

# Brasil12<sup>th</sup>Round

Oil & Gas Bidding Rounds

## Recôncavo Basin

Elaine Loureiro  
Rosemari Fabianovicz





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup>Round**  
Oil & Gas Bidding Rounds

# Agenda

**Location**

**Infrastructure and Operational Conditions**

**Exploration Overview**

**Tectonostratigraphic Evolution**

**Petroleum Systems**

**Plays**

**Area on Offer**

**Final Remarks**





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup>Round**  
Oil & Gas Bidding Rounds

## **Location**

## **Infrastructure and Operational Conditions**

## **Exploration Overview**

## **Tectonostratigraphic Evolution**

## **Petroleum Systems**

## **Plays**

## **Area on Offer**

## **Final Remarks**





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Location

**Mesozoic  
Basin**



Aporá High

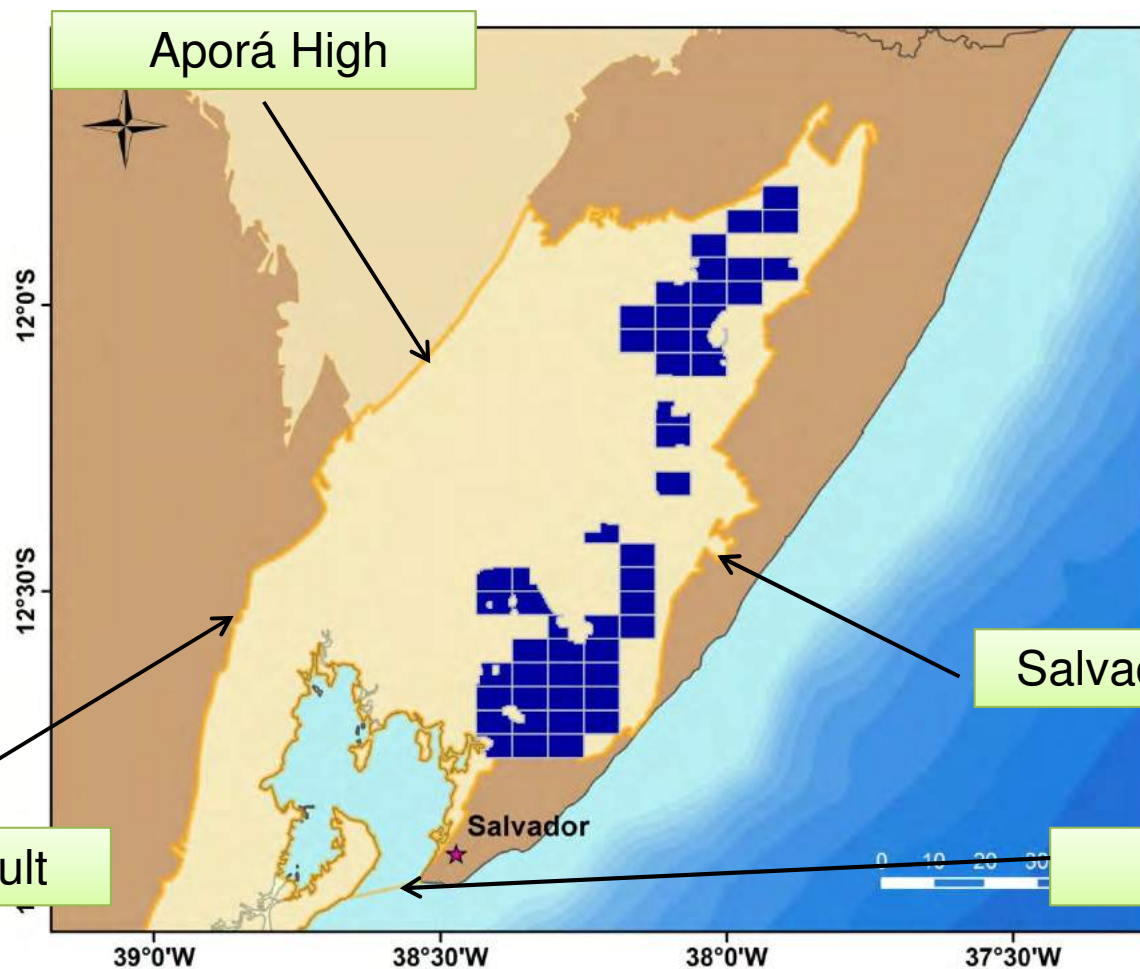
11,500 km<sup>2</sup>

Salvador Fault

Maragogipe Fault

Salvador

Barra Fault

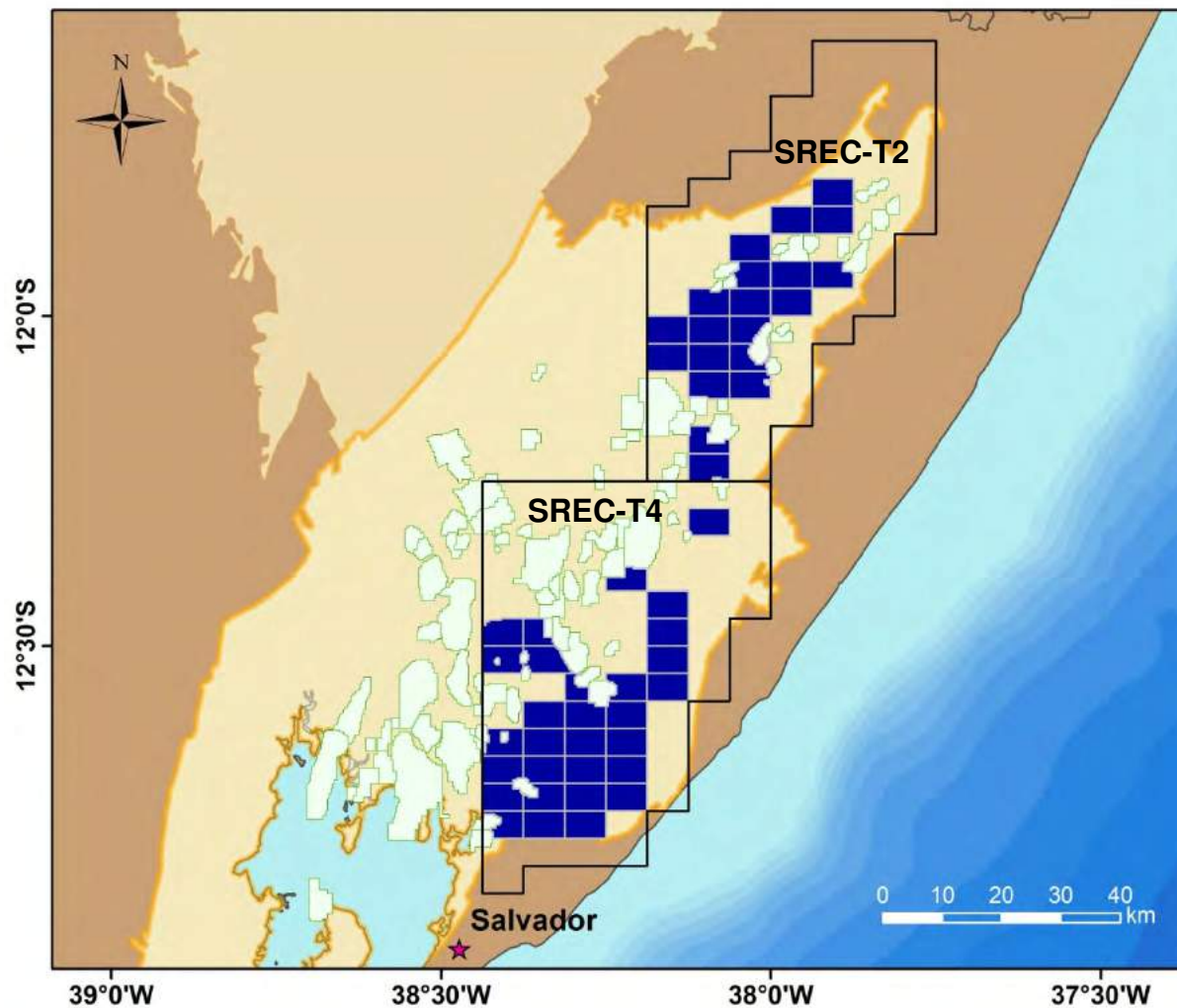




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Location



❖ SREC-T2 and SREC-T4

❖ 50 blocks

❖ 1,452 km<sup>2</sup>

★ Capitals

□ Round 12 Sector

■ Round 12 Blocks

■ Basement

■ Sedimentary Basin

■ Recôncavo Basin



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

**Location**

**Infrastructure and Operational Conditions**

**Exploration Overview**

**Tectonostratigraphic Evolution**

**Petroleum Systems**

**Plays**

**Area on Offer**

**Final Remarks**

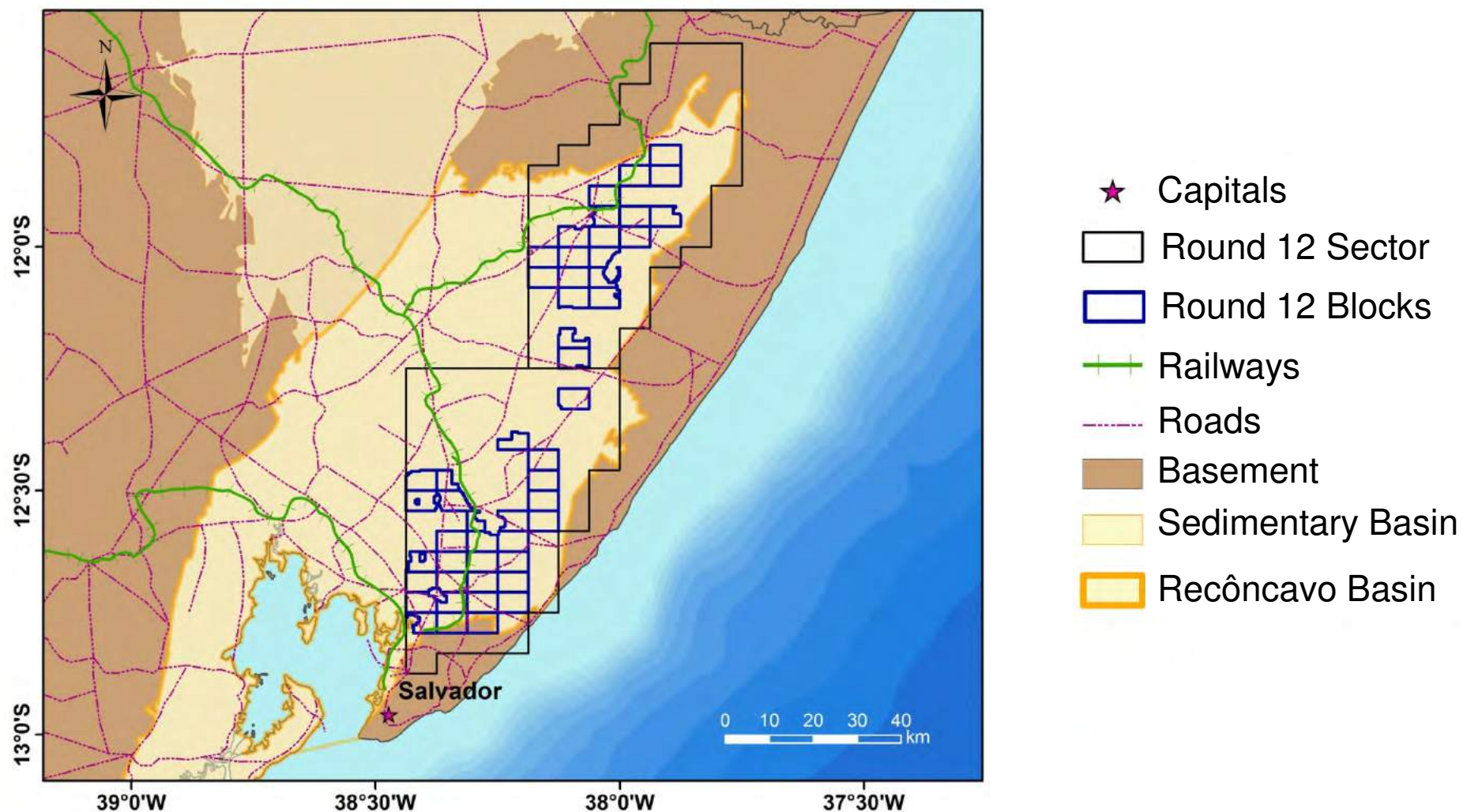




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Infrastructure

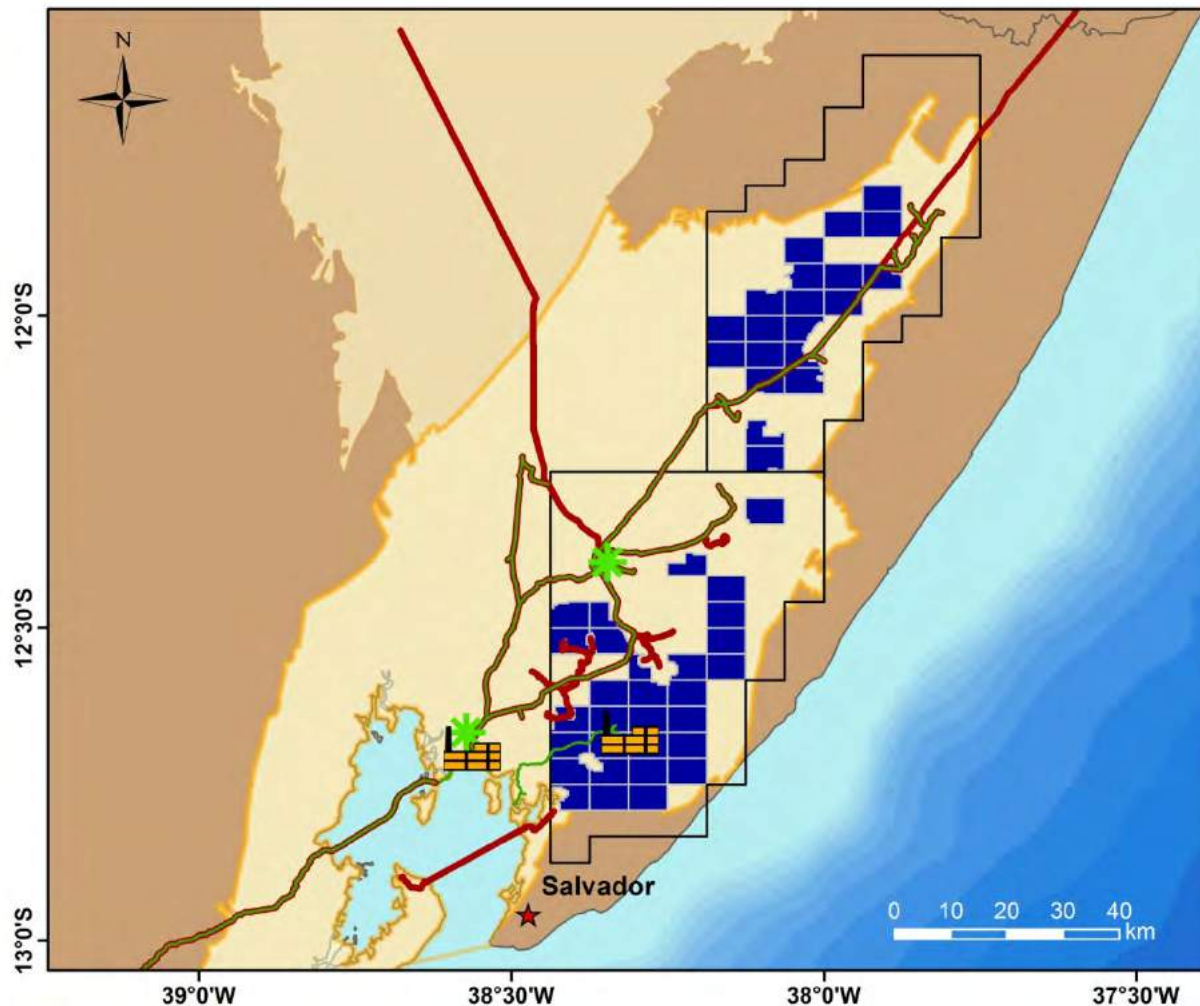




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Infrastructure



Processing capacity of  
natural gas in the region:  
**24 million m<sup>3</sup>/day**

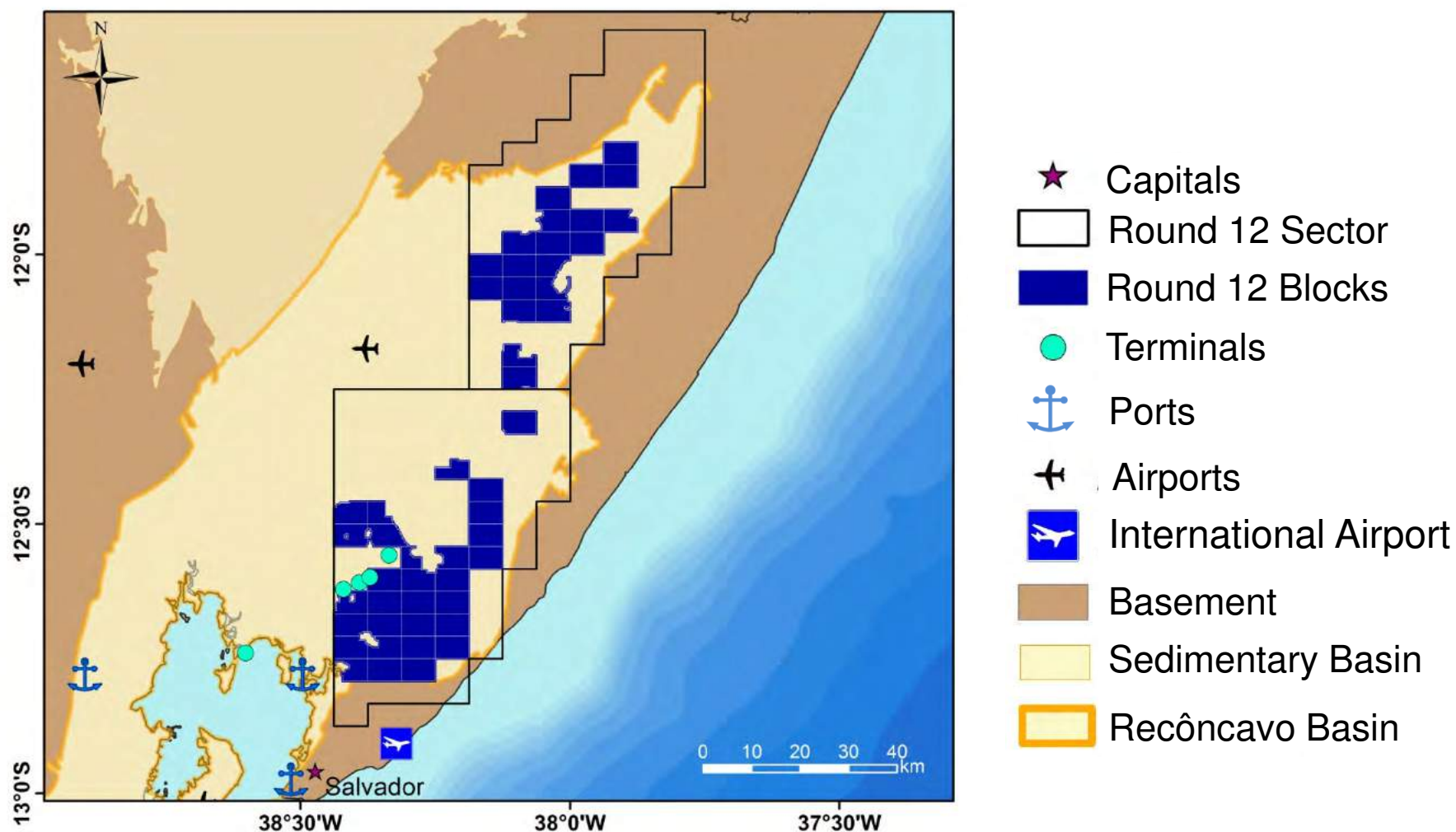
- ★ Capitals
- Round 12 Sector
- Round 12 Blocks
- 🏭 Refineries
- ✱ NGPU
- Oil Pipelines
- Gas Pipelines
- Basement
- Sedimentary Basin
- Recôncavo Basin



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Infrastructure





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

**Location**

**Infrastructure and Operational Conditions**

**Exploration Overview**

**Tectonostratigraphic Evolution**

**Petroleum Systems**

**Plays**

**Area on Offer**

**Final Remarks**

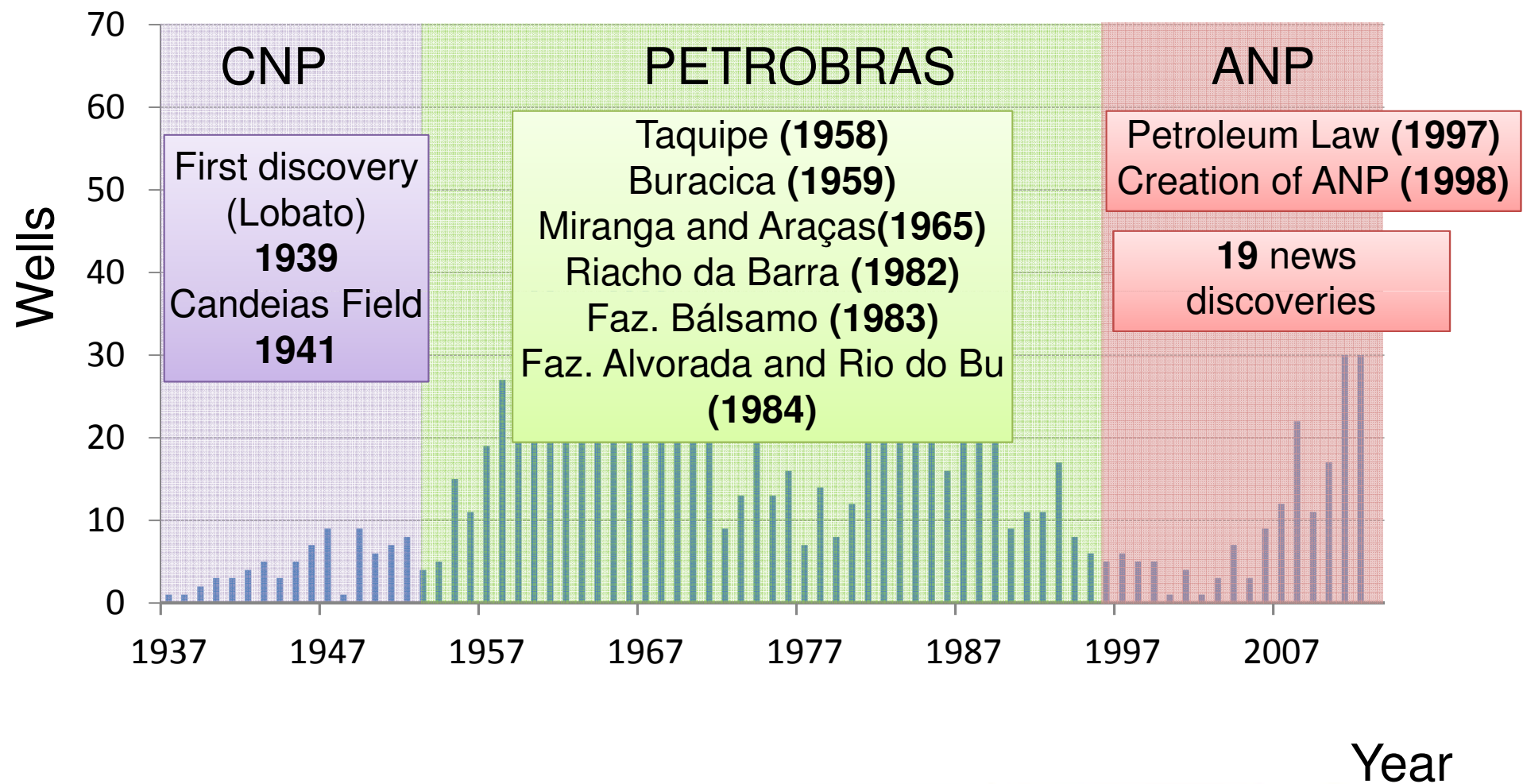




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup>Round**  
Oil & Gas Bidding Rounds

