New Stratus Energy Inc - Petrolia Ecuador

Colombia - VMM 18 Block

Corporate Technical Presentation

Tectonic Play - Middle Magdalena Basin (MMB)

Sept 2021

Southern Middle Magdalena Basin (MMB) Play Concepts and Petroleum Systems

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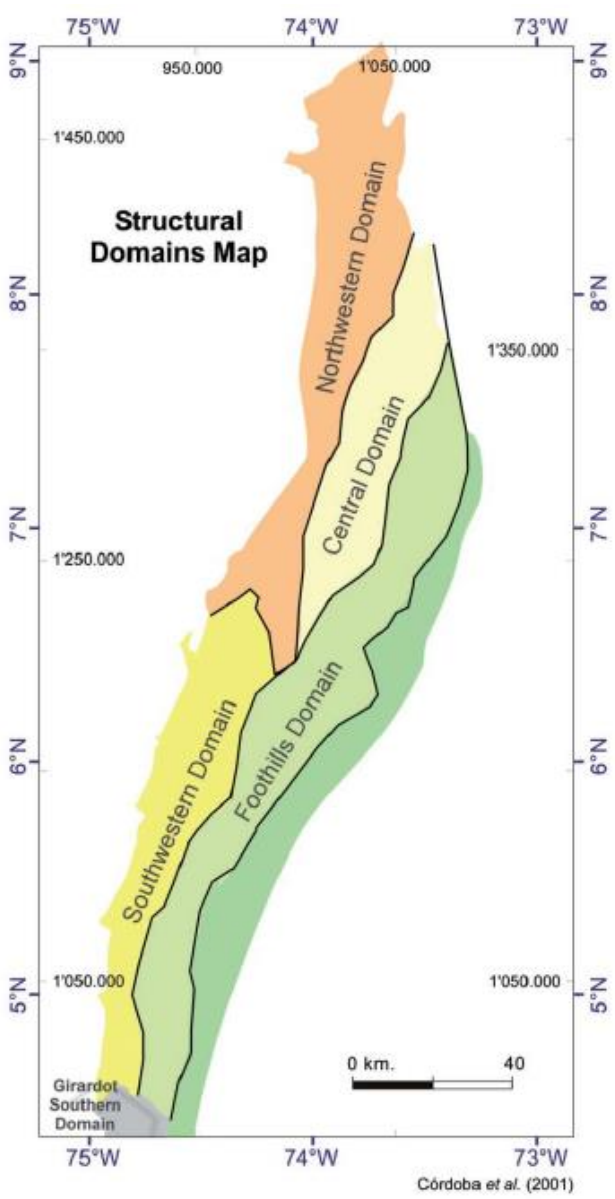
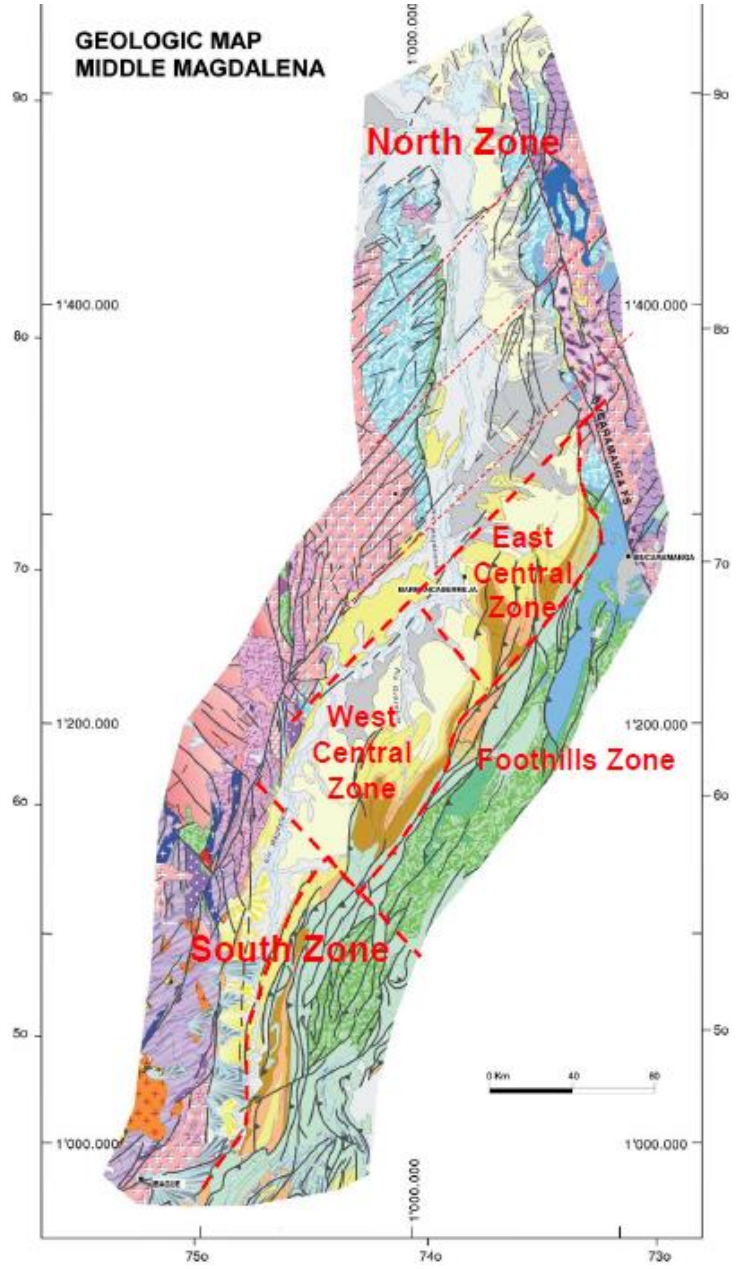
(1) New Stratus Energy (1,2) New Stratus Energy and now Hocol S.A.

Tectonic Provinces of the Middle Magdalena Basin MMB

J.F. Arminio, L. Porras, A. Lara

Tectonic Provinces of the Middle Magdalena Basin

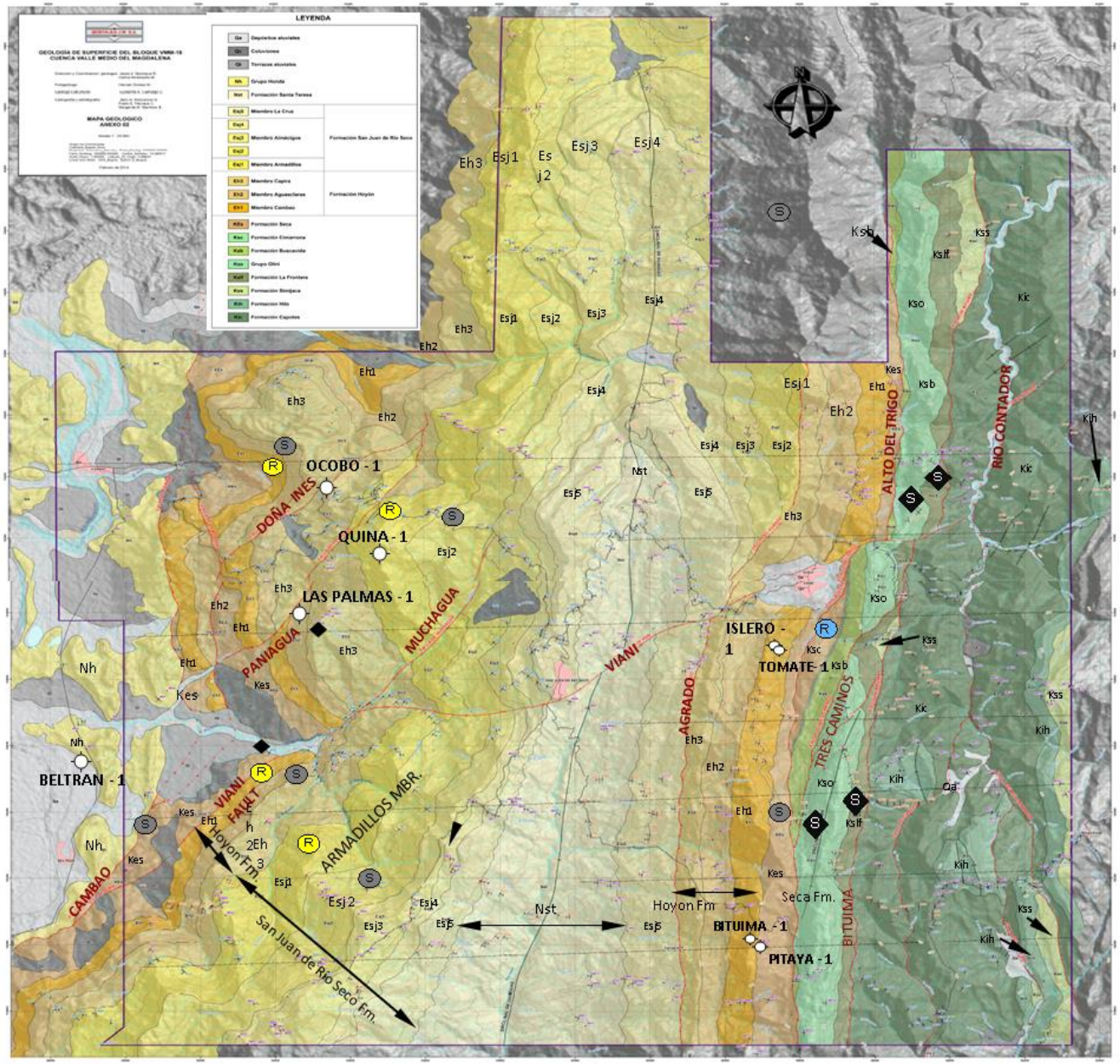




Source: ANH 2011 / 2021

Stratigraphy and Surface Geology

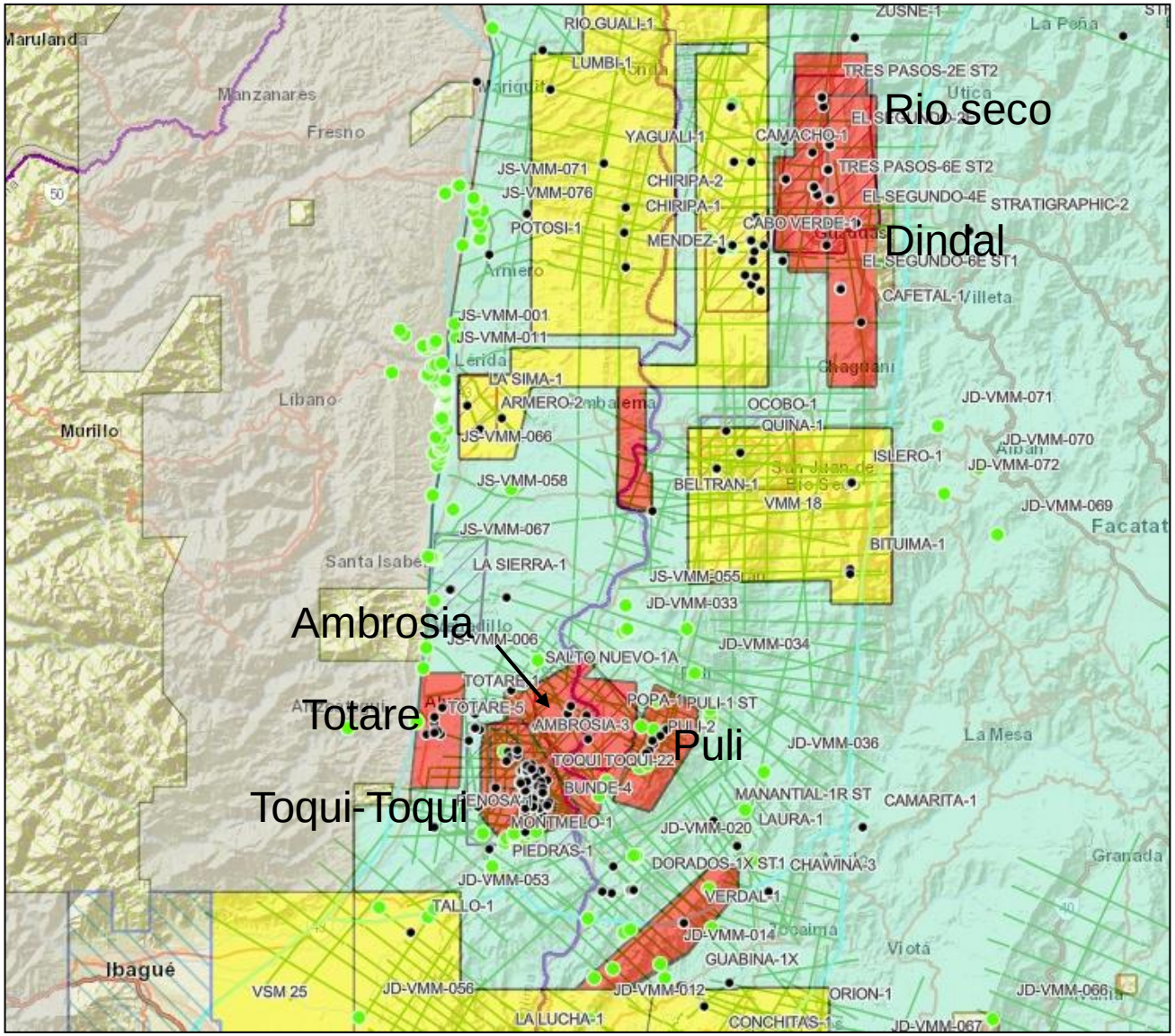
Physical Geology



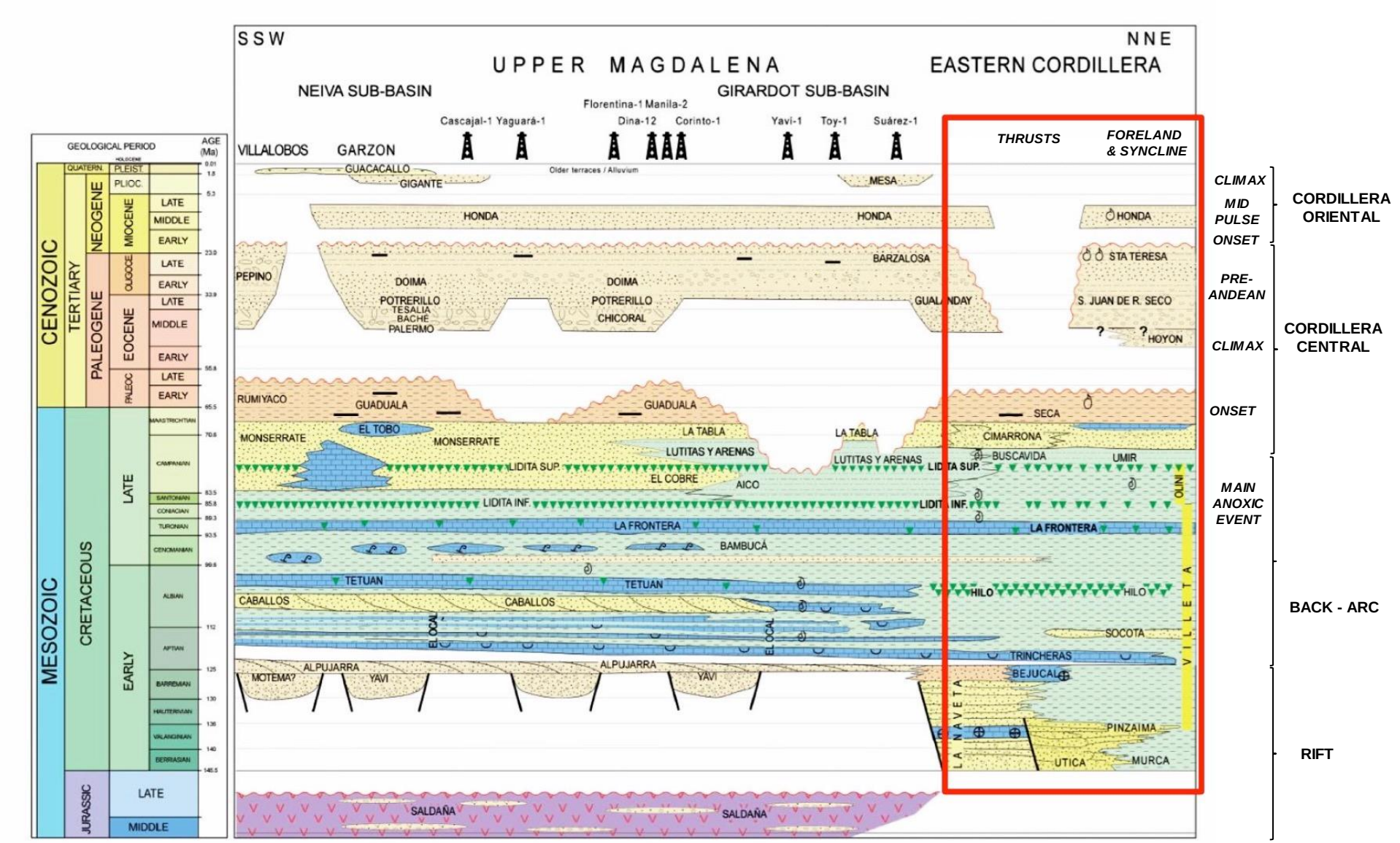
Modified from: Manrique, J., Amézquita, C. et al. (2014)

Southern MMB: E&P blocks

Oil fields, Wells & Available Seismic Data

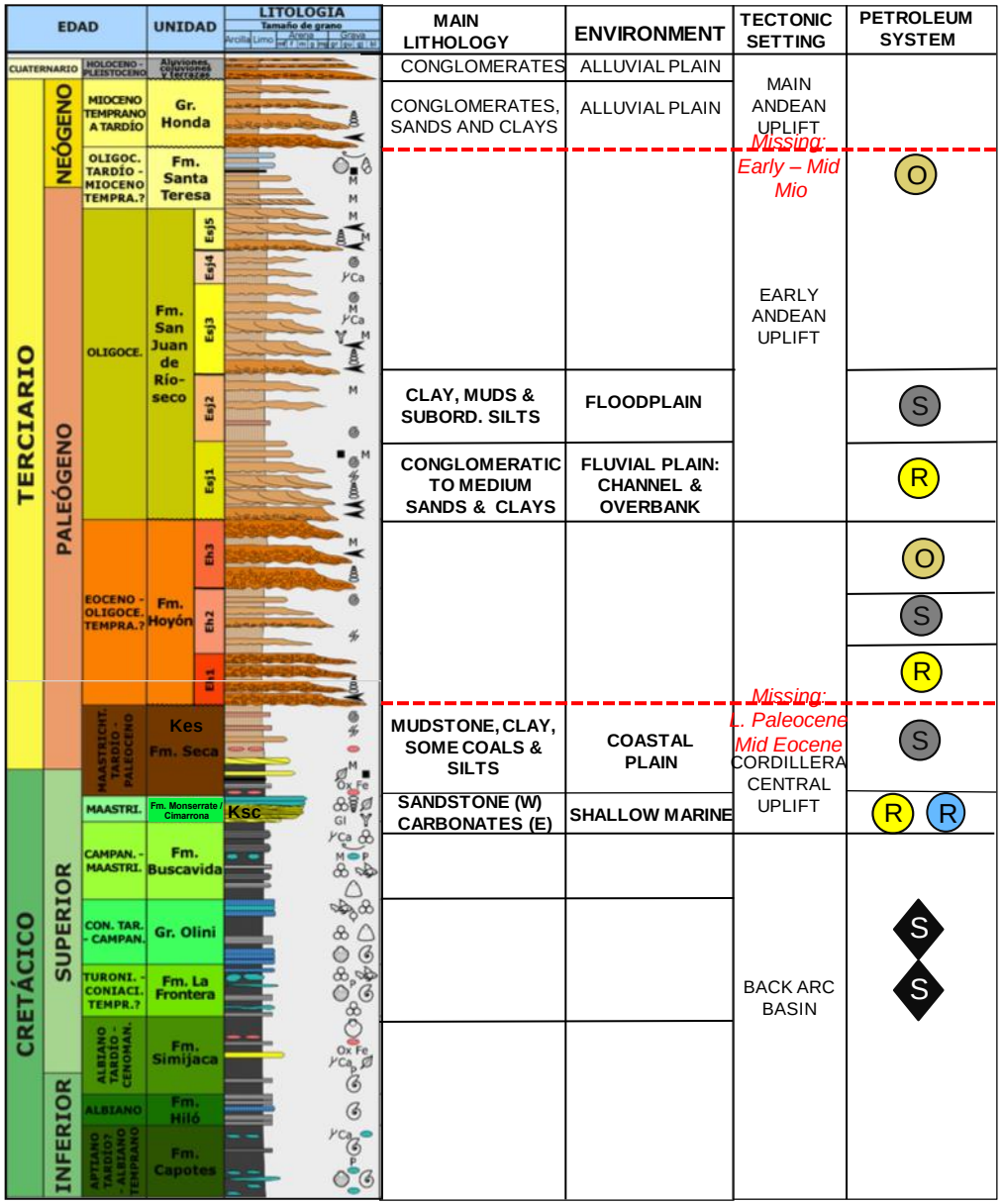


Cretaceous & Tertiary



Source: Geotec (2000) and ANH (2012)

Southern MMB: Stratigraphy and Petroleum Systems



Modified from: Manrique, J., Amézquita, C. et al. (2014)

Almacigo Esj2 clay prone local member

Oligocene fluvial Doima sands equivalent to San Juan´s Armadillos basal unit are effective reservoir in Toqui - Toqui

Hoyon´s local Agua Clara mudstone member

Eocene fluvial Chicoral sands equivalent to basal Hoyon (Cambao) are effective reservoir in Toqui - Toqui

Seca fm. regional shale unit

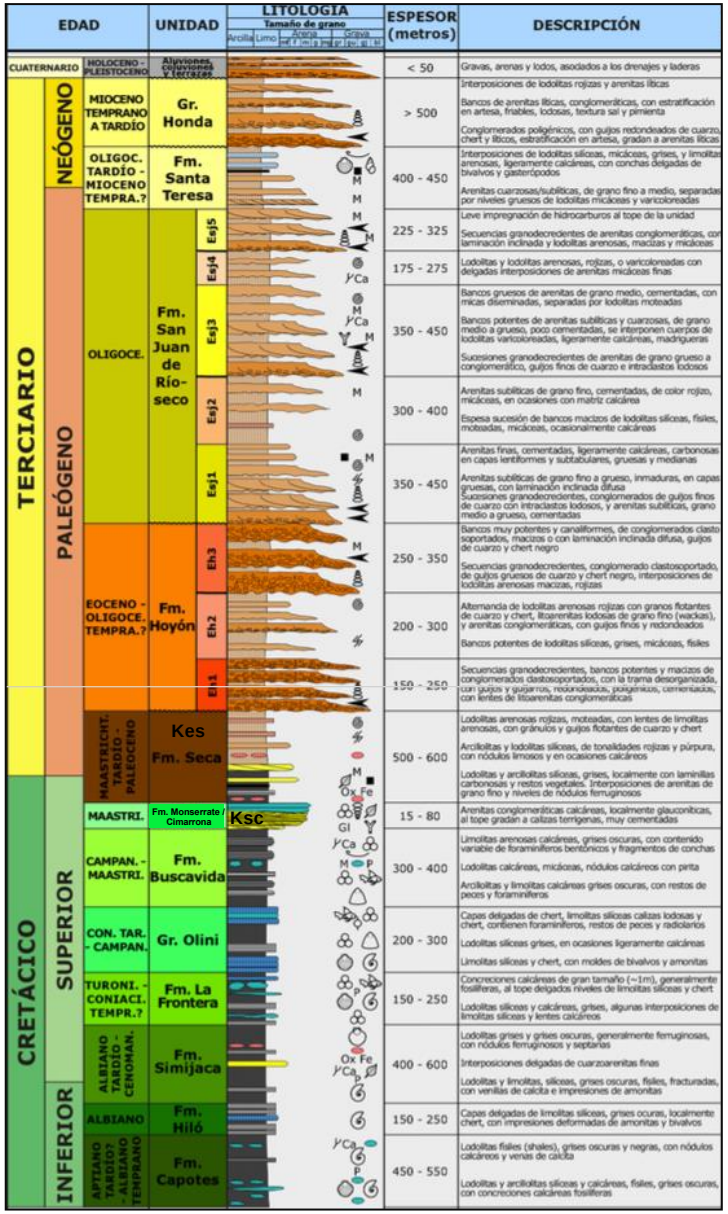
Monserrate sand reservoir in Puli and Quintero fields
Cimarrona carbonate reservoir in Guaduas

