



MINISTRY OF ENERGY AND MINES OF CUBA

GLOBAL PETROLEUM SHOW (CALGARY, JUNE 7-9 , 2016)

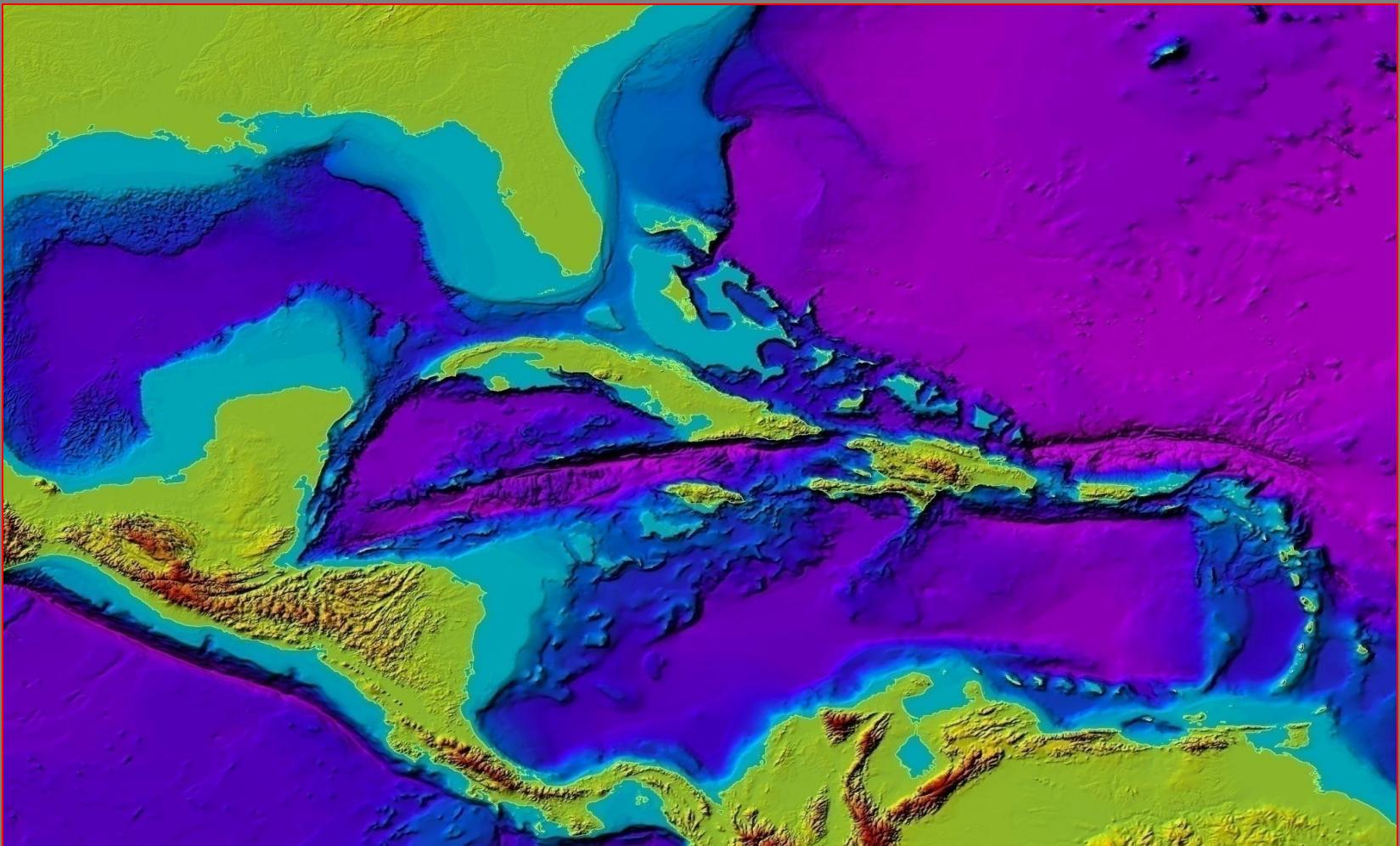
**NEW OPPORTUNITIES
OF OIL EXPLORATION&PRODUCTION
BUSISNESS IN CUBA,ONLAND AND
OFFSHORE**



República de Cuba

MINISTERIO DE ENERGÍA Y MINAS

REGIONAL LOCATION OF CUBA





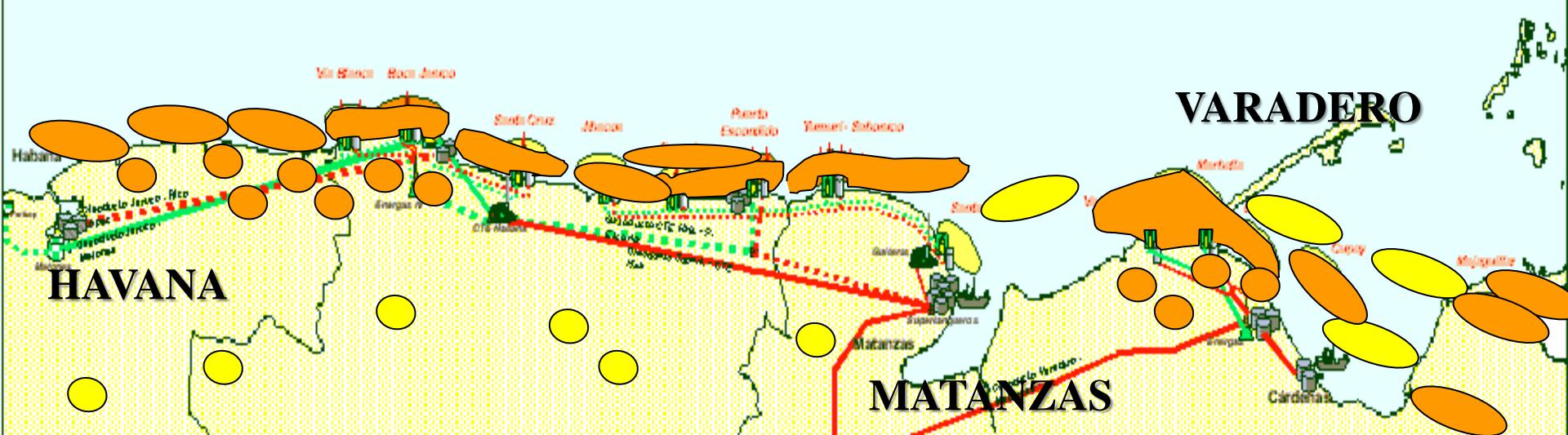
República de Cuba

MINISTERIO DE ENERGÍA Y MINAS

CUBA: PETROLEUM FACILITIES



NORTH CUBAN HEAVY OIL BELT (CNHOB) AND OTHER USEFUL INFORMATION

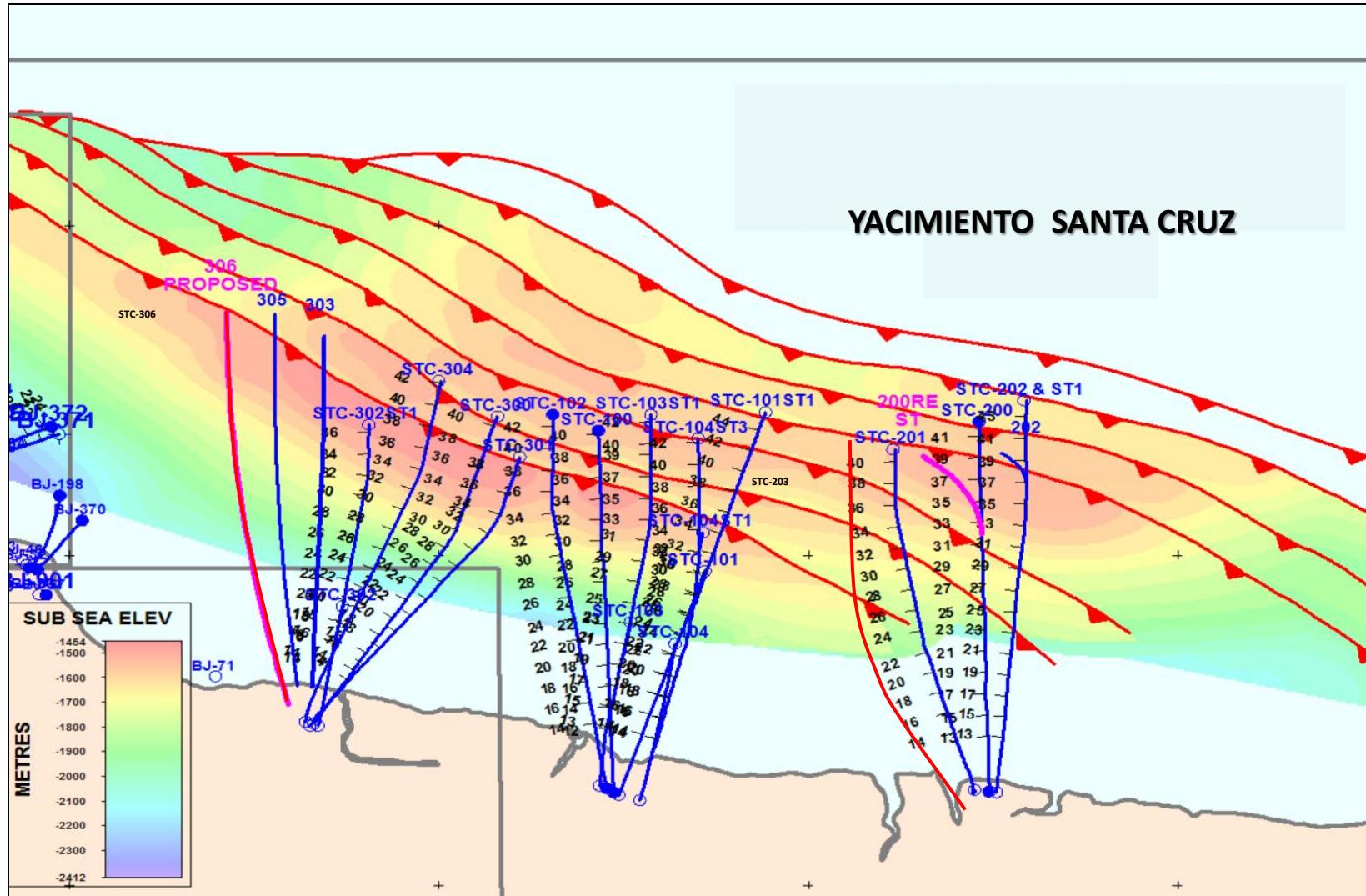


.MORE THAN 10 MEDIUM SIZE FIELDS ; ONLY THE HUGE VARADERO FIELD HAS MORE OVER 6 BILLION BARRELS OF RESOURCES IN PLACE . ALL FIELDS ARE LOCATED OFFSHORE AT 2 TO 8 KM FROM THE SEA SHORE.

