

## ***Interactive comment on “An Evaluation of the Performance of Sea-Bird Scientific’s Autonomous SeaFET™: Considerations for the Broader Oceanographic Community” by Cale A. Miller et al.***

### **Anonymous Referee #2**

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SeaFET instruments are now routinely used by the oceanographic community to measure pH in a variety of marine and coastal environments. In order to obtain useful data the instruments need to be calibrated and their performance assessed prior to, during and post deployment. This paper evaluates the performance of four such instruments under several different measurement environments and data work up procedures, and thereby provides an assessment of these particular measurements, and a procedure for other users to obtain the best data from a deployment.

This is a nice, tidily written paper, the figures and tables are relevant and easy to read and follow. As a SeaFET user myself, I found this to be a very useful manuscript,

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with procedures that I can use to improve my own practice. However, there are no substantially new concepts presented.

I recommend that this manuscript be accepted with minor revisions, as detailed below.

#### Specific comments

Several methods of assessing data quality have been used – variability, accuracy (= integrated uncertainty), uncertainty, “true pH”, variance, RMSE, Standard deviation of duplicate samples, mean anomaly . . . Although Section 2.5.1 and 3.5 describes some of these terms in some detail, I found it difficult to assess the performance of the instruments and was distracted by the variety of terms. The sentence starting line 576 is a good example of this “. . . can provide an accurate measurement of pH. . . . executed with high precision.”

I suggest a table defining how and in what circumstance each term is used.

Line 257 specify austral winter

Lines 343, 400 why are the calibration coefficients on the header file and the CD-ROM different? If they are different how can the correct one be verified?

Line 410 SeaFET397 emerged from the tank for 24 hours. Did the pH sensor dry out? And if so, how was it reconditioned.

Line 467, the absolute difference of 2.83 oC is large in this context. How did you decide what temperature to use. Do you have a recommendation around calibration of the SeaFET temperature sensor?

Line 497 How was duration of the conditioning period determined, ie the width of the blue box in Figure 6. The 14 days indicated in Figure 6 is a long time

Line 512 the sentence starting “There was no clear distinction in greater accuracy..” does not make sense to me. Please rewrite this.

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Line 632 The sentence starting “For instances of . . .” makes no sense, please reword.

Line 648 You state that “. . .the potential uncertainties calculated in this study represent the upper limit of an average uncertainty. . . .” How are you able to ascertain that this is an upper limit?

Line 654 You begin to discuss the effects of errors in the temperature measurement, but stop short of making any recommendations. This section should be tightened up, to go beyond a description of your own deployments.

Line 667 “. . .expanding the scope of pH variability. . .” this does not make sense

It would be useful to include a bullet pointed list of recommendations in the Conclusion

Was there any evidence of biofouling affecting the pH measurement during any of the deployments? Would you be able to determine the effect of this with your calibration strategy, and do you have any recommendations on how to identify this problem?

References – These are complete and up to date.

Figures – In general these are clear and helpful. I do not understand, however, the difference between Figure 4 and Figure 5. They are the same data sets, but Figure 4 is for “before they were conditioned”, and “Figure 5 is for ‘conditioned’”. Does this refer to the way they were calibrated? Please clarify in the Figure caption.

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