Natural Hazards and Earth System Sciences Discussions

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Comment on nhess-2022-138

Anonymous Referee #2

Referee comment on "Spatio-temporal analysis of slope-type debris flow activity in Horlachtal, Austria, based on orthophotos and lidar data since 1947" by Jakob Rom et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2022-138-RC2, 2022

This manuscript presents a survey of the slope-type debris flow activity in the Horlachtal region of Austria since 1947 based on historical and recent region-wide orthophotos and LiDAR data, with the expectation that the spatial and temporal changes of a debris flow can be reflected through geomorphological changes. The manuscript presents rich debris flow data and conducts extensive data analysis. These works are relatively substantial, which is in line with the interests of the potential readers of NHESS.

Reviewer still have some questions and also some suggestions about the current research and manuscript, the comments can be found in below:

Major comments:

The scientific challenge of the manuscript need to be further sorted out. The author hopes to explore the spatial and temporal distribution characteristics of local slope-type debris flows, however, there seems to be no clear rule or conclusion until the end of the manuscript.

The results indicate that the slope-type debris flow activities in the Horlachtal region show three active periods. However, they seem to be artificially divided. Under this premise, whether the statistical results of debris flows in different periods, especially the quantity, are in line with the actual situation. In reviewer's opinion, people can get good statistical results they want by adjusting the time interval. Therefore, the basis of three active periods may need clarifications and solid reference.

In Abstract, authors points out that local thunderstorms are the triggering factors of debris flows. In this manuscript, only very limited words are used to describe this phenomenon. In reveiwer's opinion, the existing materials cannot support this conclusion. Furthermore, this conclusion does not seem to be closely related to the subject of the manuscript, and it is not the main result of the study. Therefore, reviewer does not believe it is appropriate to mention in the Abstract as the main conclusion of the manuscript.

The manuscript mainly focuses on the spatiotemporal statistics of debris flows. However, the analysis of the causes of these laws and their physical mechanisms is relatively limited. The susceptibility of debris flow is affected by some important factors such as soil properties and vegetation conditions. In the analysis, the influence of the above factors should be further discussed in combination with the characteristics of the study area.

The structure of the manuscript needs to be further streamlined and optimized. For example, "Methodological limitations" are suggested to be placed after the discussion, rather than before each discussion, which will hinder readers' understanding of the research conclusions. In addition, "Conclusions" in the current manuscript need to be modified. It is recommended to refer to other literatures published in NHESS for further simplification to show the insight, impact and implication of current study.

Minor comments:

It is recommended to further modify the figures:

The font sizes in Figures 5, 6, 8, 9, 10, 11, and 12 are too small, It is recommended to adjust according to the journal requirements;

For debrs flow volume, uncertainties of the calculations are presented by error bars in Figure 8, so other volume related figures may alos need erro bars?