Table S1. pH value of each point in DLS

Sample number	Soil depth (cm)	pH		Mean value	Standard deviation
		1	2		
1	0-20	5.39	5.41	5.4	0.01
	20-40	5.13	5.11	5.12	0.01
	40-60	4.98	4.96	4.97	0.01
2	0-20	4.48	4.48	4.48	0.00
	20-40	4.44	4.42	4.43	0.01
	40-60	4.36	4.39	4.38	0.02
3	0-20	4.39	4.39	4.39	0.00
	20-40	4.29	4.31	4.3	0.01
	40-60	4.27	4.29	4.28	0.01
4	0-20	5.13	5.15	5.14	0.01
	20-40	5.09	5.11	5.1	0.01
	40-60	5.03	5.00	5.02	0.02
5	0-20	4.52	4.50	4.51	0.01
	20-40	4.47	4.49	4.48	0.01
	40-60	4.48	4.46	4.47	0.01
6	0-20	4.51	4.53	4.52	0.01
	20-40	4.38	4.38	4.38	0.00
	40-60	4.35	4.35	4.35	0.00
7	0-20	4.48	4.48	4.38	0.00
	20-40	4.35	4.33	4.34	0.01
	40-60	4.28	4.26	4.27	0.01
8	0-20	4.37	4.39	4.38	0.01
	20-40	4.32	4.35	4.34	0.02
	40-60	4.29	4.31	4.3	0.01
9	0-20	4.39	4.41	4.4	0.01
	20-40	4.36	4.39	4.38	0.02
	40-60	4.30	4.28	4.29	0.01
10	0-20	4.51	4.53	4.52	0.01
	20-40	4.30	4.28	4.29	0.01
	40-60	4.26	4.24	4.25	0.01
11	0-20	5.00	5.00	5	0.00
	20-40	4.46	4.43	4.45	0.02
	40-60	4.40	4.43	4.42	0.02
12	0-20	4.56	4.58	4.57	0.01
	20-40	4.54	4.54	4.54	0.00
	40-60	4.51	4.49	4.5	0.01
13	0-20	5.10	5.12	5.11	0.01
	20-40	4.92	4.94	4.93	0.01
	40-60	4.80	4.82	4.81	0.01

	0-20	4.93	4.95	4.94	0.01
14	20-40	4.43	4.45	4.44	0.01
	40-60	4.41	4.39	4.4	0.01
	0-20	4.52	4.54	4.53	0.01
15	20-40	4.38	4.41	4.4	0.02
	40-60	4.32	4.32	4.32	0.00
	0-20	5.31	5.34	5.33	0.02
16	20-40	5.25	5.23	5.24	0.01
	40-60	5.22	5.24	5.23	0.01
	0-20	5.33	5.31	5.32	0.01
17	20-40	4.95	4.93	4.94	0.01
	40-60	4.63	4.63	4.63	0.00
	0-20	4.88	4.86	4.87	0.01
18	20-40	4.70	4.72	4.71	0.01
	40-60	4.69	4.66	4.68	0.02

Table S2. pH value of each point in WYL

Sample number	Soil depth (cm)	pH		Mean value	Standard deviation
		1	2		
	0-20	4.62	4.62	4.62	0.00
1	20-40	4.90	4.92	4.91	0.01
	40-60	4.96	4.95	4.96	0.01
	0-20	4.84	4.83	4.84	0.01
2	20-40	4.86	4.87	4.86	0.01
	40-60	5.04	5.03	5.04	0.01
	0-20	5.17	5.17	5.17	0.00
3	20-40	5.08	5.09	5.08	0.01
	40-60	5.01	4.99	5.00	0.01
	0-20	5.38	5.36	5.37	0.01
4	20-40	5.03	5.04	5.04	0.01
	40-60	4.70	4.70	4.70	0.00
	0-20	4.97	4.99	4.98	0.01
5	20-40	4.85	4.86	4.86	0.01
	40-60	4.97	4.96	4.96	0.01
	0-20	4.97	4.99	4.98	0.01
6	20-40	5.58	5.56	5.57	0.01
	40-60	5.60	5.62	5.61	0.01
	0-20	4.73	4.71	4.72	0.01
7	20-40	4.67	4.67	4.67	0.00
	40-60	4.54	4.55	4.54	0.01
8	0-20	4.18	4.17	4.18	0.01

