Geophysical Research Abstracts
Vol. 12, EGU2010-12819, 2010
EGU General Assembly 2010

Simulation of Saline Groundwater Resources Surrounding Salt Lake in Fars Province of Iran

Majid Khayyat Kholghi (1), Mehrdad Bastani (2), and Gholamreza Rakhshandeoroo (3)

(1) Tehran University, Irrigation & Reclamation Eng. Dept., Karaj, Islamic Republic of Iran (kholghi@ut.ac.ir), (2) Shiraz University, Civil Engineering Department- Shiraz-Islamic Republic of Iran (m_bastani_a@yahoo.com, (3) Shiraz University, Civil Engineering Department- Shiraz-Islamic Republic of Iran

One of the most salty lakes in Iran is located in North-East of Fars province with Electrical Conductivities (EC) of up to 61420 μmhos/cm where water supply depends severely on groundwater resources. Increasing demand for freshwater and overexploitation of the aquifer has caused a drawdown in groundwater levels followed by a seawater intrusion into the coastal aquifer in the vicinity of salt lake. Because of invalid appropriate groundwater flow and solute transport parameter values of the coastal system, studying and modelling of saltwater intrusion in this region is in some way complicated. These unknown parameters are consisted of hydraulic conductivity, porosity, specific storage coefficient and longitudinal dispersivity. In this research, it is tried to facilitate study this problem by means of SEAWAT code, which is suitable for variable-density groundwater flow modelling. In the process of calibrating the simulation and estimating the required unknown parameters, an attempt at inverse modelling of a seawater intrusion system is made by using genetic algorithm method as the optimization procedure. The auto-calibration objective function is defined with the root mean square errors (RMSE) between the observed and the simulated values. The observed data are consisted of both hydraulic heads and concentrations obtained from observation wells. Firstly, the SEAWAT code has been used for forward solution part of salt water intrusion phenomena and then a program is written in MATLAB for coupling the forward and inverse processes. In the developed code, the flow and transport parameters are estimated simultaneously in steady and transient states. Using these estimated parameters in the structure of the simulation consequences more accurate results and more trustable model for next applications in management of the coastal aquifer.
Key words seawater intrusion; saline groundwater resources; SEAWAT; genetic algorithm; Fars province