

COLOMBIA ROUND 2021

HEAVY OIL PROSPECTIVITY OF COLOMBIA

Ivan D. Olaya Lopez & Eduardo Lozano
Mansarovar Energy

13/08/2021

- Geologist (UIS)
- Master of Science in Geology (Colorado School of Mines)
- Master of Business Administration (MBA) (Universidad de Los Andes)
- Specialist in Exploration Geophysics (Colorado School of Mines)
- Specialist in Management (Universidad de Los Andes)
- Specialist in International Management of Hydrocarbons (U. de Los Andes)

Experience

- Ecopetrol (17 years)
- Hocol (2 years)
- Pacific Rubiales (8 years)
- Mansarovar Energy (4 years)

Volunteering

- AAPG Latin America: Visiting Geologist
- ACGGP Colombia Visiting Geologist
- Bull Scout Colombia 2020 - Present
- ACGGP President 2010-2011
- Guest speaker in topics such as: Seismic Interpretation, Sequence Stratigraphy, Advanced Petroleum Geology in many Faculties of Latin America
- Author of the Lecture Series “Tour Sísmico por varias cuencas sedimentarias de Latinoamérica” (Seismic Tour in many sedimentary basins of Latin America)



Disclaimer

- Only public data was used with academic purposes
- The interpretations are regional and author responsibility
- Confidential data and reports that modify these interpretations could exist
- The main intention is making general statements and not exact locations of prospects

Regional Framework

- Where there is heavy oil in Colombia

- How to predict the future heavy oil discoveries?

Prospectivity

- Llanos Orientales Basin

- *Eastern Margin: Rubiales, Quifa, Río Ariari Type*

- *Western Margin: Castilla Type*

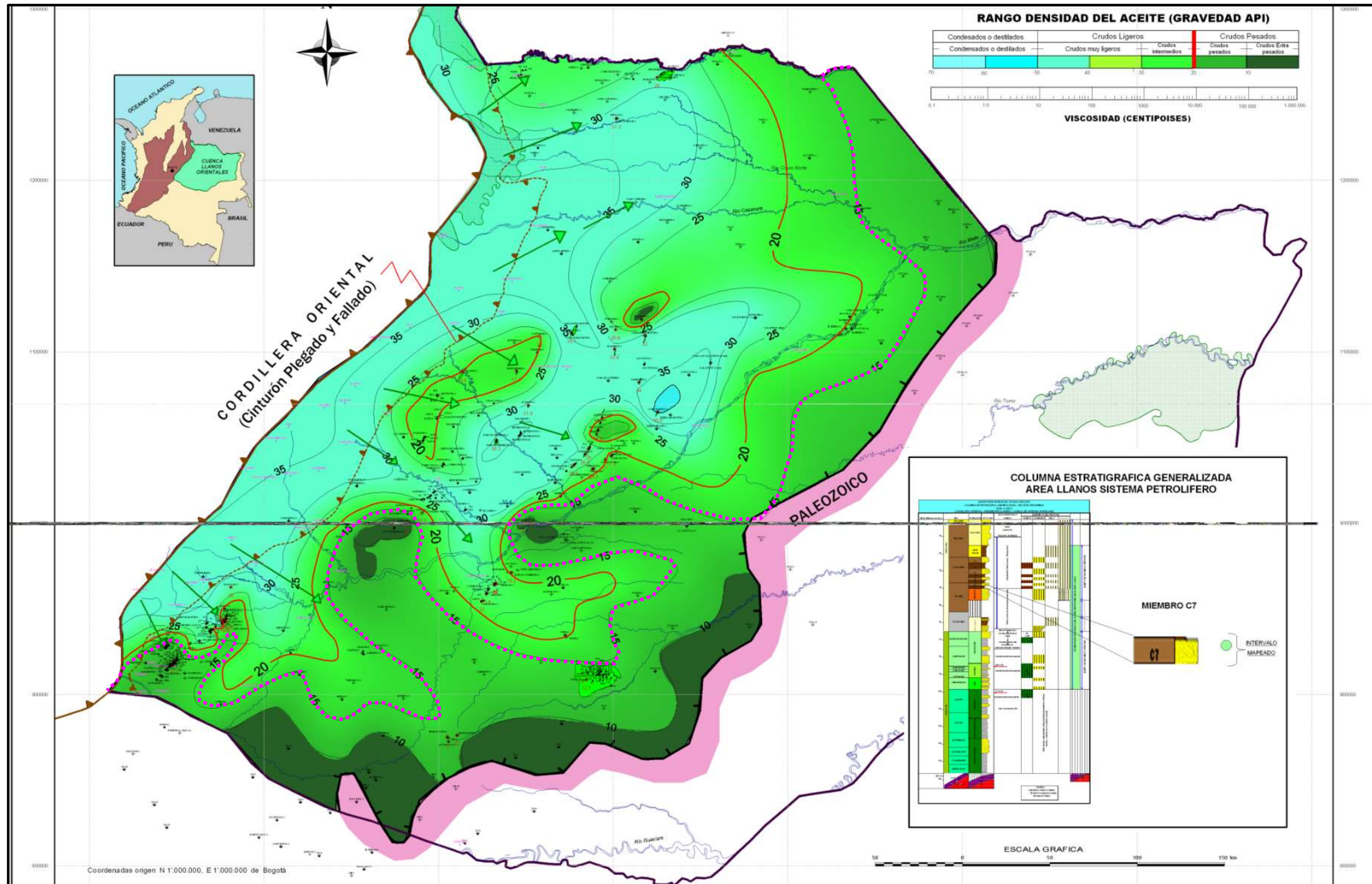
- Caguan Basin: Capella Area

- Putumayo Basin: Solita – 1 Area

- Middle Magdalena Valley Basin

Conclusions and Recommendations

Where there is heavy oil in Colombia Llanos Orientales Basin

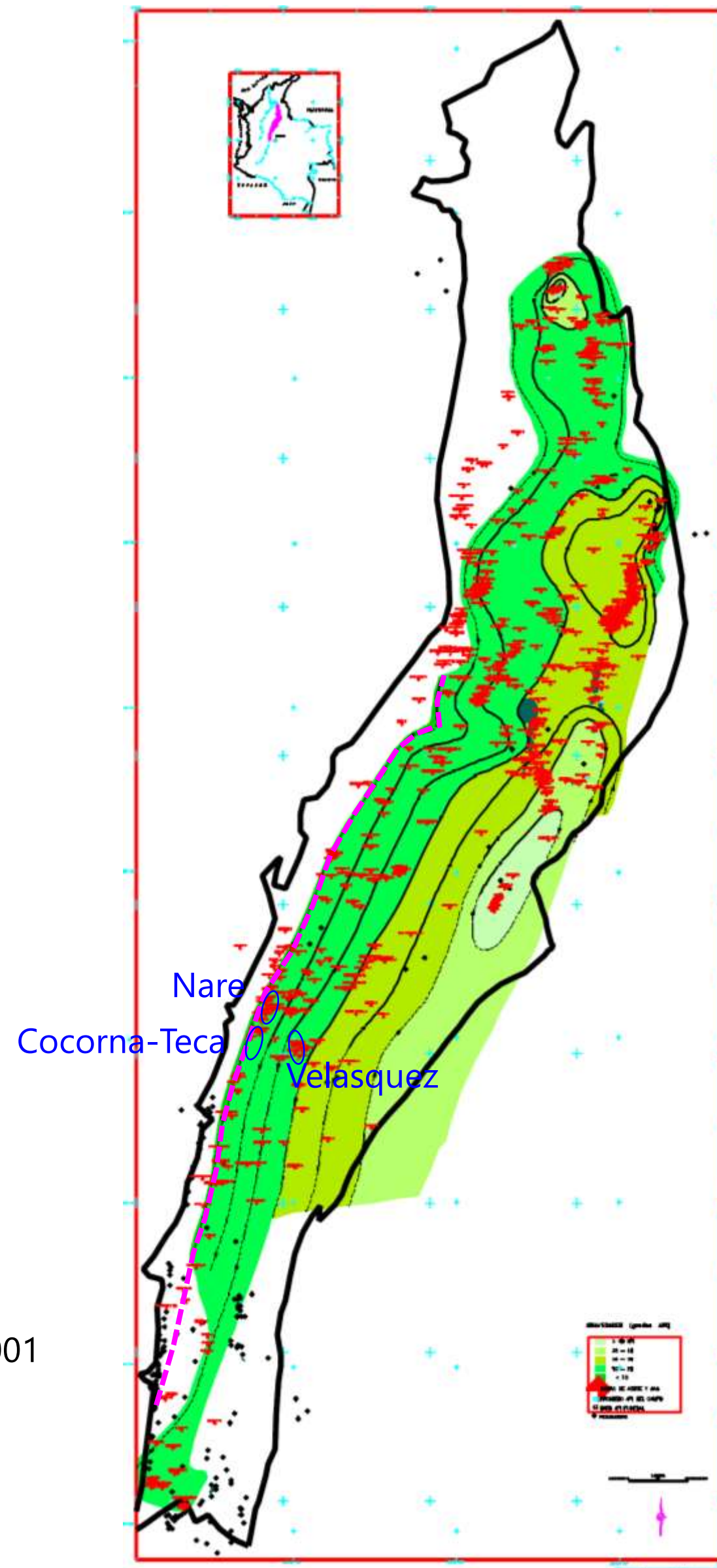


..... 15° API Contour

(Source Halliburton, 2007)

