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Quality and vertical accuracy assessment of airborne LiDAR data: a case study on the Draix basins (French Alps)

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The airborne LiDAR technology provides high-resolution topographical data, which can significatively improve the representation of land surface. A valuable characteristic of this technology is the capability to derive high-resolution Digital Terrain Models (DTMs) from ground points generated after removal of vegetation and man-made features. This filtering process is often performed by LiDAR vendors with automated methods and then delivered to the final user. With the recent increase in the use of LiDAR for geomorphic and hydrologic applications, there is the need to accurately study the quality of the ground surface LiDAR points delivered before further utilisation.

In this study, a quality and vertical accuracy assessment was carried out on TINs and DTMs (1 m grid size) derived from the airborne LiDAR data collected on April 2007 in the Draix basins (French Alps). These basins are located in a mountainous area with a mudstone substratum and present a badlands topography with deeply incised gullies. Two different ground surface points dataset obtained with different filtering parameters values have been provided by the company which carried out the survey. The accuracy of LiDAR-derived products was evaluated by comparing TINs and DTMs values with the corresponding reference points obtained by field measurements conducted with differential GPS and theodolite. Systematic elevation error was calculated as mean height differences between the modelled surfaces and the field measurements, whereas the random error was obtained from Root Mean Square Error analysis. In

this study the influence of a complex morphology (sharp divides and deep gullies with steep slopes) on the quality and accuracy of LiDAR information is investigated for a preliminary evaluation of the capability of the LiDAR-derived DTM of the study area for a detailed and precise landform characterization.