



Varying depositional environments across the Oligocene-Miocene boundary and their relevance for East Antarctic ice sheet history: IODP Site U1356, Wilkes Land margin

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IODP Expedition 318 drilled seven sites in two transects across the Wilkes Land (WL) margin of Antarctica. The objective was to obtain a long-term record of the Cenozoic Antarctic glaciation in response to climatic changes, including major transitions. Our work focuses on the study of nearly 300 meters of Oligocene-early Miocene sediments from Site 1356 (cores 42R to 72R) located on a channel levee in the lower continental rise. Shipboard core descriptions reported these sediments to consist of strongly bioturbated claystone and calcareous claystone with Zoophycos or Nereites ichnofacies. Subordinate lithofacies include: 1) laminated silty claystones, 2) convoluted claystones, sandstones and conglomerates; 3) mudstones and sandstones, with a few dispersed to common clasts; and 4) graded or cross-laminated siltstones and sandstones.

Based on our study of facies associations in the cores, we differentiate 3 major sedimentary phases, representing important changes in the depositional environments off the WL margin. During the early-late Oligocene, sediments record deposition in a deep-water setting, with bottom currents reworking hemipelagic sediments. Late Oligocene sedimentary processes are dominated by successive fine- to coarse-grained debris-flow mass transport deposits. In the early Miocene, turbidites and hemipelagic sedimentation, characteristic of levee deposition, dominate.

With this interpretation of sedimentary environments, plus the correlation between Site U1356 and seismic reflection profiles at the site and vicinity, we can begin to link the relation between along-slope and down-slope processes to the evolution of the East Antarctic Ice Sheet.