PETROLEUM SYSTEM

- O — OVERBURDEN
- S — SEAL
- R — RESERVOIR (Limestone)
- R — RESERVOIR (Sandstone)
- S — SOURCE

Petroleum System

Oil sources



OLINI

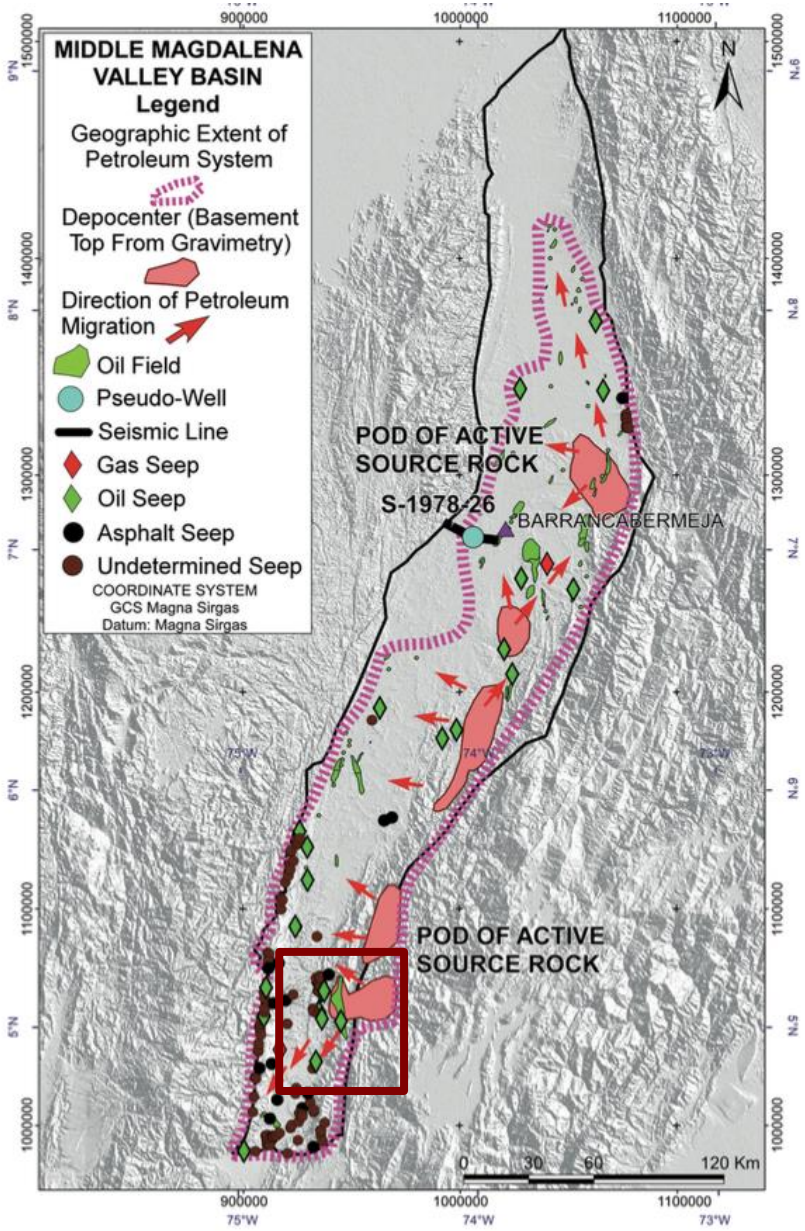
LA LUNA & VILLETA EQ.
Late Coniacian – Campanian
200m – 300m (measured sections)
reference: La Luna in Tachira, Ciniacian – Campanian; in Perija, Cenomanian – Campanian
(De Romero, Truskowski, Odreman ; Galea 2003)

LA FRONTERA

LA LUNA EQ.
Turonian – Early Coniacian
150 m – 250 m (maps) 65m (measured sections)

Modified from: Manrique, J., Amézquita, C. et al. (2014)

Petroleum Systems: Presence and Extension



Southern Middle Magdalena Basin:

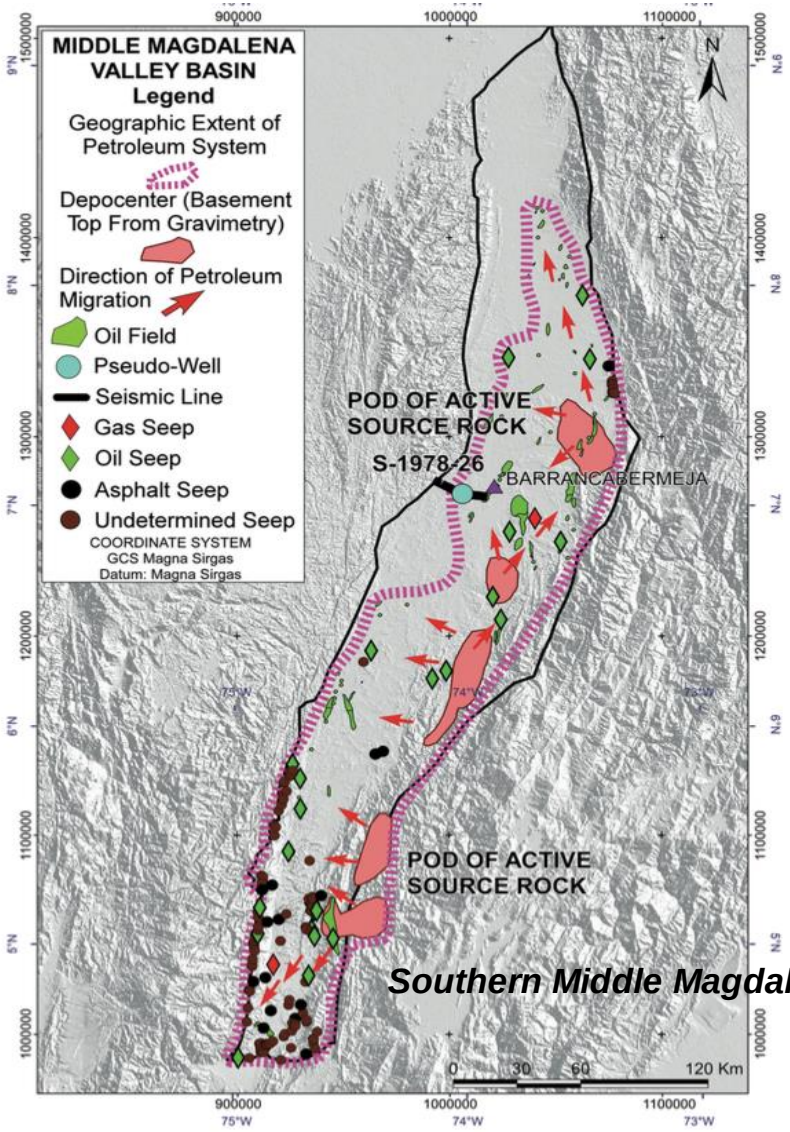
- The petroleum system associated with Guaduas, Puli and Toqui-Toqui is supplied by Villeta –equivalent Olini and La Frontera
- Surface mapping and well data confirm that Olini – Frontera extend along the piedmont and pinch out east of BELTRAN – 1

Figure 85. Petroleum systems map of the Middle Magdalena Valley Basin. Note the location of the depocenter at the top of the basement, the hydrocarbon seeps, and the hypothetical areas of influence of the hydrocarbon systems.

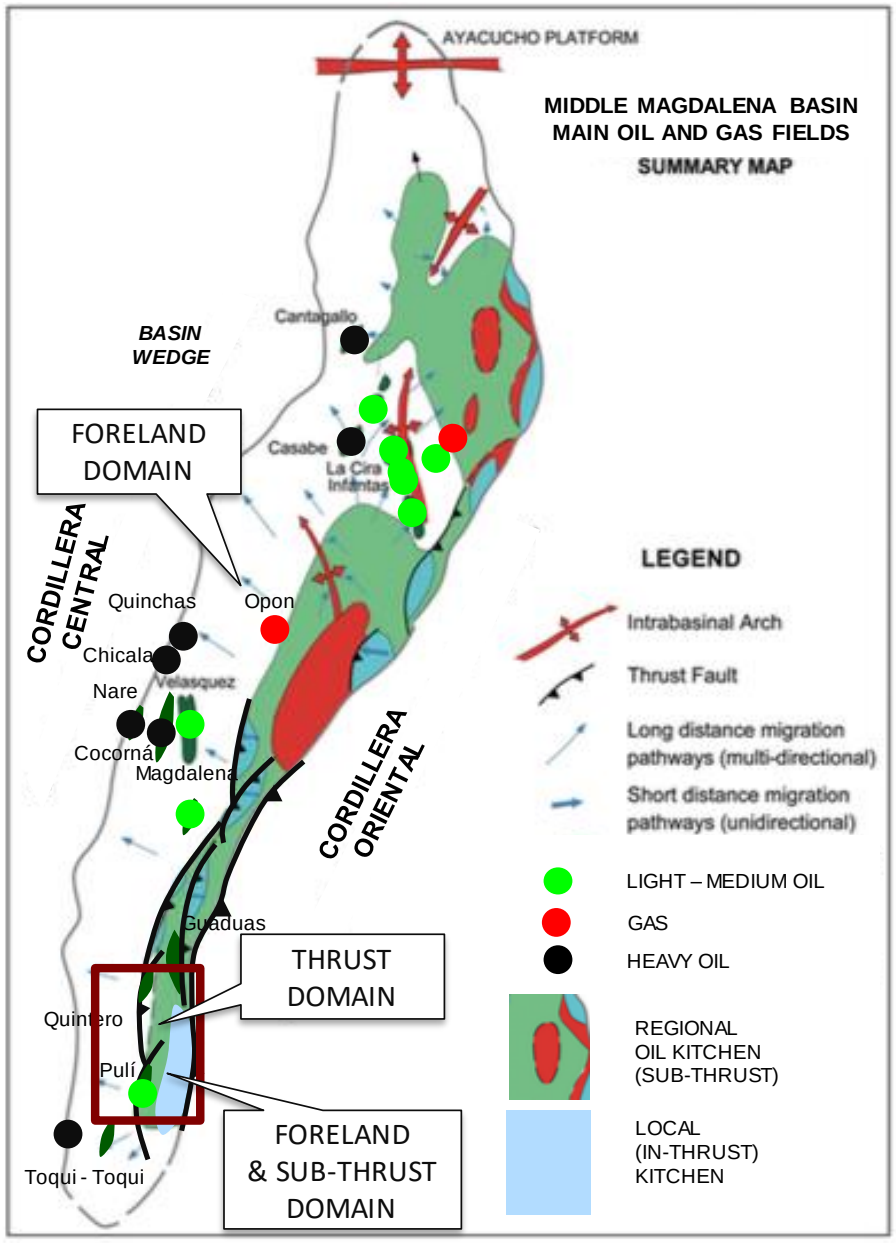
From Sarmiento (2012)

MMB: Petroleum System Map

Petroleum System Map



Southern Middle Magdalena basin



Modified from Sarmiento, 2012 (Geology and Hydrocarbon potential. Regional Geology of Colombia)

Present day: Source maturity

- Olini – Frontera are late mature in outcrops

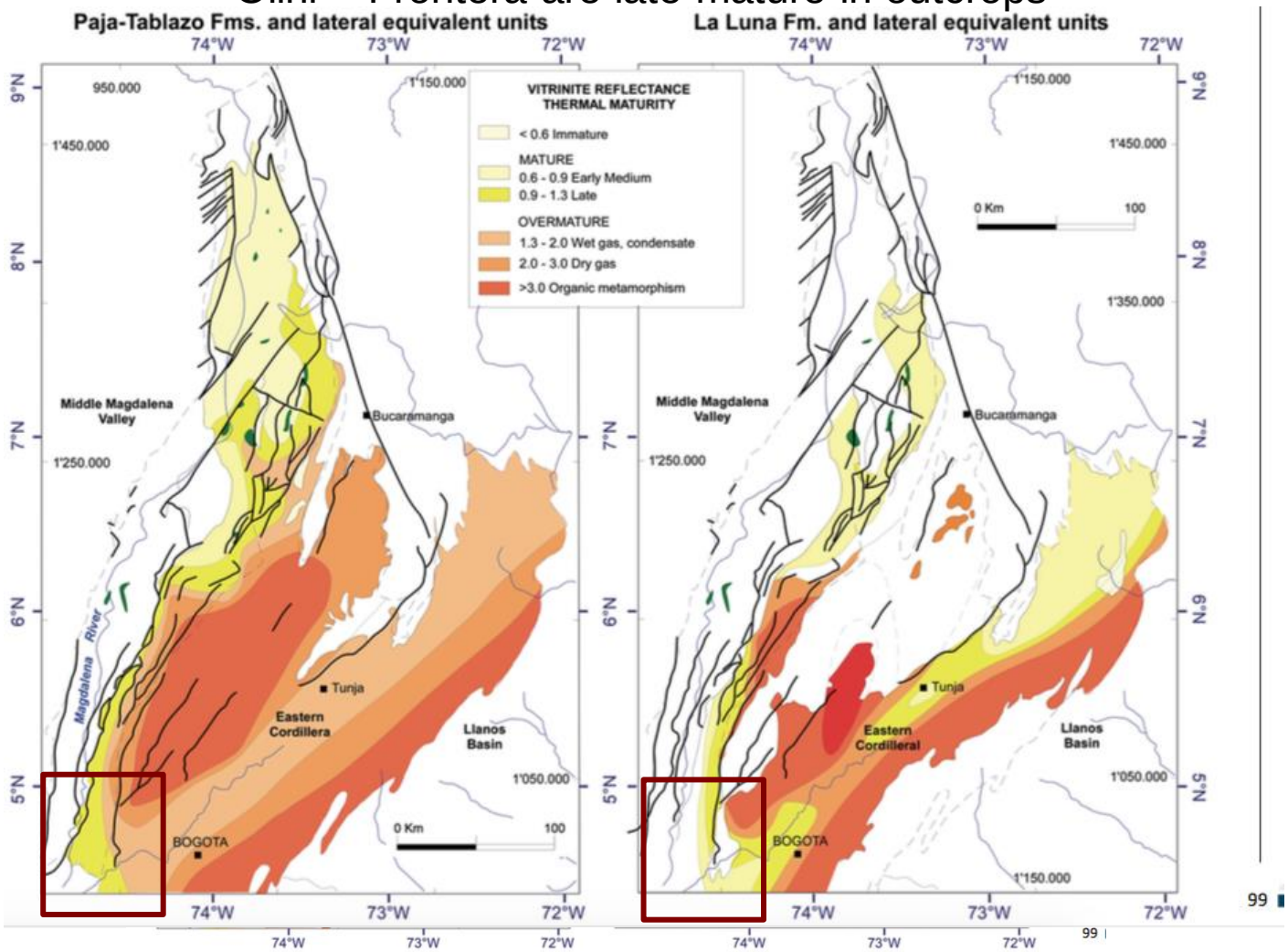
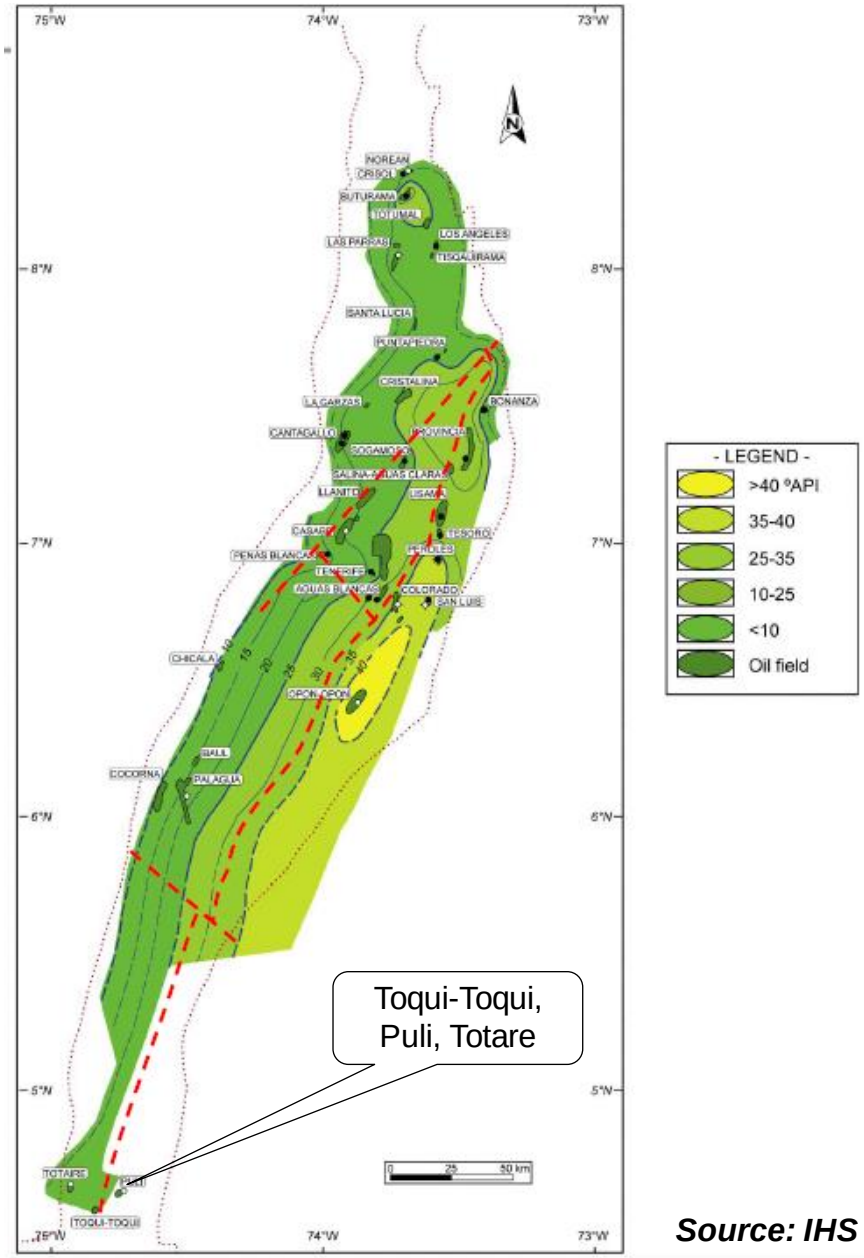


Figure 58. PPresent day thermal maturity maps for the two source rock stratigraphic intervals: the Aptian-Albian (Paja-Tablazo Fms. and lateral equivalents) and the Turonian-Coniacian (La Luna Fm. and lateral equivalents) of the ECB and MMB. From Garcia *et al*. (2003). Note that (1) maturity level of the Aptian-Albian source rock interval is greater than the maturity level of the Turonian-Coniacian source-rock, (2) In the ECB both stratigraphic intervals are over-mature except for the younger Turonian-Coniacian source rock in the Axial region of the ECB, (3) maximum maturity values approximately occur in the area of the maximum Cretaceous Cocuy, Tablazo and Cundinamarca depocenteres in the eastern and western inverted structural domains of the ECB and the relative minimum values occur in the Sabana de Bogota, Tunja, Sogamoso axial region or depressional structural domain of the ECB. (4) Mature values occur in the Western foothills of the ECB and the ESE part of the MMB (enabling local generation and dominantly vertical migration). Source rocks are immature toward the WNW (requiring WNW lateral migration to fill traps in this part of the basin).

