

## **The Future of Forecasts and Warnings**

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The communication of volcano-related information has advanced remarkably over the past few decades. Instead of focussing only on the science and monitoring indicators as the subject of messages, produced in a silo by a science agency, we are now fostering partnerships and communicating meaningful information with stakeholders to the public.

Recent events in New Zealand have taught us a lot about how to effectively communicate geohazard information. Our team of social scientists have spent a decade researching effective communication of earthquake forecasts following the Canterbury and Kaikoura earthquakes. We have applied those findings iteratively and within multi-disciplinary teams as subsequent earthquakes occurred. These findings were also translated to a volcano context and applied during the tragic Whakaari 2019 eruption to support decisions to return to the island. Our learnings have evolved as Ruapehu and Taupo volcanoes underwent unrest in 2022, in a context of high uncertainty. We have strengthened partnerships with response agencies through Volcanic Advisory Groups and co-location. We are also leaning towards people-centred communications as we build our crowdsourced hazard and impact observation capabilities.

The communication of impact-based warnings is becoming increasingly popular and encouraged, particularly in the world of weather warnings. What are these, how effective are they, and what does it mean for volcanic eruption forecasting and communication? Why do people respond in different ways to forecasts and warnings, and how can we make our messaging more effective at prompting a response?

The environment is changing due to global warming, and people's experiences with the COVID-19 pandemic have demonstrated different appetites for risk. There is exponential growth in technology and access to social media, allowing information sharing to reach unprecedented levels. In this evolving context, we must look to the future and forecast how and what we will need to communicate 5, 10, 20 years from now. In this way we can design our science and volcano monitoring capabilities, our partnerships and priorities, to meet the needs of society.