# GEOSTATISTICAL RESERVOIR MODELING OF FIMKASSAR AREA, UPPER INDUS BASIN,

## (A CASE STUDY FROM THE POTWAR PLATEAU, INDIAN PLATEAU'S NORTHWEST CORNER)

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### Summary

When it comes to entrapment and advancement of hydrocarbons, regions typified by collisional/compressional tectonics play a significant role. Collisional tectonic settings have resulted in the formation of faults, which are contributing to the trapping of hydrocarbons or the creation of channels for hydrocarbon migration. P. Mann Lisa Gahagan, 2003 investigated the tectonic settings of the world's 877 huge hydrocarbon fields and classified the tectonic settings of these giant fields into six categories: continental passive margins (304 fields), continental rifts (271 fields), collisional margins produced by terminal collision between two continents (173 fields), collisional margins produced by collision between two continents (71 fields), strike slip margins (50 fields), and subduction margins (50 fields) (8 giant fields)

### Theory / Method / Workflow

As a general rule, the research approach used in this study is as follows: generation of a synthetic seismogram, identification of potential future horizons and faults on the area's seismic data, and modelling of key entrapment structures using G Plates. There is no doubt that India's intriguing tectonics (the Northwest Corner of Indian Plate/ Kohat Potwar, Pakistan) has tremendously helped the research area's petroleum system. Indian Plate and Eurasian Plate met at their northwest corner, resulting in twisted faults (Chatterjee et al., 2013). Pop-up anticlinal structure has been used to describe the field's structural style. The principal reservoir rocks of Eocene carbonates and Cambrian sands have been trapped by thrust faults.

It should be noted that the area chosen for the study is also characterized by collisional tectonics between the Indian and Eurasian plates. The study area is located on the northwest corner of the Indian plate, and it is the second most important hydrocarbon producing region in Pakistan after the Gulf of Oman. For the investigation of the entrapment mechanism offered by collisional tectonics, seismic and well data have been employed in conjunction with each other. The kinematics of the Indian plate has been investigated with the assistance of the GPlate software. Thrusted anticlines, which are generated as a result of collisional tectonics in the area, are the most significant structural traps in the area.

### Results, Observations, Conclusions

In field development studies, static reservoir modelling is a vital phase. During the modelling process, the grid is used to simulate reservoirs. Stratigraphic, petrophysical, and structural data are all incorporated into a single model in a static reservoir model. Fine-scale stratigraphic well correlation is used to build stratigraphic models. Interpreted horizons are used to build the structural model. One gridded model combines stratigraphic and structural models. Detailed petro physical study is used to build lithological, facies, and other model systems.

This conclusion can be drawn following an extensive review of the tectonic history of the Indian Plate and its effects on hydrocarbon entrapment and progression on the NW corner of the Indian Plate, kinematic parameters by Gplates, seismic data interpretation and structural modelling. The area is marked by collisional episodes of Indian plate, which greatly facilitated the trapping mechanism to the hydrocarbons. During the Early Miocene to the Present, the oil window was open. In the Miocene era, structuration (trap formation) began. (Ahmad & Khan, 2012)

## Novel/Additive Information

There is no doubt that India's intriguing tectonics (the Northwest Corner of Indian Plate/ Kohat Potwar, Pakistan) has tremendously helped the research area's petroleum system. When the Indian Plate's northwest corner impacted with the Eurasian Plate, twisted faults were created. Pop up anticlinal structure has been proposed to explain the structural style of fields. The principal reservoir rocks of the Eocene were trapped by thrust faults (Chorgali Formation).
Because of the Indian and Eurasian Plates colliding. Pakistan's second-largest hydrocarbon-producing region is located in the northwest corner of the Indian plate, as seen in the preceding statistics.