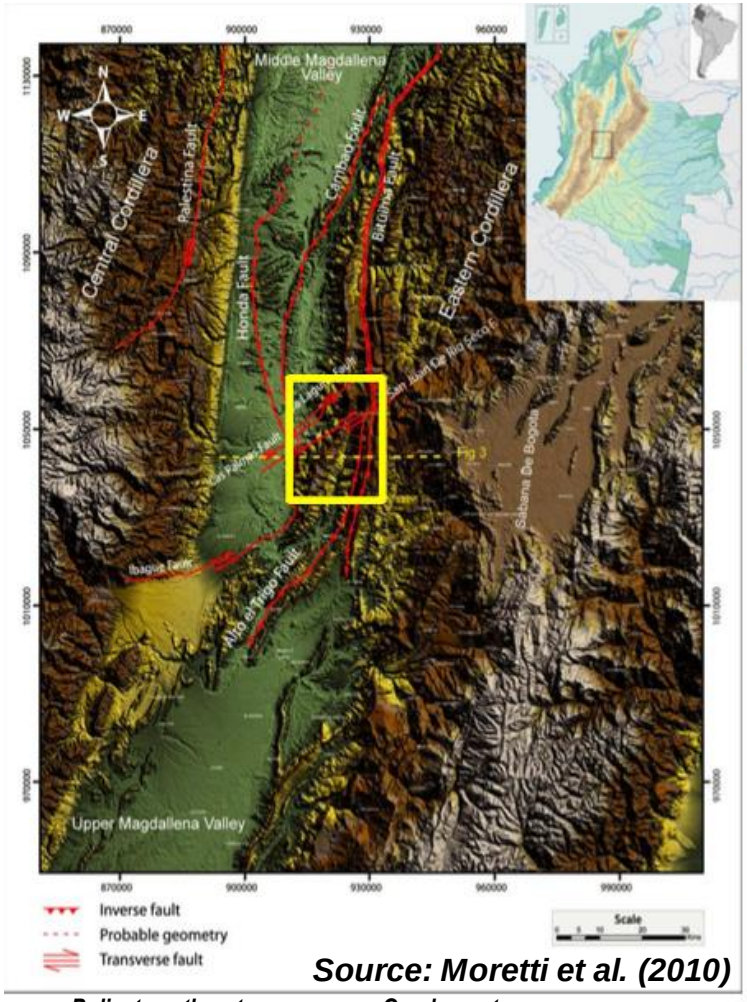
Source: Sarmiento, 2012

MMB: Iso-Gravity Map

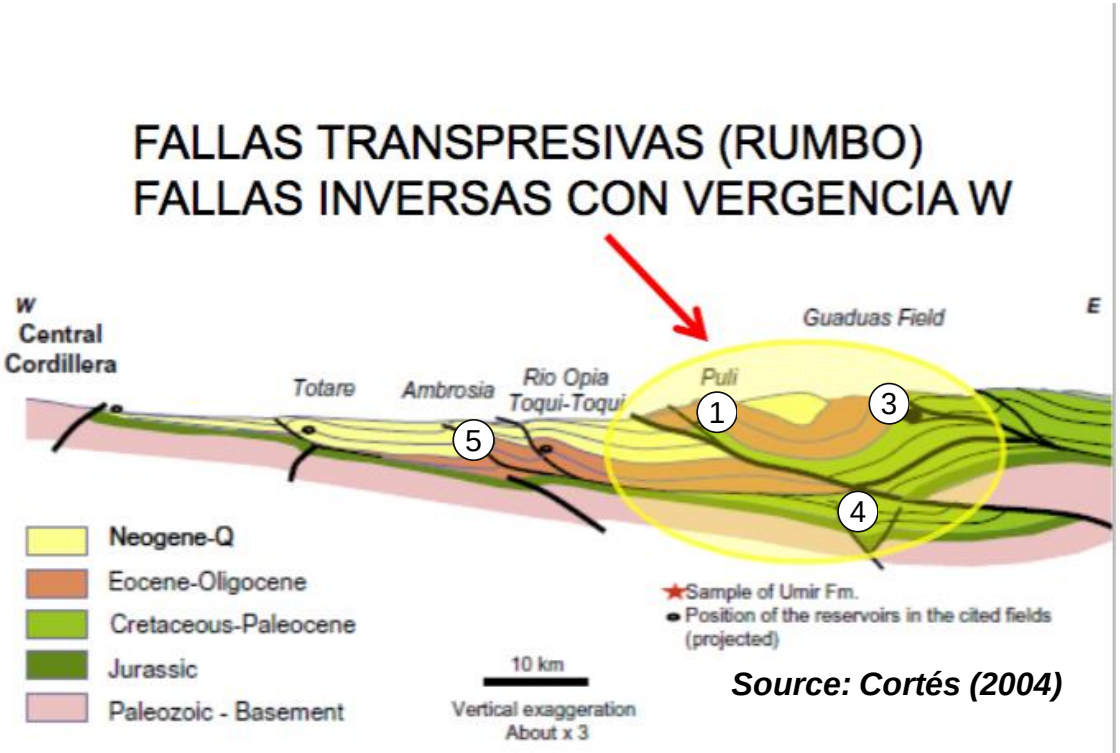


Source: IHS / ANH 2021

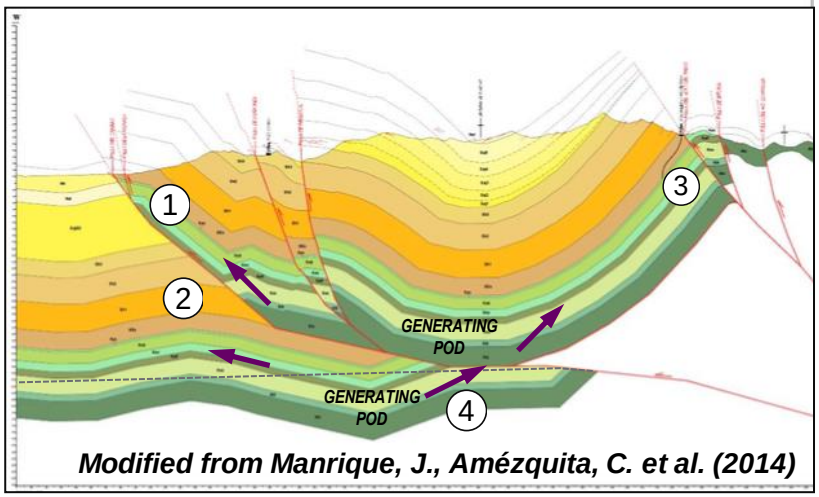
Two Generative Pods: shallow and deep



Source: Moretti et al. (2010)



Source: Cortés (2004)



Modified from Manrique, J., Amézquita, C. et al. (2014)

1 *Puli – type thrust play: light oil in Guadalupe sands*

2 *Sub thrust play: light / medium oil in Paleogene sands*

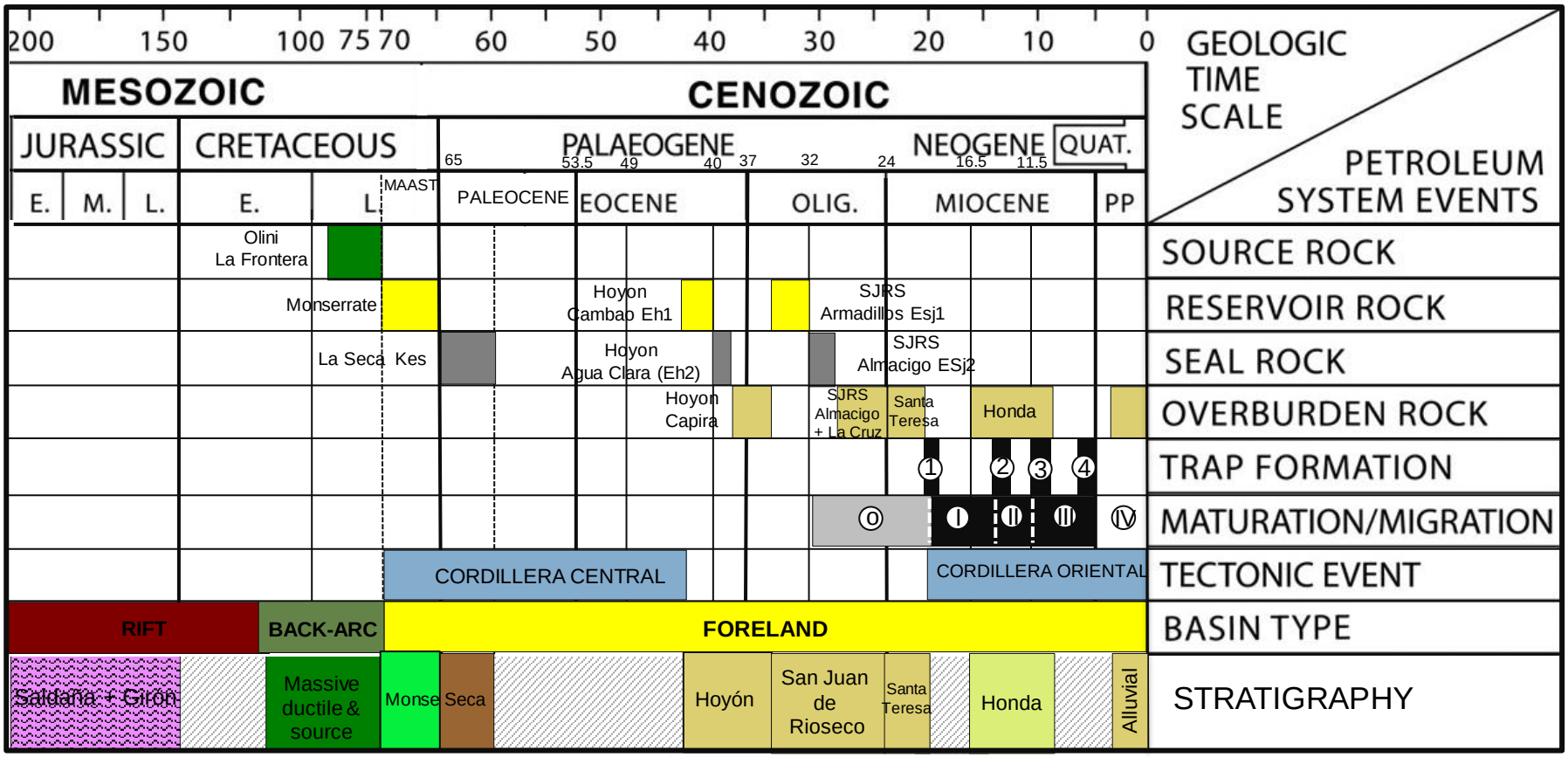
3 *Guaduas - type heavy and light oil in Cimarrona carbonates and sands*

4 *Cimarrona Deep sub-thrust play: light oil in imbricated cretaceous carbonates and sands*

MIGRATION PATH

5 *Shallow thrust play: medium oil in Tertiary clastics*

MMB South: Petroleum System Event Chart



TRAP TIMING

① CIGARRA ~ 19 Ma EARLY MIOCENE COC ONSET

② QUINA – OCOBO ~15 Ma MID MIOCENE PULSE

③ PULI – HERCULES ~10 Ma LATE MIOCENE PULSE

④ BELTRAN <10 Ma LATE MIOCENE PULSE

GENERATION / CHARGE TIMING

Ⓞ AS PER PUBLISHED MODELS – VILLETA MATURE ON DEEPEST REALM NEAR RIFT AXIS

Ⓘ AS PER PUBLISHED MODELS – OLINI / FRONTERA MATURE EAST OF VMM-18 ON RIFT FLANK; CHARGE STARTS AT CIGARRA

Ⓘⓘ FLEXURAL RESPONSE TO TECTONIC THRUSTING SHIFTS THE REGIONAL OIL WINDOW CLOSER TO CIGARRA;

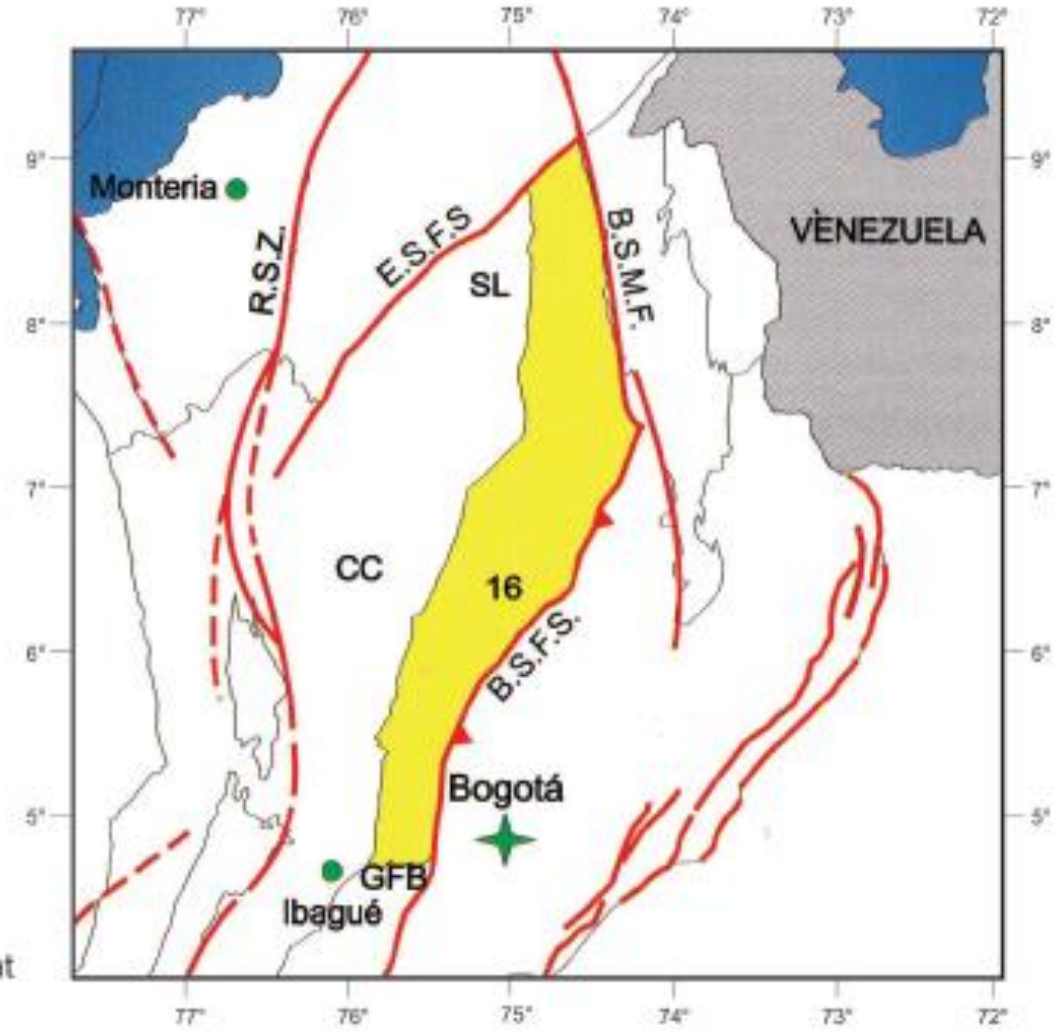
Ⓘⓘⓘ INCREASED FLEXURE FOLLOWS HERCULES – PULI THRUSTING. A SHALLOW LOCAL KITCHEN BELOW THE GUADUAS SYNCLINE CHARGES THE PULI, QUINTERO, AND GUADUAS ACCUMULATIONS.

Ⓘⓥ UPTHRUST OF THE GUADUAS SYNCLINE EXPOSES LATE MATURE OLINI – FRONTERA ON SURFACE AND FREEZES THE SHALLOW POOL; MIGRATION SHADOW ARRESTS CHARGE FROM THE DEEPER POOL TO CIGARRA AND BELTRAN

Source: NSE, 2019

Tectonic Framework

MMB: Regional Tectonic Framework



BOUNDARIES

Southeast: Bituima and La Salina fault systems (B.S.F.S.)

North: Espiritú Santo fault system (B.S.F.S.)

West: Onlap of Neogene sediments over the Serrania de San Lucas (SL) and Centrak Cordillera (CC) basement

South: Girardot fold beld (GFB)

Northeast: Bucaramanga-Santa Marta fault system (B.S.F.S.)

After ANH, Colombian Sedimentary Basins (2007)

MMB: Evolution Models (from ANH)

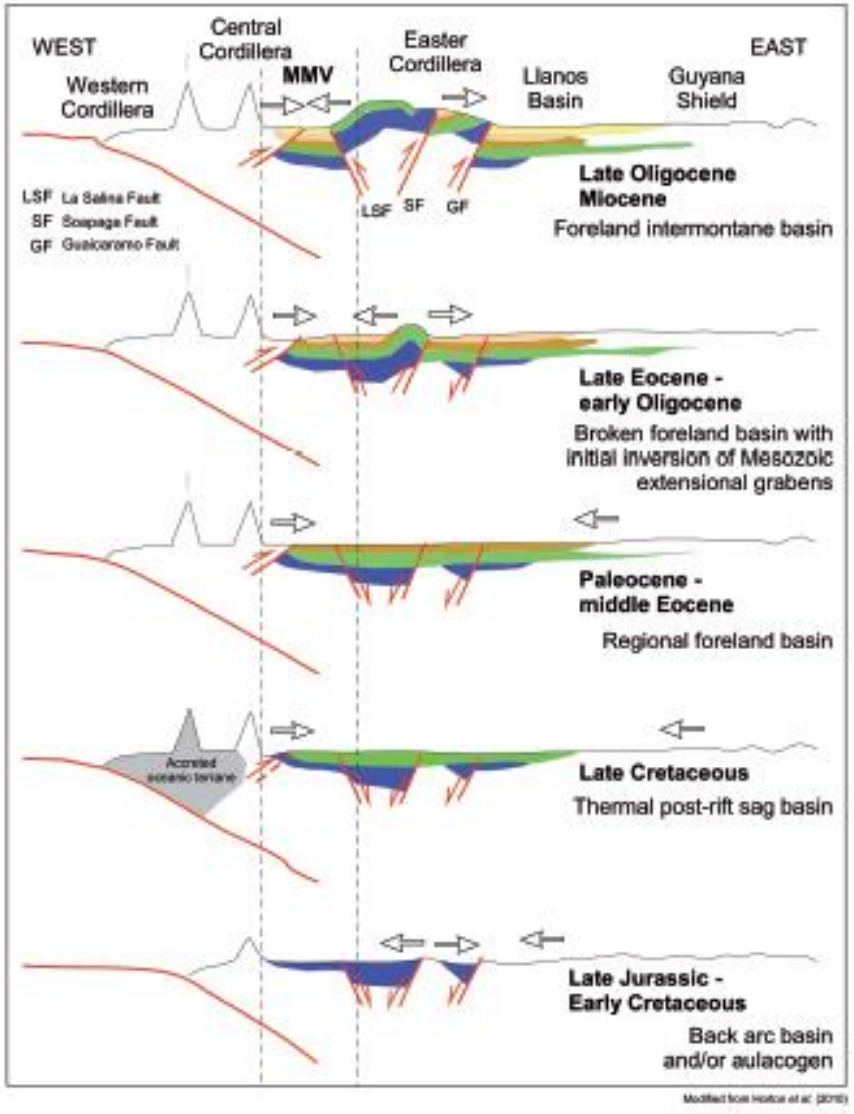
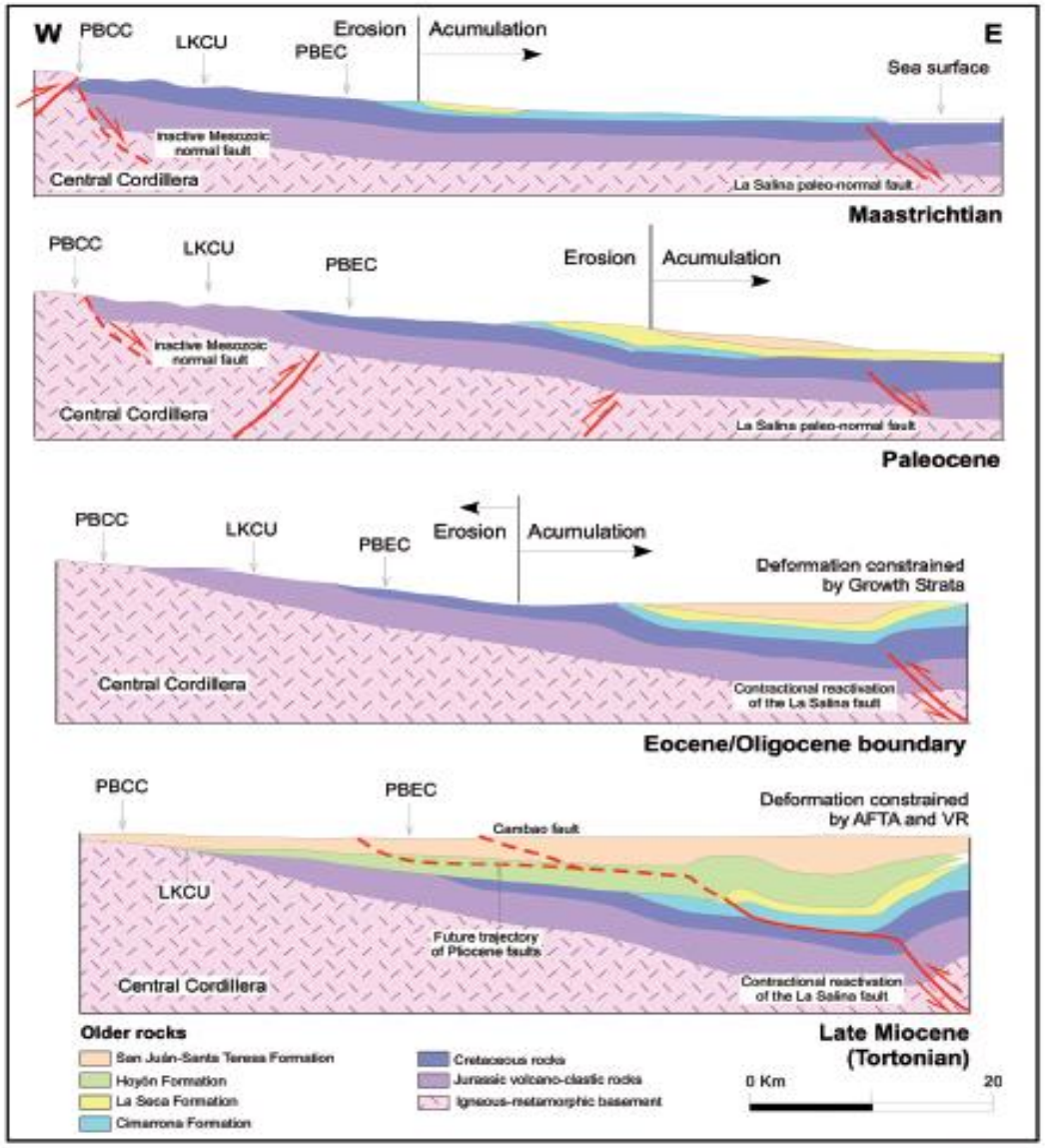
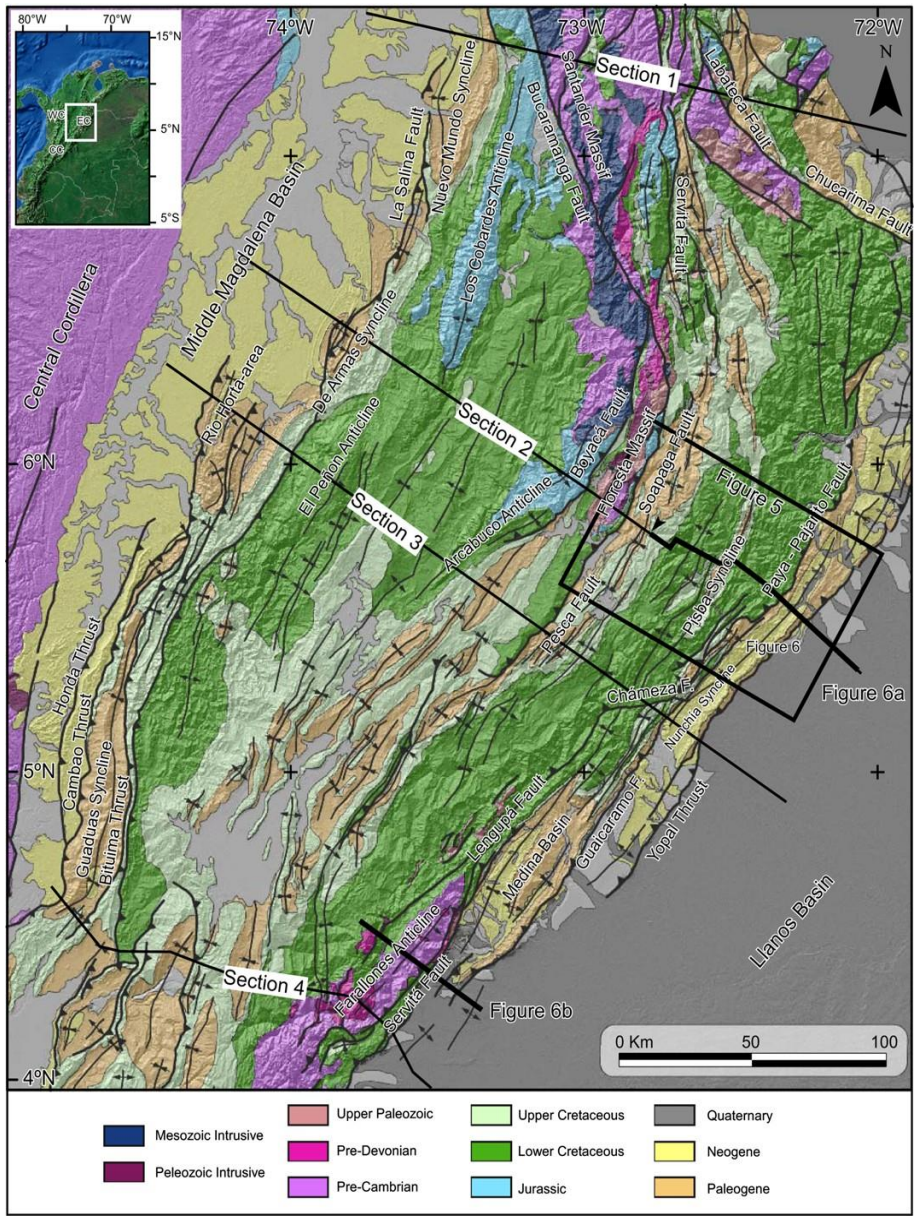


Figure 4. Schematic tectonic evolution of the MMB. After Horton *et al.* (2010a).

