QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 41

WAGENINGEN
UNIVERSITY & RESEARCH

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 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 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
2021.2	MS3	QPH111MS
2019.2	MS2	QOR140MS
2019.2	MS3	QPH103MS
2018.1	MS2	QOR134MS
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	95 % confidence limits
PCB28	µg/kg	0.137	0.0215	15.7	17	0.137	0.0150	0.0065	0.126 - 0.148
PCB153	µg/kg	1.02	0.247	24.3	34	1.04	0.168	0.053	0.931 - 1.10
PCB180	µg/kg	0.604	0.1534	25.4	34	0.612	0.1090	0.0329	0.551 - 0.658
HCB	µg/kg	0.0951	0.0157	16.5	20	0.0985	0.0110	0.0044	0.0878 - 0.102
pp'-DDD	µg/kg	0.132	0.0233	17.7	22	0.138	0.0150	0.0062	0.121 - 0.142
pp'-DDE	µg/kg	0.160	0.0293	18.3	25	0.163	0.0210	0.0073	0.148 - 0.172

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.97	0.077	3.9	24	1.96	0.055	0.020	1.94 - 2.00

Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB31	µg/kg	0.132	0.0439	33.2	24	0.137	0.0320	0.0112	0.114 - 0.151
PCB49	µg/kg	0.227	0.0183	8.0	5	0.226	0.0120	0.0102	0.206 - 0.249
PCB52	µg/kg	0.741	0.2250	30.4	36	0.796	0.1450	0.0469	0.665 - 0.817
PCB66	µg/kg	0.292	0.0862	29.5	4	0.291	0.0570	0.0539	0.173 - 0.412
PCB101	µg/kg	0.982	0.2955	30.1	34	1.018	0.1806	0.0633	0.879 - 1.08
PCB105	µg/kg	0.146	0.0805	55.0	21	0.156	0.0590	0.0220	0.110 - 0.183
PCB110	µg/kg	0.755	0.1358	18.0	4	0.750	0.0930	0.0848	0.567 - 0.944
PCB118	µg/kg	0.556	0.1657	29.8	34	0.555	0.1056	0.0355	0.498 - 0.614
PCB128	µg/kg	0.112	0.0207	18.5	6	0.113	0.0140	0.0106	0.0913 - 0.133
PCB138+PCB163	µg/kg	1.16	0.224	19.4	8	1.13	0.139	0.099	0.977 - 1.34
PCB138	µg/kg	0.925	0.2808	30.4	32	0.981	0.1970	0.0620	0.823 - 1.03
PCB141	µg/kg	0.220	0.0460	20.9	4	0.220	0.0315	0.0287	0.156 - 0.284
PCB149	µg/kg	0.886	0.2436	27.5	5	0.902	0.1810	0.1362	0.606 - 1.17
PCB156	µg/kg	0.0751	0.0389	51.7	17	0.0718	0.0282	0.0118	0.0552 - 0.0950
PCB170	µg/kg	0.334	0.0902	27.0	6	0.331	0.0605	0.0460	0.244 - 0.424
PCB183	µg/kg	0.131	0.0421	32.2	4	0.132	0.0285	0.0263	0.0724 - 0.189
PCB187	µg/kg	0.318	0.0830	26.1	4	0.319	0.0575	0.0519	0.203 - 0.434
g-HCH	µg/kg	0.0175	0.0110	62.9	10	0.0215	0.0085	0.0044	0.0098 - 0.0253
Dieldrin	µg/kg	0.0685	0.0429	62.7	8	0.0975	0.0343	0.0190	0.0335 - 0.103
pp'-DDT	µg/kg	0.0492	0.0389	79.1	17	0.0700	0.0320	0.0118	0.0293 - 0.0691

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	0.247	0.0100	4.0	6	0.246	0.0071	0.0051	0.237 - 0.257

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Acenaphthene	µg/kg	2.09	0.728	34.8	52	2.20	0.505	0.126	1.89 - 2.29
Anthracene	µg/kg	4.43	1.713	38.7	63	4.45	1.178	0.270	3.99 - 4.86
Benzo[a]anthracene	µg/kg	21.5	5.25	24.4	68	22.1	3.51	0.80	20.2 - 22.8
Benzo[a]pyrene	µg/kg	27.1	7.56	27.9	71	27.6	5.35	1.12	25.3 - 28.9
Benzo[b]fluoranthene	µg/kg	97.6	33.70	34.5	63	100.3	23.70	5.31	89.1 - 106
Benzo[e]pyrene	µg/kg	59.9	14.09	23.5	46	58.2	9.64	2.60	55.7 - 64.1
Benzo[g,h,i]perylene	µg/kg	90.9	26.77	29.4	72	90.1	18.50	3.94	84.7 - 97.2
Benzo[k]fluoranthene	µg/kg	37.7	8.16	21.6	64	38.9	5.56	1.27	35.7 - 39.7
Chrysene + Triphenylene	µg/kg	31.6	6.95	22.0	23	32.1	4.80	1.81	28.6 - 34.6
Chrysene	µg/kg	23.9	4.54	19.0	55	24.6	3.09	0.77	22.7 - 25.1
Dibenz[a,h]anthracene	µg/kg	17.1	4.93	28.9	67	17.4	3.40	0.75	15.9 - 18.3
Fluoranthene	µg/kg	42.0	8.73	20.8	73	42.5	6.04	1.28	40.0 - 44.1
Fluorene	µg/kg	6.01	2.295	38.2	59	6.60	1.600	0.374	5.42 - 6.61
Indeno[1,2,3-cd]pyrene	µg/kg	112	28.4	25.3	71	115	18.8	4.2	106 - 119
Naphthalene	µg/kg	19.9	7.81	39.3	65	20.3	5.30	1.21	18.0 - 21.8
Perylene	µg/kg	17.7	4.74	26.7	41	18.3	3.26	0.93	16.2 - 19.2
Phenanthrene	µg/kg	41.1	11.78	28.6	68	43.7	7.94	1.79	38.3 - 44.0
Pyrene	µg/kg	32.8	7.33	22.4	70	32.9	5.13	1.10	31.1 - 34.6

