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A rare intercomparison of nutrient analysis at sea: lessons learned and recommendations to enhance comparability of open-ocean nutrient data

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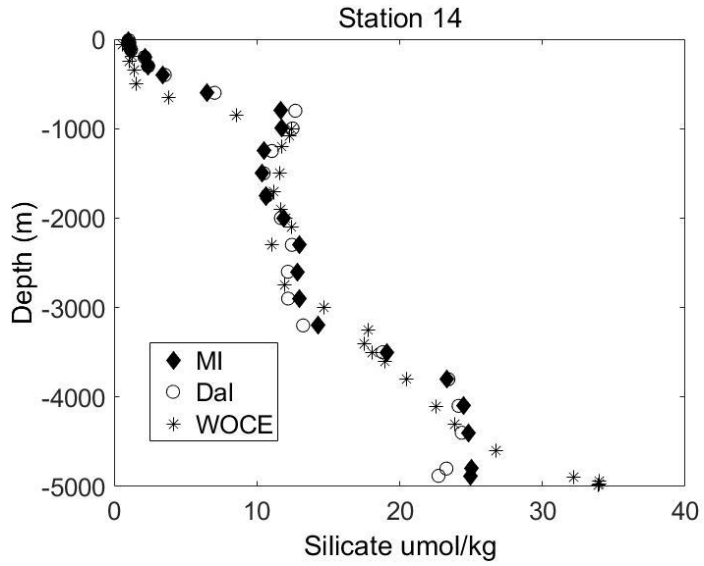
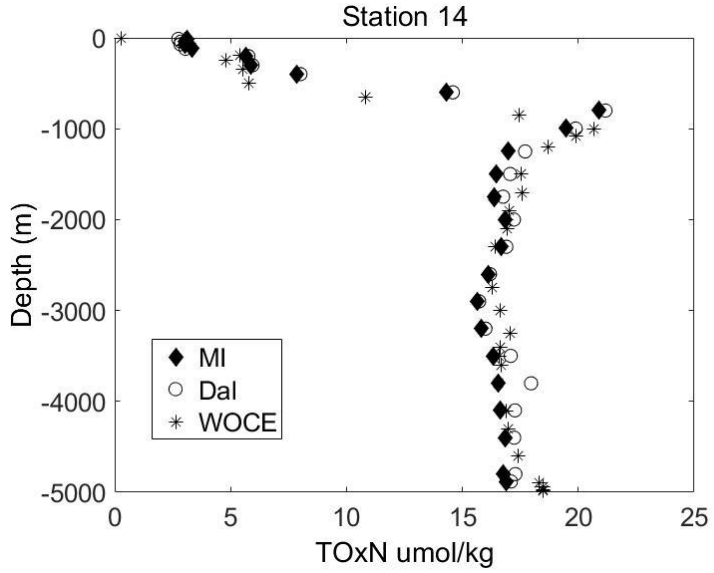
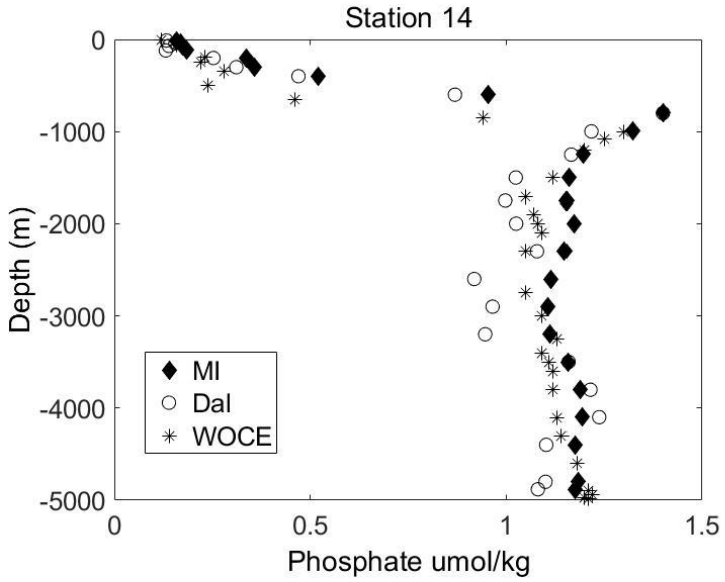
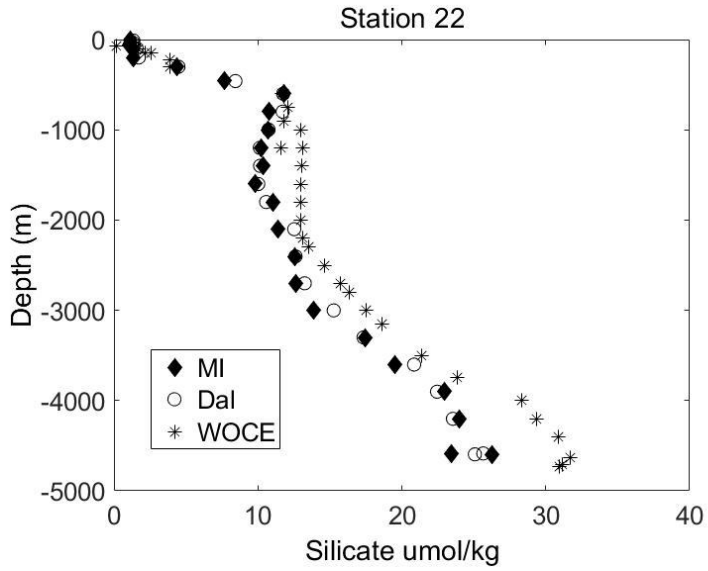
Table S1. Details of primary and secondary stock solutions to make calibration standards.

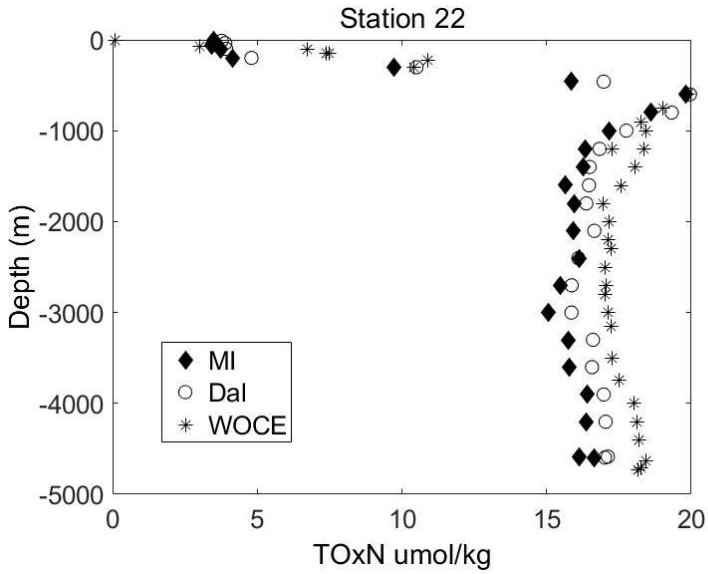
Standard	**Sodium Nitrate**	**Sodium Nitrite**	**Sodium Metasilicate**	**Potassium Dihydrogen Phosphate**	**Solution**
1° stock **MI**	0.85 g L^{-1}	0.69 g L^{-1}	2.84 g L^{-1}	1.36 g L^{-1}	Diluted to 1L with Ultrapure water Stored for 1 month
Standard	**Sodium Nitrate**	**Sodium Nitrite**	**Sodium hexafluorosilicate**	**Potassium Dihydrogen Phosphate**	**Solution**
1° stock **Dal**	0.85 g L^{-1}	0.69 g/L	1.88 g/L	1.36 g L^{-1}	Diluted to 1L with Ultrapure water Stored for 1 month
2° stock **MI & Dal**	10 mL	1 mL	10 mL	1 mL	Made from 1° stock. Diluted to 100 ml with Ultrapure water (MI) or NaCl solution (Dal) Stored for 1 week

