



Combining Multiple Change Detection Indices for Mapping Landslides Triggered by Typhoons

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An important part of landslide research is the interpretation and delineation of landslides, which has increasingly been based on high-resolution satellite images in recent years. Using pre- and post-event FORMOSAT-2 satellite images as the data sources, this study presents a new method that combines four change detection techniques for mapping shallow landslides triggered by typhoons in Taiwan. The four techniques are normalized differential vegetation index (NDVI), spectral angle, principal component analysis, and independent component analysis. We apply the multiple change detection (MCD) technique to map landslides triggered by two typhoons of vastly different magnitudes. Comparisons are then made between MCD results with landslide inventory maps compiled by using a single index (change in NDVI) in one case study and visual analysis in another. Comparison results show that MCD can perform better than change in NDVI in dealing with old landslides and landslides with non-homogeneous spectral responses. MCD is also able to detect small landslides, which are often missed by visual analysis. Additionally, landslide maps prepared by MCD include runout features of sediment deposits from debris flows. A relatively fast processing chain, MCD is expected to become a useful new tool for emergency management after a typhoon event, which occurs on average four to five times a year in Taiwan.