

# COLOMBIA ROUND 2021



UNIVERSIDAD  
NACIONAL  
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**Uptc**  
Universidad Pedagógica y  
Tecnológica de Colombia



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



**AAPG**



**EAGE**



# GEOLOGICAL INTEGRATION, PETROLEUM SYSTEMS AND PROSPECTIVITY OF COLOMBIA'S FRONTIER BASINS: GUAJIRA & GUAJIRA OFFSHORE BASINS

JULY 2021

Findings

Geology

Seismic Characterization of Provinces

Traps

Petroleum System Modeling

Play Fair Way Modeling

Yet to Find

## FINDINGS

- 3 tectono-stratigraphic provinces were identified
- A differential tectonics is interpreted in what is called the deformation front, mainly associated with the movements between the Caribbean and South American plates, with less relevance lateral subduction processes are identified with recent ages (Miocene Superior to the recent one).
- Multiple overlapping basement rock generation processes have been identified, which structurally and stratigraphically affect on the Sedimentary sequence.
- Pre-Eocene rock deposition has been identified in the basin, mainly referencing the Cretaceous deposits.



## FINDINGS

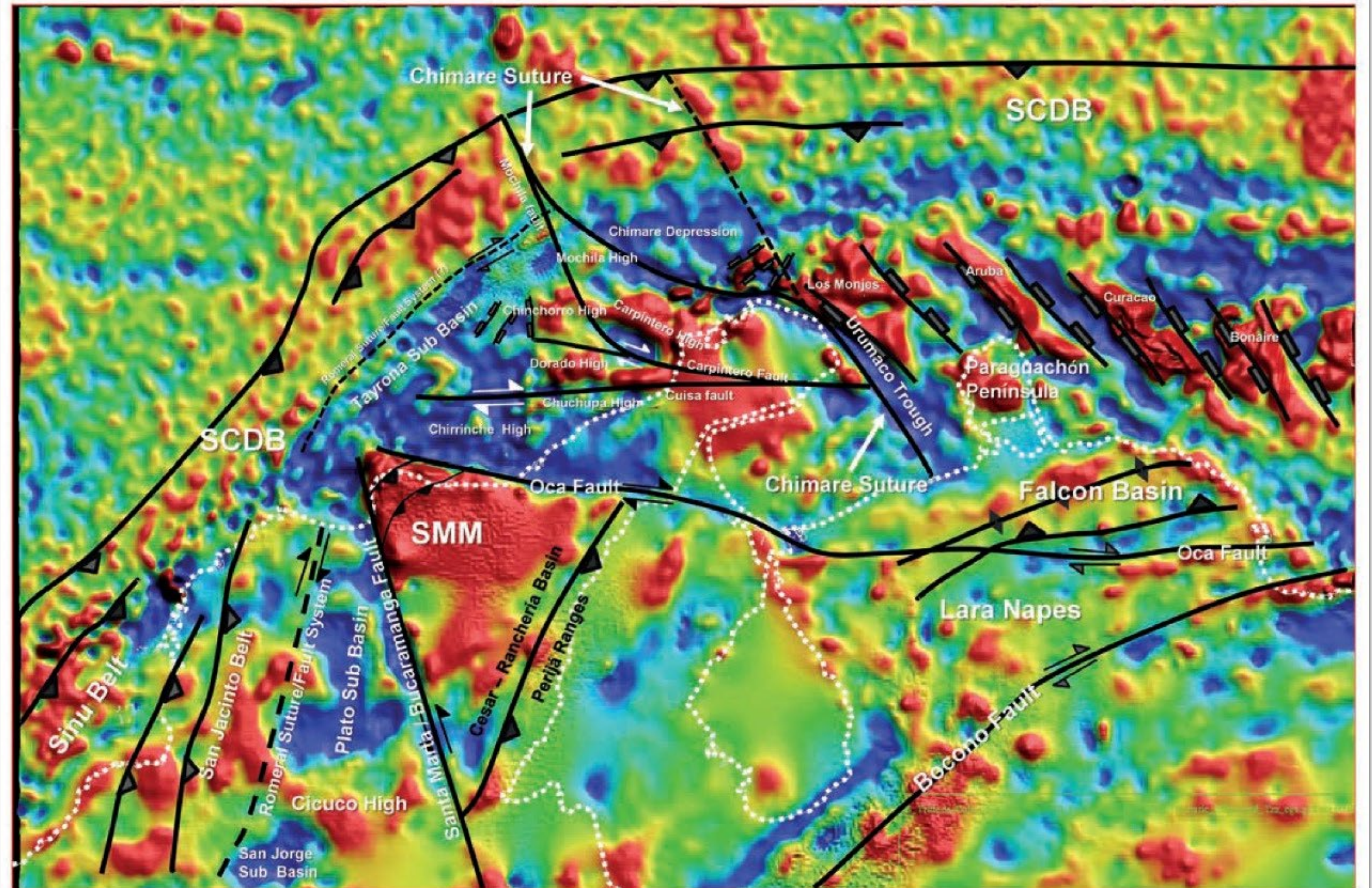
- Depocenters generated by differential tectonic activity are identified and distributed throughout geological evolution, which is reflected in stratigraphic changes and the potential for accumulation of reservoirs, source rock and associated traps.
- The presence of hydrocarbons distributed throughout the entire basin is identified, indicating migration and accumulation processes that have not yet been understood.
- Qualities of storage rock are identified, distributed throughout the basin in different sequences, which even though they are not reported as producing, indicate exploratory opportunities to be established.
- Multiple trap types are identified throughout the basin, showing unexplored potentials.

## FINDINGS

- The presence of hydrocarbons distributed throughout the entire basin is identified, indicating migration and accumulation processes that have not yet been understood.
- The connection of the North Onshore sector with rocks of the near Cretaceous of the Eastern side in Venezuela is identified. It is necessary to improve the information to establish potential resources in the Colombian sector.
- The petroleum system modeling results indicate that the Cretaceous source rocks reached hydrocarbon generation and expulsion in the Guajira Offshore basin.
- The petroleum system modeling results explain the hydrocarbons found in the basin and the thermogenic hydrocarbon manifestations reported in different piston core and indicates that there is a higher probability of finding liquid hydrocarbons north of the Guajira Offshore basin, associated with the Chimare and Urumaco depocenters

