Introduction

1/1 General Overview

The Gulf of Suez basin is the most prolific and prospective oil province in Egypt. Its history can be traced back to ancient times where oil was recovered from seepages at Gebel El Zeit and Gemsa by the Pharaohs. To date, more than 4.0 billion barrels of recoverable oil have been recovered from 30 oil fields within the Gulf of Suez basin. Recent exploration activities utilizing 3D seismic surveys and renewed exploration drilling resulting in better understanding of the petroleum geology of the basin and improvement of hydrocarbon recovery.

1/2 Location and setting of the study area

The study area is apart of the Gulf of Suez. It is located in the northeastern part of Egypt and extends from Latitude 27° 41' to 29° 55' N and Longitude 32° 22' to 34° 10' E. It measures about 200 Km long from northwest to southeast direction and about 30 Kms wide. It may be viewed as an elongated depression separating the massifs of central Sinai from the Eastern Desert of Egypt, (Fig.1-1)

The Gulf of Suez basin extends, in an east-west direction, from the Sinai shield to the east to Esh El Mellaha shield, in the Eastern Desert respectively. The average distance between these shield masses is 87Kms. In a north-south direction, the basin's northern limit lies just north of the Suez city and extends to the South to Hurghada, a distance of approximately 338 Kms. ***Gulf of suez oil fields book, EGPC(1996).*** The October oil field is located at X min. 775589 to X max. 826994 and Y min. 658029 to Y max. 739050.

1/3 Objectives and Significance

This work is concerned with the study of the probabilities and organo-geochemical characteristics of the source rock units and crude oils from some wells in October oil field. The obtained data are essential in order to identify the organic richness, type of organic matters, thermal maturation as well as the depositional environment of the organic materials. Moreover, the present work aims to shed more light on the time at which the oil was generated till maturation stage. For accomplishing this work, the following objectives will be approached.

