

# THE REVIVAL OF THE TURBIDITE HYDROCARBON PLAYS IN THE BRAZILIAN OFFSHORE BASINS

*Kattah, S.S.<sup>1</sup>; Balabekov, Y.<sup>1</sup>*

<sup>1</sup>PGS

## ABSTRACT:

Since the discovery of the Albacora field in 1984 by Petrobras, several giant hydrocarbon accumulations in turbidites were encountered in the offshore Campos basin, Brazil. Hydrocarbons in the Campos Basin turbidite fields are relatively heavy (16-21 degrees API) and derived from the rift/transitional Lagoa Feia source-rock. Oil migrated into the reservoirs through windows in the salt and via post-salt faults and fault zones. Currently, the Brazilian hydrocarbon production comes mostly from these deepwater fields. From 2006, after the discovery of the pre-salt play, the exploration efforts in Campos and Santos basins switched almost completely from post-salt targets to the carbonates beneath the thick salt layers. However, in the Northern Sergipe-Alagoas and, in lesser extent, in the Potiguar and Ceará basins, turbidite reservoirs have been the main focus of exploration.

From 2010, an exploration campaign by Petrobras and its partners in deepwater to ultra-deep waters of the Sergipe-Alagoas Basin resulted in a string of light oil, gas and condensate discoveries such as Barra, Farfan, Muriú and Moita Bonita in the offshore of Sergipe. As a result of all the previous deepwater understanding and experience in the Campos Basin and technological advances in seismic imaging, the exploration success rate for this recent campaign in the Sergipe-Alagoas Basin was very high at above 80%.

Seismic interpretation of our broadband, multichannel 3D-surveys allowed identification and delineation of these subtle hydrocarbon accumulations which can be de-risked mainly by their seismic facies mapping and amplitude response (AVO/AVA behavior). Light oil and condensate (38 to 44 degree API) are the main hydrocarbon phases. The traps are essentially stratigraphic and are mapped as soft seismic anomalies. Seismic facies and external geometries indicate that these deep-water reservoirs were deposited in channelized and unconfined environments of the lower slope settings. A continuous soft event below the major accumulations can be interpreted as a highly condensed zone of Albian-Cenomanian-Turonian age (ACT) and represent the potential mature source-rock for these accumulations. Oil migrated to the reservoirs through post-salt fracture zones and/or small faults, generally conditioned by previous basement features. The Sergipe discoveries have confirmed that post-salt source-rocks can provide a robust petroleum system and generate hydrocarbon volumes for other giant accumulations in Brazil.

Preliminary seismic interpretation of recent broadband surveys in adjacent areas allows the recognition of similar geometries and seismic responses in other Northern Eastern Brazilian basins (e.g. Jequitinhonha and Camamu-Almada) and in the Brazilian Equatorial margin basins (e.g. Ceará and Potiguar).

Cretaceous turbidites will represent the most important exploration targets in the Northern Eastern and Equatorial margin basins in Brazil. High-quality 3D seismic and the understanding of the post-salt source-rock in these basins are critical on de-risking these opportunities.

**PALAVRAS-CHAVE:** SUBTLE TRAPS, TURBIDITES, EASTERN OFFSHORE BRAZILIAN BASINS