

Supplementary Materials

Coupled Hydrogeochemical Approach and Sustainable Technologies for the Remediation of a Chlorinated Solvent Plume in an Urban Area

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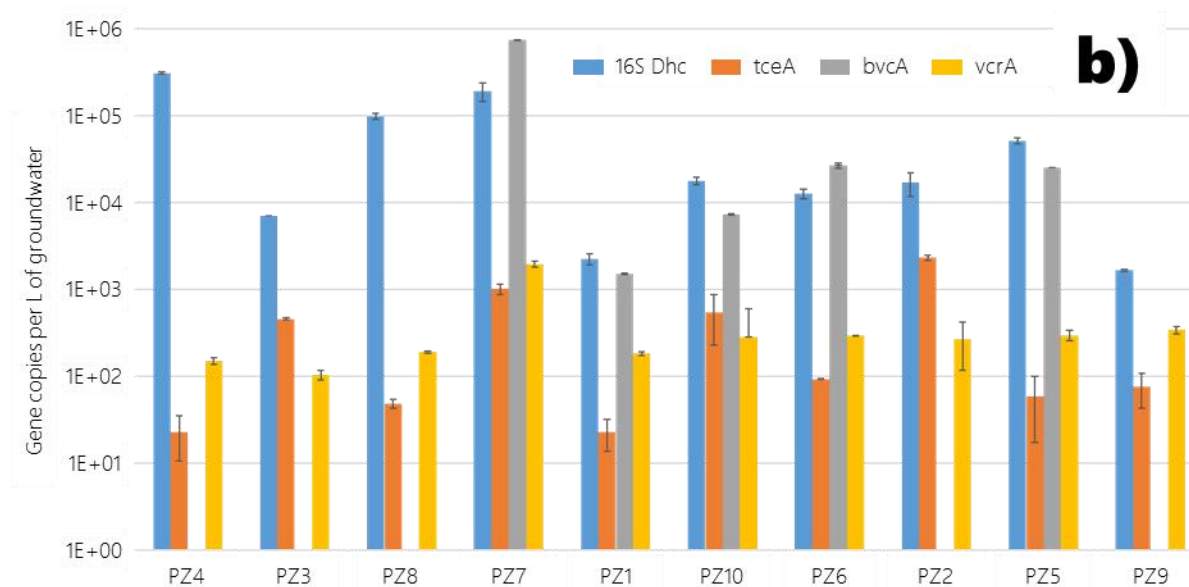
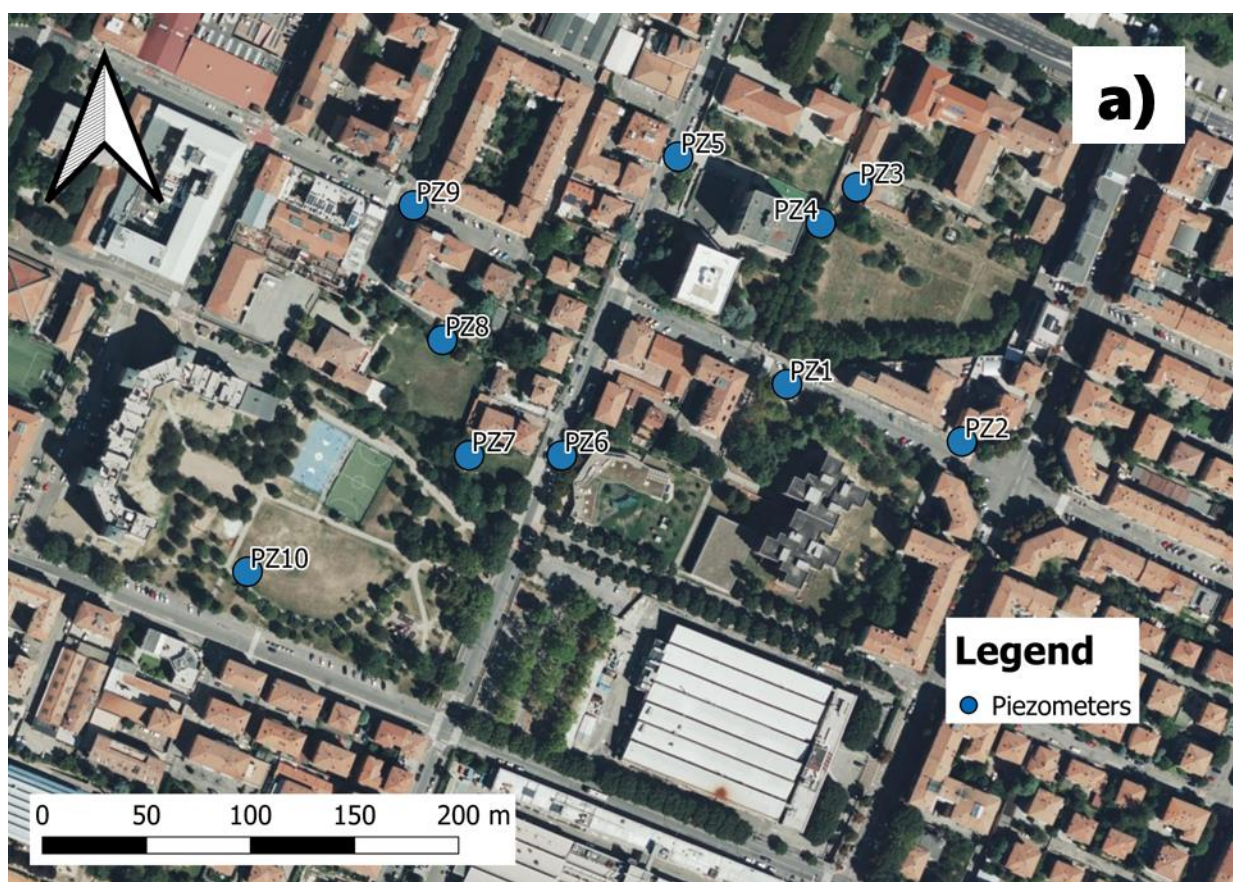


