Nat. Hazards Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/nhess-2020-199-AC1, 2020

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.

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Received and published: 14 August 2020

The authors would like to thank Renato Macciotta (Referee) for the review of this manuscript and the provided comments.

In response to the first comment, we will add a new column to Table 2 including the R-squared values. Please see the attached edited Table 2.

In response to the second comment, when we are looking at the confidence interval on the regression we are looking at the uncertainty of the regression line itself, and not the individual data points (Figure 6). Likewise, when we plot the prediction interval

(Figure 8), then we are actually looking at the scatter in the data. Accordingly, the lines 222-223 and 262-264 of the manuscript will be modified as follows:

Line 222- Figure 6 shows the log-linear regression line for Zone 1 inundation area as a function of total released volume with the 95% confidence interval of the best-fit regression line. Please note that the 95% confidence intervals account for the uncertainty of the regression line and not the individual observations.

Line 262- Figure 8 shows Zone 1 inundation area as a function of total released volume with the specified 2/3 regression line and its 95% prediction intervals which account for the uncertainty of the individual data points. The difference between the lower and upper 95% prediction intervals reflects the variability of tailings-flows and the considerable uncertainties in the prediction of inundation area using this approach.

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Database Type	Equation	n	R-squared	References
Rock avalanches	$A = 76\ V^{0.57}$	76	0.78	(Li, 1983)[a]
Rock avalanches	$A = 12\ V^{2/3}$	40	-	(Hungr and Evans, 1993)[b]
Lahars	$A = 200\ V^{2/3}$	27	0.90	(Iverson et al., 1998)[b]
Debris flows	$A = 17\ V^{2/3}$	90	-	(Berti and Simoni, 2007)[b]
Debris flows	$A = 20\ V^{2/3}$	44	0.91	(Griswold and Iverson, 2008)[b]
Rock avalanches	$A = 20\ V^{2/3}$	142	0.79	(Griswold and Iverson, 2008)[b]

[a]The original equation from (Li, 1983) is presented in power law format to facilitate comparison.
[b]A and V are planimetric area and flow volume, respectively (A is in m^2 and V is in m^3).

Fig. 1.