



The January-June 2000 fire fountaining at South-East Crater of Mount Etna (Italy): insights into the dynamics of the shallow plumbing system

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Among the explosive styles of Mount Etna volcano, in Italy, the lava fountains are very spectacular eruptions. They consist of violent degassing phases that take place (usually at the summit craters) episodically or repeatedly over periods lasting from a few weeks to months. The South-East Crater, the younger of the two subterminal cones of Etna, is an important expression of such high explosivity. This cone, arising in 1971, started to grow from 1978 mainly due to very frequent explosive activity, consisting of almost persistent Strombolian explosions alternated with periods characterised by a high number of lava fountaining episodes. We studied in particular the 26 January-24 June 2000 eruption, during which 64 fire-fountains occurred. For most of the episodes, detailed volcanological observations have been carried out and correlated with the associated volcanic tremor. These ones pointed out (Alparone et al., 2003) that a succession of eruptive phenomena is commonly repetitive for each lava fountain episode, thus suggesting to subdivide it into three main eruptive phases (re-summption, paroxysmal and conclusive). In this work, we show new petrologic data on both tephra and lavas sampled during most of the 2000 paroxysms. These data have been integrated with volcanological information, carried out with field surveys and video camera registrations, in order to: i) investigate if, and eventually how, the magmatic processes in the South-East Crater plumbing system may control the eruptive phenomenology observed during each lava fountain, according to different models on the behaviour of gas-melt mixtures (e.g., Jaupart and Vergnolle, 1989; Wilson and Parfitt, 1995), and ii) get new insights into the mechanisms governing magma differentiation during the 2000 eruption of South-East Crater. The results gained for this

eruption allowed us to better constrain the relationships existing between eruptive activity and dynamics of magma in the plumbing system related to the central conduits of Mount Etna, and to compare them with the studies of the most recent eruptions at South-East Crater occurred in 2006-2007.