8th Biennial International Conference
& Exposition on Petroleum Geophysics

"HYDERABAD 2010"

**P-339**

# Role of velocities in measuring the data quality – A Case history

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***Summary***

*Navsari Low area of Tapti-Daman Sector off the west coast of India has been a major depo-centre during the deposition of Paleocene-Early Eocene sequences. In light of the hydrocarbon discoveries, in the area in and around Navsari importance for the hydrocarbon exploration point of view.*

*3D Ocean Bottom cable surveys were conducted in around 330 SKM of Navsari area of Western Offshore basin, India.*

*In an effort to achieve the data quality to the required standards, thorough interaction with the processing team at every critical stage is planned and executed. Considering the geological understanding and linking the study with the velocity variations related to the geological anomalies has shown considerable improvement. In this paper the authors tried to explain the role of velocities in measuring the quality especially in clastic dominated regimes and in a way showed the results to support the arrived conclusion.*

**Introduction**

Navsari Low area of Tapti-Daman Sector off the west coast of India has been a major depo-centre during the deposition of Paleocene-Early Eocene sequences. Subsequent to this deposition and filling up of Navsari Low by Early Eocene time, the gentle westerly slope was attained Purna and Daman Low to the west of Navsari Low became the major depo-centre (Fig.1). Thick sedimentary column of more than two and a half kms belonging to Paleocene-Eocene sequence suggests rapid sinking of Navsari area in comparison to nearby lows. Subsequent deposition during Younger, Eocene to Miocene period took place under transgressive-regressive conditions. Major regression during Late Oligocene and early part of Lower Miocene resulted in pro-gradation of deltaic sediments from on-land areas in the east to seaside towards west. This led to deposition of coarser reservoir clastics in the major part of Tapti-Daman area during this period.

Post Mid Miocene tectonics has largely been responsible for present day geological configuration of the area. Most of the lows during Paleocene- Early Eocene were uplifted and inverted at younger levels such as North Tapti, Gauri and Laxmi structures around Navsari Low. These structure contain hydrocarbons in Oligo-Miocene sequences.

Based on the understanding said above, an effort has been made to refine the data through selection of right velocities that best fit for the said regime.

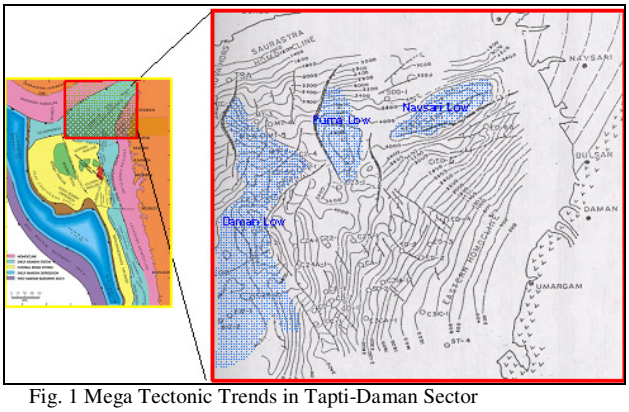



Fig. 1 Mega Tectonic Trends in Tapti-Daman Sector

**Theory/Method**

Modern seismic processing requires the velocity field to be as established as accurately as possible with dense sampling – i.e. typically at each bin location. Time spent on the feasibility analysis and to optimization of automatic velocity picking parameters is never lost. Either manual velocity picks, or velocities from previous knowledge of the area (from wells or previous seismic) is required to establish a reliable initial velocity field The application of geological concepts about the depositional regime and the possible trapping mechanism could lead the authors to check the semblance for velocity picking for support of the theory framed.

A response pick in the semblance is the combination of the causatives and the shape of the response speaks about the character of the possible geological/depositional regime especially in case of the clastics. With this background, the problem is addressed and each pick is analyzed for the causative and supportive picks were selected and then the data is processed with selected velocities.

The processed data has shown tremendous improvement over the data processed with generalized velocity picking.

