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Biogeosciences Discussions

Interactive comment on "Dynamics of dimethylsulphoniopropionate and dimethylsulphide under different CO_2 concentrations during a mesocosm experiment" *by* M. Vogt et al.

M. Vogt et al.

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Response to referee #2 for manuscript bgd-4-3673-3699

General comment:

We would like to thank R. Bellerby for his useful comments on our manuscript. The referee is right that we haven't been able to include all information contained in other manuscripts, as several drafts for the special issue were not available at the time of

submission. We have now included much of this information in the revised version of the manuscript, in particular in sections "Methods" and "Discussion". We now consistently use the past tense for the time of narration and the present tense for the time of attestation.

Detailed comments.

Abstract P 3676 line 1. We changed this sentence, according to the referee's suggestion.

Introduction P3677 line 7: We rely on the information given in Sabine et al. (Science 305 (5682): 367-371, 2004), who calculated the fraction of anthropogenic CO2 taken up by the ocean over the period from 1800-1994. Their choice of this time period is based on the start of the "anthropocene", according to Crutzen and Steffen (Climatic Change 61 (3): 251-257, 2003). These authors place the beginning of the human dominated era shortly after the invention of the steam engine in 1784, where CO_2, CH_4 and N_2O show a clear acceleration in trend. Given the debate about the start of the "anthropocene" and given that we cite Sabine et al.'s work for the fraction of CO2 taken up by the ocean, we think that our use of the 200 year period is justified.

P3678 line 2. We have rephrased this sentence.

P3678 line 12. We have changed the name of the mesocosm facility.

P3678 Material and Methods and throughout the entire document The description of the scenarios has been changed from (P, F and FF) to 1xCO_2, 2xCO_2 and 3xCO_2.

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P3681 line 25. We have added a paragraph giving additional information on both chlorophyll-a and flow cytometric counts and have cited the relevant publications in this special issue containing a detailed description of the methods used for these analyses. As chlorophyll-a and pigments have not been analysed in replicates, we cannot quantify their error during this experiment. Based on previous experiences, M. Meyerhöfer (pers. communication) estimated the analytical error to lie within 10-15% of the results and we have added this information in the text.

P3681 line 5, 6. The description of the pCO2 measurements has been removed and the paper by Bellerby et al. (this issue) has been cited and added to the reference list.

P3681 line 11, 17. We now use "enclosures".

P3681 line 20. We now compare with the slope of 1xCO_2 and use "less steep".

P3684 line 3-5. We have removed this sentence in its entity.

P3685 line 6. This sentence has been removed.

P3685 line 7. The sentence has been rephrased.

P3685 line 12. We now use "diverge", as suggested by the referee.

P3685 line 18. This issue arises due to a misunderstanding - the referee is confusing

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the total measurement error with the detection limit of the instrument used to measure $DMSP_{p/t}$. $DMSP_t$ is the sum of $DMSP_p$ and $DMSP_d$ and the total analytical or measurement error in $DMSP_p$, as deduced from a comparison of replicate samples, is 12%, whereas the detection limit of $DMSP_d$ is 1.3 nM L^{-1} and ca. 2.0 nM L^{-1} for $DMSP_p$. Hence, for $DMSP_t$ varying from a minimum of ca. 50 nM to a maximum of ca. 500 nM, the uncertainty is $\approx$ 5-50 nM. But this is the order of magnitude of the DMS measurements, so that small fluctuations in DMS will be hard to detect due to the large uncertainty in $DMSP_p$. We have reformulated the sentence, in order to avoid future confusion.

P3686 line 11. We have cited Schulz et al. (2007) here and have added the paper to the reference list.

P3687 line 2. We now use "suite".

P3687 line 6. We changed "plausible" to "possible".

P3690 line 7. We meant the mesocosm experiment and have clarified this in the manuscript. We cite the review paper by Riebesell et al. (2007) in order to give a reference to other responses.

References The reference list has been updated and the footnotes have been removed.

P3693 line 30. The reference list has been updated.

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P3694 line 30. The surname of the last author has been inserted.

Acknowledgements: The acknowledgements have been updated.

Interactive comment on Biogeosciences Discuss., 4, 3673, 2007.