



Supplement of

Quantifying exchangeable base cations in permafrost: a reserve of nutrients about to thaw

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Supplement

Table S1: Localization and field description of the soil profiles collected at the Gradient site in 2019 (Eight Mile Lake, Interior Alaska, USA). The column “n” corresponds to the number of soil layers sampled for each soil profile.

Soil profile	n	category	GPS coordinates		Active layer thickness (cm)	Organic layer thickness (cm)
			Latitude N	Longitude W		
Min1	13	Organic-thick soil profile	63°52'34.3''	149°14'55.1''	55	45
Min3	15	Organic-thick soil profile	63°52'33.3''	149°14'57''	60	40
Mod1	13	Organic-thick soil profile	63°52'40.4''	149°15'18''	50	45
Mod2	9	Organic-thin soil profile	63°52'39.6''	149°15'19.4''	88	10
Mod3	14	Organic-thin soil profile	63°52'39.7''	149°15'17.6''	75	20
Ext1	11	Organic-thick soil profile	63°52'43.7''	149°15'28.7''	48	40
Ext3	11	Organic-thin soil profile	63°52'46.6''	149°15'27.8''	65	30

Table S2: Soil characterization data (pH_{KCl} , $\text{pH}_{\text{H}_2\text{O}}$, total organic carbon (TOC), cation exchange capacity CEC and CEC density) at Eight Mile Lake (Interior Alaska, USA).

Thermo-karst area	category	Soil profile	Depth (cm)	pH_{KCl}	$\text{pH}_{\text{H}_2\text{O}}$	TOC (%)	BD (g cm^{-3})	CEC ($\text{cmol}_c^{-1} \text{kg}^{-1}$)	CEC density ($\text{cmol}_c \text{m}^{-3}$)
Minimal	Organic-thick soil profile	Min1	0-5	3.04	3.88	48.1	0.0362	85.73	3102.21
			5-10	2.99	3.85	47.6	0.0462	93.62	4322.70
			10-15	3.12	3.81	47.0	0.0572	100.87	5773.50
			15-20	3.22	3.93	45.2	0.0887	110.85	9831.31
			20-25	3.3	3.97	43.9	0.1143	139.72	15972.64
			25-30	3.36	4.03	44.6	0.1010	113.52	11471.02
			30-32.5	3.47	4.21	44.6	0.0997	87.14	8688.04
			32.5-35	3.52	4.17	42.9	0.1317	89.41	11770.93

			45-55	3.75	4.19	8.5	0.7646	22.62	17294.60
			55-65	3.72	4.65	2.6	0.8714	7.86	6981.84
			65-75	3.76	4.68	2.2	0.8798	8.78	7724.48
			75-85	3.86	4.78	3.9	0.8481	10.79	9154.72
			85-120	3.95	4.64	5.6	0.8167	15.03	12272.35
			0-5	3.20	4.11	48.5	0.0284	73.34	2079.49
			5-10	3.02	3.81	46.9	0.0587	85.34	5005.84
			10-15	3.12	3.88	46.4	0.0682	72.57	4947.44
			15-20	3.17	3.85	45.8	0.0787	108.86	8567.29
			20-25	3.30	3.93	44.4	0.1050	138.24	14519.63
			30-35	3.68	4.35	41.9	0.1509	75.23	11353.67
Minimal	Organic-thick soil profile	Min3	35-40	3.89	4.57	20.3	0.5476	37.60	20591.07
			40-55	3.85	4.32	15.3	0.6388	32.26	20609.81
			55-60	3.92	4.49	22.5	0.5074	39.02	19796.63
			60-65	4.09	4.71	23.5	0.4876	38.22	18637.19
			65-75	4.24	4.84	15.3	0.6394	35.77	22871.14
			75-85	4.08	5.12	2.9	0.8658	15.87	13743.07
			85-95	4.49	5.35	9.3	0.7496	13.01	9749.59
			95-105	4.49	5.46	2.3	0.8782	10.07	8840.28
			105-115	5.25	5.84	4.7	0.8345	15.89	13262.55
			0-5	3.36	4.16	46.7	0.0628	82.83	5203.19
			5-10	3.13	3.76	46.7	0.0624	83.92	5232.19
			10-15	2.87	3.54	47.8	0.0410	92.48	3789.94
			15-20	2.85	3.56	47.4	0.0494	107.76	5324.29
			20-25	3.17	4.05	47.2	0.0534	129.90	6938.39
			25-30	3.48	4.07	45.3	0.0884	109.73	9698.95
			30-35	3.55	4.25	43.3	0.1253	90.02	11283.24
Moderate	Organic-thick soil profile	Mod1	35-40	3.69	4.45	42.1	0.1473	68.14	10039.42
			40-55	3.76	4.47	7.6	0.7802	12.14	9469.81
			55-65	3.92	4.58	12.5	0.6912	29.80	20595.35
			65-75	4.05	4.78	28.0	0.4055	47.91	19426.75
			75-80	4.19	4.86	32.1	0.3305	53.64	17728.69
			85-105	4.28	5.25	3.3	0.8592	12.92	11104.61
Moderate		Mod2	0-10	3.45	3.92	49.7	0.0066	94.27	621.61

