Metasomatism in the Subcontinental Lithospheric Mantle beneath Azarbayjan Magmatic Plateau, NW Iran: Evidence from potassic lamprophyres from the Salavat range

A.SOLTANMOHAMMADI*[1], M.RAHGOSHAY[1], G. CEULENEER[2], M.GREGOIRE[2] AND M. BENOIT[2]

[1]Shahid Behehsti University, Tehran, Iran (*correspondence: azamsoltanmohammadi@gmail.com)

[2]Toulouse III University, GET, CNRS-IRD, OMP, Toulouse, France

The Azarbayjan Magmatic Plateau (AMP) is a huge area of Tertiary alkaline volcanism in Iran. The main tectonic features of AMP were formed as a result of convergence between the northward-moving Afro-Arabian plate and the relatively stable Eurasian plate. The lithospheric mantle evolution beneath AMP is not well known due to the limited petrological data and thus the magmatic evolution of this area is still debated.

Mafic porphyritic dykes, classified as minette lamprophyre, intrude the Early Cenozoic sedimentary formations. Idiomorphic phenocrystals of diopside-fasaite ($En_{38-45}Fs_{8.1-3.1}Wo_{49-53}$) with low Al^{vi}/Al^{iv} and medium to high Al/Ti, and phlogopite with high Mg# (64-76), TiO_2 (1.6-3.6), low and variable Al_2O_3 (14.1-16.1) are the main minerals. The rocks can be classified as calc-alkaline (shoshonitic) lamprophyres on the basis of major and trace elements; K_2O (1.4-6.5%wt), Al_2O_3 (11-21%wt), TiO_2 (0.63-0.96%wt) and V/Cr (0.2-0.96). All lamprophyres show strong enrichement in LILE and LREE, depletion in HFSE (Nb, Ta, Ti) and low Lu/Yb (0.14-0.16).

The new mineral and whole-rock geochemical data indicate that in addition to fractional crystalization and, possibly, minor crustal contamination, the partial melting of the metasomatized mantle played an important role in the formation of the lamprophyres (e.g., Dy/Yb, Rb/Sr and Ba/Rb ratios). The lamprophyre parental magma was generated in a collision-related extensional setting following the closure of the Neotethys Ocean during Cenozoic times.