Geophysical Research Abstracts,
Vol. 11, EGU2009-12641-1, 2009
EGU General Assembly 2009

Paleolimnological and Sedimentological Traces of the 1943 (Ms=7.3) Earthquake in the sediments of Ladik Lake, Samsun/Turkey

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Lacustrine environments have frequently been investigated to reveal paleoclimate and paleoseismic records in different places on earth such as; Chile, Dead Sea and Switzerland. Most of the studies for paleoseismic records are based on detection of earthquake-induced deformations within lake sediments (e.g. mass-wasting events and/or in situ soft sediment deformations). Within the scope of this study, we worked on one short (83cm) sediment core retrieved from eutrophic Ladik Lake, which is located in a pull-apart basin on the North Anatolian Fault (NAF). Since maximum water depth in the lake is approximately 3 meters and the basin is so flat, Ladik Lake is not susceptible to mass-wasting events. Primary sedimentary structures (especially lamination) are not observed due to wind-induced bottom mixing. Massive sedimentation in the lake prevents us to detect in situ soft sediment deformations. Addition to mass-wasting events and in situ soft sediment deformations, earthquakes have another consequence to be considered. Vertical displacement due to fault rupturing changes the depth of the lake, especially in this kind of flat and shallow basins. Up to 1 meter vertical displacement was recorded just after 1943 earthquake at the edge of the basin. That much displacement must have significant effects on a lake having 3 meters of water depth. Through the sediment core, a sedimentary event is clearly observed. Based on the age-depth model constructed by using radionuclide (210Pb and 137Cs) profiles, this event took place around 1940. In this poster, we discuss possible relation of this event with the 1943 earthquake by means of physical, mineralogical and geochemical properties of the sediments through the core. Measurements reflecting the physical properties include magnetic susceptibility, water content, Gamma-ray density and p-wave velocity. Mineralogical and geochemical properties are constrained by X-ray diffraction, X-ray fluorescence (ITRAX core scanner), loss-on-ignition, atomic C/N ratio, d13C and d15N measurements. After understanding the consequences of 1943 fault rupturing in Ladik Lake, similar investigations on longer cores taken from this lake may provide us with a paleoseismic record for this segment of the North Anatolian Fault.