

Welcome to the latest of the research updates from the Joint Centre for Disaster Research. The centre opened in December 2006 and is a joint venture between Massey University and GNS Science within the School of Psychology, based at the Massey University campus in Wellington.

The centre undertakes multi-disciplinary applied teaching and research aimed at:

- gaining a better understanding of the impacts of natural, man-made, and environmental disasters on communities;
- improving the way society manages risk;
- enhancing community preparedness, response to and recovery from the consequences of natural, man-made and environmental hazard events.

The worlds most productive volcano - Taupo

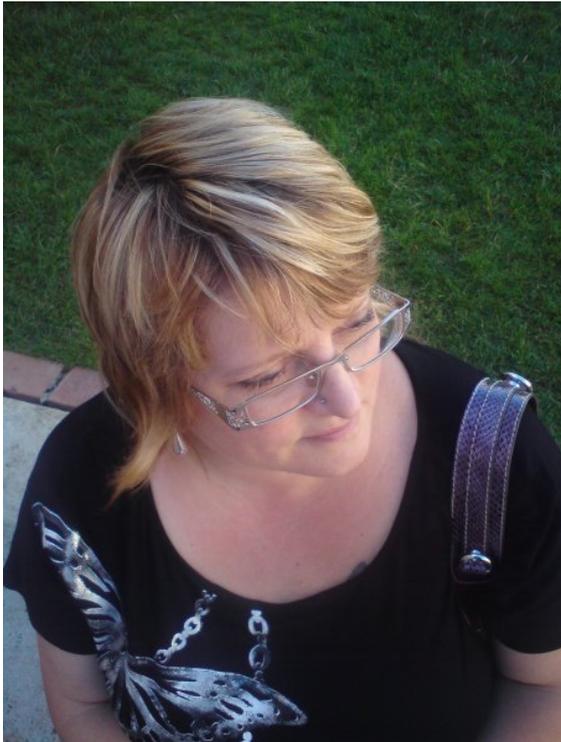


Photo: The launch “Tuwharetoa” pulled up right outside the Internal Affairs fishing lodge at Whakaipo Bay. Subsidence during the 1922 earthquake swarm brought the lake to the door of the cottage. R Gerard collection, Taupo Museum.

New Zealand hosts some of the most active caldera volcanoes in the world, yet a comparatively limited amount of detailed planning has been undertaken in preparation for the next, potentially cataclysmic volcanic event. Reawakening volcanoes can have months to years of unrest, which can cause significant social and economic effects, as well as physical damage. These periods require careful management, as they may or may not result in an eruption. Effective emergency management plans and response arrangements need to be developed for New Zealand’s calderas, reflecting the size and complexity of such an event and involving coordination between a range of agencies. Research by PhD student Sally Grant aims to investigate the management of a developing volcanic crisis at a reawakening New Zealand caldera, focussing on the relationship between the identification of volcanic precursors and the application of emergency management procedures. (Contact: Sally Grant shgrant@gmail.com)

Visit our updated website: <http://disasters.massey.ac.nz/>

New Staff at the Centre



The Joint Centre for Disaster Research, Massey University/GNS Science is pleased to announce that **Dr Miriam Hughes** has accepted the position of Public Education Advisor. Dr Hughes will be working on projects that translate research into the public domain and will work closely with the CDEM sector. The position is jointly funded by the Earthquake Commission and Massey University.

Contact: M.E.Hughes@massey.ac.nz

Understanding and improving 'short fuse' warnings for natural hazards: collaboration between the US and New Zealand

Public response to warning systems plays a crucial role in reducing physical and social vulnerability to hazardous events including extreme weather, tsunami, flash flooding, volcanic eruptions and landslides. A particular area that warrants attention is that of short fuse hazards. Such hazards develop with less than a 24-hour lead-time and the short timeline can prove difficult to provide effective warnings (for example, thunderstorms, tornadoes, local tsunami).

The Royal Society of New Zealand International Science & Technology (ISAT) linkages Fund, supported Heather Lazrus from the National Weather Center program, Social Science Woven into Meteorology (SSWIM)¹, in Norman, Oklahoma to travel to New Zealand and collaborate with Julia Becker from GNS Science on the topic of short fuse hazard warnings. The aim of the collaboration is to enhance social science research and contributions to improving the 'short fuse' warning process across multiple hazards. As part of the collaboration, a workshop entitled "*Improving 'short fuse' hazard information for severe weather: Social science contributions to effective warning dissemination and public response*" was held at the Joint Centre for Disaster Research at Massey University on 17 May, 2010. The specific goal of



¹ The **SSWIM Program** (www.sswim.org) located on the University of Oklahoma campus in Norman, OK is a partnership between the University of Oklahoma and the National Oceanic and Atmospheric Administration. SSWIM brings social scientists and meteorologists, climatologists, and hydrologists together to enhance social relevance of weather information and reduce the risks of extreme weather hazards.

the workshop was to introduce the concept of short fuse hazard warnings to participants and to identify future social science research contributions to weather warnings. Participants at the workshop represented the MetService, National Institute of Water and Atmospheric Research, Ministry for the Environment, National Rural Fire Authority, Australian Bureau of Meteorology, Civil Defence Emergency Management, Massey University, GNS Science and the University of Oklahoma.



The first half of the workshop involved several presentations that provided an overview of ‘short fuse’ hazards and looked at the current state of warnings in New Zealand and the US for these events. The workshop also had a particular focus on short fuse warnings in a meteorological context, and examples from MetService’s severe weather and thunderstorm warnings were discussed as case studies. The second half of the workshop provided an opportunity for in depth discussions of issues related to short fuse meteorological warnings and identifying problem areas where social science research needs to be undertaken.

Workshop participants provided input into developing a series of research questions that need to be studied to improve warning systems. Research themes that emerged included:

- identifying and engaging all participants involved in the short fuse weather warning process;
- warning decision-making and communication for weather hazards;
- effective warning message content in a weather context;
- effective warning dissemination for weather hazards;
- populations vulnerable to weather events;
- education for weather hazards; and
- costs and benefits of weather warnings (quantitative and qualitative).

The workshop held in Wellington was followed by a meeting between SSWIM, GNS Science and MetService to progress future research. At the meeting it was agreed to pursue funding for a project involving SSWIM, GNS Science and MetService. The project will focus on investigating who currently receives severe weather warnings and how people respond to these weather warnings. The project will benefit from international comparison with US-based research.



Follow-up meeting at the MetService office, 18 May 2009. From left: Peter Kreft (MetService), Neil Gordon (MetService), Norm Henry (MetService), Kim Wright (GNS Science), Julia Becker (GNS Science), Heather Lazrus (National Weather Centre and SSWIM).

Cities on Volcanoes 6 – Tenerife, May 31 to June 4 2010.

