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## Using GIS techniques for automatic mapping of gullies in the Moldavian Plateau, Romania

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Gully erosion represents one of the major environmental problems within the agricultural hilly areas of Moldavian Plateau, Romania. Deforestations, made in the last two centuries, and unsustainable agricultural techniques made the Moldavian Plateau a very susceptible area especially to soil erosion, gullying and landsliding. Beside the human influence that accelerated the process, gully erosion is a natural hazard that occurred from heavy rain falls and water concentrations in catchment areas. The most important natural induced factors that influenced gully head retreat in the Moldavian Plateau are the landform features, favorable lithology, land cover changes under improper human impact on the background of specific climacteric conditions such as heavy rain falls, snow melt and or freeze-thaw phenomenon. The Moldavian Plateau is the area that has one of the biggest densities of gullies in Europe, and, because of its large population of gullies and lack of materials, techniques and time no comprehensive inventory was made. Due to the appearance of high resolution LIDAR images and the evolution of GIS software in recent years, a lot of researchers, from all around the world, tried to identify gullies and quantify them using these modern techniques. For this research, morphometric features (e.g. profile curvature and a 360° hillshading grid with eight points of lightening distributed at a distance of 45 azimuth degrees) derived from LIDAR were used for a more facile mapping of gullies. These morphometric features were classified using different classification method. To evaluate the quality of the results, a shapefile with gully contours had been created by digitizing the banks of the gully. The results of the manually digitized shapefile were confronted with the results of the automatic morphometric features obtained in this research. The combination of hillshading grids that were used in this research covered a very big part of the surfaces occupied by gullies, excepting the gullies affected by landslides that were hardly recognized. Also, the derived profile curvature identified the banks of the gully in a very accurate way.