MEMBER COUNTRY: **New Zealand**
National Report to SCAR for year: 2011-12

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Geosciences						
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2)	Associate Professor Wendy Lawson	University of Canterbury , Private Bag 4800,	+64-3-3642920	+64-3-3642907	wendy.lawson@canterbury.ac.nz	www.geog.canterbury.ac.nz
3)	Dr Mike Williams	National Institute of Water and Atmospheric Research, Private Bag 14901, Kilbirnie, Wellington	+64-4-3860389	+64-4-3862153	m.williams@niwa.co.nz	www.niwa.co.nz
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Activity	Contact Name	Address	Telephone	Fax	Email	web site
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3)	Dr Stuart Henrys	GNS Science, PO Box 30-368, Lower Hutt	64-4-570-4812	64-4-570-4603	s.henrys@gns.cri.nz	www.gns.cri.nz
4)						
AGCS						
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SALE						
AAA (2010-)						

Activity	Contact Name	Address	Telephone	Fax	Email	web site
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SCAR History Group	Dr Ursula Rack	Gateway Antarctica Level 1, Geography Building University of Canterbury Private Bag 4800 Christchurch New Zealand	(+64) 3 364 2987 ext.3676		ursula.rack@canterbury.ac.nz	http://www.anta.canterbury.ac.nz/people/rack_u.shtml
Acoustics	Dr Stuart Henrys	GNS-Science, PO Box 30368, Lower Hutt	+64 4 5704812		s.henrys@gns.cri.nz	www.gns.cri.nz
Acquisition of multibeam	Dr Stuart Henrys	GNS-Science, PO Box 30368, Lower Hutt	+64 4 5704812		s.henrys@gns.cri.nz	www.gns.cri.nz
EXPERT GROUPS						
Continuous plankton rec	Dr Mike Williams	National Institute of Water and Atmospheric Research, Private Bag 14901, Kilbirnie, Wellington	+64-4-3860389	+64-4-3862153	m.williams@niwa.co.nz	www.niwa.co.nz
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ICESTAR	Dr Craig Rodger	Department of Physics, University of Otago, P O Box 56, Dunedin	64-3-479-4120		crodger@physics.otago.ac.nz	www.otago.ac.nz/physics
Permafrost Periglacial Er	Dr Megan Balks	School of Science & Engineer	64-7-856 2889	64 7 856 0115	m.balks@waikato.ac.nz	www.waikato.ac.nz/home.shtml
IBCSO	Dr V Stagpoole	GNS-Science, PO Box 30-36	+64-4-5704832	+64 4 5704 603	v.stagpoole@gns.cri.nz	www.gns.cri.nz
ADMAP						
ANTEC						
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STANDING COMMITTEES (SC)

SC-ATS						
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	Ms Wendy Shaw	Land Information New Zealand, National Office, Private Box 5501, Wellington			wshaw@linz.govt.nz	www.linz.govt.nz
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SCADM

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NATIONAL ANTARCTIC DATA CENTRE

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SCAR DATABASE

insert name of database for which your country has responsibility

A BRIEF SUMMARY OF SCIENTIFIC HIGHLIGHTS*:

2011-2012 Research Season
Event Summaries and Contact Information

K001
Oct 2011 – Jan 2012
McMurdo Sound, Skelton Glacier region, Terra Nova Bay region
Past Antarctic Climate and Future Implications (PACaFI)
GNS Science, 1 Fairway Drive, Avalon, Lower Hutt. Dr Richard Levy, Phone: (04) 570 4236, Email:r.levy@gns.cri.nz
This season, the K001 event has four main aims:
1. To quantify the distribution, composition and overall flux of aeolian (windblown) sediment that accumulates on Ice shelves and annual sea ice in the SW Ross Sea region. The sediment is an important contributor to sea floor sedimentation and is one source of iron that is critical for triggering phytoplankton blooms in the Ross Sea.
2. To map and sample glacial geologic deposits on Escalade Peak and Nearby Nunataks, with the aim of identifying past glacial history of the Skelton Neve/ East Antarctic ice sheet.
3. To understand the retreat of the Skelton Glacier during the last deglaciation (20,000 years ago to present).
4. To investigate present-day thickness and dynamic behaviour of the Skelton Glacier, using DGPS, radar, and satellite interferometry.

