

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.



“Te Maari Day” 22 March 2013

Te Maari Day was held in Turangi to offer key stakeholders an opportunity to look more closely at the science around the recent eruptions of Te Maari vent on Tongariro volcano on 6 August and 21 November 2012. Researchers from seven institutes (GNS Science, NIWA, Auckland, Waikato, Massey, Victoria and Canterbury Universities) presented overviews of their research and discussed details of a planned special issue of the Journal of Volcanology and Geothermal Research, due for publication in 2014.

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

News from the JCDR Team

Genevieve Taylor is in the final phase of her PhD, which focuses on the effectiveness of the Disaster Risk Reduction (DRR) partnerships in the Asia Pacific. Based at the National Centre for Research on Europe at University of Canterbury, her thesis investigates the European Union's (EU) DRR strategy in the region. This is achieved by evaluating the EU's current partnerships with European and local humanitarian organisations, alongside policy analysis of national strategies in the Asia Pacific region. DRR strategies are analysed with particular reference to reducing the vulnerability of children through human rights-based policy formation, alongside 'grassroots' methodology to DRR programming based on local ownership, regionalism, and multilateralism. While currently based in Christchurch, she has recently finished a placement at the Aon Benfield Hazard Centre at the University College of London, while participating in the 2012 International Disaster and Risk Conference in Davos, Switzerland. She is currently working as part of a JCDR research project under Dr. Cassie Kenney.



Sarb Johal has been selected to be part of the 2013 Leadership New Zealand programme. Leadership New Zealand is a not-for-profit incorporated charity with the mission of developing and nurturing the future generations of our nation's leaders. The focus is on bringing leaders from every generation and every sector of New Zealand together; to connect them through conversation; and to challenge them to make a difference. See <http://www.leadershipnz.co.nz/>

Sylvia Tapuke has joined the Centre as a Masters student. Sylvia is a Te Reo proficient student, active in kapa haka with primary whakapapa affiliations to Ngāi Tūhoe and Ngāti Tūwharetoa. She has a background in geology/geography with postgraduate experience in volcanology, geology and environmental management. She also has a passion for waiata and her research aims to explore ways in which waiata may be showcased as culturally relevant tools for facilitating disaster risk perception, management and recovery.



Carol Stewart is a visiting research fellow who has been based at the JCDR since February. She is an environmental chemist and comes from a background in environmental risk assessment. She is currently interested in volcanic impacts on aquatic environments and drinking-water supplies, and more generally in volcanic impacts on critical infrastructure. She works closely with the VATLAB group at the University of Canterbury, utilising a dual approach of carrying field investigations of impacts in areas impacted by volcanic eruptions, in conjunction with empirical testing of infrastructure components. Recent fieldwork includes investigations of the August 1991 eruption of Volcán Hudson, Chile; the May 2009 eruption of Chaitén, Chile; the recent activity of Tungurahua, Ecuador; and the May 2010 eruption of Pacaya, Guatemala. She has a further interest in developing and applying hazard assessment tools for volcanic ashfalls, and is a member of the

International Volcanic Health Hazard Network (www.ivhnn.org).

Sara McBride was called by the Adventist Development and Relief Agency to work in Fiji over the Christmas holiday period. She worked in their media and advocacy team, assisting them in getting the word out about the needs of people affected by Tropical Cyclone Evan.

Maureen Mooney has been invited to sit of the New Zealand Red Cross coordinated "Little People Savers Programme Advisory Group".

Miriam Hughes finished up at the centre at the mid-March, to take up a position Relationships Manager at REANNZ (Research and Education Advanced Network New Zealand).



New book – Scars: Life after the Tsunami

Scars: Life after the Tsunami
Banda Aceh

Published February 2013

Noel Trustrum



Scars: Life after the Tsunami documents the devastation, recovery and rehabilitation of the Banda Aceh area, over a succession of visits to the area after the Tsunami. Email Dr Noel Trustrum at n.trustrum@gns.cri.nz for information.

2013 Emergency Management Summer Institute

During the week of 11-15 March 2013 the JCDR held its annual Emergency Management Summer Institute. Over thirty participants from five countries took part in this year's event. The short course programme has been developed to provide a theoretical and practical introduction to selected topics relating to emergency management. Each course began with an introduction and review of New Zealand and international research and practice. The topics were then explored through a series of relevant case studies. The final session of each module provided practical tools and guidance for turning the theory to practice.



Next year's course will run from 10 to 14 March , 2014

Disaster Doctorates

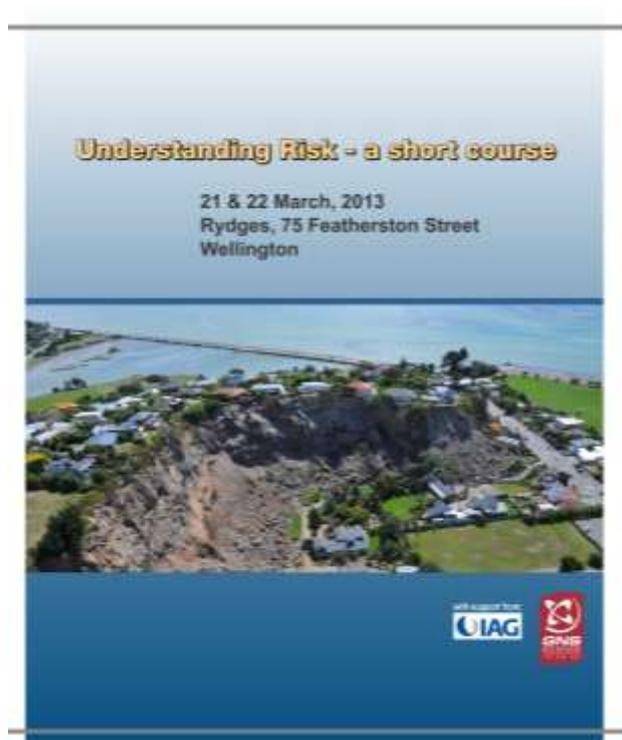
The annual Disastrous Doctorates meeting was hosted by Massey University in Wellington on 13 March. This is a forum for any New Zealand-based doctoral student working in a disaster-related field. Very broad in scope, it encompasses research across many disciplines, from physical science to social science, including psychology, earth science, emergency management, natural hazards, etc. The aim of the meeting is to meet other students and develop linkages across the disaster-research field, and also to provide a friendly, welcoming and inclusive day of learning and networking for our community of researchers. Students also had the opportunity to interact with participants of the 2013 Emergency Management Summer Institute and many join the Institute's field trip the next day.



Stevenson, J.R., Orchiston, C. (2013). Disastrous doctorates: The 6th annual meeting of disaster-related doctoral students: programme and abstracts. 13th March, 2013, Wellington, New Zealand. Joint Centre for Disaster Research, Massey University/GNS Science, 34p.

Inaugural risk short course

On 21 and 22 March 2013, GNS Science convened the inaugural risk short course (with support from IAG), in Wellington. This short course was targeted at land use planners, and focused on the how risk can be incorporated into land use planning. The impetus for this course came from the Technical Advisory Group (TAG) report released in July 2012, which recommended that risk be included in the Resource Management Act 1991 (RMA). Subsequent to this TAG report, a discussion document has been released regarding potential changes to the RMA. The suggested changes include introducing the concept of considering risk when planning for natural hazards into the RMA for the first time. On the basis of these potential legislative changes, the course was essentially split into two, to ensure that it would be of most value to the participants. The first day introduced risk, how it can be calculated and how to communicate it to the public. The second day focussed on how a risk-based approach can be implemented in land use planning and included Bay of Plenty Regional Council speaking about their experiences with undertaking a risk-based approach. A representative from the IAG Insurance Group also gave an insight into how the insurance industry considers risk, particularly in regard to making decisions when issuing new insurance policies.



