Geophysical Research Abstracts,
Vol. 11, EGU2009-3348, 2009
EGU General Assembly 2009

Predict rainfall-induced landslides using simulated scenarios of climate change

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Climate models suggest that extreme rainfall will become more common due to climate change. Extreme rainfall in turn will have severe consequence on landslide occurrence, as documented by field evidence and numerical models. This study aims to evaluate the response of landslide occurrence, in terms of frequency and magnitude, to the simulated scenarios of climatic change for a mountainous watershed in Taiwan. The Global Change Research Center (GCRC) of National Taiwan University has produced simulated monthly mean precipitation data of Taiwan from 1960 to 2099. The data are based on the Hadley Centre Coupled Model, Version 3 (HadCM3), a transient, coupled ocean-atmosphere GCM (General Circulation Model), and are derived using pointwise multivariate regression (PMR), a statistical downscaling technique. This study first converts the monthly mean precipitation data into grid data with a spatial resolution of 0.01o (1̃km). Then the study uses rain-gauge data of the past 28 years to develop an empirical model linking monthly mean precipitation to maximum 24-h rainfall (rainfall extreme). The empirical model makes it possible to predict rainfall extremes for each grid cell for each year till 2099. Finally, the study uses simulated rainfall extremes and a deterministic slope stability model to evaluate the likelihood of landslide occurrence within the study area due to climate change. The results of this preliminary study will be presented at the conference.