Nat. Hazards Earth Syst. Sci. Discuss., 1, C652–C655, 2013
www.nat-hazards-earth-syst-sci-discuss.net/1/C652/2013/

Natural Hazards and Earth System Sciences
Open Access
Discussions

NHESSD

1, C652–C655, 2013

Interactive Comment

Interactive comment on "Potential and limitations of risk scenario tools in volcanic areas through an example in Mount Cameroon" *by* P. Gehl et al.

P. Gehl et al.

p.gehl@brgm.fr

Received and published: 26 July 2013

Dear Giulio Zuccaro,

We thank you for your comments and appreciation as well as for the time that you dedicated to this review.

Please find below some responses to your questions/comments:

Main comments:

- Detailed description of the tool:

In this new version of the manuscript, we inserted three appendixes that explain how

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

we brought together and treated the basic information about adverse events, exposure of assets and their vulnerability. (To note: we have referred here to adverse events (lahars, laval flows, etc), while we use hazard for defining the combination of the intensity and frequency of an adverse event).

We also modified some aspects of the description of the approach (part 2), hopefully resulting in a more comprehensive description of the approach presented in this paper. As a summary, the simple principles of the tool (figure 1) highlight the fact that the key points in this approach are the integration of vulnerability models (table 1) and the structured management of information during the scenario runs. Conversely, in our approach, the information on adverse events, on assets and their exposure are external information, which we added in appendix in the new version of this manuscript for completeness. In practice, because this external information is sparse and heterogeneous (except for some key adverse events such as tephra fall), a significant part of our work was actually to collect and synthetize this information about all kind of assets, their typology, vulnerability functions, fortunately taking advantage of previous studies (Stieltjes, 1997, Thierry et al., 2006; Thierry et al., 2008, etc.). Nevertheless, our primary intention in this paper is still to show that despite the heterogeneity in all kind of information managed in Figure 1, it is possible to perform risk scenarios and to apply it in real case. In addition however, we are conscious of the limitations of this kind of tool, which motivated the discussion part of the paper.

Although this should be updated in the future, we think that this exercise has already provided a clearer view of the potential and limitations of using such tools in volcanic risk management. This seems to us significant given the expectations of many stakeholders in risk scenarios.

- Description of the hazard factor:

The way information about adverse events is treated in this tool is provided. We added one appendix (A) to describe how the adverse event factors have been inserted in the

NHESSD

1, C652–C655, 2013

Interactive Comment

simulations we did (Tables A1 and A2).

- Description of the exposure factor:

Description of the exposed elements and of their corresponding typologies has been obtained from previous field surveys that were carried out in the Mount Cameroun area, and from literature papers (Stieltjes, 1997, Thierry et al., 2006; Thierry et al., 2008, etc.). Table C.1 in Appendix C gives more details on the identified typologies, especially for buildings and crops. The typologies for other elements are more straightforward.

- Description of the vulnerability factor:

The vulnerability models selected in this study are summarized in Table 1. We have also added a more detailed description of the relations between intensity and damage in Table C2 of Appendix C, for the case of tephra.

- Cumulative damage under a sequence of volcanic hazards:

We agree (note that a similar comment has been made by Reviewer Alicia Felpeto) that we are not making use presently of vulnerability functions that would account for the successive damages to a given asset and how this modifies its vulnerability (like it is considered in Zuccaro et al., 2008; Zuccaro & De Gregorio, 2013). Our focus was more on the general framework for damage assessment rather than on the detailed use of specific vulnerability models.

However, the use of the inventory removal algorithm presented in the manuscript has several advantages including the fact that it allows the updating of vulnerability functions. Therefore, one future improvement in the tool could be to integrate more recent specific vulnerability models in the tool, but this can be readily done using the present architecture. Moreover, for stakeholders such as the civil security, it is important for preparedness exercises to evaluate (even roughly) how damages may occur over the time (e.g. step-by-step, over a few hours or a few weeks): their ability to respond will be different depending on the temporal dynamic of the damaging events. Figure 6 has

NHESSD

1, C652–C655, 2013

Interactive Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

been slightly modified in order to make the procedure clearer. However, this figure is very focused on explaining how damages are updated for linear and area-like objects. The general approach remains the general flowchart presented in Figure 1.

Specific comments:

- P1085, L4: “regular” has been replaced by “ordinary”.

- P1084, L23: The reference has been changed.

- P1096, L17: The Appendix that has been added to the manuscript contains some information and data that are found in Thierry et al. (2006).

With best regards

Pierre Gehl and Gonéri Le Cozannet

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 1081, 2013.