

**CHEMICAL EXCHANGES DURING CHAOTIC  
MAGMA MIXING EXPERIMENTS OF RHYOLITIC  
AND LATITIC MELTS FROM VULCANO ISLAND  
(AEOLIAN ISLANDS, ITALY)**

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Magma mixing has been recognised as a trigger of highly explosive eruptions, moreover it has been suggested to be a potential chronometer to estimate the mixing-to-eruption time. Here, a series of chaotic magma mixing experiments was performed using natural melts in order to estimate time scales of volcanic eruptions in the Aeolian Archipelago volcanic system. The end-members used to carry out our experiments were a rhyolite and a latite from La Fossa Cone in Vulcano (Italy). Vulcano is the southernmost island of the Aeolian Archipelago and it is composed of volcanic rocks with variable degree of evolution ranging from basalt to rhyolite (e.g. Keller 1980; Ellam *et al.* 1988; De Astis 1995; De Astis *et al.* 2013). Its magmatic activity dates back to about 120 ky while the last eruption occurred in 1888-1890. Mixing experiments were performed using the Chaotic Mixing Apparatus (COMMA), installed at Department of Physics and Geology of University of Perugia, at 1200°C and atmospheric pressure with different run durations (10.5, 21, 31.5 hours). The aim of the work is to track and measure the evolution of the mixing patterns and the associated modulation of chemical composition with time. The products of each experiment are crystal-free glasses in which the variation of major elements was investigated along different profiles using electron microprobe (EMPA) at Institute für Mineralogie, Leibniz Universität Hannover (Germany). In the experimental samples, we observed the presence of mixing structures generated during the experiments which are topologically similar to those occurring in natural mixed volcanic rocks of Vulcano island. The topological and chemical experimental results helped us to derive empirical relationships linking the structures generated, the chemical exchange and the mixing time to the natural system.