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The 5th Cycle of Permanent Offer Acreage: Transforming Brazil's Energy Landscape

Unlocking New Frontier Basins in Brazil's Oil and Gas Exploration

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Brazil is a powerhouse in oil and gas production, ranking as the largest producer in Latin America and home to some of the world's largest recoverable ultra-deep oil reserves. With a coastline of approximately **7,400 kilometers**, among the longest globally, Brazil holds significant untapped potential for hydrocarbon exploration.

While much of the country's oil and gas activities have historically focused on the prolific pre-salt fields in the Campos and Santos Basins, several other basins remain underexplored, presenting opportunities for future development. We will highlight the potential of some of those basins like the Foz do Amazonas where TGS seismic reservoir facies indicate highly prospective leads in Cretaceous and Tertiary structural and stratigraphic plays.

The Permanent Concession Offer (OPC) in Brazil is a continuous bidding process for oil and gas exploration, managed by the Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (ANP), which is Brazil's National Agency for Petroleum, Natural Gas, and Biofuels. Unlike traditional auctions, companies can express interest in specific blocks at any time. Once fees are paid, a 120-day bidding cycle begins, where sealed bids are submitted and opened transparently. Winning bids are based on signature bonuses and work program commitments. The process ensures flexibility and ongoing opportunities for companies to access both onshore and offshore blocks

The **5th Cycle of the Permanent Concession Offer (OPC)** was launched on February 11, 2025, with its official timeline published in the Federal Official Gazette (DOU). The ANP announced the list of registered bidders eligible to participate, with 30 companies confirmed as bidders for this cycle. The next major milestone in the tentative schedule set by the ANP is the **public session for bid presentations**, scheduled for **June 17, 2025**.

A total of 332 blocks were announced, with 288 of them being offshore exploration blocks spread across nine different basins, as shown on the map in Figure 1.

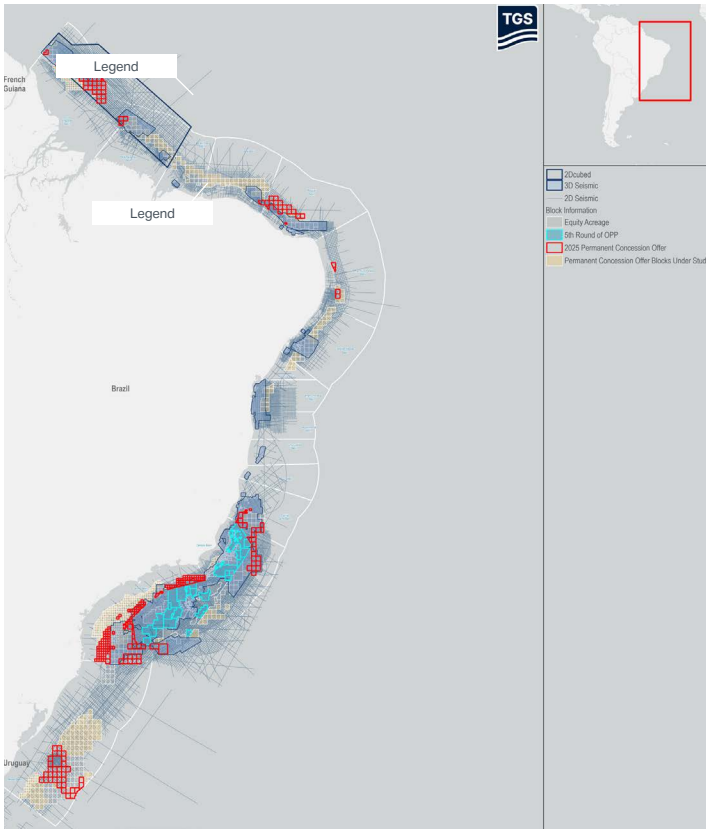

Figure 1 – Map of Blocks in the 5th Cycle of the OPC (red) overlay with TGS Data

This long-awaited cycle follows the success of the 4th Cycle, which took place in December 2023, where 192 exploratory blocks were awarded across all basins—setting a record. The previous record, established in the 3rd Cycle, saw 59 blocks awarded. This demonstrates a growing interest in Brazil's oil and gas potential, as well as the opening of new exploratory frontiers.

