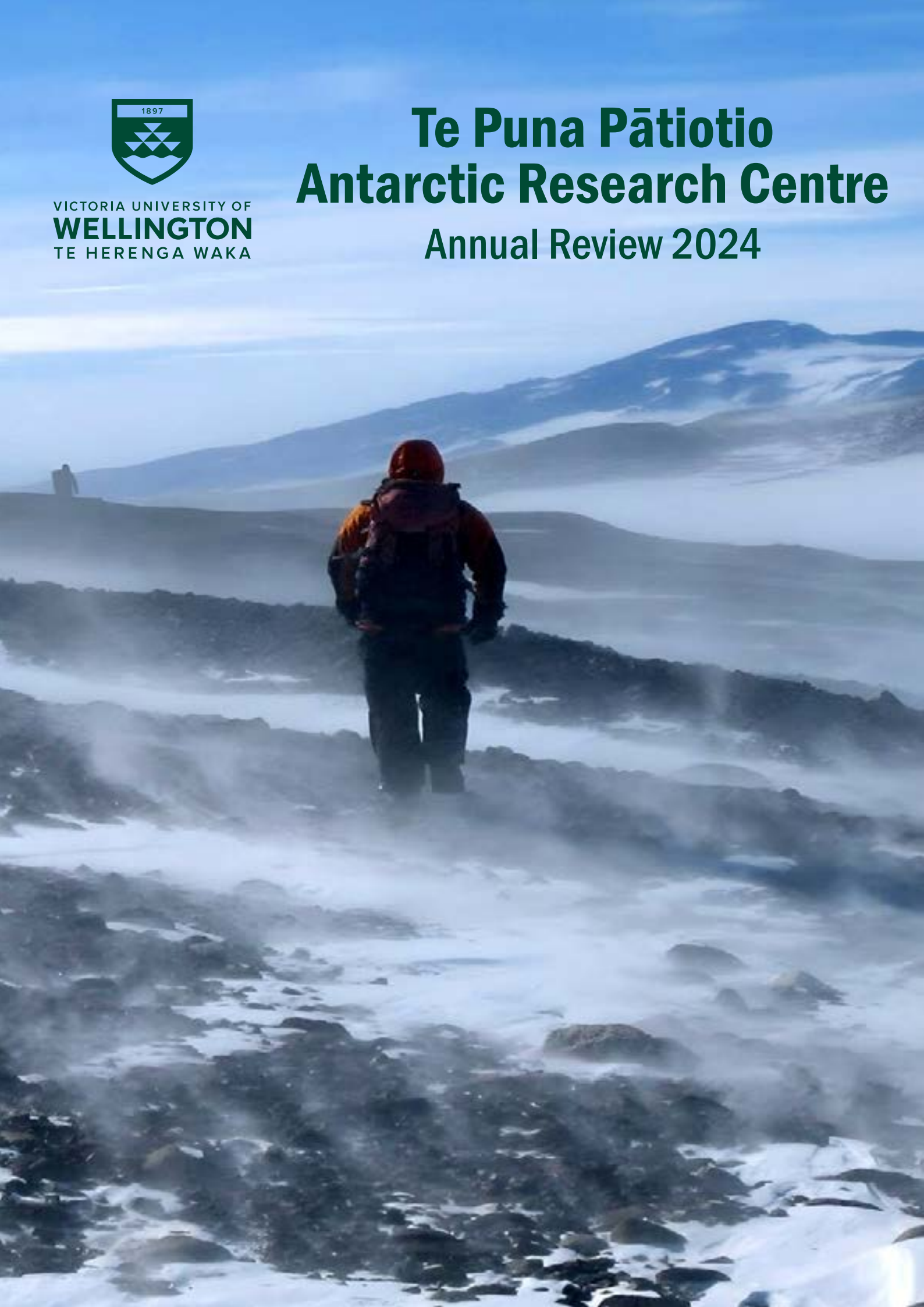
VICTORIA UNIVERSITY OF WELLINGTON
TE HERENGA WAKA

Te Puna Pātiotio Antarctic Research Centre

Annual Review 2024



Improving understanding of Antarctic climate and ice sheet processes, and their impact on New Zealand and the Earth system

Whitehall Glacier, NZ ITASE project, 2006-07
Photo by Nancy Bertler

Victoria University of Wellington Te Herenga Waka | Te Puna Pātiotio Antarctic Research Centre

Contents

Highlights	4
Director's Summary	6
Research Outcomes	8
Science Drilling Office	23
Significant Events	24
Teaching & Supervision	30
Financial Summary	36
Publications & Presentations	38
Media	42
Our People	44

Designed and edited by Anna Bowron.

Cover image by Nick Golledge.

Minna Bluff, western Ross Sea, November 2012. Prof. Richard Levy walking across glacial deposits, in strong Antarctic winds.

Research

Expeditions

Four Antarctic expeditions during the 2024-25 season involving 17 staff and drillers, and 1 PhD student (pages 16-21)

Ocean heat shifts beneath Ross Ice Shelf

caused ice sheet advances thousands of years ago (page 10)

Ice shelf loss and sea-level rise

will be irreversible if tipping points are crossed (page 11)

Location specific sea-level projections

will help build a more resilient NZ to future sea-level rise scenarios (page 15)

Funding

Antarctic Sea-ice Switch

ARC was awarded a Ministry of Business, Innovation and Employment Endeavour Fund to investigate the sharp decline in Antarctic sea ice (page 13).

External research revenue

A total of $7.44 million in internal research revenue to support high-impact science led by the ARC (page 36)

Ngā Puanga Pūtaiao Fellowship

Awarded to Dr Alex Winter-Billington for research on debris covered glaciers and mātaraunga Māori

Marsden Fund project

Awarded to Associate Prof. Natalie Robinson for research on oceanography beneath the Ross Ice Shelf

Awards

Hamilton Award
Royal Society Te Apārangi

Early Career Research Excellence Award for Science awarded to Dr Bella Duncan (page 32)

Royal Society Te Apārangi Fellow

Prof. Nick Golledge elected to the Academy of the Royal Society Te Apārangi (page 32)

WCRP Chair

Prof. Tim Naish elected as Chair of the World Climate Research Programme(page 33)

International Glaciological Society Award

Dr Lauren Vargo awarded Early Career Scientist Award (page 32)

S.T. Lee Travel Award

Recipients Anika Pinzner and Annegret Pohle travelled from Alaska to the ARC as part of the S.T. Lee exchange programme (page 27)

Engagement

38 publications

in 2024 with ARC staff and student authorship (pages 38-40)

53 talks

given to scientists, politicians, stakeholders, schools and community groups by ARC staff and students (page 40-41)

56 media interviews

given by ARC staff and students on Antarctic and climate related issues (pages 42-43)

DIRECTOR'S SUMMARY

Professor Rob McKay
Director, Te Puna Pātiotio - Antarctic Research Centre

Although it is a tremendous privilege to work in Antarctica, the downsides lie in the personal sacrifices our staff make. This year's field season was another tough one, with the SWAIS-2C project coming agonisingly close to complete success—just hours away from recovering the first long sub-ice geological drill cores in nearly two decades. That success was thwarted by equipment failure, followed by poor weather that prevented critical parts from reaching the drill site in time. This disappointment struck just days before Christmas.

For our staff to deploy for several months—away from family and friends during the holiday season—and not return with the main prize is an incredibly bitter pill to swallow. This is the nature of Antarctica: ever since the heroic age of exploration, it has never been easy, and never will be. We cannot control everything this hostile continent throws at us. Time and again, I'm amazed by the resilience and dedication of polar researchers worldwide when things don't go to plan.

While the year ended with a gut punch for a project that so many people around the world worked tirelessly on, for me it still closed with immense pride and a sense of achievement. With time, the successes have far outweighed the setbacks. As I read this Annual Review, I'm continually impressed by the breadth of work and accomplishments achieved by the entire ARC collective—our academic and professional staff, collaborators, and most importantly, our students.

Even without the long drill cores, the SWAIS-2C team delivered world-leading scientific outcomes that will leave a lasting legacy. Oceanographic measurements and short cores have produced a globally unique dataset that will help constrain how ocean waters interact with the base of the Ross Ice Shelf.

Students and early-career staff sailed into the Ross and Weddell Seas, collected new ice core and snow samples in the Transantarctic Mountains, obtained fresh geophysical datasets from the Ross Ice Shelf, and conducted cutting-edge research on sea ice processes. High-profile papers have explored how sensitive the West Antarctic Ice Sheet is to shifts in oceanic circulation beneath its floating ice shelves. Past shutdowns in heat supply helped regrow the ice sheet during the mid-Holocene epoch, approximately five thousand years ago. While such processes occurred in the past, future modelling suggests they are unlikely to be sufficient to prevent future melting—highlighting the critical need to mitigate carbon emissions to avoid the worst impacts of sea level rise in a warming climate.

Other papers looked beyond Antarctica, investigating the effects of Northern Hemisphere climate change on New Zealand. In particular, the slowdown of major Atlantic Ocean currents—which transport heat between hemispheres—was shown to have significantly impacted New Zealand during the retreat of the last great ice sheets. This raises the possibility that a future collapse of these currents could accelerate warming in New Zealand.

Christmas for the SWAIS-2C drilling team, Kamb Ice Stream, 2023. Photos by Richard Levy (above) and Ana Tovy (left).

We continue to lead the way in delivering multi-disciplinary, multi-institutional research programmes that offer policy-relevant insights into future climate change impacts on New Zealand—most notably through the Our Changing Coast and Antarctic Sea-Ice Switch programmes. These initiatives aim to document the effects of sea level rise on New Zealand's dynamic coastlines and the impacts of the dramatic decline of sea ice in the Ross Sea in recent years.

Our Endowed Development Fund once again supported international engagement and networking opportunities for our students, enabling conference participation and visits to institutes around the world. Our students have led numerous papers and submitted theses that will guide much of our future research direction. The success of our students as they progress into research careers was also highlighted by national and international awards: Bella Duncan received the 2024 Hamilton Prize, and Lauren Vargo was honoured with the 2024 International Glaciological Society Early Career Scientist Award. Both are highly prestigious accolades. Despite the challenges Antarctica and our world face, it remains a profound privilege to work alongside such a talented team of next-generation researchers—helping to tackle these challenges and deliver actionable solutions.

RESEARCH OUTCOMES

OUR RESEARCH APPROACH

Rationale

We are rapidly heading towards a climate that is 2-4°C warmer than present. Ice sheets and oceans take centuries to millennia to fully adjust to climate forcing, and the fundamental changes that we are observing today may be irreversible on human timescales. In order to provide reliable, policy-relevant projections of future climate and sea level, scientists are increasingly relying on computer models. Our Centre has undergone a numerical revolution over the last few decades, and around half of our staff now routinely carry out physics-based computer simulations of past, present and future climate.

We develop confidence in future climate projections if models show skill at simulating present and past climate. Because direct climate and ice sheet observations span the last century at best, reconstructions of past climate conditions provide the only means to assess climate and ice sheet models on their relevant timescales. Furthermore, past climate observations provide insight into the long term "endgame" (equilibrium response), that we will commit our planet to this century based on current warming scenarios. Past climate records also provide insight into the rates and magnitudes of climate and ice sheet changes that may be possible in the near future, and allow the fingerprint of human influences to be identified in the context of natural variability in the climate system.

Outcome-based research

Our research approach is policy-relevant and outcome focused. We aim to improve forecasts of future climate change including their global and New Zealand impacts, for the benefit of humanity. By reducing the uncertainties around future climate and sea-level rise predictions, our cutting-edge research is informing the International Panel on Climate Change (IPCC). Improved understanding of climate change impacts including sea-level rise impacts in the Pacific region provide tangible benefits to all New Zealanders. Our research is leveraged by strong national and international collaborations and partnerships, and world-leading in-house polar drilling technology provided by the Science Drilling Office. We are funded and supported through a range of MBIE, Marsden, and Rutherford programmes, Antarctica New Zealand and private donations.

In summary, our approach involves:

a. Improving our physical understanding and observation of modern climate, ocean, glacier and ice sheet systems.

b. Acquiring past observations of surface temperature, precipitation, atmospheric composition (greenhouse gases and aerosols), ice sheet, glacier, and sea-ice variability, and oceanic conditions from terrestrial, marine, lacustrine and ice core archives.

c. Developing and improving numerical models of climate-ocean-glacier and ice sheet systems, by advancing the physics, and then carrying out sound evaluation of models against modern observations and past climate reconstructions.

d. Using our models to improve future climate simulations, and projections of glacier and ice sheet contribution to sea-level rise, river flows and other changes in the Earth System.

e. We disseminate our research findings through publications in the world's leading scientific journals, and through education, communication and engagement with the public, practitioners and policymakers.

Photo by Ray Dibble, VUWAE27 - 1982-83

The complex dance of ice, ocean, and Earth in West Antarctica

As Antarctic ice melts due to climate change, rising sea levels could displace millions of people by the century's end. A key uncertainty in how quickly the sea level may rise is whether stable regions like West Antarctica's Siple Coast might destabilize. A recent paper published by Dan Lowry and colleagues in *Nature Communications* reveals how ice sheet stability has fluctuated over millennia in this region of West Antarctica.

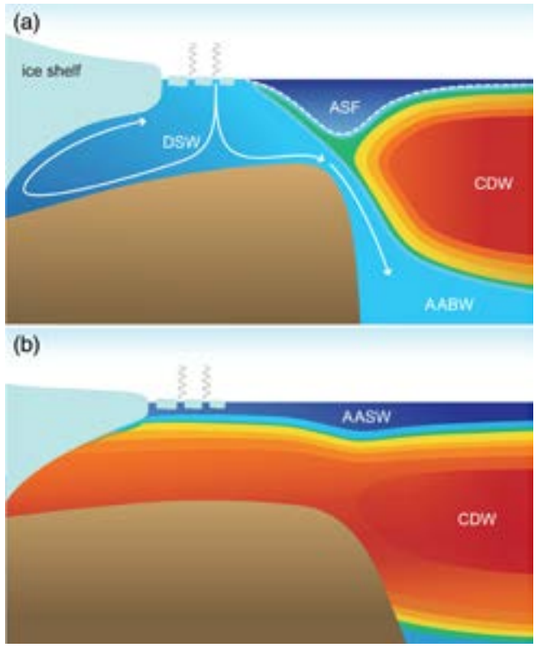
Sediment analysis shows the ice sheet retreated significantly 7,000 years ago, returning to its current position 2,000 years ago. Understanding these shifts is critical for predicting future changes. Two main hypotheses explain this historic behaviour.

