Landslide Susceptibility Analysis in the Chenyulan River Watershed, Taiwan

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Many rainfall-triggered landslides occurred in the Chenyulan river watershed of central Taiwan during typhoon Morakot. In order to prevent rainfall-triggered landslide disasters, it is important to understand the relation of the disasters and the factors of rainfall, geology, and topography. In this study, the landslide susceptibility model of the Chenyulan river watershed was built and evaluated under the multiple logistic regression analysis based on slope units. These units were delineated by topography and 249 units out of them were chosen because orientation data of weak planes were included. The detection of the binary dependent variables (landslide and non-landslide samples) were based on the geomorphic change using satellite imageries before and after typhoon Morakot. Then the independent variables include geological, topographic and rainfall factors. Especially, we considered the orientation of weak planes and the spatial and temporal variability of rainfall. The result showed that the p-value of Hosmer-Lemeshow test and the Area Under the Curve of ROC are over 0.1 and 0.75, respectively. As the result, the chosen factors in the model could predict landslides in the Chenyulan river watershed effectively. It could be reference for follow-up research.

Keywords: Landslide susceptibility, Spatial and temporal variability of rainfall, Multiple logistic regression, Orientation of weak plane, Slope unit