9th Biennial International Conference
& Exposition on Petroleum Geophysics

"HYDERABAD 2012"

P-076

Interactive Seismic Data Processing-Interpreters' Role

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Summary

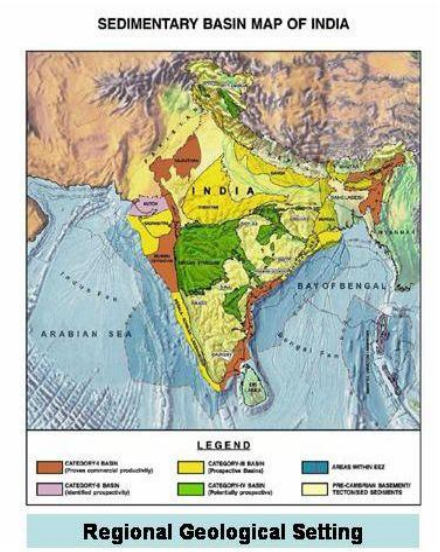
Different geological settings in Indian deepwaters and the related complexity need to be tackled while processing for obtaining good quality data for interpretation. Interacting at every quality anchor and guiding the processor in the right direction after complete examination of tests is the need of the hour for time and quality management in NELP environment. This fact explains the need of publishing this paper.

Keywords: *Geological Settings, NELP, Processing. Quality, Interpreter*

Introduction

Deepwater seismic data in general is of good quality. The changing needs of the industry and the changing environment in India with the advent of NELP necessitated the geoscientists to rethink about the data quality as more and more data is being acquired in deep waters for not only studying structural but also for stratigraphic traps and for deeper prospects which pose problems emerging in different geological settings. In this paper authors tried to address the issues related to time and data quality management and ways to monitor/address the issues like anisotropy imaging issues water velocity corrections in ultra deep areas and many more are discussed in this paper.

There is no single method or established processing flow which can suit all the imaging issues of all geological settings and hence extensive experimentation is required for each typical area of study.



Regional Geological Setting

Issues

Issues related to data quality are of different types which can broadly generalize them as non geological environmental causatives or of geological in nature. Time and data quality management for getting the input covered in different environmental conditions and geological settings is of utmost importance in this NELP regime. Geological input plays an important role in the quality management as this gives the lead to understand the problem for remedial measures. Complexity in imaging because of clastic, sub basalt and carbonate regimes are to be dealt with in different ways at both acquisition

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processing and reprocessing stages. Application of new technology at any stage needs complete understanding of geological problem and the extent to which it can be addressed.

Plays

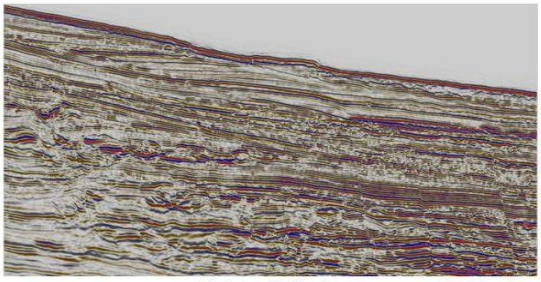
Syn-rift play, paleocene/Eocene carbonate build-ups, Paleocene fan plays, Oligocene channel plays, Mio-Pliocene channel-Levee complex and gas hydrates in shallow and wedge out/pinch-out and on-lap features in the deep are targets deep water areas. Apart from shallow clastics, deep sub basalt sequences are also targets in some deepwater areas of Indian offshore.

Methodology

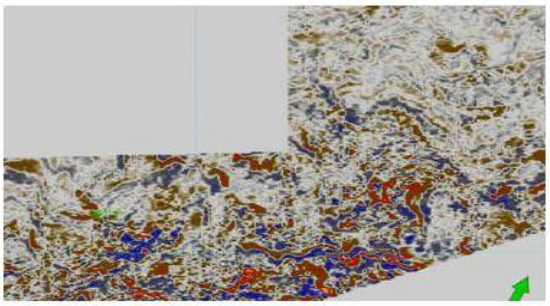
Conventional processing may not be the all time solution for the interpreter. In time quality output in complex areas need special attention while processing itself. A team with adequate AP and I experience along with the area interpreter has to monitor the data at A&P stage regularly and has to adopt "NO Compromise" attitude for better output. Most of the advanced technologies are case specific. Anisotropy in clastic and imaging issues in sub basalt and velocity pull ups in carbonates are the burning issues which need special address. Acquisition footprints and processing artifacts are to be identified and to be addressed. Problems due to seasonal variations in acquisition have to be addressed with water velocity correction in deep and ultra deep waters. Effective de-noise and de-multiple are preliminary needs which are to be addressed. Always difference plots will guide the interpreter in hunting the target. Velocities are based on the regional and spatial geological changes and all such expected conditions are to be incorporated in velocity picking. Denser velocity analysis in some cases and pack specific velocity analysis in some other cases may be of complete help in getting good data input.

