



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 23



Certificate of Analysis Sediment 23

General Information

In this report an overview is given of analytical data for this sample collected in our proficiency testing program. The consensus values are calculated using a robust statistical model. With this NDA model, the mean and standard deviation are calculated using all reported data when at least 4 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

This report is divided into two sections: Consensus Values and Indicative Values. The division is made on the reliability of the data. Consensus Values are based on at least 8 results and a maximum relative uncertainty of 6.25%. Indicative Values are based on a maximum relative uncertainty of 35% and a minimum of 4 and maximum of 7 results, or a relative uncertainty greater than 6.25% when there are at least 8 results.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation), the uncertainty of the mean (consensus or indicative) value and the relative uncertainty.

The results of each determinand is expressed on dried sediment.

Sample information

QUASIMEME reference materials cover a range of natural Marine sediment species from contaminated waters from the North Sea and/or Mediterranean. There is no spiking, mixing or other alterations of the samples. For sample preparation the sediment samples are dried at 40 °C and milled to pass a 0.5 mm sieve.

This Sediment sample 23 of estuarine sediment from Tagus river estuary, Portugal is prepared for the QUASIMEME proficiency programs. The results on which the values in this report are based were taken from the periods given in the following table.

Year.Round	Program	Sample Round Id
2025.1	MS1	QTM150MS
2020.1	MS1	QTM130MS
2017.1	MS1	QTM118MS
2014.2	MS1	QTM109MS
2014.1	MS1	QTM107MS



Consensus Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Aluminium-RT	%	2.45	0.259	10.6	81	2.47	0.193	0.036	1.47
Arsenic-RT	mg/kg	7.26	0.893	12.3	77	7.22	0.580	0.127	1.75
Cadmium-RT	µg/kg	162	40.6	25.1	73	163	27.0	5.94	3.68
Chromium-RT	mg/kg	81.4	11.0	13.5	83	80.8	6.80	1.50	1.85
Copper-RT	mg/kg	42.6	5.17	12.1	88	42.5	3.32	0.689	1.62
Iron-RT	%	1.01	0.111	11.0	83	1.01	0.070	0.015	1.51
Lead-RT	mg/kg	47.3	8.67	18.3	85	46.9	5.15	1.18	2.48
Lithium-RT	mg/kg	21.6	2.76	12.7	66	21.6	1.58	0.424	1.96
Manganese-RT	mg/kg	167	15.9	9.5	79	166	10.9	2.24	1.34
Mercury-RT	µg/kg	143	24.2	17.0	63	142	16.7	3.81	2.67
Nickel-RT	mg/kg	24.7	3.02	12.2	80	24.5	1.86	0.422	1.71
Zinc-RT	mg/kg	193	27.3	14.1	88	195	16.9	3.63	1.88
Sodium-RT	mg/kg	6230	430	6.9	11	6248	266	162	2.60
Magnesium-RT	mg/kg	3606	545	15.1	14	3633	323	182	5.05
Phosphorus-RT	mg/kg	2125	192	9.1	19	2110	113	55.2	2.60
Potassium-RT	mg/kg	14797	1265	8.5	15	14546	914	408	2.76
Titanium-RT	mg/kg	958	46.5	4.9	10	967	21.5	18.4	1.92
Barium-RT	mg/kg	210	21.9	10.4	30	211	12.3	5.00	2.38
Calcium-RT	g/kg	54.1	6.62	12.2	12	54.7	2.58	2.39	4.42
Vanadium-RT	mg/kg	18.7	2.93	15.7	38	18.8	1.74	0.595	3.19
Cobalt-RT	mg/kg	3.66	0.552	15.1	29	3.67	0.310	0.128	3.51
Rubidium-RT	mg/kg	62.6	7.95	12.7	8	62.8	5.57	3.51	5.62
Strontium-RT	mg/kg	270	31.0	11.5	21	273	17.9	8.46	3.13
Uranium-RT	mg/kg	1.05	0.067	6.4	8	1.07	0.045	0.030	2.84

