



QUASIMEME

Quality assurance of information
for marine environmental monitoring

Certificate of Analysis



Sediment

REFERENCE MATERIAL

Sediment sample 41



Certificate of Analysis Sediment 41

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.

Please note: Most WEPAL-QUASIMEME reference materials are found to be stable over the long term (>10 years) for most determinand/matrix combinations. There are a few exceptions known to us as being less stable over the long term. These are organotins in sediment (MS6), ASP in shellfish (BT7), some PAHs and PCBs in sediment (SETOC) and N-NH₄ (as N) in clay soils (ISE).

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 41 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
2019.2	MS2	QOR140MS
2018.1	MS2	QOR134MS
2021.2	MS3	QPH111MS
2019.2	MS3	QPH103MS
2017.1	MS3	QPH094MS
2017.1	MS7	QBC051MS



Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
pp'-DDE	µg/kg	0.160	0.031	19.5	25	0.163	0.021	0.008	4.87
HCB	µg/kg	0.095	0.021	21.7	20	0.099	0.011	0.006	6.06
PCB28	µg/kg	0.136	0.026	19.1	17	0.137	0.015	0.008	5.80
PCB180	µg/kg	0.607	0.169	27.9	34	0.612	0.109	0.036	5.97

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	1.97	0.105	5.3	24	1.96	0.055	0.027	1.35



Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
a-HCH	µg/kg	0.026	0.040	152.0	12	0.031	0.020	0.014	54.8
g-HCH	µg/kg	0.018	0.015	79.8	10	0.022	0.009	0.006	31.5
Dieldrin	µg/kg	0.069	0.044	64.2	8	0.098	0.034	0.020	28.4
pp'-DDT	µg/kg	0.054	0.055	103.1	17	0.070	0.032	0.017	31.3
pp'-DDD	µg/kg	0.128	0.030	23.6	22	0.138	0.015	0.008	6.28
PCB31	µg/kg	0.131	0.041	30.9	24	0.137	0.032	0.010	7.87
PCB52	µg/kg	0.733	0.264	36.1	36	0.796	0.145	0.055	7.52
PCB101	µg/kg	0.979	0.300	30.7	34	1.02	0.181	0.064	6.57
PCB105	µg/kg	0.147	0.063	43.0	21	0.156	0.059	0.017	11.7
PCB118	µg/kg	0.549	0.178	32.5	34	0.555	0.106	0.038	6.97
PCB138+PCB163	µg/kg	1.16	0.224	19.3	8	1.13	0.139	0.099	8.55
PCB153	µg/kg	1.03	0.302	29.4	34	1.04	0.168	0.065	6.29
PCB156	µg/kg	0.074	0.034	45.9	17	0.072	0.028	0.010	13.9
PCB138	µg/kg	0.921	0.268	29.1	32	0.981	0.197	0.059	6.42
PCB49	µg/kg	0.228	0.027	11.7	5	0.226	0.012	0.015	6.55
PCB66	µg/kg	0.287	0.117	40.7	4	0.291	0.057	0.073	25.4
PCB110	µg/kg	0.757	0.149	19.7	4	0.750	0.093	0.093	12.3
PCB128	µg/kg	0.113	0.024	20.8	6	0.113	0.014	0.012	10.6
PCB149	µg/kg	0.886	0.208	23.5	5	0.902	0.181	0.116	13.1
PCB170	µg/kg	0.325	0.116	35.7	6	0.331	0.061	0.059	18.2
PCB183	µg/kg	0.130	0.046	35.0	4	0.132	0.029	0.029	21.9
PCB187	µg/kg	0.318	0.082	25.9	4	0.319	0.058	0.052	16.2
PCB141	µg/kg	0.220	0.049	22.2	4	0.220	0.032	0.031	13.9

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.247	0.010	4.0	6	0.246	0.007	0.005	2.05



Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Chrysene + Triphenylene	µg/kg	31.6	6.67	21.1	23	32.1	4.80	1.74	5.50
Benzo[e]pyrene	µg/kg	59.7	13.2	22.1	46	58.2	9.64	2.43	4.08
Indeno[1,2,3-cd]pyrene	µg/kg	113	33.2	29.4	71	115	18.8	4.92	4.37
Phenanthrene	µg/kg	41.1	12.5	30.3	68	43.7	7.94	1.89	4.59
Pyrene	µg/kg	32.8	7.47	22.8	70	32.9	5.13	1.12	3.40
Benzo[g,h,i]perylene	µg/kg	90.9	26.5	29.1	72	90.1	18.5	3.90	4.29
Fluoranthene	µg/kg	42.0	8.78	20.9	73	42.5	6.04	1.29	3.06
Benzo[a]anthracene	µg/kg	21.6	6.19	28.6	68	22.1	3.51	0.938	4.34
Benzo[b]fluoranthene	µg/kg	97.4	31.5	32.3	63	100	23.7	4.95	5.09
Benzo[a]pyrene	µg/kg	27.0	7.14	26.4	71	27.6	5.35	1.06	3.92
Dibenz[a,h]anthracene	µg/kg	17.1	5.40	31.5	67	17.4	3.40	0.824	4.81
Benzo[k]fluoranthene	µg/kg	37.7	9.56	25.4	64	38.9	5.56	1.49	3.97
Fluorene	µg/kg	6.02	2.26	37.5	59	6.60	1.60	0.367	6.10
Perylene	µg/kg	17.8	5.13	28.9	41	18.3	3.26	1.00	5.64
Chrysene	µg/kg	23.8	4.97	20.8	55	24.6	3.09	0.837	3.51

