Crafting Continuity and Change: Ceramic Technology of the Early Helladic Peloponnese, Greece.
Volume I

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Abstract

This thesis examines the production, distribution and consumption of ceramics from Corinthia and the Argolid in the NE Peloponnese of mainland Greece. The period of study is the Early Helladic, dating to *c*.3200-2100 B.C. with a key focus on Early Helladic I and II in particular. The material analysed comes from five primary sites with discussion of material from eight comparative sites. The examination of material from across the NE Peloponnese, and from such a large number of sites, has enabled the regional contextualization of results from each site, providing a broad perspective on the possible locations of production, and distribution of their vessels.

This research uses an integrated programme of analysis using macroscopic, microstructural (SEM) and petrographic techniques to examine the technological variability within, and between, Early Helladic ceramic assemblages. These trends are placed within the conceptual frameworks of *habitus* and *chaîne opératoire* to reconstruct the technological and consumption choices of Early Helladic people, and where possible suggest locations of ceramic production. This work has identified widespread production and movement of ceramics, with production taking place within close proximity to all the sites examined. It has also identified key centres of production located at Ancient Corinth, particularly associated with the production of fine tablewares with dark slips, and in the area of the Talioti Valley associated with the fruitstand form in particular. In addition, this research has also found early evidence for the production and distribution of ceramics from the island of Aegina from EHI onwards, adding much needed detail to the picture of early Aeginitan pottery production.

The results of this work have highlighted the deeper level of understanding that can been gained about Early Helladic ceramics when they are examined on a regional level, from a period-specific, 'bottom-up' perspective.

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"Men go abroad to wonder at the heights of mountains, at the huge waves of the sea, at the long courses of the rivers, at the vast compass of the ocean, at the circular motions of the stars, and yet they pass by themselves without wondering"

Saint Augustine of Hippo

Abbreviations

The following are abbreviations that are used throughout this thesis, listed in alphabetical order.

ARF	Argillaceous rock fragment
Al	Aluminium
BA	Bronze Age
Ca	Calcium
DEL	Delpriza
EBA	Early Bronze Age
EB (I, II, III)	Early Bronze (I, II, III)
EDS	Energy-dispersive X-ray spectroscopy
EH (I, II, III)	Early Helladic (I, II, III)
EHIIE	Early Helladic II Early
EHIID	Early Helladic II Developed
EMP	Electron microprobe
EPI	Epidavros Apollon Maleatas
Fe	Iron
ICP-MS	Inductively coupled plasma mass spectrometry
INAA	Instrumental neutron activation analysis
K	Potassium
KER	Keramidaki
KOR	Korakou
LBA	Late Bronze Age
LH	Late Helladic
MBA	Middle Bronze Age
Ma	*Megannuss*, unit of time equivalent to 0ne million years
MG	Macroscopic group
MH	Middle Helladic
MID	Midea
Mn	Manganese
NVAP 204	Nemea Valley Archaeological Project site 204
NW/NE	North West/North East
NVAP	Nemea Valley Archaeological Project

O-R	Oxidation-Reduction firing
PG	Petrographic group
PPL	Plane polarised light
Si	Silicon
SS	Single sample
SW/SE	South West/South East
SEM	Scanning electron microscopy
TCF	Textural concentration feature
TAL	Talioti
Ti	Titanium
TIR	Tiryns
TSO	Tsoungiza
XP	Crossed polars
XRD	X-ray diffraction

Table of Contents

List of Figures

Volume I

Chapter 1

Chapter 5

Chapter 6

Chapter 7

Volume II

Chapter 8

Chapter 9

List of Tables

Volume I

Chapter 1

Chapter 4

Chapter 7

Volume II

Chapter 8

Chapter 10

Chapter 1: Introduction

1.1 Introduction

The third millennium BC in the Aegean has received considerable attention in attempts to explain the rise of palatial centres, which emerged during the second millennium. Discussion of material culture has focused on changes in craft technology and specialization as an impetus for societal change. However, this narrative of change has been constructed at the expense of a coherent picture of the character of EBA crafting and consumption practices. In particular, the locations of ceramic production, technological practices, and patterns of interaction between communities.

As a prevalent part of the material record, ceramics have held a key position within investigations of early communities. Traditionally, analysis has relied on typological approaches to trace similarities or differences in assemblages between sites and across the landscape (Weisshaar 1983; Rutter 1995; Wiencke 2000). Whilst such work has offered valuable data on the stylistic character of different EH ceramic assemblages, it has not been able to provide certain key types of information. Specifically, typological approaches have been unable to characterise technological practices, or to provide a clear picture of consumption choices made by communities. There has also been a misleading significance attached to the presence or absence of particular vessel types or wares in relation to dating and cultural identity (cf. Rutter, 1984; Brogan, 2013; Broodbank, 2013).

During the past 20 years, petrographic work centred on EBA ceramics from Crete and the Cyclades, has revealed an unexpected complexity about the production and consumption of ceramics during this period (Whitelaw *et al* 1997; Whitelaw 2014; Nodarou 2011; Day *et* al 1997, 1998, 2006, 2010; Day and Wilson 2002; Hilditch *et al.* 2008;). Such work has exemplified how petrographic analysis can successfully address social issues through examining technological traditions, the organisation of production and patterns of cultural contact. Importantly, this research has highlighted the need to reassess our understanding of these themes in relation to the EH period of the mainland. To date, whilst there have been very detailed overviews of the prehistoric archaeology of Greece and extensive volumes dedicated to analysing the typological traits of its material culture (cf. Maran 1998; Renard 1995; Wiencke 2000; Cullen 2001; Alram-Stern 2004; Phelps 2004; Pullen 2011), there have been few analytical studies of EH ceramic material from the NE Peloponnese with the exception of a small number of notable exceptions. Most prominent amongst these are the large-scale chemical study undertaken by Michael Attas during the 1970s (*et al.* 1977, 1987; Attas 1982), and the petrographic work at Lerna (Vaughan *et al.* 1995; Betancourt and Myer 2000). Additional analysis of EH material from Lerna using laser ablation ICP-MS was undertaken by Christine Shriner during the 1990s (Shriner 1999), and there have been a handful of other published small-scale petrographic studies, including from the Berbati Valley survey (Whitbread 2011), and the site of Helike (Iliopoulos *et al.* 2011). Further afield there has been petrographic analysis published of EBA material from Thebes (Hilditch *et al.* 2008), and Aegina (Gauß and Kiriatzi 2011), however, such an approach to EBA ceramics has been the exception.

Whilst highlighting the potential of analytical studies for examining ceramic material in more detail, the overall picture presented by the results of these studies is unclear, and in some instances contradictory. This has been in part the result of methodological problems, key amongst which has been the lack of a regional perspective to contextualise the results of petrographic work, the lack of an integrated analytical methodology, as well as problems with small sample sizes and/or a lack of characterisation of the full EH ceramic repertoire. As such, our understanding of EH production and vessel movement is at best, patchy. It is particularly limited in relation to understanding what variation within ceramic assemblages means in terms of the full *chaîne opératoire* and choices employed by EH potters, and the subsequent consumption choices that communities made.

Whilst the significant results of these previous studies have added some detail to early conceptualisations of EH ceramic production, and importantly, brought into question many traditional assumptions, they have also highlighted the need for a more coherent and integrated approach to ceramic studies. There are significant gaps in our knowledge about locations of production, the technological practices that were undertaken by EH potters, and the distribution of their vessels.

1.2 Approach of this thesis

Considering the limitations of previous research on EH ceramic material, this thesis uses an integrated programme of analysis utilising typological, macroscopic fabric, microstructural (SEM) and petrographic methods to analyse a wide range of ceramic forms. Using these techniques it has three primary aims:

1. To characterise the raw materials and technological practices involved in the production of EH ceramics;
2. Where possible, to identify specific areas of production;
3. To characterise the distribution and consumption trends present during the EH period.

The data from these analytical techniques will be interpreted within a conceptual framework that uses the *chaîne opératoire* and the idea of *habitus*. These theoretical tools will be used to examine the role of choice within technological behaviour and the variability present in ceramic repertoires. It will bring into focus everyday potting and consumption practices, rather than using the traditional top-down approach. Further, the results of analysis will be contextualised through comparative analysis of a total of 13 sites, offering a regional, as well as local, understanding of production and consumption.

1.3 Scales of Approach

Much of the previous work undertaken on EH ceramics within the study area has consisted of typological description from a site-specific perspective (cf. Weisshaar 1983, 1990; Rutter 1995; Pullen 1995; Wiencke 2000). This work has increasingly included comparative discussion in relation to forms and wares present at other sites, and allowed a solid understanding of the repertoires present at site level (cf. Wiencke for a particularly detailed example of typological analysis from Lerna). However, its contribution to understanding ceramic production and consumption across the EH mainland has been limited. As a result we are left without a clear picture of interaction between communities, or the development of particular patterns of behaviour across different areas. For example, whilst there are shared typological traits such as the presence of the 'Talioti phase' (Pullen 1995: 41) or 'Talioti ware' (Whitbread *et al.* 2007: 183) in EHI assemblages, it is unclear what this signifies beyond a possible chronological marker. We do not yet know to what extent communities were autonomous, as opposed to participating in regional consumption and production networks. We also have little understanding of how these behaviours changed over time.

The need to understand community interaction has become more pronounced over the past 30 years with the rise of regional surveys which have identified previously unknown activity to the NE Peloponnese (refer to Chapter 2 for fuller discussion). These surveys have been particularly important in populating the EH landscape and providing an insight into the geographical distribution of EH activity and potential sites across the landscape, however, as yet few EH sites have been extensively excavated.

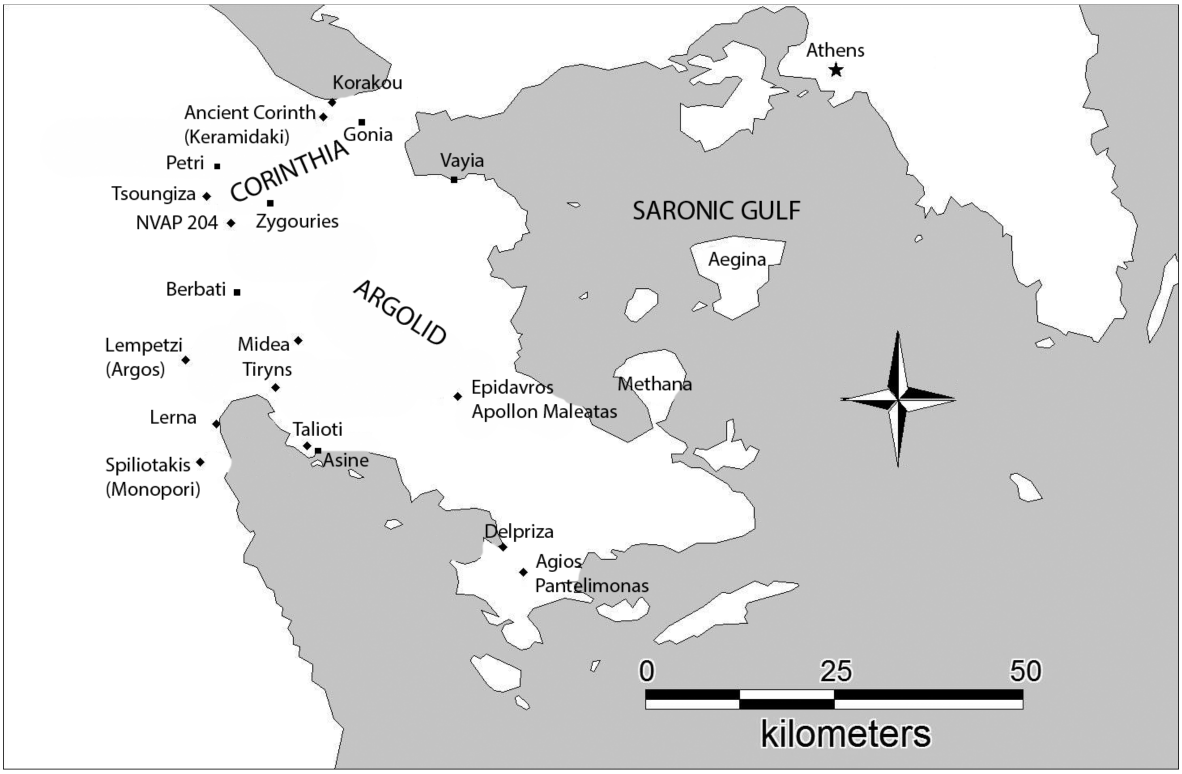


Figure 1.1: Map of EBA sites referred to in this thesis.

In order to provide a coherent characterisation of ceramic production and consumption during the EH period, this thesis has taken a multi-scalar approach from the individual site level, through to regional comparison. It will examine material from five sites within the regions of Corinthia and the Argolid: Epidavros Apollon Maleatas (referred to in the text as Epidavros), Ancient Corinth (Keramidaki), Korakou, Talioti and Tsoungiza. This will be integrated with comparative analysis of a further eight sites: Agios Pantelimonas, Delpriza, Lempetzi (Argos), Midea, Nemea Valley Archaeological Project site 204 (NVAP 204), Spiliotakis (Monopori) and Tiryns (refer to Figure 1.1 for site locations and Chapter 5 for site description). The material from Ancient Corinth (Keramidaki) and Korakou include sherds originally sampled by Michael Attas for NAA as part of his doctoral thesis (1982. Refer to Appendix I for concordance). All the samples from Korakou were from Attas' original study as these were all that remained of the EH material from the site. It should be noted that due to the size of some of the sherds it was not possible to sample all of the remaining material but 34 samples were taken. The material from Ancient Corinth (Keramidaki) includes 58 Attas samples. Additional material was chosen alongside the Attas samples to expand the range of technological variability visible from macroscopic examination of the assemblage (refer to Appendix I for concordance with Attas samples).

The primary analysis of the sites listed above has been complemented by reference to comparative thin section material from ceramics excavated at Kolonna, Aegina and held at the Fitch Laboratory in Athens, and Hellenistic assemblages from Nemea and Ancient Corinth examined by Heather Graybehl (2014).

The examination of the ceramic repertoire from a single site will provide characterisation of the forms, wares and paste recipes of the vessels consumed by the community there, and the possible locations of production for these vessels. However, the full significance of these details will not be clear unless they are placed within a wider regional context through comparison with ceramics from other sites. This will then allow discussion about distribution and the consumption choices of particular consuming sites. For example, we may find a particular fabric type present at a site, allowing for discussion about the technology, and through examination of geological maps we can begin to examine possible locations of its production. However, it is only when we are able to delineate the distribution of a fabric across multiple sites, that we can begin to infer details about the extent to which vessels moved, and spheres of interaction between different communities across the landscape. It is through contextualising ceramic trends on a regional scale that we are able to more confidently identify particular typological and paste traditions, providing information on the locations and extent of ceramic production. We are also able to discuss shared and individual consumption behaviour, and begin to consider the possible motivations behind the trends we find.

Before beginning this work, it is important to first define what is meant by the terms ‘local’, ‘regional’, ‘supra regional’, and ‘imported’. These are key terms within this research and their understanding has a significant impact on the meaning of the results presented here. Within the context of this thesis, the term local refers to the immediate area around a particular site or location. More precisely, local production at Tsoungiza and NVAP 204 refers to production within the immediate environs of these sites and the Nemea Valley; local production at Ancient Corinth and Korakou refers to production within the area surrounding these sites, including the mountain of Acrocorinth; local production at Epidavros refers to production within the immediate area surrounding the site of Epidavros; local production at Talioti refers to production within the area surrounding the site of Talioti including the Talioti Valley. The term regional will be used to describe the wider area of the NE Peloponnese unless particular regional areas are specified, such as the Argolid or Corinthia. Supra-regional is used in relation to areas that extend beyond the region of the NE Peloponnese but are not outside of Greece. Finally, the term import will be used to describe those ceramics whose area of manufacture is not the same as their find location or its immediate area.

The NE Peloponnese is one of the most intensively studied areas of mainland Greece in relation to the Bronze Age in particular, making it an ideal area in which to situate and address the questions of this thesis. The long history of research and excavation has provided an abundance of ceramic material and archaeological information with which to explore EH ceramic production and consumption. The use of such a broad range of material from across the NE Peloponnese will allow a detailed examination of distribution and consumption trends for a variety of pottery types, as well as investigation of specific technological practices and traditions. The regional perspective will allow discussion of site level consumption trends, and how these are situated within wider regional patterns of production, vessel movement and consumption behaviour.

1.4 Chronology

The chronological terminology used within this thesis and corresponding absolute dates are detailed below (refer to Table 1.1). It should be noted that more recently, Cavanagh *et al.* have re-examined EBA chronology in light of new C14 dates from the site of Kouphovouno in Laconia. They have suggested that the EH period should be divided into EHI, EHII Early, EHII Middle and EHII Late, and that the periods should be dated earlier than previously thought (2016. Refer to Figure 1.2 for their correlation). For discussion relating to Aegean-wide chronology, the terminology of EBI, EBII and EBIII will be used. When discussing periods typified by particular mainland archaeological traits such as architectural or pottery types then the relative chronological terms EHI, EHII and EHIII will be used. The material examined from each site has been correlated in terms of chronology as far as possible. However, with the exception of Tsoungiza, the primary sites examined did not often have sufficient stratigraphic detail to allow for detailed phasing to be undertaken during excavation. Therefore, the correlations discussed in Chapter 5 are based on observations from the pottery, information provided by those involved with the excavation and/or study of material, as well as details of dating discussed in published reports from the excavations.

Aegean Wide Period	**Mainland Relative Period**	**Absolute Dates B.C. (Adapted from Manning 1995)**	**Lerna Phases (Adapted from Rutter 1995)**	**Tsoungiza Phases (Adapted from Pullen 2011)**
EBI	EHI	3100/3000– 2650	Unstratified sherd material	EH I
EBII	EHII Early	2650-2350	III phase early A	EH II Initial
			III phases late A–early C	EH II Developed
			III phase late A–early B	Phase 1
			III phase late B	Phase 2
			III phase late B–early C	Phase 3
	EHII Late	2450– 2150	III phases C–D	Abandonment
EBIII	EHIII	2300/2200–2050/2000	IV	EH III

Table 1.1: Table showing the chronological phases and terminology used within this thesis.

This image has been removed due to copyright. Figure 1.2: Table taken from Cavanagh *et al.* 2016 outlining revised start dates to each of the EH phases and their correlation to Lerna (2016: 12).

1.5 Thesis Structure

The first half of the thesis is dedicated to providing an overview of previous research of the EH period and its material culture, the geological history of the study area, the archaeological background to the material under study, and the analytical and conceptual approaches being undertaken. The aim is to provide a solid background from which to contextualise the results and discussion presented in the rest of the thesis.

Chapter 2 discusses the development of EBA research and the impact it has had on our understanding of EH society, particularly the production and consumption of material culture. The chapter specifically focuses on the key paradigms and methods of analysis that have directed EH study. It then moves on to discuss EH ceramic analysis in the NE Peloponnese in more detail, presenting the current understanding of ceramic production and consumption in this area.

Chapter 3 outlines the conceptual framework used in this thesis, discussing the development of key theoretical approaches to understanding material culture and technological variability. The chapter focuses on the role of choice, socially embedded knowledge and *habitus* as key factors informing technological practices. It discusses how these themes have explanatory potential both for examining variability present within ceramic assemblages, and for moving away from the top-down interpretations that have dominated EBA ceramic research. To complement this, Chapter 4 discusses the integrated analytical programme used. It outlines the key principles of each method and the motivations for their use, referring to comparative studies that have yielded promising results in line with the aims of this thesis.

Chapter 5 details the geological history and background to the study area, with specific detail in relation to previous analysis of potential ceramic raw materials. The chapter goes on to discuss the archaeological background of each of the five key sites. It outlines their excavation history and characterises the nature of EH activity that took place to provide context to the material being examined.

Chapter 6 presents the results of macroscopic examination of the EH assemblages within this thesis. It describes the key macroscopic fabric groups that were identified according to site. It also details what technological information could be recorded for each fabric in relation to forming and surface modification practices. Further results are presented in Chapter 7 in relation to petrographic analysis. Each petrographic fabric is discussed in terms of the nature of its raw materials, potential provenance, technological practices relating to raw material processing, vessel firing and surface modification. Chapter 8 is the final results chapter and details the results of SEM analysis of a range of fabrics from each of the sites. It discusses the firing technology that was used during the production of a variety of ceramic vessels, exploring the relationship between surface modification and firing practices.

Chapter 9 brings the results presented in the previous three chapters together, discussing key findings that address the thesis aims outlined above. It focuses on specific fabric groups and vessel types that suggest key areas of production and technological practices, related to changes in consumption behaviour. Chapter 10 then summarises the key interpretations and the implications of this research, particularly discussing how the approach of this research has provided a significant and new coherent picture of ceramic production and exchange that moves away from traditional understandings centred on the rise of complex societies.

In summary, this research uses an integrated analytical approach to characterise the variability present in a number of EH ceramic assemblages in terms of everyday technological practice and choice. It examines a range of vessel types at a wide number of sites throughout the NE Peloponnese, identifying widespread production and vessel movement on a local, regional and supra regional scale, linked to the consumption of specific forms and surface modification techniques. The discussion of these results highlight new directions and approaches for EH ceramic research as well as providing a new understanding of EH ceramic production and consumption.

Chapter Two: Shaping Prehistoric Greece

2.1 Introduction

"Certainly spatial and temporal variation in human ways of life is an unequivocal fact which is manifested in the archaeological record, but, it can be argued that the particular classificatory framework developed in archaeology in order to describe and explain such variation was based on historically contingent assumptions about the nature of cultural diversity" *(Jones 1996: 64)*

This quote could be applied to many aspects of archaeological inquiry but it is particularly pertinent to the study of the Aegean BA, which has dominantly been investigated within a processual paradigmatic framework (*cf*. Renfrew 1972; Warren 1987; Branigan 1988). Within this framework, virtually every aspect of the prehistoric archaeological record has been defined in relation to palatial society (Tomkins 2004: 39; Barrett and Damilati 2004: 150-53; Georgousopoulou 2004: 207; Schoep and Tomkins 2012: 2), with emphasis being given to detecting and explaining its origin, operation and subsequent decline.

The evidence for palatial society may present us with an opportunity to investigate significant developments in BA Greek society, however, its centrality in the creation of research themes for Aegean prehistoric studies constrains our understanding of the period as a whole. By framing research using a palatial centred paradigm, the EBA has been explored in relation to what it can contribute to our understanding of the subsequent MBA and LBA; specifically its elite and their means of control. This approach has primarily characterised the EBA in relation to what it shares or lacks in comparison, perpetuating the idea that the period is a simpler prelude to the early polities and palatial systems of the MBA and LBA (also discussed by Day *et al*. 2010: 205, and Tomkins 2010 in relation to the Neolithic). Importantly, this top down approach fails to address *period specific* questions that would provide the opportunity to identify and explore distinctive archaeological characteristics of early periods (Schoep and Tomkins 2012: 12-13). A period-centred approach would provide a more solid basis from which to then examine shared features with later periods. It would also allow exploration of the more 'mundane' and 'everyday' behaviour of these communities, rather than focusing on elite populations.

The aim of this chapter is to explore the key themes, approaches and sources of evidence that have shaped our understanding of the EBA in the Aegean and the lasting impact they have had on Aegean scholarship. It will focus specifically on how such work has directed the study of the period, particularly its material culture. The detailed consideration of these prevailing themes will situate the present study within its research landscape, highlighting what it can contribute to the current narrative of EBA society.

2.2 Early Aegean Scholarship

Investigation of the Aegean can be crudely characterised as approaches before the mid 20th century, which relied on typological methodology within a culture-historical framework, and later processual methodologies of the New Archaeology, particularly after the publication of Colin Renfrew's *The Emergence of Civilisation* (1972). Both approaches have had a significant and lasting impact on the study of EBA ceramic studies.

In the late 19th and early 20th centuries formal theoretical discussion of BA Greece largely revolved around ideas of migration and diffusion. Using typological approaches, research focused on the distribution of particular artefact types as evidence of specific population groups. Typology was also used to create chronological frameworks, as such, ceramic material was taken as both cultural and chronological markers (*cf.* Blegen 1921; 1930). Commonly, distribution patterns and changes in material culture were explained as the result of invasion or contact with populations from outside Greece. Such early approaches were situated within Victorian culture-historical perspectives about the development of society, particularly 'the coming of the Greeks'. This research specifically focused on the development of the Greek language after Kretschmer first argued that suffixes with –ss- and –nth could not be satisfactorily ascribed to Greek, pointing to the existence of a pre-Hellenic language (Kretschmer 1896, cited in Haley 1928: 142). This work was catalysed by the two-part article published by Blegen and Haley which attempted to map 'pre-Hellenic' place names throughout Greece, correlating these places to known archaeological sites. In this work they concluded that the correlation was so strong that it had to be proof of a migratory or invasive population. To support this theory Blegen and Haley also highlighted the destruction layers that had been identified at numerous prehistoric sites which must have been the result of conflict with incoming groups (Haley 1928; Blegen 1928a). Many scholars continued to explain changes in the archaeological record as the result of population movement and diffusion. Such approaches became dominant paradigms for examining the development of Greek society, linking material culture types to specific, bounded groups of people. Archaeologists then traced the movement of a 'culture' through the geographical locations of specific artefact types, not only attempting to date the point at which the 'Greeks' appeared but to also establish the direction from which they had come (*cf.* Crossland 1967).

This work resulted in a research bias towards certain kinds of material culture, situated within an art-historical approach which emphasised decorated fine wares in particular (*cf.* Donovan 1961; Fahy 1964). This was accompanied by the common practice of discarding the more 'mundane' coarsewares that were assumed to be products of local subsistence-based production. This biased approach was particularly evident in discussion of 'Grey Minyan Ware' as archaeologists examined its distribution. The appearance of this 'new' pottery style, along with the presence of destruction layers on some sites such as Tiryns and Korakou, were used as evidence for a cultural break in the archaeological record. This 'break' was interpreted as 'the introduction of a new cultural strain' at the end of the MBA (Wace and Blegen 1916-1918: 189, also discussed in Blegen 1928a: 150). The argument was developed further with results from the Lerna excavations suggesting that destruction horizons should in fact be dated to the end of EHII (Caskey 1968). This change of date for the destruction layers, in addition to the striking changes in the number and types of ceramic forms and wares between EHII and EHIII, resulted in debates centred not only on the date of population movement but also the idea of multiple waves of population movement (*cf.* Crossland and birchall 1973).

2.3 A More Complex Picture of Early Bronze Age Greece?

By the early 1970s there was considerable scepticism about the validity and contribution of migratory and invasive approaches. As McNeal highlighted, archaeologists had simply projected backwards the achievements of the historic Greeks into prehistory (1972: 21). These theories had come to dominate Aegean studies with the consequence that the understanding of prehistoric Greece had stagnated. The emergent New Archaeology of this period was gaining acceptance with its avocation of objective, scientific, yet theoretically based, research. This offered frustrated Aegeanists the potential for new insights and, more importantly, the much-needed explanatory component that had been greatly lacking in their subject.

Other scholars increasingly echoed McNeal's concerns and called for research to focus on processes at work within Greece itself. This shift in approach was particularly evident in the publication of *The Emergence of Civilisation* in 1972 by Colin Renfrew, and certainly by the 1973 publication of *BA Migrations in the Aegean: Archaeological and Linguistic Problems in Greek Prehistory* (Crossland and Birchall 1973). In this Evans (1973: 25), Renfrew (1973: 263) and Chadwick (1973: 254) all questioned the validity of migration and invasion as explanatory tools 'Writing on this subject some years ago…I concluded: 'it may be that the Greeks did not come from anywhere, that in the words of Sir John Myers they were 'ever in the process of becoming'' (Renfrew 1973: 269). A point echoed 20 years later by Forsén who concluded that from her survey of 11 areas covering the Peloponnese and east-central mainland, that there was not a single period that consistently showed signs for a cultural break or evidence of invasion (1992: 258).

Within the new interpretative framework put forward in *The Emergence of Civilization,* Renfrew provided the first attempt in Aegean studies to synthesise and *explain* large-scale social changes within the BA Aegean (1972). *The Emergence* explicitly contended that theory and explanation should be central to Aegean research and to any understanding of prehistoric Greece. Significantly, it refuted migratory and invasive perspectives as not having explanatory power in themselves unless scholars explored their *effect* on a society, rather than assuming that as self-evident (Renfrew 1972: 16).

Based on Service's neo-evolutionary model for societal development (Service 1962) Renfrew focused on Middle and LBA palatial society, contending that they were one particular instance of a common process – the emergence of complex society. Stressing the spatial and temporal specificity of societal trajectories, Renfrew contended that by collating the common features of complex societies (and changes in these features over time), archaeologists would be able to formulate a generalised model of societal development. Such a model would then enable a better understanding of the process as a whole (Renfrew 1972: 3). This approach suggested a system that operated on the basis of positive feedback, whereby society was viewed as a structure with interacting sub-systems; change in one sub-system would affect another, changing the dynamics of the entire unit. Renfrew stressed that man not only influenced his environment, his environment also shaped him (1972: 13-19). As such he argued, that by looking at the developments within multiple sub-systems, and their potential interactions, archaeologists would be able to understand the operation of the system (and therefore the nature of a society) as a whole.

Within the context of the Aegean, *The Emergence* focused on the development of craft technologies and agricultural strategies as fundamental mechanisms for transforming natural and social environments. Renfrew argued that the spread of metallurgy and the development of new agricultural strategies acted as the impetuses for change and the 'progression' of Greek society towards complexity. Through examining a wide variety of evidence, Renfrew argued that shifts in cereal cultivation, accompanied by the systematic exploitation of olive and the vine, permitted higher levels of subsistence production and specialisation in particular commodities (Renfrew 1972: 280). In turn, this allowed for the accumulation of surplus that was subsequently transformed into material wealth through the development of metallurgy. Renfrew argued that the development of this technology and wealth directly led to the emergence of civilisation in the Aegean (Renfrew 1972: 308). Such wealth was seen to promote inequality which created conflict and hierarchy, resulting in the dominance of one political palatial group. This group then ultimately controlled surplus and maintained dominance and cohesion through redistribution mechanisms (Renfrew 1972: 390).

This momentous publication marked a significant shift in Aegean research, by placing emphasis on societal development as the result of processes *within* existing population groups rather than migration or invasion, whilst promoting multi-dimensional investigation. It explicitly advocated the centrality of theoretical frameworks to any investigation of BA Greek society. Importantly, it emphasised the need to look at the processes *behind* the formulation of societies in order to understand their organisation and operation. What is especially striking about the approach of *The Emergence* is that Renfrew not only examined different regions and types of artefactual evidence, from botanical remains to architecture, he also examined a wide repertoire of ceramic vessels. These included coarseware jars and pithoi, rather than focusing on particular fine wares. This holistic approach allowed Renfrew to discuss the introduction of drinking and serving assemblages which he linked to the cultivation of the vine for wine production. This stood in marked contrast to previous research which had primarily described the appearance and distribution of particular characteristic forms, such as the sauceboat, without offering an explanation beyond contact with new communities. He also attempted to examine production technology, specifically in relation to metallurgy. This was ground breaking at a time where scholarship tended to focus on the finished object rather than questioning how that object came into being.

Unfortunately, whilst *The Emergence* offered a more holistic, socially embedded and Aegean-centric approach than what had been presented before, it also suffered from some fundamental problems that have been perpetuated in much of the research that followed. These problems were primarily acute in relation to the way *The Emergence* perceived the direction of societal development and the capitalist-inspired assumptions about wealth creation, and societal differentiation. Although Renfrew had redirected people to consider a wider variety of archaeological evidence and emphasised the role of change within, rather than outside the Aegean, he had perpetuated the problem outlined by McNeal in relation to earlier scholarship. Specifically, Renfrew had projected the achievements of Mycenaean and Minoan culture backwards when examining the Neolithic and EBA in an attempt to explain societal development.

Through the application of Service's neo-evolutionist model (Service 1962), Renfrew had perpetuated the issues inherent in any evolutionary scheme - the notion that development of culture was a linear progression. There was also the assumption that specific stages of societal development shared particular cultural markers that allowed identification of a type. Such a model attempted to provide a checklist of characteristic traits to identify complexity, just as early scholars had used ceramic forms and decoration to trace change in cultures over time. However, rather than being a typology of material culture, it was a typology of societal organization. This linear typology ranged from the 'simple [Neolithic] village society' with 'primitive concepts of kinship and territory' (Renfrew 1972: 362) to the EBA chiefdom with its development of new agricultural strategies and beginnings of societal differentiation through wealth. Finally culminating with the emergence of a palatial principality with professional specialised occupations, controlled by a wealthy elite (Renfrew 1972: 362-403).

Renfrew's direct association of differentiation with social ranking failed to acknowledge the multiple levels, complexity and different meanings of identity and status an individual could hold at any one time. It did not consider the numerous social, political and economic obligations to which individuals and groups could be held and their personal negotiation of each sphere (Georgousopoulou 2004: 209). By using a fundamentally pyramid model of differentiation Renfrew proposed that status was essentially political and wealth derived, with a linear progression from peasant to chief. Importantly, the consequence of equating hierarchical structure with complexity is the creation of a divide between those societies which do not outwardly appear to contain hierarchy and are therefore 'simple', and those which have an explicit hierarchy which are seen as 'complex'. Just as the absence of a particular material type has been taken to signify the absence of a specific cultural group or chronological period, this approach suggests the absence of particular traits indicate the absence of complexity within a society.

Although the approach suffered from some criticisms (McGuire 1983, Pullen 1985, Cherry 1983) Renfrew's exceptional work fundamentally transformed the way in which the Aegean BA was examined. Research now centred on craft as a mechanism with which to understand ancient society rather than simply focusing on finished objects for their aesthetic value. This shift of research direction centred on the island of Crete in particular with palatial centres which offered potential to understand societal development. Archaeologists focused on concepts of craft specialisation, trade, and political economy to characterise the economic and political organisation of these 'complex' societies (*cf*. Cherry 1983, Brumfield and Earle 1987, Branigan 1988, Clark and Parry 1990). Within this framework, the EBII period has received considerable attention, particularly on mainland Greece where it has been perceived as having most promise for emergent complexity and evidence for striking changes within the archaeological record (Renfrew 1972: 450-451).

Discussion of the EBA mainland has centred on key 'type sites' and specific material culture, such as the House of Tiles at Lerna, presented as evidence of monumental architecture and central administration (Attas 1982: 11; Renfrew 1972. A notable exception has been Peperaki 2004). Seals have been discussed in terms of evidence for an administrative system (Weingarten 1997: 149), and fortifications and destruction horizons at Lerna and Tiryns as evidence for conflict (Attas 1982: 11; Wiencke 2000: 649). Such work has directly linked the EBII period with the comparable archaeological features of the later Middle and Late BA (Parkinson and Pullen 2014). In contrast, the earliest part of the BA has commonly been discussed as a mere continuation of the Neolithic (Renfrew 1972: 451; Attas 1982: 5-6; Cherry 1986: 31). As such, research has focused on the monumental and the exceptional, failing to characterise everyday life within EBA Greece. This focus on particular material culture types, periods and hierarchical structure has also been visible in approaches to results from regional surveys over the past 30 years.

The use of both extensive, and more recently intensive surveys, has enabled the identification of more extensive human activity across the mainland and in the NE Peloponnese in particular, which was previously understood through a handful of excavated sites such as Korakou, Zygouries, Lerna, and Asine. In Corinthia, the NVAP survey has been important for providing a chronological overview of activity in the Nemea Valley, having identified the previously unknown EH site 204 (from which comparative ceramic material was sampled. Wright *et al.* 1990), and the Eastern Korinthia Survey has explored the unusual EHII fortified site of Vayia (Tartaron *et al.* 2006). Further south in the Argolid, the Southern Argolid Survey has been particularly important in revealing an abundance of EHI activity a period which was previously poorly understood and under represented from excavated sites. The survey uncovered 26 potential EHII sites, four of which also contained EHIII material suggestive of continued activity in the area (Runnels *et al.* 1995). In addition to this, the Berbati-Limnes Survey identified 12 EHI sites and 11 dating to EHII (Wells and Runnels 1996), providing a much more active EBA landscape than was previously thought to have existed.

A significant aim of such surveys has been to reconstruct settlement organisation within a landscape and over time. This approach is exemplified by Pullen's overview of survey results from the NE Peloponnese in which the estimated site size, artefact types and the distribution of sites in relation to each other has been used to attempt to reconstruct a hierarchical settlement structure. Pullen argues that the apparent slow down in growth and abandonment of some sites in the NE Peloponnese between EHI and EHII, such as within the Fournoi Valley, indicates a shift towards settlement nucleation during EHII and the growth in status of some sites (Pullen 2011: 904; 1985: 348). Wells has also suggested a decrease in sites from the Neolithic to EHI and from EHI to EHII in the Berbati Valley may be the result of nucleation, with some settlements continuing and expanding whilst others decline and are abandoned (Wells 1994: 73). However, unlike Pullen, Wells puts forward an environmentally based explanation for this change related to erosional episodes during the EBA created by land clearance for farming (1994: 74-75).

Survey work has also commonly used the material culture recovered to reconstruct the nature, size and perceived importance of the sites they are taken to represent. For example, interpretations about the assumed organisation of production, origin and status of particular material culture recovered from the Southern Argolid Survey has been used to infer spheres of contact and site importance, as well as to reconstruct settlement hierarchy. Runnels *et al.* have used the recovery of roof tiles to suggest the presence of sizable buildings, whilst the recovery of non-flaked lithics has been taken as evidence for 'specialised' crafting activity under 'elite control' (Runnels *et al.* 1995: 141-142). In addition, macroscopic and typological interpretations about the provenance of ceramic material recovered at some sites from the survey has been used to suggest differential access and relationships with Attica and the islands of the Saronic Gulf. When put together Runnels *et al.* argue this evidence must point towards a hierarchy of settlement types within the Southern Argolid during EHII (Runnels *et al.* 1995: 141-142; Similar indicators of site hierarchy also discussed in Jameson *et al.* 1994).

Significantly, the presence and absence of these 'exotic goods' and regionally based typological parallels has been used to infer the status of identified sites, and the region of the Southern Argolid generally, the interpretation of which has been framed differently between EHI and EHII. Specifically, a general lack of parallels for the EHI pottery recovered from the survey area has been used to argue that the southern Argolid was isolated during EB1. In contrast, the presence of similar but typologically distinct EHII ceramics has been explicitly interpreted as evidence that the southern Argolid was *politically* independent from surrounding regions (Pullen 2011: 905; 1985: 355, Runnels *et al.* 1995). In contrast, Mee and Taylor's discussion of the results of the Methana survey which includes similar artefacts to that found by Runnels *et al.* (1995) is much more cautious. Whilst they also try to estimate site size, they explicitly state that it's not clear whether it's possible to link estimated site size and possible status (1997: 50)

Such work has fundamentally changed our understanding of the extent and locations of EH activity, however, it must also be acknowledged that it suffers from problems related to what constitutes a site, a lack of standardisation in project design and methodology making comparison between surveys difficult (Alcock and Cherry 2004: 3; Given 2004: 13), the common assumption that it is possible to reconstruct settlements and demography from collections of artefacts from the surface and finally, the perpetuation of hierarchical and politically derived understandings of social organisation.

Survey relies on the ability to identify and date often well-worn objects, in addition, there is the need to consider the visibility of particular periods (Davis 2004; Bintliff *et al.* 1999;). For example, early sites such as those of the

Neolithic may not be close to the surface, therefore their identification and subsequent discussion about continuity and change over time is problematic. It is also problematic to discuss settlement structure and the significance of specific artefact types from objects that are without context, and where there has not been an excavation to delimit site size or provide clear evidence about the nature of a site e.g. evidence of inhabitation. Further, where material analysis has not taken place we cannot be certain of imports or spheres of contact, therefore, interpretations of trade networks based on macroscopic and typological observations alone are precarious.

Despite these difficulties, the rise of survey over the past 30 years has provided an opportunity to gather more data about the potential locations of EH settlements and places of activity, populating the prehistoric landscape. Importantly, it has also provided an abundance of typological comparanda for a range of material culture to allow comparison of objects found in different locations. Further, it has provided great detail about the geomorphology of different landscapes examining the relationship between human activity and the environmental conditions of the past (NVAP Wright *et al.* 1990, Mee and Forbes 1997, Tartaron *et al.* 2006). Finally, such work has highlighted the potential of examining craft items to understand the nature of EBA activity, first highlighted in *The Emergence of Civilisation* (Renfrew 1972).

2.4 The Emergence of Crafting Complexity: Examining EH Ceramics

The Emergence's focus on material culture, craft specialists, and particular technological developments, combined with the New Archaeology's advocacy of the application of scientific techniques to the study of craft items, resulted in a renewed interest in the creation and movement of specific material culture types. Investigations were approached in two ways. The first was the typological comparison of artefacts perceived as associated with particular parts of the Aegean as discussed above in relation to the Southern Argolid Survey. If these objects were found elsewhere this was seen as indicative of trade (Renfrew 1972: 51). The second was the application of scientific techniques such as NAA, which analysed the raw material composition of objects which could then be linked to specific geological areas (Aspinall *et al.* 1972; Shelford *et al.* 1982; Gale and Stos-Gale 1989).

On the mainland, metallurgy and obsidian initially gained most attention as craft products that held promise for understanding trade and social differentiation through wealth. The movement and consumption patterns of obsidian were relatively easy to characterise due to its restricted number of sources, and the compositional homogeneity of the material itself (*cf.* Renfrew *et al.* 1965; Aspinall *et al.* 1972, Torrence 1986 for full discussion). Accompanying this, investigations of metallurgy centred on the assumption that metallurgy was a specialised craft in 'valuable' objects. Therefore, regions seen as controlling the circulation of metal objects, and the development of metal technology, were also seen as having a controlling influence on the accumulation of wealth and therefore power (Renfrew 1967; Branigan 1988; Broodbank 1993).

Ceramics were approached in terms of evidence for provenance and craft organisation, based within models of craft specialization and trade. Analysis primarily continued to use the typological approaches first established in Aegean scholarship, focusing on the style and shape of vessels for descriptive typologies (French 1972). Discussion centred on chronology and comparative analysis of distribution patterns, associating specific shapes and surface modifications with particular regions. Their abundance elsewhere was interpreted as evidence for trade or contact with other populations, resulting in terms such as 'Cycladicising' (Rutter 1981; Coleman 1974, 1985).

Information about production technology was derived from typological characteristics and placed within progressive models of manufacture. These models characterised production at different levels ranging from household through to centralised, gaining in complexity with each stage tying in with Renfrew's model of social complexity (*cf.* van der Leeuw 1984; Peacock 1982). Within such a framework EBA crafting was characterised as operating at household level for small scale, subsistence based consumption, with communities being relatively isolated (Cherry 1983: 33, 1986: 20). 'Unusual' or particularly 'well-made' objects were interpreted as the products of a small number of commonly unidentified specialist centres who must have possessed very specific skills and technical knowledge 'The style of the Korakou culture pottery suggests to me that the vast majority of it was produced at household level by non-specialists. A small number of more adventurous, and perhaps also more capable potters, possibly identified as specialist artisans, are attested in the later stages of the culture by the appearance of small numbers of atypical decorated vessels' (Rutter 1993: 28).

It was not until the work of Michael Attas that scientific provenance techniques were extensively applied to EBA ceramics from mainland Greece (Attas *et al.* 1977, 1987; Attas 1982), although the examination of pottery from later periods was already more common place (e.g. Farnsworth 1970; *cf.* Jones 1986 for full summary). In his initial study, Attas applied INAA to 111 ceramic EHI, II and III samples from the site of Lake Vouliagmeni in Perachora (Fossey 1969, 1977) with the aim of characterising the supply of ceramic material to the site. This investigation tested the dominant hypothesis that the majority of production in this period was local, produced on a household basis, with an increase in external contacts in EBII.

In contrast to the widely held assumption that EBII was the period of trade and contact in the Aegean as outlined in *The Emergence of Civilisation* (Renfrew 1972) and discussed above, Attas' results suggested that it was actually EBI which showed the highest percentage of regional vessel movement, primarily from the Corinthia and Argolid. Further, he found that by EBII this supply had actually diminished considerably, with Vouliagmeni appearing to rely more heavily on local production (Attas *et al.* 1977: 42). To examine the extent to which these results were characteristic of trade in the EBA generally, Attas conducted a larger provenance study. Again using INAA Attas analysed 255 samples from Keramidaki, Korakou, Phlious, Zygouries, Tiryns, Asine and Argos, in the NE Peloponnese, in addition to including his earlier work at Lake Vouliagmeni.

Based on the simple hypothesis of there being, or not being, trade between sites, Attas focused on the ceramic material of the EBII and III periods in order to contextualise and investigate the extent of the localised vessel movement he had found at Vouliagmeni. In an attempt to choose representative material for the EBII period, Attas focused primarily on EHII fineware sauceboats and small bowls, as these were commonly present in all assemblages for this period across all sites in the region. Assuming that the prevalence of these forms at all sites indicated that their production did not require specialist skill, and as such were likely to be made at each site, he would be able to assess the level of movement for such tablewares across the study area. To complement this he also tested larger, coarser objects such as pithoi, hearth rims and bricks, which, it was assumed, were either too large or fragile to make transport over great distances viable (Attas 1982: 39). To provide a rounded picture of ceramic production and distribution trends, Attas additionally examined material that was perceived to require specific skills set such as Yellow-Blue mottled ware vessels, and objects displaying zoomorphological characteristics. These objects had until this point been taken to represent the presence of a small number of specialist workshops. By tracing the movement of these goods, Attas argued he would be able to characterise the trade in 'prestige' ceramics, as well as more common household wares (Attas 1982: 39).

Like his earlier study, Attas' results presented an unexpected picture of vessel production and movement. He was firstly able to demonstrate that all EBII sites were producing the common sauceboat and small bowl forms but additionally that there was evidence for their exchange, albeit over a short distance between neighbouring sites. Further, after examining Attas' results, Pullen highlighted that a number of Attas' sites (five out of eight) were dominated by a one-way movement of vessels. This suggested that some sites may have been 'specialist' suppliers for others (Pullen 1985: 341). What was particularly striking about these results was that people were in essence exchanging vessels that they could theoretically obtain nearby, on their doorstep. This highlighted the need to question the dominant notions of trade as explanations for vessel movement. Did this movement indeed represent 'trade' or was it more socially motivated? (Pullen 1985: 341; Rutter 1993: 23).

The second striking feature that Attas' work revealed was that ladles, assumed to be simple, non-specialised objects were *not* made at all sites (1982: 381), but were in fact made at two sources; one that was not within his core reference groups, and the other at Zygouries. This intimated that not only was there evidence of 'specialised' production, but that assumptions about what constituted simple or mundane objects had been misleading when production was considered within specialisation models. Conversely, Attas' results revealed that wares that *had* been taken as specialist, i.e. Yellow-Blue mottled, were produced at a wide number of sources and, although none of the samples matched reference groups from the sites under study, he concluded that the majority were most likely within the immediate region of the NE Peloponnese (Attas 1982: 388). Additionally, Attas also found significant trends relating to the production of EHIII pattern painted wares. Previously, from a typological perspective, Dark-on-Light ware had been taken as characteristic of the northern Peloponnese of the mainland, whilst Light-on-Dark ware had been assumed to be characteristic of techniques from Boeotia and central Greece (Donovan 1961). However, Attas suggested that these two wares were in fact being produced at the same sites contemporaneously (Attas 1982: 399), a result which demonstrated the need to question assumptions underlying previous interpretations. Attas' work not only highlighted the difficulties and pitfalls of examining provenance and vessel movement on typological merits alone, but also emphasised the need to question how archaeologists had determined what should be a specialist product. The results contradicted the widely held belief that EBI was simply a continuation of the Neolithic with small-scale local production and limited vessel movement. Further, it demonstrated that ideas of what constituted specialist vs. common household production were wrong; as such the entire understanding of EH ceramic production and vessel movement was incorrect.

Attas' study unquestionably provided significant results, however, it must be acknowledged that it also contained some methodological and theoretical weaknesses. Most notable, was the inability to integrate its results into an anthropologically derived theoretical discussion, instead simply placing interpretations within functional models of trade and consumer demand. Further, as Attas himself acknowledged, there was a degree of ambiguous geological definition between possible production centres primarily due to the geological makeup of the region under study and the nature of ceramic fabric. This resulted in chemical differentiation and similarity actually being a partial reflection of the heterogeneity and homogeneity found in the geology, rather than a true characterisation of production centre locations (Attas 1982: 28). This problem was most apparent in Attas' inability to assign production centres for coarser material (Attas 1982: 392) and, as such, the analysis resulted in a simplified description of vessel movement. Significantly, Attas was unable to differentiate between multiple producers at a single site or identify production sites for samples whose chemical compositions did not fit with any of the major groups identified. His inability to include coarsewares also resulted in a narrow examination of what constituted an EH ceramic repertoire, being unable to discuss the production of the full range of EH vessel types. Importantly, investigation of ceramics by INAA alone meant that there was no exploration of the technological practices and choices involved in the production of the vessels examined. Therefore, although being a major step forward in examination of EH vessel movement Attas' work, being based solely on chemistry, was unable to characterise the full range of technological or provenance based variability present in a typical EH assemblage. However this was partially addressed in further analysis undertaken on the ceramics from Lerna.

Integrating Attas' initial work, petrographic analysis was conducted by Betancourt and Myer and published within Wiencke's extensive volume detailing the morphology and typology of the Lerna Ceramics from EHII (2000). The petrographic analysis analysed 40 EHII samples from Lerna, identifying 16 petrographic fabrics, 12 of which were assigned a local provenance. Significantly, they were able to refine some of Attas' initial results, distinguishing between different local fabrics, something Attas had not been able to achieve. Unfortunately, the small number of samples from Lerna, which did not represent the full repertoire, resulted in very limited interpretations. The work suggested widespread production in the area of Lerna, but it did not significantly add to the understanding of EH ceramic production generally or contextualise the place of Lerna within wider production and distribution networks. As Betancourt and Myer themselves stated: 'These observations furnish us with a beginning rather than a conclusion to the problems of pottery manufacture' (2000: 679).

Petrographic analysis was also undertaken on 104 EHIII samples from Lerna by Vaughan *et al.* which identified 12 fabrics (Vaughan *et al.* 1995). This was significantly lower than the number which had been identified for EHII, a striking result considering the much larger number of samples involved, and the wider range of vessel types included. Unlike the EHII study this analysis investigated both provenance *and* technology, and suggested that local producers used a variety of raw materials to produce a wide repertoire of vessels. Importantly, Vaughan *et al.* were able to demonstrate that EHIII potters used a wide range of technological practices that included clay mixing and tempering of clays, as well as refining paste recipes used to produce coarsewares in order to produce fineware forms (Vaughan *et al.* 1995: 708). This work was able to demonstrate that local EH potters made a variety of technological choices and possessed a wide range of technical knowledge, something which had largely been underestimated.

As well as a high proportion of local fabrics (*c.*50%), Vaughan *et al.* also identified regional imports, most likely from the Argolid, of both finewares and coarsewares (1995: 707). Additionally, they were also able to identify a centre of production on the island of Aegina, which explained, at least in part, why Attas had not been able to match some of his samples as he had no chemical reference group from Aegina (1995: 700). Critically, Vaughan *et al.* found that many of the possible regional imports from the mainland, and supra-regional imports from Aegina, did not display significant chronological or typological characteristics. Instead, they represented vessel types and wares that were locally available (Vaughan *et al.* 1995: 710). These results from petrographic analysis confirmed Attas' initial chemical results. They demonstrated the movement of common vessel forms whilst adding much needed detail about technological practices and the locations of centres of production. As such, it not only highlighted the level of detail that petrographic analysis could provide but it also presented the first detailed technological study of a well-defined EH ceramic assemblage, marking an important step towards understanding EH ceramic production and technological practice.

As Lerna was such a well-defined assemblage, it continued to draw interest for ceramic studies with further work conducted by Christine Shriner utilising petrography, EMPA and XRD. Unlike the previous analytical studies, Shriner examined the ceramic material from a consistently geological rather than archaeological perspective, and included sampling of geological deposits. She argued that the majority of the fabrics (95% of the sample material Shriner 1999: 59), including many of the suspected imports, did not represent different production centres. Instead, she contended that variability noted by Attas and Betancourt *et al.* could be explained by differentiation in geology along the Xerias river system resulting from a small number of potters gathering materials from different locations along the system, accompanied by an increased use of coarser more carbonate rich fabrics between Lerna III and IV (refer to Chapter 1 for relative chronology). She argued that there were in essence two raw material sources, one that was finer and more micaceous from the lower river valley, and a coarser limestone and quartzite based one from the highlands. The use of these two sources could be explained in two ways, firstly, that there were two potting groups using each source or secondly, that there was one local potting group who used both but moved diachronically towards the use of coarser fabrics, relying more on the more carbonate rich source over time (Shriner 1999: 63-64).

In the discussion of these potential explanations Shriner contended that the use of particular raw materials was directly linked to their performance characteristics. If the raw material variability reflected the presence of two groups, the use of the micaceous clay source for finer thin walled vessel types and the coarser limestone and metaquartzite fabric for thicker walled vessels could mean that 'Each population could have eventually specialized in products for which their clays were best suited.' (1999: 63). Shriner further argued that the increased use of coarse and commonly limestone-metaquartzite based fabrics from Lerna III to IV related directly to their assumed stability at low firing temperatures, suggesting an increase in the use of cooking vessels and vessels for food preparation in Lerna IV. She then went on to suggest that this in turn could indicate that Lerna changed from a trading post to a town between Lerna III and IV (1999: 65). Concluding that it was most likely that there was one group using two sources she argued that the use of each of the two clay sources, and changes in their relative coarseness and popularity over time, was again due to performance of the raw materials 'With time they learned the characteristics and advantages of each kind of clay body and came to use their raw materials for the specific purposes most suited to the clay body.' (1999: 63).

Whilst offering an unconsidered alternative perspective on the raw material variation within ceramics and emphasising the importance of considering the natural variation present in the local geology, Shriner's work failed to acknowledge or account for the role of choice in raw material variability beyond functional performance considerations. This is most evident in her direct association of changes in raw materials and their perceived performance characteristics with no consideration of alternative explanations such as learned potting traditions. This functionally based approach is further highlighted when compared to the original interpretations of the Lerna fabrics by Vaughan *et al.* Whilst also suggesting that the micaceous fabrics may have originated from a river system such as the Xerias River, Vaughan *et al.* stressed that potters were processing coarser fabrics to produce finer vessels, and discussed the implications of this for understanding a range of technological practices and choices (1995: 106). In contrast, Shriner argued that production of finer vessels related to the use of finer clays, and that potters changed the choice of raw materials for particular vessel types after developing an understanding of their raw material properties over time. Such a perspective not only assumes a linear development of potting practice with a natural progression over time, but that potters choices were only related to the suitability of locally available raw materials for the function of the vessels they were making. As such, potters choices and motivations were limited and dictated by vessel type and use, and did not relate to their own socially embedded understanding of raw material suitability and the right way to undertake their crafting practice.

More recent petrographic analysis of EH ceramics from the Berbati Valley survey (Whitbread *et al.* 2007, Whitbread 2011), and the settlement site of Helike (Iliopoulos *et al.* 2011) has also identified a range of fabrics consistent with dominantly local production. Although the numbers and range of vessel types sampled were limited for both of these small-scale studies, they were able to make important comment on the raw materials and technological choices potters were making. Both studies identified a range of fabrics and a variety of technological choices related to raw material types, clay mixing and tempering.

Importantly, both of these analytical studies also identified a small number of fabrics that were clearly not compatible with local geology, with a distinctive volcanic fabric identified in the Berbati material from an unidentified source outside of the valley (Whitbread 2007: 184), and regional serpentinite and metamorphic imports at Helike (Iliopoulos *et al.* 2011: 140). Additionally, both of these studies also commented on the level of firing suggested by the degree of optical activity within the ceramic matrices of their fabrics, with Iliopoulos *et al.* even suggesting the use of kiln structures during this early period (2011: 140).

Although these recent studies suffer particular limitations due to their small scale, they have provided important steps forward in our understanding of the choices both potters and consumers were making. They have exemplified the contribution petrographic analysis can make to an emerging picture of EH technological practices, and vessel distribution.

2.5 What is the Picture of Mainland EBA Ceramic Production and Consumption?

'As a preliminary step, let us briefly run through what we know about the production of EH pottery, for doing so will quickly make us realize how poorly equipped we in fact are' (Rutter 1993: 19).

Although writing over 20 years ago Rutter's summation of the state of knowledge about EH ceramic production and exchange is as valid today as it was in 1993. As highlighted above, the results of Attas, Betancourt *et al.* and Vaughan *et al.'s* research emphasise the inability of typological classifications of imports to provide a true picture of vessel movement. They also highlight the misleading effects of assumptions regarding technical skill as an indicator of specialised production and complexity in craft organisation. Although Shriner emphasised the importance of natural variation in geology when considering differentiation in ceramic fabrics, she only offered functionally deterministic explanations for the production trends she identified and centred these on Lerna as a focal point of importance. The results of these key mainland studies and the lack of consensus amongst researchers, highlight the amount of work still to be done to characterise and understand EBA ceramic production and consumption, and emphasise the need for us to reassess our approaches to the study of material culture.

Significantly, whilst none of the studies could agree on the extent of local vs. non-local production, they do suggest that ceramic production in EBII does not reflect a period of increased cultural contact as previously argued (*cf.* Renfrew 1972). They also highlight that framing EH ceramic production in terms of specialised vs. non-specialised may not provide a coherent picture that truly reflects the nuances and choices that were present in the period. Instead, such an approach only provides an insight into a narrow aspect of ceramic production. More recent prehistoric ceramic research has established the success that can be achieved through an integrated approach. Specifically, an approach that examines the choices involved in both the *chaîne opératoire* of production and distribution patterns. This work has demonstrated that it is possible to gain an insight into the meaning of production and consumption practices outside of economic and functionally deterministic concepts (Hilditch 2014; Kiriatzi *et al.* 1997, 2011; Day *et al.* 1997, 1998, 2010; Hilditch *et al.* 2008).

2.6 The Emergence of Choice: New Approaches to Craft

'There is more to the meaning of technology than its acting as an organizing principle for metaphorically comprehending and living in the world' (Dobres, 2000: 16).

Understandings of the creation and consumption of material culture, and the relationship of craft to society, have been extensively re-evaluated during the last thirty years. This has been particularly evident with the development of post-processual paradigms of understanding societal processes which have placed explanatory power with the role of the human agency and choice. Within such a framework there has been a marked epistemological shift toward the explicit acknowledgement and investigation of the 'situatedness of knowledge' (Dobres 2000: 12). This approach has emphasised the biasing role of culturally constituted knowledge in the formulation of both our own understanding of the past, and of past approaches to the creation, consumption and manipulation of material culture. The main protagonists of this perspective argue that archaeological attempts to understand technology have been placed within pragmatic, capitalist models. Such models have placed emphasis on the organisation of production and technology in relation to functionalist scales of economic management, such as those used to explore material culture changes of the Aegean BA. Within such a framework, they contend that archaeologists primarily conceptualise technology as a universal trait from which we can investigate evolutionary complexity, be that physical, societal, or political (Dobres 2000; Lemonnier 2002), failing to acknowledge its role as an arena for the interplay of both the social and the material.

Material culture theorists have argued that to understand technology fully, is to acknowledge it as a socially constituted set of technical behaviours, informed by cultural ideologies relating to the appropriate way to produce and consume an item (for full theoretical discussion refer to Chapter 3). In line with this shift, archaeologists researching the material culture of the prehistoric Aegean have attempted to move away from placing finished objects within rarefied models of production and trade related to emergent complexity associated with palatial society. Instead, they have begun to explore the processes behind technological innovation and development, applying a period specific research framework that moves away from traditional economic models solely based around specialisation. From such a perspective, Aegean archaeologists have found an unexpected complexity to the production and consumption of prehistoric craft items (Tomkins 2002, 2004; Carter 2007; Nakou 2007; Day *et al*, 1997, 1998, 2010; Hilditch *et al*. 2008; Doonan *et al*. 2007).

The strengths of such an integrated approach, which focuses on the socially embedded nature of ceramic technology, are particularly highlighted in the work of Nodarou and co-workers (Nodarou 2011). Examining EBA ceramics on Crete using a combination of analytical techniques including petrography, they explored the distinct stylistic differences between Minoan and Helladic ceramic types found on the island. This analysis revealed that the Helladic-style ceramics were produced in West Crete rather than representing imports, with typological elements of the vessels representing different *technological choices* as a manifestation of particular identities. As such, Nodarou concluded that different parts of Crete were participating in different networks and systems of value within the EMII period, creating the ceramic variation that had been observed (2011: 90-91).

Similarly, Hilditch *et al.* (2008) examined EHII ceramics from Thebes, assessing the relationship between typological characteristics and production practices. The typology of the assemblage suggested the existence of Anatolian vessels alongside Helladic examples, which had traditionally been used as evidence for migration or invasion. However, this integrated analytical study using petrographic, chemical and typological techniques revealed that although the ceramic assemblage contained vessels with 'Anatolianising' stylistic features, many of these vessels were actually made using existing local fabrics and technological practices. These results indicate that local potters actually incorporated new elements within existing traditional practices, choosing specific drinking and tableware shapes associated with Anatolian dining practices and adapting them within a local context. As such, the presence of these vessels does not lend support to the traditional ideas of invasion or migration but instead highlight the need to contextualise ceramic assemblages and technological practices within both local and regional contexts (Hilditch *et al.* 2008: 267-268). Such results also exemplify the ways in which analytical studies can add much needed meaning to the typological trends identified within assemblages, and that such meaning is not necessarily best understood in economic terms.

2.7 Early Helladic Choice and Practice

The success of such studies has lain with the integration of different analytical techniques, complemented by appropriate theoretical frameworks (more fully discussed in Chapter 3). Significantly, at the heart of these studies has been the acknowledgment that choice plays a central role in the production and consumption of EBA ceramics. Surprisingly, whilst this work has highlighted the exciting possibilities for understanding the creation and role of ceramic material culture within these societies, mainland scholars have been slow to adopt such approaches on a large scale.

Instead, EH research has continued to rely heavily on typological approaches and examination of EBA crafting using a top down perspective. Work has also continued to be based around political economy and specialisation, under the assumption that these concepts are most useful for examination of the BA as a whole (*cf.* Parkinson and Pullen 2014). Such work has illuminated some interesting parallels between earlier and later periods but it has failed to provide an adequate explanation for the widespread changes evident in all aspects of the EH material record, particularly ceramics. Whilst typologies are undoubtedly a very useful organisational and descriptive tool, allowing for broad comparisons between assemblages, they hold little explanatory power. As an approach solely reliant on categorising and describing the visual characteristics of vessels, they are unable to provide us with information about the actual mechanisms for the production and consumption of the material being categorised. They cannot develop our understanding of the motivations for particular production or consumption activities without being complimented by other analytical techniques. Further, whilst the variation present in EH material culture clearly indicates a shift in the everyday choices and ways of 'doing' for mainland communities, the tendency for research to focus on the concept of complexity has resulted in particular biases. Significantly, there has been a disproportionate preoccupation with those sites, periods and categories of material culture that appear to display the hallmarks of later periods. Such an approach has resulted in characterisation of the exceptional rather than the norm. Nowhere is this more evident than in the contradictory and incomplete picture of ceramic production and consumption presented by the key analytical studies discussed in this chapter.

2.8 Summary

The overview of Aegean research within this chapter has highlighted how the development of particular paradigms has directed the analysis and understanding of the ceramic material culture, and the EBA as a period generally. The emphasis placed on complexity and production organisation, has left us with a conflicting and incomplete picture of EH ceramic craft and consumption practices that largely ignores the role of choice. Using the conceptual approaches and analytical methodology outlined in the following two chapters this thesis will build on, and add detail to, current understandings of ceramic production and consumption. This will provide a coherent picture of everyday crafting practices, the location and interaction between potting communities, and explore the motivations behind the choices they made.

Chapter 3: Conceptual Approaches To Material Culture

3.1 Introduction

The study of material culture is fundamentally the study of the physical remains of human action (Sackett 1990: 32). The abundance and variety of material culture recovered by archaeologists testify to its use in virtually all aspects of daily life; from the architectural remains of where people lived, to the ceramic fragments of vessels used to prepare and consume food. Therefore, questions about material culture necessarily relate to questions about the behaviour of people and the activities in which they took part (Schiffer 2011: 4-5).

To understand these activities using the material remains left behind requires us to consider two fundamental questions. Firstly, what are the processes that have enabled and influenced the production and consumption of material culture? Secondly, what role does the creation and consumption of that material culture play within a social group, be it a small community or a large-scale society (Dietler and Herbich 1998: 234)? For the archaeologist faced with the fragmented remains of activities performed long ago, it is impossible to answer these questions with true certainty, nor should we expect to (Hill 1994: 85). However, it is possible for us to explore what potential explanatory power different investigative strategies have, and to identify those areas of research that may further our understanding of these possibilities.

A key approach in understanding the role of material culture within a society is the examination of the character and degree of variability present in assemblages, both spatially and temporally, questioning why particular patterns exist. As discussed in Chapter 2, artefact variability in the Aegean has been characterised primarily in an attempt to manage, and make sense of, assemblages through the formation of typological classifications. The distribution of these typological groups has been examined and explained using models relating to large-scale economic and politically structuralist paradigms.

However, if we consider material culture as the remains of past actions, then variability within material culture is most appropriately examined as an indication of a variety of individual and group behaviours, of different ways of making and using material culture. To explore that behaviour we need to begin by examining the process of material culture production and the patterns of its consumption. From understanding these processes we can begin to explore the role of these activities within wider contexts of societal organisation. Through examining the creation and consumption of cultural objects we are able to use the tangible, physical aspects of material remains, to examine the more intangible aspects of their creation and use. As Whitbread so eloquently states, whilst we cannot say exactly what a potter thought about the vessels they made, we are able to look at the processes they used to understand the way they thought about them (2001a: 449), examining the potential meaning behind particular production behaviours. For such an approach to be successful, it is essential that we employ an appropriate methodology that uses empirical techniques to record the physical characteristics of material culture. This needs to be complemented by a conceptual framework that emphasizes the role of human agency and decision-making. Finally, it is fundamental that such an approach accounts for the historical, and social contextual factors within which production and consumption activities took place (Schiffer 2011: 22-23).

The purpose of this chapter is to discuss the range of conceptual approaches that archaeologists have employed in our attempt to understand the creation and consumption of material culture. Following the examples of Dietler and Herbich (1998), and Lemonnier (1986; 2002) amongst others (Mauss 2009 [1934]; Leroi-Gourhan 1971 [1943]), this chapter will highlight the advantages of a conceptual framework that encompasses sociologically, ethnographically and anthropologically derived understandings of the processes of production and consumption. By combining the idea of *habitus* and the holistic approach offered by the *chaîne opératoire* it is possible to develop a conceptual methodology that offers a link between the top-down structural perspectives commonly employed to investigate material culture of the Aegean EBA, and those of smaller scale, agency-centred research which offer the potential to examine the everyday activities of a population (Dietler and Herbich 1998).

3.2 Characterising Material Culture

The production and consumption of material culture has been a key point of interest within archaeology since the 19th century, being used to investigate themes such as ideology, identity, and socio-political/economic organisation. However, for a long time its study was largely the study of objects and patterns, rather than techniques and processes (Dietler and Herbich 1998: 239; Lemonnier 2002: 2). Technological development, innovation and consumption practices have been primarily considered in terms of necessity, in line with White's widely quoted assertion that culture is an 'extrasomatic means of adaptation' (White 1959: 8). An idea which was developed further in Binford's widely quote 1965 paper discussing the definition of a culture (Binford 1965: 205). Within this framework, technology has been seen as the means by which that adaptation is facilitated (Pfaffenberger 1992: 495), whilst consumption has been primarily related to ideas of cultural identity and modern concepts of commoditisation and wealth.

Whilst it is not within the scope of this thesis to detail the history of material culture studies as a whole, there are key approaches that have been developed, particularly in relation to the study of prehistoric ceramics, which are pertinent to understanding the approach put forward by this thesis. These themes can be broadly categorised as: 1. the aesthetics of objects; 2. the function of objects; 3. the effects of objects and technology (Dietler and Herbich 1998: 237; Lemonnier 2002: 2).

3.3 Aesthetic Value

Placed within a culture-historical framework, the aesthetic characteristics of ceramics have been explored through the concept of style defined as the formal variability (such as decoration) within a ceramic assemblage. Traditionally, assemblages were initially examined to form typologically based chronologies, primarily used to explain ideas associated with diffusion and migration (Conkey 1990: 8, discussed in Chapter 2). With the advent of the New Archaeology, style was viewed as non-functional variability conceptualised as a normative form of culturally significant data. It was argued that socially specific codes were embedded in stylistic design, which could be read by the archaeologist (Wobst 1977). Whilst still maintaining a descriptive typological approach, stylistic variability became increasingly characterized as relating to specific cultural group identity, or particular stages in the development of social systems. By understanding style, archaeologists argued, these group identities and social systems could be understood, placing emphasis on the examination of patterning within material culture (Sackett 1990: 33; Conkey and Hastorf 1990: 2).

Developing ideas around the role of style within society, archaeologists considered it as a discursive mechanism, whereby groups chose stylistic attributes to communicate cultural information. As the concept of style was broadened, archaeologists began to look in more detail at the social processes behind it. They specifically contemplated the role of the producer and consumer in the process of communication, explicitly concerning how material culture was created and received (Plog 1980; Hodder 1982; Wiessner 1983). Within the study of EBA ceramics from mainland Greece the early culture-historical stylistic approach was typified by the debate over the presence of Grey Minyan Ware as an indication of migration (*cf*. Crossland *et al*. 1973). Whilst such ideas are no longer in fashion, the examination of the aesthetic elements of artefacts has continued in the Aegean, particularly for ceramic material in relation to typological chronologies and discussions based around ideas of contact and diffusion (Rutter 1981, 1982; Haggis 1997; Cazzella *et al*. 2007; Psaraki 2007).

As discussed in Chapter 2, typologies offer the archaeologist a useful mechanism through which to organise and comprehend homogeneity and heterogeneity within an artefact assemblage (Arnold 1985: 1). They allow broad comparisons between assemblages, and a general consideration of artefact distribution. However, they tell us very little about the actual mechanisms or motivations involved in production and consumption practices. Being a descriptive approach, they hold little explanatory power, being unable to develop our understanding of the motivations for particular production or consumption activities other than as a result of diffusion or as a mechanism for culturally specific discursive exchange. Further, relying on the distribution of typological series for understanding chronological frameworks or the boundaries of particular groups, leads us to the particularly naive assumption that the absence of certain typological groups reflects the absence of their associated periods or cultural groups. Such assumptions have resulted in significant gaps in our understanding of different periods, geographical areas and communities. Nowhere is this more apparent than in the continued discussions around the 'Cycladic Gap' whereby Jeremy Rutter highlighted an apparent cultural gap at the end of EBIII, suggested by the lack of material dating to that period (Rutter 1983, 1984). Whilst more recent archaeological work in the Cyclades and surrounding area has brought to light evidence of material that begins to close this gap, a gap still exists. This gap in our knowledge should act as a continual warning about relying on the assumption that the distribution of particular material culture types reflects the presence of specific chronological phases or cultural groups. This is especially problematic when our evidence base derives from a narrow range of archaeological excavations/contexts such as the domination of burial evidence in the Cyclades, or discontinuities in stratigraphical sequences (*cf.* Brogan 2013; Rutter 2013; Kouka 2013 for more recent discussion of the 'Cycladic Gap').

If the significance of material culture is considered in terms of style alone, then social aspects of technology become reduced to details about shape or decoration. Such an approach has the effect of separating objects from the actual processes that brought them into being, and the meaning behind specific technological practices (Lemonnier 2002: 2). Whilst many have argued that the stylistic approach aims to understand the social context of material culture (Hodder 1982, 1990; Wiessner 1984), it often reduces those producing material culture to automaton participants in a shared social system which dictates the way in which material culture is produced. This does not allow for the consideration of choice, through acknowledging that producers are involved in a dynamic process of creation, negotiation and innovation. It ignores the role of cognition on behalf of the producer in relation to different motivations for the way in which they create material culture, and of the consumer in relation to the different choices of object open to them. Importantly such an approach has the added consequence of leading to a research bias towards highly stylized material culture. This is particularly true for Aegean ceramics where emphasis has been placed on highly decorated ceramic vessels, implicitly assuming that undecorated ceramic vessels have no social significance. Whilst there is significant ethnographic evidence to suggest that style can be related to discursive processes with social and cultural meanings such as group identity (Bowser 2000), these meanings are not only related to highly stylized objects, nor are they negotiated or expressed through style alone (Gosselain 2000: 189).

A more valuable approach to style has been the attempt to broaden its definition beyond formal, 'non-functional', material attributes to include the concept of technological or technical style (Lechtman 1977; Hegmon 1998; Gosselain 1998). Accompanied by developments in technological theory (Lemonnier 1986; 1992; 2012), investigations of style have increasingly included ideas about technological behaviours and how they have culturally specific styles of their own. Whilst still based on ideas about transmitting normative cultural information, such work has highlighted the potential of style, as a characteristic of socially embedded technological behaviour. Technological style then can be used to inform archaeologists about the social contexts in which material culture was produced, as well as the groups involved in its creation (*cf.* Eckert 2008). This explanatory potential has been highlighted in the Aegean (Day *et al.* 1997; Nikolakopoulou 2009; Nodarou 2011). Utilising traditional concepts of style, alongside examination of specific technological practices in the creation of ceramic material culture, these authors have been able to expand understandings of the cultural identity and interaction on Crete and Thera.

By broadening the concept of style to include technical behaviour, archaeologists have the opportunity to move beyond adaptationist and essentially culture-historical perspectives. It facilitates questions about why craftspeople take different approaches to the objects they create, and views creation as a dynamic process where the world of the material and that of the social are negotiated. In this way, archaeologists are able to contemplate the role of agency and choice within the creation of material culture, by acknowledging that the production and consumption of objects are not simply a function of adaptation to external forces or a passive reflection of cultural identity. When the fundamental roles of choice and cognition of producers, and consumers, of material culture is explicitly acknowledged, broader conceptualisations of style offer a promising tool with which to understand artefact variability.

3.4 Functional Considerations

The second theme to dominate material culture studies, has been the idea of function. Function has been one of the few areas that archaeologists have explicitly examined technological aspects of material culture production. Much of this work has aimed to investigate and describe raw materials and artefact functionality, examining the mechanical performance characteristics of particular objects (Skibo *et al.* 1989; Schiffer 1990; Yiouni 1996; Kilikoglou *et al.* 1998; Tite and Kilikoglou 2002). For example, in addition to a frequent interest in the use function of ceramic vessels ascertained from their form (Tenwolde 1992; Tomkins 2007), much work has focused on investigation of the raw materials used to produce cooking pots in particular, examining the different properties of temper and clay types, and assessing their suitability for exposure to heat (West 1992; Tite *et al.* 2001).

Much of this work with a few notable exceptions (*cf.* Muller *et al.* 2014), consider the functional and environmental context of material culture, stressing the physical performance characteristics as the primary factor for determining the way in which material culture is produced (Bronitsky 1986). From such a techno-functional perspective, the actions of the craftsperson are viewed as limited by the materials with which they have to work, and the use-function of the objects they have to produce. Rather than socially considered choices, craftspeople are in essence forced to undertake specific activities, using specific resources, due to both the physical nature of the raw materials available to them and the demands of the consumer in relation to how they intend to use the object. Whilst these are undoubtedly considerations within production it is important not to overemphasise them. If too much emphasis is placed on performance characteristics and function then we enforce constraints on the choices of the craftsperson. In turn, this limitation leaves little room for craftspeople to incorporate or express any form of social identity or meaning in their work, and ignores the inherently social context of these activities (Gosselain 1998: 80).

Undoubtedly, the character of the raw materials available to a craftsperson, as well as the nature of the object they are making, are important considerations in understanding the process of production (Berg 2007: 236). In order to create a successful vessel, a potter has to consider the qualities of the clay they use, their forming techniques, and the vessel they intend to produce. For example, if a clay is too wet, then it will not hold its shape during forming but we should be cautious of mistaking functional considerations with intentional choice and action (Dietler and Herbich 1998: 247). Whilst a potter may need to think about the workability of a clay we must consider that there may be a wide variety of functionally suitable clays available to them, as well as numerous ways of manipulating clays to make them more workable, such as adding temper. The significance is why a potter chooses a specific clay or technological practice over another, and why potters within the same area with access to the same raw materials will make different choices. Such behaviour, whilst possibly related to functional considerations, cannot be solely defined in these terms and instead must be related to a potter's broader perceptions of how to make a ceramic vessel (Berg 2007: 236).

Reducing all technological activity simply to a suite of tools and physical processes, bounded by specific material restrictions, is a very narrow perspective. It offers little to our understanding of the social context in which these activities take place. If technical acts are only considered as functionally determined behaviours, dictated by universal laws of science, then how can we explain the use of raw materials that do not offer optimal performance characteristics? How do we explain variability in the tools and technical acts undertaken to produce the same types of objects? Further, whilst offering an interesting avenue of research, we must question the appropriateness of focusing on performance characteristics of objects for which we assume a particular function and use, as a means of explanation (Gosselain 1998: 80).

Functional and performance considerations will have necessarily played a part in the choices that potters made, and research attempting to characterize these traits offers us additional and important interpretative possibilities. However, it is important to be cautious when making interpretations based on functional considerations, that they do not become deterministic. Approaches which concentrate on performance characteristics as a primary, or sole means of explanation for technological behaviour serve to reinforce a false separation of technical considerations from stylistic ones, the former related to functionality and the latter to some form of social discourse. It is also necessary to consider how the function of an object may be re-contextualised beyond our own understanding of use. Objects can be assigned different functions dependent on the social context of their use which may change multiple times during its use life (Kopytoff 1990; Philbert and Jourdan 1996). By assigning function to objects when we do not have a clear understanding of their context of use, we risk only learning about our own ideas of function, and not that of the community who produced and consumed these items. Exploring use and function of objects offers an interesting research avenue for understanding material culture and its place within a society, however, we must bear in mind that our interpretations are but one of many possibilities and not a scientific fact.

A more productive approach to function would be to consider not only what an object's function is as perceived from a purely material perspective, but to also consider its social function (Skibo 1992: 34). For example a cooking pot will indeed need to perform in accordance to its use for heating food. However, it may also have a socially derived function associated with its use to prepare food for something like feasting activities, or those associated with culturally specific cooking practices. As such the understandings about the technology of its production and the mechanisms of its consumption have to be considered in a holistic manner, that considers an object's role in both mechanical and social terms.

We must also remember that craftspeople do not act in accordance with our analytical understandings of material properties (Arnold 2000: 354). Their technical behaviour is characteristic of their own understandings of what raw materials should be used to create an object and what processes they should undertake in this process of creation. For example, Day's work on Crete (2004) looking at traditional potting communities found that technological variability and continuity was due to the movement of potters to different areas through marriage. He found that although potters were faced with different geological sources when they moved, they still chose clays and temper that appeared familiar to them based upon attributes such as colour. This resulted in changes to the quality of the vessels they produced as the raw materials did not respond in the same way as those the potters had previously been taught to use. However, their understandings of how to make their vessels had been framed within specific traditional learnt behaviours and not about materialistic understandings of raw material performance characteristics. Such ethnographic work acts as a warning; if these vessels had been excavated, a purely functional perspective would assume that they had been produced by poorly skilled potters, and would not account for the learning activity and mobility detected in Day's study. In this context, a functional perspective would negate an understanding of the social conditions influencing modern Greek ceramic production. Whilst it is impossible to have such in depth detail and understanding from examining archaeological material, work such as Day's offers us an additional explanatory possibility.

3.5 Cause and Effect: Production, Consumption and Social Complexity

As discussed in Chapter 2, since the publication of *The Emergence of Civilisation* (Renfrew 1972), Aegean archaeologists have focused on the *effects* of material culture production and consumption in particular, specifically relating them to the concept of emergent social complexity. This has been accompanied by a wider archaeological and anthropological interest in the concept of specialised production and, often associated, conspicuous consumption. Viewed as fundamental to the development of socio-economic and political complexity, examination of specialisation and complex societies has focused on specific aspects of material culture variability as signifiers of different modes of production. These have then been associated with different stages of economic and political development (Brumfield and Earle 1987; Parkinson and Pullen 2014). Much work has centred on ceramic material culture in particular and the concept of standardisation as a gauge of specialised production (cf. Vitelli 1984, 1995; Perlès & Vitelli 1999).

Standardisation refers to 'decreasing levels of formal and material variability' within an assemblage (Hilditch 2014: 25). The degree of standardisation is assumed to reflect the intensity, and organisation, of production (Roux 2008: 768). Standardisation is assessed through the recording of several data primarily related to finished items of material culture. These data are concerned with composition, such as variability within raw materials, and those features relating to appearance, such as variability within formal stylistic attributes (Arnold 1991; Roux 2003). If standardisation is low and variability is high, production is assumed to be unspecialised, undertaken by a wide variety of individual producers, in a largely unorganized fashion. This is commonly associated with a particular mode of organisation referred to as 'household' production (Arnold 1991: 365; van der Leeuw 1977), regarded as part-time, and playing a secondary economic role within society. In this case, vessels are primarily for consumption by those within the household or by their immediate community through the mechanism of exchange (Peacock 1982: 8; Costin 1991). As the degree of standardisation increases the number of people directly involved in production is assumed to decrease, and control of production becomes more centralised. In addition, the distribution of products is seen to increase as production and movement of vessels becomes more organized and market orientated.

Associated with this model are particular ideas about the amount of time, level of skill, efficiency, and social factors conditioning production. Unspecialised household production is considered as a seasonal activity, playing a secondary economic role to agricultural practices, as such its scale and location are determined by subsistence, need-related strategies. In contrast, specialised production is identified as being an increasingly skilled, full-time, economic activity. As a full-time intensive occupation, specialised craftspeople have the resources to focus their skills, developing routinized motor habits resulting in standardised practices. Their focus is on efficiency to ensure they maintain their economic viability. Location is primarily in relation to sources of income, be that markets or those sponsoring the production. The latter are often deemed to be specific economic or political elites who conspicuously control or direct production and consumption to establish and legitimate their position (Costin 1991).

Placing our understanding of production and consumption within the framework of specialisation has created some fundamental issues about the way we are able to approach the study of material culture creation and consumption. Primary amongst these is the assumption that the development of production, and its organisation, occurs in a monolithic linear fashion with specialisation being an inevitability (Hilditch 2014: 25). To accompany this, the development of production and consumption of material culture is seen to directly correlate to the development of social complexity. As social organisation becomes more structured so too does the production of its material culture, each structure being taken as a reflection of the other. By defining specialisation as an indicator of complex society and defining complex society as something that includes specialisation, leads us to the circular question of which came first. Does increased specialisation facilitate the differentiation and emergence of elites as they are able to conspicuously consume what are perceived as more valuable objects? Or does elite influence over production in the form of organisation and sponsorship lead to specialisation?

As several authors have argued, there are multiple factors affecting the data we use to assess specialisation and its relationship to modes of production (Arnold 1991: Rice 1981; Costin 1991; Clark and Parry 1990). They stress that these should be seen as dynamic, rather than a rigid set of relational data. Further, they suggest that we need to be particularly considerate of the specific contextual factors influencing production and consumption. This has been echoed by Day *et al.* (1997; 2010) in relation to the use of the concept of specialisation within the Aegean EBA where we have little evidence of primary production.

As specialised production is seen to involve a higher degree of skill and is dominantly associated with objects of a 'higher quality', the concept assigns inherent value to the objects being produced. This fails to consider how else value may have been assigned to an object, or indeed how value was perceived or measured by those producing and consuming these items. As such, we need to be cautious about applying our modern day ideas of value and question the appropriateness of applying concepts of complexity. By using the term 'complex' we are inherently opposing it to the concept of simplicity. If specialised production is a fundamental aspect of complex society then its absence must equally represent a simple social structure and organisation of production. Such an assumption fails to recognize the complexity involved with many forms of organisational structure and the negotiation of particular obligations and expectations. For example a kinship group may not be viewed as a complex organisational structure, however, kinship is a complicated web of relationships based around particular allegiances (Day *et al.* 2010; Georgousopoulou 2004).

Many of the criticisms of this approach, stem from the assumptions made by models of specialisation and the continued inherent association with modes of production. For example, the widespread use of standardisation as an indicator of specialised production does not account for the social significance of an object's appearance. It may be that in the community consuming particular ceramic vessels, individuality is 'valued' more than standardisation (Costin 1991: 34). To address some of the problems of this model various researchers have attempted to broaden the definition of craft specialisation. For example, Clark and Parry argue that it is simply the modification of raw materials with the explicit intention of producing objects (1990: 295) and that consumers are outside of the production household (1990: 297). By broadening the definition, they account for the production of different objects using similar raw materials ranging from highly decorated ceramic vessels to cooking pots. Both require similar raw materials, tools and facilities but require different 'specialist' knowledge.

Their definition also allows for specialisation to be examined outside of market economies, as they assign value in terms of social gain. Using traditional ideas of style as a marker of cultural messaging, they argue that through owning and controlling the production of these social messages people gain status. However, it could be argued that their definition goes to the extreme of being too broad, which may not be able to detect different nuances in production strategies. In addition, it relies on the traditional ideas of style being a reflection of cultural messages, and the association of specialised production with economic or elite influence (1990: 297).

Analytical work over the last 20 years by Wilson and Day (1994) and Day *et al.'s* (1997) has questioned the way in which the concept of specialisation has been applied to EBA ceramics, arguing for the presence of a number of ceramic specialists on Crete during the EBA. Their work has demonstrated how broadening the scope of specialisation and by separating it from the modes of production and societal organisation, specialisation can be applied in a wide variety of society types. Such work has highlighted how specialisation should not be viewed as a totality, a present or absent phenomenon. Instead, there can be several aspects of material culture creation and use that indicate a more standardised approach to production and organisation but do not mean specialisation or the presence of particular organisations. For example, the consistent use of the same raw materials confined to a particular vessel type may indicate a specialised product, or simply a technological tradition. This does not necessarily mean that producers of these vessels only make this type or that they are based within a particular economic or political system. It may simply indicate that there is a specific approach to the making of particular vessels, the meaning of which could relate to a wide variety of social factors and learnt practice.

3.6 Cognition in Technology and Consumption

Functional and performance considerations, and the political and economic context of technology and consumption, are important in understanding some features of production and consumption behaviour. However, considered in isolation these themes offer little explanatory power for key aspects of artefact creation, movement and use. For example, they cannot adequately explain innovation or indeed technological variation; if all cooking pots have an ideal clay, an ideal temper and an ideal form, then why do we find differences in these features both *within* and *between* social groups and landscapes? Furthermore, these functional perspectives cannot explain the formation or dynamics of the political and economic conditions said to be controlling technological and consumption behaviour. Nor can they explain the way in which these relationships have been created and maintained. Instead, technological determinism makes the assumption that if a society shares particular technological traits they, therefore, also share the same developmental path resulting in the same economic, administrative and political organisational principles (Pfaffenberger 1992: 510).

To explore these themes more successfully, we should not consider technology and consumption in static, descriptive, and deterministic terms but rather as a dynamic process. We need to recognise that there is usually more than one way to do something, therefore, we should begin with asking why do some crafts people work in one way and not another? (Dobres 2000: 135; van der Leeuw 2002: 239). We also need to consider why some communities consume certain objects but not others. This becomes especially relevant where it is possible to identify different technological and consumption behaviours in close proximity to each other, amongst groups who we might assume would be within shared spheres of interaction and activity. The key to answering these questions is by considering the agency of the communities as central to all technological and consumption behaviour. As Sahlins states so concisely: 'for the greater part of human history, labour has been more significant than tools, the intelligent efforts of the producer more significant than his simple equipment' (1972: 81). We must also remember that craft and consumption activities are not undertaken in a vacuum, they are performed within different physical and social contexts, be that a specific type of natural landscape or a cultural one.

3.7 Habitus

Objects are created and used by people as a process of conceptualising the world around them (Miller 1985: 1). Whilst technology represents the point at which social and technical functions are brought together to produce an object, consumption is the point at which 'material is articulated with the symbolic, and social meanings inscribed in goods' (Philbert and Jourdan 1996: 55). Therefore, whilst technology allows us to consider the cognitive process behind production of material culture, patterns of consumption allow us to explore the role of choice on behalf of those using these objects.

There has been considerable discussion dedicated to the motivations and mechanisms of consumption both in ethnography and archaeology (Miller 1995; Hoskins 1998; Appadurai 2003 [1986]; Mee and Renard 2007), many examples of which demonstrate the complicated relationship between people and the objects they choose to use (*cf*. Appadurai volume 2003 [1986]). With this in mind, consumption should not be considered as simply an act of utilization reflecting particular tastes or identities, nor as a mode of creating wealth and inequality. Material culture plays a key part in how people express themselves and their understandings of the world. Therefore, interpretations of consumption should be placed within broader contexts of the production and reproduction of social and personal expression. Traditionally, scholars have considered the organisation of ceramic production and the movement of vessels within an economic framework. Within such a model consumption is directly related to concepts of trade, the accumulation of wealth and the creation of inequality. However, within societies such as that of the EH period, for which there is little evidence of an economic wealth system, it becomes clear that the consideration of consumption and the circulation of ceramic vessels as economic act is unsatisfactory and may be inappropriate.

The key to understanding the creation, movement and consumption of material culture in such a society, is to explore what is meant by value and consider the wide variety of ways in which value is ascribed to an object. We need to broaden what we define as consumption beyond the acquirement and use of an object. Objects are not merely part of a passive process of creation and use for functional purposes, they are assigned social (as well as economic) values by both those who make them and also by those who consume them. There is an intentionality to creation and consumption behaviour. Material culture and contexts of consumption are used to navigate the complex spheres of identity in which individuals and communities operate, expressing particular messages of belonging or otherness, and participation in a particular cultural world.

We must consider the factors influencing the creation of material culture. For an object to come into being, the craftsperson must have access to raw materials and tools, the physical capacity to form the object they intend to make, and specific knowledge about how these things fit together (Lemonnier 2002: 4). These resources, technical activities and the form of the final object are chosen by the craftsperson in line with practical considerations, but also the social norms and expectations of their community, be that of fellow craftspeople or from wider society in which they live. Technological knowledge comes not only from practical considerations about raw materials and functionality, but also from socially derived understandings of what is the most appropriate way to make an object. These understandings and associated behaviour are learnt and structured by particular value systems and ideas about the necessary activities required to undertake craft (Dobres 2000: 138). It is also important to bear in mind what constitutes technological practice. Whilst the term technology provides a useful concept for us as archaeologists to examine the creation of material culture, such practices may have been seen in wholly different terms by those who enacted them (a similar point discussed by Sterne 2003: 376).

As Mauss observed, even the simplest of physical gestures, such as walking or swimming, are shared amongst different social groups. He described these shared behaviours in terms of *habitus* whereby everyday actions were conditioned by three factors: biological/physical, psychological/cognitive and sociological/socio-cultural, the combination of which dispose people to undertake similar routinized action (Mauss 2009). Also writing about *habitus* Bourdieu explored the idea as an organising principal within a systems based approach to the structure of society (2009). For Bourdieu, *habitus* was a structuring principle in society, as shared behaviours denoted sameness and otherness, each being conditioned by particular social and economic circumstances. He put forward that those with shared *habitus* behaved in a way that, although appearing natural to them, actually denoted them as belonging to a particular social group; their life-style and concept of the world was a product of their *habitus* (2009: 166-168, 1984). Bourdieu contended that *habitus* was 'a system of lasting, transposable dispositions which, integrating past experiences, functions at every moment as a *matrix of perception, appreciations and actions*' (2009: 82-83).

Using the concept of *habitus* it becomes clear that all action needs to be considered as the result of both sub-conscious and conscious choices, guided by 'embodied subjectivity' (Sterne 2003: 370) which encourages similarity through cohesion to shared traditions, social norms and ideas of expected behaviour (Mauss 2009: 120, Bourdieu 2009: 83, Dobres 2000: 138). Further, innovation should be considered as the result of modifications in the conditions informing these choices and influencing *habitus*. Therefore, in order for any technological behaviour and item of material culture to be accepted by both producers and consumers, it must fit with both social and practical expectations. People do not simply accept a 'good idea' because it is a good idea, it must be a good idea *to them,* as exemplified in the quote from a missionary in India 'Though the Indians see daily before them the furniture and cooking utensils of the Europeans, they have never yet thought to make proper use of them. The customs prevalent among them above three thousand years ago still remain unchanged.' (Fra. Paolino de San Bartolomeo 1800: 156 cited by Thomas 1991: 1).

When considered from this perspective technology and material culture cannot be examined as simply the physical manifestation of practical knowledge about particular materials, tools and processes (Pfaffenberger 1992: 508).

Instead, technological and consumption practices should be thought of as a dynamic processes of transformation, where material considerations interact and come together with social understandings and ideas of craft, and craft objects (van der Leeuw 2000: 240). Therefore, it is not possible to disassociate the choices and the behaviour of the craftsperson, from the social expectations of their community, the materials they use and the objects they produce. Techniques cannot be studied in isolation from the human behaviour and social contexts which structure them.

3.8 But How Do We Investigate Technological Choice? - The Chaîne opératoire

Technology, as a complex, socially embedded set of cognitive and physical processes, requires a conceptual methodology that is able to use the tangible aspects of those processes, to understand the more intangible aspects of technological behaviour (Dobres 2000: 143). Technology is not simply an entity that exists separate from social life, as Sterne argues 'Technologies are socially shaped along with their meanings, functions, and…use.' (2003: 373). Technological practices act as an arena of communication where social expectations, norms and understandings of behaviour are communicated, observed and learnt. Traditions and communities of technological practice, therefore, represent shared spheres of socially informed and embedded practices and understandings (a similar point noted by Relaki 2012: 291).

As a student of Mauss, Leroi-Gourhan expanded the idea of *habitus* when examining prehistoric lithic technology, putting forward the term *chaîne opératoire,* ('operational chain'. 1971). This offers a conceptual framework for investigating the technical activities involved at each stage of an objects manufacture, considering technical action as the points at which the social and functional aspects of technology are articulated. Through examining the technological characteristics of objects using the *chaîne opératoire*, we can investigate the sequence of decisions and physical actions a craftsperson has made at each stage of production, including the raw materials they sourced, processed, and shaped into objects, how these objects were finished, to where they were distributed and eventually discarded.

There is an extensive range of ethnographic and archaeological literature emphasising the varied motivations and influences behind the choices of particular techniques of production incorporating the *chaîne opératoire* (Gosselain 2000; Dobres 2000; Lemonnier 2002: Mahias 2002; van der Leeuw 1994; 2002; Sall 2005; Hilditch 2014). Indeed, the complicated and interconnected relationship of the social and technical is exemplified in the recent work by Lemonnier in New Guinea where he observed fence building in the Baruya village. Although the community explicitly stated the fences they made were to prevent pigs from destroying their gardens, the fence itself and the technical act of constructing it were in reality a way to reaffirm particular roles, kin obligations and statuses within the group. The technical acts each person undertook, the associated tools used, and the objects produced, reminded those involved of their place in the Baruya community, and of the Baruya expectations and norms by which they must abide (2012: 21-43).

Such work highlights that by placing emphasis on the socially embedded and cognitive nature of technology, the explanatory possibilities offered by technological research are greatly expanded. It highlights the potential of the *chaîne opératoire* approach for investigating technological variability across an area and through time. It enables the exploration of the variety of technical strategies employed by crafting groups, and discussion about the choices that were open to the craftsperson, and those consuming their products. Importantly, it allows for reflection on the strategies, raw materials and techniques that were chosen, and those that were not (van der Leeuw 2002: 242). We are able to discuss levels of skill, ideas of problem solving, those aspects of a technology and consumption that appear to be static, and those that are open to change, the consequences of these choices, what is gained and what is lost. Most importantly, we can then question the cognitive foundations of these decisions, whether they can be explained solely in material/functional terms or whether there exists a deeper sociological reasoning such as reinforcing particular identities or community ties.

3.9 Summary

This chapter has highlighted the need to reassess dominant approaches to the study of material culture in order to develop new and insightful interpretative possibilities. Whilst acknowledging the value of traditional concepts, it has advocated a shift in perspective with the use of a conceptual framework emphasising cognition and choice. By considering style and function as embedded within technological ways of doing and thinking, we are able to move beyond deterministic interpretations that see the production and consumption of ceramics as passive acts. Instead, we are able to consider technological and consumption trends as particular instances of choice amongst an array of options open to both the producer, and the consumer.

By considering material culture as the physical remains of past activity we are able to explore technological processes as the points at which social and technical functions of material culture come together. In turn, patterns of consumption are not merely passive reflections of particular socio-political, economic or cultural organisations. They are evidence of particular choices linked to the way in which people understood and constructed the material world around them. To compliment this conceptual approach Chapter 4 will outline the analytical techniques that have been used to examine the ceramics within this thesis. It will specifically examine their merits, focusing on what they can contribute to addressing the aims of this thesis.

Chapter 4: The Analytical Methodology

4.1 Introduction

Having a long history of study, Aegean Bronze Age ceramics have enjoyed an almost unrivalled position amongst the various types of evidence studied by archaeologists. As already discussed, more recently emphasis has been placed on fabric analysis. Questions have focused on the social dimensions of ceramic production and consumption, such as identity and cultural transmission (Day *et al.* 1997, 2006; Kiriatzi *et al.* 1997; Berg 2007; Nodarou 2011). Research on the EBA ceramics of the Greek mainland has continued to primarily use traditional typological methods of analysis, allowing archaeologists to trace different classes of ware and vessel types spatially and diachronically, providing a solid foundation from which to conduct more in depth analysis of provenance and consumption trends (Weisshaar 1983; Wiencke 2000; Pullen 2011).

Whilst the typological approach has proved useful in allowing a broad understanding of the distribution of different assemblage types, it has some inherent challenges. Most notable is the inability to characterize technological practices or the raw materials of a vessel. Being a method for describing and recording vessel types, typological analysis is also unable to provide an insight into the mechanisms for the movement and consumption of ceramics. Instead, there is often the assumption that if a particular typological feature is missing at a site then the period or cultural phase it is taken to represent is also assumed to be missing. This assumption fails to consider not only the incomplete nature of the archaeological record, but importantly, it does not account for the different consumption choices, distribution networks and spheres of contact that the presence or absence of different wares/vessels may suggest.

The use of typological sequences to examine production has also proven to be problematic by creating a bias towards studying wares and forms that are most easily recognizable and classified. This has resulted in detailed examination and description of fine and highly decorated vessels, often assumed to be the products of the most skilled and specialized potters, with coarse wares largely ignored. The perceived lack of value assigned to coarse wares stems from the traditional idea that such undecorated and 'utilitarian' vessels would be produced locally at the majority of settlements and would be highly unlikely to move. This focus on fine and highly decorated vessels has left us with a partial understanding of the entire repertoire of vessels produced and consumed by EH communities; in essence we are only using one part of the data available to us (Peacock 1970: 385). In addition, that understanding has been further limited by framing it within *expectations* about the nature of ceramic production and vessel movement that have not been tested.

This chapter outlines an integrated methodology that builds on and expands traditional approaches, with the argument that this provides the best opportunity to gain a more representative picture of EH ceramic production and consumption. To successfully address the aims of this thesis, the investigative methodology must consider variation and similarities in technological and consumption trends as representative of choices made by communities. Ceramics are a manufactured material, brought into being, used and deposited through human actions. These actions are the result of a series of choices. Technological and consumption practices are derived from socially informed knowledge and ideas about what is the correct and most appropriate way to make and use a vessel (Whitbread 2001: 453; Lemonnier 2002: 3). Therefore, in order for the archaeologist to effectively explore and understand production and consumption practices, they must examine not only the physical and functional aspects of ceramic vessels, such as form or decorative style, but also consider the wider social context of their creation, movement and use. As noted by Peacock (1970) and by Gosselain (1999) the typology of vessels may be affected by short-lived influences relating to particular tastes or emulating other traded objects at a particular time. However, the primary technological processes that have taken a long time to learn and develop, such as processing raw materials, may be less subject to such influences (Gosselain 1999: 41). Therefore, changes evident in these characteristics of the crafting sequence may relate to more fundamental influences such as changes in the organization of production (Peacock 1970: 375).

From such a perspective it is imperative that any investigation is framed within an appropriate theoretical approach that emphasizes cognition and practice. This must be complemented by analytical techniques that are able to explore technological variation and consumption trends. Such a methodology must be able to characterize the raw materials and practices involved in the production of a ceramic vessel. This will enable the identification of different potting traditions, the possible locations of potting centres, and the distribution of their products. This information provides a baseline from which it is then possible to examine the potential reasons for particular production, distribution and consumption trends.

This thesis uses an integrated programme of analysis utilising traditional typological analysis, the assessment of macroscopic fabric, characterization of microscopic fabric using thin section petrography, and examination of the ceramic microstructure using scanning electron microscopy (SEM). These analytical techniques, framed within the *chaîne opératoire* based conceptual approach outlined in Chapter 3, will allow the examination of the geological characteristics of the raw materials present in the ceramic fabric. In addition, it importantly allows for the characterization of variation in technological practices, including raw material processing and firing conditions. These data will enable a discussion of the distribution of potting communities and their products, as well as the range of technological practices they utilized. In turn, this will provide an insight into the character of production during the EH period and the spheres of interaction that existed between different communities. From this foundation of understanding future studies will be able to explore other elements related to the role of ceramic production and consumption in EBA societies. The rest of this chapter will present each analytical technique, discussing both the procedures undertaken and the justification for their use.

4.2 Macroscopic Analysis and Sampling Strategy

Macroscopic analysis was undertaken in one two-week season for each site between 2009 and 2012. Using catalogues provided by the person responsible for each set of material, every assemblage was organized by date, form and ware. Where available, material from sealed deposits was targeted, though such contexts were usually rare due to a variety of factors such as ploughing, method of excavation or discard of material (refer to Chapter 5 for archaeological discussion). As far as possible only examples of well-preserved, diagnostic sherds were chosen for sampling, based on typological comparatives from published and unpublished material (Dousougli 1987; Rutter 1995; Wiencke 2000; Pullen 1995, 2011).

As part of the macroscopic examination of each assemblage, it was necessary to expand the traditional typological classification of the material to include macroscopic fabric. The objective of this approach was to attempt to include a range of form, ware and fabric combinations during sampling, allowing characterization of visible technological variation across the assemblage as a whole. All non-diagnostic sherds (those lacking a characteristic form or decoration) were separated into fine wares and coarse wares, and general observations about macroscopic fabric and their relative abundance were noted to aid with understanding the relative proportions of different macroscopic fabric classes. Many sherds had been affected by post depositional processes such as the presence of secondary calcite from deposition in calcareous soils and abrasion due to disturbance. In these cases it was not always possible to classify sherds.

With the exception of Tsoungiza, all the assemblages were from incomplete collections, as sites still being excavated, or material surviving after discard (refer to Tables 4.1 and 4.2 for site details and to Chapter 5 for full site background). As such, it was clear that sherd counts and weights would not increase the understanding of the assemblages, therefore these data were not recorded. However, notes were made about the relative proportions of different wares, forms and macroscopic fabrics for each context or excavation lot. This methodology attempted to ensure that samples chosen were representative of the range of technological variation visible in the available assemblage as a whole, and not biased by particular vessel types etc. as far as was possible.

Site	**No. of Samples**	**EH Periods Represented**	**Recovery Type Excavation (E), Excavation with Discard (ED)**	**Context Types: Burial (B), Domestic with Architecture (DA), Pits (P) No Contextual Data (NCD)**
Keramidaki	144	II	E	NCD
Korakou	34	II	ED	DA, P
Tsoungiza	154	I, II, III	E	DA, P
Talioti	31	I, II?	E	NCD
Epidavros	48	I, II, III	E	B, DA

Table 4.1: Table showing the sites included in this thesis, the number of samples analyzed, the periods represented and the contextual data.

Site	No. of Samples	EH Periods Represented	Recovery Type Excavation (E), Excavation with Discard (ED)	Context Types: Burial (B), Domestic with Architecture (DA), Pits (P), No Contextual Data (NCD)
Delpriza	62	I, II	E	B, P
Agios Pantelimon	96	I, II	E	DA
Spiliotakis (Monopori)	68	I, II	E	DA, P
Lempetzi (Argos)	20	II	E	DA, P
Tiryns	120	I, II	E	DA
Midea	126	I, II	E	B, DA

Table 4.2: Table showing the comparative sites referred to in this thesis, the number of samples analyzed, the periods represented and the contextual data.

4.3 Descriptive Terminology

Each sherd chosen for sampling was described and photographed. Notes were made about form, decoration, fabric, and any other technological details that may have been visible, such as evidence of forming technique based on surface details like the presence of striations associated with wiping or coil join remains (Rye 1981; Courty and Roux 1995; Whitbread 1996). The descriptive terminology used for form, ware and decorative techniques was taken from multiple sources of published comparative material largely based on the descriptive systems outlined by Weisshaar (1983), Rutter (1995), Wiencke (2000), Pullen (1995; 2011), and Dousougli (1987).

Macroscopic fabrics were described based upon four key aspects adapted from methodology outlined in the *The Study of Prehistoric Pottery* (P.C.R.G 2010):

1. Colour (with reference to Munsell Soil Colour chart 1975), including notes about any cores present;
2. Hardness, defined as friable, soft or hard;
3. Fracture was noted as smooth, irregular, hackley, or laminated;
4. Aplastic inclusion presence or absence, type, colour, size, relative frequency and sorting.

After each sherd was recorded, details were submitted to the appropriate Ephorate as part of the permit application.

4.4 Sampling

For each sherd a small piece was selected for removal. Where possible the area chosen to remove ran through the vessel profile vertically rather than horizontally. This allowed for the possibility to examine a range technological information including that relating to forming technique, for example from coil remnants or the orientation of inclusions (Whitbread 1996). At all times care was taken to ensure that the area removed would not result in a loss of information that could be gained from the preserved profile, such as the removal of decoration not present elsewhere.

The sample was removed with tile clippers as this provided a quick, clean break, without damage to the remaining sherd. Where possible a sub-sample was then taken from the removed section to ensure that multiple analytical techniques could be undertaken.

4.5 Petrographic Analysis

Thin section petrography is well established as an effective method for analysing both the compositional, and technological variation present in ceramic material (Shepard 1963; Day *et al* 1999; Whitbread 1995, 2001; Riederer 2004; Kiriatzi *et al.* 2011). The technique characterises the ceramic fabric through identification of the geological raw materials present and the technological processes evident in their treatment, such as crushing, levigation etc. This allows identification of paste recipes and discrimination between different recipes suggestive of technology and possible provenance.

The technique has been most widely used to answer questions relating to provenance because of the ability to relate the raw materials used in the production of different paste recipes with particular geological units, through examination of geological maps, geological sampling and in comparison to archaeological material of known provenance. This allows the petrographer to suggest areas of raw material procurement and production, and to trace the subsequent movement of vessels through the landscape, revealing patterns of exchange and trade. However, thin section petrography offers an important advantage over other types of compositional analysis such as chemistry, in that it also allows the examination and discrimination of fabrics based upon technological criteria. Through relating compositional variation to specific technological choices and behaviour, rather than simply geographical location, we are able to look beyond the physical properties of ceramic material to the range of human and environmental interactions that affected its production (Whitbread 2001: 449).

Thin section petrography offers the opportunity to reconstruct a wide variety of technological choices and practices such as raw material procurement, processing, forming techniques and firing conditions. Identifying particular practices such as clay mixing, the addition of aplastic inclusions as temper, or the use of particular forming techniques such as coiling, allows us to discuss the potential motivations for the choices potters were making. For example, clay mixing may indicate that particular clays were thought of as too poor for use alone, therefore mixing was used to change their properties and make them suitable for potting. In another example, orientation of voids and mineral inclusions may provide insight into the forming techniques used by particular potters. However, it must also be remembered that these choices do not simply reflect practical and functional considerations but are the result of the potters' own understanding of the correct way to make a vessel. This understanding may vary from one potter to the next, as it is dependent on a variety of factors including the socially derived nature of the potter's knowledge and training.

For the prehistoric Aegean, thin section petrography has a long history of use (Farnsworth 1964; 1970; Day 1988, 1999. Haskell *et al.* 2011; Noll 1978; Wilson and Day 1994; Whitbread 1995; Vaughan *et al.* 1995; Betancourt and Myer 2000; Whitbread *et al.* 2007; Joyner 2007; Hilditch *et al.* 2008; Kiriatzi 2011; Graybehl forthcoming). The majority of work has been undertaken on Crete, as the varied geological makeup of the island lends itself well to this characterisation technique. Day *et al.* have worked extensively characterising EBA ceramic production and consumption on Crete, exploring patterns of exchange, technological choice and specialisation (1997, 1998, 2002).

Despite such innovative work, thin section petrography has not been widely employed on the EH ceramics of the mainland with the notable exceptions already discussed. However, petrography has been utilised to some extent to explore mainland ceramics from earlier and later periods (Pentedeka 2015; Farnsworth 1964, 1970; Whitbread *et al* 2007; Joyner 2007). Where it has been employed for EH ceramics, as well as ceramics from other periods, it has rarely been fully integrated into a wider ceramic study, often consisting of a publication appendix. This has commonly resulted in a limited sampling strategy that sadly reduces the contribution the analysis and its results can make to understanding ceramics at particular sites.

The under-utilisation of thin section petrography on the mainland partially derives from the limited number of analysts working on EBA ceramics in the area, but more fundamentally, the focus of study for this period has had a significant impact on the direction of analytical methodologies. As the questions asked of the period largely relate to the emergence of complex society in the Middle and Late Bronze Ages, there has been little attempt to characterise the crafting practices of the EBA. This has led to the misconception that pottery production and consumption for the EH period is already understood - small scale, local, household level, and that it is only in the later Middle and Late Bronze Age that pottery production becomes more organised, large scale and 'complex'. This is accompanied by a long held tradition of typological analysis that does little to challenge the current assumptions about the nature of pottery production and consumption for the period.

4.5.1 Sample Preparation

Petrographic analysis was undertaken on 412 ceramic samples (refer to Appendix I and II for ceramic database and descriptions), with an additional 556 comparative samples being used as reference material. The samples were prepared at the Fitch Laboratory using standard practices. Each sample was mounted onto a glass slide and ground to a thickness of 30μm on a Hillquist thin section machine. At this thickness it is possible to distinguish minerals using their interference colours in comparison to a birefringence colour chart. After grinding and polishing the samples were washed, dried and cover slipped.

4.5.2 Analytical Procedures

The thin section petrography was undertaken using a Leitz Laborlux 12 polarizing light microscope at the University of Sheffield. Each thin section was examined using magnifications ranging from x25 to x400 in both plane polarised light (PPL) and under crossed polars (XP).

Each section was characterised, grouped and described based upon four primary criteria using the system put forward by Whitbread (1989):

- Identification of aplastic inclusions types
- The size, shape, frequency and distribution of aplastic inclusions
- Textural concentration features such as clay pellets
- The appearance of the micromass including colour, optical activity and the presence and character of voids.

This approach allows characterization of each sample using descriptive methodology adapted from a combination of sedimentary petrology and soil micromorphology. Other popular characterisation methods, such as point counting, focus on the proportional relationship of different aplastic inclusions to determine fabric variation, largely for assigning provenance (Whitbread 1989: 128). In contrast, the Whitbread system allows comment on the nature of the raw materials and their significance in relation to technological processes that have been undertaken, using a wider variety of characteristics. This enables the expansion of the question types that can be asked of ceramic material using thin section petrography (Whitbread 1989: 128). The characteristics chosen to group the material must consider not only the mineralogy present in the raw materials but also their relationship to technological processes, this provides a clear methodology and understanding of how potters interact with the raw materials they procure for manufacture of their products.

4.6 SEM

SEM is an effective method for analysing the internal microstructure of ceramic bodies, providing information about firing conditions and decorative techniques. The method works by bombarding a target area with a beam of electrons. The emission of electrons, photons and backscattered electrons from the sample allows characterisation of the topography and microstructure of the surface, element distribution of the target area and for the production of images (Froh 2004: 160). Whilst not normally utilised in the investigation of EH ceramic material, this technique has been employed in a number of ceramic studies in other periods across the Aegean, providing detailed information about a variety of technological processes relating to surface treatment and firing conditions (Noll *et al.* 1975; Noll 1978; Kilikoglou 1994; Day and Kilikoglou 2001; Tomkins 2002; Faber *et al.* 2002; Day *et al* 2006; Nodarou 2011).

4.6.1 Firing

Successful firing of a ceramic vessel requires a level of skill and knowledge about how to achieve desired atmospheres and reach required temperatures, controlling and maintaining them, and allowing enough time to cool the vessel without shocking it, leading to failure. By investigating the firing conditions of a vessel we are able to understand the technological choices and skills of the ancient potter, moving beyond simply denoting 'maximum' firing temperatures, towards discussion about the wider technological *habitus* represented by patterns and variation found in this important element of the *chaîne opératoire* (Livingstone Smith 2001: 999; Sall 2005; 61).

Firing clay bodies leads to permanent changes within the microstructure and chemical makeup of the raw materials (Maniatis 2009: 3) by looking at these changes we are able to estimate equivalent temperature ranges, firing conditions and infer the specific practices that potters utilised during the firing process. Work undertaken by Maniatis and Tite (1981) has demonstrated that within particular firing temperature ranges specific changes take place in the level and extent of vitrification visible in the microstructure. They found that the amount of calcium within a sample had a significant impact on the character of its microstructure as the amount of calcium oxide (CaO) directly correlated to the amount of glassy filaments found in the microstructure. Samples with higher proportions of calcium displayed characteristic fine glassy filaments and pore structures, whilst those with a low calcium content displayed a coarser microstructure. By determining the calcium content and correlating vitrification levels with firing temperatures in calcareous and low calcareous clays, they were able to provide a guide to equivalent firing temperature ranges at which particular changes could be observed. As the firing temperature increases, the level and extent of vitrification within a ceramic body increases with key changes at particular firing temperature ranges (refer to Table 4.3). Maniatis and Tite also demonstrated that differences in the duration of firing and cooling time had a significant impact on the changes in vitrification levels (1981). This work has been refined through further analysis of ceramic bodies by Kilikoglou (1994), Day and Kilikoglou (2001) and Shaw *et al.* (2001). This thesis follows the standards set by Maniatis and Tite (1981) with modification after Day and Kilikoglou (2001), (refer to Table 4.3).

	No Vitrification (NV)	**Initial Vitrification (IV)**	**Extensive Vitrification (V)**	**Continuous Vitrification (CV)**
Temp range °C for Low-Calcareous clay (LC=<3% CaO) Reduced	<750	750-800	800-900	900-1000
Temp range °C for LC clay Oxidised	<750	750-800	850-950	>1000
Temp range °C for LC clay Oxidised-Reduced-Oxidised	<750	750-800	800-850	900-1000
Temp range °C for Medium Calcareous clay (MC=6-10%) Oxidised	<750	750-800	800-1050	>1080
Temp range °C for Medium Calcareous clay (MC=6-10%) Reduced	<750	750-800	800-900	>1000
Temp range °C for Medium Calcareous clay (MC=6-10%) Oxidised-Reduced-Oxidised	<750	750-800	800-850	1050-1080
Temp range °C for Highly Calcareous clay (HC=>10%) Oxidised	<750	800-850	850-1050	>1080
Temp range °C for Highly Calcareous clay (HC=>10%) Reduced	<750	750-800	850-1050	>1000
Temp range °C for Highly Calcareous clay (HC=>10%) Oxidised-Reduced-Oxidised	<750	850-1050	850-1050	1050-1080

Table 4.3: Summary of vitrification stages and temperature range after Maniatis and Tite (1981), and Day and Kilikoglou (2001).

Further examination of firing has been published by Gosselain, and Livingstone-Smith, who have both examined firing practices through ethnographic observation (1992; 2000). In this work, they both found that firing conditions and temperatures could range within a single firing. This led to variation in firing characteristics (such as vessel colour) both on a single vessel, and between vessels within the same firing. Such work has highlighted that whilst SEM analysis provides vital information about firing conditions and surface modification, it is best combined with other observational techniques in order to provide a representative assessment of these aspects of ceramic technology. As such, microstructural information must be collated with macroscopic (surface and ceramic colour and presence of cores), and petrographic (optical activity and presence of calcite) data. For example, macroscopically and microscopically it may be possible to identify darker cores within the ceramic, in combination with SEM it may also be possible to see differential levels of vitrification within the same sample. Such characteristics suggest differences in the rate of firing and cooling, as well as the types of atmosphere present during these phases. For example a vessel with a dark core and light surfaces may have been fired over a short period of time, preventing oxygen to penetrate the entire vessel therefore, leaving a non-oxidised core and differential levels of vitrification.

The atmosphere created during firing has a significant effect on the colour of a ceramic, dependent upon the amount of iron, carbon, and calcium within the clay mix, in addition to the duration and temperature of firing (Maniatis *et al.* 1981: 267-268; Maniatis *et al.* 1983: 778, 781). Therefore, this data has been used to infer the firing conditions of the ceramics in this study (refer to Table 4.4).

Ceramic Colour	**Surface Colour**	**Inferred Atmosphere**	**With Core**
Red, brown, orange	Red, brown, orange	Oxidised	Incomplete oxidisation/presence of carbon
Red, brown, orange	Black, purple	Oxidised-reduced-oxidised	Incomplete re-oxidation/presence of carbon
Grey	Buff, grey	Mixed, reduced	Incomplete reduction/presence of carbon
Grey	Black, purple	Oxidised-reduced-oxidised	Incomplete reduction/presence of carbon
Buff	Buff	Oxidised	Incomplete re-oxidation/presence of carbon

Table 4.4: Summary of inferred firing atmosphere based on Orton et al. 1999, Day and Kilikoglou 2001 and experimental firing of clays by the author.

As optical activity relates to the breakdown and sintering of clay minerals, it provides a useful indicator of the degree of vitrification within a ceramic, and therefore, the relative firing temperature (estimated as either high- showing low to no optical activity, or low- showing high optical activity). It is particularly important as an indicator of mixed firing conditions, in instances where optical activity varies within the same ceramic.

The petrographic identification of calcite is another important indicator of firing temperature as calcite breaks down from $CaCO_3$ to CaO at temperatures in the range of 650-750^{o}C. This is significant because CaO easily absorbs water when exposed to air, which in turn increases the volume within the clay matrix. This increase in volume can lead to fractures and peeling away of the ceramic surface, a process known as 'spalling'. As such, if calcite is present and does not appear altered, it can be assumed that the ceramic has been fired near or below 750 ^{o}C.

4.6.2 Surface Treatment

Surface modification techniques can be examined through identification of the presence or absence of surface treatments, such a burnishing or slips, by analysing their thickness and adherence to the ceramic body, as well as their bulk chemical composition. Such data can provide information on the types of clay used for slips in comparison to the composition of the body. Therefore, SEM, particularly when combined with other techniques, yields much information about many different aspects of ceramic technology, allowing archaeologists to form a more coherent and rounded picture of the production process.

4.6.3 Sample Preparation

SEM was undertaken on 26 samples across four sites, for 11 primary petrographic fabric groups. Freshly fractured surfaces were mounted onto aluminium stages in cross-section, orientated to ensure that both the internal and external surfaces could be examined. These were then coated in carbon ready for analysis.

4.6.4 Analytical Procedures

All the samples were analysed at N.C.S.R 'Demokritos' Athens, using a FEI, Quanta Inspect D8334 SEM, coupled with an attached EDS. Photomicrographs were primarily taken at x1000 and x2000 magnification of the internal and external surfaces to characterize key features of any visible surface treatments and the main body of the sample. Areas of particular interest were also photographed at higher magnifications. Estimates of firing temperature were assigned using the standard put forward by Maniatis and Tite (1981) and Day and Kilikoglou (2001) summarized above. Bulk compositional analysis was undertaken using the EDS to determine the percentage of CaO in the ceramic, and for comparison between any visible slips and body to determine the similarity or dissimilarity between the clays used for each.

4.7 Summary

This chapter has outlined the analytical techniques used for this research, integrating the conceptual framework outlined in Chapter 3. It has argued that the integrated approach put forward, is the most suited to answer questions relating to both the production and consumption of ceramic vessels during the EH period for mainland Greece.

The successful integration of the conceptual framework and the analytical techniques put forward, will facilitate the characterisation of the methods of manufacture for EH pottery which are presented in Chapters 6,7 and 8. In addition, it will also provide information on the interaction between potters and their materials, revealing technological choices and differences in practices over time and between areas. Therefore, it will be possible to examine locations of production and the distribution of particular fabric groups across the study area and beyond, revealing patterns of exchange and spheres of interaction between different communities during this period.

Chapter 5 will proceed to discuss the archaeological and geological background to the material under study. This information will provide context to the results and discussion presented in the proceeding chapters.

Chapter 5: The Study Area

5.1 Introduction

To explore the technology and provenance of ceramic vessels successfully, it is essential to begin with understanding the raw materials exploited in their production. Studying the geological characteristics of the raw materials utilised in ceramic production, and comparing them to the nature of the geology within specific locations, and comparative thin section collections of known provenance, allows us to suggest possible resource areas that could have been exploited. An understanding of the parent rock types and potential clays, also enables us to examine how these raw materials have been manipulated. This allows us to explore the technological choices and practices involved in pottery production.

Whilst exploration of raw materials within ceramics offers an insight into the potential locations of production and different technological practices, it is rarely possible to directly match raw materials within ceramic material to specific geological units. The variability within a ceramic paste can have a wide range of sources, both natural and from human action, which should be considered. Firstly, practices such as clay mixing can make it difficult to differentiate specific raw material elements and associated sources (Whitbread 2003: 11). Secondly, a range of variability can also be naturally present within a single geological unit, as well as between units. This means that two clays which look quite different, may not necessarily be from very different locations in the landscape. Finally, as archaeologists, we are additionally dealing with the variability created by changes to geological formations and the landscape over time. Raw material sources can become exhausted through use in crafting, or extracted and/or covered up by later building activity. As such, what was available to a potter in 3000BC may not still be visible in the landscape to the modern archaeologist. Importantly, it is also key to be cautious when using specifically geological resources such as maps. These resources explicitly record details from a solely geological perspective and, therefore, the clays and rocks they chart may not have been considered 'suitable' raw materials by potters working within specific learnt traditions and *habitus*.

Although assignments of provenance should be undertaken with care this does not mean that petrography is unable to address questions relating to potential areas of ceramic production. Petrography is commonly better placed than other methods such as chemistry, precisely because petrography is a visual technique. This means that it is possible to characterise variability within a single fabric, as well as between different fabrics differentiating between geological sources of variability and that due to human action through technological practices. The examination of diagnostic raw material elements within a ceramic paste, comparison to reference collections and examination of regional distribution patterns, all help to build up a picture of potential production areas and technological choices.

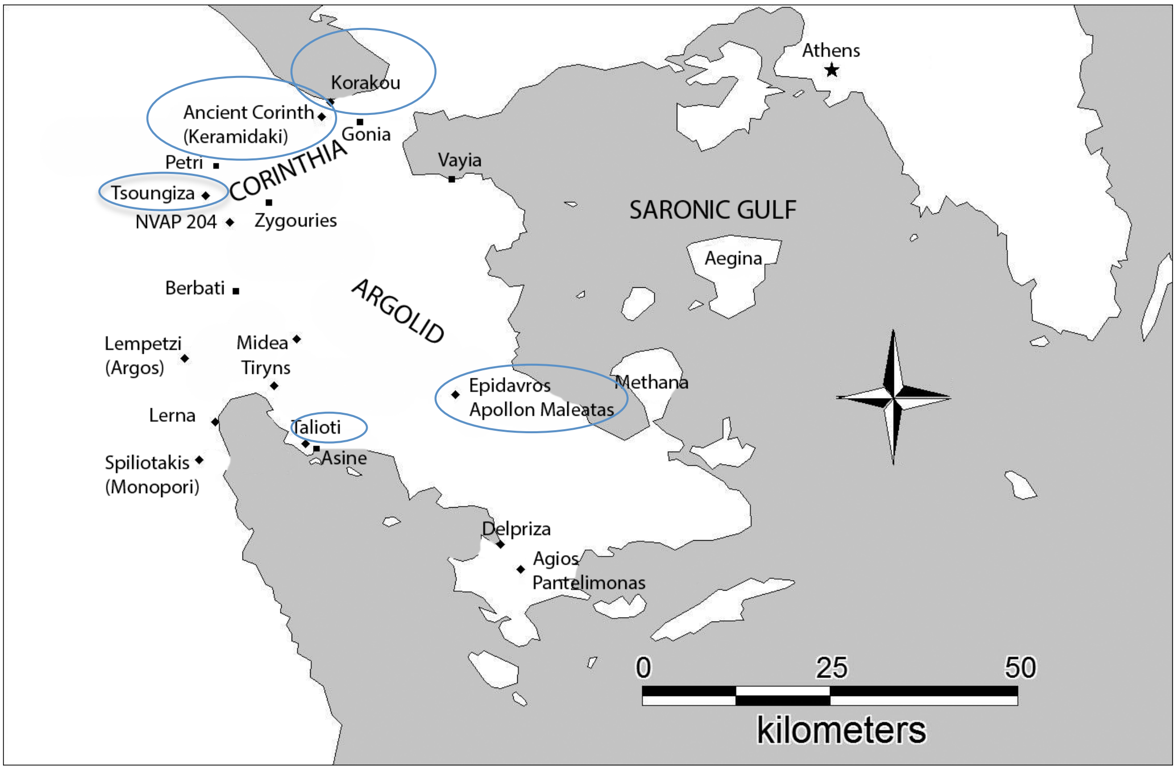


Figure 5.1: A location map of the sites examined in this thesis and other nearby EBA sites. Primary sites analysed are circled.

Examining raw materials, as well as crafting practices, not only enables us to make statements about the possible locations of production, but also about communities of practice and networks of exchange. We are able to explore the consumption choices of communities, including the extent to which they accessed ceramics from outside of their local area. However, in order to contextualise the results within the production and consumption behaviour of

EH communities, it is first necessary to understand the archaeological background to the material being examined. Firstly, it is important to understand the nature of the contexts from which material was recovered so that we can understand the types of activities EH communities were undertaking. Secondly, it is essential to understand the methods of recovery, and any issues that may affect our ability to investigate the material. With this in mind, the purpose of this chapter is to provide the geological and archaeological background of the material under study. This will contextualize later discussion of results and the conclusions of this thesis (refer to Figure 5.1 for site locations).

