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The Lake Ohrid Drilling Project: some initial interpretations of stable isotope data through the last 15 Marine Isotope Stages

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The SCOPSCO (Scientific Collaboration on Past Speciation Conditions in Lake Ohrid) project is an international research initiative to study the influence of major geological/environmental events on the biologic evolution of taxa. The target site for this study is Lake Ohrid, which is considered to be the oldest lake with continuous existence in Europe and which has more than 200 endemic species. The recovery of long sediment successions from Lake Ohrid is the basis for obtaining more precise information about the age and origin of the lake, and about the climatic and environmental history of the region including the history of Italian volcanic eruptions. The main SCOPSCO drilling campaign was carried out in 2013, and here we describe data from a 569 m core taken from centre of the lake. Initial data from borehole logging, core logging and geochemistry indicate that the sediment succession from this site covers more than 1.2 million years of Earth's history. Total carbon (TC) and Total Inorganic Carbon (TIC) content show that the amount of TIC is a proxy for short-term and long-term climate change (Vogel et al., 2010; Wagner et al., 2010). TIC is high during interglacials and primarily originates from calcite precipitated in the spring-summer in the epilimnion, when photoautotropic organisms assimilate CO_2 utilising the Ca and bicarbonate from the karstic springs. During the glacials, carbonate is almost absent except from discrete siderite layers. TOC is very low throughout both the glacial and interglacial periods and reflects the oligotrophic conditions in the lake. The oxygen and carbon isotope composition of the endogenic carbonate has been shown to be a function of the balance between freshwater input by rivers and springs and evaporation of the lake water (Leng et al., 2010). Variations both within and between interglacials show climate variability including periods of exceptional aridity and potentially very low lake levels. These early findings suggest that the record from Lake Ohrid will substantially improve the knowledge of long-term environmental change in the northern Mediterranean region, which forms the basis to better understand the influence of major environmental events on the evolution of organisms within the lake.

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