Figure S1. Location of the 10 piezometers that were sampled for microbiological analysis (a). Results of microbiological characterization in terms of gene copies per liter of groundwater. The graph shows both the total concentrations of Dehalococcoides and the individual functional genes responsible for individual steps in the reductive dechlorination of PCE (b).

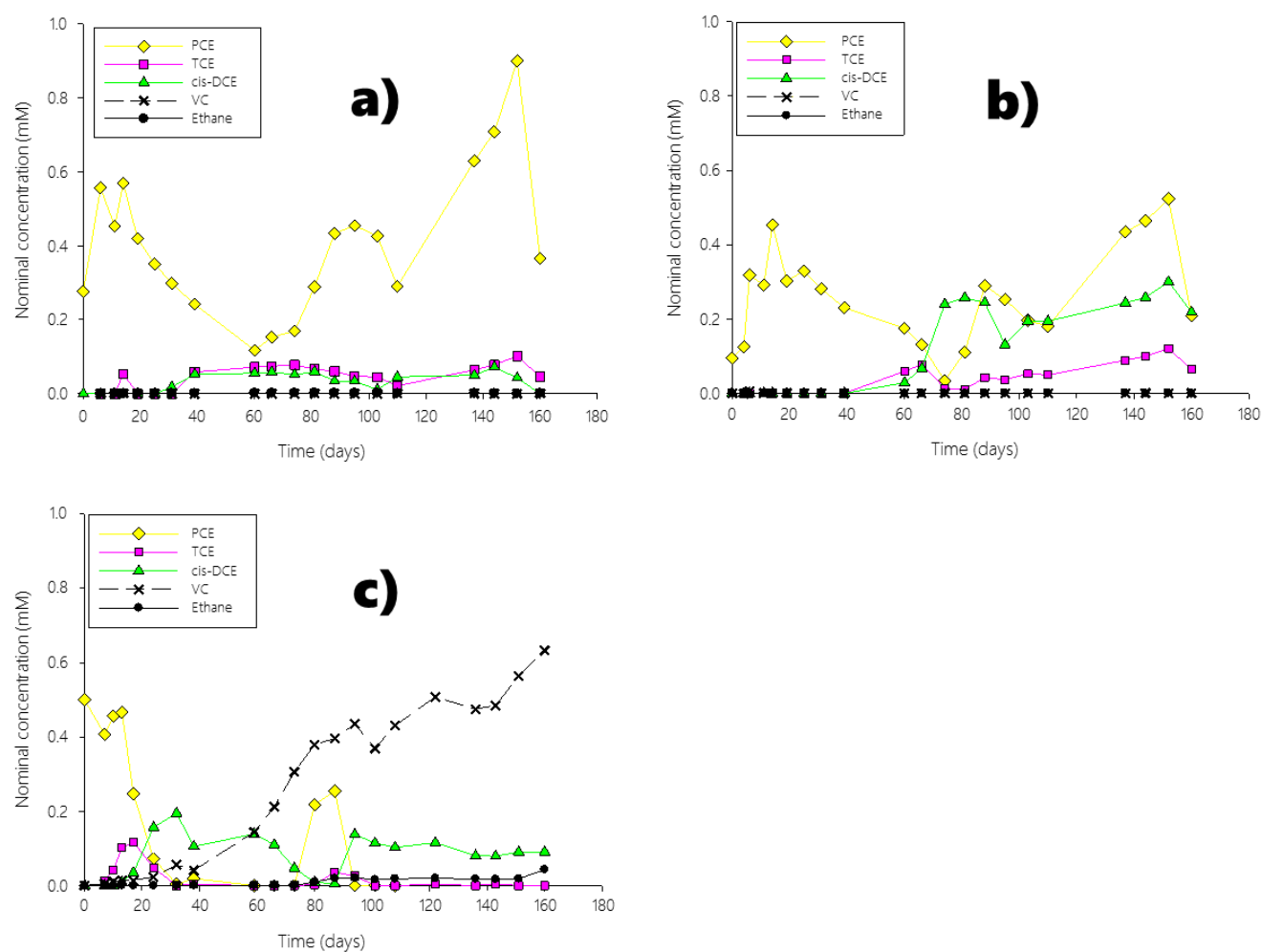