For this Well Intel article, we will focus on two key areas: the Equatorial Margin and Southern Brazil, both of which are emerging as the next frontiers for hydrocarbon exploration. Seismic data has revealed significant prospectivity in these regions, offering the potential to unlock vast resources.

Equatorial Margin

This region comprises five sedimentary basins—Foz do Amazonas, Pará-Maranhão, Barreirinhas, Ceará, and Potiguar—and is estimated to contain up to 30 billion barrels of oil equivalent.

In the 5th Cycle of the Permanent Concession Offer (OPC), 65 exploratory blocks are included in Brazil's Equatorial Margin. These blocks are distributed across key basins in the region: **Foz do Amazonas, Pará-Maranhão (PAMA), and Potiguar**. These areas are considered highly promising for oil and gas exploration due to their geological potential.

Historically underexplored, the area has recently drawn renewed interest due to its geological similarities with Guyana and Suriname, where major oil discoveries have been made.

Significant investments in multi-client 2D and 3D seismic data have been pivotal in advancing exploration efforts. In the Foz do Amazonas Basin, a partnership between TGS and Viridien completed the AMAPA Phase II 3DMC in October 2024, covering approximately 11,400 km of high-quality seismic data, providing valuable insights into the region's intricate channel structures. The map below illustrates the available 2D and 3D seismic data from TGS in the Equatorial Margin.

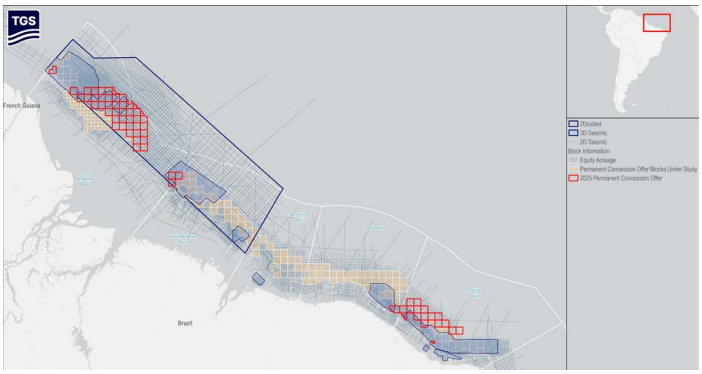

Figure 2- Map of OPC Blocks (red) TGS 2D & 3D Seismic Data in Equatorial Margin

The AMAPA Phase I and Phase II datasets provide 22,000 km² of continuous 3D multi-client data covering several blocks in the 5th Cycle Bid Round. These blocks, located in the Foz do Amazonas Basin, offer significant potential in Syn- and Post-Rift units. The Amapá 3D datasets reveal Cretaceous and Tertiary structural and stratigraphic plays, while conjugate discoveries, proven A-C-T source rock presence, and seismic reservoir facies indicate highly prospective leads, helping to de-risk exploration in this frontier basin.

