

PhD Position

Ocean impacts on New Zealand climate prediction

Description

The School of Environment at the University of Auckland is seeking a highly motivated PhD student to join the new Te Moana Mahana research team. This PhD is funded by the MBIE Endeavour Research Programme “Te Moana Mahana” and will support the activities of the Regional Ocean Work Package. The PhD project would develop research to understand predictive capabilities from ocean temperatures and salinities on weather and climate in New Zealand. The project would utilise existing data sets, new ocean reanalyses and simulation output to investigate the connections between the ocean and atmosphere impacting New Zealand.

You will be based at the University of Auckland and will travel to Wellington to work with supervisors at Earth Sciences New Zealand for short periods. In addition, you will become part of the University of Auckland/ESNZ Joint Graduate School in Coastal and Marine Science <https://www.auckland.ac.nz/en/science/our-research/jgs-coastal-and-marine-science.html>.

You'll join a collaborative team of ocean and climate scientists working across observations and modelling, over a range of scales relating to New Zealand's ocean and climate. The project offers access to supercomputing resources and simulation archives. The project includes links to government, Māori, industry, and international partners.

The PhD project will focus on regional climate predictability from ocean observations. The initial focus will be on temperature prediction using a new dataset of ocean observations to assess times, regions and variables associated with enhanced predictability. In addition to observations, regional and climate simulations are available to develop and test further hypotheses.

Candidate Requirements

- MSc/First-class Honours (or equivalent) in some form of environmental science – particularly physical oceanography, climate science, or atmospheric science.
- Demonstrated interest in climate/ocean dynamics and predictability.
- Aptitude for working with observational data.
- Demonstrable skills in Python or Matlab for quantitative analysis.
- Good communication and writing skills

What we offer

- Full PhD scholarship for 3.5 years (fees + stipend, subject to funding conditions). Please note the scholarship will not be extended beyond this.
- Access to world-class research facilities and mentorship.
- Opportunity to be part of a major research project funded by the New Zealand Ministry of Business, Innovation and Employment.
- Opportunities to collaborate with leading researchers in New Zealand and internationally.

- The successful candidate will also engage with the community of doctoral students in the ESNZ-UoAKL Joint Graduate School in Coastal and Marine Science.
- You will be supervised by Assoc. Prof [Melissa Bowen](#), Dr. Emily Gordon and Dr. Phil Sutton.

Application process

Interested applicants should email the following to Assoc. Prof. Melissa Bowen (m.bowen@auckland.ac.nz):

1. A cover letter (1 page max) outlining:
 - a. The reason for your interest in the topic.
 - b. The reason for your interest in undertaking a PhD.
 - c. Any relevant prior experience (professional and/or academic) in the field of research.
2. Curriculum Vitae including:
 - a. Any prior professional, industry and/or academic experience.
 - b. Any prior collaboration with research activities.
 - c. The details and links on any publications.
3. Full academic transcripts.
4. Contact details of two academic referees.

Please include the following in the email subject “ TeMoMa Doctoral Application”. Any email received without this subject will not be considered.

A selection panel comprising three representatives from the project team will assess all applications.

Shortlisted applicants will be invited to an online interview.

Key dates

- **Closing dates for applications:** 15 September, 4:00pm NZDT.
- **Early-September 2026:** interviews with shortlisted candidates.
- **End-September 2026:** candidate selected.
- **Candidature commencement date:** ideally March 2027.

Contacts

For academic information about the PhD and the MBIE Research scholarship opportunity, please contact Assoc. Prof. Melissa Bowen (m.bowen@auckland.ac.nz).

