

Original article

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Influence of Groundwater Level and Humidity on the Development of Peat Fire

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Abstract. The study is dedicated to the issues of extinguishing peat fires, which pose a serious threat to people, infrastructure and landscapes. The article discusses various methods for eliminating the peat fire points. In the course of a comparative analysis, their advantages and disadvantages were identified. The results of scientific researches dedicated to the issues under consideration are described. Under the conditions of a typical peat fire, experimental data were collected to scientifically substantiate the groundwater level and peat moisture content, which make it possible to localize or eliminate a peat fire with flooding. The study aims to identify the parameters of the conditions in which a peat fire develops. The article presents experimental data on measurements of peat moisture content in pits at various depths before and after flooding. The study showed that for the studied cases, peat fire points ceased to develop vertically (in depth) starting from a distance of 50–70 cm from the groundwater level below them. The critical moisture content at which peat smoldering stopped was 400 % of the dry matter mass. The horizontal filtration rate from the channels being filled with water into the burning peat field was 0.2–0.3 m/min. The ratio of the volumes of water necessary for flooding the burning peat field to the volume of empty space in the channels was 4:1. The study revealed that in all observed cases surface smoldering increased and open flame appeared before the fire points went out along with the moisture content growth. We suggest that this phenomenon is caused by steam, which is formed when water contacts with the lower smoldering zones. Based on the results of the preliminary study, a conclusion was made about the insufficient knowledge of the influence of the fire points on the adjacent peat layers, especially during horizontal fire point development, and the tasks for the next stage of the study were identified.

Key words: peat fire, groundwater level, peat moisture content, flooding.

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