Preliminary Structural and Stratigraphic Analysis of Miocene Aged Sands, Offshore Gulf of Mexico

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Stratigraphy:

The stratigraphy of the High Island area comprises sediments deposited by the Calcasieu Delta and the shifting Mississippi depocenter from the Oligo-Miocene to the present. The sediments are dominated by shale with interbedded sand deposited by fluvial and deltaic systems. The main reservoirs range in age from ~14.8 Ma (*Cibicides opima*) to ~19 Ma (*Marginulina ascensionensis*) (Figure 2) and comprise sediments deposited as delta fringe sediments, shelf blanket sands, channel/levee complexes, and distributary mouth bars. Typically these facies exhibit upward-coarsening (distributary mouth bars and delta fringe) and blocky to upward-fining (channel/levee complexes) log signatures.

Structural Setting:

The study area occurs within a structural province in the northern Gulf of Mexico called the Oligo-Miocene detachment province by Diegel *et al.* (1995) (Figure 1). The age of this province cited by Diegel *et al.* (1995) conflicts with the interpretation of Peel *et al.* (1995), who tentatively assign an Eocene-Oligocene age to the salt sheet decollement in this region. This province covers much of the modern shelf and parts of coastal and onshore Texas and Louisiana, and is characterized by evacuated allocthonous salt sheets and roho systems (Figure 1). The roller faults that characterize this structural province generally strike east-west, and dip basinward; roller faults are listric normal faults that sole into salt sheets or their equivalent welds

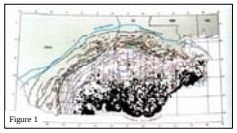


Figure 1: Northern Gulf of Mexico map illustrating Basinward dipping faults (blue), landward dipping faults (red), deepwater contrational foldbelts (green), and shallow salt (black) (from Diegel, 1995).

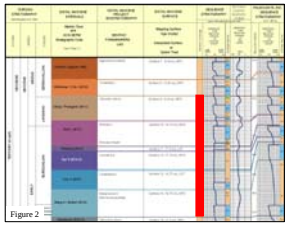


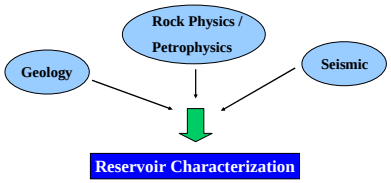
Figure 2: Biostratigraphic Chart for the Gulf of Mexico Basin (study area horizons highlighted in red)

Thesis Research Objectives:

The main objective of my thesis will be to conduct a detailed seismic reservoir characterization of Miocene aged sands, High Island Area, Gulf of Mexico. The general objective contains several goals:

(1) To characterize hydrocarbon reservoirs from seismic data using the rock physics/petrophysics link between seismic and reservoir properties;
(2) To link rock physics/petrophysics and seismic attribute analysis to sedimentary facies and geologic properties to be able to describe lithofacies and depositional environments from seismic data;
(3) To improve the understanding of seismic signatures in Northern Gulf of Mexico clastic depositional environments.

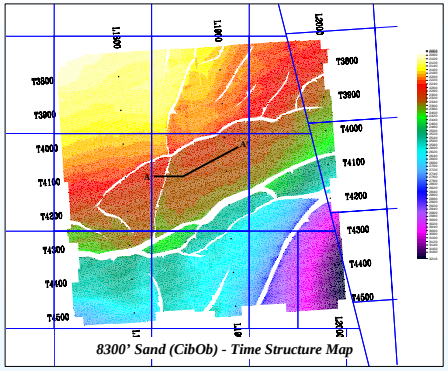
MULTI-DISCIPLINARY APPROACH



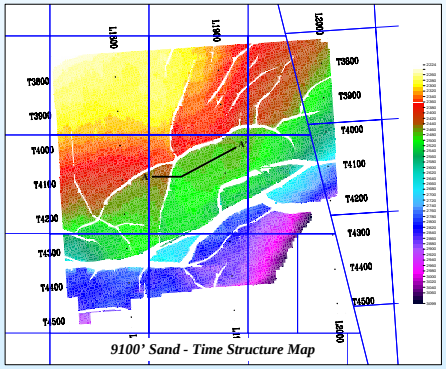
References:

Diegel, F.A., Carlo, J.F., Schuster, D.C., Shoup, R.C., and Tauvers, P.R., 1995, Cenozoic structural evolution and tectono-stratigraphic framework of the northern gulf coast continental margin, *in* Jackson, M.P.A., Roberts, D.G., and Snelson, S., eds., Salt Tectonics: a global perspective: AAPG Memoir 65, p. 109-151.