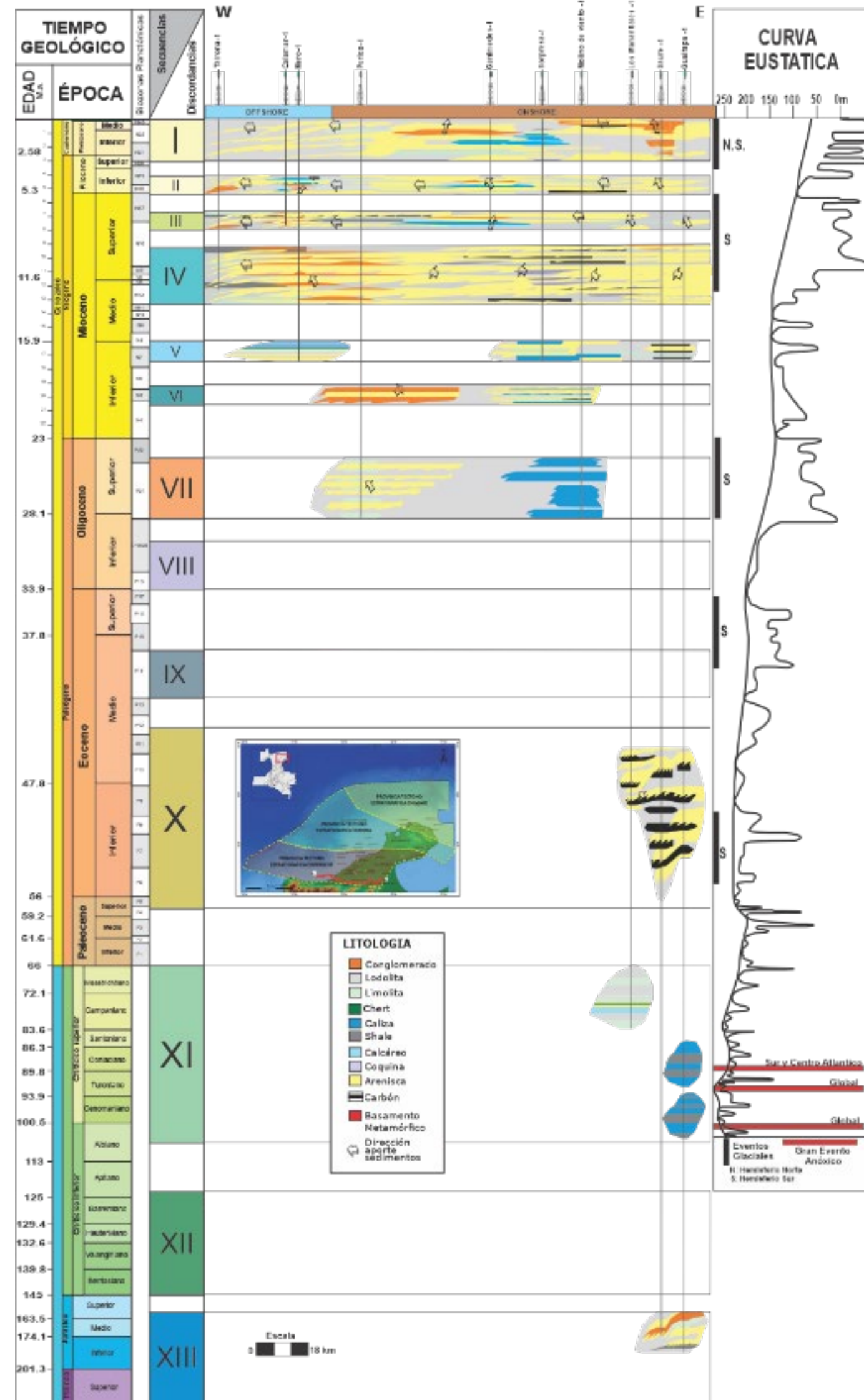


# Geology

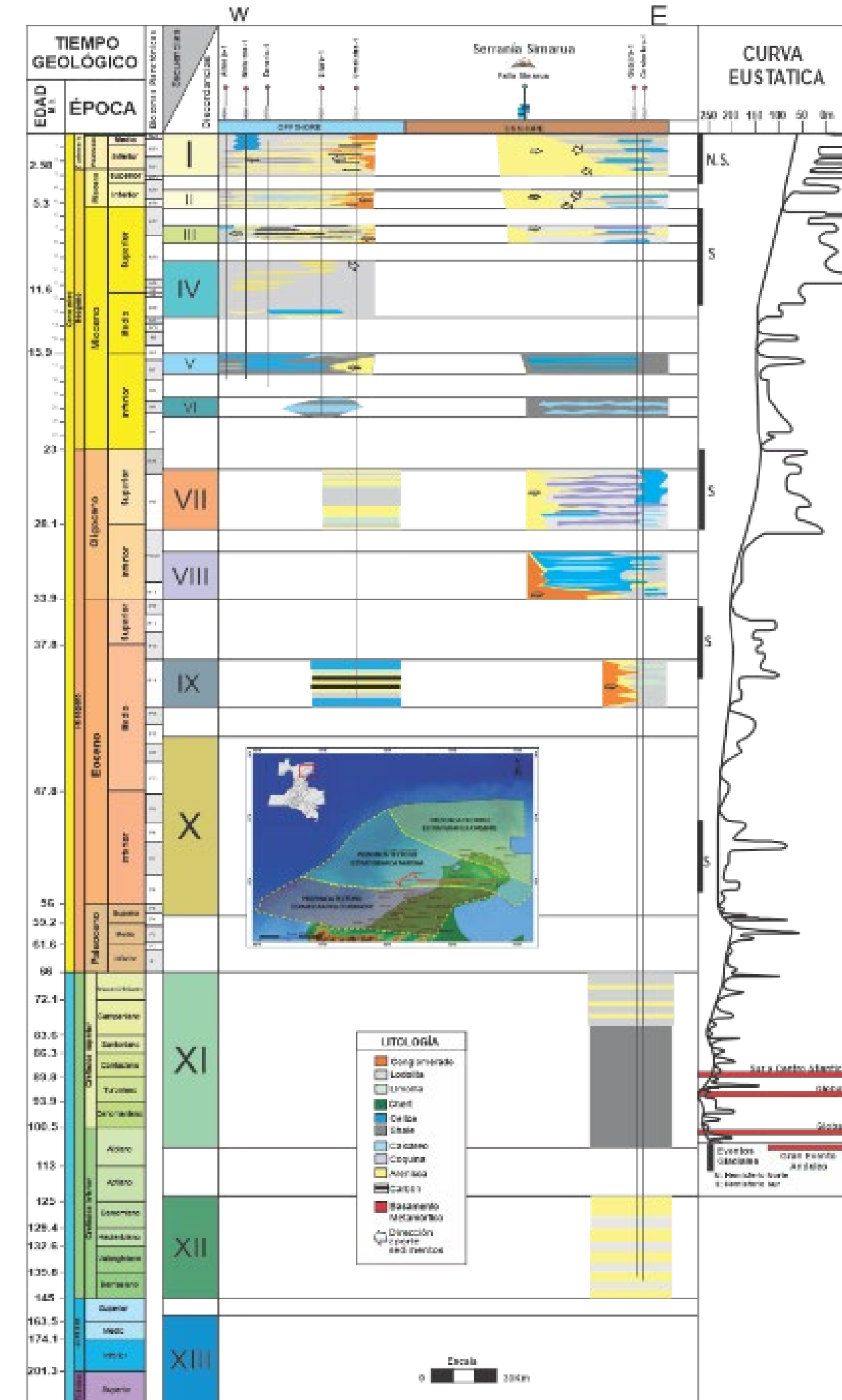




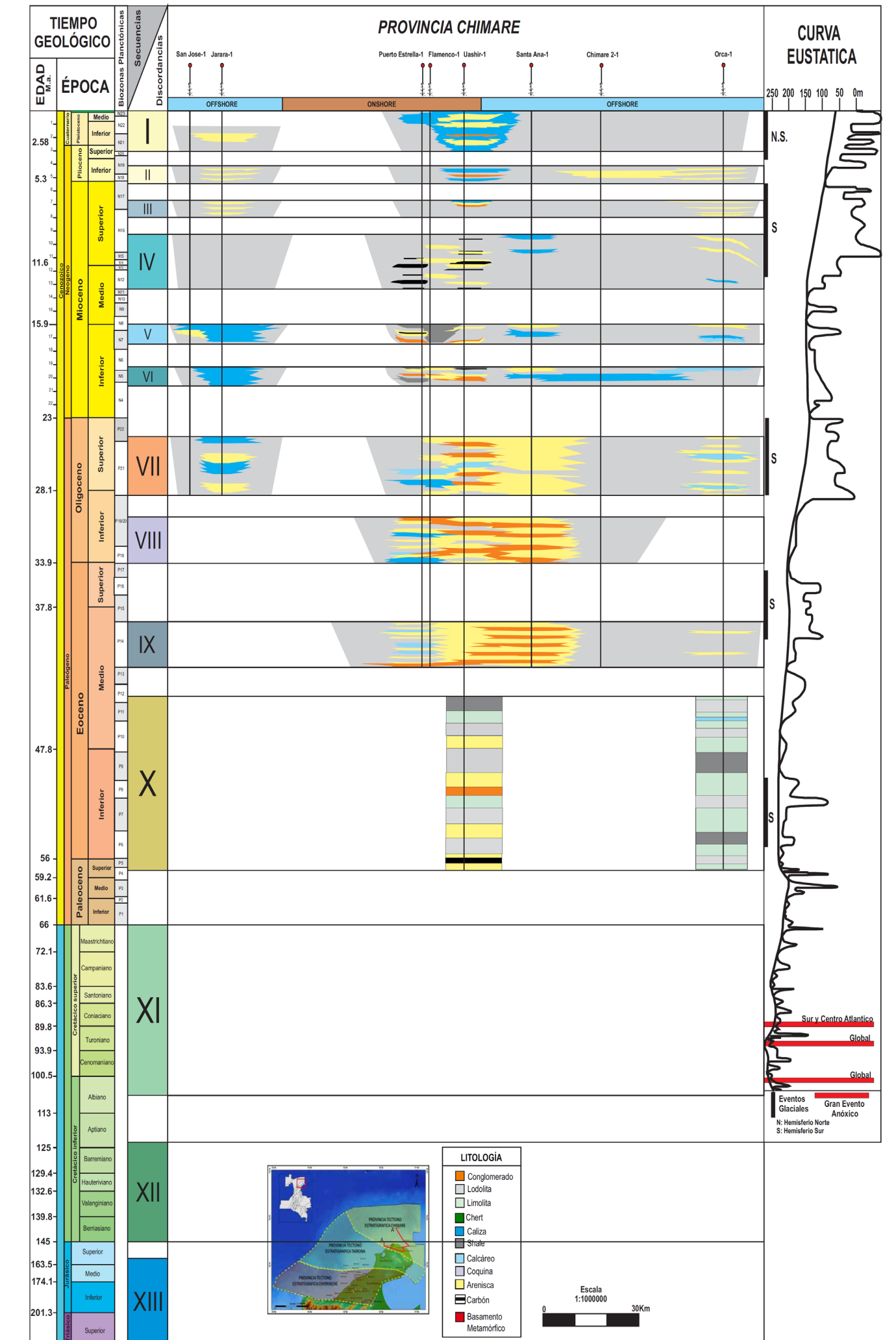
## CHIRRINCHE PROVINCE



## TAIRONA PROVINCE

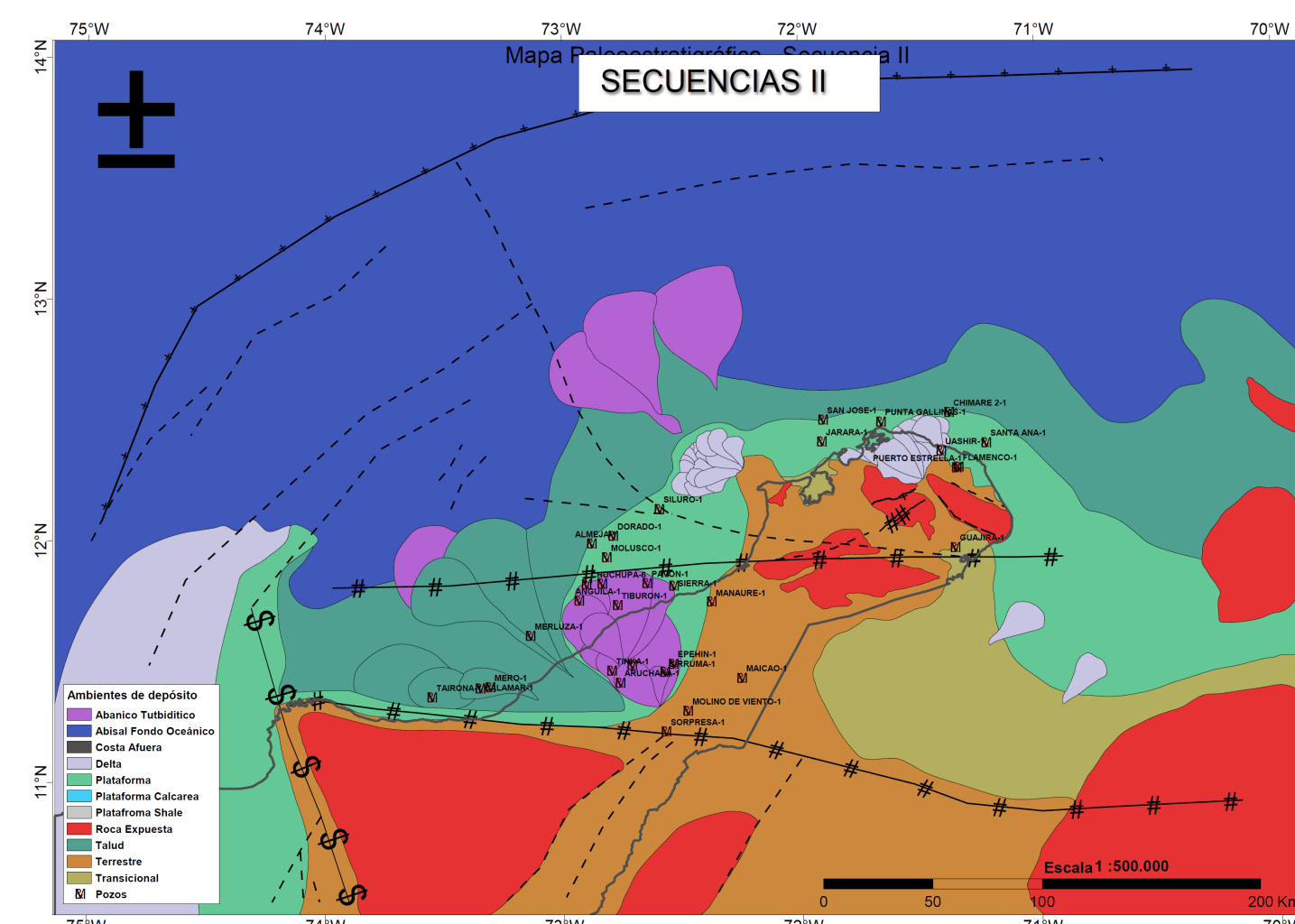
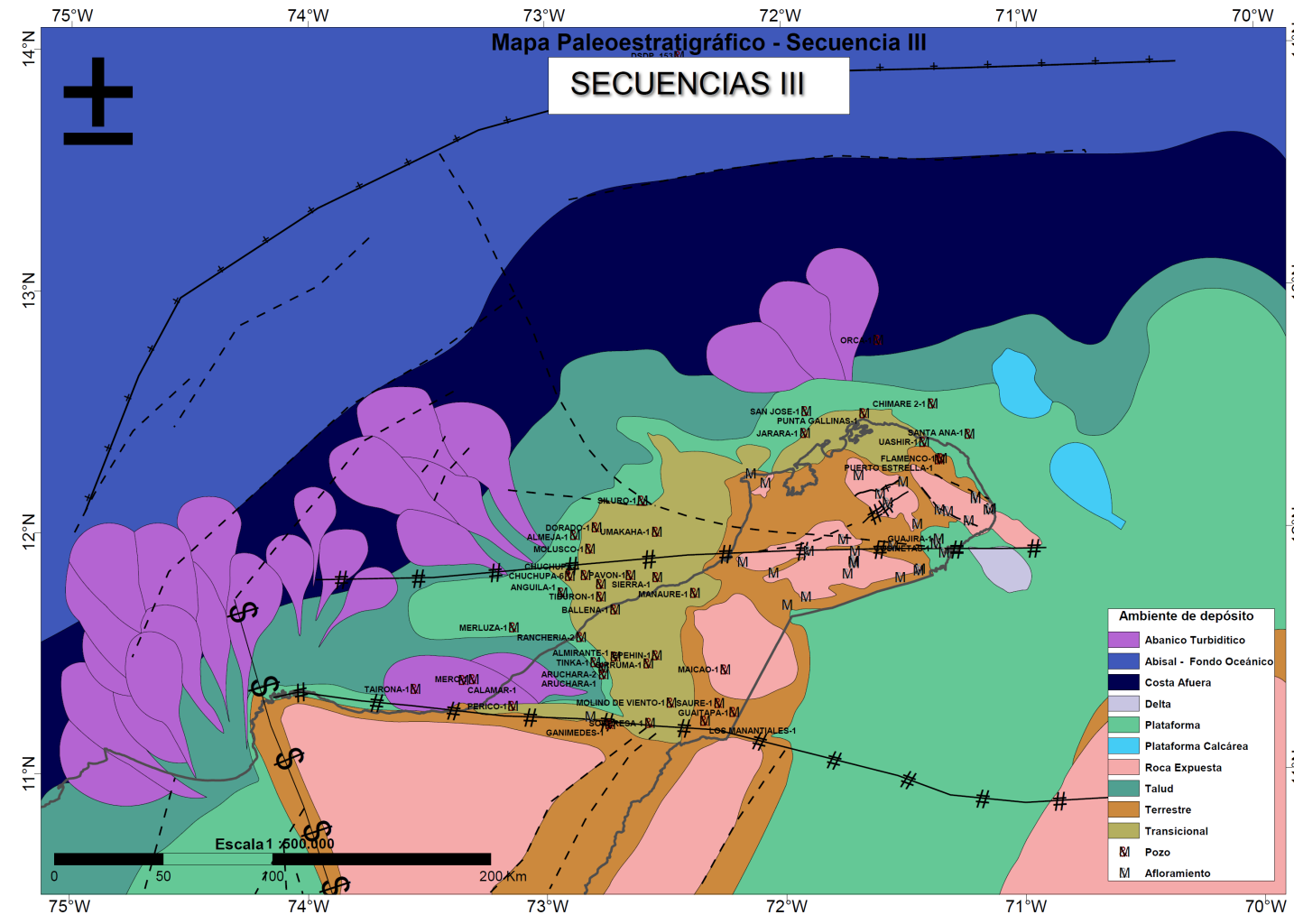
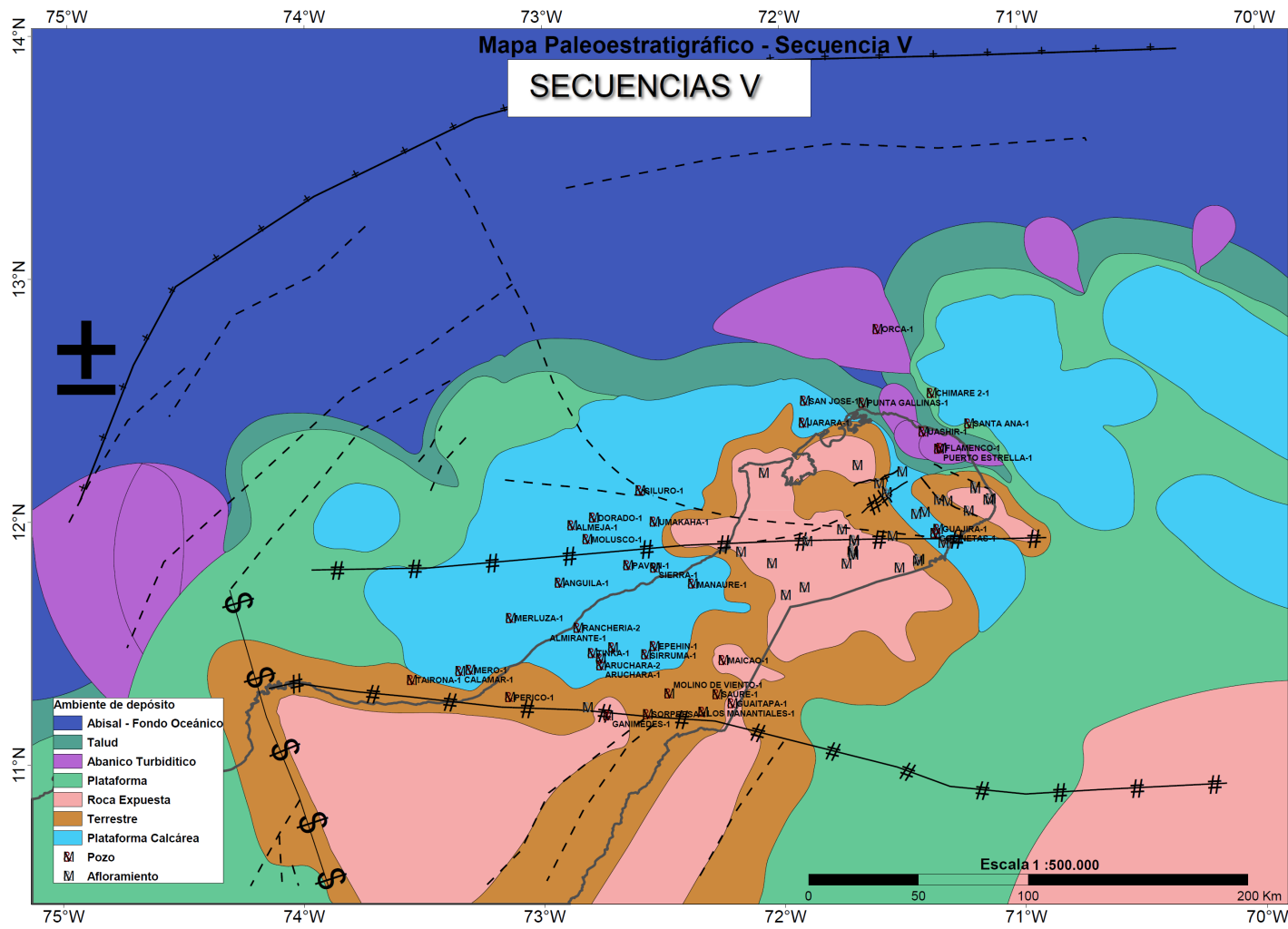
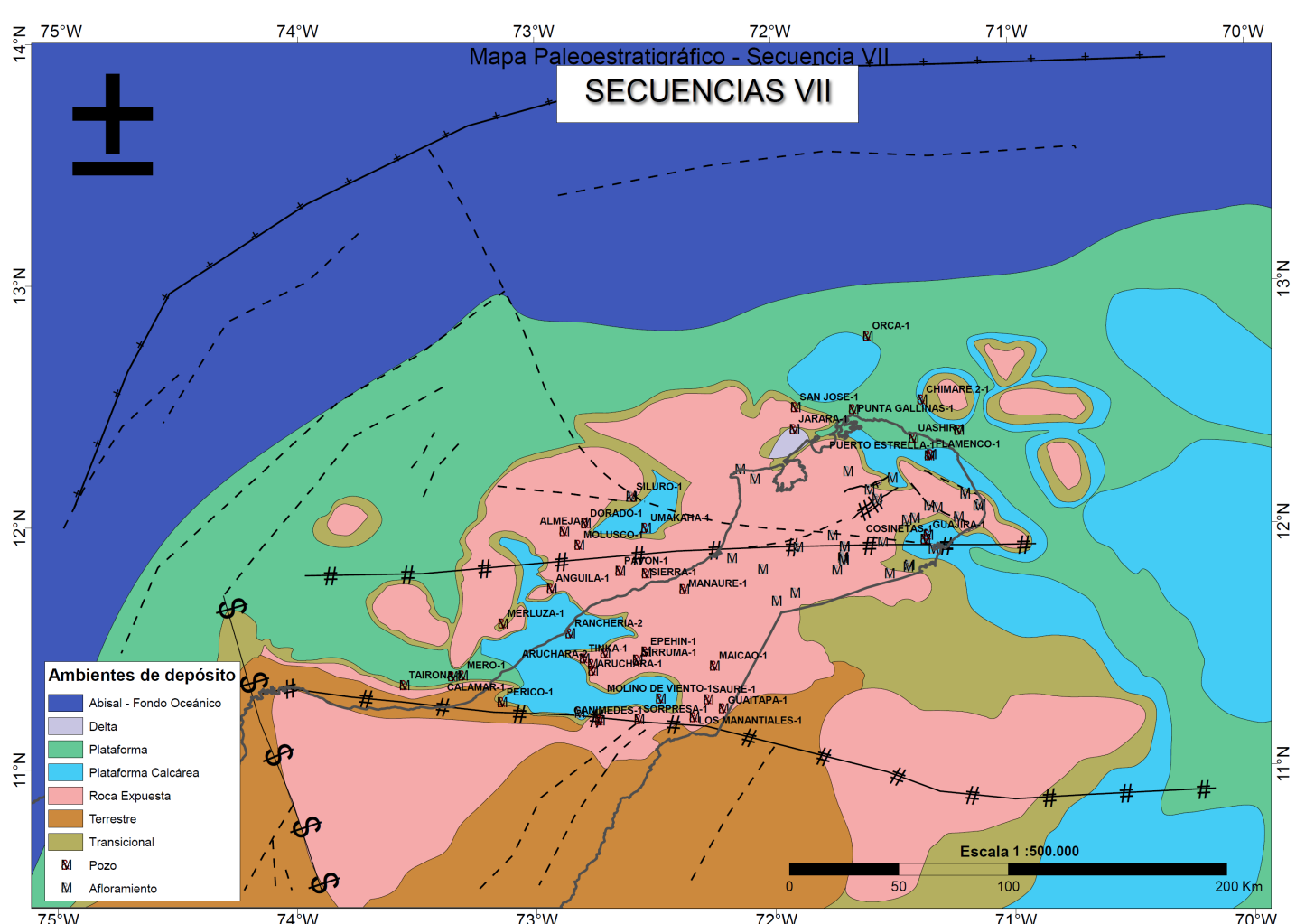
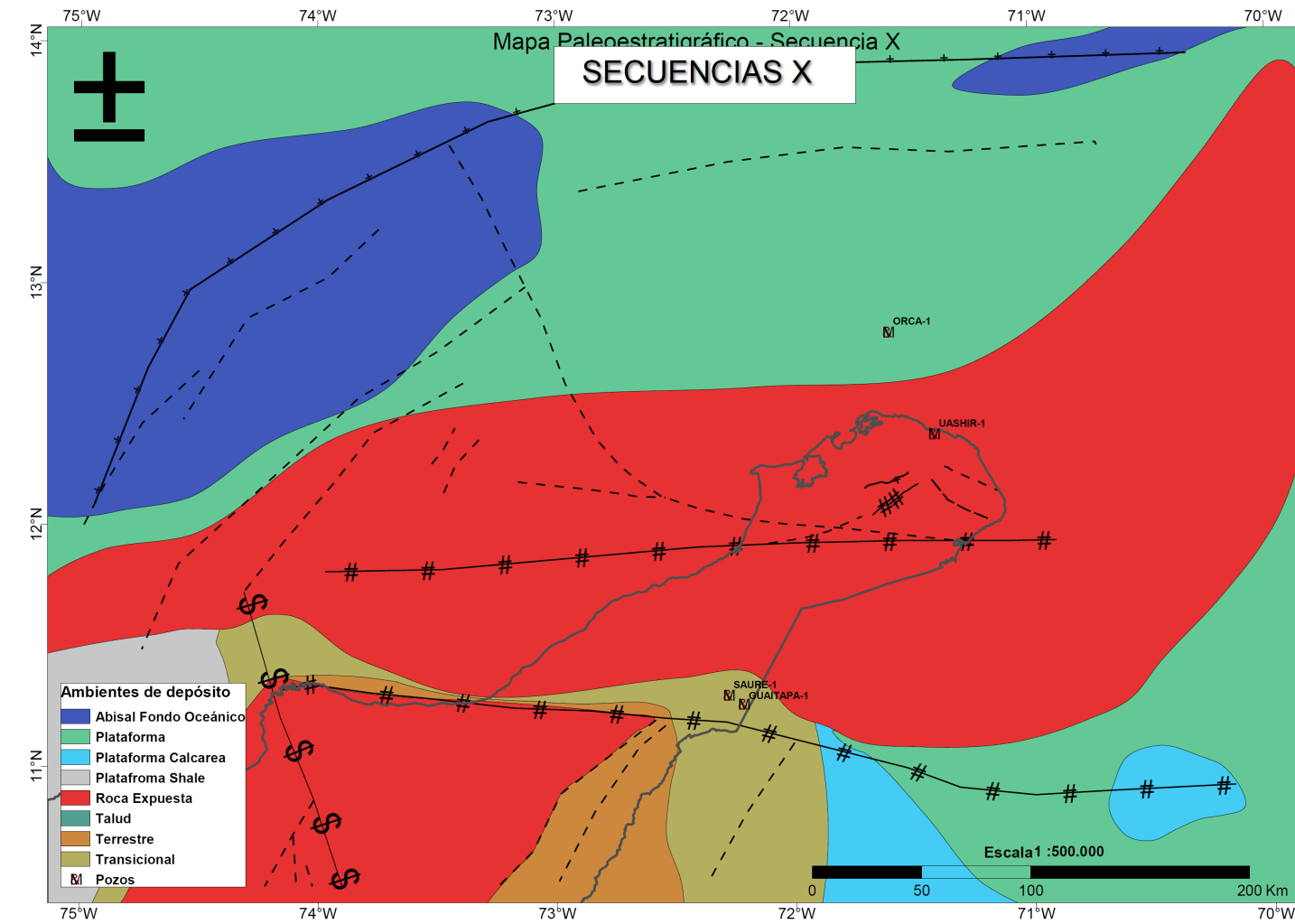
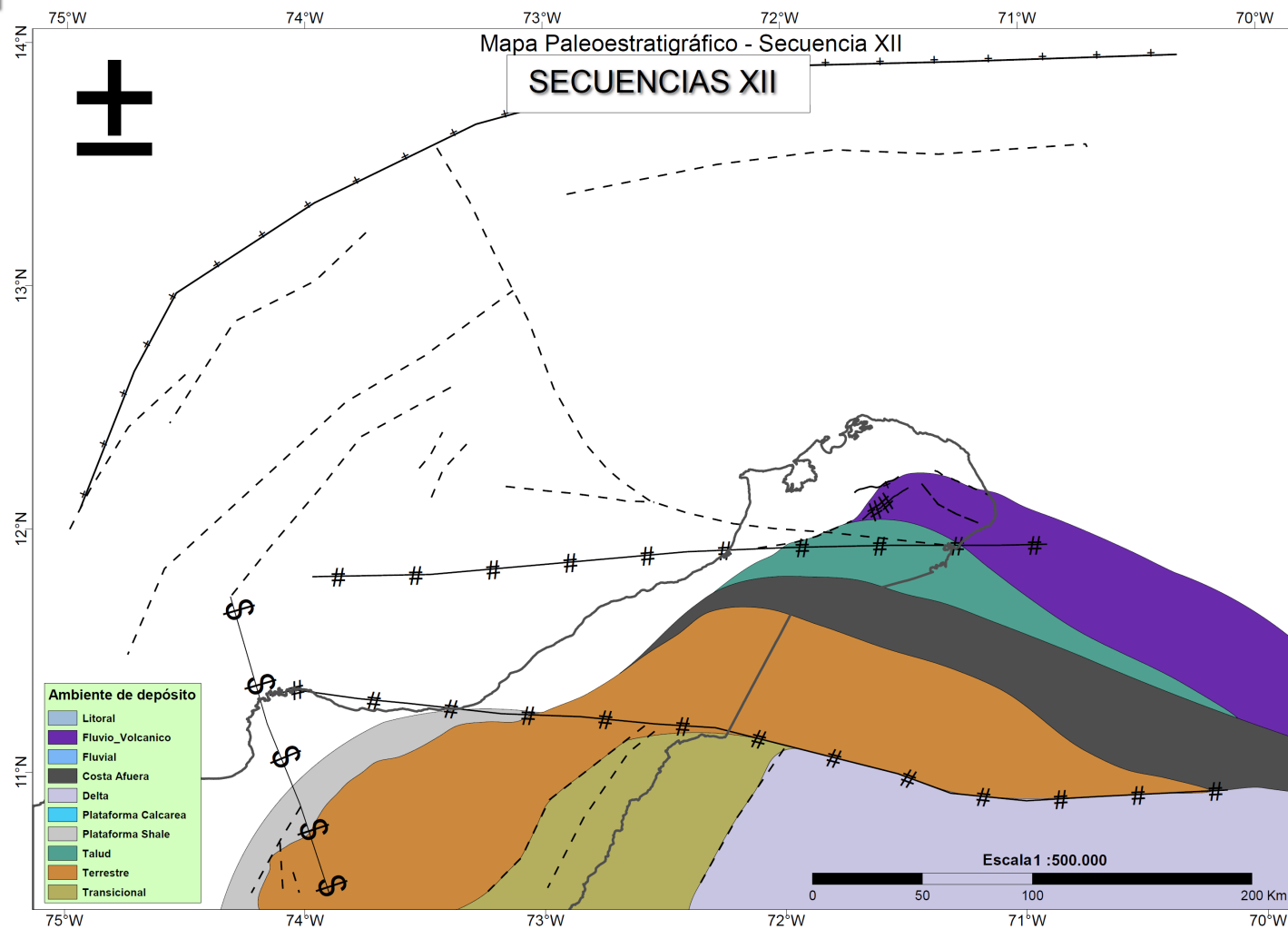
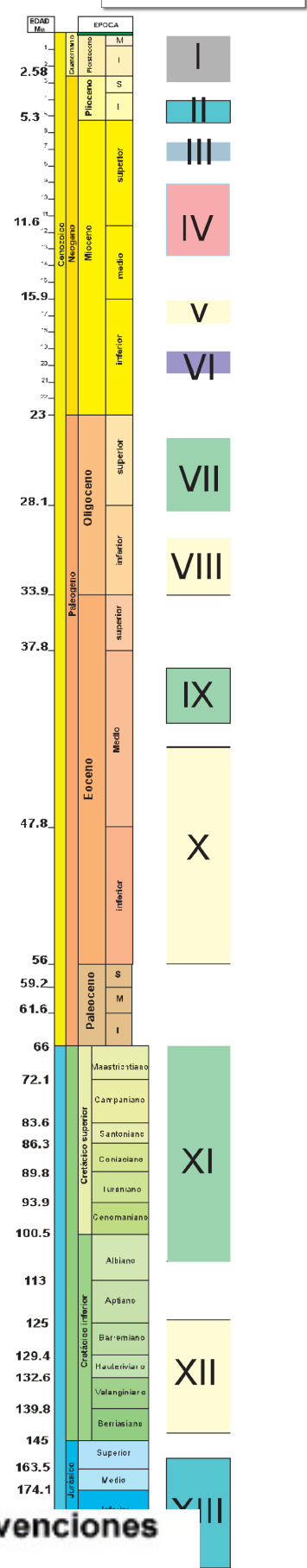


