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Comment on hess-2022-4

Anonymous Referee #2

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-RC2, 2022

Reviewer comments to hess-2022-4

Rainfall partitioning (interception loss, throughfall, and stemflow) is an old theme in the field of forest hydrology, and numerous studies have been done on quantified rainfall partitioning and their influencing factors at event scale. Nevertheless, the relevant studies are lacking for shrubs of drylands, and the intra-event dynamics have been less explored. An et al. characterized and quantified the rainfall partitioning of two xerophytic shrubs at both inter-event and intra-event scale in the Loess Plateau of China. What's really interesting to me is their concurrent finer investigation (10 min) on the intertwined rainfall partitioning processes. It seems that another paper by some of the same authors has been published in HESS (Yuan et al., 2019, 23(10): 4077-4095) in digging into the branch-scale dynamics of stemflow (only one of the rainfall partitioning processes). In my view, this study steps further and provides a full view of the reciprocal dynamics among interception loss, throughfall, and stemflow at the shrub-scale and thereby discussed the underlying mechanisms. In this sense, this study adds some new insights into rainfall partitioning and has the potential for a better understanding of the shrub-dominated eco-hydrological processes in drylands. Of course, the authors should explicitly explain the difference between two papers. Moreover, this paper is in general well-written; the experimental design and data analysis are normal and acceptable; results and discussion are informative. I have some moderate/minor comments that are required before considering the manuscript for publication.

- L49: Water loss due to interception evaporates but not transpires back to atmosphere. “transpiration” here is NOT a correct term for interception loss.
- L133: A citation is missed for Flora of China.
- L271: What does values such as “11.1±8 mm”? Mean±SD or Mean±SE? Better explain for the first time as they appear.
- L305-311: Are the thresholds for the generation of TF and SF derived from regression equations comparable to or in the range of that measured using tipping bucket rain gage? A brief discussion somewhere in the Discussion section is desirable.
- L370: significantly ☐ significant

- L404-414: The authors contributed the significant higher IC % in C. *korshinskii* than in *S. psammophila* to the higher water storage of *S. psammophila*. However, they used the absolute values (4.9 L versus 6.0 L) but not the normalized ones. Surely, a large canopy tends to absorb more rainwater than a small canopy, but that does necessarily mean that the large canopy has a higher capacity in retaining rainwater. Actually, the intercepts (0.92 for *C. korshinskii* and 1.15 for *S. psammophila*) in the fitted formulas between interception loss (mm) and rainfall amount (mm) in Figure 4e are indicative that *C. korshinskii* has a lower canopy water storage, hence a potential lower interception loss.
- L443-447: I would like to argue with the authors that the dynamic characteristics for TF such as TFI, TFI10, LETF, TFD, LGTF and LMTF are just different variables indicating the behaviors of TF but not the reasons for the generation of TF. Those variables are results but not the reasons. That means, according to those variables, it is reasonable to say which variables are indicative of an earlier or later generation of TF, but they are not the reasons that a shrub species is "beneficial to the generation of TF". This is also the case for SF.
- The authors made a detailed description of intra-event rainfall partitioning dynamics. I suggest that they elaborate more on the potential ecological implications.