The Hazar pull-apart along the East Anatolian Fault: Structure and active deformation

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The Hazar Lake occupies 20 km long, 5 km wide, 200 m deep pull-apart basin along the East Anatolian strike-slip Fault, which accommodates -together with the North Anatolian Fault- the westward extrusion of the Anatolian block. The lake is a major structure along the East Anatolian Fault, and is located within 100 km of at least three major dams on the Euphrates-Tigris river system. It was the locus of two earthquakes of magnitude 7.1 and 6.7 in respectively 1874 and 1875. This poorly studied lake (only approximate bathymetric map, no geophysical survey, or sedimentological information) was the focus in summer 2007 of a multidisciplinary study in order to constrain its structure and sedimentation, and to propose a coherent scenario of the 1874-1875 earthquake sequence. We present here a fault map of the pull-apart basin constrained by seismic profiles obtained with sparker (400-1500 Hz) and with a mean spacing of 500 m between the profiles. The structural pull-apart, a 210 m deep basin with a fault step of less than 3 km, represents only 1/3 of the present lake extent and is located at the lake northeastern extremity. Further southwest, the lake is a half-graben with the main fault system bounding the southeast edge of the lake with a fault trace showing varying level of complexities with alternating small-scale pull-apart and push-up structures. Finally a first sketch of the structural development of the basin can be proposed.