

# Supplementary Information for Chapter 5

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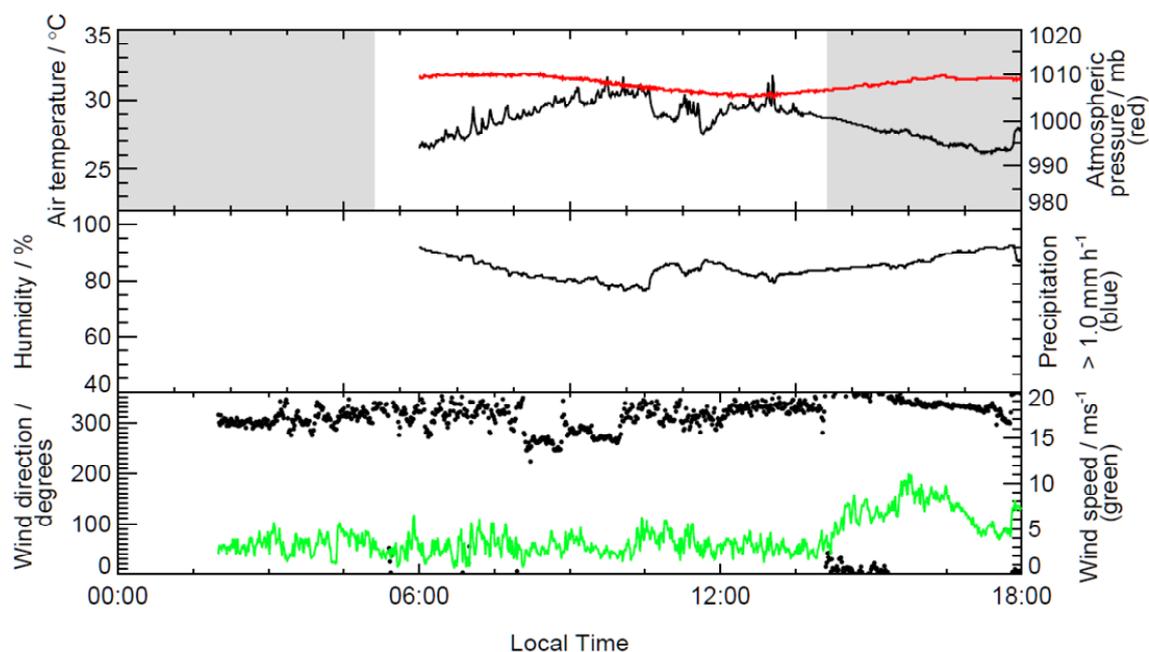


Figure S2.1. Time series of air temperature (black line, top panel), atmospheric pressure (red line, top panel), relative humidity (black line, middle panel), precipitation, wind direction (black points, bottom panel), and wind speed (green line, bottom panel) measured on the RV *Sonne* on 15<sup>th</sup> November 2011. Shaded regions in top panel indicate sunrise and sunset times.

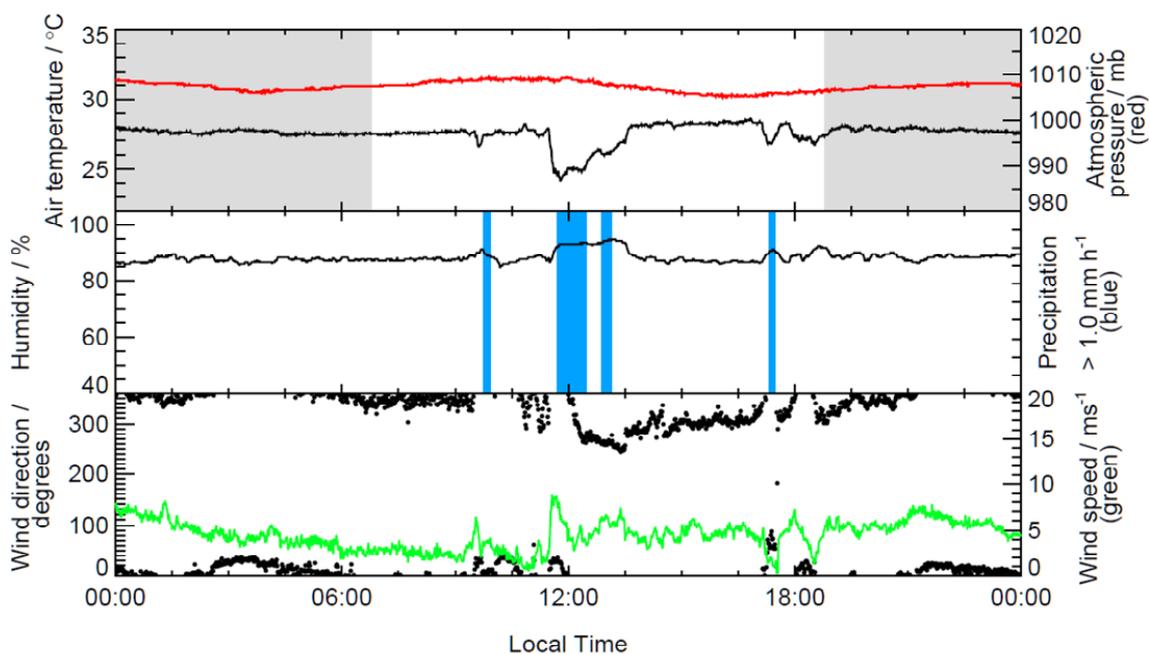


Figure S2.2. Time series as in Figure S2.1, for 16<sup>th</sup> November 2011. Blue bars in middle panel represent precipitation at more than 1.0 mm h<sup>-1</sup>. This limit excludes instrumental noise in the disdrometer measurements.

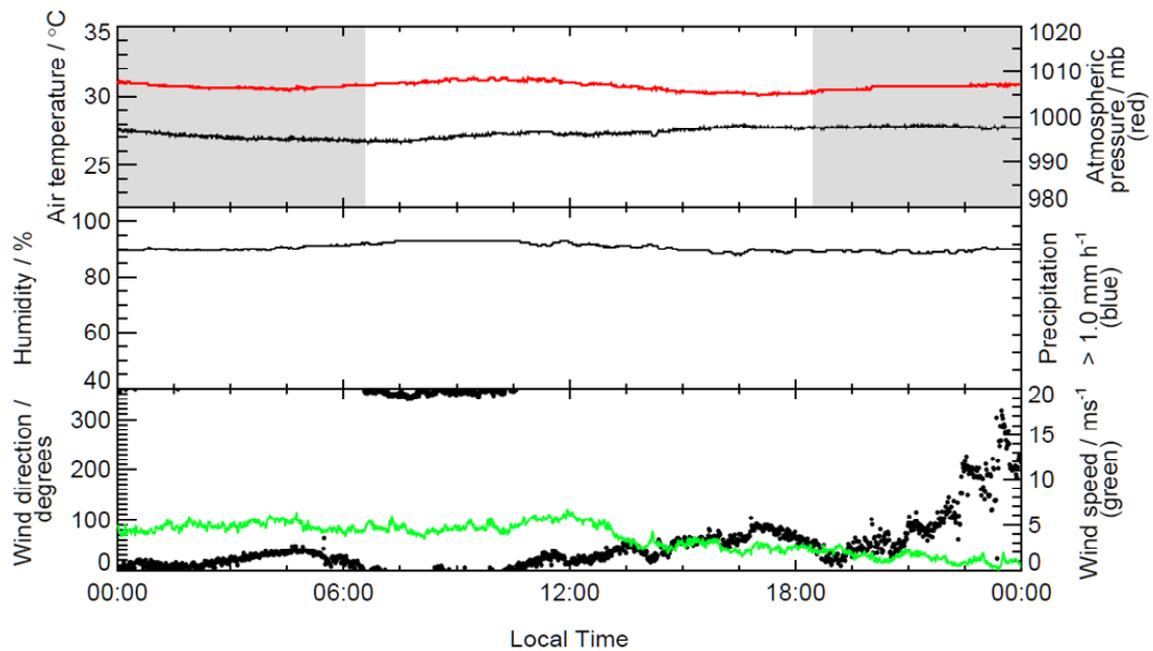


Figure S2.3. Times series as in Figure S2.1, for 17<sup>th</sup> November 2011.

