LATERAL DISTRIBUTION OF SERRAVALLIAN-TORTONIAN CHANNELIZED BODIES IN TEMSAH CONCESSION AND ITS IMPACT ON THE EXPLORATIVE POTENTIAL, OFFSHORE NILE DELTA, EGYPT

By

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Belayim Petroleum Company **(PETROBEL)**

Outline

1. Main Idea
2. Geological Background
3. Temsah Structural Setting
4. Seismic Interpretation
5. Future HC Potentiality

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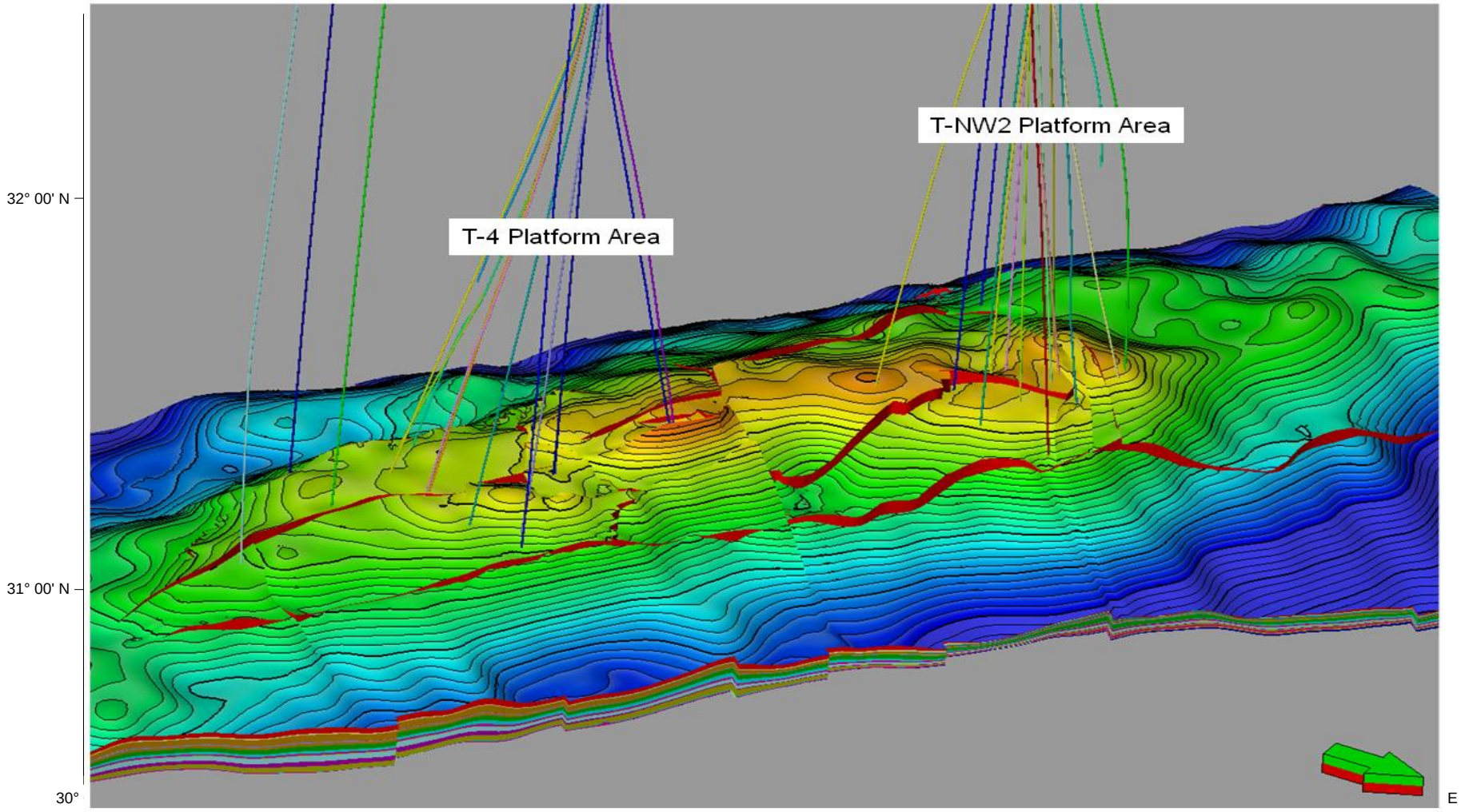
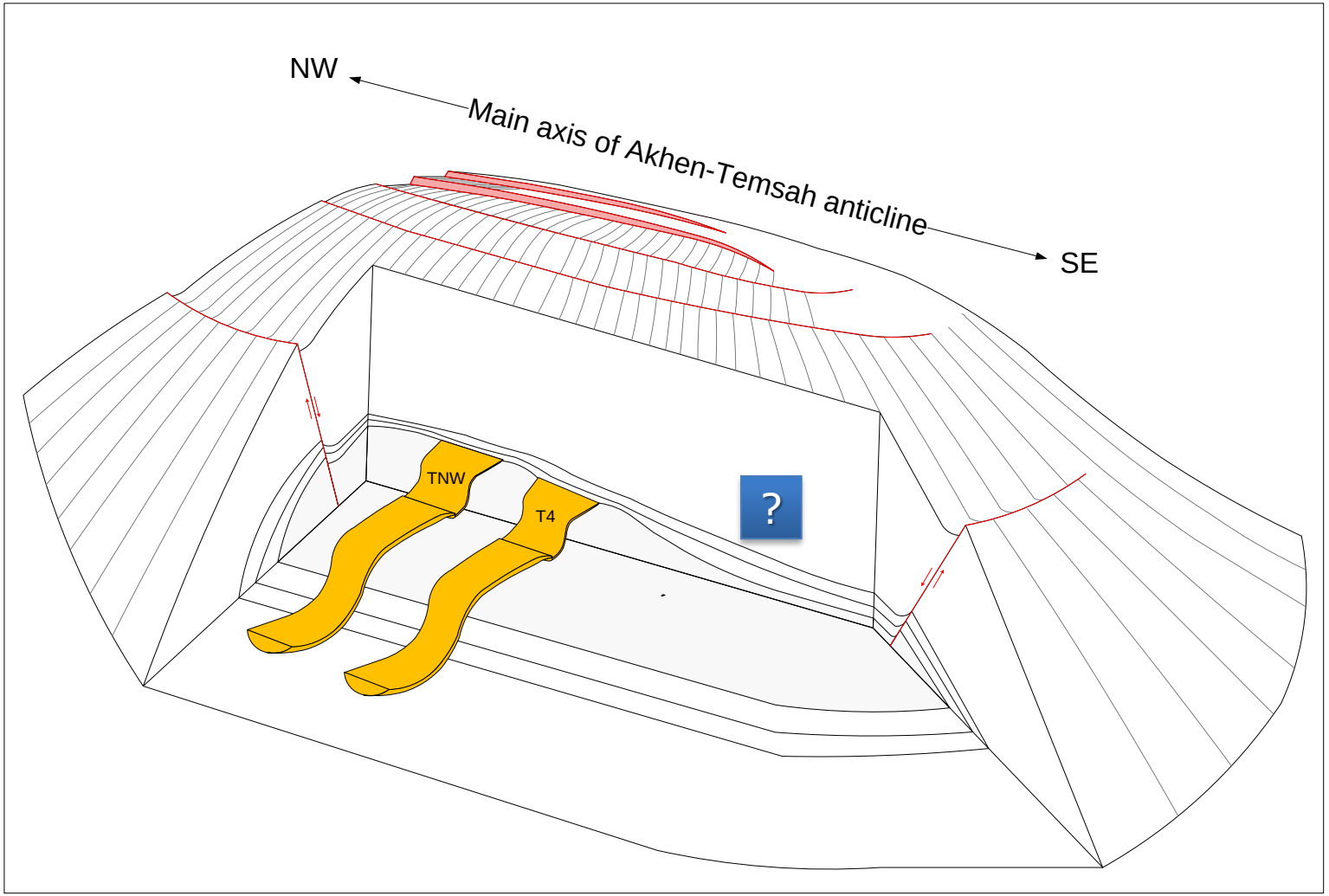
- **Main Idea**
- Geological background
- Temsah structural setting
- Seismic Data Interpretation
- Future HC Potentiality