	20-40	4.14	4.15	4.14	0.01
	40-60	4.28	4.29	4.28	0.01
	0-20	4.24	4.24	4.24	0.00
9	20-40	4.54	4.55	4.54	0.01
	40-60	4.62	4.63	4.62	0.01
	0-20	5.11	5.13	5.12	0.01
10	20-40	4.67	4.65	4.66	0.01
	40-60	4.77	4.78	4.78	0.01
	0-20	4.70	4.71	4.70	0.01
11	20-40	4.79	4.80	4.80	0.01
	40-60	4.71	4.71	4.71	0.00
	0-20	4.75	4.77	4.76	0.01
12	20-40	4.76	4.78	4.77	0.01
	40-60	5.06	5.08	5.07	0.01

Table S3. Exchangeable acidity at each point of DLS

Sample number	Soil depth (cm)	Exchangeable acidity (cmol/kg)		Mean value	Standard deviation
		1	2		
	0-20	3.15	4.18	3.66	0.73
1	20-40	4.95	5.74	5.35	0.56
	40-60	5.36	4.57	4.96	0.56
	0-20	12.81	11.87	12.34	0.67
2	20-40	6.33	5.57	5.95	0.54
	40-60	6.02	6.98	6.50	0.68
	0-20	10.79	10.03	10.41	0.54
3	20-40	7.98	7.12	7.55	0.61
	40-60	7.67	6.81	7.24	0.61
	0-20	3.58	2.91	3.24	0.48
4	20-40	3.26	2.49	2.87	0.55
	40-60	4.48	3.71	4.10	0.54
	0-20	3.47	2.55	3.01	0.65
5	20-40	2.41	1.62	2.02	0.56
	40-60	4.70	5.57	5.14	0.61
	0-20	5.06	5.92	5.49	0.61
6	20-40	9.29	10.08	9.69	0.56
	40-60	10.55	11.38	10.96	0.59
	0-20	8.33	9.29	8.81	0.68
7	20-40	4.13	4.99	4.56	0.61
	40-60	4.60	5.63	5.12	0.73
8	0-20	8.98	8.19	8.58	0.56

	20-40	7.68	6.89	7.28	0.56
	40-60	9.73	9.08	9.41	0.46
	0-20	7.89	7.09	7.49	0.56
9	20-40	6.27	7.21	6.74	0.66
	40-60	7.19	7.58	7.39	0.27
	0-20	7.59	8.51	8.05	0.65
10	20-40	7.02	7.87	7.44	0.60
	40-60	7.96	7.20	7.58	0.54
	0-20	9.21	8.46	8.83	0.53
11	20-40	8.01	7.19	7.60	0.58
	40-60	9.16	8.31	8.74	0.60
	0-20	8.88	8.05	8.46	0.59
12	20-40	7.03	6.01	6.52	0.72
	40-60	7.42	6.48	6.95	0.67
	0-20	3.01	3.69	3.35	0.48
13	20-40	2.99	3.71	3.35	0.51
	40-60	4.11	4.82	4.46	0.51
	0-20	6.31	7.19	6.75	0.62
14	20-40	5.08	4.20	4.64	0.62
	40-60	6.29	5.42	5.85	0.62
	0-20	10.73	9.86	10.30	0.61
15	20-40	9.00	8.09	8.54	0.65
	40-60	8.05	7.10	7.57	0.67
	0-20	1.58	1.40	1.49	0.13
16	20-40	0.60	0.85	0.72	0.18
	40-60	0.84	0.97	0.90	0.09
	0-20	2.91	2.02	2.47	0.63
17	20-40	4.76	3.83	4.29	0.66
	40-60	8.06	7.40	7.73	0.46
	0-20	8.74	9.60	9.17	0.61
18	20-40	8.26	9.13	8.70	0.61
	40-60	7.94	8.79	8.37	0.60

Table S4. Exchangeable acidity at each point of WYL

Sample number	Soil depth (cm)	Exchangeable acidity (cmol/kg)		Mean value	Standard deviation
		1	2		
	0-20	5.33	4.90	5.11	0.31
1	20-40	5.78	5.21	5.49	0.41
	40-60	4.22	4.43	4.32	0.15
2	0-20	3.14	3.54	3.34	0.28