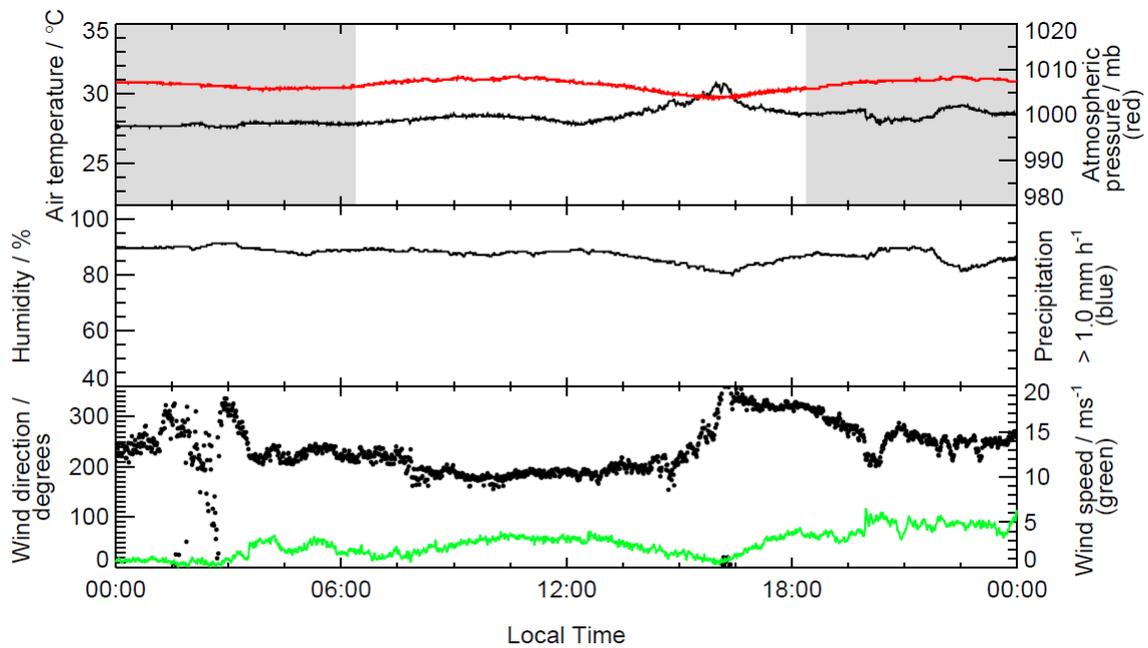


Figure S2.4. Time series as in Figure S2.1, for 18<sup>th</sup> November 2011.

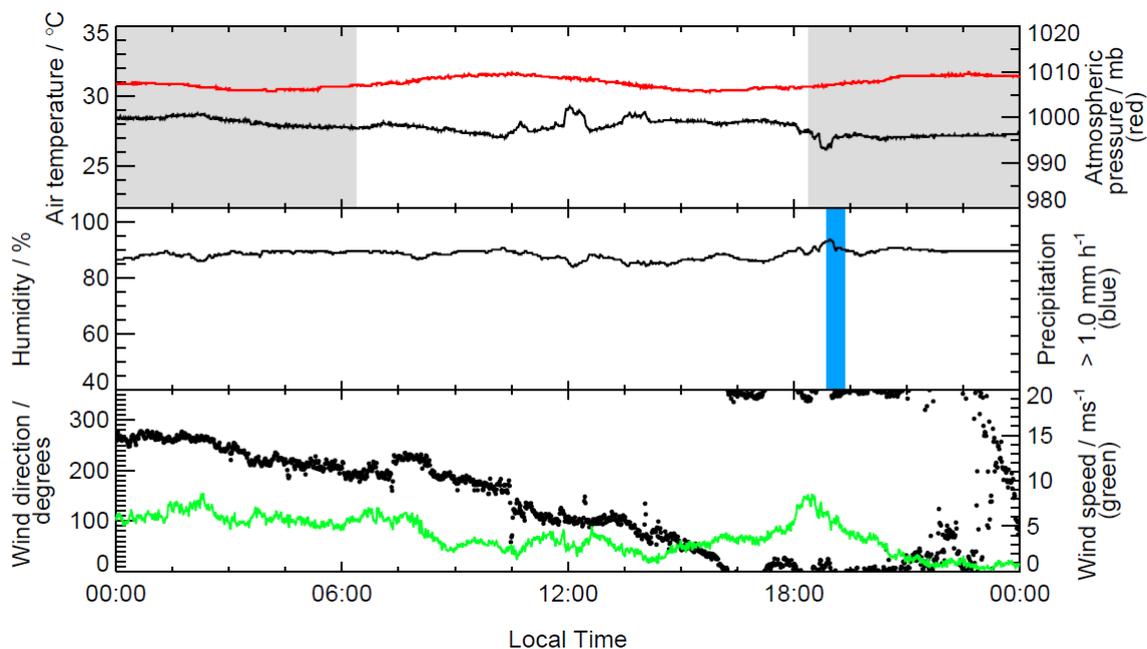


Figure S2.5. Time series as in Figure S2.1, for 19<sup>th</sup> November 2011. Blue bars in middle panel represent precipitation at more than  $1.0 \text{ mm h}^{-1}$ . This limit excludes instrumental noise in the disdrometer measurements.

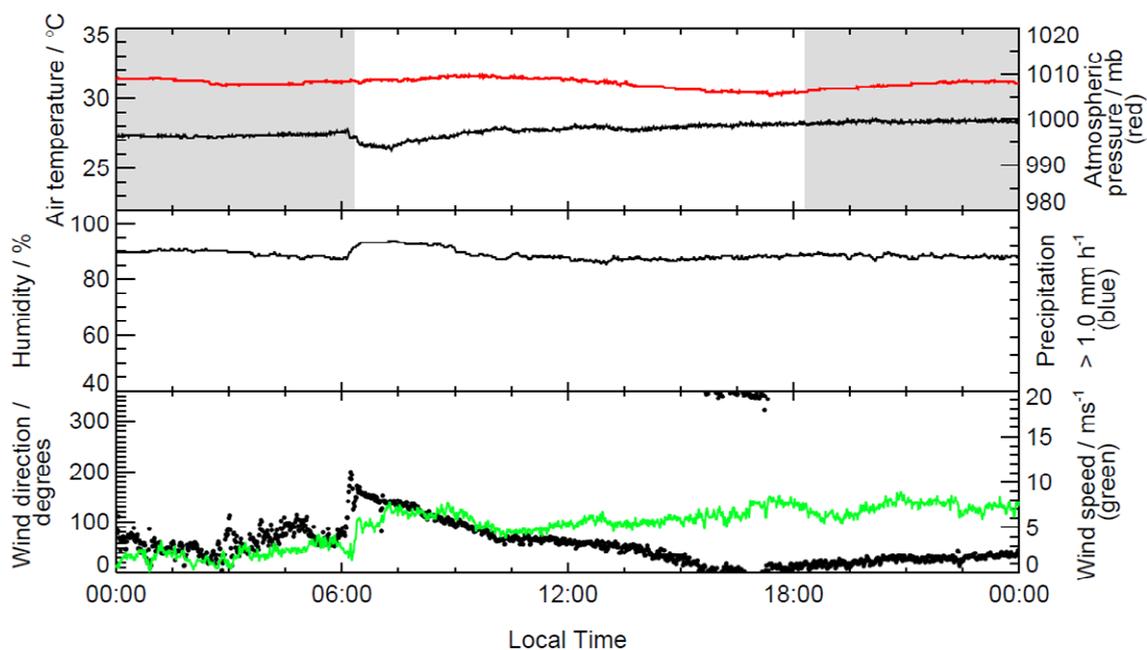


Figure S2.6. Time series as in Figure S2.1, for 20<sup>th</sup> November 2011.