## Acknowledgements

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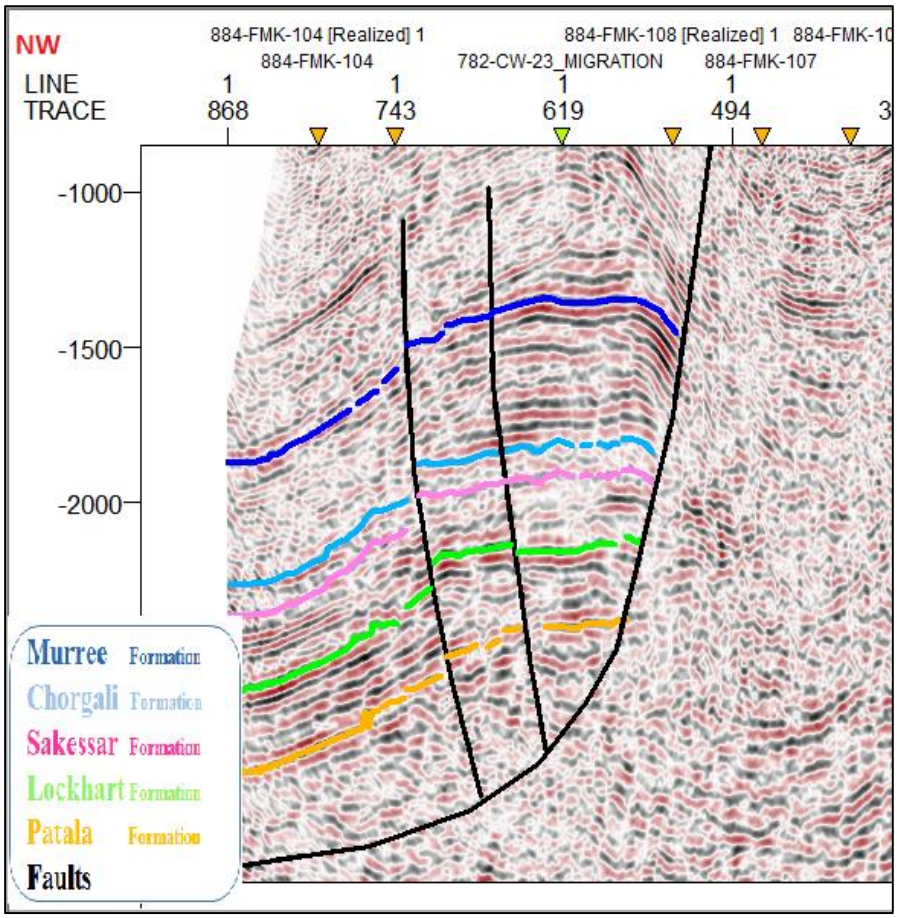
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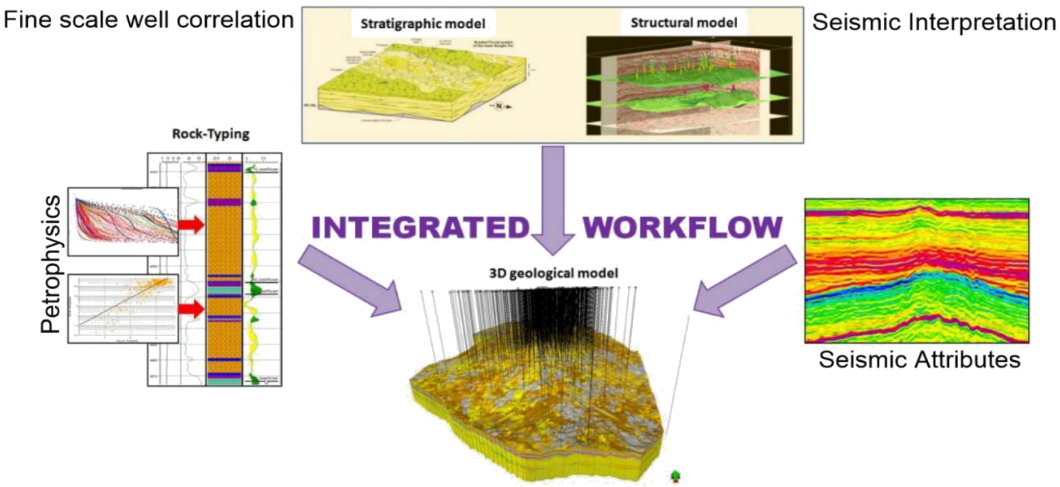
Lockhart Formation
Patala Formation
Faults


Fine scale well correlation
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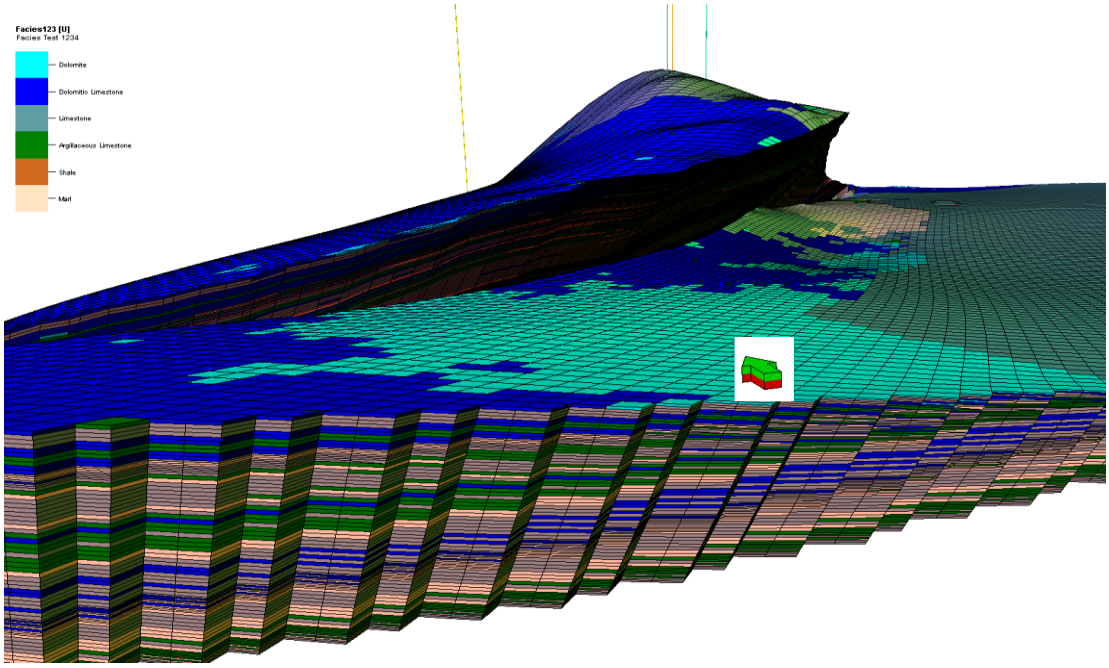
Structural model
Seismic Interpretation
Rock-Typing
Petrophysics
INTEGRATED WORKFLOW
3D geological model
Seismic Attributes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Limestone
Argillaceous Limestone
Shale
Marl