

Answers to Anonymous referee 2

As we had some problems with some referenced page and lines in the referee comments, here we refer to the manuscript version online as pdf file.

2.1- Shaded relief image of the area with the highest density of volcanoes would be helpful to show the level of detail and quality of DEMs,

answer: *we agree and we can provide a map as electronic supplementary material, in order to not overweight the manuscript.*

2.2- Several of the results in Figure 7 (especially 4a and 11a) show TIN-based pattern which negatively impacts the slope and curvature maps, creating triangular artefacts and discrete breaks in slopes and curvatures which are not found in actual topography, processing the DEM using different techniques may reduce the artefacts but it is not clear whether it would help with classification

answer: *artifacts producing the TIN-based pattern are related to the resolution of the DEM and the volcanic edifices sometimes are very small in reference to the grid resolution of 10 metres.*

2.3- mathematical symbols should be used in the equations and expressions consistently

answer: *ok, they were corrected*

2.4- S should be properly defined - it appears that slope magnitude and slope direction, two components of the elevation field gradient vector, are mixed together without clear distinction and then slope gradient term is used for slope gradient magnitude, so the authors should clarify their terminology and symbols

answer: *in the paper S is used to indicate slope gradient magnitude. I agree with your comment and the sentence in the line 19 p. 365 has to be modified into: “ S is the slope gradient magnitude and $Z...$ ”*

2.5- check equation (1), should be + ?

answer: *yes, it was corrected as:*

$$S = \arctan\left(\sqrt{(dz/dx)^2 + (dz/dy)^2}\right) * 57.29578$$

2.6 - equations 5,6,7 should be rewritten using the mathematical symbols consistent with the equations in the previous section

answer: *I agree; we can rewrite the formulas as requested (p. 367 and 368):*

“...boundary delineation layer (BDL) is:

$$BDL = PC_n f + S_n (1 - f) \quad (5)$$

where PC_n and S_n are respectively the normalised values of profile curvature and slope and f is a weighting factor of the two functions with a suggested value of 0.7 (Grosse et al., 2012).

The normalised values of PC and S are calculated as:

$$PC_n = (PC_i - PC_{\min}) / PC_{\text{range}} \quad (6)$$

$$S_n = (S_i - S_{\min})^2 / (S_{\text{range}})^2 \quad (7)$$

and the subscripts i , \min , range respectively refer to the point value, the minimum calculated value and the maximum-minimum calculated range of curvature and slope.

$$BDL_{\text{mod}} = (PC_n f) * [S_n (1 - f)] \quad (8)$$

2.7- clarification is needed of the sample from which the minimum and range is computed for the Grosse method (minimum slope observed in the entire region?, selected subregion?):

answer: *we considered the sub region related to each volcanic edifice and we extracted the minimum and maximum values. I can add a sentence in the text (line 16 p. 367):*

“These values were calculated from a sub-region related to each volcanic edifice, tracing the pixel profile that cuts the landform and extracting the minimum and maximum values for slope and curvature.”

2.8 - minor language editing is needed, for example, DEM processed in 2001 may work better than DEM elaborated in 2011 (or in 5.1 S/TC processing rather than S/TC elaboration?)

answer: *I agree, we check.*

2.9 - legends are missing in Figs 6 and 7 and all legends should indicate which color represents 0 to clearly distinguish the negative and positive values where applicable.

answer: *in the caption of Figure 6 there is the remind of the legends to Figure 4 (however, it has to be corrected from 3 to 4). In the caption of fig 7 the description of the legend has to be added.*

In all the edifices the minimum is 0, there are not negative values since the boundary is calculated normalised.