

Distributions of dimethyl sulfide in the Amundsen Sea water column, Antarctica, measured by membrane inlet mass spectrometer

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We investigated horizontal and vertical distributions of dimethyl sulfide (DMS) in the upper water column of the Amundsen Sea. Polynya and Pine Island Polynya during the austral summer (January–February) of 2016 using a membrane inlet mass spectrometer (MIMS) onboard the Korean icebreaker R/V *Araon*. The surface water concentrations of DMS varied from 1 to 400 nM. The highest DMS (up to 300 nM) were observed in sea ice–polynya transition zones and near the Getz ice shelf, where both the first local ice melting and high plankton productivity were observed. In other regions, high DMS concentration was generally accompanied by higher chlorophyll and $\Delta O_2/Ar$. The large spatial variability of DMS and primary productivity in the surface water of the Amundsen Sea seems to be attributed to melting conditions of sea ice, relative dominance of *Phaeocystis Antarctica* as a DMS producer, and timing differences between bloom and subsequent DMS productions. The depth profiles of DMS and $\Delta O_2/Ar$ were consistent with the horizontal surface data, showing noticeable spatial variability. However, despite the large spatial variability, in contrast to the previous results from 2009, DMS concentrations and $\Delta O_2/Ar$ in the surface water were indistinct between the two major domains: the sea ice zone and polynya region. The discrepancy may be associated with inter-annual variations of phytoplankton assemblages superimposed on differences in sea-ice conditions, blooming period, and spatial coverage along the vast surface area of the Amundsen Sea.