



# **STRUCTURAL – TECTONIC DEVELOPMENT OF AL-AMAL FIELD, GULF OF SUEZ –EGYPT, AND ITS IMPLICATIONS ON THE HYDROCARBON PROSPECTIVITY**

**A THESIS**

**SUBMITTED TO AWARD THE DEGREE OF DOCTOR OF PHILOSOPHY OF  
SCIENCE IN GEOPHYSICS (SEISMIC)**

**BY**

**NAHLA ABDEL MOKTADER ABDEL AZIZ EL SAYED  
(M.SC.GEOPHYSICS, 2004-AIN SHAMS UNIVERSITY)  
ASSISTANT RESEARCHER AT EGYPTIAN PETROLEUM RESEARCH  
INSTITUTE**

**SUPERVISED BY**

**PROF. DR. AHMED SAYED AHMED ABUL ATTA  
PROF OF GEOPHYSICS – DEPARTMENT OF GEOPHYSICS –AIN SHAMS  
UNIVERSITY**

**DR. SAMY HAMED ABDEL NABY  
ASSISTANT PROF OF GEOPHYSICS – DEPARTMENT OF GEOPHYSICS –  
AIN SHAMS UNIVERSITY**

**PROF.DR. SALAH SHEBL SALEH AZZAM  
OF GEOPHYSICS – DEPARTMENT OF GEOPHYSICS, EGYPTIAN  
PETROLEUM RESEARCH INSTITUTE**

**DEPARTMENT OF GEOPHYSICS  
AIN SHAMS UNIVERSITY  
CAIRO-2010**



## **APPROVAL SHEET**

**NAME:** NAHLA ABDEL MOKTADER ABDEL AZIZ EL SAYED  
ALI

**TITLE:** STRUCTURAL – TECTONIC DEVELOPMENT OF AL-  
AMAL FIELD, GULF OF SUEZ –EGYPT, AND ITS  
IMPLICATIONS ON THE HYDROCARBON PROSPECTIVITY

**DEGREE:** SUBMITTED TO AWARD THE DEGREE OF DOCTOR  
OF PHILOSOPHY OF SCIENCE IN GEOPHYSICS (SEISMIC)

### **SUPERVISED BY**

**PROF. DR. AHMED SAIED AHMED ABUL ATTA**  
**PROF.OF GEOPHYSICS – DEPARTMENT OF**  
**GEOPHYSICS –AIN SHAMS UNIVERSITY**

**DR. SAMY HAMED ABDEL NABY**  
**ASSISTANT PROF. OF GEOPHYSICS – DEPARTMENT**  
**OF GEOPHYSICS –AIN SHAMS UNIVERSITY**

**PROF.DR. SALAH SHEBL SALEH AZZAM**  
**PROF.OF GEOPHYSICS – DEPARTMENT OF**  
**GEOPHYSICS, EGYPTIAN PETROLEUM RESEARCH**  
**INSTITUTE**

## ***ABSTRACT***

The Gulf of Suez covers an area of about 25000 sq km. It extends along a Northwest trends from latitude 27° 30' N to 30° 00' N. Its wide varies from 30 to slightly over 50 km at the central part. Both the eastern and western coastal belts exhibit a sedimentary sequence, which is also present offshore. Thus, originally the gulf must have been much wider than at present.

The Amal concession area is about 27 sq km in the offshore, southern province of the Gulf of Suez basin. It is located some 55 km from Ras Gharib city, about 15 km southwest from Morgan Oil field and about 15 km offshore from the western Gulf of Suez shore line. Amal field is located on a NW-SE faulted monocline, which has a SW dip, plunging NW and SE, sealed by clysmic faults and capped by Middle–Upper Miocene evaporites.

In view of the Amal field history, the main reservoir is the Miocene sandstone of Kareem and Rudies formations, while the oil shows are encountered in the Pre-Miocene reservoirs, which are not yet well explored. In addition, the area reveals certain differences in oil gravity within both production reservoirs and different formation pressure regimes. These facts implying that, the Amal field productive reservoirs are controlled by either structural or stratigraphic barriers or both.

