



ONSHORE
LOWER
CONGO BASIN

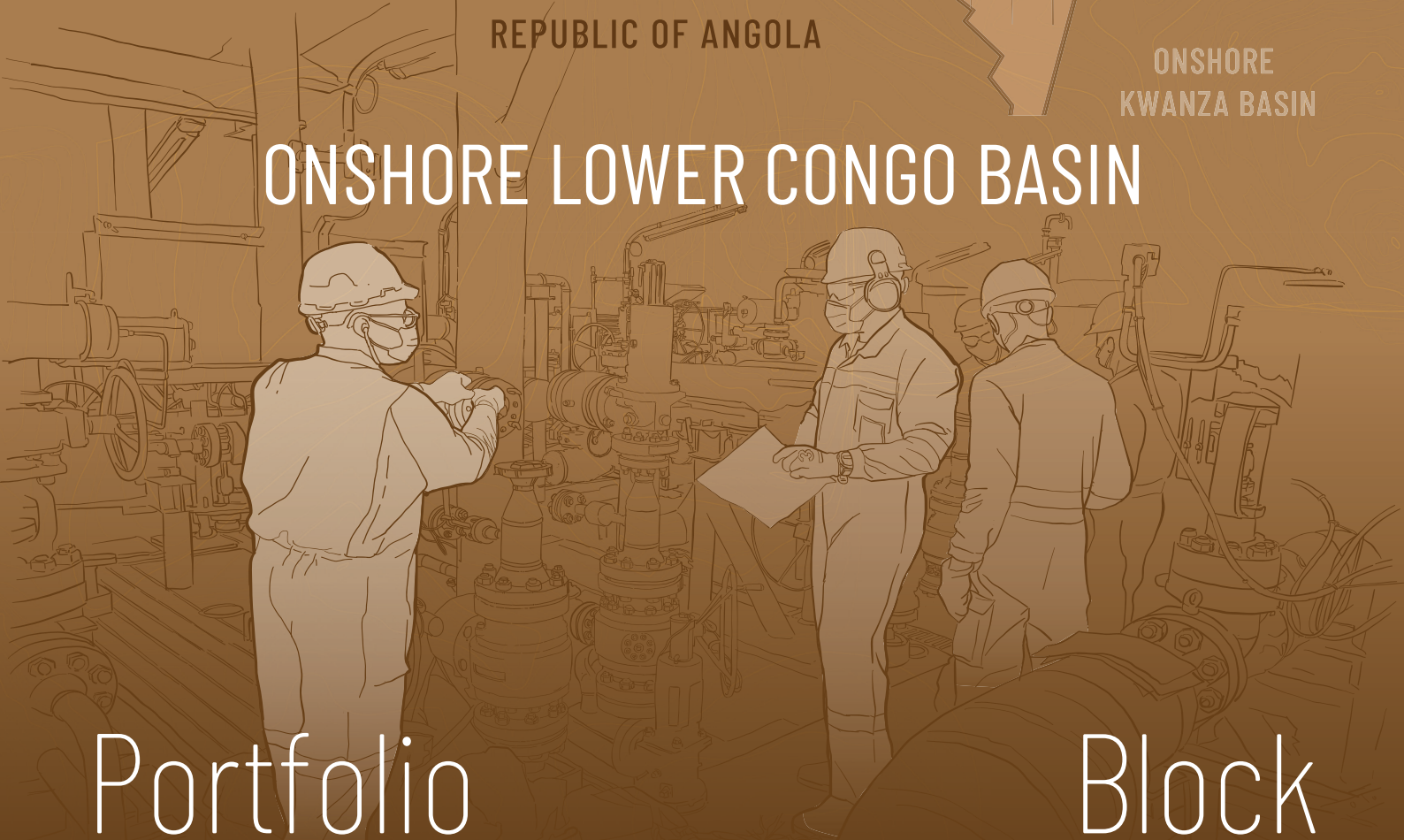


ANPG
AGÊNCIA NACIONAL DE PETRÓLEO, GÁS
E BIOCOMBUSTÍVEIS

2023 LICENSING ROUND REPUBLIC OF ANGOLA

ONSHORE
KWANZA BASIN

ONSHORE LOWER CONGO BASIN



Portfolio
OPPORTUNITIES

Block
CON2



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Introduction

The portfolio of opportunities describes the general characteristics of Block CON 2, 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 2 is in the northern portion of the Congo Basin. With no record of drilled wells, the re-evaluation of the block was based on correlations with neighboring Blocks. The company Alrosa conducted a regional 2D seismic survey in the Basin.

Structures with possible hydrocarbon accumulation were identified at the Pre-salt and Post-salt levels. The leads identified from integrating geological and geophysical data present prospective resources estimated from 950 to 2251 MMBO.



1. GEOGRAPHIC Location

The **Block CON 2** is located northeast of the Lower Congo Basin in the Soyo area. It is limited 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 geographical 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).