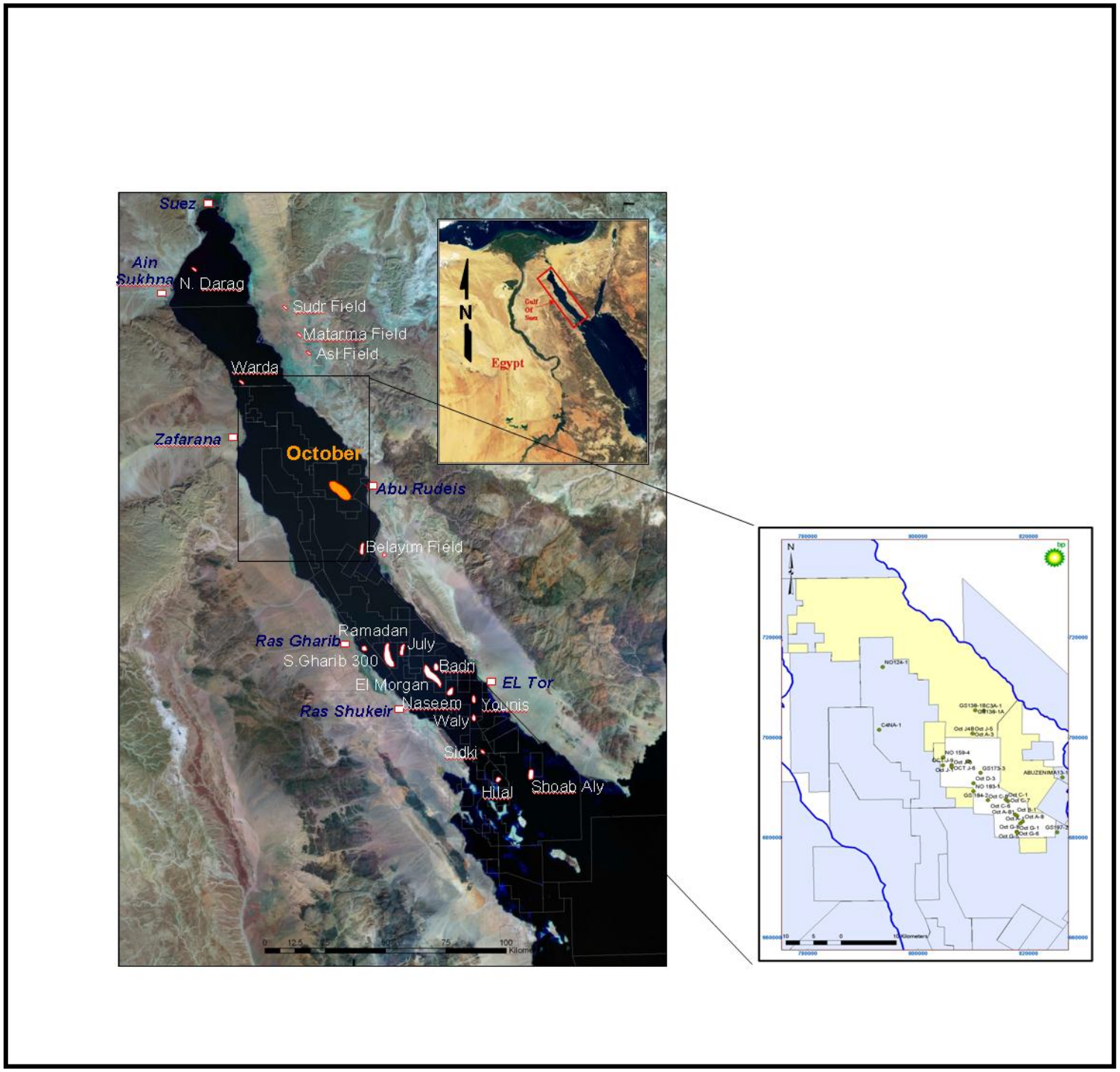

Fig. (1-1) Location Map For October Oil Field and the studied wells.

1/3/1Geochemical approaches:

1. Determining the total organic carbon (TOC) wt% in order to evaluate the organic richness of the investigated rock units.
2. Evaluation of the type of organic matter from Rock Eval II pyrolysis data.
3. Using the available geochemical data to establish the thermal maturation of the source rock.
4. Fractionation for the chloroform extractable bitumen, using the column chromatography of some samples to obtain the saturated hydrocarbons needed for gas chromatography and gas chromatography-mass spectrometry analyses of triterpenes and steranes.
5. Using the available geochemical data to conduct the oil characterization and oil-source correlation.

1/3/2 Mathematical and graphical approaches:

1. A complete quantitative geochemical analysis were performed over the study sample and the burial maturation history diagrams of the implied hydrocarbons and defining the occurrence of their types, were constructed.
2. In addition, relating to the times of generation of these hydrocarbon products to the times of the present day accumulations.

1/4 Aim of the study (Scope and purpose of the study)

This work is aiming to evaluate the petroleum system of October field through the study of subsurface setting and evaluation of the geochemical characteristics of the source rocks and oils of October field. Fifty four wells were used to evaluate :-

1. Organic richness
2. Organic matter types
3. Source rock capability for petroleum generation
4. Thermal maturation
5. Thermal burial history investigations
6. Timing of oil generation
7. Determination of oil window

8. Oil – Source rock correlation
9. Oil Maturity

1/5 Material and data used in the study area

All October field wells penetrating Brown Limestone member, Thebes, Lower Rudies and Belayim formations are available for this study of which selected composite logs for six wells; namely NO124-1, Ewarda_syn, S_October_syn, Tanka-3, Tanka-1 and W-October_syn Wells. Two hundred eighty six "286" representative ditch samples and fourty "40" crude oil samples were collected from "37" wells in the study area (Table 1-1). The composite logs and samples were kindly supplied by Gulf of Suez Petroleum Company after General Egyptian Petroleum Corporation [EGPC] approval.

1/6 Methods of investigation and interpretation

The search was carried out with the aim of evaluation of the source rocks. The first part of the research consisted of reviewing the basic data available for the studied formations depending on the pyrolysis analysis data such as total organic carbon (TOC), generating source potential (S2), production index (PI), oxygen and hydrogen indices (OI, HI) and maximum temperature(Tmax.). Besides, a full discussion of the organic richness, genetic types of organic matters, depositional environment and the thermal maturation as well as the timing of hydrocarbon generation and expulsion of the studied source rocks.

