



Varve chronology and sedimentology from lake Bolshoye Shchuchye in the Polar Ural Mountains

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Here we present an exceptionally well dated, high resolution and continuous 24 m long sediment core spanning the last ca. 24 000 years from the Polar Ural mountains, Arctic Russia. The bottom half of the retrieved sediment sequence is composed of rhythmic silt-clay couplets interpreted as annual varves. The varves are composed of coarser basal laminae most likely represent the peak of sedimentation during summer and finer clay-rich laminae corresponding to the settling of finer fractions during autumn and winter. The varves were counted on high resolution optical images from the Itrax XRF core scanning using the winter clay caps to define the varve boundaries. A floating varve chronology composed of ca. 5,100 varves was then constructed and anchored to the AMS 14C chronology. The varved part of the record stretches across the Last Glacial Maximum (LGM) from ca. 24-18.7 cal. ka BP and greatly improves the age model for this lower end of the core which is characterized by an increased scatter of the AMS 14C dates. The sedimentology of the core infer that the lake basin has remained ice free throughout the LGM when only local glaciers were present in the catchment. The glaciers had completely disappeared by 14.35 cal. ka BP in the Bølling chronozone. There are no signs of glacier reformation during the Younger Dryas but we infer a clear Holocene climatic amelioration with an early Holocene hypsithermal maximum between ca. 10-5 cal. ka BP. Our results presented here provides a long sought after continuous and high resolution record that supplement the existing, more fragmentary data from moraines and exposed strata along river banks and coastal cliffs around the Russian Arctic.