Deepwater Stratigraphic Pinch Out Plays Comparison Along the South American and West African Atlantic Margins

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ABSTRACT

Since Jubilee was discovered in Tano Basin, Ghana in 2007, oil companies have been exploring for stratigraphic pinch out plays worldwide, particularly along the West Africa transform margin (Senegal to Nigeria), and in the South American Atlantic margin (Uruguay to Venezuela). The pinch out play has not been a commercial success in several places, including Jubilee in Ghana; however, the recent Liza and Payara oil discoveries offshore Guyana, as well as other discoveries in Senegal have renovated exploration efforts in the evaluation of this play. Comparing both continental antithetic margins allows a better understanding of the extension of the play, and the development of regional exploration analogs. The petroleum system elements of this play, such as maturation history, migration pathways, trap and seal integrity are strongly controlled by the geodynamic framework of the margin, which evolved from hyperextended to-rifted, and finally into a volcanic passive margin. The tectonic setting is significantly important, because stratigraphic pinch out plays are often related to growth strata generated within a differentially uplifted margin where sequence boundaries are tectonically enhanced. The critical factors that must be understood for the successful assessment of this play are: 1) Slope geometry, 2) trap gradient, 3) faults, 4) type of gravity-flows, 5) source rock proximity, 6) migration pathway-charge, and 7) top seal integrity. In order to compare the geometry and size of the stratigraphic pinch outs, we use examples (2D seismic data) from Senegal, Sierra Leone and Liberia in Africa, and from Venezuela, Guyana, French Guiana, Suriname, and Uruguay in the South American passive margin.