

Downstream distribution and post-depositional mobilization of cadmium in alluvial soils – Supplementary material

Table S1 Lambert-72 coordinates of the sampling locations

Profile	X	Y	River, riverbank, distance ¹
Site I			
GB1a	202470	192730	Grote Beek, L, 1m
GB1b	202670	192450	Grote Beek, L, 1 m
GB1c	202640	192680	Grote Beek, L, 3 m
GB2	202670	192430	Grote Beek, L, 25 m
GB3	202700	192750	Grote Beek, L, 50 m
L ²	202650	192670	Grote Beek, R, 3 m
M ²	202640	192670	Grote Beek, R, 25 m
Site II			
ZW1	196340	188840	Zwart Water, R, 1m
ZW2	196340	188865	Zwart Water, R, 25 m
ZW3	196340	188890	Zwart Water, R, 50 m
Site III			
HU1	193000	189025	Hulpe, L, 1 m
HU2	193000	189010	Hulpe, L, 10 m
HU3	193000	188999	Hulpe, L, 25 m
HU4	193000	188976	Hulpe, L, 50 m

¹L = left riverbank, R = right riverbank, distance = distance from river

² Data from Cappuyns and Swennen [42]

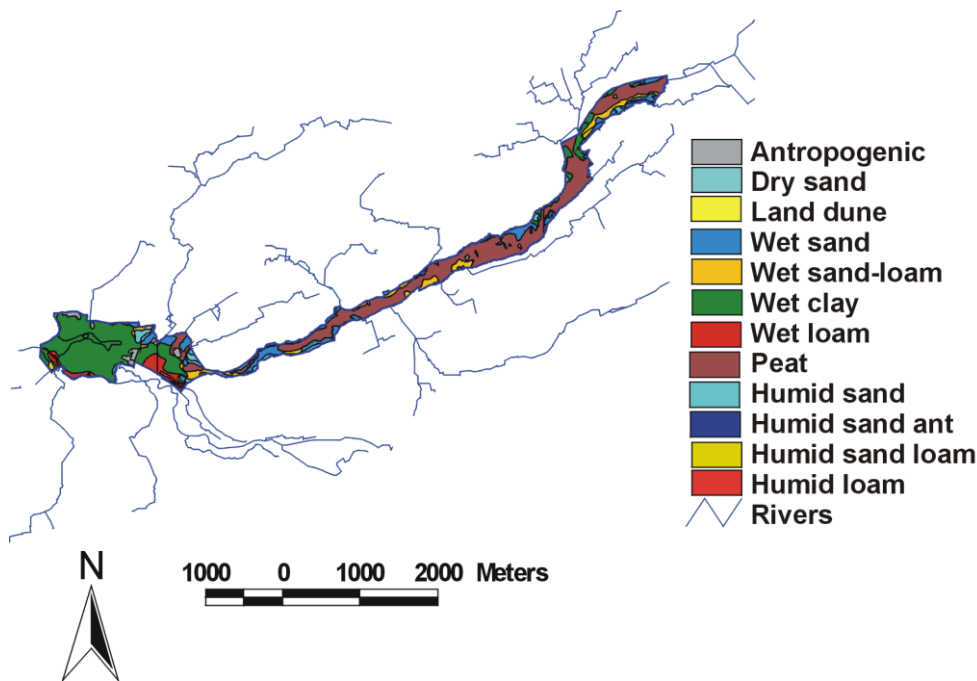
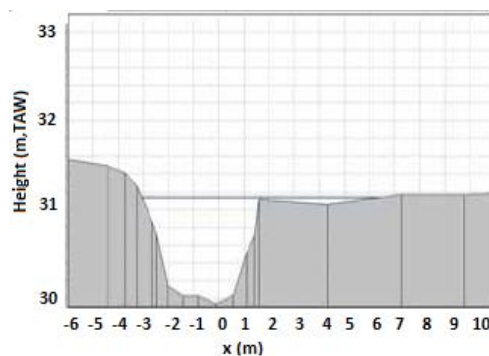


Figure S1 Occurrence of different soil types along the Winterbeek

Figure S2 Cross section of the Grote Beek (Site I). TAW stands for "Tweede Algemeen Waterpassing", The Second General Water Adjustment, which is the reference height against which height measurements are expressed in Belgium.



Modified after Ministry of the Flemish Community, Department of Water (2002). De Winterbeek Computermodellering als methode, hoogwaterbeheer als doel. [Winter Brook Computer modeling as method, flood management as goal]. D/2002/3241/039.

