



Full Waveform Inversion (FWI)

FWI utilises the entire seismic wavefield to generate refined velocity models for improved imaging. At high-frequency FWI generates high-resolution earth models for interpretation and characterisation.

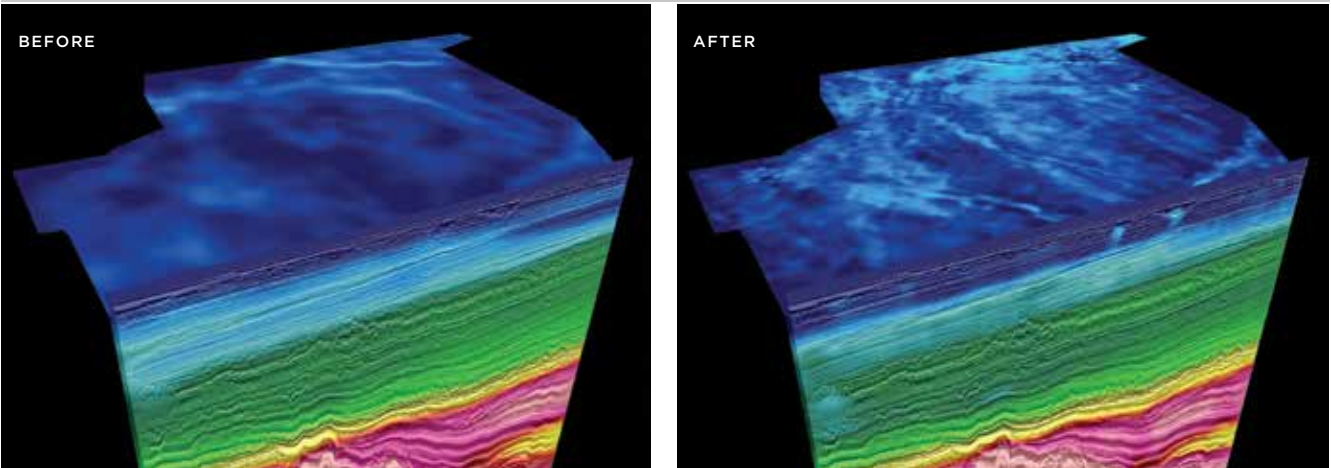
Traditional FWI for conventional model building inverts for velocity, primarily matching the kinematics of the recorded wavefield. Inverting for reflectivity has been the domain of least-squares imaging, matching amplitudes, given a known velocity model which describes the kinematics. However, the benefits of FWI at higher frequencies extend beyond conventional imaging towards interpretation and characterisation. As can be seen in the figures below,

detailed structural and stratigraphic details are resolved. High-frequency FWI is a least-squares imaging tool – the model is the answer! DUG Wave is a modern software stack for wave equation inversion an imaging. It has been designed from the ground up to enable both research and production. While it has been engineered to run efficiently and robustly at scale on huge machines it allows the end-user to focus on the geoscience.

FUNCTIONALITY INCLUDES:

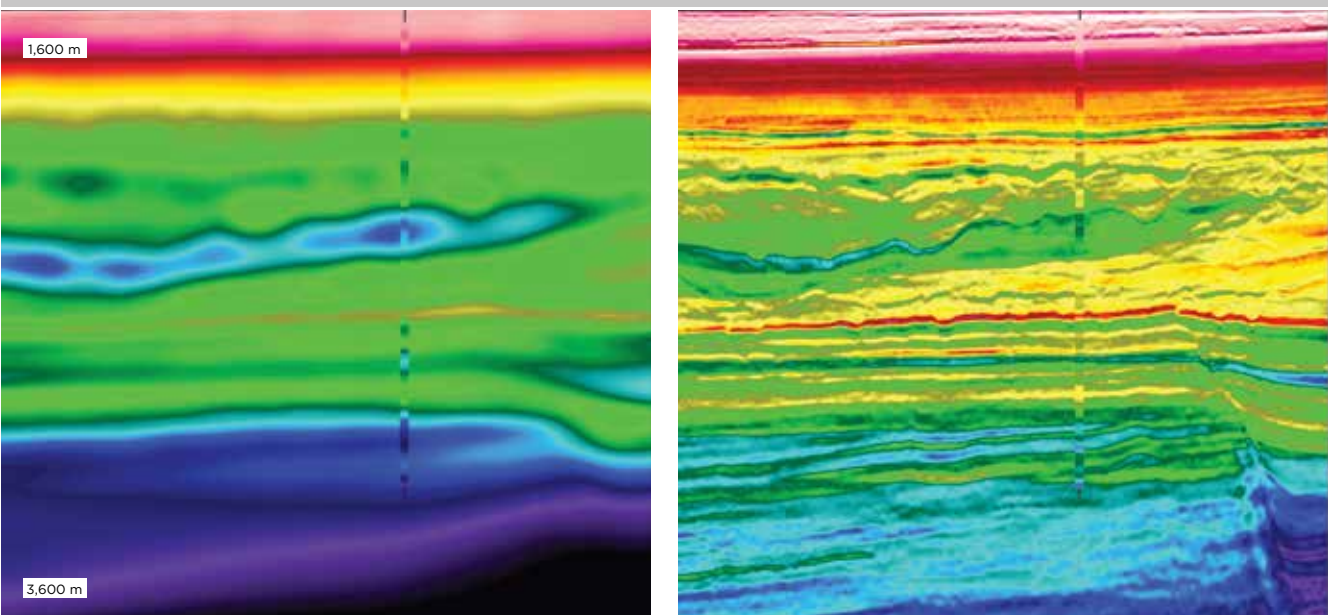
- > Diving-wave / refraction-FWI
- > Multi-parameter FWI
- > Reflection-FWI
- > Algorithmic loop-skipping mitigation
- > High-frequency imaging with FWI

FWI FOR VELOCITY MODEL BUILDING



01. Before (left) and after (right) FWI for conventional model building purposes. FWI resolves a complex system of shallow channels - mitigating the associated imaging distortions. Data courtesy of AGS and TGS.

HIGH-FREQUENCY FWI FOR INTERPRETATION



02. Imaging velocity model (left) and high-frequency FWI-derived acoustic impedance model (right) with a maximum frequency of 65 Hz. BEX MC3D data courtesy of Multi-Client Resources.