



Factors of spatial variability of soil properties in the South tundra of West Siberia (Russia)

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Soil efflux of carbon dioxide - an important parameter that can indicate the functioning of terrestrial ecosystems. For correct estimation of the process and to identify the factors affecting it, the study of soil CO₂ emissions should be made with taking into account its spatial and temporal variability.

Objective: Identification and quantification of the main factors of spatial heterogeneity of properties and parameters of functioning of soils, which are formed in different environmental conditions of continuous permafrost zone of Western Siberia. This area is characterized by severe climatic conditions: a long winter, the average annual air temperature of about -4,7 °, precipitation varies from 200 to 350 mm per year. Investigations were carried out on the complex permafrost-affected soils and peat permafrost-affected soils.

Ten-meter transects were established with step of 1 meter in both ecosystems. At each points of transects once a day within a week were measured: carbon dioxide efflux (closed chamber method), volumetric moisture and temperature at 10 cm depth. In the laboratory the pH, the total, labile and microbial carbons were measured for each point.

Average CO₂ efflux for all study period on cryogenic soil was 68± 30 mg CO₂/(m² hr). The average daily temperature of the upper 10 cm layer was 8,0-8,5 ° on frost boil and 5,0-6,5 ° on permafrost-affected soil. Volumetric moisture was 42,3%.

Many determined performance in the frost boil ecosystem was heavily dependent on the order in which the elements of the landscape studied. Identification and quantification of factors in the area, such as temperature, vegetation, carbon dioxide emission etc., varies greatly from a typical tundra ecosystem to frost boil.