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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Non-susceptible landslide areas in Italy and in the Mediterranean region" *by* I. Marchesini et al.

Anonymous Referee #2

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The paper by Marchesini et al. presents a statistical approach to delineate terrains not susceptible to landslides over large areas using two morphometric attributes (slope gradient and relative relief) from SRTM digital elevation data together with exhaustive landslide inventory information for some areas in Italy to establish linear, quantile-linear and quantile non-linear regression models to classify terrains as non-susceptible to landslides. It is an extension of the work done by Godt et al. (2012) to determine non-susceptible terrains over the conterminous United States using a linear model and employing identical morphometric attributes from SRTM data. The authors examined the performance of the obtained models using independent landslides information over Italy, employed Italian census data to determine the percentage of population located in non-susceptible terrains, and extended their terrain delineation over the landmasses

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Interactive Discussion
Discussion Paper

surrounding the Mediterranean.

From my opinion, the paper is interesting, well-structured and not far from being publishable in NHESS. I only have a very few remarks. One would be that I am missing some more information on the landslide inventories used to establish the models. The authors show that the best obtained model (the quantile non-linear model QNL) can be validated best for translational and rotational slides since the 13 inventories used for model construction mostly comprise these types of landslides. However this is not shown. What are the proportions of different types of landslide in the inventories, especially concerning their areal extent? In this context, it would be also interesting to have an idea about general model robustness: How is the success of the QNL-model in the training areas, also considering landslide typology? Does the model perform significantly better here than using the validation data? It would be interesting to have an estimate here. Since the authors cross binary information (susceptible/non-susceptible and landslide/non-landslide terrain information), the results of model evaluations might be very easily presented in contingency tables or using ROC graphs. Moreover, I am not sure if the linear Method 1 (based on the original attempt of Godt et al., 2012) should be presented since it is outperformed by the other, more convincing modeling attempts and seems not to have a real statistical significance. Last, I am not sure if the extension of the method to the landmasses surrounding the Mediterranean should really be included since it cannot be convincingly validated at this stage.

A few specific comments:

P2816L3: Heading of Section 2: Why “preliminary”?

P2817L12-13: Where all morphological landslide characteristics (e.g., depletion zone, transport zone, accumulation zone) rasterized, or only depletion zones?

P2818L12-P2819L10: Maybe the calculation of slope values from geographical coordinates can be moved to an appendix.

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P2823L14ff: Maybe the “matching index” can be better shown in terms of contingency tables and/or ROC graphs.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 2813, 2014.