Study Area - Location & Geological Background

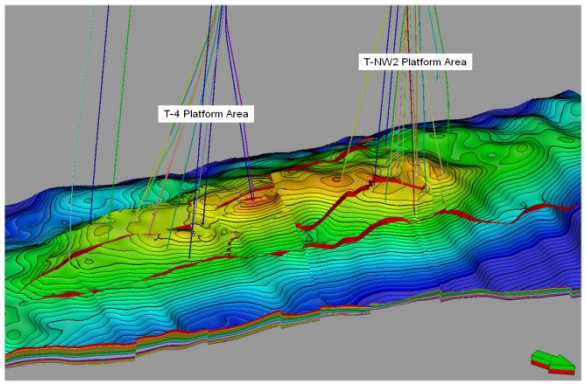


Main Idea

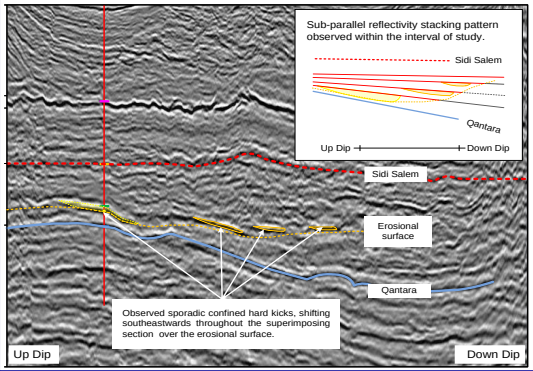


Integrated G&G Workflow

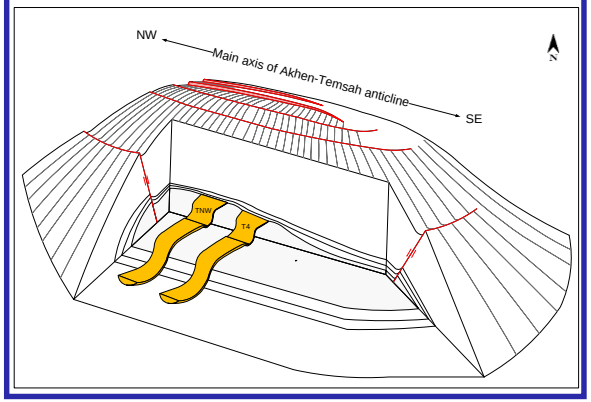
Data Review



Seismic Observation

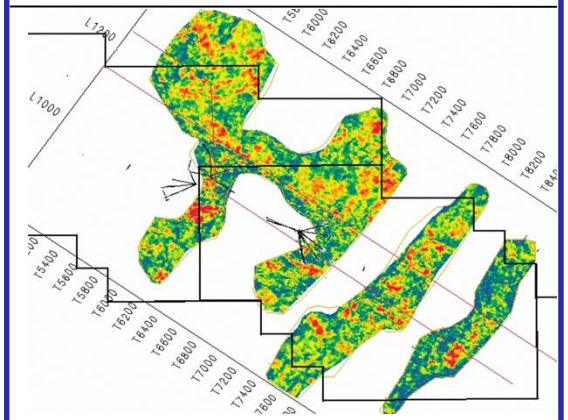


Geological Model

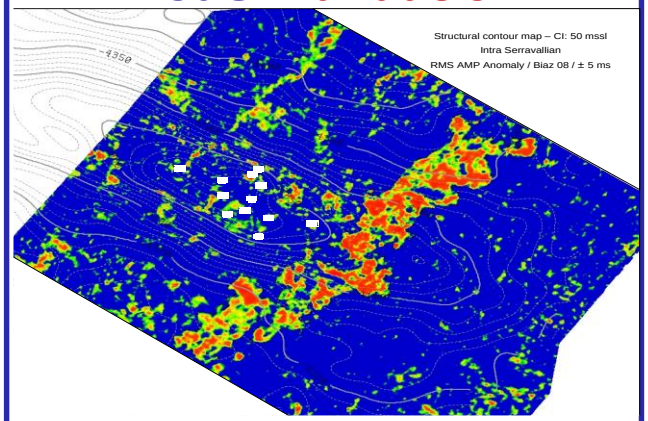


PROSPECT Identification

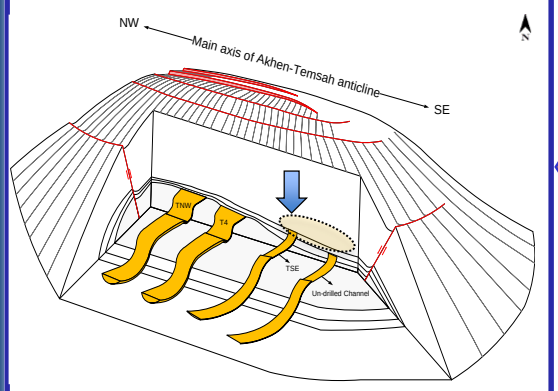
Attribute Extraction



Model Validation



Future HC Potentiality



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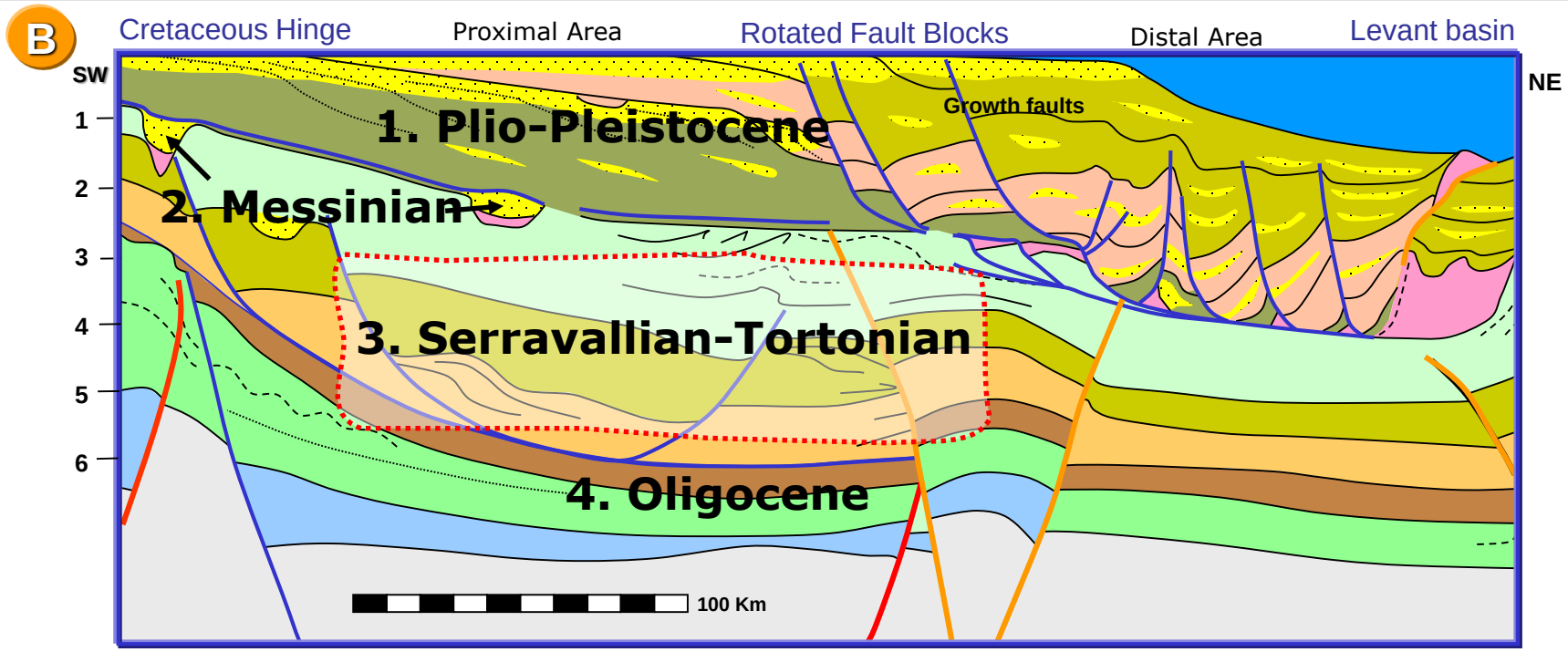
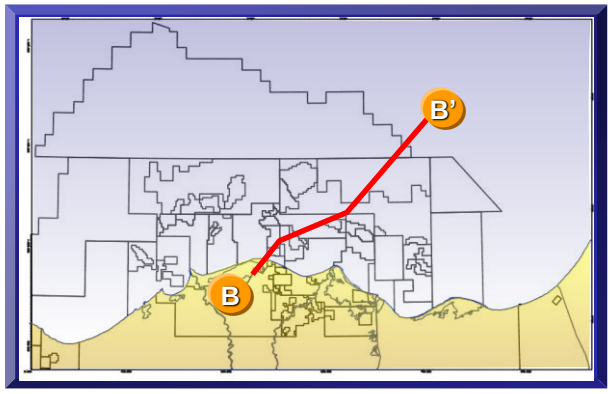
Nile Delta Plays - Regional Overview



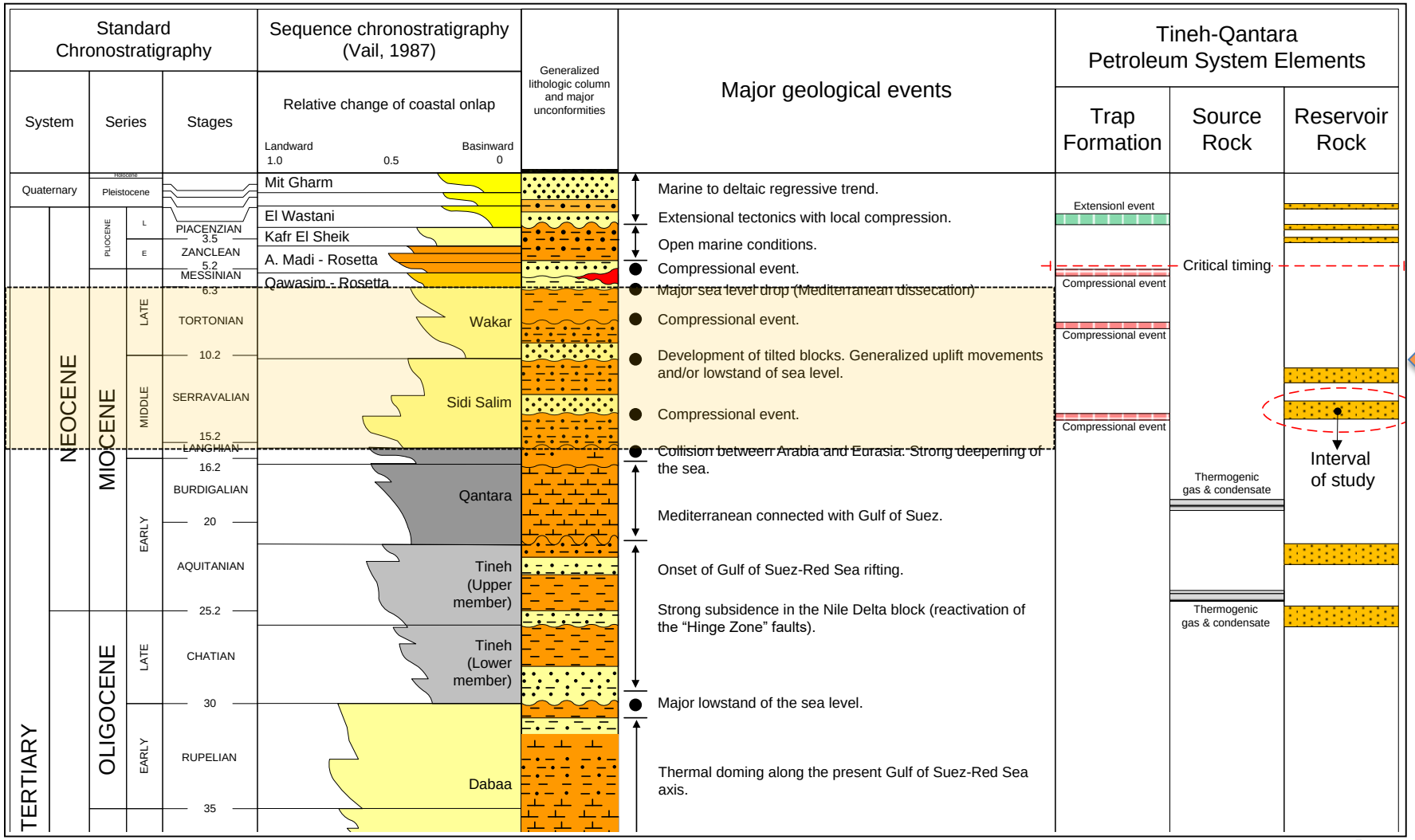


(After Dolson et. al., 2005)

