Biogeosciences Discussions

Biogeosciences Discuss., referee comment RC2
https://doi.org/10.5194/bg-2021-255-RC2, 2021

Comment on bg-2021-255

Anonymous Referee #2

Referee comment on "Predicting mangrove forest dynamics across a soil salinity gradient using an individual-based vegetation model linked with plant hydraulics" by Masaya Yoshikai et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-255-RC2, 2021

Yoshikai et al. present a well-articulated analysis of a model development effort centered on capturing mangrove ecosystem structure and long-term carbon storage using the individual based dynamic vegetation model SEIB-DGVM with a newly incorporated plant hydraulics model following Xu et al. 2016 and a salinity regulation component following the theoretical works of Perri et al. 2018 and 2019. Impressively, the new mangrove function model also accounts for the influence of nutrient availability (specifically nitrogen) alongside plant hydraulics. The new model proved capable of convincingly reproducing the behaviors of two species of mangrove along a soil salinity gradient in Japan. On the whole, the manuscript presents a strong, timely, and necessary contribution to DGVM and Earth system modeling, given the unique dynamics of mangrove ecosystems and their outsized influence on the carbon cycle. I have only minor questions and suggestions for the authors as they ready their work for publication.

L160: The introduction of an aboveground root biomass carbon pool is a particularly useful addition to this model and other mangrove/cypress systems. I am curious how the aboveground root biomass was accounted for allometricaly? Was this related more strongly with stem or crown diameters?

L195: Was the sapwood allometric relationship specific to the two mangrove species simulated in this study or is this a general equation?

L203: How was LAI measured in this study? Were different values used for the different species?

Table 1: It looks like there are a few sources missing (e.g. Dcrown,con and Hcon) what values were used for these and were they assumed or developed from literature or field

observation?

L240: How were the values for critical leaf water potential determined? Were these values optimized?

L350: It would be useful to restate the present-day average salinity for comparison's sake.

L367: More discussion of the simulated *B. gymnorrhiza* mortality would be useful and interesting. Was there a programmed lifespan that triggered this event?

L394: A figure citation here where this comparison is shown would be helpful.

L510: At what time increment is the optimization of the DBH-H adjustment applied?

L521: Does the increase in root biomass refer to both above and below ground roots or are the aboveground roots lumped into the shoot category in this scenario?

L579: It would be nice to see the code released with a DOI in a Zenodo repository or the like given the relevance of this modeling effort to the broader community of models.

Finally, there are a few instances of minor grammatical errors (subject-verb agreement and plurals versus possessives) that could be addressed through the use of a grammar editing service.