



Investigating the dynamics of the East Antarctic Ice Sheet on the continental shelf off the Adélie Coast

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IODP Expedition 318 recovered approximately 2000 m of middle Eocene to Holocene sediments from the Wilkes Land rise and shelf representing 53 Ma of Antarctic history. Site U1358 receives drainage from the East Antarctic Ice Sheet (EAIS) through the Wilkes subglacial basin. Pliocene sediments were recovered at this site and direct evidence of the presence of grounded ice on the shelf during these periods can be obtained. High resolution core scans have been used to indicate any sedimentary structural changes downcore that could indicate variable depositional environments. In addition, samples from the Pliocene section of the core have been taken for micromorphological analysis. Sets of microstructures and microstructural mapping are used to interpret glaciomarine and possible subglacial units. In particular, depositional history can be investigated by analysing the phases of fabric development within deposits that are typically polydeformational. Initial analysis of micromorphological thin sections indicates clustering of skeleton grains into distinct zones, lineations, circular structures and possible rare cracked or fractured grains. There is a lack of any well developed plasmic fabric. The chronological framework needs to be significantly improved before correlation between U1358 and other Antarctic margin sites can be accomplished. The on-going results from this study are important, because the early Pliocene epoch represents the last time Earth's climate was as warm as it is likely to be within this century ([U+0334] 3°C and atmospheric pCO₂ [U+0334] 400 ppm). If the grounding line did advance and retreat to and from the outer shelf during this relatively short warm interval then there are significant implications relating to ice sheet volume (and sea level) once a "stable" EAIS is thought to be in place (i.e. since the middle-late Miocene).