

Review of Gehl et al. manuscript: ‘Potential and limitations of risk scenario tools in volcanic areas through an example in Mount Cameroon’

In the framework of volcanic risk assessment, this paper constitutes an interesting perspective. However, the tool for volcanic impact assessment is summarily described in some points. So, major revisions are necessary before the publication.

Main comments

The authors should describe in more detail the tool.

The impact assessment of volcanic scenarios requires the analysis of three factors: volcanic hazards, exposure and vulnerability of exposed objects.

In terms of hazards (flank collapse, lava flow, tephra, lahar, etc.), the authors should specify which are the input data required by the model.

In terms of exposure, the authors should specify the different typologies of each element at risk (buildings, infrastructures and cultivated areas) hit by the volcanic phenomena under effect of each hazard.

In terms of vulnerability, the authors must clarify the vulnerability curves or matrixes adopted.

Finally, the routine used to assess the cumulative damage under effect of a sequence of volcanic hazard is not clear. The Figure 6 is insufficient to explain the procedure adopted by the tool.

From the paper it would appear that the final damage is estimated as the sum of the damage caused by single events (but maybe I misunderstood??). This is obviously incorrect, because during a volcanic sequence, the damage produced by the first event modifies the capacity of the elements (specially for buildings) to respond to the following actions, in consequence, the impact damage evaluation requires analyses step by step of the eruptive process (see Zuccaro et al., 2008 and Zuccaro and De Gregorio, 2013¹).

Specific comments

- P1085, L4. The definition “regular buildings” is not correct. It is preferable the definition “ordinary building”. Generally, in Structural Engineering, the adjective “regular” defines the building shape in plan or in elevation.
- P1084, L23. The reference Zuccaro et al., 2008 is preferable to Spence et al., 2005b.
- P1096, L17. The authors should provide more information view the difficulty of finding the BRGM report of Thierry et al. 2006.

¹ Zuccaro G., Cacace F., Spence R.J.S., Baxter P.J. (2008). Impact of explosive eruption scenarios at Vesuvius. *J. Volcanol Geoth Res* 178(2008):416–453.

Zuccaro G. and De Gregorio D. (2013). Time and space dependency in impact damage evaluation of a sub-Plinian eruption at Mount Vesuvius . *Natural Hazards* DOI 10.1007/s11069-013-0571-8.