Supplement of Biogeosciences, 15, 6731–6746, 2018
https://doi.org/10.5194/bg-15-6731-2018-supplement

Biogeosciences Open Access EGU

Supplement of

Biochemical and structural controls on the decomposition dynamics of boreal upland forest moss tissues

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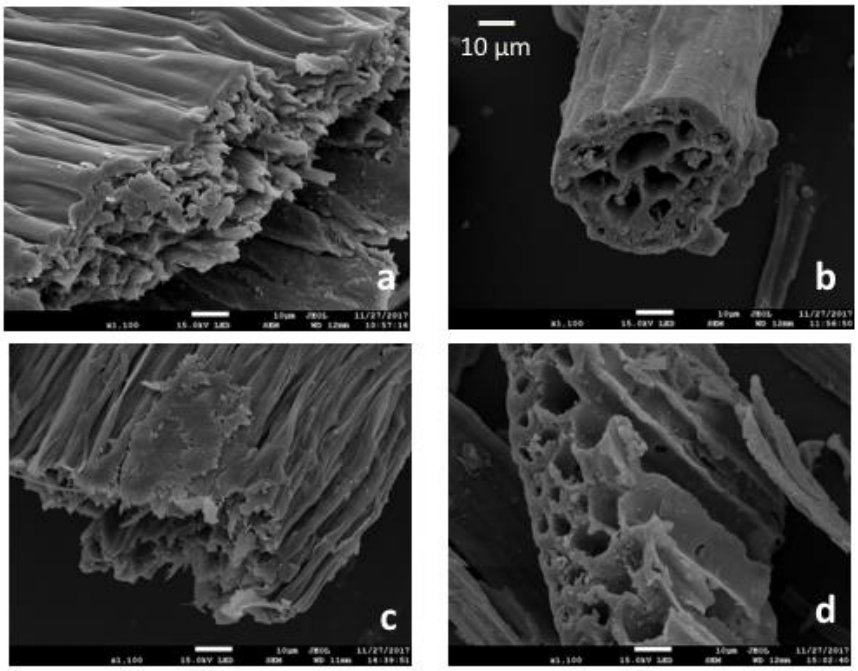

Figure S1. Additional electron micrographs of moss tissues before (panels a and c) and after (panels b and d) incubation. The top panels (a and b) depict mosses from the cooler forest, and the bottom panels (c and d) depict mosses from the warmer forest. Post-incubation moss tissues were imaged using ground material, while the pre-incubation images used dried but intact material.

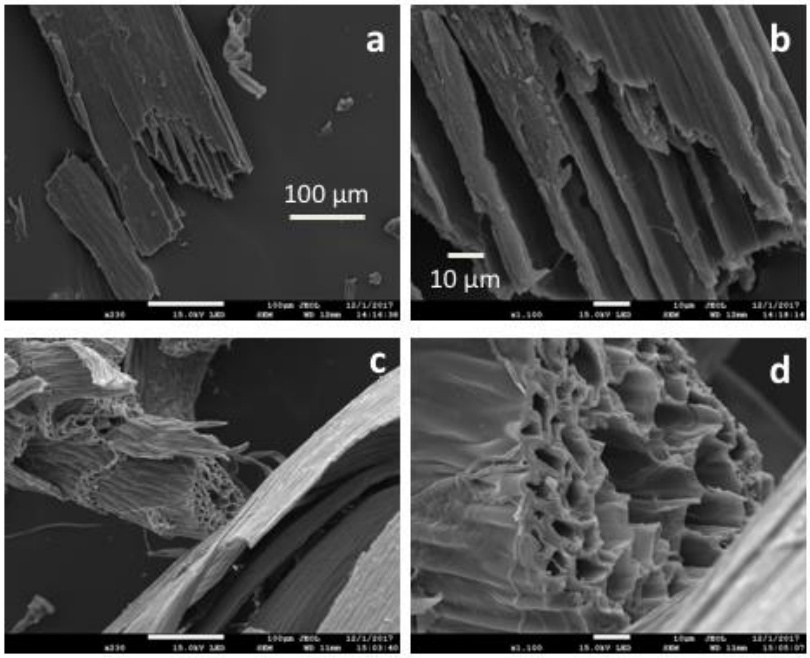

Figure S2. Electron micrographs of moss material isolated from the L horizon of the cool region (a and b) and the warm region (c and d). The left panels display low magnification (x230) and the right panels display the same areas of interest at higher magnification (x1100)

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Table S1. Mass loss, elemental, and isotope composition of moss tissues during decomposition

