



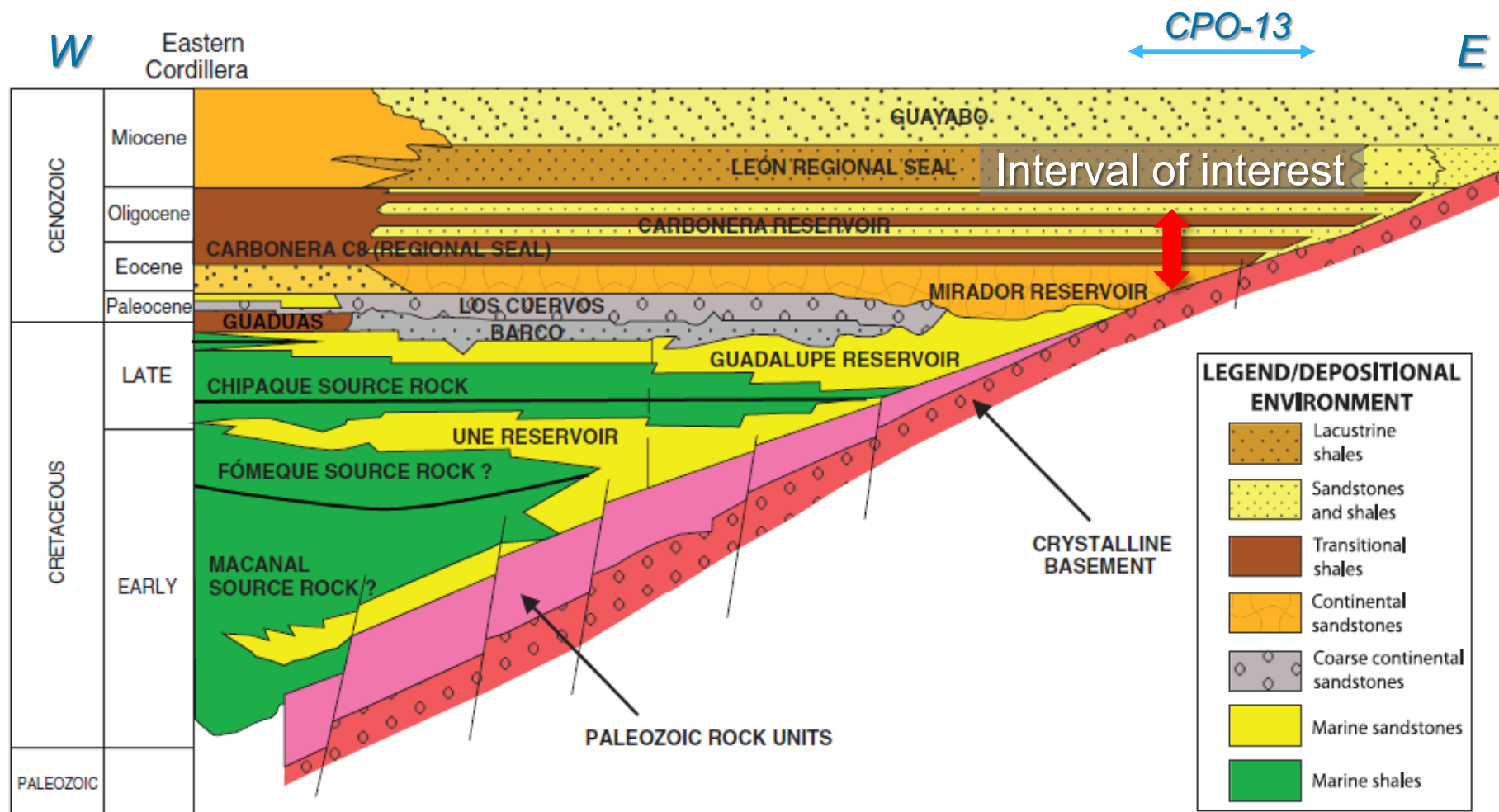
Basement Control in the Deposition of the Basal Sands (Mirador-Carbonera Fms) of the Southeastern Llanos Basin of Colombia and its Implication in the Distribution of Stratigraphic Traps

