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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Probabilistic landslide susceptibility analysis in tropical mountainous terrain using the physically based r.slope.stability model" *by* Johnnatan Palacio Cordoba et al.

Anonymous Referee #1

Received and published: 15 September 2019

The paper presents a landslide susceptibility analysis in a catchment of Colombia where an intense rainfall event took place. Authors test a method called r.slope.stability that is implemented in GRASS GIS and they compared it with another two methods, SHALSTAB and SHIA_Landslide. The results achieved can be of interest for the geological surveys and experts on landslides of the Tropical Andes region and have a high potential to be taken into account by other scientists in similar studies around the world. In my opinion, the main highlights are: (1) the results about the reliability of each deterministic method applied on studies of large areas; and (2) the good performance of the r.slope.stability tool to forecast the potential unstable areas.

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The graphic information is well designed and text is well written and organized, following a format that is easy to read. I do not have remarks on the first three sections. The "Introduction" and "Study area" sections provide a good overview of the setting and the landslide problem in the region and "The r.slope.stability model" section clearly explains the fundamental elements of the method in which this study is focused. However, "Data and procedure", "Results" and "Discussion" sections have some shortcomings that I will present below.

- I find a figure with the SHALSTAB and SHIA_Landslide models to be lacking.

- The statistical indexes of the table 4 are not defined in the "Data and procedure" section.

- ROC curves for SHALSTAB and SHIA_Landslide models are missing. This validation technique is the most robust and, in my opinion, the most appropriate to elucidate which method has the best performance.

- The elaboration of ROC curves of each model needs a more detailed explanation. I am not sure how the A, B, C and D curves presented in figure 5 have been calculated.

- I am surprised that authors do not discuss about some of the most relevant publications about the comparison of stability analysis methods implemented in GIS environments. I encourage authors to read and discuss the results obtained by Cervi et al. (2010) and Zizioli et al. (2013) among others:

OTHER REMARKS:

Line 46. Delete "because of its equatorial location", it is a repetition.

Line 198. Change "Source: Adapted from (Aristizábal et al., 2016; Qiu et al., 2007)" by "Adapted from Aristizábal et al., (2016) and Qiu et al., (2007)".

Line 316. Change "071" by "0.71".

Figure 5. I think that the figure is confused. Please change the style of the figure to

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understand it at a glance. Suggestions: Change A, B, C and D codes by the name of the models. Use similar colors according to the type of the models.

REFERENCES:

Cervi, F., Berti, M., Borgatti, L., Ronchetti, F., Manenti, F., & Corsini, A. (2010). Comparing predictive capability of statistical and deterministic methods for landslide susceptibility mapping: a case study in the northern Apennines (Reggio Emilia Province, Italy). Landslides, 7(4), 433-444.

Zizioli, D., Meisina, C., Valentino, R., & Montrasio, L. (2013). Comparison between different approaches to modeling shallow landslide susceptibility: a case history in Oltrepo Pavese, Northern Italy. Natural Hazards and Earth System Sciences, 13(3), 559-573.

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