



Assessing wood and soil carbon losses from a forest-peat fire in the boreo-nemoral zone

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Supplementary material



Figure S1. General view of the investigated burned area (photos taken in 2013)

Table 1. Stand structure and composition of field plots.

Plot #	Species	Age (yr)	DBH (cm)	Height (m)	Stem density (N ha ⁻¹)	Basal area (m ² ha ⁻¹)	Growing stock volume (m ³ ha ⁻¹)
1	Birch	68	26.1	23.7	425	22.7	246
	Pine	70	35.4	22.0	100	9.9	109
	Rowan	22	5.0	6.1	275	0.5	2
	Total				525	33.1	357
2	Alder	15	10.3	16.3	3600	29.8	248
3	Pine	46	13.8	17.6	600	9	86
	Birch	22	8.6	14.1	1600	9.3	69
	Aspen	22	10.2	15.5	100	0.8	6
	Total				2300	19.1	161
4	Aspen	70	30.3	25.0	500	36.1	403
	Birch	70	12.9	16.3	300	4	30
	Alder	60	8.5	13.9	600	3.4	25
	Total				1400	43.5	458
5	Birch	25	5.4	9.6	3400	7.9	44
	Alder	20	4.8	9.0	2500	4.5	23
	Total				5900	12.4	67
	Aspen	25	9.0	15.3	1200	7.7	53
6	Birch	25	8.5	12.3	800	4.5	35
	Pine	20	6.3	5.6	1100	3.5	14
	Rowan		3.4	5.1	400	0.4	1
	Total				3100	16.1	103

Table 2. Living biomass (dry matter) and carbon stock of tree stands on field plots.

Plot #	Living biomass (t ha ⁻¹)					Carbon stock (t ha ⁻¹)						
	stems	branches	leaves	roots	abovegrou nd	Total	stems	branches	leaves	roots	abovegrou nd	Total
1	160.3	28.8	4.6	38.8	193.7	232.5	80.15	14.4	2.07	19.4	96.62	116.02
	126.7	22.9	2.7	30.5	152.3	182.8	63.35	11.45	1.215	15.25	76.015	91.265
	33.6	5.9	1.9	8.3	41.4	49.7	16.8	2.95	0.855	4.15	20.605	24.755
	1	0.3	0.1	0.3	1.4	1.7	0.5	0.15	0.045	0.15	0.695	0.845
2	133.3	8.9	3.3	34.7	145.5	180.2	66.65	4.45	1.485	17.35	72.585	89.935
	68.2	8	2.7	15.8	78.9	94.7	34.1	4	1.215	7.9	39.315	47.215
	31.2	4.3	1.6	7.4	37.1	44.5	15.6	2.15	0.72	3.7	18.47	22.17
	33.8	3.4	1	7.7	38.3	46	16.9	1.7	0.45	3.85	19.05	22.9
	3.2	0.3	0.1	0.7	3.5	4.2	1.6	0.15	0.045	0.35	1.795	2.145
4	157.55	21.97	2.82	37.26	182.34	219.6	78.79	10.99	1.27	18.64	91.18	109.69
	137.61	18.44	1.96	31.6	158.01	189.61	68.81	9.22	0.88	15.8	79.01	94.71
	6.49	2.65	0.5	1.93	9.64	11.57	3.25	1.33	0.23	0.97	4.82	5.78
	13.45	0.88	0.36	3.73	14.69	18.42	6.73	0.44	0.16	1.87	7.35	9.2
5	34.15	4.21	1.99	8.64	40.35	48.99	17.08	2.11	0.89	4.32	20.18	24.4
	21.97	3.23	1.58	4.52	26.78	31.3	10.99	1.62	0.71	2.26	13.39	15.58
	12.18	0.98	0.41	4.12	13.57	17.69	6.09	0.49	0.18	2.06	6.79	8.82
6	45.76	6.32	3.74	12.35	55.82	68.17	22.88	3.16	1.68	6.19	27.91	33.91
	24.66	2.46	1.24	5.67	28.36	34.03	12.33	1.23	0.56	2.84	14.18	16.96
	16	2.82	1.56	5.63	20.38	26.01	8	1.41	0.7	2.82	10.19	12.93
	5.1	1.04	0.94	1.05	7.08	8.13	2.55	0.52	0.42	0.53	3.54	4.02
	0.58	0.1	0.06	0.15	0.74	0.89	0.29	0.05	0.03	0.08	0.37	0.45

