

ID: 79

Integrating Active-Learning and the Protective Action Decision Model to Motivate Household Volcanic Risk Reduction and Action

Brittany D Brand, Ashley Bosa

Hazard and Climate Resilience Institute and the Department of Geosciences, Boise State University, Boise, Idaho, USA

Adopting household preparedness to natural hazards represents a critical step toward building resilient communities. However, despite the efforts of stakeholders who provide hazard preparedness recommendations to the public, the level of disaster preparedness worldwide remains low. To address the need to find education strategies that motivate protective action, we integrate active learning and tenets of the Protective Action Decision Model (PADM) into hazard education workshops co-developed by local emergency managers and scientists. We focus on actively engaging participants in a way that helps them better understand the topic hazard, personalize their household risk, and develop positive attitudes toward taking mitigation and preparedness actions, the latter of which the PADM suggests is the strongest predictor of intention to act. Workshops finish with goal-setting strategies that direct participants to set reasonable, measurable, and achievable goals. Our workshops thus far include wildfire and earthquakes; pre- and post-workshop evaluations indicate increased self-efficacy and intention to take protective action. In this presentation, we share ideas for adapting this approach to volcanic risk with details of an ongoing collaboration with the Cascade Volcano Observatory and emergency managers to create a participatory volcanic risk workshop with residents at risk from Mt. Hood Volcano, Oregon (USA).

ID: 274

Mountain Aglow: Evaluation of a novel co-created science and arts-based exhibit to communicate volcanic risk on the island of Montserrat

James Christie¹, Jenni Barclay¹, Karen Pascal², Teresa Armijos³, Kathleen Retourné⁴

¹*School of Environmental Sciences, University of East Anglia, Norwich United Kingdom*

²*Montserrat Volcano Observatory, Montserrat*

³*School of Geosciences, University of Edinburgh, Edinburgh, United Kingdom*

⁴*No affiliation*

Disaster risk reduction initiatives are increasingly understood to be enhanced by co-creation and local experiential knowledge of environmental risks. Here I discuss 'Mountain Aglow', a collaboration between UK- and Montserrat (Eastern Caribbean)-based volcanologists and artists, with participation from Montserratian public authorities and individuals. This co-created science-/arts-based volcanic risk communication project sought to entwine scientific information with knowledge relating to the lived experience of the eruption of the Soufrière Hills Volcano. The project had three aims: 1) enhance the repertoire of disaster risk education (DRE) resources available to local disaster managers; 2) increase the relevance of, and subsequent engagement with, DRE materials by the public by encouraging experience sharing and story-telling; 3) gain insights into how the co-creation process may benefit both the typical recipients of risk communications (i.e., the public), as well as those who tend to issue communications (i.e., scientists, authorities), via co-learning. We created a multi-media exhibit, consisting of a pyramidal structure presenting information panels, and an audio and light installation ('FLOW'), together showcasing both scientific information on volcanic risk and numerous songs, poems, and stories about life with the volcano. This exhibit was accompanied by a website, and resulted in a follow-on initiative, Mountain Aglow Junior which was geared toward engagement with primary school-aged children. An essential aspect of any public engagement initiative is the evaluation of its success and the identification of opportunities for improvement. Here we introduce the project and provide an evaluation and reflection on the success of the project itself and the co-creation process on which it was built.

Does everyone know of volcanic risk?: Communicating via inclusive and accessible Warning Systems so that everyone can understand

Carina J. Fearnley¹, Rebekah Yore², Maureen Fordham², and Ilan Kelman³

¹ *UCL Warning Research Centre, Department of Science and Technology Studies, University College London, UK*

² *Institute of Risk and Disaster Reduction, University College London, UK*

³ *Institute of Global Health and Institute of Risk and Disaster Reduction, and UCL Warning Research Centre, University College London, UK*

Designing and implementing inclusive Early Warning Systems (EWS) for vulnerable populations in volcanic areas requires careful consideration of the distinct needs and abilities of diverse groups to prepare for and respond to disasters. Exclusion of certain groups from the warning notification process can result in adverse consequences, particularly for marginalized communities, which may already be at heightened risk during volcanic disasters or emergencies. For example, persons with disabilities require notifications in accessible formats, such as through audio or visual alerts or assistive technologies. Similarly, addressing the needs of women and girls requires safe spaces for women, trained responders' gender-based violence and gender-sensitive notification. By promoting equity and mitigating vulnerability, inclusive EWS can help to safeguard lives, decrease the impact of volcanic hazards on communities, and foster long-term resilience.

This presentation highlights key lessons and areas of good practice for inclusive, accessible EWS from the recent report 'Designing Inclusive, Accessible Early Warning Systems: Good Practices and Entry Points' (World Bank GFDRR, 2023). Using the four key elements of effective end-to-end EWS, key entry points are presented. Key findings that enhance existing volcanic warnings are: 1) engage diverse communities and stakeholders from the beginning; 2) integrate iteration and adaptive learning; and 3) support initiatives and activities that create an enabling environment. Evidence demonstrates that practical and contextually tailored approaches to designing and implementing inclusive warnings has more effective outcomes and reaches more-diverse populations than one-size-fits-all models.

