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Crustal Architecture,Geochemistry and Geochronologyofthe Ophiolitesand Ophiolitic Mélangesin Southeastern Anatolia

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The Neotethyan ophiolites exposed in SE Anatolia–Syria occur along two, ENE-WSW-trending, sub-parallel belts(Fig.1). The ophiolites and ophiolitic mélanges in the southern belt include the Cretaceous Kızıldağ (Hatay), Baër–Bassit (Syria), Amanos-Meydan (Kahramanmaraş–Gaziantep), Koçali–Sincik (Adıyaman), and Killan–Artuk (Çermik, Diyarbakır) complexes that tectonically reston platform carbonates of the Arabian continental margin along S-vergent thrust sheets. The age–equivalent counter parts of these ophiolites to the west are the Troodos (Cyprus) and Tekirova (Antalya, Turkey) complexes, and to the east are the Cilo (Hakkari,Turkey), Kermanshah–Neyriz (outer Zagros belt, Iran) and Semail (Oman) ophiolites (Fig.1). The ophiolites in the northern belt comprise the late Cretaceous Göksun–Berit (Kahramanmaraş), İspendere (Malatya), and Kömürhan–Guleman (Elazığ) ophiolites, and occur between the Malatya–Keban Metamorphic Massifs (MKMM) of the Eastern Tauride Platform in the north and the Pütürge–Bitlis Metamorphic Massifs (PBMM) in the South (Fig.1). The senorthern belt ophiolites correlate with the Gevaş (Van,Turkey) and Zagrosinner belt ophiolites (Nain, Dehshir, Shahr-e-Babak and Balvard–Baft) in Iran to the east.

The Koçali Complex in the southern belt (Fig.1) contains Permo-Triassic to Cretaceous oceanic assemblages representing the rift-drift and seafloor spreading phases of formation of the Southern Neotethyan oceanic lithosphere. It consists of serpentinized peridotites, gabbros, dolerite dikes, pillow lavas, lava breccia, chert–mudstone, and pelagic limestone, and is underlain by an ophiolitic mélange. Gabbros, doleritic dikes and basaltic pillow lavas with boninitic characterists have very low TiO_2 (0.09–0.36wt.%), Nb(0.1–1.1ppm), Ti/V(3–10.7), Nb/Y (0.02–0.22) values, where as island arc tholeiite-type (IAT) basalts display low TiO_2 (0.60–0.80wt.%), Nb(0.9–1.4ppm), Ti/V(8.32–14.39) contents. U–Pb zircon dating of a plagiogranite dike has yielded a Concordia age of 95.83±0.75Ma. We interpret t his age as the timing of oceanic crust formation in a suprasubduction zone environment within the Southernmost Neotethys that is coeval with the age of the Samail–Oman ophiolite. The ophiolite and the mélange are thrust over a Senomanian–Turonian flysch succession overlying the Arabian Platform carbonates, and are covered unconformably by an Upper Maastrichtian clastics equence containing ophiolitic clasts. The ophiolitic mélange contains blocks of serpentinite breccia, pillow lava, basaltic breccia, pelagic limestone and radiolarite within as heared matrix made of serpentinite and red politic rocks. Basaltic pillow lavas in mega-blocks in this mélange display N–MORB and E–MORB like geochemical affinities. An N–MORB basaltic rock displays TiO_2 (1.42wt.%), Nb(3.4ppm), Th (0.3ppm), and Ti/V (27.46) values, whereas an E-MORB type basaltic sample has TiO_2 (1.41–2.44wt.%), Nb (5.4–8.4 ppm, Th (0.6-1.2 ppm), and Ti/V (27.99–36.78) values. $^{40}Ar/^{39}Ar$ whole-rock dating of an E–MORB type basaltic rock has revealed the cooling ages of 122.6 ±3.0 Ma (WMPA) and 146.4±8.1 Ma (TFA) that we interpret as the timing of the initial, seafloor spreading generated oceanic crust formation within the Southernmost Neotethys during the latest Jurassic and early Cretaceous.

