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Rainfall-induced landslides in Laolung River watershed, Southern Taiwan

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The Laolung River watershed in southern Taiwan which covered 1367 Km^2 is chosen to study the characteristics of rainfall induced landslide and to evaluate the impact of the Chi-Chi earthquake on landslides. The study area has suffered slight to moderate horizontal ground motion 50-300 PGA and only a few coseismic landslides occurred in the earthquake. To evaluate the impact of the earthquake, the PGA of the earthquake was correlated to the occurrence of landslides, the landslide intensity, and the corresponding rainfall data of each typhoon.

The landslides of the study area were identified through 8 SPOT and 8 FORMOSAT 2 images that covered 15 typhoons from 1996 to 2007. The corresponding rainfall information in places where landslides occurred is interpolated from one hour interval rainfall data by using Kriging method.

The study results show the landslide intensity obtained from images is well correlate to the corresponding cumulative precipitation of typhoons except for those occurred in typhoon Billis in 2000, Toraji in 2001, and 0609 event in 2003. In Billis, Toraji, and 0609 events, landslide intensity in area with PGA over 150 gal is larger than that obtained form area with PGA under 150 gal without regarding the cumulative rainfall and rainfall intensity. In addition, most of landslides distributed in areas with slopes of 30^o–40^o which is typical for rainfall induced landslides except for those occurred in area with PGA over 150 gal during Billis, Toraji, and 0609 event which mainly distributed in places with slopes between 40^o-50^o. Therefore, we conclude that the influence of the Chi-Chi earthquake on rainfall induced landslides in the Laolung River watershed is only seen in area with PGA over 150 gal and it sustains only 3-4 years.