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Middle Miocene environmental and climatic evolution at the Wilkes Land margin, East Antarctica

Francesca Sangiorgi (1), Peter Bijl (1), Sandra Passchier (2), Ulrich Salzmann (3), Stefan Schouten (4), Jörg Pross (5), Carlota Escutia (6), Henk Brinkhuis (1,4)

(1) Marine Palynology, Department of Earth Sciences, Faculty of Geology, Laboratory of Palaeobotany and Palynology, Utrecht University, Budapestlaan 4, 3584CD Utrecht, The Netherlands, (2) Department of Earth and Environmental Studies, Montclair State University, 1 Normal Ave, 252 Mallory Hall, Montclair, NJ 07043, (3) Geography and Environment, School of Built and Natural Environment, Northumbria University, Ellison Building Newcastle upon Tyne, NE1 8ST, UK, (4) NIOZ Royal Netherlands Institute for Sea Research, Landsdiep 4, 1797 SZ 't Horntje (Texel), The Netherlands, (5) Institute of Earth Sciences, University of Heidelberg, Im Neuenheimer Feld 234, 69120 Heidelberg, Germany, (6) Instituto Andaluz de Ciencias de la Tierra, CSIC-Universidad de Granada, Granada, Spain

Integrated Ocean Drilling Program (IODP) Expedition 318 successfully drilled a Middle Miocene (~ 17 – 12.5 Ma) record from the Wilkes Land Margin at Site U1356A (63°18.6138'S, 135°59.9376'E), located at the transition between the continental rise and the abyssal plain at 4003 mbsl.

We present a multiproxy palynological (dinoflagellate cyst, pollen and spores), sedimentological and organic geochemical (TEX86, MBT/CBT) study, which unravels the environmental and climate variability across the Miocene Climatic Optimum (MCO, ~17-15 Ma) and the Mid Miocene Climate Transition (MMCT).

Several independent lines of evidence suggest a relatively warm climate during the MCO. Dinocyst and pollen assemblage diversity at the MCO is unprecedented for a Neogene Antarctic record and indicates a temperate, sea ice-free marine environment, with woody sub-antarctic vegetation with elements of forest/shrub tundra and peat lands along the coast. These results are further confirmed by relatively warm TEX86-derived Sea Surface Temperatures and mild MBT-derived continental temperatures, and by the absence of glacially derived deposits and very few ice-rafted clasts. A generally colder but highly dynamic environment is suggested for the interval 15-12.5 Ma.