In the study area, the relation between average and interval velocities, with the depth was calculated for ten wells. Eighteen average and interval velocities contour maps of Zeit, South Gharib, Belayim, Feiran, Kareem, Rudies, Nukhul, Eocene, and Senonian were drawn. These velocities maps were used for establishing the structure contour and isopach maps

Thirteen 2D seismic lines were interpreted with the help of well velocity and time-depth trace conversion to construct the structure-tectonic maps characterizing the different stratigraphic tops of the concerned area, as well as to confirm the validity of the proposed structural model. Most of the available seismic data in the Amal area were investigated and reviewed to select the best quality set. The used thirteen seismic lines, in the present study, are TAL-82-1, TAL-82-102, TAL-80-

104, TAL-80-105, TAL-82-106, TAL-82-108, TAL-82-109, TAL-82-110, TAL-82-111, TAL-82-112, TAL-82-118, TAL-82-122A and TAL-82-124.

In order to study the larger structural features based on the 2D seismic lines, four depth structure contour maps were constructed on the top of the mentioned formations; South Gharib, Belayim, Kareem and Rudeis, from top downward using depth data. They show that, structures are very clear through the studied maps. Faults like strike-slip, Dip-slip and oblique-slip faults are obvious. Folds are conspicuous as anticlines and synclines at some parts of the study area, while at the middle part there is a big salt intrusion between two downlifted features located at the northwestern and southeastern parts.

In order to study the detailed structural elements based on the 3D seismic lines ; six depth structure contour maps were constructed on the tops of Zeit, South Gharib, Belayim, and Kareem, Nukhul, and Matulla formations from top downward. Interpretation was aided by the missing sections detected from the well tops and dip-meter data. These maps indicate that, the Miocene and Pre- Miocene formations of the Amal field form an elongated tilted greben block trending in the NW-SE direction and bounded by two sets of faults, which are down throwing toward the west and east directions.

Six 3D seismic lines were illustrated in the northeast-southwest direction, according to the available wells data. The structural features along these lines are some faults affecting this area making grabens, horsts and step-like blocks. Some of them are of NW-SE trend, while, others are of SE-NW trend.

In the study area, the sediments deposited are mainly marls, shale, limestone and some sandstone .Some of these deposits could act as source rocks, others act as reservoir rocks. Evaporites prevailing in the Gulf of Suez act as an excellent cap rock for the Miocene reservoirs. The prevailing physico-chemical conditions were suitable enough for generating hydrocarbons. Petrophysical parameters and fault conduits played an important role for the hydrocarbon migration from the source to the reservoirs, where they are accumulated and preserved in adequate stratigraphic (where the facies carried laterally), structural (where the folds, faults and faulted folds are occurred) and combined traps (where the stratigraphic and structural elements are conjugated) . The adaptability

of the foregoing elements in a proper merging way reflects the Amal area as an excellent petroleum system model.

### **Acknowledgments**

I express my gratitude and deep thanks to Prof. Dr. Ahmed Sayed Ahmed Abu El Atta, Professor of Geophysics, Faculty of Science, Ain Shams University. He utterly planned and supervised all steps of the research; interpretations and revision have been carried out under his sincere guidance.

Special thanks and gratitude are also due to Prof. Dr. Salah Shebl Saleh Azam, Prof. of Geophysics of Egyptian Petroleum Research Institute (EPRI) for his help, guidance, support, encouragement.

I would like also to acknowledge Dr. Samy Hamed Abd El Naby, Associate Professor of Geophysics, Faculty of Science, Ain Shams University for his help and continuous encouragement during the study.

Finally, I'll never forget the role played by the family especially my husband and children.

The author likes to express his sincere thanks to all the staff members and colleagues in the Egyptian Petroleum Research Institute (Egypt).

