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Recent changes in aquatic biota in subarctic Fennoscandia – the role of global and local environmental variables

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The Arctic, representing a fifth of the earth's surface, is highly sensitive to the predicted future warming and it has indeed been warming up faster than most other regions. This makes the region critically important and highlights the need to investigate the earliest signals of global warming and its impacts on the arctic and subarctic aquatic ecosystems and their biota. It has been demonstrated that many Arctic freshwater ecosystems have already experienced dramatic and unpreceded regime shifts during the last ca. 150 years, primarily driven by climate warming. However, despite the indisputable impact of climate-related variables on freshwater ecosystems other, especially local-scale catchment related variables (e.g. geology, vegetation, human activities) may override the climate signal and become the primary factor in shaping the structure of aquatic ecosystems. Although many studies have contributed to an improved understanding of limnological and hydrobiological features of Artic and subarctic lakes, much information is still needed especially on the interaction between the biotic and abiotic components, i.e. on factors controlling the food web dynamics in these sensitive aquatic ecosystems. This is of special importance as these lakes are of great value in water storage, flood prevention, and maintenance of biodiversity, in addition to which they are vital resources for settlement patterns, food production, recreation, and tourism.

In this study we compare the pre-industrial sediment assemblages of primary producers (diatoms and Pediastrum) and primary consumers (cladoceran and chironomids) with their modern assemblages (a top-bottom approach) from 50 subarctic Fennoscandian lakes. We will evaluate the recent regional pattern of changes in aquatic assemblages, and assess how coherent the lakes' responses are across the subarctic area. Moreover, the impact of global (e.g. climate, precipitation) and local (e.g. lake and its catchment characteristics) scale environmental changes on the aquatic biota will be compared and discussed.