



ONSHORE
LOWER
CONGO BASIN

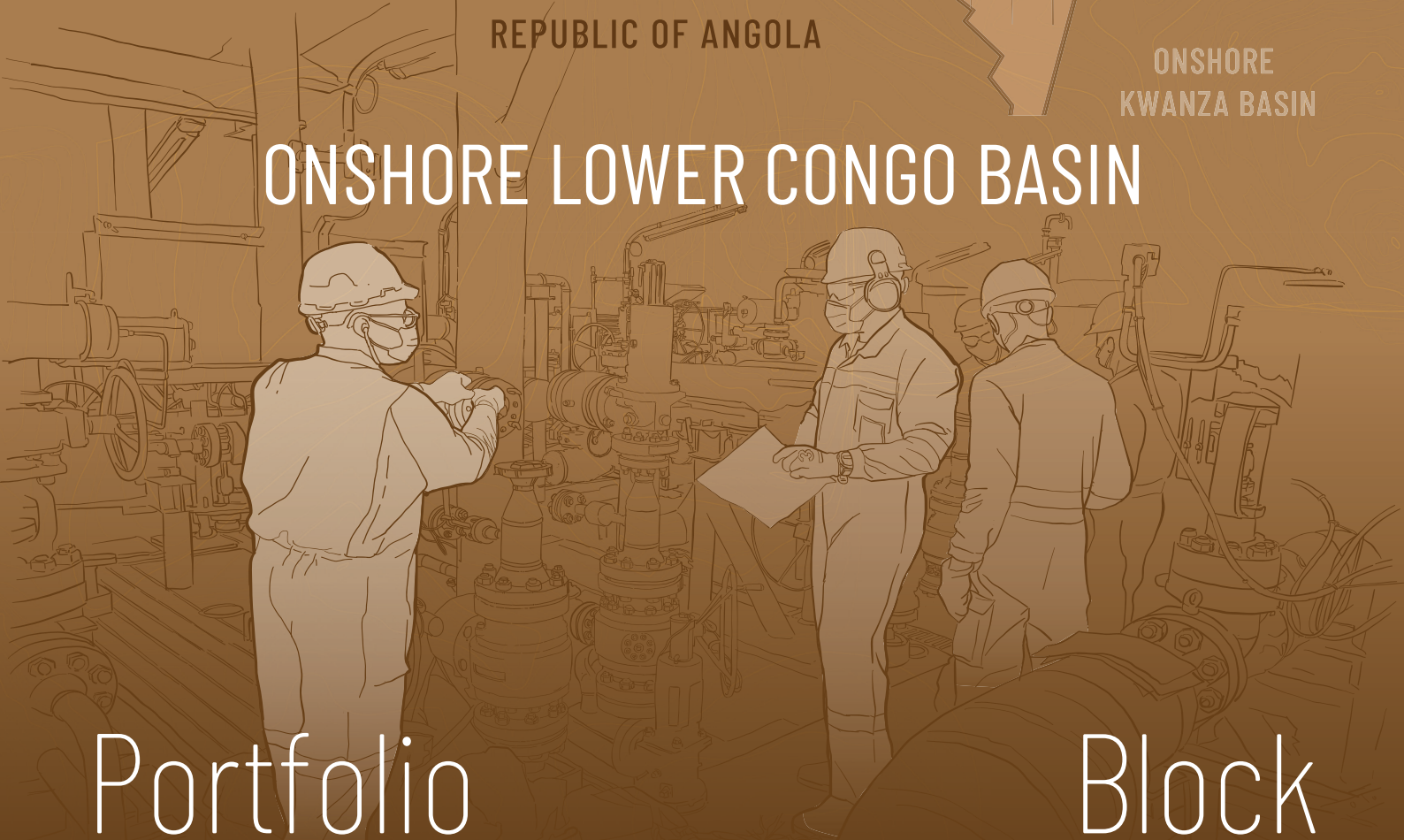


ANPG
AGÊNCIA NACIONAL DE PETRÓLEO, GÁS
E BIOCOMBUSTÍVEIS

2023
LICENSING ROUND
REPUBLIC OF ANGOLA

ONSHORE
KWANZA BASIN

ONSHORE LOWER CONGO BASIN



Portfolio
OPPORTUNITIES

Block
CON3

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1. Introduction

The portfolio of opportunities describes the general characteristics of Block CON 3, presenting the main geological and geophysical aspects from the exploration history, petroleum system, and a series of opportunities identified in the block. This characterization is the result of the survey and framing of existing data, which allowed the seismic interpretation and the elaboration of the geological model by the ANPG/DEX team.