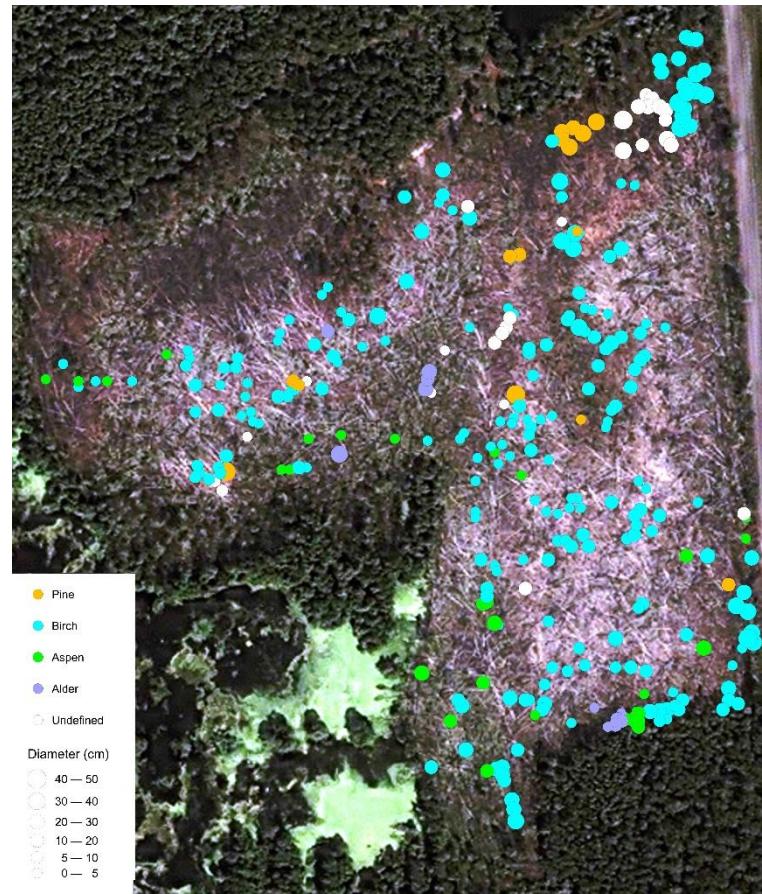


Figure S2. Results of determination of tree stump species and diameters.

