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Discussions

Interactive comment on "Actual evapotranspiration and precipitation measured by lysimeters: a comparison with eddy covariance and tipping bucket" *by* S. Gebler et al.

Anonymous Referee #1

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The paper "Actual evapotranspiration and precipitation measured by lysimeters: a comparison with eddy covariance and tipping bucket" by Gebler et al. is appropriate for the topics of Hydrology and Earth System Sciences. The authors compared three different methods for deriving actual evapotranspiration (ETa), including the weighable lysimeter (LYS) method, the eddy covariance (EC) method and the potential crop evapotranspiration according to FAO and then compared two different methods for deriving precipitation, including lysimeter method and tipping bucket. The paper is generally well organized, but further clarification is needed.

In the introduction part, the authors reviewed some literature on the topics of compar-

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ison between EC method and LYS method. The findings of previous literature include (1) A strong underestimation of EC-ETa compared to LYS-ETa is probably due to strong advection and vegetation status; (2) Errors of precipitation measurements by tipping buckets of rain gauges are caused by wind and different precipitation types (rime, dew, fog, drizzle, snow, sleat, etc.) The current study draws the similar conclusions as those finding in previous literature. Thus the novelty and scientific merit of the current paper need more justification.

Minor comments:

1. Table 3. Two columns should be better for presenting Sum and Mean.

2. Page 10, Line 12. The meaning of Sres,i in equation (1) and Sdat,i in equation (2) should be explained.

3. Page 12, Line 16-Line 19. "For the analysis of P and ETa, we compared the estimations of the TB and the eddy covariance method with the mean of six redundant lysimeter devices (unless specified otherwise) assuming that the lysimeter average is the most representative for estimating precipitation and actual evapotranspiration".

This sentence is confusing for readers. My understanding is that the author wants to first compare precipitation derived from lysimeter and from tipping bucket and then compare evapotranspiration derived from lysimeter and from eddy covariance method. I suggest the author to rewrite this sentence (maybe separate into 2 sentences) and clarify two objectives clearly.

4. Page 19, Line 14-16. A comma is needed before "the relationship . . ." And a table showing the values of wind speed and the precipitation differences or a figure showing the relationship is preferred.

5. Page 21, Line 1. Can the authors explain why evapotranspiration was limited by energy not by water according to the result that ETa-EC is close to ETc-FAO? The explanations on physical mechanisms should be elaborated.

HESSD

11, C6057–C6059, 2015

6. Page 23, Line 5. “positiv” should be “positive”.

7. In Fig.7. The grass height evolution trends for lysimeter field and EC station are different from July to Sep. Will this cause differences of measured evapotranspiration by the two methods and how?

8. In Page 23, Line 13-16. The author mentions that the evapotranspiration differences between ETa-EC and ETc-LYS and grass length differences show a good correlation (R2=0.52) during the period from May 24 to June 24. From Fig. 7, we can only see that the grass height evolution trend is the same from May 24 to June 24. Can the authors present a plot with the evapotranspiration difference as y-axis and grass length difference as x-axis?

9. In Figure 5, I would like to see the differences between P-LYS and P-TB rather than the absolute value P-LYS and P-TB.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 13797, 2014.