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2002-2003 crisis at Stromboli volcano: micro-scale variations rercording macro-scale processes

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2002-2003 crisis is one of the most powerful manifestation of the long-lived activity at Stromboli volcano. The composite activity was made up by lava flow and paroxystic explosion, with the ejection of considerable amount of large lithics and nearly-aphyric golden pumices, accompained by smaller volume of porphyritic black scoria-bombs. In-situ chemical (EMPA-WDS, LAM) and Sr-isotopic analyses have been performed on groundmasses and mineral phases (plagioclase, clinopyroxene, olivine). The simple combination of these micro-analytical methods provides a valuable tool for the understanding of the evolution of magmatic system. Stromboli lavas and scoria-bombs are shoshonitic basalts, containing phenocrysts of plagioclase with variable sieved texture zoning, clinopyroxene with complex zoning and olivine usually with small reverse zoning. Plagioclase is also present as widespread microphenocryst phase in groundmasses. Pumices are extremely vesiculated with scarce occurrence of olivine and plagioclase. Glassy groundmasses of black scoriae and lavas are relatively K- and P-rich, with K2O and P2O5 contents of 4.0-4.9 and 1.0-1.6 wt%, respectively, and MgO of 2.8-3.6 wt%. Glassy groundmasses of pumices have lower K2O(1.7-2.5 wt%) and P2O5(0.5-1.3 wt%) and higher MgO (5.5-6.2 wt%) than lava and scoria groundmasses. Trace element contents of groundmasses and mineral phases show small variations during the pre-, syn- and post-paroxysm phases. Sr-isotope ratios of lava groundmasses are generally slightly lower than those of the respective whole rocks and show a smooth decrease with time. of groundmasses decrease with time. 87Sr/86Sr of pumices are lower and similar to those of the previously erupted pumices. On the contrary, Sr-isotope ratios of performed on olivines and plagioclases of lavas

show the highest recorded values. Results suggest that the shallow reservoir feeding the normal strombolian activity, perturbated by the refilling with new batch of low-porphyritic magma, has been quickly recovered in its steady state conditions. Moreover, the correlation between Sr-isotope and trace element data suggests a combination of complex processes as mineral re-cycling, accumulation and resorption.