The short course was well attended with 30 participants from 17 councils across the country, . Representatives included planners and emergency managers from Auckland to Invercargill councils, the insurance industry, and students from Massey, Lincoln and Canterbury Universities.

The course feedback has been very positive and confirmed that the content presented over the two days was relevant for the participants. This feedback has also identified areas where future changes could be made to further improve the course. In particular, a large amount of discussion was had on what hazard information should be disclosed in a Land Information Memorandum (LIM) and it is likely that future courses will focus more closely on this issue.

Working together to help you be prepared and resilient to disasters via learning and education anywhere

Whether at home, school or work, we all need to know how to stay safe from possible hazards. This website aims to help you be as prepared and resilient as possible by using a mixture of news, videos and photos to inform and inspire. We have school and work-based resources to support teaching and learning at [edu4drr.org](http://www.edu4drr.org)

<http://www.edu4drr.org/>



A principal responds to a school tragedy

Seminar: A principal responds to a school tragedy (Burton and Tarrant)
Presented at the Ministry of Education, November 2012

In November 2012, Dr Ruth Tarrant presented a seminar, A principal responds to a school tragedy (Burton & Tarrant), to a meeting of the Ministry of Education's Education Outside the Classroom (EOTC) Reference Group in Wellington. The EOTC Reference Group comprises representatives from the education and outdoor sectors who advise the Ministry on outdoor education for schools on New Zealand.

The seminar presented an account of school principal, Murray Burton's experience of leading Elim Christian College through a canyoning tragedy in the central North Island in 2008 where six students and one staff member lost their lives. Material from the study is to be presented in the Education Gazette. Parts 1 and 2 were published in February and March.



CriSiS[®] Lab News

Crisis Integrated Simulation Science Laboratory is an international collaborative research platform consisting of core research partners supported by, and supportive of, academic, practitioner, policy, governance, community and private sector collaborators. This collaborative approach provides the opportunity to create simulated disaster test bed environments in a laboratory setting. It invites collaborating



institutes and individuals who have already developed or are developing such simulated environments to integrate their current products and research with a reputed Emergency Management simulation platform. It will also facilitate collaboration among different parties to share their existing knowledge and build capacity to create new knowledge and understanding that could enhance their performance around emergency readiness, reduction, response and recovery activities.

In parallel with the JCDR summer institute, CriSiS[®] lab officially opened for collaborative research on the 15th March with an experiment on the topic of *Human Factors and Ergonomics of Mobile Devices in Disaster Management*. This experiment was conducted by a research team from the University of Central Florida led by Fulbright visiting scholar Dr. Pamela Bush.

Review of resilience and current public education, communication, and resilience strategies

Resilience can be described as the ability of individuals and communities to adapt to a disaster situation ('adaptive capacity'). A significant amount of research has been undertaken to investigate what contributes to having an 'adaptive capacity' and how it can be developed in populations susceptible to sudden, damaging hazard events. In Hawke's Bay alone there have been seven studies that have been undertaken to help understand resilience and determine how resilience can be developed in individuals and communities.

GNS Science was engaged to undertake a review of resilience and current public education, communication, and resilience strategies in the Hawke's Bay. As part of this review they summarised the main factors that contribute to individual and community resilience, provided a 'state of the nation' report on resilience in Hawke's Bay, and provided recommendations for how to further develop resilience in the region. An evaluation was also undertaken of current activities that are already taking place that may contribute to resilience (e.g. communication, public education, engagement). Recommendations were provided on future potential activities that could be employed to build resilience, as well as on how these could be accommodated within organisational structures.



Becker, J.; McBride, S.; Paton, D. 2013. *Improving community resilience in the Hawke's Bay: A review of resilience research, and current public education, communication and resilience strategies*, GNS Science Report 2012/38. 72 p.

G-EVER Project: Asia-Pacific Region Global Earthquake and Volcanic Eruption Risk Management

by Shinji Takarada, Takashi Azuma, Masayuki Yoshimi, Norio Shigematsu, Yuzo Ishikawa and Akira Takada (Geological Survey of Japan, AIST)

As shown by the 2011 earthquake off the Pacific coast of Tohoku, the Asia-Pacific region is an area with a high risk of catastrophic natural disasters such as earthquakes and volcanic eruptions. Once a disaster occurs, in today's highly globalised community, it can create unpredictable turmoil all over the world, not just in the affected area. Understanding these global-scale disasters is crucial to the sustainable development of the global efforts to ensure human security. Japan is a country of plate convergence. Since the 1995 Hyogoken-Nanbu (Kobe) earthquake, extensive studies have been done in Japan, such as nation-wide active fault surveys, development of high density seismograph networks and GPS crustal deformation monitoring systems. Our knowledge on earthquakes has improved dramatically and observation and study results are systematically transferred to the society. However, it is fair to say that our understanding on earthquakes is still limited and further studies should be done for the mitigation of seismic disasters. One of the impediments to the development of geologic hazard studies is the infrequency of occurrence in a specific area. This makes it difficult to promote hypothesis and test processes. This may be helped by making use of the international data available in the international correlation study.. We are now able to establish an effective international framework where we collaborate and develop a system to gather information on disaster mitigation in Asia-Pacific Region, including Japan.



The first Workshop on Asia-Pacific Region Global Earthquake and Volcanic Eruption Risk Management (G-EVER1) was held in Tsukuba, Japan from February 22 to 24, 2012 (photo above). The workshop focused on the formulation of strategies to reduce the risks of disasters caused by earthquakes, tsunamis and volcanic eruptions worldwide. More than 150 participants attended the event. During the workshop, the G-EVER1 accord was approved by the participants. The Accord consists of 10 recommendations like enhancing collaboration, sharing resources, and making information about the risks of earthquakes and volcanic eruptions freely available and more easily understood. The G-EVER Consortium among the Asia-Pacific geohazard research institutes was established in 2012. The G-EVER Promotion Team of GSJ was also formed on November 2012. The G-EVER Hub website (<http://g-ever.org>) was setup to promote the exchange of information and knowledge about volcanic and seismic hazards among the Asia-Pacific countries.

Establishing or endorsing standards on data sharing and analytical methods is important to promote data and analyses results sharing. The major activities of G-EVER include participation in global risk reduction efforts such as the Integrated Research on Disaster Risk (IRDR) Program, Global Earthquake Model (GEM) and Global Volcanic Model (GVM). The G-EVER international conference will be held every 2 years in the Asia-Pacific countries as well as one to two day G-EVER international symposiums which would be held annually. The 1st G-EVER International Symposium was held in Tsukuba, Japan on March 11, 2013. The 2nd Symposium is scheduled in Sendai, Tohoku Japan, on Oct. 19-20, 2013. Several G-EVER Working Groups and projects were proposed such as the following: (1) Risk mitigation of large-scale earthquakes WG, (2) Risk mitigation of large-scale volcanic eruptions WG, (3) Next-generation volcanic hazard assessment WG, (4) Active fault catalogue WG, and (5) Asia-Pacific region earthquake and volcanic hazard mapping project.

