

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

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Wildfires in Siberia have become larger and more frequent in recent years, drawing increased attention from both scientists and the wider public audience. Fire events are important ecological disturbances connected to the overarching environmental changes that face the Arctic, 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. Using sedimentary reconstructions of past fire regimes, we can evaluate changes in fire frequencies and potential linkages to environmental factors. Unfortunately, fire history data is still very sparse in large parts of Siberia. Here, we reconstructed the late Holocene fire history using lacustrine sediments of Lake Khamra (SW Yakutia at N 59. 97°, E 112. 96°). It covers an area of c. 4. 6 km² with a maximum water depth of about 22 m, located within the zone of transition from summergreen and larch-dominated to evergreen boreal forest. We present the first continuous, high-resolution (c. 6 yrs/sample) macroscopic charcoal record (> 150 µm) of Eastern Siberia, including information on particle size and morphology for the past c. 2100 years. It reveals a peak in high fire activity around 700 CE, followed by a long period of low charcoal accumulation that corresponds with a colder Arctic climate. After c. 1750 CE fire frequency is again increasing, coinciding with both the colonization of Yakutia by the Russians and an increase in Arctic temperatures. Comparison to a pollen and non-pollen palynomorph record indicates that the relatively stable vegetation composition has likely not been the main driver behind changes in fire activity.

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