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Interactive comment on “CO₂ increases ¹⁴C-primary production in an Arctic plankton community” by A. Engel et al.

Anonymous Referee #1

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Overall quality of the discussion paper

The manuscript by Engel et al. aims at describing the responses of the plankton communities during a CO₂ enrichment experiment in Kongsfjorden, Svalbard. This is a very worthwhile study that is of high relevance considering the threat of Ocean Acidification. Unfortunately the manuscript is not easy to read as it contains several strange sentences and statements. Hence a thorough linguistic check is suggested. Furthermore the result section is full of primary production estimates referring to the mesocosms numbers. However, nowhere could I find a reference to what pCO₂ level the different mesocosms numbers were. For instance in the tables, why refer to these numbers instead of the pCO₂ levels. It can only be the participants that care about these numbers. Also I think the authors should look over how many significant digits

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they present. Having too many only makes it more difficult to keep track of the different values. Finally I am concerned with an article that does not include a conclusion (or summary and conclusion). The abstract contain some of this, but I would have liked to see some more clear statements on how an enrichment experiment impact primary production. Consequently I cannot recommend publication of this manuscript without major revisions.

Detailed comments Line 9 on page 6. What is day 10 referring to? Line 12 same page. This figure reference is not relevant here. After sentence ending on line 14 same page. Instead nclude: "the development of pCO₂ in the mesocosms is illustrated in Figure 1. Line 19 same page. How can one continuously collect 5 l of sample? Line 25 same page. I guess that the samples were not determined frozen as it now reads. Please state after how long the samples were analysed. Line 3 page 7. This ref to fig 1 is also misleading. Nothing in this figure indicate any bloom or addition of nutrient, more than what is observed by changes in pCO₂ (that can have several causes). Line 11 page 7. Strange sentence. "for the fjord every other day of the experiment of days 1, ..." . What is really meant? Are the incubations done for each mesocosm for all the days mentioned, and for the fjord water on every other day? Please rephrase so it is understandable. Line 18-20 page 7. If this rinsing was done after filtration of sub-samples how do you secure that it does not affect the POC content? Lines 11-13 page 9. I assume that this statement refers to PP measurements. If not please state what parameters it refers to. Did all observations include all different pCO₂ levels? If so I do not see how this would be a valid approach. Please clarify Line 16 page 10. Giving this primary production average with 3 significant digits is not relevant with the given standard deviation(?). The same goes for all the result section as well as in the abstract. Line 19 page 22. The reference to Arrigo et al, 2011, is not the most suitable for this purpose. There are several articles that address this aspect based on direct measurements of the C-system.

Interactive comment on Biogeosciences Discuss., 9, 10285, 2012.

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