# Preliminary Interpretations of Multi-Channel Seismic Reflection and Magnetic Data on North Anatolian Fault (NAF) in the Eastern Marmara Region, Turkey

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The North Anatolian Fault (NAF) is 1600 km long, right lateral strike-slip fault nearly E-W elongated between Karlıova in the east and Saros Gulf in the west. NAF splays into two major strands near the west of Bolu city as Northern and Southern strands. Northern strand passes Sapanca Lake and extends towards west and reaches Marmara Sea through the Gulf of Izmit. The area has high seismicity; 1999 Kocaeli (Mw=7.4) and 1999 Düzce (Mw=7.2) earthquakes caused approximately 150 km long surface rupture between the Gulf of Izmit and Bolu. The rupture has four distinct fault segments as Gölcük, Sapanca, Sakarya, and Karadere from west to east. In this study multi-channel seismic and magnetic data are collected for the first time on the Sapanca Segment to investigate the surficial and deeper geometry of the NAF.

Previously, the NAF in the eastern Marmara region is investigated using by paleo-seismological data from trenches on the surface rupture of fault or the geomorphological data (Lettis et al., 2000; Dikbaş and Akyüz, 2010) which have shallower depth targets. Crustal structure and seismic velocities for Central Anatolia and eastern Marmara regions are obtained from deeper targeted refraction data (Gürbüz et al., 1992). However, their velocity models do not have the spatial resolution to determine details of the fault zone structure.

Multi-channel seismic and magnetic data in this study were acquired on two N-S directed profiles crossing NAF perpendicularly near Kartepe on the western part of the Sapanca Lake in October 2016. The receiver interval is 5 m, shot interval is 5-10 m, and the total length of the profiles are approximately 1400 m. Buffalo Gun is used as a seismic source for deeper penetration. Conventional seismic reflection processing steps are applied to the data. These are geometry definition, editing, filtering, static correction, velocity analysis and deconvolution, stacking and migration. Echos seismic software package in Geophysical Department of Istanbul Technical University is used for processing. Proton magnetometer is used for measuring the magnetic field variations on the one of the profiles. Total magnetic field values are corrected using base readings from Bogazici University Kandilli Observatory, Iznik Earthquake Hazard Mitigation Center. Processed seismic and magnetic data are interpreted and compared to see effect of the NAF. Preliminary interpretations show vertical seismic discontinuities related to the fault figured out on the time-migrated seismic sections from surface to the about 1 s two-way travel time depth. Magnetic anomalies are also realized on the profile related to the NAF supporting the seismic data.