
Major Subsurface Stratigraphic Units of the Southern Senegal Basin, Northwest Africa

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EXTENDED ABSTRACT

This study has used 20000 km of 2D seismic lines provided by First Exchange Corporation, Spectrum, and TGS tied to 7 wells to map the post-rift, passive margin section of the Senegal basin and Guinea Plateau (Fig. 1). This 100 km² area of the rifted passive margin and Guinea Plateau, thought to be a thinned continental block, is underlain by three main units all of which have proven or proposed reservoir potential: (1) a 4-km-thick Jurassic-Lower Cretaceous carbonate platform, which is proposed here as a possible carbonate reservoir play associated with late Jurassic source rocks; (2) a 2-km-thick, Lower and Upper Cretaceous siliciclastic section which includes the main oil gas reservoirs discovered to date along this part or the passive margin of northwestern Africa; and (3) a 2-km-thick, mixed carbonate and siliciclastic Cenozoic section. Recent deep-water exploration in this basin has resulted in several discoveries (e.g., Yakaar-1, 2017; Guembeul-1, 2016; Tortue-1, 2015; Fan, 2014; SNE, 2014), including its conjugate basin in Guyana along the northeastern margin of South America (Liza, 2015).

Regional mapping for this study included 5 chronostratigraphic horizons: Jurassic, Aptian, Albian, Santonian, and Maastrichtian. The age for each of the 5 horizons is constrained by ties to 7 exploration wells, except for the Jurassic unit, which is tied to Deep Sea Drilling Project (DSDP) site 367 drilled in 1975 and located 300 km west of the study area. The 4-km-thick, Jurassic and Lower Cretaceous platform is characterized by continuous, sub-parallel, high-to-moderate amplitude reflectors that correlate with 4 wells with 400-m-thick, Aptian, micritic limestone and dolomite interbedded with minor shale and sandstone of a ramp facies. The overlying, 800 m-thick Albian section of interbedded sandstones and shales and minor limestones reflects increasing clastic input and is used to define the top of the Jurassic-Cretaceous carbonate margin. Porosities of this unit known from wells is fair to good.

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