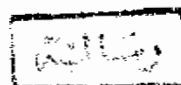


AIN SHAMS UNIVERSITY  
FACULTY OF SCIENCE  
DEPARTMENT OF GEOPHYSICS



EOELECTRIC AND HYDROGEOLOGIC STUDIES  
ON THE QUATERNARY AQUIFER IN THE NILE  
VALLEY IN ASYUT AND SOHAG  
GOVERNORATES, EGYPT

THESIS

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Faculty of Science - Ain shams University  
By

ABDEL MONAIM ABOUL FETOH ESSAM EL DIN  
(M.Sc., in Hydro-geophysics)

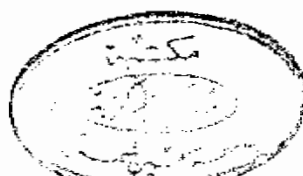
Supervised By

Prof.Dr. MAHDY ABDEL RAHMAN  
Prof. of Geophysics  
Department of Geophysics  
Ain Shams University

Dr. FATMA ABDEL RAHMAN ATTIA  
Director of Research Institute  
For Groundwater, Water  
Research Center

Dr. SALAH EL DEEN MOUSA  
Lecturer of Geophysics  
Department of Geophysics  
Ain Shams University

1994



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M. Abdel Rahman  
Fat  
A. Monaim

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## ABSTRACT

The study area includes most of Asyut and Sohag governorates. It is part of the Nile Valley, which is striking in the NW-SE direction and lies between longitudes  $30^{\circ} 30'$  and  $32^{\circ} 00'$  E and latitudes  $26^{\circ} 00'$  N and  $27^{\circ} 30'$  N. 106 vertical Electrical Soundings (VESes) were carried out in the study area. They were distributed in 16 profiles crossing the Nile Valley. Among these profiles, only eight geoelectric sections are carefully discussed to detect the geometry and geoelectric characteristics of the Quaternary aquifer. Interpretation of the sounding curves and comparison with the available drilled wells are used to detect the aquifer geometry. The thickness of the Quaternary aquifer in the study area ranges between 160 and 310 m, in which the maximum thicknesses are detected around Manfalut and Tima cities. Another 30 VESes were carried out in Wadi El- Asyuti to assest regarding water potentiality. The thickness of Wadi El-Asuyti aquifer ranges between 80 and 275 m. Generally the Nile Valley aquifer is characterized by its medium to high potentiality, while, Wadi El-Asyuti aquifer is characterized by its low potentiality.

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## PREFACE

Water is becoming more and more a critical resource. In many places water is deteriorating both in quantity and quality, creating important questions for the communities involved : Will there be enough water to sustain our future needs ? Is its quality adequate for the uses ? Is the water being used efficiently, and with a minimum waste ?

The answer to these questions dictates that, we know some basic things about the water supply, the quality of water, and its geographical and temporal distribution. Exploration for groundwater is one of the important works to answer such questions. Among field investigations, for groundwater exploration one can depend on geoelectrical surveys as a tool. Geoelectrical survey is one of the cheapest tools applied in the field of groundwater investigation. One can distinguish two types of resistivity measurements. In the first, known as geoelectric profiling or mapping, the electrodes and probes are shifted without changing their relative configurations. This gives us an idea about the surface variation of resistance values within a certain depth. In the second method, known as geoelectric sounding, the position of the electrodes are changed with respect to a fixed point (known as the sounding point). In this way, the measured

resistance values at the surface reflect the vertical distribution of resistivity values in a geoelectrical section. In this research, the resistivity sounding, (Schlumberger array has been applied). The geoelectrical field survey gives us some knowledge about surface and structural geology of the study area and few about the lithology of the formations. These data are needed essentially to support and emphasize the interpretation of the field measurements. Money and effort can be saved by using this method of exploration through the reduction of the amount of executional work (drilling of bore holes). Hydrogeological information are also needed to give a complete picture about the aquifer.

---

# *CHAPTER I*

## **CHAPTER 1**

### **INTRODUCTION AND PREVIOUS GEOPHYSICAL STUDIES**

This work deals with a region in Upper Egypt, extending between Assiut and Sohag, as shown in figure (1).

#### **1.1. General setting of the study area**

The study area includes most of the area of Assiut and Sohag governorates. This area is part of the Nile Valley striking in the NW-SE direction. It lies between longitudes  $30^{\circ} 30'$  and  $32^{\circ} 00'$  E and latitudes  $26^{\circ} 00'$  and  $27^{\circ} 30'$  N (Fig. 1). It covers a total length of about 200 km. The width of the valley in the area varies from 16 km to 25 km and increases at the areas, which are characterized by the presence of wadis.

#### **1.2. Climate**

The climate in the study area is arid and can be explained through many items. These items include temperature, evaporation and evapotranspiration, relative humidity, wind velocity, and rainfall.

The average maximum mean temperature is recorded during July and equals  $30^{\circ}\text{C}$ ; while the minimum is recorded during January and equals  $12^{\circ}\text{C}$ . Temperature is considered as the main factor affecting the degree of evaporation.