



Application of detecting the landslide behaviors with multi-temporal SAR images in Taiwan

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Taiwan is located at the boundary between the Philippine Sea Plate (PSP) and Eurasian Plate (EUP). The PSP moves northwest toward the EUP at an average rate of 82 mm/yr. Moreover, Taiwan faces almost 4 times typhoon events every year and the annual rainfall is more than 2000 mm. The plate collision and the erosion rate occur a lot of landslide events in the orogenic belt of Taiwan, especially after Chi-Chi earthquake and Morako typhoon. For detect the mechanism of creeping landslide in the central Taiwan, our research focuses on two landslide sites. The YangAn River (YAR) landslide is a slab-slide landslide case and located on the dilapidation after Morako Typhoon event. Another landslide site is located on the sensitive area of landslide near the popular spot - QingJing Farm. We applied GMTSAR software to process 96 Sentinel-1A/B images (53 image pairs in the ascending orbit and 41 image pairs in the descending orbit) from ESA between Feb. 2016 and Feb. 2018. The time-series cumulative deformation was calculated by SBAS method. The spatiotemporal differences of all image pairs are limited under 24 days and 100 m perpendicular baseline. The most mean velocity of shortening LOS displacements in the YAR landslide reaches near 10 cm/yr. The shortening LOS displacements are obvious in the toe and the erosion ditch of slab-slide. However, it is difficult to measure the movements of top of slab-slide due to a lot of vegetation covered. In the Qingjing landslide, the most mean velocity of shorting LOS displacements reaches near 5 cm/yr. The cumulative LOS displacements could contain the components of tilted buildings and surface slide. In order to analyze the geometric correlation between the landslide characteristics and satellite attitudes, we will use 5 meter resolution DEM and UAV data to detect the slope and strike of landslide. Moreover, the field survey and measurement would explain the mutual relationship between the buildings and landslide.