2010-01 Nutrients duplicates - page 1

Nitrate_plus_Nitrite:Bottle

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

The pooled standard deviation for Nitrate_plus_Nitrite:Bottle for the range 6.5 to 45.9 µmol/l was 0.10,
k = 13 (0 outlier removed) where k is the number of pairs of duplicates.

The pooled standard deviation of pairs of samples (Sp) was calculated by:
Sp = SQRT{sum (d*d)/2k}
where k is the number of pairs and d is the difference between pairs.

Accuracy of the stock standard batch was determined by using commercially available standards from
WAKO Chemicals (Sagami Chemical Company of Japan).
The values were within 0.30 % of the 20 µmol/l Nitrate Standard.

August 2009 Nitrate stock standard solution was used for this cruise analyses.

Duplicate samples from a single Niskin bottle

Event Number	Sample Number	Station	Pressure dbar	Nitrate 1 µmol/l	Nitrate 2 µmol/l	Rejected yes / no	Comment
1	7	SI03	74.8	28.5	28.4		
3	15	P2	50.8	7.0	7.0		
5	31	P2	4.6	7.1	7.1		
7	34	P4	176.2	25.7	25.9		
10	52	P4	401.7	37.3	37.1		
15	136	P12	51.3	7.5	7.4		
23	207	P16	175.5	22.6	22.8		
25	226	P16	1506.7	45.1	45.2		
34	314	P20	2499.8	41.3	41.5		
37	336	P20	175.4	25.2	25.4		
48	115	P12	797	45.8	45.9		
55	442	P8	301.7	38.3	38.4		
64	481	LC6	9.6	6.5	6.5		

2010-01 Nutrients duplicates - page 2

Phosphate:Bottle

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

The pooled standard deviation for Phosphate:Bottle for the range 0.76 to 3.23 µmol/l was 0.004,
k = 13 (0 outlier removed) where k is the number of pairs of duplicates.

The pooled standard deviation of pairs of samples (Sp) was calculated by:
Sp = SQRT{sum (d*d)/2k}
where k is the number of pairs and d is the difference between pairs.

November 2009 Phosphate stock standard solution was used for this cruise analyses.

Duplicate samples from a single Niskin bottle

Event Number	Sample Number	Station	Pressure dbar	Phosphate 1 µmol/l	Phosphate 2 µmol/l	Rejected yes / no	Comment
1	7	SI03	74.8	2.51	2.51		
3	15	P2	50.8	0.83	0.83		
5	31	P2	4.6	0.81	0.82		
7	34	P4	176.2	2.00	2.01		
10	52	P4	401.7	2.69	2.68		
15	136	P12	51.3	0.89	0.89		
23	207	P16	175.5	1.64	1.65		
25	226	P16	1506.7	3.19	3.19		
34	314	P20	2499.8	2.89	2.89		
37	336	P20	175.4	1.88	1.89		
48	115	P12	797	3.23	3.23		
55	442	P8	301.7	2.65	2.65		
64	481	LC6	9.6	0.76	0.76		

2010-01 Nutrients duplicates - page 3

Silicate:Bottle

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

The pooled standard deviation for Silicate:Bottle for the range 8.3 to 172.6 µmol/l was 0.14,
k = 13 (0 outlier removed) where k is the number of pairs of duplicates.

The pooled standard deviation of pairs of samples (Sp) was calculated by:
Sp = SQRT{sum (d*d)/2k}
where k is the number of pairs and d is the difference between pairs.

Accuracy of the stock standard batch was determined by using commercially available standards from
WAKO Chemicals (Sagami Chemical Company of Japan).
The values were within 0.73 % of the 100 µmol/l Silicate Standard.

August 2009 Silicate stock standard solution was used for this cruise analyses.