5.2 The Geological History of Greece

Greece has a complex geological history due to the multiple processes that have resulted in the formation of its landscape. Its inception as part of the warm marine basin encompassing the Tethys Ocean until the Cretaceous period, in addition to its current position just north of the Hellenic Arc (an active continental margin), have left distinct geological characteristics. Its geological origin as a marine environment is illustrated by the widespread presence of sedimentary geology, particularly characterised by large outcrops of limestone. In contrast, its more recent tectonic history is evidenced by the formation of the South Aegean Volcanic Arc, characterised by the igneous rocks associated with the peninsula of Methana on the east coast of the Argolid, and a chain of volcanic islands including Aegina, Melos and Santorini.

The closure of the Tethys Ocean during the Middle Cretaceous resulted in the re-emergence of land that today forms mainland Greece, and is characterised by areas of discrete geological formations, or isopic zones, with geological features that are repeated across the landscape. The repetition of these geological features provides difficulties for those studying and attempting to differential potential raw material sources (Hayward 2003b), highlighting the importance of comparative analysis and the examination of distribution patterns across the landscape.

The following sections present the general geological picture for a number of key areas in which sites within this study are situated.

5.3 Corinth

Located in the NE Peloponnese, *c*. 80km west of Athens, the area of Corinth has a long and notable history of occupation, most famously at the Classical site of Ancient Corinth. The earliest evidence of activity in the area dates back to the Neolithic period (*c*.6500-5750 B.C. Lavezzi 1978: 404) with evidence for more settled occupation from the EBA onwards. The EH is most dominantly represented at the site of Korakou, the area of Temple Hill, and lying beneath the later Roman Gymnasium (Keramidaki) at Ancient Corinth. Evidence for Middle and Late Helladic occupation at Korakou (Blegen 1921), has been more recently complemented by Greek excavations which have highlighted extensive Mycenaean occupation in the area of Corinth (Tzonou-Herbst 2015). Corinth reached the height of its prosperity during the Classical period (Salmon 1984), and has remained settled until the present day.

During this long history of occupation, the availability of quality raw materials and importantly water via natural springs, has ensured regular exploitation of Corinthian natural resources, attested by the remains of a number of quarrying sites (Siddall In prep: 51). This has included stone for masonry and sculpture, clay for tiles and ceramic vessels, and materials for mortars and concrete. This long history of exploitation has drawn archaeological interest and publication about the geology of Corinth, providing a comparatively comprehensive understanding its raw material resources (Farnsworth 1964, 1970; Hayward 2003a, 2003b; Whitbread 1995, 2003; Joyner 2007, White 2009; Siddall In prep).

5.3.1 The Geology of Corinthia

The oldest rock outcrops in Corinthia belong to the Sub-Pelagonian isopic zone. Dating from the Middle Triassic to Late Jurassic period, these outcrops consist of limestones with interbedded shales, cherts and ophiolites that form the mountains of Corinthia and Geraneia in the north, Acrocorinth and Penteskouphi in the centre, the Oneia mountains east of Acrocorinth. They also make up the mountains to the south and southwest (Whitbread 1995; Siddall In prep: 27. Refer to Figure 5.2). These formations are characterised by outcrops of serpentinite, volcanic lavas, sandstones, siltstones, cherts, tuffites, shales and radiolarite (Whitbread 1995: 263, 2003: 2). Whilst limestones are ubiquitously found throughout Corinthia, the ophiolitic outcrops are more sparsely located, providing a more diagnostic raw material within ceramic pastes.

This image has been removed due to copyright. Figure 5.2: Schematic geological map of Corinth. Taken from Whitbread 2003: 3.

The more recent tectonic geology of Corinthia relates to the subduction of the African plate which has resulted in normal faulting, particularly in the Peloponnese where the area is being pulled apart in a N-S direction. This normal faulting has led to the formation of a series of E-W rifts, typified by the formation of the Corinthian and Saronic gulfs. This faulting and the uplift of the northern Peloponnese over the past 500,000 years, has also resulted in the formation of a series of grabens. In addition, erosional and depositional processes due to the associated changes in sea level have helped to create a terraced topography.

The terraces are transected by valleys and gullies that run perpendicular to the sea, formed by erosion from fast flowing rivers which transported material northwards. The deltaic sedimentation from these rivers has deposited conglomerates and breccias which now cover the northern slopes of some hills, and partially cover some of the marine terraces towards the Corinthian Gulf (Hayward 2003a: 17, 2004: 385).

5.3.2 Corinthian Clays

In Corinth there are eight visible terraces running roughly parallel to the coast of the Gulf. During periods of high sea level, the coastal area was eroded to the level of the Pliocene and Pleistocene marl. Uplift in the Pleistocene resulted in a decrease in sea level and discontinuous regression of the coastline. This series of decreases in sea level caused the sequential deposition of the earlier eroded material from the surrounding higher ground forming the terraces (Keraudren and Sorel 1987; Hayward 2003a: 16, 2004: 385; Whitbread 1995; White 2009; Higgins and Higgins 1996). The stratigraphic sequence and thickness of these geological units vary above the marl in different areas of exposure along the terraces. However, they generally share the same facies of basal conglomerate overlain by inter-bedded sandstones and coarse clastics, grading through to fine sandstones with inter-granular carbonate, capped by a sequence of limestones, with inter-bedded marl (Hayward 2003a: 16, 2004: 385; Siddall In prep: 30). The flat areas of these terraces have been used for the settlement of Ancient Corinth, including the location for the Roman Forum, as well as the BA site of Korakou. The terraces to the west of Ancient Corinth contain outcrops of Pliocene and Pleistocene marls, in addition, red clayey sands are deposited between Ancient Corinth and the Isthmus. The presence of rich clay deposits, as well as other natural resources such as springs for a fresh water supply, and a coastal location has ensured that Ancient Corinth has a long history of ceramic production.

Located in the western portion of the city, archaeological remains have suggested production at the site as early as the 8th century B.C., and by the 7th century B.C. Corinthian ceramics typified the best of fineware production across the Mediterranean, including transport amphorae (Siddall In prep: 56; Whitbread 1995: 3-8). Three kilns have also been excavated dating from between the late Archaic to later Classical periods at the Tile Works which is located to the north of Ancient Corinth outside of the city walls (Merker 2006: 3). Whilst production in the area of Ancient Corinth appears to have declined after the 6th century B.C. there is evidence that it continued on a smaller scale throughout the Byzantine period (Siddall In prep: 56).

5.3.3 Previous Examination of Corinthian Clays for Ceramic Production

Archaeological interest in Corinthian raw materials most notably began in the 1960s, with the work of Marie Farnsworth who undertook pioneering petrographic research into clays and tempering materials used for 5th and 6th century B.C. coarse ware ceramics (Farnsworth 1964). Her primary aim was to be able to characterise particular clays so that she could differentiate ceramic vessels of Attic manufacture, and if they were not Attic to establish if it was possible to identify their origin. This work led her to look more closely not only at Attic fabrics but also those of Corinthian and Aeginitan manufacture. She later developed this work in the 1970s by combining petrography, XRD and NAA, to provide a more detailed characterisation of both the raw material sources, and the technology of Corinthian ceramics in particular (1970; 1977).

As part of the latter study, Farnsworth characterised three main clay types from the area of Corinth: 1. a fine white clay sampled from the Corinthian Plain; 2. a mudstone red clay with radiolaria sampled from Acrocorinth; and finally 3. a white clay also sampled from Acrocorinth. Farnsworth noted that all three clays were mineralogically similar, composed primarily of montmorillonite and containing significant amounts of illite. However, there were significant differences in the abundance of lime and the firing colours of the two white clays. The Corinthian Plain clay fired ‘creamy with greenish overtones’ whilst the Acrocorinth white clay fired ‘buff with rosy overtones’ (Farnsworth 1970: 11). Farnsworth’s analysis revealed that the clay from the Plain had significantly higher amounts of lime content which she argued was most likely due to the run off from the limestone-rich higher ground. She proposed that the enrichment of the clay with lime was a phenomenon which had taken place since the Classical period, and as such, had resulted in her inability to correlate the chemical data from the clays with that from the pottery samples (Farnsworth 1970: 20). Similar difficulties were encountered in the 1977 study by Farnsworth *et al.* which expanded the number of clays sampled to 17. Whilst two clays from the Potters Quarter and the Tile Works showed very similar chemical compositions to the ancient ceramic compositions, most of the Corinthian clays appeared to be unsuitable for pottery production due to their high lime content (Farnsworth *et al.* 1977: 460-461).

It is very difficult to match clays to archaeological ceramics, particularly using chemical techniques, however, the pioneering work that Farnsworth undertook laid the foundations for a long history of study of Corinthian raw materials. Importantly, she challenged commonly held assumptions about the prevalence of Corinthian clays suitable for ceramic production. She not only demonstrated that many assumed sources were in fact unsuitable but also suggested that clay mixing may have been in use (Farnsworth *et al.* 1977: 459-460). Such findings highlighted the role of choice, and the level of skill and understanding of ancient potters who clearly chose specific sources and manipulated clays, something which had not been considered explicitly before.

In the 1980s Richard Jones continued Farnsworth's earlier work, undertaking analysis of a variety of archaeological ceramic material from Corinth including Corinthian amphora, Blister Ware, mud brick fragments and kiln linings (Jones 1986). In addition, Jones sampled modern clays from several areas around Corinth, including the Potters Quarter and the Tile Works as had Farnsworth. Whilst his work confirmed Farnsworth's earlier results about the highly calcareous nature of most of the Corinthian clays and its incompatibility with archaeological material, he was able to extend her early results by demonstrating variation present between the marl and clay deposits. Significantly, he was also able to demonstrate variation present *within* the same outcrop, highlighting some of the issues inherent in attempting to match clays to ceramics (Jones 1986: 179).

Following on from Jones, Ian Whitbread undertook analysis of Corinthian clays during his research into the production of transport amphora (1995). This seminal work included XRD and petrographic analysis of a large number of red and white clays and sediments from the Corinth region. These included the area around the Potters Quarter, terraces around Ancient Corinth, the Nikoleto lignite quarry, the Corinth brick factory lignite outcrops, and clay outcrops in and around Penteskouphi (*cf.* Whitbread 1995: 314-333). Whitbread found that the clays associated with the lignite deposits, and the pale clays from the terraces above and southeast of the Potters Quarter, would be most suitable for ceramic production. He also found that the clays from Ancient Corinthian terraces were unsuitable for potting, with the red clays in particular disintegrating during firing, whilst those that did survive were powdery and of a very poor quality. However, Whitbread did find that the terra rossa sediments associated with the conglomerate outcrops around Corinthia, were the most commonly available sources of red clay but required levigation (Whitbread 2003: 8).

From his experimental work, Whitbread put forward the idea that some clays would only be suitable if mixed, supporting Farnsworth's earlier suggestion for the possibility of clay mixing practices (Whitbread 1995: 314-331).

5.4 Nemea

In contrast to Corinth, the geology of Nemea has not been subject to detailed study from an archaeological perspective, with the exception of work done as part of the NVAP survey (Wright *et al.* 1990). In particular, there are no published investigations of the raw material resources that could have been potentially exploited for ceramic production, therefore, it is not possible to discuss the clays of Nemea in detail. The literature that exists on Nemean geology, is largely confined to general characterisation by geologists in geological publications and reports. Although this work does not consider the same characteristics that would be examined from an archaeological perspective, it does provide a good insight into the types of raw materials that would have potentially been available to potters.

5.4.1 The Geological History of Nemea

Located *c.* 30km SW of Corinth, the sub-basin of the Nemea Valley is one of several basins in the NE Peloponnese and has a long history of occupation dating back to the Neolithic. It is bordered by a number of hill ranges including those of the Psyli Rachi massif to the SE, which divides the Corinthia from the Argolid, and the Kyllini range to the west (Wright 1990: 585; Pullen 2011: v). These ranges are intersected by passes which connect the Nemea Valley to the surrounding area including the Longopotamos Valley to the east, the location of the Bronze Age settlement site of Zygouries. The valley is drained to the NE by the River Asopos which is fed by a number of springs and small tributaries forming the plains of Phliasia to the west, the location of the modern town of Nemea.

The basin was formed during the creation of the Corinthian Gulf in the Pliocene-Pleistocene and is dominated by Pliocene-Pleistocene marls, sandstones, conglomerates, and limestones accompanied by Quaternary conglomerates, pebbles, gravels, sands, clays, silts and combinations of these. The thickness of these deposits varies throughout the basin with the Upper Pliocene conglomerate deposits reaching a thickness of over 300 metres in some places. These deposits are intersected by numerous faults running east to west and NW to SE, forming secondary ditches and horns within the basin. The topography in the basin's upper parts is steep to almost vertical in places due to the resistance of the underlying geology to erosion. In contrast, the topography of the lower parts is characterised by smoother terrain consisting of erosion debris (Wright *et* al. 1990: 588; Dounias *et al* 2006: 2; Anastasakis *et al*. 2011: 8-10; Zaronikos *et al*. 1970). The river plain contains fluvial deposits, consisting of loose gravelly-sands, pebbles, sands, silts and clays derived from weathering and transportation of the Pliocene-Pleistocene deposits which form the valley (Dounias *et al*. 2006: 2).

5.4.2 Ceramic Production at Ancient Nemea

Like Ancient Corinth, Nemea is surrounded by Pliocene marls, also located next to a natural spring, and has a fertile landscape ideal for providing many of the resources needed for ceramic manufacture, such as raw materials, and fuel. It is also well located as a natural pass through the landscape connecting surrounding areas, therefore it is perhaps unsurprising to find evidence for ceramic manufacture at the site. In 1964 excavations by Charles Williams II revealed the first evidence of what has become known as Kiln Complex located to the east of the sanctuary and which was in use between the 4th and 3rd centuries BC (Williams II 1965). Graybehl's petrographic examination of material from these kilns, ceramics excavated from the site, and comparative assemblages, has indicated the use of locally available raw materials (2014: 92). The local fabric, Fabric 1, is characterised by the presence of mudstones, micrite, and the probable mixing of calcareous Pliocene marl with a terra rossa sediment, both of which surround Nemea (2014: 92-95). Due to the undiagnostic nature of many of the inclusions within the other fabrics Graybehl examined she was unable to identify additional local fabrics, however, it is possible that local production utilized a wider range of raw materials.

5.5 The Argolid

This image has been removed due to copyright. Figure 5.3: Schematic geological map showing the Argolid region. Taken from Higgins and Higgins 1996: 41.

Located directly south of the Corinth region, the Argolid is a large peninsular that extends approximately 70km South-East into the Aegean Sea (Zangger 1993, Jameson *et. al.* 1994), bounded by the Saronic Gulf to the east and the Gulf of Argos to the west. The region is characterised by two areas, firstly that of the Argive Plain and the mountainous area to the east which have formed a large proportion of archaeological discussion. Secondly, the southern portion of the peninsular, which is dominated by the Adheres Mountains. This thesis primarily focuses on the former area, although material from sites located further south are referred to for comparative purposes.

The Argive Plain extends northwards from the mouth of the Gulf of Argos and covers an area approximately 240km^2 (Zangger 1993: 15. Refer to Figure 5.3). The alluvial plain is fed by two primary rivers, the Inachos and the Erasinos, and their tributaries. The fertile plain and the area immediately surrounding it have a long history of human occupation, including the well-known Mycenaean settlement of Argos. The earliest settlement activity dates to the Neolithic period, however, evidence for human activity across the Argolid more generally, dates as early as the Mesolithic (Perlès 1990).

5.5.1 The Geological History of The Argolid

Originally forming the same graben series as Corinth, the topography and geology of the Argolid are the result of the same complicated history of tectonic activity, accompanied by erosional and depositional processes. However, unlike Corinth, the geology of the Argolid has not been extensively explored in the archaeological literature, with a few notable exceptions (Zangger 1993; Jameson *et al.* 1995).

The region is characterised by rock types associated with the interaction of two geological units, the Tripolis zone and the Pindos zone. The Pindos unit is a nappe which is thrust over the Tripolis unit therefore, it has been subjected to severe faulting and deformation with successive thrust movements from East to West (Georgiou *et al* 2010). It is characterised by Jurassic chert and Middle Triassic limestone, flysch, marl and diabase (Zaronikos *et al.* 1970, Papavassiliou et *al.* 1984; Zangger 1993: 8). Above these lie Lower and Middle Cretaceous argillaceous shales, cherts, sandstones and coarser clastic sediments. These are accompanied by Upper Cretaceous limestones, interspersed with red clays and cherts which form the mountains in the immediate vicinity of the Argive Plain (Papastamatiou *et al.* 1970).

The Argive Plain itself is a Neogene graben that has split from the Corinthian graben. The hills surrounding it rise to between 400 and 700 metres above sea level (Zangger 1993). They are dominated by facies of the Pindos zone, primarily Late Cretaceous limestones in the west, accompanied by Triassic and Jurassic limestones to the north. The more recent Quaternary deposits of the plain itself consist of alluvium, gravels, sands and red clays, and marls deposited from erosion of the surrounding higher ground (Zaronikos *et al.* 1970). Underlying the Pindos unit, and forming the hills to the east and west of the Argive Plain, are the facies of the Tripolis zone. The base of the Tripolis unit is heavily metamorphosed containing schists and phyllites, whilst the upper layers of the unit consists of Upper Cretaceous limestone, dolomites and dolomitic limestones, interbedded with transitional layers of marls and limestones of varying thicknesses. Above the older limestones lie extensive Middle to Upper Eocene undivided flysch formations, consisting of sandstones and shales. The flysch formations extend east towards Lygourio, terminating approximately 3km south west of Nea Epidavros. At this point the landscape becomes dominated by the Triassic and Jurassic diabase-tuffite-chert series and Middle Cretaceous limestones. These are interspersed with outcrops of Triassic serpentinite, with Triassic trachyte and trachytic tuffs located in the area of Ancient Epidavros.

5.5.2 Ceramic Production in the Argolid

The Argolid is a region abundant in natural resources including water and fertile land, as well as a sheltered coastline, making it an ideal area for settlement and a variety of crafting activity. Excavations in the region, such as those at Mastos in the Berbati Valley by the Swedish Institute at Athens, have revealed evidence for kilns dating from the Late Bronze Age onwards (Åkerström 1968), however, there has not been examination of the raw materials used in these production contexts. Petrographic examination of material from sites such as Lerna, for a range of periods from EH to the Hellenistic periods, has shown that local pottery manufacture used a variety of raw materials including widely available limestone, marl and sandstone detailed above (Betancourt and Myer 2000; Vaughan *et al.* 1995; Graybehl forthcoming;

Whitbread 2001b). There has not been a detailed exploration of potential raw materials in the region with the exception of the small sampling study which formed part of Christine Shriner's thesis (1999) and the work by Whitbread in the Berbati Valley (2011). Shriner's study (discussed in Chapter 2) specifically examined the geological variability in the area of Lerna, demonstrating the presence of a range of geology, spanning both the Pindos and Tripolis zones. Rock types included metamorphic and carbonate types, forming part of Xerias river system. No other published examination of potential ceramic raw materials has been undertaken and as such, our present understanding of this in the region is not well defined, particularly in comparison to the neighbouring region of Corinth.

5.6 Archaeological Sites

5.6.1 Ancient Corinth (Keramidaki)

Located 3km inland from the Gulf of Corinth, Keramidaki refers to a selection of EHII deposits which were uncovered during excavations of the Roman gymnasium in the northern portion of Ancient Corinth, although EH finds have also been recovered during other excavations and at the surface (*cf.* Lavezzi 1978 and 2003 for discussion). The site is located *c.* 5km east of the EBA settlement of Gonia and *c.* 3km south east of the EBA settlement of Korakou (Blegen 1921, 1930).

Lying on two of the marine terraces that run parallel to the Gulf of Corinth, the underlying geology consists of Pliocene yellow to white or grey marls with intercalations of sandstones, psephitic conglomerates, oolitic and marly limestones. Immediately NW lies the Acrocorinth and Penteskouphi mountains characterised by the shale-sandstone- radiolarite facies associated with the ophiolite formations as discussed above (Hayward 2003a: 17; Whitbread 1995: 261-263; Yannetakis et al. 1972).

Excavations of the Gymnasium area were conducted by the University of Texas, under the direction of James Wiseman from 1965-1971, with the principle aim of exploring the archaeology of Corinth from the Classical period onwards. However, the recovery of a large volume of EH material from six areas across the site, clearly indicated the presence of an EBA settlement consistent with Period IIIB from Lerna (Wiseman 1967: 26). Intensive later activity had significantly disturbed these early deposits, with 17 out of 52 lots containing material of mixed date (Cherry 1973: 9). In addition, no stratigraphical sequence was identified within the EH deposits, only that these deposits were consistently composed of a 'hard, dark red matrix' which 'lay directly on limestone bedrock' and contained EH artefacts (Wiseman 1967: 403; Cherry 1973: 7).

The method of excavation within small isolated sondages and trenches, in addition to the later disturbance, meant that was not possible to determine the full extent of the EH deposits that characterised Ancient Corinth (Keramidaki). However, from examination of the site plans Cherry has estimated that they at least covered an area of 70x95m (1973: 9). In addition, other EHII material has been recovered at a variety of locations across Ancient Corinth during its long history of excavation, including Temple Hill, in the area of the Sacred Spring (Williams II *et al.* 1973: 27-32), and at the well on the north flank of Cheliotomylos (Waage 1949) all testifying to EH activity at the site.

At Ancient Corinth (Keramidaki), aside from the abundance of artefacts, two features were identified as most likely belonging to the EBA period. The first, was a cutting into the bedrock, which extended beyond the area of excavation. Although its function is unclear due to incomplete excavation, it measured at least 6.79m x 2.6m in size and contained the largest volume of EH material recovered at the site (Cherry 1973: 14). A similar feature of unknown function cut into bedrock was noted at Korakou in EH layers (Blegen 1921: 76), and at Tsoungiza pits and cisterns were commonly found cut into the bedrock, filled with EH material (Pullen 2011).

The second feature uncovered at Ancient Corinth (Keramidaki) was a portion of disturbed wall *c*.5m in length (refer to Figure 5.4). Lying directly above the bedrock, the wall was orientated E-W and consisted of roughly hewn stone cemented with clay, above which lay EH deposits suggesting an EH date. Whilst such walls have been regularly uncovered as part of EH structures across the Peloponnese, the absence of associated features at Ancient Corinth (Keramidaki) means that its purpose remains unclear.

This image has been removed due to copyright. Figure 5.4: EH wall at Ancient Corinth (Keramidaki). Taken from Wiseman 1967, Plate 82.

The lack of archaeological features and stratigraphical definition of these early deposits in the Gymnasium area, has negated a detailed spatial and contextual discussion of the EH activity at the site. However, the large volume of artifactual evidence that was recovered allows some insight into the activities that took place there, and the consumption choices of its community. Pottery was the most abundant artefact type at the site. The assemblage has been analysed from a typological and macroscopic fabric perspective by John Cherry as part of his Masters thesis in 1973.

Over 30,000 sherds were recovered, which Cherry dated to the middle of the EHII period (Cherry 1973: 106). They included tablewares, such as sauceboats and small bowls, alongside baking pans, vessels for storage, and hearth rims, all of which would be expected from an EHII settlement. Cherry noted that more specialised shapes such as askoi and frying pans were conspicuously rare (Cherry 1973: 115). This large volume of ceramic material is significant considering the small area of recovery and single period from which it derives. It is difficult to find a comparably large quantity of ceramics from one phase of the EH period at another site in Corinthia. It is especially striking, when we consider that 100,000 sherds were recovered from the nearest EH settlement of Korakou (Blegen 1921: 12); a number that represents the pottery for the *entire* Bronze Age at the site, not just the EHII period. Such evidence suggests that ceramics were consumed on a large scale and indicates a settlement of a considerable size in the area of Ancient Corinth.

In addition to the large volume of pottery, loom weights, figurines, worked stone, and a seal were also recovered. The wide variety of find types indicate that a range of activities took place at Ancient Corinth (Keramidaki), including a number of crafts such as textile production. The seal suggests that some form of administrative activity may have taken place at the site, the nature of which is unclear. With the exception of the seal, the majority of the finds are common at EH sites and testify to regular settlement activities. However, the large volume of finds for such a small area suggests that the settlement was a considerable size, particularly when compared to those such as Tsoungiza and Epidavros which are more consistent with a village or small group settlement.

5.6.2 Korakou

The prehistoric site of Korakou is located on a low hill next to the sea *c.*3km NE of Ancient Corinth (refer to Figure 5.5). Rising 35m above sea level, the mound measures 260m north to south, and 115m east to west. The geology of the area surrounding Korakou consists of Holocene sand and gravel, alongside weathered material from surrounding Pliocene marls, limestones and conglomerates (Yannetakis et *al.*1972). Blegen noted that the hill itself was primarily composed of 'soft conglomerate' (Blegen 1921: 1).

This image has been removed due to copyright. Figure 5.5: A photograph of the hill of Korakou taken from the west. Image from Blegen (1920: 4).

It was first recognized by Carl Blegen as a potential site from his observations of the abundance of pottery lying at the surface. Based on these initial observations, Blegen began a two-week fieldwork season in the spring of 1915, under the auspices of the American School of Classical Studies Athens, assisted by Alan Wace. The work was concluded the following summer in a more extensive six-week field season. The excavation consisted of several small test pits cut across the length of the mound in order to characterise the activity of the whole area. These revealed 11 phases of prehistoric activity, containing an abundance of artifactual evidence, including pottery, architectural remains and burials. Blegen identified three broad periods of activity on the mound dating them to the Early, Middle and Late Helladic periods, providing the basis of the first EH chronological sequence (Blegen 1921: 3). The EH deposits measured up to 2m in depth, from which Blegen identified six different stratigraphic levels. The lowest level rested directly upon the natural bedrock and the highest was sealed with a layer of ash which appeared to be present across the mound as a whole and interpreted as the result of conflagration of the site (Blegen 1921: 2).

Apart from pottery, few other EH remains were recovered due to the limited extent of excavation. However, several walls were unearthed ranging in size from 0.4-0.75m wide, preserved to a height of 0.60m in some places. As found at sites such as Tsoungiza and Epidavros and a typical EH construction technique, the walls were constructed from rough stone lying in a clay matrix, although in some areas preserved mud bricks were also found. Blegen estimated that there were perhaps two structures at the site possibly used for inhabitation (Blegen 1921: 74).

The only other feature dated to the EH period was a large clay lined pit 0.9m deep containing midden and carbonized material (Blegen 1921: 75). In addition to these features and the pottery, other artefacts recovered included a partial figurine, spindle whorls, loom weights, a grinding stone and worked obsidian, all artefact types indicative of domestic habitation. All the finds recovered suggest settlement activity that included textile production, and the preparation and consumption of food and drink. The primarily domestic nature of the site is similar to that at Tsoungiza and Epidavros, whilst the similarity of the pottery types to those at Ancient Corinth (Keramidaki), indicate that these sites were in use contemporaneously with broadly similar activities taking place.

5.6.3 Tsoungiza

The archaeological site of Tsoungiza is positioned on a low mound, 375m above sea level, in the southern portion of the Nemea Valley, Corinthia. To the east lies the well-known Classical Sanctuary of Zeus at Ancient Nemea, famous for being the location of the Nemean Games during the 6th Century BC and to the north-west lies the recently excavated EH settlement of Petri (Kostoula 2004). The underlying geology of the mound and its surrounding terraces, is similar to that across Corinthia being dominated by Pliocene marls, sandstones, conglomerates and combinations of these rock types (Zaronikos *et al.* 1970).

The EH archaeology at the site was first systematically explored by Carl Blegen in 1924. This work was subsequently continued and extended by James Harland until 1927 when work ceased. During the 1970s and 1980s archaeological investigation recommenced through a series of rescue excavations conducted by the Greek Archaeological Services and the University of California, Berkley. The latest series of work to be carried out was conducted between 1984 and 1986 as part of the Nemea Valley Archaeological Project (NVAP), led by James Wright under the auspices of the American School of Classical Studies at Athens. It is this last series of excavations from which the material within this thesis was recovered (refer to Figure 5.6 for site plan).

This image has been removed due to copyright. Figure 5.6: Site plan of Tsoungiza showing the different excavation units (EU). Taken from Pullen (2011: 5).

The excavation of Tsoungiza revealed features and artefacts dating from the early Neolithic through to the LBA (Pullen 2011). Most notable was the abundant evidence for activity during the EHI, EHII and EHIII periods, from which Pullen created subdivisions in the phasing of the site. The full stratigraphic relationship of their transitions (from EHI to EHII Initial and EHII Initial to EHII Developed) was not detected within a single sequence, therefore, the understanding of these transitions was primarily taken from changes noted in ceramic styles, particular architectural features and isolated areas of stratigraphy. As the full excavation history and contextual discussion has been extensively published (Pullen 2011), only a summary of key features will be provided here.

5.6.3.1 EHI

This image has been removed due to copyright. Figure 5.7: Plan of EHI features. Taken from Pullen 2011: 42.

In situ EHI remains were confined to 12 pits, one deep cistern (Cistern 2) and an associated fill (fill 29, adjacent to Cistern 2), all of which were located in the SE area of Excavation Unit 5 (EU5) at the top of the hill (for site plan refer to Figure 5.7). One other possible area of EHI activity was in EU11 which yielded an abundance of EHI pottery. However, its location downslope from EU5 and the absence of clearly defined stratigraphy suggests the EH artefacts deposited here may be the result of erosion of early material from the crown of the hill (Pullen 2011: 41). In consideration of the disturbed nature of EU11, the material in that area cannot be definitively considered *in situ,* therefore, ceramics sampled for this thesis were taken from EU5. The presence of other unstratified EHI finds across the mound attests to widespread disturbance of the early levels, from both later habitation and modern day ploughing. This has led to difficulties in forming a coherent picture of activity during EHI.

The recovery of finds, which included a wide variety of ceramic types, grinding stones, loom weights, spindle whorls, bone tools and small hearths, suggest habitation during EHI at Tsoungiza. However, no architectural remains could be definitely assigned to this period, therefore, it is likely that the later disturbance mentioned above may have removed any architectural features (Pullen 2011: 93). Despite the absence of architectural remains the artifactual evidence would suggest that there was domestic and potentially crafting activity, in the form of weaving, occurring on the crown of the hill during the EHI period.

The transition from EHI to EHII Initial does not seem to be clearly visible from the stratigraphy at Tsoungiza. Pullen tentatively suggests that Pit 32 may document this transition through the presence of ceramics that exhibit what he defines as both EHI and EHII Initial features (2011: 55-56). However, the very fragmentary nature of the ceramics meant that these were not suitable for sampling and are not included within this study.

5.6.3.2 EHII Initial

Based primarily on the ceramic evidence, Pullen was able to refine the chronology of the EH period at Tsoungiza by subdividing EHII into what he terms EHII Initial and EHII Developed (2011). EHII Initial is characterised by changes in ceramics found primarily in Pits 46, 60 and 61, associated with a curvilinear wall (Wall 38) and its associated Fill 8, all of which were again located in EU5 (refer to Figure 5.8). Whilst many of these features contained material of mixed date, they were dominated by ceramics characterised as EHII Initial. The finds were consistent with domestic use such as storage of foodstuffs, disposal of midden from food preparation and consumption, and everyday inhabitation activity. Importantly, these features, and associated deposits, allowed some stratigraphical understanding, lying over features assigned an EHI date and abutted by deposits containing later material of an EHII Developed date.

The most abundant evidence for the period comes from a small rectangular building named ‘1982 House A’, located 150m east to south-east of EU5. This structure appears to have been built within a small depression directly onto bedrock. Although not fully excavated, the remains uncovered measured 6.25m East to West and 3.5m North to South, the walls being preserved to a height of 0.75m (Pullen 2011: 150). The walls appear to have been crudely formed from stone rubble in-filled with crushed bedrock.

This image has been removed due to copyright. Figure 5.8: Plan of EHII Initial features. Taken from Pullen 2011: 143.

A large quantity of ceramic sherd material dating primarily to the EHII Initial period was recovered from inside the structure and surrounding area, representing the largest quantity of EHII Initial material recovered at Tsoungiza (Pullen 2011: 156). As such, much of the EHII Initial material within this thesis is derived from deposits associated with 1982 House A. Despite the quantity of material, much of it was fragmented, with only five vessels suitable for restoration (Pullen 2011: 154). This, in addition to the absence of a well-defined floor layer, suggests that the building was not in use at the time of its destruction and had not been in use for some time prior. It is also apparent that 1982 House A had a short use life as indicated by a pit also of EHII Initial date which was found to cut the rubble from the destruction/collapse of the building.

Pullen has suggested that 1982 House A had a "special, nondomestic function" due to the high proportion of ceramic material, notably a comparatively higher frequency of firedog stands and spindle whorls, combined with the small size and the isolation of the structure (Pullen 2011: 198). He suggests that the activity within it related to the communal storage of equipment for feasting, however, as Pullen himself acknowledges there are some difficulties with this interpretation.

Firstly, "the lack of cooking pot ware and defined storage area is problematic" to his interpretation (2011: 198). In addition, the lack of restorable vessels suggests deposition of broken vessels, not storage of complete ones, and importantly, the building was not in use for long. This, in addition to the apparent absence of a replacement facility, despite the continuation of EHII Initial activity in the immediate vicinity, suggests that the structure did not play a central role in the life of the community at Tsoungiza. Therefore, it seems unlikely that its use was related to feasting, which would have been an important activity. Possible other uses may have related to general storage, textile production and/or perhaps animal processing as indicated by the animal bone remains recovered. Whilst full nature of activity at Tsoungiza during the earliest part of EHII is not clear, it does on the whole appear to be comparable to domestic activity.

5.6.3.3 EHII Developed

Like the preceding period, EHII Developed is characterised by a number of pits, in addition to two structures (House A and B), and several other architectural features (refer to Figure 5.9). Understanding of the archaeology of this period at Tsoungiza has been affected by the early work of Harland which focused on the excavation of these early structures, and whose recording was not always clear or consistent. However, the surviving architectural and stratigraphic evidence enabled Pullen to identify three sub-phases to the EHII Developed period.

5.6.3.3.1 Phase 1

The first sub-phase is characterised by House A, the best-preserved structure for the EH at Tsoungiza (Pullen 2011: 144). The surviving extent of the building measured 9.15m in length and 6.10m wide, with walls reaching up to 1.35m high in places. Orientated NNW-SSE, the structure was divisible into three areas which Pullen has interpreted as a porch, vestibule for a staircase and a main rear room, with a possible second floor.

A second important feature of this phase is Pit 56, located south of Wall 38. Measuring 1.5m in depth this feature was clay lined indicating its use for storage. However, few botanical remains were uncovered and it is unclear what it may have stored. The pit was most notable for containing what appears to be a set of ceramic vessels in its lowest levels consisting of one small bowl, one large coarse bowl, one large incurving bowl in which lay a ladle whose scoop was resting within another small bowl (Pullen 2011: 254). These vessels were either complete or nearly complete and their purposeful placement indicates they were associated together as some form of dining set. Pullen suggests that they represent a 'drinking assemblage' (2011: 254).

This image has been removed due to copyright. Figure 5.9: Plan of EHII Developed features. Taken from Pullen 2011: 245.

5.6.3.3.2 Phase 2

This sub-phase is characterised by the remains of two structures uncovered in the NE area of EU5. The eastern building was not fully excavated, however, it appears that both structures consisted of two rooms divided by a cross wall with a doorway adjoining the two rooms, and both buildings shared a similar orientation. The western building was destroyed by a fire, the remains of which are referred to in the NVAP publication as the 'Burnt Room' (Pullen 2011: 310) and is one of the features from which ceramics within this thesis were sampled.

The 'Burnt Room' was characterised by darker soil containing charred building material remains including burnt posts, burnt clay with reed impressions and burnt beams. The reed remains were orientated E-W along a similar line to postholes that were complete with posts burnt *in situ*. The beams were uncovered lying in a perpendicular orientation to the reeds and posts. Taken together these remains suggest the collapse of a roof and its supporting structure as the result of conflagration. Although called the 'Burnt Room' the area of burning does not appear to relate to a clearly defined space. Burnt deposits were noted throughout the eastern portion of EU5 by Harland during his early excavations, and the NVAP team also noted burning in the area before the 'Burnt Room' was revealed, however, at the time they were assumed to be isolated from the surrounding area. It was subsequently realised that the construction of a later EHIII apsidal building had removed many earlier features which would have been situated in the area of the burning, whilst the construction trenches for the EHIII walls cut through the burnt deposit creating a false quadrate and misleading excavators who designated it as a room. This combination of later disturbance meant that it was not possible to define the full extent of the burnt deposit or the character of any associated structure.

Despite the issues associated with disturbance from later activity, the artefacts associated with the 'Burnt Room' do indicate what activities may have taken place in the structure. Aside from the preserved roofing remains, a large quantity of worked stone and 'blanks' were uncovered along with botanical remains including fig, grape, and cereals remains related to the final processing stages such as sieving. A large quantity of mixed date ceramics were also uncovered significantly, the majority of which were unburnt. Those that displayed burning related to a series of largely restorable vessels: 16 small bowls, one medium sized bowl, an askos and pyxis along with some jar fragments suggestive of a complete dinning set. Pullen has proposed that the remains found in this area indicate a specialised function for the structure possibly associated with food preparation and drinking, suggesting that the botanical remains could be associated with brewing. The number of small bowls indicates that dining was on a communal scale, whilst the presence of a large number of stone blanks suggests that this room was at least in part used for storage.

5.6.3.3.3 Phase 3

This final phase is primarily known from Harland's records, particularly his recording of House B (Walls 6,12, 21, and 22). It was a similar size and orientation to House A of Phase 1, which lay below it. Despite this shared orientation, the construction of House B does not appear to have incorporated any of the walls of House A. This indicates that some time had passed between the destruction of House A and the construction of B. Perhaps the builders of House B were not aware of the presence of House A, or they had purposefully chosen not to incorporate any of it in the foundations of House B. If the latter is correct it may be related to the destruction of House A by fire, for example at Lerna the House of Tiles was not built on again after its destruction by fire leading Wiencke to comment that there appeared to be a level of respect from later inhabitants who left the area clear (2000: 327).

House B appears to have been a trapezoidal shape with two rooms, a smaller one to the north and a larger one to the south. The northern room contained a hearth next to which lay an overturned vessel containing 700 acorns. The room also contained five pithoi embedded into the floor. The ceramics from both rooms consisted of a sauceboat, small bowl, pyxis, jar, cooking pot, basin and firedog stand. Similar structures have been noted at Zygouries (Blegen 1928b) and Eutresis (Goldman 1931, Caskey and Caskey 1960) and appear to be domestic in nature. They are most likely EHII dwellings with features for both food storage, and consumption.

There does not appear to have been any further EHII activity on the crown of the hill where EU5 was located. EHII remains have been noted on the surrounding terraces, however, these were not fully explored therefore, it is not clear if these belong to the later and final EHII phases which are missing from the crown (Pullen 2011: 418).

Despite issues of disturbance and mixed contexts, excavation of Tsoungiza has been valuable in its contribution to understanding of the material culture of the EHI period and early EHII period in particular (Pullen 2011: 37-39). The artifactual evidence from EHII Tsoungiza correlates well to Ancient Corinth (Keramidaki) and Korakou, relating more closely to the early-mid EHII period (Lerna III A-C). This allows good comparison between the sites, particularly in terms of their shared ceramic forms and wares.

Our previous understanding of the EHI and early part of EHII period has been limited due to incomplete excavation, and/or, publication of prehistoric sites across the mainland. This has resulted in a reliance on a small number of published sites the majority of which have lacked the full sequence between EHI and EHII, for example, the site of Lerna which only has limited evidence for EHI occupation but extensive EHII material (*cf*. Rutter 1995; Wiencke 2000). The absence of full sequences has meant that scholars have been forced to use comparable material from sites that may often lie outside their particular region of interest, resulting in an inability to account for geographically specific trends. For example, the reliance on comparison with Eutresis for an understanding of EHI of the Peloponnese, despite its location in Boeotia further to the north (*cf*. Goldman 1931; Caskey and Caskey 1960; also noted by Pullen 2011: 37, 56-57).

Despite the issues with understanding the activity during these periods at Tsoungiza due to the heavy disturbance from later activity, we are able to understand the types of, and changes in, its artifactual remains. Its material culture allows us to ask particular questions, for example about the repertoire of vessels used for dining, including those within this thesis and investigation of their production technology will provide an insight into everyday crafting activity taking place in such EHII small-scale communities. Furthermore, as more contemporaneous sites are investigated, the early activity at Tsoungiza may be better contextualized and understood more clearly at a future date.

5.6.4 Epidavros – Apollon Maleatas

The Early Helladic settlement at Epidavros Apollon Maleatas is located on the Kynortion mountain, 482m above sea level in the area of the Classical sanctuary of Apollon Maleatas (for site plan please refer to Figure 5.10). As a detailed discussion of the site has been published by Theodorou -Mavrommatidi (2004), only a summary of the key features will be provided here.

This image has been removed due to copyright. Figure 5.10: Phased plan of the site of Epidavros Apollon Maleatas. Taken from Theodorou -Mavrommatidi (2004: 1183). Blue = EHII phase 1, green = EHII phase 2 and pink = EHII phase 3. EHI Areas 7 and 8 are circled.

The site lies directly on Mid to Late Triassic trachytes and trachytic tuffs surrounded by Triassic fossiliferous limestones to the East and limestone with thin layers of dolomite to the West. Jurassic diabase-chert-tuffite formations are found in large outcrops to the North East, within which lie small outcrops of serpentinites (Papavassiliou et *al*. 1984), all of which should provide diagnostic rock types within examination of ceramic thin sections.

The earliest evidence for activity at Epidavros Apollon Maleatas dates to the FN period, with activity continuing through to Classical times. The site was first excavated in 1896 by P. Kavvadia, though it was only in the early 20th century in excavations conducted by I. Papadimitirou, that evidence for prehistoric activity in the area was confirmed (Theodorou -Mavrommatidi 2004: 1167). Between 1977 and 1978 Prof. V. Lambrinoudakis undertook systematic excavation of the area and uncovered architectural features belonging to the EHII period. This work was extended in 1995 by A. Theodorou-Mavrommatidi, who specifically focused on the EH phases of the site.

5.6.4.1 EHI

Due to the well-preserved nature of the EHII architectural features and as yet incomplete excavation of the site, the exploration of earlier phases has been limited. The excavation of EHI levels primarily consist of two small test pits (*c.* 1 x 1m) in areas A7 and A8 (refer to Figure 5.11). No architectural features were uncovered dating to EHI, but ceramic material and three burials testify to activity in the area during this early period. Theodorou - Mavrommatidi has suggested that the later EHII building activity at the site may have incorporated possible earlier structures masking their presence, therefore, it should not be assumed that there was no EHI inhabitation (Theodorou -Mavrommatidi 2004: 1168).

The three burials were characterised by cut ‘pit’ features, each of which was covered with stone slabs. These grave cuts all lay in close proximity to each other approximately 0.5m from EHII Building B to the south. Only Grave 2 contained ceramic vessels (a basin, large bowl and closed coarse-ware vessels) some of which were sampled for this thesis. Several other stone slabs, similar in appearance to those capping the grave cuts, were found in the vicinity of these three graves. However, none of them appeared to be *in situ* and no further burials were recovered, suggesting that more burials may have been present in the area but the construction of EHII Building B may have destroyed them (Theodorou -Mavrommatidi 2004: 1179).

EHI ceramics were also recovered from two areas of the site where excavation continued to lower deposits. The first area was located in the area between the apse of Building B and Building C, whilst the other was located in the area of the drain in Building A. Neither test pit found architectural or negative features such as pits, but did recover EHI pottery. EHI pottery was also uncovered mixed with later material.

5.6.4.2 EHII

The EHII period at Epidavros is characterised by the presence of three primary building phases.

5.6.4.2.1 Phase 1

The largest of the EHII structures found at Epidavros is Building A measured 8 x 5m. Aligned NW-SE, the building was constructed using a combination of herringbone wall construction, mud bricks, and rough stone walling in-filled with smaller stones and soil, faced with larger stones (Theodorou -Mavrommatidi 2004: 1227). These walls formed a series of rectangular and trapezoidal spaces at the centre of the site. Whilst Theodorou-Mavrommatidi has suggested that the quality of construction and large size of this building may indicate a non-domestic function, the heavily disturbed nature of the remains means that it is not possible to understand the full extent or character of the structure. The ceramics from the building appear to be typical of early EHII period domestic occupation, whilst the size is comparable to other structures of the EHII early period such as the 1982 House A at Tsoungiza dating to EHII initial, and the buildings noted by Blegan at Korakou (1921: 75).

5.6.4.2.2 Phase 2

Lying directly North East of Building A, were the remains of two apsidal structures with curvilinear walls, Buildings B and C, which were most likely part of the same structure. The building was orientated NW-SE with the apses positioned to the SE, the diameter of each was approximately 3m. Within the apse of Building B a rectangular hearth was uncovered at the SE section, whilst ashes and burnt material was uncovered to the North. In addition, both ceramic sherd material and vessels broken *in situ* were recovered suggesting the building may have been in use at the time of its destruction, or was abandoned shortly before.

A third curvilinear wall, Building D, was found SW of Buildings B and C, orientated on a NE-SW alignment with the apse to the SW. This building displayed the same building techniques, and was of a similar dimension and planning, as B and C indicating that it was contemporary with B and C (Theodorou -Mavrommatidi pers. comm.).

5.6.4.2.3 Phase 3

Lying directly above Buildings B, C and D, rectilinear walls were uncovered assigned as Buildings E, F and G. Building E lay above Building B, whilst Building F lay above Building C, both shared the orientation of the earlier structures. Building G to the SW in the area of Building D, is also on the same alignment as E and F, and shared a similar construction. Unfortunately, excavation of this final phase of construction was not completed, therefore the full stratigraphical sequence of these later remains was not fully established. Theodorou -Mavrommatidi states that this shared alignment may indicate that the later builders were aware of the earlier structures, however, it should also be noted a partial explanation for building orientation may relate to the direction of the sun rise and sunset which would affect heat and light within the structures. The alignments of these structures may have been related to trying to get the most light and heat from the sun throughout the year with similar orientations also being noted for structures at Tsoungiza.

The evidence uncovered at Epidavros suggests that remains from the site represent the activity of a small community, initially for the burial of their dead and later for habitation, bearing strong architectural similarities to Tsoungiza for the EHII period. It is likely that EHI habitation occurred in close proximity to, if not at, Apollon Maleatas, as suggested not only by the presence of the burials but also the abundance of EHI pottery from deeper excavations. The archaeology at Epidavros provides a good opportunity to explore pottery from contexts associated with a range of social behaviour, from internment of the dead to everyday practices of cooking and dining.

5.6.5 Talioti

The Talioti Valley is located in the South Eastern portion of the Argive plain, *c.*5km South East of the port of Nauplio and located *c.* 2km North West of Ancient Asine. The Valley is named after a village to the South (Weisshaar 1990:

1). The alluvial valley is known for its fertile soils, which has led to extensive terrace construction for the growing of olive and citrus trees. The geology of the valley is dominated by Pliocene-Pleistocene undivided flysch, containing calcite, shales, bedded reddish marls, sandstones and conglomerates. These are accompanied by small outcrops of lower Cretaceous well bedded fossiliferous limestones with intercalations of marl and marly limestones. To the East, and to a lesser extent in the SW, there are large outcrops of Middle Triassic carbonate rocks overlying keratophyric tuffs, sandstone, limestones and cherts. The valley floor consists of Quaternary, loose conglomerates which have been eroded from the higher terraces and fine alluvial deposits (Zaronikos *et al.* 1970).

The area is known for an abundance of characteristic EH pottery which has been noted at sites across the NE Peloponnese, particularly from EHI which has resulted in the assignment of a specific Talioti phase or type. Pottery from the area was recovered and recorded during a small-scale survey by Dousougli (1987) and by a survey conducted by the German Archaeological Institute as part of the work at the site of Tiryns (Weisshaar 1990), however, neither survey found evidence of ancient structures or settlements. The closest known EH sites are in Aria, on the hill of Hagios Ioannis of Leukakia, and on the acropolis at Asine.

The ceramics discussed in this thesis come from a rescue excavation undertaken by the 4th Ephorate of Prehistoric and Classical Antiquities, Nauplio. The excavation consisted of two 4 x 4m trenches in an orange grove. As work was halted the excavations were not extensive and did not reach any definable features such as pits, however, an abundance of pottery was recovered, much of which was in excellent condition. The excavators also noted a large amount of pottery at the surface across the entire field (Kossyva pers. comm.). The pottery was dominated by fruitstands in particular, but also contained bowls, ladles and jars. Ceramics associated with cooking were notably rare. Without full excavation it is difficult to characterise the activities at Talioti, however, the abundance of ceramics, and the dominance of specific shapes suggest that the activity had a specialised nature, centred on the fruitstand form in particular.

5.7 Comparative Material Background

5.7.1 Nemea Valley Survey Site 204

Like the settlement of Tsoungiza, Survey Site 204 was investigated as part of the wider Nemea Valley Archaeological Project led by James Wright under the auspices of the American School of Classical Studies at Athens (Wright *et al.* 1990). The primary aim of the survey was to establish the distribution of artefacts of different periods across a delineated area of the Nemea Valley, evaluating how representative their distribution was of activity at different times, to help develop explanations for long term changes, and to document previously poorly investigated periods, characterizing human activity in the Nemea Valley up until the modern day.

The survey covered 80km² within the Nemea Valley and surrounding area. The area was divided into tracts ranging in size from 1-2 ha. in size, covering a total of 4800 tracts. Each tract was walked by a small team (5-7 people), who counted all the artefacts observed and collected diagnostic examples. Sites were classed as areas delineated by a high concentration of artefacts, these were then investigated at a higher resolution with more extensive artefact identification and recording using photography and drawings, accompanied by geomorphological investigation to examine the level of disturbance.

Site 204 was recognized in 1984 when deep ploughing uncovered approximately 2000 sherds of EHI and early EHII pottery, spread over 1 hectare. Whilst never formally excavated, the high concentration of well-preserved material bears strong similarities those found from other small prehistoric settlements in the area (Wright *et al.* 1990: 611), including Tsoungiza. The ceramics range from cooking pots to fine slipped tablewares consistent with a domestic settlement such as that at Tsoungiza, enabling comparison of material from different locations within the same landscape.

5.7.2 Midea

The site of Midea lies at the Eastern border of the Argive Plain in the Argolid region. It is situated on a hill, standing 270m about sea level and is best known for the remains of a Mycenaean citadel. The site was first excavated in 1907 by the German Archaeological Institute at Athens, with further work being undertaken through joint Greek-Swedish excavations which began in 1983, under the direction of Katie Demakopoulou. As the site has been partially published in a series of reports, and is subject to a number of more detailed forthcoming publications (Demakopoulou *et al.* 2005, 2006, 2008; Alram-Stern forthcoming), this section will simply provide an overview of the archaeological background and ceramic assemblage.

Whilst the excavations at Midea primarily focused on the Mycenaean archaeology, abundant stray finds strongly suggested activity at the site dating back to the Neolithic. This was confirmed during the 2004-2006 excavations which revealed evidence for Late and Final Neolithic activity, and stratified deposits containing abundant concentrations of Early Helladic I and II, and III finds in two trenches (A and Aa) on the Northwest terrace of the Upper Acropolis. It is from this area that the ceramics analysed for comparative purposes were recovered dating from the Late Neolithic through to EHII. Although the EH ceramic assemblage covers the EHI-III period, EHIII has been studied by Michaela Zavadil and was not included in the analyses used for this thesis which focused on.

The EH ceramic assemblage includes a range of vessel types from coarseware cooking pots and baking pans to fine small saucers and fruitstands. However, as EHI material was not abundant, with many possible EHI sherds being worn and undiagnostic, analyses focused primarily on EHII material in particular. These ceramics included askoi, saucers, jars and pithoi but the assemblage was particularly notable for the high proportion of tablewares including small unslipped saucers and fine slipped sauceboats. There are also large jars with dark painted circular decoration which had not been noted at the other sites examined with the exception of Tiryns, suggesting a strong link between the two sites.

5.7.3 Tiryns

Tiryns is located on a small hill on the Argive Plain in the Argolid region, and has been excavated, primarily by German archaeologists, since the early 19th Century with Greek rescue excavations taking place in the late 1950's and 1980's. These excavations have revealed a long history of occupation dating from the Neolithic through to the Hellenistic and Roman periods, however the site is best known for its Mycenaean citadel and extensive palatial complex (Kilian *et al.* 1981, 1982).

The Early Helladic period represents the earliest architecture at the site with a concentration of structures in the lower citadel in particular, alongside a range of material culture primarily dated to the EHII period. Of particular interest has been a thick walled circular building in the Upper Citadel dated to the later part of EHII, the function of which is still unclear, but which represents an unusual architectural type for this early period suggesting that Tiryns was not a 'typical' EHII settlement.

This image has been removed due to copyright. Figure 5.11: Photograph of EHII ceramics from Tiryns displayed at The Archaeological Museum at Nauplio. A- A 'wine cooler'. B- A large fruitstand. C- A jar with dark circular painted decoration.

Some of the EH ceramics have been published by Weisshaar (1983) and represent a varied EHII repertoire. Those that have been used for comparative analysis for this thesis derive from the lower citadel and are largely consistent with those found at other EHII sites including forms such as sauceboats, small bowls, pithoi and jars. However, the excavations at Tiryns has also recovered more unusual shapes such as a large 'wine cooler', and very large EHII fruitstands (refer to Figure 5.11). It was also notable during macroscopic examination of the material, that some forms of decoration found at Tiryns had not been widely noted at the other sites examined in this thesis, for example white slipped sauceboats and the large jars with dark circular painted decoration which had only been observed at Midea. This variation suggests that the EHII ceramics at Tiryns whilst sharing similarities to other settlements, also includes unusual elements that indicate more unusual dining contexts, in particular dining on a scale larger than a small household, suggested by the large EHII fruitstands and the abundance of small saucers. As such, the ceramics from this site represent a good opportunity to compare the production and consumption of ceramics found at small communities such as Epidavros and Tsoungiza, with larger and perhaps more prominent sites such as Tiryns and Midea both of which go on to become significant BA settlements.

5.7.4 Spiliotaki (Monopori)

The site of 'Monopori' is located on the Spiliotaki plain, east of the main road from Velanidia to Andritsa and covers an area of 406 sq.m. It formed part of rescue excavations by the 4th Ephorate of Prehistoric and Classical Antiquities, Nauplio between 2003 and 2004, led by Alcestis Papadimitriou.

The excavation was divided into two main sectors. In sector one excavators uncovered a concentration of stones 15m in length which ran NE-SW, the purpose of which was not clear, however, to the east of the stones there were three pits which were notable for the abundance of animal bones. In sector two a second concentration of stones measuring 16m in length was also uncovered with a NW-SE orientation, again the purpose of which was unclear. A wall was found in sector two, with two pits to the south, again containing animals bones. Both sectors contained pottery, obsidian blades and stone tools dated to EHI and EHII. The ceramic assemblage from Spiliotaki is dominated by EHII forms including jars, pot stands, cooking pots, sauceboats, small bowls and ladles, consistent with other assemblages relating to Early Helladic domestic activity, such as those from Tsoungiza. These shared characteristics allow for a good comparison between Corinthian and Argolid ceramic production and consumption.

The excavators have suggested that the site was possibly associated with cereal production due to the recovery of carbonized wheat grains found in one of the pits (Kossyva pers. comm.).

5.7.5 Lempetzi (Argos)

Lempetzi was located on Theater Street SE of the ancient Agora of Argos, covering an area of c. 300 sq. m. It was excavated as part of rescue excavations between 1980 and 1981 led by Katie Demakopolou.

Finds recovered at the site date from the EH, MH, Classical, Hellenistic and Roman periods. The EH phase was located approximated 2.4-3.5m below surface level and is characterized by two walls of a rectangular building reaching a maximum length of 3.8m and a maximum height of 0.75m. To the north of the site remains of curved walls were found indicating the presence of apsidal buildings. In addition, two pits were excavated containing animal bones and pottery sherds, dated to EHII. Taken together the evidence is suggestive of settlement at the site.

The Lempetzi assemblage contains a narrower range of vessels forms than found at other sites examined in this thesis and comparatively. The assemblage is dominated by fine slipped small bowls, sauceboats, and jars with the notable absence of larger coarser forms such as pithoi or cooking pots similar to the assemblage from Ancient Corinth (Keramidaki). As this material was excavated from pit features it may suggest specific deposition practices relating to these particular vessel types.

5.7.6 Agios Panteleimon

Agios Pandelimon is a large settlement site which forms part of a wider Early Helladic landscape in the area of Kranidi, in the Southern Argolid. Modern disturbance and abundant tree growth has resulted in difficult excavation conditions. However, the excavation conducted by the 4th Ephorate of Prehistoric and Classical Antiquities, Nauplio was able to identify a range of

Early Helladic features including pits and architectural features such as metalled surfaces possibly related to housing structures (refer to Figure 5.12).

This image has been removed due to copyright. Figure 5.12: Arial photograph displaying some of the metalled surfaces uncovered at Agios Pantelimonas. Image kindly provided by Angeliki Kossyva 4th Ephorate of Prehistoric and Classical Antiquities, Nauplio.

The material studied from the site appears to largely date to the EHII period with an abundant repertoire of sauceboats, bowls, jars and cooking pots. It is of note that from the contexts available to study there is a large proportion of fine table ware vessels such as sauceboats including a high proportion of grey slipped and burnished types that were not noted at other sites examined. The material suggests that this settlement had access to high quality products, for which there was a clear demand, standing in significant contrast to the picture presented by some other sites within this study such as the Epidavros material.

5.7.7 Delpriza

Delpriza is located east of the village of Koilada, 2500m South East of Franchthi Cave, in the Southern Argolid and was excavated by the 4th Ephorate of Prehistoric and Classical Antiquities, Nauplio. It is a multi period site with archaeology dating from Neolithic through to Classical times, including an unusual EH tomb, a Classical period cemetery and classical olive press. The material examined for comparative purposes was primarily recovered from a series of pit features and the tomb that contained approx. 30 individuals (Kossyva 2009).

The EH ceramics from the pits are varied and appear largely domestic with large proportions of bowls, basins, jars, and cooking pots. Such a repertoire indicates settlement in the area, however, no distinct structural remains dating to the EH were located. The ceramics from the EH tomb were more specialised consisting of both whole and fragmentary vessels dominated by pyxides. Significantly, the vessels shared typological characteristics with the Kampos group which may indicate Cycladic links to the inhabitants within the tomb (Kossyva 2009: 362). Most of the pyxides were dark burnished or red slipped and have been dated to EHI (Kossyva 2009: 359-360).

5.8 Summary

This chapter has provided an overview of the geological and archaeological background to the sites within this thesis and those used for comparative purposes. The varied nature of the both the geological units between the Corinthia and Argolid, in addition to the range of archaeological contexts and recovery methods from which the ceramic material has been derived, should facilitate a comprehensive discussion of EH production and consumption behaviours, over time and across the landscape.

The shared chronological periods and/or settlement activities of the sites within this thesis, particularly during the EHII period, will allow discussion of contemporaneous consumption and production practices across the study area. In addition, whilst the shared character of some of the geological formations across the Corinth region, and the repetition of particular rock types and clays across the NE Peloponnese, may make differentiation between sources problematic, the varied nature of the key geological formations should facilitate discrimination between products from particular areas.

Chapter 6: Results – Ceramic Macroscopic Variability

6.1 Introduction

The investigation of ceramic technology can provide important information about producer and consumer choices exercised during the EH period. However, the resolution at which that information can be examined has a significant impact on the level of detail and understanding that can be gathered.

This chapter presents the results of macroscopic examination of the material within this thesis. As the majority of work undertaken on EH ceramic assemblages relies on macroscopic examination, it is important to establish the level of detail that can be gained through this type of analysis. This is especially the case given that scholars are increasingly concerned with the study of fabric, in an attempt to lay the foundations for further analytical work on ceramics. It is not the aim of this chapter to provide a typological overview of the material examined, as there exists a range of very detailed typologically-based publications and unpublished sources relating to EH ceramics in the NE Peloponnese, including some of the sites within this thesis (Cherry 1973; Weisshaar 1983; Weisshaar *et al.* 1990; Rutter 1995; Runnels *et al.* 1995; Wiencke 2000*;* Pullen 2011; Alram-Stern 2004; Alram-Stern f*orthcoming*). Instead, the aim of this chapter is to detail the range of technological information that can be detected at the macroscopic level and to suggest what that may represent. Of particular interest is the relationship between the macroscopic and microscopic evidence, acknowledging that these two resolutions of examination do not necessarily correlate in a straightforward manner, but that macroscopic characteristics can still offer important insights into technological processes. Further, as macroscopic examination formed the basis for sample choice, it is particularly important to present the information that informed that selection.

This chapter will outline the primary macroscopic fabric groups (MG) identified during visual examination of assemblages within this thesis and from examination of comparative material. It will detail the sites at which the fabrics appear, the vessel types, and surface modification techniques that are associated with them.

6.2 Fabrics

Macroscopic fabrics were identified from fresh breaks where possible. Details were recorded about the colour, presence or absence of firing cores, the nature of inclusions and the hardness of the fabric adapted from *The Study of Prehistoric Pottery* (P.C.R.G. 2010: 16-28).

6.3 Forming, Finishing and Surface Modification Techniques

Where possible, details relating to forming, finishing and surface modification are summarised, though clear evidence of forming and finishing techniques were often completely absent. This was due to the fact that either final decorative processes obliterated or obscured this evidence, or that the original surface was not preserved due to taphonomic processes. This was particularly problematic when examining soft chalky fabrics, especially in the Corinthia region.

Provisional macroscopic observations relating to firing and surface treatment will be discussed here, however, discussion and the results of more detailed analysis (by SEM) in relation to firing techniques and surface modification of a selection of samples will be discussed in Chapter 8.

To allow the comparison of material that has undergone varying taphonomic processes, terminology relating decorative type will be kept to simple comments on the presence, type and colour of any surface modifications. However, where possible traditional typological terminology based on Weisshaar (1983, 1990), Rutter (1995), Wiencke (2000), and Pullen (2012) is used to allow for cross referencing with other site assemblages.

6.4 Macroscopic Group 1

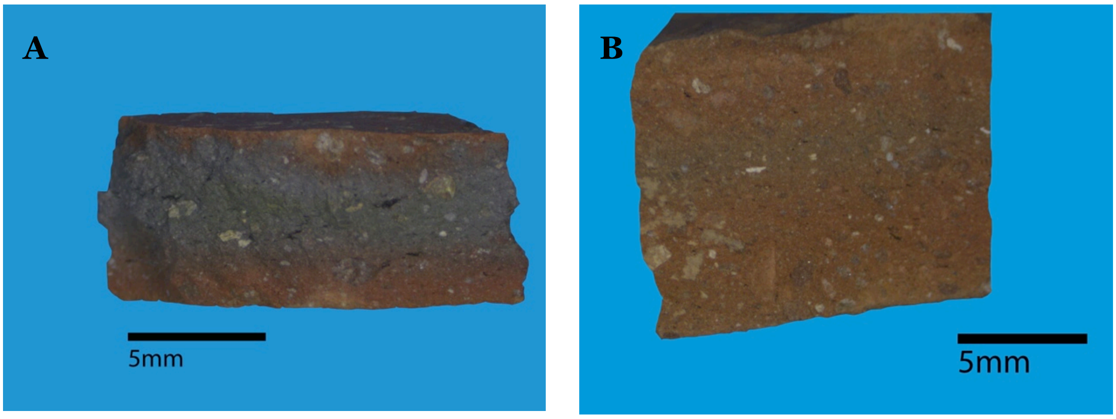


Figure 6.1: A. TSO 10/14 and B. TAL 11/11 displaying the variability found within MG1.

6.4.1 Fabric Summary

This fabric correlates with PG15 and has been found at the majority of sites studied for this thesis. It is also widely present in comparative assemblages. It directly correlates to Pullen's Class 1 fruitstand fabric (2011: 60).

Significantly, MG1 is dominant in comparative assemblages from the Argolid particularly Talioti, Midea and Tiryns (Burke *et al. forthcoming*). It is most commonly found in association with EHI forms, overwhelmingly fruitstands (also noted by Pullen at Tsoungiza 2011: 69) but does include EHII vessels, particularly in Argolid assemblages, comprising of jars, basins, ladles, sauceboats and small bowl forms.

The surface colour can be both even and mottled, ranging from orange to purple-red (Munsell reddish yellow 5YR 6/8- dark yellowish brown 10YR 4/6), dominantly accompanied by grey cores (particularly for EHI vessels. Munsell greenish grey GLEY 2 5/2 – reddish grey 2.5YR 5/1) suggestive of fast firing in both mixed and oxidising atmospheres (refer to Figure 6.1). The fabric is commonly medium coarse to fine, with moderately- to well-sorted, hard, sub-angular, grey-white inclusions (Munsell light grey 5YR 7/1 – white 5Y 8/1) that appear to glint in sunlight. It can also contain sub-angular, soft white inclusions and sub-angular to angular brown-purple inclusions (Munsell dark red 10R 3/6). The biscuit is dominantly hard with a rough to smooth fracture (particularly in the purple-red examples). Orange examples are more commonly softer and can be chalky but still display a smooth fracture. Voids are rare but when present they are rounded to elongated vesicle and vugh types.

6.4.2 Forming and Finishing Techniques

Forming technique is not commonly visible on vessels assigned to MG1. When visible, marks are consistent with hand-built methods, particularly slab and coil methods as signified by the character of void structures and their alignment. This is particularly noticeable for fruitstand rims which commonly have voids running diagonally and vertically through the length of the bowl portion from rim to base, consistent with both coil joins, and slab building. Some areas were cracked and broken at the site of joins (refer to Figure 6.2). Examination of fruitstand bowls and pedestals has confirmed that fruitstands were built as at least two composite parts, with the bowl being added to the pre-made pedestal (refer to Figure 6.3).

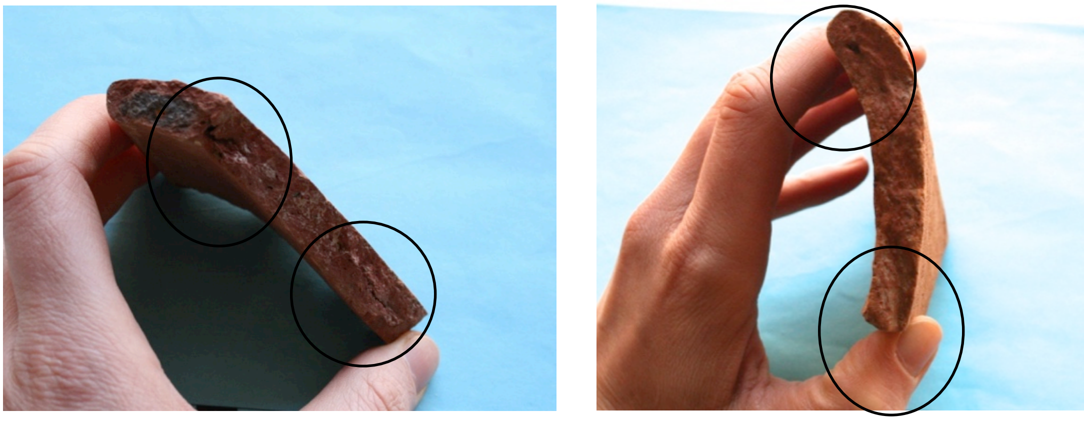


Figure 6.2: Image of EHI fruitstand bowl fragments from Talioti with joins and fractures indicated.

Figure 6.3: Image of EH fruitstand pedestal from Talioti with the location of bowl join indicated.

Finishing techniques are most clearly visible on the interior and exterior of jars and coarser vessel types, which are commonly roughly finished displaying striations and indentations consistent with drawing, pinching, scraping, and wet wiping (Rye 1981: 72. Refer to Figure 6.4). As the interior of such vessels was commonly poorly finished, it suggests that their interior finish was not important, either as they were not meant to be seen, for example in closed vessel types, or that their appearance was not significant, for example they were food preparation vessels rather than tablewares for display. Pullen noted that several vessels within his Class 1 fabric also had mat impressions on their base, suggesting the use of mats to help turn vessels during production (2011: 60).

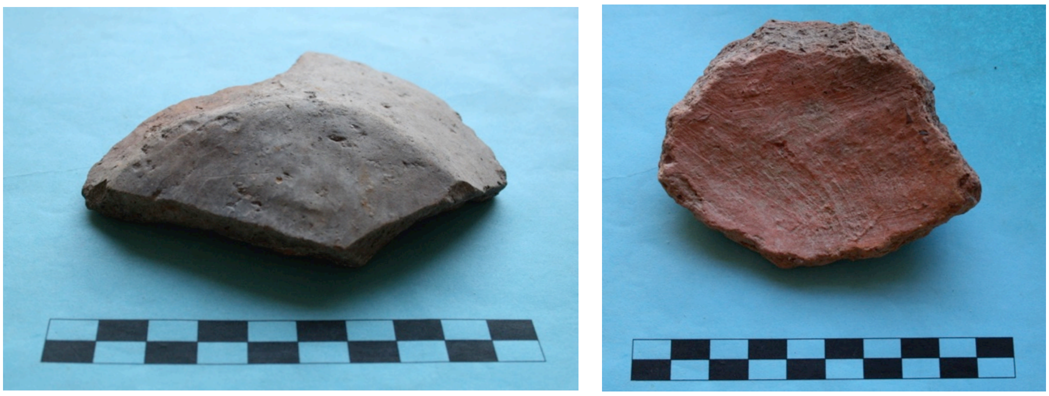


Figure 6.4: Two jars from Talioti displaying rough striations and indentations consistent with pinching and smoothing.

6.4.3 Surface Modification

Vessels are commonly undecorated or are solidly painted with a red-brown or red-orange slip/wash (Munsell red 2.5YR 4/6 – red 10R 5/8), one example of a black-brown wash (Munsell black 5YR 2.5/1) was also noted in the material from Talioti. Burnishing, incised kerbschnitt or triangles, raised, and applied decorative types are present but are not common and often restricted to particular vessels and areas of vessels (refer to Figure 6.5). Decoration was dominantly found on the fruitstand and large bowl forms. The presence of slips and burnishing on the interior of these vessels may relate their use to hold liquid based food or drink. The slip and burnish would have helped prevent the contents from being absorbed into the ceramic. The decoration of the rim and pedestal of fruitstands suggest these vessels were designed to be displayed, with the pedestal and rim acting as key areas for elaborating the vessels appearance.

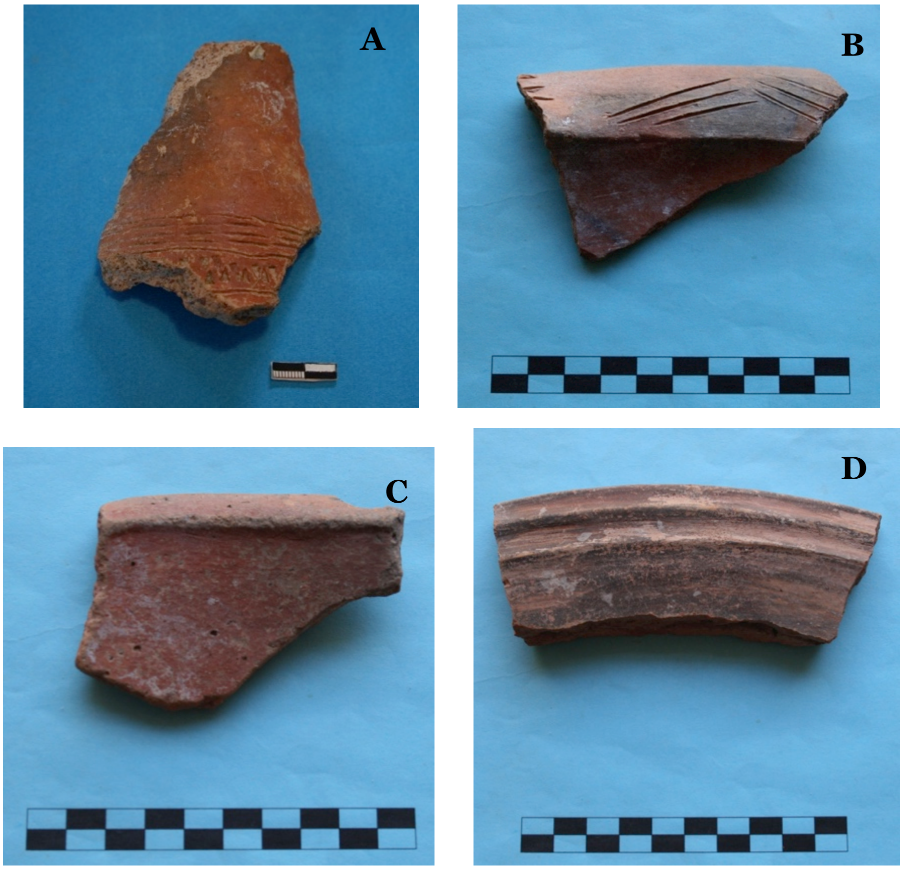


Figure 6.5: Top row: Two EHI fruitstand pedestals from Tsoungiza, A. TSO 10/24 with slipped and incised decoration and B. TAL11/16 has a raised rim with incised diagonal decoration. Bottom row: C. TAL 11/13 a shallow bowl from Talioti with slipped decoration D. TAL 11/1 a fruitstand rim from Talioti with a dark wash.

6.4.4 Summary

Macroscopic examination has enabled the distinction of MG1 as a very characteristic fabric with a specific colour range and associated grey core which makes it very recognisable (trends also noted by Weisshaar 1990 for 'Talioti ware' material). These features provide an early indication of fast firing techniques that seem to have been used for the majority of vessels within this macroscopic group, whilst the commonly very hard nature of the fabric suggesting high firing temperatures. These vessels display a variety of surface modification techniques demonstrating a range of skills and technical knowledge but a shared choice and *habitus* of where to add decoration onto the vessel. Forming and construction techniques are also consistent across the group. This range of shared practices suggest a common understanding of how the vessel should be made and how it should look.

The prevalence of the fruitstand form within MG1, and common presence of MG1 within Argolid assemblages has provided an early indication that inhabitants in the region had a preference for vessels made using this fabric and that the fabric was used to make the fruitstand forms in particular. The fact that fruitstands were recorded at the majority of sites within this thesis but not in a wide variety of fabrics has suggested that its production was restricted but that its distribution was not.

6.5 Macroscopic Group 2

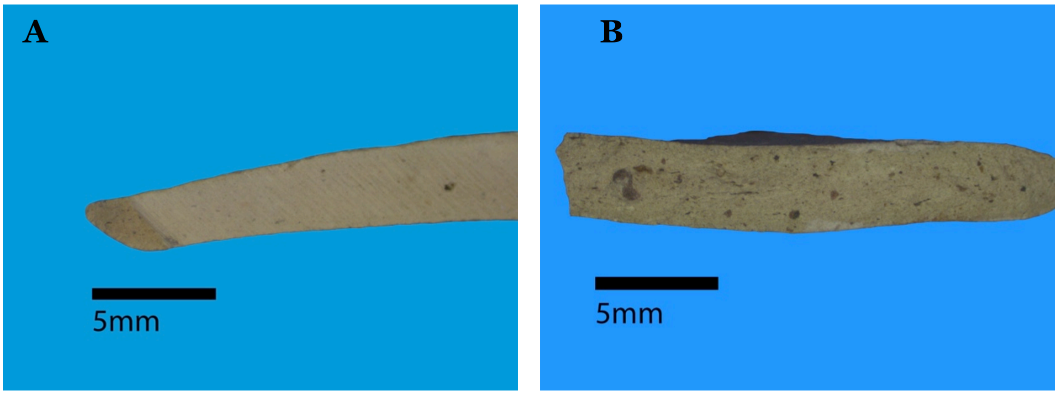


Figure 6.6: A. KER 11/9 and B. TSO 10/109 displaying the macroscopic variation within MG2.

6.5.1 Fabric Summary

MG2 has been found in association with a range of petrographic groups, however, it dominantly relates to PG1 and PG2 and has been found at all the sites examined with the exception of Talioti, as well being noted widely in comparative material. MG2 is found in association with a variety forms from EHI fruitstands to EHIII tankards, however, it is dominantly associated with EHII slipped (commonly Urfirnis) tableware forms and EHIII dark on light pattern painted table vessels. Geographically, MG2 is most abundant in assemblages in the region of Corinthia, dominating the tableware vessels at sites such as Ancient Corinth (Keramidaki) and Tsoungiza.

The surface and biscuit colour ranges between yellow buff, buff with green tones and buff with pink tones (Munsell pink 2.5Y 8/3 – pinkish white

7.5YR 8/2. Refer to Figure 6.6). The colour is commonly homogeneous, however, some examples have a slightly darker core which indicates that full oxidation was not achieved during firing of these vessels. Other examples display striations of darker red and lighter buff clay suggestive of clay mixing.

This fabric is very fine, soft and chalky with a smooth break. The biscuit contains very few rounded to sub-rounded brown, red and black inclusions (Munsell red 10R 4/6 and black 10YR 2/1), and exhibits very few voids. When voids are visible they are dominantly rounded-elongated vesicle and vugh types.

6.5.2 Forming and Finishing Techniques

The fine, soft and chalky nature of this fabric means that it has not commonly been possible to identify forming and finishing techniques. However, some examples exhibit features consistent with wet wiping, such as non-uniform striations and the dragging of some inclusions (refer to Figure 6.7). Where forming is visible it is usually in relation to the attachment of handles, necks and spouts which were hand made as separate components that were then joined to the main vessel body, a technique that appears to have been commonly used across the study area (refer to Figure 6.7).

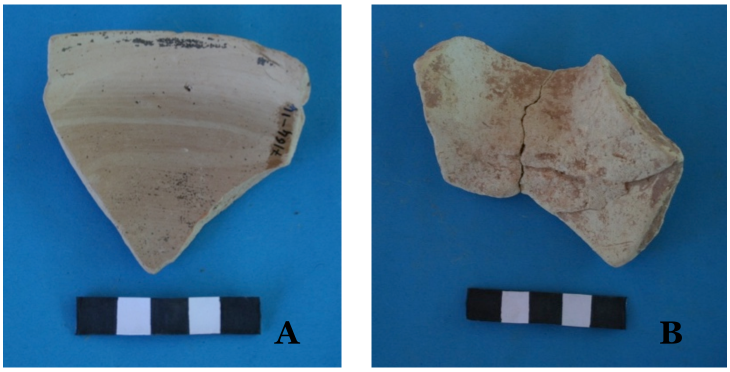


Figure 6.7: A. KER 11/13 a sauceboat from Ancient Corinth (Keramidaki) with wiping marks on the interior B. KER 11/129 a jar interior displaying a visible join between the neck and body from Ancient Corinth (Keramidaki).

6.5.3 Surface Modification

Surface modification is dominantly represented by solid and pattern-painted black or black-brown slips but also includes brown and red-brown slips which are less common (Munsell dark yellowish brown 10YR 4/6 – red 2.5YR

4/6). The motifs include bands of cross-hatching (Wiencke motif 7b, 2000: 612), hatched and cross-hatched triangles (Wiencke motifs 1b and 19, 200: 612-613) in EHII. EHIII includes intersecting horizontal and vertical lines (Rutter motif III, 1995: 37), and short diagonal bars (Rutter motif IV, 2000: 37). The bases of slipped vessels commonly have a reserved area devoid of paint. Other surface modification techniques observed for MG2 are incision and burnishing but these are not common (refer to Figure 6.8 and 6.9).

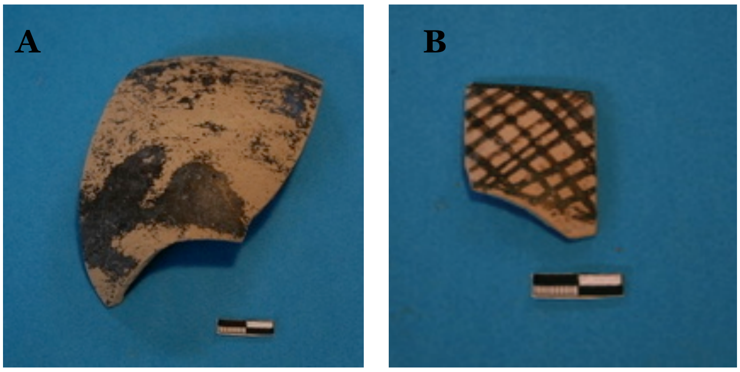


Figure 6.8: TSO 10/101 a dark slipped sauceboat from Tsoungiza, B. TSO 10/108 a pattern-painted, dark on light sauceboat from Tsoungiza.

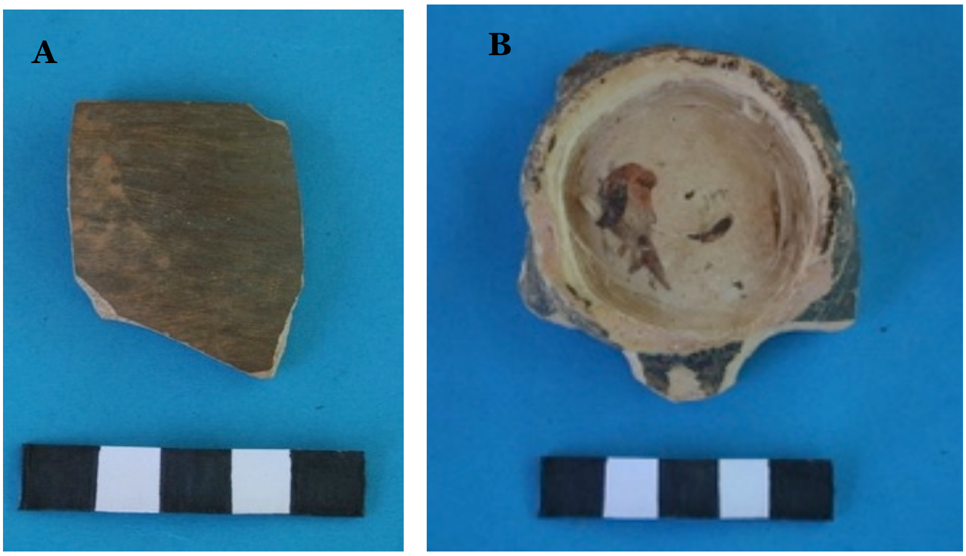


Figure 6.9: A. KOR 11/14 a slipped and burnished yellow-blue mottled sauceboat from Korakou, B. KER 11/10 a sauceboat/bowl ring base from Ancient Corinth (Keramidaki).

6.5.4 Summary

MG2 represents the main tableware fabric for the EH period, prevalent in forms related to drinking and dining such as the sauceboat, small bowls and tankards. It has a long history of use from EHI all the way through to EHIII but is consistently associated with a slipped surface, most notably the use of dark slips. Macroscopic examination has indicated that the tradition of a buff body with a contrasting slip appears to have been particularly popular with consumers at sites within the Corinth region. The use of a dark slip on a buff body demonstrates a high level of skill by potters who were not only able to produce a wide variety of fine vessel types but were also able to manipulate their firing atmosphere to produce this finish.

Examination of material from both the EH and later periods has found that MG2 has a very long history of use throughout the Bronze Age, particularly in Corinthia, and as such this fabric provides a cautionary tale again the dating of sherds based on macroscopic fabric alone.

6.6 Macroscopic Group 3

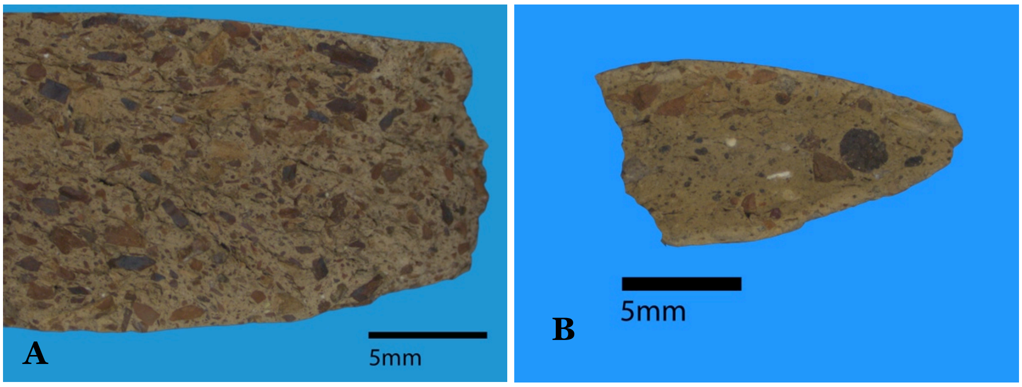


Figure 6.10: A. TSO 10/18 and B. TSO 10/67 displaying the macroscopic variation within MG3.

6.6.1 Fabric Summary

This macroscopic group has been associated with a number of petrographic groups but dominantly relates to PG3. It was most clearly noted macroscopically at Tsoungiza and from comparative material from NVAP204. It bears a strong similarity to MG9 from Ancient Corinth (Keramidaki) and if the break is not fresh it is difficult to separate the two macroscopic groups. However, MG3 is differentiated from MG9 based on the dominant presence of orange and purple angular inclusions and the absence of the black inclusions which characterise MG9.

MG3 is commonly associated with large and small bowl forms in EHI but also includes EHII forms such as sauceboats, a cup and baking pans. The surface and biscuit colour ranges from yellow-buff to pink-buff (Munsell very pale brown 10YR 8/3 – pink 7.5YR 8/3), with the rare presence of darker cores and is commonly soft with a rough to hackly break which can be friable. The fabric ranges from medium fine to coarse with sub-angular to angular purple, brown and orange inclusions (Munsell reddish brown 5YR 4/4 – reddish yellow 7.5YR 6/8. Refer to Figure 6.10). In some examples white and yellow-white (Munsell white 10YR 8/1 – very pale brown 10YR 8/2), sub-angular inclusions are also found but these are rare. Voids vary considerably between the fine and coarse fraction of this group with finer examples displaying few sub-rounded and elongated vesicle and vugh voids, whilst coarser examples are dominated by elongated channel voids.

6.6.2 Forming and Finishing Techniques

Forming technique was not usually visible when examining vessels assigned to MG3, as many vessels were slipped, or the surface of the vessels was poorly preserved due to the soft, chalky and friable nature of the fabric.

6.6.3 Surface Modification

When slipped vessels in MG3 are dominantly slipped with either a red-brown or black slip (including Urfirnis. Munsell red 10R 5/8 – black 5Y 2.5/1), with some examples also including incised decoration. Slips are commonly quite thin and appear to be more of a wash than a solidly painted slip (refer to Figure 6.11).

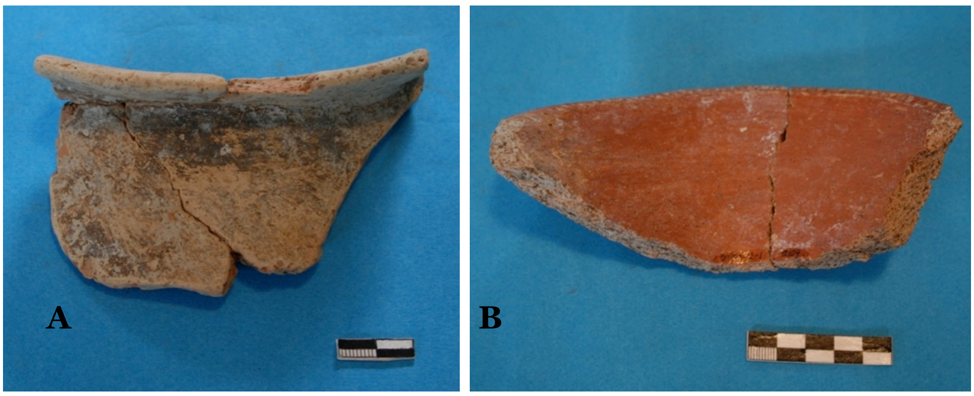


Figure 6.11: A. TSO 10/66 a jar with a thin wash, and B. TSO 10/18 an orange slipped bowl.

6.6.4 Summary

Macroscopic examination has identified both a coarse and fine version of MG3 and provided an early indication that potters were using similar raw materials but potentially using different processing practices, as well as a variety of surface modification techniques. As this fabric has been consistently found at sites within the Nemea Valley it has provided an indication of localised production and consumption of vessels, most dominantly bowl forms which represented a common part of the dining repertoire across the EH period.

Significantly, the confusion of this fabric with others from Ancient Corinth (Keramidaki) acts as a warning about the level of detail that can be gained from macroscopic examination of fabric. Petrographic analysis has shown that the orange, and purple inclusions within MG3 relate to the use of mudstone, which is a widespread tradition across the NE Peloponnese with a long history. Therefore, it is important where possible, to identify distinguishing features within comparative material to provide characteristics with which to differentiate mudstone-based fabric groups. In many instances mudstone based fabrics may represent a broad macroscopic class that will require detailed petrographic examination to differentiate producers. A similar trend was noted by Matson during his macroscopic examination of material from the Minnesota Messinia Expedition. He commented that coarsewares were usually 'tempered with red shale or light coloured rock fragments' (1972: 203), suggesting that the use of argillaceous rock fragments within paste recipes was widespread on the Greek mainland even during the MH and LH periods.

6.7 Macroscopic Group 4

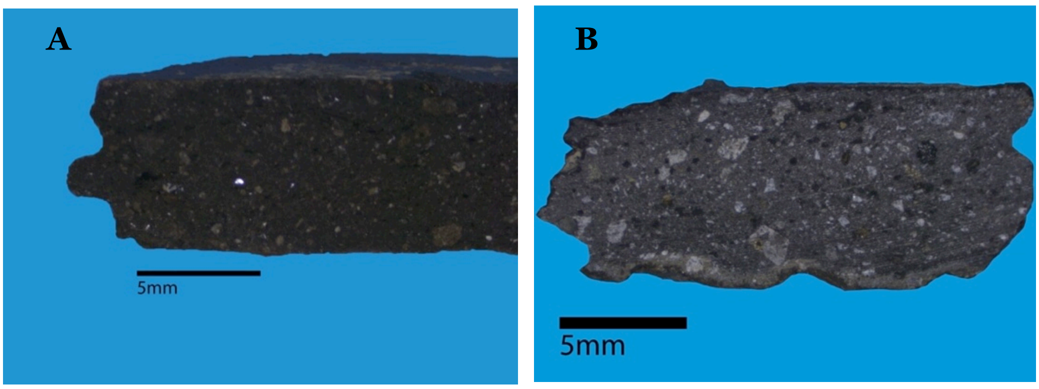


Figure 6.12: A.TSO 10/5 and B. EPI 12/12 of MG4.

6.7.1 Fabric Summary

MG4 relates to PG24 and was identified at Tsoungiza in the EHI period, and at Epidavros in vessels dating to both EHI and EHII. It was also recorded within comparative material from EHI Delpriza and relates to Gauß and Kiriatzi's MG1 (2011: 48). The fabric is most dominantly associated with slipped and/or burnished bowls which stand out due to the high quality of their surface finish.

The biscuit is commonly hard with a rough break. The colour ranges from brown to grey-black (Munsell weak red 10R 4/4 – black 10YR 2/1), with no visible core, suggestive of a consistently reducing firing atmosphere. The fabric is medium-coarse to coarse with poorly to moderately well sorted angular to sub-angular, grey-black inclusions accompanied by small, sub-angular golden inclusions that glint in sunlight, most likely indicating the presence of gold mica (refer to Figure 6.12). Voids are few consisting of irregular and elongated vughs.

6.7.2 Forming and Finishing Techniques

The compact character of the fabric combined with the slipped and burnished finish of the surfaces meant that it is not usually possible to see forming or finishing techniques. One exception is sample TSO 10/37 which displays indents and striations consistent with scraping which have been emphasised by the polish of the burnish (refer to Figure 6.13).

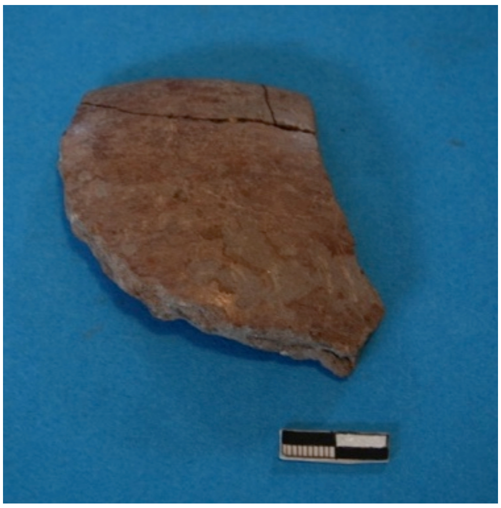


Figure 6.13: TSO 10/37, an EHI burnished bowl from Tsoungiza exhibiting marks indicative of scraping to finish the surface before burnishing.

6.7.3 Surface Modification

Vessels are commonly red-brown slipped (Munsell red 10R 4/8) and/or burnished, with rare examples of incised decoration (refer to Figure 6.14). The dominant use of burnishing represents a consistent decorative tradition for forms across this fabric group. The use of burnishing for the interior may relate to the use of the vessels to hold liquid or food stuff that could potentially soak into the ceramic. However, the use of burnishing across the whole vessel, and consistently in a range of vessel types from EHI and EHII demonstrate that the use of this technique of surface modification can not be satisfactorily explained in functional terms alone. Therefore it is more probably that the use of burnishing relates to a particular decorative *habitus* and tradition learnt by the producers of these vessels.

Figure 6.14: Incised and burnished examples of vessels from MG4. A. EPI 12/12 body sherd from Epidavros with incised decoration, B. EPI 12/27 a bowl with red slip and burnish from Epidavros, and C. TSO 10/3 a bowl with red-brown slip and burnish from Tsoungiza.

6.7.4 Summary

MG4 is a very characteristic fabric, distinctive for the presence of gold mica which is not commonly associated with mainland fabrics. As such, its identification during macroscopic examination acts as an early indicator of imported vessels. Furthermore, macroscopic analysis has also been able to identify a distinct correlation between the choice of surface modification technique and this fabric which indicates that producers of these vessels made distinctive choices with regards to the finish of their vessels. Burnishing is a labour intensive method of surface modification that would have required significant time investment, as such, the dominant presence of a burnish for this fabric may have acted as an instant and very visible a sign of quality, as well as of origin, to consumers. This is also suggested by those examples that appear to have thick slips which stand in stark contrast to some of the thin washes noted in other fabrics such as MG3 discussed above.

6.8 Macroscopic Group 5

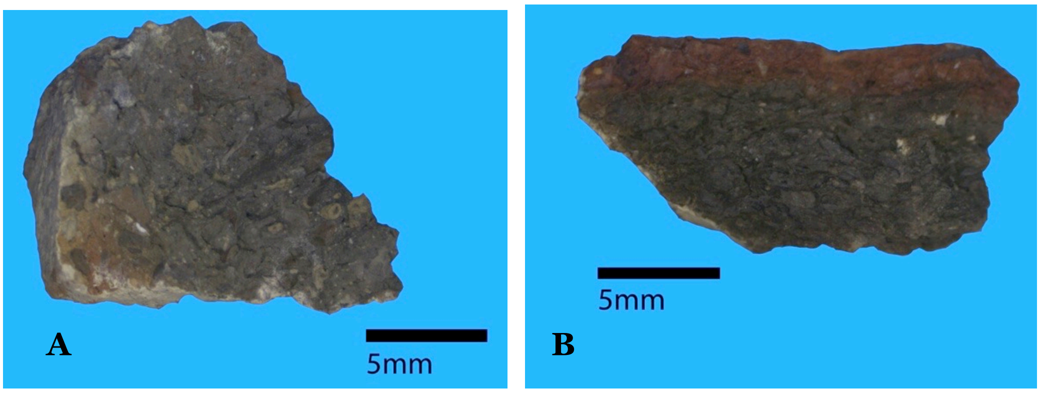


Figure 6.15: A. TSO 10/120 and B. TSO 10/53 displaying the macroscopic variation within MG5.

6.8.1 Fabric Summary

MG5 is a coarse, friable fabric with a hackly break dominantly associated with large EHI and EHII vessels, particularly pithoi, firedog stands, and jars but includes some bowl forms. It has been identified at Tsoungiza and Ancient Corinth (Keramidaki), but also noted in comparative material from NVAP204, and relates to PG3, 14 and 23.

The surface and biscuit colour of MG5 is commonly mottled and uneven, ranging from orange-brown to grey-brown (Munsell red 2.5 YR 5/8 – red 2.5YR 4/6) and displaying dark cores (dark reddish grey 2.5 YR 4/1- reddish grey 2.5 YR 5/1) suggesting mixed and poorly controlled firing atmospheres (refer to Figure 6.15). Inclusions are commonly poorly sorted sub-angular to angular purple, brown and orange in colour, however, a few examples exhibit white and yellow-white, sub-angular inclusions. Voids are common, dominated by elongated vesicle and channel voids, some of which appear to contain blackened material suggesting the use of vegetal temper.

6.8.2 Forming and Finishing Techniques

The coarse and friable nature of this fabric means that it is often not possible to see signs of forming technique, although the large and coarse nature of many of the vessels suggests hand built methods were most likely used. Many vessels appear roughly finished whilst others appear smoothed, however, no samples provided clear evidence of finishing.

6.8.3 Surface Modification

Vessels are overwhelmingly plain, however, applied (including taenia types A – E), slipped and burnished decoration was noted in small amounts (refer to Figure 6.16).

Figure 6.16: KER 11/53 an example of applied and slip decoration at Ancient Corinth (Keramidaki) from MG5.The area circled highlights the use of a red slip (Munsell 10R 4/8).

6.8.4 Summary

MG5 relates to a number of petrographic groups highlighting the sometimes unclear relationship between macroscopic observations and petrographic ones. This also emphasises the need to be cautious with interpretations of macroscopic fabric groups in relation to provenance. What is clear is that this fabric represents the use of coarse clay recipes to make large vessel types, and that these coarse vessels were most commonly undecorated and poorly fired.

6.9 Macroscopic Group 6

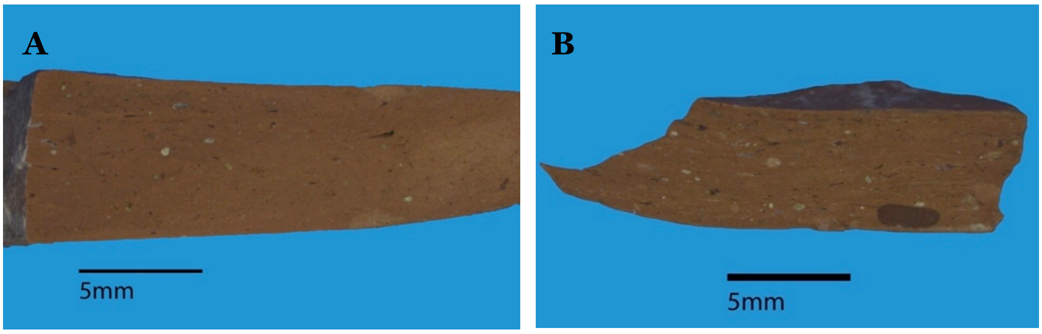


Figure 6.17: A. TSO 10/4 and B. TSO 10/38 of MG6. Image B also displays striations of light and dark within the biscuit suggestive of clay mixing.

6.9.1 Fabric Summary

MG6 relates to PG4 and is a very characteristic fine orange-pink to orange-brown fabric (Munsell red 2.5YR 5/8 – reddish yellow 5YR 6/8) that is found in relation to slipped tableware vessels from EHI-III at Tsoungiza. The fabric is hard with a smooth break and an even colour. The orange colour and rare presence of a core, indicates a consistent and well controlled oxidising firing atmosphere. Some examples display uneven colour with striations in the biscuit which may signify clay mixing (refer to Figure 6.17). Inclusions are very few to rare comprising of sub-rounded, soft yellow-white, and pink-orange inclusions. Voids are also rarely visible, but when present they are dominantly rounded to elongated vesicles and vughs.

6.9.2 Forming and Finishing Techniques

The fine nature of this fabric meant that it was not possible to identify visible signs of forming. Finishing was also not commonly visible due to the common presence of a slip or painted decoration. One undecorated vessel did display evidence of vessel finishing using paring and scraping techniques, evident from deep striations on the exterior surface. The presence of clear grooves indicate the use of a tool (refer to Figure 6.18).

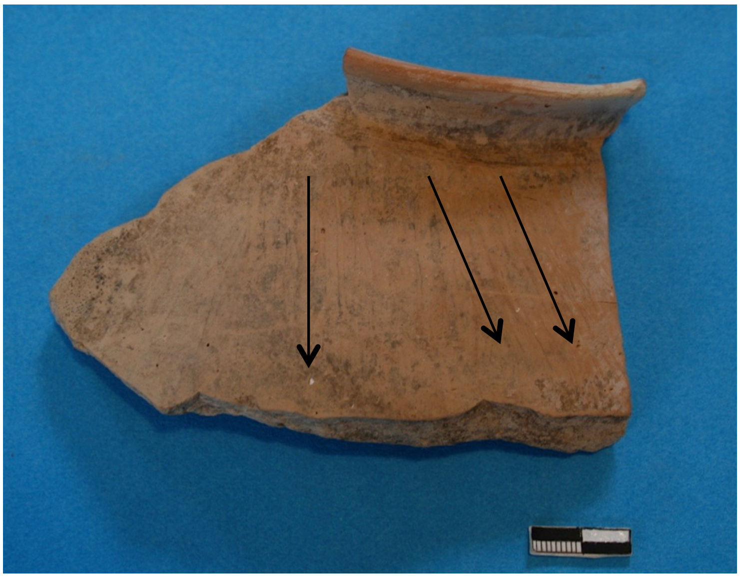


Figure 6.18: TSO 10/34 an EHI jar from Tsoungiza with vertical striations and grooves consistent with paring and scraping of the exterior surface from MG6.

6.9.3 Surface Modification

Decoration is dominated by the use of a red-brown or orange-brown solidly painted slip or wash (Munsell red 2.5YR 5/8 – yellowish red 5YR 5/8), and/or burnishing. Pattern-painted examples are included (for example Rutter motif VII, 200: 37) again with a red-brown paint on a light background. The small number of samples within this fabric make it difficult to estimate the proportion of each type of decoration type however, it is very striking that all examples were red-brown or orange-brown suggesting the common choice of this surface colour for this fabric (refer to Figure 6.19).

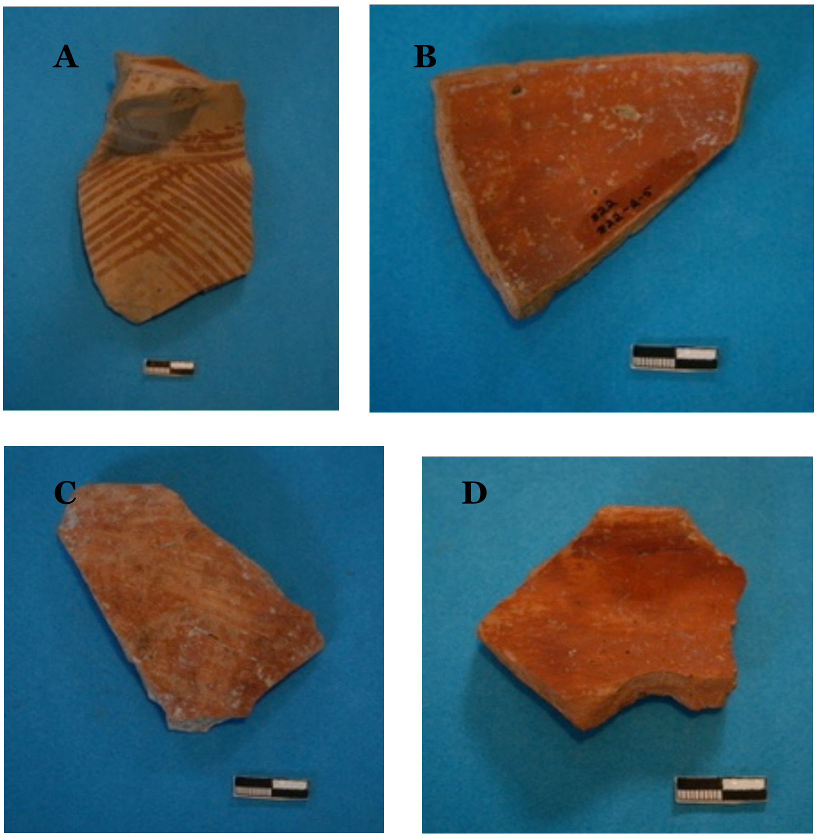


Figure 6.19: A range of decorative techniques for MG6 at Tsoungiza. A. TSO 10/123 a jug with dark on light pattern-painted decoration, B. TSO 10/38 a bowl with orange-brown slip/wash, C. TSO 10/4 with a bowl with a thin orange-brown wash, D. TSO 10/8 a jar with thin orange-brown wash.

6.9.4 Summary

Macroscopic analysis of this fabric has revealed some key features of technological choice. Firstly, some of the samples from this fabric group show signs of clay mixing indicating that potters were making very specific technical choices about the modification of clays. Secondly, there is a clear correlation between this fabric and the choice of orange slips and paints. This suggests that there was a distinct technological tradition and specific *habitus* related to surface modification techniques by those who produced this fabric group.

6.10 Macroscopic Group 7

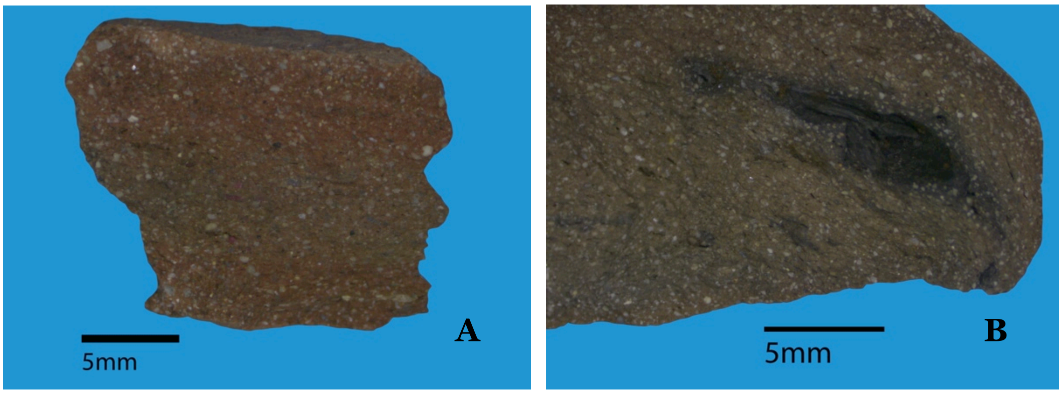


Figure 6.20: A. TSO 10/27 and B. TSO 10/31 of MG7.

6.10.1 Fabric Summary

MG7 is a distinctive fabric associated with PG20 and identified in relation to EHI-III vessels at Tsoungiza and EHII Korakou. It is associated with a variety of forms including bowls, askoi and a frying pan. It is a medium fine, relatively hard fabric with a rough break. Its colour ranges from dark brown to red-brown (Munsell brown 7.5YR 4/4 – red 2.5YR 5/8), commonly with a grey-brown core (Munsell brown 7.5YR 5/2) suggestive of incomplete oxidation during firing. Characteristically, inclusions are very well sorted, sub-angular, white and well-packed with sub-angular, red inclusions visible in some samples. Voids are commonly elongated vughs and round vesicles (refer to Figure 6.20).

6.10.2 Forming and Finishing Techniques

As the surfaces of vessels with MG7 are commonly slipped or burnished, evidence for forming and finishing is rarely visible. The laminated structure of the fabric and presence of some elongated, curved voids may indicate coil construction.

6.10.3 Surface Modification

All the samples from MG7 include some form of surface modification, most commonly burnishing but also including incision and solidly painted slip (refer to Figure 6.21).

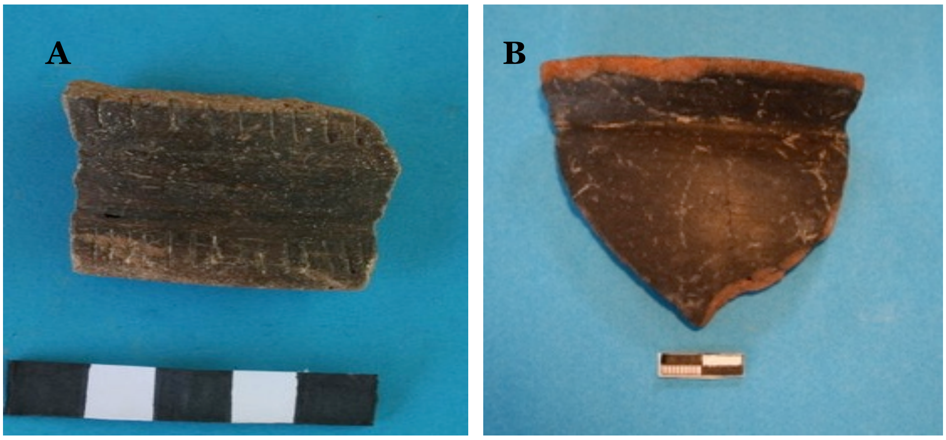


Figure 6.21: The range of decorative techniques present in MG7. A. KOR 11/33 frying pan with incised, slipped and burnished surface, B. TSO 10/139 a slipped and burnished bass bowl.

6.10.4 Summary

Through macroscopic examination it has been possible to differentiate this characteristic fabric, which is usually associated with burnished vessels. The dominant use of burnishing suggests a specific decoration tradition for this fabric. As there is a wide variety of vessel types represented by MG7, the choice of burnishing does not appear to be explained through purely functional considerations, although it may have been useful for vessels such as bowls that may have contained liquid/food that would have been absorbed into the vessel. Instead, the use of burnishing represents a specific technological choice and tradition that would have required a substantial investment of time to be dedicated to creating the appearance of these vessels.

The presence of MG7 from EHI to EHIII suggests that the same raw materials were used by a succession of potters throughout the EH period indicating a long-held tradition whose products were particularly consumed by communities in the Corinth region.

6.11 Macroscopic Group 8

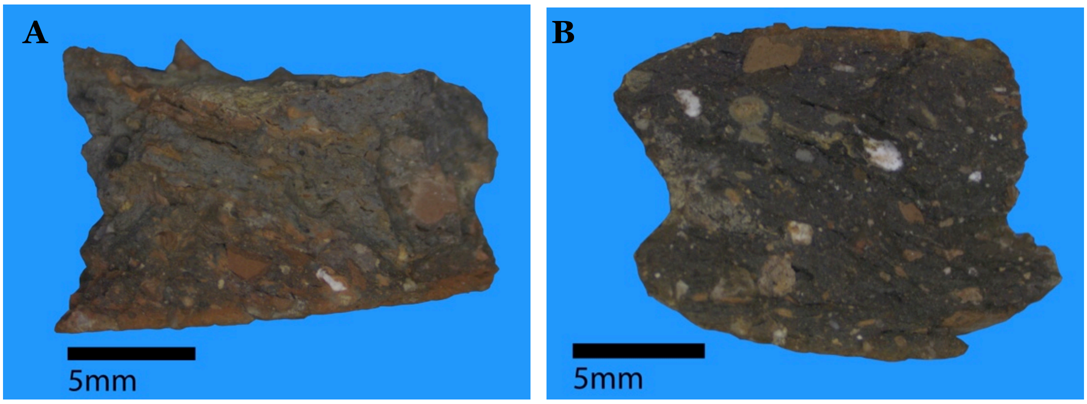


Figure 6.22: A. TSO 10/73 and B. TSO 10/57 of MG8.

6.11.1 Fabric Summary

MG8 dominantly correlates to PG5 although other petrographic groups were included in this macroscopic group. It was identified dominantly in relation to large vessel types dating to EHI and EHII, particularly firedog stands, cooking pots and some bowl forms at Tsoungiza and Ancient Corinth (Keramidaki).

Vessel surface colour is usually uneven, ranging from dark orange-brown to black-brown (Munsell red 2.5YR 4/6 – reddish black 2.5Y 2.5/1), commonly with a large black-grey firing core/biscuit (yellowish red 5Y 5/8 – dark bluish grey GLEY 2 4/10B), suggesting fast firing in mixed firing atmospheres (refer to Figure 6.22). The fabric is dominated by large poorly sorted angular, hard, grey-white, and sub-angular purple and orange inclusions. Voids are common and dominantly elongated vughs and channels, some of which display areas of charring suggestive of vegetal temper.

6.11.2 Forming and Finishing Techniques

The large and unusual shape of the firedog stands within this group indicate they were made using hand construction methods. The other vessel types did not display clear signs of forming technique. All samples were left roughly finished, with the poor preservation of the surfaces on some samples making it particularly difficult to identify finishing techniques (refer to Figure 6.23).

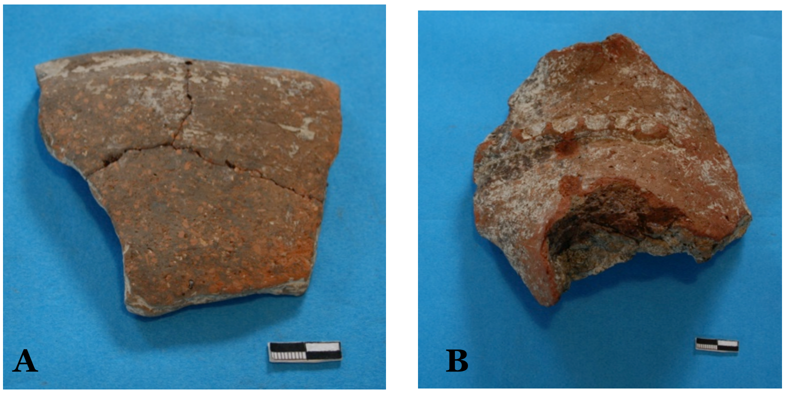


Figure 6.23: A. TSO 10/54 a plain coarse bowl and B. TSO 10/68 a firedog stand with applied decoration. Both from MG8.

6.11.3 Surface Modification

Vessels are predominantly plain, or have applied decoration such as Type A and C taenia bands. Type C taenia bands are particularly common for firedog stands (refer to Figure 6.23).

6.11.4 Summary

The macroscopic examination of MG8 was complicated by the poor preservation of surfaces and the friable nature of the fabric. However, it was possible to identify that this fabric was particularly used for large forms and significantly those related to heating. This suggests that there may be a functional link between the choice of a coarse raw materials and the vessel type.

The identification of this fabric only at some sites within the Corinthia has provided an early indication of a localised tradition.

6.12 Macroscopic Group 9

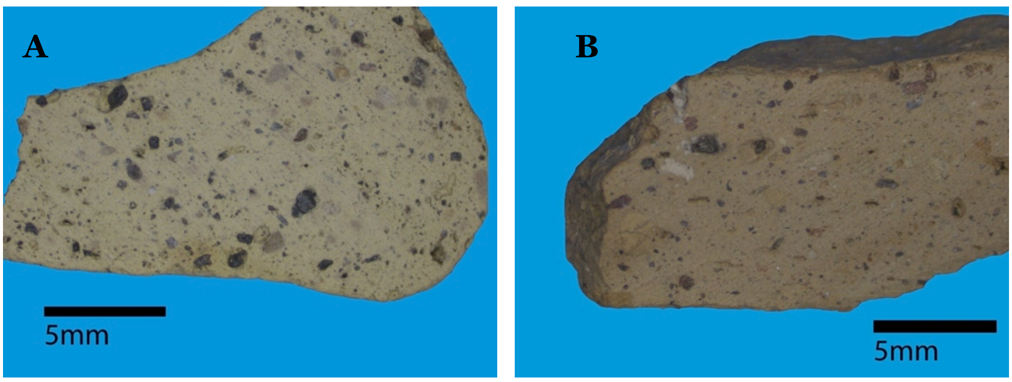


Figure 6.24: A. KER 11/62 and B.KER 11/37 displaying the variation present within MG9.

6.12.1 Fabric Summary

MG9 is a very characteristic fabric identified at Ancient Corinth (Keramidaki) and Korakou. It is dominantly associated with EHII jar forms but also includes EHII large bowls and jugs. The fabric is soft and chalky, with a smooth break and is usually medium coarse, although finer examples were noted. The surface and biscuit are yellow-buff with green tones (Munsell white 2.5Y 8/1) or buff with rosy pink tones (Munsell pinkish white 7.5YR 8/2) and no visible core, suggestive of a well controlled oxidising atmosphere. The biscuit contains well-packed sub-angular and sub-rounded dark black and distinctive dark red-brown-black inclusions (Munsell dusky red 10R 3/3- black 10YR 2/1) with few vugh type voids. Many examples also contain sub-angular and irregular white to yellow-white inclusions (Munsell very pale brown 10YR 8/2) refer to Figure 6.24).

Although MG9 predominantly relates to PG10, some samples were correlated with other groups such as PG2, 3, 7 and 9 due to the shared presence of the dark black and pink-orange inclusions which make this fabric so distinctive. Petrographic analysis has revealed that the similarity was due to the presence of clay pellets and over-fired mudstones in these latter groups.

6.12.2 Forming and Finishing Techniques

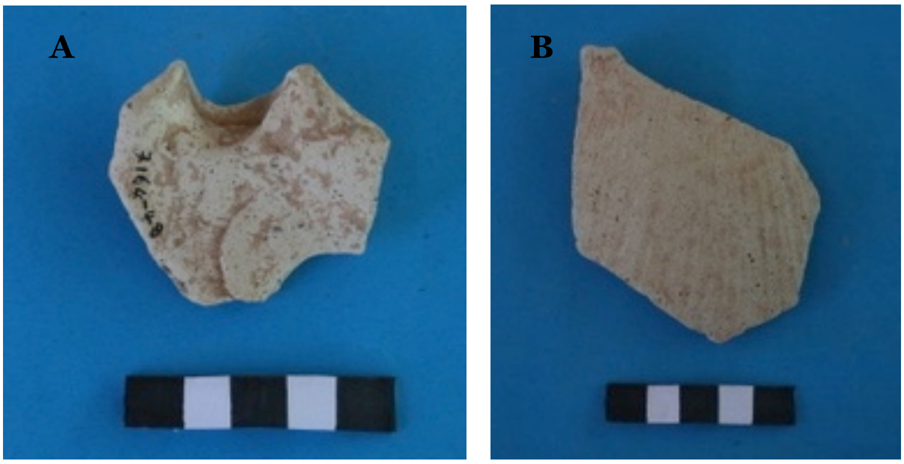


Figure 6.25: A. KER 11/42 image showing the addition of a spout from a jug and B. KER 11/127 paring of the external surface of a jar.

For many samples it is difficult to identify forming or finishing techniques due to the poor preservation of this soft chalky fabric. However, in a few examples, deep grooves and uneven striations were observed, consistent with scraping, paring and wiping with tools (refer to Figure 6.25). In addition, examination of handles, spouts and necks revealed that these were formed separately from the body and then attached, also noted for other fabric groups discussed in this chapter.

6.12.3 Surface Modification

Vessels from MG9 are predominantly plain, but the group also includes a small number of bowls with orange-brown (Munsell yellowish red 5YR 5/8) and black Urfirnis slips. Burnishing, applied lugs, and incised decorative types are also present but in small amounts (refer to Figure 6.26).

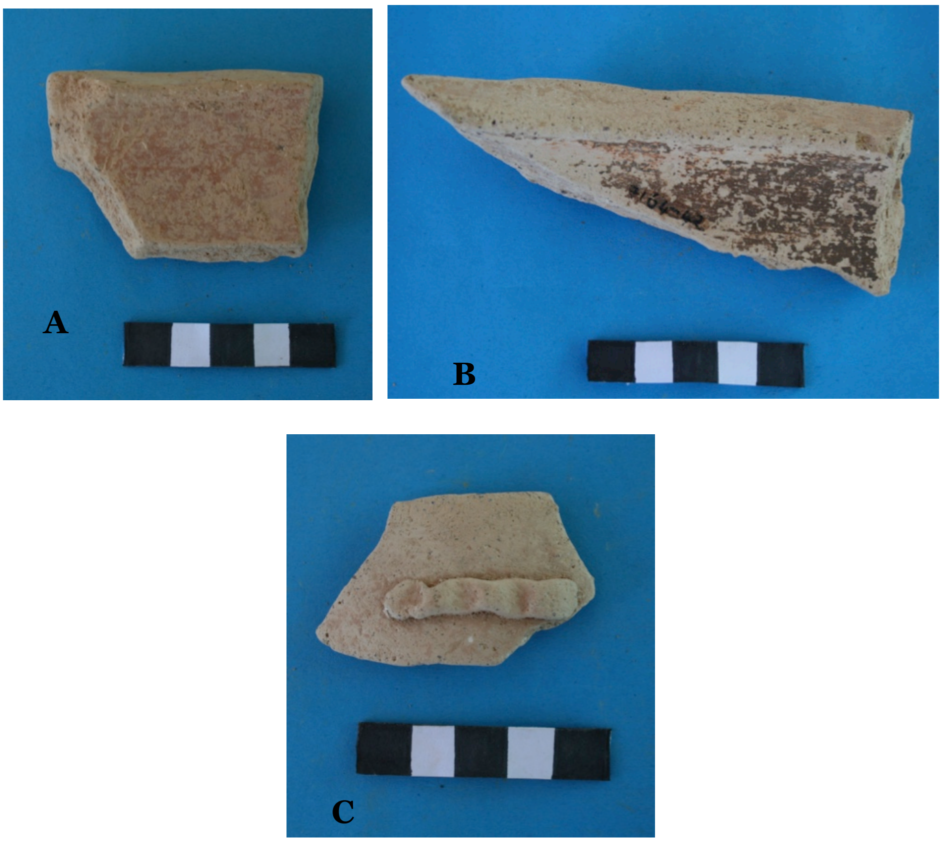


Figure 6.26: A range of decorative techniques found at Ancient Corinth (Keramidaki) for MG9. A. KER 11/81 large shallow bowl with red—brown internal slip. B. KER 11/37 large shallow bowl with brown internal slip. C. KER 11/132 cup with applied decoration.

6.12.4 Summary

Macroscopic examination has indicated that this fabric was used for particular forms, notably jars. Its correlation to more than one petrographic group illustrates the difficulty of relating microscopic and macroscopic features. As discussed in relation to MG3, the widespread and common use of argillaceous rock fragments across the NE Peloponnese and the wider mainland, can make the identification of individual fabrics difficult. Multiple centres of production/paste recipes may be represented within this single macroscopic group.

6.13 Macroscopic Group 10

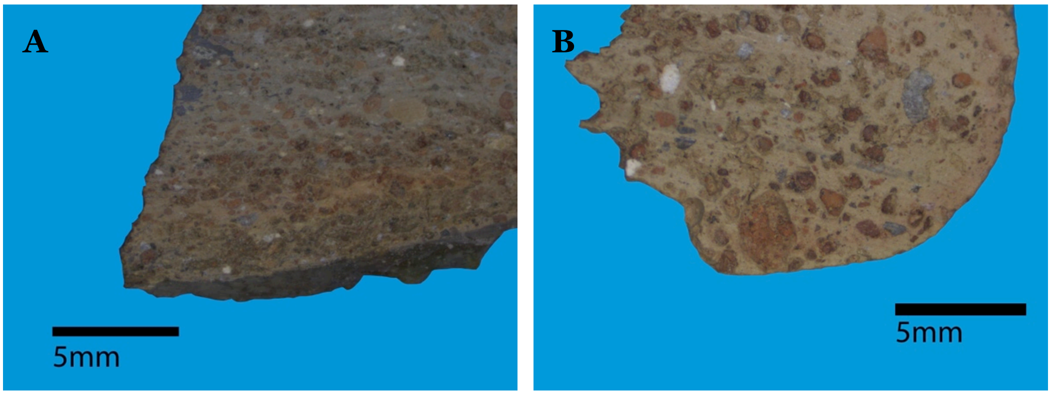


Figure 6.27: A. KER 11/56 and B.KOR 11/27 displaying the macroscopic variability found within MG10.

6.13.1 Fabric Summary

MG10 is a coarse fabric with a hackly break that has only been identified for a small number of samples from EHII Ancient Corinth (Keramidaki) and Korakou, representing a jar and a ladle. It correlates to PG11 and is very characteristic due to the presence of well-packed, large, sub-rounded orange inclusions. These are accompanied by very few sub-angular white, and red-purple inclusions (refer to Figure 6.27). The surface colour ranges from mottled grey-pink-buff to orange with buff biscuits (Munsell pinkish grey 5YR 7/2 – reddish yellow 5YR 7/6), both with and without firing cores, indicating different firing atmospheres from consistent and well controlled to mixed atmospheres. Voids are commonly visible as elongated vughs and channels, although sub-rounded vesicle voids are also present.

6.13.2 Forming and Finishing Techniques

MG10 contains both plain and slipped vessels. In all cases it is difficult to identify evidence of forming or finishing due to the generally poor preservation of surfaces, and the obliteration of such features from slipping.

Forms such as ladles, were clearly hand built due to the nature of their shape, however, it is not possible to make similar inferences for the other forms.

Figure 6.28: KOR 11/27 a ladle from Korakou from MG10.

6.13.3 Surface Modification

The only slipped vessel colour ranges from brown to black at Korakou (Munsell reddish brown 2.5YR 4/4- very dark grey 5YR 3/1. Refer to Figure 6.28).

6.13.4 Summary

During examination of the assemblage this fabric was only visible in small numbers at the sites in the Corinthia. This gave early indication of a localised pattern of consumption and production for this fabric, whilst the striking contrast in form and finish between the plain coarse jar and the finely slipped ladle, suggests that MG10 was used to make a varied repertoire.

The very distinctive nature of the rounded orange inclusions has allowed clear differentiation of this fabric from others. It also demonstrates a clear relationship between the macroscopic group and that based on petrographic examination.

6.14 Macroscopic Group 11

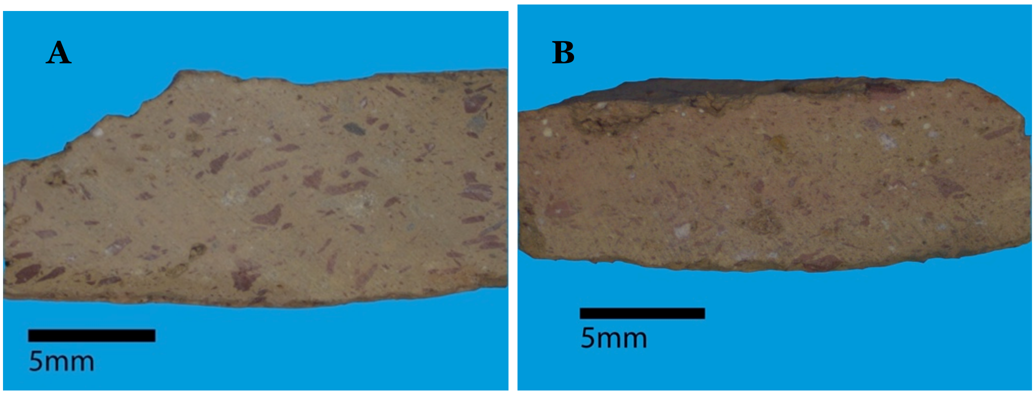


Figure 6.29: A. KER 11/33 B KER 11/50 from MG11.

