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Seismic Modeling for Structural Interpretation Verification and PSDM Workflow Design - A Case Study

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SUMMARY

In this study, Seismic modeling was used as an effective tool to verify structural interpretation of a seismic section from onshore Venezuela. The structure/velocity model was derived based on analysis of PSTM image and information from the well. Finite difference modeling was applied to the model and the resultant shot gathers have been migrated using PSTM method. The comparison of PSTM image of synthetic data with PSTM image of real data verifies the new interpretation concept and confirms that the target event was distorted by the overriding thrust fault in the PSTM image and PSDM has to be adopted to produce accurate structure image. To select adequate PSDM velocity model building workflow for the specific imaging target the same synthetic dataset collected from the modeling process has been used to evaluate different PSDM model building methods. Both grid and model based tomography workflows have been fully tested with multiple velocity update iterations. The PSDM results from both methods have been compared and the one produces accurate image has been recommended. In addition, the tests reveal many specific issues associated with selected workflow and unique geological structure, which allow us to fine tune the workflow before applying to real data.

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