

Table S1. Treethrow density and treethrow depth. a) Totally decomposed, b)Partially decomposed and c) Fresh treethrow.
a)

ID	Treethrow density	Depth
4	26	0
6	158	20
7	105	40
8	53	25
15	79	10
16	79	20
17	132	15
18	158	20
19	105	10
20	132	20
21	105	10
22	132	15
25	26	20
26	26	0
27	26	20
28	53	20
30	53	15
31	53	15
32	53	20
33	79	15
34	184	20
37	132	15
39	132	30
40	53	20

41	79	20
42	53	25
43	26	25
44	26	30
45	26	65
46	26	20
47	26	20
48	79	0
49	79	10
50	53	20
53	184	0
54	132	20
55	26	15
57	211	0
58	53	40
60	26	20
62	105	20
63	26	40
64	53	15
66	132	20
67	79	30
68	26	25
69	132	20
70	132	35
71	184	30
72	132	20
74	53	15
77	53	15

78	53	0
79	26	0
82	26	0
83	26	0
85	26	0
86	79	0
87	79	25
89	105	20
90	184	40
91	105	30
92	53	30
93	53	25
94	53	20
95	158	10
96	26	30
97	26	20
100	26	20
101	26	20
102	79	40
104	26	35
105	26	15
106	105	0
107	53	20
108	211	15
109	53	15
110	158	20
111	79	40
112	237	20

113	132	30
114	26	50
115	158	20
116	132	20
117	158	30
118	105	25
119	105	35
120	53	20
121	53	30
122	79	55
123	26	0
124	26	10
125	79	30
126	79	20
127	211	30
128	132	15
129	79	15
130	132	20
131	184	30
132	158	30
133	26	10
134	79	20
135	211	20
136	132	20
137	211	60
138	132	25
139	53	25
141	79	20

142	158	35
143	184	40
144	26	15
145	184	40
147	132	45
148	132	25
149	132	30
150	132	20
151	105	20
152	105	20
153	79	20
154	158	20
155	237	30
156	79	10
157	79	30
158	263	30
159	105	35
160	132	40
161	79	20
162	79	20
163	132	30
164	342	35
165	53	30
166	26	25
167	132	30
168	53	15
169	132	25
170	79	20

171	26	15
173	263	45
174	289	25
175	237	35
176	289	25
177	211	25
178	105	25
181	79	25
182	105	25
183	53	15
184	53	10
185	132	15
187	105	25
188	26	10
189	105	20
190	132	20
191	132	40
192	132	20
194	211	60
195	237	30
196	316	25
197	132	20
198	237	30
199	316	25
203	105	20
204	105	35
208	79	15
209	53	25

210	105	25
211	132	25
215	105	15
216	316	25
217	289	30
218	263	25
219	132	25
220	105	30
224	26	10
226	53	25
227	26	0
229	53	25
230	105	25
231	26	10
232	26	30
233	26	0
235	79	20
236	26	30
238	105	25
239	105	10
240	26	0
241	26	25
246	79	15
247	26	20
248	105	25
249	132	40
250	132	20
251	53	15

252	26	10
253	79	0
254	53	20
255	53	25
257	158	70
258	158	40
259	53	20
260	105	20
261	26	15
262	132	20
267	53	30
268	132	30
269	53	30
270	79	35
271	79	20
272	105	25
273	184	25
276	53	10
277	26	10
278	184	30
279	105	15
280	79	25
281	184	25
282	105	20
283	184	20
284	158	20
289	105	30
290	105	50

291	53	10
292	26	0
293	132	15
294	79	20
295	105	35
296	132	10
297	79	15
298	184	30
299	53	10
300	53	10
301	53	20
302	105	30
303	237	35
304	132	35
305	316	25
309	53	0
310	26	0
311	184	35
312	158	20
313	105	15
314	26	0
315	53	30
316	105	10
317	79	30
318	105	40
319	79	10
320	105	25
321	132	45

322	132	40
323	53	20
326	184	45
328	26	30
329	132	15
330	158	70
332	53	20
333	237	30
334	184	20
335	184	25
336	79	10
337	132	15
338	26	0
339	53	30
340	79	30
341	26	15
346	132	30
347	132	30
348	237	20
349	158	20
350	158	25
351	105	40
352	53	25
354	26	0
355	79	30
359	26	25
360	158	25
361	79	35

362	26	20
363	79	30
364	26	0
366	53	15
368	26	0
370	158	40
371	211	40
372	26	0
373	105	10
374	105	35
380	184	20

b)

ID	Treethrow density	Treethrow depth
4	26	5
5	53	40
7	26	0
41	26	5
45	26	15
46	26	15
74	26	20
80	26	5
100	26	0
101	26	30
121	26	0
136	26	0
146	26	5
152	26	10
161	26	10
166	26	15
178	26	5
183	26	10
195	26	0
196	26	0
209	26	15
210	26	0
232	26	0
249	26	30
262	53	0

271	26	10
281	26	20
282	26	25
284	26	25
294	26	40
340	53	40
354	26	25
371	26	40

c)

ID	Treethrow density	Treethrow depth
4	200	50
7	57	90
15	29	50
16	29	70
20	29	20
21	57	20
22	86	100

25	29	10
32	29	85
43	29	10
47	29	80
69	57	20
70	29	0
73	86	120
87	57	45
89	29	110
90	57	70
103	57	10
114	57	80
118	29	70
129	86	70
132	29	0
133	29	50
139	57	35
144	29	15
146	86	40
147	57	65
149	29	65
151	57	45
152	200	20
156	29	110
157	86	80
159	57	40
172	29	90
184	57	30

187	29	55
190	29	0
192	86	70
194	86	60
195	57	70
196	29	0
197	57	130
202	57	30
209	29	25
210	57	30
224	29	47
233	57	55
235	29	25
241	171	90
249	29	75
251	57	100
252	29	60
253	143	100
254	57	55
258	29	50
259	86	15
261	29	90
276	29	10
277	143	220
278	57	40
281	57	15
296	29	10
297	57	15

300	29	20
302	86	60
304	57	20
305	29	0
314	29	45
317	57	75
318	57	120
320	29	90
321	29	40
323	86	70
328	29	0
330	29	50
334	57	110
335	57	85
336	86	75
337	114	90
338	114	40
339	86	75
341	57	55
349	29	10
351	229	90
352	257	70
353	86	40
354	86	60
355	29	40
359	29	50
360	29	0
361	57	15

363	29	90
364	429	60
366	57	15
368	86	70
370	86	190
371	200	70
372	86	35
373	143	80
374	114	55
379	143	50
381	114	20

Table S2. a) Descriptive statistics of the surface and subsurface layers. b) The descriptive statistics are also shown for Podzols and Cambisols in the surface and subsurface layers. (N=309 samples for the surface and 309 samples for the subsurface layer).

a)