Results

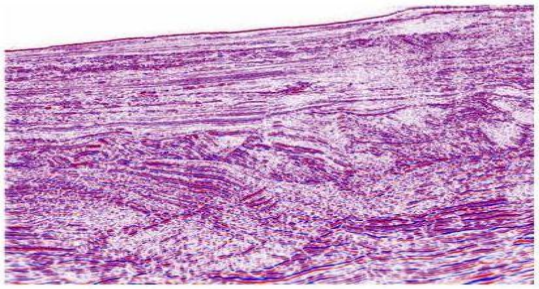
Monitoring at every quality anchor has tremendously improved the data quality. Effect of interaction at every stage with the interpreters for critically examining the result to come with the suggested process on the volume paid dividends. The results are shown below for reference.



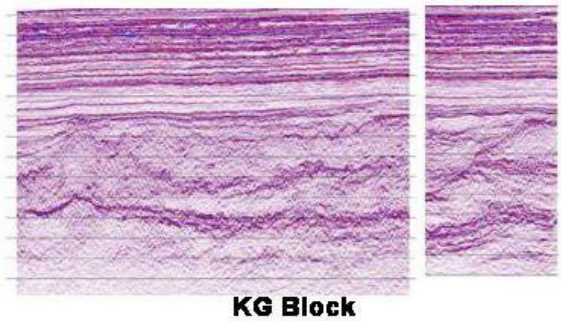
Mahanadi block
High amplitude events and channel complexes



Mahanadi block
channel complexes on timeslice



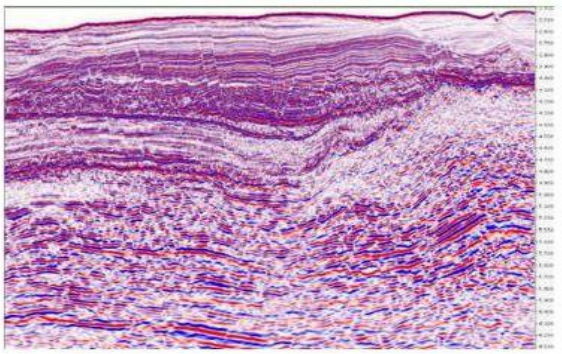
KG Block
Section depicting episodic geological environment



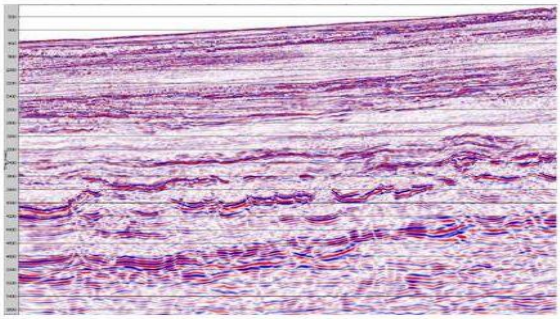
KG Block
IL & XL showing ridge

Selection of meaningful angle with area specific object orientation by the team and interactive processing to decide parameters in that angle has helped in arriving at meaningful outputs.

CY and KK and Andaman area reference stacks are shown below.



KK Block Eastcoast



CY block section depicting deeper events

Conclusions

Indian deepwaters have different geological setups while cropping through north to south or east to west. Changing environment from clastic to carbonate to basalt to sub basalt has to be dealt with care and the results are placed for reference. Interpreters' role is crucial in guiding the processor for achieving the meaningful outputs.
This paper will address the different aspects of interpreters' role with geological background in seismic data processing. This paper is to address the need of the interpreter in processing at quality anchors for better and timely quality input to interpretation.

Acknowledgements

The authors sincerely acknowledge Oil and Natural Gas Corporation Limited, for all the support extended during the period.