

Interesting new data and observations of benthic foraminiferal assemblages in an environment with seasonal varying pCO₂ values were presented in the paper. Changes of carbonate chemistry and living and dead foraminiferal communities were bi-monthly recorded on Flensburg Fjord in the southwestern Baltic Sea. Most of our knowledge about the response of calcifying organisms to increasing ocean pCO₂ comes from experimental studies. But here, the presented investigation focus on the impact of naturally changing carbonate chemistry on benthic organisms which is a very important aspect in the discussion about future ocean acidification. The topic addresses relevant scientific questions for many scientists working in the field of biogeosciences. The overall presentation is well structured and good illustrated.

Specific comments:

* Two different diversity indexes were calculated for the foraminiferal community and shown in Table 5, but I miss any interpretation of these data.

*** Results, living assemblage:**

a) Maximum numbers at station FF1 in October indicate numbers around 50 ind. 10 cm⁻³ in Fig. 4, but the authors mention 101 ind. 10 cm⁻³ in the text and in Table 5. Figure 4 has to be checked.

b) Pie charts are one way to show foraminiferal communities, but they base on percentages, and this can sometimes be problematic. For example, at station FF1 *Ammonia aomoriensis* makes 61% of the fauna in April, but the total density of foraminifera is very low in April. Actually, counts of *A. aomoriensis* are low and living conditions for this species at this station are not good in April. Table 5 gives no information about bi-monthly counts per 10 cm⁻³ on species level, but I think this will be interesting (as an additional table or figure for the three main species) because the response to carbonate chemistry changes seems to be species depending, as the authors show later in the manuscript. I

c) The last part of this chapter (p. 7794, line 9-12) is an interpretation and does not belong to the results. Additionally, I cannot follow the explanation here, why should *A. cassis* immigrated into the community, it was always found living at this station, even in August 09 (at least one living individual in a low split was mentioned in Table 5) and therefore reproduction instead of immigration would also be possible, maybe both.

*** Results, dead assemblage + Discussion, Foraminiferal community:**

I am surprised about the bi-monthly high variations in the abundance of dead foraminifera at the stations. I think this cannot be explained with living assemblages alone, because living assemblages often do not show these high variations here (e.g., FF1, June to October). Other factors should be discussed (what about transport processes in this area?).

*** Results, co-variance of population density**

Did the authors test co-variance between *Ammonium cassis* and saturation state, too? Although this is an agglutinated species, it may response indirectly to changing carbonate chemistry in the habitat because it shows advantages under undersaturated conditions.

*** Results, tests of living calcareous foraminifera:** the whole chapter needs modification and better explanations

a) 64% of the tests of living *A. aomoriensis* were intact, the remaining 36% showed different stages of tests, classified as (1) intact tests, (2) + (3) loss of chambers. When reading this text,

it is not clear for me how to distinguish intact tests from the first 64% and intact tests of the rest.

b) In the first part of this chapter, authors mention the observation of chamber loss. In line 26 on page 7797, they suddenly start to speak about dissolved chamber walls that were heavily decalcified. For me, the loss of chambers means that they are gone and there is no wall left. Otherwise, chambers show holes, as indicated in Fig. 6:4.

c) The authors mention Fig.6:1-3 as examples for irregular shape and interruption, but in the legend they describe it as “recalcifying”. The authors mention Fig.6:5 as an example for the loss of two chambers, but I cannot see two chambers missing.

d) It would be interesting to see pictures of the individuals from station FF4 that have left only the inner organic lining.

e) Maybe the number of observations is too low, but is it possible to observe any correlation between recalcification processes and changes in the saturation state?

*** Discussion, Foraminiferal community**

Page 7798, line 4-5. Why do the authors think that oxygen conditions were favourable in October 2009 at this station?

*** Discussion, Comparison with earlier finding**

Faunal differences between FF4 and FF5 in 2009 and between 2006 and 2009 are very strong. Are there any additional environmental data available in the area that may help to understand this change? Do other groups of organisms show similar variations here?

*** Discussion, Impact of rising atmospheric CO₂...**

Page 7804, line 19 ff: For me, the last paragraph about planktonic foraminifera is not directly connected to the topic of the manuscript and therefore redundant.

*** Conclusions:**

Page 7805, line 5-7: Sediment pore water is often, but not always, supersaturated, as the authors showed before. The text should be adapted here.

*** Figure 4:**

For me, increasing and decreasing population densities in the living fauna seem to follow the trends of increasing and decreasing pCO₂ in the pore water, which has probably something to do with food supply and degradation processes in the sediment. It would also be interesting to see the undersaturated and supersaturated situations at the different time intervals in this figure (maybe with different background colours, or horizontal bars?).

Technical corrections and minor comments:

Page 7786, line 8: Maybe better start the sentence with “Calcareous benthic foraminifera are common...”

Page 7791, line 11: ,, from -0.9 to 1.1....“

Page 7793, line 18, Fig. 9: It is very irritating for the reader that Fig.9 will be mentioned in the text very early, between mentioning of Fig. 3 and Fig.4, and I suggest converting Figure 9 in Plate I.

Page 7794, line 14: “During the whole investigation period (except of June at FF4 and FF5),.”

Page 7794, line 23: something is missing in this title, maybe: “Co-variance of population densities of living specimens with saturation state”

Page 7795, line 2, line 12 + line 13: I guess that 5, 15 and 53 ind. 10cm⁻³ are average values, but it is not really clear in the text.

Page 7796, line 2: “...left in October and December.”; not February?

Page 7800, line 18: “...that foraminifera respond....”

Figure 6: I suggest dividing this figure in a) upper part, graphs, and b) lower part, pictures

Figure 9, 2: Probably *Ammonia aomoriensis* instead *A. beccarii*, I guess?

I miss some hints in the manuscript concerning the content of the supplementary material.