Soil chemical properties	Surface layer							Subsurface layer						
	mean	Std. Dev	maximum	minimum	median	CV(%)	Skewness	mean	Std. Dev	maximum	minimum	median	CV(%)	Skewness
External														
Cox (%)	9.4	2.2	19.8	4.6	9.3	23.6	0.4	2.8	0.7	5.6	1.4	2.8	25.2	-0.1
pH_{KCl}	3.1	0.2	3.8	2.5	3.1	5.8	0.4	4.0	0.1	4.3	3.5	4.0	2.9	0.5
CEC (mmol+kg⁻¹)	133.7	18.1	203.0	78.1	133.4	13.5	0.2	58.3	19.2	137.3	11.6	57.8	32.8	0.0
EA (mmol+kg⁻¹)	130.2	23.3	209.0	62.0	131.0	17.9	-0.1	54.9	14.3	133.0	27.0	53.0	26.0	0.4
Mg ⁺² (mg kg⁻¹)	63.7	20.0	213.0	16.0	62.0	31.4	-0.4	9.7	12.0	126.5	1.9	6.2	124.2	0.5
Ca ⁺² (mg kg⁻¹)	0.3	0.2	2.0	0.0	0.3	66.6	0.7	0.1	0.1	0.9	0.0	0.1	113.7	-3.3
Na ⁺ (mg kg⁻¹)	13.6	8.7	85.0	0.0	12.0	63.8	3.3	13.1	8.8	57.1	4.1	9.7	67.2	0.9
K ⁺ (mg kg⁻¹)	112.6	29.1	253.0	42.0	112.0	25.9	0.5	21.8	12.0	95.7	8.1	18.2	55.1	0.5
Al (X) ⁺¹ (mg kg⁻¹)	118.6	25.6	188.2	50.1	117.2	21.6	0.1	14.6	3.7	29.0	8.1	13.8	25.3	0.5
Al (Y) ⁺² (mg kg⁻¹)	11.4	3.2	27.8	5.3	11.0	28.2	0.3	7.7	4.3	25.6	3.0	6.3	56.0	0.1
Al ⁺³ (mg kg⁻¹)	556.3	140.5	875.4	64.1	554.0	25.3	-0.4	345.8	82.6	657.1	96.5	334.4	23.9	0.1
Pedogenic														
Al_{KClsum}	686.3	158.3	1069.8	127.1	689.5	23.1	-0.3	368.1	85.6	692.7	116.8	356.9	23.3	-0.3
Al_{KCl} (mg kg⁻¹)	688.9	171.6	1127.2	121.7	685.7	24.9	-0.1	395.6	84.5	687.5	135.9	384.4	21.4	0.5
Mn_{KCl} (mg kg⁻¹)	60.6	77.7	424.4	0.8	25.6	128.3	-0.1	6.8	6.4	42.6	0.2	5.7	93.1	0.4
Fe_{KCl} (mg kg⁻¹)	228.0	120.3	625.7	12.5	221.9	52.7	0.5	9.0	7.5	53.2	1.6	6.9	83.2	0.3
Al_{ox} (mg kg⁻¹)	4170.7	1006.5	7493.2	970.8	3994.8	24.1	0.5	12201.9	4773.1	29484.4	2080.4	11560.2	39.1	-0.1

Mn_{ox} (mg kg⁻¹)	140.6	161.5	1092.8	0.7	78.5	114.9	-0.4	198.4	182.9	1010.3	3.3	144.2	92.2	0.4
Fe_{ox} (mg kg⁻¹)	12202.9	3559.7	30868.2	1463.3	11793.4	29.2	0.0	12296.0	3579.9	30117.4	3235.9	12076.0	29.1	0.3
Si_{ox} (mg kg⁻¹)	246.8	125.5	640.0	0.0	232.0	50.9	0.5	1299.7	861.2	5604.0	128.0	1126.0	66.3	0.5
Al_{dit} (mg kg⁻¹)	3473.9	1083.3	6848.8	383.8	3458.8	31.2	0.2	8936.1	3502.7	18987.5	857.5	8520.0	39.2	-0.2
Mn_{dit} (mg kg⁻¹)	175.6	177.5	1039.9	0.0	116.4	101.1	1.6	279.5	193.2	1115.0	12.0	239.5	69.1	0.2
Fe_{dit} (mg kg⁻¹)	18039.2	4269.8	37043.5	3091.5	17735.0	23.7	0.3	21086.7	4563.1	38698.8	2890.8	20967.5	21.6	0.3
Si_{dit} (mg kg⁻¹)	721.8	497.9	2725.0	0.0	675.0	69.0	0.5	1198.5	603.5	3900.0	0.0	1150.0	50.4	-0.4

b)

Soil chemical properties	Podzol				Cambisol			
	Surface layer		Subsurface layer		Surface layer		Subsurface layer	
	mean	Std. Dev	mean	Std. Dev	mean	Std. Dev	mean	Std. Dev
External								
Cox (%)	10.4	1.1	3.2	0.3	9.0	0.7	2.6	0.1
pH_{KCl}	3.1	0.1	4.0	0.0	2.9	0.1	4.0	0.0
CEC (mmol+kg⁻¹)	128.0	6.1	67.4	8.5	134.3	1.7	54.8	0.8
EA (mmol+kg⁻¹)	124.1	8.5	62.1	5.6	127.9	0.3	52.8	1.8
Mg ⁺² (mg kg⁻¹)	53.4	6.6	6.1	3.0	68.0	3.7	11.5	2.1
Ca ⁺² (mg kg⁻¹)	0.3	0.0	0.1	0.0	0.4	0.0	0.1	0.0
Na ⁺ (mg kg⁻¹)	16.5	4.1	11.6	0.6	12.6	2.2	14.9	2.2
K ⁺ (mg kg⁻¹)	106.8	5.1	16.8	2.1	117.8	2.5	24.9	1.1
Al (X) ⁺¹ (mg kg⁻¹)	107.7	12.8	17.1	1.4	112.3	3.4	13.1	0.4
Al (Y) ⁺² (mg kg⁻¹)	10.7	1.2	6.5	1.2	11.1	0.3	8.0	0.4

Al⁺³ (mg kg⁻¹)	508.3	69.4	380.9	22.2	541.1	4.2	334.2	0.9
Pedogenic								
Al_{KClsum}	626.7	82.9	404.5	23.4	664.5	0.5	355.3	0.1
Al_{KCl} (mg kg⁻¹)	630.4	83.5	433.5	24.7	661.0	7.6	381.5	1.0
Mn_{KCl} (mg kg⁻¹)	17.9	20.0	2.5	2.8	86.8	2.7	9.9	1.4
Fe_{KCl} (mg kg⁻¹)	235.2	33.4	14.1	3.4	186.7	23.6	6.0	0.3
Al_{ox} (mg kg⁻¹)	3469.8	769.2	17057.0	3415.6	4318.2	373.0	10384.0	537.1
Mn_{ox} (mg kg⁻¹)	42.4	45.8	77.4	75.8	215.8	11.6	294.1	3.3
Fe_{ox} (mg kg⁻¹)	9815.4	2469.5	11730.2	773.5	12083.4	401.2	11804.0	30.5
Si_{ox} (mg kg⁻¹)	150.9	99.5	2288.3	744.5	299.8	38.3	987.1	69.3
Al_{dit} (mg kg⁻¹)	2927.1	585.8	11803.4	2370.4	3526.1	32.6	7881.8	492.4
Mn_{dit} (mg kg⁻¹)	57.4	49.4	177.4	75.4	257.5	10.0	371.8	2.7
Fe_{dit} (mg kg⁻¹)	14478.9	3345.5	21502.6	988.1	18060.1	901.4	20523.5	45.2
Si_{dit} (mg kg⁻¹)	696.2	100.8	1523.2	299.7	740.4	38.0	1148.8	37.6