Where there is heavy oil in Colombia Middle Magdalena Valley Basin

..... 15°API Contour



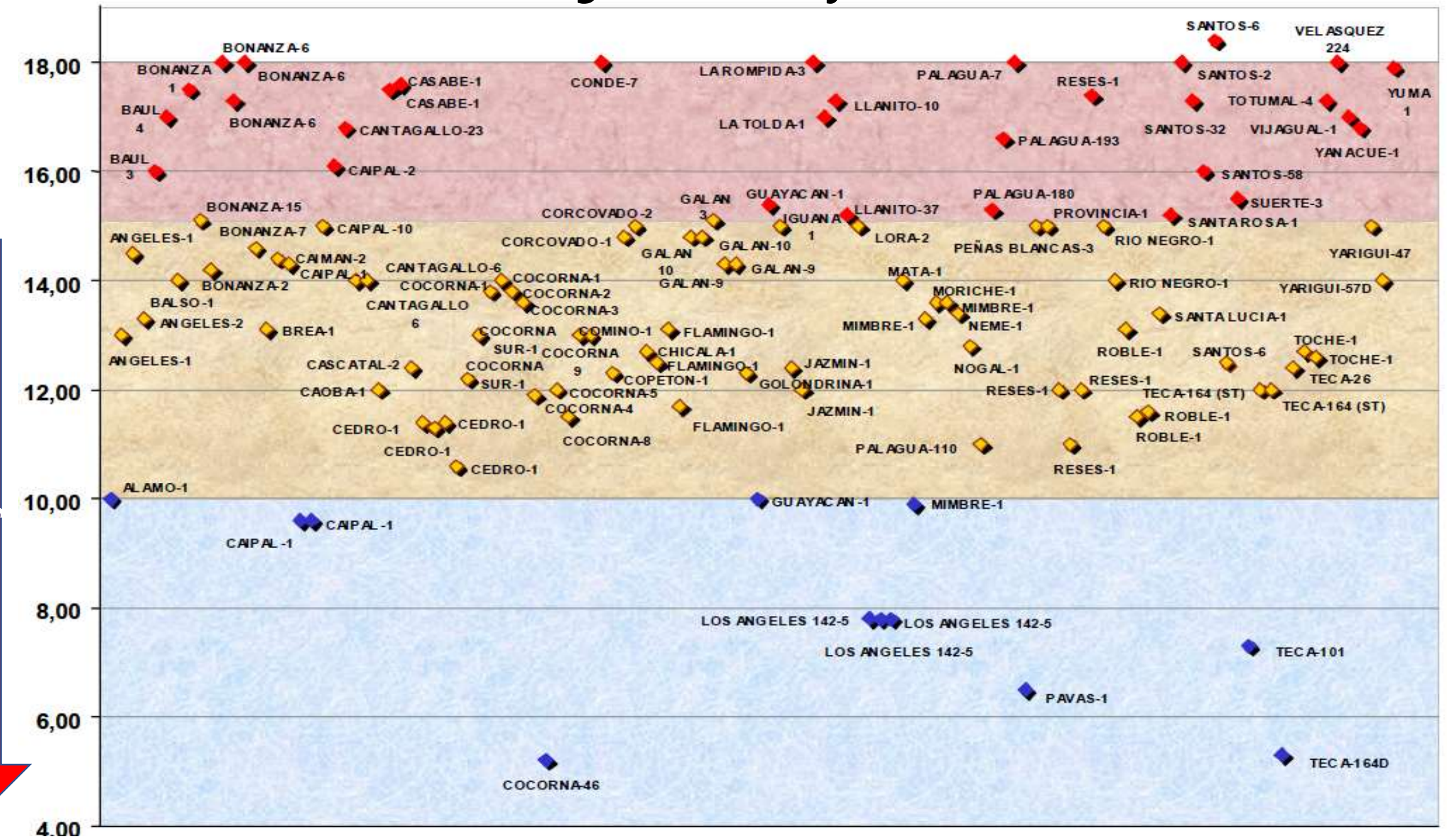
Source Gutierrez & Suarez, 2001

Where there is heavy oil in Colombia?

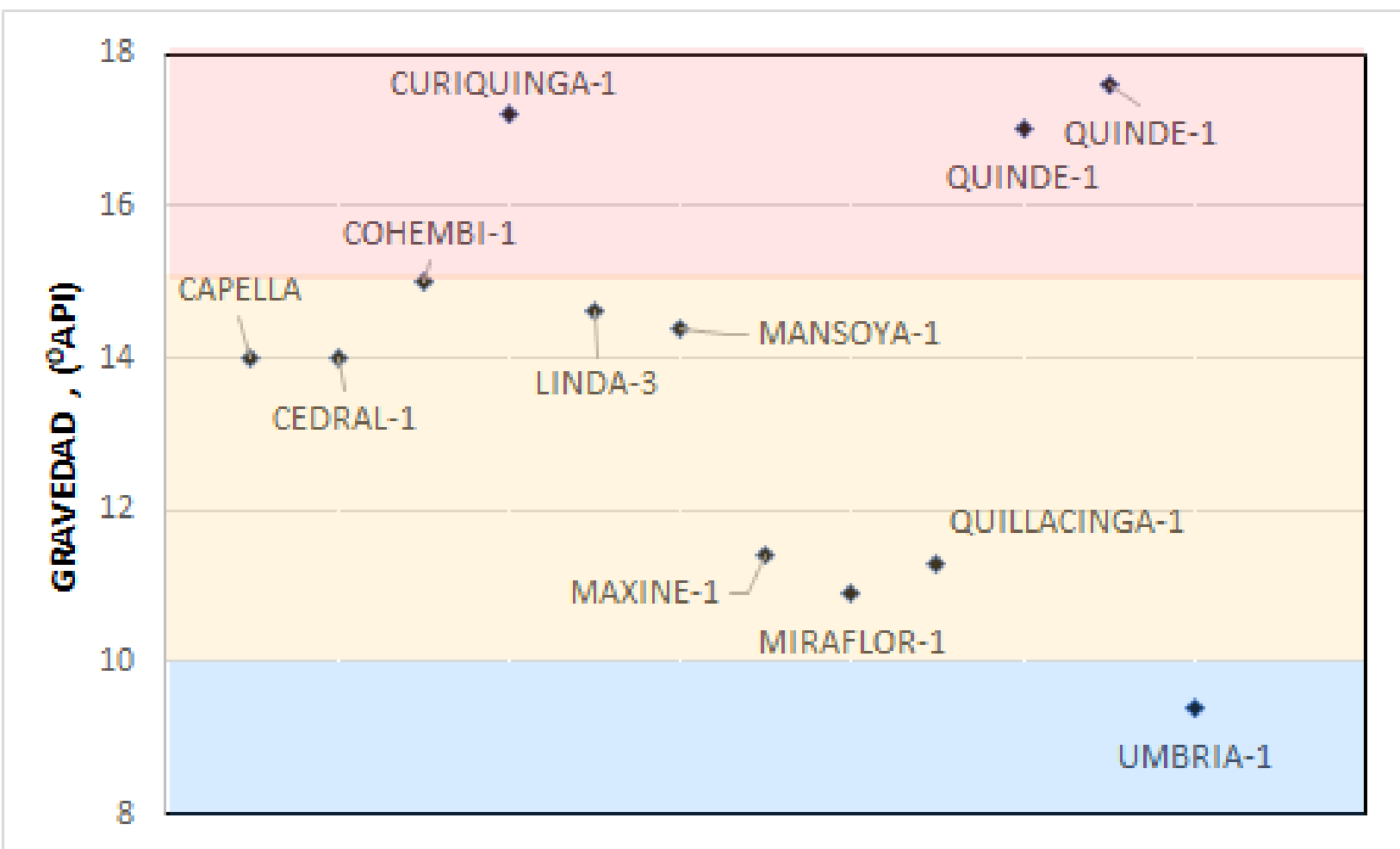
Llanos Orientales Basin



Middle Magdalena Valley Basin



Heavy Oil



Caguan-Putumayo Basin

(Source ICP, 2001)

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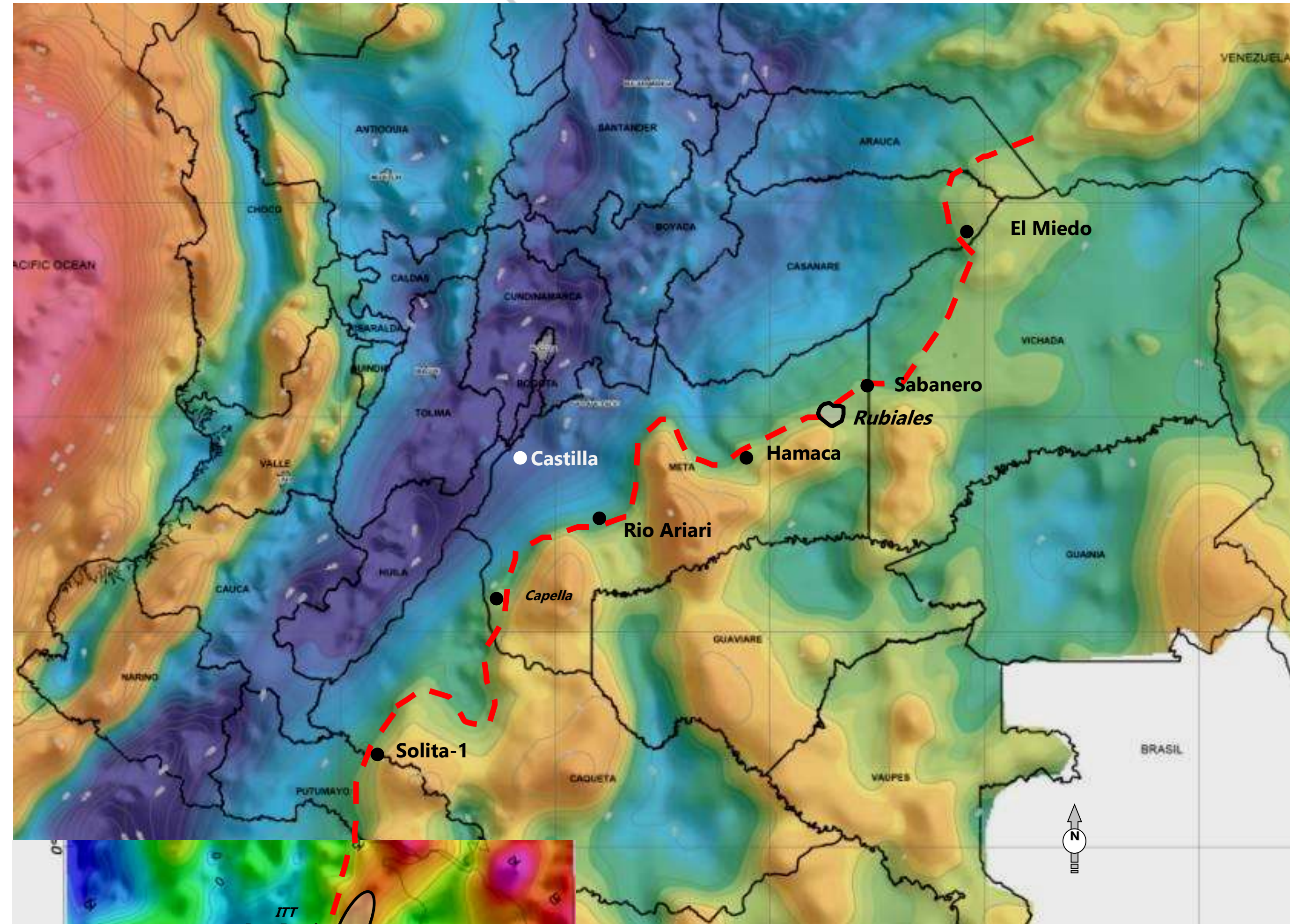
- Putumayo Basin: Solita – 1 Area

