Earth Surface Dynamics Discussions

Earth Surf. Dynam. Discuss., referee comment RC1
https://doi.org/10.5194/esurf-2021-19-RC1, 2021

Comment on esurf-2021-19

Mikaël Attal (Referee)

Referee 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-RC1, 2021

Dear authors, dear editor,

I very much enjoyed reading this manuscript with presents an extraordinary dataset on the grain size distribution of landslides. Such datasets are rare, mostly due to the challenges associated with collecting such data, but they are also much needed, as there is a growing recognition that source grain size data are essential to model sediment export and the evolution of sediment characteristics along river systems, with implications for assessing sediment fluxes, the preservation of signals in the sedimentary record, and the hazards associated with sediment movement.

Overall, the authors make a compelling case on the need for such data, but also on the need for a unifying framework that can allow scientists to predict landslide grain size data without having to go and measure tens of grain size distributions in the field. The authors evaluate the models proposed by Cohen at al. (2010) and Locat et al. (2006) for regolith coarsening with depth and for fragmentation during land slide, respectively, and they find a very good agreement with their data, which is a very exciting outcome (the data in figures 4 and 5 are amazing). This finding paves the way for a better integration of sediment supply into numerical models of landscape evolution and sediment transport, although the authors acknowledge that more data would be needed to be able to fully validate / calibrate the models. These results are certainly encouraging.

The authors also address variability at the site scale, including segregation along the slide and changes in surface grain size post-deposition, as well as variation between lithology. This work is very important and I strongly support publication.

However, I have a few suggestions, which are minor as mostly based on cosmetics. Firstly, the writing and grammar need to be improved. There are quite a lot of spelling mistakes, which I have highlighted in the annotated manuscript (I recognise that some suggestions I make may just be me being pedantic, but there are still a lot of real grammar errors that need correcting), as well as sentences that could be simplified. In a few places, statements are unsubstantiated and could benefit from a better justification as to why a given approach is taken, or support from literature. There are a few minor inconsistencies too. All of these are highlighted in the annotated manuscript.

I hope the authors find these comments useful. Very exciting work!

Mikaël Attal

Please also note the supplement to this comment:
https://esurf.copernicus.org/preprints/esurf-2021-19/esurf-2021-19-RC1-supplement.zip