Table S2 Profile descriptions and soil characteristics

Site I	Grote Beek: Profile GB1a	OC %	CEC cmol/kg	clay %	silt %	sand %
Depth	Description					
0-20 cm	10YR3/3 (dark brown); fine roots; crumb structure; occurrence of plastic grains	8.8	19.2	NA	NA	NA
20-40 cm	Matrix: 10YR3/3 (dark brown); rust (7.5YR5/6 (bright brown)); fine roots; crumb structure; occurrence of plastic grains	6.9	18.0	NA	NA	NA
40-60 cm	Matrix:10YR2/2 (brownish black); numerous rust spots (7.5YR4/6, brown); some green (10Y6/2, olive gray) spots, loam; crumb structure; occurrence of plastic grains; wavy boundary	6.9	18.0	NA	NA	NA
60-80 cm	Matrix: 7.5YR3/3 (dark brown); numerous rust spots (5YR5/8, bright reddish brown); loam; sticky; occurrence of plastic grains	13.1	40.4	NA	NA	NA
80-100 cm	Matrix: 5YR2/1 (brownish black); rust (7.5YR5/6, bright brown); lenses of green (7.5GY5/1,dark greenish gray) sand; loam; sticky	12.0	38.0	NA	NA	NA
100-120 cm	7.5GY4/1 (dark greenish gray); fine sand; loose structure	0.5	11.2	NA	NA	NA
120-140 cm	7.5GY4/1 (dark greenish gray); fine sand; loose structure	0.5	11.0	NA	NA	NA
140-175 cm	2.5GY4/1 (dark olive gray); coarse sand; loose structure	0.5	10.0	NA	NA	NA
Site I	Grote Beek: Profile GB1b	OC %	CEC cmol/kg	clay %	silt %	sand %
Depth	Description					
0-13 cm	10YR 2/1 (black); sandy loam; crumb structure, few fine to coarse roots; clear smooth boundary	4.6	20.5	17	23	60
13-26 cm	Matrix: 7.5YR 2/2 (brownish black), light yellow (2.5Y7/4) and yellowish brown (2.5Y5/3) spots ; sandy loam; crumb structure; few fine roots; regular boundary	6.5	26.3	21	29	50
26-44 cm	Matrix: 7.5YR3/2 (brownish black), rust spots (5YR4/8); few fine roots; silty loam	8.1	23.7	17	24	59
44-57 cm	Matrix 7.5YR4/6 (brown), olive gray (2.5Y6/4) spots and rust spots (7.5YR5/6), no roots, compact structure; sandy loam	0.4	9.9	17	16	67
57-69 cm	Matrix brownish black (7.5YR2/2); rust (7.5YR5/8) (2-20%) and olive gray (10Y6/2) spots; no roots, sandy loam	1.7	16.8	16	31	53
69-82 cm	Matrix: 10Y4/2 (grayish olive), rust (7.5YR3/1); friable; sand.	0.2	8.1	11	14	75
82-91 cm	5GY 4/1; friable; sand	0.2	10.6	21	17	62
Site I	Grote Beek: Profile GB2	OC %	CEC cmol/kg			
Depth	Description					
0-30 cm	Matrix: 7.5 YR2/1 (black); rust nodules (5YR4/6, reddish brown); loam, elevated organic carbon content			17.1		34.3
30-50 cm	Matrix: 7.5 YR2/1 (black); rust nodules (7.5YR5/8, bright brown and 5YR4/4, dull reddish brown); loam, elevated organic carbon content			27.4		46.6
50-75 cm	7.5 YR2/1 (black); loam, elevated organic carbon content			12.2		28.1
75-100 cm	7.5 YR2/1 (black); loam, elevated organic carbon content			17.9		33.0
100-120 cm	7.5 YR2/1 (black); loam, elevated organic carbon content. Underneath this layer: green sand (7.5GY4/1, dark greenish gray)			10.8		27.9
Site I	Grote Beek: Profile GB3	OC %	CEC cmol/kg			
Depth	Description					
0-25 cm	Matrix: 7.5 YR2/1 (black); few rust nodules (5YR4/6, reddish brown); elevated organic carbon content			35.4		42.3
25-50 cm	Matrix: 7.5 YR2/1 (black); few rust nodules (5YR4/6, reddish brown); elevated organic carbon content			32.6		39.2
50-75 cm	7.5GY4.5/1 (dark greenish gray); coarse sand			4.5		12.0
75-100 cm	7.5GY4.5/1 (dark greenish gray); coarse sand			1.3		8.3
Site II	Zwart Water: Profile ZW1	OC %	CEC cmol/kg	clay %	silt %	sand %
Depth	Description					
0-10	Matrix: 7.5YR2/2 (brownish-black); rust (5YR4/8), few fine roots; crumb structure; sandy loam; clear abrupt boundary	3.5	13.5	10	21	69
10-20	5YR3/6 (dark reddish brown), very few fine roots; compact; sandy loam	1.5	9.8	7	17	76
20-27	Matrix: 5YR2/3 (very dark reddish brown), rust (5YR5/6); very few fine roots; friable, loamy sand	1.0	9.0	8	18	74
27-39	Matrix: 5YR4/1 (brownish gray), rust (7.5YR5/6), very few fine roots; loamy sand; regular boundary	0.5	7.2	6	16	78
39-45 cm	Matrix: 7.5YR6/8 (orange), rust 5YR3/6 (red); very few fine roots; friable; sand	0.7	5.7	4	13	83
45-58 cm	Matrix: 7.5YR4/6 (brown), rust 5YR3/6 (red); friable; sand	8.2	6.6	3	7	90
58-63 cm	Matrix: 7.5 YR2/2 (brownish black); rust 7.5 YR3/6 and green (10GY6/1) spots; sand; abrupt boundary	15.4	15.6	NA	NA	NA
63-83 cm	Matrix: 10 YR2/2 (brownish black); few rust spots (5YR4/8) and blue spots of vivianite; loamy silt	8.8	15.5	7	38	55
83-95 cm	Matrix: 10 YR2/1 (black); few rust spots (7.5YR5/8) and blue spots of vivianite; wood fragments; loamy silt	1.6	14.7	18	49	33

