

# ***Interactive comment on “A physics-based probabilistic forecasting model for rainfall-induced shallow landslides at regional scale” by Shaojie Zhang et al.***

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Dear Reviewer,

Thanks a lot for your kind comments on our paper, I will reply your comments one by one, as follows:

(1) Reviewer: As expressed in Eq. 1, the safety factor is influenced by  $\phi_b$  related to the matrix suction. How this parameter is determined in the calculation?

Authors:  $\phi_b$  is the parameter relating to the matrix suction, which is close to the internal friction angle  $\varphi$  in the condition of the low matrix suction. And low matrix suction means high soil water content; this situation is favorable to landslide. So in our paper,  $\phi_b$  is

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set to be equal to the internal friction angle  $\varphi$ .

(2) Reviewer: How about the initial water content along the depth?

Authors: Initial soil water content was based on the residual water content of each soil type. If the residual water content of a soil type is equal to  $w$ , then any pixel belonging to this soil type will be assigned this value. This means that the initial water content of each layer was assumed to be  $w$ , namely uniform distribution along the depth. This distribution has some drawbacks, for example, the deeper soil layer may have higher soil water content, but we cannot identify and have to use the above easy identifying method.

(3) Reviewer: The distribution of cohesion and internal friction angle in Fig. 8 should be consistent with the soil type in Fig.7, but it is not so now.

Authors: If cohesion and internal friction angle was derived from the soil type, the distributions should be same. However, cohesion and internal friction angle were determined based on the lithology map and the rock mechanical handbook, this is the reason why their distributions are different.

Please also note the supplement to this comment:

<http://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2016-348/nhess-2016-348-AC3-supplement.pdf>

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