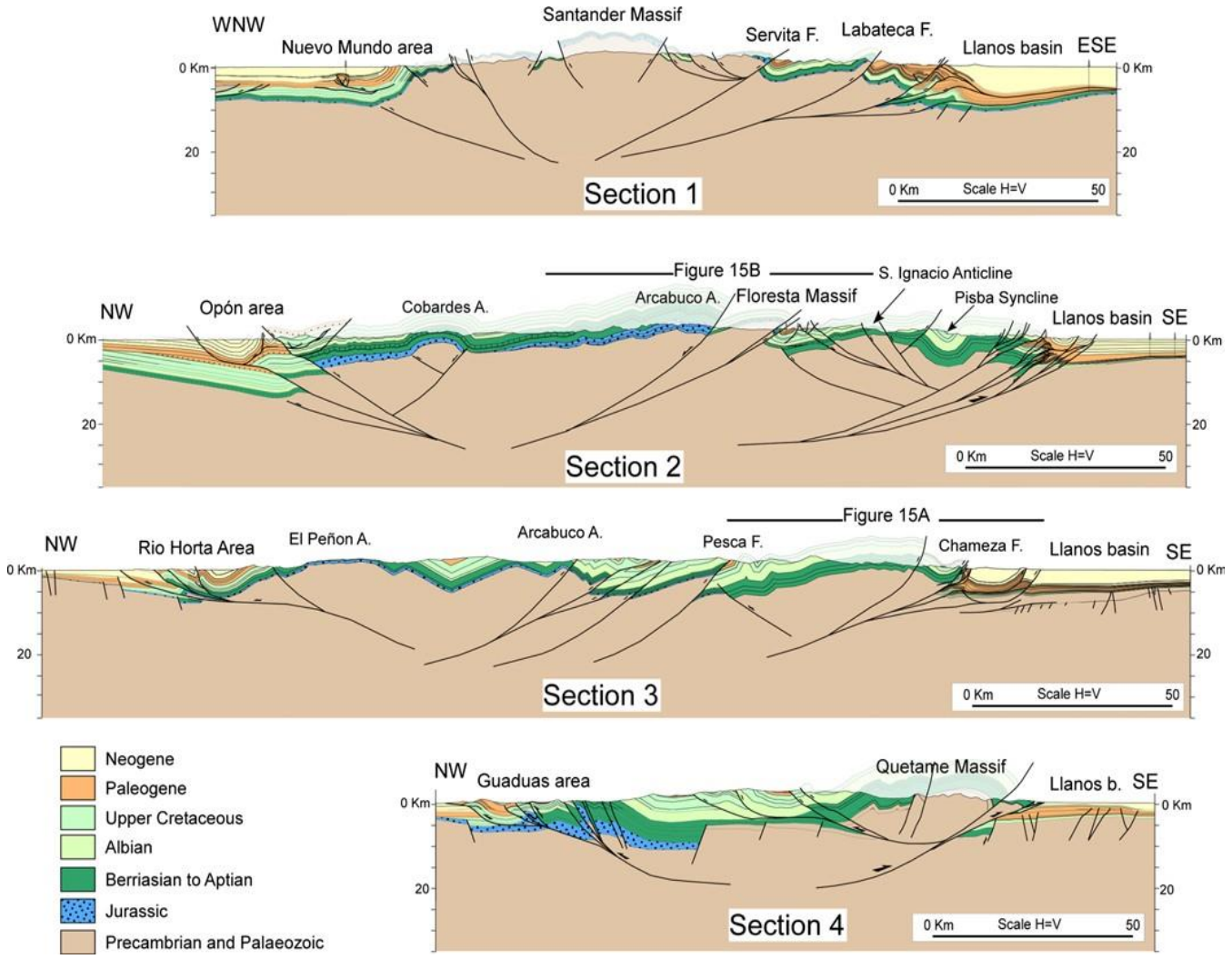


Main Fault Network



Source: Tesón et al. (2013)

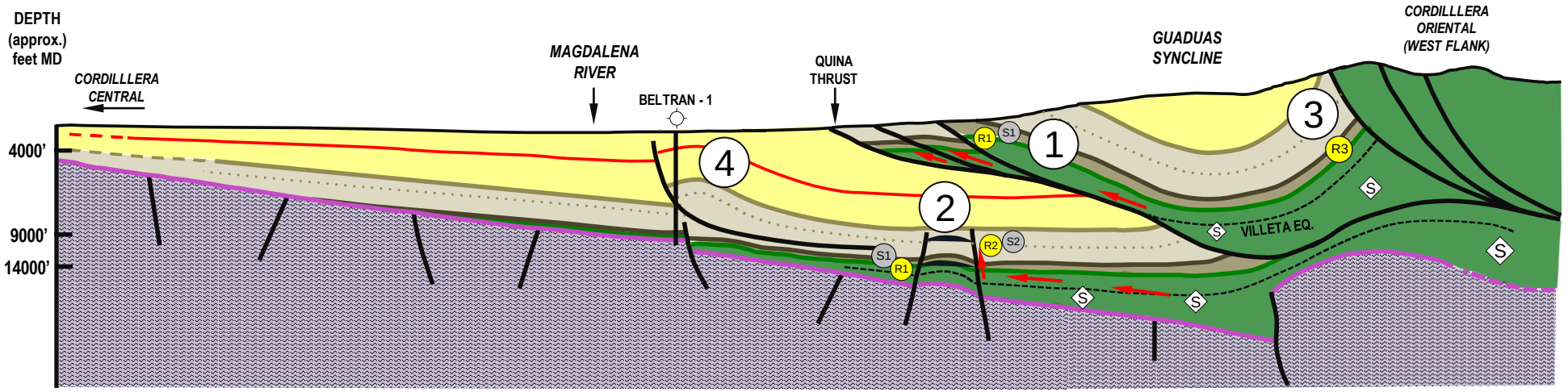
Main Fault Network



Source: Tesón et al. (2013)

MMB Southern: Play Concepts & Petroleum Systems

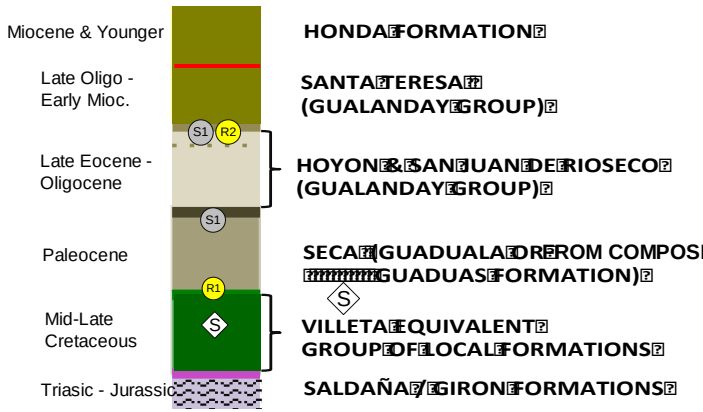
Western Mountain Front of the Eastern Cordillera of Colombia



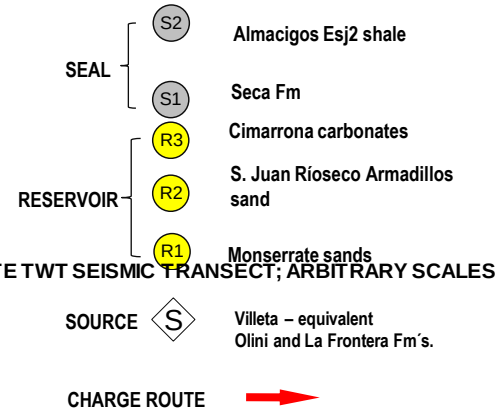
EXPLORATORY PLAYS

1. Thrust play Puli - type: *light oil in Monserrate sands*
2. Sub-thrust play: *light / medium oil in Cretaceous and Monserrate sands*
3. Guaduas - type play: *heavy and light oil in Cimarrona carbonates*
4. Frontal thrust: *Toqui Toqui style Doima and Hoyon*

STRATIGRAPHIC KEY



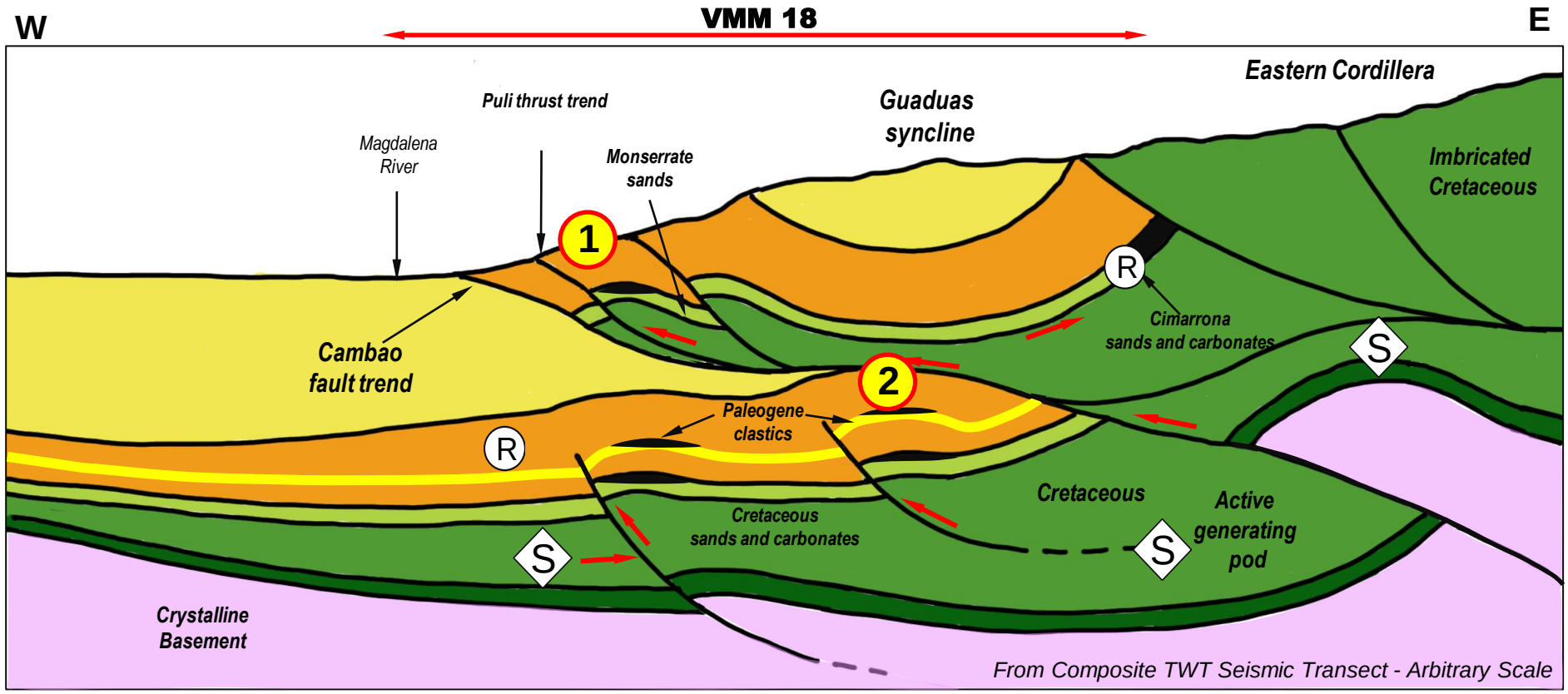
PETROLEUM SYSTEM



Modified from Sarmiento (2012)

MMB Southern: Structure & Play Concepts

Western Mountain Front of the Eastern Cordillera of Colombia



Source: NSE, 2019

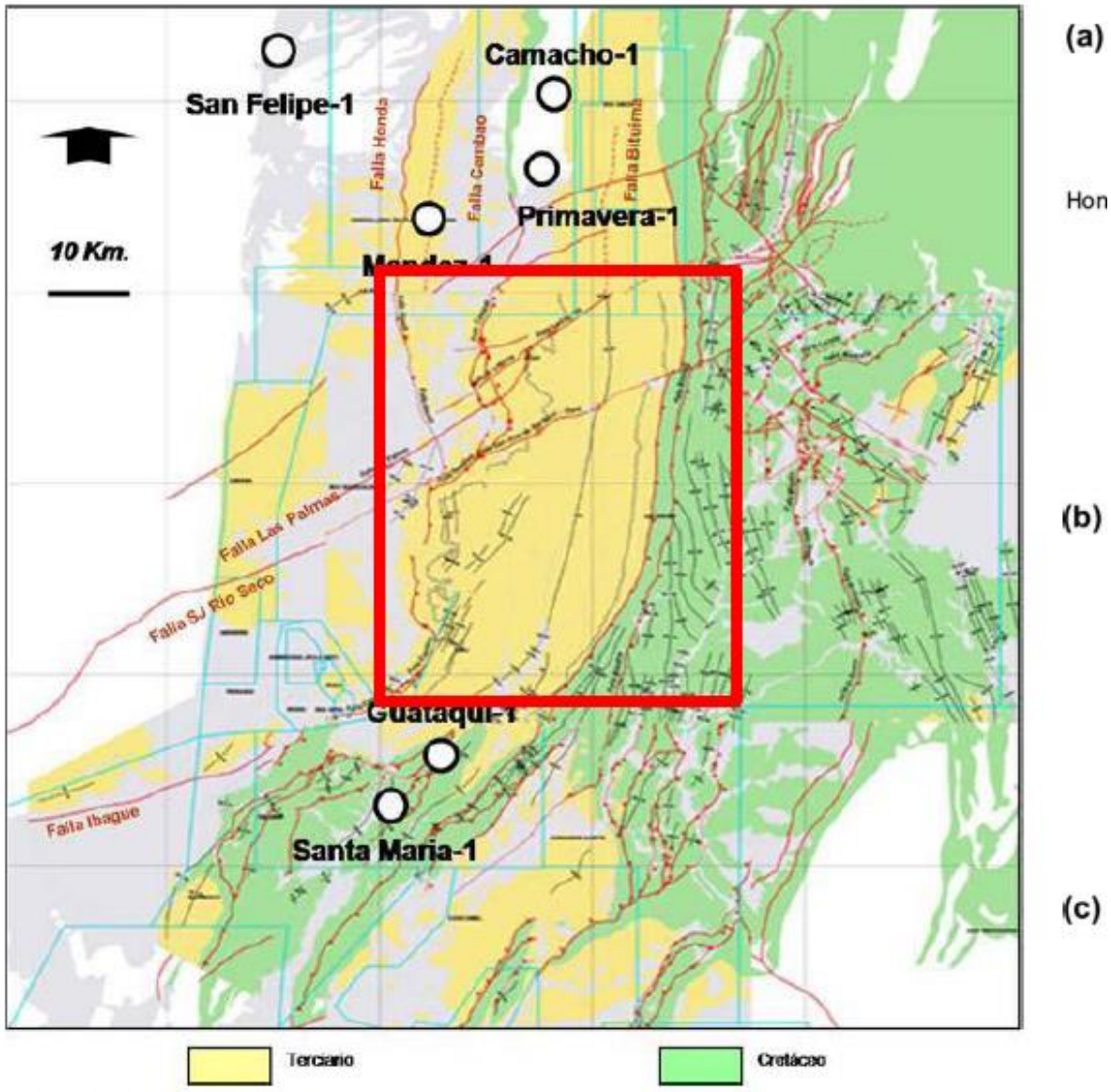
1. Puli-type thrust play (light oil in Guadalupe sands) - Hercules & Hercules Norte Prospects
2. Sub thrust play (light/medium oil in Paleogene sands) - Cigarra Prospect

S Regional Cretaceous source: Villeta - equivalent, mature in surface

R Regional Reservoirs: Cretaceous Cimarrona lmst & Monserrate ss / Eocene Hoyon & Chicoral ss

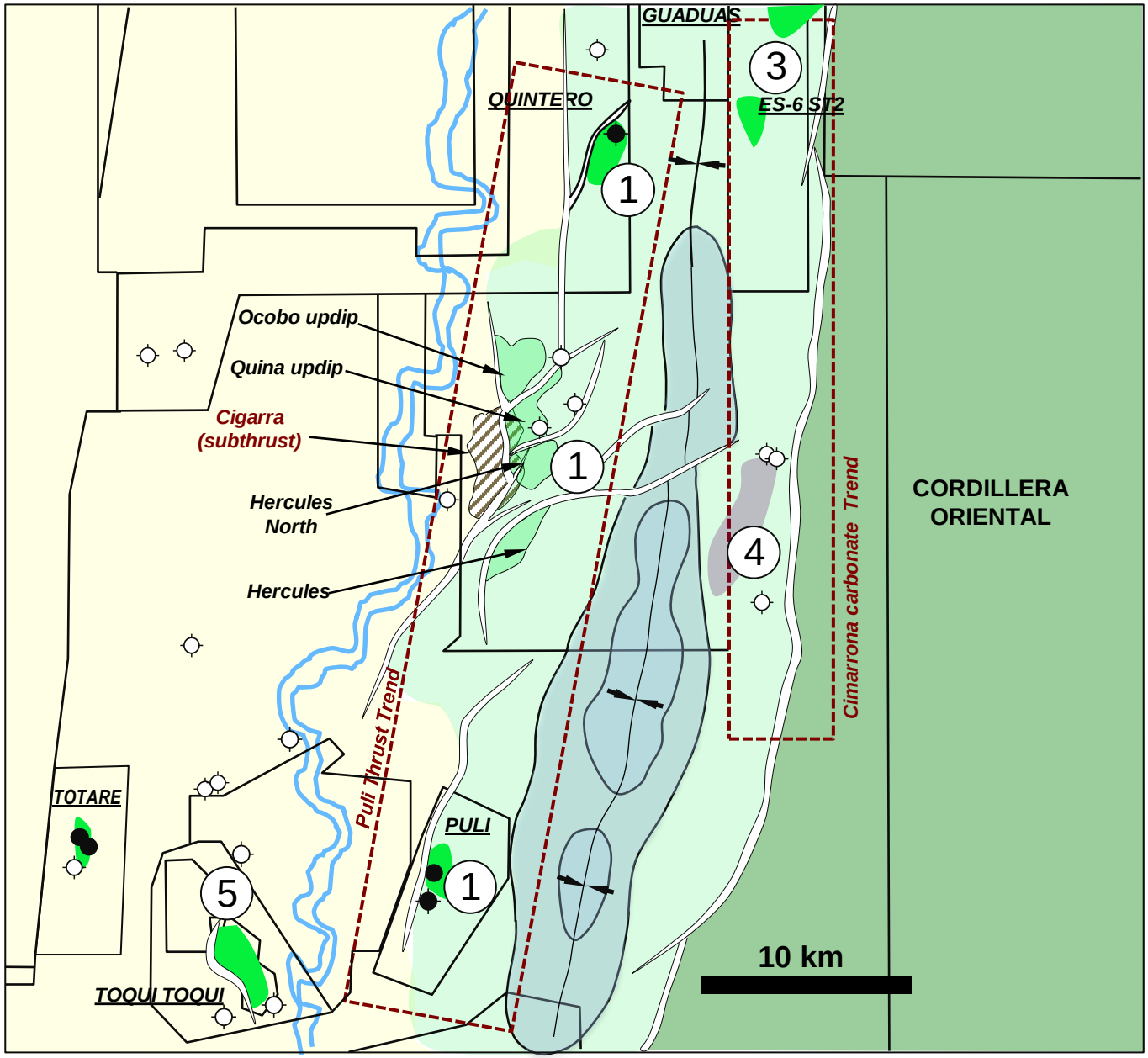
VMM18 Block is an attractive asset with three main prospects and leads located in the Puli and Dindal-Rio Seco (Guaduas Field) proven hydrocarbon trend of the MMB

Main Fault Network



Source: Moretti Et al, Cortes 2004.

