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Soil water holding capacity and the main physical properties of soils of the Russian Artic (on examples of Lena River Delta and Yamal Peninsula)

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Floodplains of rivers are one of the most dynamic and recent areas of the Earth's quaternary surface. Areas of floodplains are located in transitional conditions (land-ocean) of the permafrost zone present particular interest in terms of ongoing geochemical processes and soil water balance. Biological and geological factors together with permafrost intensively affect soil formation in these conditions. Soil thermal and water regimes of polar soils are crucial for development of vegetation cover and organic matter production, accumulation and redistribution. This work was aimed to characterize hydrological properties of soil formed in transitional conditions (land-ocean boundaries in Yamal Peninsula and Lena River Delta) on various elements of the landscape. Data obtained showed the difference in water holding capacity between soils formed in conditions of seasonal floodings (clearly manifested stratification of soil mass, fluctuated character of profile distribution) and those which were not influenced by floodings in Lena River Delta (gradual decreasing of water holding capacity values with depth). At the same time, both soil profiles from Yamal Peninsula are characterized by gradual decreasing of water holding capacity within the depth. Hydrological regime characteristics were strongly related to the depth of active layer, intensity and rate of thawing/freezing process. In this study, significant differences were noted between the soil characteristics of the two study areas. That is why profile distribution of water holding capacity ranged essentially among study sites. The predicted global climate change and high sensitivity of Arctic ecosystems may lead to significant changes in permafrost-affected landscapes and could alter their water regime in very prominent way.
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