The first relates to Earth's crust. As ice sheets shrink, the crust lifts up, and nearby sea levels drop due to reduced gravitational pull between ice and ocean. These changes may have stabilized and advanced the ice sheet.

The second hypothesis focuses on ocean dynamics. Sea ice formation expels salt, creating dense, cold water that sinks and mixes deep into the ocean, blocking warm currents from melting ice shelves. Weaker mixing may have allowed warm waters to melt the Ross Ice Shelf, prompting ice retreat, while stronger mixing coincided with ice advance.

Using computer model simulations of ice flow and crustal uplift under varying ocean temperatures and data from marine sediments and ice cores, the team showed that the most likely cause of these past shifts in the ice sheet were due to changes in ocean dynamics. However, crustal uplift controls how quickly the ice sheet changes when the ocean warms and cools. This means that the ice sheet, the ocean, and Earth's crust are all interacting.

These findings have significant implications for climate policy. Although some believe West Antarctic melting is irreversible, the study highlights the importance of climate mitigation. High emissions could recreate historical conditions of a warm ice shelf cavity, leading to extensive ice loss in a currently stable region of the West Antarctic Ice Sheet. By reducing greenhouse gas emissions and preventing ocean warming, humanity can prevent catastrophic sea-level rise.



(a) Cold dense shelf water blocks warm circumpolar deep water from melting the ice.

(b) Warm circumpolar deep water flows under the ice shelf, causing ice melting and retreat.

AGU, CC BY-SA

Lowry, D.P., Han, H.K., Golledge, N.R., Gomez, N., Johnson, K.M., & McKay, R.M. Ocean cavity regime shift reversed West Antarctic grounding line retreat in the late Holocene. Nat Commun 15, 3176 (2024). https://doi.org/10.1038/s41467-024-47369-3

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Can we stop an ice sheet collapse?

The Amundsen Sea Embayment dominates observed ice loss from the Antarctic continent. Here, the Thwaites "doomsday" Glacier and its vulnerable neighbours are exposed to warm ocean water that flows toward the continent through deep ocean trenches driving melting, thinning and retreat. Observations and models suggest future ocean-driven melting will continue to increase in the absence of climate intervention, potentially unleashing runaway retreat–though some suggest this tipping point may already have been surpassed.

In their study, the National Modelling Hub researchers explored whether these glaciers could recover under future conditions in which warm water is blocked—either through natural variability or human intervention.

Using the BISICLES ice sheet model, the team simulated nearly 200 different future scenarios, each capturing periods of increased ocean-driven melting followed by extended periods of reduced melting due to local ocean cooling. These experiments represent possible futures in which proposed artificial 'geoengineered' submarine walls or shifts in ocean circulation lower sub ice shelf melting across the region.

The results show that strong and sustained reductions in melting can indeed slow down ice loss and promote the re-advance of some glaciers. However, reversing future sea-level rise from this region is another matter. Even under the most optimistic scenario, recovery of the sector would require not only prolonged ocean cooling but also centuries of increased snowfall to replace continuing mass loss.

This study highlights the limits of geoengineering as a solution to ice sheet retreat. While interventions to reduce melting might slow grounding line retreat and the onset of instability, they cannot undo ice loss without long-term changes to the climate. The findings reinforce the urgency of emissions reductions and underscore that geoengineering proposals are no silver bullet.

Alevropoulos-Borrill, A., Golledge, N.R., Cornford, S.L., Lowry, D.P., Krapp, M. Sustained ocean cooling insufficient to reverse sea level rise from Antarctica. Communications Earth Environment 5, 150 (2024). https://doi.org/10.1038/s43247-024-01297-8

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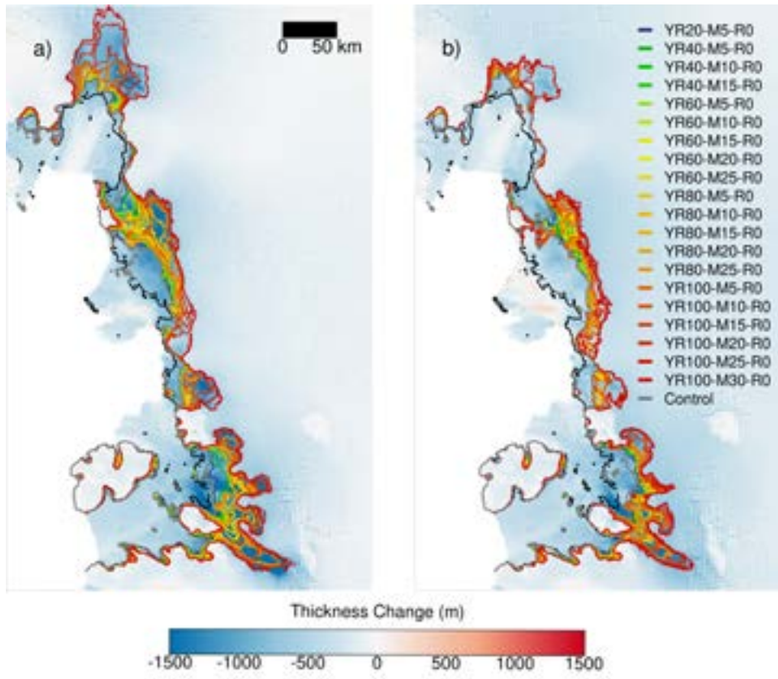

Maps of grounding line positions for each simulation in the initial subset plotted at different time snapshots a) Year 100, b) Year 200. Each line represents a different simulation in the subset which is colour coded with respect to different forcings. The background of the map shows the thickness change for the snapshot year in the high end simulation (YR100-M30) relative to the control.

New Zealand's Atlantic connection

Recent research shows that the Atlantic Meridional Overturning Circulation (AMOC)—a key ocean current that transfers warm surface waters northward—has been weakening and could collapse this century. Such a collapse would dramatically cool parts of Europe but also disrupt climate patterns across the globe.

New Zealand may not seem obviously connected to the North Atlantic, but a recent ARC study led by Shaun Eaves reveals a strong Southern Hemisphere response to past changes in the AMOC. By examining glacier landforms in the Southern Alps and sea surface temperatures from Tasman Sea sediments, the team reconstructed regional climate over the last deglaciation (~20,000–10,000 years ago). It was found that warming in New Zealand began around 18,000 years ago, but a sharp cooling occurred ~14,500 years ago—coinciding with a known AMOC intensification and the Antarctic Cold Reversal.

Glaciers in New Zealand advanced during this cooling, then retreated as warming resumed. Climate model simulations support a fast-acting link: AMOC changes alter the interhemispheric temperature gradient, shifting Southern Hemisphere wind belts that steer ocean currents and storm tracks. These shifts rapidly transmit North Atlantic changes to New Zealand, altering local climate within decades.

This study suggests New Zealand's climate is highly sensitive to AMOC variability. As global warming progresses, a future AMOC collapse could accelerate regional warming in New Zealand—beyond current projections. Understanding these past linkages helps us anticipate how distant climate tipping points may influence our own region, reinforcing the need for global action on climate change.

Eaves, S.R., Mackintosh, A.N., Pedro, J.B., Bostock, H.C., Ryan, M.T., Norton, K.P., Hayward, B.W., Anderson, B.M., He, F., Jones, R.S. and Lorrey, A.M., 2024. Coupled atmosphere-ocean response of the southwest Pacific to deglacial changes in Atlantic meridional overturning circulation. Earth and Planetary Science Letters, 641, p.118802. https://doi.org/10.1016/j.epsl.2024.118802

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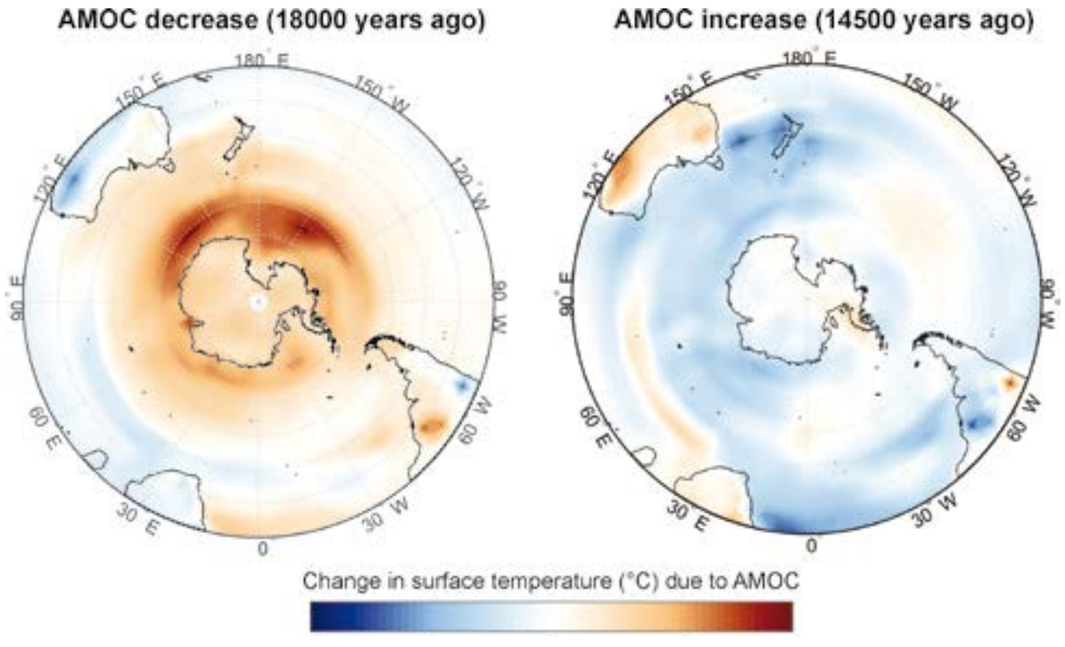


ARC leads ambitious new Endeavour Fund project

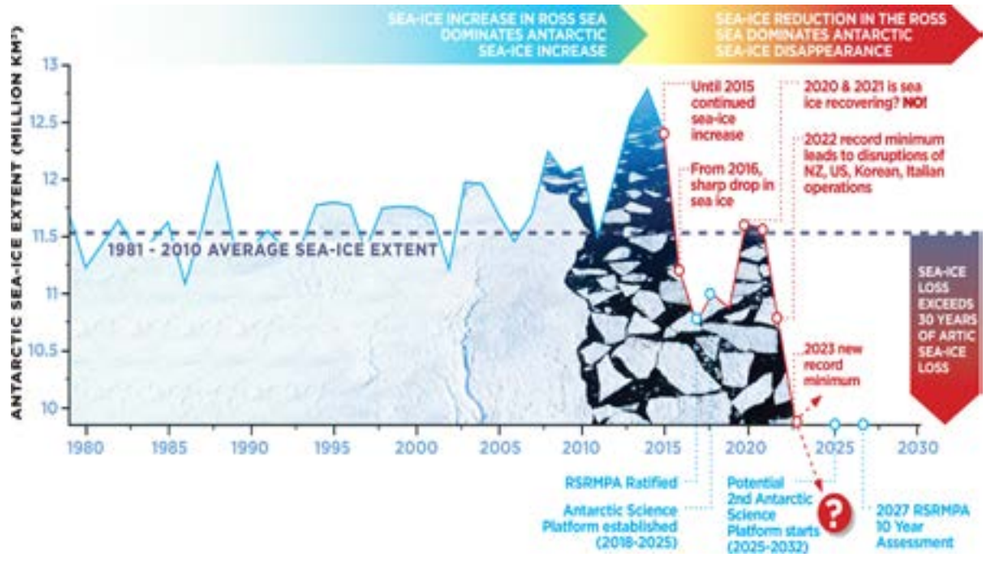
The ARC has received $13.6m funding from the Ministry of Business, Innovation and Employment's Endeavour Fund to support an urgent investigation into the drivers of the unexpected and sharp decline in Antarctic sea ice and its regional and global consequences.

Antarctic Sea-Ice Switch
http:www.seaice.aq

Led by Prof. Nancy Bertler (ARC and GNS Science), Antarctic Sea-Ice Switch—Preparing for New Threats is a five-year research programme, bringing together leading experts from New Zealand, Australia, Canada, France, Italy, Korea, Switzerland, UK, and USA to improve forecasts of future sea-ice trends on global climate, the carbon cycle and sea-level rise. The programme also has a strong marine biology focus, investigating the effects of sea-ice decline on the structure and function of ecosystems in the Ross Sea region Marine Protected Area.

Antarctic Sea-Ice Switch will provide critical insights to facilitate adaptation to unavoidable change and identify additional impacts to expect if we cannot curb carbon emissions. Timely knowledge of the most harmful but avoidable impacts will incentivise the drive to net zero 2050, while helping to provide tangible solutions. Guided by the principles of Te Tiriti o Waitangi, we build on established partnerships with Māori to grow resilience for Aotearoa and Antarctica.

As sea ice around Antarctica recedes, heat absorption accelerates surface warming with the potential to destabilise ice shelves. That could lead to rapid and potentially unstoppable loss of up to one-third of Antarctica's ice sheets, and result in multi-meter, global sea-level rise over centuries to come. Moreover, sea-ice loss weakens global ocean circulation, impacting heat distribution, decreasing ocean carbon storage, and reducing nutrient supplies that currently support 75% of global ocean primary production. As the Antarctic contracts, the tropics expand with increased heatwaves, atmospheric rivers, and ex-tropical cyclones - impacting Aotearoa.



Our Changing Coast

In 2024, the Our Changing Coast programme partnered with local organisations to present two events exploring the impact of and responses to climate change and rising sea levels.

4th Pacific Ocean Climate Change (POCC4) Conference in Apia, Samoa, May 2024.

