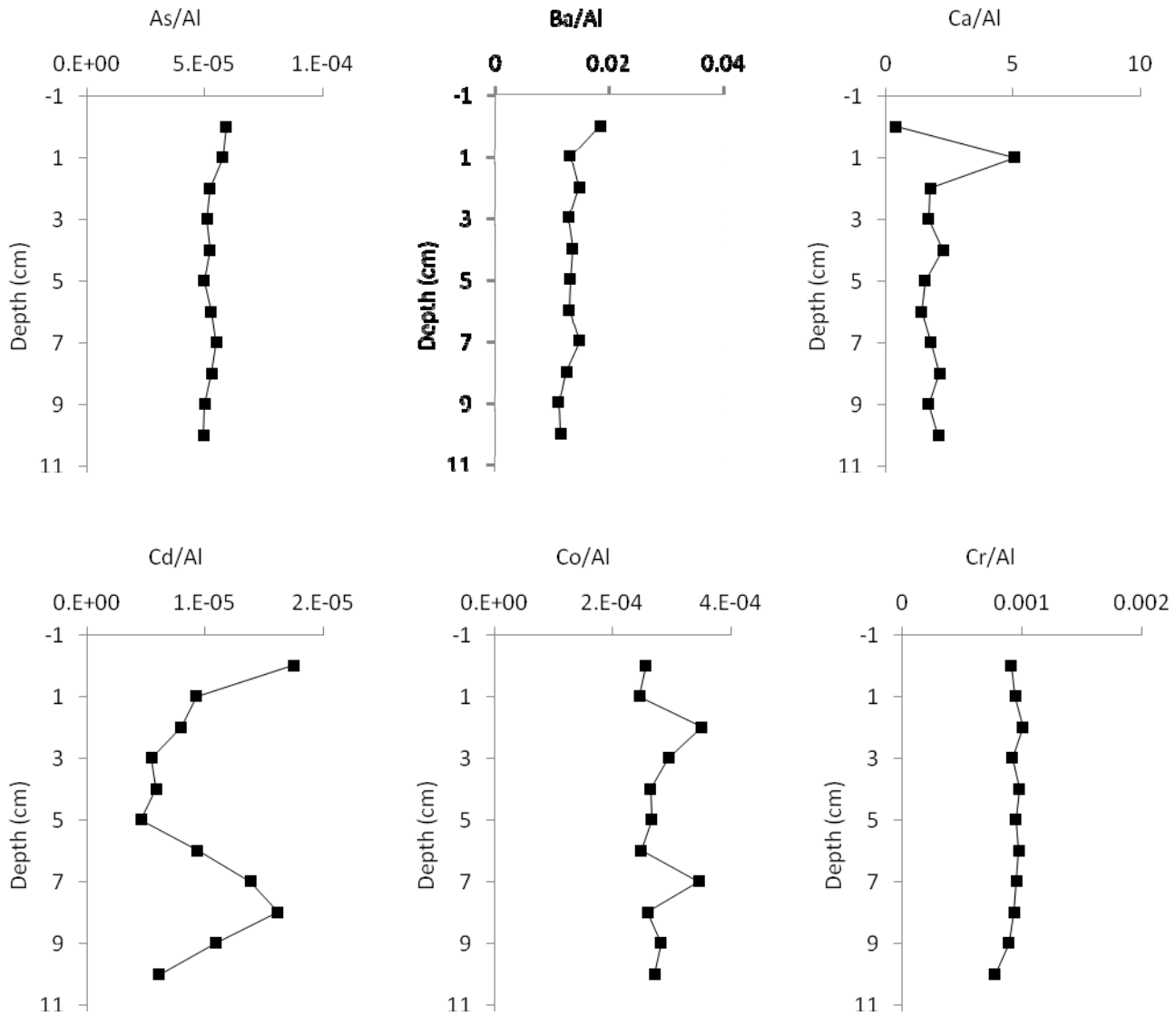
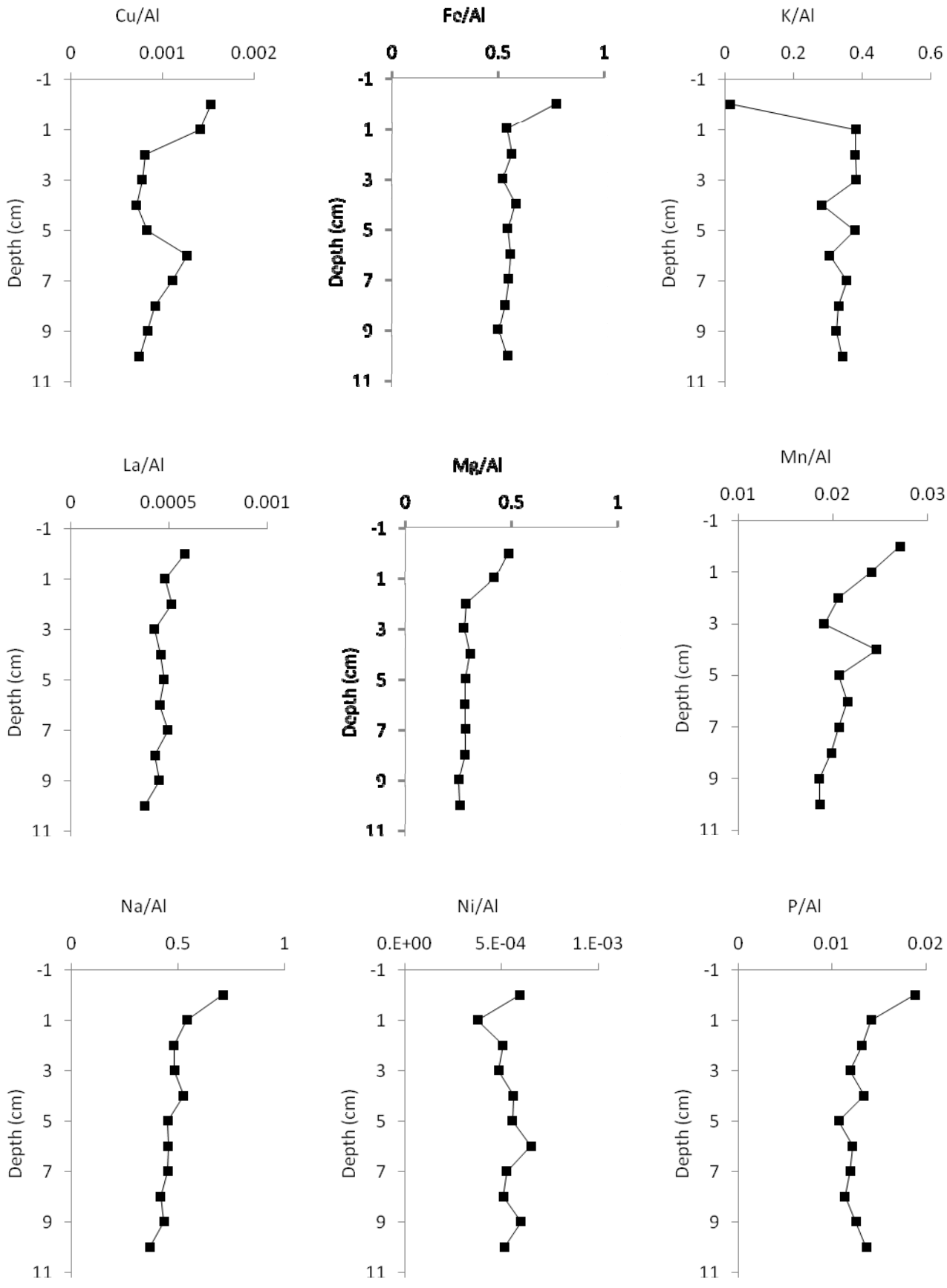
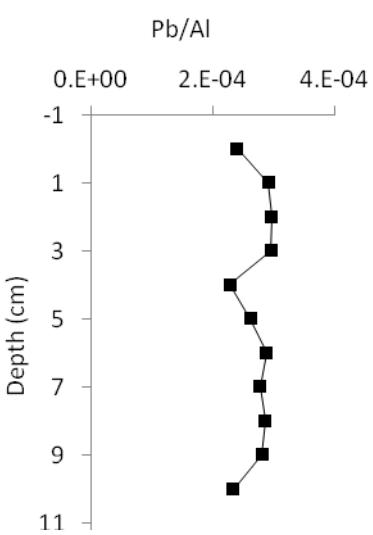
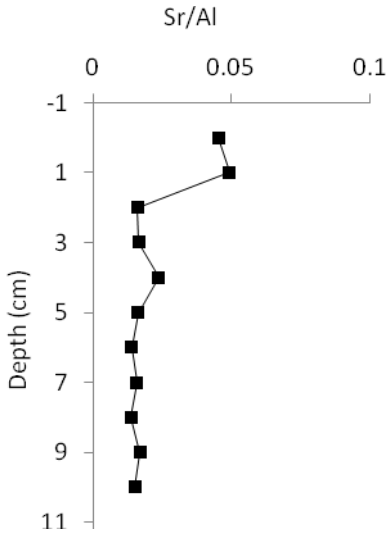
SUPPLEMENTAL MATERIAL

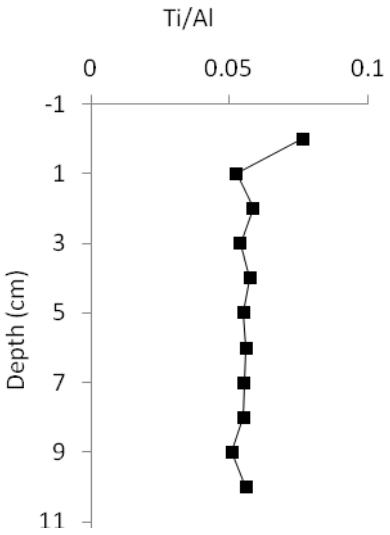
Fig. S1. Metal concentrations normalized as ratios to Al along core H2.

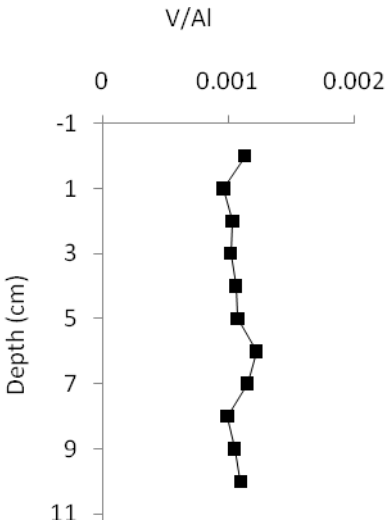



Cu/Al
0
0.001
0.002
Fe/Al
0
0.5
1
K/Al
0
0.2
0.4
0.6
La/Al
0
0.0005
0.001
Mg/Al
0
0.5
1
Mn/Al
0.01
0.02
0.03
Na/Al
0
0.5
1
Ni/Al
0.E+00
5.E-04
1.E-03
P/Al
0
0.01
0.02
Depth (cm)
-1
1
3
5
7
9
11


Pb/Al
0.E+00
2.E-04
4.E-04
Depth (cm)
-1
1
3
5
7
9
11


Sr/Al
0
0.05
0.1
Depth (cm)
-1
1
3
5
7
9
11


Ti/Al
0
0.05
0.1
Depth (cm)
-1
1
3
5
7
9
11


V/Al
0
0.001
0.002
Depth (cm)
-1
1
3
5
7
9
11

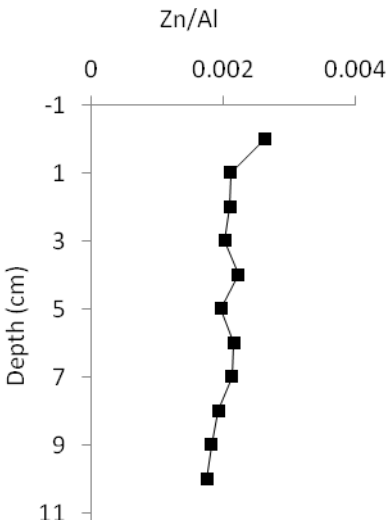

Zn/Al
0
0.002
0.004
Depth (cm)
-1
1
3
5
7
9
11

Fig S2. Chemometric treatments obtained for data normalized with Al.

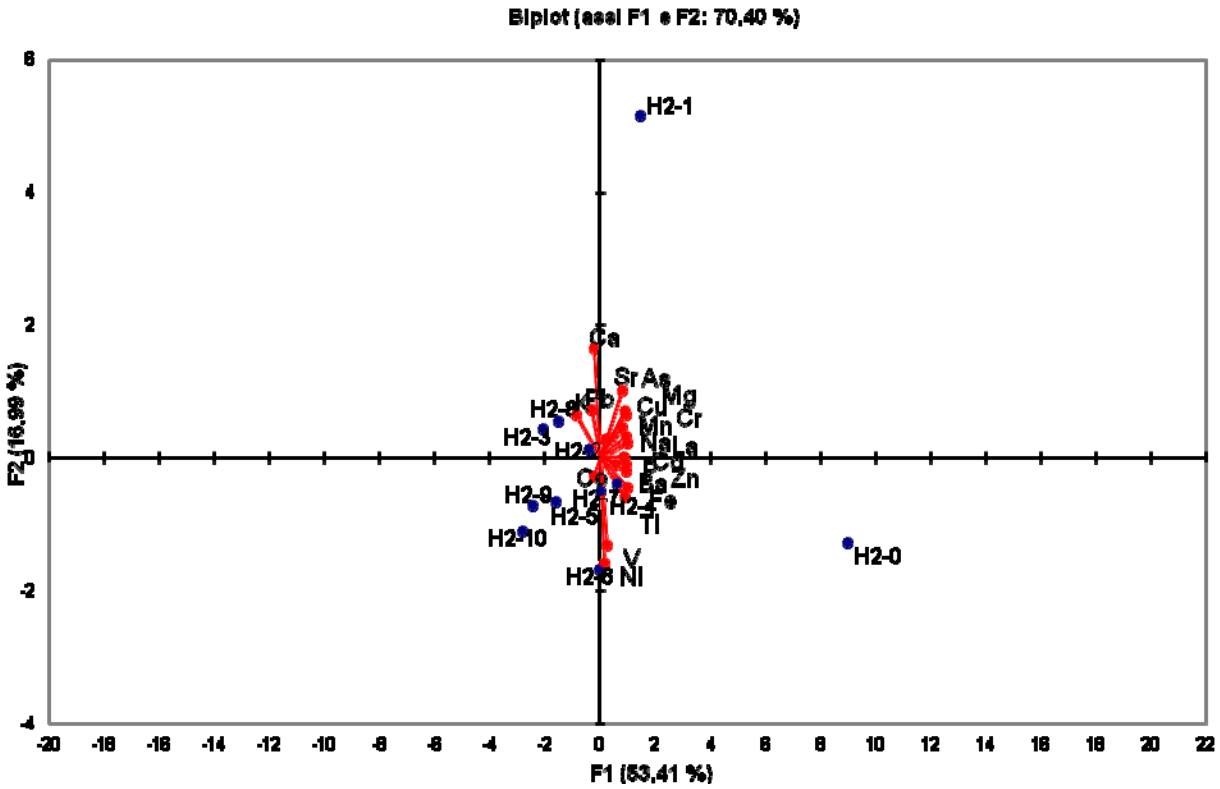
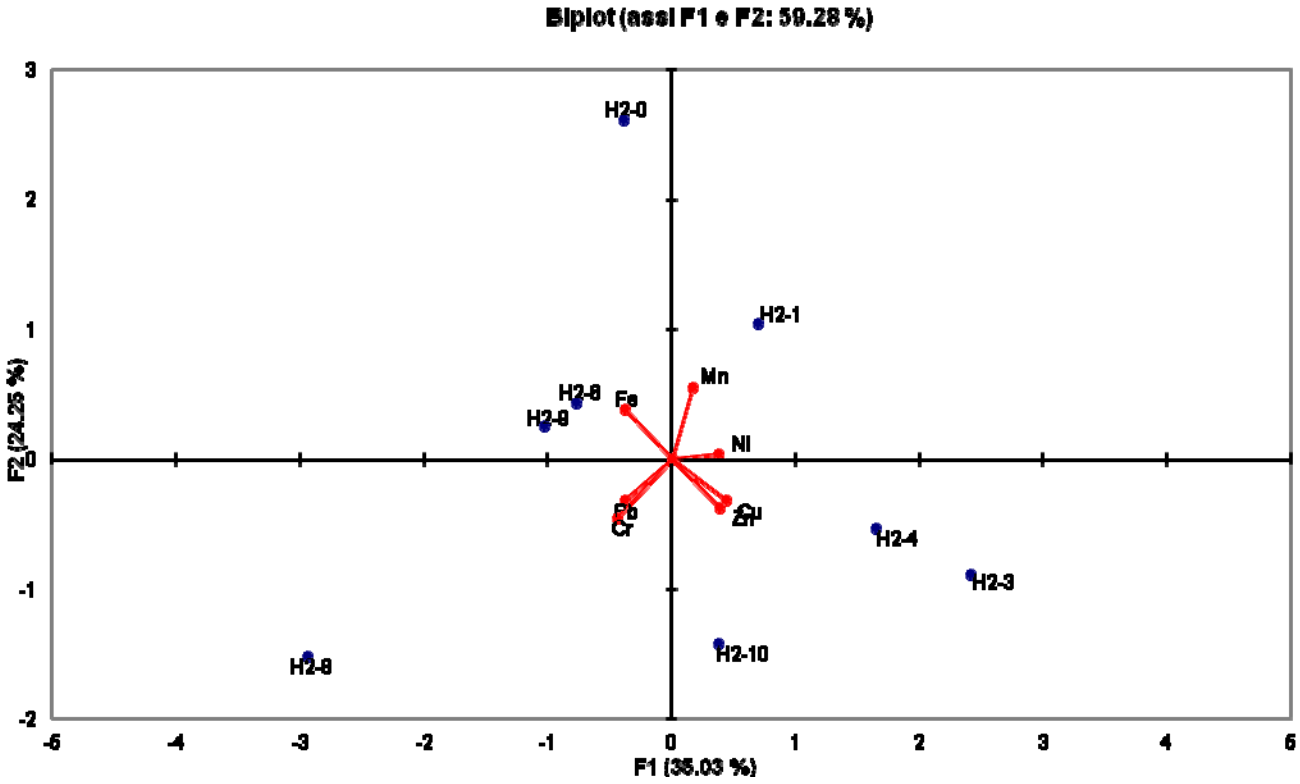
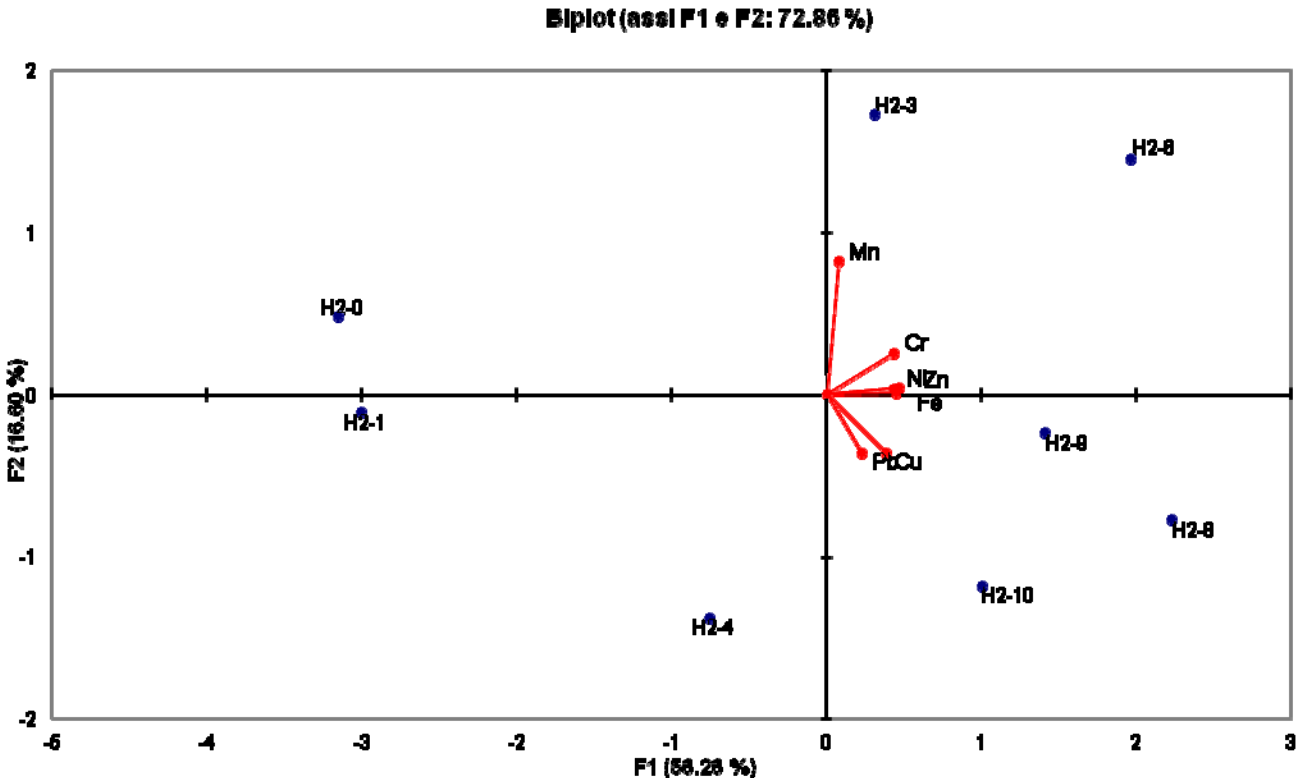


Fig. S3. Chemometric treatments obtained on BCR partitioning for each fraction: **a.** fraction 1, **b.** fraction 2, **c.** fraction 3, **d.** fraction 4.

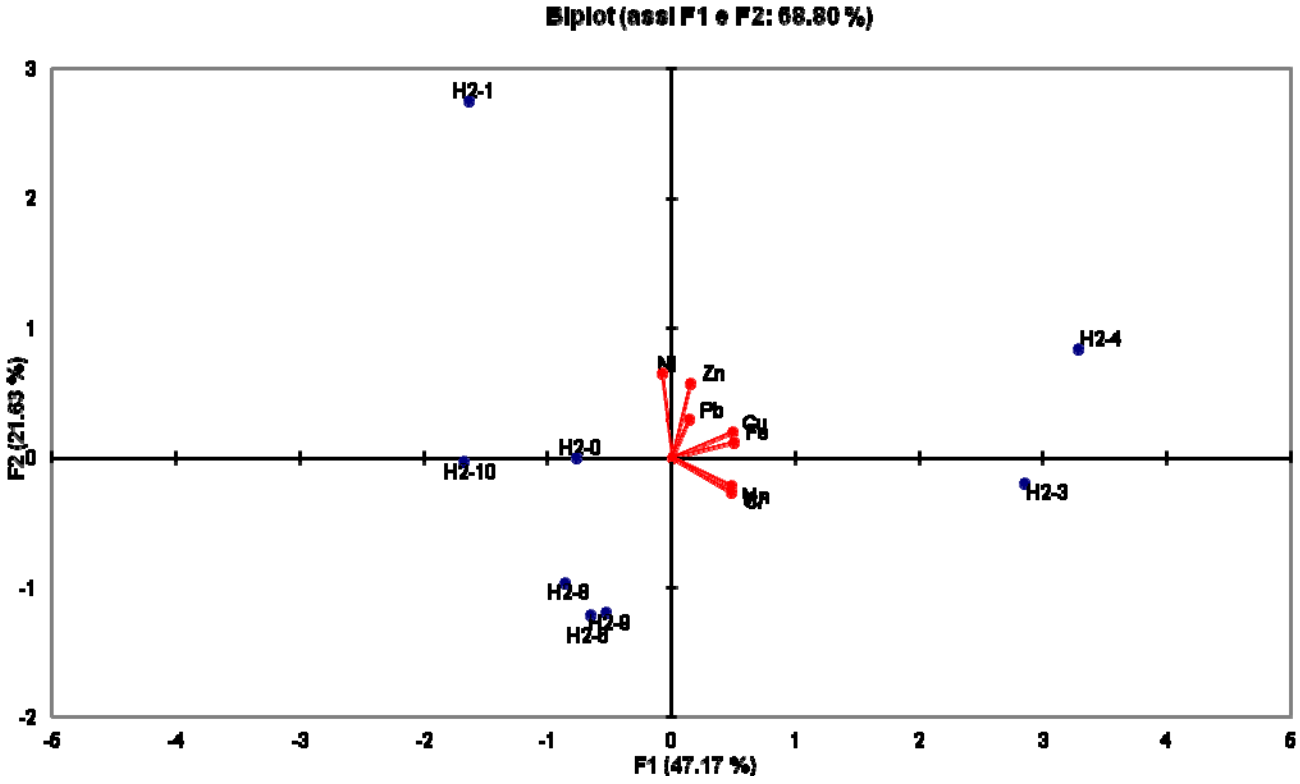
a.



b.


Biplot (assi F1 e F2: 72.86 %)
H2-3
H2-6
Mn
H2-0
Cr
Ni
Zn
Fe
H2-1
H2-9
Pb
Cu
H2-8
H2-10
H2-4
F2 (16.60 %)
F1 (56.26 %)

c.


Biplot (assi F1 e F2: 68.80 %)
H2-1
H2-4
Ni
Zn
Pb
Cu
Fe
H2-0
H2-10
H2-3
Mn
H2-8
H2-9
H2-6
F2 (21.63 %)
F1 (47.17 %)

d.

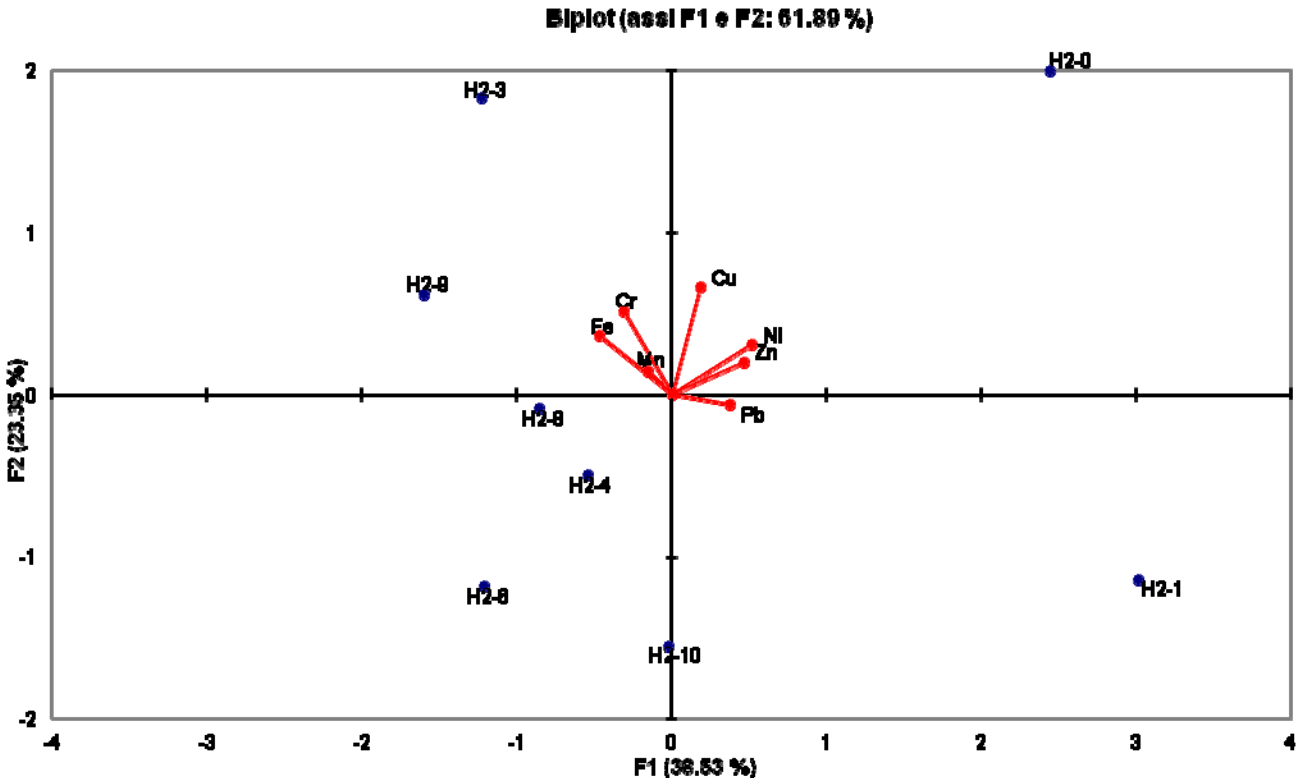

Biplot (assi F1 e F2: 61.89 %)
H2-0
H2-3
H2-9
Cu
Cr
Fe
Ni
Zn
Mn
Pb
H2-8
H2-4
H2-6
H2-1
H2-10
F2 (23.35 %)
F1 (38.53 %)
2
1
0
-1
-2
-4
-3
-2
-1
0
1
2
3
4

Table S1. Particle size distribution for H2.

μm	Distribution %
>300	10.6
300-200	13.5
200-90	25.5
90-53	46.5
<53	2.9

Table S2. Moisture content (%) for each sample of H2.

Sample	%
H2-0	1.85
H2-1	1.01
H2-2	1.03
H2-3	1.28
H2-4	1.25
H2-5	1.62
H2-6	1.87
H2-7	1.78
H2-8	1.58
H2-9	1.25
H2-10	1.38

Table S3. Total concentrations of metals, arsenic and phosphorous in the blank for each section of core H2. Concentrations (mg/kg) are shown as mean values with the standard deviations percentage in brackets.

Sample	Al	As	Ba	Ca	Cd	Co	Cr	Cu	Fe	K
H2-0	102 (0)	0.49 (0.03)	0.33 (0.02)	126 (4)	0.02 (0.00)	0.40 (0.01)	1.3 (0.2)	3.8 (0.5)	17 (1)	69 (3)
H2-1	102 (0)	0.49 (0.03)	0.68 (0.01)	126 (4)	0.02 (0.00)	0.40 (0.01)	4.4 (0.8)	1.2 (0.0)	38 (0)	69 (3)
H2-2	102 (0)	0.49 (0.03)	0.20 (0.01)	126 (4)	0.02 (0.00)	0.00 (0.00)	2.7 (0.3)	2.6 (0.8)	12 (0)	69 (3)
H2-3	102 (0)	0.49 (0.03)	0.57 (0.01)	126 (4)	0.02 (0.00)	1.63 (0.02)	1.6 (0.1)	2.83 (1)	3 (0)	69 (3)
H2-4	102 (0)	0.49 (0.03)	0.22 (0.00)	126 (4)	0.02 (0.00)	0.59 (0.01)	4.4 (0.8)	1.5 (0.5)	38 (1)	69 (3)
H2-5	102 (0)	0.49 (0.03)	0.30 (0.13)	126 (4)	0.02 (0.00)	0.60 (0.02)	1.4 (0.1)	1.2 (0.0)	7 (0)	69 (3)
H2-6	102 (0)	0.35 (0.00)	0.12 (0.00)	126 (4)	0.05 (0.00)	0.59 (0.01)	3.2 (0.5)	1.9 (0.2)	18 (0)	69 (3)
H2-7	93 (0.18)	0.51 (0.00)	0.08 (0.00)	61 (0.05)	0.05 (0.00)	0.60 (0.02)	2.9 (0.2)	0.6 (0.1)	7 (0)	9 (0)
H2-8	93 (0.18)	0.51 (0.00)	0.36 (0.01)	61 (0.05)	0.05 (0.00)	0.60 (0.02)	4.9 (0.7)	2.0 (0.7)	28 (1)	9 (0)
H2-9	93 (0.18)	0.51 (0.00)	0.31 (0.00)	61 (0.05)	0.05 (0.00)	0.29 (0.00)	5.9 (0.8)	2.3 (0.3)	55 (0)	9 (0)
H2-10	93 (0.18)	0.51 (0.00)	0.76 (0.00)	61 (0.05)	0.05 (0.00)	0.29 (0.00)	6.6 (1.1)	1.7 (0.2)	41 (1)	9 (0)

Sample	La	Mg	Mn	Na	Ni	P	Pb	Sr	Ti	V	Zn
H2-0	0.28 (0.01)	29 (2)	0.78 (0.03)	33 (2)	2.9 (0.2)	33 (0)	0.48 (0.01)	0.57 (0.01)	0.20 (0.00)	0.83 (0.15)	7.7 (1.3)
H2-1	0.17 (0.00)	49 (1)	2.59 (0.00)	57 (0)	1.9 (0.0)	16 (0)	0.48 (0.01)	2.10 (0.03)	4.86 (0.07)	2.14 (0.34)	3.6 (0.2)
H2-2	0.72 (0.04)	51 (0)	1.04 (0.02)	67 (2)	2.3 (0.4)	24 (0)	0.48 (0.01)	0.02 (0.00)	2.74 (0.05)	1.67 (0.61)	4.9 (0.4)
H2-3	0.66 (0.05)	14 (0)	0.86 (0.02)	17 (0)	2.4 (0.1)	8 (0)	0.48 (0.01)	0.46 (0.01)	3.67 (0.10)	0.59 (0.06)	0.4 (0.0)
H2-4	1.17 (0.11)	56 (1)	2.18 (0.01)	66 (1)	1.4 (0.6)	30 (1)	0.48 (0.01)	1.17 (0.01)	0.45 (0.01)	5.14 (0.34)	1.7 (0.2)
H2-5	0.35 (0.03)	34 (0)	0.64 (0.01)	44 (1)	2.3 (0.4)	18 (0)	0.48 (0.01)	0.56 (0.02)	0.21 (0.00)	0.20 (0.04)	1.9 (0.1)
H2-6	2.01 (0.10)	46 (1)	1.30 (0.02)	63 (0)	1.9 (0.1)	8 (2)	0.48 (0.01)	0.83 (0.01)	0.25 (0.00)	1.49 (0.17)	3.8 (0.2)
H2-7	0.52 (0.02)	40 (1)	2.12 (0.05)	45 (1)	2.3 (0.4)	21 (0)	0.48 (0.01)	0.01 (0.00)	1.76 (0.00)	2.91 (0.36)	2.3 (0.2)
H2-8	1.62 (0.23)	52 (0)	1.81 (0.01)	68 (1)	0.1 (0.0)	9 (1)	0.48 (0.01)	1.76 (0.00)	1.12 (0.00)	2.88 (0.03)	5.0 (0.7)
H2-9	0.55 (0.00)	53 (3)	2.52 (0.10)	66 (1)	1.4 (0.0)	21 (0)	0.48 (0.01)	1.61 (0.01)	4.43 (0.08)	4.27 (0.12)	8.5 (1.3)
H2-10	2.07 (0.18)	47 (2)	1.51 (0.06)	68 (3)	2.0 (0.4)	1 (0)	0.48 (0.01)	0.99 (0.02)	3.48 (0.03)	1.23 (0.00)	10.5 (1.8)

Table S4. Results for certified materials: **a.** SRM 2702; **b.** BCR 701. Concentrations are shown as mean values (*n=3*) with the standard deviations percentage in brackets. Data for Ca, Mg and Cu have been not certified for SRM 2702, Mn and Fe have been not certified for BCR 701.

a.

Element	Measured	SRM 2702	Recovery %
Al	76900 (5000)	84100 (2200)	91
As*	41.30 (2.20)	45.30 (1.80)	91
Ba	363.10 (36.50)	397.40 (3.20)	91
Cd*	0.81 (0.06)	0.82 (0.01)	99
Co*	29.04 (0.87)	27.76 (0.58)	104
Cr	361 (9)	352 (22)	103
Fe	76264 (1547)	79100 (2400)	96
K	20416 (1188)	20540 (720)	99
La	69.10 (13.40)	73.50 (4.20)	94
Mn	1633 (67)	1757 (58)	93
Na	7514 (202)	6810 (200)	110
Ni	75.80 (2.62)	75.40 (1.50)	100
P	1553 (20)	1552 (66)	100
Pb*	131 (3)	132.80 (1.10)	99
Sr	114.90 (12.50)	119.70 (3.00)	96
Ti	8537 (201)	8840 (820)	97
V	359.40 (11.20)	357.60 (9.20)	100
Zn	455.80 (8.10)	485.30 (4.20)	93

* Measured by GF/AAS

b.

Element	Fraction I	BCR 701	Recovery %	Fraction II	BCR 701	Recovery %	Fraction III	BCR 701	Recovery %
Cd	7.18 (0.11)	7.34 (0.35)	98	3.81(0.33)	3.77 (0.28)	101	0.30 (0.12)	0.27 (0.06)	112
Cr	2.23 (0.15)	2.26 (0.16)	99	46 (0)	46 (2)	100	135 (27)	143 (7)	95
Cu	47.40 (2.10)	49.30 (1.70)	96	111 (7)	124 (3)	89	50 (14)	55 (4)	90
Ni	14.70 (0.5)	15.40 (0.90)	96	25 (2)	27 (1)	94	15 (0)	15 (1)	101
Pb	3.08 (0.50)	3.18 (0.21)	97	121 (11)	126 (3)	96	9 (1)	9 (2)	99
Zn	198 (7)	205 (6)	96	114 (1)	114 (5)	100	45 (2)	46 (4)	98

Table S5. Sediment quality guideline low and trigger values (in mg/kg) reported in the Australian and New Zealand guidelines for fresh and marine water quality (Australian and New Zealand Environment and Conservation Council, Agriculture and Resource Management Council of Australia and New Zealand).

	As	Cd	Cr	Cu	Ni	Pb	Zn
low	20	1.5	80	65	21	50	200
high	70	10	370	270	52	220	410