Event K014
Nov 2011 – Jan 2012
Scott Base, Granite Harbour
How do Antarctic Fishes Use Antifreeze to Survive in Ice-Laden Water?
School of Biological Sciences, University of Auckland, Private Bag 92019, Auckland 1142. Dr Clive Evans, Phone: (09) 373 7599 Ext: 87245, Email: c.evans@auckland.ac.nz
How supercooled fishes utilise antifreeze glycoproteins (AFGPs) to survive in freezing Antarctic waters is an outstanding biological problem resolvable through the combination of biology and synthetic organic chemistry. We propose to chemically synthesize non-radioactively labeled AFGPs and to use the products to track the route by which secreted antifreeze is able to reach high levels in the circulation, to identify the cell type involved in ice crystal entrapment, and to characterize the likely receptor.

Event K016
Dec 2011 – Jan 2012
Cape Bird, Cape Royds
Genomic Indicators of Climate Change
School of Biological Sciences, University of Auckland, Private Bag 92019, Auckland 1142. Dr Craig Millar, Phone: (09) 373 7599 Ext: 85186, Email: cd.millar@auckland.ac.nz
We aim to identify the molecular basis by which Adélie penguins have responded to a ~10°C increase in temperature since the last glacial maximum. We will sequence the genomes of a number of ancient Adélie penguins from the late Pleistocene.
The hypothesis is that a series of molecular based physiological changes have enabled modern Adélie penguins to cope with warmer temperatures, in comparison to individuals that lived 18,000+ years ago. From the ancient genome data and using the modern genome as a reference, we can identify changes in the ~20,000 avian genes. Hence, we can identify which of these changes are likely to represent the molecular basis of adaptation to climate change.

Event K020
Jan 2012
Miers Valley, Garwood Valley,
Wright Valley,
Beacon Valley, McKelvey Valley
Protection of Antarctic Terrestrial Ecosystems
Department of Biological Sciences, University of Waikato, Private Bag 3105, Hamilton. Professor Craig Cary, Phone: (07) 838 5493, E-mail: caryc@waikato.ac.nz
This research will deliver a biogeographical characterisation for the entire Ross Sea region, together with a predictive model for the effects of climate change. We will achieve this by greatly extending and upgrading our existing model that links the biodiversity with landscape and environmental features. We will extend its coverage to include biota in all ice-free regions of the Ross Sea region and increase its prediction capability by importing detailed analyses of the physical, chemical and biological drivers responsible for the biodiversity combined with a sensitivity analysis of the model using detailed survey and ecophysiological studies of biodiversity hotspots. This will allow us to test various climate change scenarios and to determine the impacts and risks of changing global climate.

Event K021
Jan 2012
Cape Royds, Cape Evans, Cape Crozier, Hut Point
Fungal Biodiversity of Historic and Pristine Environments
Department of Biological Sciences, University of Waikato, Private Bag 3105, Hamilton. Professor Roberta Farrell: (07) 838 4704, E-mail: r.farrell@waikato.ac.nz
Very few extremophile fungi have been isolated and little is known about how they adapt and survive in unusual environments. The aim of this research is to further elucidate Antarctic terrestrial biodiversity, with a focus on the biology, ecology and adaptive physiology of fungi and extreme organisms, with the additional aim of contributing to the conservation of the historic sites of the Ross Sea region by determining how effective the conservation efforts of the past 4 years have been in removal of deleterious fungi. New molecular methodology will advance our understanding of the role these microbes have in the Antarctic ecosystem, where water content, temperatures and areas of increased carbon and nutrient inputs provide a unique field laboratory to study how global change affects polar organisms, their interactions and ecological processing.

Event K023
Nov 2011
Mt Erebus

Mt Erebus
Life at the Extreme: Resolving the Genetic Basis of Microbial Endemism in the Super-Heated Soils of Mt Erebus, Antarctica
Department of Biological Sciences, University of Waikato, Private Bag 3105, Hamilton. Professor Craig Cary, Phone: (07) 838 5493, E-mail: caryc@waikato.ac.nz
The study of high temperature extreme environments continues to challenge our understanding of the upper tolerances of microbial life and how life may have originated on earth and possibly other planets. The Tramway Ridge geothermal site on Mt. Erebus, an active volcano in Antarctica, is the most geographically isolated geothermal site on earth providing an excellent system for studies of microbial speciation, biogeography, and evolution of thermal adaptation. A recent preliminary genetic survey of the Tramway Ridge microflora revealed an unprecedented diversity of extremely novel microbes only distantly related to any known bacteria. Most of these loose affiliations are with organisms identified from deep-subsurface systems suggesting the Tramway Ridge community may be archaic and of a sub-surface origin. A group dominates the community that to date has no known cultured or environmental representative. Recent advances in high throughput DNA sequencing and bioinformatics allow us to acquire and decipher the genetic capabilities and structure of entire microbial communities without the necessity of cultivation. Employing a combination of these advanced genetic methods coupled with culture dependant approaches we will undertake a gene-centric analysis of the Tramway Ridge microflora and other Antarctic geothermal sites to address questions focused on endemism, biogeography, evolution, and adaptation.

