Single common offset bin:
input data vs final (migrated) result.

5D TRACE INTERPOLATION
IMPROVING PRE-STACK PROCESSING
AND INTERPRETATION

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GT PROCESSING SOLUTIONS

5D TRACE INTERPOLATION

Most of the seismic processing requires uniform sampling. Regular sampling of data is also an important element of true amplitude preservation in processing. Irregular sampling can affect data analysis and introduce noise, phase and amplitude distortions and a degraded final image. Issue of inadequate and irregularly sampled seismic data is one of the most important problems in seismic data processing, particularly while dealing with onshore seismic datasets.
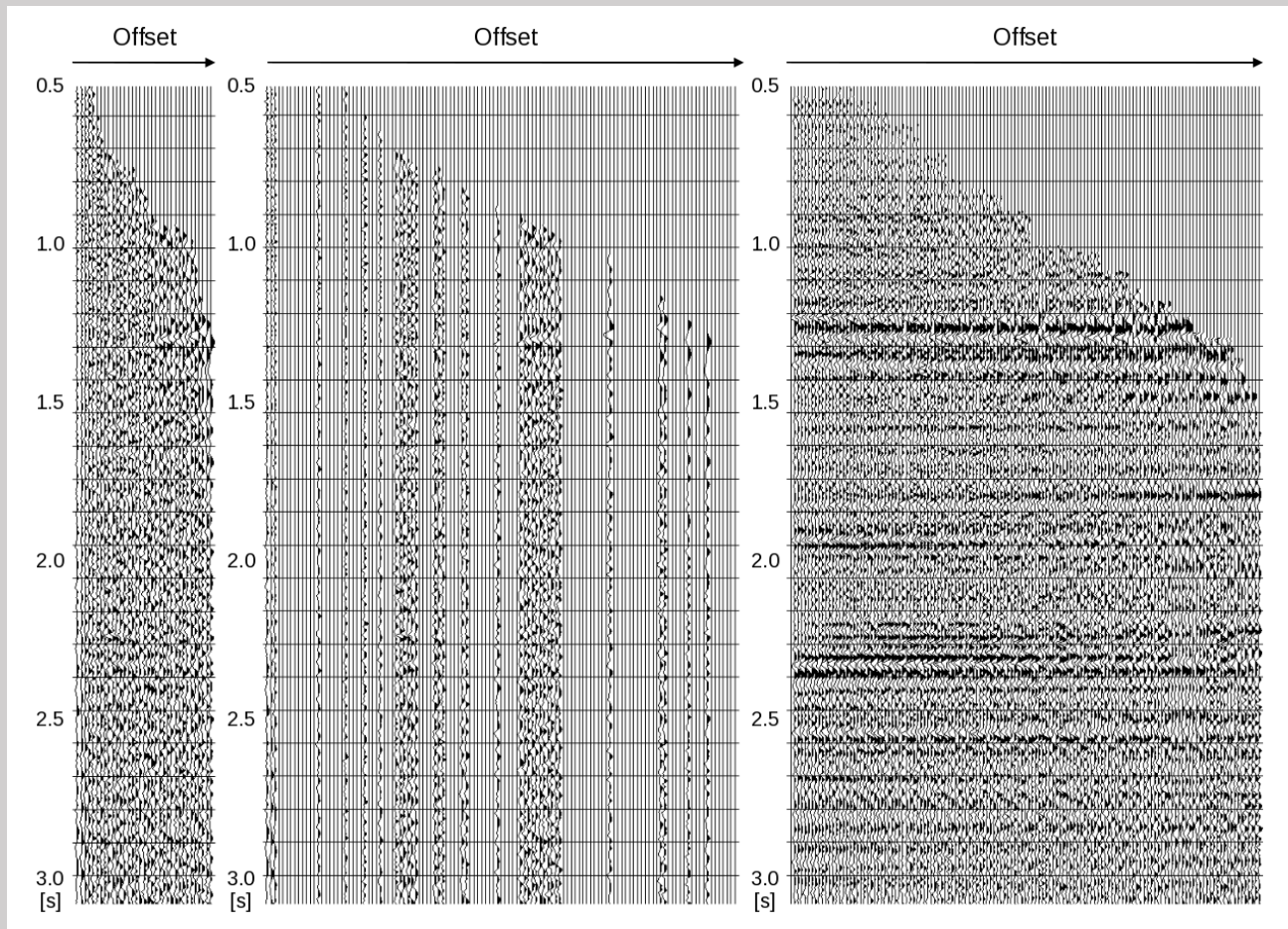

