

## ***Interactive comment on “Ecohydrological effectiveness of litter crusts in sandy ecosystem” by Yu Liu et al.***

**Yu Liu et al.**

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Dear Referee,

Thank you for reviewing the manuscript and providing your short comments. We are glad to response all the comments, which would help to improve the message and the quality of our manuscript. The following is point-to-point responses to your comments.

It is an interesting and complex study to explore the hydrological impacts of litter crusts and biocrusts in desert ecosystems.

Response: Thanks for the reviewer's positive comment.

I am not a native speaker so I cannot judge whether the manuscript has reached the

C1

level of scientific writing in grammatical terms.

Response: Thanks for your suggestion, our manuscript have been edited by an English Language editing service for language check. Please see the certification at the Supplement information.

Some small suggestions: Percentage (%) should be closer to the previous number (for example L29, L95 etc.).

Response: Thanks for your suggestion, we have deleted the spaces between % and the number throughout the manuscript.

L168 "stopwactch" => stopwatch

Response: Thanks for your suggestion, we have revised the word.

Some characters do not display correctly, but this is a typographically problem in preference (incompatible editing programs): ä, é and âĎĎ (for example L29, L62, L144 etc.).

Response: Thanks for your suggestion, we have unified the font of all the characters throughout the manuscript.

I suggest using the word "layer" instead of "crusts".

Response: Thanks for your suggestion, litter crust is a new concept that we put forward. We have given the definition of litter crust and the difference between it and litter layer in introduction. Unlike the common litter layer, litter crust is a hard shell formed by mixing litter and sand under external forces such as rain or wind. In this study, litter crust was defined as the crust formed by "all dead organic material made of both decomposed and undecomposed plant parts which are not incorporated into the mineral soil beneath".

L94-L95: minimum/maximum in which period?

C2

Response: Thanks for your suggestion, we have added the period in the sentence as "minimum of 109 mm in winter and maximum of 891 mm in summer".

"Simulated rainfall (rainfall intensity was 20 mm h<sup>-1</sup>) was applied to the quadrats for successive 30 minutes and then weighed to determine the Max WIC (g dm<sup>-2</sup>). " How long after the simulation was the sample measured? If it was measured immediately then water still drips out of the crusts and it is not exact and should not be called interception (MIC), because a part of it would infiltrate into the soil (in field).

Response: Thanks for your suggestion, we have revised the sentence as "Simulated rainfall (rainfall intensity was 20 mm h<sup>-1</sup>) was applied to the quadrats for 30 minutes continuously and then allowed to rest for 10 minutes in order for the moisture to stabilized before weighing to determine the Max WIC (g dm<sup>-2</sup>)".

L294-L295: "We immersed: : weight gain." sentence is reduplication (Materials and methods). Is 24 hours enough to saturate the litter? After L289 WHC was 170%, but after L296 could it be 200%. The correct name would be WHC<sub>24</sub>.

Response: Thanks for your suggestion, we have deleted the repetitive sentences. Soaking the litter in water for 24 hours can reach saturation, as we have confirmed in pre-test experiments before the experiment. I'm sorry we made a mistake here. The unit of Max WHC is g dm<sup>-2</sup> not g water-g litter. The Max WHC corresponds to 200% of the litter weight. So we have revised the sentence as "In our study, Max WHC of litter crusts was 48.7 g dm<sup>-2</sup>".

How did you measure the infiltration with crusts or without crusts on bare sand?

Response: Thanks for your suggestion, we measured infiltration used single-ring infiltrometry, which is a cylinder with an inner diameter of 15 cm and a height of 15 cm. Single-ring infiltrometry has been extensively applied as a basic infiltration measurement tool to measure the soil infiltration process. The method of measuring infiltration with crusts or without crusts on bare sand is the same.

C3

Could cylinder edge cut the leaves or what about the leaves under the edge of the sampling device?

Response: Thanks for your suggestion, the cylinder edge is sharp and can easily cut off leaves during installation. Moreover, to prevent water leakage from the ring, the same soil materials were used to support the outside of the ring.

Is the sample number sufficient? (Did you make statistics e.g. based on standard deviation?)

Response: Thanks for your suggestion, for each crust type and bare sandy land, six experimental plots were selected. Five sample sites as replication was selected in each plot. Soil properties analyses in each site were repeated five times. The infiltration measurement of each water quantity was repeated 3 times in each site. We conducted analysis of variance (ANOVA) on the data. Tukey's honestly test was used to analyses the differences among variables. The results of statistical analysis are expressed as Mean and SE.

L465 (Figure 2.): Missing: BSL, bare sandy land;

Response: Thanks for your suggestion, we have added the note "BSL, bare sandy land" in the caption.

L478-L479 (Figure 4.) Is "ns" non-significant? You use different scale for the diagrams, please be consistent in all of them. The scale of diagram A goes to 40 mm/min, so it would be double size, and the others from 0 to 25 mm/min with original size. It helps the comparison.

Response: Thanks for your suggestion, we have added the note "ns, no significant difference" in the caption. We have unified the range of axes throughout the Figure 4.

Please also note the supplement to this comment:

<https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-579/hess-2018-579-AC4->

C4

supplement.pdf

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-579>, 2018.