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INTEGRATION OF LIDAR DATA INTO A MUNICIPAL GIS TO STUDY SOLAR RADIATION

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Abstract. Identifying the right roofs to install solar panels inside a urban area is crucial for both private citizens and the whole local population. The aim is not easy because a lot of consideration must be made: insolation, orientation of the surface, size of the surface, shading due to topography, shading due to taller buildings next the surface, shading due to taller vegetation and other possible problems typical of urban areas like the presence of chimneys. Accuracy of data related to the analyzed surfaces is indeed fundamental, and also the detail of geometric models used to represent buildings and their roofs. The complexity that these roofs can reach is elevated. This work uses LiDAR data to obtain, with a semi-automatic technique, the full geometry of each roof part complementing the pre-existing building data in the municipal cartography. With this data is possible to evaluate the placement of solar panels on roofs of a whole city analyzing the solar potential of each building in detail. Other traditional techniques, like photogrammetry, need strong manual editing effort in order to identify slopes and insert vector on surfaces at the right height. Regarding LiDAR data, in order to perform accurate modelling, it is necessary to obtain an high density point cloud. The method proposed can also be used as a fast and linear workflow process for an area where LiDAR data are available and a municipal cartography already exist: LiDAR data can be furthermore successfully used to cross-check errors in pre-existent digital cartography that can remain otherwise hidden.

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