The Lower Congo Basin is known for its onshore and offshore exploration history of two significant plays, Pre-salt and Post-salt (Albian). The petroleum system in the pre-salt comprised the shales of the Bucomazi Formation as source rock, the sands of the Lucula Formation, carbonates of the Toca Formation, and the sands of the Chela Formation as the main reservoir, and the seal rock is composed mainly of salt of the Loeme Formation. In the Post-salt, the Pinda Albian source rock comprises carbonate facies with significant quantities of organic-rich matter. As a reservoir, the shale of the Iabe Formation seals the same formation's carbonates, and the trap types are combined.

Block CON 3 is in the northeast of the Congo Basin. With no record of drilled wells, the block was re-evaluated based on correlations with neighboring Blocks. The company Alrosa conducted a regional 2D seismic survey in the Basin.

Structures with possible hydrocarbon accumulation at Pre-salt and Post-salt levels were identified. The leads identified from integrating geological and geophysical data present estimated prospective resources of 867 to 1 509 MMBO.



2. GEOGRAPHIC Location

Block CON 3 is located northeast of the Lower Congo Basin, in the Soyo area. Bounded to the north by the Zaire River, to the south by Block CON 5, to the east by the Precambrian basement, and to the west by Block CON 2, defined by the geographic parallels $6^{\circ} 13'18''$ S and meridians $12^{\circ} 54'12.00''$ and $13^{\circ} 09'19.00''$ E, covering a total area of approximately 723.37 km² (Figure 1).

