

Response to reviewer comments on “Assessing the effect of lithological setting, block characteristic and slope topography on the runout length of rockfalls in the Alps and on the La Réunion island”

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Response to Anonymous Referee #1 (RC1)

We thank the anonymous referee #1 (RC1) for the constructive comments and detailed feedback. We greatly appreciate the suggested revisions which will improve the quality of our revised manuscript. In the following the original comments of the reviewer #1 are listed point by point in blue and replied to in black.

This paper presents a detailed analysis of deposited blocks on four study sites that are very different in terms of lithology and topography. The objective was to study the relationships between block propagation distances on the one hand and block properties (size and shape indicators) and topography indicators (mean slope, slope distribution, roughness, in particular).

The authors provided very detailed measurements of the above mentioned quantities based on analyses of Lidar data. The results obtained are very interesting as they differ from previous studies and thus moderate these results. The authors discuss these interesting results in details.

I recommend publication of the paper provided that the following minor comments are integrated :

Review Comment 1:

1) The calculation of topographical indicators (sections 3.2 and 3.3) are not detailed enough in my opinion. The authors only refer to previous studies. Additional information could be provided.

Reply: We will provide additional information on the described parameters in sections 3.2 and 3.3.

Review Comment 2:

2) The figures are small and difficult to read (small font size, in particular - Figure 4,5, 6 and 7, in particular). They have to be improved.

Reply: We will revise the figures when we revise the manuscript and ensure good readability in this step.

Review Comment 3:

3) Because the relationships between the run-out distances and topography/block properties are not clear, section 4.2 is very difficult to follow. This section should be clarified.

Reply: By means of our analyses and figures we described the complex relationship between runout lengths, block characteristics and topographic conditions of the slope and compare this with the results of other studies. In the revised manuscript we will re-organise this section in a more structured way and clarify the section 4.2.

Review Comment 4:

4) The authors mention that the deposited blocks are not only due to single blocks propagations, despite the analyses are based on this assumption. This point should be more emphasized / discussed.

Reply: We fully acknowledge that our study sites differ with respect to rockfall processes: While at Gampenalm and Dreitorspitze, we clearly see deposits that were formed by one event, the blocks measured at the other two study sites were likely deposited onto a talus slope that has been formed by “continuous” rockfall activity during a longer period of time. In the La Réunion area, large rockfalls are triggered very often by the seismic conditions there, but these are not recorded in detail. In the Zwieselbach valley, it is not possible to assign the blocks to one event. Accordingly, we will discuss this point in more detail and we will pay particular attention to this distinction in the revision of the manuscript and revise corresponding sections.

Review Comment 5:

5) p.5 l.101 : “show indicate “ ! typo ?

Rely: We will delete “show”.