

High resolution measurements of marine dimethylsulfide in contrasting environments of the Canadian Arctic Archipelago (CAA)

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What drives DMS concentrations in surface waters of the Canadian Arctic Archipelago?

Introduction

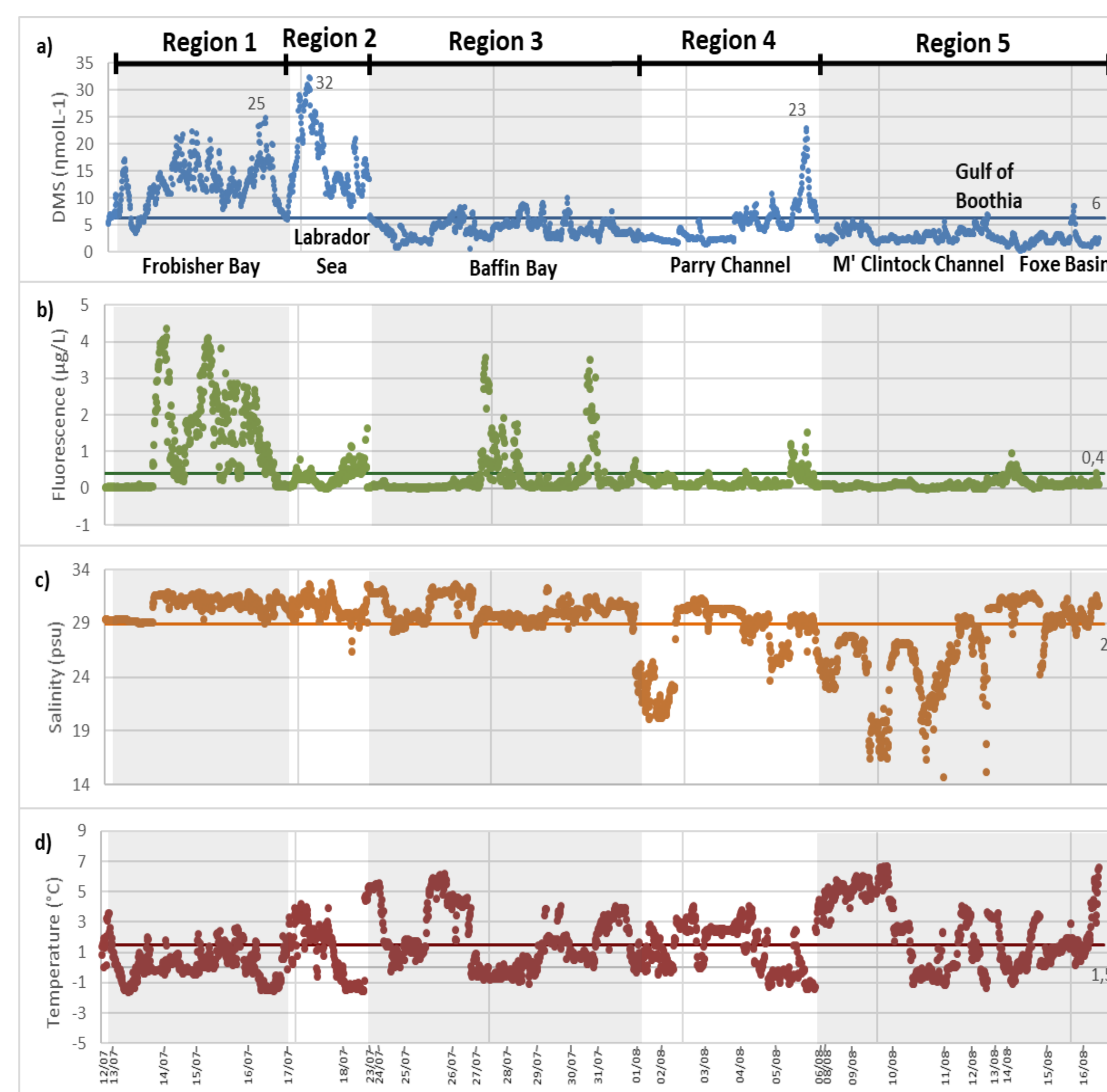
Emissions of marine dimethylsulfide (DMS), a climatically active biogenic gas, may increase in the Arctic due to changes in snow cover, extent and thickness of sea ice, increase in seasonal ice melt. The presence of DMS in Arctic waters is linked to its precursor, dimethylsulfoniopropionate (DMSP) which is synthesized by pelagic and sympagic algae.