## CHIMARE PROVINCE





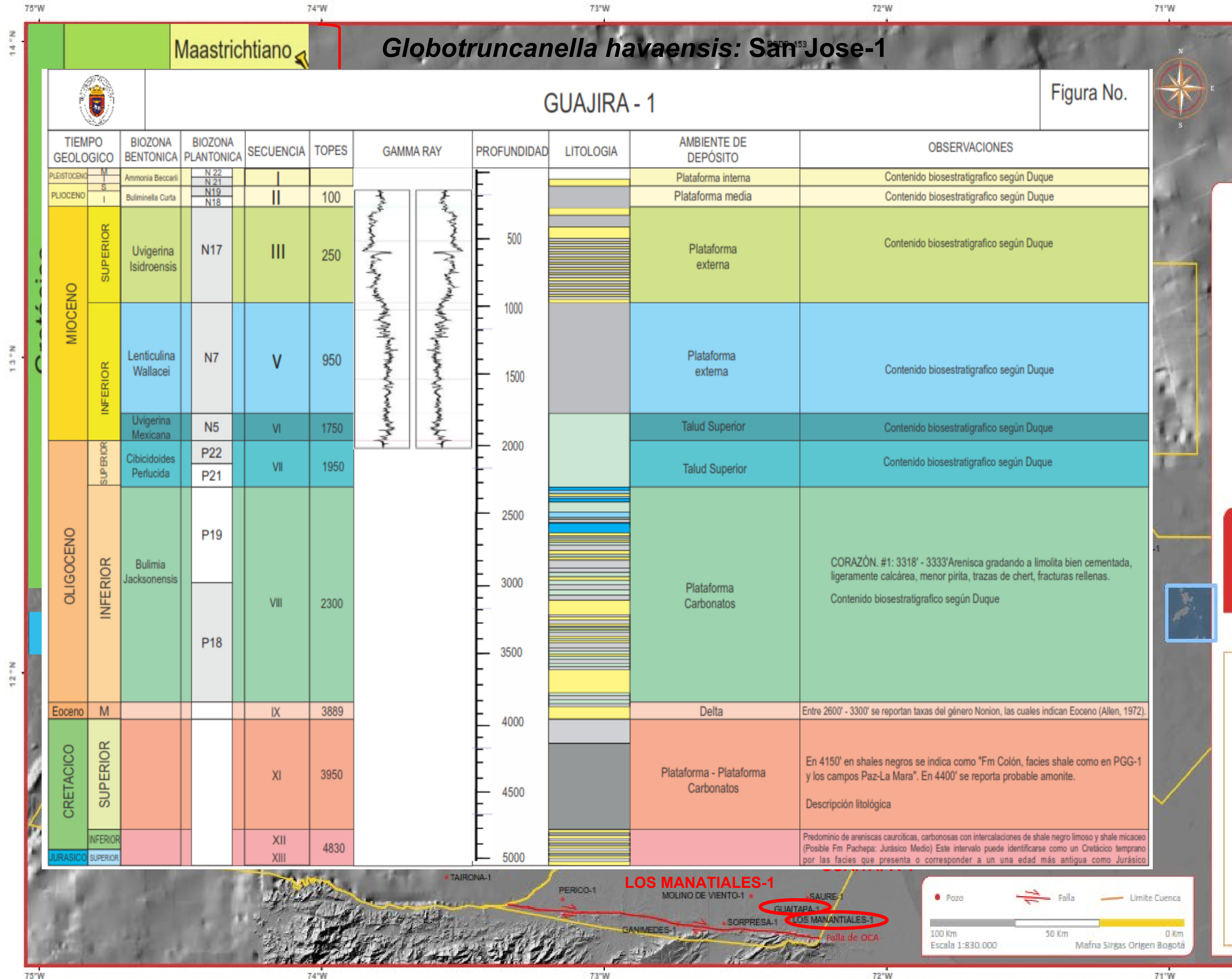
### SECUENCIAS



- ### Convenciones
- Abisal - Fondo Océanico
  - Delta
  - Plataforma
  - Plataforma Calcárea
  - Roca Expuesta
  - Terrestre
  - Transicional
  - Pozo
  - Afloramiento



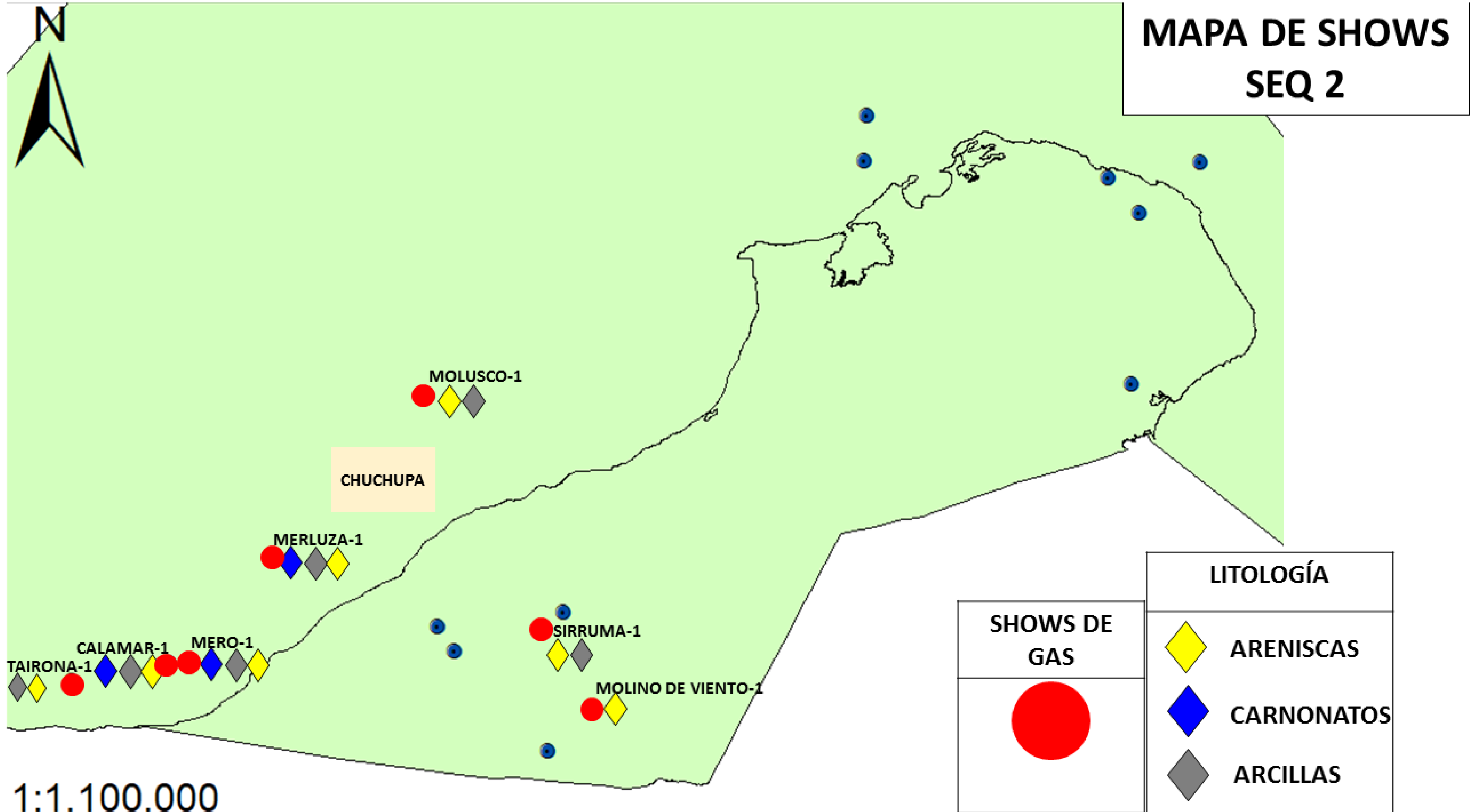
# STRATIGRAPHY



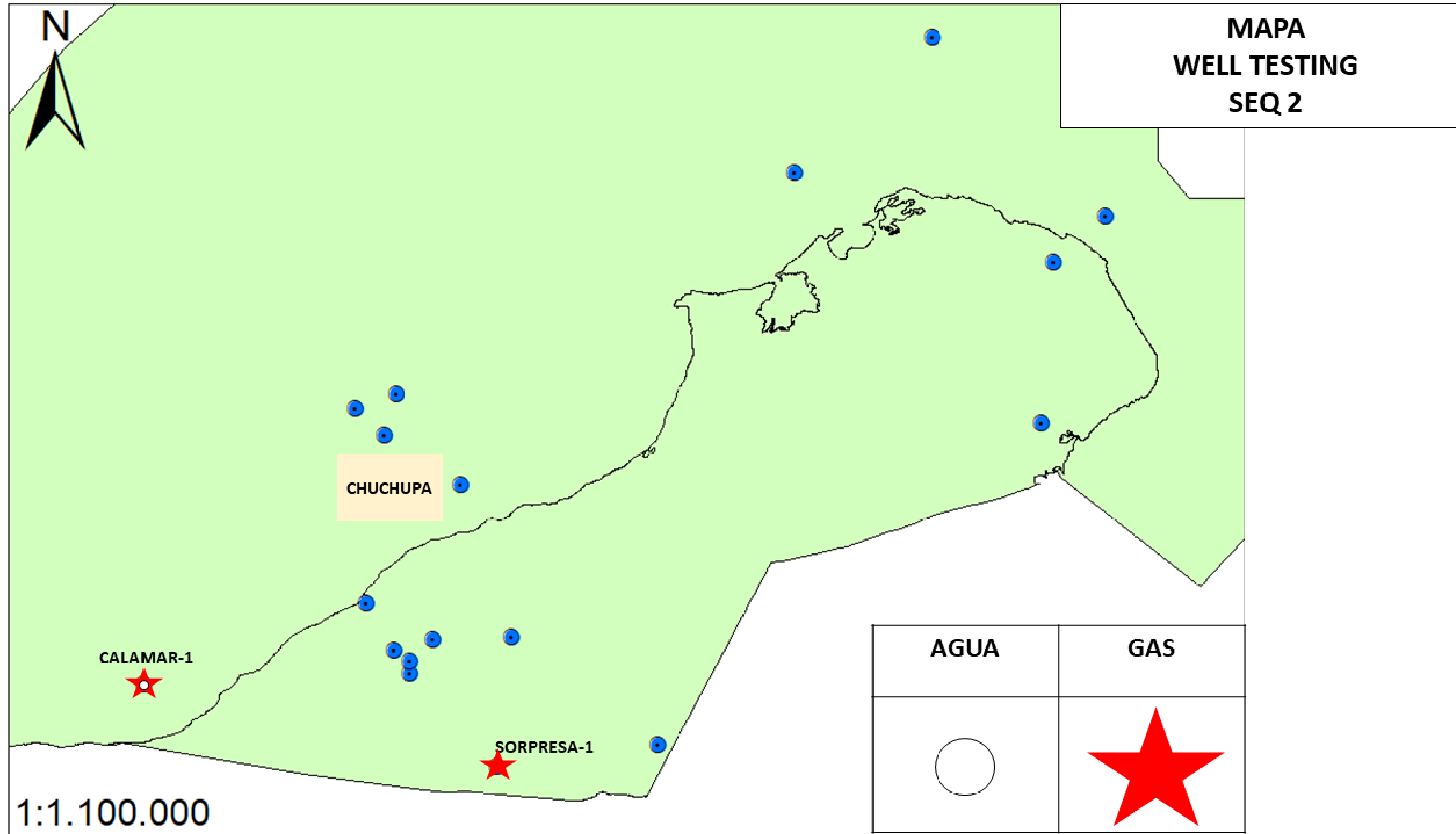
**ANH**  
AGENCIA NACIONAL DE HIDROCARBUROS

**Contrato Interadministrativo N°432**  
Integración Geológica, Evaluación de los Sistemas Petrolíferos y Prospectividad de las Cuencas Frontera de Colombia: Cuencas Guajira y Guajira Offshore  
Marzo 2021





# PRODUCTION DATA

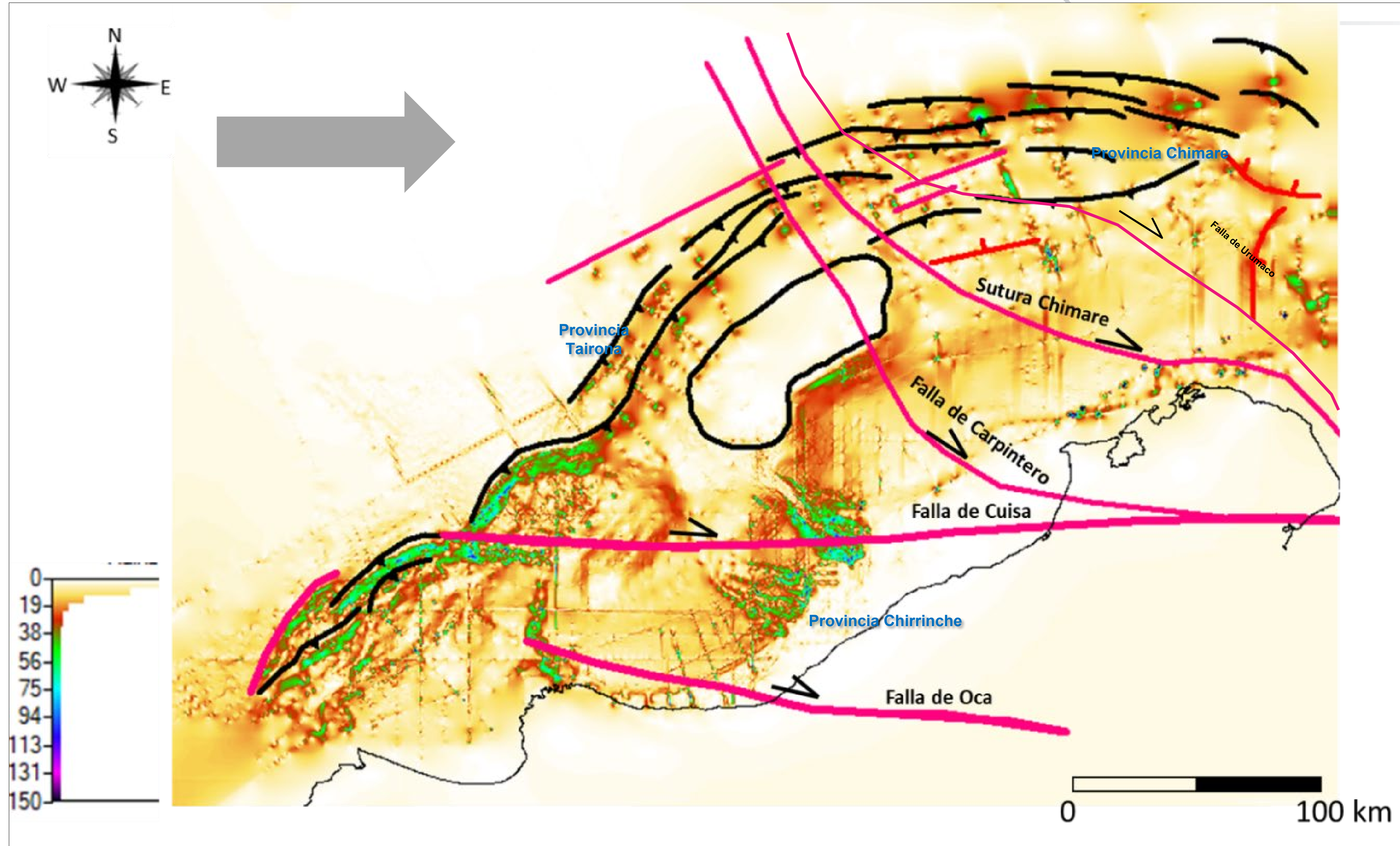


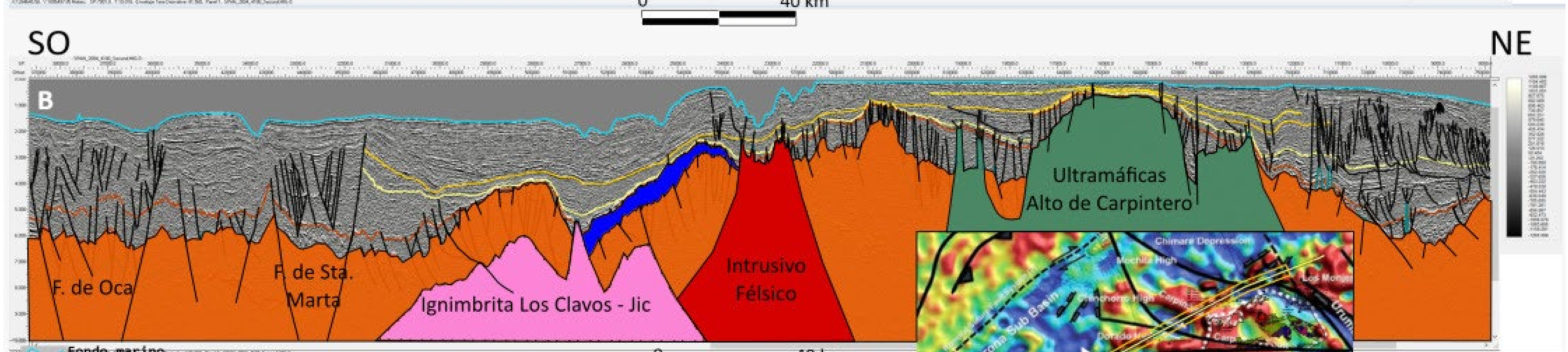
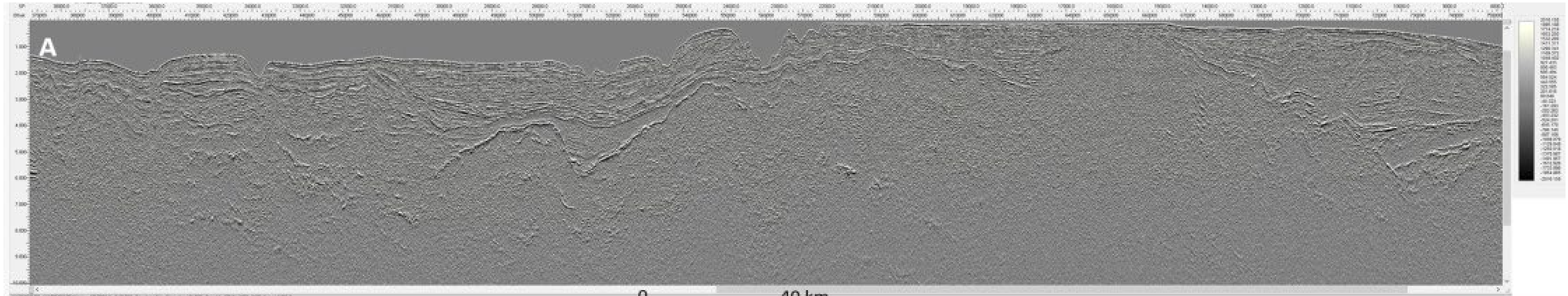


# Geological Provinces



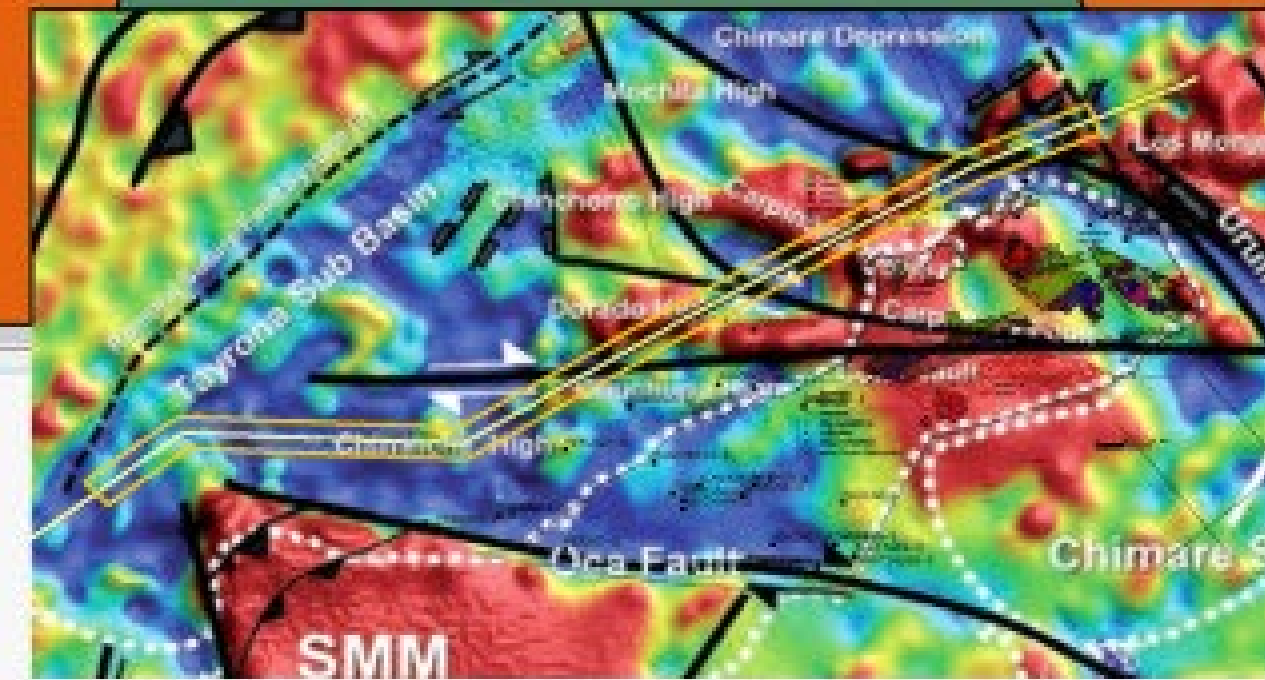
# Seismic characteristic of provinces





- Fondo marino
- Oligoceno
- Eoceno Inferior
- Basamento Meta- y sedimentario
- Basamento continental
- Magmatismo sublitosférico
- Underplating
- Manto superior
- Moho

