

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 natural, man-made and environmental risk
- enhancing community preparedness, response and recovery from the consequences of natural, man-made and environmental hazard events

Disastrous Doctorates



The 2nd Annual PhD Workshop, “Disastrous Doctorates” was held at Massey University Wellington on 3 December 2008 and attracted 15 students from six New Zealand universities. A copy of the proceedings, including research abstracts, is available on the Centre’s website.

Photo: from left to right - Abdur Rehman, Amy Stephenson, Wendy Saunders, Shabana Khan, Julia Becker, Ian de Terte, Heather Taylor, Chris Raine, Pat Kailey, Tom Wilson, Yasir Javed, Dean Podolski, Debra Ellis, Caroline Orchiston, Monica Gowan

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

Scientific Committee of the Integrated Research on Disaster Risk Programme (SC-IRDR)

The Centre Director, David Johnston has recently been appointed to the Scientific Committee of the Integrated Research on Disaster Risk Programme (SC-IRDR)

Background On the basis of the report “A Science Plan for Integrated Research on Disaster Risk: addressing the challenge of natural and human-induced environmental hazards” developed by the ICSU Planning Group on Natural and Human-induced Environmental Hazards and Disasters, it has been decided to establish a ten-year, internationally integrated, multidisciplinary, all-hazards research programme, whose objectives are the scientific characterization of natural and human-induced hazards, vulnerability and risk; understanding decision-making in complex and changing risk contexts; and reducing risk and curbing losses through knowledge-based actions. The programme is founded on the recognition that disaster prevention and mitigation are critical dimensions of the global poverty reduction agenda, and an integral part of development efforts. The Scientific Committee of the Integrated Research on Disaster Risk Programme (SC-IRDR) is appointed jointly by the International Council for Science (ICSU) and the International Social Science Council (ISSC). The first meeting is in Bergen, Norway in May 2009.



Current membership of the Scientific Committee for the Integrated Research on Disaster Risk (IRDR)

1. **EISER**, Richard (Professor of Psychology, University of Sheffield, UK – perception of risk)
2. **HOOKE**, William (former Deputy Chief Scientist, National Oceanic and Atmospheric Administration (NOAA); former Director, US Weather Research Program Office, USA – meteorology)
3. **JOHNSTON**, David (Director, Joint Centre for Disaster Research, Massey University/ GNS Science, New Zealand – earth sciences, disaster management)
4. **LANG**, Michel (Head, Unit of Hydrological and Hydraulic Research, CEMAGREF, Lyon, France – hydrology, flood risk mitigation)
5. **LAVELL**, Allan (Coordinator, Programme for the Social Study of Risk and Disaster, FLACSO, Costa Rica – social and developmental aspects of risk and disasters)
6. **McBEAN**, Gordon (former Assistant Deputy Minister, Meteorological Service of Environment Canada; Director, Policy Studies, Institute for Catastrophic Loss Reduction, University of Western Ontario, Canada – climate change, meteorology)
CHAIR
7. **MODARESSI**, Hormoz (Director, Geohazards Bureau, BRGM, Orleans, France – geohazards, coastal protection, remote sensing)
8. **PATEK**, Maria (Fed. Ministry of Agriculture, Forestry, Environment and Water Management, Vienna, Austria – avalanches, torrents)
9. **RENN**, Ortwin (Professor, Institute for Social Science, University of Stuttgart, Germany – environmental sociology)
10. **SPARKS**, Steven (Professor of Earth Sciences, University of Bristol, UK - volcanology, hazard management)
11. **SUHRKE**, Astri (Senior Research Fellow, Chr. Michelsen Institute, Bergen, Norway – political sciences)
12. **TAKEUCHI**, Kuniyoshi (Director, Int. Centre for Water Hazard and Risk Management (ICHARM), Tsukuba, Japan – hydrology, civil engineering)
13. **VOGEL**, Coleen (BMW Professor of Sustainability, University of the Witswatersrand, South Africa – geography, environmental studies)

2nd Workshop on Emergency Management and Social Science Disaster Research in New Zealand

The workshop on 8 December 2008 at Te Papa, highlighted the many positive developments that have taken place over the last year. But the SSDR-EM practice gap remains a serious concern. It was recognised that there are different priorities and incentives for SSD researchers and EM practitioners. Consequently, there are institutional barriers to prioritising research, improving communication and translating research findings into practice that will not be easily overcome. Nonetheless practical steps can be taken to close the SSDR-EM practice gap, including the recommendations for: 1) research priorities and strategy; 2) translating research into practice; and 3) improving communication. Conclusion and recommendation are discussed further in the workshop proceedings available on the Centre's website.

NZAID Post Graduate Field Research Award

Heather Taylor (PhD student at the Centre) has been awarded a NZAid Post Graduate Field Research Award to support her research in Indonesia. Her project seeks to understand the perspective and experiences of children who have felt the effects of natural disasters. The project will focus on the post-disaster and long-term recovery environment of three different events that occurred in Central Java between 2006 and 2008: Yogyakarta (earthquake), Solo (flooding) and on Mt. Merapi (volcanic eruption). By learning their concerns and capabilities,



it is hoped that development programs, disaster recovery and preparedness programs in particular, that involve children, families, schools and communities can be refined to better suit children's specific needs. The results of the research will be offered to the Indonesia government and disseminated to academic and non-governmental organizations.

JSPS Invitation Fellowship Program

Dr Sarb Johal (a Research Associate of the Centre) has been awarded a fellowship by the Japan Society for the Promotion of Science (JSPS) under the "FY2009 JSPS Invitation Fellowship Program for Research in Japan". The JSPS is the primary government research funding agency in Japan. Sarb will be based at the National Institute of Mental Health in Tokyo for 20 days in April 2009 during this short-term Fellowship, working with his colleagues, Dr Mitsuhiro Yamada, and Dr Masatoshi Inagaki. As well as exchanging ideas of best-practice and possible research areas concerning general mental health, Sarb will be giving lectures and participating in seminars about psychosocial support during emergency events.



The Emergency Management Collection – Kohinga Ratonga Ohotata

The Department of Internal Affairs Information Centre houses the Emergency Management Collection. This is a specialist collection of books, reports and research journals, provided by the Ministry of Civil Defence & Emergency Management, and available to registered users.

