

NIWA Natural Hazards

setting the foundation for a safer future

Snow and Ice Monitoring Network – first test passed

NIWA's new Snow and Ice Monitoring Network was put through its paces in mid June, when snow fell at two locations where snow and ice monitoring stations had just been installed. At Mt Cook Village, 38 cm of snow fell on 22 June, and at Arthur's Pass 14 cm was recorded on 23 June. A third station, at the Chateau at Ruapehu, is also up and running and has received its first light snowfall of the year.

Jordy Hendriks describes his snow and ice monitoring network to a TV3 film crew on Panorama Ridge, near the Godley Glacier at the head of Lake Tekapo, a site owned by Meridian Energy. [Photo: Clint Miles, Tekapo Helicopters]



NIWA scientist Jordy Hendriks explains: "These measurements will be the first of many. The new network will eventually record snowfall at 10–12 key locations. The aims are two-fold: first to gain a better understanding of snow and ice as a resource, essential to users such as the ski industry, hydropower, and irrigation, but also as a hazard; second, to assess the effect of climate change on snow and ice."

The new climate stations are like normal climate monitoring stations but have an extra sensor to measure snow depth. The sensor is an ultrasonic ranger, which measures the distance between itself and the ground. As snow falls and accumulates, this distance decreases and the total amount of snow at the location can be measured.

What's underneath gravel beaches?

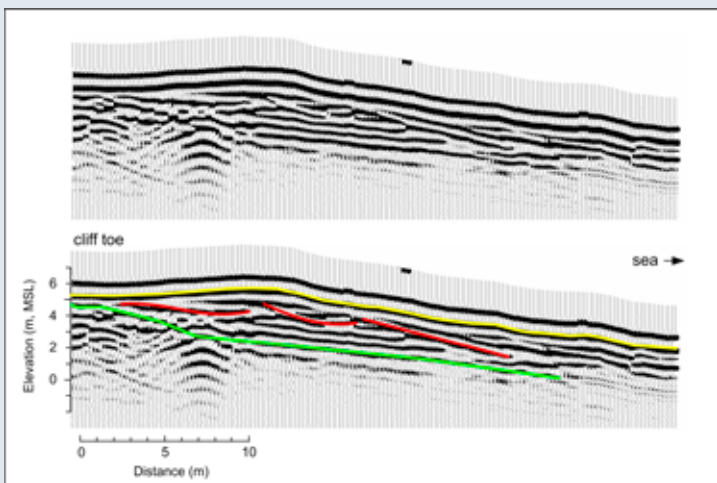
Gravel beaches form an effective first line of defence against ocean waves. On coastlines, such as those found in south Canterbury where gravel beaches front highly erodable alluvial cliffs, it is the gravel beach that prevents wave energy reaching the cliff toe. But under certain conditions, waves strip the gravel from the cliff and erosion occurs very rapidly.

In a novel application of Ground Penetrating Radar (GPR), NIWA scientists Mark Dickson and Murray Hicks have been working with Charlie Bristow from the University of London to look underneath the beach surface. The aim: to gain a better understanding of when and how beach stripping and cliff erosion take place.

The GPR proved very effective at mapping the sloping substrate beneath the beaches, which is only occasionally and briefly exposed during storm waves. This accuracy was confirmed by comparing results with University of Canterbury research, in which scientists had dug trenches on the same stretch of coastline.

By surveying multiple radar profiles along the shore and combining the data with LiDAR images of the beach surface, beach volume along stretches of coastline can be calculated. These data are being analysed alongside erosion and wave data to assess the threshold conditions under which cliff erosion occurs.

(Mark Dickson is a Foundation for Research, Science & Technology postdoctoral fellow.)



A GPR profile showing features underneath a gravel beach surface. The black lines are strata with different reflective properties. The yellow line shows the beach surface, the green line shows the substrate, the red lines show beach erosion surfaces.



A typical Canterbury gravel beach, where cliff erosion by waves is always a threat.

Inset: Dr Charlie Bristow uses the Ground Penetrating Radar. [Photos: Doug Ramsay, NIWA]

Understanding the impacts of natural disasters

NIWA, along with GNS Science, is working to increase our understanding of the impacts of natural hazards both in New Zealand and overseas. This work is essential to increase resilience to future hazards. Two projects are described below.

Understanding the effects of the Northland floods

NIWA and GNS Science are working together to develop new tools to help increase the resilience of New Zealand communities to the impacts of floods and other natural hazards. A component of this work involves better understanding the damage and socio-economic consequences that such events have on communities. The flooding events in Northland over this winter provide an opportunity to survey households, farms, and businesses in the region, to learn more about the effects of the floods.

NIWA's Stefan Reese reports that a survey will target people in the worst-affected areas, and will seek information on aspects such as structural damage, financial losses, displacement, loss of income, and flood warnings received.

Stefan says: "Post-disaster surveys help us to better understand the major factors that influence a community's vulnerability to hazard events, and the costs of such events, and in turn contribute to the development of new ways of increasing our resilience to hazards. Typically we carry out surveys 6–9 months after the event, when people are back in their homes and damages have been repaired.

The planned survey will be carried out in close cooperation with Northland Regional Council. After the 2004 floods, surveys in Lower Hutt, Manawatu-Wanganui, and the Bay of Plenty were carried out by GNS Science.



What cost to businesses? The Haruru Falls Resort, during and after the March Northland floods. [Photos: Far North District Council, and Graeme Smart, NIWA]

Managing extreme weather and flooding Two-day course, September 2007

This course is for anyone involved in resource management or natural hazard management associated with extreme weather and flood events. The course covers how weather systems develop, the extent of hazards posed by wind and rain, hydrological processes, and assessment of flood risks. Practical presentations, group projects, and a field visit are included.

Course leader – Dr Mike Revell, NIWA
04 386 0328, m.revell@niwa.co.nz

For more details, including dates and location, keep an eye on the NHC website: www.naturalhazards.net.nz

The human impacts of natural disasters

Understanding the impacts of natural hazard disasters on survivors is vital for improving how we target recovery efforts to future events. NIWA scientists James Goff and Catherine Chagué-Goff recently spent time interviewing Sri Lankan tsunami survivors.

Over 20 tsunami survivors were interviewed, and each interviewee had an important story to tell; one of survival, the chaos of the aftermath, or of dealing with personal tragedy. Interviews were carried out with men, women, boys, and girls of all ages and from a range of backgrounds.

"The technique for video interviewing tsunami survivors has developed over time. It is not simply a case of pointing a camera at a person and asking them to speak," says Dr Goff.

The final product is destined for use in schools, government departments, community education programmes, and in tsunami memorials such as regional and national museums. The interview database includes video records from over 300 tsunami survivors, from many events dating back to the 1946 tsunami in Hawaii. Dr Goff is keen to hear from any New Zealanders who might be interested in sharing their stories about the Indian Ocean tsunami "because the best way to educate New Zealanders about tsunamis is for them to hear about it from fellow Kiwis".

This international project is funded by the US National Oceanic & Atmospheric Association (NOAA).



The team interviews a Sri Lankan tsunami survivor. [Photo: Starin Fernando]

Do you have a tsunami story? Contact James Goff on:
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For more information, contact:

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