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Using GIS in geomorphometric research: examples from north and central regions of Portugal

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Geomorphometry is a research field focused on surface quantitative analysis and modelling. Due to its characteristics, it is an inherently multidisciplinary area of expertise, incorporating techniques and technology from multiple domains (e.g., geosciences, computer science, mathematics and data science). It is worth to note that the concept of surface is used here in a broad sense so, beside topography, geomorphometry can also be of interesting for study land cover change, soil formation, watershed dynamics, erosion, tectonic uplifts, landform evolution, etc. The use of modern geographic information technologies and the dissemination of digital data were major steps in the evolution of geomorphometry, allowing to go beyond the limited approach associated with quantitative geomorphology. In this work, 3 major objectives where establish: 1) assess the use of LiDAR data to build digital elevation models (DEM); 2) assess the accuracy of topographic surfaces from multiscale DEMs; 3) calculate morphometric parameters to support terrain object identification. The achievement of these objectives is based on the presentation of several examples and applications from selected key-areas in the central region of Portugal, as well as from the Côa Valley region (northeast of Portugal) in the framework of CLIMATE@COA project (COA/CAC/0031/2019).