

Interactive comment on “Drivers of long-term variability in CO₂ net ecosystem exchange in a temperate peatland” by C. Helfter et al.

Anonymous Referee #1

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General comments: The paper by Helfter et al. presents a long-term study of carbon flux exchange at a peatland site. With their study, Helfter et al. make an important contribution in advancing our knowledge of land-atmosphere carbon exchange, in particular as peatland sites are generally underrepresented in carbon-exchange studies. The paper is well written and results are presented in a clear way.

One point caused a bit of confusion. Section 3.3 discusses the effects of dry periods on CO₂ exchange. The drought in 2013 was the biggest but is not mentioned in the beginning and in the tables where droughts are discussed. You have to read carefully to understand that it belongs to the drought assessment and it is not obvious for the reader how it fits to the rest. I understand that the 2013 drought shows different patterns and the authors offer plausible explanations, why. However, to obtain an overview about

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the different droughts and their impacts it would be better if 2013 is mentioned together with the others at the beginning of section 3.3 and maybe also in table 2.

Specific comments:

P14985, I20: "Reco and GPP ... respond similarly, although not necessarily with the same magnitude, to extreme events such as drought": This effect can also be reproduced with global vegetation models (Zscheischler et al. 2014).

P14989, I9: "University of Jena": should be "Max Planck Institute for Biogeochemistry, Jena"

P14990, I14: define what the values denote after plus-minus sign the first time it appears

P14993I, I7: C missing in the unit? Consider transforming $\mu\text{mol m}^{-2} \text{ s}^{-1}$ into $\text{gC m}^{-2} \text{ s}^{-1}$ for better comparison with the other units in the manuscript

Zscheischler J., Michalak A.M., Schwalm C., Mahecha M.D., Huntzinger D.N., Reichstein M., Berthier G., Ciais P., Cook R.B., El-Masri B., Huang M., Ito A., Jain A., King A., Lei H., Lu C., Mao J., Peng S., Poulter B., Ricciuto D., Shi X., Tao B., Tian H., Viovy N., Wang W., Wei Y., Yang J. & Zeng N. (2014). Impact of large-scale climate extremes on biospheric carbon fluxes: An intercomparison based on MsTMIP data. *Global Biogeochemical Cycles*, 28, 585-600.

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