Play Trends



GEOLOGIC SETTING

- IMBRICATED CRETACEOUS CORE — *CORDILLERA ORIENTAL*
- THRUST BELT — *MIDDLE MAGDALENA BASIN*
- TERTIARY FORELAND — *MIDDLE MAGDALENA BASIN*

ECONOMIC ASSETS

- SUBTHRUST PROSPECT
- OIL FIELD
- PULI-TYPE THRUST PROSPECT
- DEEP CRETACEOUS LEAD

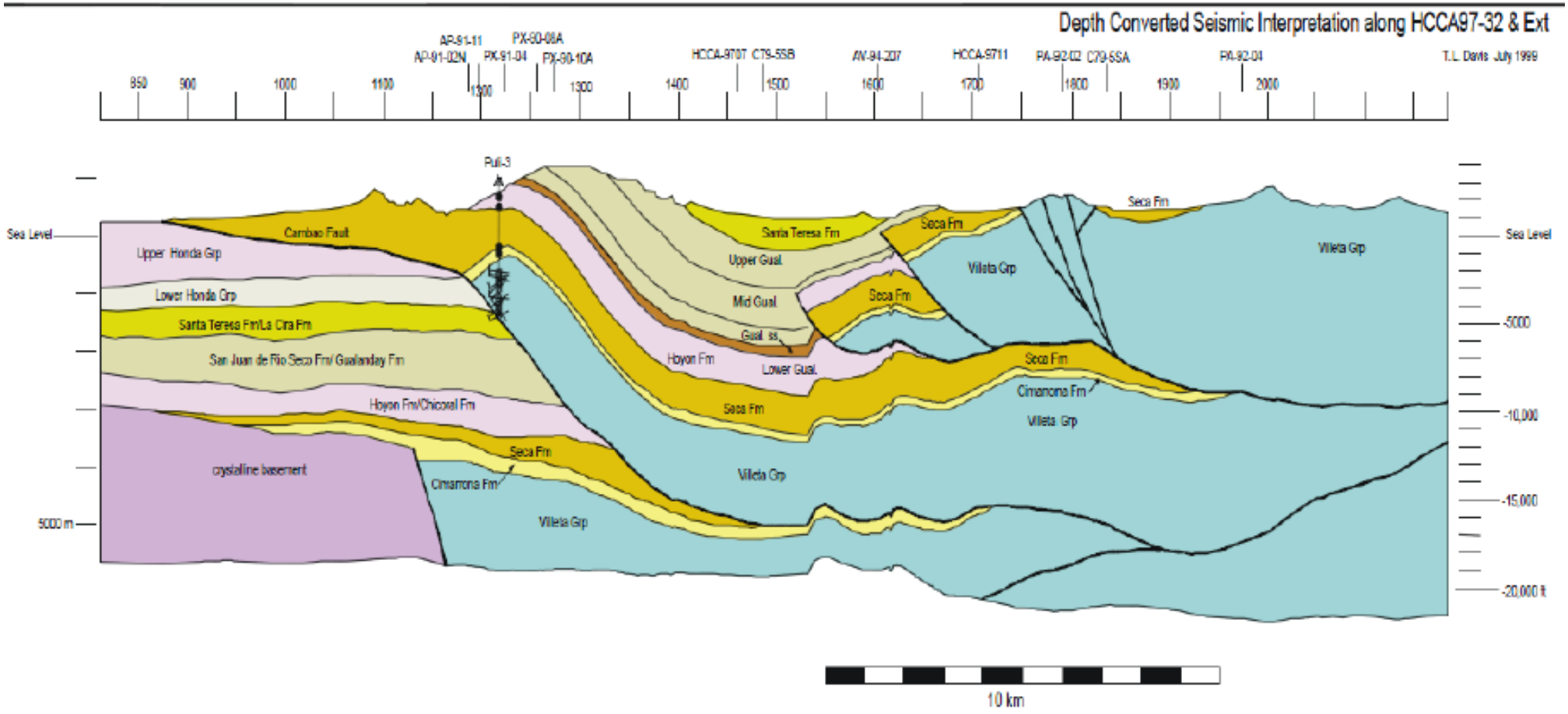
EXPLORATORY PLAYS

1. *Puli – type thrust : light and heavy oil in Monserrate sands*
2. *Sub thrust play: light / medium oil in Tertiary and Cretaceous sands*
3. *Guaduas - type heavy and light oil in Cimarrona carbonates and sands*
4. *Cimarrona Deep: light oil in imbricated cretaceous carbonates and sands*
5. *Toqui Toqui- type frontal thrust play medium oil in Doima Oligocene sands*

Source: NSE, 2019

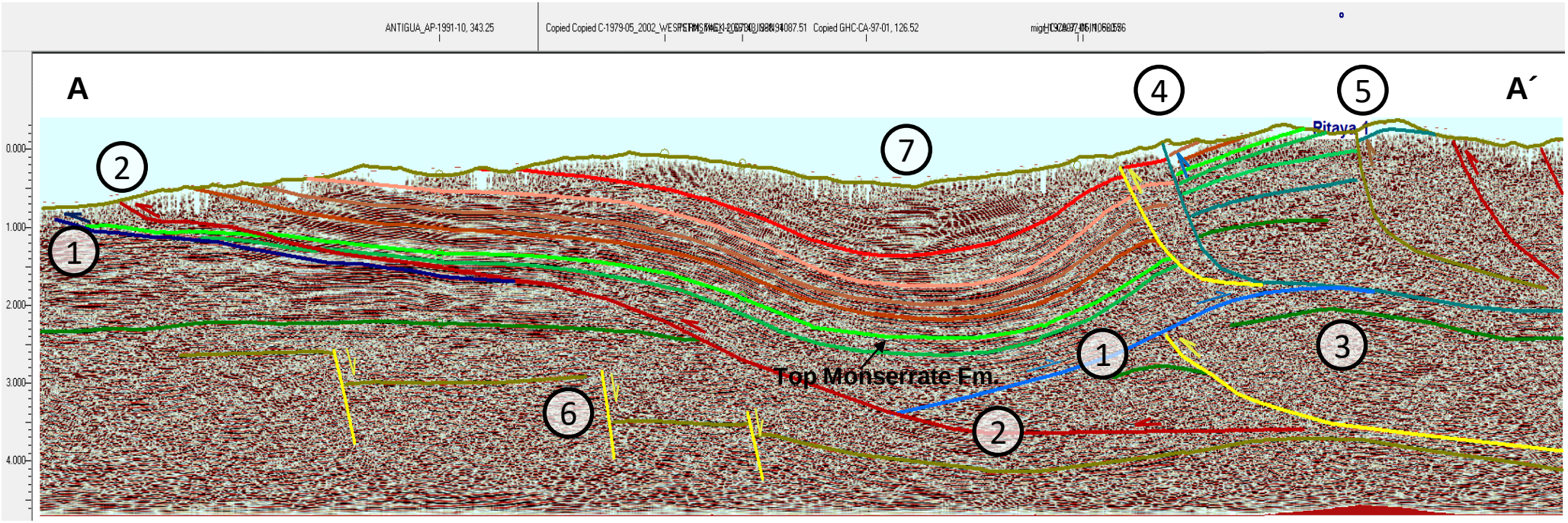
Regional Seismic Interpretation
Thrust Play

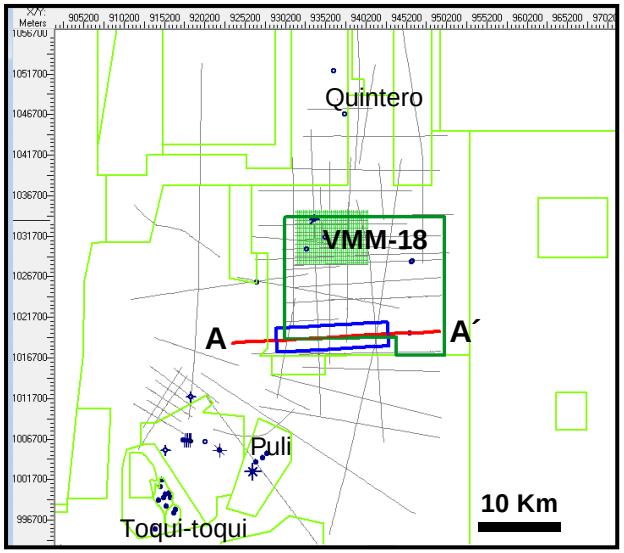
Regional Depth Converted Seismic Section



Source: Montajes JM (2016)

Regional Seismic Section (1)

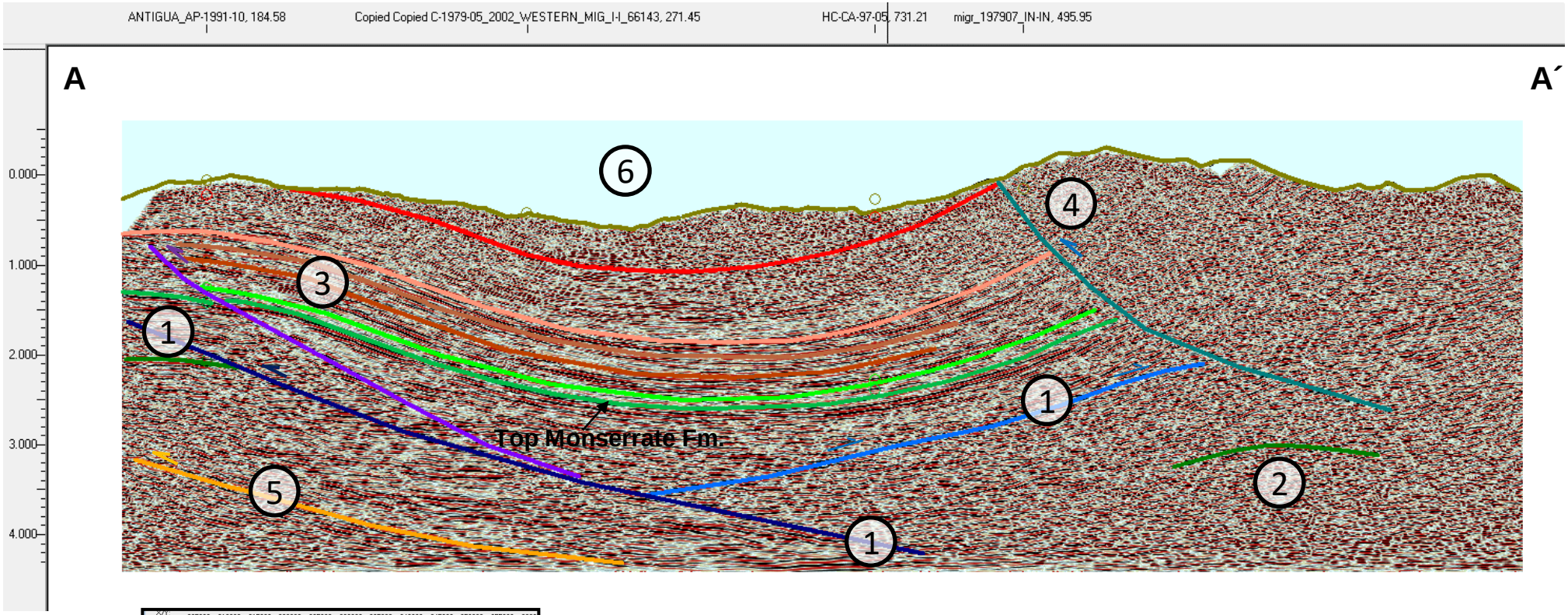


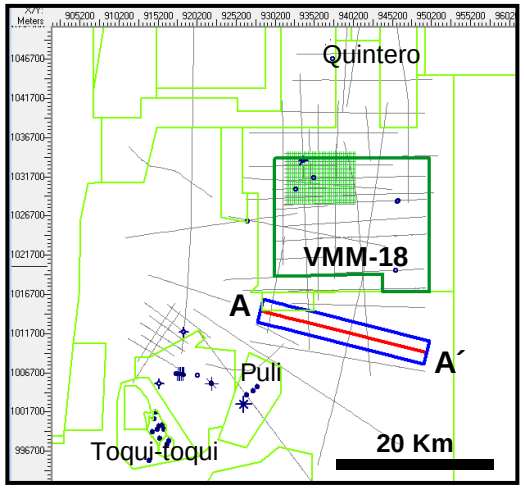


Seismic section across southern part of the block showing:

1. Cambao thrust and backthrust
2. Viani fault
3. Deep Cretaceous Cimarrona Play
4. Agrado fault emplacing Upper and Lower Cretaceous on top of the Deep Cretaceous structure
5. El Trigo fault
6. Pre-existing normal faults
7. Guaduas Syncline

Regional Seismic Section (2)

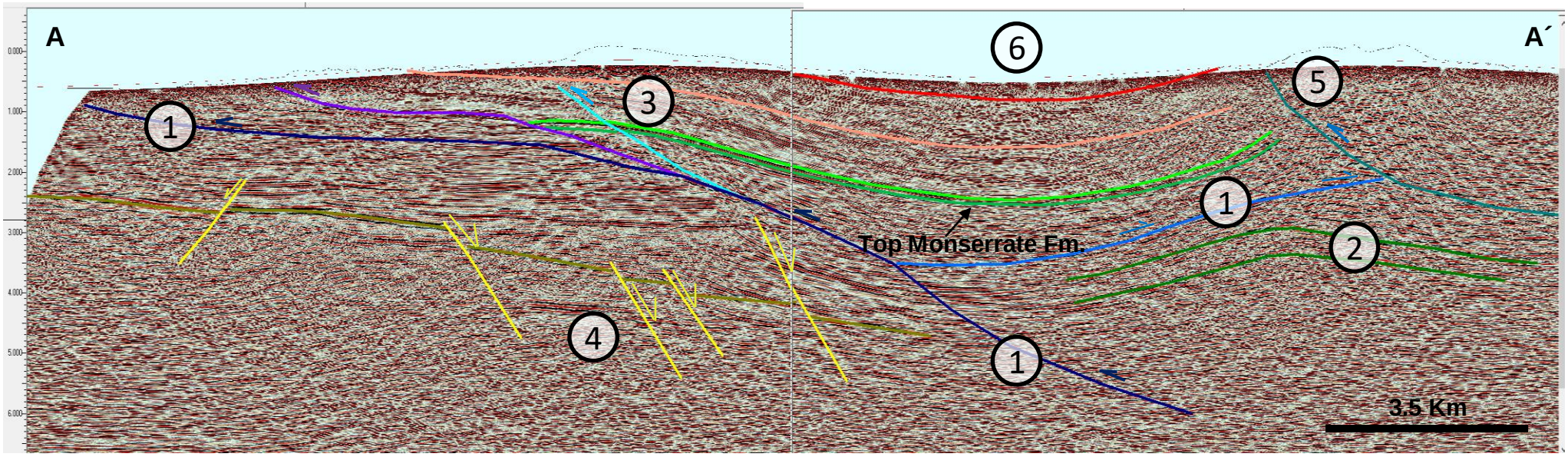


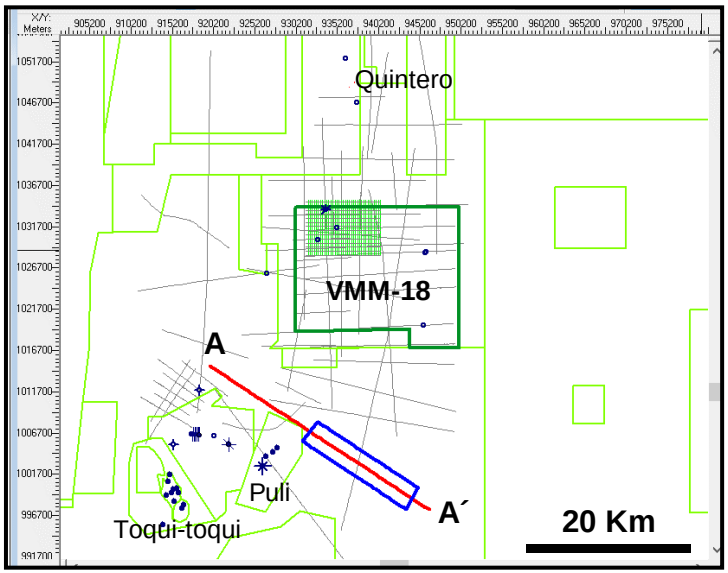


Seismic section showing:

1. Cambao thrust and backthrust
2. Deep Cretaceous Cimarrona Play
3. Hercules type structure
4. Agrado fault emplacing Upper and Lower Cretaceous on top of the Deep Cretaceous structure
5. Beltran thrust
6. Guaduas syncline

Regional Seismic Section (3)

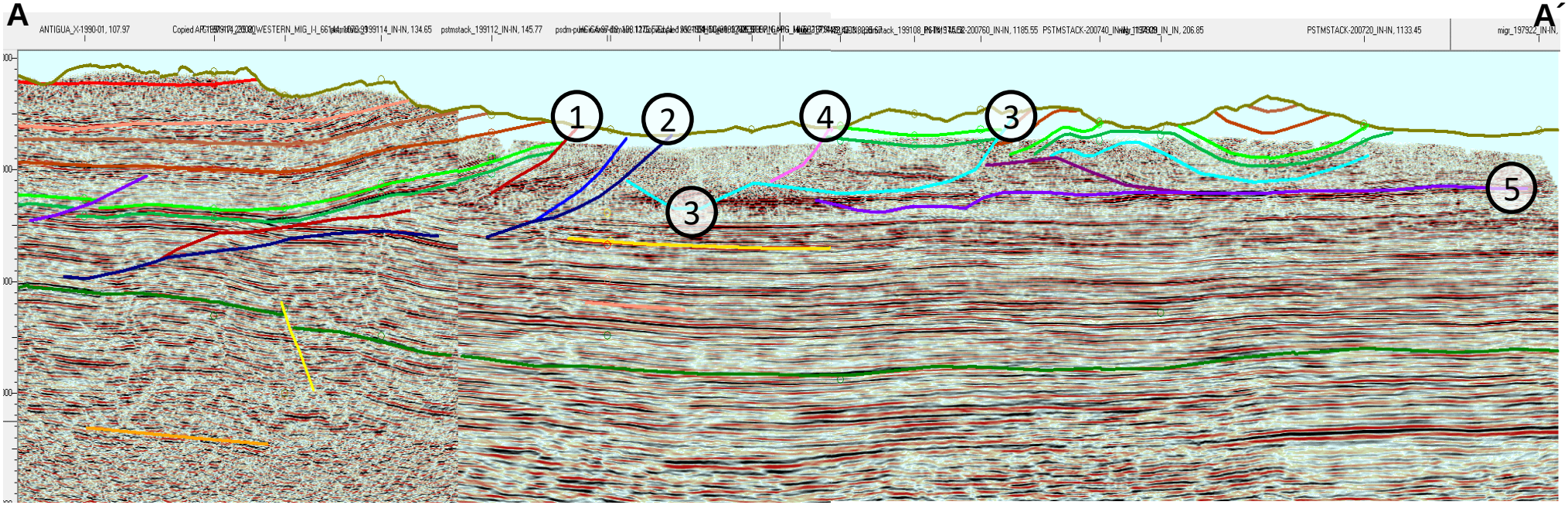


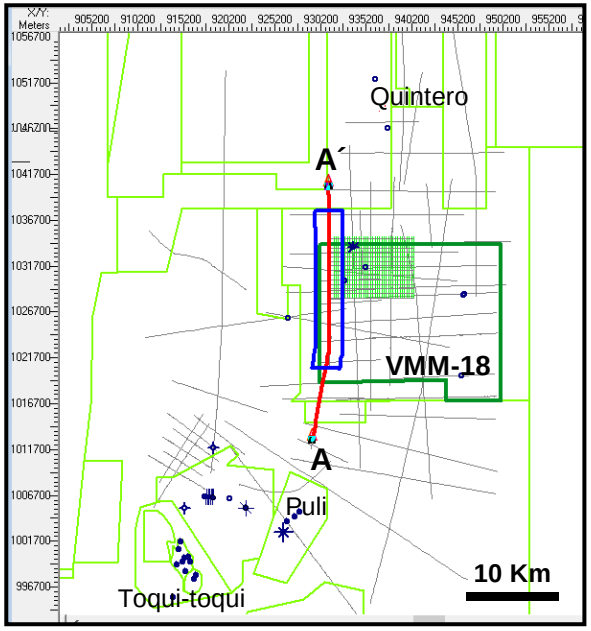


Regional seismic section showing:

1. Cambao thrust and backthrust
2. Deep Cretaceous Cimarrona Play
3. Hercules type structure
4. Pre-existing normal faults
5. Agrado fault emplacing Upper and Lower Cretaceous on top of the Deep Cretaceous structure
6. Guaduas syncline

Regional Seismic Section (4)