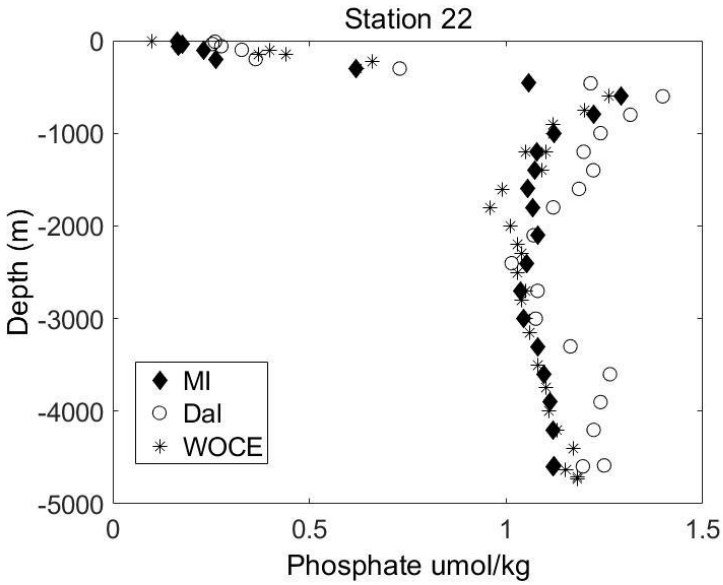

Station 14
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
10
20
30
40
Silicate umol/kg
MI
DaI
WOCE

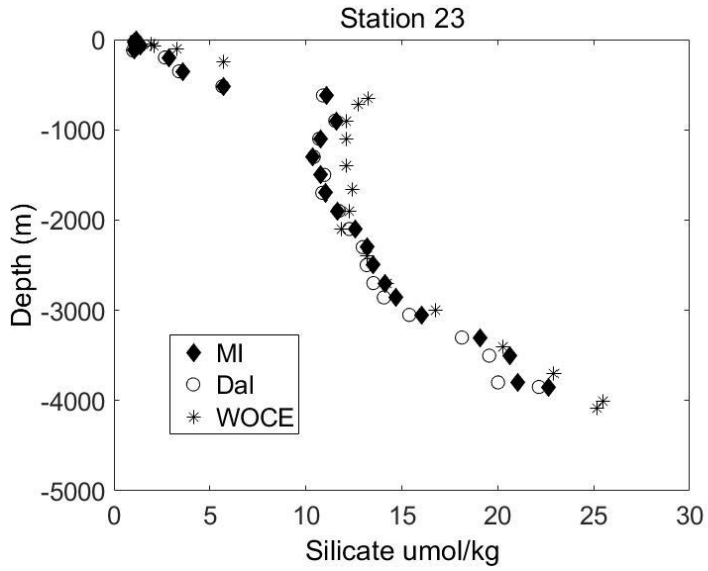

Station 14
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
5
10
15
20
25
TOxN umol/kg
MI
DaI
WOCE

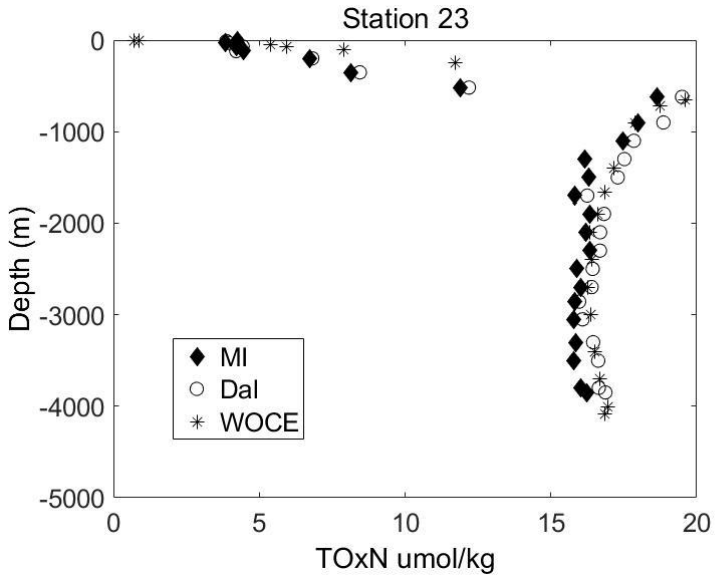

Station 14
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
0.5
1
1.5
Phosphate umol/kg
MI
DaI
WOCE

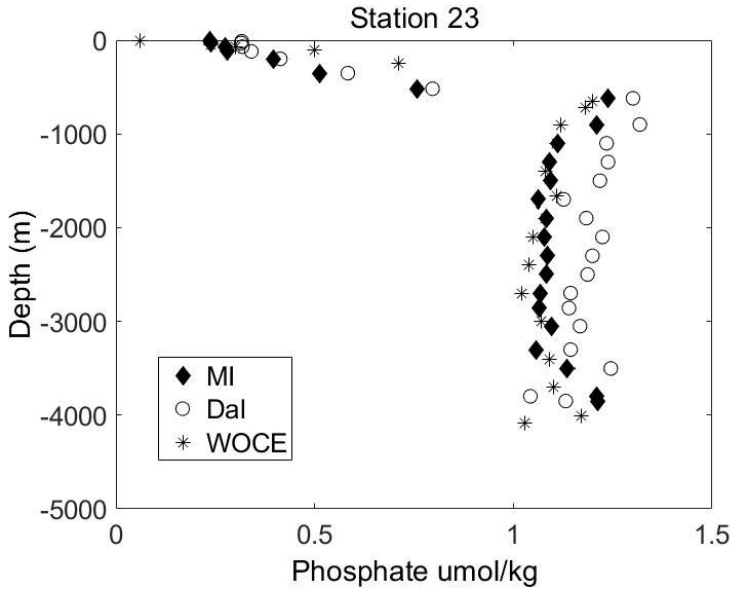

Station 22
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
10
20
30
40
Silicate umol/kg
MI
Dal
WOCE

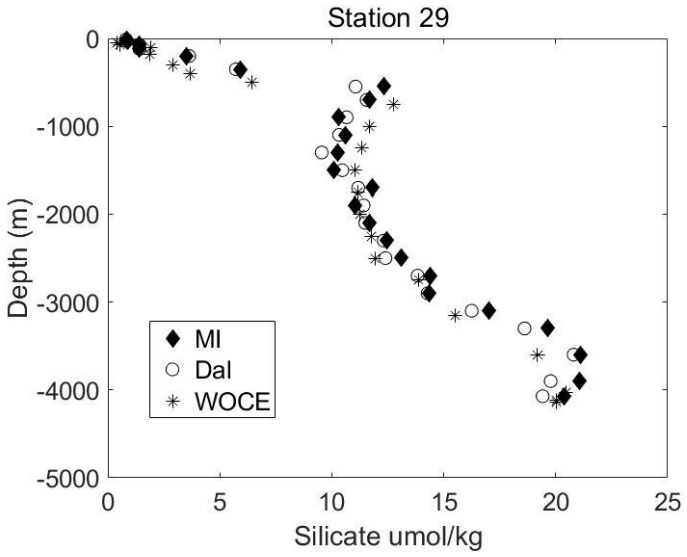

Station 22
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
5
10
15
20
TOxN umol/kg
MI
Dal
WOCE

