

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2021-502

Anonymous Referee #1

Referee comment on "A contribution to rainfall simulator design – a concept of moving storm automation" by Ravi Kumar Meena et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-502-RC1>, 2022

General comments

The manuscript analyzes the impact of a moving storm rainfall condition on the hydrograph characteristics using a programmable rainfall simulator. The authors present the results of different rainfall simulation experiments on the two hydrograph characteristics, the time to peak, and the peak discharge. The experiments were performed to test different scenarios in two different slopes and three different velocity conditions for both upstream and downstream storm direction.

This topic is very interesting, and the developed rainfall simulator system is very innovative. However, I think that the paper could be improved by the authors that would make it more attractive. Some aspects, mainly related to the developed rainfall simulator system are not clear, and others are not presented. The characteristics of the simulated rainfall are not well described, and the test to verify if it well reproduces the natural rainfall are not discussed. Those aspects are very important when using a rainfall simulator system.

- The rainfall simulation experiments were used to evaluate the peak discharge and the time to peak flow. Those two parameters are more influenced by the physiographic properties of the watershed, vegetation cover, flow dynamics, and soil water content at the begin of the rainfall event. Considering that the system includes a soil flume, why the authors didn't use it to simulate different soil water content conditions, for example?
- Why did you not include the system description in the main text? In my opinion, the mechanical innovations presented for this rainfall simulator is one of the most important part in the paper
- Did you analyzed the characteristics of the simulated rainfall? Is the system able to simulate a natural rainfall?

Specific comments

[L.25] More recent rainfall simulators have been developed but are not mentioned in the manuscript. Please add more recent references.

[L.64] The system description is not complete. What is the high of the system? Which intensities is the systems able to simulate? How did you verify if the system reproduces a real rainfall event? Did you verify the raindrops distribution? The characteristic of the simulated rainfall should be verified using a disdrometer, for example. The authors say that the system simulated "Near natural rainfall conditions" (abstract L.6], but I don't know what it means. The raindrop distribution should be investigated for all the simulated area.

[L.104] What is the system pression? What is the intensity of the simulated rainfall?

[L.112] What is "Appendix C"? It is not presented in the paper.

[L.120] What are the values for the coefficient of uniformity? Did you test the uniformity of the simulated rainfall for different rainfall intensities?

[L.125] How did you considered the wind effect during rainfall simulations? Is there any protection?

[L.125] Is there any change of the soil surface after each experiment? Is there any change of the roughness, for example?

[L.141] What is the mean intensity of the simulated rainfall? Why are you simulating this intensity?

[L.147] How did you chose the rainstorm movement velocity?

[L.133] Please change "strom" to storm.

[L.288]. check the reference: The style is not correct.

Please also note the supplement to this comment:

<https://hess.copernicus.org/preprints/hess-2021-502/hess-2021-502-RC1-supplement.pdf>