Biogeosciences
Discussions

Interactive comment on "Quantifying regional, time-varying effects of cropland and pasture on vegetation fire" *by* S. S. Rabin et al.

Anonymous Referee #1

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This study is a very welcome advance towards understanding the drivers of anthropogenic fire incidence in terms of land use activity at global scale. The paper is well written and the results are clear. The incorporation of seasonal changes is a significant improvement to similar papers and provides a more holistic point of view.

Some specific comments:

1. In page 10820 line 12: you mention that some authors highlighted that human influence as a function of human population density are poorly explained and you aknowledge the work of Prentice et al., 2010. However, Prentice et al., did not show that with a data driven analysis. In my opinion work like:

- Knorr, W., Kaminski, T., Arneth, a., & Weber, U. (2014). Impact of human population

density on fire frequency at the global scale. Biogeosciences Biogeosciences, 11, 1085-1102.

and - Bistinas, I., Oom, D., Sa, A. C. L., Harrison, S. P., Prentice, I. C., & Pereira, J. M. C. (2013). Relationships between human population density and burned area at continental and global scales. PLoS ONE, 8. doi:10.1371/journal.pone.0081188

Should be acknowledged. The first study shows a non-linear model estimating the effect of population density on burnt area at global scale. The second study (and very relevant to the current paper) highlights that the effect of population density on fire s in fact a function of land use changes and considers the agriculture being two of them.

2. Page 10824, line 16: Why not using GFED4 for that study? The native resolution of GFED4 is 0.25o, but GFED3 is at 0.5o. However, from the description you make, it looks like it's a typing error and that you indeed used the 4th version. If not, I would totally recommend to update your calculations.

3. Page 10827, line 1: You write that ''Fuel load should be higher on average for non-agricultural lands than for pasture because pastures do not have trees in densi- ties comparable to more carbon-rich forest ecosystems." That is not entirely correct as in pastures, the low vegetation has high postfire regeneration and can be prone to more than one fire events. Especially in savanna biomes.

4. Page 10827, line 13: How well they reproduce the patterns? Please provide some metrics at this point already.

5. Figure 4: besides mean annual burnt area, the most intuitive way to show your results here would be seasonal means for December-January-February and so on (MAM, JJA, SON).

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