



Quaternary Basanitic Rocks within the Eastern Anatolian Volcanism (Turkey): Petrological and Geochemical Constrains

Yavuz Özdemir (1), Çağrı Mercan (2), Vural Oyan (3), and Ayşe Atakul-Özdemir (4)

(1) Department of Geological Engineering, Van Yuzuncu Yıl University, Turkey, (yozdemir@yyu.edu.tr), (2) Vocational Higher School of Ömerli, Mardin Artuklu University, Turkey, (3) Department of Mining Engineering, Van Yuzuncu Yıl University, Turkey, (4) Department of Geophysical Engineering, Van Yuzuncu Yıl University, Turkey

The Eastern Anatolian Cenozoic continental intraplate volcanism was initiated in Middle Miocene as a result of the convergence between the Arabian and Anatolian plates. The origin of Eastern Anatolian volcanism has been the focus of many petrological studies that have aimed to resolve the relative contributions of asthenospheric mantle and/or lithospheric mantle with/without subduction component in the genesis of magmas that compositionally have many affinities to ocean island basalts (OIB) and volcanic arcs. Volcanism in the region characterized by mainly stratovolcanoes, basaltic lava plateaus and are dominantly spread at the northern parts of Bitlis Pötürge Massif (BPM). Our study focuses on a small scale Quaternary basaltic system that firstly observed within the BPM. The volcanic rocks of our study located 50 km to the south of Lake Van and are basanitic in composition. They exposed along K–G striking tensional fissures and crosscut the Upper unit of the Bitlis Massif. Initial products of the volcanism are scoria fall deposits. Thick basanitic lava flows overly the pyroclastics and formed columnar structures.

The basanites are generally fine-grained with phenocrysts of olivine+clinopyroxene. The groundmass is typically of clinopyroxene, olivine and Ti magnetite and Cr spinel with interstitial nepheline. The olivine phenocrysts are typically euhedral to subhedral with Forsterite contents of Fo73-83. Clinopyroxenes are highly calcic and show modest variations in Wo47-52-En34-42-Fs10-15 and are weakly zoned with mg# 89-87 at cores to 86-84 at rims. Nephelines occur as minor minerals within the networks of other groundmass minerals. Ti rich and Fe-Cr spinels occur as inclusions in olivine and clinopyroxenes as well as within the groundmass.

LILE and LREE enrichments over HFSE and HREE suggest similarities with magmas generated from enriched mantle sources. EC-AFC modeling of trace element and isotope compositions indicates that assimilation of crustal lithologies have minor effect on the evolutionary stages of basanitic rocks. Based on LREE/HREE, MREE/HREE ratios and partial melting models, we suggest that basanitic rocks of Çatak are produced from a lower degree melting of a garnet bearing mantle source.