

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

Bastian van den Bout et al.

Author comment on "Physically based modeling of co-seismic landslide, debris flow, and flood cascade" by Bastian van den Bout et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-292-AC1>, 2022

Dear Reviewer,

We would like to express our gratitude for the work in providing constructive feedback to our manuscript. We appreciate the feedback and are convinced the quality of the manuscript will be improved as a result.

As a response to the some of the detailed comments:
All other comments will be followed in the revision of the manuscript.

236: Sf is the momentum source term for fluids, not for solids. Please thoroughly check all equations and variable descriptions for correctness.

-Indeed, this should be changed according to the suggestion of the reviewer.

236: Sf is the momentum source term for fluids, not for solids. Please thoroughly check all equations and variable descriptions for correctness.

-This check will be carried out

Figure 4: It might be nice to add a photo showing the situation. I am sure the authors have plenty of field photos available – if not, I can offer the following:
<https://www.mergili.at/worldimages/picture.php?/7252/category/60>

-We appreciate the offered image and might use it, the angle is very nice!

410: "pedotransfer functions" (not "pseudo transfer functions"), I think

-Indeed, this is referring to pedotransfer function.

440ff: Are the root systems deeper than the typical landslide depth, so that it is appropriate to consider root cohesion for slope stability?

-The depth of the root systems is still somewhat uncertain. It is likely based on the type of vegetation that it surpasses several meters. However, the co-seismic landslides might exceed this depth. We will clarify this in the manuscript. However, we implemented the vegetation effect predominantly for the modelling of erosion, where the additional

cohesion provides increased resistance to entrainment.

561f: Please explain in some more detail the correspondence of modelled and observed timing (the text is not fully clear to me).

-We will clarify this in the revised text.

634: This statement is true in principle, but it has to be considered that the Huascarán events considered by Mergili et al. (2018b) were of a completely different type (extraordinarily rapid and energy-rich, with air-lifting of material, etc.), and there was the specific situation of the ridge that was overtopped, completely changing the impact and inducing threshold behaviour. I suggest to briefly mention that this comparison has to be interpreted with care.

-For sure, we will add this to the manuscript. We did not mean to compare the studies in the nature of the processes. Instead, we hoped to focus on threshold effects as a challenge for multi-hazard modelling and dealing with its intrinsic uncertainties.