

Interactive comment on “Autonomous seawater $p\text{CO}_2$ and pH time series from 40 surface buoys and the emergence of anthropogenic trends” by Adrienne J. Sutton et al.

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We thank all referees for their thoughtful and constructive comments and suggestions on our manuscript “Autonomous seawater $p\text{CO}_2$ and pH time series from 40 surface buoys and the emergence of anthropogenic trends.” The revised manuscript will be much improved as a result of the careful critiques. Below we discuss the comments from Referee #3 point by point including original referee comments and our responses bulleted (–) underneath.

In this manuscript, the authors present a data package that incorporates measurements from 40 buoys with $p\text{CO}_2$ and, in some cases, also pH sensors. The authors

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make a good case for why this dataset is of additional value compared to getting data independently from each buoy at NCEI. The authors also provide time of trend emergence estimates where the record is long enough and compare results for open ocean, coastal, and coral reef sites. This makes the paper interesting not just for potential users of the data, but also for researchers that might want to compare their own data trends to data from these buoys.

I appreciated the specific section on data availability and how to use and properly acknowledge the dataset, which apparently is still too complicated for some data users. This manuscript and product are timely and will be very useful for a variety of researchers, so I recommend publication after addressing the following minor issues:

Page 4 lines 10-15: what type of equilibrator is used? Is it a membrane?

– This is a bubble-type equilibrator. The MAPCO₂ methodology is described in detail in Sutton et al. 2014b. We have added these details to the following sentence in the referenced section: "Seawater xCO₂ equilibration occurs by cycling a closed loop of air through an floating bubble equilibrator at the sea surface for 10 minutes, which is described in detail by Sutton et al. (2014b)."

Page 4, line 20-26: At what temperature is pHT reported? Is there enough data at this point to evaluate the most adequate of the two sensors for long term monitoring?

– We have added to line 24 that pHT is reported at in situ SST. Evaluating the two sensors requires both an analysis of existing data as presented here and targeted side-by-side test deployments of both sensors at select mooring time series sites. Because of the latter requirement, we believe this evaluation is outside of the scope of this manuscript.

Page 9, lines 26-28. How likely do you think it is that this warm event will happen again? If you are discussing ToE and this event could happen again in the next 1-2 decades, wouldn't it make sense to keep it in the record for the ToE calculations and

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comparisons?

– To our knowledge, there have not been any assessments predicting future likelihood of similar North Pacific warm anomalies; however, we do cite Bond et al. 2015, which proposes the mechanisms that influenced development of the 2014-2015 anomaly. We do indeed include the 2014-2015 data in the ToE calculation for WHOTS. The section referenced by the reviewer is on the separate calculation of trends. We remove the anomalous event because it occurs at the endpoint of the time series, disproportionately influencing the linear regression as described in the more detailed trend assessment of Sutton et al. 2017 cited in this section.

Page 2 Line 30: change “although” for “however”

– Done.

Page 4, line 20: add reference to Table 1

– Good suggestion. Done.

Page 8, lines 22-23: “reflecting the influence of short term of the local active reef community” please rewrite this.

– Thank you for pointing that out. Rewritten as: “reflecting the influence of short-term (~1-2 days) carbonate chemistry variability of the local active reef community”

Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2018-114>, 2018.

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