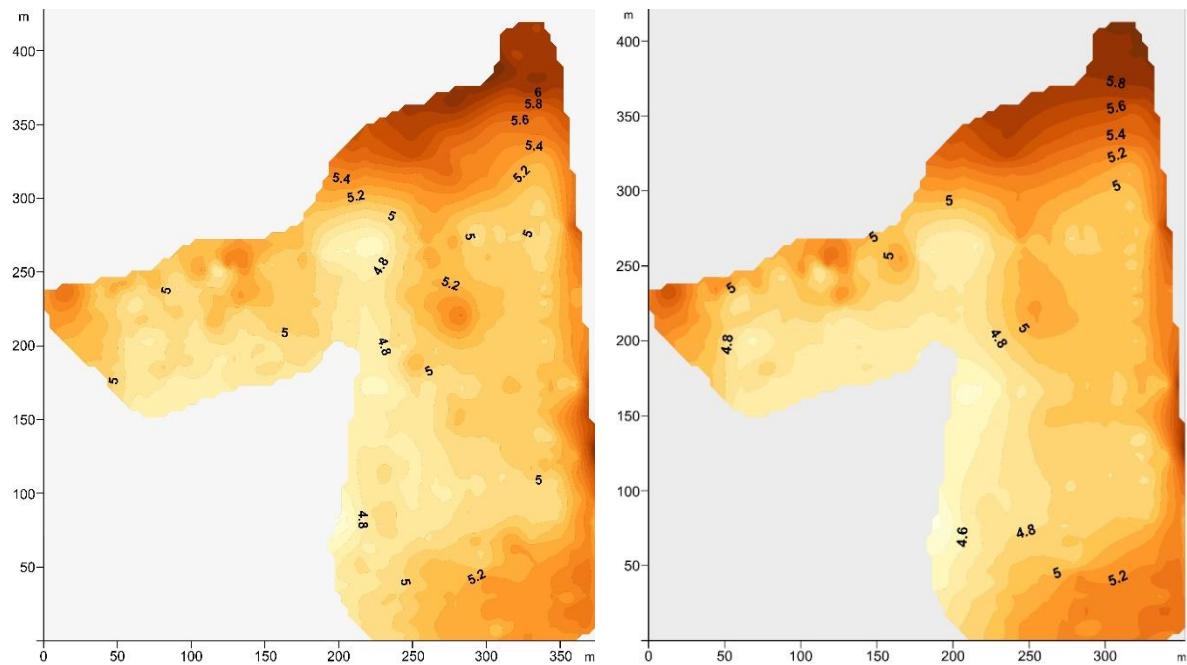


Figure S3. Site surface height before (left) and after the fire (right).

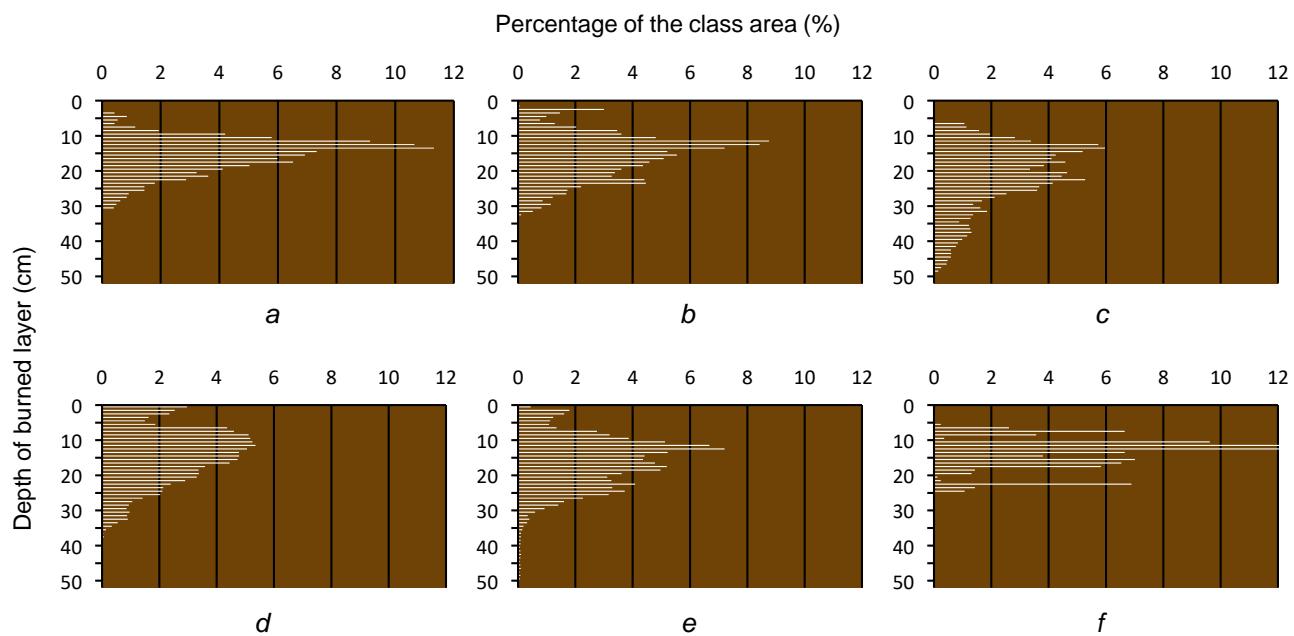


Figure S4. Distribution of the burn depths within the stand thematic classes in percentage of the class area.

(a) Pine forest with birch, (b) birch forest with some pine, (c) aspen forest with birch and pine, (d) aspen forest with birch and alder, (e) birch forest with alder, and (f) alder forest.

Table 3. Characteristics of peat on sampling plots.