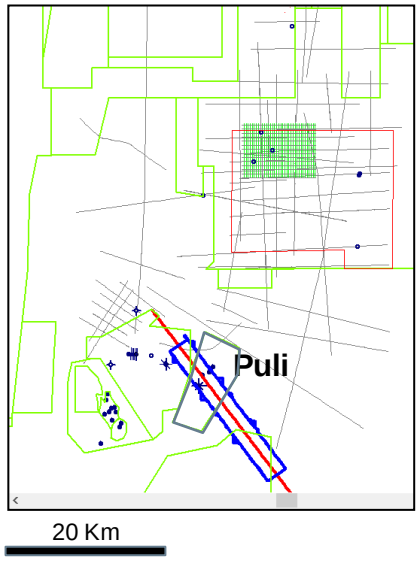


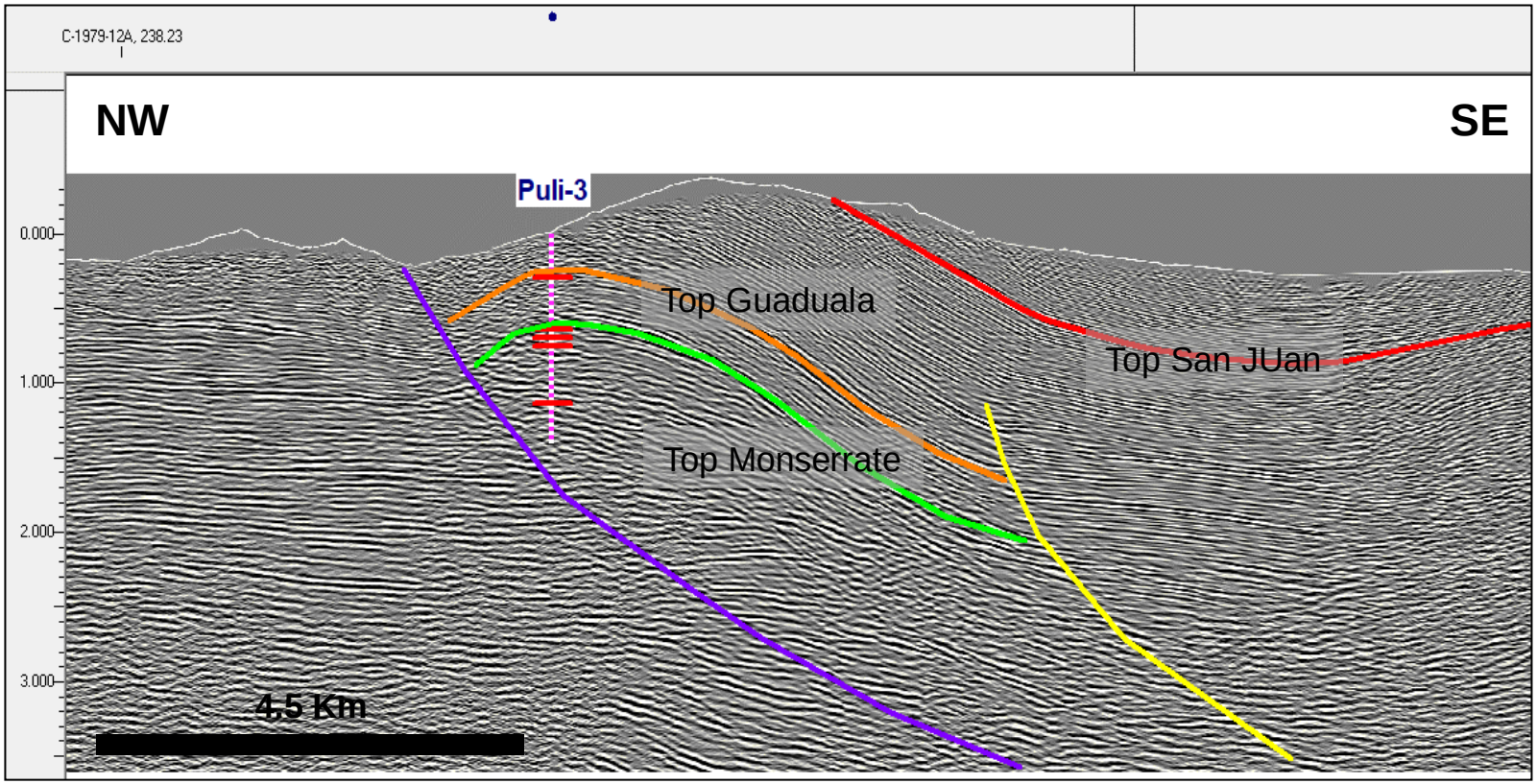
Strike seismic section across block

1. Viani thrust
2. Cambao thrust
3. Doña Ines fault
4. Paniagua fault
5. Cambao North fault

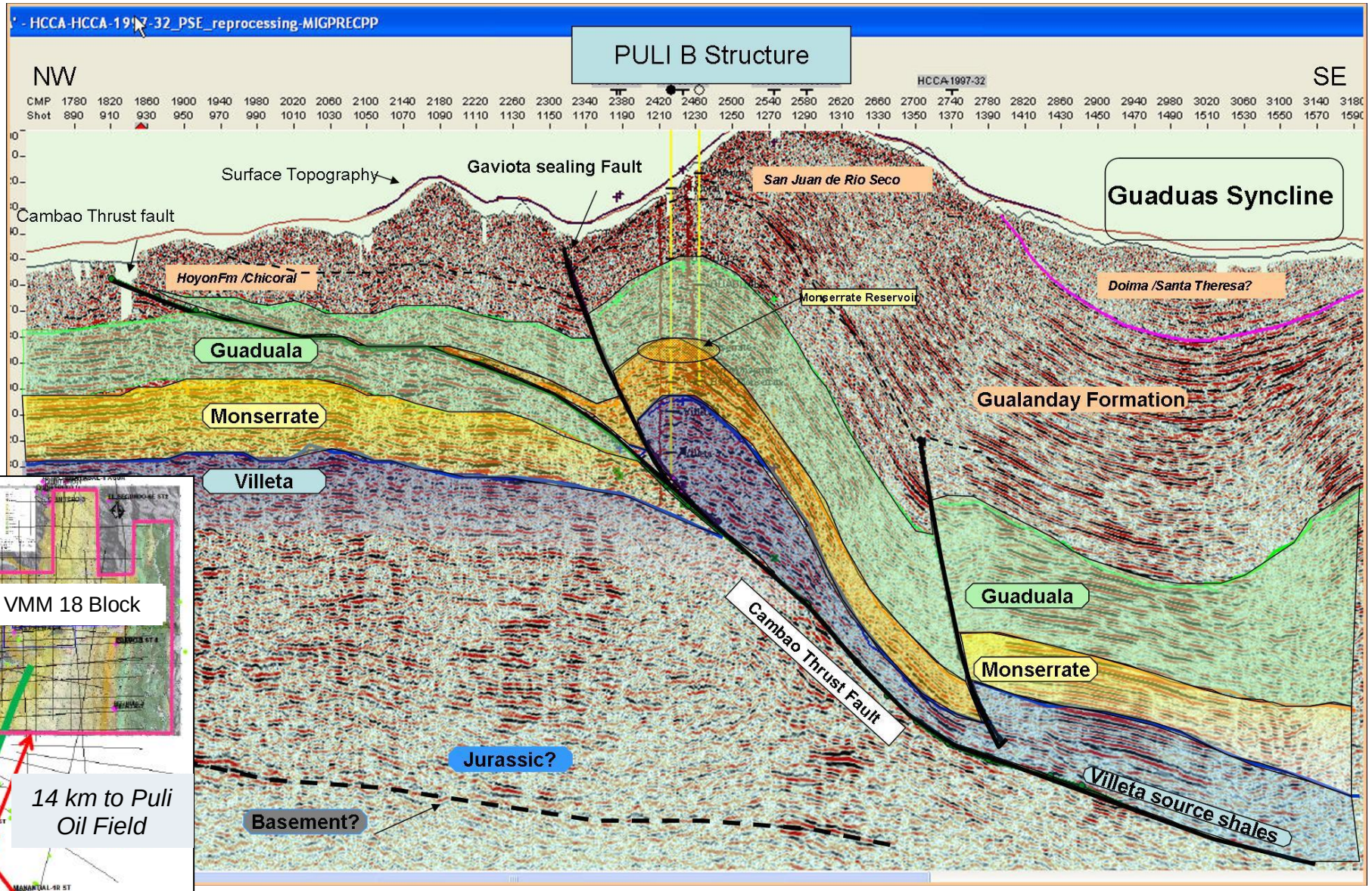
Thrust Play

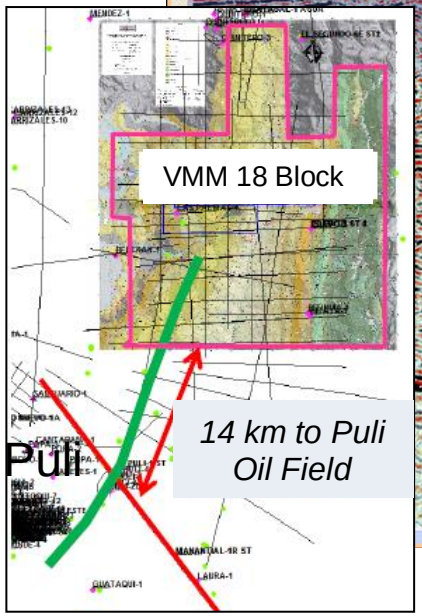
Pulí Oil Field: Thrust Play (1)





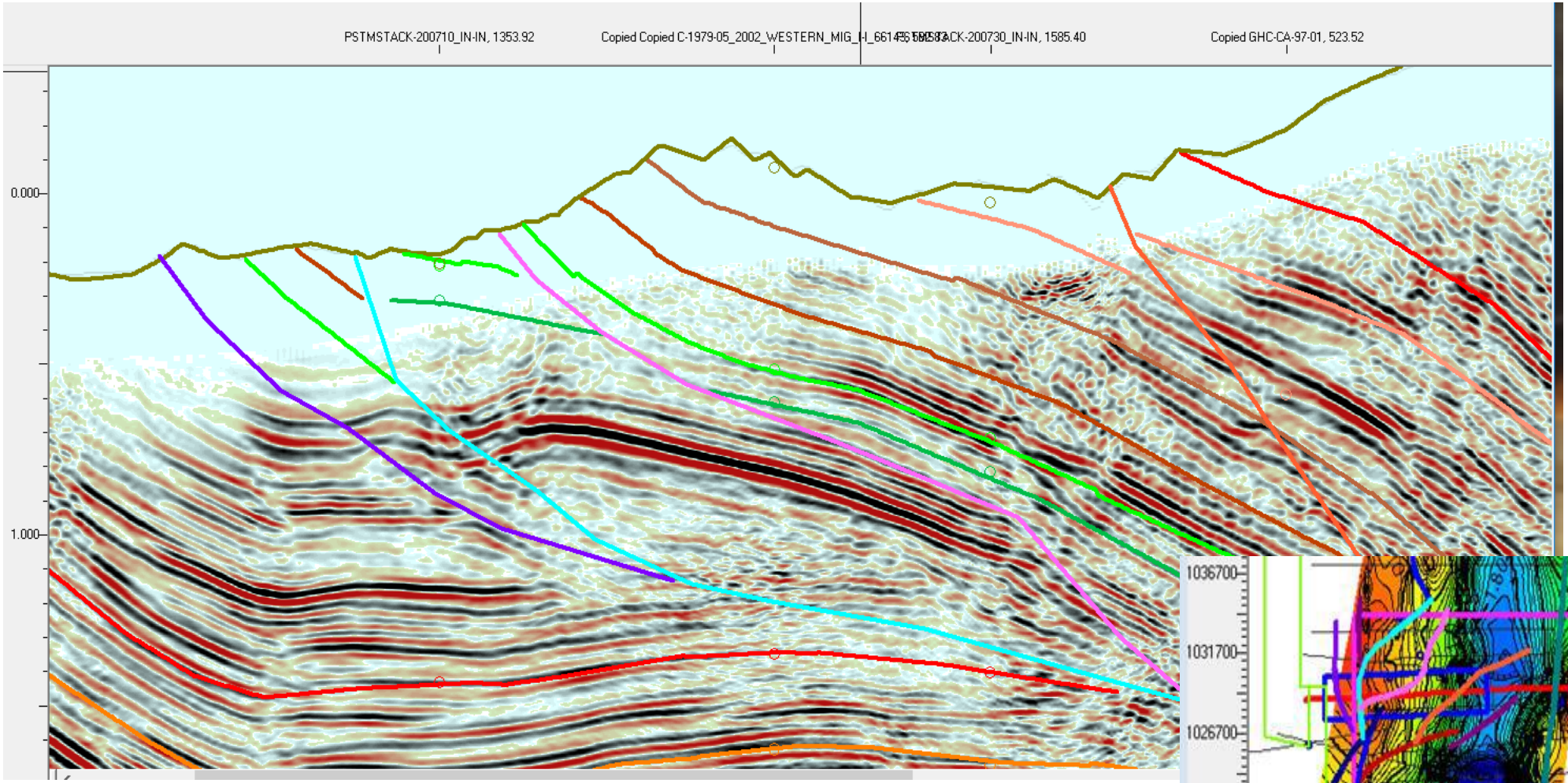
Pulí Oil Field: Thrust Play (2)

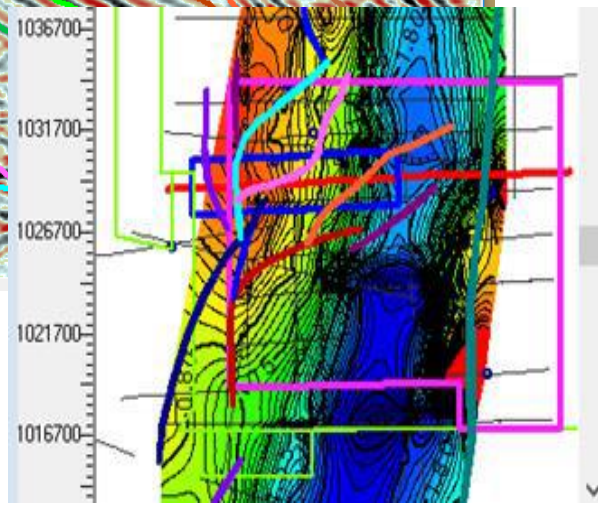




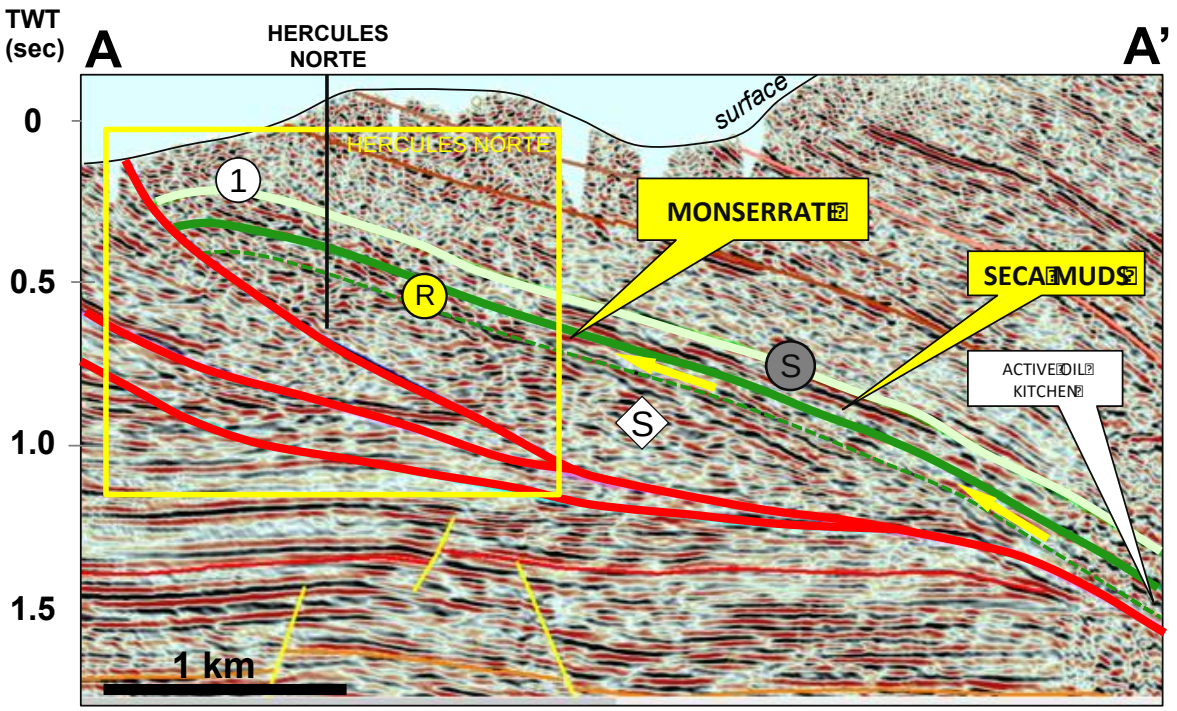
Source: Montajes JM (2016)

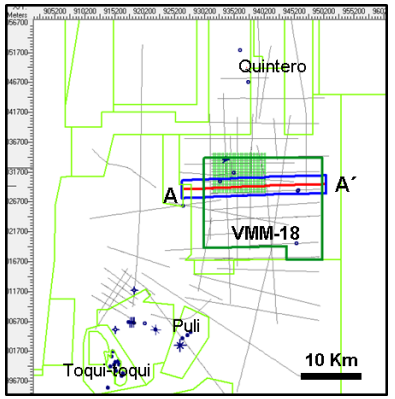
VMM 18 Block: Thrust Play (1)

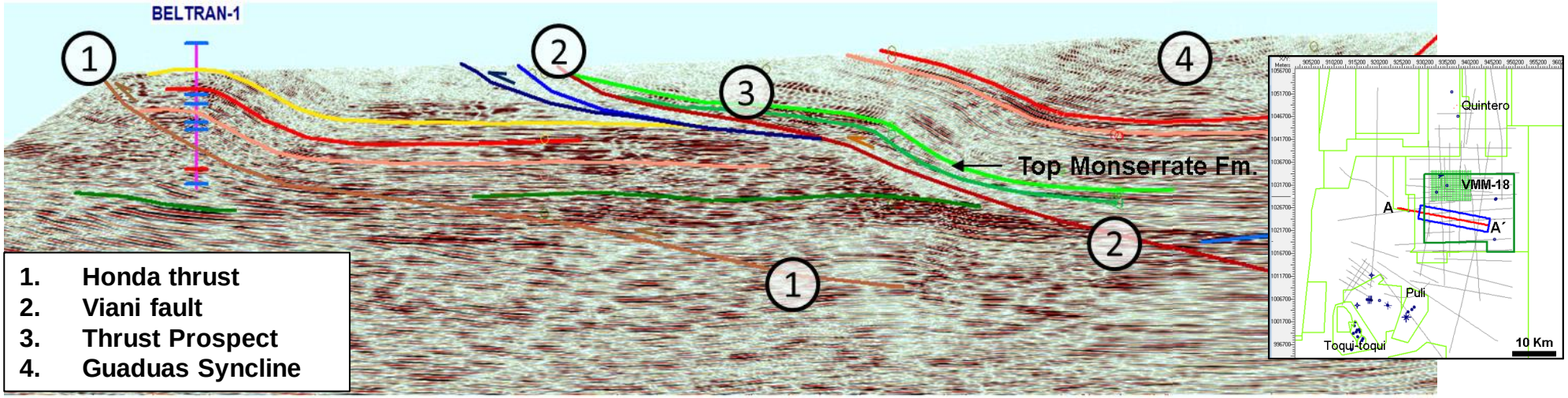




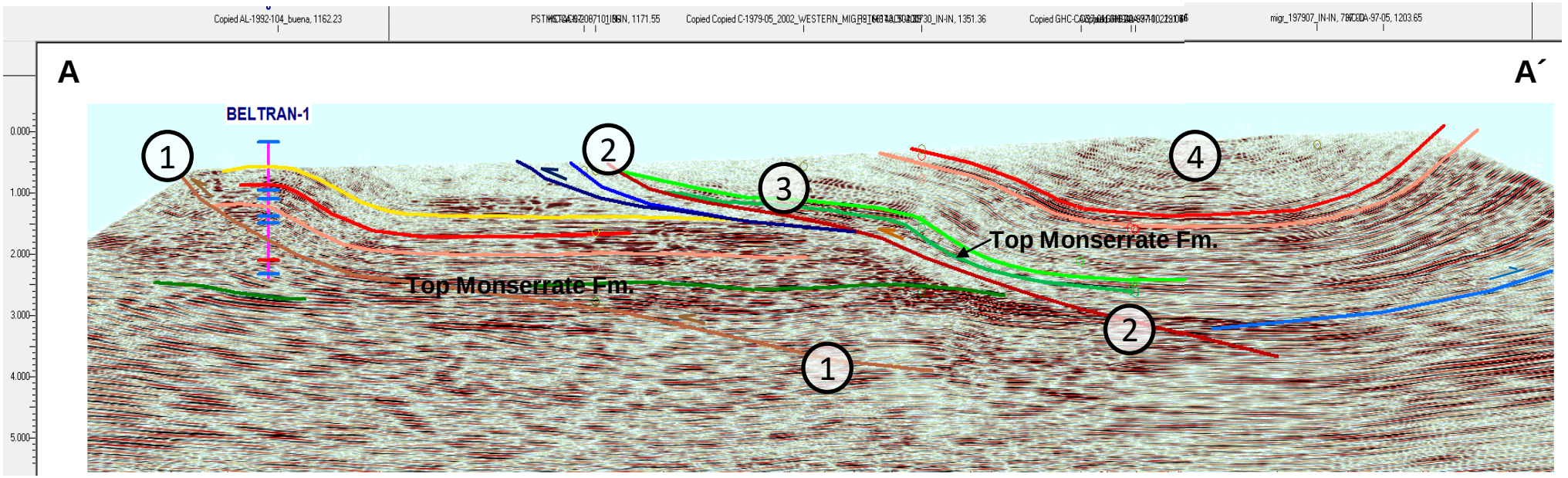
VMM 18 Block: Thrust Play (2)

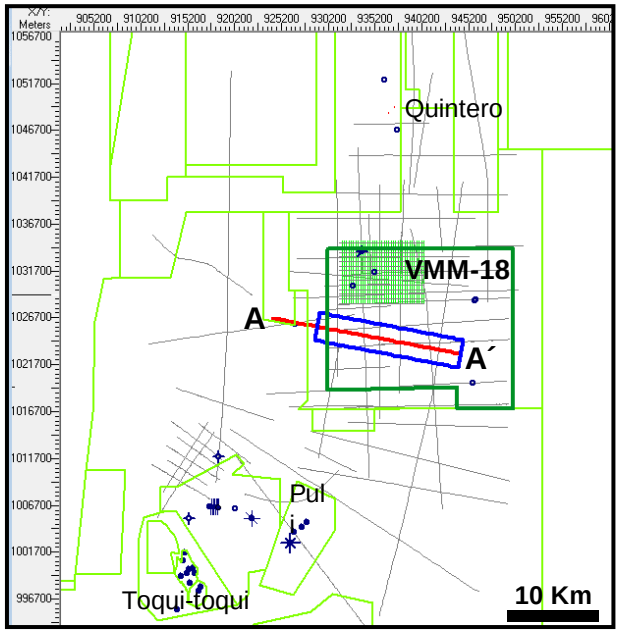






VMM 18 Block: Thrust Play (3)





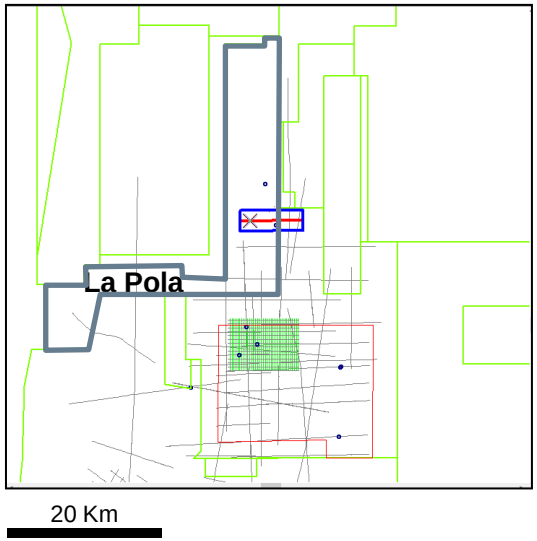
Seismic section across Hercules Prospect

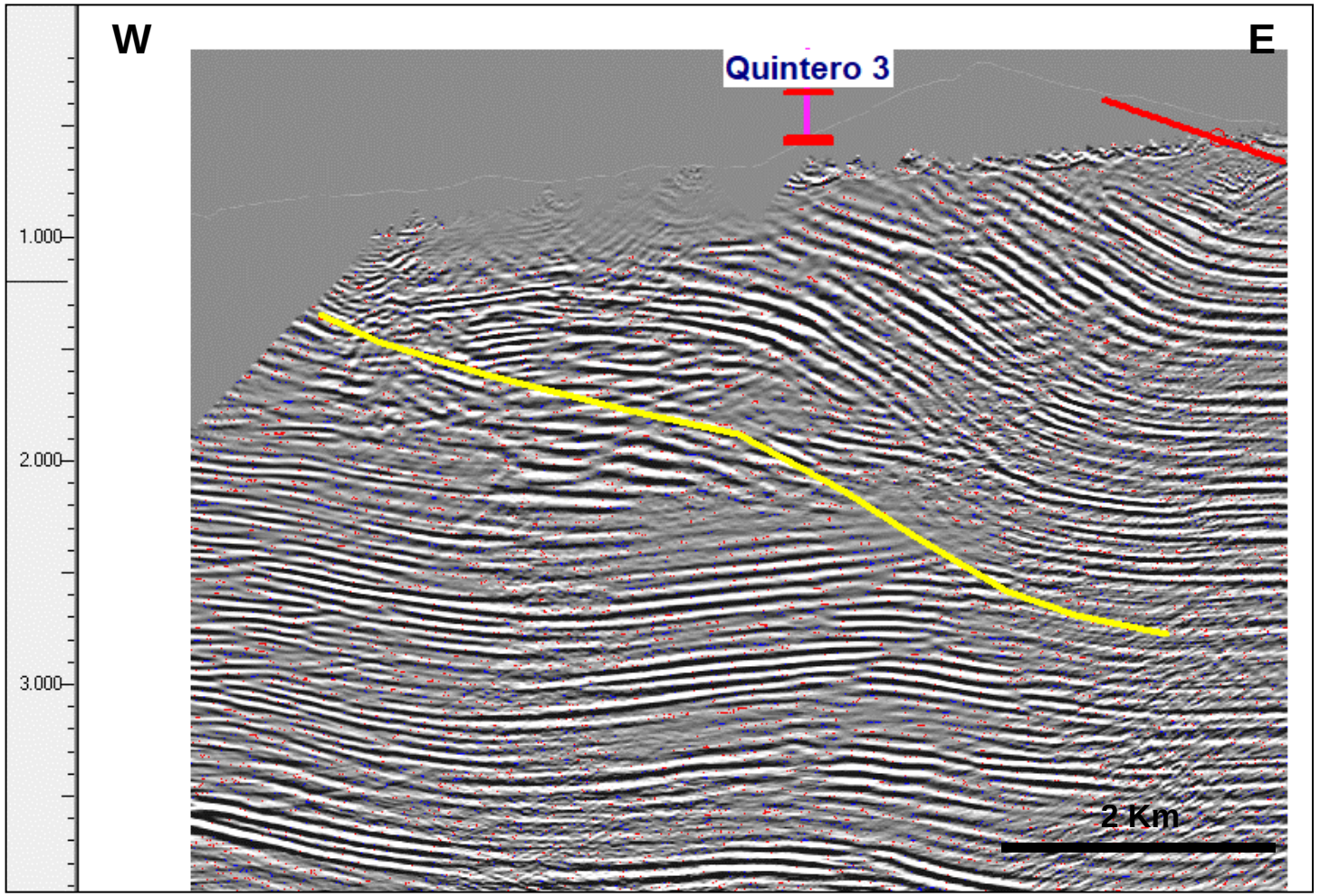
1. Honda thrust
2. Viani fault
3. Hercules Prospect
4. Guaduas Syncline

Seca Fm.

