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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Tailings-flow runout analysis: Examining the applicability of a semi-physical area–volume relationship using a novel database" *by* Negar Ghahramani et al.

Anonymous Referee #2

Received and published: 25 September 2020

General comments:

The authors present an empirical approach to constrain the relationship between tailings-flow volume and inundated area. Such approach is well known and the literature reports multiple application to different types of fast flowing landslides. Since tailings-flows have never been specifically addressed, the work done by the authors is appreciable and timely for publication. Results are relevant for the prediction of areas that can be impacted by tailings-flows. Although the method is simple and associated uncertainties relatively high, authors make a good job in recognizing limits and potential applicability of their results. I am not a native English speaker but I found it easy to

follow with clear and explanatory descriptions of the methods and results. The figures are well prepared with only minor flaws (see following) and numerical data are reported in tables that fosters the reproducibility of the method. In general, simple approaches towards the prediction of potentially catastrophic events are highly relevant and well within the scope of NHESS. In my opinion, the paper, in its present form, needs moderate modifications to further improve the quality of presentation before publication.

Specific comments:

line 97. Here you cite the dam factor parameter and in Table 1, the same is called predictor. I would stick to one definition and possibly describe the rationale behind this derived parameter. Furthermore, there is an erroneous under script parenthesis in the parameter equation.

lines 99-100. Unclear. Hf and dam factor are the same thing. Its relationship with runout distance improves with the updated database.

Table 2 (and Table 5). The dataset used by Berti and Simoni (2007) was later expanded with new cases (Simoni et al., 2011) resulting in a slightly different relationship: A=18Vˆ2/3. 12. Simoni A., Mammoliti M., Berti M. (2011) Uncertainty of debris flow mobility relationships and its influence on the prediction of inundated areas. GEOMORPHOLOGY, 132: 249–259.

lines 183-184. The definition of uncertainty is incomplete. I guess it is the ratio (expressed as % in Table 3) between area of pixels intersected by the perimeter and total area of pixels mapping Zone 1. Please define unambiguously.

lines 209-210. Here you explain an important simplifying assumption. You should discuss this assumption and its possible impact on results. You can do it here or later when discussing the results (e.g., lines 275-280). In my opinion, the deposited volume is likely underestimated in your case due to entrainment of material along the flow path. Therefore, the Volume-Area relationship has higher intercept compared to the method used by other researchers, which relates deposited volume and inundated area. However, I believe the assumption is reasonable because in case of tailings dams the release volume can be used of predictive purposes.

Figure 7. Please insert y-axis name and unit measure in the boxplots. Specify whether the regression line shown here is best-fit or 2/3 slope.

Figure 8. This figure contains the same info as Figure 6; only 95% prediction intervals are added. Consider adding them to figure 6 and eliminate Figure 8.

line 277. I could not find highlighted cases in Figure 9.

Figure 9. Please specify how your 2/3 slope fitting line is obtained in this case. Fonts used for this figure differ from other figures, please fix.

Table 5. Most of the data reported here have been reported in Table 2. Consider eliminating.

Discussion section. Here you describe a couple of interesting real cases in more detail. In my opinion, the paper would also benefit from the insertion of one (or more) example of predictions that could be obtained on your cases. More particularly, it would be interesting to compare on a map, the actual inundated area with the areas predicted using your equation and 95% prediction intervals.

line 314. The extreme runout behavior could have been also favored by an increase of the transported volume due to entrainment along the narrow channel that you describe.

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