QUASIMEME

**Quality assurance of information
for marine environmental monitoring**

Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 38

WAGENINGEN
UNIVERSITY & RESEARCH

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 38 of Open sea sediment from Norwegian trench, Norway 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
2021.2	MS1	QTM136MS
2018.1	MS1	QTM123MS

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Aluminium-RT	%	6.10	0.593	9.7	25	6.13	0.410	0.148	5.86	-	6.35
Arsenic-RT	mg/kg	11.4	1.51	13.3	22	11.5	1.07	0.40	10.7	-	12.1
Barium-RT	mg/kg	331	45.3	13.7	10	323	34.0	17.9	299	-	363
Chromium-RT	mg/kg	82.1	8.10	9.9	26	82.4	5.73	1.99	78.9	-	85.4
Cobalt-RT	mg/kg	12.0	1.10	9.1	11	12.2	0.82	0.41	11.3	-	12.7
Copper-RT	mg/kg	15.6	1.59	10.2	27	15.7	1.13	0.38	15.0	-	16.2
Iron-RT	%	3.30	0.217	6.6	27	3.29	0.149	0.052	3.22	-	3.39
Lead-RT	mg/kg	39.9	4.12	10.3	24	38.8	2.78	1.05	38.1	-	41.6
Lithium-RT	mg/kg	54.3	6.02	11.1	20	52.7	4.23	1.68	51.5	-	57.1
Manganese-RT	mg/kg	454	25.9	5.7	23	454	17.0	6.8	442	-	465
Mercury-RT	µg/kg	45.4	5.73	12.6	21	45.6	4.06	1.56	42.8	-	48.0
Nickel-RT	mg/kg	36.4	3.99	11.0	26	36.5	2.70	0.98	34.8	-	38.0
Vanadium-RT	mg/kg	121	13.6	11.3	17	121	9.5	4.1	114	-	128
Zinc-RT	mg/kg	86.5	6.78	7.8	27	85.9	4.50	1.63	83.8	-	89.2

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Arsenic-AE	mg/kg	9.95	1.460	14.7	35	9.91	1.010	0.309	9.45	-	10.5
Cadmium-AE	µg/kg	109	21.6	19.9	31	105	14.6	4.9	101	-	117
Chromium-AE	mg/kg	61.3	13.74	22.4	35	63.4	9.58	2.90	56.6	-	66.0
Cobalt-AE	mg/kg	11.0	1.32	12.0	21	11.2	0.93	0.36	10.4	-	11.6
Copper-AE	mg/kg	15.4	1.35	8.8	36	15.3	0.96	0.28	15.0	-	15.9
Iron-AE	%	3.06	0.238	7.8	29	3.06	0.160	0.055	2.97	-	3.15
Lead-AE	mg/kg	34.7	2.73	7.9	36	34.8	1.85	0.57	33.8	-	35.6
Lithium-AE	mg/kg	51.2	3.48	6.8	18	51.1	2.40	1.02	49.5	-	52.9
Magnesium-AE	mg/kg	13400	980	7.3	11	13500	700	370	12770	-	14070
Manganese-AE	mg/kg	427	37.3	8.7	33	428	26.0	8.1	414	-	441
Nickel-AE	mg/kg	34.0	2.80	8.2	35	33.9	1.90	0.59	33.0	-	35.0
Phosphorus-AE	mg/kg	669	32.4	4.8	11	670	21.8	12.2	648	-	691
Strontium-AE	mg/kg	222	25.9	11.7	10	220	17.8	10.3	204	-	240
Vanadium-AE	mg/kg	89.6	14.94	16.7	25	91.1	9.90	3.73	83.5	-	95.8
Zinc-AE	mg/kg	84.0	5.72	6.8	36	83.5	3.78	1.19	82.0	-	85.9

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Inorganic-Carbonate	%	1.82	0.283	15.5	15	1.77	0.200	0.091	1.67	-	1.98

TOC	%	1.96	0.074	3.8	21	1.96	0.050	0.020	1.92 -	1.99

Indicative Values   MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Cadmium-RT	µg/kg	119	41.6	35.0	17	129	29.2	12.6	97.6	-	140
Calcium-RT	g/kg	59.7	2.84	4.8	6	60.3	1.97	1.45	56.8	-	62.5
Magnesium-RT	mg/kg	13900	1270	9.1	6	13700	920	650	12660	-	15190
Phosphorus-RT	mg/kg	689	75.1	10.9	6	686	54.0	38.3	614	-	764
Potassium-RT	mg/kg	22900	1100	4.8	5	23100	720	620	21630	-	24170
Rubidium-RT	mg/kg	101	8.6	8.5	6	101	5.9	4.4	92.8	-	110
Scandium-RT	mg/kg	11.7	0.20	1.7	4	11.8	0.15	0.12	11.46	-	12.00
Sodium-RT	mg/kg	19800	1260	6.3	4	19800	820	780	18040	-	21520
Strontium-RT	mg/kg	256	20.2	7.9	8	254	13.6	8.9	240	-	273
Titanium-RT	mg/kg	3830	273	7.1	4	3830	184	171	3456	-	4214
Uranium-RT	mg/kg	2.54	0.174	6.8	5	2.58	0.120	0.097	2.34	-	2.74

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Aluminium-AE	%	3.81	1.300	34.1	23	3.85	0.900	0.339	3.25	-	4.37
Barium-AE	mg/kg	124	48.4	39.1	13	138	35.1	16.8	95.0	-	153
Calcium-AE	g/kg	56.6	2.51	4.4	6	56.0	1.80	1.28	54.1	-	59.1
Gallium-AE	µg/kg	13300	3430	25.8	4	13400	2300	2140	8520	-	18040
Mercury-AE	µg/kg	44.1	12.77	28.9	32	46.0	9.20	2.82	39.5	-	48.7
Molybdenum-AE	mg/kg	0.552	0.0628	11.4	9	0.548	0.0480	0.0262	0.504	-	0.599
Selenium-AE	mg/kg	0.975	0.3967	40.7	8	0.930	0.2552	0.1753	0.651	-	1.30
Thallium-AE	µg/kg	309	157.6	51.0	9	337	115.6	65.6	190	-	428
Uranium-AE	mg/kg	1.53	0.189	12.3	4	1.54	0.135	0.118	1.27	-	1.80