



Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile

'Understanding volcanoes and society: the key for risk mitigation'



Mapping and assessing ballistic hazard from a multi-vent eruption: The 2000 eruption of Usu Volcano, Japan

Rebecca Fitzgerald¹, Ben Kennedy¹, Hiromu Okada, Kae Tsunematsu², Thomas Wilson¹, Graham Leonard³

¹Department of Geological Sciences, University of Canterbury, Private Bag 4800, Christchurch 8140, New Zealand

²Mt. Fuji Research Institute (MFRI), 5597-1 Kenmarubi Kamiyoshida Fujiyoshidashi, Yamanashi 403-0005, Japan

³GNS Science, PO Box 30368, Lower Hutt 5040, New Zealand

Keywords: Ballistics, hazard mapping, hazard assessment, eruption dynamics, trajectory modelling

The 2000 eruption of Usu Volcano, Japan produced a complex ballistic distribution from 65 individual vents over a 3-month eruptive period. Many buildings and infrastructure were damaged by ballistic impacts, highlighting the consequences that can occur from ballistics in an urban environment. Fortunately, the surrounding towns had been evacuated the day prior to eruption. The eruption was well documented with video and aerial photos, allowing for mapping and analysis to be completed 16 years after the event. In addition, the area has been preserved within a UNESCO Geopark allowing for further examination of impacted buildings, roads and landscapes. This provides an opportunity to analyse the ballistic distribution (size, shape, maximum distance, spatial density and particle size), eruptive dynamics such as ejection angle and direction, and better constrain the timing and order of eruptions and how this is reflected in the ballistic distribution. We use a combination of aerial photos taken at different intervals throughout the eruptive period, video, ground-truthing of selected areas, and 3D ballistic trajectory modelling using 'Ballista' to assess and map the ballistic hazard produced in this eruption.