



C principal pools and fluxes in the field agroecosystems of Juriev-Polskiy Opolie

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There are results of 7-year (2010-2016) investigation of the Podzols and Podzoluvisols genesis, dynamics and soil organic carbon (SOC) pools in the representative agrolandscapes of the Yuryev-Polish plain (Yaroslavl region) with estimated environmental risks, including topsoil CO₂ emission and the water-soluble organic substances (WSOS) profile and lateral fluxes in conditions of different land-use practice and microclimate conditions.

A set of regional stationary plots has been investigated in 5 soil-ecological catenas with different level of erosion and hydromorphic processes. Soil organic matter is poorly fixed to the mineral matrix and has high migration ability, as shown by the sorption lysimeter and model experiments with weak solutions of oxalic acid and water.

The total content of soil organic carbon varies in the range of 1.4% to 2.8% in topsoil of the investigated arable Podzols and Podzoluvisols. SOC fractional-group average composition indicates the presence of 37% of fulvic acids and 41% of gumins.

The most available for soil microorganisms, enhancing CO₂ emission, principal water-soluble organic substances accumulate in the topsoil A1 horizon, whereas the eluvial horizon E serves as a transit barrier to their profile migration and layer of active lateral migration.

Modern climate and land-use changes play important role in the spatial-temporal variability of dominant soil GHG fluxes in these landscapes that determines the rising interest in the agroecological monitoring here to develop basic elements of the climate-smart farming systems with sustainable grass, winter wheat and barley production.