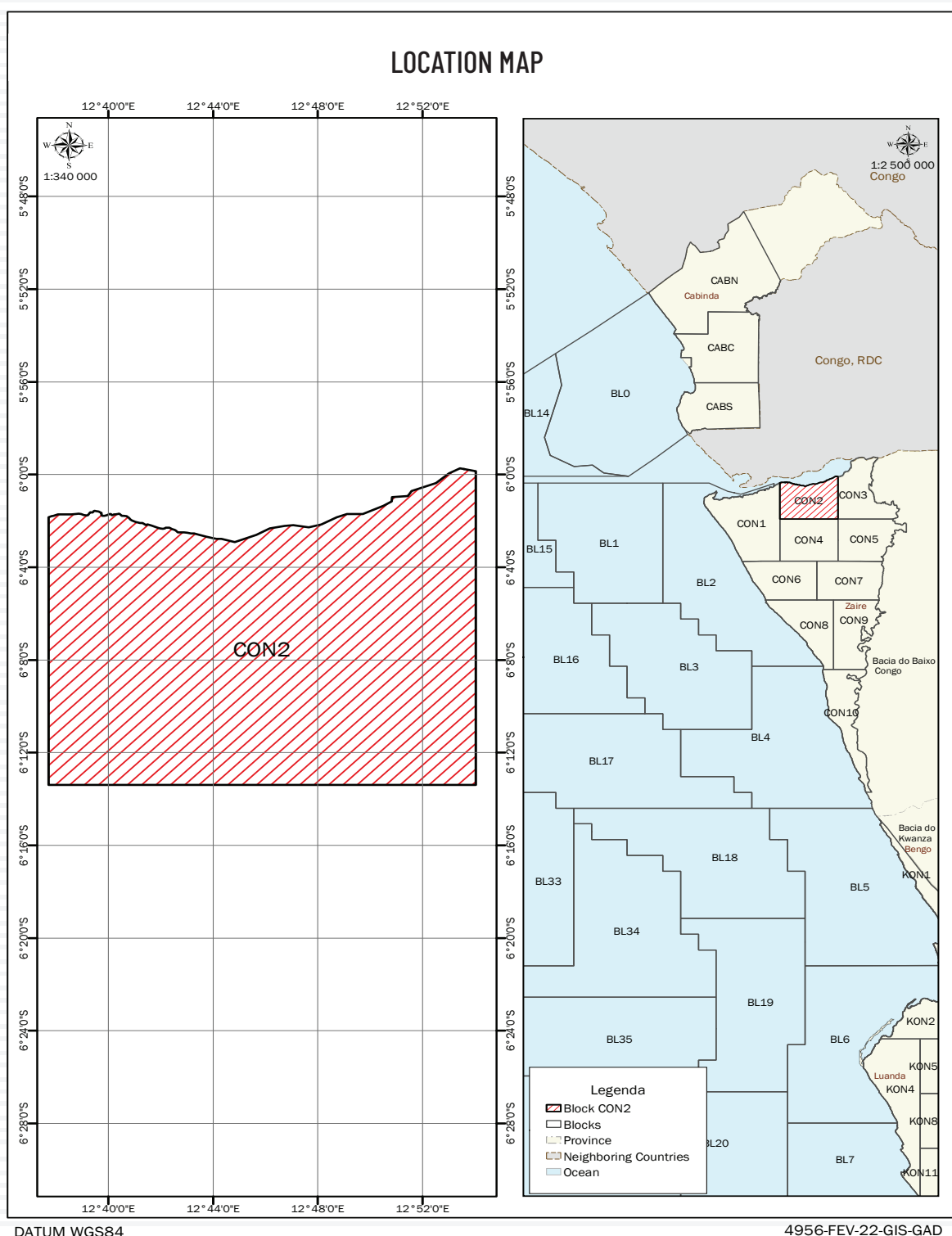


Figure 1: Location Map of Block CON 2, ANPG 2022

2. GEOLOGICAL Settings

The outcrops of **Block CON 2**, are represented by sediments of Albian to recent age, according to the geological chart of the Basin (Figure 2).

Block CON 2 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.