Event K025
Jan 2012
Bratina Island
Biodiversity, Dynamics and Metabolics of Heterogeneous Meltwater Ponds
Department of Biological Sciences, University of Waikato, Private Bag 3105, Hamilton. Stephen Archer, Phone: (07) 856 2889, E-mail: archers55@msn.com
We will conduct a detailed investigation of the microbial biodiversity and community dynamics within and between selected meltwater ponds near Bratina Island, significantly expanding the knowledge base from previous studies. We will identify environmental drivers within ponds, and examine the metabolic differences that result from geochemical gradients within ponds, and also metabolic differences due to the different geochemistries between ponds. Furthermore, temperature manipulation experiments will be conducted in the laboratory that will follow changes in the biodiversity and metabolism of these populations, providing a model for examining the effect that warming due to global climeate change will have in Antarctica.

Event K043
Nov – Dec 2011
Cape Evans,
Terra Nova Bay
Life In The Ice: Microbial Diversity and Function in Antarctic Sea Ice Ecosystems
School of Biological Sciences, Victoria University of Wellington, Private Bag 600, Wellington. Dr Ken Ryan, Phone: (04) 463 6083, E-mail: ken.ryan@vuw.ac.nz
Our hypothesis is that 'spatial and temporal variations in diversity and ecosystem function of the sea ice microbial community are sensitive indicators of changing climatic conditions'. The research will develop baseline long-term data on microbial biodiversity and community structure in the "grass" of ice-covered regions – the primary and secondary producers at the base of the food web. We will do this using both conventional methods and molecular technology, and will quantify abundances and species identifications using a range of traditional and modern techniques including DNA fingerprints, high throughput sequencing and single cell genome amplification. We will develop an understanding of the functional role of various components of the sea ice microbial community using ecophysiological methods we have developed over nearly 20 years of Antarctic research coupled with new technologies brought together with our international collaborators on this project.

Event K049
Oct 2011 – Feb 2012
Roosevelt Island
NZ ITASE: Climate Change along the Victoria Land Coast
Antarctic Research Centre, Victoria University of Wellington, PO Box 600, Wellington. Dr Nancy Bertler, Phone: (04) 463 5233 ext 8391, Fax: (04) 463 5186, E-mail: nancy.bertler@vuw.ac.nz
Unprecedented changes are occurring in the Earth's climate. The 1990s were the warmest decade in the last 2000 years and average global temperature is projected to rise between 1.40C and 5.80C by 2100 [IPCC, 2001]. Although the scientific evidence of global warming is now widely regarded as incontrovertible, predicting regional impacts is proving more problematic. Especially, conclusions of the Southern Hemisphere record are limited by the sparseness of available proxy data at present. We propose to use ice cores from the Antarctic margin to address the lack of longer-term, high-resolution climate observations in the Southern Hemisphere. We will recover a series of ice cores from glaciers along a 14 degree latitudinal transect of the climatically sensitive Victoria Land coastline. Our results will help to improve our understanding of regional patterns of climate behaviour, leading to more realistic regional climate models. Such models are needed to sensibly interpret Antarctic climate records and for the development of appropriate mitigation strategies for New Zealand.

Event K055
Oct – Dec 2011
McMurdo Sound
Assessment of the Current State of the Antarctic Middle Atmosphere and Climate Model Validation
Department of Physics and Astronomy, University of Canterbury, Private Bag 4800, Christchurch. Dr Adrian McDonald, Phone: (03) 364 2281, E-mail: a.mcdonald@phys.canterbury.ac.nz
This research programme will underpin improvements in key components of middle atmosphere climate models. We will produce an integrated high resolution database, formed from a wide variety of remote sensing and in-situ measurements, which will elucidate the current state of the Antarctic middle atmosphere. Production of this database will make it possible to validate climate model outputs, produced using the University of Canterbury Super Computer (UCSC), and feed forward the resultant improved fundamental physical understanding of this region to improve these climate model components.

