

Hydrol. Earth Syst. Sci. Discuss., author comment AC1
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Reply on RC1

Shaojie Zhang et al.

Author comment on "Quantitative effects of antecedent effective rainfall on *ID* threshold for debris flow" by Shaojie Zhang et al., Hydrol. Earth Syst. Sci. Discuss.,
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Dear Reviewer 1:

The authors would like to thank the reviewers for his detailed review of our manuscript. Regardless of whether or not this manuscript can be reviewed again, the author will carefully revise the draft with reference to the reviewers' comments one by one.

The authors agree with most of the issues raised by Reviewer 1. But we need to declare one point: this manuscript is not intended to repeat the qualitative description of the influence of AEP on the ID threshold curve. The author found that a higher AEP can provide favorable hydrological conditions for runoff generation and solid material resource recharge in JJG, but it do not always mean that the ID threshold condition for triggering debris flow is decreased. As for JJG, only after $AEP > 40$ mm, the AEP and ID threshold condition for triggering debris flow will be completely negatively correlated; when $15 \text{ mm} \leq AEP \leq 40$ mm, the solid material supply is rapidly increased by the AEP, a stronger hydrodynamic condition is required to transform them into debris flow in JJG meaning that the ID threshold condition for triggering debris flow is enhanced, and this positive correlation between them persists until the two ID threshold curves intersect in the I-D coordinate system. AEP will significantly change the position of the threshold curve in the I-D coordinate system, and the change law of the position of the ID threshold curve can be described by the functions of $\alpha \sim AEP$ and $\beta \sim AEP$, α and β are the two parameters of the ID threshold equation. Due to the two functions, the ID threshold curve can regularly move in the I-D coordinate system rather than a conventional threshold curve stay the same regardless of AEP variation, it is beneficial to improve the prediction capacity of the ID threshold. Therefore, the function of AEP and these two parameters can quantitatively describe the influence of AEP on the ID threshold curve. However, no scholars have conducted relevant research on how to construct the functional relationship between $AEP \sim \alpha$ and $AEP \sim \beta$.

The author has problems in presentation and analysis in the current manuscript, which results in reviewer 1 not really getting the innovations in the text. Therefore, the author will make a thorough revision of this draft based on the revision comments of Reviewer 1. The comments made by reviewer 1 are very helpful to improve the readability of our manuscript, and the author is very grateful. Thanks again!

Best regards!