

Interactive comment on “Variability in riparian zone potential and actual evapotranspiration in a 1st order agricultural catchment in Southern Ontario, Canada” by R. M. Petrone et al.

Anonymous Referee #4

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In this paper, the authors analyse experimental data of actual and potential evapotranspiration acquired over two sites located in riparian areas of an agricultural catchment in Southern Ontario during the summer 2003. The methodology is based on weighing lysimeters and meteorological measurements to assess AET and PET. From these estimations, the Priestley and Taylor coefficient have been calculated (ratio of AET and PET) which depend mostly on soil moisture availability. The AET and PET have been compared on the two measurement sites and the differences observed are first explained by the different soil properties which lead to different soil water storage capacities and consequently to different AET values and secondly to the different turbulent regimes (differences in wind speed and direction) due to the surrounding vegetation which lead to different PET values.

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This work is interesting because it provides new experimental dataset over riparian zones and permitted to show the spatial variability of AET and PET and to quantify it. However, it suffers from many problems listed below :

First, the dataset include only one point measurement for the precipitation and assume that it is the same on the two sites. This assumption is strong and need to be justified. The spatial variability of AET is attributed to soil moisture differences linked to the different soil properties of the two experimental sites. Why should it not be attributed to spatial rainfall heterogeneity ?

I am surprised to see that the ground heat fluxes are then the same on the two sites. This is not in agreement with the differences observed in soil moisture and soil properties. The problem is that the plots show only daily values which are not sufficient for the comparison.

Another problem is that the measurements errors are never discussed. Then it is difficult to convince the reader that the differences are significant given the known uncertainties on the measurement of micrometeorological variables and hydric budget terms. I think that an analysis error is essential in an experimental work and necessary to strengthen the results and make this paper suitable for publication.

Other secondary problems :

Why are there so few AET measurements over the experimental period ?

What is the size of the lysimeter box ? it is written in the text 1090cm³, is it correct ? It seems to me too small to make a precise measurement of AET.

The references for PT coefficient are not well presented , it can be misunderstood that the PT coefficient is larger in arid regions than in humid climate. It must be precised that it is in the case where soil moisture does not limit AET(page 273).

In paragraph 4.1, there is a confusion between evapotranspiration and transpiration. It is asserted that soil evaporation can be neglected. Can the authors justify this assertion

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The text on the axis of figure 5 is not readable.

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