

## ***Interactive comment on “Modelling marine emissions and atmospheric distributions of halocarbons and DMS: the influence of prescribed water concentration vs. prescribed emissions” by S. T. Lennartz et al.***

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The manuscript by Lennartz et al. is well written and well designed. It primarily studies the value of using ocean concentrations to generate trace-gas fluxes to the atmosphere that are more physically consistent than specifying the fluxes directly (which is what is commonly done for chemistry transport models). I did not expect the improvements to be as large as shown here, so I think this work will be important for many atmospheric chemistry modeling groups. I am surprised that a study like this hasn't been done

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before, but I am not aware of one.

I do not have any major suggestions.

I have one general comment: There were a number of times when there appeared to be minor duplication of information or comments in different parts of the manuscript. Sometimes this is useful for the reader, and I didn't notice any major cases, however I suggest the authors look for opportunities to eliminate duplicative text.

Below is a list of minor suggestions for the consideration of the authors:

p17555, line 10: Add “the” before “ocean”.

p17555, line 11: Add “in the” before “atmosphere”.

p17555, line 17: Expand acronym “VSLs”.

p17555, line 26 & 27: “k” is not defined in abstract. I suggest rewording to eliminate mention of “k” in the abstract.

p17556, line 12: Only DMS is discussed in the rest of the manuscript, so I suggest removing the other sulfur species.

p17556, line 17: Delete “effectively”

p17557, line 29: DMS emissions were also modelled in one of my papers. However, since I have a conflict of interest, I leave it entirely up to the authors to determine whether it is appropriate to mention it. This paper calculated DMS emissions from a coupled atmosphere-ocean model, with ocean biogeochemistry but no atmospheric chemistry. There was no comparison of the fluxes with observations.

P. Cameron-Smith, S. Elliott, M. Maltrud, D. Erickson, O. Wingenter, "Changes in Dimethyl Sulfide Oceanic Distribution due to Climate Change", *Geophys. Res. Lett.*, 38, L07704, 5 pp., doi:10.1029/2011GL047069, 2011.

p17558, line 20: Clarify what is meant by “comparable set-up”.

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p17558, line 27: Replace “towards” with “to”.

p17559, line 7: Typo “submodule”

p17559, line 14: Replace “on” with “of”.

p17560, line 5: Modify to “...167 days, which was found in Hossaini...”.

p17560, line 11: A DMS lifetime of 3 days seems long, and is longer than the ~1 day mentioned in section 1. Is this a typo?

p17560, line 26: I assume T is “air temperature”. If so, I suggest adding “air” before “temperature”.

p17561, line 19: Rephrase to remove the ‘e.g.’.

p17562, line 24: I assume the ‘/’ is intended to mean ‘and’. Since ‘/’ can have multiple meanings, I suggest replacing with ‘&’ throughout the manuscript.

p17563, line 17: I find this sentence confusing. I suggest it be rephrased.

p17565, lines 4-8: I find this sentence confusing. I suggest it be rephrased.

p17565, line 9: Typo “parameterizations”.

p17566, line 10: Modify to “...1990s onwards...”.

p17566, line 10: Rephrase sentence, since a couple of the stations didn’t start until 2002 or 2004.

p17566, line 22: Typo “aircraft”.

p17567, line 4: The sentence is a little confusing. In particular, it isn’t clear what ‘differ’ is referring to.

p17567, line 16: Clarify which two approaches are being referred to.

p17568, line 17: Typo “ratios”.

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p17568, line 19: Replace “stronger” with “more strongly”.

p17572, line 2: This sentence essentially duplicates the previous sentence.

p17572, line 8: Typo “2-year”.

p17572, line 9: Start sentence with “The”.

p17572, lines 23-26: Long sentence. Consider rephrasing.

p17573, line 1: The ‘/’ is confusing. Should it be “~” ?

p17573, line 5: “an own” does not make sense to me. Suggest rephrasing.

p17573, line 11: It might be less confusing to change “reduced” to “changed”, and make the numbers negative.

p17573, lines 23-27: This sentence partially duplicates the previous sentence.

p17574, lines 27- : This is a long sentence. Suggest rephrasing.

p17575, lines 6-7: Suggest deleting ‘on one hand’ and ‘on the other hand’.

p17575, line 26: Suggest deleting ‘would like to’.

Table 3: Replace ‘a oceanic’ with ‘an oceanic’.

Table 4: Replace ‘wind speed in’ with ‘wind speed at’.

Figure 2: Add units to graph for k660 axis.

Figure 2, caption: Switch ‘Marandino et al.’ and ‘M09’ for consistency.

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Interactive comment on Atmos. Chem. Phys. Discuss., 15, 17553, 2015.

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