

Application of Multi-linear Regression Technique to predict Shear Wave and its Application in AVO Analysis in a Clastic reservoir of Tripura Fold Belt.

predicted logs (MLR and Castagna) were plotted and it is observed that the log predicted with MLR has an excellent match with the recorded log (Fig. 7 & 8)

The predicted log was also cross-correlated with the recorded log and 95% correlation was achieved. One more striking observation is that both the trends are actually overlapping each other (Fig. 9).

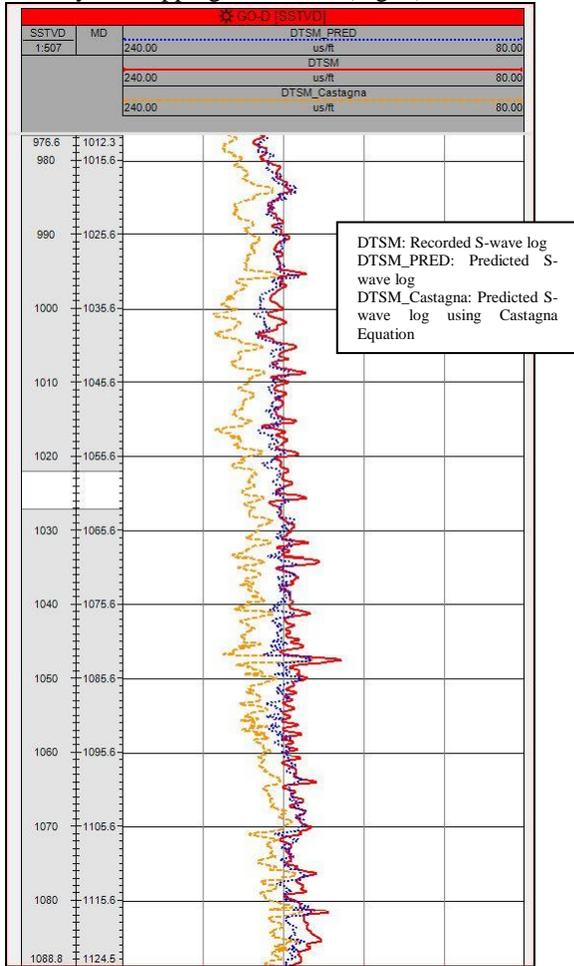


Fig. 7: Validation of predicted S-wave log (Blue) of GO-D with recorded log (Red) and predicted S-wave log using Castagna Equation (Orange).

Hence, it can be inferred that the Multilinear regression relationship established in Equation (4) can be regarded as an empirical relation.

Once a satisfactory relation is established, the same was applied for all the remaining wells in the study

area covered by 3D survey, i.e., GO-A, GO-B and GO-C.

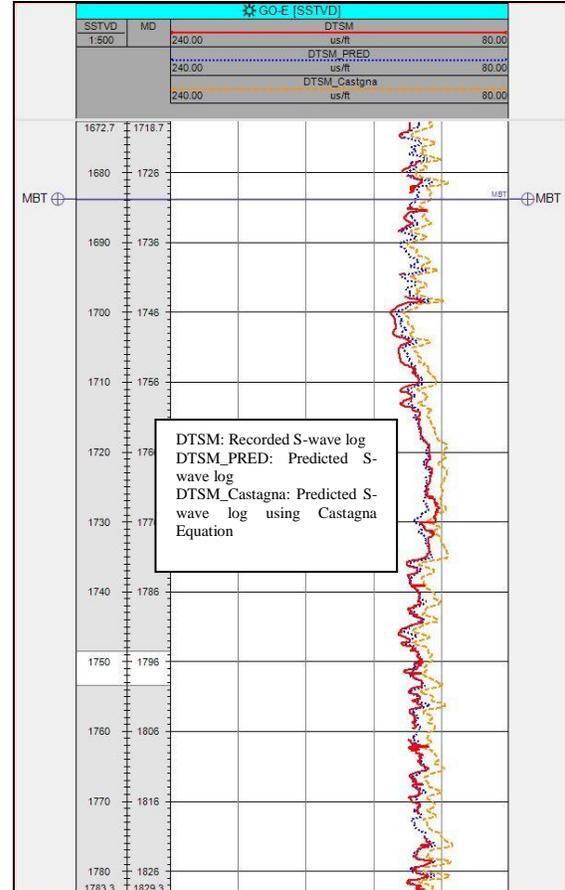


Fig. 8: Validation of predicted S-wave log (Blue) of GO-E with recorded log (Red) and predicted S-wave log using Castagna Equation (Orange).