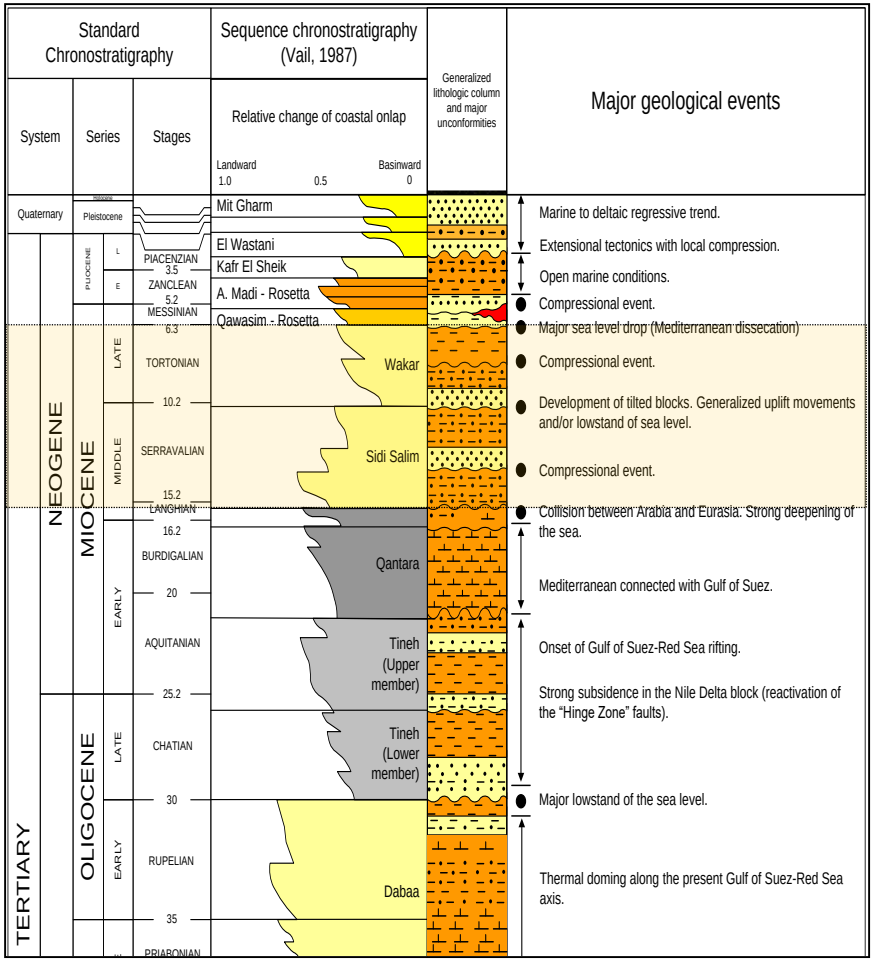
PROVEN PLAYS

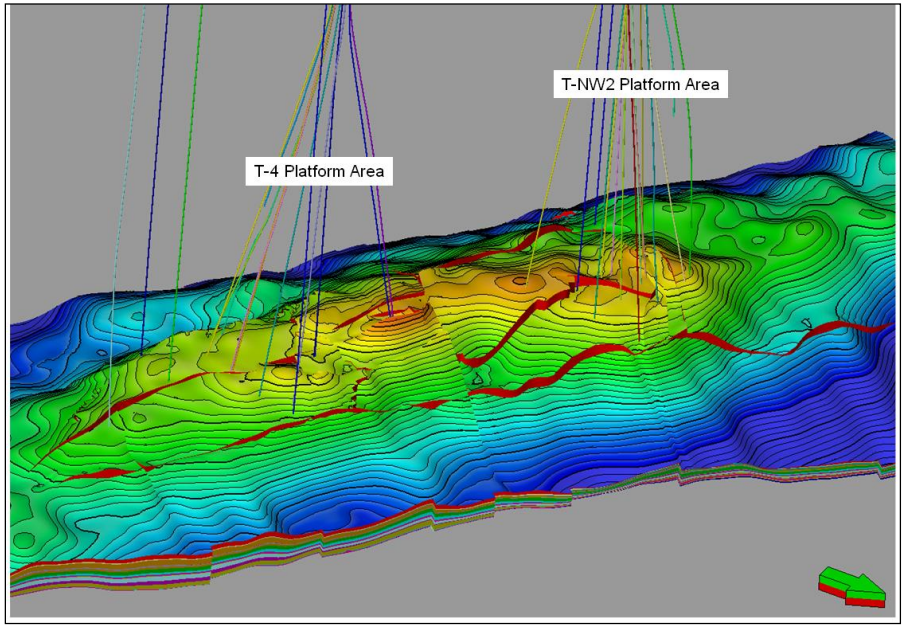
1. Plio-Pleistocene
2. Messinian
3. **Serravallian-Tortonian**
4. Oligocene

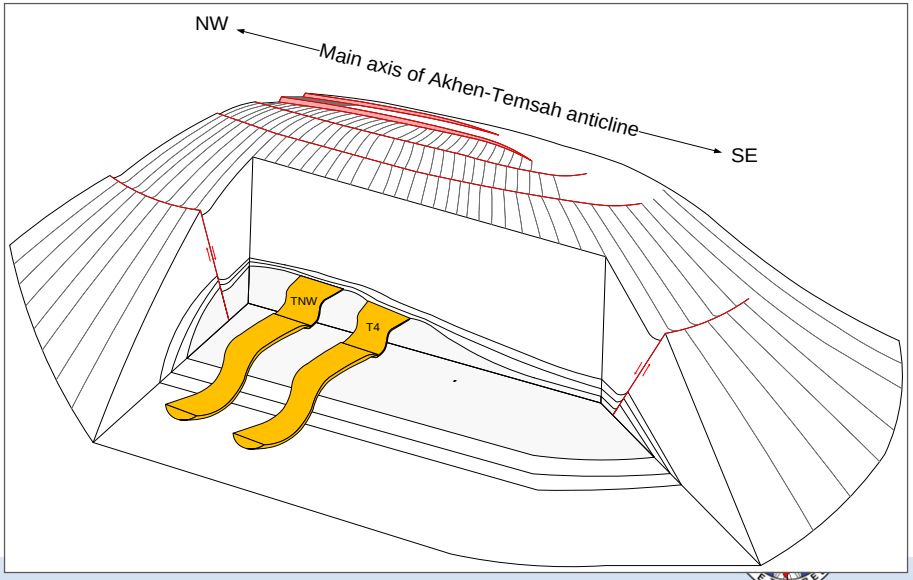
Chronostratigraphic Chart and Petroleum System



Miocene Sequence – Traditional HC Play Concept





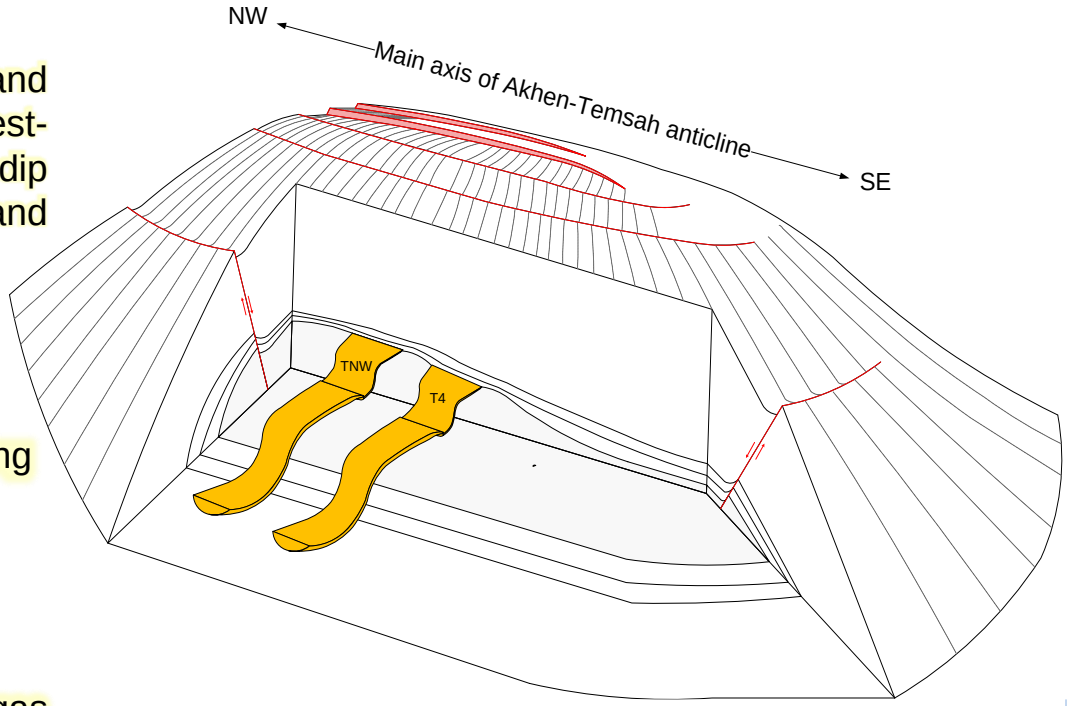


- **All Wells** drilled on **four dip closure** of Akhen-**Temsah anticline**.

3D Geological Sketch of Aken-Temsah Anticline

Miocene-Serravallian target

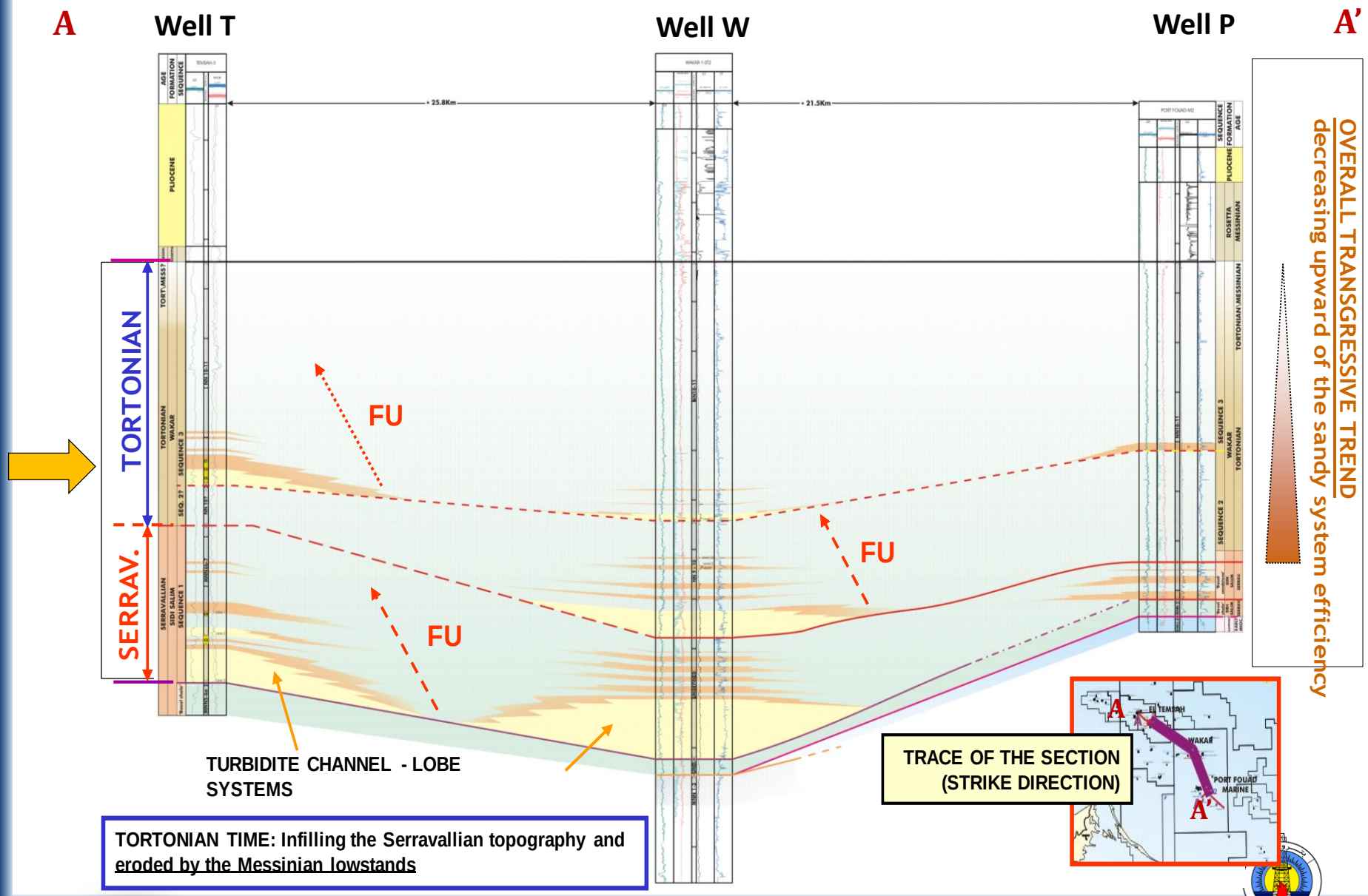
The Miocene-Serravallian Play is related to sand rich turbiditic deposits trending Southwest-Northeast, perpendicular to the four-way dip elongated anticlines (Akhen-Temsah, Wakar and Port Fouad) along the Bardawil shear zone.



Top seal is provided by thick over laying Serravallian and Tortonian section.