In June 2010, Emma Doyle (Massey U.), Thomas Wilson (U. Canterbury), Johnny Wardman (U. Canterbury), Graham Leonard (GNS Science), Jan Lindsay (U. Auckland), and Shane Cronin (Massey U.) attended the 6th Cities on Volcanoes Conference in Tenerife, Canary Islands, Spain. These conferences occur on a biennial basis, and are the premier international forum for volcanic risk assessment, mitigation, management and response. This year it was hosted by the Cabildo Insular de Tenerife and ITER and co-hosted by the Commission of Cities and Volcanoes (CaV) of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) and several international, national, regional and local institutions and organizations.

There was a wide range of science and technical sessions throughout the conference including: Understanding volcanic hazards, Volcano observation and monitoring, Geoengineering in volcanic environments, Volcanic hazard and risk assessment, Communication strategies for reducing volcanic risk, Human health problems caused by volcanic activity, and Volcanic crisis management in megacities on and around active volcanoes. This conference, and the accompanying workshops, provided invaluable opportunities to strengthen and build international collaborations. Some of the talks and posters presented by researchers associated with the JCDR are listed below. The full abstract volume can now be downloaded here:

<http://www.citiesonvolcanoes6.com/>.



- CRONIN, Shane Jason *Health, Agriculture And Water-Supply Impacts Of Long-Term Volcanic Ash And Gas Eruptions In Vanuatu – Perception Vs. Reality*. Oral: 2.7-O-1
- DOYLE, Emma E; HOGG, Andrew J; MADER, Heidi M; SPARKS, R Stephen J. *Modelling Pyroclastic Currents as Two Layers*. Oral: 1.2-O-04
- LEONARD, Graham S.; WILSON, Thomas M.; STEWART, T Carol; JOHNSTON, David M.; BAXTER, Peter J.; ROVERE, Elizabeth I.; VILLAROSA, Gustavo. *Lessons Learned from the May 2008 to Present Eruption of Volcan Chaitén, Chile: Emergency Management, Evacuation, Welfare and Recovery*. Oral: 4.1-O-08
- LEONARD, Graham S.; JOHNSTON, David M.; WILSON, Thomas M.; STEWART, Carol; CRONIN, Shane J.; COLE James W.; DALY Michele C.; HOUGHTON Bruce F.; LINDSAY, Jan M. *Ash fall impacts in New Zealand: mitigation strategies developed through New Zealand and international case studies*. Oral: 2.7-O-16
- LINDSAY, Jan; LEONARD, Graham; JOHNSTON, David; WILSON, Tom; HOUGHTON, Bruce. *Recovery From Small Basaltic Eruptions: Lessons From The 1973 Heimaey Eruption, Iceland*. Oral: 2.7-O-04
- LINDSAY, Jan; HORROCKS, Jo; JOLLY, Gill; DALY, Michele; HOLLAND, Greg. *The Role Of Disaster Exercises In Volcanic Crisis Management In Major Cities: Lessons Learned From Exercise Ruaumoko in Auckland, New Zealand*. Oral: 4.3-O-01
- MAGILL Christina; WILSON, Thomas; OKADA, Tetsuya. *Quantifying the economic impacts from thin tephra-falls*. Oral: 2.7-O-02
- SWORD-DANIELS, Victoria; ROSSETTO, Tiziana; JOHNSTON, David; WILSON, Thomas; LOUGHLIN, Sue; SARGEANT, Susanne; COLE, Jim. *State Of The Art Review Of The Impacts Of Volcanic Ash Fall On Urban Environments*. Oral: 2.7-O-15
- WILSON, Thomas; LEONARD, Graham; STEWART, Carol; VILLAROSA, Gustavo; ROVERE, Elizabeth; BAXTER, Peter J.; PIZZOLON, Lino; JOHNSTON, David. *Impacts on critical infrastructure following the May 2008 Chaitén eruption in Patagonia*. Oral: 2.7-O-14
- CRONIN, Shane J; BEBBINGTON, Mark S. *Does Regional Tectonism Control The Rate Of Volcanism Along Convergent Margins?* Poster: 2.1-P-18
- DOYLE, Emma E.; CRONIN, Shane J; COLE, Susan E; THOURET, Jean-Claude. *The Coalescence, Bulking, and Debulking, of Lahars at Semeru Volcano, East Java*. Poster: 1.2-P-16
- DOYLE, Emma E.; JOHNSTON, David M. *“They Said What?” Exploring the Understanding and Impact of Science Advice on Volcanic Emergency Decision Making*. Poster: 2.4-P-02

- JOHNSTON, David; DAVIS Matthew S.; BECKER, Julia; LEONARD, Graham ; PATON, Douglas. *Community Understanding of and Response to the Lahar Risk at Mount Rainier: Implications for Public Education*. Poster: 2.4-P-05
- STEWART, Carol; WILSON, Thomas; LEONARD, Graham; JOHNSTON, David; COLE, Jim *Protecting Water Supplies From Volcanic Activity: Lessons Learned*. Poster: 2.7-P-16
- THOMAS, Wilson; SHANE, Cronin; JIM, Cole. *Rehabilitation of Pasture following a Large Volcanic Eruption*. Poster: 2.7-P-15
- WARDMAN, Johnny; WILSON, Thomas; BODGER, Pat; COLE, Jim; JOHNSTON, David M. *Pyroclastics and Power – Quantitative Testing of High-Voltage Transmission Systems to Volcanic Ashfall Hazards*. Poster: 2.7-P-09



Ash Fall Impacts Working Group - 5 June 2010

Following the main conference New Zealand, United States and United Kingdom researchers lead a workshop of the Ash Fall Impacts Working Group, which sits within the Cities and Volcanoes commission of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI).

The group formed after recognition of a global need to collect information on the impact and recovery from volcanic ashfall hazards. Various agencies and research groups have been collecting information for a number of years, with much of the collective knowledge hosted on the Ash Impacts Website. Various reconnaissance trips, VDAP events and data collection projects have been conducted, and there is a growing feeling that in future these could be better aligned. Much of the work is aimed at standardising data collection and analysis so that comparison between events can be more easily achieved. There is also a common interest in improved protocols for ash collection and analysis, and the communication of this information to relevant end-users.

The working group has settled on five main objectives:

1. **More effective ash fall warning messages**
2. **Protocols for data collection and analysis** (including ashfall collection, health and leachate protocols)
3. **Checklist of topics and indicators to collect impact data on following eruptions**
4. **Ash impact loss-damage functions for risk calculation**
5. **Improved ash fall impact data and image repositories; improved communication**

Over 45 researchers from around the world participated in the workshop, which was given additional impetus after the recent experience following the major impacts to air travel from the Eyjafjallajökull eruption in Iceland in March and April.

The workshop provided the opportunity to discuss current research strategies, direction and priorities. It provided the opportunity for collaborations to develop and mature, and the working group have planned to have several outputs completed by the end of the year.