.SINCE 1992 WERE DRILLED MORE OVER 250 DEVIATED-HORIZONTAL WELLS FROM THE COAST TO THE SEA , WITH AN AVERAGE OF 3, 5 KM LENGTH.ONE HORIZONTAL WELL HAS REACHED LAST YEAR 7300m AND CURRENTLY CUPET IS DRILLING A WELL TILL 8000m WITH TWO LEGS IN VARADERO FIELD. **ALSO MORE THAN 200 VERTICAL EXPLORATION ONLAND WELLS WERE DRILLED IN SEVERAL SECTORS OF CUBA.**

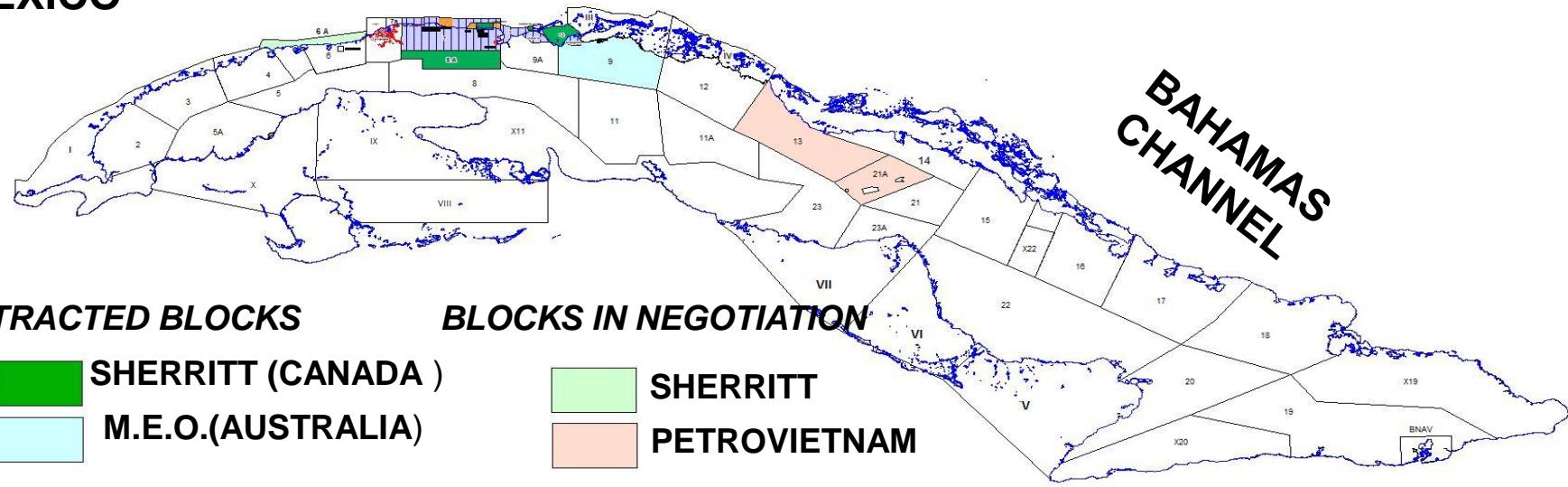
.CURRENT PRODUCTION IS AROUND 57000 B/D OF CRUDE OIL AND 3.1 MM m³/D OF ASSOCIATED GAS (80 000 BOE/DAY) , THAT COVERS THE 48% OF NATIONAL CONSUMPTION OF HYDROCARBONS OF CUBA .

EXAMPLE OF DRILLING HORIZONTAL WELLS FROM THE COAST IN THE OILFIELD SANTA CRUZ (FROM 3 PADS)



GULF OF MEXICO

ATLANTIC OCEAN



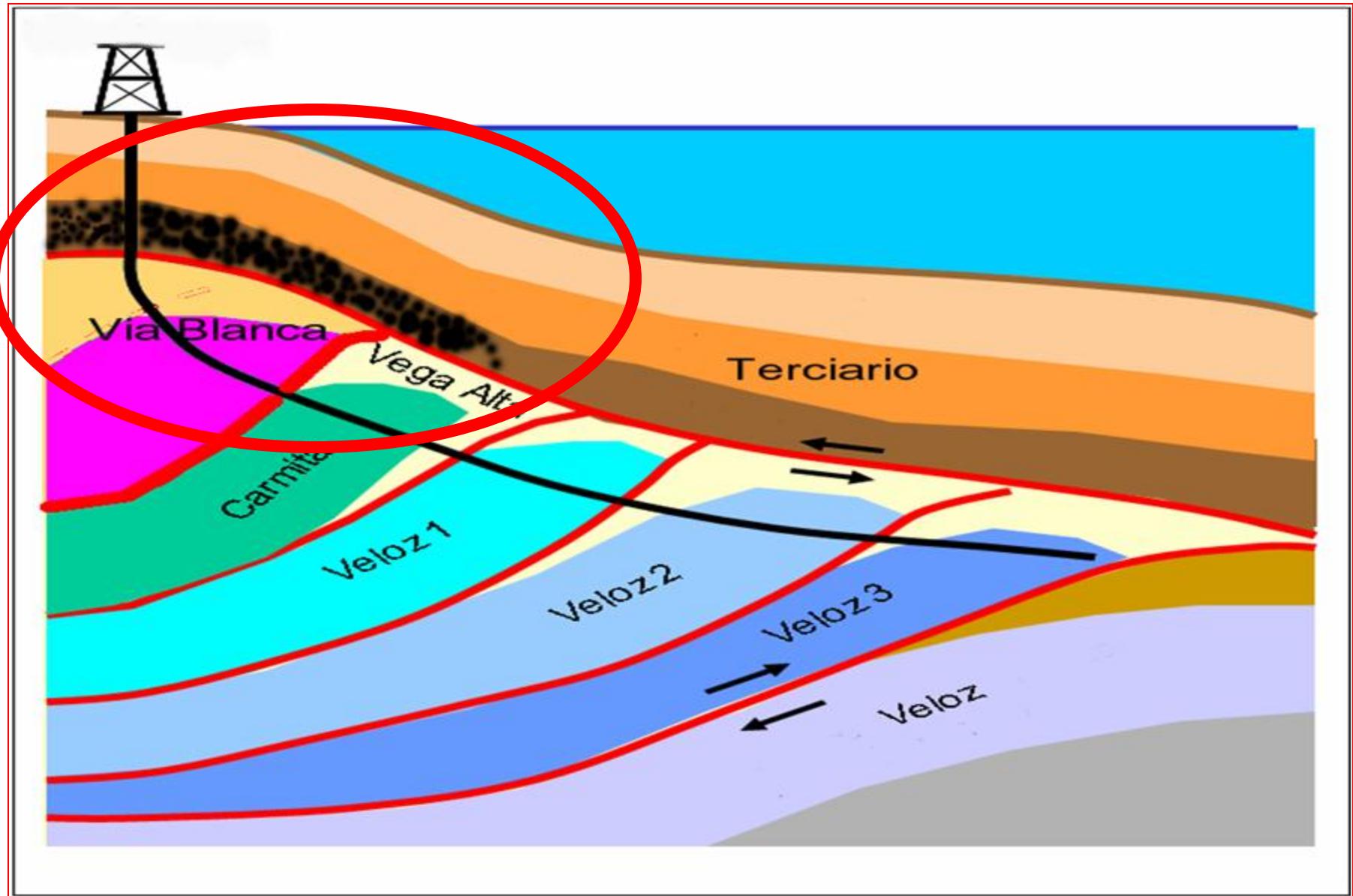
ONLAND AND SHALLOW WATER BLOCKS (PSC)

SECUNDARY RECOVERY AND UNCONVENTIONAL OIL

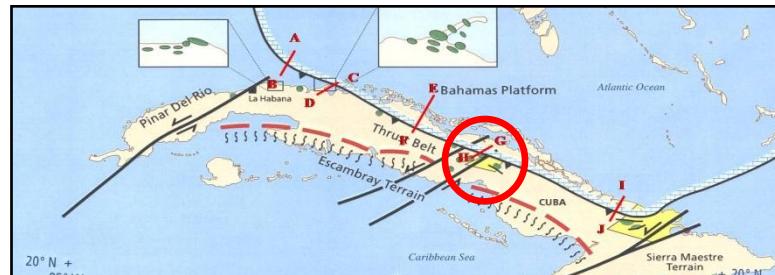
.THE RESEVOIRS OF THE NORTH CUBAN HEAVY OIL BELT ARE CHARACTERIZED BY FRACTURED CARBONATES AND THE RECOVERY FACTOR IS VERY LOW BY PRIMARY METHODS OF EXPLOTATION (MAXIMUM OF 8%). FEW OF MEDIUM SIZE FIELDS AND THE *HUGE VARADERO FIELD* ARE NEEDED OF THE APPLICATION OF SECUNDARY (ENHANCED) METHODS OF EXPLOITATION . AS A MATTER OF FACT NEVER THIS METHODS WERE BEFORE APPLIED IN CUBA .