## **CONTENTS**

	Page
Abstract	i
Acknowledgment	iii
List of Contents	iv
List of Figures	

### **CHAPTER (I)**

#### **INTRODUCTION AND GEOLOGIC SETTING**

I.1.Introduction	1
I.2.Subsurface Stratigraphy	3
I.2.a.Pre- Rift Lithostratigraphic Units	3
I.2.b.Syn-Rift Lithostratigraphic Units	7
I.3.Amal Reservoirs and Wells	10
I.4.tructural Elements	13
I.5.Tectonic Setting	23
I.5.1.Tectonic Provinces of the Gulf of Suez	23
I.5.2.Tectonic Evolution of the Gulf of Suez	28
I.6.Geologic History of the Area	31
I.7.Previous exploration activities	33
I.8.Scope of the present work	39

### **CHAPTER (II)**

#### **VELOCITY ANALYSIS**

II.1.Introduction	40
II.2.Relation between Velocity Measurements with Depth	40
II.3.Average Velocity Gradient Maps	52
II.4.Interval Velocity Gradient Maps	58

### **CHAPTER - III**

#### **SEISMIC REFLECTION DATA ACQUISITION AND PROCESSING**

III.1.Introduction	63
III.2Testing and Production Acquisition	64
III.3.Reformatting and Resembling	65
III.4.Navigation and Seismic Data Merge	70

III.5.Gun and Cable Static Correction	70
III.6.Geometric Spreading Amplitude Compensation	70
III.7.Exponential Gain	71
III.8.Swell Noise Attenuation (SWATT)	80
III.9.Tau-p Deconvolution	91
III.10.Surface-Consistent Amplitude Compensation (SCAC)	104
III.11.Phase Matching Filter	114.
III.12.Velocity Analysis	125
III.13.Depth Imaging	126
III.14.Velocity Model Building and Updating	148
III.15.Depth Migration Algorithms	149
III.15.Tomographic Approach	150
III.15.a.3D Layer Based Tomography	150
III.15.b.Final Velocity Model and Migration Parameter Tests	152
III.15.c.Stack Before and After PRSDM Comparisons	156

## **CHAPTER- IV**

### **TWO-DIMENSIONAL SEISMIC INTERPRETATION**

IV.1.Introduction	169
IV.2.Prevaling Geoseismic Conditions	170
IV.3.Available Seismic Data	172
IV.4.Seismic Data Interpretation	172
IV.5.Interpretation Results	174
IV.5.Structure Contour Maps	174
IV.5.1.Depth structure contour map on top South Gharib Formation	174
IV.5.2.Depth structure contour map on top Belayim Formation	174
IV.5.3.Depth structure map contour on top Kareem Formation	175
IV.5.4.Depth structure contour map on top Rudeis Formation	176
IV.6.1.Surface Down-lifted Features	176
IV.6.2.Geo-Seismic Cross Sections	177
IV.6.2.1.Seismic section TAL-82-1	177
IV.6.2.2.Seismic section TAL-82-111	184
IV.6.2.3.Seismic section AMAL-105	184
IV.6.2.4.Seismic section TAL-82-106	185
IV.6.2.5.Seismic section TAL-82-118	185
IV.6.2.6.Seismic section TAL-82-124	185

## **CHAPTER -V**

### **THREE-DIMENTIONAL SEISMIC INTERPRETATION**



V.1.Introduction	191
V.2.Interpretation Results	193
V.2.1.Structure Contour Maps	193
V.2.1.1.Depth structure contour map on top Zeit Formation	193
V.2.1.2.Depth structure contour map on top South Gharib Formation	193
V.2.1.3.Depth structure contour map on top Belayim Formation	198
V.2.1.4.Depth structure contour map on top Kareem Formation	198
V.2.1.5.Depth structure contour map on top Nukhul Formation	198
V.2.1.6.Depth structure contour map on top Matulla Formation	199
V.2.2.Geo-Seismic Cross Sections	199
V.2.2.1.Seismic section In-line 1295	199
V.2.2.2.Seismic section In-line 1380	209
V.2.2.3.Seismic section In-line 1501	209
V.2.2. 4.Seismic section Cross-line 4084	212
V.2.2.5.Seismic section Cross-line 4340	212
V.3. Structural Features	215
V.4. Tectonic Inferences	217

