



Geomorphometric analysis of volcanic edifices using a robust plane fitting method

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A great number of methods exist to analyse digital terrain models (DTMs) of volcanic edifices. However, most of these methods are not fully automated, or they need special treatment of the DTM to become suitable for this purpose.

In our study a robust plane fitting method is used to model the surface of the volcanic cone, including all possible landscape features. Volcanic edifices, being mostly conical, can be approximated only using planar features. Consequently, this method results in larger residual values as higher order approximation surfaces would do. However, the versatility of the planar approach compensates for that, because many irregular, or locally modified (e.g., incised, eroded) surface elements can be reconstructed.

In our current project Andean SRTM DTMs have been used as input data for the segmentation. A number of test runs have been carried out in order to analyse the sensitivity of the method on the input parameters. Many larger volcano-geomorphic features remained robust and have been modeled automatically, however, at the less steeper flanks of the volcanic cones seemed to be sensitive to some parameters (e.g. on derivation of local normal vectors, minimum size of fitted patches, point-to-plane distance and angular discrimination factor).

The results show that lava flows, conical features, in some cases, planezes can be reconstructed with relatively low residual values. Steeper slopes can be typically modeled better relative to gentle slopes.