<i>H</i> (cm)	Peat botanical composition	<i>R</i> (%)	<i>A</i> (%)	<i>D</i> (g cm ⁻³)	<i>C</i> (%)	<i>VC</i> (kg m ⁻³)	Peat botanical composition	<i>R</i> (%)	<i>A</i> (%)	<i>D</i> (g cm ⁻³)	<i>C</i> (%)	<i>VC</i> (kg m ⁻³)
Sampling plot 1 (unburned area)						Sampling plot 8 (burned area)						
0-5	Wood	—	21.8	0.17	50.9	3.33	×	—	—	—	—	—
5-10	Wood	35	18.0	0.20	52.1	4.28	×	—	—	—	—	—
10-15	Wood	30	10.4	0.19	54.9	4.75	—	—	55.8	0.13	30.8	0.88
15-20	Wood-Sphagnum	30	3.0	0.14	54.7	3.79	Eriophorum	—	23.5	0.39	38.2	5.69
20-25	Wood-Sphagnum	30-35	1.9	0.15	53.8	3.92	Eriophorum	30-35	4.1	0.31	55.1	8.19
25-30	Eriophorum	30	2.0	0.18	52.5	4.50	—	—	—	—	—	—
30-35	—	—	3.9	0.16	51.2	3.89	—	—	—	—	—	—
35-40	—	—	4.9	0.16	58.9	4.35	—	—	—	—	—	—
40-45	—	—	2.1	0.22	52.4	5.74	—	—	—	—	—	—
45-50	—	—	1.8	0.16	52.1	4.09	—	—	—	—	—	—
Sampling plot (unburned area)						Sampling plot (burned area)						
0-5	—	40-45	27	0.17	44.9	2.79	×	—	—	—	—	—
5-10	Wood-Sphagnum	40	17.8	0.17	45.6	3.18	Magellanicum	30	26	0.17	49.7	3.13
10-15	Wood-Sphagnum	35-40	14	0.19	52.8	4.32	Magellanicum	20	4.2	0.13	53.3	3.31
15-20	Wood-Sphagnum	30-35	2.2	0.16	55.1	4.31	Magellanicum	30	2.8	0.12	49.4	2.88
20-25	Sphagnum	30	2.5	0.18	53.7	4.71	—	—	2.7	0.11	51.2	2.73
25-30	Magellanicum	30	3.2	0.17	52.4	4.31	—	—	1.3	0.09	48.7	2.16
30-35	—	—	2.3	0.16	51.8	4.04	—	—	1.4	0.08	51.1	2.01
35-40	—	—	2.0	0.16	53.8	4.21	—	—	1.4	0.09	50.2	2.23
40-45	—	—	2.0	0.15	50.4	3.70	—	—	1.1	0.07	48.7	1.68
45-50	—	—	2.8	0.15	53.9	3.93	—	—	1.1	0.07	49.7	1.72
Sampling plot 6 (unburned area)						Sampling plot 7 (burned area)						
0-5	—	40-45	27.5	0.27	50.3	3.36	×	—	—	—	—	—
5-10	Pine-Eriophorum	40	5.4	0.2	34.3	5.28	×	—	—	—	—	—
10-15	Eriophorum	35	3.1	0.13	53.7	3.48	×	—	—	—	—	—
15-20	Magellanicum	35	2.2	0.16	55.8	4.31	—	—	1.9	0.13	34.5	2.20
20-25	Magellanicum	25	3.0	0.12	55.2	3.03	Eriophorum	35	4.1	0.15	50.1	3.61
25-30	Eriophorum	35	3.8	0.07	55.2	1.75	Eriophorum	25-30	41.1	0.35	25.5	2.63
30-35	—	—	4.0	0.08	51.9	2.33	—	—	1.6	0.11	52.9	2.86
35-40	—	—	2.2	0.1	51.9	2.62	—	—	2.0	0.08	52.1	2.04
40-45	—	—	2.2	0.07	60.8	1.75	—	—	1.5	0.09	52.5	2.32
45-50	—	—	1.8	0.1	53.7	2.72	—	—	1.7	0.21	49.1	5.07
Sampling plot 5 (unburned area)						Sampling plot 4 (burned area)						
0-5	Wood	45	18.5	0.14	48.9	2.79	×	—	—	—	—	—
5-10	Sphagnum	40	16.7	0.12	49.5	2.37	×	—	—	—	—	—
10-15	Magellanicum	25	3.9	0.16	49.5	3.69	—	—	—	—	—	—

