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### **Assessment of Lake Sediment Sensitivity to Earthquakes and Climate Cycles along the North Anatolian Fault.**

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Lake sediments are quiet-water environments that are particularly sensitive to continental climate variations. On millennial timescales, the main sediment components (organic, mineral and biogenic) reflect changes in precipitation, temperature, wind patterns and possibly solar variations as well. High-resolution lake records constitute powerful chronometers for tracking environmental perturbations such as earthquakes. Here, we present the first results obtained within the framework of an EU-project focusing on the seismic cycles of the North Anatolian Fault (NAF), Turkey (« Understanding the irregularity of seismic cycles: A case study in Turkey »). The NAF is a major strike-slip fault along which a series of earthquakes (magnitude > 7) occurred in a westward propagating sequence since 1939. Six target lakes are located on or next to the active fault strand on a west-east transect east of Istanbul (i.e. Yenicaga, Ladik, Boraboy, Zinav, Gollukoy, Asagitepecik). One-meter long gravity cores were taken from each of those accumulation zones formed by pull-apart basins and shallow natural lakes. Our study provides the first bathymetric maps of the lakes that have never been studied. The depositional environment of each lake was first characterized by high-resolution (100 to 500 µm) elemental analysis (major elements: Si, Al, Fe, Mn, Mg, Ca, Na, K, P, Ti) of the short gravity cores. A combination of sedimentology and petrophysical parameters (magnetic susceptibility, gamma density, electrical resistivity, and scanning electron microscopy) were used in order to detect seismo-turbidites that could be correlated to the known historic earthquake sequence. These multiproxy analyses provide a first issue on the climate and tectonic control of lakes located along the NAF. The characterization of sedimentary structures induced by recent past earthquakes will be further utilized for the recognition of earthquakes recorded on older lacustrine sequences.

Note :

The age models of recent sediments (0-150 years) are done according to independent chronostratigraphic markers. For example, the Pb<sup>210</sup>radionuclide activity (half-life 22,3 yr) provides a good estimate of the sedimentation rates. Accurate sediment chronologies of the short cores will be further constrained by <sup>137</sup>Cs artificial radionuclides profiles (nuclear weapons test

during 1953-63 period). Other independent chronostratigraphic markers like for example the sulphur distribution in lake sediment also provides an index of depositional fluxes connected to the industrial era.