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Vegetation, permafrost and climate variability – 1600 years of fire history in North Eastern Mongolia

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We are faced with negative changes concerning social and the natural environment induced the degradation of permafrost, which is related to recent global warming. Thawing permafrost affects the hydrological cycle, geomorphological processes, as well as vegetation changes. Mongolia territory is by about 63 % within permafrost zone. Therefore, it is important to understand the dynamic of the process and controlling factors responsible for the permafrost degradation. We studied two peatlands Khar Zurkhnii Khukh Nuur in the Khentii mountain range (NE Mongolia). This part of Mongolia is characterized by the occurrence of the forest-steppe mosaic in the area of discontinuous permafrost. We aimed to reconstruct dependence between vegetation composition, fire regime shift and timing of permafrost degradation during the last 1600 years from two peat archive. For this purpose, we worked on peat archive and used multi-proxy analysis (pollen, plant macrofossils, testate amoebae, Cladocera, macro-charcoal, and geochemistry). Two profiles: 36-cm (KH-1) and 55-cm (KH-2) have been extracted from two nearby peatlands, which are only 1 km away. Chronology of the KH-1 core was based on 6 AMS 14C dates, 137Cs, and 210Pb analyses, while the second core KH-2 was based on 11 AMS 14C dates. Respectively, the core KH-1 covers the last 250 years and the core KH-2 covers the last 1600 years. Our first results indicate a strong relationship between degradation permafrost, droughts, vegetation forest-steppe mosaic composition and fire regime shifts, which caused intensified erosion in the catchment. Palaeoecological and geochemical data allowed tracing the dynamics of degradation permafrost and impact of fire regime shifts on the ecosystems, both triggered by recent and past climate changes.
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