Editor's or Referees 's Comments

1. General comments

Thank you for the submission of your manuscript "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". As you know, two reviewers have now provided detailed reviews, which you have replied to. One reviewer recommended minor to medium revisions, the other one to reject the manuscript. I believe that your manuscript needs tremendous improvement to bring it up to an international level before it can be further reviewed. The main issues at this point, which will require a major rewrite and revision are as follows:

Response: Thank you very much for your valuable and constructive comments on this manuscript. Your comments are very helpful for us to improve the manuscript. In the following, we will reply to explain the comments one by one to clarify our intended meaning. Please see the specific responses below for more details.

2. Specific comments

***Comment 1*:** (a) NOVELTY OF YOUR STUDY. Your research on the application of susceptibility analysis on debris flow is a more or less interesting case study, but you do not tell us what is novel. This needs to be done both at the beginning so we understand, but also in discussion, telling us 'why should someone outside of your study area be interested in the results'. If you were to explain the results of your case study to someone in another country, what would they gain from your case study? Do they learn from your methodology and what you encountered when applying it? What is novel and what might they learn?

Response: Thank you very much for your valuable and constructive comments on this manuscript. Your comments are very helpful for us to improve the manuscript. We summarize the novelty of our paper as follows:

1. We summarize the commonly used mudflow evaluation indicators, define and explain the role of each indicator in detail. On this basis, a new factor was proposed which contributes up to 0.79, indicating that this factor should be given attention. The factor evaluates the debris flow from an energy perspective.
2. 17 models were derived through a scientific method of controlling variables in a case study. By comparing the results of the models, it is found that grouping the influencing factors helps to improve the accuracy of the models, i.e., those with similar intrinsic properties should be overlaid into one group. Then the result of these group will be calculated with each other. In contrast, previous studies merely superimposed the factor layers individually. If the study

object is linear, then the results are consistent. If the study object is nonlinear, then the results tend to be different. This research idea verifies that the debris flow system has nonlinear characteristics.

3. AUC is an effective index for evaluating models, but there are certain limitations. For basins where debris flows have occurred, we can define them as positive; but for basins that are not currently occurring, we can't define them as negative theoretically. In other words, the applicability of the method gradually increases when there is abundant data in the area in the past. But when the region is data-poor, many classifications are manual divisions, which are prone to bias. Therefore, two other indicators are proposed in our paper.

4. Only one of the 17 models proposed in this paper has an AUC below 0.6, indicating that the modeling logic is reasonable. Coupled with the simplicity of the method used, the small demand for data, and the clear meaning of the factors, these advantages ensure that the model is transferable to other regions.

***Comment 2*:** (b) BROADER CONTEXT OF YOUR STUDY. You do not relate your work to the broader literature of what others have done. We need to understand this broader context and what others have done.

Response: Thank you for your professional comments. We have read the relevant literature and added the relevant content to the ***introduction*** section.

***Comment 3*:** (c) ENGLISH. Although your manuscript will undergo a copy editing at the final stage, there are sentences in your manuscript which one cannot follow due to the issues of English. I am not saying the English must be grammatically perfect, but at least to a level that the reviewers (and myself) can understand what is being said scientifically.

Response: Thank you for your professional comments. We apologize for the misunderstanding caused by our expression. It is supposed that the language issue you mentioned is very pertinent. We have read our manuscript carefully again and revised the language significantly as well as the structure.

***Comment 4*:** You need to do an extensive revision of your manuscript before resubmit it.

Response: Thank you for your professional comments. Last time your email told me not to revise the original draft and to reply first, so I did not revise the original draft. This time, I have made a lot of revisions based on the relevant issues, and I hope it will meet your requirements and those of the reviewers. I sincerely hope that our research results can be published in your journal and

can be related in the academic community.

Thank you for your professional comments. We apologize for the bad reading experience caused by our poor English. We also hope that language issues will not become a barrier to scientific communication. We have tried our best to improve the manuscript and make changes in the manuscript. We appreciate for Editors/Reviewer's warm work earnestly, and hope that the revision will meet with approval. Once again, thank you very much for your comments and suggestions! Please feel free to contact me, if any further changes are required. We look forward to hearing from you.

Yours sincerely,

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