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Supplement of

Generalized models to estimate carbon and nitrogen stocks of organic soil horizons in Interior Alaska

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Supplemental Information

Table S1. Transformation used to improve normality. We were unable to find a way to improve normality for live moss (L) bulk density.

Transformation	Where used
Log	Bulk density: D, F, M, amorphous N: fibrous C:N D, M, fibrous, amorphous
Square root	Bulk density: H N: D, amorphous C:N: L, F, mineral
Box cox	Bulk density: mineral, fibrous C: all horizons N: L, F, M, H, mineral C:N: H

Table S2. Average bulk density values (g/cm³) by drainage and age class. Standard deviations are presented in parenthesis. Significant differences for a horizon code among drainage or age class are noted with superscripts.

Horizon Type		Drainage Class					Age class		
		Well	Moderately well	Somewhat Poorly	Poorly	Very poorly	New	Young	Mature
live moss (L)	mean	0.027	0.020	0.023	0.025	0.015	0.020	0.022	0.021
	stdev	(0.023)	(0.020)	(0.021)	(0.014)	(0.010)	(---)	(0.024)	(0.015)
	n	6	12	71	18	33	1	48	92
dead moss (D)	mean	0.049 ^{ab}	0.054 ^a	0.036 ^b	0.038 ^{ab}	0.038 ^{ab}	0.055 ^a	0.036 ^b	0.041 ^b
	stdev	(0.025)	(0.044)	(0.020)	(0.028)	(0.024)	(0.037)	(0.017)	(0.031)
	n	10	45	142	30	313	19	253	268
fibric (F)	mean	0.153 ^a	0.075 ^b	0.072 ^b	0.065 ^b	0.053 ^b	0.083	0.056	0.066
	stdev	(0.096)	(0.032)	(0.041)	(0.043)	(0.031)	(0.056)	(0.035)	(0.039)
	n	12	39	188	79	234	83	207	262
mesic (M)	mean	0.186 ^{ab}	0.164 ^{ab}	0.172 ^a	0.149 ^{ab}	0.121 ^b	0.173	0.122	0.159
	stdev	(0.061)	(0.072)	(0.078)	(0.077)	(0.067)	(0.088)	(0.060)	(0.079)
	n	5	35	264	89	241	62	197	375
humic (H)	mean	---	0.270 ^{ab}	0.251 ^a	0.214 ^{ab}	0.174 ^b	0.201	0.199	0.228
	stdev	(---)	(0.176)	(0.076)	(0.099)	(0.078)	(0.097)	(0.107)	(0.087)
	n	0	11	62	17	70	17	58	85
mineral (Min)	mean	0.799	0.810	0.722	0.663	0.722	0.859 ^a	0.787 ^{ab}	0.654 ^b
	stdev	(0.349)	(0.455)	(0.382)	(0.339)	(0.353)	(0.367)	(0.418)	(0.356)
	n	63	49	375	67	31	163	89	333
fibrous (D&F)	mean	0.105 ^a	0.064 ^{ab}	0.057 ^b	0.057 ^b	0.047 ^b	0.078 ^a	0.045 ^b	0.053 ^b
	stdev	(0.089)	(0.040)	(0.038)	(0.041)	(0.028)	(0.054)	(0.028)	(0.038)
	n	22	84	330	109	574	102	460	530
amorphous (M&H)	mean	0.186 ^{ab}	0.189 ^{ab}	0.187 ^a	0.159 ^{ab}	0.133 ^b	0.179	0.140	0.172
	stdev	(0.061)	(0.113)	(0.084)	(0.084)	(0.073)	(0.090)	(0.080)	(0.085)
	n	5	46	326	106	311	79	255	460

Table S3. Average carbon concentrations (%) by drainage and age class. Standard deviations are presented in parenthesis. For each soil horizon, superscripts denote significant differences among drainage or age classes.