Whakaoranga Tūrangawaewae; Whakoranga Iwi whānui: Māori resilience, restoration and sustainability in response to natural hazards

The tangata whenua response to supporting community well-being in the aftermath of the Christchurch earthquakes has provided a basis for two JCDR projects funded by the Natural Hazards Platform and the Ministry of Business, Innovation and Employment. Cassie Kenney and Suzanne Phibbs in partnership with Te Rūnanga o Ngāi Tahu (TRoNT) are progressing qualitative research projects that document the ways cultural factors are facilitating the recovery, resilience and sustainability of Ngāi Tahu as well as the wider



Māori community. Both research projects are in the data collection phase and have been well supported by the local Māori community. To date 43 tangata whenua including TRoNT staff members have shared their stories and perspectives on the earthquakes. Communication with relevant politicians, local authorities, community board members, Māori stakeholders, youth, whānau and kaumatua remains ongoing.

In photo: Rakahia Tau (Upoko for Ngai Tuahuriri) Sir Mark Solomon, Cassie and Kaumatua Aunty Sally Pitama

Although still at an early stage of development, initial analysis of participants' talk suggests that traditional Māori knowledge, values and practices interact as relational and moral technologies, which when applied, can enhance emergency management responses and shape effective recovery initiatives. Emergent research themes are therefore highlighting the value of Māori emergency management processes and strategies for ensuring broader community well-being after a disaster event. Longer-term considerations include ensuring that such emergent technologies are drawn on to inform integrated disaster management and recovery planning at local, regional and potentially national levels.

Risk interpretation and action: A conceptual framework for responses to natural hazards

Understanding how people interpret risks and choose actions based on their interpretations is vital to any strategy for disaster reduction. A recently published review of relevant literature aims to develop a conceptual framework to guide future research in this area. The authors stress that risks in the context of natural hazards always involve interactions between natural (physical) and human (behavioural) factors.

Decision-making under conditions of uncertainty is inadequately described by traditional models of 'rational choice'. Instead, attention needs to be paid to how people's interpretations of risks are shaped by their own experience, personal feelings and values, cultural beliefs and interpersonal and societal dynamics. Furthermore, access to information and capacity for self-protection are typically distributed unevenly within populations. Hence trust is a critical moderator of the effectiveness of any policy for risk communication and public engagement.

Decision		
Actual risk	Dangerous	Safe
Danger	<i>Hit</i>	<i>Miss</i>
Safety	<i>False alarm</i>	<i>Correct all clear</i>
Learning	<i>False alarms and hits difficult to distinguish</i>	<i>Misses may be fatal, or consequences sporadic</i>

Fig. 1. Cross-tabulation of decision–outcome combinations, including potential sources of error in learning from feedback following decisions.

Eiser, J.R., Bostrom, A., Burton, I., Johnston, D.M., McClure, J., Paton D., van der Pligt, J., White, M.P. (2012). Risk Interpretation and Action: A Conceptual Framework for Responses to Natural Hazards. *International Journal of Disaster Risk Reduction* 1: 5-16.

Disaster Waste Management: a systems approach

Charlotte Brown (a recently graduated PhD student from University of Canterbury) was able to include five international case studies in her research, including an analysis from the earthquakes in her hometown of Christchurch. Using this rich data she was able to develop a range of principles for managing disaster waste. Charlotte was also able to develop some draft disaster waste management guidelines which she hope will prove useful.

For those interested, below are two links to her final thesis. There is a full report for each case study she carried out (for those interested in specific contexts). Please see the thesis contents to point you to the right appendix.

<http://www.resorgs.org.nz/Publications/research-theses.html>

<http://ir.canterbury.ac.nz/handle/10092/7038>



Improving communication about earthquake aftershocks

The Joint Centre for Disaster Research (GNS Science/Massey University), in conjunction with the United States Geological Survey (USGS), will be conducting a study about the communication of aftershock information. Findings from the study will be used to develop guidance on how to better communicate aftershock messages after large earthquakes.

The purpose of the research is to understand:

- how information about earthquake aftershock risk was communicated both to organisations involved in responding to the Canterbury earthquakes, and the ‘general public’;
- how people interpreted that information (e.g. What was their understanding of the information? How did it make them feel?);
- what people did in response to receiving that information (e.g. What practical actions they undertook in response to the information? Was it useful in helping with the way they coped?); and
- what decision-making challenges related to aftershocks they encountered?

A better understanding of the aftershock risk communication process will allow guidance to be developed that assists with future aftershock communication, and enables the provision of relevant and helpful advice.

To undertake the research we will be conducting focus group discussions during the week of 13 May 2013. We will be asking people from organisations and the general public about their experience with aftershock information and their views about it. Two focus groups will be held in Wellington with another eight being held in Christchurch.

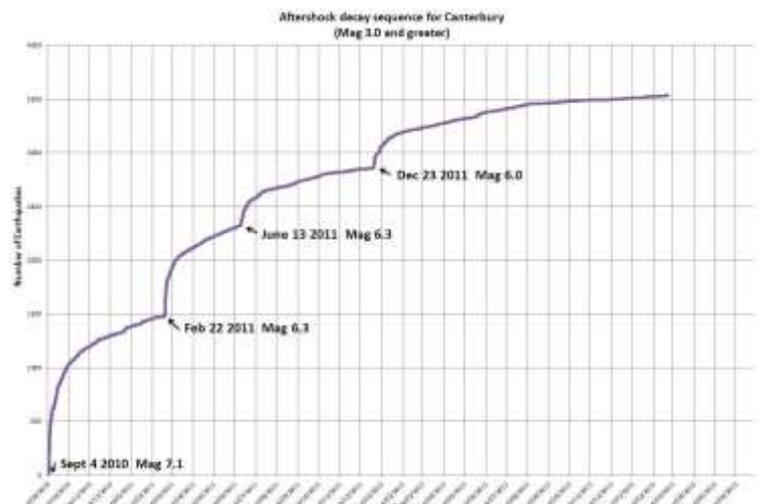


Figure above: A graph showing the significant effect of the February, June and December 2011 earthquakes re-energising the Darfield aftershock sequence. No other earthquakes have affected the decay rate in so obvious a fashion.

If you are interested in taking part in the focus group discussions please contact Julia Becker at GNS Science for more information (j.becker@gns.cri.nz, DDI: 04 5704795). Your views are very important to the success of this study, and we look forward to your participation.