In the atmosphere, DMS is rapidly photooxidized into sulfate aerosol which affect the Arctic climate system by influencing the radiative budget.

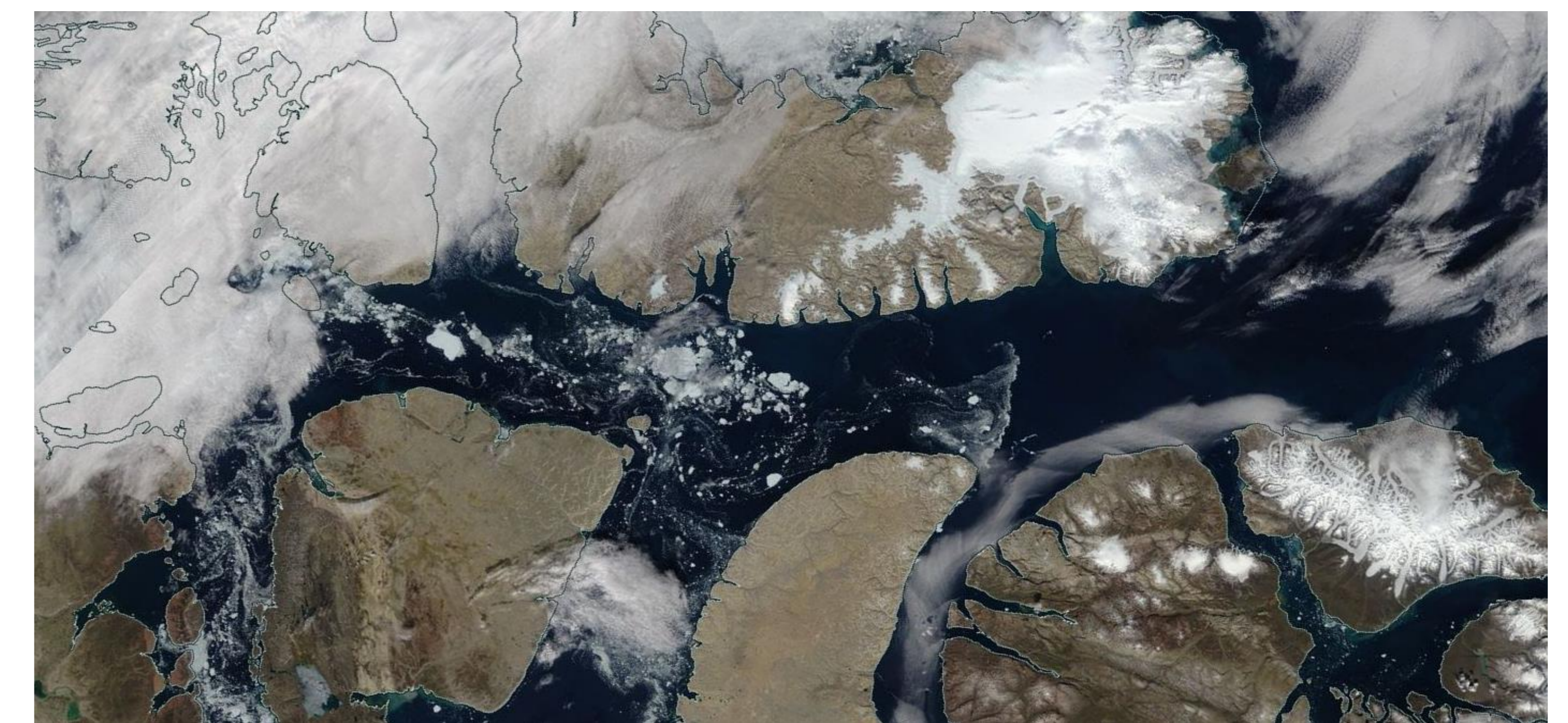
