Supplement of Atmos. Chem. Phys., 16, 6665–6680, 2016
http://www.atmos-chem-phys.net/16/6665/2016/
doi:10.5194/acp-16-6665-2016-supplement

Atmospheric Chemistry and Physics Open Access EGU

Supplement of

Dimethyl sulfide in the summertime Arctic atmosphere: measurements and source sensitivity simulations

Emma L. Mungall et al.

Correspondence to: Jonathan P. D. Abbatt (jabbatt@chem.utoronto.ca)

Text S1.

HR-ToF-CIMS data processing

In the TofWare software (in Igor Pro), peaks were fit for the reagent ion, DMS and surrounding peaks (to account for isotope peaks). This was done on a daily basis both for the calibration files and the data files. Then, peak intensity as a function of time was exported to a new Igor Pro experiment.

Calibration files were put in their own Igor Pro experiment. At the end of the campaign, a linear interpolation of each day's sensitivity was made.

Each day of data was processed in a separate Igor file due to the large volumes of data (~1 GB per day). The background times, representing five minutes of every hour, were removed using an array generated during data collection indicating whether it was a background period or not. The five minute spaces were then filled in using the median of the surrounding values, and the backgrounds were interpolated between five minute periods. This allowed point-by-point background subtraction. The background subtracted array was then normalized point-by-point by the reagent ion intensity (divided point-by-point and multiplied by the mean value for that day).

At this point, the arrays for each day of the cruise were concatenated in another Igor experiment. The linearly interpolated calibration factors were applied point by point, generating an array of DMS mixing ratios in pptv.

