Fine laminated clastic deposits revealing the delay of the deglaciation timing in the High Tatras Mts. (Central Europe) to Early Holocene

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The Tatra moraine relief and cosmogenic nuclide dating show glacier stabilization and the maximum glacier extent in two phases, at 26 – 21 ka and at 18 ka followed by a gradual retreat and a termination of the glaciation during the Bølling/Allerød warming at 14.64 – 12.9 ka (Makos et al., 2014). A renewed glaciation within the Younger Dryas (12.9 – 11.5 ka) formed smaller rock glaciers. This retreat was connected with the formation of the morainic, trough and cirque lakes and the beginning of light-grey silt sedimentation dated from 10 ka to 16 ka cal BP on the northern slopes of the Tatra Mountains and before 10 ka cal BP on its southern slopes (Klapyta et al., 2016).

A new paleolimnic research led to a discovery of a cyclic fine laminated deposit in the four Tatra Mts. lakes. The laminae of thickness from 1 to 3 mm are built of couplets of light-coloured coarse detrital and fine dark-coloured laminae. Thicker light coloured laminae occasionally show a gradation ending in dark-coloured laminae. Laminae consist occasionally of low spherical angular grains of sand and gravel fractions, rarely up to size 10 mm which deformed underlying laminae. Light-coloured laminae are predominantly composed of quartz, followed by K-feldspar, plagioclase, mica, and clay-like particles. Dark-coloured laminae consist of clay-size clastic particles. These laminae were formed in cold, oxygen-rich, ultra-oligotrophic, slightly acid conditions in which the chironomids Pseudodiamesa nivosa and Micropsectra radialis-type dominated. We interpret these lamination as varves related to annual glacial melting. Once the valleys were ice-free, varve production stopped and a short deposition period of homogenous silt was replaced by gyttja. The radiometric C¹⁴ age dating shows the deglaciation in the Tatra Mts terminated at the beginning of the Early Holocene, around 10 ka cal BP – 9 ka cal BP.

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