

Interactive comment on “P-model v1.0: An optimality-based light use efficiency model for simulating ecosystem gross primary production” by Benjamin D. Stocker et al.

Anonymous Referee #2

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Review for Stocker et al. GMD

Stocker et al present, calibrate, and evaluate a GPP model that is built off a previously published P-model. From the way the manuscript is structured it seems that the new additions to the P-model are the temperature dependence and the soil moisture stress (but this isn't clear from the abstract or the introduction). The authors should be commended for developing the model into an R package, using the FLUXNET2015 data in a way that recognizes the GPP is modeled product with considerable uncertainty (i.e., by analyzing multiple partitioning methods), and for providing throughout background for the modeling framework. Overall, the manuscript is well-written.

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My recommendations for improvements are:

Be clearer about what is new to this version of the P-model. Based on the components of the model that are in the introduction vs. methods, I would assume that the temperature dependence and the soil moisture stress are the new components.

Since the modeling framework depends on the SPLASH model, more detail is needed about that model. How many parameters does it require and how where the SPLASH parameters determined? Any parameters that it requires should be added to Table A6.

It seems that the evaluation set included the calibration set plus additional sites. A more robust evaluation would use an independent set of sites for evaluation. I recommend presenting results for the set of independent sites to help understand how the model works out-of-sample.

The variable l_{abs} is not defined in the text (only in equations)

I recommend having the main text or the SI present the full model used predict GPP in its entirety. While I can piece it together across equations, a combined equation would help me understand the model in its complete form

The * in Table 1 is not defined (I think it is the footnote).

More detail is needed about the comparison to other GPP products described in the first paragraph of the discussion. Were they using the same evaluation dataset? Where their evaluations on out-of-sample sites or the same sites used in calibration? Also, it seems the P-model is only marginally better than the VPM and slightly worse than the annual MODIS GPP. Please provide more information and context for interpreting these comparisons.

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2019-200, 2019.

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