The Hawke’s Bay Regional Council hosted the first ‘Regional RiskScape’ end-user workshop on Thursday, 13 May 2010 at the Hawke’s Bay Regional Council. ‘Regional RiskScape’ is a tool for analysing the impacts and risks from multiple hazards. A joint venture between Crown Research Institutes GNS Science & NIWA, ‘Regional RiskScape’ has been through a 4 year development phase establishing a “proof of concept” using Hawke’s Bay, Christchurch City, and Westport as pilot study areas.

The RiskScape Project is now in Phase 2, where the project developers are making RiskScape operational and available to end-users. The Hawke’s Bay workshop was run to initiate discussions with representatives from local and regional government and infrastructure and utility agencies involved in hazard management. The emphasis of the discussions is about how to ensure RiskScape becomes a user-friendly decision support tool, suitable for different users’ requirements. There were representatives in attendance from a wide range of agencies including all Hawke’s Bay councils and other interested agencies (see below). Attendees had the opportunity to use the tool and provide feedback, working through exercises involving flooding and an earthquake. Representatives from the following organisations were at the workshop: NZ Transport Agency; Port of Napier; Unison; Genesis Energy; TPG Logan; Ministry of Civil Defence and Emergency Management; Hawke’s Bay Regional Council; Hastings District Council; Napier City Council; Wairoa District Council; and Central Hawke’s Bay District Council.

The workshop concluded with discussions on the forward path. The general agreement of the workshop attendees was that the RiskScape Team needed to focus on:

1. Working with lifeline utilities (power, water, gas, transport, telecommunications) in Hawke’s Bay, and in the other pilot areas on incorporation of infrastructure data and lifeline functions, including restoration times for utilities such as water supply, electricity etc into RiskScape;
2. Working with Hawke's Bay Local Authority planners on incorporation of planning data and lifeline functions into RiskScape;



The RiskScape team will set up an end-user group where people will be able to contribute to the ongoing development of ‘Regional Riskscape.’ It was also proposed that RiskScape be used during Exercise Tangaroa (20 Oct 2010, see <http://www.civildefence.govt.nz/memwebsite.nsf>) to demonstrate distant source tsunami risks in the pilot areas and exhibit the new capabilities.

Visit www.riskscape.org.nz for more information.

Supporting Mass Evacuation: Using Ontology to Improve Shared Situation Awareness

Situation Awareness (SA) is a critical element of emergency decision making where time and information needed to make decisions are insufficient and lives are at stake. Better SA can improve operational effectiveness by facilitating the planning process, improving the quality and timeliness of decisions, and by providing better feedback about the consequences of early actions. The biggest challenge in improving SA is to improve the shared SA of the team involved in the emergency decision making response. Team members with different environmental, personal, social, task and spatial-temporal contexts make it challenging to provide a single system for all members. We will analyse how semantic technologies might be used to address these challenges. We suggest that an approach featuring domain ontologies, reasoning capabilities, semantic queries, and semantic integration techniques, provides the basis for an integrated framework for improving shared SA of a team.



Research Objectives:

1. To identify the information needs of emergency managers for decisions about mass evacuation
2. To understand how emergency managers build their conceptual representations to make collaborative sense of complex situations
3. To provide guidance for users in identifying the right information to search for and how to integrate it with existing information
4. To use Ontologies for improving context based shared Situation Awareness
5. To state the fundamental design principles of Emergency DSS with special reference to mass evacuation

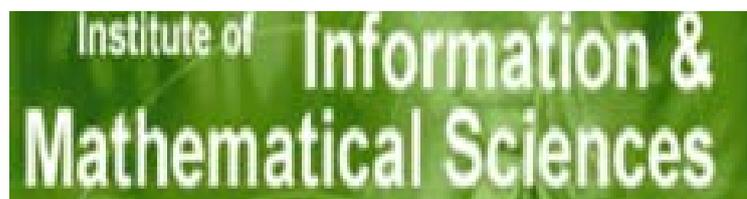
How YOU can Help!

If you have an experience of emergency management (EM), you have information that could be used to improve our understanding of Situation Awareness (SA). This information could then help us in improving the design and successful implementation of EM Systems to support mass evacuations.

We would welcome your participation in a short survey that would help us to comprehend the EM decision making process.

Please contact: **Yasir Javed, Office: 094140800 ext: 9248, Cell #: 02102735279**

Email: y.javed@massey.ac.nz



A Cloud on the Horizon

The ash from Eyjafjallajökull volcano in Iceland continues to bring chaos to international travel. The eruption, which began on 14th April, shows no sign of diminishing. Scientists cannot forecast how long the eruption will last, but they note that the volcano's previous outburst lasted for more than a year between 1821 and 1823. The prospect of another long eruption has focused attention toward economic gloom and despondency; passing virtually unnoticed is the fact that the system for warning about ash clouds has been an unqualified success.

Most of Europe has little experience in dealing with ash clouds and so its response depends on guidelines that have been developed elsewhere. The warning and response procedures are part of international protocols that evolved following the encounter in 1982 between a British Airways Boeing 747 and an ash cloud from Mount Galunggung in Indonesia. The aircraft lost power to all four engines and dropped four and a half miles (almost 25,000 feet) in 16 minutes before they could be restarted. It was agreed by the aviation community that the only way to minimise the loss or damage of aircraft was to alert pilots in a timely manner to divert flights around ash clouds. The volcanic ash aviation warning system was born, and the fact that flights in Europe were halted before any damaging encounters with the Eyjafjallajökull ash cloud demonstrates how well the warning system has worked.



Photo: Approaching the Eyjafjallajökull stratovolcano complex (credit: Stromboli online - Volcanoes of the World)

So how does the warning system operate? Countries with volcanoes monitor volcanic activity via a dedicated observatory that uses a variety of techniques - from seismicity and ground movement to gas emissions and satellite observations - to evaluate when an eruption will occur and how its hazards may develop. Detecting whether a volcano is emitting ash can be tricky, especially if the volcano is remote, so satellite imagery is used to detect any thermal anomalies or ash plumes, as conventional radar techniques cannot detect ash particles. Once a monitoring observatory has detected that a volcano is ejecting ash, it assigns an aviation colour code that ranges from green, yellow, orange to red, depending on the severity of the volcanic activity. This colour code is standardised throughout the world and is the tool that triggers the aviation and meteorological institutions to follow procedures set in place by the International Civil Aviation Organisation (ICAO). ICAO, along with the World Meteorological Organisation (WMO), established the International Airways Volcano Watch (IAVW), which is responsible for dealing with volcano ash warnings from scientists. They have divided the world's airspace into nine Volcanic Ash Advisory Centres (VAAC). The VAAC is part of the host country's meteorological authority. In the current crisis, London is the VAAC in charge, and the VAAC is part of the UK Met Office. These centres are responsible for co-ordinating and disseminating information on volcanic ash to the aviation sector.

