

2011-26 Oxygen duplicates - page 1

Precision statement for replicate samples drawn from a single Niskin bottle:

The mean difference for Oxygen:Dissolved:Bottle:Volume for the range 0.224 to 7.791 ml/l was 0.009,
k = 18 (1 outlier removed) where k is the number of pairs of duplicates

Precision calculation for duplicate samples:

Precision was determined by analyzing replicate samples drawn from one Niskin.

Pooled standard deviation of pairs of samples (Sp) was calculated by:

$$Sp = \text{SQRT}\{\text{sum}(d^2)/2k\}$$

where k is the number of pairs and d is the difference between pairs.

Determination of outliers

Outliers are discarded on the basis of Chauvenet's criteria. The statistic is calculated by the difference between the outlier and the mean, divided by the stdev.

If this absolute value is greater than the critical value of the Chauvenet criterion for the given n, the datapoint can be discarded.

Duplicate samples from a single Niskin bottle

Event Number	Sample Number	Station	Pressure dbar	Oxy:Dis 1 ml/l	Oxy:Dis 2 ml/l	Rejected yes / no	Comment
4	23	P2	10.3	7.788	7.791		
6	31	P4	800.2	0.227	0.224		
6	41	P4	76.0	6.253	6.255		
21	173	P8	1250.5	0.474	0.513		
21	187	P8	44.7	6.657	6.675		
27	238	P12	124.1	4.221	4.221		
43	351	P16	2499.7	1.920	1.917		
43	365	P16	100.9	5.852	5.858		
55	434	P20	2999.4	2.553	2.531		
55	445	P20	202.0	3.118	3.115		
82	634	P26	2999.7	2.576	2.579		
82	641	P26	600.5	0.552	0.540		
82	652	P26	24.8	7.026	7.021		
103	748	UW Float	121.3	4.544	4.541		
103	750	UW Float	40.8	6.996	6.989		
103	751	UW Float	9.5	6.958	6.953		
104	757	Eddy Centre	800.8	0.887	0.389	yes	0.887 was rejected.
104	765	Eddy Centre	124.9	2.367	2.371		
109	778	LB08	75.3	2.210	2.197		

2011-26 Oxygen duplicates - page 2

Precision statement for samples drawn from duplicate Niskin bottles closed at same pressure:

The mean difference for Oxygen:Dissolved:Bottle:Volume for the range 0.343 to 4.988 ml/l was 0.024,
 $k = 4$ (1 outlier removed) where K is the number of duplicates.

Duplicate Niskins at the same pressure

Event Number	Sample Number	Station	Nominal Pressure dbar	Oxy:Dis 1 ml/l	Oxy:Dis 2 ml/l	Rejected yes / no	Comment
4	19 / 20	P2	75	4.983	4.988		
6	28 / 29	P4	1250	0.399	0.343		
27	223 / 224	P12	3000	2.258	2.260		
55	432 / 433	P20	3500	2.880	2.269	yes	2.269 was rejected.
103	744 / 745	UW Float	500	0.974	0.936		

Note: even though the precision statement for samples drawn from duplicate Niskin bottles (not true duplicates) is calculated using the same formula as the precision statement for duplicates samples drawn from one single Niskin, this process is mainly used to identify problem samples and is not being used as a measure of analysis precision.