

Interactive comment on “The climate dependence of the terrestrial carbon cycle; including parameter and structural uncertainties” by M. J. Smith et al.

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Thank you for the interesting article. I appreciate that the article devotes several sentences in the Discussion to the issue of what the reader can actually infer from a study that assumes dynamic equilibrium. Still I have a concern. By assuming dynamic equilibrium in all carbon pools (and filtering for validation data corresponding to dynamic equilibrium), comparisons to modeled data seem difficult to believe because those model data (A1F1 & B1) represent non-linear, non-equilibrium scenarios. So it seems we have a comparison of validation data representing near equilibrium rates of carbon exchange against model data from very non-equilibrium simulations (at corresponding location).

IPCC's A1F1 scenario represents the most extreme economic and population growth
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with the largest release of CO₂ to the atmosphere. B1 represents a future where global environmental practices are incorporated and population growth and CO₂ release is reined-in. Both of these require that large proportions of the world's land are in non-steady state flux, either strongly emitting or sequestering CO₂. But this study appears to only be concerned with areas that are likely to be in equilibrium. This is a major problem because the most important thing about these different scenarios is that they represent different non-linear pathways. So by subsetting for only equilibrium locations this study does not appear to be telling me very much about the envelope of uncertainty between A1F1 and B1.

So my question is why did you not choose a middle-of-the-road scenario that is more likely to approximate equilibrium rather than either A1 or B1 which both approximate the largest (or nearly) changes to land use and carbon exchange rates? I could be wrong but I think by this work we are only seeing how well the model performs in places where there is not substantial environmental degradation or post-disturbance regrowth.

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