

Near-Surface Models for Transition Zone Data in the Arabian Gulf

Joe McNeely, Nikolai Barsoukov, Ralph Bridle, Robert Ley II, Mohammad Al-Homaili, and Bryan Maddison

Along the shore of the Arabian Gulf, 2D and 3D seismic acquisition in the transition zone has required a near-surface modelling solution that accommodates the line tie with both land and marine data. On land, the processing reference datum is a smooth representation of the surface generally positioned 60m lower. At the water’s edge the datum is at an elevation of -60m. The marine data has been processed to mean sea level (MSL). A single datum could not be used for the transition zone model without introducing a considerable time shift from the shore line to the marine data. All the transition zone models have correction statics referenced to the land datum and to MSL.

The initial static corrections were calculated from a single layer velocity model. This model is derived from upholes, and extrapolated from the shore line through the transition zone. This initial model was revised in localized cases in the transition zone where irregular shaped cavities were filled with mud but had little or no surface expression at the water bottom.

Source gathers were extracted from the seismic data and received a water depth correction. One side of the spread of each record was interpreted to derive near surface depth and velocity characteristics. These are then modelled at source location points producing a two layer model. In addition, the land surface had sand dunes over which the revised model was enhanced with refraction statics (Figure 1).

This near surface modelling strategy has resulted in a consistent near-surface correction static solution.

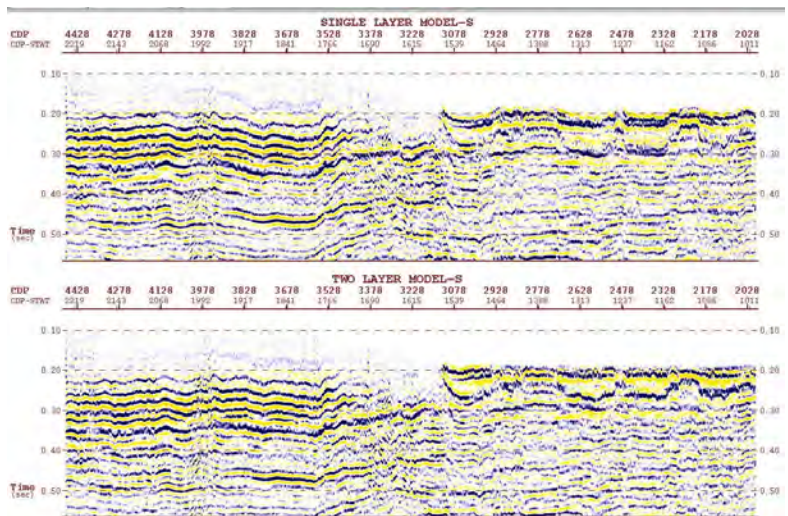


Figure 1: Single Layer and Revised model