	20-40	2.47	2.52	2.49	0.03
	40-60	2.67	3.05	2.86	0.27
	0-20	1.93	2.04	1.98	0.08
3	20-40	1.41	1.57	1.49	0.11
	40-60	1.75	1.89	1.82	0.09
	0-20	2.42	2.39	2.41	0.02
4	20-40	3.58	3.52	3.55	0.04
	40-60	3.60	3.72	3.66	0.09
	0-20	2.90	2.81	2.85	0.07
5	20-40	4.08	3.88	3.98	0.15
	40-60	3.01	3.24	3.12	0.16
	0-20	3.96	4.09	4.03	0.09
6	20-40	3.43	3.30	3.36	0.09
	40-60	3.17	3.34	3.26	0.12
	0-20	7.74	6.02	6.88	1.22
7	20-40	6.76	6.05	6.41	0.50
	40-60	4.66	4.36	4.51	0.21
	0-20	11.52	11.40	11.46	0.08
8	20-40	8.11	8.33	8.22	0.16
	40-60	5.70	6.57	6.13	0.61
	0-20	8.95	9.07	9.01	0.08
9	20-40	6.83	6.73	6.78	0.07
	40-60	6.48	5.97	6.22	0.36
	0-20	8.24	7.90	8.07	0.24
10	20-40	5.10	5.04	5.07	0.04
	40-60	3.07	3.26	3.16	0.13
	0-20	5.21	4.81	5.01	0.28
11	20-40	2.87	3.37	3.12	0.36
	40-60	2.42	2.30	2.36	0.09
	0-20	8.05	6.59	7.32	1.04
12	20-40	6.74	4.80	5.77	1.37
	40-60	5.37	4.39	4.88	0.69

Table S5. Hydrolytic acidity at each point of DLS

Sample number	Soil depth (cm)	Hydrolytic acidity (cmol/kg)		Mean value	Standard deviation
		1	2		
	0-20	5.93	6.48	6.21	0.39
1	20-40	6.73	7.21	6.97	0.34
	40-60	6.02	6.89	6.45	0.62
2	0-20	13.6	13.06	13.33	0.38

	20-40	7.89	8.23	8.06	0.24
	40-60	10.54	10.63	10.58	0.06
	0-20	19.23	18.52	18.87	0.50
3	20-40	8.68	9.51	9.09	0.59
	40-60	9.64	9.88	9.76	0.17
	0-20	3.62	3.28	3.45	0.24
4	20-40	3.47	4.44	3.96	0.69
	40-60	5.04	4.95	4.99	0.06
	0-20	4.8	5.34	5.07	0.38
5	20-40	5.59	5.52	5.55	0.05
	40-60	5.65	5.62	5.63	0.02
	0-20	10.3	10.99	10.64	0.49
6	20-40	10.96	11.36	11.16	0.28
	40-60	13.91	14.67	14.29	0.54
	0-20	11.12	11.46	11.29	0.24
7	20-40	4.95	5.44	5.2	0.35
	40-60	6.32	6.71	6.52	0.28
	0-20	9.76	9.55	9.65	0.15
8	20-40	9.52	9.42	9.47	0.07
	40-60	10.37	10.43	10.4	0.04
	0-20	8.96	9.13	9.05	0.12
9	20-40	7.96	7.41	7.69	0.39
	40-60	7.33	7.65	7.49	0.23
	0-20	9.29	10.3	9.79	0.71
10	20-40	8.99	8.45	8.72	0.38
	40-60	8.97	9.44	9.21	0.33
	0-20	10.52	10.65	10.58	0.09
11	20-40	9.76	9.06	9.41	0.49
	40-60	9.92	10.95	10.43	0.73
	0-20	11.29	11.44	11.37	0.11
12	20-40	8.64	8.22	8.43	0.30
	40-60	11.19	10.72	10.95	0.33
	0-20	3.25	4.4	3.82	0.81
13	20-40	4.89	4.74	4.81	0.11
	40-60	4.94	4.88	4.91	0.04
	0-20	7.75	8.05	7.9	0.21
14	20-40	6.9	7.16	7.03	0.18
	40-60	7.41	7.77	7.59	0.25
	0-20	15.21	15.57	15.39	0.25
15	20-40	10.42	11.3	10.86	0.62
	40-60	11.14	10.03	10.59	0.78
	0-20	2.23	1.65	1.94	0.41
16	20-40	1.89	2.27	2.08	0.27
	40-60	2.21	2.44	2.32	0.16