- Middle Magdalena Valley Basin

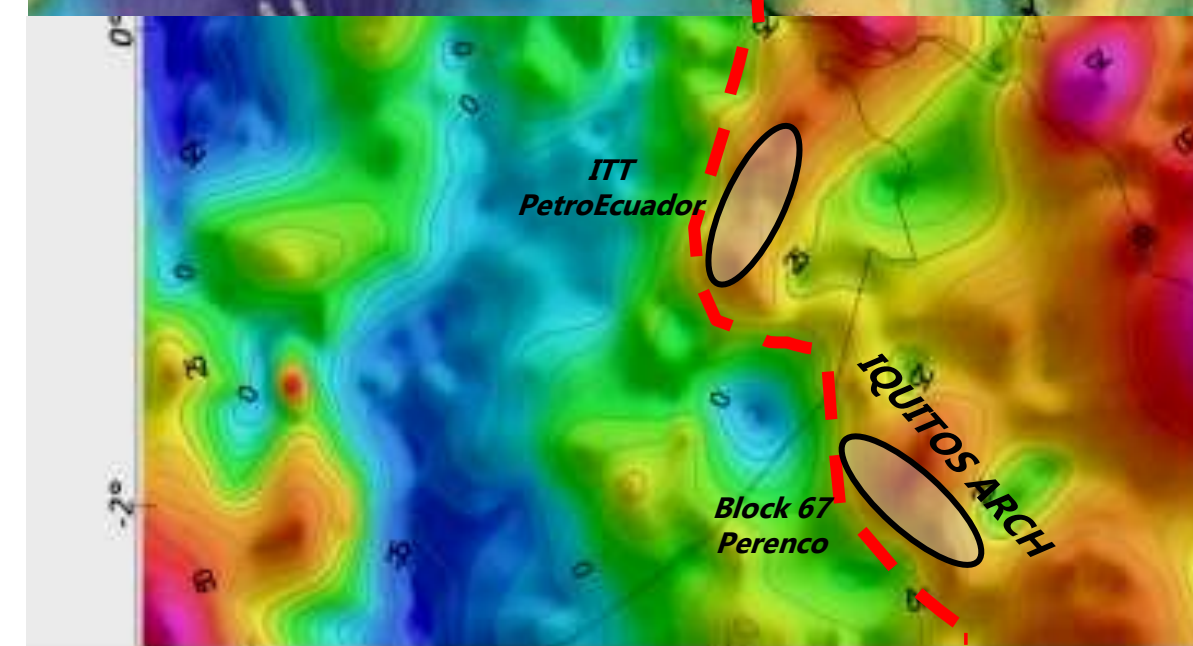
Conclusions and Recommendations

Northern South America Heavy Oil Belt

Bouguer Anomaly Map
(Source ANH)



Bouguer Anomaly Map
(Courtesy of John Ceron)



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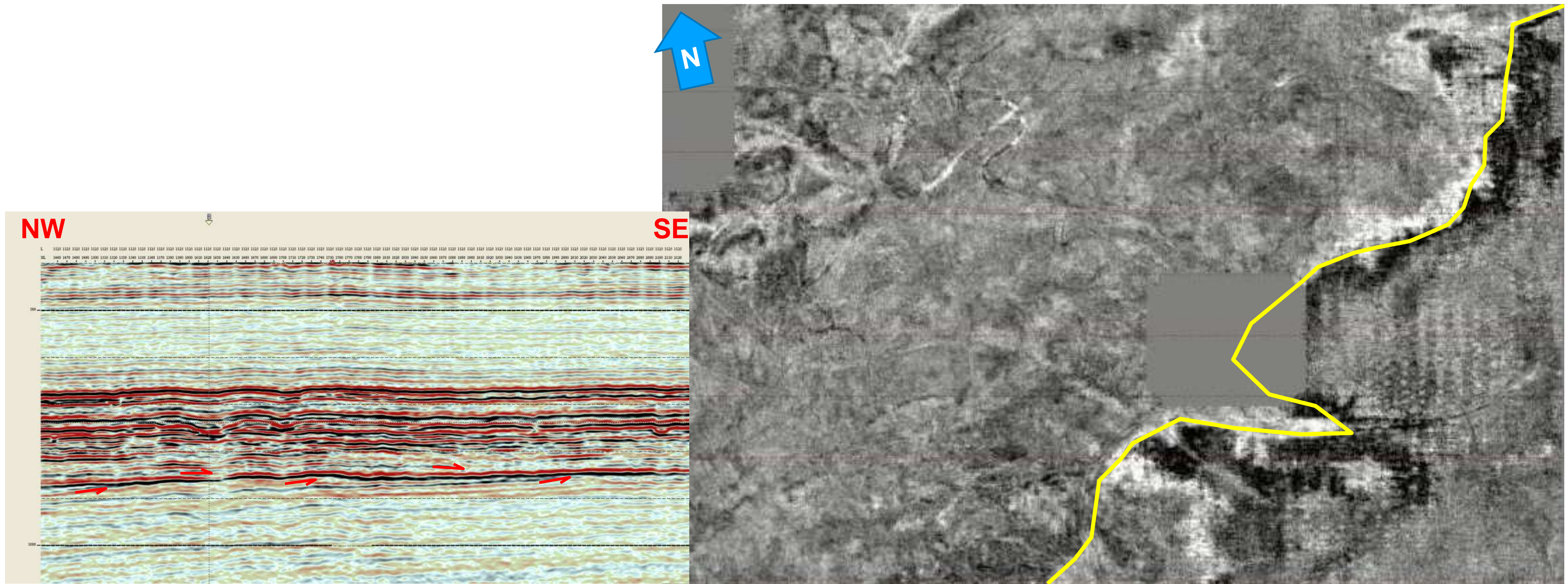
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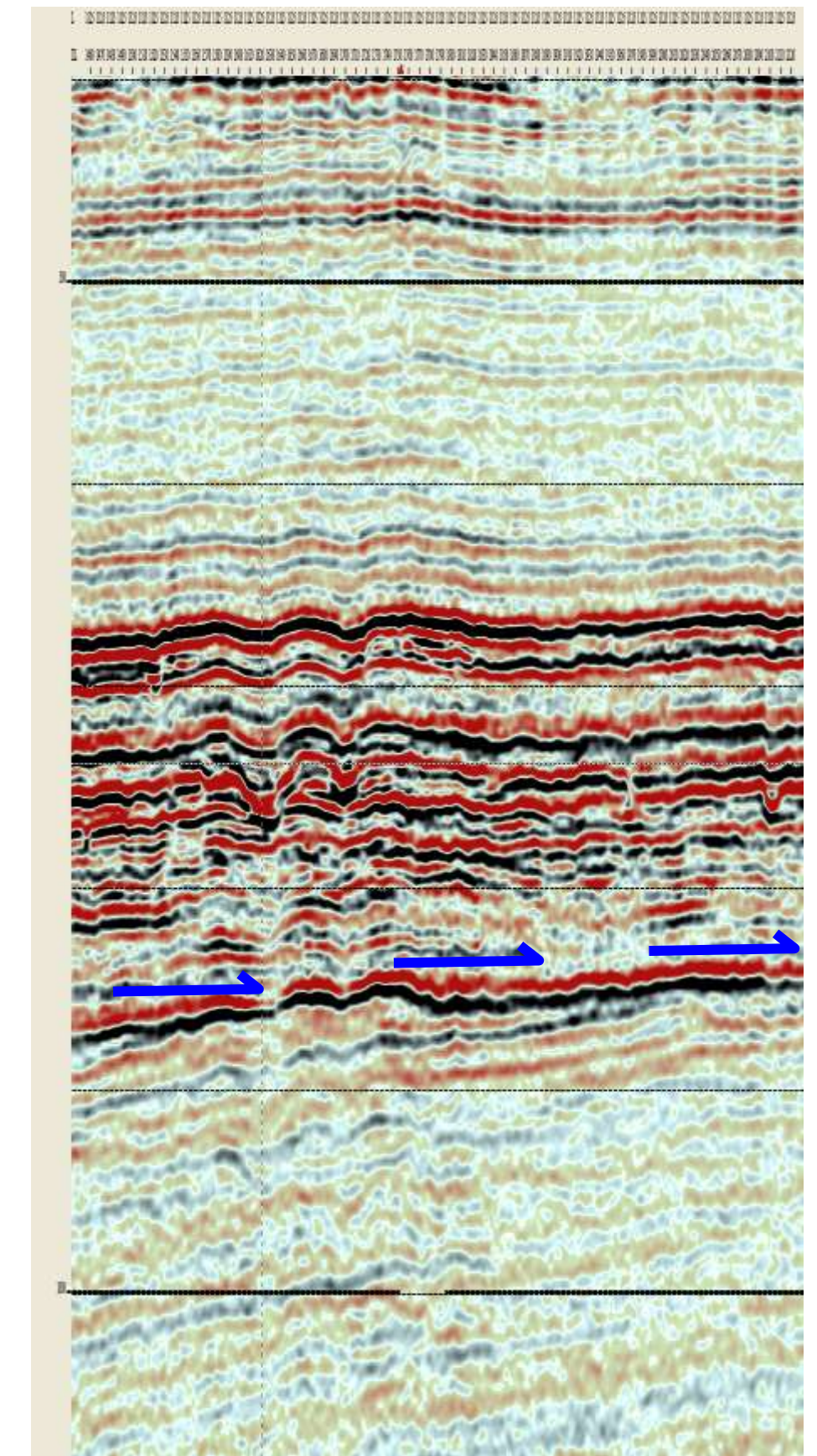
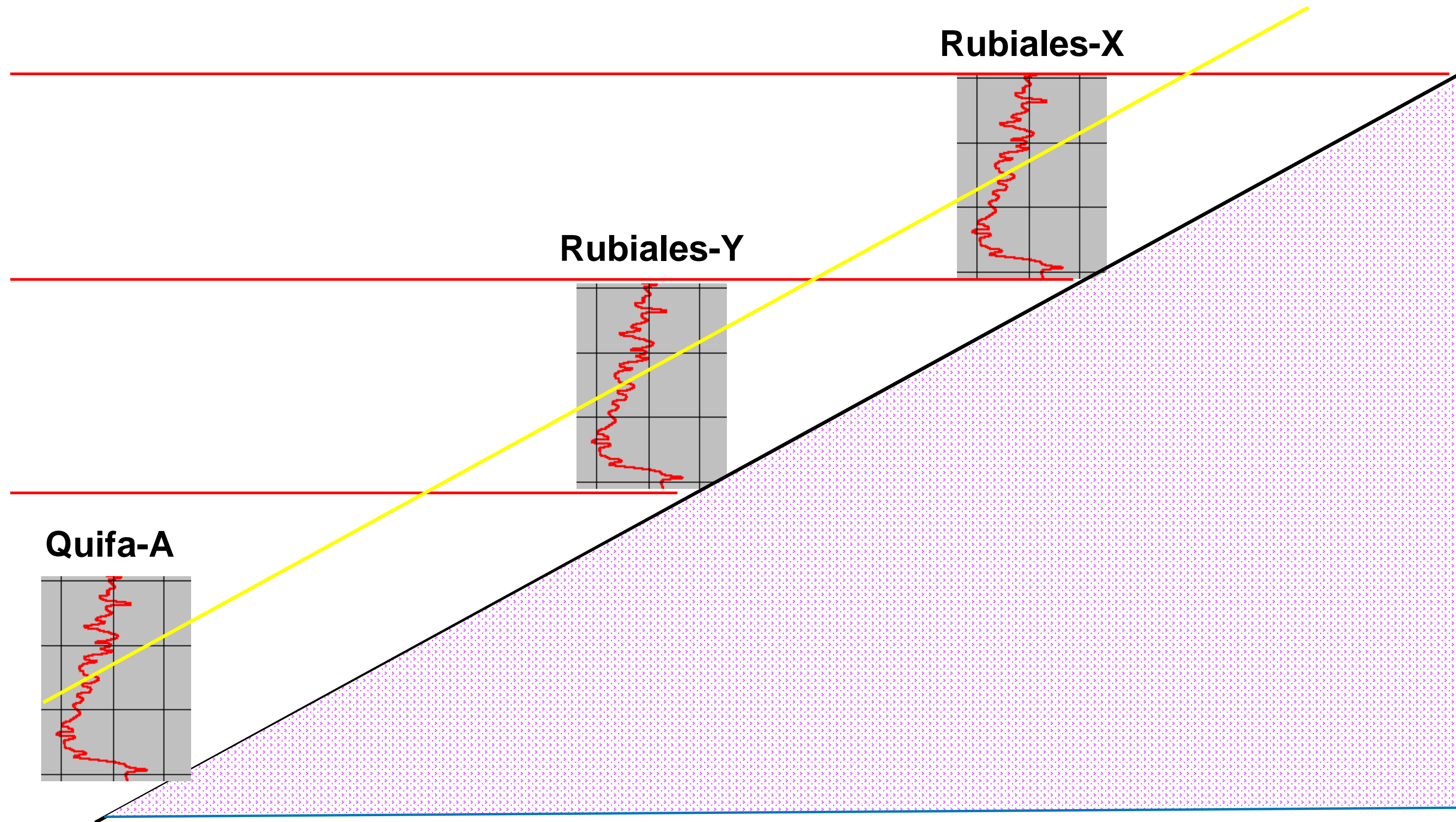
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Conclusions and Recommendations



