

Hydrocarbon Potential in Kazakhstan

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Topic of Discussion

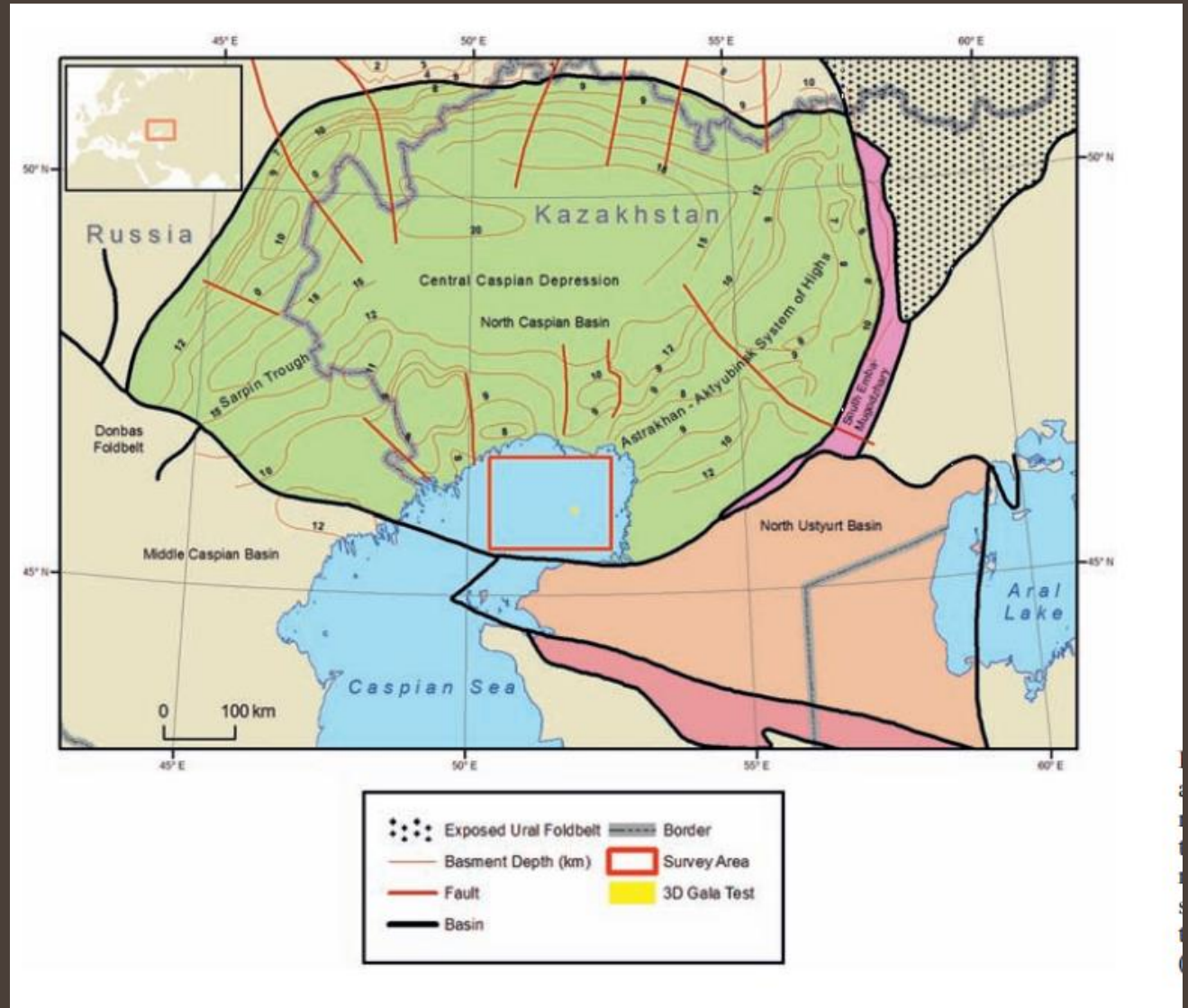
- Through different reservoirs around the area of exploration there is Hydrocarbon potential at this location
- Using seismic data as a primary recourse of what the potential of the hydrocarbons are
- Using evidence of pre-salt and post-salt processes for this possible location
- The usage of faulting in this area

Location

Located in the middle east, the north Caspian Basin encompasses much of Kazakhstan and parts of Russia.

