

Ph.D. Graduate Student Opportunity in Geochemistry and Oceanography

Iron inputs to the Ross Sea, Antarctica in a warming world

We are seeking an enthusiastic and motivated student to undertake a PhD project investigating iron inputs to the Ross Sea and its interactions with marine productivity and atmospheric CO₂ in a warming world.

Supervisors: Prof. Claudine Stirling - Department of Geology, U. Otago
Prof. Cliff Law – NIWA and Department of Marine Science, U. Otago
Prof. Michael Ellwood – Research School of Earth Sciences (RSES), ANU, Australia
Dr Matthew Druce – Department of Geology, U. Otago

Overview

Primary production by phytoplankton in the Ross Sea is critical to maintaining the productive ecosystems and significant carbon sink that characterise this region of the Southern Ocean. Phytoplankton primary production in the Southern Ocean is controlled by the availability of light and the micronutrient iron, and consequently the distribution and sources of dissolved iron are an important determinant of regional productivity.

This PhD project will characterise the distribution of dissolved iron in coastal and open ocean surface waters of the Ross Sea and relate iron concentration and isotopic signature to other parameters to establish the regional sources and patterns of dissolved iron availability. This information will inform projections of future dissolved iron availability and its impact on productivity and carbon export. This PhD project will involve close collaboration between U. Otago, NIWA and the ANU.



The project uses clean-room geochemistry and ICPMS-based mass-spectrometry to quantify the concentrations and isotopic signatures of iron and other trace metals in Ross Sea waters. These datasets will be incorporated into a coupled physical-hydrodynamic model, involving collaboration with modelers. The project involves an investigation of already-collected Antarctic water samples, and potential participation in a follow-up Antarctic sampling campaign in 2023.

Requirements and how to apply

Applicants with a strong background in the geosciences, marine sciences, chemistry, or related discipline at the BSc(Hons) or MSc level, are encouraged to apply. Selection is contingent on receiving a competitive U. Otago Doctoral Scholarship (NZ\$27,000 per year for 36-months, tax free with a fee waiver). This PhD project forms part of the '*Antarctic Science Platform*' funded by MBIE. Both New Zealand and Australian students are encouraged to apply.

Applicants should submit a cover letter, complete CV (including academic transcripts), and the names and contact information of at least two referees in a single pdf file by email to: claudine.stirling@otago.ac.nz.

Contact Prof Cliff Law (E: cliff.law@niwa.co.nz) or Prof Claudine Stirling for further information about the project. Information about Geology and Marine Science at U. Otago, RSES at ANU and NIWA can be found at <https://www.otago.ac.nz/geology>, <https://www.otago.ac.nz/marinescience>, <https://earthsciences.anu.edu.au>, and <https://www.niwa.co.nz>.