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Salt Water Intrusion Modeling of an Aquifer in the Northwest of Maharlu Lake

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Coastal aquifers are important supply sources of fresh water in numerous area of earth. The problem of saltwater intrusion has been widely caused the deterioration of water qulity in these sources. As fresh water flows from the aquifer near the coastline. Eventually dynamic equilibrium is reached between the fresh and saltwater. Intrusion of pumping wells within coastal aquifer has the potential to disturb this equilibrium.
Maharloo Lake is a salt lake located 27 km southeast of Shiraz. There are many fresh coastal aquifera around this lake that naturally are recharged by fresh water entering from the landward karstic aquifer. The hydraulic equilibrium could be disturbed due to large extraction rate and consequently dropping in groundwater table. So, the lake saltwater with high salinity (Ec more than 300ms/cm in summer) coukd flow toward the aquifer. This lake salinity is much more than oceans salinity, so aquifer salinity could be changed very much even at low equilibrium disturbance. As a result, the management and maintenance of this aquifer is very important.
The object of this research is preparation of an intrusion model of a coastal aquifer at the northwestern of Maharloo Lake, where the coastal aquifer is the single supply source of fresh water and the saltwater intrusion has been widely caused the deterioration of water quality.
In this study SEAWAT computer code, a three dimensional finit difference model, used to study the intrusion mechanisms and groundwater systems. After data collection including qualitative and quantitative data and geology and hydrogeology of study area in the field, a conseptual model were prepared. On the basis of collected data, condition of the aquifer in February 2008 were taken as the initial condition and the length of calibration and verification periods consequently take 150 and 121 days after this time. After model calibration and verification, the aquifer conditions for next year predicted on the basis of two following strategies :
1. The present condition for the next year. 2.Raising condition of Lake water level in the next year. However, with the constructed model, other strategies could be tasted base on the real situation.