Right next to the North Caspian basin is the North Ustyurt Basin shown in the photo

Very important point to know that the red box is the location that has high hydrocarbon potential.



Explored Locations

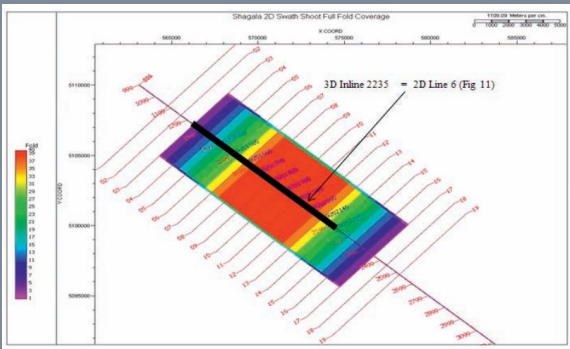
- North Caspian Basin

- Formed in the late Proterozoic-early Paleozoic
- Rifting causing a basin led to carbonate build up in the carboniferous period
- Salt deposition was interbedded with shale because it was not isolated from the ocean
- Continental collisions caused subsidence of the basin and thick sedimentary clasts were deposited

- North Ustyurt Basin

- Created in the late Devonian period as a cratonic basin
- A triangular-shaped basin that is a forebelt to the North Caspian Basin.
- The basement rock is composed of lightly metamorphosed shale
- Rifting in the central Mangyshlak created a graben and was filled with clastic sediments

Seismic Information



- Seismic data collection is a large part of the exploration process of this research.
 - Advancements in the technology used caused better imaging of faults and uplifts in salt beds
 - Salt structures became a large part of the exploration because of the seismic usage.
 - Determining the differences and similarities became easier for geologists location barings and compositions
 - Using 2D analysis in the image shown displays more area of the unexplored location as well as important sealing mechanisms that will be described in the next slides

Salting pt. 1

Pre-Salting

- The North Caspian Basins pre-salting came from unconformities in which consisted of:
 - The Base salt, Mid Carboniferous, and Top middle-Devonian
- Pre-salting has been a big factor that plays into the exploration of hydrocarbons in the fields surrounding the basin unknown.
 - The Tengiz Field, The Kashagan Field (offshore)
 - Orenburg, Karachaganak, Zhanazhol (onshore)

