QUASIMEME

Quality assurance of information for marine environmental monitoring

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Certificate of Analysis

Sediment

REFERENCE MATERIAL

Sediment sample 57

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis Sediment 57

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 57 of Estuary sediment from Nieuwe Waterweg, the Netherlands 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	MS2	QOR147MS
2019.2	MS2	QOR141MS
2019.2	MS3	QPH104MS
2019.2	MS6	QSP071MS
2019.2	MS8	QPF008MS

Consensus Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB18	µg/kg	0.675	0.0769	11.4	10	0.678	0.0520	0.0304	0.621 - 0.729
PCB28	µg/kg	1.37	0.272	19.9	38	1.36	0.190	0.055	1.28 - 1.46
PCB31	µg/kg	1.06	0.208	19.6	21	1.04	0.140	0.057	0.969 - 1.16
PCB49	µg/kg	1.00	0.063	6.3	10	1.02	0.047	0.025	0.960 - 1.05
PCB52	µg/kg	1.40	0.233	16.6	39	1.40	0.160	0.047	1.33 - 1.48
PCB101	µg/kg	1.71	0.204	11.9	37	1.74	0.140	0.042	1.64 - 1.78
PCB118	µg/kg	1.06	0.216	20.5	38	1.07	0.151	0.044	0.985 - 1.13
PCB138+PCB163	µg/kg	2.84	0.420	14.8	12	2.77	0.285	0.152	2.58 - 3.11
PCB138	µg/kg	1.82	0.310	17.1	31	1.88	0.203	0.070	1.70 - 1.93
PCB153	µg/kg	2.46	0.382	15.5	37	2.51	0.253	0.078	2.33 - 2.59
PCB180	µg/kg	1.26	0.360	28.6	37	1.22	0.261	0.074	1.14 - 1.38
Dieldrin	µg/kg	0.685	0.0877	12.8	15	0.689	0.0620	0.0283	0.637 - 0.733
pp'-DDD	µg/kg	0.294	0.0622	21.1	26	0.299	0.0420	0.0152	0.269 - 0.319
pp'-DDE	µg/kg	0.409	0.0885	21.7	25	0.410	0.0600	0.0221	0.372 - 0.445

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	0.943	0.0496	5.3	20	0.940	0.0353	0.0139	0.920 - 0.966

Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PCB44	µg/kg	0.686	0.1089	15.9	9	0.680	0.0700	0.0454	0.604 - 0.768
PCB47	µg/kg	0.412	0.0784	19.0	8	0.403	0.0505	0.0346	0.348 - 0.476
PCB66	µg/kg	1.03	0.036	3.5	8	1.02	0.027	0.016	1.00 - 1.06
PCB105	µg/kg	0.248	0.1012	40.9	23	0.273	0.0740	0.0264	0.204 - 0.291
PCB110	µg/kg	1.30	0.207	15.9	9	1.33	0.140	0.086	1.14 - 1.45
PCB128	µg/kg	0.282	0.0662	23.5	11	0.252	0.0410	0.0250	0.238 - 0.326
PCB141	µg/kg	0.288	0.0143	5.0	8	0.292	0.0099	0.0063	0.276 - 0.299
PCB149	µg/kg	1.97	0.346	17.6	12	2.07	0.202	0.125	1.75 - 2.19
PCB151	µg/kg	0.539	0.1185	22.0	8	0.560	0.0870	0.0524	0.443 - 0.636
PCB156	µg/kg	0.191	0.0729	38.1	23	0.194	0.0500	0.0190	0.160 - 0.223
PCB158	µg/kg	0.190	0.0601	31.6	7	0.183	0.0440	0.0284	0.137 - 0.244
PCB170	µg/kg	0.674	0.1715	25.4	13	0.687	0.1230	0.0595	0.572 - 0.777
PCB183	µg/kg	0.236	0.0492	20.8	9	0.245	0.0360	0.0205	0.199 - 0.273
PCB187	µg/kg	0.670	0.0920	13.7	9	0.679	0.0590	0.0383	0.600 - 0.739
PCB194	µg/kg	0.240	0.0782	32.6	11	0.256	0.0530	0.0295	0.188 - 0.292
a-HCH	µg/kg	0.0342	0.0156	45.7	15	0.0370	0.0110	0.0050	0.0256 - 0.0428
b-HCH	µg/kg	0.0671	0.0314	46.8	15	0.0730	0.0217	0.0101	0.0498 - 0.0843
d-HCH	µg/kg	0.0317	0.0037	11.7	6	0.0310	0.0025	0.0019	0.0280 - 0.0354
HCB	µg/kg	1.25	0.339	27.2	29	1.31	0.240	0.079	1.12 - 1.38
HCBD	µg/kg	0.182	0.0979	53.8	10	0.175	0.0685	0.0387	0.113 - 0.251
pp'-DDT	µg/kg	0.110	0.0786	71.7	18	0.154	0.0605	0.0231	0.0707 - 0.148

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	0.0976	0.0016	1.7	7	0.0979	0.0011	0.0008	0.0961 - 0.0990