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
TOC	%	1.96	0.148	7.6	36	1.96	0.080	0.031	1.58

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
PN	%	0.250	0.016	6.4	13	0.254	0.012	0.006	2.21



Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Naphthalene	µg/kg	19.9	8.63	43.4	65	20.3	5.30	1.34	6.72
Anthracene	µg/kg	4.48	1.87	41.8	63	4.45	1.18	0.295	6.58
Acenaphthene	µg/kg	2.09	0.839	40.1	52	2.20	0.505	0.145	6.94
Acenaphthylene	µg/kg	2.07	1.29	62.2	46	2.42	0.796	0.237	11.5
Benzo[a]fluorene	µg/kg	6.20	1.92	30.9	6	6.22	1.02	0.978	15.8
Dibenzothiophene	µg/kg	3.85	1.43	37.2	31	3.80	0.980	0.321	8.35
3-6-dimethylphenanthrene	µg/kg	2.72	0.966	35.5	14	2.81	0.815	0.323	11.9
2-methylphenanthrene	µg/kg	17.4	5.48	31.4	21	18.2	3.64	1.50	8.58
1-methylpyrene	µg/kg	5.88	2.88	48.9	6	5.84	1.10	1.47	24.9
Triphenylene	µg/kg	10.0	2.95	29.4	17	9.38	1.88	0.893	8.90
Benzo[fluoranthenes (a+b+j+k)	µg/kg	152	22.9	15.1	8	148	16.1	10.1	6.66
Benzo[fluoranthenes (b+j)	µg/kg	139	33.2	23.8	7	135	18.8	15.7	11.2
C1-phenanthr.+anthrac.	µg/kg	47.4	13.9	29.4	21	45.4	9.46	3.80	8.03
C2-phenanthr.+anthrac.	µg/kg	34.2	11.6	34.0	20	33.5	5.76	3.25	9.50
C3-phenanthr.+anthrac.	µg/kg	20.2	7.06	35.0	15	21.0	4.08	2.28	11.3
C1-pyrenes+fluoranthenes	µg/kg	38.5	17.5	45.4	16	38.7	10.5	5.46	14.2
C2-pyrenes+fluoranthenes	µg/kg	35.1	13.3	37.9	8	36.3	8.46	5.88	16.8
C1-chrysenes	µg/kg	34.7	13.5	38.9	14	34.7	9.68	4.51	13.0
C2-chrysenes	µg/kg	32.2	21.9	68.2	11	30.7	16.4	8.27	25.7
C1-benzo[fluoranthenes	µg/kg	84.5	11.2	13.2	5	86.7	6.41	6.25	7.40
C1-naphtalenes	µg/kg	66.5	26.2	39.4	8	62.2	16.2	11.6	17.4
C2-naphtalenes	µg/kg	63.1	28.1	44.5	12	64.4	16.9	10.1	16.1
C3-naphtalenes	µg/kg	51.8	32.3	62.3	12	55.4	21.2	11.6	22.5
C1-dibenzothiophenes	µg/kg	6.30	1.27	20.1	7	6.38	0.720	0.598	9.50
C2-dibenzothiophenes	µg/kg	7.34	2.07	28.3	7	7.50	1.81	0.980	13.4
C3-dibenzothiophenes	µg/kg	5.53	1.38	24.9	6	5.66	0.909	0.702	12.7
1-methylphenanthrene	µg/kg	12.6	4.63	36.6	8	13.2	2.23	2.04	16.2
1-methylnaphtalene	µg/kg	23.2	10.8	46.8	19	24.9	7.75	3.11	13.4
2-methylnaphtalene	µg/kg	26.9	11.3	42.0	19	27.9	8.01	3.24	12.1

Method: Total petroleum hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
Total petroleum hydrocarbons	mg/kg	34.5	8.83	25.6	6	32.9	4.27	4.51	13.1



Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	Rel.Uncert. %
BDE047	µg/kg	0.051	0.075	145.7	8	0.061	0.038	0.033	64.4
BDE099	µg/kg	0.038	0.032	85.2	8	0.039	0.018	0.014	37.7
BDE209	µg/kg	0.346	0.095	27.4	8	0.353	0.045	0.042	12.1