Event K057
Oct –Nov 2011
McMurdo Sound
Thermal Acclimation in Antarctic Fish
School of Biological Sciences, University of Canterbury, Private Bag 4800, Christchurch. Professor Bill Davison, Phone: (03) 364 2029, E-mail: bill.davison@canterbury.ac.nz
This project aims to examine the effects of both short term (acute) and longer term (chronic) increases in temperature on the physiology of a number of Antarctic fish. The research will examine oxygen uptake and its use at the cell level (tissue metabolism), at the organ level (gill function, heart function) and at the whole animal level (whole animal metabolic rate, exercise ability), integrating these different aspects into a model of how changes at each level act to allow survival at what are potentially lethal temperatures. Specifically the work will look at the effects of acclimation on heart rate, ventilation rate, the ability to swim coupled with a determination of aerobic scope and the effects that hypoxia has on these processes. Overall the study will determine whether hypoxia tolerance is a major determinant of survival at high temperatures and whether acclimation alleviates this.

Event K060
Dec 2011
Arrival Heights, Scott Base
Space Weather Monitoring (AARDDVARK)
Department of Physics, University of Otago, PO Box 56, Dunedin 9016. Dr Craig J. Rodger, Phone: (03) 479 4120, E-mail: crodger@physics.otago.ac.nz
It is important to understand the response of all regions above the Earth to climate change in order to improve our modelling and prediction capabilities. This should include consideration of the contribution of solar input and its variability through the transmission of solar energy from the Earth's upstream region to the lower atmosphere. This project provides a better understanding of the volatility of near-Earth space, a plasma region populated by ionised gas embedded in the geomagnetic field. One example of the solar variability to lower atmosphere linkage comes from solar-induced energetic particle precipitation leading to ozone losses in the upper stratosphere; experimental observations show increased ozone losses occurring during the polar winter and caused by solar-generated events, particularly dramatic explosions on the Sun and aurora producing geomagnetic. This variability may contribute to the recovery times of the man-made ozone hole. Polar ozone depletion has a key-influence on the global climate system, directly impacting NZ both through changes in local ultraviolet (UV) levels and producing regional climate variability.

Event K063
Nov – Dec 2011
Western McMurdo Sound, Scott Base
Antarctic Sea Ice Thickness Mapping at McMurdo Sound
Department of Physics, University of Otago, PO Box 56, Dunedin 9016. Dr Pat Langhorne, Phone: (03) 479 7787, E-mail: pjl@physics.otago.ac.nz
The aim of this event is to undertake simultaneous and co-incident surveys of sea ice from the air, on the ground and from the ocean, near parallel to satellite overflights. This will be done through: Helicopter survey of sea ice thickness and surface properties; On-ice survey of snow, ice thickness and oceanography on subset of helicopter grid; AUV at ice-water interface coincident with helicopter or EM31; and surveying of tidal movement.

Event K064
Nov 2011 – Jan 2012
Minna Bluff, Blue Glacier
The Glaciological Basis for Palaeoclimatic Reconstructions of Ice-Shelf Moraines
Department of Geography, University of Otago, PO Box 56, Dunedin. Associate Professor Sean Fitzsimons, Phone: (03) 479 8786, E-mail: sjf@geography.otago.ac.nz
The objective of this research is to develop an understanding of the entrainment, transfer and deposition of sediment by ice shelves. The outcome will be the development of a model for the accretion and transfer of ice and debris in ice shelves and a glaciological basis for palaeoclimatic reconstructions derived from ice shelf moraines. Defining the glaciological basis of ice shelf moraine formation is essential to understanding the age and chronology of ice shelf moraines, which are widely used to reconstruct the timing and magnitude of Late Pleistocene ice advances. We plan to achieve these objectives by undertaking an integrated study of the entrainment, transfer, deposition and deformation of sediment adjacent to the margin of a thin, partly grounded ice shelf (the McMurdo Ice Shelf).

Event K066
Dec 2011 – Jan 2012
Cape Bird, Cape Crozier
Latitudinal Gene Drift in Marine and Terrestrial Organisms from the Ross Sea Region
Department of Biochemistry, University of Otago, PO Box 56, Dunedin. Dr Craig Marshall, Phone: (03) 479 7570, E-mail: craig.marshall@otago.ac.nz
Very few things live in the Antarctic for the whole of their lives and all year round. Among those that do are a small group of terrestrial invertebrates including nematodes, springtails, tardigrades and rotifers. We are interested in the relationships of these invertebrates with a particular focus on nematodes. We wish to learn if populations of nematodes are widely-distributed with little evidence of local variations, or instead, nematodes form small, local populations.