# Exploration Overview

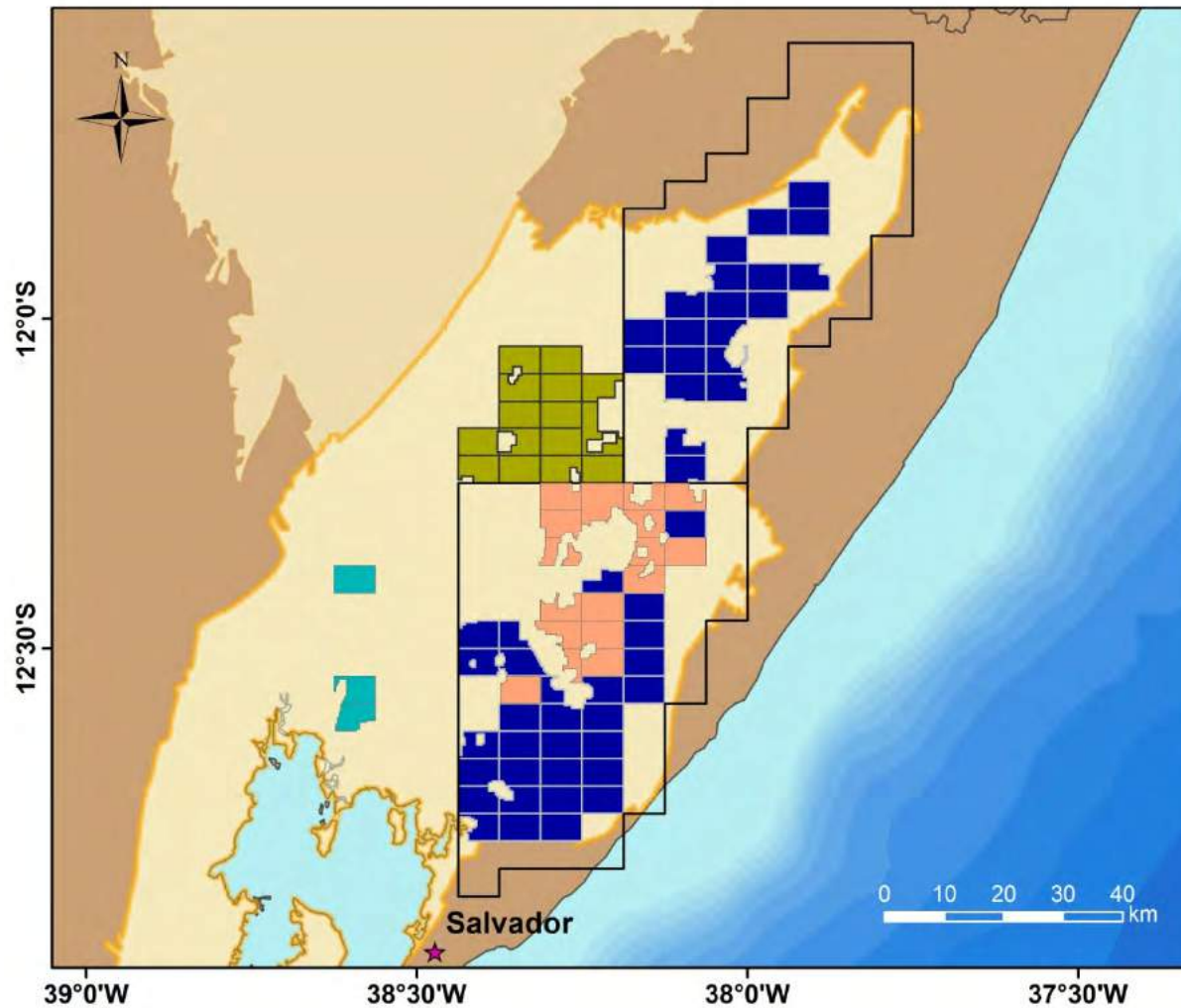




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Blocks on Concession and Bidding Rounds



❖ 20 blocks are under concession

❖ 15 blocks were granted in round 11

★ Capitals

□ Rounds 12 Sectors

■ Rounds 12 Blocks

■ Basement

■ Sedimentary Basins

■ Recôncavo Basin

■ Round 9

■ Round 10

■ Round 11

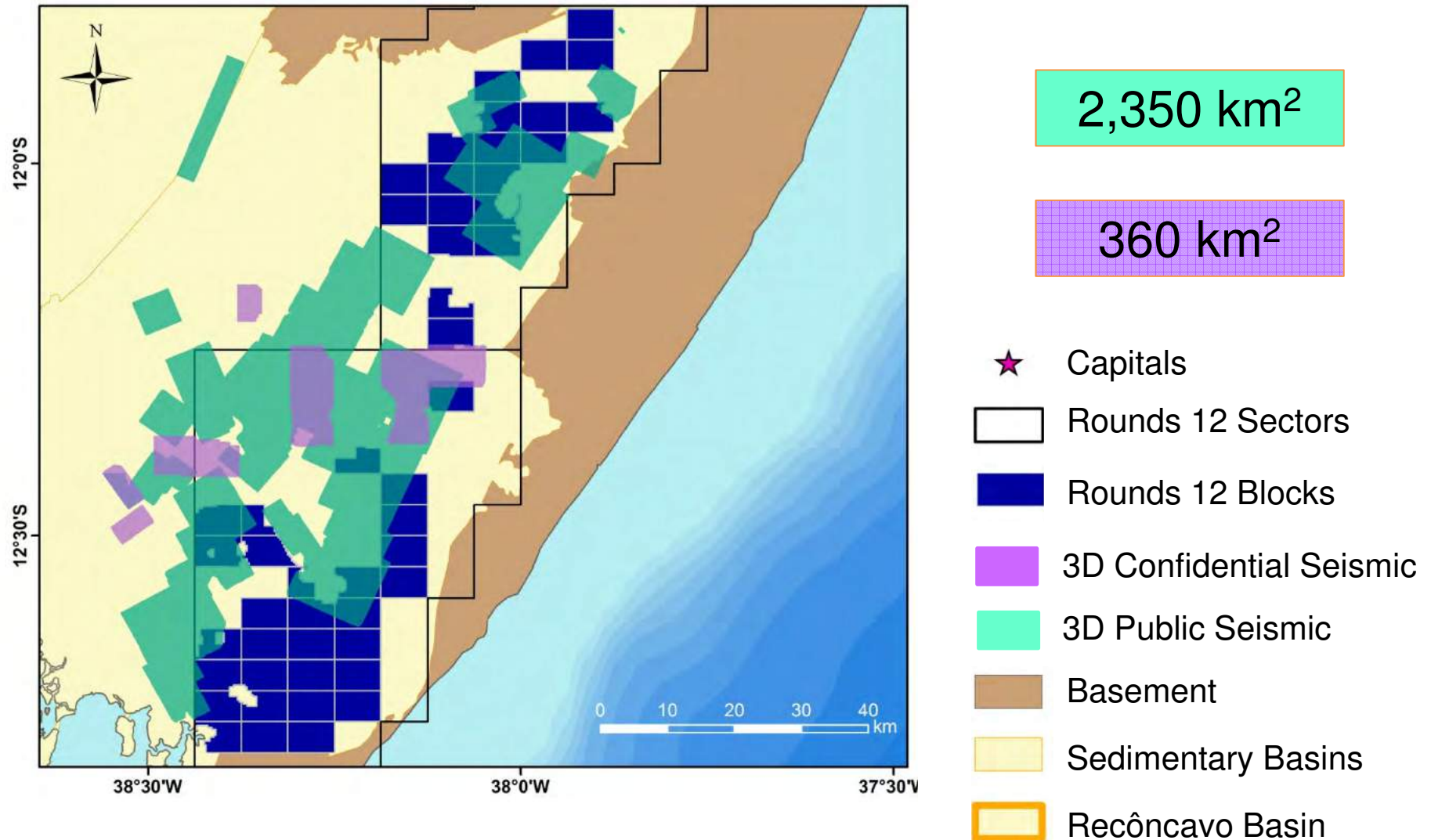
*Last update in 08/01/2013*



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

## Available Data 3D Seismic



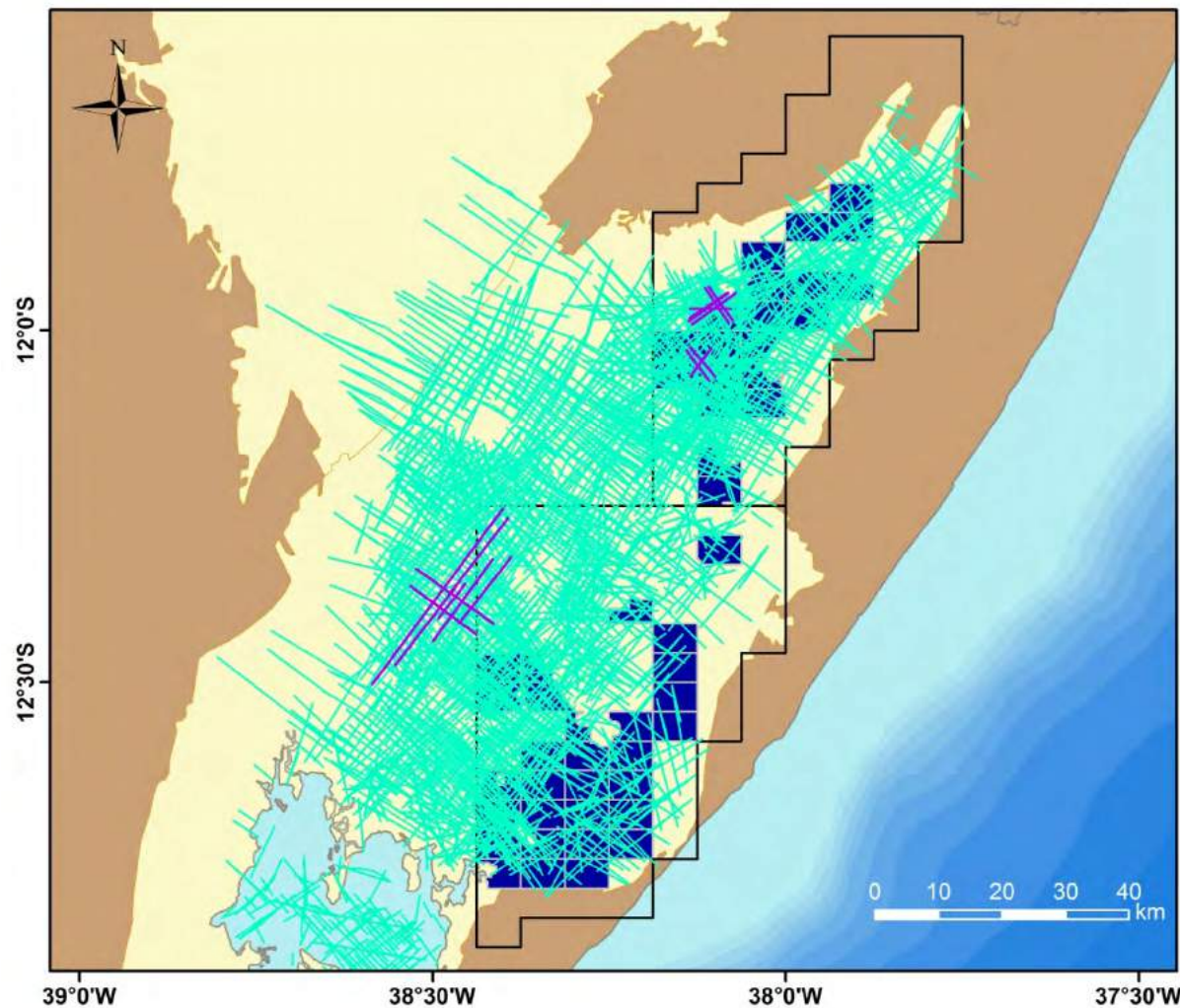
*Last update in 08/01/2013*



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

## Available Data 2D Seismic



24,518 km  
(public)

186 km  
(confidential)

- Round 12 Sector
- Round 12 Blocks
- Confidential 2D Seismic
- Public 2D Seismic
- Sedimentary Basin
- Basement

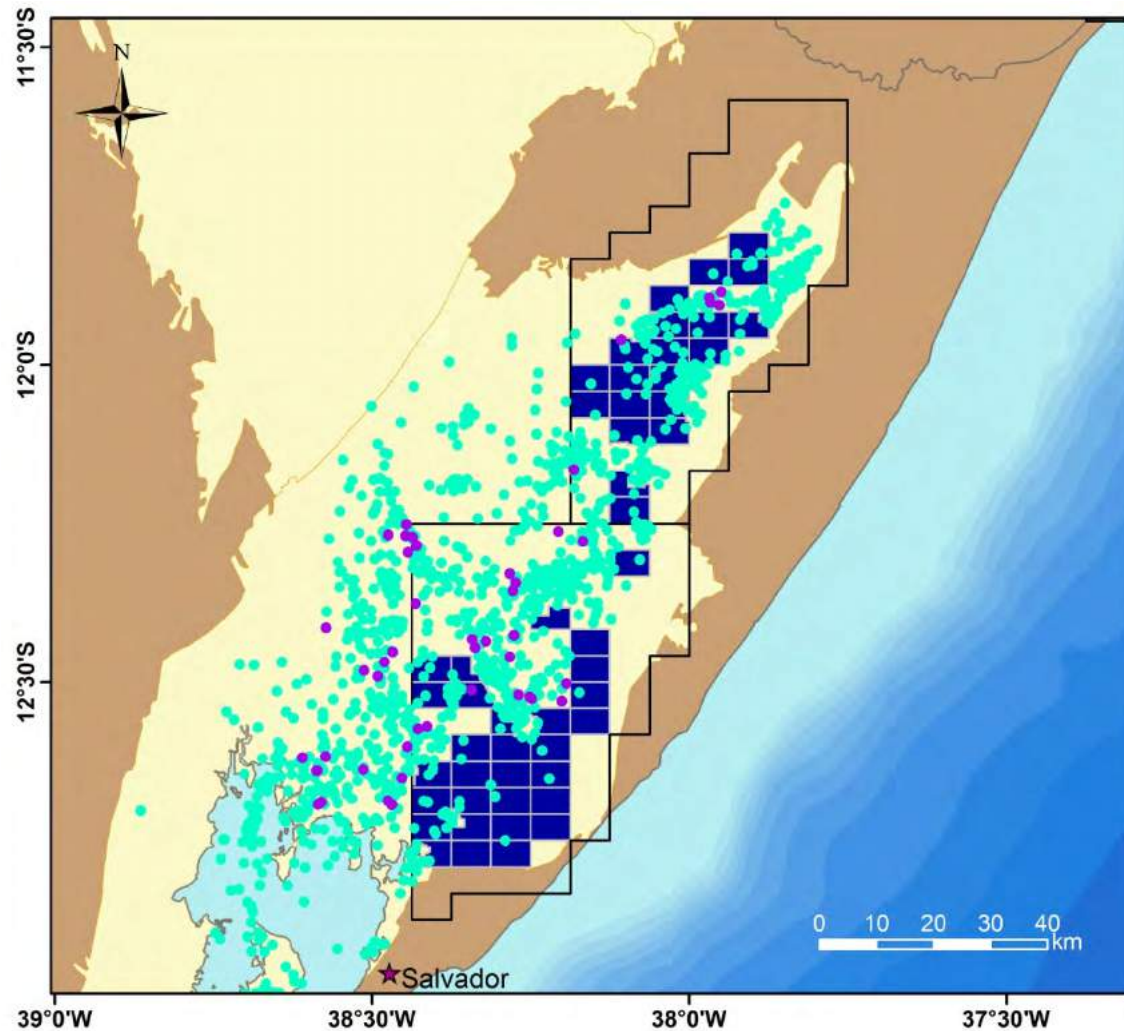
*Last update in 08/01/2013*



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Available Data Exploration Wells



1,154  
(public)

70 wells  
(confidential)

-  Round 12 Sector
-  Round 12 Blocks
-  Confidential Exploration Wells
-  Public Exploration Wells
-  Sedimentary Basin
-  Basement

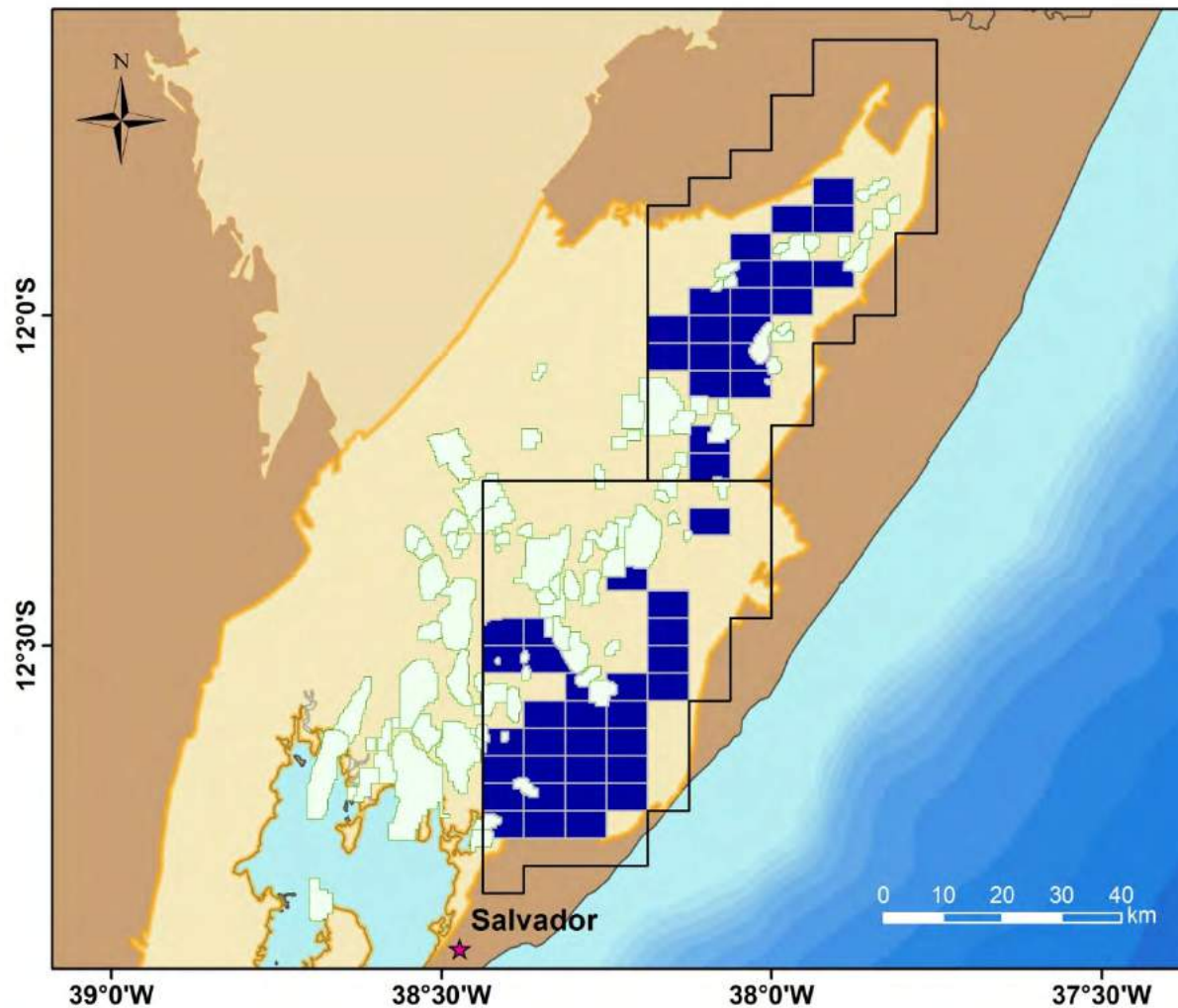
*Last update in 08/01/2013*



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Production and Development Fields



**71 oil fields**

**21 gas fields**

- ★ Capitals
- Round 12 Sector
- Round 12 Blocks
- Production and Development Field
- Basement
- Sedimentary Basin
- Recôncavo Basin