Managing temporary school closure due to environmental hazard: Lessons from New Zealand

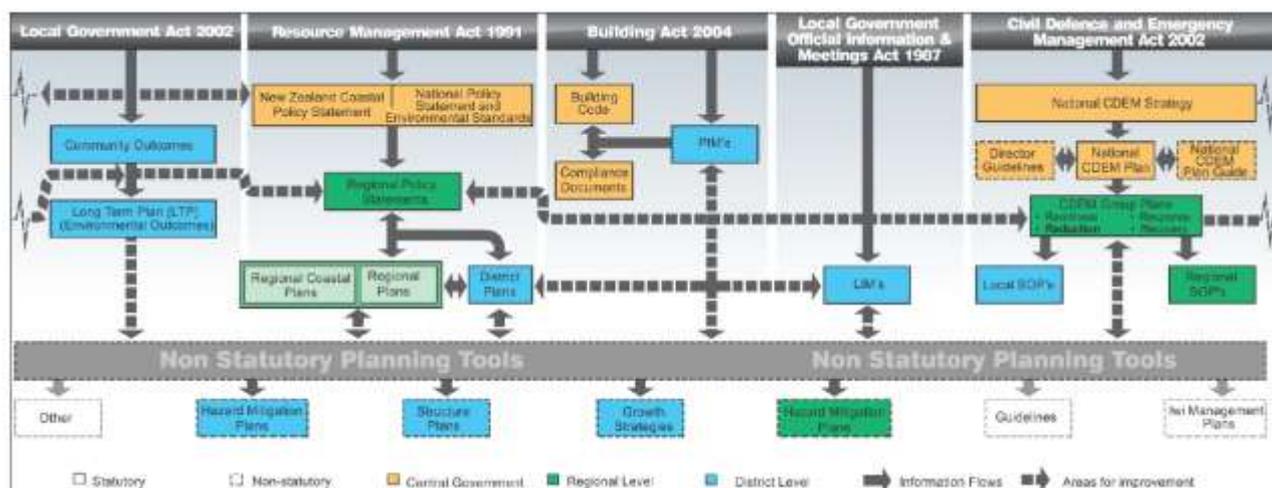
The Canterbury earthquake of February 2011 was a dramatic reminder of the need for schools to have emergency management plans in place. A number of other disaster and hazard events have historically caused New Zealand schools to close temporarily, and often within a short time frame. At such times principals must act decisively and communicate clearly with their communities in complex and difficult circumstances that carry risk for student well-being.

A recently published study explores two hazard-specific New Zealand case studies, pandemic (H1N1) and adverse weather (snowstorm) both precipitating instances of temporary school closure. Lessons taken from the case studies offer an opportunity for management staff to reflect on how to best plan for and manage environmental hazards precipitating temporary school closure in order to mitigate immediate and long-term risk to pupils and the wider school community.

Stuart, K.L., Patterson, L.G., Johnston, D.M., Peace, R. (2013). Managing temporary school closure due to environmental hazard: Lessons from New Zealand. Management in Education 27(1): 25-31.

Putting R(isk) in the RMA

In October 2011, the Minister for the Environment established a Technical Advisory Group (TAG) to undertake a comprehensive review of sections 6 (matters of national importance which must be recognised and provided for) and 7 (other matters which require particular regard by decision makers) of the Resource Management Act 1991 (RMA). As part of the terms of reference for this review, the TAG was requested to give “greater attention to managing issues of natural hazards noting the RMA issues arising from the recent Canterbury earthquakes” (TAG, 2012, 15).



On 5 July 2012, the TAG report was publicly released. Within the TAG report there is a variety of suggested changes to ss. 6 and 7 of the RMA. In response, this GNS Science report will focus on the implications of the TAG recommendations on the management of natural hazards through the RMA. While it is recognised that there are other recommendations for ss. 6 and 7 of the RMA pertaining to the urban environment and natural character considerations, the implications of these are not discussed within this report. This report begins by exploring the current legislative framework that governs the management of natural hazards in New Zealand. A discussion on how avoidance, mitigation, and risk reduction are reconciled under the RMA follows, along with the different likelihoods of various natural hazards. The TAG recommendations and their implications for councils and future development are presented and discussed. The research programmes at GNS Science that have the potential to assist councils with the TAG recommendations are then outlined. Finally, a summary of recommended actions for future consideration is presented.

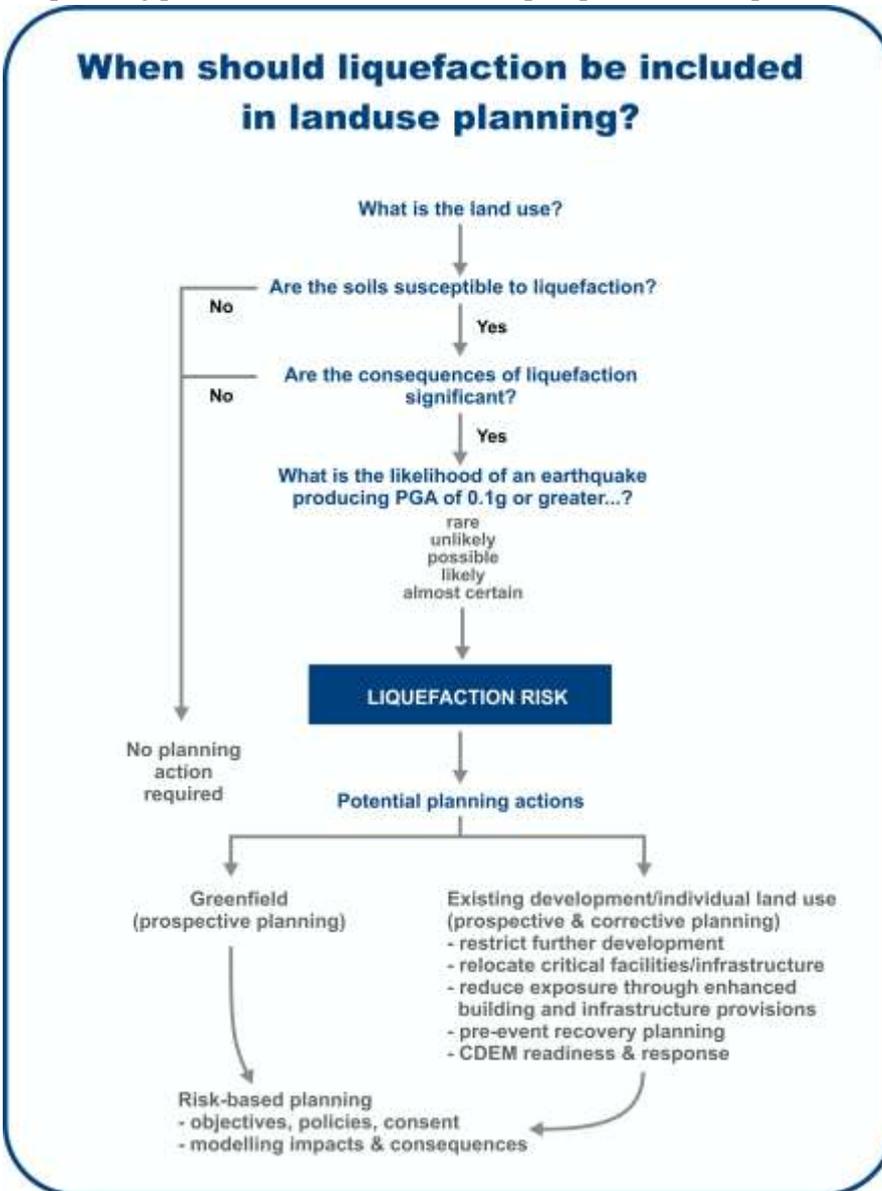
Saunders, W.S.A., Beban, J.S. (2012). Putting R(isk) in the RMA: Technical Advisory Group recommendations on the Resource Management Act 1991 and implications for natural hazards planning. GNS Science Miscellaneous Series 48, 57p.

When should liquefaction be considered in land use planning?

