Supplementary material 1

LOQ given as a range from individual LOQs from all runs.
CRM means and standard deviations calculated from averages from each run. Run averages only based on data above LOQ for that specific run.
Accuracy and method precision calculated for average CRM values from the runs.

Table 1: Replicate analyses of IAPSO seawater reference material during ICP-OES measurements (n=29 measurements, 8 ICP-OES runs)

LOQ[#] [mg/kg]	Element	IAPSO (OSIL) reference [mg/kg]	IAPSO measured [mg/kg]	Accuracy (%)	Method precision (%RSD)
0.11-0.96	**B**	4.5	4.5±0.12	0	3
0.83-9.83	**Br**	67	65±2	-2	3
0.34-14.36	**Ca**	412	430±8	4	2
2.19-10.43	**K**	399	401±8	1	2
0.36-12.10	**Mg**	1290	1427±41	11	3
1.11-72.53	**S**	904	914±16	1	2
0.42-2.82	**Si**	<0.02-5	1.4±0.2	---	17
0.20-2.98	**Sr**	7.9	7.5±0.3	-5	3

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run

Table 2: Replicate analyses of MESS-3 reference material during ICP-OES measurements (n=38 measurements, 11 digested samples, 9 ICP-OES runs)

LOQ[#] [mg/kg]	Element	MESS-3 reference [mg/kg]	MESS-3 measured [mg/kg]	Accuracy (%)	Method precision (%RSD)
28-401	**Al**	85900±2300	74546±15405	-13	21
23-183	**Ca**	14700±600	13757±1095	-6	8
5-37	**Cu**	33.9±1.6	33.7±1.2	-1	4
98-808	**Fe**	43400±1100	40447±2277	-7	6
76-542	**K**	26000[a]	25425±1273	-2	5
1-62	**Mg**	16000[a]	15874±2059	-1	13
3-100	**Mn**	324±12	311±16	-4	5
86-741	**P**	1200[a]	1306±125	9	10
4-15	**Zn**	159±8	149±4	-7	3

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run
[a] information value

Table 3: Replicate analyses of BHVO-2 reference material during ICP-OES measurements (n=24 measurements, 11 digested samples, 9 ICP-OES runs)

LOQ[#] [mg/kg]	Element	BHVO-2 reference [mg/kg]	BHVO-2 measured [mg/kg]	Accuracy (%)	Method precision (%RSD)
28-401	**Al**	71600±800	74874±1842	5	2
23-183	**Ca**	81700±1200	82833±1115	1	1
5-37	**Cu**	127±7	133±4	5	3
98-808	**Fe**	86300±1400	87784±1633	2	2
76-542	**K**	4300±100	4309±80	0	2
1-62	**Mg**	43600±700	44625±986	2	2
3-100	**Mn**	1290±40	1354±28	5	2
86-741	**P**	1200±100	1338±167	12	13
4-15	**Zn**	103±6	115±5	12	4

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run

Table 4: Replicate analyses of IAPSO seawater reference material during ICP-MS measurements (n=25, 8 ICP-MS runs)

LOQ[#] [µg/kg]	Element	IAPSO (OSIL) reference [µg/kg]	IAPSO measured [µg/kg]	Accuracy (%)	Method precision (%RSD)
0.12-1.58	**Mo**	10.5	13.07±0.99	25	8
0.004-0.452	**U**	3.3	3.09±0.15	-6	5

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run

Table 5: Replicate analyses of NASS-6 seawater reference material during ICP-MS measurements (n=50, 8 ICP-MS runs)

LOQ[#] [µg/kg]	Element	NASS-6 reference [µg/kg]	NASS-6 measured [µg/kg]	Accuracy (%)	Method precision (%RSD)
0.12-1.58	**Mo**	9.66±0.70	11.17±0.89	16	8
0.001-0.040	**Cd**	0.0303±0.0019	0.0480±0.0054	58	11
0.004-0.452	**U**	3[a]	2.81±0.16	-6	6