Duplicate samples from a single Niskin bottle

Event Number	Sample Number	Station	Pressure dbar	Silicate 1 µmol/l	Silicate 2 µmol/l	Rejected yes / no	Comment
1	7	SI03	74.8	56.8	56.7		
3	15	P2	50.8	9.0	9.0		
5	31	P2	4.6	9.3	9.3		
7	34	P4	176.2	31.7	31.7		
10	52	P4	401.7	60.5	60.4		
15	136	P12	51.3	11.5	11.5		
23	207	P16	175.5	32.9	32.9		
25	226	P16	1506.7	162.2	162.2		
34	314	P20	2499.8	172.6	172.2		
37	336	P20	175.4	41.9	42.1		
48	115	P12	797	121.0	121.4		
55	442	P8	301.7	62.9	62.7		
64	481	LC6	9.6	8.3	8.4		

2010-01 Nutrients duplicates - page 4

Nitrate_plus_Nitrite:Bottle

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

The pooled standard deviation for Nitrate_plus_Nitrite:Bottle for the range 7.1 to 45.8 µmol/l was 0.11,
k = 7 (0 outlier removed) where k is the number of pairs of duplicates.

The pooled standard deviation of pairs of samples (Sp) was calculated by:
Sp = SQRT{sum (d*d)/2k}
where k is the number of pairs and d is the difference between pairs.

Duplicate Niskins at the same pressure

Event Number	Sample Number	Station	Nominal Pressure dbar	Nitrate 1 µmol/l	Nitrate 2 µmol/l	Rejected yes / no	Comment
5	26 / 27	P2	75	7.1	7.1		
10	47 / 48	P4	1250	44.5	44.5		
25	221 / 222	P16	3500	39.3	39.6		
34	311 / 312	P20	3500	38.9	39.1		
48	108 / 109	P12	3000	41.5	41.6		
55	439 / 440	P8	600	45.2	45.1		
55	433 / 434	P8	1500	45.8	45.7		

2010-01 Nutrients duplicates - page 5

Phosphate:Bottle

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

The pooled standard deviation for Phosphate:Bottle for the range 0.82 to 3.25 µmol/l was 0.003,
k = 7 (0 outlier removed) where k is the number of pairs of duplicates.

The pooled standard deviation of pairs of samples (Sp) was calculated by:
Sp = SQRT{sum (d*d)/2k}
where k is the number of pairs and d is the difference between pairs.

Duplicate Niskins at the same pressure

Event Number	Sample Number	Station	Nominal Pressure dbar	Phosphate 1 µmol/l	Phosphate 2 µmol/l	Rejected yes / no	Comment
5	26 / 27	P2	75	0.82	0.82		
10	47 / 48	P4	1250	3.25	3.25		
25	221 / 222	P16	3500	2.74	2.73		
34	311 / 312	P20	3500	2.68	2.68		
48	108 / 109	P12	3000	2.84	2.84		
55	439 / 440	P8	600	3.18	3.18		
55	433 / 434	P8	1500	3.17	3.17		

2010-01 Nutrients duplicates - page 6

Silicate:Bottle

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

The pooled standard deviation for Silicate:Bottle for the range 9.2 to 176.2 µmol/l was 0.09,
k = 7 (0 outlier removed) where k is the number of pairs of duplicates.

The pooled standard deviation of pairs of samples (Sp) was calculated by:
Sp = SQRT{sum (d*d)/2k}
where k is the number of pairs and d is the difference between pairs.

Duplicate Niskins at the same pressure

Event Number	Sample Number	Station	Nominal Pressure dbar	Silicate 1 µmol/l	Silicate 2 µmol/l	Rejected yes / no	Comment
5	26 / 27	P2	75	9.2	9.2		
10	47 / 48	P4	1250	146.2	146.1		
25	221 / 222	P16	3500	176.2	176.0		
34	311 / 312	P20	3500	171.8	171.6		
48	108 / 109	P12	3000	176.1	176.0		
55	439 / 440	P8	600	102.6	102.6		
55	433 / 434	P8	1500	160.2	160.3		