



## **Building rainfall thresholds for large-scales landslides by extracting occurrence time of landslides from seismic records**

Hsin-Yi Yen and Guan-Wei Lin

Department of Earth Sciences, National Cheng Kung University, Tainan, Taiwan (luckysinyi@gmail.com)

Understanding the rainfall condition which triggers mass movement on hillslope is the key to forecast rainfall-induced slope hazards, and the exact time of landslide occurrence is one of the basic information for rainfall statistics. In the study, we focused on large-scale landslides (LSLs) with disturbed area larger than 10 ha and conducted a string of studies including the recognition of landslide-induced ground motions and the analyses of different terms of rainfall thresholds. More than 10 heavy typhoons during the periods of 2005-2014 in Taiwan induced more than hundreds of LSLs and provided the opportunity to characterize the rainfall conditions which trigger LSLs. A total of 101 landslide-induced seismic signals were identified from the records of Taiwan seismic network. These signals exposed the occurrence time of landslide to assess rainfall conditions. Rainfall analyses showed that LSLs occurred when cumulative rainfall exceeded 500 mm. The results of rainfall-threshold analyses revealed that it is difficult to distinct LSLs from small-scale landslides (SSLs) by the I-D and R-D methods, but the I-R method can achieve the discrimination. Besides, an enhanced three-factor threshold considering deep water content was proposed as the rainfall threshold for LSLs.