EGUsphere, referee comment RC2
https://doi.org/10.5194/egusphere-2022-798-RC2, 2022

Comment on egusphere-2022-798

Tammo Steenhuis (Referee)

Referee comment on "Elucidating the role of soil hydraulic properties on aspect-dependent landslide initiation" by Yanglin Guo and Chao Ma, EGUsphere, https://doi.org/10.5194/egusphere-2022-798-RC2, 2022

The authors present a complicated explanation for the greater number of bank failures on the south slope than on the north slope

COMMENT

I am not sure if the analysis is correct since hillslope stability is not my field. However, I know that when the soil becomes saturated, the hillslope could fail, given that roots do not keep it in place. Based on this simple principle, we can explain, based on the data given in this manuscript, the difference between the north and south-facing slopes in simple terms as follows:

The conductivity of the subsoil is greater on the north-facing slope than on the south-facing slope. Thus, the north-facing slope drained faster than the south-facing slope, and as shown in Figure 9, the soil on the north-facing slope does not saturate. In contrast, on the south-facing slope, the rainfall rate at some point is greater than the water that can be carried off laterally, and the soil saturates, as shown in figure 9. The saturation causes the soil strength to decrease, and failure occurs. Hence more failures on the south slope than on the north-facing slope.

COMMENT

Figure 9 is hardly discussed in the manuscript. It is likely the most significant finding as it shows that the oil becomes saturated on the south slope while not on the north slope.

COMMENT

On line 377, the authors write that

"the saturated hydraulic conductivities by variable-head permeameter and TRIM methods coincide with each other, which together prove that the soil mass on north-facing slope has a relatively larger water infiltration.

The amount of water infiltrated on a slope depends on the amount of rainfall and not the conductivity as long as it is greater than the rainfall rate. Moreover, laboratory-derived conductivity is a poor predictor for field hydraulic conductivity in the topsoil where plant roots and animal life provide vertical preferential flow paths

COMMENT

As I indicated before, I leave it up to the experts if the hillslope analysis is correct or not. It seems too complicated for the little information that is available on this site. The fact that the soil strength decreases greatly at the time the soil becomes saturated is important and is not well addressed. In addition, the fact that soil saturates should be stressed in the manuscript that claims to be a hydrologic analysis