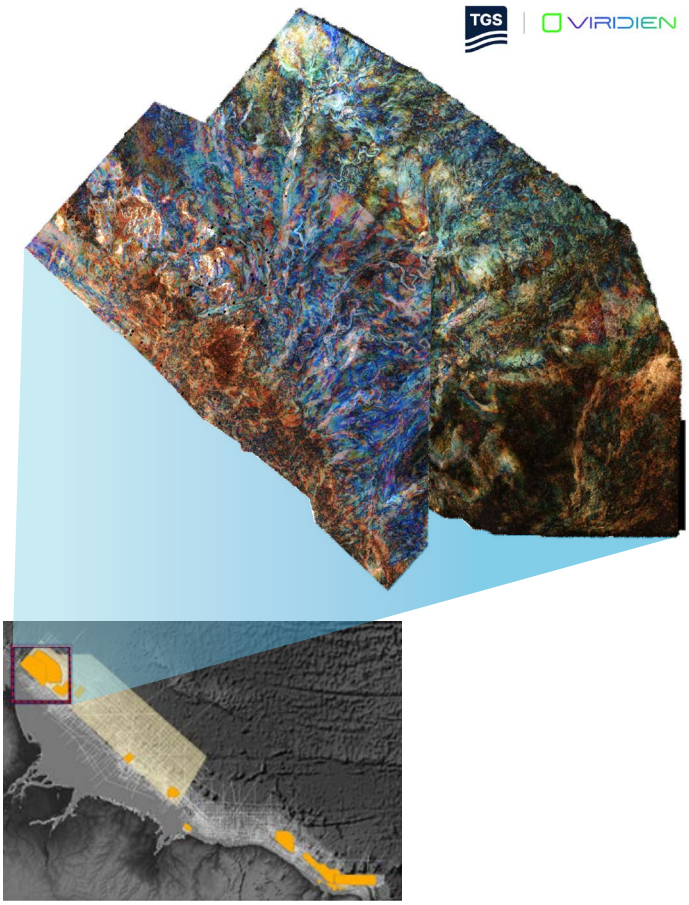

Figure 3 – Spectral Decomposition – Channels – AMAPA Phase I and Phase II

The **5th Cycle of Brazil's OPC** includes three blocks in the Para-Maranhão Basin, located within the Equatorial Margin. TGS' existing 2D seismic data in this region has already identified turbidite systems and Late Cretaceous channel complexes, which are key indicators of hydrocarbon potential. However, the complex nature of these geological formations makes accurate interpretation challenging with 2D seismic data alone.

To address this, TGS has launched PAMA Phase 1, a 19,000 km² multi-client 3D seismic program covering three blocks. This initiative provides high-resolution 3D seismic imaging of reservoirs, trap configurations, and fluid migration pathways.

PAMA Phase 1 3DMC enhances exploration value by reducing uncertainties in prospect evaluation, particularly for deepwater targets. This program supports broader industry efforts to unlock the Para-Maranhão Basin's potential and is expected to generate significant interest from operators preparing bids for the 5th OPC cycle, scheduled for late 2025.