## **CHAPTER -VI**

### **PETROLEUM SYSTEM**

VI 1.Introduction	221
VI 2.Stratigraphic Sequence	222
VI 2.1.Source Rock	222
VI 2.2.Reservoir Rocks	223
VI 2.3.Cap Rocks	224
VI 3.Transformation Cycle	225
VI 3.1.Hydrocarbon generation	225
VI 3.2.The hydrocarbon migration	225
VI 3.3.The hydrocarbon Accumulation	226
VI 4.Entrapping Style	226
VI 4.1.Stratigraphic traps	227
VI 4.2.Structural traps	227
VI 4.3.Combined traps	228

<b>CHAPTER -VII</b>	
<b>SUMMARY AND CONCLUSION</b>	229
<b>References</b>	232

## LIST OF FIGURES

Fig	Page
1-1. Amal field location map	2
1-2. Comparison of stratigraphic nomenclatures	5
1-3. Generalized Stratigraphic Column Amal Area	6
1-4. Schematic structural map of the Gulf of Suez area	17
1-5. Role of the transverse faults in the Gulf of Suez	20
1-6. Model of horst – type “twist” zone	21
1-7. Model of transfer fault and inversion of block tilting	21
1-8. Amal field, structural cross section	22
1-9. Gulf of Suez dip provinces	24
1-10. Gulf of Suez tectonic provinces showing alternative rift Shoulders.	26
1-11 Gulf of Suez region showing Gulf margins, tectonic lines ( $\alpha$ , $\beta$ , and $\gamma$ ), and tectonic provinces.	27
1-12. Gulf of Suez tectonic provinces showing geological observation.	29
1-13. Cross section the southern Gulf of Suez showing relief of the rift shoulders, geology, and depth of the axial trough.	31
1-14. Schematic model for the structural development of the southern Gulf of Suez.	35
2-1. The relation among two way time, interval velocity and average velocity curves with depth through Amal-2 well.	42
2-2. The relation among two way time, interval velocity and average velocity curves with depth through Amal-3 well.	43
2-3. The relation among two way time, interval velocity and average velocity curves with depth through Amal-4 well.	44
2-4. The relation among two way time, interval velocity and average velocity curves with depth through Amal-5 well.	45
2-5. The relation among two way time, interval velocity and average velocity curves with depth through Amal-7 well.	46
2-6. The relation among two way time, interval velocity and average velocity curves with depth through Amal-8 well.	47
2-7. The relation among two way time, interval velocity and average velocity curves with depth through Amal-9 well.	48
2-8. The relation among two way time, interval velocity and average velocity curves with depth through Amal-10 well .	49