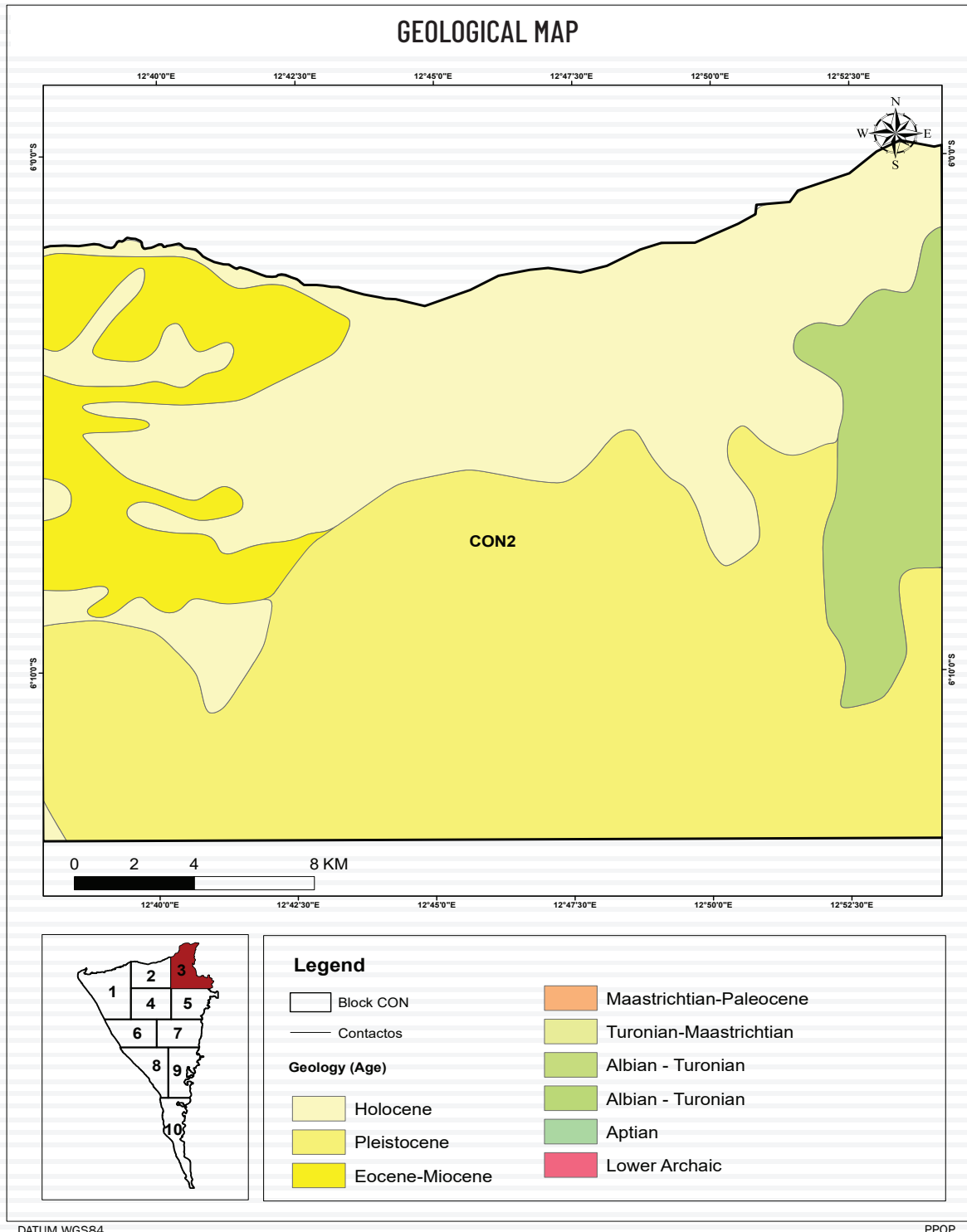


Figure 2: Geological map of Block CON 2, ANPG 2022



Pre-salt Unit

The Pre-saliferous unit is characterized by horsts and graben-type structures throughout and eradicated faults in the basement in SO-NE and SE-NO directions. However, as it moves towards E, a deeper area is observed, corresponding to a zone with the potential for accumulation, preservation, and generation of hydrocarbons, which through faults, migrate to reservoirs.

In the early Aptian, with the influence of the first marine incursions and high temperatures, a lagoonal depositional system developed, forming a salt layer, the primary seal at the level of this unit.

Post-salt Unit

The Post-saliferous unit is characterized by post-depositional extensional structures, which move under the salt of the Aptian, creating a roll-over anticline supported by listric normal faults throughout, overlain by sediments of Cretaceous age. In contrast, the Tertiary sediments are the west. The argillite sediments and organic-rich calcilutites of the Pinda Formation constitute the source rocks at the Albian level. Fractured dolomitic limestones and sandstones form 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.