- Fallas y fracturas corticales
- Fallas y fracturas de la secuencia sedimentaria

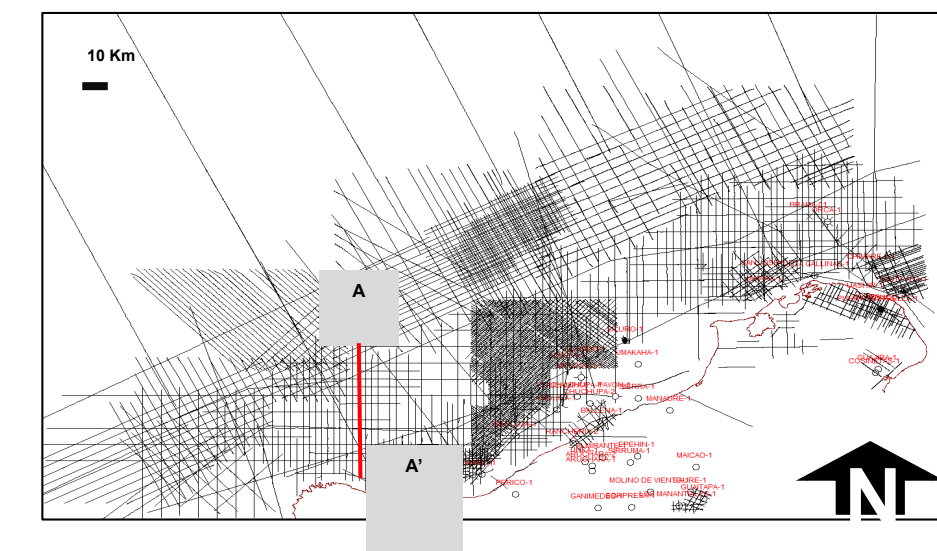
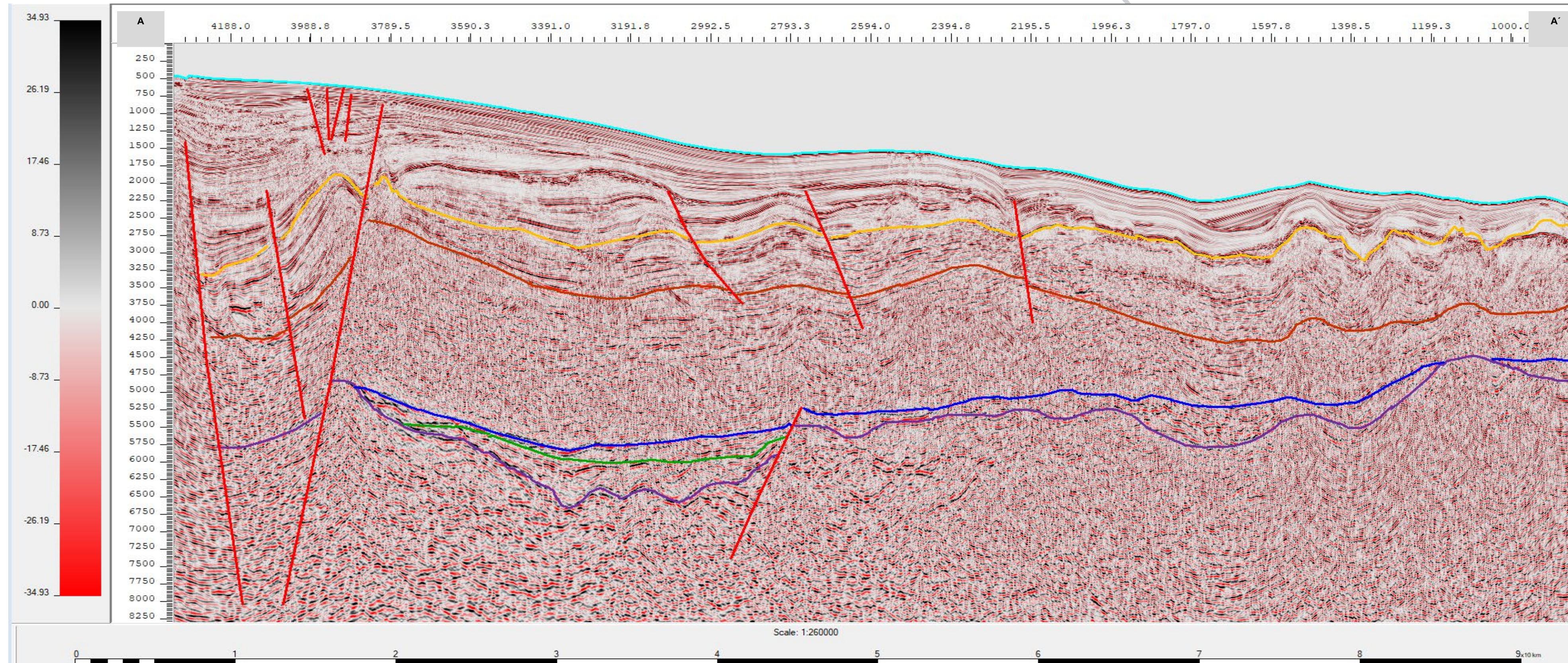




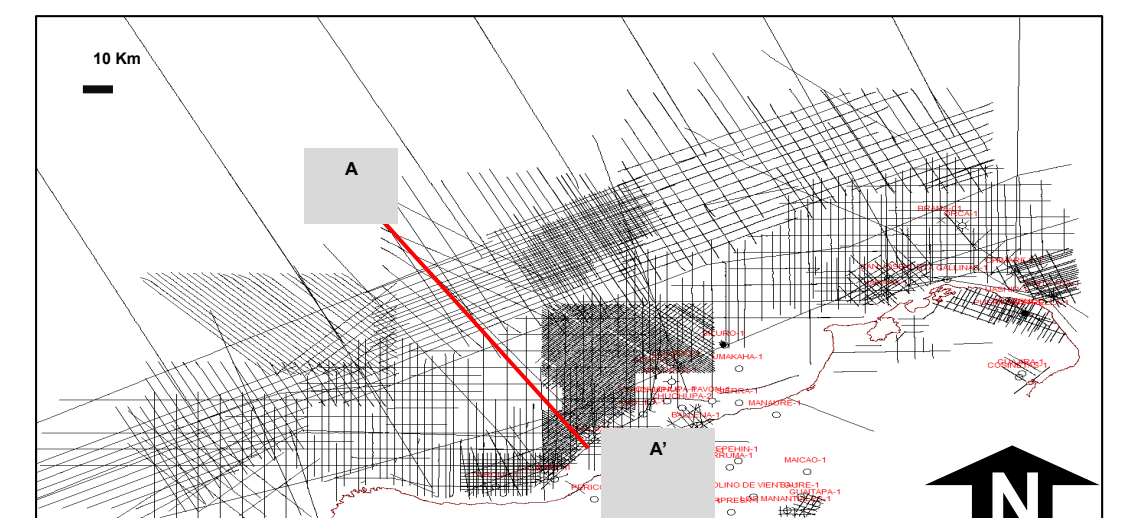
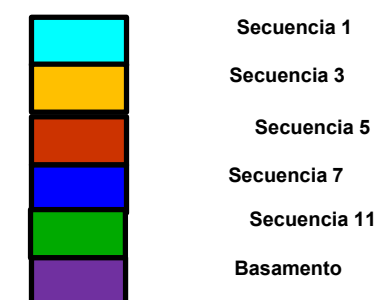
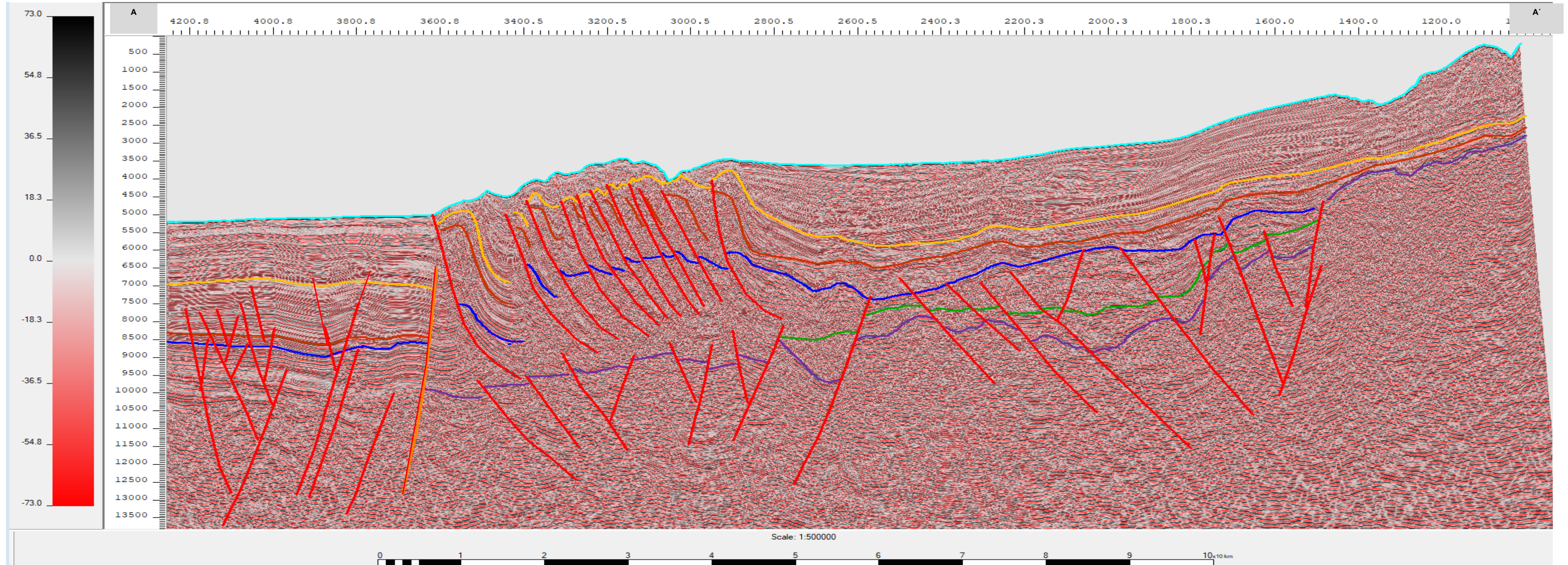
# CHIRRINCHE PROVINCE







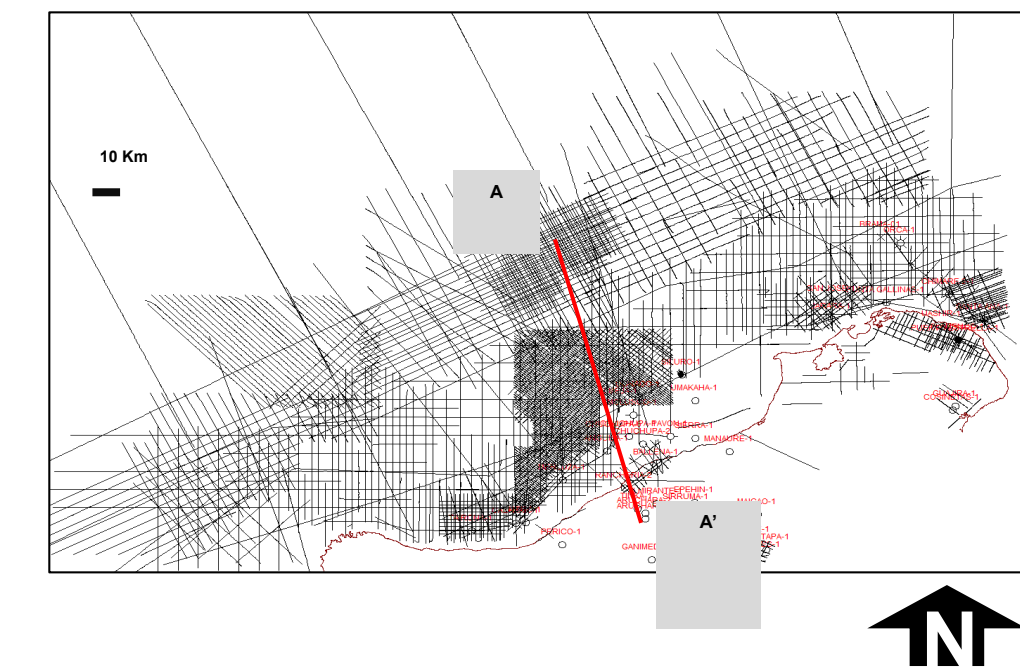
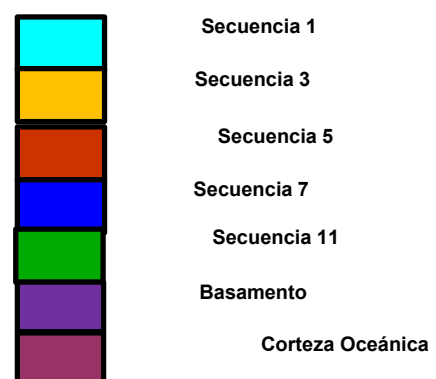
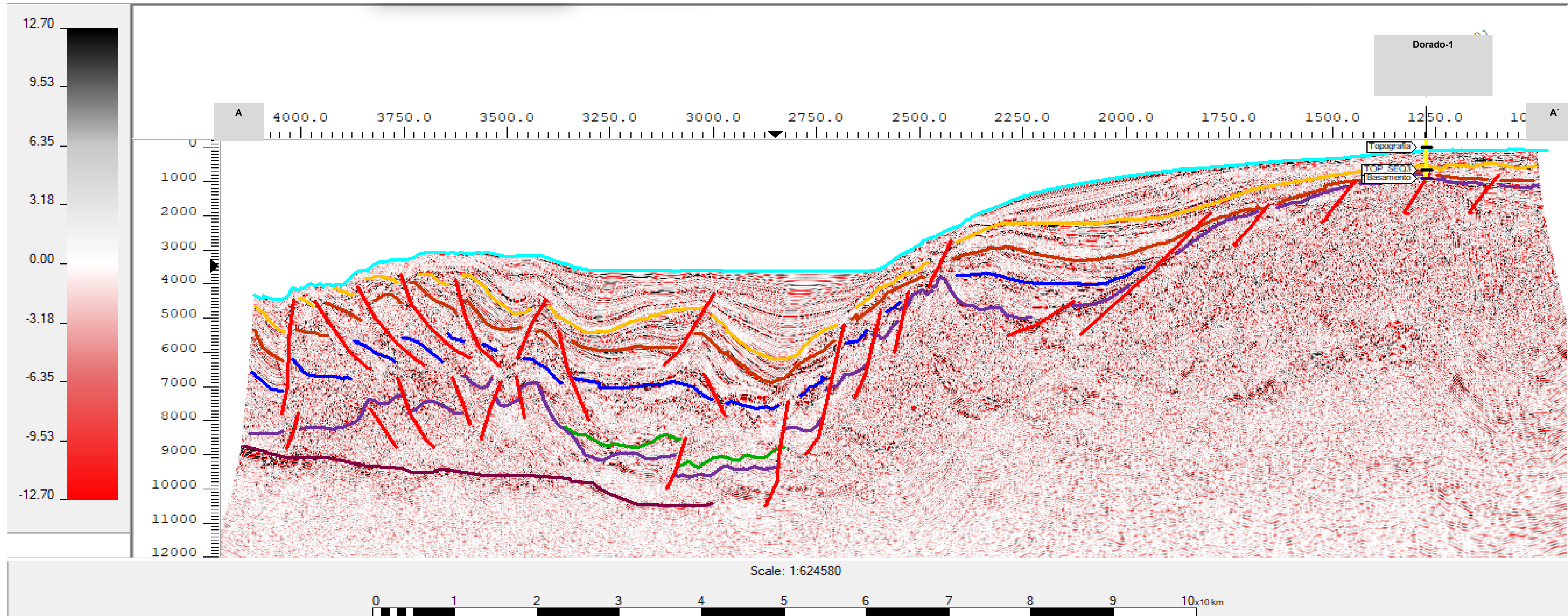






# TAIRONA PROVINCE

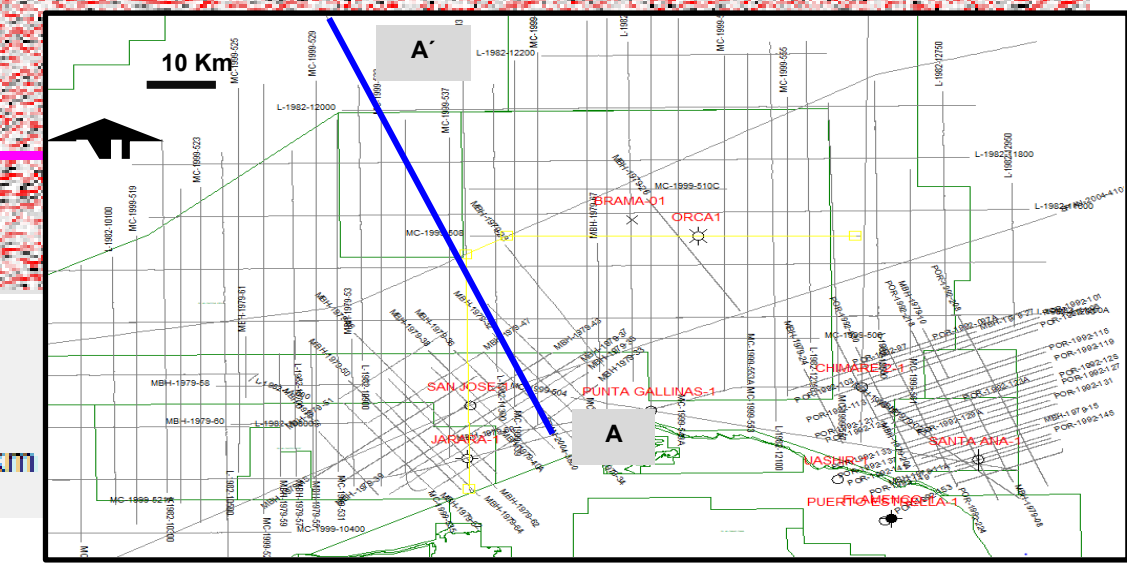
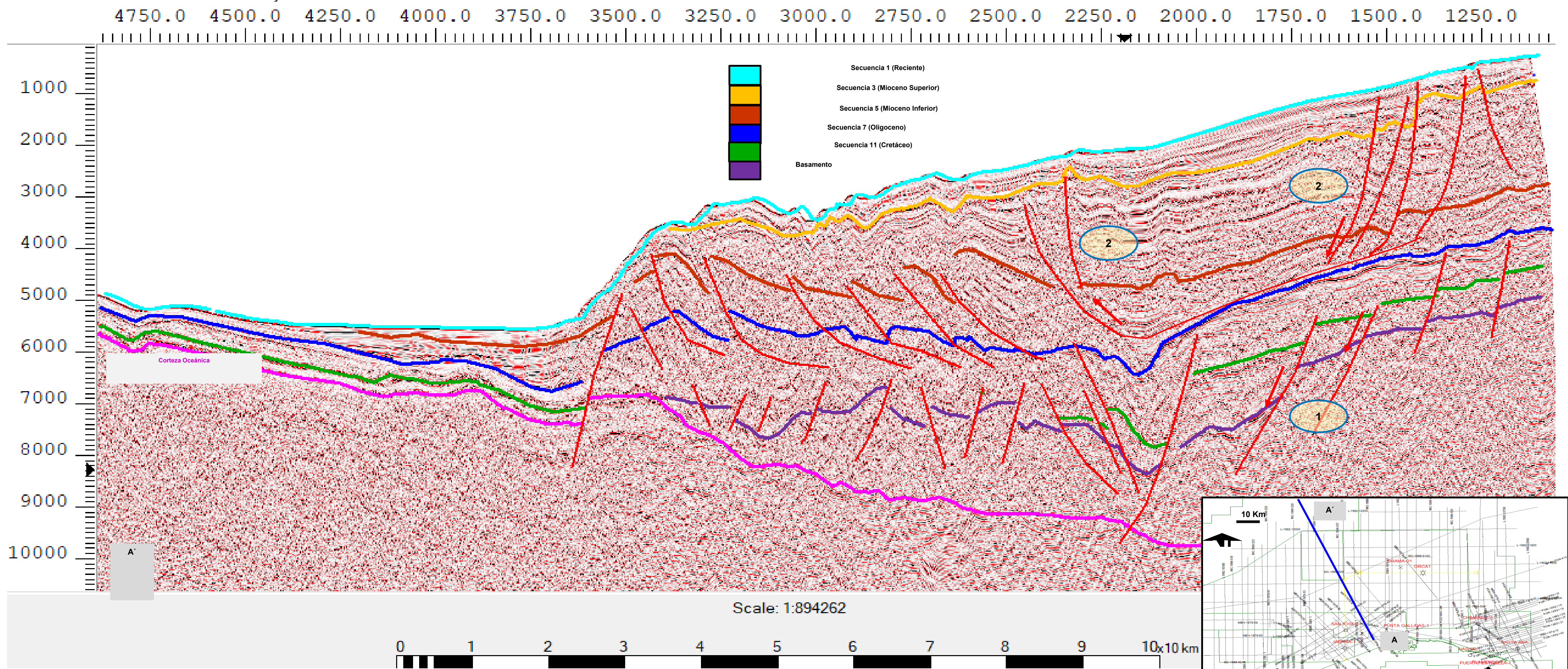