Geoheritage for Resilience – a community-focused UNESCO International Geosciences Programme Project for risk communication

¹Benjamin van Wyk de Vries, ²Marie-Noëlle Guilbaud, ³Maria del Pilar Ortega Larrocea, ³Fernanda Martínez Balez Tellez, ⁴Selene Eridani Zaragoza, ¹Claire Shires, ⁴Silke Cram, ⁶Julie Morin, ⁷Nelida Manrique, ⁷Rigoberto Aguilar, ⁸Eveling Espinosa, ⁸David Chavaria ⁸William Martinez, ⁹Miruts Hagos, ¹⁰Mahar Lagmay, ¹⁰Joy Santiago, ¹¹Naomi Irapta, ¹¹Viktor Vereb. ¹²Vladyslav Zakharovskyi, ^{12, 13}Karoly Nemeth

¹*Univeristé Clermont Auvergne, France*, ²*Instituto de Geofísica, Universidad Nacional Autónoma de Mexico (UNAM)*, ³*Instituto de Geología, Universidad Nacional Autónoma de Mexico (UNAM)*, ⁴*Insitituto de Géografía, Universidad Nacional Autónoma de Mexico (UNAM)*, ⁵*Univeristé Clermont Auvergne, France*, ⁶*University of Cambridge*, ⁷*Instituto Geológico, Minero y Metalúrgico del Peru*, ⁸*Instituto Nicaragüense de Estudios Territoriales*, ⁹*Mekel'le Univeristy, Tigray*, ¹⁰*University of the Philippines Resilience Institute*, ¹¹*Eötvös Loránd University, Budapest*, ¹²*Massey University*, ¹³*Saudi Geological Survey*

UNESCO IGCP Project “Geoheritage for Resilience” has, since 2019, initiated communication projects around the world. We have shared good practice, problems and ideas over the globe with webinars, social media chats and in person meetings. The fundamental concept of the project is to use sense of place and sense of identity through geoheritage communication promoting resilience. This programme has helped scientists to grow closer to their communities and communities to strengthen themselves. Partnerships on the touristic 'Ruta de Sillar' in Peru have helped locals with economic and legal security, while consolidating the volcanologists' message. In Nicaragua, we have co-built UNESCO global geopark/World Heritage projects with local communities and engaged in participatory science. In Mexico, we have mixed disciplines to work on the full range of natural heritage, supporting ecosystem services, recycling, circular economies and cultural well-being. In the Philippines we have worked with citizen science during eruptions and floods. In Ethiopia we have worked with nomadic people in harsh volcanic terrain. In New Zealand and the SW Pacific work has shown the need to incorporate Geoheritage in to Geohazard programmes. We'll outline the main communication philosophy of the project which is to engage with local projects and local people to use geo(bio)heritage to bring all actors to work together to improve resilience through empowerment – making locals more able to act and giving the scientist a simpler voice and a meaning to their work.

Outreach and engagement strategies for scientific divulgation in volcanic areas: the Galeras and the Ánimas Volcanic Complexes study-cases, Colombia

Silvia Castilla¹, Ana María Correa-Tamayo², Sandra López², Luisa Acosta², Santiago Villamil², Mauricio Tamayo², Indira Zuluaga², Yeni Cruz-Toro², Diego Palechor², Santiago Villota², Laura Villamil², Andrés Hamon²

¹*University of Toronto, Toronto, Canada*

²*Servicio Geológico Colombiano, Bogotá, Colombia*

Volcanologists are responsible for communicating geoscientific knowledge accurately and effectively, especially when our studies intend to have a favorable impact on communities surrounding volcanoes. For this reason, and looking forward to transferring this knowledge, we created pedagogical strategies to translate geological data into more accessible information for people not working in the Earth Sciences field.

These strategies are planned to be applied in two scenarios organized by the volcanoes geology team of the Colombian Geological Survey: 1) in socialization campaigns toward communities near the Galeras volcanic complex, where we worked on updating the geological map and the stratigraphy from 2017 to 2022, and 2) in social appropriation campaigns in the Las Animas volcanic complex area, a new project we have been working on since 2022. For both, we presented infographics, cartoons, posters, and pedagogical activities that enabled us to foster dialogues between scientists and communities. Additionally, we developed activities to receive feedback from the public to evaluate if the information received was seized. Our final objective with these strategies is to facilitate the social appropriation of knowledge by political actors and communities so that in the future, this information can be replicated by the communities to promote geo-tourism, know the territories, and understand the volcanic phenomena that will occur if any of these volcanic complexes erupt.

The eruption of the Tungurahua volcano (1999-2016), Ecuador: Communication and Community-based Monitoring Network.

