





## SUPPLEMENTARY MATERIAL

### **Evolution of shallow post-bog soils developed on Holocene carbonate sediments in NW Poland**

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**Table S1.** Some chemical properties of organogenic layers of post-bog soils on Holocene carbonate limnic deposits in NW Poland

Type of soil	Average thickness of surface horizon / horizon symbol / material / pH 1M KCl range	Statistics	Share of basic components			Organic carbon	General forms of elements						Exchangeable bases of elements				Sum of exchangeable bases		
			LOI	CaCO <sub>3</sub>	Ncf	C <sub>org</sub>	N <sub>tot</sub>	S	P	Ca	Mg	K	Na	CaEB	KEB	MgEB	NaEB		
			%			g·kg <sup>-1</sup> s.m.						cmol <sup>(+)</sup> ·kg <sup>-1</sup>							
			test																
			T	H	H	H	H	W	T	T	H	H	W	H	T	W	WT	H	
Sapric Histosols (Limnic)	51 cm / O / peat / 5.81–6.88	<i>x</i>	66.57	0.94	32.49	259.19	27.90	16.02	0.87	19.64	0.96	0.47	0.11	84.36	0.17	2.15	0.00	86.68	
		<i>SD</i>	4.89	1.04	4.11	23.34	1.90	7.24	0.31	5.70	0.09	0.19	0.05	12.01	0.14	0.29	0.00	12.08	
		<i>g</i>	d	a	a	b	b		a	a	a	a		bc	a			b	
Drainic Histosols (Calcaric. Limnic)	53 cm / O / muck / 6.65–7.38	<i>x</i>	45.30	16.90	37.79	191.50	17.35	3.72	0.74	82.20	1.68	0.93	0.14	78.55	0.08	3.61	0.01	82.25	
		<i>SD</i>	17.49	19.73	14.40	82.28	4.56	1.52	0.32	66.74	0.90	0.47	0.03	22.61	0.05	1.14	0.02	23.52	
			cd	ab	ab	b	b		a	ab	ab	a		bc	a			b	
Histic Gleysols (Murshic)	33 cm / O / muck / 6.65–7.39	<i>x</i>	37.68	13.25	49.07	154.05	13.96	4.66	0.72	76.17	1.61	1.18	0.10	64.57	0.09	1.73	0.04	66.43	
		<i>SD</i>	15.97	16.60	19.15	68.79	7.23	5.53	0.24	60.71	0.77	0.85	0.03	20.18	0.06	1.00	0.08	19.99	
		<i>g</i>	c	b	ab	b	b		a	ab	ab	a		b	a			ab	
Umbric Gleysols (Hyperhumic)	29 cm / A / mineral / 7.06–7.34	<i>x</i>	14.94	27.82	57.24	55.84	6.29	2.62	0.62	97.80	1.95	0.68	0.11	43.42	0.10	0.86	0.01	44.39	
		<i>SD</i>	2.88	20.65	18.78	13.51	1.16	2.70	0.20	81.49	0.91	0.35	0.10	19.86	0.07	0.59	0.02	20.06	
		<i>g</i>	b	b	b	a	a		a	ab	b	a		ab	a			a	
Gleyic Phaeozems (Hyperhumic)	45 cm / A / mineral / 7.17–7.30	<i>x</i>	6.16	35.82	58.03	19.23	2.96	1.13	0.69	130.57	2.50	1.46	0.10	20.16	0.09	0.35	0.00	20.60	
		<i>SD</i>	1.14	6.11	7.16	3.73	0.54	1.16	0.06	35.02	0.20	0.68	0.02	3.21	0.05	0.10	0.00	3.23	
		<i>g</i>	a	b	ab	a	a		a	b	b	a		ab	a			a	

Explanations: *x* = average, *SD* = standard deviation, *g* = different letters show the significant differences between each sample groups at  $p < 0.05$  in statistical tests: Tukey's and Kruskal-Wallis, for the Welch test groups are not distinguished, *LOI* = losses on ignition, *Ncf* = mineral non-calcium fraction, T = Tukey's test for unequal sample sizes, H = Kruskal-Wallis test, W = Welch test, WT = without test.

