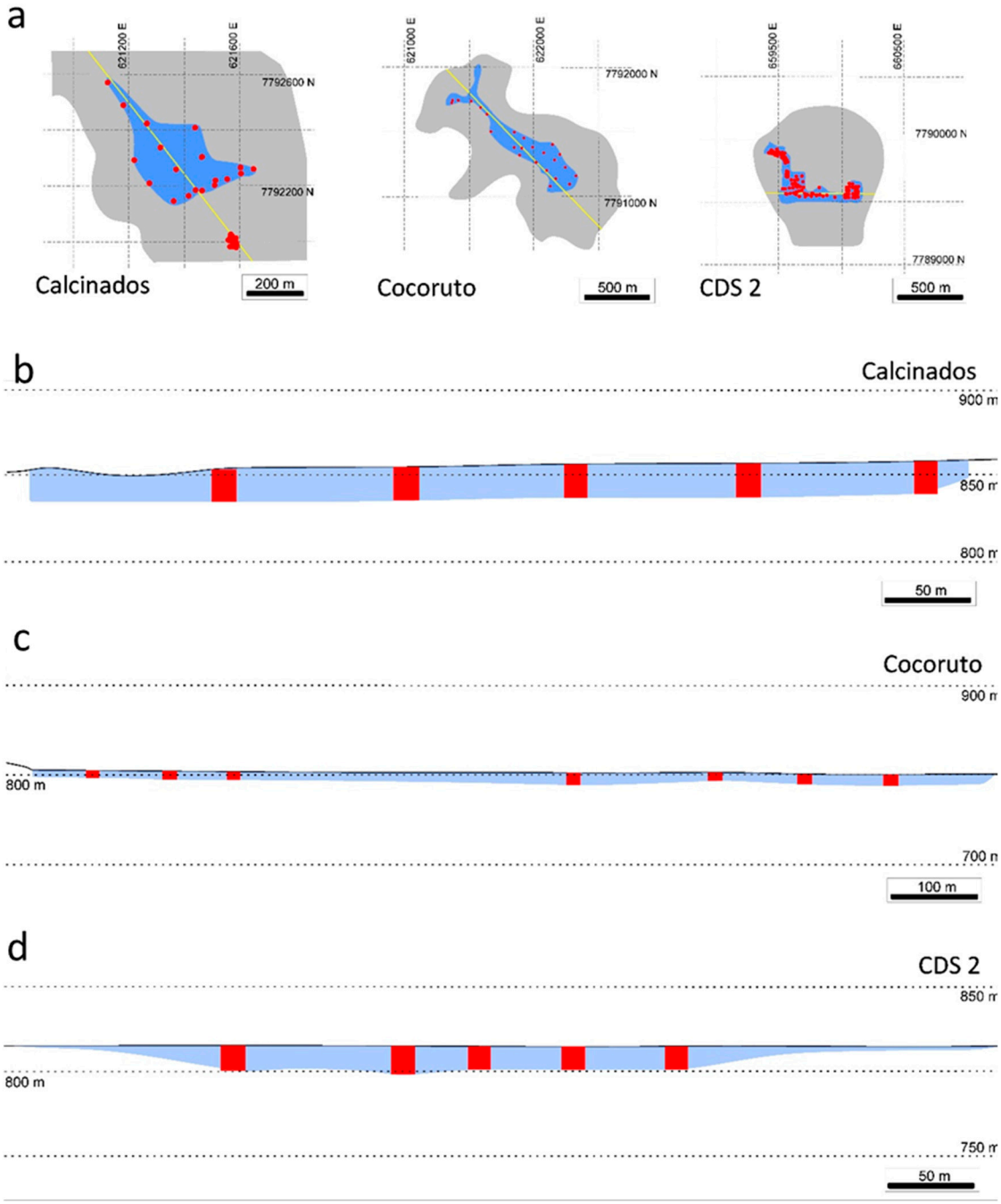
