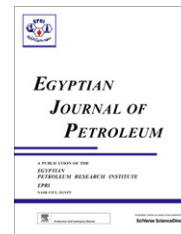




Egyptian Petroleum Research Institute
Egyptian Journal of Petroleum

www.elsevier.com/locate/egyjp
www.sciencedirect.com



FULL LENGTH ARTICLE

The improvements of three-dimensional seismic interpretation in comparison with the two-dimensional seismic interpretation in Al-Amal oil field, Gulf of Suez, Egypt

Ahmed S.A. Abuel Ata ^a, Salah S.S. Azzam ^b, Nahla A.A. El- Sayed ^{b,*}

^a Department of Geophysics, Faculty of Science, Ain Shams University, Cairo, Egypt

^b Department of Exploration, Egyptian Petroleum Research Institute, Cairo, Egypt

Received 13 December 2010; accepted 5 May 2011

KEYWORDS

Three-dimensional;
Seismic;
Interpretation;
Al-Amal Field;
Gulf of Suez

Abstract Thirteen 2D seismic lines were interpreted with the help of well velocity and time-depth trace conversion to construct the structure-tectonic maps. This is to characterize the different stratigraphic tops of Al-Amal area, as well as to confirm the validity of the proposed structural model. Most of the available seismic data in Al-Amal area were investigated and reviewed to select the best quality set.

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, Kareem, Nukhul and Matulla formations from top downward. Interpretation was aided by the missing sections detected from the available well tops and dip-meter data as well. These maps indicate that, both of Miocene and Pre-Miocene formations in Al-Amal field were affected by elongated tilted graben blocks trending in the NW–SE directions and bounded by two sets of faults, which are down throwing toward the west and eastern directions.

© 2012 Egyptian Petroleum Research Institute. Production and hosting by Elsevier B.V.

Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

* Corresponding author.

E-mail address: nahlamoktader@yahoo.com (N.A.A. El- Sayed).

Peer review under responsibility of Egyptian Petroleum Research Institute.



Production and hosting by Elsevier

1. Introduction

Al-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 shoreline. Al-Amal field is located on a NW–SE faulted monocline, which has a SW dip, plunging due



Figure 1 Amal field location map (After [1]).

NW and SE, sealed by tectonic faults and capped by Middle–Upper Miocene Evaporates (Fig. 1).

The field was discovered in 1988, started on November through five wells, producing hydrocarbons from the Lower–Middle Miocene reservoirs (Kareem and Rudeis formations), with a daily oil rate of 6500 BBL. This field is a byproduct of a complex positive structure located in the Gulf of Suez (southern province), which is characterized by a thin pre-Miocene section and high geothermal gradient with SW-dip regime.

The main productive reservoirs are Kareem and Rudeis “Middle and Lower Miocene”. A total of 14 wells were drilled in the area and the field was declared commercially by the end of 1985. Five wells are currently in production, the production facilities were constructed onshore at Ras Dib area and the production started on November 29, 1988.

The first well was drilled on July 1966 by Pan American UAR Oil Company (now BP-AMOCO Egypt Oil Company) in the southwestern part of the structure, which was outlined by using the available seismic surveys and the surrounding geological data. The main objective was pre-Miocene reservoirs in addition to the Miocene-one.

Al-Amal oil field can be considered as one of the offshore oil fields, that occupies the southern part of the Gulf of Suez. The main issue of the present study deals essentially with the interpretation of the 2D and 3D seismic data of Al-Amal area in order to define the structural features intervening the area and their role in the evaluation of the petroleum system of this southern part of the Gulf of Suez province.

In other words, the work is a trail to shed lights on the seismic techniques for both 2D and 3D seismic interpretations in order to give chances for enhancing the oil prospecting and

exploration in the Gulf of Suez oil province in Egypt. Therefore, we believed that, the detected structural elements and their types and genesis (faults and folds) in this study are controlling, to a great extent, the distribution of the hydrocarbon accumulation and trapping styles in Al-Amal oil field.

Seismic surveys, gravimetric and aeromagnetic data were conducted, from which the major structural elements were delineated, while about 1800 km coverage of seismic surveys was available on Al-Amal area. These data were acquired throughout 19 campaigns through the following phases:

- Acquisition from trading around the block,
- The 3D-seismic profiles done by CGG, 1980 (TPO own acquisition),
- The 2D-seismic lines done by GSI, 1982 (TPO own acquisition).

The 2D seismic interpretation is achieved in a parallel manner with the geological interpretation. Several seismic, geo-seismic and geological maps were constructed and interpreted. Some 3D lines have been checked to confirm the previous 2D works done in this area. Using the velocity surveys of a lot of available boreholes, the geological well-data and the picked and mapped seismic horizons have been calibrated, transferred and contoured in terms of depth structure contour maps on specific formational tops.

2. Methodology

Using different seismic data processing softwares, the 2D and 3D seismic interpretations have been made. By searching on

Download English Version:

<https://daneshyari.com/en/article/1756994>

Download Persian Version:

<https://daneshyari.com/article/1756994>

[Daneshyari.com](https://daneshyari.com)