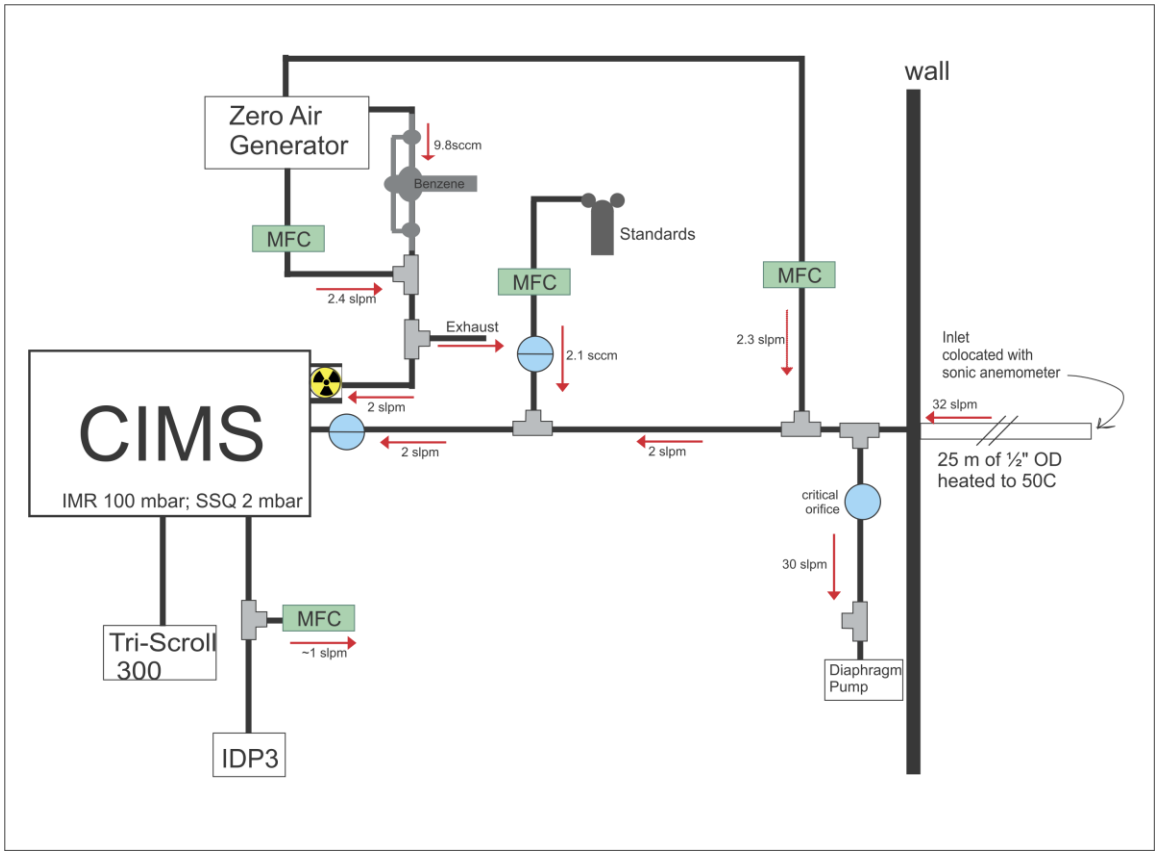

Figure S1. Flow schematic of instrumental setup during operation in the field. MFC stands for mass flow controller. The Tri-Scroll 200 and the IDP3 are scroll pumps, the former being more powerful than the latter. The IMR (ion molecule region) was pressure controlled to 100 mbar by a feedback loop controlling a MFC that allowed a leak of up to 1 slpm into the pump.

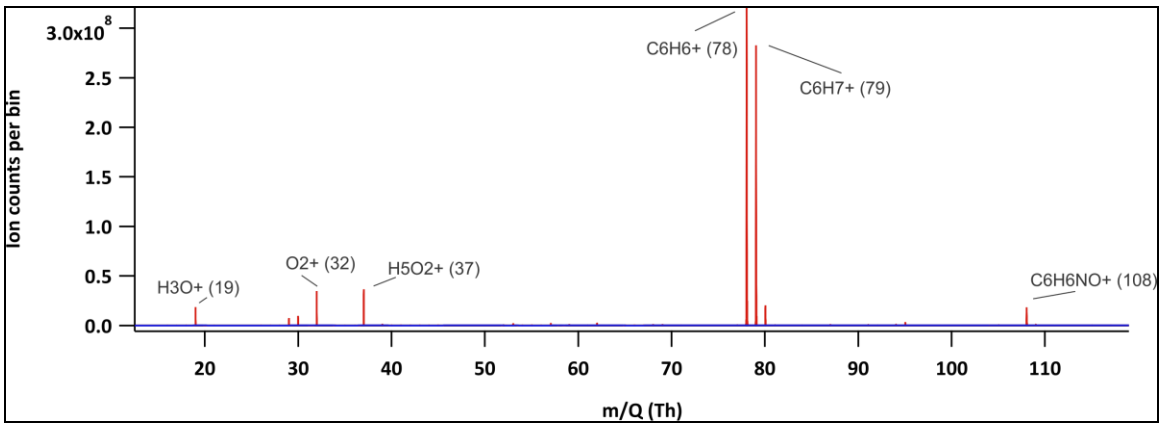

Figure S2. Typical mass spectrum during the campaign showing the most intense peaks.

