شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

HANAA ALY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

Ain Shams University

Faculty of Science
Geology Department

"Structural study of the area southwest of Gebel Akheider, Cairo-Suez District, Egypt"

A thesis submitted
In partial fulfillment of the requirements for the degree of Master of Science in Geology

By

Nessreen Gamal Mahfauz Abd El-Reheem

B.Sc. in Geology, Ain Shams University

To

Geology Department
Faculty of Science
Ain shams University

Supervisors

Prof. Adel Ramadan Moustafa
Prof. of Structural Geology, Faculty of Science, Ain Shams University

Dr. Mohamed Yousef Rizk
Associate Prof. of Structural Geology, Faculty of Science, Ain Shams University

Dr. William Bosworth
Senior Geological Advisor, Apache Egypt Companies

Cairo, Egypt

2021

Approval Sheet

Structural study of the area southwest of Gebel Akheider, Cairo-Suez District, Egypt

By

Nessreen Gamal Mahfauz Abd El-Reheem

B.Sc. in Geology, Ain Shams University

Thesis submitted

For the requirements of the M.Sc. Degree in Geology

Geology Department

Faculty of Science

Ain Shams University

Supervisors Approval

Prof. Adel Ramadan Moustafa

Professor of Structural Geology

Department of Geology, Faculty of Science, Ain Shams University

Dr. Mohamed Yousef Rizk

Associate Professor of Structural Geology

Department of Geology, Faculty of Science, Ain Shams University

Dr. William Bosworth

Senior Geological Advisor

Apache Egypt Companies

Dr. Karim W. Abdelmalik

Chairman of the Department of Geology

Note

The present thesis is submitted to the Faculty of Science, Ain Shams University in partial fulfillment of the requirements of the Master degree of Science in Geology. Besides the research work materialized in this thesis, the candidate has attended eleven post-graduate courses for one academic year as follows:

1. Advanced Structural Geology
2. Geotectonics
3. Field Geology
4. Geostatistics
5. Geomorphology
6. Photogeology
7. Sedimentary Petrology
8. Sedimentation
9. Advanced Lithostratigraphy
10. Biostratigraohy
11. English Language

She successfully passed the final examinations in these courses held in September 2013.

Student Name: Nessreen Gamal Mahfauz Abd El-Reheem

Dr. Karim W. Abdelmalik

Chairman of the Department of Geology

ABSTRACT

Detailed field mapping (scale 1:20.000) of the area located to the southwest of Gebel Akheider, central part of the Cairo-Suez district, was carried out. The area of study is about 210 square kilometers and extends from latitudes 29º 38` to 29º 45` N and longitudes 31º 59` to 32º 12` 30` E. The aim of this study is to focus on the structural evolution of the area and the relationship between the structural deformation and deposition of the Oligocene sediments.

Faults affecting the study area exist in three main sets; northwest-southeast, east-west, and west-northwest-east-southeast. These faults have en echelon arrangement with similar throw directions (e.g. Wadi Esseimer and Wadi Elshona en echelon normal faults) or opposite throw directions (e.g. Gebel Akheider horst and Wadi Esseimer and Wadi Akheider grabens). The en echelon normal faults are believed to have been formed by right-lateral divergence on deep-seated faults. This caused extension in the northeast to north-northeast direction that formed the northwest and west-northwest oriented faults after the Late Eocene and before deposition of Oligocene sediments. These en echelon faults are responsible for the development of east-west to northwest oriented horsts and grabens in the study area (e.g. Gebel Akheider horst and Wadi Esseimer graben). The northwest – southeast and east – west deep-seated faults have been rejuvenated after the Late Eocene-before deposition of Oligocene sediments. The northwest – southeast faults were rejuvenated by dextral slip that was also reactivated by synchronous with the east – west faults with strike- slip movement (right - lateral). During the Miocene, the northwest-southeast faults were also rejuvenated with dextral offset. Repeated rejuvenation affected the two main fault sets that became connected in some parts of the study area into a zigzag

fault pattern. This study revealed the dominance of extensional tectonics after the Late Eocene and before deposition of the Oligocene sediments of the area. Extension continued during the deposition of the Oligocene sediments. Upper Eocene rocks were eroded in the structurally high areas and Middle Eocene rocks were unconformably overlain by Oligocene rocks. Regional northeast – southwest extension during the Late Oligocene time responsible for the opening of Gulf of Suez led to extrusion of basaltic lava through the pre-existing northwest-trending fractures (black cone of the basaltic intrusion of Gebel Akheider). This tectonic event rejuvenated the northwest-trending faults as indicated by their silicification (Oligocene quartizite) in several parts of the study area through uprising of hydrothermal solution and basaltic lava along fault surfaces.

Keywords: Oligocene deformation, Gebel Akheider**,** Cairo-Suez district, Eastern Desert, Egypt.

List of Figures

Page

List of Tables

Page

List of Plates

List of contents Page