

# IceSked

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Newsletter of the Antarctic Research Centre  
Victoria University of Wellington

**R**ecent successes in research funding in support of Antarctic paleoclimate research have allowed us to increase our research capability through new appointments. We are pleased to welcome several new people to the staff of the Antarctic Research Centre – some are profiled here, and some will appear in the next newsletter later in the year. We also feature some of our partnerships with organisations such as Webster Drilling and Antarctica New Zealand, which are so crucial to our research, particularly in the field.



## Deputy Director Appointed

Tim Naish, Senior Scientist at the Institute of Geological and Nuclear Sciences (GNS) has started a part time position as Deputy Director of the Antarctic Research Centre. Tim will continue to work at GNS, leading research projects in New Zealand Quaternary climate history.

Tim gained his PhD from the University of Waikato in 1995, and has already become internationally recognised for his studies of the record of climate and sea level over the last 4 million years to be found in the strata of the Wanganui-Rangitikei region. A feature of this record is the well-defined pattern of Milankovitch cyclicity. He gained significant Antarctic experience through the Cape Roberts Project, from whose cores he recognised similar cyclicity from ice sheets and sea level over 20 million years ago.

He is the lead investigator on a new Marsden grant entitled “Stability of the Ross Ice Shelf in a warming world”, with Peter Barrett, Gavin Dunbar and Lionel Carter. He is also the New Zealand representative for ANDRILL (Antarctic Drilling) Project, leading a combined Foundation for Research Science and Technology grant to ARC, GNS and the University of Otago.

Tim will be leading a team in Antarctica next summer that will be gathering seismic data on the McMurdo Ice Shelf in preparation for drilling the following year.

*New Deputy Director Tim Naish*

## Lionel Carter

Lionel Carter, Senior Scientist at the National Institute of Water and Atmosphere (NIWA) has recently been appointed Adjunct Professor of Marine Geology. Lionel has had a long career in studying the marine geology, hydrography and physical oceanography of the SW Pacific region, and is probably best known for the ENZOSS concept, the New Zealand offshore sediment system, in which sediment eroded off the New Zealand continent is carried offshore into canyons and out onto the abyssal plain east of New Zealand to be swept north by the SW Pacific Boundary current into the Tonga-Kermadec trench to then be subducted and erupted as volcanic ash and flows from North Island volcanoes. He is also interested in the influence of Antarctic climate on the driving forces for the global ocean conveyor system. Lionel will contribute to both undergraduate and graduate teaching and graduate student supervision.



*Lionel Carter supervising work on the ice in 2003*

## Welcome back to Brian Anderson

We also welcome Brian Anderson, featured with Andrew Mackintosh in IceSked 3, as a Post Doctoral Fellow, starting a three-year fellowship with us in April. Brian's fellowship focuses on "Climate changes of New Zealand in the last glaciation".

## Farewell to successful MSc students

We also farewell several MSc students, who have completed their theses. Supervisors and colleagues at the ARC wish all of them well in their new endeavours.

- Nora Patterson has completed her thesis "Twentieth Century Climate Change Influences – Isotopic Fraction in Victoria Land Ice Cores, Antarctica" and has been offered a PhD in the US.

- Natalie Robinson completed her thesis "An oceanographic study of the cavity beneath the McMurdo Ice Shelf, Antarctica" and is currently in the UK.
- Joe Prebble completed his thesis "Oligocene Marine and Terrestrial Palynomorphs from the Cape Roberts Project, Victoria Land Basin, Antarctica", and is working at an environmental consultancy in Wellington.
- Joanne Whittaker completed her thesis "Cenozoic Structural and Stratigraphic History of McMurdo Sound, Antarctica" and has moved back to Sydney to begin work on a PhD.

## Fulbright Fellow at ARC

Luna Federici joined the Antarctic Research Centre in September 2004 as a Fulbright Fellow from the United States. She recently completed her undergraduate degree in the earth sciences at Stanford University with former Lee lecturer, Rob Dunbar. During her year-long fellowship in New Zealand, Luna is conducting a paleoclimate study on the Marine Isotope Stage 11 interglacial period in the southwest Pacific. She is working with Tim Naish, Helen Neil (NIWA), Lionel Carter and Peter Barrett.

An acute interest in Stage 11 climate has been generated due to its potential as a Holocene analog. The Marine Isotope Stage 11 interglacial of ~400ka occurred at a time when the two most important climatic parameters - solar insolation and greenhouse gas concentrations - were most similar to the present. Many studies have shown this interglacial to be exceptionally long while others give evidence for warmer temperatures and higher sea level than the present. A better understanding of Stage 11 becomes increasingly important in the face of anthropogenic alteration of the natural climate trajectory.

For this study, Luna is analyzing stable isotopes of planktic and benthic foraminifera at high resolution throughout the Stage 11 interglacial in a marine sediment core from the Southwest Pacific. This core is located on Chatham Rise, west of New Zealand, in an excellent position to monitor climatic changes on a global scale through the Quaternary. It is bathed by the largest deep western boundary current in the world, the only source of deep water to the Pacific, and is located near the subtropical front, which is manifested as a complex system of interacting eddies and gyres above Chatham Rise.

