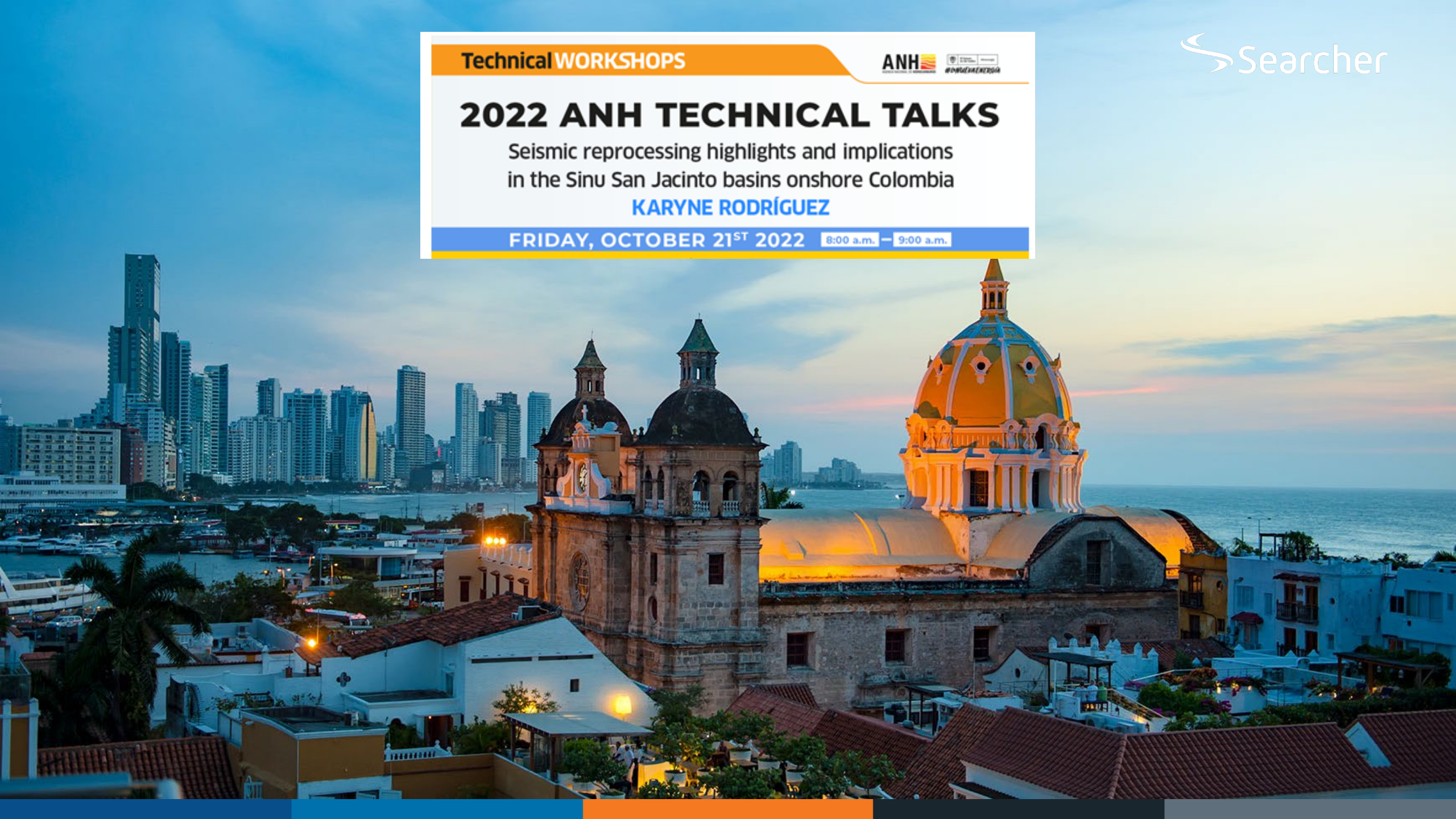
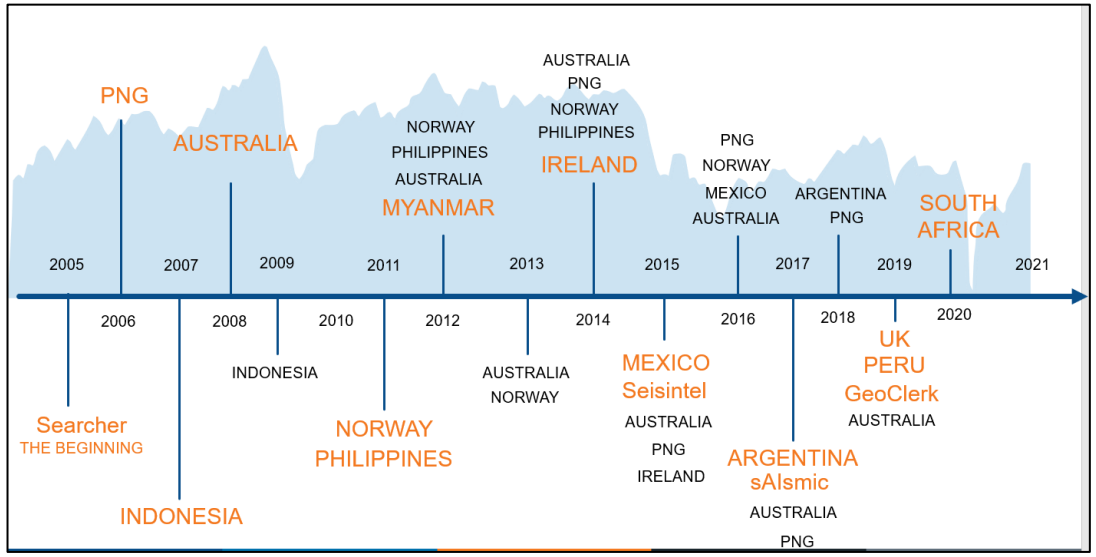
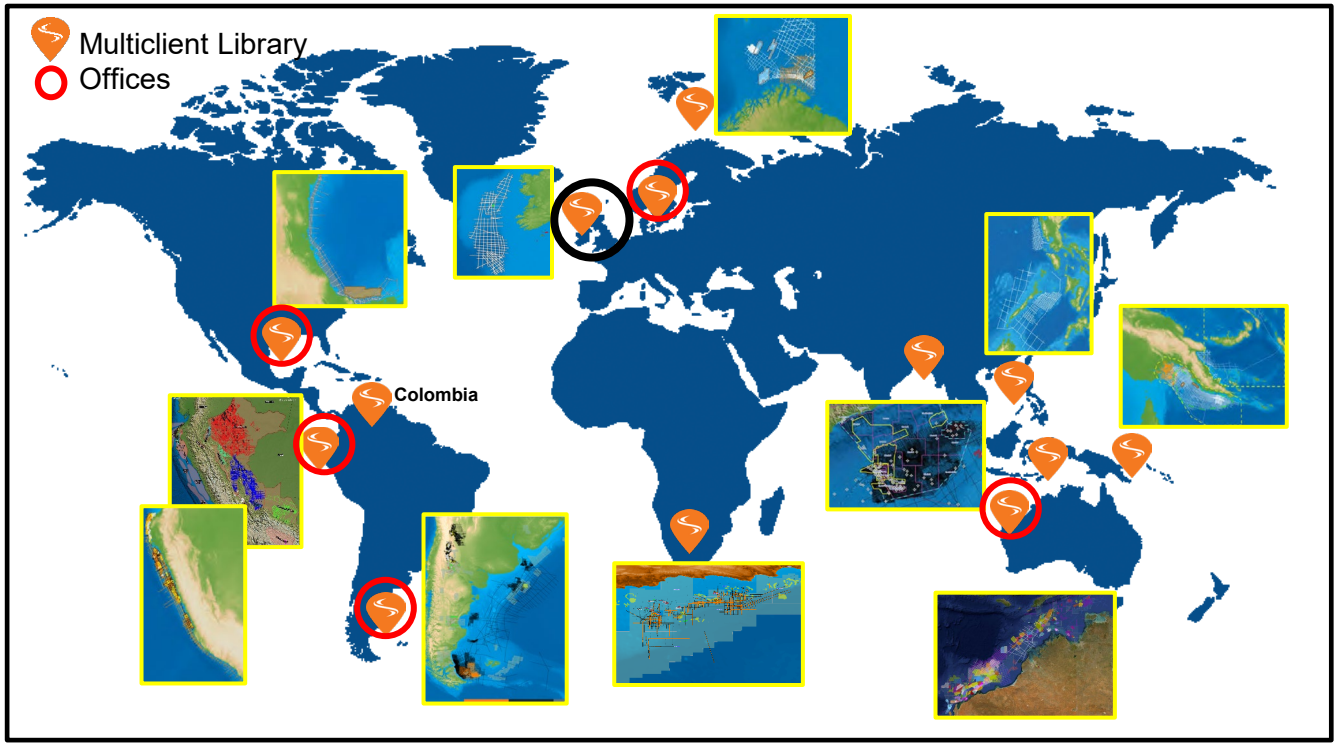

Technical WORKSHOPS
ANH
2022 ANH TECHNICAL TALKS
Seismic reprocessing highlights and implications
in the Sinu San Jacinto basins onshore Colombia
KARYNE RODRÍGUEZ
FRIDAY, OCTOBER 21ST 2022
8:00 a.m. – 9:00 a.m.

