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Biogeosciences Discussions

Interactive comment on "Arctic microbial community dynamics influenced by elevated CO_2 levels" *by* C. P. D. Brussaard et al.

Anonymous Referee #2

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Revision of the ms: Arctic microbial community dynamics influenced by elevated CO2 levels. Brussaard et al.

The objective of this study deals with the effect of acidification in the Arctic microbial community dynamics. Authors studied how different concentrations of CO2 had an effect on phototrophic communities (pico- and nano), and heterotrophic prokaryotic communities, taking into account grazing on phototrophs and viral lysis on both phototrophs and heterotrophs.

The ms is well-written, with clear abstract, state of the art, objectives and appropriate experimental set up based in the use of mesocosms, looking at the development of different communities after achieving different scenarios with increasing concentrations of CO2, and nutrients. However the study, sometimes, is difficult to follow due to the

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terminology used for sampling days, the lack of some important variables, and how the measurements of some variables were done.

I think that the ms needs to improve in the format and in some interpretation of results before be considered for publication.

Comments and questions

Material and Methods

Page 12312, line 11. Is hard to understand that Day t -7, means that were 7 days before time 0. Authors could explain better this terminology from the beginning.

Page12314, line24. Taking into account that authors have measured grazing by micro-zooplankton, why authors have not measured grazers abundance as ciliates, and/or heterotrophic dinoflagellates in the dilution experiments (at least)?.

Authors gave data of viral lysis on phototrophs, how did they estimate this? Please explain. Also for viral lysis on HP, presumably en Weinbauer et al. (pers comm)

Results Page 121315, page 19, after nanophytoplankton you should indicate Fig. 1b, 1c).

Page 12318. Grazing rates were measured in triplicate samples for each type of CO2 conditions. However, in table 1, the SD is not shown. This is because some of the replicates have failed?. Authors said that for the low CO2 treatment, during phase 2 grazing on nanophytoplankton I, was higher than in phase 1 and phase 3. Were these differences significant? It could be that the low success of grazing in mid and high addition of CO2, was due to a negative effect of CO2 on grazers?

Authors assumed that the depletion of nano and picophytoplankton is due to viruses (V4 and V5): a) Why authors do not follow the same organization for Fig. 6 as for Fig. 1? (first picophytoplankton virus and after nanophytoplanktonic viruses). b) It is not clear that the decline of algae and the appearance of viruses is more important in

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acidified samples than in less ones, right?. c) it is not clear whether grazers followed a similar dynamic as viruses. But, no counts of grazers.

Page 12319, line 21. Authors said the sum of the net growth rates of 0.5 – 0.55 d-1 with the loss rates by grazing and some viral lysis (what does “some viral lysis” means?)

Page 12320, line 25. I think that the low burst size obtained for HP is not uncommon for these Arctic waters. For instance, Boras et al. (2010) reported a burst size of 1-59 viruses per bacterium in North Svalbard during summer.

Page 12321, line 29. How did you calculate viral burst size of nanophytoplankton I?,

Page 12324, line 29 same for viral burst size of picoeukaryotes I.

All figures are referred with capital letters while in the text are in lowercase. Figure 7 c, does not have any letter in the graph.

Interactive comment on Biogeosciences Discuss., 9, 12309, 2012.