

Interactive Discussion – Reply on comments of anonymous referee #1

We thank the referee for his/her constructive comments. He/she also provided a number of specific remarks that we will address in detail. For clarity, we formatted the referees' original comments in blue italic, while our responses are formatted in black.

General comments:

In the introduction part, the authors reviewed some literature on the topics of comparison 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, sleet, 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.

We will add additional motivation to the introduction part in the revised version. In literature, there are only a few comparisons between ET measured by lysimeters and ET measured by EC-method with contradictive conclusions. Therefore, further comparison of ET measured by lysimeter and EC is of interest.

In the cited reference the role of dew was only investigated for a few days. Our study explores the contribution of dew to the total precipitation signal for a much longer period of one year. In addition, we investigate the background of the precipitation differences between lysimeter and tipping bucket in more detail than in previous studies. We are able to do so because we use high temporal resolution lysimeter data. In general, lysimeters are rarely used for measuring precipitation because of high costs in acquisition and maintenance. The detailed analysis also reveals the contribution of snow to the total precipitation difference between lysimeters and tipping bucket.

The lysimeter data in our study is additionally compared to redundant lysimeter systems with similar setup and vegetation cover to investigate the uncertainty for ET and precipitation measurements.

Minor comments:

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

We will adopt the changes as suggested by the reviewer.

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

Sorry, this erroneously disappeared from the manuscript and will be corrected.

- 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.

Thank you, we will modify this in the suggested way.

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.

Thank you. We will change this and add an additional figure for illustration.

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

We will add some additional explanation to clarify this.

6. Page 23, Line 5. "positiv" should be "positive".

We will correct this.

7. 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?

We will better explain the link between the grass length at the lysimeter field, the EC station and the measured ET. What might have been confusing is that grass height at the lysimeters themselves was different from the grass heights measured at the lysimeter field. During most of the time, the grass heights at the lysimeter field and the lysimeters themselves were in correspondence. However, in August 2012 the grass of the lysimeter field was cut, but the grass at the lysimeters themselves not. Camera images also corroborate this. Therefore, in August 2012 grass height was higher at the lysimeters compared to the surroundings, and the grass height difference is related to the measured ET differences. We will explain this in more detail and more precisely in the revised version of the manuscript.

8. In Page 23, Line 13-16. The author mentions that the evapotranspiration differences between ET_a-EC and ET_c-LYS and grass length differences show a good correlation ($R^2=0.52$) 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?

Unfortunately, only three measurements of grass heights are available at the lysimeters themselves, but in general grass length at the lysimeters is in correspondence with grass length of the lysimeter field. However, in August 2012 there was a difference. In the revised version of the manuscript we will approximate the grass height at the lysimeters themselves for the complete period, in order to clarify the manuscript. In this context, the camera surveillance

system was also helpful. This reconstruction of the grass length at the lysimeters themselves for August 2012 will help to make the plot as suggested by the reviewer.

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.

The differences are already plotted in the figure (see upper part of figure).