QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 64

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 64

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 64 of Mix sediment from harbor and open sea from Rotterdam harbor / Barrow in Furness 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
2022.1	MS1	QTM139MS

Consensus Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Aluminium-RT	%	3.14	0.290	9.3	15	3.20	0.214	0.094	2.98 - 3.30
Arsenic-RT	mg/kg	12.1	0.98	8.1	14	12.3	0.68	0.33	11.6 - 12.7
Cadmium-RT	µg/kg	660	73.1	11.1	15	656	50.3	23.6	619 - 700
Chromium-RT	mg/kg	63.9	7.31	11.4	19	64.0	5.00	2.10	60.4 - 67.4
Copper-RT	mg/kg	24.0	2.73	11.4	19	23.8	1.90	0.78	22.7 - 25.3
Iron-RT	%	1.85	0.168	9.1	16	1.82	0.110	0.053	1.76 - 1.94
Lead-RT	mg/kg	42.1	3.12	7.4	18	41.3	2.15	0.92	40.5 - 43.6
Lithium-RT	mg/kg	30.9	3.89	12.6	12	31.3	2.55	1.40	28.5 - 33.4
Manganese-RT	mg/kg	623	77.7	12.5	15	642	53.0	25.1	581 - 666
Mercury-RT	µg/kg	320	15.7	4.9	14	320	11.5	5.2	311 - 329
Nickel-RT	mg/kg	22.4	3.08	13.8	17	22.0	2.00	0.93	20.8 - 24.0
Vanadium-RT	mg/kg	47.9	6.80	14.2	11	46.4	4.92	2.56	43.4 - 52.5
Zinc-RT	mg/kg	158	16.9	10.7	18	160	11.6	5.0	150 - 167

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Arsenic-AE	mg/kg	10.7	0.81	7.6	21	10.9	0.58	0.22	10.33 - 11.07
Cadmium-AE	µg/kg	605	47.6	7.9	19	596	34.0	13.6	582 - 628
Chromium-AE	mg/kg	44.4	8.10	18.2	20	43.4	5.25	2.26	40.6 - 48.2
Cobalt-AE	mg/kg	6.98	0.252	3.6	11	7.04	0.171	0.095	6.82 - 7.15
Copper-AE	mg/kg	22.5	1.63	7.2	21	22.4	1.13	0.44	21.7 - 23.2
Iron-AE	%	1.63	0.143	8.8	17	1.64	0.095	0.043	1.55 - 1.70
Lead-AE	mg/kg	37.0	2.81	7.6	20	37.2	1.83	0.78	35.7 - 38.3
Lithium-AE	mg/kg	24.3	1.33	5.5	11	24.0	1.00	0.50	23.4 - 25.2
Manganese-AE	mg/kg	585	41.6	7.1	18	580	28.0	12.2	565 - 606
Mercury-AE	µg/kg	301	16.1	5.3	18	301	10.5	4.7	293 - 309
Nickel-AE	mg/kg	20.7	1.95	9.4	20	20.6	1.37	0.54	19.8 - 21.6
Zinc-AE	mg/kg	149	11.5	7.8	21	147	8.2	3.1	143 - 154

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.42	0.217	15.3	12	1.45	0.155	0.078	1.28 - 1.55

Indicative Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Barium-RT	mg/kg	237	32.0	13.5	6	239	22.8	16.3	205 - 269
Calcium-RT	g/kg	44.0	12.69	28.9	6	45.5	9.32	6.48	31.3 - 56.6
Cobalt-RT	mg/kg	7.42	1.405	18.9	9	7.36	0.958	0.585	6.36 - 8.48
Magnesium-RT	mg/kg	6100	576	9.4	4	6050	387	360	5300 - 6900
Phosphorus-RT	mg/kg	722	123.5	17.1	5	700	94.1	69.0	580 - 864
Potassium-RT	mg/kg	11400	1370	11.9	5	10800	1020	760	9870 - 13010
Rubidium-RT	mg/kg	58.3	4.72	8.1	4	56.8	3.45	2.95	51.7 - 64.8
Strontium-RT	mg/kg	158	16.6	10.5	8	157	10.8	7.4	144 - 171

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Aluminium-AE	%	1.94	0.380	19.6	14	1.89	0.235	0.127	1.72 - 2.15
Barium-AE	mg/kg	116	33.6	28.9	13	122	24.0	11.7	96.1 - 136
Calcium-AE	g/kg	40.1	1.50	3.7	6	39.9	1.05	0.77	38.6 - 41.6
Magnesium-AE	mg/kg	5790	690	11.9	8	5730	475	305	5220 - 6350
Molybdenum-AE	mg/kg	1.02	0.196	19.2	6	1.04	0.120	0.100	0.822 - 1.21
Phosphorus-AE	mg/kg	666	67.3	10.1	8	671	45.0	29.7	612 - 721
Potassium-AE	mg/kg	4120	2167	52.6	5	3900	1564	1212	1630 - 6610
Scandium-AE	mg/kg	4.16	0.367	8.8	4	4.02	0.280	0.229	3.65 - 4.67
Sodium-AE	mg/kg	3490	309	8.9	4	3480	204	193	3059 - 3917
Strontium-AE	mg/kg	137	8.1	5.9	8	137	5.5	3.6	130 - 143
Thallium-AE	µg/kg	190	72.7	38.2	5	198	52.0	40.7	107 - 274
Titanium-AE	mg/kg	152	61.9	40.6	4	175	46.8	38.7	66.5 - 238
Vanadium-AE	mg/kg	36.3	8.79	24.2	15	39.1	5.90	2.84	31.4 - 41.1

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Inorganic-Carbonate	%	1.28	0.200	15.7	6	1.31	0.148	0.102	1.08 - 1.48