Abstract no: 409

# Considering methane emissions from abandoned drained peatlands reduce negative effect of their potential rise after rewetting

Andrey Sirin[1], Suvorov Gennady[2], Mikhail Glagolev[3], Maxim Chistotin[4], Irina Kravchenko[5], Nikolai Bazhin[5], Tatiana Minayeva[6]

[1)] Institute of Forest Science RAS [2)] Institute of Forest Sciences RAS

[3)] Faculty of Soil Science Moscow State Uni

[4)] Pryanishnikov All-Russian Institute of A

[5)] Winogradsky Institute of Microbiology RA, Russian Federation

[6)] Wetlands International, Netherlands

Restoration of abandoned drained peatlands through rewetting is the most urgent task nowadays, but this could raise flux of methane–GHG with much stronger GWP than $CO_2$. At the same time methane release from drained peatlands is considered negligible. During our studies methane fluxes were observed at the inter-ditch spacing at both a milled peat extraction area and a hayfield. Microbiological data showed higher genomic diversity of methanogens in both sites as compared to virgin mire. Plant roots in a hayfield could provide an additional source of fresh organic material for $CH_4$ production. This hypothesis was tested by pot experiment with mesocosms (bare peat, grass sowing, and developed grassland) under regulated wetness. Higher methane emission rates were observed under wetter conditions and under more developed grass cover. Plant organic matter can work as additional source of methane after rewetting, and to mitigate methane emission rates removal of surface layer before rewetting could be applied. High methane emissions were observed on most drained ditches studied in European part of Russia and in West Siberia. Emissions increased simultaneously with growth of organic and mineral components content, intensity of water flow and reduction of water volume. The activity and composition of methanogenic and methanotrophic communities in the bottom mud also demonstrated dependence on hydrological conditions. Considering methane emission rates from ditches and their surface we calculate the emission factors from drained peatlands. The results showed their high values which definitely reduce negative effect of potential rise of methane release after rewetting.