

Wave Velocity-Rock Property Relationships in Shallow Marine Libyan Carbonate Reservoir

Authors : Tarek S. Duzan, Abdulaziz F. Ettir

Abstract : Wave velocities, Core and Log petrophysical data were collected from recently drilled four new wells scattered through-out the Dahra/Jofra (PL-5) Reservoir. The collected data were analyzed for the relationships of Wave Velocities with rock property such as Porosity, permeability and Bulk Density. Lots of Literature review reveals a number of differing results and conclusions regarding wave velocities (Compressional Waves (Vp) and Shear Waves (Vs)) versus rock petrophysical property relationships, especially in carbonate reservoirs. In this paper, we focused on the relationships between wave velocities (Vp , Vs) and the ratio Vp/Vs with rock properties for shallow marine libyan carbonate reservoir (Real Case). Upon data analysis, a relationship between petrophysical properties and wave velocities (Vp, Vs) and the ratio Vp/Vs has been found. Porosity and bulk density properties have shown exponential relationship with wave velocities, while permeability has shown a power relationship in the interested zone. It is also clear that wave velocities (Vp , Vs) seems to be a good indicator for the lithology change with true vertical depth. Therefore, it is highly recommended to use the output relationships to predict porosity, bulk density and permeability of the similar reservoir type utilizing the most recent seismic data.

Keywords : conventional core analysis (porosity, permeability bulk density) data, VS wave and P-wave velocities, shallow carbonate reservoir in D/J field

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