**Role of velocities in measuring the data quality**

**Examples**

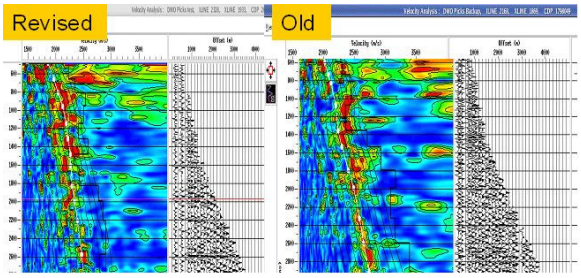



**Fig: 2 Missing picking links at shallow levels due to multiple signal responses are taken care of in the refinement. (a) Revised velocity panel , b) old velocity panel.**

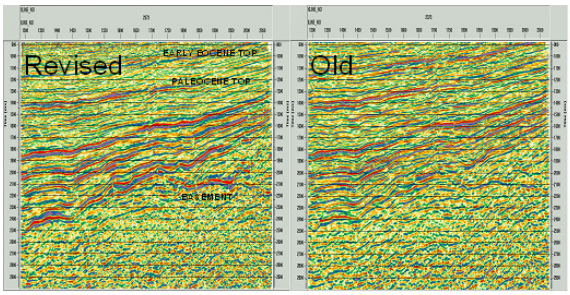



**Fig: 3 Effect of velocity review in cross line**

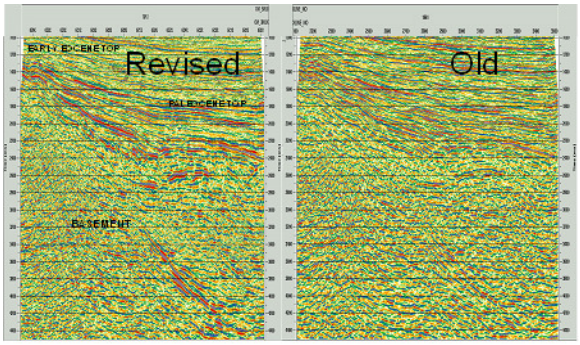
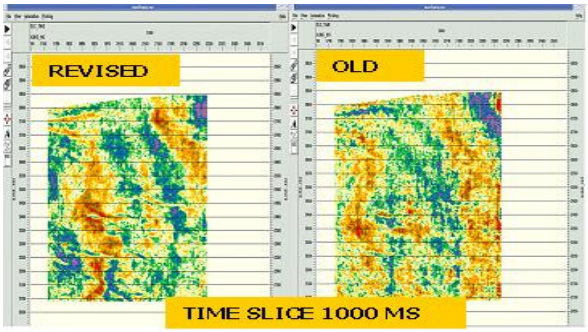
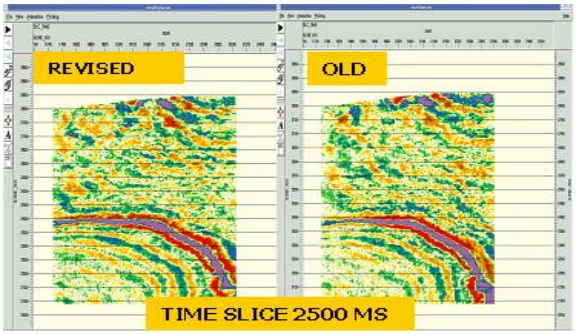



Fig: 4 Effect of velocity review in In line




**Conclusions**

Velocities picked with specific understanding of geology, depositional environment and considering the behavioral aspects of velocities during the variable geological conditions have brought out a better processed data which is clear representative of subsurface as input to the interpreter. Authors could prove the fact that in this fast computing capability environment, effective interaction with interpreter during processing will definitely give best possible results.

**References**

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The views expressed in this paper are exclusively of the authors and need not necessarily match with official views of ONGC.

**Acknowledgements**

The authors sincerely acknowledge Sri. S.V.Rao, ED-COED, Western Offshore Basin, Mumbai for assigning the job and for all the support extended during the period.