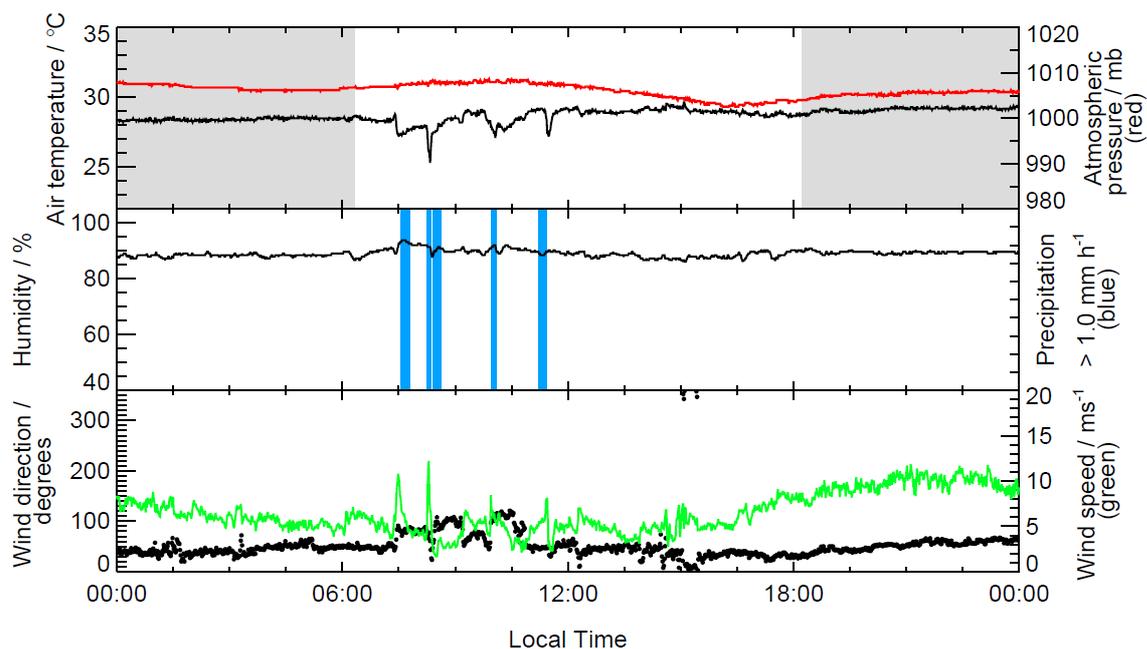


Figure S2.7. Time series as in Figure S2.1, for 21<sup>st</sup> November 2011. Blue bars in middle panel represent precipitation at more than  $1.0 \text{ mm h}^{-1}$ . This limit excludes instrumental noise in the disdrometer measurements.

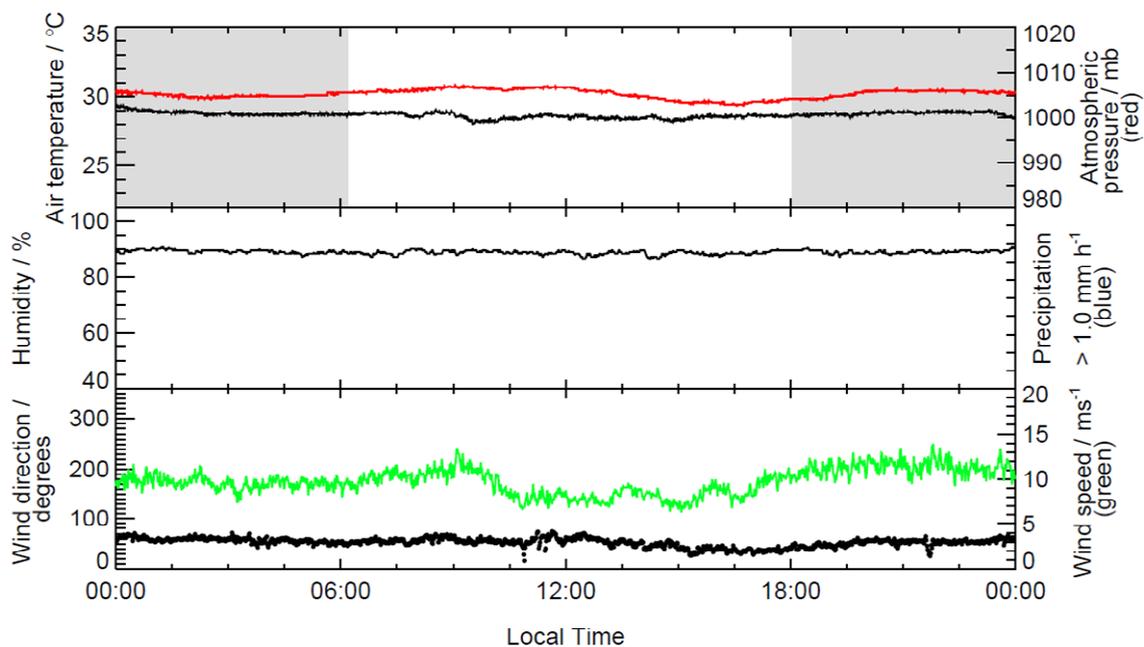


Figure S2.8. Time series as in Figure S2.1, for 22<sup>nd</sup> November 2011.

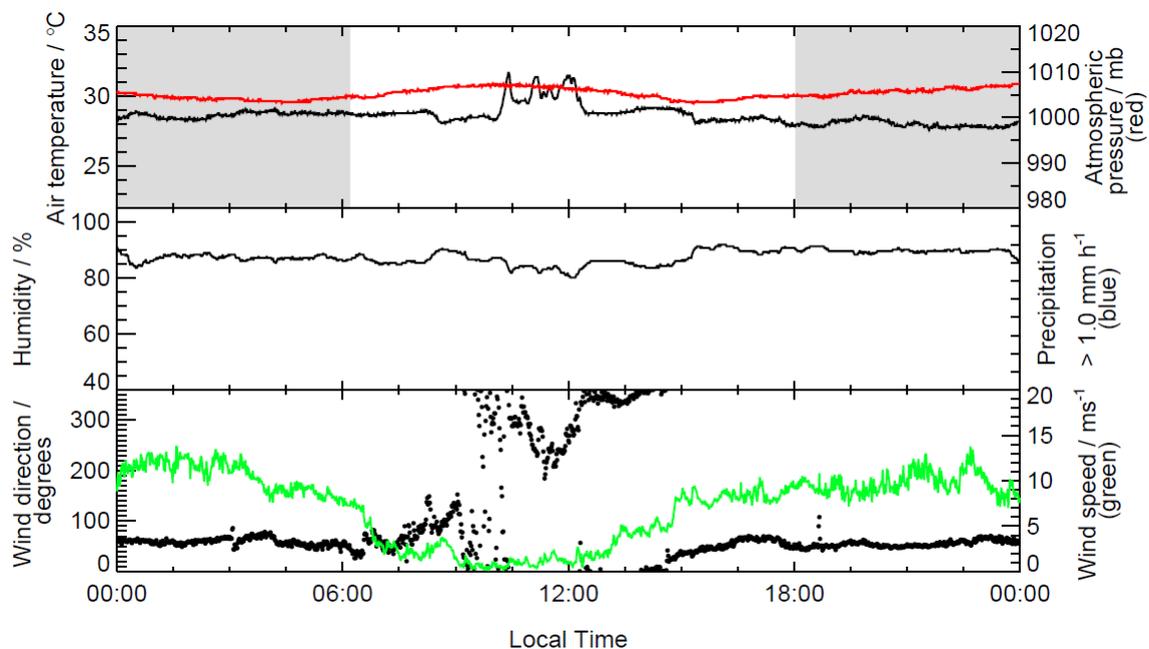


Figure S2.9. Time series as in Figure S2.1, for 23<sup>rd</sup> November 2011.

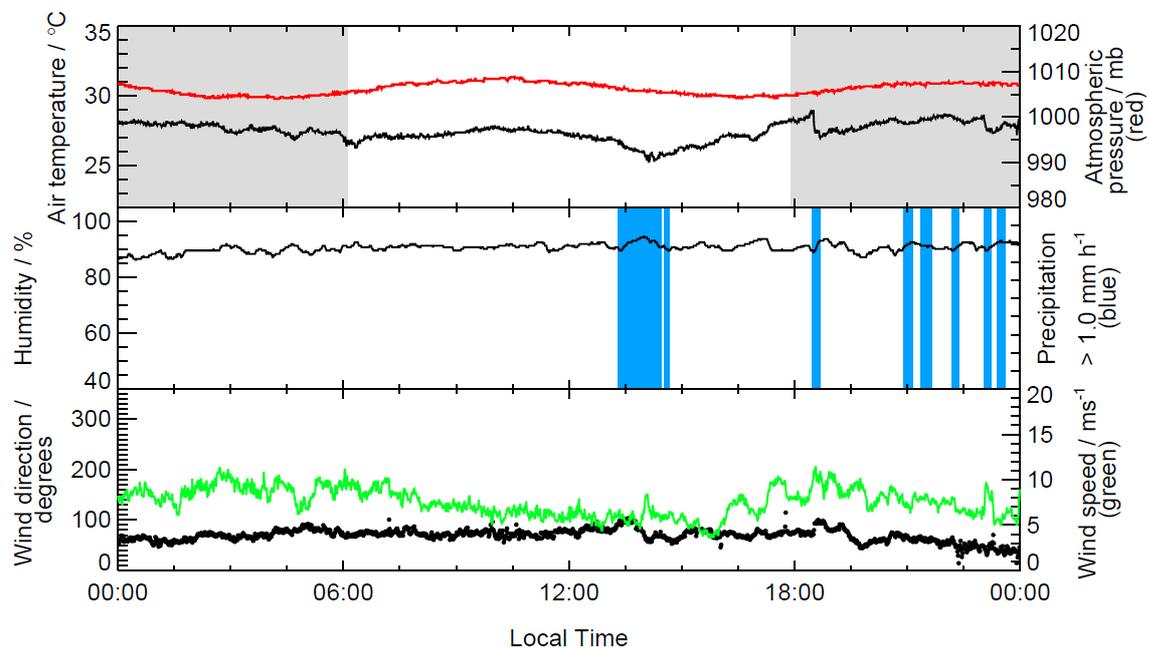


Figure S2.10. Time series as in Figure S2.1, for 24<sup>th</sup> November 2011. Blue bars in middle panel represent precipitation at more than  $1.0 \text{ mm h}^{-1}$ . This limit excludes instrumental noise in the disdrometer measurements.

