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Seismic Stratigraphic Analysis and Tectono-Structural Controls of the Post-Salt Interval in the Albacora Leste Field, Campos Basin.

Priscila Vieira (Universidade Federal Fluminense), Wagner Lupinacci (GIECAR), Victor Matheus Joaquim Salgado Campos (Universidade Federal Fluminense - UFF), André Giskard (PRIO), Francisco Abrantes Junior (Universidade Federal Fluminense), Igor Andrade Neves (PRIO)

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The Campos Basin, located along Brazil's southeastern coast, is one of the country's main petroleum-producing regions. Its geological evolution is linked to the breakup of Gondwana and the opening of the South Atlantic, which shaped the basin's sedimentary framework. Hydrocarbon accumulations are primarily hosted in post-salt turbidite systems characteristic of the Campos Basin. The Albacora Leste Field, a deepwater asset covering 511 km², produces approximately 722,000 barrels per month. Its reservoirs mainly consist of sandy turbidites exhibiting complex depositional architectures controlled by sea-level changes, tectonic subsidence, halokinetic salt movement, and gravitational processes during the Oligocene and Miocene.

In this study, we investigated the tectono-structural controls affecting reservoir compartmentalization in the Albacora Leste Field through an integrated seismic stratigraphic and structural interpretation. Using depth-migrated 3D seismic data and well data, we mapped key post-salt stratigraphic surfaces. Our methodology follows the principles of seismic stratigraphy, analyzing reflector characteristics such as continuity, amplitude, geometry, and termination patterns. We also conducted detailed fault mapping to assess fault geometry, orientation, and displacement, aiming to understand their influence on reservoir architecture. Special attention was given to the role of halokinesis, as salt tectonics strongly influence sediment distribution and reservoir heterogeneity in this basin.

The results show that salt movement significantly controlled accommodation space formation and depositional patterns within the post-salt interval. Fault networks create structural compartmentalization that affects reservoir continuity and quality. Seismic facies analysis reveals stacking patterns and depositional geometries shaped by tectonics and halokinesis, producing significant lateral and vertical heterogeneity. This complexity presents challenges for reservoir modeling and production but also offers opportunities for targeted exploration and management.

We conclude that understanding these tectono-stratigraphic controls is critical for optimizing well placement and hydrocarbon recovery in deepwater turbidite systems influenced by salt tectonics. This integrated approach enhances reservoir characterization and helps reduce uncertainties inherent in complex salt-affected settings. The insights gained provide a robust geological framework to support exploration and development strategies in the Albacora Leste Field and similar post-salt reservoirs in the Campos Basin.