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Multiproxy study of the environmental conditions during the last Interglacial in NE Siberia (Dmitry Laptev Strait, East Siberian Sea)

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In course of the IPY 'Past permafrost' fieldwork was undertaken at coastal permafrost sections of the Dmitry Laptev Strait in summer 2007. Late Quaternary permafrost deposits were sampled for further cryolithological, sedimentological, and micro-palaeontological analyses to reconstruct landscape dynamics during several climate cycles (Wetterich et al. 2009).

Records of environmental changes from the penultimate Glacial (MIS 6) to the last Interglacial (MIS 5e; ca. 130 - 115 kyr BP) are preserved in ice-wedge casts exposed along the studied coasts. Due to climate warming the transition from glacial to interglacial conditions induced extensive thawing of ice-rich permafrost (thermokarst) and the formation of ice-wedge casts. Evolving thermokarst depressions transformed formerly frozen ground into taberal (thawed and refrozen) deposits. Overlying lacustrine deposits are fossil-rich and retain evidence of changes in environmental conditions. Pollen records reflect changes from early-interglacial grass-sedge dominated tundra to shrub tundra during the thermal optimum followed by late-interglacial grass-sedge tundra. The findings of *Larix* (larch) pollen and macro-remains in mid-interglacial deposits from the south coast of the Dmitry Laptev Strait, and their absence in similar deposits from the north coast indicate the location of the northern tree line during the interglacial thermal optimum.

Species composition and dominant taxa of cladocerans remains indicate the warmer temperature during the last Interglacial in comparison to modern conditions. Among the identified sub-fossil Cladocera taxa are those that are now found on the border of the modern tree-line and to the south of it. The rich cladoceran assemblages have been represented by various ecological groups among which most frequent are littoral phytophilic and truly planktonic organisms, presented in particular by genera *Bosmina sp*.

The investigated chironomid community is diverse, with stable and evenly distributed structure (Shennon Index is 2,40, Pielou Index is 0,86). Littoral taxa form the basis of the investigated community and indicate temperate lacustrine conditions with shallow water and pronounced zone of macrophytes. Findings of steam and leaf mining taxa indicates presence of some submerged coarse vegetation, most probably remains of trees and shrubs. Majority of the taxa are inhabitants of hygropertic, which is indicative for unstable conditions, fluctuating water level and heterogeneous habitat controlled by complex factors, such as air exposure, insolation, unstable water temperature and dissolved oxygen concentration, etc. These conclusions are confirmed by mean July air temperature and water depth reconstructions performed with Yakutian chironomid based inference models (Nazarova et al. in press). Air T july reconstructed for the interglacial thermal optimum is $12{,}90 \pm 0{,}9^{o}$C.

Rich fossil ostracod records reflecting shallow lakeshore conditions can be correlated with the thermal optimum.

The last interglacial palaeoenvironmental records reflect three landscape development stages according to changes in the climatic setting: (1) thermokarst-induced formation of basins, (2) accumulation of lacustrine sequences, and (3) transformation of lake-dominated areas into polygonal tundra. The stages are considered to be of stratigraphical significance.