

Supplementary Materials:

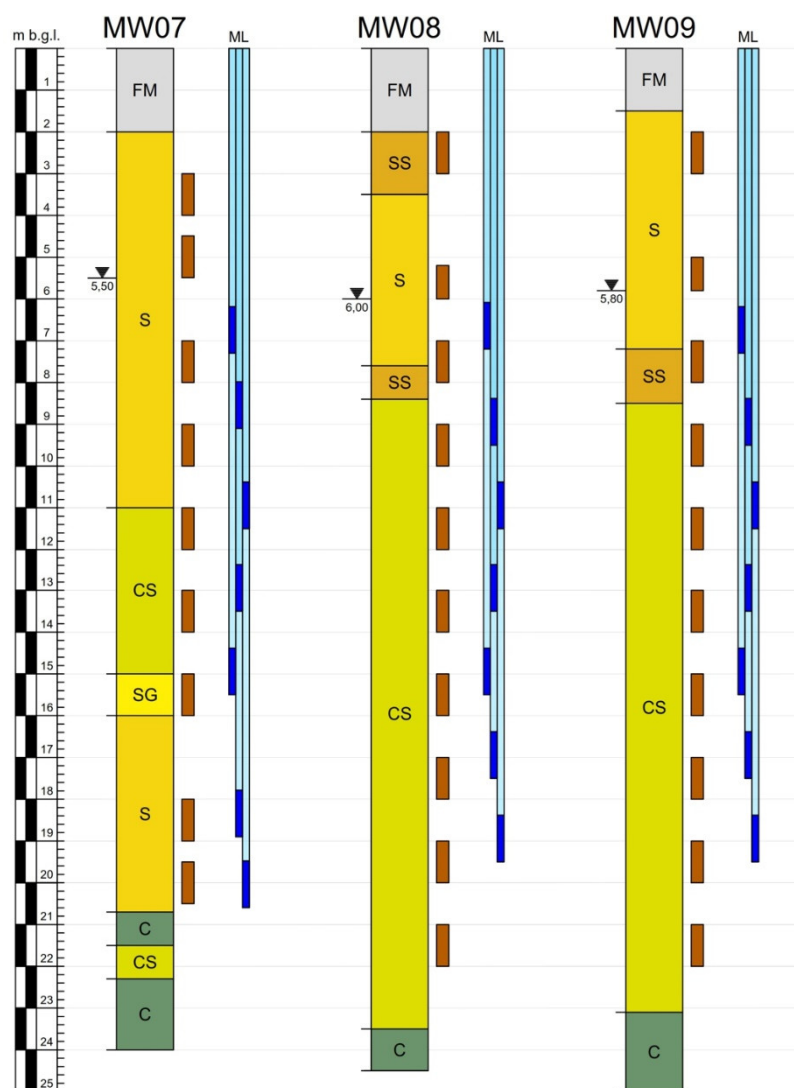


Figure S1. Simplified stratigraphic logs of the three monitoring wells drilled in 2018. **FM:** fill material; **SS:** fine sand with silt; **S:** sand; **CS:** coarse sand; **SG:** sand with gravel; **C:** clay. Brown boxes represent sediments core samples; light blues columns represent simplified construction schemes of Continuous Multichannel Tubing system (named ML).

Table S1. Sediments sampling elevation collected in 2018 sampling survey, CMT elevation levels and groundwater sampling elevation and As content in sediment and groundwater.

