



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 33



Certificate of Analysis Sediment 33

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 33 of Open sea sediment from Burbo bight, United Kingdom 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
2020.2	MS1	QTM133MS
2016.2	MS1	QTM117MS
2015.2	MS1	QTM113MS



Consensus Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Aluminium-RT	%	1.96	0.239	12.2	52	1.98	0.170	0.041	1.90	- 2.03
Arsenic-RT	mg/kg	8.32	0.812	9.8	46	8.42	0.559	0.150	8.07	- 8.56
Barium-RT	mg/kg	162	15.6	9.6	20	162	10.5	4.4	154	- 169
Cadmium-RT	µg/kg	77.5	23.08	29.8	37	76.4	16.67	4.74	69.8	- 85.1
Chromium-RT	mg/kg	60.1	7.95	13.2	51	59.7	5.50	1.39	57.9	- 62.3
Cobalt-RT	mg/kg	5.76	0.548	9.5	22	5.81	0.375	0.146	5.52	- 6.00
Copper-RT	mg/kg	10.3	0.91	8.9	49	10.4	0.62	0.16	10.01	- 10.53
Iron-RT	%	1.34	0.105	7.9	51	1.34	0.070	0.018	1.31	- 1.37
Lead-RT	mg/kg	28.1	3.66	13.0	47	27.7	2.60	0.67	27.1	- 29.2
Lithium-RT	mg/kg	21.0	2.85	13.6	42	20.6	1.84	0.55	20.1	- 21.9
Magnesium-RT	mg/kg	4890	283	5.8	12	4940	213	102	4711	- 5067
Manganese-RT	mg/kg	476	41.3	8.7	44	480	29.1	7.8	463	- 488
Mercury-RT	µg/kg	137	18.1	13.2	44	133	12.2	3.4	131	- 142
Nickel-RT	mg/kg	22.4	2.60	11.6	51	22.3	1.80	0.45	21.6	- 23.1
Phosphorus-RT	mg/kg	315	19.3	6.1	13	317	14.0	6.7	304	- 327
Potassium-RT	mg/kg	7860	553	7.0	10	7850	360	219	7474	- 8253
Strontium-RT	mg/kg	126	13.4	10.6	18	128	8.9	3.9	119	- 133
Vanadium-RT	mg/kg	32.4	3.08	9.5	32	32.7	2.00	0.68	31.3	- 33.6
Zinc-RT	mg/kg	81.7	7.48	9.2	50	81.5	4.92	1.32	79.6	- 83.8

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits	
Arsenic-AE	mg/kg	7.47	0.993	13.3	63	7.40	0.684	0.156	7.22	- 7.72
Cadmium-AE	µg/kg	68.1	14.71	21.6	51	69.1	9.90	2.58	63.9	- 72.2
Chromium-AE	mg/kg	47.0	6.97	14.8	64	47.6	4.76	1.09	45.2	- 48.7
Cobalt-AE	mg/kg	5.32	0.817	15.3	29	5.40	0.600	0.190	5.01	- 5.63
Copper-AE	mg/kg	9.36	0.944	10.1	69	9.41	0.610	0.142	9.13	- 9.59
Iron-AE	%	1.23	0.086	7.0	55	1.24	0.060	0.015	1.21	- 1.26
Lead-AE	mg/kg	24.8	3.11	12.6	68	24.9	2.10	0.47	24.1	- 25.6
Lithium-AE	mg/kg	13.8	1.73	12.6	27	13.8	1.20	0.42	13.1	- 14.5
Magnesium-AE	mg/kg	4550	445	9.8	13	4580	314	154	4286	- 4820
Manganese-AE	mg/kg	455	30.8	6.8	58	453	20.8	5.1	447	- 463
Mercury-AE	µg/kg	135	22.5	16.7	59	138	16.0	3.7	129	- 141
Nickel-AE	mg/kg	20.7	2.58	12.5	66	20.7	1.76	0.40	20.0	- 21.3
Phosphorus-AE	mg/kg	284	28.4	10.0	10	280	20.9	11.2	264	- 304
Strontium-AE	mg/kg	100	5.7	5.7	11	101	4.0	2.2	96.7	- 104.3



Consensus Values MS1

Vanadium-AE	mg/kg	23.7	4.45	18.8	36	23.4	3.13	0.93	22.2	-	25.2
Method: Acid extractable (So-called totals) - MS1											
(cont.)											

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Zinc-AE	mg/kg	78.0	5.13	6.6	68	77.9	3.45	0.78	76.7	-	79.2

Method: Carbon - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Inorganic-Carbonate	%	0.815	0.1282	15.7	17	0.816	0.0910	0.0389	0.749	-	0.880
TOC	%	0.399	0.1139	28.5	40	0.420	0.0800	0.0225	0.363	-	0.436



Indicative Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Calcium-RT	g/kg	27.2	3.12	11.5	9	27.8	2.08	1.30	24.8	-	29.5
Molybdenum-RT	mg/kg	3.01	0.532	17.6	6	3.15	0.404	0.271	2.48	-	3.54
Rubidium-RT	mg/kg	32.8	3.83	11.7	7	32.1	2.85	1.81	29.4	-	36.2
Scandium-RT	mg/kg	4.30	1.607	37.4	8	4.37	1.180	0.710	2.99	-	5.61
Sodium-RT	mg/kg	6490	116	1.8	7	6510	75	55	6385	-	6592
Sulfur-RT	mg/kg	820	63.6	7.8	6	817	44.0	32.5	756	-	883
Titanium-RT	mg/kg	1110	179	16.1	8	1090	123	79	962	-	1253
Uranium-RT	mg/kg	0.895	0.0646	7.2	6	0.900	0.0435	0.0330	0.831	-	0.960

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Aluminium-AE	%	0.968	0.3304	34.1	40	1.025	0.2260	0.0653	0.862	-	1.07
Barium-AE	mg/kg	39.9	19.32	48.4	22	42.1	12.92	5.15	31.3	-	48.4
Calcium-AE	g/kg	25.7	1.05	4.1	9	25.7	0.60	0.44	24.9	-	26.5
Gallium-AE	µg/kg	4170	648	15.6	5	3920	450	362	3420	-	4910
Molybdenum-AE	mg/kg	2.60	0.561	21.6	8	2.50	0.400	0.248	2.14	-	3.05
Thallium-AE	µg/kg	55.4	21.94	39.6	7	55.4	15.14	10.36	35.8	-	75.0
Titanium-AE	mg/kg	133	46.1	34.6	4	131	28.5	28.8	69.1	-	197
Uranium-AE	mg/kg	0.376	0.0711	18.9	7	0.390	0.0498	0.0336	0.313	-	0.440