Geophysical Research Abstracts
Vol. 18, EGU2016-644, 2016
EGU General Assembly 2016
© Author(s) 2015. CC Attribution 3.0 License.

Multi-parameter analysis of seismoturbidites in the Kumburgaz Basin of Sea of Marmara: Implications for creeping versus locked Central High segment of the North Anatolian Fault

Nurettin Yakupoğlu (1,2), Gülsen Uçarkuş (1,2), K.Kadir Eriş (1,2), M.Namık Çağatay (1,2), Pierre Henry (3), Burak Yalamaz (1,2), Asen Sabuncu (2,5), Dursun Acar (2,4)

(1) Istanbul Technical University, Faculty of Mines, Department of Geological Engineering, Istanbul, Turkey (yakupoglunurettin@gmail.com), (2) Istanbul Technical University EMCOL, 34469, Faculty of Mines Ayazağa, İstanbul, Turkey, (3) CEREGE (UMR7330), Aix-Marseille University, CNRS-IRD, 13330 Marseille, France, (4) Istanbul University, Geological Engineering Department, Avcılar, Turkey, (5) Istanbul Technical University, Faculty of Mines, Department of Geophysical Engineering, Maslak, 80626 İstanbul, Turkey

Sediment sequences deposited in active transform basins provide valuable archives of earthquake-triggered co-seismic sedimentation. A better understanding of the relationship between offshore fault ruptures and Seismoturbidites would have direct implications for earthquake hazard assessment. Submerged section of the North Anatolian Fault in the northern Sea of Marmara basin, which experienced more than 55 (Ms>6.8) earthquakes in the last 2000 years, poses a unique laboratory to study such kind of sync-tectonic history. Following the devastating 1999 Izmit and Duzce earthquakes (Mw = 7.4/7.2 respectively), a major seismic gap is now along the offshore branch of the NAF in the Sea of Marmara. The segments that control the Cinarcik and Kumburgaz basins in the Sea of Marmara have not ruptured during the 20th century.

This study focusses on the Kumburgaz basin, which is located along the central segment of the NAF, and its less-known linkage to historical earthquakes, particularly to Ms>7 1509 and 1766 earthquakes. The main objective of this study is to test the two alternative hypotheses of a creeping versus locked central High segment by determining the frequency and timing of earthquake triggered turbidite units in the Kumburgaz basin.

A 21-m-long piston core recovered in Kumburgaz basin during the Marsite cruise in 2014 is analysed at high resolution in order to identify the discrete turbidite-homogenite units (T–H units). The piston core reveals 22 T–H units where several packages consist of a sharp basal contact and multiple fining upward beds of sand to coarse silt as characteristically seen in most Seismoturbidite units. We initiated a systematic study of T-H units with the objectives of establishing criteria for identification of Seismoturbidites by analysing the physical, mineralogical and chemical composition of the piston core. The density and magnetic susceptibility changes along the core are analysed by Multi-Sensor Core Logger (MSCL). High detrital input proxies (Ca/Ti, Fe, and K) are determined with the μ-XRF core scanner equipped with X-ray radiography. Radiographic images reveal the abrupt changes of the sedimentary structures and smear-slide analysis point out the possible sources of sediments for different turbidites.

Keywords: Sea of Marmara, Seismoturbidite, Kumburgaz Basin, Paleoseismology