Tectonically imbricated with the Koçali Complex and between the BPMM (North) and the Arabian Platform carbonates (South) is as everal-km-thick metamorphosed mélange, trace dover as everal tens of kilometers in the east–west direction. Blocks in this mélange range in size from 1000-1500 m inlength and ~500 to 700 m in thickness, and include variably metamorphosed (greenschist to amphibolites facies) volcanic (chlorite–

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actinoliteschist,epidote–actinoliteschist,amphibolite) and volcaniclastic (chlorite–actinolite schist, chlorite–sericite schist) rocks, chert, and carbonate rocks. Some of the blocks contain sodic-amphibole bearing meta-basaltic rocks, indicating their high-pressure/low-temperature metamorphic history. The mélange matrix is made of fine-grained phyllitic and meta-volcanic rocks. Clasts of meta-volcanic rocks in this mélange have high TiO_2(2.3–3wt.%), Nb (24.8–32.7ppm), Ti/V (55.6–74.5), Nb/Y (2.40-3.28) values, typical of ocean island basalts (OIB). Whole-rock ^{40}Ar-^{39}Ar dating of these clasts of volcanic rocks and the meta-volcanic matrix material have yielded, respectively, average cooling ages of 76 Ma and 58.7 Ma. We interpret these ages to represent the timing of seamount construction (Campanian) within the Southernmost Neotethys and the subduction closure of this ocean basin to the North of Arabiain the late Paleocene.

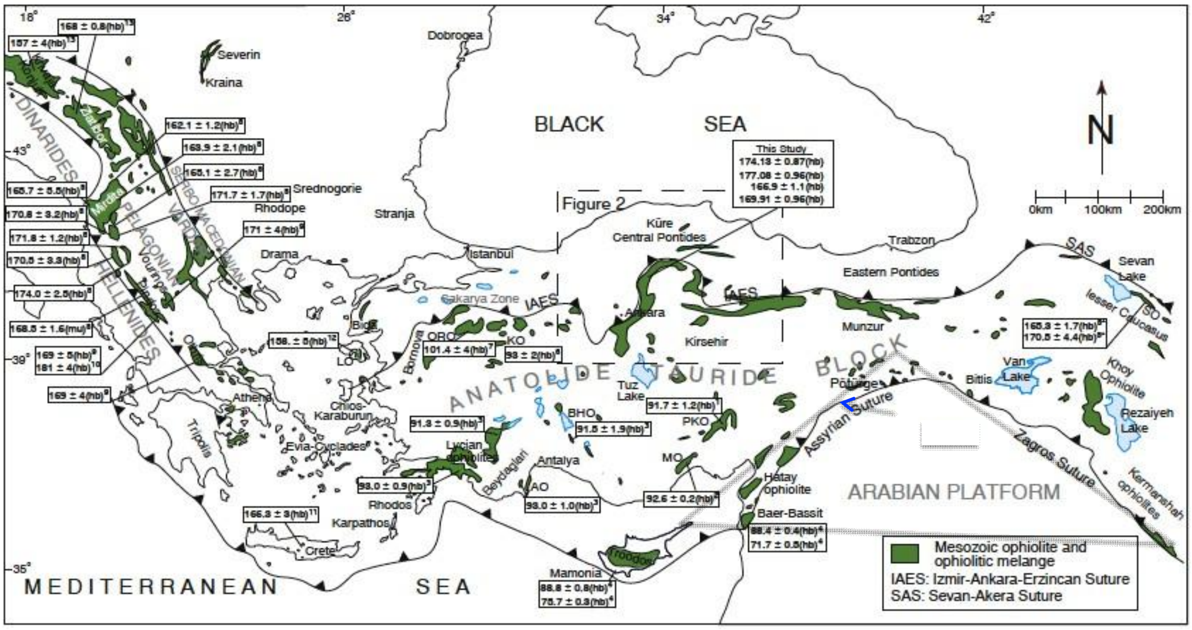

Fig.1 Ophiolite map of Anatolia (Turkey) and the distribution of Neotethyan ophiolites along the northern periphery of the Arabian plate in southeastern Anatolia (the map is from Çelik et al., 2011)