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## Reply on RC1

Axel A. J. Deijns et al.

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Author comment on "Timing landslide and flash flood events from SAR satellite: a regionally applicable methodology illustrated in African cloud-covered tropical environments" by Axel A. J. Deijns et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-172-AC1>, 2022

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Dear reviewer #1, thanks for taking the time to review our manuscript. We hereby provide a preliminary reply to the main concerns. We will provide a full item-by-time reply, including the revised manuscript, once all the reviews are in and a decision is made by the editor

1) Reviewer: "I believe the strength of the paper relies in the accurate comparison of those approaches, rather than in the new proposed approach. I'd change the title accordingly, as well as underline this in the text".

REPLY: One of the strengths of the paper is indeed in the use of a number of SAR data products that we deliberately tested within contrasting landscapes. This clearly allowed us to better understand the ability of different SAR products for detecting the timing of these interacting landslide and flash flood events within different landscape conditions and will help us when applying our methodology on a larger set of events. From an event timing detection perspective, however, we are the first one who use SAR to analyze landslides and flash floods together as being co-occurring and interacting events. This combination of geomorphic hazards is quite frequently leading to societal and environmental impacts that are more severe. However, such processes are usually studied in isolation, then leading to an underestimation of their impacts. One key step to study these combined processes together is to collect information on their temporal occurrence. However, these processes are almost never studied together and, so far, there has never been a research dedicated to their combined temporal detection using radar satellite. The use of an unprecedented combination of SAR products, plus the approach of analyzing events containing both co-occurring and interacting landslides and flash floods explains our use of 'a new methodology' (as it is summarized in lines 556-560). In our revised manuscript, we will put more emphasis on the fact that we intentionally process landslides and flash floods together to make it clearer for the reader.

2) Authors state that reducing the investigation time frame would increase the accuracy, however they consider that no time information is available, while all the methods require the inventory of the phenomena. Now, in cases in which the inventory of the event is available, and the study cases are multiple GH events, I believe the timing is more or less known (at least with +- 6 months of uncertainty). Why did you decide to make such assumption?

REPLY: The methodology proposed in this research is designed to be applied automatically with minimal intervention, with a focus on the regional scale. More specifically, tropical highly cloud covered areas where data scarcity is prevalent are the first target. In large regions, such as in our study area, information on the temporal distribution of GH events may not always be available. We will make sure that it is better understood.

3) It is not clear how, after processing, the time of occurrence is set by time series analysis.

REPLY: This is addressed in lines 351-358. For this we are using a change detection package named "rupture", that uses binary segmentation to derive the most significant change within the time series. The resulting variable is basically a point in time. In our revised manuscript, we will rephrase to make this clearer.

4) Coordinates missing in Figure 1. This figure must be improved.

REPLY: Agree, the coordinates will be added in the next iteration.

5) I would condense the text. This would make it easy for readers to follow the manuscript flow. Sometimes the same details are repeated several times in the text.

Reply: We will make sure that repetition in details is reduced to improve the quality of the text; noting nevertheless that reviewers #1 and #2 both praised the quality of the writing.