# Timescale of magmatic processes by *in-situ* Sr-isotope data in the present-day activity of Stromboli, Italy

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Over the last several hundred years, the steady-state activity of Stromboli has been characterised by persistent mild explosive eruptions, ejecting black scoria bombs. Periodically, lava flows and paroxysms, also ejecting light-coloured pumices, interrupt the "normal" activity. A degassed and highly porphyritic magma (HP-magma), with a basaltic shoshonitic composition, is erupted by the normal activity and by the lava flows, whereas a slightly more mafic and volatile-rich magma with low phenocryst content (LP-magma) is also erupted as pumices by the paroxysms. The last eruptive crisis broke a phase of intense Strombolian activity. It consisted of a lava flow from 28-December-2002 to 21-July-2003, of a landslide causing a tsunami and of the 5-April-2003 paroxysm. *In-situ* trace element and Sr isotope microanalyses on plagioclase and clinopyroxene have been performed, together with the usual whole rock analyses, in the products of the last crisis. The rocks have the same composition of the previously erupted products. $^{87}Sr/^{86}Sr$ of lavas are mostly similar to those of 2001 scoria (ca. 0.70616), but in the groundmass of November-2002 scoriae they are slightly lower, leading to hypothesise a higher supply rate of the shallow magmatic system before the onset of the lava flow. Indeed, lower $^{87}Sr/^{86}Sr$ values (ca. 0.70611) still persist in the LP-magma which is considered to represent the refreshing magma of the shallower HP-magma reservoir. Minerals show the largest Sr isotope variations (0.706401–0.705966), with the highest values usually found in the cores, as it occurs in the products erupted during the last twenty years [1]. $^{87}Sr/^{86}Sr$ of rims is often higher than the groundmass values, especially in lavas erupted after 5-April-2003 paroxysm.

These results suggest that the shallow reservoir feeding the Strombolian activity and lava flows is still maintained in steady-state conditions. The fast system perturbations (paroxysms) caused by the refilling with fresh LP-magmas are recovered quite quickly. The complex chemical and isotopic zoning of the phenocryst indicates processes of crystal recycling and variably efficient degassing, both correlated with new magma supply.

**References**

[1] Francalanci et al., (2005) *JP* **46***, 1997-2021.*