

## **Antarctic ice sheet excluded from the western Ross Embayment during the earliest Oligocene**

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### **Abstract**

The Antarctic Ice Sheet grew across the Eocene – Oligocene boundary, reaching continental-scale by 33.7 Ma (the Oi-1 oxygen isotope event). However, the sedimentary record from the CRP-3 drillcore indicates grounded ice was not present at the western Ross Embayment continental shelf until the Oi-1a event, almost 1 million years later (Galeotti et al., 2016). Our revised age model for the nearby CIROS-1 drill core confirms that grounded ice was not widespread on the western Ross Embayment continental shelf during the Oi-1 event. However, we also do not observe grounded ice coincident with the later Oi-1a event: we find no evidence of grounded ice at the CIROS-1 core site until still later in the Oligocene. Environmental proxies from the CIROS-1 core, including dinoflagellate cysts, pollen and biomarkers show regional terrestrial and marine conditions changed coincident with the Oi-1 event, in ways that are consistent with the formation of an ice sheet bounded by the adjacent Transantarctic Mountains. This spatial heterogeneity over small distances (<80 km) in the arrival of continental ice to the western Ross Embayment during the earliest Oligocene indicate deposition in this area was likely influenced by the progressive creation of new outlet glaciers draining the interior of East Antarctica.

**Keywords:** Eocene, Oligocene, CIROS-1, Ross Sea

### **References**

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