

Ultramafics in the Western Mediterranean: A geochemical perspective from the Collo area (NE Algeria)

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The dismembered fragments of the Alpine belt recovered around the Mediterranean basin are witnesses of the collisional events between Africa and Eurasia and of the opening of the western Mediterranean basins during the Cenozoic. In the eastern part of North Algeria, Cr-lherzolites outcrop in the Collo massif (c. 20km²) within the metamorphic basement of Lesser Kabylia. The contact between these mantle rocks and the metasediments is outlined by HT cordierite-sillimanite-bearing kinzigites. Among the forty-five peridotites studied, the large majority are spinel-bearing lherzolites but few samples are harzburgites, dunites and also scarce garnet-bearing lherzolites. All samples show overall high serpentinization degree (LOI% up to 15). Olivine, spinel and pyroxene chemical composition displays weakly depleted geochemical character. WR and mineral trace elements patterns yield overall a typical abyssal-like signature with a steep LREE depletion ($0.01 < \text{sample}/\text{CHUR}_{\text{REE}} < 0.1$) and flat HREE to MREE. Modelling suggests relatively low to moderate partial melting degree (8%) of a depleted mantle source. Fluid-mobile elements (Pb, U,..) show positive spikes interpreted as reflecting strong fluid circulation. Pb isotopes for all lithologies yield homogeneous signature with anomalous and high radiogenic ²⁰⁷Pb/²⁰⁴Pb ratios compared to ²⁰⁶Pb/²⁰⁴Pb. Combined to relatively unradiogenic Nd signatures (0.51227-0.51275) observed for some samples, this suggests participation of a crustal- and/or sedimentary-derived component in the magma source. These results are used to propose a geodynamical environment for the peridotites and to allow complementing the puzzling Cenozoic evolution of this part of the Western Mediterranean.