Searcher Introduction

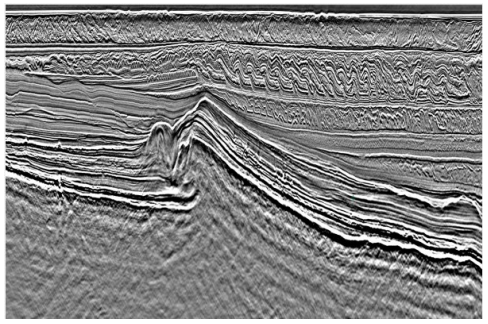
Largest privately-owned multi-client company in the world





Acquisition

Processing



Data Integration

Technology

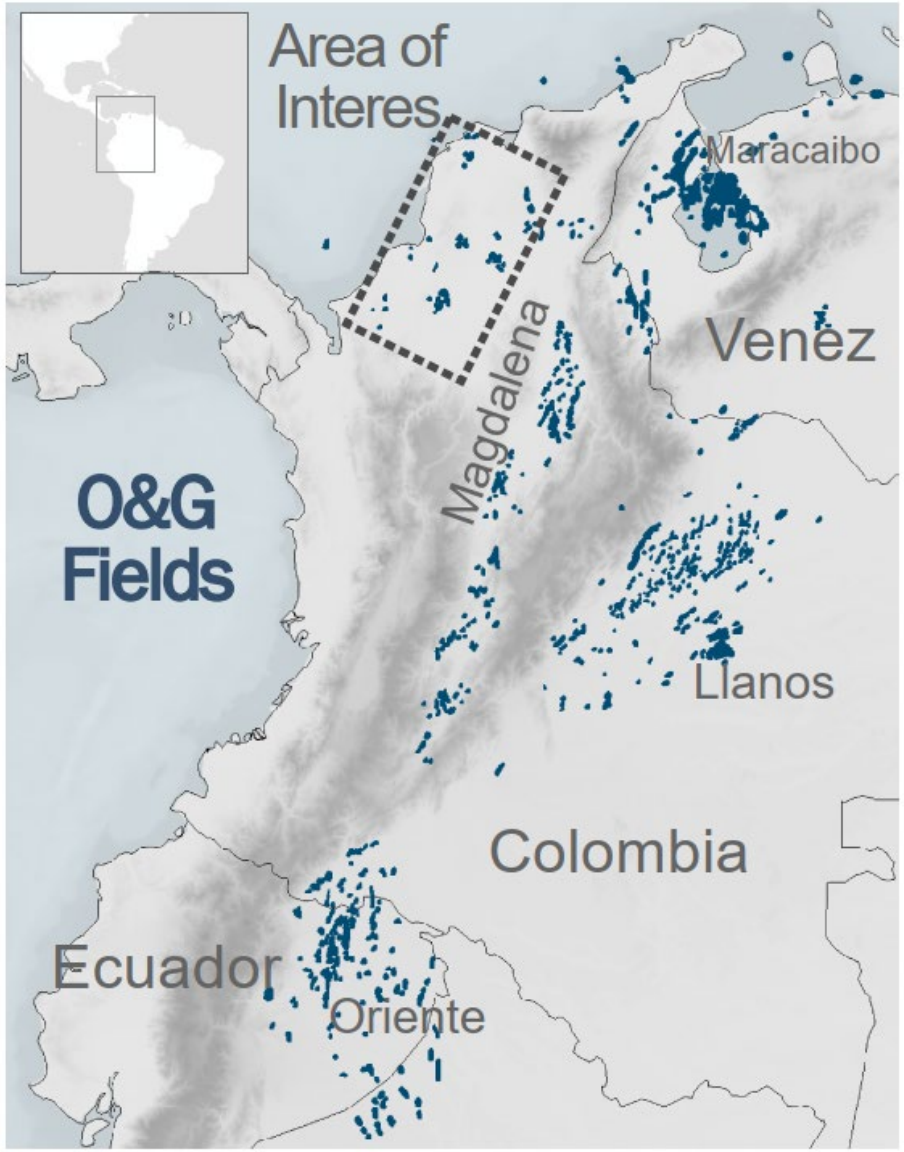
> 1,200,000 km 2D
> 350,000 sqkm 3D

SAISMIC

Seisintel

Most suitable vessel and processing company

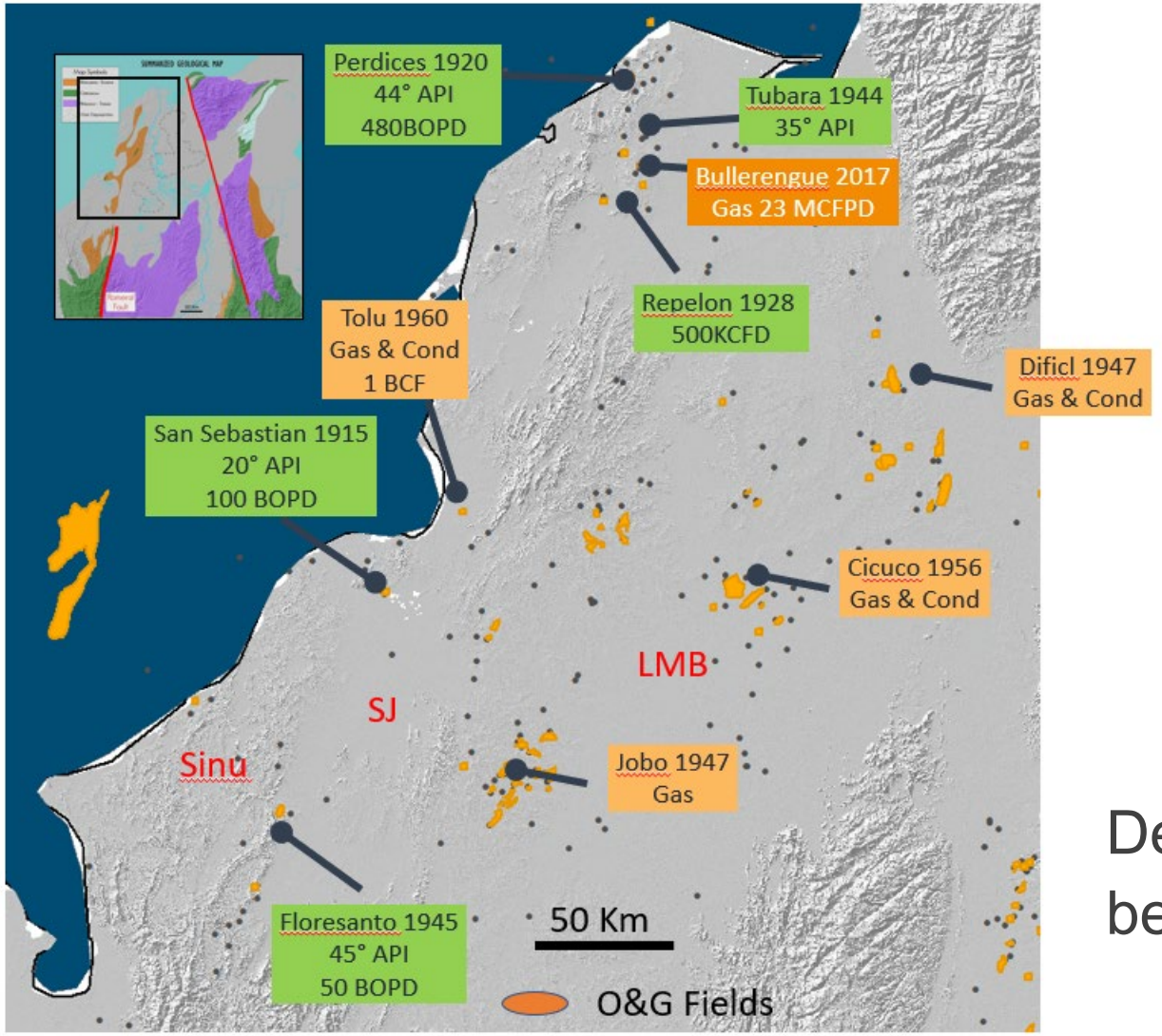
Regional Importance

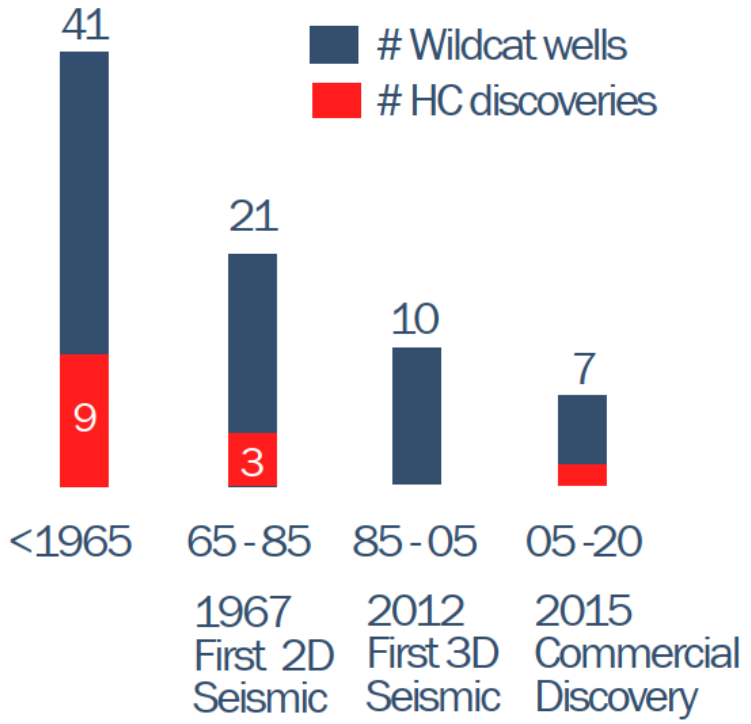


Cesar Mora talk Oct 2022 remarks

- LMB 3.57 TCF reserves discovered
- Most significant gas reserves additions in the last 10 years came from LMB
- Ranked 2nd gas producer basin in Colombia

