Nat. Hazards Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/nhess-2019-381-RC1, 2020

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Geo-climatic hazards in the eastern subtropical Andes: Distribution, Climate Drivers and Trends" *by* Iván Vergara et al.

Anonymous Referee #1

Received and published: 3 February 2020

This manuscript offers a clear and interesting analysis of the interaction of snowfall and rainfall on the triggering of landslides and snow avalanches in a section of the Argentinean central Andes, where they pose a significant hazard and risk in a very busy transport corridor. The hazards are divided in two zones with different climatic patterns, which allow statistical analysis to assess the effects of climate and global warming on the hydrometeorological hazards activity. The manuscript is well written, figures are fine and results are sound.

My main comments are on the line of providing some more detail in the statistical methods used for the analyses, rather tan just giving a reference citation, and in particular to provide, if possible, or at least comment in the discussion, more detailed insights on the relationship of snowfall and rainfall patterns with landslide types. You have a

Printer-friendly version

Discussion paper

database with landslides classified as debris flows, falls, rotational and translational slides and complex landslides, with nearly 80% of them debris flows. Is it possible to get relationships for those types as separate subsets of data? They may be not statistically significant, but it would be interesting to comment on this. Are the results biased for debris flows?, thus are they applicable for the other landslide types? A second issue is that for the analysis you separate the area into terrain units of ravine, talus and rock walls, which are very variable in size. Could you explain the criteria to define these terrain units, which are used for probability assessment? Is the size difference a problem? I presume they are linked to some preferent landslide type (e.g. rock wall for falls, ravine for flows), is then possible to analyse the data in subsets of landslide type and/or terrain unit?

Some minor comments on the manuscript are the following:

L55-57. What can you say about g-CHs in the Chilean side? Are they absent, or there are no data?

L67-79 In this paragraph you provide some details on debris flows characteristics and mechanics, but say nothing on the other landslide types or snow avalanches also included in the analysis, can you homogeneize the information?

L144-147 could you mention the proportion of those landslides/avalanches triggered by earthquakes or other identified triggers in comparison with climatic or unknown trigger?

L173-174 could you please explain a bit these methods in the Methods chapter? Computing the probability is of the the most significant aspects for hazard analysis.

L220-227 Please explain why you use surface temperature data only from the Chilean side? are they representative?

L465 please revise the sentence "Horizontal lines indicate the seasonal division used and vertical thick (thin) line."

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2019-381, 2020.

Printer-friendly version

Discussion paper