



Cretaceous and Tertiary Fracture Patterns of the Greater Cairo Area

A Thesis Submitted to

**Ain Shams University, Faculty of Science,
Geology Department**

*In Partial Fulfillment of the Requirements for the Degree of Master of
Science in
Geology*

By

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Approval Sheet

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Note

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

1. Advanced Structural Geology
2. Field Geology
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10. Geomorphology
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَلَا تَمْشِ فِي الْأَرْضِ مَرَحًا إِنَّكَ لَن تَخْرِقَ الْأَرْضَ
وَلَن تَبْلُغَ الْجِبَالَ طُولًا (37)

صدق الله العظيم

(سورة الصافات آية 37)

To my parents

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In the name of God, the most merciful, the most compassionate.

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Cretaceous and Tertiary Fracture Patterns of the Greater Cairo Area

ABSTRACT

The study area is located on the eastern and western sides of the Nile Valley, in the Greater Cairo area. The study aims at studying the fracture patterns in the Cretaceous rocks of the western area and in the Middle and Upper Eocene rocks of the eastern area, and their relationship to the nearby macrostructures (faults and folds). Damage zones of six faults in the western area and three faults in the eastern area have been studied. The study included detailed measurements of the fractures in the hinge areas of six large folds in the western area.

As a result, the fracture patterns of the western area show the following orientations NE-SW, WNW-ESE, E-W and NW-SE, while the eastern area shows two main fracture patterns; E-W and NW-SE.

Study of the fault damage zone resulted in the following conclusions; The half width of the damage zones of faults may reach up to 12 m. However, other factors may affect the fracture pattern of the fault damage zones. These include the fault type, length of the fault, amount of throw, and the existence of other structures (e.g. folds). The occurrence of shale or clay layers also affects the damage zone width.

A new fracture model is proposed based on the field observations and data analysis for the fracture patterns. In this model, two intersected fracture patterns were encountered in the fault damage zone due to the occurrence of two structures (the fault itself, in addition to nearby folds). Such damage zones are called in this study ‘Fracture Interference Zones’.

CONTENTS

	Page No.
ACKNOWLEDGMENTS	i
VITA	ii
ABSTRACT	iii
LIST OF FIGURES	vii
LIST OF TABLES	xii
CHAPTER 1	
<hr/>	
INTRODUCTION	1
1.1 Location and Accessibility	1
1.2 Climatic Conditions	2
1.3 Study Objectives	3
1.4 Work Methodology	4
1.4.1 Recorded Physical Properties of the Fractures	5
1.4.2 Field Tools	6
1.4.3 Data	6
1.4.4 Software	7
1.5 Previous Studies	10
1.5.1 Previous Studies on the Geology of the Study Area	10
1.5.2 Previous Studies on the Fault Damage Zones	11
CHAPTER 2	
<hr/>	
GEOLOGIC SETTING OF THE STUDY AREA	15
2.1 Geologic Setting of the Western Study Area	15
2.1.1 Geomorphology	15
2.1.2 Startigraphy of the Western Area	16
2.1.3 Structures	19
2.2 Geologic Setting of Eastern Study Area	23

2.2.1 Geomorphology	23
2.2.2 Stratigraphy of the Eastern Area	24
2.2.3 Structures	28

CHAPTER 3

FAULT-RELATED FRACTURES IN THE STUDY AREA 32

3.1 Introduction	32
3.2 Field Measurements	32
3.3 Faults of the Western Area	33
3.3.1 Fault F1W	35
3.3.2 Fault F2W	39
3.3.3 Fault F3W	49
3.3.4 Fault F4W	52
3.3.5 Fault F5W	55
3.3.6 Fault F6W	59
3.4 Faults of the Eastern Study Area	62
3.4.1 Fault F1E	64
3.4.2 Fault F2E	66
3.4.3 Fault F3E	67

CHAPTER 4

FOLD-RELATED FRACTURES IN THE WESTERN STUDY AREA 69

4.1 Introduction	69
4.2 Anticline A1	71
4.3 Anticline A2	73
4.4 Anticline A3	75
4.5 Anticline A4	76
4.6 Anticline A5	78
4.7 Syncline S1	79

CHAPTER 5

STRUCTURAL ANALYSIS AND INTERPRETATION	81
5.1 Introduction	81
5.2 Fracture Pattern of the Study Area	81
5.3 Orientations of the Large Structures of Abu Roash Area	85
5.4 Fracture Pattern Related to the Faults of Abu Roash Area	86
5.5 Fracture Pattern Related to the Folds of Abu Roash Area	87
5.6 Fracture Pattern Related to the Major Stress Field	88
5.7 Fracture Pattern of Gebel Mokattam Area	89
5.8 Analysis of Fault Damage Zones of the Study Area	92
5.9 Fracture Counts for the Faults Damage Zones	94
5.9.1 Fault F1W	95
5.9.2 F2WA	95
5.9.3 F2WB	96
5.9.4 F3W	97
5.9.5 F4W	97
5.9.6 F6W	98
5.9.7 F1E	99
5.10 Fracture Interference Zone Model	99
5.11 Fault Cores in the Study Area	101
5.11.1 Fault core of F1W	102
5.11.2 Fault core of F2W	103
5.11.3 Fault core of F3W	104
5.11.4 Fault core of F5W	105
5.11.5 Fault core of F1E	106
5.12 Classes of Damage Zone Encountered in the Study Area	109

