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Carbon dioxide emission from infrastructure construction on forest lands in Moscow region

Alexander Trunov
Institute of Global Climate and Ecology of Roshydromet and RAS, Russia

The paper presents the experimental results on the changes in carbon stocks of ecosystems due to the infrastructure construction on forest lands in the Moscow region. Investigated 11 plots in different parts of the region, those included the construction of roads and electricity transmission lines. Average carbon stocks of soil pool, litter, deadwood and living biomass (aboveground and underground parts) pools of the original forest ecosystems are estimated as 40.5±6.9; 2.9±2.0; 17.2±2.1 and 160.7±77.1 t C ha-1, respectively. Total carbon stocks of forest ecosystems are 221.3±56.0 t C ha-1. The average carbon stocks of the final ecosystems correspond to 26.8±8.2 t C ha-1, of which 24.6±9.0 are in the soil, 0.2±0.2 – in the litter and 2.1±1.0 t C ha-1 – in the living biomass pool. During the construction of roads, the soil carbon stocks reduced (on average by 30.6±4.4 t C ha-1). During the construction of the electricity transmission line, losses of soil carbon were not observed. Taking into account the part of the area under paved roads (where there is a complete removal of soil cover), the losses of the carbon stocks of the initial forest ecosystems averaged to 171.2±41.6 t C ha-1 in total, with losses in soil, litter, deadwood and living biomass pools as follows: 13.6±5.2; 2.8±1.7; 17.2±2.5 and 137.7±51.8 t C ha-1, respectively. Thus, the CO2 emission into the atmosphere from the construction of infrastructure on forest lands in the region is equal to 627.7±152.5 t ha-1 in average.

trunov88@bk.ru