

Interactive comment on “Identification of a general light use efficiency model for gross primary production” by J. E. Horn and K. Schulz

Anonymous Referee #2

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The authors described their processes for the formulation of a light use efficiency (LUE) model, and quantified and analyzed model parameters across many flux tower sites in great detail. However, the paper has some major flaws, including:

(1) The model formulation might not be appropriate to address the issues intended. The author used the additive approach to represent the impacts of moisture and temperature on LUE. This is just one of the many possibilities. The multiplicative approach mentioned by the authors is another one. Yuan et al., 2007 used the the Liebig law (the most limiting factor controls LUE) in GPP model (The authors wrongfully referred Yuan's paper as multiplicative approach, see p7691 lines 5-6). The results on the importance of moisture and temperature may well be dependent on specific model formulations. For example, using the Liebig-law approach, Yuan et al (2007) found that

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temperature only controlled the start and end of the growing season, and LUE was solely controlled by moisture across all sites. More reliable approaches should be used to attribute the impacts of different environmental factors on LUE. Optimal mathematical solutions do not always mean that the solutions really represent the underlying mechanisms. Therefore, the results generated from this study are very questionable.

(2) Most of the comparison and discussions about LUE values throughout the paper was invalid. It is meaningless and incorrect to compare LUE values derived from two different equations/models. For example, even if use the same $f(T)$ and $g(W)$, the additive approach (this study) would generate smaller LUE values that those generated from using a multiplicative approach (because $f(T)$ and $g(W)$ are usually smaller than 1).

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