Jointly hosted by VUW, the South Pacific Regional Environmental Programme (SPREP) and the National University of Samoa, OCC programme researchers from VUW and GNS Science attended the conference alongside around 100 climate and ocean change researchers and stakeholders from across the blue Pacific. This was the first time the conference has been held outside New Zealand.

The objectives of the conference were:

1) to raise awareness of the challenges faced by Pacific nations due to climate change;

2) to facilitate knowledge sharing and collaboration among experts, policymakers, researchers, and community leaders; and

3) to promote sustainable solutions and innovations for mitigating and adapting to climate change in the Pacific region.

Tim Naish gave a keynote address and Richard Levy, Shannon Bengtson and Ian Hamling gave talks on the uncertain contribution of Antarctic ice melt for future sea-level rise, hazard and risk assessment for Tuvalu, and the role of vertical land motions in sea-level projections respectively.

OCC and SPREP's Pacific Climate Change Centre ran a workshop on "Coastal Adaptation & Addressing the Impacts from Sea-Level Rise", aimed at strengthening coastal resilience in the Pacific through sharing of sea level science, tools to guide adaptation, and solutions that mitigate sea-level rise impacts and risk.

The conference and workshop were very successful, and good contacts were made for future collaborations. It was vital to see first-hand how the Pacific is being impacted by climate change, and the importance of local community and environmental context when thinking about solutions.

Pacific Islanders are resilient and adaptable people who understand what it means to be on the frontline of climate change.

While their communities have well-tested emergency response strategies, their losses and damages are increasing, and in some cases, there will be complete loss requiring relocation of communities. We were reminded just why the impacts of climate change on the blue Pacific require global warming to be kept below 1.5 °C above industrial levels.

Coastal strengthening, Upolo Island, Samoa. Photo by Dao Polsiri.

Climate Forum Whanganui, March 2024

Supported by Te Au Hururi: Te Au Hou - Our Changing Coast programme at the ARC and hosted by Te Ao Hou Marae in Whanganui, this dynamic event gathered indigenous voices from around the world to address pressing climate challenges they are facing and explore collaborative solutions.

A diverse lineup of speakers, including climate scientists, policymakers, indigenous scholars and leaders from iwi Māori, Yupik Alaska and Aboriginal Australians, community leaders, and youth activists, including Tim Naish and Billy van Uitregt from VUW amongst others, provided insights on climate change issues and potential pathways for action.

A key issue addressed was the impact climate change has had and will continue to have on values and assets of indigenous communities who are often the most vulnerable. Another focus was how traditional indigenous knowledge, such as mātauranga can be woven with western science to improve understanding and outcomes.

Speakers and participants alike emphasised the need for urgent and ambitious climate action, and echoed the importance of collaboration, innovation, and political will in addressing the climate crisis.

A strategy for coastal adaptation planning

Coastal zone planners and decision makers world-wide have been asking scientists to address two key uncertainties in estimates (or projections) of future sea-level rise. These are, the deep uncertainty in the future melting of the Antarctic Ice Sheet, and the influence of local coastal vertical land movements (VLMs).

Our Changing Coast Programme and its predecessor NZ SeaRise Programme (www.searise.nz) were designed for this purpose. Three new studies by the ARC-led team outline for Aotearoa New Zealand: (1) An approach for deriving probabilistic projections of relative sea-level change that account for changes in land surface elevation continuously along the coastline[1] ; (2) How we are linking changes in Antarctic ice sheet mass loss to the impacts being felt by coastal communities[2] ; (3) A proposed policy direction that utilises actionable scientific information for effective adaptation and building coastal resilience[3].

Previous sea-level projections that included vertical land movements (VLM) were restricted to tide gauge locations. To provide spatial-resolution required by practitioners for effective adaptation planning, we have combined elevations measured using satellite radar data with measurements from land-based Global Navigation Satellite System (GNSS) receivers to build a continuous VLM database showing land uplift and subsidence (sinking) for the entire coastline of New Zealand. We integrate these data into probabilistic sea-level projection methodology used in Intergovernmental Panel on Climate Change (IPCC) Assessment Report 6 (AR6) for the range of future climate scenarios.

Our approach is now being applied to regions of the world where the coastline is affected by VLM due to similar tectonic deformation. Downward land movement >2 mm/y, such as in the Wellington region, makes a significant contribution in sea-level projections for all climate scenarios out to the end of this century. This means that adaptation planning decision thresholds, such as those linked to the impacts of coastal flooding and inundation, may be brought forward by decades.

These papers together provide a scientific basis for a new set of location-specific sea-level projections *(see* toolkit *www.searise.nz/maps/)* that now underpin coastal risk assessment and adaptation planning decisions in New Zealand (*www.environment.govt.nz/publications/coastal-hazards-and-climate-change-guidance/*) as well as vision for coastal adaptation decision and policy making in Aotearoa.

1 Naish, T. (2024). The significance of interseismic vertical land movement at convergent plate boundaries in probabilistic sea-level projections for AR6 scenarios: The New Zealand case. Earth's Future, 12, e2023EF004165. https://doi. org/10.1029/2023EF004165

2 Levy, R. et al (2024) Melting ice and rising seas–connecting projected change in Antarctica's ice sheets to communities in Aotearoa New Zealand (2024) Journal of the Royal Society of New Zealand, 54 (4), pp. 449-472. DOI: 10.1080/03036758.2023.2232743.

3 Naish, T et al (2024). A Sea Change is Needed For Adapting to Sea-Level Rise in Aotearoa New Zealand. Policy Quarterly, 20, 483-93. https://ojs.victoria.ac.nz/pq/article/view/9636

Sunny day coastal flooding, Haumoana. Photo credit: Hawkes Bay Regional Council

Exploring the Secrets of Platelet ice in McMurdo Sound, Antarctica.

During the 2024 Antarctic summer, the Platelet Ice as a Habitat project returned to McMurdo Sound as part of the Antarctic Science Platform's Project 4. Led by the ARC's Natalie Robinson, the team of eleven focused on understanding the role of sub-ice platelet layers (SIPLs): how they formed, how they varied across space and time, and the kinds of life they supported. These fragile, loosely consolidated layers of ice crystals accumulated beneath sea ice, creating a distinct habitat that played an important role in coastal Antarctic ecosystems.

K892 team for 2024, from back left: Ollie Twigge, Natalie Robinson, Svenja Halfter, Jacqui Stuart, Brett Grant and Greg Leonard; front from left: Salvatore Campanile, Lizzy Skelton, Aimee van der Reis, Craig Stewart and Doug Walker. Photo by Aimee van der Reis.

The 2024 season built on work from previous years, particularly the 2022 field campaign. The team comprised staff and students from the ARC, NIWA, Oceanly Science, Universities of Auckland, Otago and Canterbury, and St Patrick's School, Kilbirnie. They focused on tracking spatial and temporal changes in the biological communities living within the SIPL. Using a sampler custom-designed by Craig Stewart, they collected 30 SIPL cores, the highest number gathered in a single season using this method, revisiting the same locations sampled in 2022. This new collection provided a valuable comparative dataset for understanding how this ecosystem functioned over time.

In addition to core sampling, a snow load experiment was carried out to investigate how changes in surface snow cover influenced microbial and microalgal communities beneath the ice. Snow acted as both an insulator and a light filter, and by adjusting snow conditions, the team observed how these changes affected the structure and nutritional value of organisms within the SIPL. The experiment ran for multiple weeks at the field camp, with three time points and multiple cores sampled at each stage. These data were expected to offer insight into short-term biological responses to snow variability.

To complement the biological work, Greg Leonard and Lizzy Skelton conducted physical measurements of SIPL thickness using a combination of EM-31 transects and point depth sampling. These data contributed to Lizzy's Master's research. When combined with snow depth, sea ice, and oceanographic measurements, they help to build a clearer picture of the physical environment shaping the SIPL ecosystem.

The 2024 season also included a dedicated outreach component. Doug Walker, a teacher from St Patrick's School in Wellington, joined the team to produce classroom resources for schools across Aotearoa New Zealand. His work included videos and hands-on activities aimed at connecting students with Antarctic science and environments.

Of course, camp operations were essential to the season's success. Brett Grant and Ollie Twigge kept everything running day to day, helping with everything from keeping the generator running, instrument deployment to last-minute repairs.

The platelet sampler in action. Photos by Jacqui Stuart.

Following the team's return to New Zealand, the work continued in the laboratory. Postdoctoral researcher Jacqui Stuart and PhD student Salvatore Campanile began processing microbial and microalgal samples collected during the season. While platelet ice may not have drawn as much attention as other parts of the Antarctic seascape, it remains a dynamic and understudied part of the Antarctic coastal system. Through this project, the team continues to build a clearer picture of how this hidden habitat functions and why it matters.

Natalie Robinson is an Associate Professor at the ARC.
Jacqui Stuart is a Research Assistant at the ARC.
Contact: jacqui.stuart@vuw.ac.nz

Left: a single platelet crystal. Mid: loosely consolidated platelet crystals on the bottom of sea ice. Photos by Jacqui Stuart. Right: The sub-ice platelet layer from below the ice, all the green/brown is microalgae! Photo by Leigh Tate, NIWA.

Biogenic Aerosol Observations in the Ross Sea from the 2025 RV Tangaroa Expedition

Southern Ocean biogenic aerosol plays a vital role in the climate system — yet observations remain limited. PhD candidate Hana Ishii had the opportunity to join the RV Tangaroa vessel for 6 weeks on her first voyage to the south.

The goal of this expedition was to expand atmospheric and oceanic observations and sample collection in the highly productive Ross Sea region. These efforts aim to improve the understanding of the sources of biogenic aerosols and validate the processes that preserve them in ice cores.

At the ocean–atmosphere interface, observations of biogenic emissions involved a combination of real-time aerosol monitoring and filter-based aerosol and seawater sampling for a range of chemical analysis. Hana monitored several real-time aerosol instruments, collected 165 aerosol samples and 4 high-volume aerosol samples, 9 air flasks, 38 seawater samples, 12 sediment and 91 filtered seawater particulate samples.

One of the scientific highlights of the voyage was reaching the southernmost point the RV Tangaroa has ever navigated: 77°37.981′S, near the front of the Ross Ice Shelf. But Hana's personal highlight was the people. "My favourite way to spend spare time on the ship was walking through the different labs, looking for anyone who needed help or just wanted to chat about their interests. I even got to watch real-time video footage from a camera deployed under the sea. I never imagined finding such colourful corals and marine life beneath the icy Antarctic Ocean. Like so much of this journey, it was full of vibrant surprises."

Hana onboard the RV Tangaroa, collecting seawater samples for biogeochemical analysis from the CTD rosette equipped with Niskin bottles. Photo by Denise Fernandez.

Below: The view from RV Tangaroa en route to the Ross Sea. Photo by Hana Ishii.

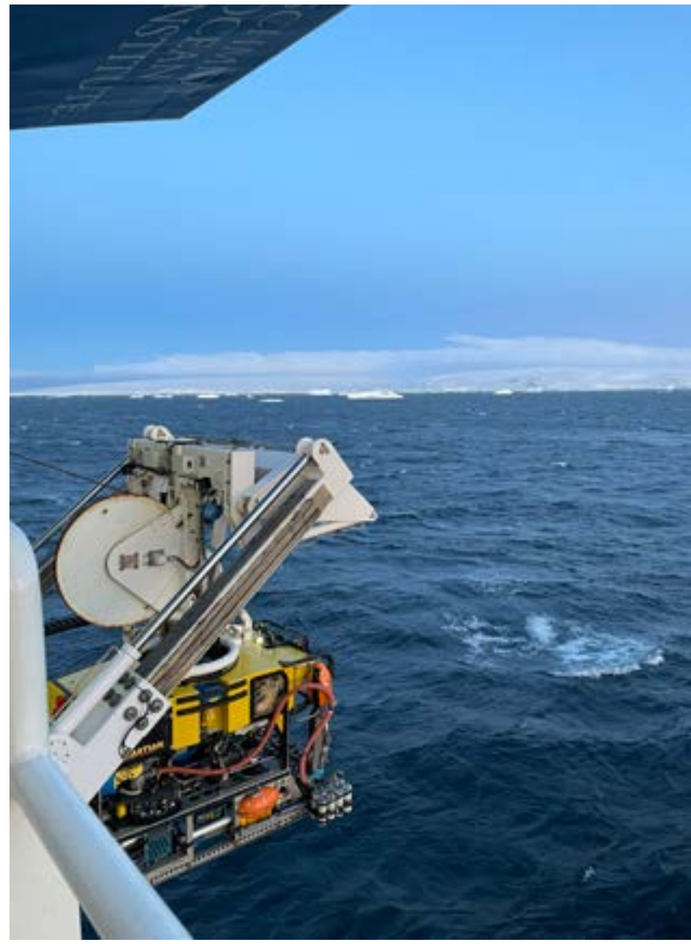
Perpetual Planet Ocean Expeditions

In December 2024, with support from the ARC, Dr Sarah Seabrook joined the Perpetual Planet Southern Ocean Expedition with National Geographic and in partnership with Rolex.

Departing from Punta Arenas, Chile aboard the R/V Falkor (too) of Schmidt Ocean Institute, Sarah was part of a multi-disciplinary team of 24 scientists, storytellers, and educators that explored and documented critical ocean processes in systems that spanned from the sea ice to the seafloor. This expedition used a suite of ocean instrumentation, including the deep submergence remotely operated vehicle SuBastian, to explore and sample the marine environment.

Sarah was part of a team focused on seafloor exploration, specifically for methane seeps and vents in the Southern Ocean's Weddell Sea region. Notably, they discovered an 11-meter black smoker hydrothermal vent, which–through collaboration with zooplankton experts on board–appeared to be providing habitat for krill in the deep sea. Additionally, several new species were observed, including the first video of an elusive Antarctic squid. Explorations and sampling took place in one of the deepest areas of the Weddell Sea, and the team was able to confirm areas of seafloor venting that was previously only hypothesized in geophysical data.

This work joins a series of scientific expeditions that span the entire ocean, from pole to pole, seeking to understand the causes and impacts of change in the marine environment, develop or advance sustainable solutions to counteract that change, and connect with the global community through storytelling and engagement.