As well as**,** describing the common methods (Oil-Oil Correlation, Oil-Source Correlation) for the characterization of crude oils in terms of source rock facies and depositional environments and their maturity and alteration stage which is a very important element in exploration studies ***Waples, (1985)***. The present contribution has implication for the oil characterization using different parameters which have been used for this purpose. Most of these parameters are based on the analyses of API gravity and sulphur compounds for the crude oil as well as saturated and aromatics hydrocarbons including stable carbon isotopes , pristine and phytane ratio, isoprenoid, n-alkanes and the biological markers distributions as steranes and triterpanes in the crude oil ***Waples and Michihara, (1991)***.

Table (1-1) Summarized data of the study samples.

Type of sample	No. of samples	Depth interval (ft)	Formation	Well Name
Ditch	4	8760-8870	BRN. LIMESTONE	C4SA-1
Samples	3	15150-15200	BRN. LIMESTONE	GS138-1B
	3	11650-11750	BRN. LIMESTONE	GS197-2
	125	10958.6-11075	BRN. LIMESTONE	OCT-C8ST1
	6	11000-11400	THEBES	ABUZENIMA13-1
	3	11360-13920	THEBES	C3A-1
	57	7672-8810	THEBES	C4NA-1
	9	13350-14050	THEBES	GS138-1B
	21	10300-11250	THEBES	GS197-2
	4	14200-14650	THEBES	GS285-1
	3	10500-10650	THEBES	GS305-2A
	4	10400-10800	THEBES	GS325-1
	10	10500-10950	THEBES	NO124-1
	20	5350-6200	L.RUDEIS	GS317-1
	12	9400-9490	BELAYIM	C3A-1
	2	5010-5170	BELAYIM	C4NA-1
	Total 286			
Crude oil	1	10520.13	Nezzazat	Oct A-1
Samples	1	11232.14	Nubia	Oct A-1
	1	10912.13	Nubia	Oct A-1
	1	11018.13	Nubia	Oct A-2
	1	10696.13	Nubia	Oct A-3
	1	11085.14	Nubia	Oct A-4
	1	10905.13	Nubia	Oct A-5
	1	10688.13	Nubia	Oct A-6
	1	10946.13	Nubia	Oct A-7
	1	11098.14	Nubia	Oct A-8
	1	10739.13	Nubia	Oct A-9
	1	10028.12	Nezzazzat	Oct B-1
	1	3447.63	NUBIA	Oct B-2
	1	10171.12	Nezzazzat	Oct B-7
	1	10938.13	Nubia	Oct B-9
	1	10315.13	Nezzazzat	Oct C-1
	1	11408.14	Nubia	Oct C-3
	1	11002.13	Nubia	Oct C-4
	1	10117.12	Nezzazzat	Oct C-6
	1	11026.13	Nubia	Oct C-7
	1	10986.13	Nubia	Oct C-8
	1	10577.13	Nezzazzat	Oct D-3

	1	9794.12	Nukhul	GS 184-2
	1	10298.13	Asl	Oct F-1
Type of sample	**No. of samples**	**Depth interval (ft)**	**Formation**	**Well Name**
Crude oil	1	9438.12	Nukhul	Oct G-1
Samples	1	10974.13	Nubia	Oct G-4
	1	10835.13	Nubia	Oct G-5
	1	10704.13	Nubia	Oct G-6
	1	10852.13	Nubia	Oct G-8
	1	10885.13	Nubia	Oct G-10
	1	10639.13	Nubia	Oct J-1
	1	10833.13	Nubia	Oct J-3
	1	9998.12	Asl	Oct J-4B
	1	10107.62	Nubia	OCT J-5
	1	9524.12	Asl	OCT J-5
	1	9550.12	Asl	OCT J-6
	1	10754.13	Nubia	OCT J-7A
	1	10189.12	Asl	OCT J-9
	1	9650.12	Nezzazat	NO 183-1
	1	9086.29	Asl	NO 159-4
	Total 40			