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## **IODP Exp. 374 provides clues into the Antarctic Ice Sheet contribution to sea level changes**

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The five sites drilled during International Ocean Discovery Program (IODP) Expedition 374 recovered the distal geological component of a Neogene latitudinal and depth transect across the Ross Sea continental shelf, slope and rise, that can be combined with previous records of ANDRILL and the Deep Sea Drilling Project Leg 28. This transect provides clues into the ocean and atmospheric forcings on marine ice sheet instabilities and provides new direct constraints for reconstructing the Antarctic Ice Sheet contribution to global sea level change. Site U1521 recovered a middle Miocene record that allows identification of the different processes that lead to the expansion and retreat of ice streams emanating from the East and West Antarctic Ice Sheets across the Ross Sea continental shelf. This site also recovered a semi-continuous, expanded, high-resolution record of the Miocene Climatic Optimum in an ice-proximal location. Site U1522 recovered a Pleistocene to upper Miocene sequence from the outer shelf, dating the step-wise continental shelf-wide expansion and coalescing of marine-based ice streams from West Antarctica. Thin diatom-rich mudstone and diatomite beds were recovered in some intervals that provide snapshot records of a deglaciated outer shelf environment in the late Miocene. Site U1523 targeted a Miocene to Pleistocene sediment drift on the outermost continental shelf and informs about the changing vigor of the eastward flowing Antarctic Slope Current (ASC) through time. Changes in ASC vigor is a key control on regulating heat flux onto the continental shelf, making the ASC a key control on ice sheet mass balance. Sites U1524 and U1525 cored a continental rise levee system near the flank of the Hillary Canyon. The upper ~50 m at Site U1525 belong to a large trough-mouth fan deposited to the west of the site. The lower 100 m at Site U1525 and the entire 400 m succession of sediment at Site U1524 recovered near-continuous records of the downslope flow of Ross Sea Bottom Water and turbidity currents, but also of ASC vigor and iceberg discharge. Analyses of Exp. 374 sediments is ongoing, but following initial shipboard characterization, the initial results of sample analysis, the correlation between downhole synthetic logs and the associated seismic sections provide insight into the ages and the processes of erosion and deposition of glacial and marine strata. Exp. 374 sediments are providing key chronological constraints on the major Ross Sea seismic unconformities, enabling reconstruction of paleobathymetry and assessment of the geomorphological changes associated with Neogene ice sheet and ocean circulation changes. Exp. 374 results are fundamental for improving the boundary conditions of numerical ice sheet, ocean, and coupled climate models, which are critically required for understanding past ice sheet and global sea level response during warm climate intervals. Such data will enable more accurate predictions of ice sheet behavior and sea level rise

anticipated with future warming.