

Earth Syst. Dynam. Discuss., referee comment RC1
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Comment on esd-2020-94

Wei Li (Referee)

Referee comment on "Bookkeeping estimates of the net land-use change flux – a sensitivity study with the CMIP6 land-use dataset" by Kerstin Hartung et al., Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2020-94-RC1>, 2021

The authors did a set of sensitivity tests using the CMIP6 LULCC forcing (i.e. LUH2) and a bookkeeping model (BLUE) and evaluated the relative importance of different aspects on the uncertainties of LULCC fluxes. It is a very comprehensive analysis with careful simulation design, precise description of different LULCC terms and results. Although the results are only from one model, I believe it documents the details in LULCC carbon flux simulations and answered some common concerns on the uncertainties like the impacts of LULCC, simulation starting time, shifting cultivation and wood harvest. It also gives an important implication that historical LULCC uncertainty is negligible for the LULCC fluxes in the future scenarios. I read the manuscript very carefully and didn't find any major problem. I therefore recommend this work for publication with small modifications.

Some small concerns:

The title "...based on CMIP6 forcing" is too broad. The work used only the LULCC forcing (i.e. LUH2). May rephrase and make it more concentrating.

If the authors still want to emphasize "CMIP6" and take this study as a reference analysis to compare with ESMs. It will be helpful if they can provide a short summary of how ESMs considered such aspects in the LULCC estimates (i.e. LULCC, simulation starting time, shifting cultivation and wood harvest).

L313-314: "Uncertainty ..." I read this sentence several times but still didn't understand.

L409-410: Did BLUE take bioenergy crops as regular food crops? To me, bioenergy crops are quite different from food crops. What are the possible consequences of taking both as the same?

My last point is kind of to echo the merits of this study that I mentioned earlier. The manuscript is written rigorously with a lot of details and supported materials, but it may be too technical for readers who are not very familiar with the bookkeeping models and LULCC carbon flux estimation. I noticed the authors tried to balance it by adding a summary paragraph at the end of each section which is very thoughtful. There still might be some room to improve by e.g. moving some detailed description of figures to supporting information.