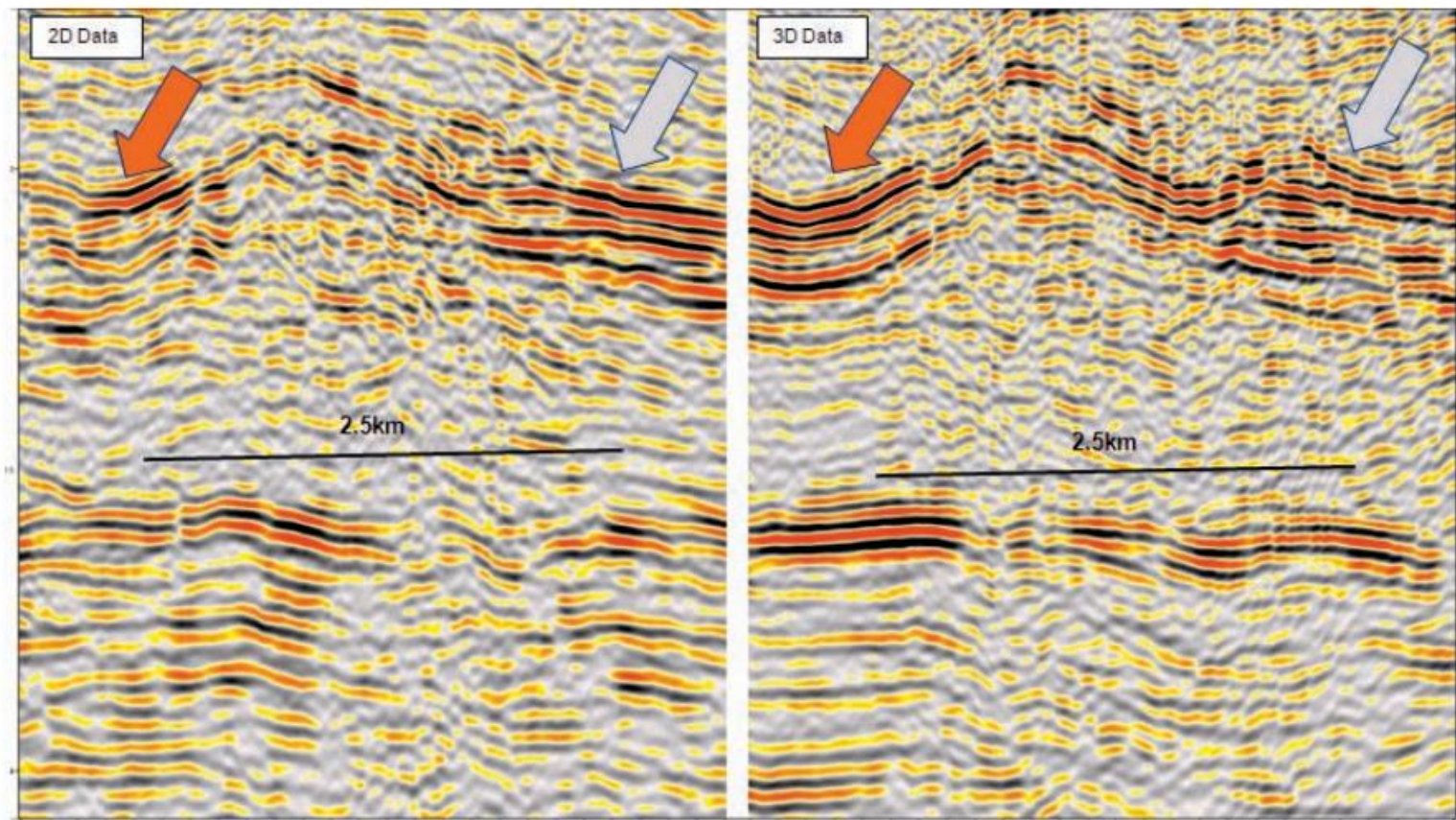


Fig. 11. A zoomed section from Figure 10 illustrating significant improvement in pre-salt imaging, with enhanced frequency and better continuity of events allowing a better understanding of the internal geology of the reef. The arrows represent similar locations on the 2D and pseudo-3D data

Salting pt.2

Post-Salting

- This seems to be an overlooked process because of the movement that the salt goes through would be a possible reason of why this basin has not been drilled.
 - But reasons such as the unconformities that move the salt can also create salt traps.
 - Within the seismic data taken gives the possibility of a reservoir that will be economically beneficial to the oil industry.