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run
[a] information value

Table 6: Replicate analyses of NASS-6 seawater reference material during ICP-MS measurements (n=24, 7 ICP-MS runs)

LOQ[#] [µg/kg]	Element	NASS-6 reference [µg/kg]	NASS-6 measured [µg/kg]	Accuracy (%)	Method precision (%RSD)
0.20-0.90	**V (KED)**	1.42±0.16	1.42±0.06	0	4
0.73-3.34	**Mn (KED)**	0.516±0.047	Below LOQ	---	---
0.08-0.22	**Co (KED)**	0.015[a]	Below LOQ	---	---
0.21-1.35	**Cu (KED)**	0.242±0.025	Below LOQ	---	---
0.17-1.65	**As (KED)**	1.40±0.12	1.28±0.10	-9	8

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run
[a] information value

Table 7: Replicate analyses of SLEW-3 estuarine water reference material during ICP-MS measurements (n=15, 7 ICP-MS runs)

LOQ[#] [µg/kg]	Element	n	SLEW-3 reference [µg/kg]	SLEW-3 measured [µg/kg]	Accuracy (%)	Method precision (%RSD)
0.38-3.55	**Mn**	8 (5 runs)	1.59±0.22	1.90±0.39	19	21
0.20-0.90	**V (KED)**	15 (7 runs)	2.54±0.31	2.94±0.12	16	4
0.73-3.34	**Mn (KED)**	8 (4 runs)	1.59±0.22	1.57±0.13	-2	9
0.08-0.22	**Co (KED)**		0.040±0.010	Below LOQ	---	---
0.21-1.35	**Cu (KED)**	15 (7 runs)	1.53±0.12	1.34±0.39	-13	29
0.17-1.65	**As (KED)**	12 (6 runs)	1.34±0.09	1.39±0.17	4	13

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run

Table 8: Replicate analyses of SLRS-6 river water reference material during ICP-MS measurements (n=12, 7 ICP-MS runs)

LOQ[#] [µg/kg]	Element	n	SLRS-6 reference [µg/kg]	SLRS-6 measured [µg/kg]	Accuracy (%)	Method precision (%RSD)
0.20-0.90	**V (KED)**		0.352±0.006	Below LOQ	---	---
0.73-3.34	**Mn (KED)**	6 (4 runs)	2.12±0.10	2.26±0.18	7	8
0.21-1.35	**Cu (KED)**	12 (7 runs)	24.0±1.8	30.5±0.95	27	3
0.17-1.65	**As (KED)**		0.57±0.08	Below LOQ	---	---

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run
Offset could be explained by a matrix effect (no salt matrix added to SLRS-6).

Table 9: Replicate analyses of MESS-3 reference material during ICP-MS measurements (n=24 measurements, 10 digested samples, 7 ICP-MS runs)

LOQ[#] [mg/kg]	Element	MESS-3 reference [mg/kg]	MESS-3 measured [mg/kg]	Accuracy (%)	Method precision (%RSD)
0.03-0.36	**Co**	14.4±2	14.1±0.1	-2	1
0.10-2.18	**Ni**	46.9±2.2	48.1±1.1	3	2
0.07-2.78	**Mo**	2.78±0.07	2.69±0.09	-3	3
0.05-4.93	**Pb**	21.1±0.7	19.6±5.2	-8	26

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run

Table 10: Replicate analyses of BHVO-2 reference material during ICP-MS measurements (n=71 measurements, 11 digested samples, 8 ICP-MS runs)

LOQ[#] [mg/kg]	Element	BHVO-2 reference [mg/kg]	BHVO-2 measured [mg/kg]	Accuracy (%)	Method precision (%RSD)
0.03-0.36	**Co**	45±3	46±2	3	3
0.10-2.18	**Ni**	119±7	126±4	6	3

[#] LOQ: limit of quantification; 10*standard deviation of acid blanks for each run