

Interactive comment on “Large-scale lysimeter site St. Arnold, Germany: analysis of 40 years of precipitation, leachate and evapotranspiration” by N. Harsch et al.

Anonymous Referee #4

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General remarks

A study of meteorological and lysimeter data is presented by the authors. The specific value of this study is in the length of the data series of more than 40 years and the parallel measurements of three types of vegetation. For the forested lysimeters even the impact of forest growth is captured. Results of precipitation, leachate, both measured and calculated evapotranspiration on an annual and biannual scale are shown.

The structure and thus, the readability of the paper could be improved by a clear separation of the methods and the results. E.g., the discussion (including trend analysis)

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of the meteorological parameters is done in the method section.

Specific comments

More technical information about the different measurements would be useful.

The differences between winter and summer half year are worked out. For the trend analysis it would be useful to have the seasonal trend lines in the graphs as well (as the trend is not always visually obvious).

In the analysis of the wind speed data the authors argue that the decrease is given by tree growth. But as the measurements are carried out at a height of 9 m it is questionable if the first years of data are really that strongly influenced by the existence of the at this time small trees.

What are the resistance values of the Penman-Monteith equation applied for the two forest types?

For a discussion of the accuracy of the calculated values of PET and AET it could be useful to compare the results of the grassland lysimeter with other studies of weighable lysimeters or to calculate them with both the measured wind speed and the one derived from three stations in the vicinity. The uncertainty in the input variables is discussed but there is no indication about the uncertainty of the method itself.

In the section about the fractioning of precipitation into leachate on a seasonal scale the pronounced difference for grassland is not discussed.

The trend in the evapotranspiration values is taken as given by the tree development. What is the impact of the increasing temperature?

The authors argue that the balance term is mainly given by interception. A comparison with values in literature would be useful. In wintertime in the deciduous forest this assumption is questionable. On a sub-annual scale leachate, evapotranspiration and the balance term (including interception, changes in soil moisture) do not necessarily

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sum up to 100% of precipitation.

Technical corrections

As Figures 1-3 give an overview of the meteorological conditions it would be more handy to have them all together in one figure. Figure 3: Annual sum in 2001 is lower than the summer term, which can be the case. Figure 4: Subtitle in the graph (annual sums) is not appropriate. Figure 5: Same range on y-axis would be an advantage for visual comparison. Figure 12 and 13: Some numbers of the balance term are wrong.

Several references are either missing in the text or in the reference list. The citation of lectures is not very appropriate.

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