Investigating compositional heterogeneity of volcano feeding systems: the Upper Pumice explosive eruption of Nisyros (Greece)

E. BRASCHI[1*], F. MASTROIANNI[2], G.E. VOUGIOUKALAKIS[3], S. DI SALVO[2] & L. FRANCALANCI[2]

[1] CNR-IGG, Via G. La Pira 4, Firenze, Italy
*correspondence: eleonora.braschi@igg.cnr.it
[2] Dipartimento di Scienze della Terra, Universita degli Studi di Firenze, Via G. La Pira 4, Firenze, Italy
[3] HSGME, S. Lui 1, Olympic Village, Athens, Greece

Understanding differentiation processes of magmas and their pathways through the crust is of crucial importance in constraining the processes driving the eruptions and in improving our knowledge on the behaviour of active volcanoes with a major impact on scientific and social aspects.

The last sub-Plinian explosive eruption of Nisyros Volcano (Greece), known as Upper Pumice (UP), emplaced a pyroclastic sequence constituted by a basal, pumice-rich fallout overlaid by a thick unit of diluted pyroclastic density current (PDC). The sequence is capped by a lag-breccia deposit and grey ash flow levels. The main juvenile component is represented by white-yellow, moderately crystalline pumice, with rhyo-dacitic composition and homogenous Sr-Nd isotope ratios. Some (5-8%) of dense, grey, crystal-rich juvenile clasts with rounded shape and less evolved composition (andesite to dacite) are present in the fallout and in the PDCs. They become the principal juvenile component in the lag-breccia deposit, characterized by biggest sizes, crenulate or bread-curst surfaces and more homogeneous basaltic-andesitic composition. All crystal-rich clasts show a large variability in chemical and isotopic composition as well as in textures, displaying high vesicle contents and variable crystals abundance, which at places forms the typical network of quenching structures.

The observed compositional heterogeneity among the crystal-rich clasts is fairly correlated with their textural features and describe two different trend of correlation. This suggests the occurrence of a distinct ascent and storage history for the mafic melts before refilling the shallow magma chamber. Furthermore, they suggest distinct interaction dynamics between the variably evolved magmas in the shallow UP reservoir prior the eruption.

This abstract is too long to be accepted for publication. Please revise it so that it fits into the column on one page.