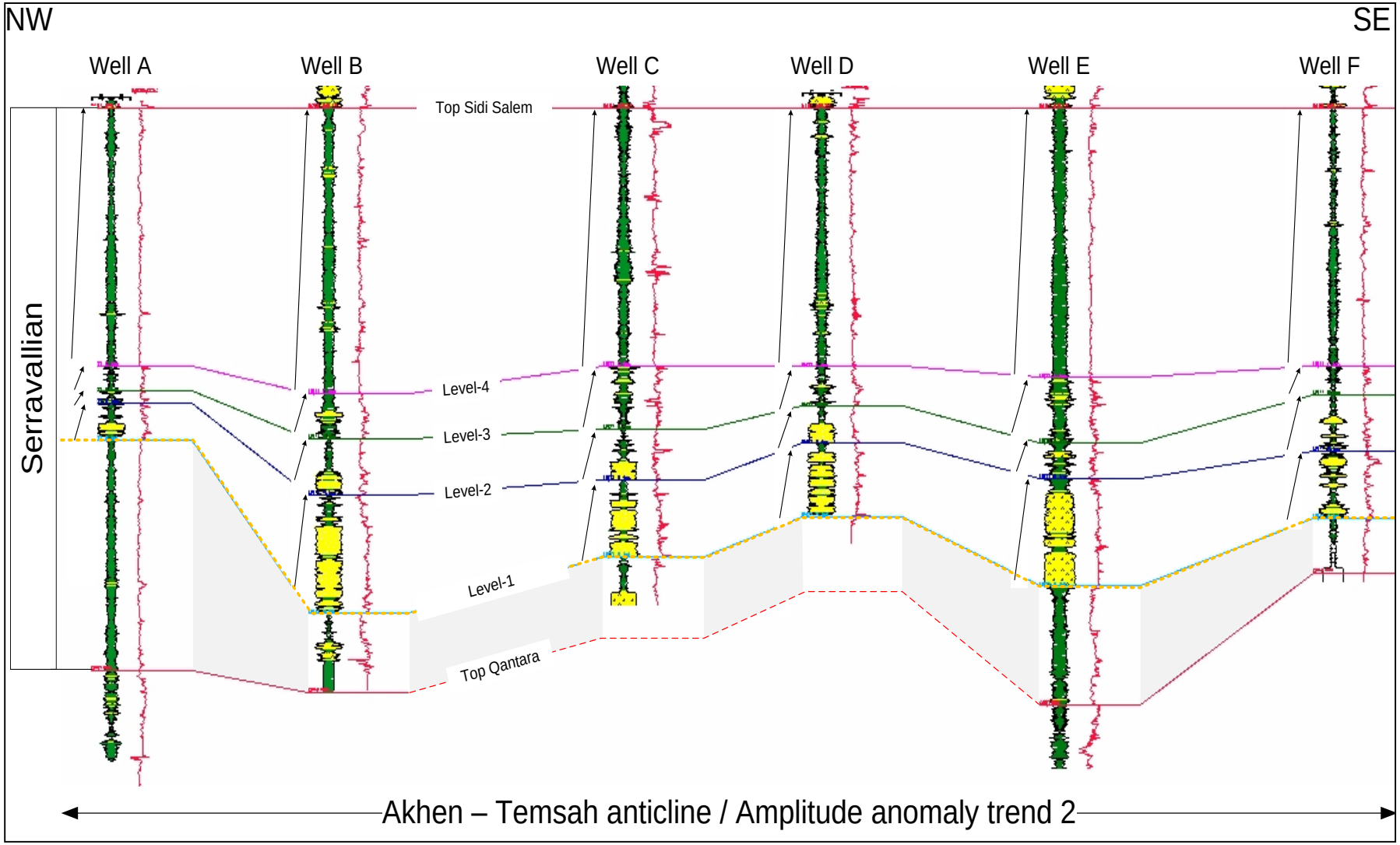
The expected hydrocarbon is thermogenic gas and condensate generated from under-laying Oligocene source rock.

Basin Scale - Well correlation



TORTONIAN TIME: Infilling the Serravallian topography and eroded by the Messinian lowstands

Field scale - Reservoir Stacking Pattern



➢ **Finning upwards GR log** pattern / AI (red) shows ⟷ High AI SST embeded in Low AI Shales

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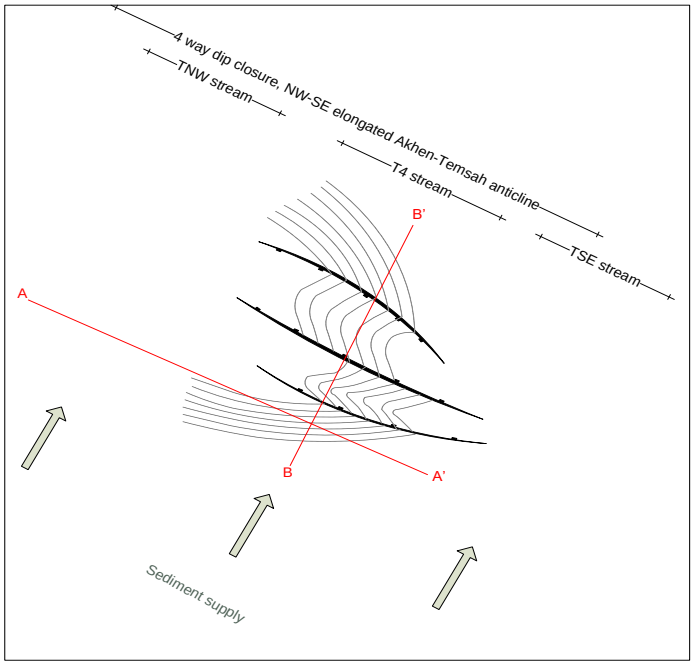
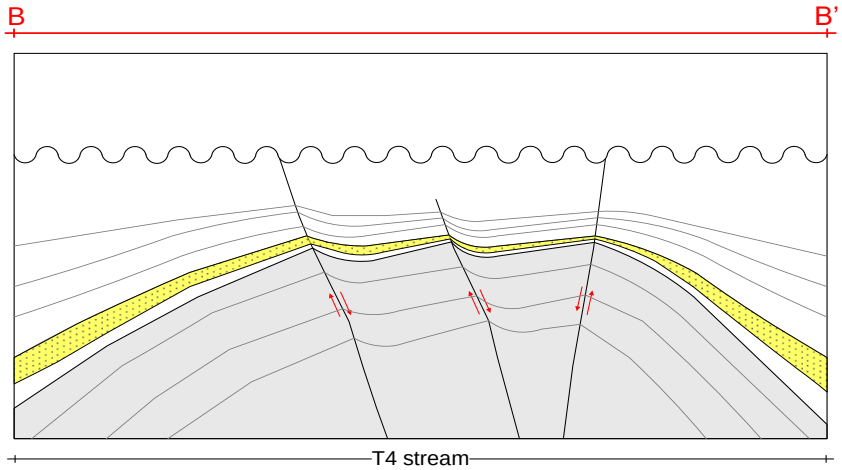
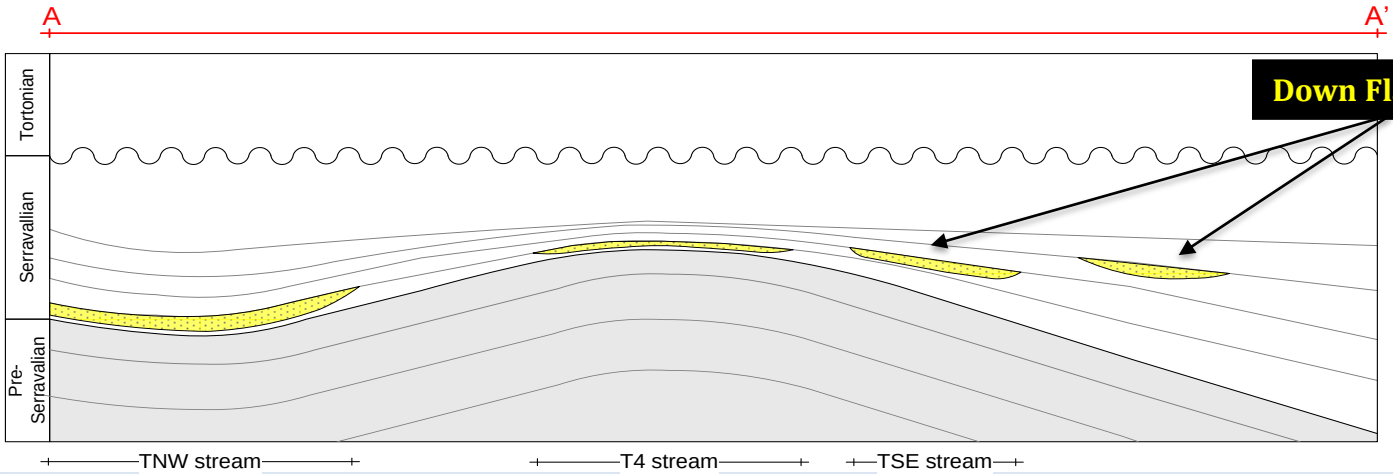
Aken-Temsah Geological & Structure Setting



- *The **Miocene-Serravallian HC Play** consists of syn-kinematic **turbiditic deposits accommodated** within the **Akhen-Temsah anticline**.*
- *Deep marine **Clastic Deposits** bypass the **NW-SE** elongated Akhen-Temsah stronghold through potent transverse **streams** identified as **TNW, T4 and TSE**.*





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Seismic phase and polarity conventions

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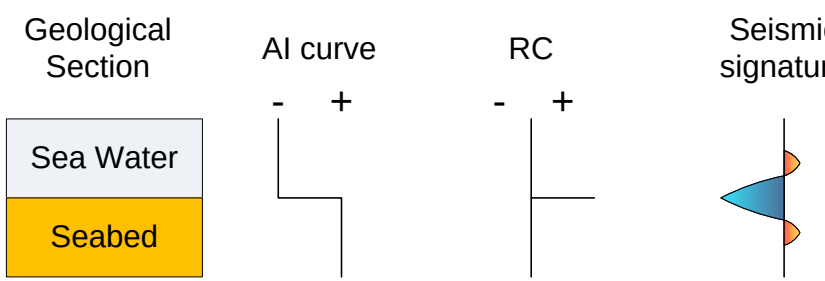
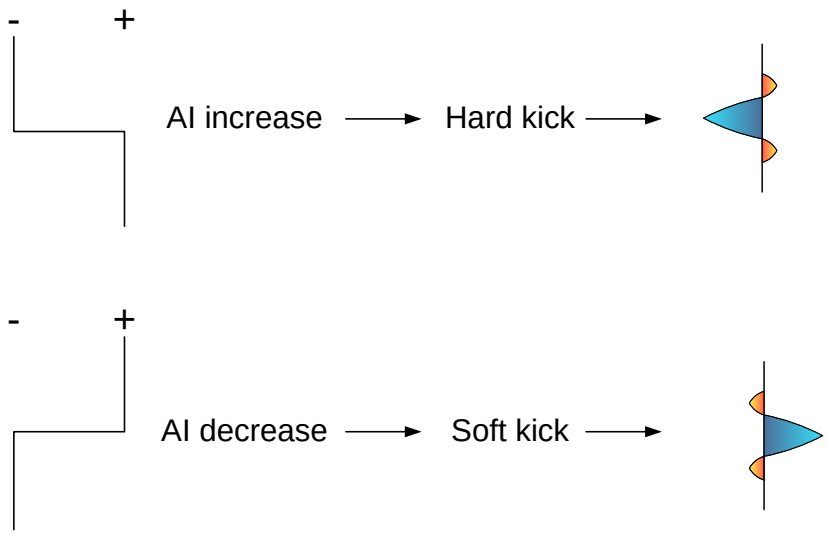
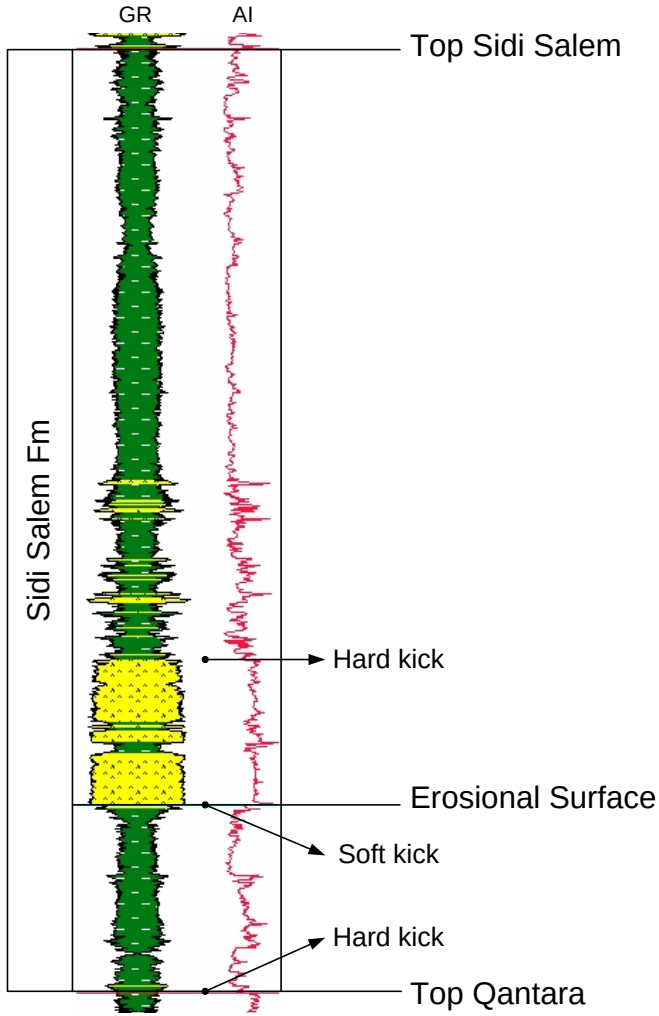