Together with the meteorological offices that normally provide weather reports to pilots, the VAAC and monitoring observatories continually review what is happening at the volcano and how the ash cloud is developing. Wind directions and speeds from weather forecasts are fed into sophisticated models that simulate where the ash cloud is travelling and dispersing. It is these models issued by the VAAC that have been seen on the news recently, showing the ash coverage over most of Europe in curious shapes driven by different winds at varying heights. Since the Galunggung encounter in 1982, more than 80 serious incidents have been logged between commercial aircraft and volcanic ash clouds. These occurred as a result of inadequate warnings. The fact that none has occurred during the start of the Eyjafjallajökull eruption shows how effective a good warning can be.

Carina Fearnley, Aon Benfield UCL Hazard Research Centre, Department of Earth Sciences, University College London, Gower Street, London WC1E 6BT, UK. E: c.fearnley@ucl.ac.uk
T: +44 (0)20 7679 2452

Community perceptions of engineering solutions to combat coastal erosion

The team: Paula Blackett and Erin Smith (AgResearch, Hamilton); Carol Stewart (Private Consultant, Wellington); Julia Becker and Maureen Coomer (GNS Science, Lower Hutt); Stefan Reese (NIWA, Wellington) and Terry Hume (NIWA, Hamilton)

The aims of this stream of research are: a) to inform land use planning policy to help society in risk reduction/recovery from coastal hazards, and b) to improve our understanding of the social context of coastal hazard management. Using both quantitative and qualitative methods, we have investigated case studies in coastal management around the New Zealand coastline, from Coromandel coastal communities, North Island west coast beaches and most recently, the Mapua/Ruby Bay community in Tasman Bay. Combining information from a range of case studies will help better inform coastal management decisions nationwide.

In 2009, the research team undertook a study at Mapua/Ruby Bay, consisting of a community survey, in-depth interviews with key local people, and other methods such as analysis of resource consent submissions and other planning documents. This community has witnessed a series of seawall constructions over the past few decades and now has little remaining unarmoured shoreline (Figure 1). One of our aims was to gain insight into community perceptions of ‘engineering solutions’ to coastal hazard management, and one of our key research questions was whether shoreline armouring was the right choice for this community as an erosion mitigation strategy.



In the past, local communities have expressed a preference (Johnston et al., 2003) for building seawalls to halt coastal erosion and protect private property or infrastructure, despite well-documented negative impacts such as loss of public access to the beach at high tide. However, building seawalls usually creates mixed feelings within local communities. Our preliminary data (Table 1) highlights these variations as well as illustrating some additional issues.

Table 1: Was shoreline armouring the right choice?

What was gained	What was lost	Other key issues
Property protected through halting erosion	Natural character - due to a mix of wall types, materials, slopes and lack of sand at high tide	Didn't provide anticipated peace of mind – worry about damage and overtopping during storm events
Protection of esplanade reserve giving public access to coast at all tides	High tide beach in front of the walls	Ongoing costs of repairs and maintenance are significant and endless
		Long term security – what will the impacts of climate change be on the existing walls?
		Privacy issues for land owners when the public walk along the top of the wall.
		Progressive degradation and armouring of the shore line has occurred slowly overtime driven by individuals with vested interests.

Overall, it is clear that participants were resigned to seawalls to protect the things they valued but at the same time, there is regret at what was lost. These issues will be further explored as the team integrates this data with that of the previous seven case studies from around New Zealand.



Top hand photo: Old Mill Walkway beachfront prior to construction of seawall, January 2009. Below photo: Photo taken from same location after construction of Old Mill Walkway Phase 2 seawall



References:

Becker, J., Stewart, C., Coomer, M., Hume, T., Blackett, P. and Davies, A. (2007) Managing our coast: the tabulated results of two community surveys undertaken at Tairua and Waihi Beach. GNS Science report 2007/28, September 2007.

Blackett, P. and Hume, T. (2010) Community perceptions of engineering solutions to combat coastal erosion at Ruby Bay and Marahau. NIWA Client Report.

Blackett, P., Hume, T., & Dahm, J. (2010). Exploring the social context of coastal erosion management in New Zealand: What factors drive environmental outcome. Australasian Journal of Disaster and Trauma Studies, 1.

Johnston, D., Leonard, G., Bell, R., Stewart, C., Hickman, M., Thomson, J., Kerr, J. and Glassey, P. (2003) Tabulated results of the 2003 National Coastal Community Survey, GNS Science Report 2003/35.

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Stewart, C.; Becker, J. S.; Coomer, M.; Wilson, T.; Davies, A., Hume, T. (2007) Coastal management in the Waikato region: a study of the views of Coromandel beachgoers on coastal erosion and its management, January 2007, GNS Science Report 2007/21.

Stewart, C., Leonard, G.S., Johnston, D.M. and Hume, T.M. (2005) The 2003 National Coastal Community Survey: results for Waikato beach communities. GNS Science Report 2005/28.

Adapting to coastal climate change

NIWA is currently involved in a 3 year FRST funded programme titled Coastal Adaptation to Climate Change (CACC), with partners including AgResearch, EcoNomos, Robin Britton, and Environment Waikato and Thames-Coromandel District Council. The CACC programme aims to create the necessary information and tools to enable adaptation by central and local government and communities to the impacts of climate-induced change on the coastal environment. The programme started in July 2008 and has been making steady progress on four main focus areas.

1) Coastal Vulnerability: Work is underway to develop a coastal hazard vulnerability index, using physical coastal and socio-economic information on a GIS platform. An international literature review has formed the basis of a methodology to develop such an index for the New Zealand coastline, and the methodology has been trialled for parts of the Waikato coastline. Next steps are to peer review this method and the resulting mapping of the index, before rolling this out for the whole New Zealand coastline.

2) Engaging communities: Earlier this year, the CACC programme held a public Open Day in February and then a public Workshop in March in Whitianga, one of the case studies to explore how communities may adapt to climate change impacts at the coast. These community interactions were a great success, and were the subject of a paper to the New Zealand Planning Institute conference held in



Christchurch in April. The paper was well received and promoted some useful discussion for the team to consider. Progress has also been made in planning work with the Manaia community (Ngati Whanaunga), the second community case study. The team is also working with the University of Waikato (Dr Anne Hume) and Mercury Bay Area School (MBAS) to develop and trial sustainability teaching units for years 9 to 10 students with a theme on coastal climate change and adaptation. These units have been developed and are now being taught in the second semester (2010) at MBAS to be followed up with a public exhibition of students work on the environment at the end of the unit.

3) Institutionalising adaptation: A draft report on 'Local Government planning practice and limitations to adaptation', reporting the results of a survey of all councils asking how they are managing adaptation issues, has been finalised following review from all councils involved, and has been shared with central Government agencies in order to seek their perspective on the information in the report. A literature review has been undertaken, aiming to better understand developments in adaptation policy in New Zealand (central, regional and local government) and internationally. Next steps include drawing these information strands together and teasing out aspects relating to barriers to institutions planning for coastal adaptation to climate change, and best practice examples.

4) Best practice and indicators: The development of best practice information and indicators for monitoring success of adaptation will start in earnest later in 2010 and in 2011, although all workstreams are building towards this now.