6.14.1 Fabric Summary

Like MG10, MG11 has been noted at Ancient Corinth (Keramidaki) and Korakou. It is prominently associated with EHII jar forms and with some large bowl types. The fabric most dominantly correlates to PG9 but does include other petrographic groups. It is a medium coarse, chalky fabric with a rough to smooth break that consistently displays a light pink-orange or green-buff biscuit (Munsell reddish yellow 5YR 7/6 – pale yellow 5Y 8/2). There is no visible firing core, indicating a consistent and well-controlled oxidising firing atmosphere. The biscuit contains very characteristic well-sorted angular and elongated purple-red inclusions (Munsell dark yellowish brown 10R 4/6). These inclusions commonly show a degree of shared alignment and are sometimes accompanied by sub-angular white inclusions (refer to Figure 6.29). Inclusions are accompanied by the common presence of voids which are dominated by sub-rounded and elongated vesicle and vugh types.

6.14.2 Forming and Finishing Techniques

Due to the chalky nature of this fabric group and the use of slips in some examples, original surfaces are not always clearly visible, making identification of forming and finishing techniques difficult. Being better preserved, bases have most commonly provided evidence for finishing, most notably non-uniform striations on the exterior indicative of wet wiping (refer to Figure 6.30). However, it has also been possible to identify some features consistent with hand forming techniques such as the presence of horizontal rounded peaks and troughs around the body of jars, suggestive of coil remains, and evidence of joins between necks and handles of vessels (refer to Figure 6.31 and 6.32).

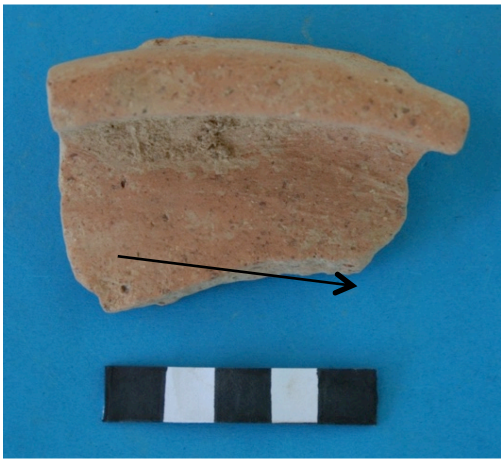


Figure 6.30: KER 11/101 a jar base displaying striations from wiping.

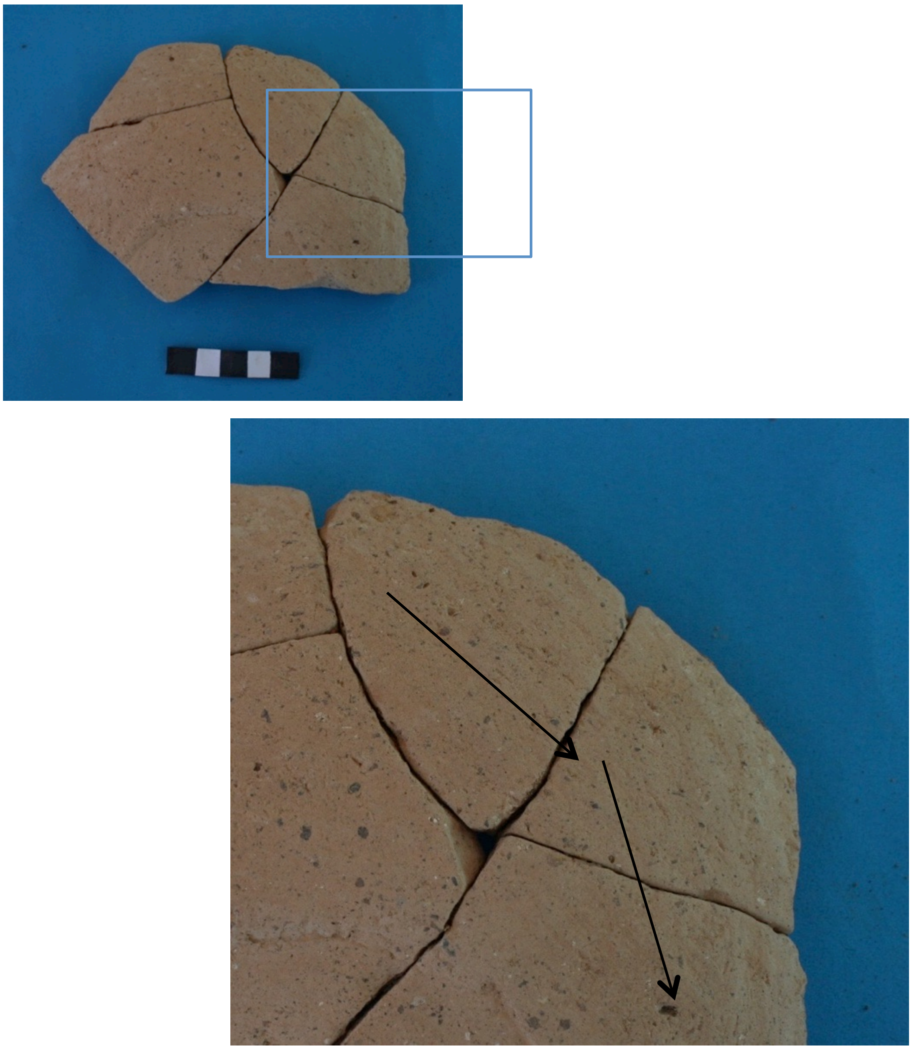


Figure 6.31: KER 11/119 jar with close up of grooves suggestive of coil remains.

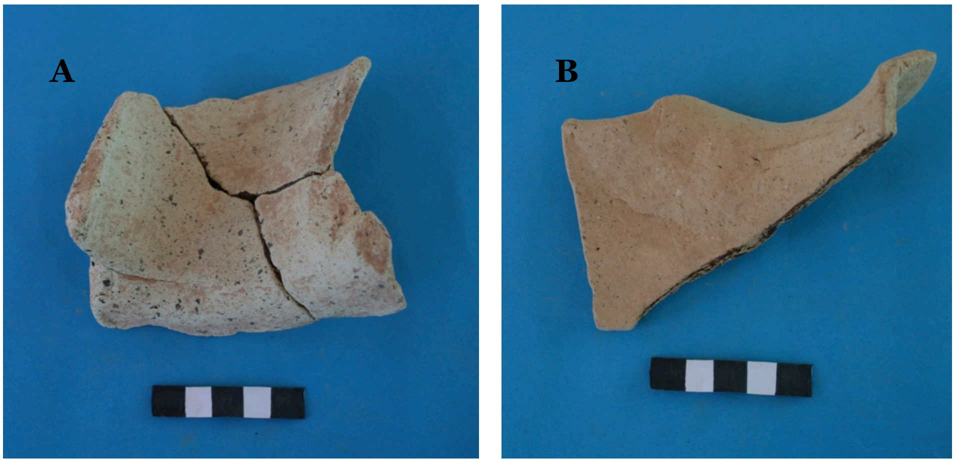


Figure 6.32: Visible neck joins on two jars A. KER 11/126 and B. KER 11/128.

6.14.3 Surface Modification

Vessels in MG11 display varying degrees of surface preservation. Forms are dominantly plain jars or bowls solidly painted with a thick, red-brown interior slip (Munsell red 10R 4/8). Some display a lustre and indentations consistent with a burnished finish (refer to Figure 6.33).

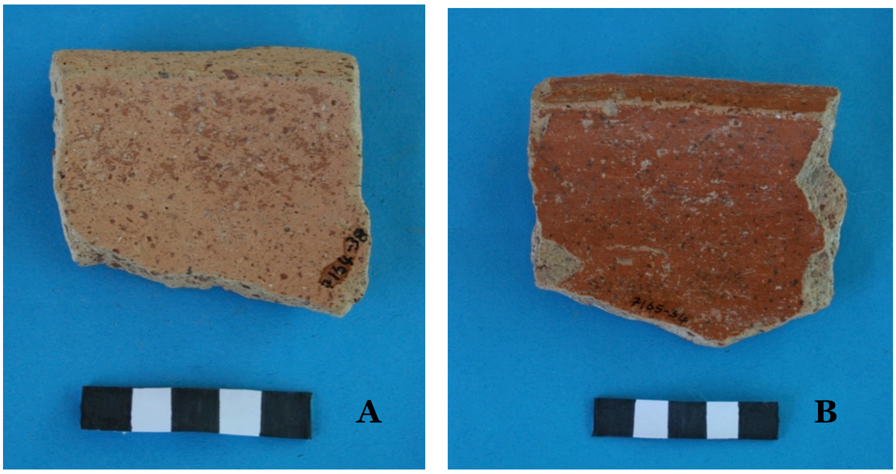


Figure 6.33: A. KER 11/33 and B. KOR 11/32; Two large bowls with remains of a slip on the interior. Example B also has a well-preserved burnish.

6.14.4 Summary

Through macroscopic examination it has been possible to differentiate this fabric group which neatly correlates to PG9. Like MG10, its presence at Ancient Corinth (Keramidaki) and Korakou has provided an initial understanding of what constitutes localised production and consumption, relating specifically to jars and slipped bowl forms.

6.15 Macroscopic Group 12

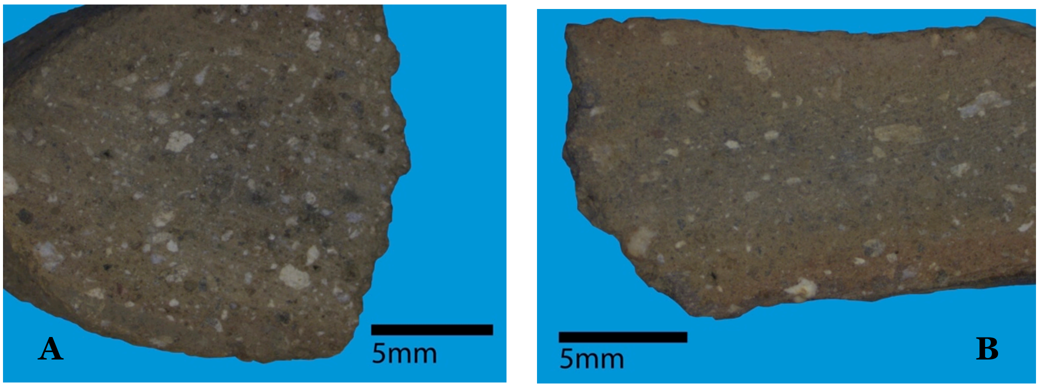


Figure 6.34: A. KER 11/55 and B. KER 11/58 of MG12.

6.15.1 Fabric Summary

MG12 relates primarily to PG25 and is dominated by bowl forms but also includes cooking pots, a pithos, jars and a baking pan. It was identified only at EHII Ancient Corinth (Keramidaki) and Korakou, but does bear a striking similarity to MG13 and 16. This is due to the shared presence of large, hard, angular white to yellow-white inclusions (Munsell very pale brown 10YR 8/2). MG12 is distinguished from MG16 due to significant differences in biscuit colour and the dominant presence of grey and red-orange inclusions (Munsell white 5YR 8/1 - red 2.5YR 5/6) in MG12.

It is a medium coarse fabric with a rough to hackly break. The surface colour of vessels in MG12 ranges from orange to grey, or brown-buff (Munsell light red 2.5YR 6/8 – pink 7.5YR 7/3) but the colour is commonly even on a single vessel, suggesting consistent firing atmospheres. The biscuit colour ranges from pink-orange to grey-brown with common grey cores (Munsell light red 2.5YR 6/6 – pink 7.5YR 6/2), suggesting fast firing and incomplete oxidation of the vessels (refer to Figure 6.34). As discussed, the fabric is characterised by the presence of well-packed but poorly sorted angular, hard, white and yellow white inclusions. These can be accompanied by are red-purple angular inclusions (Munsell red 10R 4/6) and voids with are commonly visible as small vesicle and vugh types.

6.15.2 Forming and Finishing Techniques

As with much of the material from Corinth, Ancient Corinth (Keramidaki) in particular, preservation of surfaces was poor which made identification of forming and finishing techniques difficult. Despite issues of surface preservation it has been possible to identify some finishing features, in particular the presence of non-uniform striations consistent with wiping that has dragged small inclusions, or wiping the surface with straw or grass (a technique noted ethnographically in Africa (Denbow 2014: 130). This wiping has left deep linear indents in the surface (refer to Figure 6.35).

Figure 6.35: KER 11/74 a deep bowl/cooking pot displaying striations suggestive of the dragging of inclusions during wet wiping of the vessel or the use of straw.

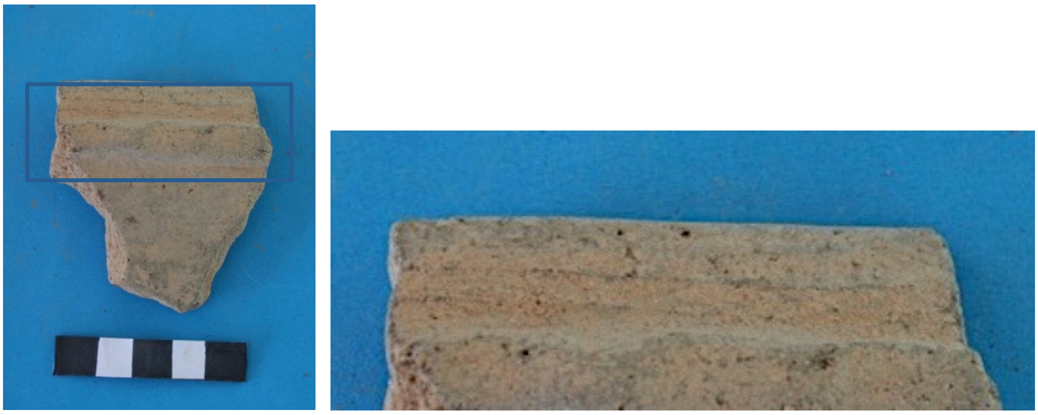


Figure 6.36: KER 11/115 a bowl with incurving rim displaying a sharp groove below the rim.

On sample KER 11/115 from ancient Corinth (Keramidaki) there is a groove below the rim. Whilst the sharpness of this could suggest the use of a mould, the uneven finish of the exterior surface and variation in the depth of the groove is more suggestive of the use of a tool used to scrape the groove into the clay, with variation in the amount of pressure applied and control over the scraping (refer to Figure 6.36).

6.15.3 Surface Modification

Vessels from MG12 are dominantly plain, however, red-brown and black-brown solidly painted slips are present on the interior and exterior of bowls (Munsell red 10R 4/8 – reddish black 10R 2.5/1), and the exterior of jars, as well as the use of applied taenia bands (commonly type B) for some large bowls (refer to Figure 6.37).

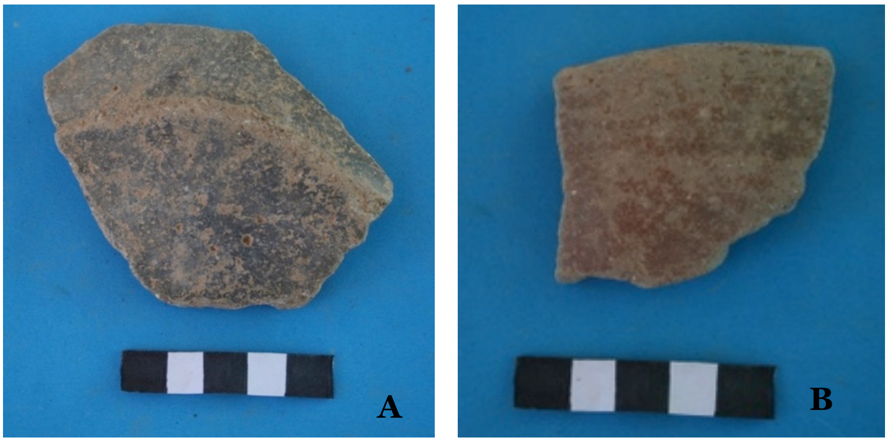


Figure 6.37: A. KER 11/136 jar base with black exterior slip and B. KER 11/142 incurving bowl with red-brown slip.

6.15.4 Summary

MG12 is consistently associated with the Corinthian sites of Ancient Corinth (Keramidaki) and Korakou indicating localised production and consumption. The similarity of this fabric to MG16 was an early indication of shared raw material types relating to the use of volcanic material and highlights the difficulty of assigning fabric groups and raw materials using macroscopic analysis alone.

The use of this fabric for a number of vessel types with a range of surface modification techniques indicates a broad production repertoire and range of technological practices.

6.16 Macroscopic Group 13

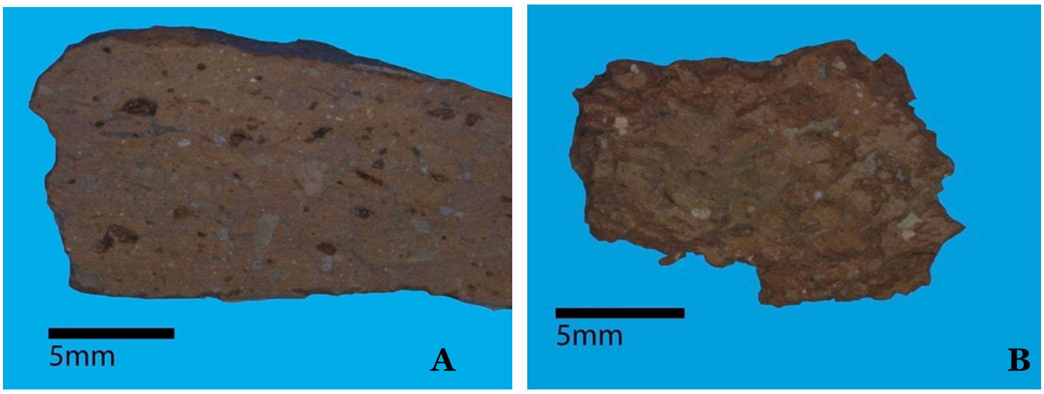


Figure 6.38: Samples KER72 and KER71 of MG13.

6.16.1 Fabric Summary

MG13 was only identified at EHII Ancient Corinth (Keramidaki) for jar and bowl forms, and relates primarily to vessels from PG7, but also includes some samples from PG8. It is very similar in appearance to MG12 but commonly with a pinker biscuit colour.

The surface and biscuit colour of MG13 ranges from orange to pink-brown (Munsell reddish yellow 5YR 6/8- red 2.5YR 5/8). The colour is dominantly consistent on a single vessel with only the rare presence of a darker firing core, indicating well controlled oxidising firing atmospheres. The fabric is dominantly medium coarse to coarse with a rough to hackly break, characterised by poorly sorted, angular white and yellow-white inclusions. These are accompanied by angular grey inclusions (refer to Figure 6.38), whilst sub-angular purple and brown inclusions are also commonly present. Voids are common dominated by irregular vughs and vesicles, with channels in some vessels.

6.16.2 Forming and Finishing Techniques

It was not possible to identify features indicative of forming technique. Irregular striations are visible on some surfaces and are consistent with wet wiping (refer to Figure 6.39).

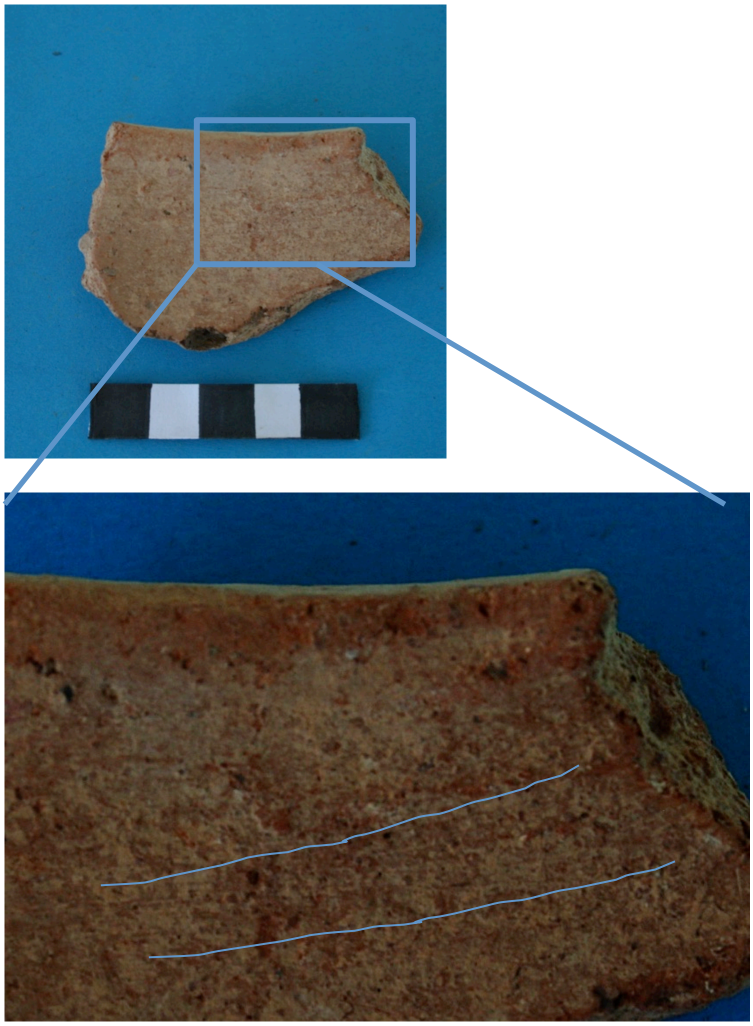


Figure 6.39: KER 11/89 displaying horizontal striations from wiping.

6.16.3 Surface Modification

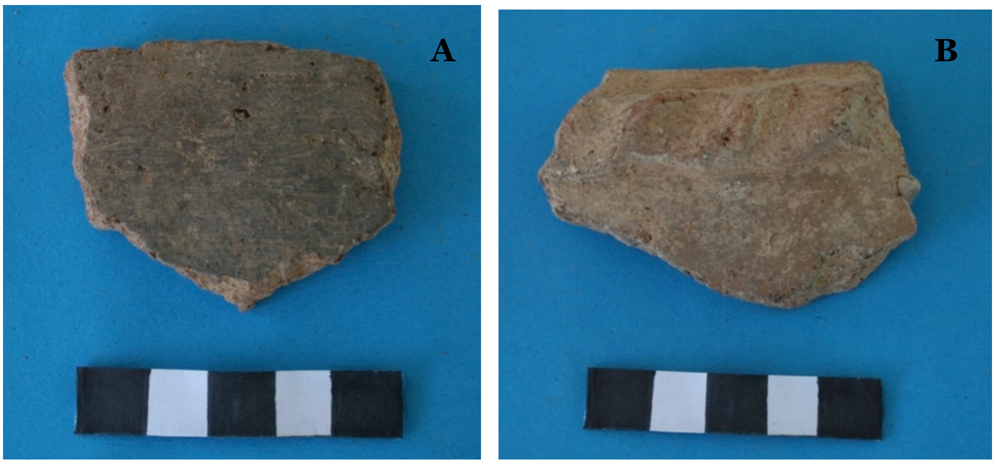


Figure 6.40: A. KER 11/73 bowl with a burnished surface. B. KER 11/89 a bowl with applied rope style decoration.

Vessels are dominantly plain. However, some bowls displayed burnishing, indicated by their smooth shiny surface, complete with striations and grooves created through the burnishing process. Other examples have applied taenia bands (type B) refer to Figure 6.40).

6.16.4 Summary

The similarity of MG13 to MG12 highlights the difficulty with differentiating fabrics in the field and the need to consider a wide variety of technological information when deciding on macroscopic groups. In this instance it was possible to differentiate MG12 from other macroscopic groups, based upon the biscuit colour and range of visible inclusions. However, this difference was not always clear, resulting in the cross-over with multiple petrographic groups. This issue again highlights the problematic relationship between the macro and micro resolution of analysis. The similarity of these fabrics acted as an early indication of shared raw material types between MG12 and MG13, but it was only possible to understand this and identify the specific raw material types through petrographic examination.

The very restricted identification of this fabric only at the site of Ancient Corinth (Keramidaki) again acted as an early indicator of localised production and consumption of a fabric dominantly used for jar and bowl production.

6.17 Macroscopic Group 14

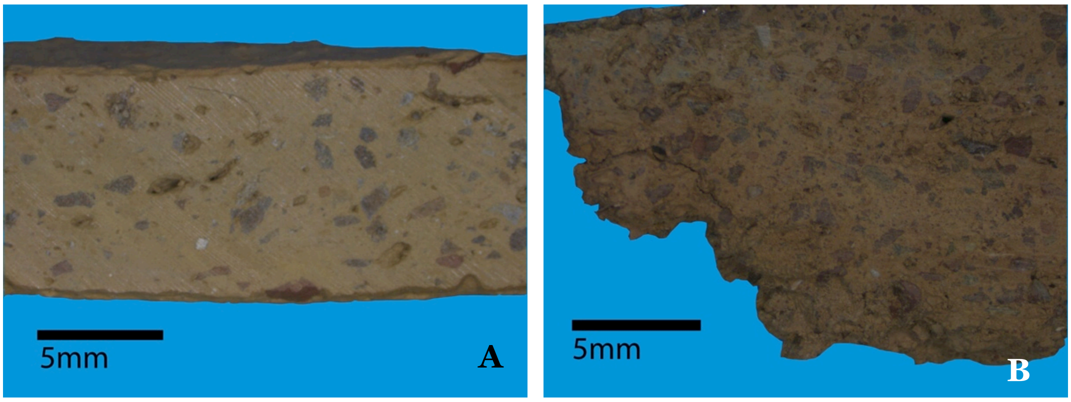


Figure 6.41: A. KER 11/67 and B. KER 10/77 of MG14.

6.17.1 Fabric Summary

MG14 relates primarily to PG7, but includes some samples from other groups such as PG8 and PG10. It was identified at EHII Ancient Corinth (Keramidaki), primarily in relation to jars and large bowls, but also a firedog stand and small bowl forms.

The fabric bears a striking similarity to MG11 in the nature of its inclusions and therefore, it was not always possible to differentiate the two (refer to Figure 6.41 and 6.29). Careful examination revealed that the two groups could be differentiated in many instances based upon the sorting and shape of the purple-red angular inclusions which dominate both groups. However, this required a fresh break and was more clearly visible if the surface was flat. In MG11 inclusions were usually sorted, elongated and showed some alignment. In contrast, in MG14 they were commonly equant and did not display any sort of alignment. These observations were later supported through petrographic examination which showed that these inclusions in MG11 were elongated argillites and phyllites, whilst in MG14 they were poorly sorted mudstone and mudstone breccia.

The fabric is soft and can be chalky with a rough to smooth break. The surfaces of vessels are commonly pink-buff or orange-buff (Munsell light reddish brown 5YR 6/3 – reddish yellow 5YR 7/6), with pink to yellow-buff biscuit (Munsell pink 5YR 7/4- reddish yellow 7.5YR 8/6). The even colour accompanied by the rare presence of firing cores is indicative of well controlled oxidising firing atmospheres. Voids are usually visible as vughs.

6.17.2 Forming and Finishing Techniques

Forming techniques for this fabric are unclear. In some examples it was possible to see where handles were attached as component parts to the main body (refer to Figure 6.42). Irregular striations and grooves on some vessels are consistent with paring and wiping finishing techniques (refer to Figure 6.43).

Figure 6.42: KER 11/70 a jar displaying the handle join.

Figure 6.43: KER 11/19 a basin displaying irregular striations running horizontally across the exterior surface suggestive of paring.

6.17.3 Surface Modification

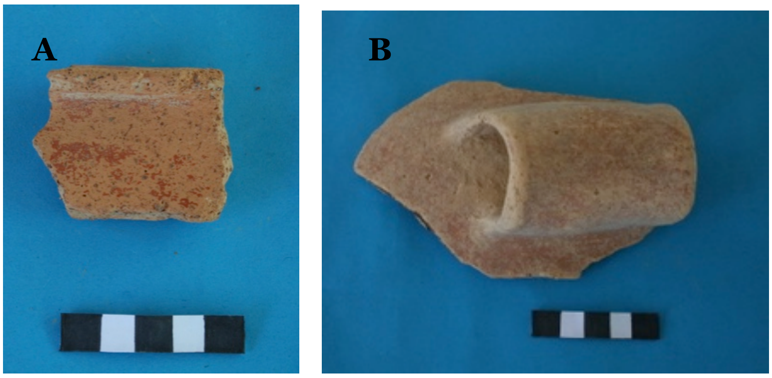


Figure 6.44: Examples of decorative techniques present in MG15. A. KER 11/18 basin with interior red slip, B. KER 11/67 jar with red-orange slip.

Vessels from MG14 are predominantly plain or solidly painted with a red-brown slip (Munsell red 2.5YR 4/8. Refer to Figure 6.43 and 6.44).

6.17.4 Summary

Macroscopic examination of this fabric was complicated, due to the strong similarities in the visible raw materials between M14 and those of MG11, but it has provided an early indication of another locally produced and consumed jar fabric. Macroscopic analysis has also indicated a strong relationship between the production of orange-pink firing vessels and the use of red slips, suggesting a particular surface modification tradition related to this fabric.

6.18 Macroscopic Group 15

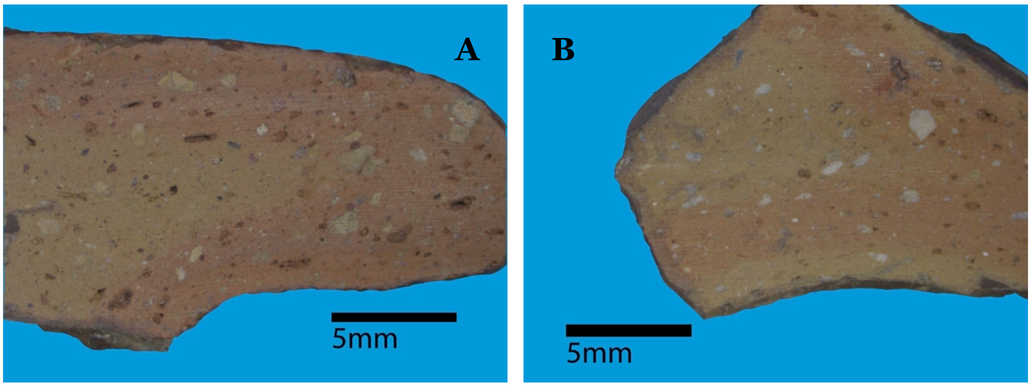


Figure 6.45: A. KER 11/114 and B. KER 11/113 of MG15.

6.18.1 Fabric Summary

MG15 dominantly correlates to PG12 and PG26 and was primarily identified at EHII ancient Corinth (Keramidaki) and Korakou. It is a medium-fine fabric dominantly associated with jar forms. The surface and biscuit colour ranges from orange to pink-buff (Munsell reddish yellow 5YR 7/8- pink 5YR 8/3), with light pink-buff cores or multiple firing horizons between pink and pink-buff (Munsell light reddish brown 2.5YR 7/4 – reddish yellow 7.5YR 8/6), indicating a series of firing atmospheres (refer to Figure 6.45). The fabric is soft and chalky with a smooth to rough break. It is characterised by well-packed, angular white and yellow-white inclusions, commonly accompanied by angular grey inclusions, with rare, sub-angular purple inclusions (Munsell white 7.5YR 8/1 – red 10R 4/6). Voids are common, dominated by vughs and some vesicles.

6.18.2 Forming and Finishing Techniques

The soft chalky nature of this fabric resulted in poor surface preservation making identification of features indicative of forming and finishing techniques especially difficult. Some vessels display irregular striations on both their exterior and interior surfaces suggesting that they were finished by wet wiping (refer to Figure 6.46).

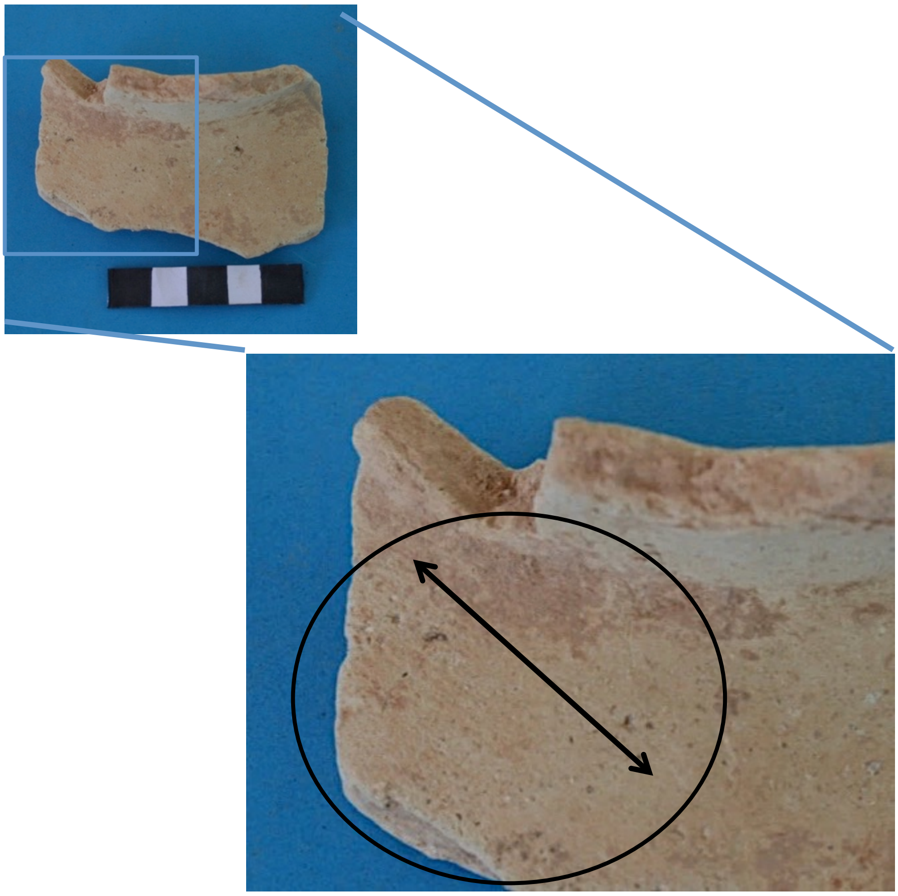


Figure 6.46: KER 11/110 a jar from ancient Corinth (Keramidaki) displaying striations on the exterior.

6.18.3 Surface Modification

Vessels are undecorated with no evidence of surface modification.

6.18.4 Summary

MG15 suggested the production and consumption of another specific jar fabric at sites in the area of Corinth. The high number of jar fabrics suggests that Corinth was a large consumer of jars and that inhabitants had access to a number of producers.

The link of this fabric to multiple petrographic groups reinforces the issues surrounding the difficulty of rigidly linking macroscopic and microscopic observations.

6.19 Macroscopic Group 16

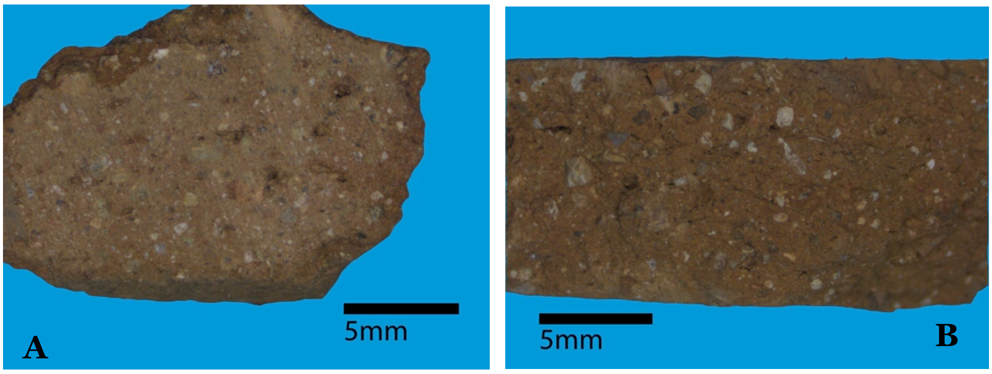


Figure 6.47: A. EPI 12/22 and B. EPI 12/23 of MG16.

6.19.1 Fabric Summary

MG16 has only been identified at Epidavros and primarily correlates to PG17A. It contains a wide variety of vessel types, including tablewares such as bowls, but most prominently large forms such as baking pans, jars and firedog stands EHI, EHII, EHIII.

It is a medium coarse to coarse, gritty fabric with a rough to hackly break and is characterised by well-packed, angular white and yellow-white inclusions (Munsell very pale brown 10YR 8/3). These are accompanied by few angular grey and purple inclusions (Munsell white 10R 8/1 – red 10R 4/6) and irregular vugh and vesicle void types (refer to Figure 6.47). The surfaces of vessels display an uneven colour ranging from pink-brown to black-brown (Munsell red 10R 5/6 – reddish black 10R 2.1/1), with an orange to pink-brown and grey-buff biscuit (Munsell red 2.5YR 5/6 – pinkish grey 5YR 7/2) indicative of poorly controlled, mixed firing atmospheres. Cores are rare suggesting that full oxidation of the biscuit was dominantly achieved.

6.19.2 Forming and Finishing Techniques

It is not possible to detect features indicative of forming or finishing techniques on the majority of vessels. However, sample EPI 12/22, an EHII deep basin, displays very consistent uniform striations running horizontally along the interior of the vessel (refer to Figure 6.48). The consistency of the striations would indicate the use of some form of rotary device such as a tournette to turn the vessel. It was not possible to detect if these striations were also on the exterior of the vessel as this surface was slipped.

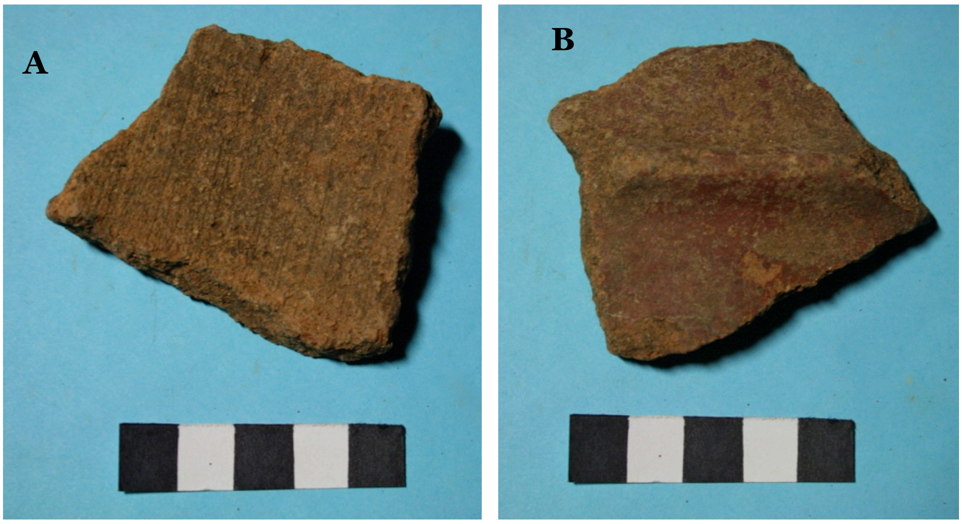


Figure 6.48: EPI 12/22 A deep basin displaying uniform striations on the interior (A) and a heavily slipped and burnished exterior (B).

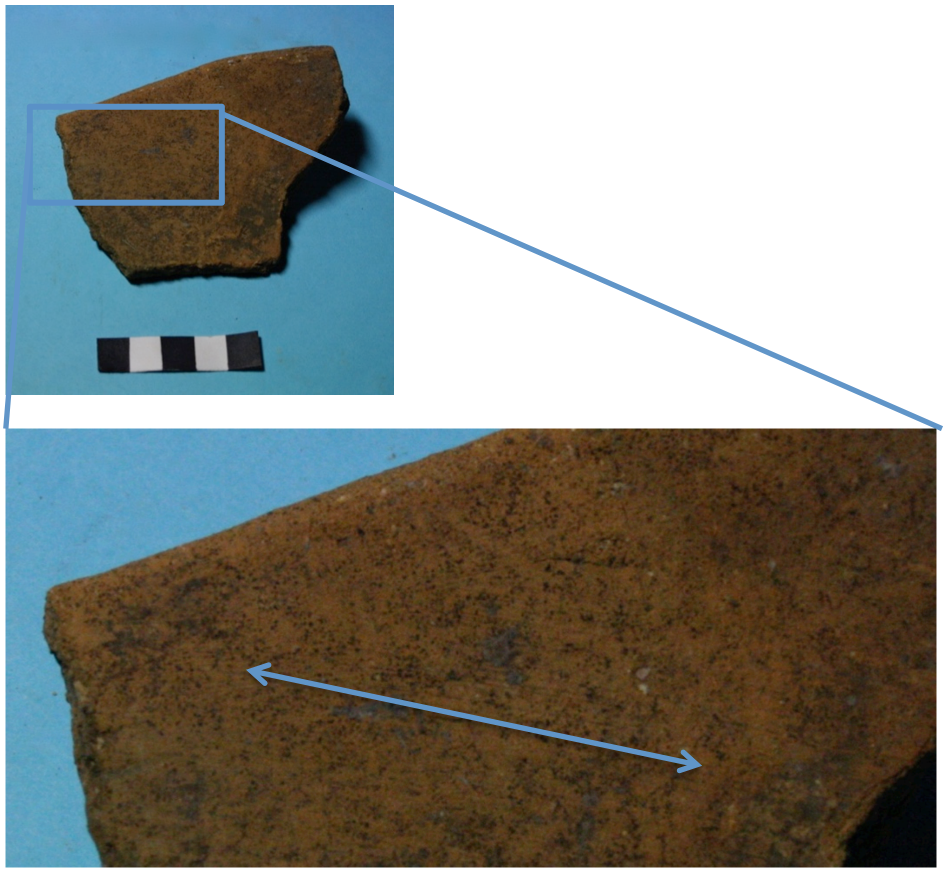


Figure 6.49: EPI 12/26 a baking pan displaying striations from wiping.

Sample EPI 12/26 also displays striations, however, in contrast, they do not have the same uniform appearance as EPI 12/22. Some areas of the vessel display striations with different orientations and the striations generally have an irregular distribution across the vessel. This lack of uniformity suggests that whilst the vessel was also wet-wiped, it was not with the aid of rotary device (refer to Figure 6.49). The irregular shape of some forms such as firedog stands and baking pans indicate that hand built techniques must have been used in these examples.

6.19.3 Surface Modification

Vessels are dominantly undecorated or solidly painted with a red-brown or brown slip (Munsell red 10R 5/8 – dark brown 7.5YR 3/3). Burnishing is common on both surfaces or just one surface (refer to Figure 6.50). Sample EPI 12/35 has a small hole made after forming and firing as indicated by the chipping away of the burnish surface and the stepped, rough appearance to the hole. EPI 12/33 displays a small circular indent suggesting that there was also an attempt to make a similar hole on this vessel (refer to Figure 6.50). As neither vessel displays an additional hole opposite which would suggest a repair, it is most likely that these holes were added to allow the vessels to be suspended. Why the hole was not completed on EPI 12/33 is unclear but it is interesting to note that both these vessels were deposited in Grave 2 and it may be that EPI 12/33 was not used before being deposited in the grave, and as such there was no need to complete the hole for hanging.

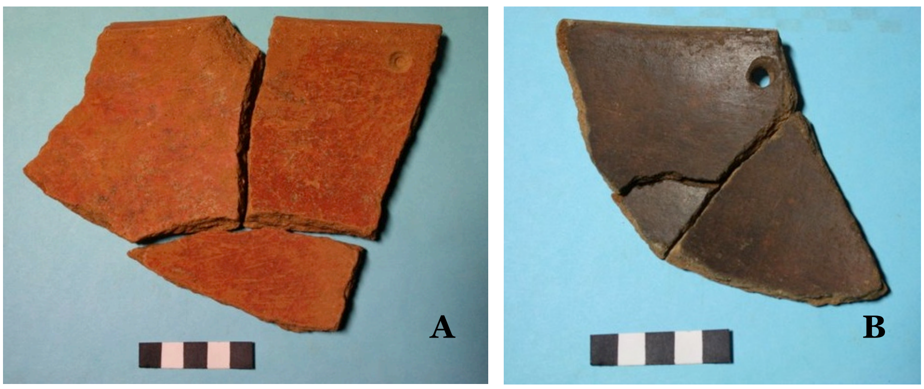


Figure 6.50: A. EPI 12/33, a large shallow bowl with red slip and circular indent. B. EPI 12/35, a large basin with a dark burnish and completed hole.

6.19.4 Summary

Macroscopic examination of MG15 indicates the domination of this fabric at the site possibly suggests a local origin, and certainly indicates a fabric which has a long history from EHI to EHIII. The similarity of the white inclusions to those identified in fabrics at Ancient Corinth (Keramidaki) also provided an early indication of the use in different locations of similar raw material types, which petrographic analysis confirmed were derived from igneous rock sources.

Analysis of surfaces has revealed that some of the vessels from MG15 may have been finished using a tournette and is the only evidence for the use of such a device at any of the sites examined in this research. The use of such a device at a small site like Epidavros would perhaps be unexpected but clearly indicates that potters at the site were skilled in a variety of forming techniques and innovative in their use of technological tools.

6.20 Macroscopic Group 17

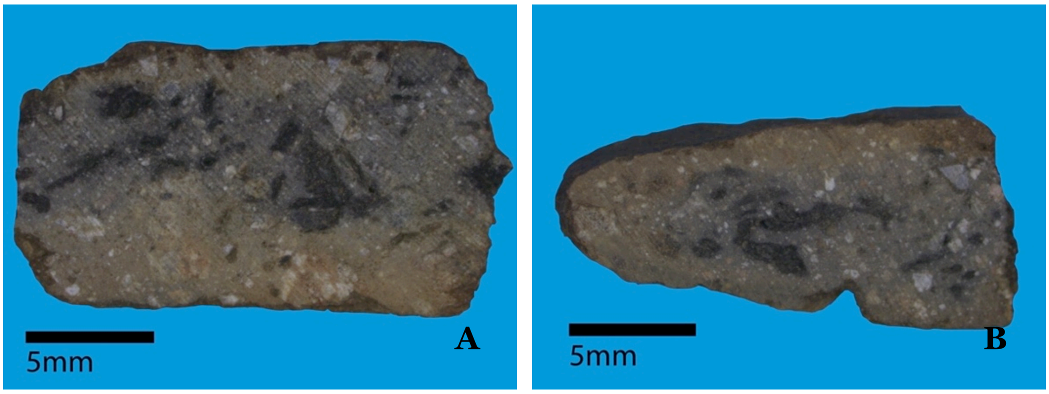


Figure 6.51: A. EPI 12/13 and B. EPI 12/16 of MG17.

6.20.1 Fabric Summary

MG17 correlates to PG17A from Epidavros and occurs in a range of EHI and EHII forms including cooking pots, bowls and jars. It is a medium coarse to coarse friable fabric with a rough to hackly break, characterised by the dominant presence of sub-angular to angular white and grey inclusions. It is very similar to MG16, but commonly has irregular vugh and channel voids with black charring suggestive of vegetal temper (refer to Figure 6.51).

The surface colour of the vessels within this group is dominantly mottled and uneven, ranging from dark brown-black to orange-brown (Munsell very dark grey 10YR 3/1 – dark red 2.5YR 3/6), suggesting the use of poorly controlled firing atmosphere. The biscuit ranges from orange-grey-brown to black-brown (Munsell reddish yellow 7.5YR 6/6 – black 10YR 2/1), with dominant grey-black cores indicative of incomplete oxidation from a fast firing/short soaking time.

6.20.2 Forming and Finishing Techniques

The irregular nature of the surfaces on some of the vessels in this group suggest hand built construction through pinching, with some surfaces displaying raised areas where the clay has been pulled up and not smoothed flat (refer to Figure 6.52), none of these pinched vessels display evidence of finishing. Other vessels from this fabric group have even surfaces with no visible evidence of forming.

Figure 6.52: EPI 12/13 a cooking pot and bowl displaying and uneven surface and indents consistent with pinch construction.

6.20.3 Decoration Types

Vessels are dominantly plain, with a small number of red-brown slipped vessels (Munsell red 2.5YR 4/8).

6.20.4 Summary

Petrographic examination has demonstrated early suspicions that MG17 was related to MG16, but with added vegetal temper. The vessels commonly have a very poor quality finish than those within MG16 indicating that they were not made with particular care or attention to detail, this may reflect the work of a poorly skilled or untrained potter. The use of these poorly finished vessels suggests that their outward appearance was not important.

6.21 Macroscopic Group 18

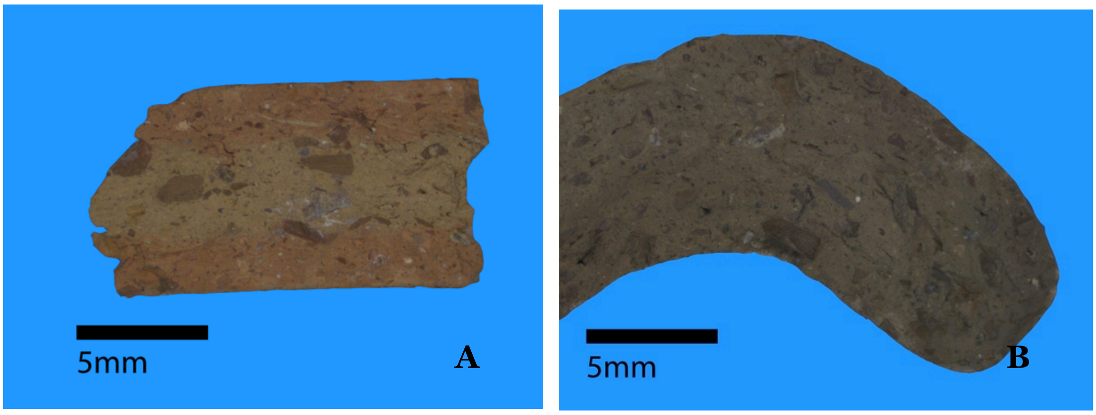


Figure 6.53: A. TSO 10/93 and B. TSO 10/104 displaying variability present in MG18.

6.21.1 Fabric Summary

MG18 is a medium coarse to coarse fabric identified at Tsoungiza and Epidavros, relating to PG3 but does include a number of other petrographic fabric groups due to the often difficulty with finding a fresh, clean break. It is present in EHI EHII and EHIII, and is dominantly associated with jars, but the group includes pithoi, baking pans and some tablewares in small amounts.

Surfaces are evenly coloured, commonly orange-buff, orange and pink buff (Munsell pink 7.5YR 8/4 – pink 2.5YR 8/3) with a grey-brown to light orange-brown biscuit (Munsell pinkish grey 7.5YR 6/2 - yellowish red 5YR 5/8) and the rare presence of darker firing cores, indicative of fast firing in dominantly oxidising firing atmospheres. The biscuit is friable, with a rough to hackly break and has characteristic grey to yellow-brown large angular inclusions. These are sometimes accompanied by sub-angular brown and purple-brown, grey-white and yellow white inclusions. Voids are common, dominated by elongated and irregular vughs and channels (refer to Figure 6.53).

6.21.2 Forming and Finishing Techniques

The surface of this fabric group was dominantly poorly preserved and/or slipped, which prevented identification of features indicative of forming or finishing.

6.21.3 Surface Modification

MG18 exhibited a wide range of surface modification techniques including applied decoration (taenia band motifs B and E), brown or red-orange slipping (including Urfirnis, Munsell reddish brown 5YR 4/4 – red 10R 4/8) or a thin wash, pattern-painted dark on light decoration, incision decoration and burnishing. The group also included undecorated vessels (refer to Figure 6.54).

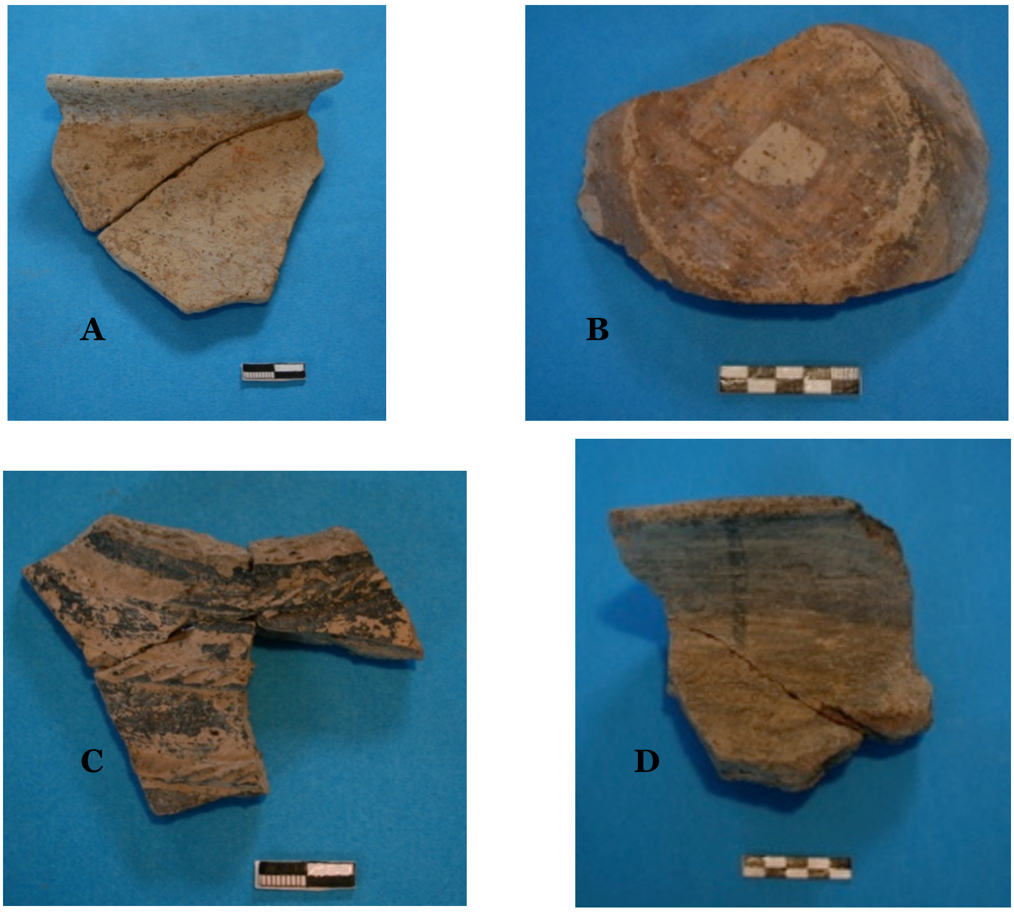


Figure 6.54: Examples of the range of decorative techniques within MG18. A. TSO 10/51 plain jar B. TSO 10/135 bowl base with dark on light pattern-painted decoration, C. TSO 10/140 jar with applied and black slip D. TSO 10/137 a pithos with a thin dark wash on exterior surface.

6.21.4 Summary

MG18 includes a wide variety of decorative techniques and vessel types providing an insight into the extensive range of achieved by potters using this paste recipe. Its strong correlation to Tsoungiza gave an early indication of a possible local fabric.

6.22 Discussion

18 key macroscopic groups have been identified across the entire study area, with the majority of groups found at several sites, suggesting a broad regional, and in the instance of MG4, intra-regional, distribution of vessels. A large proportion of the groups identified relate to a wide range of vessel types and wares. However, several groups are consistently dominated by a particular ware and/or vessel type. This suggests a link between form and macroscopic fabric/raw materials which was also supported through more detailed petrographic examination.

MG 1 and 2 are the most widely distributed macroscopic groups, being present at four of the five sites within the study. Both of these groups display a strong correlation between the range of forms and decorative techniques present. MG1 is characterised by red-orange-brown surfaces, dominated by large shallow bowl and fruitstand forms. In contrast, MG2 is characterised by buff surfaces which are commonly slipped black-brown and dominated by small thin walled shapes, particularly sauceboats and small bowls. Both these groups represent vessels associated with drinking and dining rather than cooking or storage. MG1 consistently contains large EHI serving vessels, whilst MG2 represents more individualized serving and consumption vessels for the EHII period. Examination of material within this thesis, and comparative material, has shown that both these fabrics are present throughout the EH period, however, there is a shift in their distribution. This shift is linked to distinct changes in the outward appearance of dining vessels. Whilst there is an overall change from large to small vessels from EHI, to EHII and EHIII, it appears that it is the more dominant consumption of darker slipped and decorated vessels from the EHII period onwards that results in the decline of MG1 at Corinthian sites and the eventual dominance of MG2. This suggests that the consumption of vessels from these groups relates most directly to specific dining vessel forms and their appearance rather than the decline of a particular centre of production.

MG9, 10, 11, 12 and 15 are shared only by Korakou and Ancient Corinth (Keramidaki), highlighting a strong link between these two Corinthian sites which were large consumers of jar forms and had access to a number of producers. The reason for the prevalence of the jar form at Corinthian sites is unclear. It is striking that this dominance of EHII jar fabrics is accompanied by a significant increase in production and consumption of fine dark slipped tablewares associated with pouring such as the sauceboat, and individualised vessels for consumption such as saucers. When taken together this repertoire suggests changes in dining practices probably linked to the consumption of liquids.

MG16 and 17 were only noted at Epidavros and contained a wide variety of forms throughout the EH period but displayed a restricted range of decorative techniques. Vessels were dominantly plain or red-brown slipped, providing a first indication of specific traditions for localised production and consumption at the site. This macroscopic assignment of local provenance was confirmed by petrographic analysis. The decline of MG17 suggests that there was a technological shift away from the addition of vegetal temper. The range of vessels and changes in the quality of forming and finishing during the EHII period does testify to potters with a varied repertoire of vessel types and with the ability to produce a variety of surface finishes to satisfy a range of domestic consumption needs including food preparation as well as serving.

6.23 Summary

In summary, it has been possible to identify both hand-built forming techniques and early evidence for rotary devices. Secondary forming methods and surface techniques include wet wiping, paring, slipping and applied decoration which were shared across the NE Peloponnese throughout EHI and EHII.

There are strong indications of shared forming and finishing practices, however, there is also evidence for regionally specific technological choices which demonstrate a tightly interwoven relationship between locally available resources and stylistic preferences. Corinthian sites such as Tsoungiza and

Ancient Corinth (Keramidaki) demonstrate a preference for light buff or pink coloured surfaces, with both red and dominantly black slips and paints. In contrast, Talioti and comparative sites such as Midea and Tiryns consumed vessels with more dominantly red but also black and brown surfaces on orange or brown bodies. These macroscopic observations provide an early insight into the different distribution trends for particular areas of production linked to surface modification types. As discussed next in Chapter 7, petrographic analysis has shown that sites within the Argolid were heavily reliant on vessels from a locally based centre using locally available red based clays and red firing slips (PG15). In contrast, Corinthian sites have a high proportion of locally made vessels, which utilised the locally available highly calcareous clays, using contrasting iron rich clays for their slips.

Macroscopic analysis has also highlighted a wide range of firing practices across the study area. In some instances there are mottled surfaces indicating poorly controlled firing atmospheres, and uneven surfaces suggesting a lack of skilled dexterity in the process of making a vessel. It was also possible to link uneven surface colours to vessels from particular macroscopic fabric groups, which suggests that these trends may relate to specific production centres and the knowledge and practices of the potters there (for a more detailed discussion of firing please see Chapter 8). In other groups we have the production of homogeneous dark slips on the evenly colour buff bodies. These are usually related to thin walled EHII and EHIII tablewares, indicative of well controlled and manipulated firing atmospheres for fineware vessel production. These are commonly at sites within Corinthia indicating developments in firing and surface modification practices in EHII for vessels which were dominantly consumed within the Corinth region.

Finally, the macroscopic work undertaken on these assemblages has been able to demonstrate clear links to distinct petrographic groups, as well as highlighting the complicated relationship between macroscopic and microscopic levels of analysis. This has re-emphasised the need to integrate multiple scales of analysis in order to characterise the range of technological choices involved in ceramic production.

Chapter 7: Results- Microscopic Fabric Variability

7.1 Introduction

Macroscopic analysis provides the first indication of the technological variability present within an assemblage and has been widely used in examinations of Early Helladic ceramics. However, it cannot provide a high enough resolution of detail to accurately identify the raw materials within paste recipes. It is also of limited help with identification of the specific technological practices associated with raw material processing. Without this information it is not possible to identify potential sources of raw materials, areas of production, trace distribution patterns, or to make substantial comment on technological behaviour. Such details are fundamental to any discussion about the nature of pottery production, exchange and consumption practices, therefore their understanding requires the use of a range of analytical techniques.

Building upon the macroscopic evidence already discussed, this chapter will focus on detailing petrographic fabric variability and its relationship to form, and surface decoration. The samples within in each fabric group have important similarities according to the criteria outlined in Chapter 4:

- Identification of aplastic inclusion types
- The size, shape, frequency and distribution of aplastic inclusions
- Textural concentration features such as clay pellets
- The appearance of the micromass including colour, optical activity and the presence and character of voids.

The groups described are characterized by the consistent use of materials from similar geological settings, as well as shared technological practices involved in their manipulation. The key technological differences identified relate to clay mixing and the addition of tempering materials. In several instances, sub-groups have been assigned in relation to significant variations within the overall fabric group. Such differences include the level of optical activity as a signifier of firing conditions, (for full discussion of firing refer to Chapter 8), or the identification of shared base paste recipes with elements of variation relating to the use of temper in some samples.

Each group is presented by their region of provenance, with a summary of their key petrographic features (full petrographic description can be found in Appendix II). This is accompanied by a discussion of potential raw material sources based on assessments of geological maps and literature. As discussed in Chapter 5, the nature of the geology in the NE Peloponnese can make the ascription of provenance in this area difficult due to the repetition of particular clay and rock types. To help address this difficulty and provide a more coherent picture of production locations, discussion of provenance will also be informed by the detailed analysis of petrological and textural features present in comparative archaeological ceramic material. This will be supplemented by reference to petrographic and chemical analysis in other studies of ceramics, where available.

In addition to examining the geological characteristics of the paste recipes, the fabrics will also be discussed in terms of the technological practices that they represent, and their relationship to particular vessel types and stylistic features. A full discussion of the key results will be provided in Chapter 9 focusing on an interpretation of data presented in Chapters 6, 7 and 8, in terms of an overall picture of EH ceramic production and consumption.

7.2 Results

A total of 412 samples were examined in thin section from five sites (Epidavros, Keramidaki, Korakou, Talioti and Tsoungiza). These were categorized into 28 primary fabric groups and 25 single samples. In order to contextualize this material and to explore patterns of distribution, an additional 556 samples were examined for comparative analysis from material available from eight sites (Agios Pantelimonas, Lempetzi, Spiliotakis, NVAP 204, Delpriza, Midea, Tiryns and Ancient Corinth from the Lavezzi assemblage).

Fabric Group	Suggested Area of Production
PG1: Fine Green Firing Clay Mix Fabric	Corinthia
PG2: Medium Fine Clay Mix with Rounded Pellets Fabric	Corinthia
PG3: Fine - Medium Fine Clay Mix with Angular Mudstone Fabric	Corinthia
PG4: Fine Optically Active Orange Fabric	Corinthia
PG5: Angular Mudstone, Siltstone and Chert Fabric	Nemea
PG6: Chert, Micrite and Mudstone Fabric	Nemea
PG7: Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	Ancient Corinth
PG8: Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric	Ancient Corinth
PG9: Argillite Fabric	Ancient Corinth
PG10: Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	Ancient Corinth
PG11: Rounded Serpentinite Fabric	Ancient Corinth
PG12: Angular Chert and Altered Volcanic Rock Fragments Fabric	Ancient Corinth
PG13: Fine Quartz Rich Fabric	Corinthia/NE Peloponnese
PG14: Medium Fine Clay Mix, with Mudstone, siltstone and Mudstone Breccia Fabric	Ancient Corinth
PG15: Sandstone to Low Grade Metamorphic Fabric	Argolid (Asine area)
PG16: Mudstone, Siltstone and Chert Fabric	Nemea/Corinthia
PG17: Tuffaceous Rock Fragments and Feldspar Fabric	Epidavros
PG18: Sandstone and Altered Sandstone with Micritic Veins	Argolid/NE Peloponnese
PG19: Angular Chert Fabric	Corinthia/NE Peloponnese
PG20: Disaggregated Sparitic Limestone and Sandstone Fabric	Corinthia/NE Peloponnese
PG21: Fine Clay Mix with Mudstone and Mudstone Breccia	Corinthia/NE Peloponnese
PG22: Quartz Sand Fabric	NE Peloponnese
PG23: Argillite-Shale and Mudstone Fabric	NE Peloponnese
PG24: Intermediate Igneous Rock Fragments	Aegina

Table 7.1: List of petrographic fabric group names with suggested production origin.

Fabric Group	Suggested Area of Production
PG25: Altered Volcanic Rock Fragments Fabric	Unclear
PG26: Coarse Grained Chert and Mudstone Fabric	NE Peloponnese
PG27: Fine Mica and Quartz Fabric	Unclear
PG28: Sandstone, Siltstone and Calcite Fabric	NE Peloponnese

Table 7.1 continued: List of petrographic fabric group names with suggested production origin.

7.3 Corinthian Region Fabrics

The fabric groups that have been assigned a provenance in the region of Corinthia share a number of features, the most consistent being the mixing of a calcareous yellow to green firing clay, with a red firing clay, but also includes the common use of mudstones and chert in paste recipes. The tradition of clay mixing was used for both high fired and low-fired vessels but particularly for EHII slipped tableware forms that were consumed throughout the NE Peloponnese. In some examples, characteristic inclusions such as serpentinite have provided insight into provenance but as many of these fabrics belong to fine wares, they commonly lack such diagnostic inclusions. This difficulty has been partially overcome through an examination of the distribution trends of these fabrics, which strongly suggest an origin in the Corinth region, and certainly indicate Corinthian technological traditions in relation to clay mixing and the production of dark slipped, fine ware vessels.

7.3.1 PG1: Fine Green Firing Clay Mix Fabric

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/7	Ring base of sauceboat/small bowl	Brown-black slip	EHII
EPI 12/18	Base (jug/jar)	Undecorated	EHII
EPI 12/28	Small shallow bowl	Black slip	EHII
EPI 12/29	Flat base small bowl	Black slip	EHII
KER 11/5	Small bowl	Black slip	EHII
KER 11/6	Ring based bowl	Black slip	EHII

Table 7.2: Table of samples belonging to PG1.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/7	Small bowl	Black-brown slip	EHII
KER 11/13	Small bowl	Black slip	EHII
KER 11/14	Sauceboat	Black slip	EHII
KER 11/15	Sauceboat	Brown slip	EHII
KER 11/31	Handle (jug/jar)	Brown slip	EHII
KER 11/59	Ring base (small bowl/sauceboat)	Black slip	EHII
KER 11/79	Ring base (small bowl/sauceboat)	Red-brown slip	EHII
KER 11/84	Sauceboat	Black slip	EHII
KER 11/100	Jug	Undecorated	EHII
KER 11/129	Neck (jug/jar)	Undecorated	EHII
KER 11/134	Ring base (small bowl/sauceboat)	Undecorated	EHII
KER 11/143	Ladle	Red-orange slip	EHII
KOR 11/4	Sauceboat	Black slip	EHII
KOR 11/12	Sauceboat	Black slip	EHII
KOR 11/13	Sauceboat	Brown wash? Burnished?	EHII
KOR 11/14	Sauceboat	Brown slip and burnished	EHII
KOR 11/20	Bowl	Black-brown slip	EHII
KOR 11/23	Neck (jug/askos)	Undecorated	EHII
KOR 11/25	Base (bowl?)	Undecorated	EHII
KOR 11/26	Jug	Undecorated	EHII
TSO 10/26	Fruitstand	Black slip	EHI
TSO 10/36	Fruitstand	Dark on light pattern-painted (black/brown)	EHI
TSO 10/39	Jar	Burnished	EHI
TSO 10/44	Bowl	Red slip	EHII
TSO 10/49	Sauceboat	Red-brown slip	EHII
TSO 10/61	Small shallow bowl	Black slip	EHII
TSO 10/70	Incurving bowl	Black-brown-red slip	EHII
TSO 10/74	Small bowl	Black slip	EHII
TSO 10/80	Pyxis	Burnished	EHII
TSO 10/81	Sauceboat	Orange-brown wash	EHII

Table 7.2 continued: Table of samples belonging to PG1.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/98	Inturned bowl	Black slip	EHII
TSO 10/101	Sauceboat	Black slip	EHII
TSO 10/108	Sauceboat	Dark on light pattern-painted (black)	EHII
TSO 10/109	Sauceboat	Black slip	EHII
TSO 10/114	Pyxis	Dark on light pattern-painted (black)	EHII
TSO 10/115	Sauceboat	Dark on light pattern-painted (black)	EHII
TSO 10/116	Sauceboat	Black slip	EHII
TSO 10/121	Jug/Narrow necked jar	Dark on light pattern-painted (black/brown)	EHIII
TSO 10/125	Tankard	Dark on light pattern-painted (black)	EHIII
TSO 10/126	Tankard?	Dark on light pattern-painted (black)	EHIII
TSO 10/127	Bass bowl	Dark on light pattern-painted (black)	EHIII
TSO 10/131	Jar	Dark on light pattern-painted (black)	EHIII
TSO 10/136	Tankard	Dark on light pattern-painted (black)	EHIII
TSO 10/138	Askos	Dark on light pattern-painted (black/brown)	EHIII
TSO 10/142	Tankard?	Burnished	EHIII
TSO 10/146	Bass bowl	Dark on light pattern-painted (black)	EHIII
TSO 10/149	Bass bowl	Dark on light pattern-painted (black)	EHIII
TSO 10/151	Tankard	Dark on light pattern-painted (black)	EHIII
TSO 10/155	Kantharos	Burnished	EHIII

Table 7.2 continued: Table of samples belonging to PG1.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/2	Small incurving bowl	Black-brown slip	EHII
EPI 12/3	Deep bowl	Black-brown slip	EHII

Table 7.3: Table of samples belonging to PG1A.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/17	Small bowl/Sauceboat	Black slip	EHII
KER 11/8	Sauceboat	Brown slip	EHII
KER 11/9	Sauceboat	Black-brown slip	EHII
KER 11/10	Ring base (small bowl/sauceboat)	Black-brown slip	EHII
KER 11/16	Sauceboat	Black-brown slip	EHII
KER 11/17	Sauceboat	Black-brown slip	EHII
KER 11/30	Jar	Undecorated	EHII
KER 11/45	Sauceboat	Black-brown slip	EHII
KER 11/95	Bowl with inturned rim	Red-brown slip	EHII
KER 11/96	Small bowl/Saucer	Black-brown slip	EHII
KER 11/139	Bowl	Brown slip	EHII
TSO 10/130	Pyxis	Dark on light pattern-painted (brown)	EHIII
TSO 10/144	Bass bowl	Black slip and burnished	EHIII
TSO 10/152	Bass bowl	Black-brown slip and burnished	EHIII

Table 7.3 continued: Table of samples belonging to PG1A.

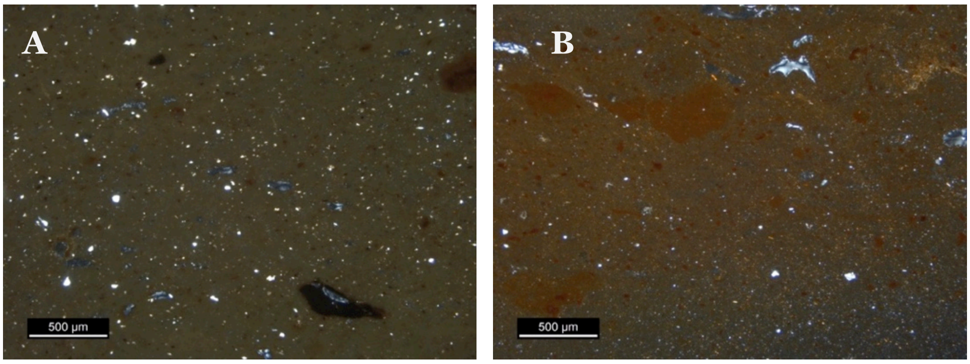


Figure 7.1: A. Micrograph of TSO 10/109 from PG1; B. Micrograph of KER 11/8 from PG1A. All images in XP.

PG1 is a very fine, high-fired group with little to no optical activity, and PG1A, is a fine to medium-fine, optically active sub-group, representing a lower firing temperature range from PG1.

PG1 has a predominantly very fine to fine, green or brown-green coloured matrix. The matrix contains few to rare fine silt sized, angular to sub-angular monocrystalline and polycrystalline quartz and feldspar which cluster in the red fraction of the clay where distinct TCFs are visible (refer to Figure 7.1 and 7.2). This clustering suggests that the majority of the silicate grains originate from the red firing clay fraction of the mix in many cases. The lower fired sub-group 1A is more commonly green-brown to red-brown, with fine silt to sand sized silicate inclusions. It commonly displays a more micaceous matrix than PG1 with moderate to low optical activity. The groundmass in all samples is dominantly heterogeneous particularly in 1A, which commonly contains TCFs such as rounded opaques, and striations. These features are suggestive of adding a micaceous, silicate rich red-firing clay to a fine green firing clay. The remains of pellets and striations indicate incomplete mixing, which is particularly evident in some samples (refer to Figure 7.2). It must also be considered that in some instances the TCFs may also represent natural red firing concentrations within the red firing clay fraction.

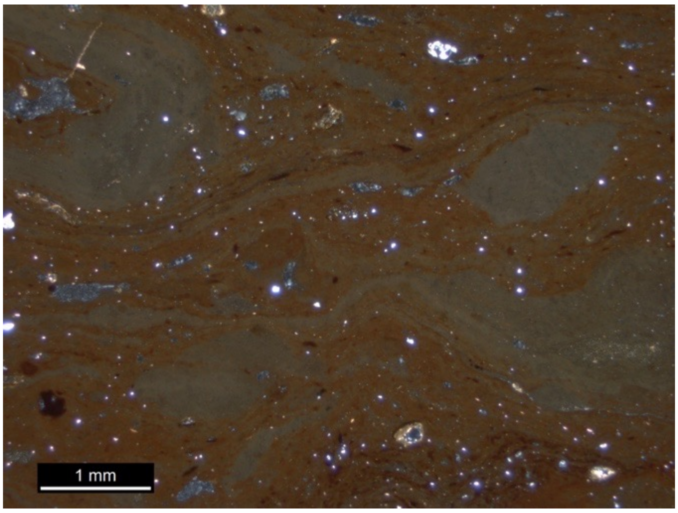


Figure 7.2: Micrograph of TSO 10/36 with visible TCFs indicative of clay mixing and the distinct distribution of silicate grains within the red fraction. Image taken in XP.

7.3.1.1 Discussion

The fine nature and very rare presence of inclusions in this group makes provenance difficult. This is further complicated by the widespread abundance of calcareous marls, red clays and terra rossa deposits throughout the NE Peloponnese. The use of clay mixing throughout the Aegean Bronze Age is well attested indicating a long held tradition (Myer and Betancourt 1990; Shaw *et al.* 2001; Day *et al.* 2006). Early work by Farnsworth, and that by Whitbread, have discussed the potential need to mix the highly calcareous Neogene clays available throughout the region of Corinth, with a red clay in order to produce a paste that was both workable and survived firing (Farnsworth 1964: 227, 1970: 9; Whitbread 1995: 314-331). This is further supported by experimental work undertaken by the author and Graybehl *et al.* (unpublished) which examined a variety of calcareous and terra rossa deposits throughout Corinth and Nemea. This work found that when used alone many of the highly calcareous clays were too plastic, susceptible to vessel collapse and did not survive temperature ranges above 750°c. In contrast, when a red firing clay or terra rossa sediment was added, the issues with plasticity were addressed and the mix survived well at a wider variety of temperatures.

The identification of clay mixing in archaeological ceramics can be a difficult process, particularly macroscopically where ceramic bodies can be very fine, or different clays can fire to the same colour, preventing detection (Whitbread 2003: 11). As such, petrography as a visual, microscopic technique of analysis offers the best opportunity to examine clay mixing.

Microscopic features suggestive of a clay mix are commonly the presence of TCFs, namely clay pellets and striations within the matrix (Whitbread 1986: 83-84). To identify clay mixing it is necessary to examine the characteristics of these TCFs and the visible differences in each clay component, such as shape, colour, the nature of any aplastic inclusions within each clay, and relative coarseness (Whitbread 2003: 11). For example, in Figure 7.2 it is possible to see concentrations of silicate grains in the red firing fraction of the mix but these are rarely present in the green firing fraction. The different colours in the matrix, and the associated inclusions, suggest the use of two separate clays.

A particular difficulty with examining clay mixing is that TCFs can be the result of how a clay has naturally formed or where clays are interbedded creating a natural mix. Faced with such problems, experimental work offers an opportunity to examine and understand the nature of possible clay sources in a landscape, and the potential for archaeological fabrics to be the result of deliberate mixes. Work such as that undertaken by Farnsworth (1970), Whitbread (1995, 2003; *et al.* 2007), and that of the author and colleagues, has highlighted the potential for clay sampling and firing experiments to help with understanding the character of potential clay sources and the effect of firing and mixing on their appearance (for example refer to Figure 7.4). This, in addition to examining the distribution of fabrics that display a mixed appearance, allow archaeologists to gain an insight into potential technological traditions in different parts of the landscape and over time, such as that at Corinthia which appears to have continued through to the Hellenistic period (Graybehl 2014: 99).

PG1 and PG1A have a broad distribution, being present at all sites within the study and within comparative material at all sites with the exception of Talioti. The fabric is commonly associated with slipped tableware forms particularly EHII sauceboats, and EHIII pattern-painted tablewares (refer to Tables 7.2 and 7.3). Notably, the lower fired PG1A is more commonly associated with vessels displaying red or brown slip colours. This suggests that the variation identified between PG1 and PG1A may relate to the degree of firing required for a specific slip colour. In this instance, the red-brown slips did not require the high temperature and extensive firing time that the black examples needed. This is because the black slip with buff body required firing in both oxidising and reducing atmospheres (for full discussion of firing techniques please refer to Chapter 8). In examples, where the vessel displays an uneven brown-black colour it is likely that the firing process was not well controlled or that this variation relates to different positions within the firing.

PG1 and PG1A are most abundant in the region of Corinthia with their frequency decreasing with distance from that area. This was particularly evident when examining comparative assemblages in the Argolid. Whilst these assemblages were abundant in the vessel types associated with this petrographic group, such as the sauceboat, they were not abundant in the light green-buff macroscopic fabric (MG2) associated with PG1/PG1A. The dominant presence of PG1 and PG1A at Corinthian sites indicate that production of this fabric was in the Corinth region, perhaps at Ancient Corinth itself where sites are particularly abundant in these fine tablewares. At the very least this trend represents a Corinthian-based tradition associated with the production of slipped vessels. Significantly, this fabric has also been identified by Harriet White for Byzantine vessels at Ancient Corinth (Clay Temper Fabric A3. White 2009: 109), in EBII sauceboats and ladles from Koropi (Day and Douni pers. comm.), for slipped EHIII and LH vessels at Kolonna on Aegina

(Gauß and Kiriatzi's fabric PG10 allocated to the Mycenae/Berbati chemical group. 2011: 116-117), and within LHIIIB pottery from in Attica by Gilstrap (fabric group 11 2015: 292). The long history of this fabric indicates that Corinth remained a significant producer throughout the Bronze Age and later periods, particularly for slipped tablewares.

7.3.2 PG2: Medium Fine Clay Mix with Rounded Pellets Fabric

Sample Number	Vessel Form	Surface Modification	Period
KER 11/11	Flat base bowl	Orange-brown slip	EHII
KER 11/12	Small bowl	Red-orange-brown slip	EHII
KER 11/46	Sauceboat	Black slip	EHII
KER 11/48	Bowl	Black-brown slip	EHII
KER 11/61	Jar	Black slip	EHII
KER 11/83	Sauceboat	Black slip	EHII
KER 11/85	Small bowl	Brown slip	EHII
KER 11/87	Small bowl	Black slip	EHII
KER 11/137	Everted rim of jar	Red-brown slip	EHII
KER 11/141	Saucer	Black slip	EHII
KER 11/144	Bowl	Brown slip	EHII
KOR 11/3	Sauceboat	Black slip	EHII
KOR 11/7	Sauceboat	Black-brown slip	EHII
KOR 11/8	Sauceboat	Black-brown slip	EHII
KOR 11/10	Sauceboat	Black slip	EHII
KOR 11/11	Sauceboat	Brown slip	EHII
KOR 11/19	Small bowl	Black-brown slip	EHII

Table 7.4: Table of samples belonging to PG2.

Sample Number	Vessel Form	Surface Modification	Period
KOR 11/21	Small bowl	Black slip	EHII
TSO 10/16	Incurving bowl	Red slip and burnished	EHI
TSO 10/17	Jug	Red slip and burnished	EHI
TSO 10/20	Bowl	Incised	EHI
TSO 10/47	Ring base bowl	Red-brown slip and burnished	EHII
TSO 10/48	Sauceboat	Red-orange slip	EHII
TSO 10/52	Jar	Red-brown slip	EHII
TSO 10/60	Askos?	Incised	EHII
TSO 10/64	Incurving bowl	Red-orange slip	EHII
TSO 10/75	Incurving bowl	Red-orange slip	EHII
TSO 10/83	Jug	Undecorated	EHII
TSO 10/85	Carinated bowl	Black slip	EHII
TSO 10/89	Small shallow bowl	Brown slip (at rim)	EHII
TSO 10/90	Incurving bowl	Red-brown slip	EHII
TSO 10/92	Small bowl	Black slip	EHII
TSO 10/94	Ring base (small bowl/sauceboat)	Red-brown slip	EHII
TSO 10/96	Sauceboat	Red and black slip	EHII
TSO 10/105	Carinated bowl	Black slip	EHII
TSO 10/106	Ladle	Black-brown slip	EHII
TSO 10/111	Incurving bowl	Red-brown slip	EHII
TSO 10/129	Pyxis?	Dark on light pattern-painted (black-brown)	EHIII
TSO 10/147	Bowl	Burnished	EHIII
TSO 10/150	Tankard	Dark on light pattern-painted (red-brown)	EHIII
TSO 10/153	Bass bowl	Dark on light pattern-painted (brown)	EHIII

Table 7.4 continued: Table of samples belonging to PG2.

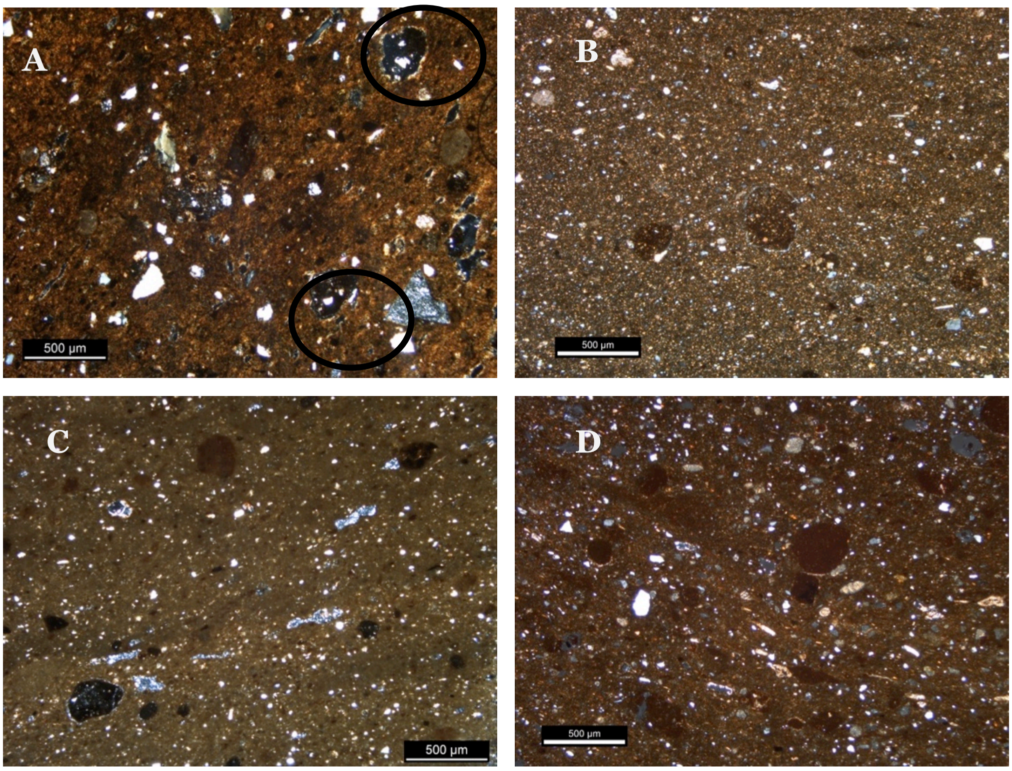


Figure 7.3: Micrographs of samples within PG2. All images in XP A. TSO 10/16 with clay pellets displaying shrinkage voids circled; B. KER 11/12; C. TSO 10/85; D. KOR 11/11.

All of the samples within PG2 share the unimodal to bimodal distribution of well-sorted, red-brown rounded TCFs, within a dominantly fine silicate rich matrix (refer to Figure 7.3). The matrix ranges in colour from green-brown to orange-brown, and displays moderate to high optical activity suggestive of a low firing temperature range. The rounded red-brown to dark brown TCFs are consistent with clay pellets, particularly from terra rossa sediments, suggested by their coarseness and distinct shrinkage voids. Striations are also commonly visible within the matrix, indicative of mixing a calcareous and a red firing clay. Both the TCFs and matrix are rich in silicate grains, however, the high concentration of coarse grains within the TCFs indicate that the red clay fraction of the mix is the source for the majority of the silicate material within the matrix. Variation is present in the type and frequency of the raw materials, for example the rare presence of calcite and small sandstones in some samples (e.g. TSO 10/20) but not in others (e.g. TSO 10/85). This variation suggests the use of different raw material sources. This is further supported by the character of the TCFs. The occurrence of shrinkage voids around the TCFs within several samples (e.g. TSO 10/16 refer to Figure 7.3 above) suggest that the clay used for these pellets had a high level of absorbency which resulted in shrinkage upon drying and as such, they did not merge into the micromass (*cf.* Day 1991). In contrast, other samples contain TCFs with diffuse edges indicating these did not undergo the same level of shrinkage and were more successfully incorporated during the process of clay mixing (e.g. TSO 10/153). This contrast suggests different practices of clay mixing and potentially different sources of red firing sediments.

7.3.2.1 Discussion

PG2 displays many similarities to PG1 with differences between the two groups related to optical activity, a higher degree of coarseness within PG2, accompanied by a higher abundance of rounded TCFs. PG1 and PG2 are characterised by the mixing of a highly calcareous clay with a red firing clay or sediment, and are both used to produce fine slipped tablewares. However, there is a degree of variation due to the use of different sources and the degree of complete mixing. In the case of PG2 it is evident that some of the red firing pellets derive from terra rossa sediments, whilst others are from fine red firing clays. This suggests the use of this paste tradition by multiple potters with shared potting practices to make the same range of vessels. Like PG1, PG2 is most dominantly associated with fine slipped tables ware forms, and most abundant within the region of Corinth. It is particularly associated with small bowls and sauceboats, but includes vessels for pouring such as askoi and jugs (refer to Table 7.4). Like the lower fired group PG1A, PG2 is commonly associated with red, brown or orange slipped vessels, re-emphasizing the link between the degree of firing and slip colour. This is further supported by the direct relationship between samples within this group that display lower levels of optical activity (suggesting a higher degree of vitrification from firing), and vessels with a black slip colour, (e.g. TSO 10/85). Such evidence strongly suggests that the impact of different firing temperatures must be considered as a source of variation between groups and may mask true relationships between fabrics. In this instance, it is likely that PG2 is in fact a lower fired version of PG1. This point was also exemplified in experimental work undertaken by Graybehl *et al.* and the author, mixing and firing green and red firing clays from Corinthia (unpublished). In this work we found significant changes occurred in the colour, optical activity, and visible coarseness of clays at different firing temperatures. This is best illustrated by the images below which show the same clay mix fired at different temperatures (refer to Figure 7.4).

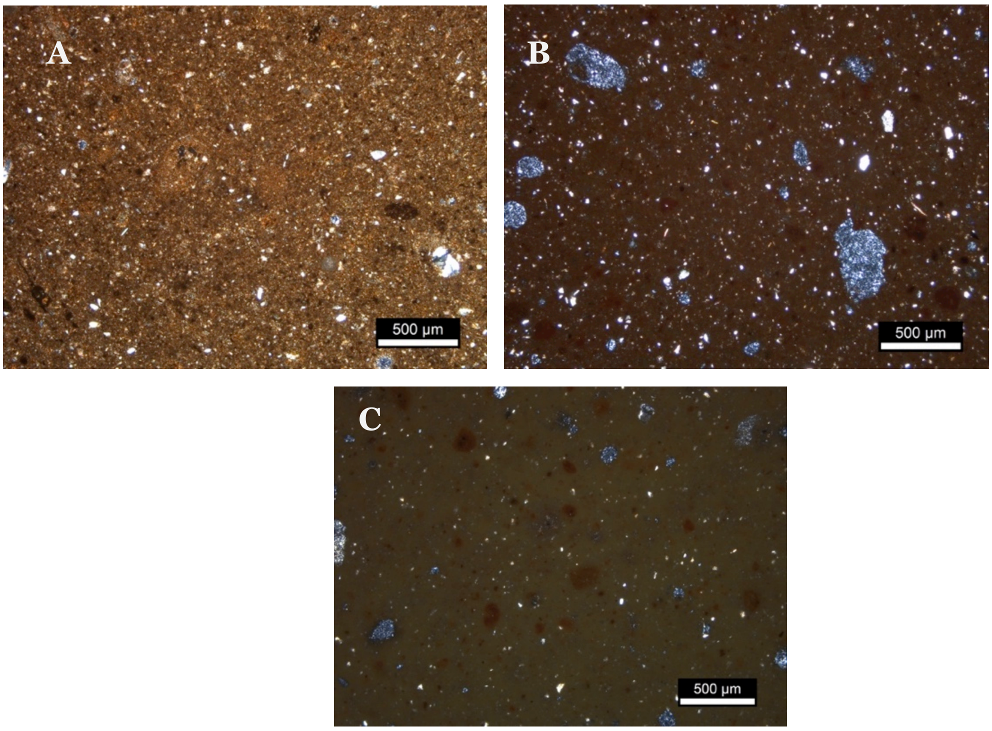


Figure 7.4: Micrographs of an experimental mix of calcareous clay with terra rossa in XP. A. fired at 700°C. B. fired at 900°C. C. fired at 1100°C.

The fineness of PG2 makes ascription of provenance difficult in some cases, however, the rare presence of coarser aplastic inclusions, such as serpentinite fragments within some samples such as KER 11/11 indicate an ophiolitic origin. Other samples contain chert or sandstone, consistent with the use of raw materials from a sedimentary geological environment. Such rock types are widely distributed throughout the NE Peloponnese, however, ophiolitic formations are more limited. The closest source of ophiolitic material is the Middle Jurassic limestone of Acrocorinth, characterised by the presence of sandstone, chert, and significantly marls containing ophiolitic bodies which could be compatible to the clay within this fabric. Unfortunately, the inconsistent presence across the group of geologically diagnostic raw materials, makes provenance on petrographic grounds alone difficult.

Therefore, the possibility of a definitive Corinthian provenance remains open for the time being but should be considered.

7.3.3 PG 3: Fine-Medium Fine Clay Mix with Angular Mudstone Fabric

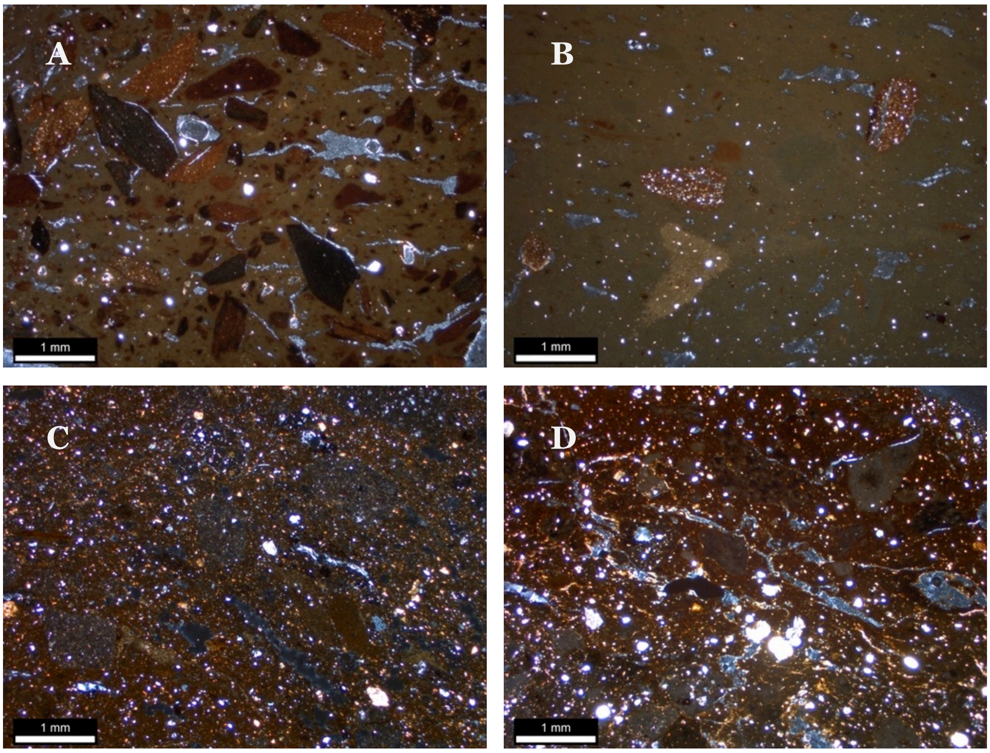


Figure 7.5: Micrographs of samples within PG3 (top row) and PG3A (bottom row). All images in XP A. TSO 10/18; B. TSO 10/32 with distinct yellow-green and orange TCFs; C. KER 11/20; D. TSO 10/78.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/1	Jar	Undecorated	EHII
KER 11/3	Jar	Undecorated	EHII
KER 11/28	Jar	Undecorated	EHII
KER 11/68	Sauceboat	Yellow-blue mottled	EHII
KER 11/91	Jar	Black-brown slip	EHII
KER 11/104	Pithos	Undecorated	EHII
KER 11/107	Large bowl	Black slip	EHII
KER 11/117	Jug/jar	Undecorated	EHII
KER 11/121	Large bowl	Black slip	EHII

Table 7.5: Table of samples belonging to PG3.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/140	Small bowl	Black slip	EHII
KOR 11/34	Jar	Black slip and applied incised	EHII
TSO 10/18	Bowl	Red slip and impressed	EHI
TSO 10/19	Bowl	Red and brown slip and burnished	EHI
TSO 10/32	Lug	Brown-black slip	EHI
TSO 10/46	Cup/Scoop	Brown slip	EHII
TSO 10/99	Incurving bowl	Incised	EHII
TSO 10/102	Small bowl	Black slip	EHII
TSO 10/140	Jar	Applied and black slipped	EHIII
TSO 10/141	Jar	Applied and black slipped	EHIII

Table 7.5 continued: Table of samples belonging to PG3.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/40	Pithos	Undecorated	EHII
KER 11/20	Jug/jar	Undecorated	EHII
KER 11/27	Body sherd (jar?)	Undecorated	EHII
TSO 10/51	Jar	Brown slip	EHII
TSO 10/69	Pithos	Undecorated	EHII
TSO 10/78	Firedog stand	Undecorated	EHII
TSO 10/79	Askos	Incised	EHII
TSO 10/82	Large jar/pithos	Undecorated	EHII
TSO 10/84	Pithos	Undecorated	EHII

Table 7.6: Table of samples belonging to PG3A.

This group can be divided between those samples that have a very fine matrix (PG3) and those that have a medium fine matrix (sub-group 3A). Both are characterised by the bimodal distribution of poorly to moderately-sorted fine-grained angular to sub-angular mudstones in a fine silt silicate rich matrix (refer to Figure 7.5). The heterogeneous matrix contains fine silt to sand sized quartz and feldspar, and is dominantly optically inactive suggesting a high firing temperature range, although a few optically active lower fired samples are noted, specifically within the medium fine sub group 3A.

The mudstones vary in colour and coarseness ranging from brown-black, grey, and brown, to yellow-brown and orange-brown. In some examples, fine silicate grains of quartz/feldspar are visible in the mud cement, accompanied by areas of darker sediment. Other examples are dominated by very fine sediment rich mudstones with very few inclusions. The distribution, angularity and size of the mudstones indicate that they have been added to the clay mix rather than being naturally present.

TCFs are common in this fabric group, being dark red-brown to yellow-brown and green, with dominantly diffuse edges merging with the micromass. They are characterised by both rounded to sub-rounded pellets and striations in the micromass which are frequently concordant with sample margins. These features are consistent with the mixing of red firing clay into a green calcareous firing clay.

7.3.3.1 Discussion

PG3 is a diverse group that shares the practice of mixing a calcareous and red firing clay, with the addition of mudstone temper. The high-fired examples of this group have a very similar clay matrix to PG1 and 2 which suggests the use of a similar clay types, and supports the suggestion that the mudstones are not naturally present but instead have been added as temper. The character of the mudstones is not consistent across the fabric, varying in terms of colour and coarseness. This, in addition to the variation in the relative coarseness of the groundmass and optical activity within PG3, indicates that this group is not the product of a single centre. Instead, PG3 represents the products of a number of potters who shared the tradition of clay mixing and using mudstone temper to produce a range of vessel types and used a variety of surface modification techniques.

The raw materials present in PG3 and PG3A are widely available throughout the NE Peloponnese and cannot be assigned to a specific location on petrographic grounds alone. All the sites at which this fabric is present, both within Corinthia and the Argolid, are in close proximity to limestone and shale-sandstone-chert formations that could potentially contain mudstones.

There has been extensive work demonstrating a long tradition of adding mudstones to marls within the Peloponnese (*e.g.* Matson 1972: 201, Iliopoulos *et al.* 2011: 131-2). Petrographic analysis of primary production waster material from Hellenistic Nemea by Graybehl, has revealed similar mudstone based fabrics possibly derived from the shale-chert-sandstone formations in Nemea (2014: 94). Further mudstone fabrics in ceramics from Corinth have been recorded by Whitbread (1995: 269), White (2009: 99-100), and Joyner (2007: 195-196), possibly associated with the mudstone outcrops on the western and southern sides of Acrocorinth, and Penteskouphi (Whitbread 1995: 334). Therefore, it is not possible to assign provenance to this fabric on geological grounds.

Within this study, this fabric has only been found in small amounts in the Argolid, in contrast to its relative abundance at Corinthian sites. Such a distribution trend suggests an origin in the region of Corinthia and certainly defines mudstone fabrics as a dominantly Corinthian tradition. There is a strong similarity of the clay matrix of some samples within PG3 to that of PG1 and PG2, for example TSO 10/32 (see image A in figure 7.5). This indicates potters may have been manipulating the same clay recipes used for PG1 and PG2 fineware vessels by adding mudstone in order to produce the larger coarseware vessels associated with PG3.

The presence of many large shapes within this group such as jars, pithoi and firedog stands, indicate that raw material choices correlate broadly with pottery function and use (refer to Table 7.5 and 7.6). It is important to stress that potters should not be considered as material scientists who tested the specific performance characteristics of these raw materials, as exemplified by extensive ethnographic work (Day 2004, Gosselain 1995: 148, 1998: 89, Livingstone Smith 2000: 31, Gosselain and Livingstone Smith 2005: 39). However, we should acknowledge that the potters' choice of a coarse paste recipe could have been in part motivated by the desire to successfully produce the objects they were making. Specifically, it is likely that they will have considered the need to prevent collapse and failure during forming, drying, and firing. The use of coarse tempering material would have aided with clay workability and toughness, preventing crack propagation and failure during firing of such large vessel types (Tite *et al.* 2001). Whilst the potters choice of specific raw materials and potting practices would have been embedded within socially derived and learnt understandings of appropriate ways to make an object, the use of coarse materials may have been implicitly linked to their suitability to successfully produce larger ceramic forms.

7.3.4 PG4: Fine Optically Active Orange Fabric

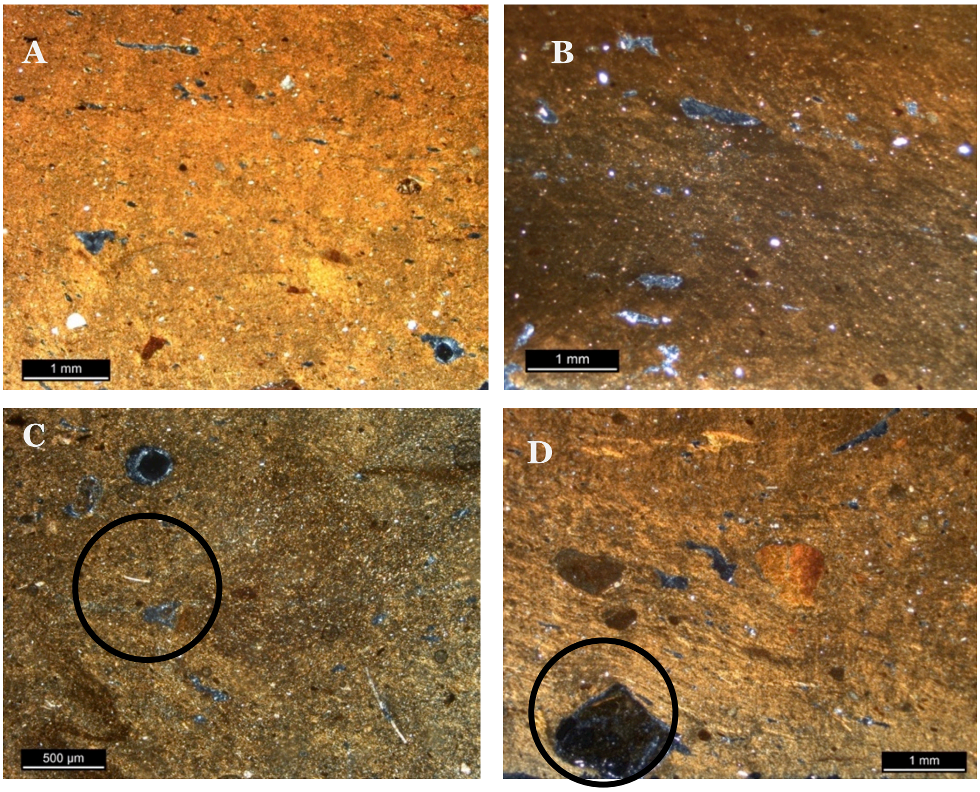


Figure 7.6: Micrographs of samples displaying the variability present in PG4, PG4A, and PG4B in XP. A. TSO 10/34 from PG4; B. TSO 10/154 from PG4A; C. TSO 10/123 from PG4A with microfossil remains circled; D. TSO 10/8 from PG4B with a fragment of serpentinite circled.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/4	Hemispherical bowl	Red-orange slip/wash	EHI
TSO 10/22	Spreading bowl	Red-orange slip/wash	EHI
TSO 10/34	Jar	Burnished	EHI
TSO 10/38	Spreading bowl	Red-orange slip	EHI
TSO 10/122	Spreading bowl	Orange-brown slip	EHIII

Table 7.7: Table of samples belonging to PG4.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/123	Jug	Dark on light pattern-painted (brown)	EHII
TSO 10/133	Bass bowl	Burnished	EHIII
TSO 10/154	Ouzo cup	Dark on light pattern-painted (brown)	EHIII

Table 7.8: Table of samples belonging to PG4A.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/8	Jar	Red slip/wash	EHI

Table 7.9: Table of samples belonging to PG4B.

PG4 has a primary group that is characterised by its bright orange colour in XP and distinctive, high optical activity that displays different orientations within a single sample. Samples TSO 10/123, 10/133, and 10/154 have been sub-grouped (PG4A) as they display a yellow-brown matrix colour in XP suggestive of firing in a partially reducing atmosphere. This is particularly evident from comparing samples within PG4 with a reduced core, and those of PG4A. Such samples share similar optical properties and raw materials, indicating that the variation is due to firing conditions rather than paste recipe. Finally, there is a sample associated with PG4 that is identical except for a large fragment of serpentinite and the presence of mudstone. Therefore, this sample has been sub-grouped based on the presence of rock fragments not found in other samples (PG4B, refer to Figure 7.6).

The fabric is characterized by a heterogeneous matrix with unimodal, silt-sized, sub-rounded silicate grains. These are accompanied by calcite, fossiliferous remains (commonly less than 0.4mm in length but not clearly visible in all samples), and TCFs (refer to Figure 7.6). The TCFs consist of rounded to sub-rounded, dark red-brown, and dark streaks within the matrix. They range from sharp to diffuse edges but commonly merge with the micromass suggestive of mixing calcareous clay, with a red firing clay.

7.3.4.1 Discussion

This is an extremely fine fabric with variation due to firing, and some variation due to raw materials. Only sample TSO 10/8 from PG4B contains diagnostic inclusions of serpentinite indicating an ophiolitic origin for the raw materials. No ophiolitic formations have been recorded immediately surrounding Tsoungiza or within the wider Nemea Valley, therefore, the fabric cannot be local to the find spot. The closest source of ophiolitic materials is in the area of Ancient Corinth located within the Jurassic limestones of Acrocorinth or at Penteskouphi (Yannetakis et *al.*1972; Siddall In prep: 28; Whitbread 1995: 334) suggesting an origin in this area. The variability present in the range of visible inclusions types indicates that this fabric represents multiple potters using the same clay sources throughout the EBA period. As such, the variation may relate to natural variation within the clay sources over time, as well as alteration of the recipe by different potters.

This fabric is dominantly associated with slipped and pattern-painted vessels. The variation in the degree of optical activity is directly linked to the type of surface modification used. Whilst solidly red painted examples are consistently optically active suggestive of low firing temperatures and an oxidising atmosphere, brown pattern-painted decorated vessels tend to be the less optically active PG4A (refer to Table 7.7). The association of the pattern-painted decoration type with the less optically active PG4A indicates that these vessels were not fully oxidised or potentially oxidised with a short reduction phase to achieve the darker slip colour on the light buff body as detailed in Chapter 7 in relation to black slipped vessels.

The association of red/brown/orange slip colours with this fabric demonstrates a long technological tradition of surface modification technique. The small number of samples within this fabric and its narrow distribution, indicates that vessels from this centre were not widely consumed. This may also suggest that it was not a significant centre of production for the sites examined within this study in Corinthia and the Argolid. Therefore, its continuation through the EBA period may represent a potting tradition used by a small number of potters who passed their knowledge and practice to each other, rather than a disparate group of potters individually using the same production technology to make a range of vessel types and wares over time.

7.4 Nemean Fabrics

Both the fabrics believed to originate from Nemea are coarse, containing chert and mudstone, with the addition of vegetal temper. Although these materials are widely available throughout the NE Peloponnese, their compatibility with local geology and the presence of these fabrics only at the site of Tsoungiza suggest a local origin.

7.4.1 PG5: Angular Mudstone, Siltstone and Chert Fabric

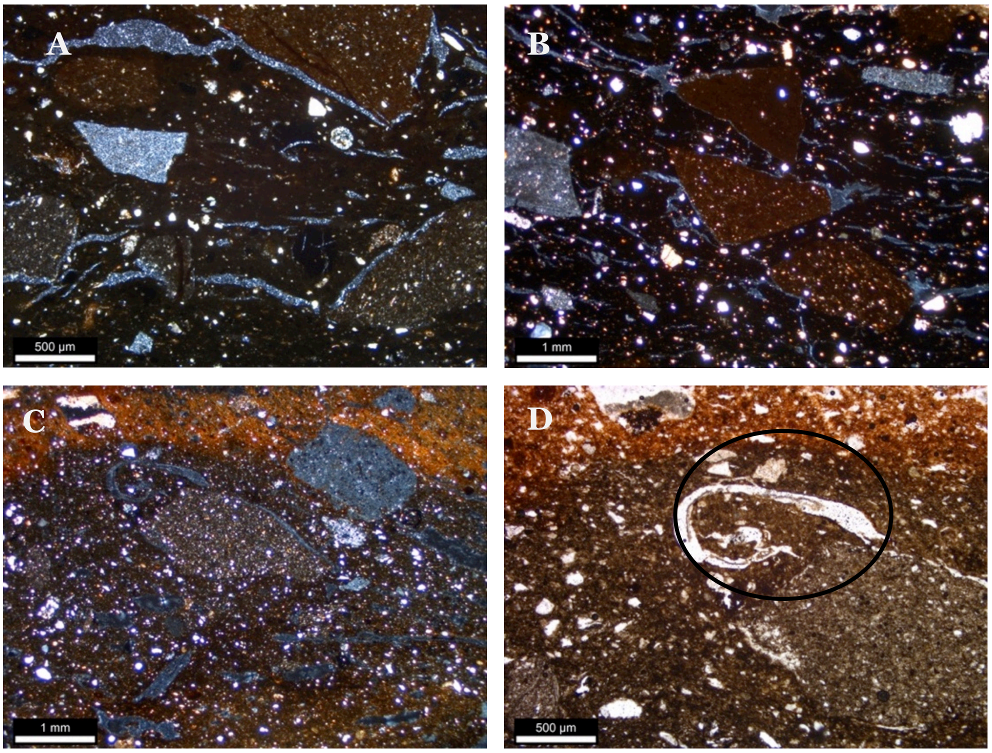


Figure 7.7: Micrographs of samples within PG5 (top row) and PG5A (bottom row) A. TSO 10/54; B. TSO 10/57; C. TSO 10/68; in XP D. TSO 10/68 in PPL with remains of vegetal temper circled.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/54	Incurving bowl	Applied	EHII
TSO 10/55	Firedog stand	Undecorated	EHII
TSO 10/57	Firedog stand	Undecorated	EHII
TSO 10/58	Flat base	Undecorated	EHII
TSO 10/63	Incurving bowl	Applied	EHII

Table 7.10: Table of samples belonging to PG5.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/65	Firedog stand	Applied	EHII
TSO 10/67	Cup	Undecorated	EHII
TSO 10/73	Firedog stand	Undecorated	EHII

Table 7.10 continued: Table of samples belonging to PG5.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/62	Askos?	Black slip?	EHII
TSO 10/68	Firedog stand	Applied	EHII

Table 7.11: Table of samples belonging to PG5A.

PG5 is characterised by the bimodal distribution of large angular to sub-angular mudstone, siltstone and chert fragments, within a fine orange-brown to red-brown matrix. Sub-group PG5A also contains vegetal matter (refer to Figure 7.7).

The matrix of both groups is dominated by silt to sand-sized, angular, silicate fragments, commonly mono- and poly-crystalline quartz but also feldspar. The matrix is commonly optically inactive or has uneven optical activity suggestive of low or mixed firing temperature and atmosphere. The mudstones are dominantly red-brown and fine-grained, commonly containing fine silicate inclusions. Bioclastic mudstone and greywacke sandstone are present in some samples, but only in few to rare amounts. The large size, angularity and sorting of the mudstone and chert inclusions suggest that these have been added to the clay rather than being naturally present. Dark red-brown and commonly opaque TCFs are common with sharp to diffuse edges and are rounded to sub-rounded. They most likely relate to naturally occurring inclusions within the clay as well as being associated with the addition of the red-brown firing mudstones.

PG5 and PG5A are dominated by meso channels with single spacing, commonly orientated parallel to sample margins. The shared structure of the voids between many samples in PG5 and sub-group 5A may indicate that vegetal temper was added to many of the samples, however, only samples within PG5A actually contain remains of organic matter.

7.4.1.1 Discussion

The consistency of inclusions across this group suggests a group of producers with the same *habitus* and understandings of raw material choice and processing. The only variation present is due to the addition of vegetal temper in vessels belonging to PG5A. The raw materials used are compatible with an origin in the Jurassic shale-chert-sandstone formations of the Nemea area with outcrops located *c.* 4km directly south of Tsoungiza. However formations containing the same rock types are repeated throughout the NE Peloponnese making a definitive assignment of provenance on geological grounds alone difficult. Its presence only at Tsoungiza, which is located a short distance from compatible raw materials strongly suggests a local origin.

Although dominated by firedog stands, this fabric was used for a number of forms both undecorated and decorated with applied bands or slipping (refer to Table 7.10 and 7.11). This highlights the potters' use of the same paste recipe to produce a varied repertoire of vessels. Whilst this paste testifies to local understandings of pottery production used to make a range of forms, its use for firedog stands in particular is interesting. The coarse materials in the paste would have aided with preventing crack propagation and thermal shock from expansion and contraction of the firedog stands during repeated exposure to heat and cooling (Tite *et al.* 2001; Muller *et al.* 2014: 269). As discussed in relation to PG3 the potter was unlikely to have explicitly considered the specific performance characteristics of their raw materials. Indeed, there would have been a number of equally suitable raw materials for these vessel types available to the potter, as testified by their production in a number of fabrics. However, the inhabitants at Tsoungiza may have perceived these firedog stands as good products which did not fail when they were being used, reinforcing the potters' ideas of suitable raw materials to make these objects.

7.4.2. PG6: Chert, Micrite and Mudstone Fabric

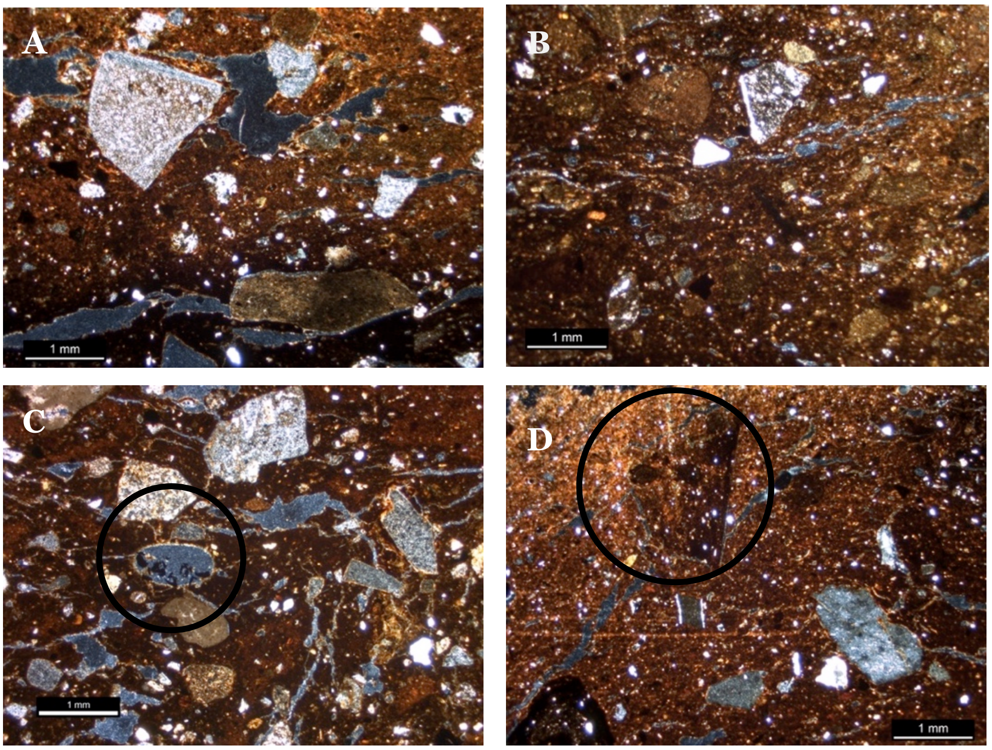


Figure 7.8: Micrographs of samples within PG6 and PG6A. All images in XP. A. TSO 10/35; B. TSO 10/6; C. TSO 10/12 with possible vegetal remains circled; D. TSO 10/43 of PG6A with possible grog fragment circled with a dark surface suggestive of burnishing.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/6	Deep bowl	Undecorated	EHI
TSO 10/10	Incurving bowl	Brown-black slip and burnished	EHI
TSO 10/12	Incurving bowl	Applied	EHI
TSO 10/21	Incurving bowl	Applied	EHI
TSO 10/35	Flat base (jar?)	Undecorated	EHI

Table 7.12: Table of samples belonging to PG6.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/143	Bass bowl	Burnished	EHIII

Table 7.13: Table of samples belonging to PG6A.

This fabric has a bimodal distribution of poorly sorted to unsorted, angular to sub-angular chert, sub-rounded micrite, and brown to orange-brown mudstone within a heterogeneous orange-brown to yellow-brown silicate rich matrix. Sample TSO 10/143 also contains possible grog as highlighted in image D above and is generally finer with less micrite, as such it has been separated into a minor sub-group, PG6A. The suspected grog displays a striking angularity and discordant alignment to the rest of the inclusions and the vessel margins, whilst the darker margin on the right side indicates a possible burnished surface (refer to Figure 7.7). The matrix of the fabric group ranges from optically active to inactive within and between samples, showing uneven firing conditions.

TCFs are dominantly red-brown, sub-rounded and elongated, commonly opaque with both sharp and diffuse edges. They are consistent with natural iron rich concentrations in the base clay. Vegetal temper is present in some voids (for example sample TSO 10/12, refer to Figure 7.8) but is not present in all samples. The void structures are consistently dominated by channels and are very similar across the group, suggesting that vegetal matter may have originally been present in more samples but has not been preserved.

The angularity and sorting of the chert and mudstone fragments suggests that these have been added to a clay by the potter, and that the silicate fine fraction relates to the addition of this material, rather than deriving solely from the base clay. This is particularly evident by the higher frequency of silicate inclusions clustered near large fragments of chert and quartz from the coarse fraction.

7.4.2.1 Discussion

The raw materials used for this paste recipe are widely available throughout the NE Peloponnese with mudstone and micrite being recorded within other petrographic studies in the region (Whitbread 1995, 2007; Graybehl 2014: 94 Joyner 2007, White 2009). However, the fabric is consistent with the Jurassic shale-chert-sandstone formations, and the Pliocene marly limestone, and limestone containing chert formations all within *c*. 4km of Tsoungiza (Zaronikos *et al*. 1970). This, in addition to the presence of PG6 only at Tsoungiza, would seem to indicate an origin in close proximity to the site.

PG6 is consistent in terms of both the nature of its inclusions and microstructure indicating the use of the same raw materials and technological practices rather than a number of different potters. However, there is a distinct difference between the EHI and EHIII examples (refer to Table 7.12 and 7.13), with the presence of grog in TSO 10/143 of PG4A, suggesting a different approach to tempering. Although the long time period confirms production by a different potter to the EHI examples, it also demonstrates continuity in the use of the same primary raw materials (chert, mudstone, micrite) for this fabric between EHI and EHIII. It is also notable that the appearance of the grog is very similar to the surrounding clay matrix, accompanied by a possibly burnished surface, indicating that it may be a sherd from a vessel of the same fabric as PG6. The use of grog has been recorded across the Aegean and has a long history of use from the Neolithic and into the EBA (Papadatos and Tomkins 2014: 323; Quinn *et al.* 2010: 1046; Pentedeka *et al.* 2012: 120-121; Whitbread 2011: 161; Day *et al.* 2005: 177-181; Iliopoulos *et al.* 2011: 131). However, the motivation for recycling vessels is unclear. Ethnographic work has suggested that older vessels are incorporated into mixes to link the success of past potters who were seen to make good pottery, with the production of new vessels (Gosselain and Livingstone Smith 2005: 41).

The small number of vessels and the absence of this fabric group at any of the sites examined indicates that this fabric represents small-scale local production at Nemea, producing decorated and undecorated bowl forms for local consumption over a long period of time.

7.5 Ancient Corinth Fabrics

The petrographic groups within this section have been assigned an origin in the area of Ancient Corinth based on the nature of their raw materials and distribution trends. Many of these fabrics are characterized by the addition of altered or degraded igneous inclusions to a calcareous clay, indicating a shared technological understanding centred on tempering and the use of a variety of locally available rock types.

The inclusions derive from ophiolitic geology, and are commonly found in association with rocks from a sedimentary origin most notably radiolarian mudstone. Extensive geological work undertaken by Siddall (In prep.), Whitbread (1995), Farnsworth (1970), and examination of geological maps has shown that Ancient Corinth, specifically in the area of Acrocorinth, has a diverse range of geological formations due to its complicated geological history (refer to Chapter 5). This includes extensive outcrops of fine clays and sediments. This abundance of raw materials suitable for potting, as well as its location near water sources, and a population of highly skilled potters has ensured that Ancient Corinth has a long history as a centre of ceramic production.

The evidence from examination of the EHII material from Korakou and Ancient Corinth (Keramidaki) indicates that there were several producers with specific paste recipes who produced a variety of vessel types, particularly coarseware jars and large bowls. The wide variety of fabrics from the area and significantly, only within the EHII period, indicates that production at Ancient Corinth was extensive. However, the majority of fabrics have not been found in the comparative material examined indicating that distribution was primarily localized to the area of Corinth.

7.5.1 PG 7: Mudstone, Mudstone Breccia and Tuffaceous Rock Fabric

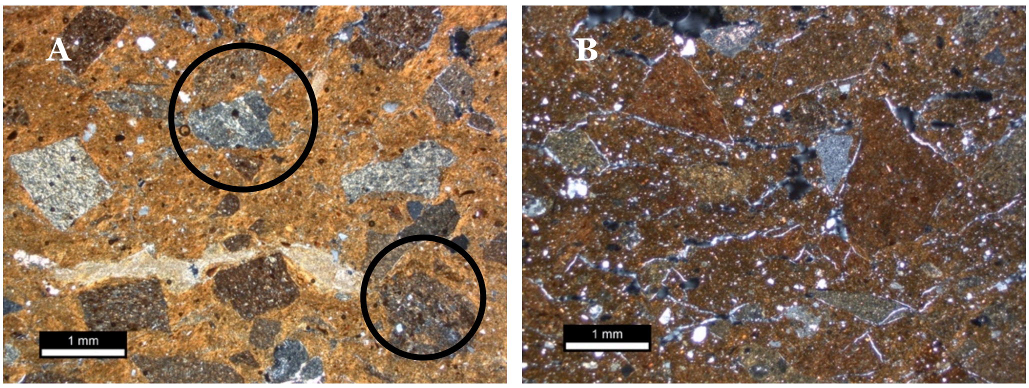


Figure 7.9: Micrographs of samples within PG7 and PG7A. All images in XP. A. KER 11/52 from PG7 with tuffaceous and mudstone breccia inclusions circled; B. KER 11/71 from PG7A.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/18	Basin	Red slip and burnished?	EHII
KER 11/24	Firedog stand	Undecorated	EHII
KER 11/36	Bowl	Orange-brown slip	EHII
KER 11/51	Jar base	Undecorated	EHII
KER 11/52	Baking pan	Undecorated	EHII
KER 11/53	Jar	Applied and red-brown slip	EHII
KER 11/66	Jar	Red-brown slip	EHII
KER 11/72	Inturned bowl	Undecorated	EHII
KER 11/73	Body sherd (bowl?)	Burnished?	EHII
KER 11/77	Hearth/Baking pan	Undecorated	EHII
KER 11/78	Bowl	Undecorated	EHII
KER 11/94	Large bowl	Red slip	EHII
KER 11/124	Jar	Undecorated	EHII
KOR 11/1	Pedestalled sauceboat	Black-brown slip	EHII
KOR 11/30	Baking pan	Undecorated	EHII

Table 7.14: Table of samples belonging to PG7.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/39	Jar	Undecorated	EHII
KER 11/67	Jar	Red-orange slip	EHII
KER 11/71	Bowl	Applied	EHII
KER 11/97	Incurving bowl	Red slip	EHII
KER 11/104	Pithos	Undecorated	EHII

Table 7.15: Table of samples belonging to PG7A.

This fabric is characterized by the bimodal distribution of poorly to well-sorted angular mudstone, mudstone breccia (after Whitbread 1995: 273), and altered tuffaceous rock within a fine silicate rich matrix (refer to Figure 7.9). It has an optically active group with a heterogeneous yellow-brown matrix (PG7) and a sub-group with a heterogeneous orange-brown matrix with no to mixed optical activity (PG7A). The difference between the two groups is due to different firing conditions. The optical activity of PG7 and the orange biscuit of vessels within this group (refer to MG13 description in Chapter 6) suggest that these vessels were consistently low fired in a primarily oxidizing atmosphere. In contrast, the grey biscuit and grey cores of some of the samples within PG7A, in addition to the range of low to no optical activity in the matrix, indicate incomplete oxidation of the fabric.

The tuffaceous fragments range from true welded tuffs to material that has become altered to display a more sedimentary siltstone or breccia appearance. These altered tuffites have a dominantly yellow-brown matrix that displays a characteristic optical activity with mixed orientation within individual rock fragments. The matrix contains angular silicate grains of quartz and feldspar. In PPL the matrix appears fine-grained with distinct individual inclusions (refer to Figure 7.10).

The true mudstones are dominantly sub-angular, with a grey- brown to orange-red-brown clay matrix, containing rare fine monocrystalline quartz. Radiolarian mudstone is common with some examples attached to altered tuffaceous rock fragments, demonstrating that they have been sourced from the same rock outcrop. The mudstone breccia is that described by Whitbread (1995: 269-273), consisting of a very fine green-grey-brown and red-brown clay mud matrix containing angular to sub-angular monocrystalline quartz and plagioclase feldspar grains. The matrix also contains red-brown TCFs, orange-yellow glassy grains and mica laths. The angularity and distribution of all the rock fragments suggest they have been added to calcareous clay rather than being naturally present.

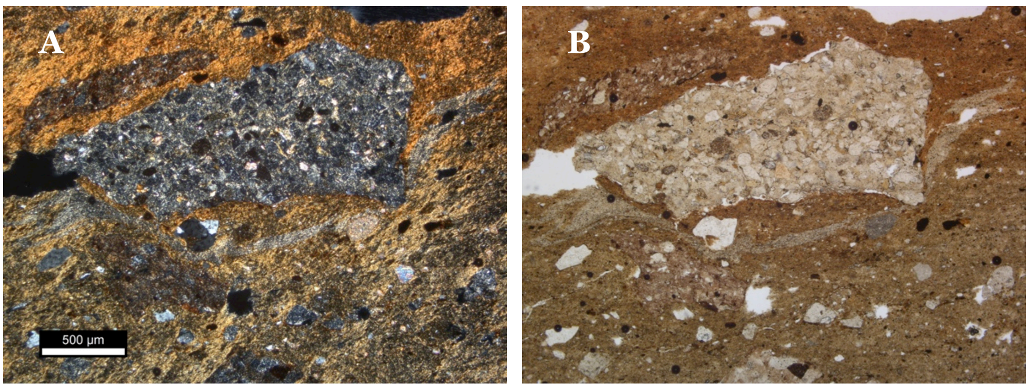


Figure 7.10: A micrograph of an altered tuffaceous rock fragment in KER 11/53. A is in XP, B is in PPL.

