



Biogeochemical role and greenhouse gas emissions from hydrological elements of anthropogenically changed peatlands

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Peatbogs and paludified lands are important sources and sinks for C-greenhouse gases, and intensity of their fluxes is varied significantly under anthropogenic disturbance. The accurate data about flux magnitude and key environmental factors are essential for proper evaluation of peatbogs functions in regulation of atmosphere gas composition and climate change. We received a large amount of data supporting high biogeochemical importance of hydrological elements in anthropogenic disturbed peatlands. Greenhouses gases fluxes were measured from artificial hydrological objects (drainage ditches of different form and purpose, zones of anthropogenic flooded zones along roads and other linear structures) on testing areas in European part of Russia (Tver and Moscow Provinces) and in West Siberia (Tomsk Province and Khanty-Mansysk Autonomous Area), including all-year observations (Dubnensky mire massif, Moscow). The relationship between CO₂ and CH₄ fluxes and environmental parameters was investigated, and water and hydrochemistry regime were found to be of key importance. Greenhouse gas, especially methane emission is increased simultaneously with growth of organic and mineral components content, intensity of water flow and reduction of water volume. These conclusions were validated by observations at back and tail-bay of dams and checks of different origin. Methanogenic activity of bottom deposits was evaluated, and its connection with parameters of ditches, flooded zones and other hydrological elements of anthropogenic disturbed peatbogs were analyzed. It was found that changes in activity and composition of methanogenic and methanotrophic communities were depended on hydrological conditions and anthropogenic disturbance. Based on obtained results main points of conceptual model describing processes of influx, formation and efflux of methane and carbon dioxide in artificial water objects on peatlands (canals, ditches, flooded zones, etc.) were worked out and stated.