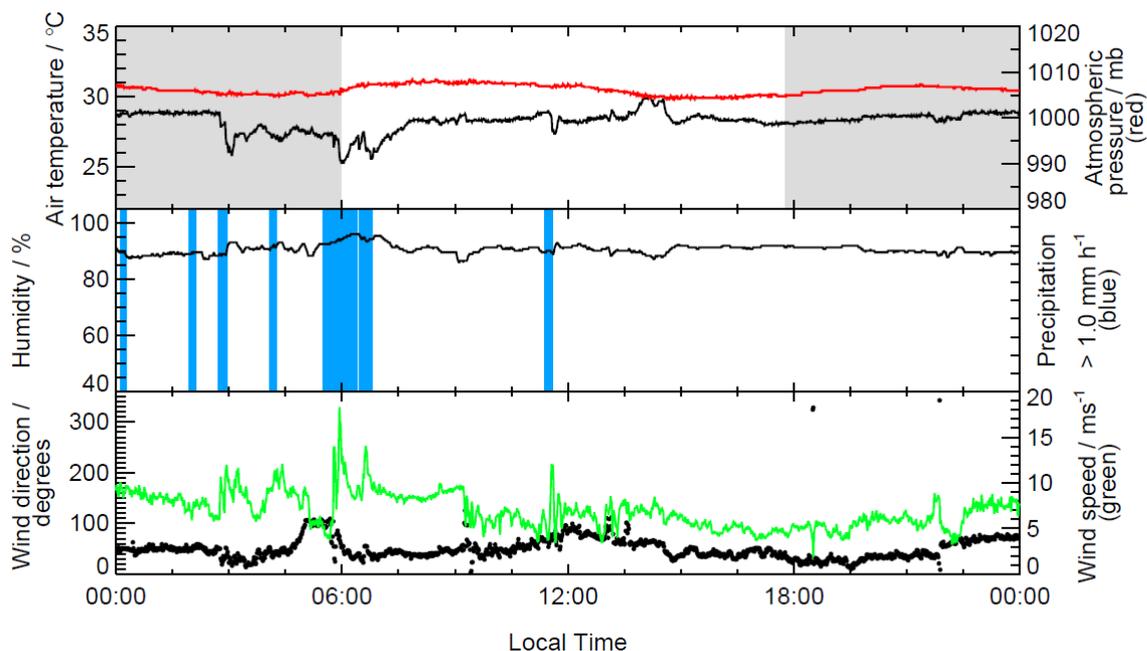


Figure S2.11. Time series as in Figure S2.1, for 25<sup>th</sup> November 2011. Blue bars in middle panel represent precipitation at more than  $1.0 \text{ mm h}^{-1}$ . This limit excludes instrumental noise in the disdrometer measurements.

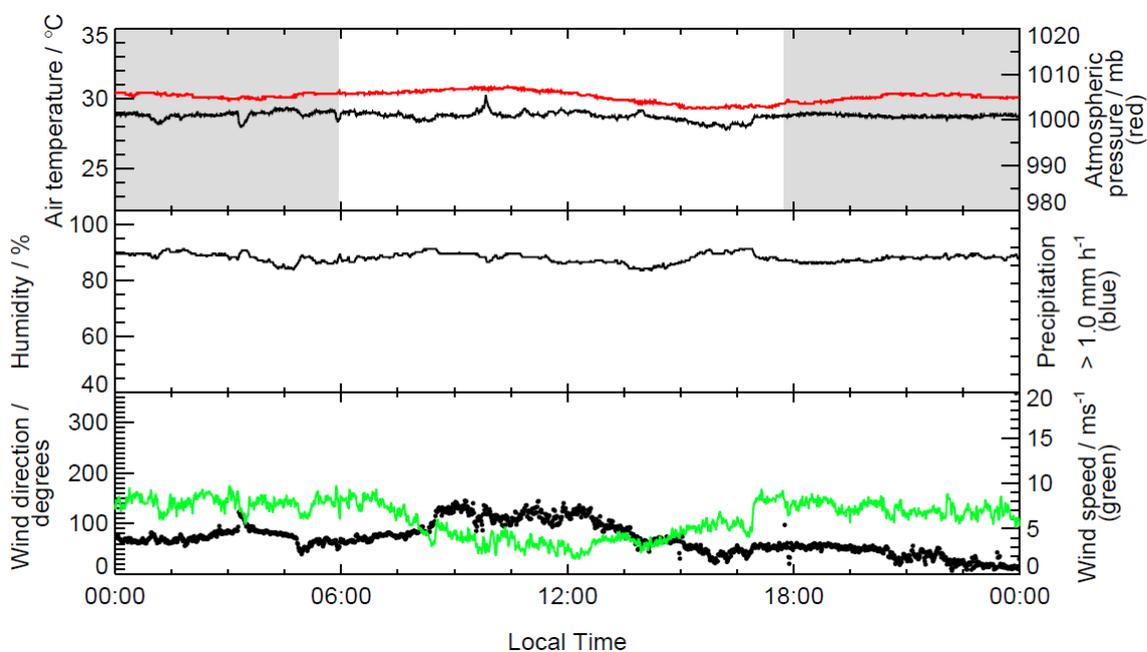


Figure S2.12. Time series as in Figure S2.1, for 26<sup>th</sup> November 2011.

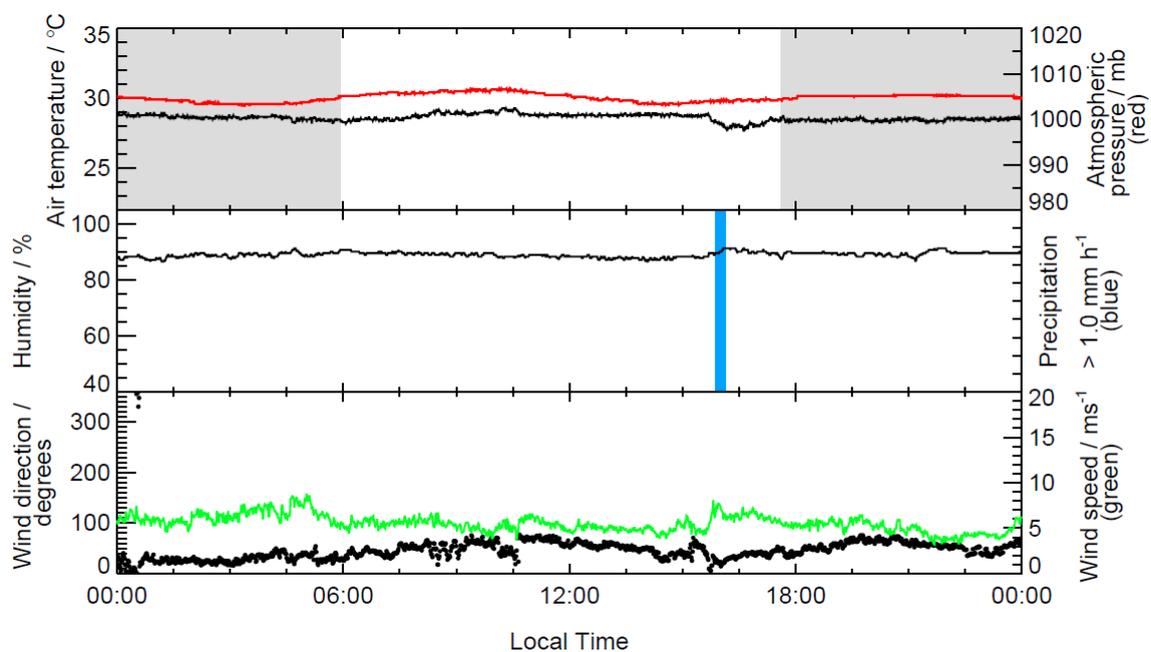


Figure S2.13. Time series as in Figure S2.1, for 27<sup>th</sup> November 2011. Blue bars in middle panel represent precipitation at more than  $1.0 \text{ mm h}^{-1}$ . This limit excludes instrumental noise in the disdrometer measurements.

