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Detecting and using Milankovic cycles in borehole logging data: Comparing methods and application to Lake Ohrid

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Borehole logging data are not yet systematically assessed using cyclostratigraphic methods. In order to obtain a reliable understanding of (long) borehole logging datasets, and especially data from complex settings, a good understanding of the potential and specifics of relevant (time/depth) evolutive methods in cyclostratigraphy are an essential prerequisite. Therefore, we test a suite of evolutive cyclostratigraphic methods using several artificial datasets consisting of modelled Milankovic signals and noise.

Aim of this work is the comparison of different cyclostratigraphic methods for an understanding of which methods are suitable for Quaternary lake records, also for a good understanding of ICDP logging data. Once artificial datasets are discussed, we apply these methods to real data. A discussion of the possible issues and potential of especially uncommon methods gives insight in further potential of cyclostratigraphy.

Lake Ohrid is a tectonic lake located on the border of North Macedonia and Albania. With 1.36 Ma, it is considered Europe's oldest lake and an important link between Mediterranean climate and African monsoon systems (Wagner et al. 2019). In 2013, an ICDP drilling campaign recovered 2100 m of sediments from four sites (Wagner et al. 2014).

Datasets from geophysical downhole logging provided by the Leibniz Institute for Applied Geophysics are used in a cyclostratigraphic analysis, which provides further insight into the sedimentation history of Lake Ohrid. Here we present initial results from the full succession in this sedimentary archive.

References:

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