

A Framework for Fast Assessment of Terrain Changes Using Satellite Images to Support Long-Term Updating of Digital Terrain Model

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The terrains in Taiwan are frequently altered by assorted natural hazards such as landslides. To better understand terrain features, LiDAR was used to create an island-wide digital terrain model (DTM). However, due to economic and technical reasons, only a small portion of the created DTM can be updated every year and the annual update may not be actually effective. To overcome this issue, using satellite imagery to quickly assess terrain changes can be a applicable approach to help develop a more efficient strategy and flight plan for update the airborne LiDAR DTM. Accordingly, this study uses satellite imagery to generate three-dimensional point cloud based digital surface models to quickly screen large-scale surface deformation areas. Therefore, it can provide the area that needs to update by LiDAR, and DTM updates are performed only for marked areas instead of island-wide. This approach ensures that limited resources are devoted to areas of significant change, reducing the overall cost and time required for large-area DTM updates.

Keywords: Satellite imagery, Digital Terrain Model (DTM), LiDAR, Terrain changes, Cost-effective