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Carbonate Rock Types Matrix, the Initial Rock Properties Classification Catalogue

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SUMMARY

In carbonate, the rock typing work that's been performed during the last two decades had a little progress in term of providing reliable estimation of reservoir behavior. However, lately in 2009, the development of Conjunction Rock Properties Convergence, CROPC, a carbonate rock typing concept that provided an important and easy solution to the carbonate rock typing gaps has a major breakthrough. the need to identify more complex carbonate pore network had led to the initiation of developing the Carbonate Rock Type Matrix CaRTM, which will be detailed in this paper, as part of a Master of Science research project. In this novel concept the carbonate rocks were classified into homogeneous, single pore network, and heterogeneous rocks, dual and triple pore network with the utilization of the effective petrophysical properties of permeability, capillary pressure, saturation, porosity and height above free water level, all were classified in a conjunction matrix that honors these properties and at the same time enables generating sub groups as down scaling and estimation for unseen groups with infinite rock complexity capturing, at the same time it enables the ease to lump the groups and generates upscaled groups that make it easier for utilization.

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Abstract

Rock typing is one of the most important steps in reservoir modeling, and it's the main task in reservoir characterization. In carbonate, the rock typing work that's been performed during the last two decades had a little progress in term of providing reliable estimation of reservoir behavior. However, lately in 2009, the development of Conjunction Rock Properties Convergence, CROPC, a carbonate rock typing concept that provided an important and easy solution to the carbonate rock typing gaps has a major breakthrough, even though, CROPC methodology was developed to capture the single pore network through the conjunction of Lithology, permeability, capillary pressure and water saturation. Therefore the need to identify more complex carbonate pore network had led to the initiation of developing the Carbonate Rock Type Matrix CaRTM, which will be detailed in this paper, as part of a Master of Science research project. In this novel concept the carbonate rocks were classified into homogeneous, single pore network, and heterogeneous rocks, dual and triple pore network with the utilization of the effective petrophysical properties of permeability, capillary pressure, saturation, porosity and height above free water level, all were classified in a conjunction matrix that honors these properties and at the same time enables generating sub groups as down scaling and estimation for unseen groups with infinite rock complexity capturing, at the same time it enables the ease to lump the groups and generates upscaled groups that make it easier for utilization by geologist and reservoir engineers to achieve the objective of better reservoir performance prediction, the work was performed using two carbonate offshore fields data. This CaRTM was structured to be the initial catalog for carbonate rock types.