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The mechanism and mitigation of the landslides of Leye region in Alishan, Taiwan

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Many serious landslides occurred in Leye region in Alishan, Taiwan during Typhoon Morakot in 2009. This study investigated the mechanism of the Leye landslides and discussed the mitigation measures for future complex hazards and their effectiveness. Leye region is located at west side of Mountain Ali in central-southern Taiwan. The toe of Leye slope is surrounded by Creek Tsengwen and is strongly influenced by the landform processes such as river cutting and riverbed widening. The special hydrological and geomorphological conditions at Leye with extreme rainfall and flood induced the landslides in Leye region. Many aboriginal residences and cultivated slopelands were destroyed. The landslide areas were over one hundred hectares. In addition, large amounts of debris were accumulated on the streambeds that cause a high potential of secondary hazards to the region. This study clarified the causes and mechanisms of the Leye landslides, estimated the volume, and discussed the influences of the "flat-iron" landform and dip-slope in sedimentary strata. The mitigation works are still ongoing to prevent possible complex hazards, such as landslide lakes, debris flows, and additional circular landslides. We discussed the mitigation works for the effectiveness to slope stability and their influence on future landform changes in Leye region. An alert level criterion for emergency evacuation was also proposed for "software" mitigation strategy to reduce damages and loses in Leye region.