

A CRITICAL REVIEW OF ROCK TYPING APPROACHES IN CLASTIC RESERVOIRS

Abstract:

Rock typing is a process of classifying reservoir rock into distinct units based on various subsurface data including core, logs, and production performance. The rock types with a unique set of characteristics are being used in the reservoir model to distribute the petrophysical properties. Over the years, various approaches of rock types have been developed by various companies according to reservoirs, lithology, locations, and company preferences. The objective of this paper is to critically review some of the most common rocktyping approaches in clastic reservoirs and highlight their limitations and uncertainties.

From simple Vshale cutoff to more advance Artificial Neural Network (ANN) or Self Organizing Map (SOM) is common to cluster the reservoir to describe the poro-perm relationship, Saturation Height Function (SHF) model, and relative permeability correlations. Although commonly used in reservoir models, there are significant pitfalls in rock type approach that are often overlooked intentionally to simplify the process, to expedite modelling workflow, and due to lack of alternate approach. The observation from various field studies is summarized in this paper.

The most common issue observed is related to the reconciliation of various rock typing approaches from various scales of data from various disciplines (sedimentologist, geologist, petrophysicist, etc). Another major issue is related to the application of the rock type to establish various correlations which often ignore statistical challenges related to averaging and regression. The paper discusses these issues and explores enhancement in the current rock typing workflow. In addition, an out of box approach with the concept of infinite rock type modelling will be proposed as an alternative to establish robust petrophysical property model in clastic reservoirs.

Bio:



Thanapala Singam is a Custodian Petrophysicist in PETRONAS with 19 years of experience in petrophysics. He has worked in various aspects of petrophysics including logging operations, integrated formation evaluation, resource assessment, and reservoir modelling in clastic, carbonate, and basement reservoirs. He is Group Technical Authority for Petrophysics and Subject Matter Expert (SME) for Integrated Reservoir Characterization and Thin Bed Analysis in PETRONAS. He holds a Bachelor of Petroleum Engineering (Hons) from Universiti Teknologi Malaysia.