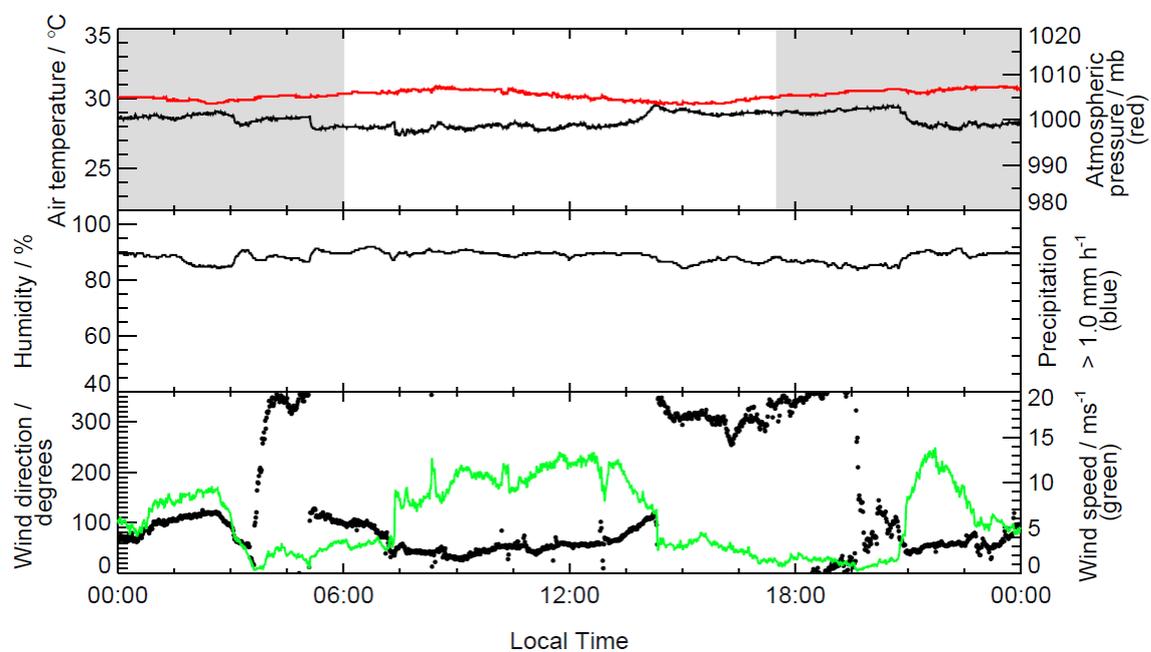


Figure S2.14. Time series as in Figure S2.1, for 28<sup>th</sup> November 2011.

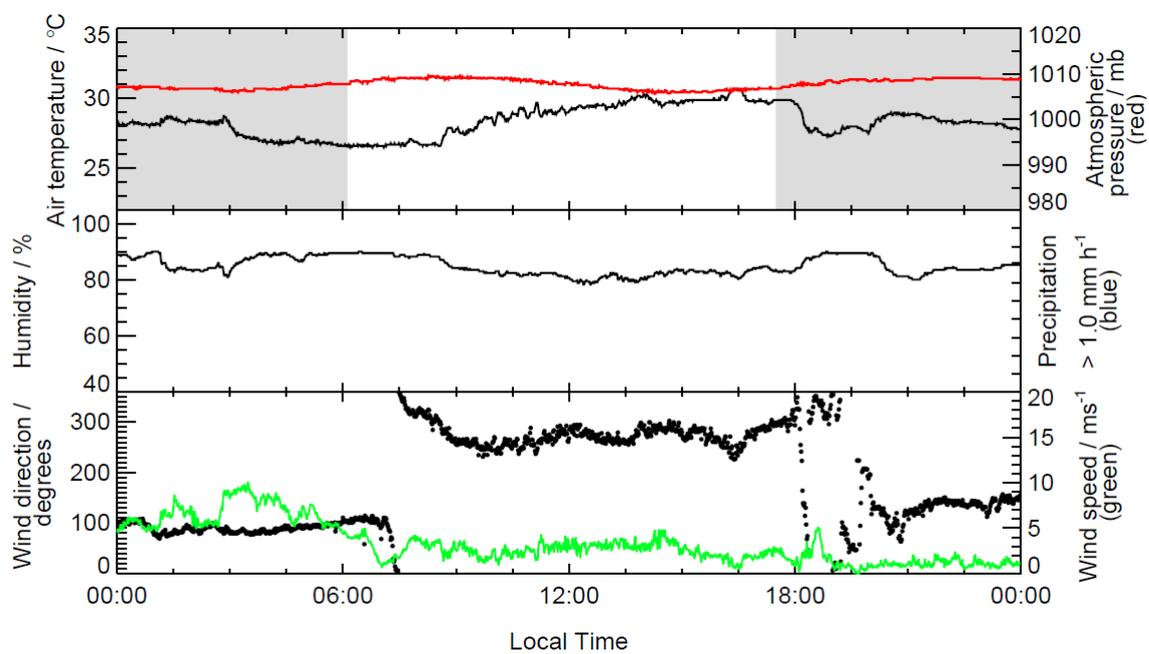


Figure S2.15. Time series as in Figure S2.1, for 29<sup>th</sup> November 2011.

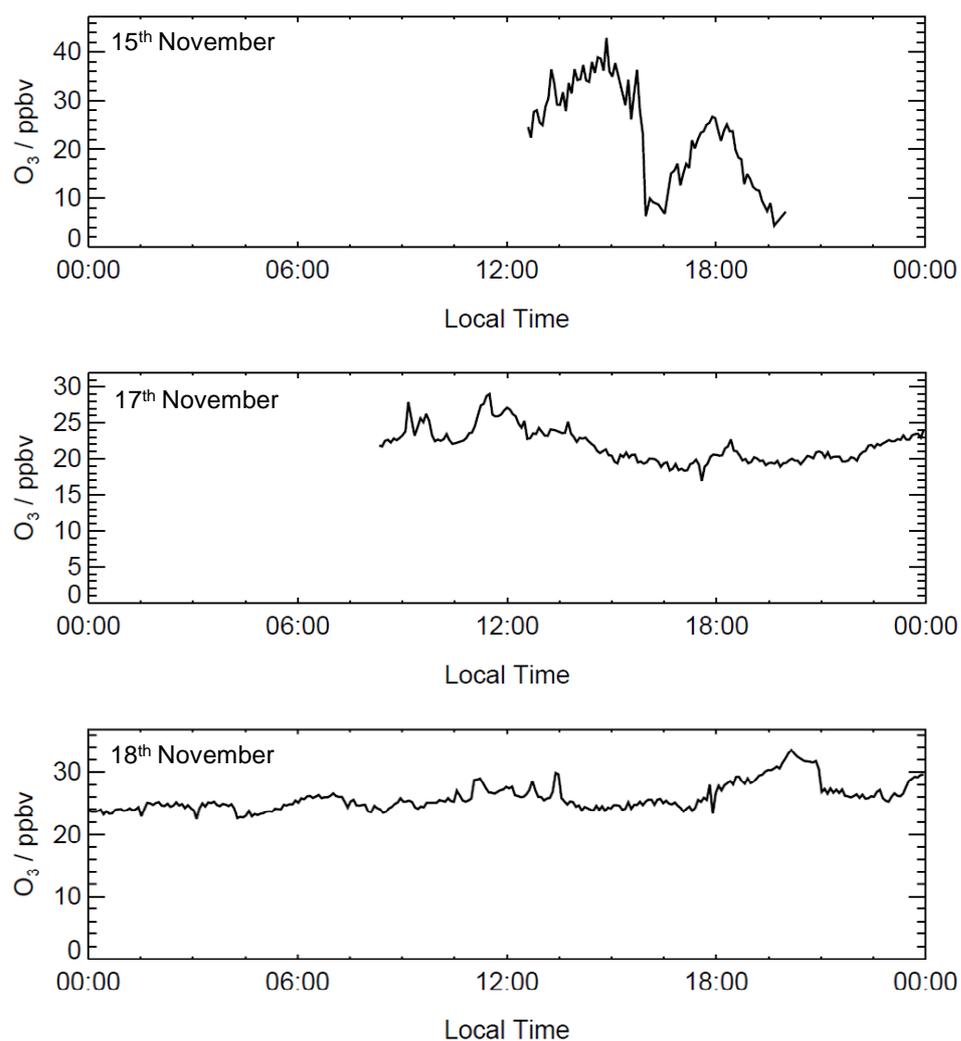


Figure S2.16. Time series of 5 minute averaged O<sub>3</sub> measured by Thermo Electron O3 TE49C analyser from bridge of RV *Sonne* during cruise SO218, on 15<sup>th</sup>, 17<sup>th</sup> and 18<sup>th</sup> November. No O<sub>3</sub> measurements were available for 16<sup>th</sup> November.

