Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03554, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03554
EGU General Assembly 2008

Morpho-structural changes of Mount Etna's summit area documented with Lidar technology

M. Neri(1), Mazzarini(2), S. Tarquini(2), M. Bisson(2), I. Isola(2), B. Behncke(1), M.T Pareschi(.2)

(1)Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Catania, Piazza Roma, 2; 95123 Catania, Italy (neri@ct.ingv.it), (2) Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Pisa, via della Faggiola, 32; 56126 Pisa, Italy (mazzarini@pi.ingv.it)

Airborne Lidar (Light detection and ranging) is a revolutionary technology to produce a high-resolution DEM (Digital Elevation Model) by rapid, accurate and moderate-to-low cost measurements of topography flying over a large area. Morphostructural data derived from Lidar surveys carried out on Mount Etna in 2005 and 2007 are compared with earlier aerophotogrammetric surveys in 1986 and 1998. In this period, Etna has produced ten major lava outflows and about 200 paroxysmal events, some of which have led to significant modifications of the summit crater morphology. Four difference maps have been derived from the comparison of the four DEMs, showing the accumulation or loss of material in the summit area of Etna during the periods 1986-1998, 1998-2005, 2005-2007 and 1986-2007. These data render an unprecedentedly clear and quantitative image of morphostructural and volumetric changes that have affected the summit area of the volcano in the past two decades and permit the production of a new topographic map. The computed volume gain during this period amounts to ˜112 x 106 m3, at a mean annual rate of ˜5 x 106 m3, against an overall volume loss of less than 10 x 106 m3. The comparison of the various surveys furthermore emphasizes the levels of accuracy and resolution of the different techniques applied. The Lidar technology used in 2007 allows production of high-precision maps in near-real-time, and is also capable of "viewing" the crater interiors even in the presence of a gas plume, facilitating work concerning environmental hazards such as numerical simulations of, e.g., lava flows.