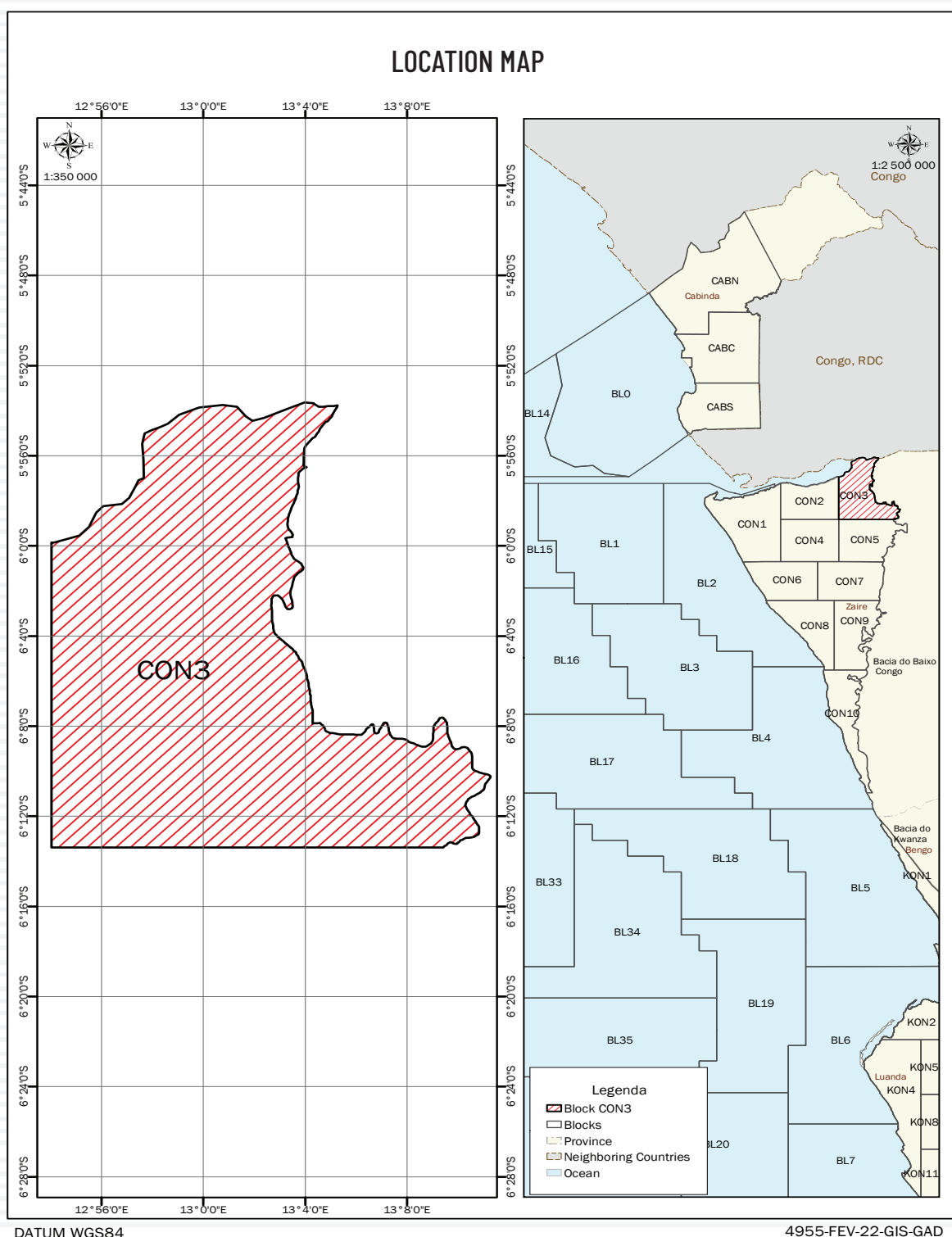


Figure 1: Location Map of Block CON 3, ANPG 2022

3. GEOLOGICAL Settings

The outcrops of Block CON 3 are represented by sediments of Precambrian to recent age, according to the geological chart of the Basin (Figure 2). Block CON 3 is part of the Onshore portion of the Congo Basin and its sedimentary history, characterized by paleoenvironmental variations between continental, transitional, and marine environments, in which two (2) units are evident: Pre-salt and Post-salt play.