Region	Temp °C	Time Days	%C	%N	%Mass remaining	%C remaining	%N remaining	C/N atm	d13C	d15N
SR	5	0	43.02	0.56	100.0	98.7	94.9	89.6	-33.06	-3.37
SR	5	0	43.67	0.61	100.0	100.2	103.4	83.5	-32.17	-3.01
SR	5	0	44.05	0.6	100.0	101.1	101.7	85.7	-32.1	-3.19
SR	5	69	43.83	0.65	82.9	83.4	91.4	78.7	-32.9	-3.42
SR	5	69	43.9	0.65	82.8	83.4	91.2	78.8	-32.13	-3.6
SR	5	69	43.07	0.71	83.3	82.4	100.3	70.8	-31.84	-2.89
SR	5	283	43.29	0.7	91.4	90.8	108.4	72.2	-31.55	-2.14
SR	5	283	44	0.66	84.6	85.4	94.6	77.8	-32.18	-2.64
SR	5	283	43.26	0.73	83.6	83.0	103.5	69.1	-31.84	-2.32
SR	5	648	43.92	0.7	73.0	73.5	86.6	73.2	-32.16	-2.55
SR	5	648	44.6	0.73	72.6	74.3	89.9	71.3	-32.46	-3.17
SR	5	648	44.38	0.7	72.9	74.2	86.5	74.0	-32.77	-2.35
SR	5	959	44.4	0.71	73.0	74.3	87.8	73.0	-32.33	-0.3
SR	5	959	44.1	0.96	68.8	69.7	112.0	53.6	-31.86	-1.76
SR	5	959	44.83	0.8	68.0	70.0	92.3	65.4	-32.02	-1.7
SR	18	0	43.02	0.56	100.0	98.7	94.9	89.6	-33.06	-3.37
SR	18	0	43.67	0.61	100.0	100.2	103.4	83.5	-32.17	-3.01
SR	18	0	44.05	0.6	100.0	101.1	101.7	85.7	-32.1	-3.19
SR	18	69	43.77	0.68	75.6	75.9	87.1	75.1	-32.45	-3.3
SR	18	69	44.14	0.72	75.8	76.8	92.6	71.5	-32.84	-2.81
SR	18	69	44.14	0.71	75.2	76.2	90.5	72.5	-31.97	-3.43
SR	18	283	43.58	0.84	65.8	65.8	93.7	60.5	-31.98	-1.02
SR	18	283	43.22	0.81	66.6	66.1	91.4	62.3	-31.78	-0.68
SR	18	283	42.84	0.81	68.2	67.1	93.7	61.7	-31.58	-0.76
SR	18	648	43.97	0.97	58.0	58.5	95.3	52.9	-31.82	-3.72
SR	18	648	42.98	0.8	60.2	59.4	81.6	62.7	-32.24	-2.99
SR	18	648	44.07	0.77	62.8	63.5	81.9	66.8	-32.2	-2.24
SR	18	959	42.97	1.04	63.3	62.4	111.5	48.2	-31.76	-2.69
SR	18	959	43.57	1.16	50.5	50.5	99.4	43.8	-31.73	-2.56

SR	18	959	43.35	1.04	62.5	62.2	110.2	48.6	-32.04	-2
GC	5	0	44.09	0.92	100.0	100.4	99.6	55.9	-32.01	-4.19
GC	5	0	43.91	0.98	100.0	100.0	106.1	52.3	-31.89	-3.3
GC	5	0	43.77	0.87	100.0	99.7	94.2	58.7	-32.21	-3.66
GC	5	69	43.75	1.06	87.4	87.0	100.3	48.2	-31.04	-3.36
GC	5	69	43.63	1.04	81.3	80.7	91.5	48.9	-31.86	-3.3
GC	5	69	44.51	0.93	86.0	87.1	86.6	55.8	-31.74	-3.92
GC	5	283	43.6	0.97	83.2	82.5	87.4	52.4	-31.56	-2.58
GC	5	283	43.69	0.95	83.6	83.2	86.0	53.7	-31.31	-2.83
GC	5	283	43.37	1.01	83.7	82.6	91.5	50.1	-31.39	-2.92
GC	5	648	43.36	0.96	73.9	73.0	76.9	52.7	-31.57	-2.23
GC	5	648	44.18	0.88	74.1	74.6	70.6	58.6	-31.85	-2.49
GC	5	648	43.78	0.94	74.1	73.8	75.4	54.3	-31.6	-2.42
GC	5	959	44.03	1.22	72.7	72.9	96.1	42.1	-31.49	-3.51
GC	5	959	44.34	1.05	71.4	72.1	81.2	49.3	-31.51	-0.74
GC	5	959	43.94	1.09	71.5	71.5	84.4	47.0	-31.45	-0.57
GC	18	0	44.09	0.92	100.0	100.4	99.6	55.9	-32.01	-4.19
GC	18	0	43.91	0.98	100.0	100.0	106.1	52.3	-31.89	-3.3
GC	18	0	43.77	0.87	100.0	99.7	94.2	58.7	-32.21	-3.66
GC	18	69	43.58	1.02	79.1	78.5	87.4	49.8	-31.27	-3.91
GC	18	69	42.52	0.98	78.4	75.9	83.2	50.6	-31.82	-3.06
GC	18	69	42.54	1	78.1	75.6	84.6	49.6	-31.52	-3.58
GC	18	283	42.51	1.01	71.0	68.7	77.7	49.1	-30.95	-1.34
GC	18	283	42.48	0.97	71.6	69.3	75.2	51.1	-30.79	-0.54
GC	18	283	42.51	0.84	72.6	70.4	98.8	58.8	-31.27	-0.79
GC	18	648	42.32	0.88	63.7	61.4	60.7	56.1	-31.57	-2.23
GC	18	648	42.39	0.78	63.8	61.6	53.9	63.4	-31.46	-1.93
GC	18	648	42.59	0.84	65.0	63.1	59.2	59.2	-31.47	-1.55
GC	18	959	42.72	1.16	60.5	58.8	76.0	43.0	-30.75	0.14
GC	18	959	42.77	1.13	64.9	63.2	79.5	44.2	-30.77	0.9
GC	18	959	41.46	1.28	66.4	62.7	92.1	37.8	-30.24	-3.44