Table S3. Pearson correlation coefficient for the relationship between treethrow density and depth of treethrow and soil chemical properties for totally and partly decomposed treethrow and fresh treethrow. Significant relations are indicated in bold and marked according to their significance level: ***p < 0.001; **p < 0.05; *p < 0.1. Noted that the relations showed in the table are the significant in Treethrow density and Depth of treethrow. The soil unit analysed are: AlPo-Albic Podzol, EnPo-Entic Podzol, DyCa-Dystric Cambisol, HaCa-Haplic Cambisol.

a) Totally decomposed treethrow

Treethrow density															
Surface layer				Subsurface layer				Surface layer				Subsurface layer			
				Soil Unit											
				AlPo	EnPo	DyCa	HaCa	AlPo	EnPo	DyCa	HaCa				
External															
Cox	0.03		0.15 **	0.02	0.06	0	-0.1	0.15	0.17 **	-0.09	-0.13				
pH	-0.22 ***		0.09	0.43	-0.16 **	-0.17	0.06	0.2	0.05	-0.25	-0.14				
CEC	0.08		0.05	0.09	0.05	-0.07	0	0.08	0.11	0.16	0.1				
EA	0.03		0.10 *	0.24	0.01	0	0	0.13	0.00	0.10	0.18				
Mg ⁺²	0.06		-0.14 **	0.001	-0.03	0.03	0.02	0.27	-0.12	-0.27	0.01				
Ca ⁺²	0.00		-0.10 *	0.07	-0.01	-0.14	0.01	0.27	0.08	-0.07	-0.09				
Na ⁺	0.00		-0.03	0.46	0.05	-0.05	-0.2	0.57 *	0.18	-0.10	-0.22 *				
K ⁺	0.03		-0.14 **	0.1	0.17 **	0.06	0.05	0.16	0.06	-0.28	0				
Al (X) ⁺¹	0.01		-0.11 *	0.38	0.08	0.06	0.02	0.13	0.00	0.21	0.08				
Al (Y) ⁺²	0.01		-0.09 *	0.14	-0.03	0.13	0.18	0.3	-0.17 **	0.09	0.17				
Al ⁺³	0.01		0.03	0.22	-0.11	0.03	0	0.06	-0.06	0.11	0.03				
Pedogenic															
Al _{Kclsum}	0.08		0.03	0.27	-0.08	0.1	0.04	0.06	0.08	0.12	0.05				
Al _{KCl}	0.60		0.06	0.25	-0.06	0.08	0.01	0.09	-0.03	0.14	0.08				

<i>Mn_{KCl}</i>	-0.17	**	-0.24	***	0.06	-0.15	*	-0.06	-0	0.3	-0.14	*	0.03	-0.22	*
<i>Fe_{KCl}</i>	0.06		-0.03		0.43	-0.05		0	0.02	0.02	-0.10		0.09	0.1	
<i>Al_{ox}</i>	-0.18	***	0.32	***	0.16	-0.14	*	-0.06	-0	0.63	*	0.33	***	-0.20	-0.04
<i>Mn_{ox}</i>	-0.18	***	-0.23	***	0.19	-0.22	***	0.08	-0.1	0.27	-0.17	**	-0.10	-0.15	
<i>Fe_{ox}</i>	-0.18	***	-0.08		0.11	-0.2	**	-0.06	0.08	0.16	-0.08		-0.02	-0.1	
<i>Si_{ox}</i>	-0.21	***	0.27	***	0.4	-0.2	***	0	-0	0.48	0.28	***	-0.18	-0.04	
<i>Al_{dit}</i>	-0.14	*	0.25	***	0.17	-0.09		-0.16	0.09	0.24	0.26	***	-0.09	-0.06	
<i>Mn_{dit}</i>	-0.14	***	-0.20	***	0.06	-0.21	***	0.03	-0.1	0.29	-0.19	**	0.04	-0.03	
<i>Fe_{dit}</i>	-0.14	**	0.15	**	0.23	-0.12		-0.01	-0.1	0.28	0.18	**	0.06	-0.04	
<i>Si_{dit}</i>	0.03		0.05		0.03	-0.09		0.2	-0.1	0.39	0.06		-0.19	0.01	

Treethrow depth													
Surface layer			Subsurface layer		Surface layer				Subsurface layer				
					Soil Unit								
					AlPo	EnPo	DyCa	HaCa	AlPo	EnPo	DyCa	HaCa	
External													
Cox	0.19	***	0.00		0.285	0.08	0.01	0.11	-0.6	-0.08	-0.43	**	-0.07
pH	-0.06		0.04		0.17	0.05	-0.05	-0	-0.2	-0.09	-0.35	*	-0.05
CEC	0.05		0.03		-0.34	-0.01	-0.1	0.01	-0.3	-0.04	-0.07		-0.03
EA	0.07		0.05		-0.02	0.01	0.01	-0.01	-0.2	-0.01	0.192		-0.02
Mg ⁺²	0.09		-0.11	*	0.14	0.06	0.06	0.06	0.27	0.02	-0.34	*	-0.13
Ca ⁺²	0.04		-0.03		-0.12	0.08	-0.15	0.04	0.18	-0.08	-0.1		-0.11
Na ⁺	0.05		0.00		0.076	0.05	-0.13	0.06	-0.1	-0.07	0.182		-0.16
K ⁺	0.12	**	-0.08		0.191	0.09	-0.07	0.09	0.39	-0.06	-0.1		-0.09

<i>Al</i> (X) ⁺¹	0.07	0.05	0.126	0.03	0.04	0.05	-0	-0.07	0.169	0.06
<i>Al</i> (Y) ⁺²	0.13 **	-0.02	0.18	0.04	0.29	0.06	0.3	-0.09	0.319 *	-0.03
<i>Al</i> ⁺³	0.01	0.04	-0.1	-0.06	0.14	-0.06	-0.1	-0.07	0.127	0.13
Pedogenic										
<i>Al</i> _{Kclsum}	0.02	0.04	-0.07	-0.04	0.13	-0.03	-0.2	-0.06	0.142	0.12
<i>Al</i> _{KCl}	0.04	0.04	-0.06	0.00	0.12	0.09	0.37	0.03	0.138	0.15
<i>Mn</i> _{KCl}	-0.05	-0.08	-0.18	-0.02	0.09	0.02	0.09	-0.08	-0	0.00
<i>Fe</i> _{KCl}	0.09	0.00	0.234	0.00	-0.07	0.02	0.09	0.05	0.177	0.05
<i>Al</i> _{ox}	0.00	0.16 ***	0.186	0.05	0.2	0.15	-0.1	0.11	-0.18	0.25 **
<i>Mn</i> _{ox}	-0.06	0.00	-0.16	-0.05	0.04	0.09	0.32	-0.07	0.005	0.18
<i>Fe</i> _{ox}	0.04	0.04	0.043	0.02	0	0.15	-0.1	0.09	-0.09	0.17
<i>Si</i> _{ox}	-0.07	0.13 **	0.045	-0.01	0.31	0.11	0.04	0.03	-0.01	0.27 **
<i>Al</i> _{dit}	0.03	0.04	-0.28	-0.06	0.15	0.28	0.32	0.13	-0.19	0.13
<i>Mn</i> _{dit}	-0.06	-0.01	-0.25	-0.07	0.09	0.12	0.12	-0.07	-0.09	0.27 **
<i>Fe</i> _{dit}	0.06	0.01	0.005	0.03	0.06	0.06	-0	0.06	-0.07	0.19
<i>Si</i> _{dit}	-0.01	0.01	-0.33	-0.02	0.02	-0.02	0.37	0.16 *	-0.22	0.20 *

b) Partly decomposed treethrow

	Treethrow density		Treethrow depth	
	Surface layer	Subsurface layer	Surface layer	Subsurface layer
External				
<i>Cox</i>	0.29	-0.21	0.26	-0.19
<i>pH</i>	0.00	0.25	-0.08	0.36 **
<i>CEC</i>	-0.12	-0.41 **	-0.06	-0.32 *
<i>EA</i>	-0.05	-0.22	-0.12	-0.13
<i>Mg</i> ⁺²	0.37 **	-0.07	0.16	-0.14
<i>Ca</i> ⁺²	0.29	-0.10	0.08	-0.11
<i>Na</i> ⁺	-0.15	-0.12	-0.06	-0.18
<i>K</i> ⁺	0.21	-0.05	-0.03	-0.07
<i>Al (X)</i> ⁺¹	0.10	-0.08	0.18	-0.26
<i>Al (Y)</i> ⁺²	0.38 **	0.00	0.46 ***	-0.02
<i>Al</i> ⁺³	-0.14	-0.33 *	0.06	-0.13
Pedogenic				
<i>Al_{KClsum}</i>	-0.09	-0.32 *	0.10	-0.29
<i>Al_{KCl}</i>	-0.09	-0.35 *	0.16	0.09
<i>Mn_{KCl}</i>	0.08	-0.17	0.12	-0.27
<i>Fe_{KCl}</i>	-0.07	-0.10	0.02	-0.28
<i>Al_{ox}</i>	-0.02	0.04	0.05	0.07
<i>Mn_{ox}</i>	-0.03	-0.15	0.02	-0.01
<i>Fe_{ox}</i>	-0.19	-0.29	0.08	-0.12
<i>Si_{ox}</i>	-0.10	0.20	-0.07	0.23
<i>Al_{dit}</i>	0.00	0.03	0.02	0.17
<i>Mn_{dit}</i>	-0.04	-0.20	0.02	-0.05
<i>Fe_{dit}</i>	-0.31	-0.37 **	-0.01	0.03
<i>Si_{dit}</i>	-0.14	0.26	0.09	0.28

c) Fresh Treethrow

	Treethrow density		Treethrow depth	
	Surface layer	Subsurface layer	Surface layer	Subsurface layer
External				
<i>Cox</i>	0.05	-0.02	0.17 *	0.08
<i>pH</i>	-0.02	0.09	-0.13	-0.03
<i>CEC</i>	0.01	0.13	0.12	-0.03

<i>EA</i>	0.01	0.03	-0.01		-0.03
<i>Mg</i> ⁺²	0.01	0.04	0.20	**	0.12
<i>Ca</i> ⁺²	0.00	0.06	0.12		0.14
<i>Na</i> ⁺	0.00	-0.11	0.06		0.10
<i>K</i> ⁺	0.08	-0.14	0.32	***	0.14
<i>Al (X)</i> ⁺¹	0.05	-0.20	0.12		0.05
<i>Al (Y)</i> ⁺²	0.01	0.08	-0.03		-0.09
<i>Al</i> ⁺³	0.05	0.07	-0.06		-0.11
<hr/> Pedogenic <hr/>					
<i>Al_{KClSum}</i>	0.01	0.07	-0.03		-0.08
<i>Al_{KCl}</i>	0.00	0.06	-0.03		-0.08
<i>Mn_{KCl}</i>	-0.17	*	-0.24	0.02	0.35 ***
<i>Fe_{KCl}</i>	-0.05	-0.20	0.10		0.00
<i>Al_{ox}</i>	-0.11	0.03	-0.18	*	-0.01
<i>Mn_{ox}</i>	-0.13	-0.02	0.02		0.09
<i>Fe_{ox}</i>	-0.13	-0.18	-0.18		-0.14
<i>Si_{ox}</i>	0.08	0.06	-0.13		0.05
<i>Al_{dit}</i>	-0.14	0.03	-0.03		-0.01
<i>Mn_{dit}</i>	0.14	0.06	0.01		-0.02
<i>Fe_{dit}</i>	-0.09	-0.07	-0.06		-0.01
<i>Si_{dit}</i>	0.03	0.15	0.00		0.11

Table S4. Redundancy analysis (RDA). Pearson correlation coefficient for the relationship between treethrow density and treethrow depth, and soil chemical properties. No. samples indicates the number of plots in each category. Significant relations are indicated in bold and marked according to their significance level: ***p < 0.001; **p < 0.05; *p < 0.1.

a) Totally decomposed treethrow

	Soil layer	No. samples	No. soil properties	Explained variability (%)	p-value	F-value
Treethrow density	Surface	287	23	2.3	<0.001 ***	6.31
	Subsurface	287	23	4.6	<0.001 ***	11.80
Treethrow depth	Surface	287	23	2.3	>0.1	0.26
	Subsurface	287	23	4.6	>0.1	1.83

Entic Podzol

	Soil layer	No. samples	No. soil properties	Explained variability (%)	p-value	F-value
Treethrow density	Surface	140	23	4	<0.05**	2.82
	Subsurface	140	23	6	<0.05**	6.21
Treethrow depth	Surface	140	23	4	>0.1	0.78
	Subsurface	140	23	6	>0.1	0.92

Haplic Cambisol

	Soil layer	No. samples	No. soil properties	Explained variability (%)	p-value	F-value
Treethrow density	Surface	68	23	1.6	>0.1	0.61
	Subsurface	68	23	1.9	>0.1	0.21
Treethrow depth	Surface	68	23	1.6	>0.1	0.49
	Subsurface	68	23	1.9	>0.1	1.02

Dystric Cambisol

	Soil layer	No. samples	No. soil properties	Explained variability (%)	p-value	F-value
Treethrow density	Surface	46	23	3.7	>0.1	1.28
	Subsurface	46	23	4.2	>0.1	0.80
Treethrow depth	Surface	46	23	3.7	>0.1	0.37
	Subsurface	46	23	4.2	>0.1	0.40

b) Partly decomposed treethrow

	Soil layer	No. samples	No. soil properties	Explained variability	p-value	F-value
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	(%)					
Treethrow density	Surface	33	23	3.4	>0.1	0.86
	Subsurface	33	23	1.1	<0.05**	3.27
Treethrow depth	Surface	33	23	3.4	>0.1	0.20
	Subsurface	33	23	1.1	>0.1	0.44

c) Fresh treethrow

	Soil layer	No. samples	No. soil properties	Explained variability (%)	p-value	F-value
Treethrow density	Surface	102	23	2.1	>0.1	1.22
	Subsurface	102	23	1.1	>0.1	0.81
Treethrow depth	Surface	102	23	2.1	>0.1	0.92
	Subsurface	102	23	1.1	>0.1	0.36

Figure S1

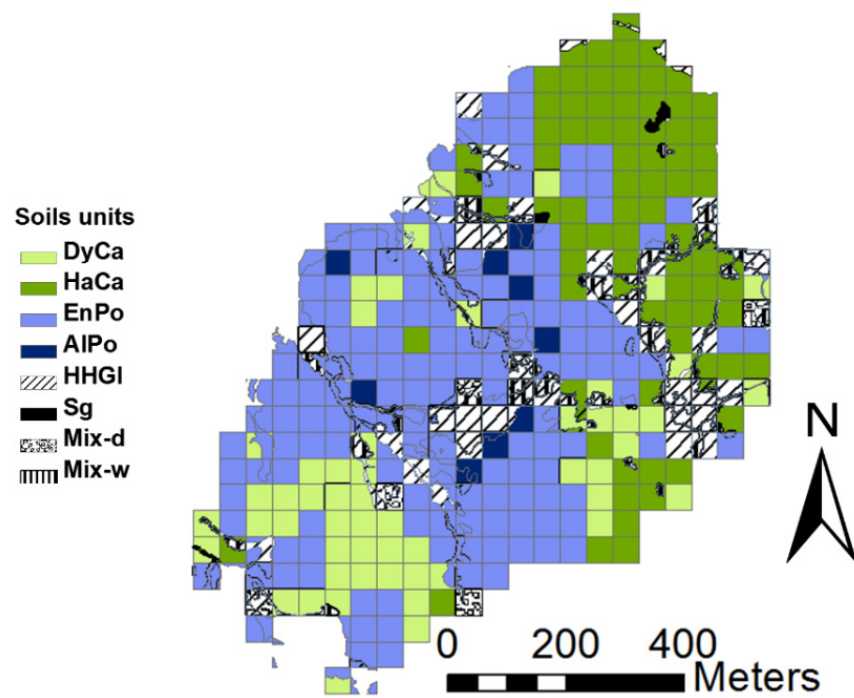


Figure S2

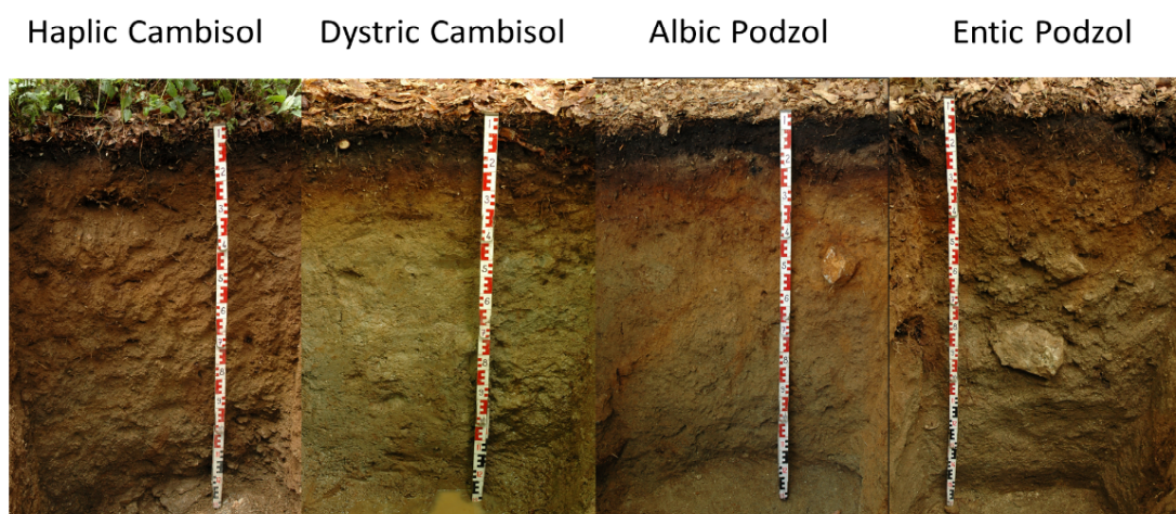


Figure S3

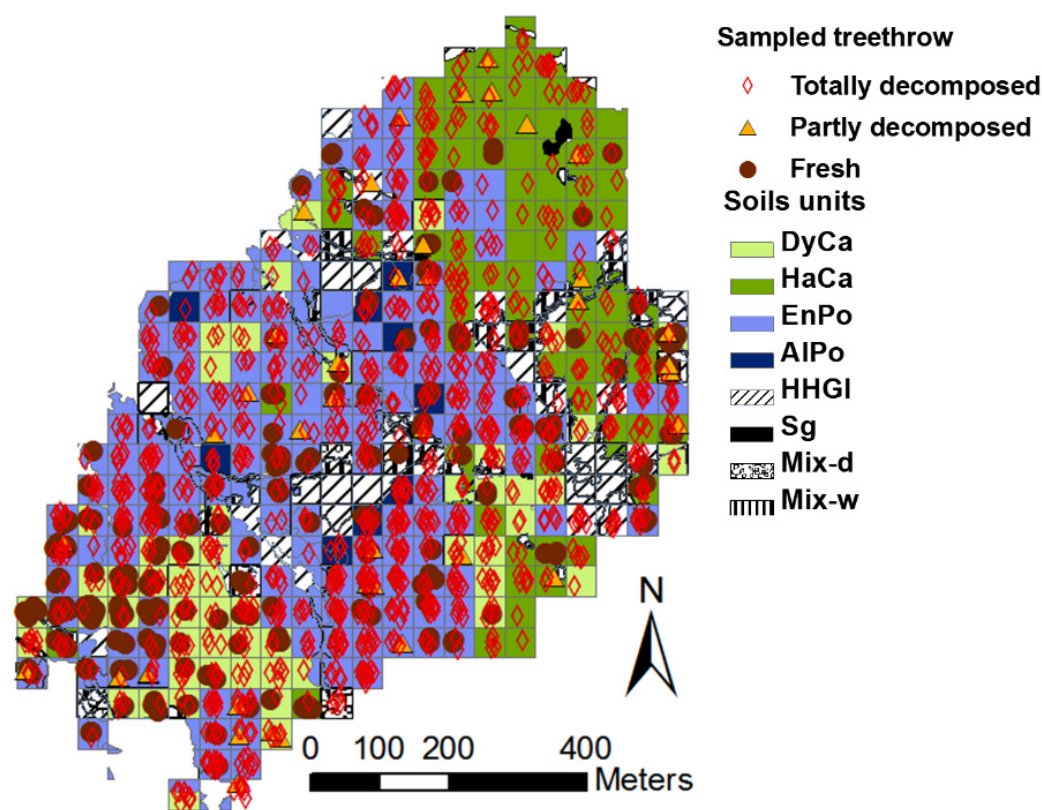


Figure S4

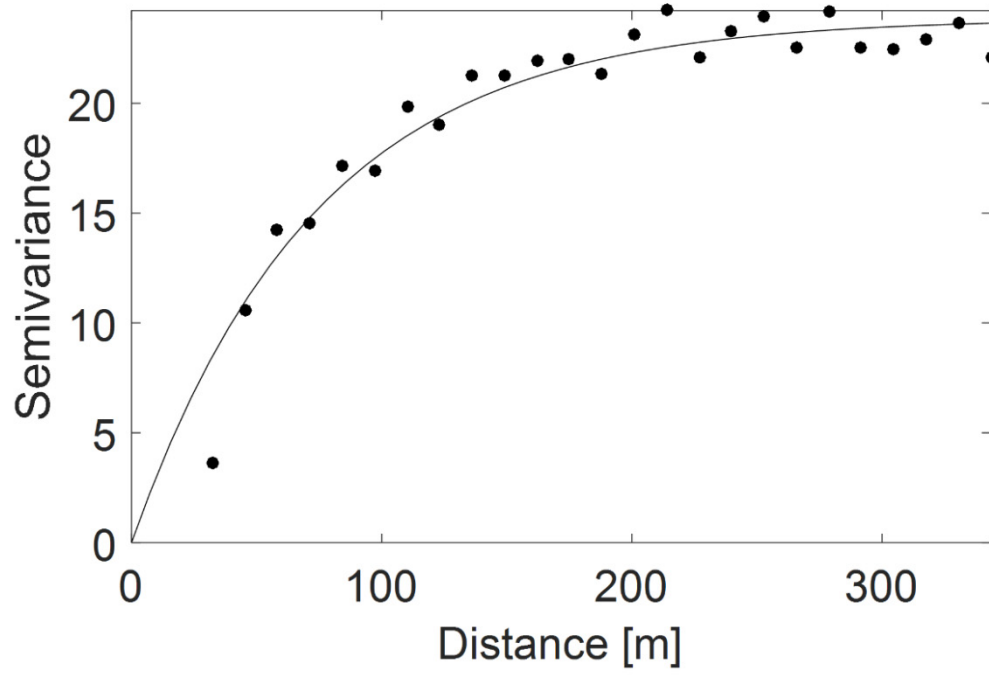


Figure S5

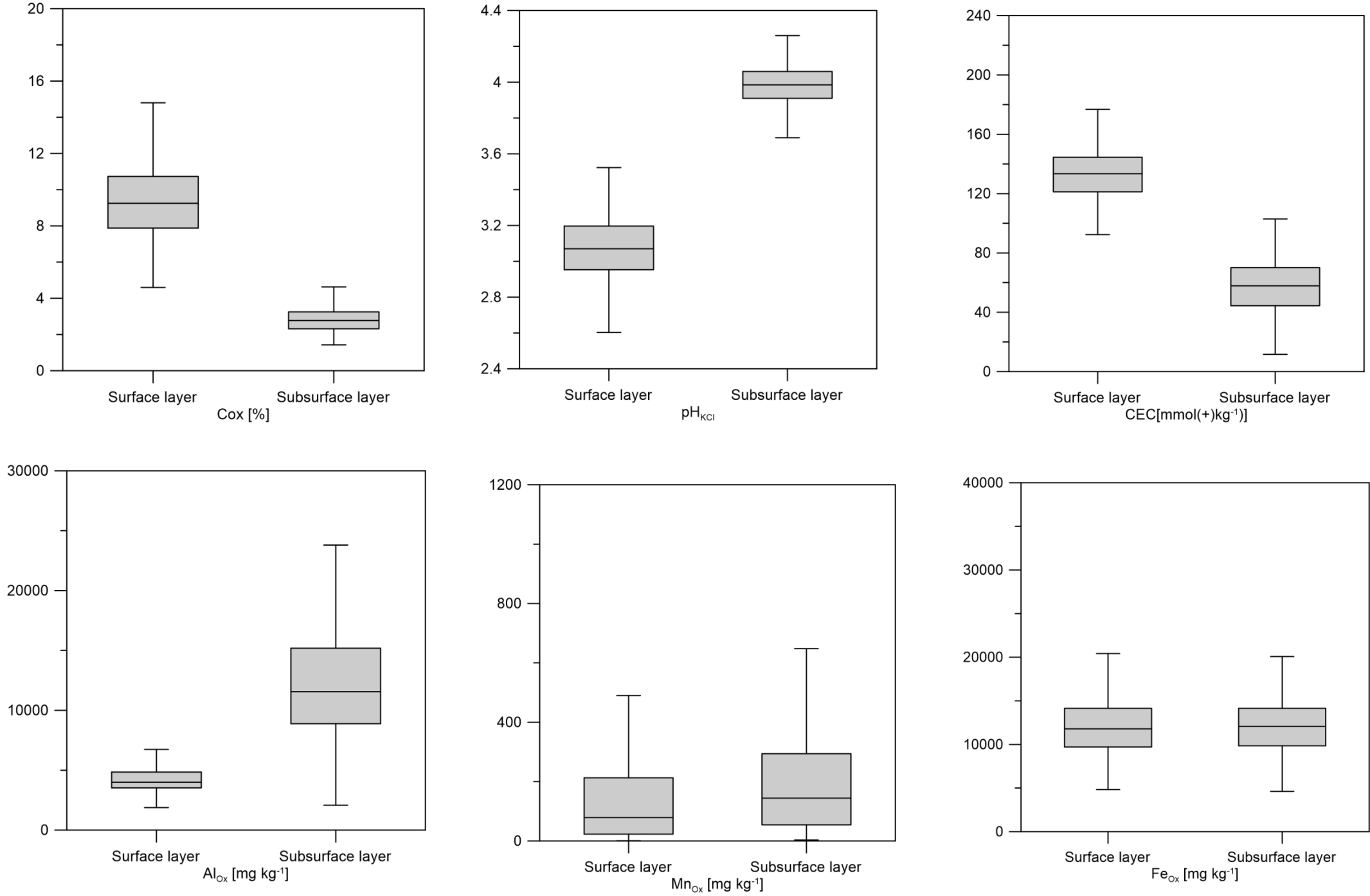


Figure S6

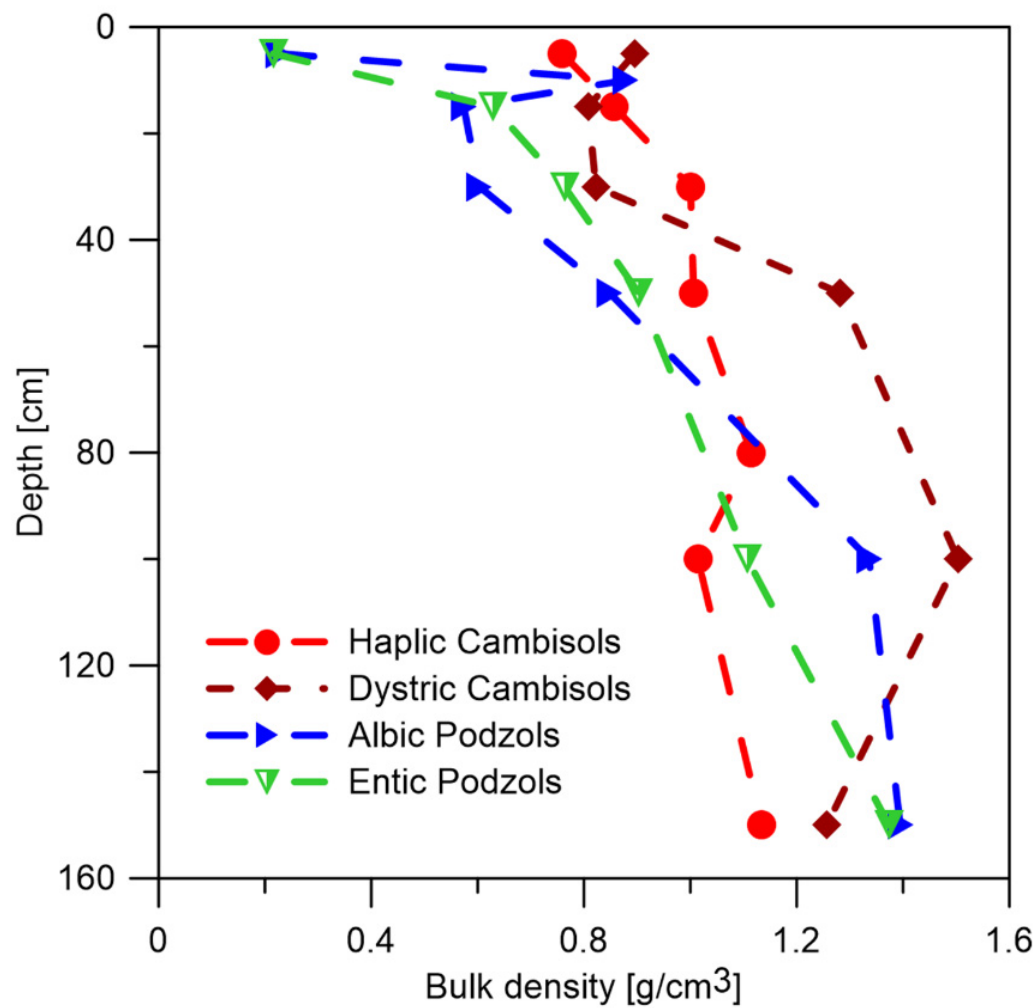


Figure S7

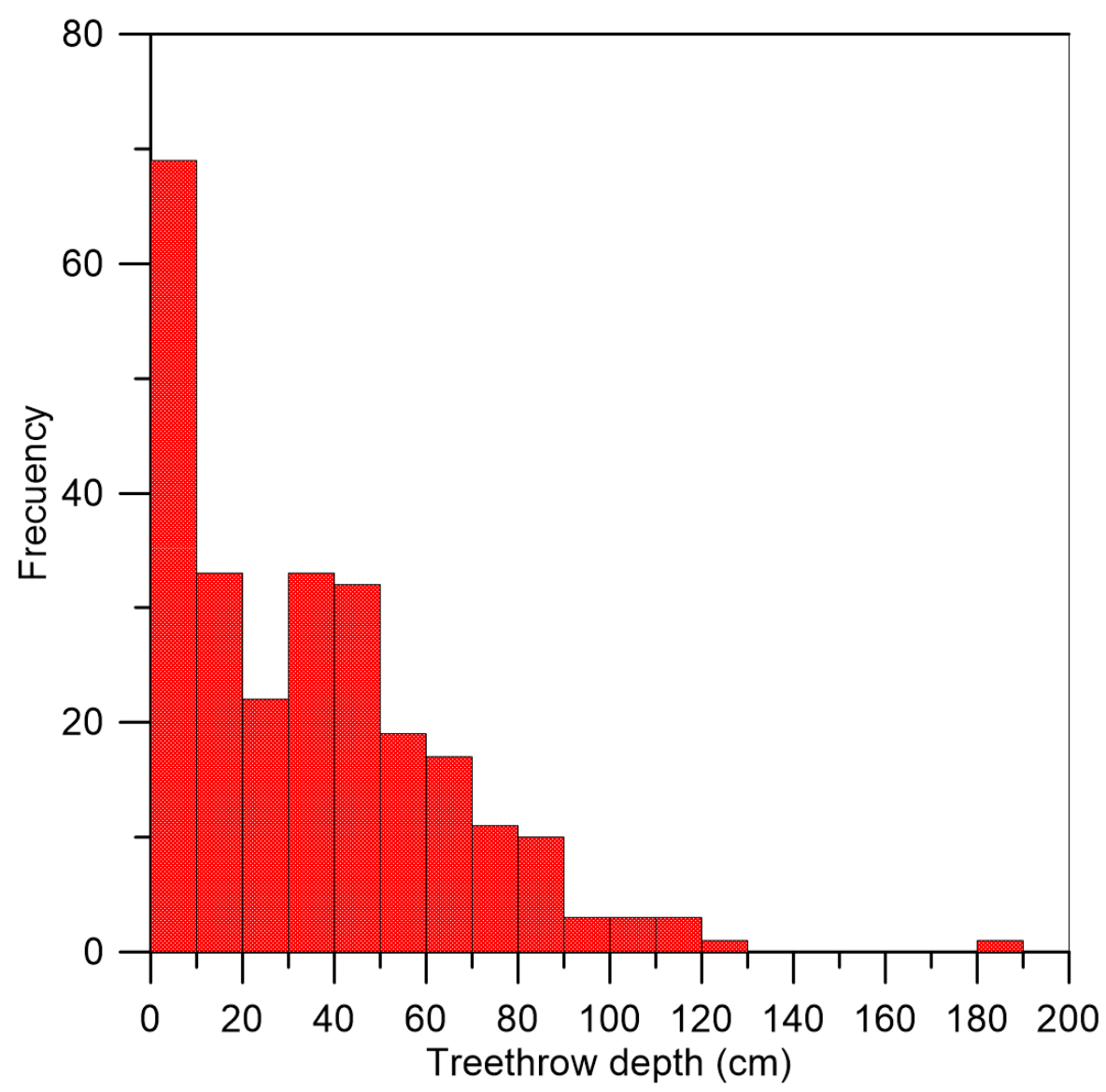
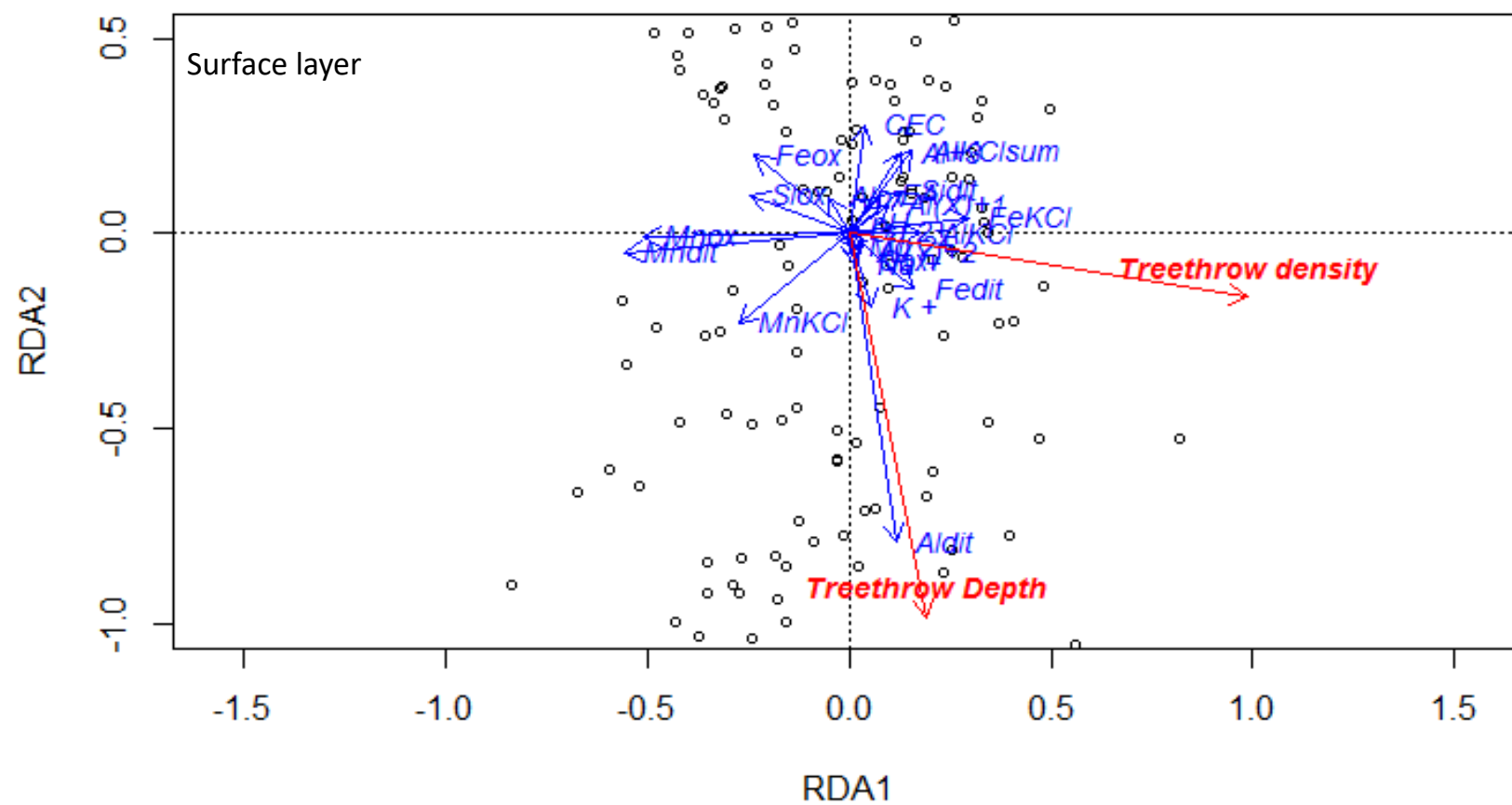
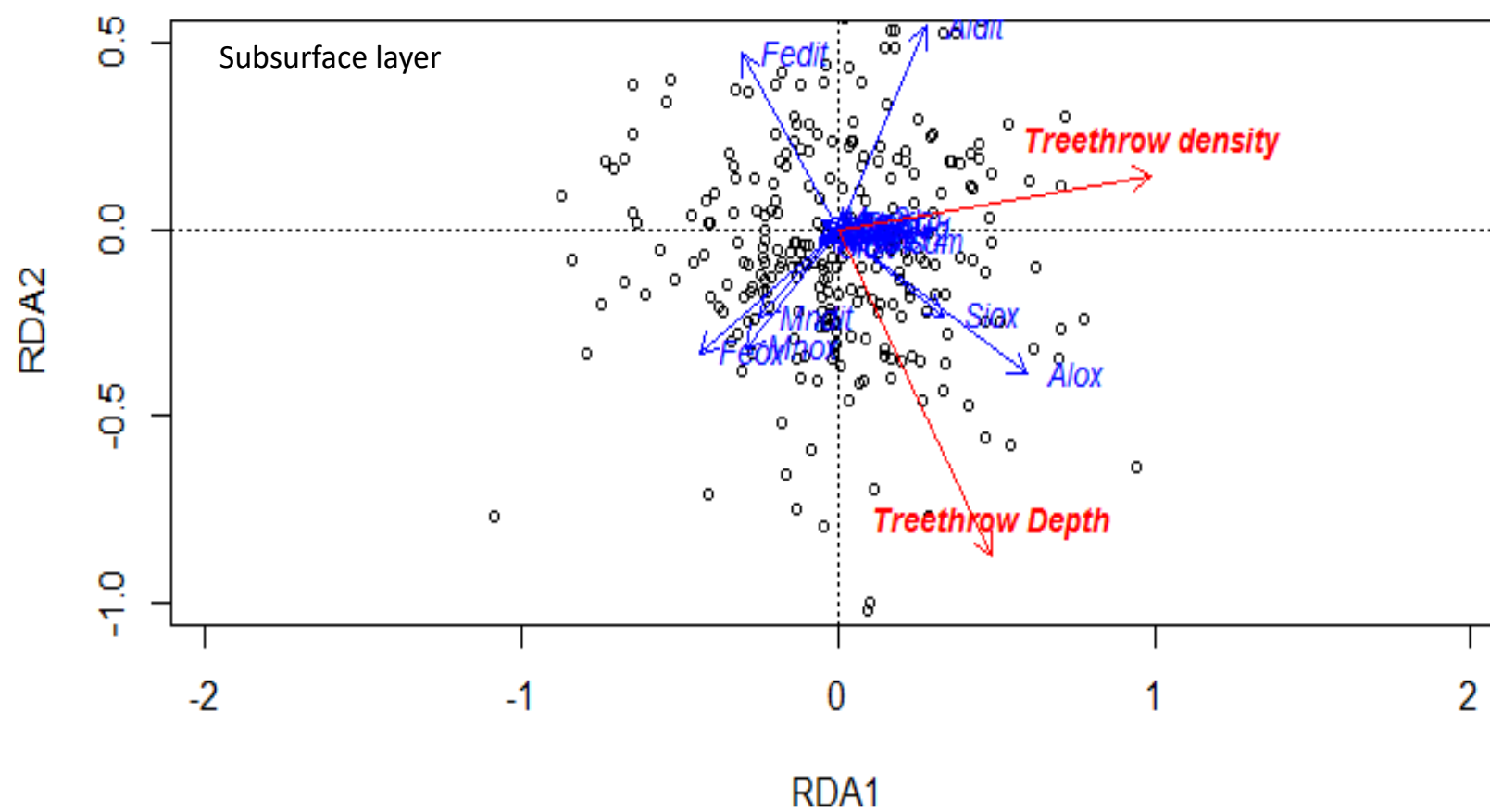


Figure S8

a) Totally decomposed treethrow





b)Partly decomposed treethrow

