NHRP

Natural Hazards Research Platform

Contest 2012

Mātauranga Māori for volcanic hazard

Leader: Jonathan Procter
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Natural Hazards Research Platform – Contest 2012

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FINAL REPORT

Mātauranga Māori for volcanic hazard

Dr Jonathan Procter (Massey University)

Abstract: The project, *He haerenga mōrearea - A hazardous journey: Exploring mātauranga Māori for assessing volcanic hazards and improving monitoring approaches and iwi/hapū planning*, is completed and the research objectives have been fulfilled. The project has built capacity and capability within Ngāti Rangi Trust to the extent that the Trust are now formulating and leading their own research. The research has developed, and is continuing to develop, culturally appropriate methods for understanding and monitoring volcanic hazards from Ruapehu, based on cultural indicators from sites that are important to Ngāti Rangi. The project has also assisted the iwi in developing methods to better record and articulate their knowledge on volcanic activity. The methods developed in this process and the outcomes have been internationally recognised. Within New Zealand, the research is becoming an example of exploring mātauranga Māori and te reo for applied science and developing new methods for working in partnership with iwi.

Keywords: *mātauranga Māori, volcanic hazards, kaupapa Māori*

Introduction / Background

Many indigenous cultures have traditionally occupied fertile, active volcanic areas. In New Zealand, Māori would have observed and monitored, as well as responded to and recovered from, numerous hazardous (volcanic) events during the last ~800 years. The knowledge or mātauranga gained from these experiences is rarely considered when scientifically identifying volcanic hazards, yet mātauranga Māori does contain a unique, valid epistemology and data source. This research will apply a solution to this disparity by extracting and combining portions of both Māori and western science within an applied spatial context, utilising both scientific and kaupapa Māori frameworks. The question we will answer in this research is: can 21st Century technology also amplify mātauranga Māori of volcanic hazard identification and monitoring to boost innovation in hazard research, as well as iwi responsiveness and resilience?

Objectives or Research Aims

Objective No. 1

Mātauranga Māori for volcanic hazard

The research will identify and document mātauranga Māori (knowledge) and Māori values using examples of volcanic landscapes. This will be carried out through determining a set of key mātauranga based cultural indicators for assessing risk and change. These data can then be used and validated as indicators for long-term volcanic hazard monitoring, risk assessment and management planning, iwi / hapū management plans, and adaptation strategies and actions.

Deliverables:

- Develop a natural hazard and emergency management plan for iwi (Ngāti Rangi)
- Submit a report to the CDEM emergency management group on the Ngāti Rangi emergency management plan
- Submit manuscripts to peer reviewed journals on:
    - Methods to identify and record mātauranga Māori for volcanic landscapes
    - Indigenous methods of hazard management.

Budget: $270,000 (excl GST)

Objective Achieved? Yes

Discussion

The research project has been a resounding success from a number of perspectives and has achieved more than expected. Outputs have been published on the methods created as part of this research, and we have also assisted Ngāti Rangi in developing their own emergency management and risk awareness strategies. The research has also been hugely successful in developing applied, Ngāti Rangi-specific solutions that incorporate their mātauranga. The project has seen the relationship between Ngāti Rangi and Massey University grow and the research we have done together has become nationally recognised as a model of successful, mutually beneficial collaboration between scientists and iwi, to the extent that Massey University has received funding from MBIE's Vision Mātauranga Capability Fund to strengthen the relationship further and expand on work initiated in this project. The research has also paved the way for better relationships between GNS Science, the Department of Conservation (DOC) and Ngāti Rangi in regards to volcano monitoring and kaitiakitanga. Ngāti Rangi has also become a source of hazards information, whereby other organisations (e.g. The Ati Hau Corporation) are approaching them for hazards information and data.

The research was split into five main streams of work, based on the needs of Ngāti Rangi and developed through hui/wānanga and regular meetings with Ngāti Rangi key researchers:

1. Assistance in developing methods to record cultural volcanic data

Outcomes: A GIS system has been developed through this project to record spatial cultural data. The system is being used (daily) by Ngāti Rangi in the management of the volcano. Ngāti Rangi staff have attended GIS workshops and conferences to present their work.

2. Development of tools and sensors to monitor cultural sites of volcanic importance

Outcomes: Ngāti Rangi Trust has installed (in partnership with WPI, Horizons Regional Council and Massey University) two pH sensors at traditional locations on the Whangaehu River and a web camera on the Dome Shelter/Crater Lake to monitor the volcano for Ngāti Rangi (http://www.ngatirangi.com/new-page-5.aspx). This has led to greater awareness by Ngāti Rangi of the processes currently used to monitor the volcano and better working relationships with DOC and GNS Science.

3. Building awareness of volcanic hazards through management planning and education

Outcomes: Project team members have assisted Ngāti Rangi to develop an education programme for its kohanga and kura on volcanoes and hazards. The methods developed for this educational technique have been published in the *Journal of Applied Volcanology* and have gained international attention from other parts of the world that struggle with communicating with indigenous populations (e.g. South America, Canada). Ngāti Rangi has also developed and implemented a Taiao Management Plan (iwi environmental management plan; http://www.ngatirangi.com/taiao-management-plan.aspx) that has a section focused on volcanic hazard management.