		10-15	3.67	4.24	8.4	0.7660	32.72	25067.30
		15-20	3.65	4.47	3.7	0.8512	19.15	16301.07
		20-65	3.61	4.64	2.1	0.8819	19.13	16872.40
	Organic-thin soil profile	65-75	3.64	4.50	2.6	0.8719	18.15	15827.50
		75-85	3.70	4.41	2.8	0.8689	15.62	13573.08
		85-95	3.84	4.69	3.1	0.8632	14.17	12233.44
		95-105	4.13	5.05	3.4	0.8570	15.01	12866.33
		105-110	5.25	6.21	1.0	0.9012	10.27	9257.35
		0-5	3.20	3.87	47.5	0.0480	89.31	4285.48
		5-10	3.24	3.99	46.0	0.0750	94.64	7093.84
		10-15	3.32	3.96	45.0	0.0933	108.12	10092.37
		15-20	3.54	4.22	35.8	0.2617	88.50	23163.86
		20-25	3.75	4.57	3.6	0.8539	20.30	17335.95
		25-30	3.68	4.78	2.2	0.8800	12.00	10558.95
	Moderate Organic-thin soil profile Mod3	30-35	3.67	4.85	2.3	0.8774	13.65	11979.90
		35-65	3.77	4.89	3.9	0.8490	17.69	15246.68
		65-75	4.52	5.25	6.2	0.8060	20.69	16675.54
		75-85	4.44	5.34	3.3	0.8599	15.58	13398.17
		85-95	4.99	6.01	1.4	0.8946	13.99	12515.28
		95-105	5.37	6.20	1.7	0.8881	15.79	14025.02
		105-115	5.94	6.57	1.6	0.8900	12.68	11288.08
		115-120	6.80	7.52	0.7	0.9062	11.05	10010.04
		0-5	2.96	3.81	47.7	0.0431	99.61	4297.06
		5-10	2.80	3.73	49.0	0.0193	102.13	1974.95
		10-15	2.82	3.74	48.6	0.0272	114.00	3103.86
		15-20	3.14	3.91	46.6	0.0631	96.17	6070.88
	Extensive Organic- thick soil profile Ext1	20-25	3.45	3.92	42.2	0.1456	81.47	11862.54
		25-30	3.69	4.26	40.6	0.1733	73.87	12798.79
		30-35	3.70	4.29	41.7	0.1543	82.33	12704.19
		35-40	3.54	4.47	29.4	0.3808	55.51	21136.43
		40-48	3.96	4.83	4.8	0.8325	20.30	16897.68
		48-55	4.33	5.16	4.7	0.8331	nd	nd
		55-65	4.45	5.12	5.4	0.8208	15.42	12653.81
		0-5	2.98	3.78	48.7	0.0261	106.42	2772.85
	Extensive Organic-thin soil profile Ext3	5-10	2.82	3.84	48.1	0.0370	113.64	4205.57
		10-15	2.79	3.60	48.0	0.0387	117.90	4564.63
		15-20	2.93	3.83	46.4	0.0671	91.79	6155.07

