

PYROGENIC LOSS OF CARBON FROM DRAINED EUTRIC HISTOSOLS IN AGROLANDSCAPES OF THE KALININGRAD REGION

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Drained peatlands are a major source of carbon emissions during fires, but they are understudied in agricultural landscapes. The work is based on the author's field surveys conducted in 2001–2004. For the first time, pyrogenic losses of organic carbon from Eutric Histosols Drainic were determined in five key areas under various geomorphological conditions in the Kaliningrad region. The data are important for assessing the carbon balance and agroecological management. It is proposed to assess the carbon losses at different fire intensity by the depth of peat layer burning. The decrease in carbon stocks was calculated by the difference between the values of the initial and pyrogenically changed soils, taking into account the complete and incomplete combustion of peat. The initial soils differed significantly in their thickness

(30–90 cm) and carbon reserves (from 32.1 to 114.3 kg C·m⁻²). High-ash, highly decomposed lowland peats with humus horizons in the 0–20 cm layer dominated. Up to 13% of the large areas of Eutric Histosols and 64–100% of the small areas were affected by fire. In weak fires with a burning depth of up to 25 cm, the loss of organic carbon reached 33.5 kg C·m⁻². In medium-intensity fire outbreaks with a depth of 25 to 50 cm, carbon losses increased to 66.7 kg C·m⁻². In areas of severe fires with a depth of more than half a meter, carbon losses exceeded 74.8 kg C·m⁻². The key role of the initial peat properties in the variation of carbon losses within individual groups has been identified. During pyrogenic degradation of drained bog soils, carbon losses in lowland peatlands were greater than in highland peatlands.

Keywords: bog soils; peat fires; depth of burning; pyrogenic carbon losses.