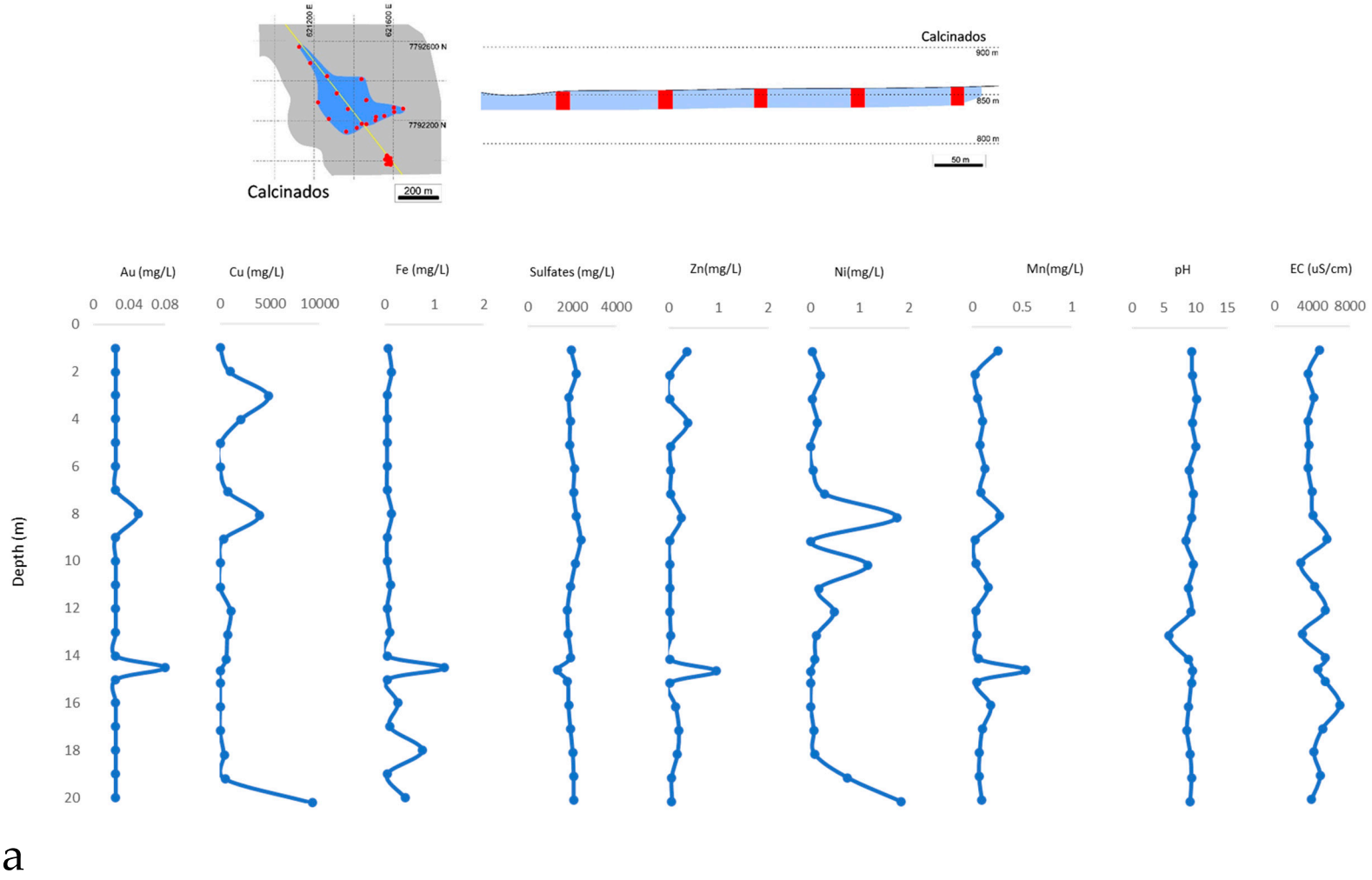