The Remotely Operated Vehicle (ROV) SuBastian is deployed from the ROV hanger on the R/V Falkor (too), off the coast of the Antarctic Peninusla amidst passing ice floes. Photo by Sarah Seabrook

Sarah Seabrook is an Adjunct at the ARC and a Marine Biogeochemist at Earth Sciences New Zealand
Sarah was employed as an ARC Research Fellow for this cruise.
sarah.seabrook@vuw.ac.nz

For more information on the project, see the press release:
https://news.nationalgeographic.org/national-geographic-society-and-rolex-announce-ambitious-exploration-encompassing-all-five-regions-of-the-global-ocean/

Or explore the Perpetual Planet expedition page:
https://www.nationalgeographic.org/society/our-programs/perpetual-planet-expeditions/ocean/

MAC3 Antarctic Fellows – Advancing Careers and Science

In January 2024, through a generous gift from MAC3 Impact Philanthropies, the ARC and the Antarctic Science Platform together launched the MAC3 Antarctic Fellows programme – a transformative initiative that brought together a diverse cohort of Antarctic researchers to grow their scientific careers.

Eleven early career researchers (ECRs) joined the New Zealand-Italy Ross Sea Voyage on the RV Laura Bassi for a two-month voyage of discovery, journeying from the Port of Lyttelton to the Ross Sea and back. The generosity MAC3 Impact Philanthropies was instrumental in advancing the careers of these emerging scientists. It allowed them to cover essential expenses for research time, conduct additional lab analyses, produce high-quality publications, engage with the media, and attend conferences.

2024 Fellows onboard the Laura Bassi. Photo by Lana Young/ Antarctic Science Platform

The fellows were particularly inspired by their interactions with MAC3, who they had the opportunity to meet online twice—first while aboard the vessel, and later during the SCAR conference in Chile. MAC3's words of encouragement to pursue impactful research and strive for excellence deeply resonated with the fellows, reinforcing their commitment to making meaningful contributions to Antarctic science.

"We are deeply grateful to MAC3 Impact Philanthropies for their incredible generosity. Their transformational gift enabled eleven bright emerging researchers to take the next steps in their careers. Together, this group is making a difference—to scientific discovery, to Antarctica, and to our planet," states Professor Nancy Bertler, Director of the Antarctic Science Platform.

On behalf of the MAC3 Antarctic Fellows, we thank MAC3 Impact Philanthropies for their incredible support!

Alina Weiczorek filtering eDNA in the onboard wetlab. Photo by Lana Young/ Antarctic Science Platform

Svenja Halfter deploying bongo nets. Photo by Lana Young/ Antarctic Science Platform

Biomarkers, Blizzards, and Uncovering Ocean History in Ice Cores

In December 2024, Holly Winton, Emma de Jong and Merijn Thornton ventured into the deep field to an ice dome near Terra Nova Bay. For three weeks, they lived and worked atop a 2100-metre-high promontory in extreme weather conditions, including wind gusts over 100 knots, to measure and collect atmospheric markers of marine phytoplankton and sea ice.

Sea ice plays a key role in driving seasonal phytoplankton blooms, but how changing sea ice conditions influence phytoplankton community composition, abundance, and the timing of blooms remains poorly understood. With only short observational records available, a longer-term record of past changes is key to accurately predict how these critical ecosystems will respond to a changing climate.

Terra Nova Bay is a biological hot spot in summer where katabatic winds keep the bay free of sea ice. Adjacent is Thern Promontory where the team collected shallow ice cores, daily snow samples, and aerosol and weather measurements, to determine if the site is suitable for drilling a deeper ice core of past phytoplankton change from Terra Nova Bay. The ice cores will be analysed for chemical and biological signatures, or biomarkers, of past phytoplankton activity. Snow and aerosol samples will help trace the journey of these biomarkers from the ocean through the atmosphere to the snow, where they ultimately become preserved in the ice.

Merijn, the team's Ground Penetrating Radar (GPR) expert, mapped the ice thickness of the Thern Promontory ice dome from the surface snow all the way to the bedrock below, with the goal of finding the most suitable site on the dome to drill a deeper 150m ice core. The team also returned to the previous season's site at Upper Priestly Glacier to conduct the GPR measurements.

The data collected by the team during this project will provide important groundwork to assess the sites suitability for drilling a longer ice core record of past phytoplankton and sea ice conditions in the Terra Nova Bay region.

Holly Winton is a Senior Research Fellow at the ARC.
Emma de Jong is a Research Assistant at the ARC.
Contact: emma.dejong@vuw.ac.nz

Holly Winton and Emma de Jong sampling a snow pit in cleansuits, with dramatic lenticular clouds overhead. Photo by Pepper Cook.

Girls* on Ice Aotearoa New Zealand

Girls* on Ice Aotearoa NZ is part of Inspiring Girls* Expeditions — an international tuition-free programme running annual expeditions aimed at empowering young women through science, art, and outdoor exploration. It began with the aim of creating space for girls and women to grow and thrive in historically male-dominated fields such as earth sciences.

2024-25 students and expedition leaders at Tongariro National Park. Photo by Gabby O'Connor.

Anonymous responses to post-expedition survey:

"It was cool meeting the amazing instructors and learning about all the different things they do with science. It's really interesting to know that they all completely love their jobs."

"I learnt something about people: that you don't have to know everything about them to have a deep connection with others."

"I really love the mountain environment. Before coming here I've been really interested in engineering so one of my favourite parts of the trip was looking at the snow and thinking maybe I could incorporate that into my career."

"To our generous donors: your backing is pivotal in supporting our future female scientists to realise their dreams and I sincerely thank you for your support.

Opportunities to do science and art individually, let alone in combination, is something that we don't get often enough. Your support for this programme is helping to shape a more inclusive future."

Professor Margaret Hyland, Deputy Vice-Chancellor, Research, Te Herenga Waka—Victoria University of Wellington.

Hosted by the ARC, the January 2025 Girls* on Ice Aotearoa expedition was led by Dr Lauren Vargo with a team comprising science instructors Julia Martin and Ashley Davis, art instructor Gabby O'Connor, and outdoor specialist Mel Harris. The programme also relies on a team of volunteers who helped with recruiting 10 students, aged 15-16, from the 175 applicants. Seven of the girls selected were from the North Island and three from the South.

During their week at Tongariro National Park, the girls learned about volcanic risk, the fossils, cave wētā and glowworms they found in the Okupata cave, snow physics and physical properties, New Zealand glacier change, and working in Antarctica. This included a call to three women working at Scott Base in Antarctica supporting science events, emphasising that going to Antarctica in any role is a possibility, not a dream.

Art instructor Gabby O'Connor helped the girls observe and respond to the landscape through art, including blind contour drawing (without looking at the page), detailed botanical drawings of alpine flora and collage from collected detritus. Later in the week, the students broke into three groups to design their own science experiments and art pieces based on their interests. It became obvious to the group that the boundaries between science, art, and mountaineering blurred as they made use of all these skills during their projects.

The group were lucky with the weather this year and their walks culminated in 'peak physical day' when they climbed to the crater lake at 2,655m elevation during a five-hour tramp.

Back in Wellington, the students compiled their research projects results and art into a presentation for their peers, staff, families, and invited guests.

Our 2026 expedition is planned for 12-22 January. Participants will be selected in October 2025.

** Inspiring Girls* Expeditions welcome cisgender girls and transgender, agender, nonbinary, intersex, and genderqueer youth.*

Science Drilling Office

With the challenges of 2023-2024 season still fresh in the rear-view mirror, planning for 2024–2025 field season started early in 2024, culminating in yet another difficult and disrupted drilling campaign. Antarctic drilling is demanding even under ideal circumstances, and this season underscored the engineering and human complexities of operating in remote and extreme environments.

The 2023-2024 season started with a key technical setback with the use of a novel Glass Reinforced Epoxy (GRE) API pipe for the sea riser. GRE, typically applied in high-sulphur oil field conditions as a steel alternative, was selected for its superior thermal properties through 600 metres of ice and its natural buoyancy in seawater, which was expected to enhance drill rig depth capacity. However, dimensional inconsistencies in GRE—relative to steel tubulars—proved problematic on a diamond core rig calibrated for steel.

Modifications to accommodate the GRE setup were ultimately insufficient. Drilling operations were abandoned, and a swift decision was made to revert to a conventional steel tubular solution. HRQ steel pipe was sourced from Perth, Australia and delivered to meet the southbound Antarctic resupply ship in February 2024.

Upon returning from the field in January 2024, we were saddened by the unexpected passing of AIDD drilling team member Martin (Paddy) Loughney. Martin had expressed interest in returning for the following season and was a highly valued member of the team. His loss reverberated throughout the year, compounded by the unavailability of several other team members due to professional and private commitments in New Zealand.

A new AIDD drill team was assembled at short notice, selected for their expertise in both commercial wireline and scientific soft-sediment ocean drilling. Ten drillers in total were required for the 2024–2025 season, five for the hotwater drilling, all returnees from previous seasons, including Stephen Stretch brought in just one week prior to deployment following a serious accident that prevented a key member of the drilling operation from deploying to Antarctica.

Further setbacks continued to plague the field season from the start with a hydraulic motor output shaft failure due to a suspected build-up of ice under the transmission belts during startup and predrilling testing. This had a knock-on effect that resulted in drilling at the Kamb Ice Stream once again abandoned following the accidental loss of the sea riser and drill string downhole.

With two years of challenges behind us, preparations are now underway for a significantly revised drilling system and a re-trained team, scheduled to deploy to Crary Ice Rise in late 2025.

James MacPhail (left) and driller Tim McPhee digging the AIDD cellar, setting up for drilling operations at Kamb Ice Stream. The cellar provides clearance under the drill rig floor to enable installation of long items and to keep sea riser support equipment clear. Photo by Jane Chewings.

The Science Drilling Office (SDO) of the Antarctic Research Centre (ARC) currently consists of two full-time engineers, Darcy Mandeno and James MacPhail, with Alex Pyne continuing in his role as part-time Antarctic Drilling Advisor.

SIGNIFICANT EVENTS

Holly Winton (left) and Neil Brough testing the core at Windless Bight. Photo by Glenn Smith

National workshop calls for actionable climate science for a climate resilient New Zealand

In June 2024, Te Herenga Waka—Victoria University of Wellington and the ARC led a national workshop hosted by Royal Society Te Apārangi to coincide with a visit by the (now past) Chair of the World Climate Research Programme, Professor Detlef Stammer. The workshop addressed the challenges of adapting to climate change in Aotearoa New Zealand.

Following an introduction by VUW Vice Chancellor Professor Nic Smith, Professor Stammer and Professor Sir Peter Gluckman, President of the International Science Council, set the global scientific and geopolitical scene in which the production of urgently needed climate science, services and information is being threatened by a changing world order with less regard for expertise and evidence-based decision making.

The presentations and discussions then focussed on New Zealand's special set of challenges that need to be addressed to secure a climate resilient future. We heard from end-users from local and central government, from iwi, and from information providers such as the Hon Simon Upton, Parliamentary Commissioner for the Environment, the NZ Climate Change Commission, Crown Research Institutes and Universities.

The workshop concluded in agreement with the NZCCC recent report that Aotearoa New Zealand did not have an adequate national adaptation strategy with large numbers of the population, settlements and infrastructure vulnerable and exposed to climate impacts that are now unavoidable.

The output of the workshop was a paper published in a special issue of Policy Quarterly themed "Environmental Issues in Aotearoa New Zealand" [1], that advocated for: (i) a nationally integrated, multi-disciplinary research platform designed to provide the type of actionable climate information end-users needed for effective and equitable adaptation decision making and solutions; and (ii) the need for a fit-for-purpose, climate adaptation strategy underpinned by well-designed policy that integrates governance structures with institutions empowered and funded to take a long-term strategic approach to climate adaptation.

Tim Naish is Professor of Earth Sciences at the ARC.
timothy.naish@vuw.ac.nz

[1] Naish, T. et al (2024). A Sea Change is Needed For Adapting to Sea-Level Rise in Aotearoa New Zealand. Policy Quarterly, 20, 483-93. https://ojs.victoria.ac.nz/pq/article/view/9636

New Zealand's WCRP officeholders from left: Lauren Vargo (ARC), Erik Behrens (NIWA), Natalie Robinson (ARC), Olaf Morgenstern (ex NIWA), Tim Naish, and at far right, Inga Smith (Uni Otago). Detlef Stammer with Peter Gluckman stand to Tim Naish's right, respectively. Copyright: Victoria University of Wellington, VUW Image Services.

S.T. Lee Lecture in Antarctic Studies

The 21st S. T. Lee public lecture was presented by Professor Sridhar Anandakrishnan from Pennsylvania State University, USA. Titled "*Slip slidin' away: glaciers and ice sheets in a warming climate*", the lecture focused on how sea level in the next century will be mainly affected by the health and volume of the polar ice sheets in Antarctica and Greenland.

Professor Sridhar Anandakrishnan presenting the ST Lee Lecture 2024.
Copyright: Victoria University of Wellington, photo by Colin McDiarmid, VUW Image Services.

Based at the Department of Geosciences at the Pennsylvania State University, Professor Anandakrishnan's research focuses on understanding how the fast-flowing glaciers of Antarctica and Greenland work and how they are changing. These glaciers feature prominently in global sea-level rise and their contribution is likely to grow in future decades.

He uses radars, seismic, gravity and other geophysical tools to measure these glaciers. When possible, he uses standard methods but, when necessary, he has pioneered novel geophysical techniques. He is proud of the many students he has mentored and trained, many of whom have taken leadership roles in glaciology and climate change research.

As part of the lecture, Sridhar introduced the glacier hydrologic system and a few glaciers he has studied, including the glaciers of the Siple Coast and Thwaites Glacier in West Antarctica and Helheim Glacier in Greenland. He outlined the potential of the glaciers to significantly raise global sea-level in the coming years and offered insights into how his observations will be critical for numerical modelling of projected ice sheet change in the future.

Over the past decade, the International Thwaites Glacier Collaboration has been conducting a multifaceted study of sea-level rise projections for Thwaites. It is important to undertake a similar study that looks at potential impacts of East Antarctic glacier mass loss—in particular, the current and future state of the Wilkes Basin. The size, remoteness, and most importantly, the perceived stability of this region has led to relatively little data collection.

