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Petrology of Neotethyan ophiolites in Turkey: Divers magma types and their tectonic significance

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The Anatolian plate is situated in a critical segment of the Alpine-Himalayan orogenic system, where remnants of the Neotethyan ocean basins crop out along E-W trending tectonic zones between metamorphic massifs and/or platform carbonates. The remnants of the Neotethys, in a structural descending order, are characterized by ophiolites, metamorphic soles and ophiolitic melanges. Well-preserved Neotethyan ophiolites in Turkey are of supra-subduction zone (SSZ) type and display a consistent sequence of events during their formation and emplacement. Geochemical evidence from the selected ophiolites such as Kizildag (Hatay), Tekirova (Antalya), Divrigi (Sivas), Kömürhan (Elazig), Ispendere (Malatya), Pı narbasi (Kayseri), Mersin, Lycian and Pozanti-Karsanti (Adana) show three different magma generations constructing oceanic crustal units during the Neotethyan subduction during Late Cretaceous.

The ultramafic and mafic cumulate rocks in the studied ophiolites are represented by dunite, wehrlite, lherzolite, olivine clinopyroxenite, olivine gabbronorite, olivine gabbro, gabbronorite and gabbro. The order of crystallization in mineral phases, whole rock and mineral chemistry data suggest that the primary magma generating the cumulate rocks is compositionaly similar to those observed in modern island arc tholeiitic sequence. The isolated dykes and isotropic gabbroic rocks exhibit three different geochemical features. These are similar to alkaline within plate basalts, island arc tholeiites and boninites. The sheeted dyke and volcanic rocks display two distinct magma generations for their formation. The first group indicates their origion from island arc tholeiitic melts whereas the second group suggests its origin from a boninitic magma.

All geochemical evidences suggest that the crustal rocks of the Turkish ophiolites were derived from three different magma types. This suggests a progressive source deple-

tion from island arc tholeiites (IAT) to boninites in a fore-arc tectonic setting. Latest stage alkaline magmatism forming some parts of the isolated dykes and isotropic gabbros was probably fed by enriched-melts that originated within an asthenospheric window or because of slab break-off, shortly before the emplacement of the ophiolites onto platforms during Late Cretaceous.