Author Responses 2025-0312 (revised).
Further responses 2025-0313

Associate editor decision: Publish subject to technical corrections
by Jack Middelburg
Public justification (visible to the public if the article is accepted and published):
Dear Dr. Schwartz:

Thank you for submitting your well-written and well-prepared revision to Biogeosciences. I have read it with much interest, and I am happy to inform you that your paper is now accepted for publication pending a few minor technical issues (see below). Simple and instructive models as yours are very useful for training the next-generation and for inclusion in integrated assessment models.

I thank the editor for the positive comments. I especially appreciate the thoughts expressed in his concluding sentence.

Minor corrections:
- P.33/Figure 9: I suggest modifying the Y-axis scale so that terrestrial biosphere 14C is fully presented

The cut off in the TB data is not due to the y axis range, but rather due to the fact that the Naegler data set for emissions, necessary to calculate TB, terminates at year 2005 as shown in the figure. There are other assessments of 14C emissions that extend beyond 2005, but they differ somewhat from the Naegler data set. Using some sort of blended data set to avoid step function jumps due to switching from one data set to another would permit extending the emissions beyond year 2005, but I chose not to go that direction for this paper because I thought that the introduction of those further data sets and description of the blending process would be a diversion here.

To allay any concern over the time series for TB being artificially cut off in the figure I will extend the axis range of the figure, as per the following:
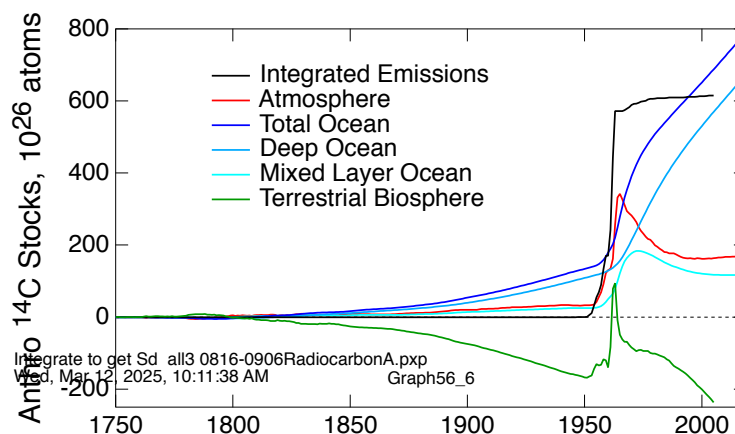
I also modified the caption to explicitly read

emissions data for years 1951-2005

- Please check whether all your figures have the optimal color scheme.

Not clear to me what the editor refers to as "optimal color scheme". There are many figures with multiple traces, including light blue shading (and occasionally other colors). I tried to use color codes that would permit distinguishing the multiple traces.

I also used different blue colors, consistently across figures, to represent deep ocean, ML ocean, and total ocean. I would hope to retain that usage. Light blue shading for uncertainty in total ocean quantities. Likewise I consistently use deep green for TB, red for atmosphere, and black for emissions. I believe such a color scheme is an aid to the reader.

When showing results of others, I simply chose colors that could be distinguishable without much thought.

I prepare publication version of all my figures in Adobe Illustrator and could readily change colors of any traces; the legends are also in the figures.

If there is a guide to optimal color scheme, I would appreciate a link to that. For the moment unless there is a more specific guide I would leave the colors as they are.

I checked several figures at https://www.color-blindness.com/coblis-color-blindness-simulator/ for protanopia, which I understand to be the most common colorblindness. I was able (albeit with a bit of effort) to distinguish all curves in the figures I checked. I feel comfortable at this point to state that I have met the journal requirements of checking the figures.

- P. 48/line 1067: closing bracket needed after kmd

Thank you. Done

- P. 53/line 1165: the quantity beta is usually evaluated numerically (easier given the tools available), but analytical expressions do exist (see Hagens and Middelburg, 2016, GCA). I propose rephrasing… that is usually evaluated numerically from …

Thank you; will modify. Modified to read

The quantity β is an equilibrium property of the CO_2–DIC system that is generally evaluated numerically from knowledge of the equilibrium constants for dissociation of H_2CO_3.

More broadly, I thank the editor for shepherding this paper through the review process, which was salutary. I am pleased that this review is nearing an end.

With best regards,

Jack Middelburg, Associate editor