

chironomids *Psectrocladius sordidellus*-type, *Metriocnemus*, *Hydrobaenus*, *Stictochironomus* and some *Cricotopus* taxa were dominant in Nunavut ponds.

We revealed that *Cymbella arctica* prefers reservoirs with higher pH values. *Nitzschia palea* develops better in waters with lower pH values and lower water hardness, which is confirmed by negative correlations with ions of calcium, magnesium and sodium. *Caloneis silicula* and *Denticula kuetzingii* prefer deeper ponds, and *Diatoma tenue* more often is found in shallowest ponds. *Cymbella amphycephala* var. *citrus* positively correlate with concentration of iron and potassium and *Diatoma tenue* negatively correlates with sulphates. Our results supplement database of taxonomic richness of the Arctic flora and fauna and will be used for climatic reconstructions in Arctic regions.

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### **S1-13 Process studies and varve chronology as the basis for high-resolution and multiproxy paleoclimate reconstructions from the sediments of Lake Żabińskie (northeastern Poland)**

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Lake sediments are among the most

valuable environmental archives as they record physical, chemical and biological conditions and processes taking place in the lake water as well as in the surrounding catchment and the atmosphere. Thus, to provide a reliable paleoclimate reconstruction, it is crucial to understand which biological, chemical and physical factors influence sediment-formation processes and how it is recorded in the sediments. Lake Żabińskie is a hardwater and eutrophic lake located in the Masurian Lake District (northeastern Poland). The lake provides a unique environment for the investigation of processes that lead to the varve formation.

During monthly field campaigns a board range of physical and chemical parameters of the lake water as well as sediment fluxes were measured. In this study, we demonstrate different mixing patterns that may occur in Lake Żabińskie and depend largely on the variability of meteorological conditions during winter/spring and fall/winter periods. We also focus on sediment trap studies that provide an information about seasonal variability in sedimentation and document the varve formation processes. The varve structure shows multiple calcite deposition during growing season which is also reflected in the chemical composition inferred from high-resolution XRF scanning. The measurements show a characteristic pattern in chemical composition of a single varve. The highest concentration of Si reflects biogenic silica deposition and occur usually in early spring after ice melting. Then, the highest Ca concentrations occur (spring-summer) followed by the maxima in Fe and S (late summer-fall), and by the maxima in K concentration in winter.

Process studies turned out to be crucial for reliable chronology of the sediment record. Based on thin sections analysis and three independent countings, we established varve chronology covering the last millennium. This chronology was then validated with two peaks of  $^{137}\text{Cs}$  activity as well as the tephra horizon (Askja eruption from AD 1875). To validate the chronology in the lower part of the core we dated 32 terrestrial macrofossils with AMS  $^{14}\text{C}$ . The dating results show that, after elimination of outliers, we received very good consistency between varve- and radiocarbon-based chronologies. With this precise chronology the sediment record has a remarkable potential for a reliable multiproxy paleoclimate reconstruction.

#### **S1-14 Hydroclimatic changes in monsoonal China during 5 ka B.P. event and their impacts on Neolithic Culture**

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There was an abrupt cooling event during ~5 ka BP, which significantly changed the environment of many regions over the world, including Southwest Asia, South Europe, north Africa, Australia, North America. Here we reviewed the recently published high-resolution speleothem, peat and lacustrine deposit reconstructions from different regions of monsoonal China, which recorded the hydroclimatic changes during the 5 ka BP event. We suggested that the monsoonal China, from the north to the south, had experienced notably dry climate during this event. The extreme dry climate had played an important role on the evolution of Chinese Neolithic culture.

The reduction of solar irradiance might cause the southward migration of ITCZ during the 5 ka BP event. Meanwhile, reduced AMOC during this event might weaken the Asian summer monsoon. The common effects of these two aspects might significantly reduced the monsoon precipitation in the monsoonal China.

#### **S1-15 Carbonate varves and minor element variations during the past 100 years in Maar Lake Twintaung, Myanmar**

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We report on maar lakes and lacustrine carbonate varves in Myanmar. Carbonate varves are well developed in maar lake Twin Taung, the deepest of five maar lakes in Myanmar. Lamination consists of light and brown-colored laminate couplets in thin sections. A light-colored layer is composed mainly of calcite crystals with thickness 50–400  $\mu\text{m}$ , and a dark-colored layer consists of other organic and siliceous matter. Climatic conditions in the study region are determined by the Indian monsoon and have a pronounced rainfall seasonality. The dry and hot season is between December and April, and warm and humid conditions prevail in summer and autumn. These characteristics are key to varve formation. In the dry and hot season, calcite crystals form with less precipitation and strong evaporation, whereas clastic and organic matter are deposited during the warm and humid season. An independent chronology derived from  $^{137}\text{Cs}$  and  $^{210}\text{Pb}$  shows good agreement with counted laminations. To