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Interactive comment on "Fertilization success of an arctic sea urchin species, *Strongylocentrotus droebachiensis* (O. F. Müller, 1776) under CO_2-induced ocean acidification" *by* D. Bögner et al.

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This manuscript aims at investigation the impact of different pH scenarios on fertilization success in an urchin species. It is based on the excellent (and unexplored) question of the modulating role of the time of exposure of the gametes to pH. Most experiments performed to date do not consider pre-incubation of the gametes prior to the fertilization trials. This limits the potential to extrapolate the results to experiment into the field.

However, the manuscript is difficult to assess in its present form because of the lack of critical information in the Materials and Methods and Results. Moreover, there are some limitations that should be better discussed (e.g. sperm concentration).

Some specific comments:

Page 8030: - "no data exists..:" This is true for fertilization but information is available for other aspects in this species. See Stumpp et al. 2012 (two papers); Dupont et al. 2012; Dupont & Thorndyke 2012; Dorey et al. 2013.

Page 8032: - When were urchins collected? How were they transported to the AWI? - You should provide information on the pH range experienced naturally by the species. I suspect that in the description of the scenarios, there will be more than 1 control (present conditions should cover the range experienced today, not only the atmospheric pCO2, see McElhany & Busch 2012 for a nice discussion on this issue). - The "control" used with seawater without CO2 manipulation is not very useful because of the high variability. It should be removed for clarity.

Page 8033: - Information on pH measurement methods and scale should be provided.

Page 8034: - provide the sperm:egg ratio. Moreover, best practices is the field suggest to use more than 1 sperm:egg ratio during fertilization experiments. - Was the sperm washed? If yes, what was the sperm:egg contact time (important parameter, see Reuter et al. 2011).

Page 8035: - The "early development" part is poorly described. It is impossible to determine how this what done (chemistry, culturing method, replication). For example, density, seawater chemistry, food concentration, etc. etc. should be provided. - Why was the experiment done at 2-3C? This seems very low for the spawning season of this population.

Page 8037: - The first part should be moved to Methods - The seawater chemistry should be provided for both fertilization assays and larval development.

Page 8038: - The part on proportion of blastula, etc. needs some quantification and statistics. Figure 3: There is no need to present successful and unsuccessful % (one is 100 – the other). Just present one of them. I would remove the part I and merge parts II and III into one graph. Also avoid duplication of data with Figure 4. Figure 6, no need to have different filling and a panel. The information is provided on the X-axis.

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