*Last update in 08/01/2013*

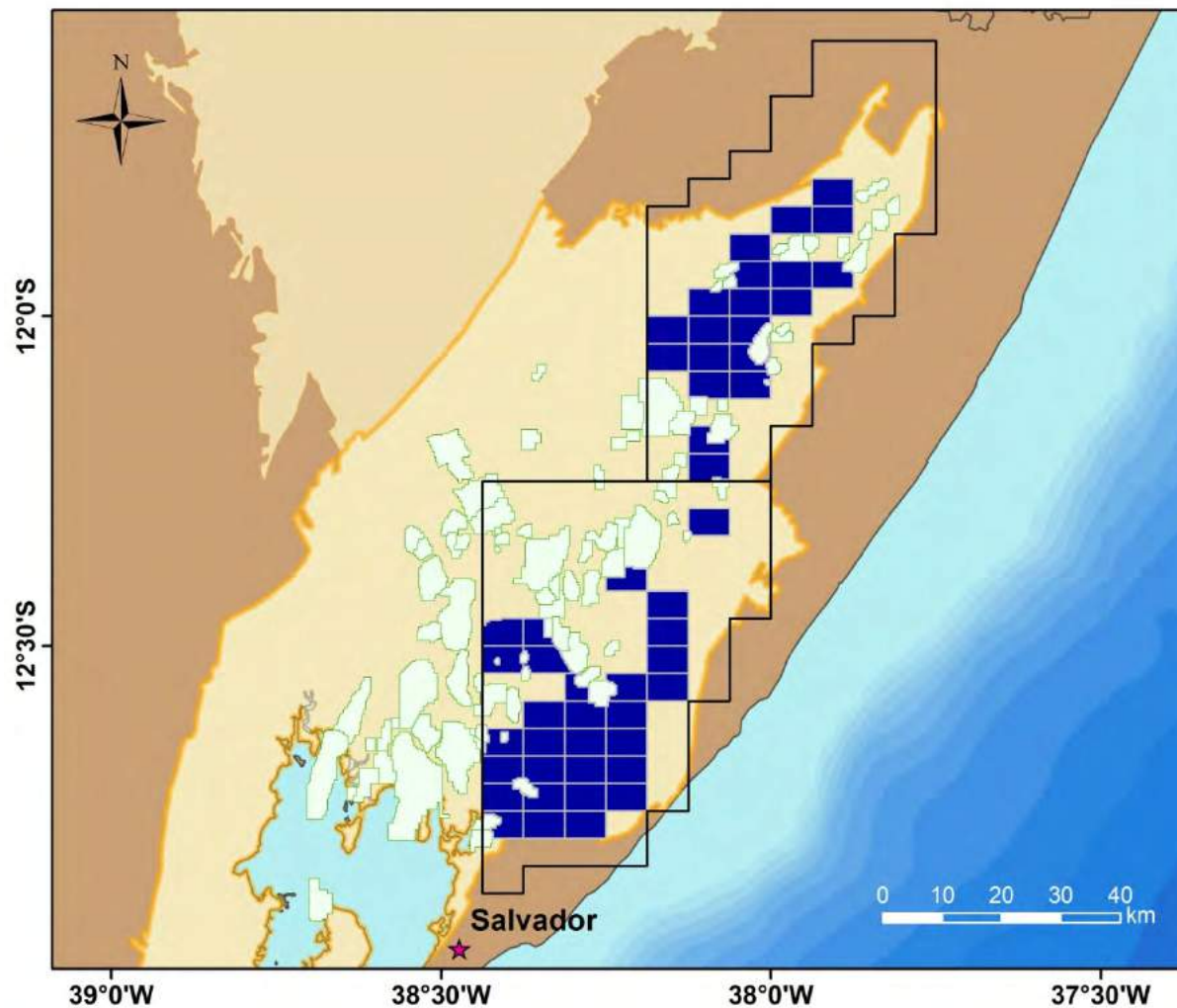


**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

## Produced Volume

**1.6 billion bbl**  
+  
**69.5 billions m<sup>3</sup>**



- ★ Capitals
- Round 12 Sector
- Round 12 Blocks
- Production and development Field
- Basement
- Sedimentary Basin
- Recôncavo Basin

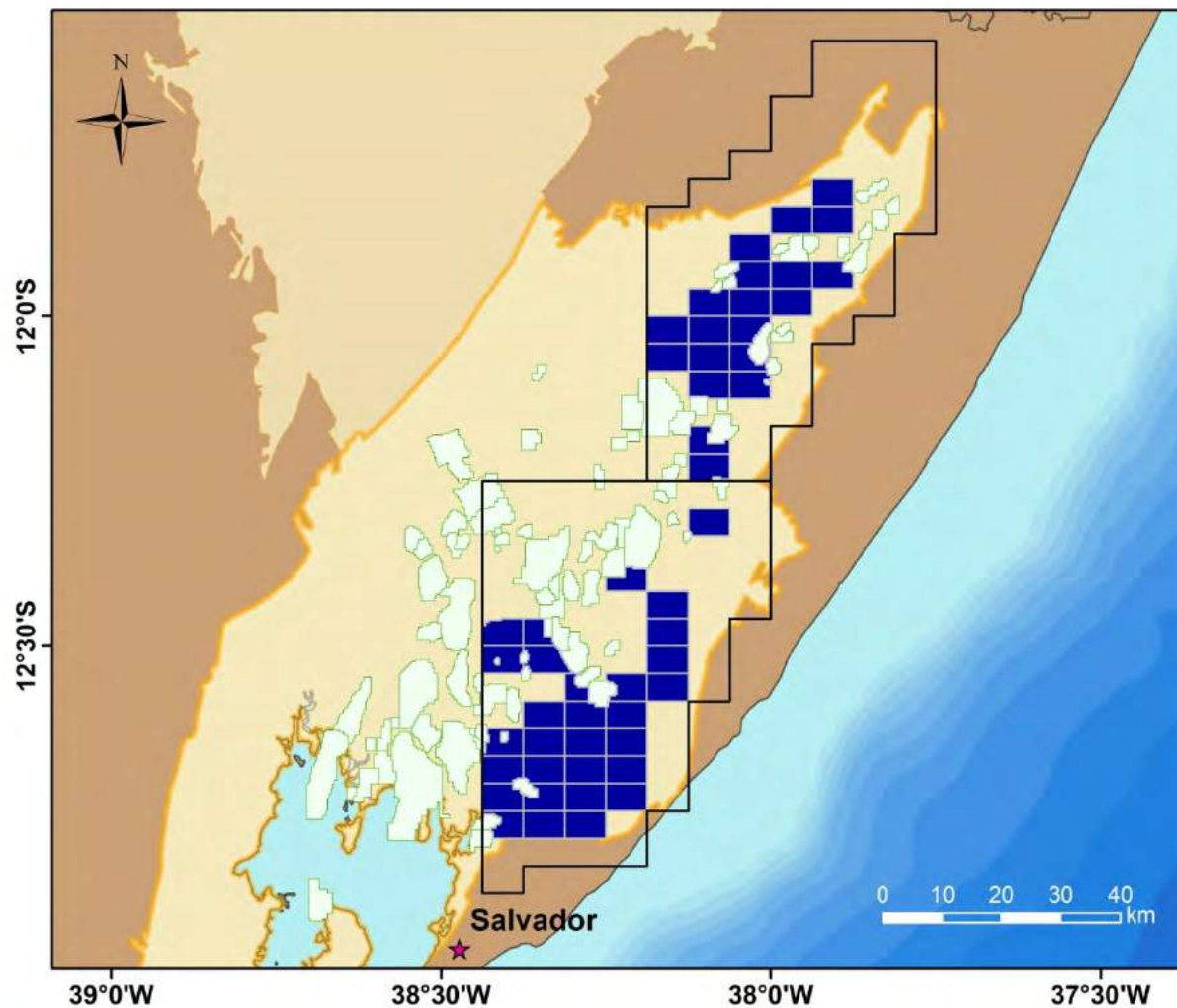
Source: Anuário Estatístico Brasileiro do Petróleo, Gás Natural e Biocombustíveis, 2012



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

## Proven Reserves



**226 millions bbl**  
+  
**5.7 billions m<sup>3</sup>**

- ★ Capitals
- Round 12 Sector
- Round 12 Blocks
- Production and Development Field
- Basement
- Sedimentary Basin
- Recôncavo Basin

Source: Anuário Estatístico Brasileiro do Petróleo, Gás Natural e Biocombustíveis, 2012



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

**Location**

**Infrastructure and Operational Conditions**

**Exploration Overview**

**Tectonostratigraphic Evolution**

**Petroleum Systems**

**Plays**

**Area on Offer**

**Final Remarks**

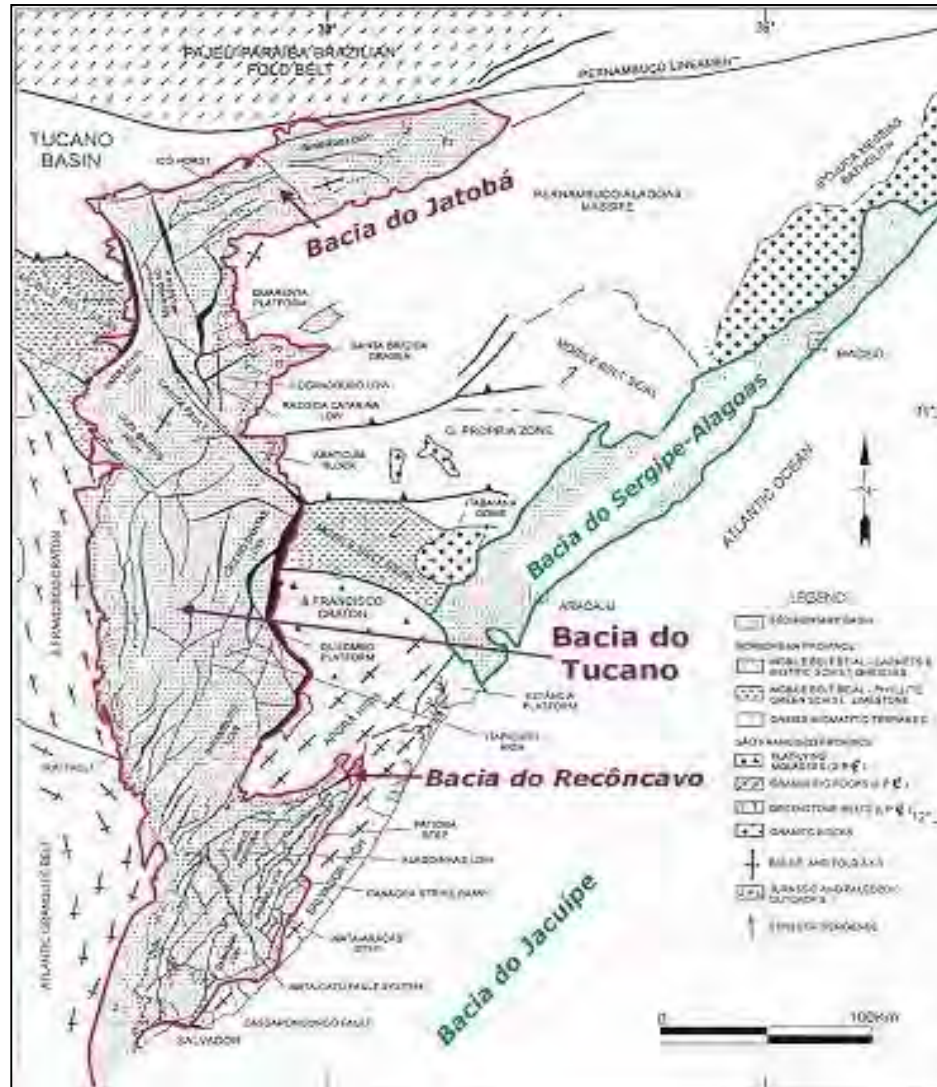




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Tectonostratigraphic Evolution



Milani, 1987

**South Atlantic rift  
bifurcation in two branches:**

**1. North-South (RTJ)**

Aborted

**2. Northeast**



Magnavita *et al.*, 2005

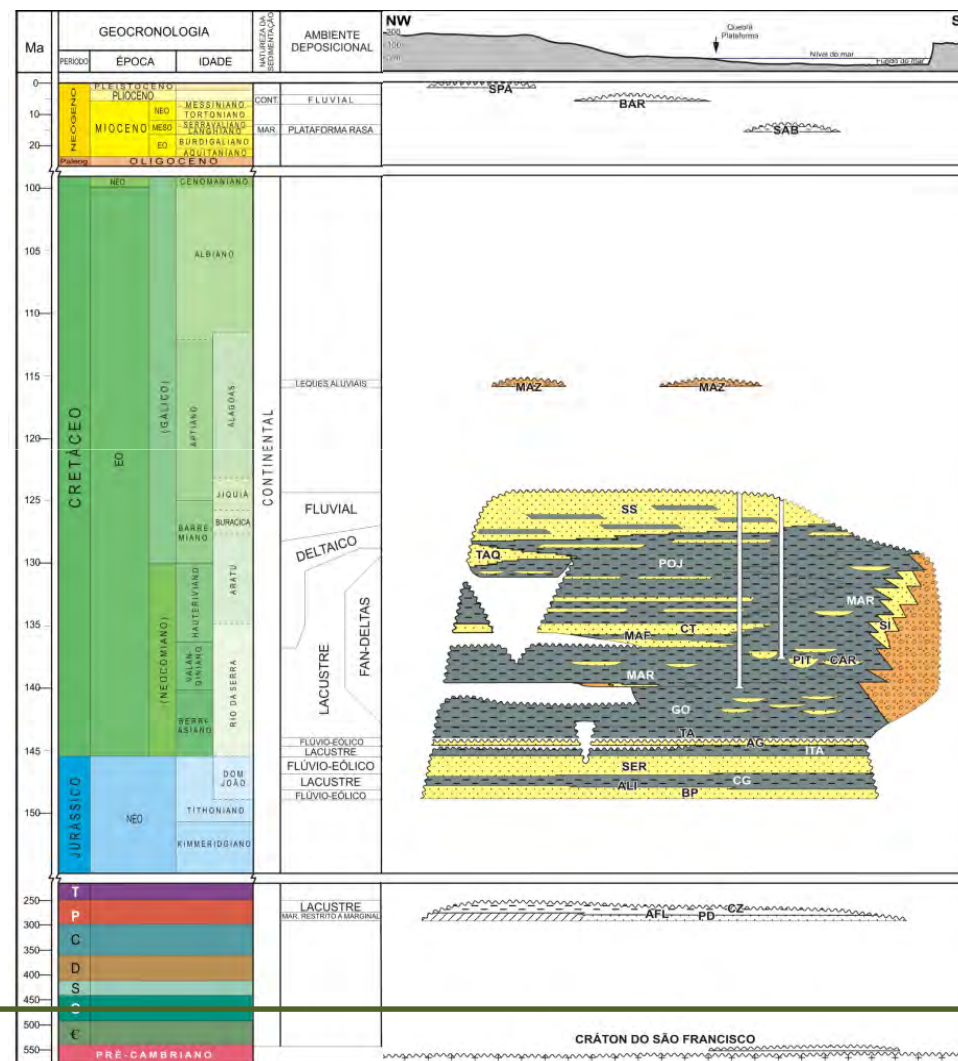


**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Tectonostratigraphic Evolution

**Pre-Cambrian  
Basement**



Silva *et al.*, 2007



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

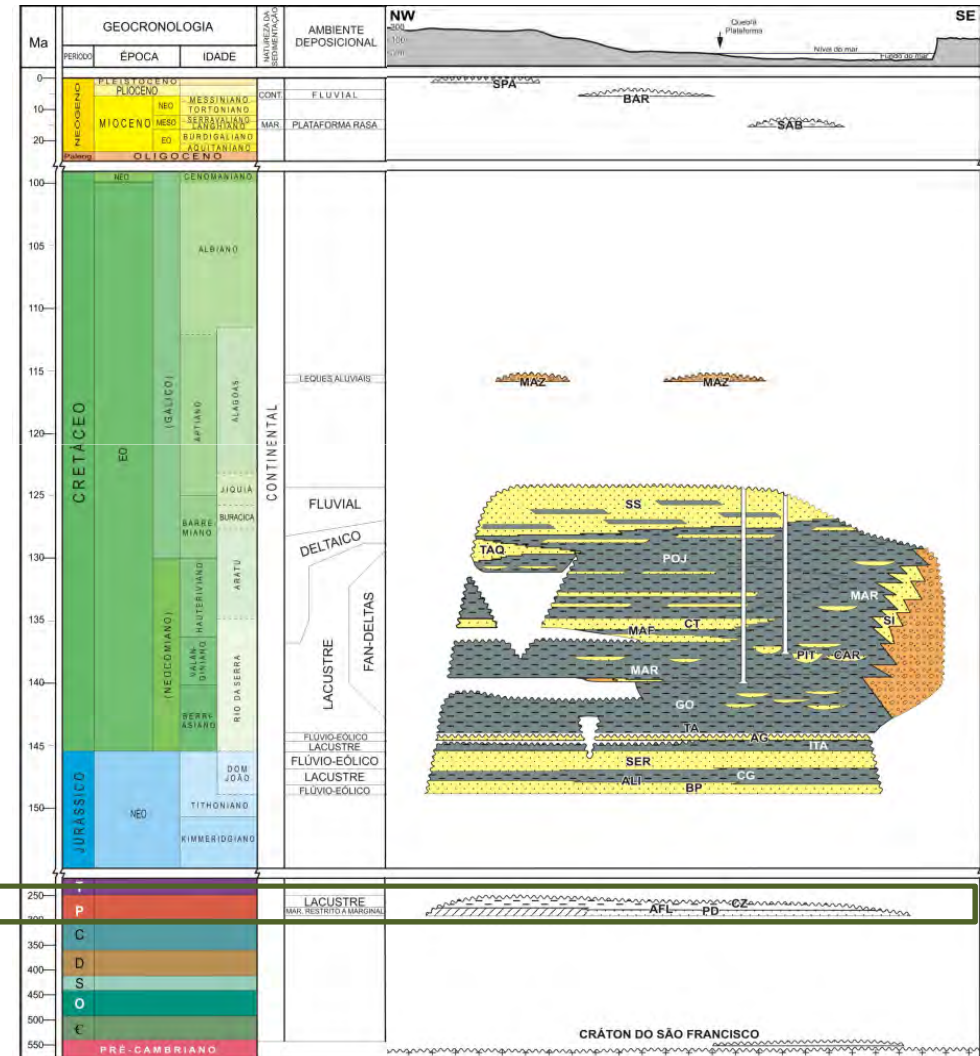
# Tectonostratigraphic Evolution

# Permian

*Lacustrine and Restrict Marine*  
**Afligidos Formation**  
Evaporites and red shales

# Paleozoic Supersequence

# SYNECLISE



Silva *et al.*, 2007



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

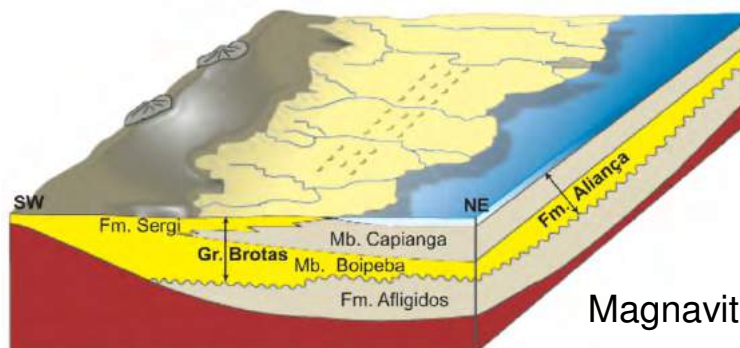
**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Tectonostratigraphic Evolution

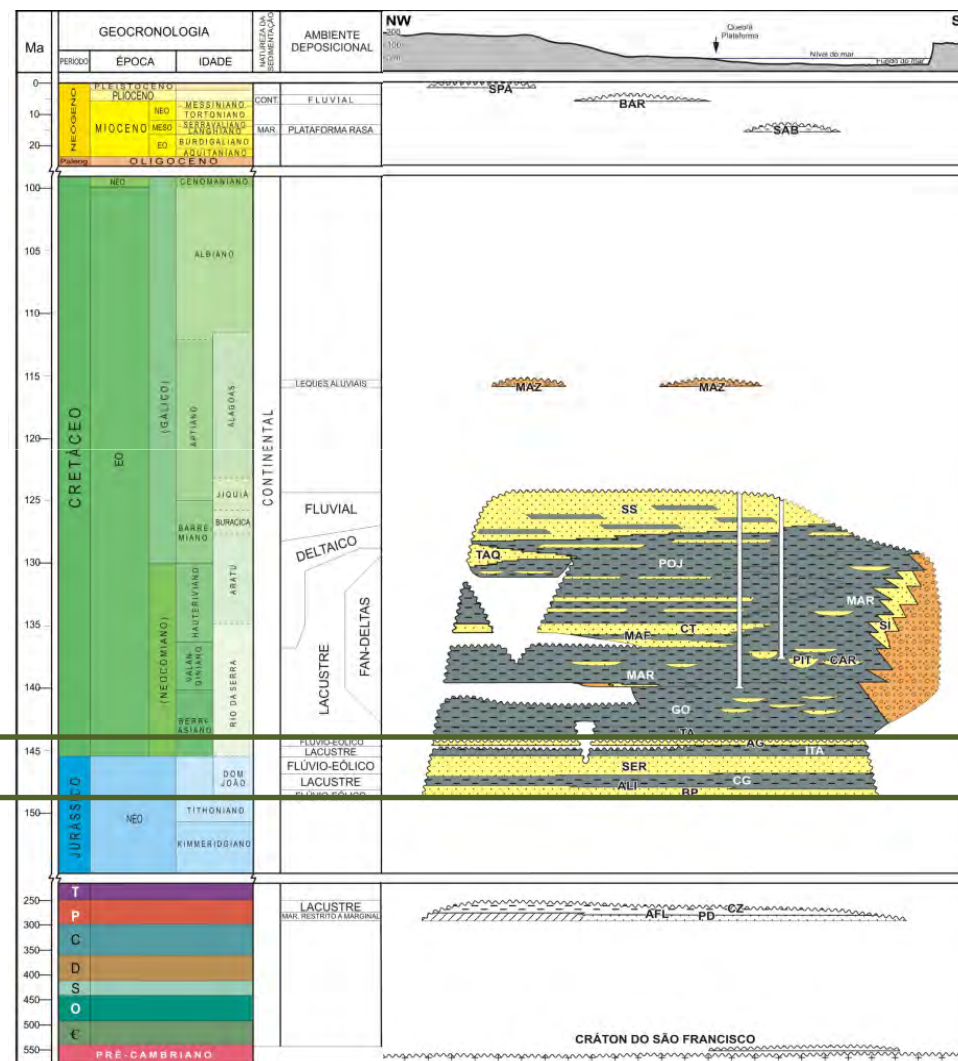
## Jurassic – Berriasian

*Fluvial-eolian and Lacustrine*  
**Aliança, Sergi, Itaparica and Água Grande Formations**  
Sandstones and shales

