Biogeosciences Discuss., 10, C2007–C2009, 2013
www.biogeosciences-discuss.net/10/C2007/2013/

Biogeosciences
Discussions
Open Access

Interactive comment on "Effect of increased $p\mathrm{CO}_2$ on early shell development in great scallop (*Pecten maximus* Lamarck) larvae" *by* S. Andersen et al.

S. Andersen et al.

ellens@imr.no

Received and published: 20 May 2013

Anonymous Referee #1

The authors thank Anonymous Referee #1 for useful comments.

General comments: We do not think that we have drawn too extensive conclusions from our results as we have made it clear that there may be additional effects of the lack of feed. Also, we think that larvae in the sea may experience shorter or longer periods of food scarcity, so unfed larvae may not be uncommon in nature. Scallop larvae are assumed not to feed on particles before the velum is properly developed – around day 2 after fertilization at 15-16 oC. Deformities observed on day 2 will then

not be affected by lack of food. We will address this further in the discussion. We do discuss the possible effects of high CO2 levels in the starting phase and the resulting drastic drop in CO2 levels for the groups exposed to the highest CO2 levels. We will include some of the references suggested, and restructure parts of the manuscript

Introduction: The general structure will be edited P3283 line 15 "Effects" will be specified, and CO2 treatment and experimental duration will be summarized in a table. P3284 line 7 We will clarify that CO2 induced changes of calcification rates observed by Ries et al. depend on taxa specific physiology P3284 line 11 We agree that 7 days may not allow any acclimation, but that was neither the purpose of the experiment, as effects on the earliest life stages (fertilized eggs to veliger) probably happens within a too short time frame.

Materials and Methods: P 3286 line 1 The number of broodstock used was ten. The scallop Pecten maximus L. is a functional hermaphrodite, but eggs from one individual were cross fertilized with sperm from 3 other individuals. Egg batches with low self-fertilization rate (< 10%, checked on not cross-fertilized egg samples) were collected for experimental use. Fertilized eggs were mixed and incubated 1-2 hours after fertilization. This information will be included in the Methods.

P 3286 line 7 The water inlet is located at 160 m depth and collects deep Atlantic water (stable temperature and salinity all year round). The water passes a sand filter, and a final filter of 50 μm after the temperature is adjusted in a heat-pump. Also, the water flows over a high surface substrate after the heat-pump to adjust gas content to atmospheric equilibrium.

One replicate for the 1184 ppm group was lost after d2. Normal pressurized air was used. This information will be included in the Methods.

P 3286 line 12 The larvae were not fed since we were mostly interested in the earliest effects (to veliger stage d3), and because the effect on starved larvae also was interesting. We are aware of the importance of energy status for effects of stressors, and

this will be further addressed in the manuscript.

P 3286 27 The information on all relevant carbonate system parameters (pH, temperature, total alkalinity, salinity and calculated values) will be presented in an additional table as suggested by JP Gattuso.

Results: All linear regressions will be deleted and the statistics will be revised P 3290 line 1 and following and Fig 5 –see above

Discussion: We will consider restructuring the discussion after revision of the result P 3295 line 16 We will cite a more recent and better publication on pteropods

P3295 line 18 We agree that living animals may react completely different than empty shells.

P3295 line 24 We will point out why this is important in this section, and rephrase the sentences.

Section 4.5 We will include our comments on the adaption potential, given the short duration of our experiment. Data on the crustaceans will be removed.

Technical corrections: The graphs will be modified and their overall quality will be raised.

Technical: yes

P3283 line 13, P3284 line 22, and P 3291 line 16: grammar will be corrected P3289 line 22 classifications – More information will be added to describe the categories and basis of shell deformities, and it will be moved to the material and methods.

Interactive comment on Biogeosciences Discuss., 10, 3281, 2013.