No. 7 (2003 r.)

IDENTIFYING RUNOFF SOURCE AREAS IN A SMALL LOWLAND CATCHMENT USING THE TOPOGRAPHIC WETNESS INDEX

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Key words: runoff source areas, contributing area, overland flow, interflow, topographic wetness index

Abstract

Foundations of the variable source areas concept in river catchments and the method of their estimation upon the topographic wetness index and grid digital elevation model are presented in this paper. Exemplary calculations made for a small lowland catchment of an area of 1.93 km² demonstrated that at an average moisture the runoff source areas (i.e. those where overland flow and interflow are formed) occupy 22% of the catchment. A high sensitivity of the method was also found to the adopted resolution of the terrain's model. Recommended resolution should refer to the relief and the improper resolution may cause error estimates. Using models of smaller accuracy one obtains overestimated sizes of runoff source areas. Described method, apart from purely hydrologic applications, may be used to delineate the areas of elevated risk of fast pollutant flow to surface waters.