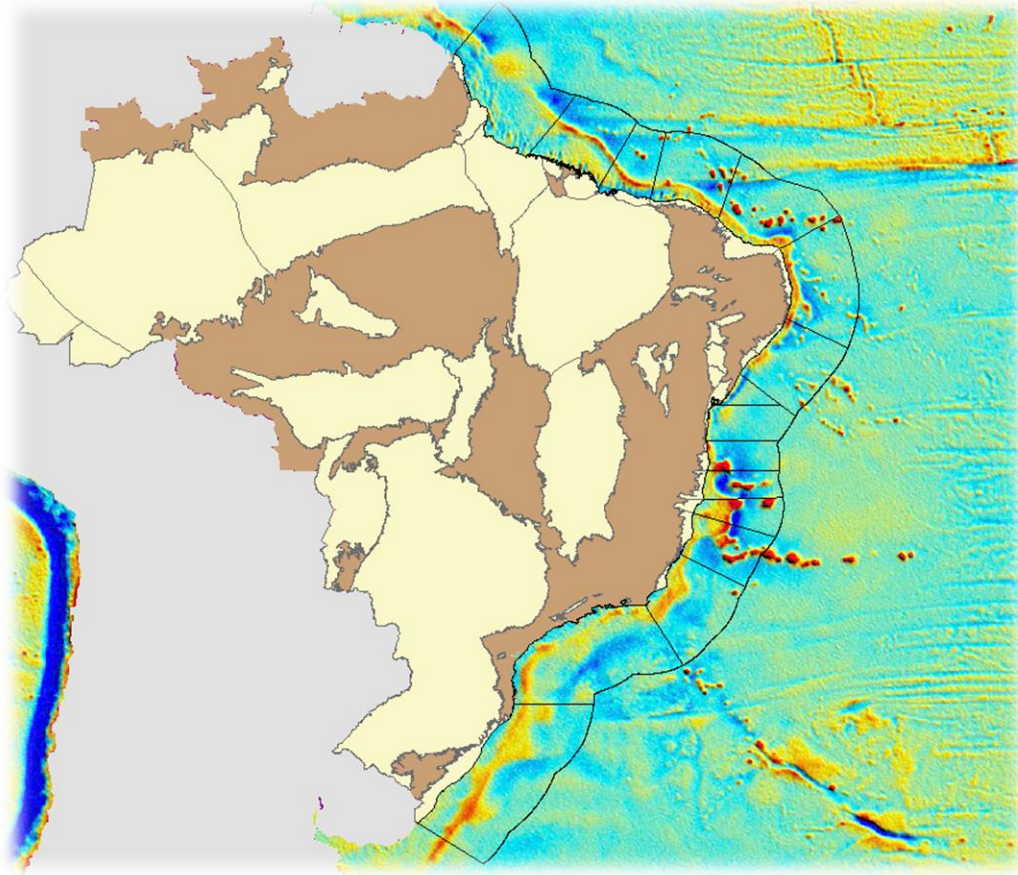


# Upcoming Bid Rounds in Brazil – Geological Aspects of Brazilian Basins

**Carlos Mikael Arnemann Batista**  
Coordinator of Brazilian Petroleum Potential Assessment  
Superintendency of Geological & Economic Assessment



# Outline

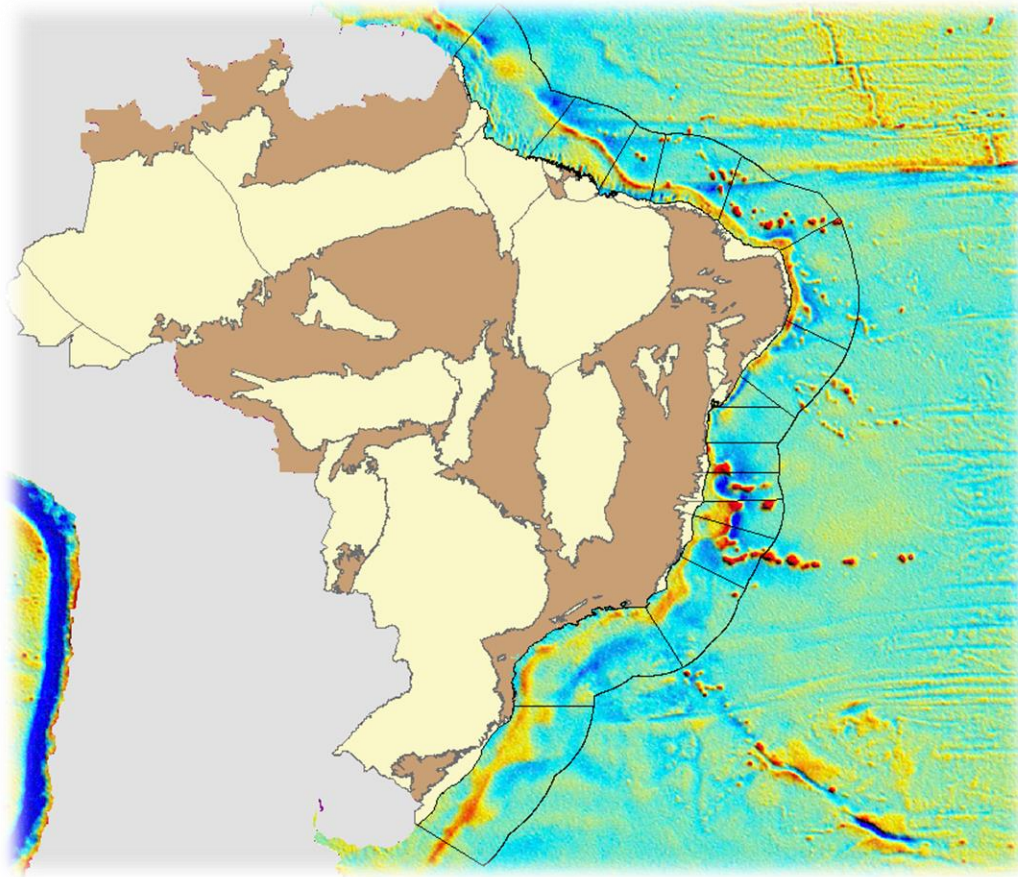


- Brazil E&P Overview
- Open Acreage Areas
  - Offshore – Pre-salt & Pos-salt
  - Onshore – Mature & Frontier Basins
- 17<sup>th</sup> Bidding Round Areas
- 7<sup>th</sup> Production Sharing Round
- What's next?
- Final Remarks





# Outline

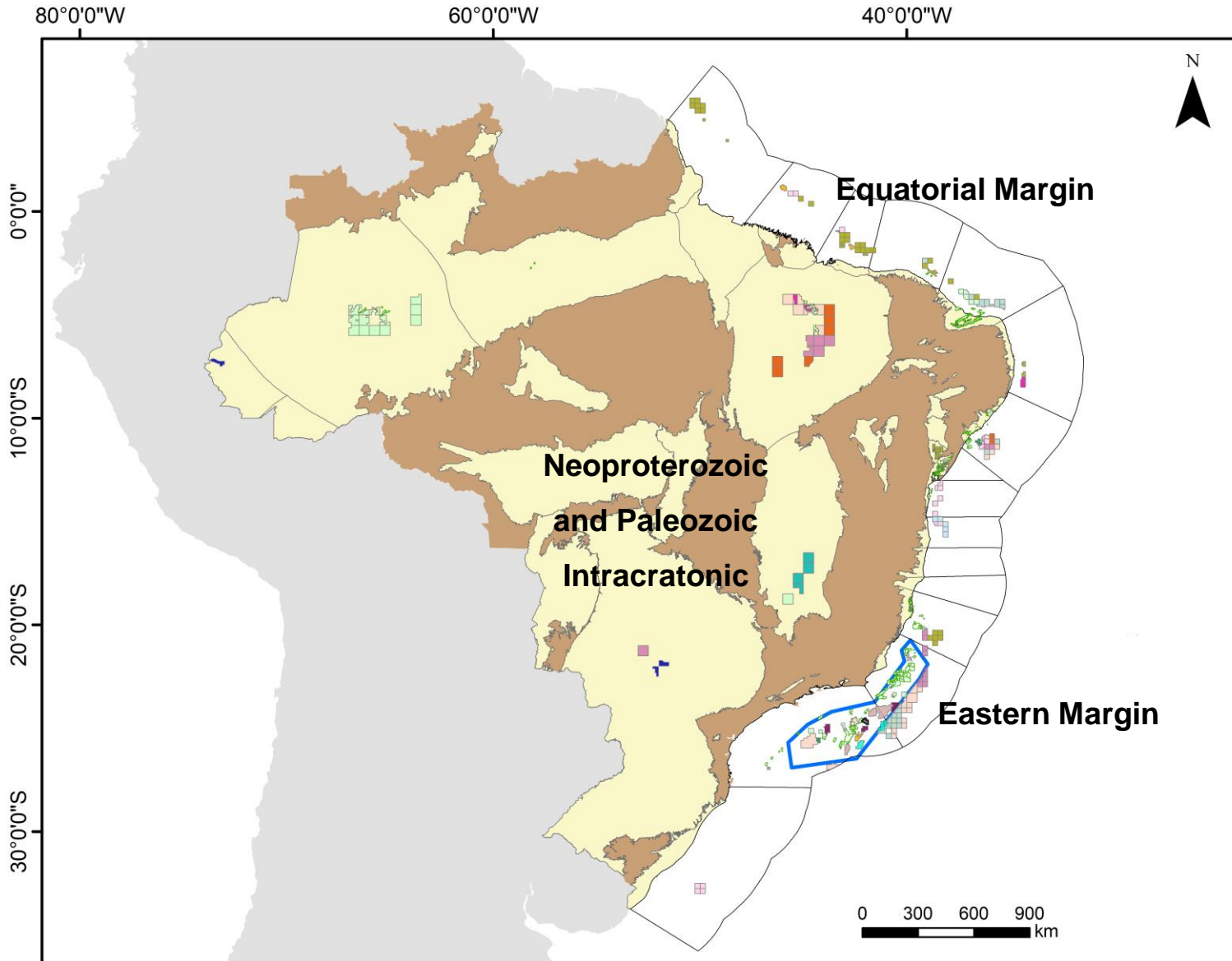


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# Exploratory Overview

**Sedimentary Area: 7,5 million km<sup>2</sup>**



Area in Concession  
~ 250,000 km<sup>2</sup>

270 Exploratory Blocks

448 Fields

35 Operators

### **Production**

(July, 2020)

Oil 3.07 million barrels/d

Natural Gas 130 million m<sup>3</sup>/d

### **Proved Reserves**

(Dez, 2019)

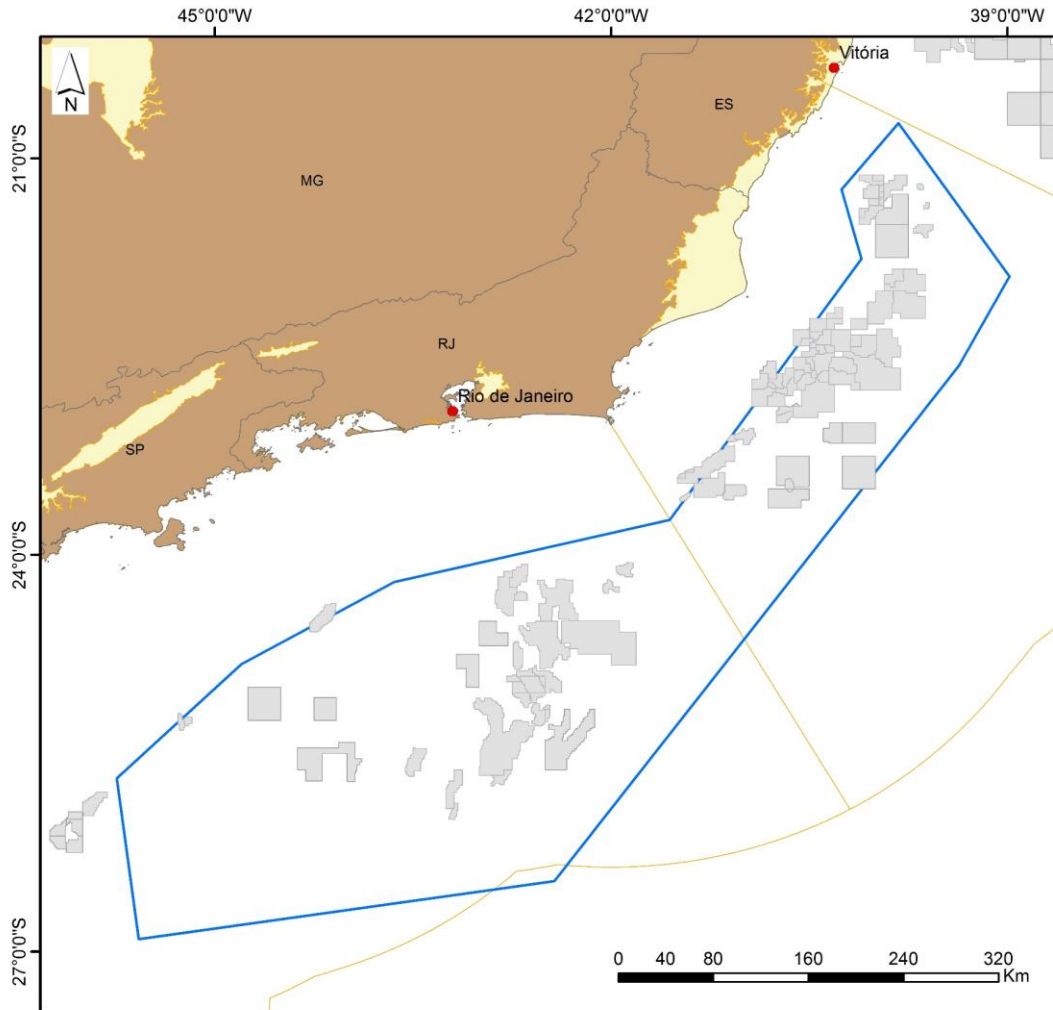
Oil 12.7 billion barrels

Natural Gas 364 billion m<sup>3</sup>

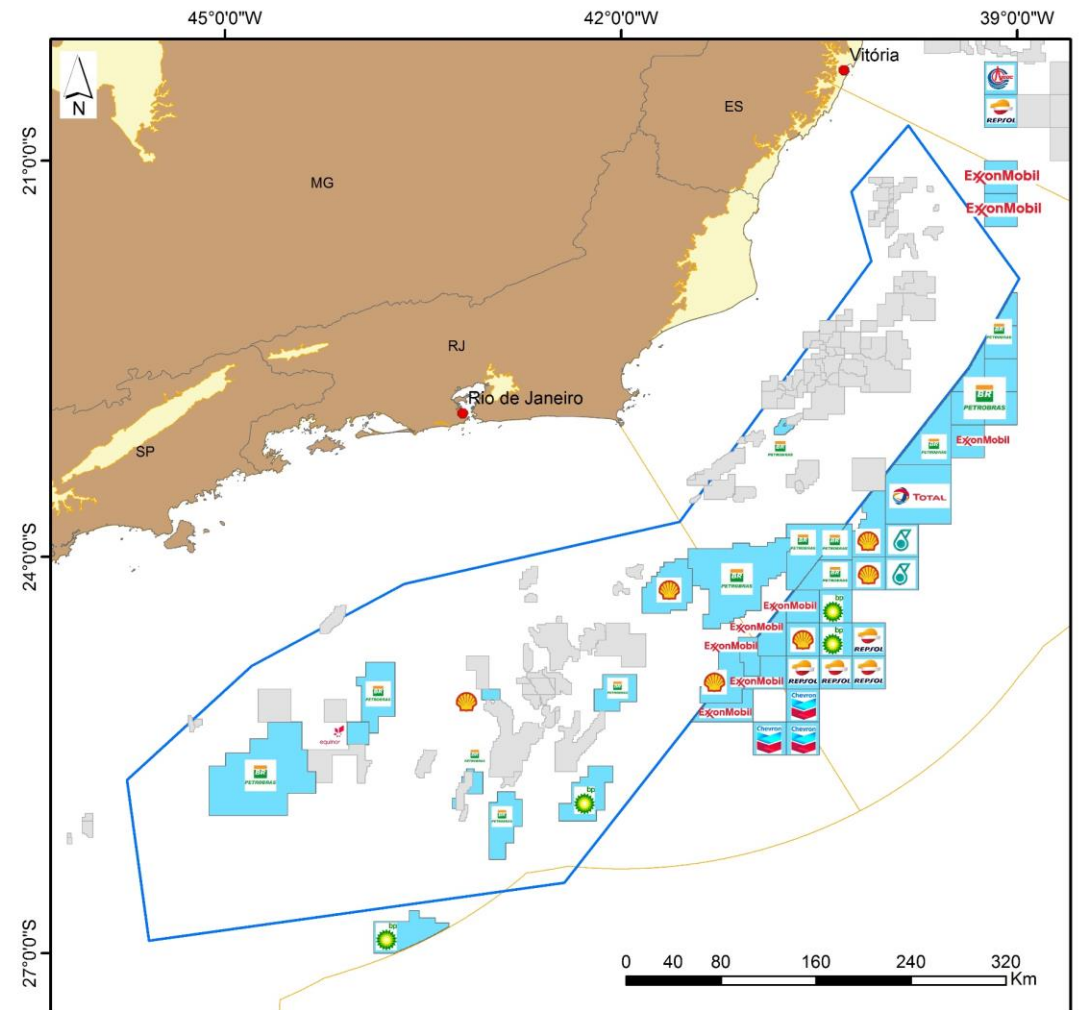
**10<sup>th</sup> world largest petroleum producer, largest from Latin America**

