

***Interactive comment on* “On the use of the post-closure method uncertainty band to evaluate the performance of land surface models against eddy covariance flux data” by J. Ingwersen et al.**

Anonymous Referee #1

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General comments

This manuscript deals with the question of how to account for the typically non-closed energy balance in observational data when comparing eddy-covariance data with modelled energy fluxes. This topic is certainly of interest for the readership of Biogeosciences because it addresses a problem that concerns every researcher who uses eddy-covariance data for investigations on biosphere-atmosphere exchange. The authors propose to use a so-called “post-closure method uncertainty band (PUB)” instead of choosing some sort of flux adjustment method of which nobody knows whether it is appropriate or not. Already in the abstract, the authors stress that “working with only a single post-closing method might result in severe misinterpretations in model-data

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comparisons”, and the results presented in Fig 7 – 10 and the corresponding discussion clearly support this assessment. For the sake of completeness, it would be good to include the findings of the following two studies in the discussion section:

Wohlfahrt, Georg, Irschick, Christoph, Thalinger, Bettina, Hortnagl, Lukas, Obojes, Nikolaus, and Hammerle, Albin. Insights from Independent Evapotranspiration Estimates for Closing the Energy Balance: A Grassland Case Study. *Vadose Zone Journal* 9(4), 1025-1033. 2010.

Charuchittipan, Doojdao, Babel, Wolfgang, Mauder, Matthias, Leps, Jens Peter, and Foken, Thomas. Extension of the averaging time in eddy-covariance measurements and its effect on the energy balance closure. *Boundary-Layer Meteorology* 152, 303-327. 2014.

The first paper compares eddy covariance fluxes with measurements from lysimeters and comes to the conclusion that it would be plausible to adjust fluxes by preserving the Bowen ratio. The second paper proposes an energy balance closure adjustment which attributes a larger portion of the residual to the sensible heat flux.

Considering the lack of knowledge about the origin of the systematic error leading to and unclosed energy balance, the proposed PUB method describes the uncertainty of the flux estimate appropriately, and I completely agree with the conclusions. Therefore, I recommend to accept this manuscript for publication in *Biogeosciences* with minor corrections.

Minor comments

P16914, I10: it should probably read “measurement errors” instead of “measuring errors”

Foken (2008) is missing in the reference list.

P16928: In his short comment, Albrecht Neftel questions the validity of the data presented by Wolf and Laca (2007), and I agree with him that the paper shows “some

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surprising and counterintuitive results". The authors did not comment on the questions by Neftel and a final version of the paper has never been published in ACP. Moreover, scalar similarity works normally quite well in the high-frequency range. So, I would suggest to drop this reference as it is also not necessary for any further conclusions.

Interactive comment on Biogeosciences Discuss., 11, 16911, 2014.

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