Biogeosciences Discussions

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Comment on bg-2021-174

Anonymous Referee #2

Referee comment on "Dimethylated sulfur compounds in the Peruvian upwelling system" by Yanan Zhao et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-174-RC2, 2021

The manuscript "Dimethylated sulfur compounds in the Peruvian upwelling system" presents results from two different ship cruises in the Peruvian upwelling region focusing on observations of marine sulfur species. Both sea water and atmospheric DMS measurements are presented as well as DMSP and DMSO concentrations. I believe that the manuscript is very interesting and well written and I therefore recommend the paper for publication after the following minor comments have been addressed:

General comments:

Comparison of atmospheric DMS concentrations: In the manuscript, you note that there is a good correlation between the two employed techniques but that the results are not on a 1:1 line. I would recommend discussing a bit further for example mentioning that the PTR measurement is showing higher concentrations. Besides, while the PTR directly measures the DMS concentration in air there might be potential losses of DMS in the other technique. Was there a possibility to do a comparison in the lab of the two techniques? This could also help to find out if the instruments actually worked well. It would also help to know which E/N ratio was used for the PTR as that has an influence on the performance of the instrument and if it was calibrated before and after the measurements. Which m/z was used to track the DMS signal in the PTR?

Regarding the atmospheric DMS concentrations, I was wondering if you could compare your data to results from satellite data?

I was wondering about the **roughness of the sea** during the cruises. For concentrations of gas and particulate species in the marine atmosphere, the structure of the surface of the ocean is quite important. Figure 7 shows wind speed that as is mentioned in the manuscript is often correlated with DMS concentrations. What about wave breaking? Do you have measurements of wave height or where the waves started breaking? Was there wave breaking in the regions defined as "coastal stations"?

Specific comments:

Sometimes there is a strange thing with the font. For example on page 3, line 76: the symbols in "°S" are too close to each other, a similar issue occurs with the word "Niño" on page 3, line 91 and in later occurrences of the word.

Page 2, line 43: in the sentence starting with "Some studies.." there is only 1 reference. Either change to "The study by xx .. " or add more references.

Page 9, line 269: you mention "terrestrial DMS sources" – did you mean terrestrial sulfate sources? Or what would terrestrial DMS sources be?