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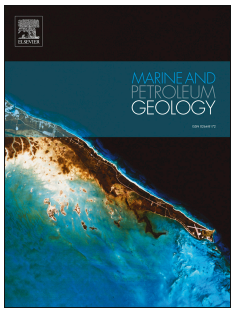

Reservoir assessment and quality discrimination of Kareem Formation using integrated petrophysical data, Southern Gulf of Suez, Egypt

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PII: S0264-8172(18)30100-4

DOI: 10.1016/j.marpetgeo.2018.03.007

Reference: JMPG 3272

To appear in: *Marine and Petroleum Geology*

Received Date: 25 August 2017

Revised Date: 28 January 2018

Accepted Date: 7 March 2018

Please cite this article as: Nabawy, B.S., El Sharawy, M.S., Reservoir assessment and quality discrimination of Kareem Formation using integrated petrophysical data, Southern Gulf of Suez, Egypt, *Marine and Petroleum Geology* (2018), doi: 10.1016/j.marpetgeo.2018.03.007.

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Reservoir Assessment and quality discrimination of Kareem Formation using integrated petrophysical data, Southern Gulf of Suez, Egypt

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Abstract

The middle Miocene Kareem Formation represents one of the most important reservoirs in the Gulf of Suez, Egypt. Six boreholes locating throughout different structural trends in the Southern province of the Gulf of Suez, Egypt, were selected to study the reservoir properties of the Kareem Formation. The study depends on integrated data of well logs and routine core analysis as well as seismic data. The present study is an integrated study aims to study and discriminate the reservoir quality of the Kareem sequence using various statistical techniques.

Testerman statistical approach and stratigraphic modified Lorenz (SML) plot were used in reservoir zonation. Principal Component Analysis (PCA) and cluster analysis were used to identify the electrofacies distribution within the studied formation. The well log data enabled characterizing the reservoir sequence into 6 electrofacies.

The available core analyses data and core description for the Kareem Formation (850 feet cored interval) in Morgan oil field enabled more accurate discrimination for the reservoir sequence into 13 hydraulic flow units (7 of them are potential flow units). The studied sequence is differentiated into five lithologic-petrophysical facies; siltstone, dolomitic siltstone, dolomitic sandstone, sandstone and friable sandstone. The sandstone and friable sandstone facies are the best petrophysical facies.

The dolomite content is the main key factor for reducing the reservoir quality of the studied Kareem sequence. From the core data, a total net pay thickness of 180 feet (mostly composed of sandstone with some siltstone intercalations) was assigned of fair quality ($\varnothing_{He}$ = 14.7 %, k_H = 89.1 md, So = 28.8 %, reservoir quality index 'RQI' = 0.60 μm, flow zone indicator 'FZI' = 3.81 μm, reservoir potential index 'RPI' = 2) with few streaks of good to very good potential. However, the siltstone samples have less petrophysical potential than the sandstones.

Keywords

Kareem Formation, reservoir quality, reservoir zonation, porosity, permeability.

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