

## Ground-based laserscanning – a new method for measuring fluvial erosion on steep slopes?

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**Abstract** In the presented study, a high resolution Terrestrial Laserscanner (Riegl LMSZ 420i) is used for scanning steep and barely vegetated slopes over a period up to 20 months between 2009 and 2010. The produced multitemporal ground-based laserscanning data on these slopes in combination with a 3-D-Software (Riscan Pro) and a GIS (LIS Desktop) are used to quantify fluvial erosion by cut and fill analyses. To consider different climatic, surface and soil conditions these measurements are carried out in two areas, which are situated in the Alps (south Tyrol/Italy) and in the Mediterranean region (Island of Elba-Tuscany/Italy). Since the investigations focus on the methodological approach, the data acquisition and the data processing are described in detail in the first part of the paper. The second part shows first results of using the method for cut and fill analyses for two test plots within the scanned slopes of both investigation areas. The results show that the amount of erosion and accumulation can be well detected by ground-based laserscanning. Due to the very high spatial resolution of the derived surface changes, the paper also shows the high capability of the method for detailed process analysis, which could lead to a better process understanding for erosion on steep and barely vegetated slopes.

**Key words** fluvial erosion; steep slopes; ground-based LIDAR; terrestrial laserscanning; GIS; Italy; Alps