Slab melt metasomatism recorded in ultramafic xenoliths from Cerro del Fraile (Argentina)

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Ultramafic xenoliths found in Quaternary volcanics at Cerro del Fraile, close to the main Austral Volcanic Zone (AVZ), represent fragments of the mantle wedge above a subducting plate, thus providing material for studying the interaction between metasomatizing slab melts and peridotite. They consist of protogranular lherzolites, harzburgites and plagioclase-bearing orthopyroxenites (opxtes). Primary cpx of peridotites (cpx1) have mg# ranging from 88.5 to 93.6 wt% and their TiO_2 content is low, whereas cpx in opxtes have lower mg# and higher Al_2O_3 and TiO_2. Based on trace element contents cpx1 can be divided into two groups. Group1 has convex HREE patterns, $(La/Yb)_N$ spanning from 0.05 to 4.04 and an increasing positive Zr-Hf anomaly. Group2 has lower HREE [$(La/Yb)_N$:1.83-14.2], high Th and U contents, wide Zr-Hf positive anomalies and a huge Ti through. Peridotitic opx have mg# and Al_2O_3 respectively higher and lower with respect to opx in opxtes. Two types can be recognized: the first is characterised by fractionated HREE, a negative Sr anomaly and flat LREE. The second one, at similar HREE values, is enriched in LREE. Opx of opxtes are different, with flat REE pattern at 1xCh and higher Sr and Ti contents.

Calculated melts in equilibrium with cpx and opx of opxtes closely resemble the adakitic magmas erupted in the AVZ.

The geochemical characteristics of peridotite xenoliths indicate that they interacted with a Si-Al-rich slab-related magma. The melt hybridized with peridotites, causing LREE enrichment in both pyroxenes and the increase in Zr-Hf abundances in cpx1. On the other hand opxtes represent the fractionation products of this melt.

Tectonic implication of the geochemical significances of the metamorphic rocks associated with the Neyriz ophiolite, SW Iran

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The Neyriz ophiolite occurs west of the Main Zagros Thrust. It mainly comprises harzburgitic peridotites that were tectonically emplaced to their present position. The ophiolites themselves are tectonically overlain by either slope basin deposits with lava blocks or massive Cretaceous limestone blocks. Sub-ophiolitic metamorphic rocks, i.e. epidote amphibolite and amphibolite are observed at the base of the ophiolite sequence, where they occur as thin tectonic slices with an inverted metamorphic gradient. These amphibolites are represented by MORB based on their major and trace compositions, characteristic of the mid-ocean ridges. Structural and geochemical evidence revealed an intraoceanic thrusting which took place near a spreading centre as a result of collision between the Afro-Arabian continent and the Iranian microcontinents during the Late-Cretaceous.