



## **Generation of high resolution Digital Elevation Models using Remote Sensing optical stereo data: application to Mount Etna test site, Italy.**

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The application of Remote Sensing techniques to the study of volcanic areas includes the possibility to generate high resolution Digital Elevation Models (DEMs) almost in real time during eruptive crisis. The use of EROS spaceborne sensor allows the acquirement of two overlapped images of the same scene (13x13 km, 2.5 m of resolution) at different viewing angles during the same pass on Mount Etna. Using specific photogrammetric softwares it is possible to retrieve a very accurate DEM using a certain number of Ground Control Points (GCPs) collected from within the border of the images, and at the high and low elevation points to avoid planimetric and elevation extrapolations. A high resolution DEM is peculiar for the creation of 3D detailed viewing of the volcano. In particular during an eruptive event it is possible to analyse the modifications in volcano morphology and to perform geometric calculations such as an approximate estimation of the volume of the erupted material. A further important application consists in the generation of real time topographic maps that need a continuous update due to the rapid change in volcanic features such as the growth of new cones and the opening of new craters.

The photogrammetry applied to satellite stereopairs represent a peculiar tool of volcanic areas analysis and monitoring especially during eruptive phases since it allows to acquire highly accurate data in rapid time and with satisfactory ground coverage.