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	1.96	0.117	6.0	36	1.96	0.080	0.024	1.92 - 2.00

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	0.250	0.0161	6.4	13	0.254	0.0123	0.0056	0.241 - 0.260

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Acenaphthylene	µg/kg	2.04	1.176	57.7	46	2.42	0.796	0.217	1.69 - 2.39
Benzo[a]fluorene	µg/kg	6.14	1.570	25.6	6	6.22	1.020	0.801	4.57 - 7.71
Dibenzothiophene	µg/kg	3.85	1.409	36.6	31	3.80	0.980	0.316	3.33 - 4.36
Triphenylene	µg/kg	10.0	2.76	27.5	17	9.38	1.88	0.84	8.61 - 11.4
Benzofluoranthenes (a+b+j+k)	µg/kg	153	24.0	15.7	8	148	16.1	10.6	133 - 172
Benzofluoranthenes (b+j)	µg/kg	140	28.2	20.2	7	135	18.8	13.3	114 - 165
1-methylpyrene	µg/kg	5.27	1.387	26.3	6	5.84	1.095	0.708	3.89 - 6.66
1-methylphenanthrene	µg/kg	12.6	3.53	28.0	8	13.2	2.23	1.56	9.73 - 15.5
2-methylphenanthrene	µg/kg	17.4	5.55	31.9	21	18.2	3.64	1.52	14.9 - 19.9
3-6-dimethylphenanthrene	µg/kg	2.73	1.110	40.6	14	2.81	0.815	0.371	2.10 - 3.37
2-methylanthracene	µg/kg	3.68	2.423	65.8	6	4.00	1.705	1.237	1.26 - 6.10
1-methylnaphtalene	µg/kg	23.1	10.71	46.3	19	24.9	7.75	3.07	18.0 - 28.3
2-methylnaphtalene	µg/kg	26.9	11.35	42.2	19	27.9	8.01	3.26	21.5 - 32.4
C1-phenanthr.+anthrac.	µg/kg	47.4	14.06	29.6	21	45.4	9.46	3.84	41.1 - 53.8
C2-phenanthr.+anthrac.	µg/kg	33.0	8.40	25.4	20	33.5	5.76	2.35	29.1 - 37.0
C3-phenanthr.+anthrac.	µg/kg	19.7	5.90	29.9	15	21.0	4.08	1.90	16.5 - 23.0
C1-pyrenes+fluoranthenes	µg/kg	38.1	14.66	38.4	16	38.7	10.53	4.58	30.4 - 45.9
C2-pyrenes+fluoranthenes	µg/kg	34.9	12.35	35.4	8	36.3	8.46	5.46	24.8 - 44.9
C1-chrysenes	µg/kg	34.7	13.85	39.9	14	34.7	9.68	4.63	26.8 - 42.7
C2-chrysenes	µg/kg	32.2	22.80	70.8	11	30.7	16.39	8.59	17.1 - 47.3
C1-benzofluoranthenes	µg/kg	83.6	8.92	10.7	5	86.7	6.41	4.98	73.3 - 93.8
C1-naphtalenes	µg/kg	66.0	24.36	36.9	8	62.2	16.24	10.76	46.2 - 85.9
C2-naphtalenes	µg/kg	63.0	24.97	39.7	12	64.4	16.85	9.01	47.3 - 78.7
C3-napthalenes	µg/kg	51.3	31.13	60.7	12	55.4	21.24	11.23	31.7 - 70.9
C1-dibenzothiophenes	µg/kg	6.18	0.964	15.6	7	6.38	0.720	0.456	5.31 - 7.04
C2-dibenzothiophenes	µg/kg	7.45	2.464	33.1	7	7.50	1.811	1.164	5.24 - 9.65
C3-dibenzothiophenes	µg/kg	5.54	1.354	24.4	6	5.66	0.909	0.691	4.19 - 6.89

Method: Total petroleum hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Total petroleum hydrocarbons	mg/kg	34.1	6.57	19.3	6	32.9	4.27	3.35	27.5 - 40.6

Indicative Values MS7

Method: Brominated Flame Retardants - MS7

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
BDE099	µg/kg	0.0334	0.0242	72.6	8	0.0392	0.0176	0.0107	0.0136 - 0.0531
BDE209	µg/kg	0.336	0.0591	17.6	8	0.353	0.0445	0.0261	0.288 - 0.384