

Interactive comment on “A retrospective study of the pre-eruptive unrest on El Hierro (Canary Islands): implications of seismicity and deformation in the short-term volcanic hazard assessment” by Stefania Bartolini et al.

Anonymous Referee #1

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This manuscript investigates the probability distribution of the location of the next vent opening and its temporal changes from seismic and deformation data. The authors look to apply the method to an assessment of volcanic activity in a real-time basis. This work is very well motivated because it is practically very important to forecast what happens next during a volcanic unrest in a real-time basis. I cannot really evaluate whether the methods the authors propose work well mainly because of the lack of information. In particular, the manuscript lacks a description of observed data which can be compared with the deduced probability distribution. Also the manuscript lacks a

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description of methodological details. I understand that they are described in previous publications but some descriptions are necessary so that a reader can reproduce what the authors got. With this, I find that this manuscript requires a substantial revision before reaching the publication quality. Please find my comments as enumerated below.

1. Section 2 overviews the methodology which mainly consists of QVAST and ST-HASSET. I followed a rough overview of what they do but did not understand mathematical details until I consult references cited in the manuscript. I would like the authors to show more mathematical details of their methods, although a full description is not necessary.
2. Section 4.1 describes a probability distribution of future eruptive vents. I understand that it is deduced from eruptive vents and fissures, dikes, faults, fumaroles, and the stress field (lines 185-186) but do not understand how the authors made use of these information. I would like the authors to add some quantitative descriptions, possibly with figures.
3. Table 1 describes temporal evolution of various parameters which are required to assess the evolution of the state of the volcano. Making a table is a good idea but making a plot as well improve the visibility of the data. Also the authors need to show us how the "probability" in the table is derived from the "value". In addition, the authors need to describe how "Y/N/na" for each monitoring component is defined.
4. Figure 3 shows a temporal evolution of vent opening probability but I cannot evaluate whether it works because the actual location of vent opening is not shown in the figure.
5. Figure 4 shows a temporal evolution of probability associated with temporal changes of monitoring parameters, but similarly, I cannot evaluate if it works well because the observed data is not shown here.
6. Line 279: How can the "smoothing factors" be defined? Use equatinos.

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7. Line 283: Show us what LSCV is more quantitatively.
8. Line 286: Show us what Silverman's Rule of Thumb more quantitatively.
9. Line 294 following weights: Seismic events, onshore vents and fissures, and offshore vents and fissures have different units so how to define the weight is not straightforward. I would like the authors to describe more quantitatively how to define the weight.
10. I find some awkward presentations in the manuscript. For example, a sentence from line 363 to 367 is too long and can be divided into two or more sentences for more clarification. I find some other awkward sentences but do not point out all. I would like the authors to take time to examine and rerun the presentation.

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