MW07	As	MW07-ML	As	MW08	As	MW08-ML	As	MW09	As	MW09-ML	As
Depth m a.s.l.	mg/kg	Depth m a.s.l.	mg/L	Depth m a.s.l.	mg/kg	Depth m a.s.l.	mg/L	Depth m a.s.l.	mg/kg	Depth m a.s.l.	mg/L
2.0	129.4	-1.7	0.27	2.5	18.45	13.9	0.013	2.5	14.45	13.0	0.018
0.5	81.06	-3.5	1.4	-0.6	30.05	9.9	1.8	-0.4	10.77	45.2	0.23
-2.0	54.52	-5.9	1.3	-2.5	26.25	7.0	4.4	-2.5	19.06	7.8	3.7
-4.0	155.10	-7.9	1.2	-4.5	90.87	260.7	1.2	-4.5	128.10	14.0	7.2
-6.0	182.90	-9.9	2.3	-6.5	175.10	63.2	110	-6.5	174.10	12.1	13
-8.0	242.60	-13.3	21	-8.5	116.60	69.0	53	-8.5	236.30	11.8	35
-10.0	173.10	-14.8	17	-10.5	468.50			-10.5	120.70		
-13.0	89.07			-12.5	223.30			-12.5	221.80		
-14.5	95.44			-14.5	118.70			-14.5	141.80		
				-16.5	68.13			-16.5	20.54		

Table S2a. Pearson correlation matrix for MW07-ML.

	<i>C-alkalinity</i>	<i>Eh</i>	<i>EC</i>	<i>pH</i>	<i>Al</i>	<i>As</i>	<i>B</i>	<i>Ca</i>	<i>DOC</i>	<i>Cl</i>	<i>Fe</i>	<i>Mg</i>	<i>Mn</i>	<i>CH4</i>	<i>Ni</i>	<i>NO3-</i>	<i>NH4+</i>	<i>K</i>	<i>Na</i>	<i>SO42-</i>	<i>TDS</i>
C-alkalinity	1																				
Eh	-0.64	1																			
EC	0.78	-0.89	1																		
pH	-0.03	0.52	-0.59	1																	
Al	0.27	0.22	-0.09	0.69	1																
As	0.57	-0.93	0.73	-0.30	-0.20	1															
B	0.70	-0.92	0.99	-0.68	-0.23	0.77	1														
Ca	-0.12	-0.47	0.51	-0.87	-0.43	0.31	0.59	1													
DOC	-0.12	-0.13	-0.14	0.28	-0.11	0.45	-0.09	-0.06	1												
Cl	0.71	-0.88	0.99	-0.65	-0.12	0.71	0.99	0.61	-0.14	1											
Fe	0.92	-0.66	0.89	-0.34	0.14	0.47	0.82	0.17	-0.38	0.85	1										
Mg	0.42	-0.82	0.89	-0.81	-0.28	0.65	0.93	0.84	-0.09	0.94	0.62	1									
Mn	0.83	-0.71	0.83	-0.46	-0.23	0.56	0.82	0.13	-0.34	0.77	0.89	0.58	1								
CH4	0.99	-0.61	0.79	-0.09	0.25	0.50	0.71	-0.09	-0.26	0.72	0.96	0.43	0.86	1							
Ni	0.95	-0.81	0.92	-0.31	0.11	0.67	0.87	0.17	-0.20	0.88	0.96	0.66	0.88	0.95	1						
NO3-	-0.20	0.39	-0.41	0.65	0.79	-0.31	-0.48	-0.36	-0.08	-0.41	-0.30	-0.41	-0.50	-0.21	-0.32	1					
NH4+	0.55	-0.10	0.10	0.43	0.11	0.23	0.04	-0.58	0.38	0.01	0.29	-0.26	0.28	0.49	0.35	-0.34	1				
K	0.86	-0.91	0.98	-0.44	-0.01	0.80	0.96	0.37	-0.02	0.96	0.89	0.81	0.83	0.84	0.95	-0.36	0.24	1			
Na	0.88	-0.86	0.98	-0.44	0.03	0.72	0.95	0.35	-0.13	0.96	0.94	0.79	0.86	0.89	0.97	-0.35	0.23	0.99	1		
SO42-	0.77	-0.89	1.00	-0.63	-0.17	0.72	0.99	0.52	-0.16	0.99	0.88	0.89	0.86	0.78	0.91	-0.47	0.10	0.97	0.97	1	
TDS	0.74	-0.88	1.00	-0.63	-0.11	0.71	0.99	0.58	-0.14	1.00	0.86	0.92	0.79	0.74	0.89	-0.41	0.04	0.96	0.97	0.99	1

Table S2b. Pearson correlation matrix for MW08-ML.

