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Estimation of Hydrodynamic Parameters of Groundwater Resources in Kouhpayeh- Segzi Watershed Using MODFLOW

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Abstract

Nowadays, due to the high potential of advanced simulation models for groundwater, these models are comprehensively applied in the management and exploitation of groundwater resources. The aim of this study was to investigate and simulate the groundwater resources in Kouhpayeh-Segzi watershed and in particular estimate the hydrodynamic coefficients of unconfined aquifer. After preparation of input layers, efficient parameters in modeling, boundary conditions and aquifer gridding were determined. Then, based on the available data, the model was run and calibrated in a steady state for the water year 2002 and in a transient state for water years between 2002 and 2004. The simulation outputs were confidently verified for the water year 2005. The results indicated that the hydraulic conductivities and storage coefficients were ranged on sub-basin from 15.26 to 19.87 m/day and 0.0107 to 0.0186, respectively. From aquifer's hydrograph for a period from 1995 to 2012, water level dropped about 25 cm. This may be due to two irrigation networks (green area). This leads to rising water level. By ignoring these recharge areas, water level declined up to 80 cm per year. With sensitivity analysis in transient state to evaluate the efficacy of each parameter, the accuracy of the results of calibration model was confirmed. In addition, the hydraulic head values computed by MODFLOW were in good agreement with those that were collected from all piezometers.

Keywords: Modeling, MODFLOW, aquifer, Transmissivity, Specific yield.

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