



## **Clay minerals in Prydz Bay rise sediments as indicators of Middle Miocene glacial evolution in East Antarctica (Ocean Drilling Program, Leg 188, Site 1165)**

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### **ABSTRACT**

#### **Introduction**

ODP Leg 188 Site 1165 was drilled on the continental rise, proximal to the East Antarctic Ice Sheet (EAIS) off the Prydz Bay. The major aim of Leg 188 was to date the earliest arrival of glacier ice on the shelf and to document the number and timing of late Neogene expansions to the shelf edge. Site 1165 records a history of sedimentation on the continental rise, extending back to the earliest Miocene times (c.a. 22 Ma). This study defines the biogenic and terrigenous material characteristics and clay mineral assemblages from the Middle Miocene aged sediment sequence at 150.05 – 326.45 meters below sea floor (mbsf) (~10 – 15 Ma). The aim was to see how the clay mineral assemblages compare with other paleoclimatological proxy data that indicate a major cooling and ice growth of the EAIS after the late Early Miocene climatic optimum.

#### **Conclusion**

The cooling trend and/or ice advance could be reconstructed from the sediment composition characteristics. The decrease in a terrigenous component reflects a probable shift in an onshore sediment source area to paleoenvironments that produced less terrigenous sedimentation. The clay mineral assemblages had two clear trends that correlated with oxygen isotope curve. Decreasing smectite in the time interval ~14.1 – ~13.6 Ma indicates a cooling trend. Smectite concentrations significantly fluctuate but slightly increases and illite concentrations decrease in the time interval ~11.5 – ~10.4

Ma which implies warmer and possible variable conditions. Overall, the clay mineral assemblages integrated with other paleoenvironmental data improves our knowledge of the past Antarctic climate and our understanding of its evolution.