

CONTENTS

VISG Co-ordinator's Note _____	1	Global Eruption Roundup _____	3
News _____	1	Media Coverage _____	3
Research Spotlight _____	2	Upcoming Events _____	3
Research Highlights _____	2	Contact _____	3

VISG CO-ORDINATOR'S NOTE

by Natalia Deligne

I'm excited to share with you the first quarterly newsletter of the Volcanic Impact Study Group (VISG) and our brand new logo. VISG, a subcommittee of the Auckland Lifelines Group (ALG), has been around since 2004 and continues to facilitate and support research on the impacts of volcanic hazards on lifelines and people, and the development of appropriate mitigation measures. This newsletter will showcase and document the latest volcanic impacts research in New Zealand. **News** and **Research Highlights** will touch on developments of the past quarter, and the **Research Spotlight** section will provide in-depth coverage of one of the many research

activities underway. In this edition, Rebecca Fitzgerald and George Williams from the University of Canterbury report back from their recent trip to Japan to learn more about volcanic ballistics impacts. The newsletter also has a **Global Eruption Roundup** featuring recent eruptions of note, a summary of **Media Coverage**, and list of **Upcoming Events** for the next four months. Please share the newsletter with colleagues, and get in touch with comments and suggestions.

Look forward to hearing from you!

NEWS

The **New Zealand Volcano Science Advisory Panel (NZVSAP)** met in August 2015. NZVSAP facilitates provision of authoritative, trans-disciplinary volcanic science advice integrated across agencies during a crisis, and leads collaborative planning and coordination for multi-agency science research response during volcanic events. It has Health, Agriculture and Lifelines sub-groups that provide technical volcanic-hazard specific advice and research as needed during unrest and eruptions. These sub-groups are also tasked with contingency planning for the way that this advice and research activity will occur during a crisis. At the August 2015 meeting NZVSAP recognised that pre-event planning and research related to volcanic impacts to lifelines continues to be coordinated through VISG as the national focal point. The NZVSAP Lifelines operational sub-group activates during eruptions and includes many of the scientists involved in VISG and will complement and apply VISG's pre-eruption work programmes. Consultation with MCDEM, National Lifelines and ALG (as VISG hosts) is on-going. Comments are welcome - get in touch with Tom Wilson (thomas.wilson@canterbury.ac.nz).

An online survey to assess the **volcanic risk perception of Aucklanders** was conducted by Canterbury University, GNS Science, Massey University and Auckland Council in March 2015; the final report is now available at <http://www.aucklandcouncil.govt.nz/EN/AboutCouncil/HaveYourSay/Documents/devorariskperceptionvolcanichazards.pdf>. The People's Panel (volunteering members of the public) were asked about their knowledge of volcanic hazards in Auckland, their information needs, preparedness, and intended behaviour before and during an eruption. Auckland Council will use survey findings to improve their public education and information campaigns, and to refine their response plans and procedures.

The **National Science Challenge – Resilience to Nature's Challenges (RNC)** was launched in June 2015. VISG researchers are involved in the Challenge.

Grant Wilson passed his PhD oral examination at the University of Canterbury. His dissertation is entitled *Vulnerability of critical infrastructure to volcanic hazards*, and will be referenced by VISG for years to come. Dr Wilson has been awarded just about every possible science degree at the University of Canterbury, including BSc, BSc (Hons), MSc and a PhD. Congratulations Grant!

VISG researchers gave four presentations at the international 26th **IUGG General Assembly** in Prague, Czech Republic in June 2015.

VISG researchers contributed to the **2015 United Nations Global Assessment Report on Disaster Risk Reduction**. The comprehensive report is now available in an open access electronic book entitled 'Global Volcanic Hazard and Risk' published by Cambridge University Press.

RESEARCH SPOTLIGHT

Ballistics impacts study trip to Japan

By Rebecca Fitzgerald and George Williams

In mid-July 2015 a collaborative ballistic impacts study trip to Japan was undertaken by the University of Canterbury and GNS Science.

Volcanic ballistic projectiles (fragments of lava or rock exploded from the volcano) are a major hazard to both life and infrastructure. They are amongst the most frequent causes of fatalities on volcanoes. Many New Zealand volcanoes produce ballistics, including Ruapehu, Tongariro and the Auckland Volcanic Field.

Our aim for this trip was to learn from the hazards and impacts of the Mt Usu and Mt Ontake eruptions and apply this knowledge to New Zealand volcanoes. Mt Usu erupted in 2000, ejecting ballistics which caused severe damage to many surrounding buildings, though fortunately no fatalities occurred due to successful warning and evacuation. Mt Ontake erupted in September 2014 and was very similar to the 2012 Te Maari, Tongariro eruption. This eruption occurred with little warning and 58 hikers were killed (55 as a result of ballistic trauma) and summit buildings were severely damaged. We collected field data, photographs and aerial imagery suitable for measuring the spatial and size distribution of ballistics and assessed impacts to ten buildings with varied construction materials.

