Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2019-343-AC3, 2019

Biogeosciences Discussions
Open Access
EGU

Interactive comment on "The Arctic picoeukaryote *Micromonas pusilla* benefits from Ocean Acidification under constant and dynamic light" *by* Emily White et al.

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Received and published: 26 November 2019

The manuscript by White et al described the responses of Arctic picoeukaryote Micromonas pusilla to ocean acidification under both constant and dynamic light. The experiments were well designed and performed. The manuscript was well-structured with a good logic flow. However, I do have several minor comments for the revisions before the manuscript be accepted for the publication in BG. We thank the reviewer for their positive comments and will address each of the suggested revisions.

Materials & Methods Line 120: What are the frequencies for the measurements of the pH and did you measure the pH everyday or several times per day, in the mid-phase

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of light period or dark period? Please clarify. The pH measurements were conducted at the start, middle and end of the experiment, to check that the carbonate system remained stable throughout the experiment. The start and middle measurement were conducted during the mid-phase of the light period, whereas the end measurement was conducted at the beginning of the dark phase, together with the sampling for all other parameters. For dynamic light this occurred on the first, third and final seventh day of the experiment, however due to faster growth rates under constant light, the measurements occurred on the first, second and fourth day of the experiment. This procedure is now explained in more detail in the revised manuscript (L124-125).

Line 133: Since the authors measured the carbonate system parameters of pH, TA, and DIC, why did you calculate the full carbonate system with pH and TA, but not with pH and DIC? This issue was also brought to our attention by Referee 1, and we provide the following explanation. According to previous comparisons of an overdetermined carbonate system in our lab (i.e. measuring three instead of two of the parameters and calculating all other from the three possible combinations), the pCO2 calculated from TA and DIC tends to be underestimated by up to 30% (Hoppe et al. 2012). We expect error propagation for measurements with slightly higher uncertainties (i.e. colorimetric DIC measurements and automated small-volume TA titrations instead of large-volume VINDTA measurements) to underlie this systematic error. In the revised manuscript, we now refer to the above-mentioned publication to justify our choices (L140).

Line 147: When did you perform the sampling for POC and PON, at the end of semi-continuous batch culture or in the middle? And when, the middle of light phase or dark phase? Please clarify. The same for Chla. The POC, PON and Chl a measurements were all conducted at the end of the experiment, at the beginning of the dark phase. This procedure is now explained in more detail in the revised manuscript (L153 - 154, L160).

Line 212: What kind of ANOVA did you perform here for the statistical analysis? And I did not see the details about all the statistical analysis that performed in this study.

So, I would recommend the authors to add a section of “statistical analysis” in the “Materials & Methods” to clarify this issue. And please also report the degree of the Freedom in a standard way for all the stats. The results were analysed using Mintiab Express statistical software and, a series of Two-way ANOVA tests were performed with a significance level set to p=0.05. We have now added a section on the statistical analysis to the revised manuscript (L212-215). In addition, the statistics in the results section (L224 ff) have been updated to include the degrees of freedom as suggested by the reviewer.

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