Additional information on the “Te Moana Mahana” MBIE Endeavour Programme

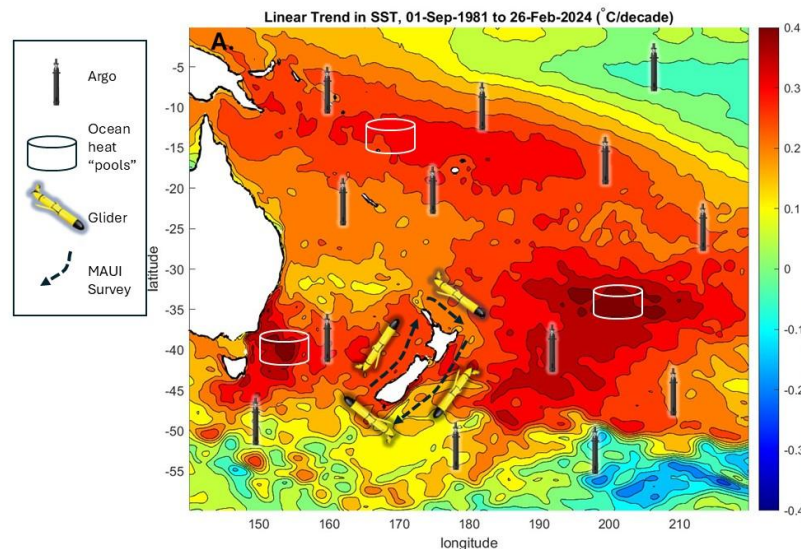
The oceans around Aotearoa New Zealand are, in some regions, warming at a rate well more than the global average. In addition to increased background warming, the most recent IPCC report on impacts provides high confidence that this region will become increasingly vulnerable to extreme ocean temperature events—marine heatwaves (MHWs), at a range of spatio-temporal scales. Model projections show that distributions of warming will broaden to more intense, longer and more frequent MHWs in the future, with the amount of change dictated by the emission scenario.

Te Moana Mahana will provide new information on the current and likely future state of the ocean surrounding Aotearoa New Zealand (AONZ) to help government and communities make the best decisions about how we use and interact with oceans as they change. Our project brings together oceanographers and atmospheric and social science experts from multiple domestic and international organisations. Using novel ocean instruments, computer simulations, and new analytical techniques our project will assess:

- Future coastal ocean temperatures and marine heat waves
- Changes in extreme weather events due to the changing ocean
- Coastal ocean thermal refugia and hot spots
- Forecasting ocean surface temperatures

We will investigate how communities understand and make decisions about changing ocean and weather. We will empower national, region and local organisations with climate and ocean decisions by:

- Creating new weather and climate forecasting and projections.
- Ascertaining changes to extreme weather from ocean heating.
- Evaluating future impacts of the changing ocean and atmosphere on the coastal ocean.
- Offering new insight into solutions for ocean planning and management.



The warming ocean around New Zealand (see Sutton & Bowen 2019).

Further Reading

Bowen, M., J. Markham, P. Sutton, X. Zhang, Q. Wu, N. T. Shears, and D. Fernandez, 2017: Interannual Variability of Sea Surface Temperature in the Southwest Pacific and the Role of Ocean Dynamics. *J. Climate*, **30**, 7481–7492, <https://doi.org/10.1175/JCLI-D-16-0852.1>.

Fernandez, D., Bowen, M., & Sutton, P. (2022). South Pacific Ocean dynamics redistribute ocean heat content and modulate heat exchange with the atmosphere. *Geophysical Research Letters*, **49**, e2022GL100965. <https://doi.org/10.1029/2022GL100965>

Gordon, E. M., & Barnes, E. A. (2022). Incorporating uncertainty into a regression neural network enables identification of decadal state-dependent predictability in CESM2. *Geophysical Research Letters*, **49**, e2022GL098635. <https://doi.org/10.1029/2022GL098635>

Sutton, P. J. H., & Bowen, M. (2019). Ocean temperature change around New Zealand over the last 36 years. *New Zealand Journal of Marine and Freshwater Research*, **53**(3), 305–326. <https://doi.org/10.1080/00288330.2018.1562945>

Shears, N. T., Bowen, M. M., & Thorat, F. (2025). Long-term warming and record-breaking marine heatwaves in the Hauraki Gulf, northern New Zealand. *New Zealand Journal of Marine and Freshwater Research*, **59**(5), 1678–1689. <https://doi.org/10.1080/00288330.2024.2319100>