QUASIMEME

Quality assurance of information for marine environmental monitoring

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
2023.2	MS2	QOR156MS
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
pp'-DDE	µg/kg	0.400	0.1061	26.5	39	0.399	0.0640	0.0212	0.366 - 0.434
pp'-DDD	µg/kg	0.278	0.0698	25.1	40	0.284	0.0465	0.0138	0.256 - 0.301
HCB	µg/kg	1.20	0.363	30.3	46	1.20	0.216	0.067	1.09 - 1.31
PCB28	µg/kg	1.32	0.301	22.8	60	1.32	0.186	0.049	1.24 - 1.40
PCB31	µg/kg	1.05	0.206	19.6	33	1.04	0.120	0.045	0.979 - 1.12
PCB52	µg/kg	1.37	0.229	16.7	62	1.36	0.167	0.036	1.32 - 1.43
PCB101	µg/kg	1.73	0.261	15.1	60	1.74	0.159	0.042	1.66 - 1.79
PCB118	µg/kg	1.03	0.216	20.9	61	1.04	0.147	0.035	0.976 - 1.09
PCB138+PCB163	µg/kg	2.80	0.492	17.6	18	2.77	0.335	0.145	2.55 - 3.04
PCB153	µg/kg	2.41	0.416	17.3	60	2.42	0.280	0.067	2.31 - 2.52
PCB180	µg/kg	1.23	0.319	25.9	60	1.23	0.224	0.051	1.15 - 1.31
PCB138	µg/kg	1.84	0.442	24.1	52	1.86	0.345	0.077	1.71 - 1.96
PCB49	µg/kg	0.989	0.1565	15.8	17	1.010	0.0700	0.0475	0.909 - 1.07
PCB66	µg/kg	0.969	0.1549	16.0	15	1.020	0.0800	0.0500	0.884 - 1.05
PCB149	µg/kg	1.97	0.425	21.6	21	2.03	0.270	0.116	1.77 - 2.16
PCB141	µg/kg	0.286	0.0371	13.0	15	0.289	0.0260	0.0120	0.266 - 0.306

Method: Carbon - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	0.941	0.0702	7.5	31	0.936	0.0460	0.0158	0.915 - 0.966

Method: Nitrogen - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
PN	%	0.0962	0.0054	5.6	11	0.0979	0.0029	0.0020	0.0926 - 0.0998

Indicative Values MS2

Method: Chlorinated organics - MS2

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
a-HCH	µg/kg	0.0366	0.0220	60.2	21	0.0370	0.0130	0.0060	0.0266 - 0.0465
g-HCH	µg/kg	0.0386	0.0390	101.1	18	0.0503	0.0215	0.0115	0.0193 - 0.0579
Dieldrin	µg/kg	0.664	0.1785	26.9	21	0.689	0.0810	0.0487	0.583 - 0.745
pp'-DDT	µg/kg	0.150	0.1261	84.1	28	0.175	0.0865	0.0298	0.101 - 0.199
b-HCH	µg/kg	0.0658	0.0312	47.5	23	0.0700	0.0185	0.0081	0.0523 - 0.0793
HCBD	µg/kg	0.204	0.1291	63.4	13	0.189	0.1090	0.0448	0.126 - 0.281
PCB105	µg/kg	0.237	0.1010	42.6	35	0.248	0.0620	0.0213	0.202 - 0.272
PCB156	µg/kg	0.190	0.0771	40.6	34	0.194	0.0495	0.0165	0.163 - 0.217
d-HCH	µg/kg	0.0289	0.0072	24.9	8	0.0295	0.0050	0.0032	0.0230 - 0.0347
PCB18	µg/kg	0.643	0.1395	21.7	17	0.663	0.0877	0.0423	0.572 - 0.715
PCB44	µg/kg	0.702	0.1551	22.1	15	0.739	0.1160	0.0501	0.616 - 0.787
PCB47	µg/kg	0.417	0.0854	20.5	15	0.405	0.0428	0.0276	0.370 - 0.464
PCB110	µg/kg	1.31	0.291	22.3	14	1.34	0.179	0.097	1.14 - 1.47
PCB128	µg/kg	0.277	0.0784	28.3	19	0.275	0.0347	0.0225	0.240 - 0.315
PCB170	µg/kg	0.654	0.1918	29.3	23	0.666	0.1400	0.0500	0.571 - 0.736
PCB183	µg/kg	0.233	0.0532	22.8	16	0.244	0.0325	0.0166	0.205 - 0.261
PCB187	µg/kg	0.654	0.1395	21.3	16	0.651	0.0793	0.0436	0.580 - 0.728
PCB158	µg/kg	0.171	0.0469	27.5	13	0.162	0.0240	0.0163	0.143 - 0.199
PCB151	µg/kg	0.545	0.1465	26.9	14	0.562	0.0895	0.0490	0.461 - 0.629
PCB194	µg/kg	0.224	0.0865	38.6	20	0.245	0.0780	0.0242	0.183 - 0.264

