Automated Landslide Detection with NDVI Time Series Using Google Earth Engine

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Landslide is one of the most common natural disasters and increasing due to the impact of climate change, demanding effective risk-reduction strategies. This study focuses on applying satellite time series for landslide detection via Google Earth Engine (GEE). The Sentinel-2 imagery was used to develop a change detection method and test its applicability in mapping landslides triggered by a typhoon event in the Yusui River Watershed, southern Taiwan. Sentinel-2 time series in the study area were collected, pre-processed, and analyzed using GEE. Specifically, the statistical signatures, such as mean, standard deviation, and z-score of the Normalized Difference Vegetation Index (NDVI) time series were used to identify the changes before and after the typhoon event. The result shows that the application of NDVI time series can effectively reduce incorrect detection due to noises and minor anomalies, and landslides are mapped when the changes are considered significant. This approach can be conducted automatically using the GEE platform and shows great potential for landslide monitoring practice.

Keywords: Landslides, change detection, NDVI, Sentinel-2, Google Earth Engine