

## Greenhouse to Icehouse Antarctic paleoclimate and ice history from George V Land and Adélie Land shelf sediments: IODP mission-specific-platform Expedition 373

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The George V and Adélie Land continental shelf of East Antarctica contains a record of Antarctica's climate and ice history from the warm and vegetated landscapes of Eocene greenhouse climates through latest Eocene glacial inception to today's ice-covered continent. Because Paleogene to Pleistocene seaward-dipping strata are accessible at shallow depths under the sea bed, we can access them with robotic seafloor drills such as MeBo. IODP Expedition 373 plans to carry out this drilling, but is currently postponed until 2023 or later.

The history of this Antarctic margin includes warm-world high-CO<sub>2</sub> environments, which will help understand Antarctic climate and the limits of ice-sheet stability under conditions expected from global warming. In particular, we plan to investigate:

- Antarctica's climate during Early/Middle Eocene greenhouse warmth, including cyclicity, temperatures, and vegetation. We would provide high latitude temperatures address the pole-equator gradient and we will look for evidence for DeConto's permafrost hypothesis for hyperthermals;
- Climate cooling over the late Eocene in advance of main glacial inception. Were there precursor glaciations? What conditions led to Antarctica becoming the ice-covered continent we see today? Up to now there are extremely few well-recovered late Eocene sediment sequences from Antarctica, and we can fill this knowledge gap;
- The timing, environmental conditions, and extent of major ice advance at the Eocene/Oligocene boundary (~34 Ma), and the role of glacial isostatic adjustment (GIA) – e.g., relative sea level rise adjacent to expanding ice sheets;
- Oligocene ice and climate conditions, which are only poorly known.