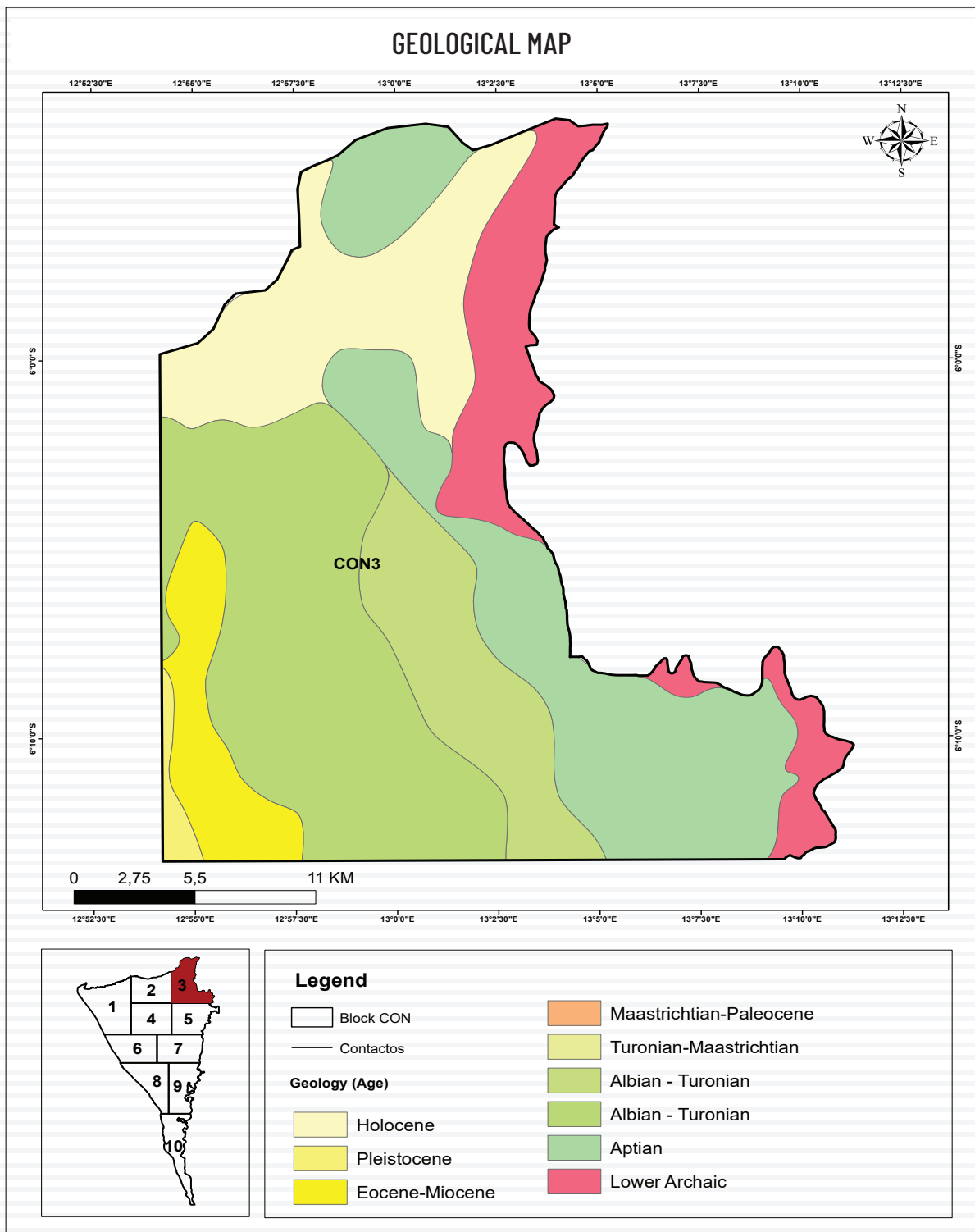


Figure 2: Geological map of Block CON 3, ANPG 2022



Pre-salt Unit

The Pre-salt unit, in structural terms, is characterized by the presence of horst and grabens type structures in all extensions and eradicated faults in the basement in the SE-NO direction; as we move in the SO direction, we observe a deeper area, which corresponds to a zone with accumulation, preservation, and hydrocarbons generation potential, that through faults migrate to reservoirs.

At the beginning of the Aptian, with the influences of the first marine incursions and high temperatures, a lagoonal depositional system developed, forming a salt layer, which constitutes the main seal at the level of this unit.

Post-salt Unit

The Post-Saliferous unit is characterized by post-depositional extensional structures, which move under Aptian salt, creating rollover blocks supported by normal faults with listric reject throughout, overlain by sediments of Cretaceous age. In contrast, Tertiary sediments lie to the west.

The argillite sediments and organic-rich calcilutites of the Pinda Formation are the source rocks at the Albian level.

Fractured dolomitic limestones and sandstones constitute the main reservoirs and Upper Cretaceous Shale as the cover rock.

The Upper Cretaceous was marked by enormous marine transgressions, which caused the deposition of vast amounts of pelagic sediments such as marls, gray Shale, brown limestones, micaceous siltstones, and sandstones deposited during minor marine regressions. Upper Cretaceous Shale of the Iabe Formation are proven source rock.