CMP gathers from left: raw data before interpolation,
middle: raw at true spatial positions; right: interpolated using 5D MWNI algorithm

GT offers a solution based on proprietary software combined with commercial modules. This solution improves seismic images, brings significant reduction of migration artifacts and increases quality of the reconstruction of amplitude relationship. We are particularly focused on the reconstruction of near offset traces in 3D datasets. Such a near-offset solution is not available in commercial software packages.
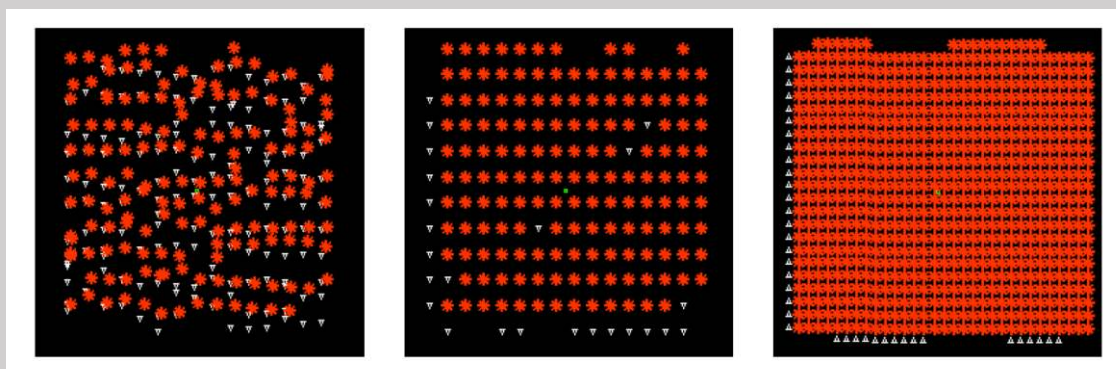