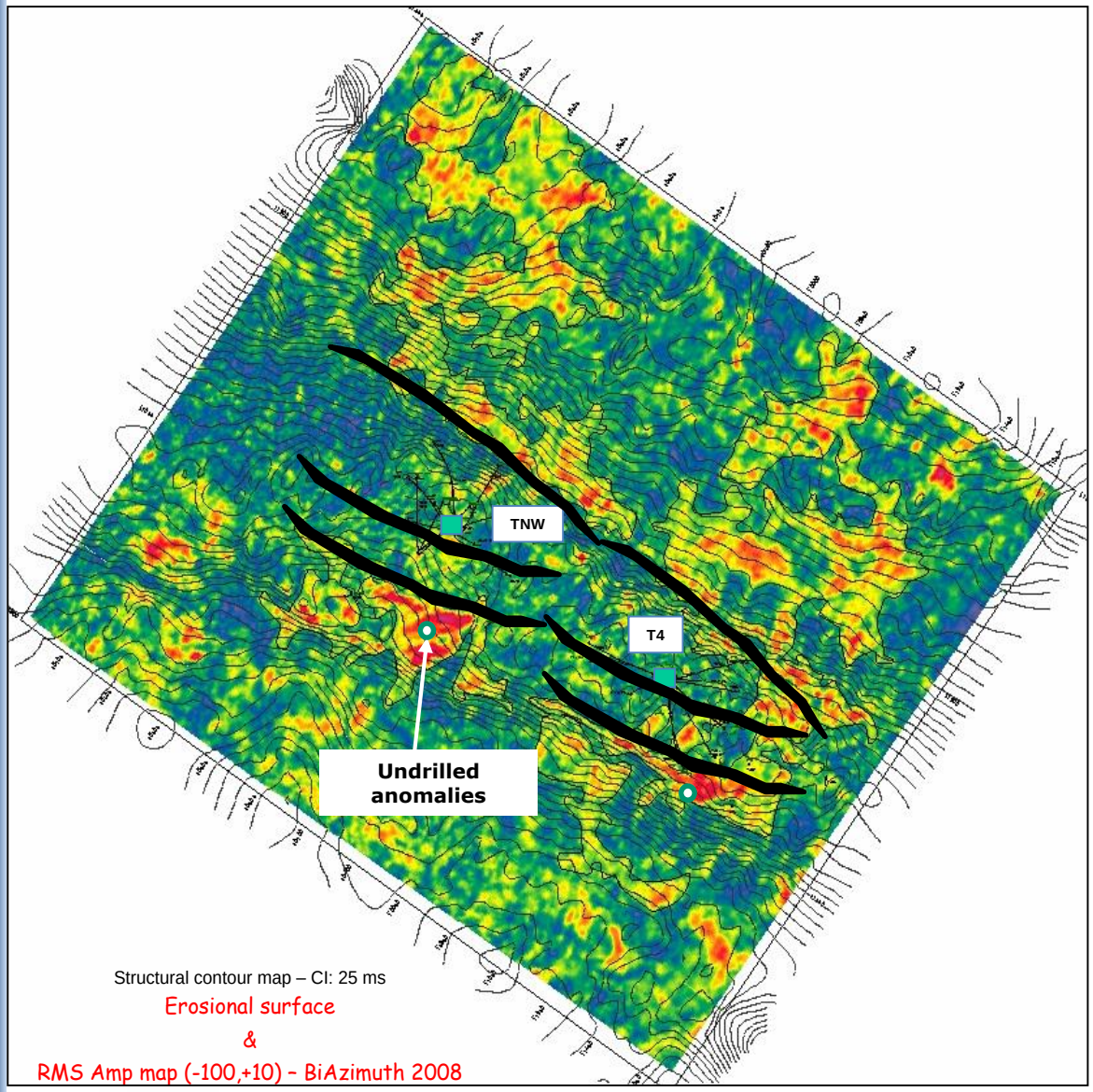
General seismic conventions



AI within the interval of study



Seismic Observation



Structural contour map – CI: 25 ms

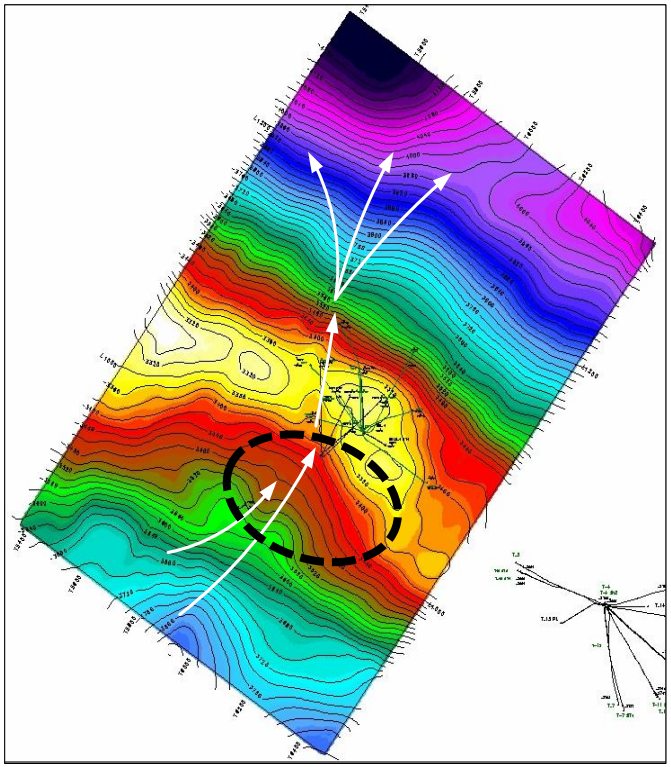
Erosional surface

&

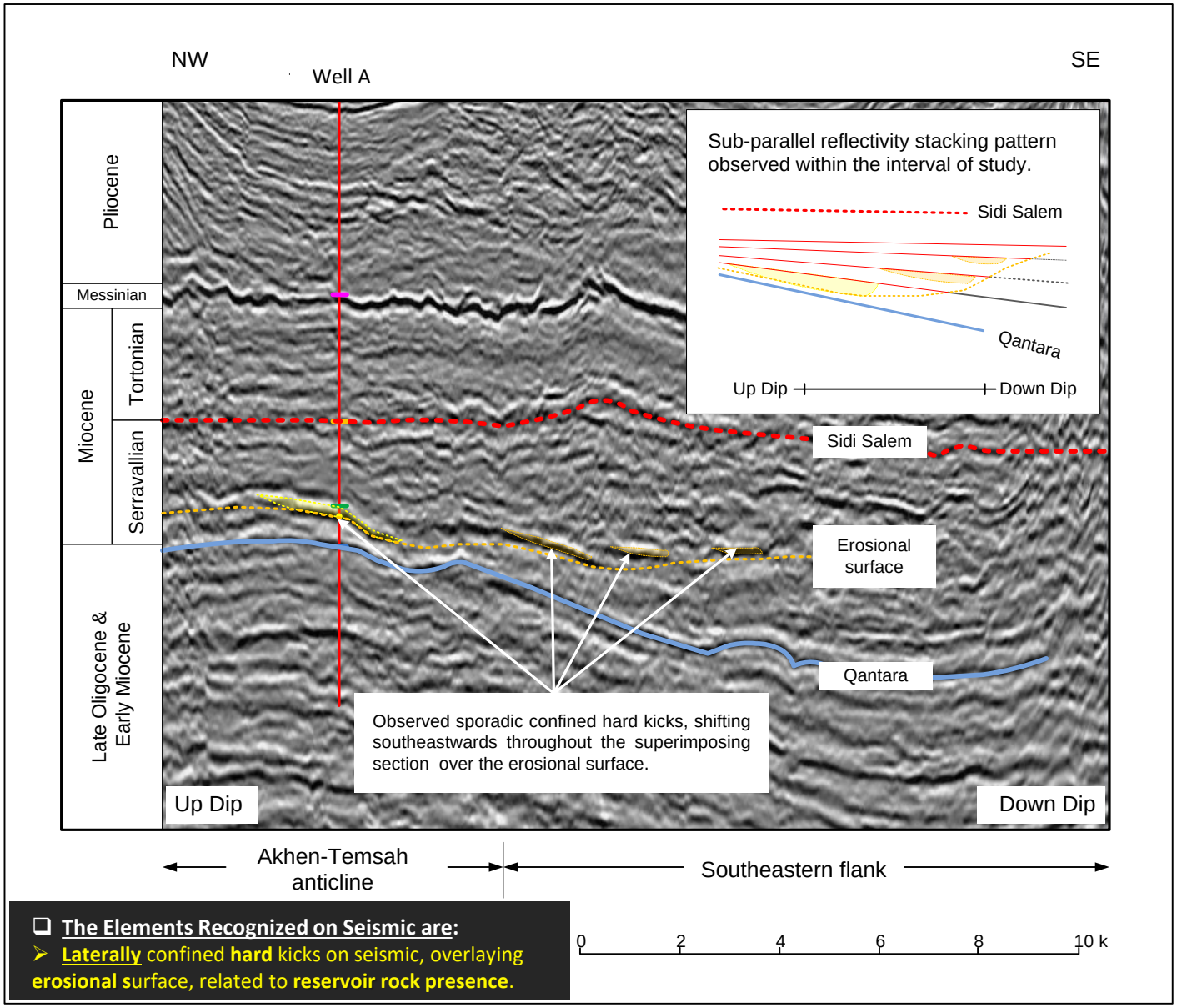
RMS Amp map (-100,+10) – BiAzimuth 2008

Observation:

New **Seismic data**, BiAzimuth volume, and **dynamic behavior** from **Temsah wells** suggest the possibility of remaining un-drained areas within **the Southern flank** of the **Akhen-Temsah anticline** at the Miocene **Reservoir levels**.