The collection is intended as a national research and education resource to enable individuals working in emergency management to access research literature and resource material that will inform their work and professional development.

Library Services

Information Alerts – as a registered user receive monthly emails listing new resources and journal articles.

Online Access – You will soon be able to search the collection resources through the holdings list on the MCDEM website.

Information Service and Borrowing – Registered users can request via email to borrow books and reports, and receive requested copies of journal articles.



Library staff can help find resources or put you in touch with others who can help through our partnerships with other emergency management libraries.

Access to the Collection

The collection is physically housed in the Department of Internal Affairs Information Centre on level 2, 46 Waring Taylor St, Wellington. The Library is open to the public and we can help you access the collection. Please contact the DIA library staff to arrange a visit.

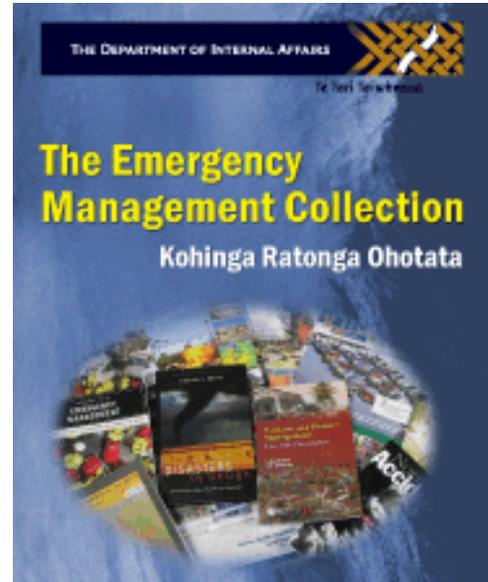
Opening Hours Weekdays 8.30am – 5.00pm

Email: Information@dia.govt.nz

Fax: (04) 495 7222 [Please mark Attention Information Centre]

Mail: Information Centre, Dept. of Internal Affairs, PO Box 805, Wellington

Physical Address: 46 Waring Taylor St, Wellington



Emergency Management Australia Library

The EMA library is a national resource which, through its collection and various services, promotes and supports the Australian emergency management community. To access their library catalogue and search their collection of books, reports, videos, EMA publications, emergency management plans, and journal articles, please visit the EMA library homepage at <http://www.ema.gov.au/library>.



Australasian Libraries in the Emergency Sector (ALIES) is a cooperative information network which aims to serve the common interests of emergency management agencies. The network was founded in 1991 and the members of ALIES are drawn from emergency services and public safety agencies. New Zealand researchers can get access to the library as part of ALIES.

Research Update

Many Strong Voices against the disaster of climate change

by Ilan Kelman (a research affiliate of the Centre) on behalf of the Many Strong Voices team

As the long-term disaster of climate change continues to affect communities, new and creative efforts are also continuing to determine how to deal with this challenge. One project, Many Strong Voices <http://www.manystrongvoices.org> , joins communities from the arctic and from the 51 Small Island Developing States (SIDS; <http://www.sidsnet.org>) in recognition of the similar vulnerabilities to climate change that both regions experience.

Many Strong Voices, launched in December 2005 by the United Nations Environment Programme, brings together arctic and SIDS participants to share and enhance knowledge and expertise about, and to collaboratively devise strategic solutions to, climate change challenges. The research component of this project involves conducting a comprehensive assessment of vulnerability and adaptation to climate change across the SIDS, so partners are always needed for this work.

The entire Many Strong Voices programme aims at catalysing local action across the arctic and the SIDS, recognising the important and complementary contributions of sound research, outreach, and lobbying. While external and top-down interventions and exchanges are useful for supporting local action, the most effective manner of reducing vulnerability and living with climate change is through



community-based initiatives. Many Strong Voices provides the inspiration, impetus, and opportunity to build and maintain community-based processes related to climate change which are solidly based on sustainability principles, policies, and practices.

Throughout, one important theme has been recognising that climate change is just one disaster, one challenge, and one opportunity amongst many others facing these regions. Multiple stressors must be considered simultaneously to ensure that tackling one problem, such as climate change, does not create or exacerbate other problems emerging from the myriad of social and environmental issues that challenge these communities. Dealing with climate change should contribute to addressing these other issues and vice versa. With such comprehensiveness, cooperation, and exchange, Many Strong Voices will be heard, leading to action locally and globally for positive change.

For more information, see:

1. <http://www.manystrongvoices.org>

2. CICERO and UNEP/GRID-Arendal. 2008. Many Strong Voices: Outline for an assessment project design. CICERO Report 2008:05. CICERO (Center for International Climate and Environmental Research, Oslo), Oslo, Norway, full text at <http://www.ilankelman.org/articles1/msv200805.pdf>

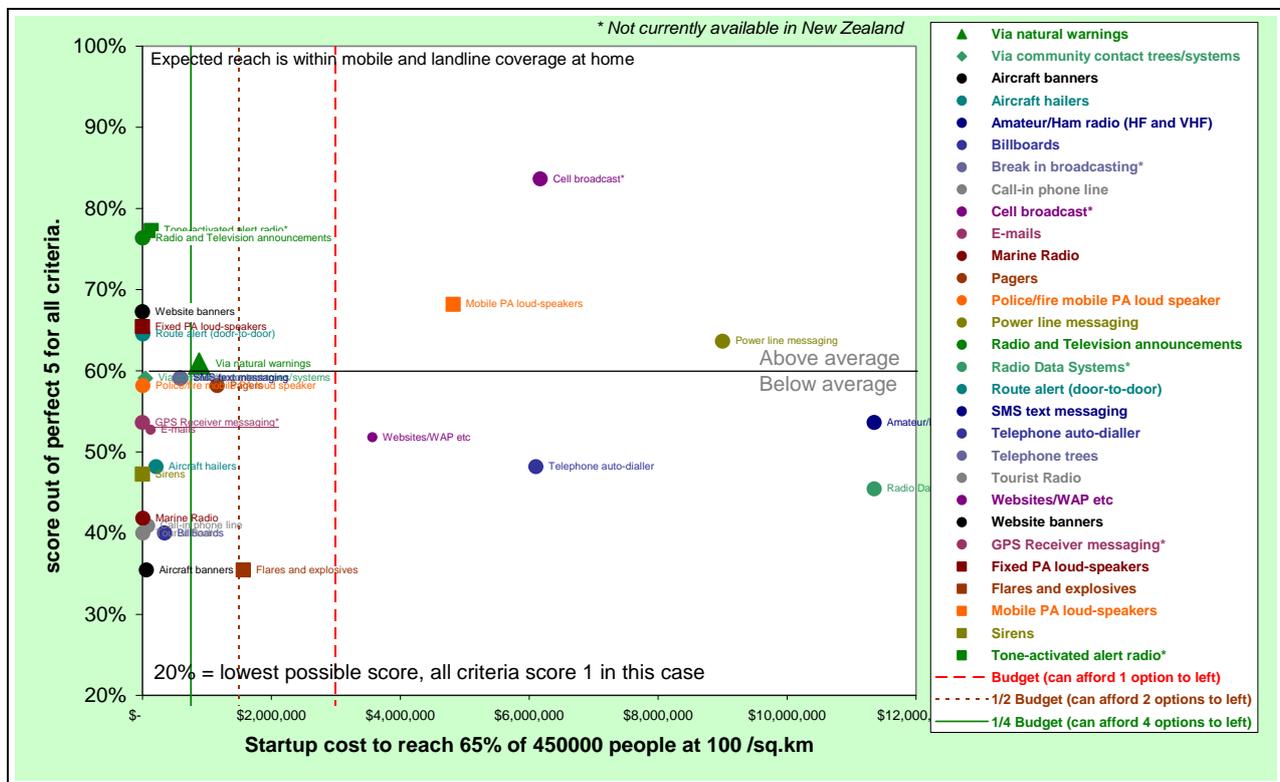
Contact Ilan through <http://www.ilankelman.org>

