[PS]A 500 Mile Seismic Cross Section Through Crucial Lower Tertiary Wells Exhibits Cenozoic Structure and Stratigraphy Changes from the West to Northeast in the Deepwater Gulf of Mexico*

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Abstract

Since the initial Lower Tertiary discovery at BAHA #1 well (AC600) in 1996, more than 60 exploration wells have been drilled in the Lower Tertiary Trend in the deep water Gulf of Mexico. A regional E-W seismic cross-section, using 23 Wilcox wells correlated with Zarra's (2007) regional cross-sections, was generated from multiple 3-D pre- and post-stacked depth migration seismic surveys. Sixteen of the wells on the seismic cross section are discovery wells based upon industry press releases, the majority subsalt.

The Perdido Fold Belt in Alaminos Canyon exhibits a series of concentric, subparallel, box folds bounded by high-angle reverse faults on one or both flanks. A prominent unconformity is observed on the top of the fold belt near upper Oligocene in Alaminos Canyon area, showing extensive erosional features. Lower to Upper Miocene strata onlap the unconformity. The timing of the unconformity appears to coincide with the global climate change from hot to cold, i.e. greenhouse to icehouse in the late Oligocene time (23.8 m.y.). Eustatic sea level was relatively high during the greenhouse period, probably limiting the siliciclastic sediment input to the deepwater. During the icehouse era, global ice volumes dramatically increased, eustatic sea level dropped and extensive erosion occurred on the continental shelf and slope. Consequent low sea level enabled siliciclastic sediment to be transported to the deepwater Gulf of Mexico through submarine canyons and continental slopes.

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Paleogene strata thinning from west to northeast suggests that the depocenters were located in the western Gulf (Alaminos Canyon area) during lower Tertiary time. Sediment was transported from northwest and west by Rio Grande, Houston, Norias and Carrizo Rivers. Neogene and Quaternary strata however, demonstrate a thickening to the east and northeast. The change indicates a shift of depocenters to the east and northeast, and sediment supplied by the Rio Grande, Houston, Norias and Carrizo Rivers was reduced. In contrast, sediment fed by the Red River, Central Mississippi and East Mississippi River systems in the north and northeast increased, and the whole Gulf was dominated by siliciclastic sediment.

References

Zarra, L., 2007, Chronostratigraphic framework for the Wilcox Formation (upper Paleocene Lower Eocene) in the deep-water Gulf of Mexico: Biostratigraphy, sequences, and depositional systems: 27th Annual Gulf Coast Section SEPM Bob F. Perkins Research Conference, p. 81.

A 500 Mile Seismic Cross Section Through Significant Lower Tertiary Wells Exhibits Structural and Stratigraphic Changes from the West to Northeast in the Deepwater Gulf of Mexico

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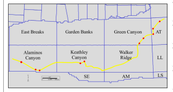
Abstract

Since the initial Lower Tertiary discovery at BAHA #1 well (AC600) in 1996, the Lower Tertiary Trend in the deepwater Gulf of Mexico has been a high profile exploration target. A regional E-W seismic cross-section, using Wilcox wells correlated with Zarra's (2007) regional cross-sections, was generated from multiple 3-D pre- and post-stacked depth migration seismic surveys. Sixteen of the wells on the seismic cross section are industry announced discoveries, the majority subsalt.

On the West, the Perdido Fold Belt in Alaminos Canyon exhibits a series of concentric, subparallel, box folds bounded by high-angle reverse faults on one or both flanks. Massive subsalt structures dominate the Tertiary strata toward the East and Northeast.

Paleogene strata thin from west to northeast suggesting that the depocenters were located in the western Gulf (Alaminos Canyon and Keathley Canyon) during Lower Tertiary time. Sediment was transported from northwest and west by the Rio Grande, Houston, Norias and Carrizo Rivers.



Alaminos Canyon | Keathley Canyon | Walker Ridge | Green Canyon | Atwater Valley

5,000'
7,500'
10,000'
12,500'
15,000'
17,500'
20,000'
22,500'
25,000'
27,500'
30,000'
32,500'
35,000'
37,500'
40,000'

Perdido Fold Belt

PLU = Upper Pleistocene PLM = Middle Pleistocene PLL = Lower Pleistocene PU = Upper Pliocene PL = Lower Pliocene MUU = Upper Upper Miocene MLU = Lower Upper Miocene MUM = Upper Middle Miocene
MMM = Middle Middle Miocene MLM = Lower Middle Miocene MML = Middle Lower Miocene MLL = Lower Lower Miocene OU = Upper Oligocene OL = Lower Oligocene EU = Upper Eocene LU = Upper Paleocene LL = Lower Paleocene KUU = Upper Upper Cretaceous

Seismic Data Provided by Western GECO & CGG Veritas