I. Sabino, H. Acevedo, C. Macellari

Location map

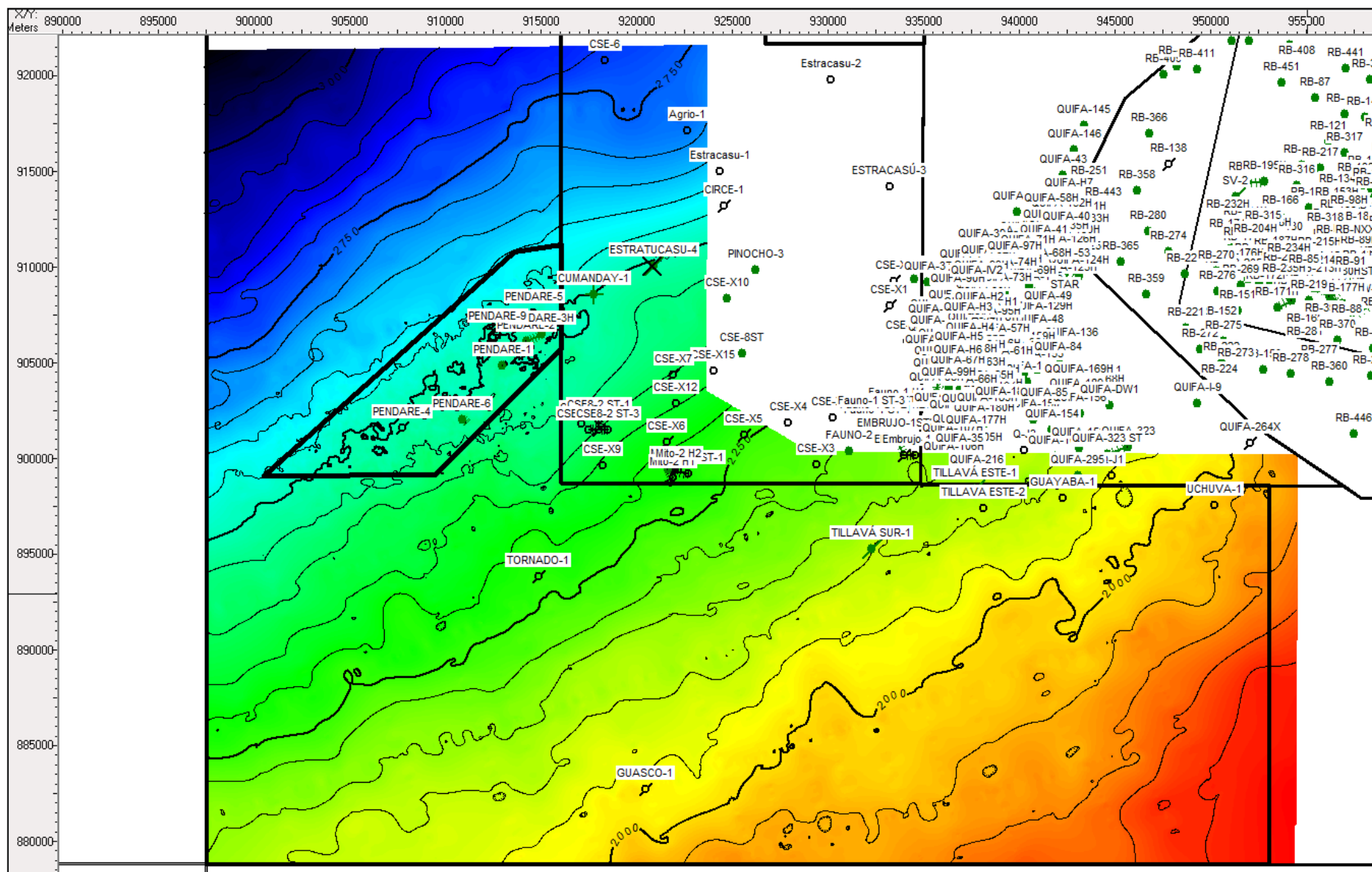


Stratigraphic scheme - Southern Llanos Basin

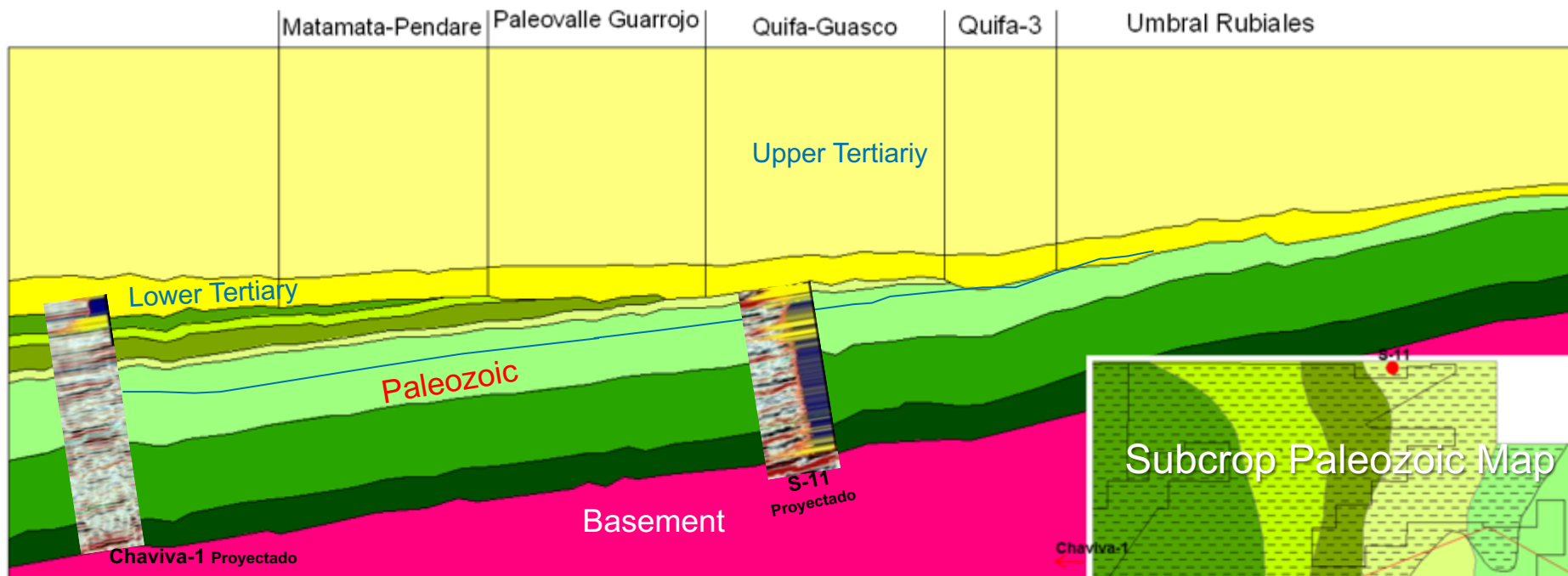


From Sanchez et al 2015, and Reyes-Harker 2015

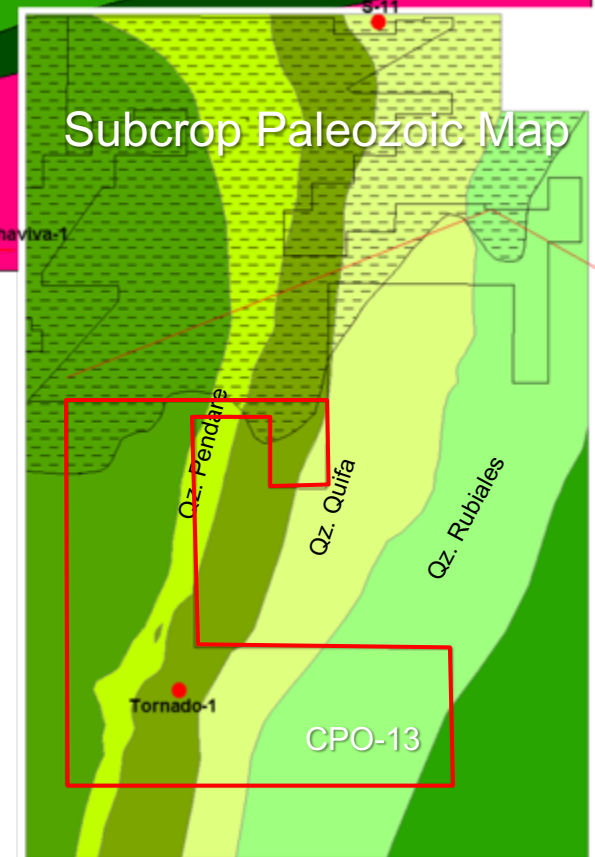
CPO-13. Structural Map. Basal Sands top



Schematic cross section



- | | |
|------------|---|
| Paleozoico | Tertiary Guayabo+Leon+upper Carbonera |
| | Tertiary Lower Carbonera (C7)+Basal Sands+Mirador |
| | Ordovician Chaviva Shale |
| | Ordovician Chaviva – Pendare Quartzite |
| | Ordovician Guarrojo Shale |
| | Ordovician Ocelote – Quifa Quartzite |
| | Ordovician Rubiales Quartzite |
| | Cambro-ordovician Sabanero Quartzite |
| | Cambro-ordovicias ST-GU-19 |
| | Proterozoic Basement |