<b>Fig</b>	<b>Page</b>
2-9.The relation among two way time, interval velocity and average velocity curves with depth through Amal-11 well.	50
2-10.The relation among two way time, interval velocity and average velocity curves with depth through Amal-12 well.	51
2-11. Average velocity gradient map on top Zeit Formation.	53
2-12. Average velocity gradient map on top south Gharib Formation.	53
2-13. Average velocity gradient map on top Belayim Formation	54
2-14. Average velocity gradient map on top Feiran Formation	54
2-15. Average velocity gradient map on top Kareem Formation	55
2-16. Average velocity gradient map on top Rudeis Formation	55
2-17. Average velocity gradient map on top Nukhul Formation	56
2-18. Average velocity gradient map on top Eocene Formation	56
2-19. Average velocity gradient map on top Senonian Formation	57
2-20. Interval velocity gradient map on top Zeit Formation	57
2-21. Interval velocity gradient map on top South Gharib Formation	59
2-22. Interval velocity gradient map on top Belayim Formation	59
2-23. Interval velocity gradient map on top Feiran Formation	60
2-24. Interval velocity gradient map on top Kareem Formation	60
2-25. Interval velocity gradient map on top Rudeis Formation	61
2-26. Interval velocity gradient map on top Nukhul Formation	61
2-27. Interval velocity gradient map on top Eocene Formation	62
2-28. Interval velocity gradient map on top Senonian Formation	62
3-1. Shot Location Map	65
3-2. Fold Map of East Morgan Seismic Survey	66
3-3. Fold Map of South Gulf Of Suez Seismic Survey	67
3-4. Fold Map East Shukheir, Amal Area	68
3-5. Fold Map All Survey, Amal Area	69
3-6. Line 1426a018: Stack Data without Geometrical Spreading Compensation, Amal Area.	73
3-7. Line 1426a018: Stack Data with Geometrical Spreading Compensation, Amal Area.	74
3-8. Line Em093-S151: Stack Data without Geometrical Spreading Compensation, Amal Area.	75
3-9. Line Em093-S151: Stack Data with Geometrical Spreading Compensation, Amal Area.	76
3-10. Line Em093-S111: Stack Data without Geometrical Spreading Compensation, Amal Area.	77

3-11. Line Em093-S111: Stack Data with Geometrical Spreading Compensation, Amal Area.	78
3-12. Line Shu-640: Stack Data without Geometrical Spreading Compensation, Amal Area	79
3-13. Line Shu-640: Stack Data with Geometrical Spreading Compensation, Amal Area	80
3-14. Line 1426a018: Stack Data without Exponential Gain, Amal Area.	83
3-15. Line 1426a018: Stack Data with Exponential Gain 3 Db, Amal Area.	84
3-16. Line Em093-S151: Stack Data without Exponential Gain, Amal Area	85
3-17. Line Em093-S151: Stack Data with Exponential Gain 3 Db, Amal Area	86
3-18. Line Em093-S111: Stack Data without Exponential Gain, Amal Area	87
3-19. Line Em093-S111: Stack Data with Exponential Gain 3 Db, Amal Area	88
3-20. Line Shu-640: Stack Data without Exponential Gain, Amal Area.	89
3-21. Line Shu-640: Stack Data with Exponential Gain 3 Db, Amal Area.	90
3-22. Line 1426a018: Stack Data without Tau-P Deconvolution, Amal Area.	95
3-23. Line 1426a018: Stack Data with Target Tau-P Deconvolution Followed By Tau-P Gap Deconvolution Using Operator Length 200 Ms, Gap20 Ms and Window from 0-1200 Ms, Amal Area	96
3-24. Line Em093-S151: Stack Data without Tau-P Deconvolution, Amal Area.	97
3-25. Line Em093-S151: Stack Data with Target Tau-P Deconvolution Followed By Tau-P Gap Deconvolution Using Operator Length 200 Ms, Gap20 Ms and Window from 0-1200 Ms, Amal Area	98
3-26. Line Em093-S111: Stack Data without Tau-P Deconvolution, Amal Area	99
3-27. Line Em093-S111: Stack Data with Target Tau-P Deconvolution Followed By Tau-P Gap Deconvolution Using Operator Length 200 Ms, Gap20 Ms and Window from 0-1200 Ms, Amal Area.	100
3-28. Line Shu-640: Stack Data without Tau-P Deconvolution, Amal Area.	101

