



EGUsphere, author comment AC1
<https://doi.org/10.5194/egusphere-2022-82-AC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Reply on RC2

Isobel M. Parry et al.

Author 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-AC1>, 2022

We would like to thank the reviewers for their constructive feedback and appreciate their contribution to improving the article. Please see below for answers to the specific points raised in the reviewer comments. Reviewer comments are listed in italics and our responses are shown in bold font.

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?

Reply: For the purposes of this study, we primarily focus on demonstrating that grid points with higher sensitivities of seasonal temperature amplitude to global warming are more likely to feature a future abrupt dieback, as shown by the tipping risk in Figure 4i. We do not use the indicator to predict the timing of a tipping point, which would require setting a threshold for rise in amplitude. Future research is required on the applicability of this indicator as an Early Warning Signal (EWS) and therefore we will tone down our references to a new potential EWS in this paper.

Throughout the manuscript samples are used to illustrate behavior (see for instance Figure 1h and Figure 3). It is not explained how these samples are chosen and if they exhibit characteristic behavior 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 behavior.

Reply: Thank you for raising this point, the samples mentioned by the reviewer were examples chosen to illustrate several different forms dieback behaviour can take in the models. This will be clarified by editing the figure 3 caption as follows: Example time series of identified dieback shifts for three models...

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 behavior 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

Reply: Agreed. As suggested, we will leave out the term to allow a better flow of the discussion.

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.

Reply: We will address these concerns by writing explicitly that 1pctCO2 refers to a run where CO2 is increased by 1% per year and PIControl refers to a control run with a fixed pre-industrial CO2 concentration. The units K/K are indeed Kelvin per Kelvin and result from the sensitivity being the gradient of a linear regression fit to the amplitude of the temperature seasonal cycle against global warming, both of which have units of Kelvin.

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

Reply: We will clarify this in text by referencing Figure 4 on line 79.

Figure 3 caption - Should black squares be black crosses?

Reply: Thank you for spotting this. We will correct the caption for Figure 1 to black crosses instead of squares.