



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 53



Certificate of Analysis Sediment 53

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 53 of Open sea sediment from Open sea sediment near 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
2021.1	MS1	QTM134MS



Consensus Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Aluminium-RT	%	2.06	0.103	5.0	15	2.06	0.072	0.033	2.00	- 2.11
Arsenic-RT	mg/kg	9.34	1.122	12.0	14	9.20	0.770	0.375	8.70	- 9.99
Chromium-RT	mg/kg	32.8	4.21	12.8	17	32.6	2.96	1.28	30.7	- 35.0
Cobalt-RT	mg/kg	4.44	0.428	9.6	10	4.46	0.296	0.169	4.14	- 4.74
Copper-RT	mg/kg	6.04	0.533	8.8	16	6.06	0.384	0.167	5.75	- 6.32
Iron-RT	%	1.17	0.098	8.4	17	1.17	0.070	0.030	1.12	- 1.22
Lead-RT	mg/kg	19.2	1.21	6.3	15	19.2	0.86	0.39	18.5	- 19.9
Manganese-RT	mg/kg	286	19.1	6.7	15	286	13.4	6.1	275	- 296
Mercury-RT	µg/kg	82.6	9.12	11.0	14	82.9	6.45	3.05	77.4	- 87.8
Nickel-RT	mg/kg	11.1	0.66	5.9	17	11.1	0.45	0.20	10.79	- 11.46
Vanadium-RT	mg/kg	35.3	3.82	10.8	12	34.2	2.62	1.38	32.9	- 37.7
Zinc-RT	mg/kg	41.1	2.17	5.3	17	41.1	1.40	0.66	40.0	- 42.2

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Aluminium-AE	%	0.979	0.1807	18.5	15	1.000	0.1100	0.0583	0.879	- 1.08
Arsenic-AE	mg/kg	7.87	0.908	11.5	19	7.77	0.600	0.260	7.43	- 8.30
Cadmium-AE	µg/kg	39.3	4.20	10.7	12	39.6	2.85	1.52	36.7	- 42.0
Chromium-AE	mg/kg	21.7	3.18	14.7	19	22.0	2.01	0.91	20.1	- 23.2
Cobalt-AE	mg/kg	3.96	0.463	11.7	10	3.99	0.310	0.183	3.64	- 4.29
Copper-AE	mg/kg	4.74	0.628	13.3	20	4.72	0.425	0.175	4.44	- 5.03
Iron-AE	%	1.08	0.068	6.3	18	1.07	0.047	0.020	1.05	- 1.11
Lead-AE	mg/kg	15.0	1.38	9.1	20	15.2	0.95	0.38	14.4	- 15.7
Manganese-AE	mg/kg	258	18.5	7.2	17	260	12.2	5.6	249	- 268
Mercury-AE	µg/kg	89.8	12.29	13.7	17	88.0	8.40	3.73	83.5	- 96.1
Nickel-AE	mg/kg	9.89	1.045	10.6	20	9.90	0.705	0.292	9.41	- 10.4
Vanadium-AE	mg/kg	25.3	3.85	15.2	14	25.1	2.45	1.29	23.1	- 27.5
Zinc-AE	mg/kg	37.9	2.71	7.2	20	38.1	1.80	0.76	36.7	- 39.2

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
TOC	%	0.263	0.0308	11.7	11	0.274	0.0245	0.0116	0.242	- 0.283



Indicative Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Barium-RT	mg/kg	199	9.2	4.6	8	199	7.0	4.1	192	-	207
Cadmium-RT	µg/kg	53.8	22.16	41.2	11	57.3	15.60	8.35	39.1	-	68.5
Calcium-RT	g/kg	27.6	3.00	10.9	6	28.1	2.00	1.53	24.6	-	30.6
Lithium-RT	mg/kg	18.3	2.50	13.6	9	18.4	1.72	1.04	16.4	-	20.2
Magnesium-RT	mg/kg	4550	296	6.5	6	4550	184	151	4255	-	4846
Molybdenum-RT	mg/kg	0.666	0.1085	16.3	4	0.708	0.0835	0.0678	0.515	-	0.817
Phosphorus-RT	mg/kg	291	28.3	9.7	4	300	20.2	17.7	252	-	331
Potassium-RT	mg/kg	9540	324	3.4	5	9530	227	181	9165	-	9910
Rubidium-RT	mg/kg	37.6	1.11	2.9	4	37.3	0.80	0.69	36.1	-	39.2
Scandium-RT	mg/kg	3.83	0.650	17.0	4	4.09	0.500	0.406	2.93	-	4.74
Sodium-RT	mg/kg	6400	837	13.1	4	6180	584	523	5240	-	7560
Strontium-RT	mg/kg	128	11.4	8.9	8	127	7.6	5.0	119	-	137

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Barium-AE	mg/kg	46.9	18.48	39.4	9	53.0	12.80	7.70	32.9	-	60.8
Calcium-AE	g/kg	25.8	0.24	0.9	5	25.9	0.20	0.14	25.49	-	26.04
Lithium-AE	mg/kg	12.1	1.66	13.7	8	12.3	1.15	0.74	10.8	-	13.5
Magnesium-AE	mg/kg	4290	145	3.4	7	4300	100	69	4157	-	4417
Molybdenum-AE	mg/kg	0.508	0.0167	3.3	5	0.500	0.0140	0.0094	0.489	-	0.527
Phosphorus-AE	mg/kg	292	25.5	8.7	7	290	19.0	12.0	269	-	314
Scandium-AE	mg/kg	2.46	0.066	2.7	4	2.49	0.050	0.041	2.37	-	2.56
Strontium-AE	mg/kg	92.8	19.88	21.4	7	94.5	14.50	9.39	75.0	-	111
Thallium-AE	µg/kg	90.7	37.90	41.8	4	90.0	25.00	23.69	38.1	-	143
Uranium-AE	mg/kg	0.472	0.1212	25.7	4	0.488	0.0790	0.0757	0.304	-	0.640

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Inorganic-Carbonate	%	0.832	0.1874	22.5	7	0.845	0.1280	0.0885	0.665	-	1.000