

## Elucidating the source of carbonate in ultramafic intraplate volcanism

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There are increased observations of carbonate-rich volcanism from ultramafic intraplate volcanic provinces which has led to discussions on the origin of the carbonate. Ultimately, the source of carbon in these areas has implications for the longevity, storage of carbon within the mantle and the reactivity of mantle-derived melts.

This study focuses on volcanism from the Calatrava Volcanic Province, Spain. We selected volcanic products that have an association with mantle xenolith material in order to identify magmas that are derived from the mantle. Careful petrological identification of carbonates trapped within mantle xenoliths and those from mantle-derived xenocrysts was performed in order to characterise the geochemistry of the most primitive examples. Carbonate also occurs as spherical fragments within glassy melilitites, as euhedral phenocrysts within glomerocrysts within leucitites and as a fine ash in many pyroclastic examples.

Carbonates within mantle xenoliths are composed of calcite and dolomite, up to a modal percent in some xenoliths. Often associated with silicate glass within veins in xenoliths the carbonate can form spherical-oblate morphologies. Carbonate within mantle-derived xenoliths has a range of compositions including aragonite, calcite and dolomite. We analysed major and trace elements along with strontium and lead isotopes. Trace element analysis indicate a similar composition to other mantle xenolith-hosted carbonates, specifically with low trace element contents. Isotopic analysis shows OIB-like affinities with enriched  $^{87}\text{Sr}/^{86}\text{Sr}$  (0.705-0.706). Spherical carbonates within glassy fresh lava may have crystallised from a carbonated-silicate melt [1] further analysis of these samples reveals the structure and origin of the carbonate associated with shallower magmatic processes.

[1] McMahon, 2015, New insights into deep mantle melts: The carbonatite-melilitite connection. PhD Thesis