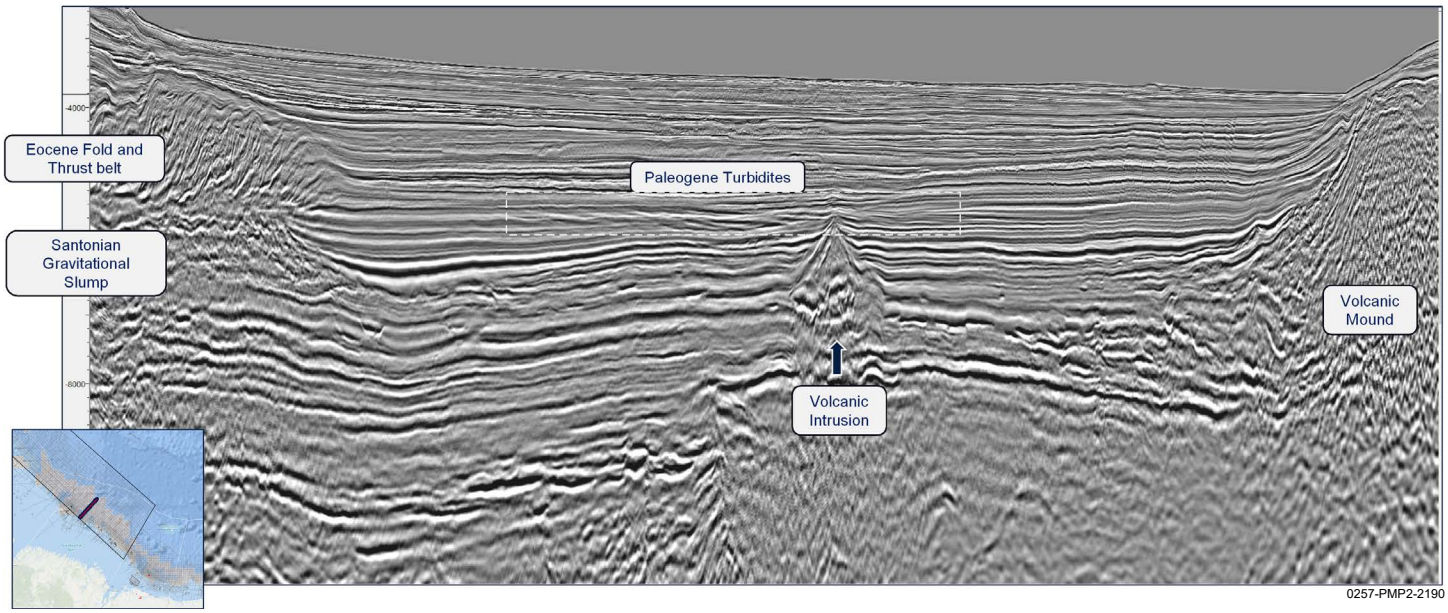

Figure 4 – 2D Line PSDM Over Blocks in the 5th Cycle OPC

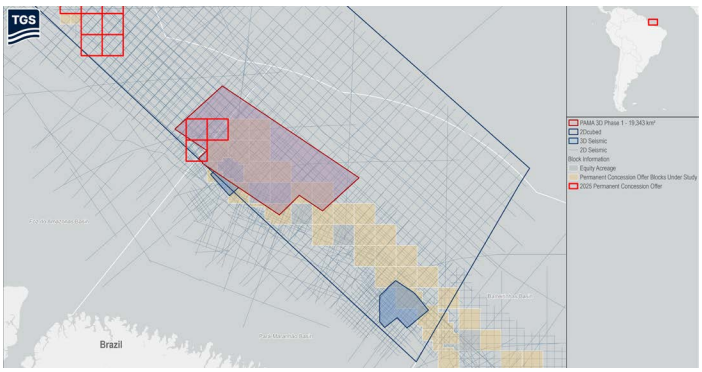

Figure 5 – New 3DMC Seismic Program – PAMA Phase 1 (~ 19,343 sq. km)

The Potiguar Basin, a premier hydrocarbon exploration frontier in Brazil's Equatorial Margin, features 16 exploratory blocks alongside two in the neighboring Ceará Basin. This region has garnered significant attention due to recent drilling successes and advanced seismic insights, particularly from TGS' **Aquiraz 3D survey**, which reveals well-organized Mid-Late Cretaceous channel and fan complexes indicative of turbidite reservoirs

The recent discovery of Pitu Oeste in the Potiguar Basin has reinforced Petrobras' strategic focus on the region. The state-owned oil giant has committed substantial investments, including plans to drill 16 new wells by 2028 as part of a $3.1 billion investment, showcasing its confidence in the basin's exploration potential. As Brazil's pre-salt reserves face gradual depletion in the coming decades, the Equatorial Margin, with its promising hydrocarbon prospects, is set to play a pivotal role in maintaining and bolstering the country's oil production capacity.

