

Biogeosciences Discuss., referee comment RC2  
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## Comment on bg-2022-208

Anonymous Referee #2

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Referee comment on "Effect of land-use legacy on the future carbon sink for the conterminous US" by Benjamin S. Felzer, Biogeosciences Discuss.,  
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This work examined how the initial state of the land surface affects simulated carbon cycles under an expected climate change. This is a kind of sensitivity analysis of a model because no systematic evaluation was conducted using observation-based data. Still, this work clarifies the importance of the initial state on simulations of transient changes in carbon pools and flux. I evaluate this model can be published in the BG if the author appropriately addresses the following issues.

### Major issues

(1) This work evaluated results from only one model, "TEM-HYDRO2". Hence results are very model-specific. The author needs to discuss, at least, to what extent the finding in this work can be generalized.

(2) Before applying the future climatic conditions, the CONDENSED run was first equilibrated by repeatedly inputting projected climate during 2016-2045 (Line 210). Why were future climatic conditions employed here? To let the model equilibrate at the year 2015 (as is indicated in table 1), climatic data during the last few decades before 2015 would be simply employed here.

(3) The manuscript lacks descriptions of the nature of the LULC data and how the model implemented it.

### Minor issues

(4) Please unify model names. The present manuscript utilizes both "TEM-HYDRO2" and "TEM-Hydro" for the same model.

(5) Words on some of the figures are too small. Please magnify them.

(6) Line 80

What is the "FIA" stands for?

(7) Line 201 "Future CO2 data are taken from Meinshausen et al. (2020)."

Is this data correspond to the RCP8.5? The author needs to inform about it.

(8) Line 212-214

Please clarify the difference between NCE and NEE in this work.

(9) Line 342 "the amount available"

Does it mean "the amount of available inorganic nitrogen"?

(10) Line 385 "NE U.S."

What it stands for?

(11) Lines 423-424

Values here correspond to NEP or NCE?