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Petrophysical properties of Cretaceous clastic rocks (Qishn Formation) in the Sharyoof oilfield, onshore Masila Basin, Yemen

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Received 23 September 2015; revised 8 June 2016; accepted 28 June 2016

KEYWORDS

Qishn clastics;
Porosity;
Permeability;
Petrophysics;
Sharyoof oilfield;
Masila Basin

Abstract The subsurface of Qishn clastic rocks, which are exposed in the Sharyoof oilfield, has been studied. The petrophysical properties, i.e., porosity and permeability of Qishn clastic reservoir rocks were investigated using well logging coupled with core data. The results were used to evaluate the reservoir quality and hydrocarbon occurrence potential. The lithology of the Qishn clastic was computed from well logs, which indicate that the lithofacies of the Qishn clastic at Sharyoof oilfield is mainly composed of sandstone and carbonates with a low amount of shale intercalations.

Generally, the Qishn clastic reservoir rocks have good reservoir quality with porosity values, averaging ~19.0%. These porosity values are mainly intergranular primary and secondary porosity. Permeability is likewise variable with values in the range of 0.001–7270 mD and an average of 413 mD. This is conformed from core porosity and permeability results. However, the relatively high values of effective porosity and permeability are due to lower shale contents in the Qishn clastic rocks. The Qishn clastic reservoir rocks have been differentiated into net-pay and non-pay zones according to the cutoff (i.e., effective porosity $\geq 10\%$, shale volume $\leq 30\%$ and water saturation $\leq 50\%$). The Qishn clastic reservoir rocks have high hydrocarbon saturation exceeding 70%, with relatively high movable oil, indicating that the production is mainly oils. Therefore, the Early Cretaceous Qishn Formation acts as a hydrocarbon reservoir in the Sharyoof oilfield, Masila Basin, eastern Yemen.

Reservoir property distributions of the Qishn clastic rocks such as net-pay thickness, porosity, permeability and hydrocarbon potential indicate that the best prospective region for oil accumulation is located in the central part of the study area. Therefore, the Qishn clastic rocks in the central part of the study area have promising reservoir characteristics and hydrocarbon occurrence potential, which should be taken into consideration during future development of the Sharyoof oilfield.

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Peer review under responsibility of Egyptian Petroleum Research Institute.

<http://dx.doi.org/10.1016/j.ejpe.2016.06.004>

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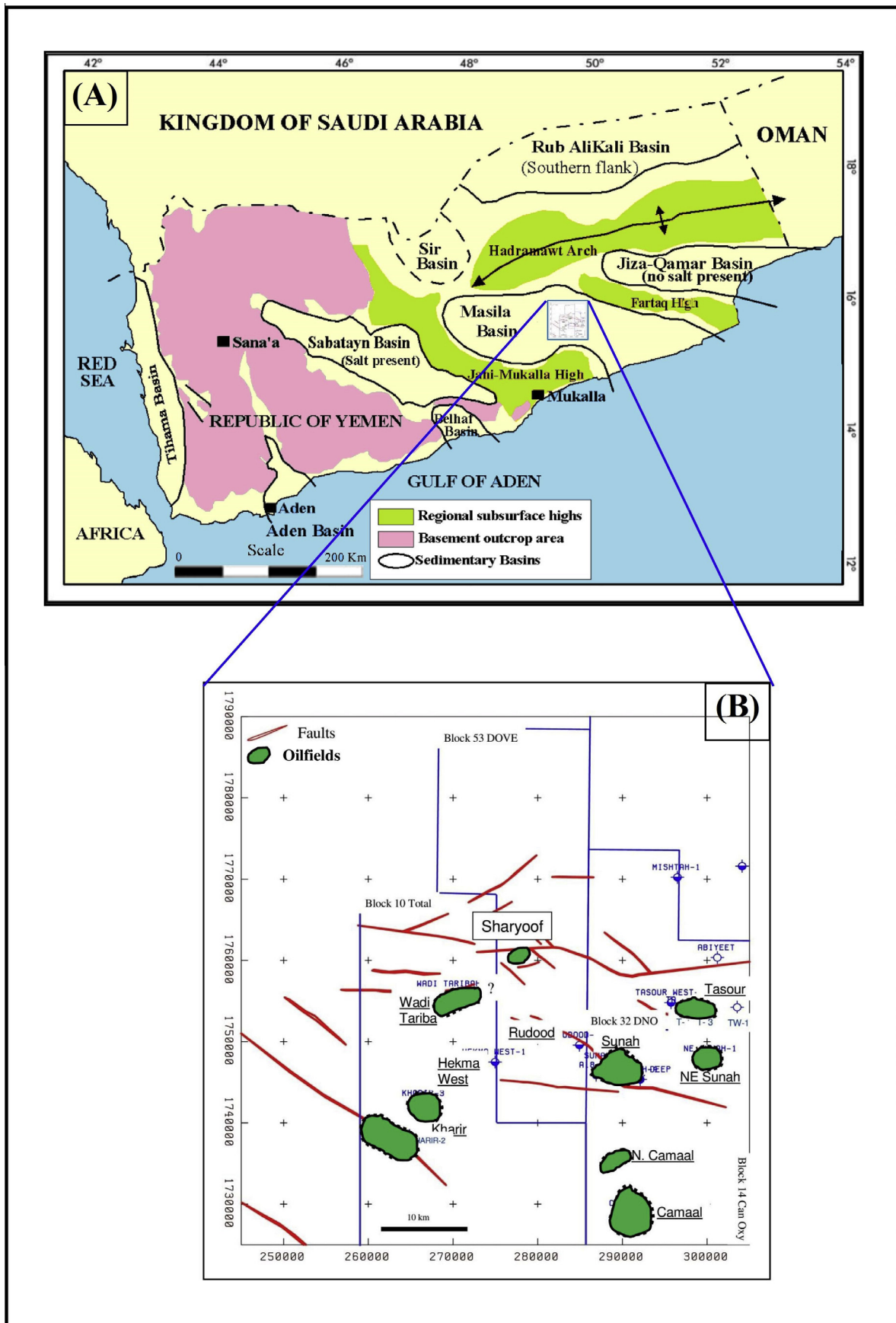


Figure 1 (A) Main sedimentary basins in Republic of Yemen (modified after Beydoun et al. [12]) and (B) location map of some Masila Basin's Blocks including Sharyoof oilfield (Block 53), Hadramawt region of the Republic of Yemen.

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