Many local authorities are currently investigating liquefaction hazard and exploring land use planning methods to mitigate potential risk. While in many cases the need to investigate liquefaction hazard is required, anecdotal evidence indicates that several councils are unduly concerned with liquefaction risk. This is because liquefaction requires the following basic conditions in order to occur: an earthquake large enough to trigger liquefaction within planning timeframes; specific soil characteristics; and a high water table. As such, the above report has been produced. The purpose of this report is to provide guidance to land use planners and decision makers so they can assess whether liquefaction is a hazard that needs to be included in the planning process. To achieve this, the report provides an explanation of liquefaction and earthquake

thresholds (quantified by peak ground acceleration), followed by a simple decision tree designed for planners to ensure that liquefaction is appropriately included in land use planning decisions. Each of the steps in the decision tree is discussed in further detail. Key questions include: Are the soils susceptible to liquefaction? Are the consequences of liquefaction significant? What is the likelihood of an earthquake generating ground motions at a site above a liquefaction threshold of 0.1g peak ground acceleration occurring? Concluding the report is an overview of future research into liquefaction and its management.

Figure left: Decision tree to assist in assessing if liquefaction should be included in land use planning.



This report *does not* provide guidance on how to include liquefaction into planning documents – additional multi-disciplinary guidance to assist with this is being developed through other research and policy. The focus of the report is the decision tree, shown below (Figure 1).

Saunders, W. S. A., & Berryman, K. R. (2012). *Just add water: when should liquefaction be considered in land use planning?* (GNS Science Miscellaneous Series 47 ed.). Lower Hutt: GNS Science.



Impacts of the June 2011 Puyehue-Cordón Caulle volcanic complex eruption on urban infrastructure, agriculture and public health

By Carol Stewart

Many people will remember the disruption to flight schedules in mid-2011 caused by the eruption of Puyehue-Cordón Caulle volcano, in southern Chile. This was a sizeable eruption which deposited substantial amounts of ashfall on population centres downwind in Argentina. The city of Bariloche, with a population of around 120,000, received 3-5 cm depth ashfall (in comparison, the maximum depth of ashfall deposited on any population centre by the 1995/1996 Ruapehu eruptions was approximately 2-3 mm, in Turangi). It was therefore a valuable opportunity to observe effects on urban infrastructure at first hand.



Team photo (left):

The NZ field team (L to R: Heather Craig, Tom Wilson, interpreter David Dewar and Carol Stewart) on Chile/Argentina border, February 2012 (photo: Carol Stewart). This area was covered in up to 50 cm pale grey pumice fragments from the June 2011 eruption of Puyehue- Cordón Caulle volcano, in southern Chile.

Photo below:

Tom Wilson and Heather Craig sampling soils and windblown ash from Puyehue-Cordón Caulle volcano, on the Patagonian steppe. The eruption had severe impacts on livestock farming in this region.

The NZ team worked with our Argentine colleagues, Dr Gustavo Villarosa and Valeria Outes and we were also joined by our colleague Dr Peter Baxter from Cambridge University, UK, an expert on the public health impacts of volcanic activity. Towns downwind of the eruption on the Patagonian steppe have been, and continue to be, severely affected by the fine airborne ash. The extremely arid and windy conditions have also prolonged the effects of the eruption, as the deposited ash is unconsolidated and easily resuspended in windy conditions. Similarly, the eruption had severe effects on livestock farming in this region, with stock losses of 40-60%.



Our findings are available as a GNS Science Report:

Wilson, T.; Stewart, C.; Bickerton, H.; Baxter, P.; Outes, V.; Villarosa, G.; Rovere, E. 2013. *Impacts of the June 2011 Puyehue-Cordón Caulle volcanic complex eruption on urban infrastructure, agriculture and public health*, GNS Science Report 2012/20. 88 p.

Validation of a GIS-based attenuation rule for indicative tsunami evacuation zone mapping in New Zealand

A GIS-calculated attenuation rule for development of indicative tsunami evacuation zone has been previously developed and presented by Leonard et al. (2008). This provides a solution for tsunami evacuation zone planning where a lack of resources or detailed topographic and bathymetric data precludes full hydrodynamic simulation of tsunami to develop evacuation zones. Attenuation of tsunami flow over land is considered to occur at different rates, dependent on the flow path – i.e. over land from the coast, along a river channel and laterally from the river, or into a harbour then over land. The attenuation relationships applied in the method were calibrated using inundation data collected during several post-tsunami field surveys. The method has been applied in several cases of evacuation zone mapping in New Zealand and the Pacific. However, since its development and application there has been no validation of the method with recorded inundation data.

The present study succeeds in validating the approach by comparing outputs of the attenuation-rule based method against inundation and run-up data points surveyed following the Great East Japan Tsunami (11th March 2011). To validate the method, firstly the inundation height versus distance inland (according to the attenuation rules for overland flow from the coast and via rivers) is directly compared against the survey data points of inundation and run-up height. Secondly, GIS-calculated evacuation zones are developed for two contrasting study areas in Miyagi Prefecture, Tōhoku, Japan, representing coastal plain topography and a rias (drowned river valley) with harbour topography. These are then

compared to the recorded survey data and satellite imagery indicating tsunami inundation extent at the same locations. The evacuation zones generated using the GIS-calculate attenuation rule successfully incorporate the zone of inundation due to the Great East Japan tsunami at both study areas, giving confidence that the method is suitable for derivation of indicative evacuation zones elsewhere.

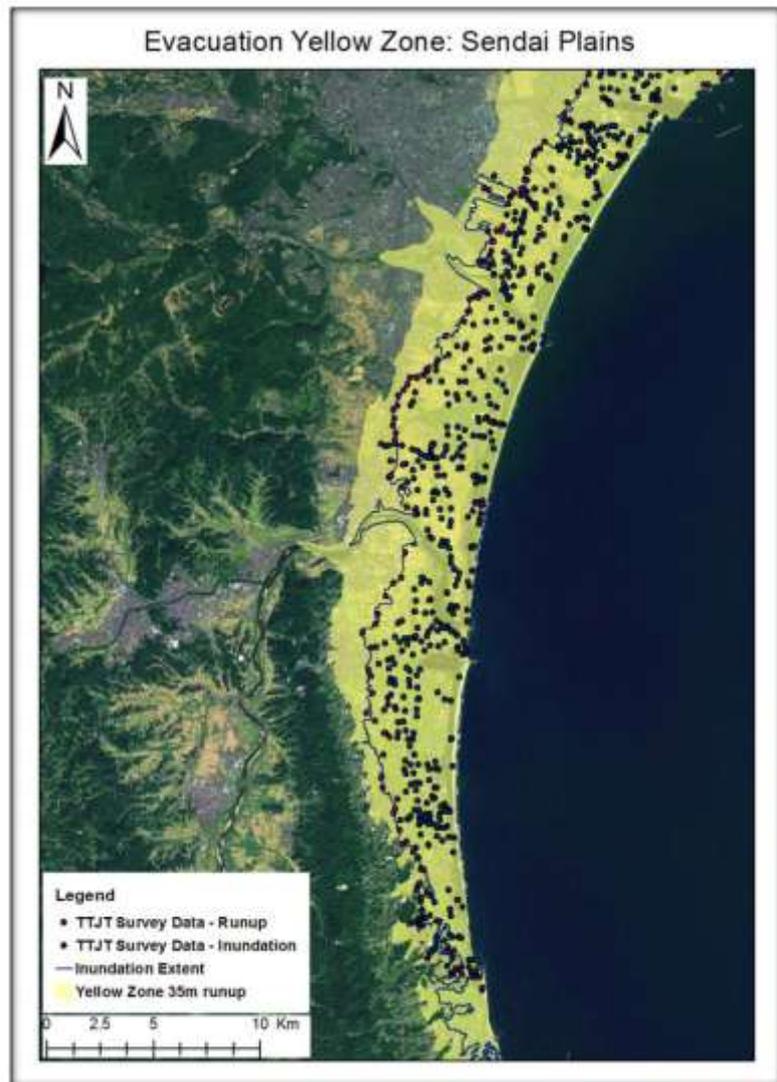


Figure above right. Evacuation zone (yellow shaded) for the Sendai Plains, produced using a maximum possible run-up (at the coast) of 35 m and tidal level of 1.798 m relative to Tokyo Peil datum. TTJT survey data points (inundation and run-up height; Mori et al., 2012) and maximum inundation extent (blue, copyright: Geographical Survey Institute, Japan) are shown for comparison.

