

Supplementary Materials

Table S1. Site average forest survey data in Downy birch and Norway spruce sites.
(https://media.rmk.ee/files/Rakendusuuuringu%20lopparuanne_Kodusoometsad.pdf).

Site	Age (yrs)	Number of Trees (#/ha)	Height (m)	Diameter at Breast Height 1.3m (cm)	Basal Area (m ² ha ⁻¹)	Tree Biomass Stock (m ³ ha ⁻¹)
Downy birch	30	1660	15	14.0	24.5	193
Norway spruce	55	942	17	18.4	25	208

Table S2. Soil physical-chemical parameters: Drained peatland forests: Downy birch (DB), Norway spruce (NS). Abandoned peat production areas: Ess-soo (ES), Laiuse (LA). Average (n = 3 (LA, DB, NS); n = 8 ES) and standard error values (in parentheses) are shown. TC—total carbon, TN—total nitrogen, TP—total phosphorus; DM—dry matter.

Site	pH (H ₂ O)	Dry Matter (g/kg)	TC (% DM)	TN (mg/kg DM)	C/N Ratio	NH ₄ ⁺ -N (mg/kg DM)	NO ₃ ⁻ -N (mg/kg DM)	K (mg/kg DM)	Ca ²⁺ (mg/kg DM)
DB	3.83 (0.02)	28 (1.4)	49 (1)	2.58 (0.36)	19 (1)	20.3 (1.9)	70.5 (9.9)	555 (25)	240 (14)
NS	4.01 (0.10)	25.3 (0.4)	48 (0.3)	2.55 (0.06)	19 (1)	4.1 (1.8)	38.8 (1.0)	485 (30)	229 (14)
ES	2.46 (0.03)	17.0 (0.4)	55 (1)	1.11 (0.05)	49 (2)	157.6 (28.1)	0.06 (0.06)	155.5 (22.4)	526 (45)
LA	3.00 (0.26)	16.6 (0.9)	54 (1)	1.10 (0.16)	53 (8)	48.9 (19.8)	2.78 (2.47)	63.2 (19.9)	2519 (800)

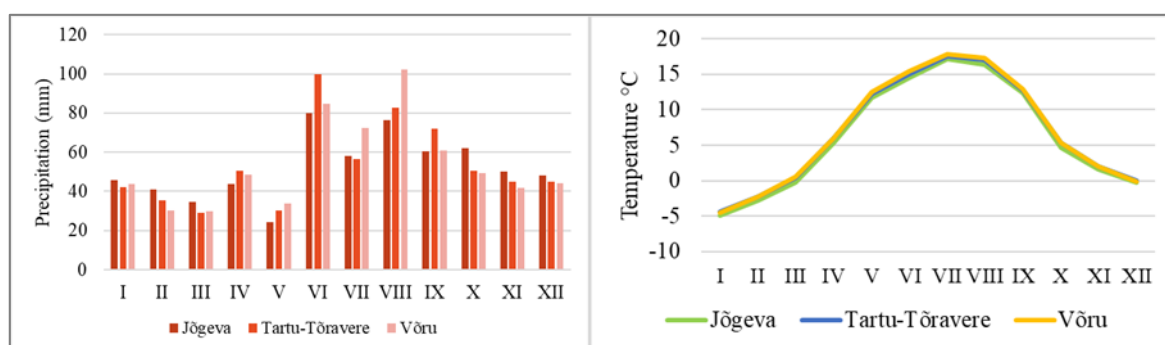


Figure S1. Mean monthly precipitation (mm) (left) and monthly air temperature (°C) (right) at Jõgeva (corresponding to Laiuse study site), Tartu-Tõravere (corresponding to the Spruce and Birch forest study sites) and Võru weather stations (corresponding to the Ess-soo study site) in the period of 2015–2019.

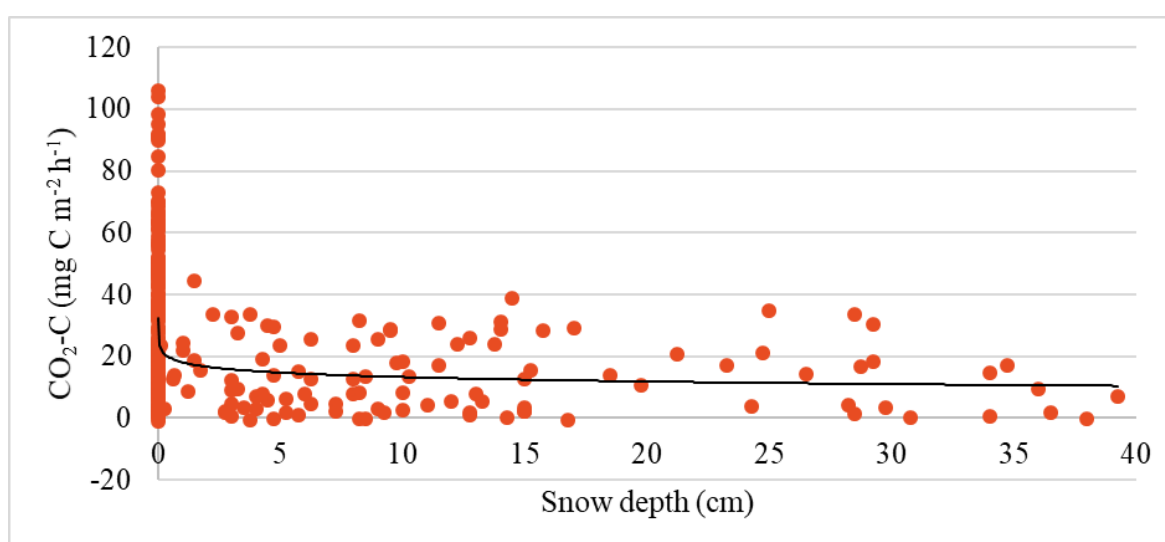


Figure S2. Relationship between CO₂-C efflux and snow depth (cm) at all study sites (n = 236).