# Recent Auctions Results

June 2016

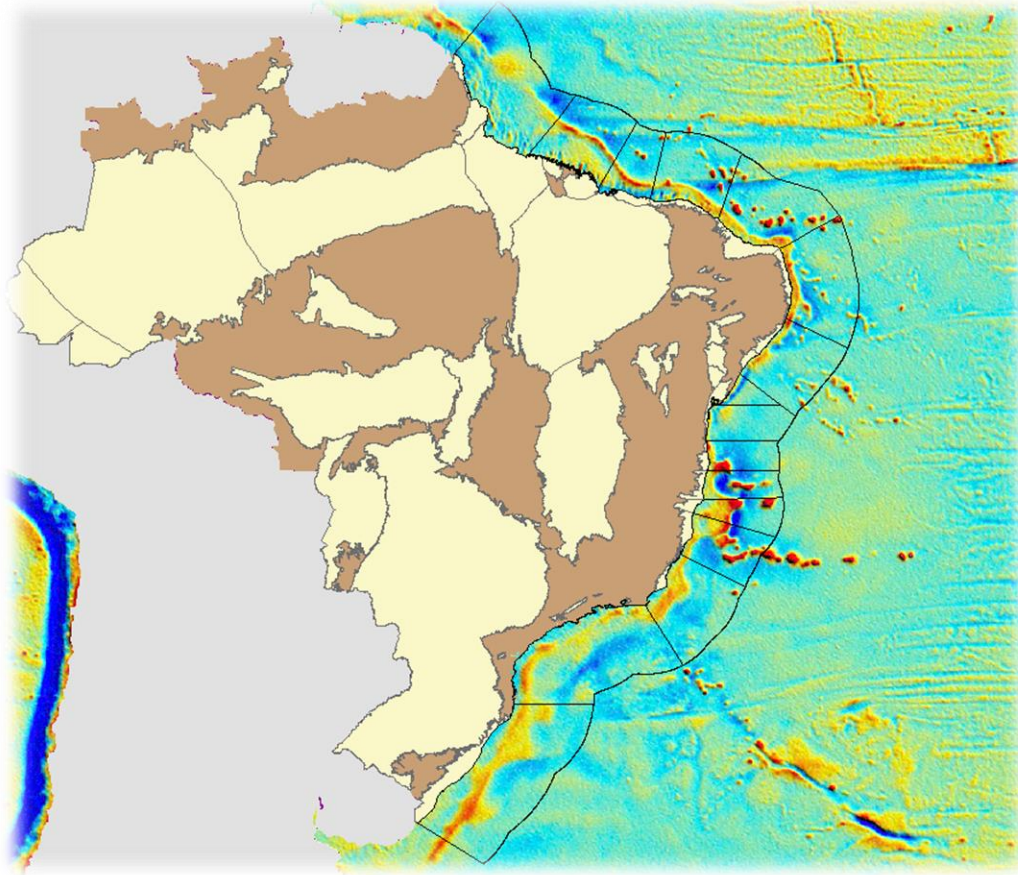


January 2020





# Outline

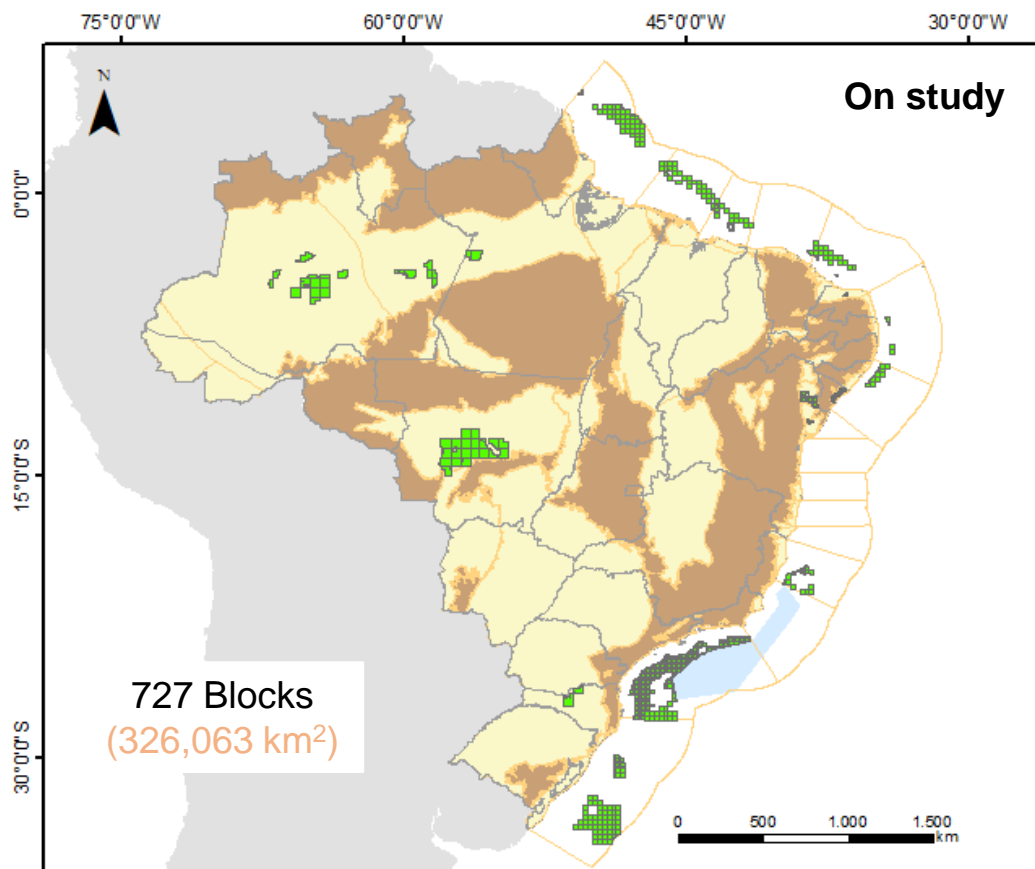


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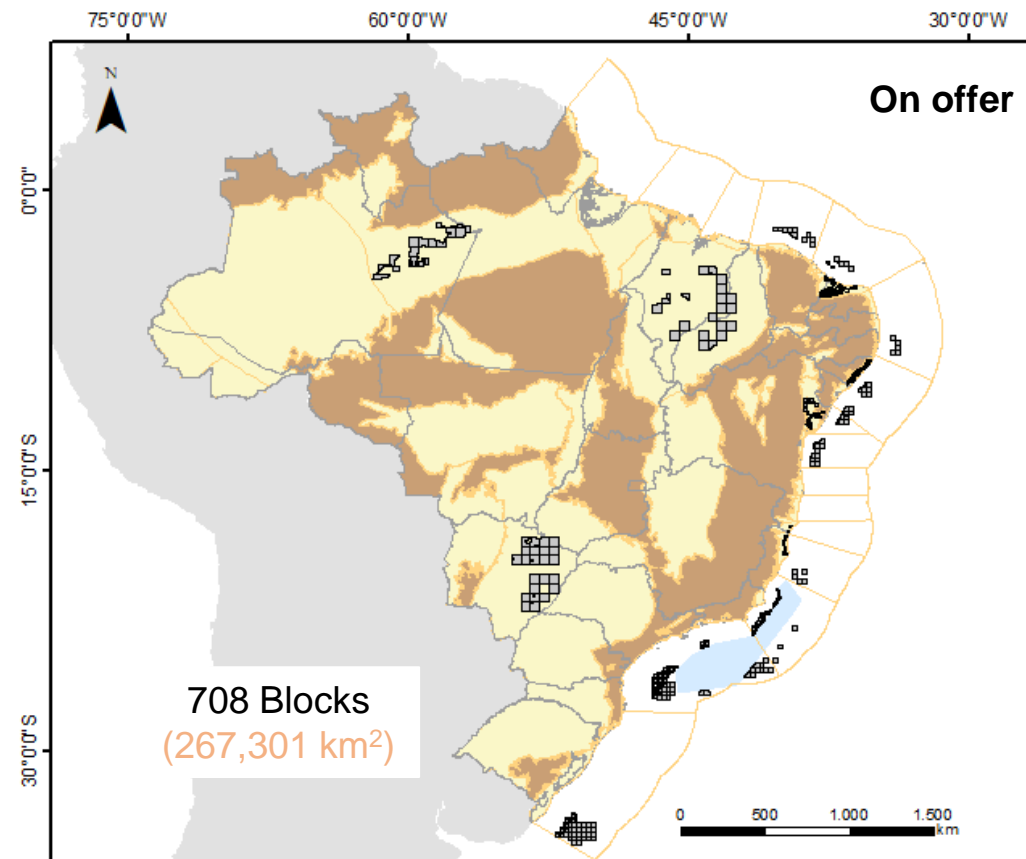
# > 1,400 EXPLORATORY BLOCKS

<http://rodadas.anp.gov.br/pt/oferta-permanente/blocos-exploratorios>



## Nomination

<http://rodadas.anp.gov.br/pt/nominacao-de-areas>

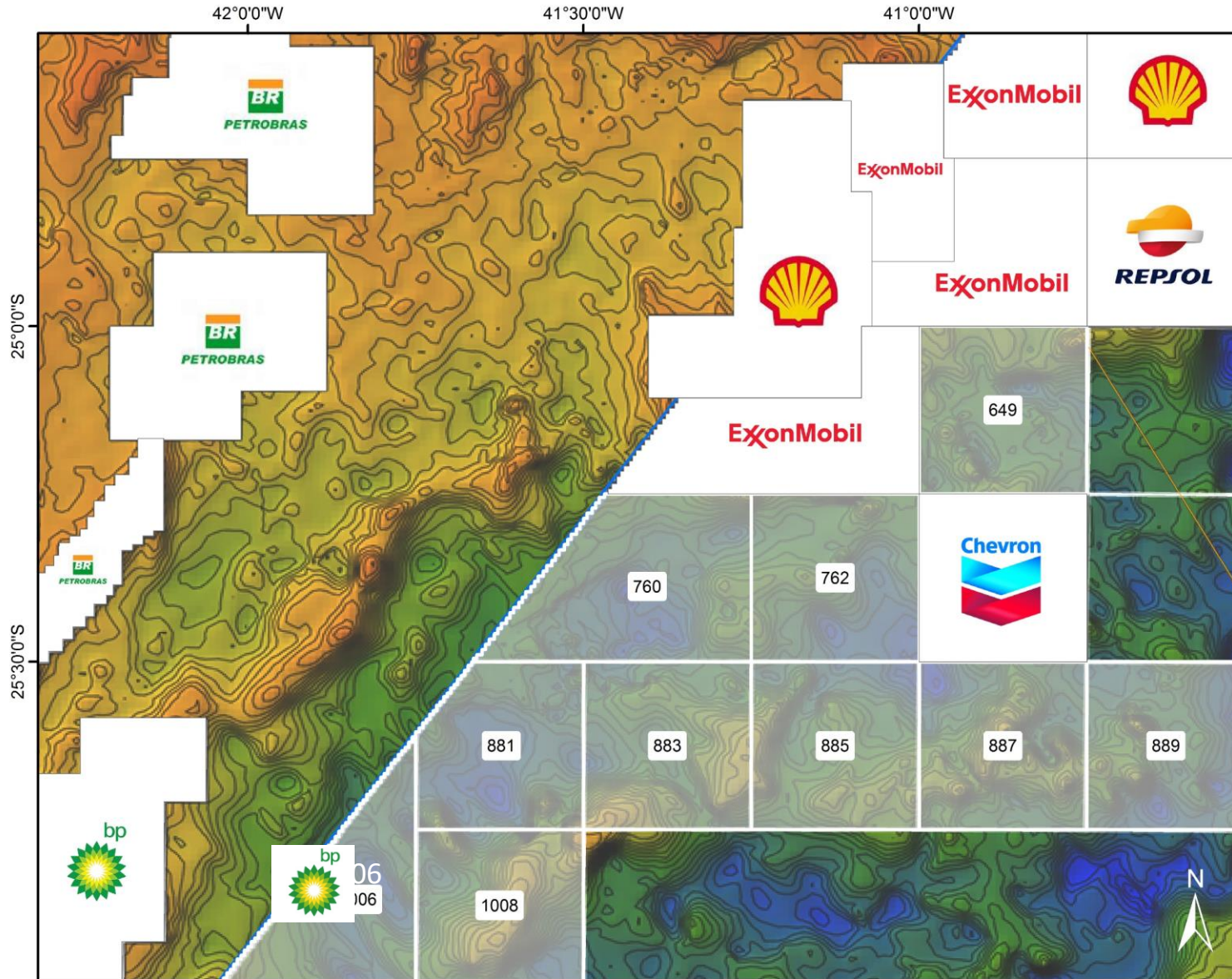


## Declaration of Interested

<http://rodadas.anp.gov.br/pt/oferta-permanente/inscricao-de-licitantes>



# Pre-salt play – Hot Exploratory Area



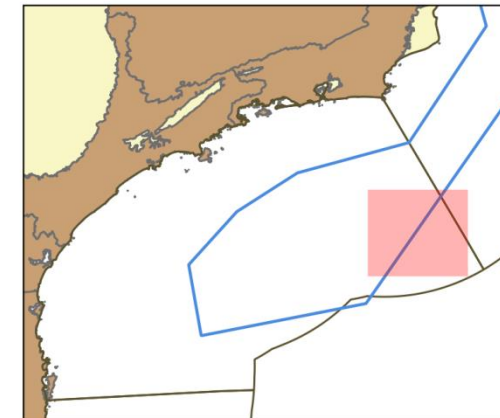
— Pre-salt Polygon

□ Block Available

Base of Salt Structural Map - Depth(m)

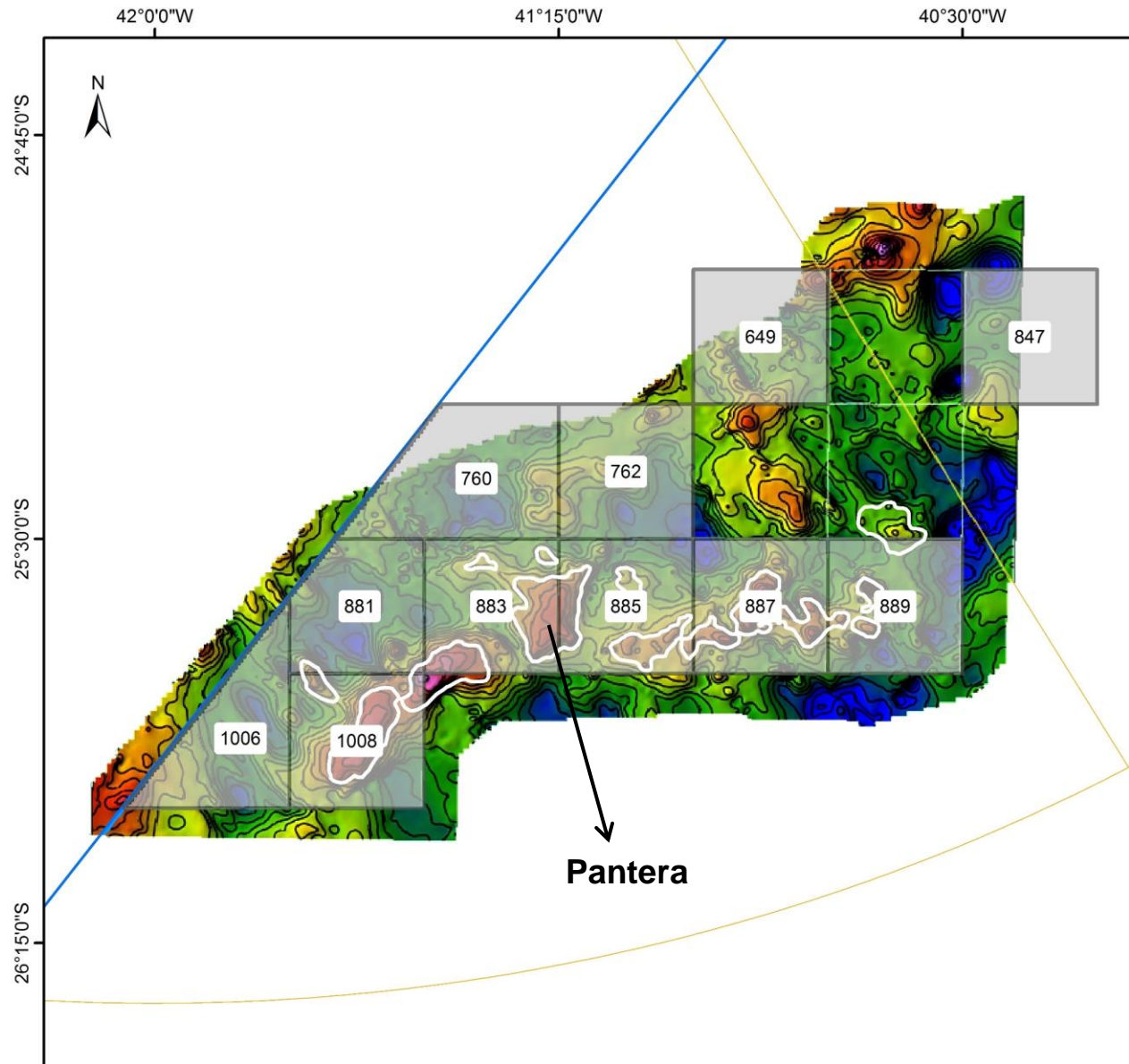


0 15 30 45 km



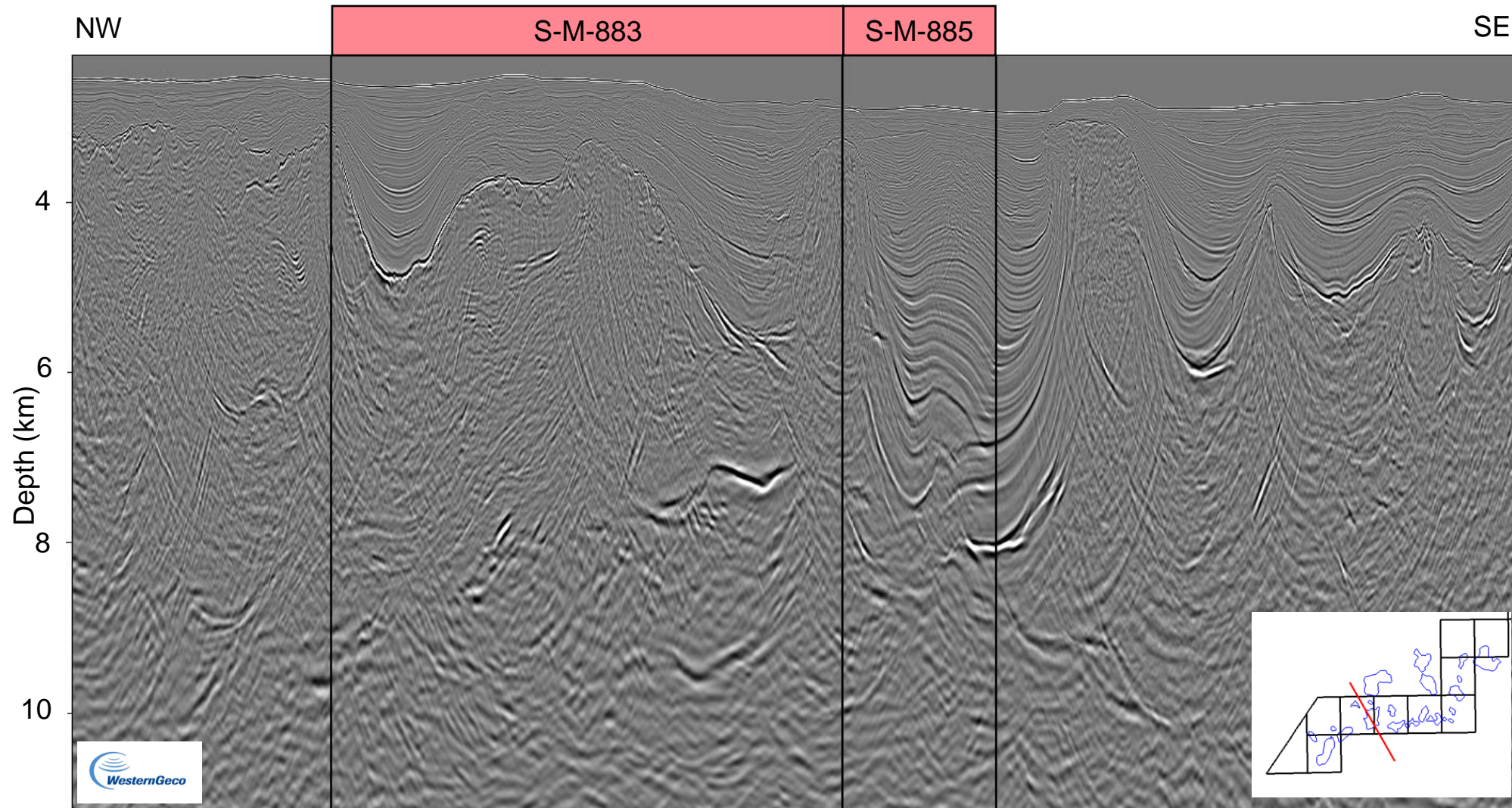


# Blocks already available

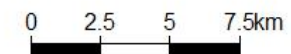


Leads Mapped on Pre-Salt  
Play(Santos Basin)

# Lead Pantera

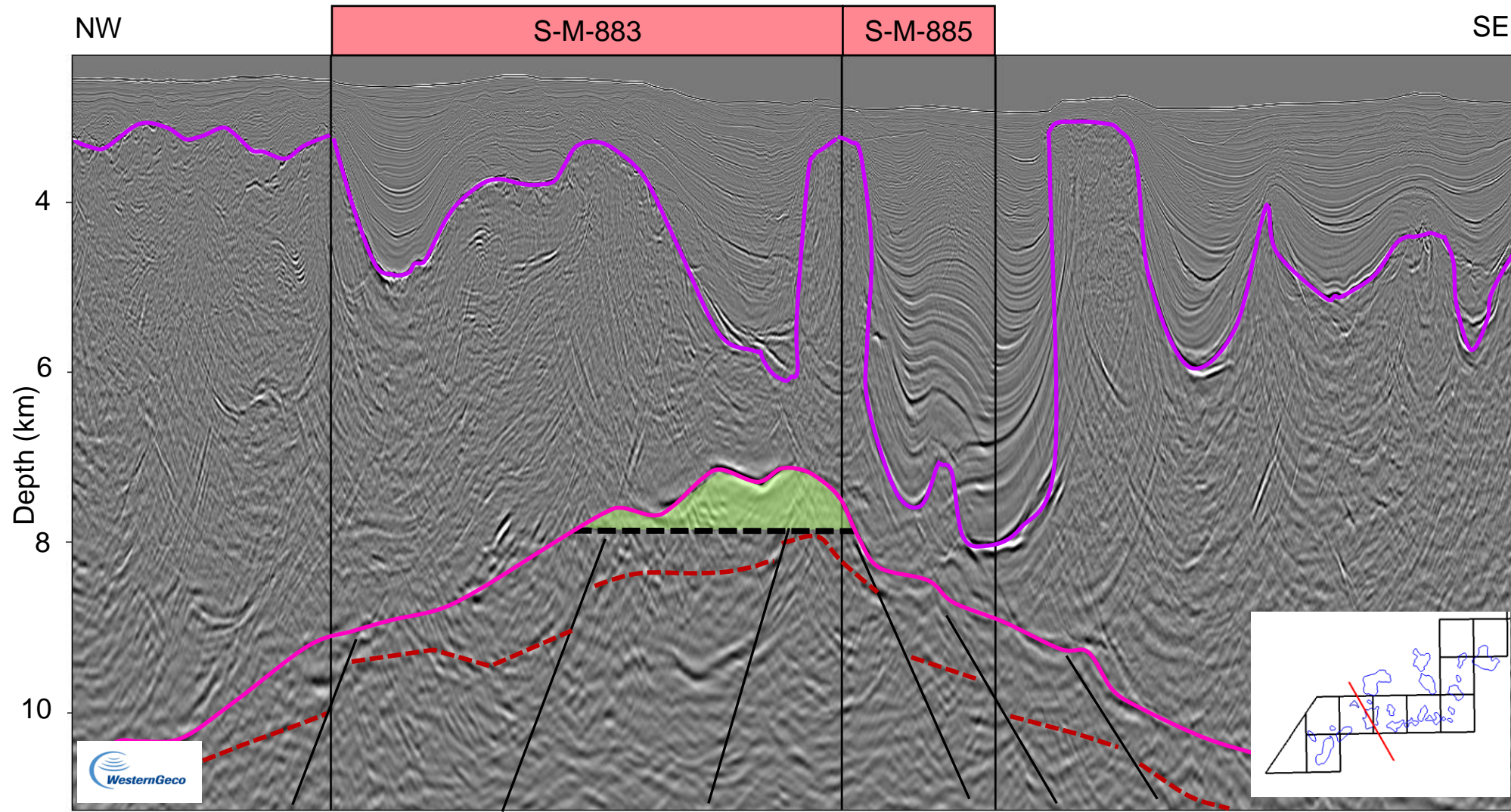


Seismic line 1803 – Survey R0258\_2D\_SPEC\_PSDM\_NTTI\_BM\_S – Courtesy WesternGeco – Extracted from ANP 16<sup>th</sup> Bid Round Technical Seminary



