

Responses to the editor

Manuscript ID : EGUSPHERE-2025-2869: Spatializing Net Ecosystem Exchange in the Brazilian Amazon biome using the JULES model and vegetation properties.

Dear Editor, Dr Marijn Bauters

Thank you for your thorough evaluation of our manuscript. We appreciate the constructive comments and suggestions. We also apologize for the shortcomings in the previous revision; the manuscript was not circulated internally in time, which affected its overall quality. We hope that this new version meets your expectations and reflects a clear improvement.

In this revision, we have addressed all comments, corrected grammatical errors and equations, and carried out language editing on both the manuscript and the supplementary material as requested. We have avoided overly long sentences and unnecessary repetition, and we have standardised the use of acronyms. We also corrected spacing, punctuation, and other minor issues throughout the text.

Below, we provide a detailed point-by-point response. To facilitate the identification of individual responses and actions, we have employed the following color-coding strategy.

- In black are the reviewer's comments.
- In blue are the author's responses.
- *In blue italic, the new text was added to the manuscript.*

We believe that this revision satisfactorily addresses the concerns raised by the editor, and we hope that the manuscript is now suitable for publication in *Biogeosciences*. We apologise once again for the shortcomings in the previous revision

Sincerely

Amauri Cassio Prudente Junior, Luiz A. T. Machado, and all co-authors.

Editor comments

"Parameters with light-limitation of photosynthesis, such as the case of alpha were also sensitive in other Dynamic Vegetation models, such as ORCHIDEE (Organizing Carbon and Hydrology in Dynamic Ecosystems), demonstrated by Zhu et al., (2025), working with a spatialization procedure of the carbon cycle in the Amazon region." --> This sentence is way too long, and needs rephrasing overall.

We agree with your suggestion and have rephrased the sentence accordingly. It has now been divided into two sentences while preserving its scientific meaning. Please see lines 319–322.

"Parameters related to light-limitation of photosynthesis, such as the case of alpha were also sensitive in other Dynamic Vegetation models. Zhu et al. (2025), working with the ORCHIDEE model in the Amazon region, demonstrated high sensitivity in the parameter alpha self-thinning, which controls tree mortality induced by light competition."

"Despite the difference in parametrization of these two different models, similarities of the parameters indicate relevance of nitrogen and radiation to reproduce carbon fluxes in tropical trees" --> it's unclear in this sentence what you refer to with 'similarities of the parameters'.

We agree with your suggestion and have rephrased the sentence. The observed similarities are linked to the sensitivity of two parameters in the ORCHIDEE and JULES models associated with light and nitrogen limitation. Please see the revised sentence in lines 726–729.

"Studies on spatializing carbon fluxes in the Amazon using process-based models are scarce; however, Zhu et al. (2025) reported similar sensitivities in ORCHIDEE model parameters. The similarities were related to light and nitrogen limitations and highlighted flux heterogeneity when accounting for vegetation differences. Despite some similar conclusions, the methodologies differed substantially."

"... regarding the spatialization carbon fluxes ..." -> 'spatialization of carbon fluxes'

We agree with your correction and have revised the sentence accordingly. Please see lines 726–728.

“Studies on spatializing carbon fluxes in the Amazon using process-based models are scarce; however, Zhu et al. (2025) reported similar sensitivities in ORCHIDEE model parameters.”

-"The model was progressively updated , en"--> don't use spaces before a comma

We agree with your correction and have revised the sentence accordingly. Please see lines 58-60.

“The model was progressively updated, enhancing the number of plant functional types (PFT): five PFTs (HadGEM3, Clark et al., 2012), nine PFTs (Harper et al., 2016), more recently 13 PFTs (UKESM1, Harper et al., 2018), and additionally four non-vegetation land cover types.”

“Therefore, this set of flux towers includes multiple kinds of upland forests communities, which extend through” --> extend to

We agree with your suggestion and have revised the sentence accordingly. Please see lines 113-114.

“Therefore, this set of flux towers spans diverse upland forest communities, which cover more than 80% of the Amazon biome (Moraes et al., 2021).”