2011-27 Oxygen duplicates - page 1

Precision statement for replicate samples drawn from a single Niskin bottle:
The pooled standard devistion for Oxygen:Dissolved:Bottle:Volume for the range 0.362 to 7.087 ml/l was 0.013,
    k = 16 (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 calucalated by:
    $Sp = SQRT\{sum\ (d*d)/2k\}$
    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.
The Chauvenet Statistic assumes a normal distribution

Duplicate analysis for samples drawn 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	
1	6	SI03	100.6	0.954	0.928		
4	16	P2	99.8	3.392	3.410		
12	76	P4	76.1	6.347	6.354		
24	141	P8	1249.0	0.362	0.411	no	Bad but not excluded
24	150	P8	175.8	2.185	2.187		
31	195	P12	2500.0	1.845	1.850		
31	203	P12	400.3	0.946	0.954		
31	211	P12	74.8	6.513	6.446	yes	
42	269	P16	2499.1	1.933	1.936		
42	275	P16	599.9	0.563	0.559		
42	283	P16	100.8	5.409	5.414		
57	373	P20	2500.0	1.990	1.962		
57	379	P20	600.1	0.567	0.583		
57	388	P20	75.0	6.790	6.785		
70	498	P26	2500.3	2.004	1.992		
70	506	P26	301.5	1.577	1.585		
70	513	P26	76.1	7.066	7.087		

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Precision statement for samples drawn from duplicate Niskin bottles closed at same pressure:
The mean difference for Oxygen:Dissolved:Bottle:Volume for the range 0.410 to 4.535 ml/l was 0.013,
    k = 4 (0 outlier removed) where k is the number of pairs of duplicates.

The distribution has a slightly positive skew. Less confidence should be placed on the
    criteria for removal of outliers.

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	17/18	P2	75	4.535	4.510		
12	63/64	P4	1250	0.421	0.410		
42	266/167	P16	3500	2.686	2.707		
57	370/371	P20	3500	2.863	2.849		

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Precision statement for samples drawn from the loop and a Niskin bottle closed at 5 m:

The mean difference for Oxygen:Dissolved:Bottle:Volume for the range 5.847 to 7.339 ml/l was 0.042,
        k = 13 (1 outlier removed) where k is the number of pairs of duplicates.

Loop and 5-m Niskin bottle

Event Number	Sample Number	Station	Pressure dbar	Oxy:Dis 1 ml/l Niskin	Oxy:Dis 2 ml/l Loop	Rejected yes / no	Comment
2	13	P1	4.7	6.929	7.109		
9	50	P3	5.0	7.339	6.749	yes	
19	134	P5	4.9	5.998	5.959		
21	138	P7	5.7	5.916	5.887		
26	164	P9	4.4	5.895	5.847		
28	168	P11	5.3	6.112	6.087		
37	251	P13	4.8	6.019	6.004		
40	255	P15	4.9	6.100	6.147		
49	343	P17	4.6	6.111	6.114		
52	347	P19	5.2	6.136	6.092		
60	427	P21	5.4	6.199	6.250		
62	431	P23	5.5	6.182	6.192		
65	457	P25	4.1	6.235	6.250		
66	459	P35	5.5	6.202	6.236		