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Earthquake imprints on a lacustrine deltaic system: the Kürk Delta along the East Anatolian Fault (Turkey)

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Delta contains a sedimentary record primarily indicative of water level changes, but particularly sensitive to earthquake shaking, which results generally in soft-sediment-deformation structures. The Kürk Delta adjacent to a major strike-slip fault displays this type of deformation (Hempton and Dewey, 1983) as well as other types of earthquake fingerprints that are specifically investigated. This lacustrine delta stands at the south-western extremity of the Hazar Lake and is bound by the East Anatolian Fault (EAF), which generated earthquakes of magnitude 7 in eastern Turkey. Water level changes and earthquake shaking affecting the Kurk Delta have been reevaluated combining geophysical data (seismic-reflection profiles and side-scan sonar), remote sensing images, historical data, onland outcrops and offshore coring. The history of water level changes provides a temporal framework regarding the sedimentological record. In addition to the commonly soft-sediment-deformation previously documented, the onland outcrops reveal a record of deformation (faults and clastic dykes) linked to large earthquake-induced liquefactions. The recurrent liquefaction structures can be used to obtain a paleoseismological record. Five event horizons were identified that could be linked to historical earthquakes occurring in the last 1000 years along the EAF. Sedimentary cores sampling the most recent subaqueous sedimentation revealed the occurrence of another type of earthquake fingerprint. Based on radionuclide dating (137Cs and 210Pb), two major sedimentary events were attributed to the 1874-1875 earthquake sequence along the EAF. Their sedimentological characteristics were inferred based X-ray imagery, XRD, LOI, grain-size distribution, geophysical measurements. The events are interpreted to be hyperpycnal deposits linked to post-seismic sediment reworking of earthquake-triggered landslides. A time constraint regarding this sediment remobilization process could be achieved thanks to the fact that the two studied sedimentary events are separated by less than one year.