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Editorial: Enabling people-centered risk communication for geohazards

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Editorial on the Research Topic
Enabling people-centered risk communication for geohazards

Introduction

In the field of natural hazards, communicating science with the public and stakeholders (i.e., interested parties) involves entering the challenging and complex world of hazard and risk communication, the ultimate purpose of which is to reduce the impact of impending hazards on people and property at risk. Hazard and risk communication are adequate if they reach people with the information that they need, at the right time, and in a form that they can use. This task appears to be particularly difficult when decisions by the public and stakeholders have to be made in the presence of uncertainty about what could happen, as is often the case with geohazards. Moreover, decision-making is complex when there are time pressures, human and economic resources are limited, and multiple sources of information need to be considered. This poses several challenges for the development of two-way and people-centered risk communication for geohazards.

The "Enabling People-Centered Risk Communication for Geohazards" Research Topic analyses these challenges and identifies innovative pathways to address them. More precisely, it draws together 13 state-of-the-art articles from around the world on improving communication practices, strategies, and understandings relating to a range of various geohazards and weather-related hazards.

Summary of papers

The first two papers we discuss are meta-analyses of tsunami risk and earthquake early warning system perceptions. Cugliari et al. provides a review of tsunami risk perception studies from around the world and found that although lower severity tsunamis are damaging, they are not regarded as dangerous by the public. They note that it is important to use local terms for tsunamis to improve communication, and they found that more assessments of tourist

risk perceptions is needed, and a more homogeneous survey data collection strategy can be used worldwide to enable global comparisons. Tan et al. reviewed 70 manuscripts relating to earthquake early warning (EEW) systems and found that the role of stakeholders' involvement in developing EEW systems is an important factor to consider when assessing the benefits of these systems. Further research on EEW is needed to enhance public understanding, examine earthquake resilience benefits, and investigate best practices for engaging, educating, and communicating with the public.

Five articles in this Research Topic focussed on social media. Stovall et al. and Goldman et al. describe the approach used by the U.S. Geological Survey (USGS) for managing social media during the 2018 Kīlauea eruption in Hawaii. The former describes the details of the social media strategy formed and used during the eruption, finding that the use of Facebook and Twitter platforms acted as a virtual community meeting, with timely conversations able to take place. The latter analysed the USGS Facebook posts and comments throughout the eruption and found that users expressed positive sentiment for the communications and that the communication was effective at answering questions and correcting misunderstandings. Fathi and Fiedrich present the use of a Virtual Operations Support Team (VOST) initiative to assist situational awareness of personnel in Emergency Operation Centers (EOC) in a case study for a flood in Germany. By monitoring social media platforms and interviewing decision makers, they found that the integration of VOST information into EOC improves perception and comprehension of decision makers. Pignone et al. describe the development and use of a social media platform developed by the National Institute of Geophysics and Volcanology (INGV) in Italy to aid two-way communication between scientists and citizens. Consisting of a coordinated suite of social media channels and a blog, the platform enables regular updates and for misinformation to be addressed. The development and use of a social bot to provide rapid answers to users' questions after an earthquake is described by Bossu et al. The social bot has helped to fight against misinformation and enhance risk awareness and preparedness.

Three papers looked at misinformation and rumours relating to earthquakes. Dryhurst et al. elicited opinions from scientists to categorize common public statements about earthquakes as misinformation, debatable, or supported by scientific consensus. Findings reveal the need to clarify whether earthquake prediction are deterministic or probabilistic and specify key parameters (e.g., induced *versus* naturally occurring) as well as the magnitude of the earthquake. Fallou et al. describe the Euro-Mediterranean Seismological Center (EMSC) experience in addressing misinformation during two earthquake case studies, describing how EMSC has improved their communication strategies. The strategies used by scientists to combat rumours in another case study in Italy are described by Crescimbene et al. They found that multi-agency coordinated outreach meetings with communities have helped build relationships on several occasions.

In a similar vein, Rödder and Schaumann studied interdisciplinary collaborations and engagement with stakeholders in tsunami-related fields. Their interviews indicated that there is strong collaboration between engineers and scientists, while interactions with social scientists and stakeholders is still limited.

The final two papers that we discuss are on the topic of citizen science in the communication of hazards. The strengths of web-based flood information portals were analysed by Mostafiz et al. They found that social media, citizen science, and mass media allow flood information to be communicated for short-term benefit, but a tool is needed to widely communicate flood information for long-term planning purposes. Citizen science was found by Tan et al. to have a potential role in response to high impact weather, based on the results from two workshops. Despite the challenge of data quality control, citizen science projects can contribute along the chain of observations; weather, hazard, and impact forecasts; warnings; and decision making. An additional benefit of citizen science is increasing awareness and creating a sense of community to help bridge gaps along the value chain.

Conclusion

By drawing together 13 state-of-the-art articles, this special Research Topic provides an overview of old and new challenges in risk communication for geohazards. Examples of these challenges include managing mis- and dis-information effectively, monitoring social media, formalizing involvement with stakeholders, communicating across disciplinary boundaries, leveraging social media platforms, and encouraging citizen science. The articles analyse these challenges and often identify innovative solutions to address them. By doing so, they provide contributions not only to enable people-centred risk communication for geohazards, but also to consolidate risk communication theories and methodologies.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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