



The applicability of landslide potential mapping in heavy rainfall event with mechanical approach

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Identifying potential landslide area is an important basis for landslide hazard mapping. The geographical information system has been adopted to analyze landslide potential factors in recent years with rapid development of techniques. The assessment of landslide potential can be divided into several domains such as statistical approach, empirical approach and mechanical approach. Statically approach leads to causal factors of landslide potential and retrieves potential values. Empirical approach obtains landslide potential based on historical landslide events. Mechanical approach applies the force equilibrium to calculate landslide potential. The mechanical approach is adopted in this research. The mechanical approach used in this research is based on the terrain stability mapping method developed by SINMAP and revised to fit with the selected landslide events, which include typhoon Toraji, Mindulle, Sinlaku, and Morakot in 2001, 2004, 2008 and 2009, respectively. The study area selected is near Alis-han mountain area in Taiwan, where the heavy rainfall concentrated in these landslide events. The rainfall threshold to initiate debris flow is also determined in this research to help calculate landslide potential. The results show that mechanical based approach with geographical information approach is suitable in typhoon Toraji, Mindulle and Sinlaku events. However, the result in typhoon Morakot event is not consistent with other events. The main reason is the accumulated rainfall in typhoon Morakot is more than 2000mm, which is more than twice of other events. The research also indicates that cell or pixel based calculation of landslide potential mapping will be inadequate under heavy rainfall condition such as typhoon Morakot. The landslide potential did not increased with landslide area ratio for typhoon Morakot, which implied a different approach might be required when encountering such heavy rainfall.