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CCGS *JP Tully*

Dimethylsulfide (DMS) & Dimethylsulfoniopropionate (DMSP) Report

June 8 to June 23, 2014

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1. Sample Collection

Samples were collected from all major stations (P2, P4, P12, P16, P20, P26) for DMS, $DMSP_{D\ (dissolved)}$ & $DMSP_{T\ (total)}$.

1.1 DMS

Fourteen water samples from various depths (300m, 200m, 175m, 100m, 75m, 50m, 40m, 30m, 25m, 20m, 15m, 10m, 5m, surface) were collected at each of the stations P4, P12, P16, P20 & P26. At P2 there were eleven samples collected (100m, 75m, 50m, 40m, 30m, 25m, 20m, 15m, 10m, 5m, surface). In all cases, samples were collected in 250 ml ground glass stoppered bottles and stored in a fridge, in the dark and removed one at a time before analysis.

1.2 DMSP

Six samples for both $DMSP_D$ and $DMSP_T$ were collected at each station; two at the surface (0m, 5m), one in the mixed layer (100m), one in the deep chlorophyll max (20m) and two in the salinity mix layer (175m, 200m). The only exception to this was P2 where there were no 175m or 200m samples, hence, only 4 samples were collected.

2. Analysis

2.1 DMS

A sample was loaded onto the stripper and purged with UHP Nitrogen for 10 minutes at ~100 ml/min. The DMS was extracted from the water and absorbed onto a Tenax TA trap kept at -80ºC. The trap was subsequently desorbed at 100ºC (with a Dewar containing boiling water) onto a Chromasorb 330 column which eluted onto a Flame Photometric Detector (FPD). All samples were run as soon as possible after being collected.

2.2 $DMSP_D$

Approximately 50-75 ml of seawater were allowed to flow directly from the Niskin into a filtration funnel containing a 0.7µm GF/F filter. The first 3.5 ml were collected in a polypropylene tube (15 ml) containing 50 µl of a 50% sulphuric acid solution. The sample was then stored in the dark and at 4˚C where it would be analysed back at IOS at a later date.

2.3 $DMSP_T$

3.5 ml of seawater were collected directly from the Niskin into a polypropylene tube (15 ml) containing 50 µl of a 50% sulphuric acid solution. The sample was then stored in the dark and at 4˚C where it would be analysed back at IOS at a later date.

3. Calibration

3.1 DMS

A four to six level calibration table was used for calculating the concentrations of DMS. The standards were prepared in water and run under the same conditions, as described above, for the samples. A calibration curve was valid for 12 hours. If analysis exceeded 12 hours, a continuing calibration standard was run to ensure the calibration curve was still within acceptable limits.

4. Quality Control

4.1 DMS

System blanks and duplicates were run approximately every 13 samples to ensure the system remained free of contamination and had acceptable reproducibility. Stripping efficiency was evaluated at the beginning of the cruise and was proven to be acceptable at over 97%.

4.2 DMSP

Blanks and duplicates were collected at every station. Blanks were done by simply treating MQ water as an actual sample. For example, in the case of $DMSP_D$ it was put through a separate funnel and for $DMSP_T$ it was added directly to the polypropylene tube.

5. Data & Results

5.1 DMS

DMS was detected at depths of 200m (but not 300m) which is something seen very rarely in the last 15 years (if ever). The 200m value was consistent in P4 all the way to P26. Beyond the depth anomaly the DMS concentrations were not unusual for June and followed a historical pattern. The only exception to the above was Station P2. Here the values of DMS were extremely high near the surface and somewhat higher than historical records for the same time and same station.

5.2 DMSP

Samples were not run due to blank contamination.

6. Conclusions

6.1 DMS

The system worked very well for this cruise. There was a minor water blank problem at the beginning of the cruise but it was resolved by Glenn Cooper changing the ion exchange filter on the DMQ system. Normally a pre-check would have been done in the lab before the cruise to ensure the water system was performing optimally but the DMS container was loaded two weeks early and the instrument was subsequently not available to run any water samples. Once the filter was changed the water did get better as the days progressed.

6.2 DMSP

Samples were not run due to blank contamination. These blanks were run over a year after being collected and although they should have remained stable during this time it is possible they became contaminated from the storage process or while being collected.