

TECTONIC-SEDIMENTARY EVOLUTION OF THE NORTH - TETHYAN MARGIN IN THE CENTRAL PONTIDES OF NORTHERN TURKEY

Timur Ustaomer¹ and Alastair Robertson²

¹ University of Istanbul, Department of Geology, 34850, Avcilar, Istanbul, Turkey

² University of Edinburgh, Department of Geology and Geophysics, West Mains Road, Edinburgh EH9 3JW, Scotland, U.K.

The Central Pontides of northern Turkey is one of the best exposed segments of the southern margin of Eurasia, adjacent to the Tethys Ocean, at least from Paleozoic onwards, and its history can be taken as a guide to the tectonic evolution of the Pontides as a whole. A number of east-west trending tectonic units record subduction-accretion and the growth of the south-Eurasian margin. The Central Pontides also documents Lower Cretaceous lithospheric extension related to opening of the Black Sea during the Late Mesozoic-Early Tertiary period, and a later active margin and collisional history.

East-west trending, inferred Palaeotethyan subduction-accretion complexes form much of the pre-Late Jurassic basement of the Central Pontides. A number of specific tectonic units are present that include variably metamorphosed basic igneous rocks as dismembered ophiolites, coherent stratigraphical successions, ordered thrust sheets and blocks in melange. About 200 samples from ca. 200-km long N-S traverse were analyzed by a high-precision XRF technique, supplemented by electron microprobe analysis of some minerals. The basic igneous rocks have not experienced significant chemical mobility after formation and are thus useful for discrimination of tectonic settings of formation using well-known binary and ternary plots and MORB-normalized "spidergrams". From N to S the main results are basalts of the K-B8re Complex were erupted in subduction influenced tectonic setting, favoring interpretation as a dismembered ophiolite formed in a marginal basin along the S Eurasian margin. Thick mainly volcanic successions of the ABangaldag Complex show a subduction-influenced calc-alkaline composition, above a basement varying from MORB/IAT-type to high-Mg (boninitic) type, with an inferred origin as an oceanic arc above fore-arc basement. Metabasites from the adjacent Bayam M=C8lange indicate a supra-subduction zone origin as a possible dismembered fore-arc ophiolite (possibly related to the ABangaldag). A large over-riding klippe of mainly ultramafic rocks, the Elekdag, is interpreted as a supra-subduction zone ophiolite based on depleted chrome spinel composition (analysed by microprobe). Eclogitic blocks in structurally underlying melange are of MOR type. Further south a northward-dipping inferred subduction accretion complex, the Domuzdag-Saraycikdag Complex, includes MOR-type metabasites in the north, and more "enriched" lithologies in the south of within-plate origin. Lastly, the geochemistry of metabasites in the south, within the Kargi Complex, suggests a P-MOR to within-plate type eruptive setting, without continental crustal influence. During the Late Paleozoic-Mid Jurassic period Tethys was subducted northwards with development of an oceanic arc (the ABangaldag Complex), and rifting of a continental fragment (Istanbul and Devrekani units), related to transform and/or active margin processes, to form a back-arc basin system (the K-B8re Complex and equivalents) in latest Paleozoic-earliest system (the K-B8re Complex and equivalents) in latest Paleozoic-earliest Triassic time. This was followed in Lower Triassic time by collision of a seamount (the Kargi Complex) with the active Eurasian margin, leading to deep burial beneath accreted units, including ophiolitic rocks. This collision possibly triggered collapse of the K-B8re back-arc basin further north, also in Lower Triassic time. Southward closure of the K-B8re Basin by the Upper Jurassic finally led to accretion of the entire tectonic stratigraphy to the southern margin of Eurasia during the "Cimmerian orogeny". During the Upper Jurassic-

Lower Cretaceous the recently formed orogen subsided, possibly triggered by renewed northward subduction of Tethys, and carbonate platform sedimentation ensued during Upper Jurassic-Lower Cretaceous time. Crustal extension of the active margin then took place in the Lower Cretaceous. The carbonate platform was dissected into half grabens, into which turbidites, debris flows and olistoliths were shed. Lower Cretaceous extension also activated exhumation of high-grade metamorphic rocks in the Central Pontides as a precursor to opening of the metamorphic rocks in the Central Pontides as a precursor to opening of the western Black Sea marginal basin.

During the Late Cretaceous-Early Tertiary period the western Black Sea basin underwent sea-floor spreading, while the southern margin rapidly subsided, associated with northward emplacement of ophiolites and ophiolitic melange. During the Early Tertiary, the Pontides were sutured to the Anatolides to the south, resulting in south-vergent re-imbrication of the Paleotethyan basement, especially in southerly areas and north-vergent compression near the Black Sea coast.