



Evaluating life-safety risk of fieldwork at New Zealand's active volcanoes

Natalia Deligne (1), Gill Jolly (2), Tony Taig (3), and Terry Webb (4)

(1) GNS Science, Risk and Society, Lower Hutt, New Zealand (n.deligne@gns.cri.nz), (2) GNS Science, Wairakei Research Centre, Volcanology, Taupo, New Zealand, (3) TTAC Ltd., Cheshire, United Kingdom, (4) GNS Science, Director of Natural Hazards Division, Lower Hutt, New Zealand

Volcano observatories monitor active or potentially active volcanoes. Although the number and scope of remote monitoring instruments and methods continues to grow, in-person field data collection is still required for comprehensive monitoring. Fieldwork anywhere, and especially in mountainous areas, contains an element of risk. However, on volcanoes with signs of unrest, there is an additional risk of volcanic activity escalating while on site, with potentially lethal consequences. As an employer, a volcano observatory is morally and sometimes legally obligated to take reasonable measures to ensure staff safety and to minimise occupational risk. Here we present how GNS Science evaluates life-safety risk for volcanologists engaged in fieldwork on New Zealand volcanoes with signs of volcanic unrest. Our method includes several key elements: (1) an expert elicitation for how likely an eruption is within a given time frame, (2) quantification of, based on historical data when possible, given a small, moderate, or large eruption, the likelihood of exposure to near-vent processes, ballistics, or surge at various distances from the vent, and (3) estimate of fatality rate given exposure to these volcanic hazards. The final product quantifies hourly fatality risk at various distances from a volcanic vent; various thresholds of risk (for example, zones with more than 10^{-5} hourly fatality risk) trigger different levels of required approval to undertake work. Although an element of risk will always be present when conducting fieldwork on potentially active volcanoes, this is a first step towards providing objective guidance for go/no go decisions for volcanic monitoring.