# 242-16 - IMPLICATIONS OF GEOCHEMICAL ANALYSIS OF ODP SITE 696 ON GLACIATION OF WEST ANTARCTICA DURING THE EOCENE-OLIGOCENE TRANSITION


## Abstract

The Eocene - Oligocene transition (EOT) which occurred roughly 34 million years ago marked a climatic shift from greenhouse conditions to icehouse conditions on Earth. Oxygen isotope records from this period indicate a time of major cooling and ice growth, however, the development of the continental scale ice sheet is still poorly understood. This study seeks to determine the provenance and sediment transport paths of marine sediments from the South Orkney Microcontinent (SOM) to provide understanding into the evolution of the West Antarctic Ice Sheet during the Earth's transition from greenhouse to icehouse conditions. Sediments recovered from the Ocean Discovery Program Site 696 off the SOM in the Weddell Sea constitute the only relatively complete record spanning the EOT near West Antarctica. Inductively Coupled Plasma - Mass Spectrometry analysis was carried out on samples from an interval of 645 – 549 mbsf, which ranges in age from ~37 to 33 Ma. The bulk chemistry obtained from this analysis can be used to provide insight into the source material of the sediments when compared to information known about the geology of Antarctica. Elemental data indicates that the samples decrease in both Zr and Hf enrichment across the EOT. Additionally, trace and rare earth elemental ratios of the samples resemble those of material from the Antarctic Peninsula (AP). Zr/Rb ratios, which are controlled by the relative abundance of chemically and mechanically resistant Zr-bearing minerals, show maxima at ~ 36 Ma and 33.5 Ma. The abundance of these minerals in marine sediment is generally controlled by the mode of sediment transport and hydrodynamic sorting during deposition. Results from ongoing work on quartz surface textures will be included to determine the mode of sediment transport and deposition of sand sized materials. Geochemical and sedimentological characterization of Site 696 sediments is critical for understanding the timing and extent of glaciation in West Antarctica during the Eocene-Oligocene Transition.



Geological Society of America Abstracts with Programs. Vol 52, No. 6, 2020

doi: 10.1130/abs/2020AM-356514



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