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# Volcanic Crisis Communication: Where Do We Go from Here?

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This volume brings together a wealth of undocumented knowledge and first hand experience to provide a platform for understanding how volcano crises are managed in practice, with contributions from authors all over the globe ranging from observatory volcanologists and scientists, government and NGO officials and practitioners, the insurance sector, educators, and academics (multiple disciplines), and last but by no means least, vulnerable and indigenous populations. These diverse contributions have provided valuable insights into the various successes and failures of volcanic crises. This final chapter seeks to summarise the key contributions to identify trends and determine the vital future

directions for volcanic crisis communications research.

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## 1 Observing the Volcano World

Each part of the volume has explored three key themes: (i) the need to understand the multiple hazards involved in a volcanic crisis; (ii) lessons learned from past crises; and (iii) the tools available for effective communication during a crisis. There are a number of overarching lessons which are discussed below.

### 1.1 Managing Individual Hazards During a Crisis

Volcanic activity is unique in having a particularly large and diverse portfolio of associated phenomena capable of causing death and injury, societal and economic disruption, and damage to population centres and attendant infrastructure. These hazards vary in scale geographically from those proximal to the volcano, to those that can affect the regional or global climate. Many of these hazards occur during volcanic eruption, but some can occur during times of unrest, or even quiescence. Volcanoes present the ultimate natural hazard challenge with multiple hazards often occurring at the same time requiring bespoke decisions, actions, and warnings for at-risk communities. Given this diversity a ‘one size fits all’ approach does not provide the most effective means of addressing the communication

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of volcanic hazards. Although general principles apply, this generally requires that information is adapted or tailored for the particular hazard in addition to considering the local dynamics of vulnerable communities that need to respond to these warnings. The chapters in Part One of this volume demonstrate how this approach may be utilised successfully to tackle a variety of specific hazards whilst at the same time maintaining trust. The challenge remains that with many people already leading complicated lives, the need to deal with several warnings for just one volcano poses the threat that populations will not engage. Here adopting a range of communication tools appropriate to the particular context can assist in not only communicating the hazard, but also in fostering relationships that provide additional monitoring data and warning information.

## 1.2 Lessons Identified from Crises Observed

Fundamental lessons have been learnt from a number of volcanic crises. Often these lessons have been learnt the hard way with many relatively minor volcanic events leading to tragedy. It is clear that transparency and solid relationships with stakeholders lead to the success of volcano monitoring and crisis management initiatives. Whilst poor relations may initially prevail, they can be rebuilt over time, through open lines of communication. However, operating in areas of political and social instability presents significant problems in terms of stakeholder collaboration and also partnership with vulnerable communities focused on more pressing concerns to their daily security. Conflict can also emerge amongst those directly responsible for volcanic crisis management; blame and conflict between competing scientific groups in particular, have the potential to be highly disruptive. Frequently this type of conflict is the result of adopting unclear or exclusive protocols. To avoid or ameliorate this situation the use of mediators can be highly successful and should be encouraged where appropriate.

Countries have differing approaches as to whether they integrate the physical and social sciences. Often a barrier is thrown up between these two worlds, with little willingness to breach this divide, or to unite it. In countries where the social and physical perspectives of the volcano are integrated, meaningful communication that adapts over time is developed facilitating a more holistic and robust programme of management that benefits both sides of the divide. Yet, many countries (largely Western) seek to maintain two separate and distinct perspectives. The chapters from Part Two demonstrate that sharing knowledge and experience is important to successfully address any new crisis as long as this is done in a transparent, sensitive manner, and with humility. The best results occur when this is conducted well before a crisis and ensuring that all aspects of risk are addressed; particularly work that reduces underlying vulnerabilities and builds the capacities of the local population, responsible stakeholders and institutions. It is hoped that in time, barriers can be eroded and there can be more scope for discussion, deliberation, and integration of multiple perspectives. It can be done; we only have to look at the successful examples of Mt Pinatubo (1991) and Merapi (2010) to appreciate this. Learning new perspectives, languages, and disciplines requires significant effort and parties on both sides need to have patience and willingness to facilitate this growth.

