Evolution and Hydrocarbon Potential of Offshore Pinar del Rio Area. Southern Gulf of Mexico.

Rafael Tenreyro-Perez, Juan G. Lopez-Rivera, Jose Fernandez-Carmona, and Jose O. Lopez-Quintero,
Cupet, Havana, Cuba

The evolution of Southeast Gulf of Mexico comprises three main periods: pre-orogenic, syn-orogenic and post-orogenic. During pre-orogenic time, from Lower Jurassic to Campanian, the stages are the rift of Pangaea and the thermal subsidence (or drift). In drift stage two domains interacted in the space; the carbonate platforms (Bahamas, Yucatan, Organos and others) and the deep water basins. These fluctuations were dictated by the differential subsidence and horizontal displacements of basement blocks as well as by the eustatic movements of the ocean. The Organos platform, for example, was entirely submerged since Upper Jurassic and sedimentation continued in a deep water environment. The collision between Greater Antilles Volcanic Arc and the continental margins has modeled the Cuban orogen since the Upper Cretaceous. Here, the southern facies was thrusted over the northern section with simultaneous strike slip movements. The interaction suddenly ceased in the Eocene.

The source rock levels are considerably more frequent in the deep water domain than in the platforms. The Lower and Upper Jurassic as well as the Lower and Middle Cretaceous horizons have a very high content of organic matter. The offshore seismic profile shows the transition from the thrusted belt to the foreland basin with a typical triangle zone configuration. Reservoirs are expected in the Cretaceous section and are covered by seals formed of early foreland basin sediments of Upper Cretaceous-Paleocene age. Foothill structures have a great potential for hydrocarbon exploration.

An Alternative Benthic Biofacies Model for the Plio-Pleistocene of the Gulf of Mexico: Examples from the Green Canyon Area

Villamil Tomas[1], Claudia Arango[1], Paul Weimer[1], Mark Rowan[1], and Art Waterman[2]
[1]Department of Geological Sciences, University of Colorado at Boulder
[2]PaleoData Inc., New Orleans

Traditional benthic biofacies models for the Gulf of Mexico show a two-dimensional cross section from shelf to abyssal plain divided into 5 to 7 zones based on benthic foraminifer associations. These models are generalized and somewhat oversimplified and are derived from an actualistic-uniformitarian approach. The new proposed models are based on three-dimensional Plio-Pleistocene benthic biofacies maps contoured at calcareous nannofossil and planktic foraminifer last appearance "time" surfaces. Proposed models differ from traditional ones primarily in the following aspects: (1) Tradtional models consider water depth as the primary control on benthic foraminifer biofacies. Theoretically, this is only partially applicable because benthic foraminifer communities are restricted to specific environments. Restricting environmental conditions are a combination of physical (e.g., sediment supply and type, physical consistency of the sea bottom), chemical (e.g., oxygen, concentration of biolimiting chemicals), biological (e.g., competition, food availability), and thermal parameters. Biofacies are an indication of paleoenvironments, not only of water depth. In addition, baleobathymetry of the Gulf of Mexico has been and still is highly complex. The new model shows how benthic biofacies can form islands entirely surrounded by different biofacies in places not considered in traditional models. Some of these islands correlate with paleotopographic highs caused by salt domes. (2) The new model considers the effects of differential sediment supply as being of major importance in determining the type of biofacies. (3) The new model is three-dimensional. Several examples from the Green Canyon area of northern Gulf of Mexico will illustrate new models. Proposed models have important implications for the interpretation of the stratigraphic and structural (salt) evolution of a region.