

## ***Interactive comment on “Quantification of dimethyl sulfide (DMS) production in the sea anemone *Aiptasia* sp. to simulate the sea-to-air flux from coral reefs” by Filippo Franchini and Michael Steinke***

**Anonymous Referee #1**

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Review of: “Quantification of DMS production in the sea anemone *Aiptasia* sp. to simulate the sea-to-air flux from coral reefs” by F. Franchini and Michael Steinke

General: The authors use a sea anemone as a model organism to study DMS flux from coral reefs. There are major deficiencies in this approach and I cannot recommend this manuscript for publication. If anything the results are very preliminary and a gross approximation of DMS flux from coral reefs. This is only superficially acknowledged. Using artificial seawater and cold shock to 4°C to compare bleached and unbleached samples is not realistic. Generally only a 2°C shock above or below ambient seawater

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temperatures should be used to stress a coral and would be comparable to studies by Fischer and Jones (2012). No measurements seem to be made on the actual symbiodinium concentrations in samples and results are expressed per gram. Conversion to surface areas should be shown in a table and compared with other available data so that good comparisons can be made. The authors should discuss in length two other important papers that have made good measurements and assessments of DMS flux from coral reefs. These are:

Hopkins, F.E., Bell, T.G., Yang, M., Suggett, D.J. and Steinke, M. (2016) Air exposure of coral is a significant source of dimethylsulphide (DMS) to the atmosphere. *Scientific Reports*, 6:36031, doi:10.1038/srep36031.

Swan, H.B., Jones, G.B., Deschaseaux, E.S.M and Eyre, B.D. (2017) Coral reef origins of atmospheric dimethylsulfide at Heron Island, southern Great Barrier Reef, Australia. *Biogeosciences*, 14, 1-11. Doi 10.5194/bg-14-1-2017

DMS flux can be estimated by both atmospheric and seawater measurements of DMS and the two papers above have shown that corals emit DMS directly to the atmosphere. The submitted paper makes no mention of this in their article. Their measurements from a sea anemone are therefore a gross underestimate. This is not helped by arbitrarily estimating the number of clade types in the anemone and not measuring them in the anemone. Different clades of zooxanthellae contain different levels of DMSP and produce variable levels of DMS. What data is available and published on DMS and DMSP production from coral reefs and discrete corals (e.g. *Acropora*-the most abundant coral in the Indo-Pacific) is not used or quoted (see Jones et al. (2007); Jones and King (2015)).

Scientific significance: Does the manuscript represent a substantial contribution to scientific progress within the scope of Biogeosciences (substantial new concepts, ideas, methods, or data)? Score 4

Scientific quality: Are the scientific approach and applied methods valid? Are the re-

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sults discussed in an appropriate and balanced way (consideration of related work, including appropriate references)? Score 4

Presentation quality: Are the scientific results and conclusions presented in a clear, concise, and well-structured way (number and quality of figures/tables, appropriate use of English language)? Score 4

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