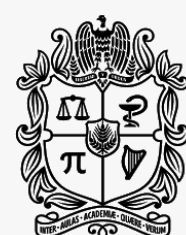


# COLOMBIA ROUND 2021



UNIVERSIDAD  
NACIONAL  
DE COLOMBIA



**Uptc**  
Universidad Pedagógica y  
Tecnológica de Colombia



**ACOGGP**  
ASOCIACIÓN COLOMBIANA DE GEÓLOGOS Y GEOFÍSICOS DEL PETRÓLEO



**AAPG**



**EAGE**

# INCORPORATED AREAS VMM 4-1 & VMM 4-2 MIDDLE MAGDALENA VALLEY BASIN

05/11/2021

Location

Infrastructure

Geological Framework

Incorporated Areas

VMM 4-1

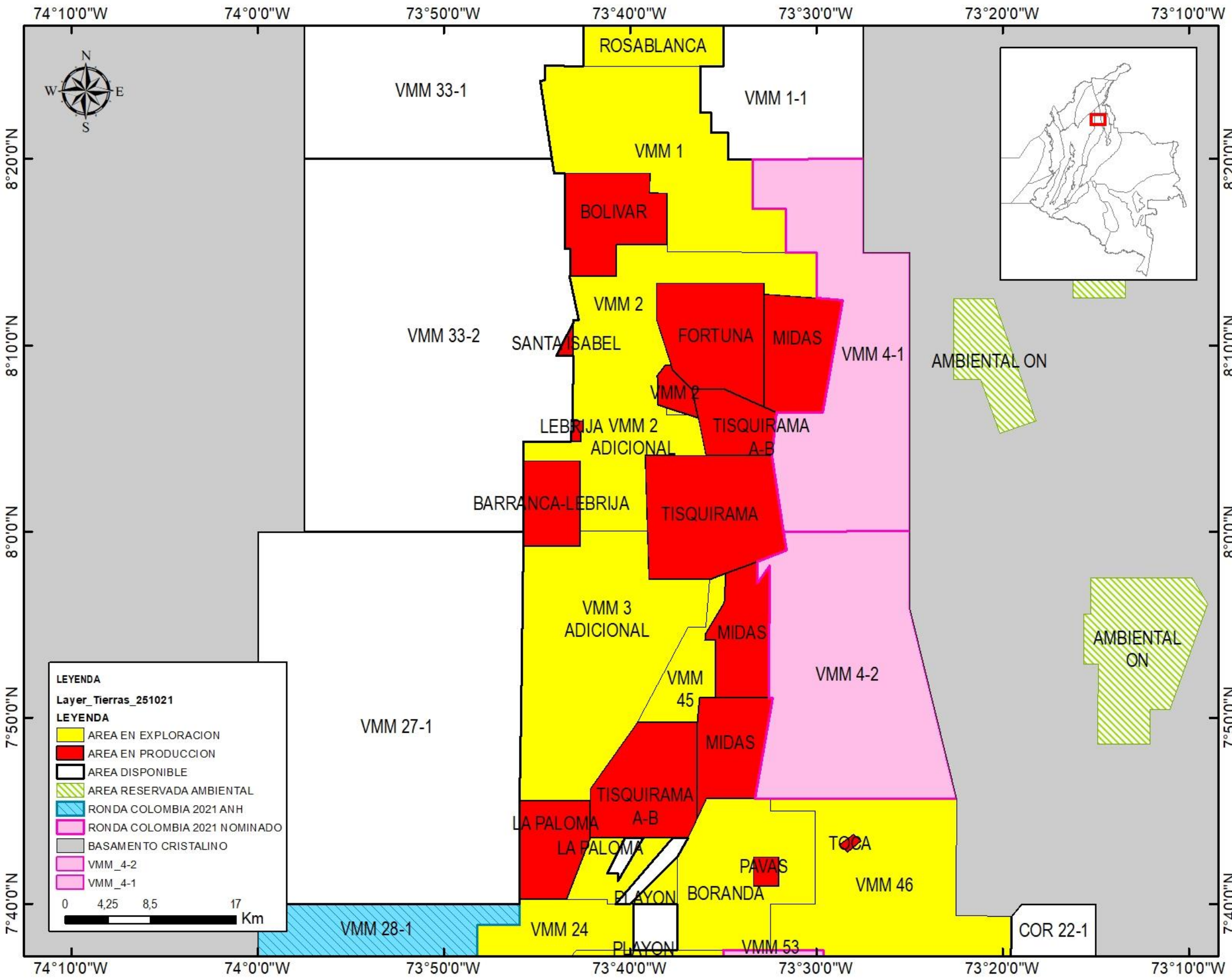
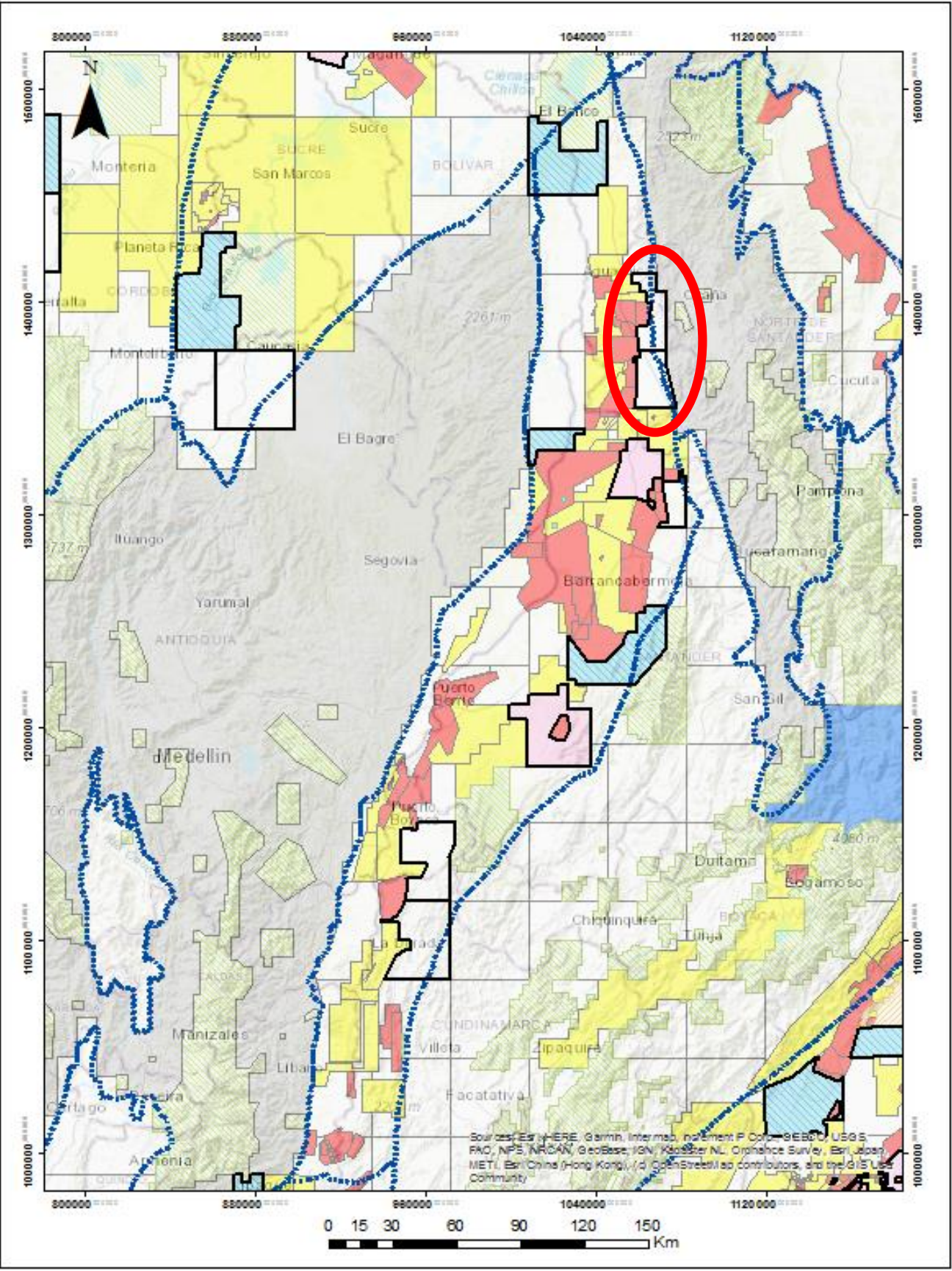
VMM 4-2

Conclusions

# INTRODUCTION



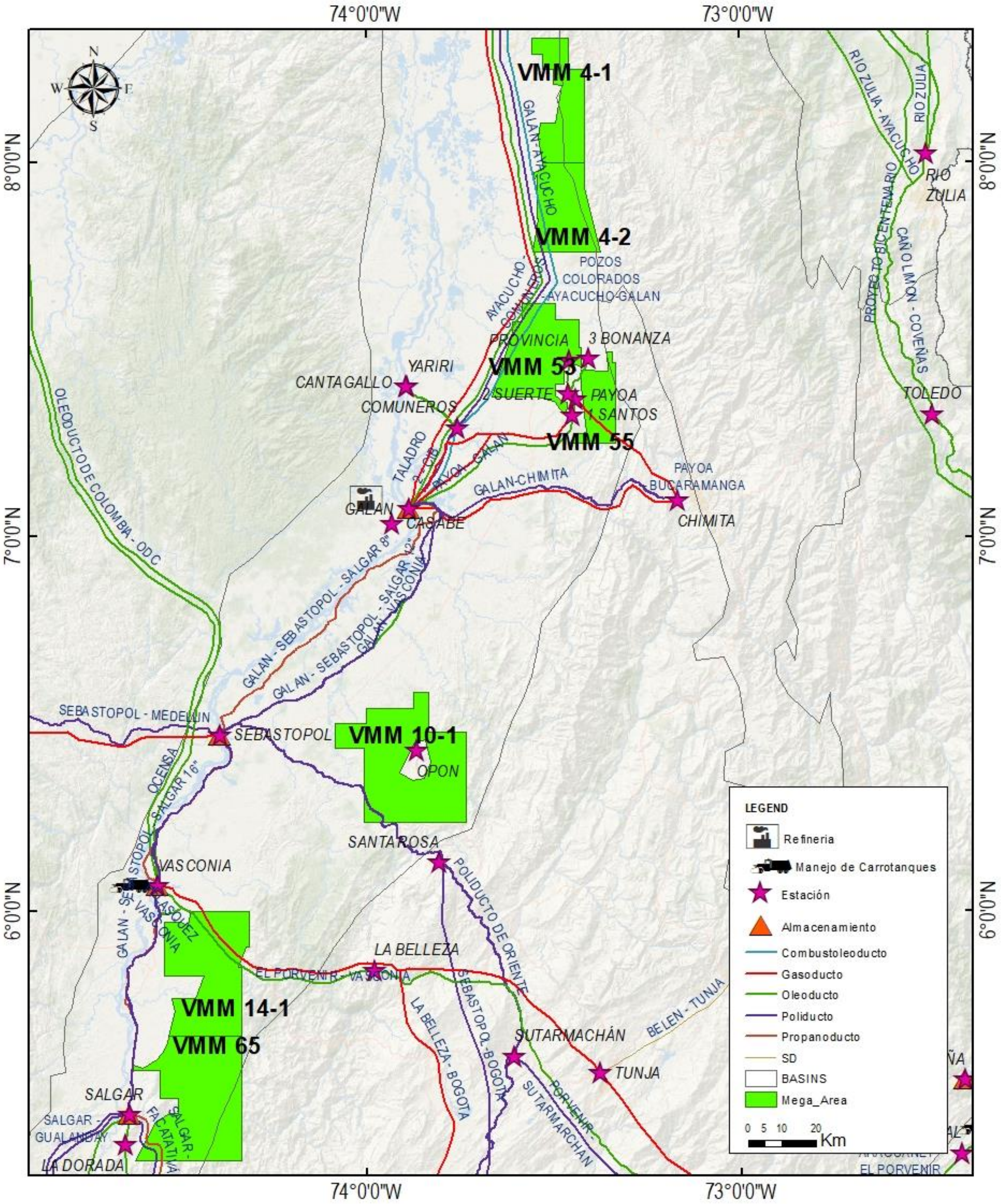
# LOCATION



## Block Areas

- **VMM 4-1** (36873,56 Ha)
- Cesar and Norte de Santander departments
- **VMM 4-2** (41394,55 Ha)
- Cesar and Norte de Santander departments





Main Infrastructure nearby

Oil Pipeline:

Galán - Ayacucho  
Ayacucho – Comuneros  
Payoa – Galán  
Oleoducto de Colombia – ODC  
Ocesa

Pipeline:

Galán - Ayacucho  
Poliducto de Oriente  
Galán - Salgar

Gas Pipeline:

Galán - Ayacucho  
Galán - Chimita  
Ayacucho – Cumuneros  
Galán - Salgar



# GEOLOGICAL FRAMEWORK

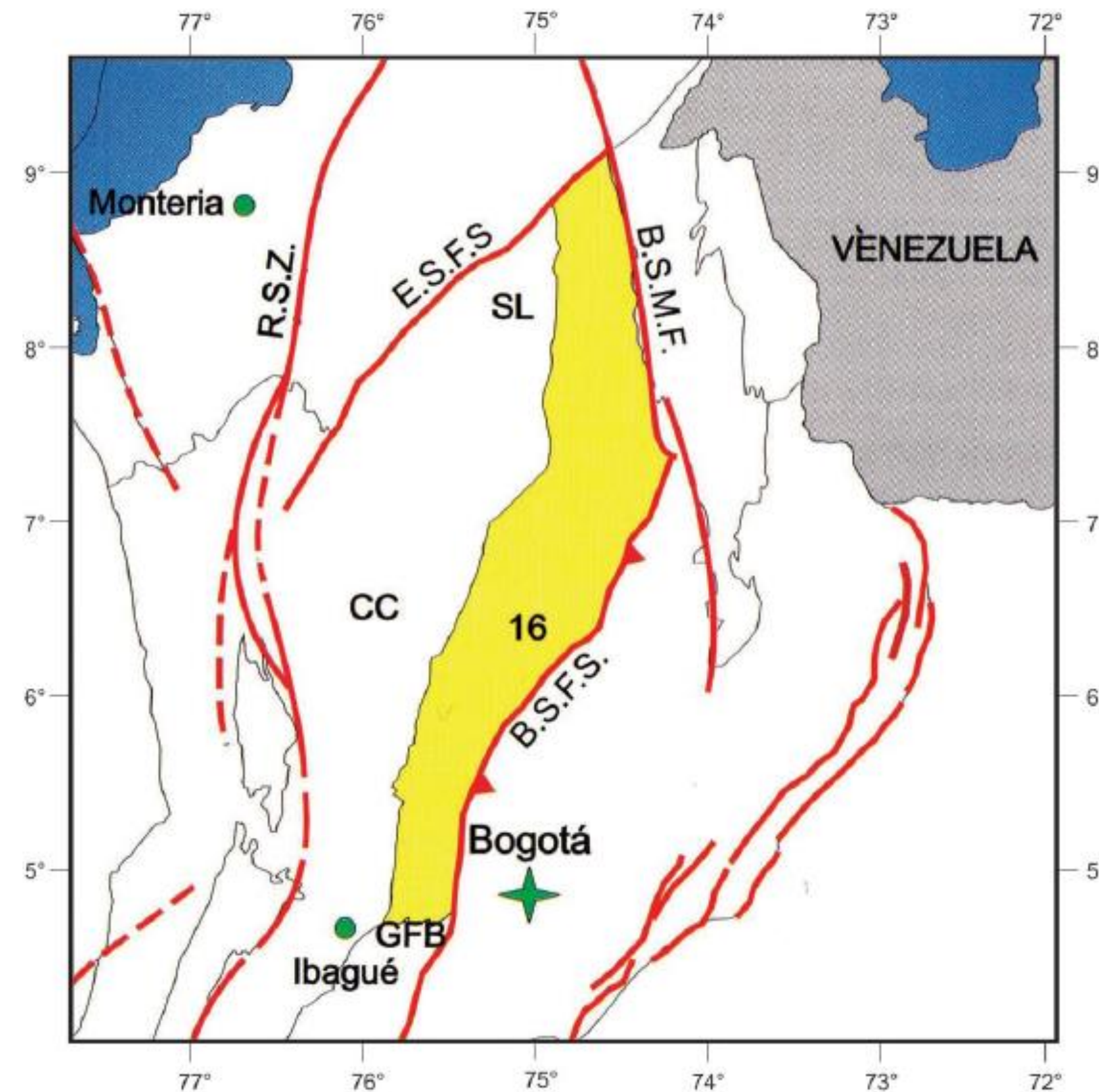


# VMM Basin



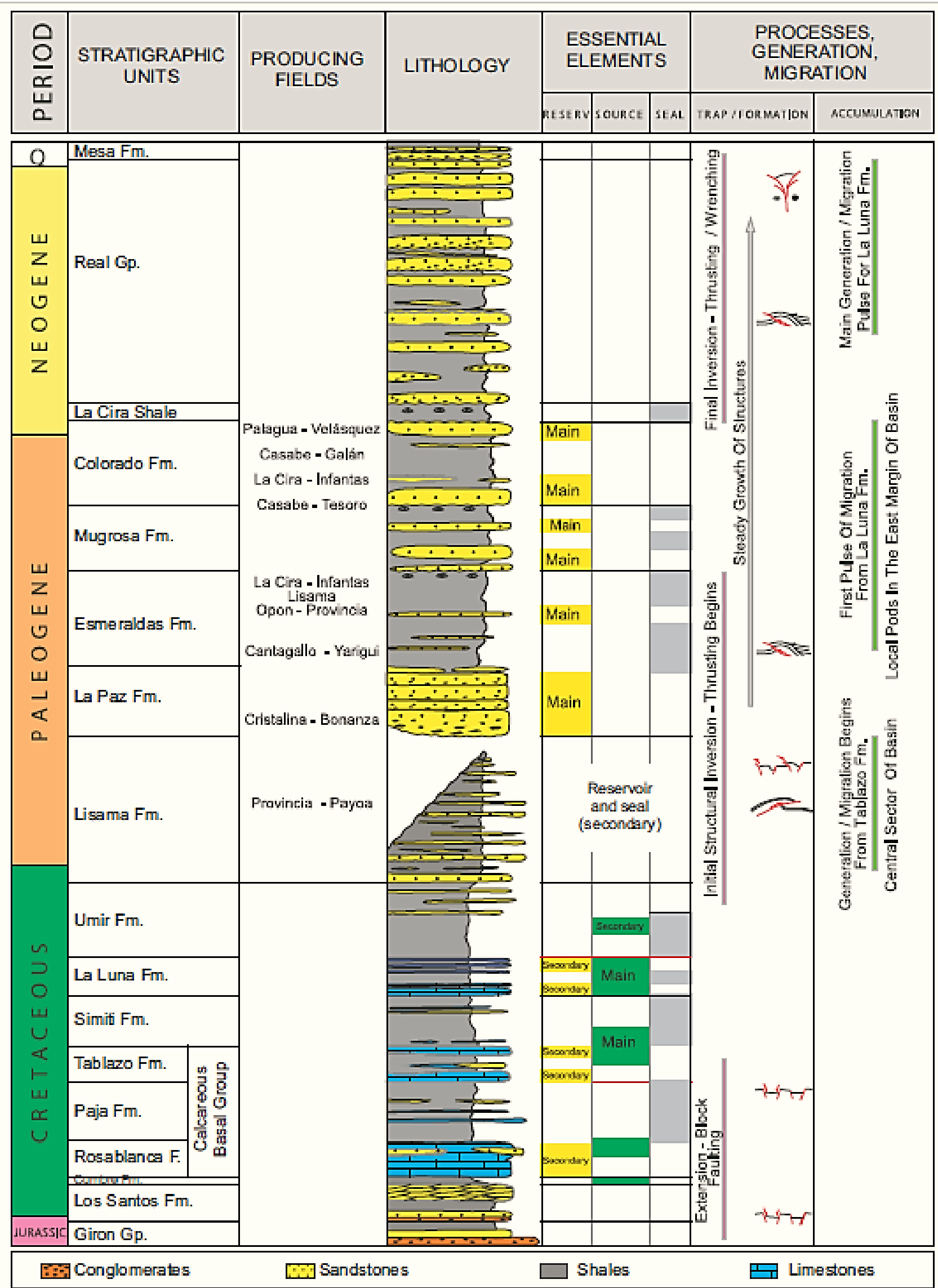
## Boundaries

- North: Espiríu Santo Fault System (E.S.F.S.).
- Northeast: Bucaramanga – Santa Marta fault system (B.S.M.F.).
- Southeast: Bituima and La Salina fault systems (B.S.F.S.).
- South: Girardot fold beld (GFB).
- West: Onlap of Neogene sediments over the Serranía de San Lucas (SL) and Central Cordillera (CC) basement.