## 1.3 Understanding the Role of Communications

A wide range of communication tools cut across the various stakeholders, disciplines, policies, and hazards associated with volcanic crises. Many have been used for centuries; centred around simple forms of communication and collaboration. Indigenous populations today still provide valuable insights that can assist in the management and communication of volcanic crises. There have been some particularly successful examples whereby partnerships between

indigenous populations and volcano observatories have enabled different knowledges and values to be brought together in order to find sensible solutions for all, for example as seen at GNS in New Zealand and CVGHM in Indonesia.

Technology is providing an impressive new set of tools to aid in the communication of ideas and practices from using: remote sensing and GIS to help visualise crises and potential scenarios, to developing more engaging maps that enable people to identify areas of danger and safety, to the role of social media. The chapters in Part Three of this volume demonstrate that whilst these tools can give us eyes and ears to information that was previously impossible (e.g. satellite data and social media) there is plenty of evidence to suggest that communication is still largely about trust, building relationships and shared understandings. As revealed in many of the narratives in this book, trust is typically hard to develop and is very easy to lose. Building and maintaining trust and ensuring a shared understanding of processes and outcomes can only occur through effective consultation. Building human relationships is therefore as important for successful volcanic crisis management as the utilisation of new methods and technological advancements.

Social media enables a more democratic multi-directional process of communication empowering the public to be part of a dialogue, as the receivers of the latest data, or the providers of first-hand observations and feedback. However, the abuse of social media can present a threat to an institution's credibility and authority as a knowledge source. It is, therefore, important to be active in the management of social media, even if this requires additional resources.

Clear communication is dependent upon an informed understanding of the nature of volcanic hazards and risks. Increasingly statistics are being used to try and make sense of and communicate the uncertain nature of volcanic hazards to a range of stakeholders. The very process of developing event trees and assessing the likelihood of events can play a vital role in preparing for the unknown, bringing various scientific data sets together to

form the basis of coherent decisions. It is important, however, to remember that models are only as good as the data they incorporate and utilise, and that whilst extremely valuable, such tools constitute just one of many. Yet, with healthy levels of scepticism such tools are beneficial and are increasingly being used. Indeed the role of insurance remains significant in providing the security required during such devastating events, and significant modelling and statistical innovation stems from the work in this sector.

Education, via formal or participatory approaches is a vital component of effective communication, involving as it does the receipt or donation of information and learning that is required for a successful outcome to volcanic crises. The use of role-play, simulations, and the adoption of innovative ways of learning for all age ranges and stakeholders enables preparedness actions and facilitates a speedy, more effective, response to a crisis. Giving an individual the power to make informed decisions during a crisis is potentially the most life-saving act possible.

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## 2 Where Are We Now?

This book should be thought of as constituting a first small step in revealing the state of the art, bringing together a collection of revealing and helpful narratives. Many more stories remain to be documented, and future trends and potential directions are constantly emerging. First, there is clearly a need for more data; to gain a better understanding of how the volcano world is observed within different contexts. Continuing to document and publish volcanic crisis communication experiences, both negative and positive, will generate continued data for future analysis on what leads to successes and failures, and what kind of practices may be suitable to adopt in different contexts.

Second, there is a need to build on the narratives presented in this volume, so as to move from the descriptive to the comparative and analytical, in order that lessons identified can become lessons learned. It is hoped that the

information and ideas presented here will allow those who wish it, to conduct further scrutiny and analysis. There is always a requirement for continued description of crises, but theoretical analysis is where, ultimately, the most gains will be made.

Third, continuous feedback and engagement are critical requirements in this field of research.

Whilst it is important to recognise their intrinsic academic value, which is frequently overseen, it is also vital to share these stories not just for, but also with various stakeholders, with the goal of moving towards developing more robust volcanic crisis communication and management in the future. To do this, let's make space for these stories; let's value them.

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