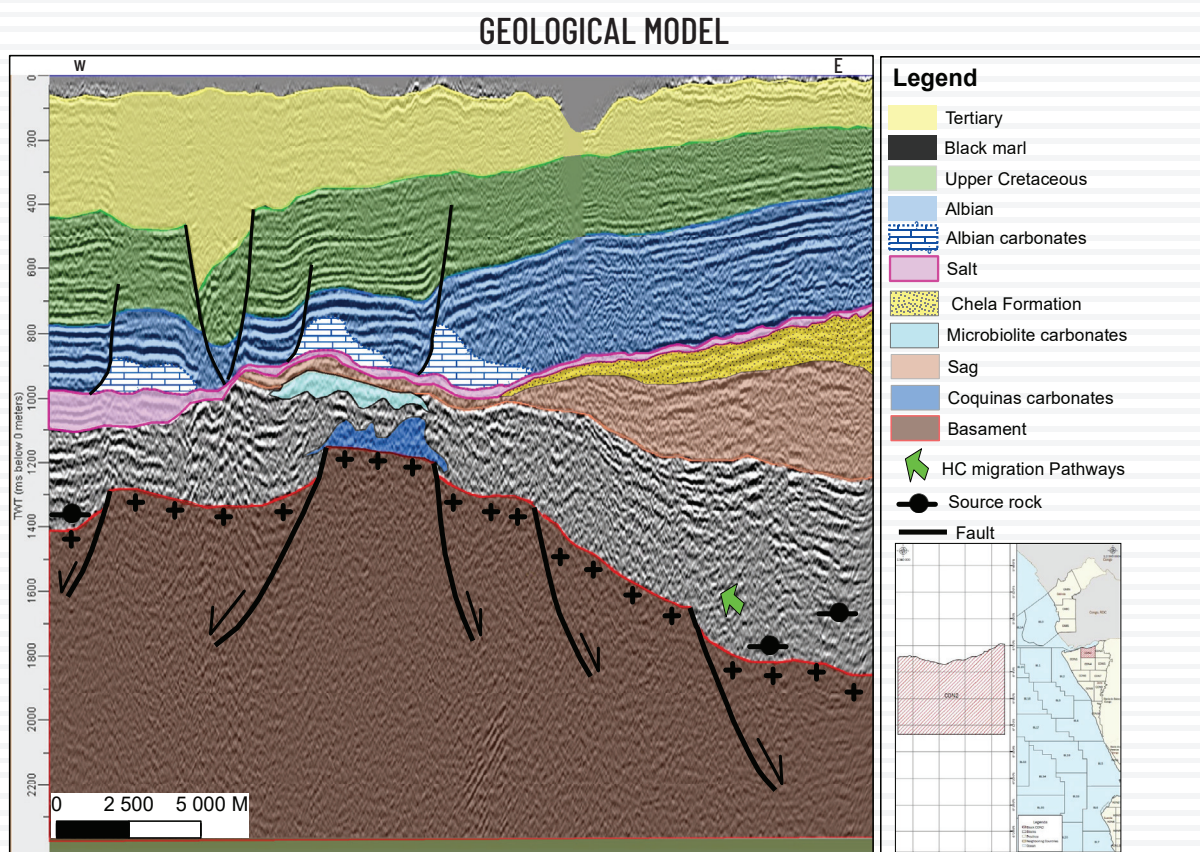


Figure 3: Geological model of Block CON 2, LCO-511-03, ANPG 2022

3. **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 Quinguila, 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 105.4 line km of seismic was acquired concerning the southern part (Figure 4).

The magnetometry and gravimetry surveys allowed us to delineate the structuring along the entire length of the Block (Figure 5).

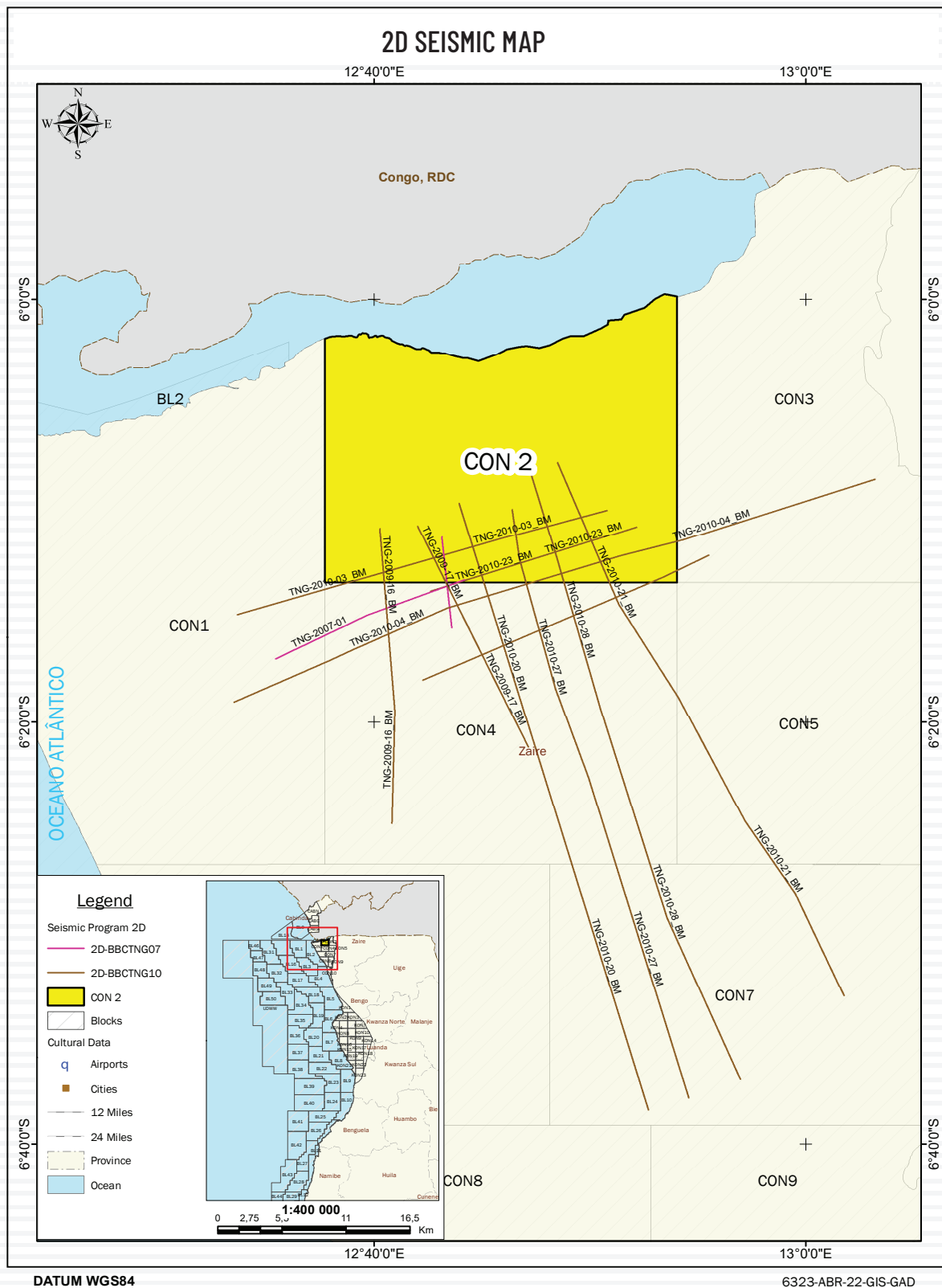
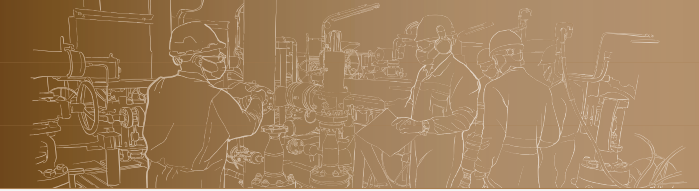