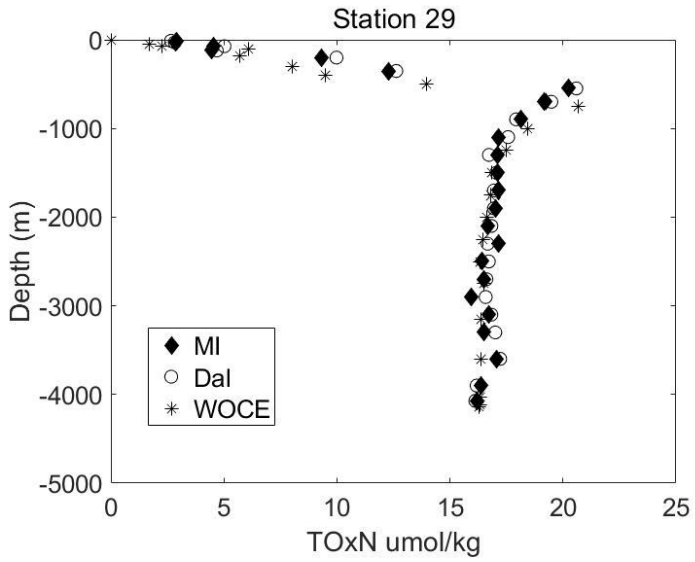

Station 22
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
0.5
1
1.5
Phosphate umol/kg
MI
Dal
WOCE

