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Bulk sediment geochemistry as a tool in palaeoclimate studies; preliminary results from shipboard analyses of IODP Expedition 318

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Understanding the evolution and dynamics of the Antarctic cryosphere, from its inception during the Eocene–Oligocene transition (34 Ma) through the significant subsequent periods of likely coupled climate and atmospheric greenhouse gas changes, is not only of major scientific interest but also is of great importance for society. Drilling the Antarctic Wilkes Land margin was designed to provide a long-term record of the sedimentary archives along an inshore to offshore transect of Cenozoic Antarctic glaciation and its intimate relationships with global climatic and oceanographic change.

Material recovered during IODP Expedition 318 included an unprecedented ultrahigh resolution Holocene core, continuous Miocene and Oligocene sections, as well as some Eocene strata. We used the shipboard analytical facilities of the JOIDES Resolution to obtain high precision bulk sediment major and trace element data on most representative lithologies. In detail we measured SiO_2, Al_2O_3, TiO_2, K_2O, CaO, Na_2O, MgO, Fe_2O_3, P_2O_5, Sr, Ba, Sc, Co, and V data. The results can be used to constrain sedimentary regimes, primary marine productivity, diagenesis, and detrital inputs through the Cenozoic. In addition the chemical index of alteration (CIA = $[Al_2O_3/(Al_2O_3 + CaO^* + K_2O + Na_2O)]$) allows to reconstruct the chemical/physical weathering conditions on the continent. Overall the data allow distinguishing geochemical intervals that broadly correlate with lithostratigraphic observations and interpretations, and provide a valuable starting point for more detailed geochemical investigations.