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Sedimentary DNA analyses decipher past and present aquatic plant diversity in Siberian and Tibetan lakes

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In recent decades Arctic and Alpine terrestrial ecosystems experienced an increase in aquatic plant biomass due to global warming, which motivates the investigation of aquatic plant diversity in High Arctic and Alpine regions, whereof so far only sparse data exist. Aquatic plants are important primary producers, food resource and supply habitat structure and thus have been widely used to infer the ecological status of modern lakes. Identification of past aquatic plants using macrofossil records only partly reflects the past community structure due to differences in spatial distribution, preservation and seed abundance of taxa. Thus, in our study we applied sedimentary DNA analyses to detect aquatic plant diversity in modern surface samples of over 200 lakes from various localities across Northern, Eastern and Central Siberia and the Tibetan plateau and selected lake core samples (covering Holocene timescales) from these regions. We applied metabarcoding of the trnL marker and used Illumina technology for NGS amplicon sequencing of PCR products and performed OBITools pipeline for bioinformatic analyses and taxonomic assignment. Firstly, our study aims to evaluate if the trnL marker typically used for detecting terrestrial plant diversity can deliver valuable information on the composition of aquatic plants. Secondly, we will use ordination analyses to test which environmental variables (e.g. lake water depth, pH and conductivity) shape the diversity of genetically detected aquatic plants. Thirdly, we will analyze past genetic aquatic plant diversity from Holocene lake cores and compare it with the modern genetic data set to reconstruct putative drivers of past diversity changes. So far, we identified free-floating (*Nymphoides*, *Ceratophyllum*), submerged (*Potamogeton* sp.), wetland taxa (*Caltha*, *Carex*, *Juncus*) and bryophytes (*Sphagnum*) in modern and past genetic data sets. Further statistical analyses are pending and will be finalized and presented at EGU.