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# Comment on nhess-2022-50

Matthias Schlögl (Referee)

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Referee comment on "Spatio-temporal analysis of the role of climate cycles on landslide activity: the case of Majorca (Spain)" by Juan Antonio Luque-Espinar et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2022-50-RC3, 2022

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The manuscript presents a spatio-temporal analysis of climate cycles on the island of Majorca and seeks to explore correlations with evidence of historic landslides, i.e. a landslide inventory featuring 423 events.

Albeit the general idea (especially the topic of identifying main climatic cycles) is interesting, I am afraid that there are several major issues with this manuscript in its present form:

- I am missing a clear red thread throughout the article, thus rendering it slightly difficult to read. It is not ultimately clear to me why these particular methods were chosen to tackle the problem under consideration and what the main findings are that the authors want to convey.
- Moreover, findings are not put into context, and a discussion section is missing completely.
- Sections are not clearly separated. Some parts of section 3.4 on rainfall series data seem more like results than "Materials and Methods" to me.
- The joint consideration of different process categories, which are simply summarized as "landslides", would need better justification. After all, these different processes are most likely characterized by different trigger conditions (e.g. rockfall - earth slides - debris flows). The authors could explore results per process category (at least for those categories where enough events are available).
- Some sections are not written in a balanced way. Especially section 3 does not really present the methods applied in a stringent and reproducible manner. For instance, Section 3.3 provides a rather general introduction of geostatistics, but ends quite abruptly with the last paragraph somehow falling short of actually explaining what is done here and why. Why was OK chosen specifically? I assume that there is a trend due to the topography? Also, it is quite common to perform cross-validation on kriging results, but it is unclear at this point if any validation was performed and if yes, how?
- I am under the impression that some important details were omitted or are at least hidden in the manuscript. For instance, satistical confidence values estimated at each rainfall station have been reclassified from 0 (not detected) to 4 (more than 99%

statistical confidence). How were these thresholds chosen, and where are they listed? I assume this information is hidden in l. 136?

- I think that the connex between the climate cycles and landslide events should be motivated in a better way. Currently, I fail to see this connection. Maybe a more detailed exploratory analysis of the landslide inventory against the identified climate cycles might provide interesting insights?
- On a more general note, all recorded landslides seem to have occurred in the north-western part, i.e. in the Serra de Tramuntana. This is statet in l.68, and indicated by the white dots in the maps (Figs. 5, 7). I do not really understand why a geostatistical estimation of the whole island does relate to landslides that only occurred in a quite specific sub-region near to a mountain range?
- Only some large landslides are prominently mentioned. Consequently, the main connection seems to be event *magnitude*, not event *frequency*. An exploratory analysis of event frequency could provide interesting insights as well.

Overall, I do not think that the manuscript is suitable for publication in its current form due to these limitations. However, I do encourage the authors to work out the proposed connection between climate cycles and landslides in a more elaborate manner.

Best regards,

Matthias Schlögl