Real-time landslide forecasting with the incorporation of landslide modeling and typhoon forecast

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Heavy rainfall brought by typhoons has been recognized as a major trigger of landslides in Taiwan. On average, three to four typhoons strike the island every year, and cause large amounts of landslides and damages in mountainous areas. Because landslide occurrence strongly corresponds to the storm dynamics, a reliable typhoon forecast is therefore essential to landslide hazard management in Taiwan. The study proposes a real-time forecasting system which integrates a landslide model and a precipitation forecast data to assess landslide hazard affected by typhoon. The system uses an event-based landslide model, ILIR-W (Integrated Landslide Initiation prediction and landslide Runout simulation at Watershed level) for landslide hazard prediction, and uses precipitation forecast data with 18 ensemble members from the Taiwan Cooperative Precipitation Ensemble Forecast Experiment (TAPEX). The study applied the system to provide landslide hazard forecast of 6 h, 12 h, 24 h, 48 h and 72 h before the arrival of three past typhoons. The system performs reasonably well in the prediction of landslide area and timing. The landslide forecasting system is useful for landslide hazard reduction.