

Interactive comment on “Estimating the depth and evolution of intrusions at resurgent calderas: Los Humeros (Mexico)” by Stefano Urbani et al.

Stefano Urbani et al.

stefano.urbani@uniroma3.it

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We thank the Referee for his comments that have all been taken into account and significantly improved the manuscript. A “bold” text copy of the manuscript (where all the minor changes and improvements with regard to the previous version, except the removed parts, are in red bold) is attached to this reply as a supplement.

Below are the replies to all the general points raised by the referee:

COMMENT: The description of events during the Caldera/Post-caldera evolution is confusing, largely because of differing names used. For example; the Cuicuilitic Member is variously called simply ‘Cuicuilitic’ (in some figures), Cuicuilitic member, Cuicuilitic de-positions, Cuicuilitic pyroclastics, Cuicuilitic rocks, and Cuicuilitic stage, with

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occasional reference to the mapping unit Qtc! There is no real description of this unit, which appears to be a key to understanding the evolution, but one assumes it is a Plinian airfall deposit, so perhaps 'Cuiluilitic Pyroclastics' is the best term to use. Perhaps a simple table within Section 2, showing stratigraphy would help, but using terminology consistent with the text and figures.

REPLY: We thank the referee to this comment. We decided to use the term 'Cuiluilitic Member' throughout all the text to be consistent with the term used by [Dávila-Harris and Carrasco-Núñez, 2014] which provides a detailed description of this deposit. We also added a table (table 1 in the revised version of the manuscript) showing the stratigraphy described in section 2 and some details on the characteristics of the Cuicuiltic Member (lines 124-126 of the revised "bold" manuscript). The description of the evolution of the Los Humeros Volcanic Complex has been also partly rewritten and should be clearer now (lines 97-145 of the revised "bold" manuscript).

COMMENT: There are lots of redundant words in the text (e.g. Page 2, line 4: 'On this regards') and variability in spelling (e.g. Maztaloya in text; Maxtaloya in figures). There are a number of apparent typos (e.g Cilinder for Cylinder in Fig. 2; Obsyidian for Obsidian in Fig. 9). Figures in general do not relate well to the text, and labelling sometimes seems to differ from the caption (e.g. Figure 5e).

REPLY: All the typos, redundant words have been corrected according to the referee suggestions (see the attached revised version of the manuscript).

COMMENT: Why are only experiments 4, 5 and 6 shown? Did experiments 1, 2 and 3 fail, or show different results not compatible with the conclusions? Why also are only the results of experiment 5 and 6, and not 4, shown in Figure 6, and which experiments are shown in Figure 7?

REPLY: Some experiments failed for technical issues with the laser scanner or for the occurrence of an air bubble within the silicone. We decided to not include this information in the text because we believe is not useful for the reader. However, we agree with

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the reviewer that this may be confusing so we decided to label the experiments shown with consecutive numbers. Experiment 4 was not shown in figure 6 because replicates the same boundary conditions of experiment 5 and shows similar results ensuring the model reproducibility (now specified in the text, see lines 259-261 of the revised “bold” manuscript). Please note that we added two experiments to the dataset (see reply to referee E.Brothelande). We added the experiment number above each point in Figure 7 (now figure 8).

COMMENT: The reference to ‘graben formation’ should specify ‘apical graben formation’, otherwise there is a danger of confusion with regional tectonic features.

REPLY: This has been changed. In accordance with the comment of referee 2 we changed the term “apical graben” with “apical depression”.

COMMENT: Figures are all generally useful, although 1 and 9 are very small and hard to read, and the use of red lettering in some darker figures (e.g. 5 and 6) is not recommended, as it is hard to read.

REPLY: We separated Figure 1a (now Figure 1 in the revised copy of the manuscript) from Figures 1b and 1c (now figures 2a and 2b) to make them larger and easier to read. We also re-organized Figure 9 (now figure 10 in the revised manuscript) so that it should appear larger now. We changed the color lettering of figures 5 and 6 (now figures 6 and 7) to white.

COMMENT: I am not sure some photos add a great deal (e.g. Figure 4b and f).

REPLY: We agree with the referee about figure 4b which may be redundant (now deleted in the revised version of the manuscript). Figure 4f does not exist thus the referee is probably referring to figure 5f. We agree with the referee and changed the photo of fig. 5f that better shows the alteration of the Cuicuiltic Member at Loma Blanca (now figure 6f in the revised manuscript).

COMMENT: The caption to Figure 8 is inadequate!

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REPLY: The caption has been rewritten (see Figure 9 and lines 652-656 of the revised “bold” manuscript).

COMMENT: In Figure 9c, why is the Los Humeros intrusion ‘projected’, if between 7.3 – 3.8ka, and in the legend what is ‘Hydrothermalism’ (Alteration?)?

REPLY: With the term “projected” we meant that the Loma Blanca and Los Humeros domes are not aligned with Arroyo Grande along the same plane as they appear in the schematic model (lines 677-678 of the revised “bold” manuscript). With ‘Hydrothermalism’ we were referring to hydrothermal activity (now corrected in figure 10 in the revised version of the manuscript).

The detailed replies to the specific comments raised by the referee, where a reply was requested, are listed below:

COMMENT: Line 146: motor?

REPLY: This has been changed (line 188 of the revised “bold” manuscript).

COMMENT: Line 159: ??

REPLY: We thank the referee for this comment. The sentence was wrong. Some calculated values of the dimensionless ratios II in nature were wrong and have been now corrected (Table 3 in the revised version of the manuscript). Moreover, we added the natural values of the parameters listed in table 1 (now table 2 in revised version of the manuscript) used for the calculation of the II . The sentence has been rewritten and should be clearer now (lines 200-202 of the revised “bold” manuscript).

COMMENT: Lines 165-170: Note different spelling of figures. . .

REPLY: This has been corrected with “Maxtaloya” throughout all the text and figures.

COMMENT: Line 179: “Lineament”

REPLY: We prefer to use the term “lineament” for the Las Papas scarp which indicates

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that no significant deformation and alteration is found at the outcrop scale (see lines 218-220 of the revised “bold manuscript) allowing it to be distinguished from the other scarps of the area (showing alteration and/or deformation).

COMMENT: Line 182: does this have a name?

REPLY: The deposit can be attributed to the Xoxoctic Tuff. A brief description of this deposit has been added to the text (lines 118-119 of the revised “bold” manuscript) and to table 1.

COMMENT: Line 193: exposes?

REPLY: This has been changed (lines 230 and 237 of the revised “bold” manuscript)

COMMENT: Line 214: Why 5 + 6 what happened to 1,2,3. Why not include 4?

REPLY: See reply to the general comment above.

COMMENT: Lines 270-276: Needs rewording

REPLY: The paragraph has been rewritten (lines 343-348 of the revised “bold” manuscript).

COMMENT: Figure 1: Maybe better to change color (yellow?) as it is hard to distinguish from normal faults.

REPLY: This has been changed as suggested by the referee.

COMMENT: Figure 9: Obsidian. Why projected?

REPLY: We changed with Obsidian. With “projected” we meant that the Loma Blanca and Los Humeros domes are not aligned with Arroyo Grande along the same plane as they appear in the schematic model. We better specified this in the figure caption (lines 677-678 of the revised “bold” manuscript).

Sincerely,

The Corresponding Author

Stefano Urbani

Please also note the supplement to this comment:

<https://www.solid-earth-discuss.net/se-2019-100/se-2019-100-AC1-supplement.pdf>

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2019-100>, 2019.

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