



EGUsphere, referee comment RC1
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Comment on egusphere-2022-835

Anonymous Referee #1

Referee comment on "Modeling of non-structural carbohydrate dynamics by the spatially explicit individual-based dynamic global vegetation model SEIB-DGVM (SEIB-DGVM-NSC version 1.0)" by Hideki Ninomiya et al., EGU sphere,
<https://doi.org/10.5194/egusphere-2022-835-RC1>, 2022

The study addresses an interesting and additional angle in vegetation modelling - NSC dynamics across different organs. As such, the study could make a worthwhile contribution to readers of EGU sphere, I believe.

That being said, the modelling exercise shows several logical flaws and conceptual inconsistencies, at least in my eyes. While I understand that a model 'validation' based on observations is an important procedure to show that the model can reproduce reality to some degree, the main findings, i.e. the modelled NSCs showed good agreement in seasonality with the observed NSCs at four sites, are a matter of model parameterization and not a proof of model precision. Being an ecophysiologicalist, not a modeller, I may be wrong, but it appears to be logic that a model constrained by field data will produce simulations that fall within the range of that data.

Even more important, I believe that the central piece of the study, the model validation, is a red herring and does not provide show that this augmented model produces more realistic simulations than simpler ones. In particular, it would be really interesting to see whether the model can achieve what the authors claim in the discussion, i.e. "the model has a high potential to simulate various biotic effects on terrestrial ecosystems". Several studies during the last decade or so (e.g., Stich et al. 2008 GCB, Wu et al. 2018 J Climate, Hartmann et al. 2022 ARPB) have shown that large-scale vegetation models have substantial difficulties in simulating stress responses to drought and heat, and cannot reproduce impacts of biotic disturbances on vegetation dynamics. If, as the authors claim, this model has a high potential to do just that, it would be great if their study could show it. This would then really be a substantial contribution to modelling science.

I also found that authors appear to confound NSC with carbon storage, which are not interchangeable terms. Some NSC, in particular starch, play a role in carbon storage, whereas other NSC, like soluble sugars, are primary metabolites of immediate use. They are needed in physiological functions and are thus not really storage that is put aside for

later use. Maybe this confusion also led to the somewhat uncommon allocation scheme shown in Fig. 2. Whether my confusion about the carbon flow from trunk to leaves to roots shown in that figure comes from the lack of a thorough explanation in the text of figure caption, I cannot say, but I am concerned that this is a documentation of the authors' misunderstanding of C allocation in real plants.

Please find more comments in the attached annotated pdf document.

Please also note the supplement to this comment:

<https://egusphere.copernicus.org/preprints/2022/egusphere-2022-835/egusphere-2022-835-RC1-supplement.pdf>