

Comment on hess-2022-30

Anonymous Referee #1

Referee comment on "Investigating the effects of herbaceous root types on the soil detachment process at the species level" by Jian-Fang Wang et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-30-RC1>, 2022

This paper presents a laboratory scouring experiment to study the effects of two herbaceous on the soil detachment process. The experimental design is reasonable, but the results shown in the manuscript are not convincing in my view.

Major issue:

- The fitting results in Fig.3, Fig4. and Fig. 6 are not good (with low R^2). I very much doubt the applicability of the equations shown in Fig.3, Fig4. and Fig. 6. So, as I stated above, the results shown in the manuscript are not convincing.
- According to the title of this manuscript, it aims to compare the differences between BI and AG in affecting the soil detachment process. However, in Fig.3-6, the results of BI and AG were fitted using the same equation which I think is unreasonable. To be specific, if the effects of two herbaceous on the soil detachment process are different and worthy to study, the relationships in Fig.3-6 should be different between BI and AG. It is easy to see from Fig.4, for example, the distribution characteristics of the result points between BI and AG are very different, which I think is a reason for the poor fitting results.
- In this scouring experiment, the value of overland flow is constant (1.5 L s^{-1}). So, the scientific significance of this paper is very limited. To my knowledge, the overland flow should have significant effects on soil detachment. In the present manuscript, all the results are derived under a constant overland flow; and if the results are applicative under other overland flows or not? I doubt it! So, Eq. 10 may be correct only under the specific experimental conditions of this manuscript.
- In Fig. 7, the predicted soil detachment rate and the measured soil detachment rate are compared. What are the data of measured soil detachment rate? Are they derived from other experiments or just the results of the present experiment? If the datasets used to build Eq. 10 are in turn used to validate Eq. 10, the result is nonsense.

Moderate issue:

- According to the manuscript, I recognize that repeated experiments are designed. However, the results of the repeated experiments are not shown in the manuscript. At least, the average values and the standard deviation of the repeated experiments should be described. Because the deviations of the repeated experiments have significant effects on the results shown in Table 1. If the deviations of the repeated experiments are very large, the comparing results between the BI and AG would be questionable; i.e. we would be not sure that the differences between BI and AG result from the species' difference or the experimental error.
- In the Materials and methods section, there are not any figures describing the experimental conditions and treatment design. This makes readers difficult to have a clear understanding of your experiments.
- In the present manuscript, many equations have been used. The authors must add the corresponding references to the manuscript.