Figure S2. Detected concentrations of PCE, TCE, cis-DCE, VC, and ethene during microcosm tests without the addition of electron donor (a), with supplementation of electron donor only (b), by adding both electron donor and inoculum (c).

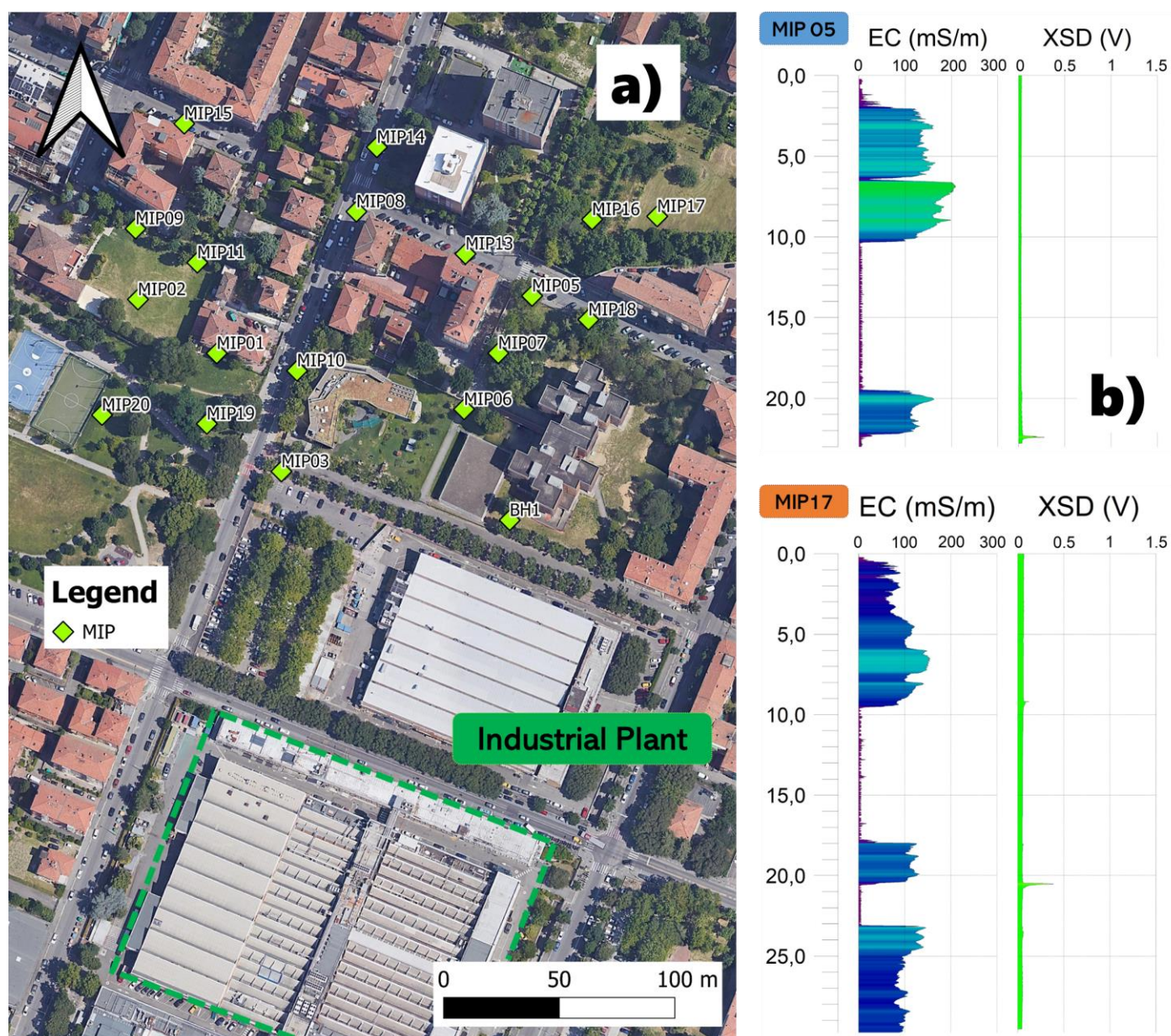


Figure S3. Location of MIP investigation north of the industrial plant (a). Electrical conductivity (EC) and halogen-specific detector (XSD) vertical profiles acquired via MIP at the MIP05 and MIP17 points (b).