Site II	Zwart Water: Profile ZW2	OC	CEC	clay	silt	sand
Depth	Description	%	cmol/kg	%	%	%
0-3 cm	Matrix: 10Y2/1 (black); rust (7.5YR4/6); crumb structure, fine to coarse roots; loamy sand; clear regular boundary	6.8	17.3	7	10	83
3-15 cm	Matrix: 10YR2/2 (brownish black); diffuse rust spots (7.5YR4/6); very few fine roots; crumb structure; loamy sand	4.5	9.0	8	14	78
15-29 cm	Matrix: 7.5Y3/1 (olive black); few rust spots (7.5YR4/6); very few fine roots; loamy sand	1.8	4.1	4	14	82
29-44 cm	7.5GY3/1 (dark greenish gray); few rust spots (7.5YR4/4); no rust; friable; loamy sand; clear regular boundary	1.4	4.5	7	17	76
44-49 cm	N2/0 (black) and 7.5 YR5/4 (dull brown); pieces of wood; loam	14.9	18.0	NA	NA	NA
49-61 cm	7.5YR2/1 (black); blue spots of vivianite; pieces of wood; sticky; loamy sand; diffuse boundary	15.7	20.7	NA	NA	NA
61-76 cm	N1.5/0 (black); blue spots of vivianite; pieces of wood; sticky; loamy sand	17.6	22.5	5	17	78
Site II	Zwart Water: Profile ZW3	OC	CEC	clay	silt	sand
Depth	Description	%	cmol/kg	%	%	%
0-8 cm	Matrix: 7.5YR2/1 (black); rust (5YR4/8); numerous fine roots; crumb structure; sandy loam; wavy boundary	4.6	13.1	11	23	66
8-19 cm	Matrix: 7.5YR2/1 (black); rust (5YR3/1); fine roots; sandy loam; crumb structure	3.1	10.1	19	38	43
15-27 cm	Matrix: 10YR2/2 (brownish black); few rust spots (5YR4/8); very few fine roots; friable; sandy loam	3.6	10.5	NA	NA	NA
27-38 cm	Matrix: 10YR2/2 (brownish black); rust spots (5YR3/1); very few fine roots; friable; sandy loam	9.6	17.5	12	35	53
38-46 cm	Matrix: 10YR2/1 (black); rust spots (5YR5/8); wood fragments; friable; loamy sand	6.2	13.4	13	24	53
46-61 cm	Matrix: 10YR3/3 (brown); rust (5YR3/6) and few spots of vivianite; wood fragments; loose structure; coarse sand	3.9	4.6	3	9	88
61-63 cm	7.5GY 4/1 (dark greenish gray) and 5Y2/1 (black); wood fragments; loose structure; sand	0.4	4.0	13	27	60
Site III	Hulpe: Profile HU1	OC	CEC	clay	silt	sand
Depth	Description	%	cmol/kg	%	%	%
0-10 cm	7.5YR3/3 (dark brown). fine roots. crumb structure. loam	12.9	33.8	39	35	26
10-20 cm	Matrix: 10YR3/4 (dark brown); rust (5YR4/6. reddish brown); crumb structure; loam	11.3	32.8	NA	NA	NA
20-30 cm	Matrix: 5YR2/2 (brownish black); rust (5YR4/6. reddish brown); crumb structure; loam	10.8	29.8	NA	NA	NA
30-47 cm	5YR2/3 (very dark reddish brown); plastic and sticky; loamy clay	8.46	32.2	52	39	9
47-55 cm	5YR2/3 (very dark reddish brown); sticky; loamy clay	7.3	29.7	NA	NA	NA
55-80 cm	7.5YR2/1 (black); sticky; loamy clay	1.53	8.9	NA	NA	NA
Site III	Hulpe: Profile HU2	OC	CEC			
Depth	Description	%	cmol/kg			
0-9 cm	5YR3/2 (dark reddish brown); fine roots; crumble structure; sandy loam	7.23	NA			
9-36 cm	Matrix: 5YR4/4 (dull reddish brown); rust (5YR5/8. bright reddish brown); few roots. crumble structure; sandy loam	1.66	NA			
36-46 cm	Matrix: 10YR3/2 (dark brown); numerous rust spots (5YR5/8. bright reddish brown); sticky; loam; gradual boundary	1.07	NA			
46-64 cm	Matrix: 5YR4/2 (grayish brown); rust (5YR4/6. reddish brown); loamy clay; gradual boundary	0.97	NA			
64-80 cm	Matrix: 5Y4/2 (grayish olive); rust in pores; sticky and plastic; loamy clay	0.80	NA			
80-95 cm	Matrix: 5Y4/3 (dark olive); numerous rust spots (5YR4/6. reddish brown); sticky; clay	0.85	NA			
95-105 cm	Matrix: 5Y3/1 (olive black); few rust spots; plastic and sticky; clay	1.05	NA			
Site III	Hulpe: Profile HU3	OC	CEC			
Depth	Description	%	cmol/kg			
0-10 cm	Matrix: 7.5YR3/2 (brownish black); rust; fine roots; sand. loose structure; gradual boundary	5.35	15.8			
10-30 cm	Matrix: 5YR4/3; rust (bright reddish brown. 5YR5/6); few fine roots; sandy loam; clear boundary	1.14	10.4			
30-52 cm	Matrix: 7.5YR4/3 (brown); numerous rust spots (bright reddish brown. 5YR5/6). blue spots of vivianite; loamy clay. plastic and sticky	1.26	25.8			
52-60 cm	Matrix: 7.5YR4/3 (brown); numerous rust spots rust (bright reddish brown. 5YR5/6). blue spots of vivianite; clay. plastic and sticky	0.79	30.8			
60-70 cm	Matrix: 7.5YR4/6 (brown); numerous rust spots rust (bright reddish brown. 5YR5/8). blue spots of vivianite; clay. plastic and sticky	1.44	22.0			
Site III	Hulpe: Profile HU4	OC	CEC			
Depth	Description	%	cmol/kg			
0-9 cm	7.5YR2/2 (brownish black); sandy loam; crumb structure	5.69	16.4			
9-17 cm	Matrix: 7.5YR4/4 (brown); rust (5YR5/8. bright reddish brown); sandy loam. friable	1.37	10.6			
17-23 cm	Matrix: 7.5YR4/6 (brown); rust (5YR5/8. bright reddish brown); sandy loam; friable	0.4	5.5			
23-100 cm	Matrix: 10YR3/3 (dark brown); rust (5YR56/8. bright reddish brown); blue spots of vivianite; loamy clay	1.34	7.3			