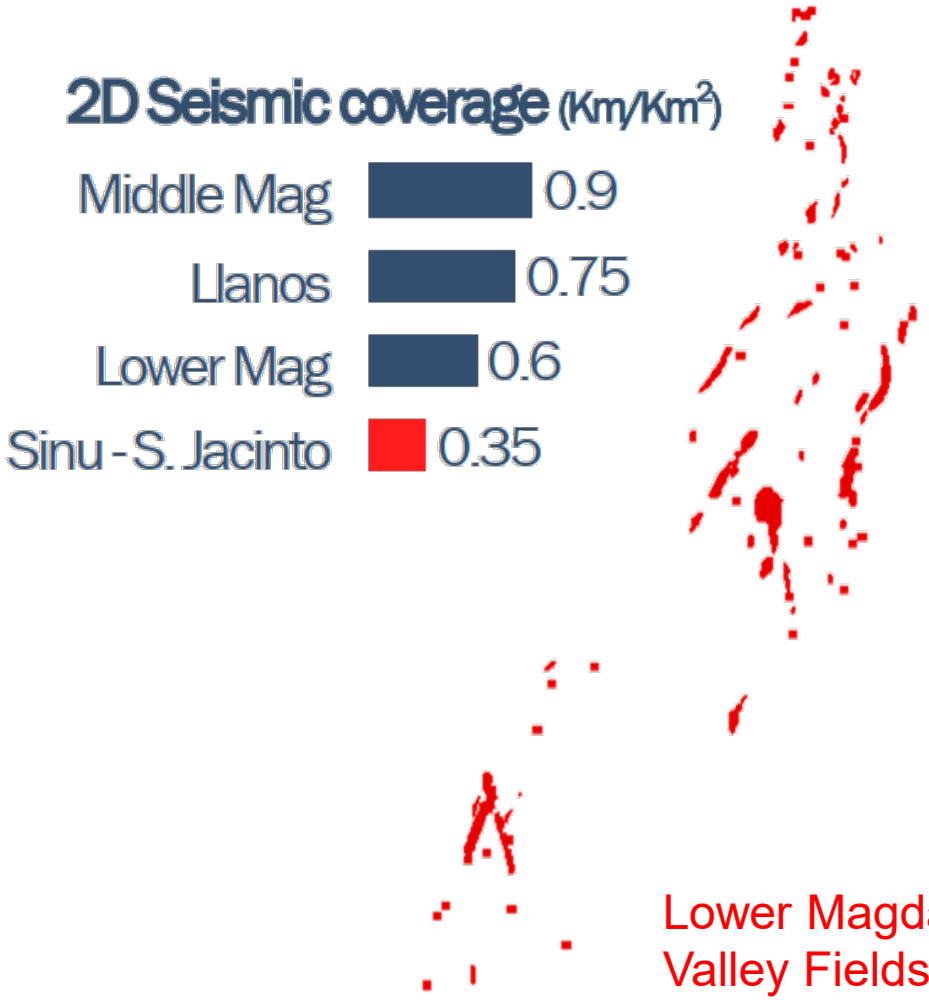
Exploration History



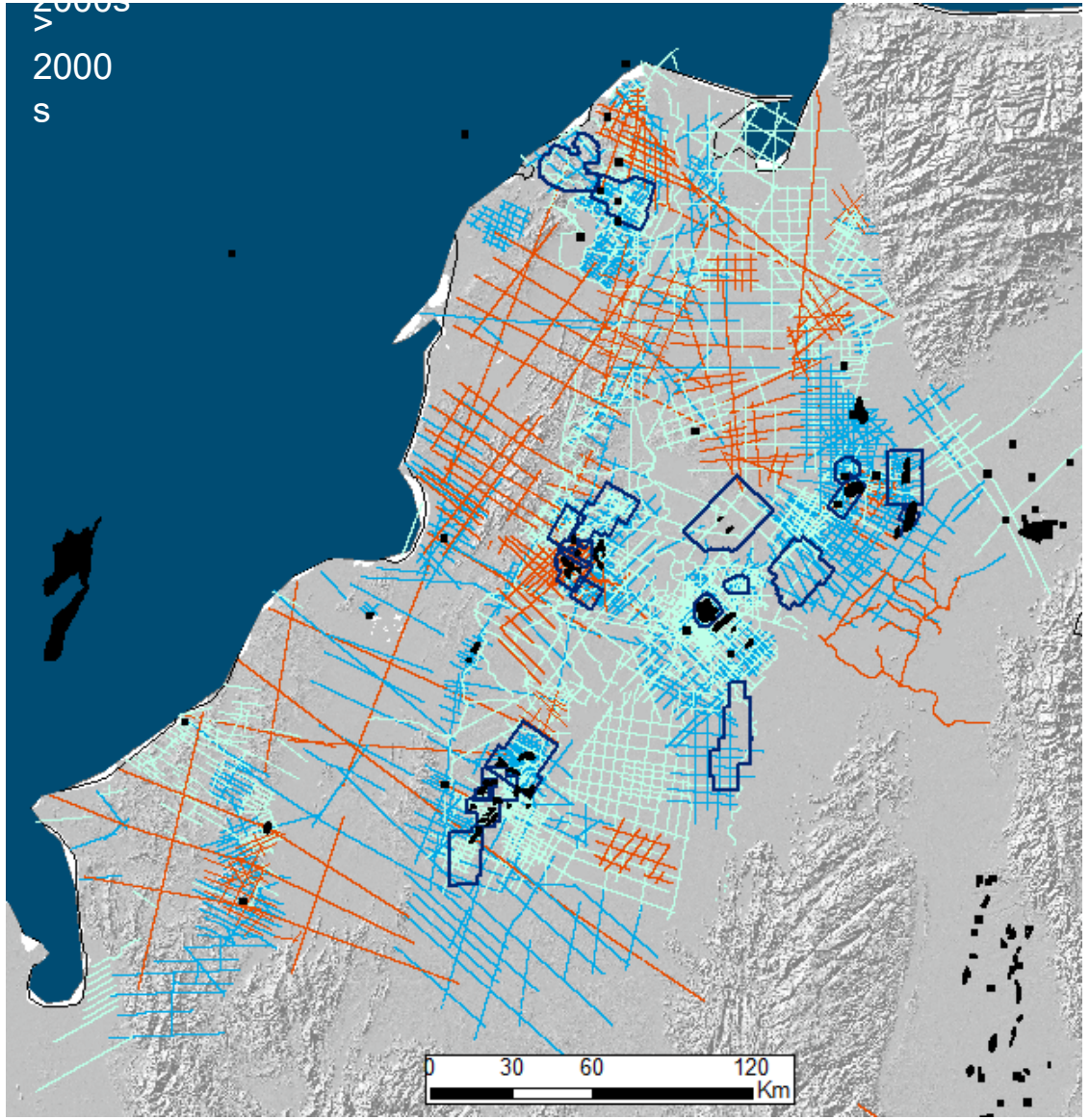


Despite HC indications, limited exploration has been done in Sinu-San Jacinto

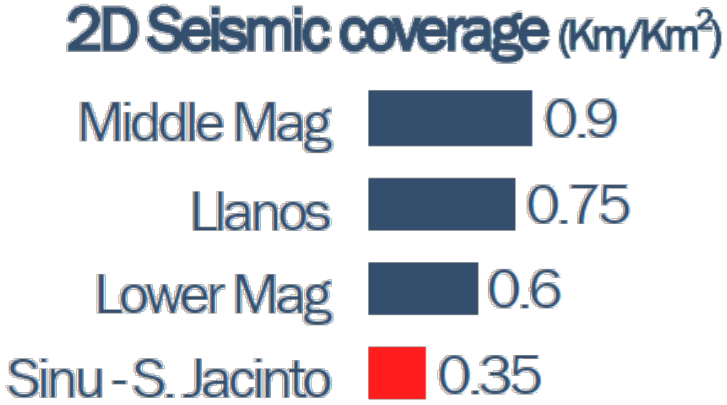
2D Seismic Coverage



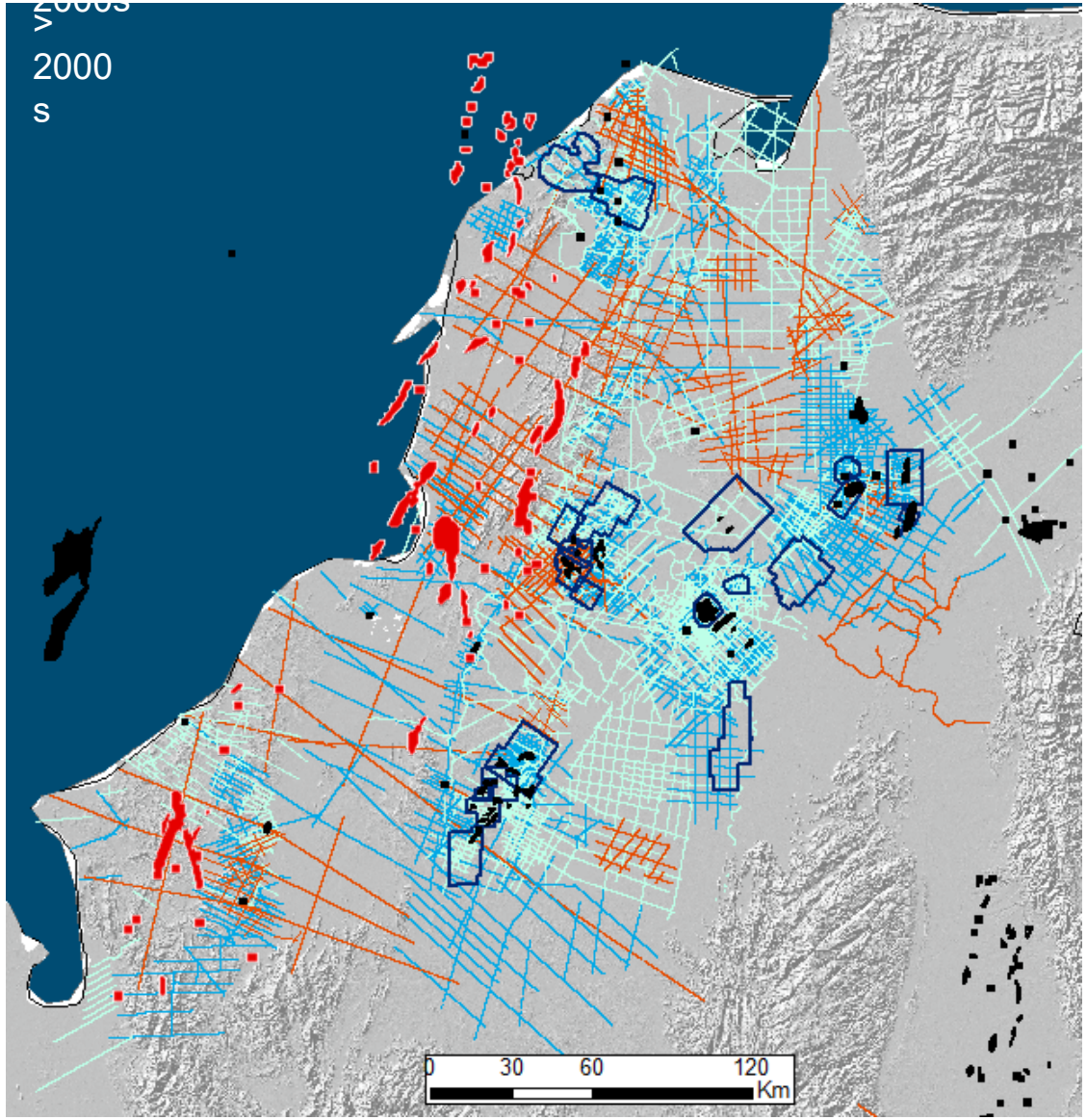
Lower Magdalena Valley Fields to Scale



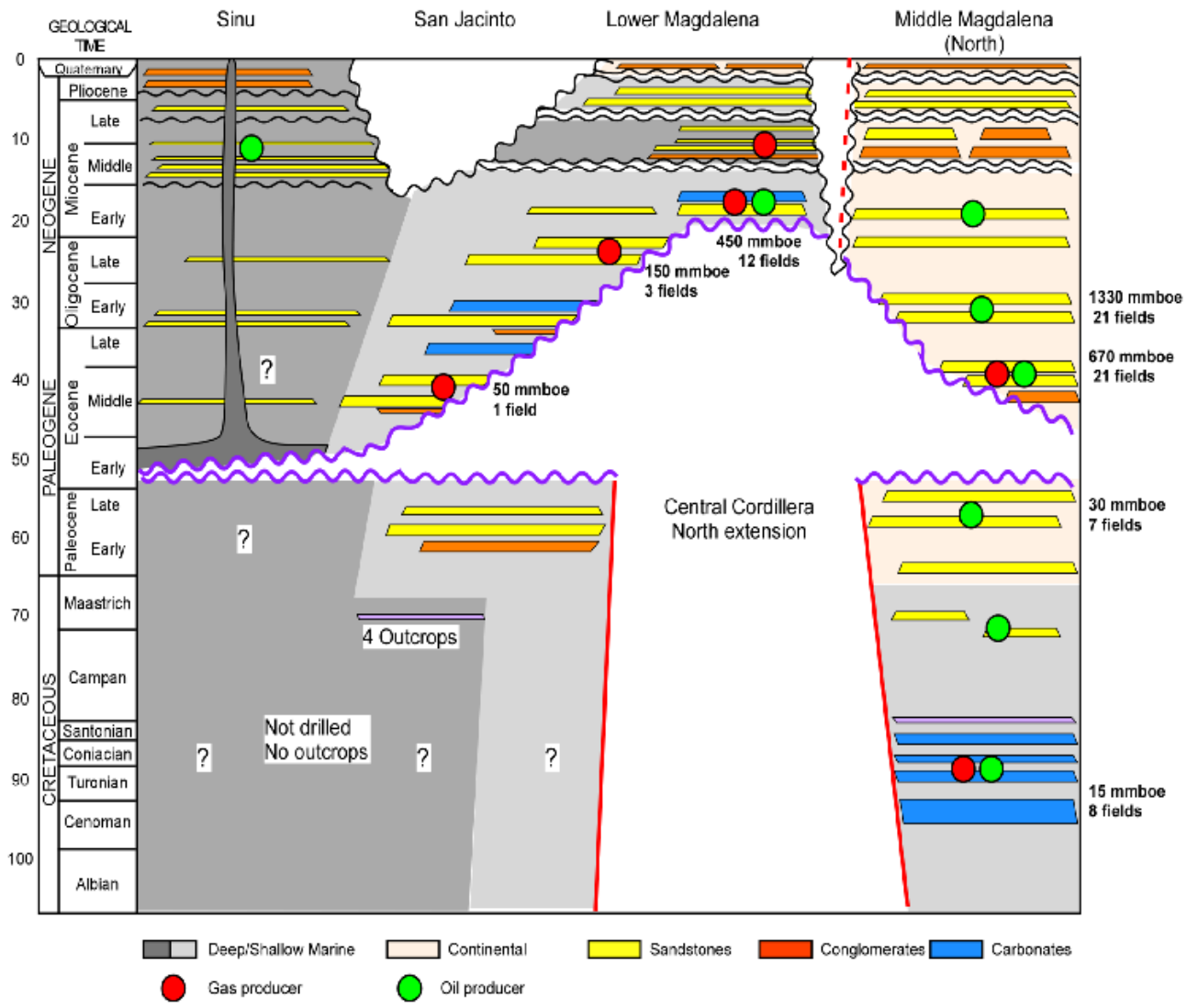
2D Seismic Coverage



Lower Magdalena Valley Fields to Scale