Cellphones vs. Sirens: Effective Public Notifications Systems for New Zealand

A fully effective warning for hazard emergencies is one which reaches people at risk no matter what they are doing, provides information on what the threat is, and on which actions to take. Kim Wright, Graham Leonard, Warwick Smith and David Johnston from the JCDR and GNS Science, with Alisha Kidd from Kestrel Group have created an interactive tool to assess most effective options for notification systems for all hazards for the Ministry of Civil Defence and Emergency Management. An extensive set of criteria was used to evaluate 29 methods for providing warnings. The tool is designed for use by those in charge of establishing warning systems for their communities, primarily CDEM agencies. The tool allows CDEM agencies to enter data about their population demographics (e.g. high transient/tourist population, large diffuse, rural population), and select hazards most important for their areas. Outputs display a cost versus effectiveness score for each warning system for both high and low density areas.



Outputs are shown separately for start up costs and annual costs. Part of the literature review for this project involved a visit by Kim to Simon Fraser University (SFU) in Vancouver, to work with Peter Anderson, an international expert in warning system effectiveness. Future plans include collaboration between SFU and GNS Science/JCDR on a warning systems handbook for use internationally by emergency managers. The tool will be available for use by CDEM agencies mid-2009.



Issues and opportunities for land-use planning for volcanic hazards in New Zealand



A significant number of active volcanoes exist in New Zealand, including the basaltic volcanic field in Northland and beneath Auckland city, the largely andesitic cone volcanoes of the North Island and the highly destructive rhyolitic calderas located in the central North Island. New Zealand is subject to a variety of volcanic hazards from these volcanoes including pyroclastic flows and surges, lahars, debris avalanches, lava flows and ash falls. Mapping of areas around the North Island has served to identify the hazards posed by many of the volcanic centres and these have been expressed in the form of hazard maps (e.g. Okataina Volcanic Centre; Mount Ruapehu; Mount Taranaki).

A number of cities and towns are located either alongside or near to these identified areas of volcanic hazard. Some urban areas could successfully employ land-use planning techniques to mitigate the effects of a volcanic eruption (e.g. mitigate against ash falls or lahars). Others may be subject to destructive hazards (e.g. pyroclastic flows) and will find it more difficult to plan for such events, but some success could still be achieved through use of land-use techniques.

In New Zealand, therefore, there still lies an opportunity to employ land-use planning initiatives to mitigate volcanic hazards. Where volcanic hazard areas have been identified (e.g. through mapping) land-use mitigation methods could include:-

- Avoiding new development in hazardous areas altogether;
- Employing low density development to minimise the number of people living in a volcanic hazard area;
- Restricting or minimising further subdivision in areas already developed;
- Siting key facilities out of hazardous areas;
- Making use of good urban design to minimise the effects of ash falls;
- Planning for the disposal of volcanic debris after an eruption;
- Planning for other land-use recovery aspects; and
- Linking land-use planning in with emergency management provisions to allow the mitigation of residual risk (e.g. through warnings, evacuation, etc).



This paper was presented by Julia Becker at CoV5 in Japan and outlined the hazards and risk posed by the New Zealand's volcanic landscape and discussed land-use mitigation options that could be employed for volcanic hazards.

Exploring Kaitiakitanga and Hazard Management in Aotearoa New Zealand.

On March 18, 2007 a dam breach of the Ruapehu Crater Lake caused a lahar which travelled down the mountain, and flowed down the Whangaehu river channel. The Department of Conservation (DoC) were aware of this potential hazard years in advance and had access to detailed predictions regarding the timing and effect of this event, and in 1999 DoC set about evaluating options for mitigating the hazard.

They chose to implement a hazard management plan that was non-interventionist and response based after intensive dialogue with stakeholders including Tangata Whenua. This non-intervention approach and collaboration with local iwi drew criticism from the local science community and the wider public, which was expressed through national media. I seek to explore the decisions made in the management of the lahar, the reasons behind the criticism of the approach taken, the implication for iwi of the resultant decision, and implications for science/Maori relations in Aotearoa New Zealand.

Laura Jardine-Coom has been awarded Te Tipu Putaiao Fellowship and is studying at University of Canterbury and working with GNS Science.



Photo (left): Laura at the 2nd Australasian Hazards Management conference, Wellington August 2008.

Photo (below): The Tangiwai Memorial a week after the 2008 lahar.

