IceSked

Issue 24: June 2015

Newsletter of the Antarctic Research Centre
Victoria University of Wellington

A Word From the Director

As we move into winter we reflect on a successful summer Antarctic field season, profile latest developments with the *Thin Ice* climate change film, welcome two new NZARI-funded postdoctoral research fellows and farewell a large cohort of our postgraduate students. With the Paris UN climate negotiations happening in November/December, I encourage you all to engage in the process. There is still a future that saves the Antarctic ice sheet.

Tim Naish

Thin Ice: Our Award-winning Documentary to Air on US Public Television

In June 2013 we reported the successful global launch of the film *Thin Ice*, a DVD and some film festival awards, all very satisfying after six years in production. The next goal was increase its reach, especially with young people through educational networks.

In November 2013 we enlisted the help of Victoria University's commercial arm VicLink, who funded summer research assistant, Suze Keith, to develop a marketing and operations strategy, and provided their management accountant Gary Ward to help Suze and I assess proposals for an educational distributor for *Thin Ice*. The successful company was Green Planet Films (GPF), based in California with ten years' experience.

GPF Chief Executive Suzanne Harle was active through 2014 promoting *Thin Ice* to a wide range of institutions, and providing access through streaming, downloads or DVD. Through her efforts we had screenings by invitation at environmental film festivals in San Francisco in June, Santo Domingo in September, and the world's oldest in Barcelona in October, and a small but rising stream of sales to schools, colleges and universities. Suzanne's most successful promotion came through a discussion with Californian TV station manager, Stan Marvin, who thought the film would appeal to American public TV audiences if it were trimmed to an hour. He suggested we submit it through his station KRCB-TV, but first we had to get the film re-edited to length at our expense ($US23,000), and find around $US10,000 for promotional costs.

Early on we got key institutional support from the Tindall Foundation (NZ) and the Climate Change Institute (UMaine). We then picked up on Suzanne's suggestion that we (Gary, Suze, Simon Lamb and I) form a team to run a crowd-sourcing campaign through "Kickstarter". Earth Sea & Sky came on board as our primary reward partner, and we launched on 24 October, 2014, with numerous e-mails to various networks, friends, and alumni. A month later we had support from 220 individual donors and three other institutions, for a total that just covered our goals and campaign costs.

In May 2015 the new TV version was accepted by American Public Television (APT). It will be broadcast on over 95 stations across the US for broadcast from 1 July, 2015. An added bonus is the agreement with APT Worldwide, to licence and market the film internationally. This will help viewers worldwide see our scientists at work, understand the direct link between rising greenhouse gas emissions and changing climate, and the consequences, and strengthen their support for a global emissions reduction agreement in Paris in December. The latest development is that Victoria University is supporting a "roadshow" during September which will see *Thin Ice* shown in New Zealand's main cities and towns with a panel discussion and Q & A featuring New Zealand's best climate change researchers, environmental personalities and experts. The aim is to raise public awareness ahead of the UN climate negotiations in Paris where New Zealand will make a new commitment to greenhouse gas emission reductions. Check out our website www.thiniceclimate.org and follow us on Facebook.

Peter Barrett

(left-right) Suze Keith, Simon Lamb, Peter Barrett, and Gary Ward

In search of Fiords, Beech Trees and Alpine Lakes in Antarctica

As we set up camp in temperatures of -15°C at 1300 m altitude in the Transantarctic Mountains last November, it was hard to believe that 15 million years ago summer temperatures of +5-10°C in this region supported a grassland tundra and stunted beech forest, with alpine glaciers feeding lakes, and dolphins swimming in the adjacent fiords! Today the Friis Hills at the head of Taylor Valley is a frozen ice-free desert that may not have seen water for the last 10 million years. It is beautiful in its desolation and wind-sculptured landscape surrounded by the vast East Antarctic Ice Sheet to the south and west, and its large outlet glaciers that flow west to the Ross Sea.

(left-right) Andrew Gorman, Adam Lewis, Richard Levy, Chris Kraus, Tim Naish, Warren Dickinson, Nick Golledge

Our team ably led by Richard Levy (GNS Science) and including the ARC's Tim Naish, Nick Golledge, Warren Dickinson, and Chris Kraus, along with Andrew Gorman (UOtago) and Adam Lewis (UNorth Dakota) undertook a geophysical survey of a series of tills (glacial drifts) and intervening fossilferous lake sediments representing a past warmer alpine glacial regime when atmospheric CO_2 levels were 400-500 ppm during the Middle Miocene. Our US collaborators Adam Lewis and Allan Ashworth (UNorth Dakota), have spent many field seasons documenting the sediments and the plant and insect fossil remains from outcrops across the Friis Hills. However because the deposits are frozen they have been unable to dig more than 50 cm below the surface. Based on their detailed mapping our aim was to survey the thickness and geometry of the deposits using seismic reflection to identify sites for drilling the frozen sediments in 2016/2017. We successfully identified several places where up to 50 m thick continuous sediment cores can be recovered through the sequence of tills and lake deposits. Volcanic ashes are known through this time period from other locations, and it is hoped a series of volcanic ashes will be inter-bedded in the sediments dating back to 19 million years ago.

