



Petrology of suprasubductive mantle xenoliths from Estancia Sol De Mayo (Central Patagonia, Argentina)

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A new suite of mantle xenoliths from Estancia Sol de Mayo in the south western corner of the Meseta Lago Buenos Aires (MLBA) has been investigated. Xenoliths were entrained in the alkaline post-plateau lavas of the MLBA, which represents one of the five Mesetas of the Triple Junction Province, together with the Meseta de la Muerte, Belgrano, Central and the northeastern region. Xenoliths are protogranular spinel-bearing harzburgites and dunites, with minor lherzolites and one wehrlite. Metasomatic minerals and textures are not observed. Olivine is the most abundant and largest mineral, commonly showing with kink-banding. Orthopyroxene is present as i) large protogranular, deformed crystals commonly showing exsolution lamellae (opx1), ii) small, clean, undeformed crystals without exsolution lamellae (opx2) and iii) small crystals arranged in vein (opx3). In the Al_2O_3 vs mg# diagram it shows two trends characterized by different Al_2O_3 contents at comparable mg# ($(Mg/Mg+Fe)*100$ mol%) value. Crystals arranged in vein (Opx3) belong to the Al_2O_3 -enriched trend, while Opx1 and Opx2 are equally distributed between the two trends. Chondrite-normalized trace element patterns of opx are characterized by negative Sr, Zr and Ti anomalies and positive Th anomaly. A remarkable positive Zr anomaly characterises opx3. Clinopyroxene has variable size but it is always smaller than olivine and opx1. Two texturally different clinopyroxenes, one protogranular (cpx1) and another growing around spinel (cpx2) are recognized. Within the same sample, at comparable mg#, cpx2 appear enriched in Al_2O_3 . In the Al_2O_3 vs mg# diagram cpx2 defines a different trend with respect to cpx1. In chondrite-normalized incompatible trace elements diagrams, the two cpxs have very similar patterns with cpx2 displaying slightly enriched values. The patterns are characterized by a positive Th anomaly, a slightly negative Sr anomaly and prominent negative Nb, Zr and Ti anomalies. La/Yb ratios are negatively correlated with the Al_2O_3 content excluding a direct link with a melting episode. Spinel are black in colour, with the smallest size, commonly subeuhedral, rounded or elongated in shape. Two well-defined trends are also defined by spinel compositions. Isolated spinels plot along a depletion mantle trend with mg# and cr# ($Cr/Cr+Al$ mol%) varying between 53.14-58.83 and 57.88-60.60 respectively, whereas spinels surrounded by cpx are characterized by MgO and Al_2O_3 enrichments (mg#, 67.02-71.57; cr#, 36.36-40.47) well outside this trend. Separated cpx have high $^{87}Sr/^{86}Sr$ and low $^{143}Nd/^{144}Nd$ isotopic ratios supporting an enrichment episode related to the infiltration of a transitional/alkaline melt analogous to the MLBA basalts.

A large comparison of the pyroxene chemical compositions from several other mantle xenoliths localities from North to South Patagonia has been also carried out, together with new Sr and Nd isotopic determinations from the same localities. These data evidence trends similar to those observed at Estancia Sol de Mayo, underlying petrological processes common to the whole Patagonian sublithospheric mantle. In few localities depletion events are highlighted, while in some others refertilization processes are responsible for the geochemical evolution.