



## **Plot-scale soil loss estimation with laser scanning and photogrammetry methods**

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Structure from Motion (SfM) is an automatic feature-matching algorithm, which nowadays is widely used tool in photogrammetry for geoscience applications. SfM method and parallel terrestrial laser scanning measurements are widespread and they can be well accomplished for quantitative soil erosion measurements as well. Therefore, our main scope was soil erosion characterization quantitatively and qualitatively, 3D visualization and morphological characterization of soil-erosion-dynamics. During the rainfall simulation, the surface had been measured and compared before and after the rainfall event by photogrammetry (SfM – Structure from Motion) and laser scanning (TLS - Terrestrial Laser Scanning) methods. The validation of the given results had been done by the caught runoff and the measured soil-loss value. During the laboratory experiment, the applied rainfall had 40 mm/h rainfall intensity. The size of the plot was 0.5 m<sup>2</sup>. The laser scanning had been implemented with Faro Focus 3D 120 S type equipment, while the SfM shooting had been carried out by 2 piece SJCAM SJ4000+ type, 12 MP resolution and 4K action cams. The photo-reconstruction had been made with Agisoft Photoscan software, while evaluation of the resulted point-cloud from laser scanning and photogrammetry had been implemented partly in CloudCompare and partly in ArcGIS. The resulted models and the calculated surface changes didn't prove to be suitable for estimating soil-loss, only for the detection of changes in the vertical surface. The laser scanning resulted a quite precise surface model, while the SfM method is affected by errors at the surface model due to other factors. The method needs more adequate technical laboratory preparation.