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Observation of geomorphological processes on steep slopes in Dalmatia by using TLS

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Each year dozens of rockfalls and small landslides are recorded in Central Dalmatian region, while problems with erosion of the slope surface are an everyday occurrence. In addition, the geological settings are various, from predominantly flysch sediments in wider area of the city of Split, to the limestone massif in other parts of the coastline. Also, Quaternary deposits in a wide range of connectivity are also present. Therefore, it is often necessary to apply different types of slope stabilization, even for small scale objects, for which detailed geodetic survey is always necessary. Field observations were carried using terrestrial laser scanner (TLS) on pilot locations in the area from Split to Omis.
Data collected by TLS can be analyzed for the entire surface of the slope to give a 3D insight into the development of the geomorphological processes which, combined with the identification of members of the cuts through photos and laser beam intensity, is the basis for a detailed analysis of phenomena such as: rockfalls, sliding, toppling, etc. Through a series of illustrative examples, categorization of observed geomorphological processes can be made, and thus the results of observations can be used as an input to geomechanical calculations.
Except for the results of direct geometrical comparisons, a modified setup of long term monitoring for this type of rock mass is presented. After the first scan is georeferenced, by using software with ICP algorithm and detecting fixed objects on or near the slope (buildings or geological members that are not subjected to weathering in the engineering time scale), it is possible to use only the TLS for all other data acquisitions on the monitored cut.