	0-20	3.4	4.04	3.72	0.45
17	20-40	5.9	6.8	6.35	0.64
	40-60	8.3	9.09	8.7	0.56
	0-20	9.36	9.87	9.61	0.36
18	20-40	9.01	9.67	9.34	0.47
	40-60	8.81	9.2	9.01	0.28

Table S6. Hydrolytic acidity at each point of WYL

Sample number	Soil depth (cm)	Hydrolytic acidity (cmol/kg)		Mean value	Standard deviation
		1	2		
	0-20	12.56	13.42	12.99	0.61
1	20-40	12.23	12.19	12.21	0.03
	40-60	12.25	12.02	12.13	0.16
	0-20	10.11	10.30	10.21	0.13
2	20-40	8.59	8.29	8.44	0.21
	40-60	6.29	6.52	6.40	0.16
	0-20	6.38	6.34	6.36	0.03
3	20-40	4.10	4.15	4.13	0.04
	40-60	4.16	4.56	4.36	0.28
	0-20	10.62	10.97	10.79	0.25
4	20-40	9.38	9.39	9.39	0.01
	40-60	11.95	11.35	11.65	0.42
	0-20	9.43	9.56	9.49	0.09
5	20-40	9.10	9.12	9.11	0.01
	40-60	9.47	9.53	9.50	0.04
	0-20	4.35	4.28	4.31	0.05
6	20-40	3.51	3.81	3.66	0.22
	40-60	3.92	4.05	3.98	0.09
	0-20	15.31	14.53	14.92	0.55
7	20-40	12.85	13.21	13.03	0.26
	40-60	9.81	9.28	9.55	0.38
	0-20	21.26	20.74	21.00	0.36
8	20-40	15.74	15.95	15.85	0.15
	40-60	10.95	10.99	10.97	0.03
	0-20	16.19	16.39	16.29	0.15
9	20-40	12.66	12.02	12.34	0.45
	40-60	10.63	10.41	10.52	0.15
	0-20	15.80	15.89	15.85	0.06
10	20-40	10.25	10.16	10.21	0.06
	40-60	7.37	6.98	7.18	0.28

	0-20	7.63	7.58	7.60	0.04
11	20-40	4.21	3.98	4.09	0.16
	40-60	2.89	3.23	3.06	0.24
	0-20	10.24	10.52	10.38	0.20
12	20-40	9.25	9.72	9.48	0.34
	40-60	9.56	9.54	9.55	0.01

Table S7. Active heavy metal data of different samples from DLS

Cr (mg/kg)	Mn (mg/kg)	Ni (mg/kg)	Cd (mg/kg)	Pb (mg/kg)
0.025	15.959	0.019	0.005	0.113
0.023	16.204	0.036	0.003	0.105
0.025	15.582	0.037	0.004	0.118
0.028	27.265	0.041	0.002	0.221
0.026	44.726	0.015	0.004	0.078
0.026	39.983	0.027	0.006	0.042
0.028	69.831	0.095	0.005	0.313
0.023	8.159	0.024	0.002	0.190
0.057	11.430	0.033	0.002	0.156
0.045	14.961	0.051	0.018	0.146
0.043	13.569	0.033	0.006	0.124
0.057	17.371	0.018	0.004	0.112
0.034	29.478	0.049	0.018	0.085
0.049	7.929	0.034	0.018	0.115
0.051	7.380	0.020	0.009	0.115
0.028	2.947	0.039	0.015	0.318
0.023	2.240	0.019	0.005	0.092
0.026	3.118	0.012	0.006	0.077
0.036	36.847	0.017	0.019	0.125
0.030	26.342	0.010	0.018	0.181
0.030	29.241	0.010	0.018	0.154
0.051	2.518	0.041	0.013	0.639
0.038	4.555	0.014	0.016	0.406
0.030	4.181	0.062	0.011	0.376
0.034	16.392	0.027	0.023	0.235
0.057	7.922	0.020	0.020	0.171
0.028	22.321	0.073	0.023	0.127
0.041	33.075	0.050	0.027	0.420
0.028	19.230	0.075	0.026	0.396
0.051	5.627	0.019	0.008	0.165
0.036	19.081	0.063	0.019	0.283
0.041	9.133	0.045	0.015	0.379