20-25	3.23	3.87	39.9	0.1865	82.30	15350.84
25-30	3.54	4.43	21.5	0.5251	51.89	27243.70
30-35	3.75	4.53	6.3	0.8048	24.25	19517.33
35-40	3.81	4.53	5.6	0.8172	16.90	13814.30
40-65	3.92	4.60	8.4	0.7664	25.38	19449.82
65-75	4.27	4.85	15.2	0.6403	26.17	16753.78
75-85	4.58	5.29	6.5	0.7999	13.40	10720.13
89-90	4.62	5.52	1.1	0.9000	nd	nd

Table S3: Characterization of the total and exchangeable fraction of permafrost soils at Eight Mile Lake (Interior Alaska, USA): base saturation (BS), concentrations in exchangeable Ca, K, Mg, Na, concentrations in total Ca, K, Mg, Na, Total Reserve in Bases (TRB), and proportions of exchangeable Ca, Mg, K, Na over the total concentrations.

Thermo- karst area	category	Soil profile	Depth (cm)	Base saturation	Ca _{exch} (g kg ⁻¹)	K _{exch} (g kg ⁻¹)	Mg _{exch} (g kg ⁻¹)	Na _{exch} (g kg ⁻¹)	Ca _{bulk} (g kg ⁻¹)	K _{bulk} (g kg ⁻¹)	Mg _{bulk} (g kg ⁻¹)	Na _{bulk} (g kg ⁻¹)	TRB (cmol _c kg ⁻¹)	Ca _{exch} / Ca _{bulk}	K _{exch} / K _{bulk}	Mg _{exch} / Mg _{bulk}	Na _{exch} / Na _{bulk}
Minimal	Organic- thick soil profile	Min1	0-5	29%	2.59	1.38	0.95	0.20	2.82	5.49	1.33	0.69	42.10	91.6%	25.2%	71.1%	28.3%
			5-10	28%	2.67	1.00	1.06	0.37	2.69	3.70	1.43	0.52	36.89	99.2%	27.1%	74.4%	71.5%
			10-15	21%	2.11	0.82	0.75	0.49	2.38	2.91	1.30	0.78	33.40	88.4%	28.2%	57.7%	63.4%
			15-20	14%	1.48	0.56	0.49	0.67	2.22	4.75	1.26	1.36	39.47	66.7%	11.7%	39.0%	49.5%
			20-25	10%	1.46	0.28	0.47	0.42	2.21	1.57	1.15	1.09	29.24	66.0%	18.0%	40.6%	38.5%
			25-30	13%	1.56	0.38	0.49	0.48	2.25	1.83	1.25	1.24	31.66	69.4%	21.0%	39.2%	38.5%
			30-32.5	14%	1.38	0.17	0.46	0.34	2.40	4.88	1.49	1.93	45.13	57.5%	3.6%	30.7%	17.4%
			32.5-35	15%	1.42	0.10	0.47	0.42	2.42	7.86	1.69	2.51	57.04	58.5%	1.3%	27.5%	16.6%
			45-55	25%	0.46	0.06	0.18	0.41	6.55	15.59	6.62	10.97	174.71	7.1%	0.4%	2.7%	3.7%
			55-65	73%	0.44	0.05	0.19	0.43	8.84	14.78	7.05	11.30	189.07	4.9%	0.4%	2.7%	3.8%
			65-75	71%	0.49	0.04	0.22	0.44	8.55	15.13	6.81	12.25	190.68	5.7%	0.3%	3.2%	3.6%
75-85	78%	0.70	0.05	0.30	0.53	8.03	14.90	7.43	11.97	191.39	8.8%	0.3%	4.0%	4.4%			
85-120	50%	0.69	0.05	0.24	0.44	7.15	15.64	6.41	10.98	176.18	9.7%	0.3%	3.7%	4.0%			
Minimal	Organic- thick soil profile	Min3	0-5	31%	2.38	1.17	0.84	0.16	nd	nd	nd	nd	nd	nd	nd	nd	nd
			5-10	31%	2.75	1.17	1.01	0.24	nd	nd	nd	nd	nd	nd	nd	nd	nd
			10-15	23%	1.77	0.69	0.60	0.28	nd	nd	nd	nd	nd	nd	nd	nd	nd
			15-20	14%	1.57	0.57	0.50	0.30	nd	nd	nd	nd	nd	nd	nd	nd	nd
			20-25	10%	1.47	0.33	0.42	0.34	nd	nd	nd	nd	nd	nd	nd	nd	nd
			30-35	14%	1.10	0.19	0.38	0.29	nd	nd	nd	nd	nd	nd	nd	nd	nd