Horizon Type		Drainage Class					Age class		
		Well	Moderately well	Somewhat Poorly	Poorly	Very poorly	New	Young	Mature
live moss (L)	mean	44.3 ^a	42.6 ^{ab}	41.0 ^b	42.9 ^{ab}	42.0 ^b	40.7	41.3	42.0
	stdev	(5.1)	(1.5)	(4.7)	(1.9)	(2.3)	(6.1)	(3.3)	(4.1)
	n	6	11	75	18	34	2	48	95
dead moss (D)	mean	42.9 ^{ab}	44.0 ^a	41.1 ^b	43.0 ^{ab}	43.1 ^a	41.2	42.5	42.8
	stdev	(3.3)	(2.3)	(5.9)	(2.0)	(2.4)	(5.2)	(2.5)	(4.6)
	n	10	43	145	30	310	19	242	277
fibric (F)	mean	34.0 ^a	43.2 ^{bc}	39.6 ^b	42.4 ^{bc}	41.6 ^c	39.7 ^a	40.5 ^b	41.8 ^a
	stdev	(7.6)	(6.3)	(7.3)	(3.9)	(3.1)	(6.9)	(4.0)	(6.0)
	n	12	39	194	84	237	85	210	271
mesic (M)	mean	30.0 ^a	41.3 ^{bd}	37.3 ^b	37.3 ^{ab}	39.1 ^c	35.4 ^a	36.9 ^b	39.3 ^c
	stdev	(6.3)	(7.2)	(7.5)	(6.5)	(5.6)	(8.0)	(6.6)	(6.4)
	n	5	33	268	89	255	63	204	383
humic (H)	mean	---	36.1 ^a	27.7 ^b	32.9 ^{ab}	35.0 ^a	31.3	34.6	30.5
	stdev	(---)	(6.7)	(5.6)	(6.0)	(5.3)	(6.4)	(5.8)	(6.7)
	n	0	12	63	17	72	18	60	86
mineral (Min)	mean	4.3 ^a	5.0 ^a	6.5 ^b	7.3 ^b	11.1 ^b	4.3 ^a	7.2 ^{ab}	7.4 ^b
	stdev	(7.0)	(5.9)	(6.1)	(5.5)	(5.5)	(5.0)	(6.5)	(6.5)
	n	73	57	436	73	35	197	107	370
fibrous (D & F)	mean	38.1 ^a	43.6 ^c	40.2 ^{ab}	42.6 ^{bc}	42.4 ^c	40.0 ^{ac}	41.6 ^b	42.3 ^c
	stdev	(7.4)	(4.6)	(6.8)	(3.5)	(2.8)	(6.6)	(3.4)	(5.4)
	n	22	82	339	114	547	104	452	548
amorphous (M & H)	mean	30.0 ^a	39.9 ^{abc}	35.5 ^{ab}	36.6 ^{ab}	38.2 ^c	34.5 ^a	36.3 ^b	37.7 ^c
	stdev	(6.3)	(7.4)	(8.1)	(6.6)	(5.8)	(7.8)	(6.5)	(7.3)
	n	5	45	331	106	327	81	264	469

Table S4. Average nitrogen concentrations (%) by drainage and age class. Standard deviations are presented in parenthesis. Significant differences for a horizon code among drainage or age classes are noted with superscripts.