0.034	8.452	0.026	0.008	0.496
0.038	38.068	0.100	0.071	0.484
0.028	7.694	0.047	0.030	0.529
0.032	7.216	0.048	0.012	0.527
0.040	12.261	0.069	0.010	0.435
0.036	20.622	0.042	0.007	0.199
0.040	8.935	0.034	0.009	0.207
0.053	9.418	0.033	0.009	0.696
0.038	5.593	0.111	0.012	0.675
0.040	4.050	0.404	0.006	0.642
0.243	38.131	0.283	0.024	0.319
0.034	36.254	0.012	0.003	0.190
0.030	52.350	0.011	0.005	0.199
0.032	45.996	0.016	0.013	0.128
0.026	32.201	0.044	0.015	0.136
0.026	25.072	0.047	0.015	0.108
0.030	56.752	0.110	0.022	0.029
0.025	27.104	0.047	0.042	0.541
0.032	17.134	0.115	0.004	0.343
0.021	54.744	0.082	0.026	1.830
0.034	34.902	0.517	0.015	1.904
0.156	8.770	0.008	0.002	0.785

Table S8. Active heavy metal data of different samples from WYL

Cr (mg/kg)	Mn (mg/kg)	Ni (mg/kg)	Cd (mg/kg)	Pb (mg/kg)
0.315	40.749	0.234	0.112	0.233
0.075	19.376	0.122	0.072	0.272
0.055	17.705	0.053	0.064	0.204
0.050	3.051	0.028	0.022	0.135
0.066	2.730	0.039	0.005	0.143
0.049	5.047	0.021	0.005	0.078
0.063	11.624	0.072	0.039	0.223
0.049	3.822	0.023	0.015	0.115
0.047	6.734	0.016	0.007	0.058
0.047	3.535	0.033	0.020	0.103
0.047	3.132	0.032	0.016	0.132
0.030	4.765	0.034	0.016	0.190
0.022	1.295	0.051	0.022	0.470
0.017	2.790	0.041	0.009	0.251
0.018	2.180	0.033	0.007	0.257
0.018	67.029	0.041	0.139	0.113
0.036	23.380	0.104	0.117	0.118

0.041	19.701	0.037	0.082	0.108
0.035	10.182	0.092	0.033	0.768
0.008	5.036	0.055	0.016	0.250
0.019	1.293	0.014	0.008	0.254
0.020	5.188	0.111	0.037	1.222
0.016	1.843	0.027	0.018	0.727
0.072	4.521	0.057	0.030	1.768
0.074	4.075	0.056	0.029	0.770
0.016	9.734	0.108	0.011	0.560
0.015	4.932	0.028	0.022	0.658
0.016	5.271	0.085	0.042	0.487
0.003	5.489	0.027	0.019	0.159
0.003	4.035	0.044	0.011	0.136
0.003	9.411	0.070	0.027	0.309
0.007	65.063	0.051	0.012	0.232
0.006	20.804	0.005	0.007	0.352
0.003	2.606	0.059	0.020	0.109
0.002	1.076	0.016	0.004	0.103
0.004	0.501	0.001	0.001	0.086
0.050	3.943	0.025	0.020	0.058
0.050	2.598	0.087	0.031	0.041
0.063	24.583	0.359	0.079	0.329
0.047	18.785	0.199	0.045	0.073
0.047	5.552	0.126	0.070	0.327
0.047	5.108	0.117	0.028	0.389
0.017	4.809	0.054	0.027	0.208
0.017	8.127	0.059	0.021	0.181
0.020	16.259	0.031	0.024	0.029
0.023	35.153	0.022	0.017	0.162
0.049	52.027	0.042	0.068	0.219
0.025	36.685	0.049	0.086	0.390
0.016	6.742	0.115	0.060	0.545



Figure S1. Photographs of soil profiles of portions of DLS (left) and WYL (right)