



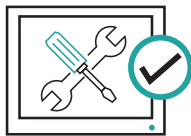
Discovery well validates reservoir-focused gather conditioning and interpretation

Harbour Energy, Indonesia



Challenge

Harbour Energy had identified a number of amplitude supported exploration prospects using multi-client 3D seismic data. However, observed differences in event alignment, noise level and bandwidth between contractor processed angle stacks gave rise to concerns about the prestack amplitude fidelity of the data and its suitability for quantitatively evaluating the prospects.



Solution

The Sharp Reflections toolkit was employed to perform full-volume prestack gather QC, post-migration gather conditioning and AVA attribute generation. The aim was to provide reservoir-focused, quality assured prestack gathers and derivative attributes to aid exploration drilling planning.

The team used iterative full-volume QC attributes at each step of the conditioning process to assist with algorithm parameterization and to address spatial and temporal variations in data quality. Interpretation of the results was assisted through extensive 3D parametric modelling of possible reservoir, seal and fluid scenarios, utilizing data from offset wells to identify key Extended Elastic Impedance (EEI) angles for reservoir and fluid prediction.



Impact

The workflow resulted in improved amplitude fidelity across the angle stacks, specifically in terms of S:N, bandwidth consistency and event alignment, with Class IIp events clearly preserved and enhanced. Resulting AVA attributes and EEI volumes demonstrated enhanced resolution of the prestack signal and allowed Harbour Energy to confidently calibrate the observed responses against pre-drill scenarios.

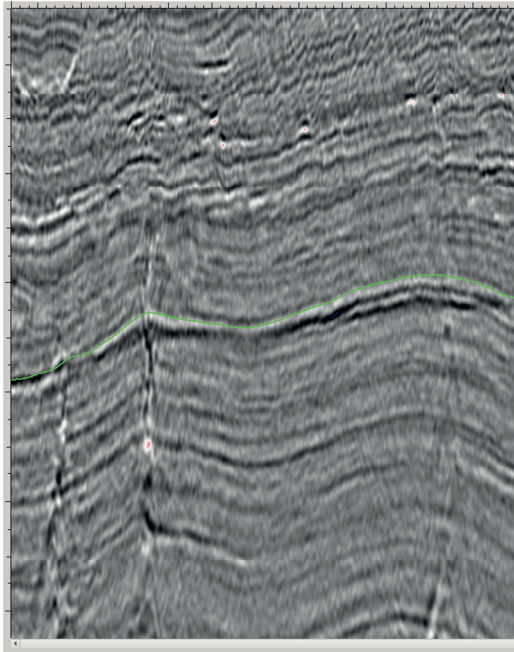
The play-opening discovery well was drilled by Harbour Energy in Q2 2022, providing valuable calibration for prestack inversion work to follow.

Sharp Reflections full-volume prestack data QC – health-checks – provide spatial, temporal and angle dependent insights into prestack data quality and fitness-for-purpose and inform decisions for gather conditioning processes and parameterization.

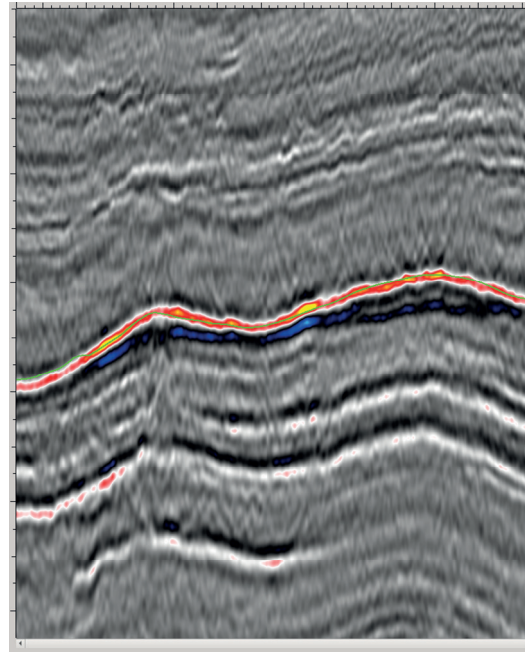
- Global AVA compliance
- RMO/gather flatness
- S:N ratio
- Spectral bandwidth
- Phase stability

