

Interactive comment on “An assessment of landslide distribution in the Faifa area, Saudi Arabia, using remote sensing and GIS techniques” by T. Alharbi et al.

Anonymous Referee #4

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The goal of this study is to compile a map where prone to landslides areas will be delineated. In order to achieve this, the author of the study collected information mainly provided by remote sensing. However, in my opinion, there are a lot issues that should be addressed before the publication of the manuscript.

In particular, the authors of this manuscript should replace the word hazard by the term susceptibility. Hazard is a term used in order to define the probability of the occurrence of an event and is the outcome obtained by spatial and temporal probability. In this manuscript, none of the above parameters have been estimated and only a correlation among factors took place.

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The planar sliding is considered a rock failure and not a landslide phenomenon. It is crucial to point out that in case of a jointed rock unit, the occurrence of failure is depending on the mechanical parameters of material e.g. friction angle of the discontinuities and not in general of the intact rock. Obviously, it is very difficult and time consuming to evaluate these parameters on regional scale. Thus, it is recommended to the authors to employ a representative value of friction angle of discontinuities instead of the intact rock and to mention that this is preliminary step that can not replace the detailed work on the field.

In addition, the authors stated that the proposed model predicts about 82% of future slope failures. It is suggested in case of validating their model, to separate the slope failures database either using temporal or spatial criteria and then check the validation by comparing these subgroups.

In order to evaluate the risk on a man made structure, it should be initially evaluated the hazard of the natural event, the vulnerability of the structure and the elements on risk. Thus, since in this study only the susceptibility has been assessed, it is recommended to replace the term risk map by using the phrase map showing points where slope failures could caused damages.

Regarding the terminology of debris flow; Soil flows can be subdivided by grain size into debris flows where the material is coarse-grained and earth flows where fine-grained. The geomorphic character, speed and travel distance of a soil flow is dependent on the particle size, slope and water content within the slide mass. Debris flows form steep, unvegetated scars in the head region and irregular, hummocky deposits at the toe. They most commonly occur on slopes greater than 65 percent (California geological survey, 2008) The section 2.2.2 deals with a natural event, overland flow, that has nothing to do with slope failures and consequently should be deleted.

P.6697, line numbers 10-20. The paragraph should be placed in introduction.

The basic point in statistics is to find a model that describes a database and not just

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correlate two points that would be liked to be correlated. It is recommended to use another statistical analysis e.g. logistic regression analysis or a discriminant analysis in order to develop a model that is the appropriate one for describing the database of this study. Figures 5 and 8 should be replaced by the outcome of the suggested statistical analysis

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