

Interactive comment on “Competing roles of rising CO₂ and climate change in the contemporary European carbon balance” by R. Harrison and C. Jones

Anonymous Referee #2

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General

The study is an effort to isolate the influence of climate alone vs. climate plus CO₂ increase on the European terrestrial carbon budget. This is an important issue given the significant contribution that the current terrestrial biosphere is making to sequestration of anthropogenic carbon emissions.

The results appear reasonable, but the lack of interpretation limits the value of the analysis. We are told that the interpretation is forthcoming in a subsequent paper, but even a few very general points here would help, specifically with regard to two issues.

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It would greatly help the interpretation if the reader could see how the climate has changed since 1948. Especially helpful would be time series plots of mean annual temperature and precipitation 1980-present, perhaps at the scale of the North, West, Central, East regions. At the very least an indication of the overall trend in temperature and precipitation is needed. The 10 years of climate data used in the spin-up (1948-1957) determines the equilibrium carbon pools, and sets the stage for the NEP trends during subsequent decades. Something should be said about how the climate of that decade relates to that in subsequent decades and to a 100 year average if possible.

Another point of interpretation is that it would be desirable to isolate the relative contributions of changes in biomass carbon and changes in dead carbon (soil + litter + CWD) to the NEP sources and sinks. Is the "climate only" source due primarily to changes in biomass or dead carbon?

Specific

P2393 L 16 Perhaps "of little use" instead of "not useful" since you are in essence making the comparison

P2394 L2 Some indication of what controls WUE in JULES would be helpful. Does stomatal regulation in JULES respond to CO₂ concentration?

P2393 L23 Be more specific about the mechanism of CO₂ fertilization. Is this resulting in more wood mass? More dead carbon?

P2395 L17 "CO₂ changes" is unclear. It could perhaps be rendered as "changes in spatial and temporal patterns of CO₂ concentration".

P2396 L14 Shouldn't it be "decreased" instead of "increased"?

P2389 L15 need comma after "climate"

P2389 L16 after "level" specify in parentheses what was used.

Tables and Figures

Figure 1. Indicate the sign convention for sources and sinks. Capitalize NEP. It would make more sense to have NEP units of $\text{gC}/\text{m}^2/\text{y}$.

Figure 3 needs axis label and units on the y-axis. The NEP is mislabeled as Net Environmental Productivity.

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