



**University of Zabol
Graduate School
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Thesis for obtaining a master's degree in civil engineering

**The effect of climate change on
groundwater resources in Zahedan plain**

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Abstract

In recent years, the development of cities and the increase of industrial activities have led to the production of significant amounts of greenhouse gases, resulting in global warming. Occurrence of such conditions causes changes in the hydrological cycle, surface and groundwater resources due to rising temperatures. In hot and dry regions such as Iran, groundwater resources play a very important role in meeting the needs of the people. These valuable resources are seriously threatened due to climate change and global warming, so it is necessary to seriously address the effects of climate change on it. Accordingly, in the present study, the effects of climate change on water levels in the aquifer of Zahedan were investigated. For this purpose, the average rainfall and temperature data from 1361 to 1390 were used to model climate change based on the fifth IPCC report and temperature and precipitation forecast over a period of 30 years. Also, MODFLOW code in GMS software environment was used to model the groundwater level in Zahedan plain aquifer. For this purpose, the recorded data of several piezometric wells were used. The amount of squared error in the calibration stage of the groundwater model of the studied plain in the steady and unstable state is 2.5 and 2.3 meters, respectively, and the correlation coefficient between the predicted level and observational values in both cases was 0.93. The simulated temperature and precipitation data from CanESM2 model were microscale using SDSM software and used in MODFLOW model to analyze the effect of climate change on the aquifer. The results of climate change in Zahedan plain, showed an increase in temperature, precipitation in the years 2010 to 2039. In general, the results of the study indicate a decrease in the level of Zahedan aquifer due to the phenomenon of climate change in the coming period was estimated at an average of about 2 meters.

Keywords: Climate change - Groundwater model - Zahedan - MODFLOW model - GMS