

Answers to J. Jasiewicz

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.

1- J. Jasiewicz

1.1- Please explain why you think that automatic or semiautomatic method over perform manual delineation and point to the benefits of its use.

answer: we underline in this paper the need to apply an objective methodology in order to reduce the subjectivity of delimitation process when the specific landforms are to be subject to regulation or laws.... (p. 358, line 25 and p. 359, lines 1 and 2).

For a better understanding we can add at the end of the paragraph the following sentence:

“The improvement of objective, reproducible methods to delimitate the external perimeter of a landform, so reducing to a minimum the subjective choices of an operator, is very important especially if the results are to be used for applying regulations.”

1.2- Section 3.1 is superfluous. It is well known formulas available in many manuals. Only formula (4) is necessary as quite a new concept

answer: the methodology described in section 3.1 can be used, as in our study, for a first recognition of the morphologies associated to volcanic edifices and the formulas here are known but, they can be useful for the complete application of the methodology elsewhere. If necessary, for a problem of space in the paper, we can put only the references to the formulas (1), (2) and (3) used for the formula (4).

1.3- Formulas (5-8) should be change to more symbolic form with explanation of symbols (abbreviation) in text for example BDL instead of boundary delineation layer etc.

answer: we can simplify 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.

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

1.4- comparison with existing or possible manual delineation at the end of the paper (for example at the fig 7) would be a good complement. Also in conclusions authors could suggest more broad application of their method except the data they used.

answer: it is difficult to introduce here a manual delimitation for the selected volcanic edifices, as it was not done before. However, we introduced in conclusions a sentence about the possibility to use the proposed method also in other volcanic (and not volcanic) areas:

“- we suggest that the proposed method of an integrated use of opportunely elaborated morphometric data (S/TC , GM , $GMod$) together with detailed geological data, may result in a more objective delimitation of landscape morphologies. In particular, the proposed method performs very well with a large varieties of

volcanic edifices, and it is probably suited for any landscape morphology clearly standing against a clearly contrasting basement.”