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PLANIALTIMETRIC ACCURACY EVALUATION OF DIGITAL SURFACE MODEL (DSM) AND DIGITAL TERRAIN MODEL (DTM) OBTAINED FROM AERIAL SURVEY WITH LIDAR

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Abstract. It ' s noticed a significant increase in the development of orbital and airborne sensors that enable the extraction of three-dimensional data. Consequently, it's important the increment of studies about the quality of altimetric values derived from these sensors to verify if the improvements implemented in the acquisition of data may influence the results. In this context, as part of a larger project that aims to evaluate the accuracy of various sensors, this work aims to analysis the planialtimetric accuracy of DSM and DTM generated from an aerial survey with LIDAR, using as reference for the planimetric analysis of the orthophotos obtained. The project was developed for an area of São Sebastião city, located in the basin of the North Coast of São Paulo state. The area's relief is very steep, with a predominance of dense forest vegetation, typical of the Atlantic Forest. All points have been established in the field, with the use of GNSS of one frequency (L1) through static relative positioning, acquiring a minimum of 1,500 epochs, for a distance less than 20 km to the base. In this work it's considered the Brazilian standard specifications for classification of cartographic bases (PEC). The Brazilian company responsible for the aerial survey (LACTEC) gave the following products for analysis: point clouds in raw format (x, y, z) using orthometric heights; point clouds (first and last pulse) for each range of flight to verify systematic errors; DTM uniformly spaced, filtering small natural obstacles, buildings and vegetation, in Geotiff format; DSM also uniformly spaced, in Geotiff format; and the mosaic of georeferenced digital images. The analysis realized on products from the LIDAR indicated their adoption to the scales 1:2,000 (Class A for the orthophotos and Class B for the DTM) and 1:5,000 (class C for the DSM). There were no indications of trends in the results. The average error was 0.01 m. It's important that new areas with different topographic characteristics may be evaluated to get an indication for other situations. As to the assessment of the altimetric accuracy, we are going to do more analysis with points obtained under the forest canopy in order to be able to assess the real accuracy of the DTM in areas with forest cover. Studies that focus the development of new methodologies for obtaining Digital Elevation Models (DEM) are very important, especially in large scales, seeking to generate data with cost-benefit's advantages. This way, topographic features can be obtained for wider areas of our country, meeting the needs of most studies and activities related to the representation of these kind of data.

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