The Pelotas Basin Oil Province Revealed

Whilst the white heat of sub-salt exploration in the Santos and Campos Basins of Brazil’s Atlantic Margin has yielded extraordinary success, its southern sister, the Pelotas Basin, has seen little attention for over ten years, despite displaying clear direct hydrocarbon indicators. However, a new 2D seismic program acquired in 2013 is revealing new evidence for sand-rich systems and oil plays, making the deepwater Pelotas Basin an excellent choice for blocks to be nominated in Brazil’s upcoming Bid Round 13.

In 2013 Spectrum acquired 7,500 km of 2D seismic data with a 12 km cable and a 13-second record length, and is currently re-processing 10,000 km of legacy 2D data across the Pelotas Basin. Modern pre-stack time and depth processing has imaged structural and stratigraphic features within both the clastic section and volcanic-rich extensional basement.
Potential for large oil plays is refocusing the attention of E&P companies in the Pelotas Basin.

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Additionally, numerous wells have encountered oil by Synthetic Aperture Radar and standard satellite imagery in the northern Pelotas Basin to define a linear feature, approximately coincident with the 550-800m isopach. This is a well developed unconfined gas column initially generated at depth below the Pelotas Basin, in response to the impingement of the uniform gas on the western margin of the basin. Petrodynamos analysis indicates large accumulations of the hydrocarbons are trapped in porous intervals below the solid hydrates. Although abundant gas in these isopachs is the potential base of gas in these structures the absence of an exploration the attention of E&P companies in the Pelotas Basin.

The BGS represents the base of a solid layer of gas hydrate, containing water molecules that form cages containing methane (CH4), ethane (C2H6) and propane (C3H8) molecules trapped by high pressure. The pressure and thermal conditions necessary for the formation of hydrate crystals require an environment with water depths greater than 350m. The associated gas hydrates exist from approximately 150m beneath the sea floor to as deep as 450m beneath the sea floor.

**Petroleum System**

The conjugate margin rift basins of West Africa and Brazil initially formed by very extensive extension during the early Cretaceous, as the South American plate began to separate, and move closer to Africa from Africa. When the margins are reactivated, the respective positions of the margins are informative to compare their respective thicknesses, for differences and similarities. A reconstruction with today’s sedimentary thickness, prior to when they may have since then 125± Ms, is shown by the aquifer from the Pelotas Basin to the conjugate Namibe Basins. This occurs because of low thickness, restless sedimentary thicknesses which supplying a sediment source to each, and it is possible to contour the Aptian- to- Albian source rocks.

In the Namibe Basin, however, it appears the pro-delta slope was too flat for deposition of slope fans as these appear to have bypassed the slope and accumulated at fixed positions below the sea floor, creating a very exciting play above Albian source rock. Additionally the Upper Cretaceous and Tertiary, overlapped prograding units appear to have suffered shelf collapse and delta failure in the northern parts of the basin, depositing thick deltaic clastic deposits on the basin slope and floor.

**Exploration Opportunities**

Of the twelve wells drilled in the offshore Pelotas Basin to date, three were effective oil exploration prospects in deeper water, all of which were dry with oil shows. A more detailed examination of the seismic data indicates the deepwater Pelotas Basin contains substantial deepwater resources. There is considerable evidence of a working petroleum system with a Paleocene source rock present in both basins, correlation with the conjugate margin provides evidence of source rock to the Albian section which opens up a second deepwater play. There are many good reasons to believe that the deepwater Pelotas Basin would make an excellent and optional source rock to be drilled in the upcoming exploration Round 13 bid.

Although few have penetrated the deeper prospective sections, the evidence suggests numerous potential plays. The supply of sediments via shelf and delta to the post rift thermally oversaturated margin was subject to both global sea level change and locally controlled delta like setting. The new seismic data in the area indicates much of the potential reservoir was trapped by mechanisms common to many passive margin intraslope basin delta systems. This thick sediments are interpreted as overpressured deltaic sediments, in addition to updip channel sediments exist (fig below). This was interpreted from the seismic data in the area indicates much of the potential reservoir was subsequently trapped by mechanisms common to many passive margin intraslope basin delta systems. This thick sediments are interpreted as overpressured deltaic sediments, in addition to updip channel sediments exist (fig below). This was interpreted from the seismic data in the area indicates much of the potential reservoir was trapped by mechanisms common to many passive margin intraslope basin delta systems. This thick sediments are interpreted as overpressured deltaic sediments, in addition to updip channel sediments exist (fig below). This was interpreted from the seismic data in the area indicates much of the potential reservoir was trapped by mechanisms common to many passive margin intraslope basin delta systems. This thick sediments are interpreted as overpressured deltaic sediments, in addition to updip channel sediments exist (fig below). This was interpreted from the seismic data in the area indicates much of the potential reservoir was trapped by mechanisms common to many passive margin intraslope basin delta systems. This thick sediments are interpreted as overpressured deltaic sediments, in addition to updip channel sediments exist (fig below). This was interpreted from the seismic data in the area indicates much of the potential reservoir was trapped by mechanisms common to many passive margin intraslope basin delta systems. This thick sediments are interpreted as overpressured deltaic sediments, in addition to updip channel sediments exist (fig below). This was interpreted from the seismic data in the area indicates much of the potential reservoir was trapped by mechanisms common to many passive margin intraslope basin delta systems. This thick sediments are interpreted as overpressured deltaic sediments, in addition to updip channel sediments exist (fig below). This was interpreted from the seismic data in the area indicates much of the potential reservoir was trapped by mechanisms common to many passive margin intraslope basin delta systems. This thick sediments are interpreted as overpressured deltaic sediments, in addition to updip channel sediments exist (fig below). This was interpreted from the seismic data in the area indicates much of the potential reservoir was trapped by mechanisms common to many passive margin intraslope basin delta systems. This thick sediments are interpreted as overpressured