Access ANTARCTICA

UC UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Issue 30 Gateway Antarctica: Centre for Antarctic Studies and Research April 2007

Season Report from K051

A geological party comprised of Dr Margaret Bradshaw (PI), Professor John Bradshaw, Dr Robert Bolhar and MSc student Greer Gilmer, all from the Geological Sciences Department, spent three weeks in the Olympus Range to Victoria Valley region in January 2007 as part of a continuing study of sedimentary, provenance and tectonic development of Devonian rocks. Their main objective was to study sediments associated with the pre-Beacon Kukri Erosion Surface and the Heimdall Erosion Surface higher in the Beacon sequence in order to determine the constraints of the early Beacon sedimentary basin and its tectonic triggers.

The deposition of the Taylor Group, the lower part of the Beacon Supergroup, is a major chapter in the development of the Ross Sea Region. The Taylor Group is the oldest part of the Beacon succession and was deposited during the Devonian period, approximately 415 to 350 million years ago. The Taylor Group was the result of initial sedimentation in a major sedimentary basin that lasted for 200 million years and is a key tectonic element on the Late Paleozoic-Mesozoic Pacific margin of the Gondwana continent.

In Devonian times the Taylor Group basin lay within the combined Australia-Tasmania-New Zealand-Antarctic continental assembly as part of the Gondwana continent. We know that within the first three of the above areas (and in northern Victoria Land) the Devonian Period was marked by major compressive deformation, mountain building and granite intrusion.

Previous studies of the Taylor Group have investigated the distribution, stratigraphy, faunas, and trace fossils. To date no-one seems to have asked the questions of why the basin was initiated and how its seemingly passive subsidence relates to the contemporaneous vigorous activity in adjacent areas.

Research in 2004/5 in the area immediately to the north of the present area, also by a Geological Sciences party, that was directed particularly at the Sperm Bluff Formation, suggested that older ideas of passive subsidence were misleading and that the Sperm Bluff Conglomerate indicated active tectonic uplift at the basin margins about the time of the development of the Heimdall Erosion Surface, a feature that divides the Taylor Group into two subunits.

K051 returning from studying a section on Mount Hercules in the Olympus Range.

The objective of the present season was to investigate the Heimdall Erosion Surface in the area south and west of that studied in 2004/5, between Mt Jason, Mt Hercules, Mt Electra, Balham Valley, Vashka Lake and Sponsors Peak. The Heimdall Erosion Surface typically separates the New Mountain Sandstone and the Altar Mountain Formation. The aim was to see what changes in environment and tectonic setting took place at the erosion surface, whether changes in provenance could be detected, and if there was a tectonic driver for the formation of the surface.

Sections were measured through the upper part of the New Mountain Sandstone and the lower part of the Altar Mountain Formation, particularly looking for evidence of relief on the surface and for pebbles (or larger fragments) of rocks that might indicate uplift of a new source area, as had been discovered in the previous season. Pebble to cobble size material was found at and above the Heimdall Erosion Surface and will be subject to further research to assess what it may be related to and where it might have come from. Sandstone material was collected for U/Pb geochronology to test the addition of

Continued pg 2

Directors Note

International Polar Year in New Zealand

IPY began at a formal international opening ceremony in Paris on 1 March 2007. Over 40 countries including New Zealand have signed up to participate with an estimated 50 000 people becoming involved in polar activities over the next two years. One cannot help wondering what impact IPY will have in New Zealand and throughout the rest of the world. David Walton (Emeritus Fellow, Environment and Information Division, British Antarctic Survey) has addressed the global issue in an editorial in the most recent edition of *Antarctic Science*. His insight and predictions are well worth reading and I won't repeat them here. In New Zealand, we have a formidable programme of events in 2007 to celebrate 50 years of New Zealand's involvement in the Antarctic, past successes from the International Geophysical Year to the present day and future plans. Many New Zealand scientists are involved in international IPY programmes, but to date New Zealand has no clear research programme specifically linked to IPY. Without an injection of new research funding, it will be "business as usual" for New Zealand during IPY. One group of New Zealanders who have been particularly active has been the IPY Youth Steering Committee. They have organized a Polar Contest which is an extracurricular opportunity for secondary school students to learn more about the Polar Regions in a creative way, to inspire the next generation of polar researchers. They too are looking for sponsorship (see http://www.ipyyouthnz.org). Let's hope that the government gets behind IPY in New Zealand so future generations can celebrate our successes and that we can leave a legacy of IPY discoveries. After all, there has never been more important reasons to undertake research in Antarctica than there is today in our warming world. How Antarctica responds to change will impact all our lives.

