

Geochemistry and petrology of the Kösedag̃ metavolcanic rocks, Sakarya Composite Terrane, Northern Turkey

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Central Pontides in Northern Turkey is a key area, comprising variably metamorphosed and deformed low-grade metavolcanic rocks. In this study we report the geochemical characteristics of the Kösedag̃ metavolcanics (KMV), and infer their tectonomagmatic evolution.

The KMV include blastomylonitic volcanic rocks covered by the Cretaceous clastics and carbonates. The chemical composition of the KMV ranges from basalt, andesite to dacite. The evolved magma compositions reflect fractionation of plagioclase, Fe-Ti oxides and ferromagnesian minerals. Based on immobile trace element systematics, the KMV are subdivided into two groups as Type-1 and Type-2. Both types are enriched in Th and LREE relative to HFSE and display negative Nb anomalies. Type-1 exhibits depletion in P, whereas Type-2 is characterized by depletion in Zr and Hf. Combined with their subduction-related characteristics, the relatively high Zr/Nb ratios (Type 1: 38.1-52.9, Type-2: 21.8-41.2) of the KMV suggest involvement of a depleted mantle source(s) which has been fluxed by slab-derived components. The KMV appear to have been generated from a mantle source(s) in the stability field of spinel, rather than garnet, owing to the low Sm/Yb ratios of the volcanics (0.9-1.2). The KMV rocks exhibit strong correlation with the modern oceanic arcs, such as Greater Antilles and Mariana.