
ENHANCED STRUCTURAL IMAGING USING TTI REVERSE TIME MIGRATION A CASE STUDY OVER THE DHOK SULTAN BLOCK

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ABSTRACT

We present a case study for advanced pre-stack depth imaging over the Dhok Sultan Block, utilizing anisotropic Reverse Time Migration (TTI RTM) to produce a more reliable structural interpretation compared to legacy processing.

The Dhok Sultan Block is located in the Upper Indus Basin of Pakistan. The data set comprises of a single 23km 2D test line. A steeply dipping anticline outcrops at the surface with a complex crush zone directly beneath. Legacy processing vintages provide conflicting interpretations of the structural closure at the reservoir level due to the imaging complexity, through the overburden. The primary objective of this study was to apply an advanced TTI anisotropic PSDM workflow with both RTM and Kirchhoff final migrations to minimize these structural ambiguities.

The results show a clear improvement compared to the legacy processing. The final Kirchhoff section shows better structural imaging, fault definition and event continuity. The RTM section shows further enhancement in resolution, particularly below the Eocene Kohat Formation and under the steeply dipping flanks of Dhok Sultan surface anticline. Moreover, the significant movement of structural features in the 2D plane calls for the re-processing of remaining vintage data, using this tested processing sequence, followed by a fresh approach to its interpretation.

This study demonstrates the improvements that can be achieved by a careful TTI tomography approach and a RTM final migration algorithm. Of course the uplift from sophisticated migration algorithms rely on the soundness of the underlying velocity model, which reinforces the need for azimuth rich 3D acquisition and well-calibrated processing.