Sergipe-Alagoas Basin
Offshore

Bolívar Haeser
Superintendency of Delimitation of Blocks
Location
Infrastructure and Operational Conditions
Exploration Overview
Tectonostratigraphic Evolution
Petroleum Systems
Plays
Area on Offer
Final Remarks
Location

Infrastructure and Operational Conditions

Exploration Overview

Tectonostratigraphic Evolution

Petroleum Systems

Plays

Area on Offer

Final Remarks
Passive Margin Basin

Total Area: 73,000 km²
≈ 60,500 km² offshore
(4,000 m water table)

Traditional onshore and shallow water producing basin (mature)
Northern Limit: Maragogi High

Southern Limit: Estancia Platform and Vaza-Barris Fault

Limit between sub-basins: Japoata-Penedo High (onshore and shallow water)
Area on Offer

11 Exploration Blocks
3 Sectors

Total Area ~7,689 km²

Ultra-deepwater water table > 2,000 m

Legend
- Onshore Basin
- Offshore Basin
- Basement
- Sector
- Block on Offer R14
- Oil/Gas Field

Exploration Blocks
- Green: Round 2
- Purple: Round 4
- Pink: Round 6
- Blue: Round 12
- Orange: Round 13

Well with ongoing appraisal plan
Well with hydrocarbons
Infrastructure and Operational Conditions

Ports and airports in Aracaju and Maceio

- Refinery
- Gas plant
- Oil pipeline
- Gas pipeline
- Field
- Block on Offer R14
- R14 Sector
Location
Infrastructure and Operational Conditions
Exploration Overview
Tectonostratigraphic Evolution
Petroleum Systems
Plays
Area on Offer
Final Remarks
1930s CNP

1935 – Geophysical surveys
1939 – First well in the basin
1930s CNP

1957 – First discovery; first offshore seismic
1963 – Carmopolis Field
1968 – Guaricema Field

Offshore exploratory wells

**1930s CNP**

**1957 – First discovery; first offshore seismic**
1963 – Carmopolis Field
1968 – Guaricema Field

**1987 – First deepwater well**
2001 – Piranema field
2012 – Ultra-deepwater discoveries

**Offshore exploratory wells**

- **Guaricema**
- **Piranema**

**Wells by Year**
- 1968
- 1972
- 1976
- 1980
- 1984
- 1988
- 1992
- 1996
- 2000
- 2004
- 2008
- 2012
- 2016

**Exploration Overview**

- BARRA, CUMBE, FARFAN, MOITA BONITA and MURIU
Guaricema, Dourado and Piranema produce in Calumbi Fm

Production  
~ 49,000 boe/d
Available Data

3D Seismic
Available Data

- 285 offshore exploratory wells
Location
Infrastructure and Operational Conditions
Exploration Overview
Tectonostratigraphic Evolution
Petroleum Systems
Plays
Area on Offer
Final Remarks
Tectonostratigraphic Evolution

Basement (Proterozoic)

Paleozoic Syncline (Early Permian - Carboniferous)

Pre-Rift (Jurassic)

Rift and Transitional (Berriasian – Early Albian)

Transgressive Drift
Late Aptian - Coniacian

Regressive Drift
Santonian - Present

Source: ANP/UFRN/FUNPEC, 2008
Riachuelo Fm (Albian - Cenomanian)
Shelf carbonates and siliclastic rocks

Fm Cotinguiba (Cenomanian - Coniacian)
Carbonatic Ramp; calcilutites, shales and marls

Transgressive Drift
Late Aptian - Coniacian
**Marituba Fm and Mosqueiro Fm**
Shelf carbonates and sandstones

**Calumbi Fm**
Shales and turbidite sandstones
Schematic Section

Basement
Volcanic Rock
SDR
Rift and Transitional Seq.
Transgressive Drift Seq.
Regressive Drift Seq. (Cretaceous)
Regressive Drift Seq. (Paleogene-Present)
Sea
Faults
Outline

Location
Infrastructure and Operational Conditions
Exploration Overview
Tectonostratigraphic Evolution
Petroleum Systems
Plays
Area on Offer
Final Remarks
Many known petroleum systems;
Most of them active only onshore and in shallow water;
For the ultra deepwater Sergipe-Alagoas basin the following petroleum systems are to be expected:

Riachuelo-Calumbi (!)
(Piranema Field)
Cotinguiba-Calumbi (.)
Ultra-deepwater:

Albian-Cenomanian shales of the Riachuelo Formation

(source rock in the Piranema Field; 42º API oil)

Cenomanian-Turonian shales of the Cotinguiba Formation

**TOC** up to 12%
Upper Cretaceous turbidite sandstones of the Calumbi Formation

\[ \Phi = 15-23\% \]