# STRATIGRAPHY



From Barrero et al.. 2007

- Paleogene fluvial channel sandstones of Esmeraldas, La Paz, Mugrosa and Colorado Formations have been identified as the main reservoirs in the area.
- La Luna Formation is the main source in the area, but Cretaceous limestones and shales of the Simití-Tablazo Formations are also source rocks in the basin. TOC are high (1-6%) and organic matter is mainly type II, Ro reaches values of 0.6 -1.2 %.

**RESERVOIR**

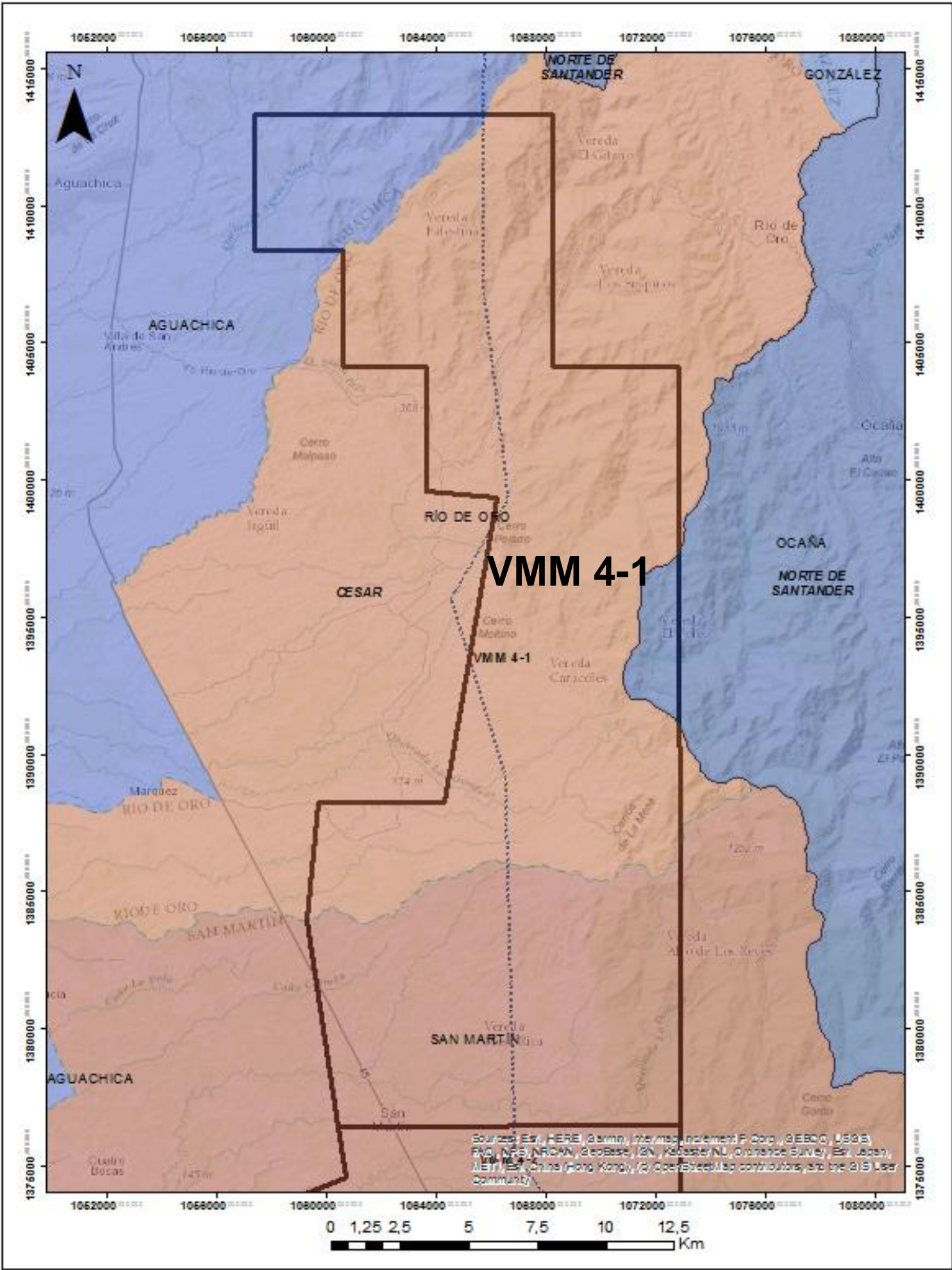
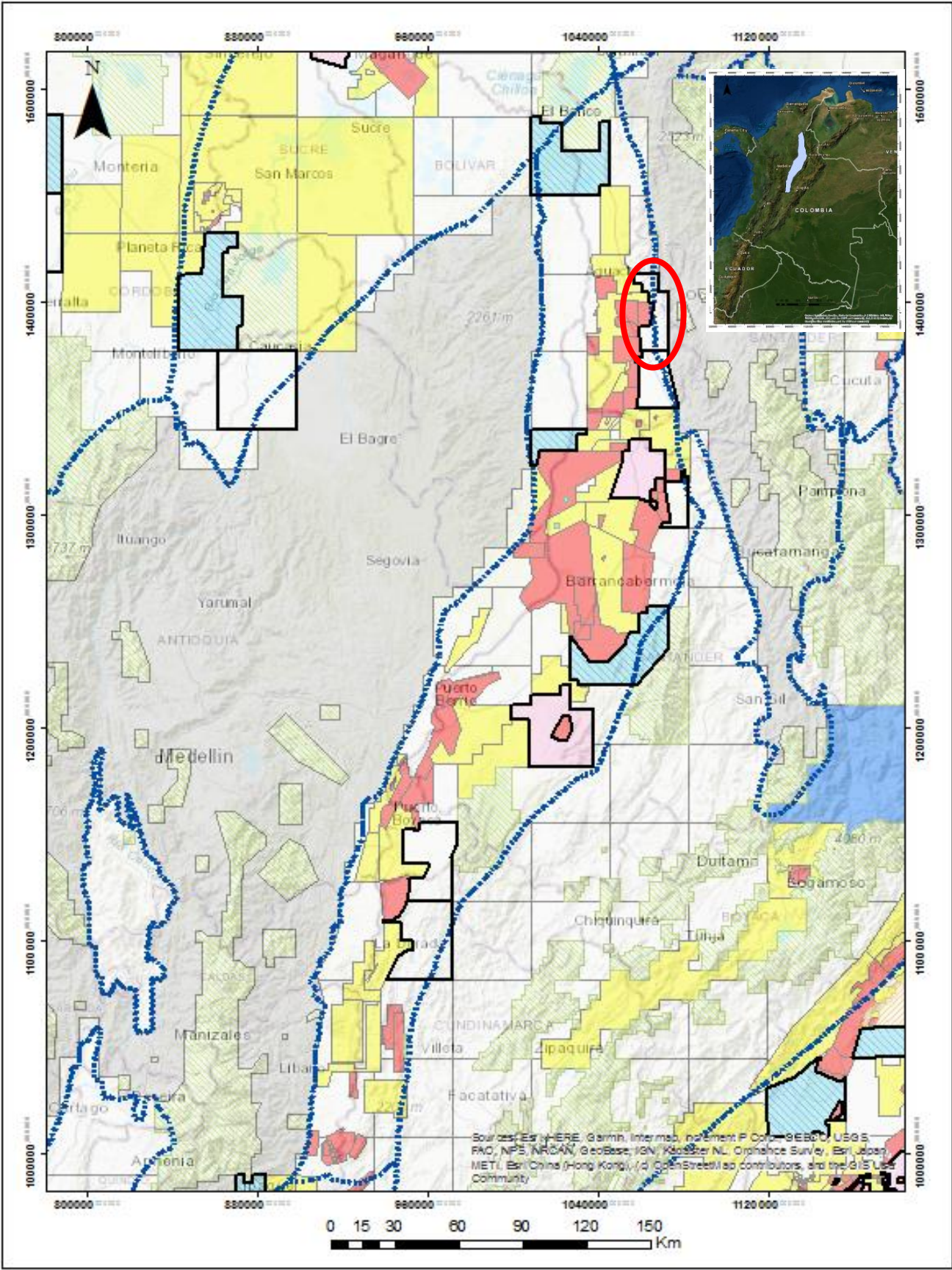
**SOURCE**

# INCORPORATED AREA

## VMM 4-1



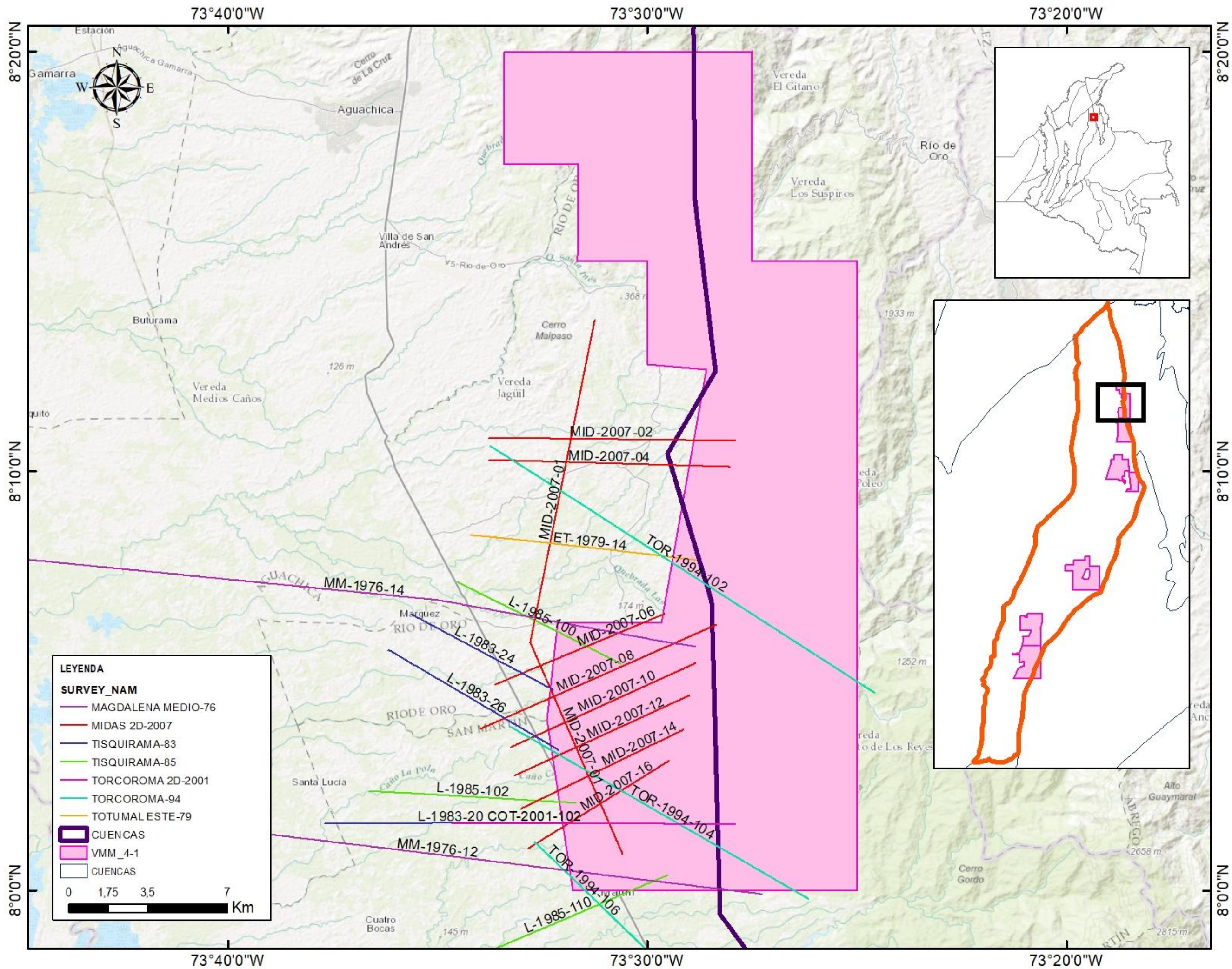
# LOCATION



- **Area:** 36873,56 Ha
- **Municipalities:** Aguachica, Río de Oro, San Martín, Ocaña.
- **Departments:** Cesar, Norte de Santander.



# DATABASE : 2D Seismic



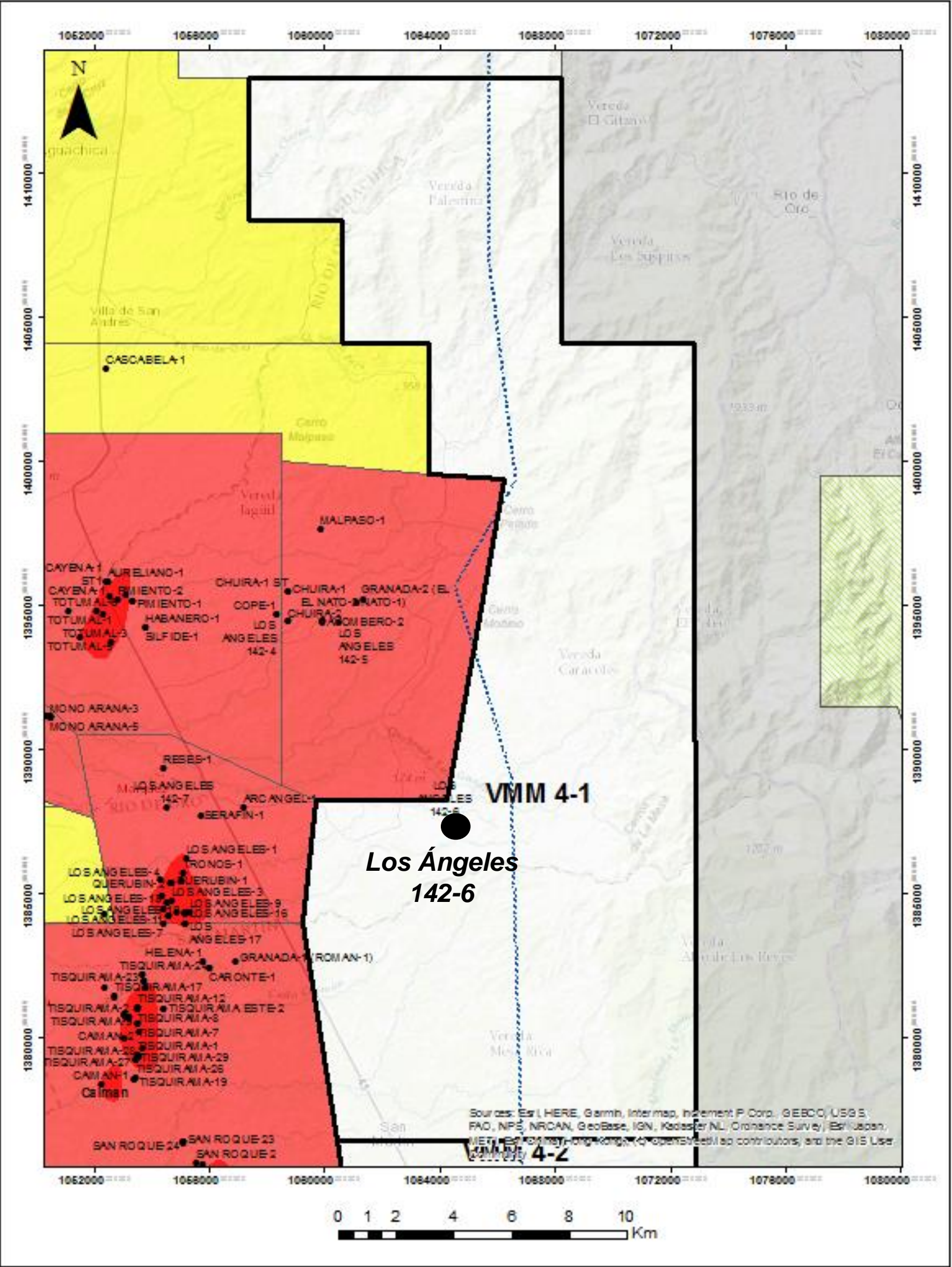
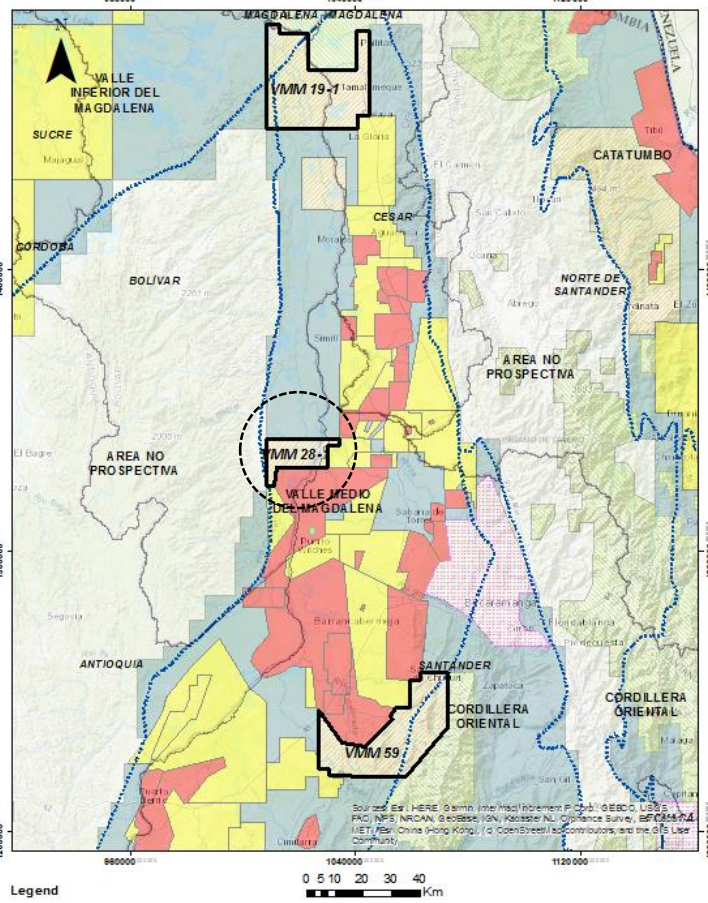
- **SEISMIC**
- **2D Seismic Surveys (7 surveys)**

SURVEY_NAME	LINE_NAME	Long_KM
MAGDALENA MEDIO-76	MM-1976-12	7,13
	MM-1976-14	6,01
MIDAS 2D-2007	MID-2007-01	7,94
	MID-2007-02	1,82
	MID-2007-04	1,79
	MID-2007-06	4,34
	MID-2007-08	7,98
	MID-2007-10	7,09
	MID-2007-12	6,58
	MID-2007-14	6,13
	MID-2007-16	5,47
TISQUIRAMA-83	L-1983-20	0,60
	L-1983-24	0,12
	L-1983-26	0,39
TISQUIRAMA-85	L-1985-100	3,15
	L-1985-102	0,71
	L-1985-110	1,72
TORCOROMA 2D-2001	COT-2001-102	7,55
TORCOROMA-94	TOR-1994-102	9,64
	TOR-1994-104	12,26
	TOR-1994-106	0,88
TOTUMAL ESTE-79	ET-1979-14	1,04

