New Frontiers in Probabilistic Volcanic Hazard Analysis

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Abstract

The Idaho National Laboratory, a sprawling nuclear research facility built on the Quaternary volcanic eastern Snake River Plain, commissioned a three-year (2021-2024) Probabilistic Volcanic Hazard Analysis to be conducted under the Senior Seismic Hazard Analysis Committee (SSHAC) Level 3 process. Mark Bebbington was one of the 7-member Technical Integration Team, responsible for the probabilistic modelling. This talk presents an overview of the problems encountered in the PVHA and the novel techniques developed to overcome them, with particular focus on the more interesting statistical issues surrounding the hazard intensities, vent locations and, especially, the temporal recurrence modelling. Many of the techniques are relevant to distributed volcanism more generally, such as the Campi Flegrei. Time permitting, the likelihood of INL burial by a caldera forming ignimbrite from the Yellowstone complex will be explored, but no comparisons to Campi Flegrei will be drawn.

Professor Mark Bebbington (Massey University, New Zealand) has over 30 years experience of stochastic modelling of geophysical hazard, with more than 75 papers quantifying volcanic hazard among his 150+ internationally refereed publications. His primary area of expertise is temporal and spatial recurrence for point processes, applied to eruption onsets and monogenetic vent locations, and statistical modeling of hazard magnitudes such as lava flow extents. Professor Bebbington has chaired the IAVCEI Commission on Statistics in Volcanology and remains active in its leadership. He has been a member of the New Zealand Volcanic Science Advisory Panel, convened by the National Emergency Management Agency, since 2012. His recent research has concentrated on the multiphase nature of volcanic eruptions, and multi-hazards in general.