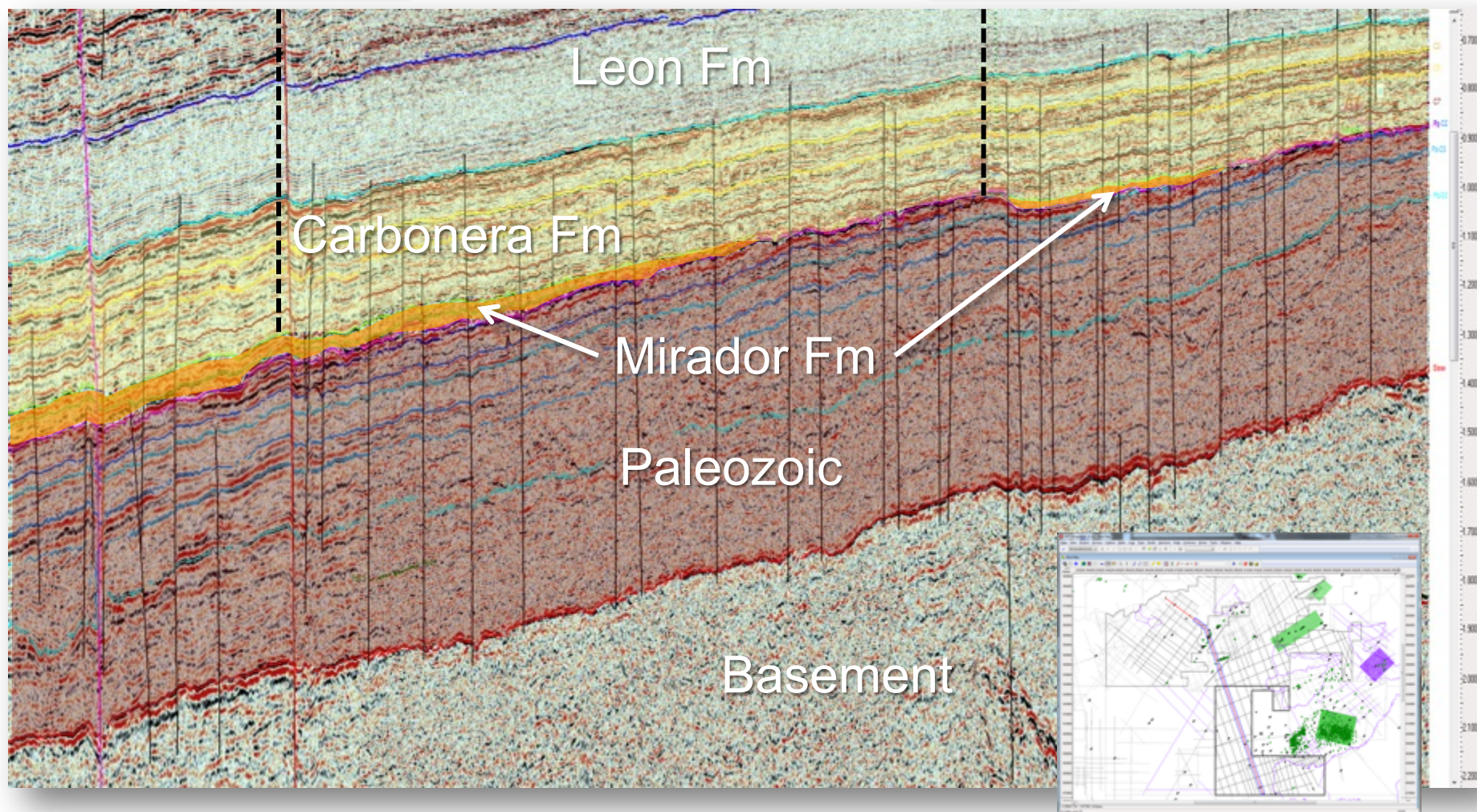
Regional structural section

NW

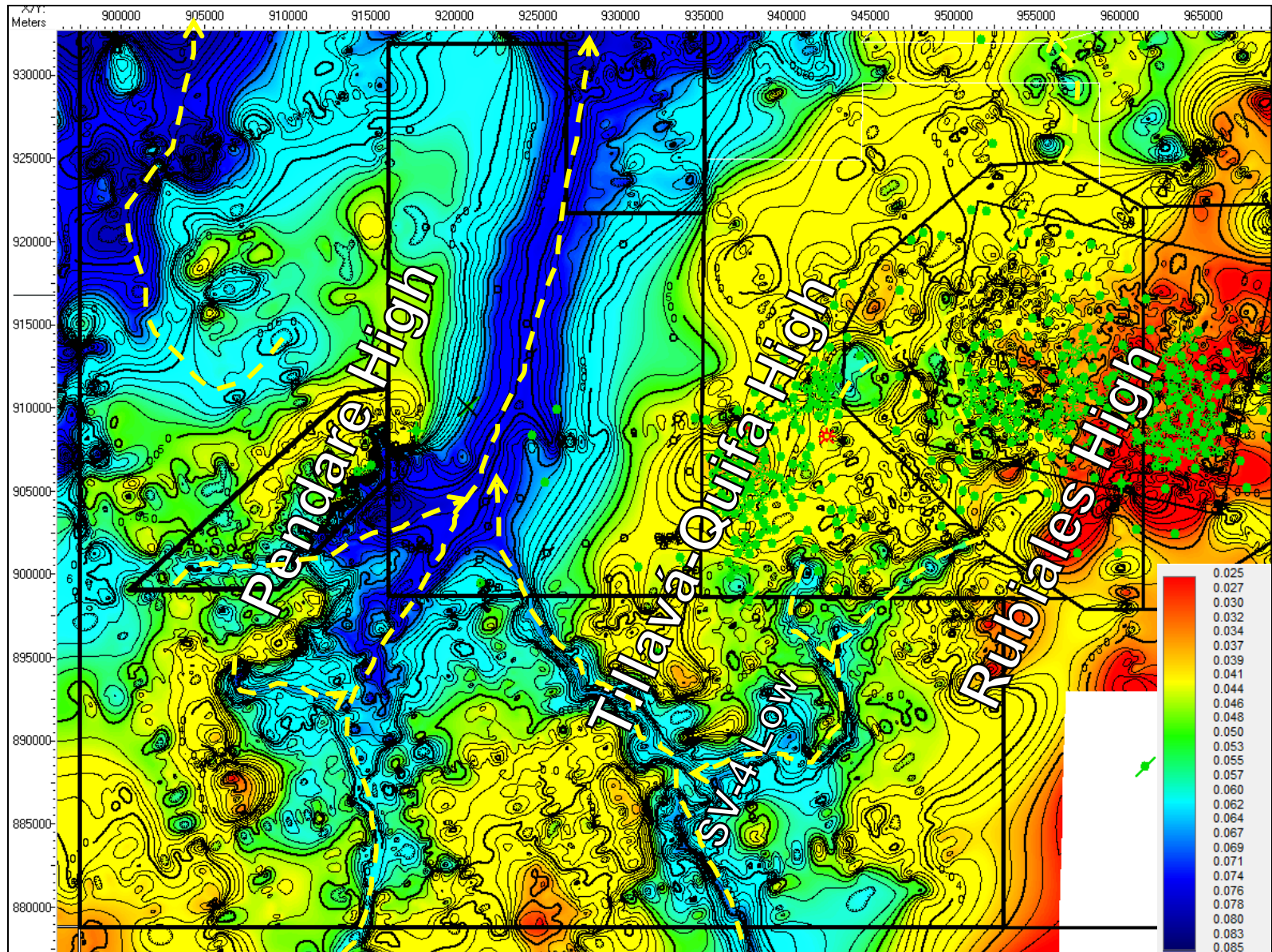
Caracara Sur

Pendare

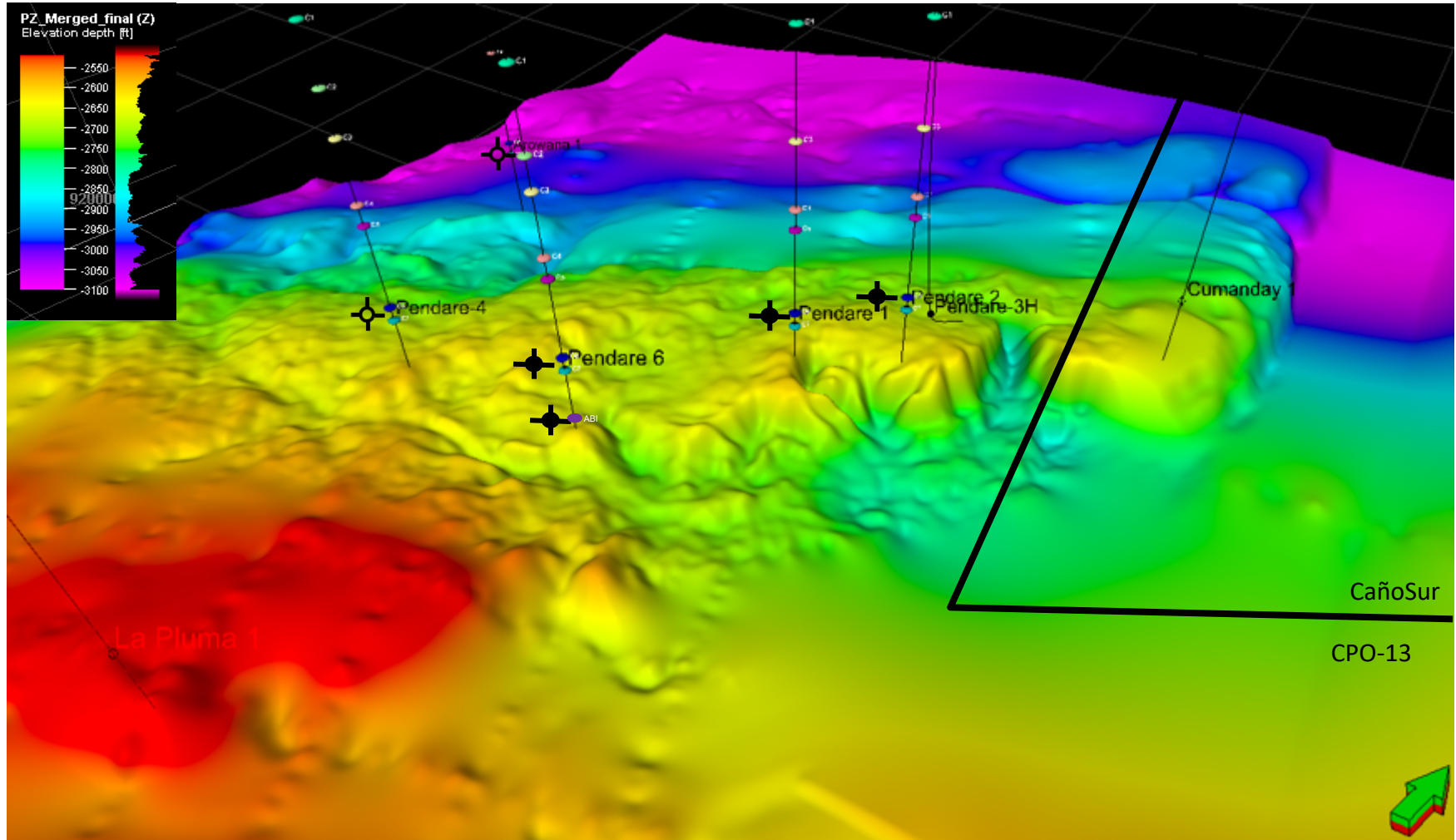
SE



Basal Sandstones isopach

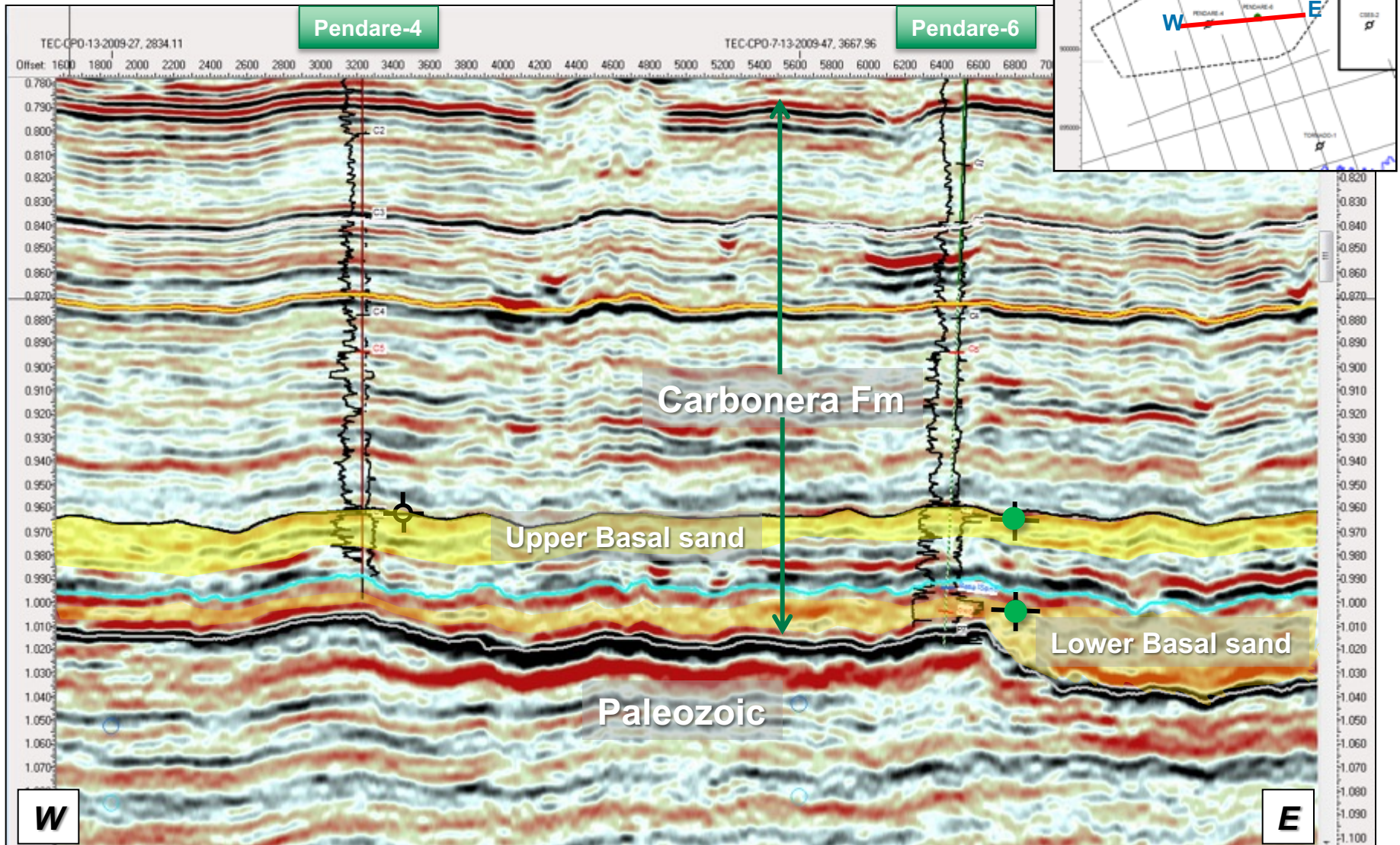


CPO-13. Paleozoic surface in 3D View - TVDSS

