Dear Reviewer 1,

the authors thank the comments. These are very relevant and well prepared and most of them were considered in the reviewing process. We believe that your contribution helped to improve the manuscript.

The manuscript addresses the effect of using land cover data of different spatial and thematic resolution in landslide susceptibility modeling, particularly for susceptibility zonation of a road network. The topic is interesting and significant. Land cover data is used in susceptibility mapping, often without questioning its quality and suitability for such an analysis. The authors provide us with an overview of what we might be missing in case we use unsuitable data (or data which is too coarse for example).

The authors first introduce us to landslides in general, and their effect on human lives, activities, infrastructure, etc. They proceed with describing the usefulness of landslide susceptibility assessments. Afterwards, we are introduced to the role of land cover and how the choice of geoinformation details of land cover is usually not studied – despite being a significant factor. The authors demonstrate their approach in a watershed in Portugal (with a detailed focus on three smaller areas within the watershed boundaries).

They use two different land use and land cover data to demonstrate the effect of using different data on landslide susceptibility: the Portuguese land cover map (COS), and the European Corine Land Cover (CLC). The landslide susceptibility mapping itself is straightforward and is based on acknowledged and commonly used methods (information value). Although, there are other approaches, where similar data could be used (logistic regression, weights of evidence), the authors chose this method, as it has been applied at a similar scale, also in Portugal. Generally, it is a nice study, however with some major flaws - most of them related to the fact that some topics were not addressed. This means, that my revision recommendation is mostly based on rewriting the main body of the text, adding additional clarifications, or expanding the discussion.

Aditional analyses are not needed.

First, while the authors investigated the role of land cover data on modeling landslide susceptibility, they did not compare different methods. I do not expect the authors to perform additional analyses with other modeling approaches – however, I would like them to discuss the method used a bit more extensively. For example, could other methods lead to larger (or smaller) differences between different land cover data?

Authors: We believe that the use of different landslide susceptibility methods culminated in different results, many studies highlight some differences in results obtained by different methods, specially between IV, logistic regression and weights of evidence. This fact is well developed scientifically, and the manuscript goal is not to compare results with different methods, but LUC with different properties. If the conditions are the same in the modeling process (predisposing factors, method, software, …), the differences in results can be derived from the change the LUC data, and its properties justify these differences. However, we introduced a reference about this point in discussion.

"*the differences observed in the landslide susceptibility models are a consequence of using different LUC data inputs (different properties), because the other predisposing factor maps are the same in two models*."

Second, I have seen many landslide susceptibility studies, where data with relatively coarse data has been used. Also here, the data on soil and lithology is on a (much) coarser resolution than other data (slope characteristics, and land cover). We can see, that while all other data has a fine and detailed pattern, the lithology and soil maps have clear boundaries, with relatively large mapping units. This is of course not the authors fault – this are probably still the most detailed soil and lithology maps available for the study area. Nevertheless, I would like to see a more detailed section in the discussion, reflecting on the discrepancy of such differences (e.g. scale and mapping unit) and the effects on susceptibility modeling. The authors already did this for the land cover maps, and wrote a few sentences in the discussion.

Authors: The data of soil and lithology used is the only free data available for the study area. Nevertheless, the soil data is incomplete in study area at scales ≥1:50 000 and this is also very expensive. The geological data is not available to the study area at the 1:50 000 scale (please check in http://www.lneg.pt/servicos/215/).

The predisposing maps (soil, lithology, slope, …) are statics in the landslide modelling process, except the LUC data, then the results change derived from the LUC data properties that integrated each landslide model. The IV can change if the scales of factor maps are different, is a fact, but we do not have the possibility to use more detailed geoinformation, specially information with high costs.

About this topic, a new sentence was introduced in discussion.

"*the data of soil and lithology was constrained to very generalized (1:1000000 and 1:50000 scales, respectively) and this factor can influence the IV results if more detailed data was considered in the modeling process. The performance of the landslide susceptibility mapping and assessment is controlled by the quality of the available data and it depends not only on the method*."

Third, I have two comments regarding the landslide inventory (page 9, lines 5-10). To be clear, the authors mapped landslides using orthophotos and google earth themselves? And the authors went on the field themselves as well? Currently, it is not clear if they received the data that was developed by photointerpretation, or if they performed it themselves. Moreover, it seems that the most landslides are outside forested areas – I compared the two land cover maps with the landslide distribution map visually.

This is of course possible, as evidence shows that forests have a positive role on slope stability (e.g. due to roots). Nevertheless, it is also difficult to map landslides in forests, using photointerpretation only. This can have significant effects on the results.

For example, if we look at Figure 4, the areas where the differences between the two susceptibility maps are the lowest are indeed areas covered by forests (or seem to be, the authors did not provide additional information that would lead to other conclusions). Also, studies have shown that landslide unit definition have a significant effect on landslide susceptibility modeling. It makes a difference if a landslide is mapped as a point, as the whole landslide area, or only the scar of the landslide. What did the authors map? From the text, I cannot see if a landslide is presented by a (centroid) point, by the whole area, or something else. Please clarify how you mapped landslides.

Authors: The landslides were inventoried and validated only by authors. In fact, the photointerpretation of landslides in forest areas is very complex, and possibly some landslides cannot be inventoried or validated in the field because are covered by vegetation. Some landslides in burned areas were also considered.

The landslides are not represented with points, but polygons (areas) that represent the unstable area (scarp, body and toe), see the table 3 (Statistics description of the landslides inventory). Additional information was introduced in the Data section.

