



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

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IODP Expedition 318 recovered approximately 2000 m of middle Eocene to Holocene sediments from seven sites on the Wilkes Land rise and shelf representing 53 Ma of Antarctic history. Site U1358, located on the continental shelf, 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 and grounding line distal conditions on the shelf during these periods can be obtained. The lower cored interval extends from 17.3 to 35.6 mbsf. Within this interval, 6.46 m of sediment was recovered containing diatom assemblages dating back to the *Thalassiosira innura* Zone of the early Pliocene that ranges from 4.2 to 5.12 Ma. Macro-scale sedimentological analysis of 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. Four facies were interpreted from the diamictos representing the progressive advance and retreat of the grounding line over the site. In particular, a directional signal was evident in some units along with other polydeformational microstructures while other units were finely laminated. 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 (approx. 3°C) and atmospheric pCO₂ concentrations were as high as they are today (approx. 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).