- **Total length in the Area: 100,36 Km**



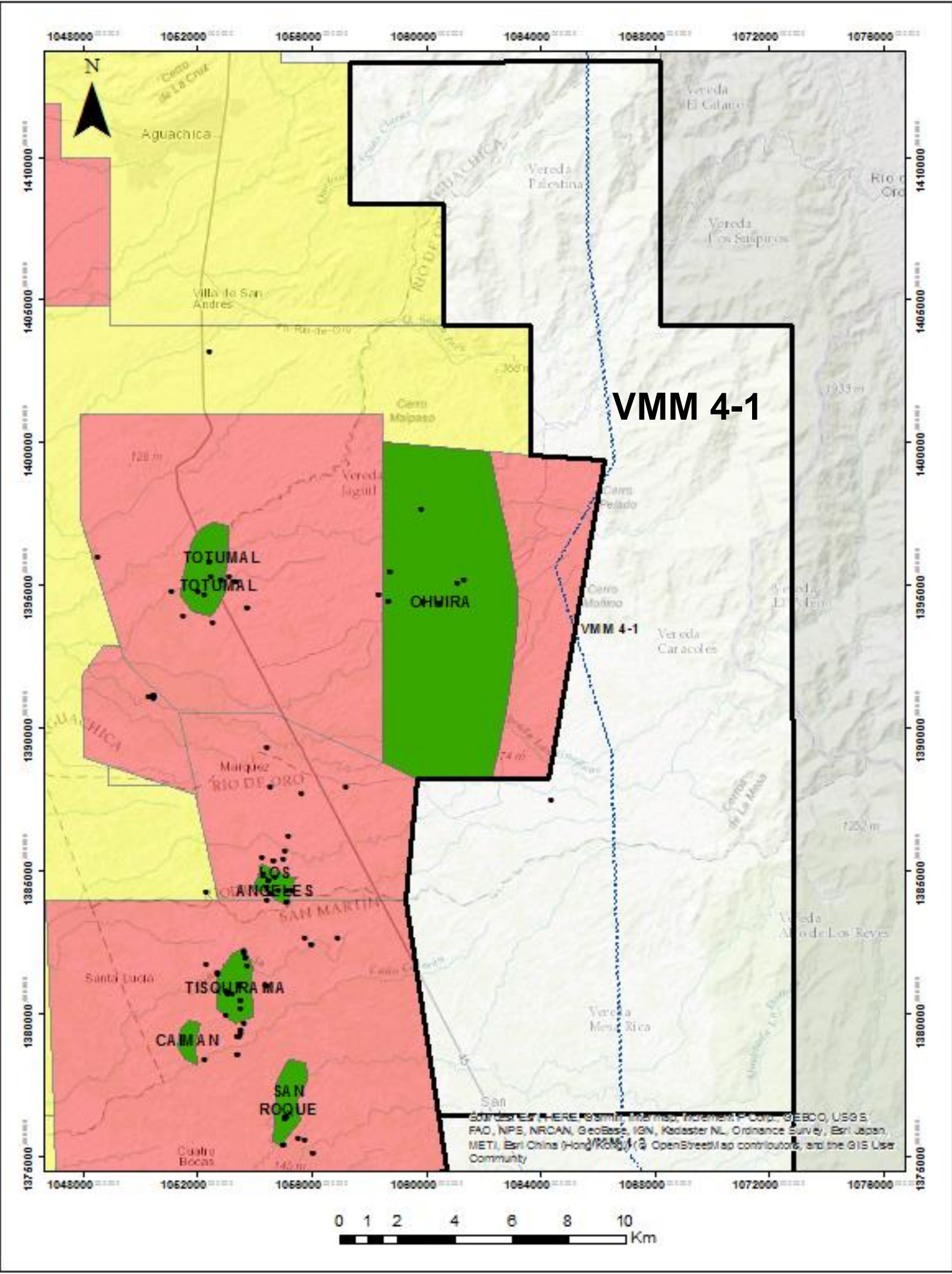
DATABASE : Wells



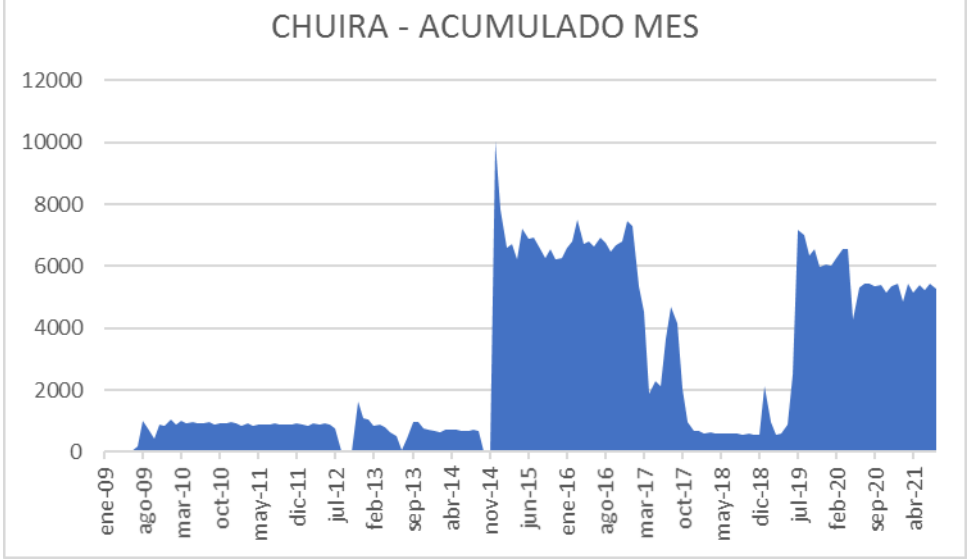
WELL NAME	MD (ft)	DATE	OPERATING COMPANY
LOS ÁNGELES 142-6	3905	1952	International Petroleum Limited



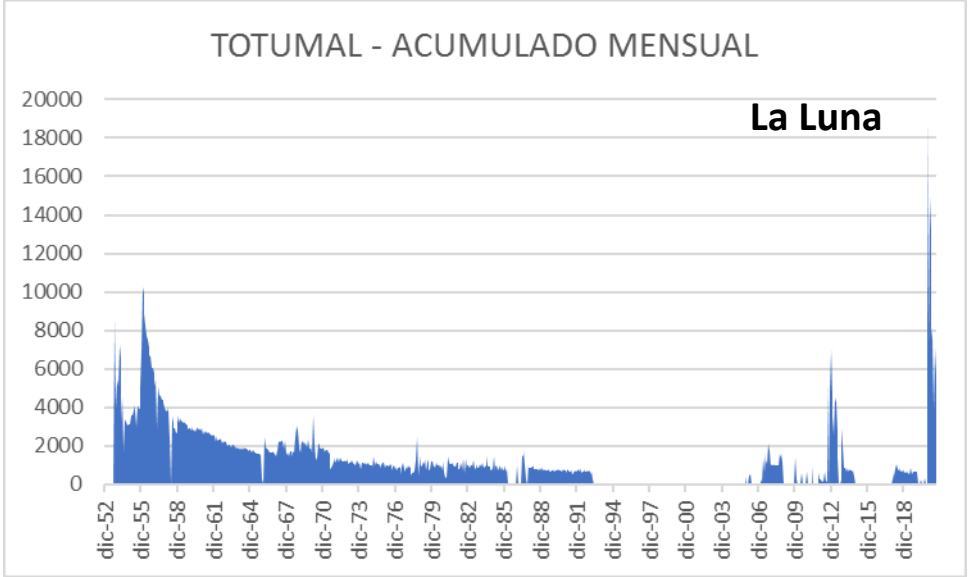
# NEAR FIELDS



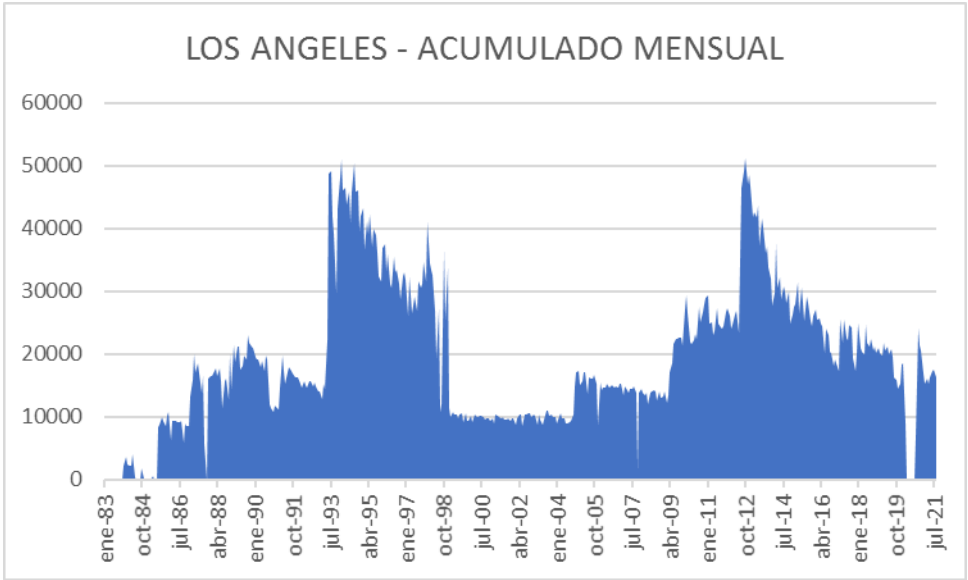
Cumulative Production: 0,426 MMBO



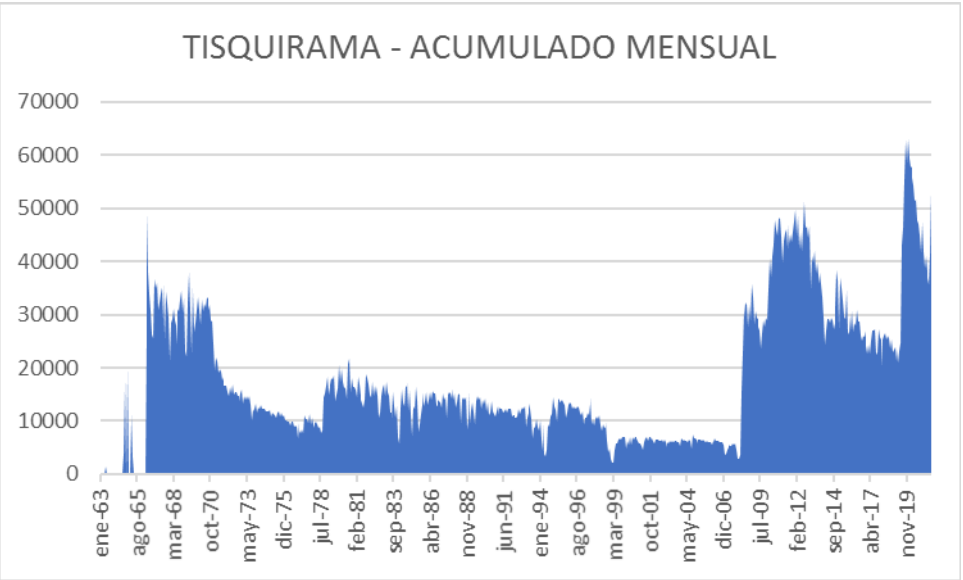
Cumulative Production: 1,03 MMBO



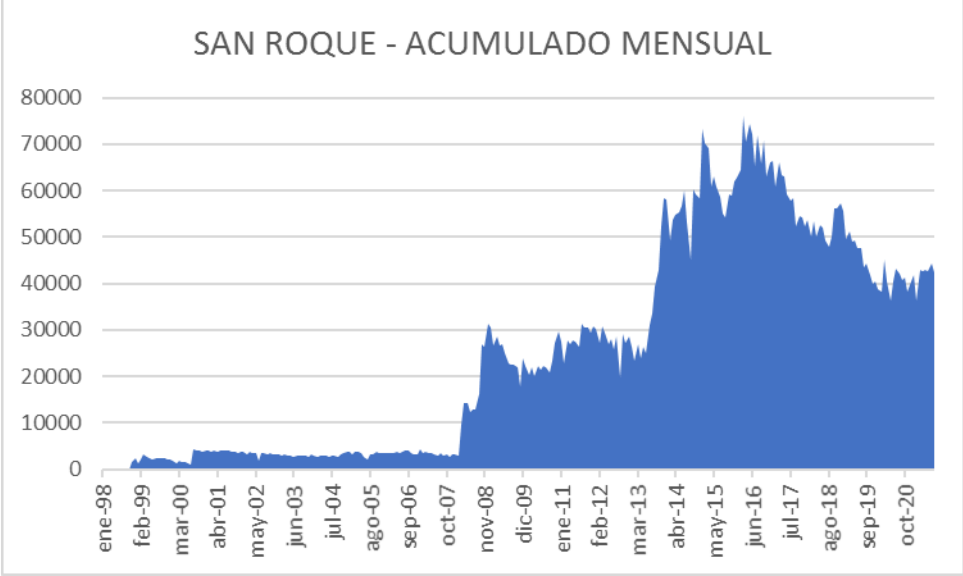
Cumulative Production: 8.91 MMBO



Cumulative Production: 12,5 MMBO



Cumulative Production: 7,13 MMBO

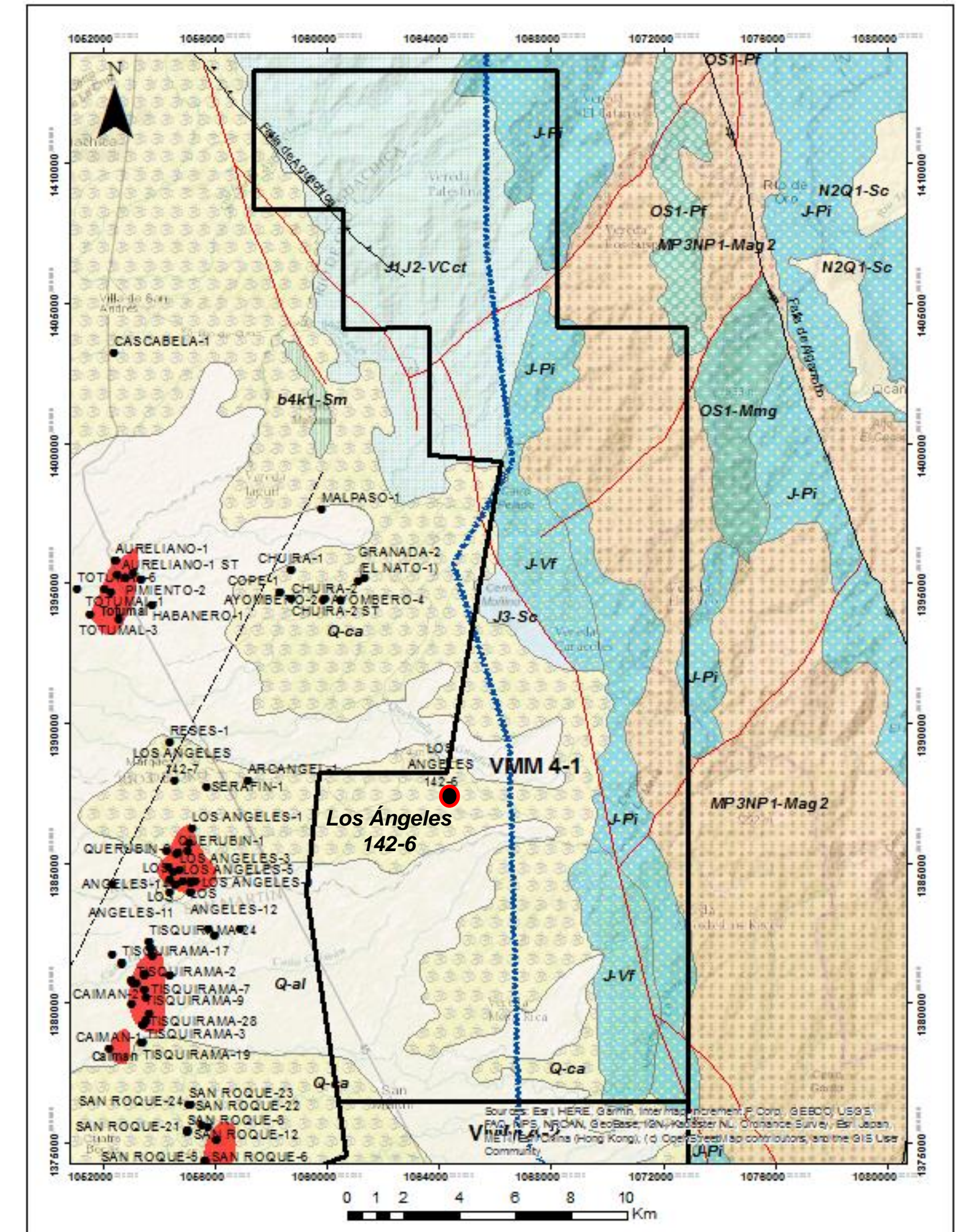
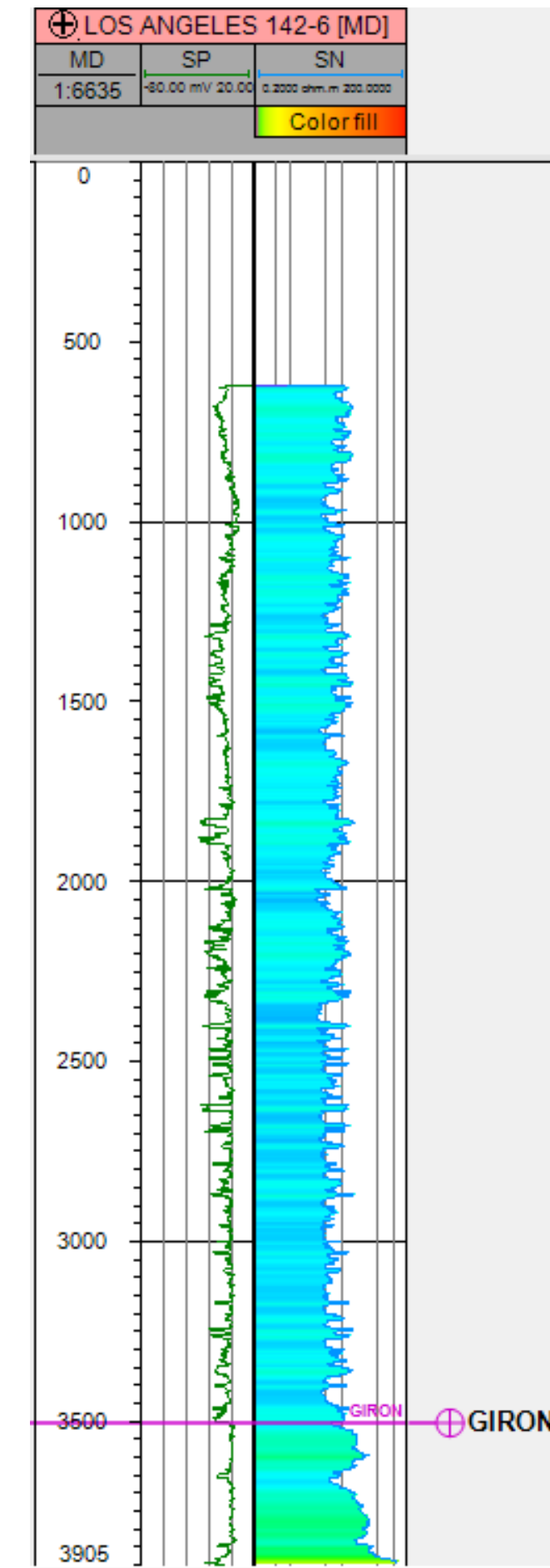
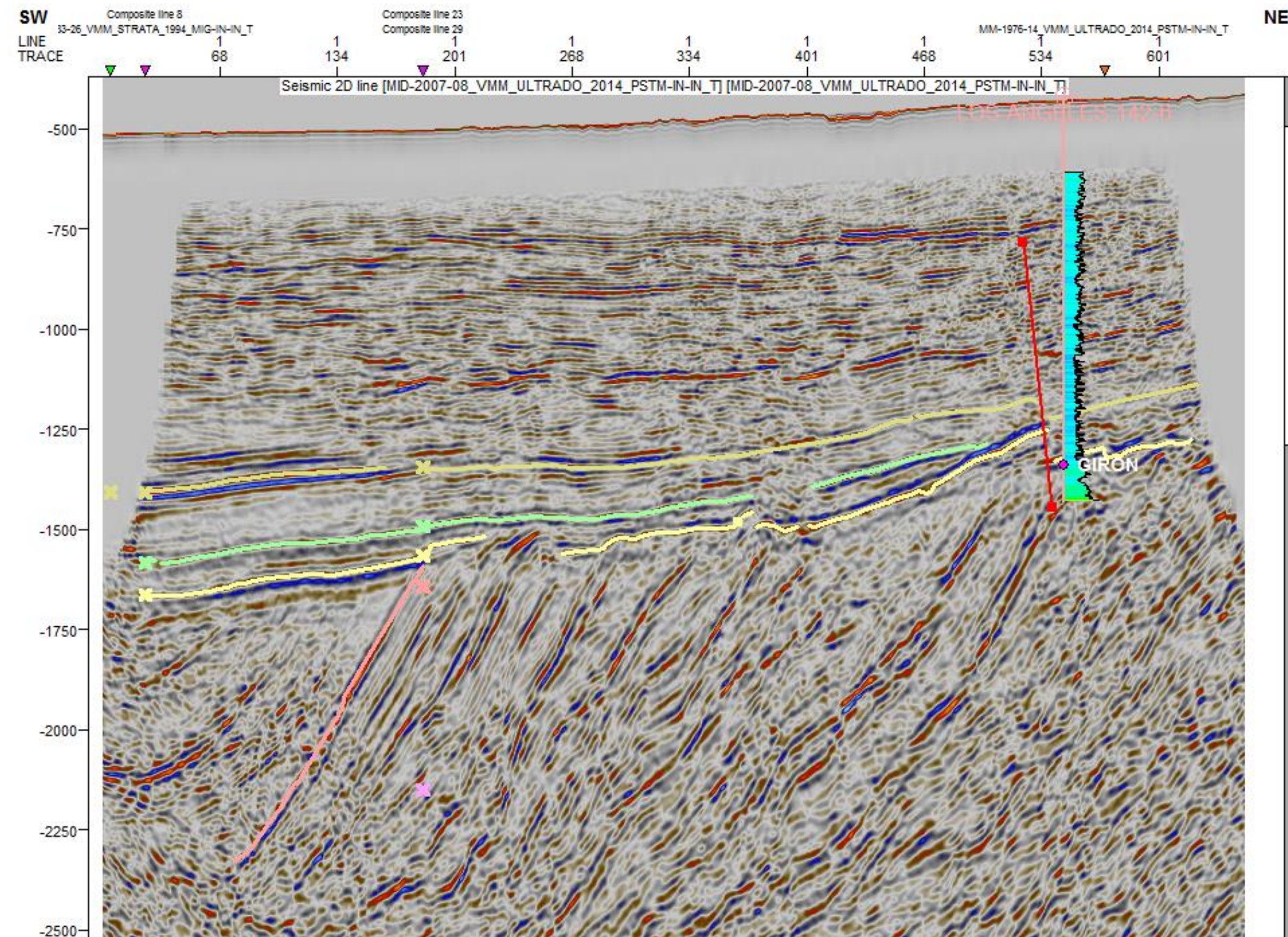




