

PhD opportunity: Carbonate chemistry and alkalinity dynamics in the coastal ocean (Chemical Oceanography/Biogeochemistry)

Supervisors:

Dr. Sebastiaan van de Velde (University of Otago & Earth Sciences New Zealand)

<https://www.otago.ac.nz/marinescience/people/staff/sebastiaan-van-de-velde>

Prof. Christina McGraw (University of Otago)

<https://www.otago.ac.nz/chemistry/people/associate-professor-christina-mcgraw>

Location: University of Otago, Department of Marine Science, Ōtepoti Dunedin, Aotearoa New Zealand

Closing date: When position is filled

About the project

The Department of Marine Science at the University of Otago (Aotearoa New Zealand) and Earth Sciences New Zealand (ESNZ) seek applicants for a PhD study on coastal ocean alkalinity dynamics to start August 2026 or soon thereafter.

We are looking for a motivated PhD candidate to work within the broader '*Catching Marine Carbon: testing ocean solutions for climate mitigation using natural analogues*' project, which aims to develop a monitoring, reporting, and verification framework for marine carbon dioxide removal technologies within Aotearoa. Alkalinity determines how much carbon dioxide can be stored in the ocean, yet the alkalinity sources to the ocean and how these sources change with environmental changes (e.g. ocean acidification, ocean alkalinity enhancement) are poorly constrained. The candidate's role is to apply measurements of stable carbon isotopes to advance our understanding of carbonate chemistry dynamics in the ocean.

About the position

This PhD project will focus on the use of stable carbon isotope (^{13}C) measurements for studying marine carbonate chemistry. The successful candidate will regularly participate in research cruises on the east Otago shelf and occasionally in other coastal areas around Aotearoa, collect and process seawater samples, and determine carbonate chemistry parameters and their isotope signatures.

We seek a candidate with a background in marine science, biogeochemistry, physics, or related fields. The selected candidate will be jointly supervised by Dr. Christina McGraw and Dr. Sebastiaan van de Velde.

- You are highly motivated to conduct research within an international and interdisciplinary team of researchers, and thus build a professional network and academic career;
- You will perform fundamental research within the domain of marine biogeochemistry and chemical oceanography;
- You prepare and participate regularly in sampling campaigns at sea.
- You have a strong interest in marine biogeochemistry;
- You are willing to participate in research cruises with lengths of a few days to a few months;

Profile and qualifications

We are looking for a flexible and creative person, who is highly motivated to tackle new and complex questions at the interface between physics and geochemistry.

- You hold a masters (MSc) and/or BSc (Hons) degree - or are expected to have one before the starting date of the position - in **marine science, biogeochemistry, physics, or a related discipline in the Natural Sciences**, and have a strong interest in cross-disciplinary research;
- Candidates who have experience with carbonate system and/or isotopic measurements are particularly encouraged to apply.
- You are creative, possess excellent organisational skills, and have a cooperative mindset;
- You are an excellent team player, and enthusiastic to learn new technologies;
- An international candidate (i.e., non-NZ or non-Australian) will be required to apply for an NZ student visa to be allowed to study in NZ.
- Where English is not an applicant's first or native language, evidence of English language proficiency that meets the requirements for Postgraduate Study at the University of Otago (<https://www.otago.ac.nz/study/entry-requirements/language-requirements>) will be required.

We offer

- A fully funded 3-year PhD scholarship, which includes a tax-free stipend / scholarship of NZ\$35,000 per year and a full university tuition fee waiver;
- An interdisciplinary work environment in the 'Centre for Oceanography' which combines experts from both Earth Sciences New Zealand and the University of Otago;
- Access to state-of-the-art carbonate chemistry analytical facilities, including the capacity to analyze ^{13}C isotopes from solid and dissolved carbonates;
- Access to a marine field station equipped with experimental facilities, including climate-controlled rooms;
- Opportunities to participate in sea-going expeditions;

Want to apply?

- Applications should be sent by email to sebastiaan.vandavelde@otago.ac.nz (subject: candidature RP-PhD) and should include
 - a cover letter specifying the motivation to apply for the position (max. 2 pages)
 - a short CV, including an abstract of the thesis
 - a copy of your academic transcripts
 - contact details of 2 referees
- The position will remain open until it is filled
- Shortlisted candidates will be invited for an interview
- For informal inquiries, please contact Dr. Sebastiaan van de Velde (sebastiaan.vandavelde@otago.ac.nz)

The **Department of Marine Science** was established in 1992, but we have a long history of marine research and teaching at the University of Otago. We are a multidisciplinary department with research strengths across the spectrum of marine sciences. We host the ESNZ national carbonate chemistry facilities. Information about the Department of Marine Science, its staff, current teaching and research, can be obtained from <http://www.otago.ac.nz/marinescience>.

Earth Sciences New Zealand (ESNZ) is a Crown Research Institute in New Zealand. It specializes in environmental research and consultancy in water, atmospheric, and marine sciences. Established in 1992, ESNZ focuses on providing scientific knowledge and solutions for environmental management, sustainable resource use, and understanding climate and weather patterns. Its work supports decision-making in areas such as climate change, biodiversity conservation, water quality, and natural hazard resilience. ESNZ operates specialized computing facilities, research vessels, atmospheric monitoring facilities, and a network of environmental monitoring stations across New Zealand. Further information about ESNZ is available from [Earth Sciences New Zealand](http://www.esnz.co.nz).