

Investigating Surface Deformation Characteristics of Multiple Slow-moving Landslides Using an Effective MTInSAR Workflow

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More than 2,500 potential slow-moving landslides have been cataloged in Taiwan, where hills and mountainous areas occupy approximately 70% of the land area. Monitoring their activity widely and efficiently before the typhoon and heavy rainfall seasons is crucial for safety concerns. This study is dedicated to establishing an effective MTInSAR workflow package named multi-snap2stamps, which is based on the existing snap2stamps. It enables the generation of interferograms for multiple regions simultaneously. The surface deformation characteristics of multiple slow-moving landslides can be efficiently investigated and analyzed in both the space and time domains. The velocity distributions indicate the active areas of these slow-moving landslides, and the time series visualizes the surface displacement behavior over a long period of time. In addition, significant seasonal fluctuation signals were observed in the time series data from two specific slow-moving landslide sites. The accelerated movements of certain slow-moving landslide were detected and compared with in situ inclinometer monitoring data. The proposed MTInSAR workflow package provides valuable information about surface deformation characteristics of multiple slow-moving landslides across a wide area. The derived information is expected to enhance landslide hazard assessment and improve the detection of landslide precursor motions in the future.

Keywords: Multiple slow-moving landslides, Effective MTInSAR workflow, Velocity distribution and movement, Seasonal fluctuation signals, Accelerated movements