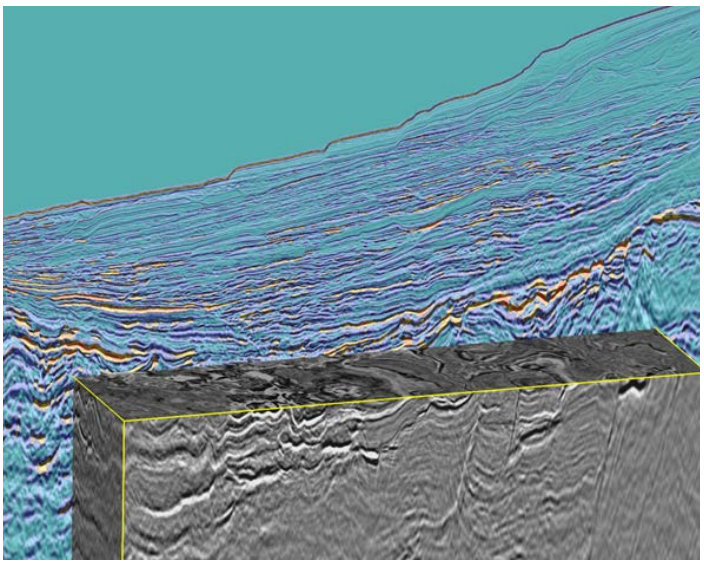

Figure 6 – Aquiraz 3DMC Potiguar: OPC Blocks on Offer

Southern Brazil

This region encompasses the southern portion of the Santos Basin and the entirety of the Pelotas Basin. The Southern Santos Basin includes deepwater outboard blocks covered by **TGS' Santos Phase IV and Phase II datasets**, extending to the boundary separating it from the Pelotas Basin.

This transition signifies the end of the traditional pre-salt plays characteristic of the Santos and Campos Basins and the beginning of stratigraphic plays. These new plays are prominently visible in the recently completed **Santos Sul 3DMC** dataset, which provides high-resolution imaging of Cretaceous to Oligocene clastic turbidites and volcanic features.

This modern seismic data is expected to redefine exploration opportunities in both the Southern Santos and Northern Pelotas Basins, offering critical insights into these frontier areas.

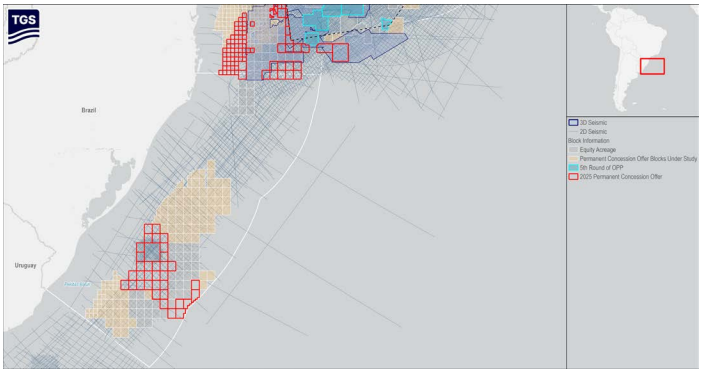

Figure 7 - Map of Southern Santos and Pelotas Basin: OPC Blocks

There is significant potential in the outboard Blocks S-M-163 and S-M-1617. The area is characterized by water depths from 2500-2900 m with thick, uninterrupted layered evaporites overlaying pre-salt horsts and grabens combining for multiple four-way closures resembling the prolific outer high at Tupi and surrounding fields. The "last frontier" of the Brazilian pre-salt play pushes the boundaries of the state's EEZ but displays characteristics consistent with some of the largest discoveries in the Santos Basin.

The crown jewel of the South Santos Basin is undoubtedly Santos Sul 3DMC. The final Pre-Stack Depth Migration product is set for release in late March 2025. This dataset features a triple-source acquisition using GeoStreamer™, delivering exceptional data quality with cutting-edge imaging techniques such as Inversion Deblending and Dynamic Matching Full Waveform Inversion (FWI). The combination of optimized acquisition parameters and advanced imaging technologies establishes Santos Sul 3DMC as the next generation of multi-client 3D Seismic Data in Southern Brazil.

The **Santos Sul dataset** covers additional exploration blocks up for bid in the **5th Cycle OPC**, encompassing both **deepwater** and **shallow water** areas.

