Submission code: G46PYLAN4B

See this and other abstracts on our website: https://home.sbgf.org.br/Pages/resumos.php

Seismic facies and stratigraphic framework of the Búzios Field in the Pre-Salt Santos Basin

Danielle Schemiko (Fluminense Federal University), Isadora Dutra (Fluminense Federal University), Wagner Lupinacci (GIECAR), Ana Carolina Carius (Fluminense Federal University), Esteban Alfaro Sabogal (Fluminense Federal University), Francisco Abrantes Junior (Universidade Federal Fluminense), Ricardo Jahnert (UFF)

Seismic facies and stratigraphic framework of the Búzios Field in the Pre-Salt Santos Basin

Introduction

Seismic stratigraphy plays a fundamental role in reservoir characterization by enabling the identification of depositional architectures, stratigraphic discontinuities, and facies distributions that directly influence reservoir heterogeneity and fluid flow. This study presents a seismic-stratigraphic analysis of the Pre-Salt interval in the Búzios Field, located in the northeastern Santos Basin, based on the interpretation of 3D seismic data and well logs. It aims to characterize key stratigraphic surfaces and depositional systems within the Barremian–Aptian interval, focusing on the carbonate-dominated Barra Velha and Itapema formations and the siliciclastic-rich Piçarras Formation. Particular emphasis is placed on variations in seismic amplitude, reflector geometry, and termination patterns to delineate stratigraphic discontinuities and depositional architectures.

Method and/or Theory

This research utilizes high-resolution, full-azimuth Ocean Bottom Node (OBN) seismic data acquired between 2018 and 2019, providing enhanced subsurface imaging. Seismic interpretation was conducted in Paradigm™ at 400m spacing and supported by synthetic seismograms from 46 wells and log data. Seismic facies were identified and mapped based on reflector characteristics.

Results and Conclusions

Seismic mapping in the Búzios Field led to the identification of key stratigraphic boundaries within the Santos Basin, notably the Pre-Jiquiá Unconformity (PJU), Pre-Alagoas Unconformity (PAU), Intra-Alagoas Unconformity (IAU), and the Base of Salt or Pre-Salt Unconformity (PSU). A consistent and readily identifiable positive peak surface, the Intra-Jiquiá Surface (IJS), within the Lower Itapema Formation, was delineated to precisely locate the PJU, which is characterized by a negative impedance contrast. Similarly, the seismic representation of the transition between the Barra Velha and Itapema formations typically exhibits a negative impedance contrast, particularly in deeper, distal basin areas. However, highly cemented zones in the Itapema Formation may exhibit a positive peak, while others show a zero-crossing. Facies analysis helped delineate this interface. For Búzios Field, five primary seismic facies were defined: wedge-shaped, tabular, inclined, mounded and sheet. Wedge facies, found in all pre-DIA units, show divergent and stratiform reflectors and point to slope dynamics and syn-tectonic deposition. Tabular reflectors with minor wedging, present in the Itapema and Piçarras units, indicate deep lacustrine deposition. Inclined facies characterized by continuous clinoform reflectors are related to tabular facies of the Itapema Formation, representing a prograding slope influenced by a northeast–southwest-oriented fault trend. Diagenetic overprinting distinguishes two Itapema Formation mound types with truncated reflectors and lateral clinoforms atop structural highs, suggesting bioclastic ridge deposition. Facies mound in the Barra Velha Formation have concordant reflectors and sideward clinoforms, pointing carbonate buildup. These deposits may occur within inclined facies as mass-transport deposits. Alongside the buildups, the facies sheet has tabular to irregular reflectors and is interpreted as shallow platform. These findings contribute to the development of a refined stratigraphic and depositional model for the Búzios Field and Pre-Salt Santos Basin, with direct implications for reservoir characterization and exploration strategies.