Figure 4: 2D seismic lines, ANPG 2022

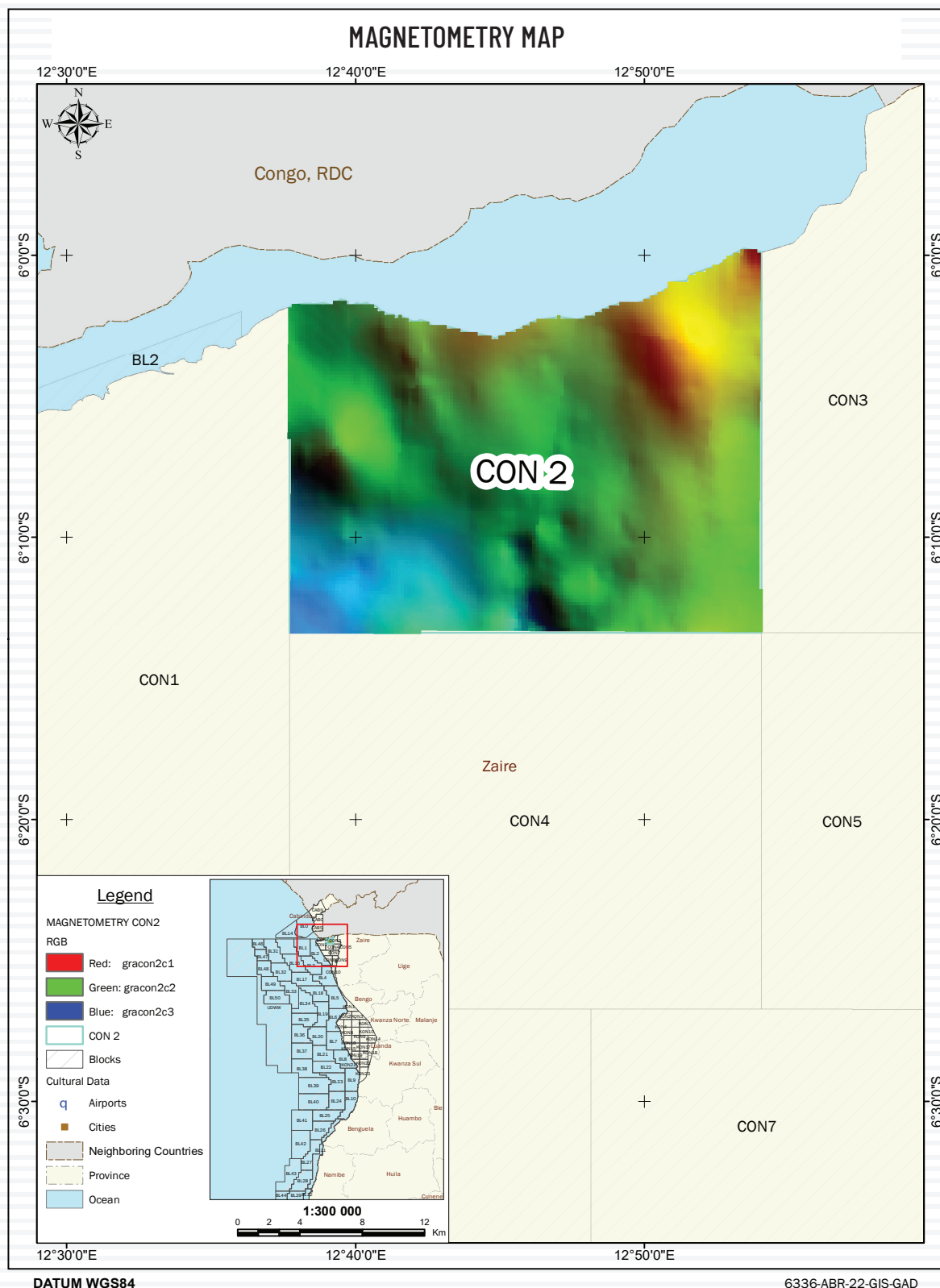


Figure 5: Magnetometry map Block CON 2, ANPG 2022

4. 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).

