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Interactive comment on "Impact of carbonate saturation on large Caribbean benthic foraminifera assemblages" *by* Ana Martinez et al.

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The manuscript 'Impact of carbonate saturation on large Caribbean benthic foraminifera assemblages ' by Martinez and co-authors aims to show the response of the benthic foraminiferal community to by using natural low pH low calcite saturation submarine springs. They show calcareous and agglutinating foraminiferal abundancies decrease, but the calcareous non-symbiont bearing species seem to be impacted the most. The manuscript is reasonably well written and the results are in line with some other similar studies, but I have some concerns about the methodology that could impact the observed trends. Especially lumping porcelaneous and hyaline species together and only using the larger fraction (>250 um) might bias some of the results. The discussion could use some restructuring and extra depth, by for instance analyzing

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trends porcelaneous and hyaline species, adding size normalized weights of Discorbis, exploring the effect of salinity and different symbiont species.

Major comments

Page 3 line 14: What kind of substrate was present and was there a difference in substrate near the vents and at the control site? Did you include plants (some benthic species prefer to live on plant debris)?. Did you apply rose bengal staining to only analyze living specimens?

Page 3, line 15: Why did you choose 250 um? Normally 125-150 um is used (Schonfield et al., 2012: Marine Micropaleontology, 94–95), since you might miss the trends in the smaller community now. The trends you observed might be true for larger specimens, but perhaps the smaller specimens tell a different story. . .

Page 4, line 13-14 I am not sure about 'lumping' low mg forams together with porcelaneous in one group, since it is known from countless studies they respond different to increased pCO2, perhaps due to e.g. solubility of high MgCO3. Did you check if both hyaline and porcelaneous species in this group show similar trends? Otherwise you might be skewing your results, especially since you see no significant change in weight of shells of Discorbis. I would also be very interested to see (relative) abundances of low (e.g. Discorbis), intermediate (Amphistegina, Astergerina) and high Mg species (Quinqueloculina, Archaias) between ojos and control. It would bring something new to the existing studies on different sites, especially since you have the opportunity to test it here on species with very contrasting Mg content.

Discussion section: The authors do not (clearly) explain why the abundancy of agglutinating foraminifera decreases at the vents. They do not calcify or have symbionts, so the explanations given to explain the calcareous response (proton pumping and symbiont activity) do not apply. Could salinity play a role?

Page 7 line 22-29 The authors missed a big overview study by Doo et al., 2014 (Biol.

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Bull. 226: 169–186.) in which they present a nice overview of response of larger benthic foraminifera to ocean acidification. I think their discussion would benefit from including these observations. For instance, to look at the different kind of symbionts (diatom, dinos) your foraminifera species have and if they follow the general trend of Doo et al., 2014. It would also be informative to add an overview of the response of benthic foraminifera (symbiont/non symbiont) in different studies, like in Keul et al., 2013 to show how your data fits laboratory and field experiments.

Minor comments

Throughout manuscript pCO2 (p in italics)

Page 2 line 9-10: Keul er al., also contains a nice overview of species-specific responses

Page 2 line 29: Do other chemical parameters change between ojos and control? Oxygen, sulphates?

Page 3, line 08-10: It is more common to use the K1 and K2 values from Lueker et al., 2000. I would suggest recalculating your carbonate parameters with these, since Millero (2010) are known to cause discrepancies in the results amongst programs (for details see Orr et al 2015). Please also specify in more detail what constants were used for carbonate system calculations. For example, what term was used for KHSO4? Dickson (1990) is commonly used.

Page 3, line 14-17: How much gram of sediment was counted?

Page 3, line 20-23: Even though only specimens from 250-355 um were picked, the test weights have to be normalized for size to be able to compare between sites and studies.

Page 4, line 7: There is no seasonality in the output/flux of the vents?

Page 4, line 24-26. The abundance of agglutinating foraminifera is very low already in

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the control sites. Do you think the numbers are high enough to make big statements of agglutinating foraminifera being more resilient to low calcite saturation state?

Page 5, line 31: Fig 4 not 5

Page 5, Line 17-20-21: Fig 5 not 4

Discussion: The discussion needs some restructuring, perhaps adding paragraphs might help?

Page 6 line 25: 3-6 units is in my opinion not a 'slight' but a big difference and should be taken into account or at least discussed

Page 8, line 7-10. There is also evidence from culture experiments showing very species specific response of agglutinating foraminfiera with pCO2 (e.g. van Dijk et al., 2017, JFR).

Page 8, line 19-25 This is not really discussed in detail the discussion and has therefore no place in the conclusion. Could you add a paragraph on this in the discussion section.

Table 1: check number of decimals for consistency. Why is there no error on calculated CO2sys values, you could apply a propagating error.

Figure 3: Top three panels: Can you put the 0 on the intersection between y and x axis? Is it possible to order the ojos from e.g. South to North or vice versa?

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