

## Geomorphometric delineation of floodplains for Quaternary deposits mapping

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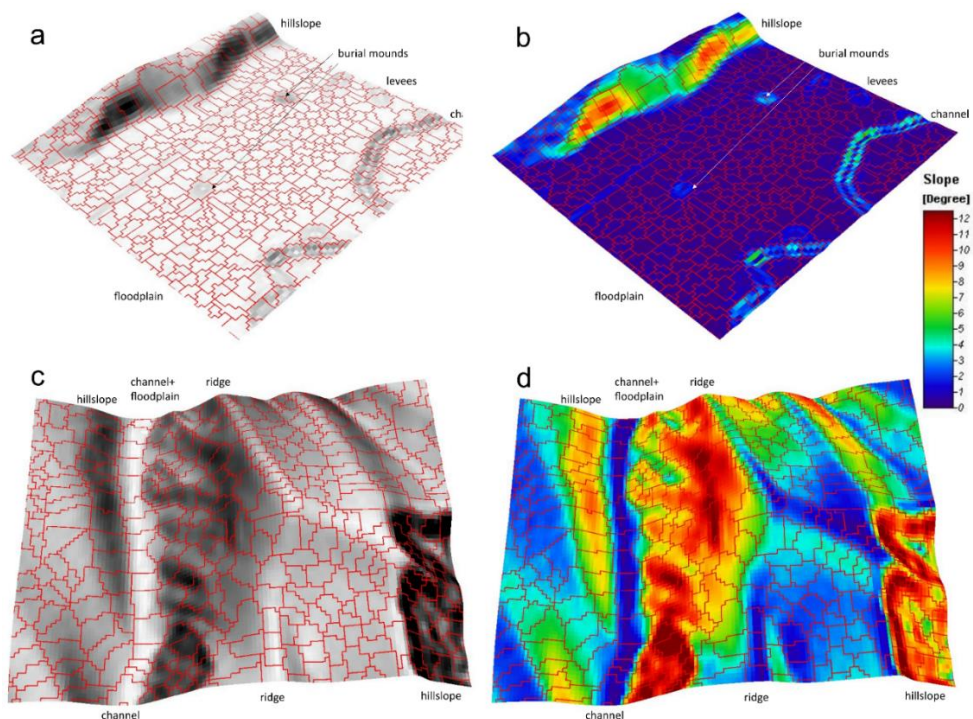
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Floodplains and their morphology, including river channels and fluvial terraces, are important fluvial landforms with practical implications from many perspectives: Quaternary geology/geomorphological mapping, flood risks, and planning. The availability of a medium-resolution Digital Elevation Model (DEM) like Copernicus DEM opens up the possibility of delineating channels and floodplains with better accuracy than with SRTM or other similar DEMs. Since the elevation data comes from radar measurements, the landform shape in non-vegetated areas is very well-constrained, as the Copernicus DEM has low noise in flat areas and excellent precision, similar to LiDAR data. At the 20 m spatial resolution, the channel and floodplain of rivers up to the third Strahler order are recognizable. The channel network was delineated using the D8 algorithm and a breaching algorithm for depressions. The floodplains were extracted by training a neural network, specifically Multilayer Perceptron (MLP), for the geomorphometric variables of watershed segments of the slope (Figure 1).



**Figure 1** Examples of slope segmentation.

MLP is a deep feedforward neural network/multilayer perceptron method that uses the neuron model, of acyclic networks, in layers that use connected functions as vector nodes to fit linear functions for an overall non-linear classification or regression.

Because there is no source of ground truth data, the evaluation of the results was performed mainly qualitatively by comparison with LiDAR data. The results show the geomorphometry's feasibility and the Copernicus DEM for floodplain delineation and mapping of the Quaternary deposits.

Considering the Quaternary age of the floodplains and terraces, with most of the floodplains dating as Holocene, their geomorphometric delineation puts the base of their mapping. As dating information improves and significantly better geological or geophysical data piles up, surface landform delineation will also be essential for depth and volume prediction.