CMP gather geometry (red - shots, white - receivers, green - CMP): left: non-interpolated,
middle: interpolated standard COV bin size, right: interpolated double-concentrated COV bin size
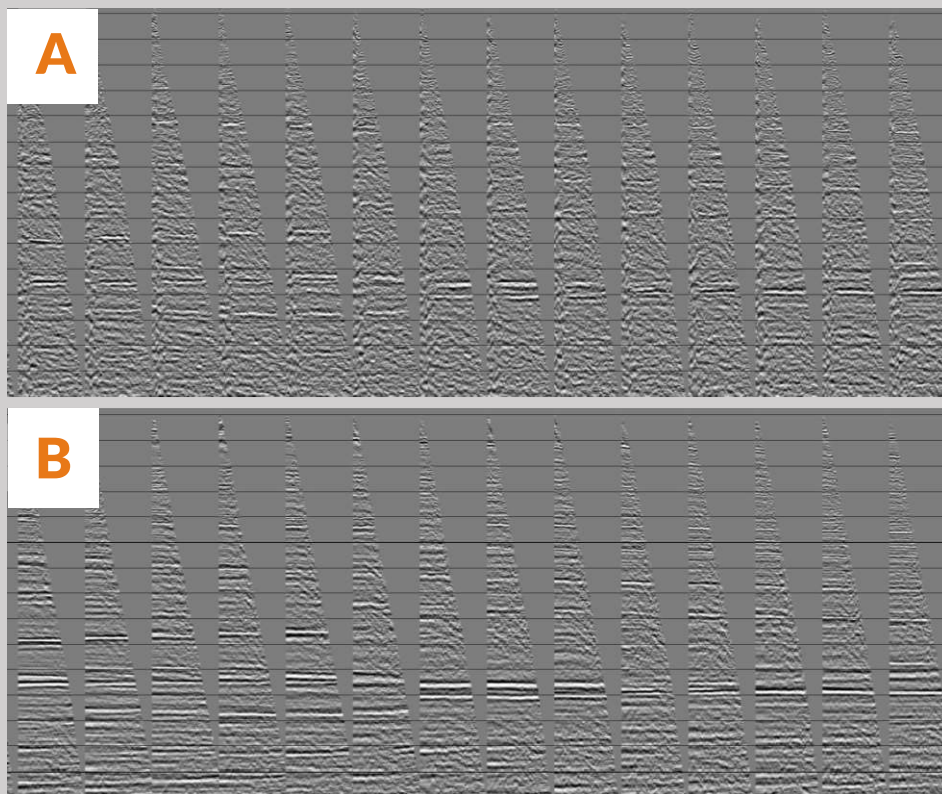
3D CDP gathers after pre-stack migration prepared for AVO analysis:
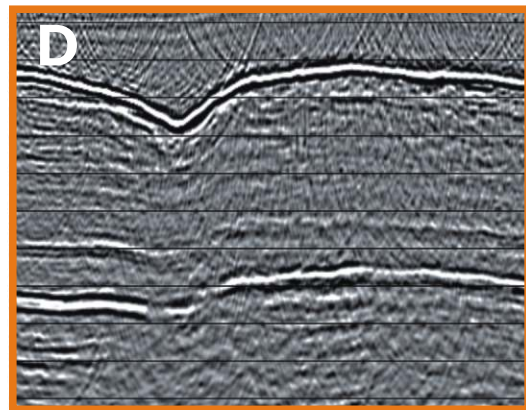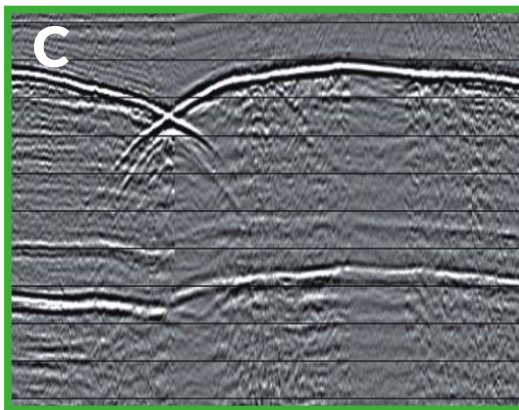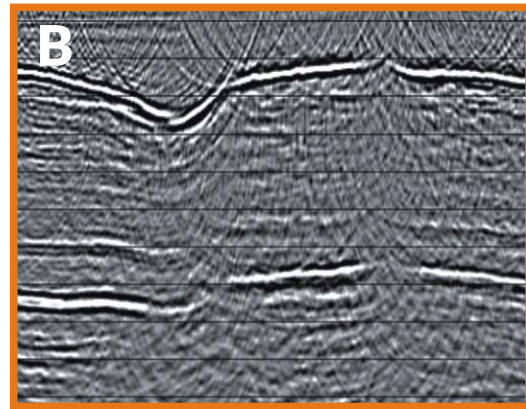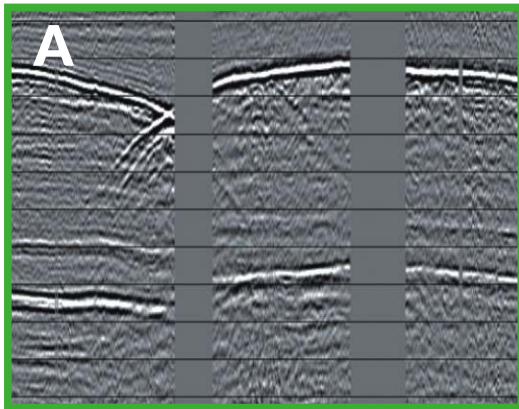A - without-interpolation, B - with interpolation.
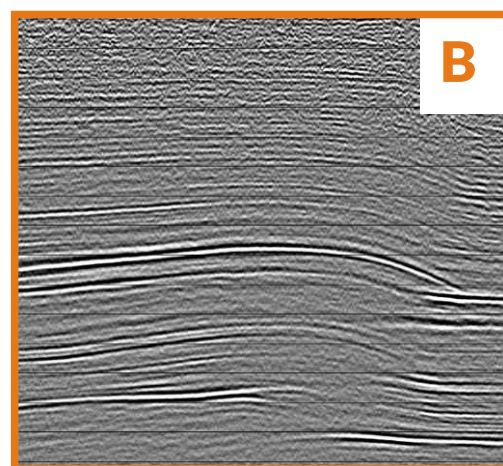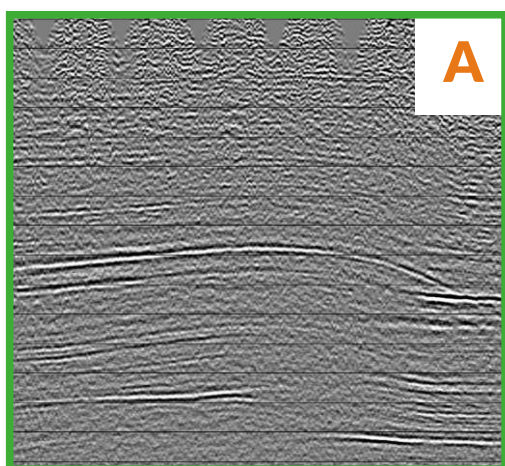
Stacked data after pre-stack time migration:
A - without pre-stack interpolation, B - with pre-stack interpolation.
