

## Does the chemical composition of lake sediments reflect past climate changes?

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Lake sediments have the ability to record palaeoinformation that affords to identify trails of various bygone climate events. The aim of this study was to find out if sedimentary organic carbon and nitrate nitrogen dissolved in pore water (pOC and pNO<sub>3</sub>-N, respectively) and phosphorus (P) can be used for climate reconstruction. A 3.5-m sediment core of a large (3,555 km<sup>2</sup>) shallow (mean depth 7 m) Lake Peipsi (Northern Europe) was examined. Radiocarbon dating of the core revealed that in time it covers the last 10,000 yrs. Sediment P was categorised into different pools using a 4-step extraction procedure [1]. The concentrations of pNO<sub>3</sub>-N and pOC were determined directly from absorption spectra of pore water. The high-resolution scale (22–53 yrs) changes in the age-related distribution of pOC, pNO<sub>3</sub>-N and different P fractions were compared with well-known climate events that have occurred in the region over the Holocene [2–5].

The ability of pOC, pNO<sub>3</sub>-N and P fractions to reflect climate changes was different. The fraction of loosely sorbed P was the only one in which the majority of the so-called rapid climate changes (RCCs), including an abrupt cooling around 8,200 cal yrs BP, were noticeable. The 8.2 kyr event could not be inferred from in any other depth profile. In the pOC and pNO<sub>3</sub>-N distributions a short cold and wet period around 1500 cal yrs BP could be most clearly observed. These distributions also indicated relatively well a sudden arid event around 4,500 cal yrs BP.

[1] Psenner *et al* (1988) *Arch. Hydrobiol. Beih. Ergebn. Limnol.* **30**, 98–110 [2] Bond *et al* (1997) *Science* **278**, 1257–1266 [3] De Jong *et al.* (2009) *Quat. Sci. Rev.* **28**, 54–64 [4] Mayewski *et al.* (2004) *Quat. Res.* **62**, 243–255 [5] Seppä & Poska (2004) *Quat. Res.* **61**, 22–31