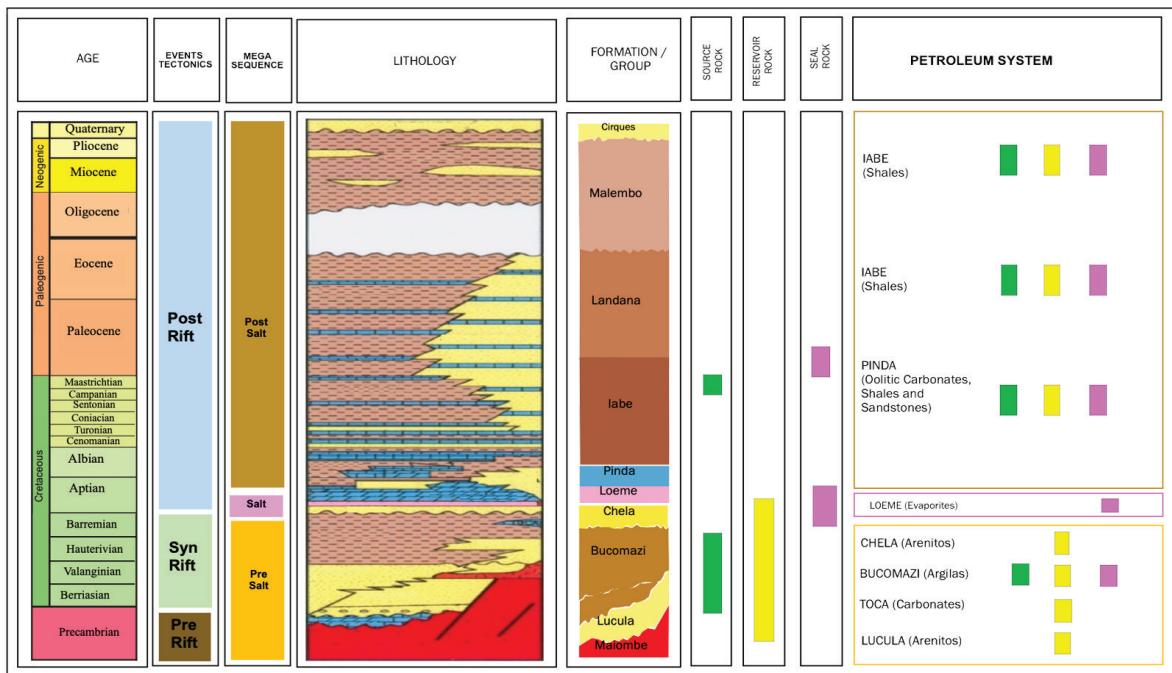


Figure 6: Lithostratigraphic Column of the Onshore Congo Basin, ANPG 2022

4.1 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 "calcilutite" 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.

4.2 Reservoir

Sandstones of the Erva Formation in pinch-out form and Coquinas carbonates onto the basement high are the predominant reservoir in this lithostratigraphic unit. In addition, oolitic limestones in the raft structure constitute reservoir rock in the Albian.

4.3 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 Pinda Formation serve as a seal for the reservoirs at this age level.

4.4 Trap

The traps in the Pre-salt and Post-salt units are structural, stratigraphic, and combined.



5. EXPLORATION Opportunities

5.1 Identified Leads

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

5.1.1 Pre-salt Leads

Lead 1

Located to the south of the block, with a north-south direction, characterized by reflectors with strong parallel amplitudes truncating over the base of the salt at the level of the Chela Formation. The low amplitudes characterized in the structural low identified in the block may be a good indicator of the presence of source rock. In contrast, the chaotic reflectors typical of massive salt at the top of Leads-1 demonstrate the possible presence of the Loeme Formation evaporites, which serve as cap rock.

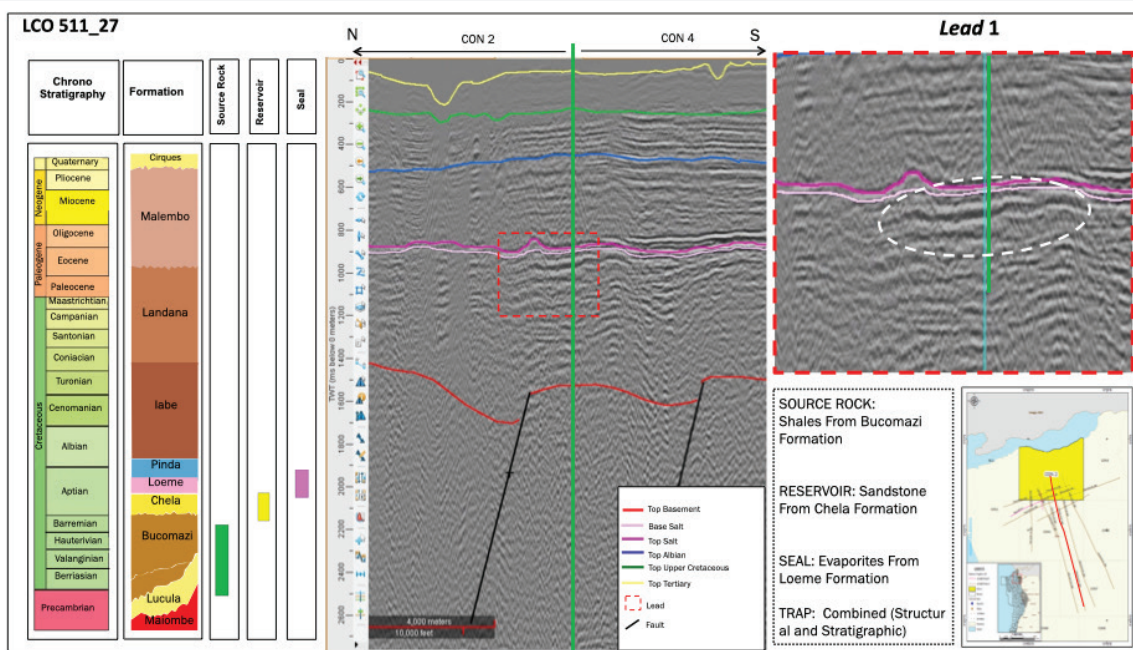


Figure 7: Lead 1, ANPG 2022

5.1.2 Post-salt Leads

Leads 2

Located south of Block CON 2 is an anticline post-salt structure of the Pinda Formation. The reservoir rock is sandstones and carbonates of the Pinda Formation and as source rock carbonate facies of the same formation, as cover rock the argillaceous facies of the labe Formation in a mixed type trap.

