

# ***Interactive comment on “Potential future exposure of European land transport infrastructure to rainfall-induced landslides throughout the 21st century” by Matthias Schlögl and Christoph Matulla***

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We would like to thank the referee for the evaluation of our manuscript and the provided feedback. Please find our responses below, with referee comments in italics, and authors' responses in standard format.

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## **1 General Comments**

*This paper displays some useful and interesting results and will be a useful paper to publish. It contributes to the understanding of landside hazards and provides new ideas. There are a number of issues with the methods section, as the results presented are not described by the methods. In order for this paper to be duplicable, the methods section needs to be completely re-written.*

### **1.1 Scientific Significance**

*Scientific Significance: The paper will potentially offer a contribution to the understanding of landslide hazards and provides some new ideas.*

### **1.2 Scientific Quality**

*The approaches used are confused, and methods are not apparent. The results and discussion section is unclear, and contains datasets and ideas which are not previously presented in either the introduction or methods sections (e.g. the CORINE dataset is first mentioned on p. 9 in the results and discussion section). References are generally appropriate, although there is an overreliance on IPCC publications, and there are a number of recent publications I consider to be missing.*

Thank you for pointing out possible difficulties in understanding parts of the results and discussion section without a proper introduction of certain data sets used and a more concise description of the methods applied. This is helpful information, since data and methods sections indeed offer room for improvement. While data sets used are referenced at the end of the manuscript in the data availability section, not all of them are described in the respective sections in the text. We will rewrite and extend the data and methods sections accordingly.

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### 1.3 Presentation Quality

*The results and discussion are not presented in a clear and concise manner. This is due to the methods section not describing the methods used. Structure is therefore lacking as much of the results and discussion section brings in new ideas and analyses not previously discussed. Language used is not always appropriate and there are grammatical and spelling errors.*

Clarification of data and methods sections should straighten out these issues. In addition, we will rework the results section to match the reworked methods section.

## 2 Specific comments

- *P. 3, L. 23 – The authors select a threshold of 37.3 mm and 25.6 mm however, references for these are not introduced until p. 4.*

We will add the reference to the CI on p3 l23.

- *P. 4 – The methods section does not describe the results discussed in the results and discussion section. This section needs to be re-written to ensure the duplicability of the study.*

Thank you for pointing this out. We will rework the data and methods sections.

- *P. 4, L. 29 – KLIWAS17 is not introduced at all.*

We will replace KLIWAS17 with “ensemble of 17 climate model runs (Imbery et al.,2013)” to avoid the introduction of a new term that is not used elsewhere in the manuscript.

- *P. 5, L. 5/6 – “While the first row of each figure refers to the near future, the second row displays projection results for the remote future. The three columns*

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*represent the quartiles in increasing order respectively” should be in the figure caption, not the text.*

- *P. 5/6 – Figures 1 and 2 are unclear. The authors need to clarify what the data are and how these were calculated.*

We will clarify this in the text, in particular by reworking the data and methods sections.

- *P. 6/7 – It is unclear whether the authors are talking about landslide events or precipitation events when discussing change between the two reference periods.*

These two are linked to each other via the CI. Changes between the two reference periods refer to the changes in the CI. The CI is based on precipitation data, but serves as a proxy for landslide events. We will clarify this in the text.

- *P. 8 – I am not sure how the authors use topography and lithology/geology or soil typology in their analysis.*

We will clarify this in the text, in particular by reworking the data and methods sections.

- *P. 8/9 – Figures 3 and 4 are good, but again, I am not sure how these were calculated; the authors need to clarify this.*

We will clarify this in the text, in particular by reworking the data and methods sections.

- *P. 9. I am not sure how the authors use erosivity or land cover in their analysis.*

We will clarify this in the text, in particular by reworking the data and methods sections.

- *In the abstract, the authors state “Results indicate overall increases of landslide occurrences. While flat terrain at low altitudes exhibits increases of about two more landslide events per year until the end of this century, higher elevated regions are more affected and show increases of up to eight additional events”, but do not show how these results are obtained from descriptions provided in the methods section. Furthermore, this “result” is not mentioned in the results and discussion section and also not mentioned in the conclusion; this needs to be clarified.*

We will clarify this in the text.

- *P. 10 – I am not sure how the mapping for Figures 5 and 6 was carried out. The authors need to be clear when it is their work that is being referenced, or the work of others. Figures must be referenced correctly if data were obtained from other sources. The use of these data must also be described in the methods section as these are first introduced in the results and discussion.*

We will clarify this in the text, in particular by reworking the data and methods sections.

- *P. 11 – I think that the authors conclusion sums up the findings of the paper, but does not reflect the results and findings described in the abstract and is confusing to read for this reason.*

We will clarify this in the text and increase consistency with respect to conclusions throughout the manuscript.

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