Identifying and effectively communicating about volcanic unrest in New Zealand

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When a volcano enters a state of unrest, it is often the trigger for prompting actions and communications from volcanologists to decision-makers, including the public. However, earthquakes, ground movement, and geochemical changes occur regularly at volcanoes, even at some that have not erupted for a long time. At what point does this activity at the volcano become recognised as 'unrest'?

Potter et al. (2015a) developed the Volcanic Unrest Index (VUI) to help integrate many monitoring parameters and combine them into one number. This index can be used to help define when the volcano is changing state, to identify 'unrest'. The VUI ranges from 0 (no unrest) to 4 (heightened unrest). Potter et al. (2015b) then investigated historical activity at Taupo Volcanic Centre, a caldera volcano in New Zealand, and determined thresholds using the VUI framework to identify 'unrest'. They found 16 episodes of volcanic unrest over 140 years. The VUI can be used at any volcano in the world, even with relatively little information about unrest, or monitoring data.

At the same time, New Zealand's Volcanic Alert Level system was reviewed using social science methodologies (Potter et al., 2014). This was to make sure that the system was useful for the decision-makers' needs, and to make it easier to effectively communicate the level of volcanic activity in New Zealand. In order to maintain clear roles and responsibilities between science and decision-makers (including response agencies), the revised Volcanic Alert Level system continues to be based on the level of volcanic phenomena, or hazard, rather than on impact, or guidance information. The revised Volcanic Alert Level system (Figure 1) was implemented by GNS Science in 2014 with the Ministry of Civil Defence and Emergency Management for all of New Zealand's active volcanoes. The Volcanic Alert Level is supplemented by Volcanic Alert Bulletins, which contain further details about the volcanic activity, monitoring efforts, and potential impacts. The Emergency Management sector support the science-based messaging by providing guidance information for the public.

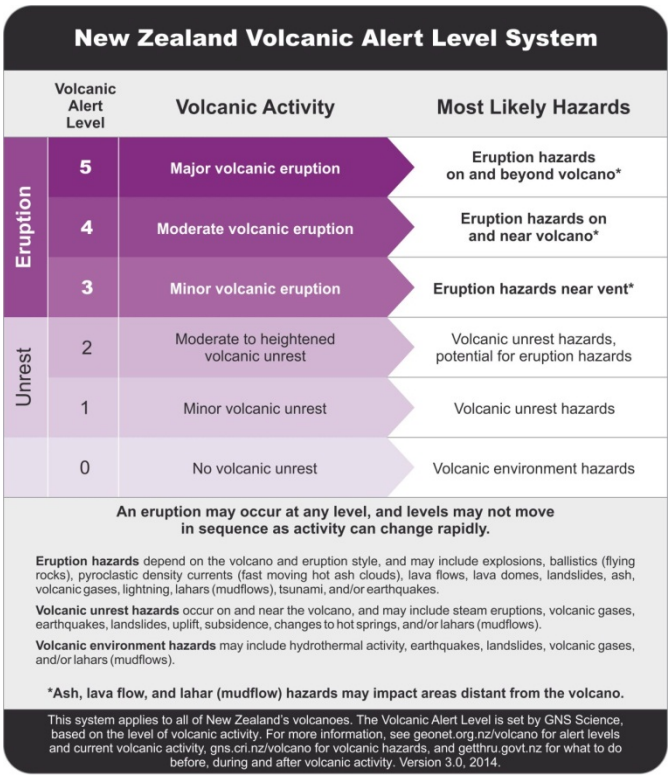

Fig. 1. New Zealand's Volcanic Alert Level system (2014). From https://www.geonet.org.nz/about/volcano/val

GNS Science strives to provide information to the public and decision-makers in the most effective way possible, by using evidence from the field of behavioural science, and continuing improvements in quality of the monitoring information from GeoNet. Effective warning messages can help to achieve an appropriate and timely response. Collaboration between physical and social scientists, stakeholders (including emergency management, infrastructure providers, tourism operators, and land owners), indigenous peoples, and communities, ensure we understand information needs so we can produce effective and useful information.

References

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