QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 52

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 52

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 52 of Estuarine sediment from Westerschelde estuary, the Netherlands 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
2019.2	MS1	QTM129MS

Consensus Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Arsenic-RT	mg/kg	11.5	1.15	10.1	10	11.5	0.85	0.46	10.6 - 12.3
Chromium-RT	mg/kg	31.0	3.82	12.3	11	31.8	2.60	1.44	28.4 - 33.5
Copper-RT	mg/kg	2.51	0.399	15.9	11	2.59	0.270	0.150	2.24 - 2.77
Iron-RT	%	1.60	0.068	4.3	10	1.60	0.045	0.027	1.55 - 1.64
Mercury-RT	µg/kg	21.0	3.29	15.7	10	20.8	2.40	1.30	18.7 - 23.3
Nickel-RT	mg/kg	4.98	0.449	9.0	10	5.01	0.322	0.178	4.67 - 5.30
Zinc-RT	mg/kg	27.6	1.42	5.2	11	27.2	0.95	0.53	26.6 - 28.5

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Arsenic-AE	mg/kg	11.6	1.38	11.9	19	11.6	1.00	0.39	10.9 - 12.2
Copper-AE	mg/kg	2.06	0.442	21.4	21	2.08	0.320	0.120	1.86 - 2.26
Iron-AE	%	1.38	0.272	19.7	20	1.41	0.195	0.076	1.25 - 1.50
Lead-AE	mg/kg	8.47	1.468	17.3	22	8.76	1.020	0.391	7.82 - 9.12
Manganese-AE	mg/kg	157	6.3	4.0	19	159	4.6	1.8	154.2 - 160.2
Mercury-AE	µg/kg	21.5	3.46	16.1	14	22.5	2.45	1.16	19.5 - 23.4
Nickel-AE	mg/kg	4.14	0.651	15.7	21	4.34	0.424	0.178	3.85 - 4.44
Zinc-AE	mg/kg	25.3	3.76	14.9	22	24.8	2.75	1.00	23.6 - 26.9

Indicative Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Aluminium-RT	%	1.32	0.305	23.0	11	1.33	0.214	0.115	1.12 - 1.53
Barium-RT	mg/kg	124	5.4	4.4	5	123	3.8	3.0	118 - 130
Cadmium-RT	µg/kg	54.5	5.95	10.9	5	56.0	4.52	3.33	47.6 - 61.3
Calcium-RT	g/kg	31.6	3.30	10.4	4	30.4	2.50	2.06	27.0 - 36.2
Cobalt-RT	mg/kg	2.28	0.071	3.1	5	2.30	0.050	0.040	2.20 - 2.36
Lead-RT	mg/kg	10.6	1.76	16.6	10	10.8	1.15	0.70	9.40 - 11.9
Lithium-RT	mg/kg	10.8	1.14	10.6	8	10.8	0.80	0.51	9.91 - 11.8
Magnesium-RT	mg/kg	3220	460	14.3	4	3240	299	287	2580 - 3860
Manganese-RT	mg/kg	165	9.6	5.8	9	164	7.0	4.0	157 - 172
Rubidium-RT	mg/kg	34.5	1.04	3.0	4	34.2	0.75	0.65	33.0 - 35.9
Strontium-RT	mg/kg	163	5.6	3.4	5	162	4.2	3.1	157 - 170
Titanium-RT	mg/kg	430	68.6	15.9	4	431	45.5	42.9	335 - 525
Vanadium-RT	mg/kg	26.4	1.38	5.2	7	27.0	1.05	0.65	25.1 - 27.6

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Aluminium-AE	%	0.631	0.1591	25.2	14	0.631	0.1065	0.0532	0.540 - 0.722
Barium-AE	mg/kg	9.87	6.699	67.8	6	9.02	4.453	3.419	3.18 - 16.6
Cadmium-AE	µg/kg	51.2	11.57	22.6	17	52.4	7.60	3.51	45.3 - 57.2
Calcium-AE	g/kg	32.0	0.59	1.8	6	31.9	0.40	0.30	31.5 - 32.6
Chromium-AE	mg/kg	25.8	5.88	22.8	19	25.6	4.10	1.69	22.9 - 28.6
Cobalt-AE	mg/kg	2.01	0.467	23.2	9	2.06	0.340	0.195	1.66 - 2.36
Lithium-AE	mg/kg	6.47	1.191	18.4	7	6.64	0.860	0.563	5.41 - 7.54
Magnesium-AE	mg/kg	2980	273	9.1	7	2960	180	129	2739 - 3226
Molybdenum-AE	mg/kg	0.287	0.0340	11.9	5	0.290	0.0260	0.0190	0.248 - 0.326
Phosphorus-AE	mg/kg	513	15.4	3.0	5	520	12.4	8.6	495 - 530
Selenium-AE	mg/kg	0.260	0.0997	38.4	4	0.257	0.0645	0.0623	0.121 - 0.398
Strontium-AE	mg/kg	146	7.9	5.4	4	149	6.0	4.9	135 - 157
Uranium-AE	mg/kg	0.617	0.0482	7.8	4	0.619	0.0300	0.0301	0.550 - 0.684
Vanadium-AE	mg/kg	23.9	4.62	19.3	12	24.5	3.14	1.67	21.0 - 26.8

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Inorganic-Carbonate	%	0.881	0.1272	14.4	7	0.910	0.0895	0.0601	0.767 - 0.995
TOC	%	0.257	0.0624	24.3	12	0.275	0.0480	0.0225	0.217 - 0.296