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## The Preliminary Results from High Resolution Seismic Survey of Lake Erçek (LESS-2015 project), Eastern Anatolia

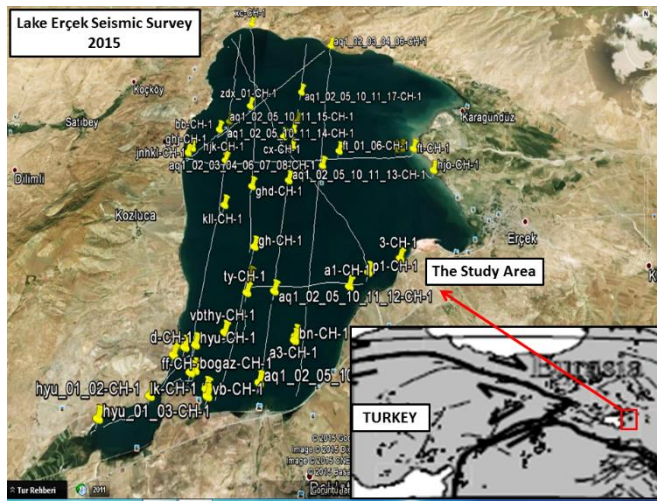
Toker, M.<sup>1</sup> and Tur, H.<sup>2</sup>

<sup>1</sup>Yuzuncu Yil University, Department of Geophysical Engineering, Van-Turkey, [tokermu@gmail.com](mailto:tokermu@gmail.com)

<sup>2</sup>Istanbul University, Department of Geophysical Engineering, Avcılar-Turkey

Lake Erçek is tectonically active, the shallowest ( $\approx 40$  m) and the highlands (1850m masl) seismogenic lake of eastern Anatolia. It is smaller and closed soda lake with high alkaline content. The lake was chosen for seismic survey in the framework of the Scientific Research Projects of Yuzuncu Yil University in Van (YYU-BAP 2015, Turkey). Prior to the present survey, no information was known about the sedimentary structure of the lake, the distribution of faulting structures on the lake floor and its seismogenic potential. The current contribution presents the first comprehensive geophysical study in Lake Erçek basin. The aim of this study is therefore to observe and evaluate the deformation and distribution of shallow morphological structures in Lake Erçek from newly acquired high-resolution, single-channel subbottom profiles ( $\approx 110$  km in length and twtt is 250-350 msec.) allowing a basin-wide structural interpretation that documents the active deformation, the possible seismogenic faults and supports seismic hazard studies for this seismically active lake.

Lake Erçek was successfully conducted in August 2015 within the framework of the LESS-2015 Subbottom Profiling Program (under the scientific project no: 2015-MİM-B119) of Yuzuncu Yil University. Preliminary results showed that the Lake Erçek basin developed in a tectonically active region and that the lake contains a number of normal faults, shallow basement and the younger deformation history of the thinner sediments. The western coasts of the lake are prominently steeper, continuing into the deep water. No delta sedimentation and progradational clinofolds have been formed at the steep western coasts of the lake. The sublacustrine slope at the western coast is normal-faulted steep block, indicating the asymmetric basin subsidence. The blocky structure at the southern and the south-eastern coasts is the sublacustrine continuation of the normal faulted horst block in the south-east. In the east, The river forms a widely muddy delta section extending 2.5 km into the lake, progradational patterns of delta section towards the deep lake and possible faults are not clearly observed. The northern part of the lake is seismically deformed. The reflection profiles show that there are north-south trending normal faults along the western and south-eastern parts of the lake that shaped the lake. This result suggests that the lake is tectonic-controlled, graben-like shallow depression basin by a number of north-south trending normal faults within the lake.



Unconsolidated, highly permeable and thinner muddy deposits observed in data show strong seismic evidences of shallow gas (e.g., seismic chimneys, enhanced reflections, acoustic blanking and reflection voids) and earthquake-triggered soft deformations. In the lake, the occurrence of extensional faults closely follows the seismotectonic trend of the 2011 Van earthquake, suggesting a close

relationship between the faulting in Lake Erçek and the Van earthquake. Deformation structures detected in seismic data are also used as criteria to interpret seismic relationship as a deformation trigger between Lakes Van and Erçek.

*Figure 1: Lake Erçek, Eastern Anatolia (Turkey)*

The seismic structural interpretation of the observed deformation features in the data allows us to understand seismic potential of Lake Erçek shedding light on intensities of strong events throughout the past. In this context, the vulnerability of the area to seismic hazards was dramatically documented by the occurrence of the devastating 2011 Van event.