Table S3 : Element composition of soil profiles, Site I

<i>Site I</i>															
Depth	Cr	Ni	Cu	Zn	As	Cd	Pb	Co	Mn	S	Fe	Ca	Al	pH	
cm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%		
<i>Grote Beek, profile GB1a</i>															
<i>Terric Histosol tpto Spodic Regosol, 1 from river</i>															
	0-15	129	62	188	1097	150	16	82	9	520	1600	9.54	3.04	2.63	6.9
	15-30	176	172	109	1166	171	26	59	9	582	994	9.80	3.25	2.59	6.8
	30-45	112	43	110	702	169	22	51	8	434	772	11.57	2.11	2.30	6.8
	45-60	58	41	18	174	261	23	24	4	83	608	13.69	2.99	1.92	6.6
	60-75	57	21	18	163	127	10	16	2	70	599	7.93	3.09	1.92	6.8
	75-90	52	8	4	21	12	0.5	8	2	34	12	2.76	0.49	1.94	7.4
	90-105	53	10	5	21	12	0.6	8	2	45	13	2.83	0.43	1.93	7.2
	105-165	47	7	6	34	17	1.2	8	2	55	12	3.08	0.53	1.82	7.3
<i>Grote Beek, profile GB1b</i>															
<i>1 m from river</i>															
	0-13	104	138	153	2184	158	158	13	8	106	719	5.43	3.10	1.31	6.8
	13-26	142	97	126	1892	181	136	20	5	110	1136	7.97	2.39	1.57	6.4
	26-44	47	14	12	158	92	13	10	3	47	949	7.52	0.92	1.18	5.7
	44-57	32	3	2	31	11	2	4	2	29	557	2.90	0.20	1.21	6.0
	57-69	60	6	3	33	11	12	5	2	35	733	3.28	0.41	1.95	6.0
	69-82	33	2	2	18	7	0.9	4	2	30	185	2.15	0.16	1.36	6.3
	82-120	45	4	2	25	9	1.5	4	3	30	138	3.01	0.24	1.63	7
<i>Grote Beek, profile GB2</i>															
<i>Terric Histosol, 25 m from river</i>															
	0-30	54	18	16	137	496	9	63	2	45	NA	16.29	1.47	1.52	5.3
	30-55	46	18	11	154	247	16	19	2	16	NA	10.63	3.64	1.05	5.3
	55-75	74	11	9	59	30	1.3	8	4	39	NA	3.99	1.50	3.16	4.7
	75-100	57	124	7	72	28	1.0	8	3	54	NA	3.23	1.64	2.34	4.8
	100-125	54	11	6	93	38	1.5	8	3	47	NA	3.33	1.24	2.26	5.1
<i>Grote Beek, profile GB3</i>															
<i>Terric Histosol, 50 m from river</i>															
	0-25	61	21	27	265	101	28	73	3	30	NA	6.57	2.35	1.53	5.5
	25-50	46	25	9	88	26	12	10	4	25	NA	2.58	2.42	1.23	5
	50-75	31	7	3	13	7	0.3	6	2	42	NA	1.21	0.41	1.49	5.2
	75-100	23	5	4	6	4	0.2	6	1	23	NA	1.23	0.15	1.02	5.5

NA = Not analysed