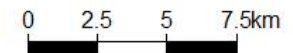


# Lead Pantera



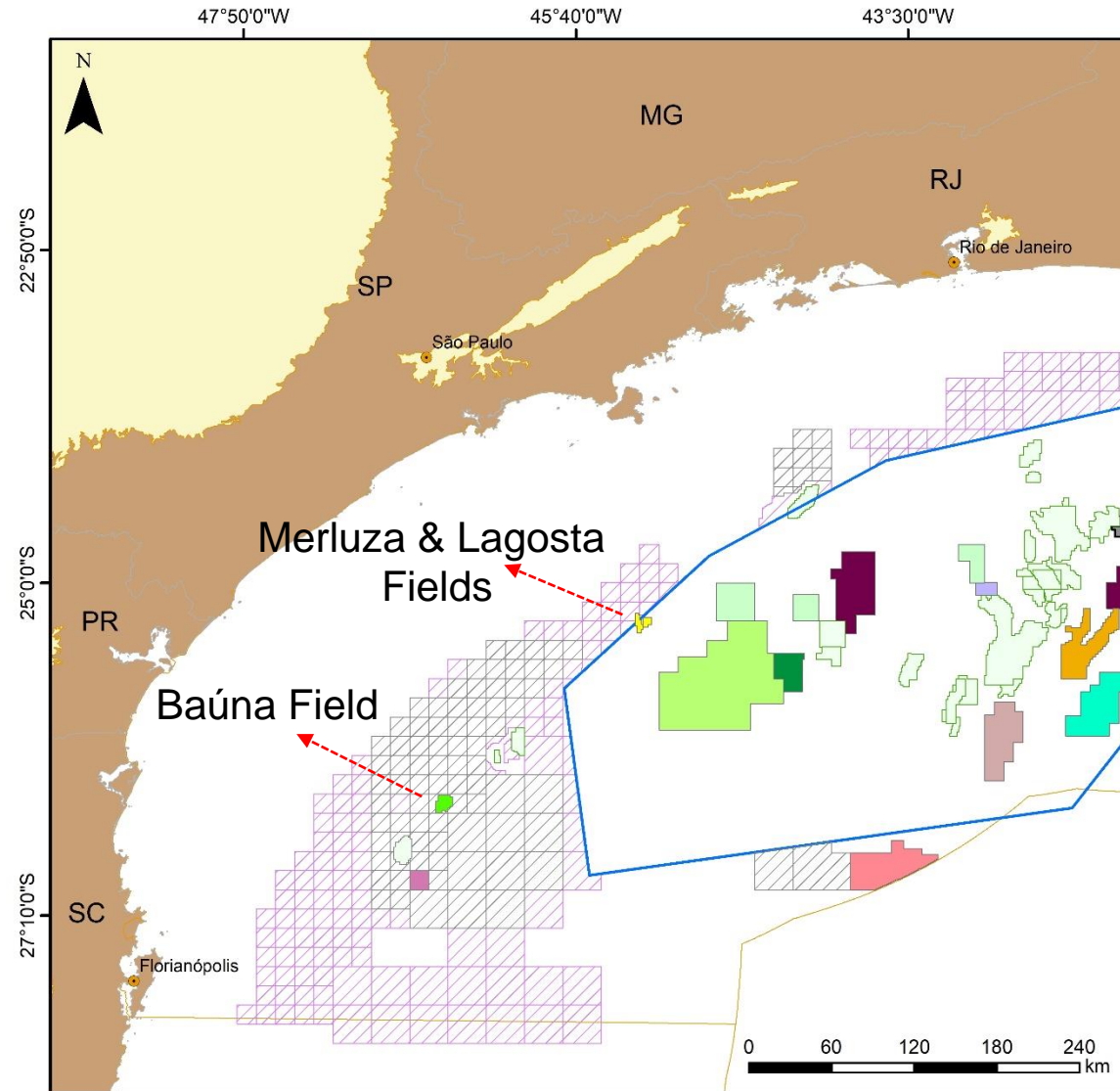
Seismic line 1803 – Survey R0258\_2D\_SPEC\_PSDM\_NTTI\_BM\_S – Courtesy WesternGeco – Extracted from ANP 16<sup>th</sup> Bid Round Technical Seminary

- Top of Salt
- - - Economic Basement
- - - Water/Oil Contact
- / Geologic Fault
- Base of Salt
- Lead



# Pos-salt plays

159 BLOCKS ON OFFER



## BR – Divestment Plan

Focus on Improve Recovery Factor

Yellow "On Offer" – Teaser BR

Green Petrobras > Karoon

<https://www.investidorpetrobras.com.br/resultados-e-comunicados/teasers/>

## ANP – Permanent Offer

White hatched On Offer

Purple hatched On Study

Light green Field

## Block

	R2		P2
	R3		P3
	R7		P4
	R16		P5
	P1		P6

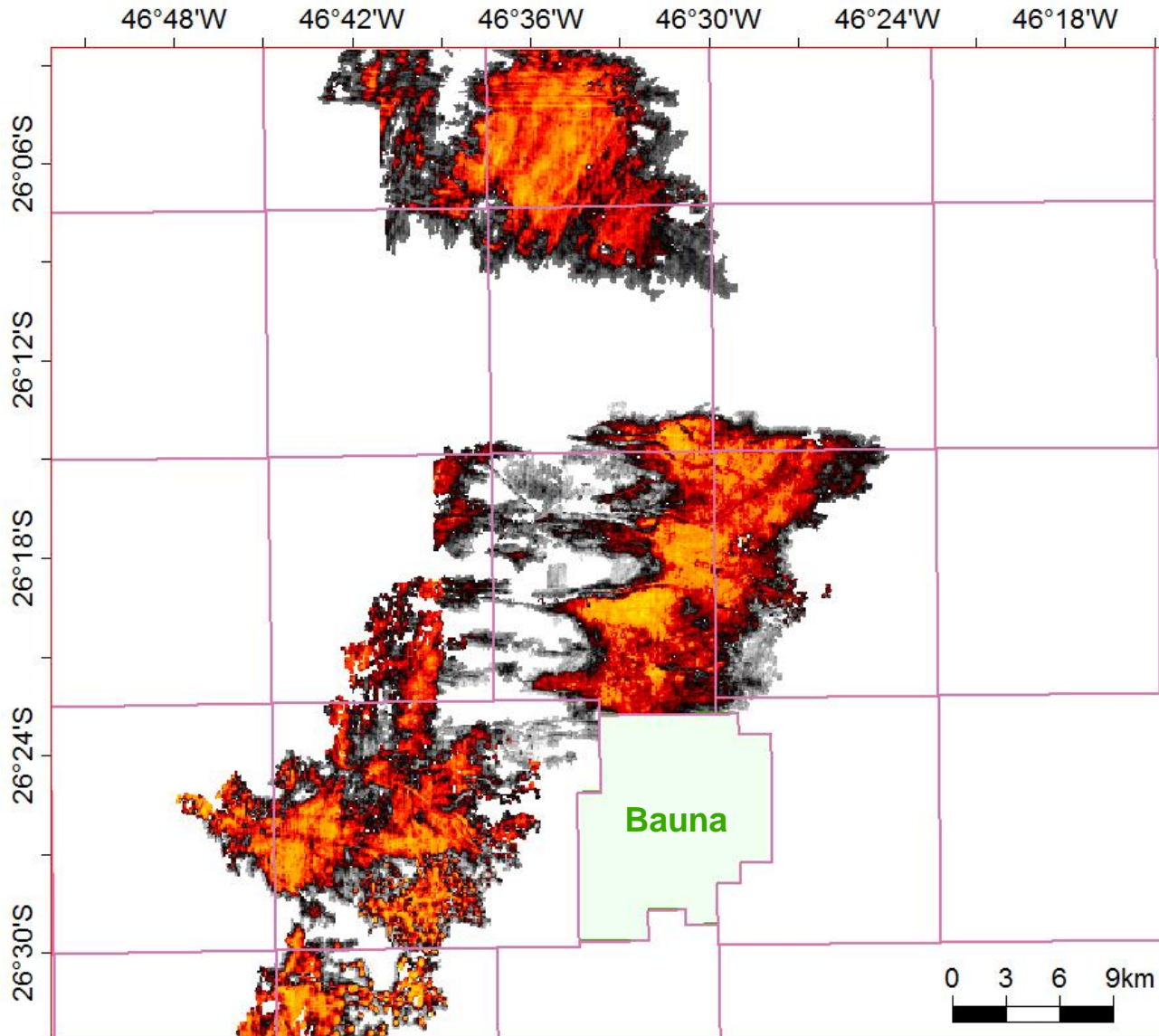
**ANP Encourage Nomination**

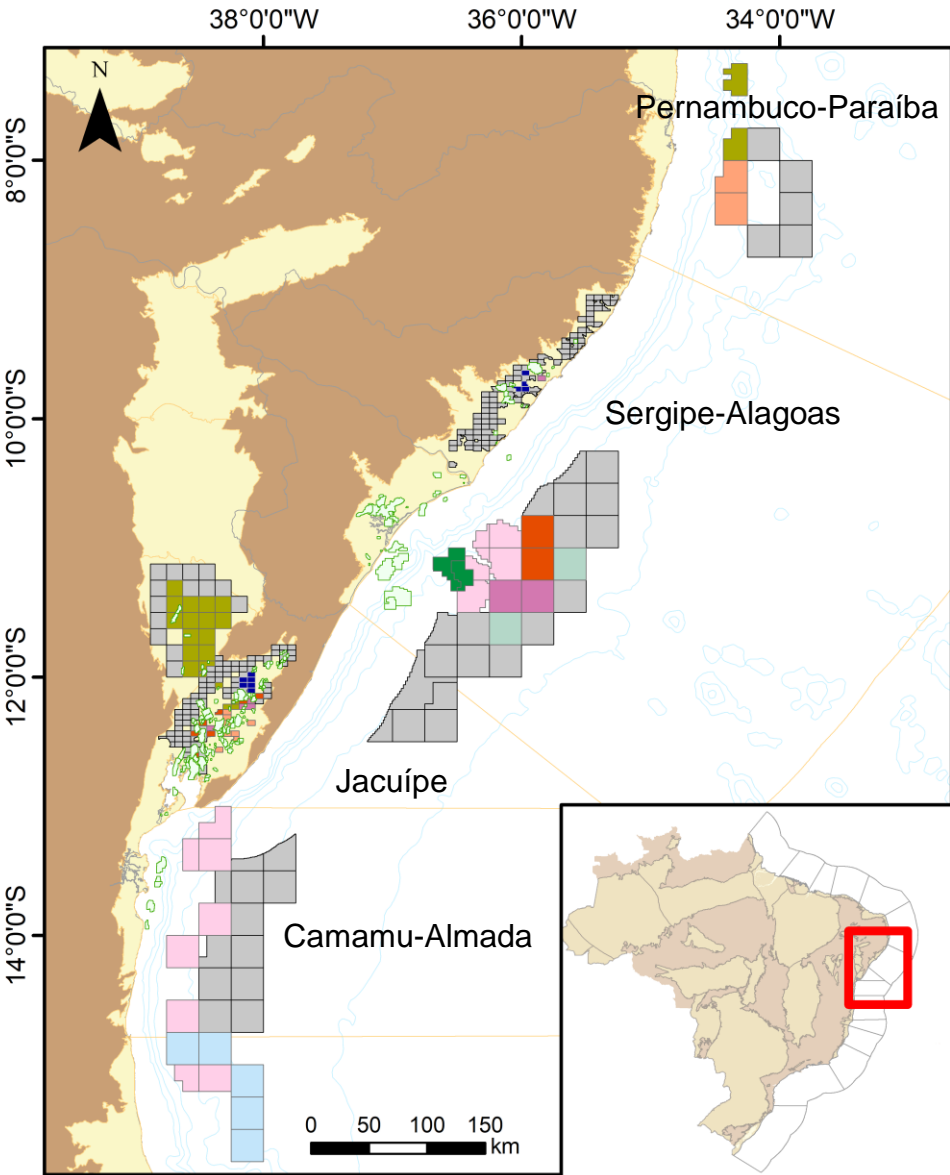
<http://rodadas.anp.gov.br/pt/nominacao-de-areas>



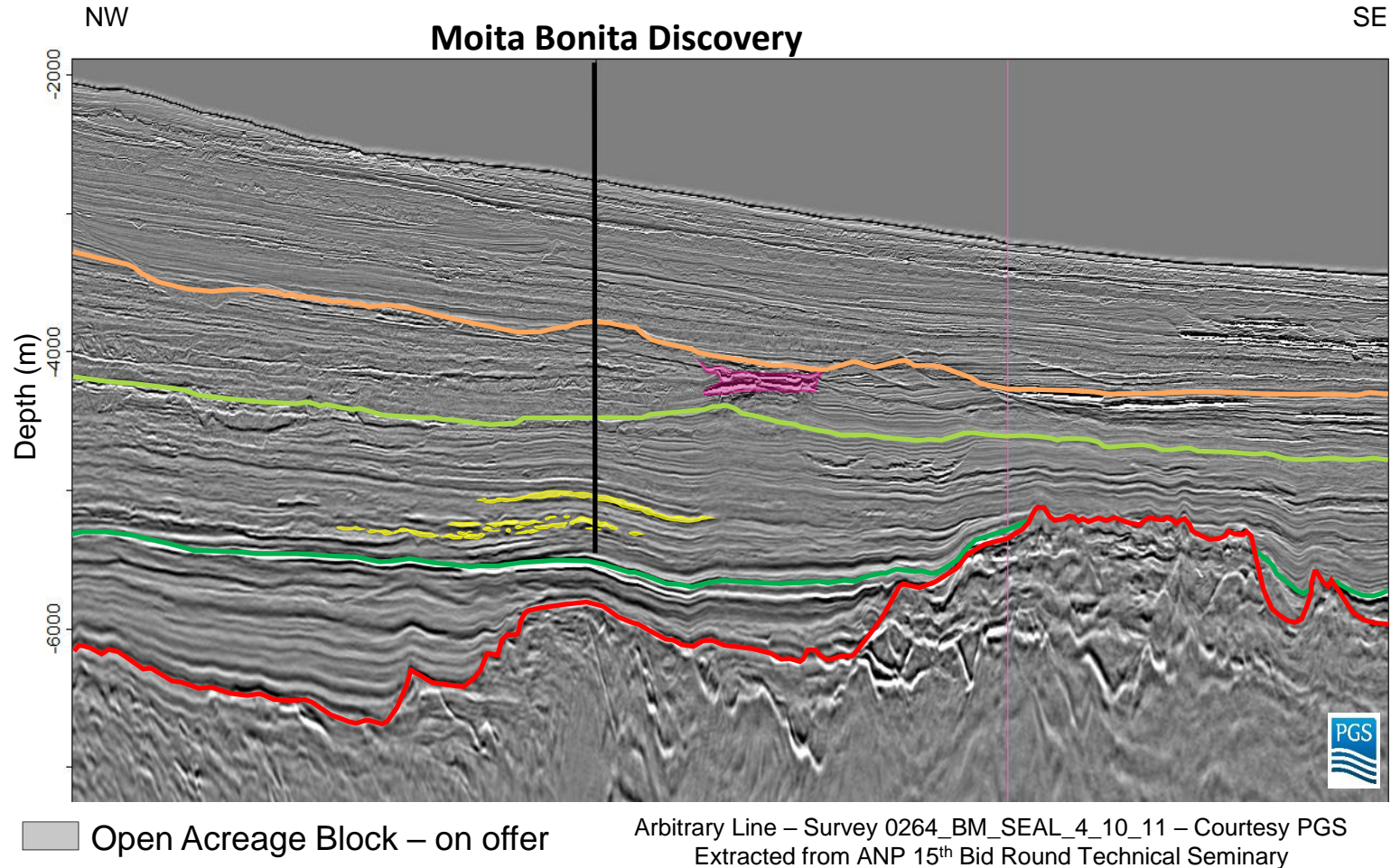
# POS-SALT

## Sandstone Turbidites



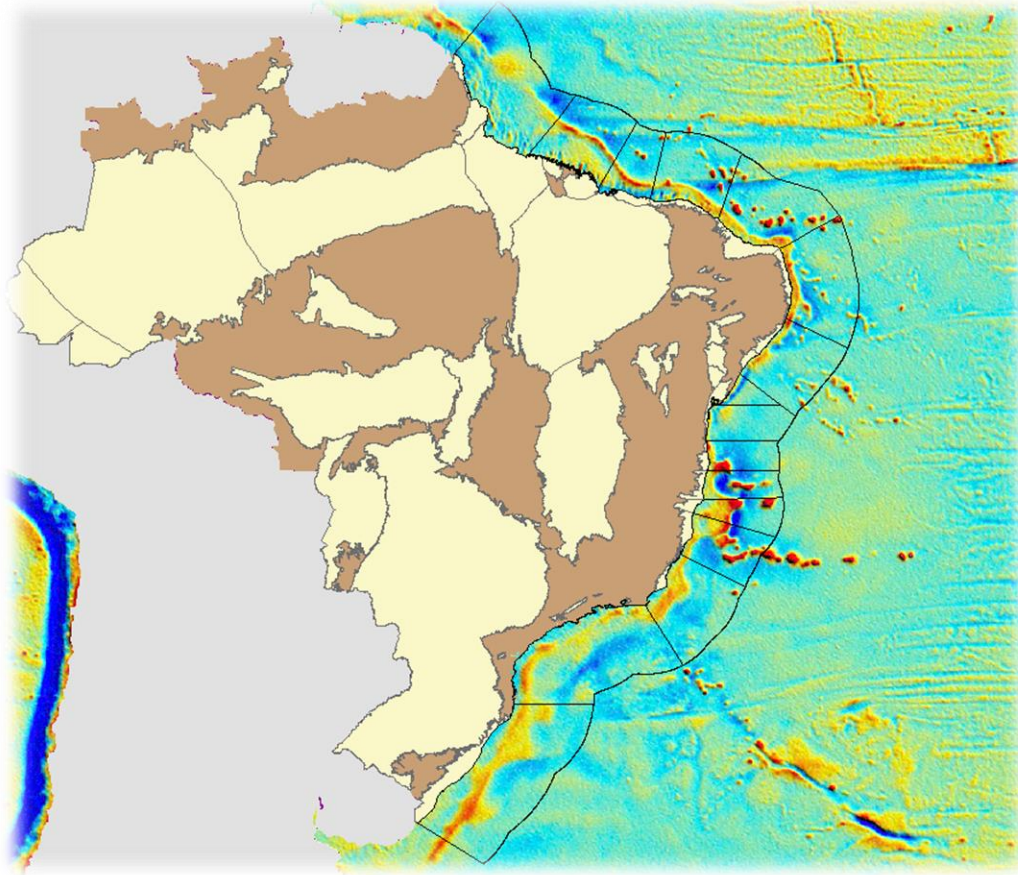


Regional Analogue – Deepwater Sergipe-Alagoas Basin  
Elements of PS are present in the other basins of this region





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# Onshore Mature Basins

- Well-known Geology
- Available Infrastructure
- Small and Medium-Size Companies