TCFs are common in this group, although not present in every sample. They have both sharp and diffuse edges and many examples merge with sample matrix. They range from sub-rounded to elongated, often concordant with sample margins and are consistent with both natural inclusions within the base clay and associated with the addition of rock material to the paste.

7.5.1.1 Discussion

PG7 and 7A are very consistent in terms of the nature, frequency and distribution of the raw materials used, and the microstructure of the fabric. However, they display characteristics suggestive of two different firing regimes. The consistency of the raw materials within the fabric would suggest a single centre of production. However, the use of different firing regimes which does not appear to relate to form or surface finish, suggests that multiple potters were working at the same centre. As the EHII early period was over 300 years long it may be that these potters were not working contemporaneously.

The presence of this fabric only at the sites of Ancient Corinth and Korakou indicates that the centre of production may have been in close proximity to Corinth. This is further supported through the examination of the constituent raw materials. The mudstone breccia is consistent with that noted by Whitbread for his Type A Amphorae, which he argued were likely to be Corinthian (1995: 279). The heavily altered tuffaceous inclusions are not consistent with recent volcanic formations but instead ancient geological units with an igneous origin. Examination of the geological maps and literature have shown that tuffaceous and breccia outcrops are found in associated with ophiolitic formations on Acrocorinth, Penteskouphi, and in the Geraneia mountains (Yannetakis et *al.*1972; Whitbread 1995: 334, 2003: 3). Mudstone breccia has also been recorded in ceramic fabrics from Corinth by Joyner (Quartz-mudstone-chert fabric 2007: 221-223). Finally, the additional presence of radiolarian mudstone, also observed in the area of Ancient Corinth and discussed by Whitbread in relation to his Amphorae Fabric A, lends further support to the idea that PG7 and PG7A represent a centre of production in the area of Ancient Corinth. This centre made a wide repertoire of vessels, most commonly large vessel types, such as jars, that were commonly undecorated, or bowls that were red slipped (refer to Table 7.14 and 7.15). The absence of this fabric group from contemporary sites in the Argolid, suggests that it had a localized distribution.

7.5.2 PG8: Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric

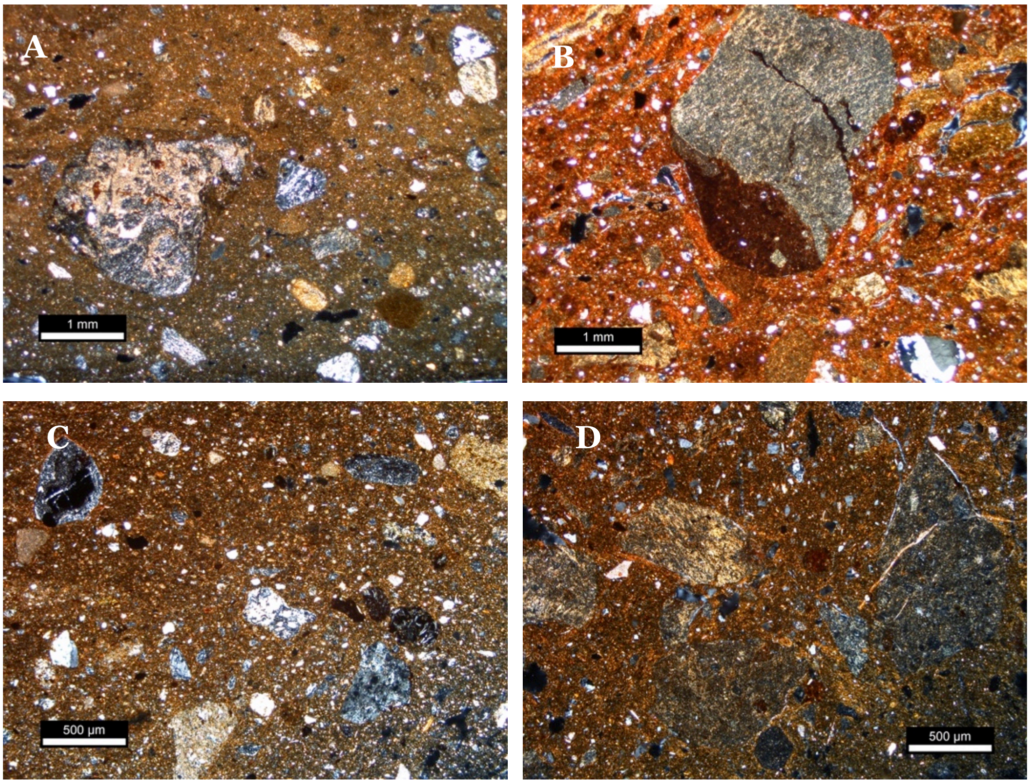


Figure 7.11: Micrographs of samples within PG8. All images in XP. A. KER 11/19; B. KER 11/23; C. KER 11/35; D. KER 11/89.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/19	Basin	Red-brown slip	EHII
KER 11/23	Body sherd	Undecorated	EHII
KER 11/35	Jug	Undecorated	EHII
KER 11/49	Large bowl	Undecorated	EHII
KER 11/70	Jar	Undecorated	EHII
KER 11/89	Shallow bowl	Applied	EHII
KER 11/112	Base (jar/bowl?)	Undecorated	EHII
KER 11/114	Base (jar/bowl?)	Undecorated	EHII

Table 7.16: Table of samples belonging to PG8.

PG8 shares some of the rock types discussed in PG7 and is characterized by the bimodal distribution of commonly angular mudstone, tuffaceous rock fragments with sparry calcite and micrite (refer to Figure 7.11). These are in a heterogeneous yellow-brown to orange-brown silicate rich, optically active matrix. Fragments of vitrified orange and red inclusions are commonly present in the matrix, however, their small size means it is not possible to see their true structure in order to determine if they are serpentinite or vitrified clay. The tuffaceous fragments range from true welded tuffs to altered tuffites as described in relation to PG7. The mudstone ranges from micritic to brown-red brown examples and include radiolarian types (for example in KER 11/89). The large size, angularity and distribution of the tuffaceous inclusions suggest they may have been added to the calcareous clay.

TCFs are found throughout the group with sharp to diffuse edges, some merging with the clay matrix. They are commonly opaque or dark red brown and range from rounded to sub-rounded deriving from both natural inclusions within the clay, and the addition of rock material.

7.5.2.1 Discussion

PG8 is consistent in terms of the nature of its raw materials, but not in the frequency of its inclusions, most likely due to natural variation present in the raw material sources. As discussed in relation to PG7, Ancient Corinth is the probable source, with inclusions derived from ophiolitic formations.

The presence of tuffaceous and mudstone material in both PG7 and PG8 indicates that some of the raw materials within these fabrics derive from the similar rock formations. The presence of calcareous rock fragments in PG8, accompanied by the common absence of mudstone breccia, and the consistently finer nature of PG8 suggests that the variation between the two fabrics is not solely due to natural variability in raw materials. It may represent the use of different sources by different potters working in close proximity. With the paste for PG8 being dominantly used for undecorated vessels (Refer to Table 7.16).

7.5.3 PG9: Argillite Fabric

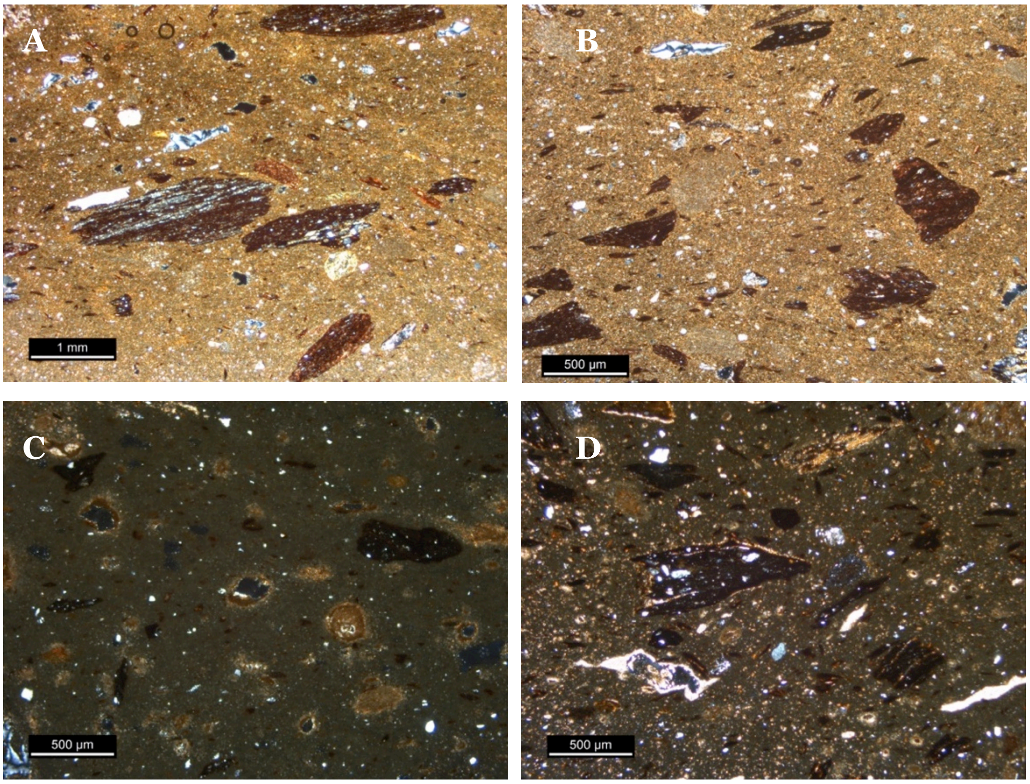


Figure 7.12: Micrographs of samples within PG9 (top row) and PG9A (bottom row). All images in XP. A. KER 11/33; B. KOR 11/32; C. KER 11/29; D. KER 11/130.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/33	Large Bowl	Red-brown slip?	EHII
KER 11/38	Neck (Jug/Jar)	Undecorated	EHII
KER 11/47	Jar	Red-brown slip?	EHII
KER 11/50	Jar	Black-brown slip	EHII
KER 11/93	Jar	Undecorated	EHII
KER 11/101	Large bowl	Red slip	EHII
KER 11/119	Jar	Undecorated	EHII
KER 11/122	Large bowl	Undecorated	EHII
KER 11/125	Jar	Undecorated	EHII
KER 11/128	Jar	Undecorated	
KOR 11/32	Bowl	Red-brown slip and burnished?	EHII

Table 7.17: Table of samples belonging to PG9.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/29	Base (Jar?)	Undecorated	EHII
KER 11/60	Sauceboat	Black-brown slip	EHII
KER 11/126	Jar	Undecorated	EHII
KER 11/130	Jar	Undecorated	EHII
KOR 11/24	Jug	Undecorated	EHII

Table 7.18: Table of samples belonging to PG9A.

This fabric is divided according to optical activity. PG9 has a highly to mixed, optically active yellow-brown heterogeneous matrix, and PG9A is an optically inactive subgroup with a green-brown matrix. These differences are due to different firing temperature ranges rather than the use of different raw materials.

Both groups are characterized by the bimodal distribution of well to moderately sorted, fine-grained, slightly metamorphosed argillaceous rock fragments in a fine silicate rich, calcareous matrix (refer to Figure 7.12). The argillite inclusions are elongated, angular to sub-rounded with a dark red-brown clay matrix and laminated structure. They contain sub-rounded silicates and occasional biotite mica, and are present in both the coarse and fine fraction of the clay paste recipe. In PG9A, the argillite fragments commonly have a dark border and lighter brown core, indicative of localized reduction. Very few degraded basic igneous rock fragments are also present. Samples within PG9 also contain fragments of sparry calcite and micrite, whilst PG9A contains both degraded and secondary calcite, again suggestive of a higher firing temperature.

TCFs are found throughout the group, commonly dark brown with defined and diffuse edges, some merging with the clay matrix. They appear to be dominantly associated with the addition of the argillaceous inclusions to the calcareous clay.

7.5.3.1 Discussion

There are shale outcrops in the Argolid, south of the Nemea Valley, and in the area of Acrocorinth, however, the argillite inclusions within this fabric do not display strong fissility consistent with shale. Instead they appear to be weakly metamorphosed mudstones. As discussed above, mudstone outcrops are present on the southern and western flanks of Acrocorinth (Whitbread 1995: 334), and Whitbread has argued that the Corinthian 'hornfels' identified by Farnsworth (1970: 9) should be re-classed as argillites due to the absence of evidence for thermal metamorphism (1995: 334-335), indicating that Acrocorinth is a likely source for PG9. The rare presence of degraded basic igneous rock fragments also provides some indication of provenance. These inclusions are compatible with those found in PG10 which most likely derive from the pillow lavas that are intercalated with mudstones identified by Siddall on the slopes of Acrocorinth (In prep.: 28). Further, as this fabric is also only present at Ancient Corinth (Keramidaki) and at Korakou it would add additional support to the argument for a production in the area with a localized distribution.

This fabric is strikingly consistent in terms of its raw materials and the nature of the microstructure. The only variability present relates to firing, with PG9 consistently displaying high optical activity and calcareous content indicative of a relatively low firing temperature. In contrast, PG9A displays no optical activity, indicative of a higher firing temperature, clearly demonstrating two different firing regimes. This difference does not appear to correlate to any specific form or surface modification technique (refer to Table 7.17 and 7.18). The use of multiple surface modification techniques and of different firing practices to produce a varied repertoire of vessels, indicates a range of technical knowledge, choice and skills suggestive of multiple producers. However, the consistency of the raw materials and microstructure suggests a single centre of production, therefore the range of practices strongly indicates that production may have been undertaken by a number of potters within the same centre. This trend was also noted for PG7, and is found within other fabrics from Corinth highlighting Corinth as a significant centre of production.

As with many of the Corinthian fabrics, PG9 is dominated by large vessel types, most commonly jars, emphasising a possible focus by Corinthian potters on such vessels.

7.5.4 PG 10: Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric

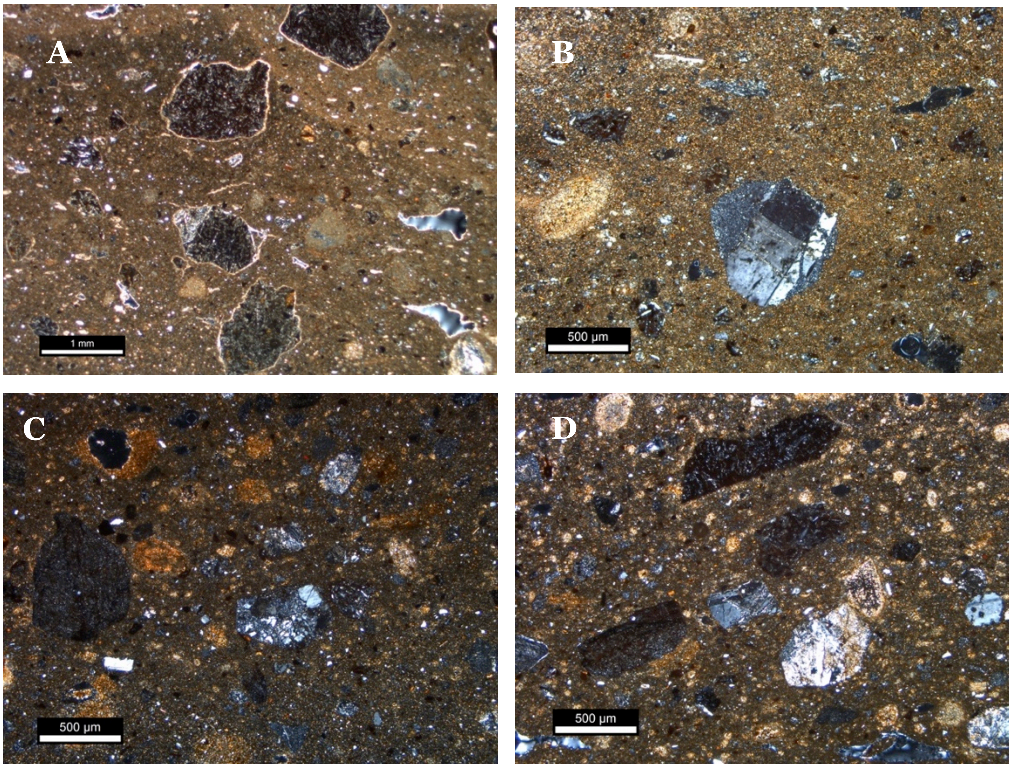


Figure 7.13: Micrographs of samples within PG10 (top row) and PG10A (bottom row). All images in XP. A. KER 11/32; B. KER 11/123; C. KER 11/63; D. KER 11/102.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/32	Large bowl	Red-brown slip	EHII
KER 11/34	Ring base (large bowl)	Red-brown slip	EHII
KER 11/37	Large shallow bowl	Brown slip	EHII
KER 11/81	Large shallow bowl	Red slip	EHII
KER 11/98	Large bowl	Red slip	EHII
KER 11/99	Incurving bowl	Red-brown slip	EHII
KER 11/123	Large shallow bowl	Orange-brown slip	EHII

Table 7.19: Table of samples belonging to PG10.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/2	Jar	Undecorated	EHII
KER 11/4	Jar	Undecorated	EHII
KER 11/41	Jug	Incised	EHII

Table 7.20: Table of samples belonging to PG10A.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/42	Double spouted vessel	Undecorated	EHII
KER 11/43	Jug	Undecorated	EHII
KER 11/44	Jar	Undecorated	EHII
KER 11/62	Bowl	Undecorated	EHII
KER 11/63	Jug/Jar	Red-brown slip	EHII
KER 11/69	Jar	Undecorated	EHII
KER 11/80	Jug/Jar	Undecorated	EHII
KER 11/102	Jar	Undecorated	EHII
KER 11/127	Jar	Undecorated	EHII
KER 11/132	Cup?	Applied	EHII
KER 11/135	Ring base (large bowl)	Black slip	EHII

Table 7.20 continued: Table of samples belonging to PG10A.

PG10 is optically active with a yellow-brown matrix, while sub-group PG10A is optically inactive with a green-brown matrix. These differences are due to the degree of vitrification related primarily to firing conditions rather than raw material choice. Both groups are characterized by the bimodal distribution of angular to sub-angular, moderately well sorted, degraded basic igneous rock fragments (basaltic). Welded tuffs and altered tuffaceous fragments with mudstone are also present within a commonly heterogeneous, fine silicate rich, calcareous matrix (refer to Figure 7.13).

The welded tuffs and altered tuffaceous fragments are the same types as in PG7 and PG8. The degraded basic igneous inclusions are dominantly angular to sub-angular, dark red-brown to opaque. They have a sediment matrix containing plagioclase feldspar laths, and/or voids where laths have fully degraded. Some also contain fragments of serpentinite and it is common to see that many have degraded to the point of becoming mudstone.

The mudstones range from red-brown examples (which most likely derive from the degraded igneous inclusions) and are rarely accompanied by mudstone breccia as described in fabric PG7. Calcite and micrite are present in PG10, but appear as degraded and secondary types in PG10A. This is again indicative of different firing temperature ranges between the two groups.

TCFs are found throughout the fabric with sharp and diffuse edges, some merging with the clay matrix. They are commonly opaque or dark red-brown and range from rounded to sub-rounded. Their characteristics are consistent with the mixing of a darker firing clay with a calcareous clay, and the presence of sediment associated with the degraded igneous material. The distribution and angularity of the degraded igneous rock fragments are suggestive of temper, further supported by their incompatibility with the calcareous clay.

7.5.4.1 Discussion

The degraded and altered nature of the basalts and tuffs indicate that these rocks do not derive from fresh igneous rock outcrops, but instead represent ancient rocks which were originally formed under igneous conditions. The nearest compatible outcrops to the sites from which the material was excavated, are the pillow lavas that have been identified on the slopes of Acrocorinth (Siddall In prep.: 67), consistent with the basaltic nature of the majority of the degraded inclusions in this fabric.

This fabric is very consistent in terms of both the raw materials and the character of the micromass, suggesting that it represents the product of one centre which produced a restricted range of forms that have been fired using different firing regimes. PG10, the lower fired group, is associated with large bowl forms with a red-brown slip, whilst PG10A is associated with undecorated jars suggesting that the difference in firing regime relates to the choice of surface colour/modification technique. Both groups are made using the same raw materials, however, those vessels in PG10 commonly have orange bodies with red-brown slips, whilst many of the jars in PG10A have green-buff undecorated surfaces (refer to Table 7.19 and 7.20). The red-brown colours of PG10 would have been achievable at relatively low temperatures in an oxidizing atmosphere. However, it would have been necessary to fire the same raw materials at a higher temperature to achieve a higher degree of vitrification and the green-buff colour of the fabric of PG10A.

Further, the black slipped bowl in PG10A would require a two stage firing technique of oxidation and then reduction (O-R) to produce a light body with a black slip (Noll 1975, 1978; Kilikoglou 1994). This evidence demonstrates a range of technological choices were being made at this production centre, regarding the type of vessel and the firing process. It is clear that potters were highly skilled in the management of firing to ensure the production of dark slipped vessels with buff bodies. To achieve such controlled manipulation over the firing conditions would be difficult without the use of some form of firing structure such as a kiln, which would allow timely control and alteration of firing conditions and temperatures.

These results suggests the contemporaneous use of multiple firing techniques for different vessel types associated with particular surface finishes. The presence of similar raw materials in PG7, 8 and 9 indicate a number of potters working in close proximity to each other but making specific raw material choices. Such evidence again suggests that production at Ancient Corinth was on a significant scale in comparison to other areas of production identified within this thesis.

7.5.5 PG11: Rounded Serpentinite Fabric

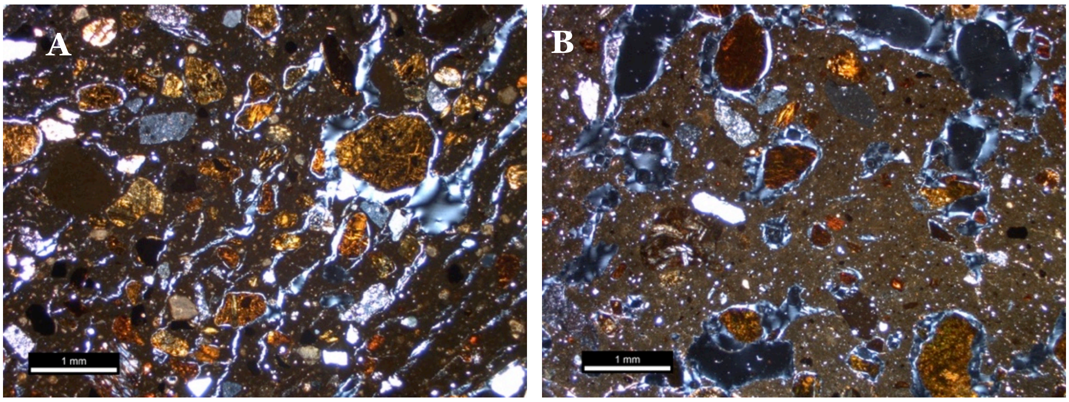


Figure 7.14: Micrographs of samples within PG11, XP. A. KER 11/56; B. KOR 11/27.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/56	Jar/Basin	Black slip?	EHII
KOR 11/27	Ladle	Black-brown slip	EHII

Table 7.21: A table of samples belonging to PG11.

PG11 is characterised by the weakly bimodal to unimodal distribution of sub-rounded to rounded, red-orange and yellow-orange serpentinite fragments in a green-brown heterogeneous matrix which is optically inactive (refer to Figure 7.14). The rounded nature of the serpentinite suggests it has been eroded, perhaps by water, whilst its sorting and distribution indicates that it has been added to the clay base rather than being naturally present.

The fabric contains sub-rounded, red-brown, commonly opaque TCFs, with diffuse edges, consistent with both clay mixing and naturally occurring sediment inclusions within the clay. Sub-angular to more commonly sub-rounded chert, quartzite and brown mudstones are also present in very small amounts and appear to be related to the red firing clay fraction of the mix.

7.5.5.1 Discussion

The serpentinite that characterizes this fabric derives from an ophiolitic rock formation, the closest of which would be Acrocorinth. As with many other fabrics, the consistency of this group at both Korakou and Ancient Corinth (Keramidaki) suggests these sites both sourced their vessels from the same producer. The small number of samples makes comment on the repertoire of vessels from this centre difficult, although the potter(s) were skilled in slipping methods and the production of more than one vessel type (refer to Table 7.21).

7.5.6 PG 12: Angular Chert and Altered Volcanic Rock Fragments Fabric

Sample Number	Vessel Form	Surface Modification	Period
KER 11/21	Ladle	Undecorated	EHII
KER 11/74	Deep bowl/Cooking pot	Undecorated	EHII
KER 11/88	Large bowl/Cooking pot	Applied	EHII
KER 11/92	Large bowl	Undecorated	EHII

Table 7.22: A table of the samples belonging to PG12.

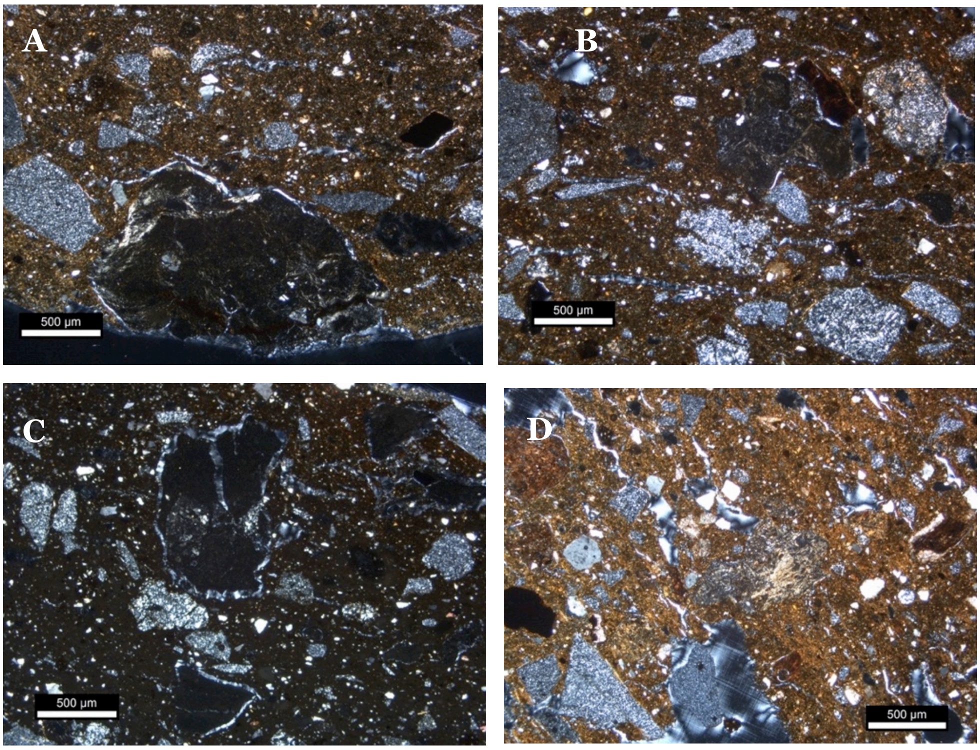


Figure 7.15: Micrographs of samples within PG12. All images in XP. A. KER 11/88; B. KER 11/92 with sub-angular to sub-rounded chert examples; C. KER 11/74; D. KER 11/21.

This fabric is characterised by the bimodal distribution of large angular to sub-rounded chert, including radiolarian types, and altered volcanic rock fragments within a heterogeneous matrix (refer to Figure 7.15). The micromass is silicate rich, consisting of dominantly monocrystalline quartz with feldspar. Its colour ranges from green-brown to orange-brown, and commonly displays low to no optical activity, often heterogeneous within a single sample. As the surface colour of vessels in PG12 are dominantly grey, and the fabric displays mixed optical activity, it is likely that vessels were fired in a reducing or mixed atmosphere. The presence of calcite within some samples indicates that the temperature range was not particularly high in some cases (for example refer to Figure 7.15 image D above).

The volcanic fragments include welded tuffs and altered tuffs as described in relation to PG7, 8 and 10. They also include devitrified rock fragments that are partially or completely isotropic, and bear a striking similarity to those described within PG25. Importantly, the presence of small fragments of red serpentinite within PG12 accompanying these altered volcanic fragments, suggest a relationship between the raw material sources of PG12 and PG25.

TCFs are present across the group, ranging from dark brown and opaque inclusions, to black-brown sediment with sharp and diffuse edges. These TCFs are indicative of mixing two clay types. The presence of sub-rounded chert fragments alongside highly angular examples, indicates that these may not have been added to the clay as temper but are a natural constituent within one of the clays used within this mix. Evidence for naturally occurring angular chert within clays has also been noted by Whitbread in relation to clays sampled from within the Berbati Valley (2011: 145). The TCFs do not display a clear relationship to particular rock types within the paste preventing a clear differentiation of the individual clay components.

7.5.6.1 Discussion

The samples within PG12 display a strong consistency in terms of the nature of the raw materials, their frequency and distribution, suggesting this fabric represents the product of a single centre. It bears a striking similarity to PG19 in terms of the dominance of chert, distribution of these aplastic inclusions and the structure of the micromass (refer to Figure 7.16). It also includes rock types found within PG7, 8, 10 and PG25, suggesting the use of similar raw material sources for these fabrics.

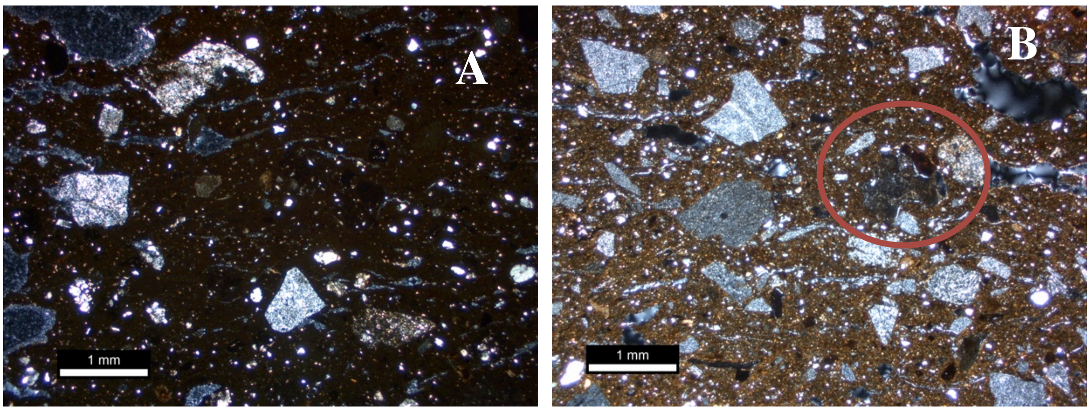


Figure 7.16: A. TSO10/132 Jug/jar handle in PG19; B. KER11/74 cooking pot/large bowl in PG12 with a fragment of altered igneous rock highlighted. All images are in XP.

Chert is widely distributed throughout the NE Peloponnese, however, the presence of the altered volcanic and serpentinite inclusions indicate an ophiolitic origin. Examples of such geological outcrops are more restricted and allow for a more precise discussion of provenance. As discussed in relation to PG7 and PG8, tuffaceous geology has been recorded in the area of Acrocorinth (Siddall In prep.: 67). It has also been noted in geological exploration *c.* 10km south of Corinth in association with greywacke and conglomerates (Yannetakis et *al.* 1972). As this fabric does not contain conglomerate or greywacke material, and has a narrow distribution only being found at Ancient Corinth (Keramidaki) it is most likely that the raw materials were sourced at Acrocorinth rather than further south. Joyner has also recorded the presence of a 'weathered volcanic fragment' in her Group 5 but sadly did not describe it in detail so it is difficult to compare. However, she does state that such inclusions are not unusual within Corinthian sediments originating with local ophiolitic sources (2007: 220). In addition, although chert is widely distributed across the region, chert outcrops are also located on Acrocorinth as bands or nodules within the Middle Jurassic limestone, and within the shale-chert formation. As the two primary rock types within this fabric can both be sourced at Acrocorinth there is no reason to suggest production outside of Corinth.

The provenance of vessels made using chert based paste recipes has been subject to recent discussion by Joyner (2007: 200) and Graybehl (2014: 101). Both Joyner and Graybehl have argued for a Corinthian provenance, based upon typological grounds, the presence of compatible raw materials in the Corinth area, and similarities to chert types found by Whitbread in his Type B amphorae (1995: 276). However, due to the lack of diagnostic inclusions within some of their chert fabrics this interpretation of provenance has been open to debate. As such, PG12 represents a further and more diagnostic link between chert fabrics and production at Ancient Corinth. The striking similarity of PG12 to PG19, Joyner's Fabric 1 (2007: 193) and Graybehl's Fabric 2 (2014: 98), suggest the absence of the diagnostic volcanic inclusions in their fabrics may represent natural variation or changes in the choice of clay sources over the long period of time under consideration -

between different phases of the EBA, and between the EBA, the Hellenistic, Byzantine and Frankish periods.

PG12 represents a centre or production at Ancient Corinth that produced a variety of vessel types for local consumption with particular focus on cooking pots (refer to Table 7.22). Significantly, unlike many other Corinthian potteries, it would appear that this centre also focused on the production of undecorated ceramic forms, evident by the presence of an unslipped ladle, (a form dominantly found slipped), accompanied by the general absence of slipped vessels.

7.5.7 PG13 Fine Quartz Rich Fabric

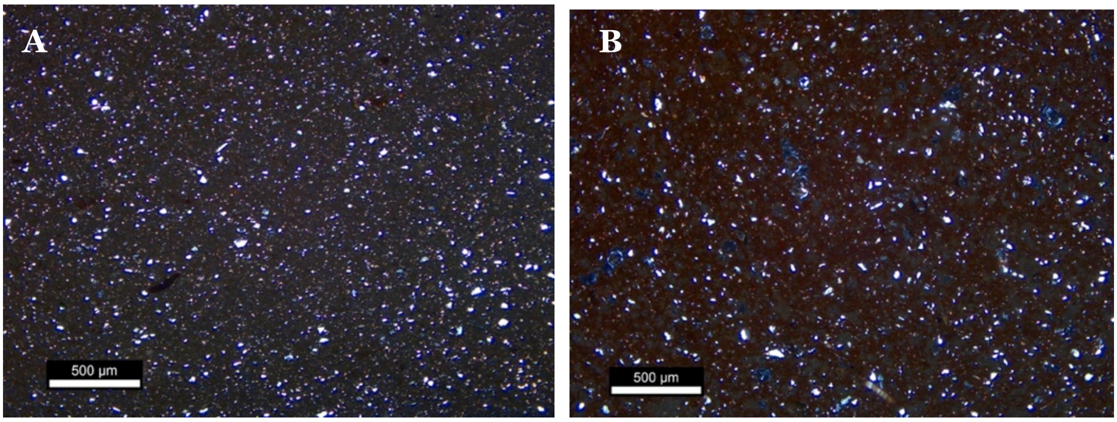


Figure 7.17: Micrographs of samples within PG13. XP. A. KOR 11/15 B. KOR 11/28.

Sample Number	Vessel Form	Surface Modification	Period
KOR 11/15	Sauceboat	White slip (yellow-blue mottled)	EHII
KOR 11/28	Ladle	Brown-red slip	EHII

Table 7.23: Table of samples belonging to PG13.

This fabric is characterised by a dark red-brown, low to optically inactive matrix suggestive of higher firing temperatures. The matrix is rich in silt-sized silicate grains, with small biotite laths which are visible in lower fired more optically active areas (refer to Figure 7.17). Larger inclusions of quartzite are very rare.

TCFs are dark red-brown and green-brown concentrations, with the mica rich elements concentrated in the redder areas. This is suggestive of mixing a green-firing calcareous clay with a mica-rich red firing clay.

7.5.7.1 Discussion

The fineness of PG13 and lack of diagnostic rock inclusions means that it is not possible to assign a provenance on geological grounds, however, there are elements which suggest an origin in the region of Corinthia. Firstly, Attas' NAA study assigned these samples as Corinthian. Secondly, the clay mix is consistent with that seen in PG1, but has been separated due to the significantly higher proportion of silica and mica within the matrix. Finally its confinement to the site of Korakou lends support to a possible Corinthian provenance. The small number of samples suggest the use of a range of surface modification techniques (refer to Table 7.23).

7.5.8 PG14: Medium Fine Clay Mix, with Mudstone, Siltstone and Mudstone Breccia Fabric

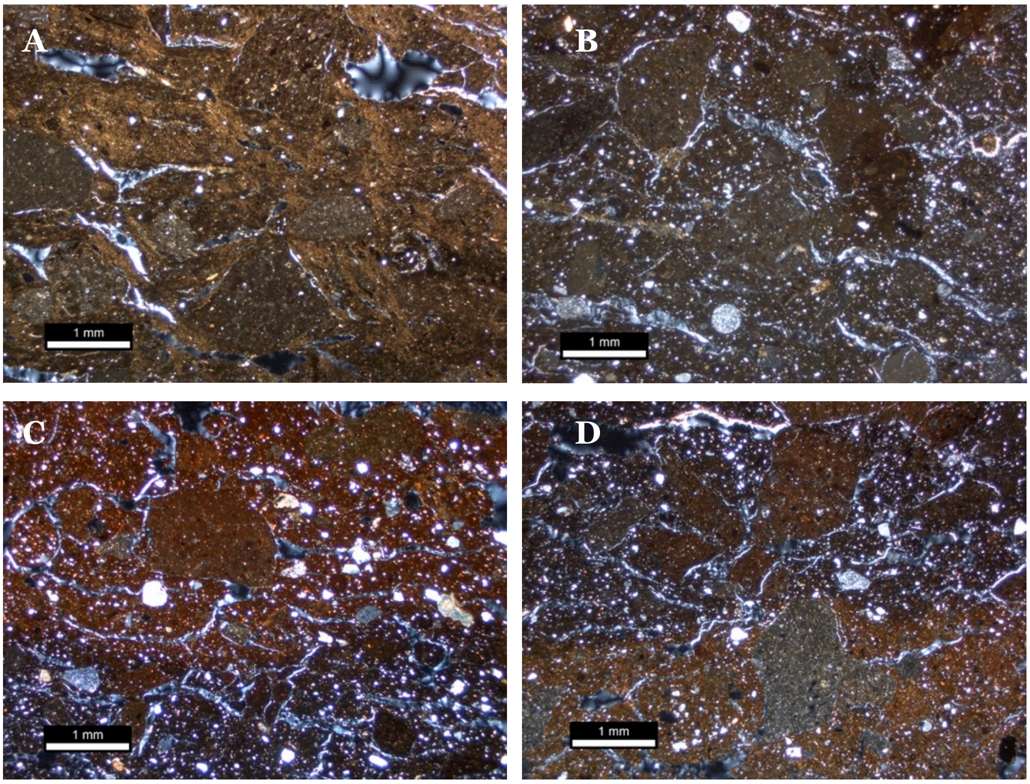


Figure 7.18: Micrographs of samples within PG14. XP. A. KER 11/40; B. KER 11/57; C. KER 11/75; D. KER 11/76.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/40	Storage jar/Basin	Undecorated	EHII
KER 11/57	Coarse bowl	Applied	EHII
KER 11/75	Cooking pot	Undecorated	EHII
KER 11/76	Cooking pot	Undecorated	EHII
KER 11/105	Jar	Undecorated	EHII
KOR 11/29	Baking pan	Undecorated	EHII

Table 7.24: A table of samples belonging to PG14.

This fabric is characterized by the bimodal distribution of poorly to well-sorted, angular mudstone, siltstone and mudstone breccia, within a fine silicate rich matrix (refer to Figure 7.18). The matrix also contains glassy orange-yellow inclusions and biotite mica. There is considerable variation in the degree of optical activity, both within and between samples, indicating mixed firing conditions and temperatures. The use of some of these vessels for cooking may have also affected the degree of vitrification.

The mudstones are dominantly sub-angular, with a grey-brown to orange-red-brown clay matrix, containing rare, fine monocrystalline quartz grains. The mudstone breccia is as described in relation to PG7. The groundmass of the ceramic fabric also contains the red-orange translucent inclusions seen within the breccia, but it is unclear if this is clay-rich or altered serpentine. As they commonly display similar properties to those within the breccia it is possible that they originate from these rock fragments. Radiolarian mudstone, radiolarian chert and rare serpentinite are also found in this fabric group. The angularity and distribution of all the rock fragments suggest they have been added to the calcareous clay base by the potter. The presence of red-brown TCFs commonly with both sharp and diffuse edges indicates mixing of a calcareous and red-brown firing clay.

7.5.8.1 Discussion

This fabric group is very consistent in terms of the raw material types, their size and distribution, suggesting a single centre of production. It shares many of the rock types present in PG7, indicating a similar source of raw materials. It also shares a striking similarity to Joyner's Group 3 and Group 4 cooking pot fabrics (Joyner 2007: 195-196). Of particular note is the shared presence of mudstone breccia, mono- and poly-crystalline quartz and chert, including radiolarian examples which Joyner argues are compatible with the mudstone-shale outcrops on Acrocorinth (2007: 195-196). This Corinthian provenance is further suggested by the presence of serpentinite in some samples from PG14, indicating an ophiolitic source, perhaps that on Acrocorinth (Yannetakis et *al.*1972).

This fabric represents a local centre of production at Ancient Corinth with particular focus on undecorated cooking and kitchen wares which do not appear to have been widely consumed outside of Corinth (refer to Table 7.24). Significantly, Joyner also found this type of fabric for Byzantine and Frankish cooking pots, suggesting a long tradition of using mudstone based fabrics for such vessels at Corinth. The motivations for these raw materials choices will have been multi faceted depending on the potters own understanding of suitable raw materials; however, the continued use of mudstone for large vessels and in this instance cooking vessels suggests that these choices had a functional aspect. Whilst the potter may not have explicitly considered the performance characteristics of the raw materials they chose, they would have been aware of the suitability of coarse fabrics to successfully produce cooking pots and large vessel types. As discussed in relation to PG4, the use of such a coarse paste recipe would have produced vessels with increased toughness, decreasing the chance of vessel failure from thermal stress during its use as a cooking vessel (Rye 1981; Kilikoglou *et al.* 1998). Whilst the use of multiple raw material types for cooking vessels and other large vessel types demonstrates that there were a wide variety of motivations for raw materials choices, it is significant that there is a shared tradition of using coarse paste recipes for large vessels and vessels which would have been exposed to heat.

7.6 Argolid Fabrics

Those fabrics that have been assigned a provenance within the region of the Argolid, share the presence of metamorphic and mica-rich raw materials, dominantly within orange firing non-calcareous clays. PG15 is particularly characteristic and represents a major centre of production in the area of the

Talioti Valley which produced a wide repertoire of vessels, of which the fruitstand had the widest distribution.

7.6.1 PG15: Sandstone to Low Grade Metamorphic Fabric

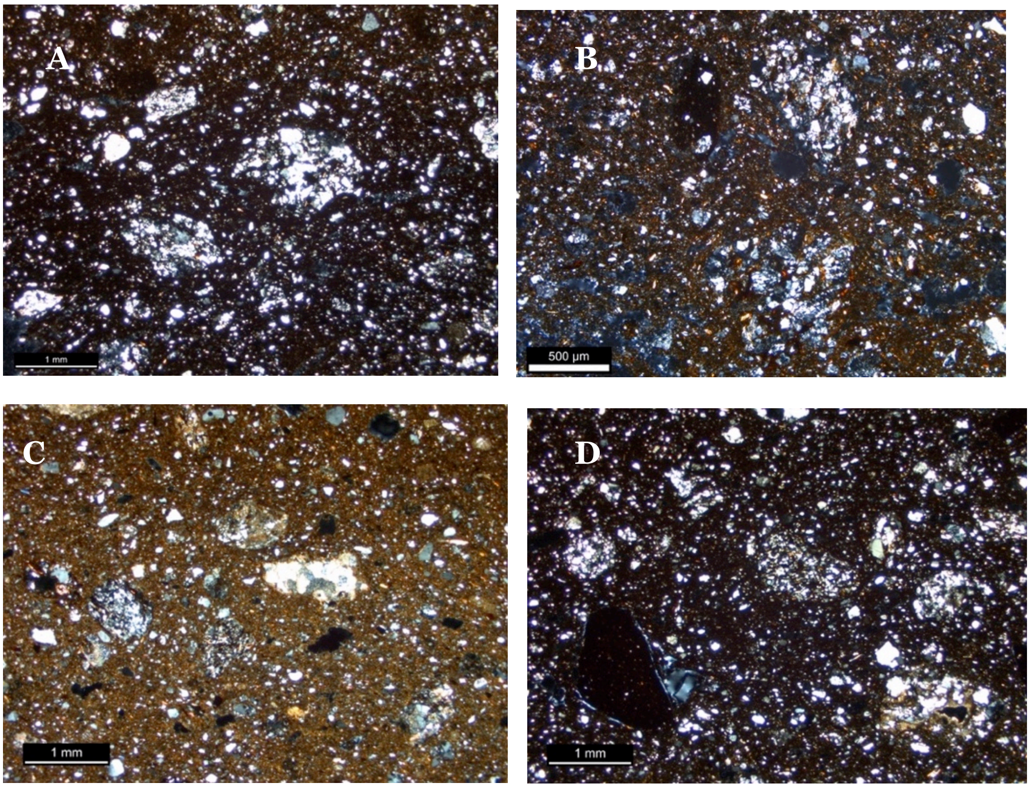


Figure 7.19: Micrographs of samples within PG15 (top row) and PG15A (bottom row). All images in XP. A. TSO 10/23; B. EPI 12/19; C. TAL 11/10; D. TAL 11/15.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/4	Ring base (small bowl/sauceboat)	Undecorated	EHII
EPI 12/6	Base (jug/jar)	Brown slip?	EHII
EPI 12/8	Collar of jar	Undecorated	EHII
EPI 12/19	Collar of jar	Undecorated	EHII
EPI 12/31	Deep bowl	Undecorated	EHII?
EPI 12/37	Large bowl	Undecorated	EHII
EPI 12/42	Collar of jar	Undecorated	EHI?
KOR 11/6	Sauceboat	Red-brown slip	EHII

Table 7.25: Table of samples belonging to PG15.

Sample Number	Vessel Form	Surface Modification	Period
TAL 11/1	Fruitstand	Raised decoration (Black brown wash?)	EHI
TAL 11/8	Jar	Undecorated	EHI
TAL 11/10	Ladle	Red slip	EHI
TAL 11/17	Small incurving bowl	Black slip?	EHII?
TAL 11/19	Jar handle	Red-black wash?	EHI
TAL 11/27	Large shallow bowl rim	Undecorated	EHI
TAL 11/29	Base of jar	Red slip	EHI
TAL 11/31	Fruitstand	Undecorated	EHI
TSO 10/7	Large basin	Incised with red slip	EHI
TSO 10/9	Fruitstand	Red slip and burnished	EHI
TSO 10/14	Base of large bowl	Red slip and burnished	EHI
TSO 10/23	Fruitstand	Red-orange slip	EHI
TSO 10/40	Ladle	Red-orange slip	EHI
TSO 10/41	Fruitstand	Red-orange slip	EHI
TSO 10/42	Fruitstand	Incised with red-orange slip	EHI
TSO 10/100	Jar handle	Red-brown slip	EHII
TSO 10/128	Tankard	Dark on light pattern-painted (brown paint)	EHIII
TSO 10/148	Jar	Orange slip/wash	EHIII

Table 7.25 continued: Table of samples belonging to PG15.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/133	Large bowl/basin	Undecorated	EHII
TAL 11/9	Storage jar	Applied	EHI
TAL 11/15	Jar	Applied	EHI
TAL 11/18	Base (jar/cooking pot)	Undecorated	EHI
TAL 11/28	Rim (jar/fruitstand)	Undecorated	EHI

Table 7.26: Table of samples belonging to PG15A.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/43	Small shallow bowl	Red slip	EHII
TSO 10/104	Jar	Grey-black slip and burnished?	EHII

Table 7.27: Table of samples belonging to PG15B.

PG15 is characterised by the bimodal distribution of moderately sorted, sub-angular greywacke and arenite, and micaceous sandstone grading to low-grade metamorphic rock fragments (refer to Figure 7.19). The groundmass is dominantly optically inactive, mid red-brown, or brown to dark brown, rich in biotite mica and angular quartz and feldspar rich sand. The silica and mica-rich nature of the fine fraction is consistent with the geological character of the larger rock fragments within the coarse fraction, suggesting the base clay and rock fragments originate from the same geological unit and that this is not a tempered fabric.

TCFs consisting of rounded and elongated opaque or dark red-brown sediment are frequently present. Some are well defined and consistent with clay mixing whilst others may be naturally occurring sediment within the clay.

Variation is present with regard to the presence of sparitic calcite in small amounts in samples with a mid-brown matrix, whose optical activity suggests a lower firing temperature. The absence of calcite in the optically inactive samples may be due to the result of firing as well as variation naturally present in the raw material sources. Fragments of serpentinite and degraded basic igneous are also present but are rare and not consistently found across all samples within the fabric group.

PG15A has been subdivided from the main group, as it also contains large angular to sub-angular, red-brown mudstones (refer to Figure 7.19). The vessel types within PG15A are all large forms such as jars, which may have required the addition of coarse temper to aid with forming and avoid collapse during drying and firing, and to helped produce a tough vessel. PG15B is a very fine version of the fabric used for a variety of forms, as such, it may relate to the use of a finer clay sources rather than the manipulation of the clay paste (refer to Tables 7.25, 7.26 and 7.27 for forms).

7.6.1.1 Discussion

The sandstone and mica-rich low-grade metamorphic inclusions in this fabric are consistent with a flysch deposit. Flysch commonly contains rocks that display deformation from faulting and folding during the orogenic process in which they are deposited. The presence of rare serpentinite and degraded igneous inclusions suggest that the flysch deposit must have been in close proximity to ophiolitic formations. Flysch outcrops are located throughout the NE Peloponnese, however they are not commonly found in association with ophiolitic geology. The most comparable formations are in the area around and within the Talioti Valley near Asine in the Argolid region. This valley contains large expanses of sandstone bearing flysch and flysch interbedded with crystalline limestones, consistent with the calcareous material present in some of the samples from this group. These outcrops also contain ophiolitic bodies which would explain the presence of serpentinite in some samples.

This provenance hypothesis is further supported through examination of the proportional distribution of this fabric and its associated vessel types, which reveals significant variation in the types of vessels produced and their distribution. Firstly, PG15 is most abundant in Argolid assemblages. Its abundance, and the range of associated vessel types, decreases with distance from the region. Significantly, in the Corinthia PG15 is associated with a very narrow range of vessel types, most dominantly the EHI fruitstand form.
PG15 is very abundant in the seven Argolid assemblages that have been examined, but in this case in a wide variety of vessel types and wares, ranging from large coarse ware jars to fine tablewares, and from a range of periods. At the site of Talioti located within the Talioti Valley itself, the entire sampled assemblage belongs to this fabric group and it is the dominant fabric at the sites of Midea and Tiryns located only 2-4km away from the Talioti Valley. These distribution trends suggest that the origin of PG15 is within close proximity to the site of Talioti and most probably within the Talioti Valley. Indeed, the dominance of this fabric at Tiryns may explain the identification by Attas of a specific Tiryns chemical group (Group Q, Attas *et al.* 1987: 83) and why this chemical group also dominated the material he examined from Asine. As Asine also lies in close proximity to the Talioti Valley, it is highly likely that

the community at the site will have also consumed vessels from this centre of production.

This centre produced a varied repertoire of vessel types throughout the EH period from EHI to EHIII, but appears especially in the earliest phase to have focused on, and been known for, the production of fruitstands, which had a much wider distribution than other products from this centre. A non-local origin of the fruitstand in Corinthia may also explain the high proportion of repairs noted for these vessels at some sites in the region (Pullen 2011: 67, 93). If fruitstands were not widely available but utilized by most households as their wide distribution would imply, then their repair may have been necessary, in contrast to other vessel types which could have been more readily sourced from local producers. A similar fabric has been noted by Whitbread in relation to EHI material sampled from the Berbati Valley, which was classed as 'Talioti ware' (Whitbread's 'sandstone siltstone, mudstone group' 2011: 156).

Variation within this paste recipe, noted at Midea and Tiryns (refer to Figure 7.20), where it dominates the assemblages, indicates that more than one producer was operating within the Talioti Valley using the same raw materials to produce a wide variety of forms, both fine- and coarsewares. In contrast, the consistency of fruitstand fabric suggests that production of these was much more standardized, perhaps being made by a limited group. This may have also made them particularly desirable or emphasized their importance through restricted production. All the examples of fruitstands in PG15 found at sites outside Talioti are consistently a red-orange even colour, whilst examples at the site itself vary due to the use of multiple firing procedures. This, in addition to the abundance of ceramics found within the Talioti Valley and the entire repertoire of the site consisting of this fabric, indicates that this may have been a site of production rather than of consumption.

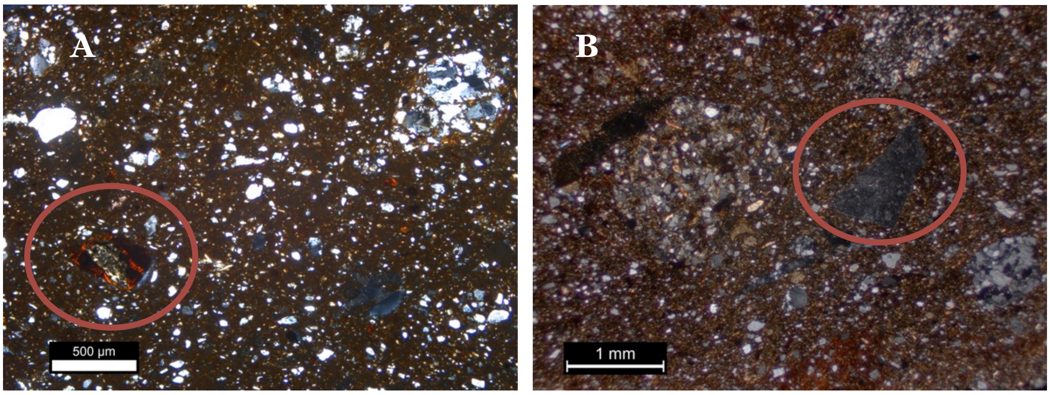


Figure 7.20: Micrographs displaying the variation present within PG15 from comparative samples. All images in XP. A. TIR 14/82, an EHII small bowl from Tiryns rich in serpentinite and mica (circled). B. MID 14/82, an EHII saucer from Midea with more sediment rich sandstones accompanied by felsic rock fragments (circled).

7.6.3 PG16: Mudstone, Siltstone and Chert Fabric

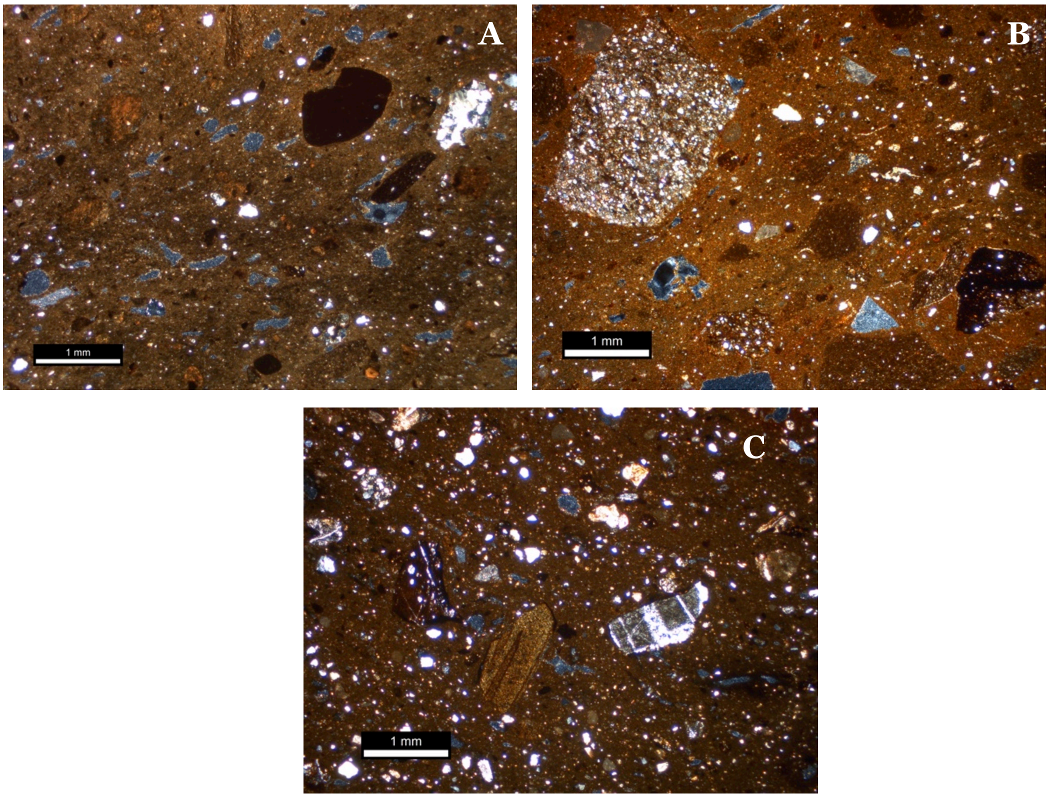


Figure 7.21: Micrographs of samples within PG16. All images in XP. A. TSO 10/88; B. TSO 10/93; C. TSO 10/113.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/88	Incurving bowl	Undecorated	EHII
TSO 10/93	Incurving bowl	Red-orange slip and applied	EHII
TSO 10/113	Incurving bowl	Brown slip	EHII

Table 7.28: Table of samples belonging to PG16.

Fabric PG16 is characterised by the presence of a range of mudstone types commonly sub-angular or sub-rounded and elongated. These are accompanied by chert, radiolarian chert, radiolarian mudstone, calcite and polycrystalline quartz which are bimodal in their size distribution. The heterogeneous matrix is silicate rich, with moderate optical activity. The colour ranges from dark brown to grey or orange-brown (refer to Figure 7.21). TCFs are few, consisting of both opaque, well rounded inclusions, and dark brown well rounded and irregular inclusions. These are consistent with both clay mixing and the natural occurrence of dark sediment within the paste recipe from the addition of the coarse rock fragments which appear to have been added as temper.

7.6.3.1 Discussion

This group, while rather heterogeneous, shares key rock components such as radiolarian mudstone and chert with bands of large silicate grains running through it. The variation in the groups suggests the use of the same types of raw materials by different potters making the same bowl forms (refer to Table 7.28). These general rock types are not very diagnostic and are consistent with the shale-chert-sandstone formations south of Tsoungiza, as well as similar rock formations located throughout Corinthia. As they are consistent with the local geology there is no reason to suggest an origin from outside of Nemea but definitive provenance is not clear.

7.6.4 PG17: Tuffaceous Rock Fragments and Feldspar Fabric

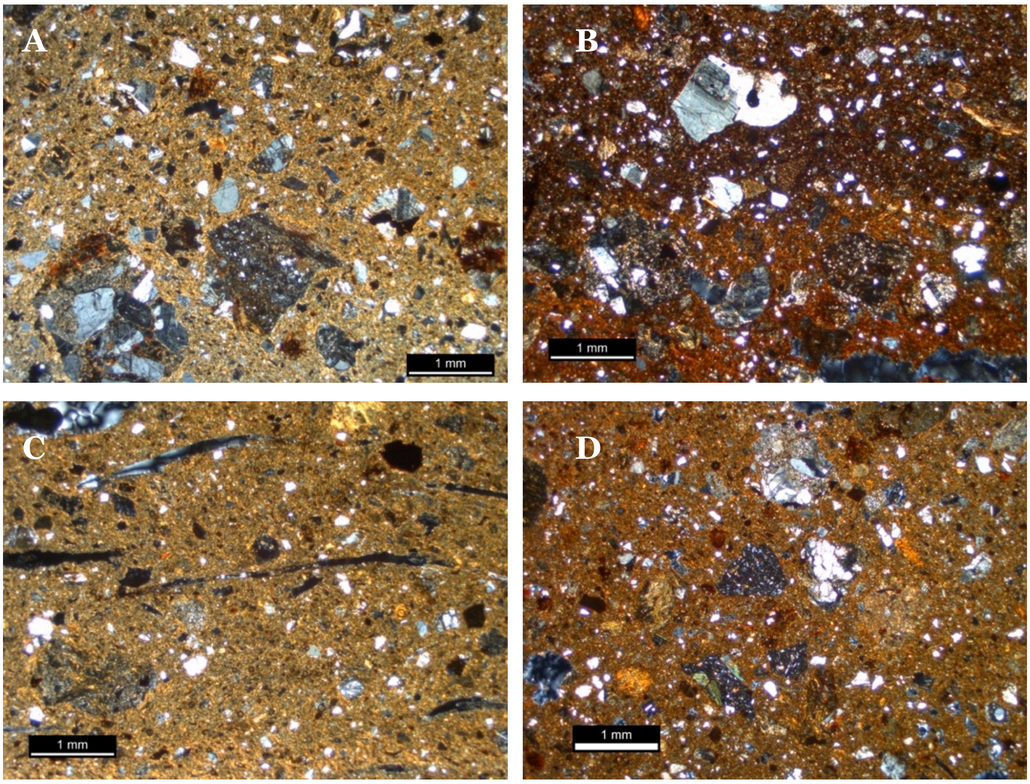


Figure 7.22: Micrographs of samples displaying the variability present in PG17, PG17A, and PG17B in XP. A. EPI 12/21 from PG17; B. EPI 12/39 from PG17; C. EPI 12/5 from PG17A; D. EPI 12/34 from PG17B.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/10	Base (Jug/Jar)	Undecorated	EHII
EPI 12/15	Shallow bowl	Red-brown slip and burnished	EHI
EPI 12/21	Baking pan	Undecorated	EHII
EPI 12/22	Deep basin	Red-brown slip and burnished?	EHII
EPI 12/23	Jar	Undecorated	EHII
EPI 12/24	Pot stand	Undecorated	EHII
EPI 12/25	Baking pan	Undecorated	EHII
EPI 12/26	Baking pan	Undecorated	EHII
EPI 12/30	Deep bowl/Basin	Red-brown slip	EHI
EPI 12/32	Jar	Red-brown slip	EHII
EPI 12/33	Basin	Red-brown slip and burnished	EHI

Table 7.29: Table of samples belonging to PG17.

EPI 12/35	Basin	Brown slip and burnished	EHI
EPI 12/36	Basin	Undecorated	EHI
EPI 12/39	Cooking pot	Undecorated	EHII
EPI 12/41	Cup/Brazier (Lerna Type)	Burnished?	EHIII
EPI 12/43	Bowl	Black slip and burnished	EHII
EPI 12/44	Bowl	Red-brown slip and burnished?	EHII
EPI 12/45	Bowl	Red-brown slip and burnished?	EHII

Table 7.29 continued: Table of samples belonging to PG17.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/5	Deep bowl/Basin	Brown slip and burnished?	EHI
EPI 12/5	Deep bowl/Basin	Brown slip and burnished?	EHI
EPI 12/13	Cooking pot?	Undecorated	EHI
EPI 12/14	Large bowl/Basin	Undecorated	EHI
EPI 12/16	Bowl	Burnished?	EHI

Table 7.30: Table of samples belonging to PG17A.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/34	Shallow bowl	Red-brown slip and burnished	EHI

Table 7.31: Table of samples belonging to PG17B.

This fabric has three sub-groups. The main group, PG17, is characterized by the bimodal distribution of angular to sub-angular welded tuff, tuffaceous rock fragments, and feldspar inclusions within a fine feldspar and quartz rich matrix (refer to Figure 7.22). The matrix is heterogeneous, with a colour range from yellow-gold to orange-brown and dark brown. Mixed optical activity is common both across the group and within the same sample suggestive of uneven firing conditions.

The second group, PG17A, is distinguished by the presence of elongated vesicle and channel voids, several of which appear to contain the remains of charred vegetal temper.

The final sub-group PG17B, again has the main characteristics of group PG17, however, it also includes angular fragments of andesite. There are very few inclusions within the matrix associated with the andesite rock fragments, although there is an abundance of tuffaceous material. This, in addition to the angularity of the andesite, may suggest that these rock fragments have been added from a secondary source such as a quern stone, rather than from a primary rock outcrop. The practice of adding andesite grinding stones to pottery has also been suggested by Vitelli during the Neolithic at Franchthi (1995: 11, also discussed by Perles 2001: 242).

The tuff types vary across all the groups and within samples, ranging from welded glassy tuff to fine grey-isotropic ashy types, with a yellow brown glassy flow structure. The altered tuffaceous rock fragments are dominantly angular to sub-angular, consisting of a yellow-brown cement with a 'wavy' texture due to differing orientation within the cement. They commonly contain fragments of alkali and plagioclase feldspar (some examples are highly altered), quartz and areas of dark brown and carbonate sediment replacement.

TCFs are common, consisting of red-brown opaque- iron rich sediment. They display both sharp and diffuse edges and appear to be naturally occurring within the clay matrix. The distribution, sorting and comparable nature of the base clay and the inclusions indicate that this is not a tempered fabric, with the exception of PG17A which includes vegetal matter and PG17B which has added andesite.

7.6.4.1 Discussion

The igneous material within this fabric group is very characteristic, containing both unaltered and heavily altered tuffaceous material which differs markedly from that noted in PG7, 8 or 10 from Ancient Corinth. Compatible with the Jurassic-Lower Cretaceous diabase-chert-tuffite and tuffitic breccioconglomerate formations, and Triassic tuffs that surround Epidavros (Papavassiliou et *al.* 1984). As this fabric dominates the assemblage at the site, is compatible with the local geology, and has not been found in comparative assemblages, there is no reason to think that this fabric is from outside of Epidavros.

The addition of vegetal temper to some vessels cannot be correlated to particular forms or surface modification techniques and represents a distinctive method of paste preparation at the site. As PG17A is confined to the EHI period, its absence in later vessels testifies to a shift in potting tradition at Epidavros. PG17B also represents a very different approach to paste recipes with the addition of andesite material. When we consider that both PG17A and PG17B were made during the same period as PG17, it is clear that there were a number of producers using the same local clay sources within the EHI but making distinctive choices about additional raw materials. The lack of variability in terms of fabric in EHII suggests a more standardized approach to paste recipes during this period.

The dominance of PG17 at the site suggests that the community consistently chose to consume from local potters who were skilled in a wide variety of forms, but used a restricted range of decorative techniques highlighted by the preference for red-orange slipping (refer to Tables 7.29, 7.30 and 7.31). The presence of vessels from EHI, II and III highlight the long tradition of local production at Epidavros but with a strong technical *habitus* related to decoration and raw materials, whilst forming methods (refer to Chapter 6) and the type of vessels made appears to have been more open to innovation.

7.7 Argolid/NE Peloponnese Fabrics

The fabric within this section has a broad assignment of provenance due to small sample numbers but shares characteristics with other Argolid fabrics and is present in comparative material in proportions that indicate an Argolid origin.

7.7.1 PG18: Sandstone and Altered Sandstone with Micritic Veins

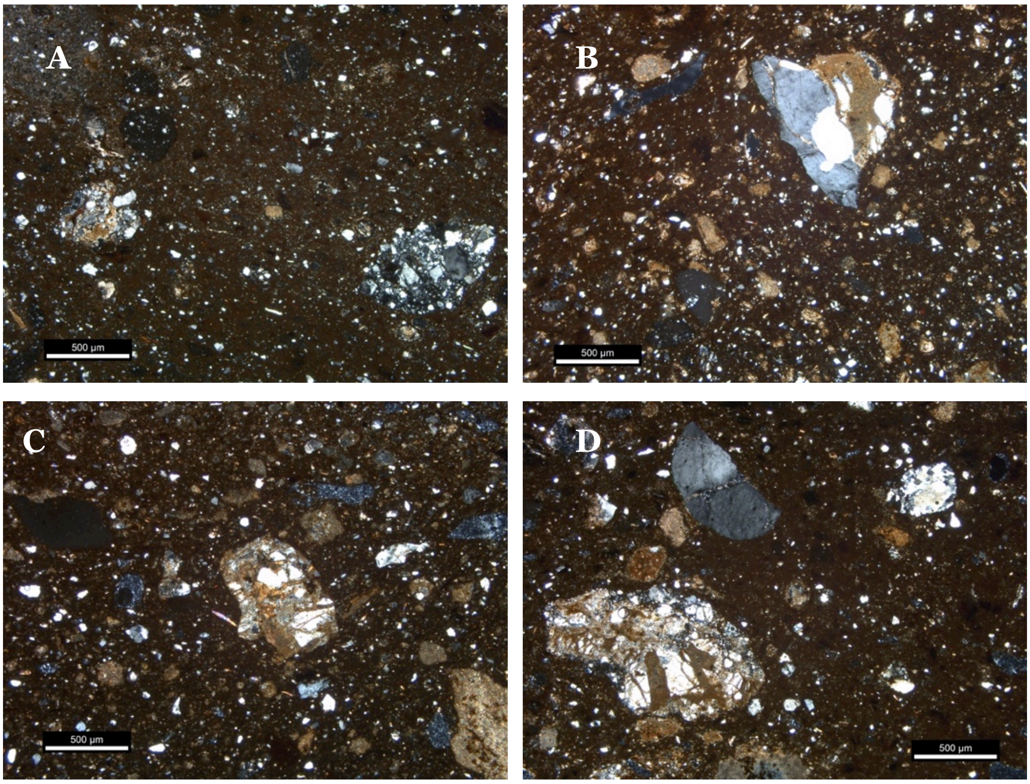


Figure 7.23: Micrographs of samples within PG18. All images in XP. A. KER 11/64; B. NVAP 204 11/31; C. TSO 10/45; D. TSO 10/50.

Sample Number	Vessel Form	Surface Modification	Period
TSO 12/45	Incurving bowl	Red-orange slip	EHII
TSO 12/50	Jar	Brown slip/wash	EHII
KER 12/64	Bowl	Red-orange slip	EHII

Table 7.32: A table of samples belonging to PG18.

PG18 is characterized by the strongly bimodal distribution of sub-angular and sub-rounded sandstone (greywacke and litharenite types), accompanied by altered sandstone and clastic rock fragments that contain micritic veins and secondary calcite replacement (refer to Figure 7.23). These are accompanied by polycrystalline quartz, and angular black-brown mudstones. The large size, distribution and angularity of these inclusions suggest they have been added to the clay. The mid-brown to green brown silicate rich matrix is optically inactive suggestive of high firing temperature ranges. The matrix also contains biotite mica and rare. The silicate within the matrix is compatible with the sandstones suggesting it derives from these larger rock fragments.

TCFs are common, characterised as sub-rounded opaque or black-brown sediment containing small silicate grains. They have both sharp and diffuse edges and are consistent with the remains of pellets from a brown firing clay that has been mixed with a green-brown firing calcareous clay. The black colour of some examples suggest localised reduction or over firing.

7.7.1.1 Discussion

PG18 is consistent in terms of the geological nature of its raw materials and the character of the groundmass, suggesting the use of the same rock and clay sources. However, there is some variability in the distribution and proportion of the different inclusion types which may be due to natural variability as well as suggesting the use of similar raw materials by different potters.

The distinctive sandstone and altered sandstones with secondary deposition of calcite are consistent with a sedimentary origin. Comparable marly sandstones, conglomerates, and sandstones are present throughout the Nemea Valley and the area of Corinth, as well as the NE Peloponnese generally, making assignment of provenance particularly difficult. However, analysis of comparative material from Midea and Tiryns in the Argolid has found the altered rock fragments with secondary calcite are more commonly present, in addition to the general domination of sandstone fabrics at these sites (refer to Figure 7.24). Whilst this is not conclusive evidence of provenance it does suggest that this fabric may derive from formations in the Argolid region.
The small number of samples makes it difficult to discuss the repertoire of this potter(s) however, it is clear that they were skilled in the production able of both large and small vessel types, with particular emphasis on red-brown slips (refer to Table 7.32).

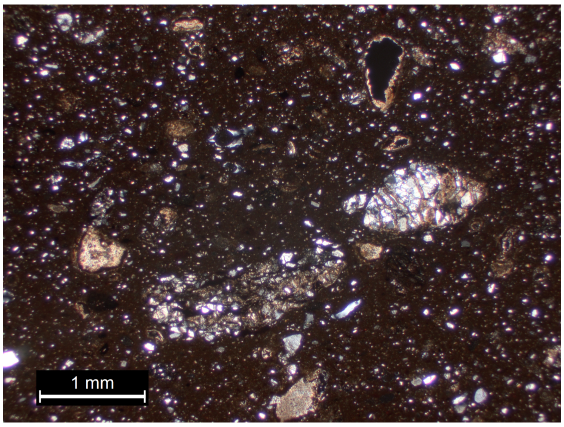


Figure 7.24: Micrograph image in XP of MID 14/76, an EHII bowl in a similar fabric to PG18.

7.8 Corinthia/NE Peloponnese Fabrics

The two fabrics in this section have a broad provenance due to the lack of diagnostic rock types in most samples. As such, their assignment as of possible Corinthian origin is based on distribution trends, similarities to other Corinthian fabrics, and comparative work by others.

7.8.1 PG19: Angular Chert and Quartz Fabric

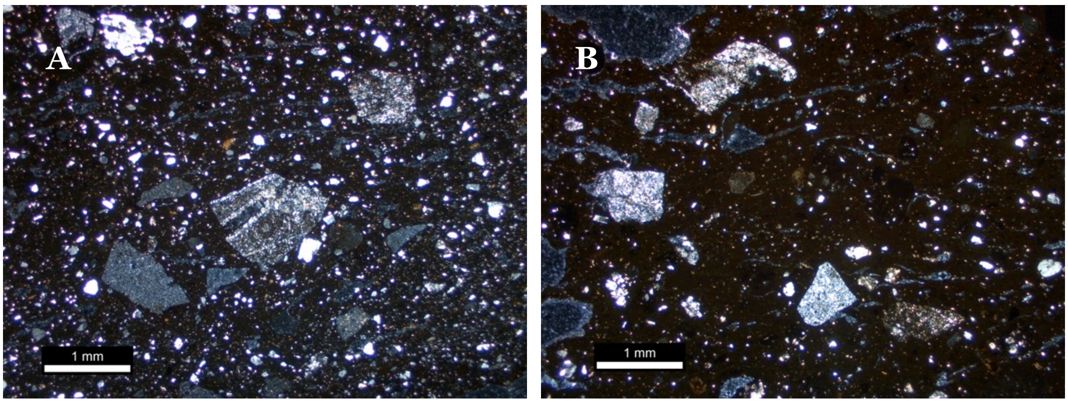


Figure 7.25: Micrographs of samples within PG19, in XP. A. TSO 10/56; B. TSO 10/132.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/56	Incurving bowl	Red-brown slip	EHII
TSO 10/132	Jug/Jar	Incised and black slip/wash	EHIII

Table 7.33: Table of samples belonging to PG19.

PG19 is characterized by the bimodal distribution of angular fine-grained chert within a silt to sand sized, silicate rich heterogeneous matrix (refer to Figure 7.25). The matrix colour ranges from red-brown to dark green-brown and black brown, with low to absent optical activity both between and within samples, suggestive of a relatively high or mixed firing temperature. The coarse fraction also includes quartzite, mudstone and micrite. TCFs of dark brown and red-brown rounded sediment are common, displaying diffuse edges suggestive of clay mixing. The coarse fraction is consistent with the fine fraction and it is likely that the rock fragments are naturally present within the clay rather than being added as temper.

7.8.1.1 Discussion

Whilst the samples within PG19 share the same raw material types, there is significant variation in the relative frequency the inclusions indicating the group may represent the use of the same raw materials by different potters.

PG19 has no distinctive petrological features which can point to a particular provenance. However, as discussed in relation to PG12, it bears a striking similarity to PG12 and is a direct match to Graybehl's Fabric 2 (2014: 101) also sharing many features with Joyner's Group 1 (2007: 193) including the presence of micrite (Joyner uses the terminology calcimudstone 2007: 201). It also bears a striking similarity White's 'Quartz-Chert' fabric (2009: 105-106). All these authors argue for a local Corinthian provenance based on similarities to raw materials to those found on Acrocorinth, and in relation to typological characteristics. However, in the examples within this thesis there is no definitive typological or archaeological evidence making discussion of a definitive provenance difficult. Chert is widely available throughout the study area and has a long history of use within ceramics. Cherts fabrics have also been found within comparative assemblages from Argolid sites (for example Midea refer to Figure 7.26). However, in all cases it is found in small amounts, preventing examination of a specific distribution pattern that could aid with a provenance hypothesis but was clearly used to make more than one vessel type (refer to Table 7.33).

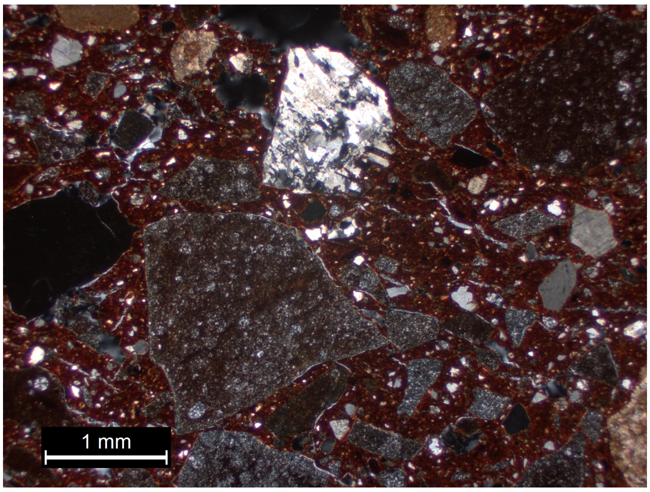


Figure 7.26: A micrograph taken in XP of MID 14/85, an EHII basin in a chert fabric.

The presence of small amounts of low-grade metamorphic quartzite and schist may relate to the same rock types identified by Farnsworth in relation to her Corinthian White clay (1970: 13). However, there is considerable debate about the presence of schist in the Corinth area due to conflicting geological maps. Joyner highlights that schist is recorded on a 1:50,000 geological map of Greece in association with Permo-Triassic limestone, greywackes and volcanic outcrops, however, the Korinthos 1:50,000 sheet does not record schist within an outcrop of the same formation (Joyner 2007: 201). Therefore, it is not clear if these metamorphic rock types are consistent with a Corinthian provenance but the striking similarity to comparative fabrics both within and outside of this present study strongly suggest a Corinthian origin.

The small number of samples also makes it difficult to comment on the repertoire of the potters involved in the use of this chert fabric, although it is clear that they were proficient in the production of slipped wares.

7.8.2 PG20: Disaggregated Sparitic Limestone and Sandstone Fabric

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/27	Askos	Incised and burnished?	EHI
TSO 10/31	Basin/Deep bowl	Burnished	EHI
TSO 10/139	Bass bowl	Black slip and burnished	EHIII
KOR 10/33	Frying pan	Incised, black slip and burnish	EHII

Table 7.34: Table of samples belonging to PG20.

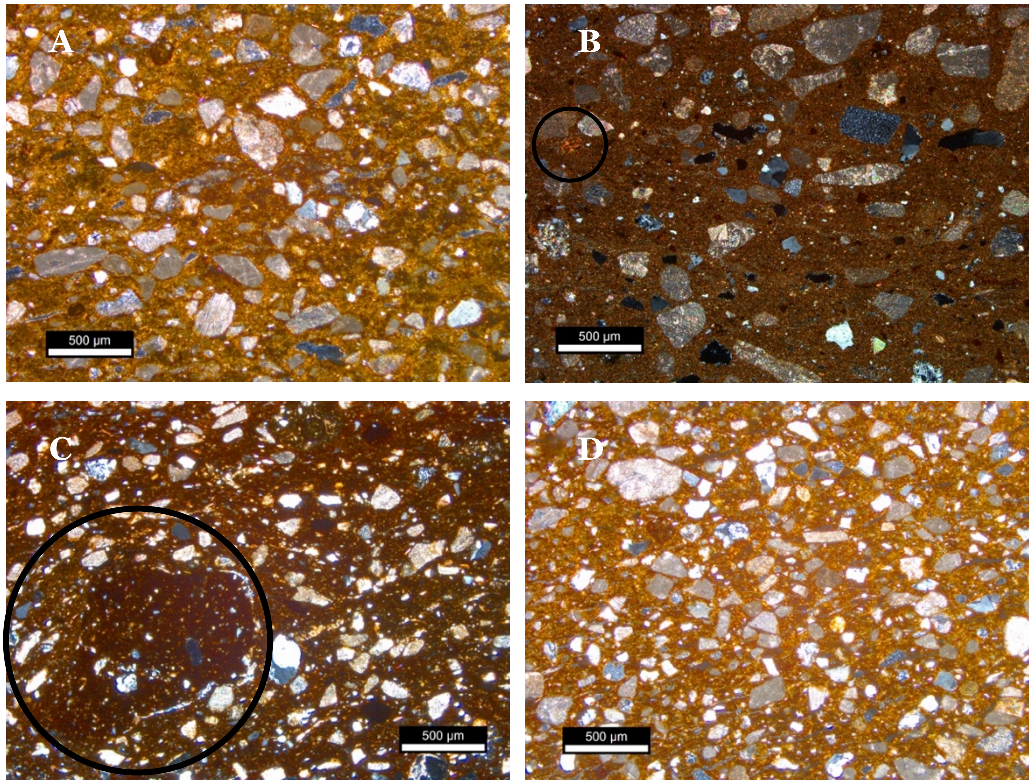


Figure 7.27: Micrographs of samples within PG20. All images under XP. A. TSO 10/27; B. KOR 11/33 with possible serpentinite fragment circled; C. NVAP 204 11/13 with clay pellet indicative of mixing circled; D. TSO 10/139.

PG20 is characterized by the unimodal distribution of rounded sparitic calcite in a heterogeneous matrix (refer to Figure 7.27). The matrix colour ranges from yellow-brown to red-brown with high to moderate optical activity both within and between samples, suggestive of low firing temperatures and mixed firing conditions.

Sub-angular, iron rich, red-brown mudstone fragments and angular chert are present in very small amounts. TCFs are common, consisting of red-brown rounded to sub-rounded sediment with both sharp and diffuse edges, suggestive of the mixing of a calcareous and a red firing clay. The red clay is quartz rich, as evident in the TCF highlighted above from comparative sample 10/13 from NVAP 204 (refer to Figure 7.27 image C), suggesting that the red clay fraction is the source of the silicate content within the fabric matrix.

7.8.2.1 Discussion

Examples of this fabric from Nemean sites are very consistent in terms of the types of raw materials, their distribution, and frequency. This consistency indicates a single centre of production, with a long tradition of producing decorated tablewares in particular. However, sample KOR 11/33 varies from the Nemean samples, as it contains inclusions of small orange glassy fragments which may be serpentinite and which have been discussed above in relation to other fabric groups (for example PG7 and PG14). This suggests that although the samples within PG20 all share the same basic raw material types and processing techniques they may come from at least two sources.

The dominant raw materials within this group are compatible with sparitic limestones which have been crushed and added to the clay. Such limestones are ubiquitous throughout the NE Peloponnese and comparable sources can be found both in the Nemean Valley and the area of Ancient Corinth. The possible serpentinite within KOR 11/33 indicates an ophiolitic origin for this sample, the closest source of which would be in the area of Acrocorinth, however, it is not possible to assign a more definitive origin for the Nemean samples.

The repertoire for this fabric is varied containing quite specialized and rare vessel forms such as the frying pan (refer to Table 7.34). Significantly, all the vessels have a burnished finish suggesting a shared decorative practice between the potters involved in producing this fabric. This may indicate that this fabric was particularly suitable for this surface modification type, and certainly suggests shared knowledge between potters using similar raw materials. The use of a burnished finish, and calcareous temper may also explain the low firing temperature range for these vessels, implied by the high degree of optical activity and well preserved condition of the calcite grains. If these vessels were to have been high fired they would have most likely failed due to spalling and the burnished surface would not have been preserved. As such the use of a low firing temperature may relate to both the raw material choice and decorative technique.

7.8.3 PG21: Fine Clay Mix with Mudstone and Mudstone Breccia

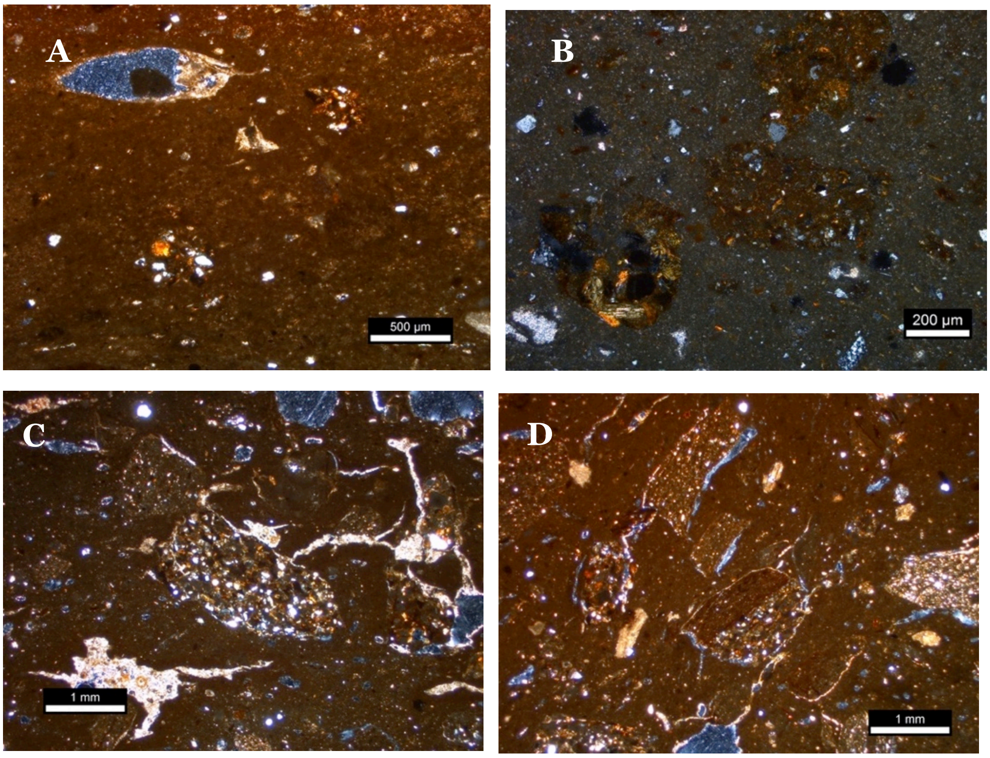


Figure 7.28: Micrographs of samples within PG21 (top row) and PG21A (bottom row). All images in XP. A. TSO 10/124; B. KOR 11/5; C. TSO 10/137; D. TSO 10/145.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/124	Jar	Dark on light pattern-painted (brown)	EHIII
TSO 10/134	Bowl	Brown-orange slip/wash	EHIII
TSO 10/135	Bowl	Brown-orange slip/wash	EHIII
TSO 10/137	Pithos	Black slip/wash	EHIII
TSO 10/145	Pithos	Applied and black slip/wash	EHIII
KOR 11/5	Sauceboat	Black slip/wash	EHII
KOR 11/18	Bowl	Black slip	EHII

Table 7.35: Table of samples belonging to PG21.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/15	Bowl	Red slip	EHI
TSO 10/28	Handle	Brown-grey slip/wash and burnished	EHII
TSO 10/30	Basin/Deep bowl	Red-brown slip	EHII

Table 7.36: Table of samples belonging to PG21A.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/71	Base	Red slip	EHII
TSO 10/112	Bowl	Red-brown slip	EHII

Table 7.36 continued: Table of samples belonging to PG21A.

Both the fine fabric PG21 and a medium coarse group PG21A, are characterised by the bimodal distribution of dominantly sub-angular mudstone and sub-rounded mudstone breccia in a fine heterogeneous matrix (refer to Figure 7.28). The matrix colour ranges from green-brown with little or no optical activity, to orange-brown with low optical activity. This variation in optical activity suggests a range of firing temperatures. Commonly the finer examples of the fabric appear less optically active and higher fired.

The mudstone has an orange-brown clay matrix, containing silt and sand-sized grains of quartz and feldspar. The breccia is similar in colour but appears more granular, with large grains of glassy orange and red inclusions, accompanied by commonly sand sized quartz and feldspar, and dark black-brown opaque inclusions. Red-orange vitrified fragments are also present in the micromass, however, the fragments are too small to see their structure, as such, it is not clear if they are serpentinite or vitrified clay. Their similarity to the vitrified material in the breccia fragments suggest they are related and derive from these rock larger fragments.

TCFs are found throughout the group with sharp and diffuse edges, some merging with the clay matrix. They are commonly opaque or dark red brown and micaceous, ranging from rounded to sub-rounded. They are consistent with the mixing of a mica rich red firing clay into a calcareous clay which contains small amounts of quartz. The distribution of the mudstone and breccia inclusions and the presence of associated inclusions within the groundmass suggest that these rock fragments may be associated with the iron rich clay proportion of the mix.

7.8.3.1 Discussion

The raw materials used in this fabric are not diagnostic of a specific source, having a broad distribution across the NE Peloponnese, including Nemea and Corinth where the two sites with this fabric are located. The raw materials are comparable to those identified in Graybehl's Fabric 5 from Hellenistic Nemea which were typologically identified as Corinthian (2014: 112-114), and are comparable to Whitbread's Corinthian Fabric A (1995: 268-70). However, unlike Whitbread's fabric and the breccia discussed in relation to PG7, the examples within PG21 and PG21A do not contain radiolarian mudstone, which suggests natural variation within the raw material sources but also the possible use of different sources, particularly considering that Whitbread examined much later material.

Mudstone breccia fabrics have been found within comparative material from the Argolid of both EH and LH date (Burke *et al.* forthcoming), but these examples contain breccias that are often coarser with larger, highly angular and more distinctive individual grains within a fossiliferous clay suggesting different raw material sources (refer to Figure 7.29). As such, whilst it is not possible to assign a definitive provenance to these fabrics, it is possible to see differences between Corinthia and Argolid examples suggesting production using similar raw materials in the different regions.

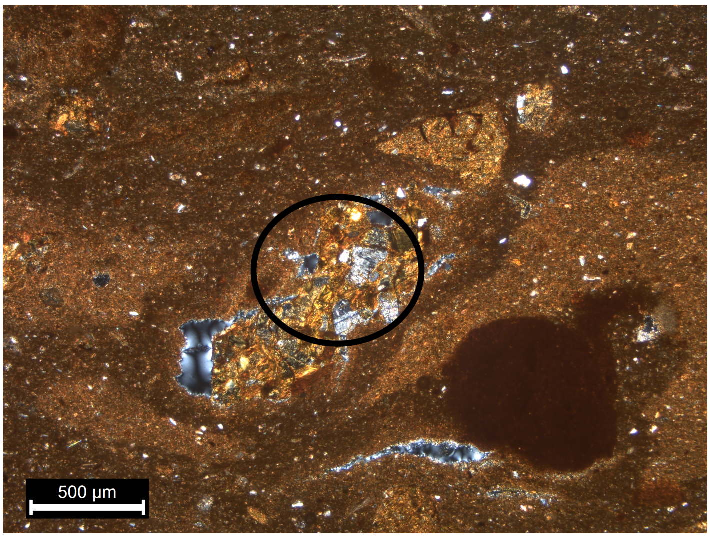


Figure 7.29: A micrograph of MID 14/47, an EHII jar with in a distinctive mudstone breccia fabric. Large, angular grains of feldspar are clearly visible which contrast with the smaller, less angular silicate grains in Corinthian examples see in figure 7.27.

PG21 and PG21A are consistent in terms of inclusion type with variation in their frequency and the degree of firing implied by the level of optical activity. The presence of both a high and a low fired group indicates the use of two firing strategies. As PG21 is most commonly associated with black slips and PG21A is more commonly associated with red slips, it is likely that the different firing strategies are linked to surface colours, as discussed for the same trend in relation to PG9 and PG10. The common use of these two firing strategies between a wide number of producers suggests shared knowledge and a high degree of skill to manipulate the firing, across producing groups with the Corinthia.

This fabric was used to produce a variety of forms and high quality finishes for both tablewares and storage/transport vessels, with use of a finer version particularly in EHIII (refer to Table 7.36). The tradition of mudstone breccia fabrics clearly has a long history and widespread distribution from the EH to the Hellenistic period in Corinthia, and the EH to LH in the Argolid (Kardamaki In press).

7.8.4 PG22: Quartz Sand Fabric

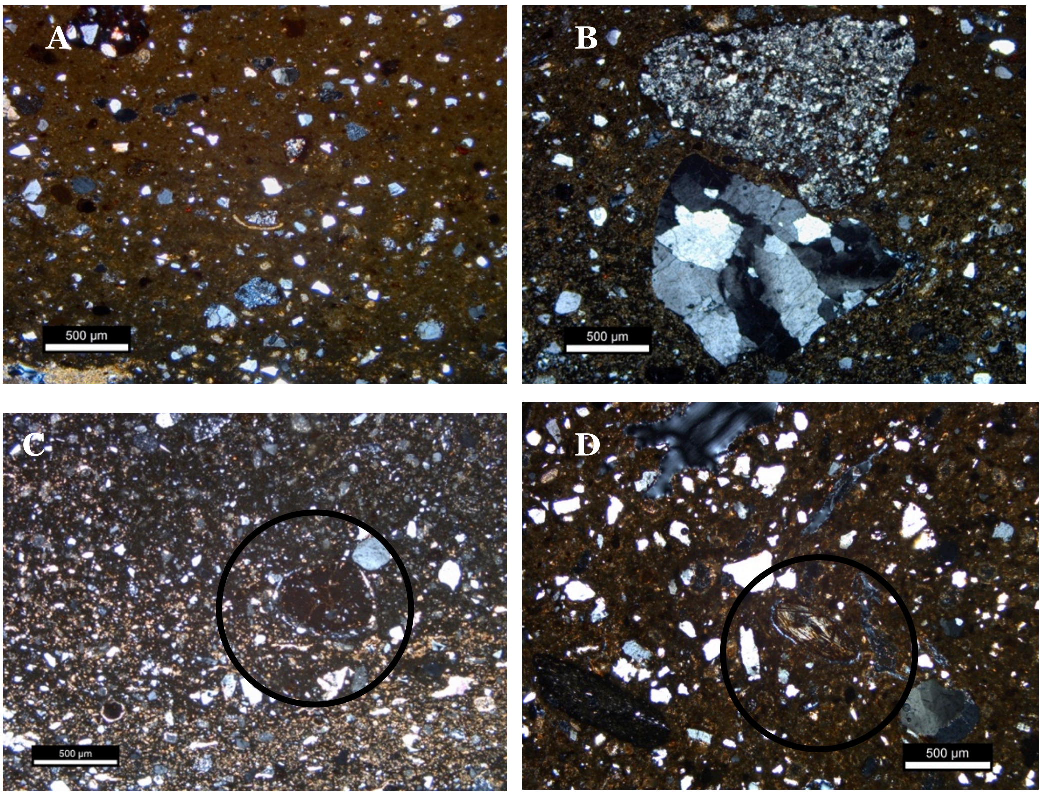


Figure 7.30: Micrographs of samples within PG22. All images in XP. A. KOR 11/9; B. KOR 11/9 showing quartzite and sandstone inclusions; C. KER 11/108 showing clay pellet circled; D. KER 11/82 with fragment of a serpentinite rock circled.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/108	Cooking pot	Applied	EHII
KER 11/82	Jar	Undecorated	EHII
KOR 11/9	Sauceboat	Black slip	EHII

Table 7.37: Table of samples belonging to PG22.

PG22 has an inactive to low optically active matrix suggestive of a high firing temperature range. The matrix is rich in angular sand and silt sized grains of feldspar and quartz. The inclusions have a bimodal distribution consisting of sub-angular chert, polycrystalline and monocrystaline quartz, feldspar and litharenite sandstone, with the silicate grains of the matrix deriving from these larger rock fragments (refer to Figure 7.30). Rare ostracod fossil fragments and degraded basic igneous rocks are also present in some samples possibly associated with the base clay.

TCFs are present in the form of darker areas of rounded red-brown sediment, commonly surrounded by shrinkage voids. These are consistent with clay pellets suggesting clay mixing.

7.8.4.1 Discussion

PG22 has been grouped based on the shared presence of sandstone and quartzite in a sand rich matrix. However, variability in the nature of some of the raw materials indicates that these samples are not from the same producer. Therefore, this fabric represents the use of similar raw materials and clay mixing practices by multiple potters to make a variety of vessel types and wares (refer to Table 7.37).

The sandstone fragments in conjunction with the fossil remains within the matrix, and the presence of serpentinite inclusions in some samples, are compatible with the Jurassic limestones of Acrocorinth. These limestones are recorded as containing sandstones and marls with ophiolitic bodies (Yannetakis et *al.*1972) suggesting a possible local origin for these fabrics. The presence of this fabric only at Corinthian sites would also indicate this is a local fabric, however, as fossil rich marine deposits and outcrops of sandstone are also widely distributed across the NE Peloponnese a definitive assignment of provenance is difficult.

7.8.5 PG 23: Argillite-Shale and Mudstone Fabric

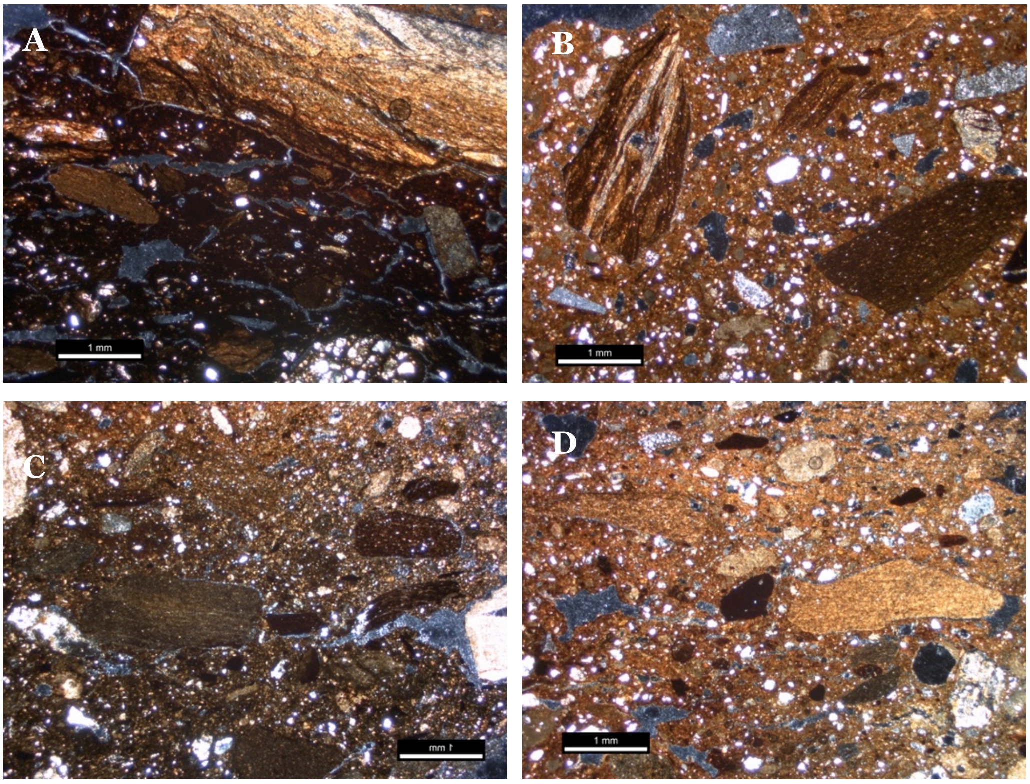


Figure 7.31: Micrographs of samples within PG23. All images in XP. A. TSO 10/53; B. TSO 10/110; C. TSO 10/77; D. TSO 10/87.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/131	Incurving bowl	Red-brown slip	EHII
TSO 11/53	Incurving bowl	Applied	EHII
TSO 11/77	Baking pan	Undecorated	EHII
TSO 10/87	Incurving bowl	Applied	EHII
TSO 10/91	Firedog stand	Undecorated	EHII
TSO 10/95	Incurving bowl	Applied	EHII
TSO 10/110	Baking pan	Undecorated	EHII
TSO 10/120	Firedog stand	Undecorated	EHII

Table 7.38: Table of samples belonging to PG23.

This fabric is characterised by the bimodal to trimodal distribution of poorly sorted, angular to sub-angular argillite, shale, calcite and mudstone, in a fine sand to silt sized, silicate rich heterogeneous matrix (refer to Figure 7.31). The matrix colour ranges from orange-brown to dark red-brown and is commonly optically active but levels of optical activity vary within most samples suggestive of low, uneven firing temperature and atmosphere.

Rare TCFs are present throughout PG23, being sub-angular to sub-rounded red-brown and orange-brown, with sharp to diffuse edges. Many are opaque and share similarities in colour and appearance to some of the darker mudstones suggesting they derive from the coarse fraction material.

7.8.5.1 Discussion

The samples of PG23 have been grouped on the shared presence of fine-grained argillite and shale inclusions within a silicate rich matrix. The range of rock inclusions within single samples of this fabric show terminal grades suggesting they are from the same geological source. However, variation in the character of the raw materials, their size and frequency across the group indicates that this fabric group may not represent the paste recipe of a single potting group.

The argillaceous inclusions range from mudstones, to true shales and are consistent with an origin from a shale-chert-sandstone formation. The two closest compatible outcrops are located *c.* 4km south of the Nemea Valley and in the immediate area of Ancient Corinth respectively. Both of which are located within close proximity to limestone formations which would account for the presence of the sparitic calcite, as such there is no reason to suggest production beyond the local/regional level.

This fabric has also been found at a number of comparative sites within the Argolid such as Midea and Tiryns (Burke *et al.* In press. Refer to Figure 7.32). It has only been identified in small numbers and again commonly displays a degree of variability across the samples indicative of local production to each site. Significantly, the fabric is most commonly found in association with vessels for cooking/heating such as baking pans, firedog stands and cooking pots (it should also be noted that some of the incurving bowls at the Tsoungiza display charred surfaces suggestive of use as a cooking vessel. Refer to Table 7.30). This distribution pattern may be suggestive of itinerant potting or a shared technological practice across the NE Peloponnese.

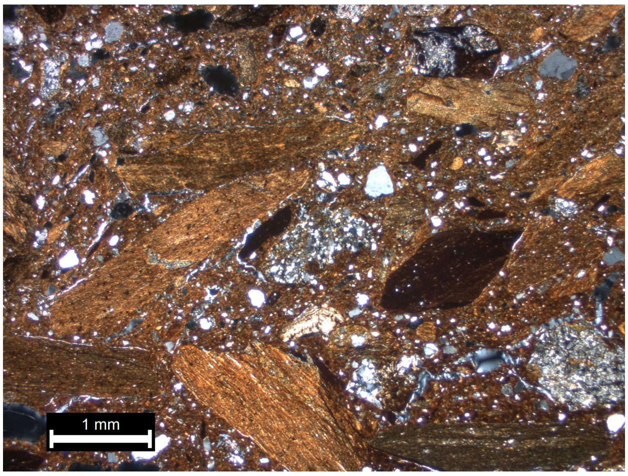


Figure 7.32: A micrograph of TIR 14/5 an EHII cooking pot in a shale based fabric.

The use of coarse materials would have helped to prevent thermal shock, both during production and during use, as well as aided with forming. As Muller *et al.* have discussed, at low firing temperatures (below 1000^{o}c) the type of temper is unlikely to affect the toughness of the ceramic, but its abundance certainly does, as high proportions of temper significantly increases ceramic toughness, preventing crack propagation (2010: 2464-5).

Whether this fabric represents an itinerant potter or the presence of a shared practice, its relationship to vessel function does not seem to be coincidental. The consumption of vessels from this potter or the shared tradition of shale based recipes for cooking vessels may have been related to a perceived idea that these vessels were particularly suited for the cooking practices being undertaken by EH communities and indicates shared cooking practices between communities.

7.9 Aeginetan Fabrics

The samples in this section have been assigned an Aeginetan provenance based on the presence of diagnostic volcanic rock fragments, specifically andesite with plagioclase feldspar and hornblende. This geological compatibility is complimented by similarity of the samples within this thesis to MH and LH pottery originating in Aegina (Day and Gilstrap pers. comm.; Gilstrap *et al.* 2016). In addition, comparative examination of material held at the Fitch Laboratory Athens (Gauß and Kiriatzi 2011) shows matches for PG24 and PG24A in particular.

Their presence in both EHI and EHII material testify to a sustained history of exchange of Aeginetan vessels and to production on the island during EHI, a period for which there is no primary production evidence (Berger pers. comm.). Significantly, EH Aeginetan vessels are often remarkable macroscopically for their red-brown slips and highly burnished surface. It is particularly striking that many vessels of this fabric represent common forms that were widely available in other production centres closer to their find spots. This suggests that the wide exchange of the Aeginetan products may have been related to both the quality of their surface finish, and the reputation of their producers. It is also plausible that movement of these vessels was in association with grinding stones from the island which have been widely distributed.

7.9.1 PG24: Intermediate Volcanic Rock Fragments

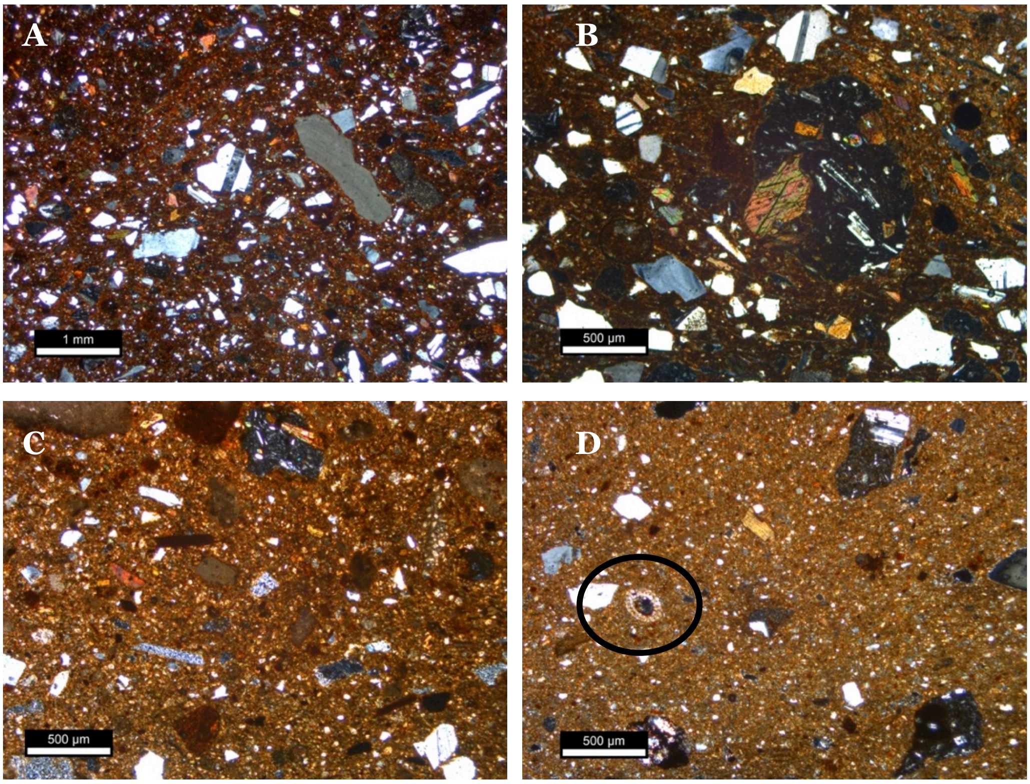


Figure 7.33: Micrographs of samples within PG24A (top row) and PG24 (bottom row). All images in XP. A. TSO 10/5; B. TSO 10/37; C. TSO 10/3; D. KOR 11/22 with microfossil circled.

Sample Number	Vessel Form	Surface Modification	Period
KOR 11/22	Bowl	Red-brown slip	EHII
TSO 10/3	Deep bowl	Brown slip and burnished	EHII
TSO 10/25	Hemispherical bowl	Brown slip and burnished	EHI

Table 7.39: Table of samples belonging to PG24.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/12	Body sherd (jar/bowl)	Incised and burnished	EHII
EPI 12/20	Jar?	Red slip	EHII
EPI 12/27	Incurving bowl	Red-black slip and burnished	EHI
TSO 10/5	Hemispherical bowl	Red slip and burnished	EHI
TSO 10/37	Shallow bowl	Brown slip and burnished	EHI

Table 7.40: continued: Table of samples belonging to PG24A.

PG24A is a medium coarse fabric with a dark red-brown non-calcareous matrix, which displays moderate to absent optical activity within samples, suggestive of low firing temperatures in mixed atmospheres. This group is characterised by the presence of large angular fragments of intermediate volcanic rock, dominantly andesite. These are accompanied by their associated minerals of plagioclase feldspar, amphibole (most commonly hornblende) and clinopyroxene (refer to Figure 7.33). The large size, angularity and distribution of the rock fragments suggest they have been added to the clay.

PG24 shares the presence of intermediate rock fragments as described in relation to PG24A with their constituent minerals, but is a medium-fine to fine fabric group with smaller sub-angular to sub-rounded rock fragments which occur less frequently. It is characterised in particular by a mid-brown optically active calcareous matrix which contains small microfossils of foraminifera. The nature of the rock fragments within this sub-group are not compatible with the calcareous base clay indicating they have been added rather than being naturally present.

7.9.1.1 Discussion

Samples within both PG24 and 24A have direct matches with samples examined from the site of Kolonna on the island of Aegina which would explain why Attas was unable to assign KOR 11/22 (Attas KRK24) to one of his reference groups (1982). PG24 is a direct match for Gauß and Kiriatzi's FG1A (2011: 93-96) associated with the volcanic outcrops *c*. 4km south of Kolonna, and the Holocene colluvial sediments in the northern part of the island (2011: 132). Due to the more rounded nature of some of the inclusions in FG1, and based on results of experimental work to replicate the paste recipes, Gauß and Kiriatzi argue that FG1 represents the use of a natural clay rather than the use of tempering. The angularity of the fragments within PG24 is consistent with tempering, although the low frequency of inclusions in some samples and the presence of more rounded fragments suggest that not all the large non-plastics within these samples are temper. As many of the samples from Kolonna are from the later periods of MH and LH periods it is to be expected that there would be different practices in use by potters at different points in time.

PG24A is a match to Gauß and Kiriatzi's FG2B (2011: 102-104) which, whilst comparable to the Pliocene clays on Aegina, was not found to be a direct match during their clay sampling and experimental work. This was possibly due to natural variation over time and to manipulation of the clay by potters (2011: 135).

Although PG24 and PG24A share the same rock types, suggesting the use of similar raw material sources for tempering, the use of different base clays clearly indicates different production practices and technological choices indicative of a number of potters rather than a single producing group. Further, other samples such as EPI 12/12, are consistent in terms of their raw materials but vary in comparison to the samples examined from Kolonna which again may suggests multiple potters on Aegina with different practices.

What is consistent across all the samples is the high quality of the surface finish of the vessels (refer to Figure 7.34, Table 7.39 and 7.40, and Chapter 6 discussion of MG4). All samples have a burnished finish with the majority also displaying a red-brown slip or surface colour. The same trend was also noted in comparative material where many samples of Aeginitan imports were dominantly from red-brown slipped and/or burnished vessels, although undecorated vessels were also found. In all cases small bowls appear to have had the widest distribution, though other vessel types such as jars and cooking vessels were also consumed on the mainland.

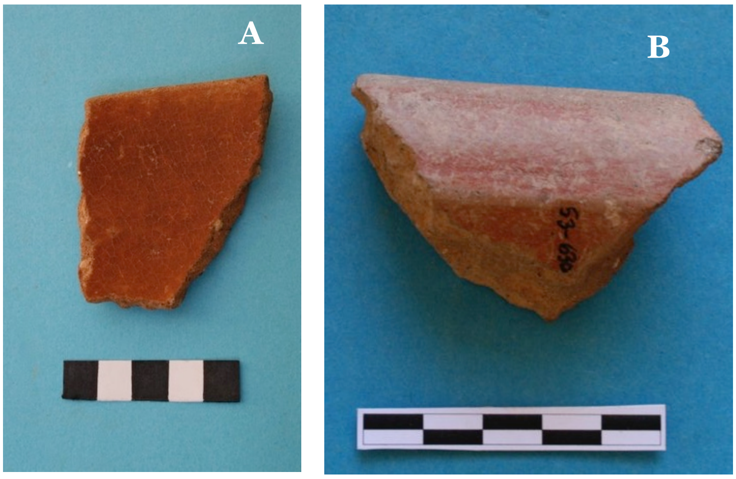


Figure 7.34: A. DEL 11/1 a slipped and burnished bowl from Delpriza with an andesite fabric; B. MID 12/29 a slipped and burnished large bowl from Midea with an andesite fabric.

In summary, the frequency of the inclusions, types of base clays, and the nature of the microstructure within PG24 and PG24A indicate that these groups contain vessels with different production sequences, but which shared key raw materials and decorative techniques. These results clearly highlight the role of Aegina as a centre of production during the earliest phase of the EH period onwards, with a wide distribution network. The potters of the island produced a varied repertoire of vessels, but it is their slipped and burnished wares that were most widely distributed. The high quality slipped and burnished finish of these vessels may have been particularly desirable to consumers.

7.10 Fabrics of Indeterminate Origin

7.10.1 PG25: Altered Volcanic Rock Fragments Fabric

Sample Number	Vessel Form	Surface Modification	Period
KER 11/55	Baking pan	Undecorated	EHII
KER 11/58	Baking pan	Undecorated	EHII

Table 7.41: Table of samples belonging to PG25.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/86	Large bowl	Black-brown slip	EHII
KER 11/118	Jar	Brown slip	EHII
KER 11/136	Jar	Black slip	EHII
KER 11/138	Shallow bowl	Undecorated	EHII
KOR 11/31	Baking pan	Undecorated	EHII

Table 7.41 continued: Table of samples belonging to PG25.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/109	Cooking pot	Applied	EHII
KER 11/115	Incurving bowl	Applied	EHII
KER 11/142	Incurving bowl	Red-brown-black slip	EHII

Table 7.42: Table of samples belonging to PG25A.

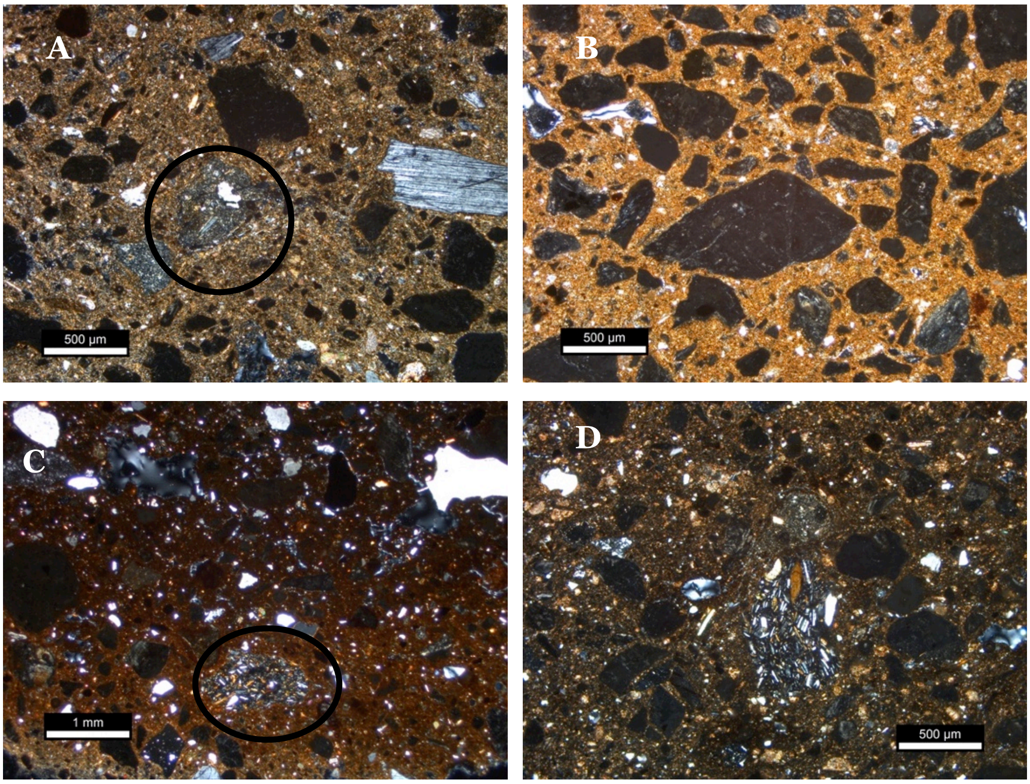


Figure 7.35: Micrographs in XP of samples within PG25 (top row) and PG25A (bottom row). A. KER 11/58 with a fragment of tuff highlighted; B. KOR 11/31; C. KER 11/109 with an intermediate volcanic rock highlighted; D. KER 11/142.

This fabric is characterized by the bimodal distribution of heavily altered glassy volcanic rock fragments, accompanied by orange and red serpentinite, within a fine silicate rich heterogeneous matrix. PG25A has been subdivided as it also contains intermediate igneous rock fragments and associated inclusions (refer to Figure 7.35). Both fabrics are dominantly optically active although the degree of optical activity ranges from high to moderate indicating different firing conditions.

The highly altered volcanic rock fragments are angular to sub-angular, dark black-brown and dominantly isotropic. Biotite and feldspar laths are visible in some examples whilst other fragments contain serpentinite. In PPL the inclusions commonly appear granulated, greyish in colour and de-vitrified, although the character of their internal structure varies considerably between fragments signifying a range of alteration stages (refer to Figure 7.36). Welded tuffs are also present in some samples (refer to Figure 7.35).

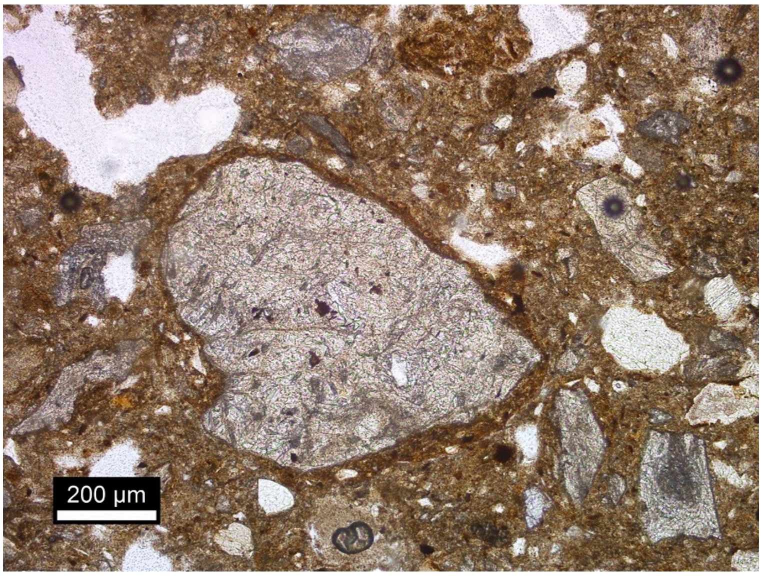


Figure 7.36: KER 11/55 with an altered volcanic rock fragment in PPL.

PG25A includes intermediate volcanic rock fragments consistent with andesite. They are small, angular to sub-angular with a fine matrix containing plagioclase feldspar laths and biotite. The altered, and andesite rock fragments are not compatible with the calcareous clay matrix suggesting the addition of these rocks as temper. TCFs are not common in this fabric but when present they consist of red-brown sediment possibly representing natural sediment within the clay.

7.10.1.1 Discussion

The dominant volcanic inclusions in this fabric have been heavily altered and appear to be in different stages of transformation and de-vitrification. The absence of identifiable minerals or crystal structures within these rock fragments makes their classification beyond 'volcanic rock fragments' difficult. The presence of serpentinite and in some samples tuffaceous material, in association with the altered rock fragments may indicate an ophiolitic origin. Whilst the similarity to some of the tuff types to those within PG10 suggests a shared origin, however, extensive comparative examination of material from across the NE Peloponnese and the island of Aegina has not revealed a comparable fabric. The presence of this fabric only at sites within Ancient Corinth and its suspected association with ophiolitic geology may indicate an origin in that area. However, geological maps and literature currently available do not detail any formations that would be consistent with the altered volcanic fragments and as such provenance is not clear.

PG25A shares the same raw materials as the main group PG25, but has also been tempered with andesite rock fragments. These rock fragments are not degraded or altered, indicating that they are unlikely to be from the same geological unit as the volcanic rock fragments. The andesite is sub-angular and in a very small proportions, in addition there is a striking absence of any associated minerals in the rest of the matrix. As such, they may represent the addition of material from secondary source such as a quern stone or an individual rock rather than from a primary geological outcrop.

The two groups represent the shared tradition of tempering calcareous clay with altered volcanic rocks, although the extra addition of intermediate rocks indicates that PG25A is the product of different technological choices. The wide variety of forms within this fabric group indicates that this centre of production was skilled in a wide repertoire of vessels and finishes (refer to 7.41 and 7.42), however, their presence only at sites within the Corinth area indicate that they did not have a broad distribution.

7.10.2 PG26: Coarse Grained Chert and Mudstone Fabric

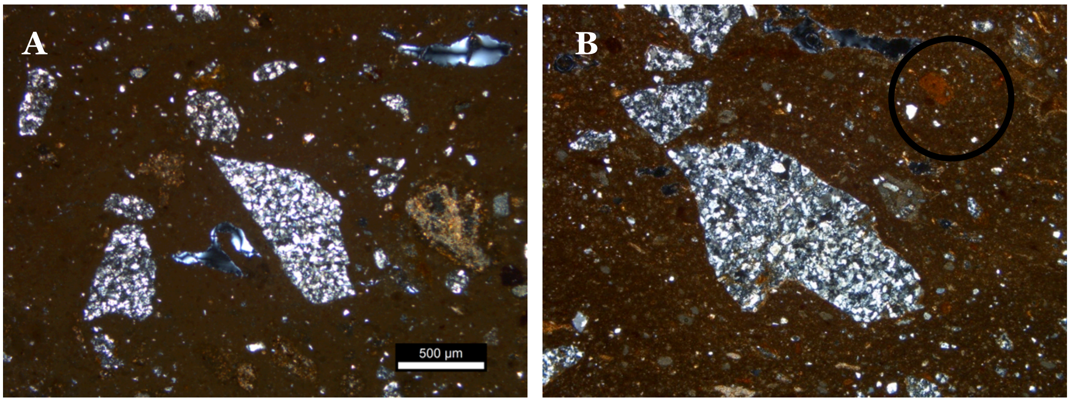


Figure 7.37: Micrographs of samples within PG26 in XP. A. KER 11/110; B. KER 11/113 with translucent vitrified clay circled.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/110	Jar	Undecorated	EHII
KER 11/113	Jar	Undecorated	EHII

Table 7.43: Table of samples belonging to PG26.

This fabric is characterised by the weakly unimodal to bimodal distribution of comparatively coarse grained, sub-angular to sub-rounded chert in a fine heterogeneous matrix (refer to Figure 7.37). The distribution and angularity of the chert suggests it is an addition to the clay rather than being naturally present. The matrix colour ranges from mid green-brown to orange brown with low to no optical activity suggestive of high firing temperature ranges. Glassy red to orange-red inclusions are also common in the matrix which do not display any structure and are likely to be vitrified clay (refer to Figure 7.37). TCFs are common, consisting of striations relating to the presence of secondary calcite and concentrations of darker orange-brown clay with diffuse edges, commonly merging into the micromass indicative of clay mixing.

The striking consistency in the fabric may indicate that the two samples are parts of the same vessel (refer to Table 7.43), with variation being due to the presence of secondary calcite and differences in firing temperature/atmosphere for different parts of the vessel.

7.10.2.1 Discussion

The inclusions are not distinctive in terms of provenance, however, the micromass compares well with samples within PG1 and PG2. Specifically, the character of the matrix with the mixing of red and yellow-green firing clays, and the presence of vitrified orange-red firing clay. Chert outcrops are present in the area of Ancient Corinth but chert is also widely distributed across the NE Peloponnese and mainland Greece generally, therefore specific provenance is unclear.

7.10.3 PG27: Fine Mica and Quartz Fabric

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/1	Deep bowl	Undecorated	EHII
KOR 11/2	Sauceboat	Brown slip	EHII

Table 7.44: Table of samples belonging to PG27.

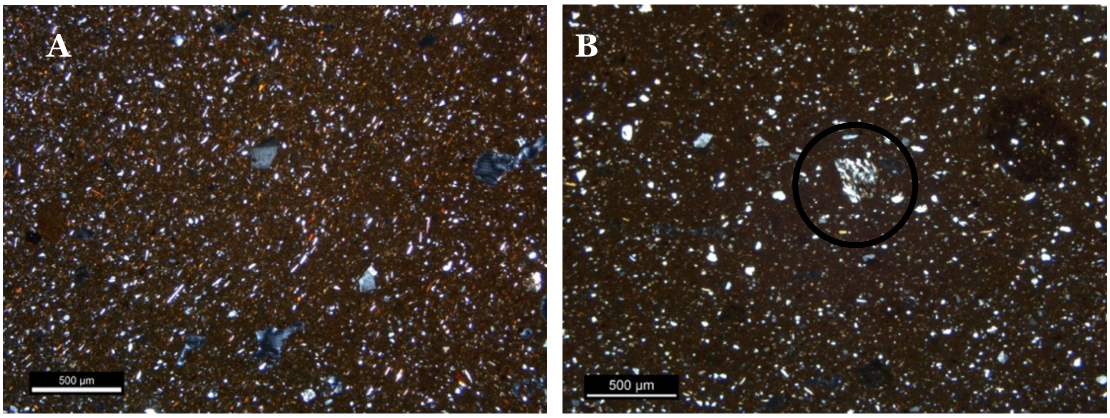


Figure 7.38: Micrographs of samples within PG27 in XP. A. KOR 11/2; B. EPI 12/1 with a low grade metamorphic rock fragment highlighted.

