

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2  
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## Comment on hess-2021-265

Anonymous Referee #2

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Referee comment on "Does maximization of net carbon profit enable the prediction of vegetation behaviour in savanna sites along a precipitation gradient?" by Remko C. Nijzink et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-265-RC2>, 2021

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With great interests, I have read through this interesting paper to understand vegetation dynamics along a precipitation gradient. I think it is publishable but subject to some revisions. Here I list some of my major concerns:

1. Hypothesis 1: One of my major concern concern it that the TBMs (or LSMs) in Whitley et al. (2016), which are designed for global-scale, long-term climate projectoin models, are optimized to make a fair comparison to VOM, though they have more specific vegetatiion parameters.
2. Hypothesis 2 is too model specific. Does any other TEMs use this paramter? or what would other models learn from this? or does this hypothesis have any implication for plant adaptation or optimality?
3. Hypotheses 3 is also model specific. It depends on model representations of the links between LAI, vegetation cover, light transfer and absorption, assimilated carbon allocation. This mansusript does not clear describe how these processes are represented in VOM.
4. Hypothesis 4 shoul be the focus of this manuscript. If this would have been well tested, it is enough to be a good paper. However, this would be greatly affected by the rerepresentation of subsurface soil moisture profile and further likined to capillary fringe. I am wondering why the authors did not use the results of Schymanski et al. (2015). So I strongly suggest to include groundwater effects.
5. It is not clear to me (I have to read also Schymanski et al., (2015)) that how VOM is

optimized. "Maximizing the NCP"? what is the maximum NCP? how do we know the maximum NCP? Please expand Section 2.2.4 a bit to describe this process in model detail.

6. Section 2.3.3, the cost factor for water transport (crv) should be described here. If not reading Schymanski et al., (2008), I did not understand its meaning.

7. Conclusions: please generalize these conclusions through discussions. I do not care much about how VOM is better or not or how to improve it but more about how to implement improved understandings through VOM studies into the current TBMS that are widely used in IPCC climate projections.