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The Batagay permafrost mega thaw slump: an environmental archive of the Late Pleistocene continental climate

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Palaeoenvironmental data preserved in permafrost contribute in our understanding of climate changes and their influence on the biocenoses during the Late Quaternary. Here we present cryolithological and palaeoecological results of studies carried out on a newly described permafrost exposure near Batagay about 50 km from Verkhoyansk, Sakha Republic, Russia, the town with the most continental climate recorded in the northern hemisphere. According to Günther et al. (2015), this unique exposure is the biggest mega thaw slump measured so far with the dimensions 800 m wide and 73 m deep. Only sparse data on the exposure are so far published in few articles (Novgorodov et al., 2013; Kunitsky et al., 2013; Ashastina et al., in press; Murton et al., 2016). The site is situated inWest Beringia, the Late Quaternary landmasscovered by tundra steppe and inhabited by diverse mega herbivores.

We analyzed sedimentological data, plant macro- and micro-fossils together with insect remains in order to reconstruct the changes in the biome. The temporal frame for the accumulation of the sequence is provided by radiocarbon and optical stimulated luminescence dating, according to which the formation of the sequence started in the late Middle Quaternary. The features of permafrost accumulation and sedimentation give us an opportunity to propose the landscape changes responding to the climatic pulses of Pleistocene at this particular place. The shifts in vegetation from taiga to steppe associations are in a line with stadial and intersadial events.

We propose a scheme of permafrost state and vegetation changes and merge it with climate variation during Late Quaternary.

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