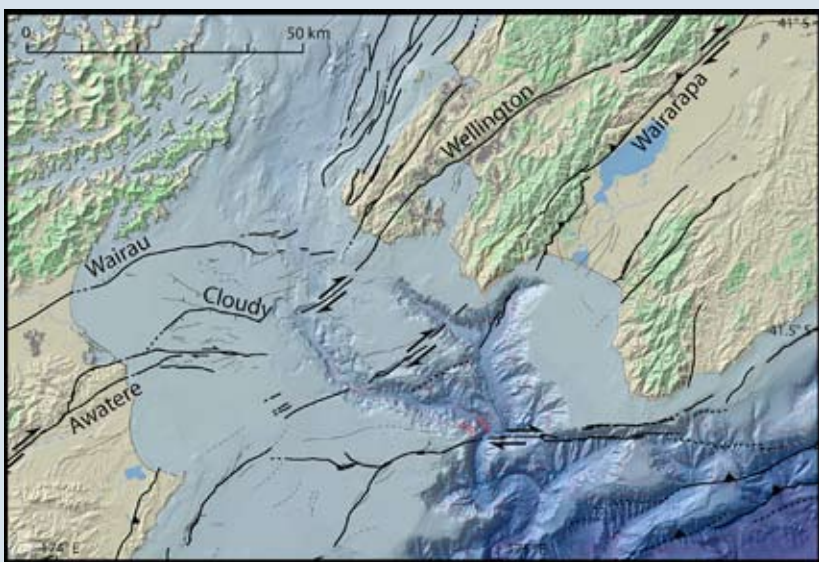


# NIWA Natural Hazards

setting the foundation for a safer future

## Fault mapping in Cook Strait

NIWA's ocean geology group recently mapped Cook Strait, using a combination of multi-beam bathymetry and high-resolution seismic data. The work revealed valuable information about the geometry and history of subterranean fault lines, which were last studied almost 20 years ago.



Active faults in Cook Strait – rupture in large magnitude earthquakes could cause substantial damage to the Wellington and Marlborough regions.

The segmentation of the faults was a big surprise to us," says Dr Nicolas Pondard. "We know now that Cook Strait faults are discontinuous and smaller than previously expected, making them less hazardous. On the other hand, we discovered a new earthquake source close to Wellington – the Cloudy fault – and realised that the Wairau fault is near the end of its seismic cycle. Thus an earthquake may occur along that fault within the next few centuries."

A rupture of one of the newly-mapped faults could, it is estimated, cause a magnitude 7 earthquake, while the time interval between ruptures of the Strait faults in general is estimated at between 1000 and 3000 years.

The research was sub-contracted by GNS Science, and funded by the Foundation for Research, Science & Technology, and NIWA's Capability Fund, with support from EQC, ACC, and Greater Wellington Regional Council.

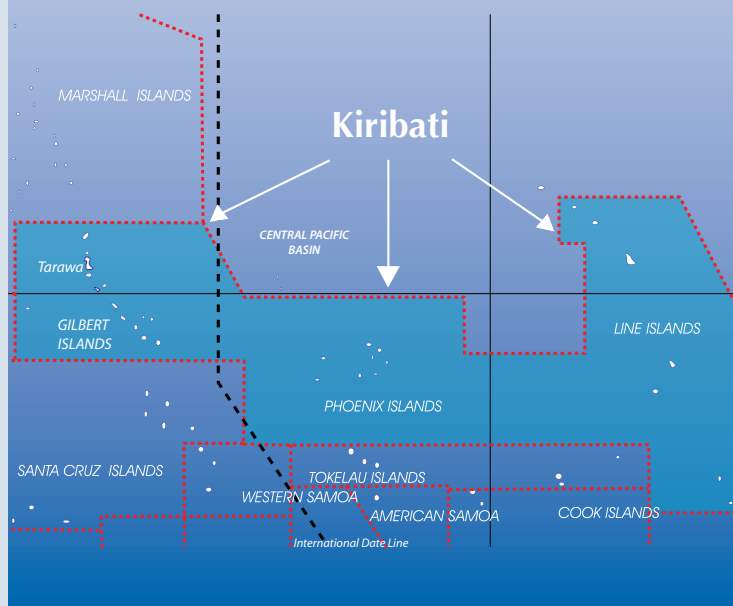
## Climate change in Kiribati

NIWA has started work on one component of Phase 2 of the Kiribati Climate Change Adaptation programme. The project aims to provide climate change information for risk management to this widely dispersed group of Pacific islands.

