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# Results and examples of a geomorphological interpretation key based on high resolution LIDAR and optical data in the Eastern Alps

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Digital terrain models (DTM) derived from high resolution LIDAR/airborne laser-scanning data (LIDAR: Light detection and ranging) have been available in mountainous areas in recent times, especially in the Alps. Its potential for the detection of geomorphic processes has been widely discussed in the last decade focussing primarily on landslides. Studies suffer from a lack of a geomorphological inventory based on these high resolution DTMs. We present an interpretation key for meso- and microscale landforms visualized, detected and evaluated in the study regions Vorarlberg and Tyrol (Austria) as well as South Tyrol/Alto Adige (Italy). Four geomorphological systems were distinguished such as glacial (5 landforms), periglacial (4), denudative (10) and fluvial (8) process systems which are demonstrated in the form of 29 examples. Each landform was characterised with the terms perception, attributes, parameterizing and a concluding comment to support the approach of a subsequent automatic classification.

Visual interpretation in terms of the detection of geomorphological landforms shows high potential using DTMs from LiDAR data. For example non linear landforms like roche moutonnée are not characterised by distinct break lines. So a higher resolution leads to an increased amount of details and supports the recognizability of patterns in texture. The detection of landforms under vegetation depends strongly on the point density on the surface. Examples near the tree line with a decreased point density ($3pt/25m^2$) show that also in sparsely forested areas details on block fields are not

clearly visible for correct detection. On the other hand details of primary and secondary processes on deep seated gravitational slope deformations under vegetation are detectable due to their larger extent (example Zintlwald, Tyrol).