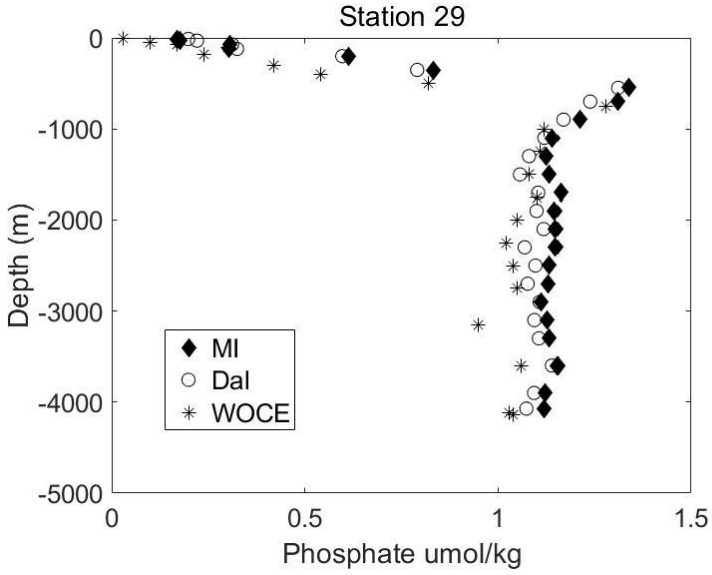

Station 23
Depth (m)
Silicate umol/kg
MI
DaI
WOCE

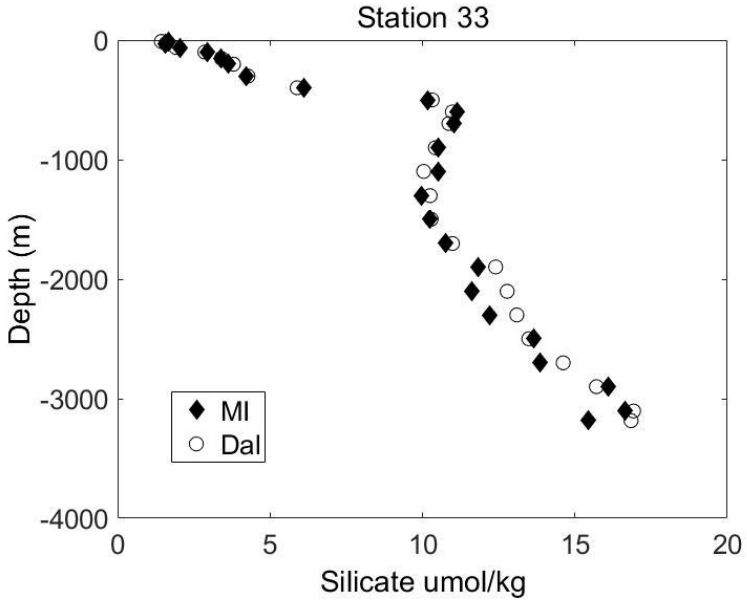

Station 23
Depth (m)
TOxN umol/kg
MI
DaI
WOCE

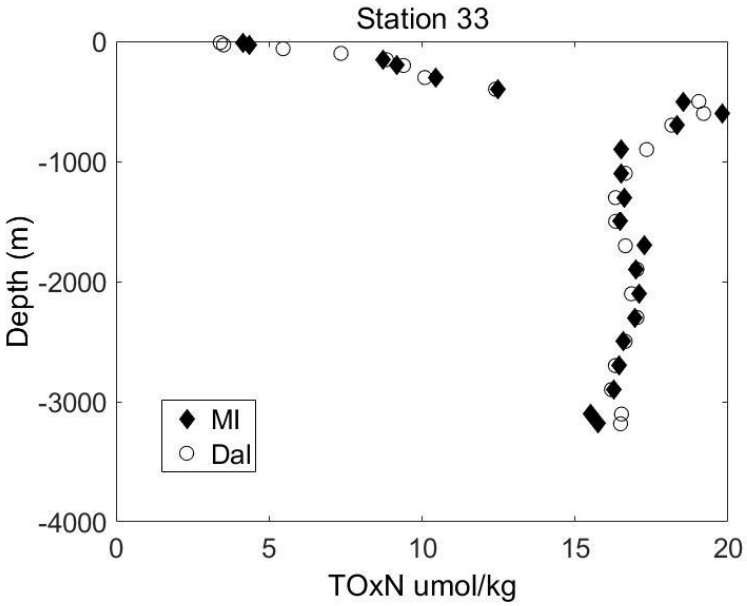

Station 23
Depth (m)
Phosphate umol/kg
MI
DaI
WOCE

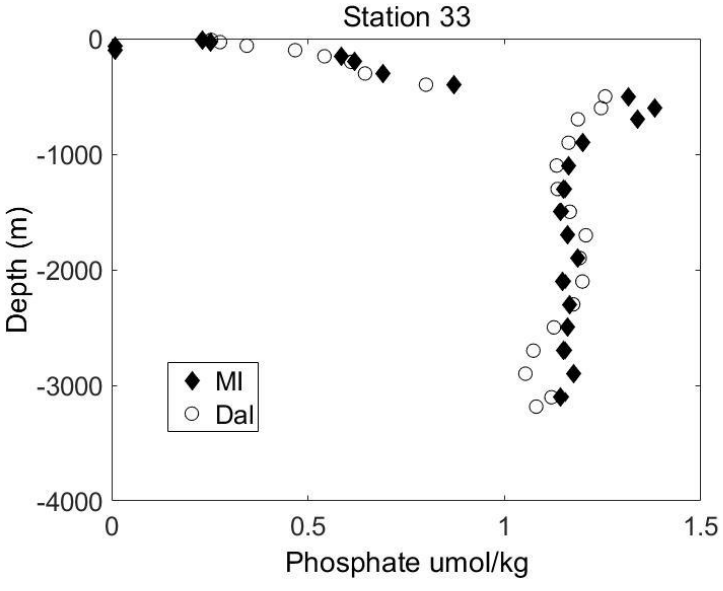

Station 29
Depth (m)
Silicate umol/kg
MI
Dal
WOCE

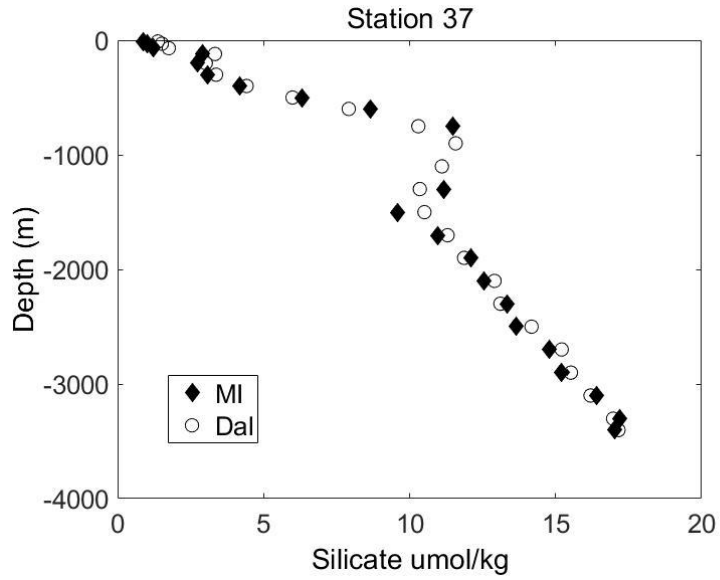

Station 29
Depth (m)
TOxN umol/kg
MI
Dal
WOCE

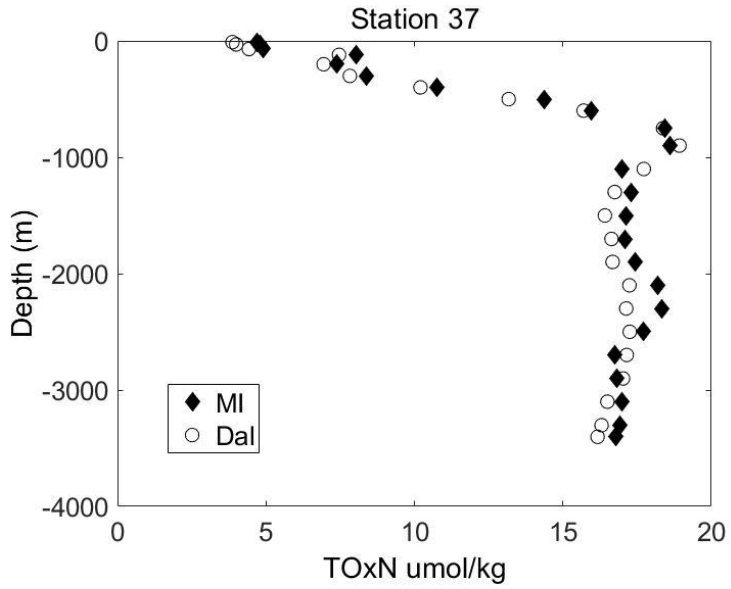

Station 29
Depth (m)
Phosphate umol/kg
MI
Dal
WOCE

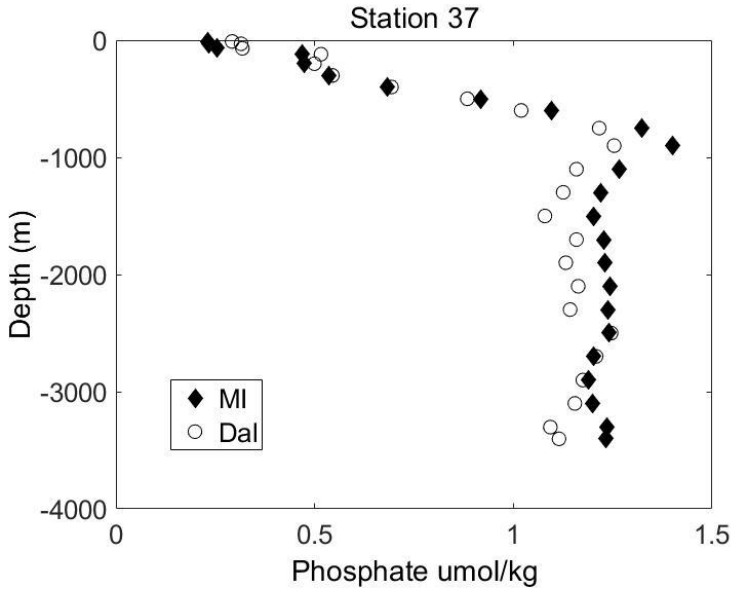

Station 33
Depth (m)
0
-1000
-2000
-3000
-4000
0
5
10
15
20
Silicate umol/kg
MI
Dal

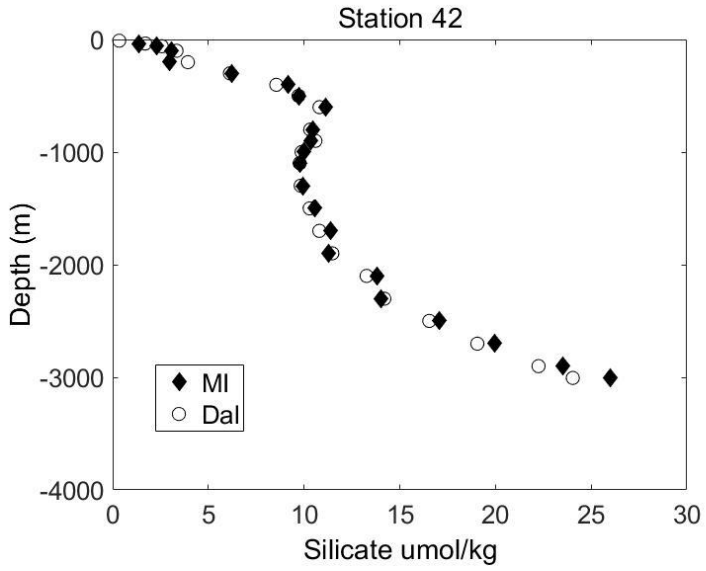

Station 33
Depth (m)
0
-1000
-2000
-3000
-4000
0
5
10
15
20
TOxN umol/kg
MI
Dal

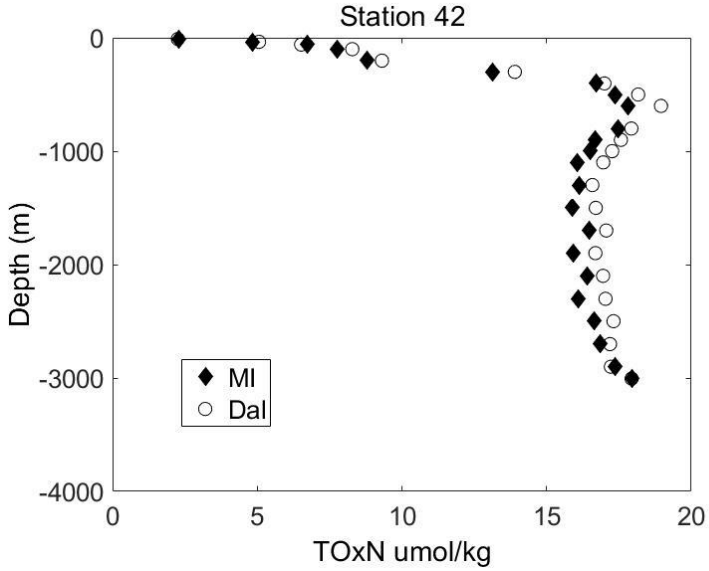

Station 33
Depth (m)
0
-1000
-2000
-3000
-4000
0
0.5
1
1.5
Phosphate umol/kg
MI
Dal

