

Lateral Distribution of Petrophysical Properties on Clastic Mangahewa Formation, Maui Field, New Zealand

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Abstract

Mangahewa Formation is one of the three prolific hydrocarbon producing clastic reservoirs of Maui Field, which was deposited with fluctuating northeast trending shoreline over a narrow coastal plain. In this study, the Mangahewa Formation has been extensively reinterpreted seismically and at the well scale so that specific petrophysical properties can be remodeled and redistributed laterally across the field. This predominantly sand-rich reservoir of Mid-Late Miocene presents relatively complex petrophysical property distributions compared to the rest of the reservoirs in Maui Field. This particular reservoir having an average thickness of 250m was characterized geostatistically by the means of Sequential Gaussian Simulation (SGS) and exponential variograms. These geostatistical methods have been used to spatially distribute effective porosity (PhiE), permeability (K), water saturation (Sw) and volume of shale (VSh); PhiE and K being distributed as a J-function along the reservoir. The results are astounding; having significant improvement of petrophysical parameters used which would have been difficult with previous means of conventional approaches.