

Processes of seasonal layer formation in varved Lake Czechowskie (N Poland): Linking monitoring and sediment core data

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The interpretation of environmental and climate records, such as lake sediments, rely on the profound understanding of the proxy sensitivity towards past changes. Monitoring of lake sedimentation, limnological, hydrological and climate parameters are natural experiments combining measurements and observations. In this study, we present monitoring data from Lake Czechowskie (N Poland) for the period 2013-2016. Lake Czechowskie has a surface area of 73 ha and a maximum water depth of 32 m. Sediment has been trapped in a 4-cylinder and an automatic sequential trap installed at 12 and 30 m water depths close to the deepest part of the lake, respectively. Sampling intervals range from 15 (sequential) to 30 days (4 cylinder) days. The sediment has been analyzed for total sediment flux, calcium carbonate and organic matter contents. Continuous water temperature measurements (30 min. intervals) are based on 17 data loggers covering the entire water column (1 m steps from 0-12 m; 5 m steps from 12-32 m). Limnological measurements (e.g. electrical conductivity, dissolved oxygen and pH) have been carried out manually on a monthly routine. Air temperature, precipitation, wind speed and direction are available for the same period from a meteorological station installed at the shore of Lake Czechowskie. Our dataset exhibit seasonal deposition starting with diatom blooms and calcite precipitation in spring after lake stratification. A second deposition peak occurs at the onset of lake mixing in late autumn and winter. This is caused by an initial deposition of planktonic diatoms (mainly *Fragilaria* spp.) indicating lake productivity, followed by an increase in larger calcite patches ($>30 \mu\text{m}$) and periphytic diatoms (mainly *Navicula* spp.) representing resuspension of littoral sediments. We paired sediment trap data with micro-facies analyses from a sediment core obtained in autumn 2016 covering the same time interval.

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