

PhD Position

Aotearoa shelf seas ocean heatscape

Description

The Department of Physics at the University of Auckland is seeking a highly motivated PhD student to join the new Ike Moana Mahana research team. This PhD is funded by the recently activated 2025 MBIE Endeavour Research Programme “Te Moana Mahana” and will support the activities of the Ocean Heatscape Work Package. The PhD project would develop research looking to map and understand evolution in ocean temperatures in the shelf seas around New Zealand with opportunities to work with sampling, data analysis and modelling aspects but with an emphasis on new observational approaches using underwater gliders.

You will be based at Earth Sciences New Zealand (Earth Sciences New Zealand – previously NIWA) in Wellington, New Zealand, and enrolled through the University of Auckland’s PhD programme in the Physics Department (where you can visit for periods of time if required by the project). 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 observation, modelling, and AI over a range of scales relating to New Zealand’s oceans. The project offers access to a pool of oceanographic equipment and infrastructure as well as supercomputing resources and simulation archives. The work will include development of links to government, Māori, industry, and international partners.

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.
- Skills in, or interest in obtaining such skills, operating oceanography instruments.
- 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 Prof. [Craig Stevens](#) and Assoc. Prof [Melissa Bowen](#).

Application process

Interested applicants should email the following to Prof Craig Stevens (craig.stevens@earthsciences.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 "FUI-WG2 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:** 30 June 2026, 4:00pm NZDT.

Contacts

For academic information about the PhD and the MBIE Research scholarship opportunity, please contact Prof Craig Stevens (craig.stevens@earthsciences.nz).



An underwater glider.

Additional information on the “Ike Moana Mahana” MBIE Endeavour Programme and the Maui Ocean Heatscape Mission

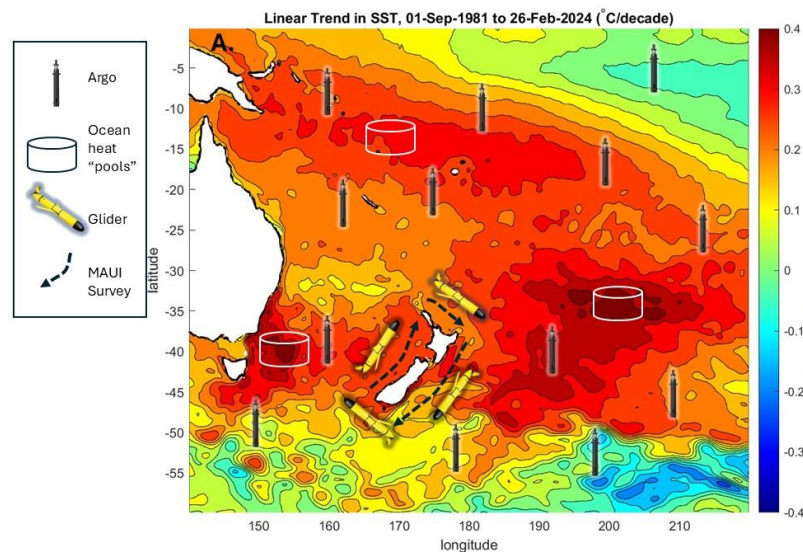
The oceans around Aotearoa New Zealand are, in some regions, warming at a rate well in excess of the global average. In addition to increased background warming, the most recent IPCC report on impacts provides high confidence that this region will become increasingly vulnerable to extreme ocean temperature 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.

Ike 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:

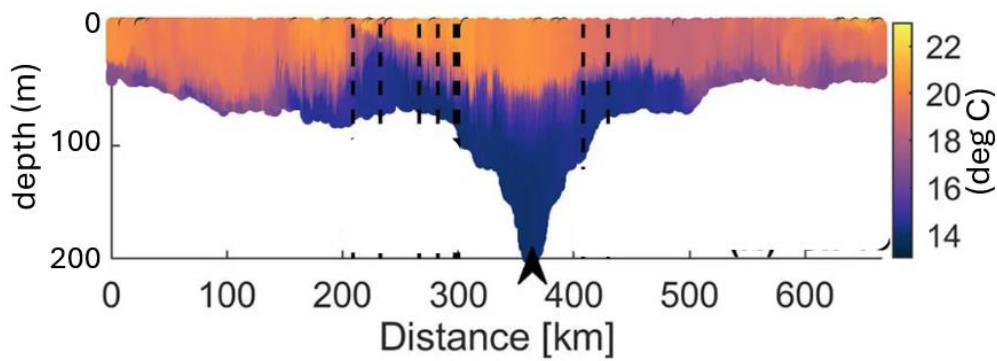
- Creating new weather and climate forecasting and projections.
- Ascertaining changes to extreme weather from ocean heating.
- Evaluating future impacts of the changing ocean and atmosphere on the coastal ocean.
- Offering new insight into solutions for ocean planning and management.



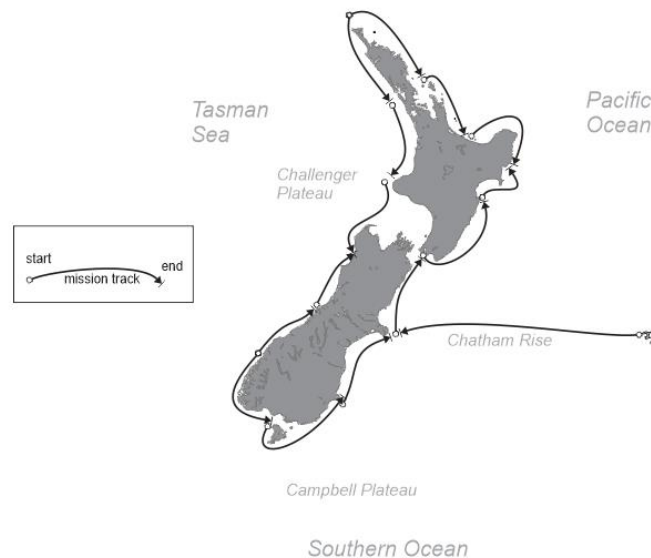
The warming ocean and a glider-survey (see Sutton & Bowen 2019).

To do this we are embarking on the **Maui Ocean Heat Content Mission** using underwater ocean drones to survey the heat pool around our island nation in stages over the next few years. Each stage will map seawater temperature and salinity as well as biogeochemical properties in each region of our continental shelf seas. While background conditions will change over this time, the survey will be interpreted using additional data from in situ observations, satellites and ocean simulations.

Each mission will involve working with local communities to launch the glider, then over the following month the robot is piloted remotely by our ocean glider team based in Te Whanganui-a-Tara Wellington. They are able to manage weather and instrumentation issues and guide the vehicle to gather the best dataset possible and bring the instrument in close to shore for pick up by a second vessel - again from a local community.



Example temperature map from a glider in an Aotearoa New Zealand coastal region.



General structure of glider missions planned for the coming years.

The **Maui Ocean Heat Content Mission** will provide a map of the coastal “heatscape” around Aotearoa. It will provide a guide for future surveys to capture the evolving heating patterns as they emerge. This will empower national, region and local organisations with the evidence to make informed decisions about climate and the marine environment. The data from the missions will be made openly available to enable anyone to benefit from the measurements.

Further Reading

Benthuyssen, J.A., et al. 2025. Observing marine heatwaves using ocean gliders to address ecosystem challenges through a coordinated national program. In *Frontiers in Ocean Observing: Marine Protected Areas, Western Boundary Currents, and the Deep Sea*. E.S. Kappel, V. Cullen, G. Coward, I.C.A. da Silveira, C. Edwards, T. Morris, and M. Roughan, eds, *Oceanography* 38(Supplement 1):22–25, <https://doi.org/10.5670/oceanog.2025e101>.

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., & Thoralf, 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>

Stevens, C. L., O’Callaghan, J. M., Chiswell, S. M., & Hadfield, M. G. (2021). Physical oceanography of New Zealand/Aotearoa shelf seas – a review. *New Zealand Journal of Marine and Freshwater Research*, 55(1), 6–45. <https://doi.org/10.1080/00288330.2019.1588746>