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Benzo[a]pyrene	µg/kg	54.7	7.46	13.6	21	55.5	5.47	2.03	51.3 - 58.1
Benzo[b]fluoranthene	µg/kg	77.6	12.99	16.7	18	80.9	9.26	3.83	71.2 - 84.0
Benzo[e]pyrene	µg/kg	51.7	4.31	8.3	13	52.0	2.93	1.49	49.2 - 54.3
Benzo[g,h,i]perylene	µg/kg	43.3	6.24	14.4	21	44.0	4.60	1.70	40.5 - 46.1
Benzo[k]fluoranthene	µg/kg	32.9	4.71	14.3	19	34.0	3.40	1.35	30.7 - 35.2
Dibenz[a,h]anthracene	µg/kg	12.0	2.50	20.8	20	12.2	1.77	0.70	10.8 - 13.2
Fluoranthene	µg/kg	98.7	12.26	12.4	21	100.0	9.00	3.35	93.1 - 104
Indeno[1,2,3-cd]pyrene	µg/kg	48.4	9.98	20.6	21	49.6	6.93	2.72	43.9 - 53.0
Phenanthrene	µg/kg	66.5	14.37	21.6	21	67.0	9.84	3.92	60.0 - 73.0
Pyrene	µg/kg	82.4	10.09	12.2	21	84.0	7.20	2.75	77.8 - 87.0

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	0.922	0.0464	5.0	11	0.920	0.0300	0.0175	0.891 - 0.953

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Acenaphthene	µg/kg	7.88	2.141	27.2	19	7.64	1.540	0.614	6.86 - 8.91
Acenaphthylene	µg/kg	5.19	1.995	38.4	17	5.58	1.280	0.605	4.17 - 6.21
Anthracene	µg/kg	26.4	7.01	26.5	20	27.6	5.18	1.96	23.2 - 29.7
Benzo[a]anthracene	µg/kg	53.6	12.30	23.0	19	56.0	9.10	3.53	47.7 - 59.5
Chrysene + Triphenylene	µg/kg	67.5	4.49	6.7	6	67.6	2.83	2.29	63.0 - 72.0
Chrysene	µg/kg	61.1	16.14	26.4	18	63.2	11.55	4.76	53.1 - 69.1
Dibenzothiophene	µg/kg	7.11	1.678	23.6	10	6.79	1.110	0.663	5.93 - 8.29
Fluorene	µg/kg	13.6	4.30	31.6	20	13.8	2.81	1.20	11.6 - 15.6
Naphthalene	µg/kg	34.2	10.25	30.0	20	33.3	7.00	2.87	29.4 - 38.9
Perylene	µg/kg	45.7	10.11	22.1	11	44.0	6.38	3.81	39.0 - 52.4
Triphenylene	µg/kg	19.7	3.06	15.5	5	19.5	2.33	1.71	16.2 - 23.3
2-methylphenanthrene	µg/kg	24.9	4.84	19.4	7	25.8	3.50	2.29	20.6 - 29.2
3-6-dimethylphenanthrene	µg/kg	5.22	2.531	48.5	5	4.95	1.760	1.415	2.31 - 8.13
1-methylnaphtalene	µg/kg	10.8	3.94	36.4	7	12.4	3.20	1.86	7.29 - 14.3
2-methylnaphtalene	µg/kg	24.0	6.64	27.7	6	27.1	4.68	3.39	17.3 - 30.6
C1-phenanthr.+anthrac.	µg/kg	66.1	21.76	32.9	7	65.0	15.88	10.28	46.7 - 85.6
C2-phenanthr.+anthrac.	µg/kg	74.4	28.79	38.7	6	73.9	21.00	14.69	45.6 - 103
C3-phenanthr.+anthrac.	µg/kg	48.0	19.44	40.5	5	50.0	13.63	10.87	25.7 - 70.4
C1-pyrenes+fluoranthenes	µg/kg	82.1	28.54	34.8	5	76.2	15.71	15.95	49.3 - 115
C1-chrysenes	µg/kg	49.8	8.17	16.4	5	49.6	5.56	4.57	40.4 - 59.2
C2-naphtalenes	µg/kg	56.9	26.27	46.2	5	63.6	18.82	14.69	26.7 - 87.1

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	0.0947	0.0094	9.9	5	0.0955	0.0065	0.0053	0.0839 - 0.106

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Tributyltin (TBT)	µg Sn/kg	1.15	0.994	86.1	11	1.19	0.737	0.375	0.494 - 1.81
Dibutyltin (DBT)	µg Sn/kg	1.12	0.779	69.6	11	1.17	0.559	0.294	0.602 - 1.64
Monobutyltin (MBT)	µg Sn/kg	2.40	1.301	54.2	11	2.13	0.890	0.490	1.54 - 3.26

Indicative Values MS8

Method: Perfluorinated alkyl substances - MS8

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
n-PFOS	µg/kg	0.230	0.0308	13.4	5	0.230	0.0230	0.0172	0.195 - 0.266
PFOA	µg/kg	0.0584	0.0074	12.7	4	0.0615	0.0050	0.0046	0.0481 - 0.0686