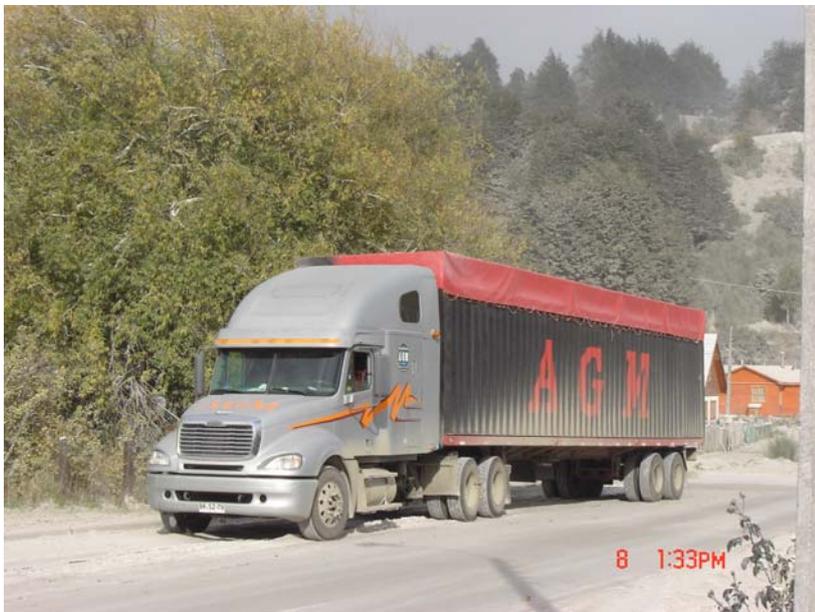


Modelling livestock evacuation following a volcanic eruption: an example from Taranaki volcano, New Zealand

Recently published research by Tom Wilson and colleagues from the University of Canterbury has highlighted the logistical challenges of livestock evacuation from farms affected by volcanic ashfall during or following a moderate to large volcanic eruption of Taranaki volcano. The volcanic hazards present during the eruption (such as volcanic ashfall) have the potential to significantly disrupt farming and transport operations in widespread areas both near to and far from the volcano. This paper presents a simplistic model that estimates the time and resources required to evacuate dairy cows from a large eruption from Taranaki volcano in New Zealand. Whilst intended to highlight the scale of time, money and logistics required for a large livestock evacuation, the model also provides a first step towards a model which can be run during periods of volcanic crisis to aid decision making. The model estimates that for a total evacuation of cows from dairy farms impacted by 100 mm of ashfall, 208 000 cows would need to be evacuated and it would take at least 43 600 man-hours and cost >NZ\$2,000,000. It would take 264 livestock truck and trailer units to evacuate this number of cows in 7 days, or 88 units in 21 days.



It would take 264 livestock truck and trailer units to evacuate this number of cows in 7 days, or 88 units in 21 days.



Photos: Livestock evacuated from Chaiten, Chile, following the 2008 eruption.

It is therefore recommended that large-scale livestock evacuation and relocation should not be considered in future volcanic crisis planning, due to the logistical requirements a large livestock evacuation would require in terms of time, livestock evacuation transport units, and lack of capacity of farms in surrounding regions to support the massive influx of additional livestock.

Wilson, T., Dantas, A., Cole, J. 2009. Modelling livestock evacuation following a volcanic eruption: an example from Taranaki volcano, New Zealand. *New Zealand Journal of Agricultural Research* 52:99–110

Contact: Tom Wilson (thomas.wilson@pg.canterbury.ac.nz)

Auckland DHB Evacuation Plan Project

The events that may lead to the evacuation of the Auckland DHB hospitals and sites are many and varied. They may result from a natural disaster, such as a volcanic eruption, severe weather or other hazards such as fire, explosion and utility failure. Part of the all hazards approach to Emergency Management requires that plans be put in place to address the issue of evacuation. Debra Ellis (JCDR PhD Student) has been working with the Auckland DHB Emergency Management Service to facilitate the project.



The evacuation planning process commenced with the formation of a Steering Group to chart the planning process and involved discussion at all levels within the DHB. This required mapping the evacuation strategy, including the decision to evacuate along with evaluation for refinement and improvement.

There are several critical issues when considering the evacuation of a hospital site. For example, the nature and severity of the threat will define the urgency of evacuation required and determine the risk to patients and staff, and their ability to function during the evacuation. Such issues were considered during Exercise Ruauumoko (2008) when a working draft of the plan was tested. The Auckland DHB Evacuation Plan adopts an all-hazards approach and is nearing completion having been designed to address an evacuation at any time

of the day/night and for a period of a few hours to several weeks/months.

The role of religious institutions in disaster risk governance: the case of 2005 earthquake in Pakistan

This research aims to explore the role of religious institutions in improving disaster risk governance. Religion and religious institutions have an important and notable role in social fabric of faith-based societies. The socio-cultural environment has a significant role in disaster governance. Vulnerabilities are generated in everyday life through a host of internal and external factors. Among internal factors, religious institutions play an important role in shaping people's perception of disaster risk which in turn influences disaster policy and practice in faith-based societies. This research endeavours to explore the role of religious institutions in the process of disaster risk governance in Pakistan in the aftermath of the 2005 earthquake. In particular, the role of an informal civil society religious institution – a mosque, which has its presence at the very local level, is investigated in this research. The Pakistan population is 97 percent Muslim, therefore mosques form a fundamental part of the civil society. Mosque not only serves as a place of worship but also a vibrant community centre to relate and network among the community members.



This research seeks to investigate the perception of Imams (prayer leaders) who regularly interact and influence public perception on matters of daily life through the delivery of public talks. It aims to delineate the degree of influence of religion and mosque on affected peoples' views and responses towards the earthquake. During this process, the research seeks to answer how far peoples' perception of any future disaster is shaped by their religious attitudes and the role of mosques in this regard. Ultimately, the research seeks to gauge the potential benefits or otherwise of including mosques and Imams in the disaster management policy arena in the future. The research is likely to have broader implications regarding the role of religious institutions in faith-based societies for disaster risk governance in other parts of the world.

Abdur Rehman Cheema (contact: arc_pk@yahoo.co.uk)

Empire to Nation: Natural disaster stories in the *New Zealand School Journal* 1907-2007

Morgan Dryburgh (photo), on a BRCSS Summer Studentship, was hosted by the Centre over the summer. Her project looked at how New Zealand stories about natural disasters have been told in the *New Zealand School Journal*. Stories about natural disasters were collected from 100 years of school journals published between 1907 and 2007. Changes in the type of disaster and narrative style in the stories were identified. This was partly to do with changes in the purpose of the *Journal* and changes to educational practices.

