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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Local land-use change based risk estimation for future glacier lake outburst flood" *by* S. Nussbaumer et al.

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General observations:

The authors present an interesting approach to estimate the risk of possible future GLOFs. They demonstrate this methodology using the example of the Aletschgletscher and the community of Naters in Switzerland. In my opinion the manuscript is definitely interesting for the audience of NHESS and therefore worth to be published. The manuscript is well structured, the quality of the figures and tables is fine and their number is appropriate. I have one major and a few minor comments to be addressed before the paper can finally be published in NHESS.

My only major concern regards the combination of the different indicators e.g., the

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losses (page 4359, line 24) or the vulnerabilities (page 4361, line 7). Arithmetic operations such as building the mean are not allowed on ordinal-scale variables. I am aware that examples of such operations are frequently found in the literature but, strictly spoken, they make no sense. I would rather suggest employing a two-dimensional matrix to combine the values or simply to use the maximum. The same problem applies to the risk (page 4361, line 10). Multiplications on ordinal indicator variables are not a valid approach. Here I strongly recommend using a matrix approach (see e.g., Mergili and Schneider 2011, Gruber and Mergili 2013).

Mergili, M., Schneider, J.F. (2011): Regional-scale analysis of lake outburst hazards in the southwestern Pamir, Tajikistan, based on remote sensing and GIS. Natural Hazards and Earth System Sciences 11: 1447-1462.

Gruber, F.E., Mergili, M. (2013): Regional-scale analysis of high-mountain multi-hazard and risk in the Pamir (Tajikistan) with GRASS GIS. Natural Hazards and Earth System Sciences Discussions 1: 1689-1747.

Further general comment:

Grammar and style are fine, but anyway I recommend going through the manuscript carefully once more as there are some minor deficiencies which cannot all be addressed here. In particular, I have the feeling that much of the manuscript should be written in present rather than in past tense. However, this may be a personal preference of myself, please only change it if you wish to do so.

Further specific comments (page, line):

4350, 10: Better write "hazard“ instead of "hazard potential“ as the hazard itself is a potential.

4350, 18: Replace " a time period of 2045“ by "the year 2045“.

4351, 20/21: "estimate“, "estimation“: word repetition.

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4353, 19: "These data were available . . .".

4355, 24: Remove "in".

4356, 8/9: "The 24yr step was chosen to allow for an overall rate of change and to avoid further uncertainties". I do not understand what is meant here, please clarify.

4357, 18: You should explain in more detail what a change from "settlements" to "settlements" means.

4359, 3: Please shortly mention the flood routing model used.

4360, 27: Did you do some weighting for computing the average? 0.7 is not the average from 0.45, 0.95 and 1.

4361, 19: Maybe better: "In reference to this information . . .".

4362, 10/11: "driving forces": word repetition.

4367, 10: "due to more limited relevance of such an approach". Maybe you could more clearly express what you mean with this.

4367, 15: I'm not sure whether you can "run" a scenario, rather you can run a model based on a scenario.

4368, 3: "mainly by" would be better instead of "by mainly".

4368, 15: "are considered" would be correct instead of "is considered".

I hope that my comments will help to further improve the manuscript. If you have any questions, wish further discussion or disagree with one or more of my comments, please do not hesitate to contact me.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 4349, 2013.