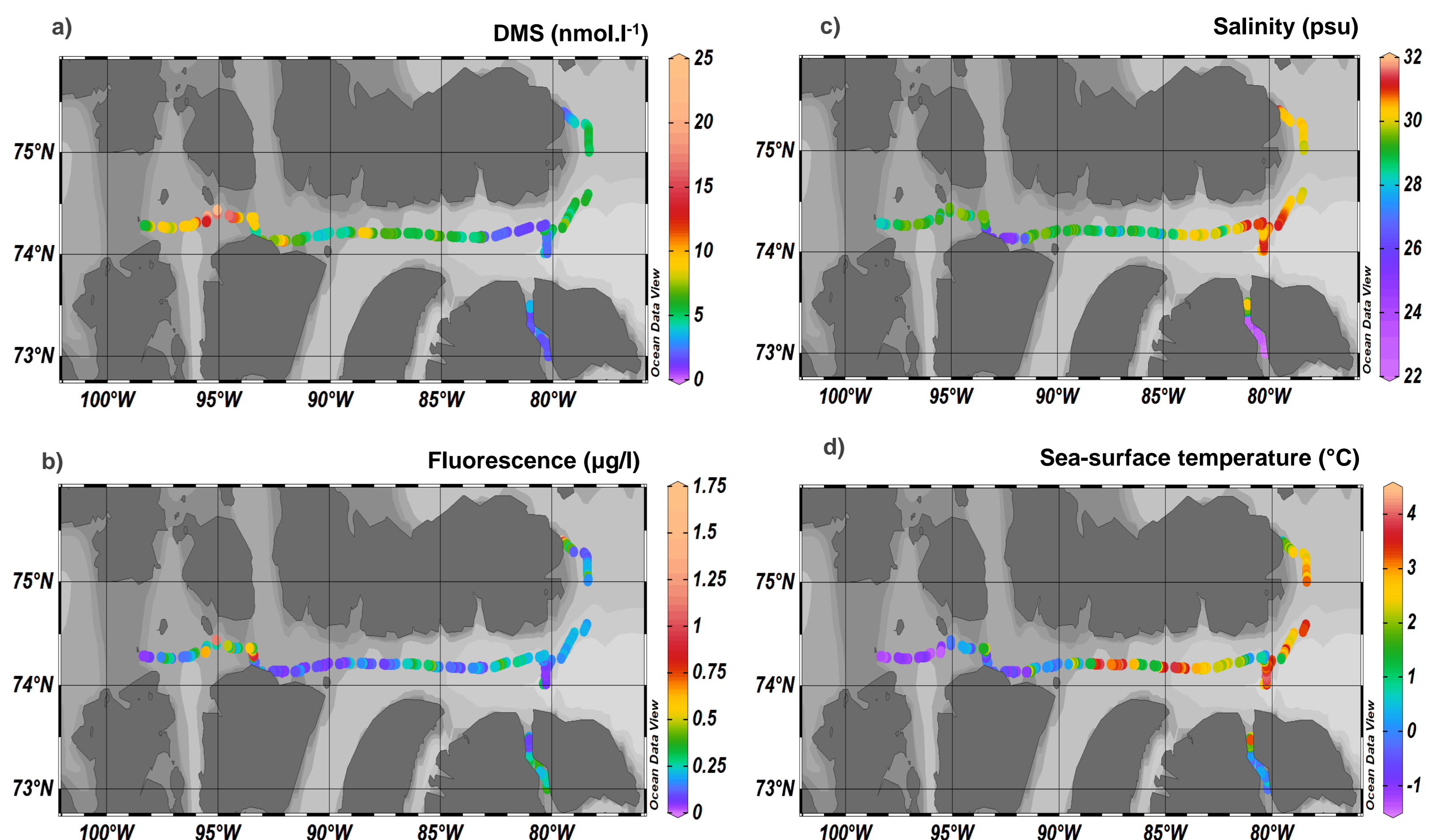
Hypothesis:

- Concentration of DMS in CAA surface waters are correlated to environmental conditions.
- DMS concentrations are correlated to primary productivity.

