

## **Abstract**

The use of digital elevation models is becoming increasingly used as a scientific method, thanks to the advancement of technologies and public accessibility, particularly in the fields of geomorphology and physical geography. The use of UAV significantly facilitates data collection and subsequent creation of a digital model through the structure from motion (SfM) process. Another data collection method employed in the research is the laser scanning using terrestrial laser scanner (TLS).

The aim of the study is to create digital models using these methods and to compare them using the software environment of Agisoft Metashape and CloudCompare software. Additionally, it investigates the influence of georeferencing points on the quality and accuracy of the models. Furthermore, a comparison of the individual methods is conducted based on such parameters as time, costs, data flexibility, environmental impact, and others. The study also seeks to determine the influence of the digital model parameters on obtaining secondary information from the DEMs, such as slope azimuth and geometry of structural planes and joints, used for example in the research of the prevention of potential rockfalls. The results indicate that the use of UAVs is suitable, if not the best option, for geomorphological features in terms of speed, economic considerations, and data accuracy. Although the use of georeferencing points improves the resulting DEM quality slightly, they are crucial if further interpretation of the models through morphometric analyses is required.

**Keywords:** 3D model, rock relief, rockfall, SfM, UAV, TLS