Consensus Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Benzo[e]pyrene	µg/kg	52.4	5.58	10.6	13	52.0	2.93	1.93	49.1 - 55.8
Phenanthrene	µg/kg	66.4	14.24	21.4	21	67.0	9.84	3.88	60.0 - 72.9
Pyrene	µg/kg	82.6	11.98	14.5	21	84.0	7.20	3.27	77.2 - 88.0
Benzo[g,h,i]perylene	µg/kg	43.2	6.99	16.2	21	44.0	4.60	1.91	40.1 - 46.4
Fluoranthene	µg/kg	99.0	14.50	14.6	21	100.0	9.00	3.96	92.4 - 106
Benzo[b]fluoranthene	µg/kg	77.9	15.41	19.8	18	80.9	9.26	4.54	70.3 - 85.5
Benzo[a]pyrene	µg/kg	54.7	8.31	15.2	21	55.5	5.47	2.27	50.9 - 58.5
Benzo[k]fluoranthene	µg/kg	32.9	5.09	15.5	19	34.0	3.40	1.46	30.5 - 35.4

Method: Carbon - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
TOC	%	0.923	0.0560	6.1	11	0.920	0.0300	0.0211	0.886 - 0.960

Indicative Values MS3

Method: Polycyclic aromatic hydrocarbons - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
Chrysene + Triphenylene	µg/kg	68.9	6.42	9.3	6	67.6	2.83	3.27	62.5	-	75.3
Indeno[1,2,3-cd]pyrene	µg/kg	48.2	12.44	25.8	21	49.6	6.93	3.39	42.5	-	53.8
Benzo[a]anthracene	µg/kg	53.7	14.92	27.8	19	56.0	9.10	4.28	46.6	-	60.9
Naphthalene	µg/kg	34.3	11.74	34.2	20	33.3	7.00	3.28	28.8	-	39.8
Dibenz[a,h]anthracene	µg/kg	12.0	2.88	24.1	20	12.2	1.77	0.80	10.6	-	13.3
Anthracene	µg/kg	26.4	6.79	25.7	20	27.6	5.18	1.90	23.2	-	29.6
Fluorene	µg/kg	14.3	5.53	38.8	20	13.8	2.81	1.55	11.7	-	16.8
Acenaphthene	µg/kg	7.89	2.058	26.1	19	7.64	1.540	0.590	6.90	-	8.87
Acenaphthylene	µg/kg	5.03	2.583	51.3	17	5.58	1.280	0.783	3.71	-	6.35
Dibenzothiophene	µg/kg	7.08	1.926	27.2	10	6.79	1.110	0.761	5.72	-	8.44
3-6-dimethylphenanthrene	µg/kg	-	-	-	5	4.95	1.8	-	-	-	-
2-methylphenanthrene	µg/kg	24.7	6.09	24.7	7	25.8	3.50	2.88	19.2	-	30.1
Perylene	µg/kg	45.7	10.22	22.3	11	44.0	6.38	3.85	38.9	-	52.5
Triphenylene	µg/kg	-	-	-	5	19.5	2.3	-	-	-	-
Chrysene	µg/kg	61.3	17.37	28.3	18	63.2	11.55	5.12	52.7	-	69.9
C1-phenanthr.+anthrac.	µg/kg	65.9	18.06	27.4	7	65.0	15.88	8.53	49.8	-	82.1
C2-phenanthr.+anthrac.	µg/kg	74.4	27.88	37.5	6	73.9	21.00	14.23	46.6	-	102
C3-phenanthr.+anthrac.	µg/kg	-	-	-	5	50.0	13.6	-	-	-	-
C1-pyrenes+fluoranthenes	µg/kg	-	-	-	5	76.2	15.7	-	-	-	-
C1-chrysenes	µg/kg	-	-	-	5	49.6	5.6	-	-	-	-
C2-chrysenes	µg/kg	-	-	-	4	39.9	17.7	-	-	-	-
C2-naphtalenes	µg/kg	-	-	-	5	63.6	18.8	-	-	-	-
C3-napthalenes	µg/kg	-	-	-	5	71.0	36.0	-	-	-	-
1-methylnaphtalene	µg/kg	10.8	4.36	40.2	7	12.4	3.20	2.06	6.94	-	14.7
2-methylnaphtalene	µg/kg	23.6	10.70	45.3	6	27.1	4.68	5.46	12.9	-	34.3

Method: Nitrogen - MS3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits		
PN	%	-	-	-	5	0.0955	0.0	-	-	-	-

Indicative Values MS6

Method: Organometals - MS6

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Tributyltin (TBT)	µg Sn/kg	1.03	0.784	76.3	11	1.19	0.737	0.295	0.506 - 1.55
Dibutyltin (DBT)	µg Sn/kg	1.15	0.830	72.5	11	1.17	0.559	0.313	0.594 - 1.70
Monobutyltin (MBT)	µg Sn/kg	2.45	1.421	58.0	11	2.13	0.890	0.535	1.51 - 3.39

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	-	-	-	5	0.242	0.0	-	-	-	-
PFOA	µg/kg	-	-	-	4	0.0600	0.0	-	-	-	-