			35-40	15%	0.55	0.11	0.20	0.24	nd	nd	nd	nd	nd	nd	nd	nd
			40-55	18%	0.56	0.07	0.19	0.25	nd	nd	nd	nd	nd	nd	nd	nd
			55-60	22%	1.18	0.06	0.16	0.34	nd	nd	nd	nd	nd	nd	nd	nd
			60-65	31%	1.74	0.07	0.21	0.32	nd	nd	nd	nd	nd	nd	nd	nd
			65-75	37%	1.89	0.08	0.25	0.37	nd	nd	nd	nd	nd	nd	nd	nd
			75-85	55%	0.85	0.10	0.35	0.32	nd	nd	nd	nd	nd	nd	nd	nd
			85-95	108%	1.40	0.08	0.63	0.37	nd	nd	nd	nd	nd	nd	nd	nd
			95-105	70%	0.78	0.08	0.28	0.15	nd	nd	nd	nd	nd	nd	nd	nd
			105-115	83%	1.83	0.03	0.41	0.16	nd	nd	nd	nd	nd	nd	nd	nd
			0-5	37%	2.92	1.64	1.42	0.06	nd	nd	nd	nd	nd	nd	nd	nd
			5-10	30%	2.13	1.54	1.24	0.05	nd	nd	nd	nd	nd	nd	nd	nd
			10-15	21%	1.55	1.32	0.98	0.10	nd	nd	nd	nd	nd	nd	nd	nd
			15-20	18%	1.93	1.19	0.81	0.10	nd	nd	nd	nd	nd	nd	nd	nd
			20-25	17%	2.69	0.72	0.71	0.20	nd	nd	nd	nd	nd	nd	nd	nd
			25-30	20%	2.77	0.44	0.75	0.19	nd	nd	nd	nd	nd	nd	nd	nd
Moderate	Organic-thick soil profile	Mod1	30-35	22%	2.52	0.30	0.70	0.24	nd	nd	nd	nd	nd	nd	nd	nd
			35-40	23%	1.90	0.22	0.58	0.18	nd	nd	nd	nd	nd	nd	nd	nd
			40-55	30%	0.37	0.02	0.16	0.09	nd	nd	nd	nd	nd	nd	nd	nd
			55-65	31%	1.10	0.04	0.34	0.21	nd	nd	nd	nd	nd	nd	nd	nd
			65-75	16%	1.06	0.04	0.22	0.09	nd	nd	nd	nd	nd	nd	nd	nd
			75-80	24%	1.83	0.03	0.38	0.11	nd	nd	nd	nd	nd	nd	nd	nd
			85-105	56%	0.92	0.04	0.26	0.11	nd	nd	nd	nd	nd	nd	nd	nd
			0-10	24%	2.58	0.91	0.79	0.14	nd	nd	nd	nd	nd	nd	nd	nd
			10-15	24%	0.94	0.08	0.30	0.10	nd	nd	nd	nd	nd	nd	nd	nd
Moderate	Organic-thin soil profile	Mod2	15-20	41%	0.87	0.03	0.33	0.16	nd	nd	nd	nd	nd	nd	nd	nd
			20-65	41%	0.80	0.03	0.37	0.17	nd	nd	nd	nd	nd	nd	nd	nd
			65-75	33%	0.65	0.05	0.25	0.13	nd	nd	nd	nd	nd	nd	nd	nd

