
Title: Rock Type Assignment Using Correlations between Dynamic Rock and Fluid Property Interaction Data (Capillary Pressure and Relative Permeability) and the Porosity

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Abstract: This paper discusses a methodology where measured dynamic rock and fluid interaction data (capillary pressure and relative permeability) are correlated against porosity to define the reservoir rock types for a carbonate reservoir zone in Abu Dhabi, UAE. The reservoir rock type can be defined (according to Gunter et al, 1997) as “a unit of rock experienced similar depositional process resulting in a unique porosity–permeability relationship, pore throat and capillary pressure profiles for a given height above the Free Water Level (FWL)”.

The technique has been successfully applied to the same reservoir productive zone in two nearby fields in Abu Dhabi, UAE using data from two extensive special core analysis (SCAL) studies. This zone of interest is characterized by a narrow range of low permeability, 0.5 – 5 mD, and a wide range of porosity, 5-25%. The analysis of the SCAL data indicated a strong dependency on porosity values. Therefore, porosity was used as the independent variable and correlations were developed to describe dynamic rock and fluid interaction data as a function of porosity. The application of these correlations was tested in dynamic flow simulation models in form of 18 rock and fluid interaction properties tables. Model initialization resulted in excellent matches of log saturation profiles and oil in place.

The paper discusses the methodology and its application to two nearby fields in Abu Dhabi, UAE.