Results from the 2017 field season

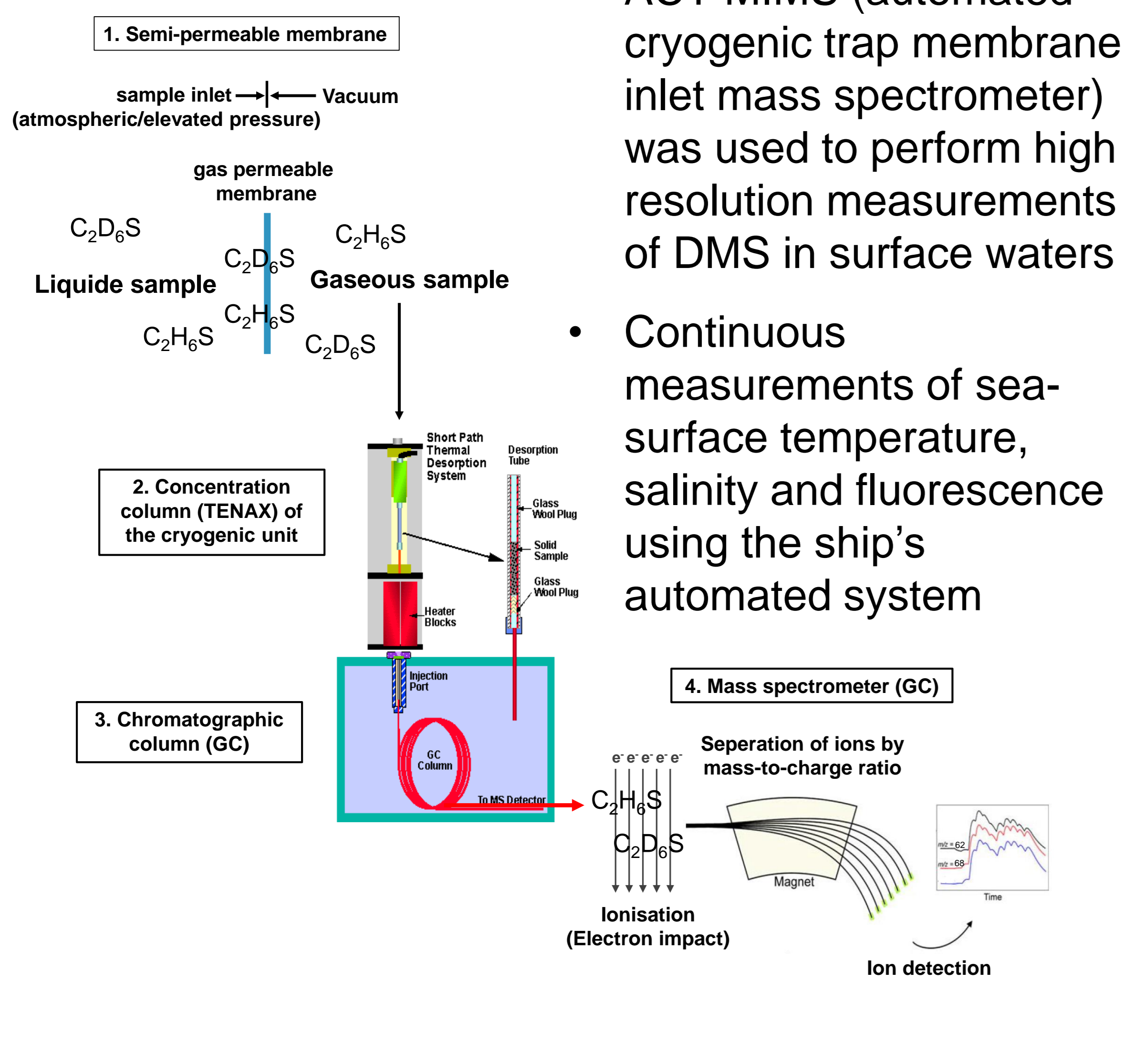


Exemple of Region 4 : Parry Channel

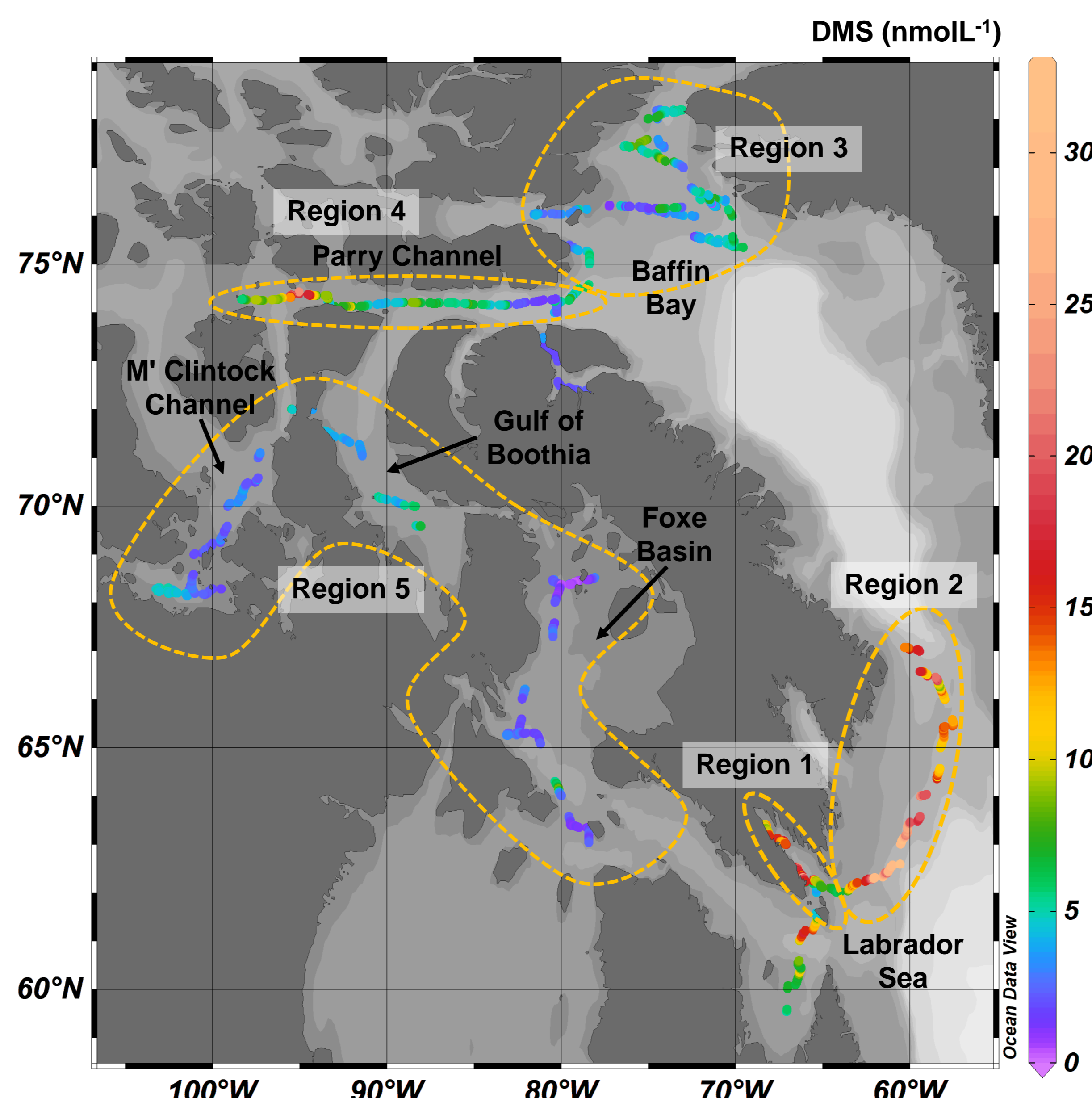


Ice condition. Modis Aqua 500m (August 6, 2017)

Methods



- ACT-MIMS (automated cryogenic trap membrane inlet mass spectrometer) was used to perform high resolution measurements of DMS in surface waters
- Continuous measurements of sea-surface temperature, salinity and fluorescence using the ship's automated system



Observations

- High DMS concentrations were observed in regions 1, 2 and 4 (up to 32 nmol.l⁻¹)
- Maximum fluorescence and high DMS concentrations were observed in a coastal region (Region 1 / Frobisher Bay).
- High DMS abundances were observed in low fluorescence areas : DMS presence is not always associated with algal biomass.