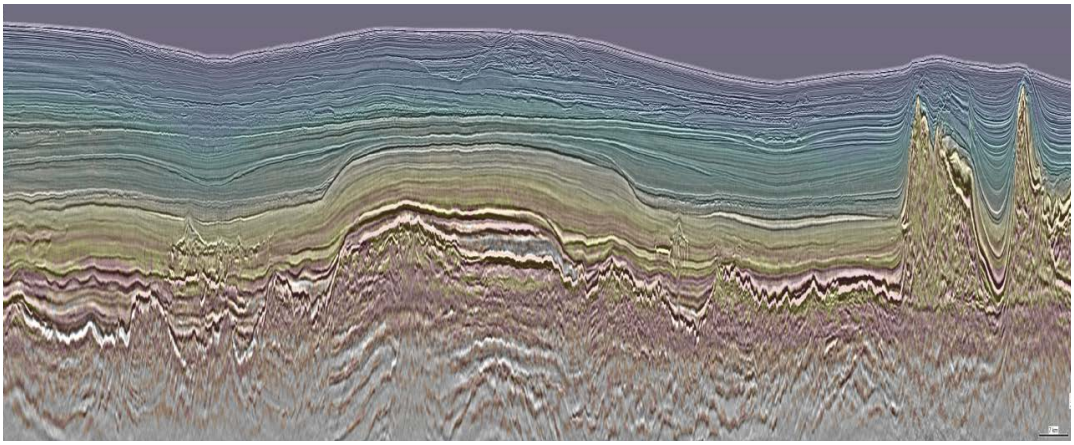

Figure 8 – Santos Sul 3DMC Fast-Track DM-FWI Arbitrary Line

Figure 9 – Santos Sul 3DMC (~ 12,300 sq. km) overlay with Blocks included in the 5th Cycle OPC

During the 4th Cycle of the Permanent Concession Offer (OPC), the Pelotas Basin emerged as a major highlight. In December 2023, 44 blocks were auctioned, marking a significant milestone for the basin. This cycle was particularly notable as it marked Petrobras' first participation in a Permanent Concession Offer, during which the company acquired 29 blocks, either independently or in partnership with Shell and CNOOC. These acquisitions positioned Petrobras as a key operator in the Pelotas Basin, reinforcing its strategy to diversify its portfolio and strengthen its role in deepwater exploration.

The upcoming 5th Cycle is expected to be another pivotal moment for the Pelotas Basin, with 34 blocks on offer. Industry expectations are high, driven by the basin's potential to significantly expand Brazil's oil reserves, which are estimated to hold between 10 and 15 billion barrels of recoverable oil. With growing interest from major international players and ongoing exploration efforts, the Pelotas Basin is poised to become a cornerstone of Brazil's energy strategy in the coming years.

There is a substantial amount of 2D seismic data in Brazil, which is fundamental to develop a new ventures strategy, and TGS holds around 150,000 line kms in the Pelotas Basin.

The South Pelotas Basin is characterized by up to 7,000 meters of sedimentary deposits from the Cretaceous and Tertiary periods, with key source rocks found in the Paleocene and Albian sections. The basin contains rich Mid to Late Cretaceous channel complex systems, as illustrated in the 2D stack (Figure 10). Geological analogs to Namibia's Orange Basin, which hosts notable oil discoveries such as Venus and Graff, have intensified interest in the Pelotas Basin as a high-potential exploration frontier, particularly for its source rock and reservoir potential in deepwater settings.