# Wells

## Los Ángeles 142-6 (1952) (TD 3905')

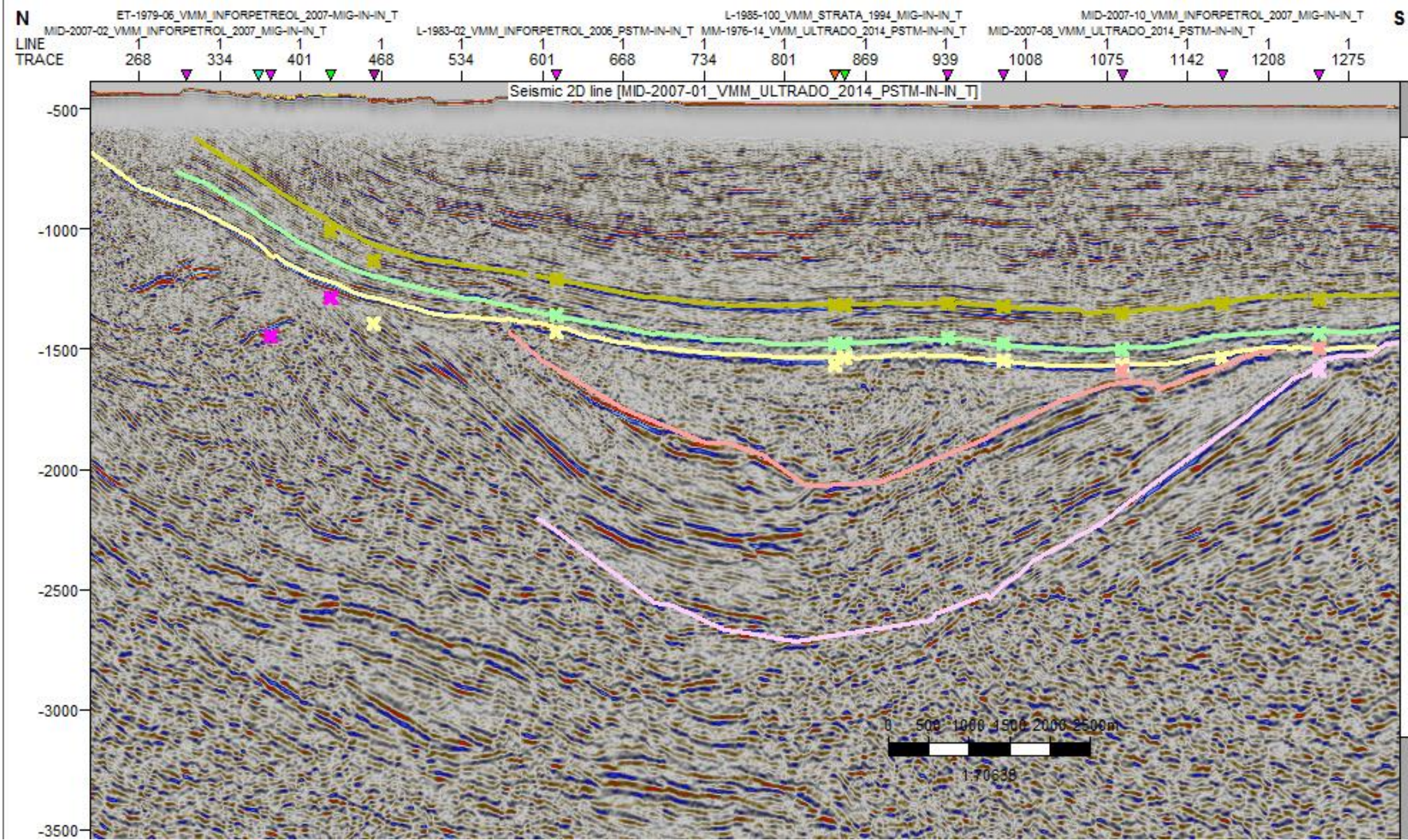
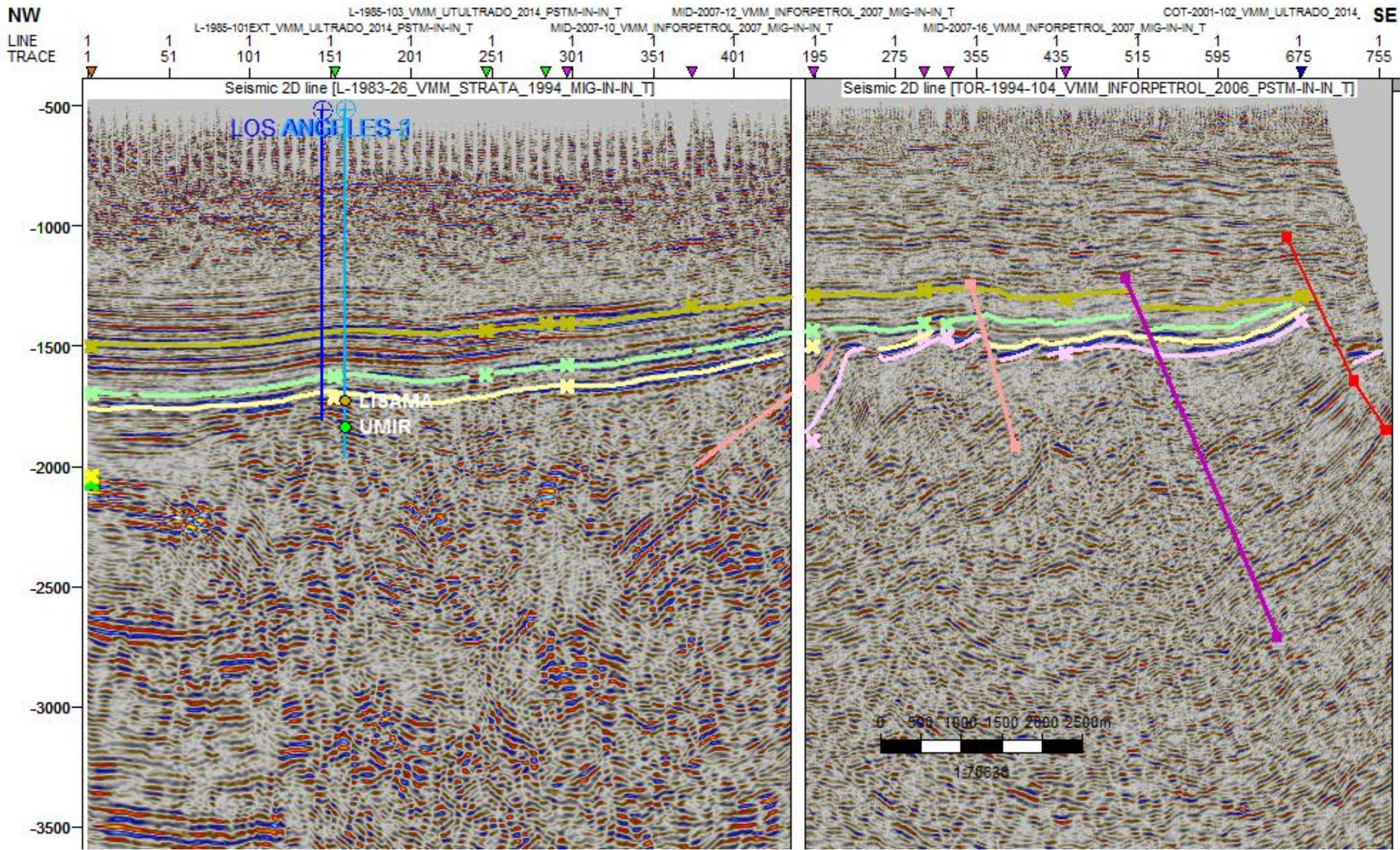
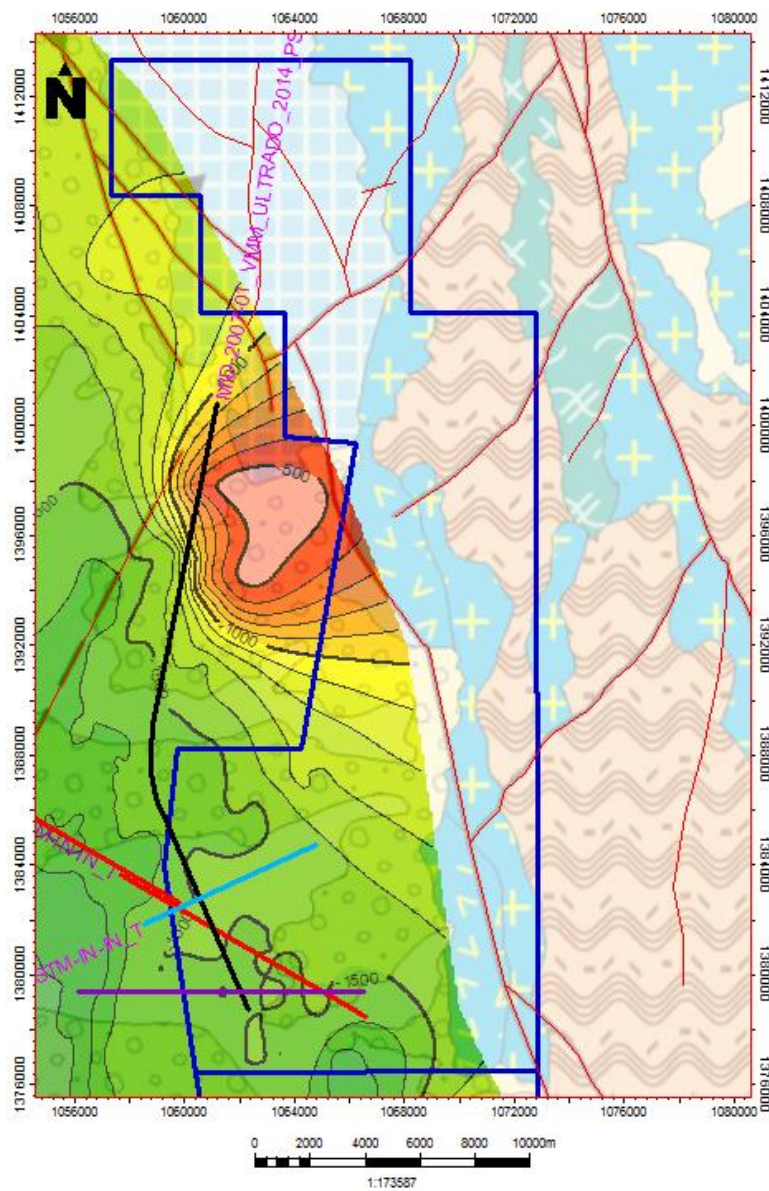
- Drilled by International Petroleum Limited.
- This well reached the basement (Girón Fm), but the petroliferous formations were not found.
- Status: Dry. Plugged and abandoned.





# SEISMIC INTERPRETATION

- PLAYS
- Stratigraphic: Truncation of Lisama Formation against the Eocene Unconformity.





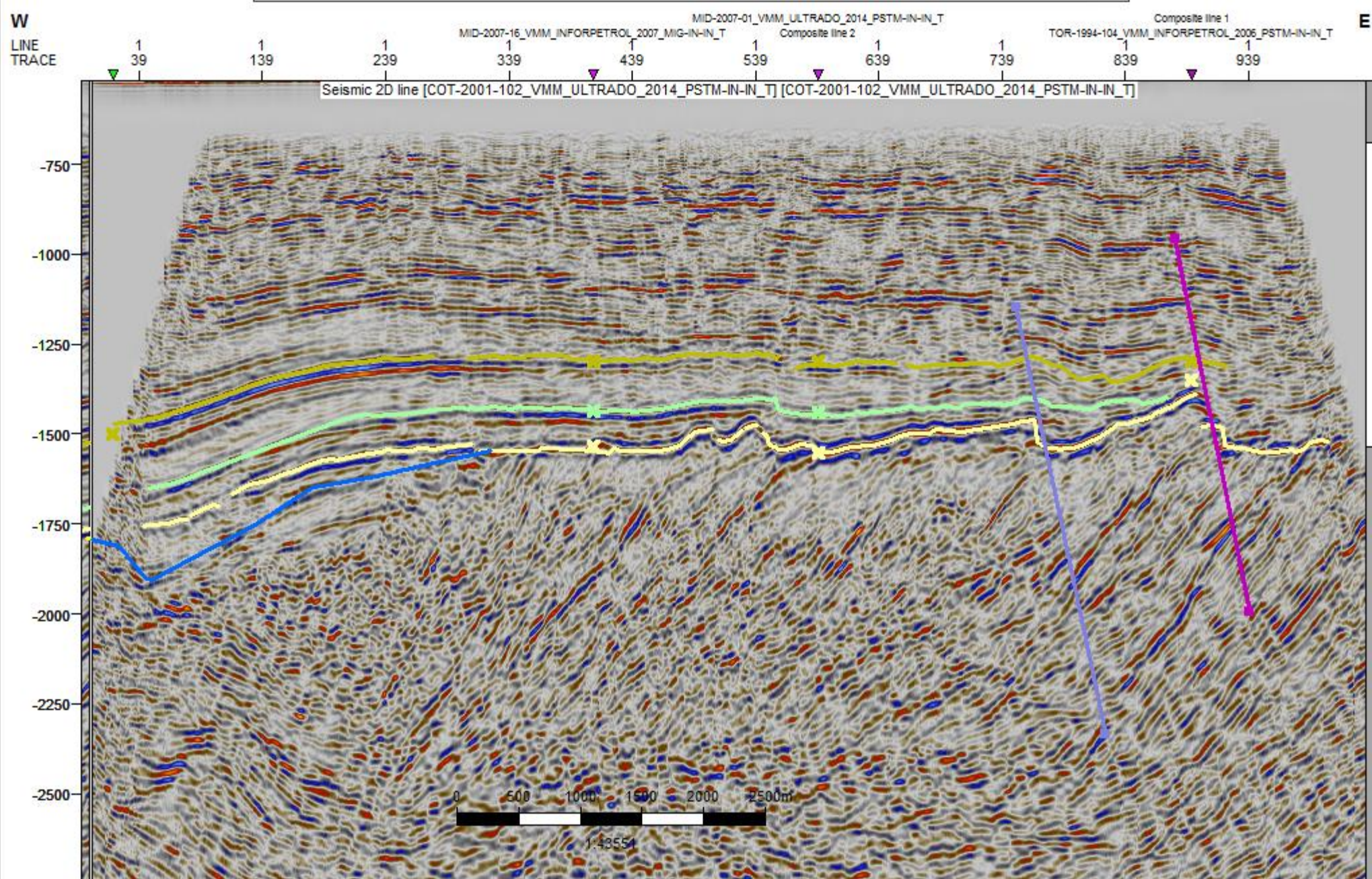
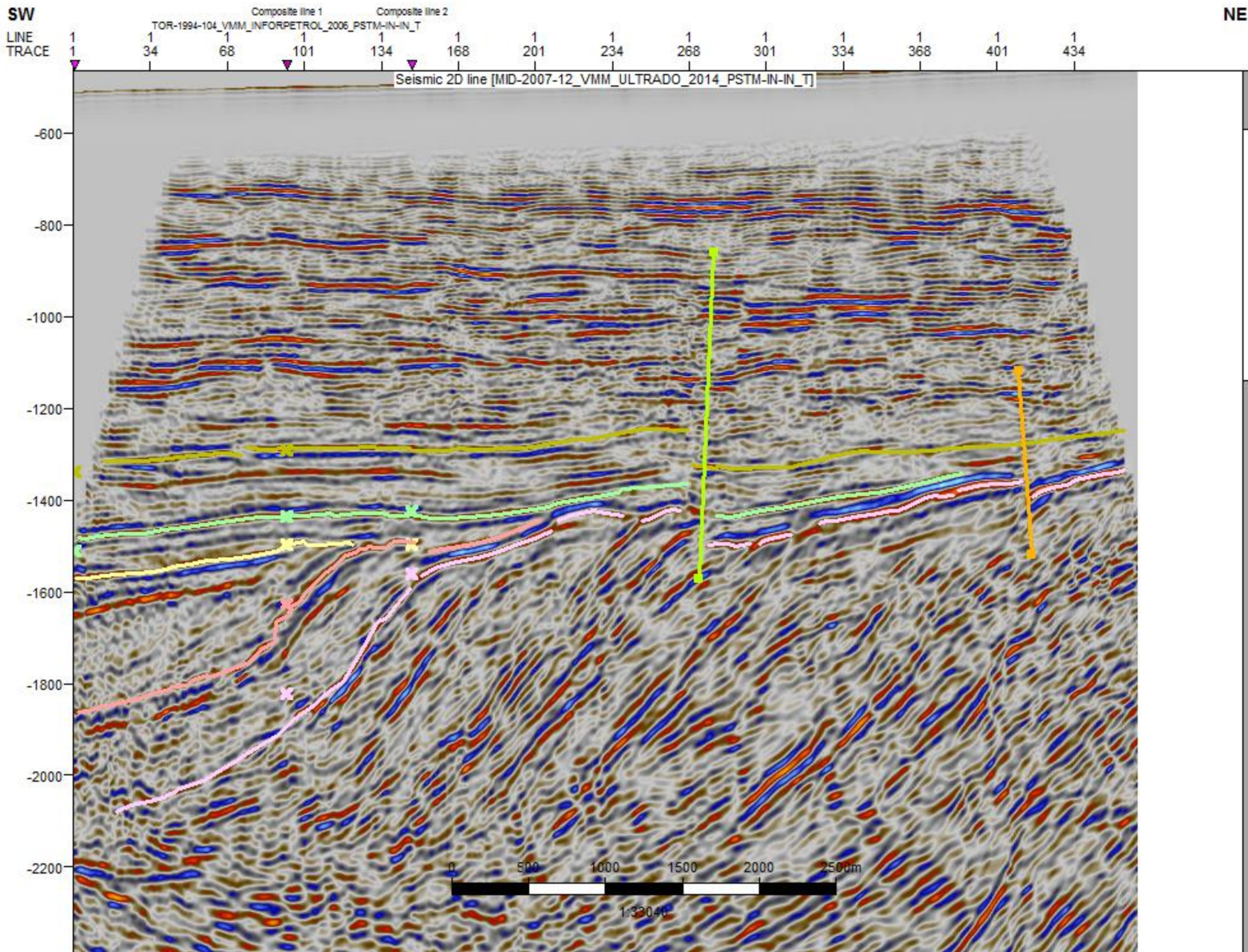
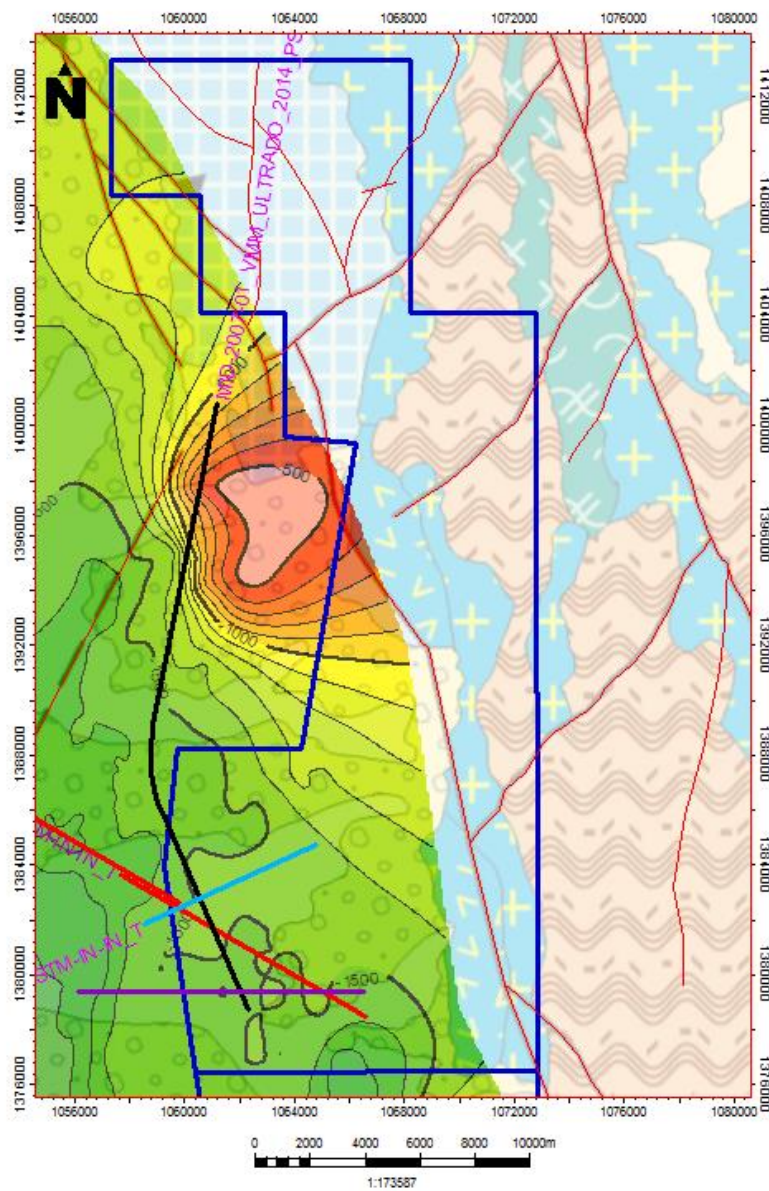
# SEISMIC INTERPRETATION