- 3-29. Line Shu-640: Stack Data with Target Tau-P Deconvolution  
Followed By Tau-P Gap Deconvolution Using Operator Length 200  
Ms, Gap20 Ms and Window from 0-1200 Ms, Amal Area 102
- 3-30. Line 1426a018: Stack Data without Deconvolution, Amal Area  
105
- 3-31. Line 1426a018: Stack Data With Surface Consistent Gapped  
Disconsolation Using Op = 340 Ms, Gap = 8 Ms & Window Length  
100-3500 Ms, Amal Area, Gulf of Suez –Egypt. 106
- 3-32. Line Em093-S151: Stack Data without Deconvolution, Amal Area,  
Gulf of Suez –Egypt. 107
- 3-33. Line Em093-S151: Stack Data With Surface Consistent Gapped  
Deconvolution Using Op = 340 Ms, Gap = 8 Ms & Window Length  
100-3500 Ms, Amal Area, Gulf of Suez –Egypt. 108
- 3-34. Line Em093-S111: Stack Data without Deconvolution, Amal Area,  
Gulf of Suez –Egypt 109
- 3-35. Line Em093-S111: Stack Data with Surface Consistent Gapped  
Deconvolution Using Op = 340 Ms, Gap = 8 Ms & Window Length  
100-3500 Ms, Amal Area, Gulf Of Suez –Egypt 110
- 3-36. Line Shu-640: Stack Data without Deconvolution, Amal Area, Gulf  
of Suez –Egypt. 111
- 3-37. Line Shu-640: Stack Data with Surface Consistent Gapped  
Deconvolution Using Op = 340 Ms, Gap = 8 Ms & Window Length  
100-3500 Ms, Amal Area, Gulf of Suez –Egypt 112
- 3-38. Line 1426a018: Stack Data without Surface Consistent Amplitude  
Compensation, Amal Area, Gulf of Suez –Egypt 115
- 3-39. Line 1426a018: Stack Data With Surface Consistent Amplitude  
Compensation Using Window Design From 800 To 2600 Ms And  
Using Source And Receiver Terms, Amal Area, Gulf Of Suez –  
Egypt 116
- 3-40. Line Em093-S151: Stack Data without Surface Consistent  
Amplitude Compensation, Amal Area, Gulf Of Suez –Egypt 117
- 3-41. Stack Data With Surface Consistent Amplitude Compensation  
Using Window Design From 800 To 2600 Ms And Using Source  
And Receiver Terms, Amal Area, Gulf Of Suez –Egypt 118
- 3-42. Line Em093-S111: Stack Data without Surface Consistent  
Amplitude Compensation, Amal Area, Gulf Of Suez –Egypt  
119

3-43. Stack Data With Surface Consistent Amplitude Compensation Using Window Design From 800 To 2600 Ms And Using Source And Receiver Terms, Amal Area, Gulf Of Suez –Egypt	120
3-44. Line Shu-640: Stack Data Without Surface Consistent Amplitude Compensation, Amal Area, Gulf Of Suez –Egypt	121
3-45. Line Shu-640: Stack Data With Surface Consistent Amplitude Compensation Using Window Design From 800 To 2600 Ms And Using Source And Receiver Terms, Amal Area, Gulf Of Suez –Egypt	122
3-46. Crossline 4370: Stack Data without Phase Matching Filter, Amal Area, Gulf Of Suez –Egypt.	123
3-47. Crossline 4370: Stack Data with Phase Matching Filter, Amal Area, Gulf Of Suez –Egypt	124
3-48. Emorg– 3d Inva (Interactive Velocity Analysis) Semblance & Gather Amal Area, Gulf Of Suez –Egypt.	127
3-49. Emorg– 3d.Inva (Interactive Velocity Analysis) Stack Panels Amal Area, Gulf Of Suez –Egypt.	128
3-50. Emorg– 3d.Final Stacking Velocity Profile For Inline 1440 Amal Area, Gulf Of Suez –Egypt.	129
3-51. Emorg– 3d.Final Stacking Velocity Profile for X-Line 4440 Amal Area, Gulf Of Suez –Egypt.	130
3-52. Emorg– 3d.Final Stacking Velocity Time Slice at Iso-Time 500 Msec Amal Area, Gulf Of Suez –Egypt.	131
3-53. Emorg– 3d.Final Stacking Velocity Time Slice At Iso-Time 1000 Msec Amal Area, Gulf Of Suez –Egypt.	132
3-54. Emorg– 3d.Final Stacking Velocity Time Slice At Iso-Time 1500 Msec Amal Area, Gulf Of Suez –Egypt.	133
3-55. Shuk– 3d.Inva (Interactive Velocity Analysis) Semblance & Gather Amal Area, Gulf of Suez –Egypt.	134
3-56. Eshuk– 3d.Inva (Interactive Velocity Analysis) Stack Panels Amal Area, Gulf of Suez –Egypt.	135
3-57. Eshuk– 3d.Final Stacking Velocity Profile For Inline 1360 Amal Area, Gulf of Suez –Egypt.	136
3-58. Eshuk– 3d.Final Stacking Velocity Profile For X-Line 4440 Amal Area, Gulf Of Suez –Egypt.	137
3-59. Eshuk– 3d.Final Stacking Velocity Time Slice At Iso-Time 500 Msec Amal Area, Gulf Of Suez –Egypt	138
3-60. Eshuk– 3d.Final Stacking Velocity Time Slice at Iso-Time 1000msec Amal Area, Gulf of Suez –Egypt.	139
3-61. Eshuk– 3d.Final Stacking Velocity Time Slice At Iso-Time 1500 Msec Amal Area, Gulf Of Suez –Egypt.	140

