

Step wise Multi-criteria Performance Evaluation of Rainfall-Runoff Models using WETSPRO

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ABSTRACT

This paper illustrates a methodology to evaluate model's performance of rainfall runoff model using a tool called WETSPRO (Water Engineering Time Series PROcessing tool). Simulated results of physically based semi-distributed model - SWAT (Soil and Water Assessment Tool) for Kliene Nete watershed (581 km²), Belgium are considered in this study. Paper presents a series of sequential time series processing tasks to be performed to evaluate model's performance thoroughly. The problem of serial dependence and heteroscedasticity is addressed and model performance evaluation on different flow components (peak flows, low flows and volume) and flow volume is carried. Performance evaluation of both flow components on their extremes is also performed. Two most commonly used goodness-fit-statistics (Mean Square Error – MSE and Nash Sutcliff Efficiency – NSE) are used with number of complementary graphical plots for evaluation propose. Results indicated model's robust performance on peak flows although base flows are slightly underestimated especially for lower return periods. Cumulative flow volumes tend to be overestimated. Based upon the study, some recommendations are summarized to enhance model's ability to simulate the flows events.

Keywords: Rainfall runoff model, SWAT, WETSPRO, Kliene Nete, peak flows, low flows.