

## **The Impact of Post Migration Data Conditioning on Seismic Images and Attributes**

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Many exploration and production activities are taking place in complex geologic settings with weaker seismic signal and stronger noise. As such hydrocarbons are fast becoming more difficult to find and produce. The interpretation and analysis of seismic data for prediction of structure, lithology and reservoir properties depend on various extractable attributes. The integrity and reliability of the attributes are directly related to the Signal-to-Noise ratio (S/N) of the source data, therefore the need for better seismic data quality is all the more high. Enhanced seismic data quality is achieved through carefully carried out conditioning processes. The objective of this paper is to evaluate the impact of post migration data conditioning on seismic images and attributes. Data example is from OML-53 South field, onshore Niger Delta Nigeria.

Conditioning processes were carried out to attenuate residual noise and correct for processing effects on PreStack Time Migrated (PSTM) gathers. The noise and effects are residual multiples, high frequency random noise, coherent linear dipping noise, and residual Normal Moveout (NMO) and low frequency NMO stretch. Multiples inherent in the data were suppressed by frequency dependent Diversity Noise Attenuator (DNA) and Hi-Res Radon. DNA attenuates near offset ringing inter-bed multiples while Radon suppresses residual long path multiples. With wavelet transform filter and dynamic structural correction, dipping and random noises were respectively suppressed to achieve a higher S/N. A statistical approach; Robust Optimized Moveout was used to flatten reflector events before compensating for variation in frequency with offset caused by normal moveout stretch. Products of the data conditioning work include offset gathers, angle gathers, angle stacks, and Amplitude Variation with Offset (AVO) attributes. The products show significant improvements in seismic images; much more suitable for interpretation, reservoir properties prediction and AVO analysis. Moreover, structure conformable seismic attribute maps were achieved. This effort resulted in greater confidence in seismic interpretation and amplitude analysis results, which in turn enabled better business decisions.