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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 9.2 to 46.0 µmol/l was 0.20,
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 1.66 % of the 20 µmol/l Nitrate Standard.

Accuracy was also determined by using commercially available standards from Kanso
(Environmental Technos Co. Ltd, Japan). Kanso Lot AZ-0722.
When this standard was run as an unknown, nitrate values were within 0.8 %.

Nitrate data from 1000 to 4000 m agree with results averaged at P26 from 2002 to 2006 to within 3.16 %

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	8	Si03	49.9	29.6	29.4		
4	15	P2	74.6	21.0	20.9		
7	44	P4	21.1	12.1	12.1		
9	64	P4	399.8	41.4	40.7		
18	131	P8	399.5	45.4	45.8		
31	231	P12	26.3	26.2	26.2		
31	236	P12	9.4	9.3	9.2		
34	268	P16	15.0	11.7	11.6		
35	285	P16	597.3	45.7	46.0		
37	345	P20	2.2	12.7	12.7		
38	351	P20	2499.0	42.3	42.5		
40	408	P26	248.6	38.5	38.9		
44	434	P26	49.6	14.7	14.7		

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Phosphate:Bottle

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

The pooled standard deviation for Phosphate:Bottle for the range 0.98 to 3.28 µmol/l was 0.008,
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 was determined by using commercially available standards from Kanso
(Environmental Technos Co. Ltd, Japan). Kanso Lot AZ-0722.
When this standard was run as an unknown, phosphate values were within 1.24%.

Phosphate data from 1000 to 4000 m agree with results averaged at P26 from 2002 to 2006 to within 0.43 %

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	8	Si03	49.9	2.59	2.59		
4	15	P2	74.6	1.75	1.77		
7	44	P4	21.1	1.12	1.12		
9	64	P4	399.8	2.93	2.93		
18	131	P8	399.5	3.28	3.25		
31	231	P12	26.3	1.86	1.86		
31	236	P12	9.4	0.98	0.99		
34	268	P16	15.0	1.12	1.12		
35	285	P16	597.3	3.16	3.16		
37	345	P20	2.2	1.19	1.19		
38	351	P20	2499.0	2.92	2.90		
50	408	P26	248.6	2.75	2.75		
44	434	P26	49.6	1.33	1.33		

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Silicate:Bottle

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

The pooled standard deviation for Silicate:Bottle for the range 10.3 to 178.1 µmol/l was 0.24,
k = 13 (0 outliers 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 0.24 % of the 100 µmol/l Silicate Standard.

Accuracy was also determined by using commercially available standards from Kanso
(Environmental Technos Co. Ltd, Japan). Kanso Lot AZ-0722.
When this standard was run as an unknown, silicate values were within 1.5%.

Silicate data from 1000 to 4000 m agree with results averaged at P26 from 2002 to 2006 to within 1.64 %

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	8	Si03	49.9	59.9	59.8		
4	15	P2	74.6	30.1	30.1		
7	44	P4	21.1	17.8	17.9		
9	64	P4	399.8	77.2	77.2		
18	131	P8	399.5	142.0	142.3		
31	231	P12	26.3	41.0	41.1		
31	236	P12	9.4	10.4	10.3		
34	268	P16	15.0	13.9	13.9		
35	285	P16	597.3	114.8	114.3		
37	345	P20	2.2	14.9	14.9		
38	351	P20	2499.0	177.2	178.1		
50	408	P26	248.6	75.7	75.2		
44	434	P26	49.6	21.3	21.3		

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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 8.8 to 45.2 µmol/l was 0.20,
k = 11 (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
3	15 / 16	P2	75	26.1	25.8		
7	49 / 50	P4	0	13.3	13.3		
7	46 / 47	P4	10	13.1	13.1		
7	43 / 44	P4	20	12.1	12.1		
7	40 / 41	P4	30	9.0	9.1		
7	38 / 39	P4	40	8.8	8.8		
7	35 / 36	P4	75	19.1	19.0		
7	33 / 34	P4	100	27.9	27.9		
9	59 / 60	P4	1250	45.2	44.7		
35	278 / 279	P16	2500	43.6	43.6		
38	350 / 351	P20	2500	42.6	42.4		

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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 0.96 to 3.28 µmol/l was 0.007,
k = 11 (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
3	15 / 16	P2	75	1.88	1.87		
7	49 / 50	P4	0	1.19	1.20		
7	46 / 47	P4	10	1.19	1.18		
7	43 / 44	P4	20	1.13	1.12		
7	40 / 41	P4	30	0.99	0.97		
7	38 / 39	P4	40	0.97	0.96		
7	35 / 36	P4	75	1.54	1.54		
7	33 / 34	P4	100	2.20	2.19		
9	59 / 60	P4	1250	3.28	3.27		
35	278 / 279	P16	2500	2.93	2.93		
38	350 / 351	P20	2500	2.92	2.91		

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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 11.2 to 179.6 µmol/l was 0.12,
k = 11 (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
3	15 / 16	P2	75	32.9	32.8		
7	49 / 50	P4	0	20.6	20.7		
7	46 / 47	P4	10	20.3	20.2		
7	43 / 44	P4	20	17.9	17.9		
7	40 / 41	P4	30	11.7	11.6		
7	38 / 39	P4	40	11.2	11.2		
7	35 / 36	P4	75	22.3	22.3		
7	33 / 34	P4	100	39.7	39.4		
9	59 / 60	P4	1250	152.5	152.1		
35	278 / 279	P16	2500	179.5	179.6		
38	350 / 351	P20	2500	177.7	177.7		