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Interactive comment on "High-resolution ocean pH dynamics in four subtropical Atlantic benthic habitats" *by* C. A. Hernández et al.

C. A. Hernández et al.

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Thank you for your comments. The detailed review will be essential in guiding our revision and we hope to satisfactorily deal with the constructive criticisms and clarified any points that were originally confusing. We very much appreciate your efforts in refining and highlighting our research. And we thanks that you found the manuscript important and worthy of publication, for instance: "...useful dataset on pH diurnal and seasonal variability in shallow coastal waters...", "Such variability in carbonate chemistry parameters is of great importance to ocean acidification (OA) studies, yet has relatively neglected".

Specific comments:

Title/Abstract/Intro

- New proposed title: “High-resolution ocean pH dynamics in four subtropical North Atlantic coastal habitats”.

- We have changed the first two sentence of the abstract by: “Oscillations of ocean pH have not been well studied in shallow coastal waters, and such variability remain not available for certain world regions. However, these dataset are of great importance to ocean acidification studies, yet has relatively neglected. In order to fill this knowledge. . .”

- Yes, we also think that the term “site” would be better within the Abstract.

- We also think that and update of the references cited in the introduction is needed. We will include e.g. Kroeker 2013, Johnson et al 2013, Shaw et al 2013, Bernhard et al 2015, Le Quere et al 2015, IPCC 5th. . .

- We have included all the other small suggestions to improve the text.

Material and methods

- Yes, we have more in situ data: temperature and carbon chemistry. We will include that information within a new table.

- Underwater cages were all at 6-8m but there are water depth changes due to tides (almost 2m). We will be more precise on the mat&met explanation.

- About the extra info that could be included. It would be fantastic to include all that info if available but unfortunately is not. However, we could provide a detailed site location map to show the exact location of pH sensor cages. We will combine this new info within Figure 1. In the Canaries, no CO2 vents have been detected yet but it would be fantastic, natural CO2 vents are the golden eggs goose for ocean acidification studies! Regarding to your question, it won′t be rare though to find some in these volcanic islands. Next project!

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Results

- Small-suggested changes will be included in the reviewed version of the MS.

- We think that the delay in pH maxima is due to the higher algae biomass of Cystoseira beds.

Discussion

- Yes, including physical/hydrographic information would be very interesting but those data are not available. We will consider it for future studies.

- About your question on the effect of temperature: Higher temperatures will increase photosynthetic activity, however its effect on a daily pH cycle will be greater on intertidal areas. In the revised version of this MS we will include a daily temperature cycle data that would help to clarify this point.

- Well, yes. . . the thermocline breakdown occurs in February-March according with De León & García-Braun (1973) (Ciclo anual de la producción primaria y su relación con los nutrientes en aguas canarias. Boletín del Instituto Español Oceanografía, 167: 1-24), depending on the year. However, there is a delay on algae growth, it is not immediate; algae need some time to growth. Then, what we are detecting is that increment in algae biomass during spring that generate higher pHs.

- About the ESTOC time series (http://www.eurosites.info/estoc.php; http://cdiac.ornl.gov/oceans/Coastal/ESTOC.html), yes, there are pH data taken every two days at 1.5m since 2010. So it is a really good idea to include a comparison with an oceanic station. Thanks for this great idea! We will include some extra graphs on Figure 2 and 3, and add some paragraphs explaining what we have done, results and the main conclusion.

Tables and Figures

- We will include dates on Table 3.

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- For Figure 3, we used month/day/year.

Thank you again for your comments; we look forward to hearing from you.

Sincerely,

José Carlos Hernández

January 20th 2015, La Laguna, Tenerife, Canary Islands

Interactive comment on Biogeosciences Discuss., 12, 19481, 2015.