

Access Antarctica



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Gateway Antarctica: Centre for Antarctic Studies and Research

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Climate change research – cutting edge technology at Gateway

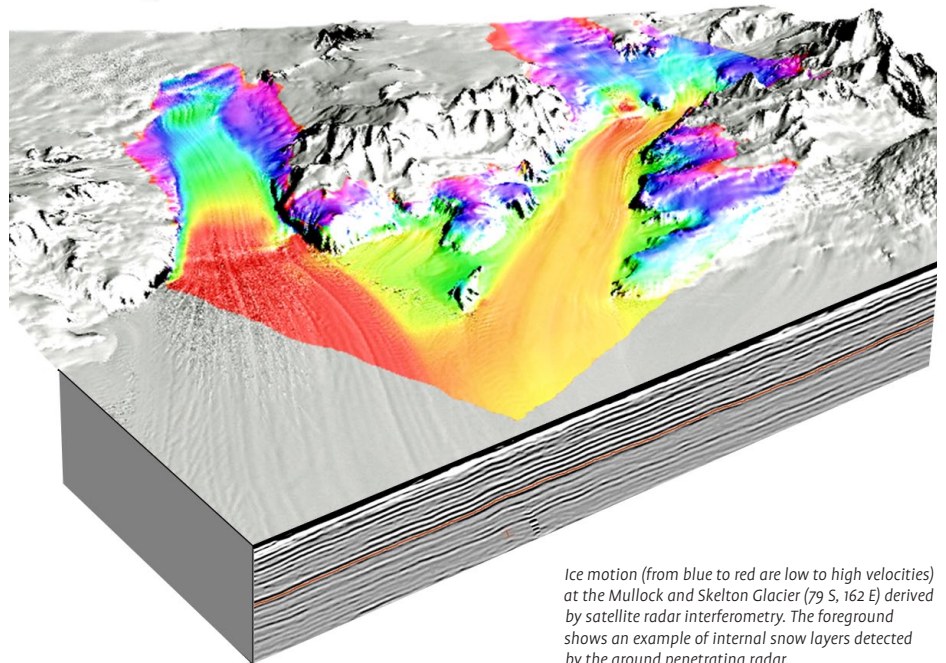
Two important investments in instruments and software were made in 2008 significantly extending Gateway Antarctica's capabilities in future cryosphere remote sensing research. A new ground penetrating radar (GPR) system from the Canadian company pulseEKKO enables measurements of ice thickness to depths beyond 1000m as well as the measurement of internal layers at high precision. In addition a new radar analysis software from the Swiss company Gamma Remote Sensing improves our ability to process high resolution satellite radar images. This includes the interferometric analysis for precise ice deformation at cm accuracy and surface topography at m accuracy.

The GPR equipment was already successfully tested in Antarctica. The Ross Sea region offers excellent opportunities for in situ investigations of snow and ice properties in relation to satellite remote sensing studies. In November 2008, three experimental measurement grids for snow accumulation and snow morphology on land ice near Scott Base were established. Internal snow structures near sea level at the Mc Murdo Ice Shelf and up to about 400 m above sea level at Ross Island were measured. The field study is related to the European Space Agency's Calibration and Validation Experiment for the Cryosat-2 satellite. The GPR data are analyzed within the PhD study of Nikolai Kruetzmann, who won the Christchurch City Council scholarship enabling his participation in the field work. Additional GPR measurements as well as stake height measurements were conducted by GCAS students in late December. In addition to the ground survey, measurements will be extended to air based platforms in November 2009 using a helicopter and an unmanned aircraft developed by the Geospatial

Research Centre. On sea ice, the measurements will be linked to the International Polar Year (IPY) project of Otago University. In December 2008, the new GPR system proved its quality when ice thickness was measured in the Darwin Hatherton glacial system down to 1250m depth. The data will be analyzed by the PhD candidate Mette Riger-Kusk and input to a computer model for an ice dynamical study.

A variety of satellite data have already been received and analysed within research projects in order to obtain information on snow properties and ice dynamics: these are, amongst others, high resolution radar images from the Japanese satellite ALOS (project "Mass flow of

polar glaciers and snow properties in Greenland and Antarctic key regions"), and the German TerraSAR satellite (project "Dry snow zone and accumulation mapping on polar ice sheets"). Within the IPY project ASAIID (Antarctic Surface Accumulation and Ice Discharge) Landsat images and ICESat surface elevation data have been processed in student projects to derive the grounding line position and the corresponding ice thickness at the Ross Ice Shelf. This meets the IPY goal to engage a young generation of New Zealand students in polar research. The new investments at Gateway Antarctica will certainly contribute to this goal.



Ice motion (from blue to red are low to high velocities) at the Mullock and Skelton Glacier (79 S, 162 E) derived by satellite radar interferometry. The foreground shows an example of internal snow layers detected by the ground penetrating radar.

Directors Report – International Polar Year

It is hard to believe that we have already reached the official end of the IPY that focused attention on the Polar Regions, March 2007-09. To mark the event, over 200 people attended international celebrations in Geneva in February, hosted by the World Meteorological Organisation.

