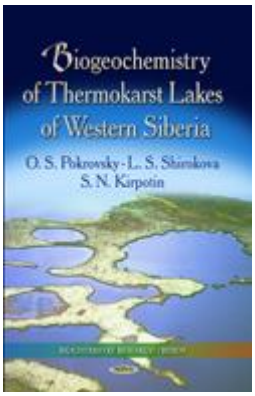
Biogeochemistry of Thermokarst Lakes of Western Siberia



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Book Description:

This book described the current status and possible future changes of the thermokarst (thaw) lakes of western Siberia as dominant forms of landscape and regulators of greenhouse gas exchange within the atmosphere. Thawing permafrost and resulting microbial decomposition of previously frozen organic carbon is one of the most significant terrestrial ecosystem positive feedbacks to a warming climate. Ongoing processes of the permafrost thawing in Western Siberia are likely to increase the surface of water bodies via forming so-called thermokarst lakes, mobilizing the organic carbon (OC) from the soil pool to the rivers and, finally, to the ocean, and thus modifying the fluxes of methane (CH_4) and CO_2 to the atmosphere. Despite their tremendous importance for green house gazes regulation and hydrological regime control, very little is known about hydrochemistry of western Siberia thaw lakes. This book assesses the variation of major and trace elements (TE) and organic carbon (OC) concentration along the chronosequence of lake development and the latitude profile of variable permafrost abundance; characterizes the colloidal status of TE and distinguishes between the relative proportion of organic and organo-mineral colloids; describes the particularity of microbiological composition of thermokarst lake waters and production/mineralization processes in the water column; and presents the perspective of water chemical composition evolution under the climate change scenario. Each of these aforementioned objectives present a scientific challenge given mainly the paucity of existing information on these important but still very poorly studied ecosystems. Taken together, understanding of these issues and identification and quantification of controlling environmental parameters should produce conceptually new knowledge of biogeochemical processes operating within the Western Siberia Plain with the possibility of extrapolation of generated knowledge to much larger territories of arctic and subarctic permafrost-affected areas. (Imprint: Nova)

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