Patricio Ramón¹, Patricia Mothes¹, Silvia Vallejo¹, Hugo Yepes¹

¹ *Instituto Geofísico, Escuela Politécnica Nacional, Ladrón de Guevara E11-253 y Andalucía, Quito, Ecuador*

During the eruption of Tungurahua volcano in Ecuador (1999-2016), the Volcanic Observatory of the Instituto Geofísico de la Escuela Politécnica Nacional (IGEPN) had the additional responsibility of communicating about the evolution of the volcano's activity, mainly directed to the community at risk, those living close to the volcano, as well as to the local and national authorities, Civil Defense and the media. Starting in 2000, with the objective of having more and better visual observations of the volcanic eruption, the IGEPN organized a network of volunteer observers, later known as "Vigías", members of the communities subject to the eruption threats and who were also the recipients of the information that originated in the IGEPN Observatory and that finally reached their communities. It should be emphasized that this Network of "Vigías", in addition to functioning as a communications channel, definitively contributed to the endangered communities with their knowledge of the volcano and its activity, and helped them to substantially improve their preparedness actions for the eruption, in this way the "Vigías" and their communities became active elements of the early warning system that worked successfully during the crisis and finally, through that knowledge and actions, they became a resilient community. Numerous lessons can be drawn from these experiences in community-based monitoring and communication, but most of all it should be considered that they have been very important and definitely contribute to the disaster risk reduction (DRR).

ID: 726

Following in the footsteps of the Kütralkura Giants: a collaborative project to address and build resilience to volcanic hazards in Chile.

María Angélica Contreras Vargas^{1,2}; Carolina Geoffroy³; Sofía Vargas^{4,5,6}; Gabriela Pedreros¹; Teresa Venegas⁷; Gabriela Tascon²

¹ *Red Nacional de Vigilancia Volcánica - Sernageomin, Chile*

² *Geoparque mundial UNESCO Kütralkura*

³ *Xterrae Geología*

⁴ *Centro de Excelencia en Geotermia de los Andes*

⁵ *Facultad de Ciencias Físicas y Matemáticas Universidad de Chile*

⁶ *Eidgenössische Technische Hochschule Zürich*

⁷ *Liceo Bicentenario Polivalente*

Developing effective and long-term risk communication strategies is one of the key challenges facing volcano observatories around the world. At the same time, it is well documented how social, gender, cultural and economic factors make women more vulnerable to geological hazards. This complex scenario is observed in Chile, a country with more than 90 active volcanoes.

In the Chilean region of Araucanía, where the Volcano Observatory is located, 28.3% of the population is rural, 53.8% is female and 31.3% is indigenous. Araucanía also has the lowest income in the country and is home to three of the most active volcanoes.

In this context, a transdisciplinary group of women from different Chilean institutions is developing the project "Following in the footsteps of the Kütralkura Giants". The initiative aims to carry out actions to reduce the volcanic risk in this region by co-designed a volcano exploration guidebook with/for young female population" (Kütralkura is the name of the UNESCO Global Geopark).

The pillars of our project are the gender perspective and the recognition of different knowledge systems. In this sense, the guide integrates both geological information and indigenous/local knowledge.

In 2023, several workshops and a four-day fieldtrip were conducted with the participation of women scientists (social and volcanologists), 36 girls and teachers from local schools, indigenous women who have been witnesses of recent eruptions. The result of this exchange of knowledge is a collaborative book guide to understanding volcanic hazards and building resilience, especially among the most vulnerable populations.

ID: 600

Improving risk communication using VolFilms videos and photo collection resources provided by the Smithsonian's Global Volcanism Program

Edward Venzke, Benjamin Andrews, Janine B. Krippner, Sarah Brown

Global Volcanism Program, Smithsonian Institution, Washington DC, USA

Photos and videos are frequently included in broader volcanic risk communication strategies to improve knowledge of specific hazards. Comprising over 5,000 volcano photos organized in topical and volcano-specific galleries, and more than 8,500 images included in activity reports, the collection provided by the Smithsonian's Global Volcanism Program (GVP) is a reliable free resource that can be utilized by researchers, communities, and decision-makers. Curated galleries are structured to align with VolFilms topics for volcanic hazards and processes, impacts, and experiences videos.

The entire collection of VolFilms (120 videos) is available through the GVP website. A recent collaboration between GVP, the U.S. Geological Survey, U.S. Agency for International Development, and Bristol University produced additional videos. These cover Volcano Monitoring, Health Hazards of Volcanic Ash, Debris Avalanches and Landslides, and Human Experience: Lava Flows, each in eight language versions (US English, UK English, Spanish, French, Italian, Indonesian, Tagalog, Japanese).

Photo captions have been professionally reviewed, evaluated for topical galleries, and assigned keywords. Additional galleries present volcanic types and features, satellite imagery, and specific photographers. Almost 150 keyword galleries provide supplement the broad topical collections. High-quality photos were recently solicited from currently active volcanologists and professional photographers.

Understanding the complexity and variety of volcanic and other natural hazards is challenging, for both professionals and the public. It is hoped that these visual resources will be combined with other material and used in a wide variety of future efforts to make risk communication more effective.