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Ecological training set of freshwater ostracods in Canadian and Siberian periglacial regions

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Quantified palaeoenvironmental reconstructions are essential to estimate the impact of future climate changes on ecosystems. Based on faunistic data from regional multi-reference sites and limnological surveys, ecological training sets can be used to build transfer functions to infer major environmental variables (e.g., temperature, conductivity, DOC, and pH value) in a greater study area. The remote Polar regions are affected by bigger amplitude of climate change than elsewhere on this planet and make ecological training sets in this region so important.

Freshwater ostracods from Arctic environments have the potential to hindcast glacial/interglacial and stadial/interstadial palaeoclimate variations. Various methods can be applied to fossil assemblages such as indicator species approach, modern analogue techniques and transfer functions based on ecological training sets.

The present training set combines data from the Canadian (Southampton Island at 63-65˚N; Bylot Island at 72-73˚N) and the Siberian (Central Yakutia at 61˚N; Northeast Yakutia at 66˚N; Lena Delta at 72˚N) high latitudes with reference areas in Central Canada (Whapmagoostui-Kuujjuarapik at 50-55˚N; Churchill at 58˚N). A total of 75 localities were sampled during field work in 2005-2007. In general, life conditions for aquatic organisms such as freshwater ostracods in the high latitude regions are extreme and limited by short open water periods during the summer and strong variations of water temperatures in the shallow waters. The host waters in periglacial regions are

affected by permafrost and thermokarst processes and mostly represented as polygonal ponds or thermokarst lakes in different stages of their development.

Generally, the waters in our study area have a mean pH-value of 7.6, ranging from pH 6.0 to pH 9.2. They are characterised by low ionic contents ($Cond_{mean}$ = 231 μS*cm^{-1}), but the training set includes sites between 4.4 μS*cm^{-1} (e.g., on Bylot Island) and 1433 μS*cm^{-1} (e.g., in Central Yakutia).

A principal component analysis reveals that 88.5 % of the variability of the environmental data is explained by the first ordination axis corresponding to pH, conductivity and major cations (i.e., Ca, Na).

The studied ostracod assemblages are characterised by dominance of single species in different regions, e.g., *Cyclocypris ovum* on Bylot Island, *Fabaeformiscandona pedata* in the Lena Delta. In general, the species diversity in northern latitudes is relatively low due to the harsh environmental conditions affecting ostracod's ontogeny. In total, 16 species were used in the presented data set.

Further implementation of the ecological training set into transfer functions for one or more variables are prosperous.