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Typhoon-triggered landslides and regional geological structure: case from Typhoon Morakot in Taiwan

C.-C. Huang (1), C.-P. Chang (1,2), and S.J. Giletycz (1)

(1) Department of Geophysics, National Central University, Taiwan, (2) Center for Space and Remote Sensing Research, National Central University, Taiwan

Typhoon Morakot invading Taiwan on August 8th, 2009 caused numerous major disasters throughout the island. Exceeding rainfall threshold in many sides in mountainous areas triggered slope failure leading to widespread damage and loss of life. Hsiaolin village located at the foothills of Shiendu Shan on the third day typhoon existence was entirely buried by massive landslide. This tragic event left absolute necessity of studying such incidents due to understanding those phenomena. A detail field investigation focused on structural measurement, around whole the Hsiaolin landslide as well as its surrounding area, has been carried out in this study. In order to realize the landslide mechanism of regional settings, we focused on the affect of geological structures and stress analysis around the study area. Wedge failure had been observed at numerous outcrops, which produced by bedding and fault systems' inter-cutting at the dip-slope area of the mountains. Therefore, in some areas landslide could have happen even in dry season with relative stable condition. Mountains of SW Taiwan is very susceptible and landslides are easily happened even by a minor factor. After a detailed investigation we came to a conclusion that structure geological setting played a major role as a direct factor for creating the regional landslide. By considering the geometric correlation between geological structure, strata attitude and topography, a objective hazard map can be provided. In this map, study area can be classified into different slope stability level, which implied different probability of landslide. Our study proved the importance of structural measurement in landslide study. The results derived from the structural analysis can also be applied for improving advanced estimations of other related studies.