

## Reconstructing the history of the West Antarctic Ice Sheet using sediment provenance techniques

**Supervisors: Prof. Tina van de Flierdt and Dr Jim Marschalek (Imperial College London)**

The marine-based West Antarctic Ice Sheet lies on a retrograde bed slope, making it particularly vulnerable to runaway mass loss. This part of the Antarctic cryosphere is already seeing ice acceleration, thinning, and grounding zone retreat. Whether this ice sheet will decay rapidly over the coming decades or prove more resilient remains the largest contributor to uncertainties in sea level rise projections.

One way we can better predict the future of the West Antarctic Ice Sheet is by using the sedimentary record to better understand how it has responded to environmental change in the geological past. Ice sheet extent and flow patterns can be reconstructed using sediment provenance techniques, which identify the geochemical 'fingerprint' of geological source regions in sediments.

This studentship will focus on analysing the sediment provenance of new sedimentary records collected as part of the Sensitivity of the West Antarctic Ice Sheet to 2°C warming (SWAIS2C) project (<https://www.swais2c.aq/>). This international collaboration seeks to detect West Antarctic Ice Sheet



retreat from new sediment cores from beneath Kamb Ice Stream (2024/2025), near the centre of the West Antarctic Ice Sheet, and Crary Ice Rise (2025/2026).

Results from SWAIS2C sediment analyses will be compared to those collected from recent ship-based drilling by the International Ocean Discovery Program in the Ross Sea.

You will conduct radiogenic isotope analyses in the MAGIC (Mass Spectrometry and Isotope Geochemistry at Imperial College London) laboratories at Imperial College London, co-led by Prof. Tina van de Flierdt. These analyses will be complemented by geochronology (and thermochronology) work via established collaborations with the London Geochronology Centre (University College London) and the Argon Geochronology for Earth Sciences (AGES) laboratory at Lamont-Doherty Earth Observatory (Columbia University).

You will be part of a large international project, open opportunities for networking with a large number of collaborators both in the UK and around the world.

The position would suit students with backgrounds in geochemistry, geology and Earth Sciences and will be based at Imperial College London.

If you require further information, please get in touch by sending a short CV to Jim Marschalek ([jwm17@ic.ac.uk](mailto:jwm17@ic.ac.uk)) or Tina van de Flierdt ([tina.vandeflierdt@imperial.ac.uk](mailto:tina.vandeflierdt@imperial.ac.uk)).

Please note that Tina van de Flierdt will be leading the SWAIS2C fieldwork from mid-November 2024 to mid-February 2025. She will be out of email contact during this time and all correspondence should be directed to Jim Marschalek.