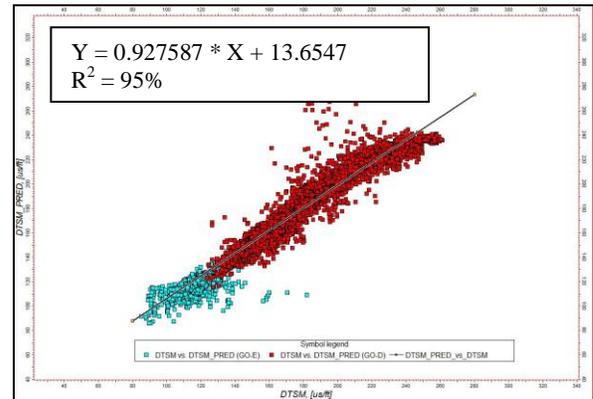


Fig. 9: Cross-correlation between Predicted and Recorded S-wave logs for GO-D and GO-E.

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Applications

After the Pseudo S-wave log is generated, synthetic AVO response was calculated, which was otherwise not possible due to non-availability of S-wave log. The AVO synthetics modeling was also carried out for Well GO-C and GO-E. AVO Gradient Analysis of these two wells of equivalent sand indicates Class-I type of AVO anomaly (Fig. 10 & 11).

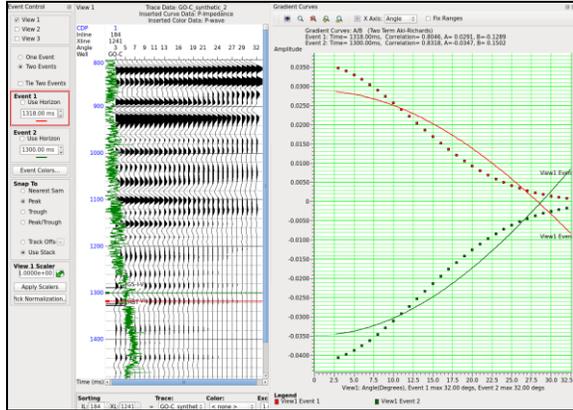


Fig. 10: Gradient analysis of Well GO-C for sand GS-I-IV showing Class-I type of AVO Anomaly.

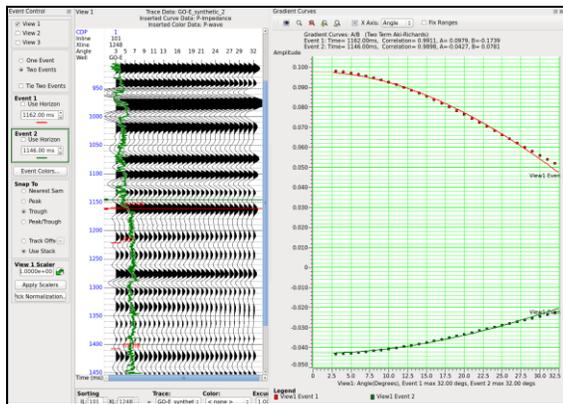


Fig. 11: Gradient Analysis of Well GO-E using Synthetic S-wave log showing Class-I type of AVO Anomaly.

Conclusions

The preliminary objective of the present study was to ascertain a good relationship for generating S-wave log from the other existing conventional logs. The process adopted is validated in wells having S-wave log and further propagated to wells not having S-

wave log. This kind of result helped us in AVO Modeling and Analysis.

References

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Acknowledgments

This study is carried out at AAFB, Jorhat, Assam. The authors are thankful to ONGC authority for permitting to publish the work. The views expressed in this paper are solely those of the authors and need not necessarily be that of ONGC.