Table S2. Total hydrolysable amino acid yields and mole % composition

Region	Days	Ala	Gly	Val	Leu	Ile	Thr	Ser	Pro	Asx	Hyp	Glx	Phe	Lys	His	Tyr	%N as THAA	%C as THAA
									Mol%									
SR	0	11.6	13.0	7.2	9.3	4.0	7.4	7.1	6.4	13.7	1.1	7.4	4.5	4.5	0.9	1.9	51.3	2.5
SR	0	10.5	11.4	5.4	7.7	3.3	6.7	7.5	5.7	17.5	1.2	12.0	3.7	4.3	1.6	1.6	53.4	2.6
SR	0	11.4	13.1	7.4	9.1	4.1	7.0	6.4	6.4	14.8	1.0	9.1	4.5	3.1	0.6	1.8	51.7	2.6
GC	0	10.4	10.9	5.1	7.2	2.8	6.3	6.7	5.5	17.1	0.9	16.8	3.5	4.0	1.4	1.5	56.0	4.2
GC	0	11.3	11.4	5.7	8.5	3.3	6.0	6.9	5.5	15.4	1.0	12.7	4.2	4.7	1.8	1.7	47.2	3.5
GC	0	12.0	12.6	6.9	9.1	3.7	6.6	6.6	5.8	12.5	0.8	11.3	4.5	4.8	0.8	1.9	49.3	3.8
SR	69	11.6	13.4	6.5	8.4	4.7	7.5	7.6	6.1	14.0	1.3	7.3	4.1	4.1	1.7	1.7	40.1	2.2
GC	69	10.8	11.9	5.4	8.0	4.7	6.0	6.8	5.4	15.2	1.5	12.8	4.2	4.0	2.0	1.5	18.9	1.6
SR	283	12.9	15.0	6.0	8.5	4.6	8.2	8.5	5.7	10.8	1.4	6.4	4.3	3.9	2.0	1.7	28.6	1.9
GC	283	11.7	13.7	6.0	8.1	4.1	7.7	7.4	5.5	12.4	1.3	11.5	4.4	2.8	1.7	1.6	32.1	2.7
SR	648	12.6	14.5	7.3	7.7	4.6	9.2	7.4	6.1	12.9	1.0	6.4	3.6	3.8	1.4	1.5	37.4	2.9
GC	648	12.3	15.4	7.0	9.0	5.1	7.6	7.2	6.4	11.3	1.5	5.6	4.9	2.9	2.1	1.6	30.6	2.3
SR	959	12.0	16.0	7.5	8.1	5.1	8.9	7.2	6.8	13.6	1.3	4.1	4.0	3.4	0.9	1.2	22.8	1.9
SR	959	13.3	15.0	7.4	8.3	4.7	8.8	6.5	5.7	11.2	0.9	7.1	3.9	4.4	1.4	1.4	34.0	3.1
SR	959	12.5	15.3	6.6	8.4	4.4	8.3	7.5	5.9	13.1	1.4	5.8	4.2	3.5	1.7	1.3	22.3	1.9
GC	959	12.4	15.5	7.3	8.0	4.9	7.7	6.7	6.5	12.4	1.4	7.1	4.1	3.1	1.3	1.5	24.1	2.3
GC	959	13.2	16.4	7.3	9.4	5.1	8.2	6.5	6.4	11.7	1.6	5.1	5.1	2.5	0.5	1.0	17.6	2.0
GC	959	13.1	16.5	7.9	9.8	4.6	7.5	5.6	7.6	8.1	1.1	7.5	5.1	2.8	1.1	1.7	21.9	2.1