In September 2005, Luna will begin post-graduate study at the University of Washington in applied mathematics.

## Webster Drilling and Exploration

The Antarctic Research Centre is now involved in several styles and scales of scientific drilling, none of which would be possible without our partnership with Webster Drilling & Exploration, based in Porirua.

This last summer, Dr Nancy Bertler's successful ice core drilling programme had the expertise of Tony Kingan from Webster Drilling. Tony was responsible for the drill operations, and provided specialist expertise that retrieved two 180m long cores.



*Tony Kingan using his expertise to keep the ice core drill working well in late 2004*

Webster Drilling is also heavily involved in working with Alex Pyne to prepare the drilling system for the ANDRILL project, under contract to Antarctica New Zealand, the ANDRILL operator. The ANDRILL system will drill its first hole in the 2006/07 season, through 100m of ice and 1000m of water into 1000m of sediment beneath the McMurdo Ice Shelf. This is an ambitious project, but Websters' expertise and involvement in the Cape Roberts Project and earlier Antarctic Drilling (including DVDP and CIROS) and in drilling in other remote and inaccessible locations, such as PNG and Iran, is invaluable.

Websters personnel have also been involved in planning and operations for seismic shot hole drilling for a collaborative VUW/GNS/University of Otago project and for permafrost coring in the Antarctic Dry Valleys. The permafrost drilling system developed by Alex Pyne and Websters uses chilled air flush for coring, and has attracted interest for its potential for drilling on Mars.

Webster Drilling and Exploration have also committed \$30,000 to the ARC's Endowed Development Fund.

## Alfred Wegener Institute

The Antarctic Research Centre also has links with the Alfred Wegener Institute (AWI) in Bremerhaven, Germany. This year, Sepp Kipfstuhl of AWI joined the ice coring programme to provide advice on the use of the AWI drill (which AWI loaned for the work), and coring procedures in AWI programmes.



*Sepp Kipfstuhl enjoying the ice coring trench during fieldwork in late 2004*

AWI scientists Frank Niessen, Uwe Nixdorf, and technical expert Eric Dunker worked with ARC people in previous seasons at Windless Bight, doing site survey work for ANDRILL, including oceanography and marine geology under the McMurdo Ice Shelf, and hot water drilling through the ice shelf.

## Antarctica New Zealand

Antarctica New Zealand provides logistics support to all our Antarctic programmes. ARC staff and Antarctica NZ begin joint planning for the summer field season up to 12 months ahead. Our close working relationship is evidenced by the fact that Lou Sanson, the CEO of Antarctic NZ, is a member of our Advisory Board. During the Antarctic season, everything from flights, food, and support in the field is provided by Antarctica New Zealand.

Antarctica New Zealand is also the Project Operator for ANDRILL, and Alex Pyne works very closely with Antarctica NZ's ANDRILL Project Manager, Jim Cowie and support engineer Jonathan Leitch.



*Erick Dunker and Uwe Nixdorf from AWI with Antarctica NZ staff member Jono Leitch and Alex Pyne during early ANDRILL preparatory fieldwork in 2003/04*

Antarctica New Zealand has also given a generous contribution of \$10,000 to the ARC's Endowed Development Fund.

# OTHER ACTIVITIES

## ST Lee Lecture coming up

This year's ST Lee Lecture in Antarctic Studies will be held on the 16th June. This year Prof David Sugden of the University of Edinburgh will present the lecture, entitled *How sensitive is the Antarctic Ice Sheet to climate change? An earth-science perspective*.

Professor David Sugden is Professor of Geography at the University of Edinburgh, and a world leader in glacial and polar geomorphology. He pioneered our understanding of how ice sheets behave and interact with the global environment through computer reconstructions of the dynamics and thermal regime of ice sheets, but is best known for his comprehensive field observations and syntheses of polar landscapes and their history.

The public lecture will be held at 6.45pm on Thursday 16th June, in MacLaurin Lecture Theatre 101 on the Kelburn Campus. Contact Tamsin Falconer on 04 463 6587 for more details, or email [Antarctic-Research@vuw.ac.nz](mailto:Antarctic-Research@vuw.ac.nz)

## Canoe Trip

ARC staff and students took time out to canoe the Whanganui River early in February. The three-day trip featured some discussions of the geology of the river channel, lots of water fights, and a plentiful amount of sustenance.



## Visit of Paul Fitzgerald & Suzanne Baldwin

Geologists Paul Fitzgerald and Suzanne Baldwin from Syracuse University have recently completed two months at the Antarctic Research Centre and School of Earth Sciences on sabbatical. Paul started his geological studies at Victoria, and now works with low temperature thermochronologic techniques to analyse the evolution of features including the West Antarctic Rift System. Suzanne uses thermochronology and petrology to study the evolution of the Earth's crust, particularly focussing on plate boundary processes in the South West Pacific.

## Peter Barrett

ARC Director Peter Barrett injured his back in a motorcycle accident in February. After spending some time in Burwood Spinal Unit in Christchurch, catching up with colleagues and friends in Christchurch, he returned to Wellington at the beginning of April. Peter would like to thank all those who sent good wishes, and is happy to report that doctors expect him to make a full recovery.



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