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

A THESIS SUBMITTED IN PARTIAL FULFILLMENT FOR THE
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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.

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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 $30^{\circ} 15'$, $30^{\circ} 30'$ N and Longitudes $30^{\circ} 00'$, $30^{\circ} 25'$ 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**).