Event K067
Oct – Nov 2011
McMurdo Sound, Cape Evans, Cape Royds, Cape Bird
Does Sea Ice Microbial Production Support Benthic Consumers in the Ross Sea, Antarctica?
Department of Marine Science, University of Otago, PO Box 56, Dunedin. Associate Professor Stephen Wing, Phone: (03) 479 9038, E-mail: steve.wing@stonebow.otago.ac.nz
The goal of the proposed project is to test whether sea ice microbial communities are an important source of organic material supporting benthic communities in the Ross Sea. We will use bulk and compound specific isotopic composition of organic matter sources to trace their contribution to consumers across spatial gradients corresponding to different sea ice extent and persistence. This will be extended to a systems level modeling approach to understand organic matter flux is the Ross Sea benthic community. The project addresses an important unknown for Antarctic communities: the connectivity between primary production within sea ice and availability of organic material for benthic consumers. It will provide new understanding of the role of sea ice for ecosystem functioning in Antarctica.

Event K068
Oct – Nov 2011
McMurdo Sound
Developmental and Metabolic Responses of Antarcic Marine Invertebrate Larvae to a Warmer, Acidified Ocean
Department of Marine Science, University of Otago, PO Box 56, Dunedin. Dr Miles Lamare, Phone: (03) 479 7463, E-mail: miles.lamare@stonebow.otago.ac.nz
The objective of our research is to advance our understanding of the effects of climate change (seawater pH and temperature change) on Antarctic marine larvae by applying experimental conditions that realistically simulate predicted future pH and temperature changes in a range of marine environments to quantify responses in terms of metabolic rates, acid-base regulation, the activity and gene expression of the key enzyme, carbonic anhydrase, fertilization, development, mortality and calcification rates. This research will contribute to a greater understanding of the responses of Antarctic marine invertebrates to climate change by addressing: (1) mechanisms that can be used to adjust physiology in response to change, (2) how these adjustments contribute to compensating for change and; (3) trade-offs that result from any such physiological adjustments.

Event K069
Jan 2012
Arrival Heights
Monitoring Magnetosphere-Ionosphere Coupling and Space Weather in the Polar Region
Department of Physics, University of Newcastle, NSW 2308, Australia. Professor Brian Fraser, Phone: (+61) 2 4921 5445, E-mail: bhbjf@cc.newcastle.edu.au
This project will provide a better understanding of the volatility of near- Earth space, a plasma region populated by ionised gas embedded in the geomagnetic field. Energy from the Sun must pass through many important regions and

This project will provide a better understanding of the volatility of near-Earth space, a plasma region populated by ionised gas embedded in the geomagnetic field. Energy from the sun must pass through many important regions and boundaries to reach Earth, including the magnetosphere and the ionosphere. The dynamic behaviour of this plasma system, now referred to as "space weather" is of vital importance to life on our planet, and its effects are best studied at high latitudes, e.g. the aurora. Space weather can disrupt the operation of satellites, radio and GPS navigation and power distribution systems. The results of this project will provide important input parameters to global magnetospheric circulation models currently under development for space weather forecasting. In particular, it will study the dynamics and topology of the southern high latitude cusp and polar cap, geomagnetic field regions open to direct solar influence. Ultra-low frequency (ULF) waves will be used as tracers to study plasma dynamics and magnetosphere-ionosphere coupling. The Scott Base magnetometer and optical imager data, in conjunction with international observations from Australian bases, USA-UK-Japan-China polar cap remote sites will provide the basic dataset.

Event K073
Jan 2011
Scott Base
Lore and Law: Sense of Place, Sense of Right and Pro-Environmental Behaviour in the Antarctic
Lincoln University, PO Box 84, Cnr Ellesmere Junction & Springs Road, Lincoln 7647. Dr Gary Steel, Phone: (03) 325 3820, E-mail: steelg@lincoln.ac.nz
This research aims to investigate environmentally responsible decision-making by human beings in the Antarctic. Specifically, it will identify decision factors about human behaviour that promote the protection and resilience of Antarctic eco-systems, or endanger them.
The principal aims of this research are:
1. To catalogue the various proximal and distal influences on pro-environmental behaviour by scientists and support personnel while they are in the Antarctic;
2. To investigate the relationships between these various influences;
3. To create recommendations for environmental managers of Antarctic research field sites and stations.

