

## ***Interactive comment on “Assessing the interaction between mountain forests and natural hazards at Nevados de Chillán, Chile, and its implications for Ecosystem-based Disaster Risk Reduction” by Alejandro Casteller et al.***

**Anonymous Referee #1**

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1. The title of this paper needs to be more detailed: The paper deals with snow avalanches and to a smaller extent also with debris flows

2. The introduction needs a better structure:

The first part deals with event documentation (in addition, the first and second sentence have no link). Then how settlement in mountains other than the Alps increased substantially and "thus it is particularly important in such more remote mountain areas, in which human populations and infrastructure are expanding, to learn more about

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different natural hazard processes and how they interact with mountain ecosystems". Why that? I would say it is important to know how these processes potentially affect the humans living there.

Next the introduction continues with how lacking event information can be obtained via dendrochronological methods.

Then we pass on to the statement "forests can protect infrastructure from natural hazards in mountainous areas" and after that the authors only mention the interaction between forests and snow avalanches. and the paragraph ends with Eco-DRR, which is shortly introduced.

The goal of the paper is not specific enough: The overarching goal of this investigation was to evaluate the role of mountain forest ecosystems as an Eco-DRR measure against natural hazards at Valle de Las Trancas, Nevados de Chillán, in the Biobío Region of Chile. The primary focus of the whole paper is on snow avalanches.

3. Make sure there is a link between the methods chapter and the results chapter. Suggestion for the structure of the methods chapter 1. Introduction - find the relevant tracks in the forest 2. Forest structure analysis 3. Tree ring analysis 4. Avalanche simulation with forest effect

4. The methods chapter mentions (p. 6, line 14): "In some of the avalanche tracks, we also observed abundant evidence of the occurrence of debris flows which were confirmed in some cases by documentary records" and "it was not possible to differentiate between the snow avalanches and debris flows". Then in the results (p.7 /line 18) the authors mention: "The results of our tree-ring analyses allowed us to reconstruct past snow avalanche and debris flows years" This is all confusing. In the discussion again: "In the current investigation area, however, we were not able to distinguish between avalanche and debris flow events using tree-ring methods because both processes occur typically during the same season (winter), when most of the precipitation commonly occurs. However, through available records, types of damages in the forest,

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topographical features (including channel geometry) and process modelling we were able to distinguish - to a large extent - one process from the other". The paper needs to provide more clarity!

5. The paper refers to the snow avalanches and debris flows as: natural hazards, natural events, disturbances, natural disasters. Probably it would help the reader if you reduce the number of different terms you use in the paper.

6. Conclusion "Our study shows that a combination of different methods and approaches is crucial to a comprehensive understanding of interactions between natural hazards, forest ecosystems and human drivers" natural hazards => only snow avalanches and debris flows, which is not that well understood because of the difficulty to separate the two human drivers => where does this suddenly come from, not analysed in the article

"provide a sufficient basis for decision support" decision support on what?

"This is particularly true for complex mountainous regions like the Nevados de Chillán" why are they complex?

"the combination of different methods applied in this study suggests that the conservation of regional native forests may contribute" The findings of the study may suggest that, not the methods.

"it is important to better integrate related spatial information as an input for land-use planning tools" rephrase this sentence please

7. Overall remark: the scope of the paper needs to be improved, a good red line is currently missing. A range of different results are presented and finally linked with Eco-DRR in the discussion without properly explaining what this concretely means in this region.

8. Figure improvement - Fig. 1: Focus is on the yellow square- please zoom in on the yellow square and the red line - Fig. 4: Replace plot number by "forest plot (fp)

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number" - Fig. 6 : scale is missing; the green dots are probably sampled trees - not mentioned;

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