This fabric is characterised by a red-brown matrix rich in silt-sized silicate and biotite mica grains. The matrix has low to no optical activity suggestive of a high firing temperature range. Larger inclusions of quartzite, sandstone and low-grade schist are present, but rare (refer to Figure 7.38). Both rounded and, more commonly, irregular dark brown TCFs are visible in some areas of the matrix, with both sharp and diffuse edges. Some TCFs are consistent with sediment naturally present within the clay but other examples have a well rounded shape with defined and diffuse edges more suggestive of the remains of clay pellets from mixing.

7.10.3.1 Discussion

This fabric is very fine. The presence of rare sandstone and quartzite fragments suggest the raw materials are associated with a low grade metamorphic and sandstone environment, consistent with flysch outcrops as discussed in relation to PG15. This fabric has been found in higher proportions in Argolid material, most particularly at the sites of Midea and Tiryns. However, the fine nature of the fabric, lack of diagnostic inclusions and the small number of samples makes it very difficult to assign provenance on either petrographic or archaeological grounds and will require further analysis using NAA. However, it is possible to say it was used for more than one vessel type (refer to Table 7.44).

7.10.4 PG28: Sandstone, Siltstone and Calcite Fabric

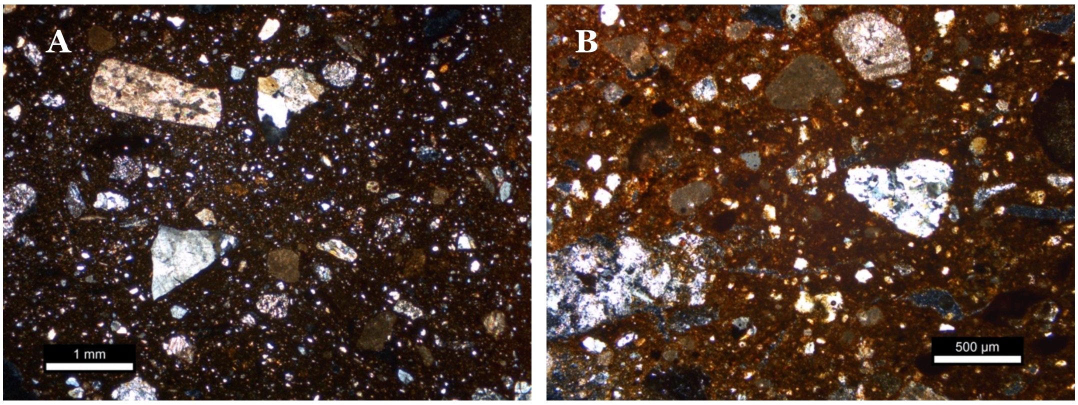


Figure 7.39: Micrographs of samples within PG28 in XP. A. TSO 10/86. B. TSO 10/118.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/86	Incurving bowl	Red-orange slip	EHII
TSO 10/118	Incurving bowl	Undecorated	EHII

Table 7.45: Table of samples belonging to PG28.

This fabric is characterized by a grey to orange-brown silicate rich matrix. The groundmass displays low to moderate optical activity suggestive of low firing temperatures, this is further suggested by the prevalence of calcite inclusions indicative of firing below 750°C. Inclusions are bimodally distributed and consist of angular sandstone, micrite and sparitic calcite and few brown mudstones refer to Figure 7.39). The distribution and angularity of many inclusions suggest that the coarse fraction has been added as temper.

7.10.4.1 Discussion

The inclusions within this fabric are not diagnostic, being widely distributed throughout the NE Peloponnese. There are comparable limestone outcrops within the Nemea Valley which may suggest a local origin for these samples, however, it is not possible to provide a definitive provenance, particularly considering the small number of samples (refer to Table 7.45).

7.11 Summary of Main Petrographic Groups

From the characterization of the main petrographic groups it has been possible to identify a large number of fabrics. Many of these fabrics represent individual paste recipes and approaches to raw material procurement and processing, as well as shared technological practices relating to tempering of clays in particular. At times the assignment of provenance has not been a straightforward task, due to the wide distribution of geological formations across the NE Peloponnese. However, through detailed examination of geological maps, comparative archaeological ceramics, relevant literature, as well as distribution trends and some experimental work, it has been possible to suggest possible areas of production.

Of particular note are three key production areas, one in the Talioti Valley associated with fruitstands in particular, one in close proximity if not actually at Ancient Corinth with multiple potters utilising raw materials from Acrocorinth, and finally a third area of production on the island of Aegina. All three of these production areas are characterized by the involvement of a number of potters, some of whom shared raw material choices whilst others did not. Importantly, each centre is closely linked to a particular vessel type and/or surface modification technique. This suggests the consumption of vessels from these centres by surrounding settlements was linked to their ability to produce specific wares and vessel types for which they perhaps had a reputation of quality. In contrast, the Nemean and Epidavarian fabric groups did not have a broad distribution network. However, the presence of a variety of imported vessel types at Tsoungiza, the neighbouring site of NVAP204, and Epidavros from both regionally and supra regionally based centres, demonstrates that these settlements were not isolated but made specific consumption choices.

The next section of this chapter will be dedicated to describing those fabrics which do not belong to any of the main petrographic groups. In the majority of instances it has not been possible to assign a definitive provenance to single fabrics as they rarely contain diagnostic inclusions and it is not possible to identify a distribution trend for these pastes.

7.12 Single Sample Petrographic Fabrics

Single Sample Fabrics
Single Sample 1: Rounded Mudstone, Quartz and Radiolarian Mudstone Fabric
Single Sample 2: Argillite, Mudstone and Siltstone Fabric
Single Sample 3: Siltstone and Vegetal Temper Fabric
Single Sample 4: Altered Sandstone Fabric
Single Sample 5: Calcareous Sand Fabric
Single Sample 6: Biogenic Limestone and Sandstone Fabric
Single Sample 7: Limestone, Marble and Mudstone Fabric
Single Sample 8: Mudstone and Grog Fabric
Single Sample 9: Medium Coarse Mudstone, Mudstone Breccia and Micrite Fabric
Single Sample 10: Angular Calcite, Limestone and Siltstone Fabric
Single Sample 11: Angular Calcite and Micrite Fabric
Single Sample 12: Radiolarian Mudstone and Chert Fabric
Single Sample 13: Fine Micaceous Matrix with Calcite and Sandstone Fabric
Single Sample 14: Fossiliferous Limestone
Single Sample 15: Biogenic Limestone
Single Sample 16: Altered Felsic Volcanic Rock Fragments Fabric
Single Sample 17: Fine Clay Mix with Quartz and Altered Felsic Rock Fragments

Table 7.46: List of all the fabric for single samples that do not belong to the main petrographic group.

Single Sample Fabrics
Single Sample 18: Fine Matrix with Bioclastic Mudstone and Translucent Clay Pellets
Single Sample 19: Mudstone, Chert and Granitic Rock Fragments Fabric
Single sample 20: Sandstone, Quartzite and Mudstone Fabric
Single Sample 21: Radiolarian Mudstone Fabric
Single Sample 22: Mudstone, Serpentinite and Degraded Igneous Rock Fragments Fabric
Single Sample 23: Intermediate Volcanic Rock Fragments (Dacite-Trachyte)
Single Sample 24: Clay Mix with Siltstone Fabric
Single Sample 25: Fine Silicate Rich Clay Mix Fabric

Table 7.46 continued: List of all the fabric for single samples that do not belong to the main petrographic group.

7.13 Single Sample Fabric 1: Rounded Mudstone, Quartz and Radiolarian Mudstone Fabric

A

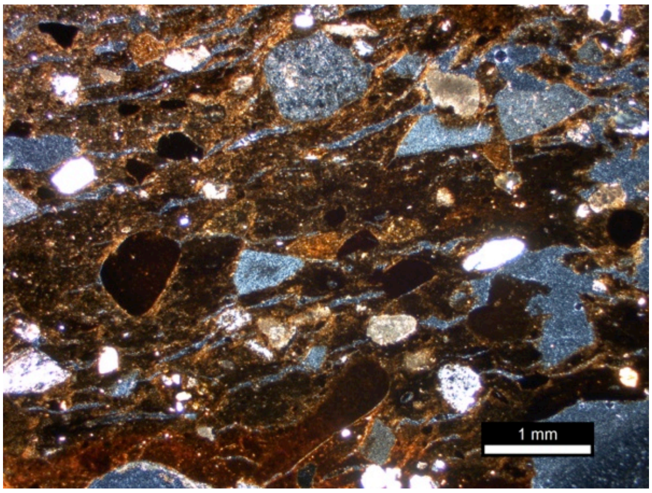


Figure 7.40: Micrograph of SS1 in XP showing the general character of the fabric with strong void alignment.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/2	Askos	Incised	EHI

Table 7.47: Table detailing the sample belonging to SS1.

This fabric is characterised by an optically active orange to yellow-brown heterogeneous matrix. The matrix contains rounded to sub-angular radiolarian mudstone, chert, micrite and polycrystalline quartz (refer to Figure 7.40).

Inclusions have a bimodal distribution, with the large size and distribution of the inclusions indicating that the coarse fraction has been added to the marl base clay.

Voids are micro and meso vughs and channels which display strong alignment to the sample margins potentially indicating coil construction. TCFs are dark red brown or opaque but this may be partially due to slide thickness which was uneven in some areas.

The rounded nature of the inclusions within this sample suggests that they have been added as water worn sand grains to a calcareous marl based clay. Compatible sedimentary geology can be found throughout the NE Peloponnese including the area of the Nemea Valley which contains large outcrops of sandy marls, pebbly and sandy conglomerates, mudstones, including radiolarian, and sandstones (Zaronikos *et al.* 1970a). This lack of diagnostic raw materials means it is not possible to assign provenance to this single sample beyond the region of Corinthia, however, there is no reason to suggest that this is not local to the Nemea Valley.

7.14 Single Sample Fabric 2: Argillite, Mudstone and Siltstone Fabric

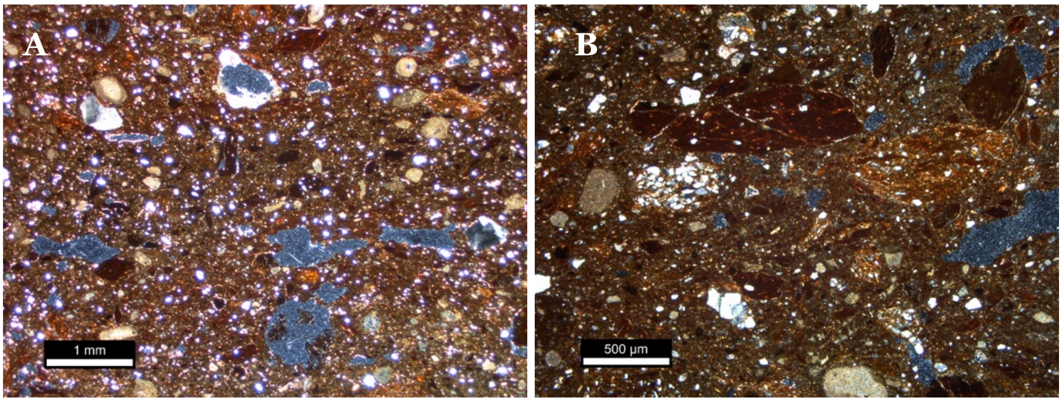


Figure 7.41: Micrographs displaying the variation present in SS2 in XP. A. a general overview of the fabric; B. a close up of the key inclusion types.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/103	Large bowl	Red-orange slip	EHII

Table 7.48: Table detailing the sample belonging to SS2.

This fabric is characterised by the bimodal distribution of argillaceous mudstone inclusions which have an ovoid appearance indicating that they have undergone low level metamorphism, altering to argillites. The strong similarity in appearance of these argillites to the red-brown mudstone inclusions within this fabric suggests the two inclusion types are related and represent a spectrum of alteration. These primary inclusions are accompanied by sub-angular siltstone and sub-rounded micrite in a fine quartz rich matrix that contains the same inclusions as the coarse fraction indicating that the fine fraction derives from this coarser material (refer to Figure 7.41). The matrix is mid red to yellow-brown with low optical activity. This, in addition to the presence of some decomposed areas of calcite, indicate a firing temperature above but close to c. 750^{o}C.

The low-grade metamorphic nature of the argillaceous inclusions within this fabric are consistent with the sandstone-shale geology present throughout the region of Corinthia, as such provenance with a single sample cannot be further refined.

7.15 Single Sample Fabric 3: Siltstone and Vegetal Temper Fabric

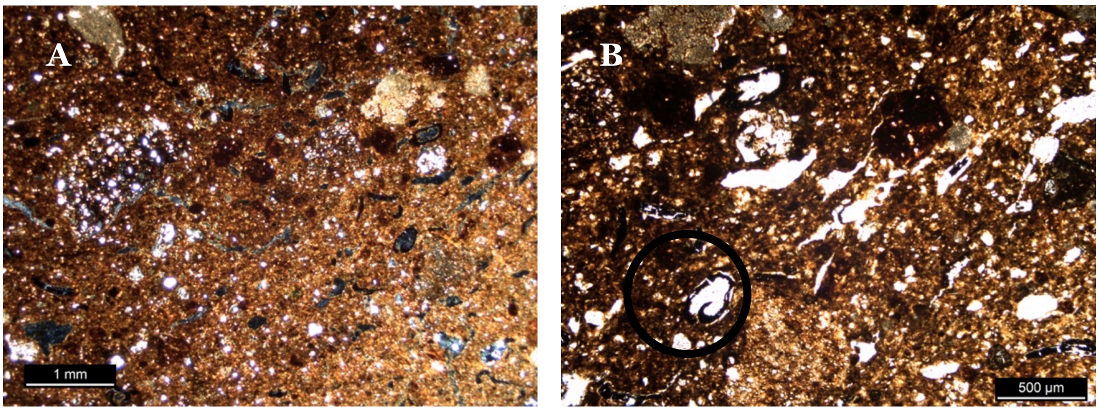


Figure 7.42: Micrographs displaying the variation present in SS3. A. a general overview of the fabric in XP. B. a remnant of vegetal matter within a void in PL .

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/29	Askos	Incised	EHI

Table 7.49: Table detailing the sample belonging to SS3.

This fabric has a mid orange-brown matrix, displaying mixed to low optical activity, this in addition to the presence of calcite within the matrix suggests a firing temperature in the region of 750ºC. The paste is characterised by the strongly bimodal distribution of large sub-angular to sub-rounded siltstone and rounded micrite in a silicate rich matrix (refer to Figure 7.42). Remnants of vegetal temper are also visible in XP and PL as irregular opaque strands in voids, as highlighted in the image above.

TCFs are common throughout the sample, often with an opaque appearance or dark red-brown with defined edges and are suggestive of pellets from clay mixing.

The raw materials in this fabric are consistent with the sedimentary sandstone and limestone geology throughout the Nemea Valley, and the region of Corinthia generally, making provenance beyond the region of Corinthia difficult. However, the addition of vegetal temper signifies a specific approach to clay preparation and manipulation not found in other askoi in this study. It is more commonly found in association with large vessels such as firedog stands, in addition to cooking pots and coarse ware bowls, from the Nemea Valley and from Epidavros. The presence of raw materials consistent with the Nemea Valley and the use of a tempering technique also found in other Nemean fabrics may lend support to a local provenance.

It is of note that none of the askoi within this study share the same paste recipe suggesting that their manufacture was not standardized or related to a specific centre of production.

7.16 Single Sample Fabric 4: Altered Sandstone Fabric

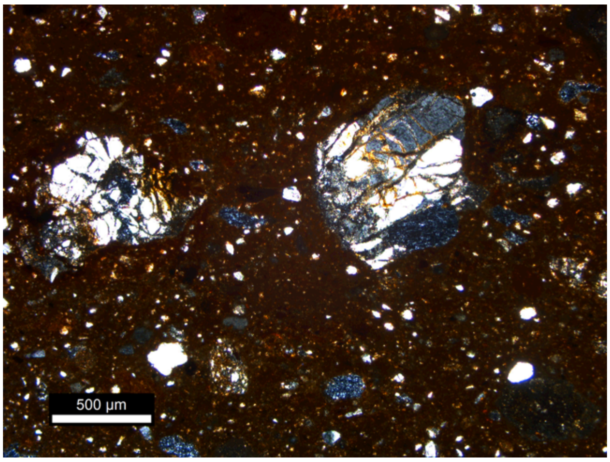


Figure 7.43: Micrograph of SS4 fabric in XP.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/107	Plate/shallow bowl	White slip?	EHII

Table 7.50: Table detailing the sample belonging to SS4.

This fabric has a red-brown silicate rich matrix, displaying mixed to low optical activity suggestive of mixed firing conditions. The paste is characterised by the bimodal distribution of large sub-rounded to rounded sandstones with spallation like fractures, commonly in-filled with secondary calcite making them very distinctive (refer to Figure 7.43). Sub-angular and sub-rounded siltstones are present, accompanied by the rare presence of rounded degraded basic igneous rock fragments. TCFs are present throughout the sample, often with an opaque appearance or dark red-brown in colour. They have defined edges but mixed interior consistency suggestive of mixing a red firing and yellow firing clay.

This fabric has inclusions consistent with the sedimentary sandstone and limestone geology throughout the Nemea Valley, and the wider region of Corinthia. However, their altered appearance is unusual and suggests they have undergone some form of stress or shock alteration. With a single sample it is not clear what the process of this alteration may have been and therefore, it cannot help with provenance beyond that of Corinthian.

7.17 Single Sample Fabric 5: Calcareous Sand Fabric

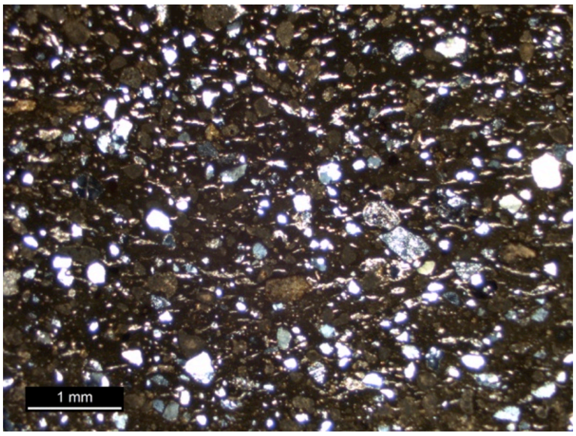


Figure 7.44: Micrograph of SS5 in XP.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/59	Askos?	Incised	EHII

Table 7.51: Table detailing the sample belonging to SS5.

This fabric is characterised by the strongly bimodal distribution of sub-rounded micrite, much of which appears muddy and greyish (refer to Figure 7.44). It is accompanied by sub-angular to angular quartz (mono- and polycrystalline) and angular chert in an optically inactive dark brown matrix. The high frequency of what appears to be degraded calcite and the optical inactivity of the matrix suggests a firing temperature close to but above 750^{o}C. TCFs are rare but consist of opaque dark brown sediment inclusions within the base clay.

This fabric is similar to PG20 in terms of the presence of rounded calcite in a fine matrix. However, the higher proportion of quartz and feldspar grains suggest that the raw materials derive from sand rather than crushed limestone material. Marly sands compatible with the materials in this fabric are located throughout the Nemea Valley (Zaronikos *et al.* 1970a) indicating that the fabric may represent another Nemean derived paste.

This single sample belongs to an askos, and as discussed above the presence of a number of askos fabrics highlights a general trend for this form to be made by a wide number of individuals rather than by key centres of production associated with other tableware vessels. This pattern has also been noted within comparative assemblages, suggesting that askos production was widespread and did not form a significant part of the ceramic repertoire of larger centres of production. This may indicate that these vessels were not a common part of the dining repertoire, also suggested by their commonly low numbers within assemblages. It is also possible that they were more commonly made from organic material which may also explain the characteristic sagging shape, representing skeuomorphism of leather.

7.18 Single Sample Fabric 6: Biogenic Limestone and Sandstone Fabric

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/117	Sauceboat?	Burnished	EHII

Table 7.52: Table detailing the sample belonging to SS6.

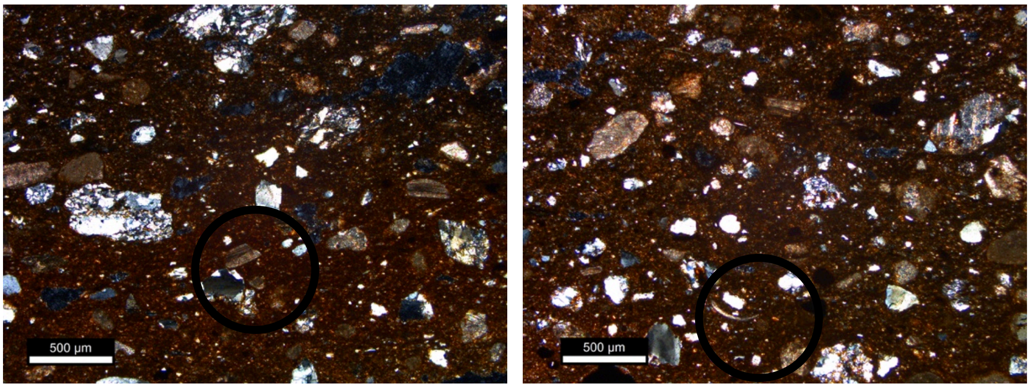


Figure 7.45: Micrograph displaying the variation present in SS6, highlighting the fragments of shell in XP.

SS6 has a mid orange-brown matrix which displays mixed to low optical activity suggestive of a mixed firing atmosphere, whilst the presence of calcareous material suggests a firing temperature below 750°C. The fabric has a bimodal distribution of angular polycrystalline and monocrystalline quartz, some of which appears to grade into sub-arkose sandstone. This is accompanied by sub-rounded micrite, sparitic calcite and fossil remains (refer to Figure 7.45). Some fragments of calcareous material belong to ostracod remains.

The raw materials within this fabric are consistent with a bioclastic limestone, marl and sandstone geological environment. The closest source of such material are the extensive Pliocene limestone, marls and sandstone formations which form the Nemea Valley. These outcrops are noted as containing various ostracods and foraminifera (Zaronikos *et al.* 1970a) which would be consistent with the fossiliferous remains in this fabric. It demonstrates that whilst production of fine table wares in EHII was dominated by producers of PG1 and PG2, other locally based potters were making fineware forms.

7.19 Single Sample Fabric 7: Limestone, Marble and Mudstone Fabric

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/119	Incurving bowl	Red slip	EHII

Table 7.53: Table detailing the sample belonging to SS7.

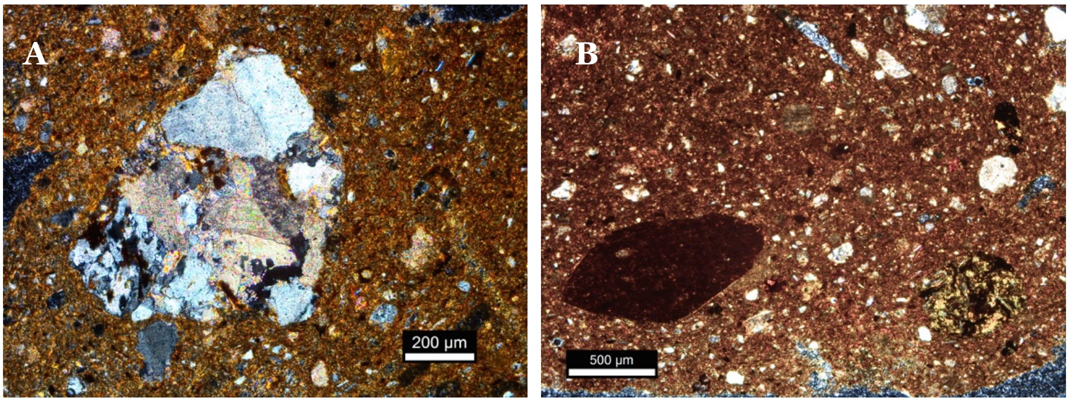


Figure 7.46: A. a micrograph of a marble fragment in SS7. B. a micrograph of a degraded igneous fragment. All images in XP.

This fabric is characterised by a mid yellow-brown matrix which displays low optical activity indicative of a relatively low firing temperature. It has a bimodal distribution of mid brown sub-angular mudstone, sub-angular siltstone and rare marble within a fine silicate rich matrix (refer to Figure 7.46). Rare degraded igneous rocks are also present, possibly associated with the base clay rather than being purposefully added. TCFs are commonly rounded iron rich pellets suggestive of clay mixing.

Limestone and dolomitic limestones are recorded 2km south of Tsoungiza indicating a local origin for this fabric (Zaronikos *et al.* 1970a). However, these rocks types are very widely distributed throughout the Corinth region so a precise assignment of provenance is not possible.

7.20 Single Sample Fabric 8: Mudstone and Grog Fabric

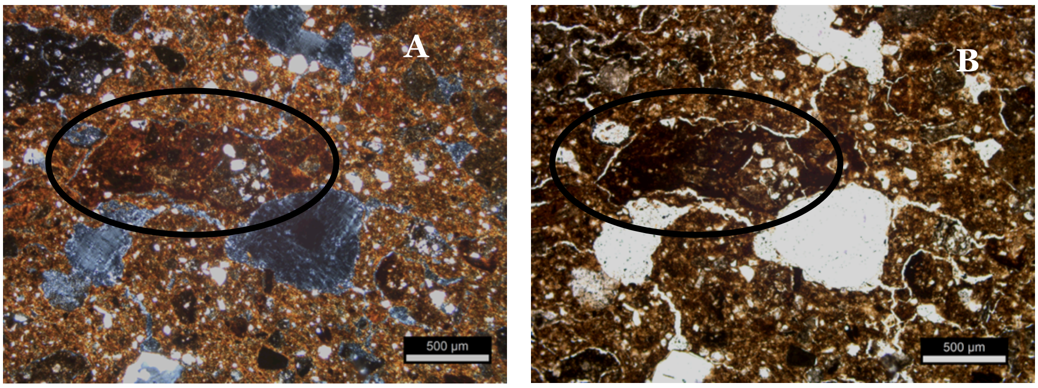


Figure 7.47: Micrograph displaying the variation present in SS8. A. highlights a fragment of grog in XP and image B displays the same fragment in PL.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/76	Firedog stand?	Undecorated	EHII

Table 7.54: Table detailing the sample belonging to SS8.

This fabric is characterised by the bimodal distribution of angular to sub-angular mudstones and grog fragments within an orange-brown silicate rich matrix. The high degree of optical activity suggests a low firing temperature range. The appearance of the grog varies throughout the sample, indicating the use of multiple ceramic bodies. It is distinguished by its angularity, the common presence of shrinkage voids and a distinct internal structure. Indeed, in several examples it is possible to identify distinct rock fragments and clay mixing. The rock types within the grog include chert, micrite, mudstones and silicate grains which are similar to the composition of the sample suggesting similar raw material sources (refer to Figure 7.47).

The ARFs consist of two primary types, one is rounded and highly calcareous, whilst the other is commonly angular with a very dark brown colour. These rock fragments are distinguished from the grog by the internal consistency of sediment and do not contain any distinct rock fragments.

This fabric is a calcareous clay tempered with argillaceous rock fragments and grog, both of which have been crushed. The raw materials are consistent with an origin within the Nemea area, and although they are also distributed across the wider Corinthia, there is no evidence to suggest a non-local origin for this sample.

The grog fragments do not relate to a single paste recipe indicating the use of multiple vessels, however, the inclusions within it are consistently calcareous and sedimentary in nature, again compatible with an origin in the Corinthian region. Some examples of grog contain rounded dark TCFs which may indicate clay mixing, a dominant technological practice in Corinthia.

The addition of grog as a temper is uncommon within the EH material examined in this thesis. Its inclusion represents a distinct technological choice, the significance of which is not clear. Analysis of comparable material from the Argolid has found that grog tempering is commonplace during the Neolithic but sharply declines by the start of the Bronze Age, only continuing for large shapes such as jars. As such, its continued use may represent a link back to Neolithic traditions and learnt practices.

7.21 Single Sample Fabric 9: Medium Coarse Mudstone, Mudstone Breccia and Micrite Fabric

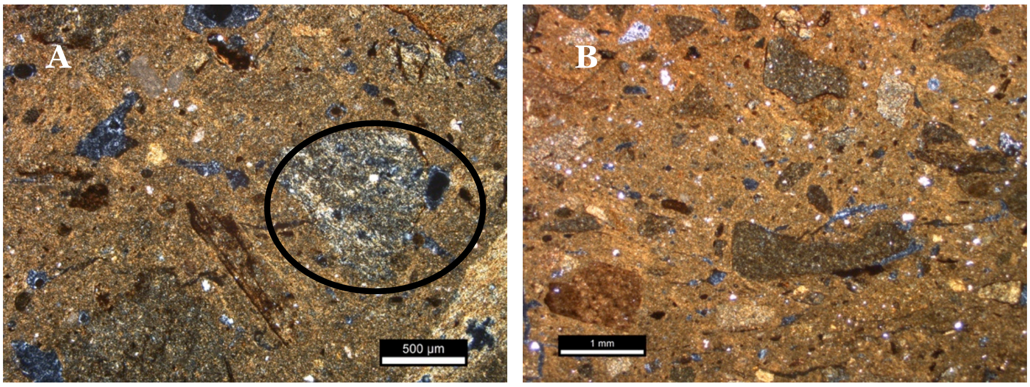


Figure 7.48: Micrographs displaying the variation present in SS9. A. A mudstone inclusion that is very similar to some of the altered tuffaceous rock fragments in PG7 and PG8; B. a general overview of SS9. Images in XP.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/13	Base	Undecorated	EHI

Table 7.55: Table detailing the sample belonging to SS9.

This fabric is characterised by the bimodal distribution of large sub-angular mudstone, mudstone breccia and argillites within an optically active yellow-brown matrix. The optical activity of the matrix suggests the use of a low firing temperature range (refer to Figure 7.48). Some inclusions bear a striking similarity to the altered tuffaceous inclusions in PG7 and PG8 (refer to image A of figure 7.47). However, these inclusions have a stronger sedimentary appearance, this in addition to the absence of other igneous material in the sample means that it is not possible to link the groups.

TCFs are common, characterised as dark red-brown rounded sediment and striations within the calcareous matrix which may suggest clay mixing.

This fabric looks very similar to PG7 and 8 from Ancient Corinth (Keramidaki). However, this sample does not contain any tuffs or other igneous material which characterises the Ancient Corinth (Keramidaki) fabric. As breccia rock fragments have been found in both Nemean and Ancient Corinthian samples belonging to other groups it does not aid with provenance of this fabric beyond a regional level. This said, its similarity to PG7 and PG8 suggest it may originate in the area of Ancient Corinth with the variation between the fabrics due to natural variation in the raw material source.

7.22 Single Sample Fabric 10: Angular Calcite, Limestone and Siltstone Fabric

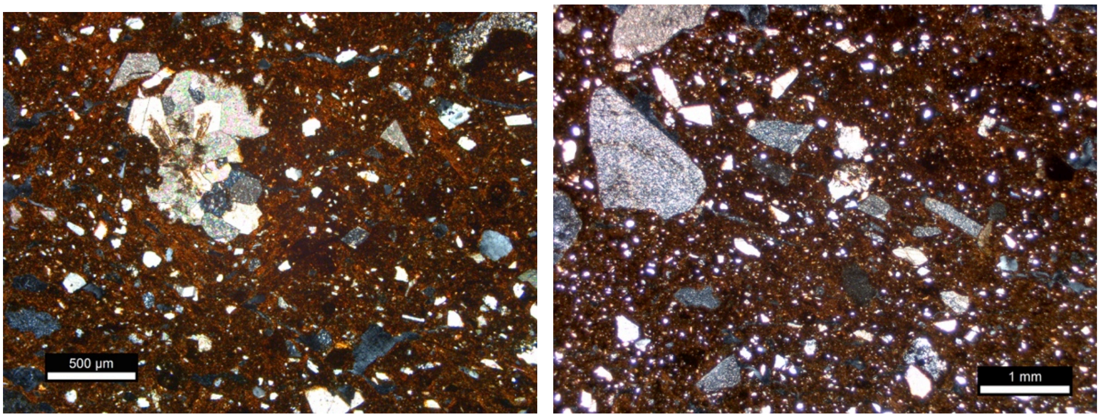


Figure 7.49: Micrograph displaying the variation present in SS10. Images in XP.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/72	Incurving bowl	Undecorated	EHII

Table 7.56: Table detailing the sample belonging to SS10.

This fabric is characterised by a red-brown optically active matrix with the bimodal distribution of angular limestone, sparitic calcite, siltstone and silicate grains. The optical activity of the micromass and the presence of well-defined calcite grains suggest a firing temperature below 750^{o}C (refer to Figure 7.49). The sparitic calcite grains are consistent with those which make up the limestone rock fragments suggesting the limestone has been crushed and added to the non-calcareous clay base.

This fabric comprises of crushed crystalline and dolomitic limestone accompanied by siltstone. Compatible limestone and siltstone outcrops are present in the lower Triassic limestone formations *c.* 2km SE and 25km directly west of Tsoungiza (Zaronikos *et al.* 1970a), suggesting a possible local origin for this fabric. As these limestones are widely distributed across Corinthia assignment of local provenance is tentative.

Crushed calcite fabrics have been noted in very small proportions in other fabrics such as SS11 and within comparative material from the Argolid, but none of the samples appear to follow a consistent paste recipe. This variability indicates that a number of potters were utilizing the same raw materials to produce a variety of vessels across the NE Peloponnese.

7.23 Single Sample Fabric 11: Angular Calcite and Micrite Fabric

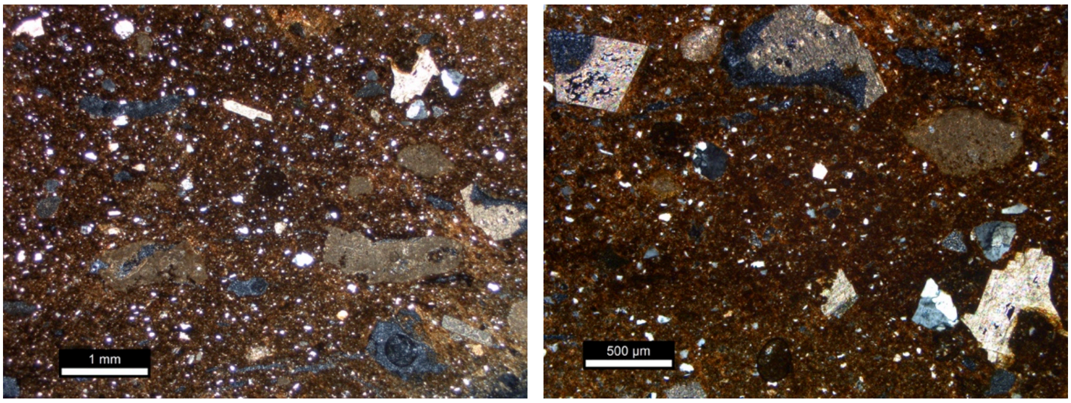


Figure 7.50: Micrographs displaying the variation present in SS11. Images in XP.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/24	Fruitstand	Orange brown slip and incised	EHI

Table 7.57: Table detailing the sample belonging to SS11.

This fabric has a silicate rich orange-brown matrix. The matrix displays mixed to low optical activity suggestive of mixed firing atmospheres and the use of consistently low firing temperature ranges. This is further supported by the presence of angular sparitic and dolomitic calcite with sub-rounded to rounded micrite (refer to Figure 7.50). These inclusions are bimodally distributed in the matrix. TCFs are rounded red-brown clay pellets suggestive of clay mixing.

SS11 is very similar to SS10 in terms of raw materials, with the exception of the presence of siltstone in SS10. Like SS10, the raw materials in this sample are consistent with a limestone to dolomitic limestone origin. Compatible formations are present through the NE Peloponnese including the area around Nemea which makes a definitive assignment of provenance difficult but there is nothing to suggest a non-local origin.

This fabric is significant in that it represents a fruitstand which is more dominantly produced in the PG15 fabric. The use of this possible local fabric to make a fruitstand may indicate an attempt to imitate those produced within

PG15. This is further suggested by its similarity in outward appearance to the Talioti examples. As no other samples of this fabric have been identified either within this thesis or comparative material it is not possible to comment further on the repertoire or distribution trends for the fabric represented by SS11.

7.24 Single Sample Fabric 12: Radiolarian Mudstone and Chert Fabric

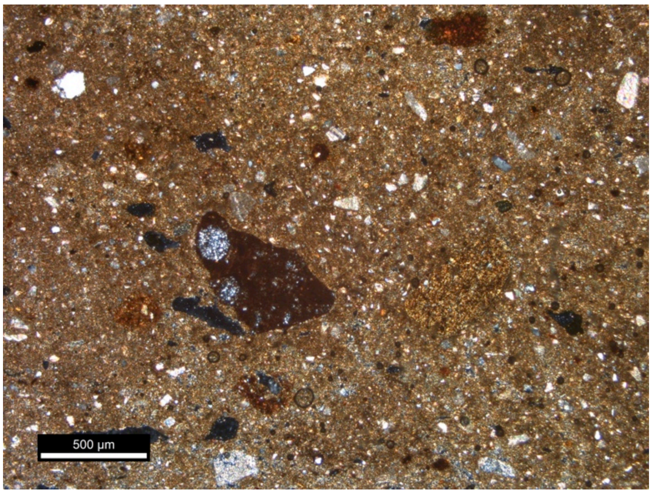


Figure 7.51: A micrograph of SS12 displaying radiolarian mudstone. Image in XP.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/11	Jar	Orange slip and burnished	EHI

Table 7.58: Table detailing the sample belonging to SS12.

This fabric has a silicate rich orange-brown matrix with a high level of optical activity suggestive of low firing temperatures. Inclusions are few to very few with bimodal distribution, dominated by characteristic red-brown mudstones with radiolarian porphyroclasts and sub-angular and sub-rounded orange mudstones. These are accompanied by angular chert, calcite, and rare low grade schist (refer to Figure 7.51). TCFs comprise of brown and red-brown rounded well-defined pellets, and striations that merge with the micromass. These features are consistent with mixing yellow and red firing clays.

The inclusions within this fabric are not abundant or diagnostic. On the whole they suggest a sedimentary origin, however, the presence of a single schist fragment indicates that they may lie in close proximity to a metamorphic source. The absence of more abundant diagnostic inclusions mean that it is not possible to definitely assign provenance.

7.25 Single Sample 13: Fine Micaceous Matrix with Calcite and Sandstone Fabric

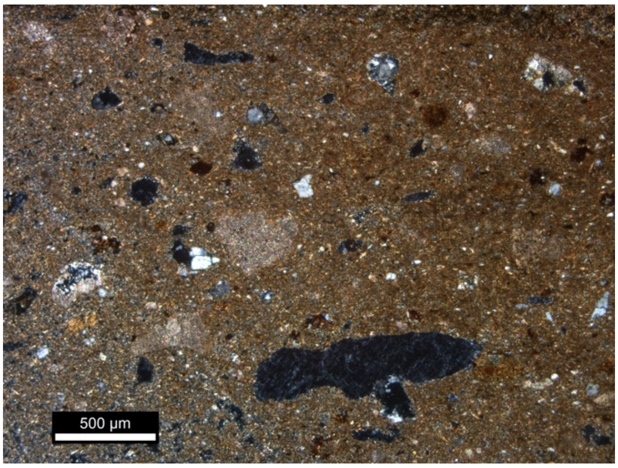


Figure 7.52: A micrograph of SS13 in XP.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/1	Frying pan	Black slip, burnished and incised	EHI

Table 7.59: Table detailing the sample belonging to SS13.

This fabric has a biotite mica and quartz rich, yellow-brown matrix. The matrix displays high optical activity suggestive of low firing temperatures at or below 750°C, this is also suggested by the presence of calcite. Inclusions are very few with bimodal distribution, comprising of orange-brown mudstones, by sub-rounded and rounded micrite and sparitic calcite, and angular sandstones (refer to Figure 7.52).

The rare presence of inclusions in this fabric and their undiagnostic nature make assignment of provenance difficult. The inclusion types are consistent with a sedimentary origin with compatible outcrops being located as part of the Upper Pliocene marly limestones containing sandstones which form the Nemea Valley (Zaronikos *et al.* 1970a). As such there is no evidence to suggest a non-local origin for this sample.

7.26 Single Sample Fabric 14: Fossiliferous Limestone Fabric

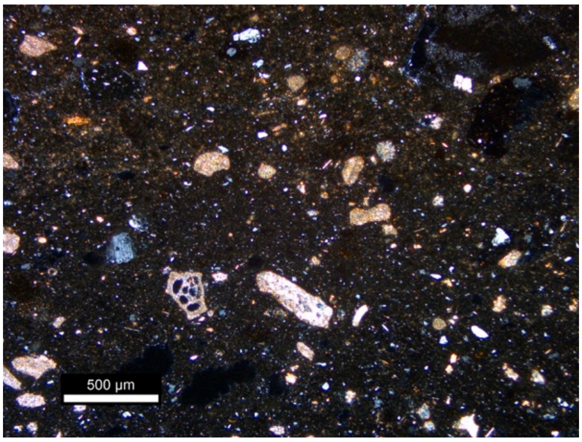


Figure 7.53: Micrograph of SS14 in XP.

Sample Number	Vessel Form	Surface Modification	Period
KOR 11/16	Small bowl	White slip (yellow-blue mottled)	EHII

Table 7.60: Table detailing the sample belonging to SS14.

This fabric is characterised by the weakly bimodal distribution of sparitic calcite, shell and microfossil remains, in a silt-sized, silicate rich matrix (refer to Figure 7.53). Some fragments of altered and degraded igneous rocks are present in rare amounts and appear to be associated with the non-calcareous portion of the base clay mix, whilst the biogenic material has been added. The matrix is dark black brown and optically inactive, this in addition to the grey coloured of the ceramic body suggests firing in a reducing atmosphere. The presence of calcareous inclusions indicate the use of low temperature ranges.

Dark brown angular mudstones are present in small amounts. Rounded dark brown and mid orange-brown TCFs are also present consistent with clay pellets from mixing.

The raw materials in this fabric derive from foraminifera bearing limestone, with the visible shell remains belonging to milidina, echinoderms, and gastropods, consistent with the Jurassic limestone formations in the area of Ancient Corinth (Yannetakis *et al.*1972). The presence of altered igneous rock fragments would support an origin in this area, particularly in proximity to Acrocorinth.

This demonstrates that Corinthian potters were skilled in the production yellow-blue mottled pottery which has traditionally been seen as a very specialized ware. Yellow blue mottled pottery has been identified within this study in a range of fabrics which vary across the NE Peloponnese. The presence of more than one fabric in association with this decorative technique supports the argument that it was produced by multiple centres. The lack of other forms within this fabric prevents detailed comment about the full repertoire or distribution of vessels from this particular producer.

7.27 Single Sample Fabric 15: Biogenic Limestone Fabric

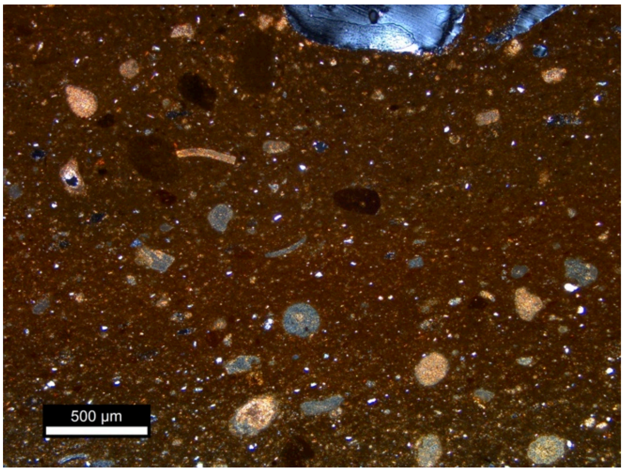


Figure 7.54: Micrograph of SS15 in XP.

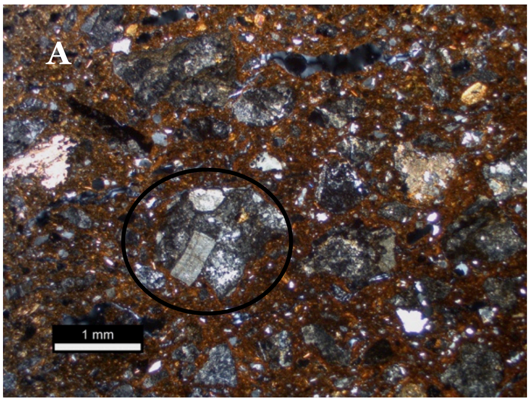
Sample Number	Vessel Form	Surface Modification	Period
KOR 11/17	Bowl with inturned rim	Undecorated	EHII

Table 7.61: Table detailing the sample belonging to SS15.

This fabric is characterised by the bimodal distribution of rounded micrite and shell, within a fine mid yellow to red-brown matrix (refer to Figure 7.54). The matrix displays low to no optical activity, this in combination with the grey biscuit colour of the ceramic, suggests that the vessel was fired in a low oxygen atmosphere at moderately high temperatures. Sub-rounded red-brown mudstones are also common accompanied by rounded, dark red-brown TCFs. The TCFs display both well-defined and diffuse edges indicative of red firing clay pellets from the mixing of a calcareous clay with a red firing clay.

The raw materials in this fabric are consistent with limestone outcrops distributed throughout the region of Corinth, including the Jurassic limestones rich in microfaunal remains that outcrop in the area of Ancient Corinth (Yannetakis *et al.* 1972) which may indicate a possible local provenance. The use of clay mixing is also consistent with Corinthian potting practices.

7.28 Single Sample Fabric 16: Altered Felsic Volcanic Rock Fragments Fabric



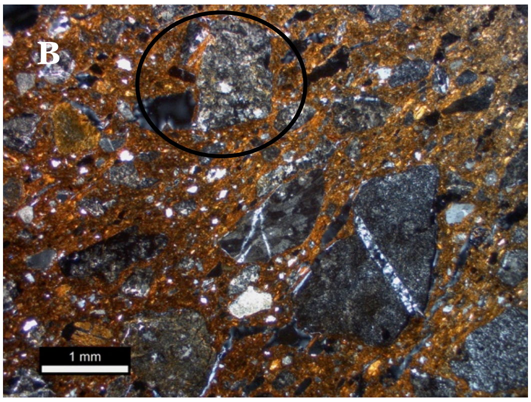


Figure 7.55: Micrograph displaying the variation present in SS16. A- a highlighted tuff fragment. B- highlighted altered tuff fragment. Images in XP.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/116	Cooking pot	Applied	EHII

Table 7.62: Table detailing the sample belonging to SS16.

SS16 is a characteristic fabric with a non-calcareous heterogeneous matrix, ranging from yellow-brown to dark orange-brown rich in angular quartz rich in feldspar and serpentinite. It displays moderate to high optical activity suggestive of a low firing temperature ranges and mixed firing conditions.

The fabric is characterised by the presence of large, angular, altered igneous, and felsic rock fragments deriving from clastic tuffaceous rock. They display a fine-grained matrix with larger angular felsic inclusions (refer to Figure 7.55). Fresh welded tuffs are also present in small amounts, along with elongated orange-brown mudstones and rare orange serpentinite. The coarse fraction is consistent with the nature of the base clay, but the angularity, size and distribution of the altered volcanic rock fragments suggest that they have been added.

The inclusions within this fabric are very characteristic, deriving from a highly altered igneous geological formation associated with ophiolitic geology, as indicated by the presence of serpenitinite. Altered pillow lavas and tuffs have been identified in the area of Acrocorinth (Siddal In press: 28), which also contains serpentinite bearing ophiolitic bodies. This may indicate an origin within the area of Ancient Corinth although the presence of these altered igneous fabrics highlights the need for more intensive geological sampling and analysis in the area.

7.29 Single Sample Fabric 17: Fine Clay Mix with Quartz and Altered Felsic Rock Fragments Fabric

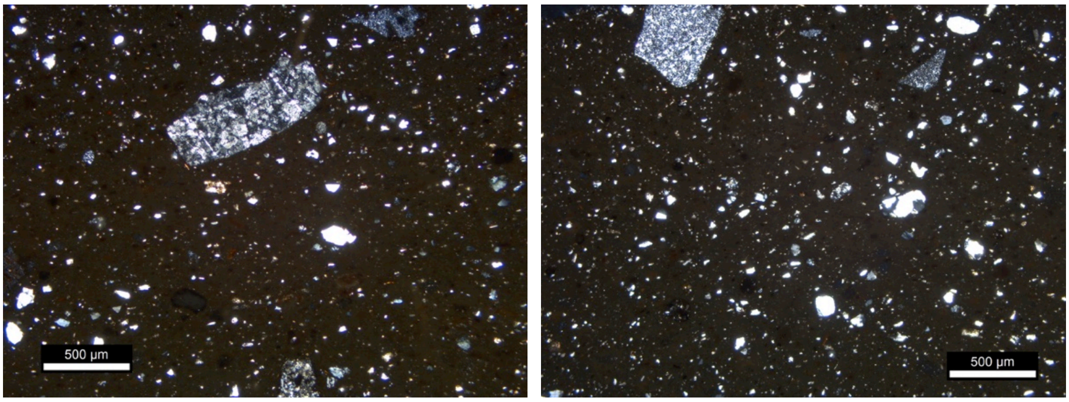


Figure 7.56: Micrograph displaying the variation present in SS17. Images in XP.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/106	Sauceboat	Black-brown slip	EHII

Table 7.63: Table detailing the sample belonging to SS17.

This fabric is characterised by the bimodal distribution of angular radiolarian chert and altered felsic rock fragments similar to those in SS14. However, the examples within SS17 are smaller with a finer groundmass (refer to Figure 7.56). These inclusions lie within a heterogeneous optically inactive matrix suggestive of a high firing temperature. The matrix is rich in biotite mica, angular silt sized quartz and feldspar, and appears dark green brown in colour with areas of dark red- brown TCFs suggestive of clay mixing, very similar to PG1.

This fabric's clay matrix is similar to PG1. The inclusions of radiolarian chert and altered felsic rich rock fragments which share some similarities to those in SS14 suggests a origin in the area of Corinthia, possibly at Ancient Corinth itself, as such, a local provenance is likely.

7.30 Single Sample Fabric 18: Fine Matrix with Bioclastic Mudstone and Translucent Clay Pellets Fabric

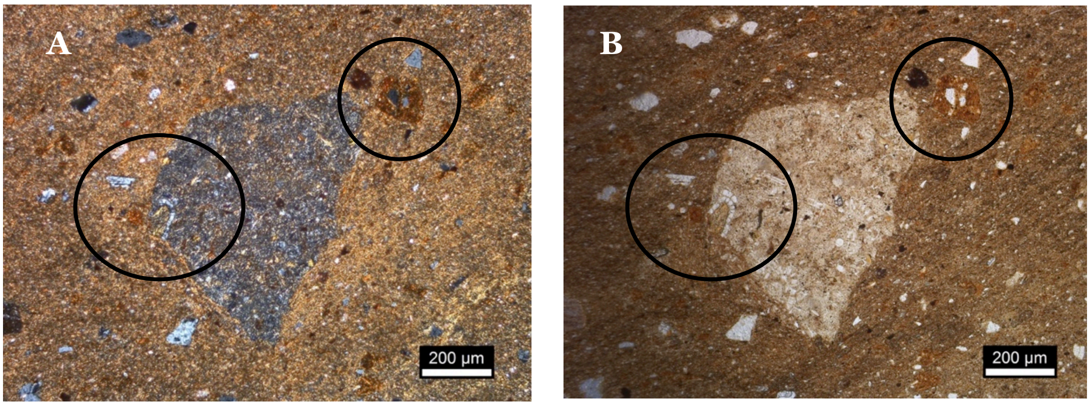


Figure 7.57: A- a micrograph of SS18 displaying a bioclastic mudstone fragment and translucent clay pellet highlighted in XP. B- is the same image in PL with a bioclast clearly visible within the mudstone.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/65	Incurving bowl	Orange-red-purple slip	EHII

Table 7.64: Table detailing the sample belonging to SS18.

This fabric is characterised by an optically active, fine, calcareous matrix suggestive of a low firing temperature range. Within this matrix there are few silt sized, angular silicate, muscovite, and calcite grains. The coarse fraction is composed of sub-angular bioclastic mudstones (refer to Figure 7.57) which are similar to mudstones within PG7 and PG8. The fabric also contains rounded very optically active, orange translucent clay pellets which contain angular mono- and polycrystalline quartz, quartzite and feldspar fragments.

The pellets in this fabric are similar to the vitrified clay pellets noted in many other groups. Similar vitrification of terra rossa clay pellets was noted in experimental work undertaken by the author and Graybehl *et al.* (unpublished) as shown below (refer to Figure 7.58). Whilst these examples are much finer than those of SS16 their colour and translucent nature bears a striking similarity. These stand in stark contrast to the terra rossa pellets noted within PG2 which can be dark brown and have distinct shrinkage voids suggesting that they may have undergone localized reduction during firing, where as the examples in SS16 have not.

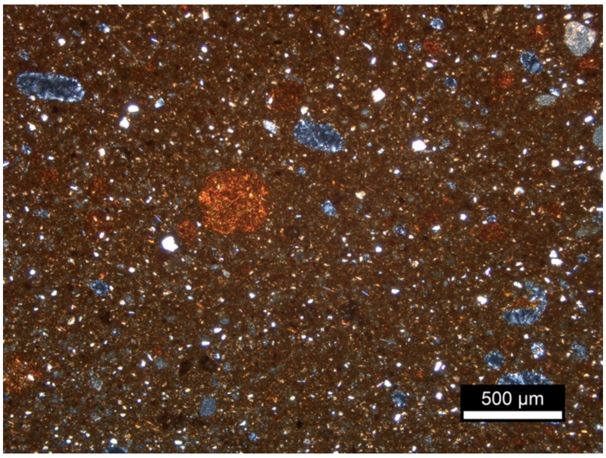


Figure 7.58: Orange clay pellets within calcareous clay, fired at 800°C. Image in XP.

The nature of the calcareous bioclastic rock fragments in this fabric are consistent with algae bearing limestone, formations of which are present *c.* 3km south of Agios Vasileios located some 10-15km away from Ancient Corinth suggesting an origin in this area.

7.31 Single Sample Fabric 19: Mudstone, Chert and Granitic Rock Fragments Fabric

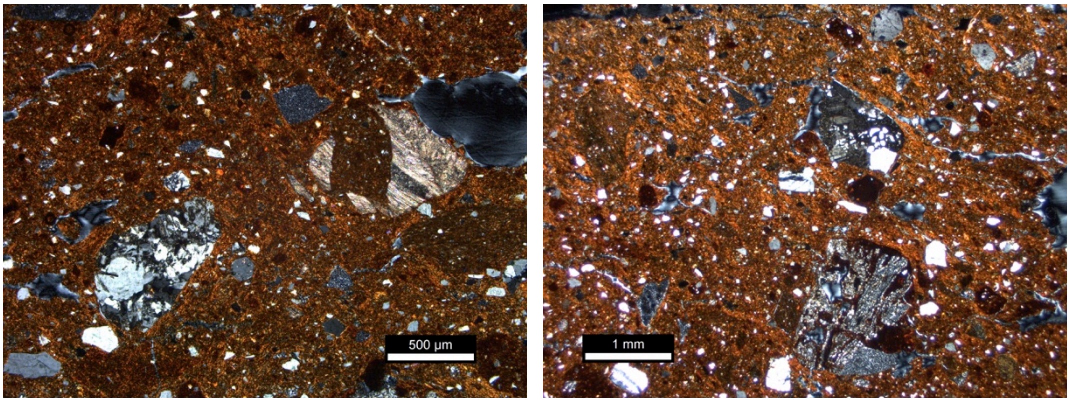


Figure 7.59: Micrograph displaying the variation present in SS19. Images in XP.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/22	Jar?	Undecorated	EHII

Table 7.65: Table detailing the sample belonging to SS19.

This fabric is characterised by an optically active orange-brown matrix containing silt and sand sized angular quartz and feldspar grains. The high level of optical activity suggests the use of a low firing temperature range. The coarse fraction is characterised by large angular chert, microgranite, and rounded polycrystalline quartz with undulose extinction (refer to Figure 7.59). Rare schists are also present. Sub-angular red-brown mudstone, and radiolarian mudstone are common, accompanied by angular cherts which have dark brown mud cement. Sparitic calcite is present in small amounts and commonly attached to the mudstone fragments indicating they derive from the same rock formation. The distribution, angularity and frequency of the larger inclusions suggest these have been added to the non-calcareous clay base.

Whilst Ancient Corinth does contain areas of igneous geology these are associated with volcanic and volcaniclastic formations rather than the intrusions from which the granitic rock fragments in this fabric derive. As such, the raw materials within this fabric are not consistent with the geology of the Corinth region. Comparable geological formations are also not known in the region of the Argolid, suggesting that this represents an import from outside of the study area, the location of which is currently unknown.

7.32 Single Sample 20: Sandstone, Quartzite and Mudstone Fabric

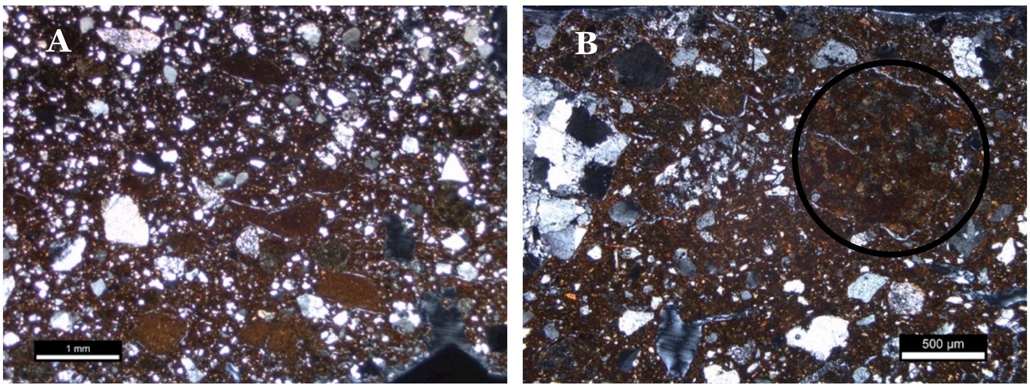


Figure 7.60: Micrographs of samples within SS20. All images in XP. A. KER 11/26. B. KER 11/26 with close up of mudstone breccia, circled.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/26	Jar	Undecorated	EHII

Table 7.66: Table detailing the sample belonging to SS20.

SS20 is characterised by a dark red-brown, optically inactive matrix, rich in angular quartz and feldspar sand sized grains. The coarse fraction contains large angular brown mudstones, arenite sandstone, quartzite orange-red serpentinite and mudstone breccia (refer to Figure 7.60). The attachment of serpentinite to some of the quartzite fragments clearly indicates that these rock fragments are derived from the same formation. The presence of the mudstone breccia, the absence of sandstones grading to mica rich metamorphic rock fragments, and the more common abundance of serpentinite in SS20 distinguish it from PG15.

The angularity and distribution of the coarse fraction suggests that the mudstones and sandstones have been added to the clay base. The high proportion of angular, sand-sized silicate grains within the groundmass appears to derive from both the addition of the silicate rich sandstone and quartzite, whilst the smaller silt sized grains may be naturally present within the clay.

The rock types within this fabric group are consistent with a sandstone environment associated with ophiolitic geology. The closest source would be the area around Acrocorinth, which consists of Jurassic limestones, and sandstones containing ophiolitic bodies (Yannetakis *et al.* 1972). This is further supported by the presence of the mudstone breccia directly comparable to that present in PG7 believed to be Corinthian.

7.33 Single Sample 21: Radiolarian Mudstone Fabric

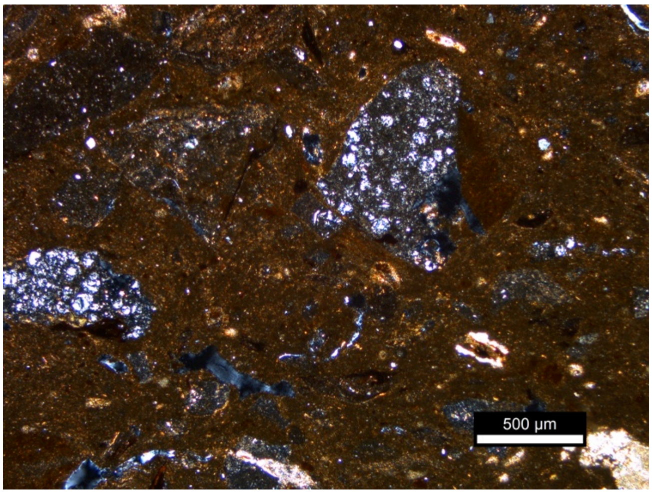


Figure 7.61: A micrograph of SS21 in XP.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/111	Incurving bowl	Red slip	EHII

Table 7.67: Table detailing the sample belonging to SS21.

This fabric is characterised by a moderately optically active grey-brown matrix containing secondary calcite. The level of optical activity suggests the use of mid range firing temperature ranges.

The coarse fraction is characterised by large angular to sub-angular radiolarian mudstone with a brown matrix and large radiolarian porphyroclasts. Sub-angular brown and grey mudstone is frequently present, accompanied by sub-angular radiolarian chert (refer to Figure 7.61). There are rare degraded igneous inclusions with an orange-brown matrix and feldspar laths probably basaltic in origin. Rare yellow-brown serpentinite is also present. The distribution and frequency of the larger inclusions suggest these have been added to the clay base.

The rock fragments within this fabric are compatible with an origin in the area of Ancient Corinth. Cherts and mudstone have been noted at Acrocorinth, and the presence of degraded basic igneous and serpentinite inclusions are consistent with an ophiolitic origin. This suggests that this fabric is local to Corinth.

7.34 Single Sample 22: Mudstone, Serpentinite and Degraded Igneous Rock Fragments Fabric

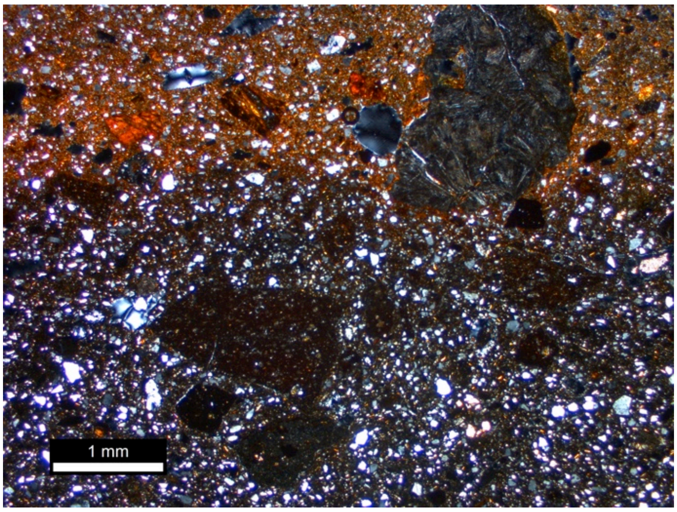


Figure 7.62: A micrograph of SS22 in XP.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/46	Collar of jar	Undecorated	EHII?

Table 7.68: Table detailing the sample belonging to SS22.

This fabric is characterised by a heterogeneous matrix that has distinct firing horizons. The outer edges are optically active orange brown whilst the core is dark brown with no optical activity. This suggests a short firing in oxdising conditions at low temperatures which has left a thick unoxidised core. The matrix is silicate rich with the strongly bimodal distribution of angular brown mudstones accompanied by chert, siltstone and sandstones with few degraded basic igneous and serpentinite rock fragments (refer to Figure 7.62). There are also rare tuffaceous inclusions. The distribution and angularity of the mudstones suggest these have been added as temper, whilst the silicate in the matrix may be related to the silicate rich silt and sandstones. TCFs are commonly opaque and may relate to the addition of the mudstones or be naturally present within the clay base but they do not appear to suggest clay mixing.

The tuff rock fragments within this fabric are consistent with those of PG17, the local Epidavrian fabric, suggesting that this sample is local. This is further supported by the presence of Triassic serpentinites and cherts located in the area surrounding the site of Epidavros (Papavassiliou *et al.* 1984) compatible with the inclusions within this fabric. However, this fabric is very dissimilar to PG17 indicating a very different approach to raw materials and a move away from the dominant local clay sources, suggesting the presence of more than one local potter at Epidavros.

7.35 Single Sample 23: Intermediate Volcanic Rock Fragments (Dacite-Trachyte) Fabric

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/11	Jar	Undecorated	EHII

Table 7.69: Table detailing the sample belonging to SS23.

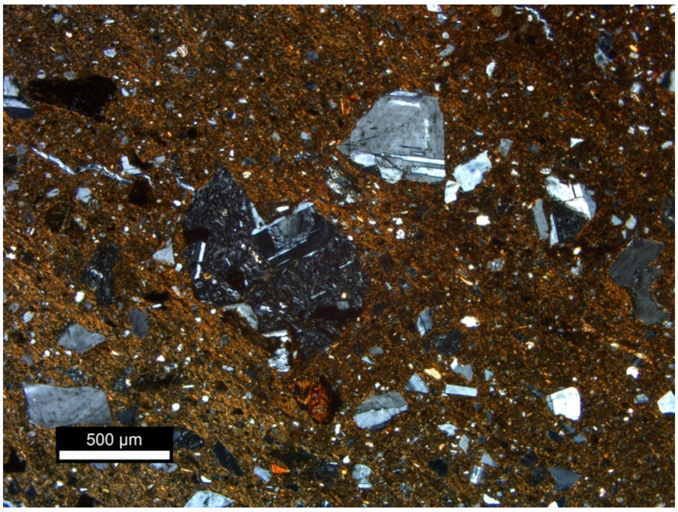


Figure 7.63: A micrograph of SS23 in XP.

This fabric is characterised by a heterogeneous orange-brown optically active matrix containing angular fragments of dacite and trachyte (refer to Figure 7.63). The optical activity suggests low firing temperatures and the angularity and distribution of the rock inclusions suggests these have been added as temper to the clay.

The rock fragments within this fabric are consistent with the Triassic dacite and trachyte tuffs surrounding Epidavros (Papavassiliou *et al.* 1984) suggesting a local origin to this fabric. The presence of an additional local fabric at Epidavros suggests the use of more than local raw material source.

7.36 Single Sample 24: Clay Mix with Siltstone Fabric

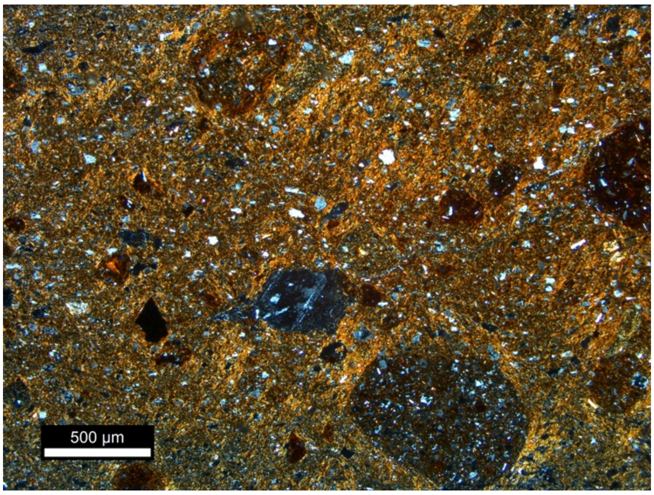


Figure 7.64: A micrograph of SS24 in XP.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/48	Bowl	Undecorated	EHII?

Table 7.70: Table detailing the sample belonging to SS24.

This fabric is characterised by a heterogeneous orange-brown, silicate rich, optically active matrix suggestive of low firing temperatures. Inclusions are bimodally distributed, consisting of rounded dark red-brown TCFs with rare trachyte and dacite fragments (refer to Figure 7.64). The TCFs are consistent with clay pellets.

The presence of trachyte and dacite rock fragments indicates an origin in the Triassic dacite and trachyte tuffs surrounding Epidavros (Papavassiliou *et al.* 1984), as such, this fabric is consistent with a local origin to its findspot.

7.37 Single Sample 25: Fine Silicate Rich Clay Mix Fabric

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/9	Jug	Undecorated	EHII

Table 7.71: Table detailing the sample belonging to SS25.

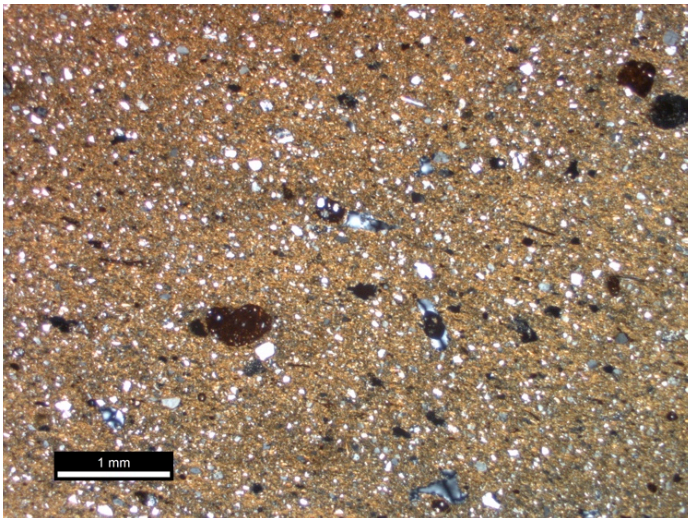


Figure 7.65: A micrograph of SS25 in XP.

This fabric is characterised by a heterogeneous yellow-brown, silicate rich, optically active matrix suggestive of low firing temperatures. Inclusions consist of rounded dark red-brown TCFs, rare angular chert, mudstone, with an abundance of feldspar and quartz (refer to Figure 7.65). Some of the TCFs merge into the micromass suggestive of clay mixing.

The inclusions within this fabric are not diagnostic being widely distributed across the NE Peloponnese. As such, it not possible to assign a definitive provenance, however, it does bear strong similarities to PG2 and may represent a low fired, coarser version of this fabric.

7.38 Summary

Macroscopic Group No.	Dominant Petrographic Group Association	Suggested Provenance
1	15	Talioti Valley
2	1, 2	Corinthia
3	3, 3A	Corinthia
4	24, 24A	Aegina
5	3, 14, 23	Ancient Corinth and Corinthia
6	4, 4A, 4B	Corinthia
7	20	NE Peloponnese/Corinthia
8	5, 5A	Nemea
9	10, 10A	Ancient Corinth
10	11	Ancient Corinth
11	9	Ancient Corinth
12	25, 25A	Unclear
13	7, 7A, 8	Ancient Corinth
14	7, 7A, 8	Ancient Corinth
15	12, 26	Ancient Corinth/ NE Peloponnese
16	17	Epidavros Apollon Maleatas
17	17A	Epidavros Apollon Maleatas
18	3, 3A	Corinthia

Table 7.72: Table showing correlation between macroscopic groups discussed in Chapter 6 and petrographic groups discussed in this chapter.

This chapter has detailed all the fabrics that have been identified within the material examined in this thesis. It has discussed preliminary observations about the degree of firing and suggested possible areas of provenance, identifying a total of 28 primary fabric groups and 25 single sample fabrics, several of which were first identified during macroscopic examination (refer to Table 7.72 and Chapter 6).

The majority of the petrographic fabric groups can be provenanced to the NE Peloponnese and more specifically the regions of Corinthia and the Argolid, many of which show strong links between surface modification and fabric, or form and fabric. These fabrics include raw materials that derive from sources local to their find spots, in the Nemea Valley, at Ancient Corinth and Epidavros. Significantly, it is possible to identify different production strategies in different areas, for example Epidavros had a very long and consistent tradition of using a specific raw material source and red-brown slips which was attested in macroscopic analysis through the identification of MG16 and MG17 as of probable Epidavrian origin. In contrast, Nemean fabrics show a wider degree of variation, accompanied by a wider range of surface modification types, testifying to a larger number of local producers in the area. This also explains the difficulty with attempts to identify macroscopic fabrics specific to NVAP204 and Tsoungiza.

Of particular importance has been the confirmation of distinct technological traditions and choices in the regions of Corinthia and the Argolid which were first suggested through macroscopic analysis. Initial macroscopic observations indicated a preference for buff bodies with dark slips at Corinthian sites, and red and brown bodies, dominantly with red slips, at Argolid sites, suggesting distinct regional potting practices. This has been confirmed by the petrographic evidence for the use of specific clay types in each of these regions, associated with at least two major centres of production in the NE Peloponnese who made a wide repertoire of vessels but who were especially associated with particular vessels and surface finishes.

There was evidently a large centre of production at Ancient Corinth where potters utilized a variety of raw materials from the area of Acrocorinth to produce a range of vessels but who consistently used calcareous clays resulting in the buff and light coloured fabrics noted during initial sorting of the material.

The variety of inclusion types was also recognised macroscopically with the identification of several site-specific macroscopic groups present only at Ancient Corinth (Keramidaki) and Korakou. Petrography confirmed that these fabrics were of probable Corinthian origin (PG 7, 8, 9, 10 and 11), however, due to the long timespan represented by the typology of these vessels, some 300 years, it is unlikely that all of these fabrics reflect the presence of multiple potters working contemporaneously. Instead, it is more likely that in some instances these fabrics represent multiple generations of potters or variation in raw material sources. For example, this may be the case in relation to PG7 and PG8, the local altered tuffaceous fabrics, whose variation may represent natural variation within an outcrop rather than different potters making different choices. In contrast, other fabrics are quite distinctive and commonly do not share inclusions with other fabrics, for example PG10 the degraded igneous fabric looks very distinctive macroscopically in comparison to PG11, the rounded serpentinite fabric, suggesting the use of very different outcrops. In such examples the diversity in temper type indicates a number of potters utilising materials from the area of Acrocorinth to undertake similar tempering practices contemporaneously.

Production at Ancient Corinth seems to have been particularly focused on jar forms, large red-brown slipped bowls and fine dark slipped tablewares, the latter of which was most widely distributed. Together these vessel types make up a specific type of repertoire centred on the consumption and movement of liquids in particular, with little evidence for the widespread production or consumption of vessels related to cooking at Ancient Corinth (Keramidaki). The presence of the same fabric types at both Ancient Corinth (Keramidaki) and at Korakou indicates that the same production centre was supplying multiple communities, whilst the presence of same repertoire of vessels in different fabrics suggests that there was enough demand to sustain multiple potters.

A second significant centre of production was located either within or in close proximity to the Talitoti Valley which shares many similarities to that at Ancient Corinth but which was based on a tradition of using locally available iron rich, red firing clays. Firstly, whilst this centre made a range of vessels which dominate local assemblages, it clearly specialized in and was known for the fruitstand form in particular. These vessels were widely distributed and evidently sought after, suggested by both their imitation by local potters at other sites, and by the number of repairs recorded on fruitstand vessels at Tsoungiza. Like Corinth, it appears that production involved a number of potters, supplying multiple settlements within close proximity, as well as further afield. However, in contrast to the centre at Ancient Corinth the potting community here shared raw material sources, firing, forming and finishing practices, indicating a koine of ceramic technology and a single community of practice.

In addition, to these local and regional fabrics there are a number of fabrics that cannot be assigned a provenance to these regions, a small proportion of which have an unknown origin. Of the fabrics from outside of the study area the andesite fabric from Aegina is most informative, being linked to red-brown highly burnished vessels in particular and was easily recognized macroscopically (MG4). This testifies to another centre of production linked to vessels with a specific appearance perhaps popular for the quality of their burnished finish. Significantly, whilst there is as yet no direct evidence for production in the EH period on Aegina the results of this thesis suggest the use of two raw material sources on the island during this time possibly suggesting the presence of at least two potting groups.

By including many of the same vessels examined by Attas at Korakou and Ancient Corinth (Keramidaki), alongside adding a greater time depth and including sites and vessels types not examined by Attas, it has been possible to add significant detail to his early results and our understanding of EH ceramic production and consumption. Importantly, it has been possible support Attas results by confirming widespread ceramic production across the NE Peloponnese. However, unlike Attas, the results presented here have been able to identify a variety of fabrics from a single production centre, the use of a range of potting practices, and characterize vessel movement more clearly.

Further, these results have added more detail to our picture of local ceramic production during the EH period. Expanding the picture presented by Shriner at Lerna, this thesis has found that EH communities did produce a wide range of vessel types themselves and employed a variety of technological practices that were not solely related to vessel type or available raw materials.

However, importantly, they also still chose to consume vessels from outside of their local area.

Whilst this trend was noted by Attas (1983) and expanded upon by Vaughan *et al.* (1995), these studies were unable to fully contextualize their results within a regional or technological framework, preventing a clear understanding of the possible motivations for these consumption choices. In contrast, the analytical and conceptual approach within this thesis has provided results which strongly suggest that the vessel movement and consumption choices must have been related to both the reputation of the potters from whom communities obtained particular vessels, but also the culinary and dining practices in which they took part. This is particularly well demonstrated by the overwhelming preference for consumption of the fruitstand from Talioti in preference to the small number of local examples. There was clearly something about these vessel types from this centre that gave the ownership of them particular meaning, whilst their wide distribution and number of repairs show that they were a central and valued element of the EH dining repertoire for communities.

Crafting Continuity and Change: Ceramic Technology of the Early Helladic Peloponnese, Greece.

Volume II

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A thesis submitted for the degree of

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Chapter 8 Results- Firing Technology

8.1 Introduction

Firing is a fundamental aspect of ceramic production that has received little attention for the EH period. SEM is a well-established analytical technique for examining the microstructure of ceramic bodies, and provides an opportunity to investigate firing conditions and surface modification techniques. In combination with the macroscopic study of colour, the degree of vitrification present in a ceramic microstructure examined by SEM can provide significant information about the relative firing temperature ranges achieved, as well as the nature of any preserved surface treatments (*cf*. Noll *et al*. 1975; Maniatis and Tite 1981; Maniatis *et al*. 1993; Kilikoglou 1994; Day and Kilikoglou 2001; Faber *et al*. 2002). In addition, SEM-EDS bulk chemical data can be examined to characterise the nature of the clays used in the ceramic body for comparison to any slip to provide information on whether the same raw materials were used for both. The spectra produced detail the measured energy levels of the X-rays detected for each element listed on the X-axis, with the peaks of the Y-axis corresponding to the counts of these emitted X-rays at specific energies. As the energies of the X-rays are characteristic for individual elements, the height of the peaks correspond to the intensity of the emitted X-ray of the associated element. This allows for a semi-quantitative characterisation of the bulk elemental composition of the ceramic body and any visible slips or paints.

Chapters 6 and 7 presented the results of macroscopic and petrographic analyses, revealing the presence of multiple centres of production through the EH period. They demonstrated that these centres employed technological practices that reflect both specific choices, and those that represent shared technologies between centres in terms of raw material choices and surface modification. This chapter will integrate these forms of analysis to examine the practices involved in firing a range of vessels from different petrographic groups and centres of production. The examination of these vessels will not only characterise a range of firing processes in general, but also enable examination of surface modification techniques. By comparing the elemental composition of the raw materials between the ceramic body and potential slipped surfaces, and the character of their microstructure, it will be possible to examine the firing practices that were used to achieve these decorative types.

Twenty-seven samples from 10 fabric groups were analysed to examine a range of preserved surface treatments, and the microstructure of the ceramic body of both fine ware and coarseware vessels (refer to Table 8.1). These samples were chosen with the specific aim of characterising firing practices from a number of centres of production, alongside exploring the relationship between firing method, vessel type and/or surface modification technique.

The results of SEM analysis have been combined with macroscopic and petrographic observations relating to surface colour, the presence of cores, the level of optical activity, and the presence of primary calcite to provide a coherent picture of both firing procedures and surface modification techniques. The investigation of these aspects of ceramic technology, in addition to petrographic fabric analysis, provides us with the opportunity to examine trends that may relate to provenance and technological choice. Further the characterisation of these trends over time enables us to identify particular traditions and developments in the techniques employed, providing historical depth to the picture of ceramic production during the EH period.

Sample ID	*Form*	*Surface Colour*	*Biscuit Colour*	*Core*	*Petro. Fabric Group*	*Optical Activity*	*Presence of Ca (Petrog.)*	*Body CaO (Wt %)*	*Surface CaO (Wt %)*	*Surface vs. Body (Fe_2O_3/K_2O)*	*Firing Atmosphere*	*Vitri. Stage Body*	*Vitri. Stage Surface*	*Est. firing temp range °C*
EPI 12/3	Deep bowl with flaring rim	Dark brown slip	Yellow-buff	None	1A	None	Secondary	Low	Low	Body higher in Fe_2O_3 and K_2O	O	IV	CV - TV	750-800
KER 11/8	Sauceboat	Brown slip	Yellow-buff	Pink	1A	Mixed	Secondary	High	Low	Surface higher in Fe_2O_3 and K_2O	O-R	V	TV	850-1080
KER 11/45	Sauceboat	Black-brown (slip)	Yellow-green buff	None	1A	None	Secondary	Medium -High	Low	Slip significantly higher in Fe_2O_3 and K_2O	O-R	V	TV	850-1050
KER 11/84	Sauceboat	Black-brown (slip)	Green-buff	None	1	None	Secondary	High	Low	Surface higher in Fe_2O_3 and K_2O	O-R	V	V	850-1050
TSO 10/26	Fruitstand	Buff with black (pattern slip)	Buff	None	1	Low	Secondary	Low-Medium	Low	Surface has slightly higher Fe_2O_3	O-R	V	V – CV	850-1050
TSO 10/89	Small shallow bowl	Brown-Pink-buff (brown slip at rim)	Brown-pink - buff	Grey	1	Mixed	Secondary	No Data	No Data	No Data	O	V+	CV - TV	850-1050
TSO 10/101	Sauceboat	Black (slip)	Yellow-buff	None	1	None	Primary and Secondary	No Data	No Data	No Data	O-R	V	TV	850-1050
TSO 10/108	Sauceboat	Buff with black (pattern slip)	Yellow-buff	None	1	Mixed	None	High	Low	Surface higher in K_2O	O-R	V	CV	850-1050
TSO 10/126	Tankard	Buff with black (pattern slip)	Buff	None	1	Mixed	None	High	Low	Surface higher in K_2O	O-R	V	CV	850-1050
TSO 10/127	Bass bowl	Buff with black (pattern slip)	Yellow-green buff	None	1	None	None	High	Low	Surface higher in K_2O	O-R	V	CV	850-1050

Table 8.1: Table showing firing information and estimated temperature ranges for samples examined by SEM. NV- No Vitrification, IV – Initial Vitrification, V – Extensive Vitrification and CV – Continuous Vitrification.

Sample ID.	*Form*	*Surface Colour*	*Biscuit colour*	*Core*	*Fabric Group*	*Optical Activity*	*Presence of Ca (Petrog.)*	*Body CaO (Wt %)*	*Surface CaO (Wt %)*	*Surface vs. Body (Fe2O3/K2O)*	*Firing Atmosphere*	*Vitri. Stage Body*	*Vitri. Stage Surface*	*Est. firing temp range °C*
TSO 10/150	Tankard	Buff with red-brown (pattern slip)	Brown-buff	Pink-orange	2	Mixed	Primary and Secondary	High	Low	Surface higher in Fe203 and K2O	O-R	V	V-CV	850-900
KER 11/28	Jar strap handle	Light brown-grey	Light brown	Grey	3	None	Secondary	High	No surface treatment	No surface treatment	IO Fast firing	V	No slip visible	850-1080
TSO 10/18	Bowl	Red-orange (slip)	Buff	None	3	None	None	High	Low-Medium	Surface significantly higher Fe203	O	V	V	850-900
TSO 10/38	Spreading bowl	Orange-brown (slip)	Orange-brown	None	4	High	Primary	Medium	Low	Surface higher in Fe203	O	V	IV (not well preserved)	850-1050
TSO 10/10	Incurving bowl	Brown mottled (burnish)	Brown	Black	6	Mixed	Primary and Secondary	Low	Low	Surface slightly higher Fe203	IO (fast firing)	IV-V	V	750-850
KER 11/125	Jar	Light orange	Light orange	None	9	High	Primary	High	No surface treatment	No surface treatment	O	NV	No slip visible	<750
KER 11/126	Jar	Green-buff	Green-buff	None	9A	None	Secondary and Primary	High	No surface treatment	No surface treatment	Oxidising	V	No slip visible	850-1050
TAL 11/1	Fruitstand	Black-brown (thin wash)	2 zones Pink-orange	Grey	15	Low	Secondary	Low	Not visible in SEM	Not visible in SEM	O (fast firing)	V	No slip visible	800-900
TAL 11/2	Fruitstand	Orange	Orange	Pink-orange	15	None	None	Low	No surface treatment	No surface treatment	IO	IV-V	No visible slip	750-900
TAL 11/22	Fruitstand	Red-brown (slip)	Pink-orange	Grey	15	None	Secondary	Low	Low	Unclear	IO	V	V	800-900

Table 8.1 continued: Table showing firing information and estimated temperature ranges for samples examined by SEM. NV- No Vitrification, IV – Initial Vitrification, V – Extensive Vitrification and CV – Continuous Vitrification

Sample ID.	*Form*	*Surface Colour*	*Biscuit colour*	*Core*	*Fabric Group*	*Optical Activity*	*Presence of Ca (Petrog.)*	*Body CaO (Wt %)*	*Surface CaO (Wt %)*	*Surface vs. Body (Fe_2O_3/K_2O)*	*Firing Atmosphere*	*Vitri. Stage Body*	*Vitri. Stage Surface*	*Est. firing temp range °C*
TAL 11/30	Jar?	Brown-black smudged with possible orange slip	Grey-black	None	15	High	Secondary	Low	No surface treatment	No surface treatment	IO/Mixed atmosphere	NV	No visible slip	<750
EPI 12/16	Bowl with slight flaring rim	Dark brown (burnish)	Mid-light brown	Grey	17A	Mixed	Secondary	Low	Low	No significant difference	IO (Incomplete oxidation)	NV	V (Compacted)	<750
EPI 12/35	Basin	Dark brown (burnish)	Mid-brown	Several firing horizons but no distinct core	17	High	None	Low	Low	No significant difference	IO	NV	Not well preserved but appear V (compacted)	<750
EPI 12/44	Bowl body sherd	Red-brown (burnish)	Mid-brown	None	17	Moderate	Secondary	Low	Low	No visible slip	O	NV	No slip visible	<750
TSO 10/5	Hemisphe -rical bowl	Brown (burnish)	Black-brown	None	24	Low	None	Low	Low	Surface slightly higher Fe_2O_3 but no significant difference	IO-Reducing	IV	Compacted	750-800
KER 11/138	Shallow bowl	Orange	Mid orange-brown	None	25	Low	Secondary and primary	Low	No surface treatment	No surface treatment	O	NV	No slip visible	<750

Table 8.1 continued: Table showing firing information and estimated temperature ranges for samples examined by SEM. NV- No Vitrification, IV – Initial Vitrification, V – Extensive Vitrification and CV – Continuous Vitrification.

8.2 PG1 – Fine Green Firing Clay Mix Fabric

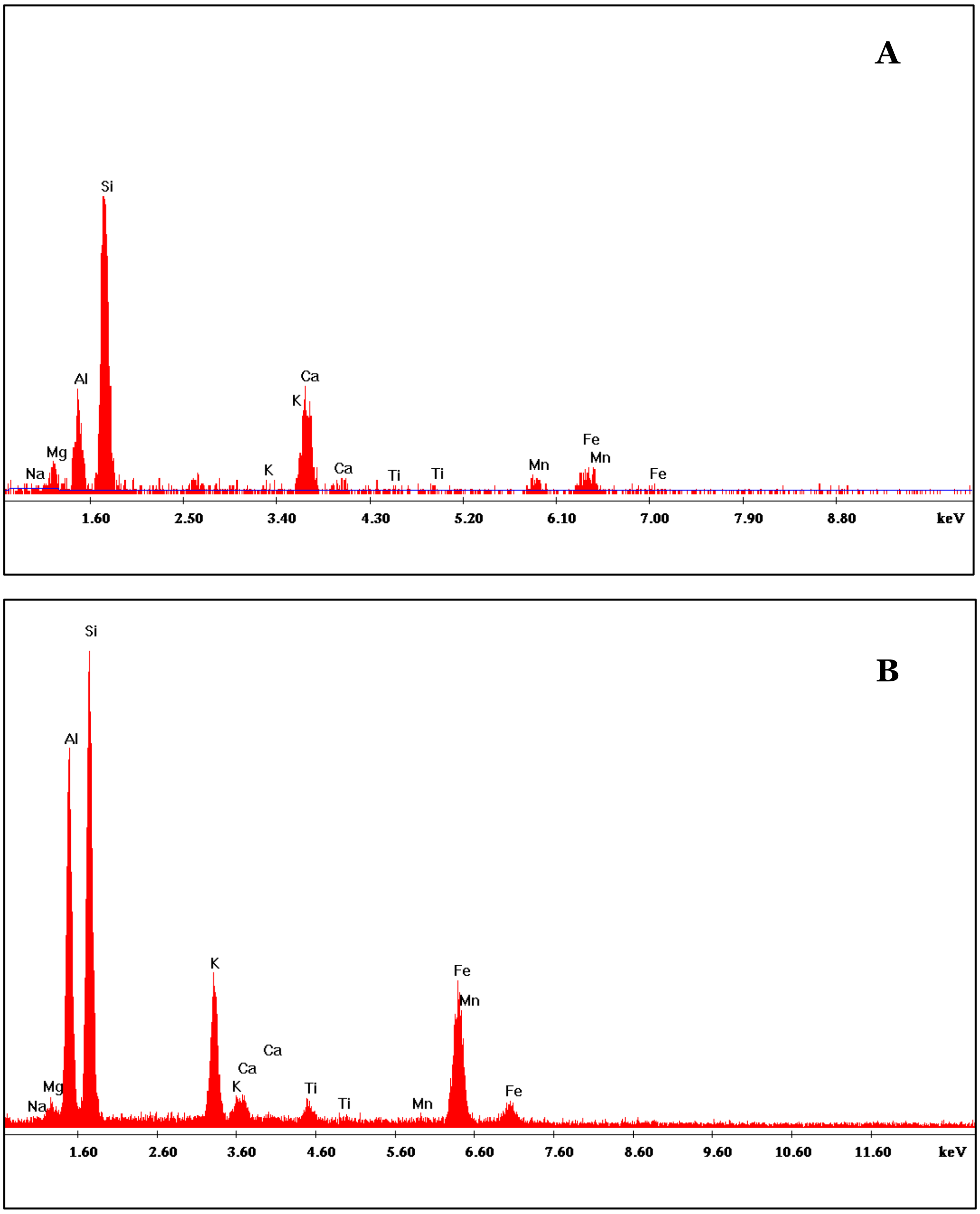


Figure 8.1: SEM-EDS element spectrums for KER 11/84. A. the body with a high Ca content; B. the slip with a high Fe and low Ca content.

This fabric is present in the EHI period through to EHIII but it is most dominantly associated with EHII and EHIII vessels with dark sips. Bulk chemical analysis of PG1 and PG1A samples by SEM-EDS showed that this fabric group has a dominantly high calcareous content with iron and potassium rich, slipped surfaces (refer to Figure 8.1). These results are consistent with macroscopic observations of colour as the dominantly black-brown slip colours suggested the use of an iron rich slip.

8.2.1 Firing

Macroscopically this fabric group consistently displays a green-buff to pink-buff biscuit, with only the rare presence of a weak core (refer to Figure 8.2). These features indicate a prolonged soaking time to allow uniform oxidation state, and therefore uniform colour, of the ceramic bodies.

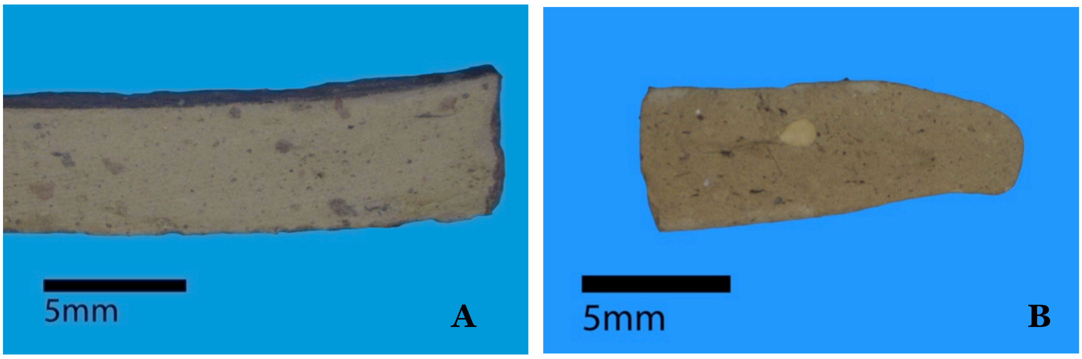


Figure 8.2: Macroscopic fabric images of samples from PG1, displaying a dominantly even buff colour. A. KER 11/45 and B. TSO 10/101.

Microstructural analysis using SEM revealed that vessels were consistently fired at temperatures of between 850°C and 1050°C, and in some cases even above this range, commonly displaying sintering with long, fine, glassy filaments and areas of small rounded pores (refer to Figure 8.3 and 8.4). Furthermore, the fineness of the filaments and the absence of unreacted calcite, indicate the fine nature of the original carbonates present in clay. The green colour and high levels of Ca suggest that the firing temperature would have most likely been at the higher end of this range.

Petrographically, PG1 was divided into 1 and 1A based upon the level of optical activity related to firing conditions. Comparative examination of samples from 1 and 1A using SEM highlighted that small differences in the degree of vitrification were evident both within and between the groups suggesting that vessels were fired at a range of temperatures which resulted in commonly extensively vitrified ceramic bodies. For example KER 11/8 displays more rounded pores and thicker filaments than TSO 10/127 both of which are from PG1 (refer to Figure 8.3). The structure of KER 11/8 is suggestive of temperatures possibly above 1050°C which would have produced a more robust ceramic body.

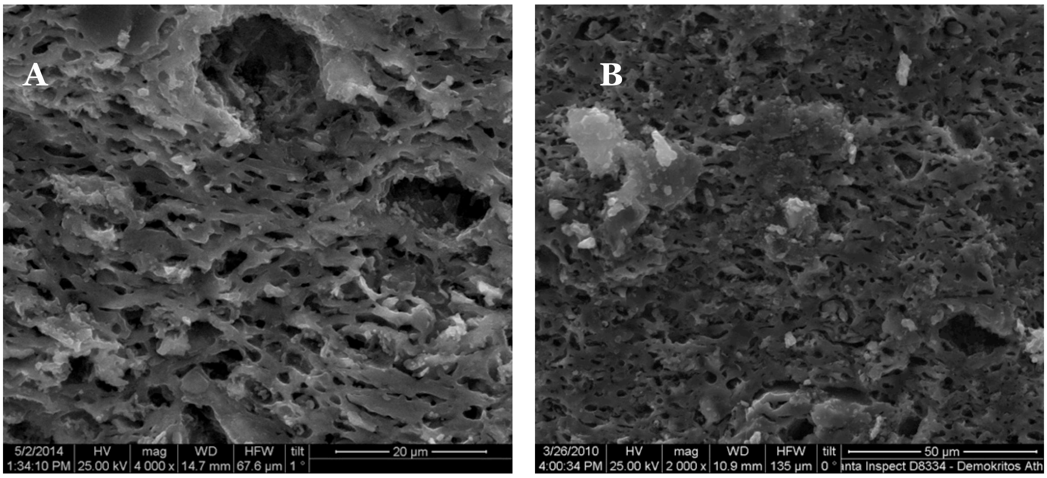


Figure 8.3: The vitrification structures of samples from PG1. A. Microstructure of KER 11/8 and B. microstructure of TSO 10/127. Both display fine glassy filaments consistent with extensive vitrification.

This variability within and between the groups may reflect different placement in the firing and/or different firing episodes. The variability in the microstructure may also be due to the nature of the raw materials for these vessels, specifically the distribution and fineness of the calcite, however, with very few exceptions (for example EPI 12/3) the firing temperature ranges for this fabric are very consistent.

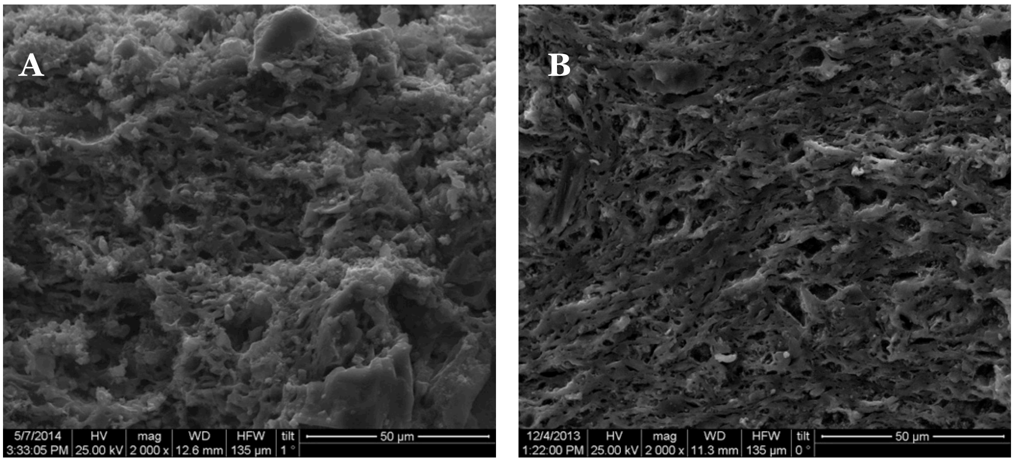


Figure 8.4: The vitrification structures of samples from PG1A with extensive vitrification. A. KER 11/84 displaying fine glassy filaments; B. TSO 10/26 displaying slightly a higher proportion of filaments suggesting more extensive vitrification than KER 11/84.

The microstructure of EPI 12/3 stands apart from the other samples analysed from PG1A. Unlike the other samples, EPI 12/3 only exhibited isolated areas of sintering and glassy filaments (refer to Figure 8.5) indicative of initial vitrification. This suggests that it was fired in the range of between 750^{o}C-800^{o}C, a much lower temperature range than the other PG1A samples.

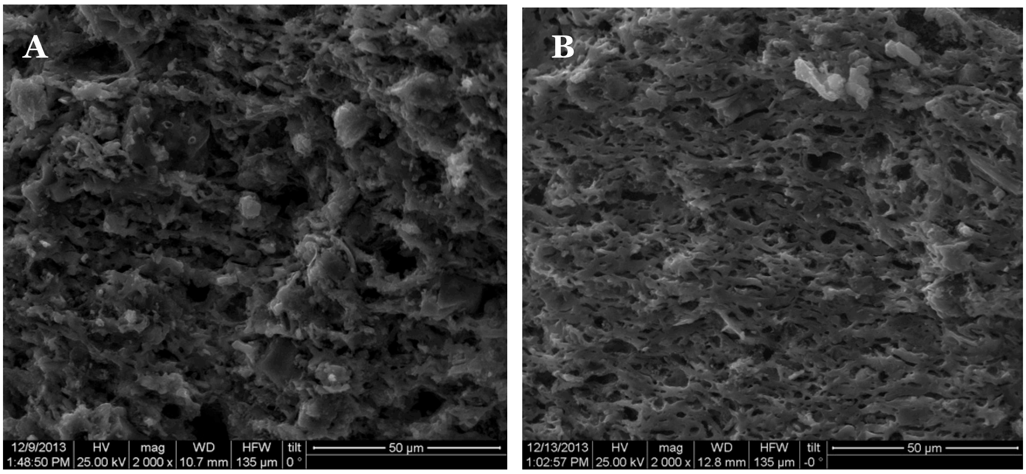


Figure 8.5: The vitrification structures of samples from PG1A. A. EPI 12/3 displaying initial vitrification with remains of the original clay structure still visible; B. KER 11/8 has fine glassy filaments indicative of extensive vitrification.

8.2.2 Surface Modification

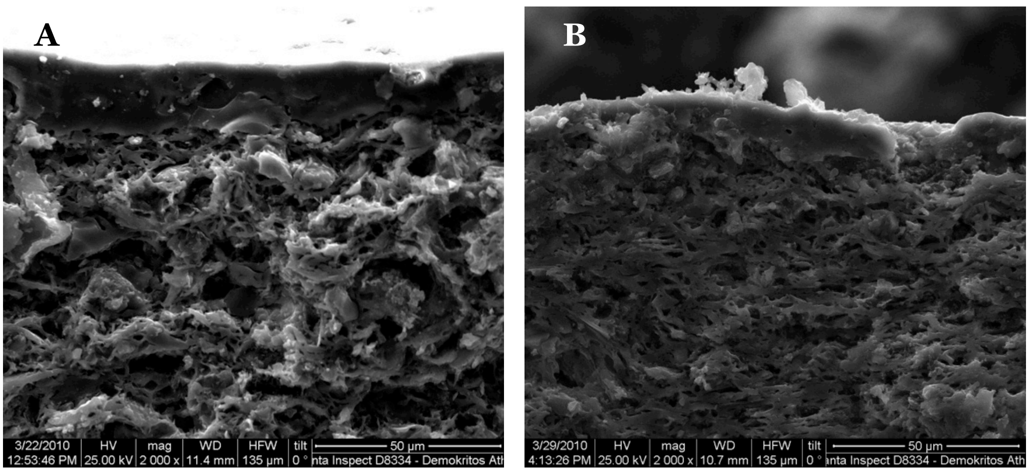


Figure 8.6: The fine vitrified surfaces of samples A. TSO 10/101 and B. TSO 10/126.

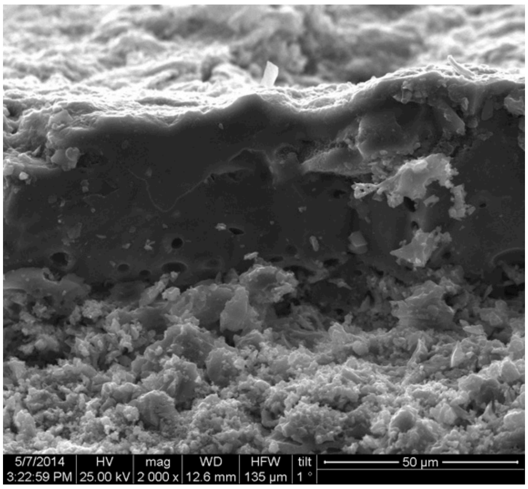


Figure 8.7: The fine vitrified surfaces of sample C. KER 11/84 from PG1.

This fabric group was consistently associated with dark black and brown slips, rich in Fe and K. SEM analysis showed that slipped surfaces were dominantly completely vitrified with a smooth glassy appearance and the rare presence of small rounded pores. The thickness of slips varied both within and between samples from 10μm to 45μm (refer to Figures 8.6 and 8.7) and they were well adhered to the ceramic body. Noll has discussed the production of a black slip in oxidising atmospheres which could be achieved with the use of a manganese rich slip (Noll 1978). The absence of Mn in the slip of the samples examined in this thesis, accompanied by the higher Al, K and Fe values in relation to the Si content, clearly indicates the use of an iron rich slip. The slip must have been fired in reducing conditions in order to produce the black colour, with the high amounts of both Fe and K acting as fluxing agents promoting the production of a fine glassy dark slip. The highly calcareous body would have required dominantly oxidising conditions to achieve the contrasting light buff colour. The presence of an iron rich black slip on a buff body therefore suggests the use of alternating firing atmospheres, specifically the use of oxidation and reduction techniques (O-R) to achieve the contrasting slip and body colours.

Firstly, the vessel would need to be fired in a dominantly oxidised atmosphere resulting in the light body colour due to the high calcium content (Noll 1978: 496), secondly, it would then be necessary to produce a reducing atmosphere to transform the haematite slip from a red to a black colour. The presence of maghemite (Fe_2O_3) means that the reduction phase would not have needed to have been extensive as this naturally darker iron oxide is more easily transformed to produce a darker colour. The short reduction firing phase would not have necessarily reduced the already highly vitrified calcareous body preserving its buff colour. Such a firing procedure would require a degree of control of both the firing atmosphere and the temperature to ensure that the buff colour of the body was not lost during the reduction phase. If control was not maintained the biscuit would also display an uneven colour with distinct firing horizons as noted in relation to PG15 below.

Macroscopic examination of slipped vessels within PG1 did note that vessels did not always display an even colour. This indicates that during some firing episodes potters were not able to achieve and maintain the atmospheres and/or temperatures required, in some instances the reduction phase may have been too short resulting in partial re-oxidation of the Fe within the slip. This was particularly evident for samples belonging to PG1B which were characterised as lower fired than PG1A (please refer to Figure 8.8).

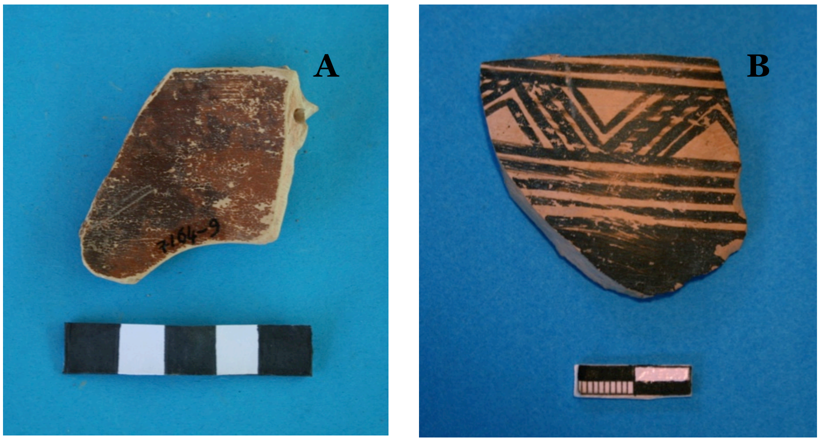


Figure 8.8: A. KER 11/8, (PG1B) displaying an uneven brown-black colour associated with incomplete reduction of the slip. B. TSO 10/126 displaying a dark even black paint on a pink-buff body (PG1A).

The lack of an intense black colour may also be due to the natural occurrence of maghemite in the clay which would produce a browner rather than black colour (Noll 1978: 503). The presence of Ti in the slip spectrums of some samples indicates that this may have been a possibility, with the Ti resulting from the oxidation of Fe_2 spinels present within the maghemite.

8.2.3 Summary

PG1 vessels were well fired at consistently high temperatures using the O-R technique to produce well-vitrified dark iron-rich slipped and painted surfaces. The production of dark slips on buff bodies would require detailed knowledge about both the types of clay required for the body and slip, as well as the necessary firing procedures. The O-R technique requires those responsible for firing to not only understand the need for different firing atmospheres but also to judge the length of time required for each firing stage and when the optimal temperature and time has been reached. Such skills would require a substantial investment of time to undertake experimentation and training. This firing procedure would also require a high degree of control over the firing temperature and atmosphere suggesting the use of a firing structure rather than an open firing. Such a structure would firstly provide a separation of fuel and vessel, allowing the potter to control the temperature and the rate at which vessels were heated, in addition to allowing control of the firing atmosphere (Rice 2005: 109) which would be essential to achieve the dark slip colours present in PG1.

The early use of this firing technique is visible in EHI with the dark slipped fruitstand from Tsoungiza (TSO 10/26), however, it is clear that whilst potters were able to produce dark slips they were a very uncommon type of decorative technique. Instead orange and brown surface colours were prevalent during this early period this may be in part related to skill as well as technical knowledge about firing practices, as these surface colours would only require the use of one firing atmosphere. However, by EHII, dark slipped wares are very common, dominating tableware assemblages specifically associated with the sauceboat and small bowl forms. This change in surface modification marks a distinct shift in the production and consumption of tablewares between EHI and EHII. The evidence for the use of the O-R technique in EHI suggests that this shift cannot be solely explained by developments in firing technology over time but must also be related to specific consumption practices linked to a preference for particular vessel colours.

The evidence from Tsoungiza indicates that during EHII developed and certainly by EHIII, the use of iron rich slips for dark on light pattern painted decoration is a dominant decorative style for tableware forms, with the dark slip being well contrasted on the fine buff bodies. This evidence indicates a decorative style and its associated slipping and firing techniques in use for the entire EH period, some 1000 years. Indeed, the use of similar reduction based techniques to produce such high quality black slips on light bodies has also been recorded for Early Minoan pottery (Kilikoglou 1994: 74) and appears to continue as a technique into the LH and even classical periods (Gilstrap 2015; Maniatis *et al.* 1993: 32-33).

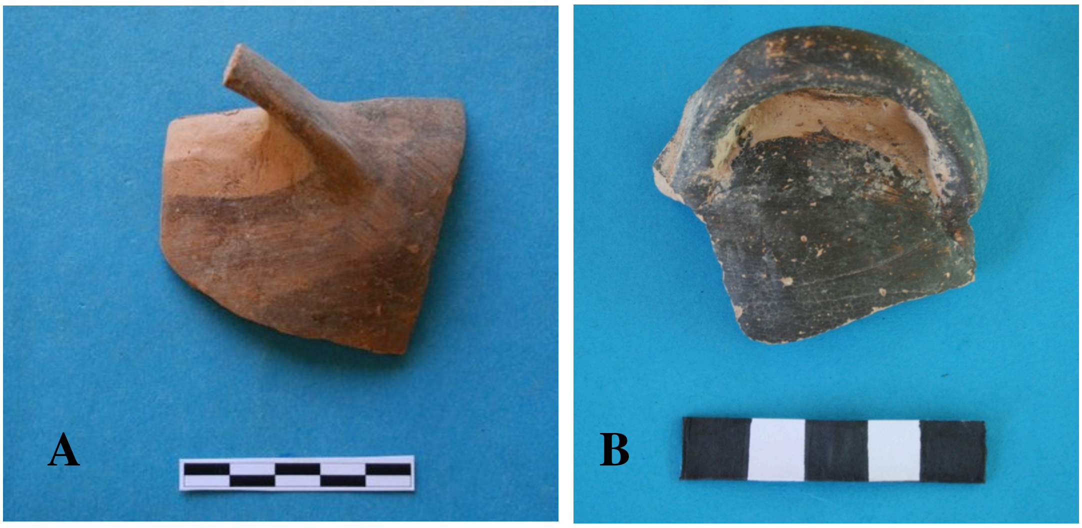


Figure 8.9: Sherd images comparing sauceboat finishes. A. MID12/59 EHII sauceboat in the local Talioti fabric PG15; B. KOR11/3 EHII sauceboat from the Corinthian fabric PG1.

Whilst it has been possible to identify dark slipped vessels at all the sites within this study, it is clear that there is considerable difference in the quality of the slip between examples from Corinth (PG1) and those from the Argolid (PG15) (refer to Figure 8.9). This suggests that whilst multiple centres of production attempted to produce dark slipped table wares, those from Corinth were visibly of a higher quality which may explain their wide distribution as discussed in Chapter 7 and Chapter 9.

8.3 PG2: Medium Fine Clay Mix with Rounded Pellets Fabric

A single sample was analysed from PG2, TSO 10/150.

8.3.1 Firing

The microstructure of TSO 10/150 displays features consistent with initial vitrification, characterised by localised areas of sintering with thin glassy filaments accompanied (refer to Figure 8.10). These traits are indicative of a firing temperature range of 850^{o}C to 900^{o}C, however, the presence of primary calcite and slight optical activity under the polarising microscope would suggest the sample was fired at the lower end of this temperature range.

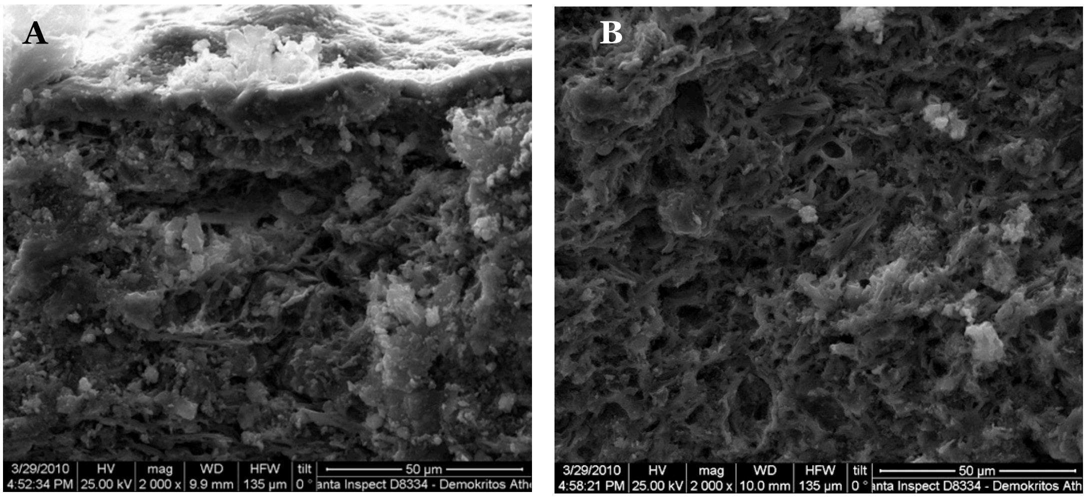


Figure 8.10: The vitrification structures of samples from PG2. A. The microstructure of the external surface of TSO 10/150 with a fine glassy appearance; B. The microstructure of the body of TSO 10/150 displaying rounded pores and fine glassy filaments consistent with continuous vitrification.

Macroscopically, samples within this fabric group can be divided into two sub-groups; the first are vessels with an orange body dominantly belonging to the EHI or early EHII periods. The second are EHII developed, and EHIII vessels with a pink-buff body, including sample TSO 10/150. Vessels with an orange body commonly display a clear grey core, perhaps indicative of fast firing with a short soaking time, preventing full oxidation of the body. In contrast, those with a pink-buff body display a pink core or no core suggest longer firing and soaking periods allowing more complete oxidation (refer to Figure 8.11).

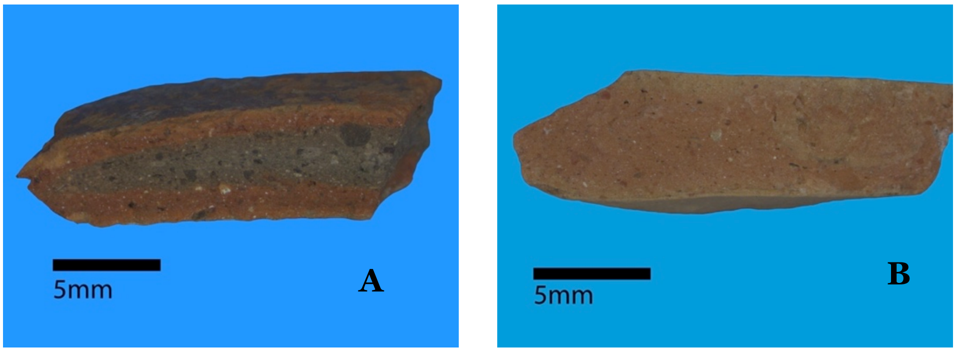


Figure 8.11: Macroscopic fabric image of EHII early sample TSO 10/75 (A) and EHII developed sample TSO 10/150 (B) displaying cores.

In thin section it was noted that the EHII early orange firing vessels displayed a much higher degree of optical activity than the later buff firing examples, indicating that they were lower fired.

8.3.2 Surface Modification

Bulk chemical analysis by SEM-EDS revealed that the pattern painted dark on light decoration on sample TSO 10/150 is rich in iron and potassium, which when fired in an oxidising atmosphere would produce the paint's red-brown colour. The slip was not well preserved across the sample but measured between 6µm and 10µm (refer to Figure 8.10).

Macroscopic examination of PG2 has identified two surface modification techniques. The first are EHI and EHII early vessels with a red-orange or red-brown slip dominantly on an orange body, although grey-buff examples are present. The second are EHII and EHIII vessels with a dark black-brown or red-brown slip commonly on pink-buff body including TSO 10/150 (refer to Figure 8.12). The red colour of some samples suggests the use of a single primarily oxidising, to not fully oxidised, firing atmosphere, whilst those with a black-brown slip on a buff body reflect the use of the iron reduction firing technique described in relation to PG1 above.

The red-orange brown colour of the early slips suggests that oxidation of the surface was usually achieved, but the common presence of cores indicates that complete oxidation of the vessel was rare. The presence of cores suggests a short soaking time, whilst the even external surface colour suggests that the use of a single, consistent firing atmosphere. In contrast, those vessels with a buff body dominantly display an even biscuit with the occasional presence of a weak core but complemented with an even black slip. This indicates that the initial oxidation of the body was not complete before the reduction phase was undertaken. Further, there is macroscopic evidence to suggest vessels may have been stacked resulting in both areas of oxidation and reduction on the same vessel that may have been deliberate (refer to Figure 8.12), a phenomenon also observed at Lerna for EHIII dark-painted vessels (Wiencke 2000: 325).

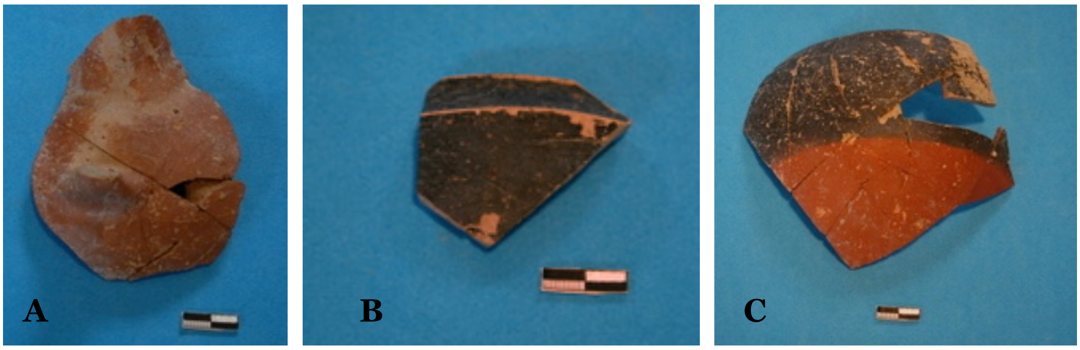


Figure 8.12: Macroscopic images of samples from PG2. A. TSO 10/17- An EHI jug with orange surface; B. TSO 10/85- An EHII developed carinated bowl from Tsoungiza with buff body and dark black slip; C. TSO 10/96- An EHII developed two-toned sauceboat- The dark half was probably fired in a reducing atmosphere, whilst the red part was oxidised.

8.3.3 Summary

The combination of macroscopic, petrographic and SEM analysis has revealed significant diachronic changes in firing techniques for PG2 which are most likely related to surface modification techniques, especially the increase in popularity of dark slips on buff bodies during EHII.

The EHI and EHII early vessels with orange slips are commonly fast fired, at lower temperatures. In contrast, the later buff examples that dominantly display dark slips would require a longer firing time and a significant degree of control over both the firing temperature and atmosphere to undertake the O-R procedure, indicating the use of a firing structure.

8.4 PG3: Fine-Medium Fine Clay Mix with Angular Mudstone Fabric

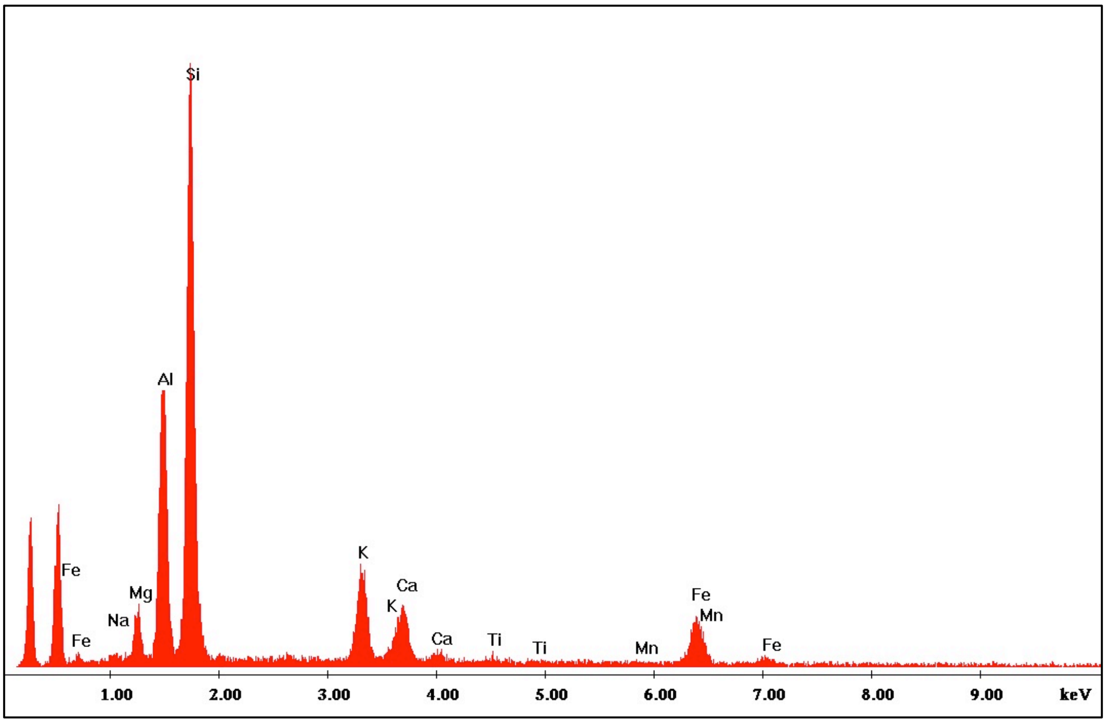


Figure 8.13: SEM-EDS element spectrum of sample the body of KER 11/28 with a high proportion of Ca.

Bulk chemical analysis by SEM-EDS showed that both samples analysed had a high calcareous content (refer to Figure 8.13), with TSO 10/18 having an iron rich slip.

8.4.1 Firing

The microstructure of these samples display widespread sintering and long glassy filaments consistent with extensive vitrification and indicating a firing temperature range of between 850°C and 1050°C (refer to Figure 8.14). The absence of both primary calcite and optical activity under the polarising microscope would support a high firing temperature for these samples, however, optically active samples have been noted in the wider group. This suggests that not all vessels were fired at a homogeneously high temperature.

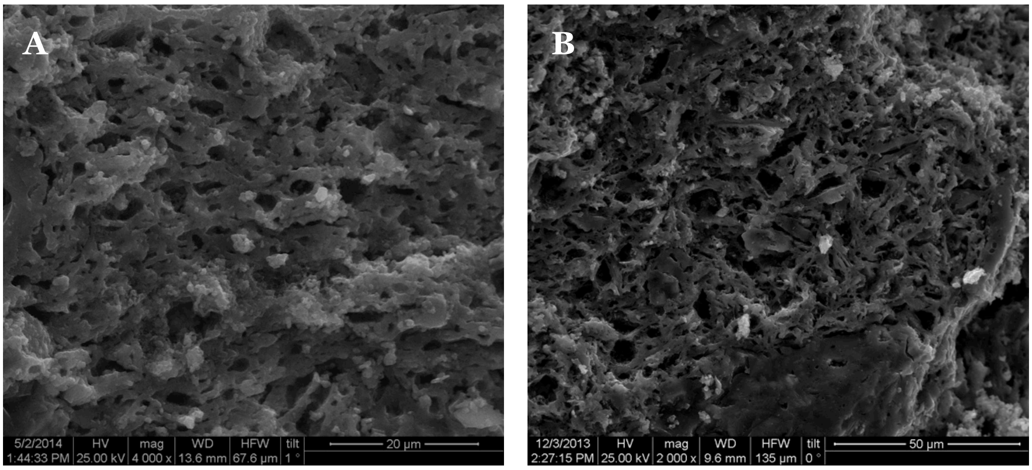


Figure 8.14: The vitrification structures of samples from PG3. A. KER 11/28 and B. TSO 10/18 both displaying extensive vitrification with long glassy filaments and rounded pores.

Like PG2 this fabric group has both vessels with a buff body and weak or absent core, and orange firing vessels with a strong core suggestive of different firing procedures as outlined above (refer to Figure 8.15).

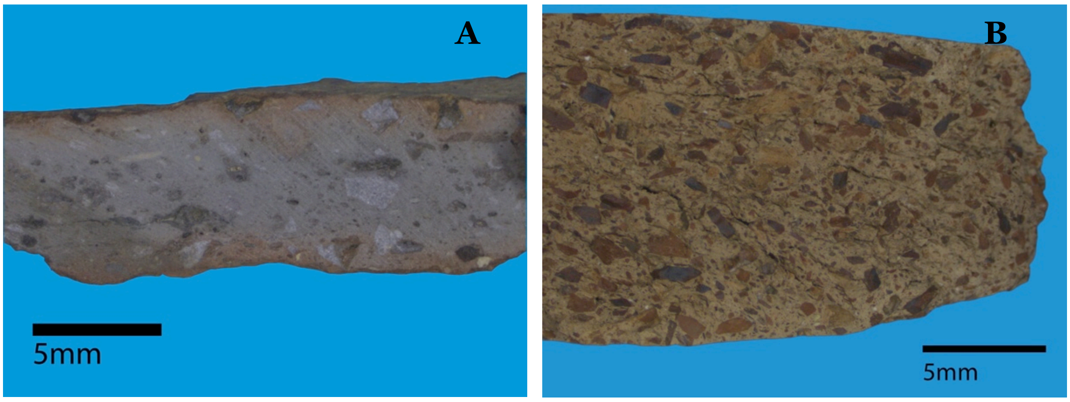


Figure 8.15: Macroscopic fabric image of sample KER 11/28 with a grey core (A) and TSO 10/18 (B) without a core.

Unlike PG2 the difference does not appear to have a diachronic pattern. Further, whilst it is common for irregular forms like firedog stands to have a thick core and uneven surface colour, there is little other correlation between the body colour and the majority of vessel types within the fabric group. Indeed, both large forms like jars, and small forms like scoops, have evenly coloured bodies and do not display a clear core, as such the variation in body colour may represent different firing episodes rather than variable conditions within a single firing. The variability may be compounded by their production in different locations. This is further supported by the petrographic evidence discussed in Chapter 7, which suggests that this fabric group represents a number of different producers.

8.4.2 Surface Modification

TSO 10/18 was the only sample with a preserved slipped surface from PG3 (refer to Figure 8.16). Bulk chemical analysis by SEM-EDS showed that the surface was significantly lower in Ca and higher in iron, which would have produced the red-brown slip in oxidizing conditions.

