Earth Surface Dynamics Discussions

Earth Surf. Dynam. Discuss., author comment AC1
https://doi.org/10.5194/esurf-2021-19-AC1, 2021

Preliminary Reply on RC1 comments

Odin Marc et al.

Author comment on "Controls on the grain size distribution of landslides in Taiwan: the influence of drop height, scar depth and bedrock strength" by Odin Marc et al., Earth Surf. Dynam. Discuss., https://doi.org/10.5194/esurf-2021-19-AC1, 2021

First I want to thank the referee for his enthusiasm about the data, analysis and interpretations presented in this work.

Second I want to thank him for his detailed correction of the language, that, in spite of several rereading and exchange with co-authors I failed to clean sufficiently.

Given a further review is waited I below simply give a few details on some of the points which were raised as unclear in the current draft.

Hopefully it can be useful to conclude the discussion.

Odin Marc, on behalf of the authors

Methods:

Bootstrapping and correlation:

We mean that to estimate the correlation between X and Y (say H and D50) from 20 GSD, we do not just give the correlation for the sample. We compute 10,000 correlation from bootstrapped samples and give the mean and std of R. It's just a way to assess if the correlation is substantially affected by outlier or extreme values.

Volume /Thickness estimates :

A-V scaling are crude way to estimate volume, and we need to choose soil (leading to low V and T) or bedrock (leading to large V and T) exponents. In the few cases where we have constrained a volume from the field we do not need to use scaling, but for the other slides we attempt to find a volume more representative than the end members from soil or bedrock exponents. When slides were large (Ws>50m) and displayed fresh rock we consider the bedrock scaling more relevant (with larger V and T). For the smaller slides which probably involved more soil but also some bedrock, we use an average of the two

scaling.

We will rephrase to make these points clearly.

Number of curves in Fig 2: There was some confusion and we reported wrong number in some places.

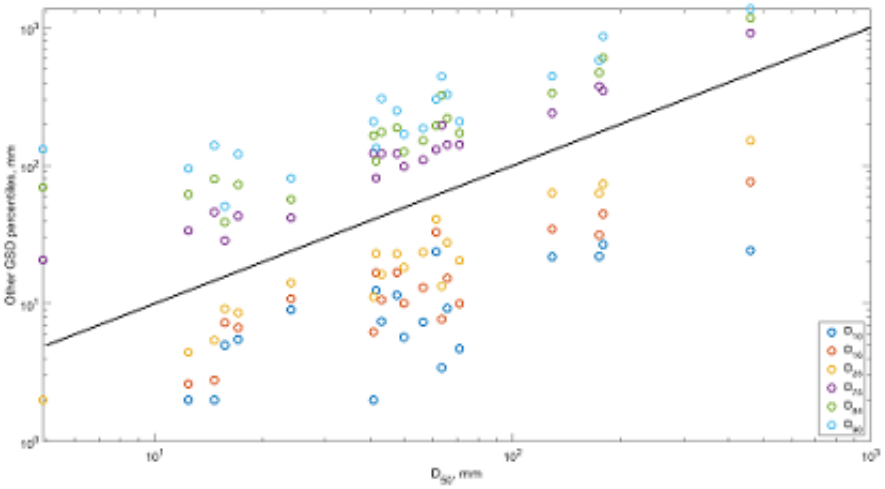
There are 17 landslide, but three of them are separated in "surface" and “inner” GSD, which makes 20 GSD. Then indeed the two panel and the dashed line are simply for visibility. We made two group based on Weibull Lognormal but it is somewhat arbitrary.

Weibull / Lognormal: Other studies have also suggested Weibull is better suited for fragmentation products and fractured bedrock, while lognormal emerges from multiple sorting processes (such as fluvial sediment transport). But we could not describe “well” all GSD with one or the other and could not correlate the fitted distribution (or magnitude of misfit) with any other parameters we have. So it is unclear if this section should be expanded (with some extra references) even if we do not reach any clear conclusions, or removed entirely.

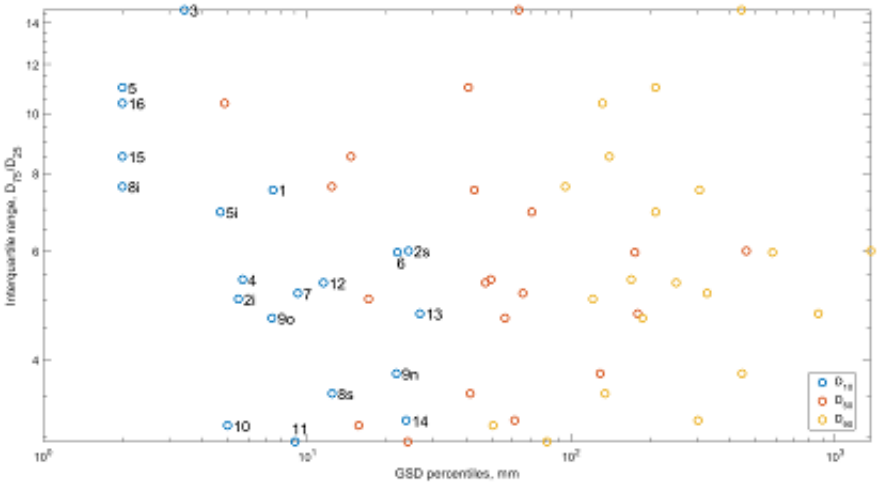
We will decide at the end of the discussion.

Showing correlations describing the GSD

As suggested by the referee, we plan to add extra supplementary figure about correlations between IQR and percentiles similar as the ones below:



Supplementary Figure : D50 against the other percentiles of the GSD for the 20 GSD. 1:1 line for reference.



Supplementary Figure : Interquartile range (D75/D25) against GSD percentiles. No correlation with high percentiles (D50, D90) while a moderate anticorrelation exist with D10.