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Hydrology and Earth System Sciences Discussions

Interactive comment on "Partitioning of evaporation into transpiration, soil evaporation and interception: a combination of hydrometric measurements and stable isotope analyses" *by* S. J. Sutanto et al.

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Anonymous Referee #1

General Comments: We would like to thank reviewer 1 for the valuable suggestions and comments. We agree with the suggestion in the general comment to focus only on the partitioning of evaporation using stable isotopes and HYDRUS-1D modeling. We will exclude the Penman-Monteith method from our comparison, and will only use it

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as an upper boundary verification of our results. On the other hand, we will keep the water balance method in our analysis since the water balance method can be used for a good comparison. The water balance method is not equal with mass balance since the water balance method measures the total water looses from the lysimeter as evaporation. Meanwhile, isotope mass balance separates evaporation fluxes based on flux-masses and isotope values in every evaporation flux. In the discussion section we will focus more on the isotope mass balance and HYDRUS-1D model.

Specific Comments: We will change our abstract according to the new comparison between the results of the isotope mass balance approach and the HYDRUS-1D model application.

We will elaborate Section 2.4.2 to give more detailed information on the isotope fractionation method (both the equilibrium and the kinetic method). We use the formula for kinetic and equilibrium fractionation of isotopes from Majoube, 1971 which is adopted from Craig-Gordon model. These fractionations have been added together in the mass balance analysis to calculate the soil evaporation rate as Xv = εeq + εdiff in formula number 8 (we will change into Xe for evaporation terms). We used the weighted average of the isotope values in every layer for the isotope mass balance calculation. The formula will be added in the paper.

Section 2.5.1 will be rewritten. We will change Equation 5 accordingly and label percolation with L. We will also split E into Ei, Et, Es.

Section 2.5.2. We will shorten Section 2.5.2, since we do not use the results of the Penman-Monteith calculations as a comparison anymore. However, we prefer to shortly explain the PM-equation, because we use it as an upper-boundary verification.

Section 2.5.3 will be elaborated with more detailed information on the HYDRUS-1D modeling.

Section 2.5.4: We will improve our methodology section on the isotope mass balance.

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We will emphasis the unknown and measured terms.

Section 2.6: For the interception analysis, we used the net precipitation values, where we subtracted the intercepted water by the grass from the precipitation. To be clear, we are talking about interception by grass and not by canopies. We assume that the net precipitation that infiltrates into the soil is not affected by isotope fractionation. A study from Gehrels et al. (1998) also showed that interception will not play a significant role in isotope fractionation for lower vegetation types. Equations 15 to 18 are taken from the HYDRUS-1D manual (Simunek et al., 2008). This formula shows how HYDRUS-1D estimates the interception. We will explain this in more detail within the manuscript.

Results and Discussion: A more detailed discussion about the HYDRUS and isotope mass balance will be addressed in the paper. A comparison between two methods can only be analyzed after we took an isotope sample and unfortunately not after every rain events. The temporal resolutions of the isotope mass balance are different. We will explain this in the paper.

Figure 2 and 3: We agree and will remove Figure 2. Figure 3 will therefore be split into two figures.

Figure 5 will be reworked by adding all of the water fluxes of both results in a graph. This will give a clear presentation and an improved comparison of the results.

The information in Figure 7 top will be reduced to make it easier to read. The four elements in this figure are the Δ18O of the drying front from four rain events. This information will be added to the manuscript and caption of the figure

We will change Figure 8 accordingly.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 3657, 2012.