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Modeling of the carbon dioxide fluxes in European Russia peat bog

Juliya Kurbatova, Andrei Varlagin, and Changsheng Li
A.N. Severtsov Institute of ecology and evolution RAS, Moscow, Russian Federation (kurbatova.j@gmail.com)

A process-based model (Forest-DNDC) was applied to describe possible impacts of climate change on carbon dioxide (CO2) fluxes from a peat bog in European Russia. In the first step, Forest-DNDC was tested against CO2 fluxes measured by the eddy covariance method on an oligotrophic bog in a representative region of the southern taiga (56[U+F0B0]N 33[U+F0B0]E). The results of model validations show that Forest-DNDC is capable of quantifying the CO2 fluxes from the bog ecosystem. In the second step, the validated model was used to estimate how expected future changes of the air temperature and water table depth could affect the C dynamics in the bogs. It was shown that decrease in the water table and increase of temperature influence significantly CO2 exchange between our bog ecosystem and the atmosphere. Under elevated temperature and deepened water table the bog ecosystems could become a significant source of atmospheric CO2.