Borehole / Well / Piezometer	Groundwater Level (m a.s.l.)
CGC01	22,22
CGC02	22,29
CGC03	22,36
CGC04	22,48
CGC05	22,8
CGC06	22,88
CGC07	22,95
CGC08	22,88
CGC09	22,87
CGC10	22,8
CGC11	22,44
CGC12	22,36
CGC13	23,26
CGC14	22,72
CGC15	22,45
CGC16	22,35
CGC17	22,29
CGC18	22,24
CGC19	22,19
CGC20	22,13
CGC21	22,08
CP4	22,4
CP7	25,83
CP8	26,98
CP3	22,36
CP1	22,66
PZ1	23,82

Table S1. Observed groundwater levels at the measurement points of the monitoring network.

Days	Mass of PCE extracted (kg) in the period	Cumulative mass of PCE extracted (Kg)
4	0,0	0,0
5	0,2	0,2
21	0,8	1,0
34	1,3	2,2
48	0,7	3,0
62	3,4	6,4
92	1,0	7,3
125	1,2	8,5
156	2,3	10,8
184	5,4	16,2
271	0,1	16,3
285	0,2	16,5
302	5,2	21,7
315	1,3	23,0
329	1,7	24,7
357	7,3	32,0
385	2,9	34,9
412	5,6	40,5
446	4,0	44,5

Table S2. Extracted PCE mass (in kg) over time (days) since the startup of the IEG CGC-AS®-annexed plant along with the A-B barrier.

Days	PCE Concentration (µg/L) in CP1	PCE Concentration (µg/L) in CP3
0	2550,0	159,0
20	1560,0	510,0
35	1670,0	159,0
49	1170,0	430,0
62	870,0	189,0
92	810,0	400,0
124	840,0	570,0
156	500,0	430,0
184	400,0	220,0
217	40,0	1890,0
252	75,0	810,0
264	7,8	730,0
284	213,0	820,0
301	139,0	450,0
314	264,0	800,0
328	52,0	400,0
356	5,9	144,0
384	15,1	74,0
411	89,0	80,0
445	288,0	118,0

Table S3. Detected PCE concentrations (µg/L) over time (days) at the CP1 and CP3.

Days	Mass of PCE extracted (kg) in the period	Cumulative mass of PCE extracted (Kg)
5	0,0	0,2
19	1,0	1,2
33	0,2	1,4
48	2,4	3,8
63	0,2	4,0
91	17,1	21,1
119	4,9	26,0
147	1,7	27,7
182	1,8	29,5

Table S4. Extracted PCE mass (in kg) over time (days) since the start-up of the IEG CGC-AS®-annexed plant along with the C-D barrier.

Days	PCE Concentration (µg/L)
0	1080,0
27	4100,0
34	7900,0
47	6700,0
62	7800,0
83	8700,0
90	4400,0
96	3600,0
103	6400,0
110	8300,0
118	3600,0
144	3700,0
181	1750,0

Table S5. Measured PCE concentrations (µg/L) over time (days) at the CP4.

Days	PCE Concentration (µg/L) in CP7	PCE Concentration (µg/L) in CP8
0	700,0	1020,0
63	1,7	102,0
94	1,2	0,2
122	4,2	2,2
149	4,1	70,0
177	1,1	57,0

Table S6. Measured PCE concentrations at the injection intervention control points, CP7 and CP8.

Days	PCE Concentration (µg/L)	TCE Concentration (µg/L)	1,2-DCE Concentration (µg/L)	VC Concentration (µg/L)
0	1330,0	2,1	2,9	0,0
16	2850,0	4,6	0,5	0,0
63	1030,0	60,0	13,1	0,0
77	0,1	0,0	1300,0	0,3
94	24,9	3,6	1300,0	0,2
122	40,0	4,4	1500,0	0,4
133	560,0	29,0	1600,0	0,5
149	430,0	25,2	880,0	0,2
177	460,0	30,0	1300,0	0,4

Table S7. concentrations of the parameters PCE, TCE, 1,2-DCE, and VC in the PZ1 monitoring piezometer.