Secondarily Paleocene turbidite sandstones of the Calumbi Formation
Calumbi Formation shales
Stratigraphic or combined (pinch-outs and channels)
Play

Upper Cretaceous turbidite sandstones of the Calumbi Fm

Secondary Play

Paleocene turbidite sandstones of the Calumbi Fm
Location
Infrastructure and Operational Conditions
Exploration Overview
Tectonostratigraphic Evolution
Petroleum Systems
Plays
Area on Offer
Final Remarks
9 ultra-deepwater wildcat wells
5 discoveries under appraisal

Last decade:
29 deepwater exploration wells
21 wells with hydrocarbons

Legend
- Onshore Basin
- Offshore Basin
- Basement
- Sector
- Block on Offer R14
- Oli/Gas Field

Exploration Blocks
- Round 2
- Round 4
- Round 6
- Round 12
- Round 13

Well with ongoing appraisal plan
Well with hydrocarbons
Moita Bonita Discovery

Depth (m)

-2000

-4000

-6000

-8000

-10000

0 2.5 5 7.5km

Paleocene  Turonian  Lead
Maastrichtian  Volcanic Rock

R0257_SEALP1_PSDM Survey
Courtesy of Spectrum
Moita Bonita Discovery

Depth (m)

Paleocene
Turonian
Maastrichtian
Volcanic Rock
Lead
Leads

Arbitrary Section –0264_BM_SEAL_4_10_11 Survey
Courtesy of PGS

Depth (m)

Paleocene  Turonian  Lead
Maastrichtian  Volcanic Rock
Crossline 3145–0264_BM_SEAL_4_10_11 Survey
Courtesy of PGS

Leads

Depth (m)

Paleocene
Turonian
Maastrichtian
Volcanic Rock
Lead
Paleocene  Turonian  Lead
Maastrichtian  Volcanin Rock
Survey Courtesy of PGS

Paleocene
Turonian
Maastrichtian
Volcanic Rock

Depth (m)
Leads

Paleocene  Turonian  Lead
Maastrichtian  Volcanin Rock
Blocks 633 and 635

Paleocene  
Maastrichtian  
Turonian  
Basement  
Lead
Leads

Paleocene | Turonian | Lead | Maastrichtian | Volcanic Rock

Depth (m)
Blocks 633, 635 and 571

Depth (m)

-2000
-3000
-4000
-5000
-6000

- Lead
- Paleocene
- Turonian
- Maastrichtian
- Basement

Survey Courtesy of Spectrum
R0257_SEALP1_PSDM
Survey
Courtesy of Spectrum

Blocks 635 and 571

Depth (m)

Paleocene  Turonian  Lead
Maastrichtian  Basement
Blocks 635 and 571

Depth (m)

-3000

-4000

-5000

-6000

-7000

Paleocene  Turonian  Lead
Maastrichtian  Basement

R0257_SEALP1_PSDM Survey
Courtesy of Spectrum
Paleocene
Turonian
Maastrichtian
Baseement
Lead
Blocks 212 and 281

Depth (m)

-6000
-5000
-4000
-3000

-0
-2
-4
-6
6km

Paleocene
Turonian
Maastrichtian
Top of Rift
Lead

NW

SE

R0257 SEALPT PSDM Survey
Courtesy of Spectrum
Blocks 212 and 281

Depth (m)

Paleocene  Turonian  Lead
Maastrichtian  Top of Rift

R0257_SEALPT_PSDM Survey
Courtesy of Spectrum
Paleocene  Maastrichtian  Turonian  Top of Rift

Lead

R0257_SEALP1_PSDM Survey
Courtesy of Spectrum
Leads

Unrisked in place Volume ~15 billion bbl
Outline

Location
Infrastructure and Operational Conditions
Exploration Overview
Tectonostratigraphic Evolution
Petroleum Systems
Plays
Area on Offer
Final Remarks
Sergipe-Alagoas, a traditional onshore and shallow water producing basin, is one of the most promising ultra-deepwater frontiers in Brazil;

Over the last years, large discoveries of light oil, gas and condensate were reported in the ultra-deepwater Sergipe-Alagoas basin;

These discoveries prove the existence of an active and efficient petroleum system (Albian-Turonian marine source rock with accumulations in Upper Cretaceous turbidite reservoirs);
The area on offer is in the same geological context of these discoveries;

Several leads analogous to the Barra, Farfan, Muriú, Moita Bonita and Poço Verde discoveries were identified;

The identified leads exhibit seismic facies favourable to the presence of turbidite lobes and channels;

Unrisked in-place volumes were evaluated at 15 billion barrels of oil.
National Agency of Petroleum, Natural Gas and Biofuels

Bolívar da Silva Haeser
seminariostecnicos_sdb@anp.gov.br

www.anp.gov.br