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An approach on automatic landform mapping using high resolution LIDAR: a case study in the Italian Eastern Alps

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The potential of high resolution Digital terrain models derived from LiDAR (Light detection and ranging) data in visual detection of landforms has been widely discussed in recent times. Automatic landform mapping using terrain parameters is a common tool to transform elevation data into thematic maps regarding geomorphological processes. We report on a case study in the Martell valley, Südtirol/Alto Adige, (Italy, 46° N 31′, 10°41′) where we categorised different process domains using a combined segmentation - classification approach (object based classification). The segmentation algorithm divides the dataset into contiguous regions/segments that have uniform slope and curvature. Then a multivariate classification can be performed based on terrain attributes calculated for each region rather than on a cell by cell basis. The idea being that the regions better represent unique and individual landform untis on the ground than the arbitrary cell does. The use of regions, rather than cells, also opens up for the use of shape based parameters, and in addition it is an effective way of reducing the amount of data points from the high spatial resolution LiDAR data.