rust
 roots
 vivianite

organic carbon content > 10%
 organic carbon content between 5% and 10%
 organic carbon content < 5%

Table S4 : Element composition of soil profiles, Site II

<i>Site II</i>																
Depth	Cr	Ni	Cu	Zn	As	Cd	Pb	Co	Mn	S	Fe	Ca	Al	P	pH	
cm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	%	%	%		
<i>Zwart Water: Profile ZW1</i>																
<i>Gleyic Cambisol, 1 from river</i>																
0-10	19	4	11	96	40	3	10	3	114	162	7.6	0.24	0.58	0.69	6.6	
10-20	15	3	2	24	12	1	4	3	120	95	11.1	0.17	1.27	0.97	5.7	
20-27	19	4	4	46	30	2	8	3	162	127	5.6	0.14	1.11	0.55	5.5	
27-39	15	2	2	23	38	0.3	6	2	105	67	3.9	0.08	1.11	0.08	5.2	
39-45	10	2	2	8	22	0.2	4	1	41	124	1.8	0.06	0.99	0.03	5.6	
45-58	9	1	2	7	23	0.2	4	2	51	92	2.4	0.06	0.96	0.06	5.6	
58-63	17	2	2	15	179	0.1	5	3	107	296	18.8	0.40	0.89	0.25	NA	
63-83	18	2	2	24	69	0.1	17	3	242	404	23.5	0.57	0.39	1.00	NA	
83-95	10	2	3	16	87	0.1	3	2	117	504	17.7	0.39	0.36	0.36	5.1	
<i>Zwart Water: Profile ZW2</i>																
<i>Eutric Gleysol, 25 m from river</i>																
0-5	16	2	5	48	70	0.9	15	3	124	284	5.8	0.23	0.80	0.13	5.1	
5-15	15	2	3	25	145	0.4	10	2	79	270	9.4	0.19	0.88	0.16	4.4	
15-29	12	1	1	8	24	0.0	4	2	57	30	4.2	0.10	0.73	0.13	4.5	
29-44	13	1	2	13	8	0.1	5	2	38	100	2.0	0.07	0.83	0.06	4.5	
44-49	44	5	6	24	26	0.2	8	4	84	NA	10.0	0.35	2.13	0.23	NA	
49-61	43	4	6	18	18	0.1	8	3	55	NA	5.0	0.41	2.16	0.19	NA	
61-76	16	2	2	50	43	0.1	3	3	100	NA	10.0	0.58	0.42	1.71	NA	
<i>Zwart Water: Profile ZW3</i>																
<i>Eutric Gleysol, 50 m from river</i>																
0-8	18	2	6	44	44	0.8	17	3	100	NA	5.0	0.25	0.92	0.10	5.1	
8-19	15	2	3	22	98	0.3	13	2	108	NA	8.7	0.24	0.96	0.14	4.8	
19-27	15	2	3	18	46	0.2	6	2	79	NA	7.3	0.21	0.77	0.15	4.2	
27-38	26	4	4	19	43	0.2	5	5	90	NA	20.6	0.50	1.20	0.33	NA	
38-46	23	4	4	23	13	0.0	8	3	204	NA	8.3	0.15	0.74	0.14	NA	
46-61	7	2	2	10	3	0.1	3	1	64	NA	1.4	0.05	0.29	0.04	4.1	
61-63	17	3	2	11	2	0.0	6	1	34	NA	0.5	0.06	0.89	0.01	3.9	