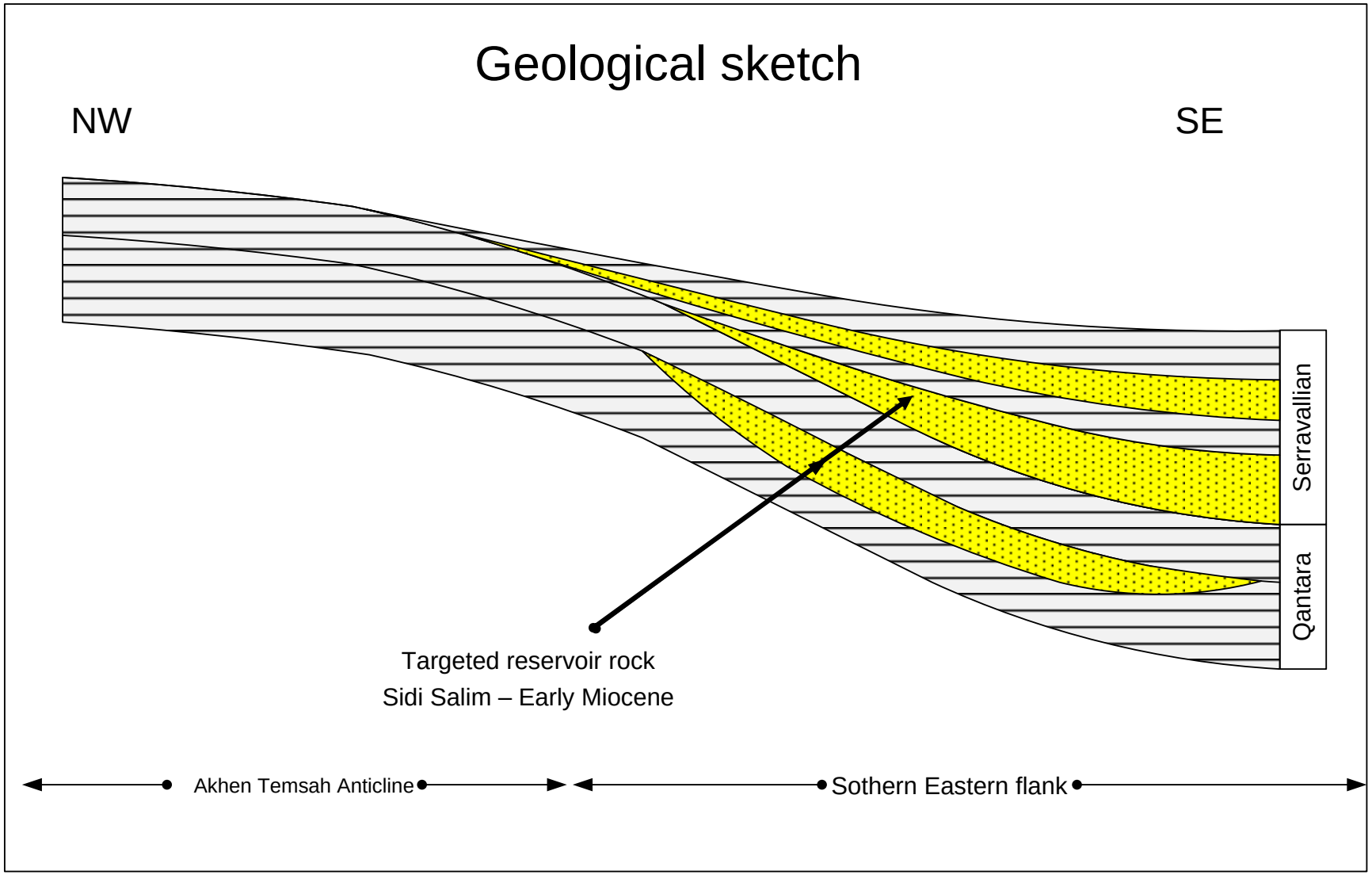


Serravallian Reservoir – Lateral Distribution

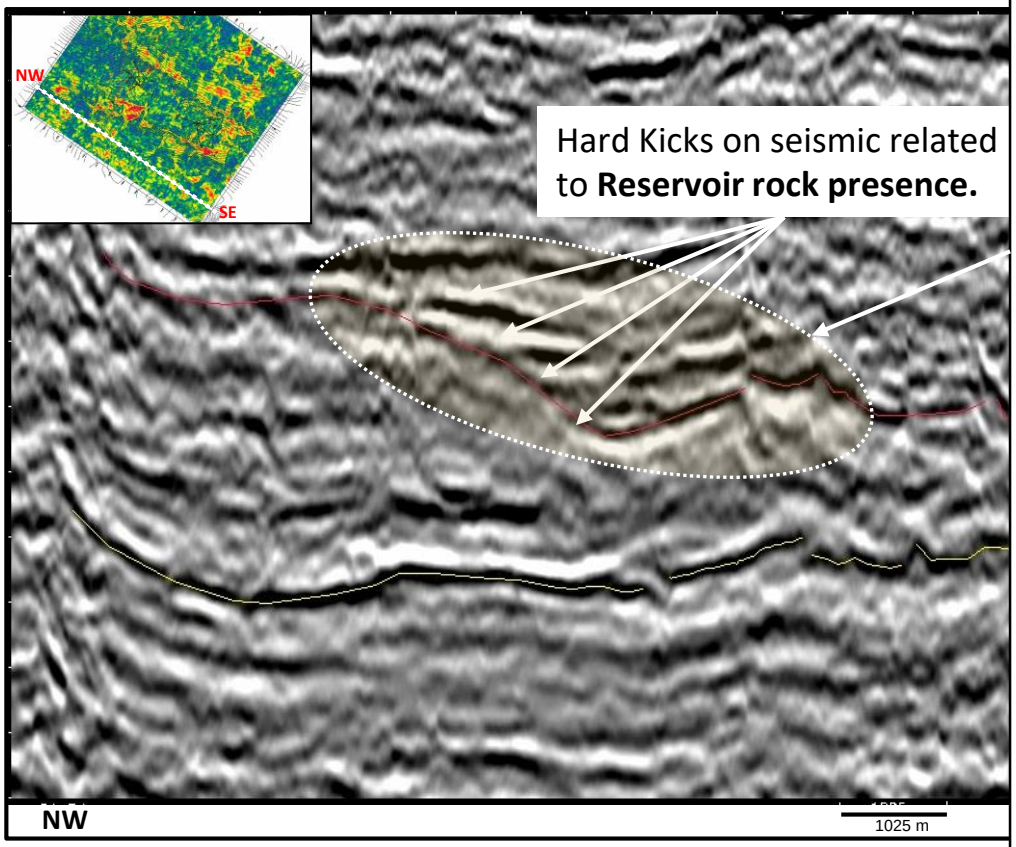


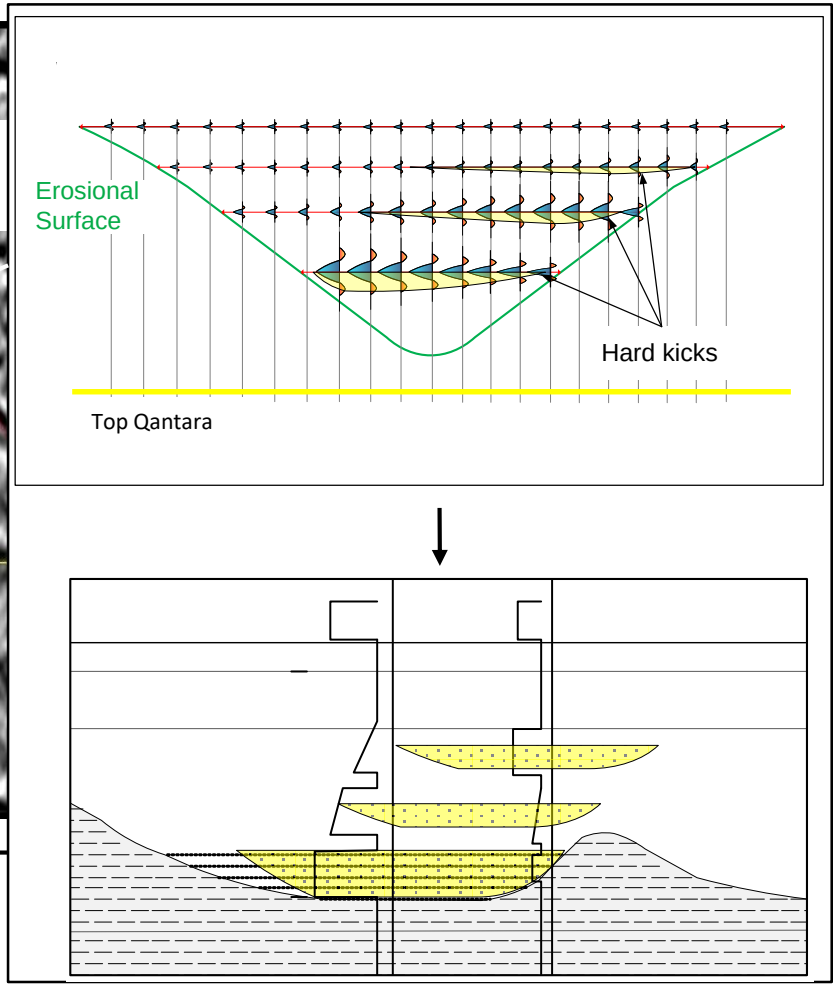
- **The Elements Recognized on Seismic are:**
  - **Laterally** confined **hard** kicks on seismic, overlaying **erosional** surface, related to **reservoir rock presence**.

