

Pliocene anisotropy of magnetic susceptibility (AMS) and diatom stratigraphy from the Wilkes Land margin

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During IODP Expedition 318, Sites U1359 and U1361 were drilled on the continental rise offshore the Wilkes subglacial basin to reconstruct the stability of the East Antarctic Ice Sheet (EAIS) during Neogene warm periods, such as the late Miocene and the early Pliocene. As the drilled core has complex story of compaction, erosion (thus hiatuses), and possibly artificial disturbance, identifying these is important for reconstructing paleoenvironments. Anisotropy of magnetic susceptibility (AMS) is sensitive to lithological changes and differential compaction. At site U1359 and U1361, highly anisotropic layers correspond with lithologic boundaries and hiatuses. In places, it appeared that the degree of anisotropy was controlled by the presence or absence of diatoms. Here we present a detailed study of the relationships between sediment compaction based on AMS fabric and variations in diatom taxa and magnetic mineralogy.

There is clear correlation between degree of anisotropy and moisture content; where moisture content is high, the layer is more isotropic, and vice versa. Moreover, the anisotropic layers correspond to layers with high diatom valve concentration, in contrast, the more isotropic layers are low diatom valve concentration. There are also strong rock magnetic indications for changes in the sources of the magnetic minerals.

We will describe our AMS and diatom stratigraphy to 1) characterize sediments compaction with diatom taxa variation and 2) detect the source of magnetic mineralogy throughout Pliocene.