MANTLE XENOLITHS EVOLUTION DURING NEOGENE POST-COLLISIONAL TRANSITION FROM CALC-ALKALINE TO ALKALINE VOLCANISME IN ORANIE : A SLAB BREAKOFF

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Abstract
The western Oranie, located at the northern margin of the African plate, is characterized by important plio-quaternary alkali volcanic extrusions. This volcanism shows a change in composition during the Neogene from calco-alkali at the Miocène to alkali at the Plio-Quaternary. These xenoliths are subdivided in three groups : (1) Type I mantle tectonites (porphyroclastic and equigranular lherzolites and protogranular harzburgites) reequilibrated in the spinel and/or plagioclase stability field. (2) type II basaltic cumulates (wehrlites, pyroxenites and hornblendites) and (3) rare composite xenoliths. On the basis of trace element compositions determined by LAM-ICP-MS, three groups of clinopyroxene can be subdivided. (1) Clinopyroxenes with trace element signature depleted in LREE ((La/Yb)N=0.21-0.33) belong to protogranular Sp-bearing harzburgites or Cpx-rich Sp-bearing lherzolite. They show evidence of small degrees of partial melting that affected only LREE. (2) Clinopyroxenes associated with composite xenoliths have the same shape of patterns (enrichments in MREE relative to LREE) but show different level of enrichment in trace elements characteristic of a nearly complete reequilibration with deep alkali segregates. This difference in trace element enrichments is related to the Mg# of the cpx and probably to the depth of crystallisation of the cpx in an alkaline melt. (3) Clinopyroxenes associated with harzburgites or lherzolites showing various degrees of enrichments in LREE are directly related to different stages of incomplete reequilibration during melt-rock reaction processes. Some of these peridotites are enriched in metasomatized cpx and can evolve to a werhlitic composition. Moreover, some of these peridotites are strongly metasomatized and show occurrences of glass in foliation plans underlined by spinel alignements. The trace element composition of the glass has been determined and shows enrichments in LREE (La/YbN=22.4-23.6) but positive anomalies in Nb, Ta ((Nb/La)N=1.82-2.17) without significant other enrichment or depletion in other HFSE. The glass trace element composition is either distinct from the trace element composition of the alkaline host lava nor with the trace element composition of calco-alkaline lavas in the area. The composition of the glass probably results from complex infiltration-reaction-crystallisation processes. The calc- alkaline volcanic products of Oranie would derived from melting of a mantle having preserved an orogenic geochemical, probably inherited of a previous subduction episode. This signature would have dimmed progressively during the time, what would reflect a change of geodynamical context bordering to a contribution more and more marked of the process of partial melt of a subcontinental sheared and more fertile mantle.