



Past and new analysis of the morphological changes at the summit of Mt. Etna volcano (Italy) through use of aerial photographs: 1976 - 2006

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During the last 30 years volcanologists of the *Istituto Internazionale di Vulcanologia* of the Italian *Consiglio Nazionale delle Ricerche* in Catania, later become *Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Catania*, have made extensive use of aerial photographs of the summit area of Etna both for research purposes and for the surveillance of volcanic activity. Observation and monitoring of the morphological changes in the four summit craters of Etna (Voragine or Chasm, Bocca Nuova, North-East and South-East craters) is actually of utmost importance to understand and possibly forecast the activity of this seemingly tireless volcano. The invaluable support provided by aerial pictures throughout this period was achieved by use of helicopters, such as model AB 212SW made available by the Italian Navy and Agusta A-109 made available by the Italian Department of Civil Defence. Aerial photographs were taken with variable frequency during the considered period, depending both on the level of volcanic activity and on the availability of the aircrafts, but at least three pictures per year is available for this study.

Examination of single aerial pictures, without taking into consideration the volcanological context, has a limited interest for monitoring volcanic activity. However, by putting together in a chronological sequence the pictures taken since 1976, we observe that this period, although relatively short in comparison with the life-span of the volcano, can be considered as a very active one in terms of morphological, structural and volcanological evolution of Etna. The photographic sequence shows the remarkable and often sudden changes occurred at the Voragine, Bocca Nuova and North-East craters. It documents, the birth and impressive growth of the South-East crater, the

rapid development of the Cratere del Lago during the 2001 eruption, the built-up of the majestic and complex cones of the 2002-2003 eruption, the disappearance of the decades-old Torre del Filosofo mountain hut at 2900 m of altitude under the thick cover of pyroclastic materials erupted by the nearby 2002-2003 cones, etc.

Past structural changes at the summit craters of Etna documented by the photographic sequence here presented are expression of the very active dynamics of this volcano. The historical reconstruction based on aerial photographs can be successfully used to improve our comprehension of volcanic processes, becoming one of the leading tools linking past records and new monitoring techniques of volcanoes.