Review on manuscript hess-2020-182

Throughfall isotopic composition in relation to drop size at the intra-event scale in a Mediterranean Scots pine stand

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General comments

In the manuscript entitled 'Throughfall isotopic composition in relation to drop size at the intra-event scale in a Mediterranean Scots pine stand' by J. Pinos et al., a study is presented that investigates the relationship between the isotopic composition of throughfall and throughfall drop size - assuming that splash droplet evaporation plays an important role.

For throughfall and rainfall sampling, two setups were installed in 100m distance. Typical meteorological parameters were logged every 30s. 21 summer events were classified by duration and intensity and the isotopic composition of event-based rainfall and throughfall samples was analysed. Tipping buckets were combined with laser disdrometers for drop size distributions (DSD). Throughfall proportions of the three types free throughfall, canopy drip and splash throughfall were calculated and the interrelationship of isotopic shift and drop size between rainfall and throughfall was analysed.

It could be shown that throughfall is characterised by a lower number of drops, slower drop velocity and larger drop diameter than open rainfall. It could also be shown that the difference in the isotopic composition of throughfall and rainfall increased with a larger proportion of splash droplets and that a higher contribution of splash throughfall and higher VPD results in a greater isotopic shift.

Eventually, one may consider changing the manuscript into a **technical note**, since many of the hydrological aspects are discussed rather briefly and the key contribution is the investigation of the interrelationship between throughfall isotopic composition and throughfall drop size. No mechanistic understanding is provided by the manuscript. The main conclusion also starts with the technological aspect.

Throughfall is typically sampled with multiple samplers to account for the high spatial variability. In this study, only one sampler for throughfall and one for open rainfall was used, which makes the study a bit weak. Some technical issue with the Arduino datalogging system could also be solved to improve the quality of the dataset. Nevertheless, the interrelationship between throughfall isotopic composition and throughfall drop size is a promising new approach to gain insight in small-scale evaporation processes.

Overall, the manuscript is well structured and nicely written. The topic fits well to the scope of the journal and appears to be of interest for the readers; besides the eventual change into a technical note I only suggest minor revisions prior to acceptance and publication in *Hydrology and Earth System Sciences*.

Global changes

Throughout the manuscript: Please add city and country to the suppliers of the instruments/ parts (ISCO, DT85, Picarro, …)

Specific + technical comments

L. 34

Please add

Isotopic shifts in throughfall

Isotopic shifts are mainly caused…

L. 35

please insert

“but also by sub-canopy water recycling i.e. evapotranspiration and re-condensation (Green et al., 2015)” after (Allen et al., 2017)

L. 140

…”by the”… instead of …”with”…

L. 164ff and Fig. 3

Please clarify and rephrase:

How can “the maximum splash throughfall diameter be set at 2mm” when the threshold for splash throughfall is < 1 mm?

L. 190

Please change to global meteoric water line (GMWL)

L. 361 and L. 374

please delete the “Delta” of the “Delta delta 18-O isotopic shift (…”

L. 371

I suggest “,” after „meta-analysis“

L. 386 and L. 400

Please delete either “;” or “and” in these sentences.

L. 419

“…isotopic shift (…” should probably be your “Delta delta 18-O_{TF-RF}” in the brackets.

L. 650

event<u>s</u>

L. 696, Fig. 5

legend and axis labeling is too small.

References

Green, M. B., Laursen, B. K., Campbell, J. L., McGuire, K. J., and Kelsey, E. P.: Stable water isotopes suggest sub-canopy water recycling in a northern forested catchment, Hydrol Process 29, 5193–5202, doi: 10.1002/hyp.10706, 2015