

The 2500 yr long paleoseismological record of the Hazar Lake, East Anatolian fault, Turkey

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The East Anatolian Fault (EAF) is a major left-lateral strike-slip fault accommodating with the conjugate North Anatolian Fault the westward extrusion of the Anatolian Plate away from the Arabia-Eurasia collision zone. The East Anatolian Fault ruptured over most of its length during the 19th century in a series of magnitude ~7 earthquakes. During the 20th century this fault was less active with only two events of magnitude greater than 6. This absence of large earthquakes has resulted in relatively little attention being paid to the East Anatolian Fault compared to the North Anatolian Fault, which has ruptured during the last century in several earthquakes of $M_s \sim 7$. There is nearly no paleoseismological record along the EAF. However, the EAF historical seismic activity indicates that it is a recurrent source of large-magnitude earthquakes.

Sedimentological data (eight 1.2 m short cores and two 5 m long cores) from Lake Hazar, a large pull-apart basin along the EAF were collected in 2007 to constrain the seismic history of the East Anatolian Fault over the Late Holocene. Sedimentary events are pin-pointed combining X-ray imagery, magnetic susceptibility, and XRF measurements. The cores chronology is based on radiocarbon and radionuclide (^{137}Cs and ^{210}Pb) dating, and the age model established using the Oxcal program. We obtained a complete earthquake record covering the last 2500 years that we compared to historical catalogues. Recorded earthquakes comprise historical earthquakes that ruptured the EAF in 1874-1875, in 1789, in 1513, in 995. Earthquake sedimentary disturbances also occurred in the 13th century and around AD 600 and may correspond to the 1284 and AD 602-603 historical earthquakes that occurred in a broad area around the EAF. Finally we have two large earthquakes between AD 440–AD1, and one between 300-650 BC.