Geophysical Research Abstracts
Vol. 16, EGU2014-1365, 2014
EGU General Assembly 2014

Potential and Distribution of Rainfall-induced Landslide

Yie-Ruey Chen (1), Kuang-Jung Tsai (1), Jing-Wen Chen (2), Jie-Lun Chiang (3), and Yu-Li Ho (1)

(1) Dept. of Land Management and Development, Chang Jung Christian University, Tainan, Taiwan. (yrchen@mail.cjcu.edu.tw, +886-6-2785902), (2) Dept. of Civil Engineering, National Cheng Kung University, Tainan, Taiwan., (3) Dept. of Soil and Water Conservation, National Pingtung University of Science and Technology, Pingtung, Taiwan.

Recently, because technological and economic development, the original plain area in Taiwan has been nearly fully developed and human development has extended to the hillside area. Human development coupled with the global impact of extreme weather, typhoons and heavy rains caused the hillside disaster. The scope and impact extent of the damage are more serious than ever before. For this reason, the establishment of an assessment model to evaluate potential and distribution of rainfall-induced landslide hazard event is essential to disaster prevention.
In this study, the Genetic Adaptive Neural Network was implemented in the analysis techniques for the interpretation of satellite images before and after typhoons and to obtain surface information and hazard log data, and multivariate instability index was employed to establish evaluation model of landslide potential. Nine landslide potential factors are included: slope, aspect, elevation, geology, distance from the fault, distance from water, slope disturbance, slope roughness, and effective accumulated rainfall. The module of spatial analysis in geographic information system and digital elevation model were employed to obtain information of ridge and water system and to explore characteristics of landslide distribution.
Results of image classification show that the values of coefficient of agreement for eight different time periods are at intermediate-high level. The predicted potential of landslide is in reasonable confidence level. The results show that effective accumulated rainfall and geology are the most important factors and that distance from the fault, aspect, slope disturbance, elevation, and slope are secondly important.
The results also show that the number and volume of landslide increase after each typhoon rainfall and are approximately proportional to effective accumulative rainfall. Generally, the landslides after typhoon Morakot in 2009 are evenly distributed and several large landslide areas were found. The landslide areas after typhoon Fanapi in 2010, Nanmadol in 2011, and Saola in 2012 are close to ridges and the scale is small. However, the landslide areas near river are small in number and large in scale. This may be due to the completeness of vegetation cover.