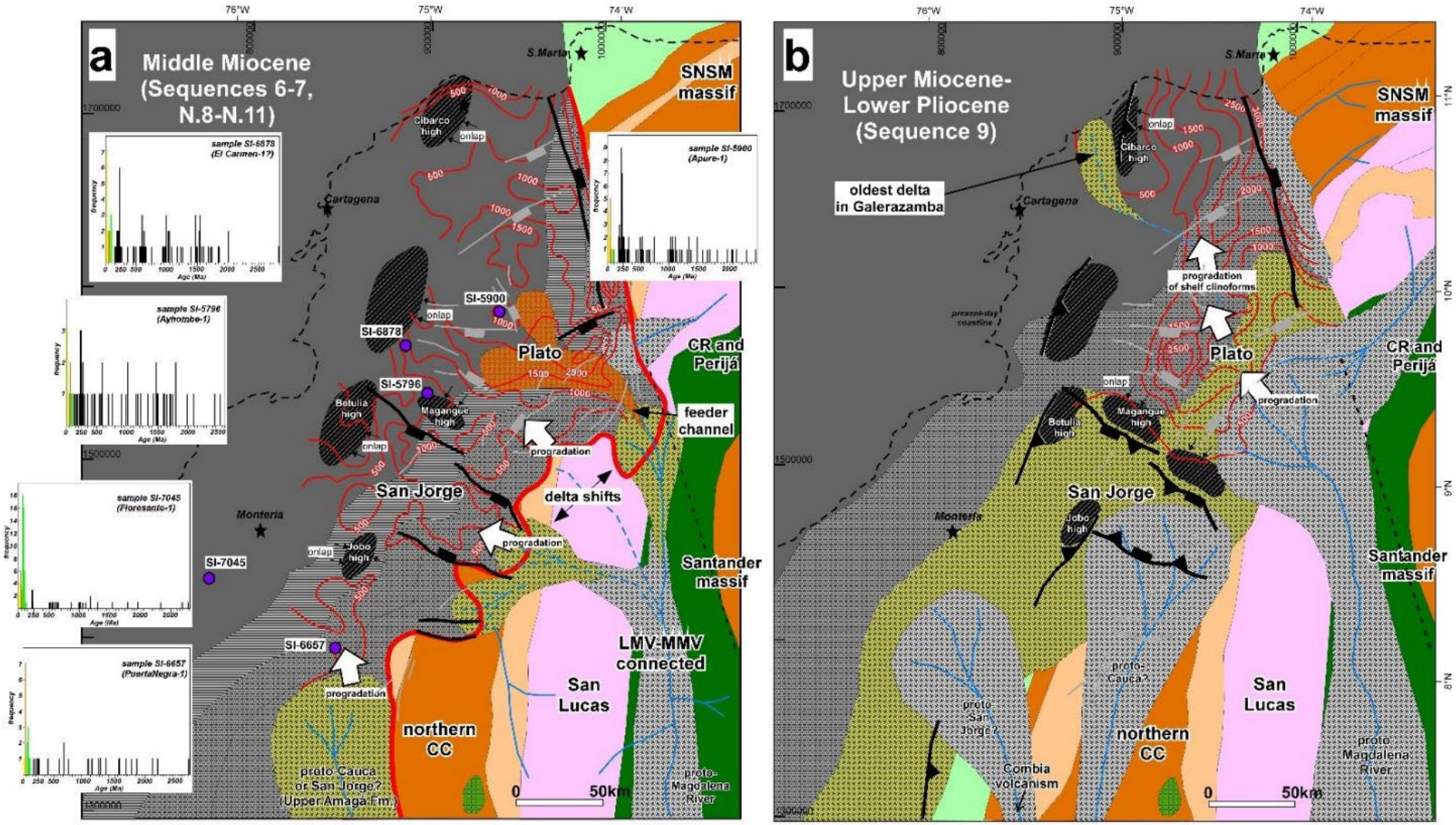
Regional Stratigraphy



Older reservoirs have been proven to be effective recently by commercial discoveries from Hocol in the North of San Jacinto

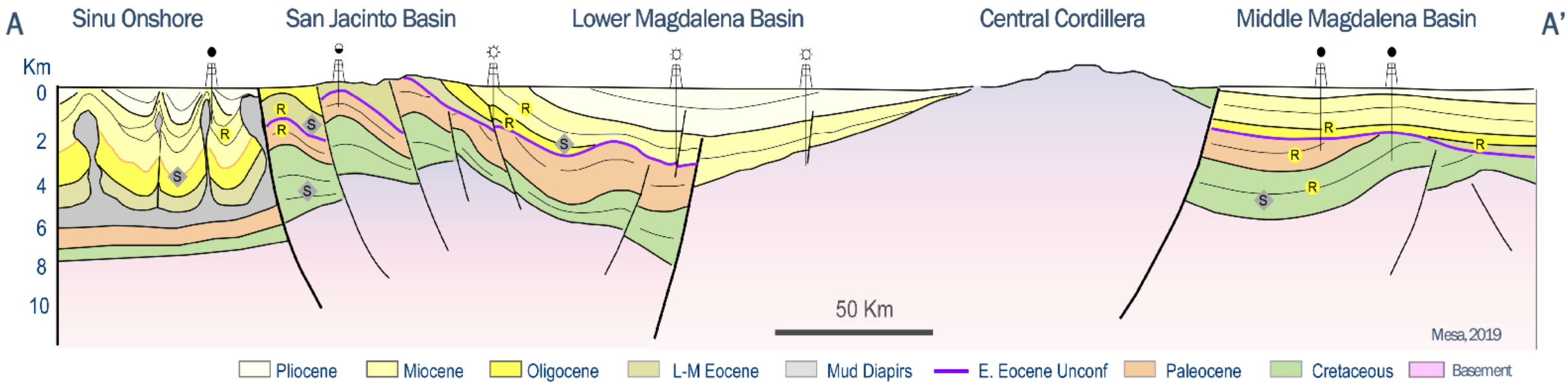
Even though there are potential similarities in the evolution of oil prolific basins to the East, there are still question marks to be solved by the industry and academia

