



Investigation Of North Anatolian Fault In The Sea Of Marmara: Fault Geometry, The Cumulative Extension, Age Modeling In Çinarcık Basin Using Multi Channel Seismic Reflection Data

Orhan Atgın (1), Günay Çifçi (1), Christopher Soelien (2), Leonardo Seeber (3), Michael Steckler (3), Donna Shillington (3), Hülya Kurt (4), Derman Dondurur (1), Seda Okay (1), Savaş Gürçay (1), Hakan Saritaş (1), H. Mert Küçük (1), and Burcu Barın (1)

(1) DOKUZ EYLUL UNIVERSITY, Institute of Marine Science and Technology Te, Geophysical Laboratory (Seislab), Izmir, Turkey (orhan_atgin@windowslive.com), (2) California University, Earth Research Institute, Santa Barbara, (3) Columbia University, Lamont - Doherty Earth Observatory, (4) Department of Geophysics, Mining Faculty, Istanbul Technical University

Marmara Sea is a limelight area for investigations due to its tectonic structure and remarkable seismic activity of North Anatolian Fault Zone (NAFZ). As NAFZ separates into 3 branches in the Marmara Sea, it has a complicated tectonic structure which gives rise to debates among researchers.

Çinarcık Basin, which is close to Istanbul and very important for its tectonic activity is studied in this thesis. Two different multichannel seismic reflection data were used in this thesis. First data were acquired in 2008 in the frame of TAMAM (Turkish American Multichannel Project) and second data were in 2010 in the frame of TAMAM-2 (PirMarmara) onboard R/V K.Piri Reis. Also high resolution multibeam data were used which is provided by French Marine Institute IFREMER. In the scope of TAMAM project total 3000 km high resolution multi channel data were collected. 3000 km of multichannel seismic reflection profiles were collected in 2008 and 2010 using 72, 111, and 240 channels of streamer with a 6.25 m group interval. The generator-injector airgun was fired every 12.5 or 18.75 m and the resulting MCS data has 10-230 Hz frequency band.

In this study, a detailed fault map of the basin is created and the fault on the southern slope of the basin which is interpreted by many researchers in many publications was investigated. And there is no evidence that such a fault exists on the southern part of the basin. With the multichannel seismic reflection data seismic stratigraphic interpretations of the basin deposits were done. The yearly cumulative north-south extension of the basin was calculated by making some calculations on the most active part of the faulting in the basin.

In addition, the tilt angles of parallel tilted sediments were calculated and correlated with global sea level changes to calculate ages of the deposits in the basin.

Keywords: NAFZ, multi channel seismic reflection, Çinarcık Basin