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Interactive comment on "Larval development and settling of *Macoma balthica* in a large-scale mesocosm experiment at different fCO_2 levels" *by* A. Jansson et al.

Anonymous Referee #2

Received and published: 15 February 2016

General comments: Using large scale mesocosm units this study explores the role of future pH conditions on the settlement process of the benthic key species Macoma balthica. Indeed, the authors suggest that the settling of M. balthica larvae was delayed with increasing CO2 levels. The role of ocean acidification is somewhat of a hot topic within the scientific community. In recent years a large number of publications have been published. That being said, most of the published literature is based on laboratory studies and to a lesser extent on natural or, as in this case, mesocosm experiments. I think this manuscript deserves publication. However, before publication the authors should consider the comments given below.

The authors should consider their aims of the study, the results obtained and conclusions drawn. As is evident below, it is not always clear why some aims have been included, how the aims were tested or what results support (or not) the aims.

Specific comments: Abstract Page 20412, line 11: tolerance and development? The authors state that they focus on the tolerance, development and subsequent settlement process. The settlement process is clearly visible, however, tolerance and development is not discussed nor any results given or conclusions made on the topics. If still considered a focus of the study then please add results, discussion and conclusions. If not please delete from abstract.

Introduction Page 20413, lines 26-29: "The disadvantages of limited ecosystem realism that arise from the exclusion of factors such as currents and large predators, which impact the natural succession and dispersion patterns of the species, nevertheless have to accounted for when interpreting the results." This all sounds perfectly fine, but did you actually do so in this study? Did you take this into account? I couldn't find any information on how this was done in the discussion? Please add how these factors could have influence your results

Page 20414, lines 4-5 and throughout manuscript: How are the references sorted, not chronologically and not alphabetically?

Page 20414, line 11: Omstedt et al., 2010 is not available in the reference list, please add

Page 20414, line 14: Almen or as in the reference list Almén?

Page 20414, lines 23-24: as commented on in the abstract. I do not think you present any data on tolerance and development of the larvae? How do you define development here? Size of the mussel, is that development? How did you measure tolerance? Please add additional information and data on this or consider deleting shed light on (1)...

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Page 20414, lines 27-28: How did you measure/calculate growth? I can't find any information on growth measurements and calculations rather it seems as if the authors"predicted the size of the larvae to decrease along. . ."?

Material and methods

Page 20416, line 10: Is it Riebesell et al 2013 a or b?

Page 20416, line 20: bayc? I do not know what this is? Page 20417, line 1: Dickson et al 2007 is not found in the reference list, please add

Page 20418, line 27: R core team 2012 is not found in the reference list, please add

Results

Page 20420, line 14: why did so few individuals settle in M3? I was not able to find anything on this in the discussion, please add

Discussion

Page 20421, lines 7-10: "an indication that M. balthica post-larvae settled at a larger size in the high fCO2 treatments was also observed" is that really true? In the results section 3.5 the sizes of settling individuals the authors state that"no significant differences were found in the sizes of the settling individuals." I'm confused, do they or do they not settle at a larger size in the high fCO2?

Page 20422, lines 1-4: "Shell growth alone. . .IS NOT automatically reflecting the overall biomass production and developmental stage of the organism". Wasn't development one of the main aims of this paper? If so then why didn't the authors use an appropriate measure of growth?

Page 20422, line 17: Pedersen et al 2008 and Pineda et al 2009 are not found in the reference list, please add

Page 20423, lines 8-13: This is one of the main arguments for using mesocoms i.e.

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incorporating factors beyond what is possible in a laboratory experiment. Did you actually test this? I can't find any results on this. If you didn't, why not? A quick glance at the manuscripts, currently presented for the special issue, seemingly all necessary data for e.g. food quantity and quality is available. So, as the authors state here this provides an excellent platform to study this, then why didn't they? If possible please add this to the manuscript.

References

For all references please double-check abbreviation e.g. J Marine Syst should probably be J Mar Syst? Sometimes doi, sometimes not? Compare Riebesell et al 2013b o Schulz et al 2013 one has a webpage and the other a doi. Please be consistent throughout the reference section

Tables

Table 1: Why aren't the averages for the whole time period presented for aragonite and calcite? On what basis are the later days excluded? Please add to the Materials and methods section

Figures

Figure 3 and 4, are the graph based on actual or targeted fCO2 values? Please add explanation to the figure legend/caption. Why the use of SE in fig 3 and SD in fig 4? Why not use the same in both figs??

All the best

Interactive comment on Biogeosciences Discuss., 12, 20411, 2015.