Geological Section - Downflank HC Play Concept

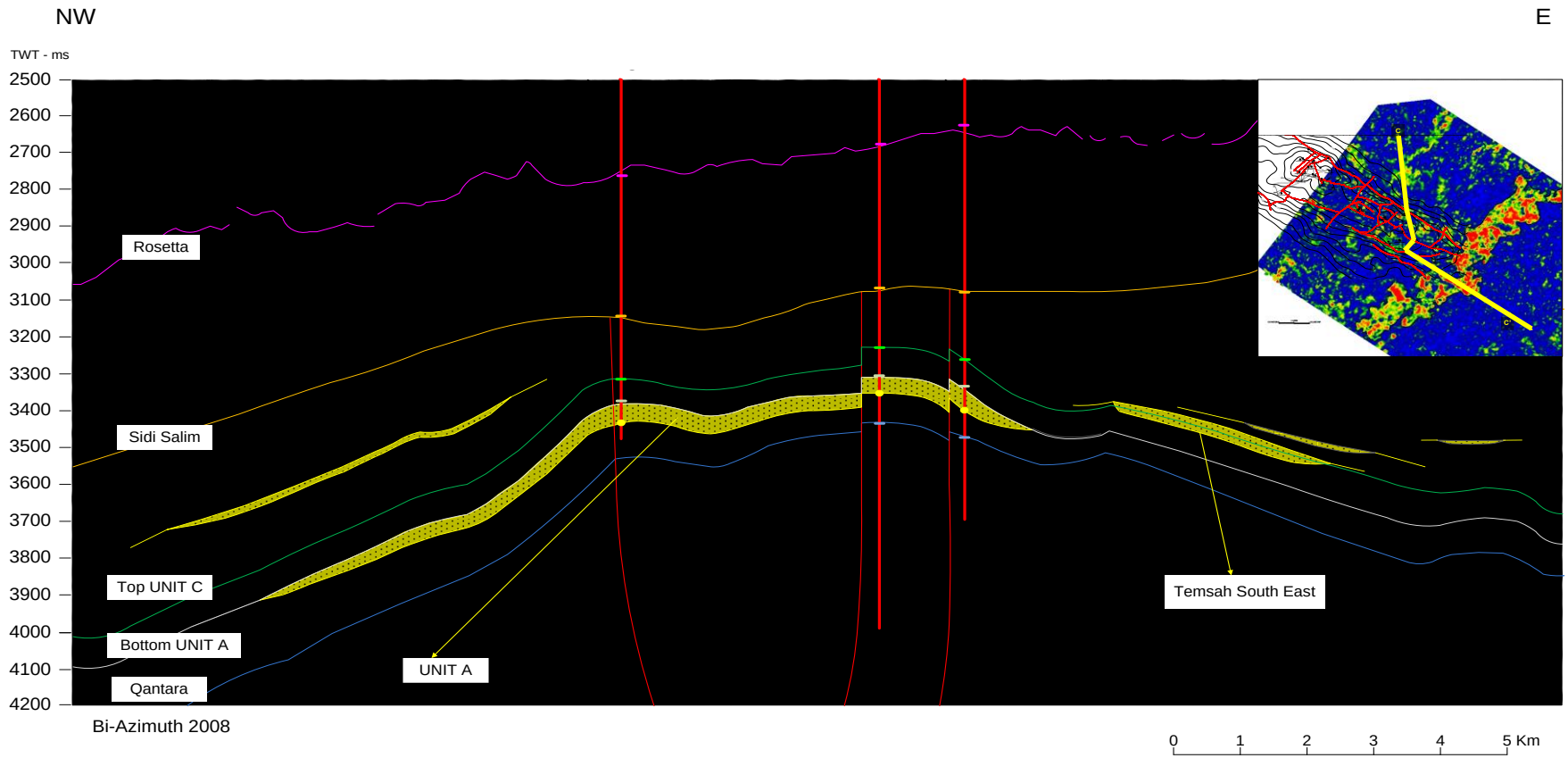


NW-SE Seismic Section Located @ Southern flank

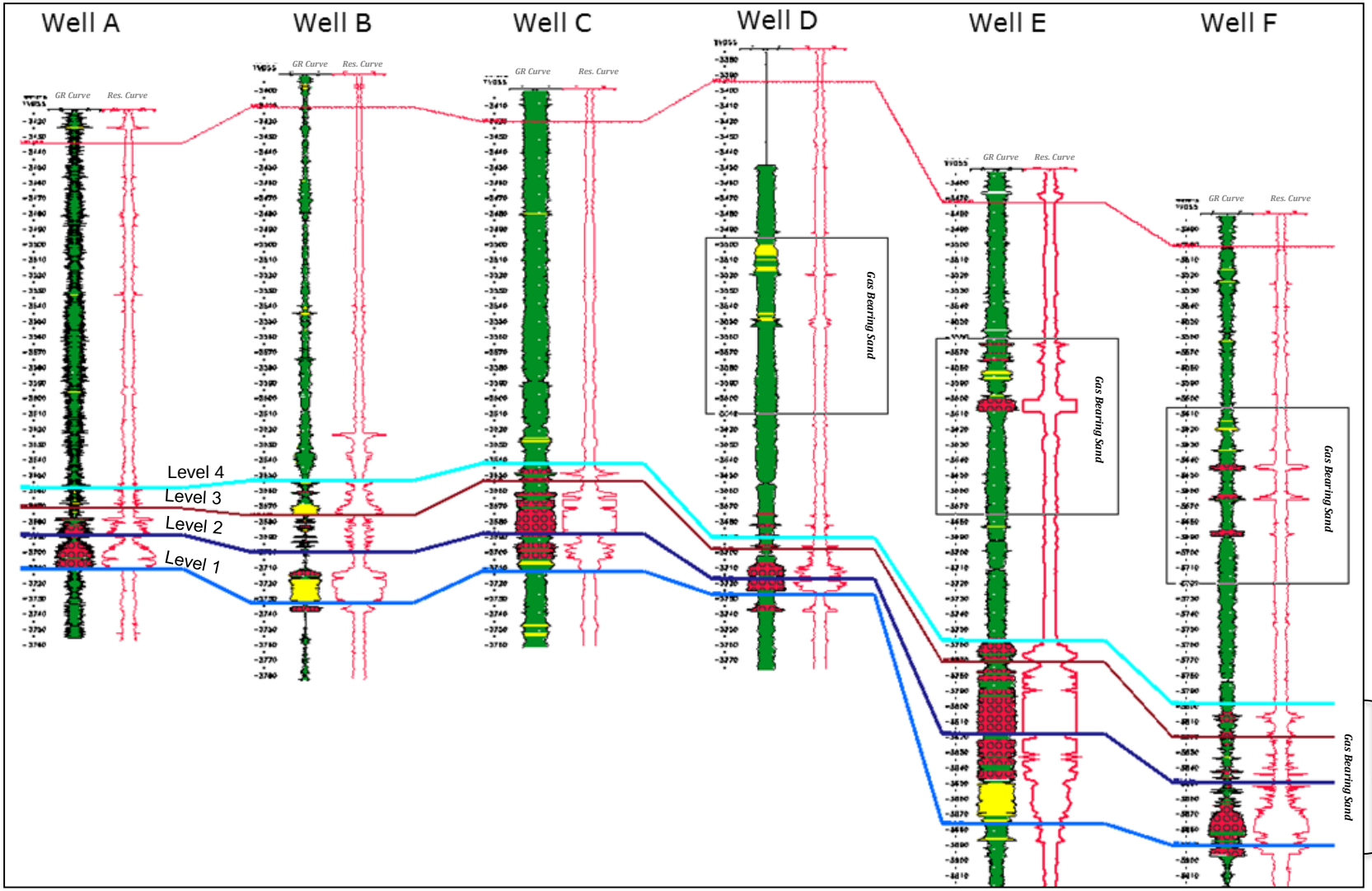




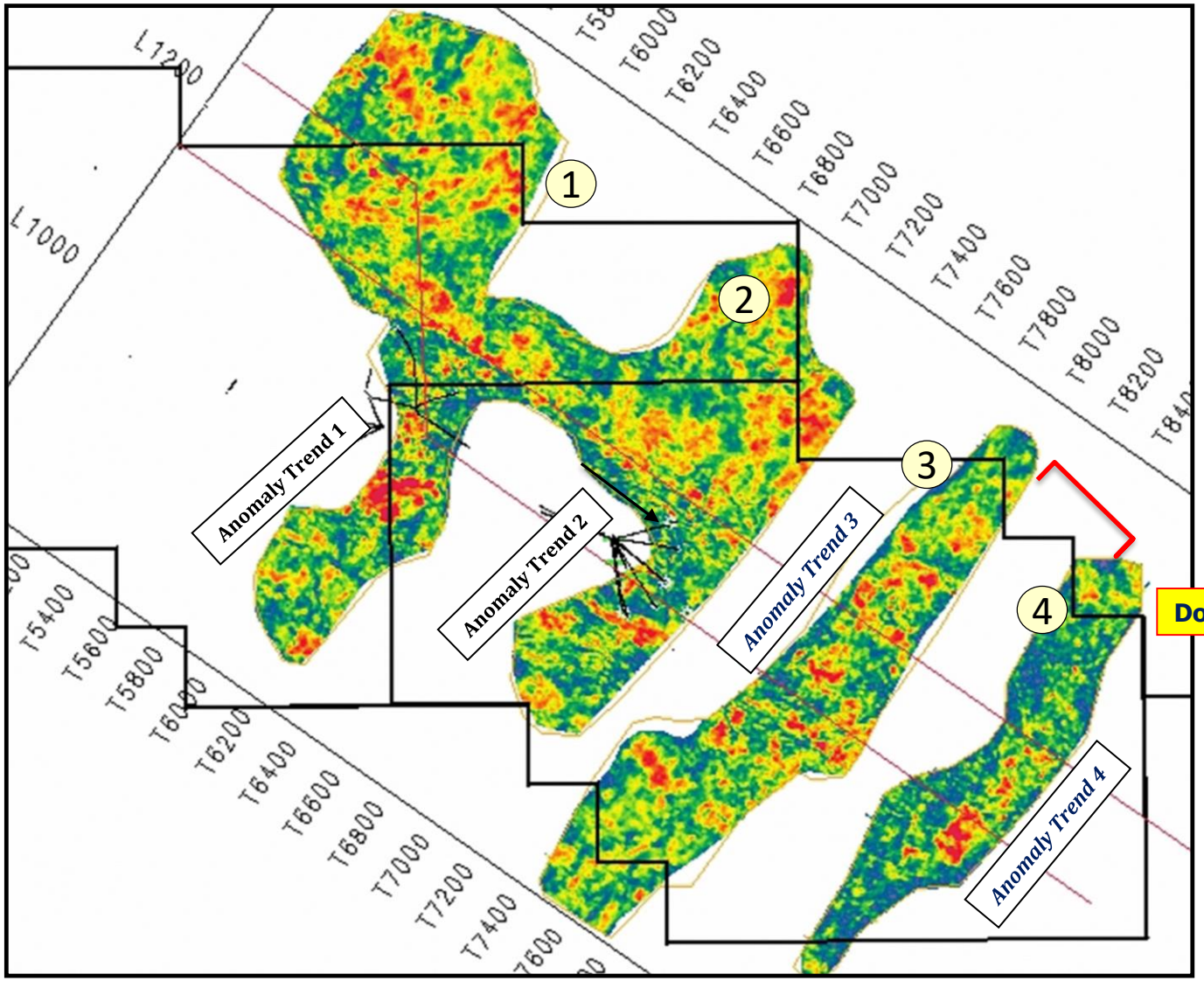
Lateral Distribution of Serravallian Turibiditic Reservoir Bodies



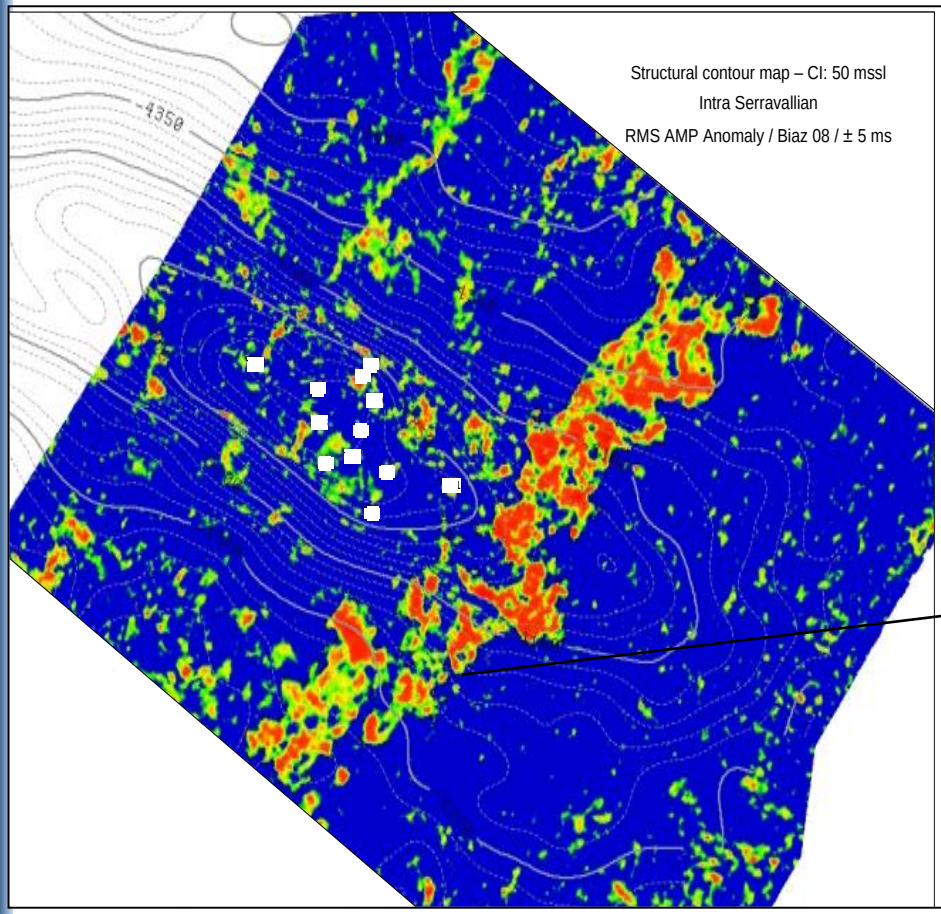
Structural well correlation – Reservoir zonation