		75-85	39%	0.67	0.09	0.24	0.11	nd	nd	nd	nd	nd	nd	nd	nd		
		85-95	56%	0.93	0.09	0.29	0.14	nd	nd	nd	nd	nd	nd	nd	nd		
		95-105	62%	1.16	0.08	0.33	0.13	nd	nd	nd	nd	nd	nd	nd	nd		
		105-110	102%	1.31	0.07	0.42	0.09	nd	nd	nd	nd	nd	nd	nd	nd		
Moderate	Organic-thin soil profile	Mod3	0-5	25%	2.63	1.09	0.70	0.06	2.95	7.01	1.31	0.84	47.08	89.1%	15.6%	53.7%	6.8%
			5-10	28%	2.78	0.76	1.07	0.46	2.82	4.18	1.83	1.26	45.28	98.3%	18.2%	58.9%	36.6%
			10-15	22%	2.67	0.65	0.98	0.11	2.76	3.28	1.53	0.69	37.73	96.5%	19.9%	63.9%	16.1%
			15-20	17%	1.94	0.28	0.52	0.09	2.42	4.76	2.25	2.30	52.76	80.1%	5.8%	23.0%	4.0%
			20-25	42%	0.97	0.03	0.37	0.13	7.24	15.13	7.49	11.09	184.68	13.4%	0.2%	5.0%	1.2%
			25-30	69%	0.95	0.02	0.34	0.16	7.37	15.97	7.22	11.21	185.79	12.9%	0.1%	4.7%	1.4%
			30-35	63%	0.98	0.03	0.35	0.17	7.38	15.99	6.56	10.33	176.57	13.3%	0.2%	5.3%	1.6%
			35-65	39%	0.83	0.03	0.26	0.14	7.09	16.36	7.47	11.43	188.38	11.7%	0.2%	3.4%	1.2%
			65-75	62%	1.81	0.07	0.36	0.13	8.85	15.85	7.71	10.53	193.98	20.5%	0.5%	4.7%	1.3%
			75-85	66%	1.35	0.08	0.33	0.12	9.22	16.63	8.16	11.76	206.86	14.6%	0.5%	4.1%	1.0%
			85-95	76%	1.36	0.09	0.40	0.09	8.60	16.65	8.20	11.67	203.73	15.8%	0.5%	4.8%	0.8%
			95-105	74%	1.53	0.09	0.42	0.09	8.24	15.75	8.35	11.53	200.26	18.6%	0.6%	5.0%	0.8%
		105-115	95%	1.61	0.10	0.42	0.08	9.96	15.31	9.21	12.08	217.18	16.2%	0.7%	4.5%	0.6%	
		115-120	116%	1.61	0.10	0.49	0.11	8.90	15.99	7.98	11.37	200.50	18.1%	0.6%	6.1%	1.0%	
Extensive	Organic-thick soil profile	Ext1	0-5	20%	2.25	1.19	0.61	0.04	nd	nd	nd	nd	nd	nd	nd	nd	
			5-10	17%	1.78	0.96	0.67	0.04	nd	nd	nd	nd	nd	nd	nd	nd	nd
			10-15	14%	1.62	0.79	0.75	0.04	nd	nd	nd	nd	nd	nd	nd	nd	nd
			15-20	16%	1.87	0.41	0.54	0.08	nd	nd	nd	nd	nd	nd	nd	nd	nd
			20-25	16%	1.72	0.15	0.40	0.09	nd	nd	nd	nd	nd	nd	nd	nd	nd
			25-30	12%	1.18	0.08	0.26	0.08	nd	nd	nd	nd	nd	nd	nd	nd	nd
			30-35	10%	1.16	0.06	0.26	0.07	nd	nd	nd	nd	nd	nd	nd	nd	nd