## Profile

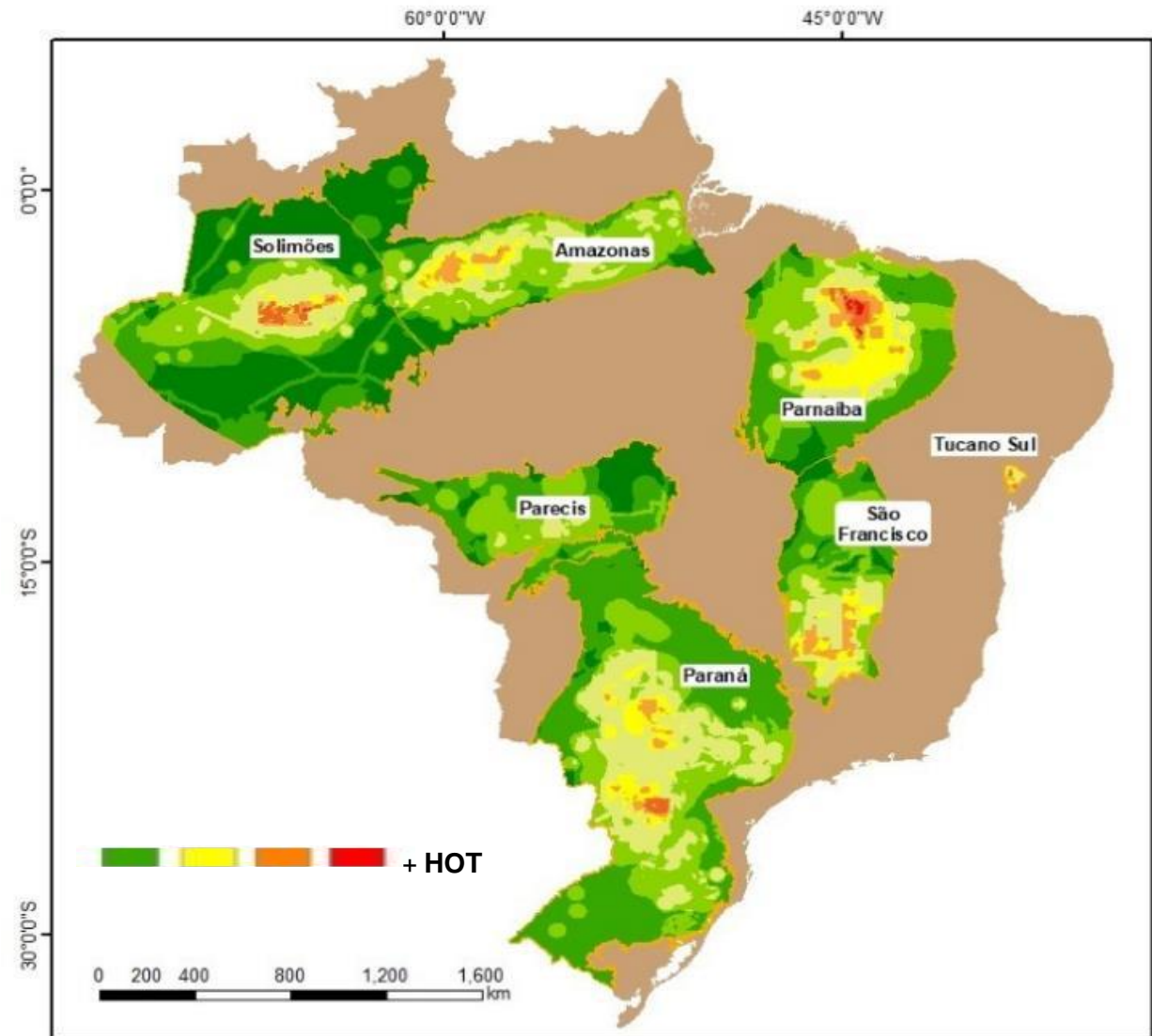
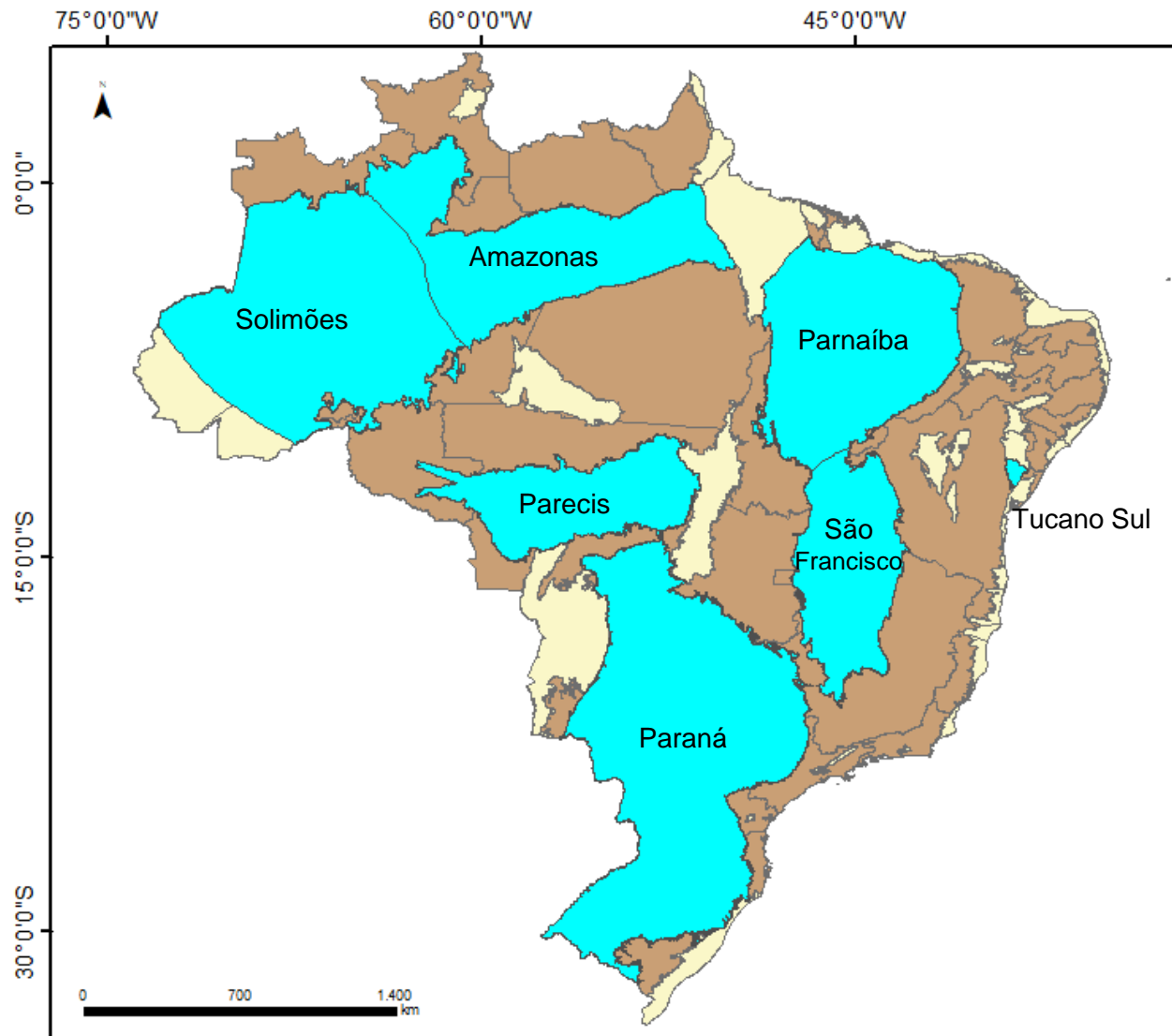
- Positive Social Local Impact
- Recent Discoveries Reported
- On Demand Bidding Rounds



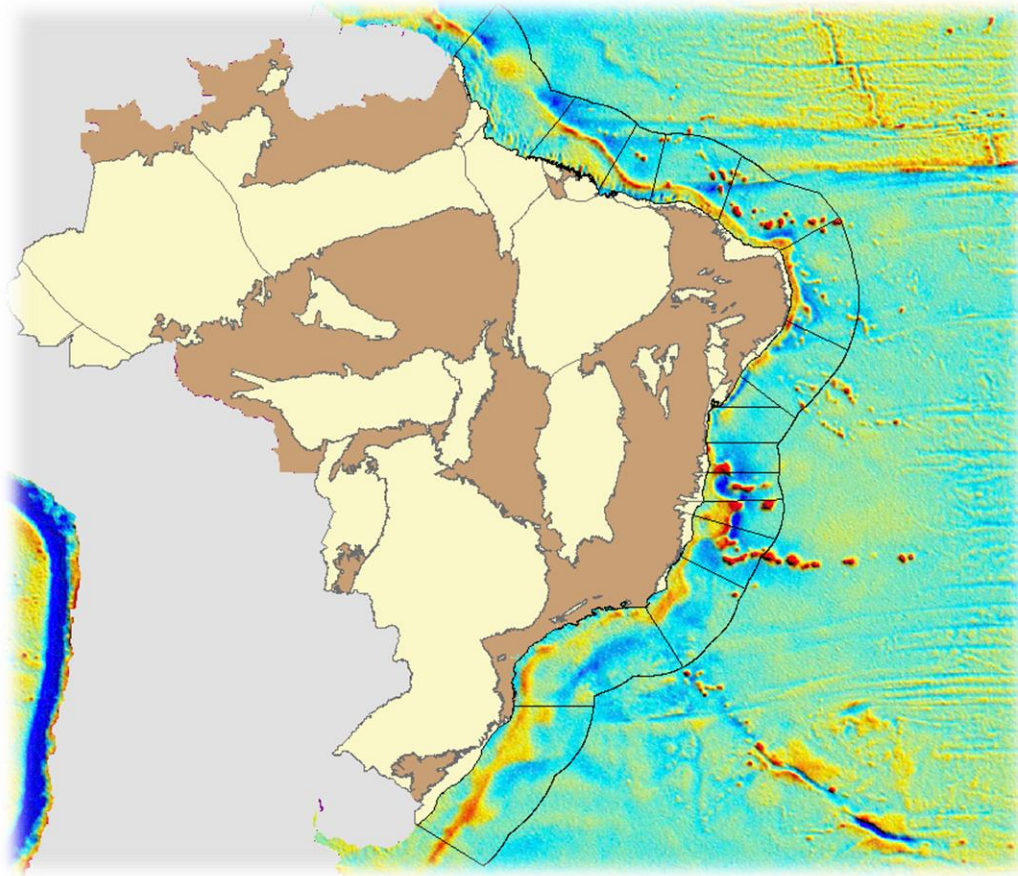


# Onshore Frontier Basins

Reate 2020 – Multi-criteria Analysis



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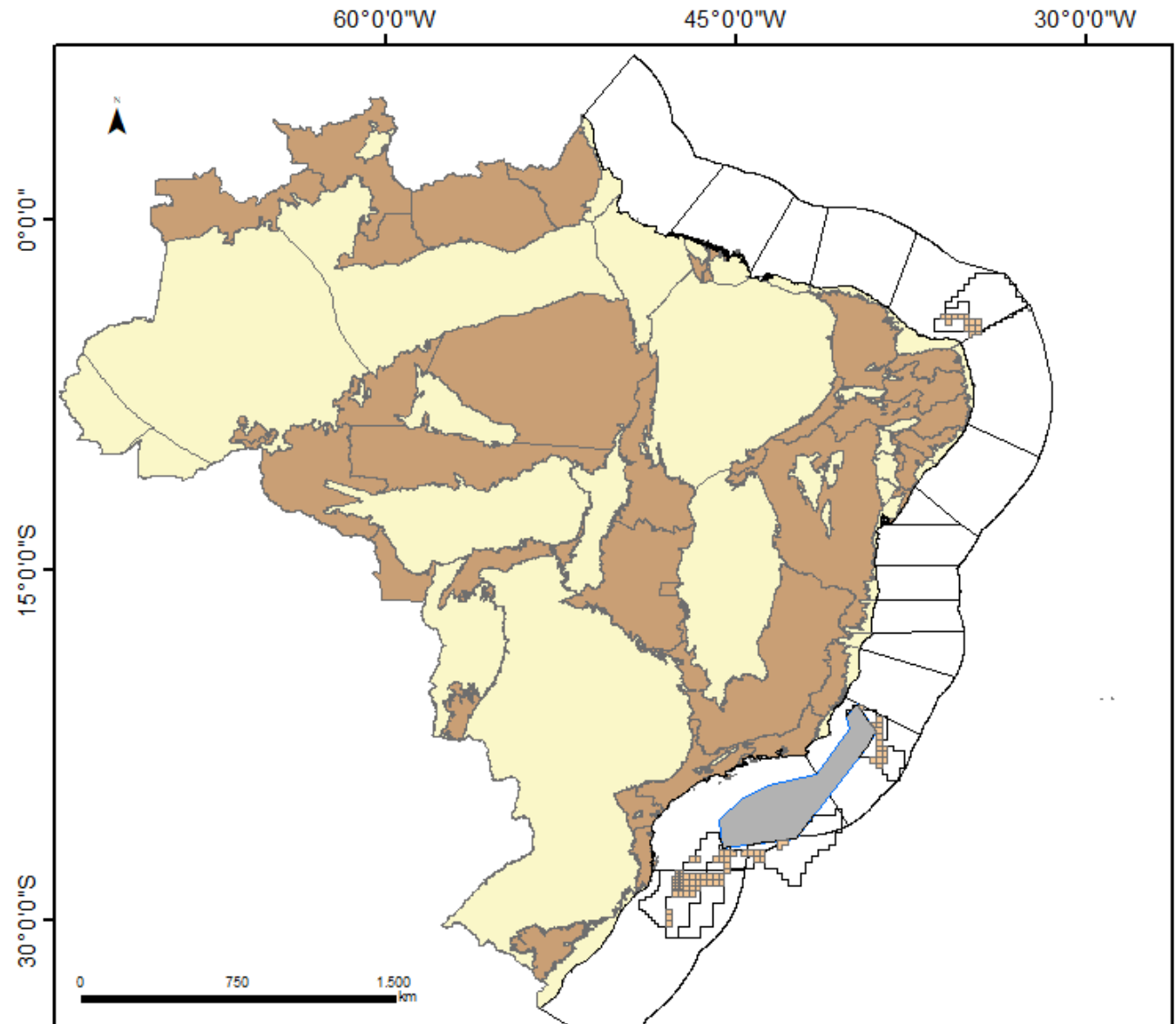




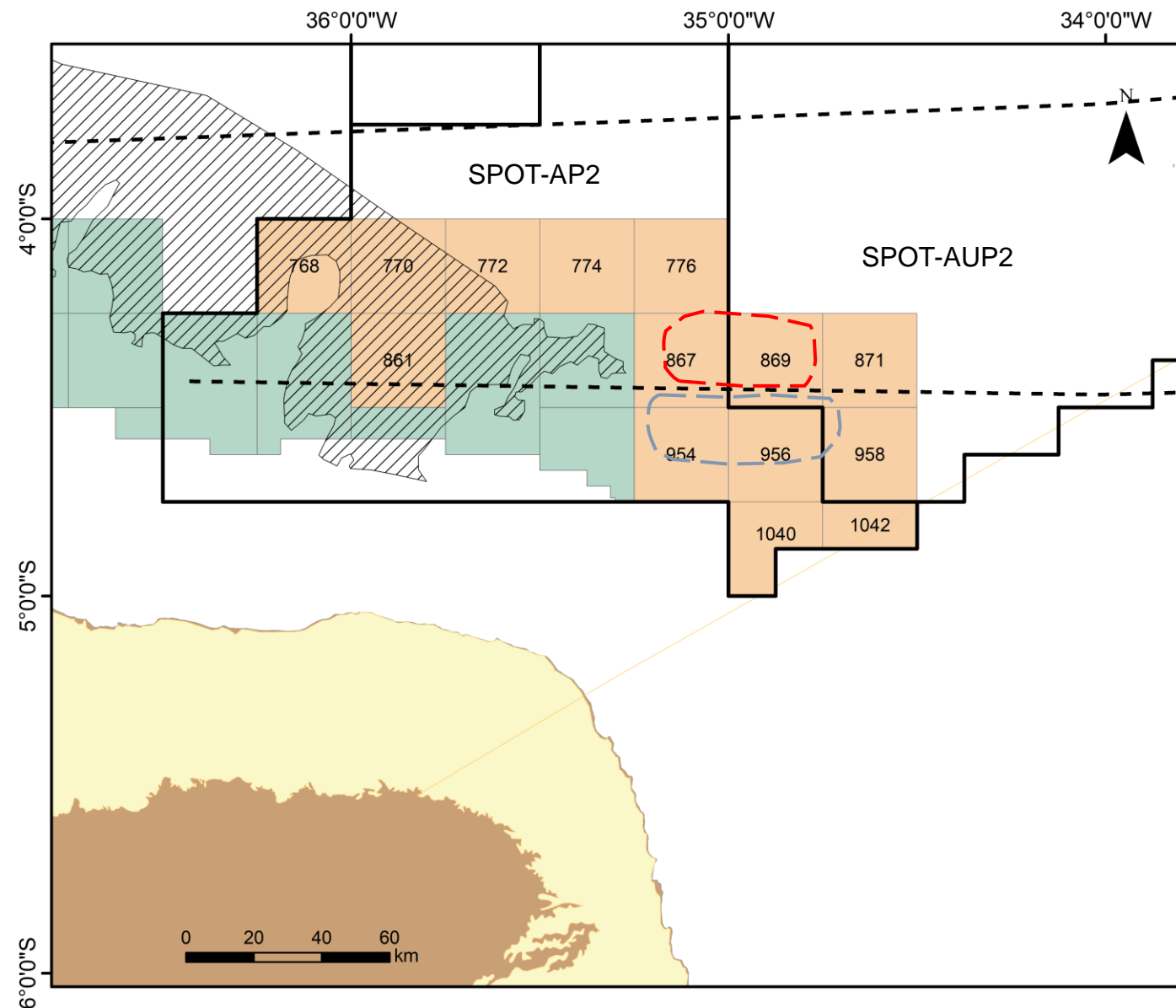
## 96 Blocks on Offer:

- 14 Blocks – Potiguar Basin
- 50 Blocks – Pelotas Basin
- 15 Blocks – Campos Basin
- 17 Blocks – Santos Basin

Area on offer ~ 54,000 km<sup>2</sup>



# Offshore Potiguar Basin



Mapped Aptian Source Kitchen

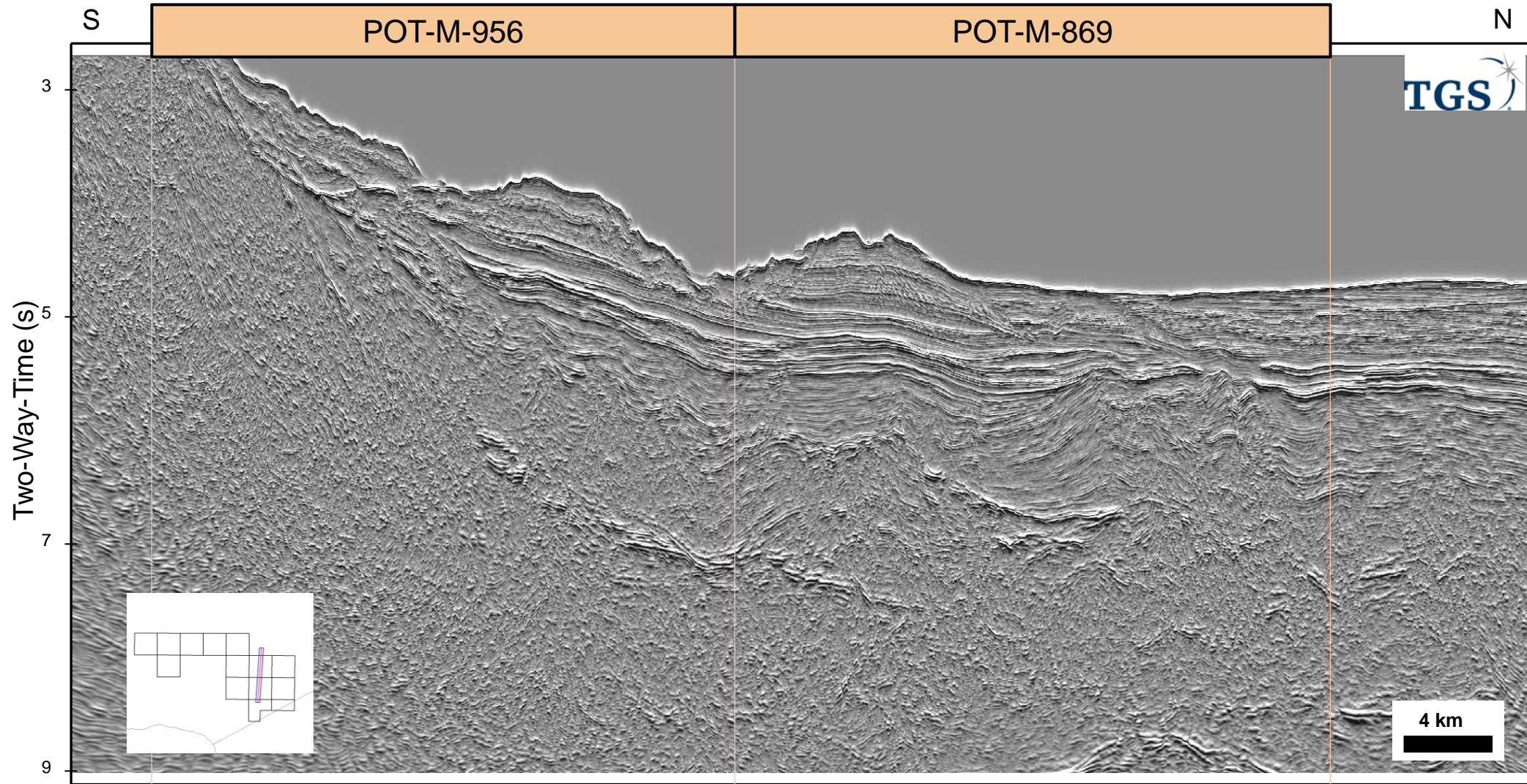
Structures related to Chain FZ

- Source Kitchen
- Chain Fault Zone
- Block R17
- Block under Concession
- Compressional domain
- Extensional domain





