

## ***Interactive comment on “Competing roles of rising CO<sub>2</sub> and climate change in the contemporary European carbon balance” by R. Harrison and C. Jones***

**R. Harrison and C. Jones**

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We are now ready to resubmit our version of the manuscript 'Competing roles of rising CO<sub>2</sub> and climate change in the contemporary European carbon balance', which has benefited by consideration of the reviewer's comments we received. The manuscript has been much improved, and we thank the reviewers for their thoughtful comments. To receive 4 such positive reviews was very encouraging. We have also received considerable help with both the paper revisions and extra analysis and also in some new simulations from John Hughes, and so his name has been added to the author list.

Our responses to your comments are as described below (reviewer's comments in

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italics). The changes are often very minor, but where we have made a significant change we have described what we have added.

*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. 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.*

We have added some analysis, and figures, to discuss and show the driving climate data.

*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?*

We have added a discussion on the model's responses of carbon storage in its different pools.

*Specific*

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

Done

*P2394 L2 Some indication of what controls WUE in JULES would be helpful. Does*

*stomatal regulation in JULES respond to CO2 concentration?*

We have extended the model description section, and the reader is also referred to Cox et al 1998 for the process based mechanisms controlling stomatal conductance in JULES.

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

It results in more productivity, but this manifests itself in soil carbon storage rather than biomass. This is discussed in the text.

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

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

Done

*P2389 L15 need comma after 'climate'*

Done

*P2389 L16 after 'level' specify in parentheses what was used.*

Done

*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 gC/m2/y.*

Done, but we chose units of Tg C / y.

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

Done

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Interactive comment on Biogeosciences Discuss., 4, 2385, 2007.

S1815

**BGD**

4, S1813–S1815, 2007

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