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Opening, evolution and closure of the Neotethyan Oceanic Branches in Anatolia as inferred by radiolarian research

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Eastern Mediterranean area is characterized all along its geological past by the amalgamation of number of terranes of continental as well as oceanic origin. Their identification is mainly based upon the presence of suture belts represented by belts with ophiolites or ophiolitic mélanges. Despite disagreements on the numbers and locations of these belts, those with Triassic to Late Cretaceous oceanic assemblages are ascribed to the multi-branched Neotethys. In the last twenty years we performed detailed studies on the radiolarian-based ages and geochemistry of the oceanic volcanic rocks along the three main suture belts representing the Intra-Pontide, Izmir-Ankara-Erzincan and southern oceanic branches of Neotethys (Fig. 1). The results of this multi-disciplinary approach mainly comprise the data obtained from volcanic rocks and radiolarian-bearing sediments in depositional relation with them.

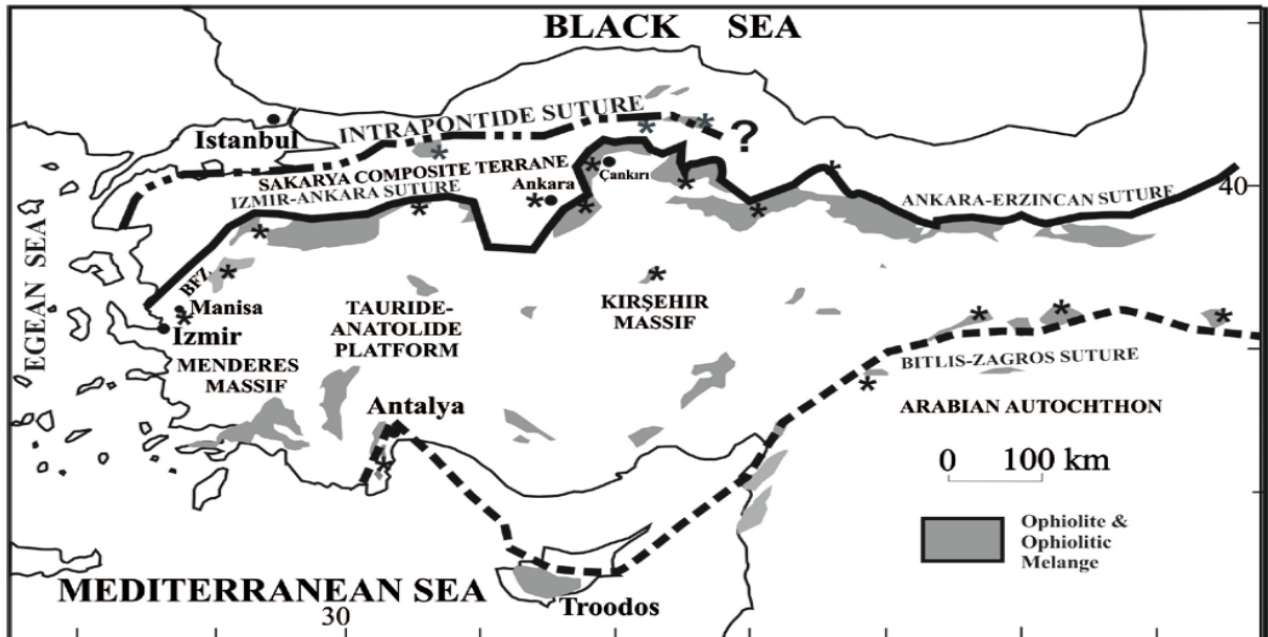


Figure 1 Distribution of the Neotethyan ophiolites, ophiolitic mélanges and suture belts in Anatolia. (*) stands for outcrops with dated radiolarians.

A-The Intra-Pontide Oceanic Branch (IPO): The suture of the IPO stretches from the Aegean coast to northern Central Anatolia, where it probably joins the suture of the IPO. Radiolarians obtained from mélangé blocks correspond to very probably only a limited life-span of this oceanic branch (Fig. 2). Even though not yet clearly dated, HP/LT as well as LP/LT metabasic rocks of supra-subduction-type dominate over other tectono-magmatic settings. The IPO may stand for the eastern extension of the Vardar Ocean, where successive intra-oceanic subduction-accretion events were realized during the Mesozoic.

