# SG02

# Seismic Image Enhancement Through Prestack Depth Migration Techniques, An Example from the Columbus Basin

T. Rampersad[1], D. B. Shepherd[1], W. Rietveld[2], F. Billette[2], S. R. Wharton[1], R. Ramkhelawan[1], J. Bhajan[1], G.M. Weir[1]
(BP AMOCO Trinidad[1], BP AMOCO UTG, Houston, USA[2])



**Abstract**

Exploration success in the Columbus Basin of Trinidad has been driven by technological advancements in subsurface imaging from 3D seismic. Numerous challenges exist for effective subsurface imaging including, acquisition orientation limitations and cable feathering due to strong offshore currents and interference from shallow gas deposits.

Recent efforts in the southern Block 5b area (BP Amoco 70%, Repsol 30%) have focussed on image enhancement in the Manakin Prospect. The Manakin Prospect lies in the Columbus Basin approximately 100 km east-southeast of Galeota Point. The Manakin Prospect is a large 3 way dip closure against a major down to the northeast dipping normal fault (I). The I fault is a secondary synthetic fault related to the regional listric growth H fault with a maximum throw in excess of 2000 feet. Due to the acquisition geometry, the 3D survey over this area was not optimal to the trend and shape of the anomalies or the bed dips.

Shallow pay sands in the footwall block of the (I) fault and velocity contrasts across the I fault present a significant challenge in imaging the deeper horizons in the footwall. An initial 3D poststack migration from the contractor was unable to focus sufficient energy below the I fault. As part of an initiative to improve exploration efficiency, the Upstream Technology Group (UTG, BPAmoco) evaluated two prestack depth migration techniques to help image the structures at depth. Image improvement was achieved using 3D V(z) prestack depth migration with a single velocity model derived from contractor stacking velocities. Using the velocity cube created from this first migration, in a more sophisticated 3D V(xyz) prestack depth migration routine, provided further image enhancement with greater reflector continuity up to the fault. As it impacts interpretation, the results of this study will be reviewed and contrasted with the initial poststack migration

## Manuscript Not Submitted