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# Multi-scale and multi-temporal geoinfomatic data acquisition, evaluation and progressive landslide assessment

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Taiwan, due to the high seismicity and high annual rainfall, numerous landslides triggered every year and severe impacts affect the island. In recent years, the remote sensing technology improves rapidly, providing a wide range of image, essential and precious geoinformation. In order quantify the hazards, we try to integrate several technologies, including 1) Remote-sensing images gathered by Unmanned Aircraft System (UAS) and by aerial photos taken in different periods; 2) UAS multispectral images, 3) field geologic investigation; 4) Differential GPS, RTK GPS and total station works, etc. in-site geomatic measurements; 5) and UAS LiDAR data acquisition. Based on the methods we firstly construct multi-scale and multi-temporal DTMs, before, just after landslide, as well as the subsequent periods. Firstly the field surveying data used as ground control points to adjusting the UAS-associated true 3D models and DSMs. 7 UAS flight missions for the study areas dated since 2015 to 2018, for an area large than 5Km2 with 8-12 cm spatial resolution. Then, the datasets was compared with the airborne LiDAR data, to evaluate the quality and the interpretability of the dataset. Recently, we integrate UAS LiDAR technology to scanning part of the study area, to re-evaluate the data precision by dense point cloud, higher than 250 and 100 pts/m2 for the total and ground point, respectively. Based on the dataset, the sliding process and morphologic changes of large landslide areas, slope debris migration, sediment transport and budgets, river migration etc. processes are thus analyzed. The results of this study provide not only geoinfomatic datasets of the hazardous area, but also for essential geomorphologic information for other study, and for hazard mitigation and planning, as well.