The S. T. Lee public lecture is presented annually by the Victoria University Foundation and Te Puna Pātiotio—Antarctic Research Centre in honour of Dr Lee Seng Tee, whose philanthropic support for scholarship helped establish distinguished lecture series at academic institutions throughout the world.

S.T. Lee Travel Award 2024

With funding from S.T. Lee, the ARC and the International Arctic Research Center of the University of Alaska Fairbanks (IARC) began a graduate student exchange programme in 2004 for the purpose of promoting polar research. In 2024, the S.T. Lee Travel Award Young Scientist Exchange was awarded to two IARC postgraduate students, who travelled to Wellington to collaborate with ARC staff and postgraduates.

Anika Pinzner - IARC PhD candidate

"My time at the Antarctic Research Centre was both scientifically highly enriching and personally rewarding. The collaborative atmosphere, the depth of expertise, and the warm welcome I received made this a wonderful experience. I am deeply grateful to the S.T. Lee Exchange for making this visit possible and would like to extend my thanks to the entire ARC community for their generosity in sharing their knowledge, time, and enthusiasm. I look forward to continuing collaborations between our research communities and carrying forward the insights I gained during my time in Wellington, and I hope to extend the same hospitality to future S.T. Lee Exchange participants from the ARC and make their visit just as welcoming and rewarding as mine."

"During my stay, I had the chance to present my PhD research on Arctic snowmelt and snow distribution on sea ice through a public lecture, which led to valuable discussions and feedback from the ARC community and beyond. My work focuses on how snow accumulation, redistribution, and melting affect the surface roughness of sea ice, its optical properties, and its implications for mobility and climate feedbacks. By integrating remote sensing and field observations, I aim to enhance our understanding of snow-sea ice interactions in a rapidly changing Arctic."

Anika Pinzner, IARC

Annegret Pohle - IARC PhD candidate

"During my four weeks in Wellington, I worked with Nicholas Golledge on modeling subglacial water drainage beneath the Antarctic ice sheet. The goal was to produce maps of flow paths and locate where the water is discharged to the ocean at the terminus of the glaciers. This may be of interest, for example, for the transport of sediments or carbon. I produced these maps for different paleo-climatic states of the Antarctic ice sheets, where Nick was providing me with the ice thickness scenarios that came out of a paleo ice sheet simulation. Although one month is a short time to really get to the depths of a project, I already learned a lot working on this subject and it gave me a different perspective to think about subglacial hydrology in Antarctica, which is different from the Greenland and Alpine glaciers that I usually restrict myself to. It is definitely something I will think about more and that I hope to continue working on in the near future."

Fox Glacier through native forest. Photo by Annegret Pohle.

"In addition to the project, I greatly appreciated the opportunity to experience a different academic environment and make new connections. Coming from a very glacier-focused research group, I enjoyed being in a group with a much wider range of expertise and the different perspectives that come with it.

One of my favorite moments as a visiting glaciologist was to see Fox glacier side by side with palm trees, something I do not see every day!

The highlight of my stay was perhaps my last week, when I attended the Joint Snow and Ice Research Group (SIRG) and Sea Ice Symposium at Lyall Bay. I enjoyed talking to many people there and learning a lot about sea ice and Antarctica in general."

Annegret Pohle, IARC

ARC student travel 2024

Postgraduate students across the university were supported through ARC's Endowed Development Fund, the Arnold Heine Antarctic Research Award and external grants to travel to conferences, workshops, summer schools and research institutes throughout the world - offering invaluable opportunities to present papers, progress their research, talk with peers and make connections for future roles and projects. Here they share their stories...

Béatrice Désy - SCAR, Peru

Béatrice was awarded the 2024 Arnold Heine Antarctic Research Award.

Pucón city skyline. Photo by Béatrice Désy

In August I attended the SCAR Open Science Conference in Pucón, Chile. This was my very first "climate science" conference, which felt like a baptism by fire, or perhaps by ice. Coming from a background in statistical physics and network science, it was fascinating to engage with such a diverse crowd of Antarctic researchers, and to see differences and similarities across a range of fields. I took the stage twice to present my research on recurring patterns in ice core records - one contributed talk is more than enough, lesson learned! I greatly enjoyed all the keynote presentations and the few posters that I could squeeze in during the very dense poster session, especially the ones about research that weaves together different approaches and areas of study, mirroring and expanding my own experience.

Alexey Ippolitov - British Antarctic Survey, UK

Alexey received a scholarship from the Endowed Development Fund.

The ARC EDF grant supported a 2-week visit to the British Antarctic Survey (BAS; Cambridge, UK) in October 2024 to examine their palaeontological collections. BAS holds the largest available collection of cephalopod fossils from Antarctica, collected mainly from the Antarctic Peninsula. I found several specimens belonging to a new taxon previously found by me in collections from New Zealand and representing a phylogenetic link between Mesozoic belemnites and recent squids, according to modern interpretations (Fuchs et al., 2013). This taxon is currently under description by me, and for the first time we can confirm its past presence in Antarctica. I was also able to stopover in India to undertake fieldwork collecting new material, and to examine historical collections held in museums in Kolkata, Pune and Hyderabad.

Alexey during fieldwork in India

Ihanshu Rane - IUGG-CMG 2024, Mumbai, India

Ihanshu received a scholarship from the Endowed Development Fund.

The Mathematical Geophysics 2024 conference (IUGG-CMG 2024) held in Mumbai, focused on "Mathematical Geophysics for Sustainable Development." As a PhD researcher, I am developing a Machine Learning (ML) model to predict Antarctic coastal polynyas, critical regions for sea-ice production with global climate impacts. Current models poorly represent these polynyas, making predictions challenging. My ML model aims to improve understanding of these processes and their climate implications. The conference allowed me to network with peers, learn from ML experts, and gain valuable feedback from senior researchers, which has significantly enhanced my model development and is shaping my thesis.

Ihanshu in Mumbai for the IUGG-CMG 2024

Prasad presenting his talk, EGU 2025

Prasad Shelke - EGU 2025, Vienna, Austria

Prasad received a scholarship from the Endowed Development Fund.

With this EDF grant, I was able to successfully convey the urgency of changes in the 'Antarctic atmosphere' through my talk titled, 'Does Blocking Shape the Future of Antarctic Heat Extremes?' The presentation was followed by curious questions and led to potential collaborations for future experiments. It has helped this pressing issue gain visibility across hemispheres, among scientists and stakeholders. I participated in numerous discussions, exchanged ideas on atmospheric dynamics and extreme events, and formed meaningful connections that will support future collaborative efforts. These interactions have laid the groundwork for deeper investigation into the changing dynamics of blocking patterns and their role in shaping the Antarctic atmosphere.

Linda Balfoort - IODP Core Repository, Texas

Linda received a scholarship from GeoDiscoveryNZ and ANZIC.

This July, GeoDiscoveryNZ and ANZIC supported my travel to the International Ocean Discovery Program (IODP) core repository at Texas A&M for the GLAcial Sediment School (GLASS). Researchers, lab technicians, and tutors presented lectures about their respective fields (Arctic and Antarctic) and the week's goal was to learn to correctly classify the sediments, interpret the environment in which these sediments were deposited, and understand their significance. A dual approach of lectures and labs was incredibly valuable and getting an insight into everyone's different methods and approaches to research was fascinating. The absolute highlight of the trip was seeing the core repository and seeing the ANDRILL cores in person. I love sediments!

Linda at the core repository, Texas A&M University

Julianne Burns - Urbino Summer School, Italy

Julianne received a scholarship from GeoDiscoveryNZ and ANZIC.

In July, I had the privilege of attending the Urbino Summer School for Paleoclimatology in Urbino, Italy. The course combined lectures, practical sessions, and a field day covering all aspects of paleoclimatology, with this year's focus specifically on modelling. I presented a poster on the research I have been doing titled "Investigating the Role of Orbital Forcing on Antarctic Ice Sheet-Ocean Dynamics during the Miocene." The course provided me with a strong foundation in various paleoclimatological methods that generate the data I use, and it was an excellent opportunity to meet researchers whose papers I have frequently read. Many thanks to GeoDiscoveryNZ and Australia New Zealand International Scientific Drilling Consortium for their support.

Julianne at the Urbino Summer School, 2024

Vincent Charnay - Karthaus, Italy

Vincent received a scholarship from the Endowed Development Fund.

I was able to attend the Karthaus summer school on Ice Sheets and Glaciers in the Climate System in South Tyrol, Italy. Located in a beautiful little town in the middle of the European Alps, the summer school offered courses relevant to my thesis, on ice sheet modelling, paleoclimate modelling, ice-ocean interaction and many more. Lectures, exercises, computer projects, hikes, sauna and a delicious dinner were part of the daily Karthaus programme. One of the highlights of those two weeks was an excursion to nearby glaciers, which generated interesting discussions on glacial geomorphology and how the glaciers and ice sheets have shaped the landscape surrounding us.

Karthaus excursion to observe glaciers in the Italian Alps.Photo by Vincent Charnay

TEACHING AND SUPERVISION

ARC PhD candidate Aylin de Campo collects GPS data and records a description for a glacial erratic on Mt Tadpole, East Antarctica, during the K861 field campaign. Photo by Lottie Stevenson.

ARC teaching

Our staff support a wide range of courses taught within the School of Geography, Environment and Earth Sciences, as well as provide postgraduate student supervision. In 2024, our staff supervised 26 PhD and 1 MSc candidates.

ESCI111	The Earth System: An Introduction to Physical Geography and Earth Sciences
ESCI132	Antarctica: Unfreezing the Continent
ESCI201	Climate Change and New Zealand's Future
ESCI204	Petrology and Microscopy
ENSC301	Topics in Environmental Science
GEOG321	Ice and Climate
ESCI301	Global Change: Earth Processes and History
ENSC402	Perspectives in Environmental Science in Aotearoa New Zealand
PHYG414	Climate Change: Lessons from the past
ESCI412	Paleoclimatology
ESCI452	Earth History

ARC postgraduate students

PhD Candidates

Olya Albot : Coastal modelling
Faezeh Bahmani : Geophysics
Linda Balfoort : Sedimentology and Paleoclimatology
Julianne Burns : Antarctic Paleoclimatology
Aylin de Campo : Paleoclimatology and Glaciology
Vincent Charnay : Climate Modelling
Béatrice Désy : Information Systems
Kirstin Gerrand : Atmospheric Modelling
Nikhil Hale : Geophysics
Matthew Hardcastle : National data sets and models for dynamic adaptive pathways planning
Zoe Heine : Sea-level rise
Hana Ishii : Antarctic Paleoclimatology
Daemon Kennett : Atmospheric Modelling
Karsten Lorentz : Geochronology and Erosion Mechanics
Erika Macapagal-Taluban : Environmental Studies
Frank Mackenzie : Paleoclimate Modelling
Alexander Mattin : Paleoclimatology and Volcanism
Julia Martin : Sea Ice Evolution
Vanessa Monteiro : Environmental Studies
Ruby Muir : Physical Geography
Harrison O'Sullivan-Moffat : Atmospheric Science
Ihanshu Rane : Antarctic foehn winds
Prasad Shelke : Geophysics
Xingyu Wang : Physical Geography
Yaowen Zheng #: Antarctic Climatology
Huiling Zou *: Antarctic Paleoclimatology

 # Graduated in 2024
**Thesis submitted for examination in 2024*

MSc Candidates

Lottie Stevenson : Physical Geography

Postgraduate student awards

Endowed Development Fund
Awarded annually to Victoria University postgraduate students studying a topic relating to the Antarctic region or Antarctica's influence on New Zealand.

2024 recipients (see pages 28-29)
Vincent Charnay
Alexey Ippolitov
Ihanshu Rane
Prasad Shelke

Arnold Heine Antarctic Award
New Zealand and Antarctic glaciologist Arnold Heine has generously donated to the Antarctic Research Centre to establish the Arnold Heine Antarctic Research Award to support future generations of Antarctic researchers.

2024 recipient (see page 28)
Béatrice Désy

S.T. Lee Travel Award Young Scientist Exchange
Graduate exchange between the ARC and Te Herenga Waka—Victoria University of Wellington and the International Arctic Research Center of the University of Alaska Fairbanks (IARC) to promote polar research. Awarded biannually to a PhD student or early career scientist.

2024 recipients from University of Alaska Fairbanks (see page 27)
Anika Pinzner
Annegret Pohle

Ray Hoare Scholarship
2023-24 recipient:
Lottie Stevenson

Beanland-Thornley Prize 2024
Alex Mattin

ARC staff news

ARC staff have been recognised with local and international awards in 2024, as well as book publications and leadership roles.

Dr Bella Duncan - 2024 Hamilton Award

ARC Senior Research Fellow Dr Bella Duncan received the prestigious Hamilton Award from Royal Society Te Apārangi for her research on Antarctic climate history. Her study, 'Climatic and tectonic drivers of late Oligocene Antarctic ice volume' published in Nature Geoscience, reconstructs a 45-million-year record of ocean temperatures using molecular fossils from single-celled organisms.

Bella's research has far-reaching implications for understanding climate change in inaccessible areas of Antarctica and the Southern Ocean. The Hamilton Award is the Royal Society Te Apārangi Early Career Research Excellence Award for Science and is awarded for a single piece of work published within 13 years of receiving a PhD.

Bella with award certificate. Photo by Rebecca McMillan, Royal Society Te Apārangi

Prof. Nick Golledge - Royal Society Te Apārangi Fellow

The ARC's Professor Nick Golledge is one of 21 new Ngā Ahurei a Te Apārangi Fellows elected to the Academy of the Royal Society Te Apārangi in 2024. Fellowships recognise researchers, scholars, and innovators throughout Aotearoa New Zealand who have achieved excellence in their various disciplines across science, technology, and the humanities, and have made an impact at the highest international level.

Nick was elected for global leadership in Antarctic ice-sheet modelling. His fundamental discoveries include that ice-sheet melting could produce a positive feedback loop that accelerates its own retreat, and the 2°C temperature-rise threshold for long-term Antarctic ice-sheet stability.

