

Spence, R., I. Kelman, A. Brown, G. Toyos, P. Baxter, and E. Calogero. 2006. "The influence of building type on human survivability of explosive volcanic eruptions". Poster in Symposium VII "Human Health Impacts of Volcanism" at Cities on Volcanoes 4, Quito, Ecuador, 23-27 January 2006.

Abstract:

When explosive volcanic eruptions threaten large urban areas, completing and maintaining complete evacuations throughout a volcano's period of activity can pose difficulties. Thus, assessing possible human health impacts of people sheltering in different types of buildings would contribute towards determining available mitigation alternatives and their potential effectiveness. Based on field work on three European islands susceptible to explosive volcanic eruptions, a combination of medical and engineering analyses were used to examine the potential for human survival in different building types.

Three sources of casualties are examined: from window or structural failure due to pyroclastic flow pressure, from infiltration of hot ash and gases into the building, and from roof collapse due to tephra accumulation. Field surveys identified, categorised, and analysed building characteristics which would influence such casualties, indicating which building characteristics to alter in order to obtain a desired reduction of different casualty types. Understanding such vulnerabilities assists in developing analysis tools such as a sheltering index as well as considering which mitigation options might be the most effective for reducing casualties. These tools and results can be presented to civil defence and other stakeholders, but limitations should be clearly identified. This work contributes to the EU-funded project EXPLORIS (Explosive Eruption Risk and Decision Support for EU Populations Threatened by Volcanoes, EVR1-2001-00047).