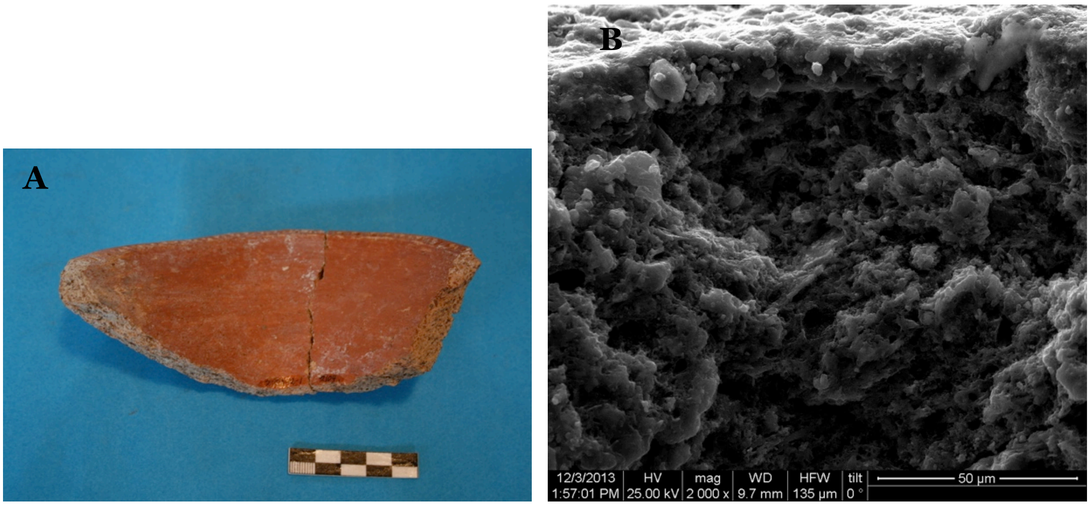


Figure 8.16: Images of TSO 10/18. A. Sherd image of TSO 10/18 with slipped surface and B. the vitrification structure of the surface of TSO 10/18.

Macroscopically it is clear to see that the thickness of the slip varies with some areas displaying more of a wash rather than a true slip. This is also reflected when examining the surface microstructure using the SEM which measures between 5µm and 11µm and in some places it is not visible at all. Where visible the microstructure of the slip is sintered in places and not well attached to the ceramic body.

8.4.3 Summary

The two samples from PG3 examined by SEM displayed a microstructure consistent with a high firing temperature and both appear to be fired in oxidising atmospheres. However, macroscopically the difference in body colour and the presence of cores suggest that KER 11/28 was rapidly fired with a short soaking period, whilst TSO 10/18 was fired for a longer period of time allowing for full oxidation of the body. These differences reflect wider variations noted for vessels in PG3 which display a wide range of firing characteristics in terms of body colour and optical activity, indicative of different firing sequences by multiple potters.

8.5 PG4: Fine Optically Active Orange Fabric

Only one sample was examined from PG4. Bulk chemical analysis showed that this fabric was medium calcareous with a low calcareous, iron rich surface consistent with its red-brown slip colour.

8.5.1 Firing

The microstructure of sample TSO 10/38 from PG4 displays areas of sintering and glassy filaments but it is not extensive or well developed throughout the sample suggestive of a firing temperature at the lower end of the 850-1050^{o}C range (refer to Figure 8.17). The high degree of optical activity within the clay matrix and presence of calcareous inclusions also indicates that the vessel was fired at the lower end of the range.

Macroscopically, the biscuit is an orange-brown colour that varies due to incomplete clay mixing (refer to Figure 8.18). There is no firing core and the surfaces exhibit a largely even orange colour with darker and lighter areas appearing to relate to the thickness and preservation of the slip, rather than differential firing atmosphere. These features indicate that the vessel was fired at length in an oxidising atmosphere with an extensive soaking time to allow full oxidation of the vessel. Other vessels within this group also have even surface and core colours, with the exception of one pattern painted example (TSO 10/122) which displays a core suggestive of a shorter firing time.

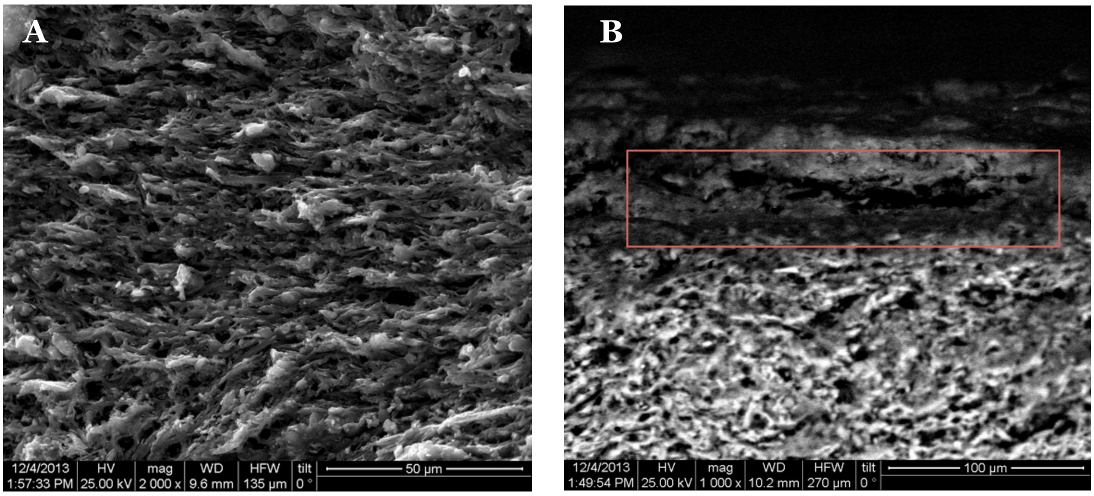


Figure 8.17: The vitrification structure of TSO 10/38. A. the vitrification structure of the body of TSO 10/38 displaying areas of fine filaments; B. a backscattered image of the interaction of the slipped surface and body of TSO 10/38 highlighting poor attachment of the slip.

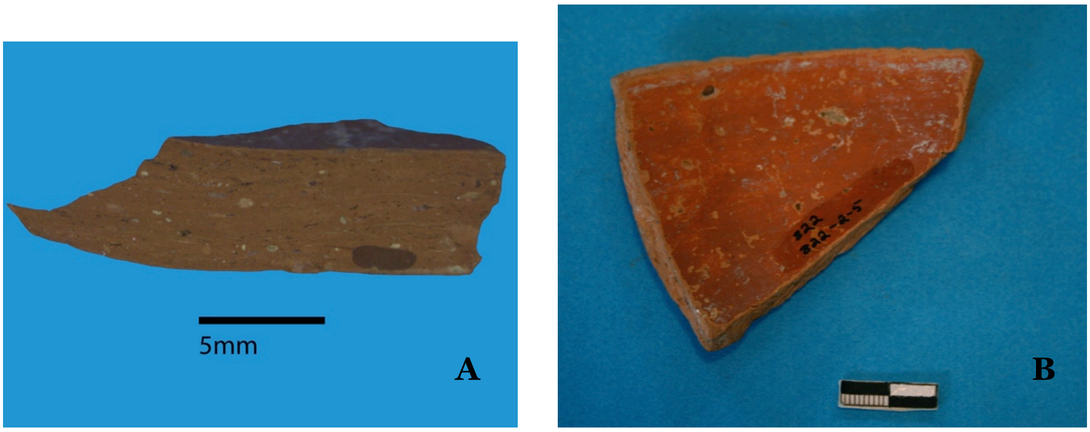


Figure 8.18: A. a macroscopic fabric picture of TSO 10/38 and B. a photograph of the sherd from which TSO 10/38 was sampled.

8.5.2 Surface Modification

Macroscopically it is possible to identify an orange slip on the exterior surface of TSO 10/38 which is a dominant method of surface modification on vessels within this fabric group. Under the SEM the slip is not well preserved and measures between 10µm and 15µm, with low levels of vitrification. The presence of a gap between the vessel body and the slip indicates that the slip is peeling away from the body, as illustrated in the backscattered image above (refer to Figure 8.17).

Bulk chemical analysis indicates that the surface is higher in iron content than the body which would provide the orange surface colour in an oxidising atmosphere.

8.5.3 Summary

TSO 10/38 was fired in a consistent oxidising atmosphere that was well-controlled and reached around 850-1050°C, however, the presence of calcite and the poorly developed glassy filaments within the microstructure suggest that it may have been slightly lower. All the vessels from PG4 display very consistent macroscopic and microscopic features indicating that vessels from this group were fired in very similar conditions to that TSO 10/38.

The poor quality of the slipped surface was illustrated by the low levels of vitrification and its poor attachment to the ceramic body. This stands in stark contrast to the slips examined for PG1 and PG2 suggesting a significant different in the quality of the raw materials and skill level between these potters.

8.6 PG6: Chert, Micrite and Mudstone Fabric

Only one sample from PG6 was examined using SEM. Bulk chemical analysis by SEM-EDS showed that this sample was low calcareous with a compacted surface.

8.6.1 Firing

The microstructure of the sample is inconsistent, exhibiting both areas with initial vitrification, with glassy filaments, and those characteristic of extensive vitrification (refer to Figure 8.19). This indicates the use of a varied firing temperature that reached a maximum of 750-850°C. This is further supported by the mixed levels of optical activity and the presence of primary calcite observed in thin section.

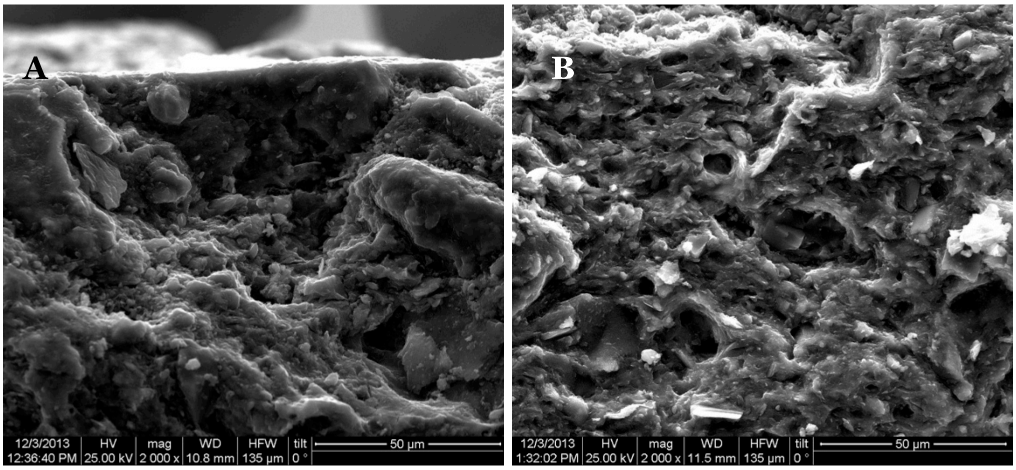


Figure 8.19: The vitrification structure of the surface and body of TSO10/10. A. displaying a compacted surface; B. displays initial and extensive vitrification with both small and large pores, and isolated glassy areas.

Macroscopically, the vessel appears to have been rapidly fired as indicated by the presence of a thick black core. In addition, the exterior surfaces of the vessel display an uneven, mottled brown-black colouration indicating a mix of oxidising and reducing firing atmosphere (refer to Figure 8.20). The mottling does not have a consistent pattern that could be related to the placement of other vessels in close proximity. Instead it may reflect the presence of fuel in close contact with the vessel surface. Such features are usually associated with open firing methods.

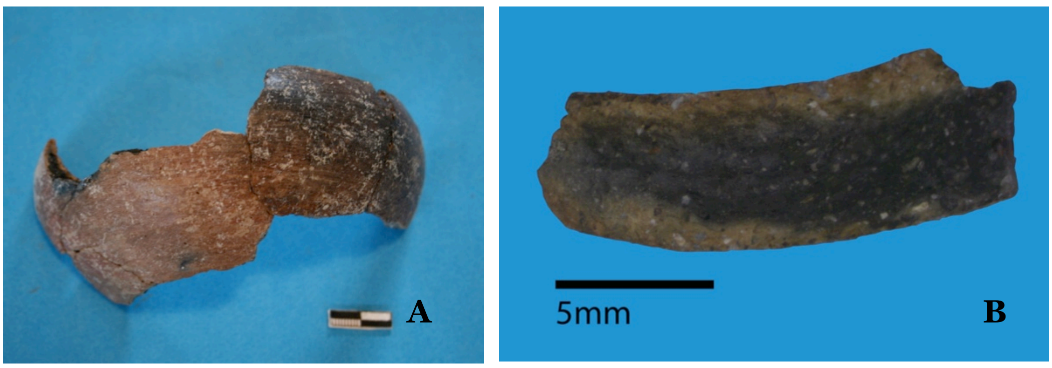


Figure 8.20: Images of TSO 10/10. A. A photograph of the vessel from which TSO 10/10 was taken, displaying uneven colouration of the surface; B. An image of the macroscopic fabric showing a thick dark core.

The other vessels belonging to PG6 share mottled external surfaces, the presence of cores and mixed levels of optical activity suggesting that they may have been fired within similar conditions.

8.6.2 Surface Modification

Macroscopically, the lustre and presence of striations on the exterior of this vessel indicates that it was burnished. This is further supported by examination of the surface using SEM which shows a compacted rather than fully vitrified surface (refer to Figures 8.20 and 8.21).

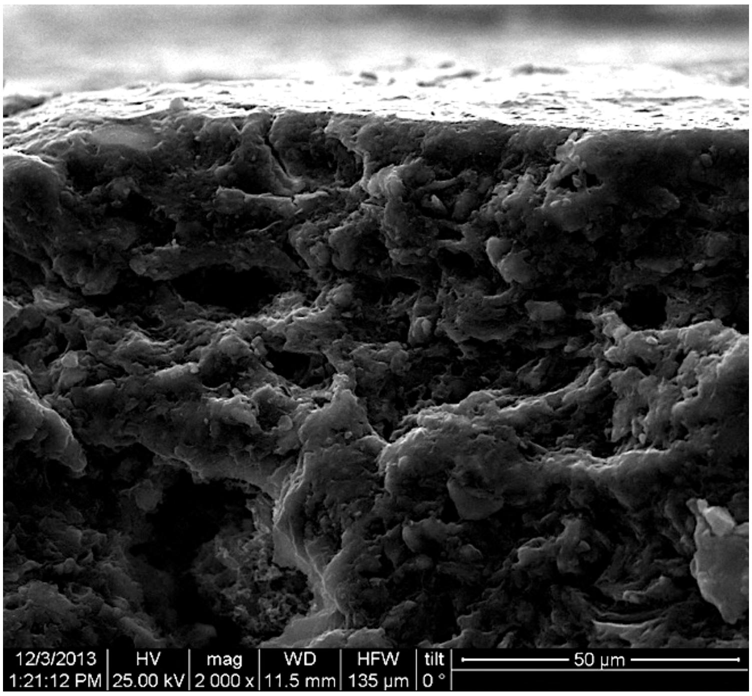


Figure 8.21: Image of the compacted microstructure of the surface of sample TSO 10/1.

8.6.3 Summary

Integrated macroscopic, petrographic and microstructural analysis of vessels belonging to PG6 reveal that this fabric was fired in a mixed firing atmosphere at low temperature ranges suggestive of open firing techniques.

8.7 PG9: Argillite Fabric

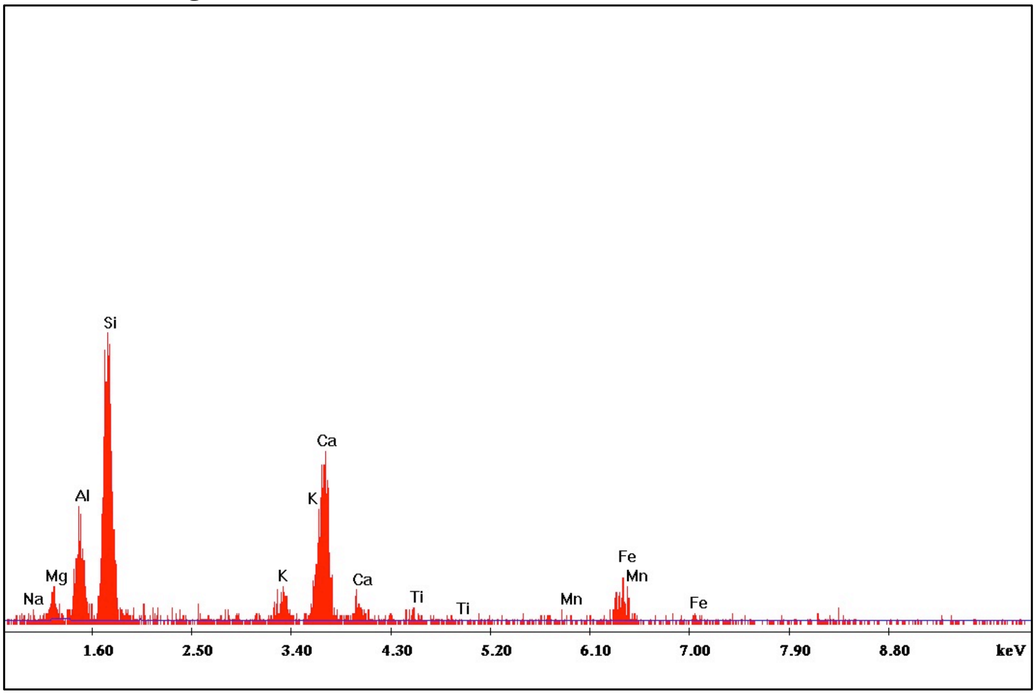


Figure 8.22: SEM-EDS element spectrum of sample KER 11/125 with a very high Ca content.

Bulk chemical analysis using SEM-EDS shows that both the samples analysed from PG9 are highly calcareous (for example spectrum refer to Figure 8.22).

8.7.1 Firing

Petrographically PG9 has been divided into two groups based upon the degree of optical activity with PG9 being lower fired and 9A higher fired. The microstructures of KER 11/125 (PG9A) and KER 11/126 (PG9B) do differ markedly from each other (refer to Figure 8.23). KER 11/125 does not exhibit any vitrification, and displays distinct clay particles suggesting an equivalent firing temperature of below 750°C. In contrast, the microstructure of KER 11/126 displays long glassy filaments with some areas continuously vitrified, suggesting a range of 850°C-1050°C.

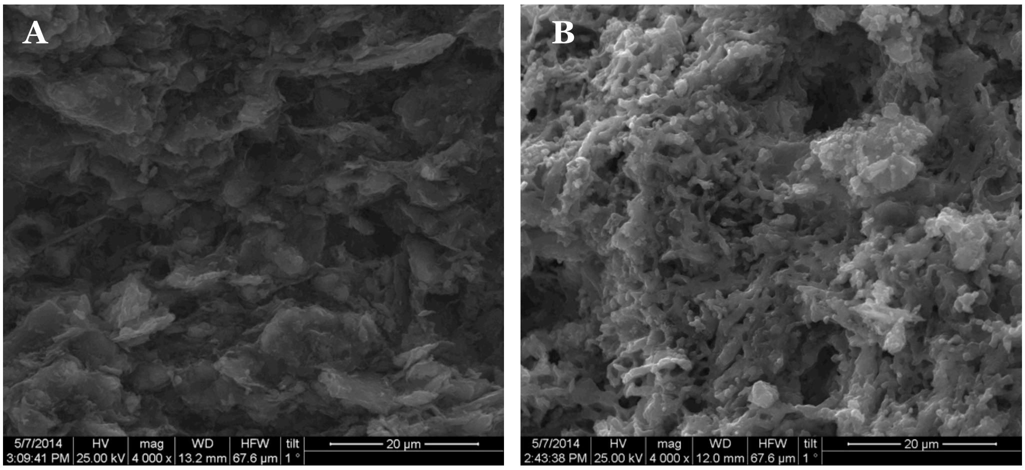


Figure 8.23: Images of the vitrification structure of samples from PG9. A. KER 11/125 displaying no vitrification and B. KER 11/126 displaying extensive vitrification.

Macroscopically this difference is also noted in the colour of the biscuit. The low fired samples have a pink-orange biscuit with purple-red angular inclusions, whilst the high fired samples have a green-buff biscuit with black-brown inclusions, some of which look almost entirely black (refer to Figure 8.24). The black appearance of these inclusions is most likely due to their high density which would have restricted the circulation of oxygen and created localised reducing conditions. As reducing conditions lower the temperature at which vitrification will occur these inclusions may have vitrified at a faster rate than the surrounding more porous body.

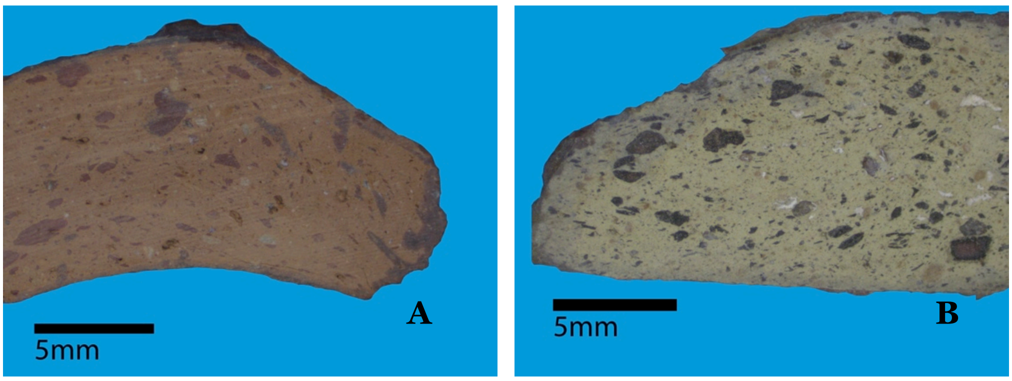


Figure 8.24: Images of the macroscopic fabric of KER 11/125 on the left and KER 11/126 on the right.

None of the samples display a firing core, suggesting they were fired in an oxidising atmosphere for a prolonged period of time, achieving full oxidation. This difference in firing temperature does not correlate with the relative coarseness of the vessels, as both contain the same forms, dominantly jars and large bowls. However, there is a difference amongst vessels with preserved slips. The lower fired, orange-bodied examples are commonly red slipped bowls and jar or plain jars. In contrast the high-fired buff examples are plain or black slipped jars, with one example of a sauceboat. This correlation of surface modification and firing temperature range suggests that different firing practices most likely related to the choice of surface modification. The red slips would have been achieved in an oxidising atmosphere at relatively low temperatures, whilst the dark slips would require the use of both oxidising and reducing firing techniques at high temperatures above 950°C to achieve both the dark slip and the light coloured body. The even colouration of all the vessels and strong correlation of firing to different slip colours, suggests that this choice was deliberate and testifies to the use of two distinct firing regimes that were well understood and well controlled.

8.7.2 Summary

SEM analysis has added further detail to macroscopic and petrographic observations in relation to the degree of vitrification from firing. The evidence suggests that the centre that produced these argillite tempered vessels employed two distinct firing regimes according to the colour of the vessel they wanted. Red slipped/orange bodied vessels were fired at low temperature which SEM analysis has suggested was below 750°C, whilst buff bodied/dark slipped vessels were fired at temperatures above 850°C. The presence of high-fired and low-fired undecorated vessels suggests that these were included in the firings with the slipped vessels.

8.8 PG15 – Sandstone to Low-Grade Metamorphic Fabric

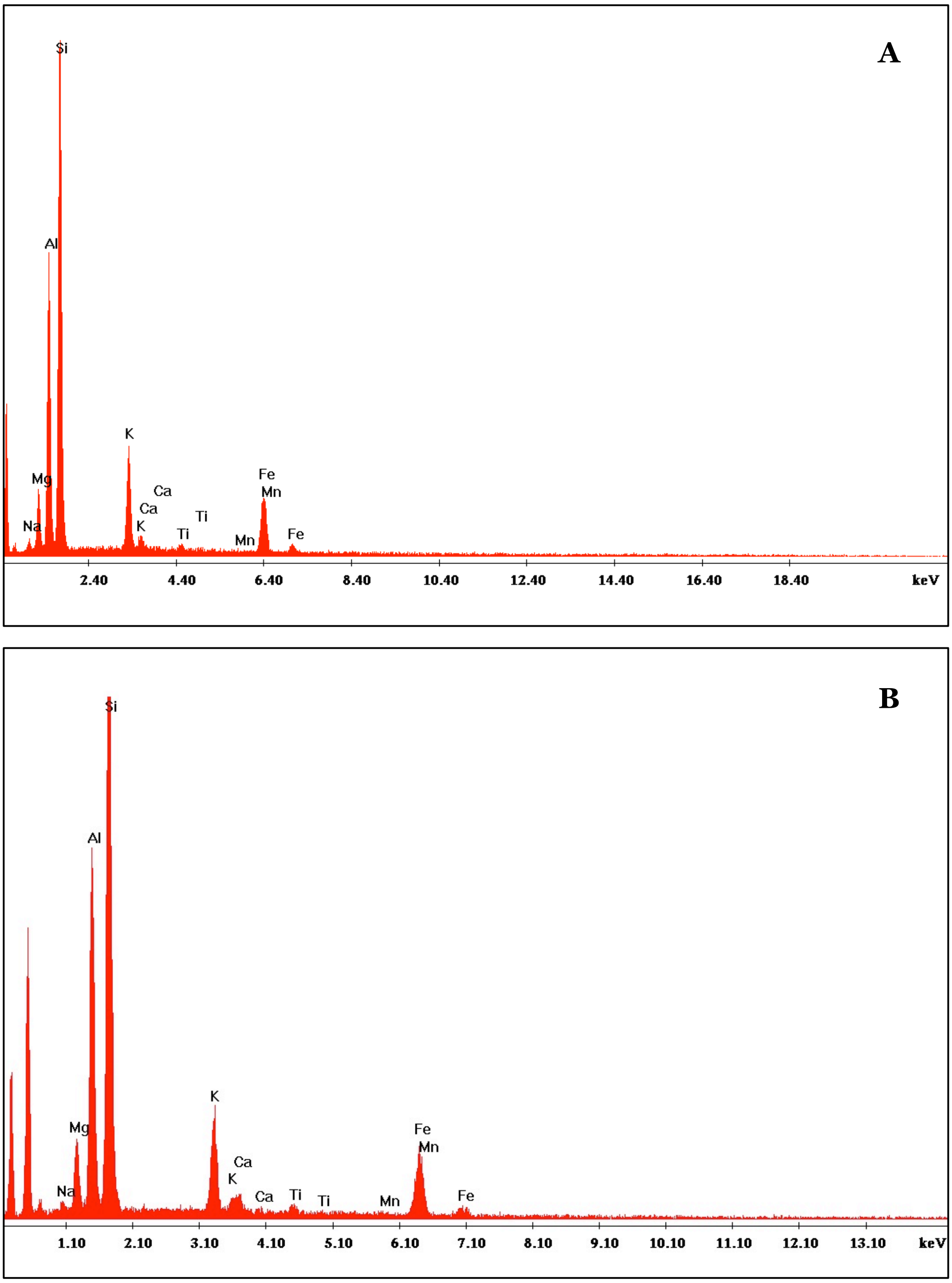


Figure 8.25: SEM-EDS element spectrums for A. the body of TAL 11/2 showing high Fe and K but low Ca content. B. the body of TAL 11/30 showing high Fe and K but low Ca content.

Bulk chemical analysis of PG15 samples by SEM-EDS shows that this fabric group is iron rich and low calcareous (refer to Figure 8.25). This is consistent with the dominantly orange/red/brown firing colour of the ceramic. Slips are rarely present, but where visible they also have a high Fe content.

The microstructures in these samples suggest equivalent firing temperatures ranging from below 750°C to a maximum of 900°C, but consistently between 800 and 900°C. Each sample presents slightly different macroscopic and microstructural features related to firing and surface treatment, as such they will be discussed individually before discussion of the fabric group as a whole.

8.8.1 Sample: TAL 11/1

8.8.1.1 Firing

The presence of a darker core accompanied by pink-orange firing horizons (refer to Figure 8.26 image A), indicates that TAL 11/1 was fired quickly in an oxidised atmosphere with a short soaking time. This resulted in incomplete oxidation of the ceramic. The microstructure of sample TAL 11/1 displays extensive vitrification, with long glassy filaments and areas of small pores (refer to Figure 8.27), indicating a firing temperature range of 800 °C to 900 °C.

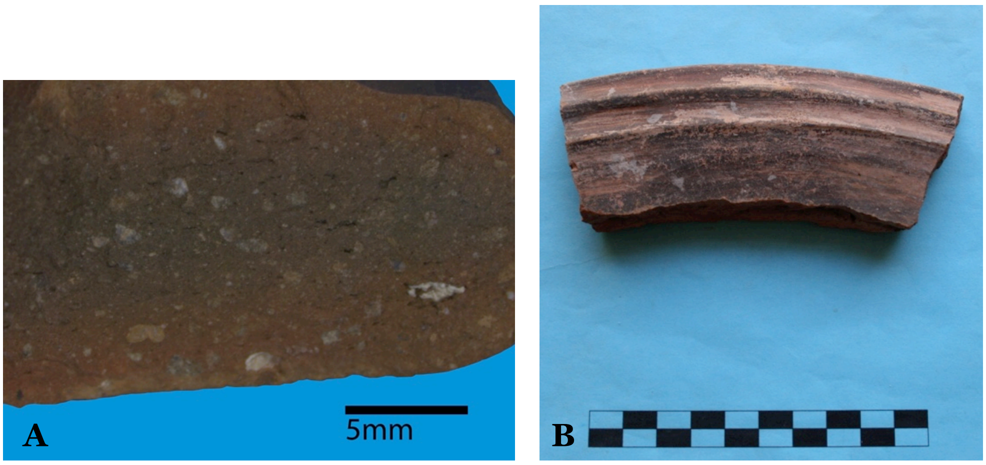


Figure 8.26: A. an image of the macroscopic fabric of TAL 11/1 showing a faint darker grey-brown firing core and B. an image of the sherd from which TAL 11/1 was sampled which displays a thin dark wash.

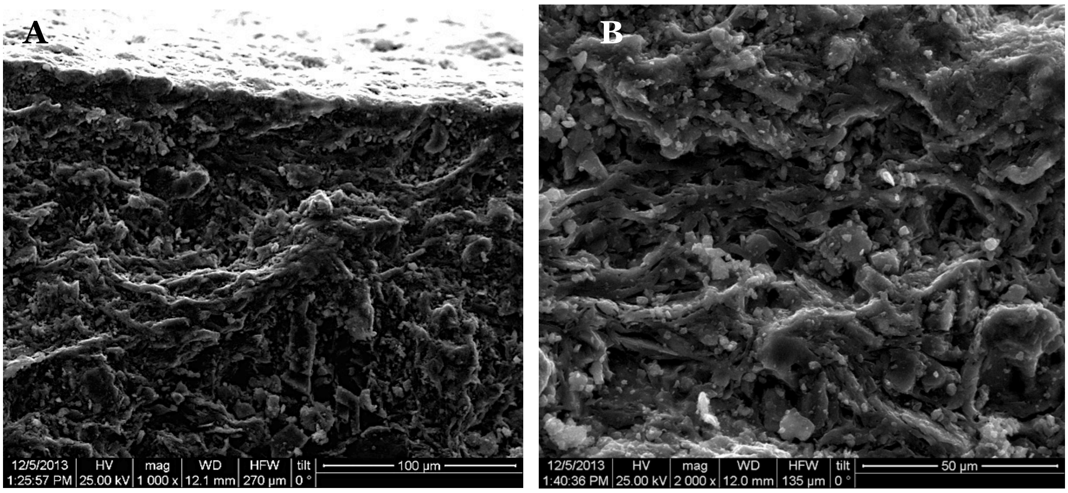


Figure 8.27: The vitrification structure of TAL 11/1. A. TAL 11/1 microstructure showing a smoothed surface with poor slip preservation; B. the microstructure of the body of TAL 11/1 exhibiting long glassy filaments consistent with extensive vitrification.

8.8.1.2 Surface Treatment

Macroscopically a thin black-brown wash can be observed over the exterior of the vessel, however, it has not been possible to detect this surface treatment using the SEM. The dark colour of the wash would suggest that it was subjected to a reducing environment during firing but that his must have been for a short period of time, having only affected the slip rather than the entire external surface of the vessel.

8.8.2 Sample: TAL 11/2

8.8.2.1 Firing

Sample TAL 11/2 displays areas of both initial and extensive vitrification suggestive of a firing temperature of between 750 and 900^{o}C (refer to Figure 8.28). The dominance of features associated with initial vitrification, such as distinct clay structures, would suggest the lower end of this temperature range. Macroscopically, the vessel has an even, unslipped orange surface with a very weak darker pink-orange core (refer to Figure 8.29). This suggests that the vessel was fired in a consistently oxidising atmosphere with a longer soaking time than TAL 11/1 allowing for more extensive oxidation of the biscuit.

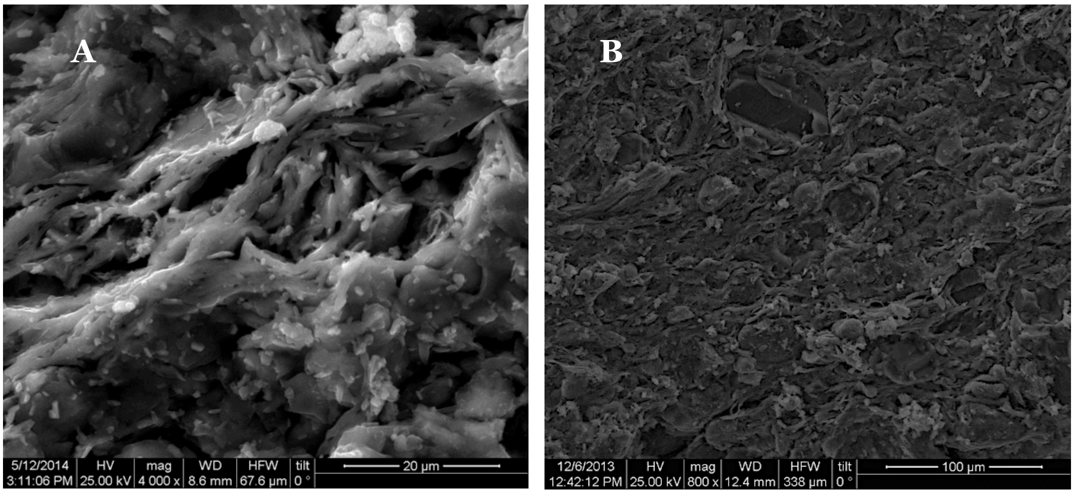


Figure 8.28: A. the microstructure of TAL 11/2 displaying long glassy filaments and isolated areas of vitrification in addition to the presence of less well developed vitrification structures; B. the microstructure of TAL 11/2 at a lower magnification showing fine glassy filaments across the ceramic accompanied by large pores.

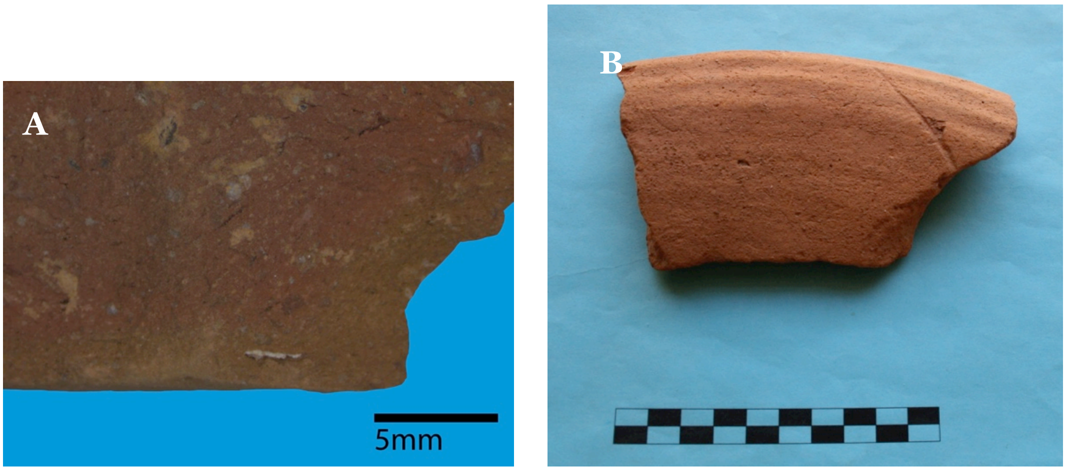


Figure 8.29: A. the macroscopic fabric showing a weak pink firing core of TAL 11/2; B. an image of the sherd from which TAL 11/2 was sampled, displaying an even orange surface.

8.8.3 Sample: TAL 11/22

8.8.3.1 Firing

The even, pink-orange colour of the biscuit for sample TAL 11/22 indicates that this low-calcareous vessel was fired in an oxidising atmosphere, where full oxidation of the biscuit was achieved. However, the mottled exterior surface below the possible red slip indicates that the firing atmosphere was mixed between oxidation (creating areas of red-orange colouration) and reduction (creating areas of purple-black colouration). The mottling is very localized, only being present on the exterior surfaces (refer to Figure 8.31). It does not appear to have a regular shape or patterning that would indicate localized reduction from the stacking of vessel during firing. These characteristics would suggest that the localized areas of reduction represent the presence of fuel close proximity to the exterior of the vessel, something usually associated with open firing techniques.

The microstructure of the sample displays features consistent with extensive vitrification typified by the glassy slipped surface, long glassy filaments and small rounded pores, consistent with a firing temperature range of 850-950^{o}C (refer to Figure 8.30). The presence of more continuously vitrified areas within the body and associated small pores, and the lack of optical activity noted during petrographic analysis, would suggest that the firing temperature was at the higher end of this temperature range, and certainly that TAL 11/22 was higher fired than TAL 11/2.

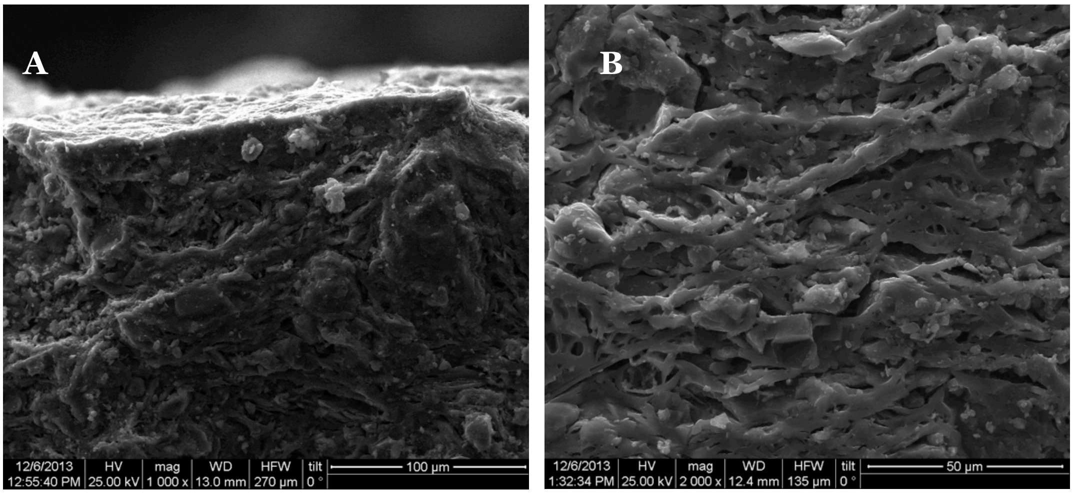


Figure 8.30: The vitrification structure of Tal 11/22. A. the fine glassy well vitrified slip of TAL 11/22; B. the microstructure of the ceramic body with extensive vitrification and small pores.

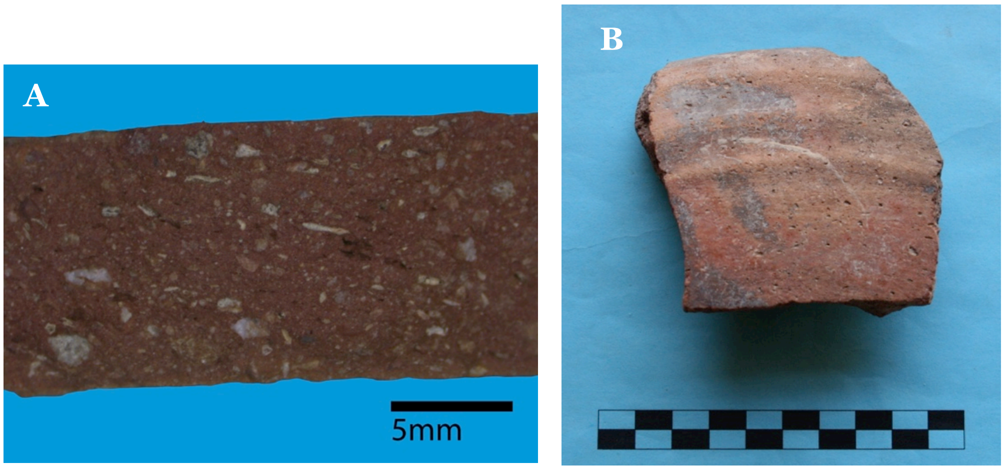


Figure 8.31: The macroscopic fabric and sherd images of Tal 11/22. A. an image of the macroscopic fabric showing no firing core; B. an image of the sherd from which TAL 11/22 was sampled displaying an irregular, mottled surface colour.

8.8.3.2 Surface Treatment

Macroscopically, the remains of a red-brown slip is clear on the interior surface of the fruitstand. This is supported by the SEM analysis which has revealed a glassy vitrified surface measuring c. 10-16µm, however, the slip was not present across the whole of the sampled surface (refer to Figure 8.32).

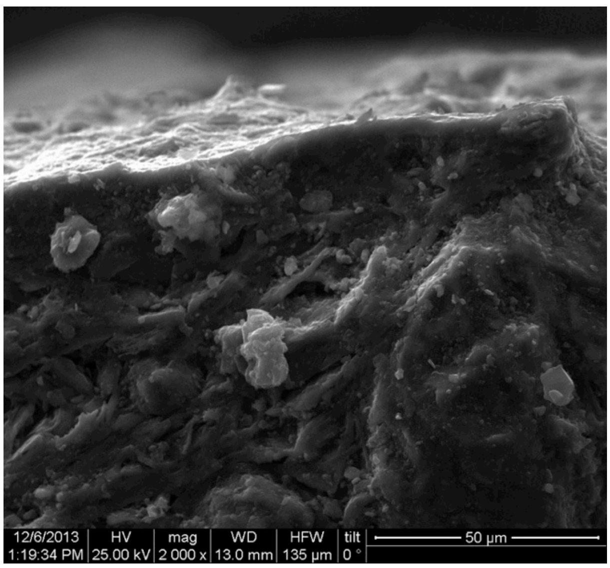


Figure 8.32: The vitrification structure of sample TAL22 displaying an extensively to continuously vitrified slipped surface.

It was not possible to get a good sample of the slip for bulk chemical analysis by SEM-EDS, therefore, it is not clear if the slip was the same clay as the body.

8.8.4 Sample: TAL 11/30

8.8.4.1 Firing

TAL 11/30 displays no signs of vitrification suggesting that it was fired below 750^{o}C (refer to Figure 8.33). This supports petrographic observations of a high degree of optical activity consistent with a low firing temperature. The slip was not well preserved and could not be detected by the SEM.

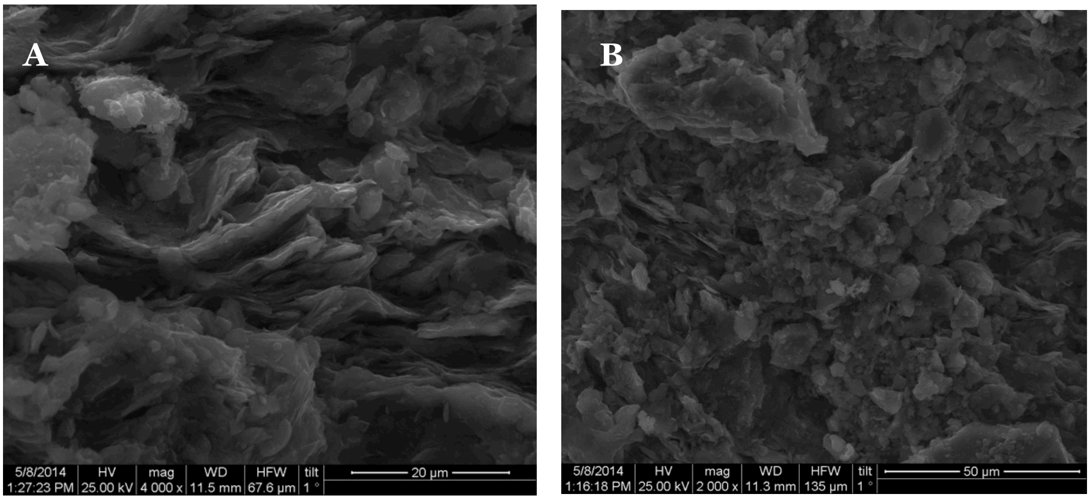


Figure 8.33: The vitrification structure, macroscopic fabric and sherd images of TAL 11/30. A and B. the unvitrified microstructure of TAL 11/30.

Macroscopically, this sample has a thick grey-black core with a very thin brown-orange-black mottled surface (refer to Figure 8.34), indicative of very quick firing in a mixed atmosphere where a reducing atmosphere was dominant. Like sample TAL 11/22, the mottled colouring on the exterior surface does not have a regular or distinctive pattern.

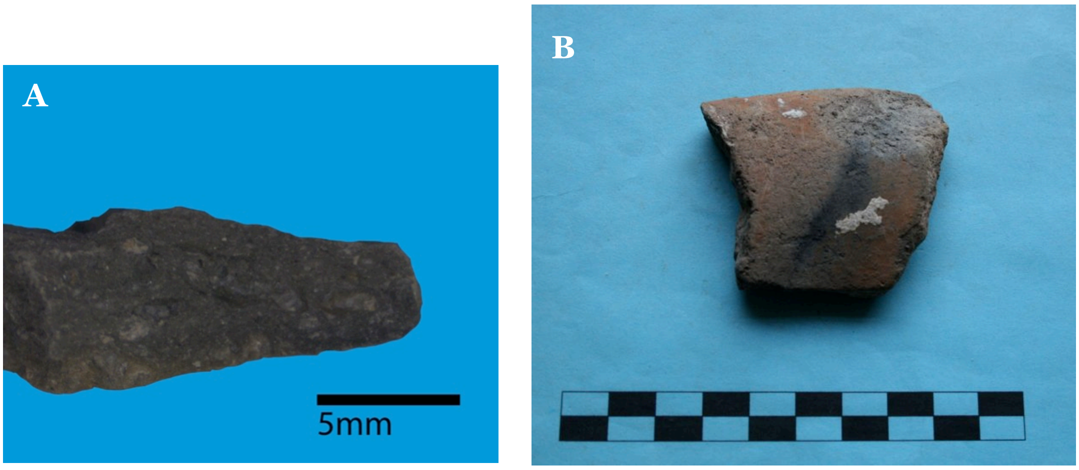


Figure 8.34: A. the biscuit of TAL 11/30 displaying a dark grey-black colour; B. the mottled surface colour of TAL 11/30.

The irregular patterning most likely represents contact of fuel with the vessel surface. Similar mottling has been noted on several samples within this fabric group with some examples displaying areas of significant charring (for example refer to Figure 8.35). The uneven firing atmosphere, with a short soaking time, accompanied by evidence for close contact with fuel are all consistent with open firing techniques.

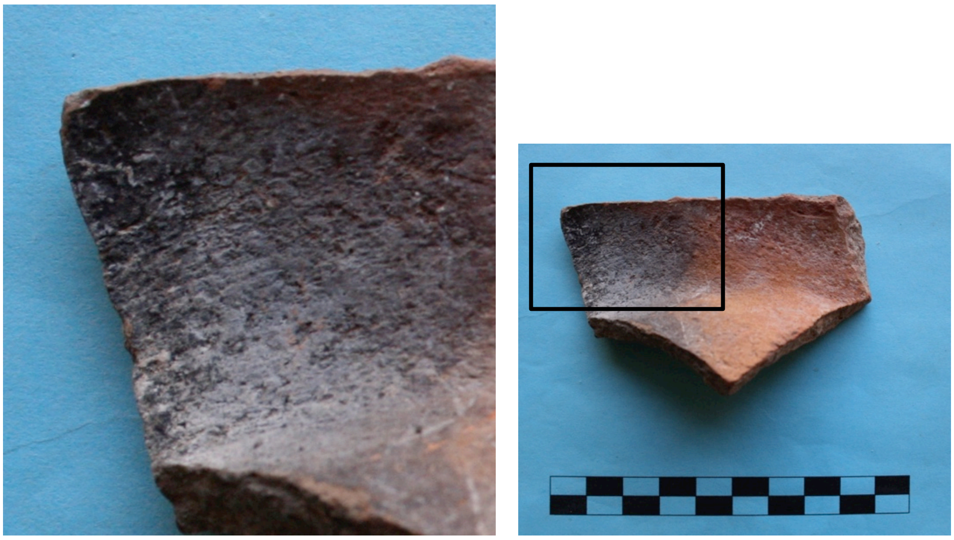


Figure 8.35: Sample TAL 11/3, a fruitstand displaying localized burning on the exterior from firing.

8.8.5 Summary

Macroscopic, microstructural and petrographic examination of PG15 displays characteristics consistent with a range of firing temperatures and atmospheres. The evidence from both SEM and macroscopic examination suggests poorly controlled firing episodes, consistent with the open firing of vessels. Whilst some vessels display uneven colouration to external surfaces indicative of contact with fuel, other vessels display an even red-orange colour but consistently with a firing core indicative of fast firing (refer to Figure 8.36).

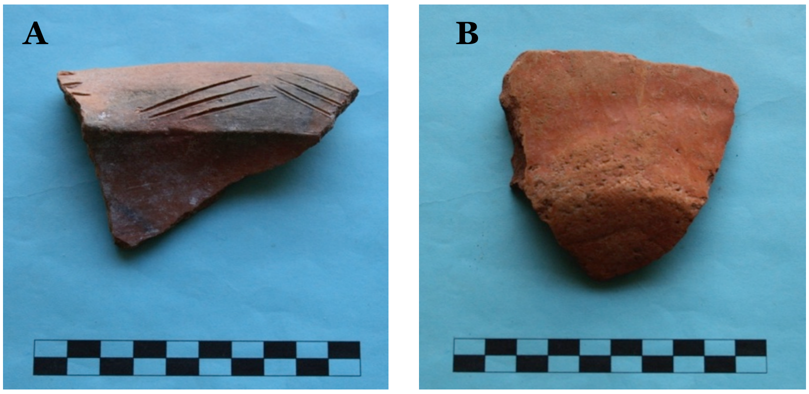


Figure 8.36: Images of sherds from PG15. A. TAL 11/16, a fruitstand displaying mottled colouring from firing; B. TAL 11/23, a large bowl with even orange biscuit and slip colour.

This marked differed in surface colour suggests that there was considerable variation during firing episodes, with vessel colour varying depending on their position within the firing. Those vessels in close contact with fuel would have a mottled surface whilst those away from the fuel would have a more even red-orange colour consistent with a dominantly oxidising atmosphere. The thick cores on all vessels suggests fast firing techniques with a short soaking time, whilst the vitrification structures suggest they reached a maximum of 900°C.

Comparative EHII material from the sites of Midea and Tiryns indicates that the trends noted in the EHI material within this thesis continue but later examples dominantly have an even orange or red-brown surface (refer to Figure 8.37) with the less common presence of sharp cores, although cores are still common. This would suggest that there was an improvement in the level of control of the firing atmosphere with a separation of fuel from the vessels. This increase in control of firing atmosphere is consistent with a move away from open firings towards the use of some form of firing structure. The continued presence of cores in the EHII material from the Argolid suggests that although some firing practices may have changed, fast firing with short soaking times continued.

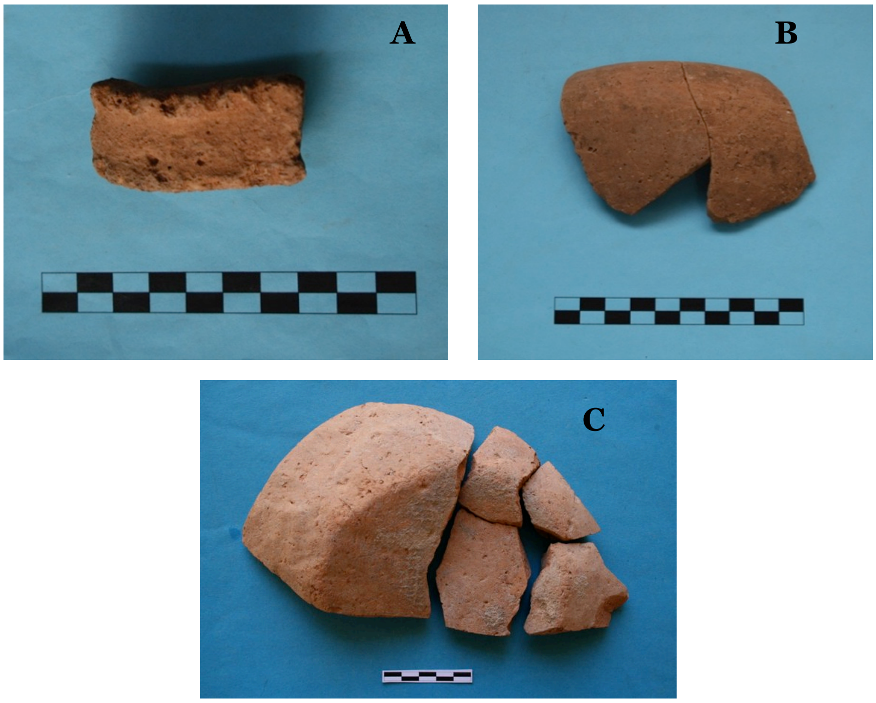


Figure 8.37: Images of comparative samples from PG15 displaying orange surfaces. A. SPI 11/7, an EHII handle from Spiliotakis; B. LEM 11/1 an EHII incurving bowl from Lempetzi; C. MID 13/56 an EHII jar base from Midea.

8.9 PG17: Tuffaceous Rock Fragments and Feldspar Fabric

Bulk chemical analysis of the samples from PG17 shows that this is a low calcareous fabric with a significant iron content, consistent with its igneous origin (refer to Figure 8.38).

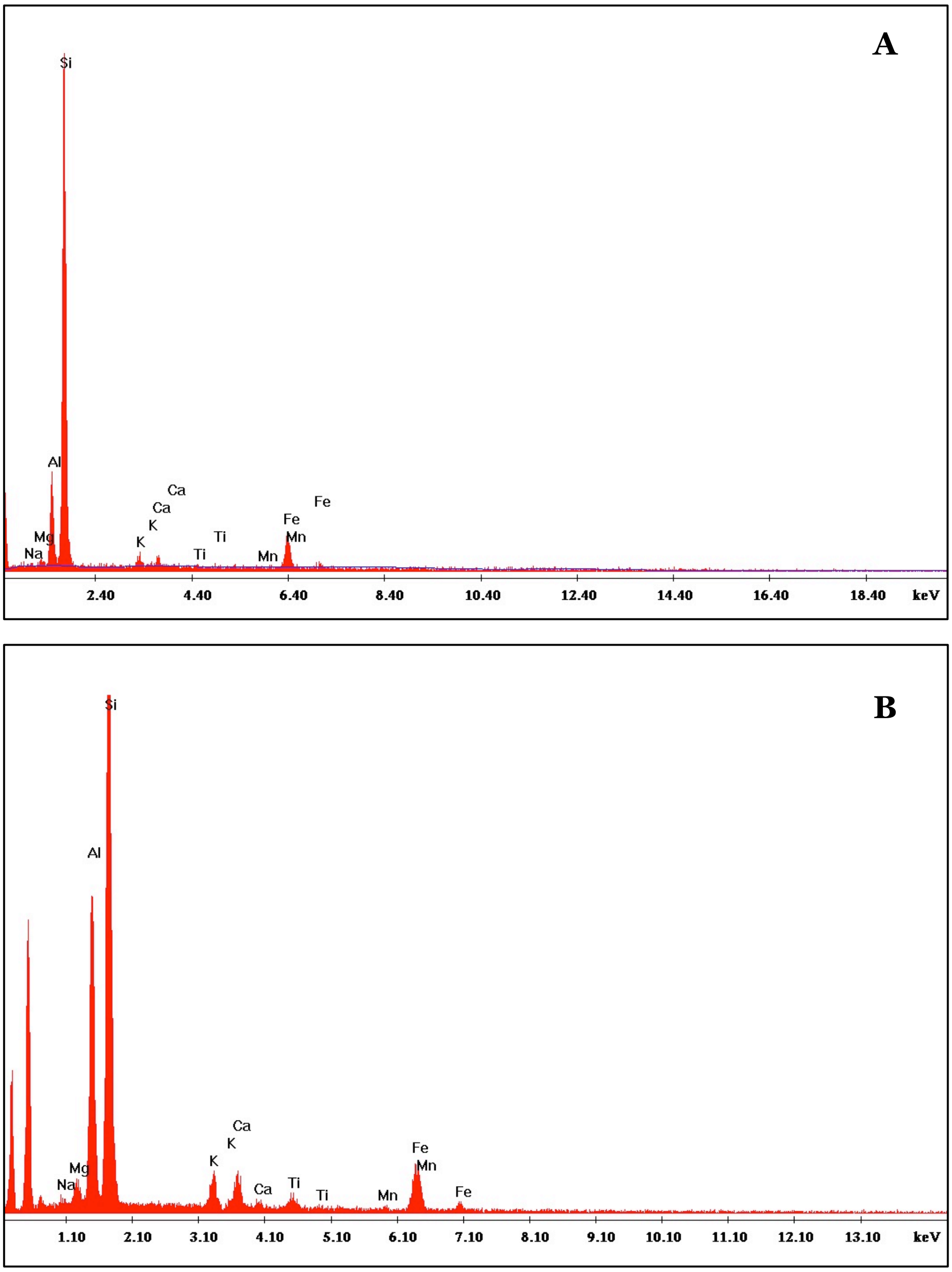


Figure 8.38: A. SEM-EDS element spectrums for the clay body of EPI 12/44 B. SEM-EDS element spectrums for the clay body of EPI 12/35.

8.9.1 Firing

The microstructure of all the samples commonly exhibits no evidence of vitrification, indicating that these vessels were fired below 750°C (refer to Figure 8.39 and 8.40). This is consistent with the petrographic evidence for mixed to high levels of optical activity throughout the group suggestive of low firing temperatures.

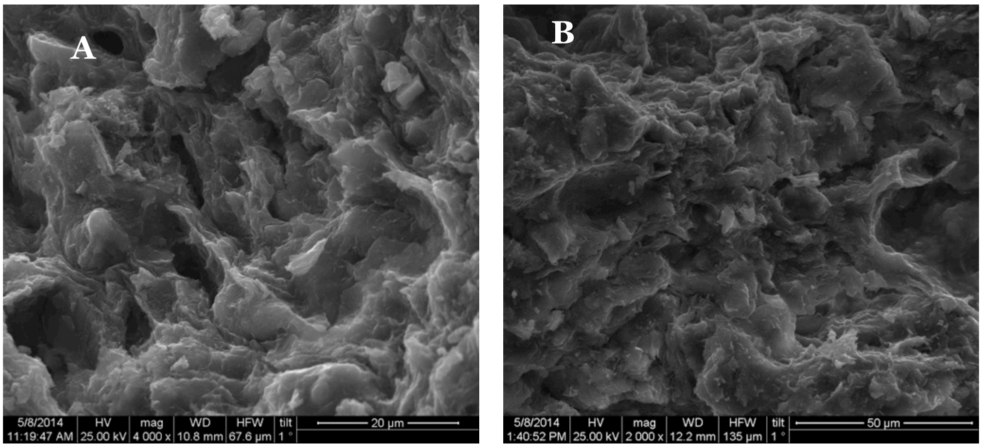


Figure 8.39: Images of the vitrification structure of samples from PG17. A. the unvitrified body of displaying clear unaltered clay microstructures of EPI 12/16; B. the unvitrified body of EPI 12/35.

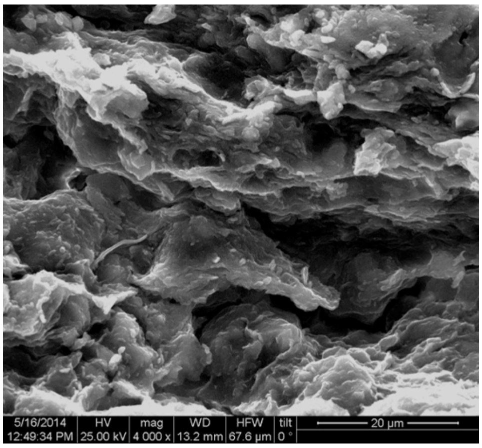


Figure 8.40: Image of the vitrification structure of a sample from PG17. The unvitrified body of EPI 12/44.

Macroscopically, the vessels from PG17 vary greatly in terms of the quality of the surface finish and body colour, this was reflected in the samples chosen for SEM. Sample EPI 12/16 from group PG17A contained vegetal temper. The vessel is poorly finished with dark unevenly coloured exterior surfaces and thick grey-black core, a common feature of PG17A. The presence of a thick firing core is consistent with fast firing and a short soaking time. A rapid firing would have prevented the complete combustion of the carbon rich organic temper within the vessel and impeded full oxidation of the biscuit. The uneven colour of the external surfaces indicates the vessel was fired in a mixed oxidizing and reducing atmosphere, possibly in close contact to fuel through an open firing technique as discussed in relation to samples from PG15.

Sample EPI 12/35 is from the main PG17 and displays a high quality evenly coloured, dark brown, burnished surface. The biscuit exhibits firing horizons graduating from brown to dark brown. The red-brown colour suggests that this vessel was fired in a primarily oxidizing atmosphere, whilst the more even appearance of the vessel and biscuit, indicates that it had a longer soaking period than sample EPI 12/16.The contrast between EPI 12/16 and EPI 12/35 suggests the EPI 12/35 was fired in more consistent firing atmosphere away from fuel. This may reflect a position within the firing that was less varied in terms of atmosphere and temperature, rather than a completely different firing technique.

Finally, sample EPI 12/44 has a high quality red-brown slipped surface on a pink-brown biscuit with no visible firing core. The red-brown colour again indicates the use of a primarily oxidising atmosphere converting the iron content to a red-brown colour. The absence of a core accompanied by the even colour tone of the vessel indicates that it was fired in a well-controlled atmosphere for a prolonged period of time, with an extensive soaking time. This would allow complete oxidation of the body (refer to Figure 8.41). The even tone and lack of core may indicate the use of more controlled firing practices.

Other samples from PG17 and its sub-groups display a range of macroscopic variability. This variability is not confined to a single period, vessel type or type of surface modification. Both EHI and EHII decorated and plain, fine and coarseware vessels can be found with or without firing cores and with both even or mottled exterior surfaces. The widespread variation between and within vessels of different forms, finishes and periods indicates variation in the degree of control over the firing conditions consistent with open firing techniques. However, it has been notable during macroscopic examination, that vessels from EHII are more consistently even in colour and displayed less firing cores which may suggest a shift in firing practice during this period. This shift resulted in more controlled firings suggestive of the use of a firing structure.

8.9.2 Surface Modification

Macroscopic examination has highlighted a slight lustre on the exterior surface of EPI 12/16, suggesting that the vessel was burnished, however, the poor preservation of the surface has made it difficult to be certain (refer to Figure 8.41). SEM analysis confirmed the presence of a compacted layer measuring 8μm (refer to Figure 8.42). In addition, bulk chemical analysis showed an increase in Al, K and Fe (refer to Figure 8.43). This is most likely the result of burnishing as the finer particles of these common clay elements would migrate to the surface during the burnishing process. The low firing temperature of the vessel would have ensured the preservation of the burnished surface.

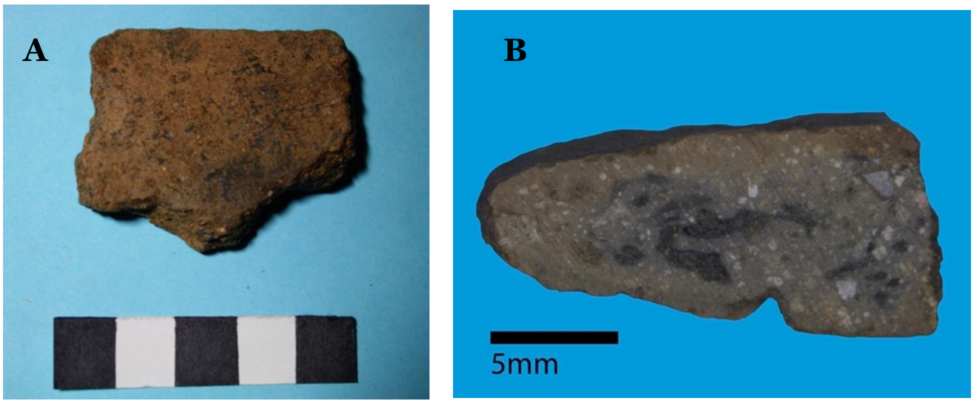


Figure 8.41: Images of EPI 12/16. A. an image of the exterior surface of EPI 12/16, an EHI small bowl from PG17A showing a slight lustre suggestive of burnishing; B. an image of the macroscopic fabric of EPI 12/16 displaying a thick firing core.

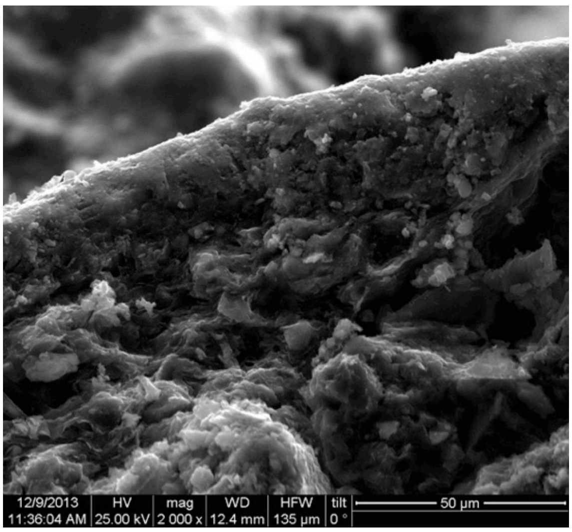


Figure 8.42: The compacted microstructure of the surface of EPI 12/16.

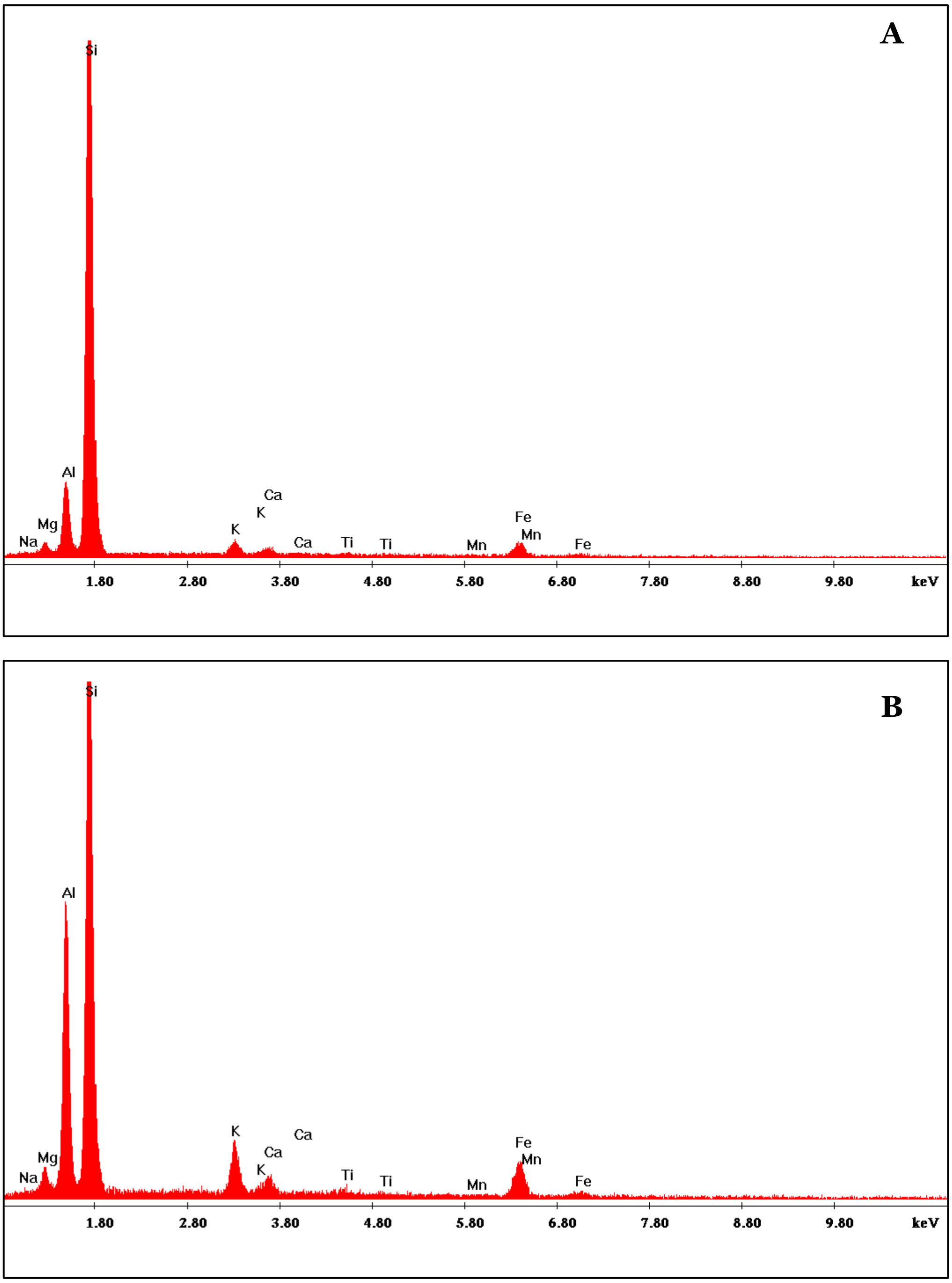


Figure 8.43: SEM-EDS element spectrums for EPI 12/16. A. spectrum of the body of EPI 12/16; B. a comparative spectrum for the surface of EPI 12/16 displaying higher levels of Al, K and Fe that the body.

Macroscopic examination of EPI 12/35 recorded a burnished surface (refer to Figure 8.44) but SEM analysis has revealed that it is not well preserved on the sample, appearing to have partially come away from the body (refer to Figure 8.45).

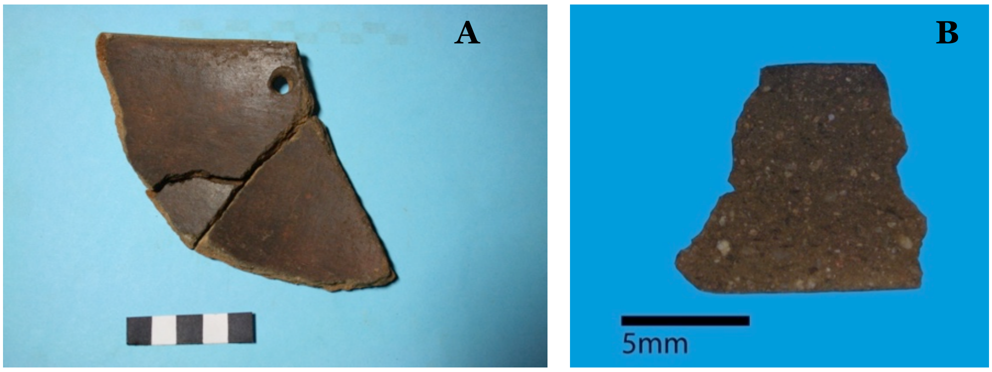


Figure 8.44: Images of EPI 12/35. A. an image of the interior surface of EPI 12/35, an EHI basin from PG17 displaying a high shine burnish; B. an image of the macroscopic fabric of EPI 12/35 showing a slight gradient in colour but no obvious core.

Where it is visible, it displays a compacted microstructure ranging from 5µm to 16µm in thickness, and like EPI 12/16 the elemental spectrum of the surface displays slightly higher concentrations of Al, K and Fe, consistent with burnishing as discussed above (refer to Figure 8.46).

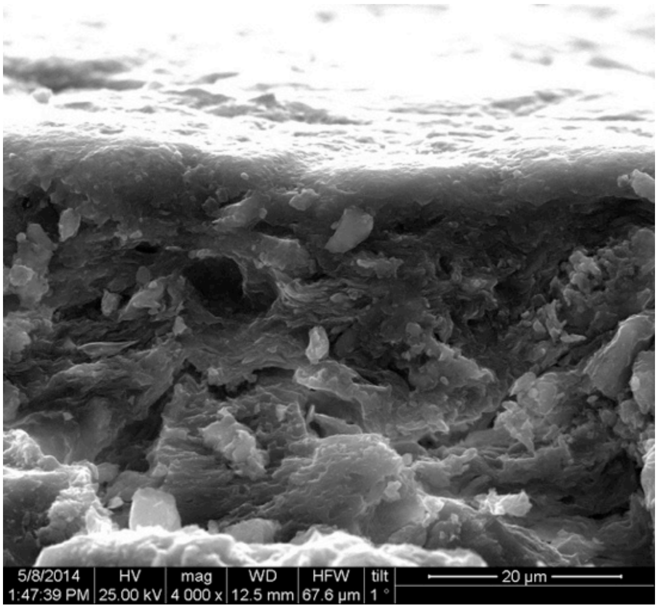
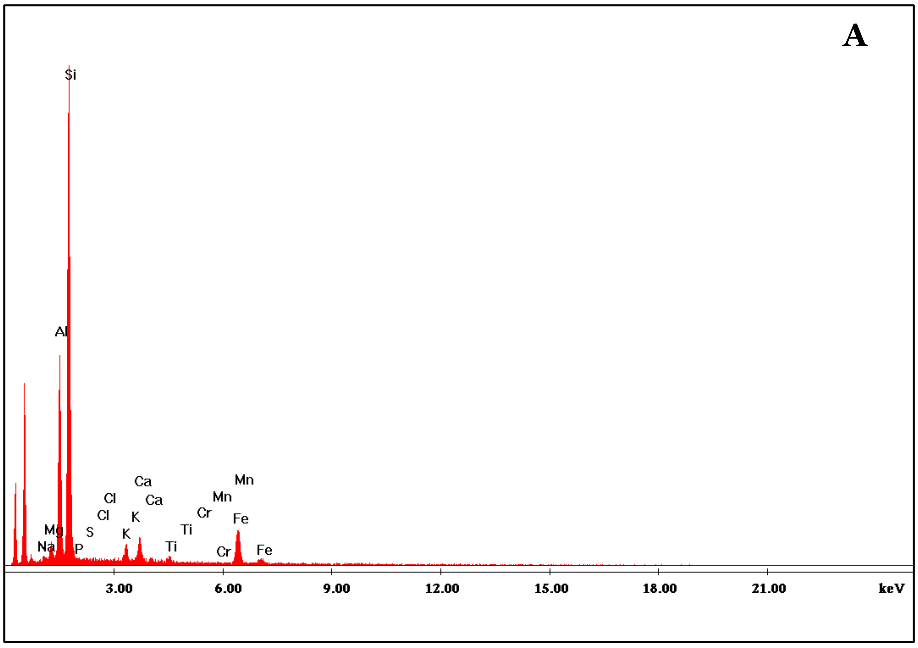


Figure 8.45: Image of microstructure of EPI 12/35 displaying a smooth partially compacted surface.



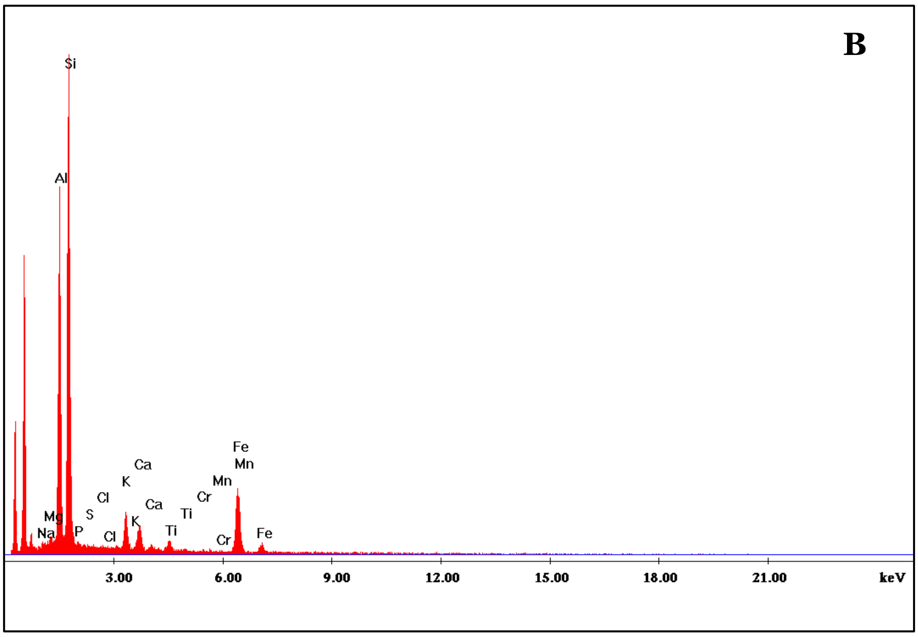


Figure 8.46: SEM-EDS element spectrums for EPI 12/35 comparing body and surface elemental chemistry. A. elemental spectrum of the body of EPI 12/35; B. an elemental spectrum for the surface of EPI 12/35 displaying higher levels of Al, K and Fe that the body.

The surface of sample EPI 12/44 contains significantly higher proportions of Fe, K and Al (refer to Figure 8.49) which may relate to the use of burnishing (refer to Figure 8.47) as discussed above. This is further supported by the compacted and sintered microstructure of the surface sintered (refer to Figure 8.48). The absence of a vitrified surface accompanied by the similarity in the elemental make up of both the body and the surface suggest that this vessel was not slipped and the dark red colour is from firing in an oxidising atmosphere and the compaction of the red-brown biscuit through burnishing.

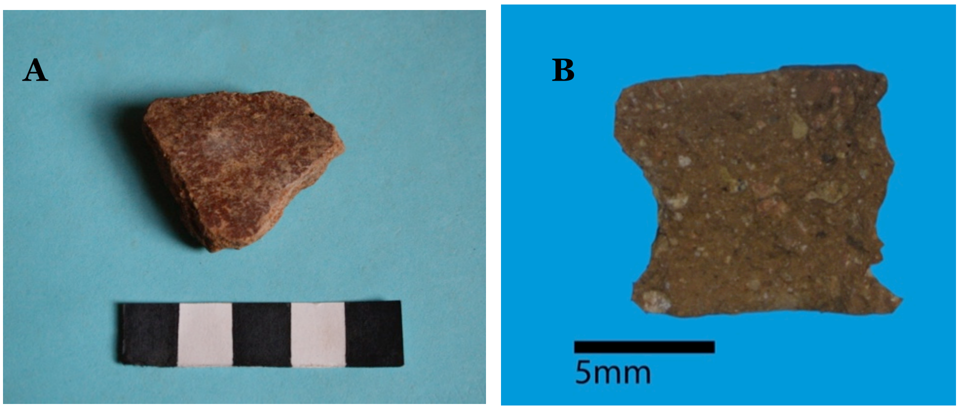


Figure 8.47: Images of EP 12/44. A. the external surface of EPI 12/44, an EHII small bowl from PG17 displaying a red-brown burnished surface; B. the macroscopic fabric of EPI 12/44 displaying an even colour and no firing core.

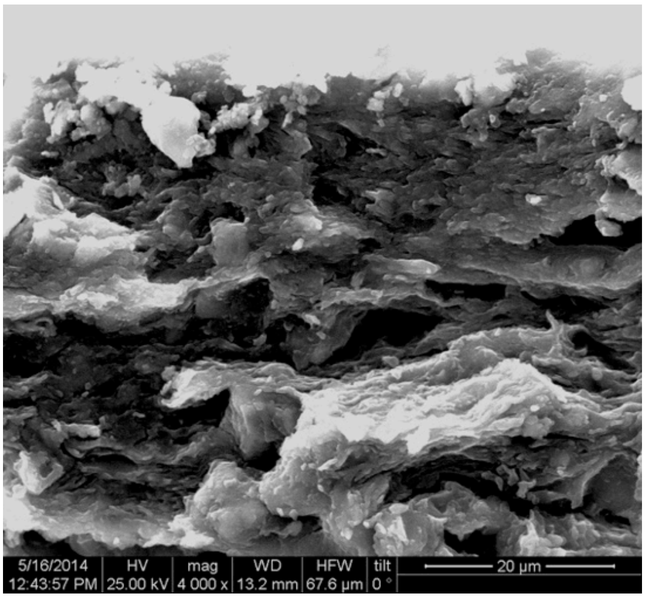
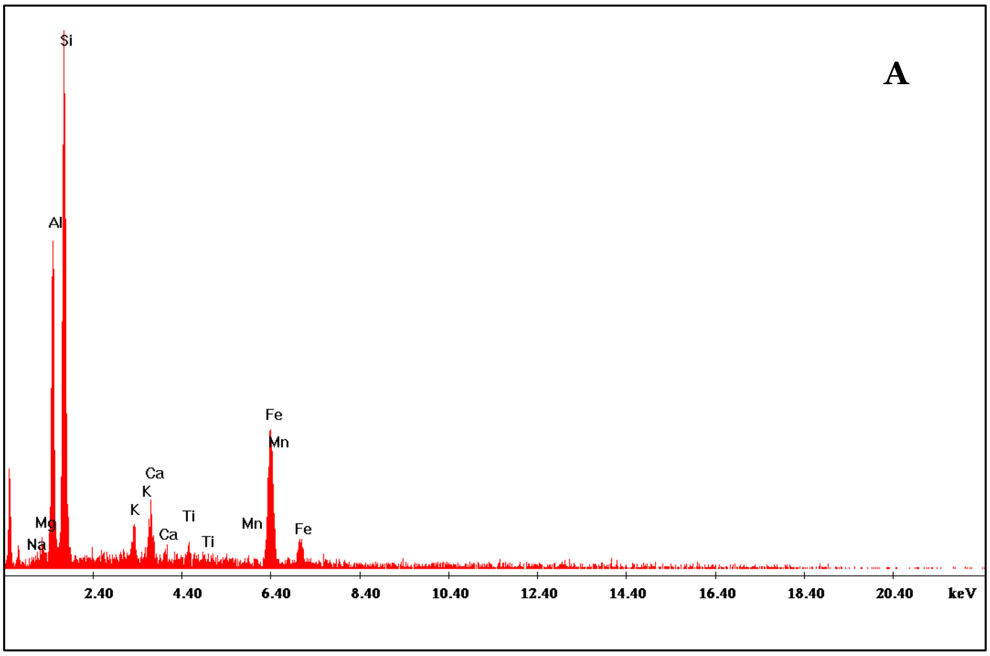


Figure 8.48: The microstructure of EPI 12/44 displaying a thick compacted surface above the unvitrified body, consistent with burnishing.



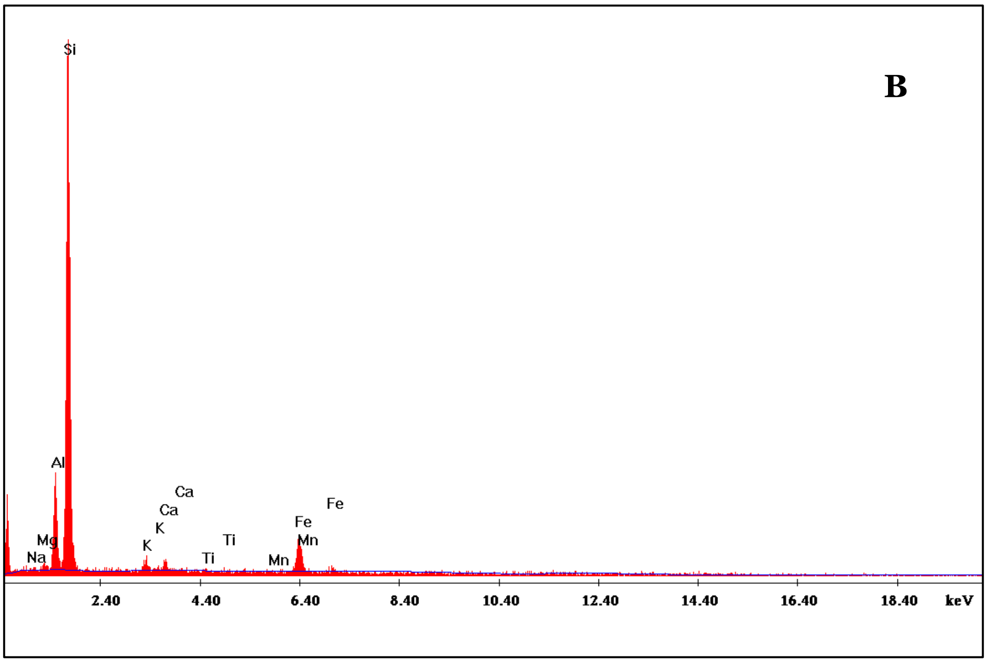


Figure 8.49: SEM-EDS element spectrum for EPI 12/44. A. a spectrum from the surface, displaying a high Fe, Al, Ca and K content. B. a spectrum from the body displaying lower levels of Fe, K, Ca and Al.

8.9.3 Summary

The SEM analysis undertaken on samples from PG17 and its associated subgroups demonstrates that these vessels were consistently low fired and burnished. This evidence supports petrographic observations relating to the high level of optical activity within samples of this fabric and macroscopic evidence for surface modification techniques. The variation across the fabric groups in terms of firing atmosphere and the extent to which vessels were fully oxidised appears consistent with the use of open firing techniques, accompanied by the later shift towards more controlled methods of firing during EHII.

8.10 PG24: Intermediate Igneous rock Fragments Fabric

Bulk chemical analysis has revealed that this is a low calcareous fabric, consistent with its igneous origin. The microstructure displays isolated areas of sintering, however, the original clay structure is also visible. This combination of features are indicative of initial vitrification and consistent with a low firing temperature of 750°C and 800°C (refer to Figure 8.49). This firing range is supported by the low levels of optical activity observed under the polarising microscope and agrees with Gauß and Kiriatzi's observations on the same fabric from Kolonna, Aegina (2011: 271).

8.10.1 Firing

Macroscopically, the surface has an even red-brown colour and the biscuit exhibits a consistent black colour with no core (refer to Figure 8.51). The contrast between the lighter brown surface and the dark black biscuit suggests that the vessel was primarily fired in a reducing atmosphere with a short oxidising phase that produced the red surface but which did not allow oxidation of the biscuit. The oxidation could have also been achieved through exposing the vessel to air after being fired in reducing conditions.

Macroscopic examination of the other vessels in PG24 has shown that they all share consistently dark biscuits and dominantly even coloured red-brown burnished surfaces. This suggests shared firing and finishing practices across the group.

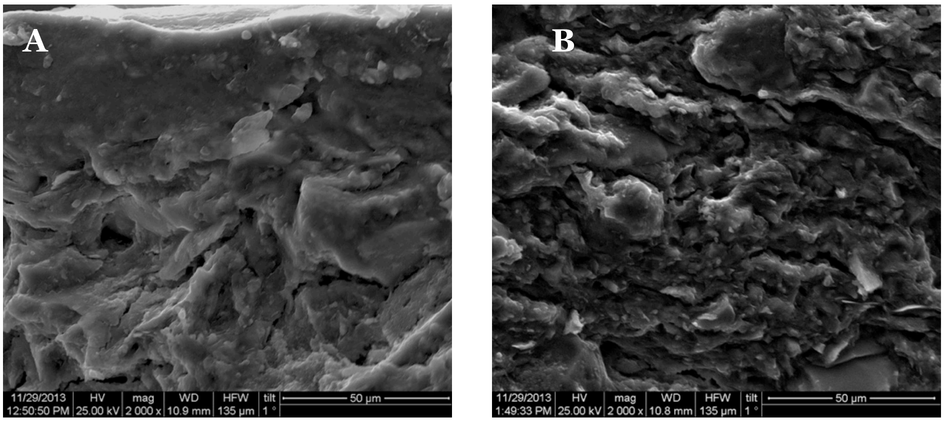


Figure 8.50: The microstructures of TSO 10/5. A. the very well compacted surface; B. the body of TSO 10/5 displaying initial vitrification with early melt structures.

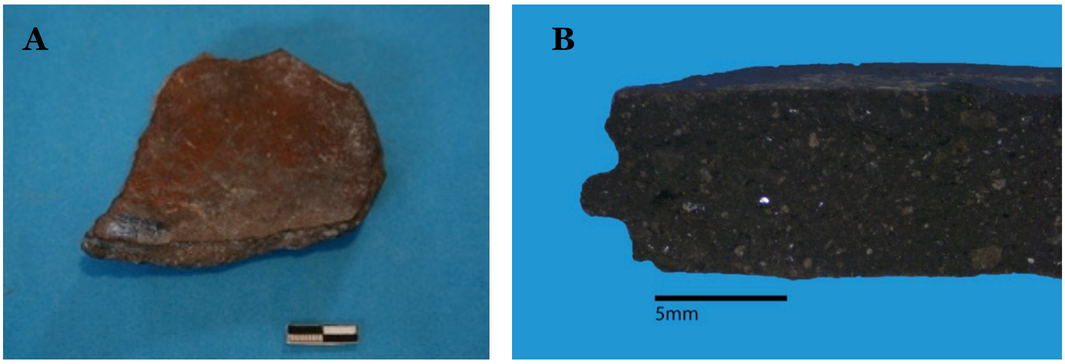


Figure 8.51: The exterior surface (A) and macroscopic fabric image (B) of TSO 10/5.

8.10.2 Surface Modification

Macroscopically, the surface displays a striking shine with a very consistent colour, suggesting a high quality burnish. SEM analysis has revealed that the microstructure of the surface is glassy and compacted ranging between 30 and 50µm in thickness (refer to Figure 8.50), considerably thicker than the surfaces examined in other fabrics. The thickness of the burnish would have produced a high quality surface finish and involved significant time investment on behalf of the potter. This thick burnish produced a high lustre which may have been a signature of quality to consumers and made Aeginitan pottery particular recognisable and desirable.

Bulk chemical analysis shows only an increase in the Fe, K and Al content but no significant difference between the surface and body. This supports the evidence that the vessel was burnished, as the finer particles of these elements within the clay would rise to the surface during burnishing.

8.10.3 Summary

PG24 is a relatively low-fired fabric, but the commonly even colour of both the surfaces, and the biscuit show that the firing atmosphere was well controlled. The red-brown burnished surface was of a strikingly high quality and would have involved significant time investment and care, producing a high quality lustre. This may have made these vessels striking and recognisable to consumers.

8.11 PG25: Altered Volcanic Rock Fragments Fabric

Bulk chemical analysis of sample KER 11/138 from PG13 has revealed that this is a low calcareous fabric which is consistent with its volcanic origin.

8.11.1 Firing

The microstructure displays little evidence of sintering and some areas of initial vitrification, suggesting a low firing temperature at around or below 750°C (refer to Figure 8.52). This is also supported by the petrographic analysis with low to high levels of optical activity and the presence of primary calcite.

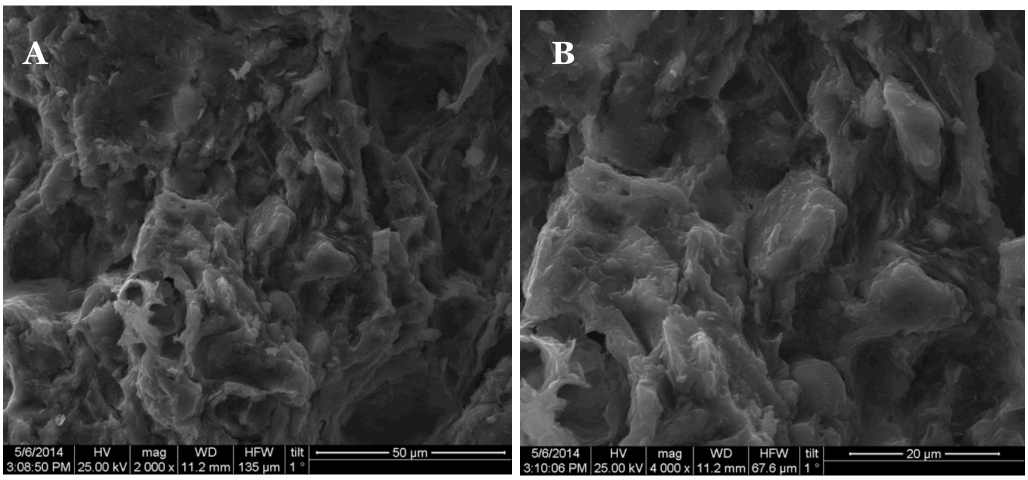


Figure 8.52: Images A and B displaying the unvitrified microstructure of KER 11/138.

Macroscopically, the external surfaces of sample KER 11/138 display an even orange colour with a weak core, indicating an oxidising atmosphere, but that full oxidation was not achieved most likely due to a shortened soaking period (refer to Figure 8.53).

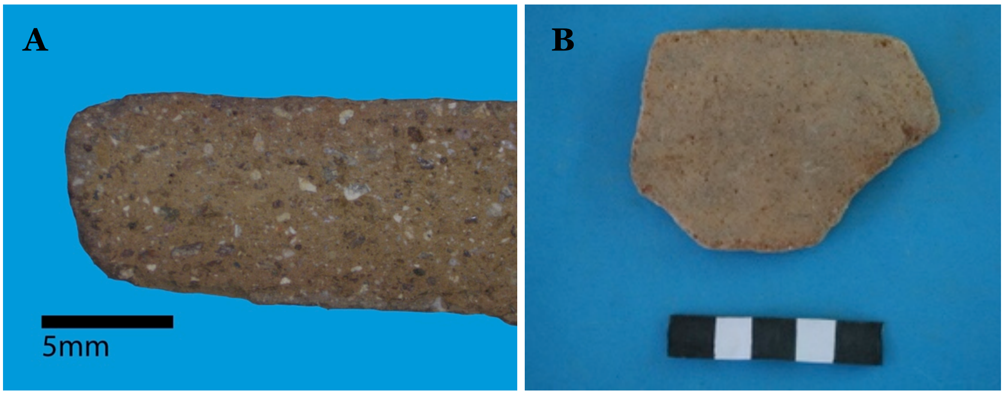


Figure 8.53: A- an image of the macroscopic fabric of KER 11/138, an EHII shallow bowl from Keramidaki displaying a slight core. B- an image of the plain surface of KER 11/138.

Macroscopic examination of the wider group shows that whilst vessels display a variety of firing colours from orange to grey, orange examples are more common. Their external surface colour is even but there are examples with different coloured surfaces on the same vessel. For example the external surface may be grey, whilst the internal surface of the same vessel is orange, each surface displaying an even tone without mottling. The grey colour suggests incomplete oxidation of the external surface. None of the vessels display slips or burnishing both macroscopically or using the SEM, suggesting that this centre of production focused on the production of plain wares. All vessels commonly display a dark firing core suggestive of a fast firing time and short soaking period. The mix of vessel colours may be due to different positions within the firing.

8.11.2 Summary

PG25 is low-fired, dominantly fast fired in oxidising atmosphere suggested by the higher proportion of orange fired vessels. Whilst all the samples within this fabric group display dark cores suggestive of fast firing their external surface colour is even with no evidence of charring on the external surfaces such as that associated with vessels in PG15. This evidence suggests that fuel was not in contact with the vessels from PG25 but that vessels were fast fired with a short soaking time preventing full oxidation of the vessel. The presence of difference surface colours on the same vessel suggests that there was variation in atmosphere, potentially due to each vessels location within the firing.

8.12 Conclusion

This chapter has highlighted and discussed the wide variety of firing practices in use during the EH period found at a selection of sites from the NE Peloponnese. Firing temperature ranges do not display a diachronic variance that would perhaps suggest a progressive change or 'improvement' in firing practices over time. Indeed, there were a wide range of firing temperatures being used in both early and late periods (refer to Table 8.2). Potters were already achieving high temperature ranges of up to 1050^{o}C in the earliest part of the EH period, whilst low temperature of below 750^{o}C have been recorded for EHII vessels (refer to Tables 8.1 and 8.2). It also does not appear to relate to the relative coarseness of the fabric, with coarseware fabrics having both low and high firing temperature ranges. Instead, firing temperature ranges are most commonly linked to the type of surface modification chosen, and to particular fabrics representative of specific producing centres.

The lowest fired vessels were dominantly burnished with red-brown surfaces suggestive of firing in oxidising conditions, whilst the common presence of cores suggest fast firing techniques and short soaking times. The use of low firing temperatures for burnished vessels must directly relate to the need to prevent the loss of the burnished sheen. Macroscopic examination of the assemblage at Epidavros has revealed that burnishing appears to have been a popular method of surface modification which would partially explain the prevalence of low fired vessels from this site within its locally produced fabric group PG17. However, petrographic analysis has noted a high degree of optical activity indicative of low firing temperatures for vessels from PG17 with a variety of surface finishes including plain vessels. This would suggest that there was a tradition at the site both in EHI and EHII for low temperature firing practices not solely linked to decorative techniques.

Sample ID	Petro. Group	Period	Form	Surface Colour	Estimated firing temp range °C
TAL 11/30	PG15	EHI	Jar?	Brown-black smudged	<750
EPI 12/35	PG17	EHI	Basin	Dark brown (burnish)	<750
EPI 12/16	PG17	EHI	Bowl with slight flaring rim	Dark brown (burnish)	<750
KER 11/125	PG9	EHII	Jar	Light orange	<750
KER 11/138	PG24	EHII	Shallow bowl	Orange	<750
EPI 12/44	PG17	EHII	Bowl body sherd	Red-brown (burnish)	<750
TSO 10/5	PG25	EHI	Hemispherical bowl	Brown (burnish)	750-800
EPI 11/3	PG1A	EHII	Deep bowl with flaring rim	Dark brown slip	750-800
TSO 10/38	PG4	EHI	Spreading bowl	Orange-brown (slip)	800-850
TSO 10/101	PG1	EHII	Sauceboat	Black (slip)	850-1050
KER 11/45	PG1A	EHII	Sauceboat	Black-brown (slip)	850-1050
KER 11/84	PG1	EHII	Sauceboat	Black-brown (slip)	850-1050
TAL 11/1	PG15	EHI	Fruitstand	Black-brown (thin wash)	850-900
TSO 10/89	PG1	EHII	Small shallow bowl	Brown-Pink-buff (brown slip at rim)	850-1050
TSO 10/26	PG1	EHI	Fruitstand	Buff with black (pattern slip)	850-1050
TSO 11/127	PG1	EHIII	Bass bowl	Buff with black (pattern slip)	850-1050
TSO 10/108	PG1	EHII	Sauceboat	Buff with black (pattern slip)	850-1050
TSO 11/126	PG1	EHIII	Tankard	Buff with black (pattern slip)	850-1050
TSO 11/150	PG2	EHIII	Tankard	Buff with red-brown (pattern slip)	850-1050
KER 11/126	PG9A	EHII	Jar	Green-buff	850-1050
TSO 10/18	PG3	EHI	Bowl	Red-orange (slip)	850-1050
KER 11/8	PG1A	EHII	Sauceboat	Brown slip	850-1080
KER 11/28	PG3	EHII	Jar strap handle	Light brown-grey	850-1080
TAL 11/2	PG15	EHI	Fruitstand	Orange	850-900
TAL 11/22	PG15	EHI	Fruitstand	Red-brown (slip)	850-900

Table 8.2: Table showing firing temperature range by surface colour.

Low to mid range firing temperatures of up to 850°C cover a wide range of fabric groups and are also consistently associated with red-brown surfaces which were either slipped or burnished. This indicates shared firing practices between different producers who used oxidising atmospheres with low to mid-range temperatures to achieve red-brown surfaces both in EHI and EHII.

The highest firing temperature ranges of up to 1050°C are consistently associated with dark brown to black slips on buff bodies. As discussed above in relation to PG1, it would have been necessary to fire such vessels using an iron reduction technique. This would have required high temperatures to ensure full vitrification of the iron rich slip during the reduction stage to create and maintain the dark slip colour during re-oxidation. These vessels are dominantly associated with PG1 and demonstrate the high skill and level of control that the potters from this centre in Corinth had over their firing regime, which most likely involved the use of a firing structure.

Those vessels that display the widest range of firing temperatures belong to PG15 from the Talioti Valley which contains both low fired vessels, below 750°C, and high fired vessels of 900°C. This group also displayed the widest range of variation in terms of macroscopic observations of colour accompanied by the dominant presence of a thick dark core. These trends suggest that this centre, in contrast to PG1, used fast, open firing techniques where it was not possible to have good control the firing atmosphere or temperatures. As such, some vessels were low fired whilst others were higher fired, and some examples have an even exterior colour whilst others are mottled with localised areas of oxidation and reduction due to proximity to fuel.

8.13 Summary

In summary, this chapter has been able to demonstrate the use of shared firing practices related to surface modification techniques between producers at Epidavros, Ancient Corinth and Aegina. It has also shown the contrast in firing techniques between two large centres of production. The Talioti Valley consistently appears to have used open, fast firing poorly controlled techniques in EHI, with an improvement of control of atmosphere in EHII but still reliant on the use of fast firing techniques. In contrast, Corinthian potters used well-controlled techniques incorporating a firing structure to produce high quality slipped tablewares throughout the EH period. Significantly, there seems to be a distinct differentiation in the types of knowledge, level of skill and investment in time between these different producing areas adding further support to the argument put forward in Chapter 7 for presence of both larger centres of production and small scale localised production. Indeed, there is a clear distinction between the technological *habitus* related to firing between potters of the Talioti Valley and those in Corinth highlighting that whilst there is a relationship between firing and surface colour there is also a strong relationship between learnt practice and specific communities of potters.

Chapter 9: Early Helladic Ceramic Production and Consumption

9.1 Introduction

As detailed in Chapters 2 and 3, the widespread use of typological and stylistic approaches to the study of EH ceramics, has furnished us with a good picture about the character of assemblages across the NE Peloponnese, and wider Aegean. This has enabled comparison of ceramic types and the ability to chart their distribution across the landscape. In this way, ceramics have been used as a tool to delineate chronological, cultural, economic, and political horizons. These data have traditionally been placed within generalised models of societal development focused on concepts related to the emergence of social complexity. Particular attention has been paid to investigating and understanding the organisation of craft production, and its socio-political and economic implications (*cf.* Parkinson and Pullen 2014).

The focus on developing generalised models has provided an insight into the shared characteristics of Bronze Age communities as a whole. However, it has made it difficult to understand the meaning behind any apparent continuity and importantly, *variation,* present within different chronological and geographical contexts (Pullen 2010: 1; Schoep and Tomkins 2012: 5). As such, archaeologists have not been able to successfully address what ceramic distribution patterns may signify beyond potential chronological or cultural groupings. These difficulties have been further compounded by a general lack of published ceramic studies that explicitly examine the raw materials and technological practices used in ceramic production. Where research has moved beyond typology to the examination of raw materials, through chemistry or petrography, the lack of integrated methodologies, and/or limited sampling strategy, has resulted in an unclear, and at times contradictory, picture of EH ceramic production and consumption. In summary, we have not yet been able to successfully lay the foundations for understanding the role of ceramics within wider socio-political structures. This is because we have not been able to address the basic questions relating to the locations of EH ceramic production, the character of production practices, and the extent to which vessels moved.

This thesis has questioned these past approaches to EH ceramic material culture, not only in terms of analytical methodology, but more fundamentally in relation to the conceptual frameworks within which interpretations of ceramic production and consumption data have been placed. It has been argued that we need to start with a bottom up approach, that explores the role of everyday choice and practice through the concepts of the *chaîne opératoire* and *habitus*. It is only by addressing the basic questions of where and how ceramics were made and distributed, that we can begin to build the foundations with which to address larger questions about the meaning of specific aspects of continuity and change. By understanding the commonplace and everyday, we can fully appreciate and contextualise particular innovations and associated social trajectories.

The examination of raw materials, fabric distribution patterns, and comparison to ceramics of known provenance, has enabled identification of multiple areas of production, charting the distribution of ceramic production across the study area. Through examination of the multiple *chaînes opératoires* involved in ceramic crafting, it has been possible to document the wide range of technological choices and *habitus* associated with different producing communities. Furthermore, this work has enabled the characterisation of distribution patterns of particular fabrics and their relationship to specific vessel types, highlighting the close relationship between elements of production and consumption behaviours. These results now allow for more detailed interpretation about the meaning and implications of the specific technological and consumption trends identified.

9.2 Areas of Production and Contrasting Scales

Supporting the results presented by Attas (1982), this thesis has found that production took place within close proximity to all of the sites studied, both those presented in this thesis, and those examined for comparative purposes. This demonstrates that ceramic production was widely distributed and a regular aspect of life for EBA communities of the NE Peloponnese. Importantly, it has been possible to further develop and refine Attas' chemical results. The multi technique approach of this thesis, has allowed for the documentation of a range of technological practices and utilisation of varied raw materials. Whilst Attas could only broadly assign samples to groups such as 'Corinth' or 'Tiryns', the results of this thesis has enabled the identification not only of possible locations of production but also of a number of producers working in close proximity within the same geological/geographical area across the NE Peloponnese. These producing groups employed specific understandings of how to undertake their craft, from the choice and processing of raw materials, through to forming, finishing and firing.

Significantly, the results of this thesis present a more nuanced picture of production than that previously presented for the EH period, for example, such as that presented by Shriner in relation to Lerna (1999). The examination of patterns of production and consumption of material within this thesis has highlighted that, whilst the material from each site contains fabrics that relate to production in close proximity to the site, there is a distinct contrast between the production strategies employed by producers in different areas, and importantly that this does not simply correlate to perceived constraints of local raw materials or performance characteristics of vessels.

What is perhaps most striking is the variation in both the scale of ceramic production at, and the reach of particular vessels from, different potting communities. There is evidence compatible with traditional perspectives of small-scale community based production, most clearly identifiable in the areas of the Nemea Valley and Epidavros, comparable to the results from Helike (Iliopoulos *et al.* 2011). The vessels from both Nemea and Epidavros were not widely distributed but instead were consumed by surrounding communities for use in everyday activities of food storage, preparation and consumption. However, there is also evidence for significant centres of production that must have been operating on a larger scale, and in a more organised co-operative way than the potting groups identified in Nemea and Epidavros. Significantly, these larger centres were part of wide reaching distribution networks, tied into the consumption of specific vessel types and tablewares.

9.3 Small Scale Local Production

9.3.1 Nemea

The local fabrics at Tsoungiza and within the comparative material from NVAP 204, represent a range of raw materials and technological practices, including tempering, clay mixing, and the employment of a number of different decorative techniques. The diversity in the range of raw materials and ways of doing, attests to the presence of a number of local producers in the area of Nemea. Each producer had a different *habitus* of practice and understanding about ceramic crafting, producing a varied repertoire of ceramic objects. The level of variation in the approaches these potters undertook suggests that they were not part of a single community of practice and learning, but worked more autonomously using different learnt behaviours. Further, the presence of vessels from multiple potters at Nemean sites implies that there was not a single local producer that dominated the supply of vessels to Nemean communities, but instead shows that Nemean communities exercised a varied range of choices open to them. That said, the small number of Nemean fabrics strongly suggests that production involved a small number of producers who do not appear to have produced vessels in large quantities. The vessels from Nemea fulfilled a wide range of everyday domestic purposes, and as yet there is no evidence to suggest circulation outside of the Nemea Valley. This picture of production is more consistent with traditional perspectives of EH ceramic production but does not typify all EH ceramic production and consumption. This is especially evident when comparing the results from Nemea to those at Epidavros, a settlement site which shares many archaeological characteristics with Tsoungiza but differs greatly in relation to ceramic production.

9.3.2 Epidavros

Whilst largely contemporaneous to Tsoungiza, it is clear that pottery production local to Epidavros was dominated by potters who were part of the same community of practice. Although there is some limited evidence for more than one producer at Epidavros, the majority of variation present within the sampled assemblage is due to different choices and innovations within a single dominant tradition, rather than representing multiple producing groups with completely different ideas about crafting.

The fabrics from Epidavros are remarkably consistent over the entire EH period, utilising locally available tuffaceous raw materials. There is also continuity in the outward appearance of vessels from this production area, which are dominantly low fired to an orange-brown colour and/or red-brown slipped, often with a burnished finish. This is particularly striking in the EHII period where dark slipped vessels are more commonly present in comparative assemblages, and the NE Peloponnese generally. This high degree of consistency apparent in technological behaviour demonstrates the sharing and learning of a specific crafting *habitus*, passed over time from one potter to another for at least 1000 years.

What is perhaps unexpected is that within such an apparently ‘conservative’ community of practice, there is also evidence for innovation and different approaches to ceramic crafting. These can be identified within three key elements of the *chaîne opératoire,* some of which became embedded within the local tradition, and others were rejected. The first relates to raw material choice, with the addition of andesite, and vegetal temper to the tuffaceous paste of some vessels. This practice of tempering does not appear to have been widely adopted, or to have become part of the traditional practices of local potters who continue to use the unaltered tuffaceous clay. The second element of innovation relates to vessel finishing with the use of a rotary device in EHII. This again does not seem to have been widely adopted during EHII but testifies to a degree of experimentation. The final area of innovation relates to firing techniques which become more controlled over time. These more controlled firing practices were widely adopted, with evidence for an increase in evenly coloured bodies and a decrease in cores on a wide number of vessels between EHI and EHII.

These innovations within the Epidavrian potting tradition suggest that multiple potters made different choices along the same *chaîne opératoire,* some of which were adopted whilst others were rejected. As discussed by Arnold (2008: 229-270), and more recently by Abell in the context of Aegean crafting (2014), the *chaîne opératoire* is open to modification over time as potters experiment with practices, looking at the advantages or disadvantages of different methods. However, it is important to remember that these perceived advantages or disadvantages are not merely practical or functional in terms of efficiency for example. As discussed in Chapter 3, innovations must also sit within current understandings of potting to be accepted by an existing community, particularly within a strong potting tradition such as that we see at Epidavros. This is best exemplified by the limited use of a rotary device at Epidavros, in contrast to the distinct shift in firing practices. As the firing practices were still able to produce the red-orange coloured vessels, using the local tuffaceous clay, which appear to be have been fundamental elements within the potting tradition, the innovation was not so far outside of the rest of the traditional *chaîne opératoire* as to be rejected. In contrast, the rotary device would have most likely required the development of new and different motor skills which would have taken time to develop. However, as it was not possible to examine the entire EHII and EHIII assemblage it is difficult to establish if the use of a rotary device became more common place over time.

9.3.3 Evidence for Small Scale, Localised Production: A Summary

The comparison of production at Nemea and Epidavros demonstrates the varied and complicated trajectories of small-scale production during the EBA. Both sites fit within traditional models of small-scale production with limited distribution, which have been assumed to dominate EH ceramic manufacture. However, there are clear nuances between the potting behaviour within each community. This variation can only be detected and understood by acknowledging the central role of choice in structuring crafting practice. By deconstructing the *chaînes opératoires* of Nemean and Epidavrian fabrics, it has been possible to see the divergent choices potters made, and those practices which they rejected. The generalised models that have dominated study of the EBA have previously failed to detect or explain these nuances in production practices. As such, we have not been able to characterise or understand the complexity present in small-scale production, both at the individual site level, and between what initially appear to be very similar site types.

9.4 Larger Scale Local Production

In contrast to the picture presented from an examination of production in Nemea and Epidavros, the evidence for production in close proximity to the Talioti Valley and Ancient Corinth testifies to the presence of two important mainland potting communities in these areas. These two centres display characteristics indicative of communities of practice with shared approaches, producing the same repertoire of vessels, dominating the supply of ceramics to surrounding communities. In addition is has been possible to identify a final key centre of production on the island of Aegina with evidence to suggest the presence of more than one potting community on the island.

9.4.1 Talioti

The raw materials used in all of the ceramic vessels sampled from the site of Talioti are consistent with an origin in the Talioti Valley itself testifying to production in close proximity to, if not actually at, the site itself. This fabric dominates comparative assemblages sampled from the Argolid, such as Midea and Tiryns. It was used to produce a wide range of vessels types including those for storage, cooking and dining, from as early as the Neolithic, through to at least EHII (Burke *et al.* forthcoming). The domination of this fabric within sampled Argolid assemblages suggests it was a key centre of production in the region, with multiple communities consuming its products.

As discussed in Chapter 7, the small degree of variation within the fabric group is suggestive of geological variation from multiple potters working in close proximity along the Talioti Valley. These potters made the same repertoire of vessels that display a strong degree of consistency with regards to choice of forming techniques, vessel colour and surface modification techniques. In addition, SEM and macroscopic analysis has highlighted shared fast firing practices. This evidence all indicates a collective community of practice with a common *habitus* and approach to their craft which must have been developed from shared learning experiences.

Of particular note are the distinct spheres of practice that have been identified between Talioti and Corinth in relation to firing and surface finish of vessels. Examination of firing practices in particular has highlighted that producers at Corinthian sites and those in the area of Talioti, were part of different networks of practice and learning. At all of the Corinthian sites brown-orange-red slips on locally produced vessels, were dominantly fired at lower temperature ranges. The same vessels in darker colours, were fired at high temperatures, employing the use of a firing structure to manipulate the atmosphere from oxidising to reducing. These trends indicate that surface colour and firing practices were directly related within Corinthian production. In contrast, firing practices at Talioti were more closely linked to the widespread use of open oxidising firing methods, using high temperature ranges for the majority of vessels, irrespective of surface finish. This contrast in firing practices and technology highlight two distinct spheres of practice and tradition. It would seem that potting communities within Corinthia and the Argolid did not share firing technology or practices but instead co-existed using their own well-developed traditions.

9.4.2 Ancient Corinth

Like Talioti, production in the area of Ancient Corinth suggests the presence of multiple potters, sharing elements of their *chaînes opératoires*. The shared approaches to tempering, forming, finishing and firing, testify to a common *habitus* and learning environment. However, in contrast to Talioti there is a degree of variation in the production strategies employed by different potters which imply differing localised production strategies. This is best evidenced through comparison of the repertoire and distribution of PG7, PG9 and PG10.

The widest repertoire of vessels and decorative techniques associated with a single fabric are found in PG7. This fabric was used to produce vessels for cooking, storage and dining, satisfying the everyday needs of the EH community, similar to the picture of production at Epidavros. In contrast, PG9 and PG10 are more dominantly associated with a more restricted repertoire, specifically low fired red slipped bowls, and high fired jars. Significantly, vessels from PG9 and PG10 would not have been easily discernable from each other to consumers due to the shared outward appearance of body colour and decorative technique (refer to Figure 9.1). Indeed, when we compare the range of vessels, decorative techniques and firing techniques between PG9 and PG10 the only detectable difference within the *chaînes opératoires* for these fabrics relates solely to the choice of temper.

The strong correlation in practice between these two fabrics demonstrates a shared understanding and body of knowledge about making these ceramic vessel types. Due to the length of time that these vessels represent (some 300 years) we should consider that the variation in temper may potentially result from natural variation in sources over time. However, the general absence of tuffaceous material in the other fabrics, or the presence of a distinct gradient between one temper to another in a single sample, suggests that this is not the case.

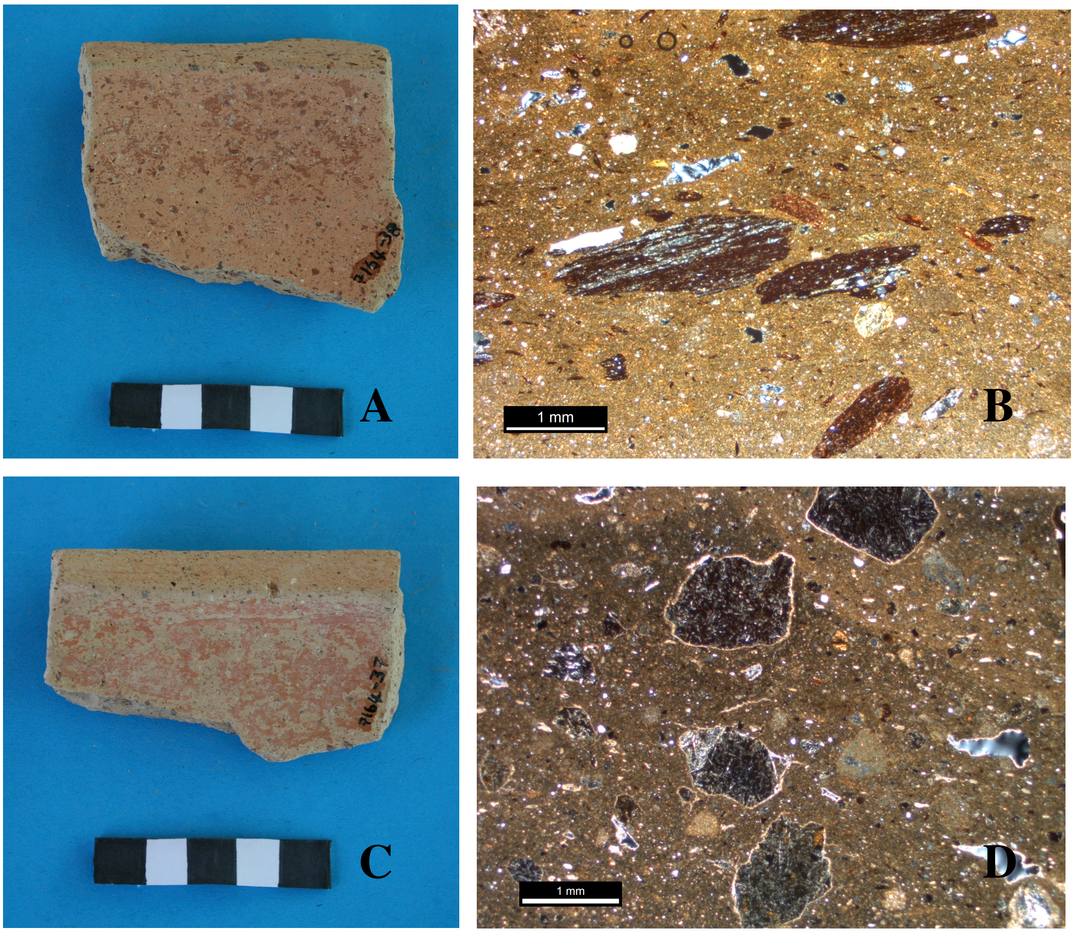


Figure 9.1: A. an image of a large incurving bowl from PG9 with micrograph of fabric depicted in image B. C. an image of a large incurving bowl from PG10 with micrograph of fabric depicted in image D.

It must also be considered that the variation may be masking production by the same potters who were using raw materials that looked similar. Indeed, macroscopically the inclusions within PG9 (MG11) are very similar to those within PG7 (MG14 refer to Figure 9.2). Therefore, it would not be unreasonable to consider that the potters using these raw materials were not aware that they were geologically distinct. However, when we look more holistically at these pastes there is variation in key elements suggestive of choices by different producers with different approaches.

Firstly, it is important to note the more varied and extensive repertoire of PG7 compared to PG9. There is a range of vessel types, surface modification techniques and firing practices, including reduction firing, associated with PG7. This suggests the employment of different production strategies compared with PG9 which is associated with a much narrower range of vessel types.

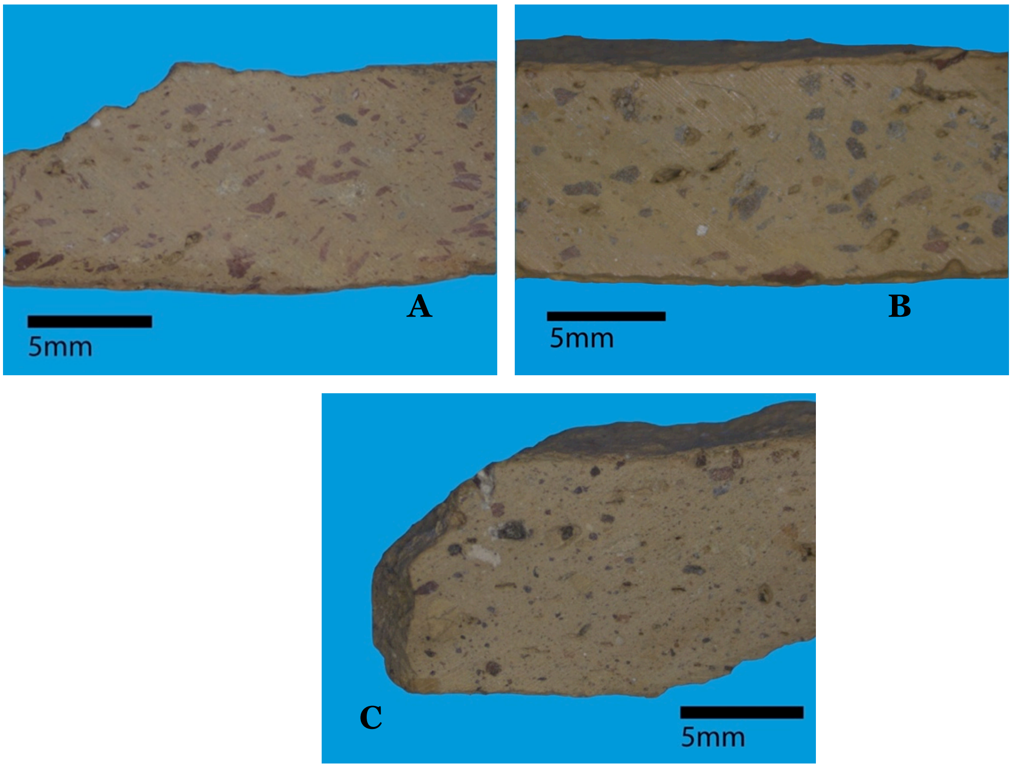


Figure 9.2: A. Macroscopic images of KER 11/33 from PG9 (MG11) and B: KER 11/67 from PG7 (MG14) displaying very similar macroscopic fabrics. C: KER 11/37 from PG10 (MG9).

Secondly, the closest link and similarity in vessel types, firing strategy, and vessel appearance is not between PG7 and PG9, but instead between PG9 and PG10 (MG9). The rock inclusions within PG9 and PG10 are macroscopically distinctive to the extent that it is unlikely that potters would not have been able to differentiate them.

Particularly as they would be familiar with different properties such as how these rocks would break, as well as their colour and how they would fire. Those within PG10 have a rounder appearance and commonly have a lower frequency within the ceramic (refer to Figure 9.2). They also have a darker colour which was a distinctive macroscopic characteristic both from fresh breaks but also on the vessel surface. As such, it is more likely that these fabrics represent different potters making specific choices about their raw materials.

The identification of different production strategies at Ancient Corinth implies that production was widespread in the area involving multiple potters. Examination of the *chaîne opératoire* for PG7 suggests that this potter, or group of potters, focused on a broad repertoire for local domestic consumption, in line with traditional expectations of EH production such as that at Epidavros. In contrast, examination of fabrics like PG9 and PG10 suggest more specialised production of a narrow range of vessels types, undertaken by multiple potters sharing technological practices. Significantly, although outwardly very similar, there is a significant variation in the distribution of vessels from PG9 and PG10. High fired jars from PG9 have been found at Midea and Tiryns (Burke *et al.* forthcoming). However, no coarseware vessels from PG10, or indeed any other Corinthian coarseware fabric, have been identified at any of the other sites within this thesis or comparatively. The only exception is Korakou, which evidently consumed vessels from the same potters as Ancient Corinth. As there is no obvious difference in quality or appearance between the vessels from PG9 and PG10, it is difficult to explain the variation in distribution unless we consider that the presence of PG9 vessels in the Argolid may indicate early movement of goods carried *within* these jars, rather just the movement of the ceramics themselves.

The large quantity of vessels at Ancient Corinth (Keramidaki) alone (Cherry 1973: 65), and the presence of the same fabrics at Korakou testify to production on a significant scale. Further, the production of the same vessels by multiple producers, testify to a specific demand for jars and large incurving bowls in particular. The emphasis does not appear to have been on differentiating products from a single producer but rather providing a uniform range of vessels suggesting a level of cooperation, rather than competition between these producers. When taken together the picture of production at

Corinth and that at Talioti displays characteristics that are more indicative of an organised community of potters, operating on a significant scale, rather than disparate potters producing for subsistence needs. This is further exemplified by consideration of tableware production and distribution.

9.5 Production and Distribution: Examining Table Wares from Talioti

Examination of comparative material demonstrates that the potting centre at Talioti produced a wide range of vessels from cooking pots to fine saucers, however, the movement of vessels to sites outside of the Argolid was confined to specific forms. In EHI, fruitstands are most widely distributed, alongside basins and ladles. Fruitstands appear to have been a specialist product of Talioti with 32 of the 37 fruitstands sampled from all sites (both EHI and EHII examples), belonging to PG15. In EHII, it is red-orange fired and/or slipped sauceboats and jars which are distributed outside of the Argolid, with examples at Tsoungiza, Korakou and Epidavros. This is especially striking as we know that Corinthian potters were producing orange-red bodied and slipped vessels in both EHI and in EHII but these were *not* widely circulated. This suggests that there was a specific quality of the Talioti examples that made them desirable. This is further supported by the examination of fruitstands produced outside of the Argolid.

Of the five fruitstands that are not from PG15, two are from PG1 and are high fired buff vessels, decorated with a dark slip. Two are from fast-fired siltstone and mudstone fabrics, and one is from a calcite fabric. The examples from these latter fabric groups all share a similar outward appearance to examples from Talioti, in terms of morphology, slip colour and incised decoration (refer to Figure 9.3). This would have made it difficult for consumers to easily distinguish them from Talioti fruitstands and suggests that these were purposefully imitating the Argolid examples.

In contrast, the buff examples from Corinth would have been instantly recognisable to consumers as different, and not from Talioti. In this instance there was no attempt to make the fruitstands appear to be Argive but in fact the reverse. They were purposefully made to look different and display aesthetic qualities in terms of the dark slip colour and buff body, which become desired characteristics especially associated with Corinth in EHII.

