EGUsphere, referee comment RC1
https://doi.org/10.5194/egusphere-2022-596-RC1, 2022
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Review to egushere-2022-596 by Uwihirwe et al.

Anonymous Referee #1

Referee comment on "Potential of satellite-derived hydro-meteorological information for landslide initiation thresholds in Rwanda" by Judith Uwihirwe et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-596-RC1, 2022

General comment

The manuscript deals with the investigation of the use satellite-derived rainfall and soil moisture information to derive thresholds useful for hazard assessment (in the sense of early warning) in Rwanda. In particular, the authors compare different satellite-derived precipitation and soil moisture products with observations. They also use soil moisture derived from a simple hydrological model. Then they use several rainfall variables to analyse their predictive power for landslides (single rainfall variables and rainfall+soil moisture 2D analysis).

The manuscript is well written and the investigation is sound. I think that just a few points need clarification and some additional comments, as detailed below. For this reason I suggest minor revisions for this manuscript.

Specific comments

Section 3.3.3 This section describes the hydrological model-derived soil moisture. I feel that maybe the manuscript can benefit from a few more words about the model and its calibration. Perhaps just 5-10 lines may be sufficient, as I understand that you do not want to break too much the flow of the manuscript. Otherwise go for an appendix/supplementary material.

Equation 7. I really appreciate the approach of normalizing the soil water content to make comparisons between models and observations. However more details should be given on this: which values of theta_max and theta_min have been found for the various soil moisture products?

Section 3.1 The landslide inventory is made of 32 useful landslides. These are a bit few (see analyses in https://link.springer.com/article/10.1007/s10346-021-01704-7). A comment on this may be added. However, for the manuscript this is not a big issue as it focuses on Rwanda which is an area for which only a few studies exist.

Section 4.2.3 : A comment on the limitations of the analysis related to the constraint of using a bilinear threshold form may be added (see e.g., https://www.mdpi.com/2073-4441/13/13/1752/htm, where other forms are suggested).

Minor comments/technical corrections

LL 364-365 This is unclear: I immagine that the critical level for landslide occurrence is sort of fixed and then it is reached more or less easily based on the prior rainfall and the time lag.

LL 500 The authors apply a threshold of 10 mm on satellite products to make them better agree with observations. This is a sort of a "bias correction", about which a lot of literature exist. Perhaps make a fast literature review and add some references. (This could be useful also for future work)

Fig. 1 is perhaps a little bit messy (especially in B/W).

LL 512 the authors write "inter-event time" as the minimum dry interval between rainfall events. Perhaps add "minimum", even if I understand that IET is aligned with previous literature in the field of landslides.

L120 a ")" is missing after Mukungwa.

L586 thus "can be" (?) very useful (something is missing in the sentence).