## Pre-Rift Supersequence

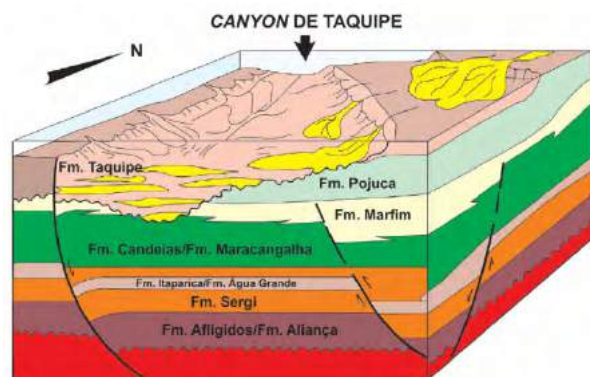


Magnavita *et al.*, 2005



Silva *et al.*, 2007

# Tectonostratigraphic Evolution



Magnavita *et al.*, 2005

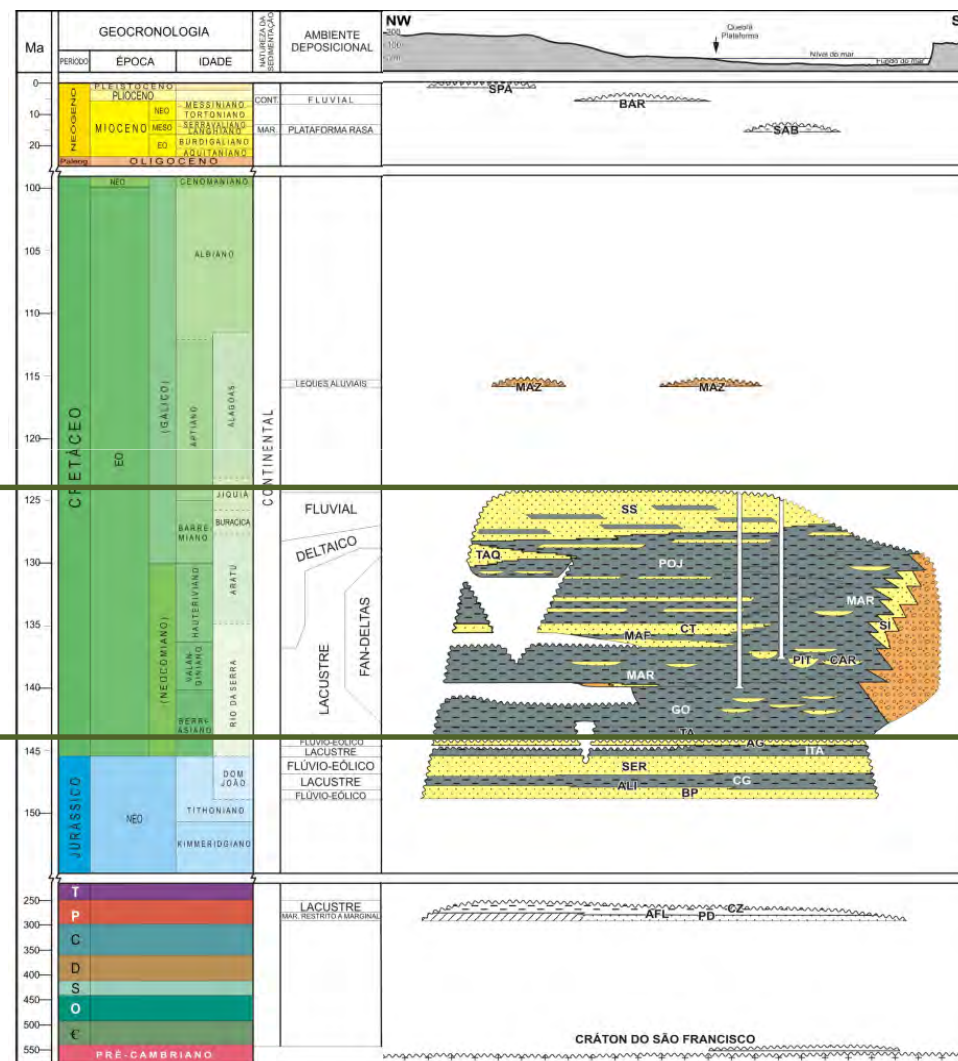
## Rift Supersequence

### Berriasian – Aptian

*Lacustrine*

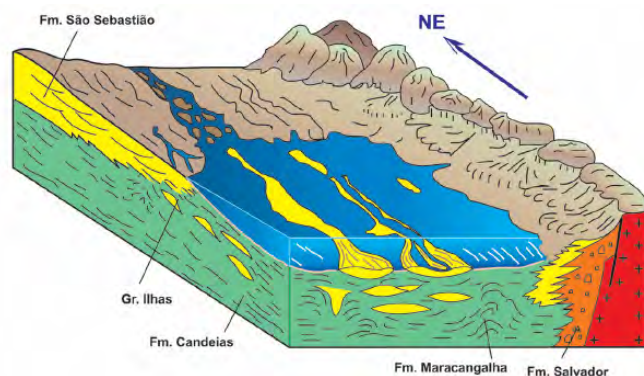
### Candeias and Salvador Formation

*Conglomerates, shales and  
sandstone turbidites*



Silva *et al.*, 2007

# Tectonostratigraphic Evolution



Magnavita *et al.*, 2005

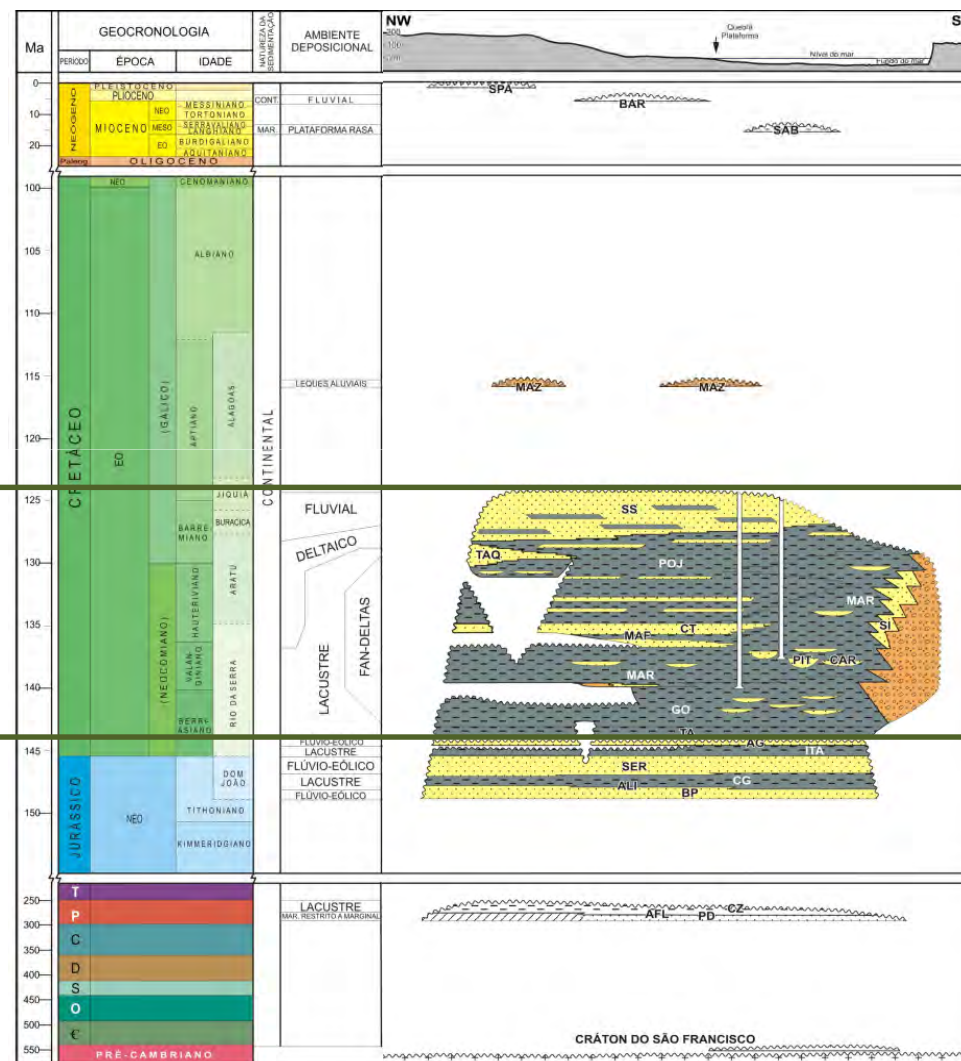
## Rift Supersequence

### Berriasian – Aptian

*Deltaic and Fluvial*

**Salvador, Maracangalha and Pojuca Formations**

*Conglomerates, shales and deltaic sandstones*



Silva *et al.*, 2007



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Tectonostratigraphic Evolution

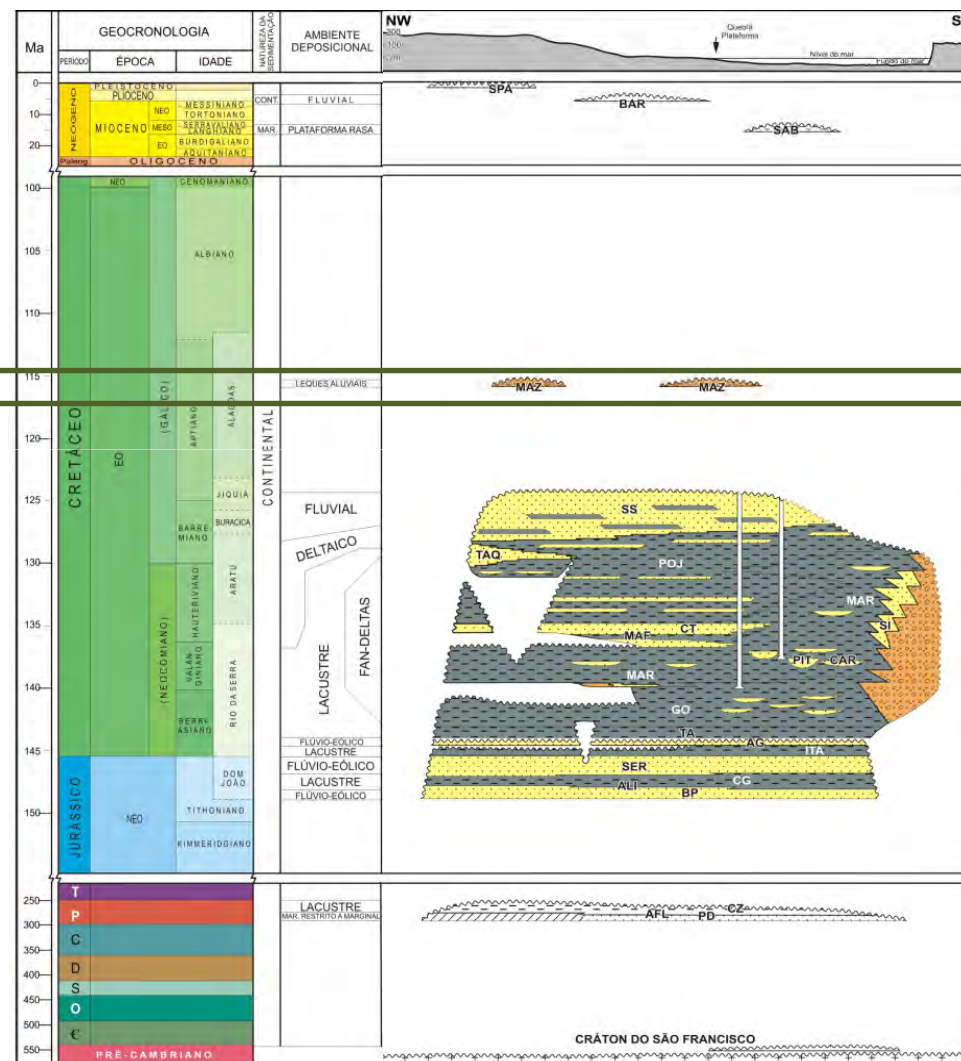
## Post-rift Supersequence

**Early Aptian**

*Alluvial Fans*

**Marizal Formation**

*Conglomerates, shale and deltaic sandstones*



Silva *et al.*, 2007

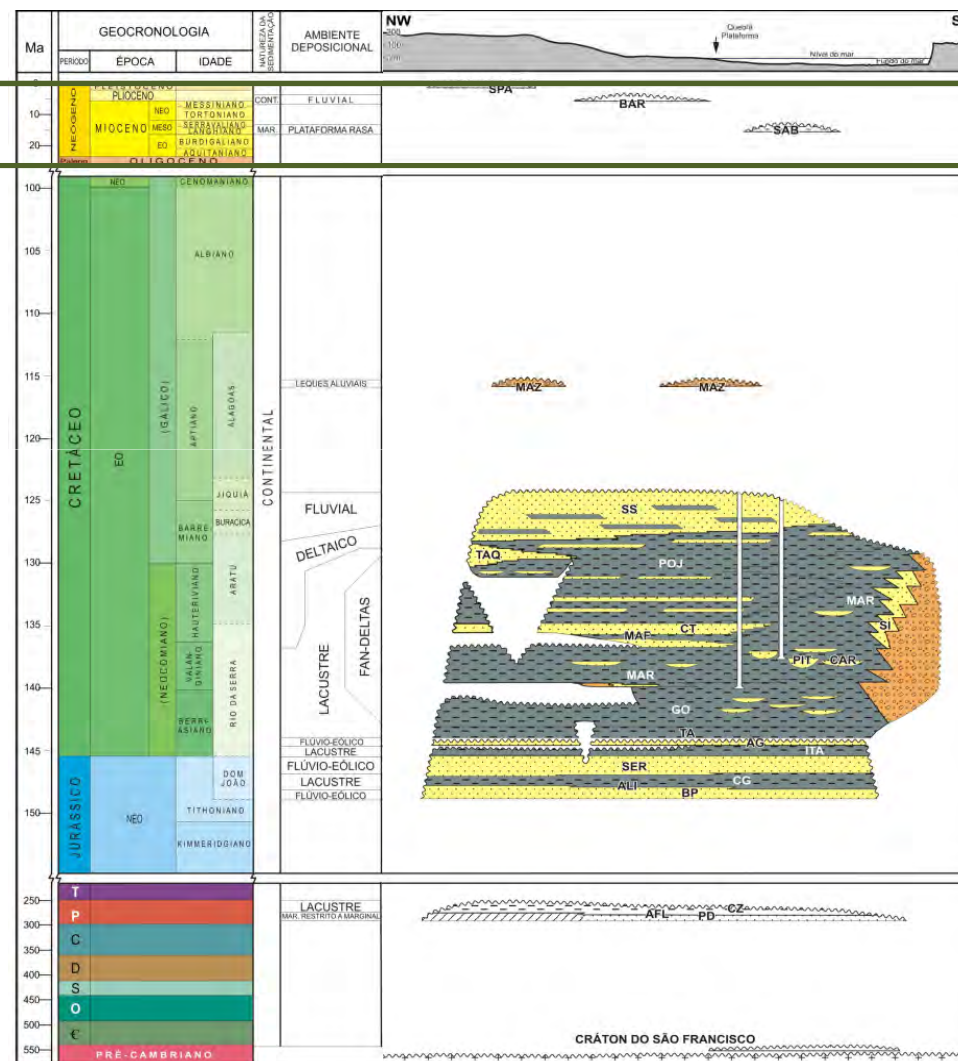


**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Tectonostratigraphic Evolution

## Neogene Sequences



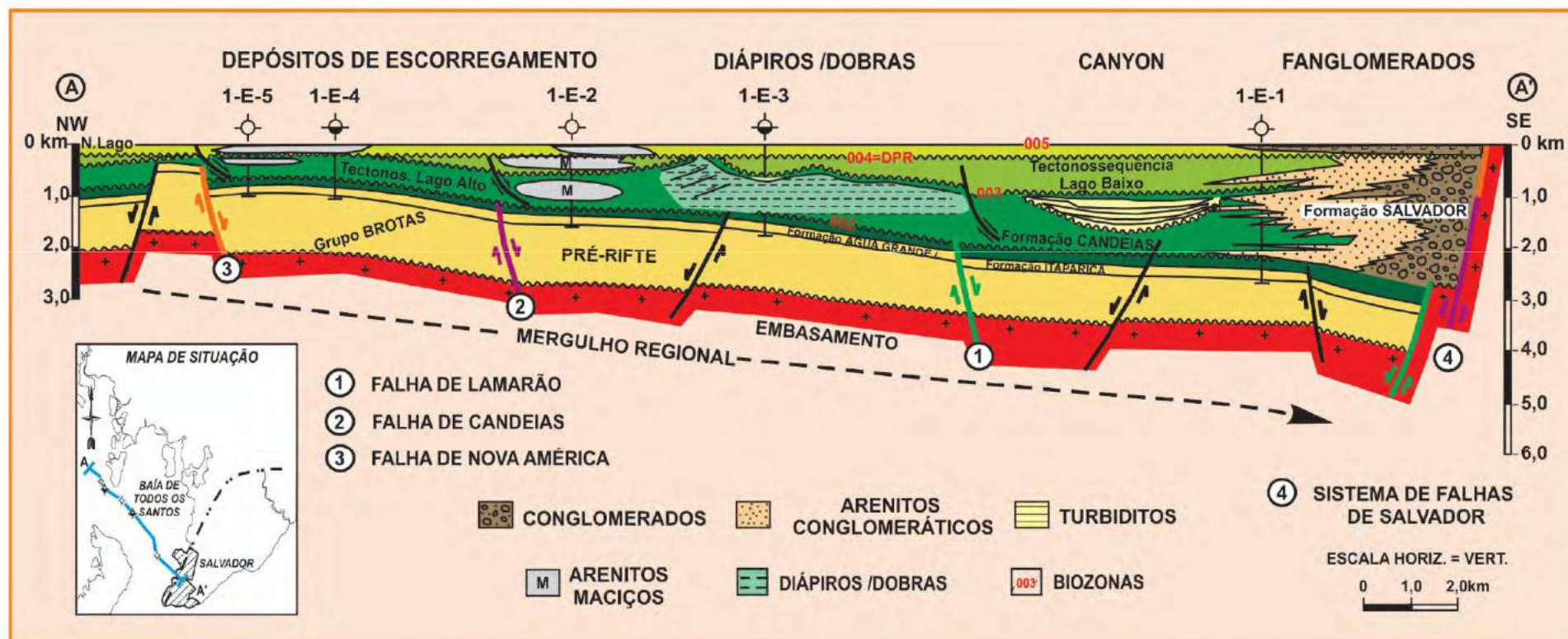
Silva *et al.*, 2007



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Tectonostratigraphic Evolution