NIWA's input, led by Natural Hazards Centre Leader Doug Ramsay, will include wave modelling, analysis of tides, storm-surge, and extreme water levels, joint probability analysis, assessment of extreme rainfall intensities, and drought return periods. It will also involve a visit early in 2008 to Tarawa, the capital, to carry out a series of workshops to present the work and to develop the skills of local staff in using and applying the data.

Kiribati is considered to be one of the most vulnerable countries in the world to the effects of climate change and sea-level rise. It comprises 33 atolls, spread over 3 500 000 km<sup>2</sup>. Twenty one of the atolls are inhabited; of the estimated total population of 105 000, many live on Tarawa, which is less than 3 m above sea level. The small size of Tarawa and other atolls means adaptation to climate change will be extremely challenging.

The project is supported by the World Bank, the Global Environmental Facility, AusAID and NZAID, the Japan PHRD Climate Change Fund, UNDP, and a parallel project by the EU.



## Involving communities for better environmental outcomes

Coastal erosion is a big issue around New Zealand. Local authorities and other agencies are increasingly turning to communities in their efforts to implement successful, environmentally-benign, erosion control.

Encouraging local people to take responsibility for dune revegetation and the like can be both rewarding and challenging. NIWA, AgResearch, and GNS scientists have been looking at what makes for successful environmental projects involving local people. A series of case studies and interviews led us to conclude that there are a number of factors which will determine the success or otherwise of projects. Some of those we identified are:

- a trusting and cooperative relationship between the local authority and community must be fostered
- communities need access to resources such as technical knowledge and funding
- inspirational community leaders are a big help
- good records of failed attempts in the past to put things right can save everyone from trying to re-invent the wheel.

The research was funded by the Foundation for Research, Science & Technology, under sub-contract to GNS Science.

*Dune restoration work by community group  
DuneCare Bay of Plenty, Mt Maunganui beach.  
[Photo: Terry Hume, NIWA]*

## Auckland prepares for climate change

Manukau City Council is first off the blocks in adapting its engineering standards in response to the latest climate change projections provided by the Intergovernmental Panel for Climate Change Fourth Assessment Report. A report prepared by NIWA climate and coastal hazard specialists developed scenarios of high intensity rainfall and extreme sea-level rise in the mid-to-late 21<sup>st</sup> century, and the information will now be incorporated into the city's Engineering Quality Standards (EQS), underpinning all future housing and infrastructure development.

Meanwhile, members of the NIWA Coastal Process Group and Auckland climate team, in association with the Ministry for the Environment, ran a half-day workshop for Auckland City Council staff on potential climate change impacts in the Auckland region. The workshop provided an opportunity for City Council and also Auckland Regional Council staff to discuss areas where work may be needed to better inform future planning and engineering decisions.

## Mass field campaign in the Jollie catchment

NIWA scientists Dr Jordy Hendriks and Dr Martyn Clark recently led a successful 29-strong field team into the Jollie catchment near Mount Cook. The purpose: to collect as much data as possible on snow depth and density.

Groups were dropped on mountain ridges and made their way down, while others started in the valley and made their way up, all following a predefined sampling strategy. The campaign is unprecedented for snow research in New Zealand and will provide some fundamental data for model validation.

The more unevenly the snow is distributed, the longer the snowmelt season can last – knowing when snow will melt is crucial for water resource managers, especially hydroelectricity companies. Understanding the distribution of snow is also a key issue for avalanche forecasting.

The team included researchers from University of Otago, University of Canterbury, Victoria University of Wellington, and DoC. Funding was from the NIWA Capability Fund.

*Dr Jordy Hendriks (NIWA) uses a long avalanche probe to take multiple snow depth measurements, while Associate Professor Ian Owens (University of Canterbury) records the observations and the location from a GPS. [Photo: Hillary McMillan, NIWA]*

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