

Peridotite xenoliths from the El Morrón de Villamayor volcano (Calatrava Volcanic Field)

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The El Morrón de Villamayor (MVM) volcano is one of the scarce leucitite outcrops in the circum-Mediterranean area. Lava flows carry thin cm-sized peridotitic xenoliths whose petrographic and chemical features are indicative of a singular lithospheric mantle below Central Iberia.

This is the only xenolith suite displaying modal composition ranging from orthopyroxene-poor lherzolite to wehrlite in the Calatrava Volcanic Field (CVF). Clinopyroxene trace element composition indicates that the MVM xenoliths are more primitive than other suites of the CVF. These xenoliths can be divided in two groups according to clinopyroxene chemistry: (1) LREE-depleted mantle xenoliths (mostly wehrlites) and (2) slightly Sr-LREE-HFSE (Th, U, Nb, Ta, Pb) enriched lherzolite xenoliths showing a low degree of metasomatism by an old? carbonate-rich silicate alkaline melt. This second group represents a mantle affected by a higher degree of partial melting, as evidenced by the high Mg-number (91.8 to 93.7) of their primary mafic phases.

The MVM peridotite xenoliths are slightly shallower (8.8-13.6 kbar) and markedly colder (618-942 °C) than most of the mantle xenolith suites of the CVF. Nevertheless, *P-T* results are aligned along the theoretical geotherm of Central Iberia. The mantle section sampled by the MVM leucitite is in a marginal position with respect to the bulk CVF, and lacks the strong imprint of alkaline metasomatism shown by other xenolith suites of this volcanic field.

The MVM xenoliths show a variable host leucitite-peridotite interaction, indicated by positive K anomalies in multi-trace element plots (whole rock analysis) and the occurrence of K-rich minerals within reaction zones (e.g., sanidine, richterite, nepheline and leucite). The Sr-Nd isotopic composition of the MVM peridotites define a trend towards the EM-II lithospheric component, overlapping the field of the host leucitites. This is in marked contrast to the characteristic FOZO isotopic signature exhibited by the bulk CVF melts and associated xenolith suites.