

2009-09

CCGS *JP Tully*

Dimethylsulfide (DMS) & Dimethylsulfoniopropionate (DMSP) Report

June 6 - June 23, 2009

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1. Sample Collection

Samples were collected from all major stations (P4, P12, P16, P20, P26) and the “new” major station “P2” for DMS, DMSP_D (dissolved) & DMSP_T (total).

1.1 DMS

Thirteen water samples from various depths (200m, 175m, 100m, 75m, 50m, 40m, 30m, 25m, 20m, 15m, 10m, 5m, surface) were collected at each of the stations P4, P12, P16 & P20. 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 250mL ground glass stoppered bottles and stored 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 ~100mL/min. The DMS was extracted from the water and absorbed onto a Tenax TA trap kept at -80°C. The trap was subsequently desorbed at 100°C (with a dewar containing boiling water) onto a Chromasorb 330 column which eluted onto a Flame Photometric Detector (FPD). All samples were run immediately after being collected.

2.2 DMSP_D

Approximately 50-100mL of seawater was allowed to flow directly from the niskin into a filtration funnel containing a 0.7µm GF/F filter. The first 3.5mL was collected in a polypropylene tube (15mL) containing 50µL of a 50% sulphuric acid solution. The sample was stored for 24 hours in the dark and at 4°C after which time 3mL was transferred to a 25mL serum bottle containing 21mL of MQ water. An additional 1mL of a 5 Molar solution of sodium hydroxide was added to the bottle before it was crimped and sealed. The bottle was stored in the dark and at 4°C.

2.3 DMSP_T

3.5mL of seawater was collected directly from the niskin into a polypropylene tube (15mL) containing 50μL of a 50% sulphuric acid solution. The sample was stored for 24 hours in the dark and at 4°C after which time 3mL was transferred to a 25mL serum bottle containing 21mL of MQ water. An additional 1mL of a 5 Molar solution of sodium hydroxide was added to the bottle before it was crimped and sealed. The bottle was stored in the dark and at 4°C.

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. Normally a continuing calibration standard is run after all samples from a station have been run or every 12 hours, whichever comes first, to ensure the calibration curve is 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. There was a slightly elevated blank level for P2 which adversely affected the 100m sample (false positive) but all additional blanks were non-detectable and duplicates did not differ by an average 6% (well within the acceptable limits of 20%). Stripping efficiency was evaluated at the beginning of the cruise and was proven to be acceptable at over 98%. A performance evaluation mixture (PEM) was run at the start of every cast to further ensure method accuracy.

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

There was a major instrument problem that occurred while running the samples from Station P12. Analysis was stopped and the problem was traced to a leak in the trapping apparatus. Unfortunately the problem was not noticed until several samples had been run and as a result data from 30m to the surface are considered to not be reliable.

5.2 DMSP

Samples are to be run here at IOS within the next couple of months.

6. Conclusions

6.1 DMS

Instrument and analysis performed well on this cruise and with the exception of the leak while running P12 samples there were no additional issues. Including the Laval Dust Incubation DMS samples; over 200 DMS samples were run on this cruise which was a good test of the durability and throughput of the system.

6.2 DMSP

No problems to report.