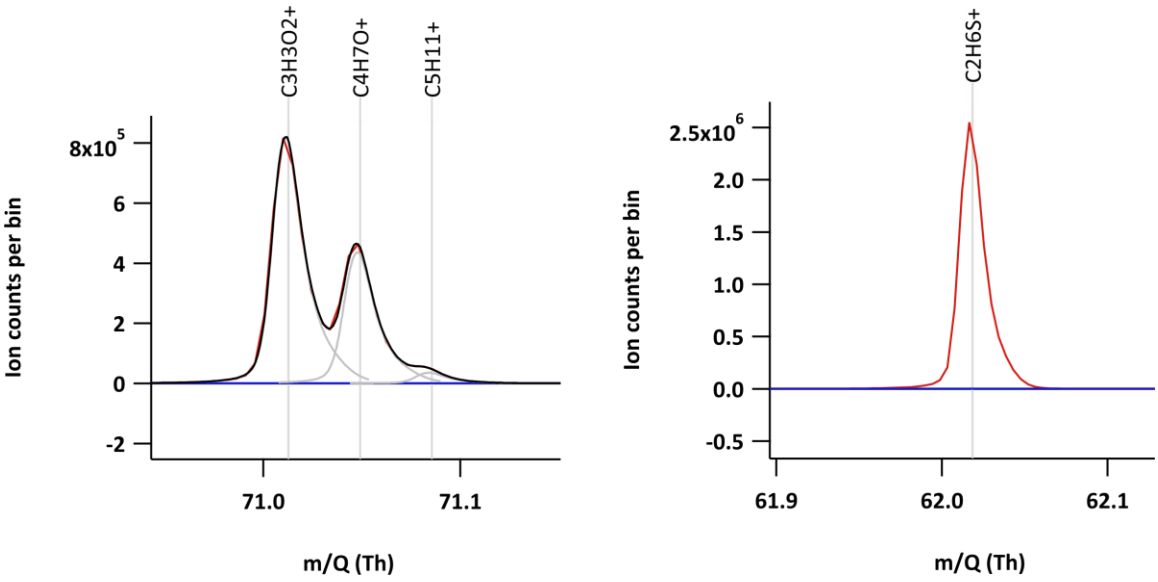

Figure S3. On the left, m/z 71 showing the high res peak fitting allowing separation of interfering masses. On the right, m/z 62 (DMS) showing that typically the DMS peak was free of interfering peaks. This was partly due to the large intensity of this peak (it was consistently one of the most intense peaks in the spectrum).

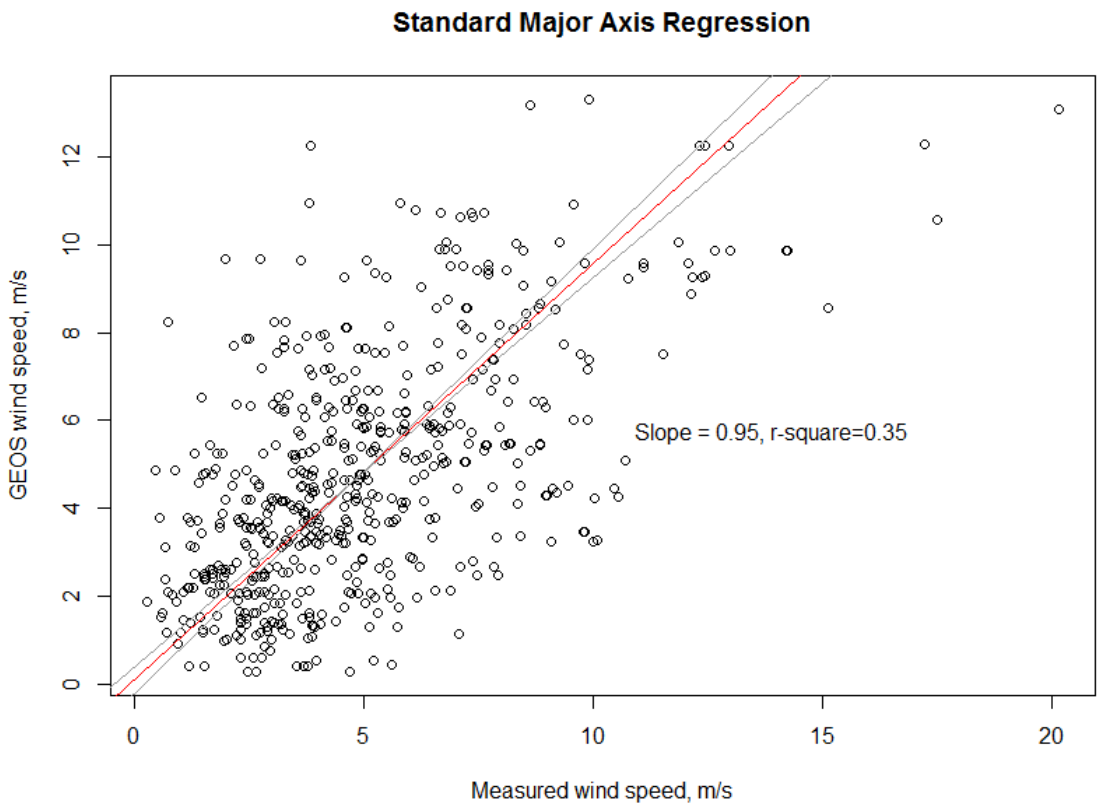

Figure S4. Standard major axis linear regression of GEOS wind speeds on measured wind speeds. Gray lines show 95% confidence intervals.

