

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

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Thank you for providing constructive feedback on the manuscript. Below we address each comment from your review.

1. In this technical note, we cannot address all problems associated with interpreting pH changes. The manuscript is focused entirely on the common problem of misinterpreting or misrepresenting the meaning of pH changes, i.e., that a pH change represents a relative rather than an absolute change in  $[H^+]$ . Addressing other problems would lengthen the paper and divert the reader from this sole objective. Furthermore, on the Biogeosciences page that describes manuscript types, it states that Technical Notes "should be short (a few pages only)". Thus, adding other concerns, such as this

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analytical issue, is not feasible.

2. We agree that biological responses to ocean acidification are complex and require consideration of the full seawater chemistry, not just pH. However, we think this topic extends beyond the article scope. Additionally, unlike for all other carbonate system variables whose changes are absolute, the logarithmic scale of pH means that its changes are equivalent to relative changes in  $[H^+]$ . We chose to emphasize this.

3. We have deleted this sentence.

4. In response to this comment, and feedback from a voluntary reviewer regarding the coastal ocean analogue to our open ocean examples, we have added a sentence near Line 114:

Yet, at another Equatorial Pacific site ( $0^\circ N$ ,  $155^\circ W$ ; Sutton et al., 2014), there is a similar  $[H^+]$  trend to that of the Irminger Sea site because the initial pH differs. While we focus here on pH changes in the open ocean, pH changes also occur in coastal waters where they tend to be larger (Carstensen and Duarte, 2019). Recognizing that a change in pH represents a relative change in  $[H^+]$ , regardless of location, and examining long-term trends in both parameters should improve interpretation of chemical changes across ocean domains.

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