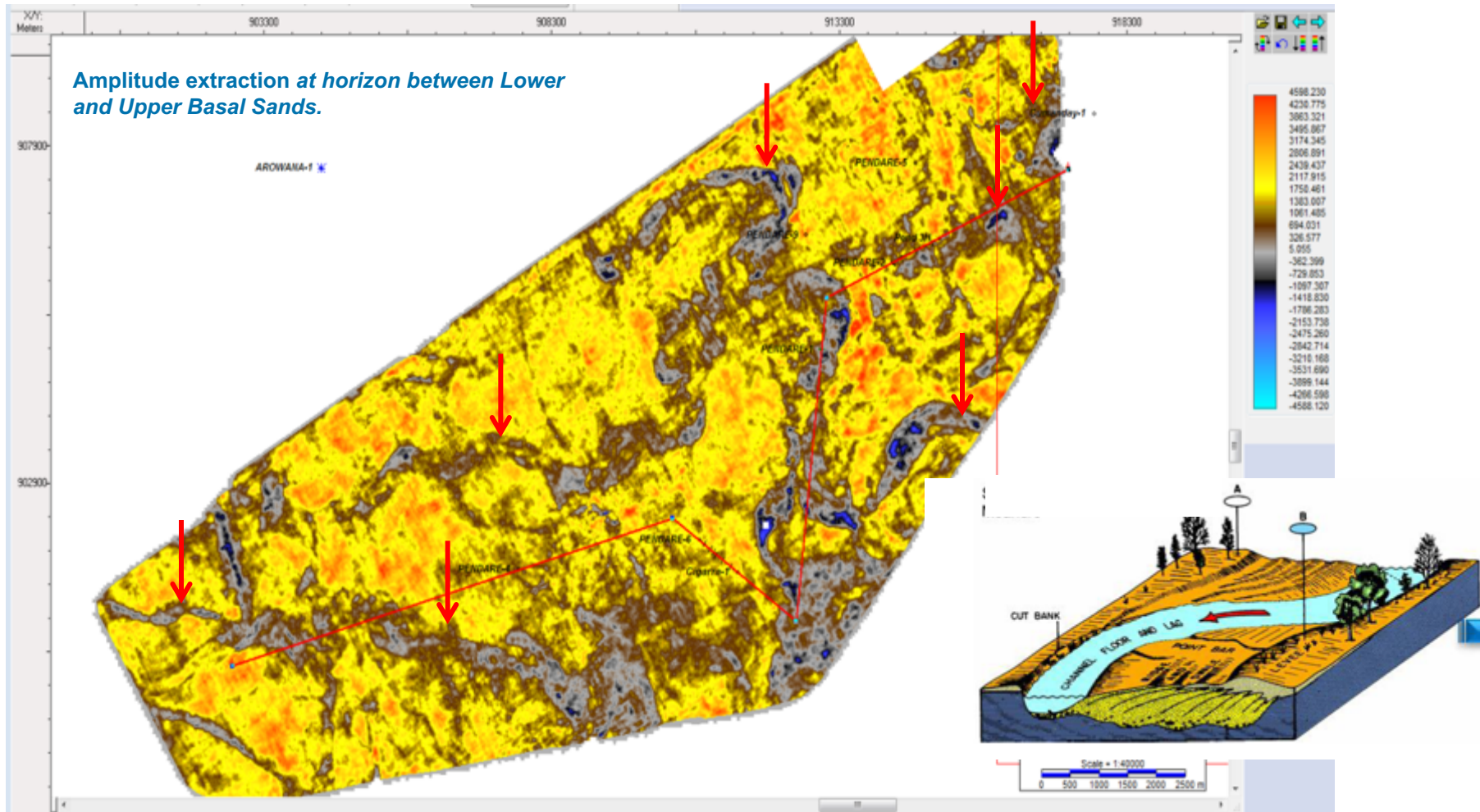


LOWER BASAL SANDS - PENDARE

Main stratigraphic units

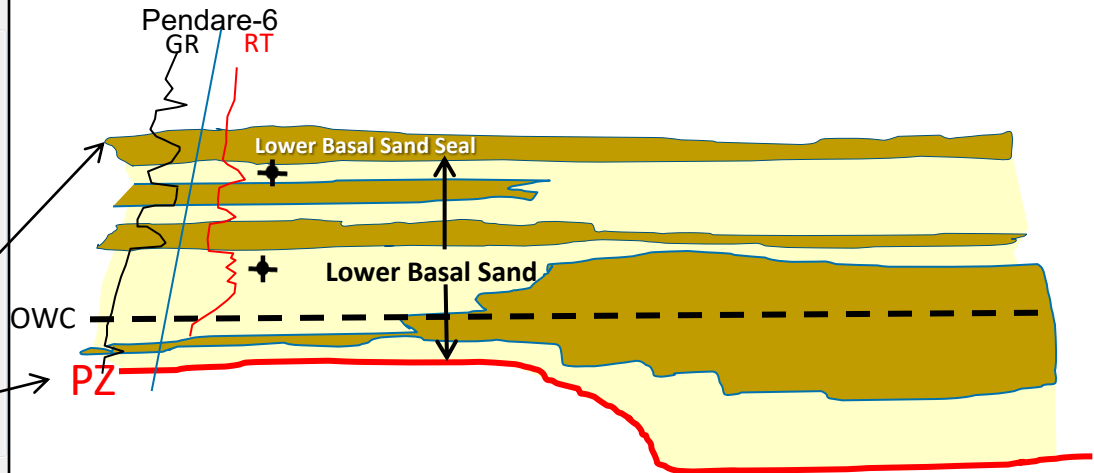
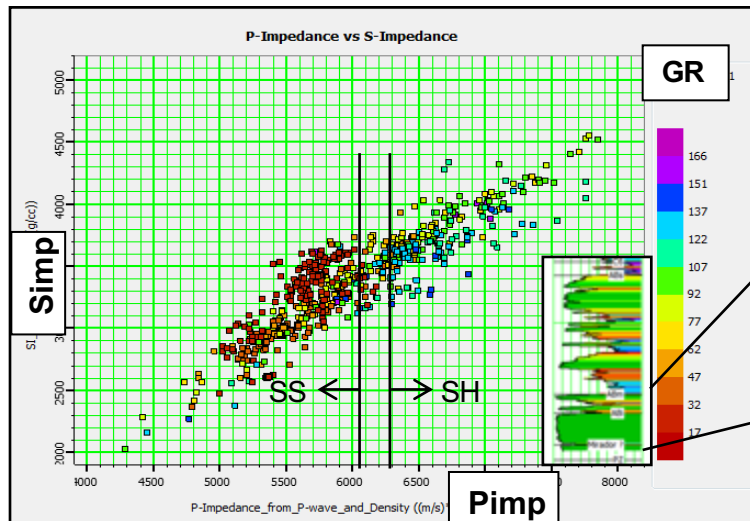
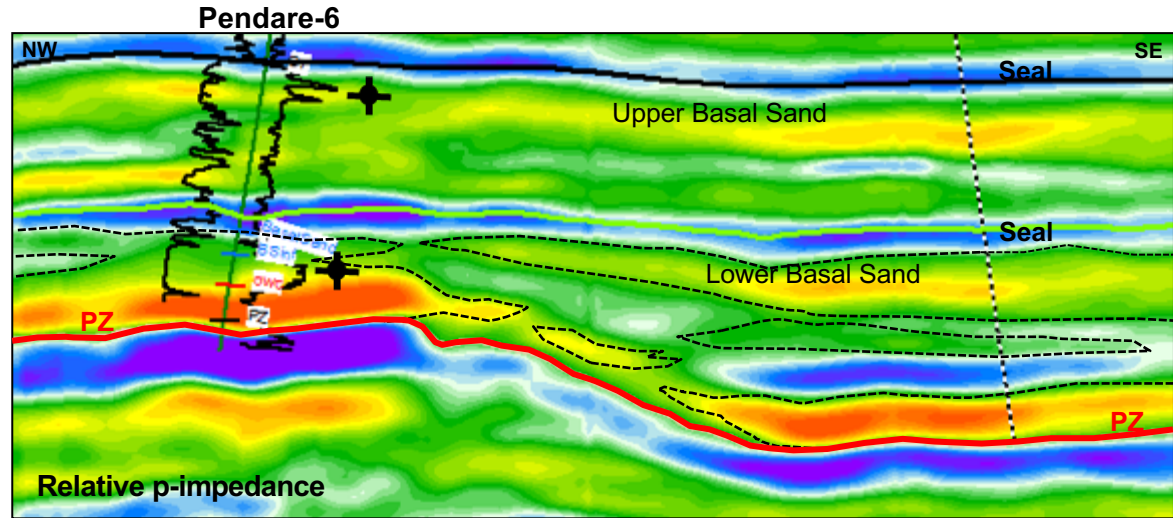
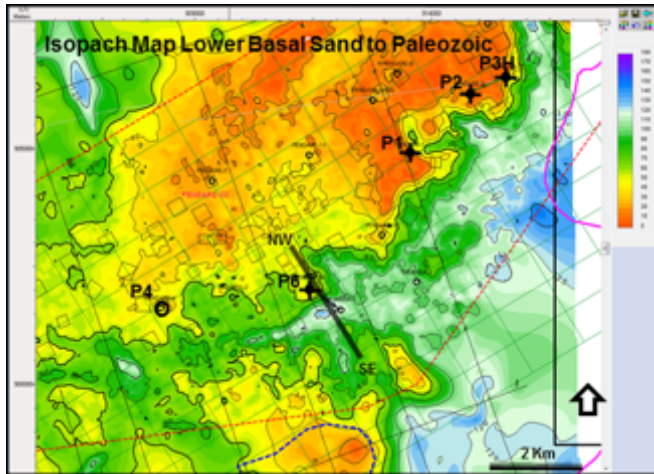