3-62. Sgos– 3d.Inva (Interactive Velocity Analysis) Semblance & Gather Amal Area, Gulf of Suez –Egypt	141
3-63. Sgos– 3d.Inva (Interactive Velocity Analysis) Stack Panels Amal Area, Gulf of Suez –Egypt.	142
3-61. Sgos– 3d.Final Stacking Velocity Profile For Inline 1440 Amal Area, Gulf of Suez –Egypt.	143
3-64. Sgos– 3d.Final Stacking Velocity Profile For X-Line 4440 Amal Area, Gulf Of Suez –Egypt.	144
3-66. Sgos– 3d.Final Stacking Velocity Time Slice At Iso-Time 500 Msec Amal Area, Gulf Of Suez –Egypt.	145
3-70. Sgos– 3d.Final Stacking Velocity Time Slice At Iso-Time 1000 Msec Amal Area, Gulf Of Suez –Egypt.	146
3-71. Sgos– 3d.Final Stacking Velocity Time Slice At Iso-Time 1500 Msec Amal Area, Gulf Of Suez –Egypt.	147
3-66. Initial Residual Map And Histogram Amal Area, Gulf Of Suez –Egypt.	153
3-72. Residual Map And Histogram After First Iteration Of Linear Tomography Amal Area, Gulf Of Suez –Egypt.	154
3-73. Residual Map And Histogram After Final Iteration Of Linear Tomography Amal Area, Gulf Of Suez –Egypt.	155
3-74. Inline 1400: Stack With Depth Step 8m Amal Area, Gulf Of Suez –Egypt.	157
3-75. Inline 1400: Stack With Depth Step 12m Amal Area, Gulf Of Suez –Egypt	158
3-76. Inline 1400: Stack With Depth Step 16m Amal Area, Gulf Of Suez –Egypt	159
3-77. Inline 1400: Stack With Depth Step 20m Amal Area, Gulf Of Suez –Egypt.	160
3-78. Inline 1440: Stack With Depth Step 8m Amal Area, Gulf Of Suez –Egypt.	161
3-79. Inline 1440: Stack With Depth Step 12m Amal Area, Gulf Of Suez –Egypt.	162
3-80. Inline 1440: Stack With Depth Step 16m Amal Area, Gulf Of Suez –Egypt.	163
3-81. Inline 1440: Stack With Depth Step 20m Amal Area, Gulf Of Suez –Egypt.	164
3-82. Inline 1440: Stack With Depth Step 24m Amal Area, Gulf Of Suez –Egypt.	165
3-83. Inline 1420: Stack Before Psdm Amal Area, Gulf Of Suez –Egypt.	166
3-84. Inline 1420: Stack after Psdm Amal Area, Gulf Of Suez –Egypt.	167