Monserrate Fm.

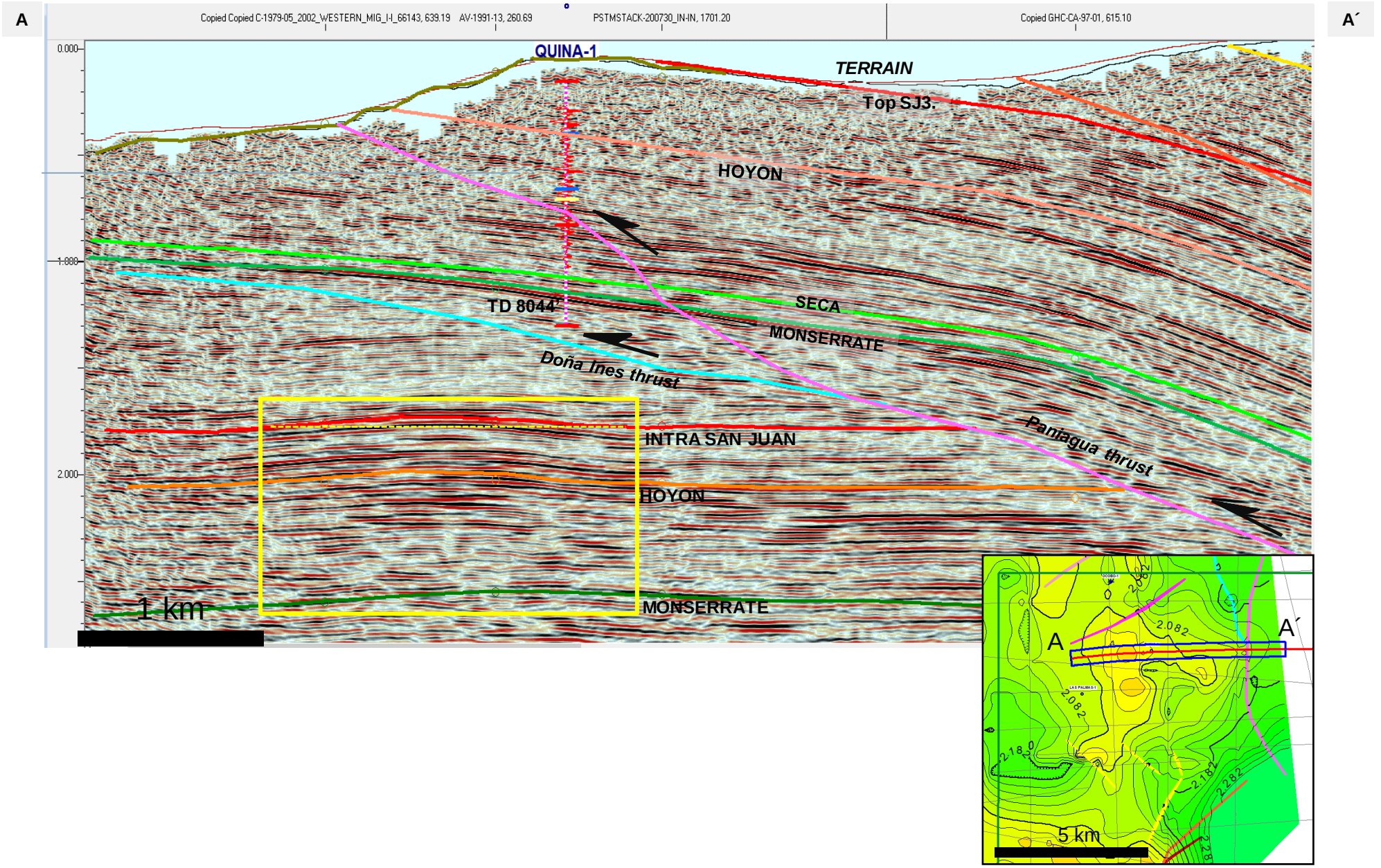
Quintero Oil Field: Thrust Play



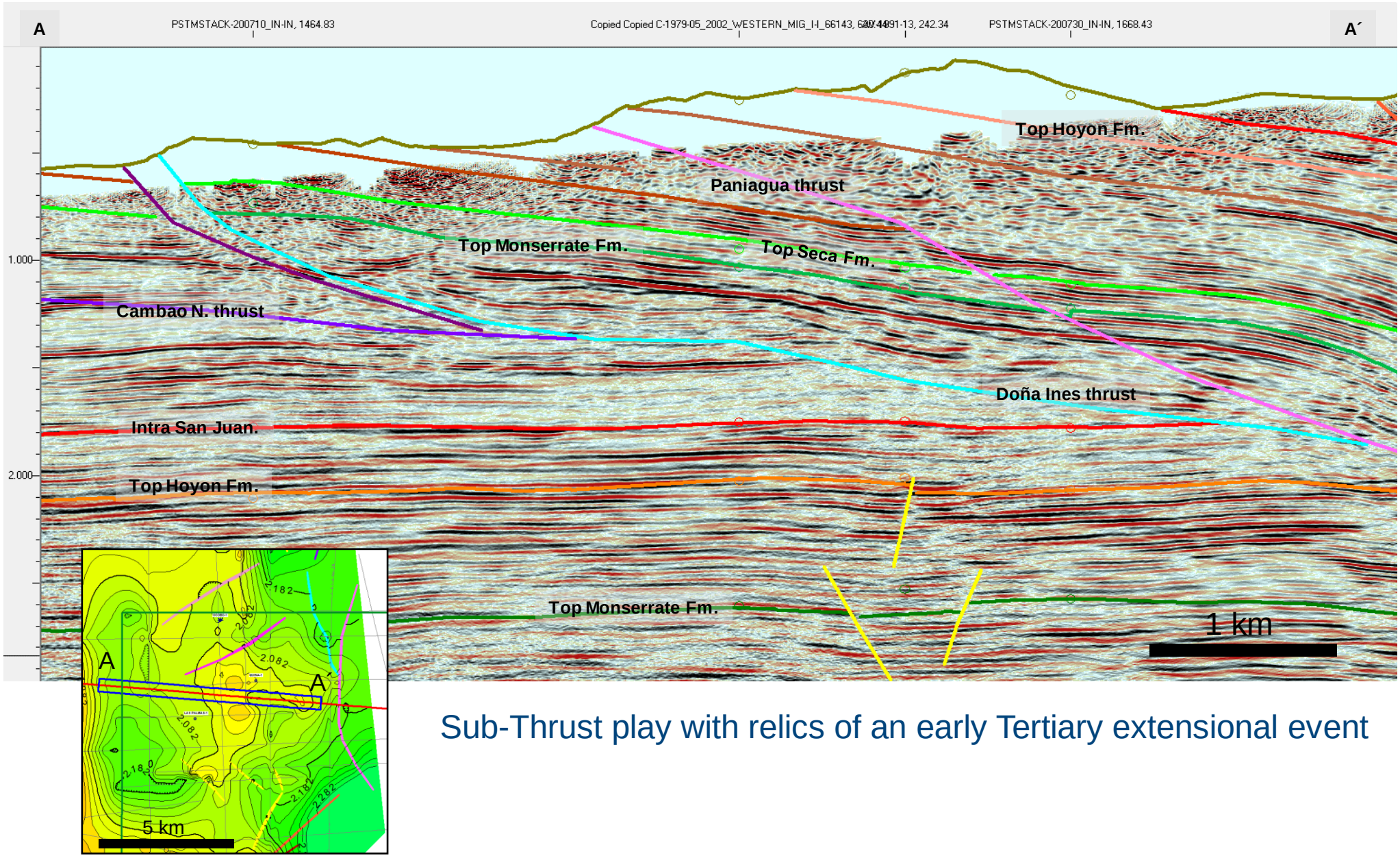


Sub-Thrust Play

VMM 18 Block: Sub-Thrust Play (1)

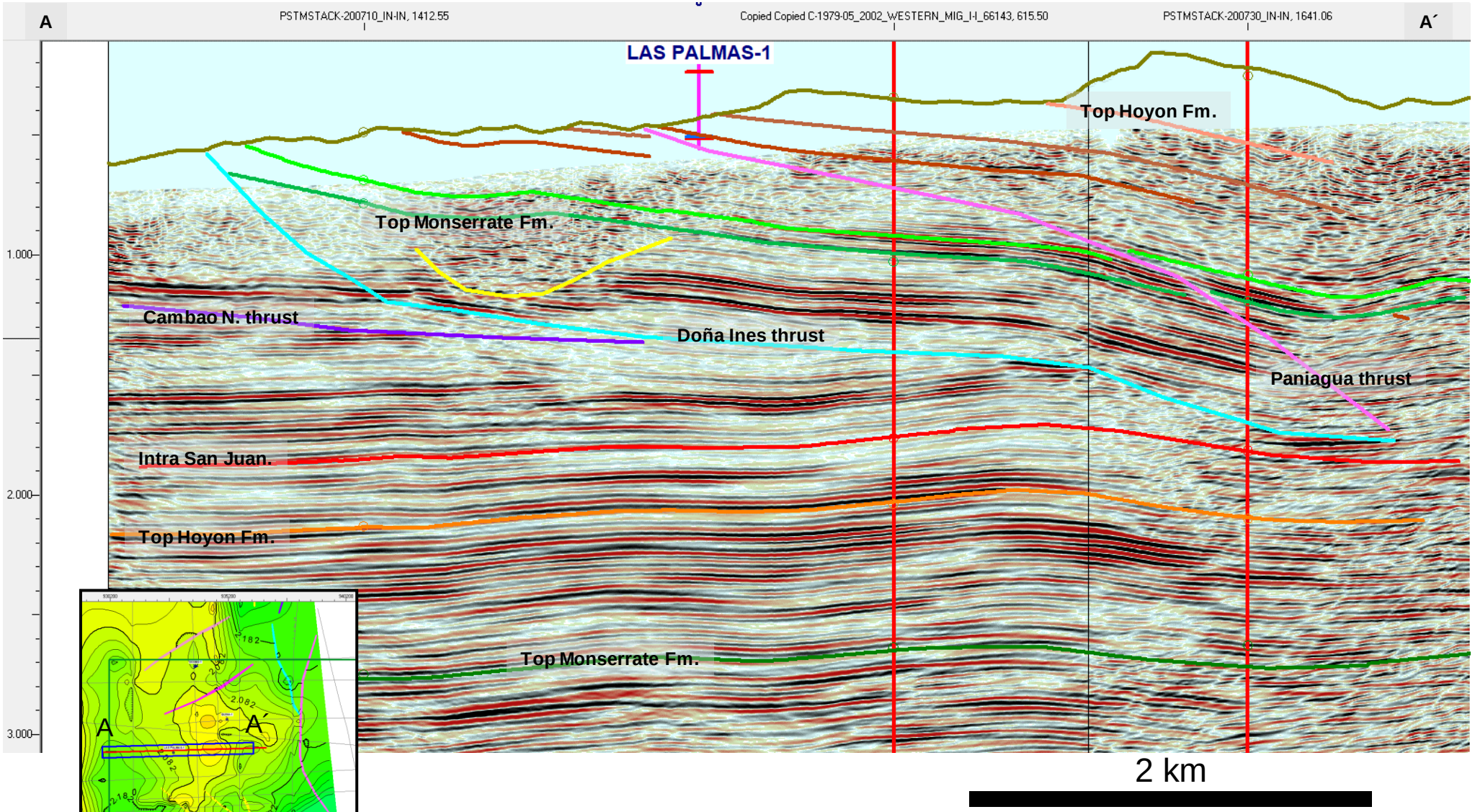


VMM 18 Block: Sub-Thrust Play (2)



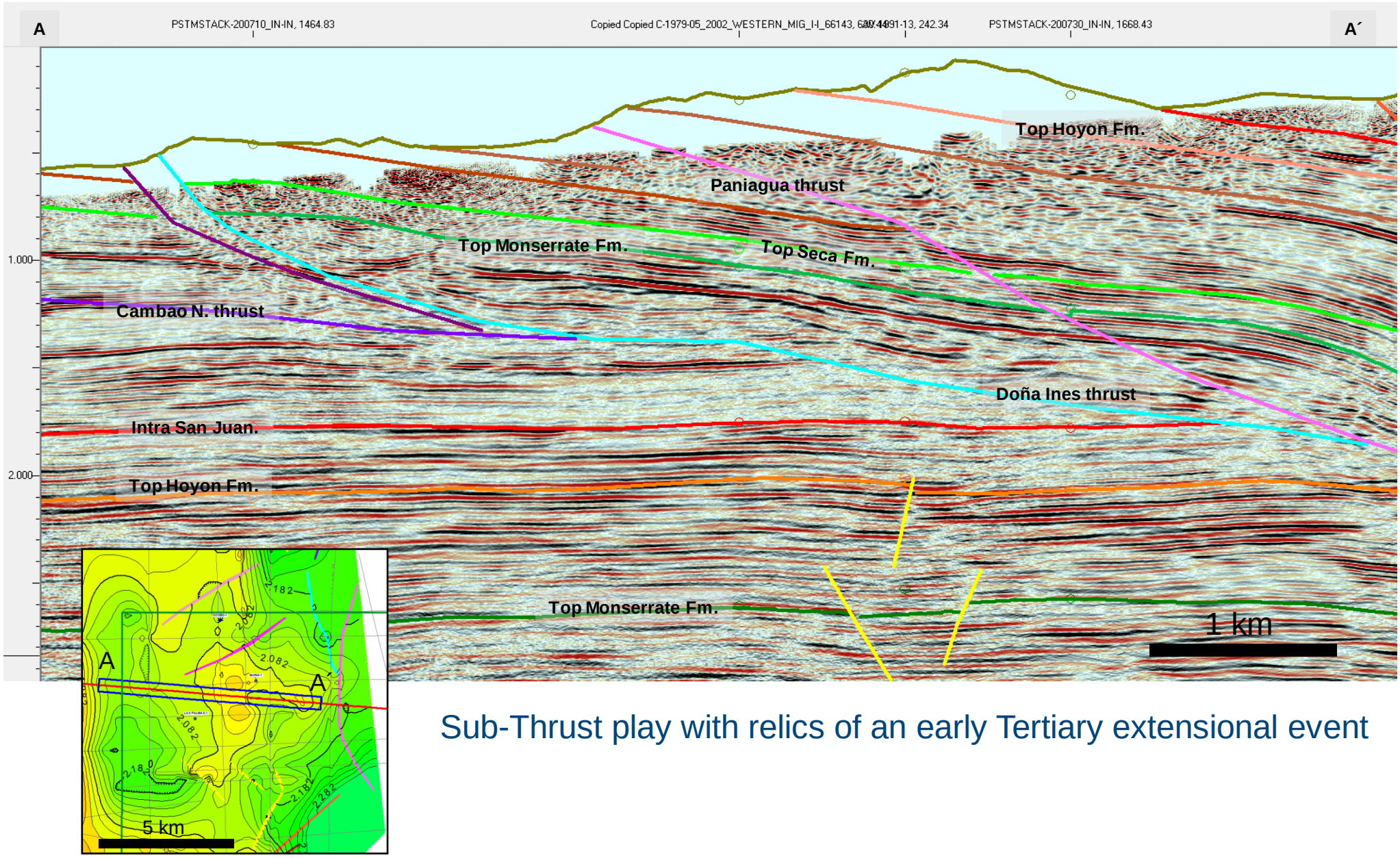
Sub-Thrust play with relics of an early Tertiary extensional event

VMM 18 Block: Sub-Thrust Play (3)



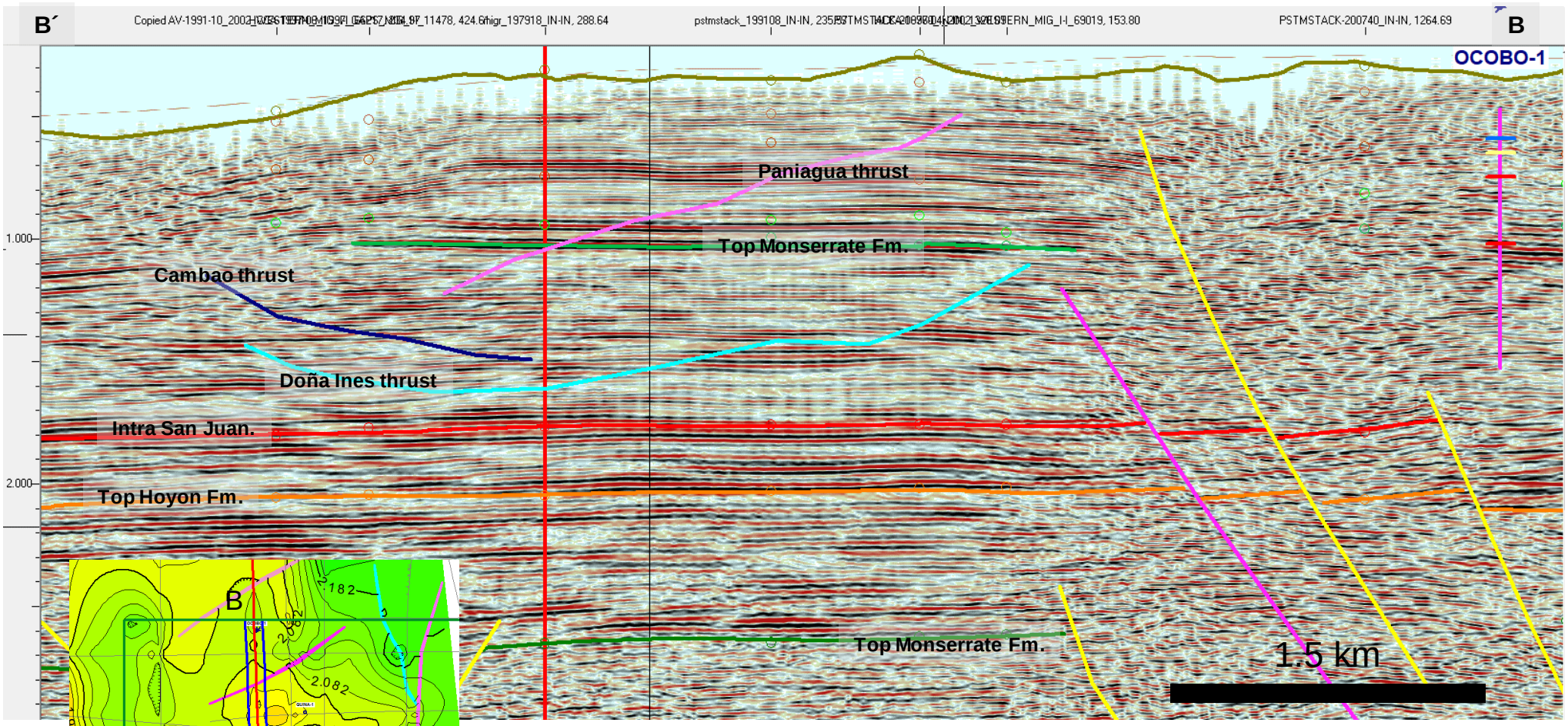
Sub-Thrust Play - Las Palmas 1 Structure

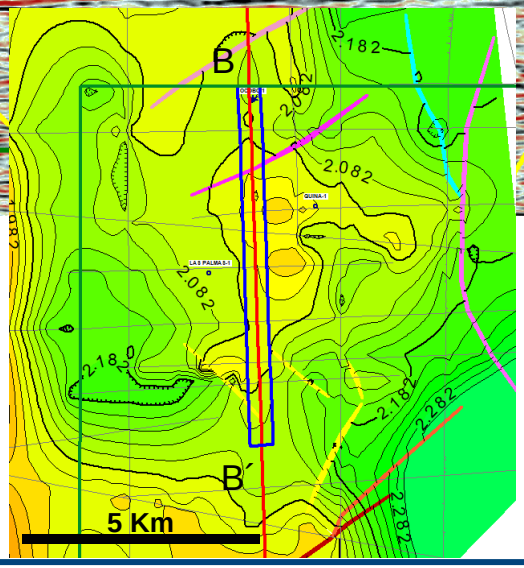
VMM 18 Block: Sub-Thrust Play (4)



Sub-Thrust play with relics of an early Tertiary extensional event

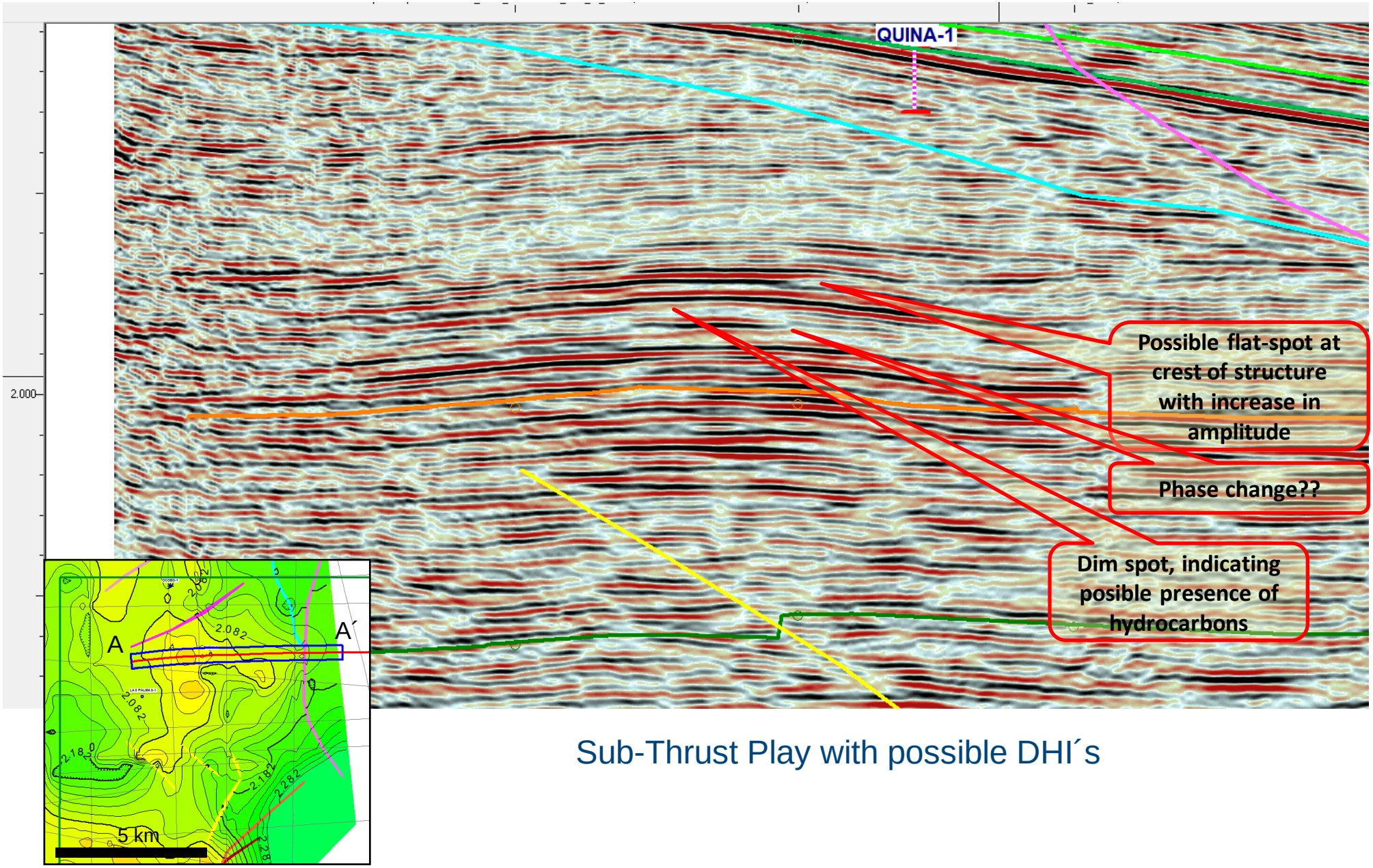
VMM 18 Block: Sub-Thrust Play (5)