- PLAYS
- Structural and stratigraphic



El futuro es de todos

Minenergía

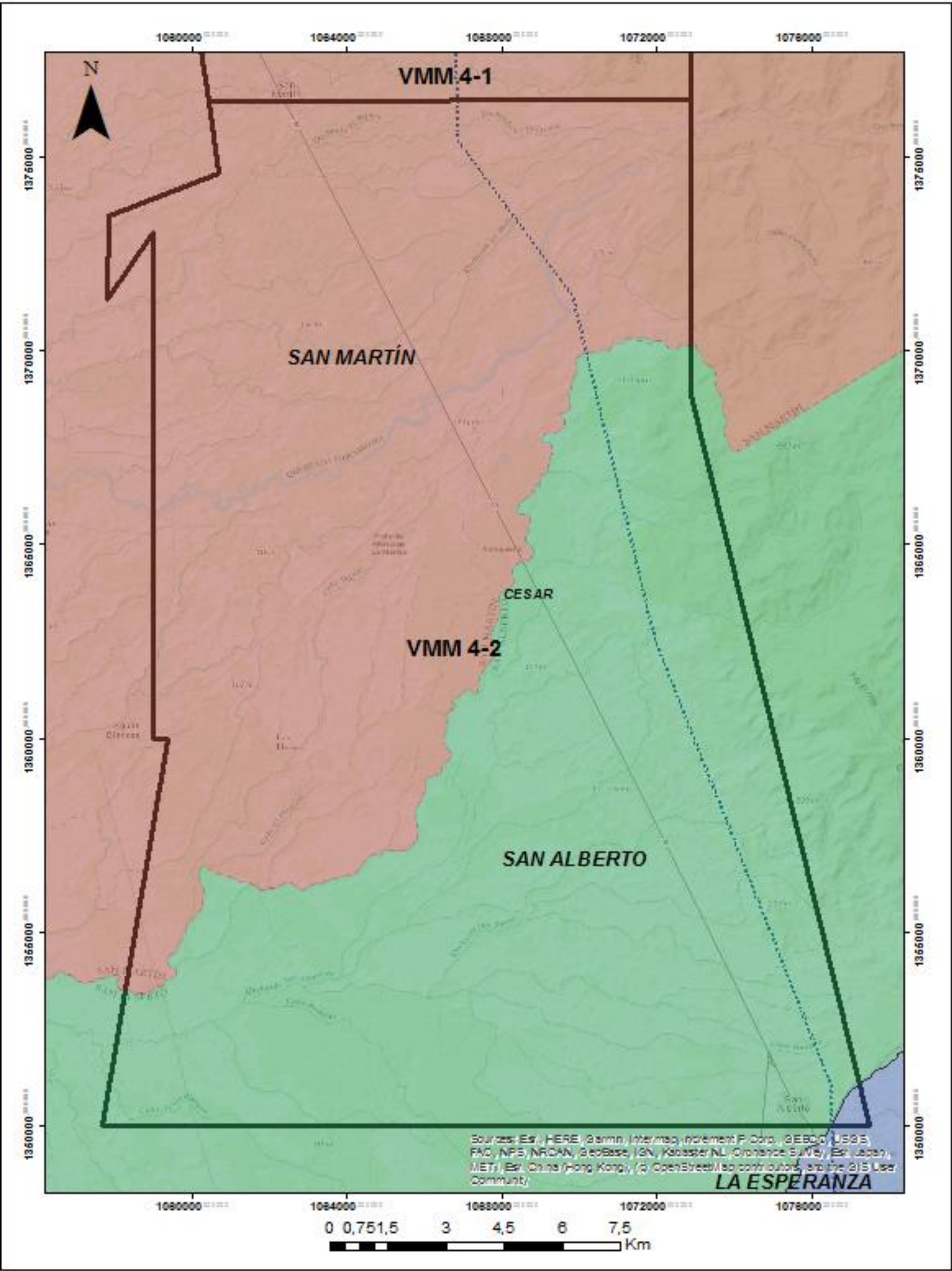
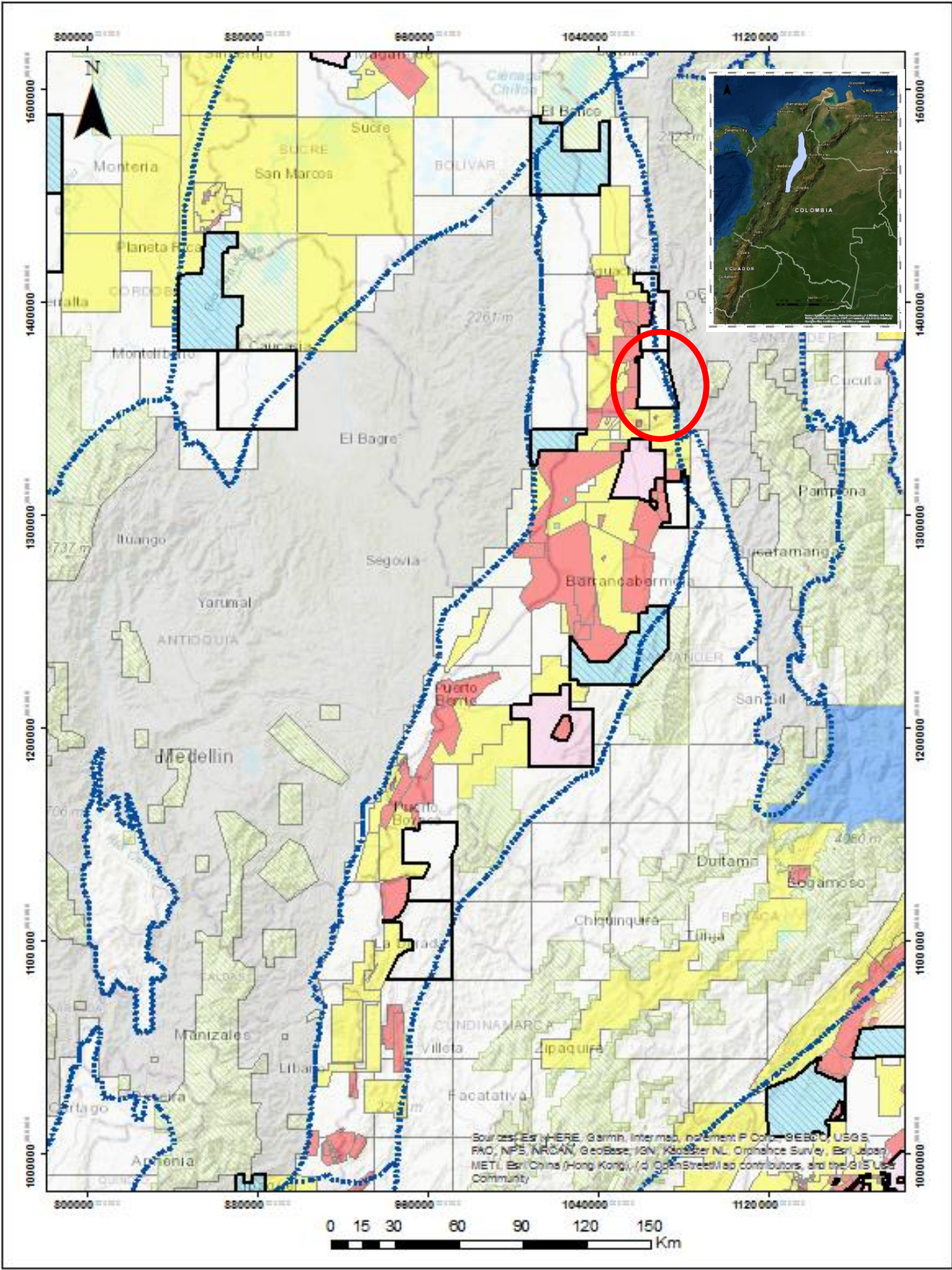




# INCORPORATED AREA VMM 4-2



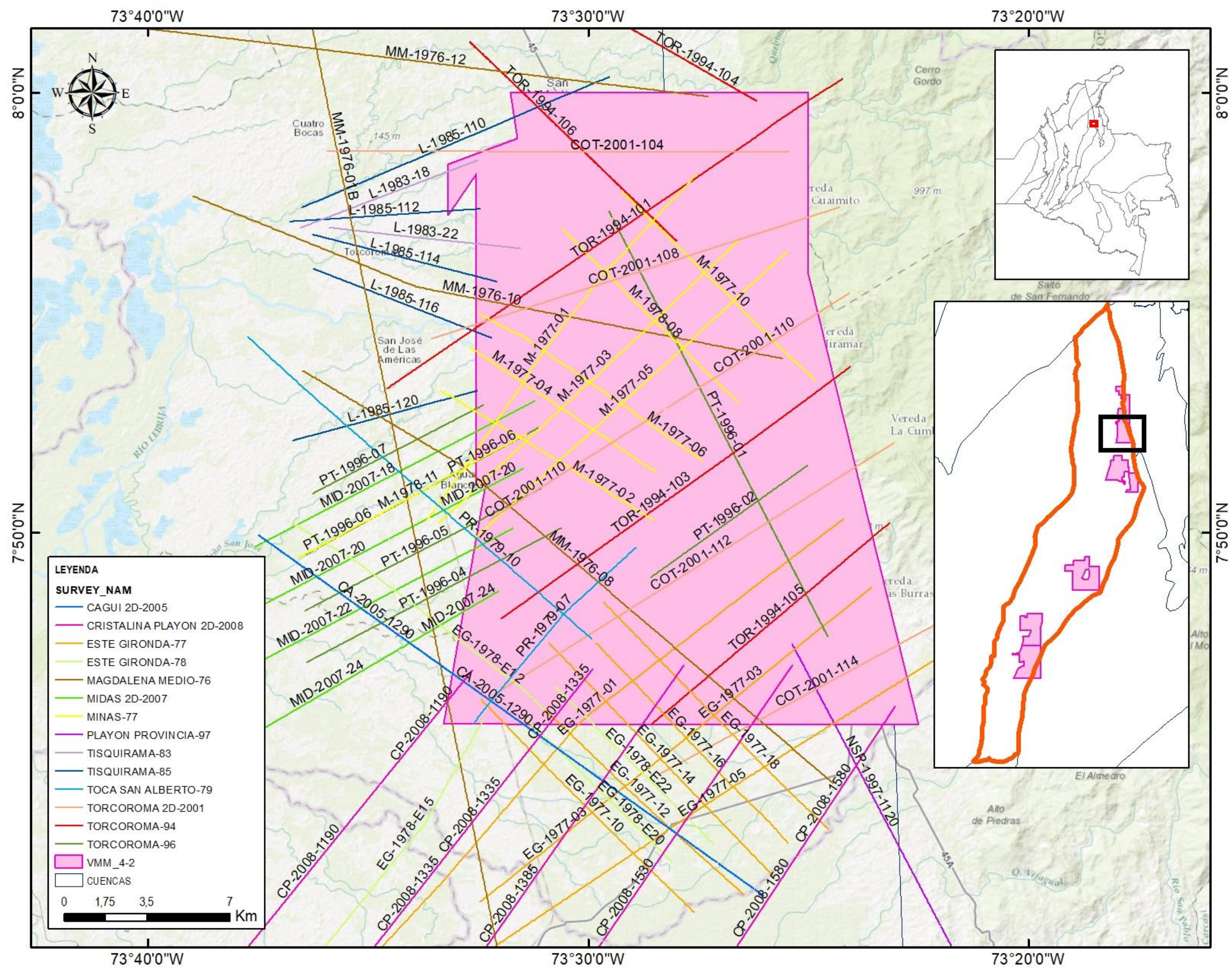
# LOCATION



- **Area:** 41394,55 Ha
- **Municipalities:** San Martín, San Alberto, and La Esperanza.
- **Departments:** Cesar, Norte de Santander.



# DATABASE : 2D Seismic

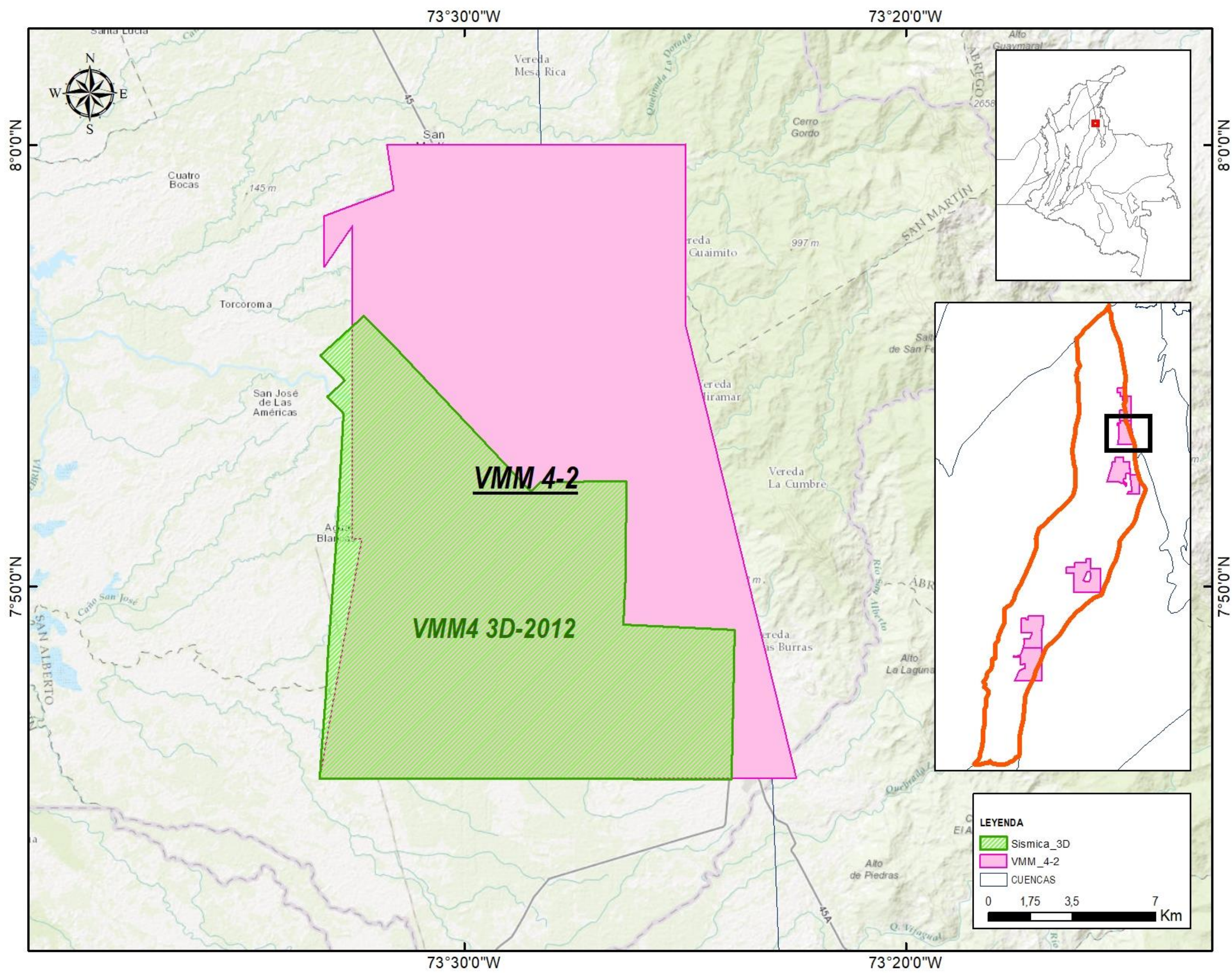


## SEISMIC

- **2D Seismic Surveys:** (14 surveys)
- Cagui 2D-2005
- Cristalina Playón 2D-2008
- Este Gironda-77
- Este Gironda-78
- Magdalena Medio-76
- Midas 2D-2007
- Minas-77
- Playón Provincia-97
- Tisquirama-83
- Tisquirama-85
- Toca – San Alberto-79
- Torcorama 2D-2001
- Torcorama-94
- Torcorama-96
- **Total length in the area:**  
**399,63 Km**