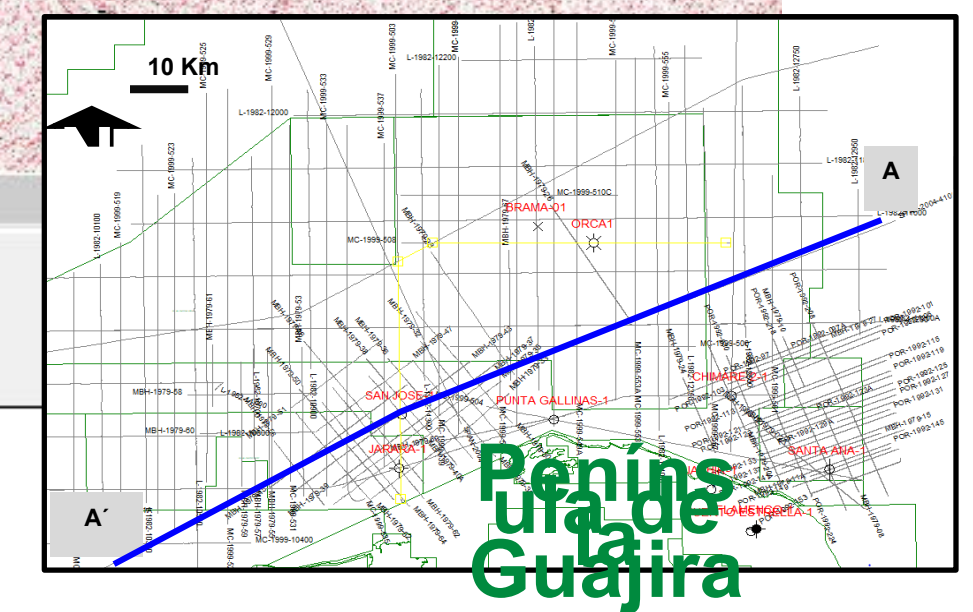
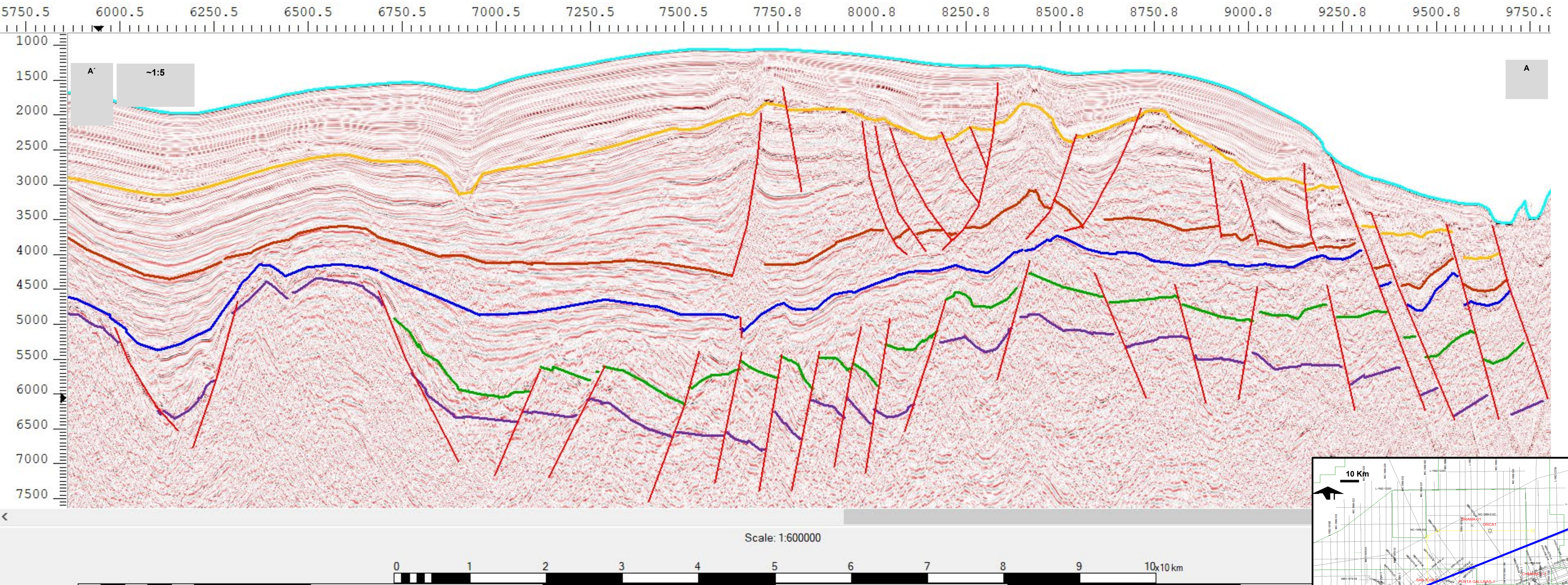
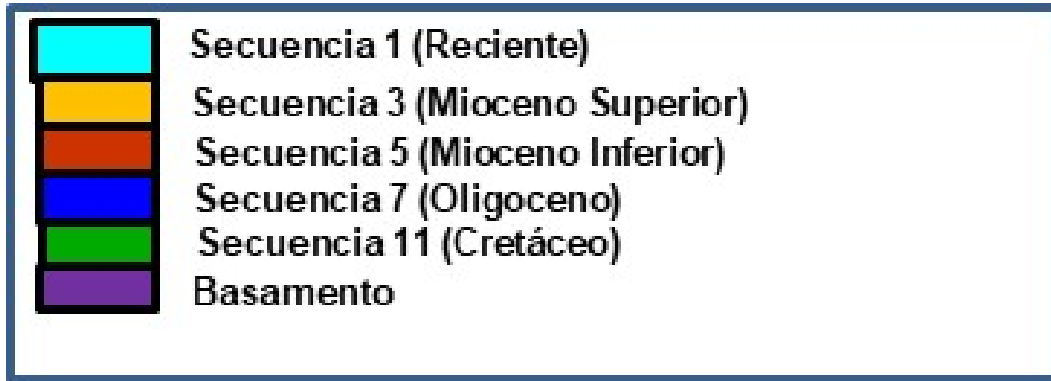
# CHIMARE PROVINCE





