



Southern McMurdo Sound Project (SMS- ANDRILL): overview of Mid Miocene Climatic Optima events and correlations in western Ross Sea, Antarctica

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The ANtartic geological DRILLing Program (ANDRILL), an international collaboration between Antarctic research programs of Germany, Italy, New Zealand and the United States, successfully cored in late 2007 (with 98% recovery) a 1138 meter drill hole that documents an excellent history of high latitude paleoenvironmental conditions and climate/glacial variation during Miocene climatic optimum periods. In addition, fracture mapping, core orientation success, and borehole hydrofracture experiments reveal details regarding the history and current stress regime in the western Ross Sea. We present initial correlations of the AND-2A drillcore to global proxies of sea-level and deep-sea geochemical stratigraphy, guided by a robust chronostrati-graphic framework for the early and middle Miocene. Changes evident in stratigraphic sequences, physical properties (borehole and core), and geochemical logs, record fine details of glacial, climatic, tectonic and eustatic influence in the western Ross Sea help establish through correlation to existing records how local changes evident in the drillcore relate to regional and global events. These records combined with paleontological and geochemical evidence for terrestrial - marine paleotemperatures provide important data input for climate and ice-sheet model reconstructions and testing. An abundance of volcanic materials reveals evolution of the McMurdo Volcanic Group, including episodes of explosive volcanism. Substantial subsidence occurred within the last 2 Ma associated with volcanic loading from Ross Island, reversing the persistent littoral to shallow neritic depths evident through most of the cored sequence. Persistent sediment supply into western Victoria Land Basin during a steady phase of thermal subsidence produced a thick stratigraphic sequence from which we are reconstructing the details of paleoclimatic, eustatic and glacial variations on the shallow marine coast of the Transantarctic Mountains.