

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

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This manuscript reports on the positive effects of litter crusts on soil water holding capacity and water interception capacity by comparing between litter crusts, biocrusts and the bare soil. They synthesized multi hydrological-related properties of crust soils to give the whole picture of the hydrological processes differences between litter crust and biocrust in sandy lands. They found litter crusts significantly increased soil organic matter than biocrusts and bare sandy lands, and also increased soil porosity and decreased soil bulk density, which can help to maintain maximum infiltration rates. They also found the effect of crusts on water infiltration rate was depending on the level of water supply: significant different was only found at high water supply (>1000 mL) as the litter crusts increased the water infiltration. This research highlights the instrumen-

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tal role for litter crusts in many hydrological processes, which is of great value under the context that national ecological programs in China improved vegetation recovery and developing litter crust intensively. In my opinion, this is an interesting and important study in understanding the ecohydrological functioning of litter crust and thus deserved to be published in HESS.

I also suggest several specific revisions as follows.

L52. Considering the term “litter crust” is not familiar to the reader, it is better to define what is “litter crust”, and what is the difference between “litter crust” and more commonly “litter layers”. L76. “(China)” is better to move upward to L74 when “Loess Plateau” is first appear. L126. The unit “dm⁻²” is incorrect, please revise it. L126. The unit for biocrust evolution needs to be added. L129 and L130. As you’ve mentioned the unit for other factors you measured, it’s better to address the unit of Max WIC and Max WHC here as well. L132. ->”at depths of 0-3 cm, 3-5 cm, and 5-10 cm” L134. “. . . was measured using a soil bulk sampler (100 cm³) stainless steel cutting ring. . .”: the sentence is incorrectly phrased. Please revised it. L141.” . . . and holding capacity of litter crust” ->” . . . and water holding capacity of litter crust” L149 and L152. You can give the unit of Max WHC and MIC at their first appearance as suggested at L129 and L130. L154. The unit for SOM needs to be added. L169. “The time duration for the end of water infiltration . . .”. I understand your point, but this expression is not correct. L203. Table 1, the data source for these changes of BD and TP, need to be cited here. L207. The abbreviation “BSL” doesn’t need to be explained again and placed in “()”, as you have already explained it and used the “BSL” in the former passages. L213. Here comes the confusing that what does “crust mass” mean because you didn’t mention such term in Methods. I suppose it refer to the same thing as “biocrust evolution” which you’ve mentioned in L126. If so, please be consistent through out the text. L277. “Our study showed that the ~5 cm litter crusts measured from 2-year and the ~9 cm litter crusts measured from 4-year-old *Populus simonii* forests.” This sentence is not complete. Please revised it. L289. “maximum WHC of litter crust was 1.7 g water - g

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litter". You use the unit "g dm⁻²" for maximum WHC in previous text, please be consistent throughout the manuscript. "The maximum volume of litter crust was 1540 cm³". It is confusing here to use "maximum volume": does "1540 cm³" indicate the volume for the whole crust sample, or the relative volume for the pores inside the crust sample? I guess you mean the later one, as you sampled the crust by the same volume. L460. The caption needs to provide the information of which statistic test was used. The significant level also needs to be noted in the footnote. L464. Bare sandy land didn't have any crust. It is not appropriate to summarize the four sub-figure using "in different crusts". L465-. The meaning of the error bar needs to be given in the caption (eg. M+SE). The meaning of the abbreviation "BSL" is also need to be included in this caption (same as in figure 4 and figure 5).

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