



Groundwater Numerical Modeling, An Application of Remote Sensing, and GIS Techniques in El Shab area, Western Desert, Egypt

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El Shab region is located in south Darb El Arbaieen, western desert of Egypt. It occupies the area between latitudes 22° 00' and 22° 30' North and Longitudes 29° 30' and 30° 00' East, from southern border of Egypt to the area north Bir Kuraiym and from the area east of east Owienat to the area west Tushka district, its area about 2750 Km². The famous features; southern part of Darb El Arbaieen road, G Baraqat El Scab El Qarra, Bir Dibis, Bir El Shab and Bir Kuraiym, Interpretation of soil stratification shows layers that are related to Quaternary and Upper-Lower Cretaceous eras. It is dissected by a series of NE-SW striking faults. The regional groundwater flow direction is in SW-NE direction with a hydraulic gradient is 1m / 2km. Mathematical model program has been applied for evaluation of groundwater potentials in the main Aquifer –Nubian Sandstone- in the area of study. Total period of simulation is 100 years. After steady state calibration, two different scenarios are simulated for groundwater development. 21 production wells are installed at the study area and used in the model, with the total discharge for the two scenarios were 105000m³/d, 210000m³/d. The drawdown was 11.8 m and 23.7 m for the two scenarios in the end of 100 year. Contour maps for water heads and drawdown and hydrographs for piezometric head are represented. The drawdown was less than the half of the saturated thickness (the safe yield case).