

### **Tupi's Conjugate: New Pre-salt Plays in the Angolan Offshore**

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The pre-drift geologic history is very similar on both sides of the South Atlantic, including the deposition of world class source rocks ( Brazil: Lagoa Feia and Angola: Falcão/Organic Bucomazi). The recent exploration successes in the Brazilian pre-salt, are now focusing attention on the under-explored Angolan pre-salt. We will present BrasilSPAN and CongoSPAN deep imaging PSDM seismic data in the South Atlantic illustrating the similarities and differences between these two established petroleum systems.

Exploration in the Brazilian pre-salt has resulted in the discovery of an estimated 8-20 billion BOR over the past 4 years, starting with the drilling of Tupi (2006). The Tupi Play type consists of rich pre-salt source rocks deposited in a Valanginian sag basin which are currently in the active oil generation window, and having up-dip migration into pre-salt carbonate reservoirs with a thick overlying seal of salt. To the east of Tupi, the Jupiter (2007) well is in closure on a younger Barremian rift rotated fault block, with the pre-(Barremian) rift Lagoa Feia source rock in the oil window and carbonate reservoirs, sealed beneath thick salt.

Although a pre-salt petroleum system had also been established in the Kwanza basin of Angola, it has not received significant follow up since the initial wells were drilled. The Falcão (1992) well drilled through salt into non-porous carbonates, and through 600 m of rich source rocks (up to 9.5% TOC) that flowed oil to the surface. The Baleia (1996) well drilled through salt and into a non-permeable dolomite. The dolomite at Baleia is estimated to contain in place volumes exceeding 1 BBO. These wells and others have established an active pre-salt petroleum system in Angola.

The Tupi structural setting has been mapped in Angola and identified to extend 750 km from the Congo basin in the north to the Benguela basin in the south. However, the thick sediments of the Congo Delta have buried sag basin below the oil window, the Tupi Play is more likely to be successfully applied to the south of the delta.

The pre-salt imaging provided by the CongoSPAN data supports the development of both carbonate and clastic reservoirs in the Angolan deepwater. One of the new potential pre-salt reservoirs are basin floor fans that developed in the later stages of sag basin infill. These fans drape broad highs formed by Valanginian-age horst blocks, and have the potential for producing giant discoveries in the Angolan pre-salt.