

The Geometry and Activity of the North Anatolian Fault's Middle Strand at the Southern Shelf of the Sea of Marmara

Vardar, D.(1,1), Öztürk, K. (1,2), Yaltırak, C. (2,1), Alpar, B. (1,3), Tur, H. (3,1), Elitez, İ. (2,2)

(1) İstanbul University , Institute of Marine Sciences and Management, Department of Marine Geology and Geophysics, İstanbul, Turkey

(2)İstanbul Technical University, Faculty of Mines, Department of Geological Engineering, İstanbul, Turkey

(3) İstanbul Univesity, Faculty of Engineering, Department of Geophysical Engineering, İstanbul, Turkey.

Corresponding Author: Vardar, D., (denizhan@istanbul.edu.tr)

The middle strand of the North Anatolian Fault (NAF) extends from the İznik Lake to the Bandırma Bay. Although the E-W trending character is overviewed in previous studies, there is not enough information about its segmentation and activity. In this study, new high resolution seismic profiles (2-8 KHz band sweep), old seismic profiles that were acquired in earlier studies and multibeam data that was collected by SHOD (TURKISH NAVY, OFFICE OF NAVIGATION, HYDROGRAPHY AND OCEANOGRAPHY) are used together for constructing the fault map of middle strand of the NAF.

The Gemlik Bay is opened by the NAF middle strand as a pull-apart basin between Gençali fault and Armutlu-Bandırma segment. NW-SE trending normal faults that formed the Gemlik Bay, are developed on the old fault system (Thrace-Eskişehir fault zone). The pull-apart basin evolved with the Gencali fault and is cut by E-W trending young segment that extends from the western side of the İznik Lake to the Gemlik Bay at least in the last 24000 years. Considering the evolution of delta formation and lacustrine sediment deposits, the slip-rate of this segment calculated from multibeam bathymetry is 0.2 cm/year. The Armutlu-Bandırma segment is 75 km long and extends from the northern side of the Gemlik Bay to the southern side of the Bandırma Bay, This segment consists of very close 3 step-shaped sub segments. The NEE-SWW trending faults shift the sediment packages. The deformation of the Armutlu-Bandırma segment within the last 11000 years old deposits can be traced in a limited area. The traces of earthquake effects can't be observed during last few thousand years. The middle strand steps over to the southern side of the Kapıdağ and merges with Edincik fault from northern side of the bay basin. Between the trend of this segment named Kapıdağ-Edincik segment (N59E) by us and the segment placed on the southern edge, a direction at 16 degrees is comprised. Therefore, Bandırma Bay developed as a triangle-shaped geometry and is cut through by a N85E trending fault at the deepest center of the bay.

The integration of the faults observed between Gemlik and Bandırma bay, which cut the old system, couldn't know clearly. For understanding the fault activity in the study area, higher resolution multibeam and shallow seismic data (signal band 500 hz-6.5 khz) should be collected in the future.