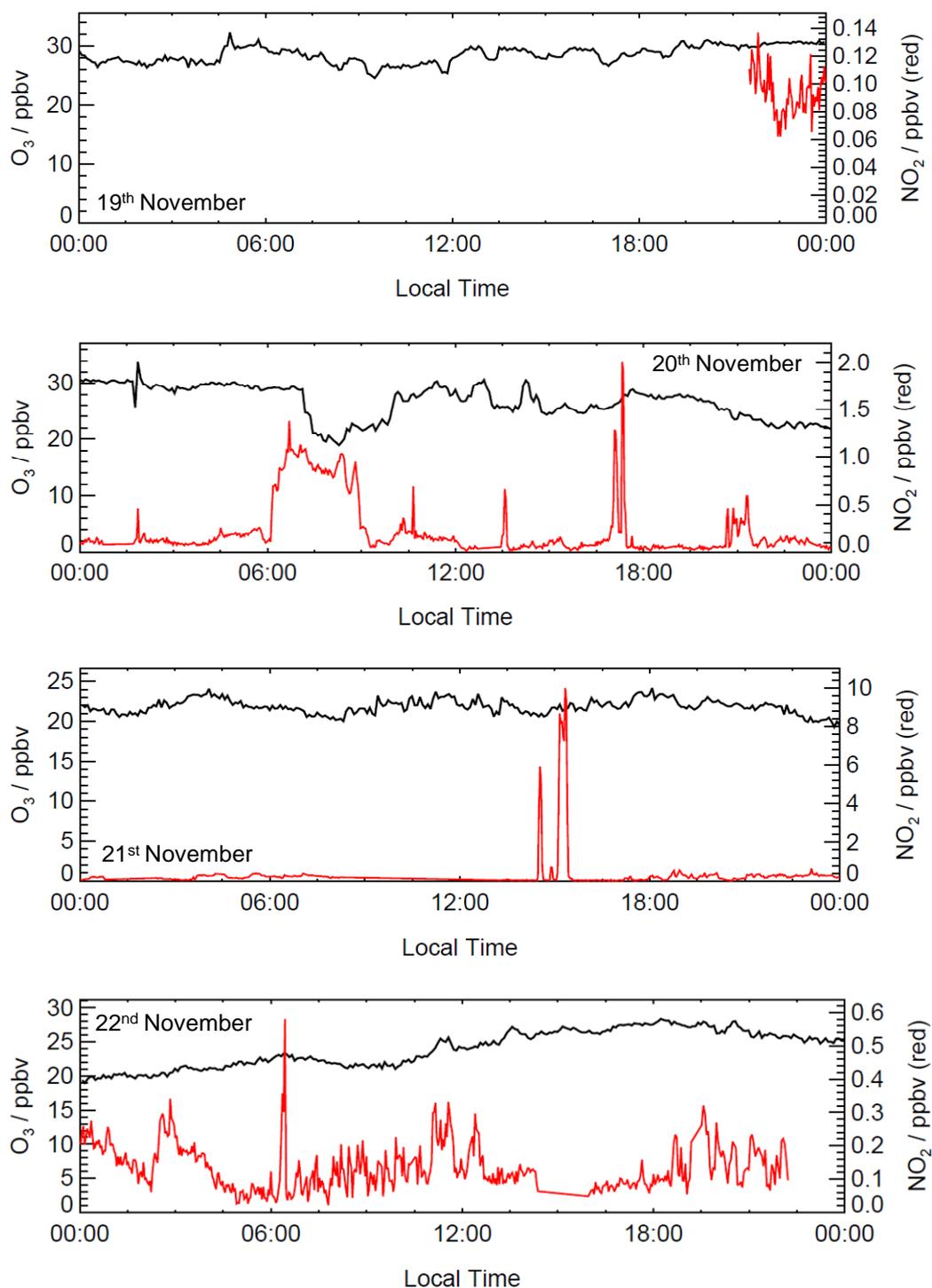


Figure S2.17. Time series of 5 minute averaged  $O_3$  (black line) and 2 minute averaged  $NO_2$  (red line) measured by Thermo Electron O3 TE49C analyser on the bridge, and CE-DOAS on the 'monkey' deck of RV *Sonne*, respectively.

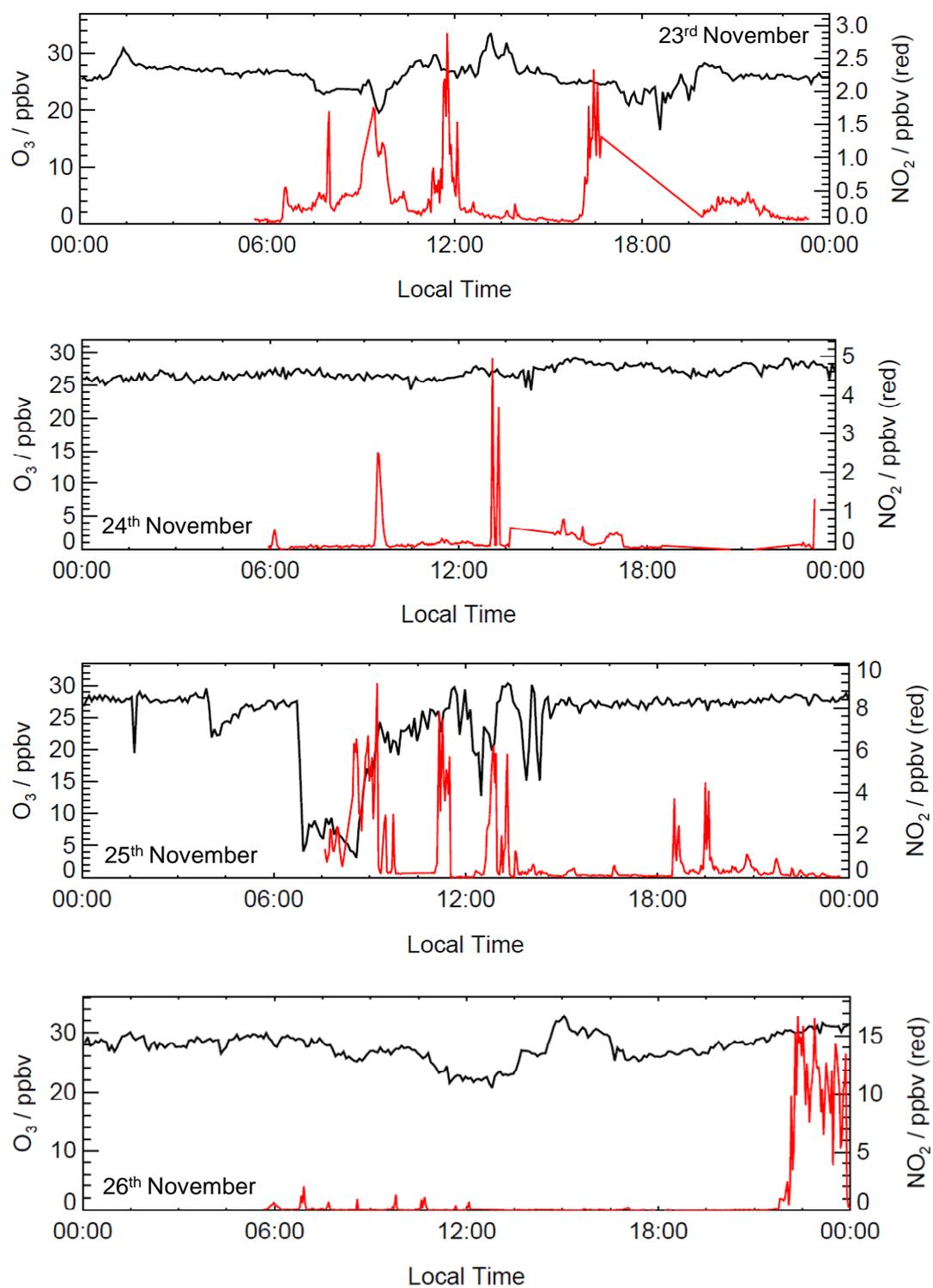


Figure S2.18. Time series as in Figure S2.17, for 23<sup>rd</sup>–26<sup>th</sup> November 2011.

