

***Interactive comment on* “Summertime sources of dimethyl sulfide in the Canadian Arctic Archipelago and Baffin Bay” by E. L. Mungall et al.**

Anonymous Referee #2

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A review of "Summertime sources of dimethyl sulfide in the Canadian Arctic Archipelago and Baffin Bay" by Mungall et al.

General comments:

This paper reports data and analyses from a recent field campaign made in the Canadian Arctic during the summer, with a particular emphasis on the observations of DMS in air by high time-resolution mass spectrometry, associated with some seawater DMS data obtained by gas chromatography. The authors investigate the role and impacts of oceanic and land sources of DMS in combination with a chemistry-transport model. The data in this region in this season is very valuable to fill the database and to test our understanding of the air-sea sulfur cycle. The measurements are sound and the analyses are thoroughly made. The paper is generally well organized and written. With

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the above three reasons, I would support publication after minor and technical revision.

Specific comments:

P35557, L10: The authors use primary productivity as a proxy of DMS in seawater. The first question is why primary productivity not Chl-a? There exist some parameterizations using Chl-a and MLD for the global oceans (Simo and Dachs, GBC, 2002) and SST and SSN for the North Pacific (Watanabe et al., Marine Chem., 2007). A recent paper suggested that primary productivity can be a good proxy in predicting seawater DMS (Kameyama et al., GRL, 2013). It seems to me that the authors' phrase sounds a bit awkward. The authors can be a bit stronger in phrasing this sentence by referring the Kameyama et al. paper. Also I wonder how seawater DMS is parameterized from primary productivity and where this primary productivity data came from (e.g., satellite?). As the model simulations were often used in the analysis later in the paper, the authors are encouraged to elaborate more details here.

Table 2 and Figure 1b: Clearly indicate atmospheric measurements, please.

Section 4.4: Although the investigation of non-marine sources is interesting and worth trying, some parts of the analyses are not strong. I feel better if the authors say "speculative". Otherwise, the authors should try to add more robust evidence from the observations or supporting information from the model runs.

P35557, L9: In order to assess . . .

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 35547, 2015.

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