A relational database for the digitization of fluvial architecture: conceptual scheme and overview of possible applications


INTRODUCTION

Fluvial architecture is the ensemble of geometry, proportion, internal organization and spatial distribution of genetic packages within fluvial successions (cf. Allen, 1999). In a relational database approach, fluvial architecture is described as objects translated from fieldwork and published literature, from both modern rivers and ancient counterparts in the stratigraphic record. The work herein presented focuses on the latter case, showing the main scales of the database scheme and data definition, and some possible outputs and their applications.

DATABASE SCHEME - implementation

The building blocks of fluvial architecture, belonging to the different scales of fluvial depositional systems in different settings: Lower Williams Fork Formation, Coal Canyon, Piceance Basin, Colorado. AAPG Bull. 93: 1379-1401.

OBJECTS TRANSITION:

The same numerical indices that are used also to describe genetic packages are also used for object neighbouring relationships representation, such as object containing other objects (e.g. type, location, and measured hard data}).

CASE STUDIES CLASSIFICATION:

Most of the metadata that refers to the original source of data acquisition is stored within the most internal levels of each case-study. The metadata for each case-study is stored as metadata and will be also associated with the object when relevant (e.g. certain date, curation, user, etc.)

OUTPUT AND APPLICATIONS

The database is currently running on the MySQL Database Management System, it can be simply interrogated through SQL queries, in order to generate quantitative information. The above output resulting from database interrogation is summarized here to show the potential of this database as a tool for the quantitative characterization of fluvial architecture.

CONCLUSIONS & FUTURE WORK

A relational database for the digitization of fluvial architecture has been designed, developed and populated with literature-derived case-studies. The early output of this system demonstrates the potential impact this tool on fluvial geochemistry research, as an instrument that can be used mainly for:

- A) improving our understanding of fluvial architecture in different settings and leading remotely to different controlling factors
- B) overcoming depositional and facies models, which are frequently based on few examples that are thought to be representative, but which may be misleading due to:
  - an insufficient understanding of the influence of different factors governing the sedimentary architecture of fluvial systems.
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FUTURE DEVELOPMENTS:

The database will be further developed to make it more suitable for these purposes:
- a) overcoming depositional and facies models, which are frequently based on few examples that are thought to be representative, but which may be misleading due to:
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