Horizon Slide at the top of the producer level

Application of new technologies for the new heavy oil resources discoveries: Quifa Case



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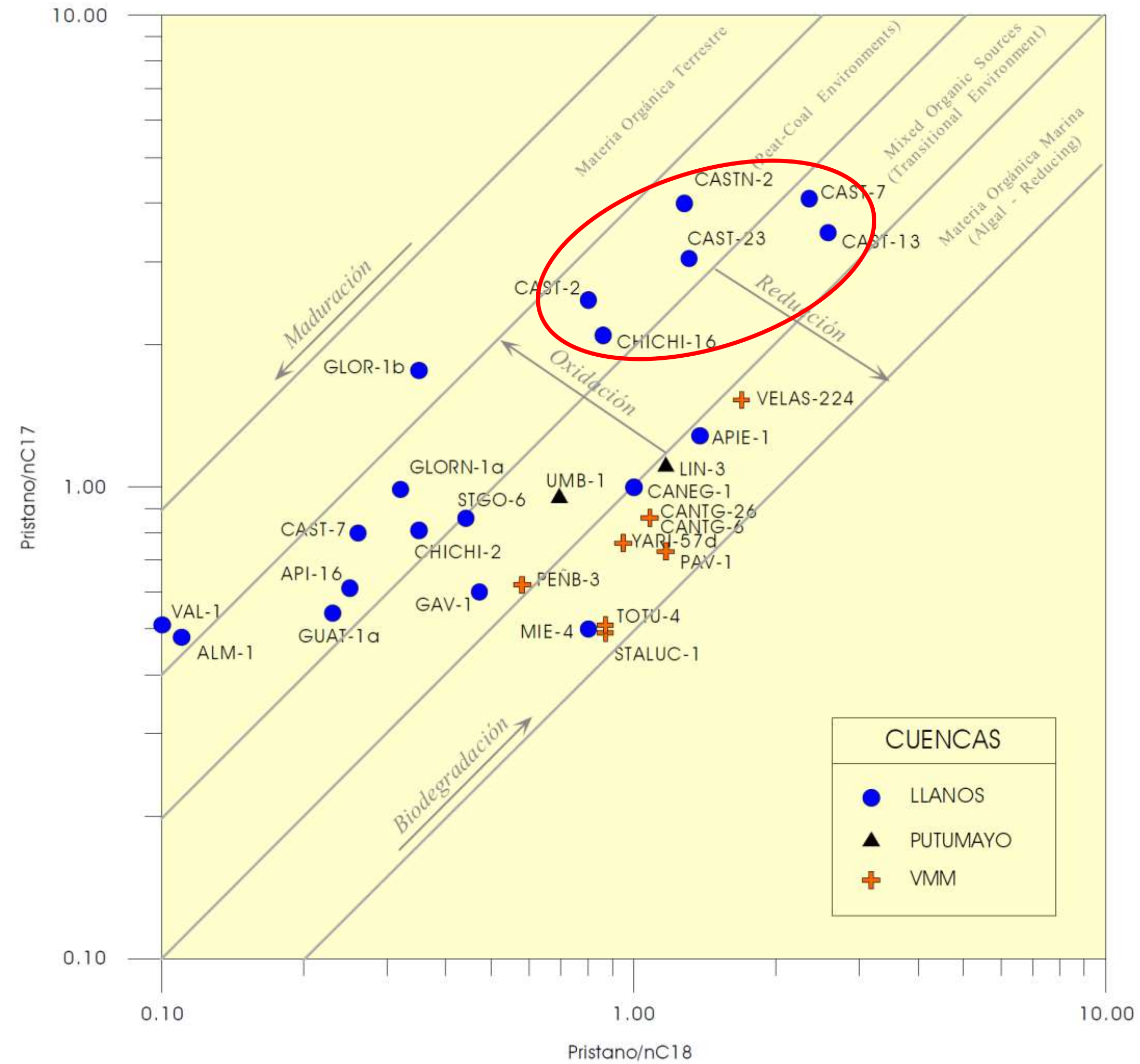
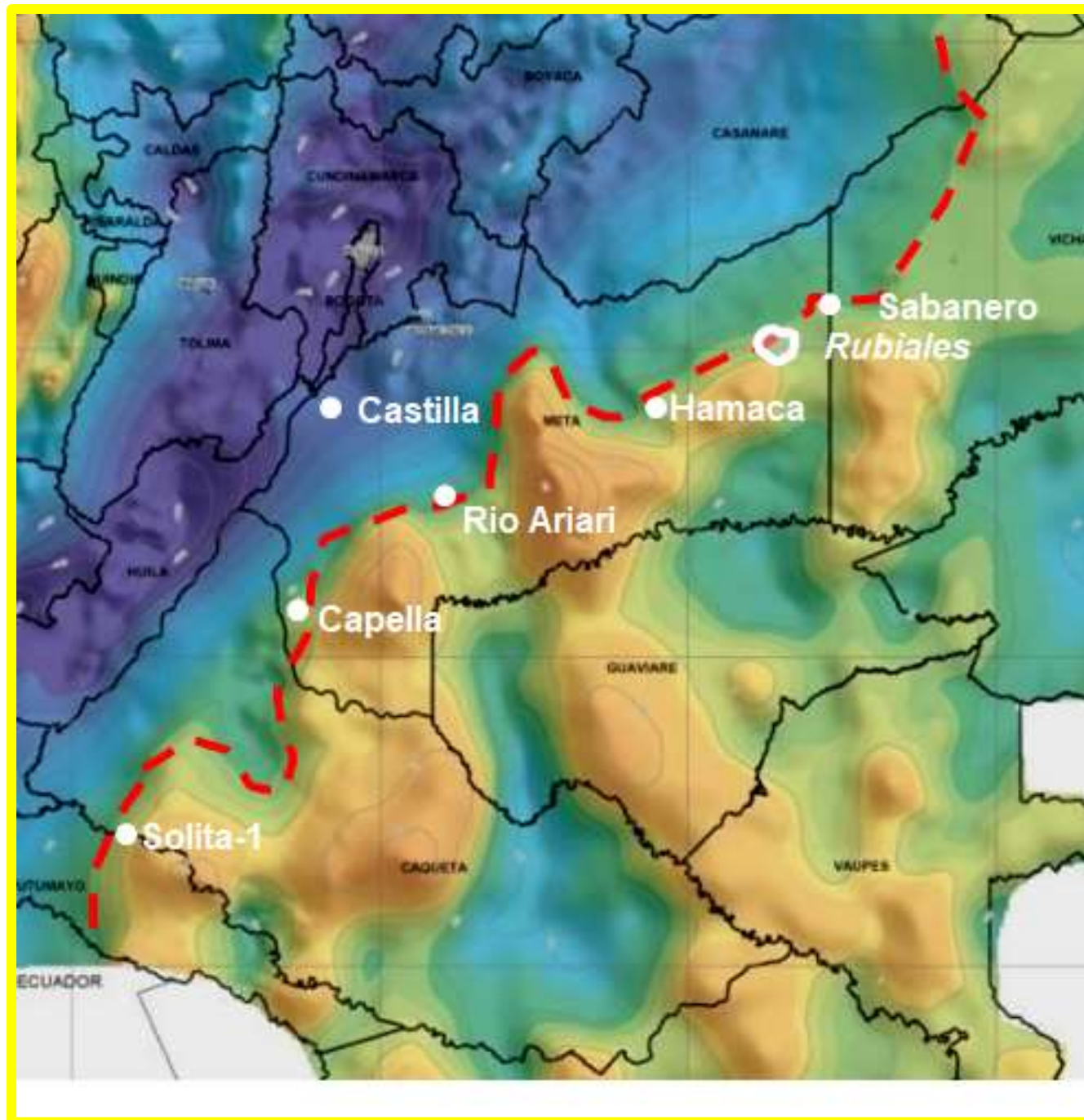
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Conclusions and Recommendations

