



Microgravity, Hydrological and Meteorological Monitoring of Shallow Ground Water Aquifer in Al-Ain (UAE)

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The United Arab Emirates (UAE) is situated within an arid zone where the climate is arid and the recharge of the groundwater is very low. Groundwater is the primary source of water in the United Arab Emirates. However, rapid expansion, population growth, agriculture, and industrial activities have negatively affected these limited water resources. The shortage of water resources has become a serious concern due to the over-pumping of groundwater to meet demand. In addition to the deficit of groundwater, the UAE has one of the highest per capita water consumption rates in the world. The study area is located in Al-Ain city. Al-Ain is the second largest city in Abu Dhabi Emirates and the third largest city in the UAE. The groundwater in this region has been overexploited. In this study, a combination of time-lapse measurements of microgravity and depth to groundwater level in selected wells in Al-Ain city was used to estimate the variations in groundwater storage.

Relative gravity measurements were acquired using the Scintrex CG-6 Autograv. This latest generation gravimeter from Scintrex Ltd, provides fast, precise gravity measurements and automated corrections for temperature, tide, instrument tilt and rejection of data noise. The CG-6 gravimeter has a resolution of 0.1microGal. The purpose of this study is to estimate the groundwater storage changes in the shallow aquifers based on the application of microgravity method. The gravity method is a nondestructive technique that allows collection of data at almost any location over the aquifer. Preliminary results indicate a possible relationship between microgravity and water levels. The results will help to develop the relationship between monthly microgravity changes with meteorological and hydrogeological changes of shallow phreatic aquifer. The study will be useful in water management considerations.