	35-40	11%	0.81	0.03	0.20	0.06	nd	nd	nd	nd	nd	35.0%	0.2%	nd	nd	
	40-48	28%	0.73	0.01	0.19	0.10	nd	nd	nd	nd	nd	8.4%	0.1%	nd	nd	
	48-55	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
	55-65	57%	1.24	0.05	0.24	0.11	nd	nd	nd	nd	nd	12.1%	0.3%	nd	nd	
Extensive	Organic- thin soil profile	Ext3	0-5	20%	2.38	1.05	0.74	0.07	nd	nd	nd	nd	85.1%	19.8%	66.4%	13.9%
			5-10	16%	1.81	0.97	0.81	0.04	nd	nd	nd	nd	73.0%	18.5%	69.4%	10.8%
			10-15	13%	1.36	0.80	0.73	0.05	nd	nd	nd	nd	58.1%	16.1%	54.7%	6.5%
			15-20	17%	1.71	0.49	0.69	0.07	nd	nd	nd	nd	68.2%	12.4%	50.0%	5.1%
			20-25	13%	1.27	0.33	0.43	0.07	nd	nd	nd	nd	53.7%	5.1%	21.2%	3.0%
			25-30	11%	0.73	0.07	0.20	0.06	nd	nd	nd	nd	29.0%	0.5%	12.7%	2.5%
			30-35	19%	0.50	0.02	0.19	0.11	nd	nd	nd	nd	6.5%	0.1%	2.4%	1.0%
			35-40	19%	0.34	0.02	0.13	0.09	nd	nd	nd	nd	4.6%	0.1%	1.8%	0.8%
			40-65	17%	0.54	0.02	0.14	0.12	nd	nd	nd	nd	7.8%	0.1%	2.0%	1.1%
			65-75	34%	1.32	0.04	0.20	0.12	nd	nd	nd	nd	20.5%	0.2%	4.0%	1.4%
			75-85	58%	1.10	0.05	0.23	0.07	nd	nd	nd	nd	12.9%	0.4%	3.8%	0.7%
	89-90	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	

Table S4: Characterization of the exchangeable fraction of permafrost soils at Eight Mile Lake (Interior Alaska, USA): exchangeable base cations density and stock.

