

# IceSked

Issue 44 - July 2025

Newsletter of Te Puna Pātio—Antarctic Research Centre  
Te Herenga Waka—Victoria University of Wellington

## A word from our Director

In this issue, we profile the diverse research our students and early career researchers are conducting – but also work we are doing to preserve our history. Over the past year, we have supported a range of projects to catalogue documents held by founding Director, Professor Peter Barrett, as well as collecting and restoring video footage from expeditions across all decades. We hope this catalogue and archive will provide a unique and important resource for social scientists and historians to understand not only the ARC's history, but also that of the New Zealand Antarctic programme as a whole.

*Rob McKay*

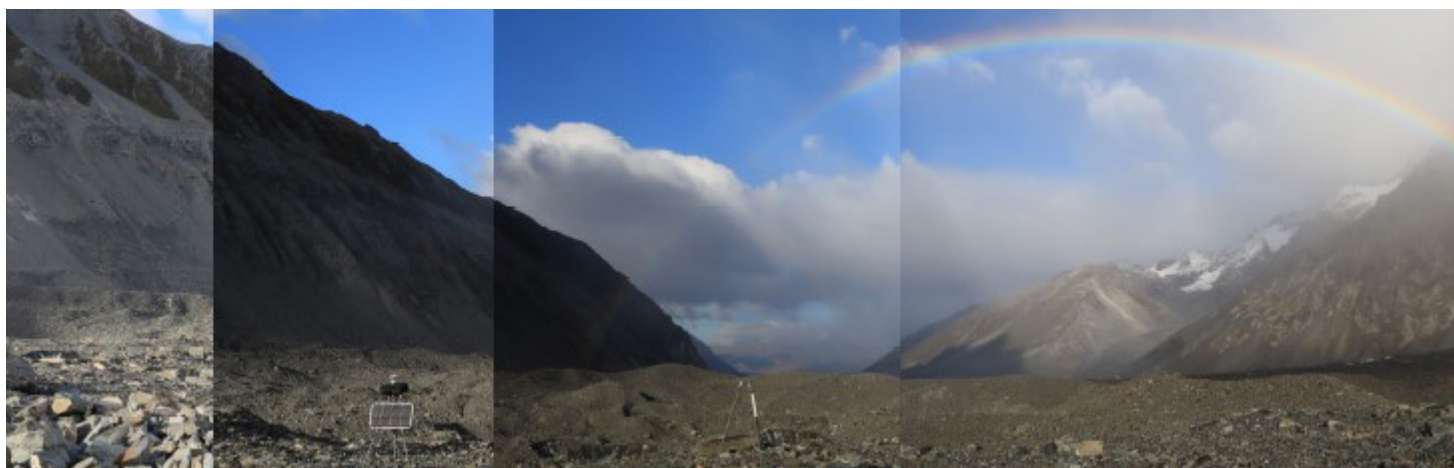
## A Clearer View of Debris-Covered ice

Dr Alex Winter-Billington's Ngā Puanga Pātaiao research, funded by Te Apārangi Royal Society of New Zealand, is revealing complexities of an understudied aspect of glacier science: how debris cover influences melt rates under changing weather conditions. Focusing on Aotearoa's Haupapa Tasman Glacier, India's Satopanth glacier, and Nepal's Changri Nup, Alex is establishing a network of field monitoring stations to capture high-resolution data on surface melt, debris thickness, and local meteorology.

Debris-covered glaciers, blanketed in landslide sediment, are melting as rapidly as debris-free glaciers - but through different mechanisms. Thin debris can accelerate melt, while thicker layers insulate the ice beneath. How this relationship holds under variable weather conditions remains poorly understood and difficult to predict.

Fieldwork began in May with the installation of a new station on Haupapa. The two-week campaign highlighted the system's complexity: dry debris under patchy snow cover was rapidly saturated by warm rain and snowmelt during a storm. As conditions cleared, cold winds dried the surface but froze pore water in the fine sediments adjacent to the ice. With high-resolution observations, Alex aims to quantify how passing meteorological conditions influence heat transfer within the debris layer and, ultimately, affect melt rates.