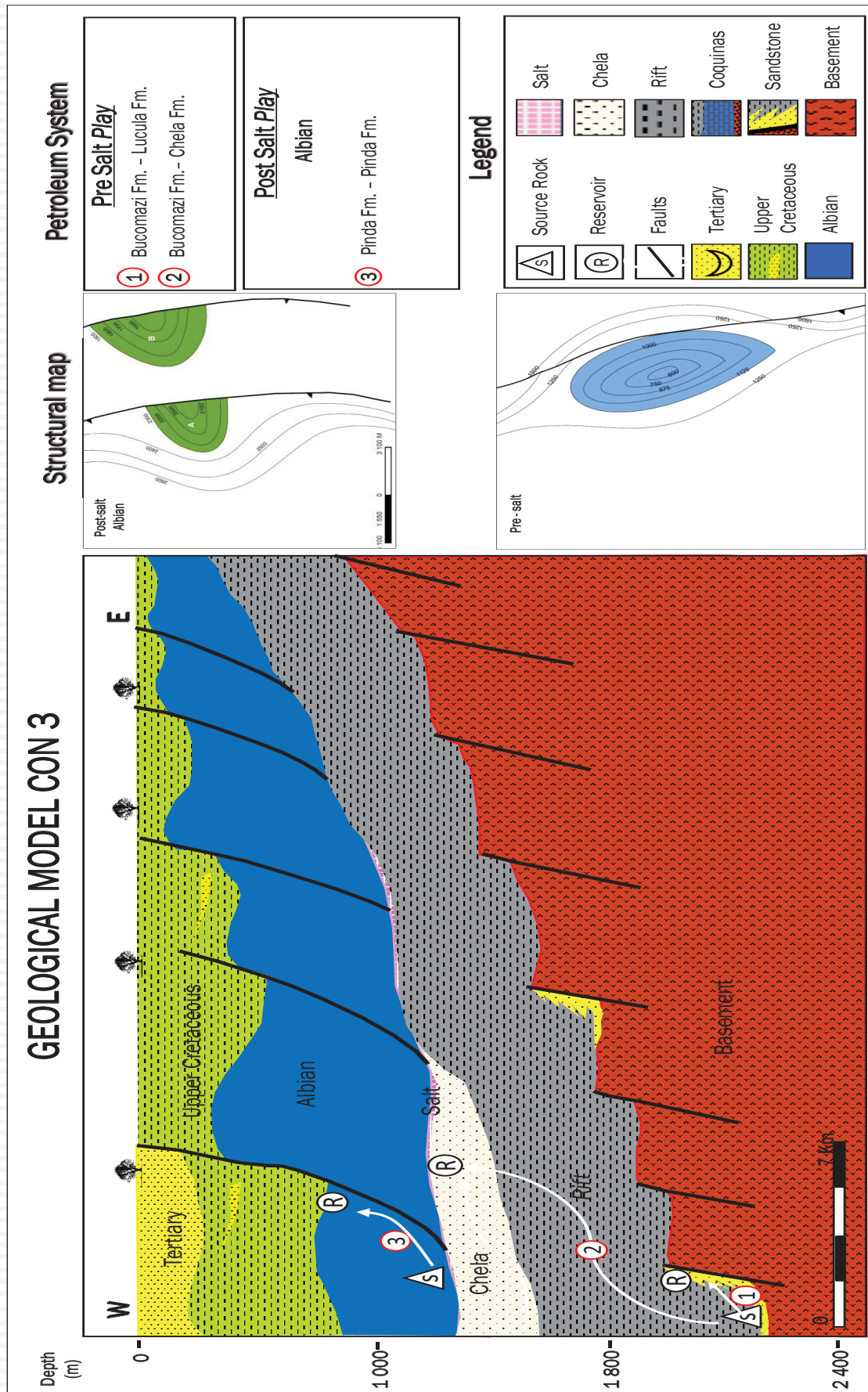


Figure 3: Geological model of Block CON 3, ANPG 2022



4. EXPLORATION History

The first exploration work in the basin dates to 1916, with the drilling of 8 wells that led to the discovery of the Ngondo field. However, to date, no wells have been drilled in the Block.

In 1968, the first commercial oil discovery was made by Petrangol in the Soyo region, Zaire province, in the Cabeça da Cobra well, followed by the discovery of the Quingula, Nzombo, Ganda, Pangala, and Quinfuquena fields and the Sereia natural gas field.

The FS-FST Association exploration period began between 1969 and 1988 with sixteen commercial oil discoveries, one commercial oil and gas discovery, and two commercial gas discoveries. The discovered resources total approximately 862 MMBO (STOOIP), distributed in 46.35 MMBO (STOOIP) and 815.5 MMBO (STOOIP) for the FS and FST Association, respectively, currently operated by Somoil.

From 2008 to 2009, Alrosa conducted a regional seismic survey in the Basin; approximately 19.29 line km of seismic was acquired concerning the southern part (Figure 4).