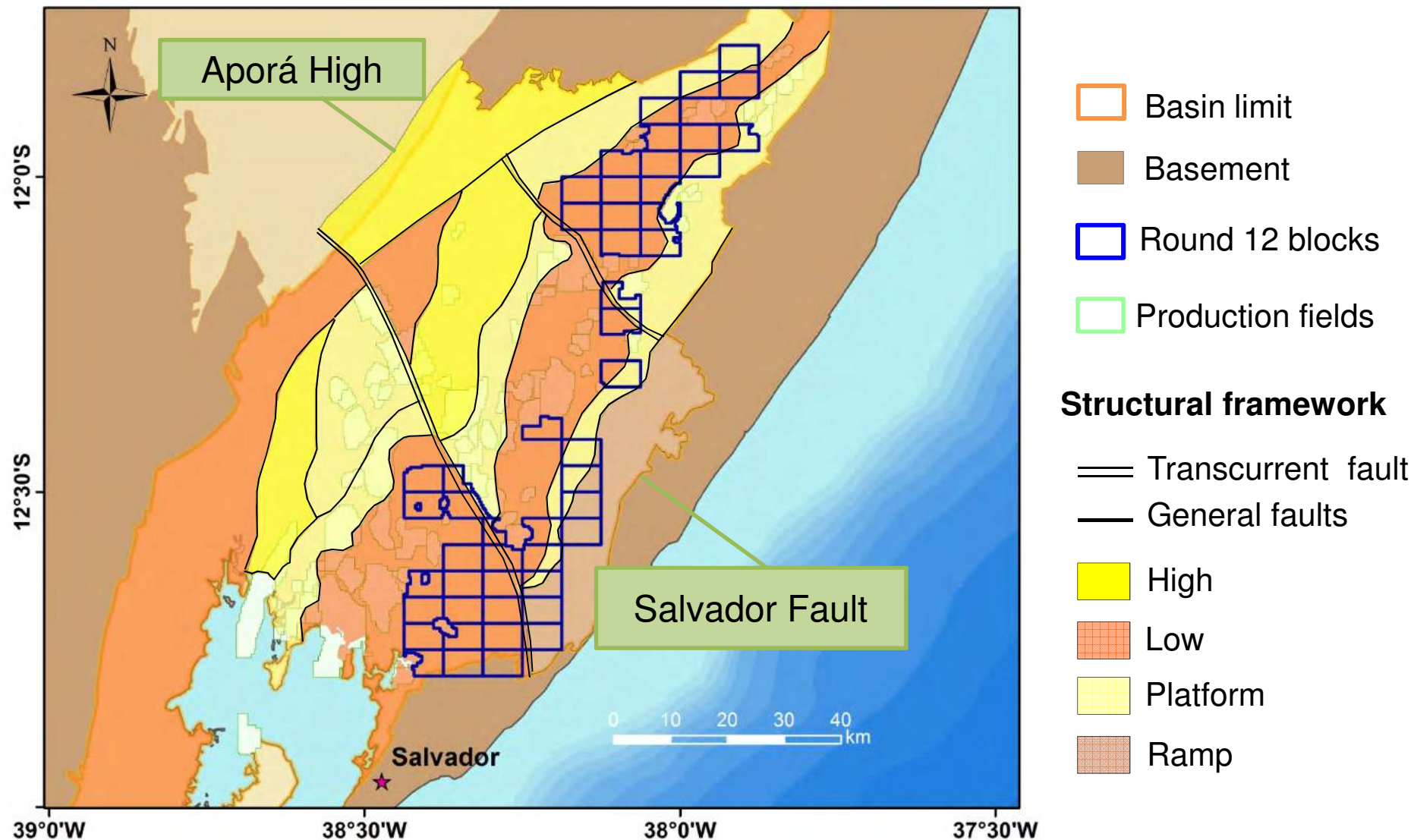
Cupertino and Bueno, 2005



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Structural Framework

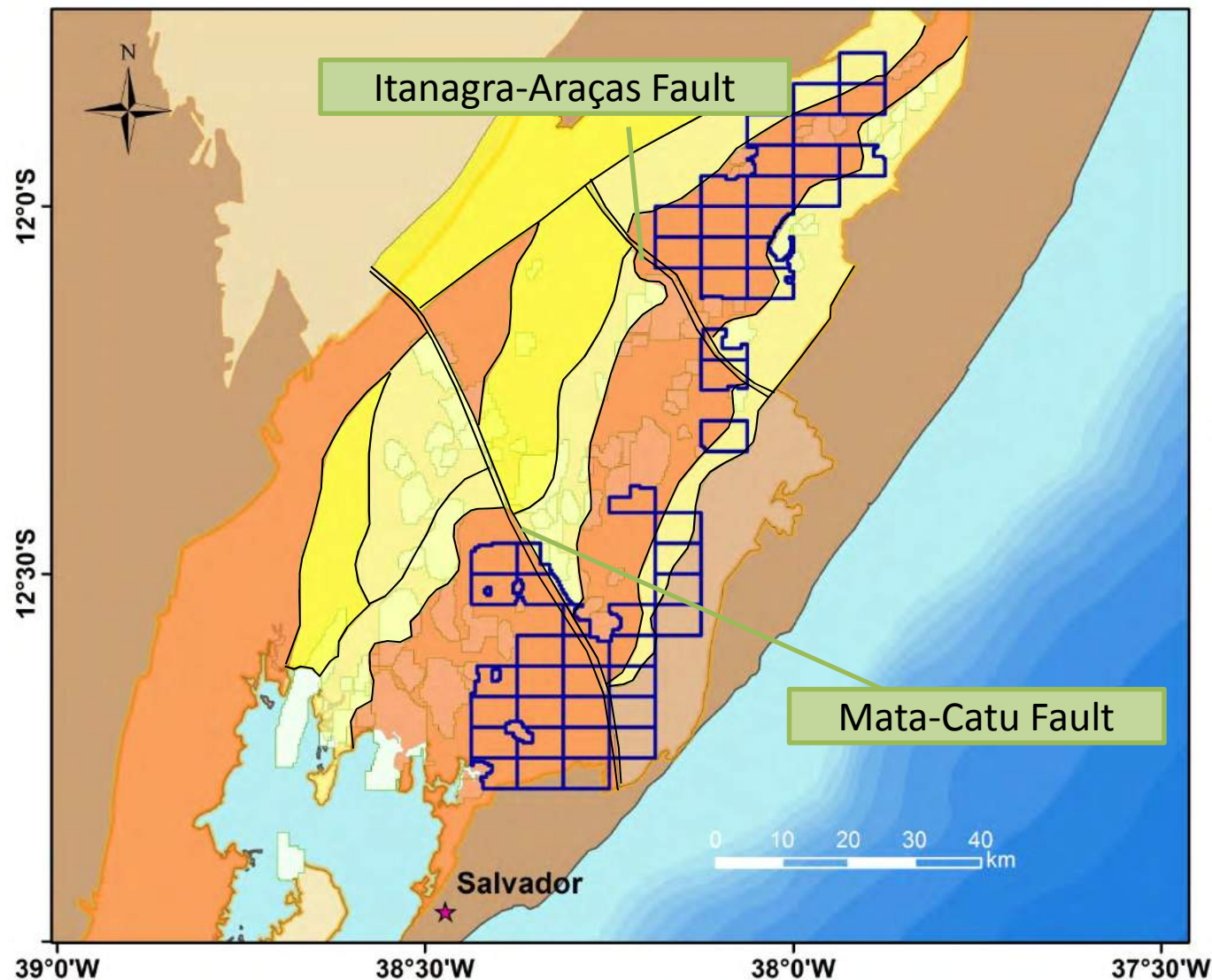




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Structural Framework



- Basin limit
- Basement
- Round 12 blocks
- Production fields

## Structural framework

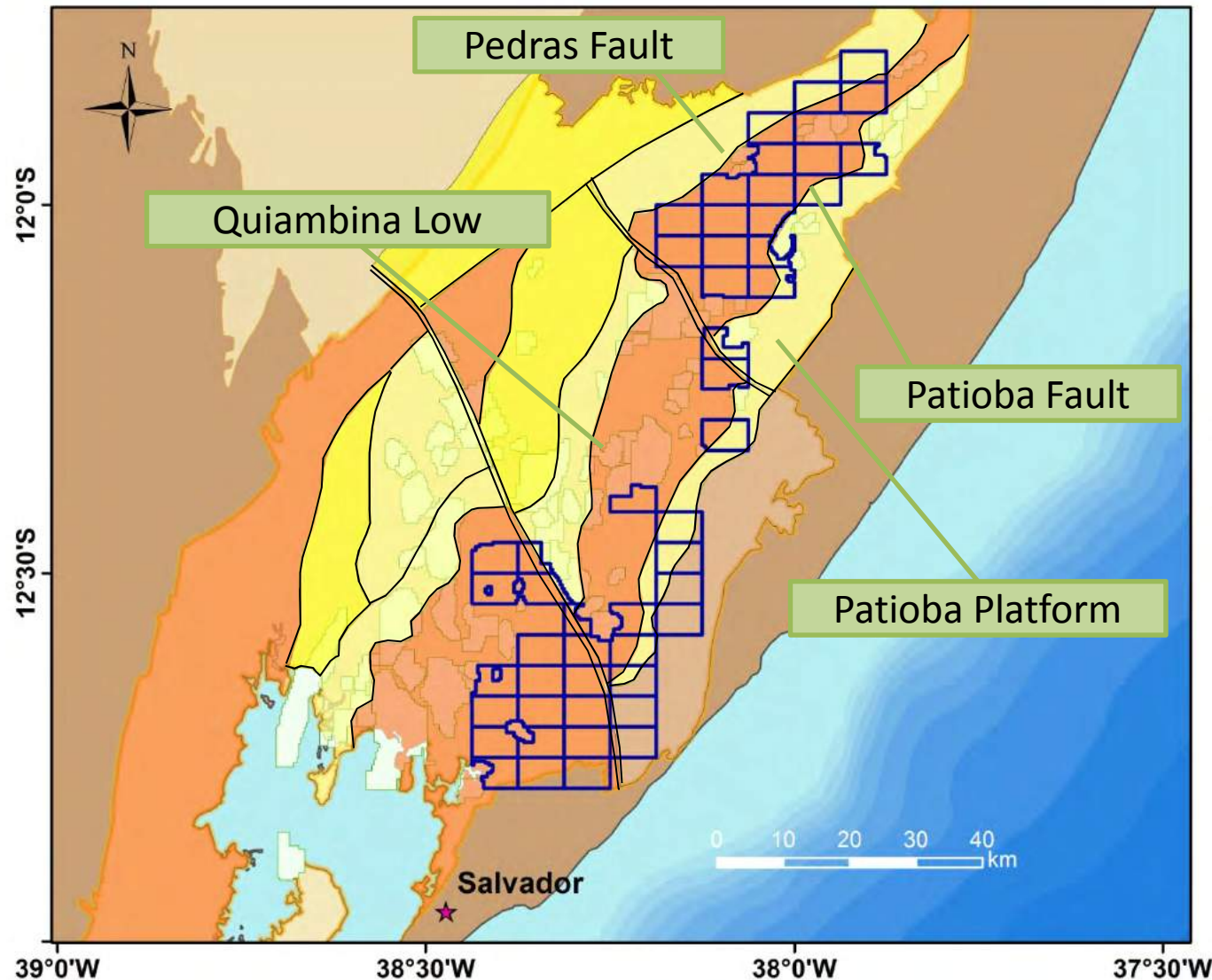
- Transcurrent fault
- General faults
- High
- Low
- Platform
- Ramp



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Structural Framework



- Basin limit
- Basement
- Round 12 blocks
- Production fields

## Structural framework

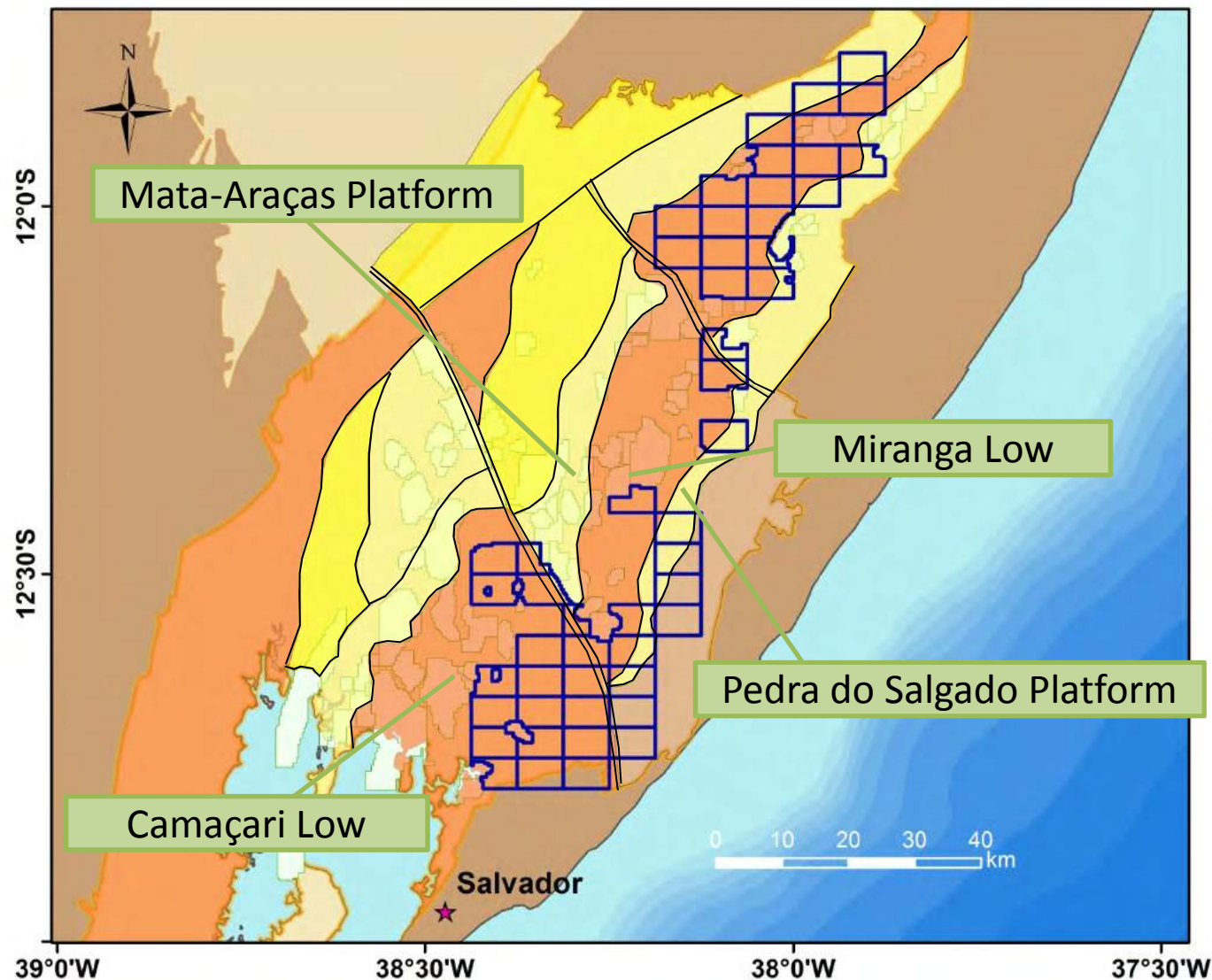
- Transcurrent fault
- General faults
- High
- Low
- Platform
- Ramp



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels







**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Structural Framework



-  Basin limit
-  Basement
-  Round 12 blocks
-  Production fields

## Structural framework

-  Transcurrent fault
-  General faults
-  High
-  Low
-  Platform
-  Ramp



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

**Location**

**Infrastructure and Operational Conditions**

**Exploration Overview**

**Tectonostratigraphic Evolution**

**Petroleum Systems**

**Plays**

**Area on Offer**

**Final Remarks**





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

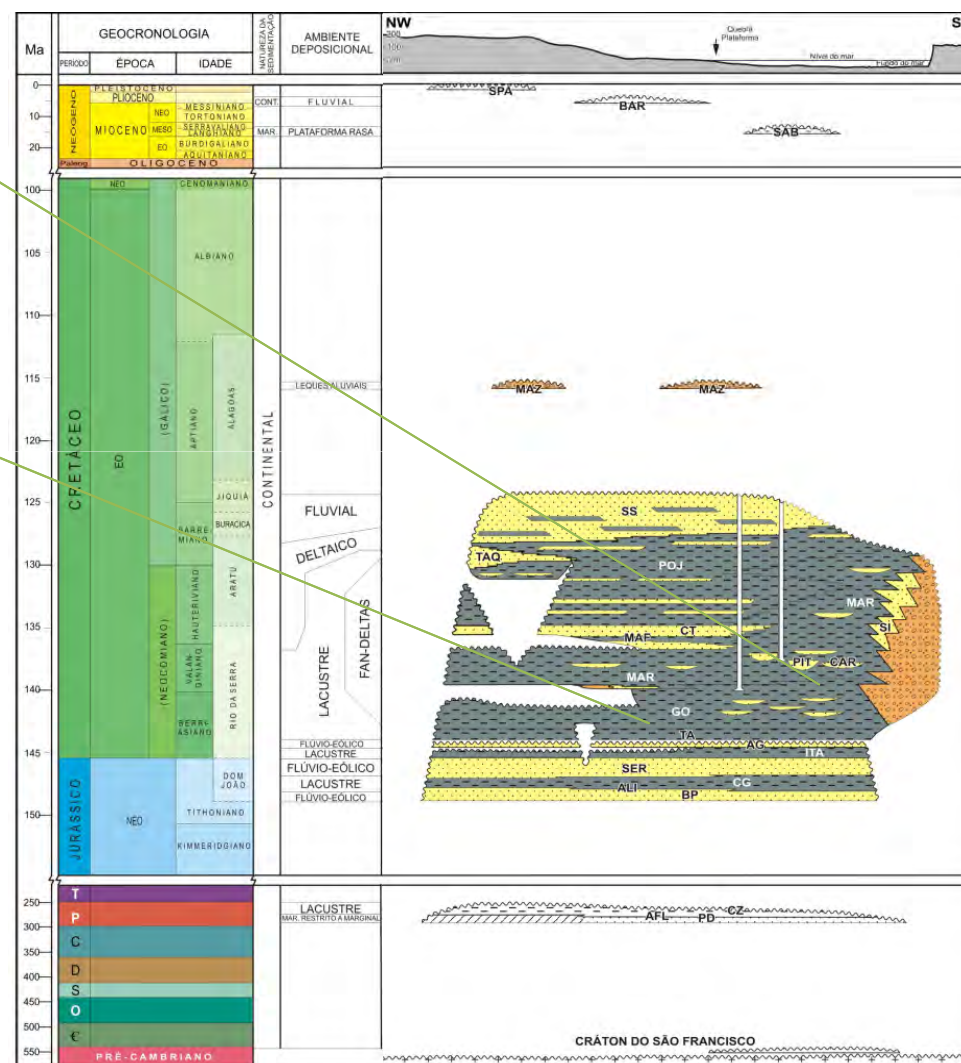
**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Source Rocks

**Berriasian/Valanginian**  
Gomo Member

**Berriasian**  
Tauá Member

TOC<sub>average</sub> = 1-2%  
(up to 10%)  
Kerogen Type I



Source: ANP/UFBA, 2008

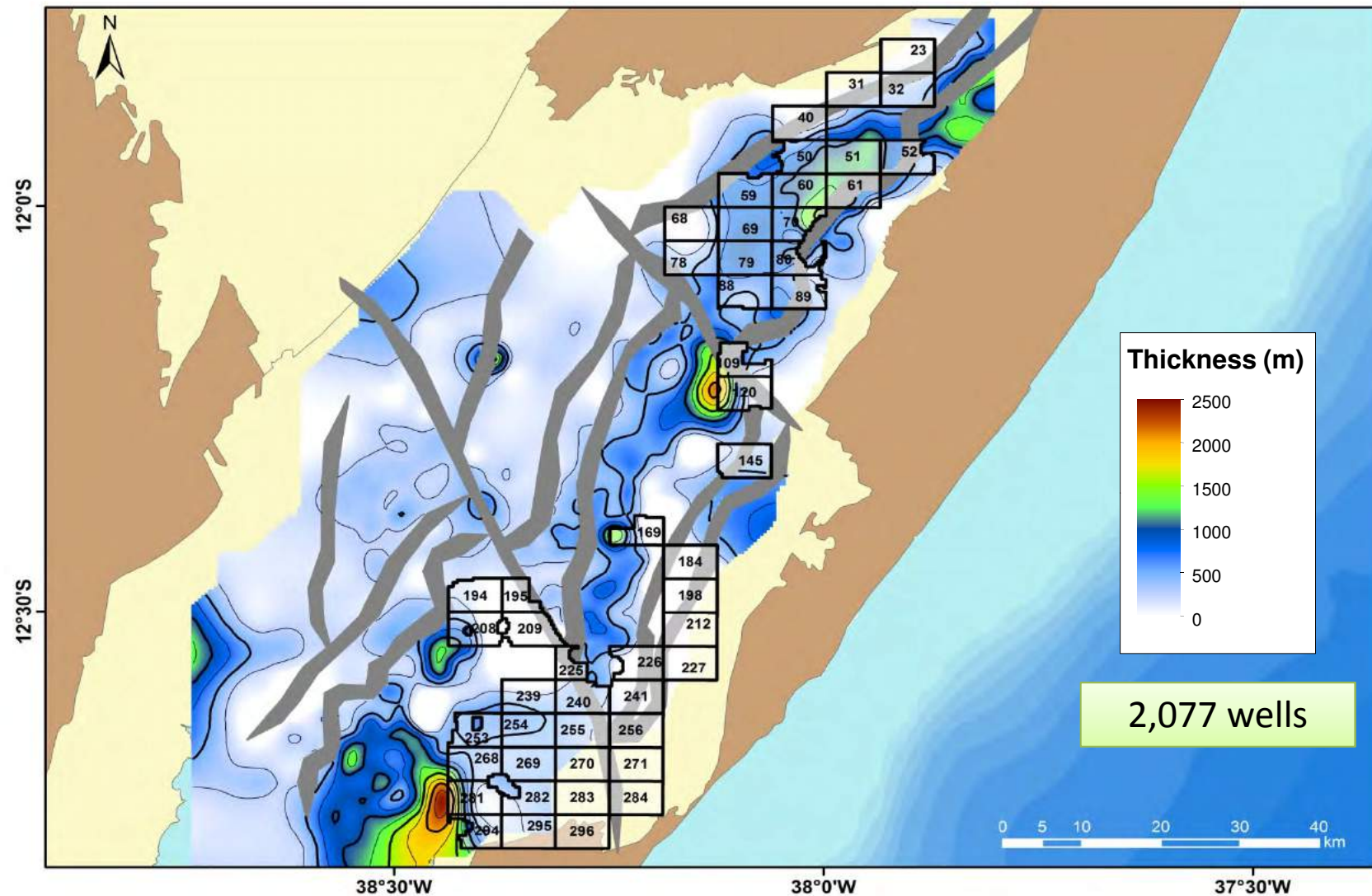
Silva *et al.*, 2007

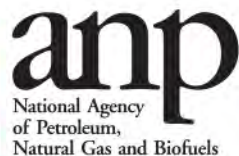


**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Source Rocks





# Brasil 12<sup>th</sup> Round

Oil & Gas Bidding Rounds

## Hauterivian/Barremian

### Ilhas Group

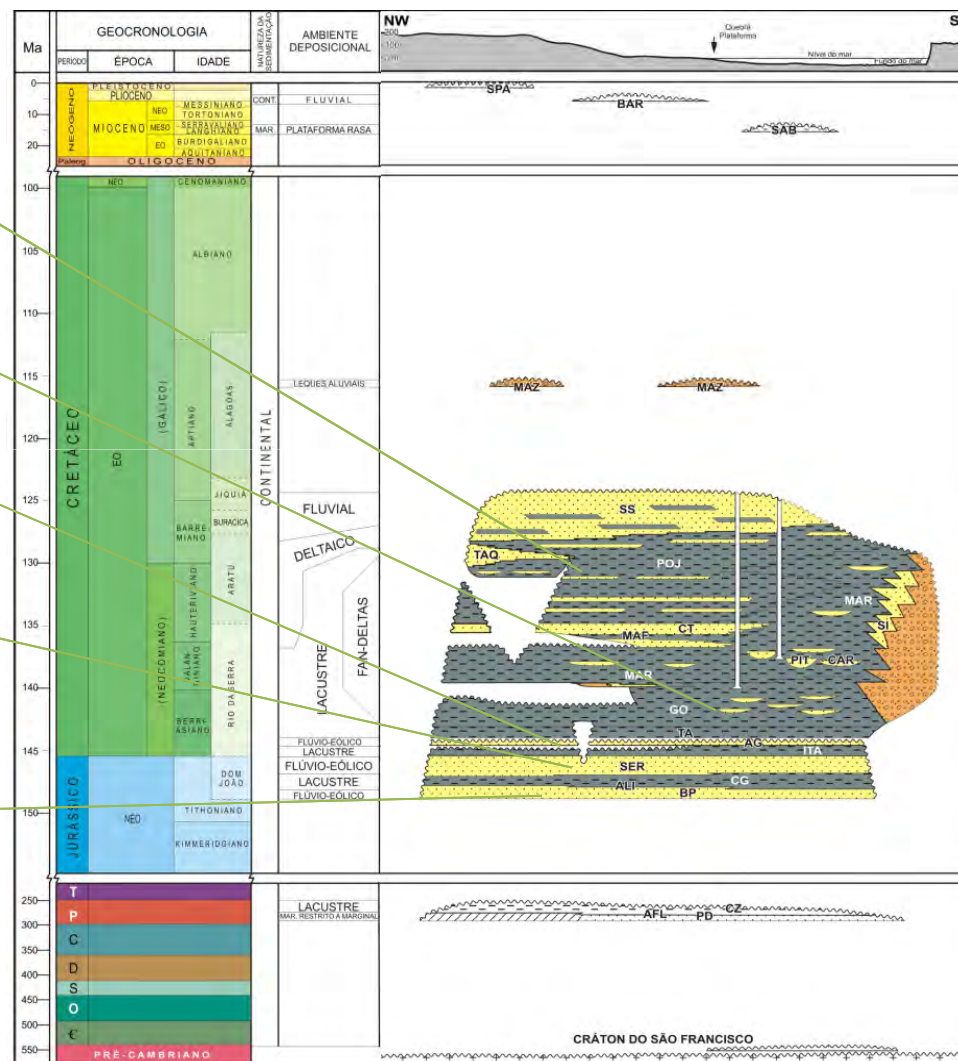
**Berriasian**  
Candeias Formation  
(Pitanga & Caruaçu Member)