Carbonera Fm Depositional Environment



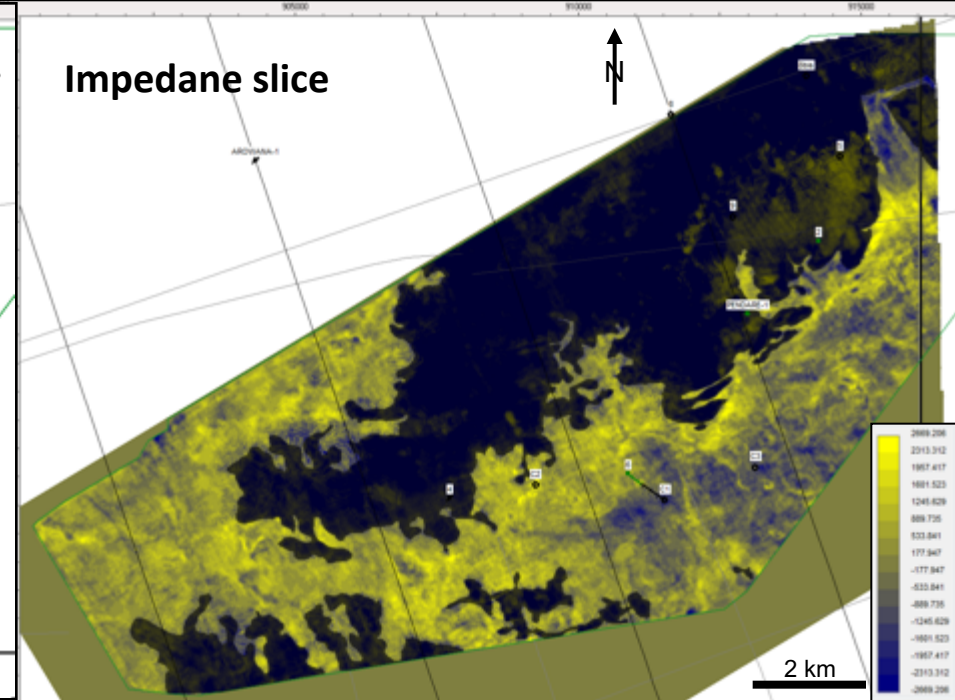
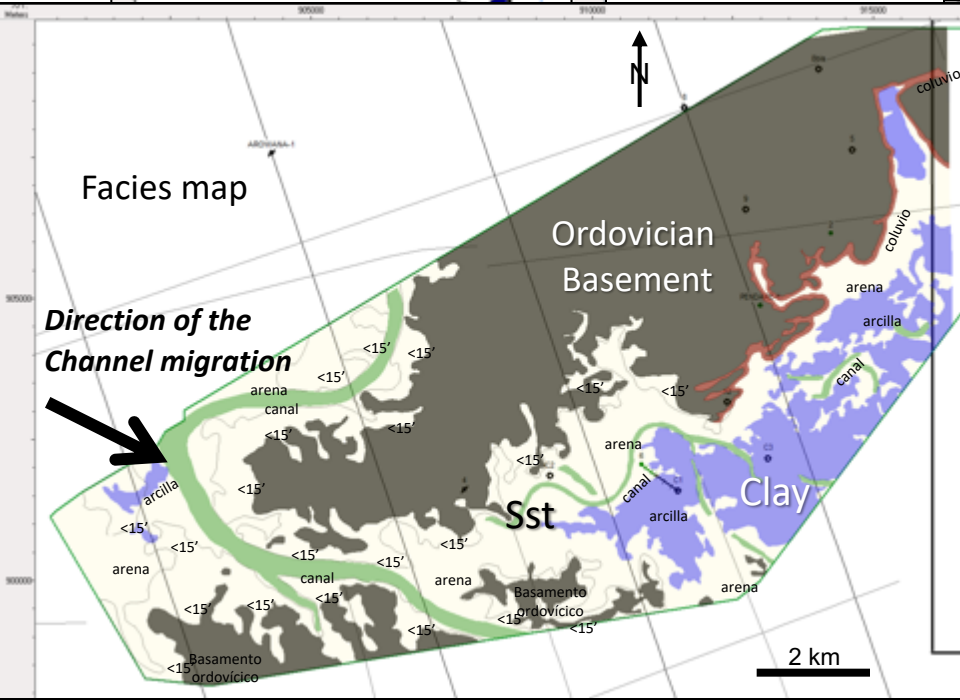
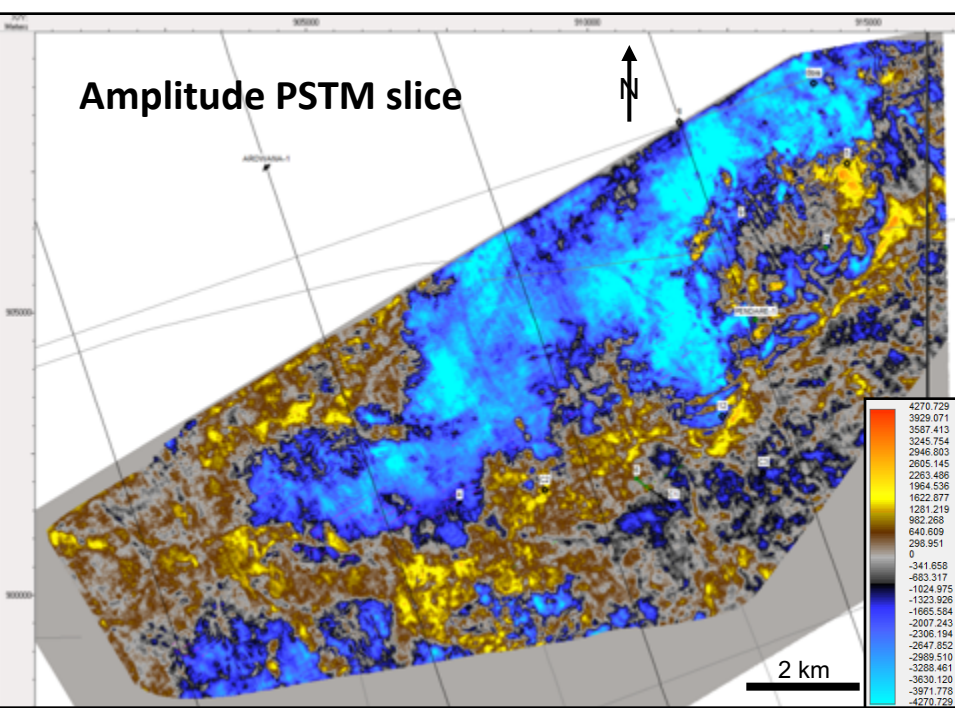
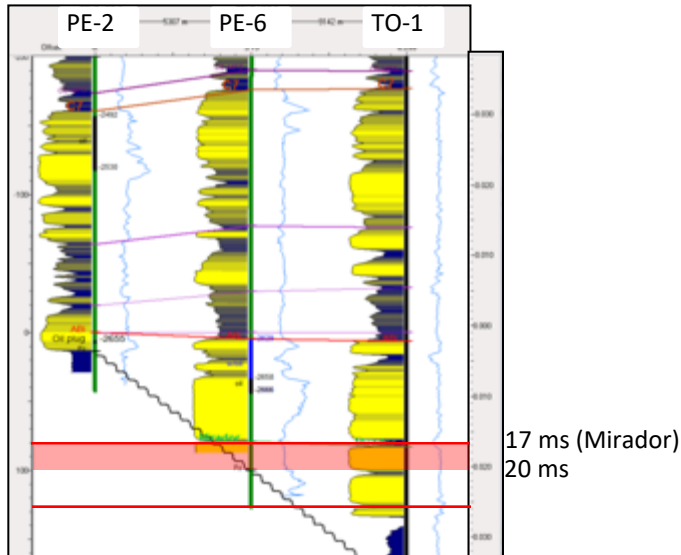
Sandstone shows minimum acoustic impedance. (cold colors)

