

## **Quantification, analysis and modelling of soil erosion on steep slopes using LiDAR and UAV photographs**

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**Abstract** Steep hill slopes in the Bavarian Alps and at an artificial waste dump on the Island of Elba are subject to soil erosion through geomorphological processes. Long-term high-resolution terrestrial LiDAR data are available and have been analysed for both areas. The analysis indicated different erosion patterns on the slopes that could be the result of different geomorphological processes. Additionally, both study sites show a good agreement between the annual erosion rates and the size of the hydrological catchment as a proxy for the sediment contributing area. The results presented in this study represent the first analysis of hill slope erosion measured with LiDAR and UAV systems. The hill slope erosion will be subject to measurements using a higher temporal resolution during future years in order to identify different erosion processes throughout the annual time step.

**Key words** terrestrial LiDAR; hill slope erosion; modelling; sediment contributing area; Bavarian Alps; Italy; UAV; photogrammetry