



Effects of neotectonic and sedimentary processes on the seafloor geomorphology of the Tekirdag Basin of the western Marmara Sea (Turkey)

Mustafa Ergin (1) and Füsun Yigit-Faridfathi (2)

(1) Ankara University, Faculty of Engineering, Department of Geological Engineering, Tandoğan, 06100 Ankara, Turkey
(ergin@eng.ankara.edu.tr)/Fax +90 312 2127464, (2) General Directorate of Mineral Research and Exploration, MTA,
Eskişehir Yolu, Söğütözü, 06520 Ankara, Turkey, (fyigit@mta.gov.tr)/Fax +90 312 2854271

This study forms part of a project (TUBITAK YDABCAG 101Y071) with the main purpose of investigation of late Quaternary slope stability, sediment mass movements and turbidite formations in the tectonically active Tekirdag Basin and its margins from the western Marmara Sea. The results were also intended to relate to the major earthquakes and sea-level changes. During this project, in 2001 aboard the former R/V MTA Sismik-1, a total of 100 km seismic reflection profiles were obtained along three tracklines representing from shelf to slope to deep basin environments. A multichannel airgun seismic system and well-known methods and principles of seismic stratigraphy was used for interpretations. At 11 sites from 29 to 1111 m water depths gravity sediment cores were taken having 100 to 359 cm recoveries and textural and structural characteristics were determined using standard petrographic methods. The NEE-SWW directed seismic profile (TKD-01) which runs parallel to the North Anatolian Fault zone displayed syntectonic sedimentation with negative flower structure that increased in thickness toward the Ganos Fault and pinched out in the east. ENE section of this profile also bears structures of underwater landslides with slump facies. Seismic profile TKD-02 which crosses the Tekirdag Basin in WNW-ESE direction most likely displays major 3 fault segments of the NAF zone. Many faults and syntectonic sedimentation structure can be recognized on this profile. A morphological feature of a sediment wedge or former lowstand delta at the present shelf edge can be related to the effects of last sea-level change. Mounded and chaotic seismic reflection configurations which indicate channel and slope-front fill as well as slump facies are thought to reflect submarine slides and slumps. Other morphological features such as incised submarine valleys or channels running E-W direction are also present on this profile. The seismic profile (TKD-03) runs from NNW to SSE across the basin and like profile TKD-02, shows mounded and chaotic slump facies on the unstable basin slope and syntransform sedimentation with deformation. The incised valleys, slumps/slides with scarps are also prominent on this profile. We suggest that the observed underwater morphological features on seismic profiles are most likely triggering mechanisms for gravity mass movements of sediments on the sea floor due to earthquake or seismotectonic activities in this part of the Marmara Sea. The presence of sandy-silty laminations within the mud matrix of the cores can further confirm the tectonic effects prevailed in this basin.