

Review of Vent opening at Campi Flegrei: clues from dyke propagation patterns, by Selva and Mangone.

The manuscript describes a method to determine the likelihood of the next Campi Flegrei vent opening location, based on the distributions of past vents from the caldera centre, using the azimuth and distance of those vents as model input. The model also considers topographic focussing as suggested by Rivalta (2019). I found the paper to be clearly written and logically laid out with adequate illustration.

My general comments concern the validity of the definition of the centre of the caldera. Choosing the max uplift location as the caldera centre assumes that uplift is associated with the magmatic system. What is the relationship of the centre of uplift to geophysical images of present-day magma location? Where would the “centre” of the caldera be interpreted from those images?

The caldera centre also assumes dyke propagation arises from the middle of the reservoir, but stress models (e.g. Gregg et al 2012) often show that dyke propagation from the edge of the reservoir is a more favourable location. In other words what is the sensitivity of your model to the position of the centre of the caldera from which dyke growth occurs.

Finally, how valid is the present-day centre of the caldera for assessing the location of the past eruptive centres? During the different eruption epochs, it seems feasible that the magma reservoir (caldera) centre (inferred at present to be under the max uplift) – could have been in different locations. Please comments on this in your text. How would this relate to your results of distributions presented in paragraph line 112-126. Could a different caldera centre location explain the difference you describe in paragraph line 169 for Epoch1 and 2?

### **Specific points**

Line 46 – why especially in calderas? Is it because the vent location is uncertain?

Line 106 impact ON all statistical analysis

Line 163 - clarify the significance of they hypothesis of equal distribution – i.e. what does it mean?

The first paragraph of the discussion reads more like a description of the results.

Line 208. By “outer ring” do you mean the “outer high probability region”? You don’t mention what these rings are but then refer to them as rings.

Paragraph, line 198. Does a relative difference =1 indicate they are complete different or the same? Please explain the scale.

### **Figures**

Figure 1. The shading on the DEM is confusing, are dark colours low or high elevation? Preference is low = dark, high = light.

Point of max uplift is small and hard to see.

Colour code the caldera rims to their appropriate epoch – as for the vent locations.

Figure 3, given the importance of topography in stress localisation, it might be better to show the DEM as the basemap in this figure, rather than the road map.

Figure 4. What do the blue bars in Figure 4G indicate? The colour bar font in H and I is small and hard to read.