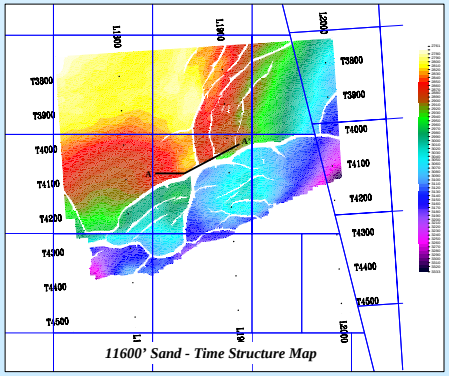
Peel, F.J., Travis, C.J., and Hossack, J.R., 1995, Genetic structural provinces and salt tectonics of the Cenozoic offshore U.S. Gulf of Mexico: a preliminary analysis, *in* Jackson, M.P.A., Roberts, D.G., and Snelson, S., eds., Salt Tectonics: a global perspective: AAPG Memoir 65, p. 109-151.



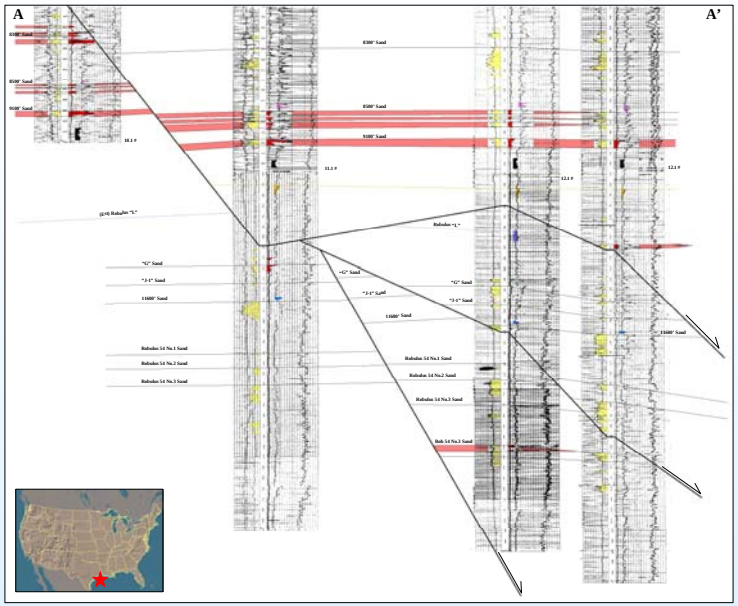
8300' Sand (CibOb) - Time Structure Map



9100' Sand - Time Structure Map



11600' Sand - Time Structure Map



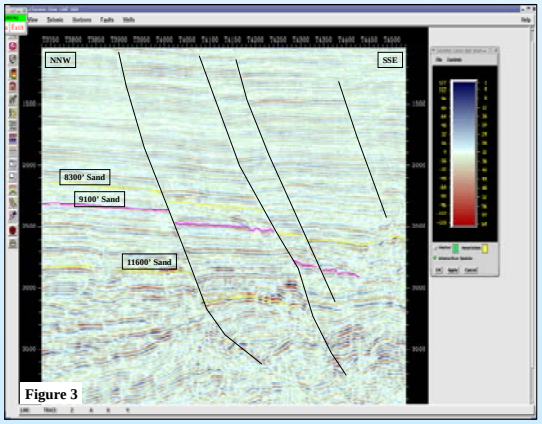


Figure 3: Seismic profile showing some of the major SE dipping faults in the study area. (Data courtesy of Fairfield Industries)

Figure 4: Type Log annotated with paleo picks and major sand horizons. (Data courtesy of A2D Technologies)