

Pre-Stack Depth Imaging in Complex Thrust-Belt Environment: A Case Study from Cohat Basin, Onshore Pakistan

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ABSTRACT

We present the results of an adapted imaging workflow in an area of complex near-surface and thrust-belt geology, onshore Pakistan. In addition to the very rough topography leading to data sparseness and irregularity, steep dips and strong velocity heterogeneity cause complex wave propagation and require advanced prestack depth migration (PSDM) to resolve. Key elements of the PSDM workflow are outlined, with an emphasis on those stages closely linked to the key data challenges; irregular data sampling, complex velocity model, and poor signal-to-noise ratio disabling reliable interpretation. The results of the final tilted transversely isotropic (TTI) Kirchhoff depth migration (KDM) depth images show the expected improvement over time-domain equivalents. Accurate velocity model building remains the key challenge and requires a combination of data conditioning and a velocity updating methodology that overcomes the uncertainty of the interpretative input.