

Interactive comment on “Calibration of the Crop model in the Community Land Model” by X. Zeng et al.

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The authors describe their application of a parameter calibration method to their newly-developed crop component of the Community Land Model. They show that this MCMC-based parameter calibration successfully improves the model-data fit. Their methodology is not particularly novel, but the authors show that this standard parameter calibration method can be successfully applied to this complex model. Overall, the study seems to be executed well, and the paper is well-written.

I have one significant concern with the methodology: If I understand right, the authors adjust 6 parameters to fit just 10 values. It seems to me that they would risk over-fitting the data since the number of degrees of freedom is close to the number of data points. I would like to at least see this addressed somewhere in the paper.

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Additional comments follow:

1. The text in section 1 before 1.1 feels like an introduction. I would reorganize the headings so that this is “1 Introduction”, then section 2 becomes “The CLM-Crop model”, which begins with what is currently 1.1 (which will be renumbered to 2.1).
2. P 385, L 13: How is GPP derived at this site?
3. P 385, L 16-18: What is the frequency of biomass measurements?
4. P 385, L 19-27: A number of details are unclear here. These are generally addressed later in the paper, but should be addressed here: (1) did you take the max and slope of all of these variables? (2) describe the computation of slope in more detail – both from the model and from observations; (3) is the end result a single slope and single max value per each variable per year?
5. Section 1.4: What parameters were used for spinup? I assume you didn’t redo the spinup each time you changed the parameters? This is a tricky aspect of calibrating parameters for a model with such a long spinup time, and this issue should be addressed here.
6. P 388, L 12: perturbed by how much?
7. P 388, L 20-21: (1) When you say max(NEE), do you mean the most negative value?; (2) when you say the slope from planting to the max value, is the value at planting 0 for everything except NEE?
8. P 389, L 3-11, and Fig 1b: Particularly for parameters with large standard deviation, it is helpful to separate whether this is due to their being unconstrained by data, and/or being correlated with other parameters. To this end, it would be helpful to see correlation plots between at least some pairs of parameters, and/or a correlation matrix in tabular form.
9. P 389, L 23-27, and other parts of the paper: Simulations probably need to be

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redone with corrected use of the Sacks et al dataset, as per my comment on the Drewniak et al. paper describing CLM-Crop

10. P. 390, L 2-5: I don't understand the connection between this and the rest of section 3.3

Interactive comment on Geosci. Model Dev. Discuss., 6, 379, 2013.