



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

D. Garcia Moreno (1, 2), A. Hubert-Ferrari (1), J. Moernaut (2), M. Van Daele (2),
Emre Damci (3) and Marc De Batist (2)

(1) Royal Observatory of Belgium, section of seismology, 1180 Brussels

(2) Renard Centre of Marine Geology, Ghent University, Belgium

(3) Eastern Mediterranean Center for Oceanography and Limnology, Istanbul Technical
University, Maslak 34469 Istanbul

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. Located within 100 km of at least three major dams on the Euphrates-Tigris river system, it is a major structure along the East Anatolian Fault and locus of two historical earthquakes of magnitude 7.1 and 6.7 in 1874 and 1875 respectively. 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 Hazar basin constrained by single-channel high-resolution seismic data collected with a mean spacing of 500 m between survey lines. This map shows a pull-apart structure located in the North-Eastern extremity of the lake covering 1/3 of its present extension with the main strike-slip active fault cutting across the pull-apart and uplifting its southern part. This strand is presented as the most probable locus for the 1875 earthquake. Further southwest, the pull-apart structure becomes a half-graben with two parallel faults situated in the southern part of the lake showing varying level of complexity with alternating of small-scale pull-apart and

pop-up structures. Finally, a sketch of the structural evolution of the basin is proposed using isochrones mapped from the seismic profiles.