CHAPTER 6

SUMMARY AND CONCLUSIONS	111
REFERENCES	114
ARABIC SUMMARY	

List of Figures

Fig. No.		Page No.
1.	Map showing the location of the study area.	2
2.	Measuring tape representing the linear traverse.	4
3.	Raw model of the rose diagram as drawn by Dips software (version 5.1).	8
4.	Superimposed geological map over the Google earth satellite image for the western area.	9
5.	Fault zone model of Braathen and Gabrielsen (2000).	14
6.	Composite stratigraphic section of the Abu Roash area.	17
7.	Simplified geological map of the Abu Roash area showing the field measurement stations of the present study.	20
8.	Composite stratigraphic section of the eastern study area.	27
9.	Modified simplified geological map the area east of Cairo, El Maadi and Helwan showing the field studied locations of the present study.	31
10.	Simplified geological map of the Abu Roash area showing the studied faults (F1W, F2W, F3W, F4W, F5W, and F6W).	34
11.	Simplified geological map of the central part of Abu Roash area showing the location of Fault F1W.	35

12.	Rock cut showing the damage zone of Fault F1W. The sketch shows the fractures in the rock cut.	36
13.	Scan line for F1W showing the orientations of the measured fractures.	38
14.	Rose diagrams for the damage zone of Fault F1W.	39
15.	Simplified geological map of the area of Fault F2W.	40
16.	Rock cut showing the damage zone of Fault F2WA.	42
17.	Scan line for Fault F2WA showing the orientations of the fractures.	44
18.	Rose diagrams for the damage zone of Fault F2WA.	44
19.	Rock cut showing the damage zone of Fault F2W at site B.	46
20.	Scan line of Fault F2WB showing the orientations of the fractures.	47
21.	Rose diagrams for the damage zone of Fault F2WB.	48
22.	Simplified geological map for Fault F3W.	50
23.	Fault plane of F3W.	51
24.	The footwall of Fault F3W (area of field measurements).	51
25.	Rose diagram for the damage zone of Fault F3W.	52
26.	Simplified geological map for Fault F4W.	53
27.	Two intersecting fracture sets close to Fault F4W.	54
28.	Rose diagram for the damage zone of Fault F4W.	55
29.	Simplified geological map of Fault F5W.	56
30.	Fault plane of F5W and associated structures.	58

31.	Rose diagram for the fractures of Fault F5W.	59
32.	Simplified geological map of Fault F6W.	60
33.	Fractures of profile 7 (F6W).	61
34.	Rose diagram of the fractures of Fault F6W area.	62
35.	Simplified geological map of the eastern area showing the locations of the three studied faults.	63
36.	Simplified geological map of Fault F1E area.	64
37.	Fault surface of F1E, A:Sketch for the fault with clay smear along the fault surface, B: Field photo for the fault plane with the clay smearing.	65
38.	Rose diagram of the fractures of Fault F1E.	66
39.	Simplified geological map of Fault F2E.	66
40.	Rose diagram of the fractures of Fault F2E area.	67
41.	Simplified geological map of Fault F3E.	68
42.	Rose diagram of the fractures of Fault F3E area.	68
43.	Simplified geological map of Abu Roash area showing the NE-SW oriented folds of the area and locations of field measurements.	70
44.	Geological map of Anticline A1.	71
45.	Rose diagram of the fractures affecting the crestal area of El Hassana Anticline (fold A1) at the Acteonella Series.	72
46.	Sketch showing the minor faults affecting the southeastern limb of El Hassana Anticline.	72
47.	Rose diagram of the fractures at the southeastern limb of El Hassana Anticline.	73

48.	Geological map of Anticline A2 in Abu Roash and location of field measurements.	73
49.	Rock cut through the crest of Anticline A2 showing fractures parallel to the fold axis.	74
50.	Rose diagram of the fractures at the crest of Anticline A2.	75
51.	Geological map of Anticline A3 of Abu Roash area.	75
52.	Rose diagram of the fractures at the crest of Anticline A3.	76
53.	Geological map of Anticline A4.	76
54.	Rose diagram of the fractures at the crest of Anticline A4.	77
55.	Geological map of Anticline A5.	78
56.	Open fractures at the crest of Anticline A5.	78
57.	Rose diagram of the fractures at the crest of AnticlineA5	79
58.	Geologic map showing the location of Syncline S1.	79
59.	Trough of Syncline S1 Showing fractures parallel to the fold axis.	80
60.	Rose diagram of the fractures at the trough of Syncline S1.	80
61.	Satellite image of Abu Roash area showing the location of field measurements and rose diagrams for the fractures at each location.	83
62.	Histogram showing the lengths of folds and faults in Abu Roash area.	86
63.	Rose diagram of all fractures in vicinity of the faults of Abu Roash area.	87
64.	Rose diagram of all of the fractures at the hinge areas of the	