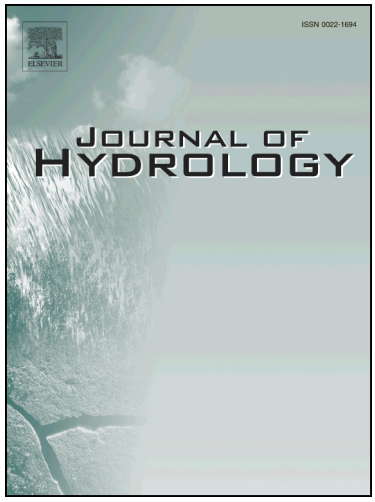

Research papers

The Areal Reduction Factor: A New Analytical Expression For The Lazio Region In Central Italy

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THE AREAL REDUCTION FACTOR: A NEW ANALYTICAL EXPRESSION FOR THE LAZIO REGION IN CENTRAL ITALY

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Abstract

For the study and modeling of hydrological phenomena, both in urban and rural areas, a proper estimation of the areal reduction factor (ARF) is crucial. In this paper, we estimated the ARF from observed rainfall data as the ratio between the average rainfall occurring in a specific area and the point rainfall. Then, we compared the obtained ARF values with some of the most widespread empirical approaches in literature which are used when rainfall observations are not available. Results highlight that the literature formulations can lead to a substantial over- or underestimation of the ARF estimated from observed data. These findings can have severe consequences, especially in the design of hydraulic structures where empirical formulations are extensively applied. The aim of this paper is to present a new analytical relationship with an explicit dependence on the rainfall duration and area that can better represent the ARF-area trend over the area case of study. The analytical curve presented here can find an important application to estimate the ARF values for design purposes. The test study area is the Lazio Region (central Italy).