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Risk Assessment of Sediment Hazards Potential Communities for Remote Mountainous Areas nearby the River Bank in Southern Taiwan under Climate Change

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As a result of the steep slope, fragile geology, intensive rainfall and overdevelopment of slopeland, the sediment-related disasters frequently occur in Taiwan. During recent years, the extreme rainfall events brought huge amounts of rainfall and triggered severe changes in watershed environments. Typhoon Morakot in August 2009 caused severe landslides, debris flow, flooding and sediment disasters induced by record-break rainfall under climate change. The maximum rainfall of mountain area was over 2,900 mm during 4 days in Chiayi city, southern Taiwan. According to Disaster Prevention Center NCKU (2013), there are 359 landslides occurring nearby the mountainous communities in Southern Taiwan in 2011, and they increase to 608 landslides in 2013. The area of landslide is about 968.2 ha.

The risk assessments of study area included 16 sediment hazards potential communities for remote mountainous areas nearby the river bank in Chia-yi County and Tainan City were analyzed. The collapse area nearby the 16 communities in last 10 years was discussed, and the numerical models (CCHE-2D and FLO-2D) were used to simulate the scouring and deposition of river bank and alluvial fan of debris-flow hazard for the safety of communities under the different return period. The results show that 4 communities have high risk potential to occur the collapse disasters, 2 communities are closed to the water level for the flood at the return period of 100 years and the deposition area of debris flow is corresponding to the announce area by Soil and Water Conservation Bureau (SWCB). The results of this study can provide the disaster risk management of administrative decisions to lessen the impacts of natural hazards and may also be useful for sediment disasters caused by climate change.