

EXPLORATORY PLAYS OF PARÁ-MARANHÃO AND BARREIRINHAS BASINS IN DEEP AND ULTRA DEEP WATER, BRAZILIAN EQUATORIAL MARGIN

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ABSTRACT: The Pará-Maranhão and Barreirinhas basins are exploratory frontier areas. In the Brazilian equatorial margin those basins are the least studied, with few wells, some considered oil/gas sub-commercial producers and without any large accumulation known. After the discoveries in deep/ultra deep water turbidites at the correlated basins of African equatorial margin and French Guiana (Jubilee and Zaedyus plays) in the last years, the exploratory interest was retaken for those basins. This led to the application of 2D seismic interpretation looking for possible occurrences of hydrocarbons accumulations (plays), focusing on turbiditic reservoirs of Travosas Formation, which may be correlated to Jubilee and Zaedyus. Three types of plays linked to three distinct segments of the margin were identified: shallow water play, failed shelf border play and deep/ultra deep water play. The shallow water and failed shelf border plays would be related to two petroleum systems: Caju-Travosas and Travosas-Travosas. The source rocks of these petroleum systems are related to marine shales/calclutites of Caju Group (Late Albian-Early Cenomanian) and marine shales of Travosas Formation (Cenomanian-Turonian), which occur approximately between the depths of 2400 to 3700m below sea water bottom for the shallow water play, and between 1300 and 4800m below sea water bottom for the failed shelf border play. The reservoirs of shallow water belong to Travosas Formation (Late Cretaceous) and occur as turbidites at progradant clinoforms base of continental shelf, while the reservoirs of failed shelf border belong to Travosas Formation too (Late Cretaceous to Paleocene-Oligocene) and occur as turbidite lenses limited by a set of listric faults. The play of deep/ultra deep water is the most extensive and would be related to three different petroleum systems: Codó-Travosas, Caju-Travosas and Travosas-Travosas. The source rocks of Codó Formation (Aptian) are related to lagoon shales and occur approximately between 2860 and 4550m below sea water bottom, the source rocks of Caju Group (Late Albian- Early Cenomanian) are related to marine shales/calclutites and occur between 2200m and 3800m below sea water bottom, while the source rocks of Travosas Formation (Cenomanian-Turonian) are related to marine shales and occur between 1430 and 2860m below sea water bottom. The reservoirs of deep/ultra deep water belong to Travosas Formation (Late Cretaceous to Paleocene-Oligocene) and occur as turbidite lenses. The proximity of deep/ultra deep water plays with the intrusive rocks of São Paulo Transformant Zone may have helped to warm the source rocks composing an atypical petroleum system. Considering that the oil window top is located around 2700m below the sea water bottom in the African equatorial margin, it can be concluded that the source rocks of Pará-Maranhão and Barreirinhas basins would also be able to generate oil/gas in the specified depths. These results indicate that these exploratory frontier basins have a relevant potential for petroleum prospecting.

KEYWORDS: PARÁ-MARANHÃO/BARREIRINHAS BASINS, PETROLEUM SYSTEMS, PLAYS.