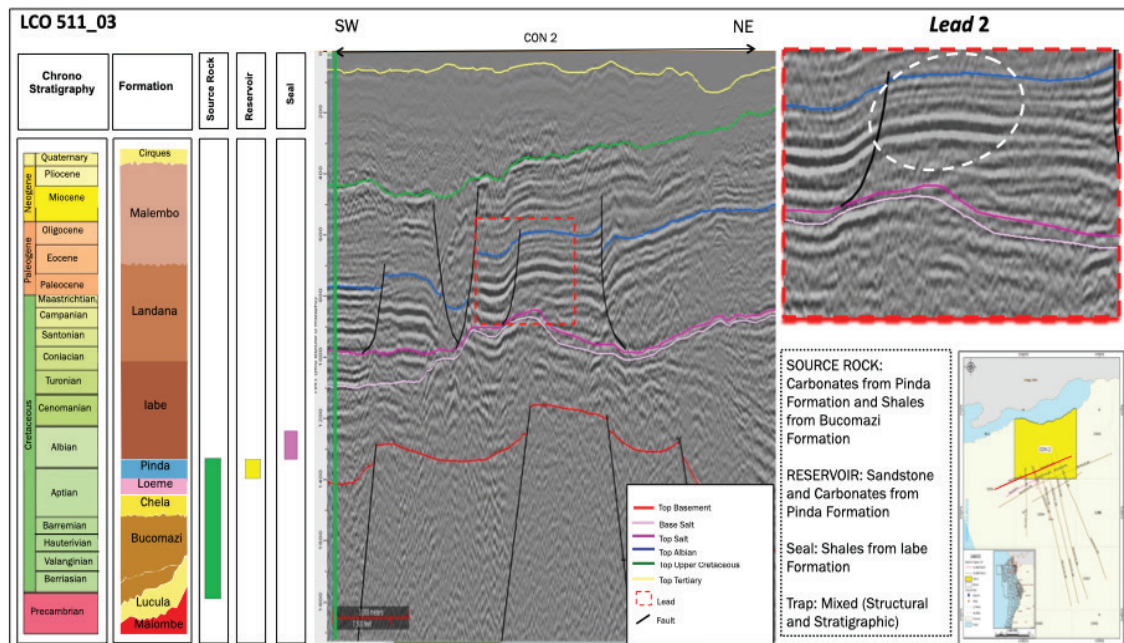


Figure 8: Lead 2, ANPG 2022

Leads 3

Located south of the block, with a NE-SW direction, characterized by strong and well-marked reflections in the Pinda Formation. The base and top of the structure are marked by reflections with weak amplitudes, a typical response of sediment rich in organic matter at the level of this lithostratigraphic unit, which acts as source rock and caprock for the same structure.

