

QUANTIFYING SURFACE RUNOFF IN THE WATER DISTRICT OF WESTERN MACEDONIA USING MULTIPLE REGRESSION ANALYSIS AND G.I.S

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EXTENDED ABSTRACT

Quantification of Greece's surface runoff constitutes a major field of research, as so far there has not been a robust national methodology with a firm scientific basis. Therefore, the need for reliable estimation of surface water resources and a forecast of their future trends is obvious. In this paper, a grid-based distributed hydrologic model is developed, in order to enable estimation of surface runoff in the water district of western Macedonia. Model development is based on the evaluation of parameters that emerge after the processing of raw data of geographical, hydrometeorological and hydrometric nature. Analysis of these data is achieved by using state-of-the-art informatics tools, including a Database containing time series of the quantities of interest and a Geographic Information System. The water district is subdivided in various subcatchments, defined by the locations of the hydrometric stations. This is followed by the estimation of the hydrometeorological and morphological characteristics of interest for each subcatchment. Then, stage-discharge curves are constructed and the respective streamflow time series are produced. Multiple regression analysis is conducted in order to relate streamflow in the hydrometric stations and independent characteristics of the catchments upstream of the stations. These characteristics are mean areal precipitation, catchment area and catchment mean slope. Finally, a grid network is utilised for representation of the study area and the multiple regression equations that were generated previously are applied in every grid cell of the network, in order to obtain the appropriate results of spatial distribution of surface runoff for the water district.

Key words: surface runoff, regional hydrologic models, GIS, regression analysis