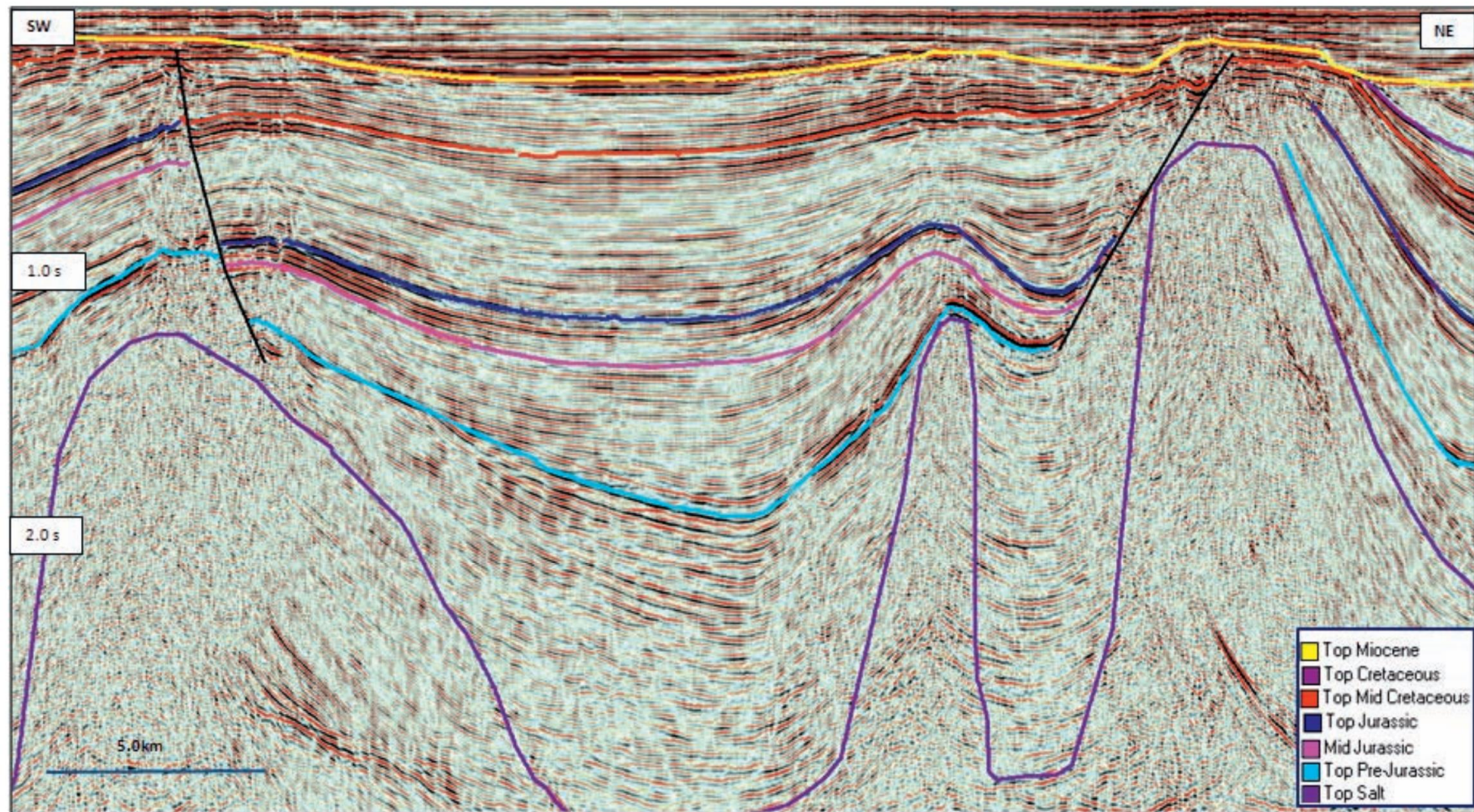


Fig. 20. Interpreted regional SW-NE line illustrating key post-salt seismic horizons.

Thrust Faulting in the Area

- Faulting are common occurrences in the Caspian Basin, which lead to believe that there are hydrocarbon accumulations within the undiscovered basin.
 - Through seismic data thrust faulting
 - In the image below shows the Ustyurt Basin with its faulting
- In other locations thrust faulting became a success in finding hydrocarbons
 - Those are Kalamkas sea and Pearl Blocks (offshore discoveries)
- The time at which the thrust occurred was the Permian-Triassic period and that time period is very important for hydrocarbon potential.
 - But this fault has not been drilled so there is no physical evidence that this fault contains enough hydrocarbons for economic consumption

