Public justification (visible to the public if the article is accepted and published):

Dear Authors,

Thank you again for your revised manuscript and replies to your referees.

As I noted previously, I returned your revised manuscript to your referees to assess its improvements over the original draft, and I now have further responses from all three referees. Overall, they are satisfied with the manuscript, and generally happy for it to proceed to publication.

However, there is a remaining issue that should be resolved before the manuscript can be accepted for publication. One referee notes the same problem that I raised with you previously, namely that the alkalinity bias referred to in the text (ln. 481), and shown in bias Figure 15f, is at odds with the information presented in Figures 15b and 15d. As the referee notes, the difference between latter panels suggests a bias closer to 100-150 ueq / kg rather than the 400 ueq / kg shown in Figure 15f and referred to in the text. The referee suggests (and I would agree) that Figure 15f has an error in it and should be amended. Could it be something as simple as the difference between model alkalinity and observed DIC? Certainly, the maximum delta in Figure 15f (500 ueq / m3) is significantly greater than the range of data range shown in Figure 15d (300 ueq / m3). As such, to reach this maximum bias, locations would need to have values at either end of the colourscale used for panels 15b and 15d. Can you please clarify this situation, make the relevant corrections to your manuscript and provide a response to the referee comment?

Answer) We sincerely thank the reviewers and the editor for careful review. Upon rechecking the values for annual mean and bias of alkalinity, we found that an incorrect value had been applied in the process of calculating the bias. As pointed out by reviewer and editor, the bias is indeed less than 150 $\mu eq\ kg^{-1}$. We have corrected the relevant content and updated the corresponding figure (line 481 and Fig. 15 in the revised manuscript) accordingly.

Additionally, in reviewing your manuscript again myself, I note a number of minor issues that should be addressed. I list these below.

I note that you refer to alkalinity in units of umol / kg, when the correct unit is ueq / kg. Please correct this throughout your manuscript.

Answer) We corrected the unit.

I previously raised with you the issue of using colourblind-appropriate colourscales for your figures. Our guidance for this is available here: https://www.geoscientific-model-development.net/submission.html#figurestables. As we are approaching publication, I would suggest that you revisit this policy and use it to guide the presentation of your figures in your manuscript. Specific figures that are problematic are those using a rainbow palette, that is: 3a-b, 4a-b, 5a-b, 6a-f, 7a-b, 8a-b, 9a-b, 10a-b, 10d-e, 10g-h, 11a-b, 12a-b, 15a-d, 17a-b, 18a-f, S1a-f and S2a-b.

Answer) All the figures have been updated using an alternative color palette instead of the rainbow palette, in consideration of readability and color vision deficiencies.

Finally, while your Zenodo archives document your model code and model output, they do not appear to include post-processing or plotting scripts (per point 5 of https://www.geoscientific-model-development.net/policies/code_and_data_policy.html#item2). Please either append these to your Zenodo archives or upload them to a new archive. This will require you to update your Zenodo links.

Answer) We uploaded the plotting scripts on Zenodo links (https://zenodo.org/records/15228135)