Horizon Type		Drainage Class					Age class		
		Well	Moderately well	Somewhat Poorly	Poorly	Very poorly	New	Young	Mature
live moss (L)	mean	0.92 ^a	0.78 ^{ab}	0.90 ^a	0.81 ^a	0.72 ^b	1.26 ^a	0.93 ^a	0.78 ^{ab}
	stdev	(0.16)	(0.12)	(0.31)	(0.15)	(0.15)	(0.56)	(0.29)	(0.21)
	n	6	12	75	18	34	2	48	95
dead moss (D)	mean	1.10 ^a	0.86 ^{ab}	0.71 ^{bc}	0.75 ^{bc}	0.78 ^c	0.84 ^{ab}	0.78 ^b	0.75 ^a
	stdev	(0.26)	(0.29)	(0.27)	(0.18)	(0.26)	(0.27)	(0.26)	(0.28)
	n	10	43	144	30	310	19	241	277
fibric (F)	mean	0.92 ^{ab}	0.93 ^{ab}	0.89 ^a	1.17 ^b	0.99 ^{ab}	0.97	0.97	0.99
	stdev	(0.16)	(0.30)	(0.25)	(0.61)	(0.45)	(0.35)	(0.33)	(0.49)
	n	12	39	193	83	237	84	209	271
mesic (M)	mean	0.90 ^a	1.08 ^a	1.23 ^a	1.66 ^b	1.60 ^b	1.25 ^{ab}	1.30 ^a	1.52 ^b
	stdev	(0.20)	(0.30)	(0.43)	(0.51)	(0.57)	(0.38)	(0.36)	(0.61)
	n	5	33	267	91	255	63	203	385
humic (H)	mean	---	1.11 ^a	1.26 ^a	2.02 ^b	1.72 ^c	1.46 ^a	1.71 ^{ab}	1.42 ^b
	stdev	(---	(0.19)	(0.29)	(0.44)	(0.36)	(0.55)	(0.39)	(0.41)
	n	0	12	63	17	72	18	60	86
mineral (Min)	mean	0.18 ^a	0.29 ^a	0.33 ^b	0.48 ^c	0.63 ^c	0.22 ^a	0.36 ^b	0.40 ^b
	stdev	(0.21)	(0.32)	(0.29)	(0.39)	(0.34)	(0.22)	(0.31)	(0.34)
	n	73	57	437	73	33	198	105	370
fibrous (D & F)	mean	1.00 ^{ab}	0.89 ^{ab}	0.81 ^a	1.05 ^b	0.87 ^a	0.94 ^{ab}	0.87 ^b	0.87 ^a
	stdev	(0.22)	(0.30)	(0.27)	(0.56)	(0.37)	(0.34)	(0.31)	(0.41)
	n	22	82	337	113	547	103	450	548
amorphous (M & H)	mean	0.90 ^a	1.09 ^a	1.23 ^a	1.72 ^b	1.62 ^b	1.30 ^{ab}	1.39 ^a	1.50 ^b
	stdev	(0.20)	(0.28)	(0.41)	(0.52)	(0.53)	(0.43)	(0.40)	(0.58)
	n	5	45	330	108	327	81	263	471

Table S5. C:N ratio values by drainage and age class. Standard deviations are presented in parenthesis. Significant differences for a horizon code among drainage or age classes are noted with superscripts.

Horizon Type	Drainage Class					Age class		
	Well	Moderately well	Somewhat Poorly	Poorly	Very poorly	New	Young	Mature
live moss (L)	50.2 ^{ab} (12) 6	55.8 ^{ab} (9) 12	50.8 ^a (18) 75	54.5 ^a (10) 18	60.4 ^b (12) 34	34.8 ^{ab} (11) 2	48.2 ^a (14) 48	57.1 ^b (15) 95
dead moss (D)	40.8 ^a (9) 10	58.6 ^{ab} (27) 43	67.5 ^b (31) 144	60.3 ^{bc} (13) 30	60.9 ^c (19) 310	52.7 ^{ab} (14) 19	59.8 ^a (19) 241	64.7 ^b (26) 277
fibric (F)	37.7 ^a (10) 12	50.0 ^{ab} (14) 39	47.1 ^{ab} (12) 193	46.0 ^a (23) 83	48.6 ^b (18) 237	45.9 ^{ab} (18) 84	46.9 ^a (17) 209	48.6 ^b (16) 271
mesic (M)	33.3 ^{abc} (4) 5	41.0 ^a 13 33	34.0 ^a (14) 267	24.0 ^b (8) 89	27.9 ^c (12) 255	30.4 (10) 63	30.7 (11) 203	30.6 (14) 383
humic (H)	--- (---) 0	32.8 ^a (5) 12	22.7 ^{ab} (6) 63	16.7 ^c (3) 17	21.2 ^b (6) 72	23.5 ^a (7) 18	21.2 ^{ab} (6) 60	22.6 ^b (7) 86
mineral (Min)	18.2 ^{ab} (9) 73	16.8 ^{ab} (8) 55	18.4 ^b (7) 436	16.8 ^a (4) 73	17.3 ^{ab} (3) 33	17.9 (7) 196	18.9 (5) 105	17.8 (8) 370
fibrous (D & F)	39.2 ^a (10) 22	54.5 ^{abc} (22) 82	55.8 ^b (24) 337	49.8 ^{ab} (22) 113	55.6 ^c (19) 547	47.2 ^{ab} (18) 103	53.8 ^b (19) 450	56.7 ^a (23) 548
amorphous (M & H)	33.3 ^{ac} (4) 5	38.8 ^a (12) 45	31.9 ^a (13) 330	22.8 ^b (7) 108	26.4 ^c (11) 327	28.9 (10) 81	28.5 (11) 263	29.1 (14) 469

Figure S1. Predicted versus observed stocks for carbon (A) and nitrogen (B) from Thompson, Manitoba (see section 4.2). Predicted stocks were calculated using the bulk density, C, and N values found in Table 1, and thicknesses measured from this study. Red line is 1:1 relationship, black line is predicted versus observed relationship. Red line is 1:1 relationship, black line is predicted versus observed relationship.

