Recent Stromboli (Italy): insights into magma sources and processes from melt inclusions.

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In the petrogenesis of the recent magmas erupted at Stromboli volcano (Aeolian Arc, Italy) the role of mantle and crust components as well as that of magma dynamics and residence at shallow level are still largely debated. New constraints on source processes and magma dynamics are provided by geochemical and isotopic investigations of olivine-hosted melt inclusions (MI).

Two different MI populations were considered: i) MI in pumice from tephra layers related to paroxysmal eruptions of the present Stromboli activity (<1.5 ky); ii) MI in S. Bartolo lava emitted during the preceding activity (5-2 ky). MI display high-K calc-alkaline and K-basaltic compositions. Occasionally MI from S. Bartolo show a calc-alkaline composition. As a whole, the chemistry of MI and host olivine (Fo is mostly 84-87, and scarcely 89-90, mol%) indicates that MI do not represent primary melts and formed from melts which underwent fractional crystallization at different extent of prevailing cpx and possibly crustal contamination.

The trace element compositions of MI, analyzed by SIMS and LA-ICPMS, are similar and reveal typical IAB signatures. However, peculiar of the pumice-hosted MI are significantly higher trace element concentration levels and slightly lower LILE/HFSE and LILE/REE ratios.

Pb isotope ratios, measured by HR-SIMS, reveal a decoupling between chemistry and isotope values. MI from pumices are characterized by more evolved chemical compositions and lower $^{207}Pb/^{206}Pb$ and $^{208}Pb/^{206}Pb$ values than reported for present Stromboli lavas, pointing to FOZO-like compositions. Such compositions are similar to bulk lavas from other Aeolian volcanoes. In contrast, more primitive MI from S. Bartolo lavas closely approach $^{207}Pb/^{206}Pb$ and $^{208}Pb/^{206}Pb$ values of Stromboli (De Astis et al., 2000) bulk lavas, plotting in proximity of EM2.

These new data are discussed in terms of possible source heterogeneity, changes in magma sources through time and mechanisms of magma dynamics within the deep and shallow plumbing system.

References

[1] De Astis (2000) *CMP* **139,** 684-703.