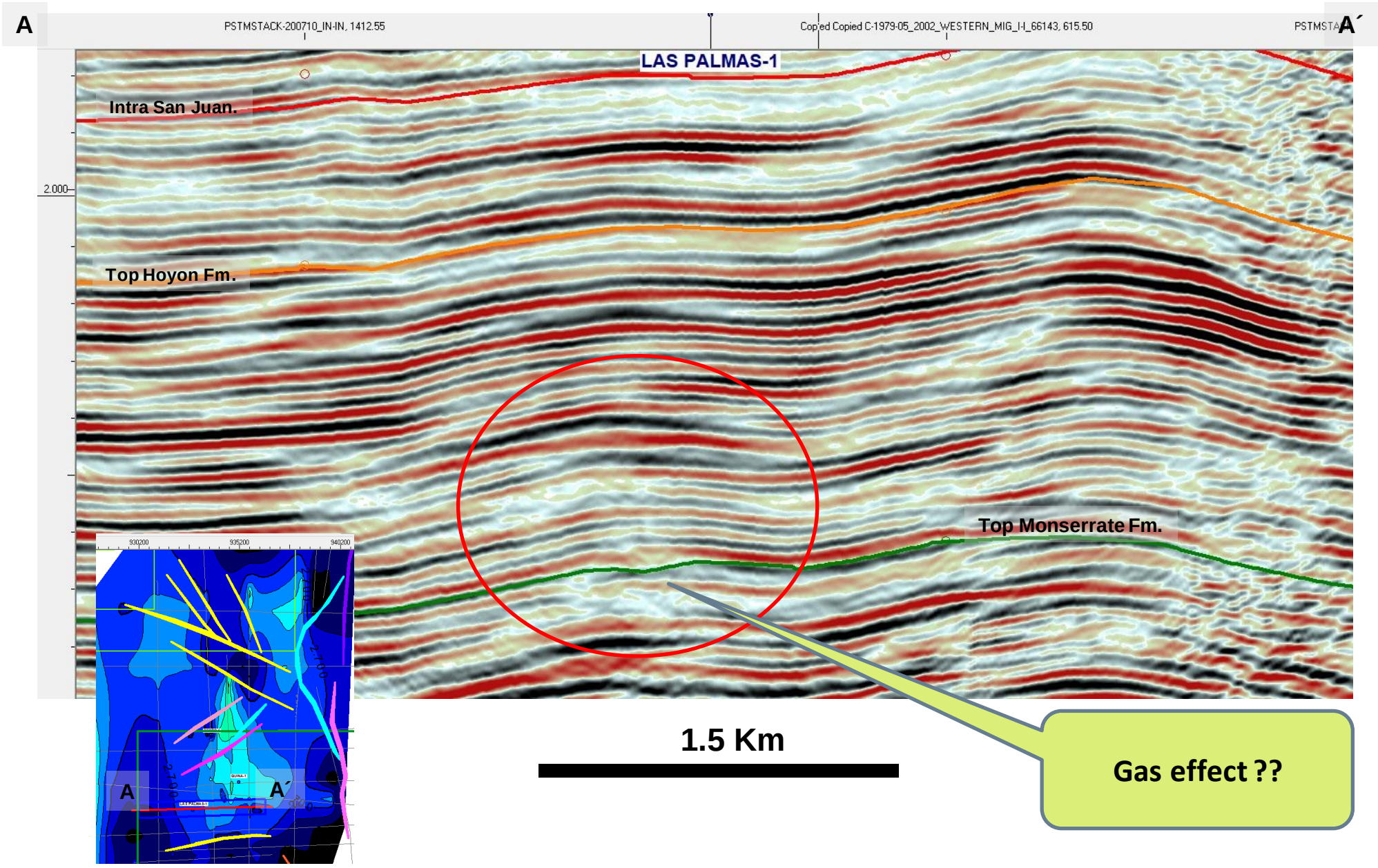
2D seismic strike line across sub-thrust play

VMM 18 Block: Sub-Thrust Play (6)



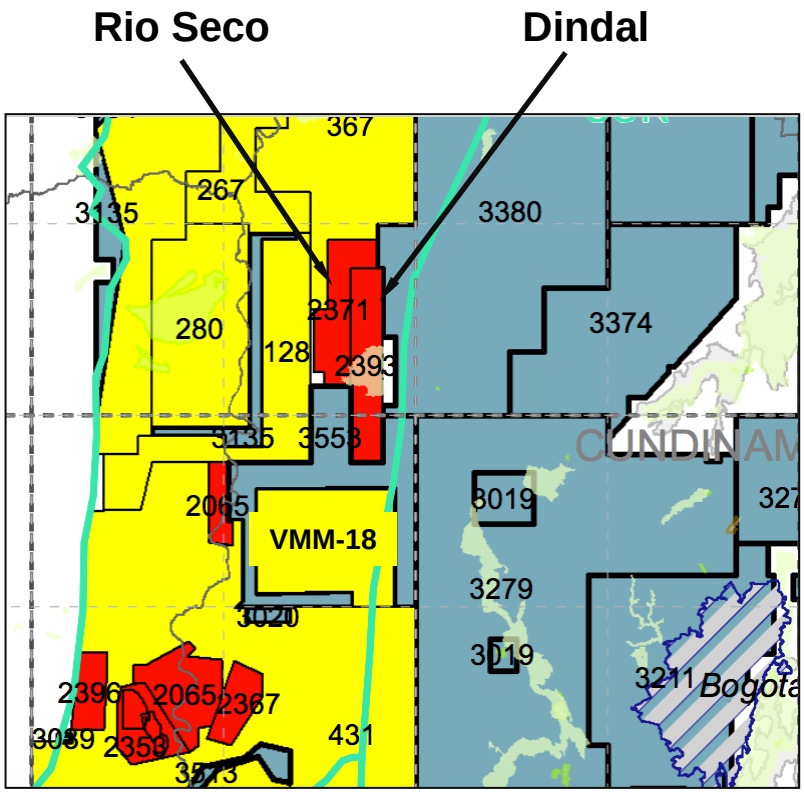
Sub-Thrust Play with possible DHI´s

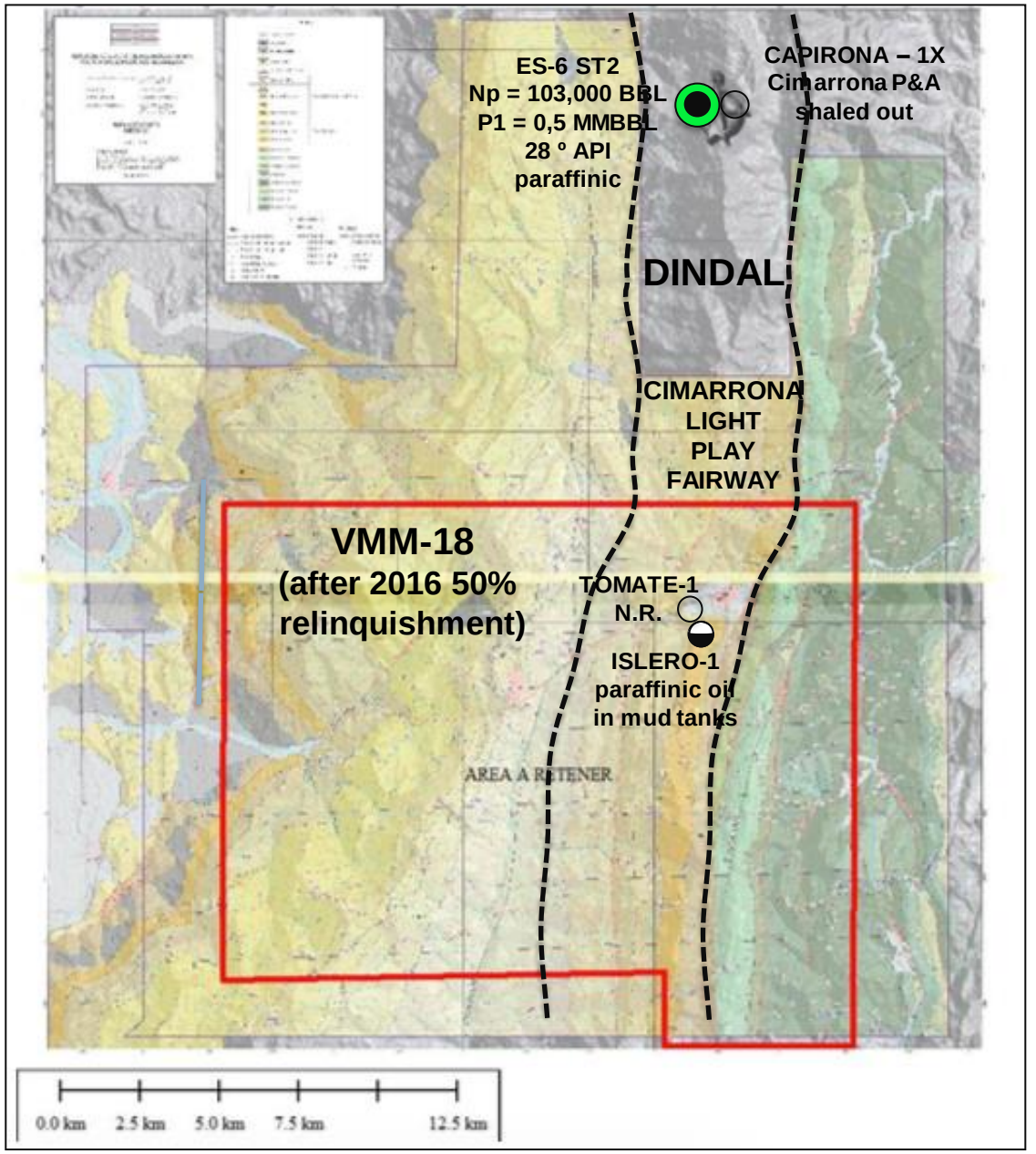
Possible gas effect on top of Monserrate Fm.



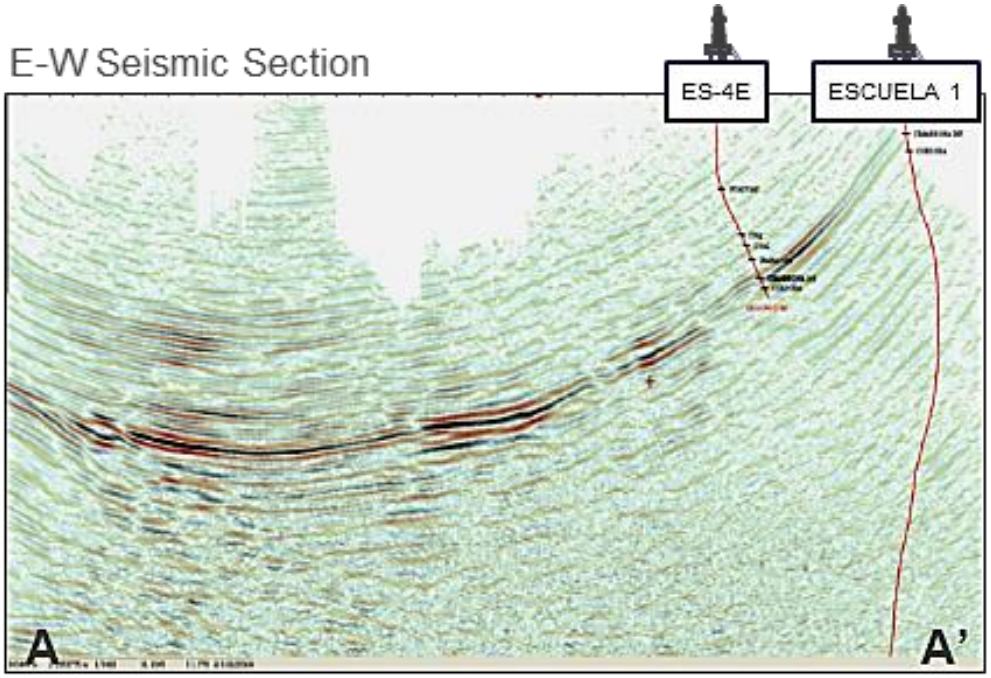
Guaduas Syncline Play
Cimarrona Deep Sub-Thrust Play

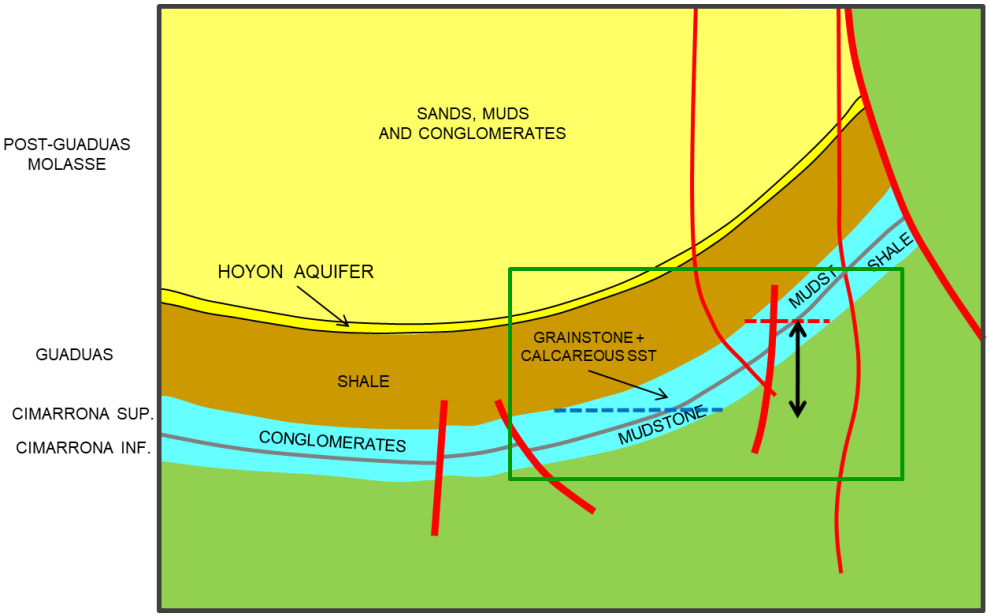
Cimarrona Light Play Fairway





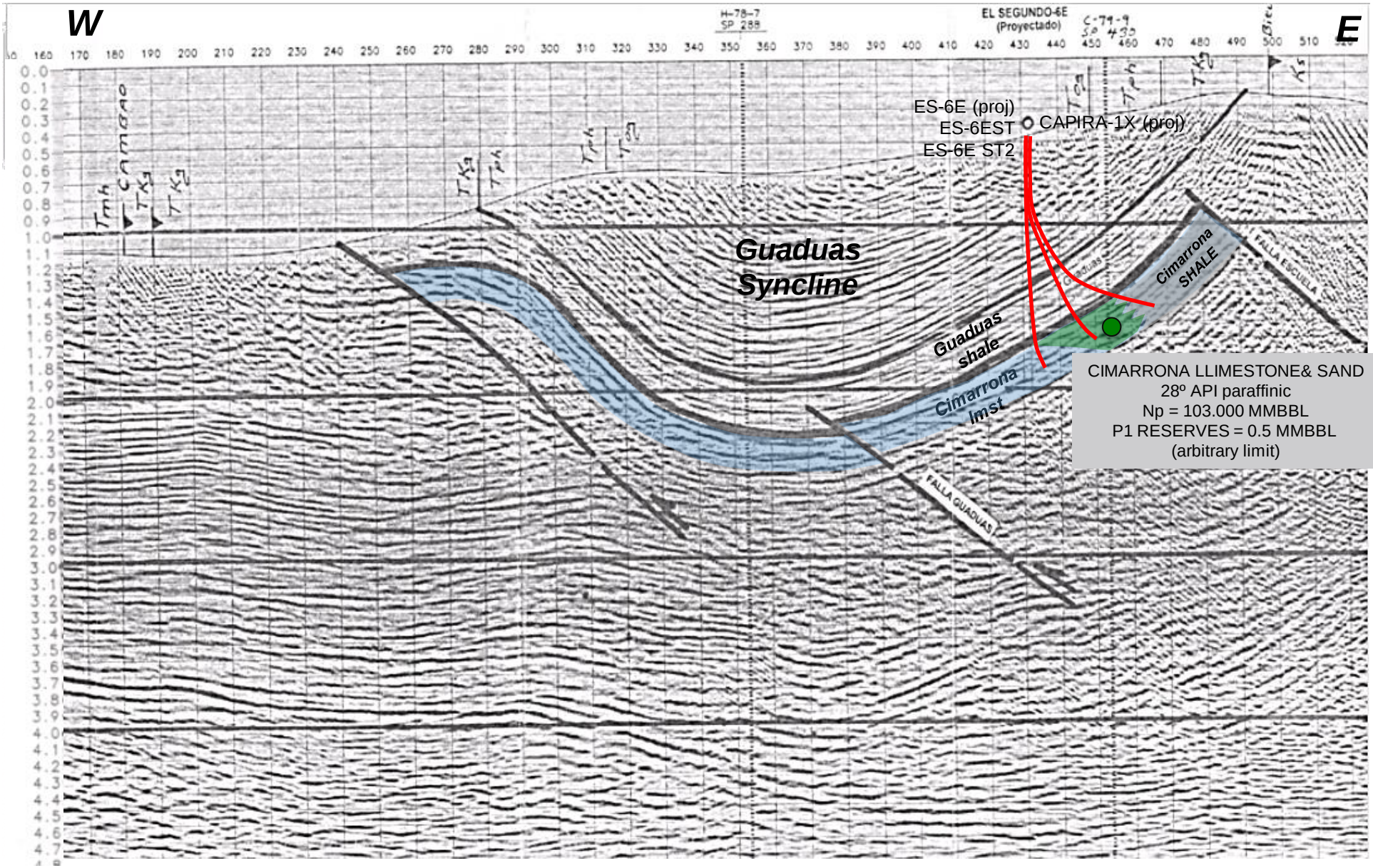
Guaduas Syncline Play (1)





Source: Presentation PRE, 2010

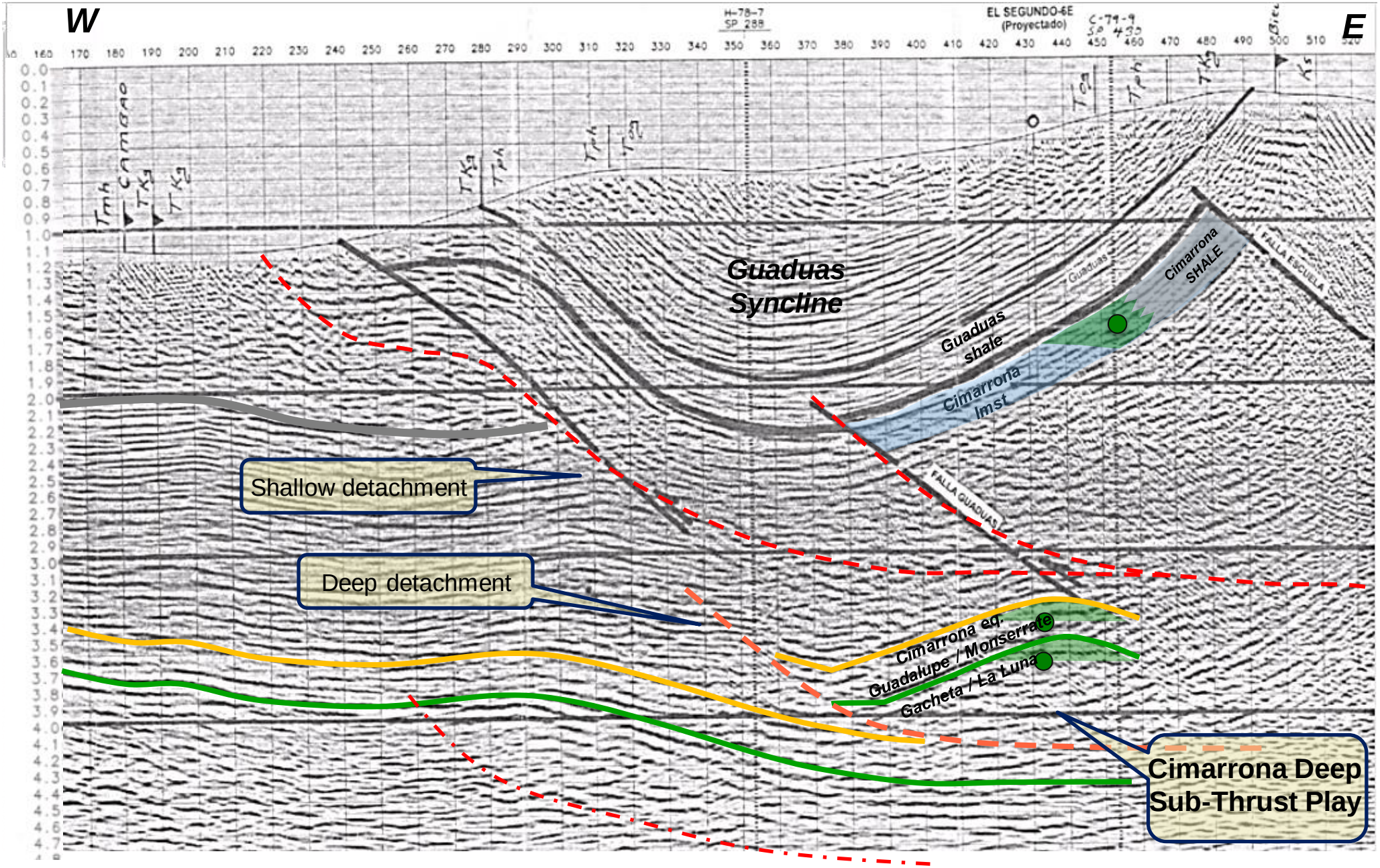
Guaduas Syncline Play (2)



CIMARRONA LLIMESTONE& SAND
28º API paraffinic
Np = 103.000 MMBBL
P1 RESERVES = 0.5 MMBBL
(arbitrary limit)

Cimarrona Deep Sub-Thrust Play

Cimarrona Deep Sub-Thrust Play



END

L. Porras[1,2], J.F. Arminio[1], A. Lara[1] and M. Ostos[1]
1) New Stratus Energy (1,2) New Stratus Energy and now Hocol S.A.