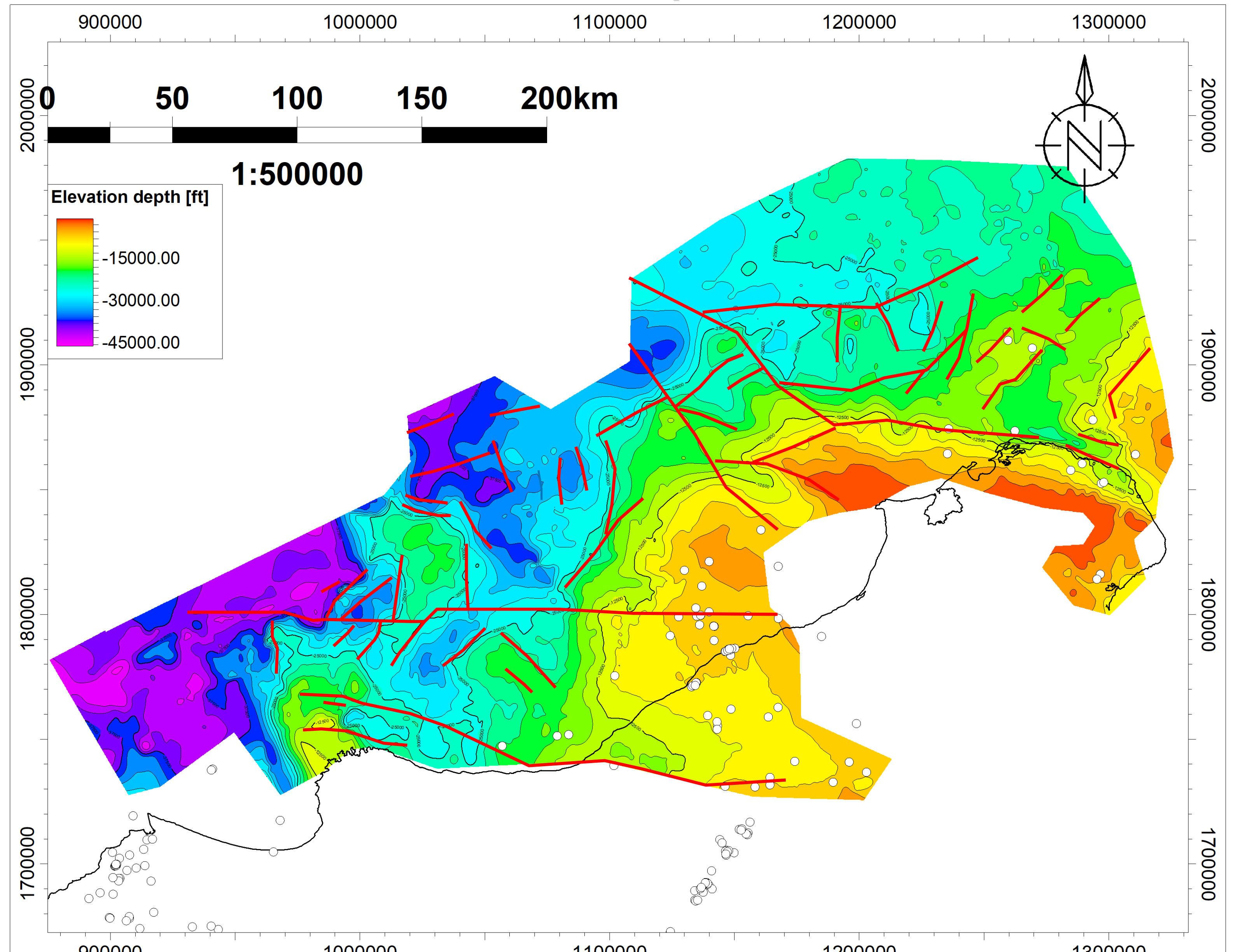


# Seismic characteristic of provinces



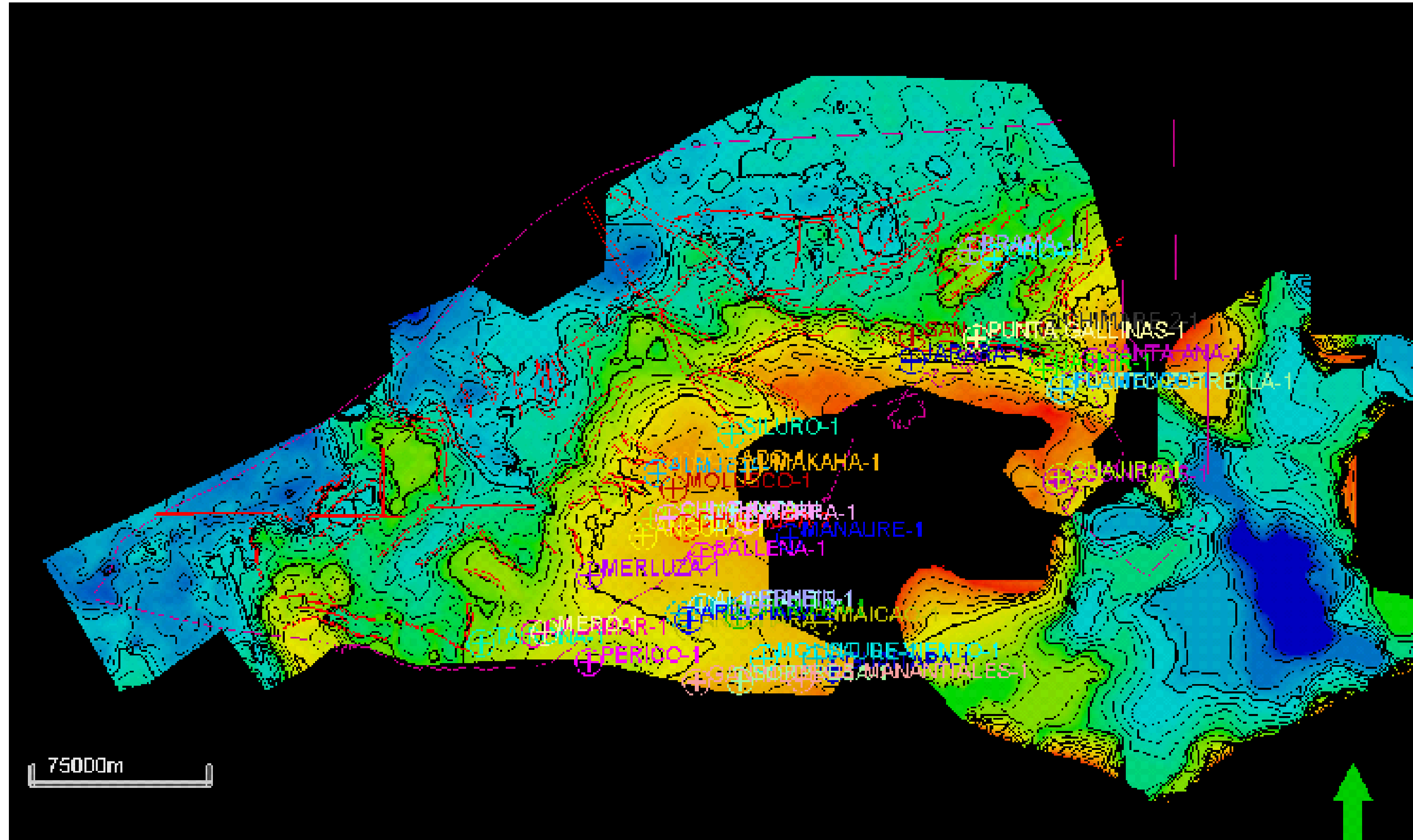


## BASAMENT MAP





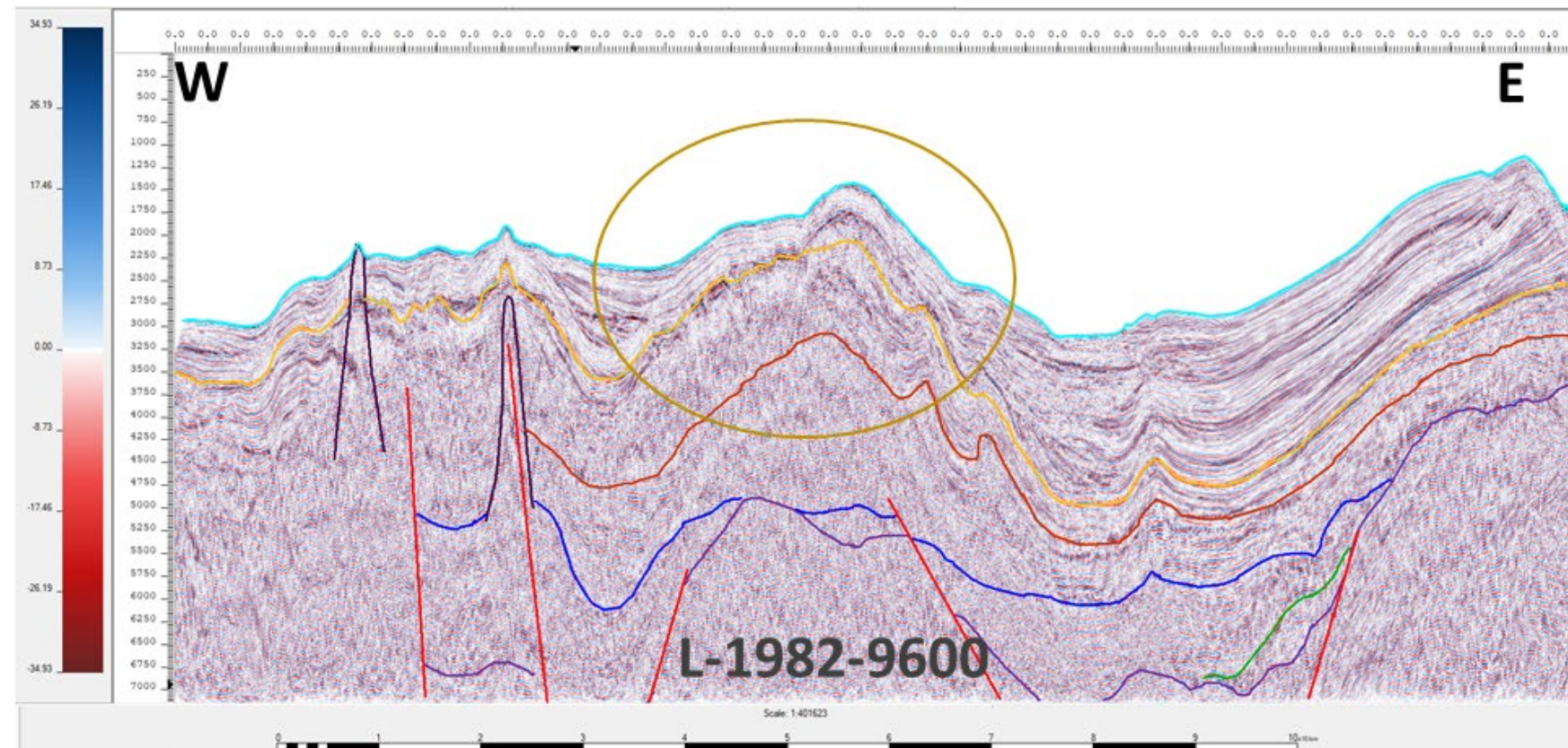
# STRUCTURAL MAP OF THE BASEMENT OF GUAJIRA BASIN AND VENEZUELA GULF



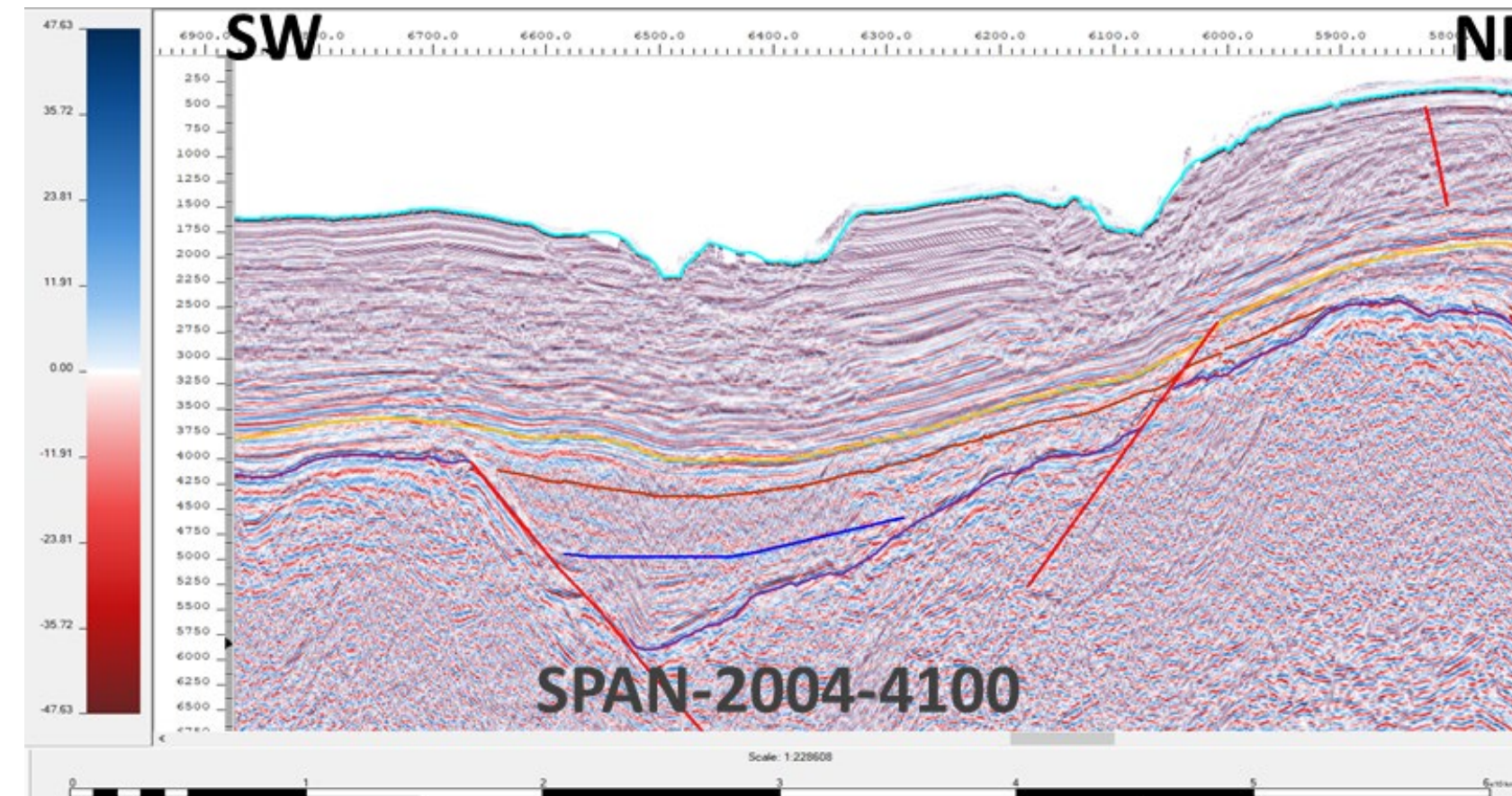


# STRUCTURAL TRAPS

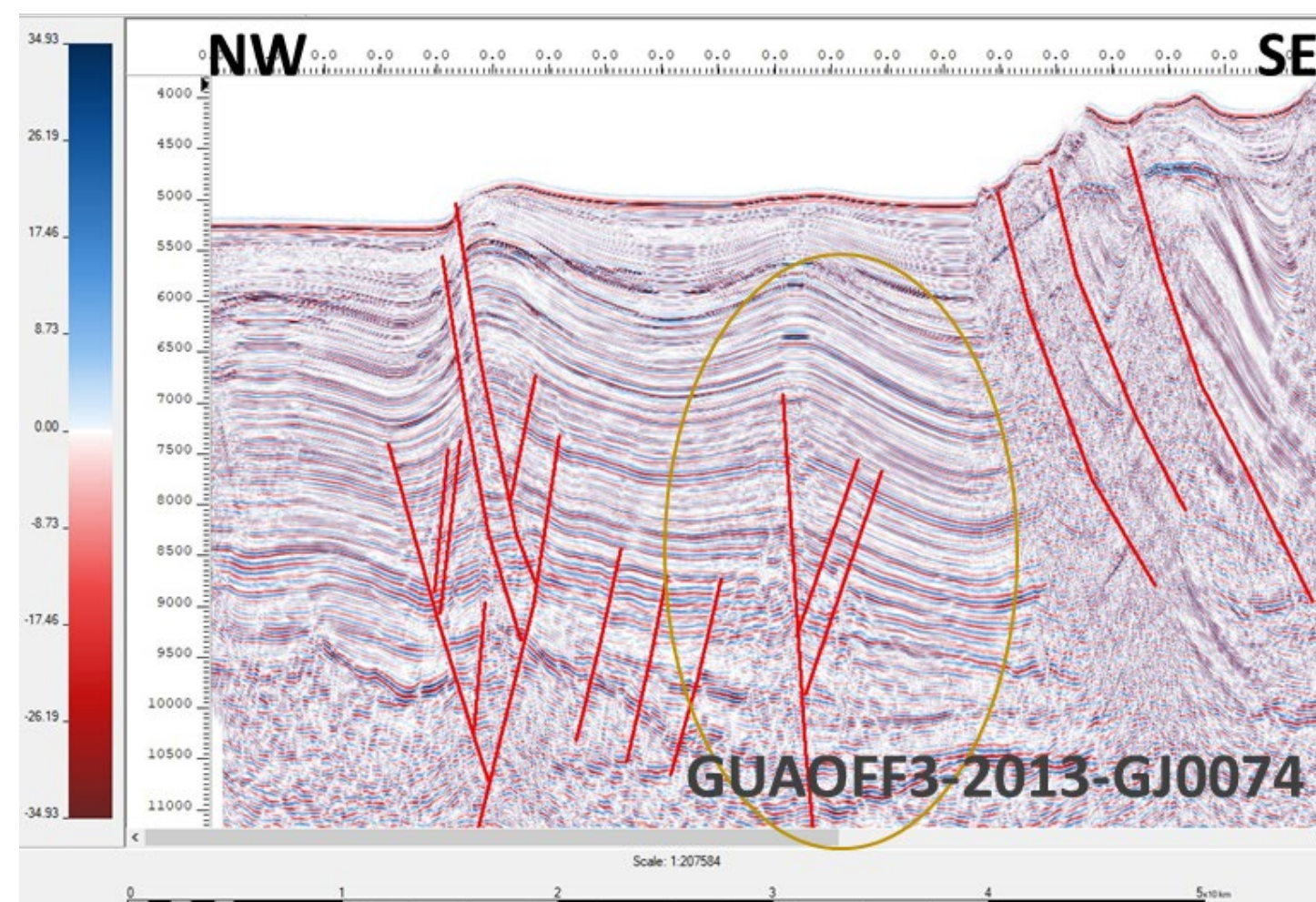
## 1. positive structures: Anticlines



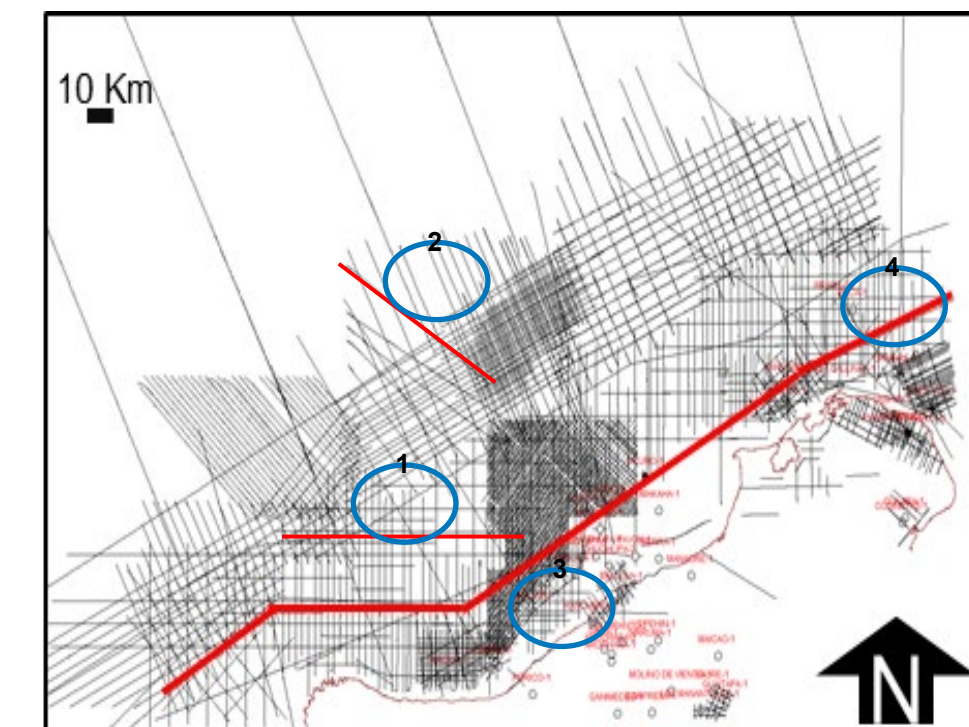
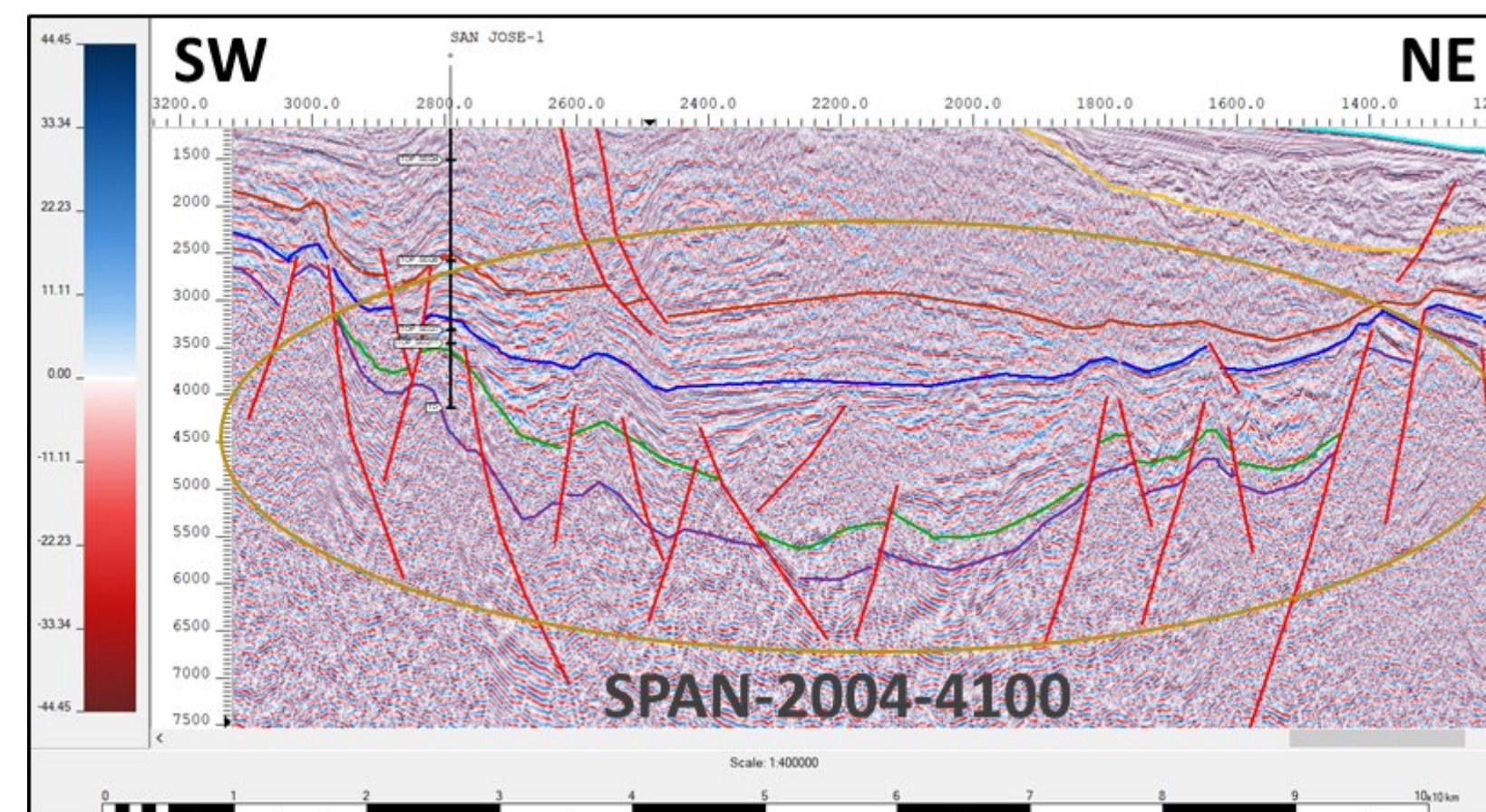
## 3. Sandy fillings in Grabens



