

Oil-Based Dipmeter and Imaging Tools: Implications for Determining Structure and Fractures in Different Logging Conditions

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Downhole imaging in oil-based muds has seen a number of significant advances in the last decade. The development of oil mud tolerant resistivity imaging tools has added new options beyond the scratcher dipmeter tool and the acoustic televiewer, both of which have been available since the 1960's.

It is worthwhile to investigate the differences between oil-based electrical imagers, oil-based dipmeters and televiwers, specifically in how they compare to each other in their usefulness for measuring structural and stratigraphic bedding, fractures and drilling induced features. Also, it is helpful to look at how they respond in different lithologies, in different mud weights and salinities, as well as differing borehole wall rugosity. Because each tool measures the rock in a different way, some tools will succeed in certain tasks and in certain environments while others may fail in that same environment so now that the oil-based electrical imaging technology has reached a level of maturity, a comparison is warranted.

Each of the three different oil-based imaging tool types have environments and measurement goals to which they are best suited and it seems that as time goes on, data quality is improving as the tools are run more optimally.

While modern oil-based dipmeter and imaging technology is useful for measuring bedding, fractures and other features, currently there are some mud types and environments in which some of these features cannot be measured at all. Care must be taken to correctly match the logging goals with the correct tool while being aware that sometimes the logging goals may still be unattainable with the currently available technology.