



## **Effect of salt water intrusion on the groundwater resources at Delta of Wadi Kiraf area , Shalten ,**

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Abstract The hydrogeophysical investigation plays a very important role in the assessment of groundwater in the Delta wadi Kiraf area. This area is located at the triangle Halaib-Shalatin area - Southeastern corner of Egypt. The present work is aimed to show the drawbacks of the effects of saltwater intrusion on the groundwater using the vertical electrical sounding technique. Many conduit faults with different orientations are presented to exist at or near to polluted sites. Thirty vertical electrical soundings (VES) were conducted in the concerned area. The Schlumberger configuration was used with distances of current electrodes varying from 1.5 m up to 600 m. Correlation of the deduced geoelectric parameters and the available geological information was helpful in establishing the specific resistivities of the formations. The interpretation of the acquired resistivity field data led to the classification of the geoelectrical and geological successions to four geoelectric units; the first unit is divided into two units corresponding to the surface layer (first unit corresponding to wadi deposits and the second unit corresponding to high resistivity weathering materials), the second unit is a sandstone layer saturated with fresh/brackish water, and the third unit has resistivity values less than one Ohm.m which reflects the existence of saltwater. The decrease of the value of resistivity may reflect the increase of the salinity in the aquifer. The fourth unit: represents the basement rocks (metamorphic rocks). It appeared at VES. No 41, 42, 43, 44 and 45. Its true resistivity values range between 25.2 and 5500 Ohm.m. It shows the salt water pollutions are still affected in the area under study. It represents dry to saturated fractured basement rocks. Generally, resistivity values decrease with depth with the highest values the unsaturated zone near the surface and the lowest values the saltwater saturated zone. The resultant models from resistivity measurements

agree with other lithologic data. The result 1D inversion was not fully resolved for complicated geologic structure. Also, the least squares ABIC technique was applied to the same data set. The results of the inversion process elucidate the lateral and vertical variations in lithology. The results of distribution of resistivity indicate the salt-water affected on occur and extend groundwater aquifers in the study area.