NA = Not analysed

rust

roots

vivianite

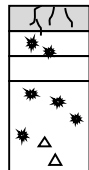
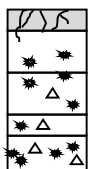
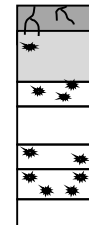
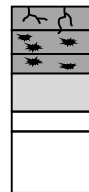
organic carbon content > 10%

organic carbon content between 5% and 10%

organic carbon content < 5%

Table S5 : Element composition of soil profiles, Site III

<i>Site III</i>															
Depth cm	Cr mg/kg	Ni mg/kg	Cu mg/kg	Zn mg/kg	As mg/kg	Cd mg/kg	Pb mg/kg	Co mg/kg	Mn mg/kg	S mg/kg	Fe %	Ca %	Al %	P %	pH
<i>Hulpe, Profile HU1</i>															
<i>1 m from rivier</i>															
0-10	94	22	104	718	71	17	77	5	120	1242	19.2	2.51	1.93	2.85	6.8
10-20	152	28	147	1046	133	34	90	6	296	425	18.1	2.41	2.23	3.31	6.4
20-30	220	35	449	3019	136	77	111	7	387	536	15.9	1.92	2.28	3.64	6.1
30-47	207	45	751	4840	232	159	130	7	521	933	16.1	2.31	2.47	4.45	6.6
47-55	215	57	198	2709	228	163	76	9	510	948	15.8	2.08	2.81	3.67	6.4
55-80	65	18	34	299	39	17	28	6	617	282	4.25	0.51	1.75	0.35	6.5
<i>Hulpe, Profile HU2</i>															
<i>15 m from river</i>															
0-9	48	20	22	160	19	7	59	6	284	665	3.2	0.6	3.79	0.14	5.2
9-36	45	17	12	72	15	1.3	30	8	494	17	4.1	0.4	4.37	0.06	5.7
36-46	47	17	10	56	16	0.4	22	7	460	28	4.0	0.5	4.83	0.07	6.0
46-64	55	19	11	53	18	0.3	27	8	427	30	4.4	0.5	4.89	0.08	6.3
64-80	60	23	13	65	32	0.3	21	8	663	23	4.2	0.5	6.0	0.07	6.4
80-95	72	27	15	71	93	0.2	26	11	725	33	8.2	0.4	5.43	0.11	5.4
95-105	75	28	15	84	46	0.3	29	12	246	18	8.2	0.4	6.27	0.18	5.8
<i>Hulpe, Profile HU3</i>															
<i>25 m from river</i>															
0-10	44	18	19	145	23	6	55	6	140	1319	3.85	0.38	3.01	0.11	5.0
10-30	36	14	10	49	12	0.8	23	6	460	74	2.83	0.29	3.5	0.05	5.3
30-52	82	28	15	75	23	0.4	37	12	746	70	5.8	0.44	6.11	0.06	5.8
52-60	84	31	15	79	19	0.3	36	13	905	26	5.34	0.44	7.23	0.05	6.2
60-70	46	20	8	65	117	0.3	26	12	1413	56	20.5	0.47	3.7	0.42	5.5
<i>Hulpe, Profile HU4</i>															
<i>50 m van river</i>															
0-9	39	19	18	155	20	8	56	6	233	1288	3.12	0.376	2.86	0.11	5.4
9-17	31	13	8	68	12	1.3	23	4	114	56	2.53	0.244	2.71	0.04	5.4
17-23	20	5	4	37	8	0.4	11	2	107	46	1.56	0.29	0.93	0.03	5.8
23-100	74	27	15	96	24	0.5	33	12	870	53	5.94	0.458	6.83	0.06	5.6



- rust
- roots
- vivianite

- organic carbon content > 10%
- organic carbon content between 5% and 10%
- organic carbon content < 5%

