Development and evaluation of a rainfall–runoff model using regionalization data as model input

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Abstract A major difficulty for studies of small hydrological watersheds is the lack of good quality time series of hydrologic data, mainly because the flow rates in small watersheds are not monitored. Another important issue is that available rainfall–runoff models are almost always developed focusing on watersheds of medium and large scale. Regionalization studies have become an important tool to attempt to overcome these limitations. Suitable in most of the hydrological studies is the regionalization of rainfall–runoff-model parameters by using specific characteristics of a watershed. A tool was developed in a geographic information system which automatically gets the physical characteristics of watersheds from a digital elevation model by selecting the outlet and then generating the rainfall–runoff model parameters with neural networks. This paper evaluates this newly-developed tool with the data from small dams in the semi-arid region of northeast Brazil. A previously developed methodology is applied using target watersheds for the parameter estimation. The results show that the developed tool can be very useful for rainfall–runoff estimation in small watersheds.

Key words regionalization; rainfall–runoff model; watershed