



Active Tectonics in the Ohrid Basin (Macedonia/Albania)

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The Ohrid Basin is a major N-S trending graben structure located on the border of Macedonia and Albania, associated with other basins (Korce basin) in the Dinaride mountain belt. Within the basin an “ancient lake” developed since the Late Miocene/Pliocene with almost 290 m water depth. Since the beginning of basin formation around 700 m of sediment accumulated in the lake, the initial stage of subsidence is triggered either by extension or strike-slip movements. The general geodynamic setting of the Lake Ohrid area can be described with a “basin and range” situation. The multidisciplinary ICDP-SCOPSCO initiative is currently investigating Lake Ohrid and its environs.

The central mountain chain, especially the intramontane basins of Late Neogene age, form one of the most active seismic zones in Albania/Macedonia with several moderate earthquakes reported during the last few centuries (Muço 1998; NEIC database, USGS). Major earthquakes occurred during historical times. Lychnidos (the ancient city of Ohrid) was destroyed completely by an earthquake in 526 AD. It was rebuilt by Emperor Justinian (527-565), who was born in the vicinity, and was called by him Justiniana Prima, i.e. the most important of the several new cities that bore his name. The last prominent earthquake took place in on 18th February 1911 at 21.35 close to Lake Ohrid Basin, (M 6.7, corresponding to EMS X; 15 km depth, N 40.9°, E 20.8°). The last earthquake occurred on Jan 8th 2009 with a magnitude of 4.9 close to the lake. Hypocenter depths scatter between 10 and 25 km but some deeper earthquakes occur between 25 and 50 km depth. Very rarely intermediate earthquakes around 100 km depth are observed. Small and moderate earthquakes (< M 5.5) take place predominantly along major fault zones, and are concentrated along the margins of the Ohrid Basin. The Ohrid-Korça Zone is considered to be the region of the highest seismic hazard in the Albanian-Macedonian Corridor based on present-day seismicity (Aliaj et al., 2004).

The Ohrid Basin meets all criteria of an active, seismogenic landscape: linear step-like fault scarps in the landscape and under water in the lake. Post-glacial (or Late Pleistocene) bedrock fault scarps at Lake Ohrid are long-lived expressions of repeated surface faulting in tectonically active regions, where erosion cannot outpace the fault slip. Other morphotectonic features are wineglass-shaped valleys and triangular facets, which are well preserved. Generally, the faults and fault scarps are getting younger towards the basin center, as depicted on seismic and hydroacoustic profiles. Additionally, mass movement bodies within the lake and also onshore (rockfalls, landslides, sub-aqueous slides, homogenites, turbidites) are likely to be seismically triggered, eventually damming the outflow of Lake Ohrid temporarily.

References:

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