For more information about the CACC programme, contact Helen Rouse h.rouse@niwa.co.nz

Predicting community earthquake preparedness: a cross-cultural comparison of Japan and New Zealand

A recently published paper by Douglas Paton and colleagues (Robert Bajek, Norio Okada and David McIvor) investigated cross-cultural equivalence in predictors of earthquake preparedness. Data were collected from Napier (New Zealand) and Kyoto (Japan). These locations were selected because they face comparable levels of seismic risk but differ with respect to their cultural characteristics. This mix of hazard similarity and cultural differences provided an opportunity to assess the degree of cross-cultural equivalence in predictors of earthquake preparedness. Cross-cultural equivalence was examined by assessing the degree to which individual hazard beliefs (outcome expectancies) and social characteristics (community participation, collective efficacy, empowerment, trust) could explain levels of hazard preparedness in each location. Structural equation modelling analyses revealed similarity in the pattern of relationships between predictor variables and intention to prepare in the Napier and Kyoto data. It is argued that this provides support for the existence of some universal, cross-cultural equivalence in how hazard beliefs and social characteristics interact to predict the degree to which people adopt earthquake preparedness measures. Differences between the data sets are discussed in the context of the fundamental cultural differences between Japan and New Zealand. The theoretical and practical implications of the findings are also discussed in the paper.

Paton, D., Bajek, R., Okada, N., McIvor, D. (in press). Predicting community earthquake preparedness: a cross-cultural comparison of Japan and New Zealand *Natural Hazards*. Online version available

The social psychology of seismic hazard adjustment: re-evaluating the international literature

Christian Solberg¹, Tizianna Rossetto², and Helene Joffe¹

(1) Division of Psychology and Language Sciences, University College London, (2) Department of Civil, Environmental, University College London

The majority of people at risk from earthquakes do little or nothing to reduce their vulnerability. Over the past 40 years social scientists have tried to predict and explain levels of seismic hazard adjustment using models from behavioural sciences such as psychology.

This review paper aims to synthesise the major findings from the international literature on psychological correlates and causes of seismic adjustment at the level of the individual and the household. It starts by reviewing research on seismic risk perception. Next, it looks at norms and normative beliefs, focusing particularly on issues of earthquake protection responsibility and trust between risk stakeholders. It then considers research on attitudes towards



seismic adjustment attributes, specifically beliefs about efficacy, control and fate. It concludes that an updated model of seismic adjustment must give the issues of norms, trust, power and identity a more prominent role. These have been only sparsely represented in the social psychological literature to date.

Solberg C., Rossetto, T., and H. Joffe, H. (2010). The social psychology of seismic hazard adjustment: re-evaluating the international literature. *Natural Hazards and Earth Systems Science* 10: 1663–1677.

Note that NHESS is an Open Access journal. The link is

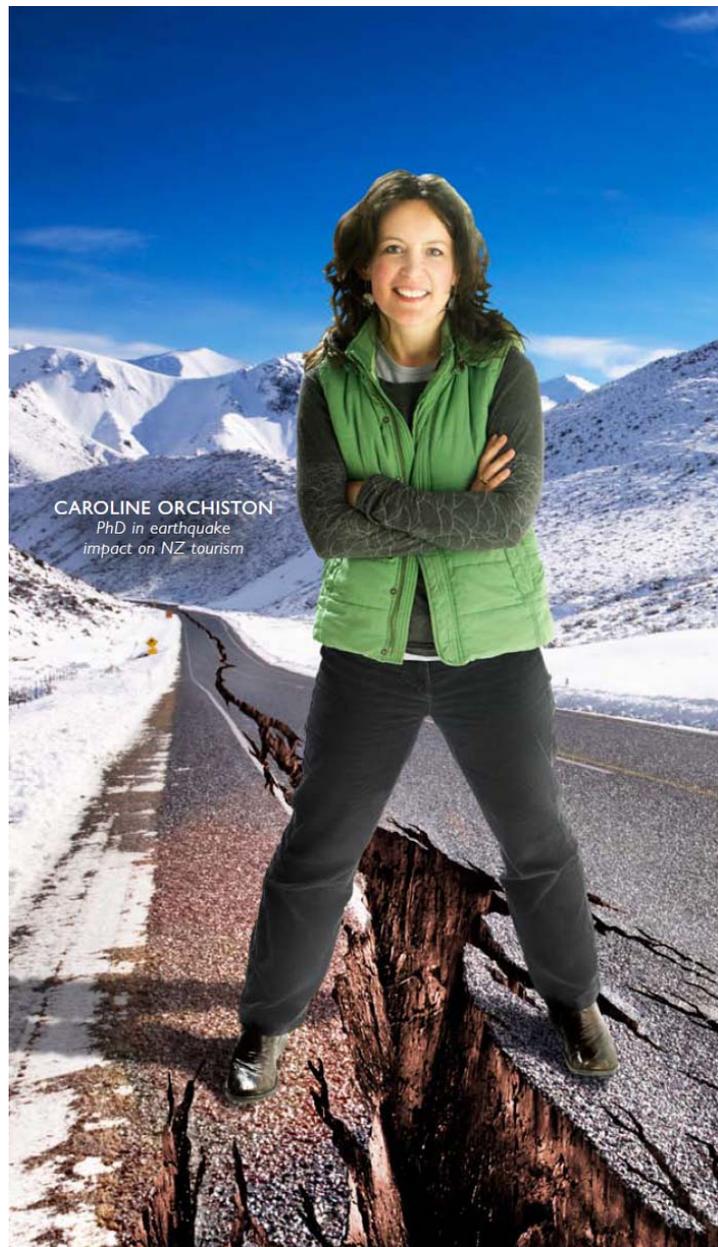
<http://www.nat-hazards-earth-syst-sci.net/10/1663/2010/nhess-10-1663-2010.html>

Tourism and earthquakes in the zone of the Alpine Fault: risk perceptions and business resilience in the tourism industry

The Alpine Fault is a 450 km-long fault which defines the position of the plate boundary as it runs the length of the Southern Alps in the South Island. Paleoseismic evidence suggests it is overdue for a significant earthquake of magnitude ~ 7.8 - 8. Coincident with this area of high seismic potential is a burgeoning tourism industry, which, over the past two decades has shown remarkable growth, capitalising on the region's international reputation for unique nature-based tourism experiences. Visitor activities occur, at times, in relatively remote and hazardous settings, such as National Parks, alpine or coastal areas. Many tourism destinations in the Southern Alps can only be accessed via alpine passes or road ends.

