

SOFT SHALE COMPLICATION IN AVO INTERPRETATION IN SABAH BASIN

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Field A is a faulted EW trending anticline which has been produced for more than two decades from early Miocene sand. It is very important to understand the rock elastic properties for the purpose of near field wildcat exploration. In Field A, the shale which capped sands is called 'A' shale and roughly 70-100m thick across the field. The upper part of the 'A' shale has Acoustic Impedance(AI) higher than that of the shale, however, the lower portion of the shale is the opposite. Therefore, such a response imposed a challenge to differentiate the sand and shale responses on seismic data set.

Detailed rock physics modeling on petrophysically conditioned logs is a must in order to quantify the elastic properties of the shales with reference to underlying sand reservoir. Figure 1 shows the representative well log response and histograms for shales and sand. Our analysis revealed that soft shale seismic amplitude response is similar to that of the gas sand. The proper AVO/rock physics modeling of the soft and hard shale and the various fluid fill sands responses are necessary in order for us to do correct AVO analysis and thus to be used correctly in the prospect de-risking process. It has been observed that elastic properties like Elastic Impedances, LambdaRho-MuRho are necessary in order to distinguish among them. In addition, proper conditioning of the pre-stack gather is also necessary in order to improve the data quality and enhance the subtle contrast.

REFERENCES

TARANG, A., SINGH, Y., 2010. Unpublished Internal Report. Petronas Carigali Sdn Bhd

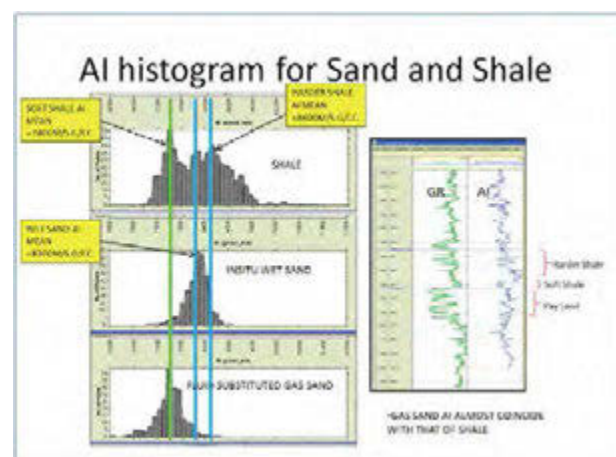


Figure 1: A representative Gamma Ray (GR) and P-Impedance (AI) logs and the AI histograms for shale, wet sand and fluid substituted gas sands over the zone of interest (after Tarang et al, 2010).