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## **AN EVALUATION OF BLUE WATER PREDICTION IN SOUTHERN PART OF IRAN USING THE SOIL AND WATER ASSESSMENT TOOL (SWAT)**

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### **Abstract**

Soil and water are the two major resources in the Earth's hydro biological and geological systems. The hydrology of arid areas has become a topic of interest recently for hydrologists as water shortage at these areas can affect the agriculture, irrigation, and industry as a whole. This has also prompted water resource planners to more thoroughly investigate water resource crisis at arid areas. In this respect, the Soil and Water Assessment Tool (SWAT), a semi-distributed hydrological model, can be a subsidiary tool to be used in the prediction of surface runoff (blue water). This paper presents the application of SWAT on the Roodan watershed, which is located in the southern part of Iran and has 215 mm of annual precipitation. SWAT was engaged to know more about the daily flow and to evaluate the runoff volume. Three continuous scenarios were defined over the 21 years (1988-1992, 1993-2001, 2002-2008) for the land use map as it was found that continuous update of this layer were basically done during these periods. Results of sensitivity analysis showed that parameters related to transmission losses are most sensitive for this watershed. Furthermore, the SWAT had also visualized from the input data that the sub basins which have been designated for agricultural activities from 1988 to 2008 were at the southwest, center and northeast parts of Roodan watershed. Strength of modeling was evaluated by percentage of observations covered by the 95 Percentage prediction uncertainty (P-factor) and relative width of 95 % probability band (R-factor). The P and R factors in this study were recorded at, for calibration and validation periods, 50 % and 0.18 (calibration), and 50 % and 0.17 (validation) respectively. Nash-Sutcliffe and PBIAS obtained for calibration period were 0.75 and 1.5 %, and those for validation period were 0.64 and 21 %. However, results showed an underestimation trend for most peak flows during the modeling of daily stream flow. Nevertheless, the annual runoff volume for calibration and validation periods depicted a promising performance and thus validated the usage of SWAT as a subsidiary hydrological tool for water management projects attributed with stream flow and runoff volume.

*Key words:* arid area, runoff volume, stream flow, SWAT

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