## Berriasian

### Água Grande Formation

**Late Jurassic**  
Sergi Formation  
Ø~10 to 20%

**Late Jurassic**  
**Aliança Formation**  
**(Boipeba Member)**



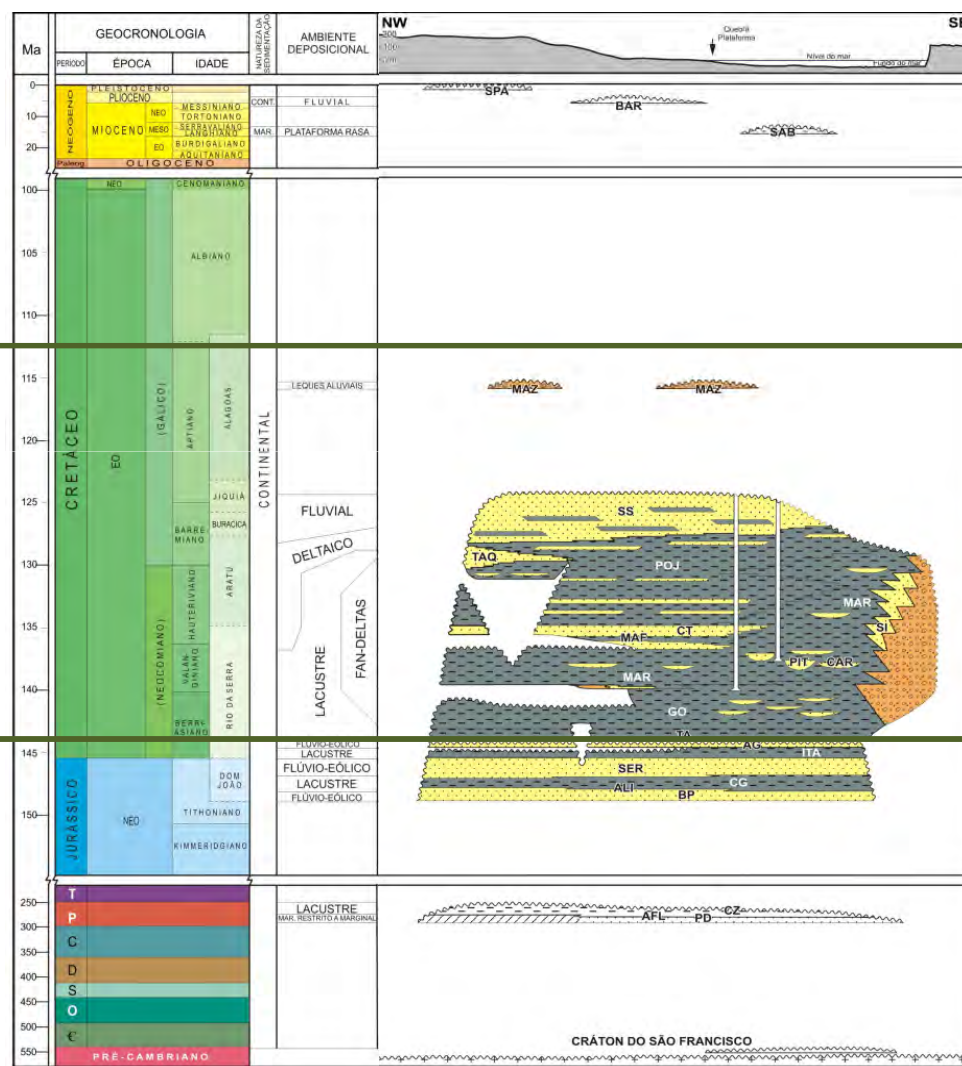
Source: ANP/UFBA, 2008

Silva *et al.*, 2007

# Seals

**Rift and Post-rift**  
Candeias, Maracangalha,  
Marfim and Pojuca Formations

**Pre-Rift**  
Itaparica and Candeias  
Formations

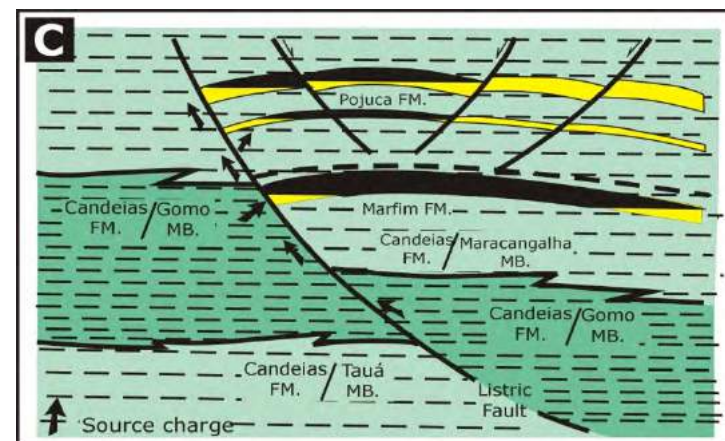
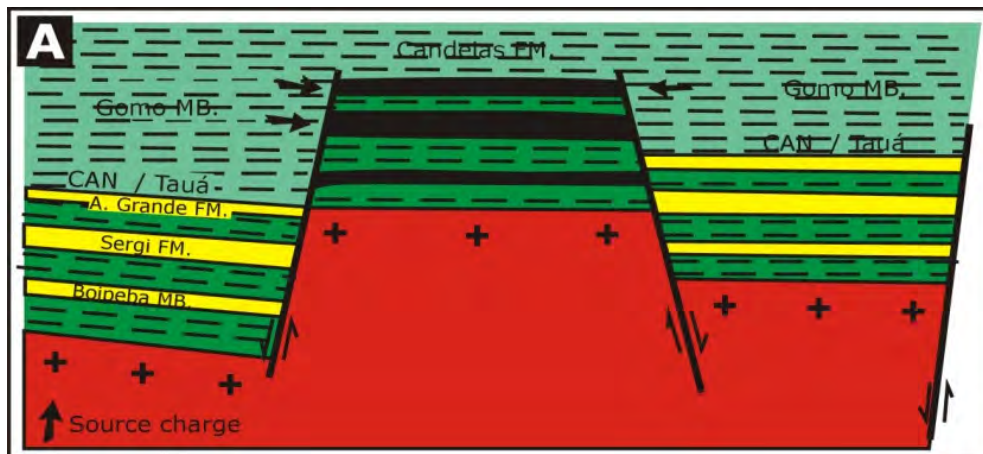




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Petroleum Systems Migration and Traps



## Structural traps

**A) Horsts** – tilted or not;

- ❖ Lateral migration from the blocks low

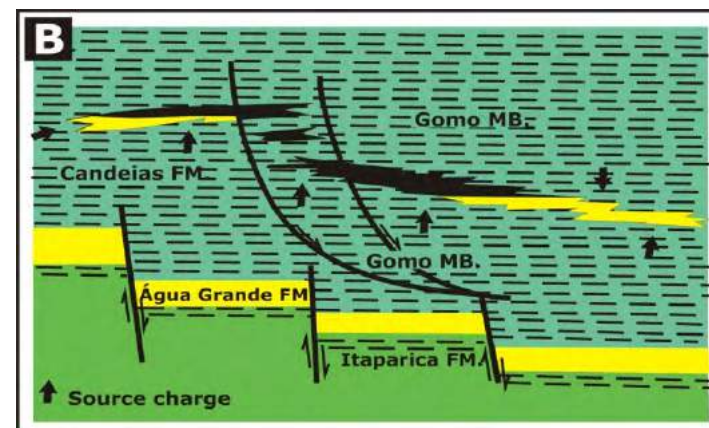
**C) Rollovers** – Growth faults low, blocks of sin-rift section;

- ❖ Vertical migration through regional faults.

## Stratigraphic or combined traps

**B) Turbidites reservoir** of Candeias and Marfim formations

- ❖ Direct migration from short distances.



Santos and Braga, 1989



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

**Location**

**Infrastructure and Operational Conditions**

**Exploration Overview**

**Tectonostratigraphic Evolution**

**Petroleum Systems**

**Plays**

**Area on Offer**

**Final Remarks**





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup>Round**  
Oil & Gas Bidding Rounds

# Conventional Plays

Age	Description
<b>Late Jurassic</b>	Fluvial and eolian sandstones - Sergi Formation
<b>Berriasian</b>	Fluvial and eolian sandstones - Água Grande Formation





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

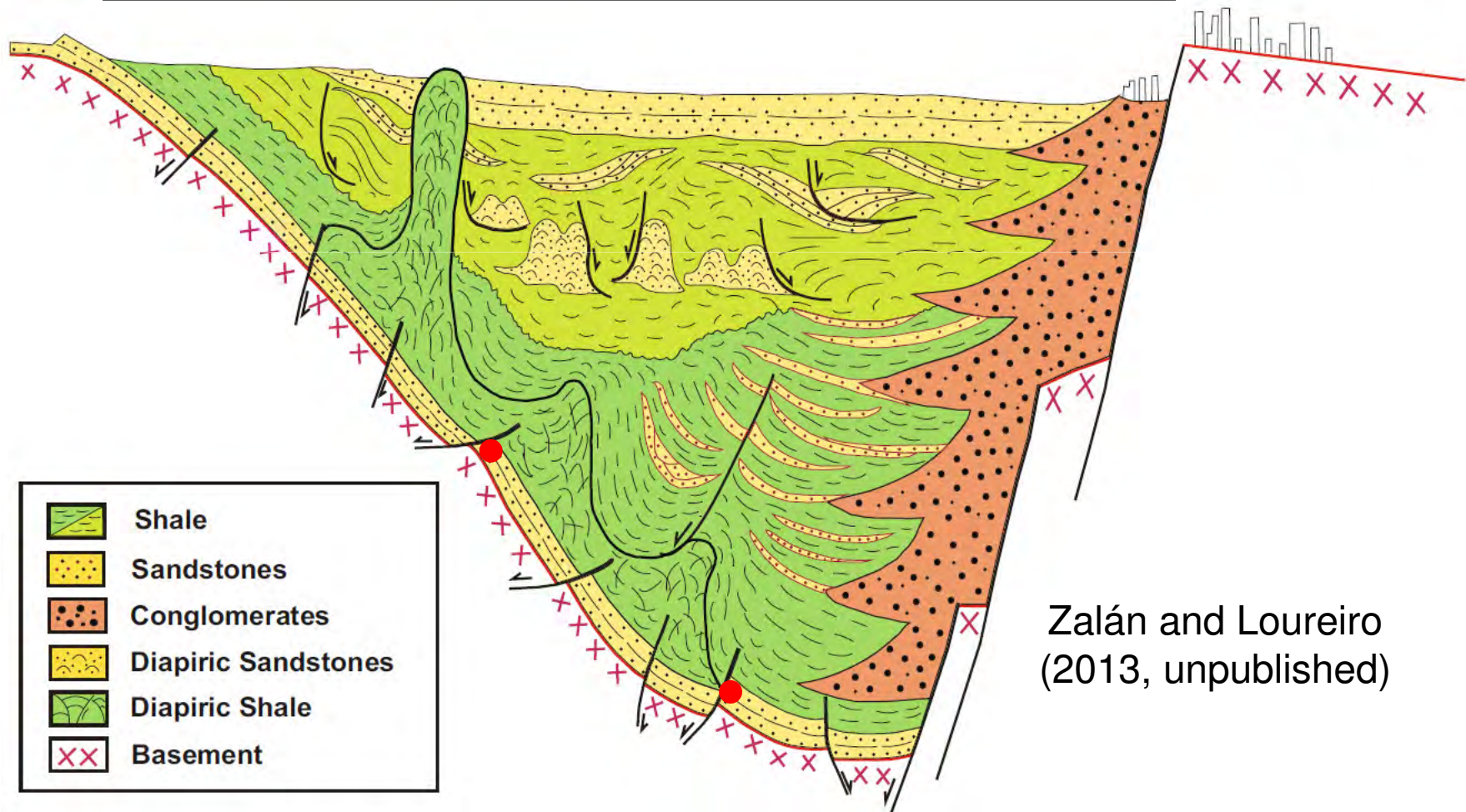
# Conventional Plays

NW

## Late Jurassic

Fluvial and eolic sandstones Sergi and Água Grande Fm

SE





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup>Round**  
Oil & Gas Bidding Rounds

# Unconventional Plays

Age	Description
<b>Neocomian</b>	Deep tight gas sands - Caruaçu Mb
	Fractured shales (diapirs), shale oil or shale gas – Gomo Mb
	Diapiric tight gas sands - Maracangalha Fm – Pitanga Mb

