

Magma hybridization recorded in banded pumices from the 0.17 Ma El Abrigo eruption, Tenerife: preliminary results

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The El Abrigo member, belonging to the Diego Hernández Formation (SE Tenerife, Canary Islands) represents the final (0.17 Ma) and most voluminous eruption (>20 km³ DRE) of the last cycle of explosive eruptions of the Las Cañadas volcano. It is a dominantly phonolitic ignimbrite, but both mafic and banded pumices are common. It has been suggested that the El Abrigo eruption was triggered via the input of fresh, more mafic magma into a shallow, phonolitic magma chamber.

Here we show the first results of a petrological and geochemical study carried out on a variety of pumices sampled in the El Abrigo member, ranging from dominantly mafic to banded to phonolitic. Banded pumices show textures varying from coarsely to finely banded. More disorganized, patchy pumices are also present. Mafic pumices host numerous phonolitic enclaves, sometimes grading to banded within a hand sample. In contrast, phonolitic pumices are homogeneous, and highly vesicular. Raman spectra indicate that phonolitic glasses from both white and banded pumices contain 2.2-3.3 wt.% H₂O.

Small-scale, fluidal mixing structures are widely present in SEM BSE images and involve a less-evolved, partially-crystallized melt of tephriphonolitic composition (SiO₂~53 wt.%; MgO~2 wt.%) and a phonolitic melt (SiO₂~61 wt.%; MgO~0.3 wt.%). EPMA glass profiles highlight that the entire range of compositions is present within a single thin section, and high compositional contrasts exist on scales of tens to hundreds of microns. The presence of such small-scale structures suggest that mixing was of limited efficiency and that the eruption likely started shortly after the beginning of this process, as longer timescales would erase such heterogeneities by advection and chemical diffusion.