

## bg-2017-70: Response to Reviewer's comments

**“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**

**Reviewer Comment:** The paper has improved enormously. It is now easy to read and to understand. Good job.

**Author response (AR) 1:** *We thank the referee for their comments.*

However, I have some minor comments:

P3 L34: “To quantify the net production of DMS released into the aqueous medium by the holobiont...”; I think you should write “... the net concentration of DMS released...” You cannot release a production into the surrounding water.

**AR2:** *Changed this to: ‘...To quantify the net production of DMS by the holobiont (net DMSaq production; the release of DMS into the aqueous medium over time)...’*

P4 L20: “Note that  $N$  does not reflect the actual number of symbionts within anemones but was arbitrarily set in order to calculate the proportion of clade  $i$  among all clades within anemones.” How did you decide, which cell numbers are reasonable to use for you simulations. You wrote in table 1 a range of 0-100 cells. That seems to be a quit small number. You said that you tested also with 1000 cells. Are there not millions of Symbiodinium cells in the anemones? Please give a reference or a reason for the small cell numbers you selected and if this reflects the real abundance of symbiont cells in the anemones. Did you run the model also with a higher cell number like 10 000 or even 1 million cells? Is the output still the same?

**AR3:** *We ran the model with 100, 1000 and 1 million cells and the principle outcome is the same. We clarified our approach by making the following change to the text (p.4, l. 20): ‘...Note that  $N$  does not reflect the actual number of symbionts within anemones but was arbitrarily set to 100 in order to calculate the proportion of clade  $i$  among all clades within anemones (setting  $N$  to  $10^3$  or  $10^6$  did not change the final outcome of the simulation)...’*

P7 L25-27: “Last but not least corals calcify and this might change the allocation of resources within the host with consequences on the type of relationship with their symbionts

under stress conditions.” What do you mean with this? How can a different allocation of resources influence the relationship between host and symbionts? Can you clarify?

**AR4:** *We agree with the reviewer that this sentence is speculative and not very clear. We decided to remove it from the text to avoid confusion.*

P7 L30: “The percentage of the gross production escaping into the water surrounding the anemones ranged from 1 to 120%...” 120%? Is more released into the water than is produced? This is not realistic.

**AR5:** *We added the following text to the manuscript to offer an explanation of the high simulated net/gross production rates: ‘...A percentage of gross DMS production escaping into the atmosphere greater than 100% occurs when the simulated net production exceeds the gross production. This is due to the random sampling of high net-production values (Table 1), and to the calculation of low gross production within the simulation framework. Low gross production arises when a particular combination of parameter values are inserted into Equation 1. For example, a low symbiont population resulting in low DMSP<sub>H</sub>, combined with a population of low DMS-producing *Symbiodinium* clades with small cell volume (e.g. *Symbiodinium* clade B1) could result in this output from the simulation framework. Highest probabilities of 60% were found for net/gross production ratios of 5 to 30% (Fig. 2c)...’*

Fig 3: In the label of x-axis you wrote DMSPA and in the caption you wrote DMSPH. Please change the label. You forgot to describe DMSaq NP in the caption.

**AR6:** *Corrected as requested by reviewer.*

Ref. Kemp et al. 2014 you wrote “during, and after a coral beaching event “, please change to “bleaching”.

**AR7:** *Corrected as requested by reviewer.*

*Please note that in addition to the changes requested by the reviewer, we also updated one of the in-text references which resulted in the removal of a paper by Lana et al. 2011 and the addition of the paper by Land et al. 2014.*

**END OF RESPONSE**