" Stratigraphic and Micropaleontologic Studies on some Upper Cretaceous-Lower Paleogene Successions at Farafra Oasis, Western Desert, Egypt "

THESIS
SUBMITTED IN PARTIAL FULFILLMENT FOR THE DOCTOR OF PHILOSOPHY DEGREE IN PREPARATION OF SCIENCE TEACHER (GEOLOGY)
BY

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(2019)

To

My Family …….

Approval sheet

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Thesis has not been previously submitted for a degree at this or any other University.

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ACKNOWLEDGMENTS

"I am grateful to Allah for helping me to bring this work to light"

I would like to express my thanks and appreciation to ***Prof. Dr. Mohamed Hamed Abd El-Aal,*** *the present head of the Biological and Geological Sciences Department, Faculty of Education, Ain Shams University for his continuous encouragement and the facilities offered during the course of this work.*

I would like also to express my sincere thanks and gratitude to the supervising committee of the present work ***Prof. Dr. Mohamed Abdel Kader El-Boukhary*** *Professor of Micropaleontology, Faculty of Science, Ain Shams University for his generous contributions, helpful advice, constructive criticism during the work, and revising the manuscript. I would also like to thank* ***Prof. Dr. Nageh Abel-Rahman Obaidalla*** *Professor of stratigraphy and Micropaleontology, Geology Department, Faculty of Science, Assiut University for suggesting the point of this research, endless support and encouragement, constructive criticism during the work and revising the manuscript. I am also deeply indebted to* ***Dr. Radwan Abdelaziz Abul-Nasr*** *Assistant Professor of stratigraphy and micropaleontology, Faculty of Education, Ain Shams University for his endless support and encouragement, helpful advice, constructive criticism during the work, and revising the manuscript and* ***Dr. Gamal Ramadan Salama*** *for his kind help in fieldwork, helpful advice and continuous encouragement throughout the work.*

Many thanks to my family specially my husband for his continuous cordial support for me and for his direct and indirect help especially in fieldwork.

Deep thanks and appreciation is extend to Dr. Kamel Mahfouz, El-Azhar University and Mr. Eslam El-Sheikh, Assiut University for their kind help in fieldwork.

Thanks to all who helped me

Abeer Shreif

ABSTRACT

The Upper Cretaceous-Lower Paleogene successions exposed in the study area at Farafra Oasis in Western Desert, have been studied in terms of foraminiferal distribution to figure out the biostratigraphical distribution and sedimentary environment of these successions.

Two sections were measured, one at Naqb El-Farafra area, and the other to the south at the western scarp of Farafra Oasis which is El-Guss Abu Said plateau. The Eocene succession of El-Guss Abu Said consists of Esna Formation (shale) at the base, which is overlain by well-bedded alveoline marl (Nusf Formation) with occasional limestone ledges rich in *Nummulites.* Nusf Formation ends with varved-like thin beds of marl and limestone before it is truncated by a limestone unit of the Farafra Formation.

Nummulites has been investigated thoroughly to identify them and determine the age of upper part of the succession. Two species of *Nummulites* were identified; *Nummulites solitarius* De La Harpe 1883 and *Nummulites fraasi* De La Harpe 1883. These two species date this unit to Early Eocene time (Ypresian) .These two species assign this unit to Early Eocene time (Ypresian) that ranges from SBZ5 to SBZ6 of the standard Serra-Kiel *et al*. (1998) shallow benthic zonal scheme and Papazzoni *et al.* (2017) updated shallow benthic zonal scheme. El Nusf Formation ends with varved-like thin beds of marl and limestone before it is truncated by limestone unit of the Farafra Formation. Depending upon studying the vertical distribution of the planktonic foraminifera, El-Guss Abu Said succession can be divided into two international zones namely, *Morozovella marginodentata* (E3) and *Morozovella formosa formosa* (E4). *M. marginodentata* Zone is locally subdivided into three subzones namely in stratigraphic order, *Morozovella subbotinae*, *Acarinina esnehensis* and *Parasubbotinae inaquispira.*

Naqb El-Farafra succession consists of Khoman Formation, which extends in age to the Cretaceous- Lower Paleogene. Khoman Formation was studied sratigraphically with the aid of planktonic foraminifera where the K/Pg boumdary is recorded and eight planktonic zones were established. These zones are *Globotruncana aegyptiaca* Zone, *Gansserina gansseri* Zone, *Racemiguembelina fructicosa* Zone, *Pseudoguembelina hariaensis/ Gansserina gansseri* Zone, *Pseudoguemblina Palpebra* Zone, *Parasubbotina pseudobulloides* Zone *Subbotina triloculinoides* Zone and *Igorina albeari* Zone.

Benthic foraminifera have been used to determine the paleoecology of the study area, where the benthic foraminiferal assemblages are used to determine the paleoenvironments of the studied successions and Planktonic/Benthic ratio of all washed samples has been calculated. Three benthic foraminiferal associations have been detected at Naqb El-Farafra succession indicating deep outer shelf environment at its lower part and inner-middle shelf environments at the upper part of the succession.

Investigating the benthic foraminiferal associations of the Early Eocene succession of El-Guss Abu-Said revealed that the succession can be subdivided also into three benthic associations. These associations revealed that, Esna Formation at the lower part of the succession has been deposited in a deep outer shelf environment. At the upper part, the scarcity of small foraminifera and rich occurrence of *Alveolines* and *Nummulites* in the Nusf Formation point to a carbonate platform environment and this can be also extended to Farafra Formation. This also seems in harmony with the calculated P/B ratio. This shifting from deep outer shelf facies to the carbonate platform one could point to a tectonic uplift that occurred during Early Eocene time.