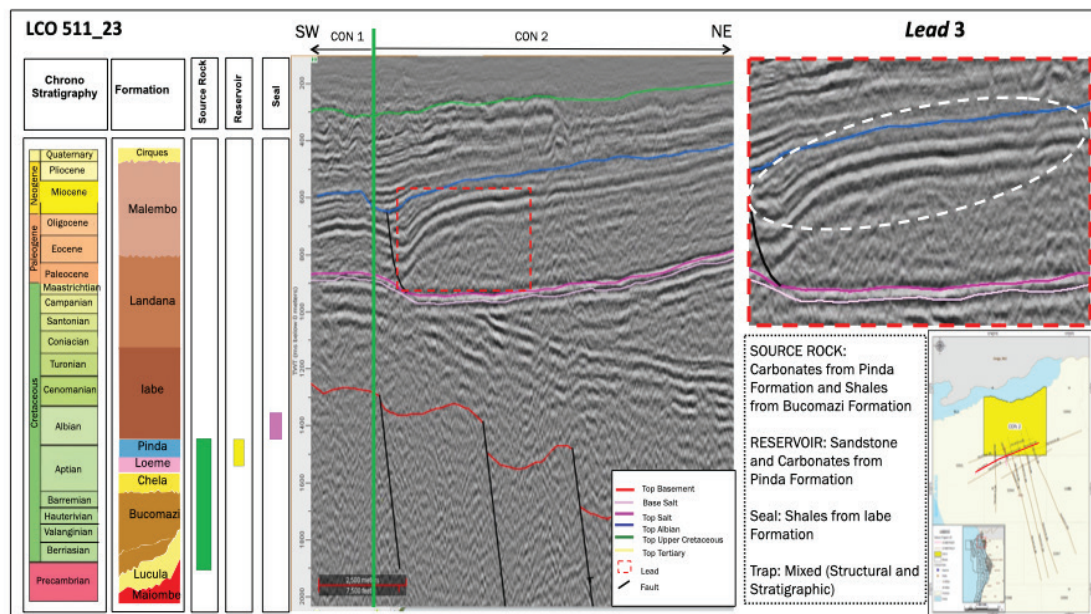


Figure 9: Lead 3, ANPG 2022

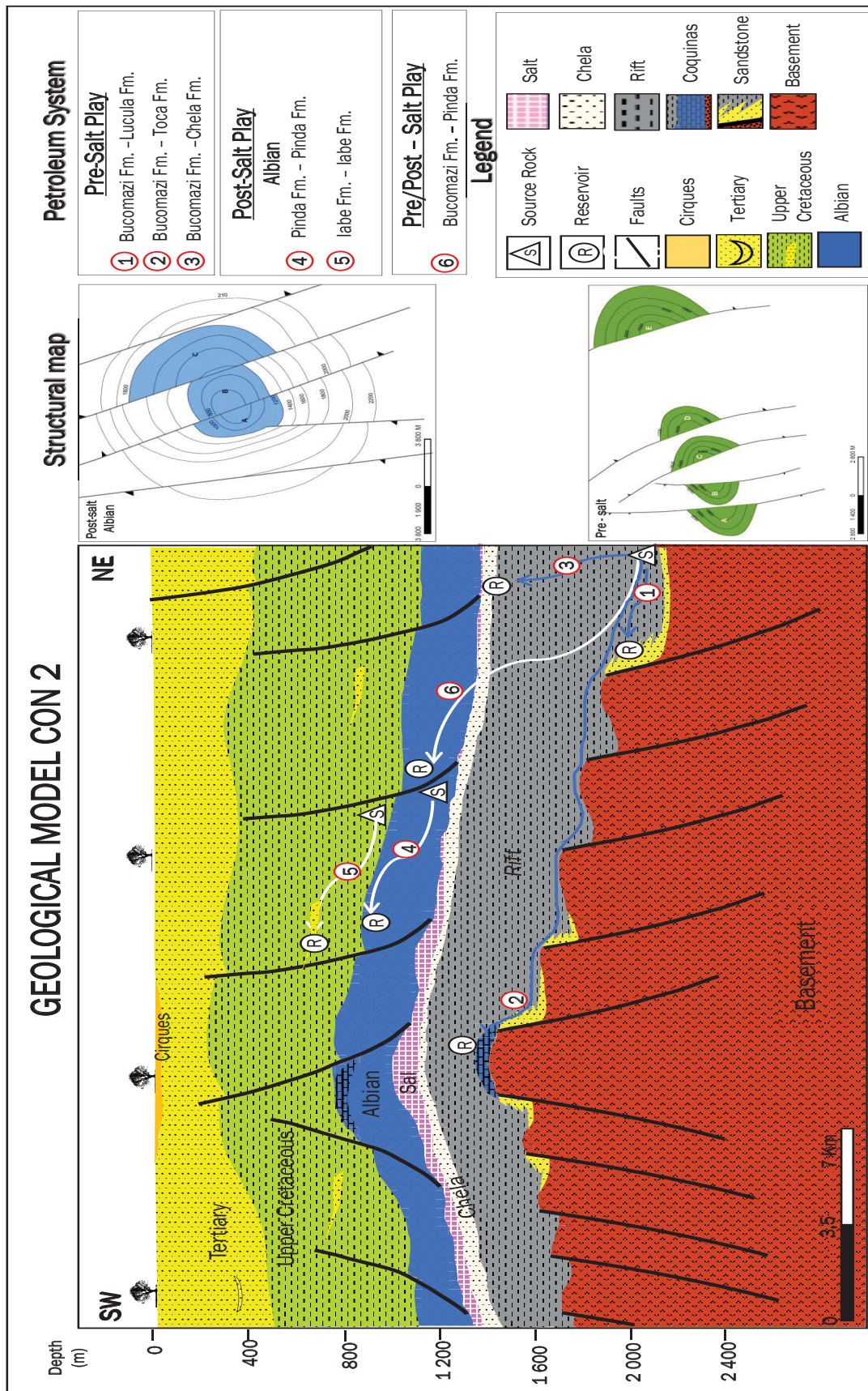


Figure 10: Geological model of Block CON 2, ANPG 2022



6. **FINAL** Remarks

After re-evaluating Block CON 2, it was found that it has potential in the pre-saliferous (Chela Formation) and post-saliferous (Pinda Formation) units, with well-defined structures and formations with potential for generation and accumulation of hydrocarbons.

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 companies to invest in these blocks, as they present potential, and encourages the opening of more studies to ensure the discovery of the real existing potential that should allow the boosting of exploration activity aiming to revert the production decline observed over recent years.

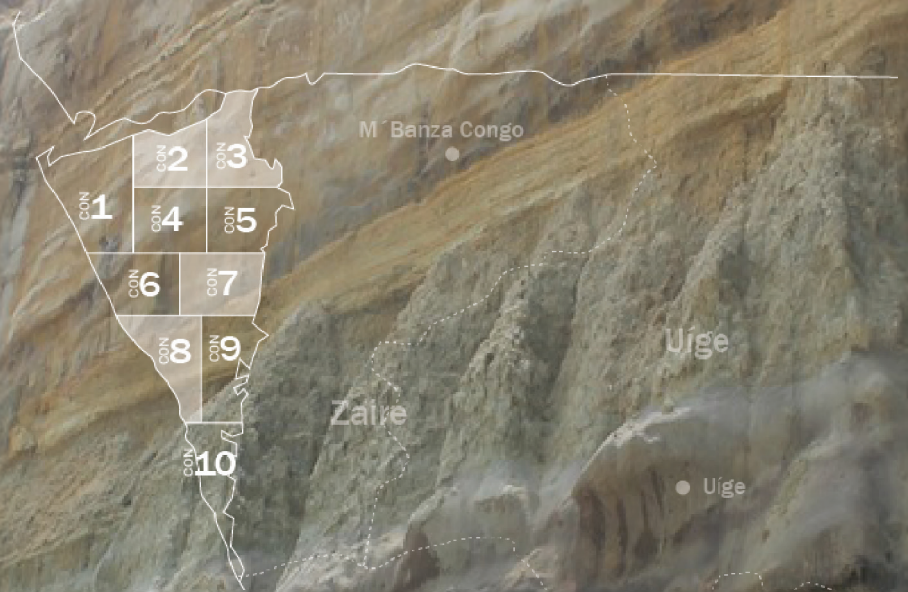
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BACIA TERRESTRE DO BAIXO CONGO



BLOCK
CON 2



ANGOLA



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