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Discussions

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Interactive comment on "Landslide susceptibility mapping using fuzzy logic and multi-criteria evaluation techniques in the city of Quito, Ecuador" *by* Daniela Salcedo et al.

Anonymous Referee #2

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The manuscript "Landslide susceptibility mapping using fuzzy logic and multi-criteria evaluation techniques in the city of Quito, Ecuador" presents an expert knowledge-based approach for landslide susceptibility assessment. Although the applied methodology is not new, the study area is of particular interest given the historical records of fatalities and damage to infrastructures. General comments: The application of fuzzy logic and AHP requires a detailed knowledge of landslide concepts, characteristics and their relationship with the predisposing factors. However, major weaknesses are evident along the manuscript regarding these issues. For instance, the concepts of vulnerability, susceptibility and risk are often confused. We can also find sentences and/or ideas that are scientifically wrong. As already highlighted by reviewer #1, the

structure of the paper is not well organized. The introduction content is very poor and other studies regarding the application of fuzzy logic and multi-criteria evaluation techniques are never mentioned, although already applied worldwide. The authors must also justify the choice of such methodology. In the "Results and Discussion" the reader can find part of the methodology used and, in fact, the paper lacks a proper discussion. Another important flaw is related to the fact that the type of landslides under study is never referred (debris flows? shallow slides? deep-seated landslides? rockfalls?...) as well as their morphometric characteristics. Finally, one of the major weaknesses of this work is the lack of quantitative validation (e.g. ROC curves, prediction rate curves, etc). Due to my overall appreciation of the manuscript I would recommend its rejection. Detailed comments: regarding the detailed comments I will not extend to much, but I think some points should me remarked: Lines 59-62: the inventory of landslides is not based on probabilistic, deterministic, heuristic or statistical techniques. I think the authors would want to refer to "susceptibility mapping" instead. Plus, saying that deterministic techniques rely on "assign weights to a series of causal factors used according to the researcher's experience" is not correct. Lines: 68-69: these tools are very important, but they don't allow, by themselves, the assessment and/or identification of landslide risk. Thus, the sentence should be reviewed, as well as others along the manuscript (e.g. line 93: "the study area evaluates the susceptibility...."). The is also an excess of toponyms along the manuscript. These should be represented in the figures or, if they are not relevant for the study, deleted. Plus, all the figures should be referred in the text also by their number. Lines 119-120: irrelevant for the study. Lines 123-125; 151-152: the maximum precipitation value should be mentioned. Lines 167-171: Review the principle "The past and the present..." according to existing literature (e.g. Varnes, 1984). Line 174: delete "landslides" because they are not the independent variable. Lines 238-239: the landslides inventory is not used to determine the triggering factors... Line 253: In Table 2, the reader can only understand the assign weight if the type of landslide is known. However, how can "beaches" have the highest value, which means that it is more related to high landslide susceptibility? Line 285:

the lithological classes should be generalized at least for its cartographic representation, otherwise the map becomes unreadable (figure 10). Lines 287-290: The authors should explain why they chose those distance limits to faults, rivers and roads. I think that the maximum distances might be exaggerated. Lines 326-328: If the authors want to assume that their susceptibility map is more reliable than the existing one, then a quantitative validation should be done. Plus, the comparison between the two maps should be performed in a quantitative way. Finally, the final version of the manuscript should be revised by a native-speaker.