	<i>C-alkalinity</i>	<i>Eh</i>	<i>EC</i>	<i>pH</i>	<i>Al</i>	<i>As</i>	<i>B</i>	<i>Ca</i>	<i>DOC</i>	<i>Cl</i>	<i>Fe</i>	<i>Mg</i>	<i>Mn</i>	<i>CH4</i>	<i>Ni</i>	<i>NO3-</i>	<i>NH4+</i>	<i>K</i>	<i>Na</i>	<i>SO42-</i>	<i>TDS</i>
C-alkalinity	1																				
Eh	0.74	1																			
EC	-0.51	-0.92	1																		
pH	-0.31	-0.18	-0.12	1																	
Al	-0.29	-0.41	0.57	-0.20	1																
As	-0.69	-0.48	0.28	0.66	0.20	1															
B	-0.80	-0.97	0.89	0.23	0.56	0.55	1														
Ca	0.62	0.53	-0.23	-0.90	0.09	-0.80	-0.57	1													
DOC	0.45	0.24	-0.03	0.04	0.51	-0.09	-0.10	0.14	1												
Cl	-0.48	-0.92	0.99	-0.14	0.49	0.22	0.85	-0.21	-0.12	1											
Fe	-0.49	-0.89	0.95	-0.10	0.39	0.37	0.80	-0.27	-0.18	0.96	1										
Mg	-0.28	-0.79	0.94	-0.38	0.46	-0.01	0.70	0.04	-0.08	0.96	0.91	1									
Mn	-0.36	-0.82	0.90	-0.31	0.34	-0.07	0.72	-0.02	-0.25	0.94	0.85	0.96	1								
CH4	-0.54	-0.93	0.99	-0.12	0.59	0.24	0.90	-0.22	-0.07	0.99	0.92	0.93	0.92	1							
Ni	-0.39	-0.63	0.67	-0.11	0.66	-0.10	0.70	-0.07	0.16	0.64	0.42	0.61	0.69	0.74	1						
NO3-	0.39	0.61	-0.54	-0.58	-0.36	-0.57	-0.69	0.73	-0.42	-0.47	-0.46	-0.31	-0.26	-0.50	-0.40	1					
NH4+	0.77	0.64	-0.49	-0.30	-0.07	-0.60	-0.67	0.65	0.22	-0.44	-0.49	-0.29	-0.32	-0.45	-0.20	0.63	1				
K	-0.53	-0.73	0.72	0.35	0.55	0.79	0.76	-0.57	0.18	0.66	0.75	0.50	0.37	0.66	0.23	-0.72	-0.50	1			
Na	-0.52	-0.94	0.99	-0.07	0.50	0.29	0.89	-0.28	-0.10	1.00	0.96	0.94	0.91	0.99	0.64	-0.53	-0.49	0.71	1		
SO42-	-0.11	-0.59	0.83	-0.38	0.81	-0.05	0.61	0.18	0.40	0.79	0.69	0.84	0.73	0.82	0.72	-0.38	-0.07	0.53	0.78	1	
TDS	-0.48	-0.91	0.99	-0.16	0.53	0.23	0.86	-0.19	-0.08	1.00	0.96	0.96	0.93	0.99	0.66	-0.47	-0.43	0.68	1.00	0.82	1

Table S2c. Pearson correlation matrix for MW09-ML.