Method: Acid extractable (So-called totals) - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Aluminium-AE	%	0.954	0.305	32.0	70	0.993	0.209	0.046	4.78
Arsenic-AE	mg/kg	6.96	0.994	14.3	100	7.02	0.570	0.124	1.79
Cadmium-AE	µg/kg	162	31.6	19.5	87	163	18.0	4.24	2.62
Chromium-AE	mg/kg	68.1	12.7	18.7	97	68.3	8.14	1.62	2.37
Copper-AE	mg/kg	42.9	4.81	11.2	98	42.9	3.00	0.607	1.41
Iron-AE	%	0.940	0.072	7.7	78	0.949	0.043	0.010	1.09
Lead-AE	mg/kg	43.7	6.91	15.8	99	43.5	5.00	0.868	1.99
Lithium-AE	mg/kg	11.7	2.19	18.8	47	12.0	1.10	0.400	3.42
Manganese-AE	mg/kg	144	12.2	8.5	84	145	7.50	1.67	1.16



Consensus Values MS1

Mercury-AE	µg/kg	142	28.9	20.4	93	141	16.2	3.75	2.65
Method: Acid extractable (So-called totals) - MS1									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Nickel-AE	mg/kg	22.8	3.22	14.1	96	22.9	2.00	0.410	1.80
Zinc-AE	mg/kg	201	21.1	10.5	96	200	12.7	2.70	1.34
Sodium-AE	mg/kg	3645	190	5.2	16	3628	142	59.4	1.63
Magnesium-AE	mg/kg	3474	217	6.2	27	3470	150	52.2	1.50
Phosphorus-AE	mg/kg	2010	200	10.0	25	1997	117	50.1	2.49
Sulfur-AE	mg/kg	1488	68.0	4.6	10	1500	37.7	26.9	1.81
Calcium-AE	g/kg	51.5	3.23	6.3	21	51.4	2.15	0.880	1.71
Vanadium-AE	mg/kg	12.7	3.06	24.0	56	12.5	2.10	0.510	4.02
Cobalt-AE	mg/kg	3.21	0.454	14.1	43	3.19	0.290	0.087	2.69
Strontium-AE	mg/kg	261	14.6	5.6	24	262	10.0	3.72	1.42
Molybdenum-AE	mg/kg	5.18	1.22	23.6	25	5.30	0.702	0.305	5.90
Method: Carbon - MS1									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	1.60	0.234	14.6	61	1.64	0.162	0.037	2.34
Inorganic-Carbonate	%	1.57	0.253	16.1	25	1.58	0.169	0.063	4.02



Indicative Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Scandium-RT	mg/kg	2.33	0.408	17.5	12	2.44	0.275	0.147	6.31
Sulfur-RT	mg/kg	1590	26.8	1.7	5	1580	17.0	15.0	0.941
Gallium-RT	µg/kg	5417	415	7.7	4	5523	222	259	4.79
Cesium-RT	µg/kg	2688	263	9.8	5	2711	155	147	5.47
Thallium-RT	µg/kg	379	43.3	11.4	7	380	31.1	20.5	5.40
Molybdenum-RT	mg/kg	5.36	1.29	24.0	12	5.47	0.800	0.465	8.68

Method: Acid extractable (So-called totals) - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Scandium-AE	mg/kg	1.66	0.778	46.8	7	1.64	0.540	0.368	22.1
Potassium-AE	mg/kg	1649	728	44.1	17	1470	501	221	13.4
Titanium-AE	mg/kg	134	76.6	57.2	11	143	42.5	28.9	21.6
Gallium-AE	µg/kg	3152	883	28.0	10	3345	535	349	11.1
Selenium-AE	mg/kg	0.205	0.080	38.9	17	0.215	0.033	0.024	11.8
Cesium-AE	µg/kg	1518	484	31.9	8	1525	282	214	14.1
Barium-AE	mg/kg	41.4	13.6	32.9	37	39.5	10.6	2.79	6.75
Thallium-AE	µg/kg	94.0	40.7	43.3	17	110	31.0	12.3	13.1
Rubidium-AE	mg/kg	16.1	6.68	41.5	6	15.6	3.28	3.41	21.2
Cerium-AE	mg/kg	15.8	4.64	29.4	6	15.9	2.34	2.37	15.0
Uranium-AE	mg/kg	0.593	0.139	23.4	18	0.600	0.095	0.041	6.89