

Construction of Large-scale Landslide Potential Analysis Model

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Abstract

Large-scale landslides triggered by rainfall or earthquake often caused severe loss of lives and property, thus landslide susceptibility assessment plays an important role in hazard mitigation. The study focused on the geo-environmental characteristics of the large-scale landslide including morphological, geological and hydrological features and the differences between those of landslide and non-landslide. The Chishan River basin in Namashia District, Kaohsiung County, Taiwan, with 57 events of large-scale landslides caused by Typhoon Morakot in 2009 was used as study area. The slope-units were used as statistic unit, and the morphological, geological and watershed factors were extracted. By conducting the hypothesis test and discriminant analysis, significant factors correlated to landslides were found to form the potential analysis model. It was found that with the slope-units and 6 factors including: slope type, standard deviation of slope degree above half ramp, types of formations, distance to geological structural line, watershed width and unit drainage density, appearing to be significant factors with physical meanings and low correlation to one another. The overall accuracies of discriminant analysis model for fitting and prediction were 70.3% and 75.8%. The discriminant model constructed in this study provides satisfactory result for large-scale landslide potential analysis.

Key words: Large-scale landslide, Slope-unit, Hypothesis test, Discriminant analysis.

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