Prof. Nick Golledge with Prof. Geoff Chase, Academy Executive Committee Chair. Photo credit RSNZ

Dr Lauren Vargo - International Glaciological Society Early Career Scientist Award

The International Glaciological Society Early Career Scientist Award honours outstanding contributions to glaciology by early-career researchers. Lauren exemplifies this through her groundbreaking work attributing extreme glacier melt events to human-driven climate change research cited in the IPCC's 6th Assessment Report. She has advanced glacier monitoring in Aotearoa New Zealand by integrating historical imagery with modern photogrammetry.

Beyond research, Dr. Vargo is a leader in science communication and outreach. She co-founded Girls* on Ice Aotearoa NZ, serves in key international climate science roles, and actively engages with students, policymakers, and the public to raise awareness about glaciers and climate change.

Dr Lauren Vargo. Photo by Rebekah Parsons-King.

WCRP leadership team in Paris at UNESCO during the 46th Joint Scientific Meeting, May 2025. Photo credit WCRP.

Tim Naish - Chair of the Joint Scientific Committee of the World Climate Research Programme (WCRP).

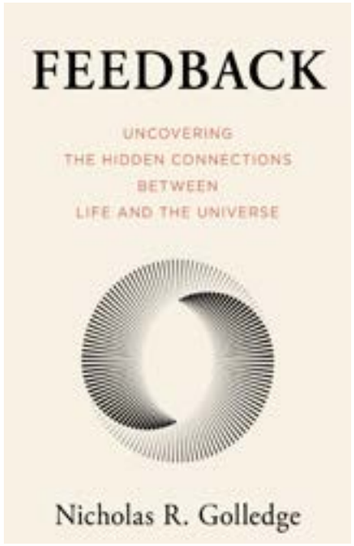
The Joint Scientific Committee is the WCRP's top governance committee, responsible for co-ordinating research that underpins decisions made under the United Nations Framework Convention on Climate Change (UNFCCC), such as the 2015 Paris Climate Agreement. One of its major roles is to oversee the delivery of climate model projections for Intergovernmental Panel on Climate Change (IPCC) Assessment Reports.

Speaking about his new role, Professor Naish said: "It is a great honour to be appointed chair of the Joint Scientific Committee. New Zealand has played a vital role in advancing global understanding about the scale and impacts of climate change and we now have an exciting opportunity to lead the international climate science community through the next IPCC assessment report cycle.

"The WCRP plays an important role in highlighting climate challenges and priorities and engaging with all key stakeholders, including governments. It is crucial that we help accelerate conversations that will deliver actionable science solutions at global and local scales."

Professor Naish's term as chair of the Joint Scientific Committee is for the period 2025-2027, with the option for a further 2-year extension.

Tim Naish was also appointed to the Royal Society of New Zealand Academy Executive Committee as Convenor of the Physical, Earth and Mathematical Sciences Panel, 2024-2027.



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FEEDBACK
Prof. Nick Golledge

Step into a world where chaos meets creativity, where the origins of life and the intricate dance of existence unfold. From the fiery tumult of Earth's early days to the entangled networks that shape our modern lives, a tapestry of feedbacks weaves its way through time and space, permeating our world, orchestrating cycles of change. *Feedback: Uncovering the Hidden Connections between Life and the Universe* invites the reader into this invisible world and reveals the waves of change that structure our lives.

On this captivating journey the birth of complexity is witnessed. Through countless tiny adjustments, our world experiments with ideas and possibilities, reinventing itself with each revolution to make better use of the forces that drive it. This is a place where avalanches of energy and information reverberate through systems as vast as the universe itself, triggering cycles of growth that build over aeons, only to collapse in a heartbeat. With each new cycle feedbacks drive a creativity that electrifies our world, conceiving and shaping every facet of our culture.

By understanding feedbacks we understand ourselves, our place in the world, our relationships with one another, and the ways we imagine and construct our futures. As we stand at the threshold of social and environmental disasters, Feedback reveals the strength to be found in the invisible threads that underpin our social networks, personal relationships, emotional well-being, and spiritual beliefs, and which weave us across vast scales of time and space into the very fabric of the universe.

ARC new staff appointments

The ARC welcomed three new staff in 2024, building capability in oceanography, Artificial Intelligence and glacier research.

Associate Professor Natalie Robinson

The ARC is excited to welcome Natalie Robinson as our new Associate Professor in Sea Ice Science and Oceanography. Natalie joined us from NIWA, where she still retains a fractional role helping us to enhance collaboration with their oceanography teams.

Natalie undertook her Master of Science project in the ARC, where she pioneered the application of oceanographic measurements beneath the Ross Ice Shelf in 2003.

She has since become a leading global expert in the processes of ice-ocean interactions, leading major initiatives to highlight the increasing importance of catastrophic declines in sea ice in the past 5 years, its potential influence on the Ross Sea Marine Protected Area and New Zealand's climate. She was also successful as Principal Investigator in last year's Marsden Fund, leading a project to understand the oceanographic connections between ice shelf cavities and sea ice. To achieve this, she has returned to the use of our newer Hot Water Drilling system almost 20 years after she first used this technology for her MSc.

Natalie was recently seconded (half-time) to Antarctica New Zealand as Deputy Director of the Antarctic Science Platform, and incoming Director for Phase 2 – helping guide the direction of Antarctic science for all of New Zealand over the next 7 years.

View from Scott Base looking towards the South, across the ice shelf towards Mt Discovery. Photo by Nancy Bertler

Alex on a recent trip to Haupapa

Dr Alex Winter-Billington
Ngāti Kahungunu ki Wairoa me Pākehā

Originally from Pōneke, Alex is stoked to be home after several years in Canada, where she completed a PhD at the University of British Columbia. She studied at Te Herenga Waka in the 2000's, completing two years of undergraduate study and a Master's degree.

As an alpine glaciologist. Alex's research centres on debris-covered glaciers—which she considers the quiet underdogs of the cryosphere, often overlooked despite their considerable scientific importance and beauty. Alex is interested in understanding how debris and snow interact to influence glacier melt, and she continues to refine physically based melt modelling for these complex systems on the basis of observational data. She also aims to understand the mātauranga Māori of the cryosphere and use that to improve projections of glacier change in Kā Tiritiri o te Moana.

With her closest whānau now based in Te Waipounamu, she's grateful to be working closer to home and contributing to research in Aotearoa.

Dr Peter Siew

The ARC and the National Modelling Hub welcome Peter Siew as a Research Fellow in Artificial Intelligence. Previously a Postdoc at Columbia University, Peter brings his expertise in machine learning applications in Arctic sea-ice modelling to the Antarctic-focused work of the Modelling Hub. He joined us through the NZ SeaRise programme to spearhead a new project in collaboration with the Centre for Data Science and AI (CDSAI) at VUW.

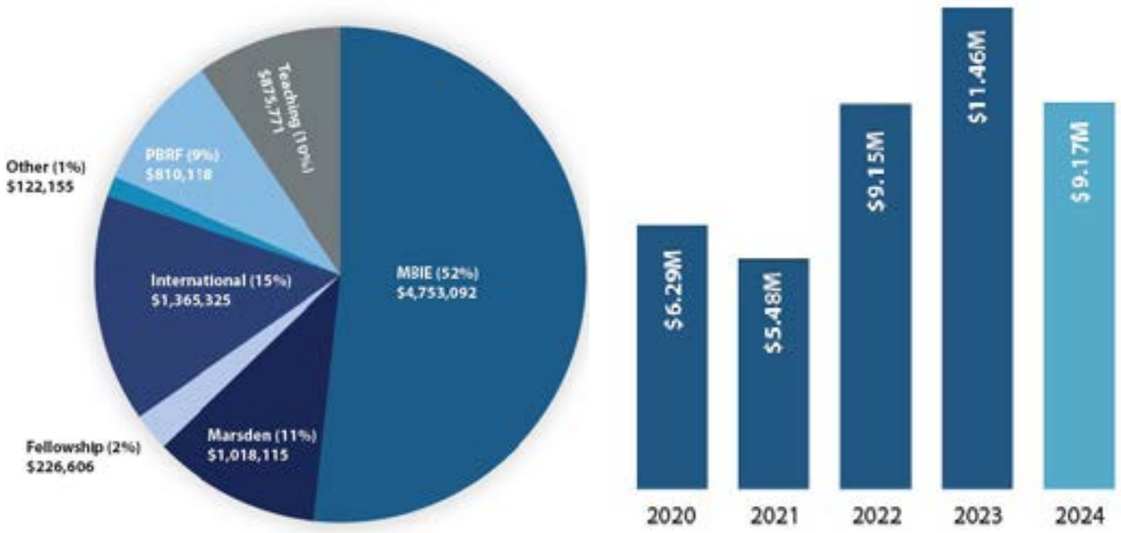
Peter uses machine learning methods to project future Antarctic ice melting and sea level rise. The goal is twofold: achieving Antarctic ice sheet predictions with minimal uncertainty and unravelling the underlying physical processes. Machine learning approaches are especially useful here because they are able to extract complex relationships. They can work along with climate models to reconstruct observational data in the past, especially in the polar regions where sea ice and land ice data were missing before the satellite era. Understanding the past climate is helpful in projecting future changes. By bridging the gap between the Arctic and Antarctic regions, Peter is shaping his research to meet his ultimate goal of becoming a cryosphere scientist.

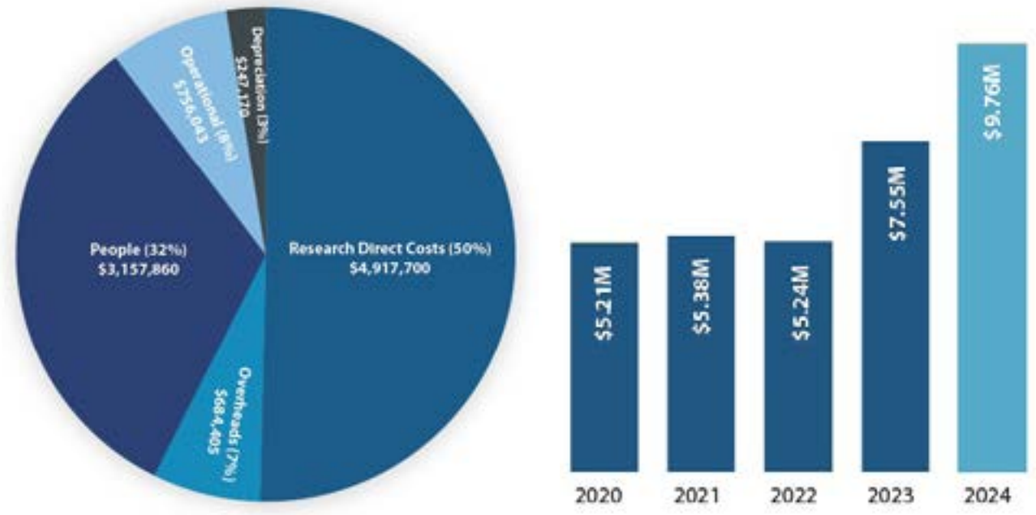
Peter in Galdhøpiggen, Norway.

FINANCIAL SUMMARY

The ARC finances include both a Centre budget and 33 grants held by the Research Trust of Victoria University of Wellington (RTV). Our consolidated revenue sources and expenditure areas as well as five year summaries are summarized in the charts below (all figures are exclusive of GST). These charts combine the Centre budget that operates over the University financial year (January-December) and RTV budgets which operate over the life of the projects, as such, the year-end balances for revenue versus expenditure are often out-of-phase.

In 2024, the ARC generated $9.17M in total revenue. In 2024, our expenditure was $9.76M, some of which was from revenue obtained in the Research Trust during 2023. Expenditure included $684K of overheads returned to the University from grants, and we generated an operational surplus of $9,333.





Revenue

Overall, 81% of ARC's revenue was from external funding sources. With funding from the Ministry of Business, Innovation and Employment (MBIE) making up 52% of this.

The ARC received $9.2m revenue in 2024, a decrease compared to last year due to the bulk of the SWAIS2C international project funds being received by the Research Trust of Victoria University of Wellington in 2023. However, a final tranche of payments for the SWAIS2C project was made in 2024 contributing to the $1.3m of revenue from international sources. We had five active Marsden grants, a Rutherford Discovery Fellowship and a Ngā Puanga Pūtaiao Fellowship in 2024.

The 12% increase in MBIE funding compared to last year was due to the Antarctic Sea Ice Switch. Our $122K of 'Other' external funding came from national funding sources, as well as reimbursement of costs from other institutes and private donations held by the Victoria University of Wellington Foundation, and transferred to the Centre for the ARC Endowed Development Fund and Arnold Heine Antarctic Research awards.

The remaining sources of revenue are from internal sources. The $810K PBRF (Performance-Based Research Fund) accounted for 9% and has continued to increase every year over the last six years. Our teaching revenue of $876K was from EFTS (Equivalent Full-time Student) for teaching and co-ordinating undergraduate classes and tuition fees for supervising postgraduate students. The increase in teaching revenue from last year was due to increased postgraduate supervision.

Expenditure

Overall, our expenditure was up on the previous year. ARC expenditure is divided between costs incurred directly within grants held in the Research Trust of Victoria University of Wellington, and those directly from the Centre's budget.

Our 'People' costs accounted for 32% ($3.2M) and covered salaries, annual leave and superannuation for permanent and fixed term staff including research assistants paid from grants.

The Centre's 'Operational' costs include $312K for occupancy charges for office and workshop space, $140K to support students through scholarships and grants, $45k for the Geodiscovery NZ consortium membership, $10K for consultancy fees, $52K for IT related charges, and $20k for small equipment purchases, maintenance and consumables. The remaining $177K covered general operational costs such as office supplies, catering, printing, and domestic and international travel costs.

The Centre budget also included $247K of expenditure for the depreciation of CAPEX equipment.

The almost $4.9M of Research Direct Costs includes $3.2M of subcontracts to our research partners, and $1.4M towards SWAIS-2C operational costs. The remaining $300K supported costs such as fieldwork, consumables and travel costs.

The ARC's $684K overhead contribution included $435K to the Research Office and $249K to the University.

