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Biogeosciences Discussions

Interactive comment on "Coral reef origins of atmospheric dimethylsulfide at Heron Island, southern Great Barrier Reef, Australia" *by* Hilton B. Swan et al.

Anonymous Referee #2

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The paper "Coral reefs origins of atmospheric dimethylsulfide at Heron Island, southern Great Barrier Reef, Australia" by Swan et al. is an interesting study that helps to understand if and under which environmental conditions coral reefs seems to contribute to atmospheric DMS emissions. Due to continuous DMS measurements during two different seasons, the study gives a great overview about how atmospheric DMS loading by coral reefs changes with time and which environmental conditions influenced the emissions. The paper is well structured and written, however, minor revisions are necessary.

Method: The description of the measurement procedure is insufficient. More details are necessary to understand how atmospheric DMS was measured, e.g. what is the

cryogenic trap consist of, is the DMS preconcentrated and trapped before analysis?

Is it right that the inlet of the measurement device is around 100 m away from the coral reef? If is it so how you can be sure that the DMSa you measured is directly emitted by the reef.

Give more details about how you determined low and high tides. You give even a negative value (p6 line 18). Did you use the height of the reefs as a zero-point?

In section 2.2 "Flux calculation" you introduced the mass balance equation. Did you perform an error estimation of the different parameter of the equation? Did you estimate the variability of the parameter over time? A mass balance calculation can exhibit many errors due to uncertainties of the different parameter and their variability over time. You have to discuss in more detail that the different parameters you are used are reasonable.

Results and Discussion: An overall description of your data is missing. What are the general patterns of your data? Is there a general trend? Additionally, you start directly with the interpretation of the peaks without any introducing sentences. Say in the beginning shorty what you have done and why and what you found.

In the first paragraph (p5 l3-10) you mentioned many time points which is hard for the reader to follow. Additionally, the different time points are hard to see in fig. 3. Maybe show clearly in the fig the time steps you described in detail and maybe reword the text a little bit for a better understanding for the reader.

P6 L3-15: Why you talked in this paragraph about the measurements on 16 March and before about data from 17 March. Why it is not in chronological order?

The mixed layer depth (MLD) you mentioned in the text (p7 line 28) is it in the water or in the atmosphere. Is it the same like the MBL? The MLD is generally used for the water. Please clarify.

Can you discuss in the results and discussion section the stress level and health con-

ditions of the coral reef you investigated? Is the reef already affected by global change (temperature, pH), has it a high biodiversity, was coral bleaching observed? Can these factors affect the DMSP and DMS production? Are the events observed during the measurements (very low tides, reef exposure to the air, rainfall on the corals) normal events which occurred on a regular base or were these extreme and seldom events?

It would be also interesting to measure directly DMS emissions by the corals in incubation experiments under different environmental conditions to have the direct evidence that the DMSa is coming from the corals directly. It is clear that this cannot be part of this study but is interesting to investigate in future studies.

Figures: Fig 1 is not necessary to understand the paper and is not discussed in detail in the paper. It has not important new information. I recommend to delete it.

Figures 3 and 6 are hard to read. The grey, green and blue colors are hard to distinguish and there are too many parameters in one graph. Additionally, you discussed a lot time points but they are hard to see in the sub-panels. See comment above.

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