Responses to comments by the Associate Editor:

Line 72: What do you mean by 'varying conditions'?

This was meant to indicate that sensors are not typically tested in environments with highly variable salinities and as a result, environments with highly variable salinity have been found to have poorer correspondence between sensor and discrete measurements than areas with more constant salinity (Sastri et al. 2019). We changed the text to say "highly variable salinities".

Line 84: What do you mean by this?

By 'known acidification' we meant evidence of acidification (based on previous sentences). We changed the text to say 'evidence of acidification'.

Line 127: Did you calibrate the sensor to lab measured pH, or just apply an offset based on this value to the entire pre-calibrated dataset? I think it is best to calibrate the entire dataset to the sample measured in lab based off the code in Bresnahan et al.

After reading this comment and re-reading Bresnahan et al., we realized that we misinterpreted their correction and actually went with a more simplistic correction based on lab measured "benchmark" pH samples that were analyzed spectrophotometrically (with purified mCP) and converted to in situ temperature using CO2SYS (using measured pH and DIC). This type of correction has been done before in Shadwick et al. (2019). We changed the text (and supplementary materials) to note this and added clarification that biofouling—which would be a likely driver of sensor drift and more necessitate the more advanced correction—was not experienced in this case. The text now reads:

"The average difference between sensor pH and discrete quality assurance samples measured spectrophotometrically in the lab was used to establish a correction factor (-0.05) across the entire sensor pH dataset. Note, this correction scheme was not ideal (Bresnahan et al., 2014) although less rigorous correction based on sensor and discrete pH values has also been used (Shadwick et al. 2019). Nevertheless, the overall good agreement between discrete and corresponding sensor pH values during the deployment period suggested that the SeaFET sensor remained stable. It is also worth noting that our monitoring setup remained free from biofouling during the 10-month period. We attribute this to the deployment design in which the high frequency movement of the pumping mechanisms in the diaphragm pump must have eliminated the influence of animal larvae."

Reference:
Shadwick, E.H., M.A.M. Friedrichs, R.G. Najjar, O.A. De Meo, J.R. Friedman, F. Da, and W.G. Reay. 2019. High-Frequency CO_2 System Variability Over the Winter-to-Spring Transition in a Coastal Plain Estuary. Journal of Geophysical Research: Oceans 124: 7626-7642.

Lines 679-681: What about the influence of the freshwater carbonate chemistry? If I remember correctly the rivers have high TA concentrations which could help buffer changes in pH/pCO2.

You are correct that the region has high river alkalinity (see lines 77-78 for that background). This ship channel area is far removed from the location of freshwater inflow (see Fig 1), but the river chemistry does lead to generally high buffer capacity throughout the entire estuary. We mention that the relatively small fluctuation seen in pH is likely (at least partly) due to the high alkalinity in the region (see lines 575-579).

We agree that it is worth mentioning the unique river alkalinity situation at this location in the text, especially since the subsections were restructured based on reviewer comments and this section is specific to salinity and freshwater inflow. The rivers still have lower pH and higher pCO_2 than the seawater endmember in this region despite their high TA, but pH and pCO_2 may not be as extreme in the rivers here compared to others. We have added the following text to the section:

"Though the river water still has elevated pCO_2 and depressed pH compared to the seawater endmember, the high riverine alkalinity (often higher than the seawater endmember) in the region results in relatively well-buffered estuarine conditions in MAE (Yao and Hu, 2017)."