Miocene Basin Floor Fans Potential



From Mora, et al. 2018

Geologic Cross Section



High structural complexity in the region have a significant impact on the subsurface image, which impacts the appetite for more exploration

Searcher

SEISMIC PROCESSING

Seismic Data Enhancement

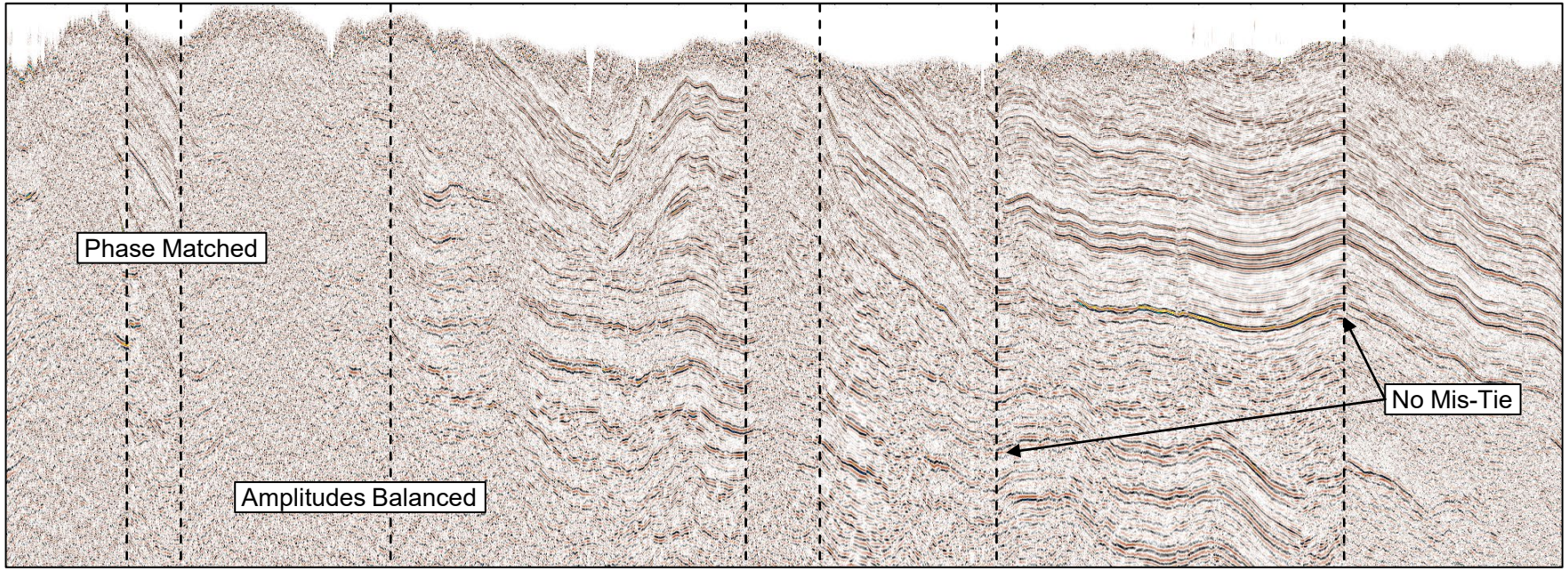
1. Post stack rectification
   a) Merged
   b) Time, amplitude and phase corrected
   c) Result : Regional dataset

2. Pre stack reprocessing
   a) Data reprocessed from field
   b) tapes
   c) Using modern and suitable algorithms
   d) Result: Improved seismic image

Saismic Rectification Workflow

- Data Collection and Review
- QC Lines
- QC Shot Annotation
- **Geometry Correction**
- Standardise EBCDIC
- AGC
- Time, Phase and Amplitude Matching
- Reporting
- Ingestion To Saismic

Time, Phase, Amplitude, Navigation and Metadata Rectification



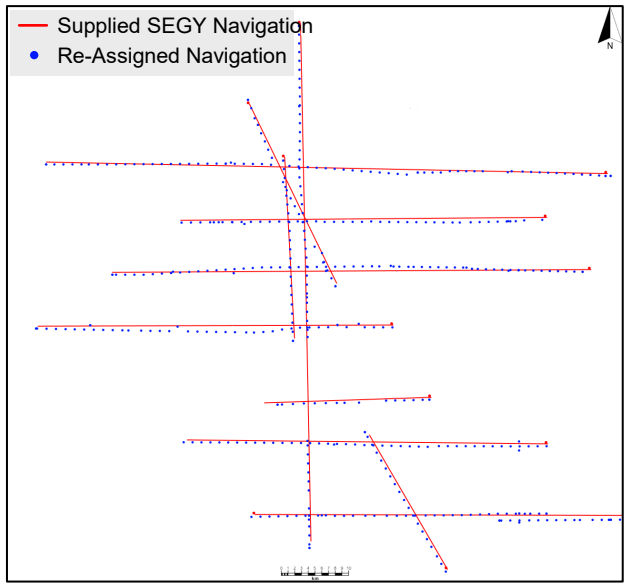
ONSHORE **PERU** RECTIFIED DATA

The result of the rectification process is to have a contiguous database that can be easily loaded into any interpretation software

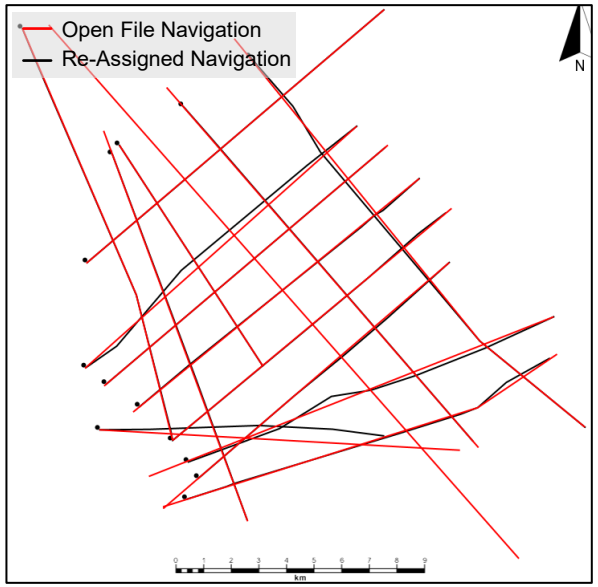
Much-improved, consistent, regional grid covering the onshore basins of Peru, with multiple vintages tying as many wells, leads and prospects as possible

WORKFLOW: GEOMETRY RECTIFICATION

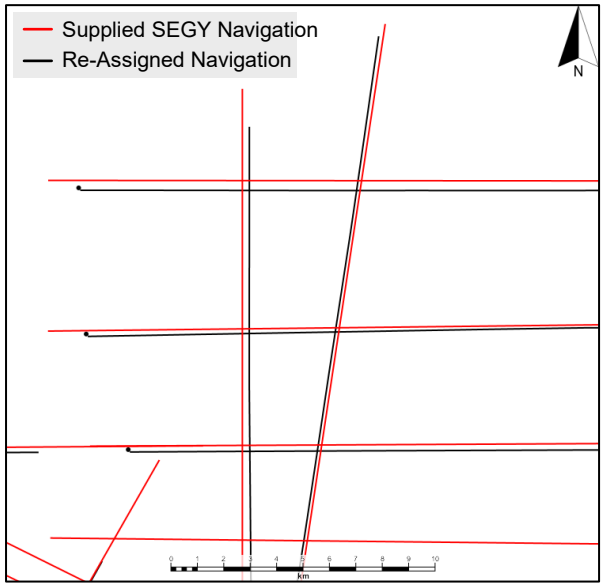
- This is a critical step in the rectification workflow and each line is carefully examined and inspected prior to use. Lines are often received with wrong projections, incorrect geometry, flipped lines, substantially simplified geometry compared to original navigation or received without geometry. Errors can easily exceed 1km.
- To ensure the most accurate geometry is applied to the rectified seismic, all sources of navigation are compared. Depending upon the data available, navigation sources may include:
  - SEGY headers
  - Supplied navigation text files (e.g. P190, S-Card, C-Card)
  - Shape files



Example SEGY header navigation over-simplified compared to original navigation.



