

## **Biogeochemistry of DMS and DMSP in the surface microlayer of the western North Atlantic during fall 2003**

GUI-PENG YANG<sup>1,2</sup>, MAURICE LEVASSEUR<sup>1</sup>, ANISSA MERZOUK<sup>1</sup>, MARTINE LIZOTTE<sup>1</sup>, MICHAEL SCARRATT<sup>3</sup> and SONIA MICHAUD<sup>3</sup>

<sup>1</sup>*Department of Biology (Québec-Océan), Laval University*

<sup>2</sup>*College of Chemistry and Chemical Engineering, Ocean University of China*

<sup>3</sup>*Maurice-Lamontagne Institute, Fisheries and Oceans Canada*

The distributions and cycling of dimethylsulfide (DMS) and dissolved and particulate fractions of dimethylsulfoniopropionate (DMSPd and DMSPp) were investigated in the surface microlayer and subsurface water of the western North Atlantic during fall 2003. DMS concentrations in the subsurface water varied from 0.08 to 0.78 nM with a mean of 0.38 nM. In contrast, DMS concentrations in the microlayer were considerably low with an average value of 0.15 nM. No enrichment of DMS was observed in the microlayer. Average concentrations of DMSPd and DMSPp in the subsurface water were 1.49 (0.15-3.98) and 9.86 (3.18-26.99) nM, respectively, and those in the surface microlayer were 9.07 (2.7-27.99) and 17.33 (3.74-70.47) nM. It is worth noting that DMSPd was highly enriched in the microlayer with an average enrichment factor of 11.2. However, DMSPp and chlorophyll a were only moderately enriched in the microlayer. DMS appeared to be significantly correlated with DMSPd in the microlayer. There was also a significant relationship between DMSPd and DMSPp in the microlayer. Moreover, we found a significant correlation between the microlayer and subsurface water concentrations of DMS, DMSPp, chlorophyll a and phaeopigments, as well as bacterial abundances, demonstrating that the bulk water is a main source of materials in the microlayer. The production and consumption rates of DMS were measured at two stations and the result showed these two rates were very low, primarily due to low biomass during the study period. On the basis of the concentration of DMS in the subsurface water, and the current model for gas exchange across the air-sea interface, we obtained a mean DMS sea-to-air flux from the study area of approximately 0.88  $\mu\text{mol}/\text{m}^2/\text{d}$ .