Ain Shams University
Faculty of Education
Dept. of Biological and Geological Sciences

SEDIMENTOLOGICAL AND GEOHAZARD STUDIES OF THE EXPOSED QUATERNARY SEDIMENTS, WADI EL NATRUN, EGYPT.

A THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE MASTER DEGREE IN TEACHER PREPARATION IN SCIENCE (GEOLOGY)

By

Aya Osham Ahmed Abu Elyazeed

(B.Sc. in Geology & Biology, 2015)

Supervised By

Prof. Dr. Abd El-Moneim Ahmed Mahmoud: Professor of Sedimentology, Department of Biological and Geological Sciences, Faculty of Education, Ain Shams University.

Prof. Dr. Mohamed Hamed Abd El Aal: Professor of Geophysics, Department of Biological and Geological Sciences, Faculty of Education, Ain Shams University.

Dr. Sahar Mahmoud Abd El Baky: Lecturer of Geology, Department of Biological and Geological Sciences, Faculty of Education, Ain Shams University.

Department of Biological and Geological Sciences, Faculty of Education, Ain Shams University.

2019

ACKNOWLEDGEMENT

First of all, I would like to express my deep thanks and gratitude to **my God** who gave me the power, patience and blessings to start and complete this work.

I would like to express my deep thanks and great appreciation to **Prof. Dr. Abd El-Moneim Ahmed Mahmoud,** professor of sedimentology, Department of Biological and Geological Sciences, Faculty of Education, Ain Shams University, for proposing the point of research and providing me with careful guidance and kind help during the course of this thesis and for his fruitful discussions, continuous support, and through revision of thesis manuscript.

Special thanks are due to **Prof. Dr. Mohamed Hamed Abd El Aal**, professor of Geophysics and Chairman of Biological and Geological Sciences department, Faculty of Education, Ain Shams University, for his kind supervision, , fruitful help, patriotic patience, energetic guidance, continuous support and conclusive instructions throughout the course of this investigation.

My sincere thanks to **Dr. Sahar Mahmoud Abd el Baky,** lecturer of geology, Department of Biological and Geological Sciences, Faculty of Education, Ain Shams University, for her kind supervision, and providing me with all various material, and valuable advices and being a very effective factor in driving over this work successfully.

Great thanks to to all colleagues and members of the Biological and Geological Sciences Department for their help. Special thanks are due to **Dr. Safia Gaber** and **Dr. Ahmed Gad** for their kind help, continuous support and useful advices.

Last, but not least, I wish to express my sincere gratitude to **my family** my father, my mother, my sisters and my brother who spared no effort to provide suitable atmosphere and comfortable means that let me accomplish this work.

ABSTRACT

Paleoenvironmental interpretation and mineralogical studies of the exposed Quaternary Nile terraces in Wadi El Natrun area were investigated using collaborative techniques. Ten stratigraphic sections were collected for the present study. These sections are Hammra I, Hammra II, Hammra III, Quarry IV, Quarry V, Quarry VI, Sand sheet, Torrent VII, Torrent VIII and Torrent IX. Hammra I, II and III sections belong to the Middle Pleistocene, Quarry IV, V and VI sections belong to the Late Pleistocene, Sand sheet belongs to the Holocene and Torrent VII, VIII and IX sections belong to the Holocene (Recent).

Textural and mineralogical characteristics of the studied Quaternary point bar sediments revealed that they were deposited by defunct braided Nile channel. This is indicated by the nature of their cumulative curves which indicate that their transportation was dominated by saltation and traction. Mineralogically, the investigated heavy minerals are amphiboles, pyroxenes, zircon, tourmaline, rutile, epidote, kyanite, staurolite monazite and garnet. The ZTR index lies below 25 % indicating mineralogically immature sediments. The mineralogic and petrographic characteristics of the studied sediments revealed their derivation from older formations (Eocene, Oligocene and Miocene). Also, the obtained data revealed the occurrence of tufa on top of Hammra III section as a spring fed up by carbonate lake.

A flash flood fell of the November 4, 2015 and left remarkable economic losses and large number of victims in Wadi El Natrun depression. Regarding to salinization, the accumulation and precipitation of salt and natrun crystals affect drastically the fertile soils and turn it into bad land.

Contents

CHAPTER ONE

INTRODUCTION

CHAPTER TWO

LITHOSTRATIGRAPHY

CHAPTER THREE
GRAIN SIZE ANALYSIS

CHAPTER FOUR
MINERALOGY

List of Figures

List of Tables

Chapter 1

INTRODUCTION

CHAPTER 1

INTRODUCTION

The advent of Quaternary on Egypt was marked by great climatic changes. Egypt is mostly barren desert except for the Nile Valley. During Tertiary, humid conditions prevailed and the Quaternary witnessed frequent episodes of wet and moist climate changes. These climate changes since the Neogene are largely responsible for the processes that have sculptured the major geomorphic features of Egypt (**Abd El Baky, 2006**).

1.1 Location of the study area

Wadi El Natrun is a narrow elongated depression, located in the northeast corner of the Western Desert, west of the Nile Delta. It runs in a NW-SE direction, roughly parallel to Cairo-Alexandria Desert Road, between Latitudes 30° 15′ , 30° 30′ N and Longitudes 30° 00′ , 30° 25′ E, or from the kilometre 78 to the kilometre 136 along the Cairo-Alexandria Desert Road (**Fig. 1.1)**. The whole area of Wadi El Natrun depression is around 1090 km^2, attaining a length of about 50 km and a width ranging from 5 to 10 km. The lowest point of the depression is almost 23 m below sea level and 44 m below the water level of the Rosetta branch of the Nile (**Abd-El Malek and Rizk, 1963).**

The name refers to the presence of isolated hypersaline lakes which regarded as one of the principal sources in the ancient world of natron, a mixture of sodium salts (**Lucas and Harris, 1962).**