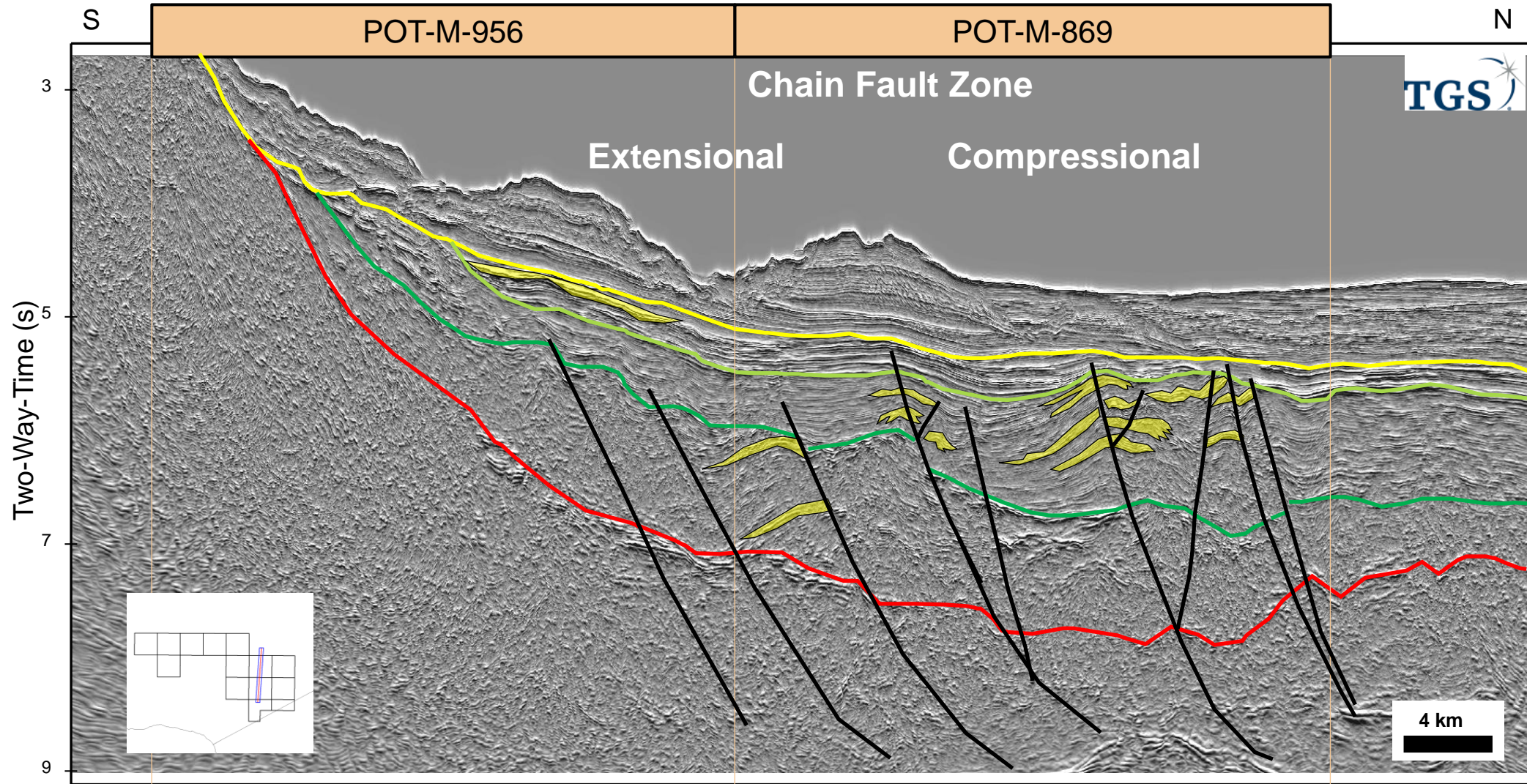
# Offshore Potiguar Basin



Seismic line 3785 – Survey 0257-PBP2-PSTM – Courtesy TGS



# Offshore Potiguar Basin



- Sea Bottom
- Lower Albian
- Basement
- Lower Miocene
- Upper Alagoas
- Lead

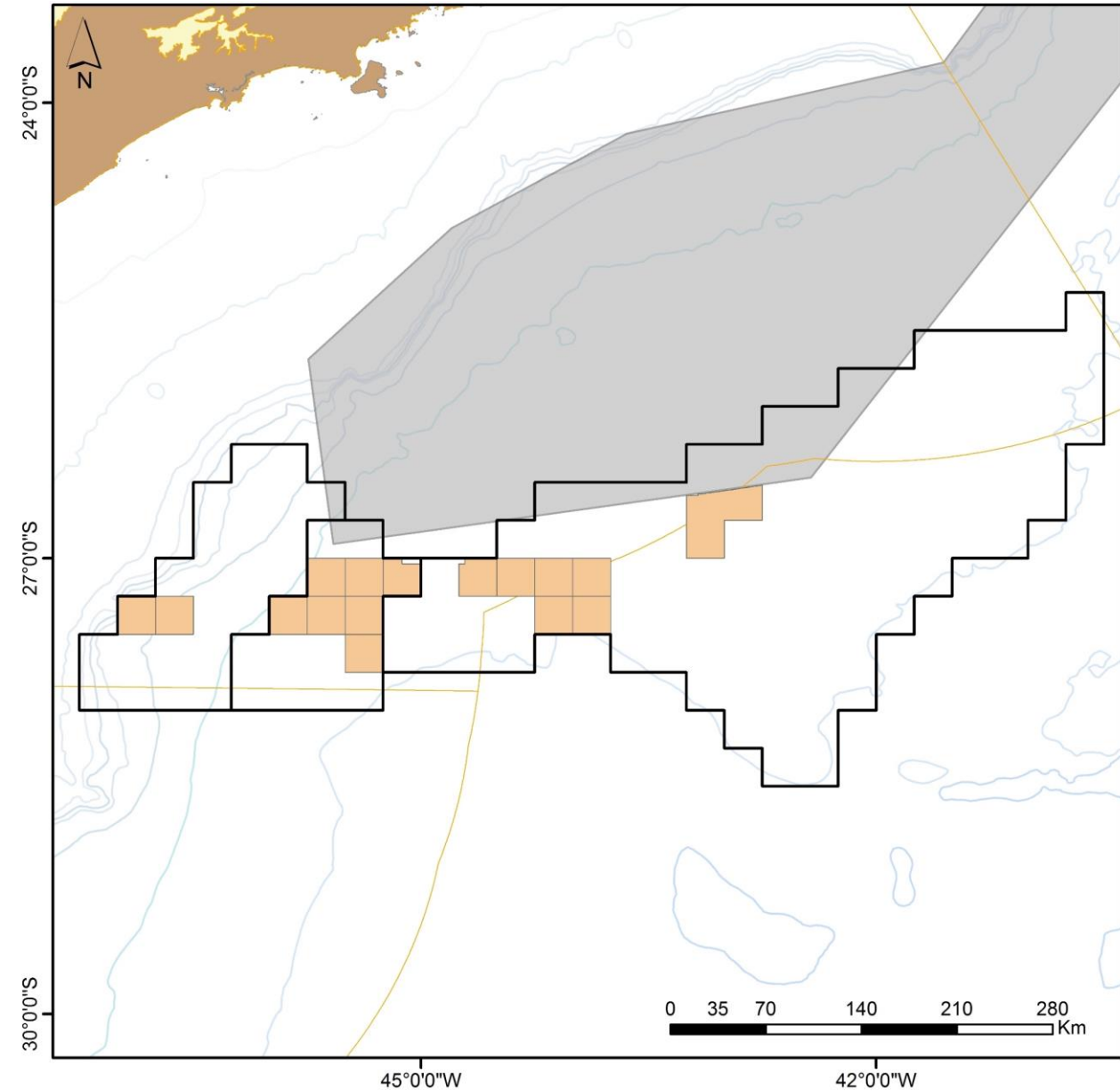
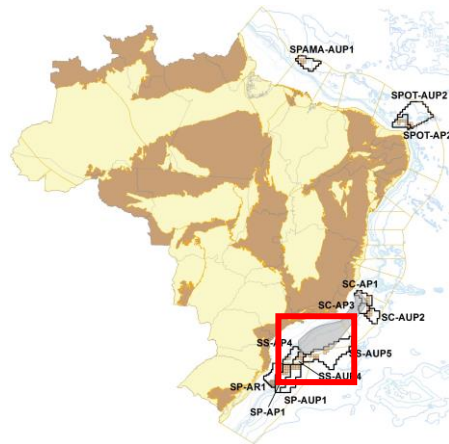
Seismic line 3785 – Survey 0257-PBP2-PSTM – Courtesy TGS



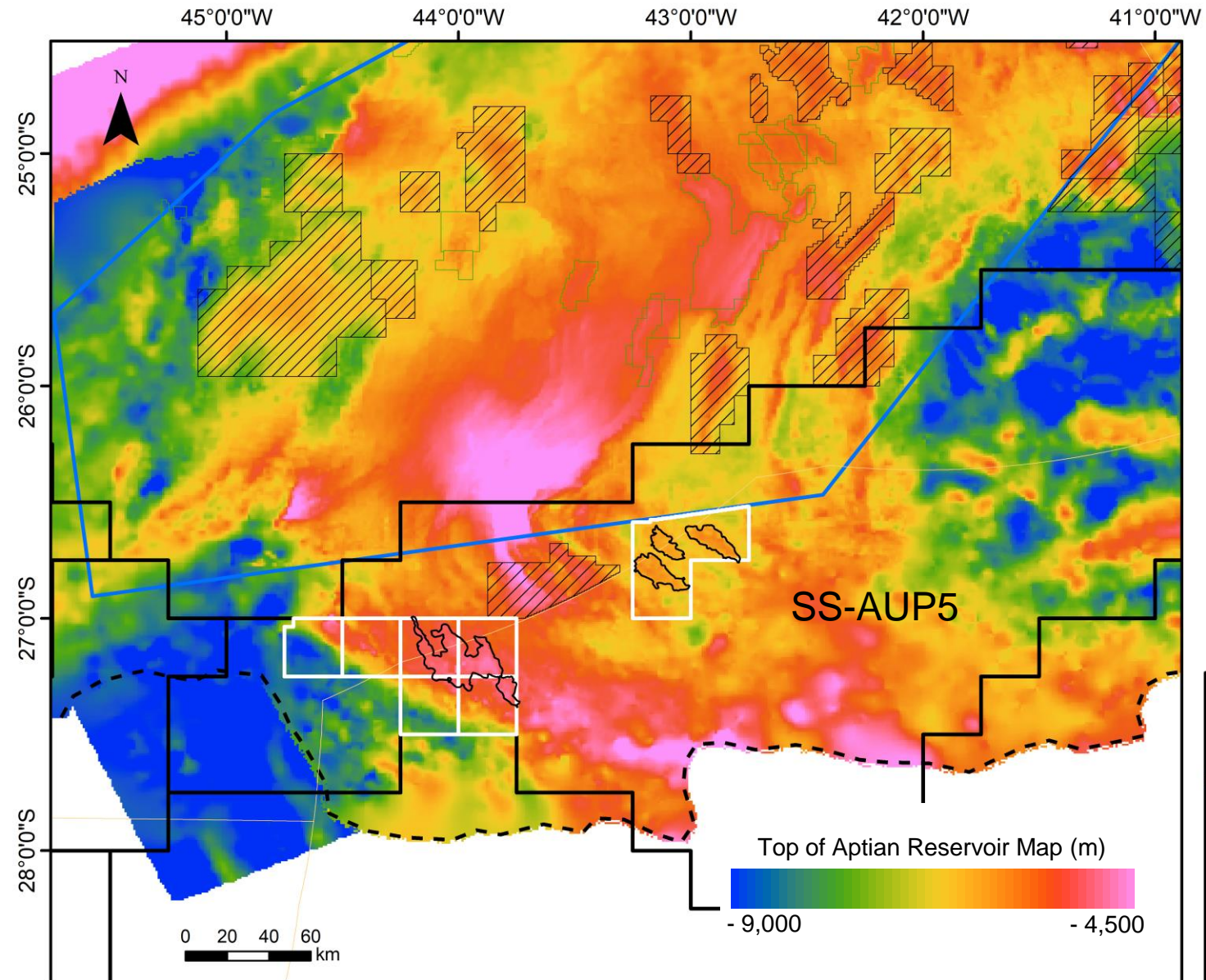
# Santos Basin

10 Blocks with potential for Pos-salt  
(carbonates and turbidites)

7 Blocks with potential for Pre-salt



# Santos Basin – Sector SS-AUP5

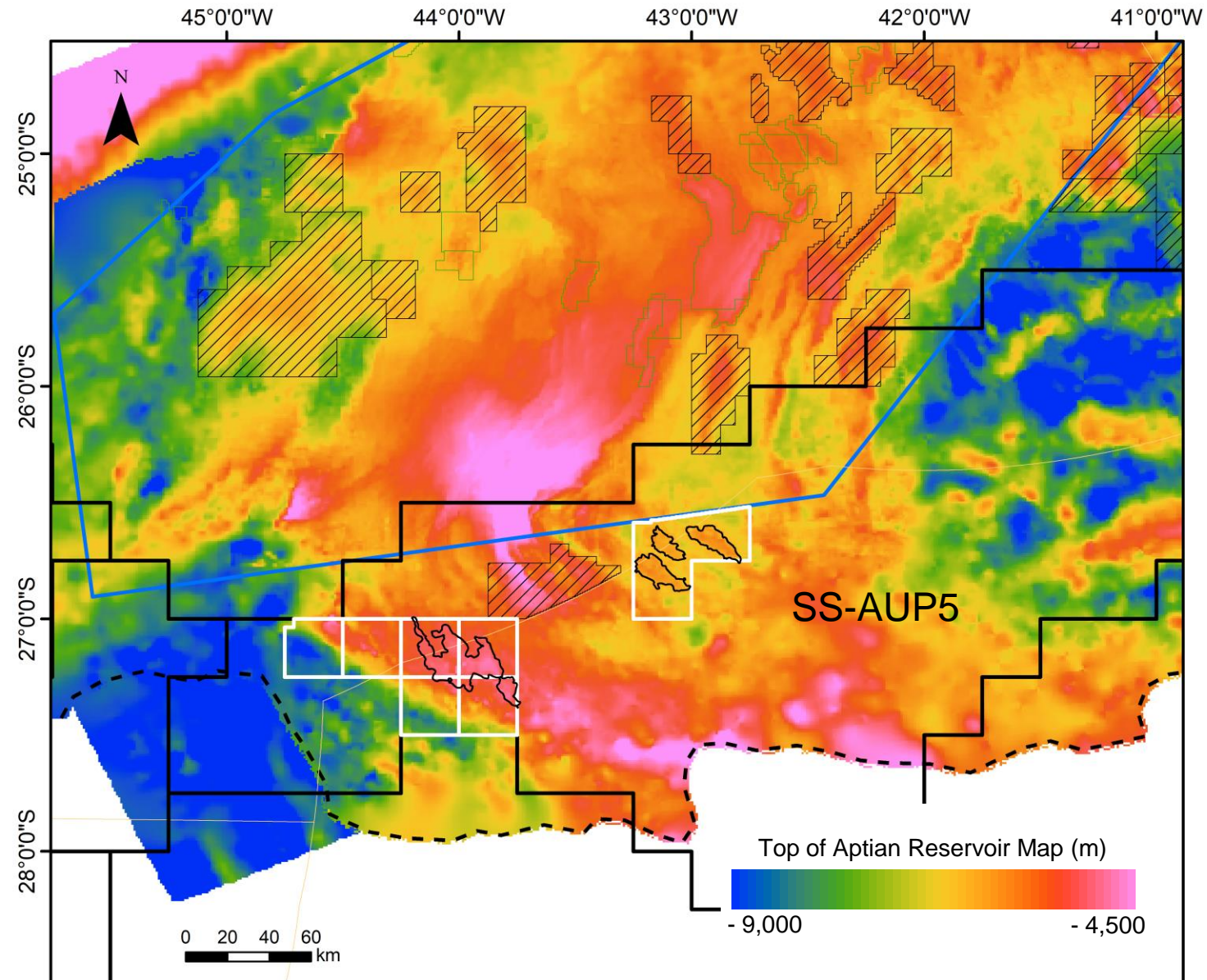


- Blocks on Brazilian Extended Continental Shelf
- 4-way closure structures mapped
- Frontier from the Pre-salt play
- Geological Uncertainties

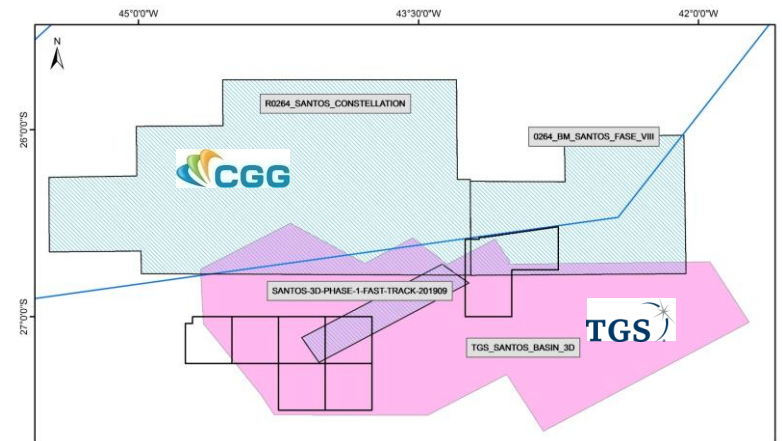
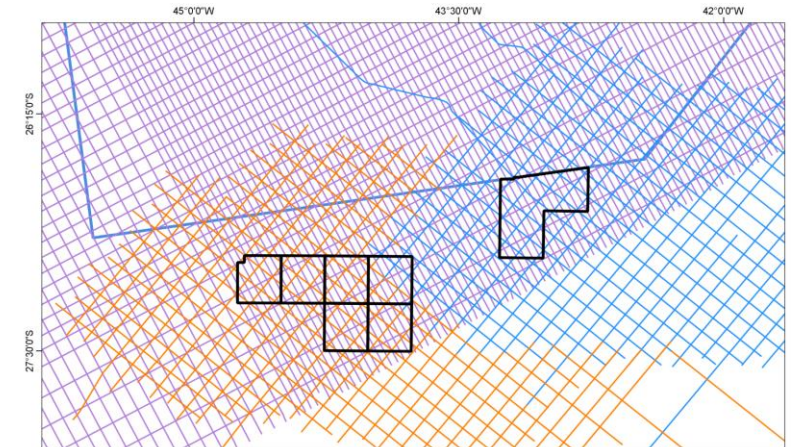