Figure S5. Melt ponds covered a large percentage of the sea ice to the west of the ship. This photo was taken on 23 July 2014 from the bridge of the CCGS Amundsen in Resolute Bay (facing Cornwallis Island).

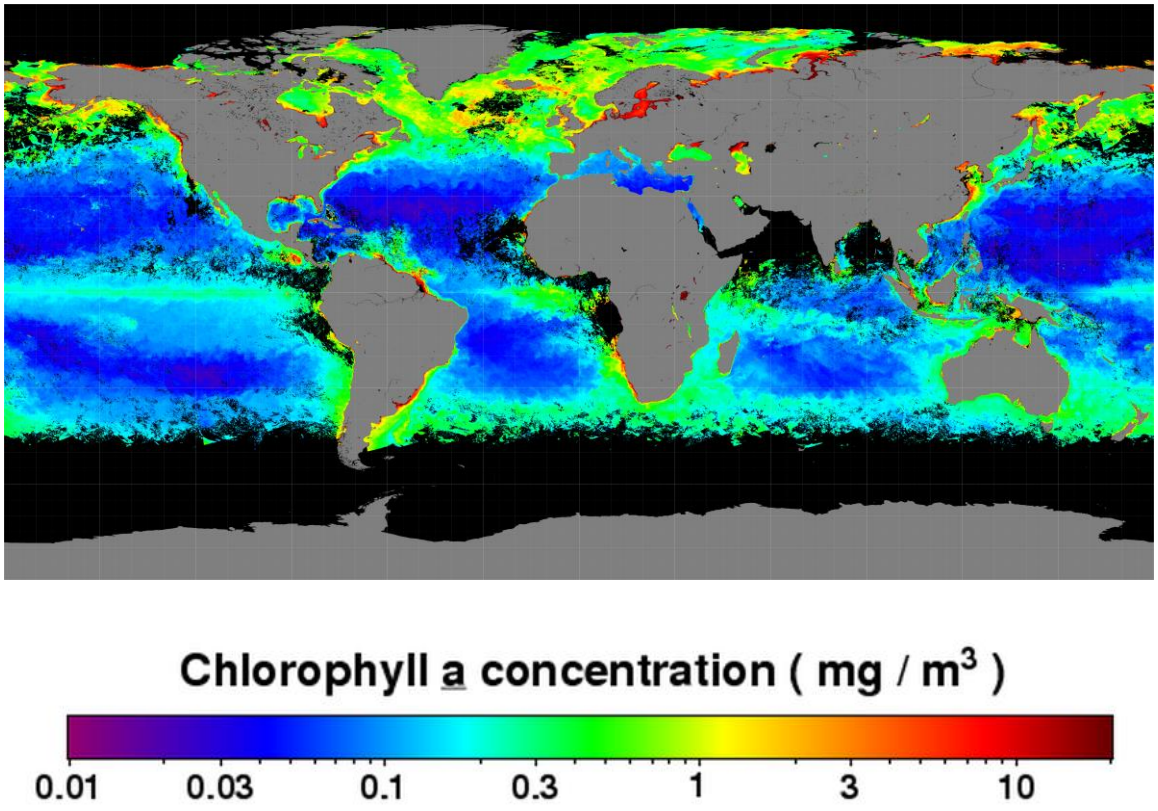

Figure S6. Global chlorophyll a concentration showing high chlorophyll a in lakes in Northern Canada. From the NASA Ocean Colour Web tool; monthly composite for July 2014. (http://oceancolor.gsfc.nasa.gov)