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Reviewer comments on hess-2022-4

David Dunkerley (Referee)

Referee comment on "Inter- and intra-event rainfall partitioning dynamics of two typical xerophytic shrubs in the Loess Plateau of China" by Jinxia An et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-4-RC1>, 2022

This paper explores a little further data from the same field observations as were discussed previously by some of the same authors in their 2019 HESS paper *Temporally dependent effects of rainfall characteristics on inter- and intra-event branch-scale stemflow variability in two xerophytic shrubs* (Yuan et al. 2019).

[Yuan, C., Gao, G., Fu, B., He, D., Duan, X., & Wei, X. (2019). Temporally dependent effects of rainfall characteristics on inter- and intra-event branch-scale stemflow variability in two xerophytic shrubs. *Hydrol. Earth Syst. Sci.*, 23(10), 4077-4095. doi:10.5194/hess-23-4077-2019].

The same two species of shrubs are studied, and the field observations analysed here come from the same 2014-2015 data collection as were analysed by Yuan et al. (2019). The field data collection appears to have been one and the same for both papers.

Both Yuan et al. (2019) and the present ms. (An et al.) seek to explore the role of rainfall variability and plant architecture on stemflow, throughfall, and interception, paying attention to how these work at intra-event timescales. Their ability to do this is however hampered by their reliance on rainfall observations that were aggregated and logged only

every 10 minutes. This is hardly sufficient temporal resolution to permit analysis of time lags before the commencement of stemflow, and various other analyses that the authors seek to make.

Given that the two papers explore the same shrub taxa in the same field area during the same two years (2014-2015), and that both explore the intra-event workings of stemflow and throughfall, I think that a key requirement is for the Introduction to make it clear and explicit how the present paper differs in scope and results from the earlier paper of Yuan et al. (2019). The earlier paper appears to have focussed more strongly on branch-scale mechanisms, but a clear distinction requires very careful reading and differences in data processing make it very difficult indeed to see what is new in the current ms.

In particular, in their Introduction (and perhaps also in a covering letter to accompany their submission) the authors should highlight what can be learned about stemflow and throughfall in the two shrub taxa that was not already demonstrated by Yuan et al. (2019). I think that it would be helpful for the authors to compare and contrast what was learned by Yuan et al. (2019) and what similarities or differences emerge in the present study (An et al.).

In other respects the paper seems entirely routine, containing nothing new in method, theory, or argument. I do think that the authors should evaluate the adequacy of their data and field sampling, however. Do the 38 rainfall events in two years form a sufficiently large sample of events? Does sampling of just four branches (line 202) represent a sufficiently large sample? What is the evidence for this being the case? And only a single individual plant of each species was used to measure throughfall and stemflow dynamics (line 198). How was the single individual selected? Is a sample of one really sufficient to draw meaningful conclusions concerning the entire species, as the authors do? These matters and similar considerations should be discussed and critically evaluated. As the paper stands, the authors merely report that they studied only a single shrub of each species but provide no evaluation of whether this is a sufficient and representative sample. (In the same vein, the use of aggregated, 10-minute rainfall amounts warrants critical comment by the authors. The authors should also report fully and properly the characteristics of the rainfall events that they monitored. To judge from the data in Yuan et al. (2019) these were mostly rather brief - from one to a few hours. But the present ms. (An et al.) does not even mention the event duration (nor, for instance, whether the rain was during daylight hours or at night - which is surely relevant to evaporative losses and hence to interception amounts). All of this must be corrected in

a revision to the current ms. Some evidence of the nature of just four rainfall events can be found in Figure 5 but this is hardly sufficient.

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