



Terrane daylight mapping on large dip-slope terrain based on high-resolution DTM and semi-automatic geoprocessing processes

Chih-Hsiang Yeh (1), Ming-Lang Lin (2), Yu-Chang Chan (3), Kuo-Jen Chang (4), and Yu-Chung Hsieh (5)

(1) NTU, Taiwan (d96521027@ntu.edu.tw), (2) NTU, Taiwan (mlin@ntu.edu.tw), (3) SINICA, Taiwan (yuchang@earth.sinica.edu.tw), (4) NTUT, Taiwan (epidote@ntut.edu.tw), (5) CGS, Taiwan (hsiehyc@moeacgs.gov.tw)

“Daylight” in slope engineering means a lineament appearing on the ground surface caused by an internal weak plane of a rock slope. The morphology of the daylight implies the free surface condition of the rock mass upper the weak plane, directly affecting the slope stability and safety. Traditionally, the reconnaissance of daylight employs field investigation and drillings in local dip slope area, but when mapping in large area, it would be subjected to vegetation cover and budget limitation to get a simply result not used for engineering applications. Therefore, the purpose of this study is to develop a rapid and reliable mapping program based on high-resolution DTM, and to generate a large-scale daylight map for large dip slope area. The methodology can be divided into two phases: the first is re-mapping terrane boundary lineaments using LiDAR data and 3D GIS mapping technology; the second is automatically mapping daylight tracks by trend surface analysis and python scripts based on above terrane boundary lineaments. This study takes the area of Keelung River north bank, which is mainly cuesta topography, for an example. Recently, in the area, the frequency of dip slope landslide occurrence becomes more higher because of human development. One major reason to cause the daylight appearing on downslope is the slope toe cutting or river incision. Hereby, according to the final results of the daylight map, we can assess where the potential landsides dip slopes are, and further differentiate three different risks of dip slope from the daylight’s morphology, expecting to provide more detail engineering and geological information for future engineering site selection and the design and application of disaster prevention.