The *New Zealand School Journal* was started in 1907 as a reader in history, geography and civics, which later became social studies. It presented articles and some stories about the way of life in the world, though specifically in the British Empire. The *Journal* was distributed to all NZ primary schools, and so earned its place as a very influential text in the fabric of educational life for children in New Zealand. Because of this, it is a great source of examples of the attitudes and behaviours that children were supposed to be learning at any given point in time.



The study found that, over time, natural disasters played a very different role in the *School Journal*. In the early years of the *Journal*, natural disasters were the backdrop for expressions of individual heroism, and functioned to promote the ideology of the Empire. In the later half of the century, the natural disasters in the *Journal* helped to emphasise collective solidarity and the New Zealand national identity, with emphasis placed on the way in which communities and families stick together in times of natural disaster.

Older peoples' experiences of a flood disaster: making sense of an extraordinary event.

This research focuses on the experiences of older people in a flood disaster and has been undertaken by Robyn Tuohy (as part of her Masters). In July 2007, a number of older people in Kaitaia, New Zealand were evacuated from their homes because of flooding. This qualitative study explores older peoples' experiences of the disaster to gain a broader understanding of how they responded to and recovered from the flood. This narrative research is based on semi-structured interviews with nine older people who were evacuated from the flood. These interviews were conducted with four residents living in a rest home and five pensioners living independently. Thematic analysis was used to describe how older people accounted for their experiences of the flood.



Photo: This is the panorama of the area which flooded in July 2007, and shows the proximity of the stop-bank and the pensioner flats on the right, behind the wooden fence to the stream.

The narratives were influenced by the participants' identity as either rest home residents or pensioners living

independently. The analysis showed that their accounts of the disaster were incorporated and integrated into the personal and social context of each person's life story. The two groups differed in the levels of evacuation and post disaster assistance received. The rest home residents experienced little disruption and did not require relocation, whereas the pensioners experienced major disruption and relocation. Narrative themes that emerged from the analysis for the pensioner group were coping alone, the importance of treasured possessions, social support and community, while themes for the rest home residents were protection and care. The narrative findings suggest that older people integrated the disaster into their lives by linking the event to their life story. The themes reflected the dependent world of the rest home residents and the security of being cared for. The themes for the pensioners revealed their vulnerability to a disaster and the challenges they faced during the post disaster recovery phase. These findings are important for planning emergency support for this age group.

Robyn Tuohy (contact: 2e@paradise.net.nz)

Tourism and earthquakes in the zone of the alpine fault: risk, readiness and resilience

The islands of New Zealand lie astride two actively deforming tectonic plates, creating a diverse physical landscape with high scenic value, but one which is prone to a range of natural hazards. 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. The “footprint” of an earthquake this size would produce severe damage to infrastructure, buildings and roads, and cause lengthy interruption to human activities. 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. Road access to Milford Sound, the West Coast and Mt Cook is restricted to alpine passes or road ends, which are highly vulnerable to closure from earthquake-induced landslides and avalanches. The likely extent of landsliding following an Alpine fault event will cause an immediate drop in visitation due to road closures, with long-term repair work required to restore access. To date, there has been a significant gap in our understanding about earthquakes and their potential affects on the tourism industry in New Zealand.



Photo above: Caroline in the field in winter



This doctoral research project is designed to address the gap in knowledge by investigating tourism operations in the zone of the Alpine Fault with respect to perceptions of seismic risk, business resilience, and preparedness for an Alpine fault earthquake. The field area extends from Milford Sound to Greymouth, including Queenstown, Mt Cook and Arthur’s Pass. Primary data collection involved the distribution of a questionnaire survey in May 2008 to all activity, attraction and accommodation providers.

Caroline Orchiston Departments of
Tourism and Geology,
University of Otago
corchiston@business.otago.ac.nz

Rediscovering the events of May 1960: the impacts of the tsunami from Chile

A recently published paper by David Johnston tells the story of the May 1960 tsunami in New Zealand. The magnitude 9.5 earthquake on 22 May 1960 in southern Chile was the largest instrumentally recorded earthquake in the 20th century. It generated a tsunami that swept the shores of Chile and radiated out across the Pacific, with the major loss of life in Chile and, despite warnings being issued, in both Hawai'i and Japan.



The absence of a Pacific-wide tsunami warning system at the time meant that the tsunami struck New Zealand without an official warning being issued.

Fortunately, there was no loss of life despite widespread damage to coastal facilities. A large aftershock occurred in Chile 3 days later (25 May) and fears about a tsunami from this event resulted in the broadcasting of a nationwide warning on radio in New Zealand. Newspapers of the day reported that thousands of people around the country

were evacuated, making this the largest and most widespread evacuation in New Zealand's history. Almost the entire population of Whitianga, Waihi Beach, Whakatane, Ohope, and Opotiki were moved to high ground for several hours and, in many other communities, people self-evacuated from coastal fringes.

After the event, there was much discussion in the newspapers of the need to improve both warnings and public awareness of the hazard, and of the appropriate response to warnings. Over the 40 years from 1960 up to the 26 December 2004 Indian Ocean tsunami, public awareness of New Zealand's tsunami risk and preparedness had waned. Since 2004, the renewed focus on tsunami has built on a range of improvements in emergency management policies and practices, and the lessons identified from the event paved the way for a number of new initiatives to get underway to enhance the New Zealand's tsunami warning capacity and capability.

Photo: (above) A small boat washed ashore in Lyttleton. (*Evening Standard*)

Johnston, D., Pettersson, R., Downes, G., Paton, D., Leonard, G., Pishief, K., Bell, R. (2008). Developing an effective tsunami warning system: lessons from the 1960 Chile earthquake tsunami for New Zealand coastal communities. *Kotuitui: New Zealand Journal of Social Science* 3:105-120.



Pyroclastic Peril: Impacts and Short-Term Recovery Assessment of the 2008 Chaiten eruption, Chile

Research affiliates of the JCDR, Tom Wilson (University of Canterbury), Graham Leonard (GNS Science), Carol Stewart, and David Dewar (see photo below), travelled to northern Patagonia, during January and February 2009, to assess the impacts from the on-going eruption of Chaiten volcano (Chile). As the first major explosive rhyolitic eruption in over 50 years (eruptions are typically large but infrequent), this was a highly unique and important opportunity to record and analyse the impacts and short-term recovery to an area geographically, climatically, and ecologically similar to New Zealand. The eruption is similar in magnitude and physical and chemical characteristics to what is expected from a future eruption of one of New Zealand's numerous rhyolitic volcanoes in the Taupo Volcanic Zone.