## 2. Positive structures: generated by strike

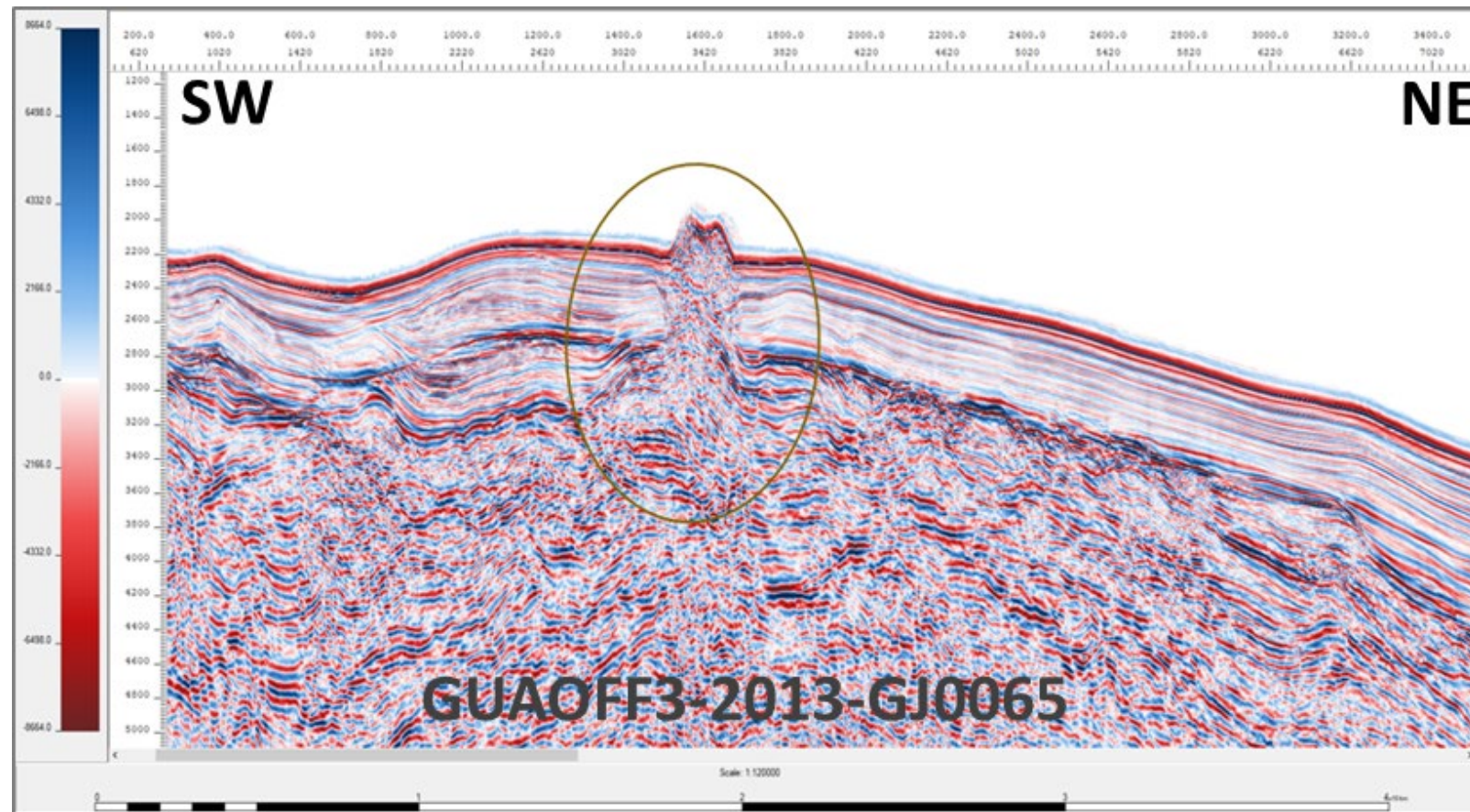


## 4. Rotated Blocks

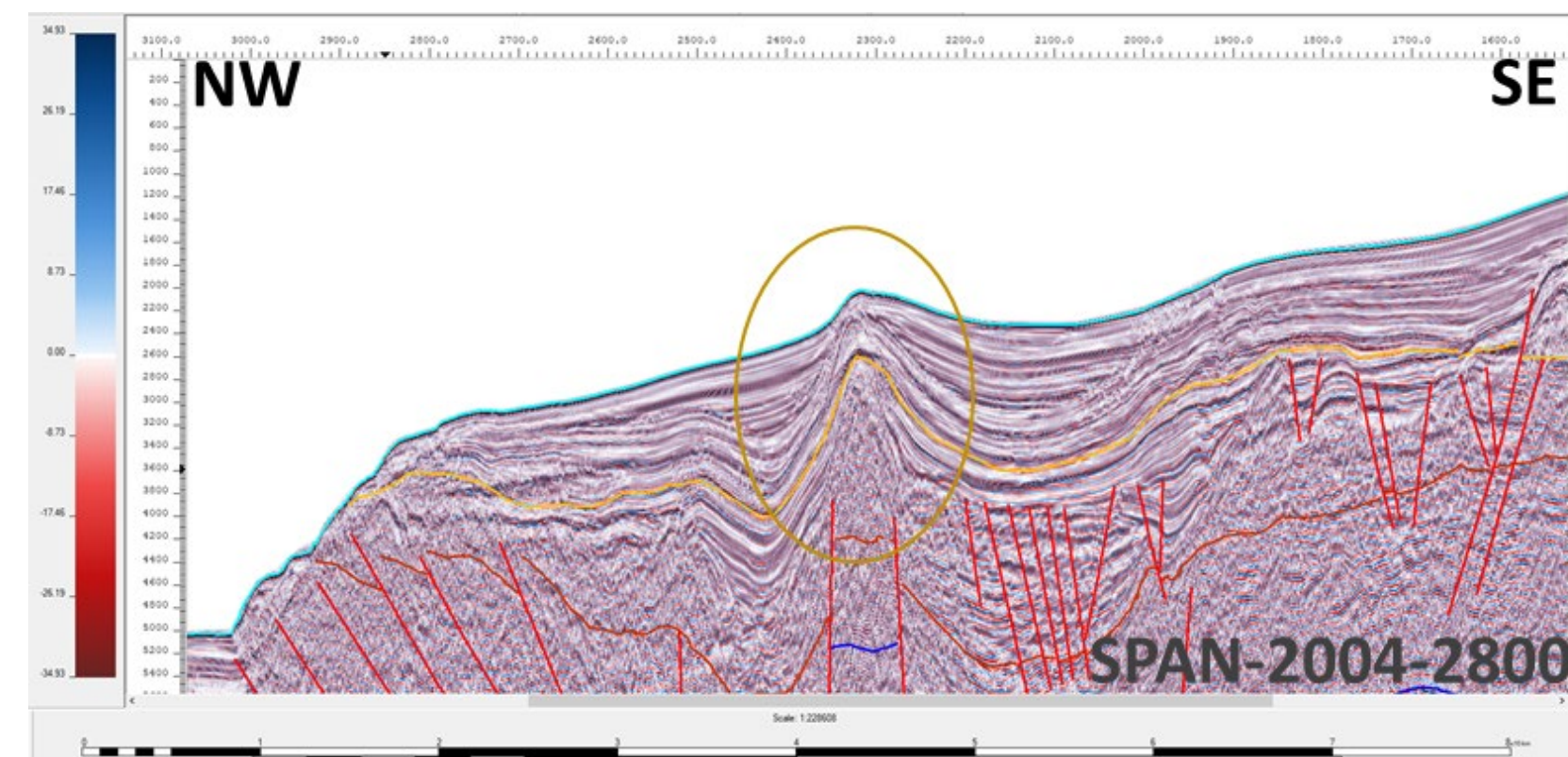




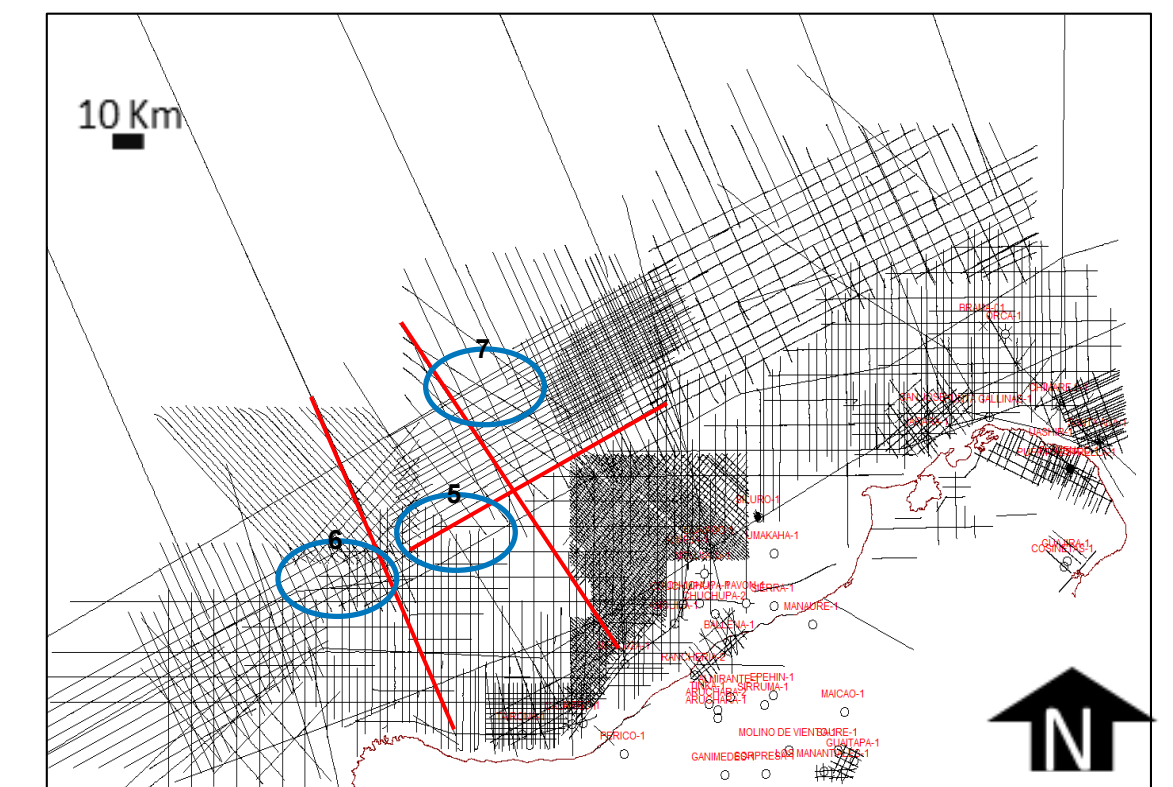
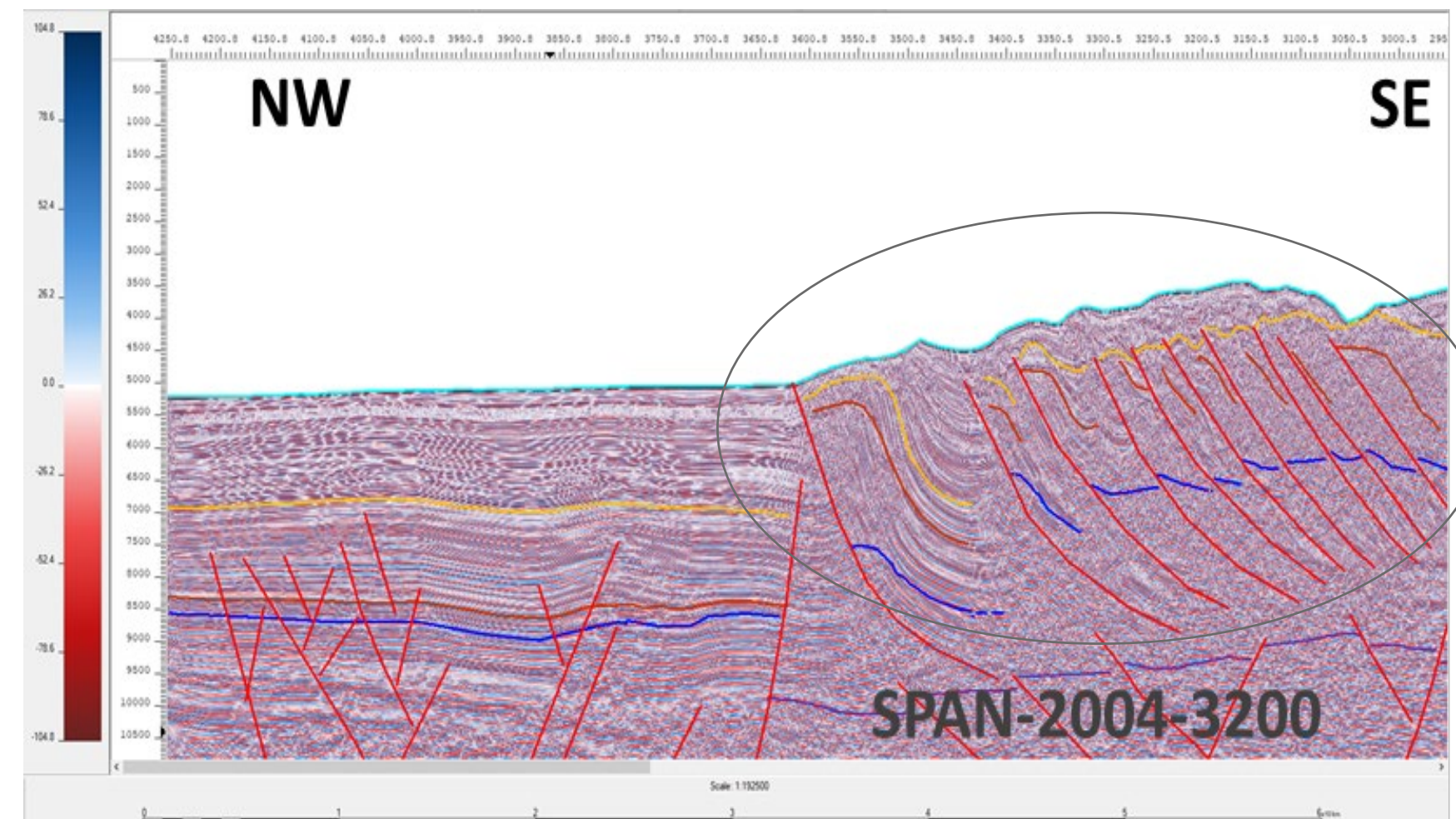
## 5. Structures Associated with Mud Diapirs