"*The landslide inventory was obtained by photointerpretation (orthophotos of the year 2005 and Google Earth images), a process supported by ancillary topographic data and further field work validation only performed in the sample areas (Fig. 1) due to the extension of the study area. A total of 128 landslides (predominantly shallow translational slides), with a total area of 74042 m2, was validated during field work in sample areas (49.4% of the total inventoried landslide cases). Among the landslides initially inventoried by photointerpretation in sample areas more than 90% of cases were confirmed. In these sample areas roads disruptions were also validated.*"

Specific comments

Title

In my opinion, geoinformation properties is too vague. What about simply "effects of different land cover data on: : :"

Authors: We accept your suggestion and the title will be changed accordingly.

Data

Effect of the different land cover data used – what I would be interested in, is also the extent of the influence of any land cover data at all. The difference between the results of the two LUC data used suggests, that land cover does play a role – we do not fully know how significant it is (in this study area). I would be interested in seeing the difference between the two land cover data, and a susceptibility map without a land cover map. It would also be a sort of sensitivity analysis.

I would like to see the distribution of landslides (so, the points) on the data figure (Figure 2) as well (so, where are landslides located on a land cover map, soil map...)

Authors: We present a new table in supplementary data with the importance of each LUC type to landslide occurrences inventoried and also the distribution this LUC classes by slope classes, because this is also an important variable to landslides occurrence.

LUC data was tabulated (COS and CLC) and represented in table 2. The results show a distinction of the LUC types with principal differences between CLC Vs COS. The importance of this LUC variables is presented in table 4 and it is not necessary a new map to assess their importance in modelling. The construction of a new susceptibility landslide map without LUC data will be developed in a further study.

The landslides areas will be represented in Figures 2 and 5.

Figure 4. I would like to see a different color map for the difference map. First of all, it would make sense, that there is a more logical center class. Currently, there are classes between 0.1 – 1 and -0.9 -0 (I assume, 0 is completely within this class). It would make more sense, to have a class -0.5 - +0.5 (or something similar).

Authors: we acknowledge the reviewer comments. The colors and classes of this map were corrected in order to be represented with a more logical center and constant interval.

Results

The authors compared the two maps visually, by map overlay, and by performing an overall accuracy and kappa coefficient. There is something I do not understand: what exactly is the overall accuracy? You compared the two maps, so this cannot be overall accuracy, is it maybe overall agreement? The same goes for commission and omission errors. These are not errors, but differences between two maps (so, two models). Also, I do not fully understand Table 4. From what I see in the table, most of the area is modelled as very high susceptibility in the study area – this however cannot be true. Or is the table presenting something else – maybe the susceptibility of the road network only? Please explain or modify the table.

Table 4 is one of the main results in my opinion, however, now you present it in % of total area. This is fine, but then you really need to replace the term accuracy with agreement, because 66.7% of accuracy (LSRN2/LSRN1) for the class high does not mean accuracy, but agreement.

Authors: The overall "accuracy" will be changed to overall agreement, and "errors" by differences. The table present errors in the column headers due to a mistake in the copy process. The classes will be corrected. The class "very low" can never have 86.11% of total study area! Thank you for reporting us this error.

Discussion

I already mentioned above what needs to be expanded in the discussion. Besides that, I would like to see the following in the discussion: - Any recommendations based on the results? (in terms of using land cover data) - Comparison with other, similar studies, and what did they find out? - The influence of the method used (maybe information value results to fewer differences between using different land cover maps) - Discussion on other data, particularly landslide inventory (potentially missed landslides in forests, or type of mapping).

Authors: We will introduce some recommendations based on results, and discussion the problem of landslide inventory (potentially missed landslides in forests, or type of mapping).

"*More detailed LUC data (COS) allows better landslide susceptibility results, while LUC data is more generalized than CLC data, resulted in the IV reduction, not allowing identify some places where landslides occurred effectively*."

"*The assignment of landslide susceptibility results to the road network allowed to identify the locations with the highest spatial probability to the landslide occurrence*"

Technical corrections

In the abstract, the authors use the term "very good" when describing their models –

please either replace it with a different term, or add justification for it being very good (e.g. both have an AUC over 0.9). Also, the AUC is not the only measure to address the model success, so I would refrain

myself by using very good – you can state that the models have a high accuracy in terms of AUC or something similar.

Authors: We agree with your comment and changes will be made accordingly.

The last sentence – landslide susceptibility maps are exactly what their name implies, maps providing information on how susceptible an area is to landslides. They are not maps, where landslides will probably occur. Please change this.

Authors: Thank you for the comment. Changes will be made accordingly.

Generally, the level of English is high. Nevertheless, a spell check or rewriting of some parts of the manuscript is necessary: - The authors tend to use the word "the" too much in my opinion (the landslides, the total or partial, the landslide susceptibility assessment: : :).

Authors: The English will be reviewed by English editor services.

- Study area description, first sentence: simplify and write "We performed this study in Zezere: : :).

Authors: OK.

Also, what does "high slopes" mean? Steep slopes?

Authors: high slopes will be changed by "steep slopes".

Same goes for low slopes.

Authors: low slopes will be changed by "gentle slopes"

The authors use a lot of abbreviations – while some are presented in the main body, some are presented only in the abstract (e.g. LUC, COS, CLC). I recommend that you again define the abbreviations in the main text, when you use them for the first time.

Authors: Some abbreviations will be decoded and eliminated (e.g. MMU, AUR, SRC, PFM). Other will be defined in the text when used for the first time.