

## **Morphotectonics of Sea of Marmara: A Basin on North Anatolian Continental Transform Plate Boundary**

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The Sea of Marmara is located the North Anatolian Fault (NAF), a continental transform plate boundary between the Eurasian and Anatolian-Aegean plates. The area is also under the influence of the N-S extensional Aegean regime. The 100 km-wide NAF zone in the Marmara region accommodates about 25 mm/yr dextral motion, with 70-80% of this displacement taking place along the northern branch of the NAF, the Main Marmara Fault in the Sea of Marmara.

The main morphological elements of the Sea of Marmara consists of less than 100 m deep shelf areas, ~1250 m three deep sub-basins (Tekirdağ, Central and Çınarcık) and two NE-trending pressure highs (Western and Central) separating the deep subbasins. The other elements are ~800 m deep Kumburgaz Basin on the Central High, ~400 m deep İmralı Basin in the south, and 100-200 m deep, E-W oriented gulfs or bays. The slopes connecting the shelf to the deep basins have slope angles ranging between 6° and 29°, and are incised by submarine canyons and marked by landslides scars. The basins have accumulated up to 6 km thick sediments. They are subsiding at a rate 5-6 mm/year and accumulating sediments at rates of 1-3 mm/yr over the last ~15 ka, with the rates for the glacial periods being the 2-3 times that for interglacials. The sedimentation rates over the highs range between 0.2 and 0.4 mm/yr over the last 70 ka.

The morphology of the Sea of Marmara is controlled by the NAF activity that was in turn guided a complex basement structure in the region. The basement of the Sea of Marmara region consists of various micro-continents (Istanbul Zone and Rhodope-Pontide and Sakarya continents), ophiolitic suture zones and the hydrocarbon bearing Eocene-Middle Miocene Thrace Basin on the southern margin of Rhodope-Pontide continent. After closure of the Intra-Pontide Ocean and the collision of the Sakarya and Rhodope-Pontide continents during the Oligocene-Early Miocene, the region was uplifted, and subjected to peneplanation during the mid-Late Miocene. The incipient NAF activity started about the same time, when the Marmara region was covered by shallow lakes. Initiation of crustal extension and strain localization in the Sea of Marmara area started in the Earliest Pliocene while shallow siliciclastic and carbonate sediment were deposited. Considering the rates of subsidence and sedimentation, the present day morphology of the Sea of Marmara, with its transtensional basins and the intervening highs between the splays of the NAF, developed mainly during the last 1-2 Ma. This geomorphic evolution is reviewed on the basis of published and unpublished data.