Source: own study.

**Table S2.** The average pH and macroelements content in groundwater from 17 piezometers and macroelements content in plants material from 17 sites

No. of piezometer	Type of soil	Type of plant community	Groundwater							Plants				
			pH	N <sub>tot</sub>	P	Ca	Mg	K	Na	P	Ca	Mg	K	Na
1	Sapric Histosols (Limnic)	<i>Carex acuta</i> with <i>Phalaris arundinacea</i>	7.39	1.75	0.12	69.95	7.90	0.82	7.88	1.25	11.62	1.79	5.11	1.02
2	Drainic Histosols (Calcaric, Limnic)	<i>Arrhenatherum elatius</i>	7.66	2.19	0.05	82.20	16.89	2.08	9.63	2.75	3.52	1.61	20.18	0.32
3	Drainic Histosols (Calcaric, Limnic)	<i>Deschampsia caespitosa</i>	7.4	3.85	0.07	167.54	26.44	2.73	13.67	1.63	6.75	1.57	17.12	0.32
4	Drainic Histosols (Calcaric, Limnic)	<i>Arrhenatherum elatius</i>	7.44	1.66	0.05	39.46	8.43	0.73	10.92	1.45	5.44	1.37	9.24	0.11
5	Drainic Histosols (Calcaric, Limnic)	<i>Bromus inermis</i>	7.48	0.79	0.06	28.32	8.97	1.55	15.60	1.74	6.51	1.92	12.86	0.06
6	Histic Gleysols (Murshic)	<i>Bromus inermis</i>	7.33	1.75	0.06	55.24	7.09	0.90	7.40	1.14	4.19	1.11	10.78	0.04
7	Histic Gleysols (Murshic)	<i>Bromus inermis</i>	7.34	1.75	0.05	51.28	10.53	0.78	7.66	1.36	2.68	0.82	13.14	0.03
8	Histic Gleysols (Murshic)	n. d.	7.28	1.49	0.07	40.10	8.35	1.23	8.63	1.30	6.63	2.67	9.42	4.28
9	Histic Gleysols (Murshic)	<i>Arrhenatherum elatius</i>	7.38	1.05	0.07	32.22	5.11	1.00	6.35	2.09	4.76	1.72	10.46	0.09
10	Umbric Gleysols (Hyperhumic)	<i>Carex acuta</i>	7.47	1.75	0.05	53.03	10.52	8.21	5.42	1.12	3.23	1.04	17.68	0.05
11	Umbric Gleysols (Hyperhumic)	<i>Arrhenatherum elatius</i> with <i>Alopecurus pratensis</i>	7.42	4.81	0.07	63.23	10.94	12.64	6.31	0.90	3.22	0.74	23.74	0.05
12	Umbric Gleysols (Hyperhumic)	<i>Arrhenatherum elatius</i>	7.62	1.75	0.06	32.31	6.55	0.37	6.64	1.69	5.44	2.48	5.84	0.83
13	Umbric Gleysols (Hyperhumic)	<i>Festuca rubra</i>	7.59	2.28	0.08	45.92	1.91	0.80	3.99	2.29	5.44	1.86	11.20	0.29
14	Umbric Gleysols (Hyperhumic)	<i>Arrhenatherum elatius</i>	7.39	1.66	0.05	48.53	4.57	1.19	4.16	0.77	13.34	0.88	15.17	0.08
15	Umbric Gleysols (Hyperhumic)	<i>Carex acuta</i>	7.37	2.10	0.06	37.27	6.40	0.38	4.36	1.06	5.70	0.67	8.19	0.10
16	Gleyic Phaeozems (Hyperhumic)	woodland (alder)	7.42	2.98	0.05	44.88	5.89	0.29	3.66	1.01	2.46	0.62	10.10	0.09
17	Gleyic Phaeozems (Hyperhumic)	woodland (alder)	7.49	3.38	0.06	39.17	8.10	0.45	6.05	n.d.	n.d.	n.d.	n.d.	n.d.

Source: own study.