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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Extending periodic eddy covariance latent heat fluxes through tree sapflow measurements to estimate long-term total evaporation in a peat swamp forest" *by* A. D. Clulow et al.

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The study was motivated by the need to estimate ET from Peat Swamp Forest (PST) without the high-cost of continuous EC maintenance. The goal is to use overlapping sap flow, EC and meteorological measurements to derive empirical equations for seasonal ET.

I found the paper rich in observations and the results useful for the site and interesting to the general audience of HESS. But it is overly cluttered with too many analyses that

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are poorly conceptualized and not essential (such as the crop factor), which distracts the readers from the essential messages such as that sap flow from a single emergent tree can represent fairly well the total ET in this wet site (no water limitation).

My main suggestion is to condense the paper and focus on the key messages. There are too many different forms of ET, and the reader can get lost regarding the purpose and the concepts behind them. For example, I would expect to see three ET terms, (1) the familiar potential ET (PET) which measures ET without water stress, (2) the EC-measured ET which can be taken as actual ET (AET) within the margins of energy closure, and then (3) plant transpiration which is a portion of the AET. Establishing the relations among the three will be really useful for understanding the process-controls, and deriving a practical method to filling data gaps.

Then the PET can be calculated with Penmann-Monteith equation directly (you have all the variables), instead of using the FAO version which is designed for agricultural crops, with assumptions that do not apply at the site here and causing difficulties in interpreting its meanings. Perhaps there are reasons not to use site-specific parameters, but they are not given.

Next, instead of using the crop factor, it would be more straight-forward to compare PET with AET to understand atmospheric vs. land controls on the AET. Perhaps the crop factor accomplishes this but it is not clear what it means, e.g., Kc>1 vs. Kc<1, without consulting Allen et al. A comparison of PET vs. AET through the daily and seasonal course can yield insights on the control of ET at the swamp forest where water limitation is likely much reduced compared to upland sites. A question frequently asked is, do swamp plants transpire at potential rates? This study can potentially shed lights on that.

Minor suggestions include:

(1) Have an appendix to list all the variables and definitions, as well as the abbreviations – it is hard to keep track of them all throughout the reading.

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(2) Combine tables 1-3 into table 1. They have the same format, but for 3 sampling periods, and can be combined into one table easily.

(3) Similarly, combine figures 8 with 9, and 10 with 11.

(4) Explain the concepts of the Regression Tree – what it tells us and what the numbers mean in Fig.13

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 13607, 2014.