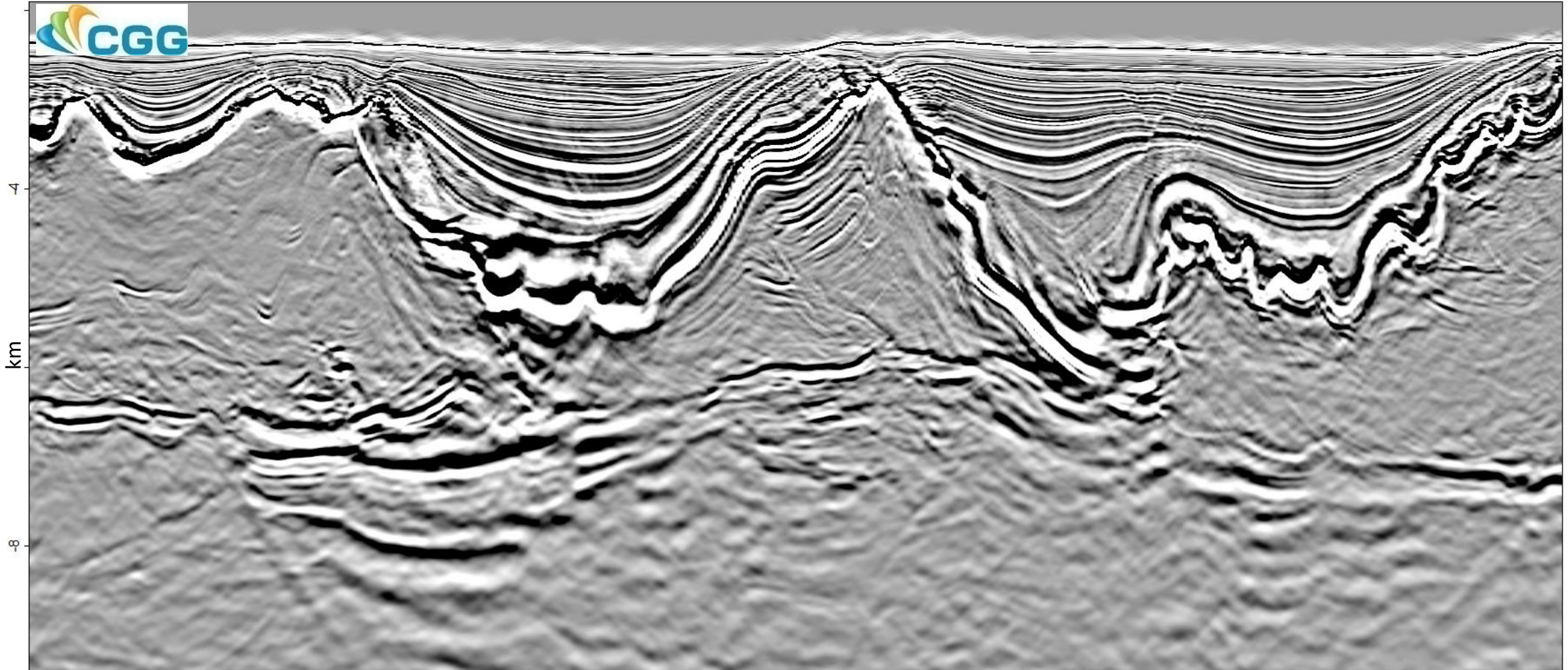
# Santos Basin – Sector SS-AUP5



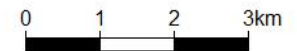
Region covered by 2D and 3D seismic





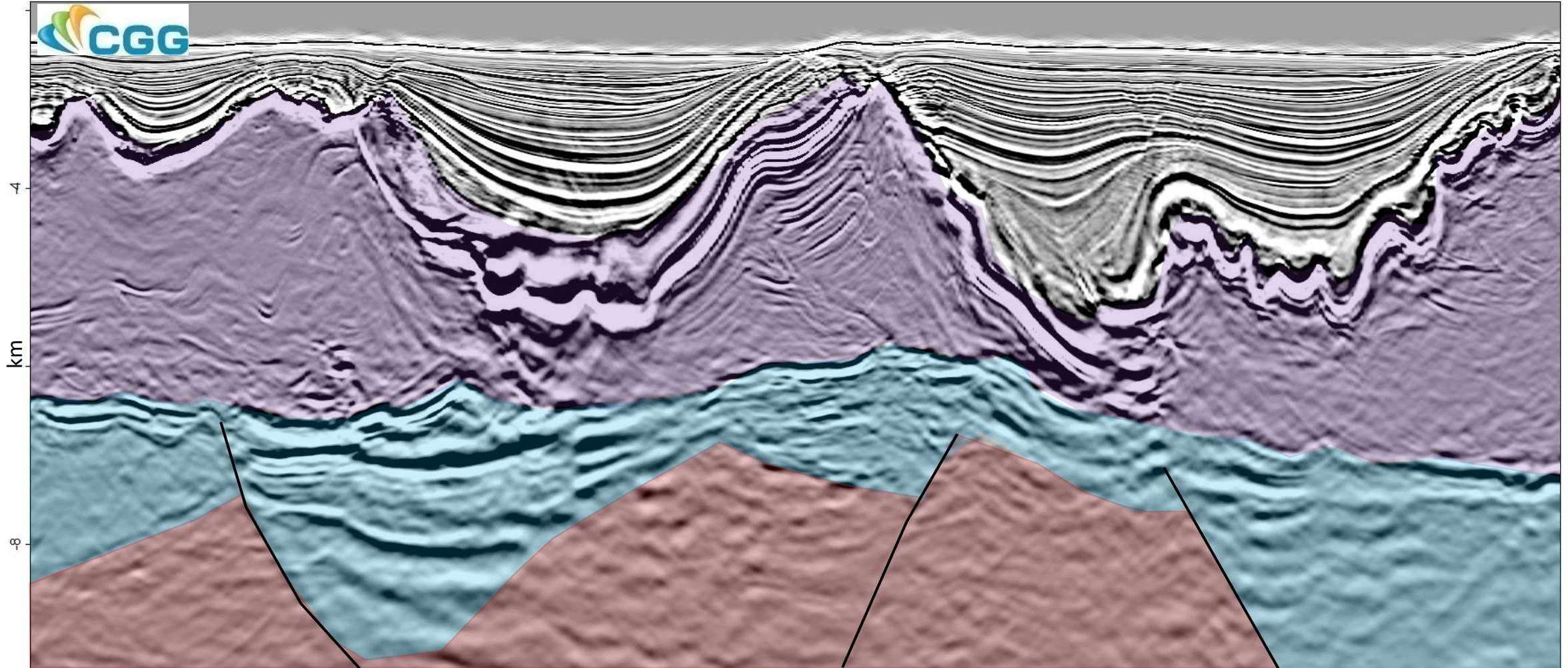


Arbitrary Line – Survey 264\_BM\_SANTOS\_FASE\_VIII (RTM) – Courtesy CGG

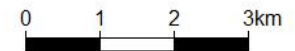




# Santos Basin – Sector SS-AUP5

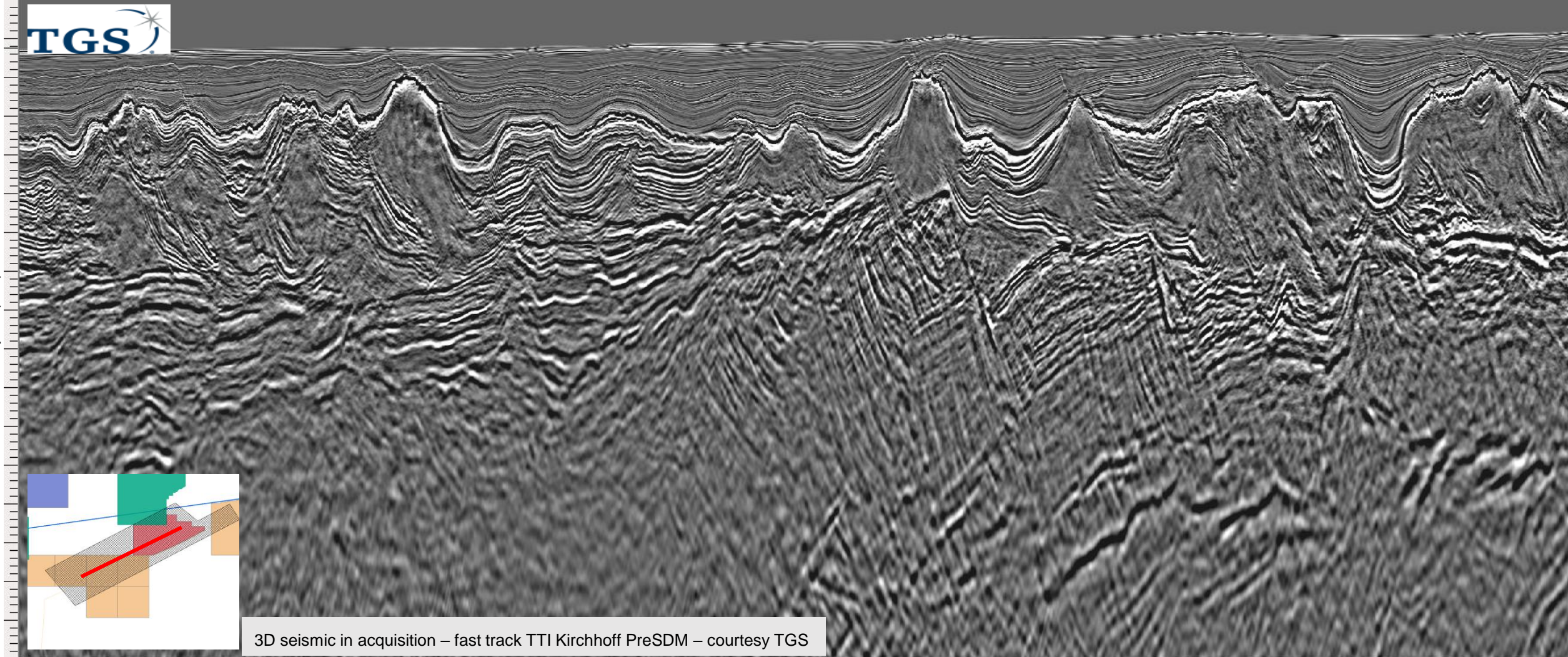


Arbitrary Line – Survey 264\_BM\_SANTOS\_FASE\_VIII (RTM) – Courtesy CGG

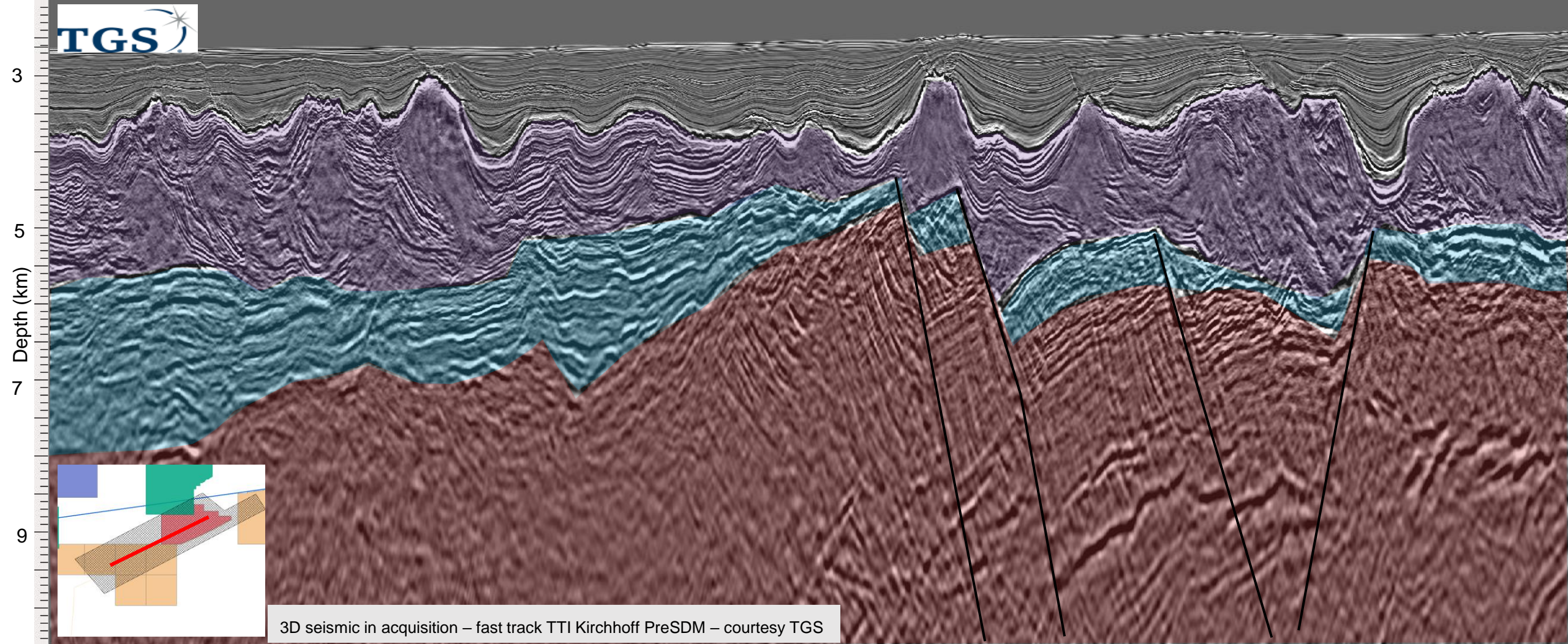




# Santos Basin – Sector SS-AUP5

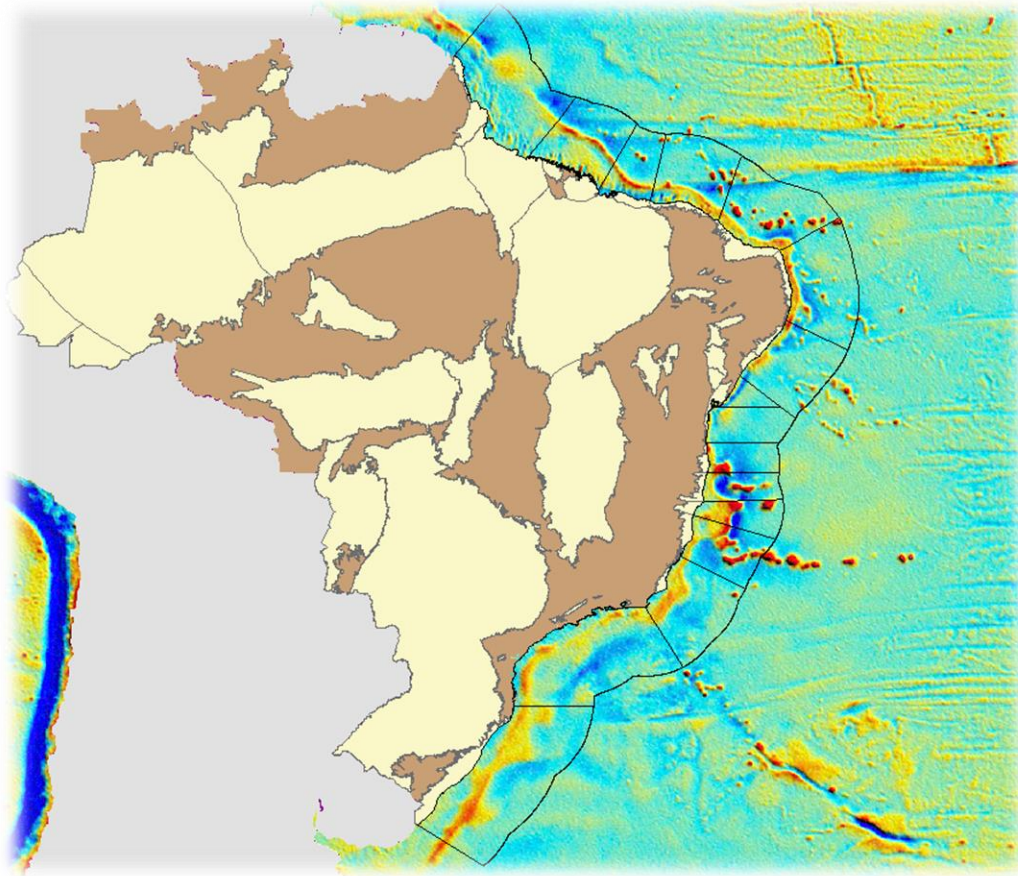








# Outline

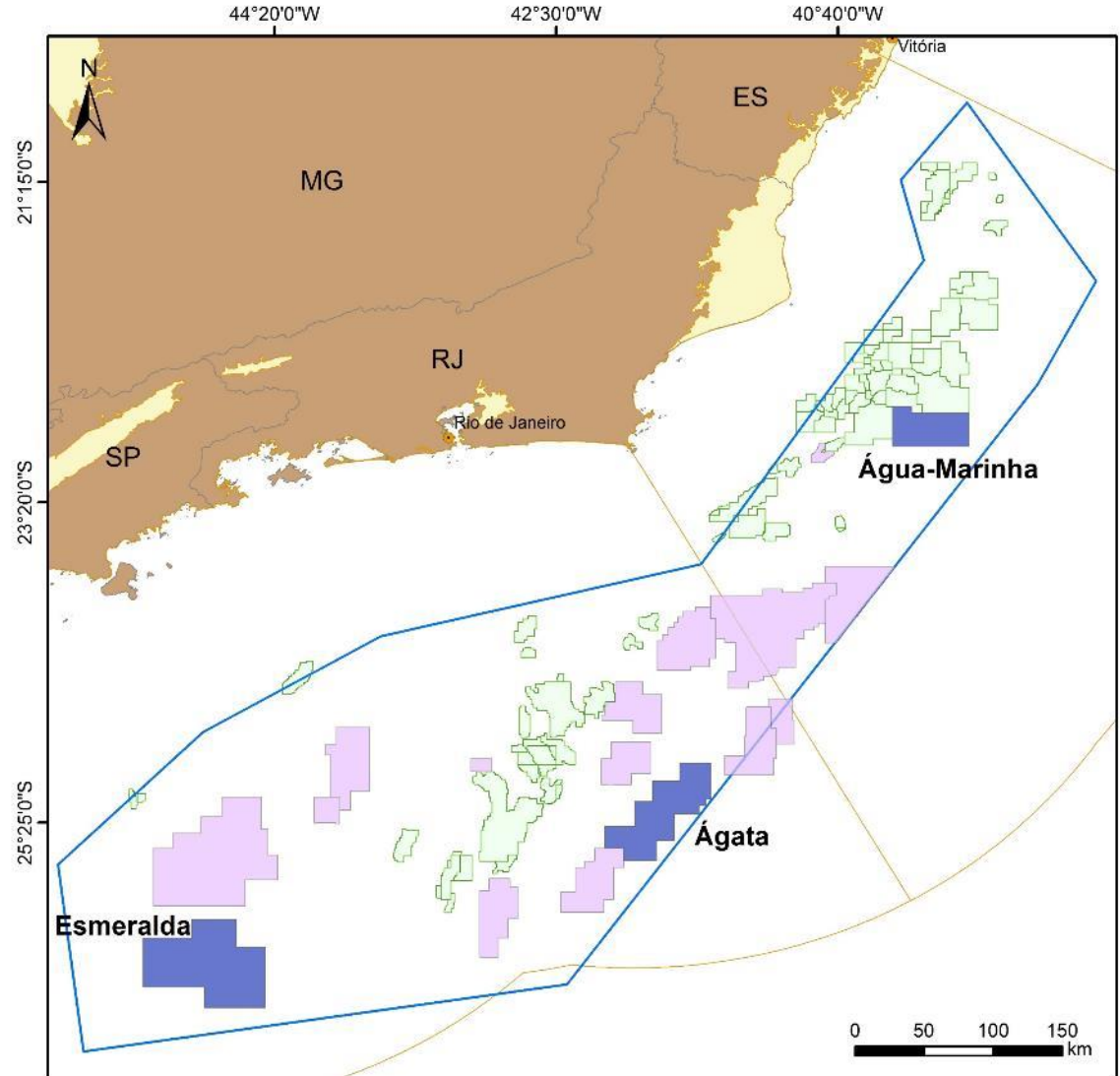


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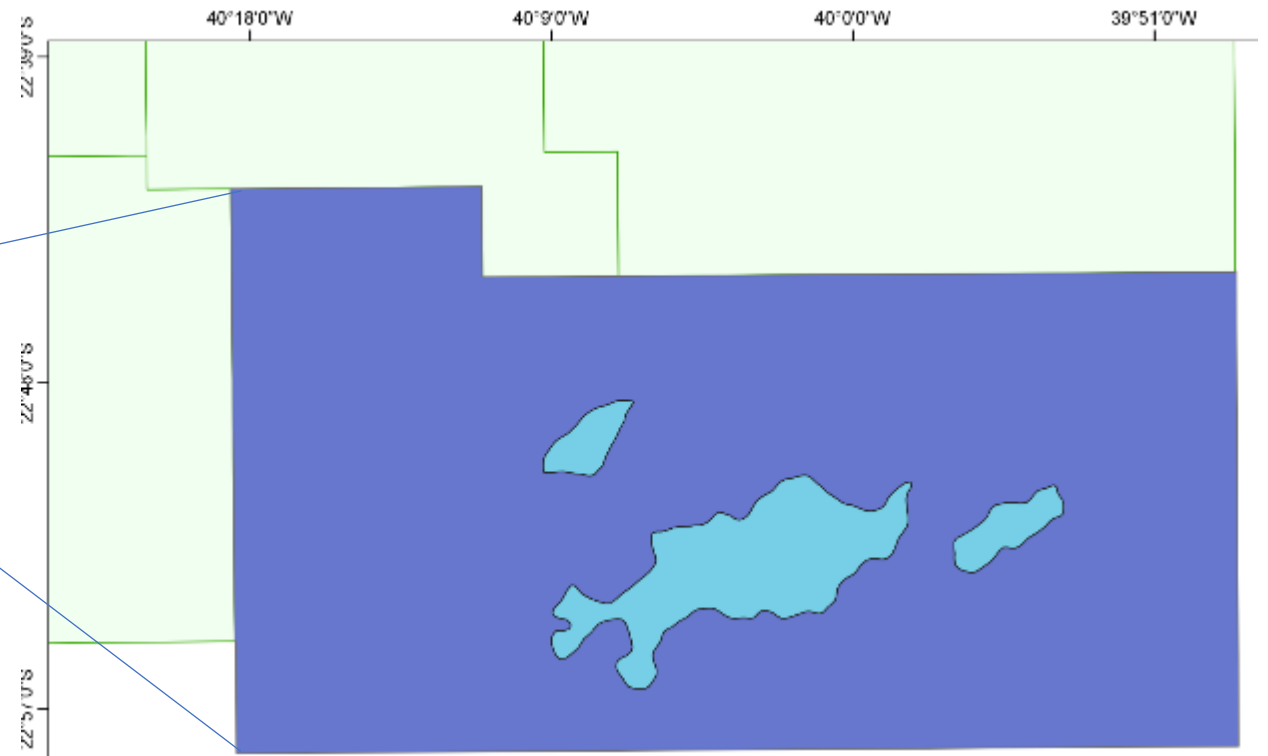
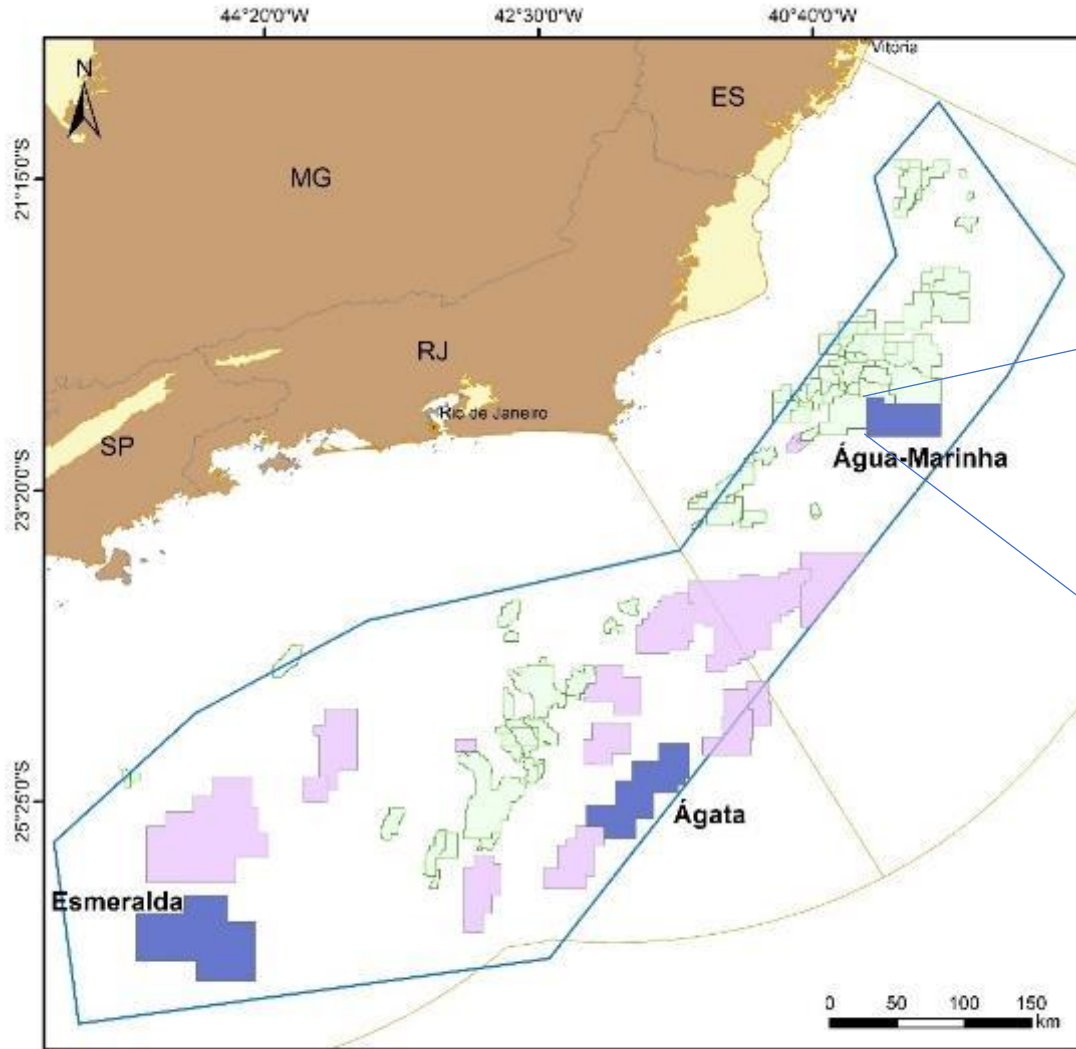