PUBLICATIONS AND PRESENTATIONS

Peer-reviewed publications

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Books, reports

Golledge, N. Feb 6th - outputs from Tipping Points workshop:

Golledge, N. Report: https://www.csiro.au/-/media/Environment/CSIRO_Tipping-Points-Report.pdf

Gollege, N. Feedback book publication. See page 33

Naish T., Ministry for the Environment. 2024. Coastal hazards and climate change guidance. Wellington: Ministry for the Environment. Tim Naish, Richard Levy were contributing authors https://environment.govt.nz/assets/publications/Coastal-hazards-and-climate-change-guidance-2024-ME-1805.pdf.

Naish T., Levy,R. Information Paper 194, Understanding Future Sea Level Change Around Antarctica, 46th Antarctic Treaty Consultative Meeting, 20-25th May, Kochi India. https://www.ats.aq/devAS/Meetings/Documents/97?id=97&tab=meeting

Vargo, L. and Jones, M-F, The Earth Will Be Fine, Landfall 247: Autumn 2024

Conference, workshops, invited presentations

Dickinson, W., Verret, M.*, Lacelle, D., Fisher, D. & Andersen, D.T. (2024), Antarctic ground ice in a changing climate. 12th International Conference on Permafrost (ICOP), Whitehorse, Canada, 16-20 June 2024.

Golledge, N., November 28th - Sir Holmes Miller Memorial Lecture, NZ Antarctic Society. “Sync or Swim: saving an atomized society from the polycrisis”

Golledge, N., November 19th - Invited presentation, Woods Hole Oceanographic Institution (expenses paid). “Antarctica and the global climate system: observations, models, and chaos”

Golledge, N., Feb 13th - Invited presentation for workshop on freshwater hosing in climate models. “Ice-sheet melt as a climate amplifier: insights from the past and implications for the future”. Online.

Gossart, A., Malyarenko, A., Pletzer A., Scott, C., NeSI Webinar- Enhancing Code Reusability: Using Containers to port an Atmosphere-Ocean Coupled Model on NeSI - April 4 2024 (online presentation).

McKay, R., 18-20 March, IODP3 Forum, Japan.

Mattin, A., Barker, S.J., Winton, V.H.L., Piva, S. B., Iverson, N., Sigl, M., Wilson, C.J.N. (2024, October 10). Detecting physical and glaciochemical signals of the ~25.5 ka Ōruanui supereruption in Antarctic ice cores [Presentation]. Beanland-Thornley Prize Night 2024, Victoria University of Wellington, Wellington, New Zealand.

Mattin, A., Barker, S.J., Winton, V.H.L., Piva, S.B., Iverson, N., Wilson, C.J.N., Burke, A., Hutchison, W., Wolff, E., Bertler, N., Sigl, M., Kurbatov, A., Kjær, H.A., Svensson, A., Severi, M., Winski, D., Fujita, S., Hirabayashi, M., Oyabu, I., Goto-Azuma, K. (2024, September 8-12). Detecting variability in physical and glaciochemical signals of the ~25.5 ka Ōruanui supereruption in ice cores across Antarctica [Conference presentation]. IAVCEI Commission of Tephrochronology Conference, Catania, Italy.

Naish, T., 8th March. Invited Lecture “Climate Change & Aotearoa’s changing coast”, Whanganui Climate Forum, Whanganui.

https://www.horizons.govt.nz/HRC/media/Media/Agenda-Reports/Climate-Action-Joint-Committee/Climate-Action-Joint-Committee-2024-2-09/24113%20Annex%20A%20Climate%20Forum%20Whanganui%202024%20Funding%20Report.pdf

Naish, T., 21st May. Keynote Opening Lecture at the 4th Pacific Ocean Climate Change Conference. Climate-driven loss of Earth’s frozen Regions is having widespread impacts on the Islands, Ecosystems and People of the Pacific Ocean.

https://www.pacificclimatechange.net/document/4popccc-conference-programme

Naish, T., 26-28th August. Invited talk “The significance of vertical land movements at convergent plate boundaries in probabilistic sea-level projections for AR6 scenarios:

The New Zealand case.” PALSEA-Next Meeting, University of California, Santa Barbara. https://pastglobalchanges.org/publications/pages-magazines/pages-magazine/138492

Naish, T., 24th September. The significance of vertical land movements at convergent plate boundaries in probabilistic sea-level projections for AR6 scenarios:

The New Zealand case. Australian InSAR Vertical Land Movement Exploratory Workshop. (online).

Naish, T., 25th November. “Scientific Committee on Antarctic Research (SCAR) perspectives relevant to Ant-CF” Scoping Workshop on the establishment of the Antarctic Climate Forum (AntCF), and meeting of the Antarctic Advisory Group (AntAG) under the Executive Council Panel on Polar and High Mountain Observations (EC-PHORS), Milan, Italy (online).

Robinson, N. J., C. L. Stevens, D. Fernandez, C. L. Stewart, and K. Ryan, Antarctic sea ice and its oceanic connections, invited keynote speaker for Fluids in New Zealand, 7 February 2024, Waikato University, Hamilton, New Zealand

Robinson, N. J., Antarctic sea ice and its oceanic connections, lecture for VUW course ENSC301, 15 April 2024

Robinson, N., Leonard, G., Stuart, J., Smith, I.J., Radlwimmer, A., Foley, A., Halfter, S., 2025. Was 2019 so anomalous after all? How winter storms impacted landfast sea ice in McMurdo Sound, Antarctica over the period 2019 – 2024. Verbal presentation (Presenter: Greg Leonard) at the New Zealand Snow and Ice Research Group (SIRG) 2025 Workshop and New Zealand Sea Ice Symposium 2025, 10-12 February 2025, Lyall Bay Surf Lifesaving Club, Wellington, New Zealand.

Robinson, N. Caldarella, N.R.D., Smith, I.J., Leonard, G.H., Smedsrud, L.H., Grant, B., Schmidt B.E., Dichek, D., Meister, M., Hurwitz, B., Quartini, E., Mullen, A., Bryson, F., Richter, M.E., Lawrence, J., Russell, P., Thompson-Fawcett, J.F.W. 2025. Frazil ice, currents and supercooling in front of the McMurdo Ice Shelf. Poster presentation (Presenter: Inga Smith) at the New Zealand Snow and Ice Research Group (SIRG) 2025 Workshop and New Zealand Sea Ice Symposium 2025, 10-12 February 2025, Lyall Bay Surf Lifesaving Club, Wellington, New Zealand.

Robinson, N. J., Two contrasting seasons under ice, New Zealand Snow and Ice Research Group, 14 February 2024, Lauder, New Zealand

Robinson, N. J., An introduction to New Zealand’s Antarctic Science Platform, 21 March 2024, Joint NZ-Aus collaboration workshop, Monash University, Melbourne

Robinson, N. J., B. G. Grant, O. Twigge, C. L. Stewart, J. Stuart, G. H. Leonard, K. Ryan, An unprecedented season for sea ice – the view from the ocean, SCAR Open Science Conference, Pucon, 19 – 23 August 2024

Robinson, N. J., Opportunities to connect with the Antarctic Science Platform, Deep South Challenge Climate Workshop, 21-22 February, Wellington, New Zealand

Robinson, N. J. Plans for Phase 2 of the Antarctic Science Platform, ASP Steering Group meeting, 10 April 2024

Robinson, N. J. ASP Phase 2 connections for Stakeholders and Impact Partners, NZ Antarctic Environmental Workshop: Ocean and Cryosphere environments, 7-8 May 2024

Robinson, N. J., An update from the field – Live!, for International Glaciological Society, Live from an Antarctic field camp, 6 November 2024

Winton, V.H.L., 2024. Southern Ocean phytoplankton, aerosols and ice cores: fuelling every other breath you take. Invited talk at University of Waikato Environmental Research Institute seminar series, Hamilton, 19 May 2024.

Winton, V.H.L., 2024. Ice cores, aerosols and tohu. Invited talk at VUW School of Biology seminar series, Wellington, 17 May 2024.

Talks to policymakers, schools & community groups

Duncan, B., 11th June - Public talk at the Rotary club of Masterton South

Golledge, N., 16th October - Outreach event with Greytown School (Year 2)

Golledge, N., 14th October - Outreach event with Greytown Cub Scouts

McKay, R., 24th July - How to melt an ice sheet. talk to Science Wairarapa.

McKay, R., 11th November - Interaction lesson to Year 2 and Year 7 classes. Karori Normal School

Naish, T., 5th February, Key moments in scientific discovery in Antarctica: Once there were trees, Lecture on Holland America Antarctic Expedition (Buenos Aries to Punta Arenas)

Naish, T., 8th February, Key Moments in scientific discovery in Antarctica: unlocking the secrets of the ice house (Buenos Aries to Punta Arenas)

Naish, T., Melting ice and rising seas (Buenos Aries to Punta Arenas)

Naish, T., 9th February, How is climate change affecting Antarctica and what does it mean for us? (Buenos Aries to Punta Arenas)

Naish, T., 10th February, International Scientific co-operation in Antarctica (Buenos Aries to Punta Arenas)

Naish, T., 29th February, Forest and Bird Centennial Lecture Series. “No Future for Coal Mining”. https://www.forestandbird.org.nz/events/no-future-coal-mining-centennial-speaker-series.

Naish, T., 20th April, Lecture, Dunedin Wild South Festival. Otago Museum. “A Change in the Weather”. https://www.odt.co.nz/lifestyle/magazine/festival-nature-events.

Naish, T., 31st July, Facilitated climate change adaptation workshop “Climate Change: What it means for Aotearoa”, for 4th Year University of Auckland, School of Architecture Students. https://rtastudio.co.nz/journal/climate-warriors

Naish, T., 10th October, on Panel. “Argentina & New Zealand in Antarctica: Multilateral Diplomacy & Scientific Collaboration”. Rutherford House https://events.humanitix.com/argentina

Robinson, N. J., 12th March - A season of unprecedented sea ice conditions, ‘Fresh off the Ice’ public event for NZ Antarctic Society [Wellington branch], NIWA Greta Point, Wellington

Robinson, N. J., 13th March Antarctica’s role and response to our changing climate, Tūhara Otago Museum

Robinson, N. J., 3 July - Antarctica’s role in Earth’s Climate system, Club for the Blind (Wellington)

Robinson, N. J., 11th September - Antarctica’s role in Earth’s Climate system, Mana Blind Society

Robinson, N. J., Hendry, R., 10th June - Antarctica and the New Zealand Antarctic Society, Rotary club of Wellington

Robinson, N. J. and K892-0405, November - Adventures in Platelet Ice, Scott Base bar talk

Robinson, N. J., 24th November - Participation in ‘Inspiring the Future’ with Newlands Intermediate, live from an Antarctic field camp

Stuart, J., May - Talk to Woodford House School (Havelock North) Assembly and Physics classes

Stuart, J., May - Talk to Iona College year 10 Science class (Havelock North)

Stuart, J., May - Talk to year 7 class at Broadgreen School (Nelson)

Vargo, L., 3oth October - Public talk, “Girls* on Ice Aotearoa”, Hutt Valley Tramping Club, Wellington

Vargo, L., 14th October, Talk to Ministry for the Environment (MfE) “Impacts of current and future changes to snow and glaciers in Aotearoa”

Winton, H. and de Jong, E., 9th February, St Brigit’s School, Johnsonville, “What it means to be a scientist”

Convened Workshops

Uiteght, B., Naish, T., Polisri, D.,18th-20th March, Whanganui Climate Forum (see page xxx).

Levy, R., Tim Naish, T., Dao Polsiri, D., 11-12th April, Our Changing Coast Programme, Annual Hui, THW-VUW, Wellington.

Naish, T., Polsiri, D., 20th June, Actionable Climate Science in Aotearoa New Zealand, RSNZ, Wellington, co-sponsored by VUW-THW, WCRP, RSNZ.

Keratai, M., Naish, T., Levy, R., Polsiri, D., 25-28th June, Our Changing Coast, Community Climate Resilience Workshop, Te Whare Wānanga o Awanuiārangi, Whakatane

Naish, T., Colleoni, F., 17th August, SCAR INSTANT Thresholds and Instabilities in Antarctica – mid-term meeting, SCAR Open Sciences Conference, Pucon, Chile. https://www.scar2024.org/programme/business-meetings/

Naish, T., Polsiri, D., 7th November, West Coast North Island Case Study OCC Workshop, Rutherford House, Wellington.

Robinson, N. J. Series of eight workshops across New Zealand (NIWA, Wellington; GNS, Wellington; Christchurch, Dunedin, Hamilton, Auckland, plus 2x online) to identify science priorities for Phase 2 of the ASP (May/June 2024)

Stuart, J., Robinson, N., Leonard, G., Smith, I., Skelton, L., Radlwimmer, A., Halfter, S. 2025. McMurdo Sound’s “Unprecedented” Sea Ice Events: Causes and Consequences. Poster presentation (Presenter: Jacqui Stuart) at the Antarctic Science Platform (ASP) Hui 2025, 1-3 April 2025, Te Papa, Wellington, New Zealand.

Holly Winton collects surface snow samples in a cleansuit to prevent contamination during K044 field campaign. Photo by Emma de Jong

MEDIA

TV/Film/Video

TV1 6pm News – 17/7/2024, Tim Naish, "Sea-level rise and subsidence a double hit for coastal areas." https://www.1news.co.nz/2024/07/17/watch-sea-level-rise-and-subsidence-a-double-hit-for-coastal-areas/

Imagination TV - 17/9/2024, Natalie Robinson, interview for Scott Base redevelopment documentary film.