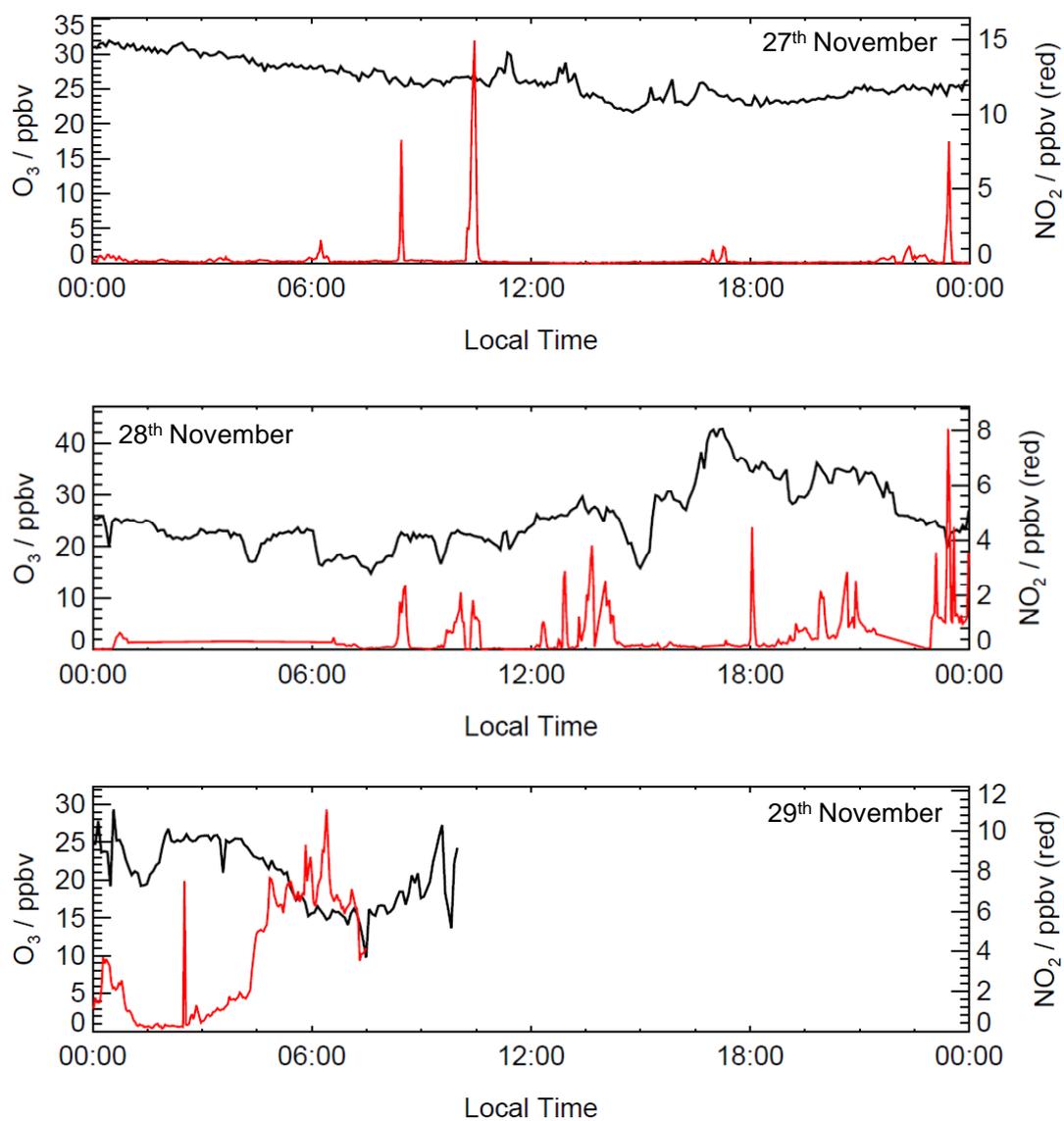


Figure S2.19. Time series as in Figure S2.17, for 27<sup>th</sup>–29<sup>th</sup> November 2011.

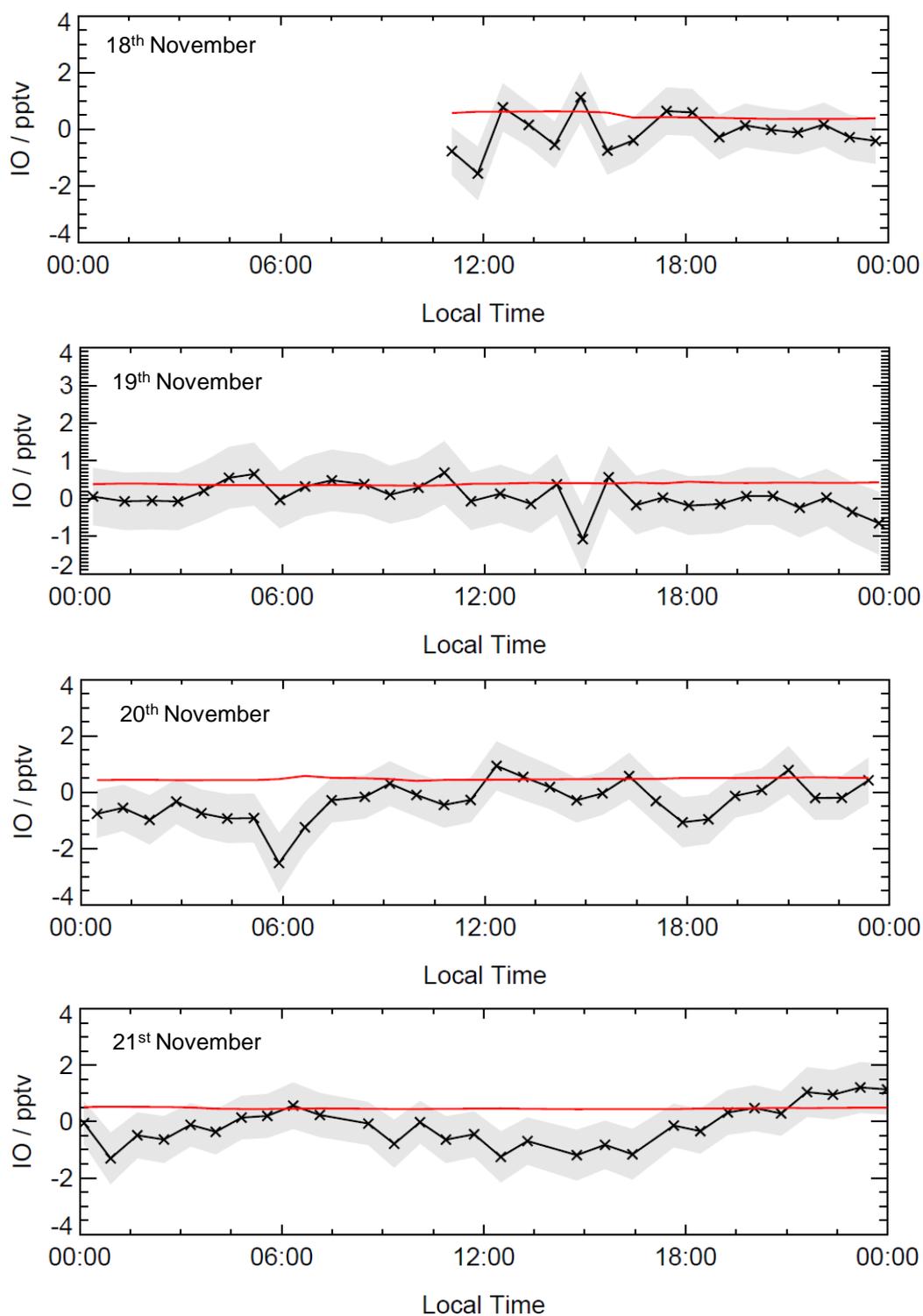


Figure S2.20. Time series of IO (black points and connecting lines) for 18<sup>th</sup>–21<sup>st</sup> November 2011, averaged over 15 minutes of online measurements (45 minutes total averaging time). The shaded area represents the uncertainty in the measurements. Red lines are limits of detection for 15 minutes of online data. Negative data points and points below the limit of detection are included for completeness.