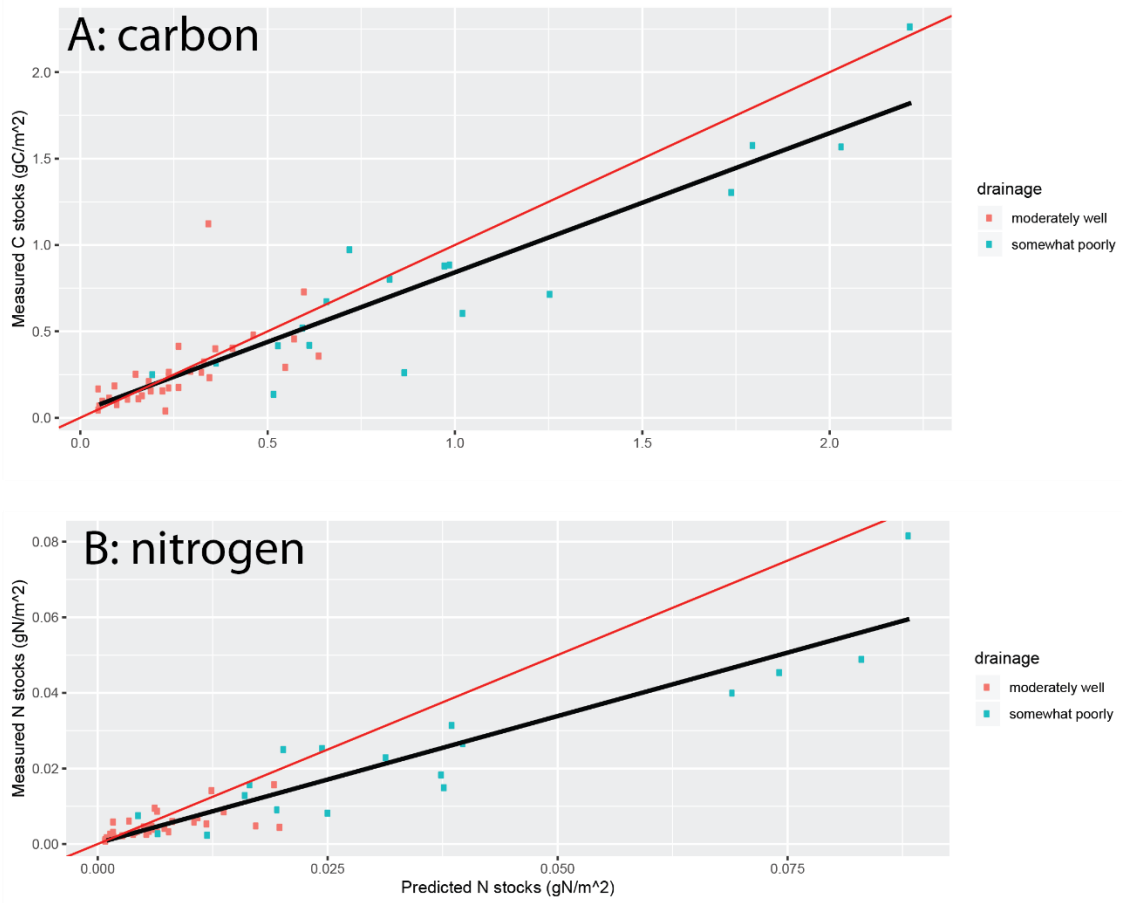


Figure S2. Predicted versus observed carbon stocks for Kane and Ping, 2004 (see section 4.2), using bulk density and C data from Table 1 for the amorphous horizon (A), mesic horizon (B), and fibric horizon (C). Thicknesses values from Kane and Ping. Red line is 1:1 relationship.

