

## ***Interactive comment on “Recent changes in the dominant environmental controls of net biome productivity” by Barbara Marcolla et al.***

### **Anonymous Referee #2**

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This manuscript by Marcolla et al investigates global CO<sub>2</sub> fluxes during the carbon uptake and carbon release period and at different time-scales. Overall, the paper is very interesting, the method sound and the manuscript well written. However, I did find that the discussion/broader impact was essentially missing, making it difficult to see what the consequences of this work are for the community.

Here are some comments: 1) The title “Recent changes in the dominant environmental controls of net biome productivity” is misleading. This paper does not look at “recent changes” or what the history of environmental controls was, so I would choose a title that reflects the actual paper better.

2) Section 2.2 is a little laborious, even though the actual analysis method is obvious once the reader gets to the figures. I would suggest illustrating the described analysis

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with the evolution of a single pixel, it would help clarify the section.

3) Section 3 is a monstrous lock of text describing the figures one by one. The “Discussion” part of this section consists of a few sentences here and there. The paper would greatly improve if 1) The Section was split between “Results” and “Discussion” and 2) the “Results” section was split further into subsection for each type of analysis, just to help guide the reader through the overall progression of the analysis. I think that splitting the “Results” and “Discussion” would force the authors to put this work into perspective and draw conclusions about why this work matters for the different communities that might be interested in these results (flux tower, land surface modelers, global models, etc. . .).

4) In the Discussion section, it would also be helpful to include some limitations: how is the way vegetation is modeled influencing the results in one direction? Is the modeled know for modeling some aspects better than others? This would be a very valuable addition.

5) I would move Figures 3 to the Supporting Information since it doesn’t actually show new data, just the same data from Figure 2 plotted differently. It is still nice to see though, so the SI would be a good place for it. Similarly, Figures 4 and 5 show essentially the same data. I found Figure 5 more interesting though, so I would again move Figure 4 into the SI.

Edits: overall, the text was very well written. My only minor comment on the text is that at line 142, I would replace “As for radiation” with “Similarly to radiation”. The sentence is technically correct, but I found the use of “as” in this specific context to be confusing.

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