QUASIMEME

Quality assurance of information for marine environmental monitoring

Certificate of Analysis

Metals in seawater

REFERENCE MATERIAL

AQ3 sample 182

WAGENINGEN
UNIVERSITY & RESEARCH

Certificate of Analysis AQ3 182

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.

Sample information

QUASIMEME reference materials cover a range of natural SeaWater species from contaminated waters from the North Sea and/or Mediterranean.

This AQ3 sample 182 of Seawater spiked with metals from North Sea 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	AQ3	QTM352SW

Consensus Values AQ3

Method: Metals - AQ3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Copper	µg/l	2.85	0.331	11.6	15	2.87	0.231	0.107	2.67 - 3.03
Cadmium	µg/l	0.106	0.0128	12.1	15	0.109	0.0110	0.0041	0.0994 - 0.114
Lead	µg/l	1.19	0.133	11.2	15	1.20	0.070	0.043	1.12 - 1.26
Manganese	µg/l	2.00	0.175	8.7	11	2.00	0.110	0.066	1.89 - 2.12
Chromium	µg/l	1.41	0.162	11.5	11	1.40	0.070	0.061	1.31 - 1.52
Nickel	µg/l	2.89	0.339	11.7	13	2.90	0.170	0.118	2.69 - 3.09
Zinc	µg/l	19.1	1.39	7.3	14	19.3	1.04	0.47	18.3 - 19.9

Indicative Values AQ3

Method: Metals - AQ3

Element	Unit	Mean	Std.Dev.	CV %	N	Median	MAD	Uncertainty	95 % confidence limits
Cobalt	µg/l	0.326	0.0799	24.5	8	0.359	0.0550	0.0353	0.261 - 0.391
Iron	µg/l	2.76	1.703	61.6	6	2.67	0.851	0.869	1.06 - 4.46
Arsenic	µg/l	3.15	0.776	24.6	11	3.14	0.530	0.292	2.64 - 3.67
Silver	µg/l	0.115	0.0453	39.3	6	0.123	0.0255	0.0231	0.0700 - 0.161
Boron	µg/l	4250	230.9	5.4	6	4252	129.0	117.8	4019 - 4480
Vanadium	µg/l	2.88	0.515	17.9	10	2.86	0.220	0.203	2.52 - 3.24
Uranium	µg/l	-	-	-	5	2.88	0.1	-	- - -
Magnesium	mg/l	1203	50.7	4.2	7	1200	28.0	23.9	1158 - 1249
Strontium	mg/l	7.23	0.446	6.2	7	7.31	0.270	0.211	6.83 - 7.63