Event K081
Jan 2012
Wright Valley, Scott Base
Identification and Management of Change in Inland Antarctic Aquatic Ecosystems
University of Canterbury, Private Bag 4800, Christchurch. Dr Ian Hawes, Phone: (021) 022 81494, E-mail: ian.hawes@canterbury.ac.nz
This programme's goal is to determine how climate-driven hydrological change controls the biological structure and biodiversity values of Antarctica's inland aquatic ecosystems by quantifying and modelling the climate-hydrology-biodiversity linkages. We will apply new molecular, biological process and environmental modeling techniques in the field and in laboratory experiments to identify key biodiversity and ecosystem components and values.

Event K083
Nov 2011 - Jan 2012
Taylor Glacier
Stable Carbon Isotope Constraints on Methane Sources During Fast Climatic Transitions
NIWA, Private Bag 14-901, Wellington. Dr Hinrich Schaefer, Phone: (04) 386 0316, E-mail: h.schaefer@niwa.co.nz
Atmospheric methane, i.e. CH_4, is a powerful greenhouse gas (GHG) and its natural sources are strongly climate dependent. In response to anthropogenic climate change, natural CH_4 emissions could therefore increase strongly, leading to further warming through higher greenhouse forcing. We propose to measure the stable carbon isotope ratio of CH_4, a characteristic that is indicative of its different source types. This global atmospheric parameter has been preserved in air occlusions of polar ice. A record covering the last deglaciation from a newly explored Antarctic site where ancient ice is pushed to the glacier surface will reveal detailed changes throughout warming periods with unprecedented precision, thus overcoming the limitations of previous work.
This season, this event is being supported mostly by the US Antarctic Program with some support from the NZ Programme

Event K085
Aug 2011 – Jan 2012
Arrival Heights, Scott Base
Drivers of Global Change in the Antarctic Atmosphere: Atmospheric Remote-Sensing and Air Sampling
NIWA, Private Bag 50061, Omakau. Dan Smale, Phone: (03) 440 0424, E-mail: d.smale@niwa.co.nz
The Antarctic atmosphere with its unique physical and chemical attributes is an important part of the global system. This research aims to improve understanding of how the Antarctic atmosphere drives and responds to global change and its interaction with New Zealand. It focuses on Antarctic ozone depletion, the effect of that depletion beyond Antarctica, and the Antarctic's influence on global greenhouse gas (GHG) concentrations. Antarctic stratospheric air, depleted in ozone as a result of anthropogenic interference, is transported to southern mid-latitudes in summer, decreasing ozone and increasing UV radiation over the New Zealand region.
Natural variability complicates this detection and increasing GHG concentrations may delay the recovery. Changes in GHG concentrations, including ozone, affect the radiative balance of the atmosphere in ways that are not fully understood. The Antarctic provides aunique opportunity to measure global trends in atmospheric trace gases at sites isolated from anthropogenic sources, assess human impacts on a pristine environment, and quantify the Southern Ocean uptake of CO_2.

Event K089
Jan 2012
Arrival Heights, Scott Base
Climate Data Acquisition – Scott Base and Arrival Heights, Antarctica
NIWA, PO Box 8602, Christchurch. Mr Andrew Harper, Phone: (03) 343 7890, E-mail: a.harper@niwa.co.nz
The goal of this programme is to obtain a high-quality continuous climate record for Scott Base and Arrival Heights in Antarctica, and archive it in NIWA's publicly accessible climate database. Scott Base is one of 47 reference climate stations for the New Zealand region managed by NIWA, and climate observations (wind speed and direction, air temperature, relative humidity, barometric pressure, global solar radiation, diffuse solar radiation and direct solar radiation) are recorded there daily. This climate record began in 1957 and is one of the longest continuous records in Antarctica. Wind speed and direction, air temperature, relative humidity and global solar radiation are also recorded at Arrival Heights. The measurements are needed for characterising the local climate and state of the environment, identifying climate variations and changes, and in research on climate-sensitive processes and ecosystems. This programme also includes measurements from the sea level recorder installed at Scott Base.