# DATABASE : 3D Seismic

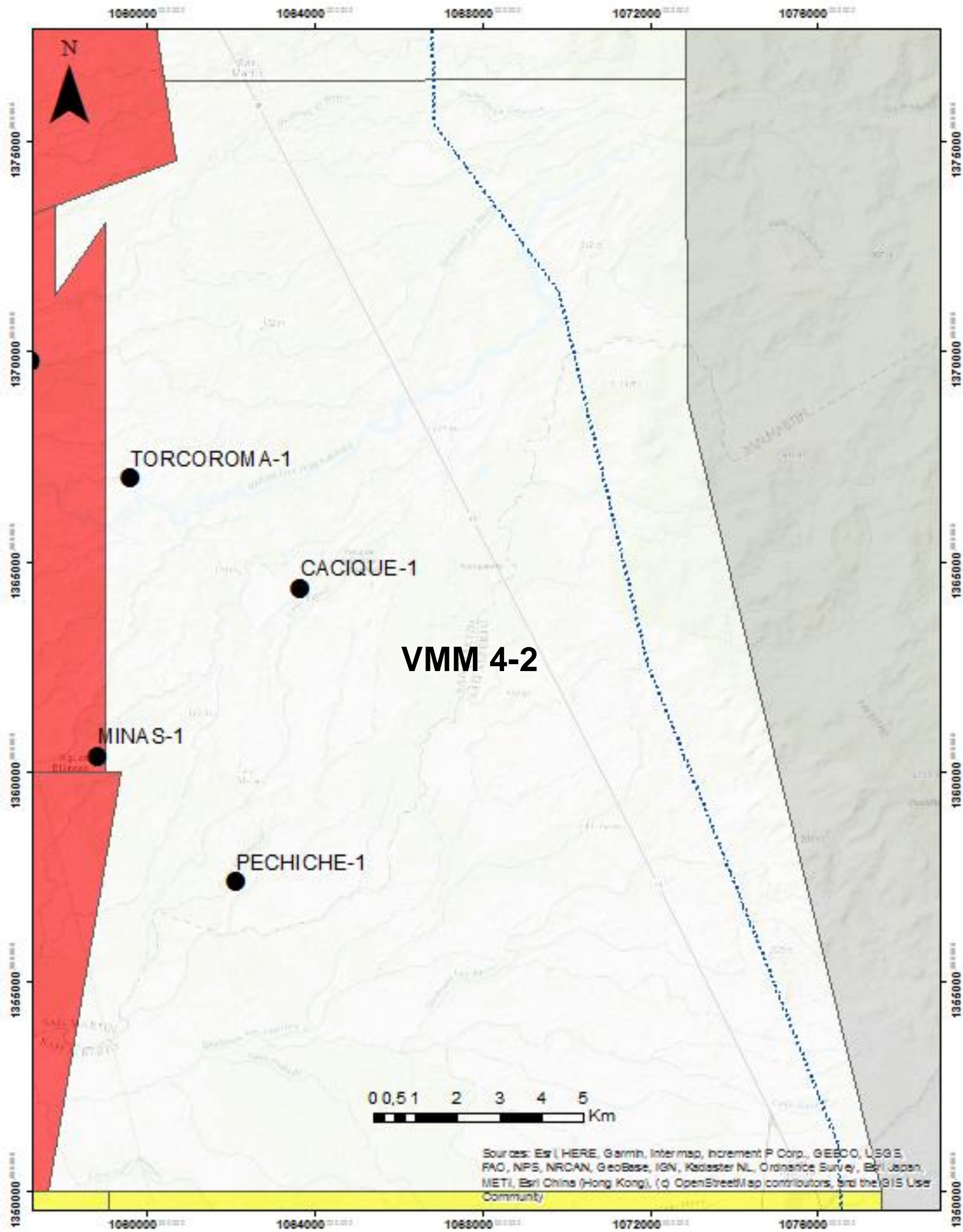
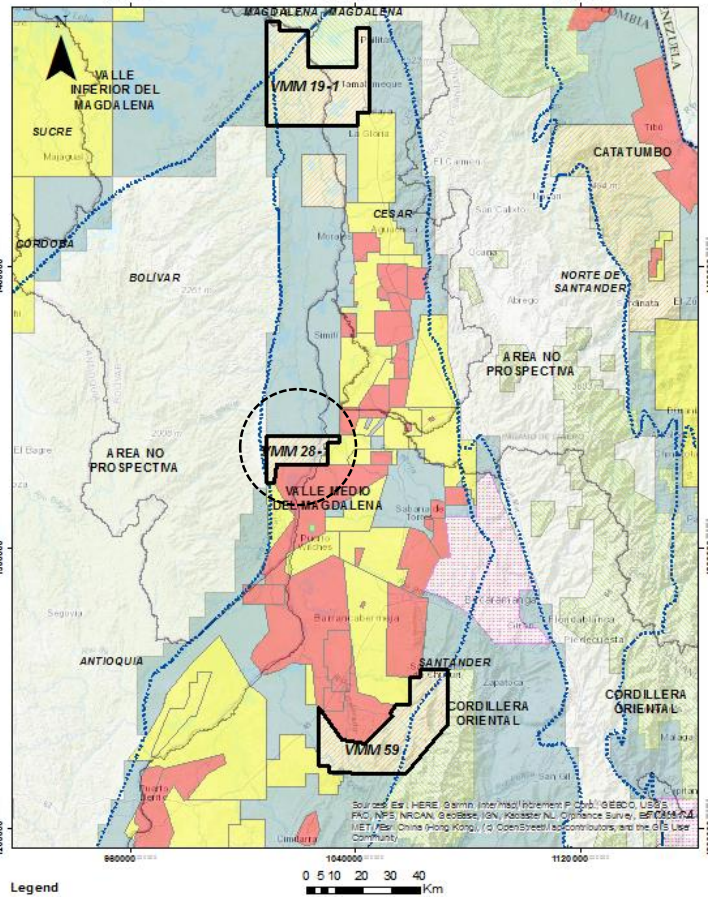


- 3D Seismic:

SURVEY	AREA (Km²)
VMM4 3D-2011	200,23



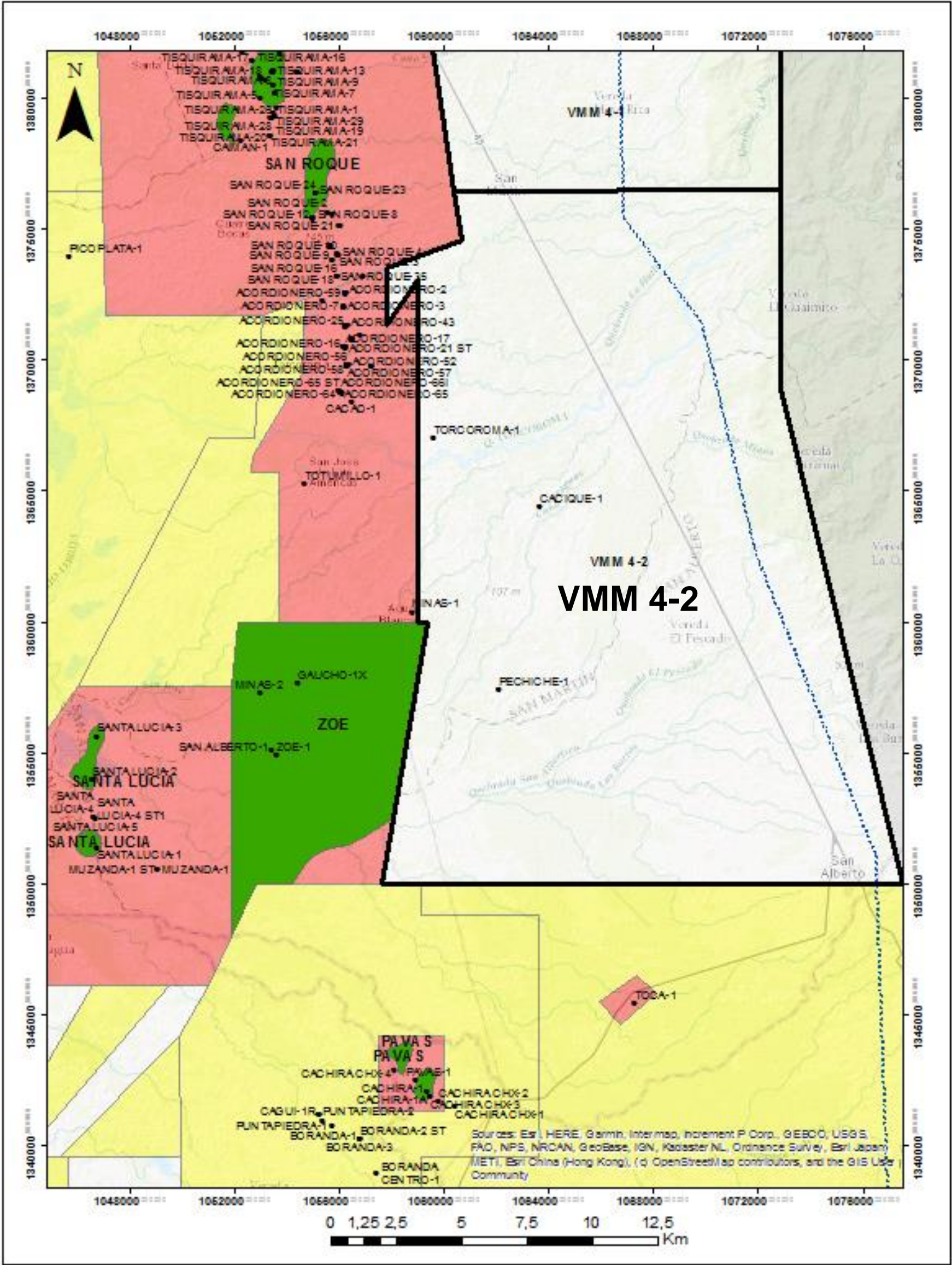
# DATABASE : Wells



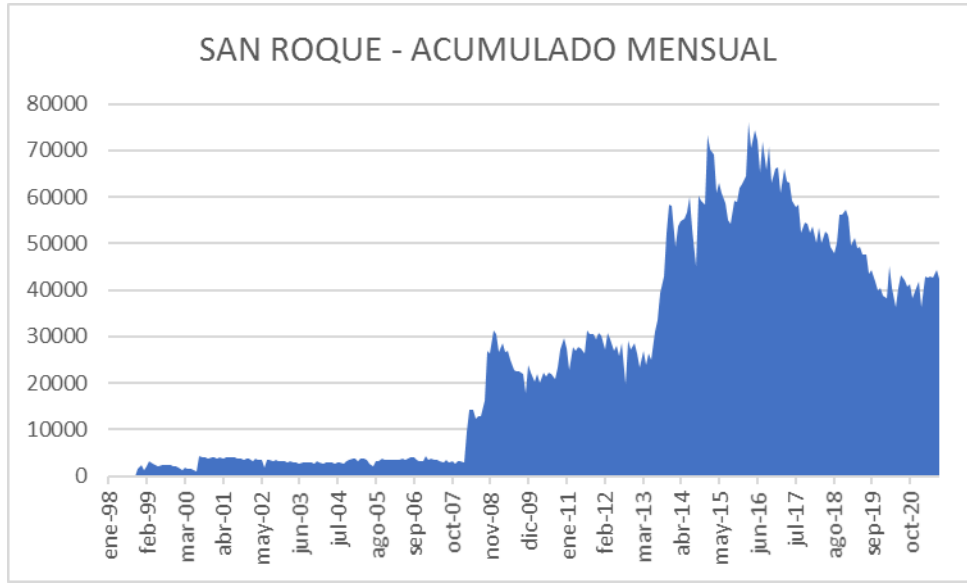
WELL NAME	MD (ft)	DATE	OPERATING COMPANY
MINAS-1	8285	1961	INTERCOL
TORCORAMA-1	7859	1965	TEXAS PETROLEUM COMPANY
CACIQUE-1	6547	2018	LA LUNA
PECHICHE-1	10348	2018	LA LUNA



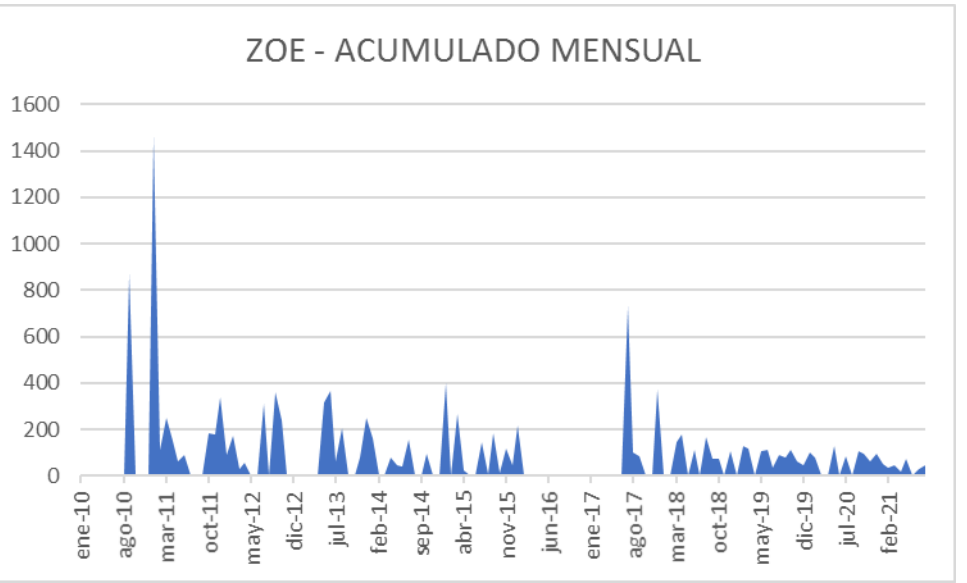
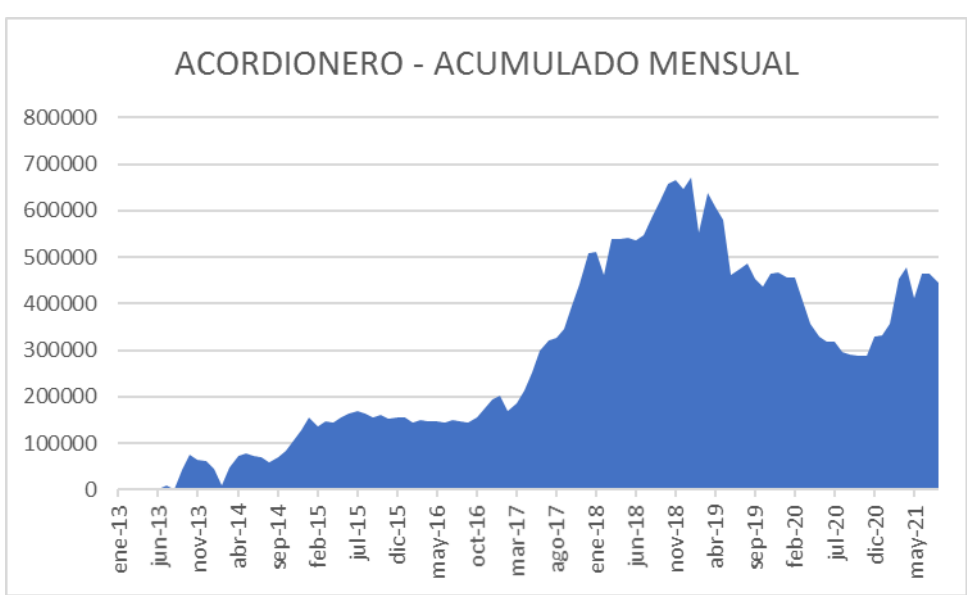
NEAR FIELDS