The team observed ashfalls: contaminating water supplies, causing infrastructure failure, damaging residential and commercial buildings, causing livestock deaths and coverage of feed, human health hazards, engine failure, and closure of transport networks including road and air links. Continuing ashfall and block-and-ashfall hazards and remobilisation of ash fall deposits are causing on-going problems for communities in affected areas. The team has also begun to piece together the complex emergency



response to the volcanic crisis. An example of the scale of the crisis was the highly successful evacuation of 5,000 people between 2-4 May from the town of Chaitén and surrounding areas.

One of the key objectives of the trip included assessing health impacts from volcanic ashfall to urban and rural communities. World renowned volcanic health expert Dr. Peter Baxter from Cambridge University was a welcome addition the multi-national collaborative project, which included scientists from Chile and Argentina. The team will now begin the mammoth task of collating and analysing the many field notes, interview data, visual images, and collected reports. The large collections of soil, vegetation and water samples will be analysed in various laboratories to add to the mountain of data collected from the trip.



The outcomes from the trip will lead to a much greater understanding of how communities and infrastructure providers manage and cope with impacts from a rhyolitic eruption. Valuable insights were also learnt in rapid evacuation planning and management during a major volcanic crisis and potential health effects which may be sustained by communities from a rhyolitic eruption.

Photo: Dr Peter Baxter (Cambridge University, Dr Joaquin Garcia (Futaleufu hospital) and Dr Graham Leonard (GNS Science) in Futaleufu, February 2009.

Volcanic impacts website

During late January the Centre hosted Steve Brantley from the USGS to work with David Johnston, Tom Wilson, Graham Leonard and Carol Stewart on reviewing of the Volcanic Impacts Website. The idea for this website was developed in parallel by two groups who decided to combine their efforts. In 2000 the late Dr. Richard V. Fisher, scientist emeritus of University of California Santa Barbara, approached USGS volcanologists to explore what he could do to help prepare volcano-hazard educational material for the benefit of people having to deal with active and erupting volcanoes. Volcanic ash typically covers a much larger area and disrupts the lives of far more people than the other more lethal types of volcano hazards, but information about ash and what to do with it is not readily available. With Dr. Fisher's extensive experience and interest in pyroclastic rocks, he enthusiastically agreed to begin work on a website about volcanic ash. By creating an online resource about the known effects of volcanic ash and summarizing how people have dealt with the tiny abrasive rock particles during and after recent eruptions, Dr. Fisher and the partners listed below hope people can learn to prepare and protect themselves from future volcanic ash fall.



In a separate development, following the 1995-1996 Ruapehu (New Zealand) eruptions, David Johnston and Bruce Houghton highlighted the need for real-time information on the consequences of volcano hazards. Such information often blends volcanology with input from engineering, medical, plant, animal, and material sciences and often cannot be found readily in any single institution or reference. This information needs to be available in a format that meets the needs of a variety of end-users and structured in a fashion that permits rapid access to all the information required by each end-user sector. From this perspective, work was begun to provide information about volcanic ash through this website.



The initial material for this Web site was designed by Jennifer Adleman and Steven Brantley (USGS), David Johnston (Massey/GNS Science), Richard Fisher (University of California Santa Barbara) and Bruce Houghton (University of Hawai'i, Manoa).

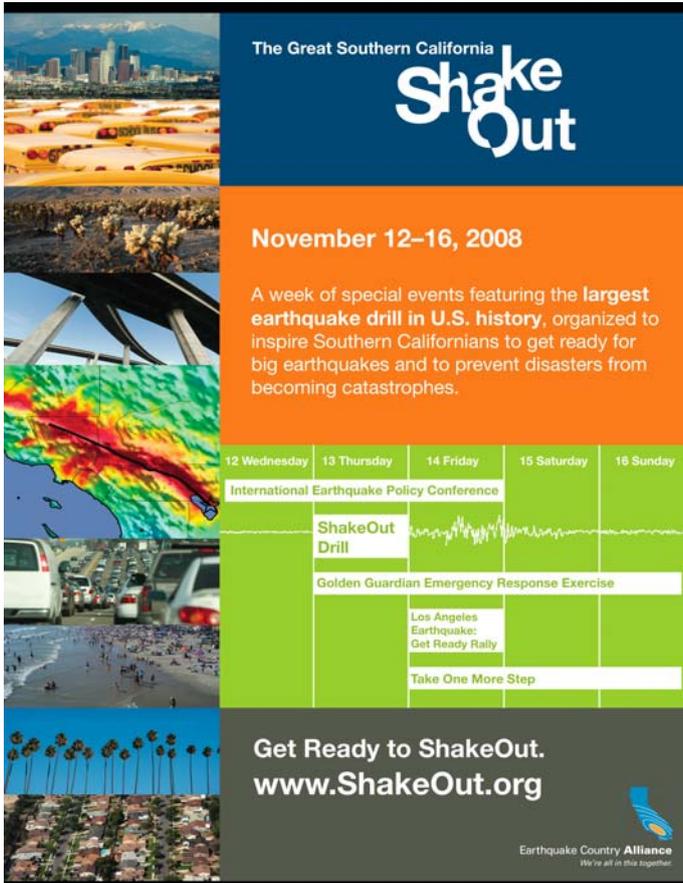
Photo: Steve Brantley

Further review and revisions are planned for 2009.

See: <http://volcanoes.usgs.gov/ash/>

The Great Southern California ShakeOut

At 10 a.m. on 13 November 2008, millions of Southern Californian residents participated in the ShakeOut Drill, the largest earthquake preparedness activity in U.S. history! The Great Southern California ShakeOut included the ShakeOut Drill and other related activities to help us get ready for big earthquakes, and to prevent disasters from becoming catastrophes. With support from the Earthquake Commission, Julia Becker (PhD student at the Centre and GNS Science staff member) attended the week's activities to observe and research the influence that the earthquake exercise (and related activities) had on awareness and preparation, including identifying:



The Great Southern California
ShakeOut

November 12–16, 2008

A week of special events featuring the **largest earthquake drill in U.S. history**, organized to inspire Southern Californians to get ready for big earthquakes and to prevent disasters from becoming catastrophes.

