ANNUAL REPORT ON GEOTRACES ACTIVITIES IN AUSTRALIA

May 1st, 2024 to April 30th, 2025

New GEOTRACES or GEOTRACES relevant scientific results

- New manuscript to be submitted by Dr Tom Williams, University of Tasmania on *Drivers of Dissolved Thorium Isotope Distributions along the Adélie Land Margin, East Antarctica: The Roles of Reversible Scavenging, Conservative Transport, and Lithogenic Supply* showing the highest concentrations of dissolved 232Th observed in the global ocean (GEOTRACES IDP, 2021) reflecting the strong dissolved lithogenic Th flux from the Antarctic shelf sediments and/or glacial meltwater.

GEOTRACES or GEOTRACES relevant cruises

- The Denman Marine Voyage, East Antarctica was completed during 1 March to 2 May 2025 with 60 scientists onboard and 40 ships crew and operations technicians. It was the first scientific voyage carried out on the new Australian icebreaker RSV *Nuyina*. Several different organisations were involved including Australian universities, the Australian Antarctic Division (AAD) and the Commonwealth Science Industry Research Organisation (CSIRO). There were multiple voyage objectives relating to understanding the history of the Denman Glacier, the drivers of ice mass changes and ecological diversity. We also collected new data on the eastern side of the Shackleton Ice Shelf to investigate the satellite-based observations of differences in biological productivity between Denman Glacier and Shackleton regions.
- We collected samples for the GEOTRACES process study GPpr17. There were 26 TMR deployments, 9 multicore stations, and two process stations in each of the Denman and Shackleton regions where insitu pumps collected particles in the water column, and multiple TMR deployments allowed for incubation experiments.
- Our initial ship-based observations showed

A wrap-up video can be viewed here: https://youtu.be/tbnl7M4kZTk

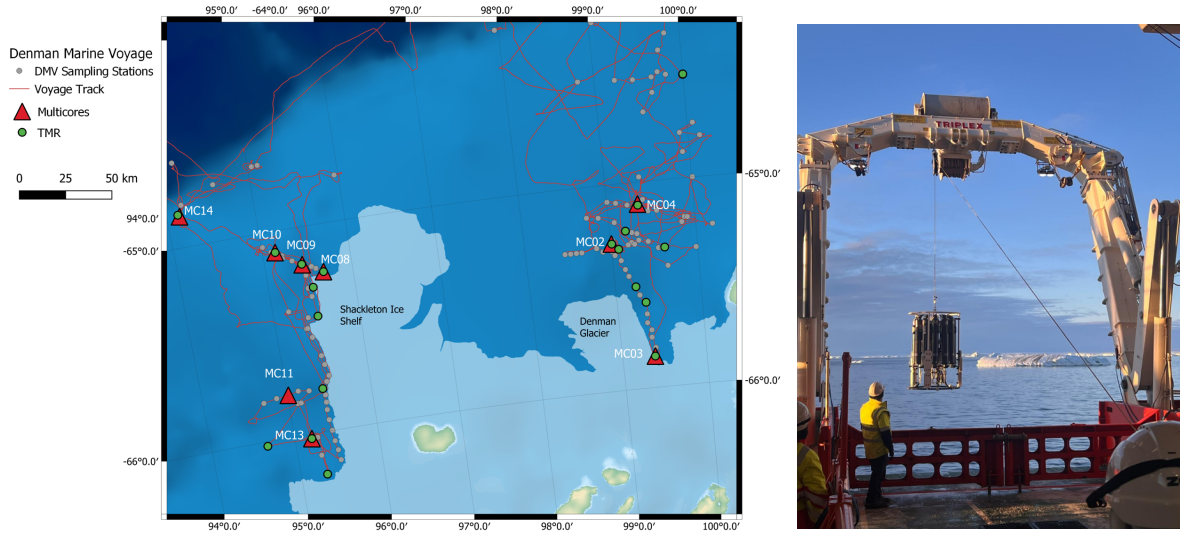

Figure 1: Left: Map of the Denman-Shackleton region showing the location of all the sample stations, and highlighting the location of the TMR and multicore deployments. The other stations not distinguished (orange circles) were either CTD, beam trawl or towed camera deployments. Right: TMR deployment off the A-Frame.

New projects and/or funding

- A follow up voyage *Multidisciplinary Investigations of the Southern Ocean (MISO-2): Linking physics, biogeochemistry, plankton, aerosols, clouds, and climate* will take place **Jan-Mar 2027** on the RV Investigator led by S. Rintoul (CSIRO).

GEOTRACES workshops and meetings organised

- N/A

Outreach activities conducted (please list any outreach/educational material available that could be shared through the GEOTRACES web site) *(We are particularly interested in recordings from webinars from GEOTRACES research)*

- There are videos relating to the Denman Marine Voyage on the Australian Antarctic Program Partnership website here Denman Marine Voyage - AAPP

  and more images, videos and blogs on the Australian Centre of Excellence in Antarctic Science (ACEAS) website DMV - ACEAS

Other GEOTRACES activities

- N/A

New GEOTRACES or GEOTRACES-relevant publications (published or in press) *(If possible, please identify those publications acknowledging SCOR funding)*

Hassler, C. S., Simó, R., Fawcett, S. E., Ellwood, M. J., & Jaccard, S. L. (2025). Marine biogenic humic substances control iron biogeochemistry across the Southern Ocean. *Nature Communications* , *16*(1). https://doi.org/10.1038/s41467-025-57491-5

Hird, C., Perron, M. M. G., Holmes, T. M., Meyerink, S., Nielsen, C., Townsend, A. T., de Caritat, P., Strzelec, M., & Bowie, A. R. (2024). On the use of lithogenic tracer measurements in aerosols to constrain dust deposition fluxes to the ocean southeast of Australia. *Aerosol Research*, *2*(2), 315–327. https://doi.org/10.5194/ar-2-315-2024

Maharaj, P. P. P., Barrett, P. M., & Ellwood, M. J. (2025). Biogeochemical cycling of dissolved Cu along the East Australian Current. *Marine Chemistry*, *268*. https://doi.org/10.1016/j.marchem.2024.104481

Strzepek, R. F., Latour, P., Ellwood, M. J., Shaked, Y., & Boyd, P. W. (2025). Microbial competition for iron determines its availability to the ferrous wheel. *ISME Journal*, *19*(1). https://doi.org/10.1093/ismejo/wraf015

Traill, C. D., Rohr, T., Shadwick, E., Schallenberg, C., Ellwood, M., & Bowie, A. (2025). Coupling Between the Subantarctic Seasonal Iron Cycle and Productivity at the Southern Ocean Time Series (SOTS). *AGU Advances*, *6*(3), e2024AV001599. https://doi.org/https://doi.org/10.1029/2024AV001599

Please indicate if there is any forthcoming or planned GEOTRACES special issue publication

- N/A

Completed GEOTRACES PhD or Master theses *(please include the URL link to the pdf file of the thesis, if available)*

- S. Wang. *Using thorium isotopes to assess the impact of dust in the Indian sector of the Southern Ocean*. Honours Thesis. University of Tasmania. Supervised by Taryn Noble and George Rowland

GEOTRACES presentations in international conferences

- N/A

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