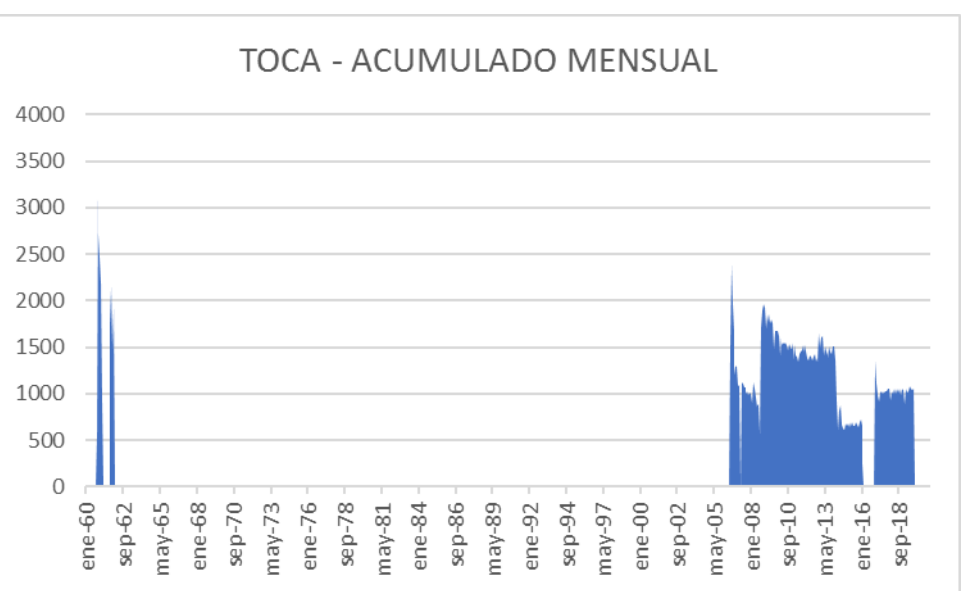
Cumulative Production: 7,13 MMBO



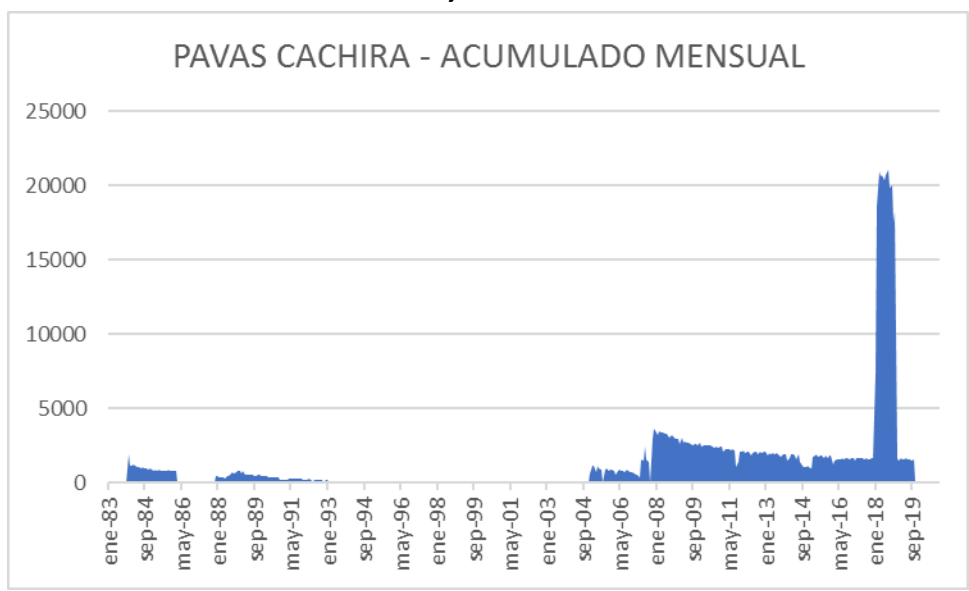
Cumulative Production: 29,17 MMBO



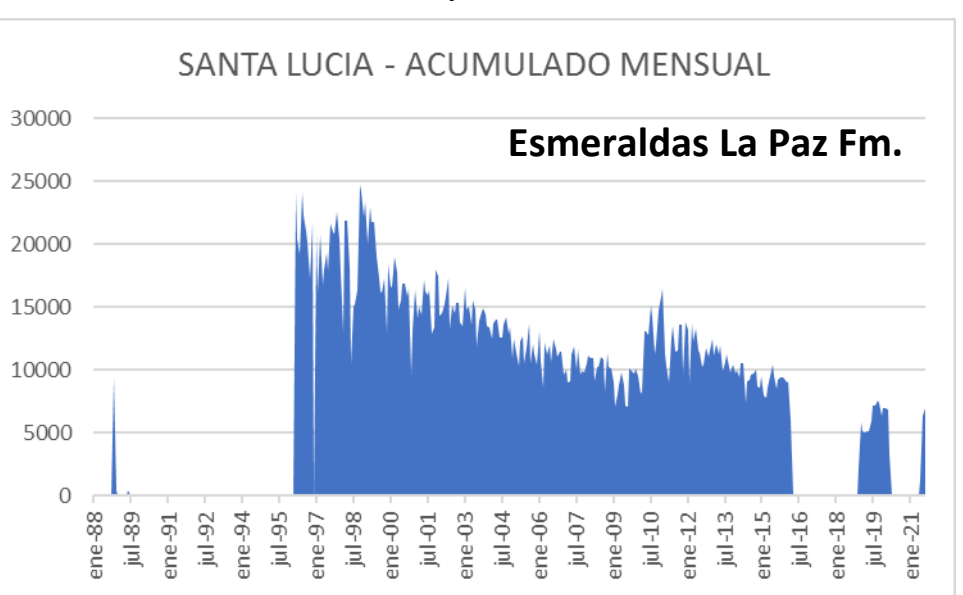
Cumulative Production: 0,20 MMBO



Cumulative Production: 0,574 MMBO



Cumulative Production: 3,32 MMBO





# Wells

## Torcorama-1 (1965) (TD 7859')

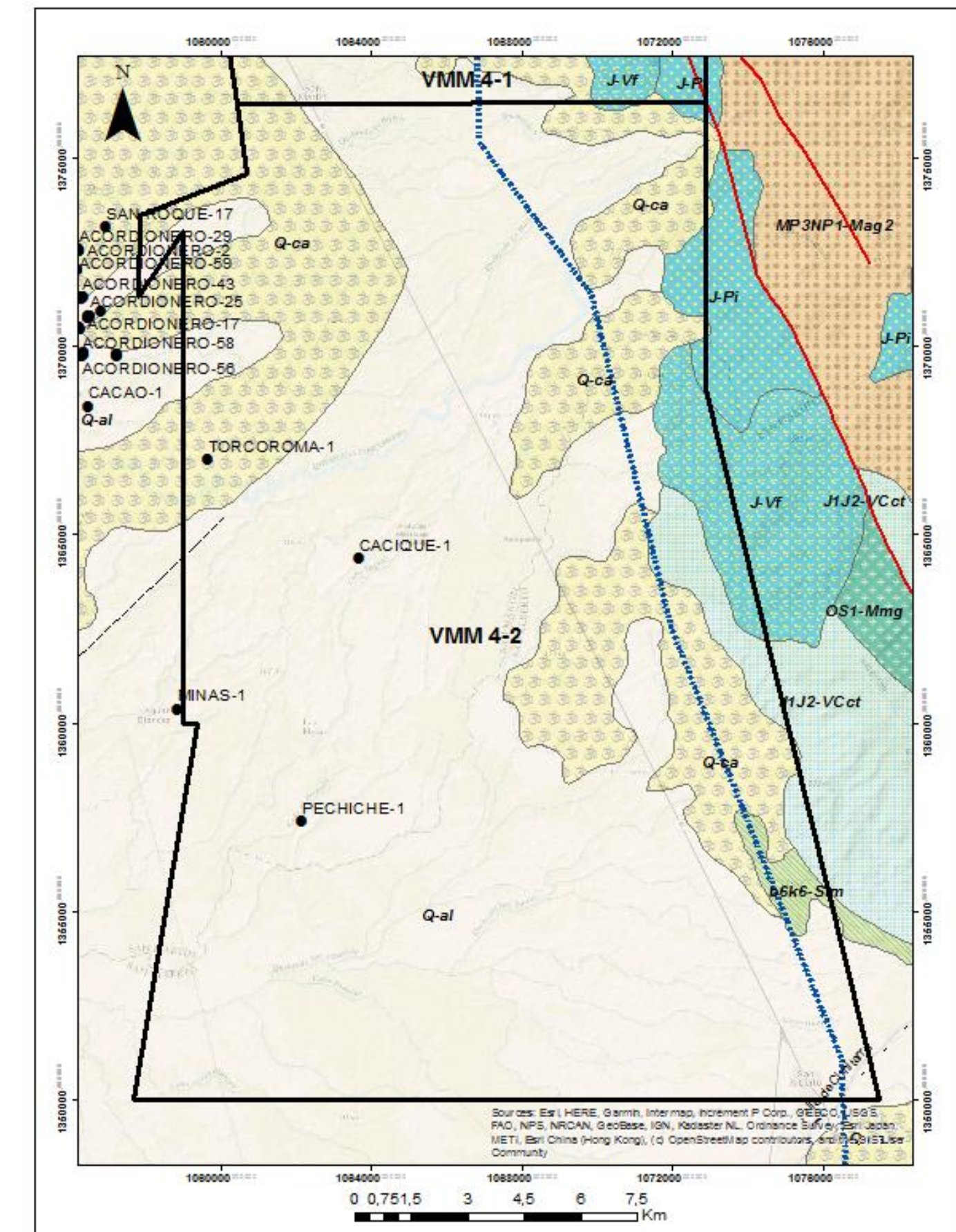
- Drilled by Texas Petroleum Company. Ecopetrol. Trap: faulted anticline. Target: Basal sands of the Chorro Group and Lisama
- Negative production tests. There were only methane gas shows in the lower intervals (>6000 ft).
- Status: Dry. Plugged and abandoned.

## Cacique-1 (2018) (TD 6547')

- Drilled by La Luna Company. Trap: closure against fault. Target: Basal sands of the Chorro Group.
- Cacique-1 drilled Real, Colorado and Esmeraldas Formations.
- Based on the petrophysical evaluation carried out, it is concluded that the CACIQUE-1 well is 100% saturated in water.

## Pechiche-1 (2018) (TD 10348')

- Drilled by La Luna Company. Trap: Stratigraphic. Target: Lisama sandstones and secondary target: Grupo Chorro sandstones.
- Petrophysical evaluation: Areas without hydrocarbons accumulation, the rock is 100% saturated in water. Oil manifestations were very poor showing residual oil in the Lower Lisama sandstones.
- The upper sands do not showed oil manifestations and the second packet showed traces at 10% of spotty black to dark brown oil staining. The shows were rated as very poor residual oil (TAR).



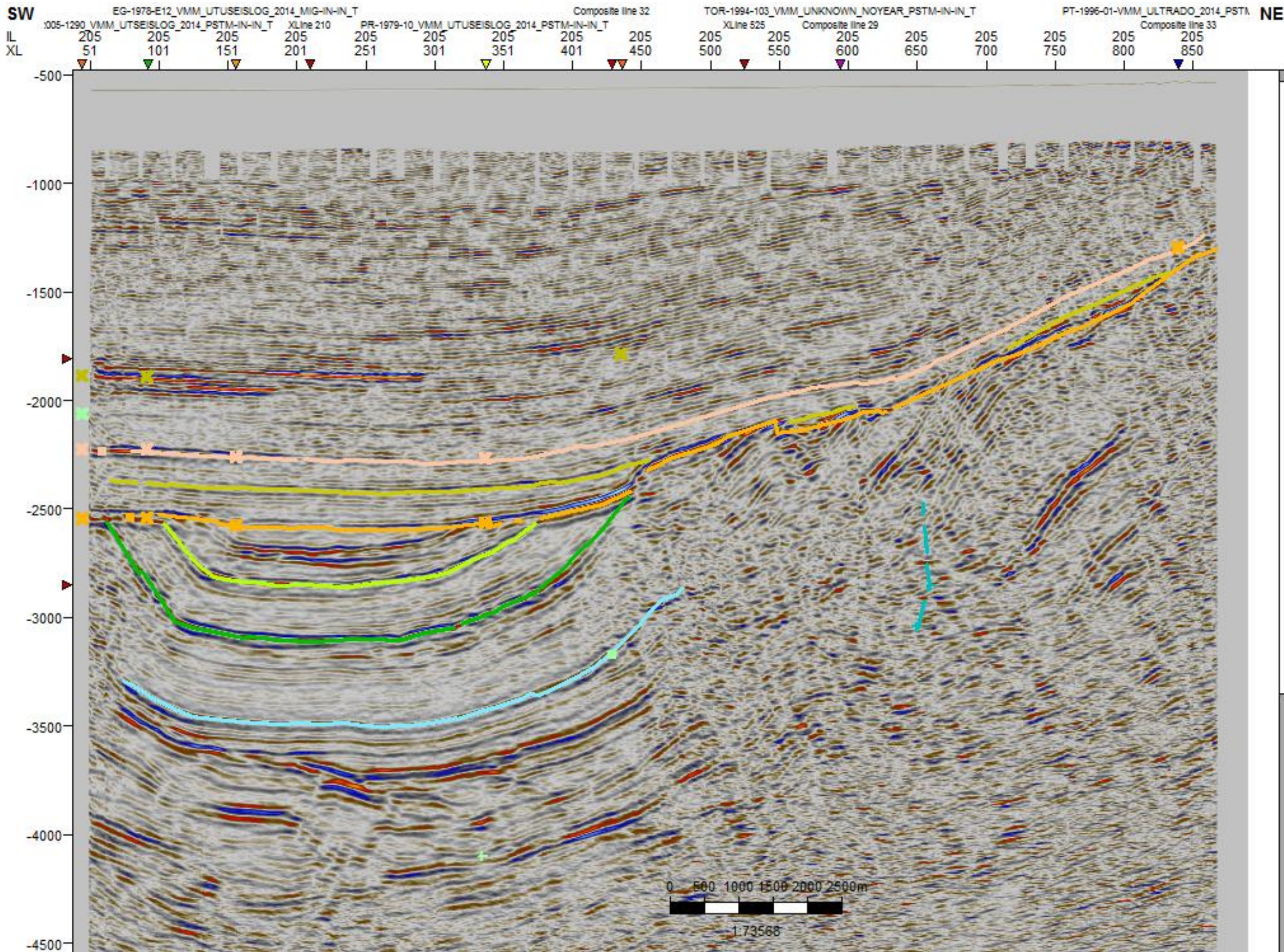
### GEOLOGICAL UNITS

Q-al	
Q-ca	
Q-t	
Q1-ca	
Q2-l	
N2Q1-VCc	Mesa Fm.
n4n6-Sc	Real Group
e8n3-Sc	Chuspas Group
e6e8-Sc	Chorro Group
E1-Sc	Lisama Fm.
b6k6-Stm	La Luna
b2b6-Sm	Simiti Fm.
b1-Sct	Tambor Fm.

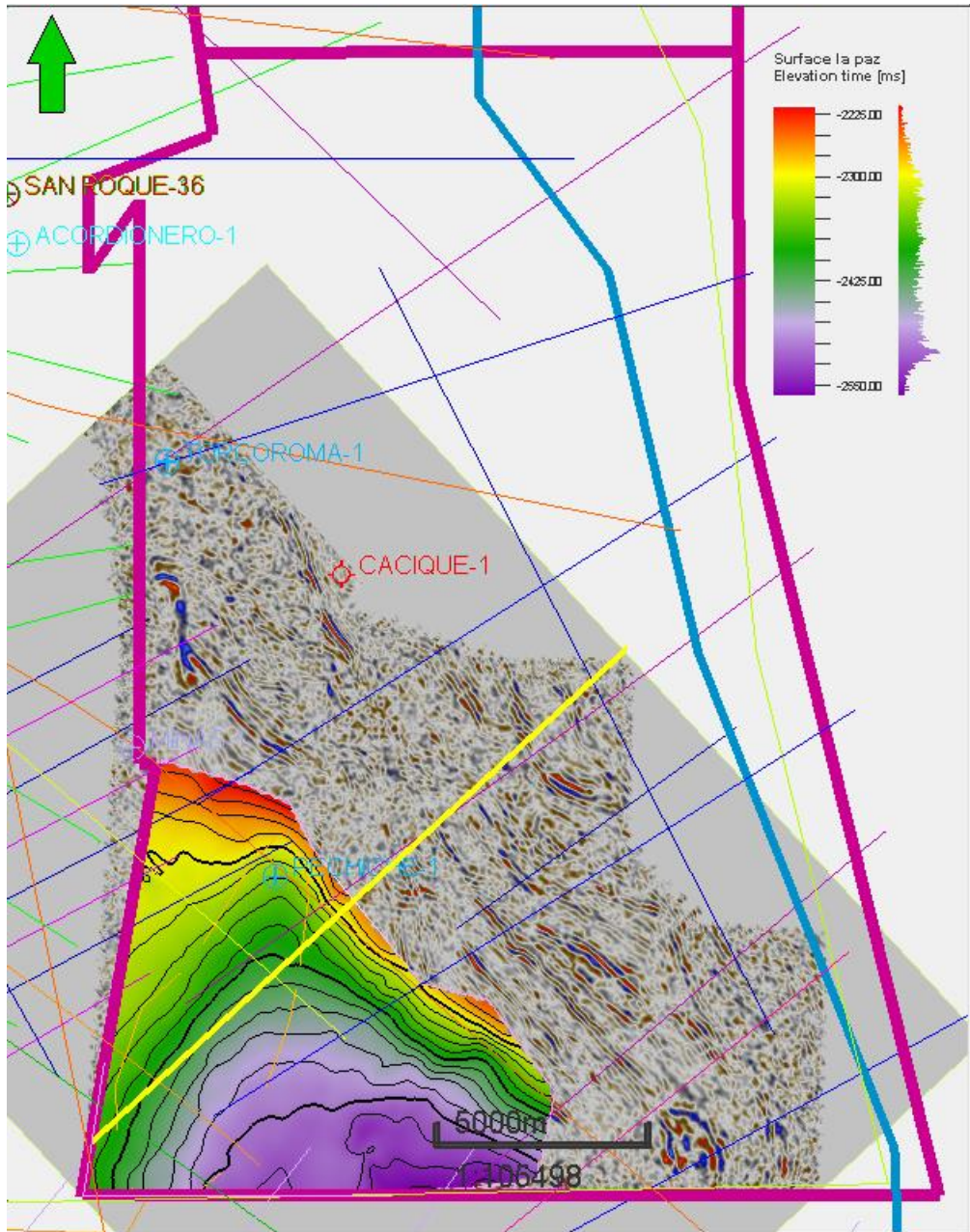


# SEISMIC INTERPRETATION

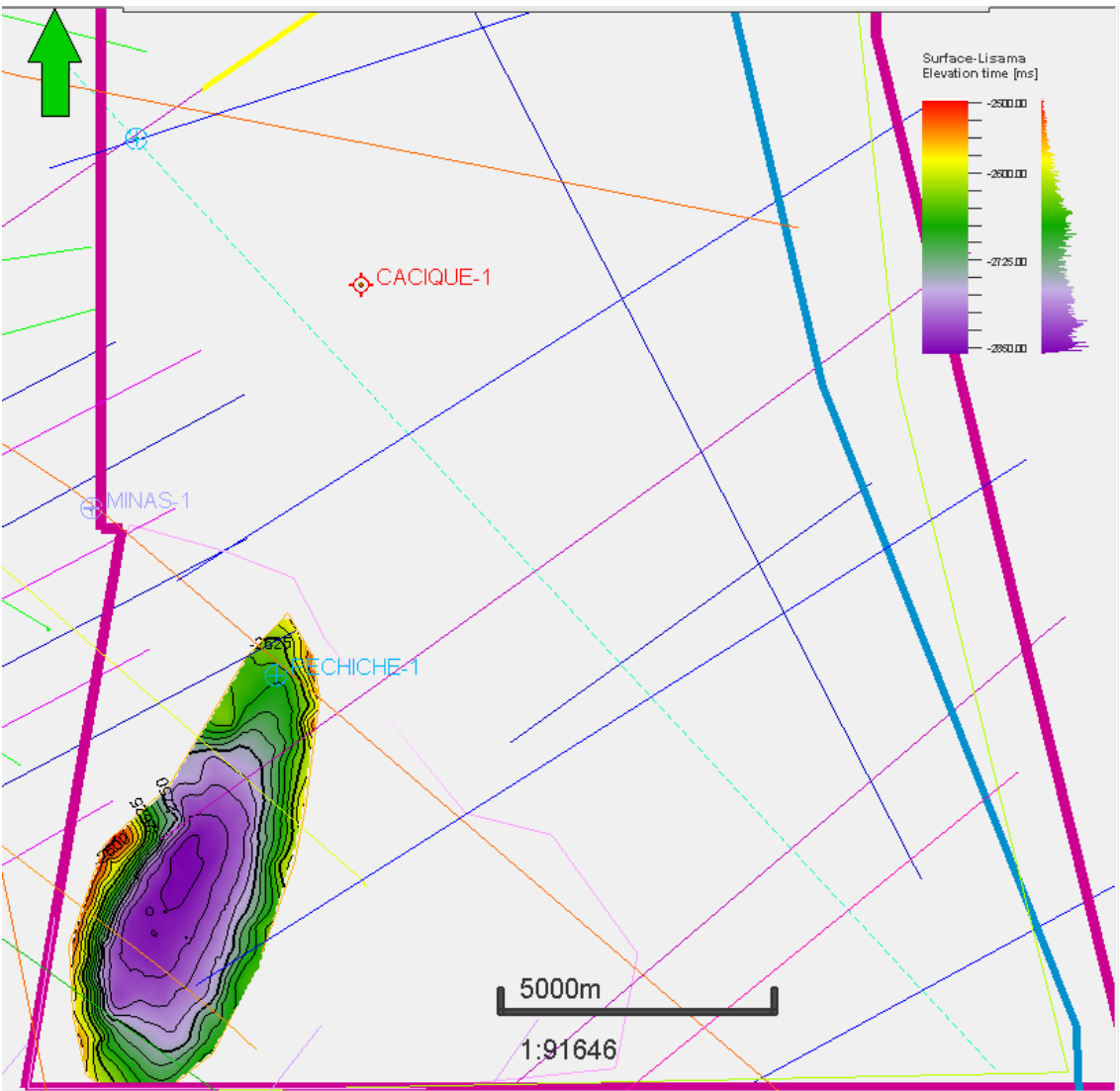
- PLAYS
- Lisama Truncation against Eocene Unconformity
- Onlap patterns of Esmeraldas – La Paz Formation



