

Comparing of an Estimated Sonic Log with Measured Sonic Log

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This study presents a workflow for quantitative interpretation of sonic and seismic data. Measured data collected at the point of logging can be fraught with errors that can lead to wrong interpretation. One of such data is the shear wave velocity which in most cases, is collected with the compressional wave velocity.

The measured shear wave velocity log may contain errors that are due to drilling conditions, mud invasion etc. It may also contain cycle skips and might contain a lot of missing data and information. It is because of the poor quality of this type of log that has often made well log analysis companies and log interpreters neglect the measured shear wave log and subsequently generate or create an estimated shear wave log which they use for interpretation and modeling to check how the amplitudes vary with increasing offsets, among other uses.

The workflow presented in this study considers the effect of working with the measured data, a reprocessed shear wave log and a locally estimated shear wave log. Specific correction procedures for invasion of the logs was done and synthetic seismograms were created for each type after correction for comparison to a 3D seismic data.

The results of this study suggest that oil based mud invasion can cause significant problems to sonic logs especially the shear wave log. It also suggests that, if a shear wave log is of low or bad quality, a reprocessed shear wave log would be better for interpretation and modeling rather than a locally calibrated shear wave log or an estimated shear wave log using global predictions. The conclusion is evident from the synthetics generated using the measured shear wave data and the estimated shear wave data.