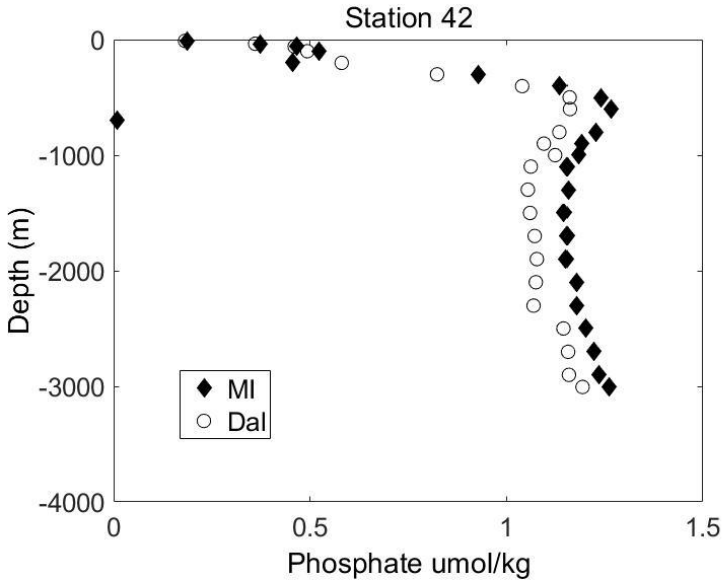

Station 37
Depth (m)
0
-1000
-2000
-3000
-4000
0
5
10
15
20
Silicate umol/kg
MI
Dal

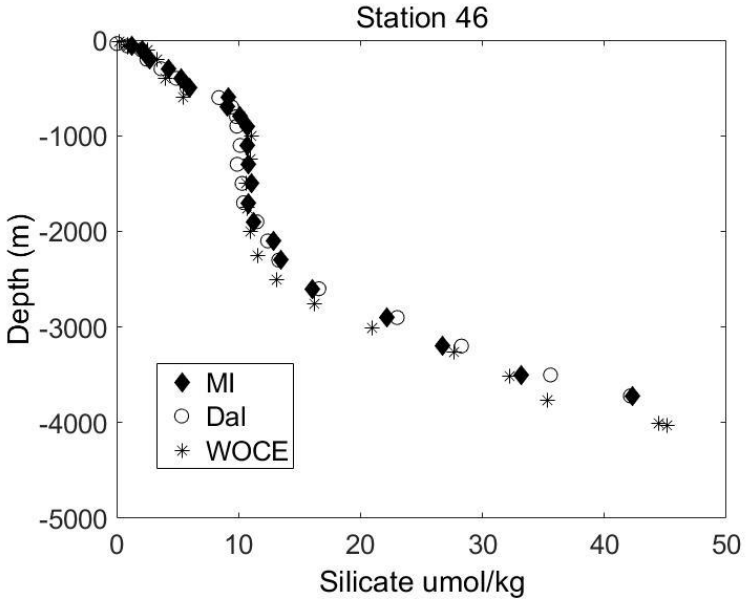

Station 37
Depth (m)
0
-1000
-2000
-3000
-4000
0
5
10
15
20
TOxN umol/kg
MI
Dal

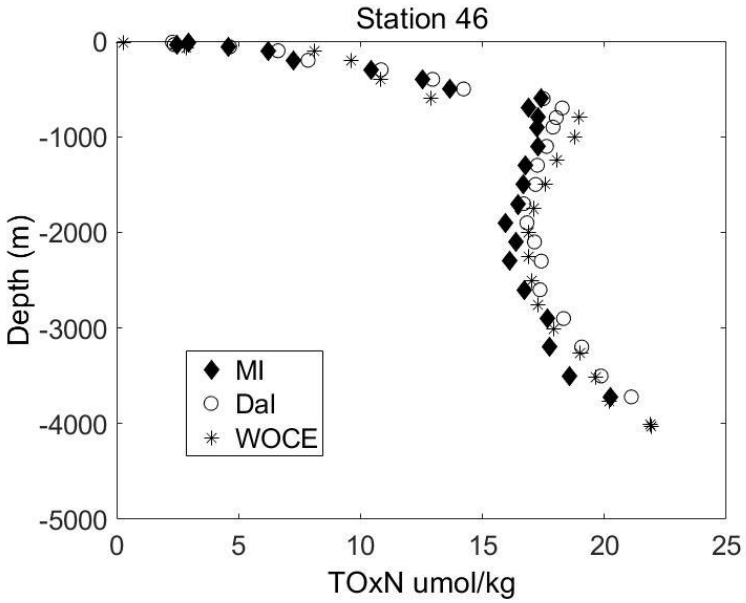

Station 37
Depth (m)
0
-1000
-2000
-3000
-4000
0
0.5
1
1.5
Phosphate umol/kg
MI
Dal

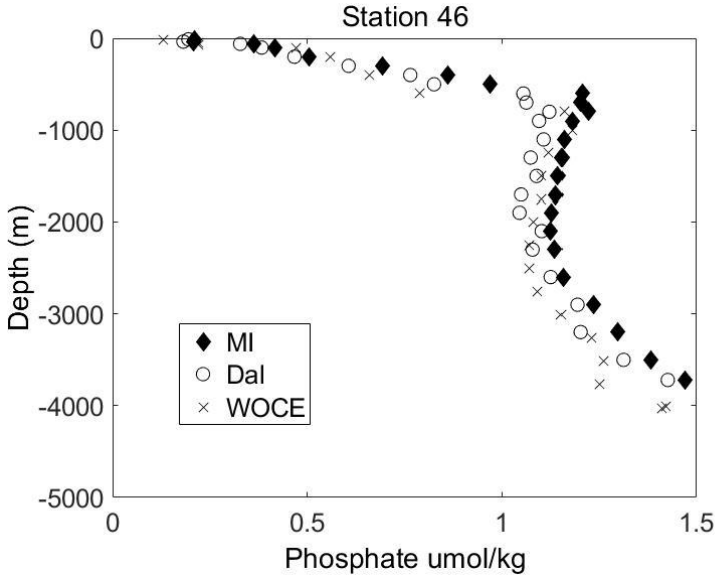

Station 42
Depth (m)
0
-1000
-2000
-3000
-4000
0
5
10
15
20
25
30
Silicate umol/kg
MI
Dal

