



The rainfall threshold and flow patterns of gravelly debris flows

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The rainfall-induced debris flows in the gravelly gullies, Miaoli county, Taiwan and the corresponding rainfall threshold condition are explored in this study. According to the in-situ rain gauge data, the monitoring system and field surveys in the period of 2006 - 2013, gravelly debris flows occur when the total rainfall exceeds 57.5 mm and the subsequent rainfall intensity is higher than 3 mm/hr. Field survey and terrestrial LiDAR measurement indicate the talus deposition in source areas and outbursts of landslide dams on the gully bed are dominant factors to induce debris flows. Finally, HHT spectrum analysis of geophone signals for stony debris flows depicts the peak frequencies within the range of 10-50 Hz. The temporal intensity distribution of geophone signals are determined by both the magnitude of debris flows and the travel distance with respect to the monitoring station.