12 Wednesday	13 Thursday	14 Friday	15 Saturday	16 Sunday
International Earthquake Policy Conference				
ShakeOut Drill				
Golden Guardian Emergency Response Exercise				
Los Angeles Earthquakes: Get Ready Rally				
Take One More Step				

Get Ready to ShakeOut.
www.ShakeOut.org

Earthquake Country Alliance
We're all in this together.

Julia Becker (PhD student at the Centre and GNS Science staff member) attended the week's activities to observe and research the influence that the earthquake exercise (and related activities) had on awareness and preparation, including identifying:

- The range of individuals and community groups involved in the exercise itself;
- The range of individuals and community groups involved in other activities related to the exercise;
- The types of participation that have occurred;
- How this participation was made possible;
- The effectiveness of the exercise in raising awareness about the potential effects of an earthquake;
- The effectiveness of the exercise in contributing to individuals and/or communities adopting actual hazard adjustments;
- What actual hazard adjustments are;
- Potential drivers for those adjustments; and

- Other key activities (which may be related or unrelated to the exercise) that may have contributed to individuals and/or community groups adopting actual hazard adjustments.

Photo: California Governor, Arnold Swartzenner, speaking to responders at the Providence Holy Cross Medical Center on the day of the ShakeOut earthquake drill.



This research will support the development of community-based public education in New Zealand and assist agencies with their programmes. In particular this research will enable us to better understand the benefits and logistics of community participation related to large-scale earthquake exercises. For more information contact Julia Becker (j.becker@gns.cri.nz)

New Urbanism and natural hazard risk reduction – a case study from Seabrook, Washington State, U.S.A.

A current study being undertaken by PhD student Wendy Saunders is exploring New Urbanism and natural hazard risk reduction. A sustainable community is a resilient one; it is a community that seeks to understand and live with the physical and environmental forces present at its location. Sustainability represents a powerful theoretical framework through which to understand land use and hazards. Creating sustainable

places is to create places that are far less vulnerable to natural forces and events, and that are resilient to these events. From the sustainability paradigm has come the concept of new urbanism, which incorporates those attributes of a sustainable community.

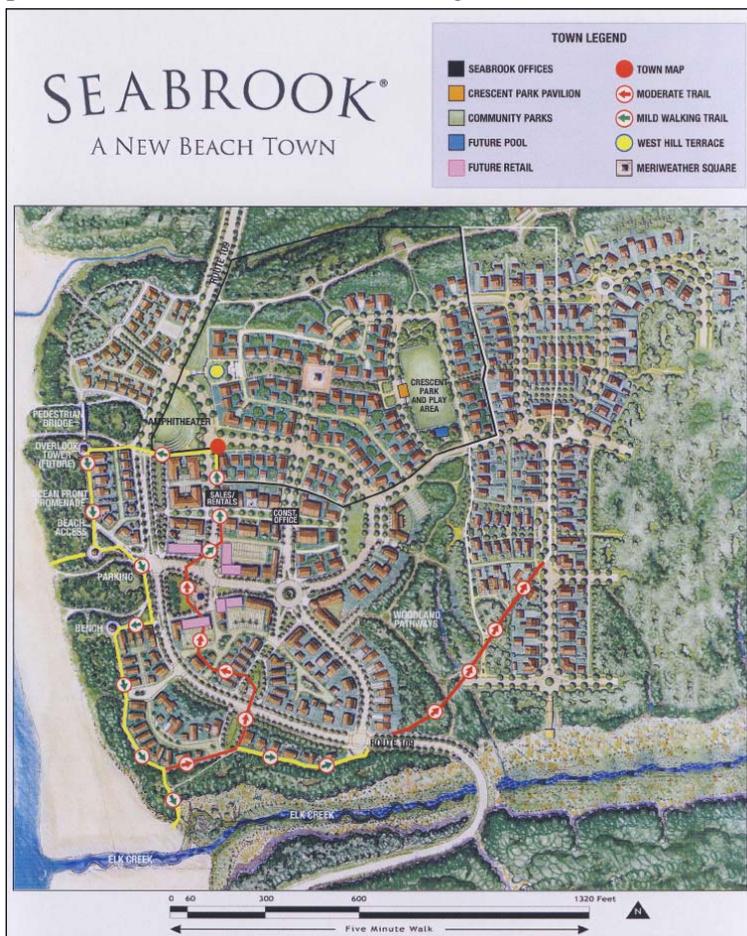
Established in 2004 and located on the Pacific Coast of the Olympic Peninsula in Washington State, United States, Seabrook is a new urbanist development which includes planning and design for the well-known risks of storm surge, coastal erosion, and tsunami risk. Located on the boundary of the Cascadia Subduction Zone, Seabrook is a 90-acre beach town on the Washington coast which once completed, will incorporate around 400 homes on a wooded bluff above a mile long stretch of beach. A pedestrian-friendly, new urbanist community, the town is organised around a town centre, with plans for shops, a grocery store, swimming pool, parks, an outdoor amphitheatre, wooded trails, a beach front promenade, and a bistro. The Washington coast where Seabrook is located has a well-known tsunami inundation risk, which has

the potential to affect the entire section of coast. The developer stated in a promotion paper that:

“It was no accident that we chose this site for our new beach town” ... [which] included geologists and other experts in the planning process. “While nearly all other developments on the Washington Coast are within what’s called a ‘tsunami inundation zone’, Seabrook was designed with deep protective buffers from the beach, and our homes are engineered to meet the highest earthquake standards” (Seabrook 2007b).



Photo: Graham Leonard checking out Seabrook.



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 will be organised by the centre in 2009.

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)
“The role of non-governmental organizations (NGOs) in long-term recovery from disaster”

Robyn Tuohy (MSc student, School of Psychology, Massey University)
“Older people’s experiences of the Kaitia flood evacuation: a narrative study with the residents of two communities.”

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”

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)
“Mapping an Incident to Incident Information Management System (IIMS): Prioritizing the local council’s challenges”

Laura Jardine-Coom (Masters student, Geography Department, University of Canterbury)
“Exploring Kaitiakitanga and Hazard Management in Aotearoa New Zealand”

Shabana Khan (PhD student, School of Geography, Environment and Earth Sciences, Victoria University of Wellington).
“A geographical analysis of the hazardscape of Wellington region: influences on intra-regional response.”

