Comment on nhess-2021-254
Anonymous Referee #1

Referee comment on "GIS-models with fuzzy logic for Susceptibility Maps of debris flow using multiple types of parameters: A Case Study in Pinggu District of Beijing, China" by Yiwei Zhang et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-254-RC1, 2021

The paper entitled "Regional-scale GIS-models with fuzzy logic for Susceptibility Maps of debris flow: A Case Study in Pinggu District of Beijing, China", focused on the debris flow susceptibility map computation of a series of drainage basins of the Pinggu District of Beijing. The authors proposed a methodology based on GIS-models, combining diverse methods: grey relational method, data-driven and fuzzy logic methods. The manuscript deals with the application of susceptibility analysis on debris flow. The topic is interesting and is suitable for the journal. The model used in the manuscript not only considers the scientificity and accuracy, but also considers the application in engineering practice. I think the article can be acceptable after some revisions are made.

I have two main questions for the authors to explain:

- In ArcGIS, the watershed algorithm is to obtain the sub watershed units of the whole Pinggu region. How can the author select these specific watersheds in the article? How are other unqualified units excluded?
- How to explain the similarities and differences between models R6-R17?

Specific comments are listed as follows:

- The **introduction** needs a section concerning susceptibility methods.

- The **Results and Discussion** needs to be more detailed and organized.
The language in this article should be polished by a native speaker. The English is in some cases not good enough for the reviewer to understand the points the authors are trying to make, or follow their descriptions of the research.

-Line 26  by the results ☐ by results
-Line 26  validated by the other two ☐ validated by two other
-Line 27  the method to ☐ a method to
-Line 47  significance to establishing ☐ significance to establish
-Line 76  disaster chain and that the geomorphic ☐ disaster chain and the geomorphic
-Line 76  rather than simple data fitting ☐ rather than simply data fitting
-Line 80  account for ☐ accounts for
-Line 90  1. Data and Methodology ☐ 3 Data and Methodology
-Line 99  watershed characteristics factors ☐ watershed characteristic factors
-Line 103  our primary assumption here are ☐ our primary assumptions here are
-Line 103  First ☐ Firstly
-Line 105  Second ☐ Secondly
-Line 114  by professional team--- ☐ by professional teams
factors (Type B) factors → factors (Type B)
a effective method → an effective method
3.4 fuzzy memberships → 3.4 Fuzzy memberships
can be used to derive their fuzzy → can be used to derive their fuzzy
order to use properly → order to use it properly
Compared with other four fuzzy operator → Compared with other four fuzzy operators
Fuzzy Gamma (Eq.6) → Eq.5
seventeen results were compared (Table.6) → Table.5
the results is not comprehensive → the results are not as comprehensive
there are total 135 basin → there are total 135 basins
uncertain factor compared with factors compared → uncertain factors compared
bedrock fracture flow; and root strength--- bedrock fracture flow, and root strength
in which all factors as a single---in which all factors are considered as a single
nonlinear methods is consistent  □  nonlinear method is consistent

clear and the data is easy to obtain  □  clear and the data is easy to obtain