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Mantle xenoliths from the plio-quaternary volcanism of Aïn Témouchent (North Western Oranie): evidence of mantle metasomatism recorded in wehrlites

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The alkaline volcanic products of the plio-quaternary eruptive complex of Aïn Témouchent (North Western Oranie) contain numerous peridotite xenoliths (lherzolites, harzburgites and wehrlites). They are spinel + amphibole + feldspar + mica-bearing rocks characterized by textures showing traces of deformation and recrystallization typical of mantle tectonites. In the lack of deep basement occurrences in Oranie, the study of the mantle xenoliths contributes to a better knowledge of the upper mantle along the South margin of the Alboran plate.
The mantle xenoliths of Aïn Témouchent evidence the textural and mineralogical heterogeneities of the upper mantle under Oranie. Their bulk compositions (major and trace elements) show an evolution from poorly refractory lherzolites to highly refractory harzburgites whereas those of wehrlites commonly do not fit in this trend.
Lherzolites and harzburgites are depleted in rare earth elements and their patterns show an evolution from a DMM type (Depleted Mantle MORB type), in spinel lherzolites, to an asymmetrical U shaped one in spinel + amphibole + feldspar harzburgites and lherzolites. This evolution could possibly reflect superimposed metasomatism processes over an earlier episode of partial melting. Wehrlites are both enriched in rare earth elements and their REE patterns evidence an almost total obliteration of an earlier depleted character by interaction processes between a peridotitic upper mantle and infiltrated basaltic magmas. These processes of interactions would be thus responsible for the significant "wehrlitisation" of some areas of the upper mantle beneath Oranie.