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Application of the high-resolution digital elevation model in an integrated numerical method for the occurrence mechanism and post-failure behavior of the landslide

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In 2009, a large-scale landslide was triggered by typhoon rainfall and buried an entire village, which named Hsiaolin and located in Taiwan.
After that, Soil and Water Conservation Bureau (SWCB) has promoted a national project for the prevention work of large-scale landslide. The national project includes with the investigation of potential area, the design of monitoring system, and the design of warning system, etc.
The investigation of potential large-sclae landslide was based on the digital elevation model with 1 meter resolution. However, the investigation of the underground was lack and not clear enough. Therefore, the specific landslide's body is hardly to estimate and it causes difficulty in follow-up works.
This study applied two methods to investigate the scenario of slope failure. The first method is based on the limited equilibrium method, which proposed by Yoshino and Uchida (2019). The method was used to search the specific region of unstable slope based on a series of high-resolution digital elevation models. After the specific region of unstable slope was confirmed, the landslide can be simulated by a numerical model, which this study proposed to represent the entire landslide process from occurrence to post-failure .
These proposed methods were applied at Baolai area, south Taiwan to track the evolution of the potential area. The failure scenario could be evaluated by the proposed numerical model. By this study, the investigation of underground can be evaluated and these results are very important information for the design of monitoring system.