

Anomalous review for “Remote land use impacts on river flows through atmospheric Teleconnections”

This study explores how the local and remote land use changes (LUC) might affect the river runoff. This study explores how the land-atmosphere interactions due to LUC can affect the river runoff changes. Unlike previous study on the impacts of LUC on the river runoff, this study further considers the role of land-atmosphere interactions due to LUC in affecting the precipitation, then the river runoff. The main conclusion is that when we study the LUC effects on the river runoff, we cannot exclude the effect from Land-Atmosphere Interactions, and consideration of terrestrial moisture recycling is essential for understanding the changes in river runoff. Overall, the findings presented in this paper may be of interest to the community; however, there are several aspects that need to be addressed before the paper is accepted.

1. Most of the regions show decreases in evaporation. It seems like the effect from irrigation is rather small? Any reasons? Also, I suggest to include a figure showing the irrigation water amount applied in this study that might be useful.
2. P2L31: “no studies have quantified the magnitude of LUC impacts on P or Q”.

There are several studies have quantified the magnitude of LUC on P. The definition of LUC is rather broad, irrigation, deforestation, urbanization, so please carefully check those literatures.

3. P3L25 “P differences between model iterations converges after about four simulations.”

Why after four simulations is choosing? Any particular physical meaning? Also, how long is the “four simulations”? 12 hours? (4 time steps?)

4. P3L22-25 “P under potential land cover is obtained through a coupled model simulation. We use E output from STEAM in WAM-2layers, and iteratively adjust the current day P forcing to STEAM with the changes in P with terrestrial origin obtained by forward tracking continental moisture in WAM-2layers (SI Materials and Methods). P differences between model iterations converges after about four simulations.”

Based on this description of the “considering the L-A coupling”, I guess this model does not take into account the effect the atmospheric nonlinearity nor the atmospheric circulations changes. While the authors have nicely summarized the different approaches in exploring the effects of LUC in Table S1. However, can the authors elaborate this further? In other words, how different the result might be if we use the couple global climate model to conduct the similar LUC experiment?

5. P4L25:” (i.e., meeting the convergence requirement of mean annual precipitation change < 1% and monthly precipitation change < 5 mm/month in every grid cell”

The threshold value should be clearly mentioned regarding the reason to choose such values of 1% and 5mm/month. Are there any sensitivity tests to achieve such values?

6. P5L13: “Our results show that human LUC (from potential land cover to current land use) (Fig. 1a) has”

Be clearly on how to obtain the difference (or anomaly). Is from the potential land cover minus current land use? Or vice versa? Please also indication in the caption of Figure 1.

7. Figure 3 is interesting. It might be nice to include the changes in P and E on the bar chart plots.
8. Some of the figures from the supporting information can be moved to the main content for the readers to read, and there are not many figures in the main content either at this draft.
9. The ocean’s E seems to be fixed because of using the reanalysis product. So, will the LUC over land affect the ocean’s E? IF yes, the ocean’s responses are completely ignored in this study. The authors may want to elaborate this issue further on the discussion as well. Also, to what extent the results from this study may be altered after considering the ocean’s effects?
10. Can the model simulate the surface temperature changes due to LUC? We usually can see the changes in surface temperature accompanying with changes in evaporation. It will be nice to show the figure of surface temperature changes as well.