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Morphometric analysis of adventitious cones and automatic identification of lineaments around Villarrica Volcano using digital elevation models

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There is an important relationship between the site of eruptive centers and regional stress field in tectonically controlled volcanic arcs. This is the case of stratovolcanoes and minor eruptive centers of the Southern Volcanic Zone (SVZ) of the Andes, genetically related to the Liquiñe-Ofqui Fault Zone (LOFZ). Into this framework, it is relevant to get quantitative morphometric data in order to determinate the tectonic and/or magmatic control of these structures. Nowadays there is a large number of freely available Digital Elevation Models (DEM) that can be used to extract quantitative information. However, extraction of this information should be done automatically or semi-automatically using different algorithms or programs in order to avoid subjectivity. Along with this, the quality of such DEMs is also significant in reliable data recollection. In this contribution we present a work related to a morphometric analysis of adventitious cones and automatic identification of lineaments around Villarrica volcano using DEMs of several resolutions and applying some free-access codes. First, we performed an altimeter quality analysis of DEMs available in the studied area (from 90 m to 5.6 m of resolution) by means of comparison with a network of differential GPS control points. Also a high resolution DEM (5 cm) was used in a cone field located at the NE flank of the volcano that was obtained in the framework of this project using an unmanned aerial vehicle. On these DEMs we use NETVLOC and MORVOLC algorithms, to define the basal outline of volcanic structures (cones) and to extract a set of morphometric measures. In order to complement the structural mapping of the zone, it will be performed an automatic identification of lineaments in the different mentioned DEMs with PCI Geomatics program. This work is actually in process and the results will be presented during the meeting.