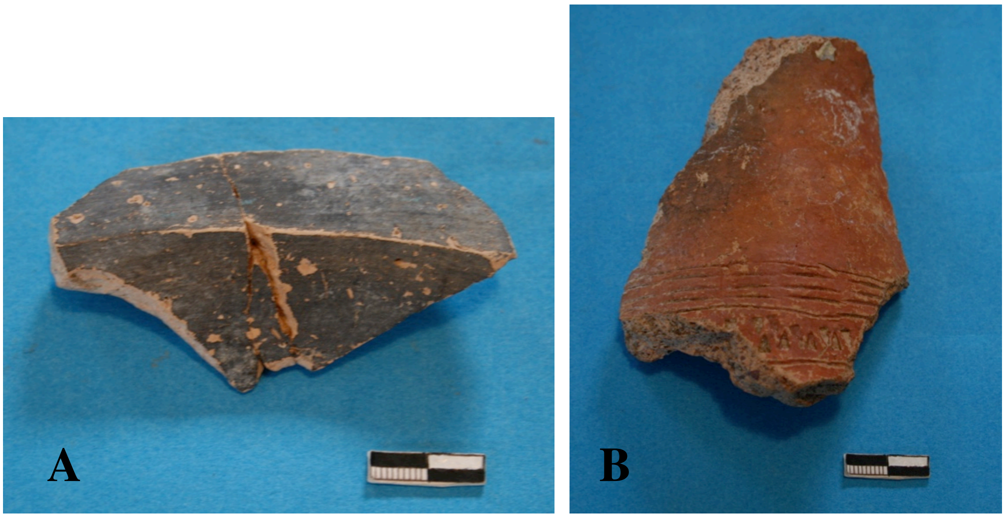


Figure 9.3: A. TSO 10/26, Dark slipped EHI fruitstand from Tsoungiza from PG1. B: TSO 10/24 a red slipped EHI fruitstand in a calcite fabric SS11.

This suggests that Corinthian potters did not feel the need to imitate other centres of production, perhaps already having a reputation for producing high quality dark slipped vessels which would have been particularly striking, and perhaps therefore, desirable, during a time where red-orange-brown vessels are dominant within assemblages (for typological discussion of EHI ceramics *cf*. Weisshaar 1983; Pullen 2011). The limited production of fruitstands outside the Talioti Valley, alongside their widespread consumption, suggests that although the vessel was a key component of EHI dining practices, consumers purposely sought out Talioti produced vessels. It would appear that it was the characteristic red body and common red slip that made them particularly recognisable. It may have also been the weight and durability of these vessels which are macroscopically characteristic for their hard ceramic body and solid feel. These characteristics stand in stark contrast to the light coloured and soft fabrics from Corinthia, and may have been used as a sign of a quality Talioti product by consumers.

The consistent presence of the fruitstand form in assemblages from the EHI period at sites across the NE Peloponnese clearly demonstrates its importance within EHI dining practices. Whilst the high level of repairs noted for these vessels at Tsoungiza (Pullen 2011: 65) implies that they were valued but perhaps not easily replaced, which may also explain the attempts to imitate them. The strong correlation of fruitstands to PG15 suggests that production of the vessel was restricted, yet Corinthian potters possessed a wide range of technical skill and knowledge to be able to produce such vessels, therefore, it is strange that as a valuable and clearly important element of EHI dining practices, fruitstand production was not more widely distributed. The limited production but widespread consumption of these vessels clearly implies that fruitstand production was a more specialised practice, undertaken by a specific potting community, which may have added to their value for consumers. However, the widespread consumption of these vessels testifies to shared dining practices undertaken in many EHI communities.

The large size of fruitstands and the elaboration of the rim and pedestal with decoration suggest that this vessel was used for communal dining that involved an element of display. The plain nature of the majority of other EHI vessels indicates that the fruitstand would have drawn attention, acting as a central element of the dining practices it was involved in, perhaps the equivalent to the modern practice of using the best dinner service when there are guests. What the fruitstand contained is unknown due to a lack of residue analysis for such vessels, however, despite the name of 'fruitstand' there is no reason to suggest that it was used for food rather than drink. Indeed, the fruitstand form bears a striking similarity to the modern day punch bowl (refer to Figure 9.4), whilst the depth of some ladle bowls, in addition to the more vertical angle of the handle, would suggest the use for dipping into a liquid, rather than scooping more solid foodstuffs (refer to Figure 9.4). It should of course also be considered that the fruitstand may have been used for liquid based food stuffs like a broth or stew.

The dominance of this form in the Argolid and the restriction of its production to that area, could indicate that it is more strongly associated with Argolid dining practices that spread to other areas. As such, the presence of fruitstands in Corinthian assemblages may testify to Corinthian communities taking part in traditionally Argolid dining practices, whereby having a Talioti fruitstand acted as a signal to others of being connected and aware of these dining behaviours. It also demonstrates a clear link between the communities in Corinthia and those within the Argolid who were part of this network of vessel movement and consumption.

This image has been removed due to copyright. Figure 9.4: A. A photograph of 20th century glass punch bowl (image from Laurel Leaf Farm country antiques 2016). B: A composite illustration of a fruitstand from Tsoungiza (Pullen 2011: 66). C: An illustration of a ladle from Tsoungiza (Pullen 2011: 75).

Although there is the continuation of ceramic production in the area of Talioti and movement of some vessel types to Corinthian sites during EHII, there is limited evidence for fruitstand production or consumption after EHI. Indeed, within this thesis there are no EHII examples in Corinthia. However, examples have been noted from Talioti at Tiryns (Burke *et al.* forthcoming, also recorded by Weisshaar 1983: 348), and from unknown sources at Lerna (Wiencke 2000: 555-556) and Agios Dhimitrios (Zachos 2008: 403). Instead, EHII is characterised by the introduction and widespread consumption of sauceboats, and dark slipped tablewares. This suggests a very distinct shift in the expectation of what a vessel should look like, and in the dining practices EH communities undertook. This shift in ceramic repertoire is also mirrored by a shift in vessel movement which becomes dominated by sauceboats, dark slipped table wares from Corinth, and jars.

9.6 Production and Distribution: Examining Table Wares from Corinth

Whilst there is clear evidence for the widespread production of coarse wares at Ancient Corinth, it is more difficult to definitively assign fine ware production on petrological grounds alone. As outlined in Chapter 7, PG1 and PG2, form the bulk of slipped tablewares from Corinthian sites and are of probable Corinthian origin, based on their distribution and their associated decorative wares. Indeed, the very low number or general absence of fine wares in definitively Corinth fabrics such as PG8, is strange unless we consider PG1 and PG2 as Corinthian products.

Both fabrics are strongly associated with EHII and EHIII fine tablewares, most specifically EHII slipped sauceboats and small bowls, and EHIII pattern painted tankards and bowls. These fabrics dominate EHII and EHIII tableware forms found at sites within Corinthia, accounting for 34 of the 47 sauceboats sampled. Significantly, the higher fired fabric PG1 is more frequently present in relation to black and black-brown slipped vessels and is found at sites outside of Corinthia. In contrast, PG2 and the lower fired examples from PG1 (PG1A) are more commonly associated with undecorated red bodied vessels or red-orange slipped table wares, such as sauceboats, and do not have a distribution outside of Corinthia.

As outlined in Chapter 8, the use of both high and low firing temperatures for PG1 and PG2 is not related to a diachronic development in firing techniques, as high fired, dark slipped EHI fruitstands have been identified belonging to PG1, and lower fired red slipped EHII vessels have been identified from PG2. Instead, they represent differing contemporary practices related primarily to the specific surface or slip colour of the vessel. This has also been exemplified through the contrasting firing practices between Corinthian and Argolid potters. This suggests that the widespread distribution of Corinthian dark slipped tablewares, particularly sauceboats, from PG1 relates to the quality of the dark surface finish on a buff body achieved by Corinthian potters.

The dark slipped vessels from Corinth are very striking due to the high quality of the dark slip, which stands in contrast to the very buff and lightweight ceramic body. These qualities would have made them stand out to consumers as noticeably different to vessels from other areas of production. This is especially evident when examining Argolid assemblages with local attempts at EHII dark slipped sauceboat production. Many are confined to PG15 and have orange-brown or brown-buff bodies, commonly unslipped or with poor quality black brown slips, or thin washes (refer to Figure 9.5). As such, the presence of vessels from PG1 within assemblages outside of Corinthia relates to a preference by consumers for the high quality dark slipped vessels that were made by Corinthian potters. In contrast, the red-orange vessels associated with PG2 from Corinth, were widely available with a similar finish from Argolid producers, which may explain the Corinthian centred distribution of PG2.

Figure 9.5: TIR 14/105, and EHII unslipped mottled sauceboat also from PG15.

The strong association of dark slipped pottery, particularly sauceboats, with Corinth suggests that Corinthian potters were specialist producers of such vessels, just as Talioti was of the fruitstand. This must be tied into a variety of factors including the raw materials available to Corinthian potters compared to their Epidavrian and Argolid counterparts. It is also related to their specific potting *habitus* and knowledge, and to the introduction and spread of dining practices that demanded such vessels.

It is clear from examining Argolid attempts at dark slips that Argolid potters did not possess the same set of skills and knowledge as Corinthian potters in order to be able to produce dark slips on light bodies. Talioti potters traditionally used an iron rich coarse sandstone based clay which had a long history of use. This paste tradition had served them well in the Neolithic, and in EHI. These raw materials were widely distributed and an abundant source in the area of the Talioti Valley. In addition, these potters consistently used fast, open-firing techniques, in both EHI and EHII. These long held potting practices were not conducive to the production of high quality fine, light buff vessels and dark slips which became popular in EHII, as some of their attempts demonstrate. This would also explain the absence of Epidavrian produced dark slipped vessels, as production there was also embedded within a very specific potting tradition and knowledge that did not include the production of dark slipped buff bodied vessels.

In contrast, Corinthian potters used mixing very fine iron rich and fine calcareous clays to produce a buff body, and fine iron rich clays to produce their red-brown or black slips. A range of fine calcareous and iron rich clays would have been available in the surrounding area of Ancient Corinth. In addition, they had developed the skill and technology to be able to manipulate their firing atmosphere to produce different slip colour and decorative effects, which as discussed above does not appear to have spread to the area of Talioti. The resources, specific learnt skills and practices at Corinth made them well placed to be able to produce dark slipped fine vessels, however, it is the need for these vessels that must have influenced their widespread consumption.

9.7 The Context of Consumption

When we look at the wide distribution of vessels from Corinth, it is restricted to specific vessel types, namely coarseware jars and fine dark slipped tablewares, particularly sauceboats. We also find that in EHII there is a distinct shift in the vessels exported from Talioti which move from the fruitstand and associated types like the ladle, to red slipped/bodied sauceboats and jars. This indicates that ceramic distribution was not only related to the skills and repertoire of different potting groups but also to specific dining practices which involved the sauceboat in particular.

The sauceboat's morphology suggests that it was designed as a pouring or, less-likely, a drinking vessel, with some examples having particularly elongated necks indicating a specific emphasis on the act of pouring (also noted by Day and Wilson in relation to Crete 2004: 50). If we consider this, in addition to the movement of jars being associated with their contents, it is reasonable to suggest that the dining practices associated with the these vessel types was tied into the movement and consumption of liquid, possibly wine or beer. Whilst the use of residue analysis in EBA Aegean archaeology is not well developed, particularly for EH ceramics, there is evidence from studies to suggest the use of ceramics for the storage and consumption of wines and beers during EBII on Crete (Beeston *et al.* 2008; McGovern *et al.* 2008). There is also archaeobotanical evidence for grape and grain remains such as barley at EH sites, including Tsoungiza (Hansen and Allen 2011: 810-887). It is not unreasonable to consider that these may have been utilised for the production of alcohol.

If the decline in fruitstand production and consumption was related to the introduction and widespread use of the sauceboat as suggested by diachronic evidence, then dining etiquette now emphasised pouring rather than dipping or scooping. Whilst both vessels indicate dining within communal settings, it is clear that the specific methods of serving had a different emphasis. The morphology of many sauceboats indicates that the vessel would have to be held with two hands, for example the presence of small or delicate handles such as that of TSO 10/49 (refer to Figure 9.6) would have made pouring with one hand cumbersome or impossible. Therefore, it would not have been possible for the same person pouring to also hold the drinking vessel. This suggests that these vessels were used in communal dining practices that involved reciprocal serving (also discussed by Day and Wilson 2004).

The introduction and widespread use of small saucers alongside sauceboats, also lends support to the idea of communal dining practices associated with the consumption of alcohol, and reciprocal serving. The small size and narrow, or rounded, bases found on some examples of these vessels would have made it difficult to stand them upright without support. This indicates they were intended to be held in the hand rather than laid on a surface such as a table (refer to Figure 9.6). With this in mind it is possible to build a picture whereby such vessels were held whilst a fellow diner poured for you. Their small size also suggests they were not designed to hold a large quantity, such as that expected for a regular meal. This may be more directly related to the potential value, and effects of, alcohol consumption.

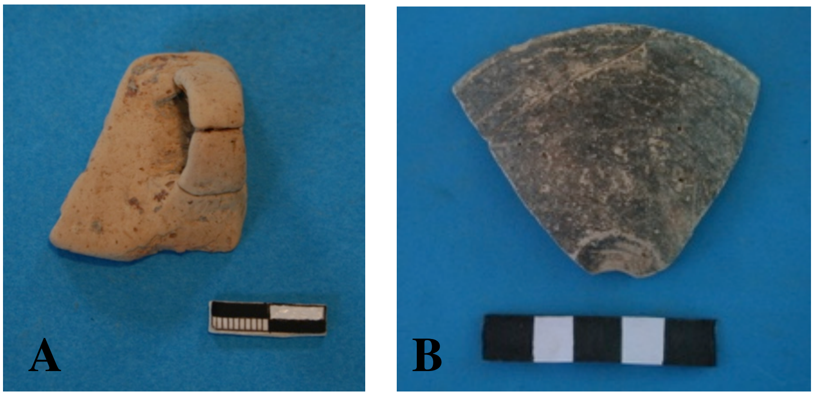


Figure 9.6: A. TSO 10/49 an EHII sauceboat with small handle. B: KER 11/141, and EHII saucer with small inset base.

Communal consumption practices related to drinking are also evidenced from the ceramic assemblage associated with the House of Tiles at Lerna, which contained vessels specifically associated with food and drink preparation and consumption. Particularly notable were the large number of saucers (Weincke estimates that 55 were in current use from Room XI. 2000: 235). It is further testified on a smaller scale from the excavation of *in situ* ceramics from the 'Burnt Room' at Tsoungiza. The presence of 16 complete or near complete small bowls, a jar and an askos are consistent with a drinking set (refer to Figure 9.7. Pullen 2011: 322-323). The jar could have been used to store the liquid, whilst the askos was used to pour into the smaller individual bowls which may have acted as cups.

This image has been removed due to copyright. Figure 9.7: A set of bowls and partial jar from the Burnt Room at Tsoungiza. Taken from Pullen 2011: 323.

These trends for the use of smaller vessels, vessels associated with pouring and the consumption of liquid, are seen across the mainland, and wider Aegean generally during EBII (Warren 1972: 114-7; Wilson and Day 1999: 9; Day and Wilson 2004; Wiencke 2000: 600-601), testifying to the spread of an Aegean wide commensal phenomenon. Whilst it is not the intention or within the scope of this thesis to attempt to recreate potential social structures, the evidence does suggest that groups of people were gathering to take part in specific dining contexts centred on the consumption of liquids. This evidence supports Day and Wilson's suggestion that the move from larger communal ceramic forms in EBI to more individualised vessels in EBII on Crete reflects a significant change in social practice, possibly associated with competition and the negotiation of identity (2004). As discussed by Halstead this was not a new practice. There is evidence for the brewing and consumption of fermented drinks during the Neolithic, as well as the production and consumption of drinking sets (2004: 28). This suggests that such commensal drinking activity was already taking place well before EBII, whilst the EBIII ceramic evidence indicates that these practices and contexts of communal drinking became more pronounced. During EHII and certainly by EHIII there is the introduction and proliferation of new ceramic shapes such as the tankard and ouzo cup. These vessels again lay emphasis on drinking within communal contexts, with multiple handles on some tankards implying passing of the vessel from one person to another.

Examination of EHIII material at Tsoungiza has shown that although vessel types change in appearance, the consumption of vessels from the key centre at Talioti continues. However, like in EHII there is again a shift in the types of vessels that move, with Talioti vessels at Tsoungiza being confined to a large jar and a tankard, again potentially associated with drinking and the storage of liquid. During this time PG1 dominates the assemblage, associated with dark slips and D-o-L pattern painted decoration which become prevalent decorative techniques. This shift seems to be the cementation of consumption choices *and* technological practices which had already began in EHI.

Events centred on the consumption of food and drink, both historically and within a wide range of cultural setting, have acted as arenas in which different social relationships and behaviour have been played out, particularly in communal contexts (Dietler and Hayden 2001; Hamilakis 1999; Day and Wilson 2004; Peperaki 2004). These events can act as a means for social display, the negotiation of identity, reaffirmation of particular ties and obligations, and assertions of power (Kirch 2001; Dietler 2001; Clarke 2001). In this sense, the EH communal consumption of liquid, and apparent reciprocal nature of the task of pouring, may have had social significance related to the negotiation and affirmation of particular relationships and obligations. Moreover, the presence of Corinthian drinking vessels in the Argolid, and *vice versa*, may indeed relate to gift exchange between communities in each region and a confirmation of community ties.

9.8 Intra-Regional Connection

The final key centre of production identified, is that of Aegina. Whilst this thesis did not include samples from sites on the island, the identification of PG24 at Epidavros, Korakou and Tsoungiza, as well as within comparative material at Delpriza, Agios Pantelimonas and Midea, clearly represent Aeginetan pottery production during EHI and EHII. The variation within the pastes of this fabric group suggests that there were multiple producers working in different areas of the island. These potters used different clays and paste recipes, one which was fine and calcareous whilst the other was coarse and non-calcareous (refer to Figure 9.8). This is suggestive of different ideas and knowledge of suitable raw material sources. The use of a finer and more calcareous clay in EHII was possibly linked to the preference for buff bodied vessels.

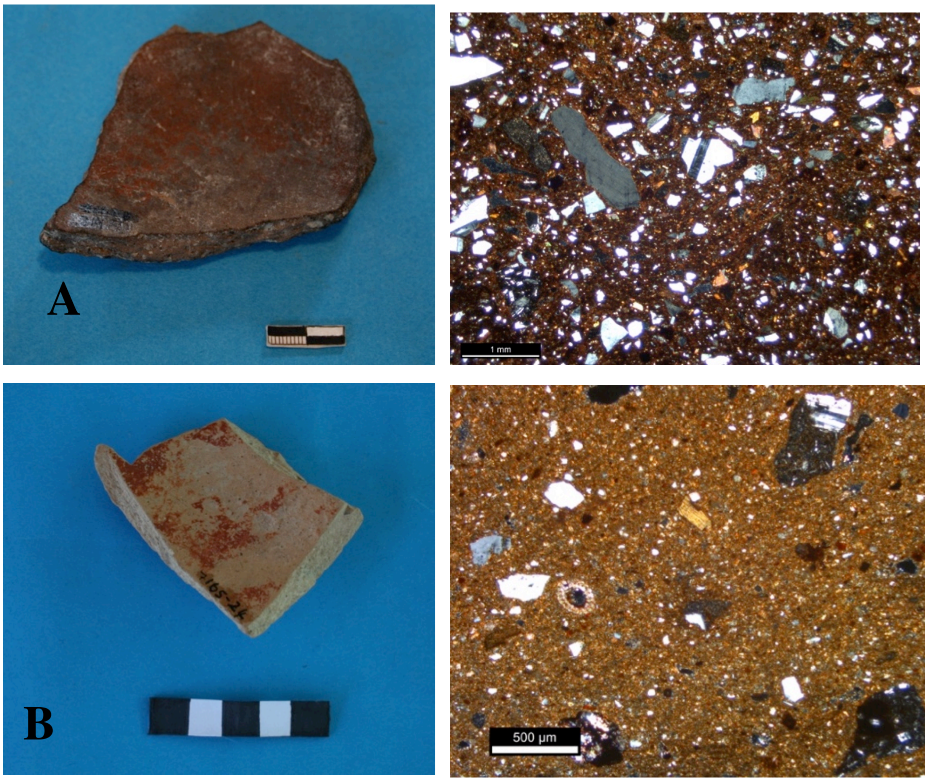


Figure 9.8: A. TSO 10/5 EHI slipped and burnished bowl in PG24A. B: KOR 11/22 EHII bowl with remains of thick red-brown slip in PG24.

The Aeginitan vessels were particularly striking for the shared use of a thick red-brown slip or surface colour, with a good quality burnish in EHI, and the continuation of thick red-brown slips in EHII (refer to Figure 9.8). These techniques were used to decorate vessels both in the calcareous paste recipe and that of the non-calcareous paste. The shared use of decorative techniques indicates that although there were multiple potters using different clay sources, they shared approaches and knowledge about the outward appearance of a vessel. Indeed the high quality finish of Aeginitan vessels may have made them instantly recognisable and desirable.

All the vessels were fired using the same low temperature firing regimes, both in EHI and EHII. This was indicated by the level of optical activity in the calcareous samples, and supported by SEM analysis undertaken on TSO 10/5 from the non-calcareous paste. The use of low firing temperatures was most likely linked to the use of burnished and red slips which would have required lower firing temperature ranges.

The low number of vessels identified both macroscopically and within the sampled material of this thesis, indicates that vessel movement between the island and mainland was not extensive. A possible decrease in Aeginitan vessels in EHII, detected in macroscopic study of assemblages may indicate that distribution became restricted and appears to have declined in Corinthia at least, although comparative material from the Argolid does not show the same decline. This may be related to the increased popularity of dark slipped vessels with light buff bodies, which Aegina does not appear to have been producing at this time. This may also explain the significant decline of Aeginitan vessels identified in Corinthia in particular, as Corinthian potters possibly already had a reputation for producing such wares. They were also clearly already dominating production in Corinthia during EHII with distribution at all sites examined from the NE Peloponnese. Indeed, petrographic analysis undertaken by Gauß and Kiriatzi on EHIII dark on light vessels found at Kolonna on Aegina has revealed many belong to a green firing fabric (FG10) which appears to be a direct match for PG1. Based on chemical data they assign this fabric to Mommsen's Mycenae/Berbati group (2011: 165) but chemical separation of this group from the products of Corinth is fraught with difficulty and it may actually be the suspected Corinthian fine ware group identified in this thesis. The presence of this fabric at Kolonna again indicates a shift in the direction of vessel movement related to tablewares during EHII.

The fact that common EHI bowl forms were exchanged is perhaps unexpected, as such vessels were widely produced locally at each of the sites where Aeginitan examples were consumed. The quality of the vessel finish may have been a factor in the choice of Aeginitan vessels, but it may also be related to the exotic nature of their origin or to exchange mechanisms relating to community ties.

9.9 Conclusion

This chapter has discussed the overall picture of ceramic production and consumption presented by the analytical programme. The examination of the full EH ceramic repertoire, using multiple techniques, and placing the role of choice and *habitus* at the centre of explanations of technological and consumption practices, has enabled the detection of the complex and varied trajectories of ceramic production and consumption behaviour. These results have added a significant degree of detail to the existing petrographic studies from the NE Peloponnese and to the chemical work of Attas, providing information about the scale and distribution of production, and the identification of multiple producers working within the same area. Key amongst these results has been the documentation of the rise of particular centres of production related to shifts in dining practices that demanded new vessel types which they were well placed to produce due to existing technological traditions, knowledge and skills.

It has been suggested that production at Ancient Corinth and Talioti operated on a significant and organised scale, involving multiple potters making a range of vessels. The production traditions at each of these centres crafted vessels with specific aesthetic characteristics for which they had a reputation and which were purposely sought out by consumers. Significantly, production of ceramics at these centres was directly tied into specific dining practices based around commensality and the consumption of particular food or drink. As these dining practices changed over time and demanded new ceramic forms and wares, the spread of vessels from each of these centres changed.

These results show a long history of contact and exchange between communities, with different settlements obtaining vessels from the same key producers. These networks of exchange and contact were most directly linked to the introduction and spread of shared dining practices which may have acted as arenas within which community ties and identity were reaffirmed and renegotiated.

Chapter 10: Conclusions

10.1 Introduction

Chapter 1 of this thesis set out three primary aims:

1. To characterise the raw materials and technological practices involved in the production of EH ceramics;
2. Where possible to identify specific areas of production;
3. To characterise the distribution and consumption trends present during the EH period.

To address these aims, this thesis used an integrated analytical methodology that had three complementary stages. The first was the macroscopic examination of vessels, including fabric and technological details relating to forming, finishing and firing. This allowed for a sampling strategy that attempted to cover a wide range of vessel types and technological details within the EH assemblages at each site, bringing together the typological and technological information observed in each assemblage. Whilst constraints of time, financial resources, and the nature of the material and the deposits available to study, meant that it was not possible to detect and record all the variation within each assemblage, this approach has been able to gather a wide range of data providing significant results about ceramic production and consumption during the EH period.

The second stage of the methodology was petrographic analysis to examine the specific geological character of raw materials used in the production of EH ceramics. This enabled the characterisation of different paste traditions and technological practices in relation to the manipulation of raw materials, as well as the assignment of potential sources. As exemplified by PG7 and PG8 at Ancient Corinth, some of the fabric variation related to natural variability within raw materials, whilst other fabric variation clearly denoted the use of different sources and/or technological practices, for example PG1 in comparison to PG15. These results highlight the need for caution when assigning sources of fabric variation, and future research should consider the potential effect of both human action and natural geology.

The final stage of analysis was to select a sub-set of samples from a range of petrographic fabric groups for more detailed examination of firing practices and surface modification techniques, using SEM. The results of all these analyses were situated within a conceptual framework that placed emphasis on the role of choice and *habitus* as factors influencing different elements of technological practice, examined through the *chaîne opératoire*.

The thesis has argued for a fundamental shift in how we think about and approach the study of the EBA, and the production and consumption of ceramics during this period. Specifically, it has advocated for an approach that examines everyday ceramic crafting and consumption within a period specific context, rather than looking for elements of continuity with later periods.

The overarching aim has been to move away from the traditional top down examination of the Aegean Bronze Age related to social complexity that has masked the distinctions present within different geographical and chronological contexts. To achieve this it has been key to examine a number of sites from across the NE Peloponnese, and to include material that represented the full EH repertoire present at each site. The motivation for such a wide scale approach was to enable not only the characterisation of technological and consumption practices at the individual site level but to also place trends within a regional context. This holistic approach has subsequently enabled discussion of ceramic distribution, spheres of interaction and elements of shared and individual practice.

Key amongst the results of this thesis has been the identification of ceramic production in close proximity to every site within the study but with different production strategies and distribution networks. Importantly, it has identified three key production centres, one at Talioti which was a community of practice who produced a wide range of vessels types but which specialised in the fruitstand form in particular. This production dominated the supply of pottery to surrounding settlements but was also part of a wide reaching distribution network, tied to vessels associated with particular dining practices. A second larger centre of production has been identified at Ancient Corinth which involved the collaborative efforts of a number of producers. This centre produced a comparatively large number of jar and slipped bowl vessel types, and was a specialist producer of dark slipped table ware vessels in particular, which were again part of a wide reaching distribution network. The final key centre of production was located on the island of Aegina whose red-brown slipped and/or burnished vessels were particularly sought after in EHI, but which appears to have had declined in reach during EHII (refer to Table 10.1 for overview of key trends).

Alongside this evidence for key potting communities and specific distribution networks, this thesis has also identified smaller localised potting communities in proximity to Epidavros and Nemea. Some of these testify to long-held potting traditions by a single community with a strong identity and coherence, whilst others were short lived and related to the crafting of pottery by a number of disparate potters rather than a single community of practice. These nuances in pottery production and consumption testify to the range of choices by both potters and consumers made within different communities. It is apparent that EH communities of the NE Peloponnese appear to have outwardly shared dining practices, particularly related to the communal consumption of food/drink, and were all tied into the same distribution networks for specific table ware shapes. However, they also exercised more individualised choices of where to obtain a wide range of other vessels types from.

The evidence for these key centres of production suggest the existence of large scale production with elements of specialisation, directly related to the resources, skills and knowledge of different potting communities. Such a picture does not fit well with our current understandings about EH crafting practice which emphasises small-scale localised production and distribution (Pullen 2014: 78; Shriner 1999). This serves to highlight the need to question the assumptions we have made primarily based on the outward similarities or difference in appearance of ceramic assemblages, and from a processual evolutionary approach.

10.2 Overview of Ceramic Production and Consumption Trends

NE Peloponnese

- Range of raw material sources were utilised between EHI and EHIII indicating a number of potters within the NE Peloponnese;
- Some fabrics (PG20 and PG21) show production throughout the EH period demonstrating long held paste recipe traditions;
- Potters made a wide range of vessel types including both fine ware and coarse ware forms;
- Technological practices identified include: clay mixing, tempering, coiling, and a wide range of firing strategies.

Corinthia

- Production from EHI to EHIII, consistently for fine slipped ware forms which have the widest distribution;
- The range of technological practices identified are confined to clay mixing, and tempering clay for larger vessel types;
- Vessels are dominantly fired at temperatures between 850-1050oC in well-controlled oxidising or O-R atmospheres. The latter indicating the use of a firing structure and sophisticated approach to surface modification.

Nemea

- The use of raw materials consistent with an origin in the Nemea Valley testify to production by a small number of producers between EHI and EHIII;
- A range of vessels were produced for food preparation and consumption, with a limited decorative repertoire;
- Technological practices were based on tempering and fast firing in poorly controlled mixed atmospheres.

Table 10.1: A summary of trends found within this thesis.

Ancient Corinth
• A large number of paste recipes for EHII all utilising raw materials consistent with sources on or near Acrocorinth; • Production involved a number of different potters but the evidence suggests the presence of a large community of practice; • A diverse range of vessels were produced, however, there appears to have been a particular focus on large red slipped bowls, and jar forms. A large number of slipped tablewares, most dominantly dark slipped sauceboats are also suspected to originate from Ancient Corinth; • Vessels were not widely distributed with the notable exception of jars and the suspected Corinthian fine tablewares; • There is the consistent use of iron rich slips on calcareous bodies which are fired to both red and black; • Vessels are fired at both high and low temperatures commonly related to the desired surface colour of the vessel for slipped types;
Talioti
• The raw materials are consistent with an origin in the Talioti Valley; • Production from EHI to EHIII by a number of producers utilising the same raw materials, indicative of a large community of practice; • A wide range of vessels were produced dominantly with orange bodies commonly with orange-red slips and burnishing but appear to have particularly specialised in fruitstands; • Specific distribution patterns are linked to particular vessel types. In EHI the fruitstand form has the widest distribution. In EHII there is a shift to the movement of red slipped and/or fired sauceboats and jars; • Technological practices are very consistent with the long tradition of using a coarse red firing clay and the use of fast open firing techniques.

Table 10.1 continued: A summary of trends found within this thesis.

Epidavros
• Local production using a coarse tuffaceous clay in EHI to EHIII;   • Variation in this tradition relates to tempering with different tempering materials;   • The local paste recipe does not have a wide distribution outside of Epidavros;   • A wide range of vessels were produced but all consistently have a red slip and/or burnish or undecorated finish. Of note, fine tablewares and dark slipped pottery are rare in this fabric, whilst sauceboats are completely absent;   • Technological practices show strong consistency with the use of the same clay, decorative techniques and firing strategies using low temperatures and possibly open firing techniques;   • There is evidence for experimentation with the use of a rotary device in EHII.
Aegina
• Production in EHI and EHII using multiple paste recipes;   • Widespread distribution to a number of different sites in EHI but becomes more limited in EHII;   • Vessels are consistently red-brown slipped and/or highly burnished bowls but includes jars and pithoi in comparative material;   • Technological practices include tempering, burnishing, slipping and the use of low firing temperatures.

Table 10.1 continued: A summary of trends found within this thesis.

The integrated conceptual and analytical approach used in this research has produced a large body of data adding significant detail to our previous understanding of EH ceramic production, distribution and consumption. Specifically, it has confirmed the presence of multiple production areas, and technological approaches to ceramic crafting, as first suggested in the petrographic work at Lerna (Vaughan *et al.* 1995; Betancourt and Myer 2000). Furthermore, it has clarified the picture of vessel movement first presented in the chemical work of Michael Attas (1982; Attas *et al.* 1987), not only confirming the movement of sauceboats but also the movement of a wide range of vessels, including coarsewares that Attas was unable to characterise. Indeed, analysing many of the very same vessels he sampled has provided a much higher degree of resolution to his results, for example the confirmation of a number of producers in a single geographical/geological area and the identification of different potting traditions. Importantly, through examining the full EH repertoire from a large number of sites it has been possible to begin to examine the motivations behind specific distribution and consumption trends.

Of particular note has been the identification of vessel movement specifically related to changing dining practices and the ability of different producing communities to make the required vessel types involved in these dining events. Production of different vessel types was deeply embedded within existing crafting knowledge and traditions at these centres, which produced characteristic pottery types and styles that were purposefully sought out by consumers. As dining practices and consumer tastes shifted over time so too did the reach of these centres and the vessels they produced.

10.3 Directions for Future Work

A key strength of the work of this thesis has been the use of an integrated analytical methodology, complemented by a conceptual framework and examination of a wide range of vessel types present at each site. To continue to build on the picture presented, it is important that future ceramic research considers using such an integrated methodology. Importantly, macroscopic analysis needs to include consideration of fabric and evidence of forming, finishing and firing. It is also key that macroscopic analysis is not used for provenance assumptions alone. Whilst it will enable a broad idea of different fabric types, it is only through petrographic analysis that a true idea of raw material sources can be gained. This is especially important considering the wide distribution and shared nature of many of the raw materials and paste recipes within this thesis, as well as their long history of use in some cases.

To build on and test the conclusions of this work future research needs to also more fully consider how these vessels were used, utilising residue analysis complemented by examination of faunal and botanical information. It is only through a detailed examination of the contents of sauceboats, bowls, fruitstands and jars, that we will understand the nature of the shared dining behaviour that led to their wide distribution. Once we understand this we can also consider more fully, the motivations for these dining practices and changes within them.

The analysis within this thesis would also benefit from a detailed examination of potential raw material sources particularly in the Talioti Valley, the area of Epidavros and around Acrocorinth which was not possible due to time constraints. Whilst it is rare to match geological outcrops directly with ancient ceramics, such work would provide a better understanding of the potential raw materials sources, and their degree of variability, within these areas.

Finally, the current archaeological information for EH settlements and activity in the NE Peloponnese is still greatly lacking in detail. Whilst this is due in part to later disturbance, there are also some key factors resulting from archaeological approaches to the period. Key amongst these is: the incomplete excavation of sites due to a concentration on later archaeology; variable excavation techniques that prevent the identification of clear stratigraphical relationships, particularly a lack of open area and single context excavation; and, the continued concentration on attempting to characterise activities at specific EH sites, such as Lerna, that may not provide information on everyday EH ways of living. Further, the wide geographical and chronological scope of this thesis would also not have been possible without access to important assemblages, particularly those from excavations of the 4th Ephorate of Prehistoric and Classical Antiquities in Nauplio, which are commonly the most recent, and most abundant sources of archaeological finds. It is hoped that this thesis will encourage increased integration and cooperation of analytical programmes with the work of colleagues in the Greek Archaeological Service, who have been exceptional in their generosity, and without whose support many elements of this thesis would not have been possible.

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Appendix I: Ceramic Dataset

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Epidavros Maleatas	12/7	MG2	Fine Green Firing Clay Mix Fabric	PG1		Ring base of small bowl/sauceboat	EHII	Black-brown slip
Epidavros Maleatas	12/18	MG2	Fine Green Firing Clay Mix Fabric	PG1		Base of jug/jar	EHII	Plain
Epidavros Maleatas	12/28	MG2	Fine Green Firing Clay Mix Fabric	PG1		Shallow bowl flat base	EHII	Black slip
Epidavros Maleatas	12/29	MG2	Fine Green Firing Clay Mix Fabric	PG1		Small bowl with flat base	EHII	Black slip
Keramidaki	11/5	MG2	Fine Green Firing Clay Mix Fabric	PG1	KER 6	Bowl	EHII	Black-brown slip
Keramidaki	11/6	MG2	Fine Green Firing Clay Mix Fabric	PG1	KER 7	Ring based bowl	EHII	Black-brown slip
Keramidaki	11/7	MG2	Fine Green Firing Clay Mix Fabric	PG1	KER 8	Bowl rim	EHII	Black-brown slip
Keramidaki	11/13	MG2	Fine Green Firing Clay Mix Fabric	PG1	KER 14	Bowl rim	EHII	Black slip
Keramidaki	11/14	MG2	Fine Green Firing Clay Mix Fabric	PG1	KER 15	Sauceboat	EHII	Black slip
Keramidaki	11/15	MG2	Fine Green Firing Clay Mix Fabric	PG1	KER 16	Sauceboat rim	EHII	Brown slip
Keramidaki	11/31	MG2	Fine Green Firing Clay Mix Fabric	PG1	KER 33	Jar/jug handle	EHII	Brown slip??
Keramidaki	11/59	MG2	Fine Green Firing Clay Mix Fabric	PG1		Ring base of sauceboat/bowl	EHII	Black slip
Keramidaki	11/79	MG2	Fine Green Firing Clay Mix Fabric	PG1		Partial ring base of small bowl or sauceboat	EHII	Red-brown slip
Keramidaki	11/84	MG2	Fine Green Firing Clay Mix Fabric	PG1		Sauceboat spout	EHII	Black-brown slip

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/100	MG2	Fine Green Firing Clay Mix Fabric	PG1		Jug neck and handle	EHII	Plain
Keramidaki	11/129	MG2	Fine Green Firing Clay Mix Fabric	PG1		Shoulder and neck of jug/jar	EHII	Plain
Keramidaki	11/134	MG2	Fine Green Firing Clay Mix Fabric	PG1		Ring base of small bowl/sauceboat	EHII	Plain
Korakou	11/4	MG2	Fine Green Firing Clay Mix Fabric	PG1	KRK 6	Handle of Sauceboat	EHII	Black slip
Korakou	11/12	MG2	Fine Green Firing Clay Mix Fabric	PG1	KRK 14	Spout of Sauceboat	EHII	Black slip
Korakou	11/14	MG2	Fine Green Firing Clay Mix Fabric	PG1	KRK 16	Rim of Sauceboat	EHII	Brown slip
Korakou	11/15	Unassigned	Fine Green Firing Clay Mix Fabric	PG1	KRK 17	Rim of Sauceboat	EHII	Brown wash and burnished?
Korakou	11/20	MG2	Fine Green Firing Clay Mix Fabric	PG1	KRK 22	Bowl with carinated rim	EHII	Black-brown slip
Korakou	11/23	MG2	Fine Green Firing Clay Mix Fabric	PG1	KRK 25	Jug neck/ askos?	EHII	Plain
Korakou	11/25	MG2	Fine Green Firing Clay Mix Fabric	PG1	KRK 27	Bowl base?	EHII	Plain
Korakou	11/26	MG2	Fine Green Firing Clay Mix Fabric	PG1	KRK 28	Jug neck	EHII	Plain
Tsoungiza	10/26	MG2	Fine Green Firing Clay Mix Fabric	PG1		Fruitstand	EHI	Black slip.
Tsoungiza	10/36	MG2	Fine Green Firing Clay Mix Fabric	PG1		Fruitstand	EHI	Black-brown slip Dark on Light pattern painted

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/39	MG2	Fine Green Firing Clay Mix Fabric	PG1		Jar	EHI	Burnished
Tsoungiza	10/44	MG2	Fine Green Firing Clay Mix Fabric	PG1		Bowl	EHIIE	Red-brown-black slip

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Tsoungiza	10/49	MG2	Fine Green Firing Clay Mix Fabric	PG1	Sauceboat	EHIIE	Red-brown-black slip
Tsoungiza	10/61	MG2	Fine Green Firing Clay Mix Fabric	PG1	Shallow Bowl	EHIIE	Black slip
Tsoungiza	10/70	MG2	Fine Green Firing Clay Mix Fabric	PG1	Incurving Bowl	EHIIE	Black-brown-red slip
Tsoungiza	10/74	MG2	Fine Green Firing Clay Mix Fabric	PG1	Bowl	EHIIE	Black slip
Tsoungiza	10/80	Unassigned	Fine Green Firing Clay Mix Fabric	PG1	Pyxis	EHIID	Brown slip? Burnished
Tsoungiza	10/81	MG2	Fine Green Firing Clay Mix Fabric	PG1	Sauceboat	EHIID	Orange slip-wash
Tsoungiza	10/98	MG2	Fine Green Firing Clay Mix Fabric	PG1	Inturned Bowl	EHIID	Black slip
Tsoungiza	10/101	MG2	Fine Green Firing Clay Mix Fabric	PG1	Sauceboat	EHIID	Black slip
Tsoungiza	10/108	MG2	Fine Green Firing Clay Mix Fabric	PG1	Sauceboat	EHIID	Black-brown slip dark on light pattern painted
Tsoungiza	10/109	MG2	Fine Green Firing Clay Mix Fabric	PG1	Sauceboat	EHIID	Black slip
Tsoungiza	10/114	MG2	Fine Green Firing Clay Mix Fabric	PG1	Pyxis	EHIID	Black-brown slip dark on light pattern painted

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Tsoungiza	10/115	MG2	Fine Green Firing Clay Mix Fabric	PG1	Sauceboat	EHIID	Black slip dark on light pattern painted
Tsoungiza	10/116	MG2	Fine Green Firing Clay Mix Fabric	PG1	Sauceboat	EHIID	Black slip
Tsoungiza	10/121	Unassigned	Fine Green Firing Clay Mix Fabric	PG1	Jug or Narrow-necked jar	EHIII	Black-brown slip dark on light pattern painted
Tsoungiza	10/125	MG2	Fine Green Firing Clay Mix Fabric	PG1	Tankard	EHIII	Black slip dark on light pattern painted
Tsoungiza	10/126	MG2	Fine Green Firing Clay Mix Fabric	PG1	Tankard?	EHIII	Black slip dark on light pattern painted
Tsoungiza	10/127	MG2	Fine Green Firing Clay Mix Fabric	PG1	Bass Bowl	EHIII	Black-brown slip dark on light pattern painted
Tsoungiza	10/131	MG2	Fine Green Firing Clay Mix Fabric	PG1	Jar	EHIII	Black slip dark on light pattern painted
Tsoungiza	10/136	MG2	Fine Green Firing Clay Mix Fabric	PG1	Tankard	EHIII	Black slip dark on light pattern painted
Tsoungiza	10/138	MG2	Fine Green Firing Clay Mix Fabric	PG1	Askos	EHIII	Black brown slip dark on light pattern painted
Tsoungiza	10/142	Unassigned	Fine Green Firing Clay Mix Fabric	PG1	Tankard?	EHIII	Burnished
Tsoungiza	10/146	MG2	Fine Green Firing Clay Mix Fabric	PG1	Bass Bowl	EHIII	Black slip dark on light pattern painted
Tsoungiza	10/149	MG2	Fine Green Firing Clay Mix Fabric	PG1	Bass Bowl	EHIII	Black slip dark on light pattern painted

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/151	MG2	Fine Green Firing Clay Mix Fabric	PG1		Tankard	EHIII	Black slip dark on light pattern painted
Tsoungiza	10/155	Unassigned	Fine Green Firing Clay Mix Fabric	PG1		Kantharos	EHIII	Burnished
Epidavros Maleatas	12/2	MG2	Fine Green Firing Clay Mix Fabric	PG1A		Small incurving bowl	EHII	Black-brown slip
Epidavros Maleatas	12/3	MG2	Fine Green Firing Clay Mix Fabric	PG1A		Deep bowl with flaring rim	EHII	Black-brown slip
Epidavros Maleatas	12/17	Unassigned	Fine Green Firing Clay Mix Fabric	PG1A		Bowl/Sauceboat Body sherd	EHII	Black slip
Keramidaki	11/8	MG2	Fine Green Firing Clay Mix Fabric	PG1A	KER 9	Sauceboat	EHII	Orange-brown slip
Keramidaki	11/9	MG2	Fine Green Firing Clay Mix Fabric	PG1A	KER 10	Sauceboat	EHII	Black-brown slip
Keramidaki	11/10	MG2	Fine Green Firing Clay Mix Fabric	PG1A	KER 11	Ring based bowl/Sauceboat	EHII	Black-brown slip
Keramidaki	11/16	MG2M	Fine Green Firing Clay Mix Fabric	PG1A	KER 17	Sauceboat spout	EHII	Black slip
Keramidaki	11/17	MG2	Fine Green Firing Clay Mix Fabric	PG1A	KER 18	Sauceboat spout	EHII	Black-brown slip
Keramidaki	11/30	MG2	Fine Green Firing Clay Mix Fabric	PG1A	KER 32	Everted rim of jar	EHII	Plain
Keramidaki	11/45	MG2	Fine Green Firing Clay Mix Fabric	PG1A	KER 52	Sauceboat rim	EHII	Black-brown slip
Keramidaki	11/95	MG2	Fine Green Firing Clay Mix Fabric	PG1A		Body and inturned rim of bowl	EHII	Red-brown slip
Keramidaki	11/96	MG2	Fine Green Firing Clay Mix Fabric	PG1A		Small bowl/saucer	EHII	Black-brown slip

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/139	MG2	Fine Green Firing Clay Mix Fabric	PG1A		Ring base of sauceboat/bowl	EHII	Red-brown slip
Keramidaki	11/143	Unassigned	Fine Green Firing Clay Mix Fabric	PG1A		Ladle handle	EHII	Red-orange-brown slip
Tsoungiza	10/130	Unassigned	Fine Green Firing Clay Mix Fabric	PG1A		Pyxis	EHIII	Brown slip dark on light pattern painted
Tsoungiza	10/144	Unassigned	Fine Green Firing Clay Mix Fabric	PG1A		Bass Bowl	EHIII	Black slip and burnished
Tsoungiza	10/152	Unassigned	Fine Green Firing Clay Mix Fabric	PG1A		Bass Bowl	EHIII	Brown-black slip and burnished
Keramidaki	11/11	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KER 12	Flat based bowl	EHII	Orange-brown slip
Keramidaki	11/12	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KER 13	Bowl	EHII	Red-orange-brown slip
Keramidaki	11/46	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KER 53	Sauceboat rim	EHII	Black slip
Keramidaki	11/48	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KER 55	Coarse bowl rim	EHII	Black-brown slip
Keramidaki	11/61	MG9	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Jar with inturned rim	EHII	Black-brown slip
Keramidaki	11/83	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Horizontal handle of sauceboat	EHII	Black-brown slip

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/85	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Rim of small bowl	EHII	Brown slip
Keramidaki	11/87	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Base of bowl	EHII	Black-brown slip
Keramidaki	11/137	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Everted rim of jar	EHII	Red-brown slip/wash
Keramidaki	11/141	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Small saucer	EHII	Black-brown slip
Keramidaki	11/144	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Bowl	EHII	Brown slip/wash
Korakou	11/3	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KRK 5	Handle of Sauceboat	EHII	Black-brown slip
Korakou	11/7	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KRK 9	Partial handle of sauceboat	EHII	Black-brown slip
Korakou	11/8	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KRK 10	Handle of sauceboat	EHII	Applied and black-brown slip
Korakou	11/10	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KRK 12	Spout of Sauceboat	EHII	Black slip
Korakou	11/11	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KRK 13	Spout of Sauceboat	EHII	Brown slip

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Korakou	11/19	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KRK 21	Bowl	EHII	Black-brown slip
Korakou	11/21	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	KRK 23	Bowl	EHII	Black slip
Tsoungiza	10/16	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Incurving Bowl	EHI	Red slip and burnished
Tsoungiza	10/17	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Jug	EHI	Red slip and burnished
Tsoungiza	10/20	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Bowl	EHI	Incised
Tsoungiza	10/47	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Ring Base	EHIIE	Red-brown slip and burnished
Tsoungiza	10/48	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Sauceboat	EHIIE	Red-orange slip
Tsoungiza	10/52	MG18	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Handle	EHIIE	Red-brown slip-wash
Tsoungiza	10/60	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Askos?	EHIIE	Incised

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Tsoungiza	10/64	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Incurving Bowl	EHIIE	Red-orange slip
Tsoungiza	10/75	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Incurving Bowl	EHIIE	Red-orange slip
Tsoungiza	10/83	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Beaked Jug	EHIID	Plain
Tsoungiza	10/85	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Carinated Bowl	EHIID	Black slip
Tsoungiza	10/89	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Small Shallow Bowl	EHIID	Brown slip
Tsoungiza	10/90	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Incurving Bowl	EHIID	Red-brown slip Dark on Light
Tsoungiza	10/92	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Bowl	EHIID	Black slip
Tsoungiza	10/94	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Ring Base	EHIID	Red-brown slip
Tsoungiza	10/96	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Sauceboat	EHIID	Red-black slip
Tsoungiza	10/105	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Carinated Bowl	EHIID	Red-black slip
Tsoungiza	10/106	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Ladle	EHIID	Black-brown slip
Tsoungiza	10/111	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2	Incurving Bowl	EHIID	Red-brown slip

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/129	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Pyxis?	EHIII	Black-brown slip dark on light pattern painted
Tsoungiza	10/147	Unassigned	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Bowl	EHIII	Burnished
Tsoungiza	10/150	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Tankard	EHIII	Red-brown slip dark on light pattern painted
Tsoungiza	10/153	MG2	Medium Fine Clay Mix with Rounded Pellets Fabric	PG2		Bass Bowl	EHIII	Brown slip dark on light pattern painted
Keramidaki	11/1	MG2	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3	KER 1	Strap handle of jar	EHII	Plain
Keramidaki	11/3	MG9	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3	KER 4	Jar with horizontal handle	EHII	Plain
Keramidaki	11/28	Unassigned	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3	KER 30	Strap handle	EHII	White slip?
Keramidaki	11/68	Unassigned	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Sauceboat	EHII	Grey slip (yellow-blue mottled) and burnished
Keramidaki	11/91	MG9	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Everted rim of large globular jar	EHII	Black-brown slip
Keramidaki	11/104	MG5	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Body sherd of pithos	EHII	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/107	MG9	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Body sherd of large bowl	EHII	Black slip
Keramidaki	11/117	Unassigned	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Base of jug/jar	EHII	Plain
Keramidaki	11/121	MG12	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Base of large bowl	EHII	Black slip
Keramidaki	11/140	Unassigned	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Ring base saucer/small bowl	EHII	Black slip
Korakou	11/34	Unassigned	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3	KRK 36	Jar body sherd	EHII	Applied Taenia, incised and black-brown slip
Tsoungiza	10/18	MG3	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Bowl	EHI	Impressed and red slip
Tsoungiza	10/19	MG3	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Flat Base	EHI	Red and brown slip and burnished
Tsoungiza	10/32	MG3	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Lug	EHI	Brown-black slip
Tsoungiza	10/46	Unassigned	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Cup or Scoop	EHIIE	Brown slip
Tsoungiza	10/99	MG3	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Incurving Bowl	EHIID	Incised

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/102	MG2	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Small Bowl	EHIID	Black slip
Tsoungiza	10/140	MG18	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Jar	EHIII	Applied Taenia Type D and black slip/wash
Tsoungiza	10/141	MG18	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3		Jar	EHIII	Applied Taenia Type D and black slip/wash
Epidavros Maleatas	12/40	MG18	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3A		Pithos	EHIII	Plain
Keramidaki	11/20	MG15	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3A	KER 21	Neck of jug/jar	EHII	Plain
Keramidaki	11/27	Unassigned	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3A	KER 29	Body sherd	EHII	Plain
Tsoungiza	10/51	MG18	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3A		Jar	EHIIE	Brown slip-wash
Tsoungiza	10/69	MG18	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3A		Pithos	EHIIE	Plain
Tsoungiza	10/78	MG3	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3A		Firedog Stand	EHIIE	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Tsoungiza	10/79	Unassigned	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3A	Askos?	EHIIE	Incised and red-orange slip
Tsoungiza	10/82	MG3	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3A	Large Jar or Pithos	EHIID	Plain
Tsoungiza	10/84	MG3	Fine-Medium Fine Clay Mix with Angular Mudstone Fabric	PG3A	Pithos	EHIID	Burnished?
Tsoungiza	10/4	MG6	Fine Optically Active Orange Fabric	PG4	Hemispherical Bowl	EHI	Red-orange slip/wash
Tsoungiza	10/22	MG6	Fine Optically Active Orange Fabric	PG4	Spreading Bowl	EHI	Impressed/stamp and red-orange slip
Tsoungiza	10/34	MG6	Fine Optically Active Orange Fabric	PG4	Jar	EHI	Burnished
Tsoungiza	10/38	MG6	Fine Optically Active Orange Fabric	PG4	Spreading Bowl	EHI	Impressed/stamp and orange-brown slip
Tsoungiza	10/122	Unassigned	Fine Optically Active Orange Fabric	PG4	Tankard	EHIII	Red slip and white slip dark on light pattern painted
Tsoungiza	10/123	Unassigned	Fine Optically Active Orange Fabric	PG4A	Jug	EHIII	Red-brown slip dark on light pattern painted
Tsoungiza	10/133	Unassigned	Fine Optically Active Orange Fabric	PG4A	Bass Bowl	EHIII	Burnished

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Tsoungiza	10/154	MG6	Fine Optically Active Orange Fabric	PG4A	Ouzo Cup	EHIII	Brown slip dark on light pattern painted
Tsoungiza	10/8	MG6	Fine Optically Active Orange Fabric	PG4B	Jar	EHI	Red slip
Tsoungiza	10/54	Unassigned	Angular Mudstone, Siltstone and Chert Fabric	PG5	Incurving Bowl	EHIIE	Applied Taenia Type A
Tsoungiza	10/55	MG18	Angular Mudstone, Siltstone and Chert Fabric	PG5	Firedog Stand	EHIIE	Plain
Tsoungiza	10/57	MG8	Angular Mudstone, Siltstone and Chert Fabric	PG5	Firedog Stand	EHIIE	Plain
Tsoungiza	10/58	MG8	Angular Mudstone, Siltstone and Chert Fabric	PG5	Flat Base	EHIIE	Plain
Tsoungiza	10/63	MG8	Angular Mudstone, Siltstone and Chert Fabric	PG5	Incurving Bowl	EHIIE	Applied Taenia Type C
Tsoungiza	10/65	MG8	Angular Mudstone, Siltstone and Chert Fabric	PG5	Firedog Stand	EHIIE	Applied Taenia Type C
Tsoungiza	10/66	MG3	Angular Mudstone, Siltstone and Chert Fabric	PG5	Jar	EHIIE	Brown slip-wash
Tsoungiza	10/67	MG3	Angular Mudstone, Siltstone and Chert Fabric	PG5	Cup	EHIIE	Red-brown slip
Tsoungiza	10/73	MG8	Angular Mudstone, Siltstone and Chert Fabric	PG5	Firedog Stand	EHIIE	Plain
Tsoungiza	10/62	Unassigned	Angular Mudstone, Siltstone and Chert Fabric (with vegetal temper)	PG5A	Askos?	EHIIE	Black slip
Tsoungiza	10/68	MG8	Angular Mudstone, Siltstone and Chert Fabric (with vegetal temper)	PG5A	Firedog Stand	EHIIE	Applied Taenia Type C
Tsoungiza	10/35	MG5	Chert, Micrite and Mudstone Fabric	PG6	Flat Base	EHI	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/6	MG5	Chert, Micrite and Mudstone Fabric	PG6		Deep Bowl	EHI	Plain
Tsoungiza	10/10	Unassigned	Chert, Micrite and Mudstone Fabric	PG6		Incurving Bowl	EHI	Brown slip and burnished
Tsoungiza	10/12	MG8	Chert, Micrite and Mudstone Fabric	PG6		Incurving Bowl	EHI	Applied Taenia Type C
Tsoungiza	10/21	Unassigned	Chert, Micrite and Mudstone Fabric	PG6		Incurving Bowl	EHI	Applied Taenia Type C
Tsoungiza	10/143	Unassigned	Chert, Micrite and Mudstone Fabric (with grog)	PG6A		Bass Bowl	EHIII	Burnished
Keramidaki	11/18	MG14	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7	KER 19	Basin	EHII	Red-orange slip and burnished?
Keramidaki	11/24	MG15	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7	KER 26	Pot stand	EHII	Plain
Keramidaki	11/36	MG15	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7	KER 41	Bowl	EHII	Orange-brown slip
Keramidaki	11/51	MG13	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7	KER 55	Coarse jar base	EHII	White slip?
Keramidaki	11/52	MG13	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7	KER 59	Baking pan body sherd	EHII	Plain
Keramidaki	11/53	MG13	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7	KER 60	Jar	EHII	Applied and red-brown slip

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/66	MG13	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7		Vertical strap handle of large bowl or jar	EHII	Red-brown slip
Keramidaki	11/72	MG13	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7		Inturned rim of bowl	EHII	Plain
Keramidaki	11/73	MG13	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7		Body sherd of bowl?	EHII	Burnished?
Keramidaki	11/77	MG14	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7		Hearth/baking pan?	EHII	Plain
Keramidaki	11/78	MG14	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7		Body and partial base of bowl	EHII	Red-brown slip
Keramidaki	11/94	MG15	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7		Partial base of large bowl	EHII	Red slip
Keramidaki	11/124	MG15	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7		Vertical strap handle of jar	EHII	Plain
Korakou	11/1	MG15	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7	KRK 3	Pedestalled base Sauceboat	EHII	Brown-black slip
Korakou	11/30	Unassigned	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7	KRK 32	Baking pan	EHII	Plain
Keramidaki	11/39	MG13	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7A	KER 44	Base jar?	EHII	Plain?

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/67	MG14	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7A		Strap handle of collared jar	EHII	Red-orange slip
Keramidaki	11/71	MG13	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7A		Coarse bowl	EHII	Applied
Keramidaki	11/97	MG14	Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric	PG7A		Rim of incurving bowl	EHII	Red slip
Keramidaki	11/19	MG15	Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric	PG8	KER 20	Basin	EHII	Red-brown slip and burnished?
Keramidaki	11/23	Unassigned	Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric	PG8	KER 25	Body sherd	EHII	Plain
Keramidaki	11/35	MG15	Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric	PG8	KER 40	Large jug spout	EHII	Plain?
Keramidaki	11/49	MG14	Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric	PG8	KER 56	Base of large bowl	EHII	Plain
Keramidaki	11/70	MG13	Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric	PG8		Strap handle from jar	EHII	Plain
Keramidaki	11/89	MG13	Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric	PG8		Shallow bowl	EHII	Applied Taenia
Keramidaki	11/112	MG13	Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric	PG8		Ring base of bowl or jar?	EHII	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/114	MG15	Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric	PG8		Ring base of bowl or jar?	EHII	Plain
Keramidaki	11/33	MG11	Argillite Fabric	PG9	KER 38	Large bowl	EHII	Red-brown slip?
Keramidaki	11/38	MG11	Argillite Fabric	PG9	KER 43	Neck of jug/jar	EHII	Plain
Keramidaki	11/47	MG11	Argillite Fabric	PG9	KER 54	Jar neck	EHII	Red-brown slip?
Keramidaki	11/50	MG11	Argillite Fabric	PG9	KER 57	Body sherd jar	EHII	Black-brown slip
Keramidaki	11/93	Unassigned	Argillite Fabric	PG9		Body sherd of large jar	EHII	Plain
Keramidaki	11/101	MG11	Argillite Fabric	PG9		Ring base of large bowl	EHII	Red slip
Keramidaki	11/119	MG11	Argillite Fabric	PG9		Base of jar	EHII	Plain
Keramidaki	11/122	MG11	Argillite Fabric	PG9		Ring base of large bowl	EHII	Plain
Keramidaki	11/125	MG11	Argillite Fabric	PG9		Jar with out-turned rim	EHII	Plain
Keramidaki	11/128	MG11	Argillite Fabric	PG9		Low collar of large globular jar	EHII	Plain
Korakou	11/32	MG11	Argillite Fabric	PG9	KRK 34	Bowl	EHII	Red-brown slip and burnished?
Keramidaki	11/29	MG2	Argillite Fabric	PG9A	KER 31	Jar base?	EHII	Plain?
Keramidaki	11/60	MG9	Argillite Fabric	PG9A		Sauceboat	EHII	Black-brown slip
Keramidaki	11/126	MG9	Argillite Fabric	PG9A		Collar of jar	EHII	Plain
Keramidaki	11/130	MG9	Argillite Fabric	PG9A		Everted neck of jar	EHII	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Korakou	11/24	MG9	Argillite Fabric	PG9A	KOR 26	Jug tall neck	EHII	Plain
Keramidaki	11/32	MG14	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10	KER 37	Large bowl	EHII	Red-brown slip
Keramidaki	11/34	MG14	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10	KER 39	Ring base of large bowl	EHII	Red-brown slip
Keramidaki	11/37	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10	KER 42	Large shallow bowl	EHII	Brown slip
Keramidaki	11/81	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10		Large shallow bowl	EHII	Red-brown slip
Keramidaki	11/98	MG11	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10		Bowl with inturned rim	EHII	Red-orange slip
Keramidaki	11/99	MG11	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10		Incurving bowl	EHII	Red-brown slip
Keramidaki	11/123	MG11	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10		Large incurving shallow bowl	EHII	Orange-brown slip
Keramidaki	11/2	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A	KER 3	Jar Handle	EHII	Plain
Keramidaki	11/4	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A	KER 5	Strap Handle	EHII	Plain
Keramidaki	11/41	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A	KER 47	Twisted handle jug	EHII	Twisted

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/42	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A	KER 48	Double spouted vessel	EHII	Plain
Keramidaki	11/43	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A	KER 49	Shoulder and neck of jug	EHII	Plain
Keramidaki	11/44	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A	KER 50	Jar body sherd	EHII	Plain
Keramidaki	11/62	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A		Inturned rim of bowl	EHII	Plain
Keramidaki	11/63	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A		Jug/Jar	EHII	Red-orange-brown slip?
Keramidaki	11/69	Unassigned	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A		Everted rim of jar	EHII	Plain?
Keramidaki	11/80	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A		Jug/jar with vertical strap handle	EHII	Plain
Keramidaki	11/102	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A		Vertical strap handle of jar	EHII	Plain
Keramidaki	11/127	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A		Shoulder of large jar	EHII	Plain
Keramidaki	11/132	MG9	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A		Rim of cup?	EHII	Applied

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/135	MG12	Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric	PG10A		Ring base of large bowl	EHII	Black slip
Keramidaki	11/56	MG10	Rounded Serpentinite Fabric	PG11	KER 63	Rim of coarse jar/basin?	EHII	Black slip?
Korakou	11/27	MG10	Rounded Serpentinite Fabric	PG11	KRK 29	Ladle handle	EHII	Black-brown slip
Keramidaki	11/21	MG12	Angular Chert and Altered Volcanic Rock Fragments Fabric	PG12	KER 22	Ladle handle	EHII	Plain
Keramidaki	11/74	MG12	Angular Chert and Altered Volcanic Rock Fragments Fabric	PG12		Incurving rim of deep bowl/cooking pot	EHII	Plain
Keramidaki	11/88	MG12	Angular Chert and Altered Volcanic Rock Fragments Fabric	PG12		Large bowl/cooking pot	EHII	Applied Taenia
Keramidaki	11/92	MG12	Angular Chert and Altered Volcanic Rock Fragments Fabric	PG12		Rim of bowl	EHII	Plain
Korakou	11/15	Unassigned	Fine Quartz Rich Fabric	PG13	KRK 17	Body sherd of Sauceboat	EHII	Burnished (Yellow/Blue mottled)
Korakou	11/28	Unassigned	Fine Quartz Rich Fabric	PG13	KRK 30	Handle	EHII	Brown-red slip
Keramidaki	11/25	MG5	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14	KER 27	Pot stand	EHII	Plain
Keramidaki	11/40	MG12	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14	KER 46	Rim of storage jar/basin	EHII	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/57	MG12	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14	KER 64	Coarse bowl	EHII	Applied
Keramidaki	11/75	MG11	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14		Rim of cooking pot	EHII	Plain
Keramidaki	11/76	MG8	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14		Body fragment of cooking pot	EHII	Plain
Keramidaki	11/90	MG5	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14		Pithos rim	EHII	Plain
Keramidaki	11/103	MG5	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14		Pithos rim	EHII	White slip?
Keramidaki	11/105	MG14	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14		Rounded base of large jar	EHII	Plain
Keramidaki	11/120	MG12	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14		Large bowl	EHII	Red-brown slip
Korakou	11/29	M18	Medium fine Clay Mix with Mudstone, Siltstone and Mudstone Breccia Fabric	PG14	KRK 31	Baking pan	EHII	Plain
Epidavros Maleatas	12/31	Unassigned	Sandstone to Low-Grade Metamorphic Fabric	PG15		Deep bowl with flaring rim	EHII?	Plain
Epidavros Maleatas	12/4	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Ring base of small bowl or sauceboat	EHII	Plain
Epidavros Maleatas	12/6	MG2	Sandstone to Low-Grade Metamorphic Fabric	PG15		Jug/Jar base	EHII	Brown slip?

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Epidavros Maleatas	12/8	MG2	Sandstone to Low-Grade Metamorphic Fabric	PG15		Collar of jar	EHII	Plain
Epidavros Maleatas	12/19	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Collar of jar	EHII	Plain
Epidavros Maleatas	12/37	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Large bowl/dish	EHII	Plain
Epidavros Maleatas	12/42	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Jar collar	EHI?	Plain
Korakou	11/6	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	KRK 8	Partial handle of Sauceboat	EHII	Red-brown slip
Talioti	11/30	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Jar with offset neck	EHI	Plain
Talioti	11/31	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Fruitstand rim	EHI	Plain
Talioti	11/14	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Jar/Jug vertical handle	EHI	Plain
Talioti	11/1	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Fruitstand rim	EHI	Raised
Talioti	11/2	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Fruitstand rim	EHI	Raised
Talioti	11/3	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Fruitstand rim	EHI	Incised
Talioti	11/4	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Fruitstand rim	EHI	Plain
Talioti	11/5	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Large shallow bowl	EHI	Plain
Talioti	11/6	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Jar horizontal handle	EHI	Plain
Talioti	11/7	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15		Jar base	EHI	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Talioti	11/8	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Jar base	EHI	Plain
Talioti	11/10	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Ladle	EHI	Red slip
Talioti	11/11	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Jar	EHI	Red slip
Talioti	11/12	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Stand?	EHI	Plain
Talioti	11/13	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Large shallow bowl	EHI	Red slip
Talioti	11/16	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand rim	EHI	Incised
Talioti	11/17	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Small incurving bowl	EHI	Plain?
Talioti	11/19	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Jar handle	EHI	Red-black slip?
Talioti	11/20	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand rim	EHI	Raised
Talioti	11/21	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Jar body	EHI	Plain
Talioti	11/22	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand rim with partial handle	EHI	Raised
Talioti	11/23	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Large bowl/jar base	EHI	Red slip
Talioti	11/24	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Incurving bowl rim	EHI	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Talioti	11/25	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand pedestal	EHI	Applied
Talioti	11/26	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand pedestal	EHI	Incised
Talioti	11/27	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Bowl rim	EHI	Plain
Talioti	11/29	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Jar base	EHI	Red slip
Tsoungiza	10/7	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Large Basin	EHI	Incised and red slip
Tsoungiza	10/9	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand	EHI	Red slip and burnished
Tsoungiza	10/14	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Flat Bowl Base	EHI	Red slip
Tsoungiza	10/23	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand Pedestal	EHI	Red-orange slip
Tsoungiza	10/33	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand	EHI	Incised and red-orange slip
Tsoungiza	10/40	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Ladle	EHI	Red-orange slip
Tsoungiza	10/41	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand	EHI	Incised and red-orange slip
Tsoungiza	10/42	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Fruitstand Pedestal	EHI	Incised and red-orange slip
Tsoungiza	10/100	MG1	Sandstone to Low-Grade Metamorphic Fabric	PG15	Jar handle	EHIID	Red-brown slip
Tsoungiza	10/128	MG18	Sandstone to Low-Grade Metamorphic Fabric	PG15	Tankard	EHIII	Brown slip dark on light pattern painted
Keramidaki	11/133	Unassigned	Sandstone to Low-Grade Metamorphic Fabric (with mudstone)	PG15A	Large bowl/basin with flaring rim	EHII	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Talioti	11/9	Unassigned	Sandstone to Low-Grade Metamorphic Fabric (with mudstone)	PG15A	Storage jar	EHI	Applied
Talioti	11/15	MG1	Sandstone to Low-Grade Metamorphic Fabric (with mudstone)	PG15A	Jar	EHI	Applied
Talioti	11/18	MG1	Sandstone to Low-Grade Metamorphic Fabric (with mudstone)	PG15A	Jar/cooking pot base	EHI	Plain
Talioti	11/28	MG1	Sandstone to Low-Grade Metamorphic Fabric (with mudstone)	PG15A	Jar with offset rim	EHI	Plain
Tsoungiza	10/43	MG1	Sandstone to Low-Grade Metamorphic Fabric (fine)	PG15B	Small Shallow Bowl	EHIIE	Red slip?
Tsoungiza	10/104	MG18	Sandstone to Low-Grade Metamorphic Fabric (fine)	PG15B	Jar	EHIID	Grey-black slip and burnished?
Tsoungiza	10/88	Unassigned	Mudstone, Siltstone and Chert Fabric	PG16	Incurving Bowl	EHIID	Plain
Tsoungiza	10/93	MG18	Mudstone, Siltstone and Chert Fabric	PG16	Incurving Bowl	EHIID	Applied Taenia Type E and red-orange slip
Tsoungiza	10/113	Unassigned	Mudstone, Siltstone and Chert Fabric	PG16	Incurving Bowl	EHIID	Brown slip
Epidavros Maleatas	12/10	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Base of jug/jar	EHII	Plain
Epidavros Maleatas	12/15	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Shallow bowl with partial base	EHI	Red-brown slip and burnished
Epidavros Maleatas	12/21	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Baking pan	EHII	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Epidavros Maleatas	12/22	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Deep basin	EHII	Red-brown slip and burnished?
Epidavros Maleatas	12/23	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Flat base of jar	EHII	Plain
Epidavros Maleatas	12/24	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Pot stand	EHII	Plain
Epidavros Maleatas	12/25	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Baking pan	EHII	Plain
Epidavros Maleatas	12/26	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Baking pan	EHII	Plain
Epidavros Maleatas	12/30	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Deep bowl/basin	EHI	Red-brown slip
Epidavros Maleatas	12/32	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Jar	EHII	Red-brown slip
Epidavros Maleatas	12/33	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Basin	EHI	Red-brown slip and burnished
Epidavros Maleatas	12/35	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Basin	EHI	Brown slip and burnished
Epidavros Maleatas	12/36	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Basin with horizontal handle	EHI	Plain
Epidavros Maleatas	12/39	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Cooking pot base (hollow)	EHII	Plain
Epidavros Maleatas	12/41	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Cup/Brazier (Lerna type)	EHIII	Cut out and burnished
Epidavros Maleatas	11/43	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Bowl with flaring rim	EHII	Black slip and burnished

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Epidavros Maleatas	11/44	MG16	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Bowl	EHII	Red-brown slip and burnished?
Epidavros Maleatas	11/45	Unassigned	Tuffaceous Rock Fragments and Feldspar Fabric	PG17	Bowl	EHII	Red-brown slip and burnished?
Epidavros Maleatas	12/5	MG16	Tuffaceous Rock Fragments and Feldspar Fabric (with vegetal temper)	PG17A	Deep bowl/basin	EHI	Brown slip and burnished?
Epidavros Maleatas	12/13	MG17	Tuffaceous Rock Fragments and Feldspar Fabric (with vegetal temper)	PG17A	Body sherd cooking pot?	EHI	Plain
Epidavros Maleatas	12/14	MG17	Tuffaceous Rock Fragments and Feldspar Fabric (with vegetal temper)	PG17A	Large bowl/basin with flat rim	EHI	Plain
Epidavros Maleatas	12/16	MG17	Tuffaceous Rock Fragments and Feldspar Fabric (with vegetal temper)	PG17A	Bowl with slightly flaring rim	EHI	Burnished?
Epidavros Maleatas	12/34	MG16	Tuffaceous Rock Fragments and Feldspar Fabric (with andesite temper)	PG17B	Shallow bowl	EHI	Red-brown slip and burnished
Keramidaki	11/64	MG14	Sandstone and Altered Sandstone with Micritic Veins	PG18	Inturned rim of bowl	EHII	Red-orange slip
Tsoungiza	10/45	Unassigned	Sandstone and Altered Sandstone with Micritic Veins	PG18	Incurving Bowl	EHIIE	Red-orange slip
Tsoungiza	10/50	Unassigned	Sandstone and Altered Sandstone with Micritic Veins	PG18	Jar	EHIIE	Brown slip-wash
Tsoungiza	10/56	Unassigned	Angular Chert and Quartz Fabric	PG19	Incurving Bowl	EHIIE	Red-brown slip

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Form	Period	Decoration
Tsoungiza	10/132	MG18	Angular Chert and Quartz Fabric	PG19	Handle	EHIII	Incised and black slip/wash
Tsoungiza	10/27	MG7	Disaggregated Sparitic Limestone and Sandstone Fabric	PG20	Askos?	EHI	Incised

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/31	MG7	Disaggregated Sparitic Limestone and Sandstone Fabric	PG20		Basin or Deep Bowl	EHI	Burnished
Korakou	11/33	MG7	Disaggregated Sparitic Limestone and Sandstone Fabric	PG20	KRK 35	Frying pan base	EHII	Incised and black-brown slip
Tsoungiza	10/139	MG7	Disaggregated Sparitic Limestone and Sandstone Fabric	PG20		Bass Bowl	EHIII	Black slip and burnished
Tsoungiza	10/124	MG2	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21		Jar	EHIII	Red-brown slip dark on light pattern painted
Tsoungiza	10/134	MG2	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21		Everted Bowl	EHIII	Brown-orange slip/wash
Tsoungiza	10/135	MG18	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21		Bowl	EHIII	Brown slip/wash
Tsoungiza	10/137	MG18	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21		Pithos	EHIII	Black slip/wash

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/145	Unassigned	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21		Pithos	EHIII	Applied Taenia Type C and black-brown slip
Korakou	11/5	MG2	Fine Clay Mix with Mudstone and Mudstone Breccia Fabric	PG21	KRK 7	Handle of Sauceboat	EHII	Black-brown slip
Korakou	11/18	MG2	Fine Clay Mix with Mudstone and Mudstone Breccia Fabric	PG21	KRK 20	Bowl	EHII	Black slip/Oxidised
Tsoungiza	10/15	MG3	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21A		Hemispherical Bowl	EHI	Red slip
Tsoungiza	10/28	MG18	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21A		Handle	EHI	Brown-grey-orange slip and burnished
Tsoungiza	10/30	Unassigned	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21A		Basin or Deep Bowl	EHI	Red-brown slip and burnished
Tsoungiza	10/71	Unassigned	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21A		Base	EHIIE	Red-orange slip and burnished
Tsoungiza	10/112	MG2	Fine Clay Mix with Mudstone and Mudstone Breccia	PG21A		Bowl	EHIID	Red-brown slip
Keramidaki	11/82	Unassigned	Quartz Sand Fabric	PG22		Collar of Jar	EHII	Plain
Keramidaki	11/108	MG2	Quartz Sand Fabric	PG22		Sauceboat rim	EHII	Black slip
Korakou	11/9	MG2	Quartz Sand Fabric	PG22	KRK 11	Spout of Sauceboat	EHII	Black slip
Keramidaki	11/131	MG11	Argillite-Shale and Mudstone Fabric	PG23		Incurving bowl	EHII	Red-brown slip

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/53	MG5	Argillite-Shale and Mudstone Fabric	PG23		Incurving Bowl	EHIIE	Applied Taenia Type C
Tsoungiza	10/77	Unassigned	Argillite-Shale and Mudstone Fabric	PG23		Baking Pan	EHIIE	Plain
Tsoungiza	10/87	Unassigned	Argillite-Shale and Mudstone Fabric	PG23		Incurving Bowl	EHIID	Applied Taenia Type A-C-A
Tsoungiza	10/91	Unassigned	Argillite-Shale and Mudstone Fabric	PG23		Firedog Stand	EHIID	Plain
Tsoungiza	10/95	Unassigned	Argillite-Shale and Mudstone Fabric	PG23		Incurving Bowl	EHIID	Applied Taenia Type A-C-A
Tsoungiza	10/110	MG3	Argillite-Shale and Mudstone Fabric	PG23		Baking Pan	EHIID	Plain
Tsoungiza	10/120	MG5	Argillite-Shale and Mudstone Fabric	PG23		Firedog Stand	EHIID	Plain
Korakou	11/22	Unassigned	Intermediate Volcanic Rock Fragments Fabric	PG24	KRK 24	Bowl base	EHII	Red-brown slip and burnished?
Tsoungiza	10/3	MG4	Intermediate Volcanic Rock Fragments Fabric	PG24		Deep Bowl	EHI	Brown slip and burnished
Tsoungiza	10/25	Unassigned	Intermediate Volcanic Rock Fragments Fabric	PG24		Hemispherical Bowl	EHI	Brown slip and burnished
Epidavros Maleatas	12/12	MG4	Intermediate Volcanic Rock Fragments Fabric	PG24A		Body sherd	EHII	Incised and burnished
Epidavros Maleatas	12/20	Unassigned	Intermediate Volcanic Rock Fragments Fabric	PG24A		Body sherd jar?	EHII	Red slip
Epidavros Maleatas	12/27	MG4	Intermediate Volcanic Rock Fragments Fabric	PG24A		Incurving bowl	EHI	Red-brown-black slip and burnished
Tsoungiza	10/5	MG4	Intermediate Volcanic Rock Fragments Fabric	PG24A		Hemispherical Bowl	EHI	Red slip and burnished

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/37	Unassigned	Intermediate Volcanic Rock Fragments Fabric	PG24A		Shallow Bowl	EHI	Brown slip and burnished
Keramidaki	11/55	MG12	Altered Volcanic Rock Fragments Fabric	PG25	KER 62	Baking pan	EHII	Plain
Keramidaki	11/58	MG12	Altered Volcanic Rock Fragments Fabric	PG25	KER 65	Baking pan	EHII	White slip?
Keramidaki	11/86	MG14	Altered Volcanic Rock Fragments Fabric	PG25		Body sherd of large bowl	EHII	Black-brown slip
Keramidaki	11/118	MG12	Altered Volcanic Rock Fragments Fabric	PG25		Body sherd of large jar	EHII	Brown slip
Keramidaki	11/136	MG12	Altered Volcanic Rock Fragments Fabric	PG25		Jar base	EHII	Black slip?
Keramidaki	11/138	MG12	Altered Volcanic Rock Fragments Fabric	PG25		Shallow bowl	EHII	Plain
Korakou	11/31	MG12	Altered Volcanic Rock Fragments Fabric	PG25	KRK 33	Baking pan	EHII	Plain
Keramidaki	11/109	MG12	Altered Volcanic Rock Fragments Fabric (with intermediate igneous rocks)	PG25A		Cooking pot rim	EHII	Applied
Keramidaki	11/115	MG12	Altered Volcanic Rock Fragments Fabric (with intermediate igneous rocks)	PG25A		Incurving bowl rim	EHII	Applied
Keramidaki	11/142	MG12	Altered Volcanic Rock Fragments Fabric (with intermediate igneous rocks)	PG25A		Incurving bowl	EHII	Red-brown-black slip
Keramidaki	11/110	MG16	Coarse Grained Chert and Mudstone Fabric	PG26		Everted rim of globular jar	EHII	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/113	MG16	Coarse Grained Chert and Mudstone Fabric	PG26		Vertical strap handle	EHII	Plain
Epidavros Maleatas	12/1	MG2	Fine Micaceous Fabric	PG27		Deep Bowl	EHII	Plain
Korakou	11/2	MG2	Fine Micaceous Fabric	PG27	KRK 4	Pedestalled base Sauceboat	EHII	Brown slip
Tsoungiza	10/86	Unassigned	Sandstone, Siltstone and Calcite Fabric	PG28		Incurving Bowl	EHIID	Red-orange slip
Tsoungiza	10/118	Unassigned	Sandstone, Siltstone and Calcite Fabric	PG28		Incurving Bowl	EHIID	Plain
Tsoungiza	10/2	Unassigned	Rounded Mudstone, Quartz and Radiolarian Mudstone	SS1		Askos	EHI	Incised
Tsoungiza	10/103	Unassigned	Argillite, Mudstone and Siltstone Fabric	SS2		Large Bowl	EHIID	Red-orange slip
Tsoungiza	10/29	Unassigned	Siltstone and Vegetal Temper Fabric	SS3		Askos	EHI	Incised
Tsoungiza	10/107	Unassigned	Altered Sandstone Fabric	SS4		Plate or Shallow Bowl	EHIID	White slip?
Tsoungiza	10/148	Unassigned	Fine Quartz Sand and Sandstone Fabric	SS4		Jar	EHIII	Orange slip/wash
Tsoungiza	10/59	Unassigned	Calcareous Sand Fabric	SS5		Handle	EHIIE	Incised
Tsoungiza	10/117	Unassigned	Biogenic Limestone and Sandstone Fabric	SS6		Sauceboat?	EHIID	Burnished
Tsoungiza	10/119	Unassigned	Limestone, Marble and Mudstone Fabric	SS7		Incurving Bowl	EHIID	Red slip
Tsoungiza	10/76	Unassigned	Mudstone and Grog Fabric	SS8		Firedog Stand?	EHIIE	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Tsoungiza	10/13	Unassigned	Medium Coarse Mudstone, Mudstone Breccia and Micrite Fabric	SS9		Base	EHI	Plain
Tsoungiza	10/72	Unassigned	Angular Calcite, Limestone and Siltstone Fabric	SS10		Incurving Bowl	EHIIE	Plain
Tsoungiza	10/24	Unassigned	Angular Calcite and Micrite Fabric	SS11		Pedestal?	EHI	Incised/Impressed and orange brown slip
Tsoungiza	10/11	Unassigned	Radiolarian Mudstone and Chert Fabric	SS12		Jar	EHI	Orange slip and burnished
Tsoungiza	10/1	Unassigned	Fine Micaceous Matrix with Calcite and Sandstone Fabric	SS13		Frying Pan	EHI	Incised, black slip and burnished
Korakou	11/16	Unassigned	Fossiliferous Limestone Fabric	SS14	KRK 18	Bowl	EHII	Burnished (Yellow/blue mottled?)
Korakou	11/17	Unassigned	Biogenic Limestone Fabric	SS15	KRK 19	Bowl with inturned rim	EHII	Plain
Keramidaki	11/116	Unassigned	Altered Felsic Volcanic Rock Fragments Fabric	SS16		Cooking pot body sherd	EHII	Applied
Keramidaki	11/106	Unassigned	Fine Clay Mix with Quartz and Altered Felsic Rock Fragments Fabric	SS17		Sauceboat rim	EHII	Black-brown slip
Keramidaki	11/65	Unassigned	Fine Matrix with Bioclastic Mudstone and Translucent Clay Pellets Fabric	SS18		Inturned rim of bowl	EHII	Red-orange-purple slip
Keramidaki	11/22	Unassigned	Mudstone, Chert and Granitic Rock Fragments Fabric	SS19	KER 24	Body sherd jar?	EHII	Plain

Table detailing the samples examined within this thesis.

Site	Slide No.	Macroscopic Group No.	Petrographic Group Name	Petrographic Group No.	Attas Sample No.	Form	Period	Decoration
Keramidaki	11/26	Unassigned	Sandstone, Quartzite and Mudstone Fabric	SS20	KER 28	Body sherd of jar	EHII	White slip?
Keramidaki	11/111	Unassigned	Radiolarian Mudstone Fabric	SS21		Incurving bowl	EHII	Red slip
Epidavros Maleatas	11/46	Unassigned	Mudstone, Serpentinite and Degraded Igneous Rock Fragments Fabric	SS22		Collar of jar	EHII?	Plain
Epidavros Maleatas	12/11	Unassigned	Intermediate Volcanic Rock Fragments (Dacite-Trachyte) Fabric	SS23		Flaring neck of jar	EHII	Plain
Epidavros Maleatas	11/48	Unassigned	Clay Mix with Siltstone Fabric	SS24		Body sherd of bowl	EHII?	Plain
Epidavros Maleatas	12/9	Unassigned	Fine Silicate Rich Clay Mix Fabric	SS25		Vertical handle of jug	EHII	Plain
Epidavros Maleatas	11/47		NO DATA SLIDE MISSING			Small Incurving bowl	EHI	Red-brown slip and burnished
Tsoungiza	10/97		NOT SAMPLED			Pedestal	EHIID	
Keramidaki	11/54		NOT SAMPLED			Jar	EHII	Applied and red slip

Table detailing the samples examined within this thesis.

Appendix II: Petrographic Descriptions

II.1 Petrographic Group 1

Fine Green Firing Clay Mix Fabric

Samples Numbers

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/7	Ring base of sauceboat/small bowl	Brown-black slip	EHII
EPI 12/18	Base (jug/jar)	Undecorated	EHII
EPI 12/28	Small shallow bowl	Black slip	EHII
EPI 12/29	Flat base small bowl	Black slip	EHII
KER 11/5	Small bowl	Black slip	EHII
KER 11/6	Ring based bowl	Black slip	EHII
KER 11/7	Small bowl	Black-brown slip	EHII
KER 11/13	Small bowl	Black slip	EHII
KER 11/14	Sauceboat	Black slip	EHII
KER 11/15	Sauceboat	Brown slip	EHII
KER 11/31	Handle (jug/jar)	Brown slip	EHII
KER 11/59	Ring base (small bowl/sauceboat)	Black slip	EHII
KER 11/79	Ring base (small bowl/sauceboat)	Red-brown slip	EHII
KER 11/84	Sauceboat	Black slip	EHII
KER 11/100	Jug	Undecorated	EHII
KER 11/129	Neck (jug/jar)	Undecorated	EHII
KER 11/134	Ring base (small bowl/sauceboat)	Undecorated	EHII
KOR 11/4	Sauceboat	Black slip	EHII
KOR 11/12	Sauceboat	Black slip	EHII
KOR 11/13	Sauceboat	Brown wash? Burnished?	EHII
KOR 11/14	Sauceboat	Brown slip and burnished	EHII
KOR 11/20	Bowl	Black-brown slip	EHII
KOR 11/23	Neck (jug/askos)	Undecorated	EHII
KOR 11/25	Base (bowl?)	Undecorated	EHII
KOR 11/26	Jug	Undecorated	EHII
TSO 10/26	Fruitstand	Black slip	EHI
TSO 10/36	Fruitstand	Dark on light pattern painted (black/brown)	EHI
TSO 10/39	Jar	Burnished	EHI
TSO 10/44	Bowl	Red slip	EHII
TSO 10/49	Sauceboat	Red-brown slip	EHII
TSO 10/61	Small shallow bowl	Black slip	EHII
TSO 10/70	Incurving bowl	Black-brown-red slip	EHII
TSO 10/74	Small bowl	Black slip	EHII
TSO 10/80	Pyxis	Burnished	EHII
TSO 10/81	Sauceboat	Orange-brown wash	EHII
TSO 10/98	Inturned bowl	Black slip	EHII
TSO 10/101	Sauceboat	Black slip	EHII

Samples from PG1.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/108	Sauceboat	Dark on light pattern painted (black)	EHII
TSO 10/109	Sauceboat	Black slip	EHII
TSO 10/114	Pyxis	Dark on light pattern painted (black)	EHII
TSO 10/115	Sauceboat	Dark on light pattern painted (black)	EHII
TSO 10/116	Sauceboat	Black slip	EHII
TSO 10/121	Jug/Narrow necked jar	Dark on light pattern painted (black/brown)	EHIII
TSO 10/125	Tankard	Dark on light pattern painted (black)	EHIII
TSO 10/126	Tankard?	Dark on light pattern painted (black)	EHIII
TSO 10/127	Bass bowl	Dark on light pattern painted (black)	EHIII
TSO 10/131	Jar	Dark on light pattern painted (black)	EHIII
TSO 10/136	Tankard	Dark on light pattern painted (black)	EHIII
TSO 10/138	Askos	Dark on light pattern painted (black/brown)	EHIII
TSO 10/142	Tankard?	Burnished	EHIII
TSO 10/146	Bass bowl	Dark on light pattern painted (black)	EHIII
TSO 10/149	Bass bowl	Dark on light pattern painted (black)	EHIII
TSO 10/151	Tankard	Dark on light pattern painted (black)	EHIII
TSO 10/155	Kantharos	Burnished	EHIII

Samples from PG1.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/2	Small incurving bowl	Black-brown slip	EHII
EPI 12/3	Deep bowl	Black-brown slip	EHII
EPI 12/17	Small bowl/Sauceboat	Black slip	EHII
KER 11/8	Sauceboat	Brown slip	EHII
KER 11/9	Sauceboat	Black-brown slip	EHII
KER 11/10	Ring base (small bowl/sauceboat)	Black-brown slip	EHII
KER 11/16	Sauceboat	Black-brown slip	EHII
KER 11/17	Sauceboat	Black-brown slip	EHII
KER 11/30	Jar	Undecorated	EHII
KER 11/45	Sauceboat	Black-brown slip	EHII
KER 11/95	Bowl with inturned rim	Red-brown slip	EHII
KER 11/96	Small bowl/Saucer	Black-brown slip	EHII
KER 11/139	Bowl	Brown slip	EHII
KER 11/143	Ladle	Red-orange slip	EHII
TSO 10/44	Bowl	Red-brown slip	EHII

Samples from PG1A.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/130	Pyxis	Dark on light pattern painted (brown)	EHIII
TSO 10/144	Bass bowl	Black slip and burnished	EHIII
TSO 10/152	Bass bowl	Black-brown slip and burnished	EHIII

Samples from PG1A.

Coarse:Fine:Voids =24μm

3:93:5 to 10:85:5

Microstructure

There are few voids in samples from this group. They range from micro to meso vughs and vesicles with double but primarily open spacing. Orientation is crudely to well aligned, parallel to sample margins. Elongated aplastic inclusions are crudely to well aligned to sample margins.

Groundmass

The groundmass is dominantly heterogeneous dependant on the visibility of clay mixing (example of very heterogeneous TSO 10/39). The colour ranges from dark red brown to green brown. Red brown samples appear more micaceous and commonly have low optical activity (example KOR 11/14), whilst some samples contain red-orange striations (example KER 11/5 and KER 11/83) in XP (x25). Higher fired examples display no optical activity. Secondary calcite is commonly present.

Inclusions-General Features

Equant. Sub-angular to sub-rounded. Double to open spaced with weak to no alignment to sample margins. Inclusions have bimodal distribution of coarser inclusions within a finer grained silicate groundmass. Inclusions are well to moderately well sorted.

Coarse Fraction Size Range

0.24-1.6mm. Mode - 0.4mm.

Coarse Fraction Dominant

Siltstone; <1.6mm. Mode - 0.8mm. Elongated and equant. Sub-angular - sub-rounded. Iron rich red-brown to green-brown matrix in XP and PPL, sometimes with sub-angular monocrystalline quartz grains within the cement. Some examples in this group also contain micritic mudstones.

Coarse Fraction Rare

Polycrystalline quartz: <1.2mm Angular. Equant. Not present in all samples.

Siltstone: <0.8mm. Equant and elongated. Sub-angular silicate grains within a micritic or brown mud cement (for example KER 11/16).

Coarse Fraction Very Rare

Chert: < 0.8mm. Sub-angular to angular. Equant (for example KER 11/30).

Degraded basic igneous (basaltic): 0.6mm Rounded. Brown cement with plagioclase laths (for example KER 11/30).

Fine Fraction Size Range

<0.24mm.

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Very Few

Opaque inclusions

Textural Concentration Features (TCFs)

TCFs are common in this fabric group consisting of dark red-brown to yellow-brown in XP and PPL (x25), rare examples contain fine silicate grains. They have sharp to diffuse edges commonly merging with the micromass. They are rounded to sub-rounded, equant and elongated, frequently concordant with vessel margins (for example TSO 10/134). Their characteristics are consistent with clay pellets as many merge into the striations present in the micromass, indicative of mixing a red firing clay into a calcareous clay. The silicate in the micromass may derive from the red clay which can contain silicate grains.

Comments

There is a range of coarseness, matrix colour and degree of optical activity within this fabric which relates to the degree of vitrification from firing, as such high-fired examples belong to PG1 whilst lower fired examples belong to PG1A. The fineness of this fabric makes provenance difficult although the rare inclusions are consistent with a dominantly sedimentary environment. The clays are compatible with the Neogene clays found throughout the NE Peloponnese. The rare presence of degraded basic igneous inclusions may indicate an association with igneous geology such as the pillow lavas at Corinth.

II.2 Petrographic Group 2

Medium Fine Clay Mix With Rounded Pellets Fabric

Sample Numbers

Sample Number	**Vessel Form**	**Surface Modification**	**Period**
KER 11/11	Flat base bowl	Orange-brown slip	EHII
KER 11/12	Small bowl	Red-orange-brown slip	EHII
KER 11/46	Sauceboat	Black slip	EHII

Sample Number	Vessel Form	Surface Modification	Period
KER 11/48	Bowl	Black-brown slip	EHII
KER 11/61	Jar	Black slip	EHII
KER 11/83	Sauceboat	Black slip	EHII
KER 11/85	Small bowl	Brown slip	EHII
KER 11/87	Small bowl	Black slip	EHII
KER 11/137	Everted rim of jar	Red-brown slip	EHII
KER 11/141	Saucer	Black slip	EHII
KER 11/144	Bowl	Brown slip	EHII
KOR 11/3	Sauceboat	Black slip	EHII
KOR 11/7	Sauceboat	Black-brown slip	EHII
KOR 11/8	Sauceboat	Black-brown slip	EHII
KOR 11/10	Sauceboat	Black slip	EHII
KOR 11/11	Sauceboat	Brown slip	EHII
KOR 11/19	Small bowl	Black-brown slip	EHII
KOR 11/21	Small bowl	Black slip	EHII
TSO 10/16	Incurving bowl	Red slip and burnished	EHI
TSO 10/17	Jug	Red slip and burnished	EHI
TSO 10/20	Bowl	Incised	EHI
TSO 10/47	Ring base bowl	Red-brown slip and burnished	EHII
TSO 10/48	Sauceboat	Red-orange slip	EHII
TSO 10/52	Jar	Red-brown slip	EHII
TSO 10/60	Askos?	Incised	EHII
TSO 10/64	Incurving bowl	Red-orange slip	EHII
TSO 10/75	Incurving bowl	Red-orange slip	EHII
TSO 10/83	Jug	Undecorated	EHII
TSO 10/85	Carinated bowl	Black slip	EHII
TSO 10/89	Small shallow bowl	Brown slip (at rim)	EHII
TSO 10/90	Incurving bowl	Red-brown slip	EHII
TSO 10/92	Small bowl	Black slip	EHII
TSO 10/94	Ring base (small bowl/sauceboat)	Red-brown slip	EHII
TSO 10/96	Sauceboat	Red and black slip	EHII
TSO 10/105	Carinated bowl	Black slip	EHII
TSO 10/106	Ladle	Black-brown slip	EHII
TSO 10/111	Incurving bowl	Red-brown slip	EHII
TSO 10/129	Pyxis?	Dark on light pattern painted (black-brown)	EHIII
TSO 10/147	Bowl	Burnished	EHIII
TSO 10/150	Tankard	Dark on light pattern painted (red-brown)	EHIII
TSO 10/153	Bass bowl	Dark on light pattern painted (brown)	EHIII

Samples from PG2.

Coarse:Fine:Voids =80μm

5:75:20 to 0:90:10

Microstructure

Voids are few, dominantly consisting of micro and meso vughs, channels are rare. Voids are double to open spaced and display moderate to poor alignment to sample margins.

Groundmass

The groundmass is heterogeneous with common TCFs and the rare presence of firing cores sometimes (for example see TSO 10/75, TSO 10/48). The colour of the matrix ranges from orange-brown to yellow-brown in XP (x25) and displays optical activity ranging from low to high.

Inclusions-General Features

Equant and elongated. Dominantly rounded-sub-angular TCFs that are moderately to well sorted with bimodal distribution.

Coarse Fraction Size Range

0.8 -0.4mm. Mode- 0.4mm.

Coarse Fraction Dominant

Micrite: <0.8mm. Mode - 0.4mm Sub-rounded to rounded.

Coarse Fraction Few

Chert: <0.8mm. Mode - 0.4mm. Angular to sub-angular. Fine grained occasional radiolaria clasts and ribbons of coarser grains (for example see TSO 10/83).

Fine Fraction Size Range

<0.4mm.

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Very Few

Polycrystalline quartz
Iron rich ooids

Textural Concentration Features (TCFs)

TCFs are the dominant characteristic of this group. They range from striations to rounded clay and sediment inclusions which dominantly display sharp edges. They range in colour from red-brown to dark black-brown in XP (x25). Some examples of the rounded TCFs contain sub-angular and angular quartz grains, whilst smaller examples do not display inclusions and common have diffuse edges. These features are consistent with the mix of a red clay and in some examples terra rossa (for example see TSO 10/16), with a calcareous clay. The presence of silicate grains within the fine fraction most likely derives from the red clay/sediment that contain silicate.

Comments

This fabric group displays many of the characteristics of PG1 in terms of clay types and the practice of mixing, as well as the forms and wares which it is associated with. These striking similarities indicate that this group is related to PG1 and may be a lower fired version with poorer clay mixing. The clays within the mix are widely available across the NE Peloponnese, this in addition to the lack of diagnostic geological features within the paste make provenance on geological terms difficult.

II.3 Petrographic Group 3

Fine – Medium Fine Clay Mix with Angular Mudstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/1	Jar	Undecorated	EHII
KER 11/3	Jar	Undecorated	EHII
KER 11/28	Jar	Undecorated	EHII
KER 11/68	Sauceboat	Yellow-blue mottled	EHII
KER 11/91	Jar	Black-brown slip	EHII
KER 11/104	Pithos	Undecorated	EHII
KER 11/107	Large bowl	Black slip	EHII
KER 11/117	Jug/jar	Undecorated	EHII
KER 11/121	Large bowl	Black slip	EHII
KER 11/140	Small bowl	Black slip	EHII
KOR 11/34	Jar	Black slip and applied incised	EHII
TSO 10/18	Bowl	Red slip and impressed	EHI
TSO 10/19	Bowl	Red and brown slip and burnished	EHI
TSO 10/32	Lug	Brown-black slip	EHI
TSO 10/46	Cup/Scoop	Brown slip	EHII
TSO 10/99	Incurving bowl	Incised	EHII
TSO 10/102	Small bowl	Black slip	EHII
TSO 10/140	Jar	Applied and black slipped	EHIII
TSO 10/141	Jar	Applied and black slipped	EHIII

Samples from PG3.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/40	Pithos	Undecorated	EHII
KER 11/20	Jug/jar	Undecorated	EHII
KER 11/27	Body sherd (jar?)	Undecorated	EHII
TSO 10/51	Jar	Brown slip	EHII
TSO 10/69	Pithos	Undecorated	EHII
TSO 10/78	Firedog stand	Undecorated	EHII
TSO 10/79	Askos	Incised	EHII
TSO 10/82	Large jar/pithos	Undecorated	EHII
TSO 10/84	Pithos	Undecorated	EHII

Samples from PG3A.

Coarse:Fine:Voids =40μm

15:80:5 to 30:50:20

Microstructure

Voids are few to common, ranging from micro and meso vughs and vesicles, to macro channels with single to open spacing. Orientation is crudely to well aligned parallel to sample margins. Elongated aplastic inclusions are randomly to crudely orientated to sample margins.

Groundmass

The groundmass ranges from heterogeneous with uneven firing margins which are red-brown to black- brown in XP (x25), to homogeneous in the high fired and highly calcareous examples often green in colour in XP (x25, for example TSO 10/18). The micromass is optically inactive in most examples (for exception see TSO 10/28 and 10/79). The micromass ranges from micaceous and quartz rich to primarily high fired vitrified clay. Secondary calcite is present in some samples.

Inclusions-General Features

Elongated and equant. Angular to sub-angular. Single to open spaced. They are random to crudely aligned to sample margins with the bimodal distribution of coarse grains in fine matrix. Inclusions are moderately to poorly sorted.

Coarse Fraction Size Range

0.4-3.8mm. Mode - 0.8mm.

Coarse Fraction Dominant

Mudstone: 3.8mm-0.08mm. Mode - 0.8mm. Elongated with some equant examples. The mudstones are dominantly angular to sub-angular, composed of fine-grained black-brown, grey, yellow-brown and red-brown clay matrix in XP (x25) with very fine monocrystalline quartz grains. The inclusions often have dark borders and appear very high fired and reduced (for example TSO 10/99).

Coarse Fraction Frequent-Few

Siltstone: 1.2mm-0.8mm. Mode - 0.8mm Elongated and equant. Sub-angular to sub-rounded. The siltstones have a red brown to yellow brown clay matrix in XP (x25) containing angular to sub-angular silicate grains (for example TSO 10/32, TSO 10/102).

Coarse Fraction Few

Fine grained chert: <2.5mm. Mode - 0.8mm. Angular to sub-angular. Not present in all samples, with rare examples containing radiolaria (for example KER 11/68 and 11/27).

Coarse Fraction Very Few

Polycrystalline quartz: <0.8mm. Mode - 0.4mm. Angular to sub-angular, equant to irregular. Not present in all samples (for example see KER 11/104).

Plagioclase feldspar: <1.2mm. Mode - 0.8mm. Angular to sub-angular. Equant and elongated. Some twinning is present.

Greywacke sandstone: <2.0mm. Mode - 0.8mm. Sub-angular, equant and elongated. Poorly sorted angular to sub-angular quartz grains in a red-brown to yellow-brown clay matrix. Not present in all samples and can be more common in some samples (for example see TSO 10/91).

Micritic mudstone: <0.12. Mode - 0.8mm. Sub-rounded equant and irregular. Not present in all samples (for example see TSO 10/79).

Coarse Fraction Rare

Bioclastic mudstone: <2.0mm. Mode - 1.6mm. Angular to sub-angular. Fine-grained mudstone which are commonly grey brown in XP (x25) containing radiolaria and foraminifera. Not present in all samples (for examples see KER11/61 and 11/28).

Sparry calcite: <1.2 Mode - 0.4mm. Elongated to irregular shape. Not present in all samples (for example see KER 11/120 and 11/103).

Coarse Fraction Very Rare

Iron rich ooids: <0.8mm. Mode - 0.8mm. Rounded and elongated and brown in XP (x25). Only present in TSO 10/99.

Serpentinite: 0.32mm. Irregular shape. Orange red in XP (x25). Only present in KER 11/27.

Fine Fraction Size Range

<0.32mm.

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Common

Polycrystalline quartz

Fine Fraction Very Few

Vitrified hematite clay

Fine Fraction Rare

Plagioclase feldspar

Textural Concentration Features (TCFs)

TCFs are common in this fabric being are dark red-brown to yellow-brown in XP and PPL (x25). They have sharp to diffuse edges commonly merging with the micromass. They are rounded to sub-rounded, equant and elongated frequently concordant with sample margins (for example see TSO 10/94). Size <0.8mm in length. They appear to be clay pellets as many merge into the striations present in the micromass and characterise the mixing of a non-calcareous clay into a calcareous clay.

Comments

This is a diverse group, with considerable variability in the types of mudstones present and the proportions of different inclusion types suggesting different geological sources and potters. However, all samples consistently share the dominant inclusion of mudstones. There is also considerable variability in the degree of optical activity and level of vitrification. Some examples display no optical activity and appear highly vitrified and have been assigned to the main PG3 (for example see TSO 10/32), whilst others display high optical activity and appear lower fired so have been assigned to the sub groups PG3A (for example see TSO 10/79).

Some examples appear very similar to PG1 in terms of the matrix and clay mix with the addition of mudstone and siltstone as temper (for example TSO 10/99). In contrast, other samples appear to be coarse clays naturally containing siltstones, cherts and mudstones, with the groundmass containing inclusions consistent with the coarse fraction. The consistent structure of the voids and inclusion types suggest shared technological processes for many of the samples within this group, including raw material processing and forming. The elongated and irregular form of many of the voids would suggest the addition of a vegetal temper, (for example see TSO 10/68).

II.4 Petrographic Group 4

Fine Optically Active Orange Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/4	Hemispherical bowl	Red-orange slip/wash	EHI
TSO 10/22	Spreading bowl	Red-orange slip/wash	EHI
TSO 10/34	Jar	Burnished	EHII
TSO 10/38	Spreading bowl	Orange-brown slip	EHI
TSO 10/122	Spreading bowl	Orange-brown slip	EH

Samples from PG4.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/123	Jug	Dark on light pattern painted (brown)	EHII
TSO 10/133	Bass bowl	Burnished	EHIII
TSO 10/154	Ouzo cup	Dark on light pattern painted (brown)	EHIII

Samples from PG4A.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/8	Jar	Red slip/wash	EHI

Samples from PG4B.

Coarse:Fine:Voids =60μm

10:70:20 to 1:75:24

Microstructure

Few to common voids in this group, ranging from micro to meso vughs and vesicles with double to open spacing. Their orientation is dominantly well aligned to sample margins (for example TSO 10/22). Elongated inclusions range from crudely to well aligned.

Groundmass

The groundmass is heterogeneous with rare firing cores and common TCFs characterised as striations within the clay matrix. The groundmass displays a distinct high level of optical activity at different orientations. In XP (x25) the matrix has a very characteristic orange- yellow to red- orange colour within PG4 and PG4B with a grey-orange-brown in PG4A.

Inclusions-General Features

Elongated and equant. Open spaced. Crudely to well aligned to sample margins with bimodal distribution. Moderately to well sorted.

Coarse Fraction Size Range

0.4-1.2mm. Mode - 0.8mm.

Coarse Fraction Few to Rare

Serpentinite; <1.6mm Mode - 1.2mm. Elongated and equant. Angular to sub-angular. Orange-brown in XP and PL (x25). Only present in TSO 10/8.

Coarse Fraction Rare

Siltstone; <1.2mm. Mode - 0.8mm. Elongated and equant. Rounded to sub-rounded. Not present in all samples.

Chert; 1.2mm-0.8mm. Angular to sub-rounded. Only present in TSO 10/38.

Fine Fraction Size Range

<0.4mm.

Fine Fraction Dominant

Monocrystalline quartz
Microfossils; <0.8mm Mode - 0.4mm. Curvilinear and rounded calcite shell fragments.

Fine Fraction Common

Vitrified hematite clay: red-brown and glassy.

Fine Fraction Rare

Hornblende

Textural Concentration Features (TCFs)

TCFs are common in this fabric group characterised as dark red-brown to yellow-brown in XP and PPL (x25). They have sharp to diffuse edges commonly merging with the micromass. They are both striation and rounded to sub-rounded concentrations of clay with crude to well aligned concordance with sample margins. Size <0.16mm in length. They appear to be clay pellets suggesting that this fabric is a mix of a red clay and a clay containing fossils.

Comments

This is a very characteristic fabric, demarked by the striking optical activity within the very fine matrix and the presence of very small microfossils. The sub group PG4A displays a lower level of optical activity and a darker colour suggesting of different firing conditions to that of PG4 and PG4B.

The fineness of this fabric makes provenance difficult, however, the presence of serpentine indicates an ophiolitic origin consistent with Corinth. As serpentinite is not present in all samples, it is difficult to assign definitive provenance for the group as a whole. The difference in firing between PG4 and PG4A may reflect changes in firing technology for EHII and EHIII vessels. The motivation for this is unclear, as it does not relate to decorative technique that is shared across all samples of this fabric.

II.5 Petrographic Group 5

Angular Mudstone, Siltstone and Chert Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/54	Incurving bowl	Applied	EHII
TSO 10/55	Firedog stand	Undecorated	EHII
TSO 10/57	Firedog stand	Undecorated	EHII
TSO 10/58	Flat base	Undecorated	EHII
TSO 10/63	Incurving bowl	Applied	EHII
TSO 10/65	Firedog stand	Applied	EHII
TSO 10/66	Jar	Brown slip	EHII
TSO 10/67	Cup	Red-brown slip	EHII
TSO 10/73	Firedog stand	Undecorated	EHII

Table x continued: Samples from PG5.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/62	Askos?	Black slip	EHII
TSO 10/68	Firedog stand	Applied	EHII

Samples from PG5A.

Coarse:Fine:Voids =80μm

10:70:10 to 5:75:10

Microstructure

Voids are micro and macro vughs, and vesicles, channels and planar voids with single to double spacing. Well to moderately aligned to sample margins. Aplastic inclusions are poorly to moderately aligned but poorly sorted.

Groundmass

The groundmass is orange – red- brown (in XP) and heterogeneous with uneven firing margins. It is optically inactive to moderately active within samples suggestive of mixed firing conditions, however, most samples are optically inactive. The matrix is dominated by silt to sand-sized angular silicate fragments, commonly mono- and poly-crystalline quartz but also feldspar.

Inclusions-General Features

Elongated and equant. Angular to sub-angular. Single to open spaced. Random to crudely aligned to sample margins with bimodal distribution of coarse mudstone and chert within a fine matrix. Inclusions are moderately to poorly sorted.

Coarse Fraction Size Range

0.4-3.8mm Mode - 0.8mm

Coarse Fraction Dominant

Mudstone: 3.8mm-0.08mm. Mode - 1.2mm. Elongated with some equant examples. Dominantly angular to sub-angular, composed of fine grained red-brown clay matrix in XP (x25) with very fine silicate grains.

Coarse Fraction Common-Frequent

Siltstone: 1.2mm-0.8mm. Mode - 0.8mm. Elongated and equant. Sub-angular. Red-brown in XP (x25) clay matrix with fine angular to sub-angular polycrystalline quartz grains which are coarser than the mudstones but clearly related.

Fine grained chert: <2.5mm. Mode - 1.0mm. Angular to sub-angular fine-grained chert.

Fine Fraction Size Range

<0.8mm

Fine Fraction Dominant

Monocrystalline quartz.

Fine Fraction Common-Frequent

Polycrystalline quartz.

Fine Fraction Rare

Vitrified hematite clay.
Plagioclase feldspar.

Textural Concentration Features (TCFs)

TCFs are commonly present across the group characterized as dark red-brown and commonly opaque XP and PPL (x25). Size <0.8mm in length. They have sharp to diffuse edges and range from rounded to sub-rounded in shape. They may relate to inclusions within the clay and the addition of mudstones to the paste that also contain some opaque inclusions.

Comments

This is a tight group, all sharing the same types and proportions of raw materials. The angularity and distribution of the coarse fraction are suggestive of temper rather than being naturally present. In addition the form of many of the voids would suggest the addition of a vegetal temper to all samples however only those in PG5A display remains. The temper raw material types are consistent from the shale-sandstone-chert formation 4km south of Tsoungiza, whilst the clay may derive from the alluvial marl and clay beds that surround the site. The larger silicate grains within the clay matrix may be associated with the addition of the silicate rich siltstones and mudstones which share the same silicate types, whilst the finer grains appear to be naturally present being evenly distributed throughout the matrix.

The mixed optical activity of the groundmass would suggest mixed and poorly controlled low firing temperatures.

II.6 Petrographic Group 6

Chert, Micrite and Mudstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/6	Deep bowl	Undecorated	EHI
TSO 10/10	Incurving bowl	Brown-black slip and burnished	EHI
TSO 10/12	Incurving bowl	Applied	EHI
TSO 10/21	Incurving bowl	Applied	EHI
TSO 10/35	Flat base (jar?)	Undecorated	EHI

Samples from PG6.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/143	Bass bowl	Burnished	EHIII

Samples from PG6A.

Coarse:Fine:Voids =16μm

70:10:20

Microstructure

Voids are meso channels and micro vughs which are single to double-spaced with moderate to good alignment to sample margins. Aplastic inclusions are moderately sorted and display crude to no alignment to sample margins.

Groundmass

The groundmass is heterogeneous due to darker areas of reduced firing. Matrix ranges from optically active to moderately active within and between samples displaying a yellow-brown to red-brown colour in XP (x25).

Inclusions-General Features

Elongated and equant. Angular to rounded with single to double spacing. Inclusions are crudely to unaligned to sample margins with moderate to poor sorting and a bimodal distribution of coarse grains within a finer silicate rich matrix.

Coarse Fraction Size Range

<0.8mm. Mode - 0.16mm.

Coarse Fraction Dominant

Micrite: <0.8mm. Mode - 0.16mm. Equant and sub-angular to rounded.

Coarse Fraction Common-Frequent

Chert: <0.8mm. Mode - 0.4mm. Angular to sub-angular and fine grained.

Coarse Fraction Frequent-Few

Calcite: <0.8mm. Mode - 0.4mm. Elongated and Equant. Angular to sub-angular.

Coarse Fraction Few

Mudstone: <0.8mm. Mode - 0.4mm. Sub-rounded to rounded. Equant and irregular. Red-brown in PPL and XP (x25). Rare examples of mudstones with small sub-angular quartz grains within the fine matrix.

Coarse Fraction Rare

Monocrystalline quartz: <0.8mm. Angular-Sub-angular Single and undulose extinction.

Fine Fraction Size Range

<0.16mm

Fine Fraction Dominant

Monocrystalline quartz.

Fine Fraction Very Few

Chert.

Textural Concentration Features (TCFs)

TCFs are dominantly red-brown sub-rounded and elongated, often opaque with sharp and diffuse edges in XP and PPL (x25) <0.4mm in size. They are consistent with natural inclusions in the base clay and the merging of mudstones into the clay matrix.

Comments

Vegetal temper is present in some voids (for example sample TSO 10/12) but is not present in all samples, however the void structures are consistently dominated by channels and are very similar across the group suggesting that vegetal matter may have originally been present in more samples but has not been preserved.

The angularity and sorting of the chert and mudstone fragments suggests that these have been added to a clay, and that the silicate fine fraction relate to the addition of this material rather than deriving solely from the base clay. These raw materials are consistent with the shale-sandstone-chert and associated limestone formations south of Tsoungiza.

II.7 Petrographic Group 7

Mudstone, Mudstone Breccia and Tuffaceous Rock Fragments Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/18	Basin	Red slip and burnished?	EHII
KER 11/24	Firedog stand	Undecorated	EHII
KER 11/36	Bowl	Orange-brown slip	EHII
KER 11/51	Jar base	Undecorated	EHII
KER 11/52	Baking pan	Undecorated	EHII
KER 11/53	Jar	Applied and red-brown slip	EHII
KER 11/66	Jar	Red-brown slip	EHII
KER 11/72	Inturned bowl	Undecorated	EHII
KER 11/73	Body sherd (bowl?)	Burnished?	EHII
KER 11/77	Hearth/Baking pan	Undecorated	EHII
KER 11/78	Bowl	Undecorated	EHII
KER 11/94	Large bowl	Red slip	EHII
KER 11/124	Jar	Undecorated	EHII
KOR 11/1	Pedestalled sauceboat	Black-brown slip	EHII
KOR 11/30	Baking pan	Undecorated	EHII

Samples belonging to PG7.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/39	Jar	Undecorated	EHII
KER 11/67	Jar	Red-orange slip	EHII
KER 11/71	Bowl	Applied	EHII
KER 11/97	Incurving bowl	Red slip	EHII
KER 11/104	Pithos	Undecorated	EHII

Samples belonging to PG7A.

Coarse:Fine:Voids =60µm

5:85:05 to 20:65:15

Microstructure

Voids are micro and meso vesicles and channels. They are single to open spaced, ranging from well aligned to moderately aligned to sample margins.

Groundmass

The matrix is heterogeneous with areas of variation in colour due to mixed firing conditions. Groundmass colour varies from yellow-brown and red-brown to dark grey-brown in XP (x25). Optical activity is present in all samples within PG7. PG7A has been ascribed as a sub-group due to the lower levels of optical activity which must represent different firing conditions to PG7.

Inclusions-General Features

Inclusions are equant and elongated. Angular to sub-angular with single to open spacing. They are moderately to well sorted, with the bimodal distribution of coarse inclusions are within a finer silicate rich matrix. Inclusions are poorly to unaligned to sample margins.

Coarse Fraction Size Range

2.8mm-0.8mm

Coarse Fraction Dominant

Mudstone: <2.8mm. Mode - 1.2mm. Elongated and equant and dominantly sub-angular. Their colour ranges from grey-green to brown and orange-red-brown examples in XP. The fine mud matrix commonly contains fine monocrystalline quartz grains (x100). Radiolaria and fossiliferous remains are present in some samples (for example see KER 11/24).

Coarse Fraction Common-Frequent

Mudstone breccia; <2.0mm. Mode - 1.6mm. Elongated and equant. Sub-angular to sub-rounded. Very fine green-grey-brown in PG7A, and red-brown in PG7 clay mud matrix (in XP) with angular to sub-angular monocrystalline quartz and plagioclase feldspar grains. The matrix also contains characteristic red-brown TCFs and orange-yellow glassy grains with mica laths (in XP x100).

Coarse Fraction Frequent-Few

Tuffaceous Rock Fragments: <2.8mm. Mode - 2.0mm. Dominantly sub-angular to angular and *c.* equant. They are characterised by a golden yellow cement in XP, containing fragments of quartz, feldspar, and serpentinite. The texture of cement often appears 'wavy' with areas of differing orientation which makes them particularly distinctive. They are dominantly heavily altered grading into fragments with a more sedimentary suggesting a link to the other coarse fraction rock types (for example see KER 11/24 and 11/52).

Coarse Fraction Very Few

Fine grained chert: <2.0mm. Mode - 0.4mm. Angular to sub-angular.

Coarse Fraction Very Rare

Granite: <0.8mm. Sub-angular, equant with a granophyric texture. Only present in KER 11/73.

Sparry calcite: <1.2mm. Mode - 0.4mm. Sub-angular and present in KER 11/67 only.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Monocrystalline Quartz

Fine Fraction Few

Polycrystalline Quartz

Fine Fraction Few

Serpentinite

Fine Fraction Rare

Sparry calcite

Textural Concentration Features (TCFs)

TCFs are common in this group, although not in every sample. Size 0.16- 0.4mm. They have both sharp and diffuse edges, many examples merge with the matrix. They are dominantly sub-rounded and elongated, often concordant with sample margins, consistent with inclusions within the base clay as well as the addition of material.

Comments

The nature of the raw materials and character of the microstructure of PG7 and 7A are very consistent but they have been split based on differences relating to firing conditions. The main group of PG7 displaying high levels of optical activity consistent with a low firing temperature, whilst PG7A has very low to no optical activity suggestive of a higher firing temperature range.

Examination of the geological literature and maps indicates that the raw materials of this fabric derive from the area of Acrocorinth or the Geraneia mountains (Siddall In prep.; Whitbread 1995: 334, 2003: 3). The mudstone breccia is consistent with that noted by Whitbread for his Type A Amphorae which he argued were likely to be Corinthian whilst the heavily altered tuffaceous inclusions must relate to ancient geological units with an igneous origin such as those within the Corinth region. Whitbread also discussed radiolarian mudstone in relation to his Amphorae Fabric A as a product of Ancient Corinth.

II.8 Petrographic Group 8

Mudstone, Calcite-Micrite and Tuffaceous Rock Fragments Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/19	Basin	Red-brown slip	EHII
KER 11/23	Body sherd	Undecorated	EHII
KER 11/35	Jug	Undecorated	EHII
KER 11/49	Large bowl	Undecorated	EHII
KER 11/70	Jar	Undecorated	EHII
KER 11/89	Shallow bowl	Applied	EHII
KER 11/112	Base (jar/bowl?)	Undecorated	EHII
KER 11/114	Base (jar/bowl?)	Undecorated	EHII

Samples from PG8.

Coarse:Fine:Voids =40μm

5:85:10 to 25:50:25

Microstructure

Micro and meso vughs present in all samples and channels present in some samples (for example KER 11/89). Voids are single to open spaced. Moderately (KER 11/19) to well aligned (KER 11/89) to sample margins.

Groundmass

The matrix is heterogeneous with darker areas and striations. The colour varies from mid orange-brown to yellow-brown in XP (x25). Optical activity is present in all samples but varies in level of activity both within samples and across the group.

Inclusions-General Features

Equant and elongated. Angular to sub-angular with single to open spacing. Sorting is dominantly moderate to poor. Inclusions display a bimodal distribution of coarse inclusions within a finer matrix. Inclusions do not appear to be aligned to the sample margins.

Coarse Fraction Size Range

3.8mm-0.4mm

Coarse Fraction Dominant

Tuffaceous rock fragments: <3.8mm. Mode - 0.8mm. Equant and irregular. Angular to sub-angular. These are degraded fragments of tuffaceous material as described in relation to PG7. They display a golden-yellow cement in XP with a 'wavy' texture due to differing orientation within the cement. They commonly contain fragments of alkali and plagioclase feldspar (some examples are highly altered for example 11/19), quartz and areas of dark brown and carbonate sediment replacement.

Coarse Fraction Common-Frequent

Micrite: <2.0mm. Mode - 0.8mm. Elongated and equant. Sub-rounded to rounded, most commonly sub-rounded. Fragments rarely include silicate and opaque inclusions.

Coarse Fraction Few

Tuff: <1.2mm. Mode - 0.8mm. Sub-angular to angular, a more rounded example can be seen in KER 11/112. Fragments display a porphyritic texture, with fine-grained grey/black ash groundmass (in XP), containing fragments of plagioclase and alkali feldspars and quartz. Some examples appear to grade into tuffite (for example see KER 11/70 and KER 11/49). Many are altered containing carbonate and mud replacement.

Coarse Fraction Very Few

Mudstone: <2.4mm. Mode 0.8mm. Elongated, equant and irregular. Angular to sub-angular displaying a mid orange-brown to grey-brown colour in XP (x25). They rarely contain silicate and opaque inclusions. Some examples contain radiolarian within the mudstone (for example see KER 11/23 and KER 11/89).

Coarse Fraction Very Few - Rare

Chert: <2.0mm. Angular to sub-angular (for examples see KER 11/23 and KER 11/112).

Sandstone: <1.2mm. Mode - 0.8mm. Sub-angular consisting of both quartz arenite (for example see KER 11/89 and KER 11/112) and litharenite, primarily sedarenite with carbonate matrix containing quartz, feldspar and few brown clay inclusions (for example see KER 11/35).

Calcareous siltstone: <2.0mm. Mode - 0.8mm. Sub-rounded. Sparry calcite cement with sub-angular to sub-rounded silicate and brown mud inclusions (not present in all samples).

Coarse Fraction Rare

Degraded basic igneous rock fragments (probably Basalt): <1.2mm. Mode - 0.4mm. Sub-angular to rounded. Dark red brown mud matrix with remnants of plagioclase feldspar laths. Some contain what appear to be degraded clastic rock fragments (KER 11/35). Not present in all samples.

Quartzite: <0.8mm. Sub-angular but not present in all samples within the coarse fraction.
Sparry Calcite: <0.8mm. Angular to sub-angular (for examples see KER 11/23 and 11/49).

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Quartz: Mono and polycrystalline

Fine Fraction Frequent - Few

Sparry calcite
Feldspar
Micrite

Fine Fraction Rare

Serpentinite

Textural Concentration Features (TCFs)

TCFs are found throughout the group with defined and diffuse edges, some merging with the clay matrix. They are commonly opaque or dark red brown in XP (x25), and range from rounded to sub-rounded, equant and elongated. Size ranges from 0.16-0.8mm. They derive from both inclusions within the clay, and the addition of material.

Comments

PG8 is consistent in terms of the nature of raw materials but the frequency of these inclusions do vary across the group. This variation may reflect that naturally present in the raw material sources but also the use of a moderately finer mix in some examples. The shared presence of tuffaceous and mudstone material in both PG7 and PG8 indicate the use of similar raw material sources as such the presence of calcareous material may reflect natural variability within a single raw material source. However, the presence of calcareous rock fragments in PG8, the general absence of mudstone breccia, and the consistently finer nature of PG8 suggests that the variability between PG7 and PG8 is not solely due to natural variability in raw materials, but the use of different sources by different potters working in close proximity. As Ancient Corinth is the most likely source for PG7, it is also likely that PG8 derives from that area.

II.9 Petrographic Group 9

Argillite Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/33	Large Bowl	Red-brown slip?	EHII
KER 11/38	Neck (Jug/Jar)	Undecorated	EHII
KER 11/47	Jar	Red-brown slip?	EHII
KER 11/50	Jar	Black-brown slip	EHII
KER 11/93	Jar	Undecorated	EHII
KER 11/101	Large bowl	Red slip	EHII
KER 11/119	Jar	Undecorated	EHII
KER 11/122	Large bowl	Undecorated	EHII
KER 11/125	Jar	Undecorated	EHII
KER 11/128	Jar	Undecorated	
KOR 11/32	Bowl	Red-brown slip and burnished?	EHII

Samples belonging to PG9.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/29	Base (Jar?)	Undecorated	EHII
KER 11/60	Sauceboat	Black-brown slip	EHII
KER 11/126	Jar	Undecorated	EHII
KER 11/130	Jar	Undecorated	EHII
KOR 11/24	Jug	Undecorated	EHII

Samples belonging to PG9A.

Coarse:Fine:Voids =80μm

20:70:10 to 30: 55:15

Microstructure

Micro and meso vughs. Voids are single to open spaced, moderately aligned to sample margins.

Groundmass

The groundmass is heterogeneous with darker areas most likely due to differences in firing conditions. There are also striations that appear to be from clay mixing (for example see KER 11/101). The groundmass colour ranges from yellow/golden brown to dark green in XP (x25). The former is highly optically active whilst the latter is inactive as such the main group has been split based on differences in optical activity relating to firing.

Inclusions-General Features

Elongated. Angular to sub-rounded. Single to double-spaced. Moderately well sorted with bimodal distribution with coarse rock fragments within a fine matrix, however, the coarse and fine fractions share many of the same inclusions suggesting that the fine fraction derives from the coarse fraction inclusions. Inclusions are moderately to well aligned to sample margins with moderate to poor sorting.

Coarse Fraction Size Range

0.80-2.0mm

Coarse Fraction Dominant

Argillite: <2.4mm. Mode - 1.2mm. Elongated. Angular-sub-rounded. Dark red-brown clay matrix with laminated structure, containing sub-rounded silicate grains and occasional biotite mica laths. In high-fired samples the argillite inclusions have a dark border with lighter brown core suggesting localised reduction.

Coarse Fraction Common-Frequent

Limestone: <1.2mm. Mode - 0.8mm. Equant and irregular. Sub-angular. Sparry calcite grains with rare dark brown cement attached to the argillite fragments. Most commonly found in the lower fired PG9.

Micrite: <2.4mm. Mode - 0.8mm. Elongated and equant. Rounded to sub-angular. Dark yellow brown and light yellow brown in XP (x25).

Mudstone: <1.6mm Mode - 0.8mm Elongated. Sub-angular. Mid to dark orange-brown matrix containing silicate crystals and mica laths. These appear to be the un-metamorphosed versions of the argillites.

Coarse Fraction Very Few

Degraded basic igneous fragments: <0.8mm. Mode - 0.4mm. Equant and elongated. Angular to sub-rounded. Dark black brown sedimentary matrix with remnants of plagioclase laths, often left as voids. These vary in degradation some being largely mud sediment. Not present in all samples but see KER 11/119 and KER 11/128 for examples.