Event K102
Dec 2011 – Jan 2012

Lake Vanda,Cape Evans, Scott Base
Repeat Magnetic Field Measurements
GNS Science, PO Box 30-368, Lower Hutt. Mr Tony Hurst, Phone: (04) 570 44813, Email: T.Hurst@gns.cri.nz
The aim of this event is to carry out magnetic field measurements at repeat stations, to measure the long-term magnetic field changes at stable undisturbed sites.

Event K121
Nov – Dec 2011
Western McMurdo Sound
Abundance and Spatial Distribution of South Polar Skua (Stercorarius maccormicki) in the Western Ross Sea
Landcare Research, PO Box 69, 40 Gerald Street, Lincoln 8152. Dr Phil Lyver, Phone: (03) 325 6700, E-mail: lyverp@landcareresearch.co.nz
Our primary hypothesis is that South Polar skua (Stercorarius maccormicki) population abundance broadly tracks summer food availability in the southern McMurdo Sound region.
Skuas and Adélie penguins (Pygoscelis adeliae) both prey heavily on Antarctic silverfish (Plueragramma antarcticum) and krill (Euphausia crystallorophias and E. superba) and overlap in breeding space during the summer in this region, though not entirely. If we make the assumption that physical (e.g. persistent sea-ice cover) and biological (e.g. prey abundance) conditions, in the absence of other factors, affect population dynamics and growth of both seabird species', then similar trajectories for each population could emerge. On the other hand, in McMurdo Sound, and especially along the Victoria Land Coast, appreciable numbers of skuas nest where there are no penguins. Therefore, factors not applying to penguins (e.g. historical human occupation) would seem to be important as well to the skuas.

Event K122
Nov 2011 – Jan 2012
Cape Bird
Protecting the Structure and Function of Ross Sea Ecosystems, Antarctica
Landcare Research, PO Box 69, 40 Gerald Street, Lincoln 8152. Dr Phil Lyver, Phone: (03) 325 6700, E-mail: lyverp@landcareresearch.co.nz
This research will contribute to showing how Ross Sea ecosystems can be managed to achieve conservation and fishery outcomes in a precautionary manner. It will contribute to the quantification of food web linkages within the ecosystems of the pelagic and benthic communities of the Ross Sea shelf, slope, abyss and seamounts, development of indicators for monitoring change, assessment of risk to critical biological processes, and support the establishment of protected areas. In collaboration with the US Adelie penguin team, demographic rates (e.g., survival, productivity, breeding rates) and provisioning strategies (e.g., foraging behaviour, dietary composition, chick condition) will be recorded annually at the Ross Island colonies. Variation in demographic rates and provisioning strategies will be used to predict population trajectories and plausible sea-ice and krill abundance scenarios that may be mediated by climate change.

Event K123
Dec 2011 – Jan 2012
Bull Pass, Marble Point, Minna Bluff, Mt Fleming, Granite Harbour,Victoria Valley, Convoy Range, Coombs Hills
Environmental Domains Classification for the Ross Sea Region
Landcare Research Ltd, Private Bag 3127, Hamilton 3240. Dr Jackie Aislabie, Phone: (07) 858 3700, E-mail: aislabiej@landcareresearch.co.nz
The research develops an environmental classification for terrestrial ecosystems of Ross Sea region. The classification includes associated data and models and is underpinned by new knowledge on soil distribution, climate and microbial diversity and/or abundance. Its delivery, via a one-stop web portal will produce a classification that is dynamic, widely accessible, and functional. We provide new data on these ecosystems by:
1. Developing a terrestrial environmental classification for the Ross Sea region using environmental domains analysis that encompasses climate, landform, soil, and biology layers;
2. Mapping soil attributes using soil-landscape models, validated with field data to establish the spatial distribution of soils in the McMurdo Dry Valleys;
3. Extending our existing soil climate network to include upland slopes for monitoring the impact of climate change on soil active layer and permafrost depth;
4. Characterising soil microbial communities.

Event K131
Oct – Dec 2011
McMurdo Sound, Coulman High
Sea Ice and Southern Ocean Processes
Industrial Research Ltd, PO Box 31-310, Lower Hutt, 5040. Dr Timothy G Haskell, Phone: (04) 569 0000, E-mail: t.haskell@irl.cri.nz
This programme aims to characterise the relationship between the sea ice, ocean and atmosphere of Antarctica in order to better understand and predict high-latitude coupled climate variability, and to underpin the management of Antarctica and the Southern Ocean in the context of the global climate system. It concentrates on the climate-related processes occurring within McMurdo Sound to the marginal ice zone. It covers a range of scales, from microns in structure of sea ice, to the order of thousands of kilometres in the process of sea ice dispersal in the Southern Ocean, and the relationships linking Antarctica to global climate variability and change.

