



The evaluation of landslide depth and sediment yield due to typhoon events in Taiwan

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Landslides and fast-moving debris flows are the primary geological disasters in Taiwan, and typically increase during rainfall seasons, i.e. from May to September. Heavy rainfall is the principal factor triggering geological hazards in Taiwan. Calculation of sediment yield in a reservoir watershed after typhoon events is important for engineers to plan the constructions, reduce the sediment into the reservoir and keep the reservoir use sustainable.

Typhoon events induced serious geological disasters in Taiwan, including Typhoon Mindulle in Da-Jia river watershed and Typhoon Aere in Shihmen reservoir watershed. 3,930 landslide cases with a total area of 2,743.4 ha were induced during Typhoon Mindulle, and the elevation of some middle reaches lifted over 20 m in Da-Jia river watershed in middle Taiwan. 959 landslide cases with a total area of 752.1 ha were induced in Shihmen reservoir watershed, and about 2×10^7 m³ sediment flowed into Shihmen reservoir watershed in northern Taiwan during Typhoon Aere.

The study uses the product of landslide area, which can obtained from SPOT satellite image, and landslide depth as landslide size. The evaluation of landslide depth is the key point in the study. The study calculates the relation between the landslide depth and some characteristic, such as slope, area, lithology and rainfall. The study uses 5 m \times 5 m Digital Elevation Model (DEM) to calculate the topography change before and after Typhoon events. The relation between landslide depth and slope is a normal distribution curve. According to the result in Shihmen reservoir watershed, the maximum landslide depth is 4.36 m in 30°~40° hillslope. The landslide depth decreases no matter the slope is greater or less than 30°~40° hillslope. The landslide depth in <20° hillslope and >60° hillslope are 0.32 m and 0.20 m, respectively. The relation between

landslide depth and slope has a bell distribution curve. The study also calculates the total sediment yield, including landslide volume, soil erosion and the sediment yield with sediment delivery ratio concept, in the watershed.