Spence, R., I. Kelman, E. Calogero, G. Toyos, P. Baxter, and J.-C. Komorowski. 2006. "Human casualties in pyroclastic flows: An impact model based on European case studies". Presentation in Symposium VII "Human Health Impacts of Volcanism" at Cities on Volcanoes 4, Quito, Ecuador, 23-27 January 2006.

Abstract:

When pyroclastic flows threaten an urban area, the management option suggested for ideal circumstances is usually a full evacuation of the dangerous zones. In practice, experience from past events suggests that predicting explosive volcanic behaviour and maintaining exclusion zones can present challenges. Circumstances might arise where people remain in buildings affected by pyroclastic flows. This work focuses on human casualty estimation from a multi-hazard, multi-vulnerability volcano impact model which has been developed using four European case studies.

This impact model is based on volcanological analyses of the potential hazards and hazard intensities coupled with medical and engineering analyses of the vulnerability of residential buildings and occupants to these hazards. For a case study site, inputs to the model are population data, building characteristics, volcano scenarios as a series of hazard intensities, and scenarios such as the time of eruption or the percentage of the population which has been evacuated. Outputs for a scenario are the rates of fatalities, seriously injured casualties, and destroyed buildings. GIS-based risk maps are produced to present human casualty outcomes and possible mitigation options to different audiences. Guadeloupe is used as an illustrative case study.

Technical and communication limitations of the model are discussed along with future planned development and application. This work contributes to the EU-funded project EXPLORIS (Explosive Eruption Risk and Decision Support for EU Populations Threatened by Volcanoes, EVR1-2001-00047).