



Late Holocene fire history documented at Lake Khamra, SW Yakutia (Eastern Siberia)

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Recent large-scale fire events in Siberia have drawn increased attention to boreal forest fire history. Boreal forests contain about 25% of all global biomass and act as an enormous carbon storage. Fire events are important ecological disturbances connected to the overarching environmental changes that face the Arctic and Subarctic, like vegetation dynamics, permafrost degradation, changes in soil nutrient cycling and global warming, and act as the dominant driver behind boreal forest's landscape carbon balance. By looking into past fire regimes we can learn about fire frequency and potential linkages to other environmental factors, e.g. fuel types, reconstructed temperature/humidity or geomorphologic landscape dynamics. Unfortunately, fire history data is still very sparse in large parts of Siberia, a region strongly influenced by climate change. The Global Charcoal Database (www.paleofire.org) lists only a handful of continuous charcoal records for all of Siberia, with only three of those featuring published data from macroscopic charcoal as opposed to microscopic charcoal from pollen slides.

We aim to reconstruct the late Holocene fire history using lacustrine sediments of Lake Khamra (SW Yakutia at N 59.99°, E 112.98°). It covers an area of c. 4.6 km² with about 22 m maximum water depth, located within the zone of transition from summer-green and larch-dominated to evergreen boreal forest. We present the first continuous, high-resolution (c. 10 years/sample) macroscopic charcoal record (> 150 µm) including information on particle size and morphology for the past c. 2200 years. We compare this to complementary information from microscopic charcoal in pollen slides, a pollen and non-pollen palynomorph record as well as µXRF data. This multi-proxy approach adds valuable data about fire activity in the region and allows a comparison of different prevalent fire reconstruction methods. As the first record of its kind from Siberia, it provides a long-term context for current fire activity in central Siberian boreal forests and enables a better understanding of the environmental interactions occurring in the changing subarctic landscape.