Earth **Surface**
Dynamics
Discussions

Interactive comment on "Tracing the boundaries of Cenozoic volcanic edifices from Sardinia (Italy): a geomorphometric contribution" *by* M. T. Melis et al.

Anonymous Referee #2

Received and published: 16 June 2014

The paper provides valuable overview of existing techniques for mapping boundaries of volcanic edifices and proposes an improved technique, specifically designed for the scale and conservation application in Sardinia. The main goal of the enhancements appears to be reducing the subjectivity of manual delineation using traditional techniques. The results indicate that the proposed approach broadens the range of cases when automatic delineation is possible and the information provided also assists in manual delineation when fully automated approach fails.

There are few issues in the paper that need some clarification: - 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,

- 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 artifacts and discrete breaks in slopes and curvatures which are not found in actual topography, processing the DEM using different techniques may reduce the artifacts but it is not clear whether it would help with classification

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

- 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

- check equation (1), should be + ?

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

- 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?)

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

- 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.

Reading the paper keeps me wondering how well would geomorphons perform for this type of classification - we have tested it on 3D scale models and it did pretty well for volcano type of geometries.

Interactive comment on Earth Surf. Dynam. Discuss., 2, 357, 2014.