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# ***Interactive comment on “Landscape analysis for multi-hazard prevention in Orco and Soana valleys, North-Western Italy” by L. Turconi et al.***

**L. Turconi et al.**

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Comment of the Reviewer: This paper presents a multi-hazard research for the Orco and Soana valleys which seems to have informed the civil protection plan for the area. While it seems to me that this work is very interesting I am currently unable to provide feedback on the methodology and the results used since too little information is provided and the given information is not following a clear structure. In order to move the reviewing process one step further I would suggest an in-depth revision with focus on the following points:

Response: The authors appreciate the Reviewer's comments about structure and sequence of the concepts and sentences. The authors have revised most of them for

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clarity, but some sentences remained as before because they are strictly linked to some steps of the study /methods /issues and partly comments.

Comment of the Reviewer: Objective: Please provide relatively in the beginning of the paper a clear statement of the full objective of the study you are presenting and focus the rest of the paper on explaining what you did to reach the target and what the results were. Currently I am not sure if you primarily want to present in this article what analysis you carried out/results you obtained or if you also aim at integrating how the results informed the civil protection plan. Please decide and adjust the content accordingly

Response: In Introduction section the last sentences of the first paragraph have been added in order to clarify the aims of the present study (New line numbers 45-52). Moreover, the whole introduction part has been revised as per the comments (Since the amount of revision is too long, that is why we have attaching herewith the revised manuscript for clarification -New line numbers 53-90).

Comment of the Reviewer: -Abstract: The abstract should provide a summary of every section of your paper – it should include 1-2 sentences of intro including the objective: introduce the study area in a sentence; very briefly describe your methodology; summarize your results and discussion in 1-2 sentences and close with 1-2 sentences of conclusion

Response: Abstract has been revised as per the suggestion of the reviewer(New line numbers 18-33)and it is as follows: "The study area (600 km<sup>2</sup>), consisting of Orco and Soana Valleys in the Western Italian Alps, experienced different types of natural hazards, typical of the whole Alpine environment. Some of the Authors have been requested to draw a Civil Protection Plan for such mountainous region. This offered special opportunity 1) to draw a lot of unpublished historical data, dating back several centuries mostly concerning natural hazard processes and related damages, 2) to develop original detailed geo-morphological studies in a region still poorly known, 3) to

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prepare detailed thematic maps illustrating landscape components related to natural conditions and hazards, 4) to check thoroughly in the area present-day situations compared to the effects of past events and 5) to find adequate natural hazard scenarios for all sites exposed to risk. Method of work has been essentially to compare archival findings with field evidences in order to assess natural hazard processes, their occurrence and magnitude, and to arrange all such elements in a database for GIS-supported thematic maps. Several types of natural hazards, such as, landslides, rockfalls, debris flows, streamfloods, snow avalanches cause huge damage to lives and properties (housings, roads, touristsites). A feedback of newly-acquired knowledge in a large area still poorly understood and easy to interpret products as natural risk maps are further results.”

Comment of the Reviewer: Organization: Each type of information has its place and in order to not confuse the reader it is crucial to not mix. E.g. the description of the study area, introduction to the hazards and past events should be in the introduction and the description of the study area. However, there is also information on the study area in the methodology on page 2228 – lines 24 and following on forest management, and in the results section on page 2233 you refer to pictures of torrential hazards (Fig. 9), and in the conclusion section you provide general background on the number of lives lost due to each hazard.

Response: Pages 22-33 as well the conclusion have been revised thoroughly. Moreover, the arrangement of the paper has also rectified accordingly (Revised manuscript attached- New line numbers 271-428 and 431-465)

Comment of the Reviewer: Another example is the methodology: In the methodology section far too little information is provided what analyses you actually carried out and in the results section which is split hazard by hazard (this would also be a good approach for the methodology section – this way you could present the methods used for each hazard analysis) you provide more information on your analysis approaches than in the methodology section.

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Response: The methodology part has been revised thoroughly and hazardwise techniques have been incorporated. Some the important changes, as suggested by the reviewer, as follows (New line numbers 147-268): Page 4. 1. Methodology part has been revised and reference for publications provided in the following manner: 2. Corrected: 'land use maps' 3. Corrected: 'of the last...' 4. Explanation 'how data layers have been created' was provided; changes have been incorporated in the text accordingly. 5. The formula has been explained properly 6. The importance of preservation from wildfire in a fully vegetated catchment has been clarified 7. The whole period and the subsequent one have been removed and placed in the intro section Page 5 1. The objective of the analyses is clarified and data processing procedure explained, as per the suggestion of the Reviewer 2. Informatics products are illustrated 3. The sentence arises from the work done, has been shifted to the 'results' section 4. Statistical analyses part has been revised thoroughly Page 6 1. The concept has been revised, unnecessary sentences have been deleted and tried to avoid misinterpretation 2. The exposed 'four groups of slope instability' are related to data processing and mapping, that is why they are kept as before, but some descriptions have been added in the 'results' section. 3. A short list of processes related to 'stream hazards' has been included 4. The concept of 'channel efficiency' has been clarified

Comments of the Reviewer: - Detail provided: Please provide much more detail on the methodology and results

Response: Response of this section has already been given in the two previous comments

- Please have the paper corrected by a native-speaker

Response: English has been corrected throughout the text. Moreover, final look up will be done after acceptance.

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