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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Changes in the occurrence of rainfall-induced landslides in Calabria, Southern Italy, in the 20th century" *by* S. L. Gariano et al.

Anonymous Referee #1

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General comments:

This study presented temporal and geographical variations of landslide occurrences in Calabria, Southern Italy. The authors analyzed the relation between 1466 rainfall events with landslides and the population from 1921 to 2010. This paper is interesting for the evaluation of spatiotemporal changes of landslide occurrences based on long-term landslide and rainfall datasets. However, I have questions regarding data quality and the method that would need to be verified by authors.

Major comments:

1. I concerned qualities of the landslide catalog and rainfall data which were not verified by authors. For the time series analysis of rainfall data, validation of the homogeneity is necessary. In general, quality and accuracy of time series rainfall data have heterogeneities caused by improvements of the rain gauge system. For example, the minimum rainfall value observed by a rain gauge affect to the rainfall duration and cumulated event rainfall. It would be better to check the time series quality and accuracy of daily rainfalls.

2. As authors described, this kind of landslide catalog generally has incompleteness, bias and uncertainty. Additionally, the distribution and number of landslide reports may have a correlation of the distribution and number of population. I concerned that some of results and discussion, such as section 7.3, were affected by these incompleteness, bias and uncertainty of the landslide catalog. I would like see more information and validation of the landslide catalog.

3. Throughout the sections 6 and 7, the authors described the spatiotemporal changes in the REL and the thresholds. While they described detailed results, I would like to see a more in-depth discussion on the directions of climatic conditions, land use changes, geological and geomorphological conditions in the study area, and uncertainty of the landslide catalog.

4. This study defined a rainfall event as a continuous sequence of rainfall days with cumulated daily rainfall > 0. Then, a rainfall event with landslides (REL) was defined as the occurrence of landslides during and immediately after a rainfall event. What did you mean by "immediately"? It would be better to define the end date of REL, because rainfall amounts after landslide occurrences make little sense for the analysis. The landslide catalog has date of landslide occurrences.

Minor comments:

1. Section 4: It would be better to show a map of the mean annual precipitations.

2. Section 5.1: I would like to see a more information of landslide catalogue list. 77 % of landslide events had the geographical locations. How did authors analyze other 23 % of landslide events?

3. Section 6: Considering the incompleteness of landslide reports during a rainfall event, the classification of “single” and “multiple” makes little sense.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 3579, 2015.