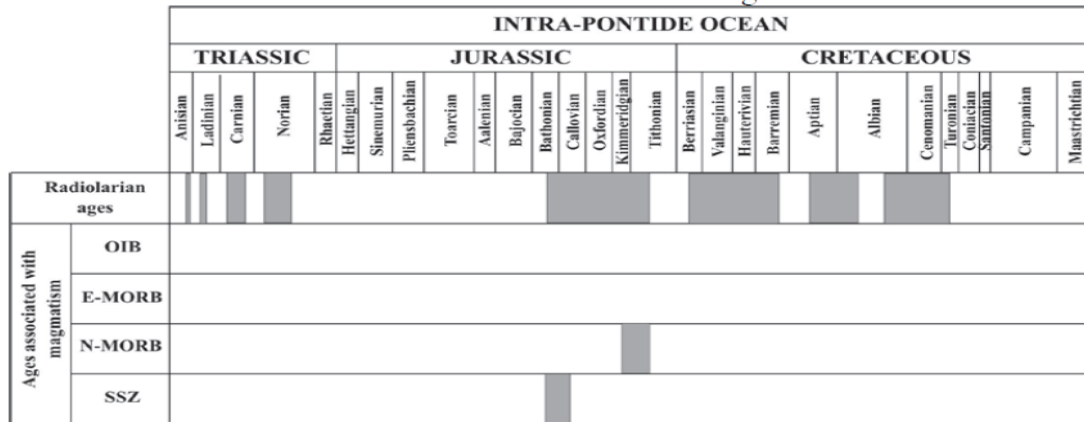


Figure 2 Radiolarian ages obtained from mélangé blocks and from basalts with well-defined tectono-magmatic settings within the Intra-Pontide suture belt.

B-The Izmir-Ankara-Erzincan Oceanic (IAEO) Branch: Geographically it consists of the Izmir-Ankara and Ankara- Erzincan branches and separates the Sakarya Composite Terrane and the Tauride-Anatolide Block (Fig. 1). IAEO has the most complete record of radiolarian-rich oceanic deposition between the Middle Triassic and mid Late Cretaceous. Geochemical data from various types of basalts indicate that already during the early Late Cretaceous (or even during the Middle Jurassic, as deduced from radiometric age data from metamorphic soles) it started to close by intra-oceanic subduction. MORB basalts of Early Cretaceous age, on the other hand is indicative for ongoing spreading in another segment of the IAEO.

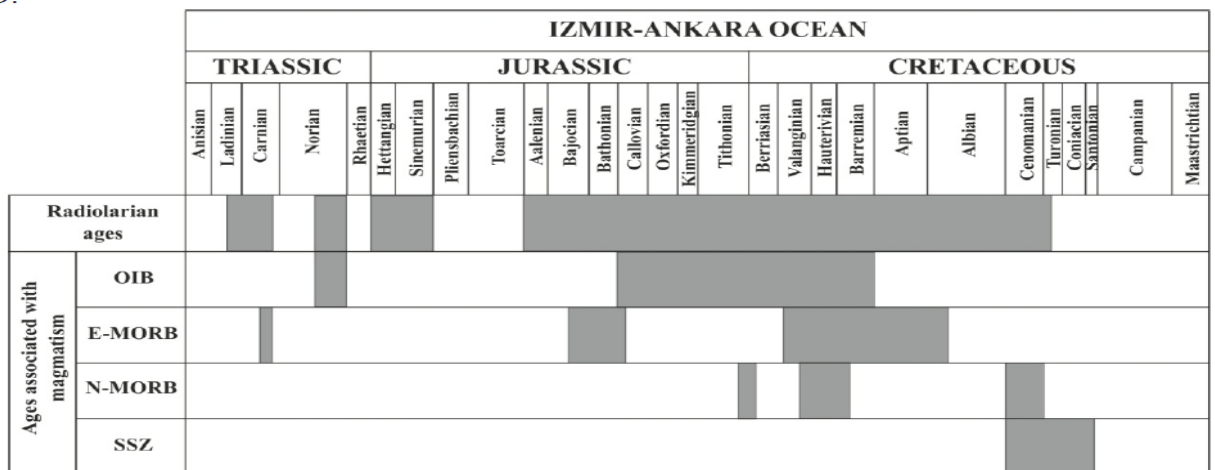


Figure 3 Radiolarian ages obtained from mélangé blocks and from basalts with well-defined tectono-magmatic settings within the Izmir-Ankara-Erzincan suture belt.