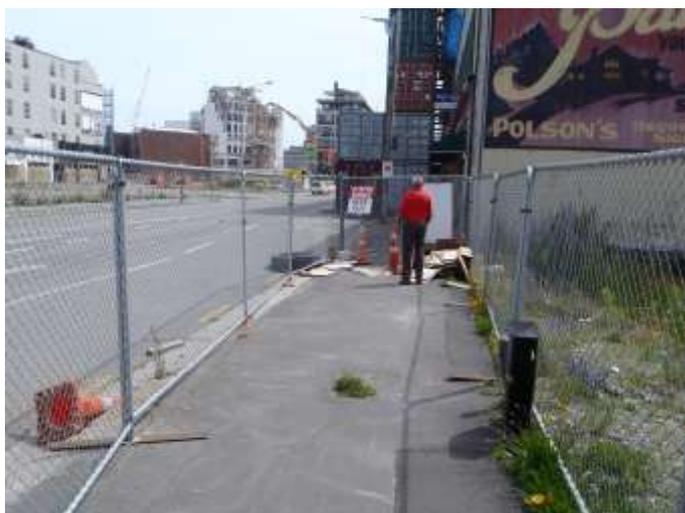
Fraser, S. A.; Power, W. L. 2013. Validation of a GIS-based attenuation rule for indicative tsunami evacuation zone mapping. *GNS Science Report 2013/02*, 21 p.

The CERA Wellbeing Survey 2012 Report

CERA and its partner agencies undertook the Wellbeing Survey to measure earthquake recovery progress across greater Christchurch. It provides timely feedback to social and other agencies as trends in community wellbeing emerge. Self-reported wellbeing data identifies the prevalence and causes of stress, quality of life impacts, barriers and opportunities, impacts on social connectedness, satisfaction with the recovery and any positive impacts people are experiencing as a result of the earthquakes.

Key results

- 2,381 residents completed questionnaires. 1,156 were from Christchurch, 618 from the Selwyn district and 607 from the Waimakariri district.
- Residents of Christchurch rate their quality of life less positively than residents of Selwyn and Waimakariri districts.



- Higher proportions of Christchurch residents have experienced a strong negative impact on their everyday lives as a result of the earthquakes.
- Nearly three-quarters of greater Christchurch residents rate their quality of life positively, and 7% believe it to be poor. However more than half believe that their quality of life has deteriorated since the earthquakes.
- 97% of residents have experienced stress at least some time in the past year. Nearly a quarter indicate they

have been living with this type of stress for most or all of the time over the past year.

- The three most prevalent negative impacts experienced as a result of the earthquake were identified as: loss of recreational, cultural and leisure time activities; distress and anxiety associated with ongoing aftershocks; and dealing with EQC or insurance issues.
- The four most positive impacts as a result of the earthquakes were: pride in ability to cope under difficult circumstances; family's increased resilience; renewed appreciation of life; and a heightened sense of community.
- Residents' opinions were polarised as to whether or not they have confidence in the decisions being made by the agencies involved in the recovery, as were their views on the communications and information received.



The full report is available from <http://cera.govt.nz/wellbeing-survey>

Co-Design Disaster Resilience Laboratory (CDRL)

The Massey Wellington Joint Centre for Disaster Research (JCDR) and AFFECT, The Centre of Affective Design Research, (AFFECT) aims to capitalise on growing international demand for disaster mitigation, preparedness and resilience products, through the establishment of a Co-Design Disaster Resilience Laboratory (CDRL). The CDRL will combine JCDR's cutting edge disaster research and AFFECT's award winning design capability to create innovative products, services and solutions for domestic and international markets.

The new lab will be officially launched in April 2013.

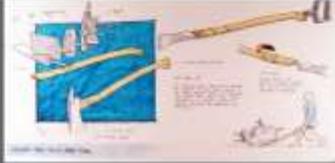
Co-Design Disaster Resilience Laboratory

Collaborative Product and Service Solutions Developing Resilient Communities

- Networked international communities of collaboration
- Co-Design, across disciplines and stakeholder groups
- Innovation and enterprise
- Delivering benefits to communities and developing resilience





Product concepts for disaster mitigation

• Pre-disaster
• Disaster Response
• Post Disaster

The Joint Centre of Disaster Research

General Enquiries Email: jcdr.enquiry@massey.ac.nz
Wellington Campus, Massey University

Telephone +64 4 801-5799, Ext 62169 Facsimile +64 4 570-4600






Mains Connected Emergency Water Tank System

Water is essential to human survival and few people store sufficient water for use in an emergency. Current methods are often either impractical, wasteful, costly or have maintenance free periods to this problem.

Hydrant captures water from the mains supply within a bladder and stores it in a tank. The stored water is released as mains supply water to avoid reducing consumption and ensuring fast access to water.

The product is designed so it fits a cabinet in the product can be installed under a sink in a kitchen or bathroom.

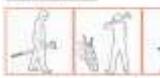


RESQMAX

EQUIPMENT & TRAINING MATERIALS UNIT
















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

Massey University

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

Sara McBride (PhD student, School of Psychology, Massey University)
“The Canterbury Tales: Learnings from the Canterbury Earthquake Sequence in New Zealand to design successful public education campaigns to increase community resilience for low risk and high impact areas in Washington State, United States of America”

Tom Huggins (PhD student, School of Psychology, Massey University)
“Optimising Visual Solutions for Complex Strategic Scenarios”

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”

Stuart Fraser (PhD student, School of Psychology, Massey University)
“The potential for using mid to high-rise buildings as vertical evacuation structures in near-source earthquake and tsunami events”

John Lindsay (PhD student, School of Psychology, Massey University)
“Maximising participatory planning in emergency management: implications for professional practice”

Robyn Tuohy (PhD student, School of Psychology, Massey University)
“Disaster preparedness of older adults in New Zealand”

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

Vicky Johnson (PhD student, School of Psychology, Massey University)
“Evaluating disaster education programs for children”

Karlene Tripler (PhD student, School of Psychology, Massey University)
“Emergency management in New Zealand primary schools”

Maureen Mooney (PhD student, School of Psychology, Massey University)
“Childhood and caregiver post-disaster recovery following Canterbury earthquakes of 2010 and 2011”

Gavin Treadgold (Masters student, School of Psychology, Massey University)
“Information management for post-disaster building assessment”

Sylvia Tapuke (Masters student, School of Psychology, Massey University)
“Ways in which waiata may be showcased as culturally relevant tools for facilitating disaster risk perception, management and recovery”

Paul Schneider (PhD student, Institute of Development Studies School of People, Environment and Planning, Massey University)
“The human face of climate change: Adaptation in a vulnerable coastal community context”

Noremy Md Akhir (PhD student, School of Psychology, Massey University)
“Developing a comprehensive framework of psychosocial intervention for people dealing with flood disasters in Malaysia”

