



Cities on Volcanoes 9
November 20-25, 2016
Puerto Varas, Chile

'Understanding volcanoes and society: the key for risk mitigation'



The 1986-2016 paroxysmal episodes at the summit craters of Mt Etna

Daniele Andronico⁻¹, Andrea Cannata^{-1,2}, Giuseppe Di Grazia⁻¹, Ferruccio Ferrari⁻¹, Luigi Lodato⁻¹

¹Istituto Nazionale di Geofisica e Vulcanologia, Sezione di Catania, Osservatorio Etneo - Piazza Roma 2, 95125 Catania, Italy

²Università di Perugia, Dipartimento di Fisica e Geologia, Via Alessandro Pascoli, 06123 Perugia

Keywords: Mt. Etna, summit craters, paroxysmal episodes, episodic eruptions, statistical analysis

Although renowned for its prolonged effusive eruptions, Mt. Etna (Sicily, Italy) has shown a major increase in its explosive activity over the last 30 years. The summit craters, in particular, have produced more than 230 paroxysmal episodes. They are characterized by strong Strombolian to lava fountaining activity, typically accompanied by the formation of eruption columns that cause tephra fallout up to tens of km away from the volcano. This activity has not only been frequent but mostly as long-lived, episodic eruptions, consisting of sequences of individual paroxysmal episodes lasting days to months, which has severely affected both the territory around the slopes of the volcano (infrastructures and agriculture) and the air space above (causing potential risks to aviation). We compiled an entirely new database, where each episode occurring after 1986 is identified by master data (date and crater), eruptive style (strong Strombolian vs. lava fountaining), and seismic features. Concerning the latter, the substantially different technologies did not allow the proper collection of data prior 2004; thereafter, a more homogenous acquisition has enabled producing comparable volcanic tremor data and parameters. The database, structured to be easily updated in the case of future volcanic activity, can run different types of graphs, displaying well the statistical analysis of the paroxysmal episodes of the last 30 years, e.g. their temporal clusterization and probability occurrence of single episodes when a new sequence has started. Furthermore, the clear representation of the temporal patterns of the main seismic parameters (RMS/RD trend and peak values, cumulative energy, and durations of the whole episode and the most energetic phase) enables analysing the last 10 years of summit activity. All these outputs, including a scale-law fitting the tremor features, constitute a powerful tool to assess the hazard from the summit paroxysmal episodes at Etna.