.AT THE SHALLOW DEPTH(600-700 m)AND *POST-OROGENIC SEDIMENTS* OF ALMOST ALL OIL FIELDS OF THE BELT, HAS BEEN DISCOVERD GENTLE MONOCLINAL LAYERS OF *CLAYED CARBONATES ROCKS* (OF EFFECTIVE THICKNESS OF 100 -150 m), WELL SATURATED OF ULTRAHEAVY OIL (7-8 API) IN AN AREA OF *FEW THOUSANDS SQUARE KM*, AND THE RESULTS OF THE FIRST EXPERIMENTAL WORKS PERMIT ESTIMATE *BIG AMOUNT OF RESOURCES OF THIS UNCONVENTIONAL OIL* .

UNCONVENTIONAL OIL

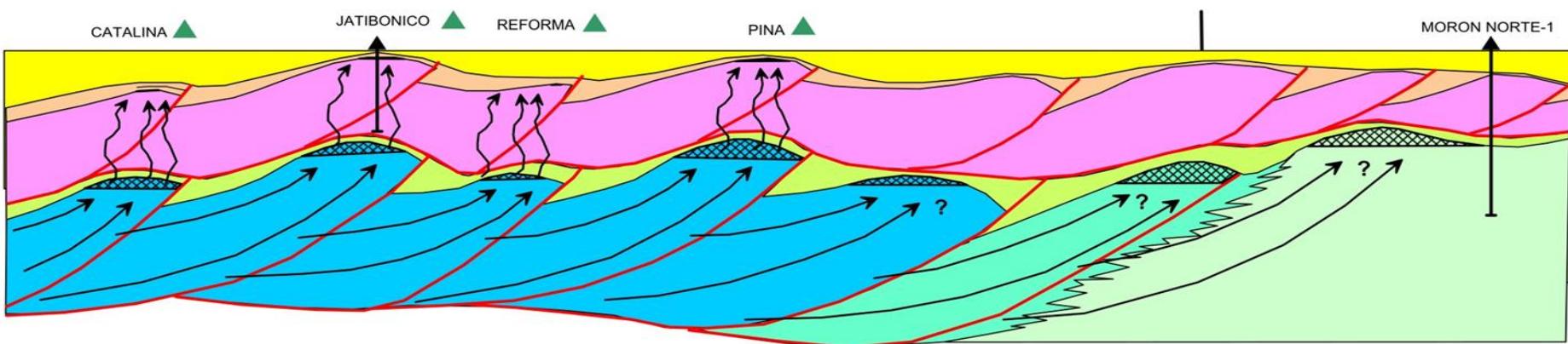


CUBAN ONSHORE AND SHALLOW WATER NEW OPPORTUNITIES FOR EXPLORATION



MODELO EXPLORATORIO BLOQUES 21 Y 14 (Parte Sur)

Autores: J.G. López, R. Tenreyro, G. Echevarría, C. Sosa, O. Delgado, J. Proll, J.L. Iparraguirre



Sedimentos Postorogénicos (P22-Q)

Sedimentos de cuenca(rampa carbonatada) del margen continental (J3-K21)

Depósitos de petróleo en yacimientos descubiertos en Cuenca Central

Sedimentos sinorogénicos de Zaza (K21-P21)

Sedimentos de cuenca(talud y pie de talud) del margen continental (J3-K)

Acumulaciones de petróleo y gas pronosticadas

Sedimentos sinorogénicos del margen continental (K2cp-P22)

Sedimentos de aguas someras de la plataforma de Remedios (J3-K)

Petróleos familia II

Volcánicos y ofiolíticas del Terreno Zaza (K1-K2cp)

Cambios faciales(A), Contactos tectónicos (B)

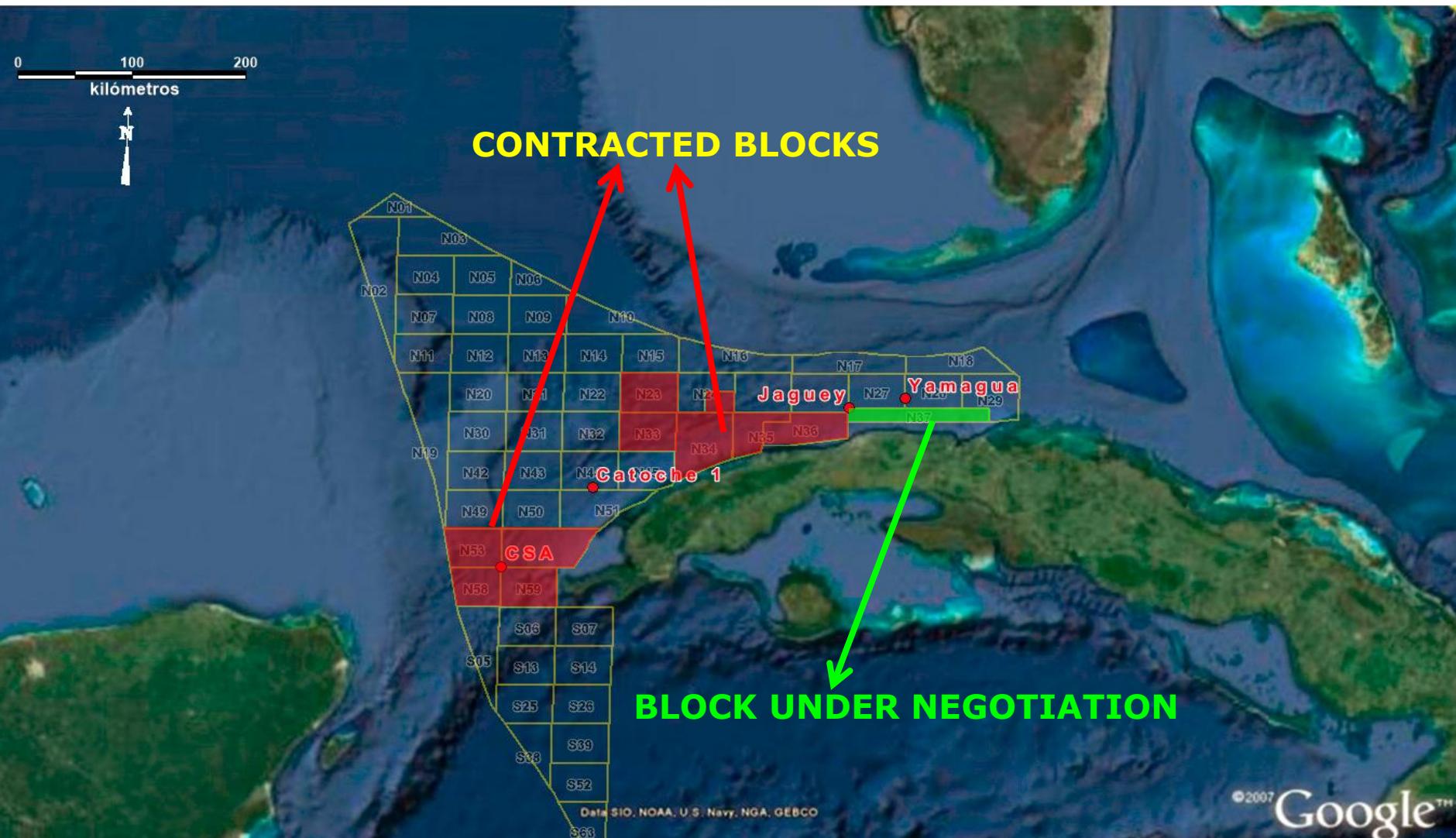
Migración (A), Dismigración (B)

**MINISTRY OF ENERGY AND MINES OF CUBA AND NOC
CUBAPETROLEO(CUPET)**

**CUBAN EXCLUSIVE ECONOMIC ZONE IN THE GULF OF
MEXICO AND OTHER NEW OFFSHORE AREAS:**

GEOLOGY AND HYDROCARBON POTENTIAL

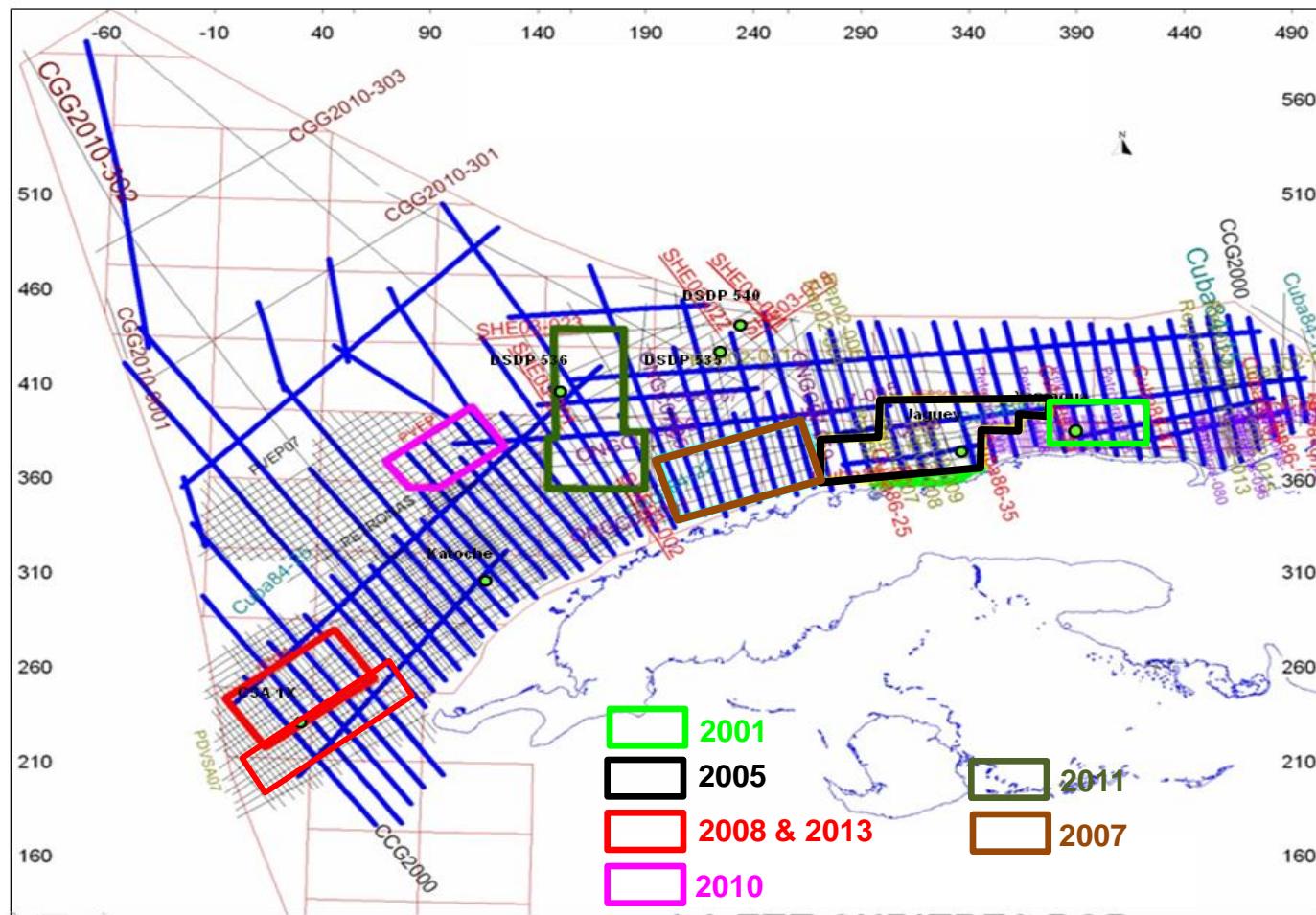
General characteristics of Cuban EEZ in the Gulf of Mexico.(Location)



AREA: 110,000 Km²

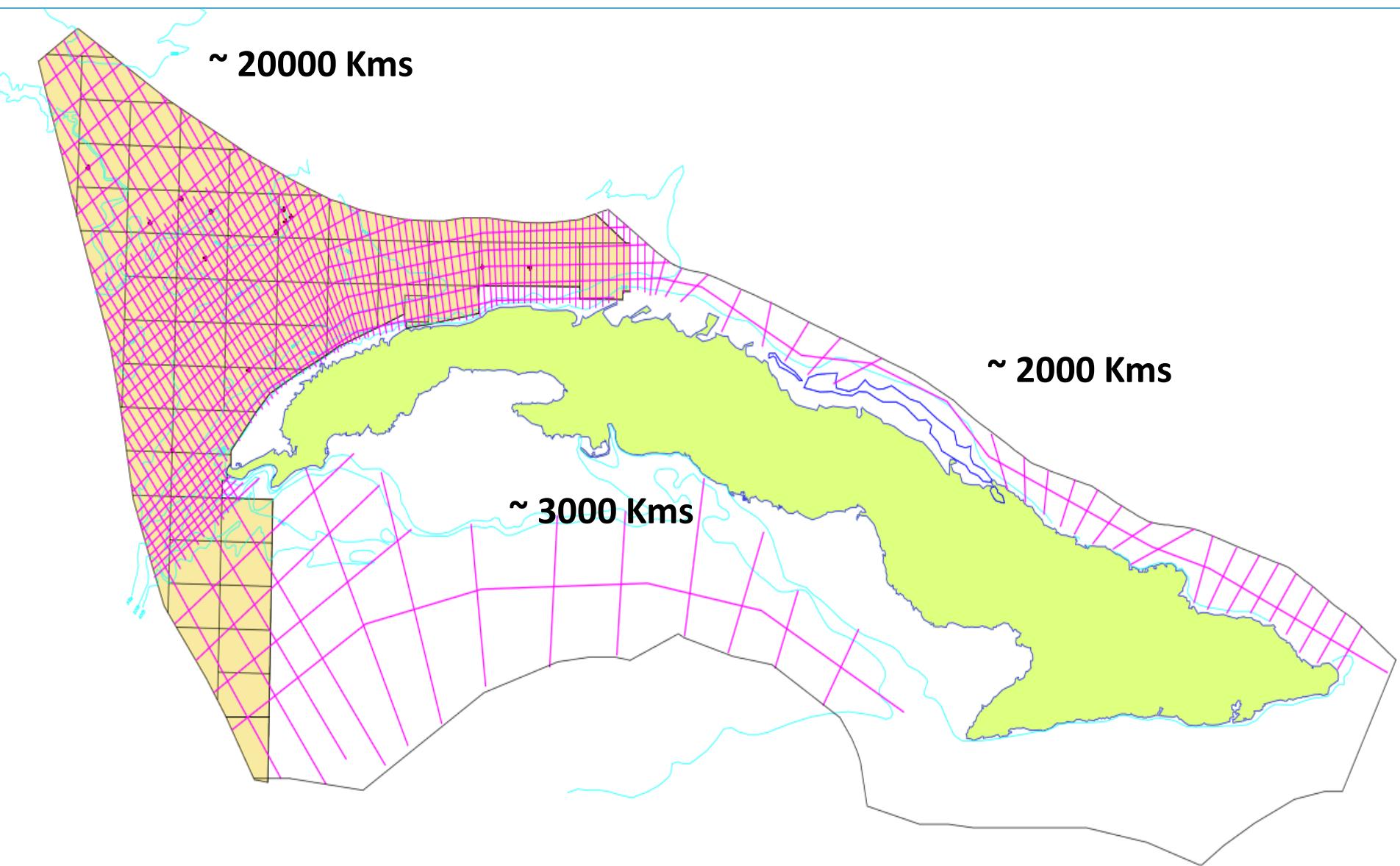
INFORMATION IN SOUTHERN AND NW BLOCKS IS POOR.

General characteristics of offshore seismic acquisitions

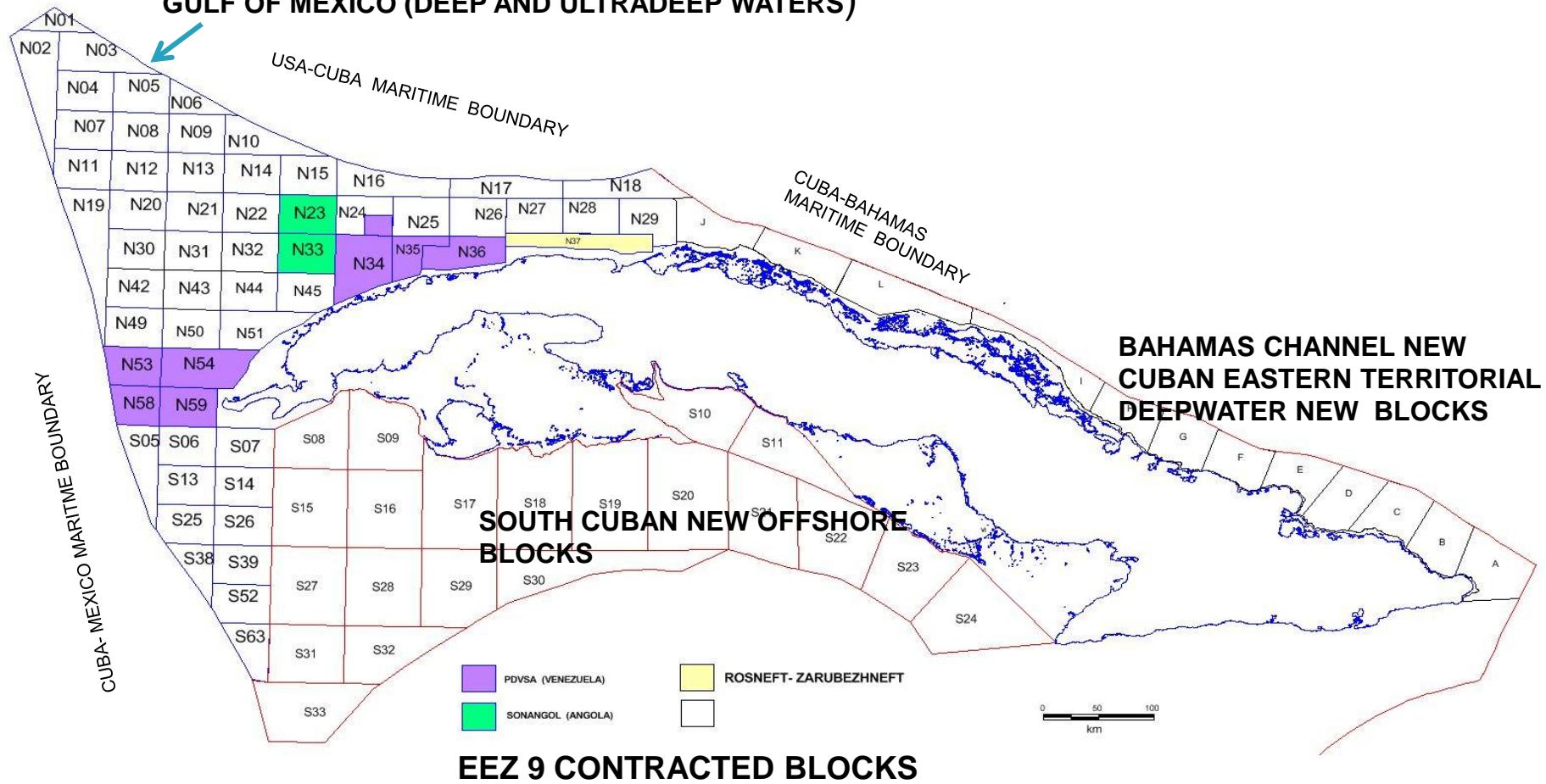


SEISMIC	31,193.40 Kms (2D)	13,004.77 Km² (3D)
GEOLOGY	Wells and log data, geochemical data, G & G reports available of onland and offshore	

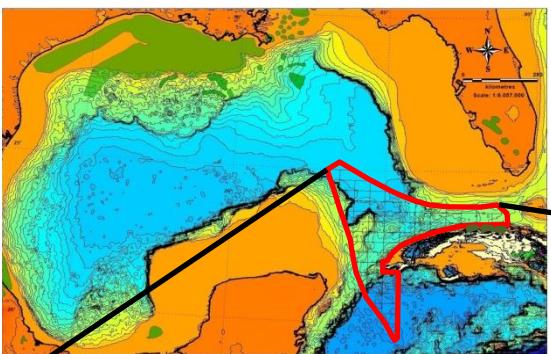
25000 KM OF ADDITIONAL MARINE MULTI-CLIENT 2D SURVEY IN 2017



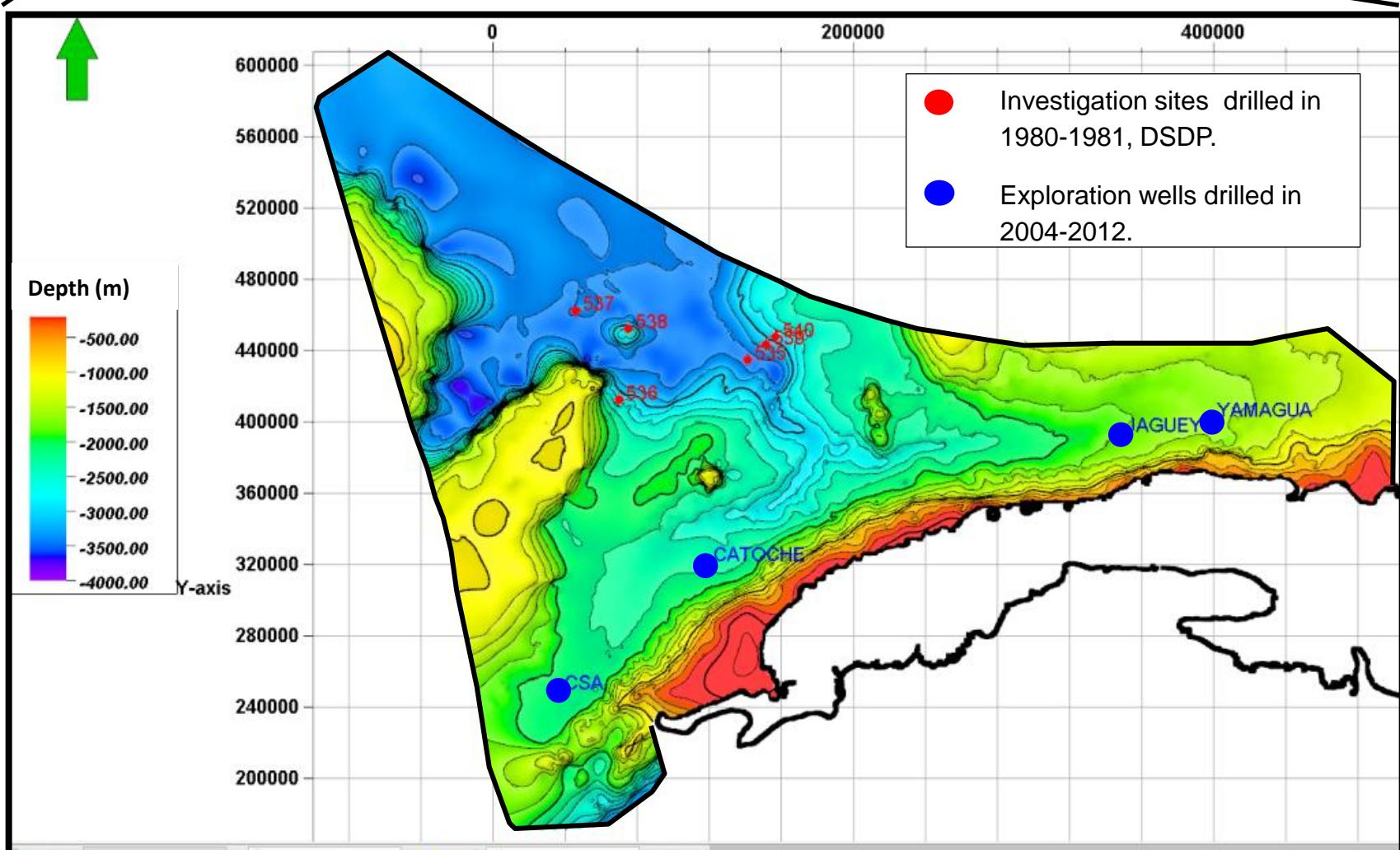
EXCLUSIVE ECONOMIC ZONE (EEZ) OF CUBA IN THE GULF OF MEXICO (DEEP AND ULTRADEEP WATERS)



NEW OFFER OF CUBAN OFFSHORE BLOCKS (PSC)



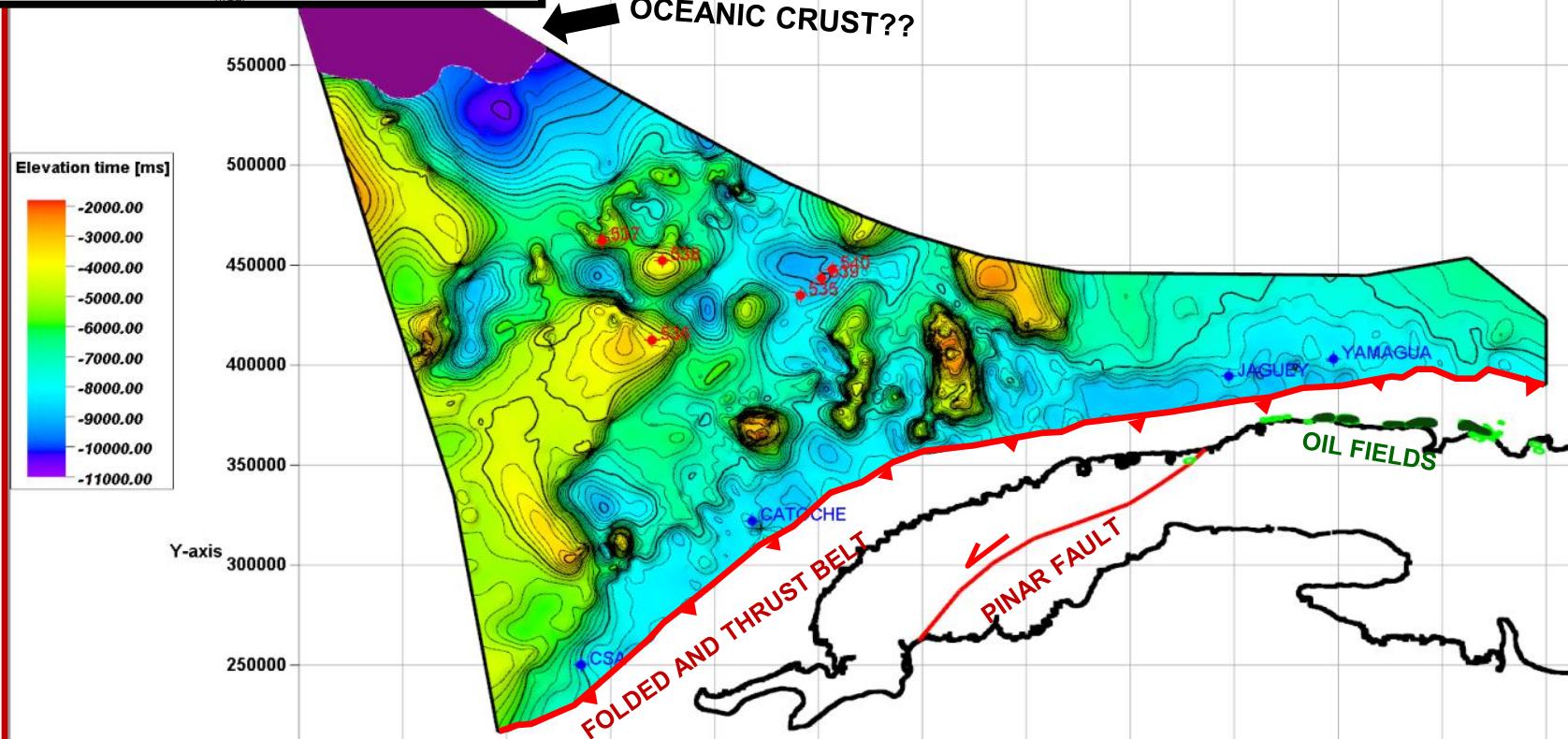
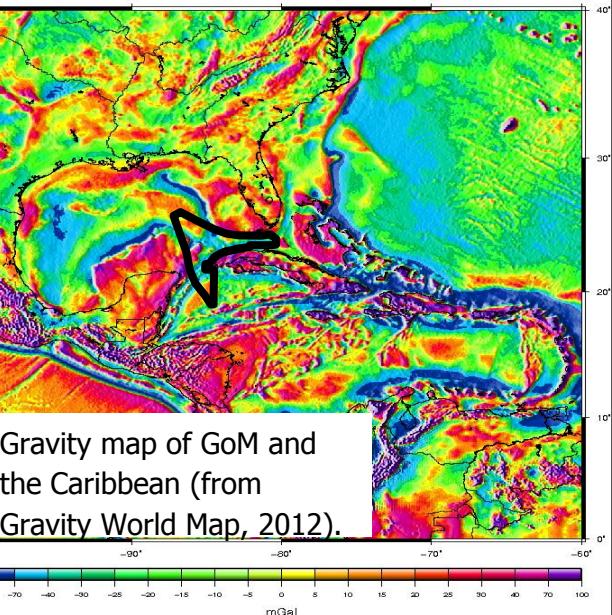
General characteristics of Cuban EEZ in GoM. (Sea bottom)



Geological and structural framework.

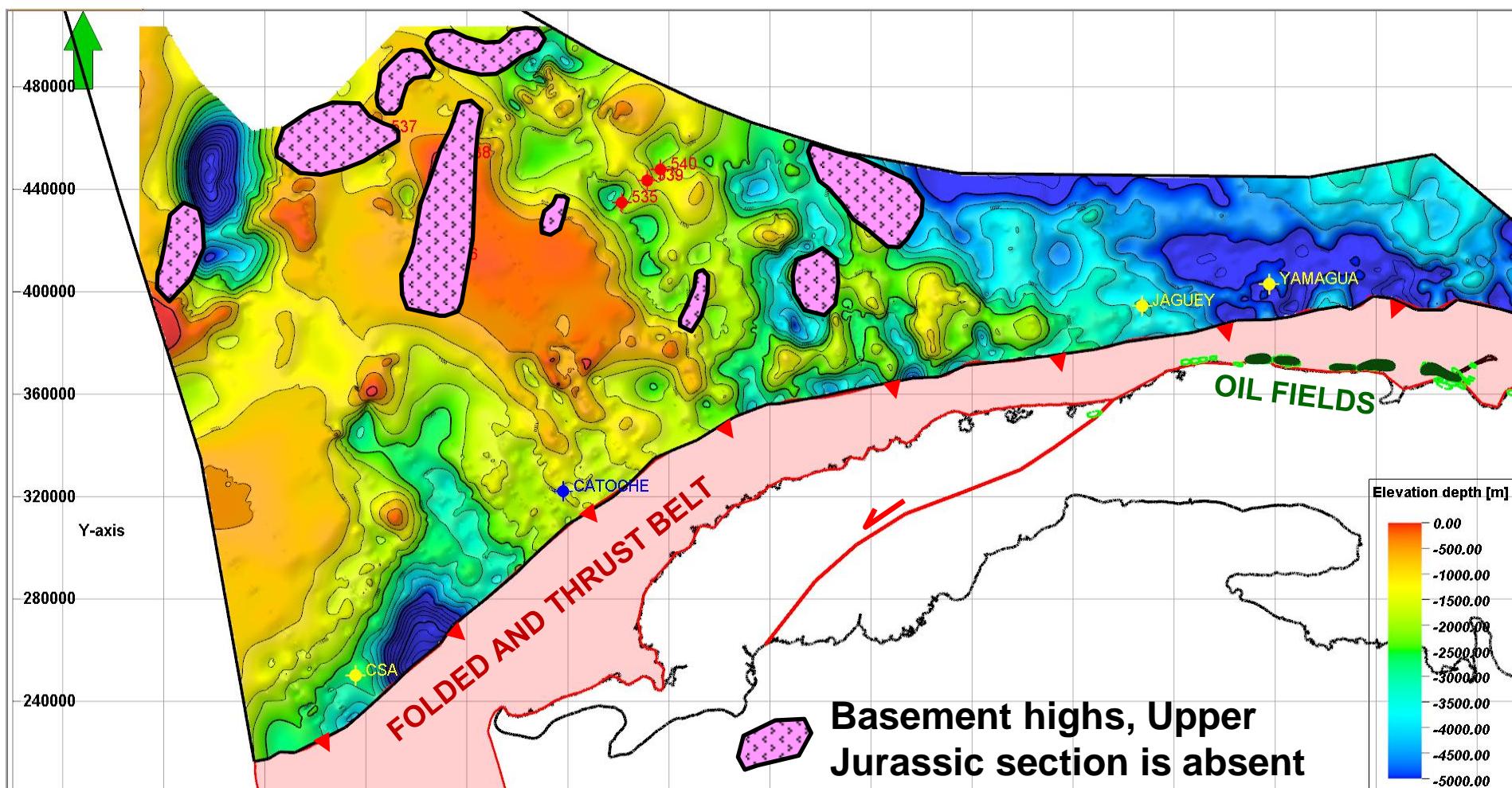
Depth of basement range from 4000-12000m, with enough sedimentary thickness for oil generation.

CRYSTALLINE BASEMENT TWT MAP

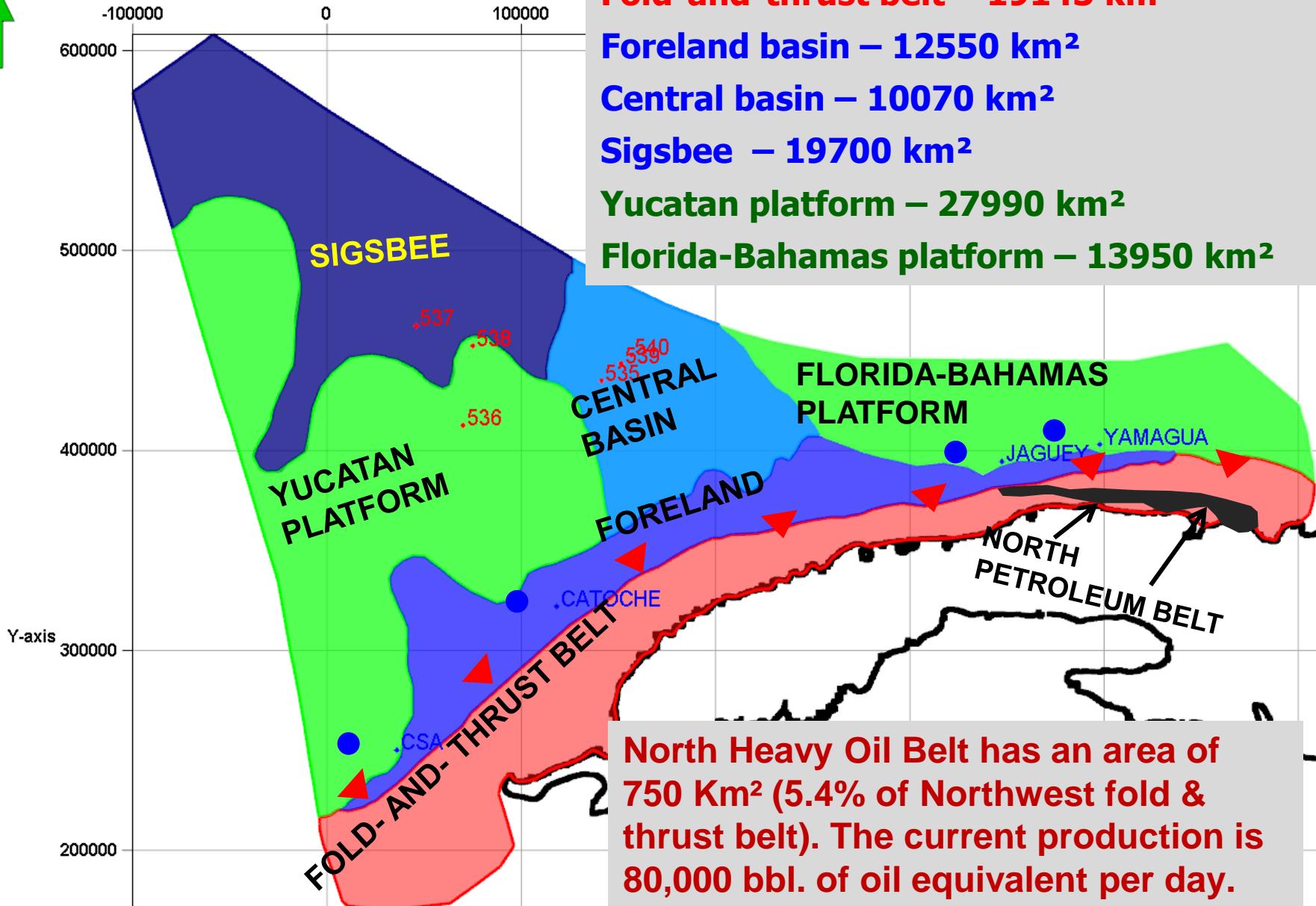


Geological and structural framework.

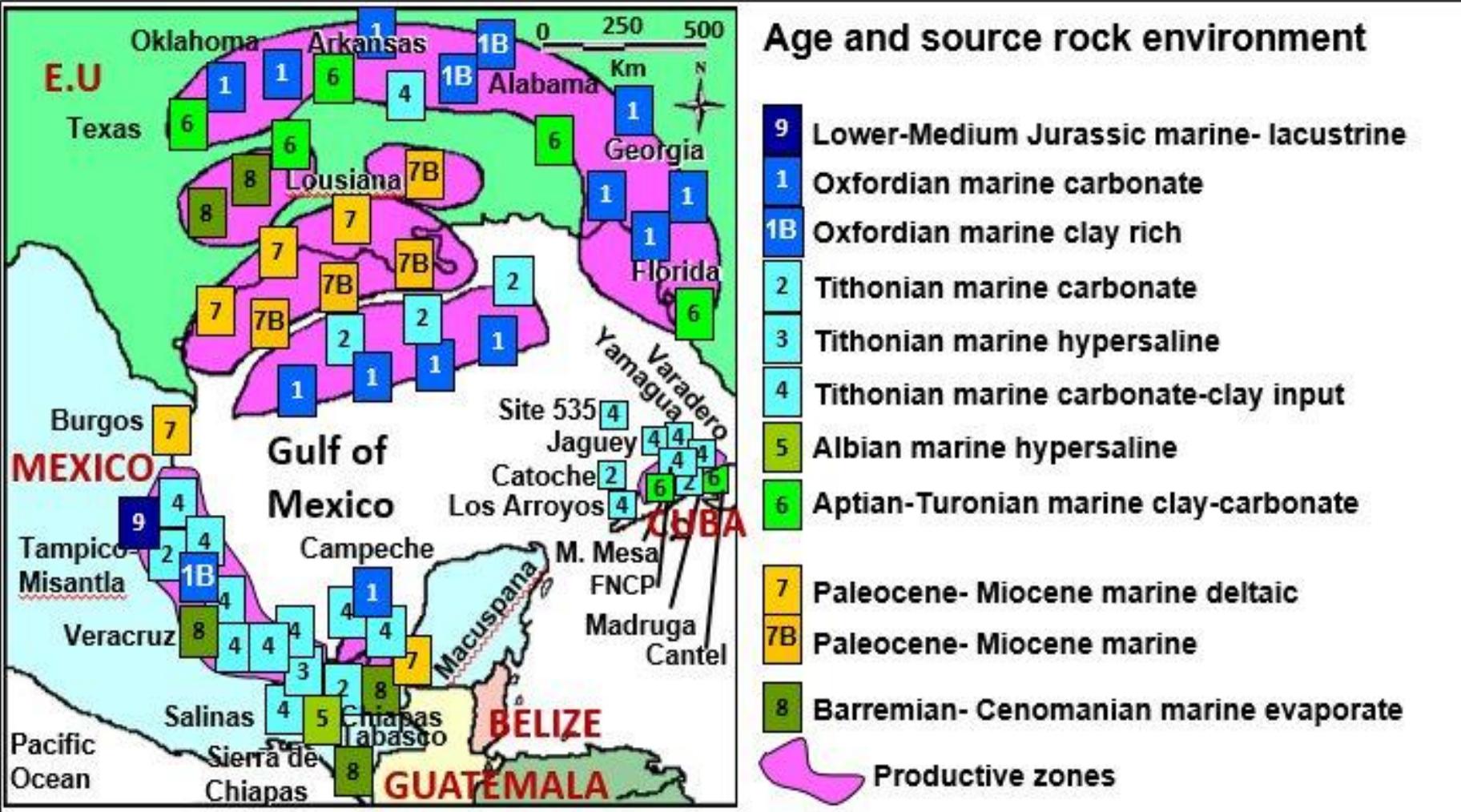
AVERAGE THICKNESS OF *UPPER JURASSIC SECTION*, WHERE MOST OF SOURCE ROCKS, RESERVOIRS AND PROBABLY SEALS ARE ASSOCIATED, RANGE FROM 1000-2500m.



General characteristics of CEEZ-GoM. (Geological scenarios)



Regional geochemical data (regional oil types correlation)



Family I of Cuban oils, correlates with Family 4 of Gulf of Mexico
Family II of Cuban oils, correlates with Family 2 of Gulf of Mexico
Family III of Cuban oils, correlates with Family 6 of Gulf of Mexico

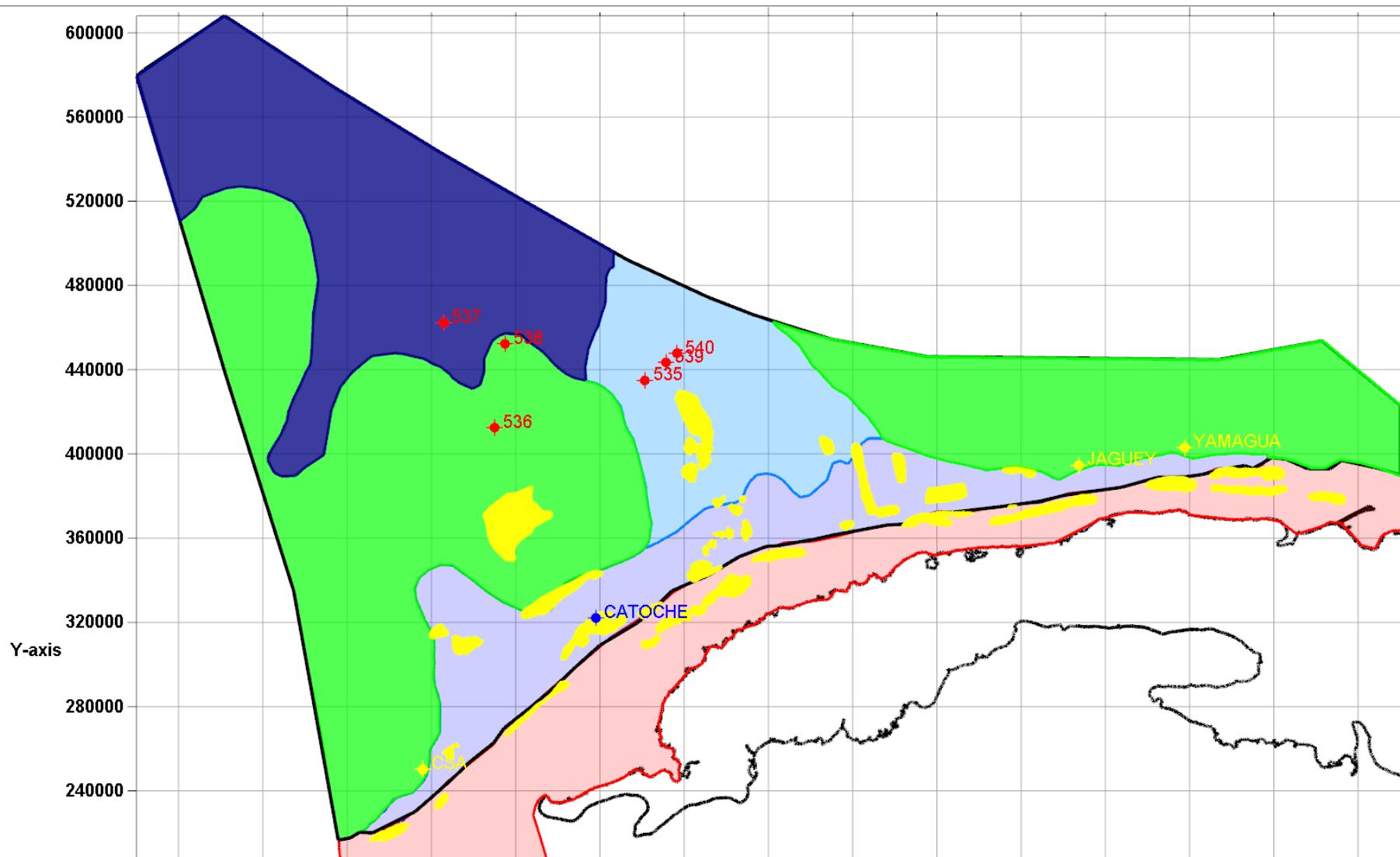
Petroleum systems

- I. Upper Jurassic – Upper Jurassic-Cretaceous (!) petroleum system**, geographically and geologically related to the Cuban fold and thrust belt.
- II. Upper Jurassic – Upper Jurassic-Lower Cretaceous (.) petroleum system**, geographically and geologically related to foreland basin.
- III. Upper Jurassic Oxfordian – Oxfordian (.) petroleum system**, geographically and geologically related to foreland and central basin.
- IV. Upper Jurassic Oxfordian – Oxfordian (.) petroleum system**, geographically and geologically related to Florida-Bahamas shelf.
- V. Lower to Middle Jurassic – Lower to Middle Jurassic (.) petroleum system, pre-salt**, geographically and geologically related to foreland and central basins, and Yucatan shelf.

Proposed play types.

PLAY TYPE	TRAP CHARACTERISTICS	REGIONAL ANALOGUES
DUPLEXES	Thrust sheets associated to Northern Cuban Folded belt. Reservoir are fractured and karstified pelagic carbonates from Upper Jurassic-Lower Cretaceous. Seal is Paleogene shale.	Varadero (Cuban F&T Belt)
FAULTED BLOCKS (HORSTS)	Structural highs, with high energy carbonates mainly from Kimmeridgian. Seal are clayey deep water carbonates and tight limestone.	San Andres? (Mexico)
OXFORDIAN	Sandstone reservoir sealed by shale.	Norphlet? (US)
OXFORDIAN	Dolomite and high energy limestone reservoirs. Seals of lower Kimmeridgian anhydrite and internal shale.	Smackover? (US)
PRE-SALT	Lower-Middle Jurassic sandstone, seal of Callovian anhydrite and internal shale.	Pre-salt? (Mexico)
TERTIARY	Sandstone reservoir, internal shale seal.	Wilcox? (US)
K/T BOUNDARY	Breccia of Upper Cretaceous, both from platform and pelagic limestone. Tertiary seal	Tamabra-Cantarell? (Mexico)

Resources estimation (main leads).



There are still many leads to be mapped, basically in northern Central Basin and Sigsbee basin, but seismic information is still poor in there.

