

Special Program in Applied Mathematics and Applied Mechanics

Towards an early-warning system for landslide disasters in Taiwan

2015 - 04 - 23 (Thu.)

11:00 - 12:00

308, Mathematics Research Center Building (ori. New Math. Bldg.)

Taiwan is the place on Earth most vulnerable to natural hazards with 73 percent of its land and population exposed to three or more hazards. More than 90 percent of Taiwan's populations live in areas at high relative risk of death from two or more hazards. As the trend of global warming accelerates, the frequency and intensity of extreme weather events keeps breaking the records in the past few years. Therefore, we desperately need an operational early-warning system to mitigate and prevent the disasters. Based on the probabilistic approach of landslide analysis, we propose six strategies to develop a landslide analysis system (LAS), including prepare a long-term and detailed landslide inventory, select preparatory factors, establish a model of landslide susceptibility index (LSI), determine the weight of each preparatory factor, calculate landslide hazard index (LHI) using triggering factor, and evaluate the performance of model with actual events of landslide. The ultimate goal is to provide early warnings to the general publics and reduce the risk of slope hazards. With this new LAS, we revisit the event of debris flow occurred in He-Jung Village in 2012, and use the archive of QPESUM data to make a series of three-hour nowcasts. Comparing the LHI calculated by LAS to the actual sites of new landslides triggered in this event, the accuracy is as high as 69%. In the case of Typhoon Fung Wong in 2014, rainfall forecast data were applied in 3 study areas for landslide susceptibility prediction in advance, and the method was modified in accordance with actual conditions. The future plan to provide nationwide nowcasts of landslide using this new LAS is also included.



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