Event K132
Dec 2011 – Feb 2012
Terra Nova Bay
Cold Spice: Double Diffusion Generated by Vertical Ice Walls
NIWA, Private Bag 14-901, Wellington, 6022. Dr Craig Stevens, Phone: (04) 386 0476, E-mail: c.stevens@niwa.co.nz
"Ocean spice" refers to one of the great hidden mechanisms driving ocean missing. Large regions of the oceans are layered in such a way that differences in molecular characteristics between heat and the salt (technically called double diffusion) are sufficient to vigorously mix the seawater – but only in vertically confined layers. These layers form tendrils anywhere from 1 to 100 m thick and can extend for hundreds of kilometres. Yet we have few direct measurements of the rates of vertical mixing within and between these layers. It is likely that rates of mixing will differ by orders of magnitude within a few meters, or even mix in the opposite direction to "normal". This process is seen in polar oceans where the interaction between seawater and melting ice (both sea ice and ice shelves) modulates ocean stratification and transport. In turn, stratification and transport strongly affect the combined climate-ecosystem. Here we will link field measurements of ocean spice generated by ice shelves with laboratory and computer models. The aim of the work is two-fold: better understanding of the details of this mixing and to fill in a key gap in predictive climate models.

Event K149
Oct – Nov 2011
Victoria Valley, Wright Valley
Warm Winds in he McMurdo Dry Valleys
School of Geography, Planning & Architecture, University of Queensland, Brisbane, Australia. Dr Hamish McGowan, Phone: +61 (7) 3365 0665, E-mail: h.mcgowan@uq.edu.au

School of Geography, Planning & Architecture, University of Queensland, Brisbane, Australia. Dr Hamish McGowan, Phone: +61 (7) 3365 6665, E-mail: hmcgowan@uq.edu.au
The study seeks to determine the meteorology of the “warm” wind events believed to be föhn that occur in the McMurdo Dry Valleys. These winds result in the largest temperature changes known e.g. > +40oC in 2 hours, triggering melt of seasonal snow and ice and ground permafrost. They are the principal control of dust genesis and sand dune geomorphology in the Victoria Valley where research of the valley’s sand dunes has been driven by their close resemblance to Martian dunes. The study will combine field measurement of föhn events in the Wright and Victoria Valleys, McMurdo Dry Valleys with state-of-the-art climate modelling studies to identify their origin and impact on the weather and climate of this unique region of global importance.

Event K150
Oct – Nov 2011
Cape Royds, Cape Evans,Cape Roberts
Land Information New Zealand
Land Information New Zealand (LINZ), PO Box 5501, Wellington, 6145. Graeme Blick, Geospatial Data Analyst, Phone: (04) 460 0191, E-mail: gblick@linz.govt.nz
LINZ and its predecessor agencies have operated surveying, charting and mapping programmes in the Ross Sea region, as well as place naming administration, for some 30 years. The Department has an agreement with the United States geological Survey, which provides for co-operation in these activities and in particular joint topographic mapping, geodetic surveying and place naming programmes.

Event K160
Postgraduate Scholarships
Postgraduate Scholarships Antarctica New Zealand, Christchurch. Dr Ed Butler, Phone: (03) 358 0200, E-mail: e.butler@antarcticanz.govt.nz
The four current scholarships are:
a) Sir Robin Irvine Doctoral Scholarship: awarded to Stephen Archer from the University of Waikato who aims to evaluate the risks of the highly productive, but sensitive, aquatic systems of Antarctica. Associated with K025.
b) Helicopters New Zealand Doctoral Scholarship: awarded to Kurt Joy from the University of Canterbury for his work on determining the extent of the Antarctic ice sheets during the Last Glacial Maximum using in-situ cosmogenic nuclides.
c) New Zealand Post Scholarship: awarded to Holly Goddard from the University of Waikato for her work looking at climate along the latitudinal gradient of the Ross Sea region, inputting data to the Environmental Domains Analysis.
d) Kelly Tarlton’s Scholarship: awarded to Kathryn Lister from the University of Otago for her work on oxidative stress on Antarctic and non-Antarctic marine invertebrates that are exposed to environmental and human-induced stressors. Associated with K068.