Geophysical Research Abstracts
Vol. 16, EGU2014-188-2, 2014
EGU General Assembly 2014

Earthquake Records of North Anatolian Fault from Sapanca Lake Sediments, NW Anatolia

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We determined earthquake records in sediment cores of Sapanca Lake which is a pull-apart basin located along the North Anatolian Fault zone in NW Anatolia. The lake has a maximum depth of 55 m, and a surface area of 46.8 km2, measuring 16 km in E-W and 5 km in N-S directions. A systematic study of the sedimentological, physical and geochemical properties of three water-sediment interface cores, up to 75.7 cm long, located along depth transects ranging from 43 to 51.5 m water depths. The cores were analyzed using Geotek Multi Sensor Core Logger (MSCL) for physical properties, laser particle size analyzer for granulometry, TOC Analyzer for Total Organic Content (TOC) and Total Inorganic Carbon (TIC) analysis, Itrax-XRF Core Scanner for elemental analysis and digital X-RAY Radiography. The geochronology was determined using AMS radiocarbon and radionuclide methods. The Sapanca Lake earthquake records are characterized by mass flow units consisting of grey or dark grey coarse to fine sand and silty mud with sharp basal and transional upper boundaries. The units commonly show normal size grading with their basal parts showing high density, and high magnetic susceptibility and enrichment in one or more elements, such as Si, Ca, Tİ, K, Rb, Zr and Fe, indicative of coarse detrial input. Based on radionuclide and radiocarbon analyses the mass flow units are correlated with 1999 İzmit and Düzce earthquakes (Mw=7.4 and 7.2, respectively) , 1967 Mudurnu earthquake (Mw= 6,8), and 1957 Abant (Mw= 7.1) earthquake.

Keywords: Sapanca Lake, North Anatolian Fault, Earthquake, Grain size, Itrax-XRF, MSCL