



شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم



شبكة المعلومات الجامعية
@ ASUNET



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of
15-25- c and relative humidity 20-40%

بعض الوثائق الأصلية تالفة

بالرسالة صفحات لم ترد بالاصل



**DETAIL HYDROGEOLOGICAL STUDIES
ON
THE AREA LOCATED BETWEEN LATITUDES
25° 50' & 26° 5' N AND LONGITUDES 32° 10' & 32° 30' E.
QENA GOVERNORATE UPPER EGYPT**

*A THESIS
Submitted for the Degree
Of Doctor Philosophy
In
Hydrogeology
By*

Phehata Attea Abadei

M.Sc. (Hydrogeology)

Supervisors

*Prof.Dr.A.I. Kenawy
Geology Department, Faculty of
Science, Assiut University*

*Prof.Dr.S.R Ismaiel
Geology Department, Faculty of
Science, Assiut University*

*Dr.A.A.Farrag
Geology Department, Faculty of
Science, Assiut University*

*Dr.M.A Mohamed
Geology Department, Faculty of
Science, South Valley University*

*Geology Department
Faculty of Science
Assiut University*

1999

ACKNOWLEDGEMENT

ACKNOWLEDGMENT

ALL gratitude is due to Almighty God who guided and aided me to Bring-forth to light this thesis. I wash to express my deepest thanks and gratitude to Prof. Dr. Kenawy. A. I. Prof. Dr Ismaiel, S.R..and Dr Farrag. A.A . from Assiut University and to Dr. Mohamed M. A South Valley University for their joint supervision, guidance and encouragement during the progress of this work.

Thanks are also due to all staff members of Geology Department, Faculty of Science, Assiut University for their encouragement.

Deep thanks are also due to Dr. Farrag .A .F. Fac. Eng. Assiut University

Deep thanks are also due to Eng. Zake Abdo Basune the chairman of Egyptalum, for main support and help, Also I'm grateful Eng. Fawaz and Eng.Safoit Abo-Raia Eng. Hamad and Chem. Zakaria Last but not least many thank forward to all the staff member of Research & Development department, Egyptalum at Nag Hammadi.

Shehata Attea Abadei

CONTENTS

	PAGE
ABSTRCAT	
INTRODUCTION	1
1.1. General outline	1
1.2. Location of the study Area	2
1.3. Previous studies	2
1.4. Scope of the present study	8
2.CHAPTER ONE	
PHYSICAL FEATURES	10
2.1.1. Climatic conditions	10
2.1.2 Landforms	12
2.2. Remote sensing studies	12
2.2.1. Haze correction	14
2.2.2. Image classification	14
3. CHAPTER TWO	
GEOLOGICAL SETTING	19
	19
3.1 Stratigraphy	
3.1.1. Eocene rocks	19
3.1.2. Post Eocene rocks	21
Paleonile sediments	21
Prenile sediments (Qena Formation)	22
Neonile sediments (Dandara Formation)	22
Recent to subrecent alluvial cover	23
3.2 Surface Structure	24
4. CHAPTER THREE	
HYDROGEOLOGICAL SITUATION	
4.1. Surveying measurements	27
4.2. Soil infiltration characters	30
4.3. Aquifers conditions	39

	PAGE
4.4 Pumping test results	48
5.CHAPTER FOUR	
HYDROGEOCHEMISTRY	
5.1. Total dissolved salts (TDS)	59
5.1.1. TDS. Electrical conductivity relationship	67
5.2. Total Hardens (TH)	67
5.2.1. Total hardness. Total dissolved salts relationship	70
5.3. Ions distribution	70
5.4. Hydrochemical parameters	83
5.5. Hypothetical ion combination	84
5.6. Hydrochemical classification	89
5.7. Groundwater quality	94
5.7.1. Groundwater quality for drinking purposes	94
5.7.2. Groundwater quality for irrigation purposes	97
6-CHAPTER FIVE	
SUMMARY AND CONCLUSIONS	100
REFERENCES	104
Appendix (1)	110
Appendix (2)	111
Arabic Summary	145

