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-Université 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.