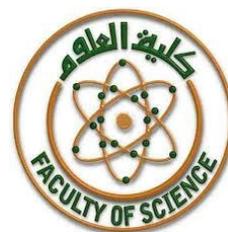




Ain Shams University



**Faculty of Science
Department of Geophysics**

Reservoir Characterization using Core data and Well Logging analysis in Obayed Field, Western Desert, Egypt

A thesis submitted in partial fulfillment of the requirements of the Master Degree in Science

By

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B.Sc. in Geophysics—Faculty of Science,
Ain Shams University, 2012

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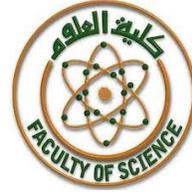
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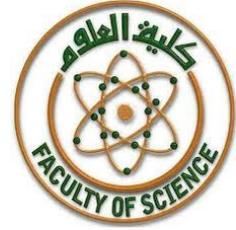
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ABSTRACT

Obayied Field is located in the Western Desert about 300 kilometers west of Alexandria, 70 kilometers south of the city of Mersa Matrouh, some 50 km south of the Mediterranean coast. The area is under discussion and exploration which produces hydrocarbons from the Upper and Lower Safa Member of Khatatba Formation which in the Middle Jurassic period. The Upper and Lower Safa reservoirs have become a very important exploration target in the Obayied field and have helped to improve exploration in the northwestern part of the Western Desert in Egypt. Therefore, the main purpose of this thesis is the evaluation of reservoir characterization using the available well logging data and core data analysis in the Obayied field.

The most important and accessible geophysical method is wireline well evaluation by the measure of the petrophysical parameters of rocks by different petro-physical techniques then interpreting all the well logging and core data to characterize reservoir rocks and locating hydrocarbons in reservoir bores, Well log and core analysis of Upper and Lower Safa reservoirs led to identify hydrocarbon-bearing zones and study reservoir properties based on data from 5 wells located in Obayied field by using the Techlog software to calculate the shale volume, water resistivity, total porosity, effective porosity, water saturation, and hydrocarbon saturation to identify net pay zones. Different litho-saturation plots in studied wells are built. Numerous distribution maps of all petrophysical parameters for the studied reservoirs in Obayied field are demonstrated.

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CHAPTER ONE INTRODUCTION

1.1.General

Even though only a limited number of discoveries have been achieved to date, the Western Desert has significant hydrocarbons potential. Many promising areas are waiting for detailed examination and are virtually untested by drilling. Since 1990 many studies concerning the hydrocarbons resources of the Western Desert suggested that approximately 90% of oil and 80% of gas reserves are still undiscovered (*EGPC, 1992*). Because of the continuous and intensive petroleum exploration programs during the past period, 239 discoveries (157 oil - 82 gas) achieved which added Egypt's oil and gas reserves about 355 million barrels of oil and condensates in addition to 36 TCF gas from 2013 until now (*Ministry of Petroleum, 2020*). The importance of the northern part of the Western Desert initiates from many hydrocarbon fields that have been discovered by the petroleum companies in the period from 1970 to 1983. Also, the northern part of the Western Desert contains rocks that reflect various environmental conditions. The marine and fluvio-marine (depositional environments), in addition to many structural controls, play a great role in hydrocarbons entrapment.

The Western Desert, Mediterranean Sea and the Red Sea are important areas that produce hydrocarbons in Egypt. The Western Desert covers about 700.000 km² of the total area of Egypt. It stretches from the Mediterranean shoreline at the north of Egypt to the border of Egypt-Sudan in the south of Egypt and