Controlled Beam Migration
Depth Imaging in Complex Settings

**PROCESSING & IMAGING**

Controlled Beam Migration (CBM) is an extension of Beam Migration technology which combines the steep-dip imaging capabilities of Kirchhoff techniques with the multi-arrival abilities of wave-equation migration. CBM imaging results in improved signal-to-noise ratio, especially in sparse, low-fold land data. The migration algorithm can also be used to remove multiple energy as part of the imaging process.

**FEATURES:**
- Imaging of multiple arrivals
- Enhanced steep-dip imaging
- Faster model building
- Isotropic or Anisotropic (VTI and TTI)
- Option to incorporate discrimination and suppression of multiples within the imaging process
- Enhanced pre-stack data

**BENEFITS:**
- Enhanced structural imaging and interpretation:
  - Salt flank and base imaging
  - Sub-salt imaging
  - Steep dips and overthrust imaging
  - Fractured basement imaging
- Improved S/N ratio, especially beneficial for sparse land and OBC data

CBM imaging of a fractured basement reservoir. Fracture and solution porosity are associated with major faults. Kirchhoff PSDM struggles to resolve these faults within the reservoir. Controlled Beam PSDM has been applied during reprocessing of the data, and the combination of multi-arrival imaging, improved signal-to-noise and enhanced steep dips results in well-defined basement contacts and internal faults.
CONTROLLED BEAM MIGRATION

Beam Migration is a multi-arrival alternative to Kirchhoff migration. The process migrates “beams” of data centered on modeled ray paths. For a given surface point and starting angle, the recorded energy is propagated along the beam to give a small part of the migrated image. Repeating this for beams over a number of starting directions, and summing the results from all surface locations, defines the fully migrated section. Because a number of raypaths are modeled from the same starting point, the possibility of multiple arrivals is explicitly included.

EBM is a specialized version of Beam Migration designed to achieve improved signal-to-noise ratios and enhanced steep dip imaging in complex geological settings.

CONTROLLED BEAM MULTIPLE ATTENUATION

As part of the migration algorithm, multiples of specific horizons may also be modeled and attenuated using a proprietary technique. In the North Sea examples below, the fault blocks in the reservoir interval below the Base Cretaceous Unconformity are obscured by noise and multiples after Kirchhoff migration. Standard EBM migration improves the imaging and signal-to-noise ratio in the target area. After CBM with multiple attenuation the fault blocks and dipping primaries are clearly defined, allowing easier interpretation of the reservoir.