Geochemistry of the mafic lavas from the Mersin mélange: Implications for the Middle Triassic subduction in the Neotethys

K. SAYIT[1]*, Y. BEDI[2], U.K. TEKIN[3], M.C. GÖNCÜOGLU[1], C. OKUYUCU[4] AND S. UZUNCIMEN[3]

[1]METU, Geological Engineering, Ankara, Turkey (*correspondence: ksayit@metu.edu.tr)
[2]MTA, Dept. of Geological Research, Ankara, Turkey
[3]Hacettepe University, Geological Engineering, Ankara, Turkey
[4]Selcuk University, Geological Engineering, Konya, Turkey

The Mersin Ophiolitic Complex is an allochthonous unit structurally overlying the Tauride Platform. The complex is made up of several tectonic slices characterized by; a sub-ophiolitic metamorphic sole, ophiolitic series and a mélange. The Mersin mélange comprises blocks of diverse origins and ages embedded in a Late Cretaceous clastic matrix. Basaltic blocks are common and sometimes primarily associated with pelagic lithologies, including chert and mudstone. In this study, we investigate the geochemistry of such basaltic lavas interbedded with the cherts ascribed to the Anisian on the basis of radiolarian fauna.

The samples are mainly characterized by fine- to medium-grained, aphyric to porphyritic lavas. The presence of secondary mineral phases reflects the influence of low-grade hydrothermal alteration on the samples. Based on immobile element systematics, the samples can be classified as sub-alkaline basalts and basaltic-andesites. In the multi-element plots, these lavas show HFSE patterns similar to N-MORB. However, Th and LREE are apparently enriched relative to HFSE (Th/Nb = 0.20-0.38, La/Nb = 1.4-2.7), which creates negative Nb anomalies. In the REE plots, the lavas show relatively flat patterns ($[La/Yb]_N$ = 0.9-1.5).

The lavas display characteristics of magmas generated above intra-oceanic arc-basin systems. The mantle source of the lavas appear to be similar those of N-MORBs, which has been variably metasomatized by slab-derived fluids and/or melts. The overall trace element systematics of the studied extrusives indicate that they are more likely to have been formed in a back-arc setting rather than an island arc. Also considering the geology, this suggests that these basaltic/basaltic-andesitic lavas represent the presence of an oceanic back-arc basin during the Anisian (Middle Triassic) in the Neotethys. This, in turn, indicates that the subduction process was ongoing during the Anisian, therefore constraining the rifting and oceanization of the Neotethys to an earlier period (i.e. Early Triassic or older).

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