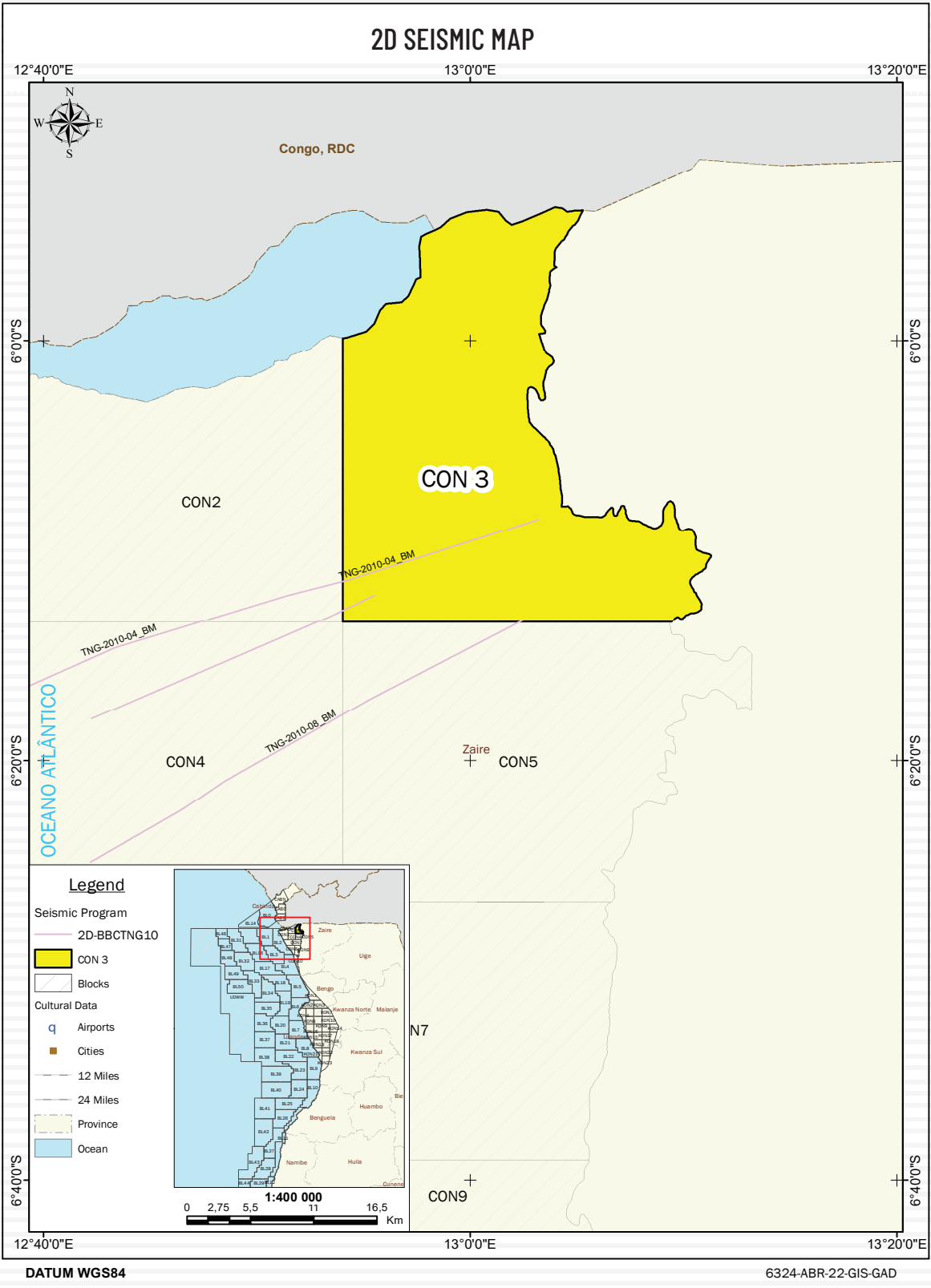


Figure 4: 2D seismic lines, ANPG 2022

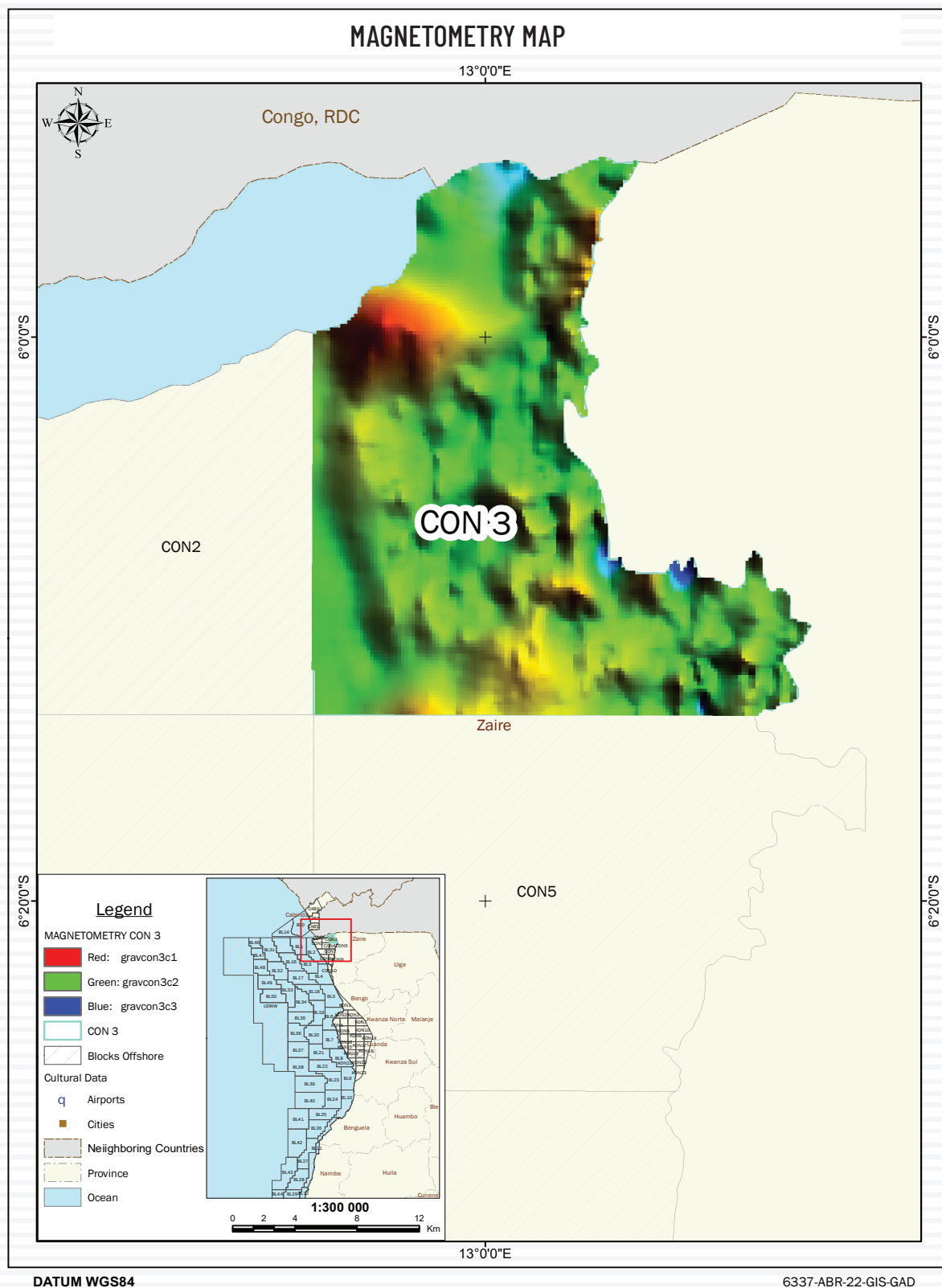
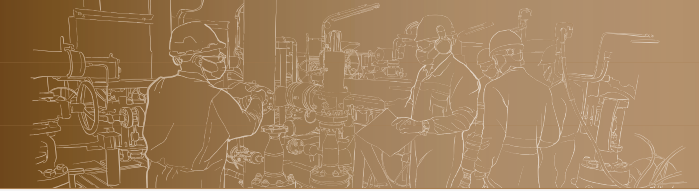


