SB-X, Sabah Inboard: Concept Driven Interpretation – Using Conceptual Models and Structural Analogs in Prospect Evaluation

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ABSTRACT

A prospect was identified in Block SB-X, an area of complex faulting and unconformable sequences. The 2D seismic data quality is poor, making the seismic interpretation very difficult. Nearby and more clearly imaged structures were used as analogs for the prospect in terms of their fault orientation, displacements and morphology. Since the compression resulted in regional uplift, many unique structural features were observed: reactivated normal faults and "arrowhead'" faults. The prospect that was identified as being bounded by compressional faults was re-interpreted as being an inversion structure with extensional bounded by normal faults. Inversion structural models also indicate that fault patterns and inversion shape are characteristic of a clay dominated stratigraphy changing the primary risk from trap integrity (fault seal) to reservoir presence and source timing.

Introduction

A block evaluation exercise requires seismic interpretation exercise to identify prospects and leads. Seismic interpretation is challenging especially when dealing with poor quality 2D seismic data on structurally complex area with steeply dipping faults. This was the case for the Pre DRU formations (Late Pliocene to Early Miocene) in Block SB-X. Chaotic seismic reflections make the horizon correlation seems almost impossible. The structure is heavily faulted yet minimal or almost non-displacement is observed on seismic lines seems against its faulted nature.

Method & Seismic Interpretation

Positive inverted structure analog model adapted from Williams, *et. al*, (Special publication, 1989) and by Yamada and McClay (2004) was used to guide seismic interpretation. A nearby lead was used to apply the analogue model. A simple structure flattening in time domain was done using Petrel to illustrate the present day structure formed from a series of syn-kinematic growth faults to post kinematic thrust fault by recent reverse activation and produce null point.

For its prospectivity, an inversion model by Eisenstadt and Sims (2005) used to discriminate sand-rich or shale-rich prospect from structural geology point of view. The structure geometry of the model fits the analog suggest a shaly than sandy environment that relates to fault reactivated structure.

Conclusion

This concept driven interpretation refined the structural interpretation of a poorly imaged prospect led to a better understanding of application of positive inverted structural interpretation.

The comparison with the analog model allowed us to propose that the sedimentary environment is more shaly than sandy at this location. Ultimately, geological risking of the prospect is better defined.

References

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