C-The Southern Branch of Neotethys: The remnants of this main Neotethyan oceanic branch are distributed from Oman in the east to N Zagros-SE Anatolia-Troodos-Antalya and the Hellenic trench in the west (Fig.1). Yet, there is no consensus whether the ophiolitic bodies and the remnants of the subduction accretion prism represent a single or a multi-branched oceanic system. The radiolarian data from the SE Anatolian ophiolitic assemblages indicates a long-lasting oceanic deposition whereas the limited geochemical data suggests Late Triassic oceanic crust generation and Late Cretaceous subduction. The radiolarian data from the Antalya area stands for a more continuous oceanic deposition from Middle Triassic to Late Cretaceous with very limited geochemical data corresponding to the presence of an oceanic crust during the Carnian.

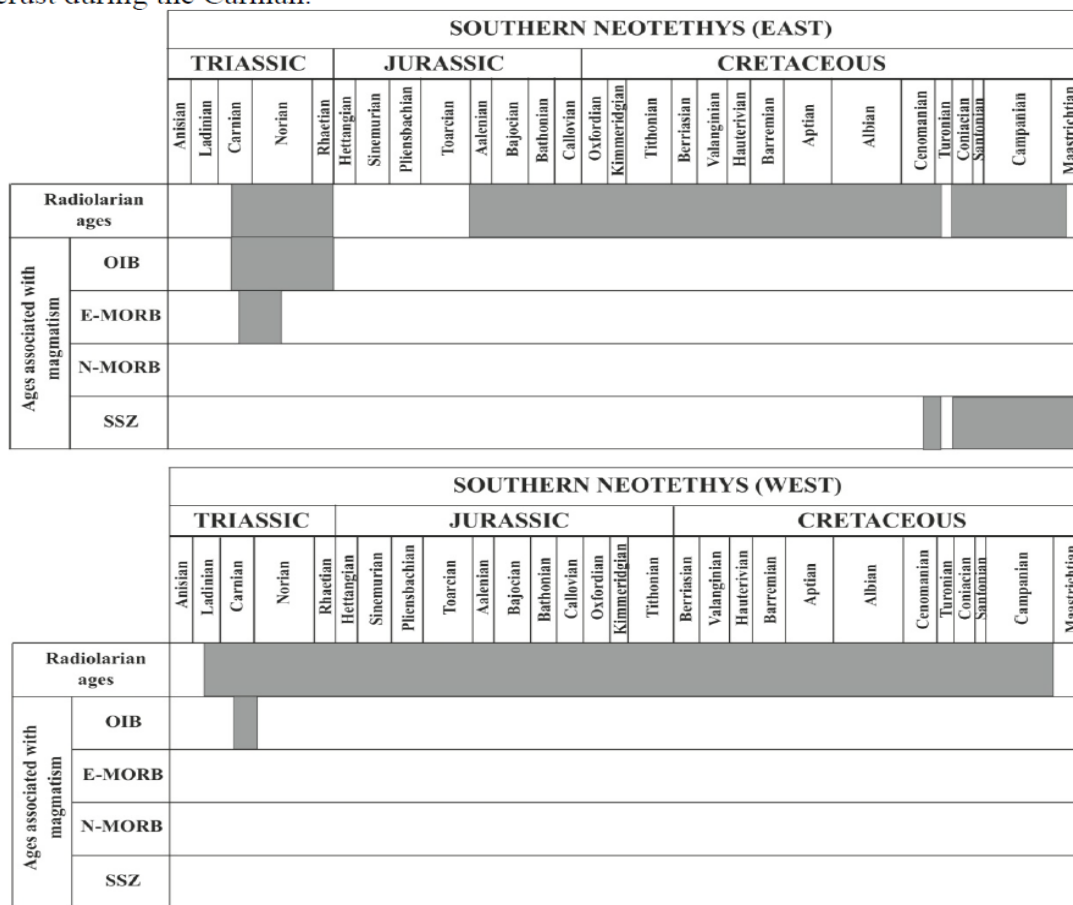


Figure 4 Radiolarian ages obtained from mélangé blocks and from basalts with well-defined tectono-magmatic settings within the Southern branch/branches of Neotethys.

No combined data from basalt-radiolarian chert associations were reported yet from the allochthonous oceanic rocks that are assumed to represent some possible sutures (e.g. Inner Tauride Ocean).