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Natural Hazards and Earth System Sciences
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Discussions

Interactive comment on "The propagation of inventory-based positional errors into statistical landslide susceptibility models" *by* S. Steger et al.

Anonymous Referee #2

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Review of the manuscript "The propagation of inventory-based positional errors into statistical landslide susceptibility models" By Stefan Steger, Alexander Brenning, Rainer Bell, and Thomas Glade

General Comments The manuscript of Steger and co-authors entitled "The propagation of inventory-based positional errors into statistical landslide susceptibility models" is an interesting well-structured and well-written manuscript that addresses relevant scientific and technical questions which are within the scope of NHESS. However it needs moderate revisions prior to be published.

Specific Comments

1 - Although it is reasonable to model landslide susceptibility using points (centroids), namely when landslides are small in size, in the opinion of the reviewer, the validation of

predictive models should be made with landslide areas (polygons), because a landslide is not a point.

2 - Additional information should be given regarding landslide inventory and sources used to construct it, namely: a) Dates of airborne laser scanning and ortophotos used for landslide inventorying; b) What is the typical depth of the shallow landslides? c) Do authors have any idea about the permanence time of landslides in the landscape? What is the possible range of age of inventoried landslides? d) What is the scale of the digital geological map used to derive lithological units?

3 - The landslide susceptibility was assessed using only 4 predictor themes: slope, lithology and aspect (two themes). In the opinion of the reviewer this is too restrict. The authors used a test site with 100 km2 where 591 landslides were inventoried as point. These landslides are mostly concentrated over the Flysch lithologic unit that spreads over the major part of the study area (81%). So, in this case, in the opinion of the reviewer, the lithological layer is not a good theme to discriminate between stable and unstable areas. This should be discussed in the manuscript. In addition, the spatial relationship between slope aspect and landslide distribution seems to be weak (i.e. the aspect is not very sensitive to positional errors of landslide points), which turns the landslide susceptibility mostly dependent on the variable Slope. Why did not you use other variables extracted from the DTM like slope curvature or the Slope over Area Ratio?

4 - Regarding the predictive performance, it is not clear which data was used to validate the predictive models. Apparently, the points with errors were used to validate, but this should be clearly stated.

5 - In section 4.3 authors state that "An expert-based evaluation of the final results was conducted by comparing all modelled relationships and maps with the results of those models that were assumed to be less affected…" In the opinion of the reviewer, this statement is not enough clear and needs to be better described.

6 - Authors developed “synthetic data” that is a virtual terrain, whose construction and justification needs to be improved. In particular, it should be explained the reason to use the land cover for the synthetic data while this theme was refused for the model with “real data”. Furthermore, authors state that “A spatially balanced landslide data set was generated according to Theobald et al. (2007)”. Please, provide more information about this procedure. Also, authors generate a sample containing 2000 “landslide points” which apparently is a very large number when compared with the 591 landslides inventoried in an area equivalent in size with the “virtual study area”.

Technical corrections Page 11 – line 16 “(iv) the selection respectively parameterization of a classification method“ Something is missing in this peace of text.

Page 17 – line 24 Brenning, A.: Spatial cross-validation and bootstrap for the assessment of prediction rules in remote sensing: The R package sperrorest, in Geoscience and Remote Sensing Symposium (IGARSS), 2012 IEEE International, pp. 5372–5375. Available from: http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6352393 (last access 22 April 2016), 2012. 2012b instead of 2012

Page 19 – line 4 Petschko, H., Bell, R. and Glade, T.: Relative Age Estimation at Landslide Mapping on LiDAR Derivatives: Revealing the Applicability of Land Cover Data in Statistical Susceptibility Modelling, in Landslide Science for a Safer Geoenvironment, edited by K. Sassa, P. Canuti, and Y. Yin, pp. 337–343, Springer International Publishing. Available from: http://link.springer.com/chapter/10.1007/978-3-319-05050-8_53 (last access 26 July 2016), 2014. 2014b instead of 2014

Page 19 This reference is not used in the text? Tien Bui, D., Pradhan, B., Lofman, O. and Revhaug, I.: Landslide Susceptibility Assessment in Vietnam Using Support Vector Machines, Decision Tree, and Naive Bayes Models, Mathematical Problems in Engineering, 2012, e974638, 45 doi:10.1155/2012/974638, 2012

Figure 5 The color palette is not easy to distinguish landslide susceptibility in the maps. Please, use a more contrasting color palette.

Figure 6 Indicate what is A,B,C and D in figure caption.

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