Figure S1. (**a**) Location of sample points in plan and depth for each structure: (**b**) Calcinados, (**c**) Cocoruto, and (**d**) Santa Barbara.

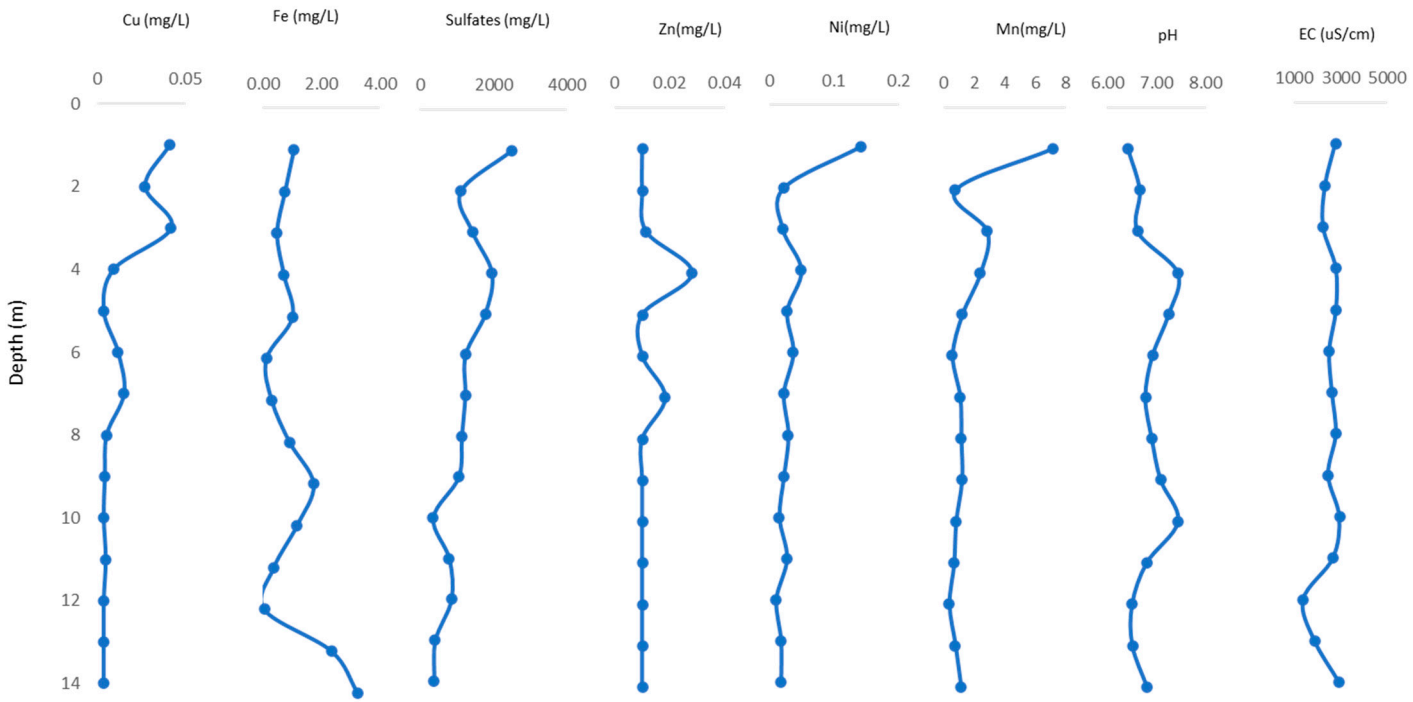


Figure S2. Correlogram matrix of physicochemical variables of groundwater by structure: (**a**) Calcinados, (**b**) Cocoruto, and (**c**) CDS2.


621200 E
621600 E
7792600 N
7792200 N
Calcinados
200 m
Calcinados
900 m
850 m
800 m
50 m
Au (mg/L)
Cu (mg/L)
Fe (mg/L)
Sulfates (mg/L)
Zn(mg/L)
Ni(mg/L)
Mn(mg/L)
pH
EC (uS/cm)
0 0.04 0.08
0 5000 10000
0 1 2
0 2000 4000
0 1 2
0 1 2
0 0.5 1
0 5 10 15
0 4000 8000
Depth (m)
0
2
4
6
8
10
12
14
16
18
20

a


621000 E
622000 E
7792000 N
7791000 N
Cocoruto
500 m
Cocoruto
900 m
700 m
100 m


Cu (mg/L)
0
0.05
Fe (mg/L)
0.00
2.00
4.00
Sulfates (mg/L)
0
2000
4000
Zn(mg/L)
0
0.02
0.04
Ni(mg/L)
0
0.1
0.2
Mn(mg/L)
0
2
4
6
8
pH
6.00
7.00
8.00
EC (uS/cm)
1000
3000
5000
Depth (m)
0
2
4
6
8
10
12
14

b

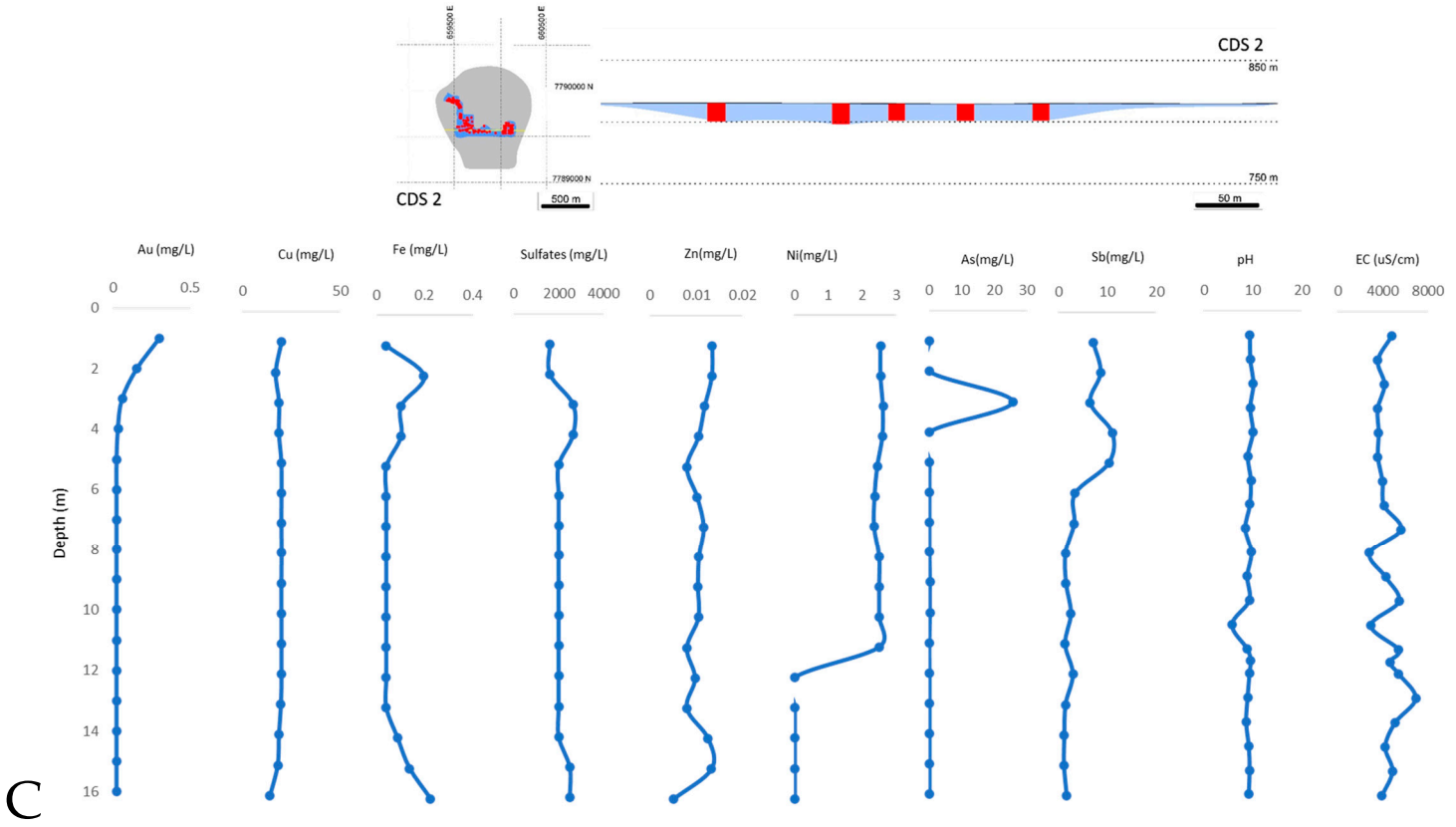


Figure S3. Distribuition of elements by depth in struture: (**a**) Calcinados, (**b**) Cocoruto, and (**c**) Santa Barbara.

Table S1. Mineralogy of the solid fraction of the Calcinados, Cocoruto and CDS2 tailings dams – Adapted from [8].

Mineral	Chemical composition (Ideal Formula)	CA (Wt%)	CO (Wt%)	CDS2 (Wt%)
Quartz	SiO_2	15.6	55.8	35.6
Feldspar Group				
Albite	$NaAlSi_3O_8$	1.5	0.37	1.11
Anorthite	$CaAl_2Si_2O_8$	0.053	0.01	0.053
K feldspar	$KAlSi_3O_8$	-	0.39	1.27
Phyllosilicates				
Biotite	$KMg_{2.5}Fe^{2+0.5}AlSi_3O_{10}(OH)_{1.75}F_{0.25}$	1	0.16	1.26
Muscovite	$KAl_3Si_3O_{10}(OH)_{1.9}F_{0.1}$	12.8	5.69	29
Chlorite	$(Mg,Fe)_3(Si,Al)_4O10(OH)_2{\cdot}(Mg,Fe)_3(OH)_6$	3.3	6.12	5.01
Oxides				
Hematite	Fe_2O_3	56.8	8.86	0.378
Fe antimoniate	FeSb(As)O	-	-	0.806
Rutile/Anathase	TiO_2	0.599	0.49	0.599
Carbonates				
Ankerite	$Ca(Fe,Mg,Mn)(CO_3)O_2$	1	11.2	9
Siderite	$FeCO_3$	-	7.25	7.2
Calcite	$CaCO_3$	0.2	2.25	5.4
Sulfates				
Jarosite (Sb)	$KFe(SO_4)_2(OH)_6$ & $(H_3O)Fe(SO_4)2(OH)_6$	-	-	1.00
Gypsum	$CaSO_4\ 2H_2O$	7.00	0.03	2.00
Sulfides	Total	0.17	1.61	0.36
Pyrite	$Fe^{2+}S_2$	0.002	0.5	0.08
Pyrrhotite	$Fe^{2+0.95}S$	0.004	0.79	0.041
Arsenopyrite	$Fe^{3+}AsS$	0.056	0.24	0.056
Berthierite	$FeSb_2S_4$	-	-	0.141
Chalcopyrite	$CuFeS_2$	-	-	0.028
Gesdorffite	NiAsS	0.01	-	-
Covellite	CuS	0.1	0.07	-
Sphalerite	ZnS	-	0.01	0.009
Au Minerals*				
Au Content (mg/kg)		2.39	0.911	0.742
Native Au	Au>80%, Ag, Cu, Hg, Fe, Ni	526	364	158
Electrum	Au=80%, Ag=20%	42	10	6

* Au number particles. CA-Calcinados, CO-Cocoruto

Table S2. Statistical summary of the chemistry of the solid fractions of the Calcinados, Cocoruto and CDS2 tailings dams – Adapted from [8].

Structure	N[1]	Element	Mean	SD[2]	Min[3]	Max[4]	N[1]	Element	Mean	SD[2]	Min[3]	Max[4]
Calcinados	230	Au (mg/Kg)	2.39	1.08	0.001	9.45	230	S (%)	1.97	0.704	0	6.33
Cocoruto	282		0.911	0.715	0.003	8.71	282		3.47	1.93	0.02	9.47
CDS2	293		0.742	0.937	0.24	12.7	293		0.785	0.378	0.005	3.93
Calcinados	230	As (%)	0.725	0.466	0.001	4.80	230	Fe (%)	42.49	8.91	0.001	83.3
Cocoruto	282		0.223	6.01	0.001	58.8	282		12.42	2.9	2.42	15
CDS2	293		0.093	0.095	0.001	0.657	293		4.12	2.2	0.86	16.4
Calcinados	230	Pb (mg/Kg)	241	64.4	0.1	383	230	Zn (mg/Kg)	3213	1100	0	6187
Cocoruto	282		46	22.4	4	46	282		187	327	5	3419
CDS2	293		69.6	28.2	16	171	293		113	30.7	75	313
Calcinados	230	Ni (mg/Kg)	494	123	10	744	230	Mn (%)	0.097	0.021	0.004	0.17
Cocoruto	282		103	38.7	49	243	282		0.281	0.067	0.01	0.42
CDS2	293		241	64.4	10	383	293		0.097	0.009	0.08	0.12
Calcinados	230	Cu (%)	0.104	0.184	0.001	0.988	230	Sb (%)	0.004	0.008	0.001	0.059
Cocoruto	282		0.019	0.018	0.001	0.266	282		0.003	0	0.003	0.003
CDS2	293		0.01	0.008	0.001	0.04	293		0.104	0.184	0.001	0.988
Calcinados	230	Co (mg/Kg)	132	35.8	0.10	195						
Cocoruto	282		19.6	11.7	4	76						
CDS2	293		21.4	6.22	4	42						