Facies changes on Impedance data

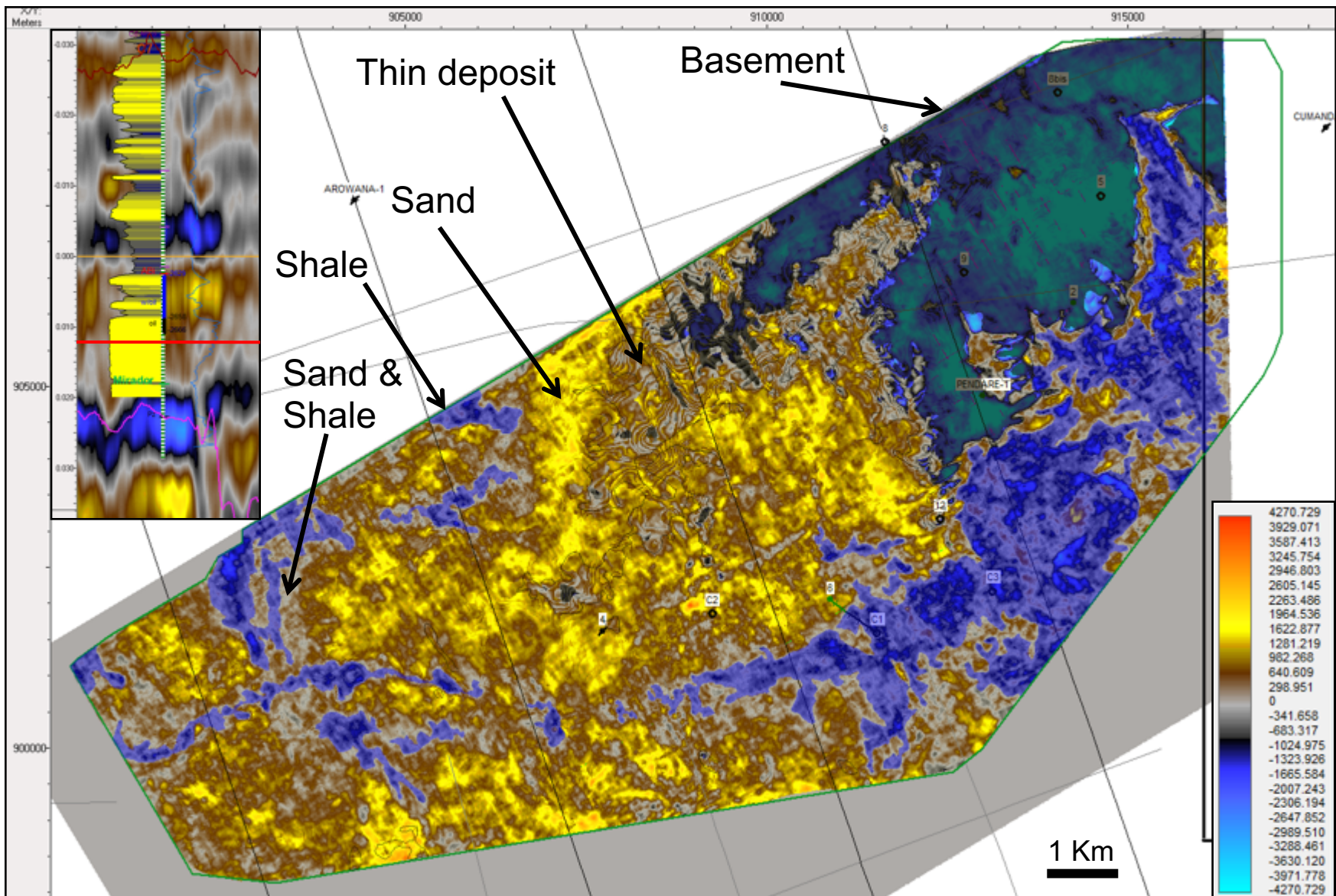


P vs S Impedance response for lower basal sands

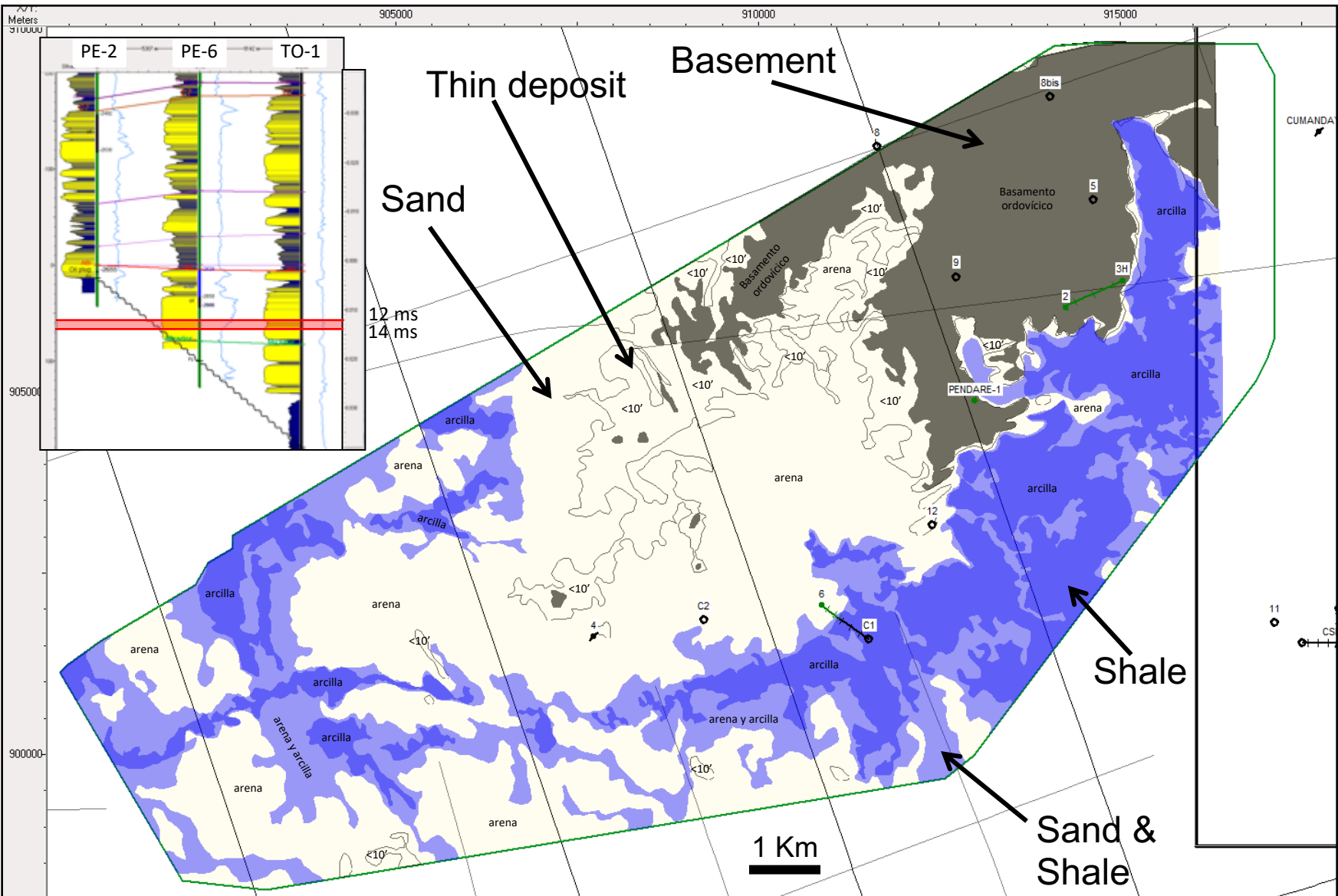
Stratigraphic section at the Mirador Fm top (carrier)