Table S6: Element composition of porewater, Site I

Site I														
Depth cm	Cr µg/l	Ni µg/l	Cu µg/l	Zn µg/l	As µg/l	Cd µg/l	Pb µg/l	Co µg/l	Mn µg/l	Al µg/l	Fe mg/l	Ca mg/l	Cl mg/l	MC w%
Grote Beek, Profile GB1a														
0-15	1	43	51	<1	<1	1	<1	1	3	175	2.69	56	909	49.6
15-30	2	56	56	<1	2	1	<1	1	3	203	2.72	57	4543	45.0
30-45	2	33	40	6	<1	3	<1	1	3	231	3.31	72	2068	45.6
45-60	5	66	62	59	3	5	<1	2	66	152	6.18	179	4653	54.2
60-75	6	61	53	47	4	<1	32	2	159	248	6.85	199	7970	54.7
75-90	5	96	95	446	<1	1	<1	2	69	387	7.02	139	4853	20.8
90-105	6	58	61	616	5	3	<1	2	255	528	7.27	194	5766	17.9
105-165	17	138	158	1034	18	6	15	6	235	930	17.22	466	5989	20.5
Grote Beek, Profile GB1b														
0-13	6	99	81	217	23	3	<0	1	10	618	7	36	109	23.5
13-26	<1	269	48	392	<1	80	<0	1	10	337	8	554	912	28.8
26-44	<1	100	99	187	<1	40	25	<0	11	276	35	1154	1638	33.1
44-57	4	320	296	277	<1	7	35	2	31	2126	64	1217	1855	13.5
57-69	<1	84	65	85	<1	4	10	<0	7	580	35	1201	1903	22.7
69-82	<1	73	45	155	<1	9	<0	2	28	458	27	1208	1727	18.9
82-120	1	54	33	93	<1	4	14	<0	20	359	30	1128	1752	22.0
Grote Beek, Profile GB2														
0-30	2	24	31	830	<1	4	<1	1	7	323	2.28	375	872	52.8
30-55	3	16	32	48	<1	1	<1	1	8	152	2.61	531	1033	72.6
55-75	2	39	36	61	<1	3	<1	3	161	254	3.40	590	1699	60.8
75-100	1	26	28	60	<1	1	<1	3	381	97	4.47	557	1479	63.6
100-125	2	33	23	117	<1	1	<1	12	591	108	74.50	522	819	51.0
Grote Beek, Profile GB3														
0-25	1	23	40	<1	<1	1	<1	<1	5	399	2.58	53	254	65.2
25-50	<1	12	25	<1	<1	<1	<1	<1	17	207	1.75	135	316	67.9
50-75	<1	7	23	<1	<1	<1	<1	<1	27	311	1.91	52	193	24.6
75-100	2	22	22	<1	<1	<1	<1	<1	61	708	4.85	26	120	29.3

MC = moisture content in wt%

NA = not analysed

Table S7: Element composition of porewater, Site II

<i>Site II</i>														
Depth cm	Cr µg/l	Ni µg/l	Cu µg/l	Zn µg/l	As µg/l	Cd µg/l	Pb µg/l	Co µg/l	Mn µg/l	Al µg/l	Fe mg/l	Ca mg/l	Cl mg/l	MC w%
Zwart Water, profile ZW1														
0-10	1	19	5	102	3	3	<1	2	255	512	29.2	18	119	27.4
10-20	<1	14	178	<3	<1	<1	10	<1	4	200	<0,1	24	114	23.4
20-27	<1	30	22	1	<1	<1	<1	1	11	277	0.1	29	106	23.4
27-39	<1	9	15	<3	<1	<1	<1	<1	5	213	0.4	8	92	20.8
39-45	<1	14	<1	12	<1	<1	<1	1	16	93	2.9	12	92	18.6
45-58	<1	12	<1	<3	<1	<1	<1	<1	8	139	2.2	7	95	20.6
58-63	<1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
63-83	<1	9	<1	<3	<1	<1	<1	1	2	28	0.6	7	<40	59.4
83-95	<1	6	<1	5	<1	<1	<1	<1	7	78	2.9	7	<40	60.5
Zwart Water, profile ZW2														
0-5	<1	30	<1	81	<1	<1	17	<1	18	136	2.5	8	NA	33.3
5-15	<1	15	<1	<3	7	<1	<1	1	<1	65	6.8	8	NA	32.3
15-29	<1	9	<1	<3	<1	<1	<1	<1	2	92	0.4	8	NA	24.0
29-44	<1	27	<1	<3	<1	<1	<1	<1	22	149	6.5	11	NA	22.4
44-49	<1	8	<1	<3	<1	<1	<1	<1	6	304	3.4	5	NA	54.5
49-61	<1	4	<1	<3	<1	<1	<1	<1	2	148	<0,1	4	NA	56.0
61-76	<1	8	<1	<3	<1	<1	<1	<1	1	91	1.2	6	NA	53.8
Zwart Water, profile ZW3														
0-8	4	55	53	66	50	1	108	2	356	287	55.3	19	NA	31.8
8-19	<1	7	<1	10	22	<1	36	<1	83	502	31.8	8	NA	25.0
19-27	<1	9	<1	<3	7	<1	<1	<1	50	358	26.3	6	NA	30.0
27-38	<1	12	<1	<3	<1	<1	<1	1	5	49	4.0	5	NA	54.9
38-46	<1	21	20	61	<1	1	5	<1	21	701	4.0	7	NA	41.1
46-61	<1	4	<1	<3	<1	<1	<1	1	3	59	<0,1	8	NA	32.3
61-63	<1	18	9	<3	<1	<1	<1	<1	9	537	<0,1	14	NA	24.0

