

STUDY OF IMPACT OF SOME CHANGES ON GROUNDWATER SYSTEM IN NILE DELTA AQUIFER

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Abstract

The climatic changes are considered one of the most important natural phenomena as a dangerous challenger for human beings. The main objectives of this research are to study the impact of climatic changes on the Nile delta aquifer, using VISUAL MODFLOW to simulate the effect of increase in SLR due to expected increase in temperature, decrease in surface water system due to decrease in surface water level of the Nile or construction structures such as Grand Renaissance Dam, Ethiopia increasing abstraction rates due to increase in population and combinations of these scenarios. The model was calibrated under current conditions based on available data for 2008 which is considered as a base case. Four different scenarios are considered. The first scenario increases SLR by 25, 50 and 100 cm, the second scenario decreases surface water by 25, 50 and 100 cm, the third scenario increases wells extraction rate by 25, 50 and 100 %, and the fourth scenario is a combination of three scenarios. The result shows that increasing SLR leads to an increase in groundwater level (GWL) in the North and a decrease in the South. It is also observed that decreasing surface water, increasing extraction rate from wells and combination of these scenarios leads to a decrease in GWL. Finally, increasing SLR, decreasing surface water and increasing extraction rate have significant effects on groundwater level but combination of these scenarios will have very dangerous effects on groundwater resources in the Nile delta aquifer.