QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 39

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 39

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 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 10 results while the relative uncertainty is smaller than 6.25%. Indicative Values are based on a relative uncertainty of maximum 35% with at least 4 and less than 10 results or a relative uncertainty higher than 6.25%.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation) and the uncertainty in the assigned value. The confidence limits (at 95 % probabilty) are calculated for these determinands.

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 oC and milled to pass a 0.5 mm sieve.

This Sediment sample 39 of Open sea sediment from South east Isle of Man, United Kingdom 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
2022.2	MS1	QTM140MS
2018.2	MS1	QTM125MS

Consensus Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Aluminium-RT	%	4.82	0.411	8.5	27	4.79	0.298	0.099	4.66 - 4.98
Arsenic-RT	mg/kg	8.96	1.236	13.8	23	9.09	0.850	0.322	8.42 - 9.49
Barium-RT	mg/kg	290	20.8	7.2	14	290	15.0	7.0	278 - 302
Chromium-RT	mg/kg	64.1	9.01	14.0	27	64.9	6.08	2.17	60.6 - 67.7
Cobalt-RT	mg/kg	9.28	0.492	5.3	13	9.21	0.344	0.171	8.99 - 9.58
Copper-RT	mg/kg	13.2	1.10	8.3	26	13.1	0.73	0.27	12.8 - 13.7
Iron-RT	%	2.46	0.211	8.6	25	2.47	0.156	0.053	2.37 - 2.55
Lead-RT	mg/kg	32.5	2.33	7.2	25	32.2	1.63	0.58	31.6 - 33.5
Lithium-RT	mg/kg	47.6	6.86	14.4	21	47.1	4.93	1.87	44.5 - 50.7
Magnesium-RT	mg/kg	11000	740	6.7	10	10800	530	290	10480 - 11530
Manganese-RT	mg/kg	483	35.2	7.3	24	476	24.0	9.0	468 - 498
Mercury-RT	µg/kg	148	19.6	13.2	23	148	14.0	5.1	140 - 157
Nickel-RT	mg/kg	24.4	2.21	9.1	26	24.3	1.57	0.54	23.5 - 25.3
Strontium-RT	mg/kg	159	7.9	5.0	12	159	5.2	2.9	154 - 164
Vanadium-RT	mg/kg	70.5	5.70	8.1	20	70.3	3.76	1.59	67.8 - 73.1
Zinc-RT	mg/kg	94.6	6.70	7.1	26	94.4	4.63	1.64	91.9 - 97.3

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Arsenic-AE	mg/kg	7.77	1.318	17.0	44	7.53	0.894	0.248	7.37 - 8.17
Cadmium-AE	µg/kg	84.8	14.87	17.5	33	86.0	10.00	3.24	79.6 - 90.1
Calcium-AE	g/kg	36.1	0.40	1.1	11	35.9	0.33	0.15	35.81 - 36.34
Chromium-AE	mg/kg	38.2	11.51	30.1	43	37.0	8.00	2.19	34.7 - 41.7
Cobalt-AE	mg/kg	8.85	1.084	12.3	23	9.01	0.776	0.283	8.38 - 9.32
Copper-AE	mg/kg	11.9	1.31	11.1	47	11.7	0.90	0.24	11.47 - 12.24
Iron-AE	%	2.21	0.178	8.0	38	2.20	0.125	0.036	2.16 - 2.27
Lead-AE	mg/kg	28.3	2.47	8.7	48	28.5	1.68	0.45	27.6 - 29.0
Lithium-AE	mg/kg	39.6	6.32	16.0	20	39.3	4.58	1.77	36.6 - 42.5
Magnesium-AE	mg/kg	10900	810	7.4	13	10900	540	280	10380 - 11340
Manganese-AE	mg/kg	458	31.7	6.9	38	454	21.6	6.4	448 - 469
Mercury-AE	µg/kg	139	13.9	10.0	39	136	9.2	2.8	134 - 143
Molybdenum-AE	mg/kg	0.550	0.0526	9.6	10	0.557	0.0370	0.0208	0.513 - 0.587
Nickel-AE	mg/kg	22.7	2.02	8.9	45	22.9	1.36	0.38	22.1 - 23.3
Phosphorus-AE	mg/kg	495	22.2	4.5	12	498	16.0	8.0	481 - 509
Strontium-AE	mg/kg	116	9.3	8.0	10	118	7.1	3.7	110 - 123
Zinc-AE	mg/kg	92.2	9.01	9.8	49	92.9	6.30	1.61	89.6 - 94.8

Consensus Values MS1

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	0.781	0.1208	15.5	23	0.811	0.0910	0.0315	0.729 - 0.833

Indicative Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Cadmium-RT	µg/kg	91.5	22.86	25.0	18	93.9	15.47	6.73	80.2 - 103
Calcium-RT	g/kg	37.7	2.70	7.2	9	37.1	2.10	1.13	35.6 - 39.7
Cerium-RT	mg/kg	49.8	0.33	0.7	4	49.7	0.25	0.20	49.32 - 50.22
Molybdenum-RT	mg/kg	0.725	0.2636	36.3	8	0.810	0.2166	0.1165	0.510 - 0.940
Phosphorus-RT	mg/kg	529	37.3	7.1	9	521	28.0	15.5	500 - 557
Potassium-RT	mg/kg	17300	340	2.0	7	17300	260	160	17009 - 17619
Rubidium-RT	mg/kg	71.6	10.25	14.3	7	73.4	6.58	4.84	62.5 - 80.8
Scandium-RT	mg/kg	8.30	0.552	6.7	5	8.42	0.390	0.309	7.66 - 8.93
Sodium-RT	mg/kg	14200	710	5.0	8	14000	570	310	13640 - 14790
Sulfur-RT	mg/kg	1210	338	27.9	5	1130	226	189	822 - 1599
Thallium-RT	µg/kg	443	43.7	9.9	5	434	27.4	24.5	393 - 493
Titanium-RT	mg/kg	2850	949	33.3	7	2860	702	448	2010 - 3700
Uranium-RT	mg/kg	1.99	0.329	16.5	7	2.06	0.230	0.155	1.70 - 2.28

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Aluminium-AE	%	2.31	1.102	47.6	30	2.38	0.785	0.252	1.90 - 2.72
Barium-AE	mg/kg	75.4	43.25	57.3	18	75.1	30.70	12.74	54.0 - 96.9
Potassium-AE	mg/kg	6470	3016	46.6	8	5890	1977	1333	4010 - 8930
Sodium-AE	mg/kg	7770	448	5.8	5	7810	343	250	7260 - 8290
Sulfur-AE	mg/kg	1500	9	0.6	4	1510	6	6	1492 - 1516
Thallium-AE	µg/kg	166	108.6	65.5	8	174	77.4	48.0	77.2 - 254
Uranium-AE	mg/kg	0.746	0.1017	13.6	9	0.772	0.0720	0.0424	0.669 - 0.823
Vanadium-AE	mg/kg	41.1	17.10	41.6	29	39.9	12.48	3.97	34.6 - 47.6

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Inorganic-Carbonate	%	1.21	0.267	22.1	13	1.28	0.203	0.093	1.05 - 1.37