Geophysical Research Abstracts
Vol. 20, EGU2018-13638, 2018
EGU General Assembly 2018

Late Quaternary Lake Dynamics in the Verkhoyansk Mountains of Eastern Siberia: Implications for Climate and Glaciation History

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Sedimentary lake records from Lake Billyakh in the Verkhoyansk Mountains of eastern Siberia provide insight into palaeoenvironmental changes over the late Pleistocene to Holocene, as revealed by palaeolimnological multi-proxy approaches on the basis of sedimentological, geochemical, and micropalaeontological data series (diatoms, chironomids, pollen, palynomorphs). The mountain lake existed during the last 50 ka and was formed by tectonic and deglacial processes. Our lake record suggests final deglaciation around 35 ka BP in association with a high lake-level stage during the Karginian interstadial. Geomorphological findings, however, point to earlier deglaciation already sometime after 85 ka BP. Karginian warming with muted signs of millennial climate variability is documented by short-term lake-level fluctuations and vegetation dynamics (40-31 ka BP). The Sartanian glacial stage was characterized by low lake level and colder and dryer conditions, followed by Holocene climate amelioration and lake-level rise after 11.5 ka BP. The overall climate history of eastern Siberia is consistent with trends across the high latitudes of the northern hemisphere. The sequence of mountain deglaciation, however, is out of phase with the global ice-volume pattern, possibly because of complex atmospheric moisture routing effects, which so far are poorly understood for eastern Siberia.