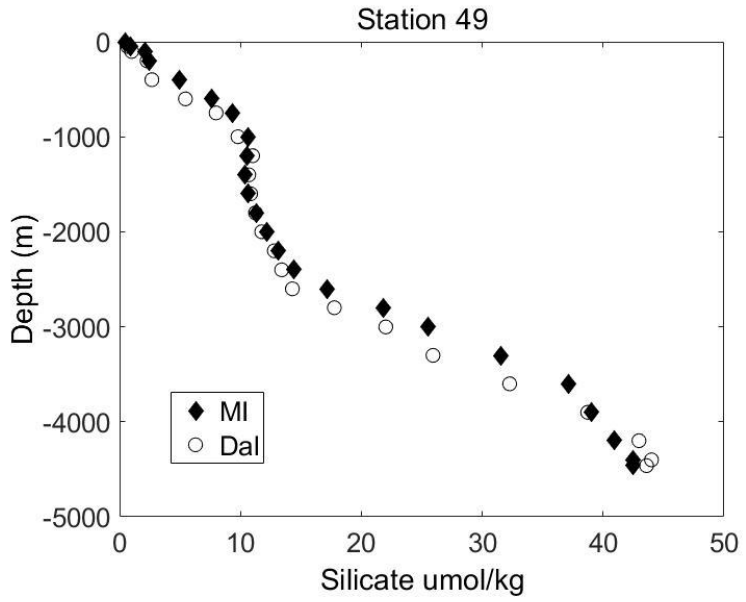

Station 42
Depth (m)
0
-1000
-2000
-3000
-4000
0
5
10
15
20
TOxN umol/kg
MI
Dal

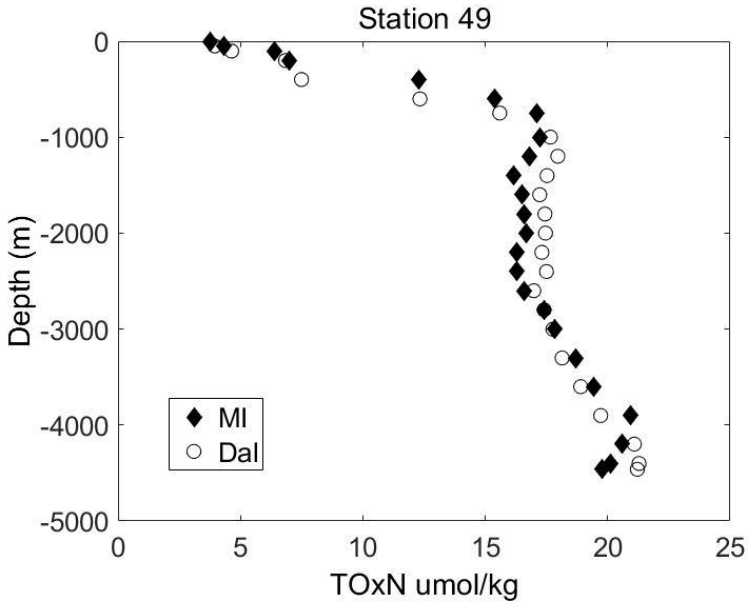

Station 42
Depth (m)
0
-1000
-2000
-3000
-4000
0
0.5
1
1.5
Phosphate umol/kg
MI
Dal

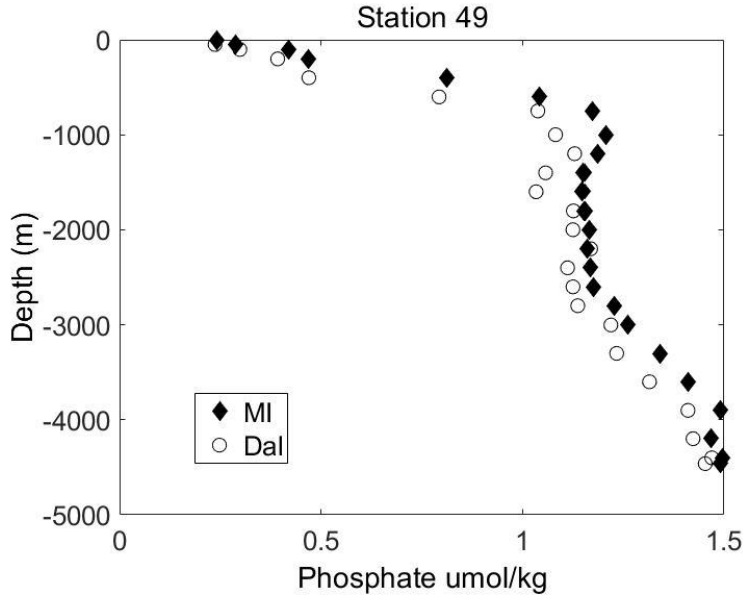

Station 46
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
10
20
30
40
50
Silicate umol/kg
MI
DaI
WOCE

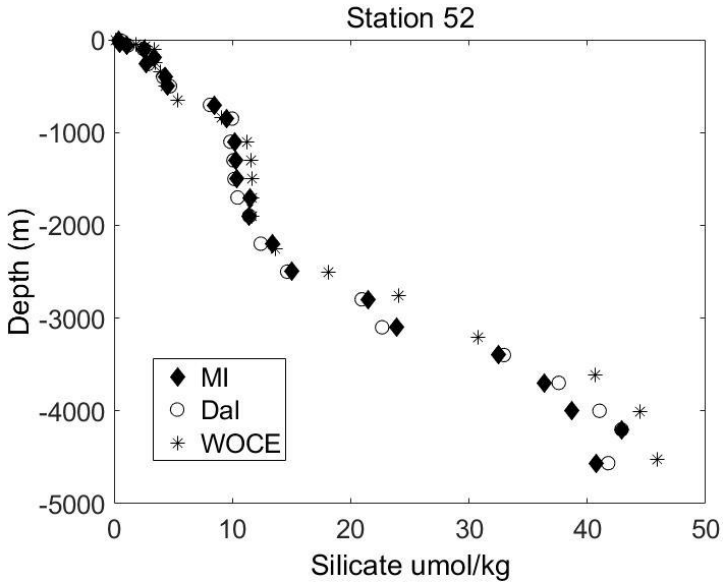

Station 46
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
5
10
15
20
25
TOxN umol/kg
MI
DaI
WOCE

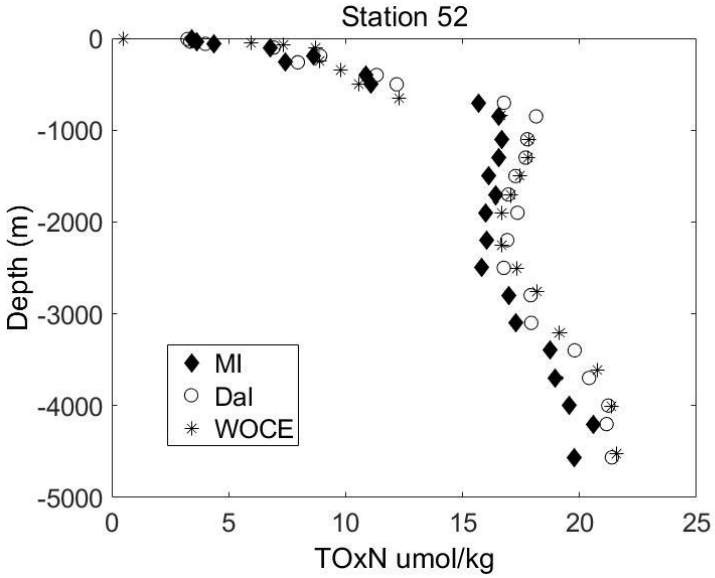

Station 46
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
0.5
1
1.5
Phosphate umol/kg
MI
DaI
WOCE