15-20	—	—	—	—	—	—	—	—	29.5	0.17	29.7	1.78
20-25	—	—	—	—	—	—	Eriophorum- Sphagnum	20	10.6	0.18	50.4	4.06
25-30	—	—	—	—	—	—	Pine	40-45	3.5	0.17	57.0	4.59
30-35	—	—	—	—	—	—	—	—	3.7	0.15	58.4	3.72
35-40	—	—	—	—	—	—	—	—	2.8	0.12	51.4	2.91
40-45	—	—	—	—	—	—	—	—	2.0	0.12	49.8	2.82
45-50	—	—	—	—	—	—	—	—	2.2	0.1	48.0	2.54

Note. H = layer depth (cm); R = degree of decomposition (%); A = ash content (%); D = bulk density (g cm^{-3}); C = carbon content in dry peat (%); VC = carbon stock in peat layer (kg m^{-2}); \times = burned layer of peat; — = no data.

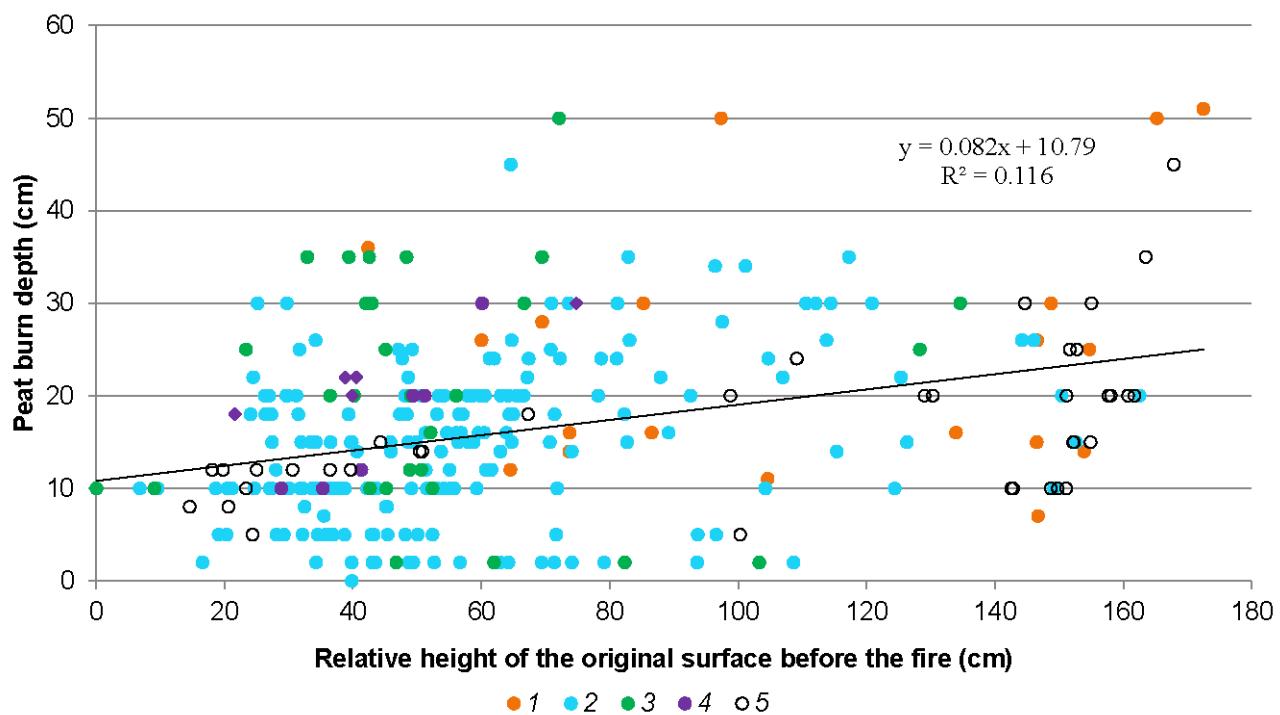


Figure S5. Peat burn depth (cm) vs. Relative height of the original soil surface before fire (cm) reconstructed from the root collar of stumps of trees of different species: 1 = Pine, 2 = Birch, 3 = Aspen, 4 – Alder, 5 – undefined.