The influence of different type of landslide for the preparation of statistical multivariate landslide susceptibility models

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The results of multivariate landslide statistical susceptibility models are highly sensitive to the type of statistical and spatial distribution of the mass movement used as grouping variable, and to the type of geofactors used as explanatory variables. Different classification of landslide data set could result in different model performance and validation fit. Exploiting a discriminant analysis (DA) and a logistic regression (LR) models, we prepared different landslide susceptibility zonation for a study area around Kurseong town in the Darjeeling Himalaya region, Eastern India. To prepare the models, we used as training data set, 342 shallow translational rock slides and 168 shallow translational debris slides, which occurred between 1968 and 2003. To validate the models we used a different set of landslide that occurred between 2004 and 2007. 62 relevant factors including morphometric and geo-environmental parameters were used as explanatory variables. We present and discuss the performance and the validation results of the landslide susceptibility zonation prepared with the two different statistical multivariate models using as grouping variables - the rock slides data set, the debris slides data set and the two type of landslides data set together. The discriminate analysis performs better than the logistic regression and this is probably due to the: a) lack of coherence in the selected training data set and the corresponding explanatory variables; b) landslide type classification problems; c) frequency distribution of landslide/no-landslide mapping units.