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Biogeosciences Discussions

Interactive comment on "Impacts of land cover and climate data selection on understanding terrestrial carbon dynamics and the CO_2 airborne fraction" *by* B. Poulter et al.

Anonymous Referee #1

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Overall comments: This article addressed a very important topic in estimating global carbon dynamics: the uncertainties from major model input data (i.e., climate and land cover). Although only one model (LPJ-DVGM) is used, it is robust enough to convey information about the uncertainties during model simulation. Huge work has been done by the authors since this study involves many data sets and simulations. A large variation in NEP/NPP/Rh is found based on the simulations of different input data. The CRU climate data (with MODIS land cover data) has been inferred to have higher agreement with the observed NEE. The authors also concluded that the uncertainties in estimating global carbon cycle are larger from climate data than that from land cover data. I very appreciate the authors' work for addressing this topic. However, there

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are some technical questions that were not described clearly and might undermine the results and conclusions drawn from this article. My final opinion is to accept this article after addressing below questions: 1) Page 1621 line 25: the authors mentioned that the equilibrium status for all the simulations was based on the first 30 yr CRU climate data. As a modeler, I know there are big vibrations when the model simulation changes from equilibration to transient. Since the climate data for ERA and NCEP are only available since 1989 (ERA) and 1979 (NCEP), I can imagine large fluctuations occurring during the transient model simulations from 1989/1979 to 2010. These fluctuations might not primarily from the difference in various climate data but from the system (LPJ) vibration or errors. In addition, the LPJ model is parameterized based on CRU climate data. Since all the equilibrium statuses are based on CRU data, it is no doubt that CRU-related simulations could yield better results than other simulations. This implies that although CRU-related simulations have better results (compared to observation), we cannot say CRU data is better than other data sets in reflecting the impacts of global climate change. I would like to hear the authors' clear explanations. 2) The authors mentioned (Page 1621 line 1) that different temporal climate data (monthly: CRU and daily: ERA/NCEP) were used to do the simulations. The LPJ seems a daily time step model (I am not for sure), could the authors explain how they use the different temporal climate data as input data for LPJ? 3) As I know that the classification system is different for those land cover data sets in this article. How to reconcile the land cover types to a unified system and to be used by LPJ? Hope the authors could clearly state this in the method. 4) The climate data spatial resolutions are different. All the climate data (CRU 0.5d, ERA 1.5d, NCEP 1.5d) are finally changed to 0.5 degree. In addition, the land cover classification is different for different land cover data sets. Two questions then need to be answered: How much uncertainties are from these changes? Are these uncertainties larger than that from the differences in climate and land cover data sets? Hope the authors can give some data to clarify it. 5) Page 1623 line 26: "between climate forcing" could be "among climate forces" 6) Fig. 1 is too small to read. 7) Table 5: I am unclear about why there are 3 different observation

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data. Could the authors offer some explanations on it? 8) Fig. 3 what is the dotted green line (not clear) that far from the main streams of model results? Is this line not necessary?

Interactive comment on Biogeosciences Discuss., 8, 1617, 2011.