Polycrystalline quartz: <1.6mm. Mode - 0.8mm. Elongated and irregular. Angular to sub-angular. Some display schistocity (for example see KER 11/47) whilst others appear associated with the mudstone and argillite inclusions (for example see KER 11/50) suggesting a similar origin but variation associated with differences in associated rock fragments.

Coarse Fraction Very Few - Rare

Schist: <0.8mm. Elongated and sub-angular. Coarse quartz and feldspar grains with biotite and muscovite seams running through. Not present in every sample but for example see KER 11/38.

Siltstone: <1.6mm. Mode - 0.8mm. Elongated and sub-angular. Mid to dark orange-brown matrix in XP. The matrix contains quartz, feldspar and small amounts of muscovite and biotite mica. Some examples appear to have undergone very low-grade metamorphism and are clearly associated with the argillite inclusions (for example see KER 11/38).

Coarse Fraction Rare - Very Rare

Tuffaceous rock fragments: <0.8mm. Sub-rounded to rounded. These match those described in relation to PG 7 and 8. Not present in all samples but see KER 11/33 for example.

Tuff: <0.8mm. Mode - 0.4mm. Composed of feldspar, quartz and ferro-magnesium inclusions within a fine ashy grey/black matrix in XP (for example see KER 11/128). Some examples appear to show alteration containing secondary minerals such as chlorite (for example see KER 11/119). These rock fragments are not present in all samples.

Fine Fraction Size Range

<0.8mm Mode - 0.8mm

Fine Fraction Dominant

Argillite

Fine Fraction Common

Quartz
Sparry calcite

Textural Concentration Features (TCFs)

TCFs are found throughout the group with defined and diffuse edges, some merging with the clay matrix. They are commonly either lighter or darker clay areas often in the form of striations within the matrix. They appear to derive from both secondary calcite and the possible mixing of red and yellow firing clays, as well as inclusions associated with the addition of the argillite rock fragments to the clay mix.

Comments

This fabric is strikingly consistent in terms of its raw materials and the nature of the microstructure. The only variability present relates to firing with PG9 consistently displaying high optical activity and calcareous content indicative of a relatively low firing temperature, whilst PG9A displays no optical activity and degraded calcite indicative if a higher firing temperature.

There are compatible argillaceous shale outcrops in the Argolid, south of the Nemea Valley, and in the area of Acrocorinth, however, argillaceous inclusions within this group appear more consistent with lithified mudstones rather than true shales. The rare presence of degraded basic igneous indicates an association with PG7, PG8, and PG10 (see below) and may derive from the pillow lava basalts identified by Siddall (In prep.) on the slopes of Acrocorinth in Ancient Corinth.

II.10 Petrographic Group 10

Degraded Basic Igneous and Tuffaceous Rock Fragments Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/32	Large bowl	Red-brown slip	EHII
KER 11/34	Ring base (large bowl)	Red-brown slip	EHII
KER 11/37	Large shallow bowl	Brown slip	EHII
KER 11/81	Large shallow bowl	Red slip	EHII
KER 11/98	Large bowl	Red slip	EHII
KER 11/99	Incurving bowl	Red-brown slip	EHII
KER 11/123	Large shallow bowl	Orange-brown slip	EHII

Samples belonging to PG10.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/2	Jar	Undecorated	EHII
KER 11/4	Jar	Undecorated	EHII
KER 11/41	Jug	Incised	EHII
KER 11/42	Double spouted vessel	Undecorated	EHII
KER 11/43	Jug	Undecorated	EHII
KER 11/44	Jar	Undecorated	EHII
KER 11/62	Bowl	Undecorated	EHII
KER 11/63	Jug/Jar	Red-brown slip	EHII
KER 11/69	Jar	Undecorated	EHII
KER 11/80	Jug/Jar	Undecorated	EHII

Samples belonging to PG10A

Sample Number	Vessel Form	Surface Modification	Period
KER 11/102	Jar	Undecorated	EHII
KER 11/127	Jar	Undecorated	EHII
KER 11/132	Cup?	Applied	EHII
KER 11/135	Ring base (large bowl)	Black slip	EHII

Samples belonging to PG10A.

Coarse:Fine:Voids =60μm

10:70:10 to 25:60:15

Microstructure

Micro and meso vughs and vesicles. Voids are single to open spaced. Unaligned (for example KER 11/121) to moderately aligned (for example KER 11/135) to sample margins.

Groundmass

The matrix is silicate rich, commonly heterogeneous with darker and lighter areas due to differing firing conditions, clay mixing and secondary calcite. The groundmass colour ranges from yellow/golden-brown to dark green in XP (x25). The former is highly optically active belonging to PG10 whilst the latter is inactive belonging to PG10A. Secondary calcite is present in some samples.

Inclusions-General Features

Inclusions are dominantly elongated and equant. Angular to rounded with single to double spacing. They are moderately to well sorted, with bimodal distribution of coarse fragments within a fine matrix. The coarse and fine fraction share many of the same inclusions indicating that the fine fraction derives from the coarser inclusions. Inclusions are unaligned to moderately aligned to sample margins and poorly to moderately sorted.

Coarse Fraction Size Range

0.8-1.6mm

Coarse Fraction Dominant

Degraded basic igneous rock fragments (probably Basalt): <1.6mm. Mode - 0.8mm. Equant and elongated. Sub-angular. The fragments are dark red brown to opaque in XP (x25) with a mud sediment matrix containing plagioclase feldspar laths, and /or voids where laths have degraded. Some contain fragments of serpentinite (for example see KER 11/69). It is common to see that many have degraded to the point of becoming mudstone.

Coarse Fraction Common-Frequent

Micrite/Calcareous mudstone: <2.4mm. Mode - 0.8mm. Elongated and equant. Sub-rounded to rounded. Ranges in coarseness from what appears to be pure micrite to a micritic cement containing small sub-angular silicate and calcite grains with rare orange-brown grains some of which have a vitrified appearance (for example see KER 11/63). The colour of these rock fragments ranges from yellow-gold to yellow-brown.

Coarse Fraction Frequent-Few

Tuff: <1.6mm. Mode - 0.8mm. Irregular, elongated and equant. Angular to sub-angular. Fine grey ashy matrix in XP (x25) containing angular grains of plagioclase feldspar, and orthoclase feldspar. Some examples appear to be grading into the tuffaceous inclusions noted in fabrics PG7 and PG8 with calcareous replacement within the matrix.

Non-calcareous mudstone: <1.2mm. Mode - 0.8mm. Elongated and equant, sub-angular to sub-rounded. Dark black-brown to red-brown matrix in XP (x25), with rare sub-angular silicate inclusions. They share a similar colour to the degraded basic igneous inclusions and are most likely the most degraded examples of these rocks.

Coarse Fraction Very Few - Rare

Mudstone breccia: <1.6mm. Mode - 0.8mm. Sub-angular. Equant and elongated. These fragments have a red-brown and orange-brown fine mud cement containing small sub-angular silicate, and red glassy grains. They appear to be associated with the alteration of the tuff and fine-grained igneous rock fragments (for example see KER 11/4). Not present in all samples.

Sandstone: <0.8mm. Elongated and sub-rounded. Fine-grained calcareous cement containing large quartz and feldspar grains (for example see KER 11/80). Not present in all samples.

Coarse Fraction Rare

Tuffaceous rock fragments: <0.8mm. Mode - 0.4mm. Sub-angular. Equant and elongated. Fine grained ash matrix which is black/grey in XP (x25) containing some remnants of feldspars. Replacement by calcite and non-calcareous sediment is apparent in many examples. Not present in all samples.

Coarse Fraction Very Rare

Polycrystalline quartz: <0.8mm. Sub-angular and equant. Not in all samples.

Serpentinite: <0.4mm. Sub- angular and equant. Not present in all samples.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Monocrystalline quartz
Calcareous mudstone/micrite

Fine Fraction Few

Mudstone
Feldspar

Textural Concentration Features (TCFs)

TCFs are found throughout the group with defined and diffuse edges, some merging with the clay matrix. They are commonly opaque or dark red brown in XP (x25), and range from rounded to sub-rounded, equant and elongated. Size ranges from 0.16-0.8mm. They appear to be the mixing of a red firing clay with a yellow/green firing clay and the presence of inclusions associated with the degraded igneous inclusions. There are also areas of differential oxidation/reduction from firing.

Comments

This fabric is very consistent in terms of the raw materials and the character of the micromass with the only difference relating to firing. PG10 is a low-fired group with a yellow matrix with high optical activity, whilst PG10A is a high-fired group with low optical activity and a green matrix.

The degraded and altered character of the basalts and tuffaceous inclusions are consistent with rocks derived from ancient formations which were originally formed under igneous conditions. The nearest compatible outcrops to the sites from which the material was excavated, are the pillow lavas that have been identified on the slopes of Acrocorinth (Siddall In prep.: 67) consistent with the basaltic nature of the majority of the degraded inclusions in this fabric. A Corinthian origin is also supported by the presence of the mudstone breccia noted in PG7.

II.11 Petrographic Group 11

Rounded Serpentinite Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/56	Jar/Basin	Black slip?	EHII
KOR 11/27	Ladle	Black-brown slip	EHII

Samples from PG11.

Coarse:Fine:Voids =40μm

25:65:10 to 30:55:15

Microstructure

Meso vughs are present but voids are dominantly channels. Voids are single-spaced and range from poorly to well aligned to sample margins.

Groundmass

The matrix is silicate rich and heterogeneous with the colour ranging from green-brown to dark brown in XP (x25) which is optically inactive.

Inclusions-General Features

Dominantly equant but also elongated. Sub-rounded to rounded. Moderately to well sorted with bimodal distribution with large grains within a finer matrix. Inclusions do not show any alignment and are well sorted.

Coarse Fraction Size Range

1.6- 0.4mm

Coarse Fraction Dominant

Serpentinite: 1.6-0.4mm. Mode - 0.8mm. Equant and elongated. Sub-rounded to rounded. Glassy fragments with a green-yellow to yellow-red colour in XP (x25).

Coarse Fraction Rare - Very Rare

Quartz: <0.8mm. Mode - 0.4mm. Sub- angular to sub-rounded. Equant.
Feldspar: <0.6mm. Sub-angular and equant.
Quartzite: <1.6mm. Elongated and equant. Sub-angular
Chert: <0.8mm Elongated and equant. Sub-angular
Hornblende Mica: <0.8mm. Elongated.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Serpentinite
Quartz

Fine Fraction Few to Rare

Quartzite
Chert
Hornblende Mica

Textural Concentration Features (TCFs)

TCFs are sub-rounded red-brown and commonly opaque. They commonly have diffuse edges but also distinct edges consistent with both clay mixing and inclusions within the clay recipe.

Comments

The serpentinite is characteristically rounded suggestive of erosion from hydraulic action such as by a fast moving river. The inclusions derive from an ophiolitic rock formation, the nearest source of which is in the area of Acrocorinth. Whilst Ancient Corinth is known for having natural springs and being in close proximity to rivers these water sources are associated with limestone geology not ophiolitic formations suggesting that the ophiolitic rocks within this fabric must have travelled some distance or may be the result of erosional episodes.

The optical inactivity of the matrix indicates firing at a high temperature range.

II.12 Petrographic Group 12

Angular Chert and Altered Volcanic Rock Fragments

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/21	Ladle	Undecorated	EHII
KER 11/74	Deep bowl/Cooking pot	Undecorated	EHII
KER 11/88	Large bowl/Cooking pot	Applied	EHII
KER 11/92	Large bowl	Undecorated	EHII

Samples from PG12.

Coarse:Fine:Voids =40µm

20:65:15

Microstructure

Voids are dominantly macro vughs and channels with single spacing. They are well aligned to sample margins.

Groundmass

The matrix is heterogeneous. The colour ranges from green-brown to orange-brown in XP (x25) with no to high optical activity with mixed optical activity within a single sample.

Inclusions-General Features

Inclusions range from equant, elongated to irregular, but are dominantly angular to sub-angular with the bimodal distribution of coarse inclusions within a fine silicate rich matrix. Inclusions are not aligned to sample margins with moderate sorting.

Coarse Fraction Size Range

2.4-0.4mm

Coarse Fraction Dominant

Chert: 2.4-0.4mm. Mode - 0.8mm. Angular to sub-angular. Equant, elongated and irregular. Fine-grained chert.

Coarse Fraction Frequent-Few

Degraded Igneous Rock Fragments (tuffaceous): <1.6mm Mode - 0.8mm Equant and irregular. Sub-angular. The fragments range in the level of degradation for example KER 11/92 has fragments that appear to be derived from tuff. Colour ranges from grey to yellow brown matrix with welded angular inclusions of feldspar and amphiboles. Other examples are isotropic and share some similarities to the degraded fragments described in PG25.

Coarse Fraction Few

Mudstone: <1.2mm. Mode - 0.8mm. Equant and elongated. Sub-angular to-sub-rounded. Colour ranges from yellow-brown to dark red-brown matrix in XP (x25). The matrix of the mudstones commonly contains small grains of silicate and occasional areas of micritic sediment which may be secondary.

Coarse Fraction Very Few

Quartzite: <0.6mm. Equant. Angular-sub-angular.

Calcite: <0.6mm. Mode - 0.4mm. Sub-rounded. Not present in all samples (for example see KER 11/21).

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Chert

Fine Fraction Common

Quartz

Fine Fraction Very Few

Mudstone

Fine Fraction Rare

Amphiboles: Associated with igneous inclusions for example see KER 11/88 and KER 11/74.

Serpentinite

Textural Concentration Features (TCFs)

TCFs are present in many samples, with both sharp and diffuse edges. Colour ranges from dark brown to black brown. They may be pellets and the remnants of clay mixing and inclusions within the clay.

Comments

This fabric display a strong consistency within the range of raw materials a single centre of production. The presence of tuffaceous and serpentinite rock fragments are consistent with an ophiolitic origin and match some of the rock types found in PG7, PG8 and PG25. The closet source to the site of Ancient Corinth (Keramidaki) is in the area of Acrocorinth which also contains outcrops of chert associated with the extinct marine environment from which the area is derived from (Siddall In prep.: 67).

This fabric bears a striking similarity to PG19 but is distinguished by the additional presence of the ophiolitic material. The two fabrics may represent the use of the same raw materials but with natural variability, however, due to the undiagnostic nature of

PG19 it has been assigned its own group. The variable optical activity within the samples indicates mixed firing conditions.

II.13 Petrographic Group 13

Fine quartz Rich Fabric

Sample Number	Vessel Form	Surface Modification	Period
KOR 11/15	Sauceboat	White slip (yellow-blue mottled)	EHII
KOR 11/28	Ladle	Brown-red slip	EHII

Samples from PG13.

Coarse:Fine:Voids

5:85:10

Microstructure

Voids are rare but when visible they are dominantly micro vesicles which are open spaced and show no alignment to sample margins.

Groundmass

The matrix is moderately homogeneous and dark brown in XP. It is silicate and mica rich with low-no optical activity.

Inclusions-General Features

Inclusions are only within the fine fraction consisting of equant, angular silicate and mica laths which are well sorted and not aligned to sample margins.

Fine Fraction Size Range
<0.2mm

Fine Fraction Dominant

Silicate (quartz and feldspar)
Biotite mica

Textural Concentration Features (TCFs)

TCFs are common in this group and consist of areas of dark brown sediment within the matrix consistent with clay mixing.

Comments

The analysis of these samples by NAA by Michael Attas assigned them a Corinthian origin, however, lack of diagnostic rock fragments means that it is not possible to assign a provenance to the fabric beyond Corinthian/NE Peloponnese.

II.14 Petrographic Group 14

Medium Fine Clay Mix, with Mudstone, Siltstone and Mudstone breccia Fabric.

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/25	Firedog stand	Undecorated	EHII
KER 11/40	Storage jar/Basin	Undecorated	EHII
KER 11/57	Coarse bowl	Applied	EHII
KER 11/75	Cooking pot	Undecorated	EHII
KER 11/76	Cooking pot	Undecorated	EHII
KER 11/90	Pithos	Undecorated	EHII
KER 11/103	Pithos	Undecorated	EHII
KER 11/105	Jar	Undecorated	EHII
KER 11/120	Large bowl	Red-brown slip	EHII
KOR 11/29	Baking pan	Undecorated	EHII

Samples from PG14.

Coarse:Fine:Voids =60μm

20:65:15

Microstructure

Dominantly micro and meso vughs and channels with single to open spacing and moderate alignment to sample margins.

Groundmass

The matrix is heterogeneous with darker areas due to firing conditions. Groundmass colour varies from yellow-brown and red-brown to dark grey-brown in XP (x25). Optical activity is present in most samples and commonly varies within a single sample. Some secondary calcite is present.

Inclusions-General Features

Inclusions are equant and elongated. Angular to sub-angular with single to double spacing. They are moderately to well sorted, with the bimodal distribution of coarse inclusions are within a finer silicate rich matrix. Inclusions are poorly to unaligned to sample margins.

Coarse Fraction Size Range

2.8mm-0.8mm Mode-1.0mm

Coarse Fraction Dominant

Mudstone; <2.8mm. Mode - 1.2mm. Elongated and equant. Sub-angular. The mudstones have a grey-green-brown clay matrix with orange-red-brown examples in XP. They contain few fine monocrystalline quartz grains (x100). Some are very similar in appearance to the breccia fragments but appear more sedimentary with a high portion of mud and the absence of distinct clastic fragments.

Coarse Fraction Common-Frequent

Siltstone: <1.6mm. Mode - 0.8mm. Elongated. Sub-angular. Mid to dark orange-brown or yellow-brown matrix containing quartz and feldspar with rare biotite mica.

Coarse Fraction Frequent-Few

Mudstone breccia; <2.0mm. Mode - 1.6mm. Elongated and equant. Sub-angular to sub-rounded. Very fine green-grey-brown and red-brown clay mud matrix (in XP) with angular to sub-angular monocrystalline quartz and plagioclase feldspar grains. Also contain red-brown TCFs and orange-yellow grains which appear glassy accompanied by mica laths (in XP x100). They appear less optically active then those described in PG7 and display a range of structures that grade from clastic breccia towards mudstone.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Common

Polycrystalline quartz

Fine Fraction Rare

Serpentinite

Textural Concentration Features (TCFs)

TCFs are common in this group. They have both sharp and diffuse edges, many examples merge with sample matrix. They are both sub-rounded and elongated, and striations which are concordant with sample margins. Size 0.16- 0.4mm. They appear to be the results of clay mixing and the poor breakdown of pellets within the mix.

Comments

This fabric group is very coherent in terms of the raw materials and character of the groundmass suggesting that it represents a single centre of production. The optical activity suggests mixed firing conditions at low firing temperature. The presence of serpentinite indicates an ophiolitic geological source, whilst the breccia and mudstones derive from sedimentary formations these rock types are all consistent with the area around Acrocorinth and Ancient Corinth.

II.15 Petrographic Group 15

Sandstone to Low-Grade Metamorphic Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/4	Ring base (small bowl/sauceboat)	Undecorated	EHI
EPI 12/6	Base (jug/jar)	Brown slip?	EHII
EPI 12/8	Collar of jar	Undecorated	EHII
EPI 12/19	Collar of jar	Undecorated	EHII
EPI 12/31	Deep bowl	Undecorated	EHII?
EPI 12/37	Large bowl	Undecorated	EHII
EPI 12/42	Collar of jar	Undecorated	EHI?
SKOR 11/6	Sauceboat	Red-brown slip	EHII
TAL 11/1	Fruitstand	Raised decoration (Black brown wash?)	EHI
TAL 11/8	Jar	Undecorated	EHI
TAL 11/10	Ladle	Red slip	EHI
TAL 11/17	Small incurving bowl	Black slip?	EHII?
TAL 11/19	Jar handle	Red-black wash?	EHI
TAL 11/27	Large shallow bowl rim	Undecorated	EHI
TAL 11/29	Base of jar	Red slip	EHI
TAL 11/31	Fruitstand	Undecorated	EHI
TSO 10/7	Large basin	Incised with red slip	EHI
TSO 10/9	Fruitstand	Red slip and burnished	EHI
TSO 10/14	Base of large bowl	Red slip and burnished	EHI
TSO 10/23	Fruitstand	Red-orange slip	EHI
TSO 10/40	Ladle	Red-orange slip	EHI
TSO 10/41	Fruitstand	Red-orange slip	EHI
TSO 10/42	Fruitstand	Incised with red-orange slip	EHI
TSO 10/100	Jar handle	Red-brown slip	EHII
TSO 10/128	Tankard	Dark on light pattern painted (brown paint)	EHIII
TSO 10/148	Jar	Orange slip/wash	EHIII

Table x continued: Samples from PG15.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/133	Large bowl/basin	Undecorated	EHII
TAL 11/9	Storage jar	Applied	EHI
TAL 11/18	Base (jar/cooking pot)	Undecorated	EHI
TAL 11/28	Rim (jar/fruitstand)	Undecorated	EHI

Samples from PG15A.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/43	Small shallow bowl	Red slip	EHII
TSO 10/104	Jar	Grey-black slip and burnished?	EHII

Samples from PG15B.

Coarse:Fine:Voids =80µm

10:85:5 to 35:55:10

Microstructure

There are few voids in samples from this group. When present they range from micro to meso vughs and vesicles, with double to open spacing. Orientation ranges from random to crudely parallel to sample margins. Elongated aplastic inclusions have a consistently random orientation.

Groundmass

Homogeneous non-calcareous matrix which often displays a darker firing core. Some more calcareous samples are present (example TAL 12/10). The colour of the groundmass ranges from red-brown to grey brown in XP (x25). The optical activity ranges from low optical activity at some firing margins to no optical activity, most notably at cores and in evenly fired samples (for examples TAL 12/20 and TAL 12/6).

Inclusions-General Features

Elongated and equant. Sub-angular-sub-rounded. Single-double spaced and open spaced. Weak-no alignment to sample margins. Moderately (TSO 10/13) - strongly bimodal (TSO 10/128) with large sandstone-low grade metamorphic rock fragments within a finer matrix of associated minerals such as quartz and mica. Coarse inclusions are in a finer grained groundmass. Inclusions are moderately to well sorted.

Coarse Fraction Size Range

0.24 to1.6mm Mode- 8mm

Coarse Fraction Dominant

Sandstone grading to low-grade metamorphic fragments; <1.6mm. Mode -0.8mm. Elongated. Sub-angular - sub-rounded. Composed of angular-sub-angular quartz and plagioclase feldspar grains in an clay matrix. Sandstone types are dominated by greywacke but also contains arenite and micaceous sandstone containing biotite and muscovite mica laths, and calcareous sandstones with sparry calcite and micrite cement. Some sandstone fragments appear to have undergone low-grade metamorphism displaying foliation and schistocity (for example TAL 12/2, TSO 10/9, EPI 12/37).

Coarse Fraction Common-Frequent

Monocrystalline quartz: <0.4mm. Mode - 0.32mm. Elongated and equant. Sub-angular - sub-rounded.

Plagioclase feldspar; <0.56. Mode - 0.24mm. Equant. Sub-angular- rounded.

Coarse Fraction Frequent-Few

Polycrystalline quartz: <0.8mm. Mode - 0.56mm. Elongated and equant. Sub-angular-sub-rounded.
Mudstone; (In PG15A mudstones are dominant to common e.g. TAL 11/9). <2.8mm. Mode - 1.6mm. Angular-sub-angular. Not present in all samples. Varies from micritic to red clay cement with rounded to sub-angular quartz grains.

Coarse Fraction Very Few

Degraded basic igneous (basaltic): <2.4mm. Mode - 0.56mm. Elongated and equant. Sub-angular to sub-rounded. Not present in all samples (for examples see TSO 10/23, 10/42, TAL 12/28). Comprises of red clay matrix, often with a cloudy appearance, and plagioclase feldspar laths at mixed orientations.

Sparry calcite; <1.2mm. Mode - 0.4mm. Irregular shape. Not present in all samples (for example see TAL 12/10).

Coarse Fraction Rare

Serpentinite: <1.2mm. Mode – 0.5mm. Equant and sub-angular-sub-rounded. Not present in all samples. Red-orange colour with vitrified foliated structure.

Fine Fraction Size Range

<0.32mm

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Common

Plagioclase feldspar

Fine Fraction Very Few

Muscovite
Vitrified hematite clay
Opaques

Fine Fraction Rare

Micritic mudstone

Textural Concentration Features (TCFs)

TCFs are few-common in this fabric group consisting of dark brown in XP and PPL (x25). They are commonly rounded to sub-rounded equant and elongated. They have sharp-diffuse edges often merging with the micromass and are discordant. When they contain aplastic inclusions, which is rare, they consists of sub-angular monocrystalline quartz grains and fine biotite mica laths. Size <0.4mm in length. They are most likely inclusions in the base clay but some examples may be clay pellets.

Comments

This fabric is characterised by a dominantly mid red brown micaceous and quartz and feldspar rich sand matrix. The fine grains of quartz and feldspar appear to be derived from the larger inclusions of sandstone to low grade metamorphic rock fragments indicating that this is the base clay of these rock fragments, and that this fabric is not tempered but that the rock fragments are naturally occurring. The sub group 15A also contains large angular mudstones which may be associated with the large vessel forms to which these samples belong. The presence of igneous material indicates an ophiolitic origin to the raw materials whilst the other rock types are consistent with flysch geology. The dominantly even colour of the matrix colour suggests a consistent firing atmosphere, however, the presence of some mixed optical activity within particular samples and the macroscopic presence of cores suggests a short soaking time.

II.16 Petrographic Group 16

Mudstone, Siltstone and Chert Fabric

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/88	Incurving bowl	Undecorated	EHII
TSO 10/93	Incurving bowl	Red-orange slip and applied	EHII
TSO 10/113	Incurving bowl	Brown slip	EHII

Samples within PG16.

Coarse:Fine:Voids =80μm

20:65:15

Microstructure

Micro and meso vugh and vesicle voids, dominantly meso vesicle types. Voids display crude to no alignment it sample margins. Voids have double to open spacing.

Groundmass

Heterogeneous grey-brown to orange brown silicate rich matrix (in XP x25) which displays a darker firing core. The optical activity ranges from low to moderate.

Inclusions-General Features

Angular to sub-angular, equant and elongated. The display crude to no alignment to sample margins. They are bimodally distributed with large inclusions within a fine matrix. Inclusions range from single to open spaced.

Coarse Fraction Size Range

<1.6mm. Mode - 0.8mm

Coarse Fraction Dominant

Mudstone: < 1.2mm. Mode - 0.8mm. Angular to sub-angular. Equant and elongated. Colour ranges from dark brown to orange-brown in XP with few silicate grains within the sediment.

Coarse Fraction Frequent-Few

Argillite: <1.6mm. Mode - 1.2mm. Angular to sub-angular, dominantly elongated. Mid-brown colour in XP and displays limited lamination suggestive of low-grade metamorphism.

Chert: <1.2mm. Mode - 0.8mm. Angular to sub-angular, dominantly equant. Some examples have radiolaria and thick ribbons of coarser grains.

Coarse Fraction Few- Very Few

Radiolarian mudstone: <1.2mm. Mode - 0.8mm. Sub-angular and equant. Commonly displays a red-brown sedimentary matrix containing radiolaria.

Coarse Fraction Very Few- Rare

Calcite: <1.2mm. Mode - 0.8mm. Sub-angular to sub-rounded, irregular but more commonly equant. Both micrite and sparitic calcite are present. There is twinning visible in the sparitic calcite.

Siltstone: <0.8mm. Mode - 0.4mm. Angular to sub-angular commonly elongated. In XP the siltstones have a brown cement with angular silicate grains.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Quartz
Feldspar
Calcite

Fine Fraction Common

Mudstone

Fine Fraction Very Few

Chert

Fine Fraction Rare

Vitrified red clay

Textural Concentration Features (TCFs)

TCFs are few-common in this fabric group consisting of dark brown in XP and PPL (x25). They are commonly rounded to sub-rounded equant and elongated. They have sharp-diffuse edges with some examples merging with the micromass. Size <0.2mm in length. They appear to relate to the mixing of a red firing clay with a calcareous clay, however, some may also relate to the mudstones which are similar in colour.

Comments

This group is heterogeneous group but does share key rock components such as the radiolarian mudstone and chert with bands of thick grains running through it. This variation in the distribution and abundance of shared rock fragments suggests the use of the same types of raw materials by different potters. These rock types are consistent with the shale-chert-sandstone formations south of Tsoungiza as well as similar rock formations located throughout Corinthia.

II.17 Petrographic Group 17

Tuffaceous Rock Fragments and Feldspar Fabric.

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/10	Base (Jug/Jar)	Undecorated	EHII
EPI 12/15	Shallow bowl	Red-brown slip and burnished	EHI
EPI 12/21	Baking pan	Undecorated	EHII
EPI 12/22	Deep basin	Red-brown slip and burnished?	EHII
EPI 12/23	Jar	Undecorated	EHII
EPI 12/24	Pot stand	Undecorated	EHII
EPI 12/25	Baking pan	Undecorated	EHII
EPI 12/26	Baking pan	Undecorated	EHII
EPI 12/30	Deep bowl/Basin	Red-brown slip	EHI
EPI 12/32	Jar	Red-brown slip	EHII
EPI 12/33	Basin	Red-brown slip and burnished	EHI
EPI 12/35	Basin	Brown slip and burnished	EHI
EPI 12/36	Basin	Undecorated	EHI
EPI 12/39	Cooking pot	Undecorated	EHII
EPI 12/41	Cup/Brazier (Lerna Type)	Burnished?	EHIII
EPI 12/43	Bowl	Black slip and burnished	EHII
EPI 12/44	Bowl	Red-brown slip and burnished?	EHII
EPI 12/45	Bowl	Red-brown slip and burnished?	EHII

Samples from PG17.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/5	Deep bowl/Basin	Brown slip and burnished?	EHI
EPI 12/13	Cooking pot?	Undecorated	EHI
EPI 12/14	Large bowl/Basin	Undecorated	EHI
EPI 12/16	Bowl	Burnished?	EHI

Samples from PG17A.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/34	Shallow bowl	Red-brown slip and burnished	EHI

Samples from PG17B.

Coarse:Fine:Voids =60μm

10:75:15 to 25:65:10

Microstructure

Voids are characterised as micro and meso vughs with micro and meso channels in PG17A. All voids are double to open spaced. Only the voids within PG17A show alignment to sample margins.

Groundmass

The matrix is heterogeneous with darker and lighter areas indicative of firing margins in some samples. The groundmass colour ranges from yellow-gold to orange-brown and dark brown in XP (x25). Optical activity is present in the majority of samples.

Inclusions-General Features

Equant, elongated and irregular. Angular to sub-rounded with single to open spacing. Inclusions are dominantly unsorted although finer examples appear moderately sorted (for example see EPI 12/43). Inclusions are unaligned to samples margins.

Coarse Fraction Size Range

0.4mm-2.0mm

Coarse Fraction Dominant

Tuff: <2.0mm. Mode - 0.8mm. Irregular, elongated and equant. Angular to sub-angular. Tuff types vary with welded glassy tuff with yellow brown glassy flow structure, and ash types which has a fine grey-isotropic ashy matrix (XP x25). The dark ashy matrix contains angular grains of feldspar. Some examples appear to be grading into tuffite others are degraded with a brown muddy matrix (for example see EPI 12/10). The size of the inclusions within the tuffs vary greatly.

Tuffite-Tuffitic rock fragments: <2.0mm. Mode - 0.8mm. Equant and elongated. Angular to sub-angular. Golden-yellow cement with a 'wavy' texture due to differing orientation within the cement. Commonly contain fragments of alkali and plagioclase feldspar (some examples are highly altered), quartz and areas of dark brown and carbonate sediment replacement (for example EPI 12/10). Some are altered to the extent that they appear to be mudstones.

Coarse Fraction Common-Frequent

Feldspar: <1.2mm. Mode - 0.8mm. Equant and angular to sub-angular. Plagioclase and orthoclase feldspar. Zoning and twinning present in many examples.

Coarse Fraction Frequent-Few

Trachyte: <1.2mm. Mode - 0.8mm. Angular, elongated and equant. Fine grained groundmass containing angular alkali feldspar grains.

Coarse Fraction Very Few-Rare

Altered igneous rock fragments: Isotropic devitrified inclusions that are irregular and have the appearance of crystal growths with each crystal growing from another or overlying each other (for example see EPI 12/24).

Tuffaceous rock fragments: <0.8mm. Mode - 0.6mm. Equant and sub-rounded. Yellow golden cement with mixed orientation displaying a distinctive optical activity. The cement commonly containing small sub-angular-angular silicate grains.

Coarse Fraction Few

Chert: <1.2mm. Mode - 0.8mm. Angular to sub-angular. Most commonly equant. Fine and coarse-grained cherts. Some examples contain brown sediment (for example see EPI 12/23).

Coarse Fraction Very Few-Rare

Dacite: <1.0mm. Mode - 0.8mm. Angular and primarily equant. The rock fragments have a fine-grained porphyritic groundmass with angular and sub-rounded plagioclase feldspar. Some alkali feldspar is also present with yellow-brown amphiboles. Rare examples appear to also contain brown sediment.

Amphiboles: <0.4mm. Sub-angular and equant. Yellow-brown in XP and yellow in PPL (x25). These are the same as those within the dacite and most likely derive from these rock inclusions.

Coarse Fraction Very Rare

Calcite: <1.2mm. Rounded and equant. Sparry calcite not present in most samples (for example see EPI 12/26).

Sanidine: <0.6mm. Sub-angular and equant. May be derived from the trachyte.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Feldspar: Dominantly plagioclase with twinning but also including orthoclase.

Fine Fraction Common

Monocrystalline quartz

Fine Fraction Very Few

Isotropic altered igneous rock fragments: These appear to be smaller fragments of the devitrified igneous crystals described within the coarse fraction.

Textural Concentration Features (TCFs)

TCFs are common, consisting of red-brown opaque- red sediment. They display both sharp and diffuse edges and are consistent with natural inclusions within the clay matrix.

Comments

The distribution, sorting and comparable nature of the base clay and the inclusions indicate that this is not a tempered fabric, with the exception of PG17A which includes vegetal matter and PG17B which has added andesite.

The igneous material within this fabric groups is very characteristic, containing both well defined and heavily altered tuffaceous material that is not compatible with that noted in PG7, PG8 or PG10 from Ancient Corinth. These rocks are compatible with the Jurassic-Lower Cretaceous diabase-chert-tuffite and tuffitic breccio-conglomerate formations surrounding the site of Epidavros.
The high degree optical activity indicates vessels were consistently fired at low temperature ranges.

II.18 Petrographic Group 18

Sandstone and Altered Sandstone with Micritic Veins Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 12/45	Incurving bowl	Red-orange slip	EHII
TSO 12/50	Jar	Brown slip/wash	EHII
KER 12/64	Bowl	Red-orange slip	EHII

Samples from PG18.

Coarse:Fine:Voids =80μm

15:75:10

Microstructure

Voids consist of micro and meso vughs but dominated by the latter. They are open spaced and show no alignment.

Groundmass

The matrix is silicate rich and heterogeneous with moderate to low optical activity. It colour is grey-brown to brown commonly with secondary calcite.

Inclusions-General Features

Inclusions are angular to sub-rounded but dominantly sub-angular. They range from equant to elongated, but dominantly equant. They are moderately sorted with a bimodal distribution of coarse rock fragments within a fine matrix. Inclusions are single-spaced and show no alignment.

Coarse Fraction Size Range

<1.8mm. Mode - 1.2mm.

Coarse Fraction Dominant

Sandstone: <1.2mm. Mode - 0.8mm. Sub-angular and sub-rounded equant and elongated. Litharenite and arenite types.
Altered sandstone: <1.2mm. Mode - 0.8mm. Sub-angular and irregular. Angular quartz grains with micritic intergrowths in the cements and over quartz grains.

Coarse Fraction Common-Few

Micrite: <1.0mm. Mode - 0.6mm. Rounded and equant. Appears greyish and degraded. Some may be related to secondary calcite whilst other examples may be the degradation of calcite.

Coarse Fraction Few

Mudstone: <1.8mm. Mode - 1.2mm. Sub-angular, equant and elongated. Grey-brown and black in colour with angular silicate grains within the cement.

Siltstone: <1.6mm. Mode - 1.2mm. Sub-angular, equant and elongated. Red-brown with angular silicate grains.

Coarse Fraction Rare

Plagioclase feldspar: <0.8mm. Equant and angular, with twinning.
Quartzite: <0.8mm. Angular to sub-angular with undulose extinction.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Quartz

Fine Fraction Common

Micrite

Textural Concentration Features (TCFs)

TCFs are common ranging from red-brown mud sediment to opaques. They are all commonly rounded or sub-rounded, although there are elongated examples. They have well defined edges but also include examples that merge with the micromass. Their similarity to some of the mudstone inclusions suggest a relation between the two inclusion types whilst the examples which merge with the micromass suggest clay mixing of a calcareous and red firing clay.

Comments

This fabric group consistently shares the same types of raw materials, particularly characterised by the presence of altered sandstone rock fragments. The shared nature of the raw materials types and groundmass suggest the use of the same rock and clay sources. However, there is some variability in the distribution and proportion of the different inclusion types which may represent variation in practice by different potters.

Comparable marly sandstones, conglomerates, and sandstones are present throughout the Nemea Valley and the area of Corinth, as well as the NE Peloponnese, making assignment of provenance particularly difficult. Analysis of comparative material from Midea and Tiryns in the Argolid has found the altered rock fragments with secondary calcite in more abundance which may suggest and origin in the Argolid.

II.19 Petrographic Group 19

Angular Chert Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/56	Incurving bowl	Red-brown slip	EHII
TSO 10/132	Jug/Jar	Incised and black slip/wash	EHIII

Samples from PG19.

Coarse:Fine:Voids =40µm

10:65:25 to 10:70:20

Microstructure

Voids are dominantly meso vughs and channels with single to double spacing. They are dominantly well aligned to the sample margins.

Groundmass

The matric is heterogeneous with areas of darker and lighter colour. The colour ranges from red-brown to dark green-brown and black-brown in XP (x25). The groundmass is optically inactive suggestive of high firing temperature.

Inclusions-General Features

Inclusions are dominantly equant or elongated. Angular to sub-angular and poorly to moderately sorted. They do not appear aligned to the sample margins and display a bimodal distribution of large rock fragments within a silicate rich fine matrix.

Coarse Fraction Size Range

2.0mm-0.4mm

Coarse Fraction Dominant

Chert: <1.2mm. Mode - 0.8mm. Angular to sub-angular. Equant and elongated. Fine and coarse-grained examples are present, however, fine-grained examples dominate. Some examples have ribbons of quartz.

Coarse Fraction Frequent-Few

Mudstone: <0.8mm. Mode - 0.6mm. Equant and elongated. Sub-rounded. Dark brown to black-brown in XP (x25). Some examples are grey green (for example see TSO 10/132). They are characterised by a very fine mud cement with the rare presence of small silicate inclusions.

Coarse Fraction Few-Very Few

Polycrystalline quartz: <1.2mm. Mode - 0.6mm. Equant and elongated. Sub-angular to sub-rounded. More commonly found in TSO 10/56.

Coarse Fraction Rare

Micrite: <2.0 mm. Rounded and equant. Appears greyish and degraded, may be secondary calcite.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Common-Few

Chert

Fine Fraction Few

Mudstone

Textural Concentration Features (TCFs)

TCFs are commonly present characterised as dark red-brown with diffuse edges. They may relate to inclusions from the mudstone but the presence of both calcareous and non-calcareous material within the clay and the rounded nature of some of the TCFs suggest that they are the remains of clay pellets from mixing.

Comments

The samples within PG19 share the same raw materials with comparable angularity and sorting. However, there is significant variation in the relative frequency of the inclusions and the character of the microstructure indicating the group may represent the use of the same raw materials by different potters.
This group bears a striking resemblance to PG12 sharing the majority of the same raw materials however it lacks the igneous material which characterises PG12 and is geologically undiagnostic. Chert is widely available throughout the study area and has a long history of use within ceramics being found at comparative sites within the Argolid.

The group shares similarities to Graybehls Quartz and Chert Fabric and Joyners Chert cooking fabrics which also include micrite (Joyner uses the terminology calcimudstone 2007: 201). Both these authors argue for a local Corinthian provenance based on similarities to raw materials and typological characteristics. Chert is present on Acrocorinth as part of the Middle Jurassic limestone as well as within the shale-chert formations, however, shale-chert-sandstone formations are also located 5km south of Tsoungiza as such a local provenance is also possible.

II.20 Petrographic Group 20

Disaggregated Sparitic Limestone and Sandstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/27	Askos	Incised and burnished?	EHI
TSO 10/31	Basin/Deep bowl	Burnished	EHI
TSO 10/139	Bass bowl	Black slip and burnished	EHIII
KOR 10/33	Frying pan	Incised and black slip	EHII

Samples from PG20.

Coarse:Fine:Voids =20µm

65:15:20

Microstructure

Voids consists of micro vughs and vesicles with single to double spacing and are well aligned to sample margins.

Groundmass

The matrix is heterogeneous due to darker areas of reduced firing and contrasting areas of optical activity within the matrix which ranges from optically active to moderately active within and between samples. The colour is yellow-brown to red-brown in XP (x25).

Inclusions-General Features

Elongated and equant. Sub-angular to rounded well sorted with single spacing or less. They are crudely aligned to unaligned to sample margins with a weakly bimodal distribution.

Coarse Fraction Size Range

<0.8mm. Mode - 0.16mm

Coarse Fraction Dominant

Micrite: <0.8mm. Mode - 0.16mm. Equant and sub-angular to rounded. Well sorted with a grey-yellow colour, some examples appear degraded and muddy.

Calcite: <0.8mm. Mode - 0.4mm. Elongated and equant. Angular to sub-angular sparitic calcite.

Coarse Fraction Few

Mudstone: <0.8mm. Mode - 0.4mm. Sub-rounded to rounded. Equant and irregular. Red-brown in PPL and XP (x25) with few to rare small sub-angular quartz grains in the fine mud matrix.

Coarse Fraction Rare

Chert: <0.8mm Mode - 0.4mm Sub-angular and fine grained.

Monocrystalline quartz: <0.8mm. Angular to sub-angular with single and undulose extinction.

Fine Fraction Size Range

<0.16mm

Fine Fraction Dominant

Monocrystalline quartz

Textural Concentration Features (TCFs)

TCFs are present, characterised as sub-rounded with both distinct and diffuse edges. They are red-brown in colour and are dominantly <0.4mm in size. They are consistent with the remains of clay mixing.

Comments

The raw materials within this group are compatible with the Upper Pliocene marly limestones, conglomerate, and sandstone formations which line the Nemea Valley. Whilst such materials are ubiquitous throughout the NE Peloponnese and comparable sources can be found both in the Nemean Valley and the area of Ancient Corinth the limited distribution of this fabric dominantly within Nemea may indicate an origin in the area. However, the undiagnostic nature of the raw materials means that is it not possible to assign a provenance more precise than Corinthia or NE Peloponnese.

II.21 Petrographic Group 21

Fine Clay mix with Mudstone and Mudstone Breccia Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/124	Jar	Dark on light pattern painted (brown)	EHIII
TSO 10/134	Bowl	Brown-orange slip/wash	EHIII
TSO 10/135	Bowl	Brown-orange slip/wash	EHIII
TSO 10/137	Pithos	Black slip/wash	EHIII

Samples within PG21

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/145	Pithos	Applied and black slip/wash	EHIII
KOR 11/5	Sauceboat	Black slip/wash	EHII
KOR 11/18	Bowl	Black slip	EHII

Samples within PG21.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/15	Bowl	Red slip	EHI
TSO 10/28	Handle	Brown-grey slip/wash and burnished	EHII
TSO 10/30	Basin/Deep bowl	Red-brown slip	EHII
TSO 10/71	Base	Red slip	EHII
TSO 10/112	Bowl	Red-brown slip	EHII

Samples within PG21A.

Coarse:Fine:Voids =15µm

5:85:10 to 35:55:10

Microstructure

Voids are dominantly micro and meso vughs, with few vesicles and channels with double to open spacing. Orientation ranges from moderately to dominantly well aligned to sample margins. Secondary calcite is present in some samples.

Groundmass

The groundmass is heterogeneous with firing horizons commonly visible. The matrix colour ranges from red-brown to green-brown in XP (x25), low to no optical activity suggestive of a high firing temperature.

Inclusions-General Features

Elongated and equant to irregular with single to open spacing and crude to random alignment to the sample margins. Distribution is bimodal with large coarse inclusions within a fine matrix. Inclusions are moderately to well sorted.

Coarse Fraction Size Range

3.2mm-0.4mm. Mode - 1.2mm.

Coarse Fraction Dominant

Siltstone: <3.2mm. Mode - 1.2mm. Elongated and equant. Angular to sub-angular. Grey-brown clay matrix with fine sub-angular to sub-rounded monocrystalline quartz and biotite mica laths in XP (x25). The size of the quartz grains and proportion of clay matrix varies from very fine to medium fine.

Mudstone: <2.8mm. Mode - 1.2mm. Elongated and equant. Grey-green-brown clay matrix (some samples include red-brown examples see TSO 10/137) in XP with few to rare fine monocrystalline quartz grains (x100).

Coarse Fraction Common-Frequent

Mudstone breccia: <2.0mm. Mode - 1.6mm. Elongated and equant. Sub-angular to sub-rounded. Very fine green-grey-brown clay mud matrix (in XP) with angular to sub-angular monocrystalline quartz and plagioclase feldspar grains. Also contains red-brown TCFs and orange-yellow grains which appear translucent (in XP x100).

Coarse Fraction Rare

Chert: <2.0mm. Mode - 0.4mm. Angular to sub-angular and fine grained. Only present in sample TSO 10/137.

Fine Fraction Size Range

<0.16

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Few

Vitrified hematite clay: <0.16 Mode - 0.08mm. Elongated and lath like. Red to red brown in both XP and PL.

Textural Concentration Features (TCFs)

TCFs are common in this group with defined and diffuse edges, some merging with the clay matrix. They are commonly opaque or dark red brown in XP (x25), and range from rounded to sub -rounded. Size <0.8mm. They appear to be from both inclusions within the clay and associated with the mudstones. Striations within the clay matrix also suggest that some TCFs are related to the mixing of a red firing clay with a calcareous clay.

Comments

The distribution of the mudstone breccia in addition to the rare presence of associated material within the groundmass indicates that these have been added to the clay mix.

The raw materials used in this fabric are not geologically unique and the use of mudstone breccia temper within ceramics has been found across the NE Peloponnese within the wider EH study by the author. The raw materials are comparable to those identified in Graybehl's material from Hellenistic Nemea (Graybehl 2014) and are comparable to Whitbread's Corinthian Fabric A (1995: 268-70). However, unlike Whitbread's fabric and the breccia discussed in relation to PG7, samples within PG21 do not contain radiolarian mudstone which may indicate that they from a different rock formation.

The extensive comparative work by the author has also enabled some discrete differences to be recorded between fabrics containing mudstone breccia. The Tsoungiza examples contain primarily mudstones, siltstone and breccia. The NVAP 204 examples also contain with feldspars and quartzite, whilst the Keramidaki examples contain tuffites and ophiolitic material. However, without detailed exploration of the breccia outcrops within Nemea and Corinth provenance can only be assigned to the region of Corinthia.

II.22 Petrographic Group 22

Quartz Sand Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/82	Jar	Undecorated	EHII
KER 11/108	Cooking pot	Applied	EHII
KOR 11/9	Sauceboat	Black slip	EHII

Samples from PG22.

Coarse:Fine:Voids =60μm

10:75:15

Microstructure

Voids are meso and micro vughs with crude to no alignment to sample margins and open spacing.

Groundmass

The matrix is heterogeneous and optically active. The colour is yellow-brown to mid brown with secondary calcite being common.

Inclusions-General Features

Inclusions are dominantly equant but elongated examples are present. They range from angular to sub-rounded but are dominantly sub-angular. Inclusions are well sorted with a bimodal distribution of coarse inclusions within a fine matrix. They commonly display no or crude alignment to sample margins.

Coarse Fraction Size Range

<1.8mm. Mode - 0.8mm

Coarse Fraction Dominant

Quartzite: <0.8mm. Mode - 0.6mm.

Coarse Fraction Frequent

Chert: <1.8mm. Mode - 0.8mm. Angular to sub-angular. Equant and elongated. The chert is dominantly fine-grained but includes coarse-grained examples and radiolarian types. Some chert fragments are fine grained but have ribbons of coarser grains.

Coarse Fraction Very Few

Mudstone-grading to argillite: <1.2mm. mode 0.8mm. Elongated and equant. Sub-angular. Mid-brown to dark red-brown with rare silicate inclusions. Some of the mudstones have a low degree of lamination and as such are more argillite types.

Coarse Fraction Very Few- Rare

Sandstone: <0.4mm. Sub-angular to sub-rounded. Litharenite.

Coarse Fraction Very Rare

Serpentinite: 0.8mm. Sub-angular and elongated. In KER 11/82 only.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Quartz

Fine Fraction Rare

Ostracod shell

Textural Concentration Features (TCFs)

TCFs are common in this fabric. They are commonly rounded with well-defined edges. Some examples are also surrounded by shrinkage voids. They are dark-red brown in colour frequently with small silicate grains within their matrix. They are consistent with clay pellets and indicate the mixing of a calcareous clay with a red firing clay.

Comments

Whilst this group share key rock types, the variability in the nature of some of the raw materials such as the inconsistent presence of ostracod fragments indicates that these samples are not from the same producer. Therefore, this fabric represents the use of similar raw materials and clay mixing practices by multiple potters.

The sandstone and mudstone fragments are compatible with the Jurassic limestones of Acrocorinth, which contain sandstones and marls with ophiolitic bodies suggesting a possible local origin for these fabrics. However, fossil rich marine deposits and outcrops of sandstone are also widely distributed across the NE Peloponnese making provenance difficult.

II.23 Petrographic Group 23

Argillite-Shale and Mudstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/131	Incurving bowl	Red-brown slip	EHII
TSO 11/53	Incurving bowl	Applied	EHII
TSO 11/77	Baking pan	Undecorated	EHII
TSO 10/87	Incurving bowl	Applied	EHII

Samples from PG23.

Sample Number	**Vessel Form**	**Surface Modification**	**Period**
TSO 10/91	Firedog stand	Undecorated	EHII
TSO 10/95	Incurving bowl	Applied	EHII
TSO 10/110	Baking pan	Undecorated	EHII
TSO 10/120	Firedog stand	Undecorated	EHII

Samples from PG23.

Coarse:Fine:Voids =60μm

15:80:5 to 30:50:20

Microstructure

Voids are dominantly micro and meso vughs and vesicles with few macro channels with single to open spacing. Voids range from unaligned to sample margins (for example see TSO 10/110) to very well aligned to sample margins (for example see TSO 10/53).

Groundmass

The matrix is commonly heterogeneous with firing cores occur in some samples (for examples see TSO 10/53 and TSO 10/77). The matrix colour ranges from orange-brown to dark brown and green-brown in XP (x25) and is commonly optically active suggestive a relatively low firing temperature below 750°C, however, samples with low to no optical activity are also present.

Inclusions-General Features

Inclusions are dominantly elongated, with rare equant examples. They display a bimodal to trimodal distribution with single to open spacing and crude (for example see TSO 10/77) to moderate alignment to sample margins (for example see TSO 10/53).

Coarse Fraction Size Range

0.4-3.2mm Mode - 1.6mm

Coarse Fraction Dominant

Argillite grading to shale: <3.2mm. Mode - 1.6mm. Elongated. Angular to sub-angular. Yellow-brown to dark brown in XP and PPL (x25) with angular silicate grains and commonly laminated structure. The shales commonly have multiple colours between layers, alternating between dark brown and yellow-brown.

Coarse Fraction Common-Frequent

Mudstone: <1.2mm. Mode - 0.8mm. Equant. Angular to sub-angular. Red-brown to grey-brown in XP and PPL (x25) with rare silicate within the mud matrix.

Coarse Fraction Frequent-Few

Micrite: <1.6mm. Mode - 0.8mm. Elongated and equant. Sub-rounded to rounded. Yellow-brown in XP and PL (x25).

Coarse Fraction Very Few

Siltstone: <1.6mm. Mode - 1.2mm. Elongated and equant. Sub-angular to rounded. Coarse angular quartz, feldspar and mica grains in fine brown clay matrix

Sandstone: <2.0mm. Mode - 0.8mm. Elongated and equant, dominantly sub-angular. Consists of arenite (for example see TSO 10/53) and litharenites (for example see TSO 10/87).

Coarse Fraction Very Few- Rare

Chert: <2.0mm. Mode - 0.8mm. Elongated and equant. Angular to sub-angular. Ranging from fine to coarse grained with its frequency within samples across the group varying. It is more frequent in samples TSO10/110 and TSO 10/87.

Coarse Fraction Rare-Very Rare

Calcite: <0.8mm. Mode - 0.4mm. Sub-angular to sub-rounded. Sparitic calcite, not present in all samples but most frequent in TSO 10/110 and TSO 10/87.

Radiolarian Mudstone: <1.6mm. Mode - 0.8mm. Equant and sub-angular to rounded. Not present in all samples.

Radiolarian chert: <0.4mm. Sub-angular and equant. Not present across the group (for example see TSO 10/87).

Chalcedony: <0.8mm. Sub-angular and equant. Not present across the group (for example see TSO 10/53).

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Common-Few

Polycrystalline Quartz

Fine Fraction Very Few

Chert

Fine Fraction Rare

Serpentinite/Vitrified clay. The small size means it is not possible to see a clear structure. Red-orange in colour and sub-rounded and not present in all samples (for examples see TSO 10/87).

Ironstone ooid (for examples see TSO 10/77).

Textural Concentration Features (TCFs)

TCFs are present throughout the fabric but are not common. Red-brown and orange-brown, with some opaque examples in XP and PPL (x25). They have sharp to diffuse edges and are sub-angular to rounded. Size <0.8mm. They are consistent with inclusions within the clay and associated with the mudstone and argillite rock fragments.

Comments

This fabric shows variation in the character of the raw materials, their size and frequency, but has been grouped on the shared presence of fine-grained argillite and shale inclusions. A significant degree of variation is present in the degree of metamorphism present in the argillaceous inclusions which ranges low metamorphosed argillites, to those that are true shales. It is possible to see a full range of variation within individual samples as well as between samples suggesting that the difference in the inclusions is related to both variation naturally present in the source of the raw materials, as well as the use of the same raw materials types but from different geological outcrops. The inclusions within this group are consistent with an origin from a shale-chert-sandstone formation examples of which are located *c.* 4km south of the Nemea Valley and in the immediate area of Ancient Corinth. The same fabric type has also been noted within comparable material from the Argolid. As with the fabric described here there is variation across the samples indicative of the shared use of raw materials from different sources. As such the distribution of this fabric across the NE Peloponnese indicates a shared fabric recipe and reflects the wide distribution of these raw materials.

II.24 Petrographic Group 24

Intermediate Igneous Rock Fragments Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KOR 11/22	Bowl	Red-brown slip	EHII
TSO 10/3	Deep bowl	Brown slip and burnished	EHII
TSO 10/25	Hemispherical bowl	Brown slip and burnished	EHI

Samples within PG24.

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/12	Body sherd (jar/bowl)	Incised and burnished	EHII
EPI 12/20	Body sherd (jar?)	Red slip	EHII
EPI 12/27	Incurving bowl	Red-black slip and burnished	EHI
EPI 12/38	Small incurving bowl	Red-brown slip and burnished	EHII

Samples from PG24A.

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/5	Hemispherical bowl	Red slip and burnished	EHI
TSO 10/37	Shallow bowl	Brown slip and burnished	EHI

Samples from PG24A.

Coarse:Fine:Voids =80μm

5:85:10 to 25:65:10

Microstructure

Voids are common in this group, ranging from micro and meso vesicles, particularly dominant in EPI 12/27, to micro and meso vughs which are more common in TSO 10/25. Alignment varies from unaligned (for example see TSO 12/37) to well aligned to sample margins (for example see EPI 12/27).

Groundmass

The matrix is dominantly heterogeneous with darker firing cores present in some examples (for example see EPI 12/27). The colour of the groundmass Matrix ranges from yellow to mid orange- brown in XP (x25). Those examples with a darker matrix primarily within PG24 have low to no optical activity, in contrast those of PG24A have high optical activity. Matrix has low to high optical activity.

Inclusions-General Features

Elongated and equant. Single to double-spaced with random alignment to sample margins. Inclusions have a bimodal distribution, being moderately to more dominantly poorly sorted.

Coarse Fraction Size Range

0.4 to 2.0mm. Mode - 0.8mm.

Coarse Fraction Dominant

Intermediate Volcanic Rock Fragments: <5.8mm. Mode - 0.8mm. Irregular and equant. Angular to sub-rounded. Rock fragments display porphyritic texture with andesine groundmass dominated by plagioclase feldspar displaying twinning and zoning. Sanidine is less commonly present. Brown-green amphiboles, hornblende and pyroxenes are common (most commonly clinopyroxene). Biotite laths and brown opaques are frequent. These rock fragments appear to be andesite although few range from basalt to rhyolite, dacite is rare.

Feldspar: <2mm. Mode - 0.4mm. Angular to sub-angular. Dominated by plagioclase feldspar commonly displaying twinning and zoning.

Coarse Fraction Common-Frequent

Amphibole Penocrysts (hornblende): <1.2mm. Mode - 0.4mm. Few elongated lath penocrysts, most dominantly euhedral. Angular to sub-angular. Colour in XP ranges from yellow to pink. Pleochroism in PPL from pale white, white-green to darker green (x25).

Biotite: <0.8mm. Mode - 0.4mm. Elongated sub-angular laths.

Coarse Fraction Few

Monocrystalline Quartz: <0.8mm. Mode - 0.4mm. Angular to sub-angular and equant.

Coarse Fraction Very Few-Rare

Mudstone
Siltstone
Serpentinite
Iron rich opaques

Fine Fraction Size Range

<0.23mm

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Common

Plagioclase feldspar
Amphibole
Biotite

Fine Fraction Rare

Serpentinite
Micrite

Textural Concentration Features (TCFs)

TCFs are not common in this fabric group and only appear in Tsoungiza 10/25 and Korakou 11/22 which also contain micrite, calcite and chert which represent the calcareous subgroup.

Comments

This fabric shows variation in the character of the raw materials, their size and frequency, but has been grouped on the shared presence of intermediate igneous rock fragments. PG24 is defined by the use of a calcareous clay base whilst PG24A is non-calcareous and commonly coarser then PG24. The raw materials within the fabric group and its related sub-group are consistent with andesite and an origin on the island of Aegina. This has also been confirmed through examination of material from Kolonna held at the Fitch Laboratory Athens, and detailed in the Aegina volume by Gauß and Kiriatzi (2011). PG24 is consistent with Guass and Kiriatzis FG1A which they conclude is related to the volcanic outcrops on Aegina located 4km south of Kolonna and the use of the Holocene sediments to the north (2011: 93-96, 132). Whilst Guass and Kiriatzi argue that FG1A is a tempered fabric, some of the inclusions within samples from PG24 are not consistent with temper. Their low frequency and more rounded appearance indicate they may be natural constituents of the clay. This is particularly evident in

KOR 11/22. However, across the group generally inclusions are very angular with strong bimodal distribution suggestive of tempering.

PG24A is a match to Guass and Kiriatzis FG2B (2011: 102-104). This fabric was found to have strong similarities to the Pliocene clays on the island but was not a direct match. Its contrast to PG24 clearly indicates the use of multiple sources on Aegina whilst the variation within PG24A suggests the use of different outcrops of a similar type.

The consistently high degree of optical activity of the samples from PG24 and PG24A suggest that both fabrics were fired at low temperature ranges.

II.25 Petrographic Group 25

Altered Volcanic Rock Fragments Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/55	Baking pan	Undecorated	EHII
KER 11/58	Baking pan	Undecorated	EHII
KER 11/86	Large bowl	Black-brown slip	EHII
KER 11/118	Jar	Brown slip	EHII
KER 11/136	Jar	Black slip	EHII
KER 11/138	Shallow bowl	Undecorated	EHII
KOR 11/31	Baking pan	Undecorated	EHII

Samples from PG25.

Sample Number	Vessel Form	Surface Modification	Period
KER 11/109	Cooking pot	Applied	EHII
KER 11/115	Incurving bowl	Applied	EHII
KER 11/142	Incurving bowl	Red-brown-black slip	EHII

Samples from PG25A.

Coarse:Fine:Voids =40µm

10:70:10 to 25:65:10

Microstructure

There are few voids in this group, including micro and meso vughs but dominantly micro vesicles. They are open spaced and unaligned to sample margins.

Groundmass

The calcareous matrix is heterogeneous with darker and lighter areas due to firing differences. The groundmass colour ranges from yellow-golden brown for samples within PG25 to dark green-brown for samples from PG25A in XP (x25). The former is highly optically active whilst the latter is inactive which has led to their division. Secondary calcite throughout sample KER 11/86 and KER 11/118.

Inclusions-General Features

Elongated, equant and irregular. Angular to sub-rounded. Moderately well sorted with bimodal distribution of coarse inclusions within a finer matrix. The coarse and fine fraction share many of the same inclusions suggesting they are related. Inclusions are not aligned to sample margins.

Coarse Fraction Size Range

1.6-0.4mm

Coarse Fraction Dominant

Highly altered volcanic rock fragments: 1.6-0.4mm Mode - 0.8mm Elongated, equant and irregular. Angular to sub-angular. Dark black-brown often opaque in XP (25). What appear to be feldspar microlites are visible in some examples (for example KER 11/138). Other inclusions appear to contain serpentinite (for example KER 11/58). In PPL the inclusions often appear granulated and greyish in colour and de-vitrified (x25).

Coarse Fraction Frequent-Few

Tuff-tuffite: 1.6-0.4mm Mode - 0.8mm Equant and sub-angular. Fine grey, ashy matrix (XP x25) containing angular grains of plagioclase feldspar, and orthoclase feldspar. Many examples appear to be grading into tuffite with calcareous replacement within the matrix (for example 11/58). Appear to be clay related and not present in all samples.

Coarse Fraction Very Few

Serpentinite: 0.8-0.4mm Mode - 0.4mm. Equant and sub-rounded. Range in colour from red to green-yellow.

Coarse Fraction Very Few-Rare

Feldspar: 1.6-0.4mm Mode - 0.4mm. Elongated and equant. Angular to sub-angular. Primarily plagioclase feldspar displaying twinning.

Coarse Fraction Very Few-Rare

Sparry Calcite: 1.2-0.4mm. Mode - 0.4mm. For example see KER 11/58. The calcite is possibly associated with calcareous clay matrix. Not present in all samples.

Hornblend: <0.6mm

Siltstone: <1.6mm. Equant and elongated. Sub-angular to sub-rounded. Angular calcite inclusions within a brown matrix (for example see KER 11/55). Not present in all samples.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Highly altered volcanic rock fragments

Fine Fraction Common

Feldspar
Quartz

Fine Fraction Very Few

Serpentinite

Textural Concentration Features (TCFs)

TCFs are not common in this group. Where visible they relate to the presence of secondary calcite within the matrix of the high-fired group PG25.

Comments

This fabric has a high-fired group, PG25, and a low fired sub-group PG25A. The altered volcanic inclusions are not geologically consistent with the calcareous base clay and as such would be classed as temper. The altered volcanic temper appears to be associated with serpentinite, with some fragments of the temper also containing areas of red serpentinite suggesting it has undergone serpentinisation. Sample KER 11/142 is the same as the other altered volcanic samples within the group but contains the addition of a fine grained intermediate igneous rock type consistent with andesite. These rock fragments are rare and do not appear unaltered suggesting they may not originate from the same formation as the altered volcanic fragments. Their presence may represent the use of a secondary source such as an andesite grinding stone rather than the use of a primary andesite rock source.

II.26 Petrographic Group 26

Coarse Grained Chert and Mudstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/110	Jar	Undecorated	EHII
KER 11/113	Jar	Undecorated	EHII

Samples from PG26.

Coarse:Fine:Voids =40µm

15:75:10

Microstructure

Voids are very few and dominated by micro and meso vughs. They are open spaced and unaligned.

Groundmass

The matrix is heterogeneous with areas of dark orange-brown and areas of lighter green-brown XP (x25) related to clay mixing. The matrix displays low to no optical activity.

Inclusions-General Features

Inclusions are equant, elongated and irregular. Sub-angular to sub-rounded with a strong bimodal distribution of large rock fragments within a fine matrix. They display weak to no alignment to sample margins.

Coarse Fraction Size Range

2.4-0.4mm

Coarse Fraction Dominant

Coarse-grained chert: 0.4-2.0mm. Mode - 0.8mm. Sub-angular to sub-rounded. Equant and elongated.

Coarse Fraction Common-Frequent

Micrite: 0.4-1.6mm. Mode - 0.8mm. Sub-angular to sub-rounded. Equant and elongated.

Coarse Fraction Very Few-Rare

Mudstone: 0.4-1.6mm. Mode - 0.8mm. Elongated and equant. Sub-angular to sub-rounded. The colour ranges from orange-brown to dark brown in XP (x25). Some examples appear vitrified (for example see KER 11/113).

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Monocrystalline quartz
Chert

Textural Concentration Features (TCFs)

There are common textural features, some are striations relating to the presence of secondary calcite whilst others are concentrations of darker orange-brown clay within the matrix consistent with clay mixing.

Comments

The strong similarity between these two samples suggests that they may originate from different portions of the same vessel. There is some variation in the degree of optical activity between the two samples suggesting that KER 11/110 was higher fired than KER 11/113. If these samples are from the same vessel this difference may relate to differential exposure to heat during firing. KER 11/110 also displays a finer clay along the edges suggestive of a slip. The inclusions are not distinctive in terms of provenance, however, the micromass is very similar to samples within PG1 and PG2 which are also the result of clay mixing. Chert outcrops are widely distributed throughout the NE Peloponnese making a definite provenance difficult.

II.27 Petrographic Group 27

Fine Mica and Quartz Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/1	Deep bowl	Undecorated	EHII
KOR 11/2	Sauceboat	Brown slip	EHII

Samples from PG27.

Coarse:Fine:Voids =40μm

2:85:13

Microstructure

There are few to rare voids in this group. They are dominantly micro vughs but range from micro to meso vughs. They display no alignment to sample margins and are open spaced.

Groundmass

The matrix is heterogeneous with colour differentiation ranging from red-brown to green brown XP (x25). Low to no optical activity.

Inclusions-General Features

Equant. Single to double-spaced. The coarse fraction is open spaced whilst the dominant fine fraction is single-spaced. No alignment to sample margins. Well sorted with dominantly unimodal distribution.

Coarse Fraction Size Range

0.8-0.4mm

Coarse Fraction Few-Rare

Quartzite: <0.4mm. Sub-rounded. Equant. Not present in all samples (for example see EPI 12/1). Undulose extinction.
Mudstone: 0.8-0.4mm. Mode - 0.6mm. Equant. Rounded to sub-rounded. Dark red-brown- brown mudstone occasionally contains fine silicate grains within the matrix.
Coarse Fraction Rare

Chert: <0.4mm Sub - rounded. Equant. Fine grained occasionally with porphyroclasts of larger radiolaria. No present in all samples (for example see Epidavros 12/1).

Fine Fraction Size Range

<0.04mm

Fine Fraction Dominant

Monocrystalline quartz: <0.04mm. Equant. Angular to sub-angular. Straight to slightly undulose extinction.

Fine Fraction Common

Biotite mica: <0.04mm. Elongated and angular. Red-brown mica laths.

Textural Concentration Features (TCFs)

TCFs are few to common. Clay pellets: 0.8-0.4mm. Mode - 0.6mm Equant. Rounded to sub-rounded. Dark red-brown mudstone occasionally containing fine silicate grains within the matrix and is commonly opaque. They have both diffuse and sharp edges. Some are consistent with clay mixing whilst others may be naturally occurring within the clay.

Comments

This is a very fine clay paste with some evidence for clay mixing in particular samples such as those from Korakou. The mix appears to have been of a micaceous non-calcareous clay and a quartz rich clay. Some examples appear to contain low-grade metamorphic inclusions, most notable in the Epidavros material which may relate to the high presence of silicate grains. The undiagnostic nature of this fine fabric makes provenance difficult. The presence of low-grade metamorphic rocks and high mica content are consistent with PG15 from the Argolid, however, these inclusions are rare and not characteristic enough to provide definitive provenance.

II.28 Petrographic Group 28

Sandstone, Siltstone and Calcite Fabric

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/86	Incurving bowl	Red-orange slip	EHII
TSO 10/118	Incurving bowl	Undecorated	EHII

Samples from PG28.

Coarse:Fine:Voids =80μm

15:75:10

Microstructure

Micro and meso vughs with crude alignment to sample margins and commonly open spacing.

Groundmass

Heterogeneous silicate rich matrix which range from grey-brown to orange-brown in colour with visible firing margins (in XP).

Inclusions-General Features

Inclusions are equant, elongated and irregular. Commonly sub-angular with a bimodal distribution of large rock fragments within a fine silicate and calcite rich matrix. They display weak to no alignment to sample margins and are single to double spaced with poor sorting.

Coarse Fraction Size Range

<1.6mm. Mode - 0.8mm.

Coarse Fraction Dominant

Sandstone: <1.2mm. Mode - 0.8mm. Dominantly equant. Sub-angular with few sub-rounded examples. Litharenite and arenite examples.

Calcite: <1.2mm. Mode - 0.6mm. Equant and sub-angular to sub-rounded. Both sparitic and micritic types, the micrite is greyish and is consistent with calcimudstone rather than secondary calcite.

Coarse Fraction Frequent-Few
Siltstone: <1.0mm. Mode - 0.6mm. Sub-angular, equant and elongated. Fine brown cement with angular silicate grains.
Mudstone: <1.6mm. Mode - 1.2mm. Sub-angular and elongated. Orange brown matric with silicate grains. Some display limited lamination suggestive of low grade metamorphism and grading into argillites.

Coarse Fraction Very Few- Rare

Polycrystalline quartz: <0.8mm. Angular and equant with undulose extinction.

Fine Fraction Size Range

<0.6mm

Fine Fraction Dominant

Quartz
Calcite (micrite and sparitic calcite).

Fine Fraction Common-Few

Mudstone
Sandstone

Fine Fraction Very Few

Siltstone

Textural Concentration Features (TCFs)

TCFs are dominantly red-brown and commonly opaque. They are sub-rounded, equant and elongated, with sharp edges in XP and PPL (x25). <0.4mm in size. They are consistent with natural inclusions in the base clay and inclusions associated with the addition of the mudstones.

Comments

The distribution and angularity of the inclusions suggest they have been added to the clay. The rock types are not diagnostic with limestone and sandstone being widely distributed throughout the NE Peloponnese. There are comparable limestone outcrops within the Nemea Valley which may indicate a local origin but it is not possible to assign a definite provenance.

II.29 Single Sample Petrographic Descriptions

II.30 Single Sample Fabric Group 1

Rounded Mudstone, Quartz and Radiolarian Mudstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/2	Askos	Incised	EHI

Sample details for SS1.

Coarse:Fine:Voids =80µm

25:15:60

Microstructure

Micro channels that are well aligned to sample margins with single to double spacing. Inclusions display poor to moderate alignment to sample margins.

Groundmass

The matrix is heterogeneous partially due to slide thickness but also with distinct firing margins. The colour ranges from red-brown to yellow brown and dominantly highly optically active.

Inclusions-General Features

Equant and well rounded, although sub-angular examples are present. They are well sorted with the bimodal distribution of large inclusions within a finer matrix.

Coarse Fraction Size Range

<1.6mm. Mode 0.8mm

Coarse Fraction Dominant

Mudstone: <1.6mm. mode 0.8mm. Equant, sub-rounded to well rounded. They are a dark red-brown colour in XP, with some examples containing radiolarian. Some examples appear opaque but this may be due to slide thickness.

Chert: <1.2mm. Mode 0.8mm. Sub-angular to sub-rounded, equant and fine grained.

Polycrystalline Quartz: <0.8mm. Mode 0.4mm. Equant and elongated, sub-angular and sub-rounded with undulose extinction.

Coarse Fraction Very Few

Calcite: <0.8mm. Mode 0.6mm. Equant and sub-rounded. Sparitic calcite.

Fine Fraction Size Range

<0.4mm. Mode 0.3mm

Fine Fraction Dominant

Quartz
Calcite

Textural Concentration Features (TCFs)

TCFs consist of areas of lighter and darker colour due to secondary calcite and differences in firing atmosphere.

Comments

The strong bimodal distribution and rounded character of the inclusions within this fabric suggest that the base marl clay has been tempered with some form of sand. The inclusions within the paste are consistent with an origin in the Nemea Valley which contains outcrops of sandy marls, mudstones and sandy conglomerates.

The presence of a coil join and strong alignment of the voids clearly indicate hand-built construction.

II.31 Single Sample Fabric Group 2

Argillite, Mudstone and Siltstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/103	Large bowl	Red-orange slip	EHII

Sample details for SS2.

Coarse:Fine:Voids =80µm

15:70:15

Microstructure

Meso vughs with moderate alignment to the sample margins and double to open spacing. Inclusions are moderately to well aligned to sample margins.

Groundmass

The matrix is heterogeneous with low to no optical activity. It ranges from orange-brown to grey-brown in colour with secondary calcite.

Inclusions-General Features

Elongated and angular to sub-angular. They are moderately well sorted with the bimodal distribution of large inclusions within a finer silicate rich matrix.

Coarse Fraction Size Range

<1.6mm. Mode 0.8mm

Coarse Fraction Dominant

Argillite: <1.2mm. Mode 0.8mm. Elongated and angular to sub-angular. Red-brown in XP. They are ovoid with a limited laminated appearance. They commonly contain few angular silicate grains. Some appear to be closer to mudstones in appearances whilst others have clearly undergone some degree of metamorphism.

Coarse Fraction Frequent

Siltstone: <1.6mm. Mode 0.8mm. Sub-angular and elongated. Orange-brown matrix in XP with silicate grains. Some examples are attached to the argillite fragments suggesting that they derive from the same rock formation.

Micrite: <1.2mm. Mode 0.6mm. Sub-rounded. Grey-yellow and muddy in appearance.

Coarse Fraction Very Few

Sandstone: <0.8mm. Sub-angular. They have an orange-brown cement with large angular silicate grains and appear to be coarser versions of the siltstones. Some examples appear to have undergone low-grade metamorphism.

Fine Fraction Size Range

<0.4mm. Mode 0.3mm

Fine Fraction Dominant

Argillite
Quartz
Micrite

Fine Fraction Few

Mudstone

Textural Concentration Features (TCFs)

TCFs consist of sub-rounded opaque inclusions possibly related to the argillites as they are similar in colour. Other TCFs relate to firing margins within the matrix between more oxidised exterior surfaces with a darker less oxidised core.

Comments

The inclusions within this fabric are consistent with the sandstone-shale outcrops that are found both in close proximity to the site of Tsoungiza but also across the Corinthia making provenance difficult.

II.32 Single Sample Fabric Group 3

Siltstone and Vegetal Temper Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/29	Askos	Incised	EHI

Sample details for SS3.

Coarse:Fine:Voids =60µm

15:30:55

Microstructure

Micro and meso-vughs and channels which are moderately to well aligned to sample margins. They are double to open spacing. Inclusions are open spaced and unaligned to sample margins.

Groundmass

The matrix is heterogeneous and optically active. Its colour ranges from orange-brown to dark brown in XP which may be due to variation in slide thickness.

Inclusions-General Features

Dominantly equant and angular to sub-angular. They are moderately well sorted with the bimodal distribution of large inclusions within a finer silicate rich matrix.

Coarse Fraction Size Range

<3.8mm. Mode 1.6mm.

Coarse Fraction Dominant

Siltstone: <3.8mm. Mode 1.6mm. Equant and elongated. Sub-angular. Brown matrix in XP with angular silicate grains.

Vegetal temper: <0.8mm. Mode 0.4mm. Elongated to irregular, and commonly curved. Black/opaque in XP and PL.

Coarse Fraction Frequent

Micrite: <2.4mm. Mode 0.8mm. Sub-rounded and equant. Grey-yellow and muddy in XP.

Coarse Fraction Very Few

Quartz: <0.6mm. Mode 0.4mm. Equant and angular to sub-angular. Both mono- and Polycrystalline varieties.

Fine Fraction Size Range

<0.4mm. Mode 0.3mm

Fine Fraction Dominant

Quartz
Vegetal temper
Fine Fraction Frequent

Micrite

Textural Concentration Features (TCFs)

TCFs are common in this fabric <0.4mm and well rounded. They are commonly opaque with defined edges. They are suggestive of mixing a calcareous clay with a red firing clay.

Comments

The inclusions within this fabrics are very similar to others from the site of Tsoungiza and are consistent with sandstone and limestone geological formations. These types of formations form much of the Nemea Valley which may suggest a local provenance, however, they are also widely distributed across the region of Corinthia.

II.33 Single Sample Fabric Group 4

Altered Sandstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/107	Plate/shallow bowl	White slip?	EHII

Coarse:Fine:Voids =40μm

5:70:15

Microstructure

Meso and micro vughs and vesicles with moderate to good alignment to sample margins. They are double to open spaced. Inclusions display no alignment.

Groundmass

Heterogeneous with a red-brown to brown colour in XP with low optical activity.

Inclusions-General Features

Dominantly equant and angular to sub-angular or sub-rounded. They are well sorted with the bimodal distribution of large inclusions within a finer silicate rich matrix.

Coarse Fraction Size Range

<0.8mm. Mode 0.4mm

Coarse Fraction Dominant

Fractured sandstone: < 0.8mm. Mode 0.6mm. Rounded to sub-rounded and equant. They consist of individual monocrystalline quartz grains with fractures similar in appearance to spallation fractures which have been in filled with micrite.

Coarse Fraction Common

Monocrystalline quartz: <0.6mm. Mode 0.4mm. Sub-angular to rounded. They appear to derive from the sandstones.

Coarse Fraction Few-Very Few

Siltstone: <0.6mm. Mode 0.4mm. Sub-angular to sub-rounded, elongated and equant. Brown cement with angular silicate grains.

Mudstone: <0.6mm. Mode 0.4mm. Sub-angular, elongated to equant. Red-brown in XP and optically active. There is an example of a very altered rock that appears to have degraded to a mudstone. It is yellow-brown with elongated striations and small vitrified brown inclusions. Its original structure is completely gone and as such it is difficult to define.

Coarse Fraction Rare

Degrade basic igneous rock fragment: 0.8mm. Sub-rounded and equant. Has a red-brown mud matrix in XP with visible feldspar laths consistent with a basalt.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Monocrystalline quartz

Fine Fraction Few

Siltstone

Fine Fraction Rare

Muscovite

Textural Concentration Features (TCFs)

TCFs are common. They are commonly opaque or dark red-brown with defined edges but with a mixed interior consistency. They are indicative of clay pellets from mixing a red firing clay into a calcareous clay.

Comments

The altered appearance of the sandstones is intriguing and suggests they have undergone some form of stress, however, it is not clear what process has resulted in their appearance. Sandstones are present throughout Corinthia. However, none with this appearance have been published or noted on geological maps. Therefore, it is difficult to provenance this sample.

II.34 Single Sample Fabric Group 5

Calcareous Sand Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/59	Askos?	Incised	EHII

Sample details for SS5.

Coarse:Fine:Voids =30μm

5:80:15

Microstructure

Micro vughs and vesicles. Voids are single to double spaced and well aligned to sample margins. Aplastic inclusions are moderately aligned.

Groundmass

Matrix is heterogeneous, optically inactive and it is dark grey-brown XP (x25).

Inclusions-General Features

Elongated and equant. Sub angular to rounded with single spacing. They are well sorted with a bimodal distribution.

Coarse Fraction Size Range

<0.8mm Mode 0.2mm

Coarse Fraction Dominant

Monocrystalline quartz: <0.6mm. Mode 0.4mm. Sub-angular to rounded. Equant.

Coarse Fraction Frequent

Micrite: <0.8mm Mode 0.3mm. Equant, sub-angular to rounded. With a greyish yellow colour in XP.

Coarse Fraction Rare

Chert: <0.8mm. Mode 0.4mm Sub-angular and equant. Fine grained

Fine Fraction Size Range

<0.3mm. Mode 0.2mm

Fine Fraction Dominant

Monocrystalline quartz
Micrite
Feldspar

Textural Concentration Features (TCFs)

TCFs are rare in this fabric consisting of rounded, red-brown and opaque inclusions <0.3mm. They have well defined edges and may relate to naturally occurring inclusions within the clay.

Comments

This fabric shares many similarities with PG20, particularly the nature of the inclusions. However, the higher proportion of silicate grains suggest the use of a sand as temper rather than disaggregated limestone. These inclusion types are common and difficult to provenance, however, it is possible that they derive from the Nemea Valley River suggesting a local origin to this fabric.

II. 35 Single Sample Fabric Group 6

Biogenic Limestone and Sandstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/117	Sauceboat	Burnished	EHII

sample details for SS6.

Coarse:Fine:Voids =60μm

10:70:20

Microstructure

Meso and macro vesicles and meso vughs with open spacing and moderate alignment to sample margins. Inclusions are weakly aligned to sample margins.

Groundmass

Heterogeneous matrix with areas of darker and lighter colour. Colour ranges from yellow brown to orange brown in XP with low optical activity.

Inclusions-General Features

Equant and elongated. Sub-angular to rounded. Moderately sorted with a bimodal distribution.

Coarse Fraction Size Range

<1.2mm Mode 0.8mm

Coarse Fraction Dominant

Micrite: <0.8mm. Mode 0.6mm. Sub-rounded to rounded and equant. Some examples are elongated but appear to be related to the fossil remains.

Coarse Fraction Common

Fossil remains: <0.8mm. Mode 0.6mm Elongated. Some are curved but it is difficult to tell the types although ostracods are visible. They range from more sparitic to micritic calcite.

Coarse Fraction Few

Sandstone (Sub arkose): 0.6-0.8mm. Mode 0.8mm. Angular to sub-angular, equant and elongated with undulose extinction.

Coarse Fraction Very Few

Polycrystalline quartz: <0.8mm. Mode 0.6mm. Equant and angular.

Fine Fraction Size Range

<0.6mm Mode 0.4mm

Fine Fraction Dominant

Micrite
Quartz

Fine Fraction Frequent-Few

Fossil remains
Vitrified red clay

Textural Concentration Features (TCFs)

TCFs consist of rounded opaque and red-brown inclusions with well-defined edges <0.4mm. Some show partial vitrification like the vitrified red clay remains suggesting they are related. It is unclear if these are naturally present within the clay or clay pellets.

Comments

This fabric is characterised by the addition of bioclastic limestone to a clay. The Pliocene limestone, marls and sandstone formations of the Nemea Valley would be the closest source indicating that this is possibly a local fabric.

II.36 Single Sample Fabric Group 7

Limestone, Marble and Mudstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/119	Incurving bowl	Red slip	EHII

Sample details for SS7.

Coarse:Fine:Voids =100μm

5:80:15

Microstructure

Meso vughs are dominant, displaying moderate alignment to sample margins and open spacing. Inclusions are open to double spaced and show no alignment to sample margins.

Groundmass

The matrix is heterogeneous with moderate optical activity suggestive of low firing temperature. Its colour is orange-brown in XP.

Inclusions-General Features

Sub-angular to sub-rounded, equant and elongated. Moderately sorted with a bimodal distribution.

Coarse Fraction Size Range

<1.6mm. Mode 1mm

Coarse Fraction Dominant

Mudstone: <1.2mm. Mode 0.8mm. Sub-angular, elongated and equant examples. Dark red-brown in XP with rare silicate inclusions.

Coarse Fraction Common - Few

Marble: <1mm. Mode 0.8mm. Sub-angular and equant. Contains grains of sparitic calcite, some of which display twinning. These are accompanied by quartz and some dark brown to opaque areas.

Sparitic Calcite: <1mm. Mode 0.8mm. Sub-angular to sub-rounded, elongated and equant.

Siltstone: <1.6mm. Mode 1mm. Sub-angular to sub-rounded and commonly elongated. Yellow brown in XP with silicate grains within the cement.

Fine Fraction Size Range

<0.4mm. Mode 0.4mm

Fine Fraction Dominant

Mudstone
Calcite (sparitic and micritic)
Silicate

Fine Fraction Common

Siltstone

Fine Fraction Rare

Serpentinite

Textural Concentration Features (TCFs)

TCFs are present <0.4mm in size. They are dominantly rounded and are dark red-brown to opaque in XP. These TCFs dominantly have sharp edges, however there are examples with diffuse edges merging into the micromass. They are consistent with clay pellets from the addition of a red firing clay. Some examples may also be naturally present or associated with the addition of the mudstones.

Comments

Marble is not recorded as a rock type on the geological maps for Nemea, however, the Nemea Valley and surrounding area is composed of Eocene to Neogene limestone, marly limestone and dolomitic limestone. This is accompanied by the widespread distribution of Cretaceous and Jurassic limestones and dolomitic limestones through Nemea and wider Corinthia. As marble has not been recorded within these limestones the provenance of this fabric difficult, the rare presence of serpentinite within the fine fraction may suggest an origin closer to ophiolitic formations such as those around

Ancient Corinth. The presence of clay pellets is suggestive of clay mixing; however, it is unclear if the aplastic inclusions have also been added or if these are associated with the base clay.

II.37 Single Sample Fabric Group 8

Mudstone and Grog Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/76	Firedog stand?	Undecorated	EHII

Sample details for SS8.

Coarse:Fine:Voids =80μm

35:45:20

Microstructure

Micro and meso channels accompanied by meso and macro vugh voids. They are dominantly double spaced and show weak alignment to the sample margins.

Groundmass

The matrix is heterogeneous with moderate to high optical activity. It is brown to orange-brown in XP. Areas of secondary calcite are visible within voids and the matrix.

Inclusions-General Features

Angular to sub-rounded. Equant and elongated. Poorly sorted with a bimodal distribution. Single to double spacing and no alignment to sample margins.

Coarse Fraction Size Range

<2.4mm. Mode 1mm.

Coarse Fraction Dominant

Grog: <2.4mm. Mode 0.8mm. Angular to sub-angular. Equant and elongated. The colour ranges from dark black-brown with no optical activity, to orange brown with optical activity. Several examples contain void structures and have discrete TCFs and rock inclusions, some of which may be secondary grog. These internal structures, the strong angularity of these inclusions, and common presence of shrinkage voids around their exterior suggest that these are crushed grog temper rather than argillaceous rock fragments.

Coarse Fraction Common

Mudstone: <1.2mm. Mode 0.4mm. Sub-angular to sub-rounded and dominantly equant. Yellow brown in XP with very few fine silicate grains within the mud cement. Some examples also contain sparitic calcite. Other mudstones are dark brown in colour with rare inclusions.

Coarse Fraction Few

Ooidal Ironstone: 1.2-1.6mm. Mode 1.2mm. Rounded and equant. Dark red-brown in XP, commonly with a dark core and lighter outer rings.

Quartz: <0.8mm. Mode 0.4mm. Angular and equant with undulose extinction.

Coarse Fraction Few-Very Few

Polycrystalline Quartz: <0.8mm. Mode 0.4mm. Angular and dominantly equant, commonly with undulose extinction.

Coarse Fraction Very Few-Rare

Chert: <0.6mm. Mode 0.4mm. Angular to sub-angular and equant. Fine grained chert with dark brown mud appearing to replace some of the silicate grains.

Fine Fraction Size Range

<0.4mm.

Fine Fraction Dominant

Grog
Quartz

Fine Fraction Common

Mudstone
Siltstone

Fine Fraction Few

Chert

Textural Concentration Features (TCFs)

TCFs are present in this sample and consist of sub-rounded and sub-angular and irregular dark brown sediment <0.3mm. They have both sharp and diffuse edges and share similarities to the dark brown mudstones suggesting they may be associated with the addition of the mudstone material.

Comments

The angularity of the inclusions within this sample suggests that it has been tempered with grog, mudstones and other sedimentary material. The optical activity is suggestive of a low firing temperature whilst the very dark colour of some of the mudstones and grog may indicate localised reduction of some of these inclusions. The rock types within this sample are consistent with the marls, marly sandstones, limestone and conglomerates of the Nemea Valley and the shale-sandstone-chert formation directly south of Tsoungiza itself. They do not suggest an origin outside of the local area, and the large, friable nature of the form may suggest that it would not have travelled well, however, the widespread distribution of such rock types makes a definitive provenance difficult.

II.38 Single Sample Fabric Group 9

Medium Coarse Mudstone, Mudstone Breccia and Micrite Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/13	Base	Undecorated	EHI

Sample details for SS9.

Coarse:Fine:Voids =60μm

15:75:10

Microstructure

Micro and meso vughs, and vesicles, with rare channels. Voids are double to open spaced, with weak alignment to sample margins. Inclusions are weak to unaligned to sample margins.

Groundmass

Groundmass colour is heterogeneous, yellow-brown in XP with high optical activity suggestive of a low firing temperature.

Inclusions-General Features

Angular to sub-rounded. Equant and elongated. Bimodal distribution. Single to double spacing and moderately sorted.

Coarse Fraction Size Range

2.8mm-0.6mm. Mode 0.8mm.

Coarse Fraction Dominant

Mudstone; <1mm. Mode 0.8mm. Elongated and equant. Angular but more commonly sub-angular. Brown, orange-brown or yellow-brown in XP. They often contain fine monocrystalline quartz, and vitrified yellow-orange grains (x100). Some examples appear to share many similarities to the tuffites from PG7 and PG8, with their yellow colour, high degree of optical activity which has mixed orientations and the presence of some large angular silicate grains. However, in the absence of true tuff material in this sample they have been assigned as mudstones.

Coarse Fraction Common

Mudstone breccia; <1.6mm. Mode 1mm. Elongated and equant. Angular to sub-angular. Very fine yellow-brown or red-brown clay matrix (in XP) with angular to sub-angular monocrystalline quartz and plagioclase feldspar grains. Also contains red-brown TCFs and orange-yellow grains which appear glassy (in XP x100).

Coarse Fraction Few

Micrite: 0.8-0.6mm. Mode 0.6mm. Sub-angular to sub-rounded. Equant and elongated.

Coarse Fraction Very Few

Quartz: <0.8mm. Angular to sub-angular and equant. Monocrystalline.

Coarse Fraction Very Few-Rare

Chert: <0.8mm. Mode 0.6mm. Angular and equant. Fine grained chert.

Fine Fraction Size Range

<0.6mm

Fine Fraction Dominant

Monocrystalline Quartz
Micrite

Fine Fraction Common

Mudstone

Fine Fraction Very Few

Polycrystalline Quartz

Textural Concentration Features (TCFs)
TCFs are common in this sample comprising of dark red-brown rounded inclusions (in XP), 0.3-0.16mm in size. They are commonly well defined and accompanied by striations of the same colour that merge into the micromass. They are consistent with both clay mixing and naturally occurring dark inclusions within the clay.

Comments

This fabric has a very strong similarity to PG7 and PG8 from Ancient Corinth but has been separated due to the lack of tuff rock fragments. As discussed mudstone breccia is present throughout Corinthia which makes a provenance assignment difficult, however, the strong similarity in appearance of this fabric to those from Ancient Corinth suggests that it may originate outside of the local Nemea area.

II.39 Single Sample Fabric Group 10

Angular Calcite, Limestone and Siltstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/72	Incurving bowl	Undecorated	EHII

Sample details for SS10.

Coarse:Fine:Voids =80μm

10:70:20

Microstructure

Micro and macro vugh, and vesicle voids. Voids are single to double spaced and moderately well aligned to the sample margins. Aplastic inclusions are not aligned to sample margins.

Groundmass

The groundmass is heterogeneous due to darker areas from firing. Optical activity is moderate and mixed suggestive of mixing firing conditions. The colour of the groundmass is dark orange brown in XPL (x25).

Inclusions-General Features

Equant and elongated. Dominantly angular but also sub-angular. Moderately well sorted with a bimodal distribution.

Coarse Fraction Size Range

<4.2mm Mode 0.8mm

Coarse Fraction Dominant

Sparry calcite: <2.0mm. Mode 0.4mm. Equant and elongated. Angular to sub-angular. These derive from the larger limestone rock fragments that are still visible in the sample.

Coarse Fraction Very Few

Chert: <2.0mm. Mode 0.8mm. Angular to sub-angular and equant. Fine grained sometimes with ribbons of coarser grains.

Coarse Fraction Very Few-Rare

Sandstone: 4.2mm. Irregular and angular. Coarse feldspar and quartz grains in red-brown cement.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Calcite

Fine Fraction Common

Quartz

Fine Fraction Rare

Muscovite

Textural Concentration Features (TCFs)

TCFs are rare and are characterised by dark red-brown and commonly opaque rounded inclusions <0.5mm in size. They dominantly have well defined edges. They may be naturally occurring within the base clay.

Comments

This fabric is characterised by angular calcite which appears to derive from larger limestone rock fragments. The angularity and bimodal distribution of the fragments suggest that the limestone has been crushed and added to the clay.
The inclusions within this sample are not very diagnostic with limestone and dolomitic limestones being widely distributed across Corinthia and the wider NE Peloponnese. As the Nemea Valley is comprised of such limestones with outcrops of Triassic limestones being located *c.* 2km south east of Tsoungiza a local origin is probable for this fabric, however, this assignment of provenance is not definitive due to the broad distribution of compatible rock formations elsewhere.

II.40 Single Sample Fabric Group 11

Angular Calcite and Micrite Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/24	Fruitstand	Orange-brown slip and incised	EHI

Sample details for SS11.

Coarse:Fine:Voids =60μm

15:65:20

Microstructure

Micro and macro vugh, channels and planar voids. Voids are dominantly double spaced and well aligned to sample margins. Aplastic inclusions are moderately well aligned to sample margins.

Groundmass

The matrix is heterogeneous with areas of lighter and darker colour ranging from orange-brown to dark brown in XPL (x25). The matrix ranges from optically active to inactive within the sample, this in addition to the mixed colour suggests mixed firing conditions.

Inclusions-General Features

Elongated and equant. Dominantly angular to sub-angular but also includes examples of rounded inclusions. Inclusions are poorly sorted with bimodal distribution.

Coarse Fraction Size Range

<2.0mm Mode 0.8mm

Coarse Fraction Dominant

Sparry calcite: <2.0mm. Mode 0.4mm. Equant and irregular. Angular to sub-angular.

Coarse Fraction Common

Micrite: <2.0mm. Mode 0.8mm Sub rounded to rounded, equant. yellow-brown in XP (x25)

Coarse Fraction Very Few

Chert: <2.0mm. Mode 0.8mm. Angular-sub angular equant.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Sparry calcite
Quartz

Textural Concentration Features (TCFs)

TCFs are characterised by well rounded dark red-brown sediments <0.6mm in size. They have well defined boundaries and are suggestive of clay pellets from mixing a red firing clay and a calcareous clay.

Comments

This sample is characterised by the presence of calcite, some of which is micritic, and some of which is sparitic. The micritic examples are greyish and may relate to the breakdown of sparitic calcite during firing.

Like SS10 the raw materials within this fabric are broadly distributed with the closest sources being within the Nemea Valley which may indicate a local origin.

II.41 Single Sample Fabric Group 12

Radiolarian Mudstone and Chert Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/11	Jar	Orange slip and burnished	EHI

Sample details for SSS12.

Coarse:Fine:Voids =40μm

10:80:10

Microstructure

Micro and meso vughs and vesicles. Voids are open spaced and show weak alignment to sample margins. Inclusions show no alignment to sample margins.

Groundmass

Heterogeneous matrix whose colour ranges from yellow brown to orange brown. The matrix is moderately optically active suggestive of low firing temperature ranges.

Inclusions-General Features

Sub-angular to sub-rounded. Equant and elongated. Well sorted with bimodal distribution.

Coarse Fraction Size Range

<1mm. Mode 0.8mm

Coarse Fraction Dominant

Mudstone: <1mm. Mode 0.8. Sub-rounded , equant and elongated. Colour ranges from dark red-brown to yellow brown in XP with very few silicate grains within the matrix. Radiolarian types are dark red-brown with radiolarian porphyroclasts.

Coarse Fraction Common

Chert: <1mm. Mode 0.8mm. Angular, elongated and equant. Includes fine-grained and radiolarian types.

Coarse Fraction Few

Calcite: <1mm. Mode 0.6mm. Angular to sub-angular. Elongated and equant. Sparitic and micritic types.

Coarse Fraction Very Few

Sandstone: <0.9mm. Mode 0.8mm. Sub-angular to sub-rounded. Arkose type.
Monocrystalline quartz: <0.8mm. Angular and equant.

Coarse Fraction Rare

Schist: <0.8mm. Sub-angular and elongated.

Fine Fraction Size Range

<0.4mm. Mode 0.4mm.

Fine Fraction Dominant

Quartz
Calcite

Fine Fraction Common

Mudstone

Fine Fraction Very Few

Muscovite

Fine Fraction Rare

Serpentinite

Textural Concentration Features (TCFs)

TCFs are common comprising of rounded orange-brown and red brown clay pellets, some of which appear translucent, whilst other appear to contain muscovite which is most likely the origin for the muscovite within the fine fraction. The rounded pellets dominantly have well defined edges. Other TCFs consist of brown striations within the matrix. All the TCFs are consistent with clay mixing.

Comments

The dominant inclusions within the fabric are consistent with a sedimentary origin and are compatible with the Jurassic shale-chert-sandstone formation located south of the site of Tsoungiza. The presence of schist suggests an association with a low grade metamorphic formation, the nearest would be the Upper Triassic to lower Jurassic Flysch 4km south of Tsoungiza which lies directly next to the shale-chert-sandstone formation suggesting a local provenance for this fabric. However, similar deposits are located across Corinthia so caution must be exercised in assignment of provenance, particularly in the case of a single sample.

II.42 Single Sample Fabric Group 13

Fine Micaceous Matric with Calcite and Sandstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
TSO 10/1	Frying pan	Black slip, burnished and incised	EHI

Sample details for SS13.

Coarse:Fine:Voids =60µm

10:75:15

Microstructure

Micro and meso vughs and vesicles with good alignment to sample margins and open spacing. Inclusions are moderately well aligned.

Groundmass

The matrix is heterogeneous, micaceous, yellow-brown in XP with moderate to high optical activity, suggestive of low firing temperatures.

Inclusions-General Features

Angular to sub-rounded, elongated and equant. Well sorted with bimodal distribution and double to open spacing.

Coarse Fraction Size Range

<1.6mm. Mode 0.8mm.

Coarse Fraction Dominant

Mudstone: <1.6mm. Mode 0.8mm. Angular, equant and irregular. Red-brown with silicate grains within the matrix.

Coarse Fraction Common

Sandstone: <0.9mm. Mode 0.8mm. Sub-angular to sub-rounded, and equant. Dominantly arenite. Some examples contain small amounts of muscovite and biotite mica.

Coarse Fraction Common

Calcite: <0.8mm. Mode 0.6mm. Sub-rounded to rounded and equant. Includes sparitic and micritic types.

Coarse Fraction Few

Chert: <0.8mm. Mode 0.6mm. Angular and equant. Fine grained.

Fine Fraction Size Range

<0.60mm. Mode 0.4mm.

Fine Fraction Dominant

Quartz
Mudstone

Fine Fraction Common

Calcite

Fine Fraction Few

Biotite mica
Siltstone

Textural Concentration Features (TCFs)

TCFs are rare, characterised as rounded red-brown sediment with well defined edges. Their rarity and well defined nature suggests they may be naturally present within the clay rather the remains of clay mixing.

Comments

The inclusions within this fabric are compatible with a sedimentary origin including the limestones and sandstone-chert-shale formations surrounding Tsoungiza. As such as local provenance is likely.

II.43 Single Sample Fabric Group 14

Fossiliferous Limestone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KOR 11/16	Small bowl	White slip (yellow-blue mottled)	EHII

Sample details for SS14.

Coarse:Fine:Voids =40µm

20:70:10

Microstructure

Micro and meso vughs with open spacing. Voids and inclusions show no alignment to sample margins.

Groundmass

Heterogeneous with darker and lighter areas and TCFs. Colour ranges from dark brown to green-brown and yellow-brown. Secondary calcite is present within the groundmass. The matrix is optically inactive but the presence of calcite suggests that the vessel has been fired in a reducing firing atmosphere at low temperatures.

Inclusions-General Features

Equant, elongated and irregular. Angular to rounded with a bimodal distribution. Moderately well sorted.

Coarse Fraction Size Range

0.8-0.4mm. Mode 0.4mm

Coarse Fraction Dominant

Calcite: <0.8mm Mode 0.4mm Sub-rounded to rounded and equant and elongated. Both sparitic calcite and micritic calcite.

Coarse Fraction Common

Microfossils: <0.6mm. Mode 0.4mm. Irregular, equant and rounded. Foraminifera (Milidina and echinoderms), gastropods and general shell fragments.

Coarse Fraction Very Few

Mudstone: <0.8mm. Mode 0.6mm Sub-rounded to rounded. Equant and elongated. Colour ranges from Orange-brown to black-brown cement with small silicate inclusions.

Coarse Fraction Rare

Degraded basic igneous: 0.8mm. Elongated and sub-angular. Dark grey-brown mud matrix with silicate lath inclusions that appear to be feldspar.

Fine Fraction Size Range

0.4-0.08mm

Fine Fraction Dominant

Calcite

Fine Fraction Few

Quartz

Fine Fraction Very Few

Mudstone
Feldspar

Textural Concentration Features (TCFs)

TCFs consist of areas of darker colour in the matrix with diffuse edges commonly merging with the micromass suggestive of clay mixing. Other TCFs are characterised as rounded dark brown and orange-brown sediment, <0.4mm in size and consistent with clay pellets.

Comments

The dominant presence of fossiliferous and calcareous material is consistent with the use of fossiliferous limestone. There are compatible Jurassic limestone outcrops in the area of Ancient Corinth suggesting a local origin for this fabric.

II.44 Single Sample Fabric Group 15

Biogenic Limestone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KOR 11/17	Bowl with inturned rim	Undecorated	EHII

Sample details for SS15.

Coarse:Fine:Voids =40μm

20:65:15

Microstructure

Meso and macro vughs that are moderately well aligned to sample margins with open spacing. Inclusions show moderate to weak alignment to sample margins.

Groundmass

The matrix is heterogeneous with low levels of optical activity. The colour ranges from grey-brown to red-brown with distinct firing horizons. Some secondary calcite is present.

Inclusions-General Features

Equant, and elongated. Angular to rounded with a bimodal distribution. Well sorted with double to open spacing.

Coarse Fraction Size Range

<0.8mm. Mode 0.4mm

Coarse Fraction Dominant

Micrite: <0.8mm. Mode 0.4mm. Sub-rounded to rounded and equant. Much appears degraded.

Coarse Fraction Common

Shell fragments: <0.8mm. Mode 0.6mm. Angular, elongated and curvilinear.

Coarse Fraction Rare

Sandstone: <0.6mm. Mode 0.4mm. Sub-angular and equant. Litharenite type with some examples containing secondary calcite in veins.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Micrite
Quartz

Fine Fraction Few

Feldspar

Textural Concentration Features (TCFs)

TCFs comprise of rounded red-brown sediment in XP. They are <0.4mm in size with some examples having shrinkage voids around their exterior. They have both well defined and diffuse edges and are indicate of clay pellets from mixing a red firing and yellow firing clay.

Comments

Like SS14 the raw materials in this fabric are consistent with Jurassic limestones throughout Corinthia which contain microfaunal remains which makes assignment of provenance difficult. There is no reason to suggest that this is not a local fabric but definitive provenance is problematic.

II.45 Single Sample Fabric Group 16

Altered Felsic Volcanic Rock Fragments Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/116	Cooking pot	Applied	EHII

Sample details for SS16.

Coarse:Fine:Voids =60μm

30:55:15

Microstructure

Meso vughs and channel voids that are single to double spaced and moderately to well aligned to sample margins. Inclusions are not aligned to sample margins.

Groundmass

The matrix is heterogeneous with the colour ranging from yellow-brown to dark orange-brown in XP (x25). It is optically active suggestive of low firing temperature ranges.

Inclusions-General Features

Equant and elongated. Dominantly angular to sub-angular but includes sub-rounded types. Poorly sorted bimodal distribution with coarse inclusions within a finer matrix.

Coarse Fraction Size Range

2.0-0.4mm. Mode 1mm

Coarse Fraction Dominant

Altered igneous felsic rich rock fragments: 2.0-0.4mm. Mode 1.2mm. Angular to sub-angular. Equant and elongated. Ranging from yellow grey and white, to grey in XP (x25). Inclusions appear to be derived from clastic rock fragments namely tuffs, displaying a fine-grained matrix with larger angular inclusions. They are heavily altered and felsic rich.

Coarse Fraction Few

Mudstone: < 0.8mm. Mode 0.4mm .Elongated and equant. Sub-angular to sub-rounded. Orange-brown in XP (x25). Occasional quartz grains and lamination. Some examples appear tuffaceous.

Coarse Fraction Very Few

Tuff: <0.8mm. Sub-angular to sub-rounded. Equant. A fine grained matrix containing large angular feldspar grains with rare opaques.

Chert: <2.0mm. Mode 1.2mm. Grain size varies and some examples contain ribbons of coarse Polycrystalline quartz.

Calcite: <1.2mm. Mode 0.8mm. Elongated and irregular. Sub-rounded. Sparitic calcite.

Coarse Fraction Rare

Serpentinite: 0.4mm. Sub-angular and elongated. Orange in XP.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Altered igneous felsic rich rock fragments

Fine Fraction Common

Mudstone

Fine Fraction Few

Tuff
Quartz
Feldspar

Fine Fraction Very Few

Chert
Translucent orange inclusions, possibly serpentinite.

Comment

The inclusions which characterise this fabric are very distinct and must originate from an altered igneous geological formation. The presence of serpentine suggests an ophiolitic origin, whilst the presence of calcite indicates the inclusion of sedimentary material. The closest sources of these very distinct rock types are the tuff and limestones in the area of Acrocorinth described by Sidall (In prep.:28). This would indicate a local origin for this sample.

II.46 Single Sample Fabric Group 17

Fine Clay Mix with Quartz and Altered Felsic Rock Fragments Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/106	Sauceboat	Black-brown slip	EHII

Sample details for SS17.

Coarse:Fine:Voids =40μm

5:80:5

Microstructure

Voids are micro vughs with single to open spacing and no alignment to sample margins. Inclusions also show no alignment to sample margins.

Groundmass

The matrix is heterogeneous with the a dark green brown colour with dark red- brown areas in XP (x25). It is optically inactive suggestive of a high firing temperature.

Inclusions-General Features

Equant, elongated and irregular. Angular to sub-angular. Bimodal distribution of well sorted coarse inclusions within a fine matrix and open spacing.

Coarse Fraction Size Range

1.2-0.8mm. Mode 0.4mm

Coarse Fraction Dominant

Quartz: <1.2mm. Mode 0.4mm. Equant and elongated. Angular to sub-angular.

Mono and Polycrystalline quartz: <1mm. Mode 0.6mm. Equant and angular. Single and undulose extinction.

Coarse Fraction Common

Chert: <1.2mm. Mode 0.4mm. Equant and elongated. Angular to sub-angular. Fine grained. Some dark brown opaque areas of sediment.

Coarse Fraction Few

Mudstone: < 0.8mm. Mode 0.4mm. Equant and sub-rounded. Fine grey matrix commonly with dark red-brown outer border.

Coarse Fraction Very Few

Feldspar: <0.6mm. Mode 0.4mm. Angular to sub-angular and equant. Alkali feldspar.

*Altered felsic rock fragment*s: < 1.2mm. Elongated and sub-angular. Granular texture with porphyroclasts of silicate. They have a similar appearance to chert but are felsic rich and match those inclusions within SS16.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Quartz
Feldspar

Textural Concentration Features (TCFs)

TCFs have diffuse and well defined edges, are well rounded and red-brown and orange brown in colour in XP. They are consistent with clay pellets from mixing a red firing clay with a green firing calcareous clay.

Comments

The clay matrix of this sample is very similar to PG1 whilst the inclusions are a match to SS16 both suggestive of an origin in close proximity to Ancient Corinth.

II.47 Single Sample Fabric Group 18

Fine Matrix with Bioclastic Mudstone and Translucent Clay Pellets Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/65	Incurving bowl	Orange-red-purple slip	EHII

Sampled details for SS18.

Coarse:Fine:Voids =60µm

5:90:5

Microstructure

Micro vughs voids with open spacing, and no alignment to sample margins. Inclusions are also not aligned to sample margins.

Groundmass

Dominantly homogenous with areas of heterogeneity due to the presence of TCFs. Colour is golden yellow-brown and highly optically active suggestive of low firing temperature ranges.

Inclusions-General Features

Equant. Angular to sub-rounded. Moderately well sorted inclusions with the bimodal distribution of coarse rock fragments within a finer matrix and open spacing.

Coarse Fraction Size Range

1.6-0.6mm. Mode 1mm.

Coarse Fraction Dominant

Mudstone: <1.2mm. Sub-angular to sub-rounded and equant. Yellow-gold and yellow brown in XP, fine-grained matrix with sub-angular silicate inclusions. Some larger examples display remains of fossils whose shells have become silicified.

Fine Fraction Size Range

<0.6mm

Fine Fraction Dominant

Feldspar
Quartz

Textural Concentration Features (TCFs)

TCFs form a common inclusion, comprising of well rounded orange-brown and commonly translucent vitrified clay. These have well defined margins and range from 0.8 to <0.6mm in size. They commonly have large angular feldspar and quartz grains within their matrix and are suggestive of clay pellets. The feldspar in the fine fraction most likely derives from these pellets.

Comments

The translucent pellets within this fabric are very similar to those noted in other samples particularly KER11/61 of PG2. The bioclastic mudstone is also similar to that noted in PG7 and PG8. These shared similarities may indicate that this fabric is local to Ancient Corinth.

II.48 Single Sample Fabric Group 19

Mudstone, Chert and Granitic Rock Fragments Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/22	Jar?	Undecorated	EHII

Sample details for SS19.

Coarse:Fine:Voids =40µm

30:50:20

Microstructure

Meso vughs and channel voids which do not appear aligned to sample margins. They are double to open spaced. Inclusions also show no alignment to sample margins.

Groundmass

Heterogeneous matrix which is optically active. The colour is orange-brown but some areas are darker suggestive of low firing temperatures but mixed firing conditions.

Inclusions-General Features

Angular to sub-angular, dominantly equant. Inclusions are poorly sorted with single to double spacing and bimodally to weakly trimodally distributed.

Coarse Fraction Size Range

<2mm. Mode 1mm

Coarse Fraction Dominant

Chert: <2mm. Mode 1mm. Angular and equant. Includes both fine and coarse grained types, commonly with ribbons of coarser grained chert.

Coarse Fraction Common

Mudstone: <1.4mm. Mode 0.8mm. Angular to sub-angular and dominantly elongated. Brown commonly containing very fine silicate and translucent orange inclusions.

Coarse Fraction Few

Microgranite: <1.6mm Mode 1.2mm. Equant. Angular to sub-angular. Displaying micrographic and granophyric texture with the intergrowth of alkali feldspar and quartz.

Coarse Fraction Very Few

Mudstone breccia: <1.2mm. Mode 0.8mm. Sub rounded. Red-orange-brown sediment with quartz, feldspar inclusions with occasional orange -red vitrified inclusions.

Calcite: <0.8mm. Mode 0.4mm. Elongated, equant and irregular. Sub-angular to sub rounded. Sparry calcite, some examples are attached to mudstones suggesting these rock types derive from the same formation.

Quartz: <1.6mm. Mode 0.8mm. Equant and elongated. Angular to sub-rounded. Displaying both plain and undulose extinction.

Sandstone: <1.2mm. Mode 0.8mm. Sub-angular to sub-rounded. Equant and elongated. Both quartz arenite and arkose with a mid-dark brown cement.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Quartz
Feldspar

Fine Fraction Very Few-rare

Serpentinite

Textural Concentration Features (TCFs)

TCFs are comprise of rounded sediment with both diffuse and sharp edges. Dark red-brown to mid brown in colour with a size of <0.4mm. Some contain small silicate inclusions and mica. They appear to be poorly mixed clay pellets.

Comments

The range of rock types, angularity and their frequency would suggest that this is a fabric tempered with granitic and mudstone based rocks. The presence of granitic rock types is consistent with intrusive igneous geology. Ancient Corinth does have igneous geology but that associated with volcaniclastic formations suggesting that this fabric may not be local. No matches have been found within comparative material and as yet the origin of this fabric is unclear.

II.49 Single Sample Fabric Group 20

Sandstone, Quartzite and Mudstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/26	Jar	Undecorated	EHII

Coarse:Fine:Voids =40μm

20:65:15

Microstructure

Micro and meso vughs and channels voids. They are single to double spaced and well aligned to sample margins. Inclusions are weakly to unaligned to sample margins.

Groundmass

The matrix is heterogeneous with low optical activity. The colour is dark red-brown in XP (x25).

Inclusions-General Features

Equant, elongated and irregular. Angular to sub-rounded. Bimodal distribution of moderately well sorted coarse inclusions within a finer silicate rich matrix with commonly single spacing.

Coarse Fraction Size Range

3.8- 0.4mm

Coarse Fraction Dominant

Mudstone: 3.8-0.4mm.. Mode 1.2mm Equant, elongated and irregular. Angular to sub-angular. Fine grained dark brown- orange brown cement with mica and quartz inclusions.

Coarse Fraction Common

Quartz: <1.6mm. Mode 0.8mm. Equant and elongated. Angular to sub-rounded. Has both mono and Polycrystalline varieties displaying both plain and undulose extinction. Many examples appear strained from metamorphism and share similarities to the sandstones and low grade metamorphic rocks suggesting they originate from these.

Coarse Fraction Few

Low grade metamorphic rock fragments: Schist and quartzite. 1.2-0.4mm. Mode 0.8mm. Equant and elongated. Angular to sub-angular. Consisting of quartzite and schist rock fragments containing mica laths.

Mudstone breccia: <1.2mm. Mode 0.8mm. Sub-angular to sub-rounded. Red-orange-brown sediment with quartz, feldspar inclusions with occasional orange -red translucent inclusions.

Coarse Fraction Very Few

Sandstone: <1.2mm. Mode 0.8mm. Sub angular to sub-rounded. Equant and elongated. Both quartz arenite and arkose types.

Serpentinite: <0.6mm. Mode 0.4mm. Sub-angular and elongated. Orange-brown in XP. Some examples are attached to metamorphic rock fragments suggesting they originate from the same formation.

Coarse Fraction Rare

Gneiss: <0.8mm. Mode 0.4mm. Equant and sub-angular.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Quartz
Feldspar
Mudstone

Fine Fraction Few

Serpentinite

Fine Fraction Rare

Hornblende

Textural Concentration Features (TCFs)

TCFs are present commonly displaying sharp edges. They are dark red-brown to mid brown in XP and are dominantly <0.4mm in size. It is unclear if they relate to clay mixing or to the addition of the mudstone material which appears similar in colour and texture.

Comments

The angularity and distribution of the inclusions within this fabric suggest that it has been tempered with mudstones and quartz sand probably deriving from the sandstones and low grade metamorphic rocks also present within the fabric. It is very similar in composition to PG15 however, the presence of mudstone breccia and a comparatively higher abundance of serpentinite, particularly within the fine fraction suggests that this fabric may derive from a different source. The similarity of the mudstone breccia to that within PG7 and PG8 suggests that this may be a local fabric with raw materials sourced from the area of Acrocorinth.

II.50 Single Sample Fabric Group 21

Radiolarian Mudstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
KER 11/111	Incurving bowl	Red slip	EHII

Sample details for SS21.

Coarse:Fine:Voids =60µm

30:50:20

Microstructure

Micro channels and meso vughs are well aligned to sample margins. They are double to open spaced. Inclusions are moderately well aligned to sample margins.

Groundmass

The matrix is heterogeneous with areas of darker and lighter colour and mixed optical activity which ranges from moderate to very low suggestive of mixed firing conditions. The colour ranges from orange-brown to more commonly grey-brown in XP. Some secondary calcite is visible within the matrix and voids.

Inclusions-General Features

Strong bimodal distribution of angular to sub-angular large inclusions within a finer matrix. Inclusions range from elongated to equant, are well sorted and have open spacing.

Coarse Fraction Size Range

<1mm. Mode 0.8mm

Coarse Fraction Dominant

Radiolarian Chert: <1mm. Mode 0.8mm. Sub-angular to sub-rounded. Equant and elongated. Some examples grade through to radiolarian mudstone that has a red-brown colour matrix with radiolarian porphyroclasts.

Coarse Fraction Common

Mudstone: <1mm. Mode 0.8mm. Sub-angular and elongated. Grey-brown in XP.

Coarse Fraction Few

Sparitic Calcite: <0.8mm. Mode 0.6mm. Sub-angular, elongated and irregular.

Mudstone breccia: <1mm. Mode 0.8mm. Sub-angular and elongated. Brown in XP containing silicate and translucent orange inclusions.

Coarse Fraction Very Few-Rare

Degraded igneous rock fragments: <1mm. Mode 0.6mm. Equant and sub-rounded. They are yellow-brown and orange-brown in XP with what appears to be the remains of feldspar laths suggestive of a basalt.

Coarse Fraction Rare

Serpentinite: <1mm. Mode 0.8mm. Sub-angular and elongated. Yellow-brown in XP.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Mudstone

Fine Fraction Common

Calcite
Quartz
Radiolarian chert

Textural Concentration Features (TCFs)

TCFs are red-brown in XP with both well defined and diffuse margins. They are commonly sub-rounded, measuring <0.6mm. Their similarity in colour to the mudstones may indicate that they are associated with the addition of this material but their diffuse margins may also indicate clay mixing.

Comments

The distribution of the rock fragments within this fabric would suggest they have been added as temper. Radiolarian chert and mudstone is present in the area of Acrocorinth, this in addition to the mudstone breccia and presence of basaltic inclusions that could derive from the pillow lavas noted at Acrocorinth indicate that this is a local fabric.

II.51 Single Sample Fabric Group 22

Mudstone, Serpentinite and Degraded Igneous Rock Fragments Fabric

Sample Numbers

Sample Number	**Vessel Form**	**Surface Modification**	**Period**
EPI 12/46	Collar of jar	Undecorated	EHII?

Sample details for SS22.

Coarse:Fine:Voids =60µm

20:65:15

Microstructure

Dominantly meso vughs with few micro vughs and vessicle voids. Voids are moderately well aligned to the sample margins with double to open spacing. Inclusions are not aligned.

Groundmass

Heterogeneous matrix with a distinct dark firing core and lighter exterior surfaces. The colour of the core of dark brown and optically inactive in XP, whilst the exteriors are orange-brown and highly optically active suggesting that the core was not oxidised whilst the surfaces were fired at low temperature within an oxidising atmosphere.

Inclusions-General Features

Angular to sub-rounded. Dominantly equant but also elongated. Well sorted with a bimodal distribution of large rock fragments within a fine silicate rich matrix. Single spacing.

Coarse Fraction Size Range

<1.5mm. Mode 1mm.

Coarse Fraction Dominant

Mudstone: <1.5mm. Mode 1mm. Angular and equant. Dark brown in XP. Rare examples contain microfossils.

Coarse Fraction Common

Siltstone: <1.2mm. Mode 0.8mm. Sub-angular, equant and elongated. Sub-angular silicate grains within a dark brown matrix.

Sandstone: <1.2mm. Mode 1mm. Sub-angular and equant. Arkose type, some examples have rare muscovite.

Coarse Fraction Very Few

Serpentinite: <1.5mm. Mode 0.8mm. Angular to sub-angular and equant. Orange-red in XP.

Coarse Fraction Very Few-Rare

Degraded igneous rock Fragments: <1.5mm. Mode 0.8mm. Angular to sub-angular. Equant and elongated. Dark brown heterogeneous matric with feldspar laths in XP and PL.

Coarse Fraction Rare

Spherulite: <1.5mm. Mode 0.8mm. Sub-rounded and equant. Fibrous feldspar with a spherulitic texture.

Altered Tuffaceous Rock Fragments: <0.8mm. Mode 0.6mm. Sub-angular to sub-rounded and equant. An ashy matrix with angular silicate, possibly feldspar. Some areas look serpentinised with a yellow-brown translucent appearance.

Granite: <0.8mm. Sub-angular and equant.

Dolerite: <0.8mm. Mode 0.6mm. Sub-angular and equant with plagioclase feldspar displaying twinning, accompanied by orthopyroxene.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Quartz
Feldspar
Mudstone

Fine Fraction Very Few

Serpentinite

Textural Concentration Features (TCFs)

TCFs are dark red-brown in XP. They are well defined edges and are commonly rounded to sub-rounded. Many are opaque and may be associated with the addition of the mudstone material rather than indicative of clay mixing.

Comments

The strongly bimodal distribution and size of the coarse fraction suggests that this fabric has been tempered with mudstones and igneous rock fragments. There are Triassic formations containing serpentinite, diabase and tuffaceous rock fragment surrounding the site of Epidavros (I.G.M.E. 1972) suggesting that this is a local fabric.

II.52 Single Sample Fabric Group 23

Intermediate Volcanic Rock Fragments (Dacite-Trachyte) Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/11	Jar	Undecorated	EHII

Sample details for SS23.

Coarse:Fine:Voids =80µm

20:70:10

Microstructure

Micro and meso vessicle and vugh voids with few channel types with open spacing. Orientation is crudely parallel to sample margins. Elongated aplastic inclusions are randomly to crudely orientated to sample margins.

Groundmass

The matrix is heterogeneous with areas of lighter and darker colour due to differences in firing. Colour ranges from grey-brown to golden orange in XP (x25) with moderate to high optical activity suggestive of low firing temperature ranges.

Inclusions-General Features

Elongated and equant. Angular to sub-rounded. Inclusions are poorly sorted with bimodal distribution of large coarse inclusions in a fine matrix. Inclusions are double spaced.

Coarse Fraction Size Range

3.8- 0.4mm. Mode 1mm

Coarse Fraction Dominant

Intermediate igneous rock fragments: <3.8mm. Mode 1.2mm. Dominantly sub-angular, but with some sub-rounded examples. Elongated and equant. Rock fragments have fine grained groundmass containing angular alkali and plagioclase twinned feldspar grains. The fragments commonly contain dark brown sediment inclusions. Hornblende and biotite in a lesser extent is also present. The fragments range from andesite to more commonly dacite and trachyte.

Coarse Fraction Common

Feldspar: <0.8mm. Mode 0.8mm. Angular and equant. Dominantly plagioclase feldspar commonly with zoning. Simple and multiple twinning also evident in some inclusions.

Fine Fraction Size Range

<0.4mm

Fine Fraction Dominant

Feldspar

Fine Fraction Common

Amphiboles - yellow-green in XP Yellow -brown in PL
Intermediate rock fragments

Textural Concentration Features (TCFs)

Sub-angular to rounded, red-brown and dark opaque inclusions <0.8mm in size. These may be associated with the addition of the temper material and are not suggestive of clay mixing.

Comments

The micromass contains inclusions consistent with the larger inclusions indicating that these derive from the larger rock fragments. The distribution, size and angularity of these fragments suggest they may have been added as temper. They are compatible with the Triassic dacite and trachyte tuff outcrops which surround Epidavros indicating that this is a local fabric.

II.53 Single Sample Fabric Group 24

Clay Mix with Siltstone Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/48	Bowl	Undecorated	EHII?

Coarse:Fine:Voids =60μm

10:75:10

Microstructure

Meso and micro vughs, vesicles and few channel voids. They are moderately well aligned to sample margins with double to open spacing. Inclusions display no alignment.

Groundmass

Heterogeneous matrix with areas of different optical activity and colour. The matrix ranges from mid orange-brown with high optical activity in XP, to brown with moderate to low optical activity in XP, suggestive of low firing temperatures.

Inclusions-General Features

Dominantly sub-rounded and equant with few sub-angular examples. Well sorted with a bimodal distribution of large inclusions within a fine silicate rich matrix. Inclusions are double to open spaced.

Coarse Fraction Size Range

<1.6mm. Mode 0.8mm.

Coarse Fraction Dominant

Mudstone: Rounded to sub-angular and equant. Black-brown in XP with angular silicate within the matrix. Some examples are orange brown in XP.

Coarse Fraction Common-Few

Chert: <1mm. Mode 0.8mm. Angular and equant.

Coarse Fraction Rare

Dacite: <0.8mm. Angular and equant.
Trachyte: <0.8mm. Angular and equant

Fine Fraction Size Range

<0.6mm

Fine Fraction Dominant

Quartz
Feldspar

Fine Fraction Very Few-Rare

Translucent orange-red inclusions possibly serpentinite.

Textural Concentration Features (TCFs)

TCFs are well rounded although sub-rounded examples are present. They are <0.6mm in size with well defined edges. They are dark red-brown or orange-brown in XP and are suggestive of a combination of clay pellets from clay mixing and inclusions naturally present within the clay.

Comments

The dacite and trachyte within this fabric suggest a local origin consistent with the Triassic dacite and trachyte formations about Epidavros. The well rounded nature of the mudstones may indicate that these are larger TCFs associated with clay mixing.

II.54 Single Sample Fabric Group 25

Fine Silicate Rich Clay Mix Fabric

Sample Numbers

Sample Number	Vessel Form	Surface Modification	Period
EPI 12/9	Jug handle	Undecorated	EHII

Sample details for SS25.

Coarse:Fine:Voids =60μm

5:85:10

Microstructure

Meso and micro vesicles and vughs with double to open spacing and good alignment to sample margins. Inclusions show no alignment to sample margins.

Groundmass

Heterogeneous with areas of lighter and darker colour. Dominantly yellow-brown and optically active in XP suggestive of low firing temperatures.

Inclusions-General Features

Dominantly sub-rounded to rounded and equant. Well sorted with a bimodal distribution of TCFs within a fine silicate rich matrix. Inclusions are double to open spaced.

Coarse Fraction Size Range

<1mm. Mode 0.8mm

Coarse Fraction Dominant

Mudstone: <1.mm. Mode 0.6mm. Sub-rounded and equant. Dark-red brown with silicate grains within the matrix.

Coarse Fraction Rare

Chert: <0.6mm. Angular and equant.

Fine Fraction Size Range

<0.6mm. Mode 0.3mm

Fine Fraction Dominant

Quartz

Textural Concentration Features (TCFs)

TCFs are dominant within this fabric. They are rounded to sub-rounded and <0.6mm in size. They are red-brown in XP with well defined edges although several examples are stretched and merge with the micromass. They are indicative of clay mixing.

Comments

The inclusions within this fabric are not characteristic or diagnostic preventing an assignment of provenance. The alignment of the voids may be due to the stretching and pulling of the jug handle during forming.