	<i>C-alkalinity</i>	<i>Eh</i>	<i>EC</i>	<i>pH</i>	<i>Al</i>	<i>As</i>	<i>B</i>	<i>Ca</i>	<i>DOC</i>	<i>Cl</i>	<i>Fe</i>	<i>Mg</i>	<i>Mn</i>	<i>CH4</i>	<i>Ni</i>	<i>NO3-</i>	<i>NH4+</i>	<i>K</i>	<i>Na</i>	<i>SO42-</i>	<i>TOC</i>
C-alkalinity	1																				
Eh	-0.77	1																			
EC	0.14	-0.24	1																		
pH	-0.21	0.05	-0.86	1																	
Al	-0.40	0.00	0.38	-0.38	1																
As	-0.14	0.27	0.23	-0.55	0.46	1															
B	-0.41	0.04	0.43	-0.16	0.54	-0.22	1														
Ca	0.02	-0.34	0.17	0.19	0.05	-0.52	0.76	1													
DOC	0.85	-0.43	0.28	-0.55	-0.24	0.11	-0.35	-0.22	1												
Cl	-0.10	-0.10	0.96	-0.77	0.48	0.26	0.54	0.22	0.03	1											
Fe	-0.31	0.42	0.24	-0.55	0.49	0.95	-0.23	-0.67	0.00	0.29	1										
Mg	-0.31	-0.07	0.72	-0.41	0.58	-0.05	0.91	0.65	-0.27	0.82	-0.04	1									
Mn	-0.39	0.31	0.55	-0.71	0.79	0.80	0.36	-0.17	-0.05	0.63	0.81	0.50	1								
CH4	-0.33	0.72	0.22	-0.48	-0.09	0.59	-0.26	-0.60	0.05	0.26	0.70	-0.11	0.47	1							
Ni	-0.38	0.07	0.56	-0.45	0.78	0.12	0.91	0.49	-0.18	0.64	0.12	0.89	0.67	-0.10	1						
NO3-	0.34	-0.49	-0.61	0.76	-0.43	-0.47	-0.21	0.41	-0.12	-0.62	-0.63	-0.36	-0.73	-0.72	-0.47	1					
NH4+	0.89	-0.65	0.48	-0.54	-0.29	0.06	-0.40	-0.17	0.85	0.25	-0.03	-0.15	-0.12	0.01	-0.29	-0.04	1				
K	0.63	-0.43	0.59	-0.69	-0.07	0.37	-0.46	-0.45	0.68	0.42	0.36	-0.12	0.18	0.29	-0.24	-0.32	0.90	1			
Na	-0.36	0.20	0.85	-0.74	0.56	0.39	0.61	0.17	-0.12	0.94	0.44	0.83	0.79	0.42	0.74	-0.74	-0.01	0.21	1		
SO42-	0.87	-0.80	0.51	-0.48	-0.08	-0.12	0.05	0.31	0.79	0.30	-0.29	0.18	-0.09	-0.37	0.10	0.13	0.83	0.59	0.06	1	
TOC	-0.12	-0.12	0.94	-0.68	0.47	0.09	0.67	0.37	-0.02	0.98	0.13	0.90	0.55	0.14	0.71	-0.56	0.19	0.30	0.92	0.31	1

Table S3. Sequential extraction results from 2016 sampling survey.

	Elevation m a.s.l.	Loosely adsorbed As (%)	Strongly adsorbed As (%)	As co-precipitated with AVS and amorphous metal oxides (%)	As included in mineral phases (%)
MW04	0.6	0.40	7.99	4.67	86.95
	-1.2	0.06	7.27	7.27	81.89
	-3.4	0.59	6.74	6.74	82.64
	-8.4	2.23	7.62	7.62	78.80
	-13.4	0.77	5.69	5.69	84.21
	-18.4	3.41	19.45	11.21	65.93
MW05	0.6	0.96	5.98	5.79	87.27
	-1.4	0.92	5.77	14.37	78.94
	-3.4	0.75	7.72	9.63	81.90
	-8.4	2.50	17.25	36.66	43.58
	-13.4	2.52	24.19	26.04	47.25
	-18.4	2.75	18.58	21.61	57.06
MW06	2.8	0.42	12.54	27.46	59.59
	0.8	0.04	19.28	33.11	47.57
	-1.2	10.08	10.31	12.16	67.45
	-6.2	0.58	7.71	6.30	85.41
	-11.2	0.78	8.80	10.05	80.37
	-16.2	0.74	8.57	11.04	79.65