Lead Author e-mail: *alpast@mail.ru*

Title: *SOC pool assessment for Arctic tundra and forest-tundra in European north-east*

Alexander Pastukhov[1], Petr Shary[2], Larisa Sharaya[3], Dmitry Kaverin[1]
[1]***Soil Department, Institute of Biology Komi SC UD RAS, Syktyvkar, Russia***
[2]*Institute of Physicochemical and Biological Problems in Soil Science RAS, Pushchino, Russia*
[3]*Institute of Ecology of Volga Basin RAS, Tolyatti, Russia*

Carbon pool assessments for the Arctic tundra and forest-tundra few different times vary in different authors. In the northern circumpolar permafrost region all C pools combined contain approximately 1672 Pg of organic C, which is approximately 50% of the global belowground organic C (Tarnocai et al., 2009). But these global estimates are based on the insufficient number of observation points (soil profiles).

In northeastern European Russia, in Usa River Basin range from taiga with isolated permafrost to tundra vegetation on continuous permafrost, mean soil C storage is estimated at 38.3 kg C m^2, with similar amounts in taiga and tundra regions. Permafrost soils hold 42% of the total soil C in the area. Peatlands dominate soil C storage with 72% of the total pool and 98% of permafrost C (Hugelius & Kuhry, 2009).

For Usa basin our estimates of SOC storage and partitioning are based on a soil database (153 different sites including mineral soils and peatlands) and environmental factors (topography and climate). The statistical analysis of interrelationships between SOC and environmental factors was performed using non-linear multiple regression and revealed that 84% of SOC spatial variability in tundra and forest-tundra of Usa River Basin was explained by soil types (three groups of them), topography (slope, exposure, and terrain dissection), and climate (mean June and July precipitation). Measured mean of SOC at regression model were 58.9 kg/m^2 in soils with organic horizon >40 cm depth – peatlands (20.3% of total area), 13.7 kg/m^2 in soils with organic horizon from 10 to 40 cm depth (50.3% of the area), 9.3 kg/m^2 in soils with organic horizon < 10 cm depth (29.3% of the area).

The results have represented as raster maps for the current time, as well as will be used for the spatio-temporal forecast of SOC for various climatic scenarios. Meso-scale studies for SOC spatial predictions appear very effective, and that topography is an important and significant factor. SOC may be predicted directly by these factors. In contrast to “pure” simulation models, real field data were used for spatial modeling, instead of various theoretical approaches that were used in simulation models. Our approach of predictive modeling may minimize the influence of subjective opinions in the model, and may be used at a regional scale as in a most objective way.

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