

The Quest From Shallow Shelf to Deepwater in Latin America - How We Got Where We Are, and Where We Are Going

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Abstract

The first exploration foray into open ocean was in the late 1940's on Louisiana's shallow shelf extending prolific onshore and marsh discoveries, enabled by a booming US post-War economy and a wealth of former military ocean engineering talent. As exploration and production innovations progressed in the '50's and early '60's Mexico's nearby 'Tampico and Salina Basin shelves, plus Trinidad's Gulf of Paria and Columbus Basin soon benefited, also extensions of geologically contiguous major onshore trends. This initial trendology, enabled by early seismic and seabed gravity, continued to garner success and gradually gave way in the 1960's to use of large digital multichannel surveys to expand beyond the basins immediately adjacent onshore production. As the '60's to the 80's progressed, however, production technology limited exploration to the shelf where failure or marginal success was achieved in basins such as Brazil's Santos, Peru's Talara, Argentina's Malvinas, and Guyana-Suriname Basins. In the '90's and 2000's production technology advances in the US GOM enabled exploration in deeper waters, focused by more data sets, integration of DSDP and ODP drilling data, seismic stratigraphy, AVO, and plate tectonics (especially in the South Atlantic linking up Africa's successes with South American target areas). Major deepwater joy followed in Brazil's Campos-Santos, and more recently Mexico's Perdido Foldbelt plus Guyana and Suriname. Not all deepwater expansion has been roses, however, with failures including Cuba, Barbados, northeast Brazil, Uruguay and Peru, plus relatively marginal or gas-only success in Colombia, Venezuela, Trinidad, French Guiana, north central Brazil and

the Malvinas - Falklands regions. We informally lump the successes of the last sixty years into 'closed' and 'open' productive systems. 'Closed' systems are highly structured with super seals and/or readily definable edges on seismic data - Mexico's Sureste Basin and Brazil's Campos-Santos, plus to a lesser extent the US-Mexico Perdido and Brazil's Sergipe Alagoas. 'Closed' systems are very rich with major reserves now found primarily by drilling in-between existing discoveries in Brazil, plus some step-out in Mexico. Their heyday has decades to come, but will probably see a production decline before we move to a post-carbon world. 'Open' systems, conversely, are usually subtly structured or purely stratigraphic with undefinable boundaries on seismic - like Guyana-Suriname. Vast regions with possible major accumulations in 'open' systems remain barely touched by the bit, from deepwater Barbados to Argentina on the Atlantic side, and higher risk Mexico to Chile on the Pacific side. A major effort is underway to identify more Guyana-Suriname resulting in new producing provinces, but at the present industry pace some large productive complexes may go undiscovered before we move to that post-carbon world.