Resources estimation of Cuban EEZ

RECOVERABLE RESOURCES ESTIMATION

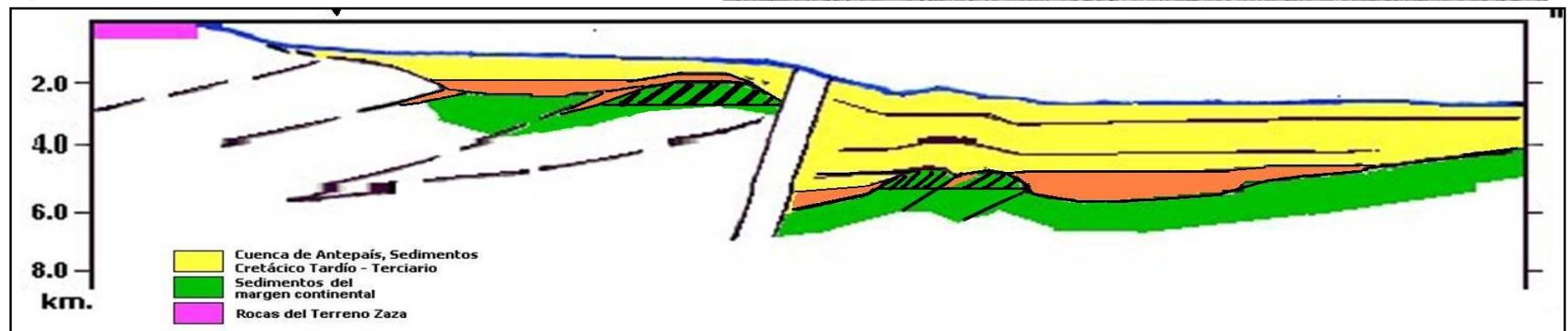
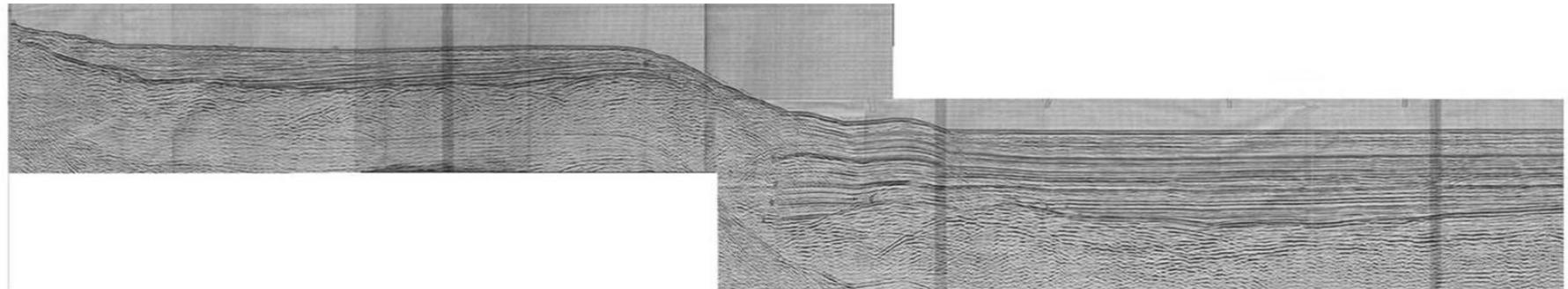
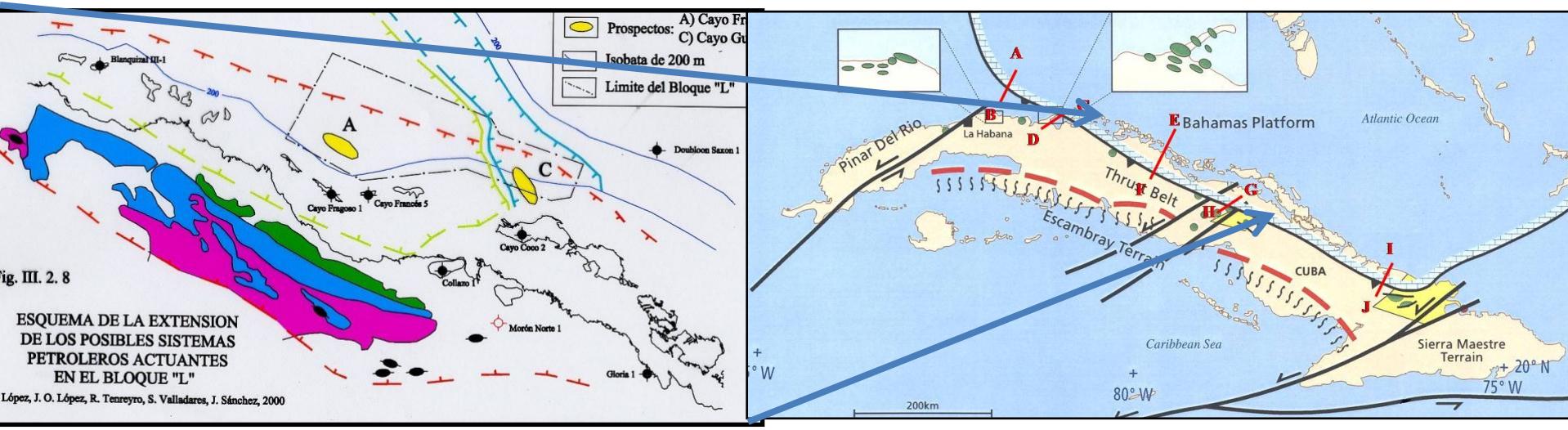
(MILLIONS OF BARRELS OF EQUIVALENT OIL)

PLAY TYPE	HIGH ESTIMATION	BETTER ESTIMATION	LOW ESTIMATION
Duplexes (Varadero-Type)	11600	6960	3000
Faulted blocks (Horsts-Type)	3000	2000	1000
Oxfordian sandstone (Norphlet-Type)	3000	2000	1000
Oxfordian Dolomites (Smackover-Type)	3000	2000	1000
Tertiary sandstone	1600	1000	400
Carbonate Breccias K/T boundary (Cantarell-Type)	1300	800	300
Synrift sandstone (Pre-salt play)	900	500	100
TOTAL:	24400	15260	6800

FINAL CONSIDERATIONS ON EEZ

1. There is a huge sedimentary thickness in the basin, with excellent levels of source rocks, reservoirs and *probable* seals. *Upper Jurassic section is the most important for the main elements of the petroleum systems.*
2. The presence of Family-I oil shows in some wells in the GoM-CEEZ demonstrate the extension of the Jurassic source rock and proper conditions for oil generation.
3. Within the GoM megabasin, Cuban area has two main differences: Tertiary sedimentary section is not as thick as in Mexico and USA sectors, and less salt tectonics is recorded in Cuban area. However, many similarities have been found concerning to source rocks, facies distribution and oil types.
4. A preliminary estimation of recoverable resources, both from probabilistic and deterministic methods, allows calculating more than 15 billion barrels of equiv .oil.
5. According to resources estimation and identified play types, big oil fields could be discovered in CEEZ-GoM.

OLD BAHAMAS CHANNEL





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**NEW LAW No 118 OF THE FOREIGN
INVESTMENT**

**UPDATING
OF LEGAL FRAMEWROK
OF THE FOREIGN INVESTMENT
IN CUBA**



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MAIN GENERAL PRINCIPLES OF THIS NEW POLICY IN THE OIL AND GAS INDUSTRY

- To contribute to increase the production of oil & gas in order to reach the self-sufficiency of the country at middle term.
 - To attract foreign investment by means of giving better tributary regime, attractive contractual conditions and guarantees for the investors.
 - Preservation of the environment



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GUARANTEES TO THE INVESTORS

- The Cuban State guarantees free transference to abroad **in foreign currency**, without payment of taxes or any other obligation, the **dividends or benefits** obtained by the foreign investor.
- The foreign investment is subject of the special tributary regimen disposed by the Law.
- **The foreign investor can sell or transmit his rights to the State, to other parts of the association or to a third part , with the previous government's authorization.**



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NEW TRIBUTARY REGIME

TAXES

NEW LAW 118

ON EARNINGS

0% DURING THE FIRST 8 YEARS AND
EXCEPTIONALLY FOR A LONGER
PERIOD



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MINISTERIO DE ENERGÍA Y MINAS

NEW TRIBUTARY REGIME

TAXES

NEW LAW 118

FOR THE UTILIZATION
OF LABOR FORCE

EXEMPT

CONTRIBUTION TO THE
LOCAL DEVELOPMENT

0% DURING THE RECOVERY
PERIOD OF THE INVESTMENT



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MINISTERIO DE ENERGÍA Y MINAS

NEW TRIBUTARY REGIME

TAXES

NEW LAW 118

ON SALES
AND SERVICES

0% DURING THE FIRST YEAR OF
OPERATIONS ; AFTERWARDS ,
50% OF BONIFICATION ON
WHOLESALES AND SERVICES

ON PERSONAL
EARNINGS
OF PARTNERS
AND PARTS

EXEMPT



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NEW TRIBUTARY REGIME

TAXES

For the utilization or
exploitation of OIL & GAS
resources, according to
the type of contract

NEW LAW 118

**BONIFICATION
OF 50% DURING
THE RECOVERY
OF THE INVESTMENT**

CUSTOMS

EXEMPT DURING THE
INVESTMENT PERIOD



Main OIL &GAS projects:

- **Exploration at risk and shared production (PSC) :**

- ✓ Onland areas.
- ✓ Shallow waters areas.
- ✓ Deep waters areas. [Exclusive Economic Zone of Cuba (EEZ) in the Gulf of Mexico ,Southern deep waters and Bahamas Channel waters)

-**Enhance recovery methods in heavy oil fields in exploitation.**

-**Unconventional oil**





**FOREIGN OIL COMPANIES ARE VERY
WELCOME TO CUBA FOR DOING
BUSINESS WITH CUBAPETROLEO
(CUPET) TAKING ADVANTAGE OF THE
COUNTRY PROSPECTIVITY FOR OIL AND
GAS, THE ATTRACTIVE NEW LAW FOR
FOREIGN INVESTMENT AND ALSO THE
POSITIVE ENVIRONMENT CREATED BY THE
UPDATING OF THE CUBAN MODEL OF
THE ECONOMY**