## 3 EXPLORATORY BLOCKS



# Campos Basin – Água Marinha Block

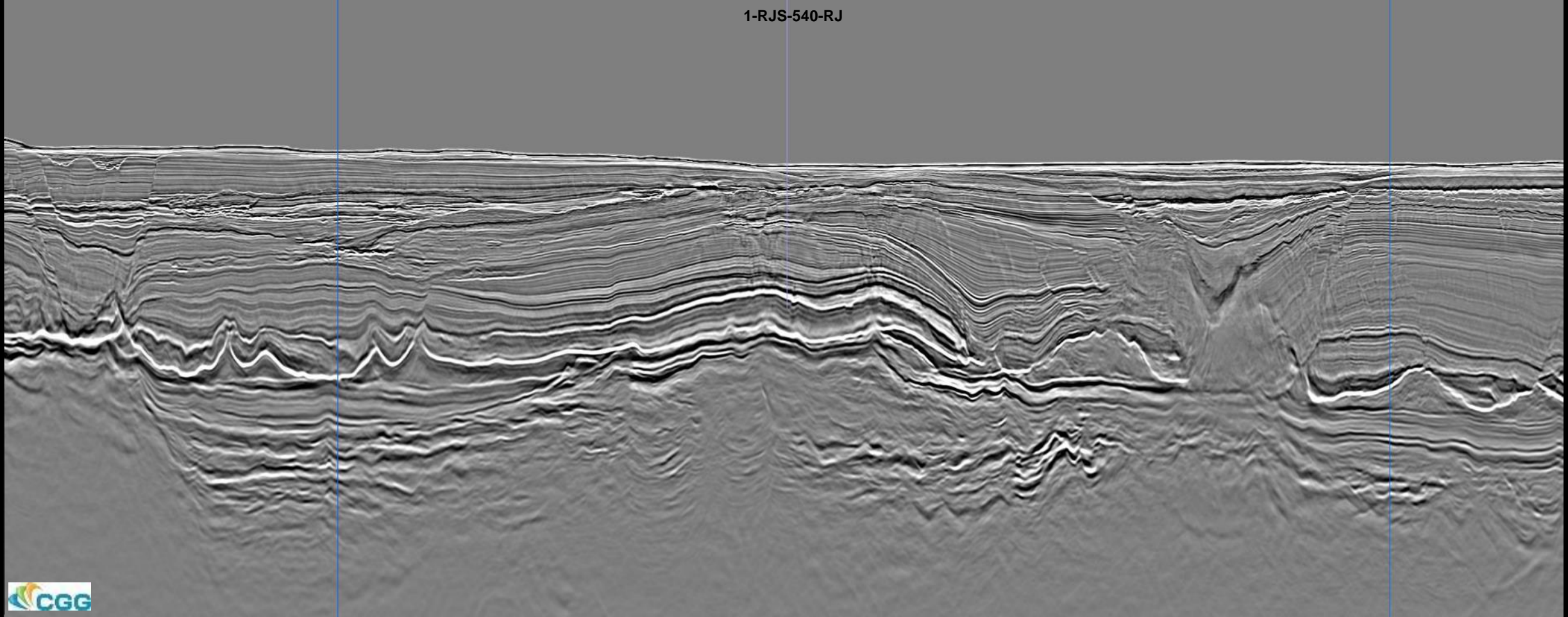


**VERY LOW GEOLOGICAL RISK PROSPECT**  
Neighbor to Several Fields



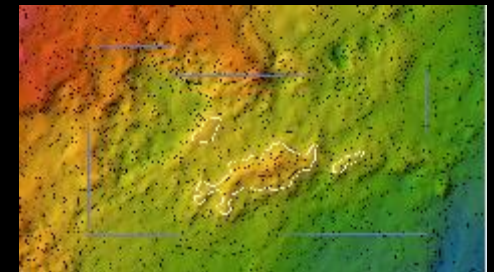
# Campos Basin – Água Marinha Block

1-RJS-540-RJ



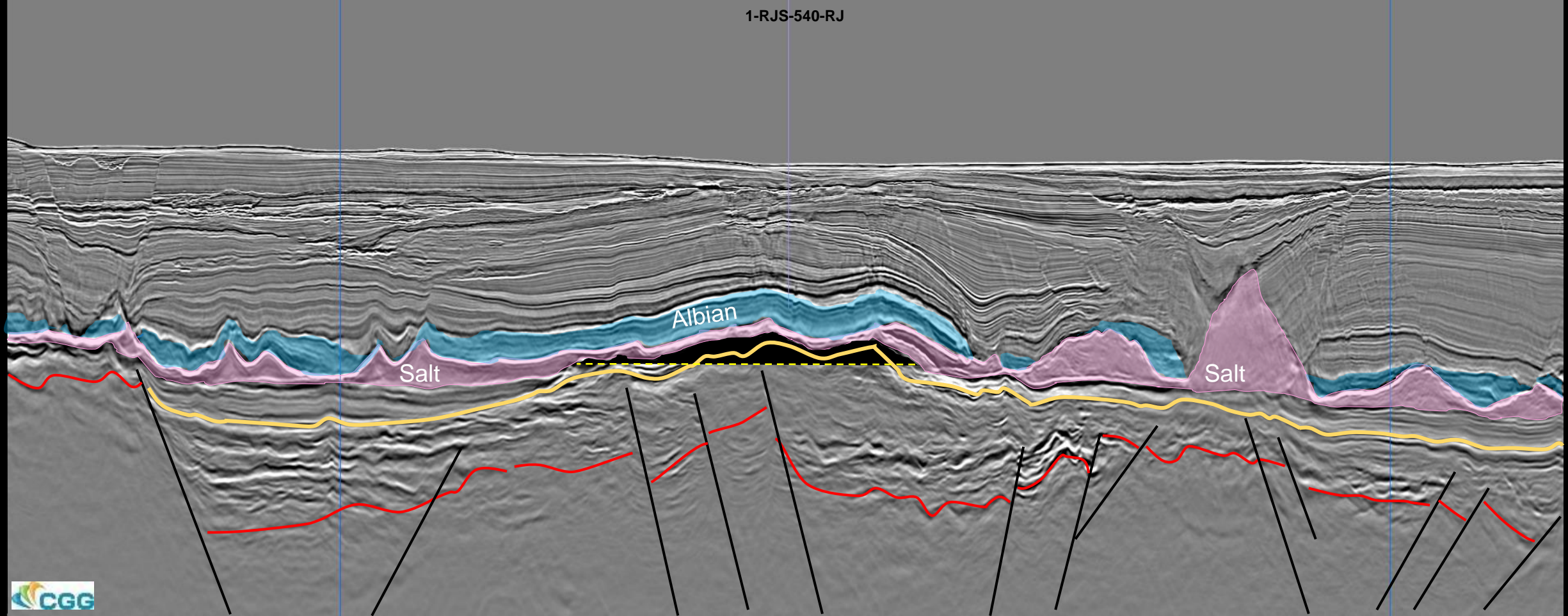
Arbitrary line – Survey0264\_BMC\_CAMPOS\_FASE\_II (RTM) – Courtesy CGG

6 Km



# Campos Basin – Água Marinha Block

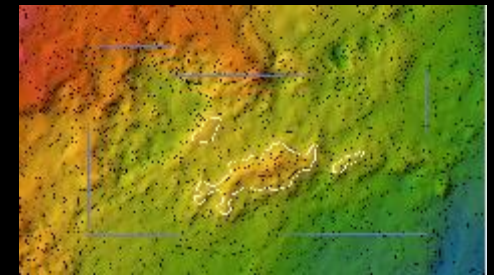
1-RJS-540-RJ



Arbitrary line – Survey0264\_BMC\_CAMPOS\_FASE\_II (RTM) – Courtesy CGG

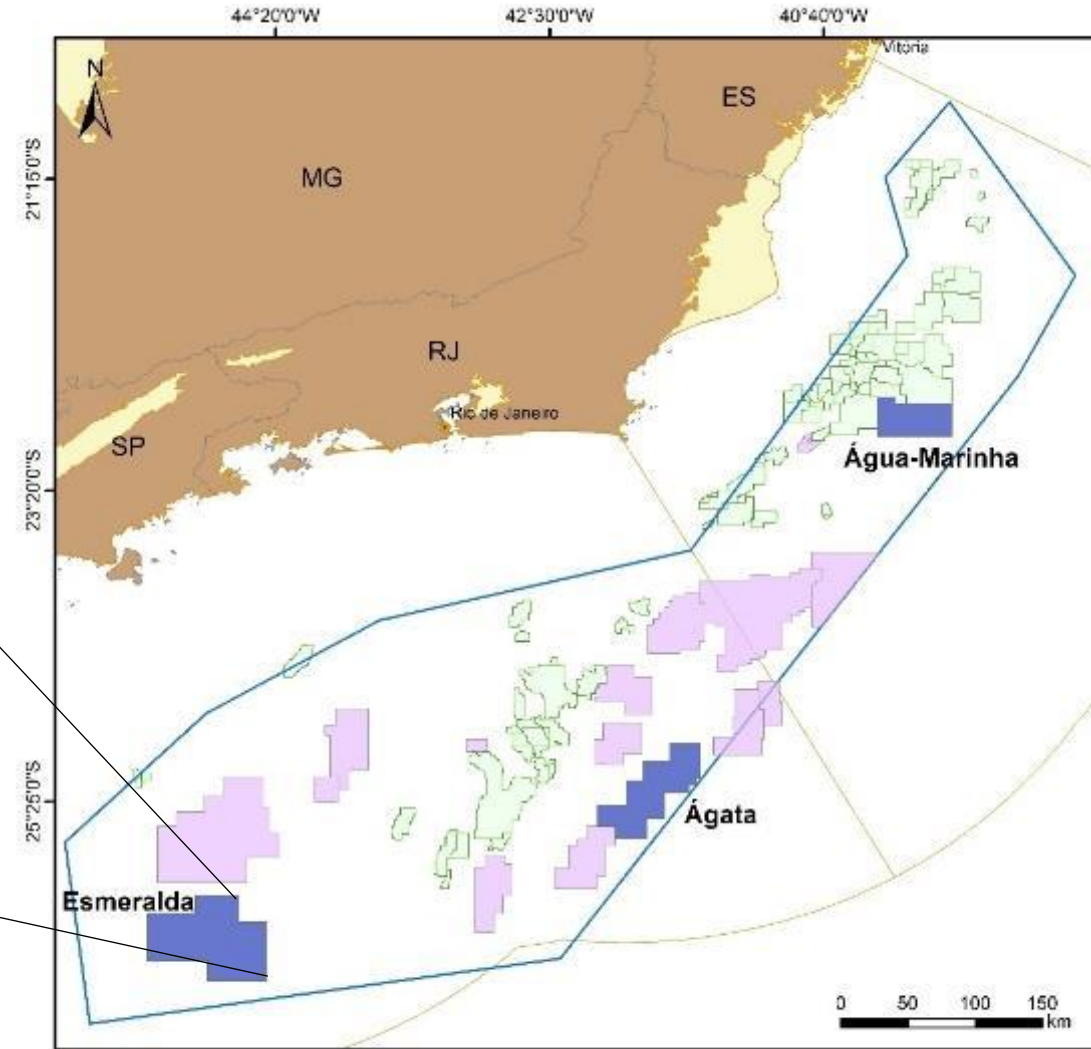
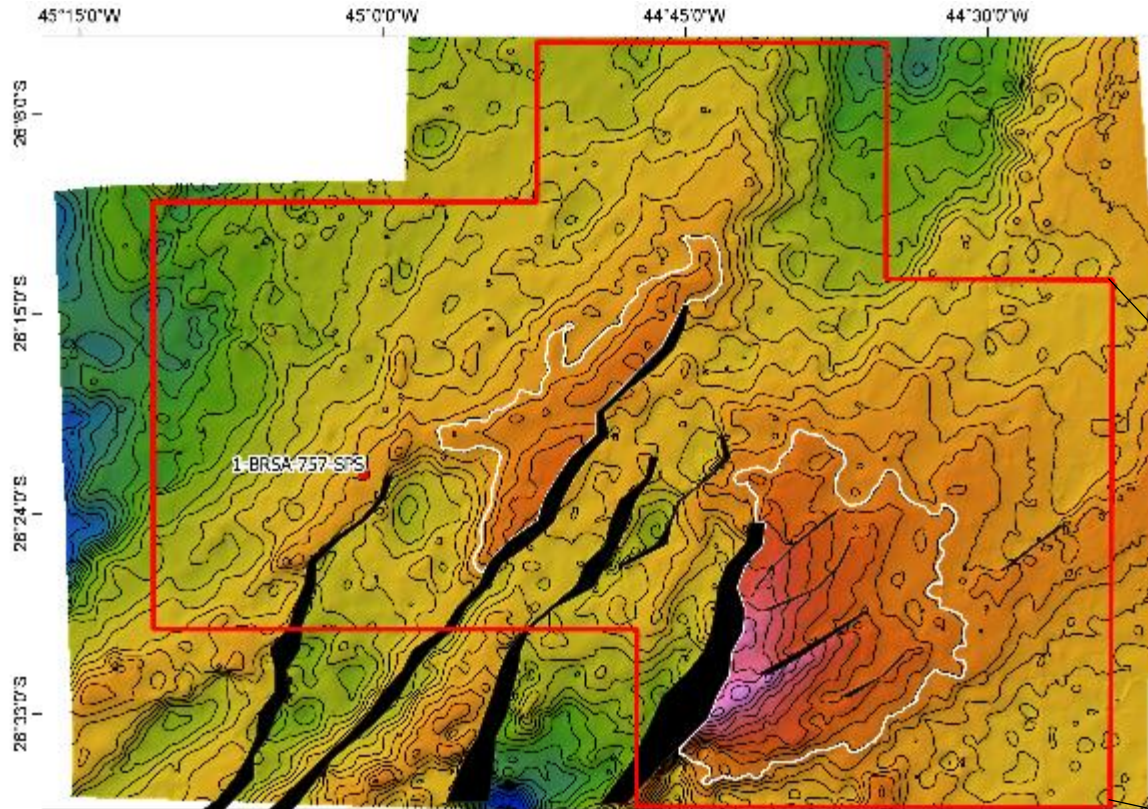
6 Km

