

**MEMBER COUNTRY: New Zealand**  
**National Report to SCAR for ye 2010-11**

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<b>AAA (2010-)</b>						
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<b>SCAR History Group</b>						
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<b>SCAR DATABASE</b>						
insert name of database for which your country has responsibility						

## A BRIEF SUMMARY OF SCIENTIFIC HIGHLIGHTS\*:

Science Supported by Antarctica New Zealand 2009/2010

### Antarctic Physical Environments Research

#### Climate Change

- K049: ITASE – Holocene Variability along the Victoria Land Coast. NZ portion of the international project ITASE aimed at collecting and analysing ice cores to determine the spatial climate variability across Antarctica over the last 200 years. This project focuses on coastal cores which have been shown to be very sensitive to climatic variability. (Sir Robin Irvine Doctoral Scholarship).
- K056: Dynamics and Change of the Darwin-Hatherton Glacial System. Studying the response of the Antarctic ice sheet to future climate change. Combines glacial, geomorphological and climatological approaches. Contributes to the Latitudinal Gradient Project.
- K072: Aims to derive a new terrestrial paleotemperature proxy based on the isotopic composition of carbonate in Antarctic soils to allow us to test hypotheses of climatically influenced changes in hydrology and glacier dynamics, provide corroboration of ice-core based isotopic paleotemperature proxies, and potentially allow reconstruction of past atmospheric CO<sub>2</sub> isotopic composition. (Helicopters New Zealand Doctoral Scholarship).

#### The Cryosphere

- K053: The aim of this project is to improve the accuracy of remotely sensed, satellite-derived, snow and ice data by calibrating these data with ground-truth measurements.
- K064: The goal of this research is to develop an understanding of the interactions between glaciers and permafrost that will permit models of glaciers to realistically parameterise ice motion, thus improving their ability in predicting glacier response to climate change.
- K131: Long-term study on sea ice and Southern Ocean processes. Looking at the physical oceanography of McMurdo Sound, the turbulence that exists under sea ice and its influence on ice formation, circulation in Antarctic fjords, and the physical processes involved in the formation of frazil ice beneath land-fast sea ice. Is a NZ-IPY funded project.

#### The Atmosphere

- K055: Dynamics and Ionisation in the Antarctic Middle Atmosphere. Long-term study on the general circulation of the atmosphere, in particular, the behaviour of wave-driven circulation in the middle atmosphere and how this effects the transport of energy and momentum to higher altitudes.
- K069: Long-term project monitoring magnetosphere-ionosphere coupling and space weather at high latitudes. Has applications for communications predictions and plasma physics.
- K085: Long-term research programme targeted at understanding the drivers of change in the atmosphere, particularly those involved in the formation of the Antarctic ozone hole.
- K087: Looking at human-induced long-term trends in trace gases to determine changes in oxidative capacity of the atmosphere.
- K089:

### Southern Ocean Research

#### Oceanography of the Ross Sea

- K042:  
b/c.
- K014:
- K018: Studying the distribution and abundance of meroplankton (larvae of benthic marine invertebrates and fish) in the water column. Uses morphological and molecular approaches to identify common larval types. Contributes to the Latitudinal Gradient Project.
- K043: Studying the productivity of algae that live in and under the sea ice. Determine what the effects of global climate change will have on this productivity (important because sea ice covers a large area). Contributes to the Latitudinal Gradient Project and is a NZ-funded IPY project.
- K068: Looking at how increased UV-R radiation damages the DNA of Antarctic invertebrate larvae and embryos and the impacts on how they recover from such damage. Also looking at the effects of ocean acidification on the development the invertebrate's skeleton.
- K082: Long-term project aimed at characterising the structure and function of benthic marine communities and determine their relationships to key environmental factors. Important for an improved understanding of Antarctic biodiversity and ecology, and management of the Antarctic coastal zone. Contributes to the Latitudinal Gradient Project and is a NZ-funded IPY project.

## Antarctic Ecosystems Research

### Terrestrial Biodiversity

This Terrestrial Biocomplexity project is using an interdisciplinary approach to determine the present status of the biodiversity, and to predict the effects of multiple potential impacts on these ecosystems. The main goal of the research will be a dynamic geographic information system in which the specific observations about patterns and processes of the physical environment, plus observations of the presence of particular organisms and their interactions, will be mapped and linked with computer models that allow prediction into as-yet unsampled locations and scenarios for future change in conditions. Contributes to the LGP and is a NZ-funded IPY project.

K020:

K023:

**Studies microbial speciation, biogeography, and evolution of thermal adaptation at a geographically isolated geothermal site.**

### Ecosystem Functioning

This research aims to understand how terrestrial organisms have adapted to changes in the Antarctic climate during the last 35 million years by conducting physiological and phylogeographic studies of freezing tolerant and freezing resistant invertebrates. Contributes to the Latitudinal Gradient Project.

K066:

**Studying various aspects of Antarctic aquatic ecosystems, geochemistry of ponds, photosynthetic and nitrogen fixation rates of microbial mats to assess model predictions against actual observations. Contributes to the Latitudinal Gradient Project and is a NZ-funded IPY project.**

K081:

**Long-term study on the population dynamics of the Adelie penguin population of the Ross Sea as a biological indicator of local, regional and global change. Contributes to the Latitudinal Gradient Project.**

K122:

### Human Ecology

**Aims to examine the relationships between circannual patterns of psychological and physical activity in Antarctica to generate recommended countermeasures for any decrements in health, safety, and job performance that may arise due to low periods of human activation while on deployment to Antarctica.**

K073:

### Management and Conservation

**Seeks to quantify the cumulative impacts of human activities on Antarctic soils, identify areas of greater vulnerability, increase our predictive environmental impact assessment abilities, and make way for informed management decisions in the future.**

K026:

**Research to support environmental protection and management of ice-free areas of the Ross Sea region by increasing the fundamental knowledge and understanding of Antarctic soils including soil distribution and climate, and vulnerability to human impact. Contributes to the Latitudinal Gradient Project.**

K123: