

## ***Interactive comment on “Technical note: Interpreting pH changes” by Andrea J. Fassbender et al.***

**Anonymous Referee #1**

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The manuscript is a brief explanation and discussion of why calculating and discussing trends in  $[H^+]$  is necessary and important in order to correctly interpret pH changes across different oceanic regions and depths. As it is a technical note the manuscript is short, and there is little in-depth description and discussion. However, the referencing is more than adequate to guide the interested reader further into the topic. In that respect the introduction provides a very nice historical overview of pH. The manuscript is well-written and very nicely presented. The figures all have high quality.

I have four minor comments, which I think it would be useful for the authors to address:  
1. How pH is measured has changed dramatically over the years, and is still changing. It would be interesting to include a brief description of what is actually measured when using spectrophotometric methods versus ion-sensitive field-effect transistors. I realize

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the authors may think this beyond the scope of this work, but in terms of interpreting pH changes I believe this issue is becoming more and more important.

2. The manuscript does not mention biological responses. Probably this is with very good reason since it goes beyond interpreting pH changes. However, research into ocean acidification is well aware that this issue is much more than just pH and always make sure to also include changes in carbonate ion, or the saturation states of calcium carbonate minerals. It would be worthwhile to acknowledge this.

3. In the conclusions the authors make the statement "Unknowingly, many studies that have focused on delta-pH have described relative changes in  $[H^+]$  presuming they were absolute." The statement has no references and I am not sure I believe it to be true. The statement makes it sound as if the general ocean carbonate chemistry community is unaware that an absolute change in pH represents a relative change in  $[H^+]$ . This is not my understanding at all. While I agree that there has been too much focus on changes in pH alone and that also discussing  $[H^+]$  is necessary, I doubt this is due to ignorance. At the very least the statement needs references as examples of this.

4. I would be worth mentioning (briefly) that changes in ocean pH, and  $[H^+]$ , occur as a result of perturbations to the carbonate chemistry buffer system. Something changes the balance between carbonate ion and bicarbonate ion and this results in a perturbation of pH. Not the other way around. Related to this a bit more discussion about the differences between coastal and open ocean would be worthwhile.

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