4. Development of research capability and capacity amongst Ngāti Rangi Trust staff members

Outcomes: Ngāti Rangi staff have attended national and international conferences and workshops on volcanic hazards and presented research papers. As a result of this project, Ngāti Rangi staff member Ms Hollei Gabrielsen is completing a Masters of Science degree at Massey University and another Ngāti Rangi person is also undertaking postgraduate study at Massey University in Earth Science.

5. Exploring mātauranga Māori and te reo surrounding volcanic traditions

Outcomes: The research has produced a book chapter for an NZQA-sponsored publication on mātauranga Māori. Another book chapter has been solicited on communicating hazard information to indigenous peoples, which is in draft, and another manuscript for an international journal is in draft.

While the research has very successfully fulfilled its objectives and has provided Ngāti Rangi with practical solutions to natural hazards and emergency management, this project has also

developed some unique methodologies to communicate scientific and hazard data to Māori, as well as methods to develop better relationships between scientists and iwi managers/leaders. These methods have not only strengthened the relationship between government agencies, CRIs and iwi, but they have also paved the way for a new area of research. This new area of research, valuing mātauranga Māori, has developed into a major programme in an upcoming National Science Challenge and has spawned a number of new research areas between Māori, hazards and science. This success of this research, and the relationships strengthened through it, has attracted MBIE Vision Mātauranga Capability Fund funding to work with Ngati Rangi and other iwi to expand the use of environment sensors and monitoring techniques, as well as remotely sensed data, to increase their capacity to monitor their rohe or environment.

One of the greatest successes of the project has seen Ngāti Rangi increase its research capacity by having more of its people undertake postgraduate research in the area of Earth Science and Emergency Management, as well as become a central point for environmental and hazard data and information. Requests for information have been made by DOC, Horizons Regional Council and The Ati Hau (Farming) Corporation. Ngāti Rangi has also benefited through the development of stronger linkages to government agencies on emergency management, as well as started on a process of internally constantly refining their communication systems (phone chains, websites, hui) for emergency management and ensuring their people and marae are ready for the next event.

The research has many applied aspects that have built capability and capacity with Ngāti Rangi to enhance their ability to participate in natural hazard research and emergency management, particularly through the iwi developing their own methods to become better involved in emergency management decision making processes and being more prepared.

Outputs

Publications

Published

Procter, J.N., Black, H., 2014: Mātauranga-ā-iwi - He Haerenga Morearea: exploring the indigenous knowledge behind New Zealand's active and hazardous volcanic landscapes. In: Black, T., Nuku, W. (eds) Mātauranga Māori and Global Indigenous Knowledge. New Zealand Qualifications Authority, Wellington.

Accepted

Pardo, N., Wilson, H., Procter, J., Lattughi, E., Black, T., in press: Bridging Māori indigenous knowledge and western geosciences to reduce social vulnerability in active volcanic regions. Journal of Applied Volcanology.

In preparation

Procter, J., Rainforth, H., Gabrielsen, H., Black, T., Harmsworth, G., Pardo, N., in preparation: Building resilience to volcanic hazards for indigenous cultures: a case study of Māori from New Zealand.

Rainforth, H., Wilson, C., Procter, J., Gabrielsen, H., Black, T., Harmsworth, G., Pardo, N., Opening shut doors: reflections from an indigenous community on volcanic event management and communications. In: Bird, D., Fearnley, C., Haynes, K., Jolly, G., McGuire, B. (eds) Observing the Volcano World: Volcano Crisis Communication. Springer.

Presentations

Conference Abstracts and Presentations

Pardo, N., Wilson, H., Procter, J., Lattughi, E., Black, T., 2014: Bridging Indigenous Māori knowledge and Geosciences through multidisciplinary arts in Aotearoa (New Zealand). IAVCEI Cities on Volcanoes 8, Yogyakarta, Indonesia, September 2014. cov8-abs-197

Procter, J., Rainforth, H., Gabrielsen, H., Black, T., Harmsworth, G., Pardo, N., 2014: Building resilience to volcanic hazards for indigenous cultures: a case study of Māori from New Zealand. IAVCEI Cities on Volcanoes 8, Yogyakarta, Indonesia, September 2014. cov8-abs-379

Procter, J., Rainforth, H., Black, T., Harmsworth, G., 2013: Methods to communicate volcanic hazards information to indigenous cultures: a case study of Māori from New Zealand. Abstract in: International Association of Volcanology and Chemistry of the Earth's Interior 2013 Scientific Assembly, Kagoshima, Japan, 20 – 24 July. Abstract: 3W_4G-P4, pp. 1245.

Rainforth, H., Procter, J., Black, T., Harmsworth, G., Pardo, N., 2012: Exploring indigenous knowledge for assessing volcanic hazards and improving monitoring approaches. Cities on Volcanoes 7, Colima, Mexico, November 2012, 1C4.4-3.

