Tectono-sedimentary evolution of the shallow continental shelf and the coastal region in the vicinity of the São Tomé Cape, Campos Basin, RJ.

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Abstract

The exploration activities in the Campos Sedimentary Basin, on the southeastern Brazilian Continental Margin, began during the late 1950's with the pioneer onshore well 2-CST-001-RJ drilled in the coastal plain near the São Tomé Cape. At that time no cretaceous rocks, which were known as the source rocks, were described in the 2-CST-001-RJ. After the discovery of the Garoupa Field and several other plays in the continental shelf, during the 1970's, the exploration was directed to deep water, culminating with consecutive discoveries of giant fields in turbidite plays during the 1980's. Since then, few studies were devoted to the shallow and onshore portions of the basin, which is the study area of this work.

However, a recent biostratigraphic review of the well 2-CST-0001-RJ described an Albian-Cenomanian age section in it. That oppened space for further discussions and adressed the interest to new sedimentary and tectonic reconstruction studies, linking onshore and offshore data.

This work was based on the interpretation of public well and seismic data provided by the BDEP (ANP), and data acquired in research projects developed by the Fluminense Federal University, consisting in a total of twelve wells and twenty-four seismic lines.

The results confirm the presence of a cretaceous section in the vicinity of the São Tomé Cape and show different tectonic and depositional regimes over the sedimentation history of this portion of the basin, since the rift stage.

Our data shows the basement dislocated by two NE-SW regional normal faults in an offshore direction. The proximal, upper fault, named here as "Cretaceous Hingeline", limits the occurrence of Cretaceous and older units. The lower fault, previously named as the "Hinge Line" and defined by different authors, is the Pre-Aptian limit of the rift section which named in this study as the "Pre-Aptian Hinge Line".

The reactivation of NE-SW and NW-SE/NNW-SSE lineaments also conditioned the tectonic-sedimentary evolution, creating structural lows that worked as rift stage depocenters and conditioning structural highs that limited the deposition and the exposure of sediment sequences and surfaces. Lateral movement components were interpreted in structures of both directions. However, the NE-SW strike-slip features are younger (Miocene) than the NW-SE structures (Paleocene).

The major NW-SE normal faults displaced the basement during the rift stage and were reactivated as strike-slip structures in different Cenozoic episodes, showing a higher displacement during the Paleogene, creating transpressional and transtensional structures and controlling sediment deposition since the Upper Cretaceous. Other faults with strike-slip components and direction close to NNW-SE dislocated younger (Neogene-Quaternary) strata, controlling drainage orientation, mainly since the Upper Oligocene, even including evidences of Quaternary movements.