New stations will be installed on Satopanth and Changri Nup by the end of 2025. Once monitoring is underway, Alex will begin exploring how Mātauranga Māori of the cryosphere might further illuminate the links between sub-debris melt and weather patterns.



Panorama showing kahukura (rainbows) arching over the new field site on the debris cover of Haupapa Tasman Glacier, Aoraki Mt Cook National Park.  
Photo collage by Alex Winter-Billington



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## In 2023, spurred by the ARC's 50th anniversary,

Prof. Rebecca Priestley of VUW's School of Science in Society spearheaded the huge job of archiving the vast collection of papers and video footage documenting VUW's activities in the Antarctic dating back as far as 1955. Standing as a record of early Antarctic exploration and developing climate change theory, the documents were mostly collected by Em. Prof. Peter Barrett, who joined the Geology staff in 1970, but also include documents from Geology Professor Bob Clark and others from 1955. They are roughly organised in boxes by year for correspondence (no email then!) and by VUWAE expeditions. The four drilling projects from DVDP (1972-75) to the Cape Roberts Project (1997-2000) had their own boxes, as did Treaty issues.

Museum-trained archivist Laura Westphal built a catalogue as a searchable Excel Workbook, with one-line descriptions of each of the 9300 documents, while Matt Wood commenced the task of digitizing footage brought home by Peter and others from Antarctic expeditions, firstly on 8-mm film and later in a wide range of analog and digital formats. In late 2024, two summer scholars continued the archival project, creating two-page summaries for about half of the 69 storage boxes, and also writing a piece on a topic they discovered in the boxes - an opportunity to delve deeper into something of particular interest found during the archiving process.



Some of the 69 boxes occupying 7 meters of shelving in Em. Prof Peter Barret's office.



## Matt Wood - video archivist

Peter produced two short films in the 1970s in collaboration with filmmaker John Pettigrew, VUWAE 15, Darwin Mountains, Antarctica and (Glo-mar) Challenger Sails South, which had previously been scanned by Park Road Post. The ARC archiving project unearthed original 16 mm reels for two unfinished films. The first would have further documented the Gondwana fossils of the Beacon Sandstone (VUWAE 16, 1971-72) and featured Rosemary Askin, a pioneering female Antarctic. The second, To the Southernmost Sea, featured the then Masters student, Ross Powell at the Crary Ice Rise during the final husky-supported field work out of Scott Base (VU-

WAE 19, 1974-75).

VHS recordings from CIROS in the mid-1980s were digitised using time base correction and digital noise reduction, resulting in usable footage from tapes that had previously been deemed beyond repair. Other highlights include Alex Pyne's Hi8 tapes from submarine ROV work in the 1990s and MiniDV camcorder footage of Warren Dickinson's Dry Valleys expeditions in the early 2000s. There is now a wealth of production-quality media in a unified library that can be used for producing short films that commemorate the history of the ARC.

## Sulma Wilson - Summer Scholar

The ARC summer research scholarship had Claire and I delving into mountains of material from Prof. Barrett's personal archive. We worked side by side on different topics; mine focusing on Antarctic drilling expeditions such as DVDP, MSSTS, and CIROS. Many documents were handwritten, which meant lots of re-reading to decipher them! It was incredible to summarise all the opinions, planning, concerns, and funding agreements behind the projects that shaped the groundwork for today's research.

Later, I collaborated with Peter Barrett and Rebecca Priestley to write a narrative tracing New Zealand's pioneering role in Antarctic geological drilling, starting with the Victoria University of Wellington Antarctic Expeditions (VUWAE) in 1957. We explored how the international Dry Valley Drilling Project (DVDP) emerged, with the US, Japan, and New Zealand navigating many scientific, logistical and funding hurdles. DVDP was foundational, cementing New Zealand's leadership in Antarctic Drilling science.

## Claire Broughton - Summer Scholar



I'm feeling very lucky to have spent six weeks at the ARC working under Prof. Barrett on a research scholarship. The first part of the project involved going through his collection of documents from his time as Director of the Antarctic Research Centre and working on a catalogue of the documents, preparing summaries of the content for future use.