The aim of the research is to understand the stability of the giant East Antarctic Ice sheet as CO_2 levels in the atmosphere continue to rise, by reconstructing its past response from the geological evidence. The fieldwork was arduous as the team "man-hauled" seismic cables, batteries and geophones across the rocky ancient landscape. Thirty kilometres of seismic reflection data were gathered using a sledge hammer, swung 6000 times against a steel plate by the team members as a sound source! It has to be said that some hammer swingers were more reliable than others, but Adam took the record for the consistently biggest bangs!

We were also joined for three days by TV3 presenter Sam Hayes and a crew who filmed and interviewed us "on the job" for a 20 minute documentary segment on how our research informs about climate change and future changes that Antarctica may face. This story is scheduled for New Zealand TV sometime in 2015. Cliff Atkins (SGEES) and Rebecca Priestley from the Science in Society group at Victoria University joined us for a few days as well – their mission to film a series of field lectures for a new online University course.

After two weeks the team returned to Scott Base, very satisfied with a job well done and with significantly improved science communication skills! We look forward to returning for the drilling campaign to come.

Tim Naish

Science of the Lambs

After working for a couple of years following the completion of my MSc degree in 2012, I was contracted by Tim Naish in July 2014, to assist in the recovery of geological cores from Whanganui Basin, and in doing so, was inspired to sign-up for the associated PhD project: "*Reconstructing sea-level for the mid-warm Pliocene period*". The shallow marine sediments in Whanganui preserve one of the world's most complete records of ancient global sea-level change. Our drillcores west of Taihape will target the "warm Pliocene" 3-3.5 million years ago, and help resolve the frequency and magnitude of global sea-level change the last time we had 400 ppm CO_2 in the atmosphere for a sustained period.

Georgia Grant logging core at Tiriraukawa drill site, Whanganui

Drilling was undertaken over six weeks in spring last year, and encompassed cold mornings followed by long days in the field logging 750 m of core. Down time was filled with watching new born lambs frolic in the surrounding fields, and eating wonderful meals prepared by the local farmers' wives.

Since then, I have spent further, colder, days in the ARC's newly developed Core Processing Facility at the VUW Karori campus. Here, I have scanned, split, sampled and re-logged the core for about three months. This data allows a calculation to be made between the change in grainsize down core to approximate sea-level below which the sediments were deposited. I am now embarking on a detailed analysis of marine microfossils to further refine the nature of past sea-level changes.

Georgia Grant

Inaugural NZARI Winter School in Science Communication

Five facilitators and 15 participants met at the Lake Ohau Lodge on a cold but beautiful autumn weekend in May for the inaugural New Zealand Antarctic Research Institute Winter School. The brainchild of NZARI Director, Gary Wilson, the school was aimed at helping media and stakeholders better understand the key questions concerning "how Antarctica responds to climate change, and what this may mean for New Zealand". Tim Naish and Nancy Bertler from ARC and Richard Levy from GNS Science were the invited scientists. Print, online, television, and radio media were also represented along with staff from Antarctica New Zealand, Christchurch City Council, and sponsors Air New Zealand and Icebreaker. The weekend was a mix of hands-on experiments such as "melting ice", presentations and facilitated discussions. A highlight was an after dinner lecture from TV celebrity psychologist Nigel Latta, who explained how science was freak'n awesome and important and how to engage the public with science – without blowing stuff up! The scientists gained an appreciation of how to make their message more accessible to the media and the constraints that media are often under when trying to communicate science.

Ice Meets Climate; Two New ARC Postdoctoral Research Fellows

Two new Postdoctoral Research Fellows will improve our understanding of potential rapid Antarctic ice sheet melting and its non-linear impacts on climate. Recent observations and modelling show that collapse of the West Antarctic Ice Sheet may be underway, with the potential to dramatically release meltwater to the oceans. During a previous period of global warming ~14,000 years ago, some geological records and computer model simulations suggest that a large Antarctic meltwater release caused a Southern Hemisphere climatic response known as the 'Antarctic Cold Reversal'. Postdoctoral scholars – Richard Jones and Shaun Eaves will investigate both the possible source of the meltwater in Antarctica, and the downstream impacts on past climate in New Zealand. These positions have been made possible by two new grants from the New Zealand Antarctic Research Institute (NZARI), led by Andrew Mackintosh and Kevin Norton (SGEES).

