



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 31



Certificate of Analysis Sediment 31

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 % probability) 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 31 of harbor sediment from Zeebrugge, Belgium 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
2021.1	MS1	QTM135MS
2017.2	MS1	QTM121MS



Consensus Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Aluminium-RT	%	2.95	0.270	9.1	28	2.95	0.183	0.064	2.85	-	3.06
Arsenic-RT	mg/kg	11.7	1.43	12.1	26	11.7	0.97	0.35	11.2	-	12.3
Barium-RT	mg/kg	175	18.8	10.7	14	173	14.0	6.3	165	-	186
Cadmium-RT	µg/kg	249	23.2	9.3	21	247	16.1	6.3	238	-	259
Chromium-RT	mg/kg	54.5	7.32	13.4	29	54.5	4.93	1.70	51.7	-	57.3
Cobalt-RT	mg/kg	5.43	0.289	5.3	12	5.41	0.212	0.104	5.25	-	5.61
Copper-RT	mg/kg	10.1	0.76	7.5	31	10.0	0.52	0.17	9.86	-	10.42
Iron-RT	%	1.76	0.178	10.1	30	1.78	0.126	0.041	1.69	-	1.82
Lead-RT	mg/kg	24.4	2.78	11.4	28	23.5	2.06	0.66	23.3	-	25.4
Lithium-RT	mg/kg	28.6	3.69	12.9	21	28.8	2.50	1.01	27.0	-	30.3
Manganese-RT	mg/kg	405	35.4	8.7	29	406	24.5	8.2	392	-	418
Mercury-RT	µg/kg	104	16.2	15.5	26	104	10.8	4.0	97.8	-	111
Nickel-RT	mg/kg	14.3	1.80	12.6	31	14.2	1.26	0.40	13.6	-	14.9
Strontium-RT	mg/kg	440	63.3	14.4	12	444	46.2	22.9	401	-	480
Vanadium-RT	mg/kg	60.5	4.22	7.0	20	60.1	2.88	1.18	58.6	-	62.5
Zinc-RT	mg/kg	72.9	4.70	6.4	31	73.5	3.00	1.05	71.2	-	74.6

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Aluminium-AE	%	1.84	0.483	26.3	31	1.90	0.320	0.108	1.66	-	2.01
Arsenic-AE	mg/kg	10.5	1.27	12.1	43	10.6	0.90	0.24	10.12	-	10.90
Cadmium-AE	µg/kg	241	20.2	8.4	39	240	14.0	4.0	234	-	247
Chromium-AE	mg/kg	37.0	6.92	18.7	45	37.2	4.56	1.29	34.9	-	39.1
Cobalt-AE	mg/kg	4.82	0.493	10.2	22	4.88	0.335	0.131	4.60	-	5.03
Copper-AE	mg/kg	8.73	1.260	14.4	47	9.00	0.910	0.230	8.36	-	9.10
Iron-AE	%	1.65	0.120	7.2	41	1.66	0.083	0.023	1.62	-	1.69
Lead-AE	mg/kg	20.9	2.57	12.3	48	21.2	1.80	0.46	20.2	-	21.7
Lithium-AE	mg/kg	22.5	2.13	9.5	19	22.0	1.40	0.61	21.5	-	23.5
Magnesium-AE	mg/kg	7700	581	7.5	12	7730	416	210	7333	-	8063
Manganese-AE	mg/kg	376	26.2	7.0	40	374	18.5	5.2	368	-	384
Mercury-AE	µg/kg	105	14.5	13.9	41	104	10.0	2.8	100	-	110
Nickel-AE	mg/kg	12.6	1.27	10.1	47	12.7	0.89	0.23	12.25	-	13.00
Phosphorus-AE	mg/kg	669	47.7	7.1	12	672	32.3	17.2	639	-	699
Strontium-AE	mg/kg	419	30.7	7.3	13	415	21.8	10.6	401	-	438
Vanadium-AE	mg/kg	45.5	8.04	17.7	30	44.7	5.45	1.83	42.5	-	48.5
Zinc-AE	mg/kg	68.5	5.49	8.0	48	68.0	3.77	0.99	66.9	-	70.1



Consensus Values MS1





Consensus Values MS1

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Inorganic-Carbonate	%	3.39	0.286	8.5	14	3.43	0.200	0.096	3.22	-	3.55
TOC	%	1.12	0.136	12.1	25	1.13	0.100	0.034	1.07	-	1.18



Indicative Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Calcium-RT	g/kg	107	8.6	8.1	8	107	6.0	3.8	99.5	-	114
Magnesium-RT	mg/kg	7950	950	11.9	8	8050	650	420	7170	-	8720
Phosphorus-RT	mg/kg	718	109.0	15.2	8	716	77.5	48.2	629	-	807
Potassium-RT	mg/kg	11500	740	6.4	7	11300	590	350	10790	-	12110
Rubidium-RT	mg/kg	51.3	4.72	9.2	5	52.9	2.96	2.64	45.9	-	56.7
Scandium-RT	mg/kg	6.32	0.790	12.5	6	6.51	0.575	0.403	5.53	-	7.11
Sodium-RT	mg/kg	13200	1360	10.3	5	13600	1030	760	11680	-	14810

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Barium-AE	mg/kg	48.0	27.90	58.2	18	47.0	20.71	8.22	34.1	-	61.8
Calcium-AE	g/kg	106	2.5	2.3	9	106	1.5	1.0	103.7	-	107.4
Gallium-AE	µg/kg	5850	1709	29.2	5	5900	1130	955	3880	-	7810
Molybdenum-AE	mg/kg	0.362	0.0906	25.0	11	0.390	0.0680	0.0341	0.302	-	0.423
Potassium-AE	mg/kg	6210	1143	18.4	5	6640	757	639	4890	-	7520
Rubidium-AE	mg/kg	41.3	6.39	15.5	4	41.3	4.15	3.99	32.5	-	50.2
Scandium-AE	mg/kg	4.60	0.956	20.8	7	4.80	0.600	0.452	3.74	-	5.45
Selenium-AE	mg/kg	0.328	0.1859	56.7	12	0.355	0.1303	0.0671	0.211	-	0.445
Sodium-AE	mg/kg	10200	600	5.9	4	10200	420	380	9390	-	11060
Thallium-AE	µg/kg	203	114.5	56.4	9	217	88.0	47.7	117	-	289
Uranium-AE	mg/kg	0.708	0.0894	12.6	9	0.721	0.0610	0.0373	0.640	-	0.775