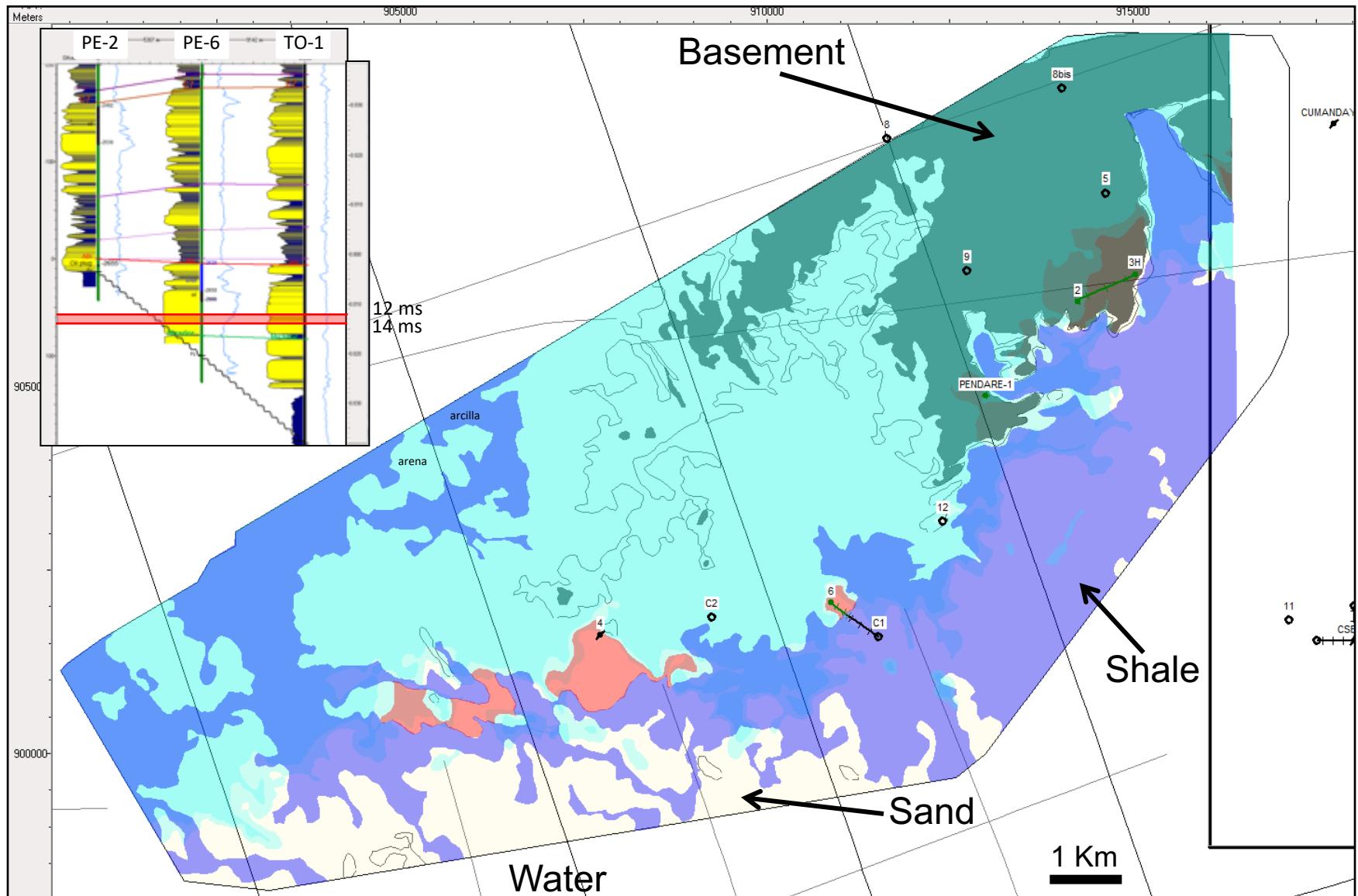
Horizon slice 12 ms below the Lower Basal Sands. Relative Impedance.



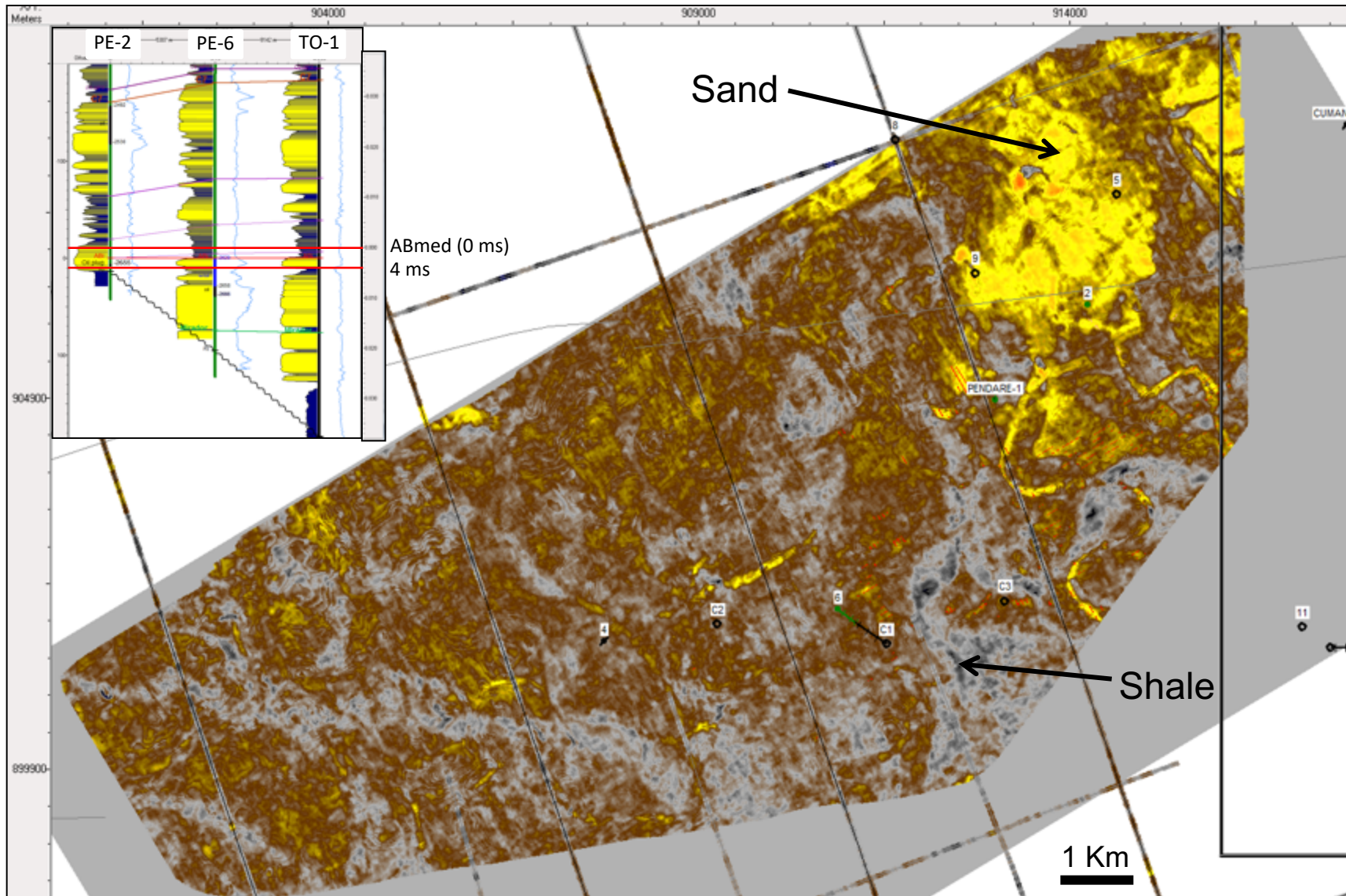
Facies map of the horizon slice 12 ms below the Lower Basal Sands top.



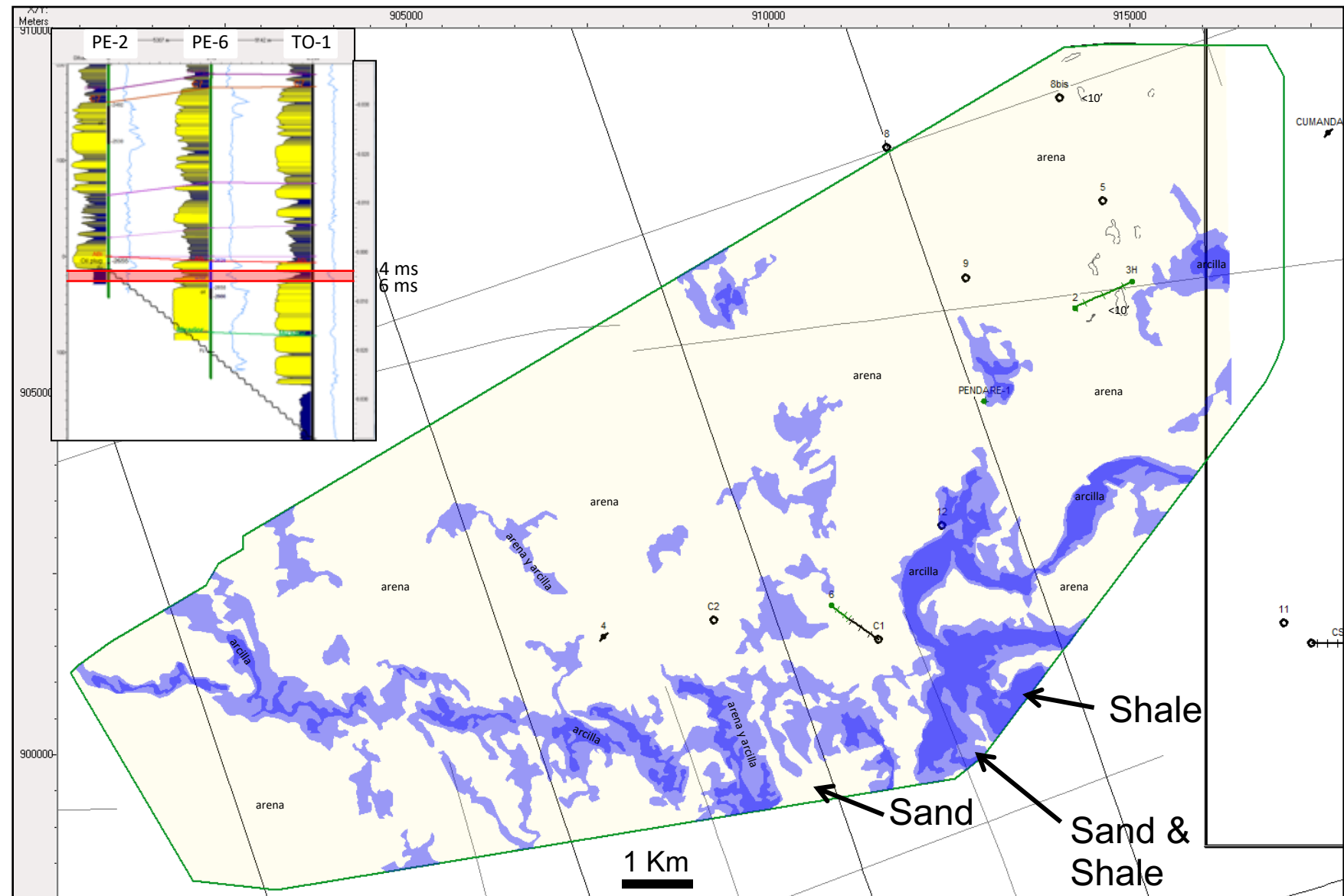
Facies map of the horizon slice 12 ms below the Lower Basal Sands top.