Richard and Shaun have spent the last three years carrying out their PhD work in the ARC. Richard will extend his work on Antarctic deglaciation including a search for the possible source of meltwater pulse 1a, focussing on Northern Victoria Land. He will apply numerical glacier modelling, supported by Nick Golledge, and ^{10}Be dating in collaboration with Kevin. Shaun will focus on the South Island of New Zealand, to investigate the climate of the Antarctic Cold Reversal. Shaun will again use ^{10}Be dating supported by Kevin and Joerg Schaefer (Lamont Doherty Earth Observatory), and glacier modelling with Brian Anderson. He will also make hemisphere-wide climate reconstructions for this time with the assistance of Andrew Lorrey and Helen Bostock (NIWA).

Together, both projects will improve our understanding of climatic responses that might arise from future Antarctic ice sheet melting.

Andrew Mackintosh

Shaun Eaves and Richard Jones in Spenser Mountains, Nelson Lakes

The Adventures of a Fulbright Scholar in Kiwi-Land

I came to Victoria University as a Fulbright Distinguished Teacher to do research on energy policies and the environmental sustainability of New Zealand. Working under the guidance of Tim Naish (ARC) and Mike Taylor (School of Education) I looked at a broader picture of New Zealand's energy story; the science and the social aspects. I visited power stations and learned from the policy makers, MPs, academics, experts, activists, film makers, CEOs and teachers. I also studied Māori perspectives on land and water use.

I learned that sustainability is more than 80% renewable energy for electricity. For New Zealand large scale agricultural and manufacturing practices, and environmental policies matter. New Zealand has been a leader on the world stage for being the first country to give women the right to vote and declaring itself nuclear free. With regard to climate change issues, it will be interesting to see what Kiwis decide to do.

Overall, this has been an amazing experience both personally and professionally, and I will take this with me wherever I go.

S. Hakan Armağan

Hakan Armağan on the road

OTHER ACTIVITIES

The ARC is Back

After a year (almost to the day) of the ARC being decamped to the Railway Building in downtown Wellington, in February we moved back to the newly refurbished offices on level 5 of the Cotton Building on the Kelburn campus. Everyone is pleased to back in the hub of the main university and reunited with our friends in SGEES.

Congratulations to Our Recent Graduate Completions

Shaun Eaves (PhD) *"The glacial history of Tongariro and Ruapehu volcanoes, New Zealand"*

Aitana Forcen Vasquez (PhD) "*Oceanography of the New Zealand subantarctic region*"

Richard Jones (PhD) *"Late Cenozoic behaviour of two Transantarctic Mountain outlet glaciers"*

Peter Neff (PhD) *"Antarctic and Southern Ocean dust transport pathways: Forward-trajectory modelling and rare Earth element source constraints from the RICE ice core"*

Heidi Roop (PhD) *"Late-Holocene climate variability in southern New Zealand: A reconstruction of regional climate from an annually laminated sediment sequence from Lake Ohau"*

Andrea Tuohy (PhD) "*Heavy metal pollutants in snow and ice from Roosevelt Island, Antarctica*"

Juliet Sefton (MSc) "*An assessment of the influence of orbital forcing on Late Pliocene global sea level using a shallow-marine sedimentary record from the Whanganui Basin, New Zealand*"

The ARC Endowed Development Fund

As a University, and here at the ARC, we are committed to delivering distinctive research. Our Endowed Development Fund was established to enhance the experience of our postgraduate students with Antarctic links by enabling them to take up amazing opportunities, both nationally and internationally. By offering small grants of up to $4,000 they can work with collaborators in world-class analytical facilities, or travel to conferences and workshops to present their scientific discoveries on a world-stage.

We want to keep growing this fund so that more students can benefit from these valuable experiences but to do this we need the help of our friends. For further information, or if you would like to support the ARC, please contact our Director, Tim Naish, Email: timothy.naish@vuw.ac.nz, or Development Manager, Emma Lewis, Email: em.lewis@vuw.ac.nz, or Ph: 0800 VIC GIFT (0800 842 4438). All donations are made through the Victoria University Foundation, a registered charity, and are therefore eligible for a charitable gift taxation rebate.

Living in the USA? The US Friends of Victoria University of Wellington is an independent American non-profit organisation set-up to receive donations from tax payers in the US to support the work of the University. The US Friends is a 501(c)(3) tax exempt American non-profit organisation and donations are tax deductible to the full extent allowed by law. The US Friends accept donations by check, appreciated stock, matching gifts and planned giving including bequests. If you have any questions please contact Angela Willis or if you would like to donate and are a US taxpayer please send your check, payable to the US Friends of Victoria University of Wellington Inc., to:

Angela Willis
US Friends of Victoria University of Wellington
Chapel & York Ltd
1000 N West Street,
Suite 1200
Wilmington, DE 19801

Remember to include your name and address details with your check so we can thank you for your gift and send you a receipt.

Thank you.

Antarctic Research Centre, Victoria University of Wellington, PO Box 600, Wellington 6140, New Zealand
Ph +64-4-463 6587 • Fax +64-4-463 5186 • Antarctic-Research@vuw.ac.nz • www.victoria.ac.nz/antarctic

TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON