

Table S 1. List of soils analyzed in the work including some properties. The coordinates of monitoring plots belong to the Czech Ministry of Agriculture and cannot be published. Data about land use of sampled plots is available since 1993 when the regular basal soil monitoring of the Czech Republic started.

Plot	Land use	Soil type	History	pH (1M KCl)	SOC	TN	Cox	Cext	Cbio	Nbio	RES	RB	RS	μ	tpeakmax	AMO	SNA	URE
1	Chemozem	arable	since 1993	6.2	2.29	0.24	2.18	47	164	31	0.9	1.36	24.6	0.123	29.3	5.06	646.2	23.6
2	Leptosol	grassland	arable 1993 – 2005, grassland since 2006	7.3	1.57	0.20	1.45	58	260	85	1.08	1.84	28.6	0.21	21.6	4.97	626	33.2
3	Fluvisol	grassland	arable 1993 – 1997, grassland since 1998	6.9	2.77	0.33	2.55	65	379	117	1.29	2.25	37.1	0.18	21.1	6.74	1243.4	31.9
4	Retisol	arable	since 1993	6.6	1.27	0.13	1.19	50	126	24	0.87	1.27	14.6	0.178	26.9	4.48	332.1	7.2
5	Fluvisol	arable	since 1993	5.2	1.99	0.25	1.93	38	170	41	0.63	0.99	13.7	0.17	27.1	3	424.7	21.6
6	Retisol	arable	since 1993	4.7	1.47	0.19	1.28	29	246	42	0.56	1	15	0.09	34.9	2.68	198.6	13.1
7	Cambisol	arable	since 1993	5.6	1.40	0.20	1.17	23	179	44	0.71	1.01	15.2	0.155	28.3	3.15	209.3	4.8
8	Cambisol	grassland	arable 1993 – 2003, grassland since 2004	4.0	1.51	0.17	1.56	47	323	57	0.92	1.69	10.1	0.096	39.9	3.94	41.2	19.7
9	Fluvisol	arable	since 1993	6.3	1.53	0.22	1.45	39	143	53	0.84	1.11	23.9	0.172	23.7	5.03	279.4	7.6
10	Luvisol	arable	since 1993	5.2	1.79	0.30	1.62	28	233	31	0.72	1.44	19.2	0.126	30.4	3.29	527.9	19.6
11	Retisol	arable	since 1993	5.4	2.23	0.27	1.91	38	136	32	0.83	1.37	19	0.145	28	4.12	367.8	17.6
12	Retisol	arable	since 1993	4.8	1.31	0.21	1.4	30	95	33	0.58	0.77	6.9	0.121	39.3	2.38	112.1	9.9
13	Cambisol	grassland	since 1993	4.7	2.88	0.24	2.78	82	325	93	1.08	2.75	35.7	0.079	29.2	11.37	32.1	13.8
14	Retisol	grassland	arable 1993 – 2004, grassland since 2005	4.2	1.69	0.20	1.69	51	219	32	0.9	1.96	16.6	0.107	33.1	3.84	67.4	16.9
15	Planosol	arable	since 1993	6.2	2.22	0.35	2.07	31	250	53	1.04	1.26	26.6	0.092	30.1	10.12	1214.2	20.6
16	Chemozem	arable	since 1993	6.1	2.29	0.25	2.04	43	204	50	1.11	2.08	38.4	0.135	22.5	5.57	787.9	26.8
17	Luvisol	arable	since 1993	5.1	1.35	0.11	1.15	20	122	25	0.62	0.74	10.4	0.12	33.1	2.23	163.1	4.5
18	Chemozem	arable	since 1993	6.0	2.53	0.30	2.18	47	329	76	1.02	1.94	34	0.138	23.1	9.5	795.4	30.1
19	Cambisol	grassland	since 1993	4.0	2.23	0.25	2.2	74	420	93	1.05	2.75	20.8	0.086	33.9	6.93	40.5	13.4
20	Cambisol	arable	since 1993	4.9	2.08	0.27	1.89	46	174	38	0.7	1.05	16.1	0.12	32.3	4.02	291.4	8.7
21	Cambisol	grassland	arable 1993, grassland since 1994	4.6	3.17	0.39	3.16	86	402	116	1.3	3.37	42.2	0.082	26.1	10.03	21.8	10.9
22	Fluvisol	arable	since 1993	5.6	2.21	0.20	2.12	41	172	37	0.68	0.88	17.9	0.127	29.6	3.88	838	14.1
23	Cambisol	grassland	since 1993	4.8	3.25	0.43	3.21	71	455	133	1.15	2.62	40.5	0.074	26.1	7.79	49.8	12
24	Cambisol	arable	since 1993	4.3	1.54	0.16	1.67	44	167	42	0.56	1.43	13.6	0.11	34.8	3.65	107.3	16.4
25	Cambisol	arable	since 1993	5.0	1.18	0.13	1.16	13	185	22	0.46	0.86	11.4	0.124	32.7	1.29	339.7	12.5
26	Gleysol	grassland	since 1993	4.7	2.70	0.31	2.33	65	429	99	1.29	2.99	33.9	0.068	30.9	5.54	17.3	8.8
27	Cambisol	grassland	since 1993	3.8	2.85	0.32	3.07	71	367	49	1.34	3.04	20.6	0.108	32.4	2.41	25.8	12.8
28	Cambisol	arable	since 1993	6.0	1.44	0.19	1.36	47	124	60	0.63	1.06	20.4	0.156	25.9	4.06	269.6	9.6
29	Retisol	arable	since 1993	4.3	1.33	0.23	1.24	38	79	20	0.55	1.04	7.5	0.1	41.5	2.06	85.8	6.5
30	Stagnosol	grassland	arable 1993 – 1997, grassland since 1998	4.8	2.76	0.33	2.48	38	515	84	1.22	3.15	39.6	0.074	26.5	11.73	44.8	10.6
31	Luvisol	arable	since 1993	6.7	1.40	0.14	1.29	28	157	53	1.42	1.84	24.1	0.171	25.3	5.24	773.7	32
32	Gleysol	arable	since 1993	6.1	1.71	0.18	1.55	33	190	56	0.82	1.36	26.5	0.136	25.1	6.43	682.8	8.6
33	Stagnosol	grassland	since 1993	3.9	3.15	0.33	3.03	74	635	111	0.96	3.11	27.8	0.088	30.8	14.16	36.6	12
34	Luvisol	grassland	protected area	4.7	2.81	0.36	3.18	60	271	75	1.62	2.65	22.8	0.11	30.7	5.46	23.4	8.8
35	Planosol	grassland	protected area	4.4	3.76	0.44	4.11	48	712	145	1.44	3.16	23.1	0.078	33.2	11.4	0	13.9
36	Leptosol	grassland	protected area	7.4	4.39	0.35	2.43	83	432	91	1.64	1.48	19.3	0.068	36.1	7.53	312.4	35.1
37	Luvisol	grassland	protected area	3.2	1.99	0.15	1.86	69	115	14	0.62	0.93	2.1	0.136	42.1	0.73	0	2.7

Table S 2. List of soils used for verification including some properties. The coordinates of monitoring plots belong to the Czech Ministry of Agriculture and cannot be published. Data about land use of sampled plots is available since 1993 when the regular basal soil monitoring of the Czech Republic started.

Plot	Land use	Soil type	History	pH (1M KC SOC)	TN	Cox	Cext	Cbio	Nbio	RES	RB	RS	μ	tpeakmax	AMO	SNA	URE	
38	arable	Regosol	since 1993	6,8	0,80	0,08	0,79	45	129	37	0,98	2,41	27,84	0,157	22,5	1,74	71	2,52
39	arable	Luvisol	since 1993	6,3	1,63	0,16	1,56	39	161	40	0,61	1,23	20,71	0,128	27,9	3,54	757	18,28
40	arable	Chernozem	since 1993	7,0	2,44	0,24	2,41	72	385	97	1,46	1,95	35,53	0,145	21,7	1,80	1761	68,47
41	grassland	Cambisol	since 1993	5,3	3,59	0,31	2,94	58	454	88	1,25	2,70	34,42	0,076	29,1	10,90	140	9,84
42	grassland	Cambisol	since 1993	4,9	3,36	0,35	3,40	52	935	152	1,89	5,34	46,98	0,054	27,3	9,19	82	11,42
43	arable	Luvisol	since 1993	5,3	1,66	0,17	1,73	42	180	42	0,70	1,17	14,26	0,132	30	2,51	394	15,24
44	grassland	Cambisol	since 1993	3,6	2,78	0,28	3,55	123	585	70	1,26	2,44	11,43	0,116	35,1	7,52	13	11,57
45	arable	Fluvisol	since 1993	5,3	2,10	0,22	1,91	35	219	39	0,68	2,15	31,76	0,130	24,3	6,54	633	18,21
46	arable	Phaeozem	since 1993	5,8	2,84	0,32	3,13	55	207	48	0,60	1,16	16,01	0,110	32,5	2,20	960	46,45
47	arable	Luvisol	since 1993	6,0	1,98	0,23	1,85	46	252	42	0,55	1,71	24,84	0,178	23,1	7,56	840	26,67
48	grassland	Planosol	since 1993	4,9	3,95	0,39	3,86	81	496	96	1,38	4,26	44,67	0,069	24,8	12,56	232	14,45
49	arable	Fluvisol	since 1993	7,1	2,08	0,23	1,99	55	374	105	1,67	2,77	46,35	0,165	19,6	10,82	2594	58,74
50	arable	Luvisol	since 1993	5,6	2,04	0,22	2,01	46	264	67	0,91	1,51	24,65	0,127	27,3	6,41	556	8,03
51	arable	Stagnosol	since 1993	6,3	1,38	0,16	1,31	29	159	46	0,52	0,85	20,46	0,160	25,1	5,92	902	28,35
52	grassland	Regosol	since 1993	4,9	2,96	0,30	2,94	92	377	71	0,83	2,39	24,72	0,152	27,1	8,82	300	16,46

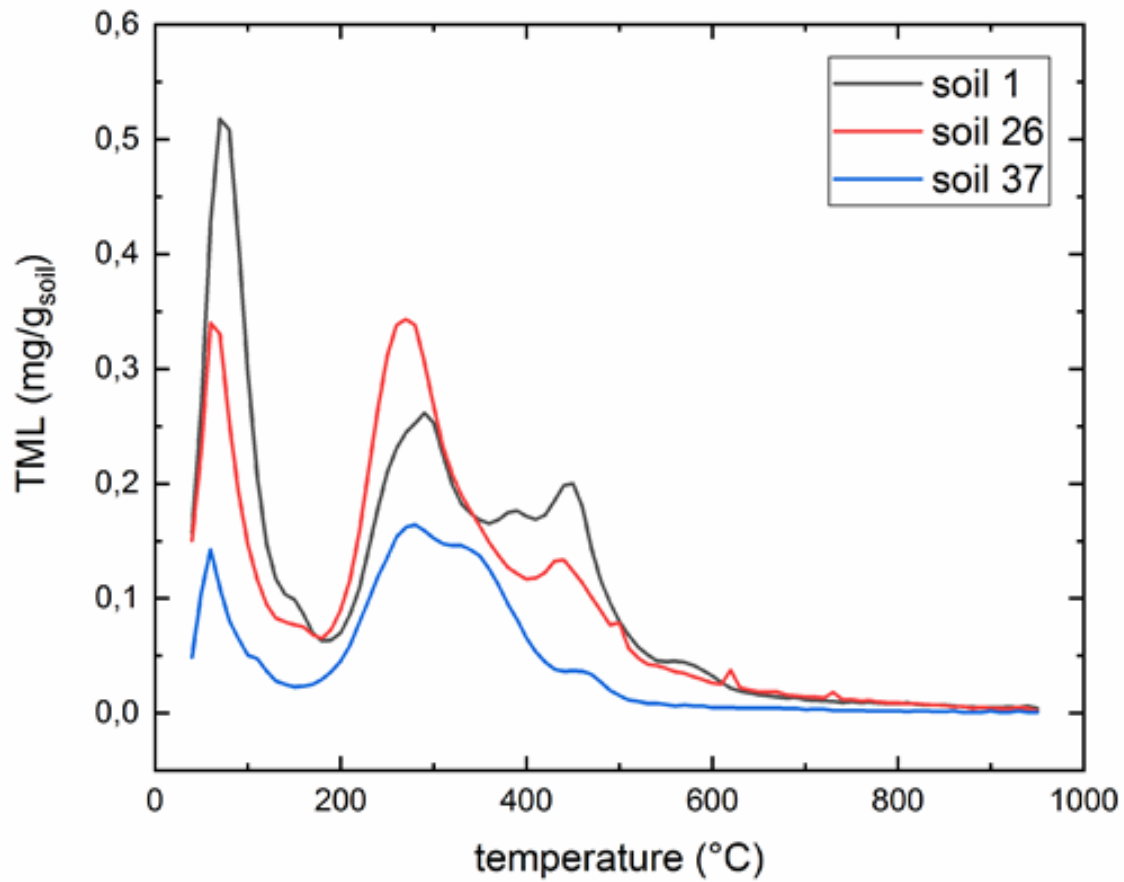


Figure S 1. A record of TML on temperature for soils 1, 26 and 37 (Adopted from (Kučerík et al., 2020)).

References

Kučerík, J., Svatoň, K., Malý, S., Brtnický, M., Doležalová-Weismannová, H., Demyan, M. S., Siewert, C., and Tokarski, D.: Determination of soil properties using thermogravimetry under laboratory conditions, *European Journal of Soil Science*, 71, 415–419, <https://doi.org/10.1111/ejss.12877>, 2020.