Other partners

Abi Beatson (PhD student, Victoria University)

“New media, information sharing and crisis mapping: an analysis of new Media Based Information Sharing Practices during the Christchurch Earthquakes

Gill Scrymgeour (PhD student, University of Tasmania)

“Creating a resilient nursing workforce to the effects of large scale natural disasters within healthcare facilities within the South Pacific”

Brenda Mackie (PhD student, School of Social and Political Sciences, University of Canterbury)

“Risk Communication, Perception and Warning Fatigue: the Australian Bushfires”

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

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

Michael Peters (MSc student, Department of Geological Sciences, University of Canterbury)

“Dissolution and hazard assessment of volcanic ash in freshwater environments”

Heather Bickerton (PhD student, Department of Geological Sciences, University of Canterbury)

“Volcanic ash impacts to agriculture”

Sarah Beaven (PhD student, Department of Geological Sciences, University of Canterbury)

“Science and operational response partnerships after the Canterbury Earthquakes: a model facilitating research and operational collaboration”

Tom Robinson (PhD student, Department of Geological Sciences, University of Canterbury)

“Planning for a Great Alpine fault earthquake: consequences for the South Island, New Zealand”

Sonali Weerasekara (MSc student, Department of Geological Sciences, University of Canterbury)

“Modelling gastroenteritis prevalence in relation to liquefaction ejecta”

Marlene Villemure (MSc student, Department of Geological Sciences, University of Canterbury)

“Cost of Clean Up: Clean up time, costs and coordination following widespread soft sediment deposition in urban environments during natural disasters”

Shaun Williams (PhD student, Department of Geological Sciences, University of Canterbury)

“Tsunami Hazards, Samoa Islands: Palaeo-tsunami investigation, numerical source modelling and risk implications”

Jason McIntosh (MSc student, Department of Geological Sciences, University of Canterbury)

“Assessing the effects of large earthquakes on healthcare capacity in Christchurch”

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”

Zachary Whitman (PhD 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”

Vivienne Bryner (PhD student, Centre for Science Communication & Geology, University of Otago)

“Communication of geoscience knowledge to achieve disaster risk reduction”

Mary Anne Thompson (PhD student, School of Environment, University of Auckland)

“The interface between probabilistic hazard and risk assessment and volcanic risk and crisis management”

Daniel Hogg (PhD student, Department of Geography, University of Canterbury)

“Geographic variations in natural disaster impacts and spatial links to non-injury related health outcomes”

New publications

- Becker, J.S., Paton, D., Johnston, D. M., Ronan, K. R. (2012) How people use earthquake information and its influence on household preparedness in New Zealand. *Journal of Civil Engineering and Architecture*, 6(2), 673-681.
- Becker, J. S., Paton, D., Johnston, D. M., Ronan, K. R. (in press). Salient beliefs about earthquake hazards and household preparedness. *Risk Analysis*.
- Becker, J.; McBride, S.; Paton, D. (2013) Improving community resilience in the Hawke's Bay: A review of resilience research, and current public education, communication and resilience strategies, *GNS Science Report 2012/38*. 72 p.
- Burton, M., Tarrant, R., Cummings, S (2013) Leadership through a school tragedy: Part 1. *New Zealand Education Gazette* issue 92.3 (25 February), p. 2-3.
- Burton, M., Tarrant, R., Cummings, S (2013) Leadership through a school tragedy: Part 2. *New Zealand Education Gazette* issue 92.4 (11 March).
- Eiser, J.R., Bostrom, A., Burton, I, Johnston, D.M., McClure, J., Paton D., van der Pligt, J., White, M.P. (2012) Risk Interpretation and Action: A Conceptual Framework for Responses to Natural Hazards. *International Journal of Disaster Risk Reduction* 1: 5-16.
- Fraser, S., Raby, A., Pomonis, A., Goda, K., Chian, S.C., Macabuag, J., Offord, M., Saito, K., Sammonds, P. (2012) Tsunami damage to coastal defences and buildings in the March 11th 2011 Mw9.0 Great East Japan earthquake and tsunami. *Bulletin of Earthquake Engineering* (in press).
- Fraser, S. A.; Power, W. L. (2013) Validation of a GIS-based attenuation rule for indicative tsunami evacuation zone mapping. *GNS Science Report 2013/02*, 21 p.
- Mamula-Seadon, L., Selway, K., Paton, D. (2012) *Exploring Resilience*. Community Resilience: Case Studies from the Canterbury Earthquakes, *Tephra*, 23: 5-7.
- Frandsen, M., Paton, D., Sakariassen, K. & Killalea, D. (2012) Nurturing Community Wildfire Preparedness from the Ground Up: Evaluating a community engagement initiative. In D. Paton & F. Tedim (Eds) *Wildfire and Community: Facilitating preparedness and resilience* (pp. 260-280. Springfield, Ill., Charles C. Thomas.
- Johnston, D., Fraser, S., Leonard, G., Saunders, W., Wright, K. (2013) Developing an effective community response to the next "Great East Coast Subduction Zone Earthquake and Tsunami". White Paper for GeoPRISMS - Planning Workshop for the New Zealand Primary Site, April 15-17, 2013; Te Papa Museum, Wellington, New Zealand. <http://www.geoprisms.org/meetings/newzealand-apr2013.html#white-papers>
- Paton, D & Tedim, F. (2012) *Wildfire and community: Facilitating preparedness and resilience*. Springfield, Ill: Charles C. Thomas.
- Paton, D., & Buergelt, P. T. (2012) Community engagement and wildfire preparedness: The influence of community diversity. In D. Paton and F. Tedim (Eds.), *Wildfire and community: Facilitating preparedness and resilience* (pp.241-259). Springfield, Ill: Charles C. Thomas.
- Paton, D., & Tedim, F. (2012) Wildfire risk management: Building on lessons learnt. In D. Paton & F. Tedim (Eds.), *Wildfire and community: Facilitating preparedness and resilience* (pp.323-336). Springfield, Ill: Charles C. Thomas.
- Paton, D., & Tedim, F. (2012) Wildfire preparedness and resilience in community contexts: Issues and perspectives. In D. Paton & F. Tedim (Eds.), *Wildfire and community: Facilitating preparedness and resilience* (pp. 3-13). Springfield, Ill: Charles C. Thomas.
- Paton, D., Tedim, F & Shand, H. (2012) The social dimensions of forest fire: Community contributions to sustainable, integrated wildfire risk management in Portugal. In D. Paton & F. Tedim (Eds.), *Wildfire and community: Facilitating preparedness and resilience* (pp. 228-240). Springfield, Ill: Charles C. Thomas.
- Saunders, W.S.A., Beban, J.S. (2012) Putting R(isk) in the RMA: Technical Advisory Group recommendations on the Resource Management Act 1991 and implications for natural hazards planning. *GNS Science Miscellaneous Series* 48, 57p.

Stuart, K.L., Patterson, L.G., Johnston, D.M., Peace, R. (2013) Managing temporary school closure due to environmental hazard: Lessons from New Zealand. *Management in Education* 27(1): 25-31.

Stevenson, J.R., Orchiston, C. (2013) Disastrous doctorates: The 6th annual meeting of disaster-related doctoral students: programme and abstracts. 13th March, 2013, Wellington, New Zealand. Joint Centre for Disaster Research, Massey University/GNS Science, 34p.