Rosalind Houghton (Victoria University PhD student – Department of Sociology and Social Policy)
“Domestic Violence following natural hazard events in New Zealand”

David McIvor (University of Tasmania PhD student – School of Psychology)
“Means-end Chain Modelling of Natural Hazard Preparedness.”

Tom Wilson (University of Canterbury PhD student – Department of Geological Sciences)
“Vulnerability of New Zealand’s pastoral farming systems and rural communities to volcanic hazards.”

Dean Podolsky (University of Canterbury PhD student – Department of Geological Sciences)
“Time-variant multi-hazard and risk communication analysis of the northern Whakatane District, Bay of Plenty, New Zealand”

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

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

Scott Barnard (University of Canterbury PhD student – Department of Geological Sciences)

“A quantitative analysis of the vulnerability of components of infrastructure to volcanic ash.”

Caroline Orchiston (Departments of Tourism and Geology PhD student, University of Otago)

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

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

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

Johnny Wardman (University of Canterbury MSc student – Department of Geological Sciences)

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

New Publications

Becker, J.; Johnston, D.; Ronan, K.; Coomer, M., 2008. Flood risk perceptions, education and warning in four communities in the Hawkesbury-Nepean Valley, New South Wales, Australia – Data report for a follow-up questionnaire, April 2008, *GNS Science Report 2008/23* 56 p.

Becker, J., Saunders, W., Hopkins, L., Wright, K. & Johnston, D. (in press). Pre-planning for recovery. In Miller, D. & Rivera, J. (Eds.) *Community Disaster Recovery and Resiliency: Exploring Global Opportunities and Challenges*.

Eustace, G., Johal, S., Stevens, G., and Yates, A. 2008. Foundations of Psychosocial Disaster Management Course Handbook, Australian Homeland Security Research Centre.

Evacuation Mapping Subcommittee, 2008. Guidelines for consistent New Zealand tsunami evacuation mapping, *GNS Science Report 2008/30*. 18 p.

Glavovic B.C., Dryburgh, M. Chittenden. R., Johnston, D.M. (editors) 2009. Proceedings of the 2nd Workshop on Emergency Management and Social Science Disaster Research in New Zealand: Deepening and Extending the Dialogue, Wellington, 8th December 2008. *GNS Science Miscellaneous Series 9*

Johnston, D., Pettersson, R., Downes, G., Paton, D., Leonard, G., Pishief, K., Bell, R. 2008. Developing an effective tsunami warning system: lessons from the 1960 Chile earthquake tsunami for New Zealand coastal communities. *Kotuitui: New Zealand Journal of Social Science* 3:105-120.

Kaye G., Cole, J., King, A., Johnston, D. (in press) Comparison of risk from pyroclastic density current hazards to critical infrastructure in mammoth Lakes, California, USA, from a new Inyo craters rhyolite dike eruption versus a dacitic dome eruption on Mammoth Mountain. *Natural Hazards*

Leonard, G.S., Wright, K.C., Smith, W.D., Johnston, D.M., Kidd, A., (in press). An evaluation and decision making support tool for public notification systems in New Zealand. *GNS Science Report 2008/34*, Wellington. 57p.

Paton, D. Parkes, B., Daly, M., & Smith, L.M. 2008. Fighting the Flu: Developing sustained community resilience and preparedness. *Health Promotion Practice*, 9, (4) Suppl., 45S-53S.

Saunders, W., Becker, J. 2008. Planning for natural hazard risk reduction in 2G plans -looking beyond the RMA. *Planning Quarterly* 171:8-10.

Saunders, W., Glassey, P. 2009. Taking a risk-based approach for landslide planning: an outline of the n\New Zealand landslide guidelines. *The Australian Journal of Emergency Management* 24:35-41.

Stewart, C., Pizzolon, L., Wilson, T., Leonard, G., Johnston, D. Cronin, S. (in press) Can volcanic ash poison water supplies? *Integrated Environmental Assessment and Management* 5(3)

Tsunami Working Group Signage Sub-committee, 2008. New Zealand national tsunami signage recommendations for CDEM Groups. *GNS Science Report 2007/40*. 38p.

Wilson, T., Dantas, A., Cole, J. 2009. Modelling livestock evacuation following a volcanic eruption: an example from Taranaki volcano, New Zealand. *New Zealand Journal of Agricultural Research* 52:99–110.

Wilson, T. M.; Stewart, C; Cole, J. W.; Johnston, D. M.; Cronin, S. J., 2009. Vulnerability of farm water supplies to volcanic ash, *GNS Science Report* 2009/01 151 p.

Upcoming Events

JOINT CENTRE FOR DISASTER RESEARCH

School of Psychology, Massey University
and GNS Science

EMERGENCY MANAGEMENT Summer Institute

Massey University Campus,
Wellington, New Zealand

16 - 20 March 2009



Matata, 2005

For more information about the 2009 Summer Institute visit the Centre's website

3rd Australasian Hazards Management Workshop Series 2009

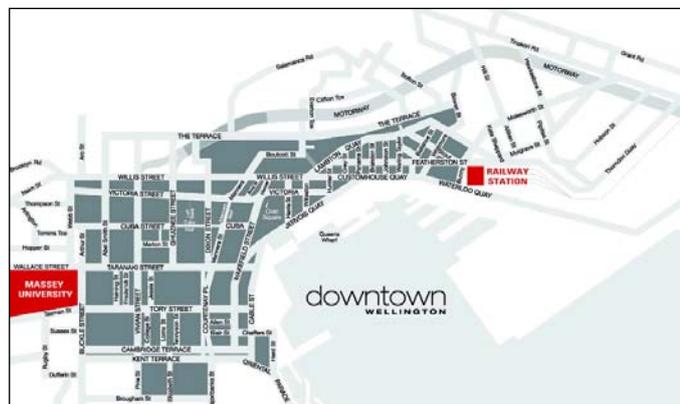


**Novotel Melbourne on Collins
Melbourne 5 – 7 August 2009**

www.hazards-education.org/ahmc/2009

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 (Room T27N). However, the Centre will draw 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
30 368,
Lower Hutt, New Zealand
Ph: + 64 4 570 1444 Fax: + 64 4 570 4679
david.johnston@gns.cri.nz