A recently completed PhD project by Caroline Orchiston (University of Otago) adopted three methodological approaches to satisfy two objectives. The first objective of the study investigated the physical outcomes of a large Alpine Fault earthquake on the tourism industry. Modelled isoseismal data for a number of earthquake magnitude scenarios were combined with map overlays illustrating tourist destinations, transport infrastructure, activity settings and travel flows, using ArcView GIS software. The second objective used a quantitative methodology involving a postal survey to gain insights into the total population of tourism operators around the Southern Alps, which generated a 51% response rate. It investigated operator perceptions of regional seismic risk, their perceived level of preparedness, and the factors that influence the resilience of tourism businesses. A third methodological tool involved semi-structured interviews with key tourism stakeholders and tourism business operators to add greater depth and support to the interpretation of the quantitative results.

Results showed that a magnitude 8 earthquake is likely to produce severe damage to infrastructure, buildings and roads, and cause lengthy interruption to human activities throughout the Southern Alps. Widespread landsliding will cause an immediate drop in visitation due to road closures, with long-term repair work (> 6 months) required to restore access. Visitors in many small, remote, tourism-based communities will be left stranded for a period of days until emergency authorities begin evacuating those most in need, adding to the immediate burden on communities. Medium to long-term recovery outcomes may be hampered by on-going aggradation of sediment in fluvial systems, particularly on the western side of the Alps. Post-disaster recovery in terms of visitation is predicted to take approximately 12-18 months, depending on the timing of the earthquake. Results also suggested tourism operators understand the likelihood of an earthquake on the Alpine Fault, but lack awareness of the potential consequences for their business. Business owners consider themselves to be poorly prepared for a large earthquake, although they see the benefit in taking steps to become more prepared. Emergency managers should make efforts to convert tourism operator motivations into improved business preparedness, primarily by making business preparedness information more readily available to the tourism sector resilience 'tools', including continuity insurance, induction, staff training and disaster planning. (Contact: caroline.orchiston@otago.ac.nz)



Older adults and disasters

Older adults experience more negative impacts resulting from a disaster event compared to other age groups. They are vulnerable prior to a disaster by nature of their age-related health needs and the influence of social conditions, which can have an effect on preparedness in a disaster. Factors such as age related physical and cognitive decline, mobility problems, reduced financial resources, and reduced social networks often result in greater challenges to older adults' ability to cope prior to, during, and after a disaster. Two reports by Robyn Tuohy have recently been published, with support from the Earthquake Commission.



The first report reviews international research literature on personal and social vulnerability that can have an impact on older adults in a disaster. Impaired physical mobility, diminished sensory awareness, cognitive decline, and chronic health conditions can all influence the preparedness of older adults. Reduced levels of social connectedness and social support, social inequality and socio-cultural factors can also influence preparedness to a disaster. The report

also describes research on a New Zealand flood disaster based on narrative interviews with four rest home participants and five participants living independently in rental flats who experienced the Kaitia flood disaster in 2007. Findings suggest that both personal and social vulnerability influenced the rental flat participants' preparedness to the disaster. The rental flat participants had reduced access to social, practical and material resources, which had an impact on their level of preparedness to the disaster. In comparison, the rest home residents had higher levels of preparedness, as they were an easily visible population by nature of their institutional location and their dependency on others. Findings from the rest home narratives showed that although the residents had high personal vulnerability because of their frailty, they were not socially vulnerable because of their institutional location, which offered protection, ongoing care and trust in others charged with their wellbeing. The research findings have highlighted the need for a community vulnerability profile of older adults, which could be used as a collaborative resource for health, welfare and emergency management agencies to promote disaster preparedness.

The second report describes and analyses factors that can influence the recovery of older adults following disaster, and is based on international research literature and qualitative case study research from a recent New Zealand disaster event. Findings from this report suggest that a better understanding of age related needs of older adults is required to improve recovery assistance. Furthermore, the engagement and participation of older adults in decision-making and planning initiatives would improve age appropriate care for this age group in the recovery phase of a disaster.

Reports are available free from the Centre's website:

Tuohy, R. J. 2010. Improving disaster preparedness of older adults living in the community, GNS Science Report 2010/07 22 p.

Tuohy, R.J. 2010. Post-disaster recovery of adults, GNS Science Report 2010/09 29 p.

Teaching and Outreach

Staff and associates of the centre currently contribute to elements of the Graduate Diploma in Emergency Services Management and MA, MPhil and PhDs in Psychology, Emergency Management and other related disciplines. The Centre also plans to work with other organisations in the provision of training within the CDEM sectors. A series of Emergency Management short courses are organised by the centre in Summer and Spring.

Graduate Students – linked to the Centre

Debra Ellis (PhD student, School of Psychology, Massey University)
“Health sector emergency management roles in New Zealand”

Julia Becker (PhD student, School of Psychology, Massey University)
“Increasing Community Resilience: Understanding how individuals make meaning of hazard information and how this relates to preparing for hazards”

Wendy Saunders (PhD student with School of People, Environment & Planning, Massey University)
“Effective land-use planning for natural hazard management”

Ian de Terte (PhD student, School of Psychology, Massey University)
“Resilience and the prevention of work related traumatic stress: testing an ecological model”

James Hudson (PhD student, School of Psychology and Te mata o te Tau, Massey University)
“The Quantification of Iwi Development: A Framework for Iwi Development & Resilience”

Heather Taylor (PhD student, School of Psychology, Massey University)
“Children in Disasters: Children's Experiences of Flooding in Surakarta, Indonesia”

Chris Raine (PhD student, School of Psychology, Massey University)
“Complexities of volunteerism associated with New Zealand Emergency Management”

Yasir Javed (PhD student, Institute of Information and Mathematical Sciences, Massey University)
“Design, Implementation and Evaluation of Web-based Integrated Incident Resource Management System for decision support in Emergency Operation Centres”

Sally Grant (PhD student, School of Psychology, Massey University)
“Effective management of a volcanic crisis at New Zealand calderas”

Belinda Beets (MSc student, School of Psychology, Massey University)
“Organisational responses to warnings of impending hazards: What can be learned from the September 2009 tsunami warning in New Zealand?”

Helen Sinclair (MPhil student, School of Psychology, Massey University)
“Decision making styles and processes within a functioning ‘emergency operations centre’ or ‘emergency coordination centre.’”

Abdur Rehman Cheema (PhD student, Institute of Development Studies School of People, Environment and Planning, Massey University)
“Role of good governance in addressing vulnerabilities in disaster management in Pakistan”

Paul Schneider (Masters student, Institute of Development Studies School of People, Environment and Planning, Massey University) “Climate change, adaptive capacity and vulnerability – a coastal communities assessment for the Coromandel Peninsula”

Brenda Mackie (PhD student, School of Psychology, University of Tasmania)
“Psychological preparedness for bushfires: risk perception, social context and resource theories”

David McIvor (PhD student, School of Psychology, University of Tasmania)
“Means-end chain modelling of natural hazard preparedness”

Mai Frandsen (PhD student, School of Psychology, University of Tasmania)
“Community predictors of effective adaptation to bushfire risk”

Briony Towers (PhD student, School of Psychology, University of Tasmania)

“Children’s perception of bushfire risk and mitigation: A developmental perspective.”