MC = moisture content in wt%

NA = not analysed

Table S8: Element composition of porewater, Site III

<i>Site III</i>														
Depth cm	Cr µg/l	Ni µg/l	Cu µg/l	Zn µg/l	As µg/l	Cd µg/l	Pb µg/l	Co µg/l	Mn µg/l	Al µg/l	Fe µg/l	Ca mg/l	Cl mg/l	MC wt%
Hulpe, Profile HU1														
0-10	13	27	59	153	19	4	11	5	22	<1	903	352	1469	54.5
10-20	47	97	55	235	9	4	242	9	823	<1	2655	388	1418	53.9
20-30	1	135	116	354	18	5	32	9	922	<1	2373	336	1222	48.5
30-47	10	48	90	165	23	12	40	7	630	<1	379	195	784	48.6
47-55	<1	39	55	113	30	5	<1	5	343	<1	265	175	818	43.6
55-80	<1	127	65	2428	15	12	65	7	270	420	1026	190	898	23.2
Hulpe, Profile HU2														
0-9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	29.9
9-36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19.7
36-46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	21.5
46-64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	23.3
64-80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	26.6
80-95	<1	31	42	264	14	2	30	4	19	<1	<1	23	NA	31.4
95-105	<1	27	50	227	15	2	21	4	35	<1	<1	16	314	40.9
Hulpe, Profile HU3														
0-10	<1	29	83	342	10	3	31	4	27	<1	<1	27	361	34.0
10-30	<1	23	105	521	36	4	33	6	20	<1	<1	9	NA	20.0
30-52	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	26.7
52-60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	27.6
60-70	<1	39	96	557	33	4	37	6	18	<1	<1	25	152	37.2
Hulpe, Profile HU4														
0-9	4	70	91	754	14	4	59	6	30	<1	<1	39	NA	30.6
9-17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	17.5
17-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.7
23-100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	30.6

MC = moisture content in wt%

NA = not analysed

Table S9: Indicative concentrations (based on between aqua regia extraction) and concentrations obtained in this work ("3-acid" extraction) (this work) concentrations (mg/kg) of Cd, Cr, Cu, Ni, Pb, and Zn in reference material BCR 701. Mean \pm standard deviation of 3 replicates

	Indicative concentrations (mg/kg)			This study (mg/kg)		
Cd	11.7	\pm	1.0	10.9	\pm	0.2
Cr	272	\pm	20	284	\pm	5
Cu	275	\pm	13	242	\pm	2
Ni	103	\pm	4	99	\pm	7
Pb	143	\pm	6	141	\pm	3
Zn	454	\pm	19	465	\pm	4

Table S13: Data and calculations used to construct Figure 5

L1						
L/S	time	V	x	x_{cumul}	C	S
l/kg	year	m ³	cm	cm	mg/kg	mg/kg
20	1.1	0.56	0.16	0.16	1.98	4
40	2.2	1.12	0.49	0.65	1.46	4
60	3.4	1.68	0.89	1.38	1.16	4
80	4.5	2.24	1.34	2.23	0.96	4
100	5.6	2.80	1.82	3.15	0.86	4

L5						
L/S	time	V	x	x_{cumul}	C	S
l/kg	year	m ³	cm	cm	mg/kg	mg/kg
20	1.1	0.56	0.16	0.16	8.76	19
40	2.2	1.12	0.49	0.65	6.44	19
60	3.4	1.68	0.88	1.37	4.66	19
80	4.5	2.24	1.31	2.18	3.80	19
100	5.6	2.80	1.78	3.09	3.82	19