



## **A study of large scaled landslide susceptibility by using Weight-of-Evidence method: A case study from the Laonung River Watershed, Southern Taiwan**

Chih-Hao Chen (1), Ching-Weei Lin (2), and Chih-Ming Tseng (3)

(1) Disaster Prevention Research Center [U+FF0C] National Cheng Kung University [U+FF0C] Tainan [U+FF0C] Taiwan (calcite@mail.ncku.edu.tw), (2) Department of Earth Sciences [U+FF0C] National Cheng Kung University [U+FF0C] Tainan [U+FF0C] Taiwan (chingwee@mail.ncku.edu.tw), (3) Department of Land Management and Development [U+FF0C] Chang Jung Christian University [U+FF0C] Tainan [U+FF0C] Taiwan (cmtseng@mail.cjcu.edu.tw)

The Laonung River watershed which covered an area 1367 km<sup>2</sup> is selected as the study area to construct large scaled landslides susceptibility model by using Weight-of-Evidence method. Within the study area, 950 landslides with an area more than 10 ha are identified from FORMOSAT 2 images, aerial photos, and LiDAR derived 1 m high resolution Digital-Elevation-Model (DEM) taken after typhoon Moratko in 2009. Among these, 271 landslides occurred recently and they show bare ground in aerial photos and satellite images. 318 landslides are vegetation recovery, and they are inferred from their topographic characteristics by using aerial photos with topographic map. Additionally, 361 landslides with topographic features of deep seated landslide such as crown main escarpment, down slop scarp, up slop scarp, and transverse cracks are identified from 1m resolution LiDAR derived DEM.

Weight-of-Evidence method is a bivariate statistical approach which uses the concept of Bayes' theorem and odds ratio to calculate the weighting of each evaluation parameter. In this study, ten parameters including slope gradient, slope aspect, landform, elevation, lithology, dip-slope, undercut slope, normalized difference vegetation index (NDVI), the distance from geological structure and the distance from stream are selected as evaluation factors. For each parameter, the weighting for landslide susceptibility is calculated, and the weighting of all parameters are then summed to generate the landslide susceptibility map.

The study results show the area under the success rate curves reaching 80%, and 70% of large scaled landslides falls within top 30% susceptibility index. It implies that the susceptibility model constructed by this study can effectively predict the location of large scaled landslides in the study area. The results can benefit to the management of mitigation plan of the large scaled landslides in southern Taiwan.