

***Interactive comment on* “Response of benthic foraminifera to ocean acidification in their natural sediment environment: a long-term culturing experiment” by K. Haynert et al.**

Anonymous Referee #3

Received and published: 7 August 2013

Dear editor,

this manuscript presents an interesting experimental study about the impact of elevated pCO₂ on benthic foraminifera. A complete foraminiferal community was tested in their natural sediment and exposed to pCO₂ enriched seawater for six months. Calcium carbonate saturation state of the sediment pore water stayed supersaturated during the experiment, and a microhabitat was formed that support foraminifera to live and grow under these conditions. This is the first time that the response of a complete foraminiferal community kept in natural sediment was investigated in simulated ocean acidification experiments, and highly interesting observations and data were found. The topic may be of significant interest for many scientists working in the field of marine

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ecology, marine science, biodiversity or climate change. The manuscript is well written, well organized and good illustrated and I recommend publication in Biogeosciences after minor revision.

Specific comments:

Material and methods Page 9527, line 11: Are the culture vessels the same Kautex wide-neck containers like mentioned before?

Page 9529, line 1-3: I suggest adding the following: "... the sediment of three culture vessel replicates for each pCO₂ line was analyzed..."

Page 9530, line 15-16: In table 1, not all mentioned chemical parameters were shown. I miss the data for the extracted pore waters of selected culture vessels that are mentioned in the text.

Page 9530 and the following pages: From this page on, species names lost their formation and are not italicized any more.

Page 9532, line 21-23: These 100 individuals of a specific size (200-300 μm), where did they come from? From pCO₂- line 430 μatm , t=0?

Page 9533, line 3: The order of tables mentioned in the text is confusing, Table 4 follows Table 1, Tables 2 and 3 are mentioned later. This order should be changed by renumbering the tables.

Results Page 9534, Fig. 2: I suggest cancelling figure 2 because it shows a species that is very rare in these sediments and I find no reason to show it here.

Page 9535, line 21-23: It is not clear for me how reproduction events can be recognized in the datasets and in Fig. 4. Is there a certain threshold of individuals < 100 μm to define a reproduction event (15%?; 20%?, references ?)? High numbers of individuals < 100 μm can also be found in lines 430 μatm and 907 μatm at t= 0.

Page 9536, line 23-25: The order of figures mentioned in the text is confusing, figure

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6 follows figure 4, and figure 5 is mentioned later. This order should be changed by renumbering the figures.

Page 9537, line 24: The statement “total organic content was found to be 4.3%” should be worded more carefully here. This is an average value measured from 100 individuals of a specific size (200-300 μm). Juveniles or bigger individuals may have different TOC contents. This value can be used for estimations, but maybe include possible over- or underestimations.

Page 9538, line 14-16: A figure with pictures from the mentioned destroyed tests may be interesting here.

Page 9538, line 19-20: “. . . a single calcium carbonate layer.” Is this in accordance with the bilamellar character of many foraminiferal species?

Discussion Page 9543, line 10-21: Are there any reports of ocean acidification experiments with other organisms tested in natural sediments that can be compared with the foraminiferal results?

Table 2 and 3: What about gaps in the tables, e.g. 430_C, Sep?

Table 4: I cannot see any bold results?

Figure 5: Legend: “. . . living specimens including. . .”

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