Charlotte Brown (PhD student, Department of Civil Engineering, University of Canterbury)

“Disaster debris management.”

Monica Gowan (PhD student, Health Sciences Centre, University of Canterbury)

“Self-management of disaster risk and uncertainty: evaluating a personal health-based wellness paradigm for building disaster resistance.”

Jennifer DuBois (PhD student, Department of Geological Sciences, University of Canterbury)

“The plausibility of a submarine landslide generated tsunami at Kaikoura Canyon.”

Johnny Wardman (PhD student, Department of Geological Sciences, University of Canterbury)

“Quantitative analysis of “flashover” potential for high voltage transmission equipment exposed to volcanic ash.”

Grant Wilson (MSc student, Department of Geological Sciences, University of Canterbury)

“The effects of volcanic ash and gas on modern laptop computers and materials used for volcano monitoring”.

Julian Idle (MSc student, Department of Geological Sciences, University of Canterbury)

“Multi-hazard risk analysis of Lyttelton, New Zealand”.

Zachary Whitman (MSc student, Department of Geological Sciences, University of Canterbury)

“Business risk perception and resiliency in an all-hazard environment: an analysis of the relationship between the public and private sectors in New Zealand”.

Victoria Sword-Daniels (EngD student, Department of Civil, Environmental and Geomatic Engineering, University College London) “Evaluating impacts on community infrastructure following recent volcanic eruptions.”

Sultan Al-Shaqsi (PhD student, Preventive and Social Medicine Department, University of Otago)

“National audit of emergency preparedness of acute care in Oman and New Zealand”

Kelvin Zuo (PhD student, Department of Civil and Environmental Engineering, University of Auckland)

“Procurement and contractual framework for disaster reconstruction.”

Alice Yan Chang (PhD student, Department of Civil and Environmental Engineering, University of Auckland)

“Resourcing for Post-disaster Reconstruction.”

John Hewitt (PhD student, Department of Civil and Environmental Engineering, University of Auckland) “Understand priority reconstruction needs of a community during response and recover stage.”

James Rotimi (PhD student, Department of Civil and Environmental Engineering, University of Auckland)

“Legislation Post-disaster”.

Fei Ying (PhD student, Department of Civil and Environmental Engineering, University of Auckland) “Applying Decision Analysis in Seismic Mitigation Implementation.”

Temitope Egbelakin (Department PhD student, Department of Civil and Environmental Engineering, University of Auckland) “Incentives and Motivators to Enhance Seismic Retrofit Implementation.”

Mohammad Reza Zare (PhD student, Department of Civil and Environmental Engineering, University of Auckland)

“Earthquake effects on wastewater systems with particular emphasis on pipelines.”

Tingting Liu (PhD student, Department of Civil and Environmental Engineering, University of Auckland)

“Managing government exposure to public-private partnerships project risk.”

Naseem Ali (PhD student, Department of Civil and Environmental Engineering, University of Auckland)

“Dispute Resolution.”

New Publications

- Coomer, M., Pedersen, S. 2010. Learning to cope with disasters. *New Zealand Education Gazette*, 29 March 2010, *Gazette Focus*, p. 9.
- Doyle, E.E., Cronin, S.J., Cole, S.E., Thouret, J-C., (2010). The coalescence and organization of lahars at Semeru volcano, Indonesia., *Bulletin of Volcanology*, DOI: 10.1007/s00445-010-0381-8
- Dumaisnil, C., Thouret, J-C., Chambon, G., Doyle, E.E., Cronin, S.J. (2010) Hydraulic, physical and rheological characteristics of rain-triggered lahars at Semeru volcano, Indonesia, *Earth Surface Landforms and Processes*, DOI:10.1002/esp.2003
- Finnis, K.K., Johnston, D.M., Ronan, K.R., White, J.D. 2010. Hazard perceptions and preparedness of Taranaki youth. *Disaster Prevention and Management* 19: 175-184.
- Glavovic, B.C. (in press). A framework for ocean and coastal governance: New Zealand's Fiordland experience, Proceedings of 7th Open Meeting of the International Human Dimensions of Global Environmental Change, 'Social Challenges of Global Change', held in Bonn, Germany, in April 2009.
- Glavovic, B. C. Saunders, W. S. A., Becker, J. S. (in press) Land-use planning for natural hazards in New Zealand: the setting, barriers, 'burning issues' and priority actions. *Natural Hazards* DOI: 10.1007/s11069-009-9494-9
- Horan, J., Ritchie, L., Meinhold, S., Gill, D., Gregg, C., Houghton, B., Matheson, T., Paton, D., Johnston, D. (in press). Evaluating Disaster Education: NOAA's TsunamiReady™ Community Program and Risk Awareness Education Efforts in New Hanover County, North Carolina *New Directions for Evaluation*
- Johal, S.S. (in press). Assessing the impact of workshops promoting concepts of psychosocial support in emergency events: A New Zealand experience. *Australian Journal of Emergency Management*
- Paton, D., Bajek, R., Okada, N., McIvor, D. (in press). Predicting community earthquake preparedness: a cross-cultural comparison of Japan and New Zealand *Natural Hazards*
- Ronan, K.R., Crellin, K., Johnston, D. (2010). Correlates of hazards education for youth: a replication study. *Natural Hazard*, 53:503-526
- Solberg C., Rossetto, T., and H. Joffe, H. (2010). The social psychology of seismic hazard adjustment: re-evaluating the international literature. *Natural Hazards and Earth Systems Science* 10: 1663–1677.
- Stewart, C., Wilson, T.M., Leonard, G.S., Johnston, D.M., Cole, J.W. Cronin, S. (in press) Volcanic Hazards and Water Shortages . In: Briggs, C.A. (ed.) *Water Shortages: Environmental, Economic and Social Impacts*. Nova Publishers.
- Stuart, K.; Patterson, L.; Peace, R; Johnston, D. 2010. Social cohesion or social strain?: temporary school closure in two New Zealand communities, GNS Science Report 2010/08
- Tuohy, R. J. 2010. Improving disaster preparedness of older adults living in the community, GNS Science Report 2010/07 22 p.
- Tuohy, R.J. 2010. Post-disaster recovery of adults, GNS Science Report 2010/09 29 p.
- Wardman, J.B., Wilson, T.M., Cole J.W., Bodger, P.S., Johnston D.M. (2010) Quantifying the vulnerability of high voltage power transmission systems to volcanic ashfall hazards. Proceedings of the EEA Conference & Exhibition 2010, 17-18 June 2010, Christchurch.
- Wilson, T.M., Cole, J.W. Stewart, C., Cronin, S.J., Johnston, D.M (in press). Ash Storms: Impacts of wind remobilised volcanic ash on rural communities and agriculture following the 1991 Hudson eruption, southern Patagonia, Chile. *Bulletin of Volcanology*
- Wilson, T., Cole, J., Cronin, S., Johnston, D., Stewart, C. (in press). Impacts on agriculture following the 1991 eruption of Vulcan Hudson, Patagonia: lessons for recovery. *Natural Hazards*
- Wilson, T., Stewart, C., Cole, J., Johnston, D., Cronin, S.2010. Vulnerability of farm water supply systems to volcanic ash fall. *Environmental Earth Sciences* 61:675–688.
- Wright, K. C.; Johnston, D. M.; Dellow, G. D. 2010. Hazard Risk in the Hawke's Bay; an update of the 2001 Assessment, *GNS Science Report* 2010/06 46p.



