



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 27



Certificate of Analysis Sediment 27

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, the 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 8 results and a maximum relative uncertainty of 6.25%. Indicative Values are based on a maximum relative uncertainty of 35% and a minimum of 4 and maximum of 7 results, or a relative uncertainty greater than 6.25% when there are at least 8 results.

For each determinand the following parameters are given: mean, standard deviation, coefficient of variation, number of results, median, MAD (Median of Absolute Deviation), the uncertainty of the mean (consensus or indicative) value and the relative uncertainty.

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 °C and milled to pass a 0.5 mm sieve.

This Sediment sample 27 of River sediment from Elbe river, Germany 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
2024.1	MS1	QTM146MS
2020.2	MS1	QTM132MS
2017.2	MS1	QTM120MS
2015.1	MS1	QTM111MS



Consensus Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Aluminium-RT	%	4.52	0.503	11.1	59	4.50	0.290	0.082	1.81
Arsenic-RT	mg/kg	21.7	2.60	12.0	54	21.9	1.70	0.442	2.04
Cadmium-RT	µg/kg	5002	423	8.5	55	4990	240	71.3	1.43
Chromium-RT	mg/kg	82.9	8.57	10.3	58	82.4	5.36	1.41	1.70
Copper-RT	mg/kg	92.1	7.77	8.4	59	92.6	5.75	1.26	1.37
Iron-RT	%	2.84	0.198	7.0	59	2.80	0.130	0.032	1.14
Lead-RT	mg/kg	116	10.2	8.8	56	116	6.00	1.70	1.47
Lithium-RT	mg/kg	36.7	3.57	9.7	50	36.2	2.30	0.631	1.72
Manganese-RT	mg/kg	674	65.8	9.8	57	672	51.0	10.9	1.62
Mercury-RT	µg/kg	1916	171	8.9	48	1900	100	30.8	1.61
Nickel-RT	mg/kg	40.5	4.16	10.3	60	40.2	2.77	0.672	1.66
Zinc-RT	mg/kg	1164	89.6	7.7	60	1159	51.0	14.5	1.24
Sodium-RT	mg/kg	6039	356	5.9	10	5954	212	141	2.33
Magnesium-RT	mg/kg	7193	603	8.4	16	7151	333	188	2.62
Phosphorus-RT	mg/kg	2261	223	9.9	17	2284	106	67.7	2.99
Potassium-RT	mg/kg	16984	1350	8.0	15	16997	823	436	2.57
Titanium-RT	mg/kg	3509	322	9.2	10	3515	131	127	3.62
Barium-RT	mg/kg	518	52.5	10.1	31	524	33.4	11.8	2.27
Calcium-RT	g/kg	43.9	4.26	9.7	14	44.9	2.15	1.42	3.24
Vanadium-RT	mg/kg	61.5	5.53	9.0	39	61.3	2.85	1.11	1.80
Cobalt-RT	mg/kg	16.3	1.42	8.7	27	16.2	0.820	0.342	2.10
Rubidium-RT	mg/kg	88.7	6.11	6.9	11	88.1	3.18	2.30	2.59
Strontium-RT	mg/kg	216	19.9	9.2	24	217	11.6	5.07	2.35
Uranium-RT	mg/kg	3.08	0.375	12.2	10	3.17	0.245	0.148	4.82

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Aluminium-AE	%	2.29	0.606	26.4	61	2.29	0.410	0.097	4.23
Arsenic-AE	mg/kg	20.7	2.15	10.4	84	20.8	1.30	0.293	1.41
Cadmium-AE	µg/kg	5027	285	5.7	85	5010	190	38.7	0.769
Chromium-AE	mg/kg	59.8	7.63	12.8	84	60.0	4.77	1.04	1.74
Copper-AE	mg/kg	92.2	6.68	7.3	88	92.7	4.11	0.891	0.966
Iron-AE	%	2.60	0.198	7.6	74	2.59	0.128	0.029	1.11
Lead-AE	mg/kg	113	8.39	7.4	91	112	5.80	1.10	0.974
Lithium-AE	mg/kg	29.2	2.98	10.2	40	29.3	1.54	0.590	2.02
Manganese-AE	mg/kg	622	36.5	5.9	75	620	23.5	5.27	0.847