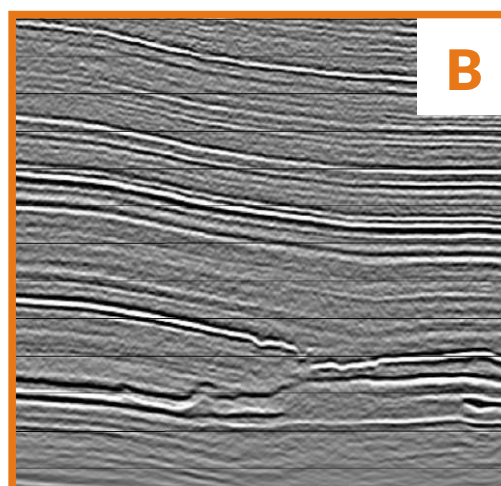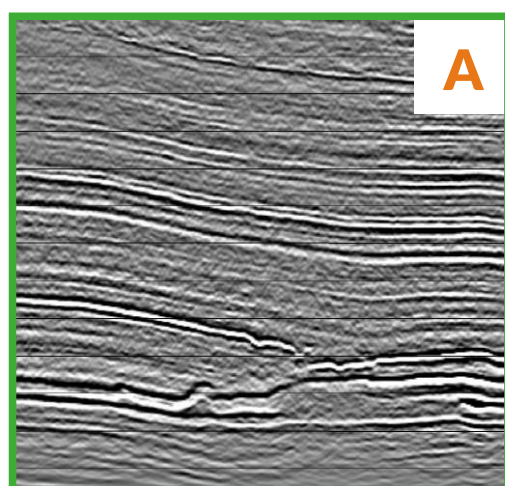
Stacked data after pre-stack time migration:
A - without pre-stack interpolation, B - with pre-stack interpolation.

Several techniques can be selected to reduce the problem of irregular geometry:

- 3D/4D/5D Minimum Weighted Norm Inversion (MWNI) Interpolation
- 3D Linear Interpolation
- 3D Flex-binning
- Local Slant Stack Interpolation

Single common offset bin: A - before, B - after migration without interpolation,
C - before, D - after migration with interpolated data.

Benefits of pre-stack interpolation:

- improves imaging
- reduces migration smiles
- enhances S/N

- improves offset-azimuth distribution
- preserves amplitude relation for AVO, AVAZ