## 6. Anticlines in Stress Zones

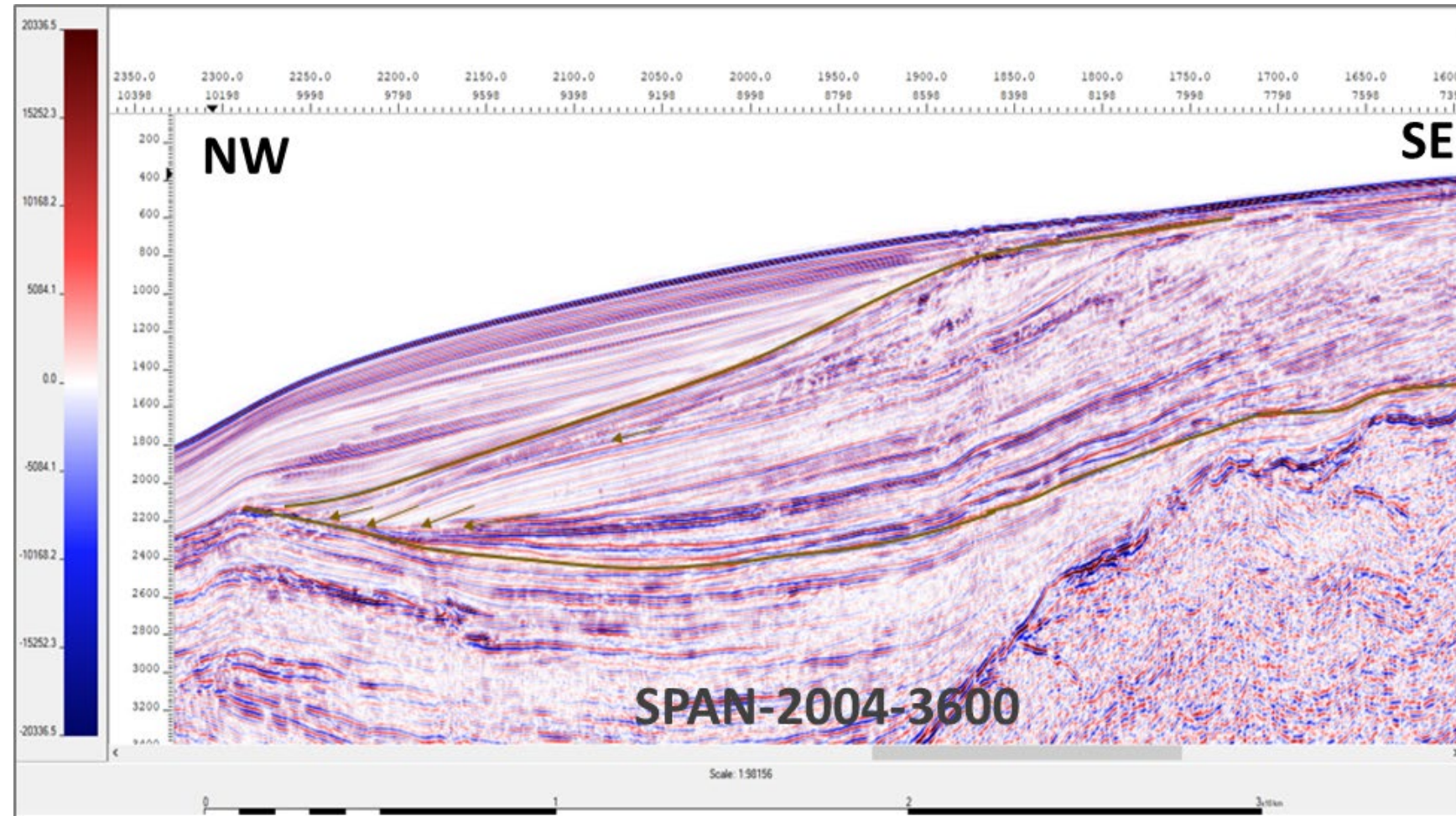


## 7. Anticlines Associated with Imbricated Fault System

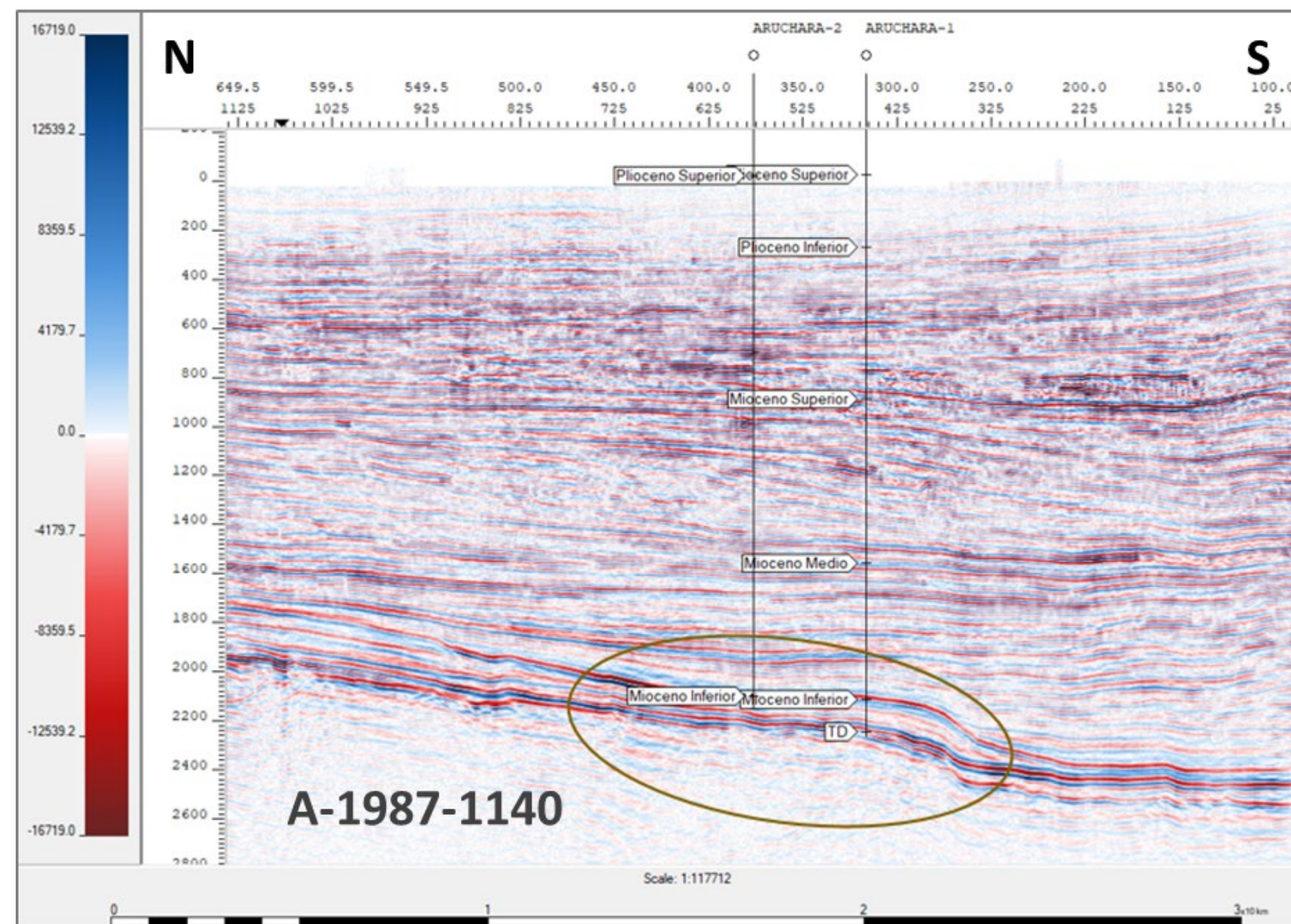




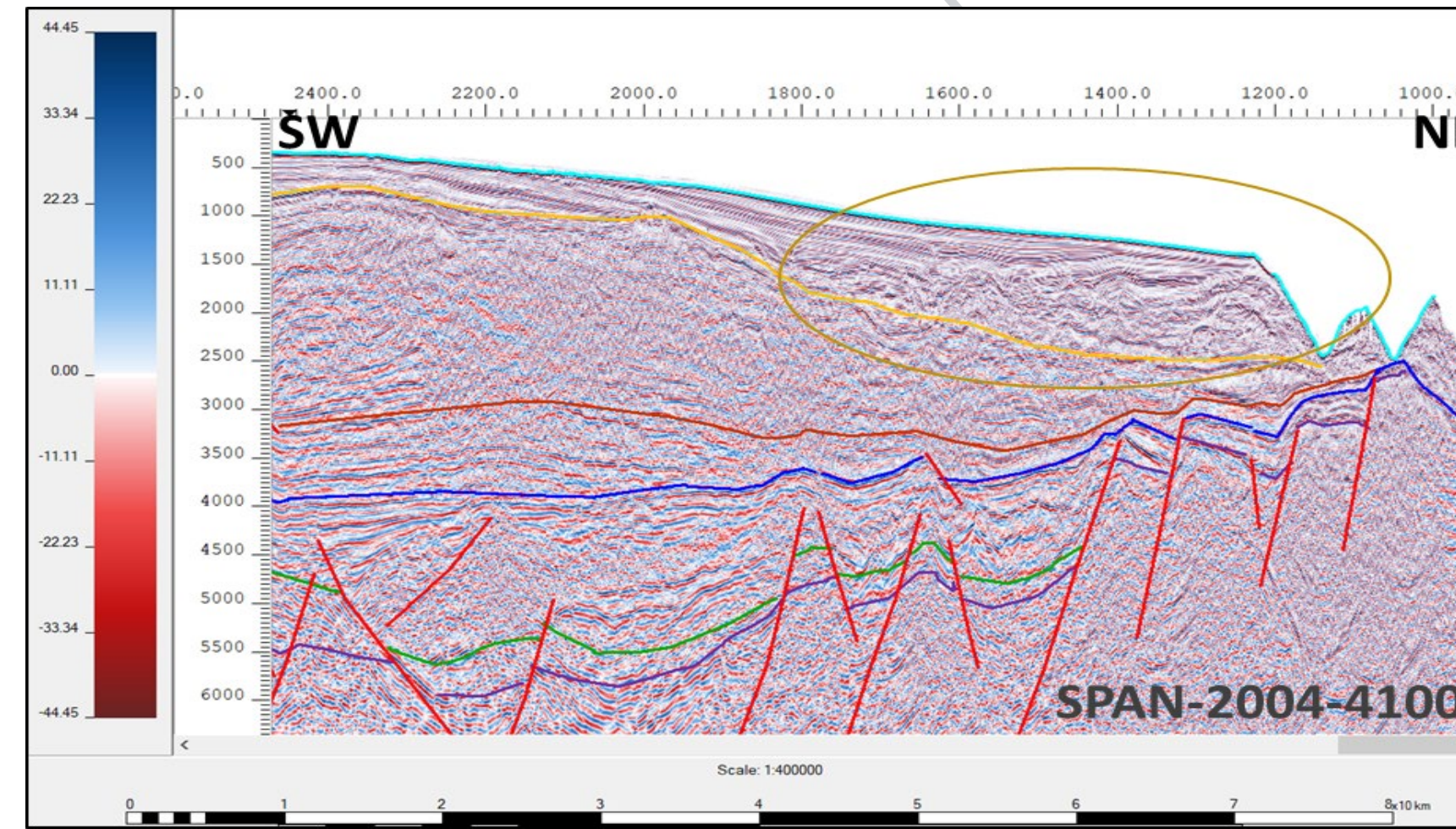
## 1. platform sands progradations



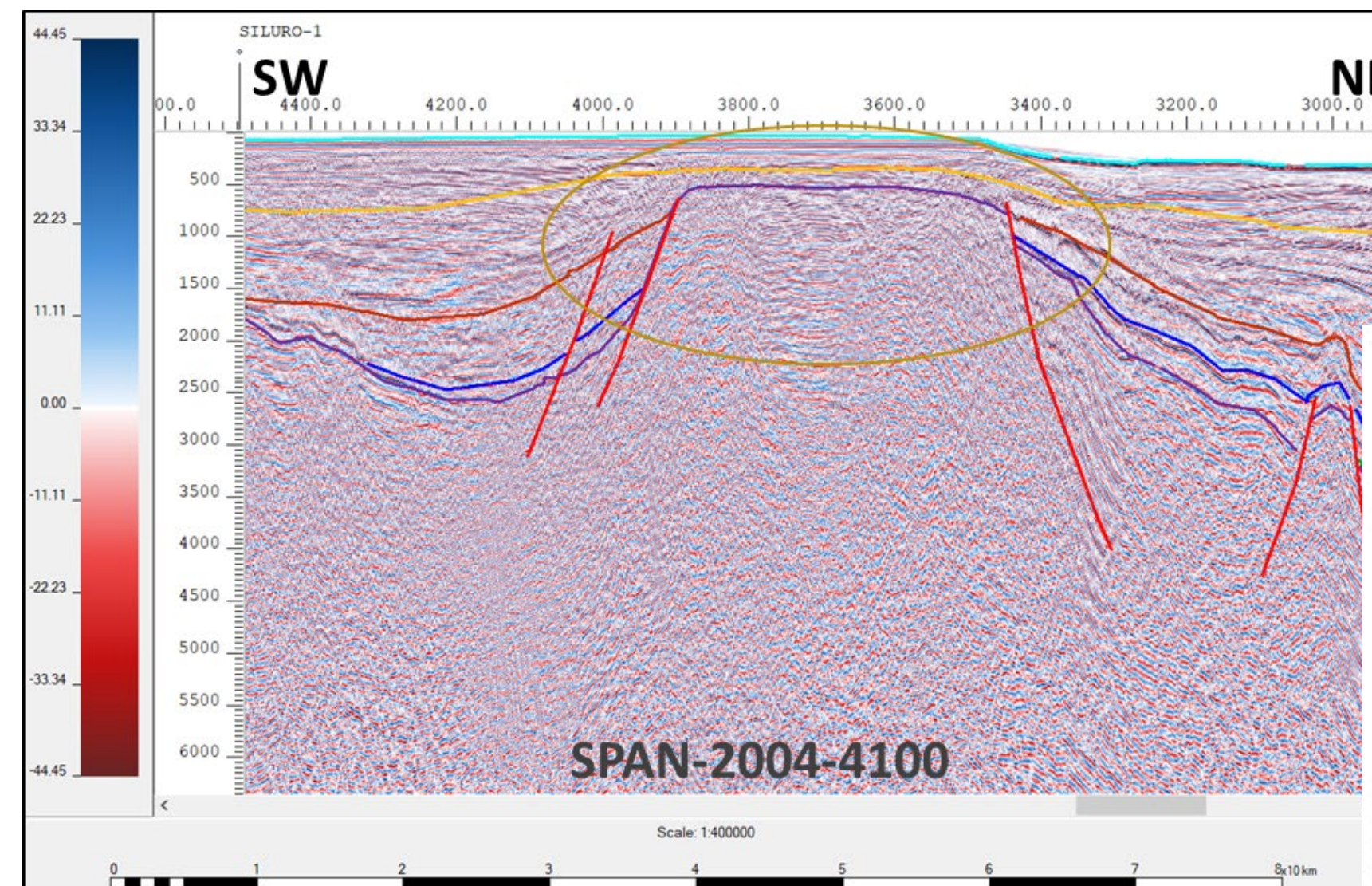
## 2. Miocene Carbonatics Developments



## 3. Turbidites



## 4. Basement overlapping



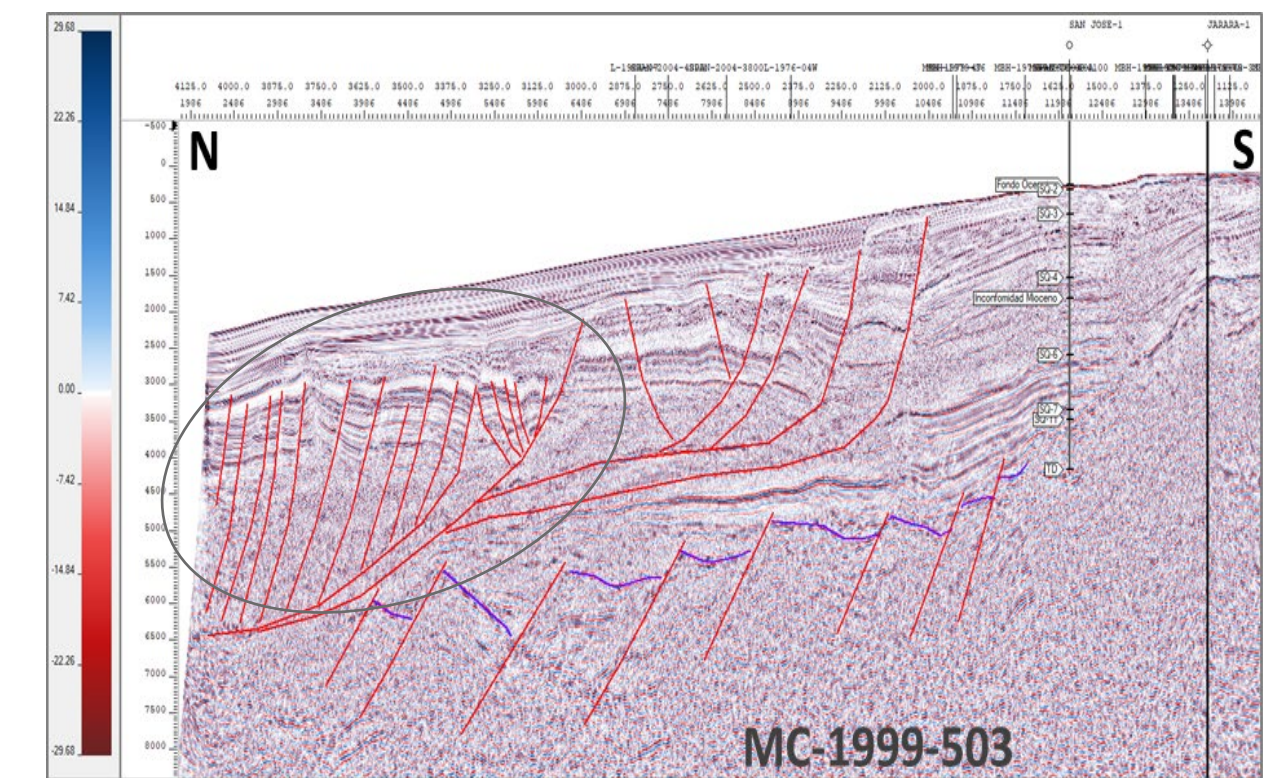
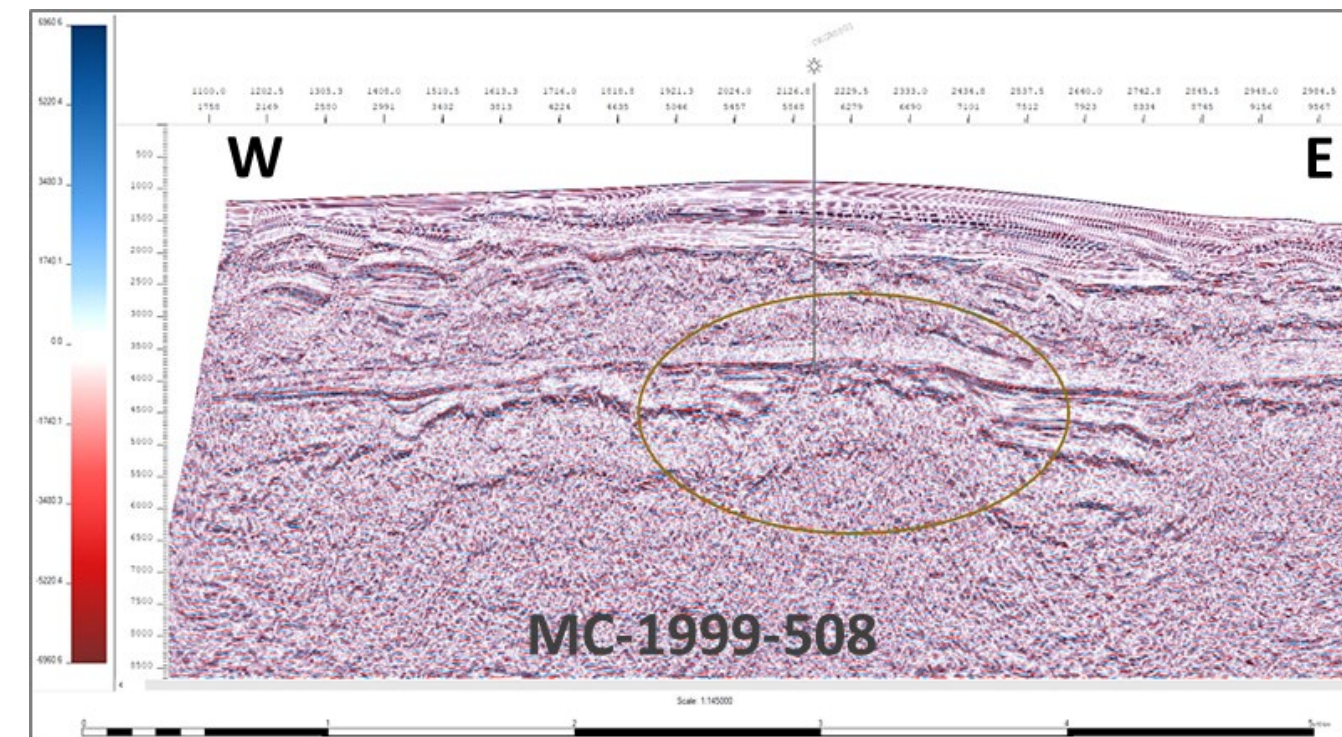
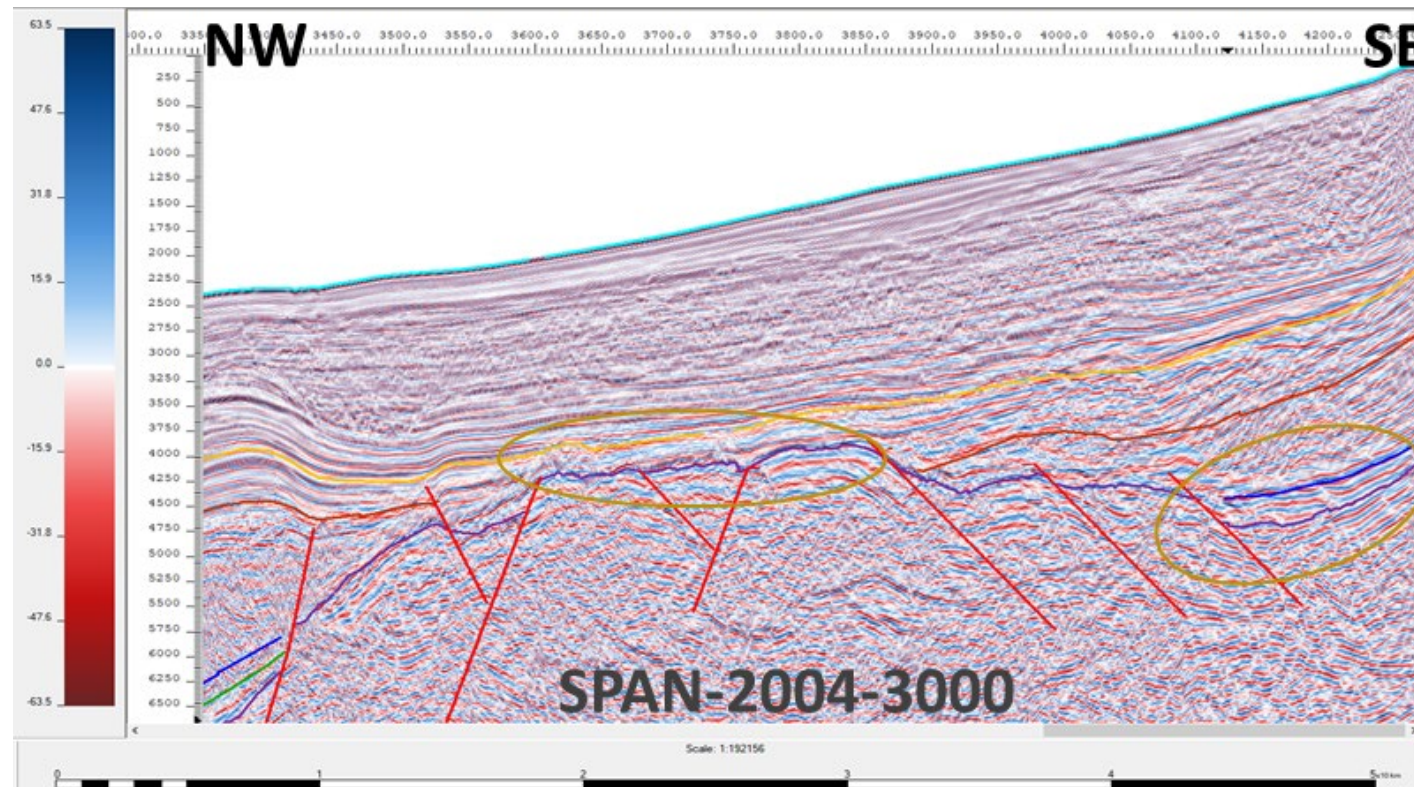


# MIXED TRAPS

1. Basement Paleo-height with carbonates

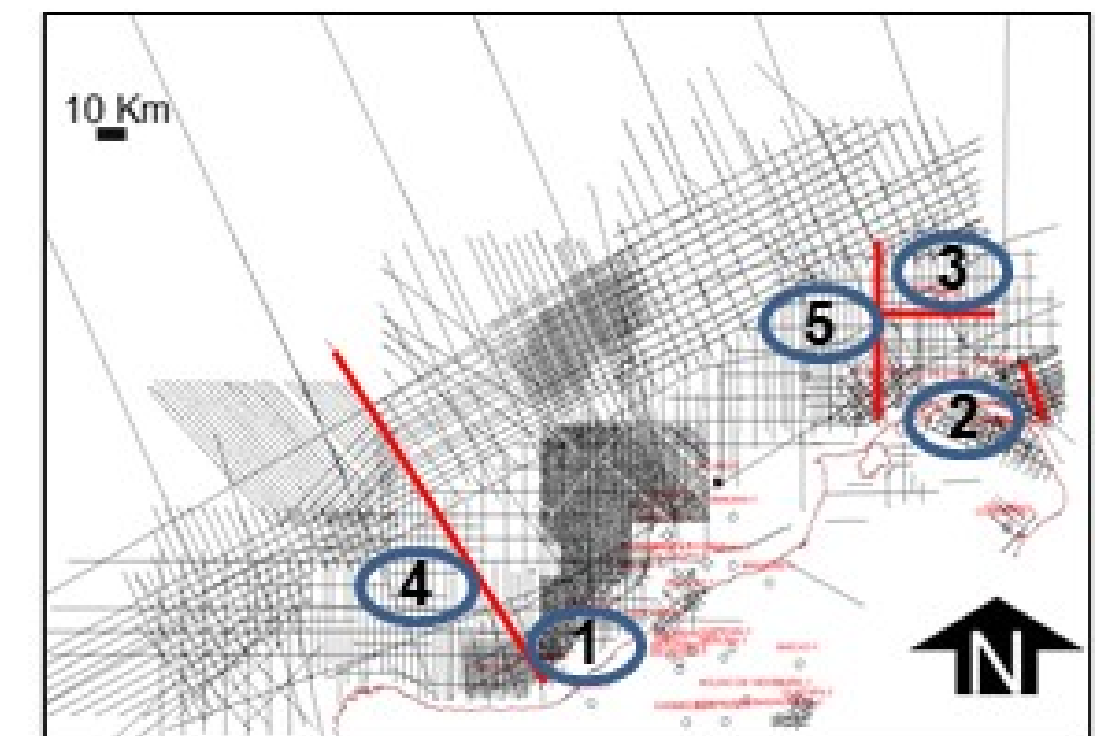
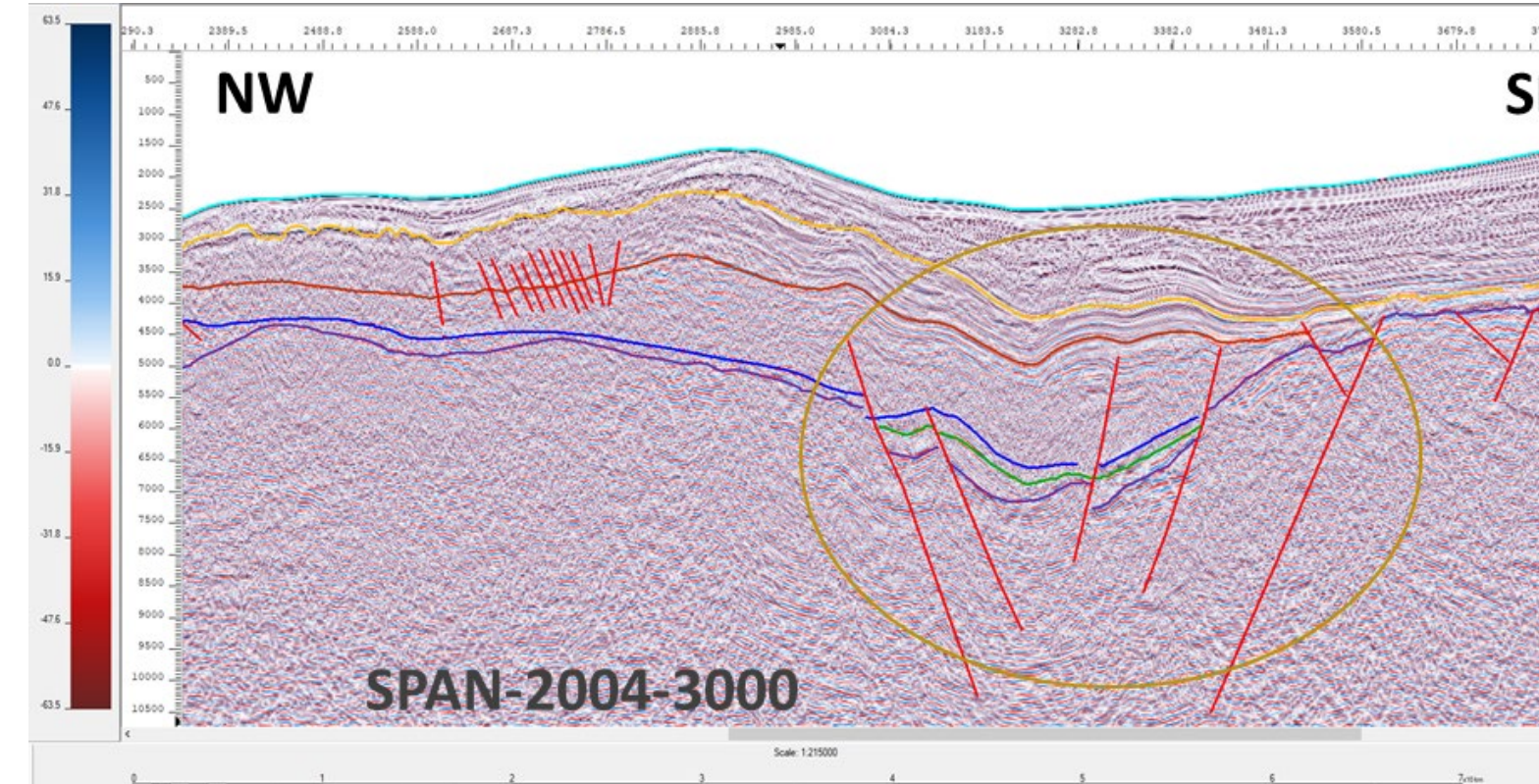
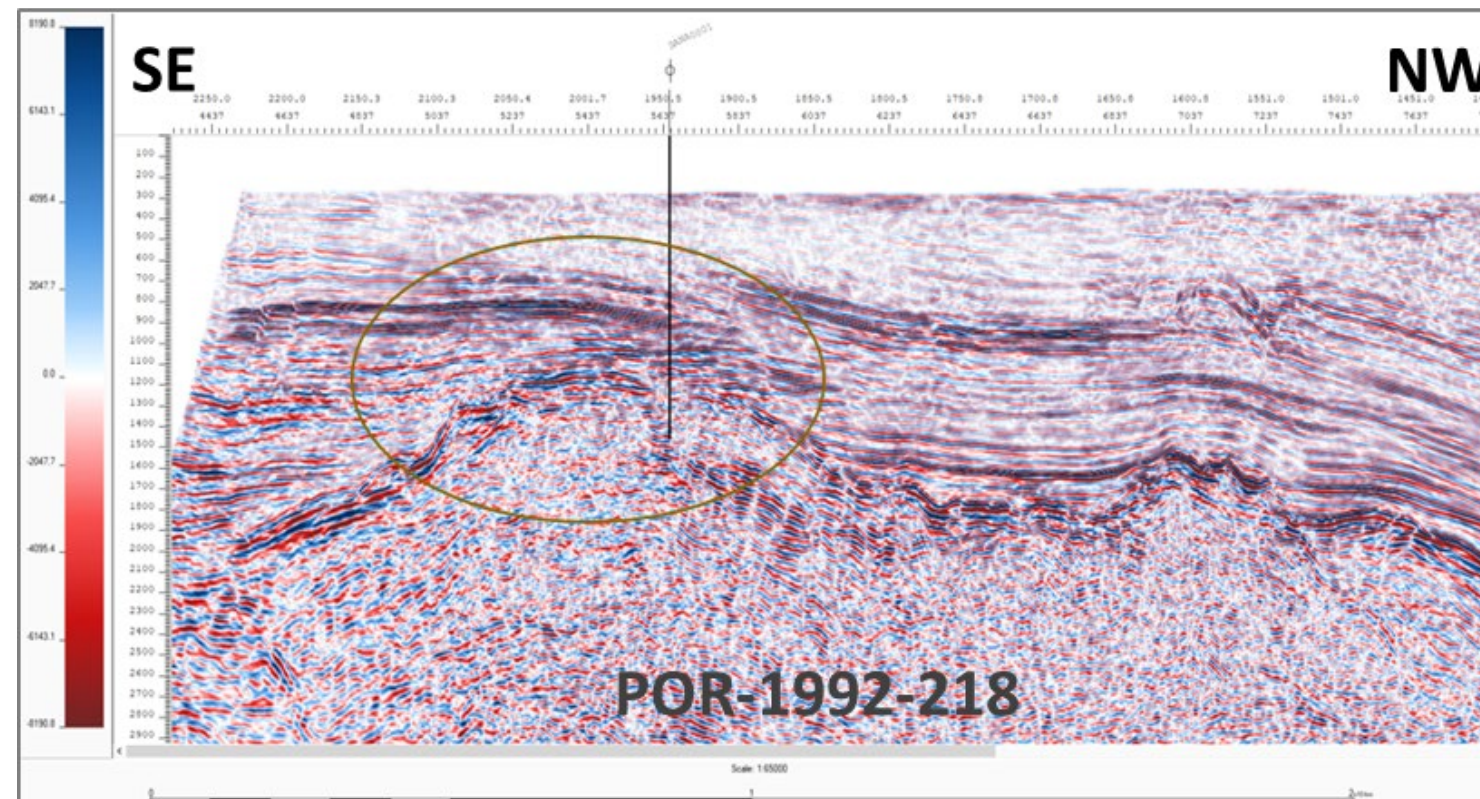
3. Oligocene sandstone over the high

5. Normal Lystric Faults in echelon



2. Early miocene sandstones over the high

4. Pull apart basin with sandstone facies





# CONCLUSIONS

- **The development of Paleogene and Lower Neogene sedimentary sequences under passive margin is identified in the understanding that the deformation front is activated from the Upper Miocene.**
- **It has been identified, mainly in the Tairona province, vector components of displacement of the Caribbean plate, towards the East, generating recent subduction events.**
- **It has been possible to establish the relationship of the sedimentary sequences of the Gulf of Venezuela, with the eastern margin of the Guajira Onshore basin, so that it is necessary to integrate these data into the prospective nature of the basin.**
- **The prospective potential of the Onshore basin is established, regarding the presence of a regional source rock (Cretaceous - Paleocene) and rocks with a reservoir character in the upper parts of the sedimentary sequence.**



# PETROLEUM SYSTEM ANALYSIS



# Thanks

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