

Oligocene environmental changes on the Wilkes Land margin in response to a developing East Antarctic ice sheet.

Alexander J.P. Houben¹, Peter K. Bijl¹, Henk Brinkhuis¹, James Bendle², Jörg Pross³, Catherine E. Stickley⁴, Matthew Olney⁵, Ursula Röhl⁶, Lisa Tauxe⁷, Steven M. Bohaty⁸, Stefan Schouten⁹, Alexander Ebbing¹, Francesca Sangiorgi¹, Paolo Stocchi¹⁰, Bert Vermeersen¹⁰, Carlota Escutia¹¹, Adam Klaus¹² and Expedition 318 Scientists.

¹ Biomarine Sciences, Utrecht University, Utrecht, The Netherlands

² G-MOL, University of Glasgow, Glasgow, United Kingdom

³ Institute of Geosciences, University of Frankfurt, Frankfurt, Germany

⁴ Department of Geology, Universitet i Tromsø, Tromsø, Norway

⁵ Department of Geology, University of South Florida, Tampa FL, USA

⁶ MARUM, University of Bremen, Bremen, Germany

⁷ Scripps Institution of Oceanography, San Diego, USA

⁸ University of Southampton, Southampton, United Kingdom

⁹ NIOZ Royal Netherlands Institute for Sea Research, Texel, The Netherlands

¹⁰ Faculty of Aerospace Engineering, Delft University, Delft, The Netherlands

¹¹ CSIC-Universite de Granada, Granada, Spain

¹² Integrated Ocean Drilling Program, Texas A&M University, College Station, USA

IODP Expedition 318 drilled several sites on the Wilkes Land margin of East Antarctica in Jan. – Feb. 2010. The principle objective of the cruise was to obtain a better understanding of the Cenozoic cryospheric evolution of Antarctica, in conjunction with the dating of major regional seismic unconformities WL-U3 thru U8. Unconformity WL-U3 was suggested to be related to the inception of Antarctic glaciation during the Eocene-Oligocene Transition (~34 Ma).

Changes in biotic assemblages distinctly denote an ecological transition from warm, Eocene ice-free 'greenhouse' conditions to colder, highly productive, Oligocene 'icehouse' conditions, more akin to the modern shelf environment of Antarctica. Preliminary dinoflagellate, and TEX₈₆ results will be discussed. In addition, our paleoecological interpretations provide constraints for on-going geophysical studies aimed at modelling changes in relative sea level in response to East Antarctic glaciation and ice-sheet arrival at the Wilkes Land margin.