



Landslides induced by heavy rainfall for 5 years after Chi Chi earthquake, Taiwan

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The Chi-Chi earthquake with a moment magnitude of 7.6 caused extensive slope failures in central Taiwan. More than 21,900 items of ground surface variation involving a total area of more than 16,000 hectares were identified. During 2 years period, 100 more debris flows induced by typhoon and heavy rainfall were believed much related to the seismic landslide. After 3 years silence, the severe Typhoon Mindulle ended on Jun 29, 2004 introduced with a high-intensity and -accumulation storm that dumped more than 1600 mm of rain during July 2 to July 4 in central Taiwan. The high-intensity and -accumulation event had caused flooding and triggered more than 14,800 soils slips and 130 more debris flow events.

We collected the information of Chi-Chi earthquake (1999) and the post-earthquake landslide inventory during 2 years period (2001) compares with Typhoon Mindulle events (2004) to illustrate the post-earthquake effect to central Taiwan. Through the interpretation of 894 documented landslides induced by Typhoon Mindulle, we identified that about 47% of landslide event in Typhoon Mindulle were relating to historical landslide, and 88% of debris flow stream in Typhoon Mindulle had contained seismic landslides in the watershed. Chi Chi earthquake seem still affect much to landslide events although as far as 5 years period have passed.

The rainfall characteristic for 894 landslide cases also studied by spatial analysis and statistics, the result showed that the landslide triggering cumulative- and the peak intensity rainfall of Typhoon Mindulle were higher than the 2 years after earthquake one. In other word, the capacity of slopes to stand the rainfall attack is increasing. Conclusion that typhoon and heavy rainfall are always the major sources to trigger landslide and debris flow, however the central Taiwan affected by Chi Chi earthquake

seem still much despite 5 years period have passed, fortunately, the influences of the seismic are progressively decaying.