



## **LiDAR, UAV SfM and geomorphic change detection in small quarry and landslide interactions**

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Quarry activity triggers landslides, especially in small, unplanned, and not maintained quarries. Given the size of these small quarries that are very frequent in the rural areas of north-eastern Romania, their study is difficult because of the lack of topographic data. We show the usage of remote sensing data for geomorphic change detection, which is able to reveal the topographic evolution of the quarrying and landsliding. Legacy LiDAR data from 2012 and field surveyed UAV from 2019 are used to assess the topographic changes, compared to the 1980 5k topographic maps. The quarry location is related to the presence of old landslide bodies (dated to the early medieval period using radiocarbon ages of soil organic matter fractions), from which the clay material is excavated for various construction projects. The unplanned excavation reactivated the body of an old landslide that will continue evolving. The usage of LiDAR data and the UAV SfM survey allowed us to derive 0.25 m DEMs that pinpoint the volumetric change of the quarried material and of the landslide reactivation. As a future prospect, the use of such remote sensing data can pinpoint areas where these unplanned quarries could affect the stability of the hillslopes and become a hazard.