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Discussions
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Interactive comment on "The biomass burning contribution to climate-carbon cycle feedback" *by* Sandy P. Harrison et al.

Anonymous Referee #1

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Review

Overall this is a potentially interesting paper which could be published after some additional analysis.

There are two major problems in the text which the authors could easily address:

1. The authors used global average proxies and see if there is a linear relationship with T. We don't really expect different regions to response the same. You allude to this in the El Nino discussion, but this should be expanded on. Ideally you should separate out different regions: that would be really interesting and relatively easy: please add this analysis to the paper. The paper is a little bit short, so adding a small amount of analysis seems quite appropriate.

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2. For the global average, as you admit in the discussion/conclusions, the preindustrial/charcoal record shouldn't necessarily have the same feedback as the recent/anthropogenic. Any ideas why that should be? This also needs to be added to the abstract.

" However, this estimate is poorly constrained, and is largely driven by the welldocumented dependence of tropical deforestation and peat fires on climate variability patterns linked to the El Niño-Southern Oscillation." Which is likely to be modulated by human activities.

What happens to your estimate if you use the new estimate of the methane seepage: Petrenko et al., 2017 instead of yours: (50 Tg CH4 a–1 according to Schwietzke et al., 2016)

"However, if deforestation and peat fires (which account for 18-28% of emissions) were excluded from the calculations (Fig. 2b), no significant relationship of biomass burning emissions to temperature remained (p = 0.476). Interannual variability in tropical deforestion and peatland fires is well known to be correlated with the ENSO (van der Werf 5 et al., 2010), whereas ENSO-related changes in temperature and precipitation are variable in sign across extratropical regions – resulting in compensatory impacts on total non-anthropogenic fire emissions, which show no clear general relationship to temperature during the satellite era (Prentice et al., 2011)." This suggests that if you removed potentially anthropogenically derived fires, you would not have a signal, which reduces the robustness of your signal?

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