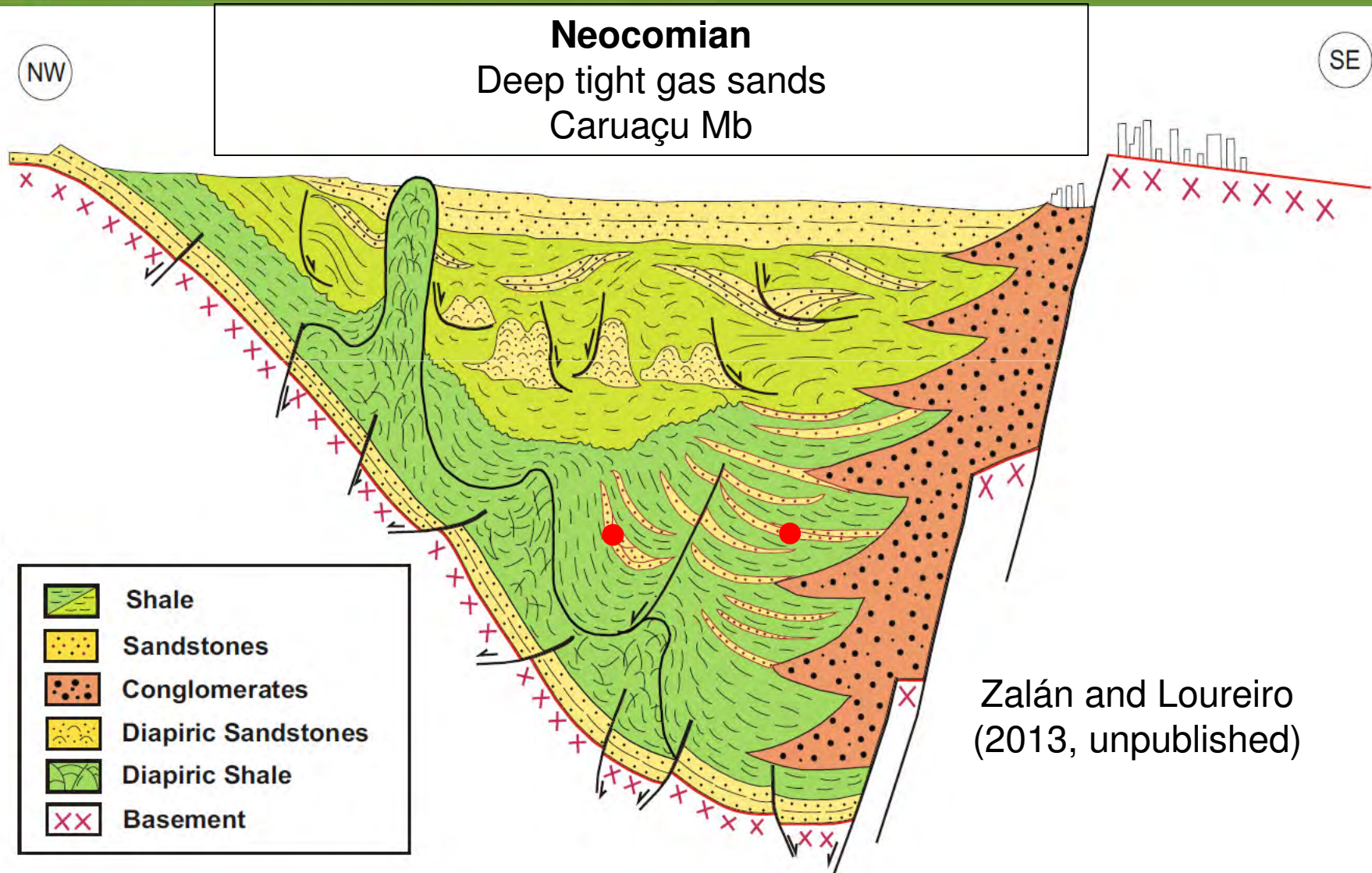




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Unconventional Plays

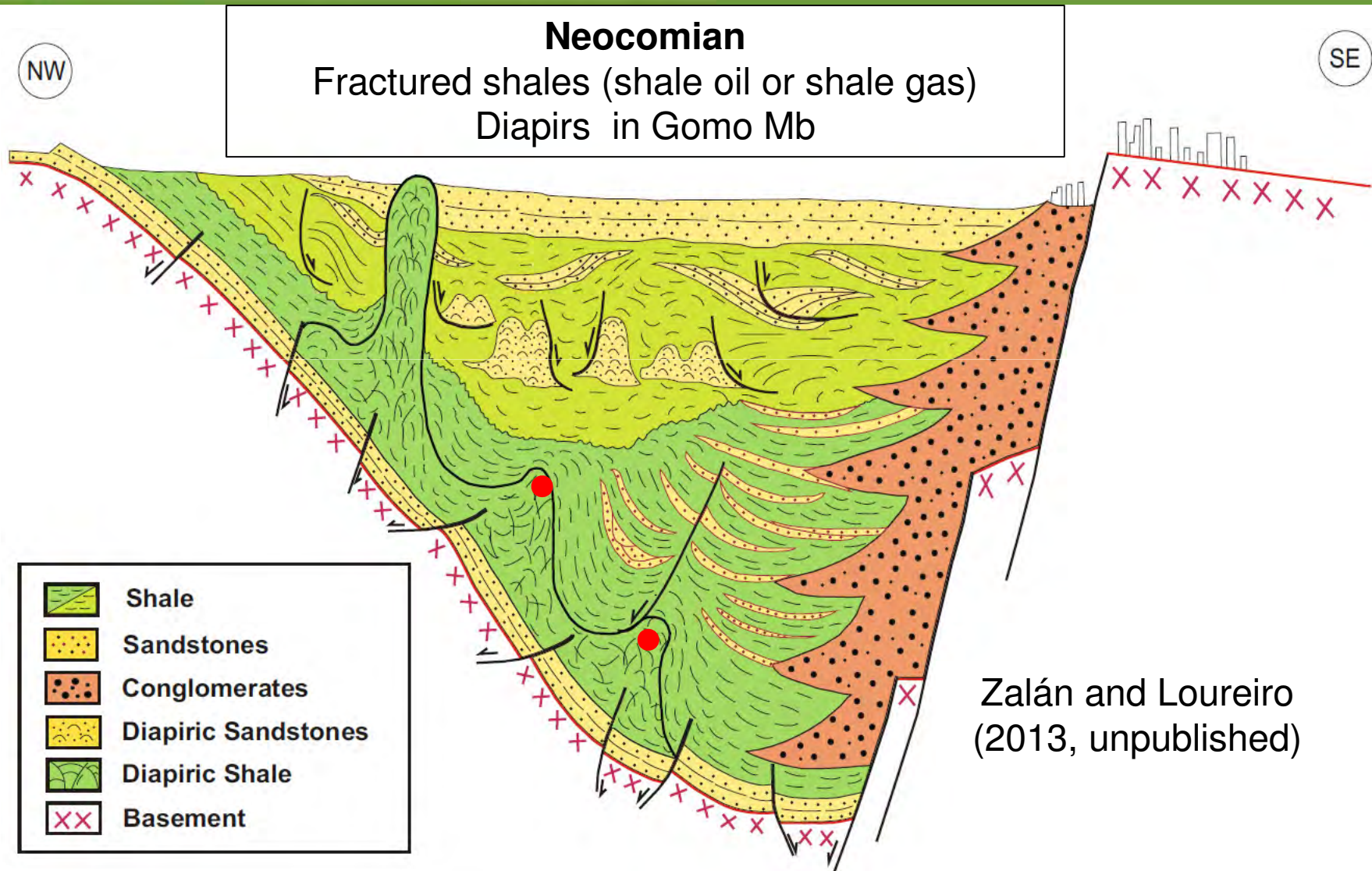




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Unconventional Plays

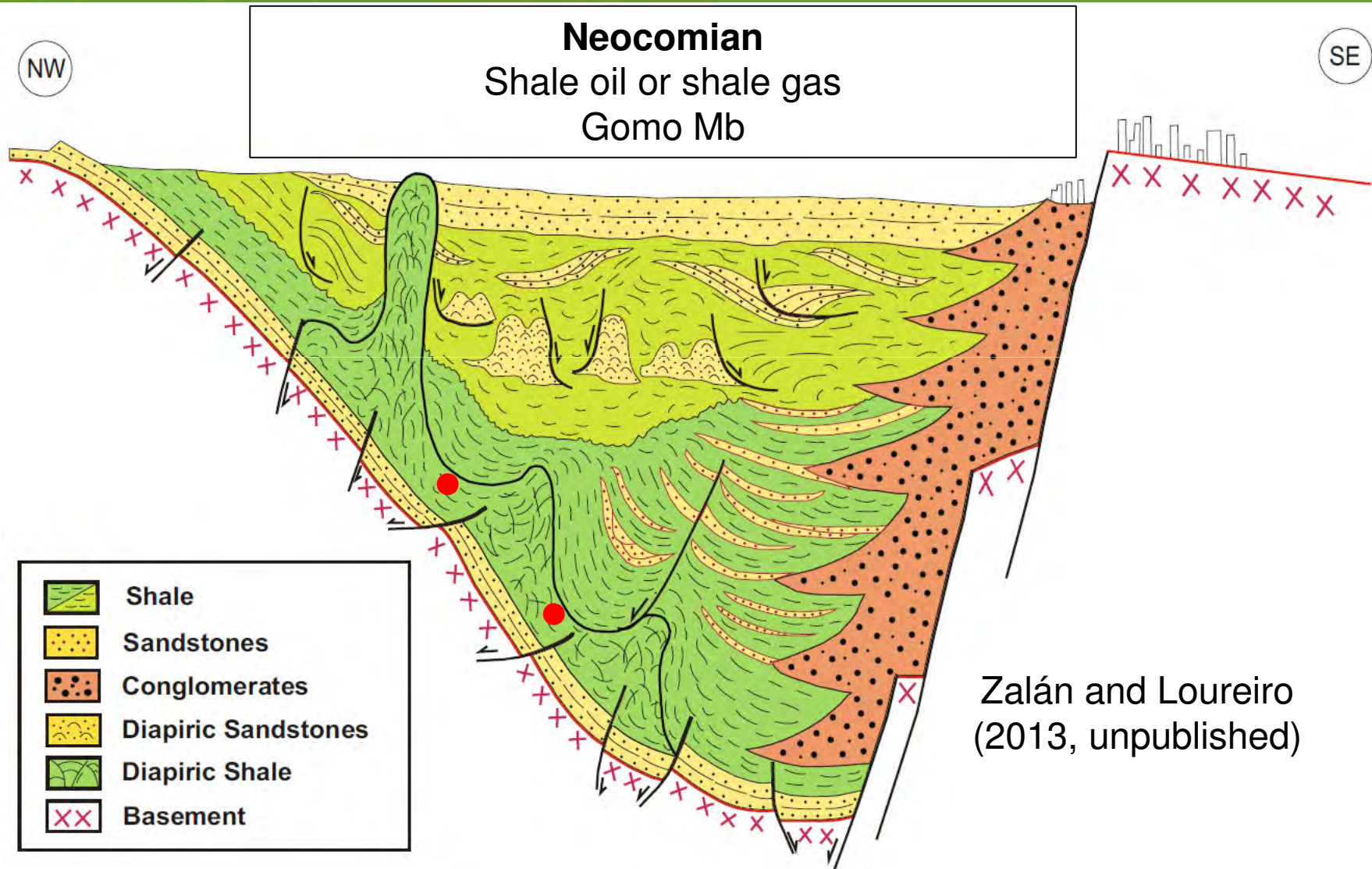




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Unconventional Plays

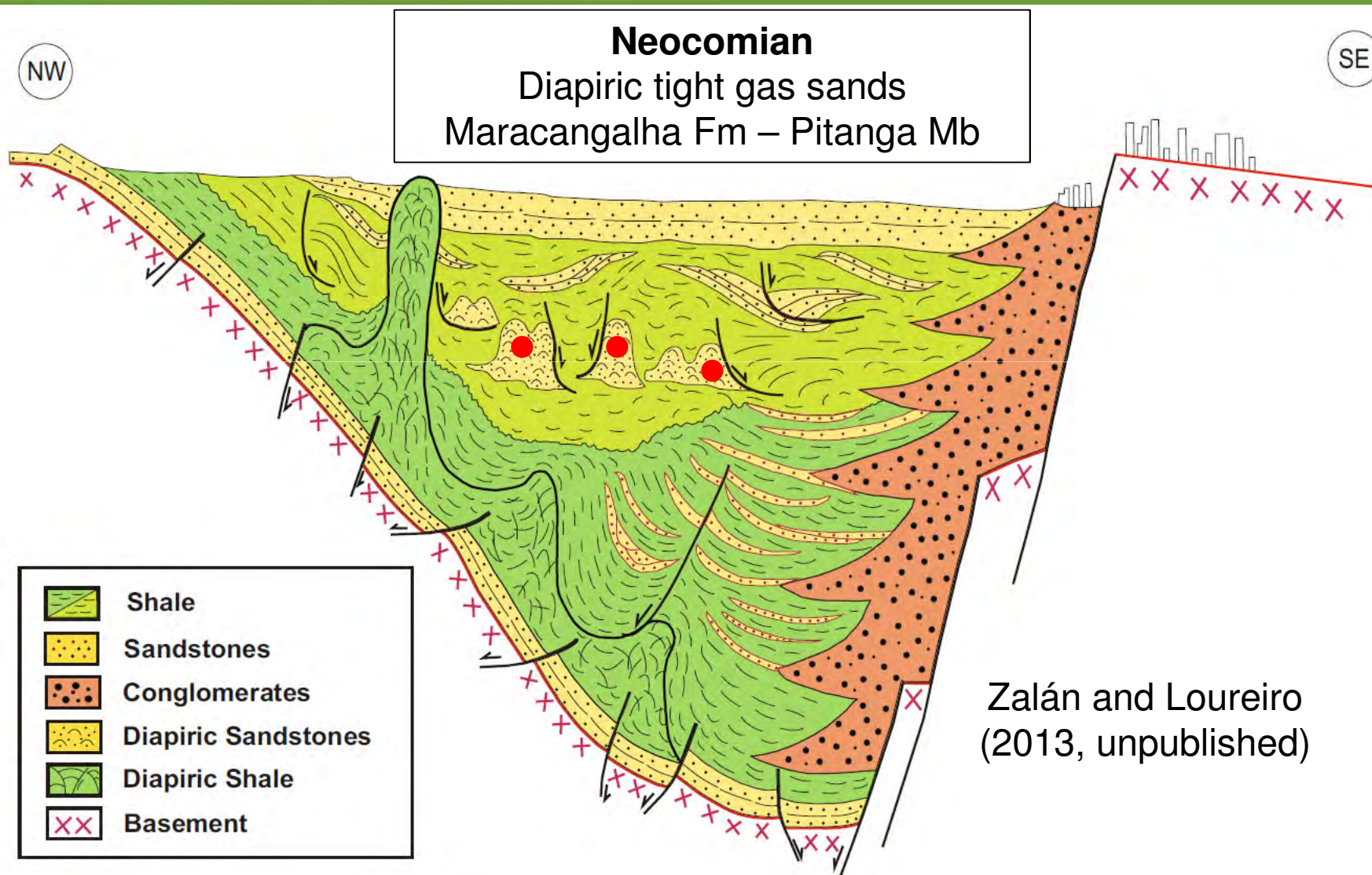




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Unconventional Plays





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

**Location**

**Infrastructure and Operational Conditions**

**Exploration Overview**

**Tectonostratigraphic Evolution**

**Petroleum Systems**

**Plays**

**Area on Offer**

**Final Remarks**

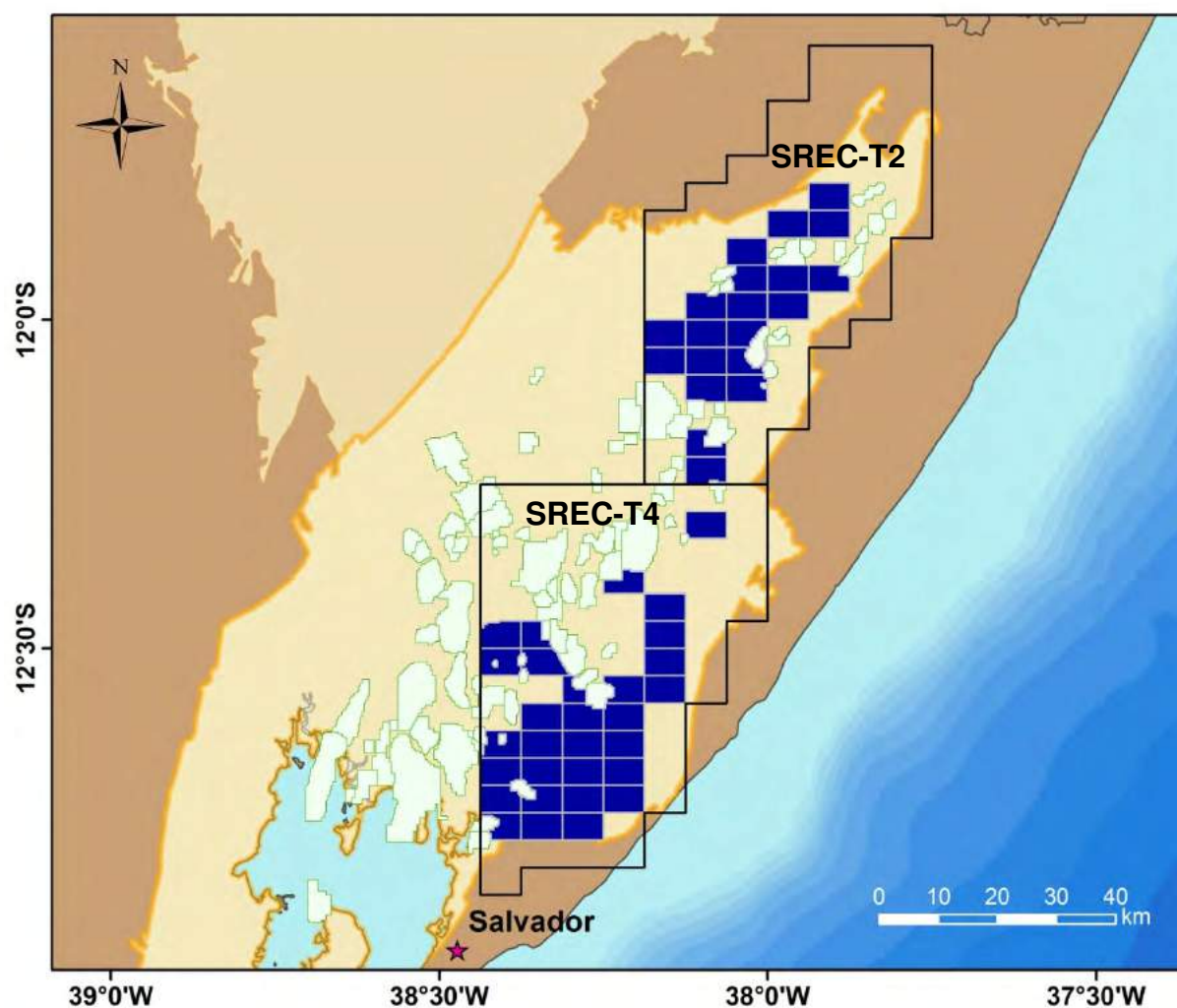




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

## Area on Offer



❖ SREC-T2 and SREC-T4

❖ 50 blocks

❖ 1,452 km<sup>2</sup>

★ Capitals

□ Round 12 Sector

■ Round 12 Blocks

■ Basement

■ Sedimentary Basin

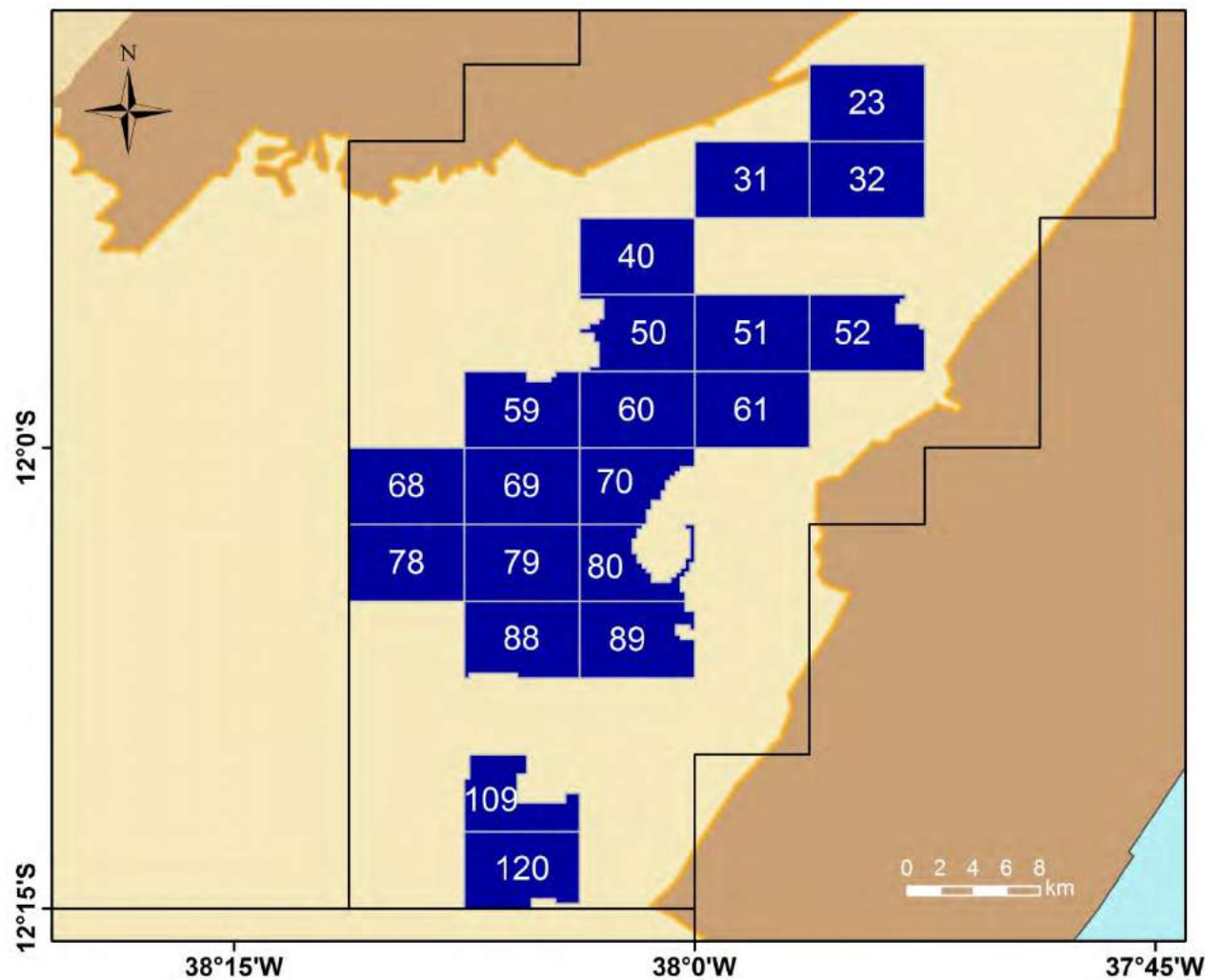
■ Recôncavo Basin



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

## SREC-T2



❖ 20 blocks

❖ 590 km<sup>2</sup>

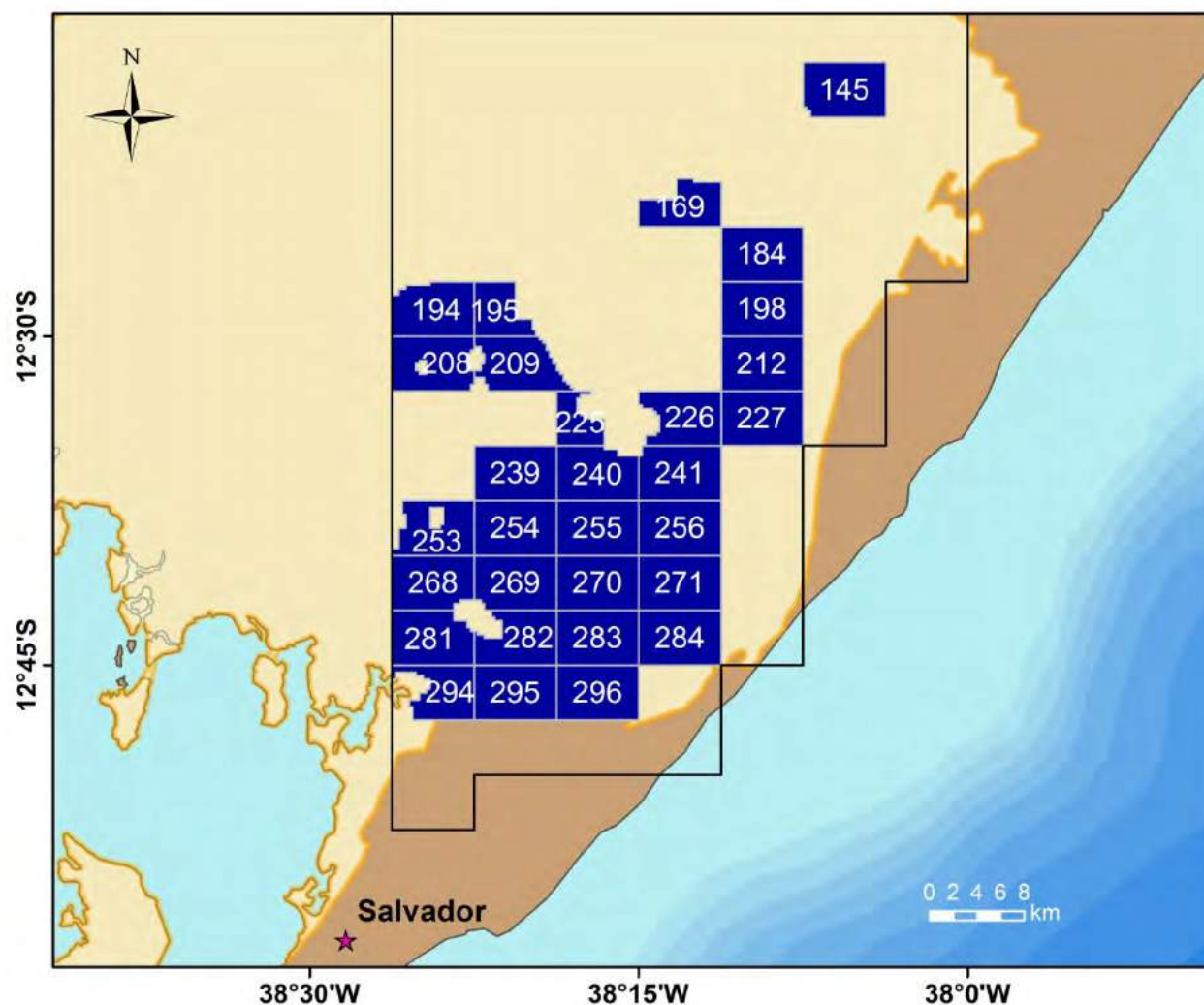
- ★ Capitals
- Round 12 Sector
- Round 12 Blocks
- Basement
- Sedimentary Basin
- Recôncavo Basin



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

## SREC-T4



❖ 30 blocks

❖ 870 km<sup>2</sup>

★ Capitals

□ Round 12 Sector

■ Round 12 Blocks

■ Basement

■ Sedimentary Basin

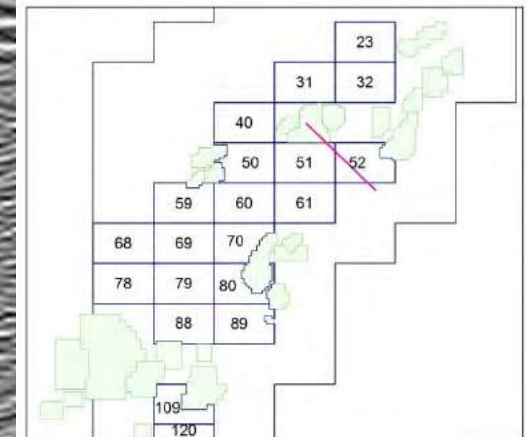
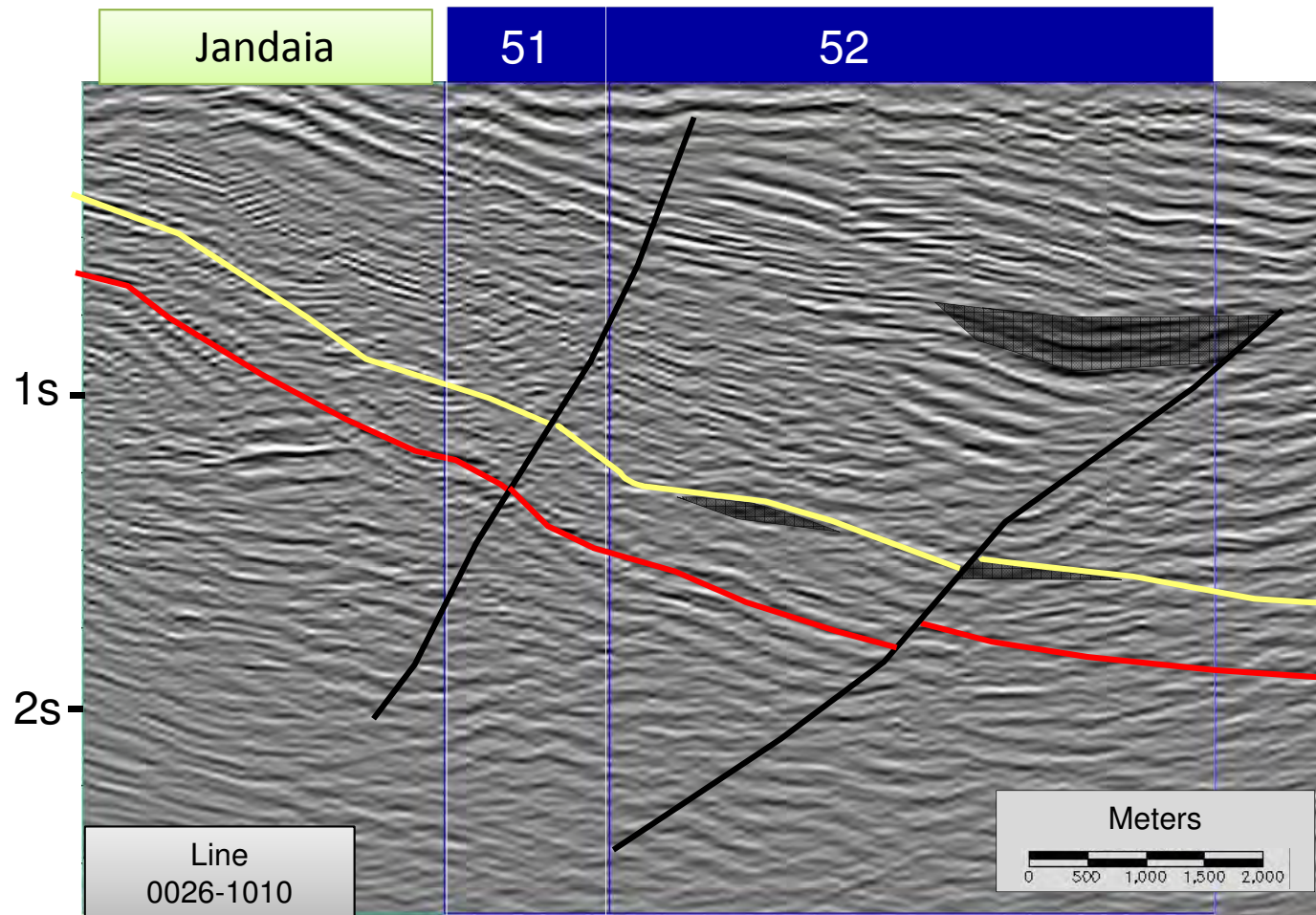
■ Recôncavo Basin



