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ABSTRACTS

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Components of Carbon Cycle in Soils Along the Permafrost Transect from the South Taiga to the South Tundra (West Siberia)

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Understanding the heterogeneity in carbon exchange in terrestrial ecosystems in different permafrost zones is a significant step towards understanding the global carbon cycle. The aim of our study was to assess variability of soil organic carbon (CO_2 efflux, content of microbial and water-extractable organic carbon) and relationship with environmental factors in south taiga (N57°19', E64°58’), north taiga (N65º18', E72º52'), forest-tundra (N66°18', E76°54’) and south tundra (N 67°48; E 76°69’) of West Siberia (Russia). The special grids (100*100 m, 121 points of measurements) have been used on all sites.

Our results show that the active layer thickness in the north taiga and forest-tundra is an important control of CO_2 efflux, but in continuous permafrost zone (forest-tundra) this relationship is stronger than in discontinuous permafrost zone (north taiga). Active layer thickness determines the type of ecosystem in such landscapes and organic matter transformation processes. The spatial distribution of water-extractable organic carbon in north taiga and forest-tundra is determined by soil volumetric moisture, in south tundra –by thickness of soil organic layer.

Despite the wide array of changes in physical (soil temperature, soil moisture) and biological conditions (vegetation, content of soil labile and microbial carbon), CO_2 efflux did not vary significantly throughout transect. But depth of permafrost table differed significantly. It explains the necessity of adequate assessment of the spatial variability of the active layer thickness as a significant factor influencing regional CO_2 emission.

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