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Collision tectonics and crustal evolution of the eastern Mediterranean region since the late Mesozoic

Y. Dilek

Department of Geology, Miami University, Shideler Hall, Oxford, OH 45056, USA
(dileky@muohio.edu / Fax: +1 513-529-1542 / Phone: +1 513-529-2212)

The late Mesozoic-early Tertiary evolution of the eastern Mediterranean region was defined by a series of collisions between Gondwana-derived continental blocks and Eurasia as the intervening ocean basins closed. Prior to the terminal closure of these basins, subduction roll-back and associated extension/magmatism caused one or more episodes of arc splitting, producing SSZ oceanic crust with heterogeneous lithostratigraphy and geochemical fingerprints. Impingement of trailing continental margins with the trenches and subduction zones resulted in the cessation of slab roll-back and in the entrapment of the protoarc-forearc oceanic crust as ophiolites in various collision zones. The late Tertiary-Quarternary evolution of the region has been controlled by the generally northward motion of Afro-Arabia and the compressional tectonics induced by the convergence between Eurasia and Afro-Arabia. Earlier collisional events (Paleocene-Eocene) between different continental fragments caused the formation of thick orogenic crust, high-standing plateaus, and heterogeneous mantle, and resulted in slab breakoffs that were collectively crucial for the onset of post-collisional collapse of the mountain belts, tectonic extension, and bimodal magmatism (marked by linear distribution of granitoid plutons and high-K, shoshonitic to alkaline volcanics throughout Anatolia). The diachronous collision of Adria (Apulia) with Europe along its irregular margins created the Alps, the Apennines, and the Dinaride-Albanide-Hellenide mountain belt at different times, and affected the formation of the Carpathians in the east. The collision of the Arabian promontory with Eurasia ca. 13 Ma facilitated the westward tectonic escape of Anatolia and caused intense deformation taken up by crustal shortening and conjugate strike-slip fault systems in a zone of $\sim$1000 km stretching from the Bitlis-Zagros suture zone in the south to the Greater Caucasus in the north. The Anatolian plate has been rotating counterclockwise relative to Eura-

sia during its escape to the west and hence has been experiencing internal deformation through a combination of strike-slip and normal faulting, including metamorphic core complex formation (i.e. Menderes massif). Subduction roll-back along the Hellenic Trench has likely been the driving force for this SW motion of Anatolia and the extensional tectonics affecting the Aegean province in the upper plate throughout the late Tertiary. The widespread alkaline volcanism both in the Aegean extensional province and in the Turkish-Iranian plateau since the late Miocene shows chemical evidence for an enriched asthenospheric mantle melt source. In both regions post-collisional slab breakoff events have played a major role in providing this asthenospheric material and weakening the orogenic crust significantly. Young basins (Tyrrhenian, Aegean?) are in the process of opening above strongly arcuate subduction zones in a broadly convergent system of the Mediterranean region. The mantle response to the discrete collisional events, the geometry of colliding continental margins, and the scale of collisions strongly controlled the syn-to post-collisional tectonics and magmatism in the eastern Mediterranean region.