Presentations to End Users

Black, T., 2013: Hui at the Ōtenuku marae in Ruātoki on 1-2 February 2013 on Mātauranga Māori, with a focus on creating linkages with iwi of Ngāti Awa, Tūhoe, Whakatōhea and Te Whānau a Apanui regarding Whakaari (White Island) and building sustainable whānau, hapū and iwi management plans for Whakaari volcanic activity.

Black, T., 2013: Presentation at Tauranga Moana on 11 Feb 2013 to Tauranga Moana Education Teacher Training Programme regarding mātauranga Māori.

Black, T., 2013: Seminar at Whakatāne Te Whare Wānanga o Awanuiārangi on 24 May 2013 on the topic of mātauranga Māori.

Black, T., 2013: Two presentations at marae wānanga in Ruātoki at the Ōtenuku marae on 4th January and 18-20 January 2013. In both presentations, Professor Black introduced and explored Mātauranga Māori connected to volcanic hazards, as well as Te Reo.

Black, T., 2013: Two presentations to hui by Awanuiārangi Whakatāneare on Tāiao Mātauranga: Vision Mātauranga. 21-22 July 2013.

Gabrielsen, H., Bennett, A., 2013: Presentation at a Ngāti Rangi hui-a-iwi at the Tirorangi Marae on 20 October 2013.

Procter, J.N., 2013: Presentation at a Ngāti Rangi hui-a-iwi at the Ngā Mokai Marae on 10 March 2013.

Procter, J., Gabrielsen, H., 2013: Mātauranga Māori and Volcanic Hazards. Presentation to the Manawatu-Whanganui Civil Defence Emergency Management Group in Whanganui, 4 July 2013.

Procter, J., Gabrielsen, H., Bennett, A., 2014: Presentation to Ngāti Rangi Whangaehu Catchment Group hui in Ohakune on 25 July 2014.

Procter, J.N., Harmsworth, G., Black, T., Pardo, N., 2012: Hui with Ngāti Rangi at the Kuratahi Marae near Taihape on 14 October 2012. The purpose of the hui-a-iwi was for the project team to introduce the project and develop appropriate tikanga.

Invited Presentation

Black, H., 2013: Exploring Mātauranga Māori (Māori Knowledge), volcanic hazards and ways for improving tribal planning. Presentation to First Nations Studies, First Nations Centre at the University of Northern British Columbia, 27 July 2013.

Reports

Black, H., 2013: Mātauranga Māori and Volcanoes. A report for Nga Pae O Te Maramatanga from Massey University, Palmerston North, New Zealand. 22p.

Masters Research

In progress

Gabrielsen, H., Methods to measure resilience in Indigenous communities; A case study from Ngāti Rangi, New Zealand. Massey University, Palmerston North, New Zealand.

School Visits

Pardo, N. 2012-2013: Teaching and learning activities with Te Kura o Ngāti Rangi in Ohakune

- Workshop 1: Origin of the Universe, Solar System and Earth structure/ Te Kore, Papatūānuku, Te Po, te Ao. 14 April 2012

- Workshop 2: Earth Structure, tectonic plates, earthquakes and volcanoes / Ruaumoko. 24 July 2012
- Workshop 3: The rock's cycle / Ruaumoko. 18 September 2012
- Workshop 4: Magma, crystals, volcanic eruptions / Ruaumoko. 10 May 2013
- Workshop 5: Summary and introduction to volcanic products. 12 August 2013

Waiata

"Ko Matua te Mana", a waiata composed by the children of Te Kura o Ngāti Rangi and Matiu Te Huki, following the workshops with the research team.

Co-funding

Direct cash

- Ngā Pae o te Māramatanga Summer Internship 2012-2013 ($5,000)
- Massey University contribution to monitoring equipment ($3,300)
- Massey University Research Fund ($13,310)

In-kind

- Horizons Regional Council's contribution to monitoring sensors installation – Whangaehu River pH monitoring gauge, Crater Lake Camera, Tokorangi Marae Stage Gauge (approx. $5,000)

End-Users

- Ngāti Rangi Trust
- Ngāti Rangi Iwi
- Horizons Regional Council
- Horizons CDEM group
- WPI (Ernslaw One Ltd)
- Department of Conservation

Conclusions & Recommendations:

This research into understanding indigenous knowledge of volcanic hazards has been the first of its kind. The research has been successful and fulfilled its objectives and deliverables, with the production of manuscripts in internationally relevant journals and book chapters that are becoming recognised internationally. Throughout the course of the research we have developed the capacity and capability of Ngāti Rangi by encouraging iwi researchers to lead and develop research ideas and apply for additional research funding. One of the greatest achievements of the research has been the improvement in the relationship between DOC, Horizons Regional Council and GNS Science with Ngāti Rangi, where they are actively all working together to find solutions to make the community more resilient in the face of natural hazards. Ngāti Rangi, as part of this research, has made a proactive step to make their people and marae more aware of natural hazards and more prepared. This internationally recognised research has also opened the door to many new research questions that will be the basis for research programmes for years to come.

Acknowledgements

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