Figure 5: Magnetometry map Block CON 3, ANPG 2022

5. PETROLEUM System

Based on the results of the wells drilled throughout the Basin, it was possible to determine the lithostratigraphy and describe the petroleum system of the two mega-sequences (Pre-salt and Post-salt).

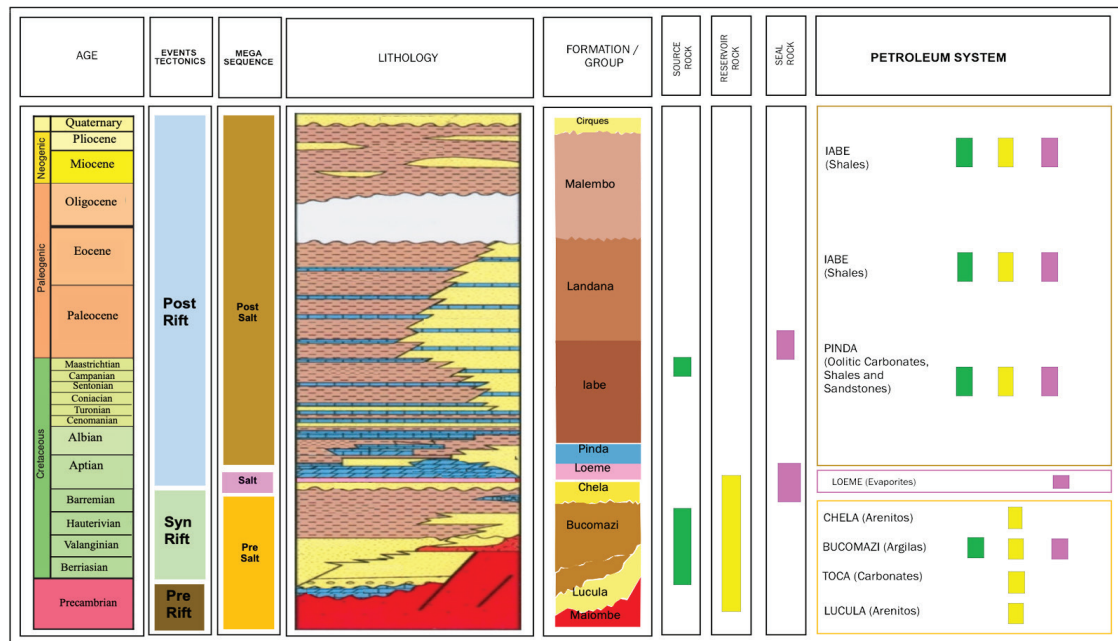


Figure 6: Lithostratigraphic Column of the Onshore Congo Basin, ANPG 2022

5.1 Source Rock

The Block presents great generation potential in its lithostratigraphic units. The organic-rich Shale of the Bucomazi Formation in the Pre-salt are the main generating facies in this unit. In the Post-salt, the carbonates with more predominant "calclutite" Shale of the Pinda Formation are the primary source rocks in the Albian, and the organic matter-rich Shale of the upper Cretaceous and Eocene in the Iabe and Landana Formations are also potential source rocks.

