

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
<https://doi.org/10.5194/nhess-2021-222-RC2>, 2022
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Comment on nhess-2021-222

Giulio Castelli (Referee)

Referee comment on "Integration of observed and model-derived groundwater levels in landslide threshold models in Rwanda" by Judith Uwihirwe et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-222-RC2>, 2022

The paper "**Integration of observed and model derived groundwater levels in landslide threshold models in Rwanda**" is a very interesting and innovative contribution, which takes advantage of a peculiar case study area in Rwanda. The contribution is particularly timely and makes a good use of the recent monitoring networks set up for the country, and it will be meaningful for other neighboring countries - more in general for central Africa.

The scientific quality of the paper is very good. However, the following issues should be solved:

- Lines 176-177. The choice of calibrating the model with the later years (instead of the earlier ones) is rather uncommon. Why is this so? Was a proper validation carried out, besides the calibration? What software/methodology was used for the calibration? Which parameters were calibrated?
- Lines 184-187. With reference to comment 1 in RC1, I am not fully convinced of the answer given by the Authors. Please state in the M&M section that this is an assumption made given the data scarcity in the area, and provide a justification of the choice, eventually citing suitable references.
- Lines 195-200: With reference to comment 2, RC 1, I have to say that even here authors should declare that the database has some intrinsic limitations in the M&M section. Kindly cite some papers using the same database to show some example of its usage.
- Line 260: It would be useful to understand which is the relative RMSE value, e.g. for example $RMSE/mean_groundwater_depth$. Moreover, it is not fully clear which was the final value of the calibrated parameter.
- Paragraph 4.5: can the differences in the three watersheds in terms of warning capabilities and thresholds can be explained by their geo-morphological differences? How this is related to the comment at line 184-187?