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Glacier variations and environmental changes over the past 60.000 years in the Polar Urals of Arctic Russia, inferred from a high resolution lake record along with other glacial geological data

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Here we present and discuss results from a coring campaign in the Polar Ural Mountains in the Russian Arctic. This includes the sediment stratigraphy in the lake basin of Lake Bolshoye Schuchye, the largest and deepest lake in the mountain chain. Seismic surveying show that this basin contains a 160 m thick sequence of lacustrine sediments above bedrock. A well-dated 24 m long core retrieved from the southern end of the lake, which in the lower half include annual layers (varves), have provided us with new and detailed insight into the glacial and environmental history since prior to the Last Glacial Maximum (LGM). We have also carried out glacial geological investigations in the catchment as well as adjacent areas of the Polar Urals to better understand the sedimentation processes and to reconstruct the extent and timing of former glaciers. This includes in situ Cosmogenic Nuclide (CN) dating (10Be) of boulders and Optically Stimulated Luminescence (OSL) dating of exposed sediments. Jointly, these results indicate that the last time this part of the Ural Mountain was covered by a complex of really large glaciers that filled most if not all mountain valleys occurred during Marine Isotope Stage (MIS) 4, but they appears to have melted away early in MIS 3. From downward extrapolation of the sedimentation rates we estimate that sedimentation in the lake started about 50-60 ka. In a later phase of MIS 3 and at the beginning of MIS 2, a new generation of medium-sized glaciers had emerged, but the lake basin remained ice free until the present.