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Discussions

Interactive comment on "Comparing multi-criteria methods for landslide susceptibility mapping in Chania Prefecture, Crete Island, Greece" *by* M. Kouli et al.

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The paper that published in NHESS Discussion (NHESSD) by Kouli and co-workers analyzed the comparison of two GIS-based modeling techniques for landslide susceptibility assessment. This comment does not address the possible limitation of the methods employed in the paper and the parameter uncertainties (e.g. quality, quantity,

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biases, etc.) related to the data involved, but verification of the landslide susceptibility maps. Landslide susceptibility can be assessed using a number of different methods. One of the key issues is how to validate the outcomes derived from these methods. As pointed out by Fernández et a. (1999), all these approaches attempt to map or zone areas that are prone to landslides; however, it is not always possible to verify how useful these methods really are. If I did not misunderstand the procedure employed by Kouli and co-workers for the validation of the two methods (i.e. WoE and WLC), the two landslide susceptibility maps were compared with the same landslide inventory that was used to construct them. However, this comparison is difficult to verify which of the two methods is more credible and tells nothing about what can be expected in the future. I think that the landslide susceptibility maps shoule be tested using landslide data that were not used to construct the susceptibility models. If there were landslide inventory data from two time periods in the same area, the landslides in the first period are taken as an input parameter to the models used to produce a landslide susceptibility map, and those in the late period are taken as test samples for examining the predictive capability of the landslide susceptibility map (Li etal., 2012). If not, the landslide inventory data available should be randomly divided into two groups. One group is taken as training samples that are used to produce a landslide susceptibility map and the other as test samples that are used to validate the reliability of the landslide susceptibility map. Casadei et al. (2003) defined an “optimal” model as one that is able to identify the maximum number of landslides with the minimal of area predicted to be unstable. In my opinions, the effectiveness of a landslide susceptibility map should be examined in the following two ways: (1) Compare a landslide susceptibility map with test samples that were not used to construct the susceptibility models and calculate the percentage of the test samples falling within areas of preferred susceptibility and the percentage of the area that has no susceptibility (very low susceptibility zone). A primary goal of susceptibility mapping is to maximize both values (Coe et al. 2004). (2) Inspect the ratio between the percentage of the test samples that fall in each class area and the percentage of the class area in total area sudied. For a successful landslide

NHESSD
1, C36–C38, 2013

susceptibility zoning, this ratio should gradually increase from low susceptibility zone (or non susceptibility zone) to very high susceptibility zone. References Casadei, M., Dietrich, W.E., Miller, L.: Testing a model for predicting the timing and location of shallow landslide initiation in soil-mantled landscapes, Earth Surf. Process. Landforms, 28, 925–950, 2003. Coe, J.A., Godt, J.W., Baum, R. L., Bucknam, R.C., Michael, J.A.: Landslide susceptibility from topography in Guatemala. In: Lacerda, W. A., Ehrlich, M., Fontura, S. A.B., Sayão,A.S.F. (eds) Landslides: evaluation and stabilization, vol 1. pp 69–78, 2004. Fernández, C.I., Castillo, T.F., Hamdouni, R.E., Montero, J.C.: Verification of landslide susceptibility mapping: a case study. Earth Surf. Process. Landforms, 24, 537–544, 1999. Li Changjiang, Ma Tuhua, Sun Leling, Li Wei, Zheng Aiping,: Application and verification of a fractal approach to landslide susceptibility mapping, Nat. Hazards, 61, 169–185, 2012.

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