Essentials of Humanitarian Practice

31 August - 4 September 2010

Trentham, Upper Hutt, Wellington, New Zealand

When the Tsunami struck, I wanted to help.

What can I do to get ready and be considered for operational deployment to humanitarian emergencies?

The aim of this five day residential course is to prepare relief workers for the realities of life on assignment so that they are able to contribute as effectively as possible. The course provides an understanding of the international context of emergency relief work, explaining the distinctions between natural disasters and conflict induced emergencies and provides an introduction to the international humanitarian system.

The Essentials of Humanitarian Practice course is designed for people from all professional backgrounds and disciplines. The course is open to all RedR register members and applicants, staff from humanitarian aid organisations and individuals currently working or with experience in relief work and for those actively seeking work in the sector. The course provides a unique opportunity to enhance participants' skills, gain fresh insights and share practical experience with others.

Upon completion of this course as well as the PSC course, participants may apply to join the RedRNZ register.

Course outline

- International Humanitarian Charter
- Working in a Team in a Relief Operation
- Minimum Standards and Indicators
- Understanding Gender and Cross-Cultural Issues
- Role and Mandate of UN and NGOs in Disasters
- Personal Health, Behaviour and Safety
- Individual Security Issues
- Introduction to Radio Communications
- Dealing with the Media
- Professional and Personal Development
- Planning for Relief Work.

Cost

NZ\$1,000

Includes food, accommodation and materials.

Applications

Please return the course application form available from our website by 10 August.

Preference will be given to register members and those likely to take up overseas assignments in the next six months.

Contact - further enquiries

Steve Glassey, Training Coordinator:
steve.glassey@hotmail.com or 021 02788930



www.redrnz.org.nz

NIWA - Managing Extreme Weather and Flooding course, 23/24 September in Wellington

New Zealand, like other countries, is facing increasing challenges from extreme weather events and flooding. In 2010 we have already had three severe weather-related events with estimated costs of \$14.5 million.

While 2009 was a comparatively quiet year, the costs of weather-related events in 2008 added up to more than \$86 million. The financial impacts are without doubt significant; so too are the risks to people's health and safety.

This workshop will assist anyone with a role in resource and emergency management to better plan for, and manage, the risk of extreme weather hazards, including:

- Planners and engineers;
- Emergency and civil defence managers;
- Educators;
- Utility and asset managers;
- Local, regional and central government policy advisors;
- Others involved in weather and flooding-related research.

The two-day workshop has a practical focus, covering weather systems and forecasting; flood and natural hazard management; evaluation of risks; and how people perceive the risk of weather-related hazards. The workshop will inform participants about the research the science sector are currently working on in relation to extreme weather and flooding, and how this information can be used so that participants are better equipped to manage the risks.



Examples of projects that are already using similar information in a hands-on way will also be presented. This is the seventh annual workshop NIWA experts have run on managing extreme weather and flooding. Costs are \$600 ex GST per person.

For enquiries or to register contact: Jenny White, NIWA, PO Box 8602, Christchurch 8440

Tel: 03 348 987, Email:

training@niwa.co.nz, www:

<http://www.niwa.co.nz/education-and-training/training-courses>

NZ Society for Risk Management 5th National Biennial Conference 2010

RISK MANAGEMENT *in* **action**

1-2 September 2010 | Aotea Centre, Auckland



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runninghot! 2010
WONDER & WIDGETS
REALISING THE VALUE
OF RESEARCH FOR NZ

We are pleased to announce a follow on from the successful Runninghot! Conferences held in 2006 and 2008. This year's conference will be held at Te Papa, Wellington, from **1st – 3rd November**, and the theme is 'Wonder and Widgets: Realising the Value of Research for New Zealand'.

Confident and vibrant research communities help drive the world's most successful economies and societies. Creativity and vision are required to undertake and invest in research that improves New Zealand's knowledge, wellbeing, wealth and environment. The immediate challenges, both in New Zealand and globally, are to address the different forms of value that can be derived from our current research, and to identify practical ways of enhancing and realising the benefits of future research. Runninghot! 2010 will address these challenges.

The programme will include prominent international presenters including Catherine Mohr (USA), Nigel Thrift (UK) and Stuart Cunningham (Australia).

Further details will be available shortly on the website (www.runninghot.org.nz). In the meantime keep these dates free and we will keep you informed.



Incorporating the Geoscience Society of New Zealand Conference and the New Zealand Geothermal Workshop

21-24th November 2010, The University of Auckland
<http://www.geonz2010.co.nz/>

“In November this year, the New Zealand Geothermal Workshop and the Geoscience Society of New Zealand are holding a joint conference in Auckland showcasing the latest and best in New Zealand geoscience research, geothermal science, and geothermal engineering. The meeting will include an overlap day with the annual meeting of the New Zealand branch of the Australasian Institute of Mining and Metallurgy, AusIMM. The theme for the meeting is "Research · Economy · Frontiers" and we particularly encourage abstract submissions that explore the interplay of pure and applied research and showcase the application of fundamental research in the commercial marketplace.”



We encourage people to attend this valuable meeting and we'd like to advertise the following symposium: 12.

It's OK to ask for help: The role of social sciences in geohazards research

Convenors: Emma Doyle e.e.doyle@massey.ac.nz, Thomas Wilson thomas.wilson@canterbury.ac.nz, & David Johnston david.johnston@gns.cri.nz

New Zealand is a country at risk from a range of natural hazards, from volcanic eruptions to tsunamis, and earthquakes to landslides. Inherent in the understanding and mitigation of these hazards is the understanding of their impacts upon society, and how we can better manage these. This session will ideally include interdisciplinary presentations that explore the intersection of social science, engineering, and natural hazards research. Topics looking at risk and vulnerability, hazard impacts, planning, hazard mitigation, hazards communication, response processes, resilience and education will all be welcome. Research that explores recent case studies, from both the physical science and social science perspective will be of particular interest.

Location

The centre is part of the School of Psychology, in the College of Humanities & Social Sciences. The centre Director, staff and students are based at the Massey University campus in Wellington (Building T20). However, the centre draws on staff from other Massey campuses, GNS Science and other collaborating organisations. Visits to the centre are welcomed but by appointment only please.



Contact Details

David Johnston,
Joint Centre for Disaster Research
GNS Science/Massey University, PO Box 30368,
Lower Hutt, New Zealand
Ph: + 64 4 570 1444 Fax: + 64 4 570 4679
david.johnston@gns.cri.nz