At the international celebrations, our recent and first PhD graduate Daniela Haase, was asked to be Master of Ceremony and give the opening address. This is an amazing achievement for a young Antarctic researcher, well done Daniela. It displays the confidence that the Antarctic community has in the next generation of polar researchers to carry forward the progress made during IPY and to lead future research. Daniela has also been elected President of the Association of Polar Early Career Scientists (APECS).

On a more local level, Gateway Antarctica researchers participated in the highly

successful first field season of the IPY Biocomplexity Project that involved 25 researchers from six different countries, a truly international event. This research, in conjunction with the University of Waikato, focuses on describing and predicting biodiversity of terrestrial habitats and linking biodiversity with environmental factors and landscape evolution. It is only possible through the financial support of the New Zealand IPY fund for which we are very grateful.

I am also delighted to report that Gateway Antarctica was successful in obtaining a \$70K research grant "Providing Gateways for Antarctic and Southern Ocean Education" through the FRST IPY fund. Many congratulations to Michelle Rogan-Finnemore, our Centre Manager, for co-ordinating and writing this proposal.

Bryan Storey, *Director*

News in Brief

MFAT Ross Dependency Scholar Announced

Gateway Antarctica is pleased to announce that the recipient of the MFAT Ross Dependency Scholarship for 2009 is Andrew Phillips. Andrew is a GCAS graduate who also holds a BA, BSc and an LLB. He is currently involved in a Masters Programme exploring the topic "Legal responses to the Unintentional Introduction of Alien Invasive Species into the Antarctic Environment" under the joint supervision of Karen Scott of the UC Law School and Michelle Rogan-Finnemore. Andrew's thesis is focusing on internal and external legal tools that the Antarctic Treaty System may choose to rely on when developing a legal framework to deal with the regulation of the introduction of non-native species into the Antarctic Treaty Area. This is a very important topic for the Committee for Environmental Protection and for National Antarctic Programmes.

New Antarctic Course for 2009

Gateway Antarctica is pleased to be working with Patrick Shepherd from the University's College of Education to deliver a new, half year course for 2009. The course is entitled "ANTA 202: Experiencing Antarctica" which will explore Antarctica through the creative works of writers, visual artists, poets, novelists, composers and dancers. Patrick has first-hand experience of this, he is himself a composer and was an Honorary Arts Fellow with the Antarctica New Zealand Antarctic Art Fellows Programme in 2003/04. The course will involve a range of guest speakers and will include such topics as "Artists by default - The poems, pictures and writings of the men on Scott's expedition and later ones who committed their thoughts and observations to paper, including the line drawings by Dr Wilson"; and "First Steps on the Blank Page - Artists discuss and comment upon their experience, particularly with regard to how their Antarctic experience has been assimilated into their work. The course will explore themes such as isolation, awe, beauty and community. More information on this course can be found at www.canterbury.ac.nz/courses/

New PhD Students

Gateway Antarctica is pleased to welcome two new PhD students, Erin Neufeld and Andrew Atkin. Erin is a full-time PhD student at Gateway Antarctica. Erin is interested in exploring place attachment in her thesis and the way New Zealanders are connected to extreme environments like Antarctica. She is supervised by Dr Gary Steel, Adjunct Senior Fellow from Lincoln University.

Andrew Atkin is a part-time PhD student at Gateway Antarctica. Andrew is interested in factors regulating the success of scientific programs on Antarctic Heroic era expeditions, 1897-1914.

Association of Polar Early Career Scientists (APECS)

The Association of Polar Early Career Scientists (APECS) is recognised as one of the important legacies of the International Polar Year (IPY).

Aiming at networking and training young polar researchers as well as fostering and communicating science to a wider public, APECS has evolved into a large and dynamic organisation that is well-respected in the international arena. Memorandums of Understanding with SCAR and the International Arctic Science Committee (IASC) as well as the recently established, partially funded APECS Directorate in Tromsø, Norway, underline this development.

Hence, it came as no surprise that APECS would be part of the ceremony and meetings celebrating the conclusion of the IPY in Geneva in February 2009. However, what came as a surprise was the suggestion by the IPY International Programme Office to have the current president of APECS, Daniela Haase, take the place of the Master of Ceremonies during the final IPY ceremony. Endorsed, supported and planned by the IPY International Programme Office, The World Meteorological Organization (WMO) and The International Council for Science (ICSU), this ceremony marked the official international conclusion of the IPY. Electrifying performances by first nation students from Nunavut, and inspiring addresses by Michelle Jarraud (Secretary-General, WMO), Catherine Bréchinac (President, ICSU), David Carlson,



the Swedish Ambassador and the co-chairs of the Joint Committee celebrated, not only the accomplishments of the IPY, but provided an outlook into the future of polar research.

The IPY ceremony in Geneva brought together veteran scientists and the new generation of polar researchers and captured a glimpse of what international and intergenerational cooperation looked like during the IPY and of what it might look like in the future.

As such, the Geneva event was far more than a final "goodbye" to the IPY – it was a warm "welcome" extended to those who will shape the face of polar research in the future and to those who will organise the next International Polar Year.

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