



EGUsphere, referee comment RC2
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Comment on egusphere-2022-82

Anonymous Referee #2

Referee comment on "Evidence of localised Amazon rainforest dieback in CMIP6 models" by Isobel M. Parry et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-82-RC2>, 2022

The manuscript "Evidence of Amazon rainforest dieback in CMIP6 models" by Parry et al. explores the behaviour of vegetation carbon in the Northern South America region for a selection of Earth System Models under a particular global warming scenario. The authors perform a grid point by grid point analysis, as well as a regional averaged analysis. It is shown that of the models which exhibit abrupt shifts, they primarily show localised shifts rather than region-wide shifts. Additionally, the authors introduce a quantity to potentially be used as an early warning signal, namely the temperature seasonal cycle amplitude.

I think the work at hand has value for the wider scientific community, however I feel a few points must be addressed before the manuscript is ready for publication.

1. My main issue is in regards to the use of temperature seasonal cycle amplitude as an EWS. It is not clear to me what the criteria for the EWS would be. For instance, how much of a rise in the amplitude needs to occur to indicate an approach to a tipping point? Is the increase significant compared to other localised increases in the signal?

2. Throughout the manuscript samples are used to illustrate behaviour (see for instance Figure 1h and Figure 3). It is not explained how these samples are chosen and if they exhibit characteristic behaviour of some class of grid points (e.g. those that exhibit a negative abrupt shift). Please consider being more transparent regarding the sample selection and how each sample compares to similar grid points in the respective models. This will help the reader to draw appropriate conclusions (and/or not draw incorrect conclusions) of the general model behaviour.

3. Line 122 mentions a critical threshold of CO₂ but then this is not further discussed in regards to the examples shown. Can you draw any connection to the behaviour seen in the models? I would suggest to either make the discussion of this more explicit or leave it

out, as it seems out of place currently.

4. There are quite a few abbreviations that are not explicitly defined or explained for the reader not familiar with the data and methods. For instance, lines 56 and 57 use terms "1pctCO2" and "PIControl" which although I was able to discern what they probably refer to, it would be better for the reader if these were explained. Also when discussing sensitivity increases the units K/K are used. Is this Kelvin per Kelvin? I don't quite understand the units here.

A few technical notes:

Line 79 - The colors red and purple are mentioned with no reference to a figure.

Figure 3 caption - Should black squares be black crosses?