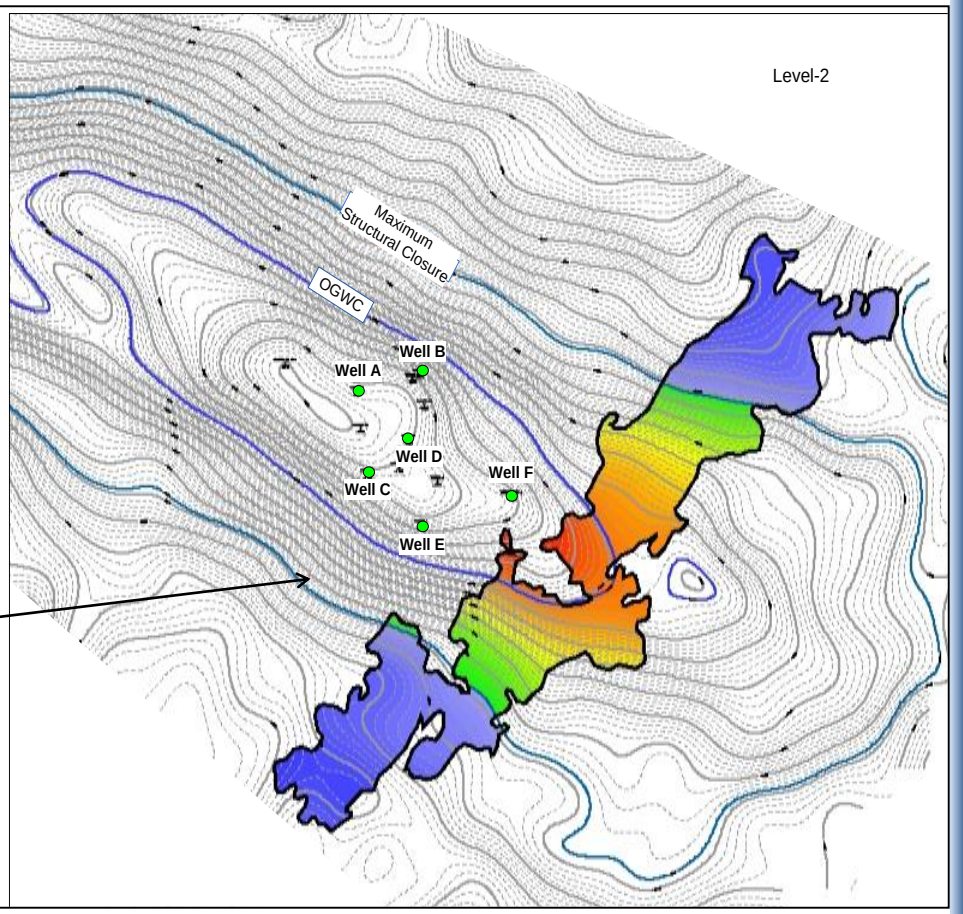


Intra-Serravallian Channels - Amplitude anomaly trends



Validation of the New Play Concept





Intra-Serravallian Depth Map Overlained by Amplitude ***Anomaly Trend 3***

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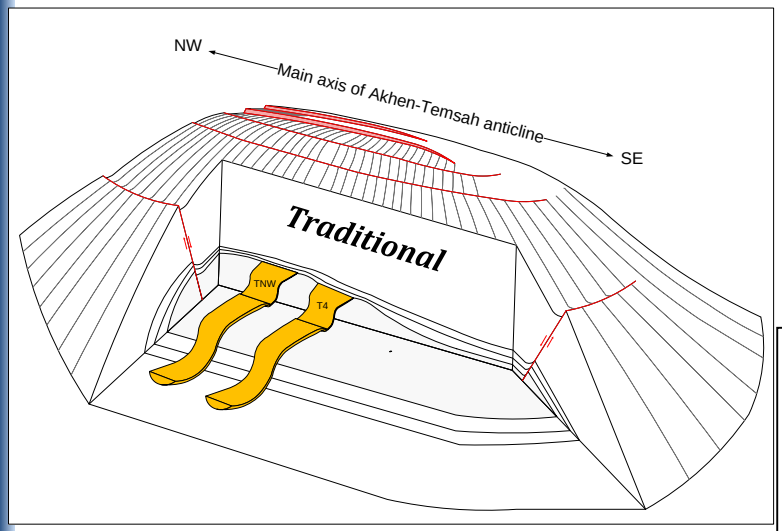
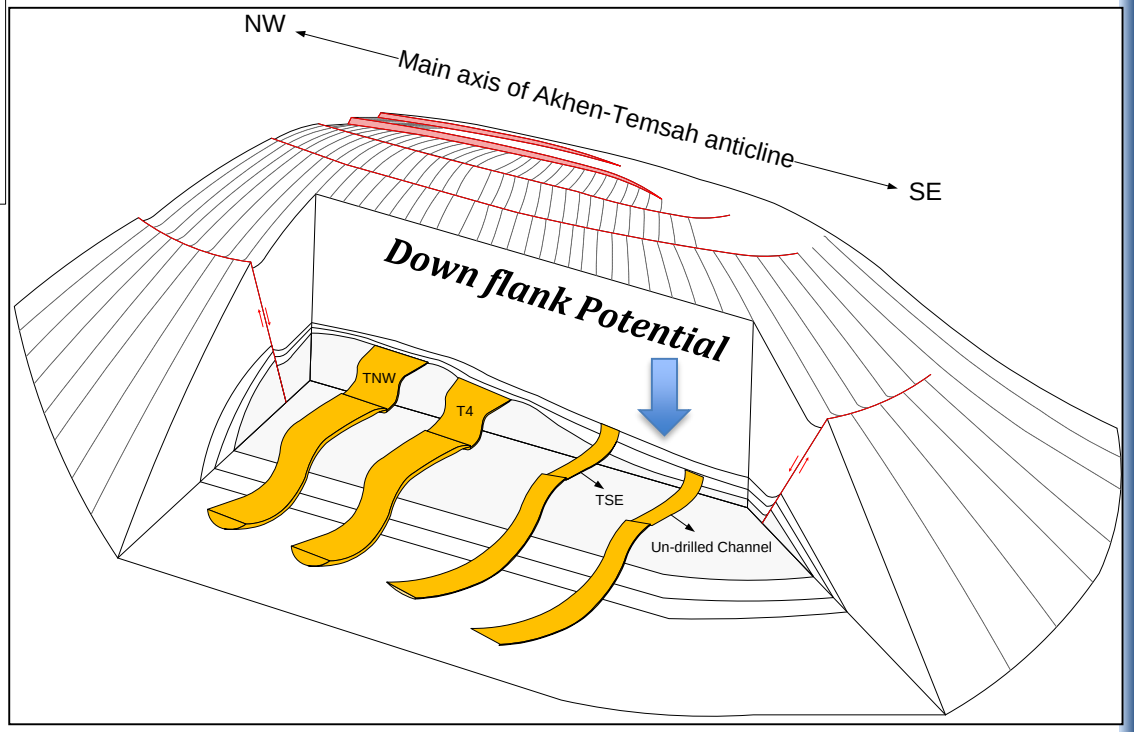
- **Future HC Potentiality**

New vs Old HC Play Concepts

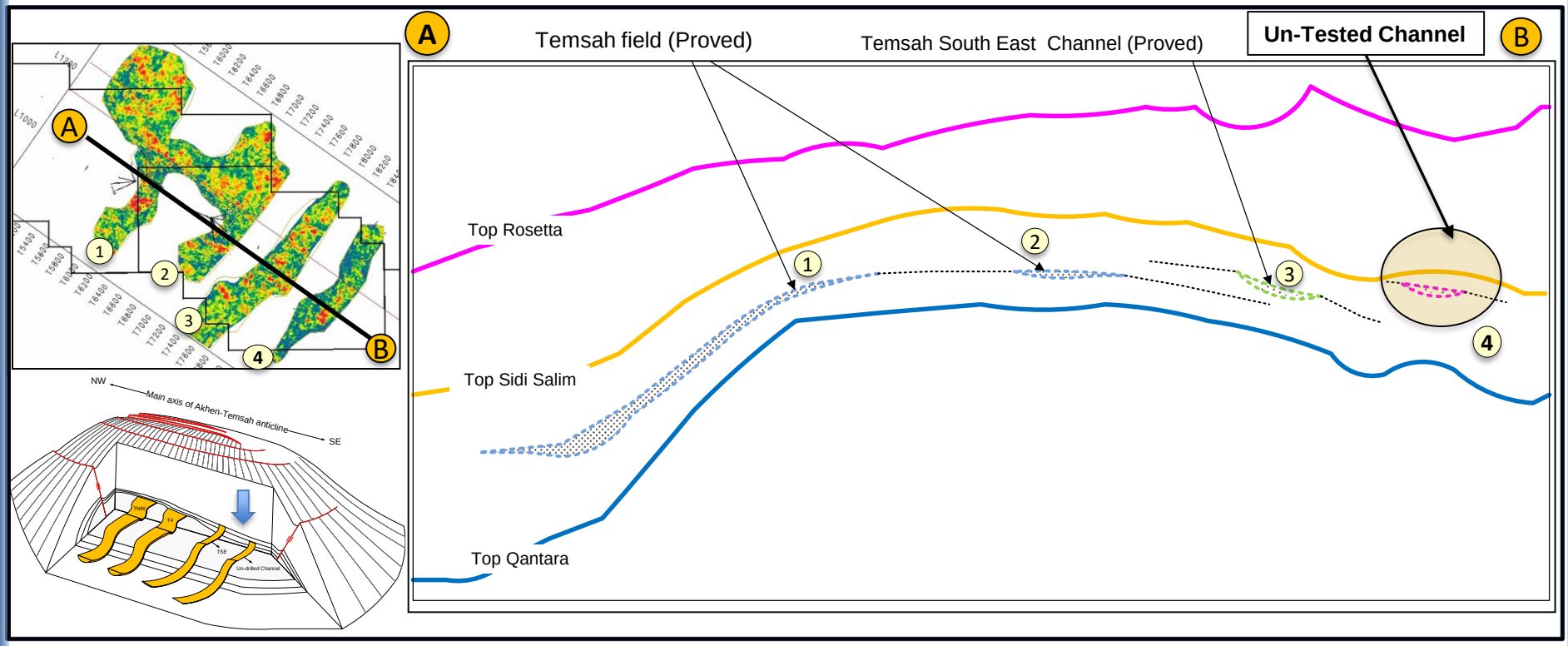


Old Prospectivity HC Model



New Prospectivity HC Model

Future Explorative Potential – Showing Undrilled Channel



- Intra-Serravallian **Eastward Migration** of Turbidite Channelized bodies

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- **Summary & Conclusion**

Summary & Conclusion

- A general **fining upwards** in the GR log pattern throughout the interval of study suggests a relative rising of sea level and proved channel fill deposits.
- Sub-parallel **stacking reflectivity pattern** and amplitude anomaly trends shifting upwards to the southeast, advocates the possibility of syn-kinematic deposition.
- **Amplitude trends mapped** along the Serravallian section, suggest **Temsah reservoir architecture** is not layer cake type, but reservoir rock presence confined to the maximum incisions of the erosional surface.

Finally, based on the New Play Concept;

- The first **proposed well** targeted Anomaly trend-3 (intra-serravallian turbiditic reservoir bodies) based on such assumption (Down-flank concept) **concluded gas and condensate** discovery and it is opening a **new room to explore** the other trends.
- The authors are recommending to test and explore the other un-drilled channel anomaly fairway (intra-serravallian channel bodies), located in the **Southeastern** flank of Temsah Structure.

THANK YOU