

Interactive comment on “Bayesian inversions of a dynamic vegetation model in four European grassland sites” by J. Minet et al.

Anonymous Referee #2

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In this manuscript, the authors used a Markov Chain Monte Carlo sampler and eddy covariance data to invert key parameters in the CARAIB model at four European grassland sites with different assumptions of the data errors. The key findings of the paper including the discussions of the homoscedastic and heteroscedastic error models, the analysis on model data mismatch, and the discussions on cross-sites parameters are particularly useful for understanding the CARAIB model and the eddy flux data. Overall the manuscript is well organized and written. I just have some minor concerns before its publication.

1. I think the most interesting part of this manuscript is the discussion of the heteroscedastic measurement errors (Section 4.2). More discussions on why the current linear heteroscedastic model doesn't work well would be plausible. I think your

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winter-summer discussion is a good start. (page 1815, line 10-14).

2. A general outline of how the inversion works at the four sites is suggested to include at the start of Section 2.4, which should help on a clear technical road map of the paper.

3. Section 4.4 could be merged into section 4.3 but should be more concise. For example, the length of discussion on the difference of the parameter values across sites could be reduced. Discussions on how you learn from your multi-site Bayesian inversion study to design a common parameter set across sites and the advantages and disadvantages of the two options you gave at the end of section 4.4 should be extended. Otherwise they should be removed as they look too thin. Your choice. Kuppel et al., 2012 could be a potential reference.

Kuppel, S., Peylin, P., Chevallier, F., Bacour, C., Maignan, F., and Richardson, A. D.: Constraining a global ecosystem model with multi-site eddy-covariance data, *Biogeosciences*, 9, 3757–3776, doi:10.5194/bg-9-3757-2012, 2012.

4. Typo error: H02 should be HO2 in the title of Table 5

5. The unit of ET should be mm day⁻¹ throughout the manuscript

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