Reviewer 1 Comments

The authors addressed most of my comments. However, I still consider that the change in the forcing product (CORE to CFS) could explain (to some degree) the enhanced OA over the last decades. I understand that running a new hindcast using a single data product for the forcing implies significant additional work, and is beyond the scope of this article. Under this limitation, the forcing issue should be clearly identified as a caveat that adds uncertainty to the derived long-term trends. My suggestion is tone down the results a bit in the discussion.

RESPONSE: We thank the reviewer for the helpful comments. We agree that the forcing switch adds uncertainty, and indeed have a full paragraph in the discussion (lines 712-729) highlighting this as a caveat to our model results. We also agree that re-running the entire hindcast with a new forcing product is a substantial additional effort that is beyond the scope of this work. We have further caveated some of our results and added additional details to help further clarify the forcing issue.

Specific comments:

410-416: You could add to Figure S3 a couple of panels showing the changes in the TA to DIC ratio. We could expect that changes in this variable are closely tight to the Ω, pH, and pCO2 changes (e.g. Wang et al., 2013: https://doi.org/10.4319/lo.2013.58.1.0325).

RESPONSE: We thank the reviewer for this great suggestion. We have added additional subplots to this figure for the change in the TA/DIC ratio. This further illustrates that the boundary condition change leads to an increase in subsurface TA relative to DIC, which would counteract the subsurface OA signal.

429-432: This statement is somewhat vague. I agree that the goal of the comparison is not suggesting that the trends are the same for the two forcing products. But you want to support your hypothesis that the enhanced bottom DIC growth in the last period is not an artifact resulting from the forcing change. That is not clear to me from your analysis.

RESPONSE: We agree that this previous sentence was overly vague and have replaced with the following, expanded description:

These amplified bottom water carbonate trends are strongest over the 1998-2022 timeframe, particularly compared to the relatively weak bottom water trends over the 1970-1994 timeframe. This suggests that the strong bottom water trends evolve over the 1998-2022 timeframe, and may be specific to the CFSR forcing. However, the bottom pH trend with CORE forcing increases from -0.0029/decade when calculated from 1970-1994 to -

0.011/decade when calculated from 1970-2003 (Fig. S5). Thus, the enhanced bottom water trends over the recent timeframe may be sensitive to the forcing product and the specific timeframe over which the trend is calculated.

Addressing the second reviewer comment about the greater Ωarag variability you mentioned: "The fact that this is not the case for pH may suggest that temperature is playing a role, since temperature has a relatively greater effect on Ωarag than pH.". I would argue that temperature has a relatively minor impact on Ωarag. You can see that in the Taylor decomposition analysis.

RESPONSE: This is a good point, we were referring to this in a more general sense (i.e. that temperature has a relatively greater effect on Ω_{arag} than pH), but the reviewer is correct that in our results, temperature has a relatively minor effect, as demonstrated by the Taylor series decomposition.

Reviewer 2 Comments

I am satisfied with the additional work and response of the authors. I noticed a few typos or omission in this new version of the manuscript that should be corrected before publication. **RESPONSE: We thank the reviewer for their helpful comments throughout the review process.**

On the new OBC figures the s axis is not explained in the legend.
Some equation numbers were not changed in the text following the addition of the new equations

RESPONSE: Thank you for catching this, the description of the s-axis has been added to the figure captions and the equation numbers have now been corrected throughout.

Line 389: TA due to differences (add to)

RESPONSE: Change made

Line 405: directly rather than direct
RESPONSE: Change made

Lines 652-653: Consistent with (add with)

RESPONSE: Change made