LIST OF FIGURES

- Fig. (1): location map of the studied area.
- Fig. (2): Cross section in the Nile Valley near the study area (After Said, 1981).
- Fig. (3): General geological map of the area and its surrounding areas. (After Said, 1981)
- Fig. (4): Location map for the groundwater wells and infiltration tests.
- Fig. (5): Infiltration test diagram No. 1 (Field curve.)
- Fig. (6): Infiltration test diagram No. 2 (Field curve.)
- Fig. (7): Infiltration test diagram No. 3 (Field curve.)
- Fig. (8): Infiltration test diagram No. 4 (Field curve.)
- Fig. (9): Infiltration test diagram No. 5 (Field curve.)
- Fig.. (10): Hydrogeological cross sections (East - West .)
- Fig.. (11): Hydrogeological cross sections (North- South).
- Fig. (12): Aeration zone thickness map.
- Fig. (13): Water table map.
- Fig. (14): Three dimensions view for the groundwater surface.
- Fig. (15): Pumping test data presentation and results for well No. 7.
- Fig. (16): Pumping test data presentation and results for well No. 17.
- Fig. (17): Recovery test data presentation and results for well No 18.
- Fig. (18): Pumping test data presentation and results for well No. 20.
- Fig. (19): Pumping test data presentation and results for well No. 24.
- Fig. (20): Pumping test data presentation and results for well No 32.
- Fig. (21): Recovery test data presentation and results for well No. 41.
- Fig. (22): Pumping test data presentation and results for well No. 46.
- Fig. (23): Recovery test data presentation and results for well No. 46.
- Fig. (24): Total salinity frequency distribution diagram of the groundwater samples
- Fig. (25): Groundwater and surface water Classification according to salinity.
- Fig. (26): Total dissolved salts (TDS) contour map.

Fig. (27): TDS-EC relationship diagram for groundwater.

Fig.(28): Total hardness frequency distribution diagram of the groundwater.

Fig. (29): TH -TDS relationship diagram for groundwater.

Fig. (30): Calcium ions concentrations contour map.

Fig. (31): Magnesium ions concentrations contour map.

Fig. (32): Sodium ions concentrations contour map.

Fig. (33): Bicarbonate ions concentrations contour map.

Fig. (34): Sulfate ions concentrations contour map.

Fig. (35): Chloride ions concentrations contour map.

Fig. (36): SO_4 - TDS relationship diagram for groundwater.

Fig. (37): Cl^- TDS relationship diagram for groundwater.

Fig. (38): Bar-graph representation diagram for ion concentrations in the study area.

Fig. (39): Bar-graph representation diagram for ion concentrations in the study area. (Well No.1, 4, 7, 8, 9, 10, 11, 12, 13, 16 and 17).

Fig. (40): Bar-graph representation diagram for ion concentrations in the study area (Well No. 18, 19, 21, 24, 28, and 31).

Figs.(41) Piper Diagrams classification diagram for anion and cation facies in terms of major-ion percentages in the study area (all well)

Figs.(42) Piper Diagrams classification diagram for anion and cation facies in terms of major-ion percentages in the study area (north well)

Figs.(43) Piper Diagrams classification diagram for anion and cation facies in terms of major-ion percentages in the study area (south well)

Fig. (44): Irrigation water classification diagram based on the electrical conductivity in micromhos per centimeter and sodium adsorption -ratio.

LIST OF TABLES

- Table (1): The mean daily evapotranspiration rates calculated according to Penman Nomogram.
- Table (2): Thematic Mapper Spectral Bands.
- Table (3): Satellite image classes identification.
- Table (4): Pliocene and Pleistocene rock units in the Nile Valley after Said, (1981).
- Table (5): Ground surface and groundwater elevations and wells locations in the area.
- Table (6): Infiltration test results.
- Table (7): Groundwater depths and levels and aquifer characters.
- Table (8): Results of pumping and recovery tests.
- Table (9): Results of the chemical analysis of the surface water and groundwater samples.
- Table (10): Water Type
- Table (11): Hydrochemical Parameters

INTRODUCTION

1.1. General Outline

The groundwater represents a very important national wealth .The occurrence of the groundwater and it's utility and management must be taken as important strategic target. The reclamation processes in the desert areas must be preceded by detail studies to evaluate the type and volume of the groundwater reserve and to determinate the safe yield of each aquifer. The groundwater potentialities in arid and desert areas. differ widely depending mainly on the type of recharging sources and on the aquifers types and characters. So, it must be bearded in mind the importance of determination of these parameters.

The present study concerned with the hydrogeology of Hiw area, which represents an important locality in Qena Governorat at Upper Egypt.

The study depended on the following data sources: -

- 1- The previous geological and hydrogeological studies.
- 2- The results of recent drilling which were carried out in the area under the supervision of the author himself.
- 3- Some field measurements and observations, including the survey measurements, ground levels, well locations, infiltration and pumping tests.
- 4- Laboratory measurements and analysis of water and soil samples.
- 5- The results of application of GPS technique and Landsat Image, analysis

The present study aims to evaluate the groundwater resource in the Study area. Both qualitative and quantitative aspects of the