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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Rainwater propagation through snow pack during rain-on-snow events under different snow condition" *by* Roman Juras et al.

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General comments

The manuscript presents results of four experiments investigating rain percolation through the snowpack and snow melt runoff generation during rain-on-snow events. The rain was artificially generated by sprinkling deuterium enriched water. Contribution of rain and snowmelt on runoff generation was estimated by hydrograph separation technique. The results indicate that rain sprinkling on a colder snowpack had a different water transport dynamics compared to wet isothermal snowpack. Authors conclude that internal mass exchange is an important process for snowmelt runoff generation during rain-on-snow events.

This is an interesting study and worth to publish in HESS. However I also agree with the previous reviews that the clarity of the manuscript will benefit from some revision. I would suggest to make the formulation of title-objectives-results more consistent. The rainwater propagation/contribution/interaction does not have necessarily the same meaning and interpretation. Moreover I missed some more clear formulation of the research hypothesis. What is the main research question and how it can be accepted/rejected by performed experiments. Was there such a clear question prior to the setup of the experiment? Why and how were the four sites/dates selected? The last general comment is related to the discussion part – where it can be considered to add (I missed) some lessons learned section.

Overall I like the manuscript and enjoyed to reading it. I thus suggest some minor revision.

Specific comments

1) Abstract, l.14: the term "advanced hydrograph separation" is not clear here. Please consider to be more specific.

2) Eq.4. The form of the relationship is not clear. Some reference or more specific information would be useful.

3) Tables/Figures. Please consider to show some more main messages of the paper (presented now in Tables) in the form of figures.

4) Figure 4. Please consider to make the x axis longer, to show more clearly the timing. Perhaps the layout 1 column/4rows would be better.

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