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FULL LENGTH ARTICLE

Source rock evaluation and organic geochemistry of Belayim Marine Oil Field, Gulf of Suez, Egypt

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Abstract Geochemical evaluation of Belayim Marine Oil Field using TOC and Rock Eval Pyrolysis investigations for a total of 19 cutting samples (9 samples covering (Nubia-B Formation) from well BM-57, and 10 samples covering (Nubia-A, B Formations) from well BM-65) was performed. Furthermore, geochemistry analyses of two crude oil samples from Wells BM-29 and BM-70, which are recovered from the Upper Rudeis Formation were performed. The BM-70 oil sample is recovered by Drill Steam Testing, while the BM-29 oil sample is taken from the flow output. Moreover, the oil samples were subjected to GC/GC-MS analysis (Biomarker) by StratoChem Company.

In general, TOC analyses showed that the Nubia-A and B formation sediments are fairly immature compared to good source rocks with very high Hydrogen Index indicative of kerogen type II. The geochemical investigations of two oil samples indicate that the Upper Rudeis oil of Belayim Marine was derived from a marine carbonate rich source, which is relatively rich in algal organic matter and has moderate sulfur content. The maturity of the analyzed oils (about 0.75% R0) falls short from the stage of peak hydrocarbon generation which is known to be reached at about 0.85% R0.

1. Introduction

The Gulf of Suez represents the most interesting oil provinces in Egypt; it is divided into three tectonic zones separated by accommodation and transfer zones. Most of them are interesting such as oil exploration and production. The main traditional play concept is represented by structurally high horst and tilted fault blocks. The Belayim Marine Field is located in east central part of the Gulf of Suez which resembles the central fields in their models, tectonics and petroleum system. Large numbers of exploratory and development wells were drilled through the long history of production and tested for this conventional play concept (Figure 1).

Many studies have been done on the Gulf of Suez province for the purpose of source rock evaluation. Among these studies are [1–7]. Younis concluded that the Black Shale of

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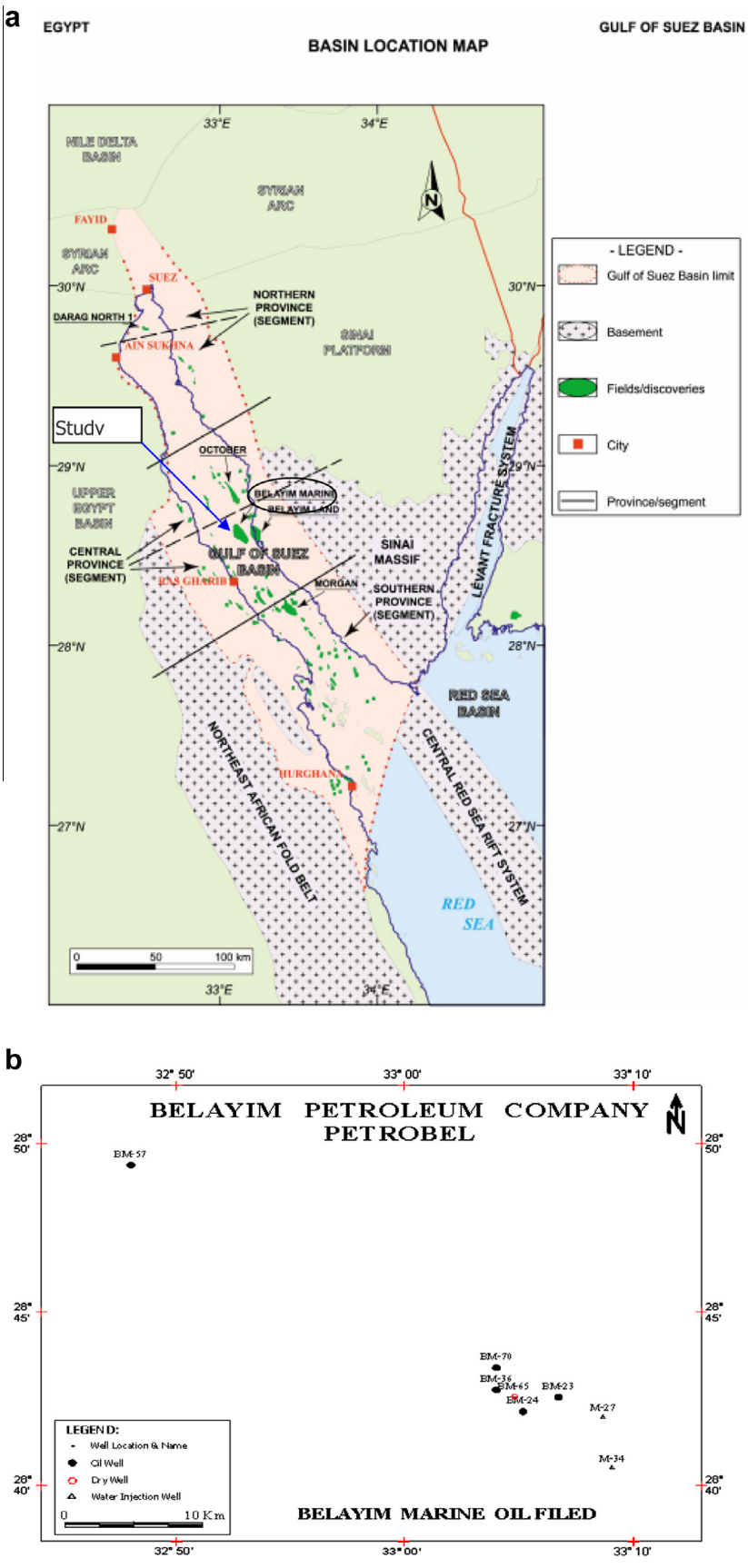

Figure 1 (a) Gulf of Suez Basin location map showing study area, Belayim Marine Oil Field [22]. (b) Study area Wells location map.