Consensus Values MS1

Mercury-AE	µg/kg	1915	170	8.9	84	1920	104	23.2	1.21
Method: Acid extractable (So-called totals) - MS1									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Nickel-AE	mg/kg	37.9	2.92	7.7	89	37.8	1.84	0.388	1.02
Zinc-AE	mg/kg	1133	85.8	7.6	91	1128	62.0	11.2	0.992
Magnesium-AE	mg/kg	6312	547	8.7	28	6293	342	129	2.05
Phosphorus-AE	mg/kg	2235	137	6.1	23	2247	85.2	35.6	1.59
Sulfur-AE	mg/kg	3056	106	3.5	8	3040	70.0	46.8	1.53
Barium-AE	mg/kg	259	31.3	12.1	43	260	21.1	5.96	2.31
Thallium-AE	µg/kg	922	122	13.2	18	932	72.5	35.9	3.89
Calcium-AE	g/kg	43.1	3.38	7.8	22	42.9	1.96	0.900	2.09
Vanadium-AE	mg/kg	41.6	9.05	21.7	55	40.8	7.28	1.53	3.66
Cobalt-AE	mg/kg	14.9	1.22	8.2	43	15.0	0.800	0.233	1.57
Strontium-AE	mg/kg	162	13.0	8.0	30	164	8.18	2.98	1.84
Molybdenum-AE	mg/kg	0.787	0.094	12.0	21	0.800	0.059	0.026	3.27
Uranium-AE	mg/kg	1.47	0.269	18.3	16	1.50	0.153	0.084	5.72
Method: Carbon - MS1									
Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	4.42	0.443	10.0	46	4.44	0.283	0.082	1.85
Inorganic-Carbonate	%	1.22	0.203	16.6	20	1.24	0.107	0.057	4.65



Indicative Values MS1

Method: Real totals - MS1

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Scandium-RT	mg/kg	7.52	1.74	23.1	10	7.60	0.850	0.688	9.14
Sulfur-RT	mg/kg	2755	1454	52.8	6	3069	565	742	26.9
Gallium-RT	µg/kg	11837	1409	11.9	5	12326	946	788	6.65
Selenium-RT	mg/kg	1.65	0.140	8.5	4	1.66	0.065	0.088	5.32
Cesium-RT	µg/kg	8674	553	6.4	7	8520	414	261	3.01
Thallium-RT	µg/kg	1195	133	11.1	6	1198	83.5	67.8	5.68
Molybdenum-RT	mg/kg	1.15	0.212	18.4	11	1.23	0.130	0.080	6.95
Cerium-RT	mg/kg	64.4	1.22	1.9	5	64.2	0.590	0.682	1.06

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

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Scandium-AE	mg/kg	4.90	2.03	41.3	8	5.30	1.16	0.896	18.3
Sodium-AE	mg/kg	548	112	20.4	12	542	65.3	40.4	7.36
Potassium-AE	mg/kg	4221	2131	50.5	15	4015	1804	688	16.3
Titanium-AE	mg/kg	487	119	24.3	14	512	74.3	39.6	8.13
Gallium-AE	µg/kg	7807	3297	42.2	10	8114	2170	1303	16.7
Selenium-AE	mg/kg	1.68	0.506	30.1	23	1.62	0.380	0.132	7.85
Cesium-AE	µg/kg	7319	801	10.9	7	7325	475	378	5.17
Rubidium-AE	mg/kg	42.6	19.8	46.5	6	39.8	10.3	10.1	23.8
Cerium-AE	mg/kg	49.2	11.4	23.2	6	49.9	4.46	5.82	11.8