

The authors did an excellent job in addressing most of the comments (incl mine Ref#1). Some minor points remain.

We thank Ref#2 for their meticulous review of this manuscript in both rounds since it has led to great improvement of the quality of our manuscript. In the following, we have attempted to address each point to the best of our abilities. Line numbers correspond to those of the revised manuscript.

I apologise for the unclear last point in my previous comments / Ref#1. It relates to ‘The GPP showed a strong response to small changes in the yearly influx from atmospheric deposition. This mirrors modelling results that show a strong response of NEP to increasing N deposition (Zaehle and Friend, 2010; Dezi et al., 2010)’. Comparing effects on NEP=GPP-(Ra+Rh) with ones on GPP is comparing apples with oranges. If the authors want to make a point that nutrients (from deposition, fertilisation, etc) can affect GPP there are plenty of papers out there.

Following advice from Ref#2, we have replaced this sentence with the following: “*The GPP showed a strong response to small changes in the yearly influx from atmospheric deposition. This mirrors, e.g., observations of the response of forest photosynthetic capacity to N deposition (Fleischer et al., 2013) and simulations of the response of GPP in afrotropical forests to increases in P deposition (Goll et al., 2022).*” (L. 768 - 770).

Added description of CASTANEA: You could add information on the timestep, the numbers of canopy layers, and number of soil layers.

Information on the timestep (half-hourly and daily), the number of canopy layers (25) and number of soil layers (50) were added in parenthesis in the model description (L. 165 -175).

Ref#2: abstract: ‘a value in agreement with measurements in K-limited eucalypt stand’. It is still not specified what the measurements of GPP reduction for K deficient stands are. Besides, it is confusing as canopy GPP cannot be directly measured (it is inferred from eddy covariance measurement of NEE by subtracting night-time respiration). Commonly ‘estimated’ is used instead of ‘measured’ in such cases. I would suggest the authors pay attention to what is a direct measurement and what is inferred from a measurement. This comment also applies to the added text on origin of parameter values.

Thank you for your comment. GPP values were estimated by using NPP and Total Belowground Carbon Allocation methodology in this case. The word “*measurements*” was replaced by the word “*estimations*” in the revised manuscript (L. 8). In the parameter section of the revised manuscript (L.550-559), “estimated” was added to the description of the origin of parameters and a reference to Tabs S1. And S3 was added since these tables contain details on the origin of parameters.

Ref#2 suggested to add to the discussion effects of other nutrients like N or P which have been shown to affect Eucalypt productivity elsewhere (e.g. photosynthesis: <https://www.nature.com/articles/s41467-022-32545-0#MOESM1>), but it was not done by the authors. I think this deserves 1-2 sentences in the discussion of the manuscript.

We have now added in the discussion to include the effects of N or P on productivity: “*CASTANEA-MAESPA-K is first step in simulating the limitation of forest productivity by base cations. The importance of N (Du et al., 2020) and P (Hou et al., 2020) limitation of forest productivity has been recognised by their inclusion in terrestrial biosphere models (TBMs) (Goll et al., 2017). This has*

*allowed for the estimation of the N and P-limitation of net primary productivity at the global scale (Ellsworth et al., 2022). The importance of base cation limitation is increasingly recognised for tropical forests (Bauters et al., 2022) and the progressive inclusion of K, Mg and Ca in TBMs could provide clues on the response of forest productivity to increasing CO<sub>2</sub> levels.” (L. 723-729).*

There are a couple of typos e.g. ‘litterature’ on line 301.

This typo along with a few others were corrected throughout the manuscript (mainly added or missing letters).