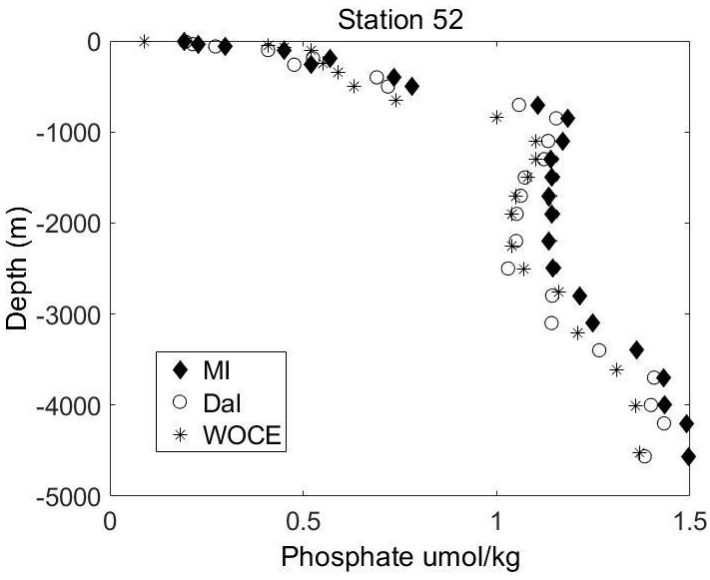

Station 49
Depth (m)
Silicate umol/kg
MI
Dal

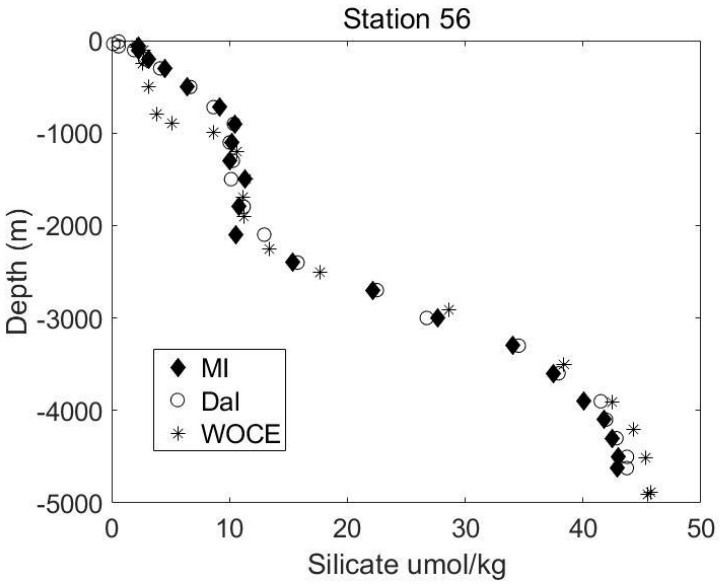

Station 49
Depth (m)
TOxN umol/kg
MI
Dal

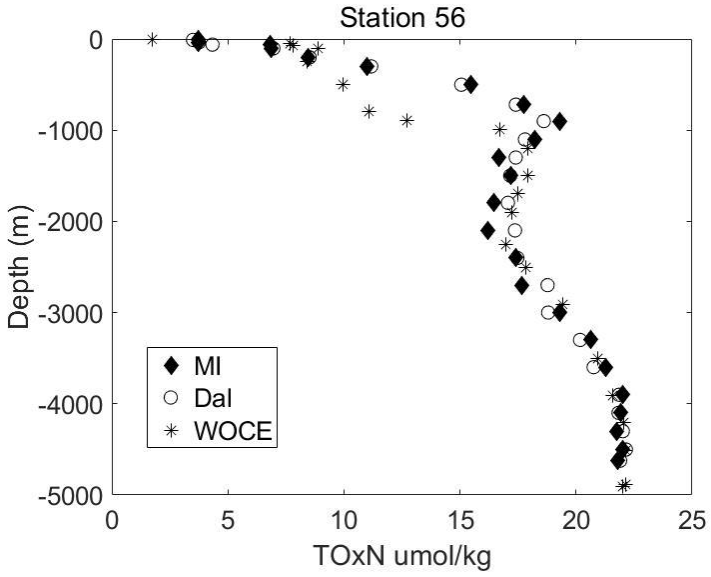

Station 49
Depth (m)
Phosphate umol/kg
MI
Dal

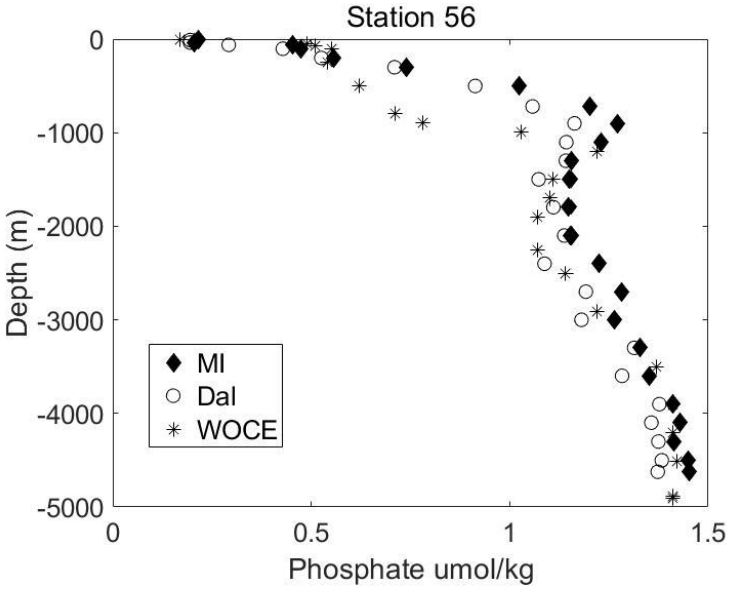

Station 52
Depth (m)
Silicate umol/kg
MI
Dal
WOCE

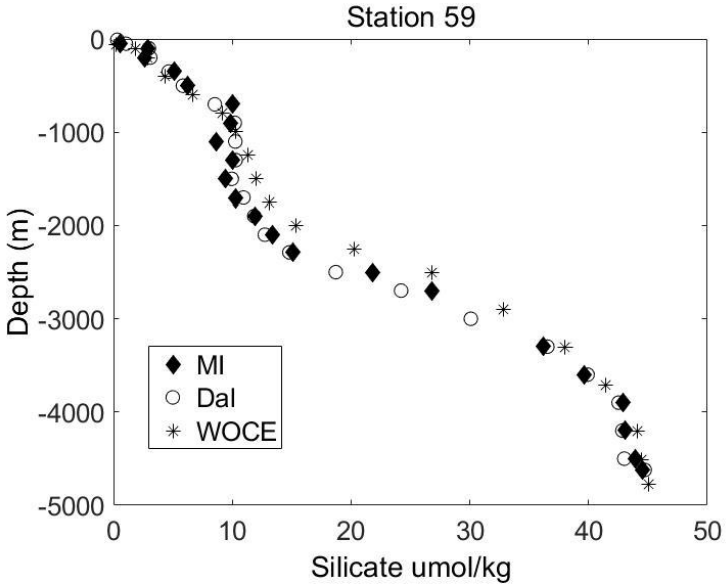

Station 52
Depth (m)
TOxN umol/kg
MI
Dal
WOCE

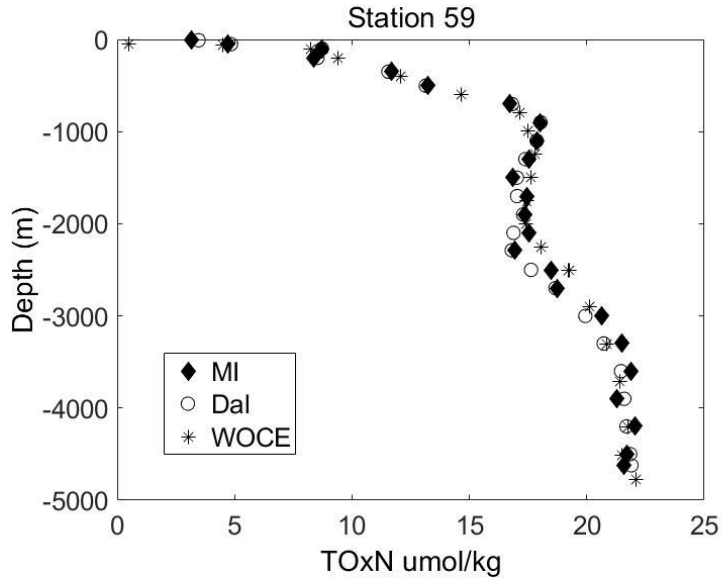

Station 52
Depth (m)
Phosphate umol/kg
MI
Dal
WOCE


Station 56
Depth (m)
Silicate umol/kg
MI
Dal
WOCE


Station 56
Depth (m)
TOxN umol/kg
MI
Dal
WOCE


Station 56
Depth (m)
Phosphate umol/kg
MI
Dal
WOCE


Station 59
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
10
20
30
40
50
Silicate umol/kg
MI
Dal
WOCE


Station 59
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
5
10
15
20
25
TOxN umol/kg
MI
Dal
WOCE

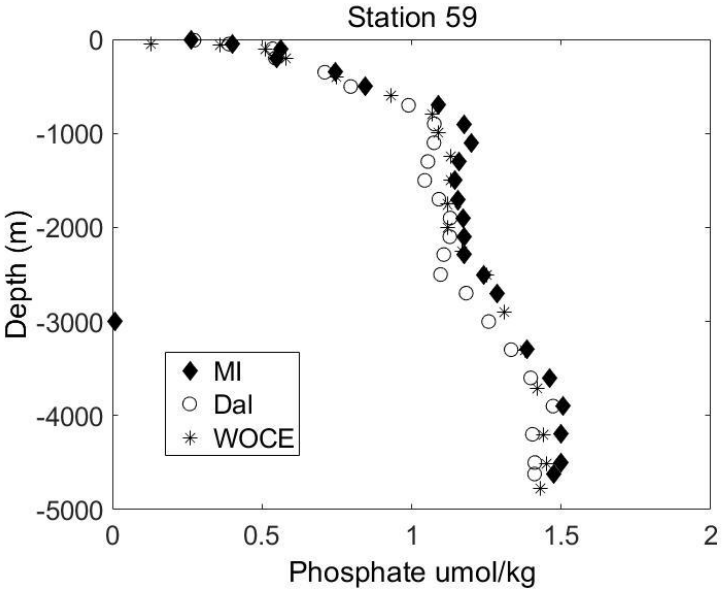

Station 59
Depth (m)
0
-1000
-2000
-3000
-4000
-5000
0
0.5
1
1.5
2
Phosphate umol/kg
MI
Dal
