

Interactive comment on “Long-term volcanic hazard assessment on El Hierro (Canary Islands)” by L. Becerril et al.

L. Becerril et al.

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Authors are thankful to the reviewer. His comments will definitely help to improve the quality of the manuscript.

Overall Impressions

I read the paper “L. Becerril et al., Long-term volcanic hazard assessment on El Hierro (Canary Islands)” with great interest. The paper presented a very interesting approach to understanding volcanic hazards in El Hierro in the Canary Islands. Recent eruptions off-shore of El Hierro place this location in the spotlight of the volcanic community, and there is general interest to understand and characterise the potentially complex volcanic hazards of this volcanic island. This paper is a very well-organised and detailed

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summary of a volcanic hazards study of El Hierro, and will surely have a great impact on the community of the island in terms how to view, weigh and understand its volcanic hazards. I found this paper to be a very progressive work that combined probabilistic tools with eruption scenario-based methods. Personally I think such an approach is essential, especially in understanding volcanic hazards on volcanic islands, where the complexity of the volcanism can be very high in regard to eruption styles and durations, and the effect of eruptions on the surrounding environments, due to the quickly changing hydrology, topography and structural elements of the island setting. I think this paper sets an example of how to combine probabilistic and eruption scenario-based volcanic hazards studies, and how such abundant data can be used in practical sense; this is critical for end-users who could use such studies for developing volcanic emergency management strategies. I also feel that this paper will be very well cited and potentially will set an example of how pure geological data can be structured into a framework that can be developed further for geomathematical analysis.

We thank your constructive comments.

While there is no doubt that such a method is very critical on volcanic islands where dispersed vents form a “volcanic field”, such as El Hierro, the proposed method is perfectly adaptable for other dispersed volcanic systems, such as intracontinental volcanic fields (eg. Auckland Volcanic Field in New Zealand). While for me this applicability is evident, and the benefits of using such methods elsewhere are clear, the Authors provide too little to introduce this early in the paper.

We agree with you and therefore we have provided more information, including more references about the applicability of our work.

In the Introduction, the Authors state the benefits of this dual approach to understanding volcanic hazards, but I find the examples listed too few and too Canary Islands-specific, which, for me as a reader, does not give a very strong impression that the Authors see the potential of their work in a much broader sense. From the citations it

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can be seen that there are some examples outside of the Canarian realm, but to spell out those locations, and methods, would have been a good addition. I believe the Authors are missing a great opportunity to make their point in a more effective, convincing and interesting way at the start of the paper. I hope that this will not turn potential readers away.

Following your comment, we have included more references of other volcanic areas.

I also found that a little bit more explanation of the definition of “long-term” hazard(s) could have been useful. In general “long-term” can mean many things, and just for clarity it would have been useful to explore and define this term.

We have added more information related with “long-term”.

In the Introduction, I would have liked to have seen slightly more detail (1-2 extra paragraphs) on the specific hazard susceptibility maps.

We have written information and references related with “Susceptibility maps”

A list of the specific hazard types you were aiming to analyse and create a susceptibility map for, with a brief justification as to why those specific hazard types were selected, would be very beneficial and would give the reader an appreciation of the power of the method published in this paper. This is also valid because there is no other section in the paper where such definitions and methodological approaches are described.

We have listed the hazard type in the introduction section. We also give more information about this topic in the methodological section.

In the Geological Section, it is stated that El Hierro’s recent volcanic eruptions are “monogenetic”. Such a term is critical for understanding volcanic hazards, and I think it is essential to provide, in this section or earlier, a definition for the term in this context, as well as describing the eruptions’ styles (and their landforms, potential hazards, following a scenario-based approach). Interestingly, in this section I found very little information about the eruption styles of past eruptions (other than a reference to

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Strombolian style eruptions etc). For clarity it would have been really useful to have more detail about the eruptions (styles, intensities etc) that these “monogenetic” volcanoes produced in the past. Again, I think such a summary would have been a very nice starting point for the reader to understand the volcanic hazards of El Hierro.

We have provided a definition of “monogenetic” including its corresponding references in the Geological Setting section. Also, we have written a paragraph detailing the eruptions styles and products of the island which has been included in section 3.1 “How: Characterization of the eruptions”, because we have considered that this section is more appropriate to remark how the eruptions have been on the island and to better understand their eruptive behavior. A little paragraph of this section has been changed to the Geological Setting section.

Overall I think, in the first sections, the paper misses great opportunities to convince the reader how and why the proposed method is “revolutionary” and very “progressive”. I think there are plenty of good studies published from other volcanic islands, such as Hawaii, Ambrym, Ambae, Tenerife, etc., that could have been compared and contrasted with this work, putting this work on a global level. Unfortunately the Authors missed this opportunity in their Discussion section as well, which I found a bit disappointing. The results and methods the Authors proposed, and very nicely applied to El Hierro could have been far better linked to other dispersed volcanic systems, either on islands or in continental regions. In summary, I think this paper is a very good and progressive contribution; however, I think the Authors missed too many opportunities to make their excellent work even more globally linked and applicable.

In order to palliate this lack, we have written both in the Introduction and Discussion and Conclusions sections more information trying to make the work more global.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/2/C782/2014/nhessd-2-C782-2014-supplement.pdf>

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