

200 kyrs of sediment deposition in the coastal lowlands of Bol'shoy Lyakhovsky – a record of deglaciation of the New Siberian Islands?

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Bol'shoy Lyakhovsky, the southernmost island of the New Siberian Archipelago, holds the longest record of palaeoenvironmental history in the North Siberian Arctic. It stretches back to ~200 kyr before present. Next to palaeosols and floodplain deposits it includes prominent thermokarst deposits from the Last Interglacial and Yedoma (Ice Complex) sections from the Last Glacial. Yet, it is unknown, whether or not the depositional history of the area is affected by the deglaciation of the northern part of the New Siberian Archipelago. Potentially, it could give insights into the break-up of the proposed MIS 6 ice sheet located on the East Siberian Sea shelf.

Polymodal particle size distributions in the sediment record suggest that more than one transport mechanism drove sediment accumulation from more than one source. From a cryo-sedimentological data set we focus on the mineral composition (63-125 μm fraction) to determine the provenance of the deposits and to identify possible changes of transport pathways. Complementary, we use pore ice hydrochemical data to track changes of the weathering solution preserved in permafrost. Presumably, the both complement each other, since the weathering products largely depend on the mineral composition.

We conclude that the observed trends in the heavy mineral and pore ice chemical data of the frozen ground record reflect short-distance material transport from weathered bedrock to the depositional area. In this sense no portion of the 200 kyr record seems to be affected by the presumed MIS 6 ice sheet break-up, which at that time happened about 250 km north of the study site.