--Prof. Bryan Storey

...in Brief

MFAT Scholar 2007

The MFAT Ross Dependency Scholarship is awarded annually to a PhD or Masters student to undertake research concerning a matter of importance to the understanding of Antarctica or the Southern Ocean.

This year it has been awarded to Kerry McCarthy. Her topic is 'Living in the ice (im)age: theorising photography at the margins of Antarctic exploration'. Kerry is the Curator of the Pictorial Collection at the Canterbury Museum and is undertaking her PhD part-time at Gateway Antarctica.

New Board Member

Prof. Scott Davidson has accepted an invitation for a 3-year term on the Gateway Antarctica Advisory Board. He is replacing Geoff Pearman, former Director of UC Opportunity whose term ended in Jan 2007. Scott is Acting Pro-Vice Chancellor for the College of Education at the University of Canterbury. The Board would like to thank Geoff Pearman for his service on the Board and long-term commitment to the success of Gateway Antarctica.

Antarctic Book

Leslie Roberts (UC MA 2006) visited Gateway Antarctica in April to finalise her book 'The entire Earth and Sky' which has been accepted for publication by the University of Nebraska Press. The book was written during a Fulbright Fellowship to Gateway Antarctica in 2003.

Looking across the Labyrinth towards Asgard Range from a camp site west of Mount Electra.

Photo by Margaret Bradshaw, KO51.

new sediment sources at this time, particularly as there was a possibility that volcanic rocks and granites of Devonian age might have become exposed in northern Victoria Land. Some of the sections were chosen for examination because previous research suggested that the New Mountain Sandstone was thin or absent, and the party wished to discover if this was the result of uplift before the cutting of the Heimdall Erosion Surface or the result of failure to subside during the period of New Mountain Sandstone Sedimentation. The investigation also included a study of trace fossils as an index of environment to support data from sedimentary structures.

Previous studies had not drawn attention to the significance of the variation in composition and texture that occurs within the New Mountain Sandstone. Abundant feldspar and pebble to cobble size basement material was found at a number of localities, as well as large boulders at three widely separated sites. Significant slump horizons were also identified. These discoveries change the picture considerably and strongly suggest contemporaneous tectonic control during the deposition the New Mountain Sandstone. This in turn leads to new questions about the origin and significance of the Heimdall Erosion Surface, as well as the environment in which the lower part of the Taylor Group accumulated.

This year's field work indicates that the lower part of the Taylor Group (the Boreas Subgreywacke, New Mountain Sandstone plus the Windy Gully Sandstone) require more attention. Is the latter formation significantly different from the New Mountain Sandstone? What is the significance of the Terra Cotta Siltstone and is it a single or multiple horizon? How do the Devonian rocks of the Darwin Glacier area fit into the picture of a basin subject to active tectonic control? Will U/Pb geochronology of detrital zircons in sandstone finally resolve the question of the age of initiation of the basin?

New GIS Technician

Gateway Antarctica has a new GIS Technician, Irfon Jones, who started in January. Irfon completed a BSc(Hons) in Geography at Otago University where he was involved in projects looking at snowfall modelling, the use of artificial intelligence for locating Aboriginal artwork and using spatial interpolation for mapping temperature distributions in Southland. He then worked for almost 2 years at the University of Canterbury's GeoHealth Research Lab, investigating the socioeconomic determinants of poor health.

This work included contributions to two Ministry of Health reports on suicide in New Zealand. Irfon takes over responsibilities for the Antarctic GIS and aerial photography collection, and tutors on GIS-related courses in the Department of Geography.

GRID Christchurch UNEP

Michelle Rogan-Finnemore and Alan Hemmings were contributing authors for the Antarctic components of the recently published UNEP GEO Yearbook 2007. The Yearbook is the fourth annual report on the changing environment produced by UNEP.

A special feature focus in this year's publication analyzes the intersection between environment and globalization where ecosystem services and the human well-being that depends on those services are affected by natural resource exploitation in response to global demands.

The book can be purchased via the web or a downloadable pdf version is available, free of charge, from http://www.unep.org/geo/yearbook/yb2007/.

Director: Prof. Bryan Storey
Senior lecturer: Dr. Wolfgang Rack
Centre Manager: Michelle Finnemore
Administrator: Susannah Hawtin
GIS Technician Irfon Jones

Gateway Antarctica
Centre for Antarctic Studies and Research
University of Canterbury, Private Bag 4800,
Christchurch, New Zealand

Phone: +64 3 364-2136 Email: gateway-antarctica@canterbury.ac.nz