WOCE

Figure S1. Vertical profiles of silicate, total oxidised nitrogen and phosphate from the MI (Marine Institute), Dal (Dalhousie University) and WOCE (World Ocean Circulation Experiment) datasets. Some stations do not have WOCE data as not every station was repeated at the exact same position in 2017 relative to 1997.

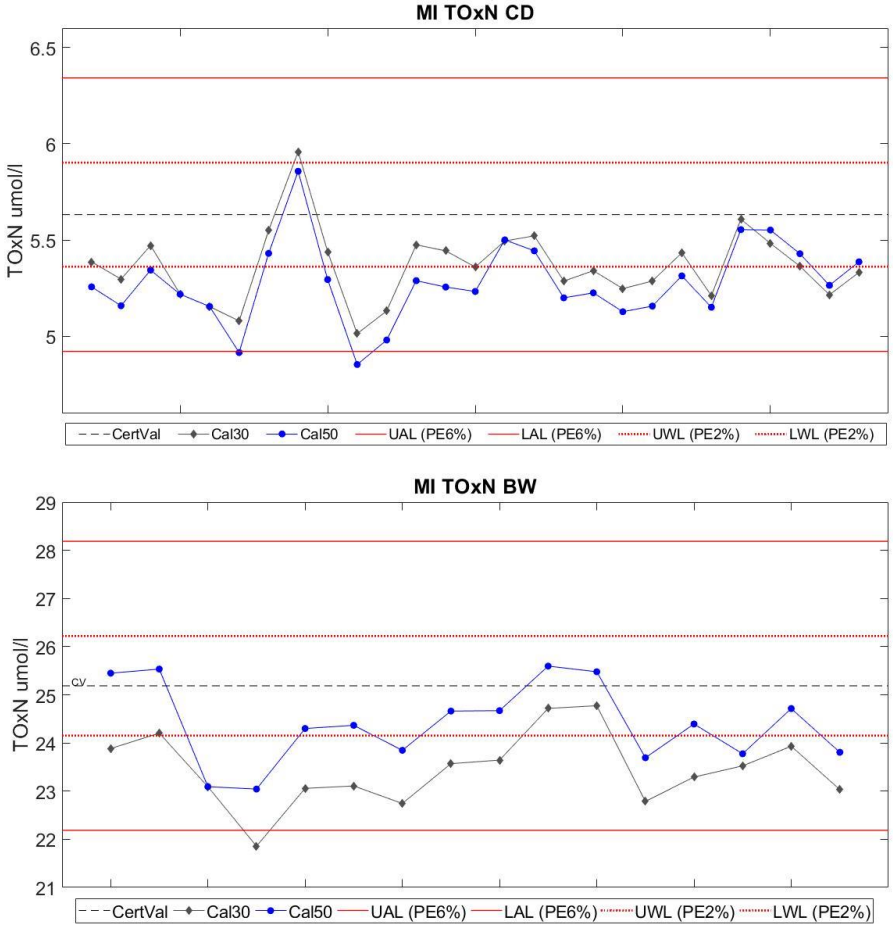


Figure S2 (a) and (b) Measured values for TOxN CD and BW CRMs on the MI system during the A02 survey to illustrate the effects of different calibration ranges – 0-30 µmol L^{-1} (Cal30) and 0-50 µmol L^{-1} (Cal50) where CertVal is the certified value of each CRM and UAL and LAL, are the upper and lower action limits using a z-score of 2 criteria and a potential error (PE%) of 6%. UWL and LWL are the upper and lower warning limits, respectively, calculated with a potential error (PE%) of 2%. Each point represents CRM results from an individual run. Due to improved QC using the TOxN range 0-50 µmol L^{-1}, the runs were re-calculated to include the higher standards.