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Tracking ice-sheet dynamics by detrital provenance Pb-isotope and $^{87}Rb/^{87}Sr$ dating during the Middle Miocene Climatic Transition, Prydz Bay, Antarctica

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Antarctic ice sheet instability is recorded by ice-rafted debris (IRD) in mid- to high-latitude marine sediment, especially throughout icehouse climate transitions. The middle Miocene climatic transition (MMCT), 14.2 to 13.8 Ma, which marks the end of a significant warm period during the mid-Miocene, saw rapid cooling in the high-latitude Southern Ocean [1]. The MMCT is recorded by IRD-rich sediment horizons in deep-sea sediment cores around the Antarctic margin, reflecting iceberg calving during times of ice-sheet instability. Resolving the locations of iceberg calving sites by detrital provenance analysis during the MMCT is important for forecasting effects of anthropogenic climate change, as those are the regions likely to become unstable again.

Here we present results of a multi-proxy provenance study targeting K- and plagioclase feldspar, which are abundant in clastic sediment compared to conventional U-hosting accessory phases (e.g., zircon). K-feldspar incorporates sufficient Rb to be suitable for source terrane fingerprinting by *in-situ* Rb-Sr dating; plagioclase typically incorporates Sr but largely rejects Rb, allowing validation of initial $^{87}Sr/^{86}Sr$ values. Additionally, both phases incorporate Pb at analytically useful concentrations, enabling *in-situ* Pb-isotope analysis. While Pb-isotope fingerprinting is an established method for provenance analysis of glaciogenic sediment [2], the combination with *in-situ* $^{87}Rb/^{87}Sr$ dating is a novel approach.

We apply these techniques to deep-sea core ODP188-1165, recovered ca. 500 km NW from the termination of the Lambert Glacier [3], which receives IRD from the Lambert sector and the Aurora subglacial basin via the Antarctic coastal current [4]. We report data for multiple IRD layers with depositional ages of 13.8 to 16.6 Ma, assessing the implications of our results for ice sheet stability of the Aurora subglacial basin and Lambert Graben.

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