Natural Hazards
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Discussions

Interactive comment on "Landslide susceptibility mapping on global scale using method of logistic regression" *by* Le Lin et al.

Anonymous Referee #1

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General Comments

The manuscript "Landslide susceptibility mapping on global scale using method of logistic regression" aims to produce a global landslide susceptibility map, thematic that fits the scope of NHESS journal. Methodological framework is the major strength of the presented work with clear description of the used "explanatory factors" and validation of the obtained results. However, it is not the case for the dependent variable (landslide inventory) which need deep clarifications of data base "procedures" and tests to their representativeness. Unbalanced manuscript when comparing Methodology and data section with Results and Discussion sections. Methodology should be increased with inventories information and Results and Discussion sections, with a clear highlight of major assumptions and uncertainties, should be much more developed.

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Specific comments

1) General state of the art is well developed. However some references to works that deal with large areas inventories in Europe should be done (e.g. Van Den Eeckhaut, M., Hervás, J., 2012. State of the art of national landslide databases in Europe and their potential for assessing susceptibility, hazard and risk. Geomorphology 139 (140), 545–558.

2) In reviewer opinion no novelty is presented considering concepts, ideas, data or methods. Despite the reference that global landslide maps can be used by industries, NGO or international cooperation, the authors should make clear what the added values of their study are. How a global landslide susceptibility map will be used for insurances that secure buildings in a local scale? Why the use of logistic regression which allow to weight each factor is importante if a world map is presented and those weights will not be used in other areas?

3)The "inventory" section is in reviewer opinion the major weakness of the presented manuscript Two general databases are combined and used: World Geological Hazard Inventory and NASA global landslide inventory. However, despite the references to the original sources some ideas should be clear in this manuscript as for example: a) what are the criteria that were used to recognize a landslide or to be inserted in the database; b) what is the best resolution?; c) are criteria/resolution the same in both inventories? d) Sometimes that kind of inventories have a high degree of uncertainty in location. How you deal with "overlapping" of registries? e) What area the time-period of those inventories? f) It is not clear for me if authors (or the team of 10 persons) collect information in newspapers? And the literature what are the main sources? only peer-review journals? Thesis? From which editors or universities? How many references are considered? Cross reference problems?

4) A deep discussion should be done about how representative are these inventories. According to the authors 2005 landslides/debris flows are in the database, but for ex-

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ample in the work of Pereira et al. (2014) which use a historical landslide inventory based on press and reports in the northern region of a small country as Portugal, more than 600 cases were registered. Are the authors confident with 2005 registries for a World Wide Map? In my opinion this is a strong weakness of this work.

Pereira S, Zêzere JL, Quaresma ID, Bateira C (2014) Landslide incidence in the North of Portugal: Analysis of a historical landslide database based on press releases and technical reports. Geomorphology 214:514–525. doi: 10.1016/j.geomorph.2014.02.032

5) Authors should try to compare subsets of their inventory with other national or "continental" ones (with higher detail and available in literature) to try to find if spatial overlay is acceptable. Some metric should be done;

6) Considering figure 1 it seems that some areas are overestimated and that could be the result of the used inventories. In fact most of the dots are in Asia, and I believe that could be true, but it should be supported with statistical data from international databases, for example EM-DAT, used by UN. It seems to me that North Africa mountain ranges are underestimated;

7) A table with the number of landslides per region (for example continent or other wide regions that the authors consider adequate) in global inventory and in each data set used to model and validate will allow the reader to understand the how spatial representative are the data sets used. This should be inserted in results section;

8) The first paragraph of Results section is mainly methodological procedure for validation.

9) Maybe the used inventories are biased by the scale of analysis and the adopted recognition methodology (small movements disappear) or by the used criteria to consider a landslide (for example only landslides that cause injuries). This and other assumptions related to the inventories should be deeply discussed in Discussion section;

9) Even if only a visual evaluation is possible to do: how different are the obtained results when compared with other global landslide susceptibility maps (some of them referred in this work)? And with other national/regional maps (for example, USA or Europe (Join Research Center))?

Technical corrections

Page 3 line 33; Page 7 line 26 – please confirm the use of the term "topology". Topography?

Please check the way how you performed in-text citations to several references: sometimes they are alphabetically (e.g. page 2 line 5), others chronologically (e.g. page 2 line 21) and others none of them (page 2 lines 17-18; page 3 line 25; page 4lines 15-16; page 5 lines 39-40; page 6 lines 14-15). Figures are adequate but in general with low resolution.

Figure 1 (in figure or caption) should include time-period of the inventory and a reference to the main sources of the inventory. Each dot (triangle) means 1 landslide or more? Please provide a similar graphical scale in figures 1 and 2. I suggest 0-2000 km.