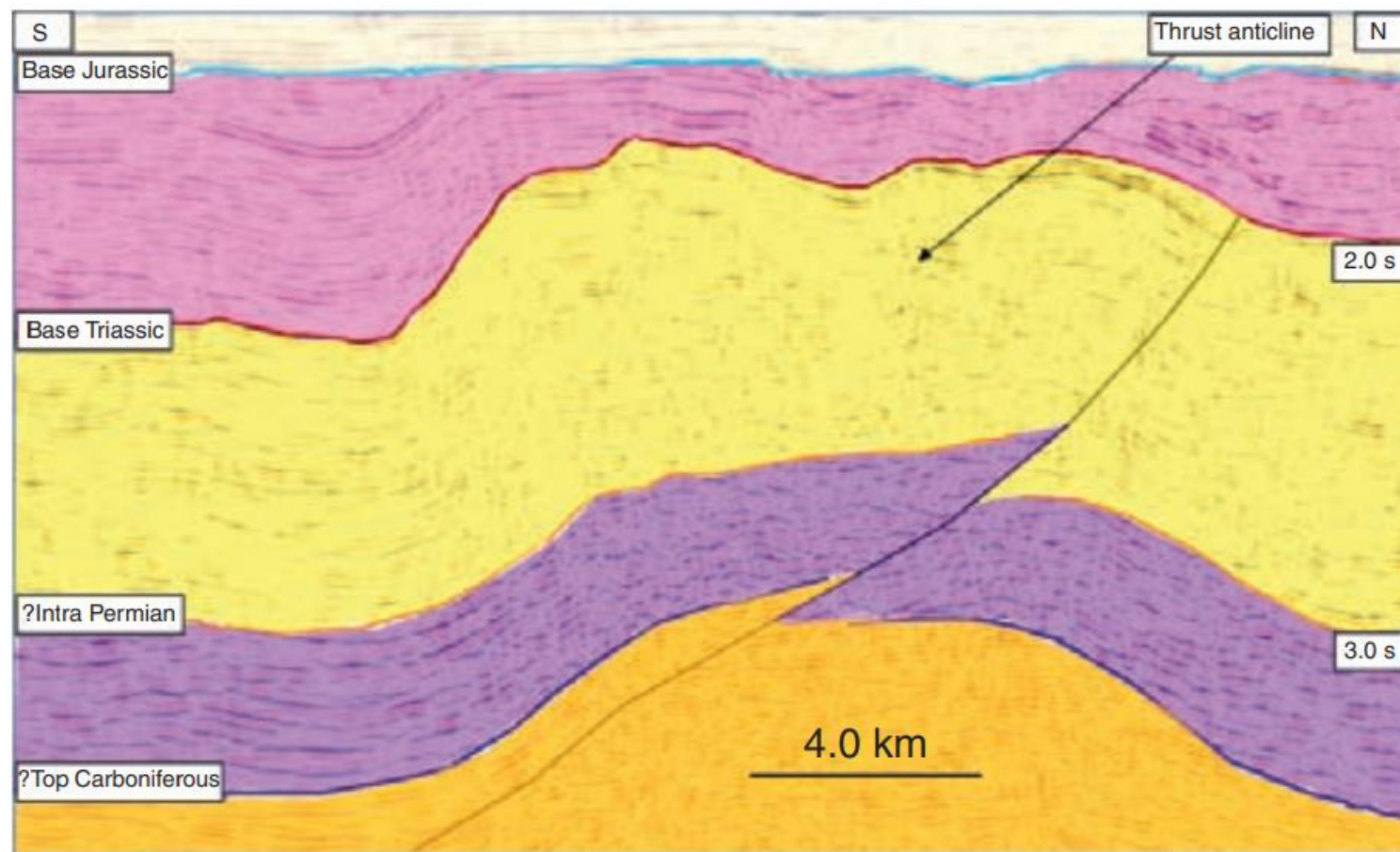


Fig. 23. South–north interpreted seismic line across a section of the North Ustyurt basin illustrating the nature of the thrust play.

Conclusion

There are many unknowns and knowns to sedimentary basins within the Kazakhstan country

- Onshore, offshore drilling
- Basins proportions and depositional environments

In the case that this Unknown basin in the North Caspian sea has economic value of natural recourses it should show in the information that I have provided.

- Seismic data
- Pre-salting, post-salting
- Faulting