We still have a lot of data to analyse, but initial lessons learned include:

1. Eruption vent locations were in different distinct locations from previous eruptions. This has implications for constructing hazard maps and applying mitigation measures;
2. People sheltering within huts on the summit survived, despite some rocks penetrating the roofs. Sheltering inside a building or protective structure may be your best chance to survive ballistic hazards;
3. Protective measures such as placing hiking bags on heads and taking shelter saved lives from small ejecta and shrapnel,



George Williams examining ballistic impacts to Toyako Kindergarten, 600 metres from the vent of the 2000 Mt Usu eruption.

nel, reinforcing the idea to use any form of protection available when exposed to ballistics hazards;

4. Reinforced concrete was one of the most effective building materials to prevent penetration by ballistics. However, if ballistics had sufficient energy to partially penetrate the reinforced concrete, they generated hazardous concrete shrapnel inside buildings. Consequently, even when sheltering inside a building or structure, protect yourself behind as many layers and/or objects as possible.

Continued quantitative analysis of this data will be crucial to inform hazard maps, warning signage and construction of structures within hazardous areas.

Participants included Rebecca Fitzgerald, George Williams and Dr Ben Kennedy (UC), and Dr Graham Leonard (GNS Science), in collaboration with Dr Kae Tsunematsu (Mount Fuji Research Institute), Professor Hiromu Okada, Professor Koshun Yamaoka (Nagoya University), and Shinji Takarada (GSJ). The trip was funded by EQC, UC Mason Trust, GNS Science and Determining Volcanic Risk in Auckland (DEVORA).

RESEARCH HIGHLIGHTS

VISG researchers took an **impacts trip to Japan** to learn more about ballistics impacts – see research spotlight for details.

VISG, DEVORA, and Economics of Resilient Infrastructure (ERI) researchers are working on an **Auckland Volcanic Field scenario** which begins where Exercise Ruaumoko ended. The “Mt Ruaumoko” scenario will allow exploration of the potential short and long term consequences of a local Auckland eruption.

VISG researchers met with United States Geological Survey and University of Hawai’i personnel in **Hawai’i** in June 2015 to learn about lava flow and volcanic gas hazard management techniques.

PhD candidate Daniel Blake (University of Canterbury) attended the **International Evacuation Modelling and Management Conference** in Tainan, Taiwan, in June 2015, to better inform his upcoming modelling of Auckland evacuations during volcanic crises.

GLOBAL ERUPTION ROUNDUP

By Josh Hayes

Over a dozen volcanoes are currently erupting around the world. Here are highlights from a few notable eruptions of the past quarter.

Raung Volcano – East Java, Indonesia

Raung Volcano has received considerable media attention over the last few months due to the impact it has had on airline travel to and from the popular tourist destination of Bali. Hundreds of flights have been cancelled, the worst phase coming in the middle of the peak tourist season (mid-July). Going to press, Raung Volcano is still erupting and showing signs of increasing activity, and has again caused the delay or cancellation of flights.

Colima Volcano – Western Mexico

An explosive eruption phase at Colima Volcano in mid-July prompted the closure and evacuation of areas within 12 km of the volcano for 1 week. This resulted in about 800 evacuees, some of those being housed in emergency evacuation centres. Explosive activity at the volcano has since ceased, with just the occurrence of an almost stagnant lava flow on the southern side of the volcano remaining.

Manam Volcano – Papua New Guinea

The eruption of Manam Volcano on the 31st July 2015 resulted in 1-2 cm of volcanic ash depositing on Manam Island. Officials who visited the island expect that there will be respiratory problems within the population arising due to the ash concentrations. Clean water supply is reported to be a problem, and many 'food gardens' were destroyed which has raised concern about a food shortage on the island.

MEDIA COVERAGE

Ballistics research using cannons and catapults at the University of Canterbury was the subject of an Our Changing World piece by **Radio New Zealand**, available online at <http://www.radionz.co.nz/national/programmes/ourchangingworld#audio-201764714>

UPCOMING EVENTS

The **Volcano Science and Risk Management** Workshop in honour of the 20th anniversary of the 1995-96 Ruapehu eruptions, the 40th anniversary of the 1975 Ngauruhoe eruption, and the 70th anniversary of the 1945 Ruapehu eruption will be on **14 August** at Whakapapa Village, with associated activities 13– 16 August. Contact Daryl Barton (d.barton@gns.cri.nz) to register and for more information.

The annual **Volcano short course** will be in Auckland on **8 – 9 September** at Mercure Hotel with optional field trip to Rangitoto on 10 September. Visit <http://www.gns.cri.nz/Home/News-and-Events/Events/Volcano-short-course> for more information.

The annual **DEVORA forum** will be at the University of Auckland on **12 November**. Contact Elaine Smid (e.smid@auckland.ac.nz) for more information.



CONTACT

Dr. Natalia Irma Deligne

Volcanic Hazard and Risk Modeller
GNS Science - Te Pu Ao
PO Box 30368
Lower Hutt 5040
New Zealand

Email: N.Deligne@gns.cri.nz
Tel: +64 4 570 4129
Fax: +64 4 570 4600