During the second part of the project I worked on a write-up on insights from Prof. Barrett's documents relating to international negotiations to allow and regulate mineral extraction (primarily oil drilling) in Antarctica during the 1980s. I was also working with Professor Catherine Iorns from the VUW Faculty of Law on this.

The negotiations in the 1980s were complex and controversial, and led to the Convention on the Regulation of Antarctic Mineral Resource Activities, before a last-minute pivot by Antarctic Treaty nations to instead ban all mining in Antarctica.

I have focused on the attitude of negotiating parties towards mining and the role NGOs played in challenging this, as well as the framing of environmental issues in the context of emerging climate change knowledge in the 1980s. I've also looked at the impact the politics had on New Zealand Antarctic research at the time.



## Collecting Velocity Measurements of the Ross Ice Shelf

**Alanna Alevropoulos-Borrill and Peter Siew**

This season, new ARC Research Fellow Peter Siew joined Alanna Alevropoulos-Borrill for four weeks at Scott Base to complete their work servicing GNSS (aka GPS) site installations over the Ross Ice Shelf. This project has been collecting ice velocity ground measurements on the Ross Ice Shelf since 2019, with this being the fourth season a team has visited the ice.

The network of six GNSS sites span up to 300 km from Scott Base, so Peter and Alanna completed the work in day trips - flying to each site by Twin Otter and Helicopter for the closest location. At each site the team dug out the instruments that were buried beneath a year of snow accumulation, then downloaded the data and replaced SD cards and cables where necessary. Of the six sites, four were left fully serviced and ready to collect another year of data, while two of the installations were disassembled and retrieved, to be upgraded and replaced in the project's next season.

Although satellites can measure the velocity of the ice shelf, the measurement is temporally sparse and has low spatial resolution; meaning direct ground measurements using GNSS are essential to have continuous records with high accuracy. The collected data will help understand ice flow behaviour and predict how the ice shelf may respond to a changing climate.



Ready to get on the Twin Otter to visit the Ross Ice Shelf. Taken on January 7, 2025. From left to right: David Cogger (Scott Base), Peter Siew, Stephen Trimble (Scott Base), and Alanna Alevropoulos-Borrill. Photo by Addison Payne

## Biomarkers, Blizzards, and Uncovering Ocean History in Ice Cores

**Emma de Jong**

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 150 m ice core. The team also returned to the previous seasons site at Upper Priestly Glacier to conduct the GPR measurements.

The data collected by the team during this project will provide important ground-work 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.



Emma de Jong drilling a shallow firn core at Thern Promontory as part of the K044 field campaign. Photo by Holly Winton

## Dr Lauren Vargo International Glaciological Society Early Career Scientist Award

ARC's Dr Lauren Vargo was recently awarded the International Glaciological Society Early Career Scientist Award which honors 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.

*"Dr. Vargo's research has made an invaluable contribution to understanding the effects of human-driven climate change on mountain glaciers, and her ability to present complex glaciological phenomena in a clear and assured manner has earned her respect both in the scientific community and in public discourse."*  
Awards Committee of the [International Glaciological Society](#).

Lauren 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. A fantastic acknowledgement for Lauren.



Dr Lauren Vargo. Photo by Rebekah Parsons-King

## 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.

### Climate and Cryosphere (CliC) 2026 Conference

Founded in 1996, the Climate and Cryosphere (CliC) is a core project of the World Climate Research Program. CliC encourages and promotes research into the cryosphere and its interactions with the global climate system. It highlights emerging issues, encourages communication between researchers with common interests in cryospheric and climate science, promotes international cooperation, and highlights the importance of this field to policy makers, funding agencies, and the general public. CliC also publishes scientific papers on the role of the cryosphere in the global climate system and recommends directions for future study.

The 2026 CliC conference will be held in Wellington, hosted by WCRP and the Antarctic Research Centre at Victoria University of Wellington

[Climate and Cryosphere Open Science Conference](#)  
9-12 Feb 2026 at Tākina Wellington Conference and Exhibition Centre

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Near Upper Priestley Glacier, Victoria Land. Photo by Holly Winton