- Top of Quissamã Fm
- Basement
- Top of Rift
- - - Spill Point





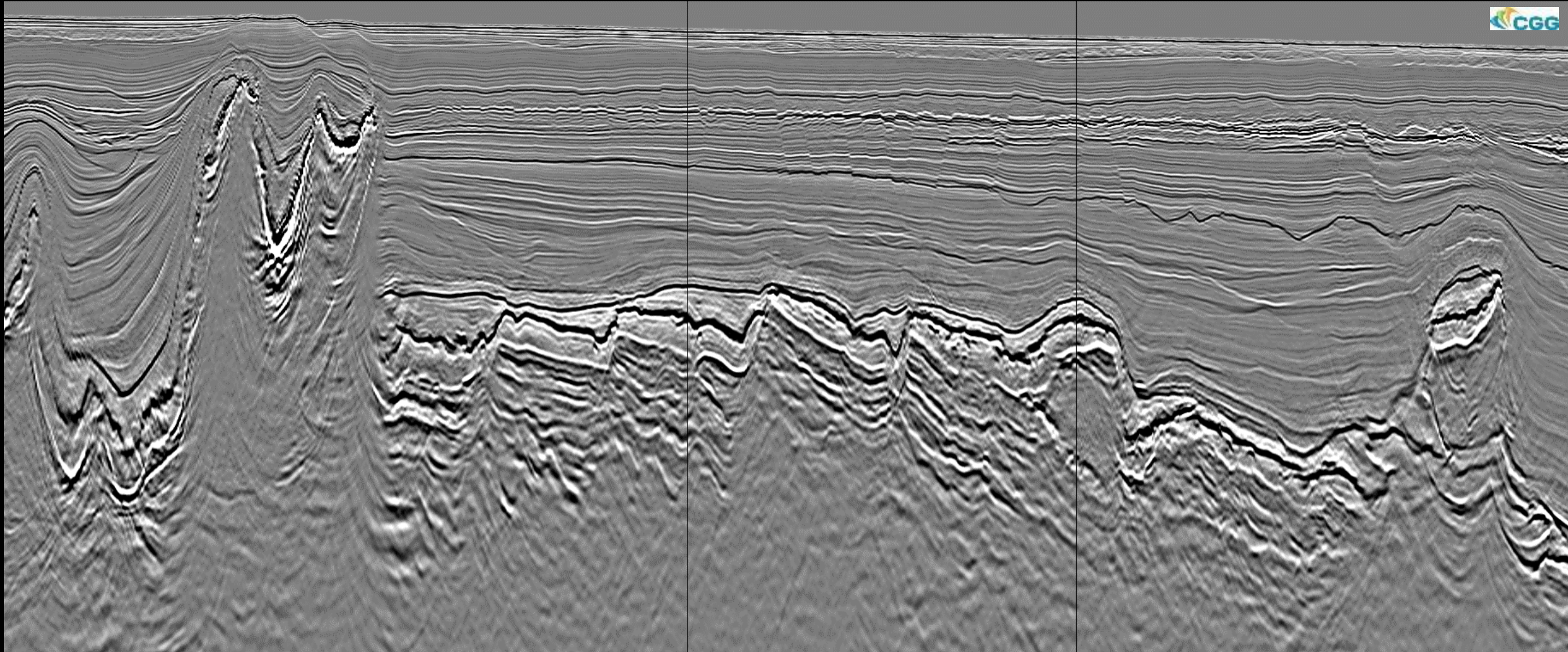
# Santos Basin – Esmeralda Block



**MODERATE GEOLOGICAL RISK PROSPECT**  
Relevant Volumes



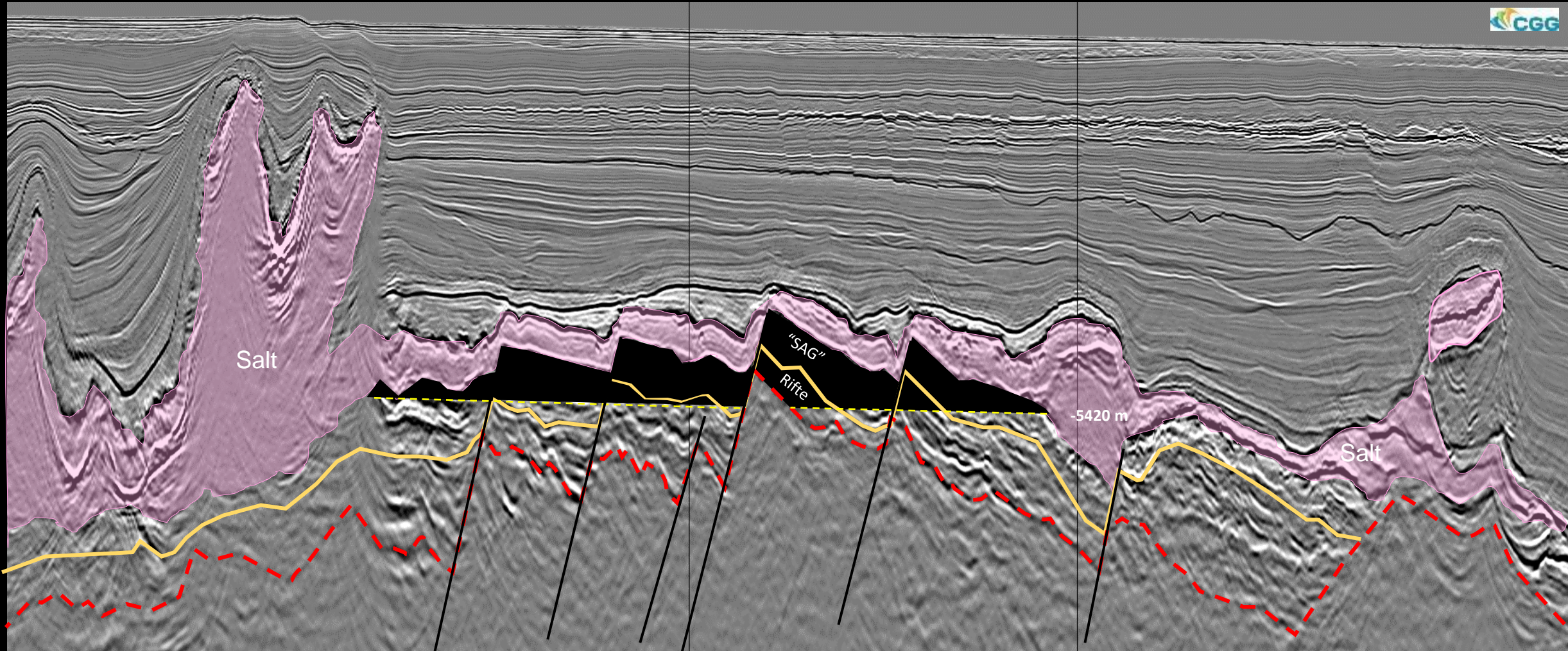
# Santos Basin – Esmeralda Block



Arbitrary line – R0264\_SANTOS\_CONSTELLATION (RTM) – Courtesy CGG



# Santos Basin – Esmeralda Block

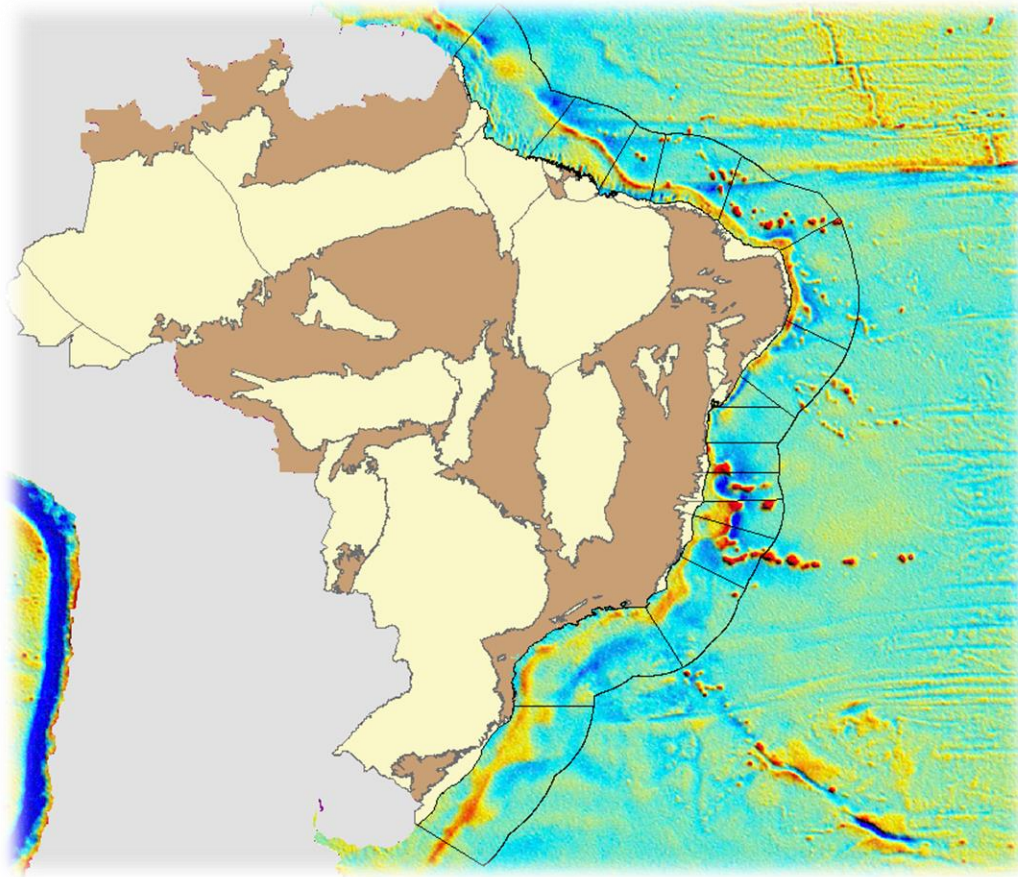


Arbitrary line – R0264\_SANTOS\_CONSTELLATION (RTM) – Courtesy CGG

--- Basement      — Top of Rift      - - - - Spill Point



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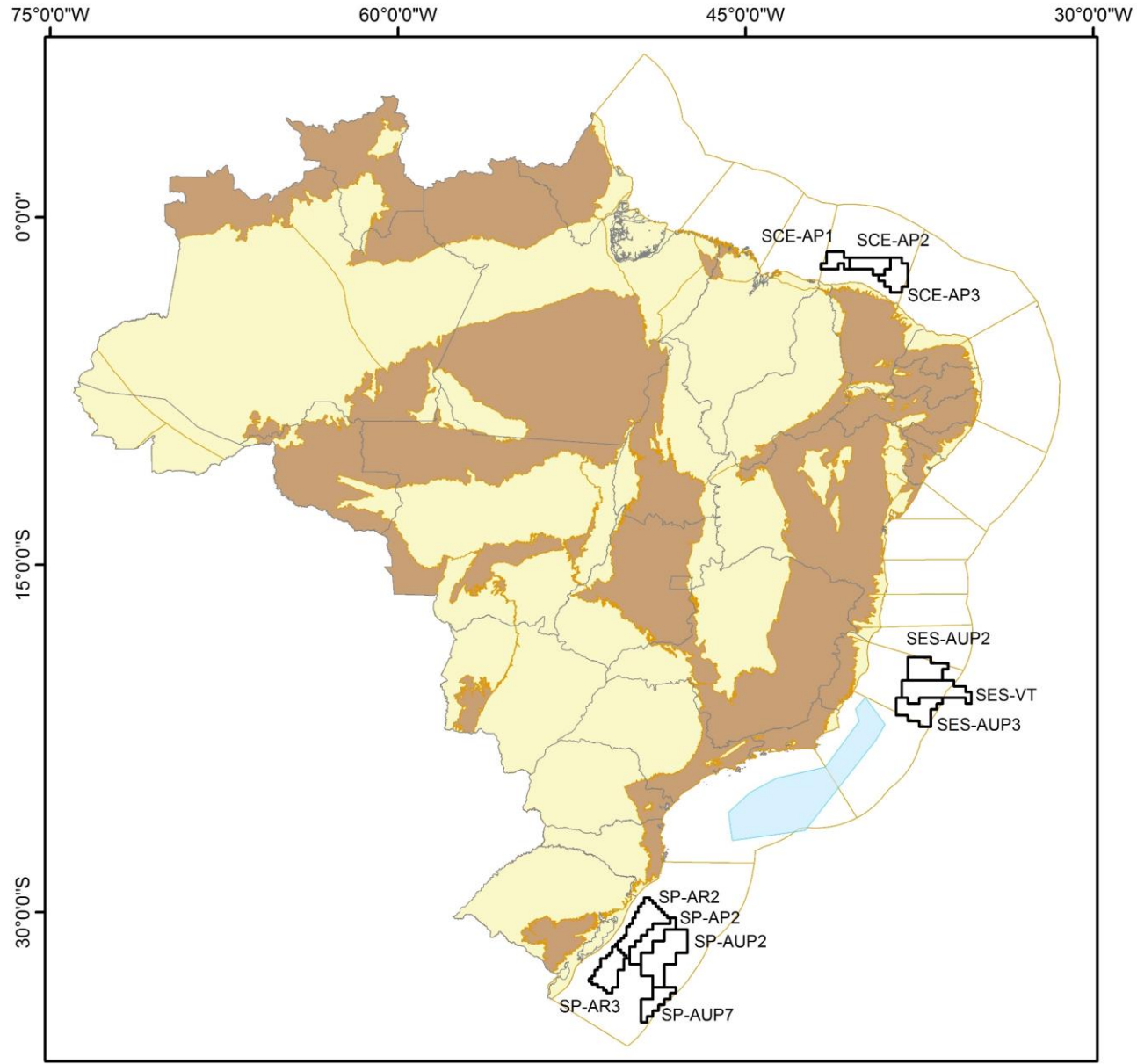


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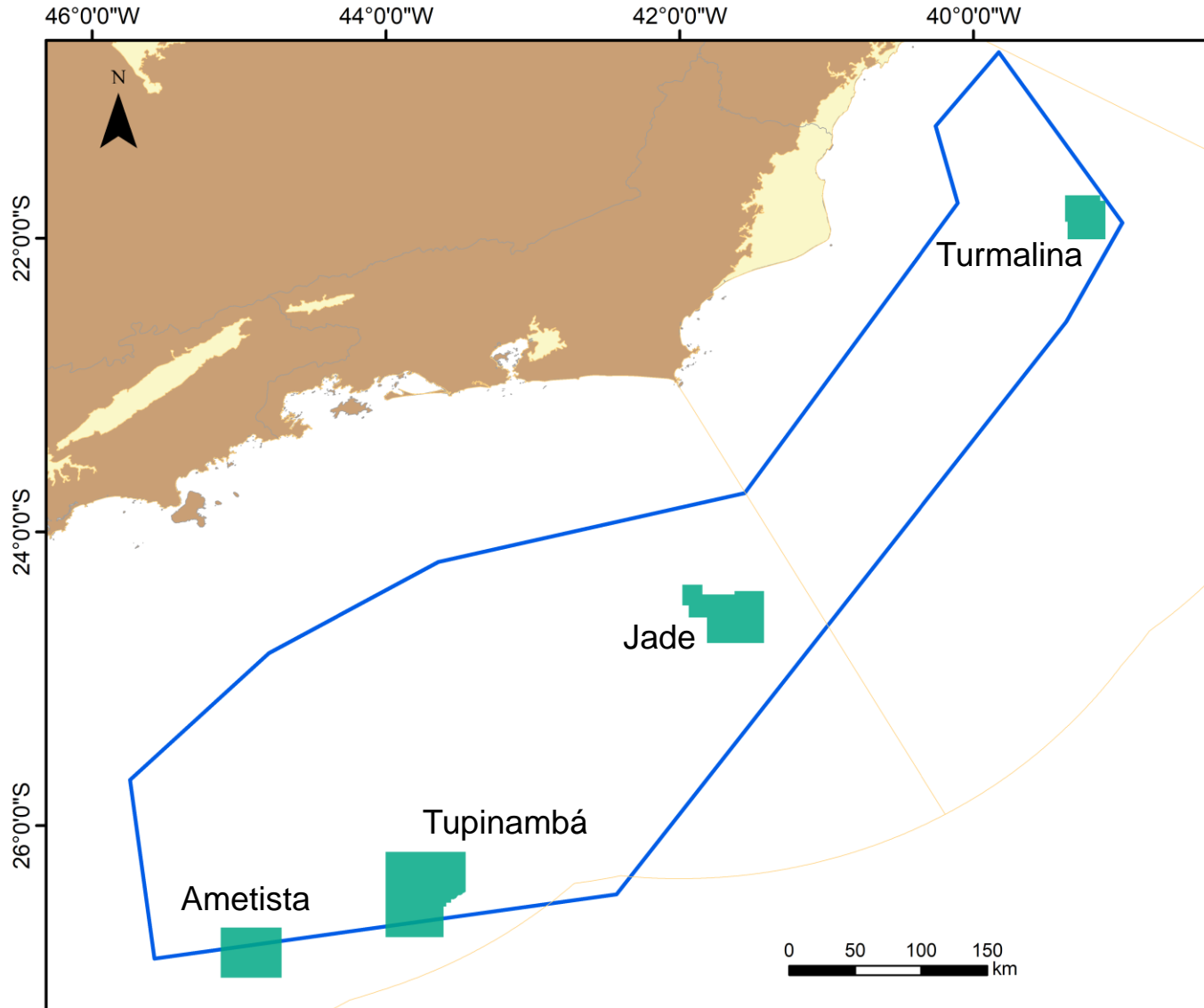




Ceará Basin  
Espírito Santo Basin  
Pelotas Basin

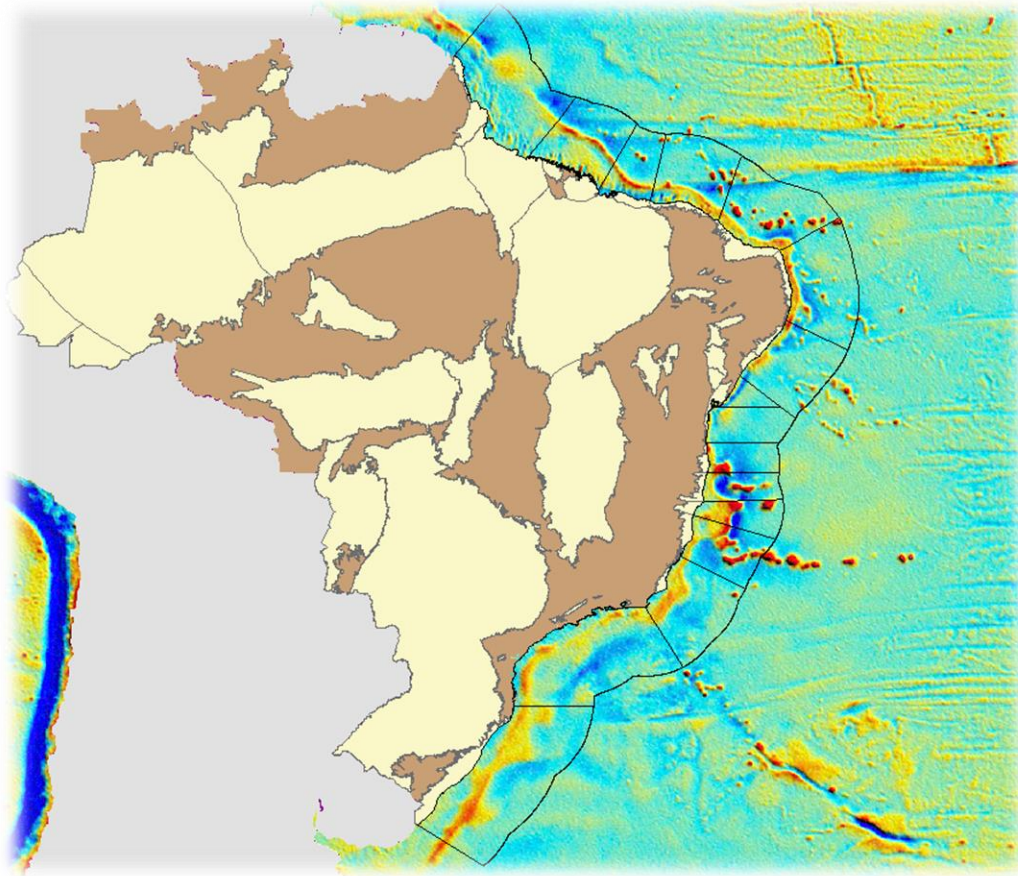


# 8<sup>th</sup> Production Sharing Round





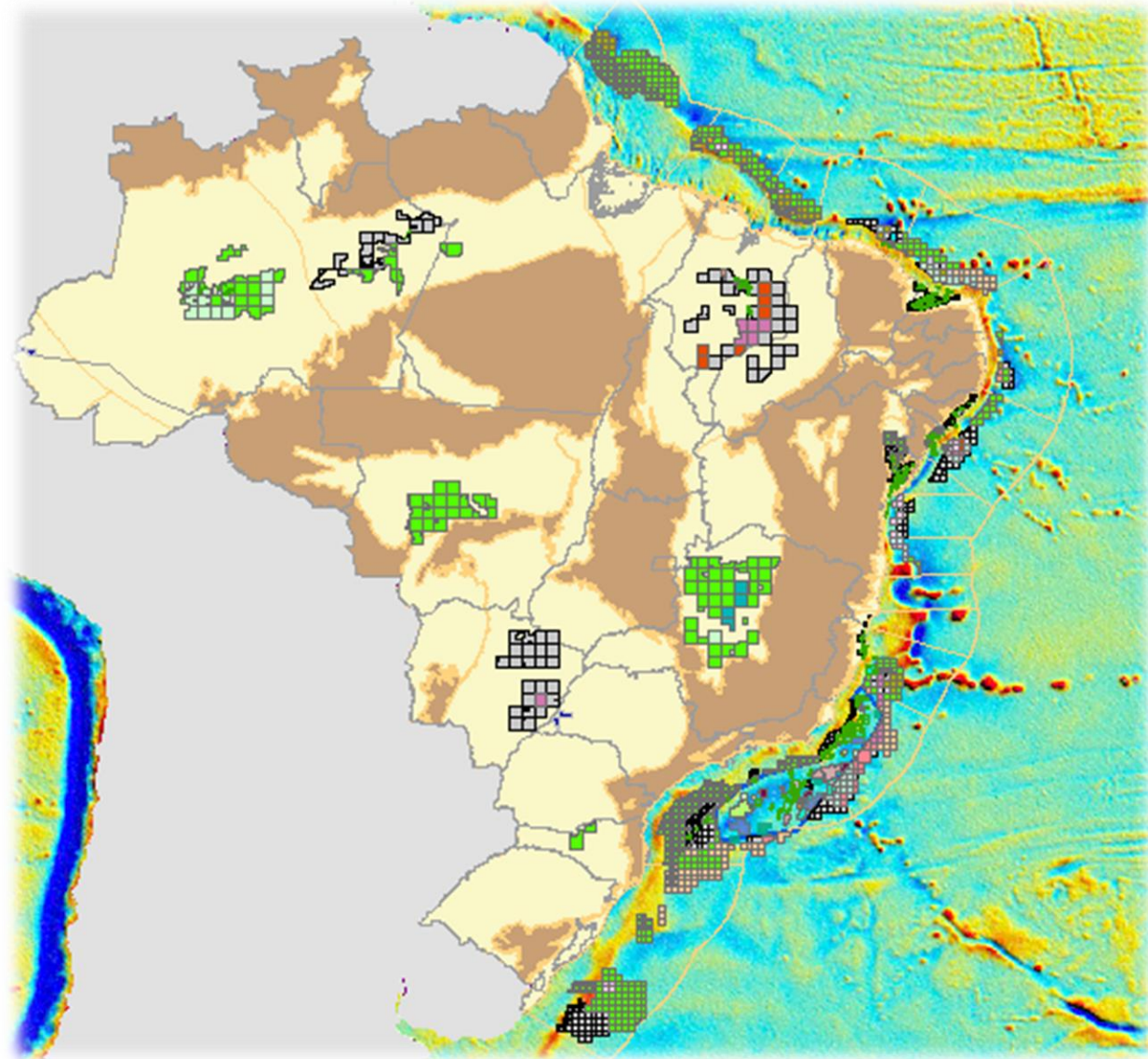
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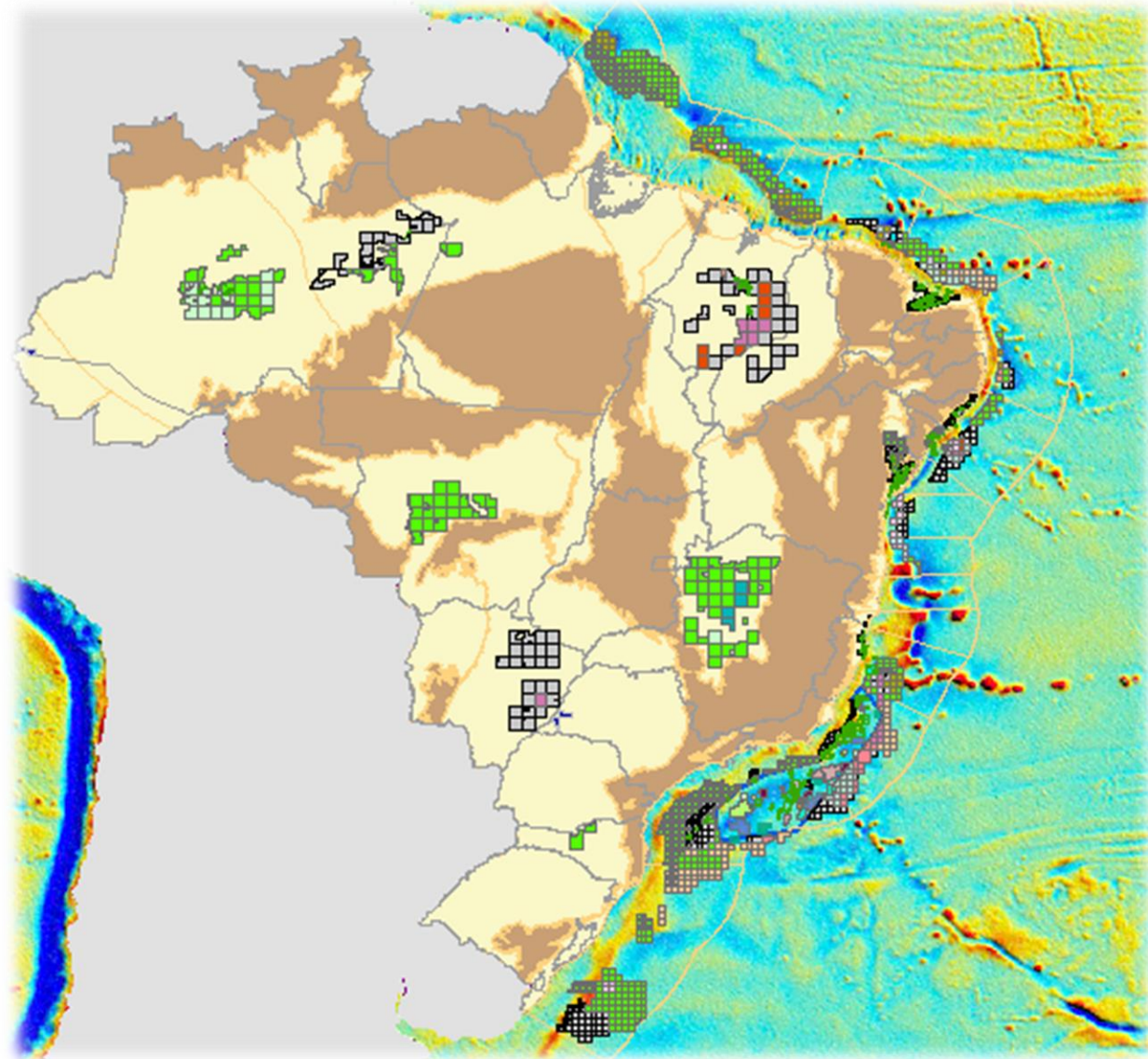
# Final Remarks



- Brazilian next Bidding Rounds – Opportunities for all sizes of companies
- 17<sup>th</sup> Concession Round – Potential for Pre-salt and Pos-salt (carbonates and turbidites)
- Potiguar, Campos, Santos and Pelotas Offshore Basins
- 7<sup>th</sup> Production Sharing Round – Campos and Santos Pre-salt



# Final Remarks



- Open Acreage is working!
- Over 700 Blocks are already available
- Potential for Pre-salt in Campos and Santos
- Potential for several pos-salt plays in nine Offshore Basins
- Potential for small and medium companies in Mature Onshore Basins
- Potential for Natural Gas in six Onshore Frontier Basins



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