



Terrestrial lidar (laser) scanner technology applied to survey the Vesuvio volcano (Italy) for geological and geo-morphological analysis.

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Terrestrial laser scanning surveys represent at the moment one of the most powerful tools to accurately map inaccessible surfaces such as volcano craters. The instrumentation measures range and reflectance of surfaces with redundant survey points and is capable of capturing topographical details within a few centimetres accuracy. During May 2005 a terrestrial lidar scanning survey was completed using Optech's ILRIS-3D to reconstruct for the first time the internal characteristics of this crater. The volcano was completely scanned and measured with 20 separate data sets, taken from four different set up points located along the perimeter of the crater rim. A final geo-referenced triangulated model was generated with a mean size of 5 cm, providing high definition geometrical, geological and geo-morphological information of the surface. Different geological and geo-morphological analysis has been made on the final model such as debits volume calculation, inclination of the walls from cross section analysis, definition of the landslide outline and analysis of relations between different kind of rock and their reflectivity for an accurate survey. Moreover the terrestrial laser dataset has been integrated with different data models provided by aerial digital photogrammetry. This allowed for the extension of the study to an area outside the crater and the integration of these two technologies for a comparison of the final results. The accuracy and the resolution obtained in the described experiment provide evidence that this approach may be a powerful technique for describing and monitoring volcanic area.