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Initial geochemistry data of the Lake Ohrid (Macedonia, Albania) "DEEP" site sediment record: The ICDP SCOPSCO drilling project

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Lake Ohrid, located at the border of Macedonia and Albania is about 30 km long, 15 km wide and up to 290 m deep. Formed within a tectonic graben, Lake Ohrid is considered to be the oldest lake in Europe.
The ICDP SCOPSCO (Scientific Collaboration of Past Speciation Conditions in Lake Ohrid) deep drilling campaign at Lake Ohrid in spring 2013 aimed (a) to obtain more precise information about the age and origin of the lake, (b) to unravel the seismotectonic history of the lake area including effects of major earthquakes and associated mass wasting events, (c) to obtain a continuous record containing information on volcanic activities and climate changes in the central northern Mediterranean region, and (d) to better understand the impact of major geological/environmental events on general evolutionary patterns and shaping an extraordinary degree of endemic biodiversity as a matter of global significance. Drilling was carried out by DOSECC (Salt Lake City, USA) using the DLDS (Deep Lake Drilling System) with a hydraulic piston corer for surface sediments and rotation drilling for harder, deeper sediments.
Overall, about 2,100 m of sediment were recovered from 4 drill sites. At the "DEEP" site in the center of the lake, seismic data indicated a maximum sediment fill of ca. 700 m, of which the uppermost 568 m sediment were recovered. Initial data from core catcher samples and on-site susceptibility measurements indicate that the sediment sequence covers more than 1.2 million years and provides a continuous archive of environmental and climatological variability in the area. Currently, core opening, core description, XRF and MSCL –scanning, core correlation, and sub-sampling of the sediment cores from the "DEEP" site is conducted at the University of Cologne. High-resolution geochemical data obtained from XRF-scanning imply that the sediments from the "DEEP" site are highly sensitive to climate and environmental variations in the Balkan area over the last few glacial-interglacial cycles. Interglacial periods are characterized by high Ca counts, likely associated with a high content of calcite in the sediments. Previous studies have shown that the calcite contents in sediments from Lake Ohrid are predominantly triggered by precipitation of endogenic calcite resulting from enhanced photosynthesis and higher temperatures. Moreover, high Ca counts mostly correspond to low K counts indicating reduced clastic input and a denser vegetation cover in the catchment. In contrast, high K and low Ca counts characterize glacial periods, indicating reduced precipitation of endognic calcite and enhanced deposition of clastic material. The variations in Ca and K counts mainly represent climatic variations on a glacial-interglacial timescale. Inorganic geochemistry data shall also be used to improve the age control of the "DEEP" site sequence. First findings of macroscopic tephra horizons allow a preliminary age control on the sediment succession, and peaks in K, Sr, Zr, and magnetic susceptibility might indicate the occurrence of cryptotephralayers in the sediment sequence.