

Application of RAMMS Software to Predict the submerged area of Debris Flow: A Case Study of Feng-Chiou torrent in Taiwan

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Predicting the submerged area of debris flow hazard events can effectively reduce the extent of catastrophe. In this study, we used three-dimensional debris flow runout model, RAMMS (Rapid mass movements simulation), to simulate the debris flow of Feng-Chiou torrent in Feng-Chiou Village, Xinyi Township, Nantou County, Taiwan. The RAMMS is based on the Voellmy-Salm rheology theory and describes the flow development of debris flow in a depth-averaged equation. The RAMMS can be used to simulate the debris flow phenomenon caused by landslide in the study area. We use the well-documented debris-flow event to calibrate the model parameters by back analysis, so that the simulation results are more realistic. Then we used parameters of the total volume (M), flow height (H), dry-Coulomb type friction (coefficient μ) and viscous-turbulent friction (coefficient ξ) of the debris flow event for sensitivity analysis and discussed the effect of each parameter on the simulation results. Further, we used the rational formula to estimate the discharges corresponding to the rainfall intensities of different recurrence intervals. We used simply hydrograph method as the initial condition to predict the possible submerged area of debris flow events caused by different recurrence intervals.

Keywords: RAMMS, debris flow, Feng-Chiou torrent, landslide