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Oligocene-Miocene paleoceanographic changes offshore the Wilkes Land Margin, Antarctica: dinoflagellate cyst and TEX86 analyses of DSDP Site 269

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Although a lot of research has been conducted to characterize the onset of Antarctic glaciation at the Eocene-Oligocene transition, little is known about the subsequent evolution and fluctuations of the size of the Antarctic Ice Sheet (AIS). The discrepancy between the conclusions of Foster and Rohling (2013) (insensitive global cryosphere between 400-650 ppmv CO_2) and variations in benthic foraminiferal δ18O records (0.5-1 ‰ illustrate the uncertainty in particularly the East AIS variability during the Oligocene and Miocene. Increasing awareness of the importance of oceanographic conditions on ice sheet melt emphasize the need to directly infer ice sheet volume fluctuations from sedimentary archives close to the Antarctic margin.
In this study, dinoflagellate cyst (dinocyst) assemblages, dinocyst-based biostratigraphy and TEX86 from Deep Sea Drilling Project Site 269, offshore the Wilkes Land Margin (WLM), were used to reconstruct the paleoenvironment and paleoceanographic setting during the Oligocene and Miocene. Preliminary results are indicative of open ocean conditions, Southern Ocean fronts and high productivity waters. Furthermore, biomarker species were found, which are useful for stratigraphic dating.
Research conducted at the continental rise of the WLM (Site U1356), by Bijl et al. (in prep.), has allowed for the calibration of dinocysts events of the Oligocene-Miocene Southern Ocean to the international time scale. Comparing the results of Site 269 to Site U1356 can thus provide an age constraint for this record. Correlating paleoceanographic changes between sites can provide insights into the variability of the EAIS during the Oligocene and Miocene, and will contribute to improving predictions of future changes in the Antarctic ice sheet.