Has Castilla the same timing as the others?



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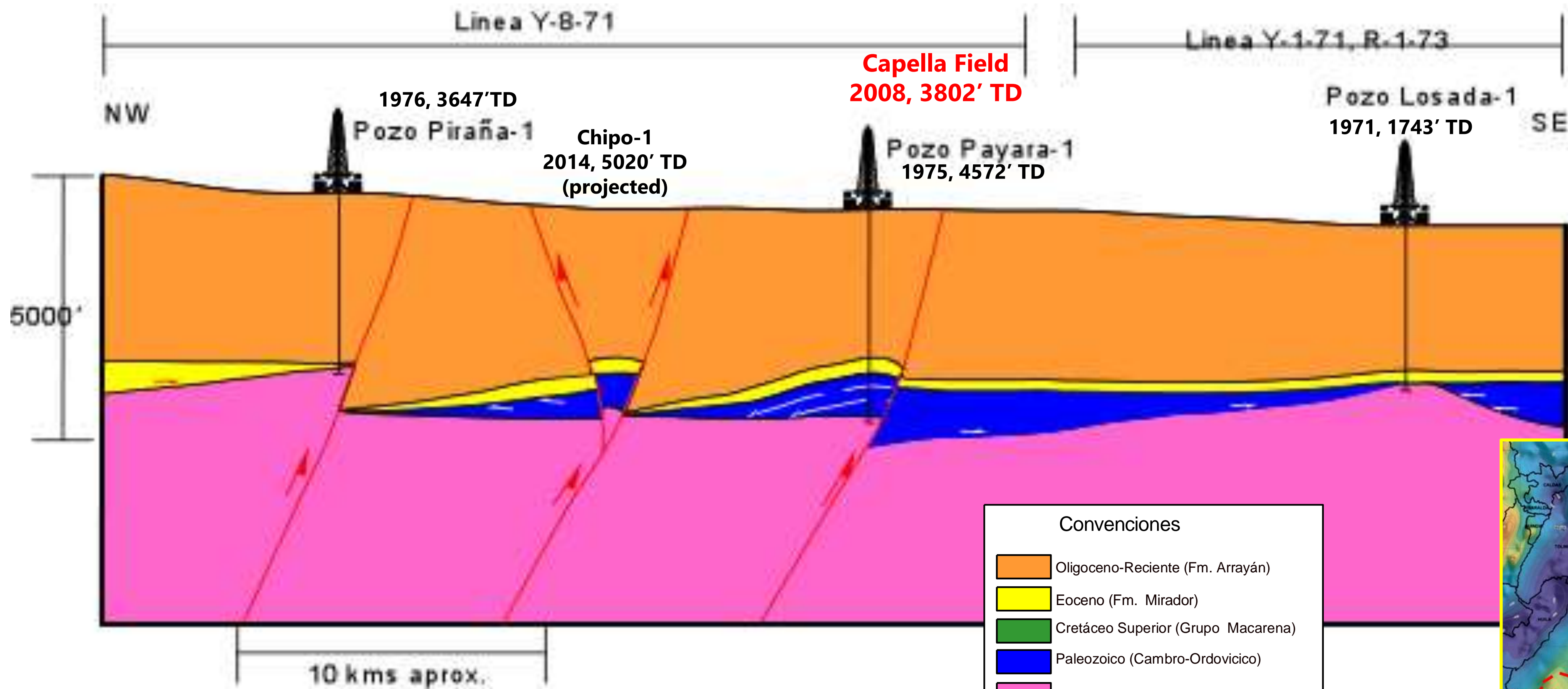
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Conclusions and Recommendations

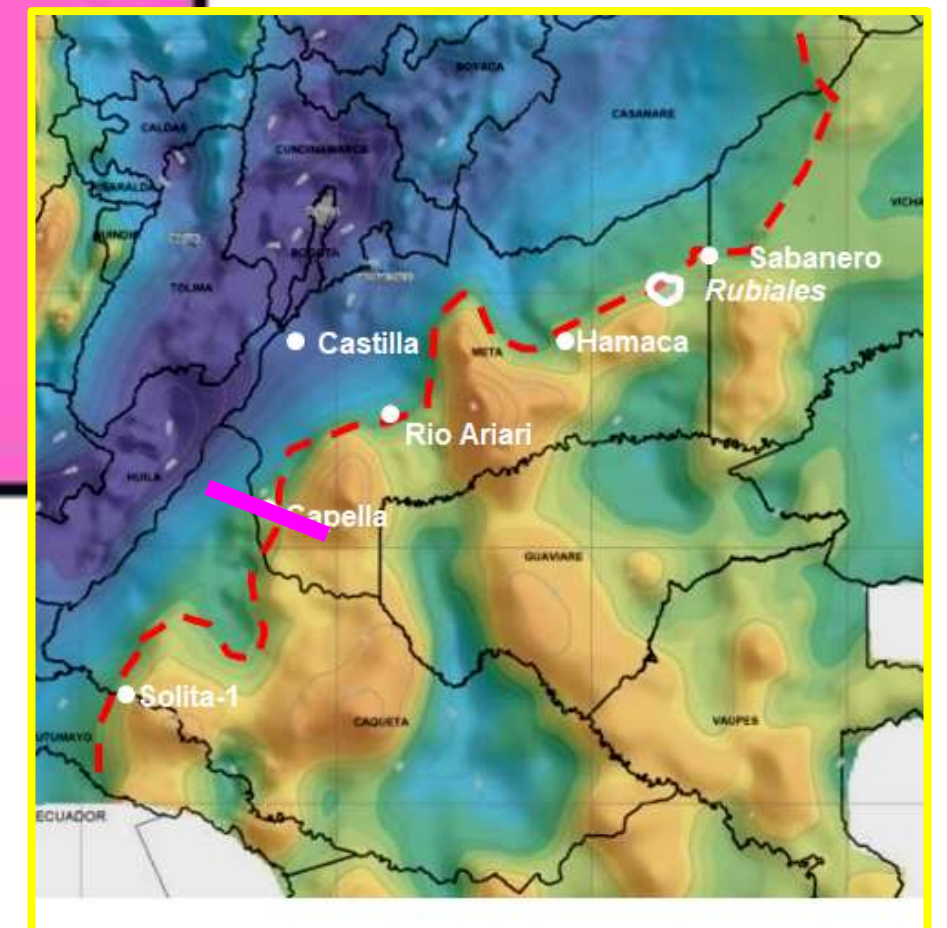
Caguan Basin – Capella Field Area

Have all the faults the same timing?