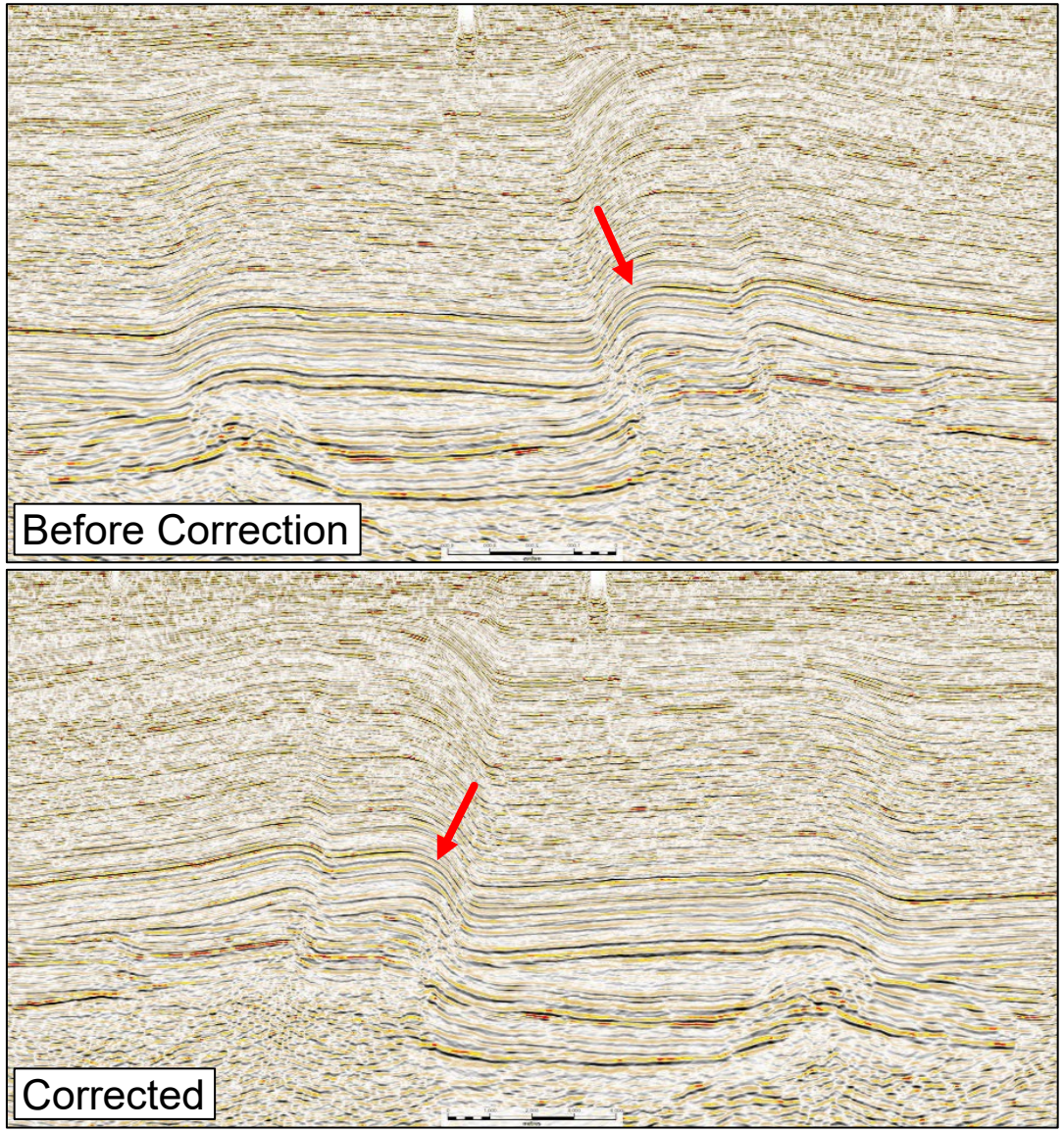
Example open file source navigation position differences compared to rectified dataset



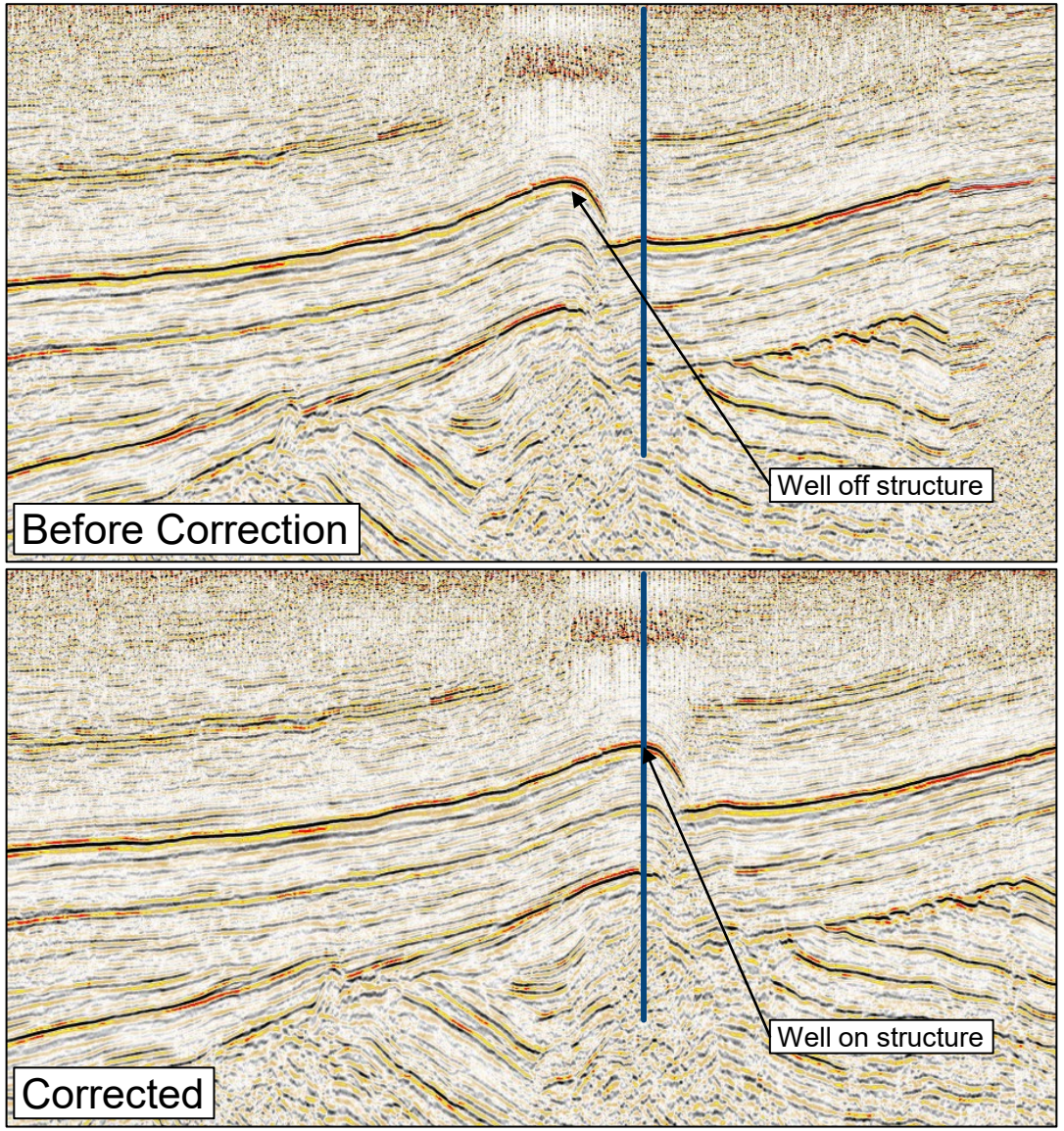
Example projection and datum correction with potential errors >200 m

WORKFLOW: GEOMETRY RECTIFICATION

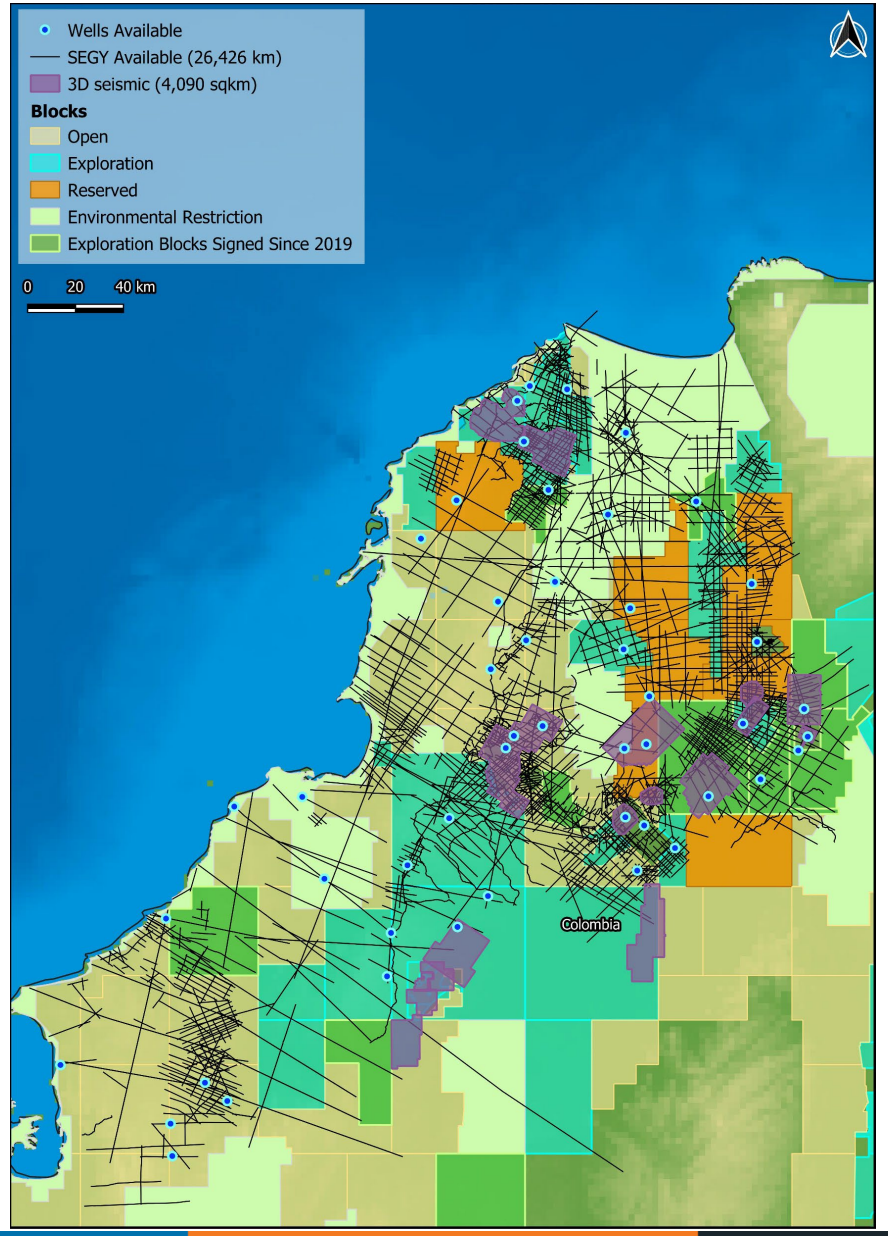
Example of a flipped line:



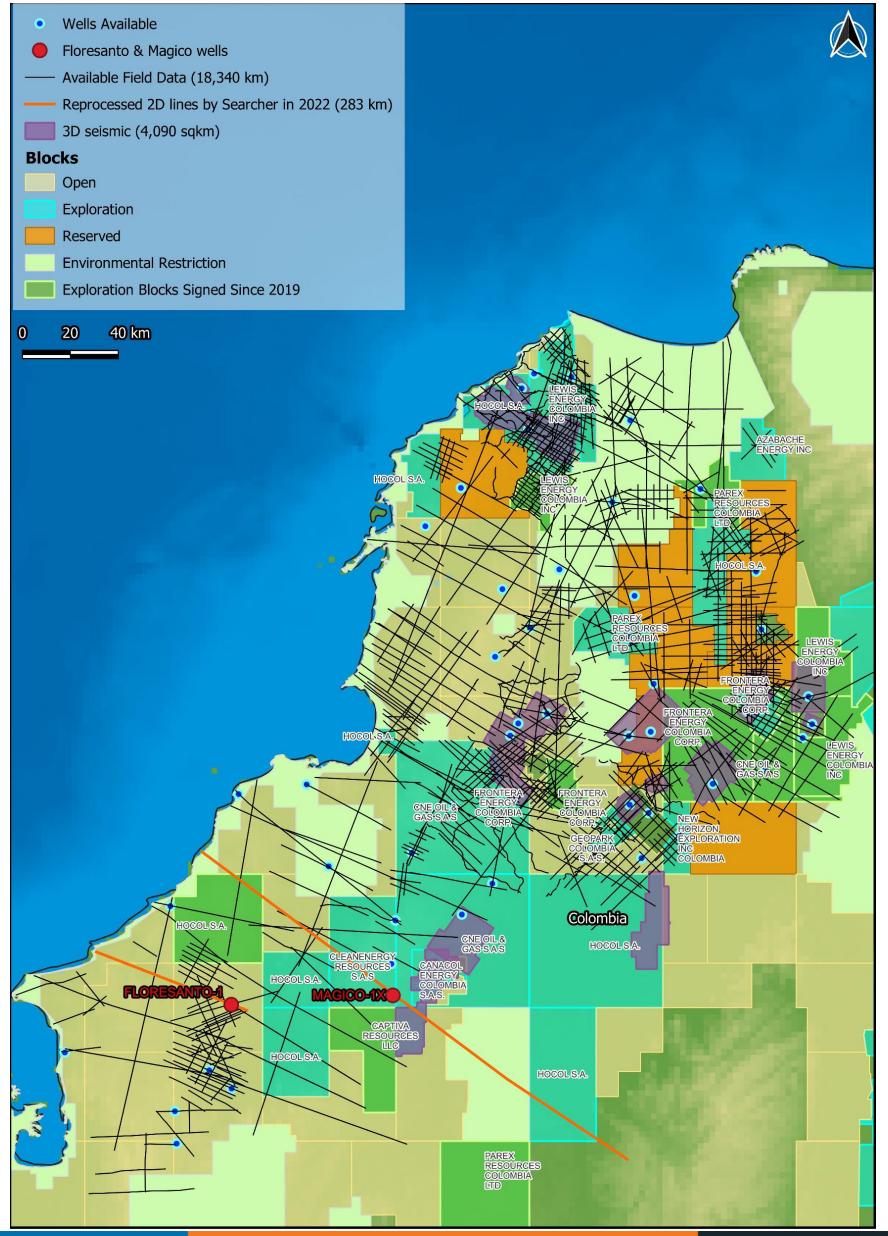
Example of incorrect geometry and projection



Segy Available at SGC – For Rectification



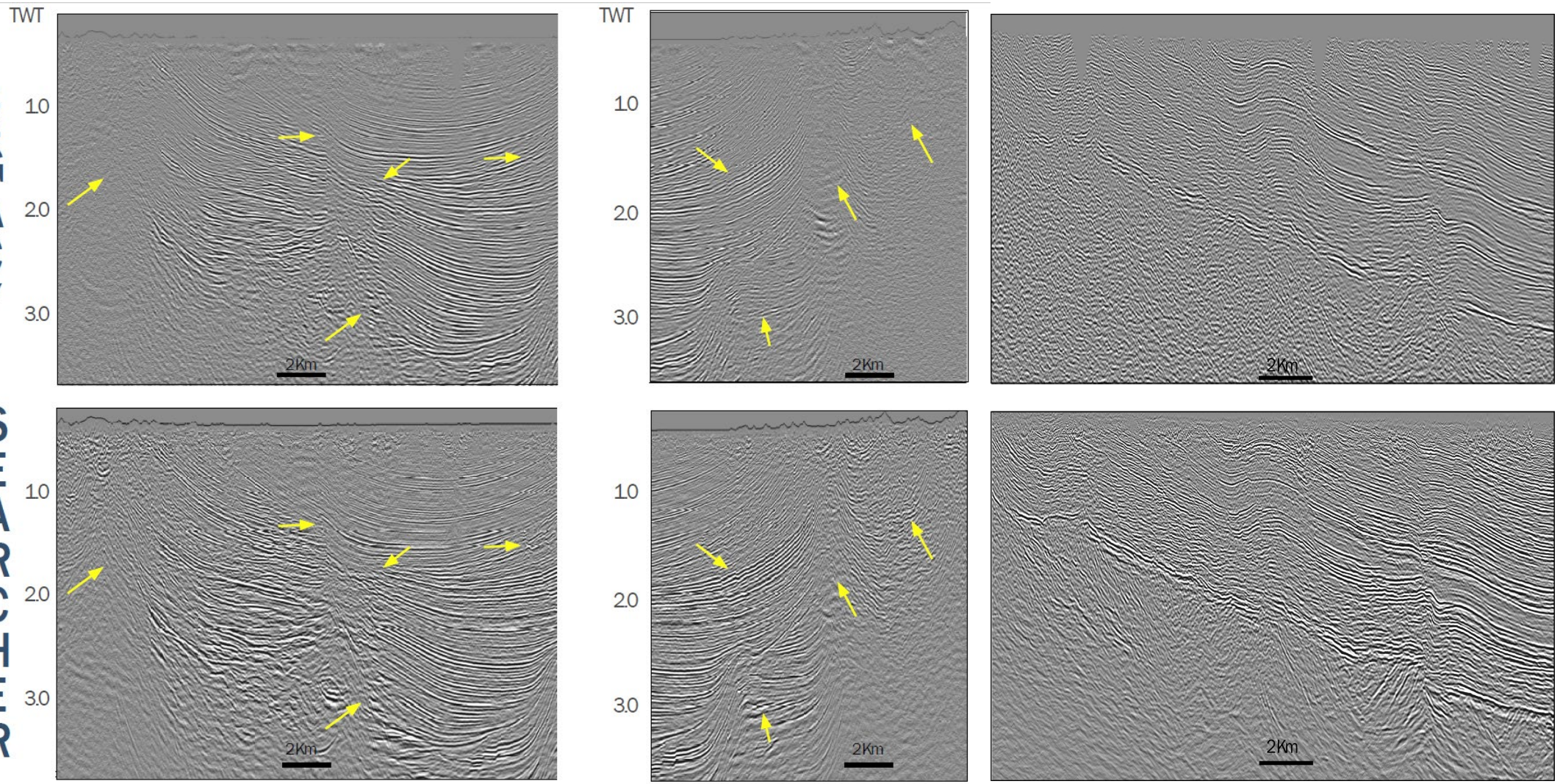
Field Data available at SGC (Minimum) – For Prestack Reprocessing