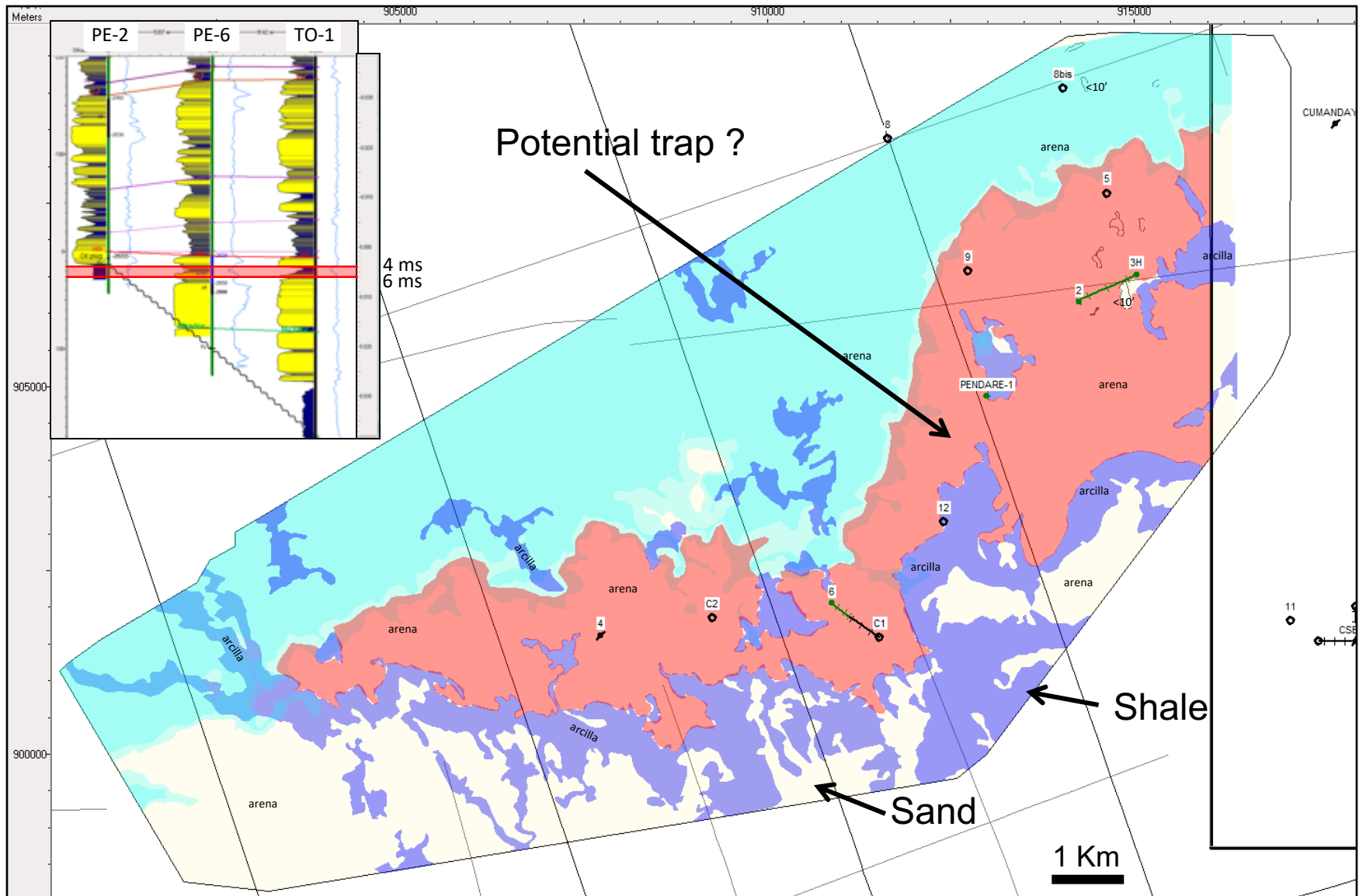
Horizon slice 4 ms below the Lower Basal Sands top.
Relative Impedance. Level close to the top of unit



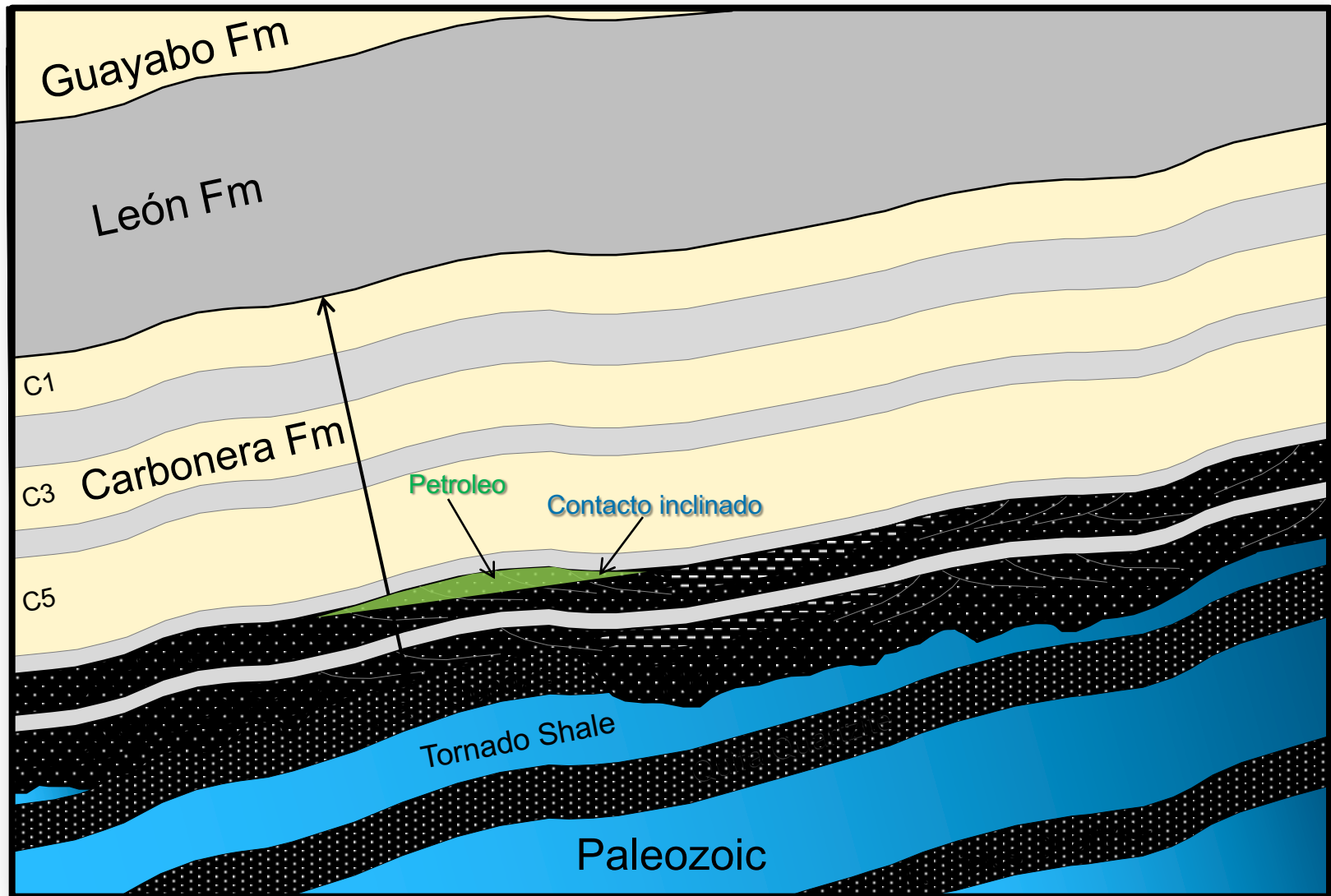
Facies map of the horizon slice 4 ms below the Lower Basal Sands top. Level close to the top of unit.



Pay map of the horizon slice 4 ms below the Lower Basal Sands. Relative Impedance. Level close to the top of unit.



Scheme of a potential stratigraphic trap



Conclusions



- The basal Carbonera sandstones were deposited in a fluvial environment with local variations in the distribution of sand and shale
- The paleotopography defined by the underlying Paleozoic rocks controlled the pattern of sedimentation of these deposits.
- In many instances the oil accumulations are somehow related to paleo-highs. It is postulated that the differentially compacted associated lows originated poorly drained areas and the deposition of finer grained sediments that developed into lateral seals.
- The analysis of changes in elastic properties of high quality PreStack inverted seismic data shows a lateral distribution of facies that tends to confirm this model.
- Other factors such as hydrodynamics, low oil gravity and the wettability of the rocks, also could play a role in the configuration of the stratigraphic traps in the southeastern Llanos Basin.