Source ICP, 1998

Convenciones	
	Oligoceno-Reciente (Fm. Arrayán)
	Eoceno (Fm. Mirador)
	Cretáceo Superior (Grupo Macarena)
	Paleozoico (Cambro-Ordovícico)
	Basamento cristalino
	Terminaciones de reflectores sísmicos (Onlap o truncaciones)



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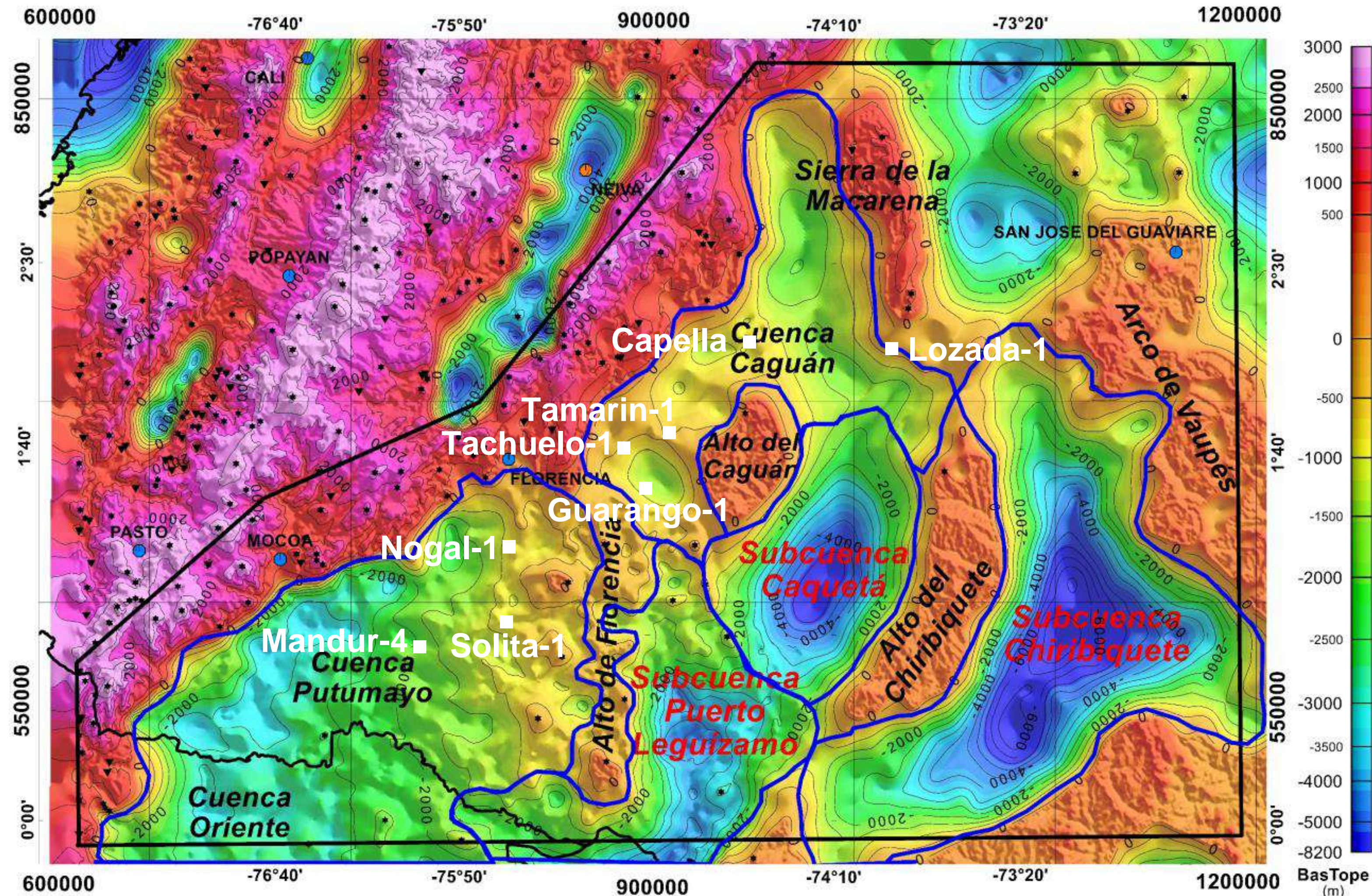
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Conclusions and Recommendations

Basement Top from Gravimetric Inversión of Putumayo & Caguan Basins

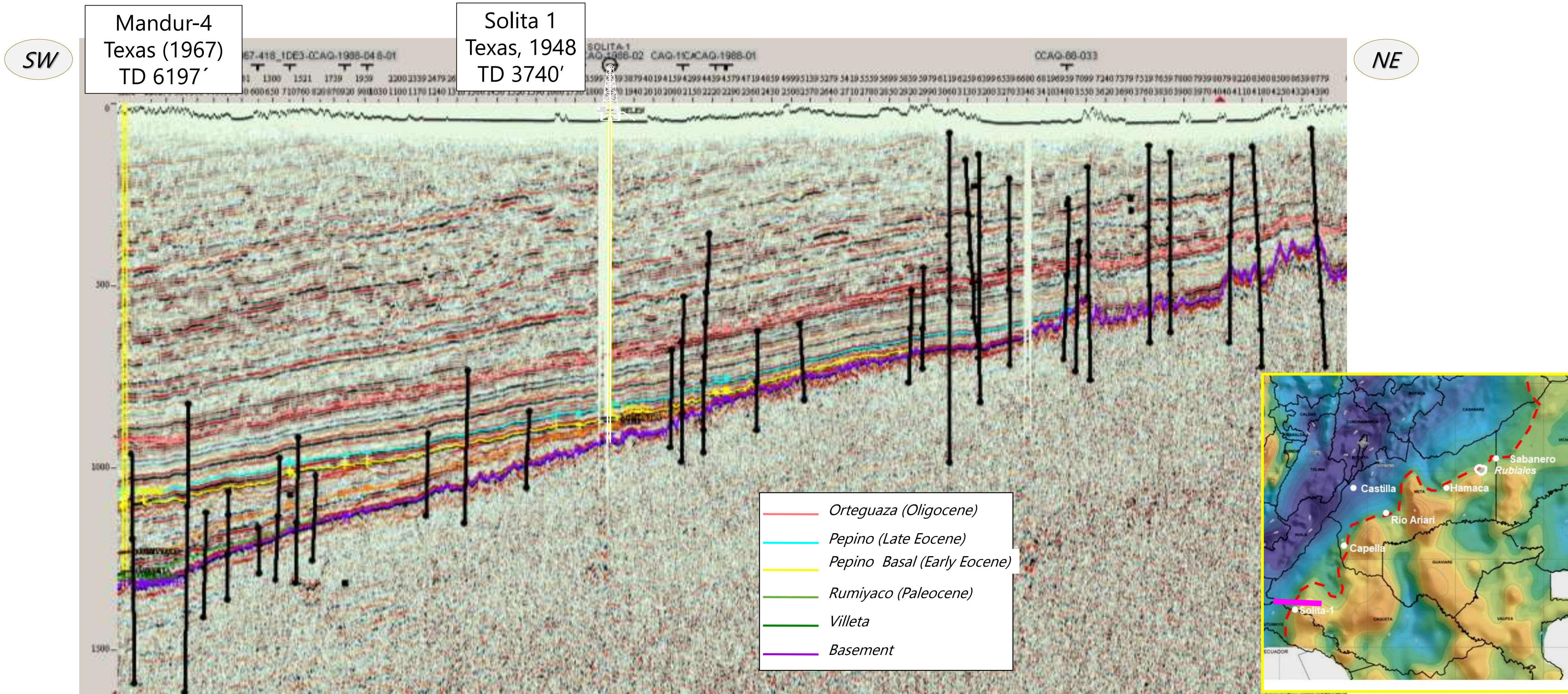


Topo del Basamento y Cuencas Relacionadas
Inversión Gravimétrica 3D del Residuo Controlado
Referencia: Nivel medio del mar
Autor: Álvaro Vargas Gómez

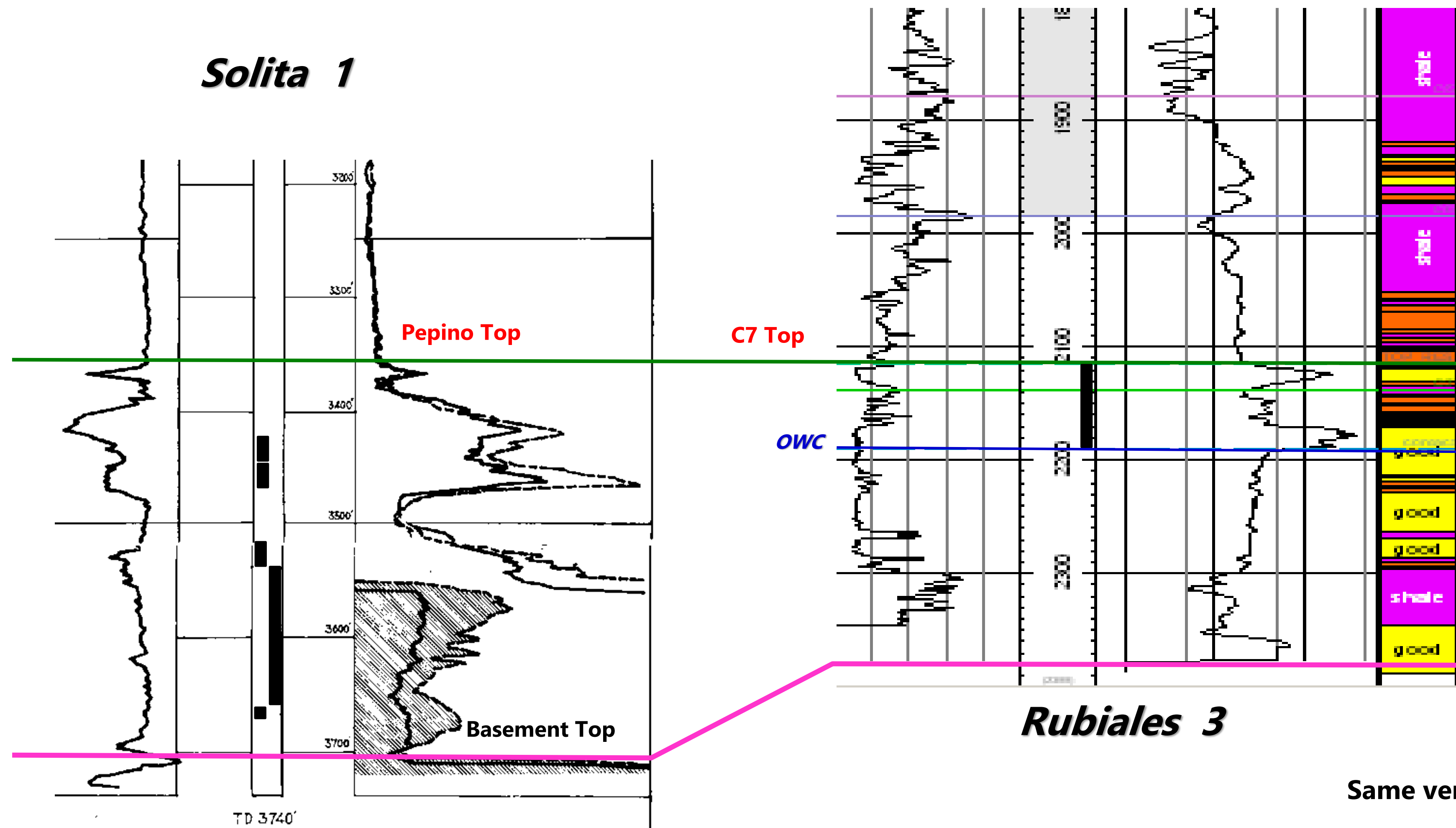
0 50000 100000
(metros)
MAGNA-SIRGAS / Colombia Bogota zone

