

Earth Syst. Dynam. Discuss., referee comment RC2
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Comment on esd-2022-37

Vivek Arora (Referee)

Referee comment on "Reconstructions and predictions of the global carbon budget with an emission-driven Earth system model" by Hongmei Li et al., Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2022-37-RC2>, 2022

The authors present a forecast system for the global carbon cycle based on the seasonal to decadal forecasting system of the MPI-ESM that requires initializing the physical variables in the model based on observations.

The manuscript reads well and the science is sound. However, since the manuscript covers two different aspects of Earth system modelling (the global carbon cycle and seasonal to decadal forecasting) the authors need to make their terminology and descriptions easier to understand for both communities. As a land carbon cycle person myself, there were several aspects of seasonal to decadal forecasting that I was unable to completely understand.

In particular, as a reader, I am unable to completely understand how the simulations are done. Are multiple 5-year simulations done starting from each year from 1960-2018, and then the values at the end of the first year of each simulation are used to construct a time series corresponding to a 1-year lead time?

In addition, several sentences are unclear and I have suggested rewording them in the annotated PDF attached to this response.

I suspect that English may not be the first language of the first author, and I think the manuscript would benefit from the attention of other co-authors.

A detailed list of comments can be found in the attached annotated PDF of the manuscript which also summarizes my comments so that they can be easily located.

I look forward to reading a revised version of this manuscript.

Please also note the supplement to this comment:

<https://esd.copernicus.org/preprints/esd-2022-37/esd-2022-37-RC2-supplement.pdf>