

SCOPSCO

Scientific Collaboration On Past Speciation Conditions in
Ohrid
Macedonia



Goal & Scientific Objective

The Lake Ohrid is considered to be the oldest lake in continuous existence in Europe and a hotspot for endemism with more than 300 endemic species. The deep drilling of Lake Ohrid has four major aims: (i) to obtain more precise information about the age and the origin of the lake, (ii) to unravel the seismotectonic history of the lake area including effects of major EQs and associated mass wasting events, (iii) to obtain a continuous record containing information on volcanic activities and climate changes in the central northern Mediterranean region, and (iv) 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.

Operational Achievements

Drilling was scheduled for spring 2012, but became postponed due to logistical issues. Drilling was finally executed 2013 with the Deep Lake Drilling System. On five sites, 13 drill holes were cored at water depths ranging from 125 to 260 m. The maximum drilling depth was 569 m below lake floor (b.l.f.) with a total core recovery of 2207.9 m:

DEEP: 6 holes, max depth of 569 m b.l.f.

Cerava: 2 holes, max depth of 90.5 m b.l.f.

Gradiste: 3 holes, max 123 m b.l.f.

Pestani: 1 hole, max 194.5 m b.l.f.

Lini: 1 hole, 10 m b.l.f.

All holes (except at Lini site) were logged by LIAG (Leibniz Institute for Applied Geophysics). MSCL (Multi Sensor Core Logger) was applied to cores from all sites. Additional zero-offset vertical seismic profiling was conducted at the DEEP site.

Data & Sample Access

Lake sediments are stored in University of Cologne, Institute of Geology and Mineralogy, and at the IODP core repository in Bremen. Data holdings can be accessed on the ICDP website.

Web & Media Resources

www.ohrid-drilling.org

<http://ohrid.icdp-online.org>

Timeline

2009 ICDP proposal submission

2011 pre-site studies including shallow hole

2013 (spring) drilling/coring operations

Principal Investigators

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Scientific Findings

Data from borehole logging, core logging and geochemical measurements indicate that the sediment succession covers more than 1.2 million years.

Sedimentological, biological and geophysical studies reveal that the Ohrid basin formed during the Miocene and Pliocene and provides a continuous record of distal tephra deposition and climatic and environmental change in the central northern Mediterranean region.

The upper 247.8 m of the DEEP site represents the last 637 thousand years. Over this period, Lake Ohrid experienced significant environmental change, which is related to orbital-scale climate forcing and regional geological events but did not cause major extinction events. The potential high resilience of the ecosystem to past climatic and environmental changes together with relatively low extinction rates may explain the extraordinary degree of endemic biodiversity in the lake.

The SCOPSCO deep drilling campaign is the very first interdisciplinary study that was able to infer the relative contribution of biotic and abiotic characteristics in driving diversification rates in highly isolated ecosystems over an extended period of time.



Drill core from Lake Ohrid

Key Publications

Wagner, B.; Wilke, T.; Krastel, S.; Zanchetta, G.; Sulpizio, R.; Reicherter, K.; Leng, M.J.; Grazhdani, A.; Trajanovski, S.; Francke, A.; Lindhorst, K.; Levkov, Z.; Cvetkoska, A.; Reed, J.M.; Zhang, X.; Lacey, J.H.; Wonik, T.; Baumgarten, H.; Vogel, H. (2014): The SCOPSCO drilling project recovers more than 1.2 million years of history from Lake Ohrid. *Scientific Drilling* 17 19-29.

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Lacey, J.H.; Francke, A.; Leng, M.J.; Vane, C.H.; Wagner, B. (2015): A high-resolution Late Glacial to Holocene record of environmental change in the Mediterranean from Lake Ohrid (Macedonia /Albania). *International Journal of Earth Sciences* 104(6) 1623-1638. doi:10.1007/s00531-014-1033-6

Wagner, B.; Wilke, T.; Wagner-Cremer, F.; Middelburg, J. (eds.) (2017): Integrated perspectives on biological and geological dynamics in ancient Lake Ohrid. *Biogeosciences*, Special Issue.

Wilke, T.; Wagner, B.; Van Bocxlaer, B.; Albrecht, C.; Ariztegui, D.; Delicado, D.; Francke, A.; Harzhauser, M.; Hauffe, T.; Holtvoeth, J.; Just, J.; Leng, M.J.; Levkov, Z.; Penkman, K.; Sadori, L.; Skinner, A.; Stelbrink, B.; Vogel, H.; Wesselingh, F.; Wonik, T. (2016): Scientific drilling projects in ancient lakes: Integrating geological and biological histories. *Global and Planetary Change* 143 118-15. doi:10.1016/j.gloplacha.2016.05.005

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