

## ***Interactive comment on “Pathway dependence of ecosystem responses in China to 1.5 °C global warming” by Xu Yue et al.***

**Anonymous Referee #1**

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This vegetation model-based quantification of various components, including rising CO<sub>2</sub>, O<sub>3</sub> pollution, and warming, influencing carbon sequestration across terrestrial ecosystems in China is not less than being complete. Moreover, there are many places that are quite interesting to me and would appeal to the broad communities around ACP. For example, to supplement with diffuse radiation the CMIP5 data the authors compiled empirical relationships between total and diffuse radiation and identified the best one therein to derive the diffuse radiation. What's also interesting is that the authors drew a conclusion that the allowable carbon budget is higher than expected to achieve the 1.5 deg C goal under a stabilized pathway.

However, one major concern among other smaller ones is about land use change, which throughout the simulations with two different pathways the land cover is assumed

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fixed. The impacts of land cover change on the land carbon sink are undoubtedly tremendous. I argue it is more persuasive to include this in the quantification, especially considering the effort by the authors trying to offer numbers on allowable carbon budget.

Another concern is about scaling up leaf-scale  $\text{CO}_2$  fixation to the canopy. How have the authors accounted for canopy layers and diffuse radiation produced within the canopy?

Also, the authors compiled experimental studies on ozone impacts on plants in China, based on which sensitivity of differing PFTs are assigned and a high and low sensitivity scheme is implemented. The variability of plant-ozone sensitivity is undeniable, which can go all the way down to the species level, evidenced by experimental studies across the globe. I am wondering what magnitude of uncertainty would such a PFT scheme bring to the quantification of GPP dampening by ozone

Finally, a couple of spots of language errors are obvious: L64: changing 'in differing pathways' to 'of differing pathways' would be better. L164: 'respectively' should be added.

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