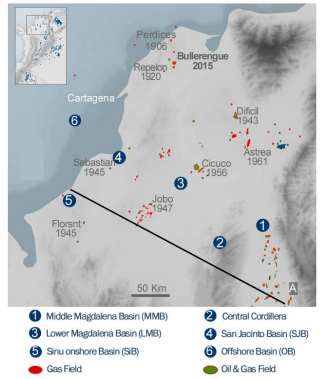


2022 PSDM Reprocessing Image Enhancement Highlights

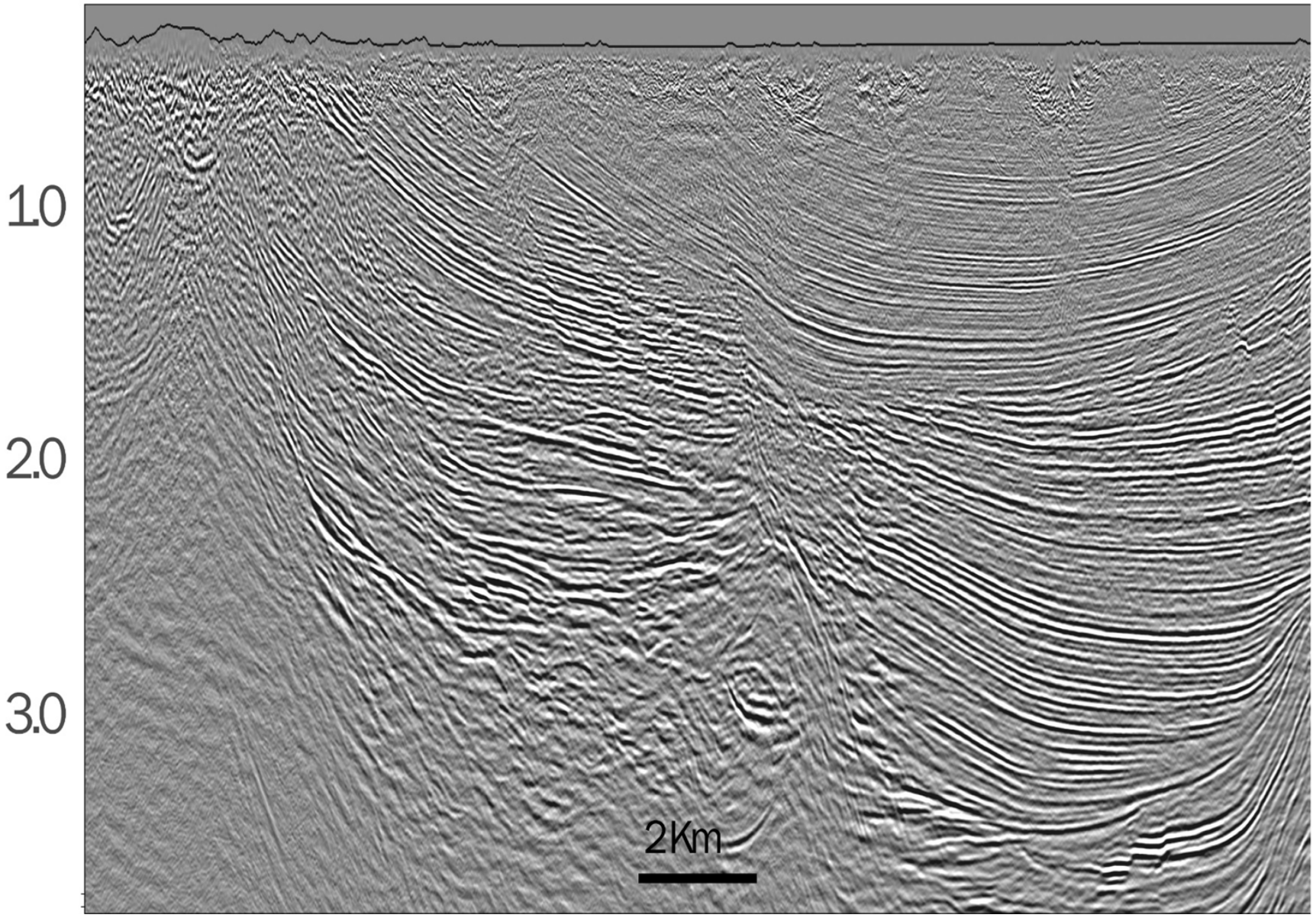
LEGACY

SEARCHER

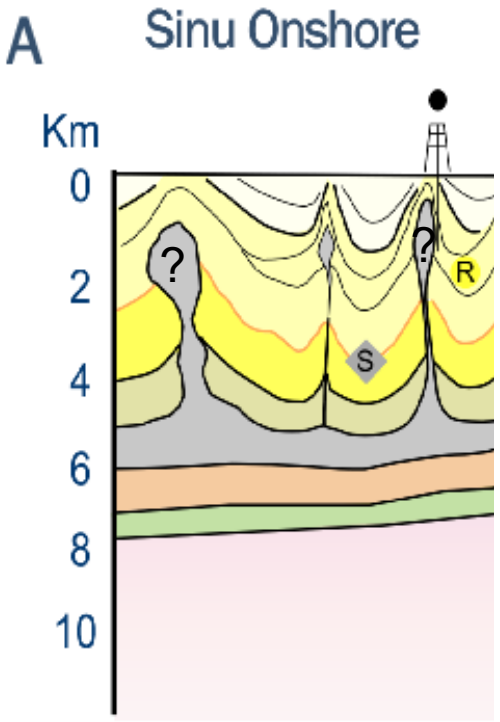




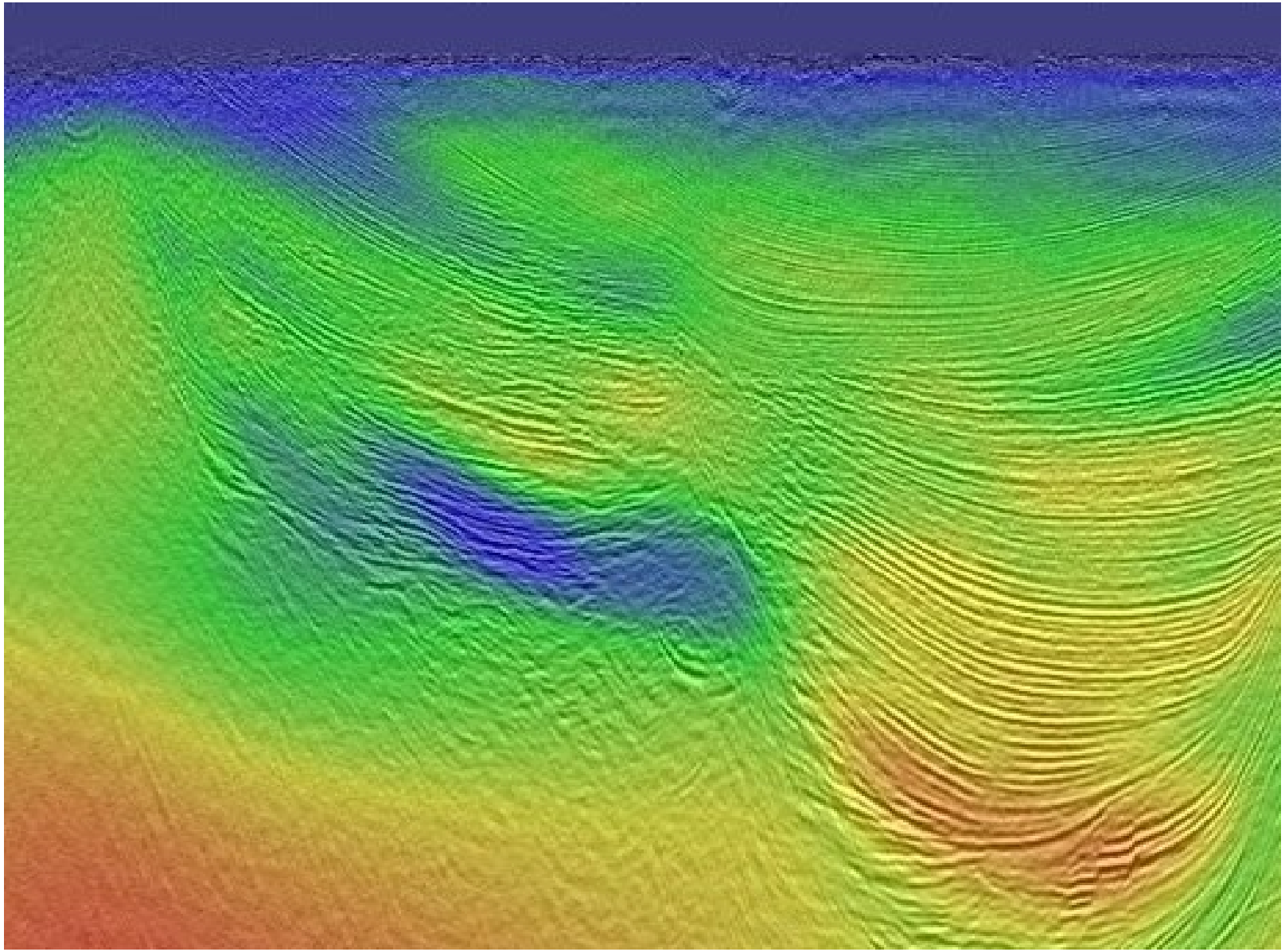
2022 PSDM in TWT



Interval Velocity Overlay



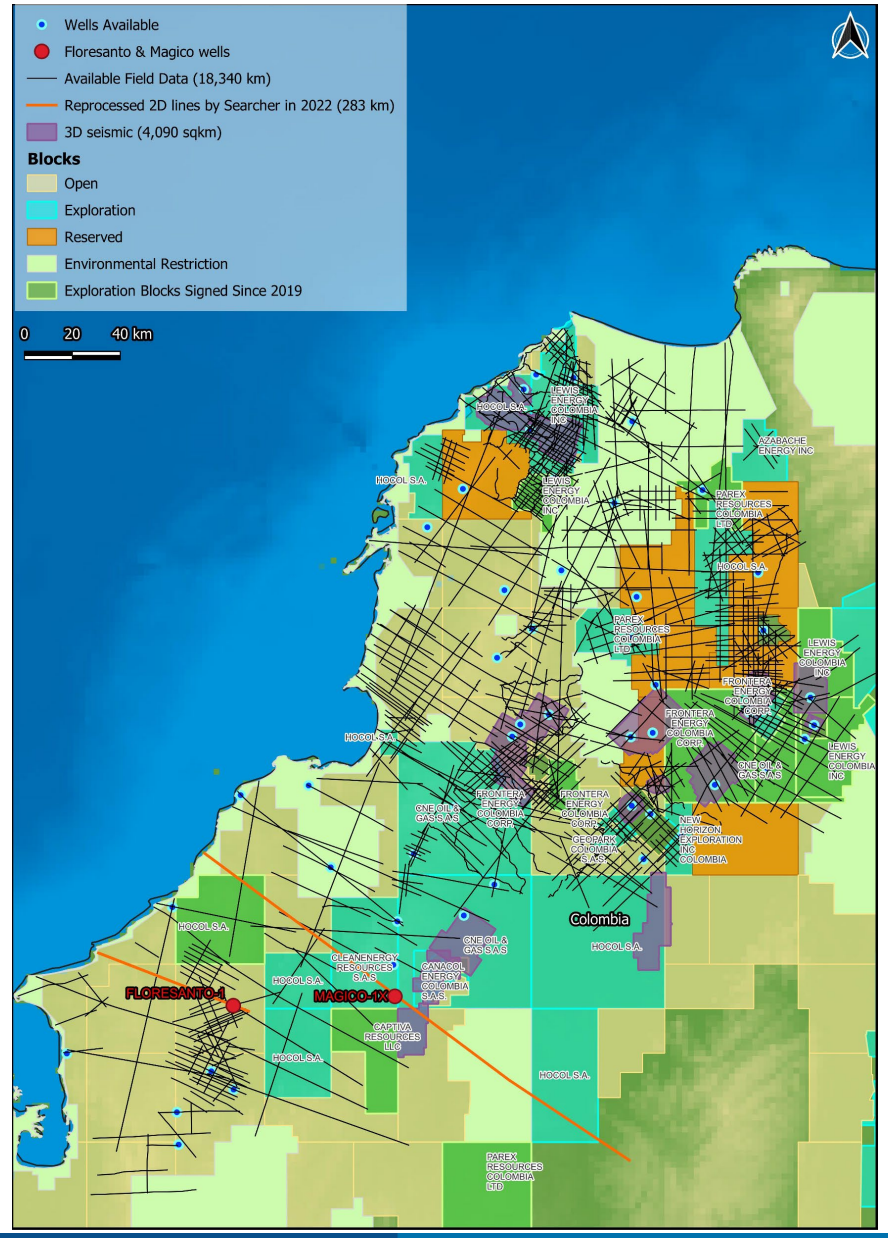
Shale diapir model not supported by high velocities



Seismic Prestack Reprocessing Results So Far

- Several breakthroughs observed from prestack reprocessing so far
  - Mud diapir model is challenged with high velocities resulting in seismic events
    - Steeply dipping fault plane?
    - Salt cored anticline?
    - Shale cored anticline?
  - Deep imaging confirm Cretaceous section and opens Cretaceous plays
  - Onlapping Oligocene sandstone new play

Forward Plan



- Reprocessing all available legacy 2D and 3D seismic in
  - Sinu
  - San Jacinto
  - Lower Magdalena Valley