



Late Cenozoic ocean-ice sheet interactions and West Antarctic Ice Sheet vulnerability: Initial results from International Ocean Discovery Program Expedition 374 in the Ross Sea continental margin

Laura De Santis (1), Robert M. McKay (2), Denise K. Kulhanek (3), and the IODP Exp. 374 Science Party

(1) National Institute of Oceanography and Applied Geophysics, OGS, Sgonico (TS), Italy (ldesantis@ogs.trieste.it), (2) Antarctic Research Centre, ARC, Victoria University of Wellington, Wellington, New Zealand (robert.mckay@vuw.ac.nz), (3) International Ocean Discovery Program, IODP, Texas A&M University, College Station, TX, USA (kulhanek@iodp.tamu.edu)

International Ocean Discovery Program Expedition 374 will core six sites in the Ross Sea in January–March 2018. The expedition aims to resolve the relationship between climatic/oceanic change and West Antarctic Ice Sheet (WAIS) evolution over the past 20 million years. The Ross Sea was selected as an ideal location for drilling because numerical ice sheet models indicate that it is highly sensitive to changes in ocean heat flux and sea level. The drilling was designed for optimal data-model integration, which will enable an improved understanding of the sensitivity of WAIS mass balance during warmer-than-present climates (e.g., Pliocene and middle Miocene).

The geological records will recover the distal component of a Neogene latitudinal and depth transect across the continental shelf and rise, with previous ANDRILL and DSDP Leg 28 sites comprising the ice-proximal component. This transect approach follows the SCAR Geoscience PAIS Past Antarctic Ice Sheet dynamics program strategy and will allow for assessment of oceanic drivers of marine ice sheet instabilities.

The objectives of Expedition 374 are to 1) Evaluate the contribution of WAIS to far-field ice volume and sea level estimates; 2) Reconstruct ice-proximal atmospheric and oceanic temperatures to identify past polar amplification and assess its forcings/feedbacks; 3) Assess the role of oceanic forcing on WAIS stability/instability; 4) Identify the sensitivity of the WAIS to Earth's orbital configuration under a variety of climate boundary conditions; 5) Reconstruct eastern Ross Sea bathymetry to examine relationships between seafloor geometry, and ice sheet stability/instability. We will present the initial scientific results that resulted from this expedition, with a focus on the paleoenvironmental reconstructions obtained from the sedimentological, geochemical and paleontological datasets