

Spence, R., I. Kelman, P. Baxter, G. Zuccaro, and S. Petrazzuoli. 2005. "Residential Building and Occupant Vulnerability to Tephra Fall", Natural Hazards and Earth Systems Sciences, vol. 5, pp. 1-18.

Paper abstract:

Plinian and subplinian volcanic eruptions can be accompanied by tephra falls which may last hours or days, posing threats to people, buildings and economic activity. Numerous historical examples exist of tephra damage and tephra casualties. The mechanisms and consequences of roof collapse from static tephra load are an important area of tephra damage requiring more research.

This paper contributes to this work by estimating the structural vulnerability of buildings to tephra load based on both analytical studies and observed damage. New studies are presented of roof strengths in the area around Mt. Vesuvius in southern Italy and of field surveys undertaken in other European volcanic locations to assess building vulnerability to tephra fall.

The results are a proposed set of new European tephra fall roof vulnerability curves in areas potentially threatened by explosive volcanic eruptions along with comments on the human casualty implications of roof collapse under tephra loading. Some mitigation recommendations are provided.