



Using airborne LiDAR to investigated the bedrock incision in the Tsaoling Landslide surface, Taiwan

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In recent decades, a great number of studies have investigated the tectonic topographic evolution and development of active orogenic belts that cause the dynamics related to a variety of terrain features. In particular, the incision of bedrock via erosion by rivers plays a crucial research role. Erosion gullies reflect the incision of bedrock by rivers during the tectonic and topographic evolution of active orogenic zones; however, a limited amount of measurement data is currently available. Therefore, this study explored the incision erosion rate of different lithologies in the collapsed surface of a landslide induced by the 1999 Chi-chi earthquake in the Tsaoling area. This study uses the 1 m high-resolution DEM established by the Central Geological Survey via airborne LiDAR, organized by the Ministry of Economic Affairs (MOEA). In this study, we investigated the distribution of erosion gullies produced in different rock formations by the Tsaoling landslide based on an openness analysis using a red relief image map (RRIM) and calculated the bedrock incision rate for the Cholan Formation and Chishui Shale for 1999, 2011 and 2012, which was 30-40 cm/yr and 54-90 cm/yr on average, respectively. These results indicated that the Cholan Formation has a higher resistance to erosion than the Chishui Shale, where the erosion was more serious.