5.2 Reservoir

The sandstones of the Erva Formation in pinch-out form and the Coquina-type carbonates in the Pre-Salt present reservoir potential in this lithostratigraphic unit. In addition, oolitic limestones in the raft structure constitute reservoir rock in the Albian.

5.3 Seal

The seal rock in the Pre-salt is formed by the intraformational Shale of the Bucomazi Formation and the Evaporites of the Loeme Formation. In the Post-salt, the fine sediments composed of Shale of the Iabe Formation serve as a seal for the reservoirs at this age level.

5.4 Trap

The traps characteristic of Pre- and Post-salt units are structural, stratigraphic, and combined.



6. EXPLORATION Opportunities

6.1 Identified Leads

The geological and geophysical data acquired, allowed the identification of leads in the Pre and Post salt as described below.

6.1.1 Pre-salt Leads

Lead 1

Located southwest of the block, with NE-SW direction, marked by reflectors of strong amplitudes truncating on flanks of the basement faults at the level of the Lucula Formation. Along the structure, reflectors with weak amplitudes are observed, indicating the possible presence of sediments rich in organic matter with potential source rock and caprock.

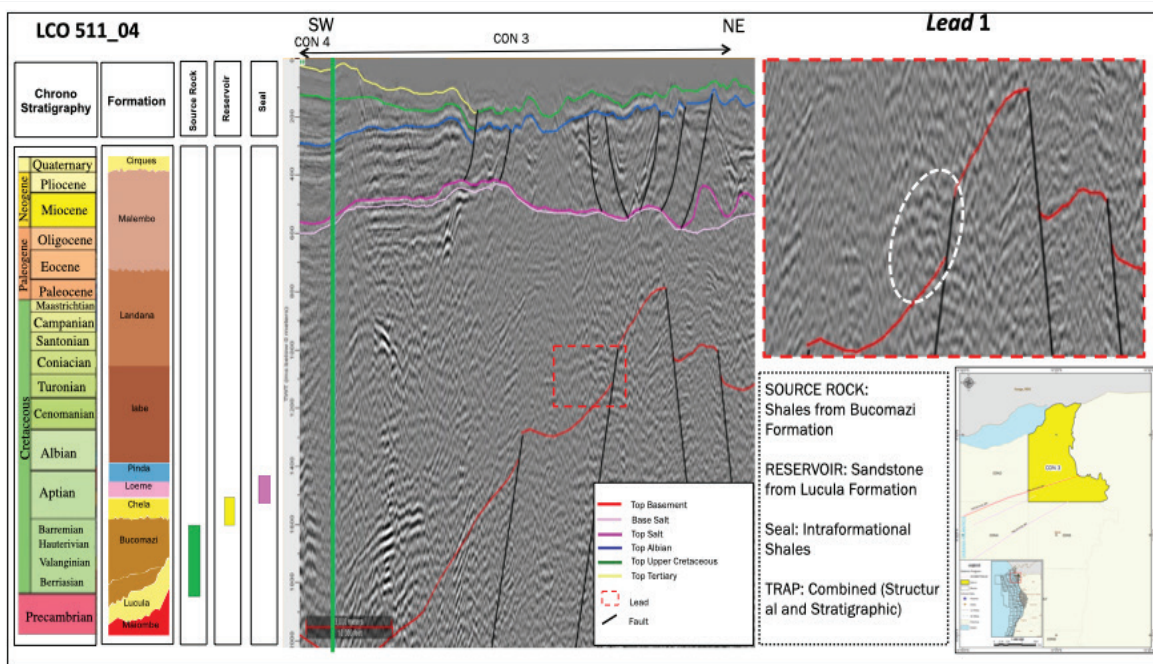


Figure 7: Lead 1, ANPG 2022



7. FINAL Remarks

After reassessing Block CON 3, it became evident that the Onshore Lower Congo Basin has a solid potential to be exploited in pre-salt and post-salt plays in a region widely known as having a proven, functional, and active petroleum system.

In the Pre-salt, the primary source rock is the Bucomazi Formation in the lower Congo Basin. The reservoirs are the sands and carbonates of the same formation.

In the post-salt, the Pinda Albian carbonates Formation is the primary source rock, and the carbonates of the same formation are the reservoir rock.

The ANPG encourages the companies to invest in this block through additional studies to ensure the discovery of the real potential, which should allow for the boosting of exploration activity aiming to revert the production decline observed over the last decade.

8. References

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BLOCK
CON 3



ANGOLA



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