



Geomorphological Seismic Interpretation of Albian to Turonian Interval of the Ceará Basin Deepwaters, Brazilian Equatorial Margin

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Abstract

Driven by advances in the mining and oil industries, seismic interpretation has evolved considerably in recent years, especially modern technologies that allow for better 2D and 3D data resolution. The Brazilian Equatorial Margin (BEM) has been increasingly studied due to its conjugate in West Africa, the latter of which has a well-documented large hydrocarbon discovery. Nevertheless, because this zone is complex, more research needs to be conducted to address knowledge gaps about the structural stratigraphic evolution. The Ceará Basin, located in the BEM, was divided into 4 sub-basins that have developed since the Cretaceous period, the Ceará Basin has different tectonic settings, compressive and distensive margins. The seismic data used in this work was acquired by CGG in 2003 from 765 km² of Ceará Basin and consists of 2233 inline spaced at 12.5m with 26.2° azimuth and 2193 crosslines spaced at 12.5m that comprehends parts of Premier Oil, PetroRio and 3R Petroleum exploration blocks, with central frequency as 25 Hz. This study focused on the Mundaú Sub-Basin distensive margin that formed during the rift phase, specifically in the geological time from the Albian to the Turonian interval which are the main sequences with oil and gas exploration in the basin. The goal of this research was to create seismic maps based on a 3D seismic cube of these time periods, analyze volume and attributes, and to identify geomorphological features that might be of scientific, as well as economical interest. Initially, we divided the seismic cube in a smaller area that comprehends half of the original and started to analyze their seismic attributes. This was accomplished by analyzing the RMS amplitude, sweetness, and gray-level co-occurrence matrices to identify deepwater features that may constitute significant oil and gas reservoirs. We observed channels, faults, and emphasized a fan-like structure nearby the Pecém wildcat.