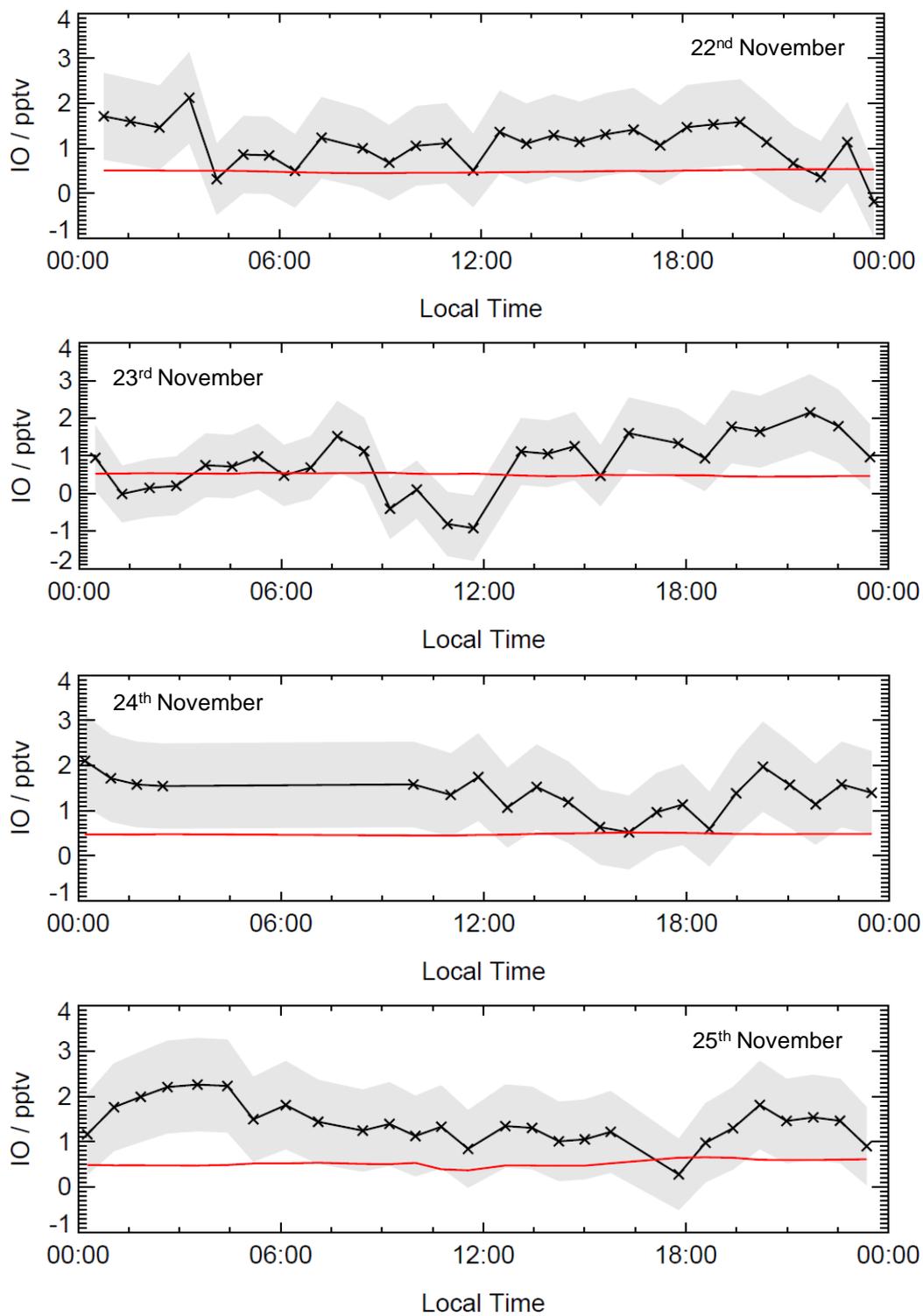
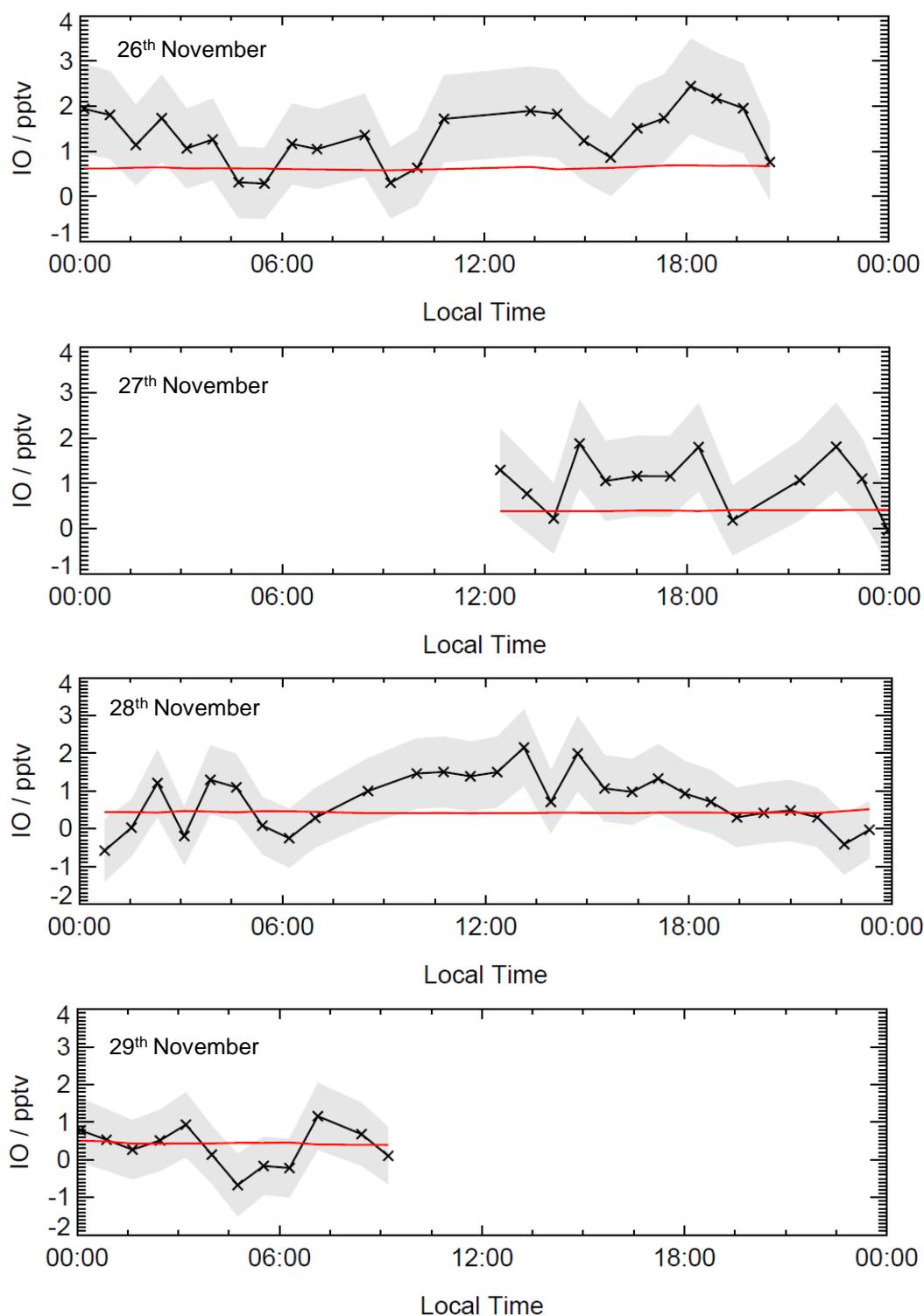


Figure S2.21. Time series as in Figure S2.20, for 22<sup>nd</sup>–25<sup>th</sup> November 2011.

Figure S2.22. Time series as in Figure S2.20, for 26<sup>th</sup>–29<sup>th</sup> November 2011.