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Leads

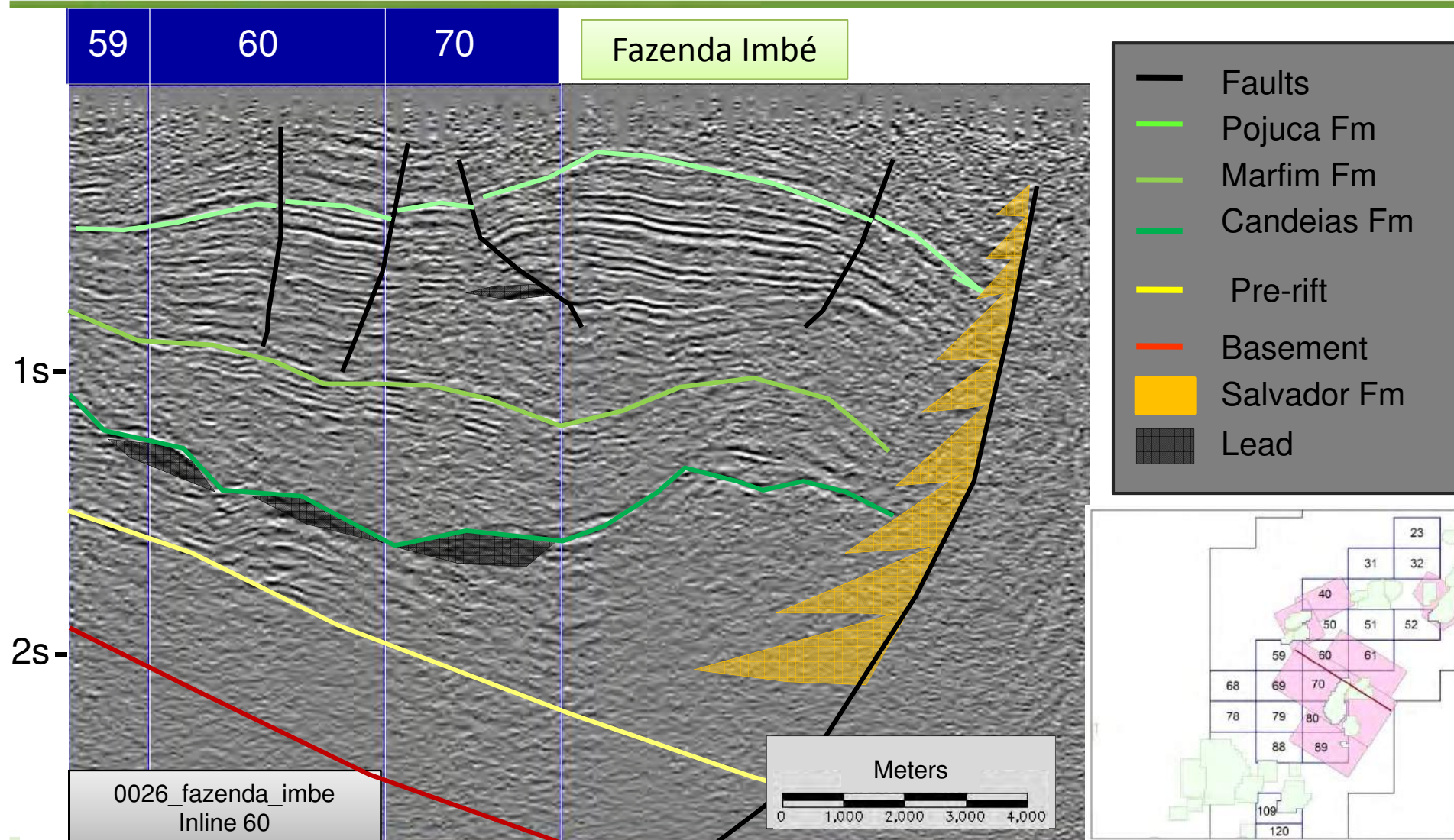




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Leads

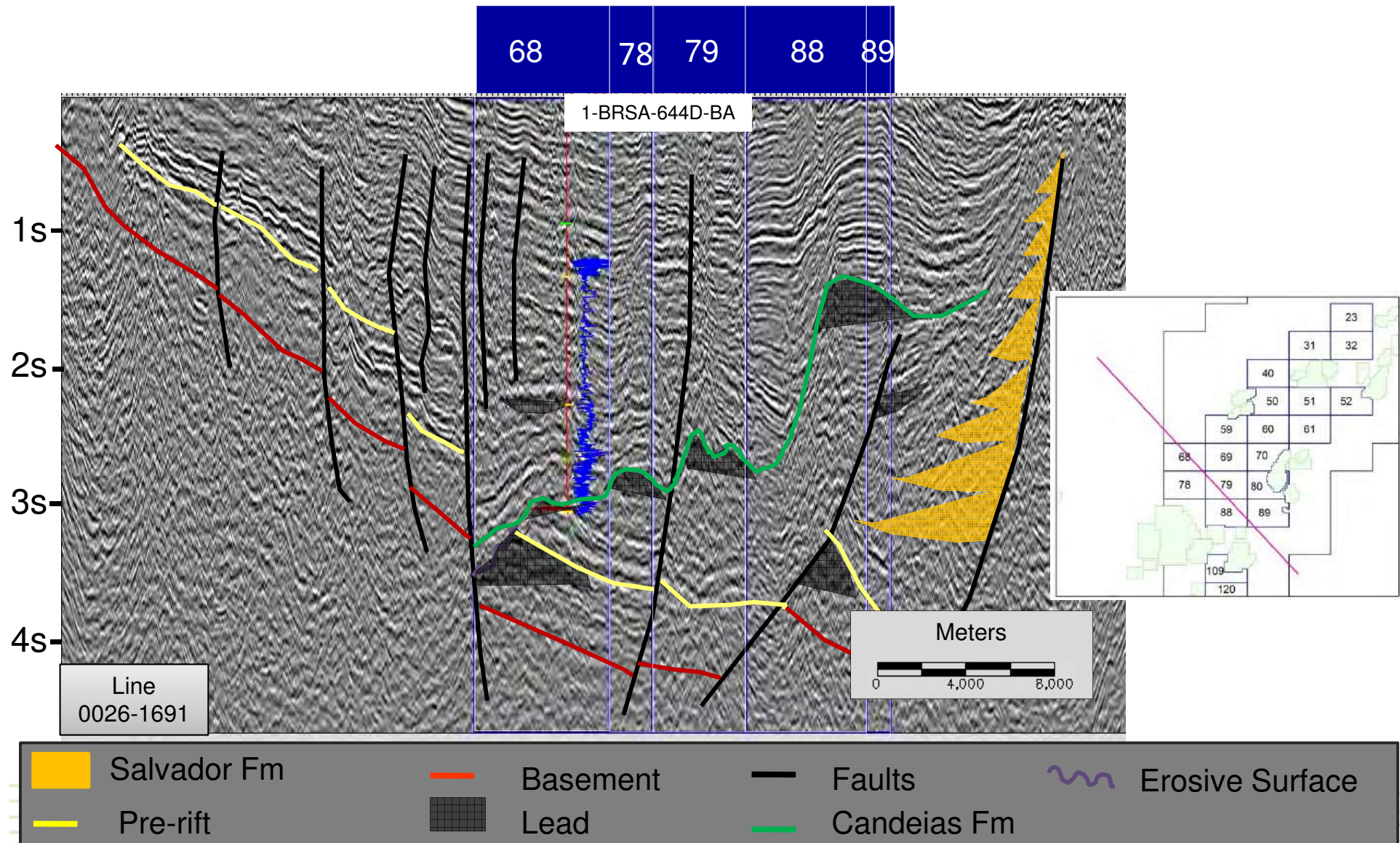




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Leads

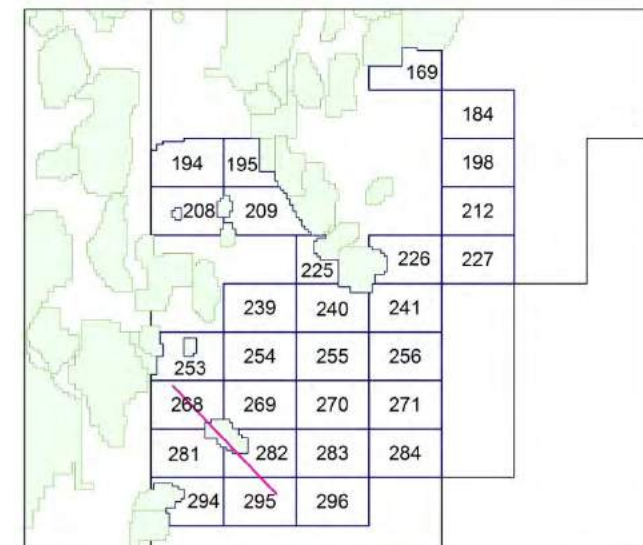
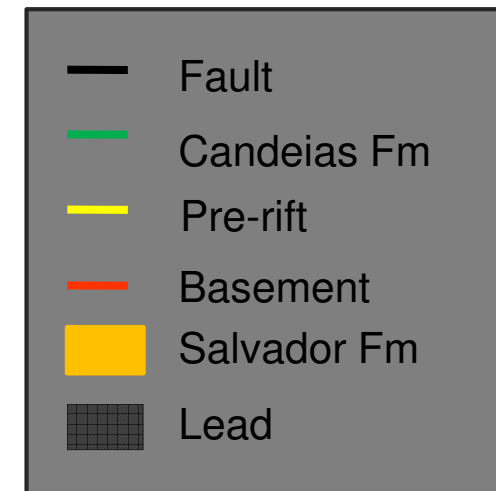
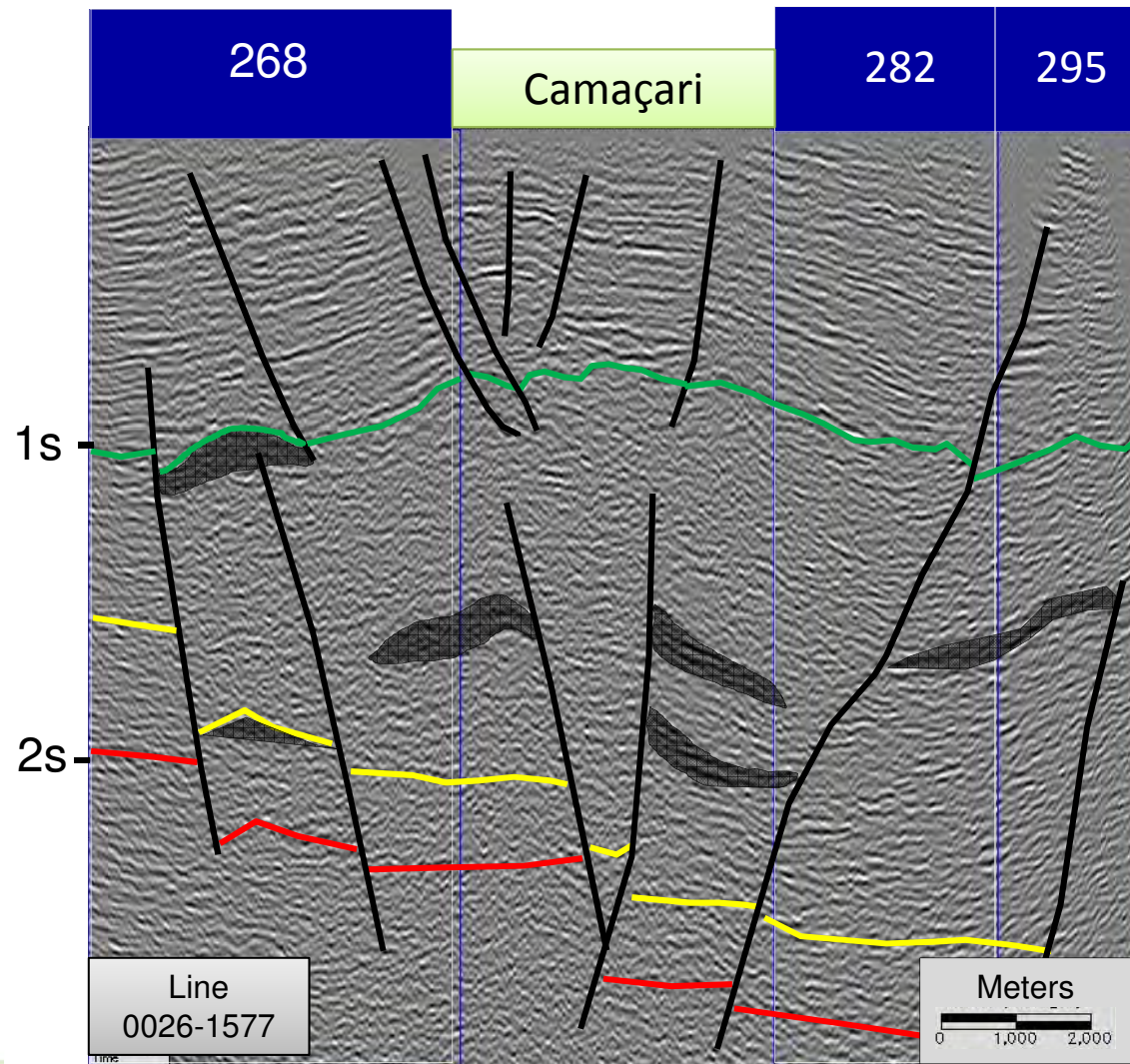




**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Leads

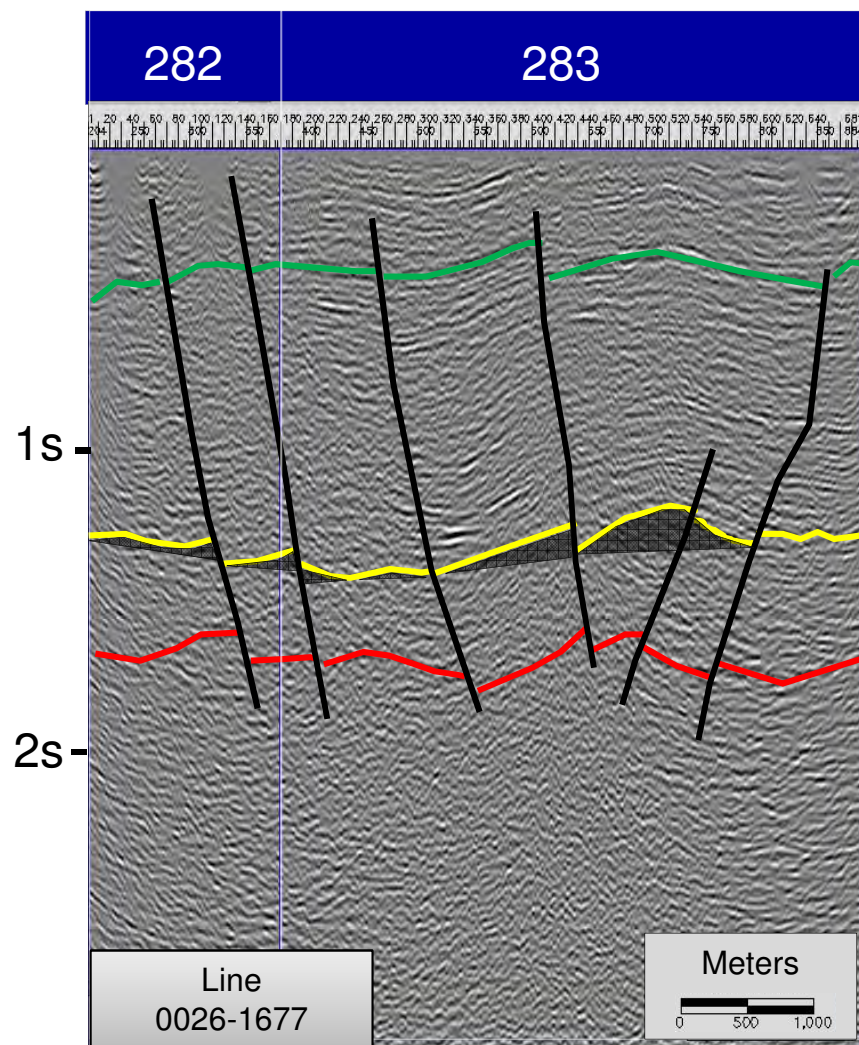




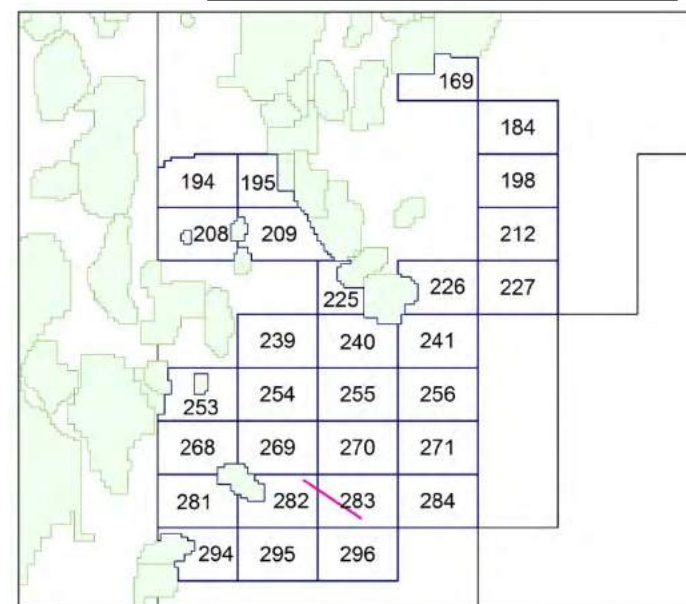
**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# Leads



- Faults
- Gomo Mb
- Pre-rift
- Basement
- Lead





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

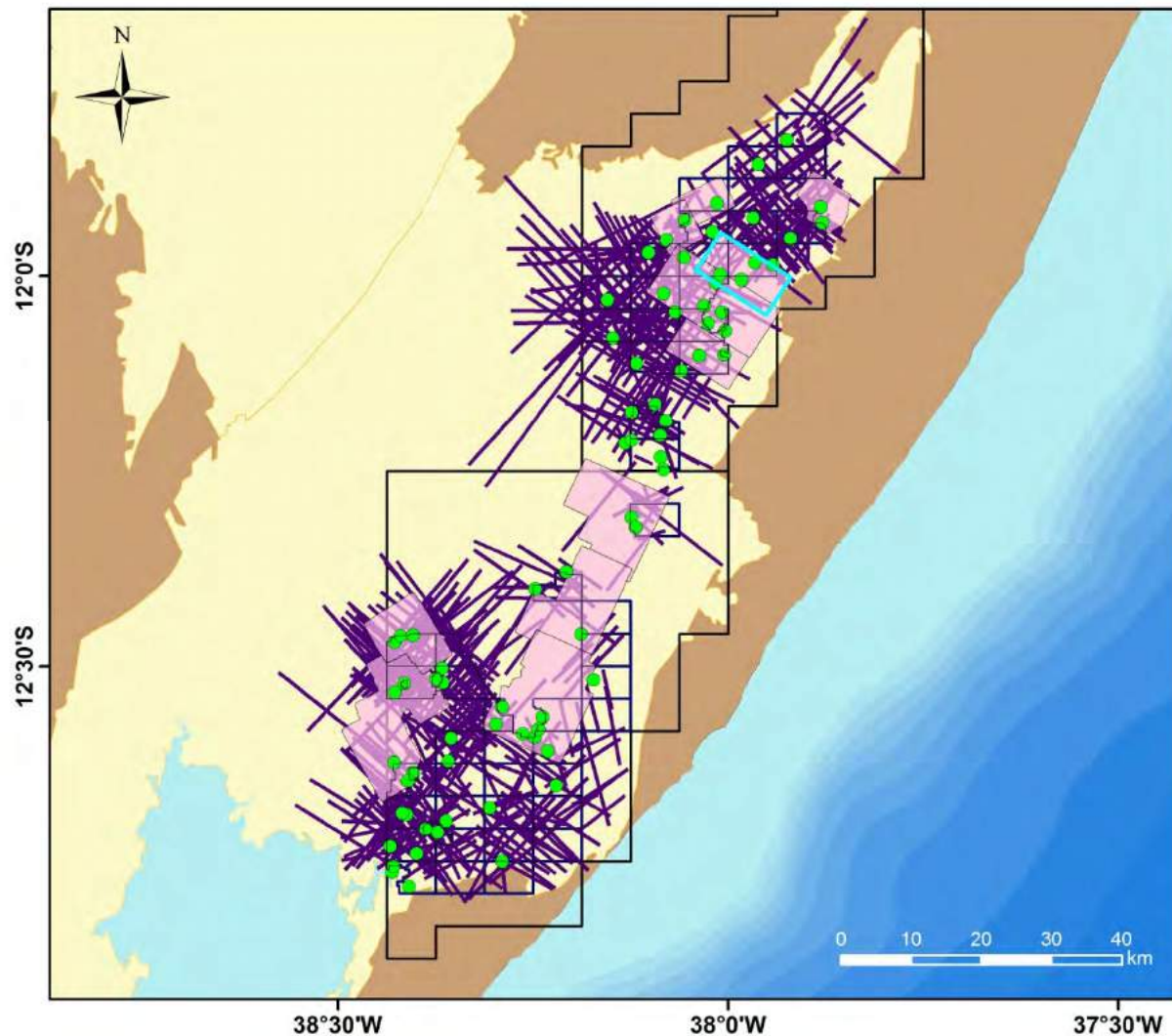
**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds







# Data Package

75 Wells

5,940 km  
2D Seismic

1,109 km<sup>2</sup>  
3D Seismic



-  3D Seismic
-  Exploration wells
-  2D seismic
-  Sector
-  Basement
-  Sedimentary basin



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup>Round**  
Oil & Gas Bidding Rounds

## Contractual Aspects

	SREC-T2 and SREC-T4
Exploration Model	Mature basin
Number of Blocks	50
Area on Offer	1,451.89 km <sup>2</sup>
Exploration Phase	5 years
Exploration Period	3 + 2 years
Technical Qualification of the Operator	C
Minimum Bonus	R\$ 169,181.18 to R\$ 367,040.59
Exploration Objective	Late Jurassic (Sergi Formation)
Stratigraphic Objective	Berriasian (Gomo Mb/Candeias Fm)



**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

**Location**

**Infrastructure and Operational Conditions**

**Exploration Overview**

**Tectonostratigraphic Evolution**

**Petroleum Systems**

**Plays**

**Area on Offer**

**Final Remarks**





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup>Round**  
Oil & Gas Bidding Rounds

# Final Remarks

- ❖ Mature Basin;
- ❖ Infrastructure for the oil and gas industry;
- ❖ Near to potential consumer market;
- ❖ Shallow and deep leads;
- ❖ Excellent opportunities for small and medium-sized companies;
- ❖ Conventional and unconventional plays.





**anp**  
National Agency  
of Petroleum,  
Natural Gas and Biofuels

**Brasil**  
**12<sup>th</sup> Round**  
Oil & Gas Bidding Rounds

# National Agency of Petroleum, Natural Gas and Biofuels

Elaine Loureiro: [eloureiro@anp.gov.br](mailto:eloureiro@anp.gov.br)  
Rosemari Fabianovicz: [rfabianovicz@anp.gov.br](mailto:rfabianovicz@anp.gov.br)

**[www.anp.gov.br](http://www.anp.gov.br)**

