

Geochemical properties of Miocene basaltic rocks from Yavuzeli-Araban-Narlı region, Southeast Anatolia, Turkey

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Miocene basaltic rocks from northern part of the Arabian plate (Southeast Anatolia, TURKEY) exposed as lava flow and blocky lava flow from the base to the top. The volcanic rocks are basalt-basaltic andesite in composition, and all of them have tholeiitic characteristics. Based on mineralogical and petrographical studies, it is observed that volcanic rocks are composed of mainly pyroxene and olivine phenocrysts. In the Wo-En-Fs classification diagram of Morimoto (1988), pyroxene compositions plot in the augite (Wo₃₁₋₄₁) field. Composition of olivine phenocrysts range from Fo₇₇ to Fo₈₄. Plagioclase minerals are generally found as a microlites in the matrix and labradorite-andesine (An₄₃ to An₆₀) in composition. Clinopyroxene and olivine are normally zoned, and MgO composition of the core and rim are virtually similar. Oxide minerals are ilmenite.

Major and trace element versus MgO diagrams indicate that fractional crystallization process is effective on the evolution of these basalts. Basaltic rocks are characterized by slightly LREE enrichment and high ⁸⁷Sr/⁸⁶Sr and low ¹⁴³Nd/¹⁴⁴Nd ratios ranging from 0.704574 to 0.705054 and 0.512652 to 0.512720, respectively. Slightly depletion of Nb-Ta on primitive mantle normalized multi-element diagrams, with have high ⁸⁷Sr/⁸⁶Sr and low ¹⁴³Nd/¹⁴⁴Nd ratios, and Th/Yb-Ta/Yb diagram reveal that crustal contamination could be effective in their generation. La/Nb (~0.7) ratios are similar to asthenospheric mantle source. The trace elements and isotopic values indicate an asthenospheric mantle source. Whereas, these rocks were not derived from a single mantle source according to partial melting modeling. The melts are produced probably by mixing of asthenospheric and garnet or spinel peridotitic mantle sources.

Reference

Morimoto, N. 1988, Nomenclature of Pyroxenes, *Bull. Mineral.* **111**, 535-550.

Petrogenesis of Delihalil Quaternary basaltic volcanism, South Anatolia, Turkey

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In this study, Delihalil Quaternary basaltic volcanic rocks situated in the southwest of Osmaniye (south Anatolia, Turkey) were studied. Volcanic units are composed of scoria cones and lava flows exhibiting alkaline characteristic. They are basanite (early eruption phase) and basalt (late eruption phase) in composition.

Volcanic rocks consist of olivine and clinopyroxene phenocrysts with plagioclase and clinopyroxene microphenocrysts and microlites. Such features as resorbed surface, skeletal textures, glass and opaque mineral inclusions in the olivine phenocrysts of the early eruption phase indicate magma mixing process in the evolution of these volcanic rocks.

Variation diagrams of MgO with major and trace elements are consistent with fractional crystallization process for basanites. However, this process did not play an important role in the formation of the alkaline olivine basalts which are the late eruption phase. Primitive mantle normalized trace- and RE-element spider diagrams exhibit that the early eruption phase (basanites) is more enriched than the late eruption phase. However, because of similar trace element patterns seen in spider diagrams, it can be concluded that they are derived from the same mantle source with different degrees of partial melting. Delihalil volcanism has low Sr and high Nd isotopic compositions. Their Sr and Nd isotopic compositions range between 0.703012-0.703617 and 0.512848-0.512947, respectively. In the Sr-Nd isotopic variation diagram, the early eruption phase samples are located into the HIMU-OIB area, whereas the late eruption phase sample is located into the EM-I field.