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GIS MODULE FOR THE ESTIMATION OF THE HILLSLOPE TORRENTIAL PEAK FLOW

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Abstract

In rural regions, characterized by a large number of small basins, some of them torrential and others without permanent flow, high intensity convective rainfall generate overland flow, not always on the same path. Overland hillslope flow, followed by a dangerous peak discharge, can happen almost anywhere at any time. The purpose of this paper is to present a GIS module for computation of possible peak flow in any point of a hillslope. The workflow is based on the rational method, but it is applied rather differently by avoiding the previous delineation of watersheds and working on a raster cell level. The module that we present is more than just an automation of known GIS procedures because the result of this model also includes the path of the maximum flow and the peak flows, which would otherwise remain unknown. There is a possibility of another path for the peak flow under different rainfall and antecedent moisture conditions. In this case, the module needs to be rerun for the new conditions when a new torrential rainfall event occurs. The module provides an easy-to-understand graphical representation of peak flow paths, maximum flows and associated maps that can be useful for further decisions and prevention measures.

Key words: GIS module, peak discharge, raster map, rural areas, Romania, torrential flow, ungauged basin

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