Eastern Putumayo Basin – Solita – 1 well Area

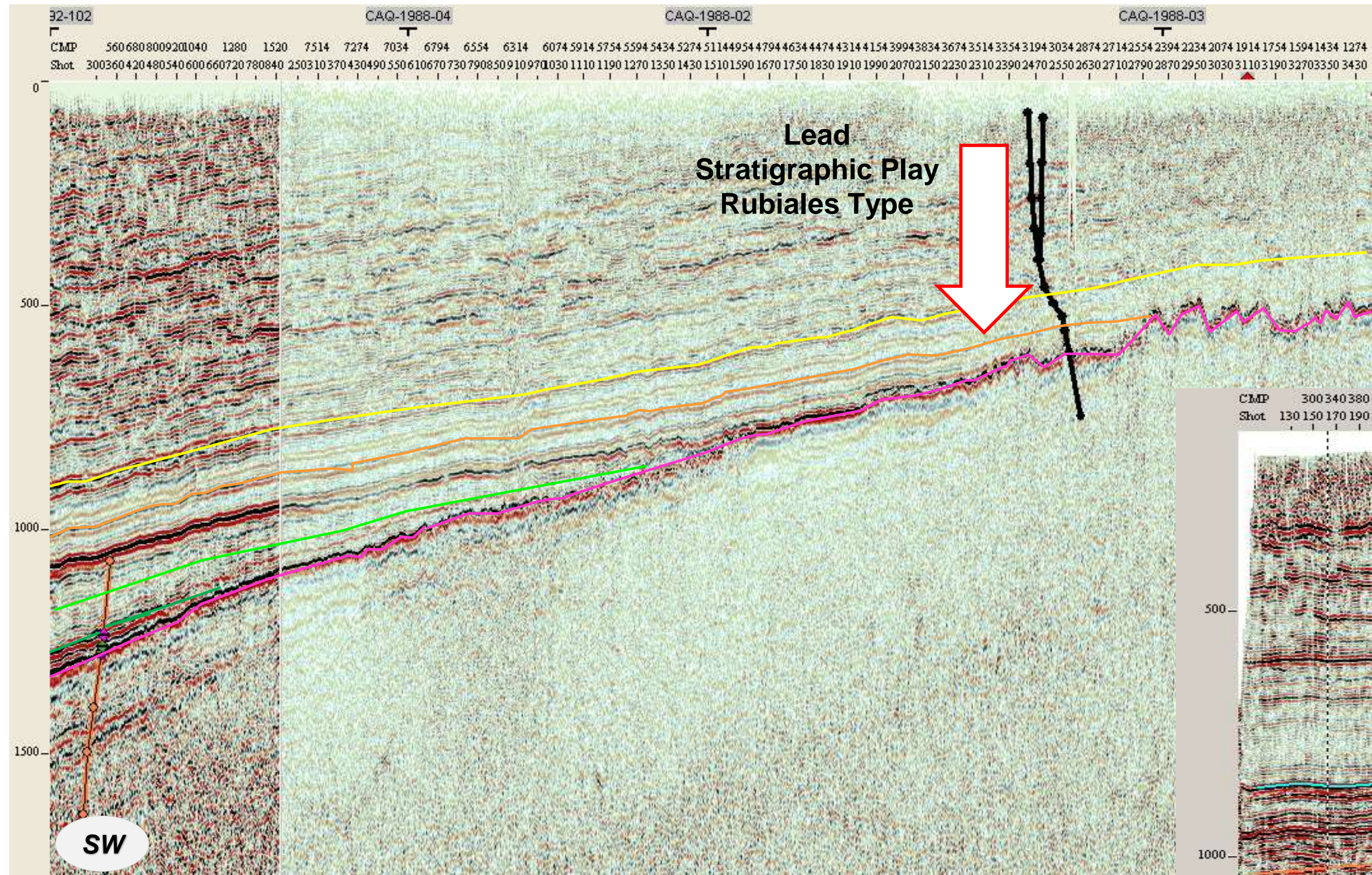
Seismic Line W-E CAQ-88-01



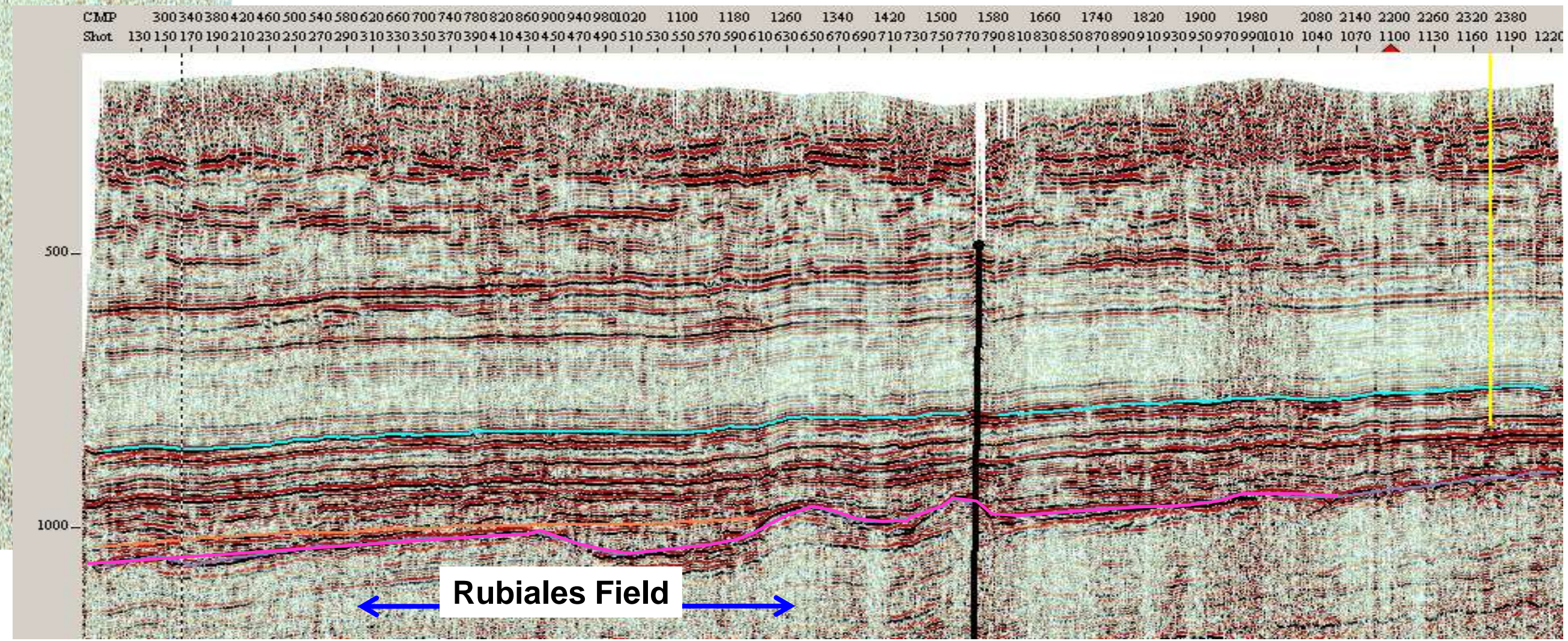
Well Correlation: Solita-1 & Rubiales-3 wells