Wardman, J.B., Wilson, T.M., Cole, J.W., Bodger, P.S. (2012) Potential impacts from tephra fall on electric power supply networks: A review and mitigation strategies. *Bulletin of Volcanology* 74: 2221-2241.

Wilson, T.; Stewart, C.; Bickerton, H.; Baxter, P.; Outes, V.; Villarosa, G.; Rovere, E. (2013) Impacts of the June 2011 Puyehue-Cordón Caulle volcanic complex eruption on urban infrastructure, agriculture and public health, *GNS Science Report* 2012/20. 88 p.





NZSEE
CONFERENCE
2013

FIRST CALL FOR ABSTRACTS

ABSTRACTS DUE: 26 NOVEMBER 2012

SAME RISKS - NEW REALITIES

New Zealand Society for Earthquake Engineering

Technical Conference and AGM

APRIL 26 - 28, 2013 | WELLINGTON



Conference Website

<http://db.nzsee.org.nz/2013/>

Conference Location

Michael Fowler Centre

Wakefield Street
Wellington
New Zealand

<http://pwv.co.nz/our-venues/michael-fowler-centre>

President

Stefano Pampanin

University of Canterbury

stefano.pampanin@canterbury.ac.nz

Conference Organisation Chair

Peter Wood

Immediate Past President

srlnprw@gmail.com

Further Information:

Win Clark

NZSEE Executive Officer

exec@nzsee.org.nz

Sponsored by:



The Conference

The NZSEE annual technical conference brings together researchers and practitioners in the multi-disciplinary field of Earthquake Engineering. The 2013 conference is being held in Wellington, a city with an active tectonic setting, many outstanding examples of earthquake resistant buildings, and significant experience in reducing risk through implementing earthquake prone building policies.

In 2013 the conference will be held at the **Michael Fowler Centre, Wellington**. The Conference this year is in **collaboration with the Wellington City Council** who are proactive in promoting a "Resilient City". A **panel forum** will stimulate discussion on "**Understanding Risk**". Field trips on the Saturday afternoon will showcase Wellington's assets, faults, hazards, and their mitigation.

Suggested Topics for Proposed Papers:

- Pathways to Earthquake Resilience
- Lessons from Earthquakes through Time
- Lessons from Christchurch
- Mitigating the Social and Economic Impacts of Earthquakes
- Advances in Hazards Definition
- Advances in Earthquake Engineering Practice
- Planning for Earthquake Response and Recovery
- Recent Practical Projects

Abstract submission:

- Online: <http://db.nzsee.org.nz/2013/> after 29 October 2012

Presenters of written papers are invited to provide a brief abstract of no more than 250 words by 26 November 2012. Abstracts are also invited for presentations at a special session on recent practical projects, for which no written paper is required.

Prizes will be awarded for the following:

- Best Student Paper & Presentation
- Best Research Paper
- Best Practice Paper
- Best Poster Paper

KEY DATES:

ABSTRACT DEADLINE:
26 NOVEMBER 2012

AUTHORS NOTIFIED:
30 NOVEMBER 2012

FINAL PAPERS DUE:
8 FEBRUARY 2013



Earthquake Resilience Expo
**EXHIBITION
PROPOSAL**

26 - 27 April 2013
Wellington Town Hall



Risk Interpretation and Action:

An agenda setting workshop to better integrate behavioural and social science and practitioner approaches to knowledge and learning in resilience building for disaster risk management

16-17 May 2013, King's College London

Co-Chairs: Richard Eiser , Mark Pelling and Emma Visman

The focus of the Risk Interpretation and Action workshop is on the question of how people – both decision-makers and ordinary citizens – make decisions, individually and collectively, in the face of risk. These are questions that social theory, psychology and learning theory have all addressed and alongside practitioner experiences have progressed somewhat independently of each other. This has led to a number of discontinuities in how the issues of risk communication and perception are conceptualized and studied, as well as gaps in the areas where research and practitioner activity (and funding) is presently concentrated. The result is a number of unanswered questions that involve diverse fields:

Can placing learning in the centre of policy and research lead to a paradigm shift for the operationalising and understanding resilience and transformation?

Can learning theory (including social learning) connect with action research and knowledge exchange work to create a paradigm shift for risk management – one built on knowledge and learning processes and perception. Is this possible, desirable, doable?

What are the practical obstacles to a more flexible and knowledge rich humanitarian sector and professional practice?

How do people's decisions, perhaps due to social norms and perceived or actual constraints on their freedom of choice, diverge from their evaluations of such risks? How can we better theorise and research the relationships between organisational and social structures on the one hand and individual agency on the other to better understanding individual and social learning and action in risk management organisations including humanitarian agencies?

How much emphasis should be placed on risk forecasting versus communication?

If the step change in risk avoidance is to come from risk communication why is this consistently underfunded compared to hazard modelling? Are the right questions being asked?

Format: The workshop will be structured around short presentations and break-out group discussions.

Objectives: The workshop has two specific outputs: (1) to feed directly into the evolving agenda and strategic plan for the Risk Interpretation and Action working group of the IRDR; (2) to allow IRDR to feed specific recommendations into UK research council discussions of future research funding for disaster risk management, and the wider UN discussion on sustainable development goals. The workshop is timed to precede the ISDR Global Platform and will similarly feed into IRDR discussions at this event.

IRDR – Integrated Research in Disaster Risk, is an international research programme supported by ICSU, ISSC and UNISDR. For more information see <http://www.irdrinternational.org/>

To propose a session or submit an abstract please contact Mark Pelling at mark.pelling@kcl.ac.uk

Deadline for submissions is 8 April 2013.



The New Zealand Climate Change Conference 2013

4-5 June • Palmerston North

4-5 June 2013, Convention Centre, Palmerston North, New Zealand

www.nzcccconference.org

For the latest research in climate change physical science, adaptation, mitigation and cross-cutting issues, The New Zealand Climate Change Conference 2013 is a must-attend event.

Bringing together researchers from across New Zealand, this two-day New Zealand Climate Change Centre (NZCCC) conference held at the Palmerston North Convention Centre 4-5 June 2013 will showcase the latest climate change research thinking and outputs.

The conference will:

- 1 Provide a platform for researchers from across New Zealand and overseas to present climate change-related research across a range of themes
- 2 Raise awareness of recently completed, current and future work programmes
- 3 Explore and encourage research that is conducted across multiple disciplines
- 4 Improve collegial relationships in a formal and informal conference setting
- 5 Identify 'who does what' in New Zealand's climate change community
- 6 Encourage student participation and increase their exposure to professional New Zealand-based colleagues and organisations
- 7 Help consider gaps in New Zealand's climate change research and explore future opportunities for New Zealand's climate change researchers.

Beyond the keynote speakers and panel discussions, conference attendees are invited to submit abstracts and deliver presentations (or posters) on recently completed or in-train research under the following themes:

- The Physical Science
- Impacts, Vulnerability & Adaptation
- Mitigation
- Integration & Cross-cutting Issues

Whilst the conference will primarily appeal to New Zealand's climate change research community it will also appeal to industry, government, NGO's and members of the public interested in the latest climate change research.

Please register for the conference at:
www.nzcccconference.org

We look forward to seeing you in Palmerston North at The New Zealand Climate Change Conference 2013. A climate change conference for climate change researchers and practitioners.

David Wratt
Director NZCCC & Conference Convenor

The NZCCC is a joint initiative by all of New Zealand's Crown Research Institutes, Massey University, the University of Canterbury and Victoria University of Wellington.

nzclimatechangecentre.org



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

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