Thermo-karst area	Category	Soil profile	Depth (cm)	density (g m ⁻³)				stock (g m ⁻²)			
				Ca _{exch}	K _{exch}	Mg _{exch}	Na _{exch}	Ca _{exch}	K _{exch}	Mg _{exch}	Na _{exch}
Minimal	Organic-thick soil profile	Min3	0-5	67.47	33.09	23.87	4.62	3.37	1.65	1.19	0.23
			5-10	161.41	68.81	59.01	13.91	8.07	3.44	2.95	0.70
			10-15	120.95	46.72	40.67	19.02	6.05	2.34	2.03	0.95
			15-20	123.91	44.80	39.65	23.96	6.20	2.24	1.98	1.20
			20-25	154.81	34.48	44.38	35.88	7.74	1.72	2.22	1.79
			30-35	165.59	29.42	57.30	43.45	16.56	2.94	5.73	4.34
			35-40	298.72	61.16	109.91	133.59	14.94	3.06	5.50	6.68
			40-55	358.49	43.62	123.58	162.49	53.77	6.54	18.54	24.37
			55-60	596.94	29.75	78.86	171.90	29.85	1.49	3.94	8.60
			60-65	848.07	32.04	100.38	158.07	42.40	1.60	5.02	7.90
			65-75	1208.19	52.34	156.66	239.27	120.82	5.23	15.67	23.93
			75-85	737.02	84.88	301.65	280.58	73.70	8.49	30.17	28.06
85-95	1047.52	63.08	475.44	274.93	104.75	6.31	47.54	27.49			
95-100	684.33	69.60	241.80	134.11	34.22	3.48	12.09	6.71			
Moderate	Organic-thick soil profile	Mod1	0-5	183.56	102.84	88.89	3.90	9.18	5.14	4.44	0.19
			5-10	132.87	95.98	77.54	3.42	6.64	4.80	3.88	0.17
			10-15	63.50	53.98	40.03	4.08	3.17	2.70	2.00	0.20
			15-20	95.49	58.88	40.16	5.16	4.77	2.94	2.01	0.26
			20-25	143.61	38.66	37.68	10.94	7.18	1.93	1.88	0.55
			25-30	244.49	38.56	66.31	16.98	12.22	1.93	3.32	0.85
			30-35	316.26	37.19	87.68	30.37	15.81	1.86	4.38	1.52
			35-40	280.41	32.77	85.53	26.76	14.02	1.64	4.28	1.34
			40-55	284.80	18.09	125.05	72.60	42.72	2.71	18.76	10.89
			55-65	761.22	28.85	233.57	142.08	76.12	2.88	23.36	14.21
			65-75	427.87	16.34	89.83	35.83	42.79	1.63	8.98	3.58
			75-80	604.31	10.23	126.32	34.90	30.22	0.51	6.32	1.75
85-100	788.38	32.91	219.49	97.38	157.68	6.58	43.90	19.48			
Moderate	Organic-thin soil profile	Mod2	0-10	17.04	5.97	5.21	0.89	1.70	0.60	0.52	0.09
			10-15	723.61	58.89	231.95	75.46	36.18	2.94	11.60	3.77

			15-20	744.41	28.89	284.68	132.89	37.22	1.44	14.23	6.64
			20-65	708.12	26.15	322.12	146.02	318.66	11.77	144.95	65.71
			65-75	566.20	44.91	215.11	109.19	56.62	4.49	21.51	10.92
			75-85	583.41	74.03	209.61	99.09	58.34	7.40	20.96	9.91
			85-95	804.23	80.31	248.60	123.21	80.42	8.03	24.86	12.32
			95-100	994.80	70.03	279.66	109.11	49.74	3.50	13.98	5.46
Moderate	Organic-thin soil profile	Mod3	0-5	126.07	52.48	33.72	2.74	6.30	2.62	1.69	0.14
			5-10	208.10	57.09	80.52	34.52	10.41	2.85	4.03	1.73
			10-15	248.93	60.99	91.05	10.35	12.45	3.05	4.55	0.52
			15-20	508.15	72.06	135.32	23.88	25.41	3.60	6.77	1.19
			20-25	826.15	23.47	316.65	110.13	41.31	1.17	15.83	5.51
			25-30	836.59	15.21	300.64	140.13	41.83	0.76	15.03	7.01
			30-35	861.50	22.93	303.65	145.93	43.07	1.15	15.18	7.30
			35-65	712.72	27.13	220.24	118.38	213.81	8.14	66.07	35.51
			65-75	1461.13	59.55	292.87	106.71	146.11	5.96	29.29	10.67
			75-85	1160.34	68.93	286.62	105.90	116.03	6.89	28.66	10.59
			85-95	1214.58	76.30	353.79	83.41	121.46	7.63	35.38	8.34
			95-100	1360.93	82.12	374.24	78.32	68.05	4.11	18.71	3.92



Figure S1: Distribution of the potential cation exchange capacity (CEC) and concentration in oxalate extractable Fe with depth, for the seven permafrost soil profiles (Min1, Min3, Mod1, Mod2, Mod3, Ext1, Ext3) at the Gradient site (Eight Mile Lake, Interior Alaska, USA). The oxalate extraction targets Fe from poorly crystalline oxides and complexes with organic carbon. The oxalate extractable Fe data are from Monhonval, 2022, Influence of permafrost thaw on mineral organic carbon interactions, UCLouvain, ID483, 283p., <http://hdl.handle.net/2078.1/266169>.