Multi-client processed angle stacks*

Near angle stack

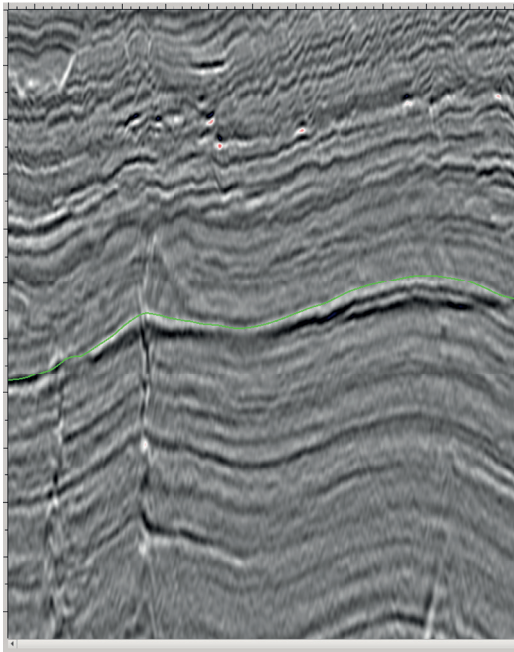


Ultra-far angle stack

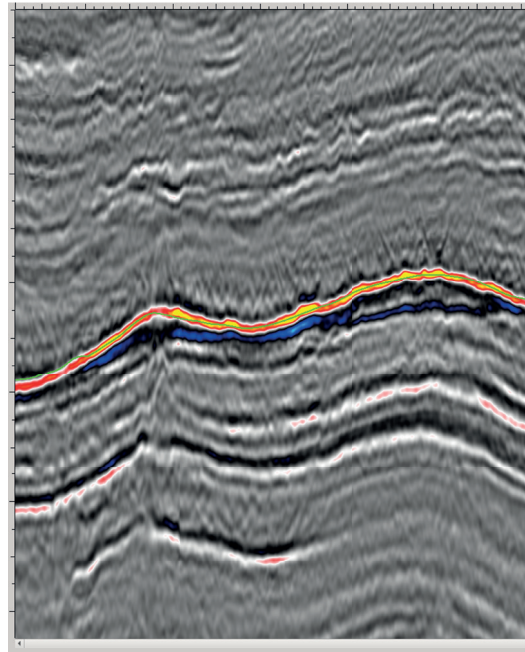


Reservoir-focused conditioned angle stacks*

Near angle stack



Ultra-far angle stack

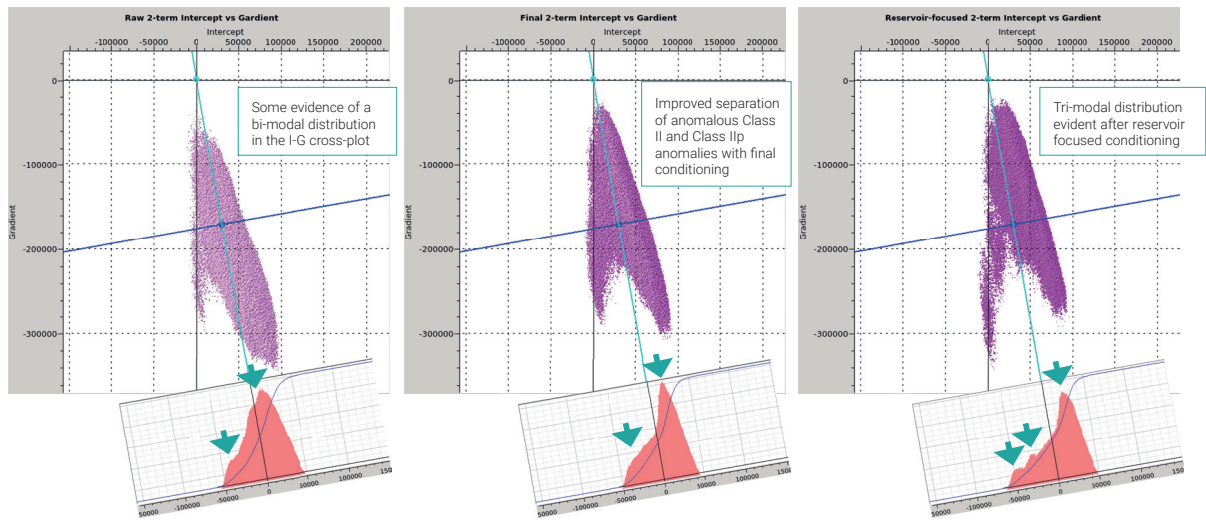


Improved S:N on near angle stack

Alignment time-shifts, increased bandwidth and improved S:N on far angle stack

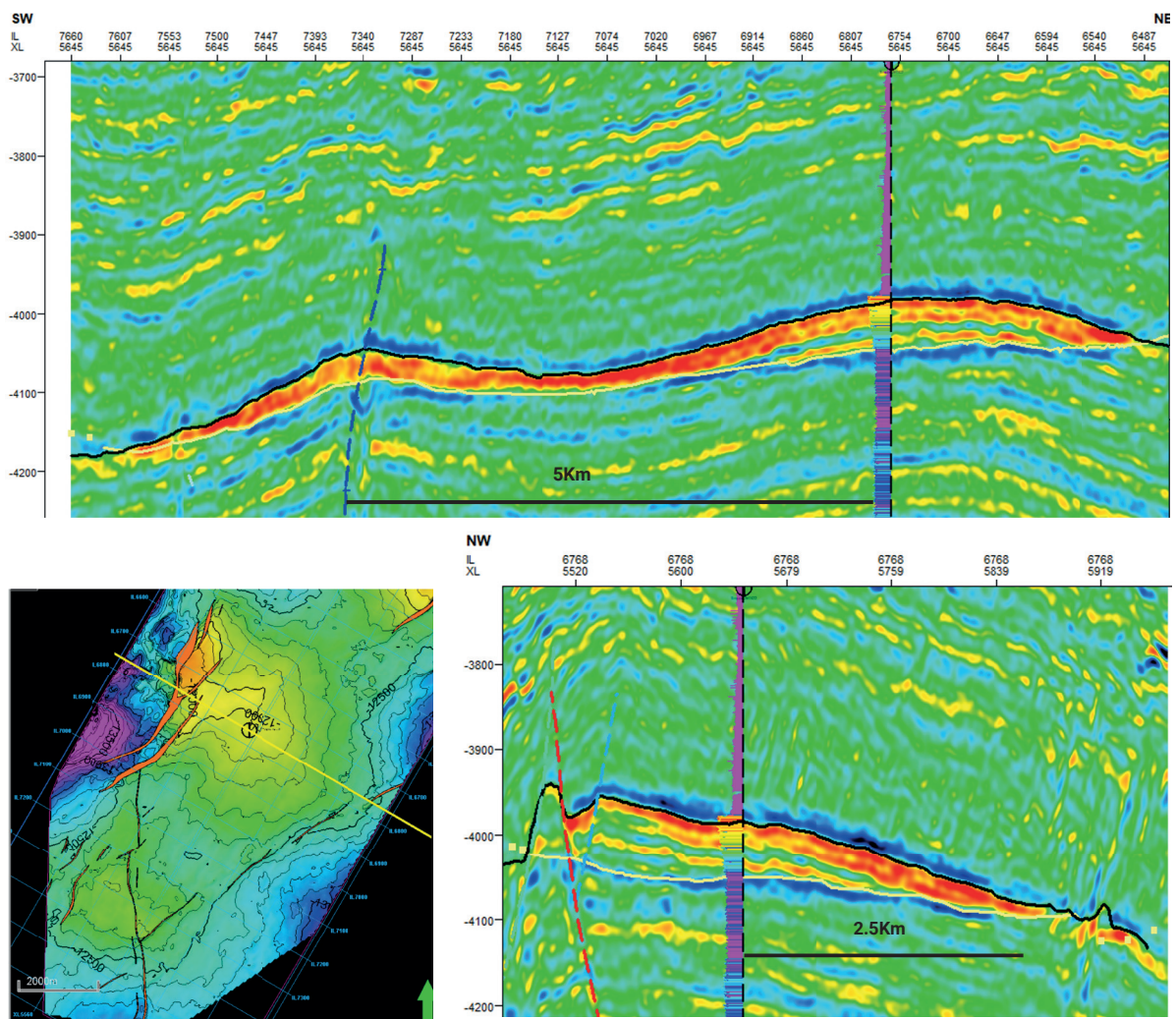
*Data courtesy of PGS

Impact of conditioning on AVA response – intercept-gradient cross-plots*



*Data courtesy of PGS

Discovery well-tie (resistivity log) with EEI fluid volume validates the conditioning and AVA attribute results



SHARP REFLECTIONS

DISCOVER MORE

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Sharp Reflections was built on a bold idea—to reinvent seismic data processing and analysis. Sharp Reflections software, powered by high-performance computing, runs on a bespoke engine that allows users to explore enormous multidimensional volumes of raw processed data.

Users are empowered to extract detailed reservoir insight, make trustable drilling decisions and optimize production.



Fidelity

Vivid details, critical information, deep insight pulled straight from your source dataset.



Capacity

A powerful computing engine for managing enormous data volumes speedily, efficiently and painlessly.



Certainty

Tools for clarifying risk factors and reducing uncertainty, so you reach accurate, trustable decisions.

For more details on this case study, and to read how Sharp Reflections has helped other clients around the world, visit our website

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