Eastern Putumayo and Rubiales Field Geometry Comparison



NE



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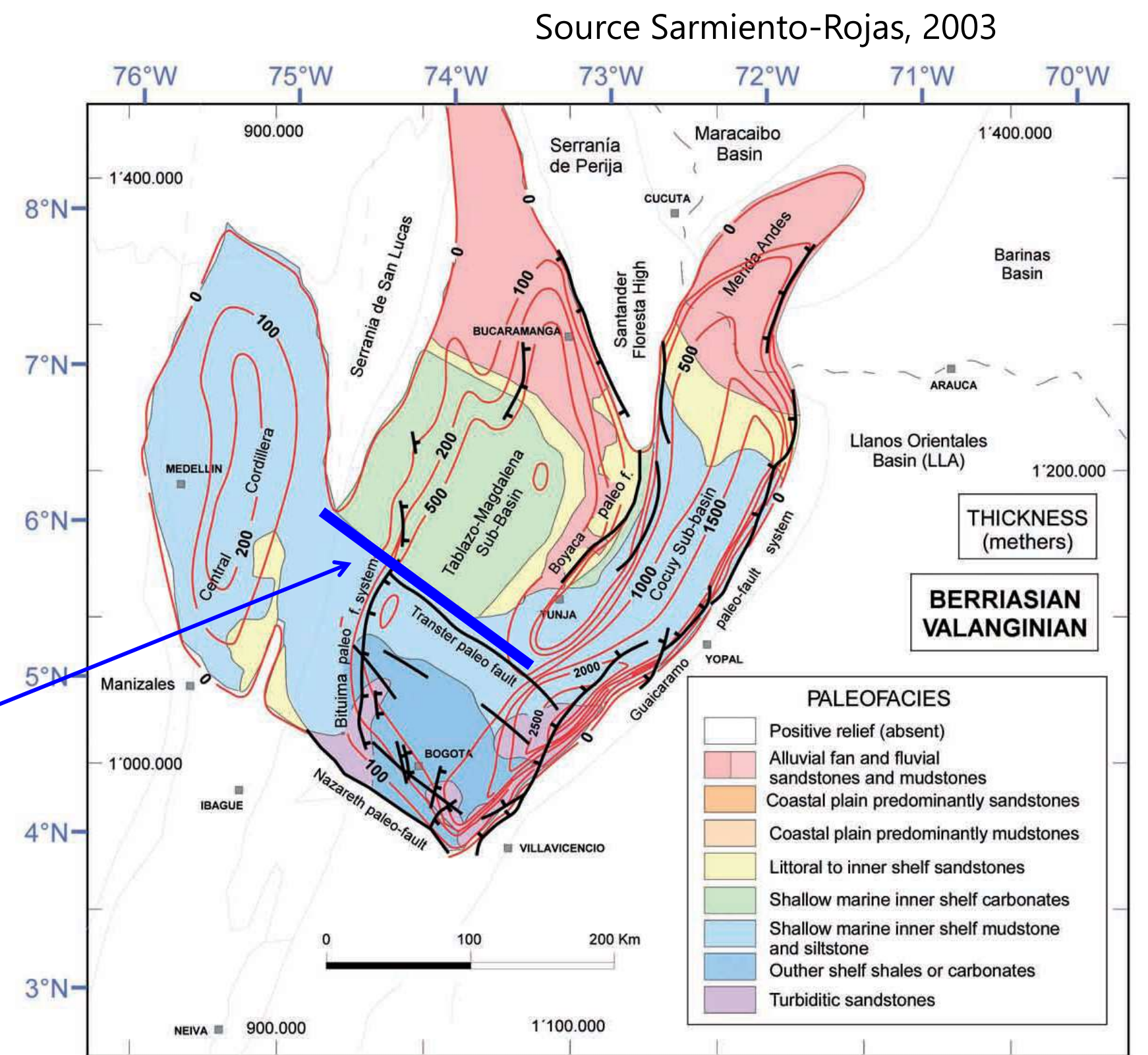
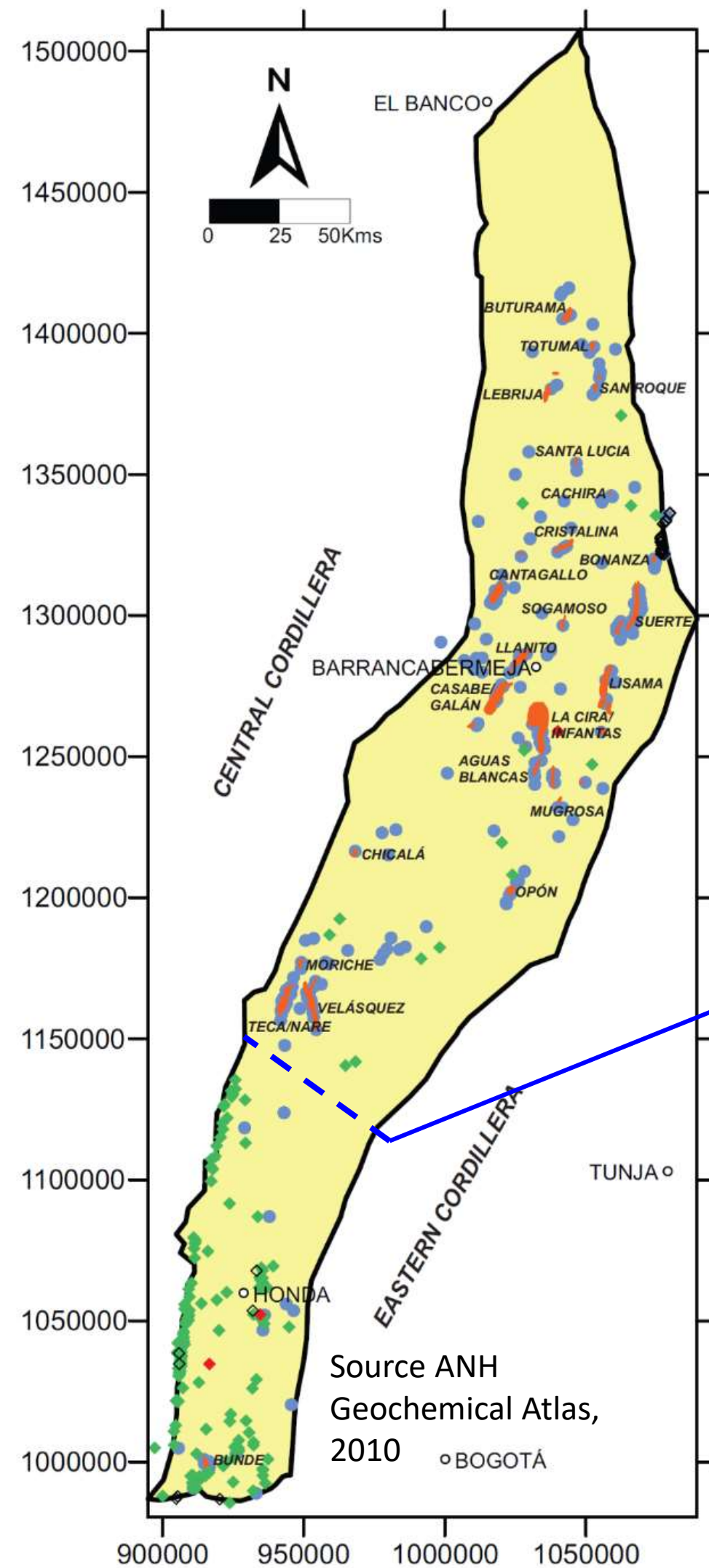
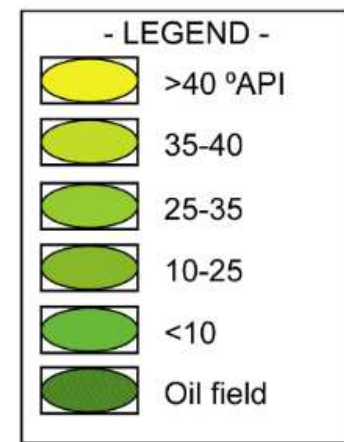
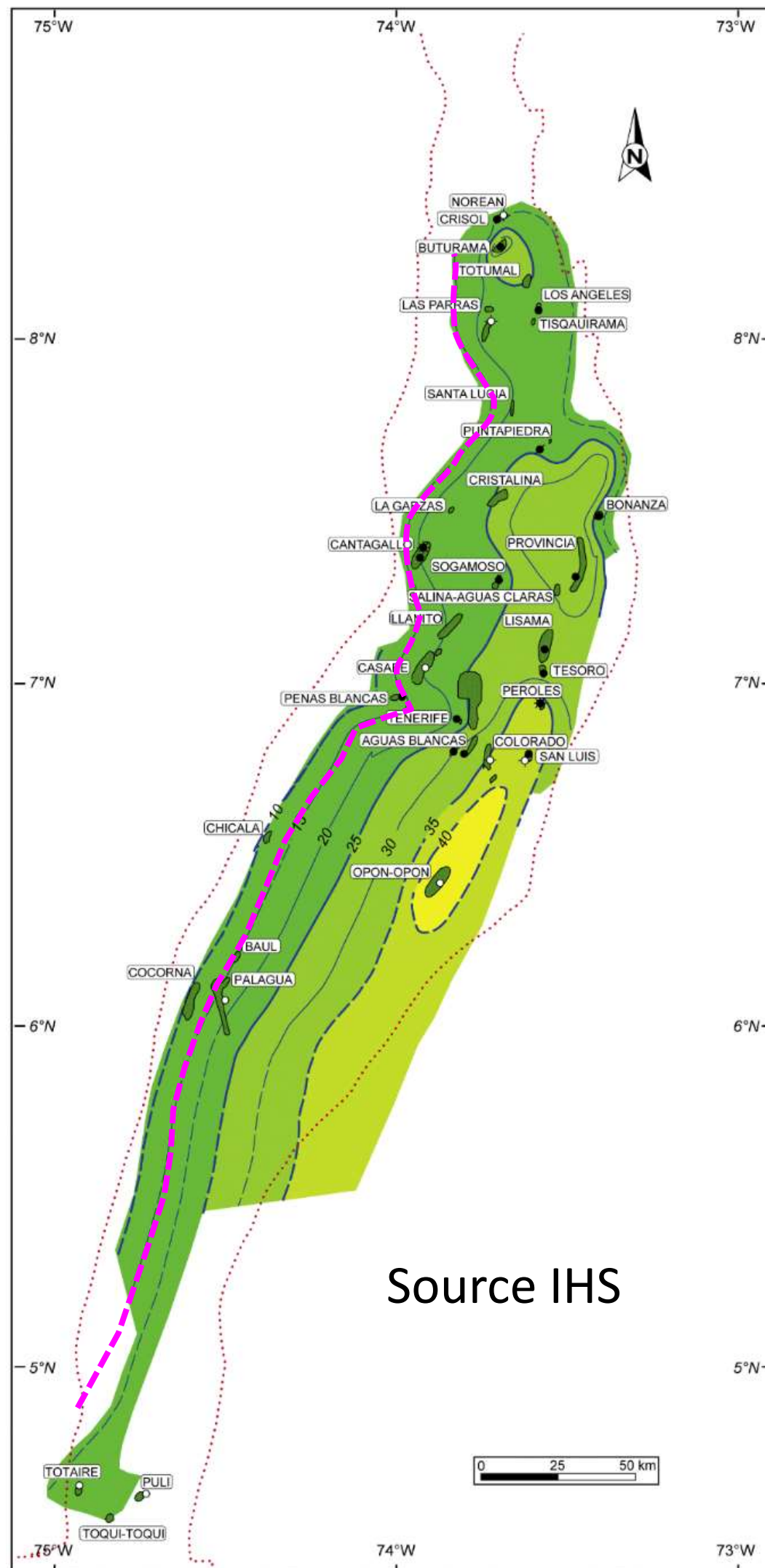
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Conclusions and Recommendations

MMV – Does it have different sources at the south and the north?



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Conclusions and Recommendations

- Colombia counts with important prospective resources of heavy oil
- The current producer fields of heavy oil have taught us:
 - New ideas in old basins
 - The new heavy oil discoveries will be far from the cordillera in hard access areas
 - It is necessary the acquisition of new data
 - The application of new methodologies and technologies have allowed the discovery and cartography of new discoveries
- Where are the future heavy oil discoveries?.
 - Eastern Putumayo
 - Southern Caguan
 - Southern Llanos Orientales
 - Southern Middle Magdalena Valley Basin

Thanks

www.anh.gov.co

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