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Utilization of Recharge Values Derived from SWAT Model in Mathematical Model of MODFLOW to Simulate Groundwater Flow of Firoozabad Plain

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Abstract

One of the most essential and appropriate groundwater model components is accurate information of the recharge values among input data often introduced to the model as the percentage of rainfall of aquifers. The recharge values are influenced by many temporal and spatial factors. Firoozabad plain is one of the suitable plains for agriculture in the Fars province in which utilization of groundwater resources has been banned since 23 September 2002, due to the declining water level and negative balance. The main purpose of this study was to estimate the recharge values of groundwater aquifer by using SWAT in the MODFLOW model. Firstly, surface water was simulated via SWAT model, and sensitivity analysis, calibration, validation and uncertainty analysis of results were performed by SWAT-CUP software. After extraction of aquifer recharge values from the calibrated model, the groundwater of basin was simulated via MODFLOW model in both steady and unsteady conditions. Following the model calibration, the hydrodynamic coefficients of plain were determined and sensitivity of model was checked in terms of hydraulic conductivity and discharge rate of pumping wells. As for the confidence, the model was revalidated, which proved in simulating the behavior of the aquifer very well.

Keywords: SWAT model, MODFLOW model, Firoozabad, Simulation, Calibration, Validation, Sensitivity Analysis.

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