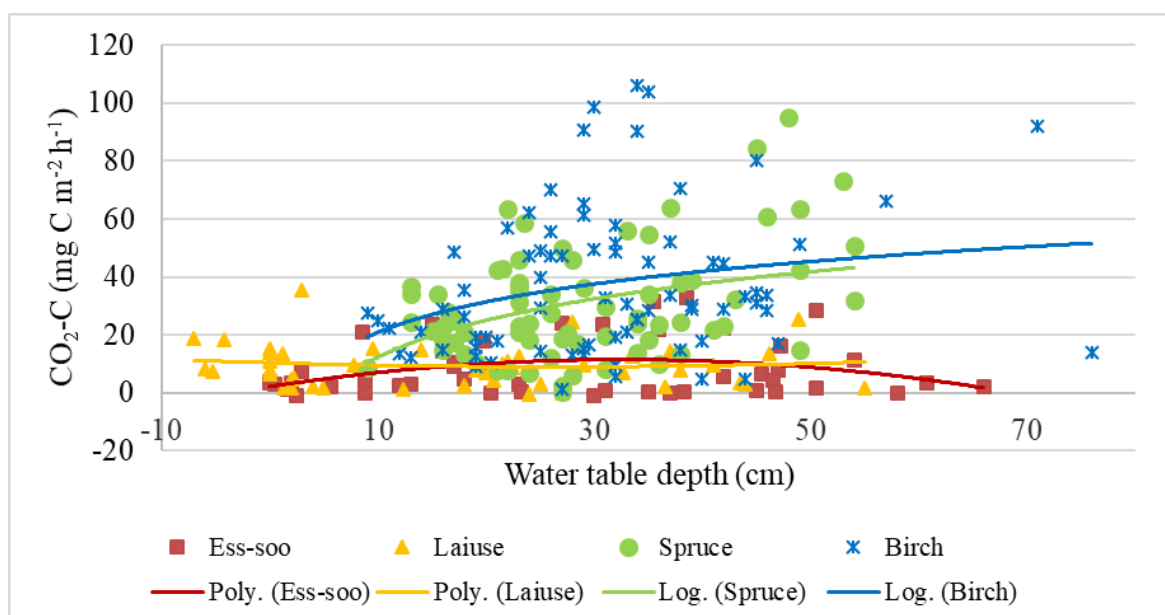


Figure S3. Relationship between CO₂-C efflux and water table depth (cm) at all study sites. Negative water table depth values show flooding (n = 245).

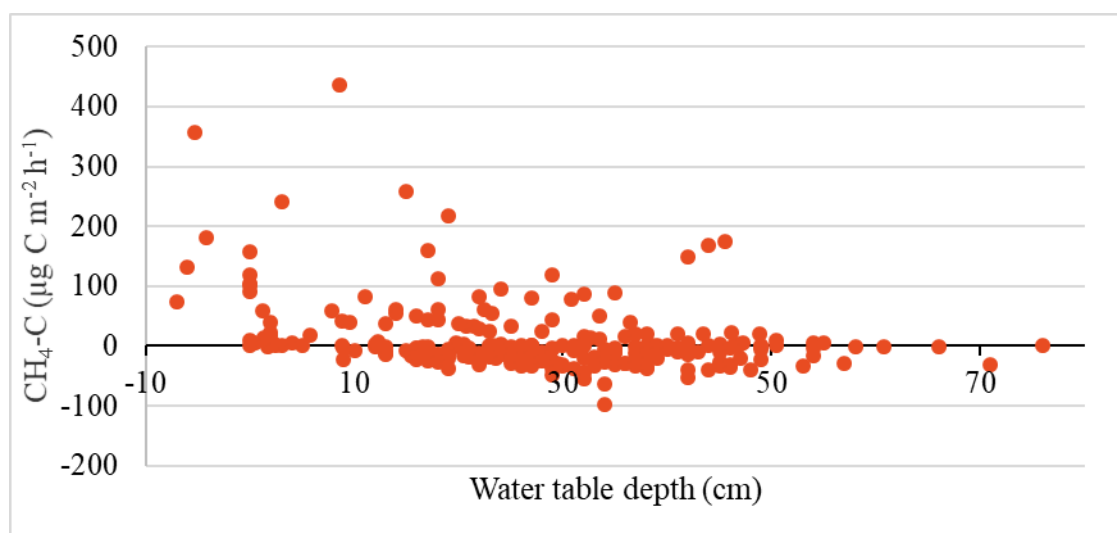


Figure S4. Relationship between $\text{CH}_4\text{-C}$ emissions and water table depth (cm) across all study sites. Negative water table depth values show flooding ($n = 245$).