TV3 6pm News / Stuff.co.nz – 8/11/2025, Tim Naish, "Fossil fuel rampage Fossil fuel rampage? Trump's incoming Presidency sparks fears for climate change." https://www.youtube.com/watch?v=44YrKG8gtUk

Radio interviews

RNZ - 2/02/2024, Richard Levy, "Scientist on efforts to drill into West Antarctic Ice Sheet." https://www.rnz.co.nz/national/programmes/morningreport/audio/2018924474/scientist-on-efforts-to-drill-into-west-antarctic-ice-sheet

RNZ - 8/02/2024, Richard Levy, "The fate of the West Antarctic ice sheet in a warming world." https://www.rnz.co.nz/national/programmes/ourchangingworld/audio/2018925062/the-fate-of-the-west-antarctic-ice-sheet-in-a-warming-world

RNZ – 22/2/2024, Lauren Vargo, (online and radio), "Girls on Ice, luring more women into science." https://www.rnz.co.nz/national/programmes/afternoons/audio/2018927168/girls-on-ice-luring-more-women-into-science

RNZ – 23/3/2024, Jamey Stutz, "Jamey Stutz: Dating rocks in Antarctica" https://www.rnz.co.nz/national/programmes/saturday/audio/2018931375/jamey-stutz-dating-rocks-in-antarctica

RNZ Checkpoint - 3/04/2024, Alanna Alevropoulos-Borrill, "Building wall not enough to stop sea level rising, research says." https://www.rnz.co.nz/national/programmes/checkpoint/audio/2018932706/building-giant-wall-in-sea-wouldn-t-be-enough-to-stop-sea-level-rise

RNZ – 26/6/2024, Lauren Vargo, Our Changing World, "The annual snowline survey". https://www.rnz.co.nz/national/programmes/afternoons/audio/2018944119/our-changing-world-snowline-survey

RNZ, Our Changing World – 27/6/2024, Lauren Vargo, "The annual snowline survey". https://www.rnz.co.nz/national/programmes/ourchangingworld/audio/2018944118/the-annual-snowline-survey

Online and printed articles

New Zealand Geographic – 24/1/2024, Tim Naish, "Antarctic octopus sounds a warning over sea-level rise." https://www.nzgeo.com/stories/antarctic-octopus-sounds-a-warning-over-sea-level-rise/

1News - 31/01/2024, Richard Levy, "Research crew drills through 580m of ice to retrieve sediment core." https://www.1news.co.nz/2024/01/31/research-crew-drills-through-580m-of-ice-to-retrieve-sediment-core/

Scoop Independent News - 31/01/2024, Richard Levy, "Antarctic frontier project 'tantalisingly close' to vital climate secrets." https://www.scoop.co.nz/stories/SC2401/S00025/antarctic-frontier-project-tantalisingly-close-to-vital-climate-secrets.htm

GNS - 31/01/2024, Richard Levy, "ScienceAntarctic frontier project 'tantalisingly close' to vital climate secrets." https://www.gns.cri.nz/news/antarctic-frontier-project-tantalisingly-close-to-vital-climate-secrets/

CGTN - 1/02/2024, Richard Levy, "Antarctic scientists gather crucial information to learn climate secrets." https://news.cgtn.com/news/2024-02-01/Antarctic-scientists-gather-information-to-learn-climate-secrets-1qPKQC7JC04/index.html

Stuff – 1/2/2024, Richard Levy, "Scientists drill 600m into ice to unlock West Antarctica's frozen past." https://www.newshub.co.nz/home/world/2024/02/scientists-drill-600m-into-ice-to-unlock-west-antarctica-s-frozen-past.html

RNZ – 2/2/2024, Richard Levy, "Scientist on efforts to drill into West Antarctic Ice Sheet." https://www.rnz.co.nz/national/programmes/morningreport/audio/2018924474/scientist-on-efforts-to-drill-into-west-antarctic-ice-sheet

Newsfounded – Richard Levy, "Unlocking the Secrets of the West Antarctic Ice Sheet Melting Process." https://newsfounded.com/india/unlocking-the-secrets-of-the-west-antarctic-ice-sheet-melting-process/

Imperial – 5/2/2024, Richard Levy, "Antarctic frontier project 'tantalisingly close' to vital climate secrets." https://www.imperial.ac.uk/news/251216/antarctic-frontier-project-tantalisingly-close-vital/

Mirage News – 6/2/2024, SWAIS2C, "Probing West Antarctic Ice Sheet Climate Mysteries." https://www.miragenews.com/probing-west-antarctic-ice-sheet-climate-1168461/

Durham University - 6/02/2024, SWAIS2C, "Investigating West Antarctic Ice Sheet's climate secrets." https://www.durham.ac.uk/news-events/latest-news/2024/02/investigating-west-antarctic-ice-sheets-climate-secrets/

RNZ - 8/02/2024, SWAIS2C, "The fate of the West Antarctic ice sheet in a warming." World https://www.rnz.co.nz/news/ourchangingworld/547415/the-fate-of-the-west-antarctic-ice-sheet-in-a-warming-world

Indian Newslink - 17/02/2024, Richard Levy, "Antarctica yields new insights into climate warming." https://indiannewslink.co.nz/antarctica-yields-new-insights-into-climate-warming/

India Education Diary - 21/02/2024, Richard Levy, "Antarctic frontier project 'tantalisingly close' to vital climate secrets." https://indiaeducationdiary.in/antarctic-frontier-project-tantalisingly-close-to-vital-climate-secrets/

New Zealand Herald - 6/03/2024, Lauren Vargo, "Climate change: Photos of NZ glaciers show they may soon be extinct." https://www.nzherald.co.nz/nz/climate-change-photos-of-nz-glaciers-show-they-may-soon-be-extinct/KAPG6KU7U5FEHATAFZSW2WOXXY/

Mindfood - 6/03/2024, Lauren Vargo, "Frozen in time: old paintings and new photographs reveal some NZ glaciers may soon be extinct." https://www.mindfood.com/article/frozen-in-time-old-paintings-and-new-photographs-reveal-some-nz-glaciers-may-soon-be-extinct/

The Conversation – 6/3/2024, Shaun Eaves and Lauren Vargo, "Frozen in time: old paintings and new photographs reveal some NZ glaciers may soon be extinct." https://theconversation.com/frozen-in-time-old-paintings-and-new-photographs-reveal-some-nz-glaciers-may-soon-be-extinct-224373

New Zealand Herald – 6/3/2024, Shaun Eaves and Lauren Vargo, "Climate change: Photos of NZ glaciers show they may soon be extinct" https://www.nzherald.co.nz/nz/climate-change-photos-of-nz-glaciers-show-they-may-soon-be-extinct/KAPG6KU7U5FEHATAFZSW2WOXXY/

Whanganui Chronicle – 18/3/2024, Tim Naish, "Whanganui Climate Forum hosting speakers from around the world." https://www.nzherald.co.nz/whanganui-chronicle/news/whanganui-climate-forum-hosting-speakers-from-around-the-world/RC5GIJXNE5CXDO5WPUIOVNSM5Q/#google_vignette

The Conversation – 3/4/2024, Nick Golledge, "Why artificial submarine curtains won't save West Antarctica's retreating glaciers." https://theconversation.com/why-artificial-submarine-curtains-wont-save-west-antarcticas-retreating-glaciers-225998

VUW News – 3/4/2024, Alanna Alevropoulos-Borrill, "Colder seas and nearly 200 years of increased snowfall needed to rebuild Antarctic ice loss." https://www.wgtn.ac.nz/news/2024/04/colder-seas-and-nearly-two-centuries-of-increased-snowfall-needed-to-rebuild-antarctic-ice-loss

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The Conversation – 3/4/2024, Nick Golledge and Alanna Alevropoulos-Borrill, "Dangerous climate tipping points will affect Australia. The risks are real and cannot be ignored." https://theconversation.com/dangerous-climate-tipping-points-will-affect-australia-the-risks-are-real-and-cannot-be-ignored-222737

The Conversation – 23/4/2024, Nick Golledge, "West Antarctica's ice sheet was smaller thousands of years ago – here's why this matters today." https://theconversation.com/west-antarcticas-ice-sheet-was-smaller-thousands-of-years-ago-heres-why-this-matters-today-225670

Science News – 23/4/2024, Nick Golledge, "A rapid shift in ocean currents could imperil the world's largest ice shelf." https://www.sciencenews.org/article/ocean-currents-imperil-ross-ice-shelf

The Conversation – 2/5/2024, Shaun Eaves and Jamey Stutz, "A clock in the rocks: what cosmic rays tell us about Earth's changing surface and climate" https://theconversation.com/a-clock-in-the-rocks-what-cosmic-rays-tell-us-about-earths-changing-surface-and-climate-228094

Aspen Institute website – 19/5/24, Tim Naish, "IN DEPTH: New Zealand faces major sea rise much sooner than we thought." https://www.aspeninstitute.org.nz/news/in-depth-new-zealand-faces-major-sea-rise-much-sooner-than-we-thought

The Conversation - 11/06/2024, Shaun Eaves, "Weakening or collapse of a major Atlantic current has disrupted NZ's climate in the past – and could do so again." https://theconversation.com/weakening-or-collapse-of-a-major-atlantic-current-has-disrupted-nzs-climate-in-the-past-and-could-do-so-again-231266

Stuff – 2/7/2024, Lauren Vargo, "Girls* on Ice: The expedition exploring earth science, art and friendship." https://www.stuff.co.nz/nz-news/350323325/girls-ice-expedition-exploring-earth-science-art-and-friendship

New Zealand Herald - 2/7/2024, Tim Naish, "Thousands of Wellington buildings 'at risk' from rise in sea levels, including hospitals and schools." https://www.nzherald.co.nz/nz/thousands-of-wellington-buildings-at-risk-from-rise-in-sea-levels-including-hospitals-and-schools/XF47AT7LSZHMFDNS5FQ7P6UVQQ/

VUW news - 8/07/2024, Lauren Vargo, "Watch: Girls* on Ice are gearing up for their next adventure." https://www.wgtn.ac.nz/news/2024/07/watch-girls-on-ice-are-gearing-up-for-their-next-adventure

Otago Daily Times – 13/7/2024, Tim Naish, "Changing the weather." https://www.odt.co.nz/features/changing-weather.

VUW news - 23/07/2024, Richard Levy, "Rangatahi explore coastal hazards and climate change science at Whakatane workshops." https://www.wgtn.ac.nz/news/2024/07/rangatahi-explore-coastal-hazards-and-climate-change-science-at-whakatane-workshops

Newsroom – 30/8/2024, Tim Naish, "A mayor's decision whether to flood his own city." https://newsroom.co.nz/2024/08/30/a-mayors-decision-whether-to-flood-his-own-city/.

VUW news - 14/09/2024, Nancy Bertler, "Research projects get $27.7 million boost." https://www.wgtn.ac.nz/news/2024/09/research-projects-get-$27-7-million-boost

Stuff - 12/11/2024, Richard Levy, "International team attempt to drill deep for 'critical to humanity' Antarctic climate clues." https://www.stuff.co.nz/nz-news/360481400/international-team-attempt-drill-deep-critical-humanity-antarctic-climate-clues

RNZ - 12/11/2024, Richard Levy, "Is the West Antarctic ice sheet already doomed?" https://www.rnz.co.nz/news/national/533488/is-the-west-antarctic-ice-sheet-already-doomed

WellingtonNZ – 28/11/2024, Tim Naish, "Antarctic research secures cryosphere conference for Wellington." https://www.wellingtonnz.com/about-us/press-releases-and-news/antarctic-research-secures-cryosphere-conference-for-wellington

Meeting Newz - 28/11/2024, Tim Naish, "Antarctic research secures Cryosphere conference for Wellington." https://www.meetingnewz.co.nz/news/around-new-zealand/item/3767-antarctic-research-secures-cryosphere-conference-for-wellington

Micenet - 2/12/2024, Tim Naish, "Wellington wins climate conference for 2026." https://mice.net.au/wellington-wins-climate-conference-for-2026/

Boardroom - 5/12/2024, Tim Naish, "Wellington to Lead Global Effort in Tackling Climate Change at 2026 Cryosphere Summit." https://boardroom.global/wellington-to-lead-global-effort-in-tackling-climate-change-at-2026-cryosphere-summit/

1News online – 11/12/2024, Holly Winton, "Scientists reveal why the Southern Alps turned red" 11 December 2024 https://www.1news.co.nz/2024/12/11/scientists-reveal-why-the-southern-alps-turned-red/

Event Organisers - 16/12/2024, Tim Naish, Lauren Vargo, "Wellington secures Antarctic research conference." https://www.wellingtonnz.com/about-us/press-releases-and-news/antarctic-research-secures-cryosphere-conference-for-wellington

Wairarapa Times-Age – 27/12/2024, Bella Duncan, "Local climate expert earns prestigious award for research."

Woodford House Magazine - 2024, Jacqui Stuart, 'Tempus' pg 62-63: https://www.flipsnack.com/woodfordhouse/wh-tempus-2024/full-view.html

Roosevelt Island, Roosevelt Island Climate Evolution (RICE) Project, 2012/13. Photo by Nancy Bertler

OUR PEOPLE

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National Modelling Hub
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Associated VUW researchers

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Judy Lawrence	Climate Change Research Institute	Climate change adaptation
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Rebecca Priestley	Centre for Science in Society	Antarctic science history
James Renwick	School of Geography, Environment and Earth Sciences	Atmospheric circulation
Tim Stern	School of Geography, Environment and Earth Sciences	Transantarctic Mountains geophysics
Billy van Uitregt	School of Geography, Environment and Earth Sciences	Indigenous Perspectives

ARC adjuncts

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Helen Bostock	University of Queensland	Oceanography
Ruzica Dadic	Institute for Snow and Avalanche Research	Snow science
Robert DeConto	University of Massachusetts Amherst	Earth system modelling
Robert Dunbar	Stanford University	Ocean chemistry
Katelyn Johnson	GNS Science	Paleoenvironmental reconstruction
Daleen Koch	GNS Science	Project Management
Mario Krapp	GNS Science	Data scientist
Karin Kvale	GNS Science	Carbon cycle
Judy Lawrence	NZ Climate Change Research Institute	Climate change adaptation
Dave Lowe	LoweNZ Ltd	Atmospheric chemistry
Dan Lowry	GNS Science	Numerical modeller
Andrew Mackintosh	Monash University	Glaciology and modelling
Alena Malyarenko	NIWA	Process-scale ice shelf modelling
Sarah Seabrook	NIWA	Marine biogeochemistry
Jamey Stutz	The Ohio State University	Geology
Levan Tieledze	Monash University	Glacial geology
Marjolaine Verret	The University Centre in Svalbard	Permafrost geochemistry
Karen Williams	The Ohio State University	Biostratigraphy
Mike Williams	NIWA	Physical oceanography
Terry Wilson	The Ohio State University	Tectonics and Antarctic geology
Yaowen Zheng	British Antarctic Survey	Climate Modeller
Dan Zwartz	Dept. Industry, Science, Energy & Resources	Climate change

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