



Using the statistical analysis method to assess the landslide susceptibility

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This study assessed the landslide susceptibility in Jing-Shan River upstream watershed, central Taiwan. The landslide inventories during typhoons Toraji in 2001, Mindulle in 2004, Kalmaegi and Sinlaku in 2008, Morakot in 2009, and the 0719 rainfall event in 2011, which were established by Taiwan Central Geological Survey, were used as landslide data. This study aims to assess the landslide susceptibility by using different statistical methods including logistic regression, instability index method and support vector machine (SVM). After the evaluations, the elevation, slope, slope aspect, lithology, terrain roughness, slope roughness, plan curvature, profile curvature, total curvature, average of rainfall were chosen as the landslide factors. The validity of the three established models was further examined by the receiver operating characteristic curve. The result of logistic regression showed that the factor of terrain roughness and slope roughness had a stronger impact on the susceptibility value. Instability index method showed that the factor of terrain roughness and lithology had a stronger impact on the susceptibility value. Due to the fact that the use of instability index method may lead to possible underestimation around the river side. In addition, landslide susceptibility indicated that the use of instability index method laid a potential issue about the number of factor classification. An increase of the number of factor classification may cause excessive variation coefficient of the factor. An decrease of the number of factor classification may make a large range of nearby cells classified into the same susceptibility level. Finally, using the receiver operating characteristic curve discriminate the three models. SVM is a preferred method than the others in assessment of landslide susceptibility. Moreover, SVM is further suggested to be nearly logistic regression in terms of recognizing the medium-high and high susceptibility.