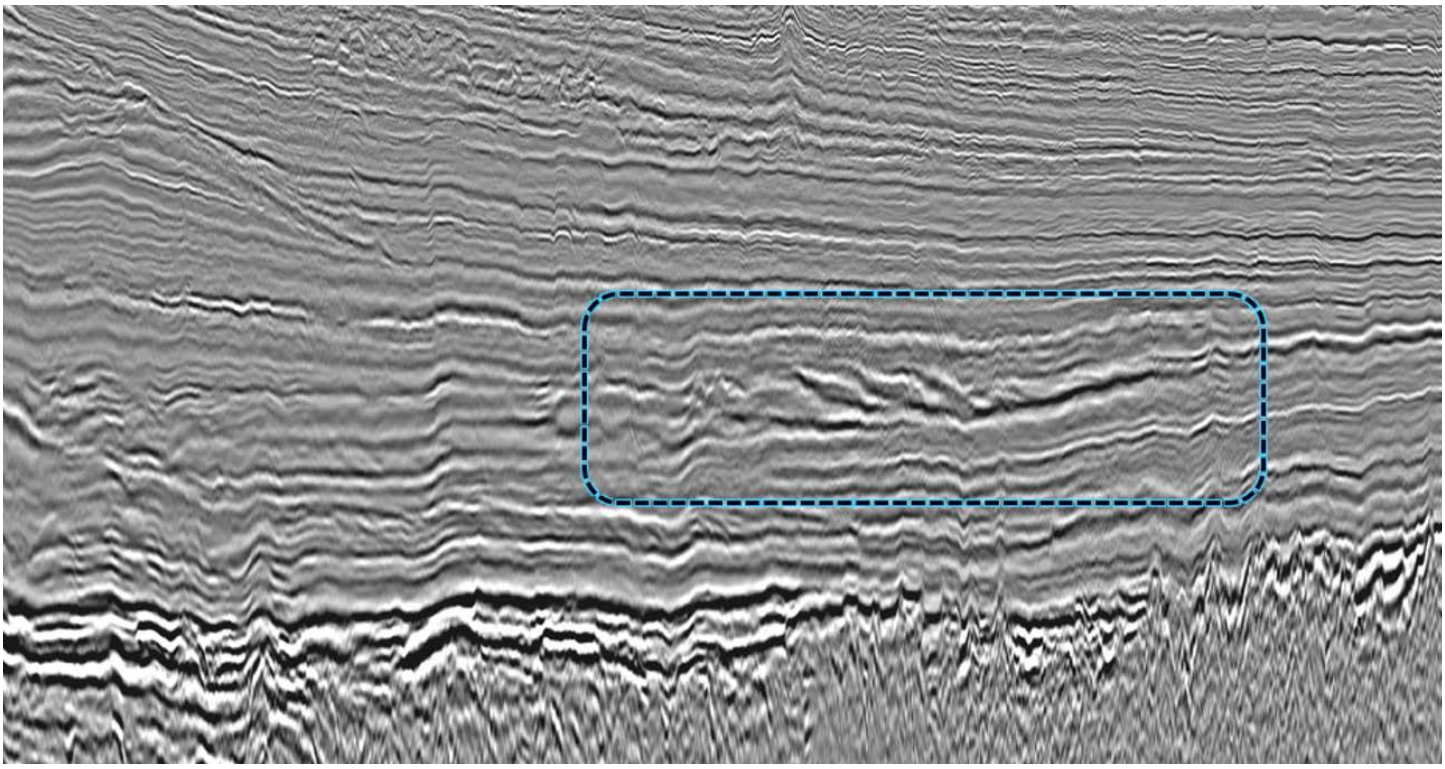

Figure 10 – Arbitrary 2D Line showing Channel Complexes over Blocks in the 5th Cycle OPC

TGS provides the most modern 2D multi-client broadband datasets covering the blocks in the bid round within the Southern Pelotas Basin. These datasets are not publicly available. Additionally, our extensive library extends to the Northern Pelotas Basin and Santos South, making it the only resource with this level of coverage—offering a unique advantage to New Ventures teams conducting regional assessments.

The Road Ahead

The **5th Cycle of the Permanent Concession Offer (OPC)** marks a significant milestone, not just for Brazil but for the global oil and gas exploration industry. The record number of blocks available for bidding is unparalleled, both in Brazil and worldwide.

As Brazil takes the spotlight, one fundamental element in mitigating exploration risks is high-quality seismic data. This includes both **2D** and more complex **3D technologies** for Towed Streamer and OBN applications. TGS is strategically positioned to support these efforts, with an impressive multi-client library of approximately **950,000 km of 2D multi-client seismic data** and **550,000 km² of 3D multi-client seismic data**. Furthermore, we are committed to acquiring additional multi-client seismic data to cover new blocks in the **5th Cycle** and future cycles, ensuring continued support for the industry's exploration needs.