TWT Map Esmeraldas – La Paz Fm



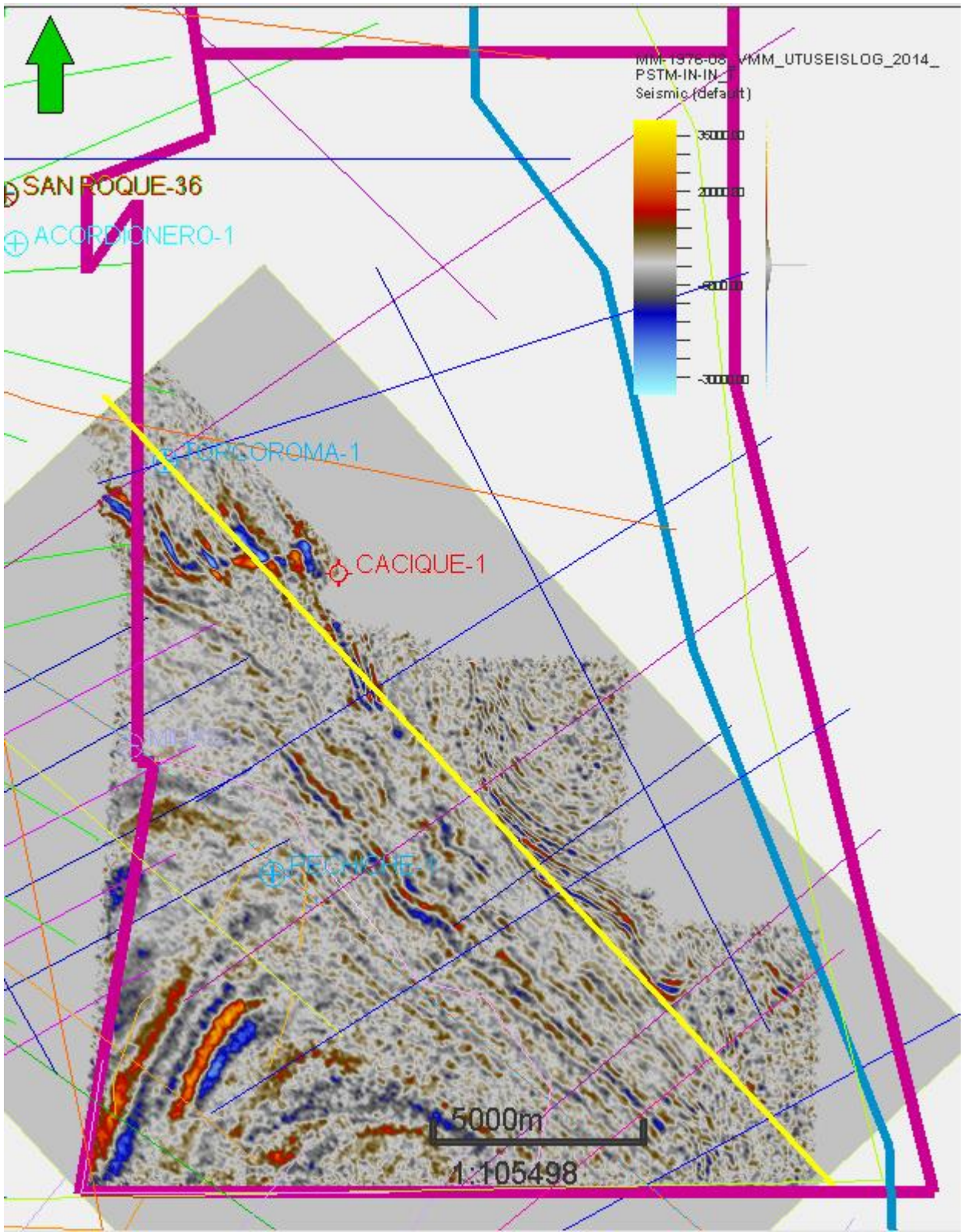
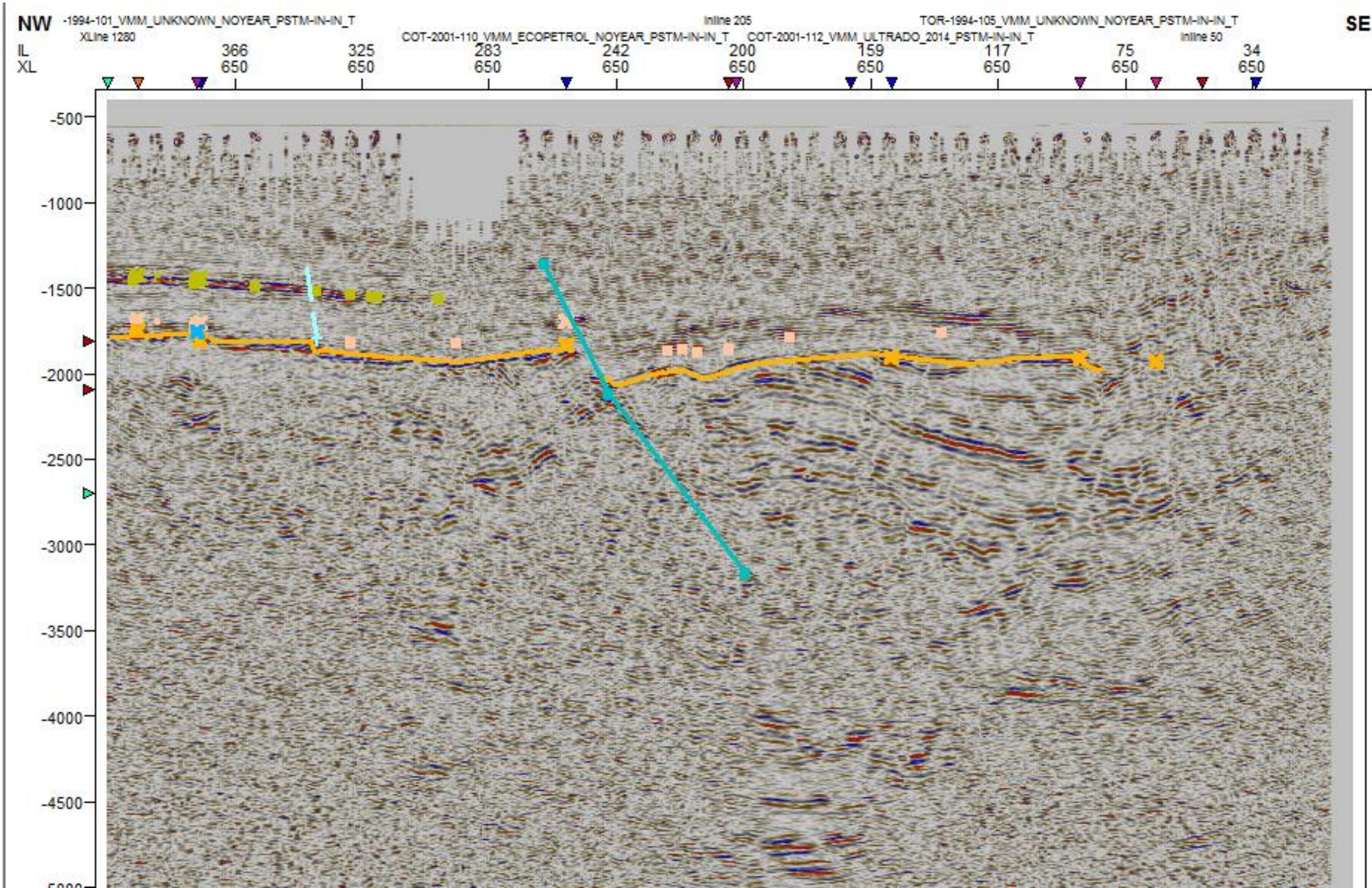
TWT Map Lisama Formation





# SEISMIC INTERPRETATION

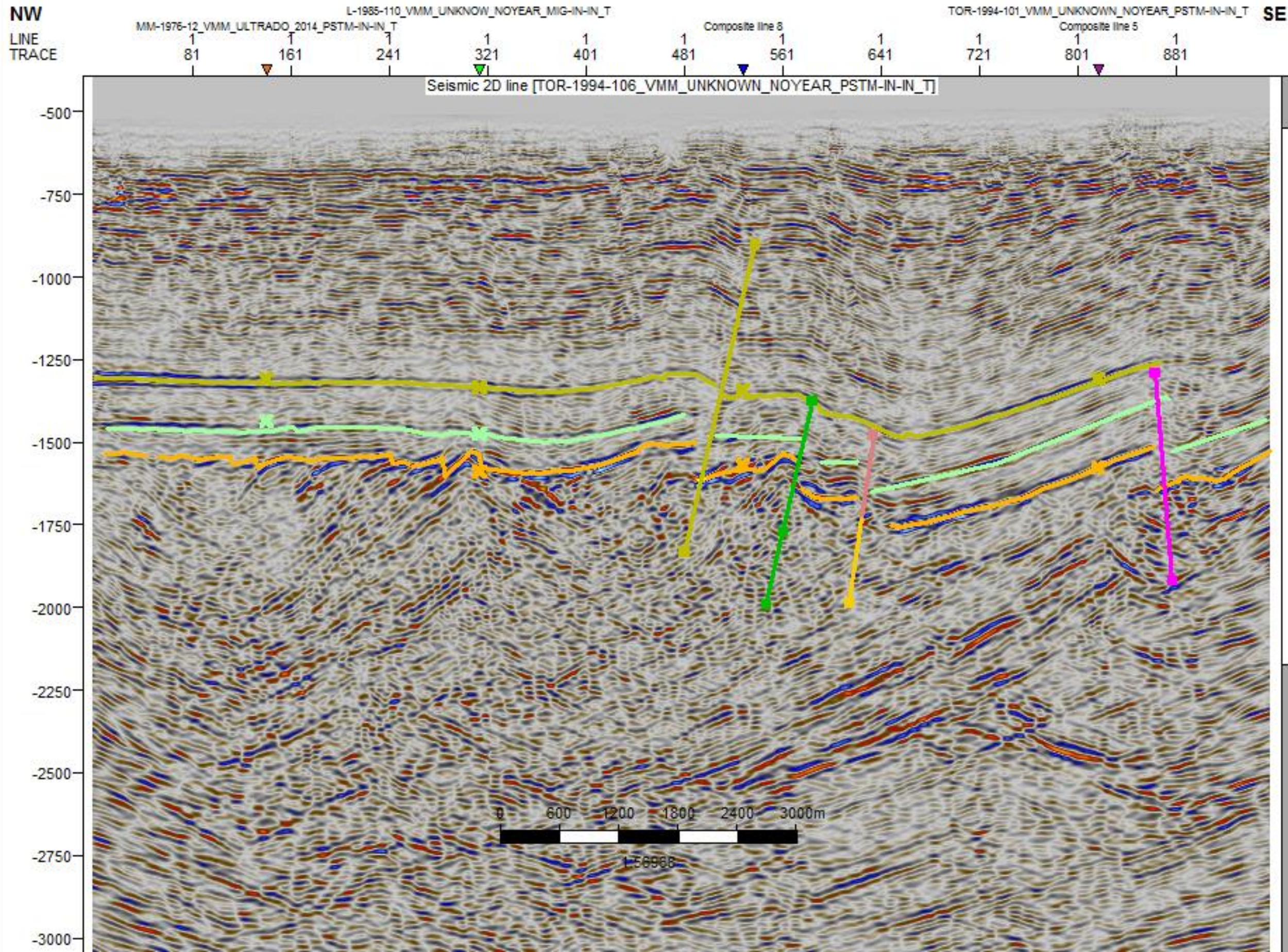
- PLAYS
- Anticline structure below Eocene Unconformity.



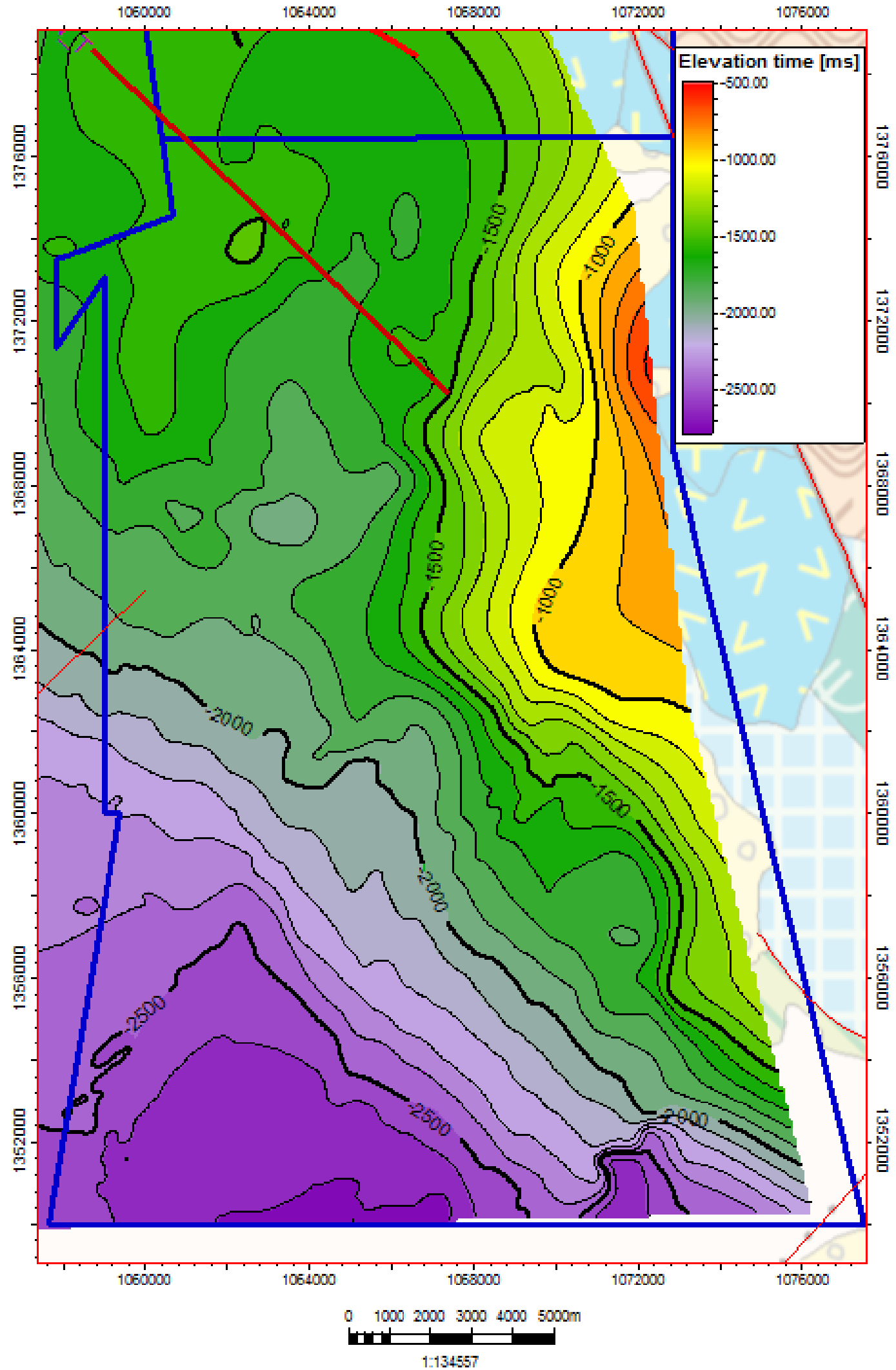


# SEISMIC INTERPRETATION

- PLAYS
- Structural plays: Closures against faults, where the target could be corresponds to Basal sands of the Chorro Group..



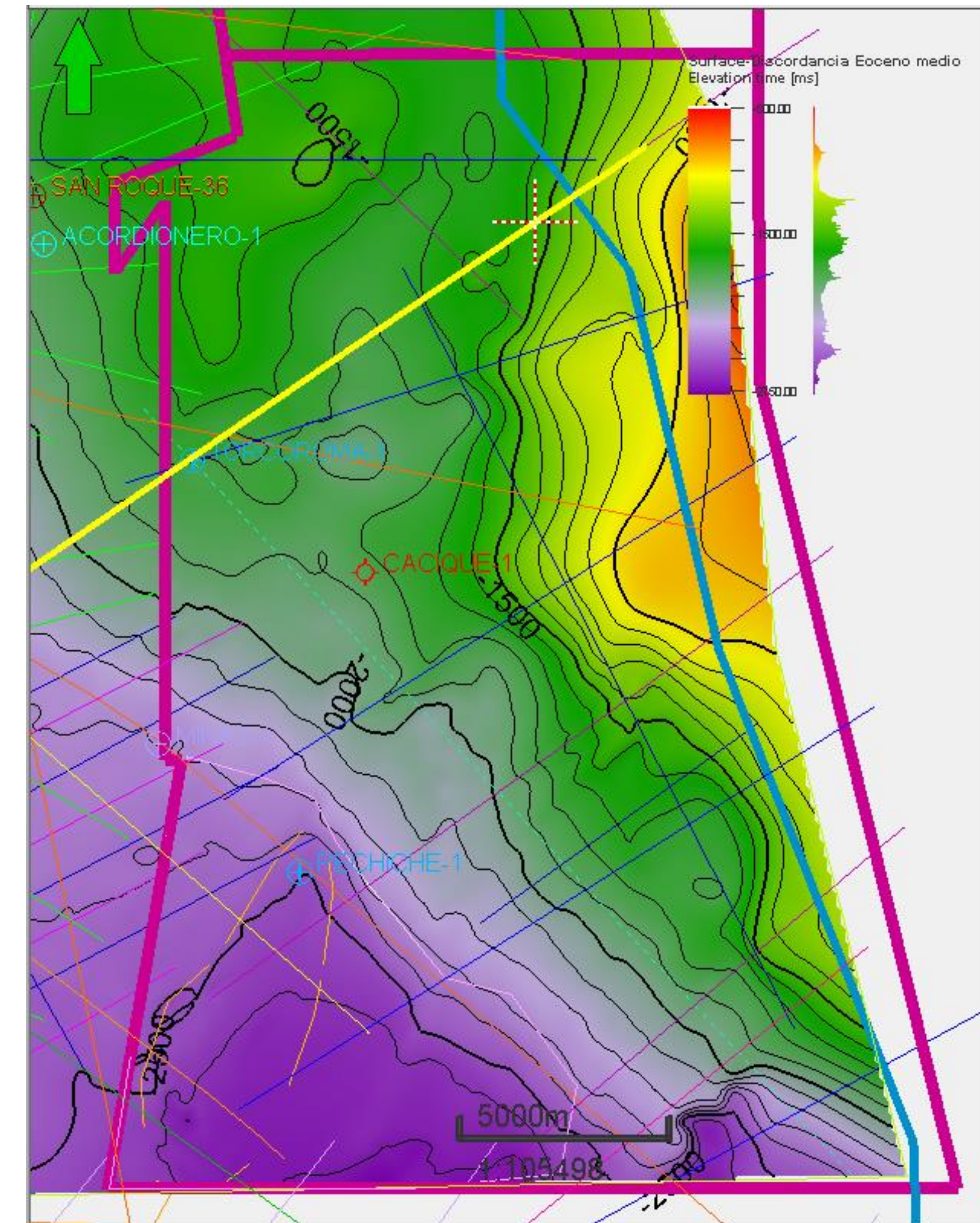
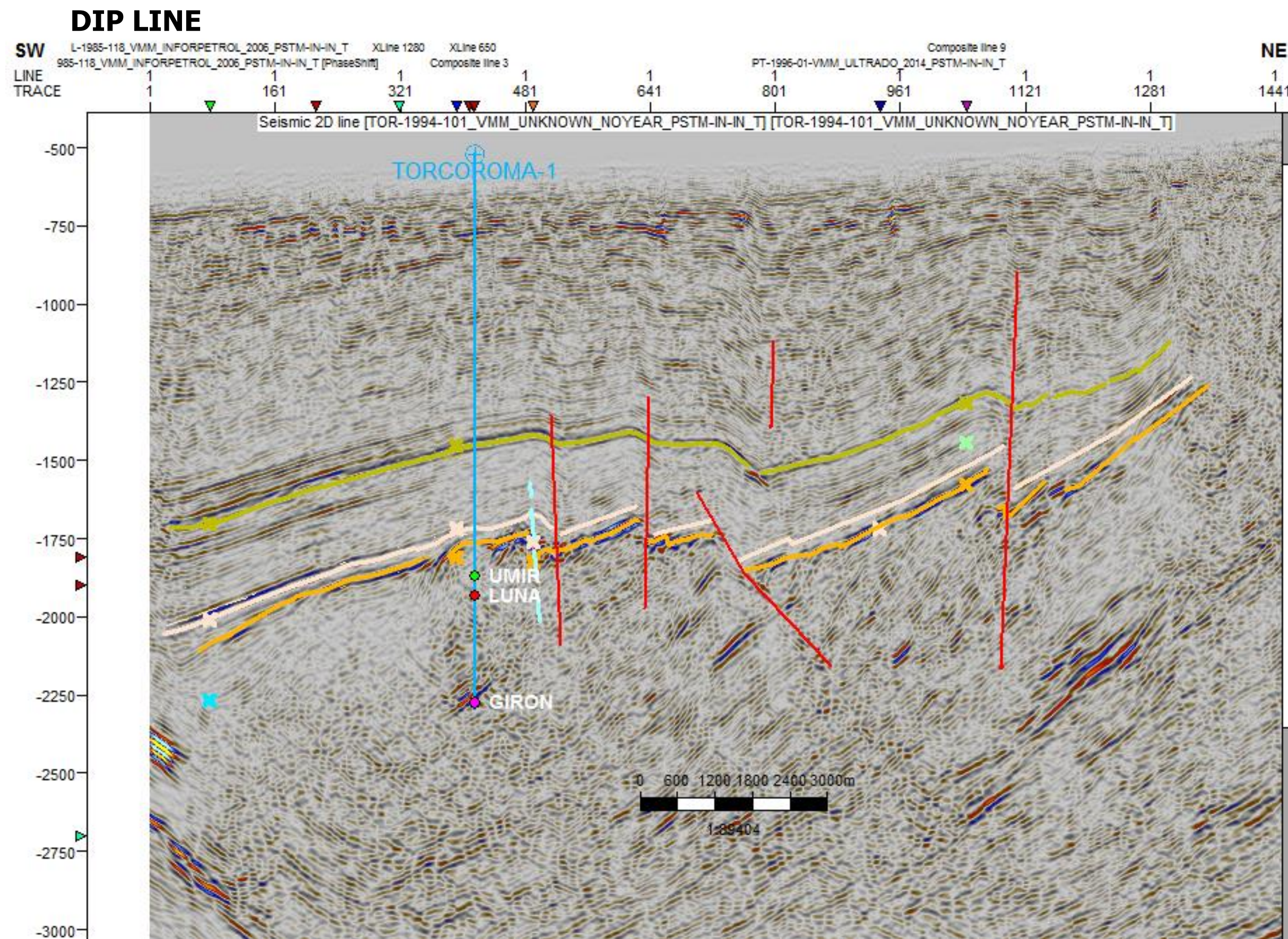
TWT Map Eocene Unconformity





# SEISMIC INTERPRETATION

- PLAYS
- Structural plays that involves the Esmeraldas - La Paz Formation.





# CONCLUSIONS

- In the incorporated area VMM 4-1 the ANH have identified different exploratory opportunities associated to structural traps that involve the Esmeraldas –la Paz Formations of Upper Eocene age, and stratigraphic plays that involve the Lisama Formation truncating against the Eocene Unconformity (?).
- In the incorporated area VMM 4-2 the ANH have identified different exploratory opportunities associated to stratigraphic plays that correspond to onlaps of Esmeraldas Fm and truncations of Lisama Formation against the Eocene Unconformity. As a structural plays there are closures against faults, where the target could be corresponds to Basal sands of the Chorro Group.



# Thanks

[www.anh.gov.co](http://www.anh.gov.co)