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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Distinguishing the drivers of trends in land carbon fluxes and plant volatile emissions over the past three decades" *by* X. Yue et al.

**Anonymous Referee #2**

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The paper addresses the trends in carbon and BVOC fluxes in the YIBs model. Although the research methods are sound and the topic one of general interest to the community, at the end of the paper, it was unclear what the guiding scientific question was. If the goal of the paper was to provide an improved accounting of carbon fluxes beyond what other models could provide, the paper did not put the YIBs results in the context of other models or previous works. This is a major deficit.

If the main science question relates to what does YIBs predict for carbon fluxes, the authors don't tell the reader why s/he should care about this specific model. The paper is a length description of simulations that test the trends in carbon fluxes using two

different reanalysis driver data sets, but also conduct experiments with climate change alone, CO2 fertilization, and land use change, before isolating LAI as a driver of carbon fluxes. Separating these drivers is important, but the paper as a result is very unfocused. Many of the figures needed to support their results are supplementary, and this diminishes the main text. The authors should revise this paper to make it clear what the science questions are and structure the results in a more organized fashion.

The paper states that the YIBs model is "well-validated", but the authors owe it to their readers to describe the methodology and results of their previous validation exercises, which is merely cited here. Given that the YIBs model is not perfect, the authors should identify both the areas where YIBs had largest disagreement with their validation data and where it was in best agreement.

On p 21471, the authors state that "Our results show the large climate-driven uncertainties in the estimate of long-term trends... indicating the necessity of forcing intercomparisons in addition to model inter-comparisons". The authors have not provided much analysis on whether there is some switch in the YIBs model that has a non-linear sensitivity to a small change in reanalysis observations used.

The authors describe the GPP product as an observation, but it is not an observation. Perhaps it is more accurate to call it a "benchmark" than an "observation".

The multi-panel figures with maps have too much white space and tenerally the maps are too small.

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Interactive comment on Atmos. Chem. Phys. Discuss., 15, 21449, 2015.