45th IAH CONGRESS
The International Association of Hydrogeologists
Daejeon, Korea / September 9-14, 2018
www.iah2018.org

Simulation of Interaction between Aquifer and Surface Flow for Different Water Resources Utilization Scenarios (Case Study : Urmia Plain)

[1*]Mostafa Javadian, [2]Mohammadmahdi Aghaie, [3]Masoud Tajrishy

*1- Researcher at Sharif Remote Sensing Research Center (RSRC), Tehran, Iran.
2- PhD Student of Water resources Eng., Sharif University of Technology, Tehran, Iran.
3- Prof., Faculty of Civil Eng., Sharif University of Technology, Tehran, Iran.

The level of water at Lake Urmia has decreased dramatically in the last two decades. Lake-Urmia basin is one of the regions in which most of the consumption of water is based on groundwater resources. The annual withdrawal of groundwater in the Urmia Plain is about 468 MCM which is the highest rate of water extraction throughout the basin. In this research, interaction between surface and groundwater flow is simulated using MODFLOW and remote-sensing. METRIC algorithm is used for estimating the amount of recharge to groundwater. The model is calibrated in 24 months of 2008 and 2009. The results show that the main input to the aquifer is the return flow of agricultural lands and the main output is agricultural wells discharge. Fluctuation of groundwater table indicates that the highest water level occurs in April and May and by contrast the lowest water level occurs in September. The results show that 94 MCM of water is directly evaporated from the aquifer per year. These areas are near the Nazlo and Barandooz rivers. The model is validated within 12 months of the year 2010. Two water utilization scenarios are designed for a better management of water resources in the Urmia plain. In the first scenario, 40% of recharge from irrigation return flow and well pumping is decreased concurrently in a five-year period. The results indicate that the groundwater table is decreased strongly but it can prevent the evaporation of 52 MCM of water from the aquifer. In the second scenario, some drains are designed in the high-evaporation zones. 57 MCM protection of groundwater from evaporation is the outcome of the second scenario. According to the main goal that is the restoration of Lake Urmia, the first scenario is recommended for a better management of water resources because it is more applicable.

Keywords: *Groundwater, Remote-Sensing, Lake-Urmia, MODFLOW, METRIC.*