

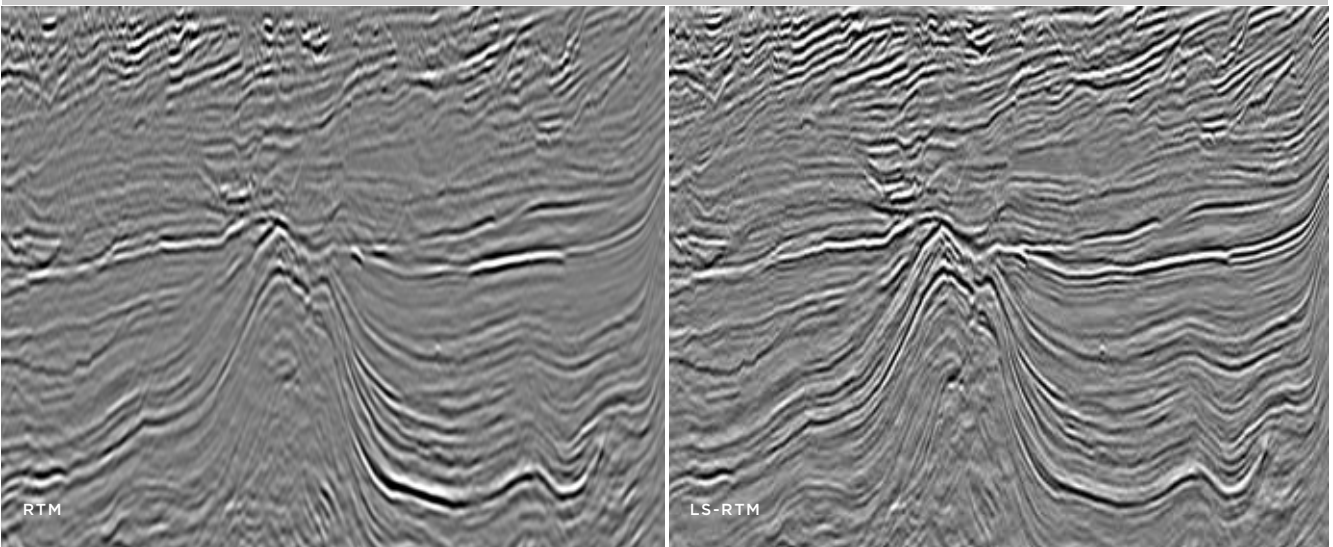


# Depth and Least-Squares Imaging

DUG Insight's extensive imaging toolkit can handle any challenge. Our innovative and flexible model-building strategies incorporate a range of technologies including full waveform inversion and high-resolution reflection tomography. We offer conventional and least-squares imaging solutions for both Kirchhoff and reverse time migration (RTM).

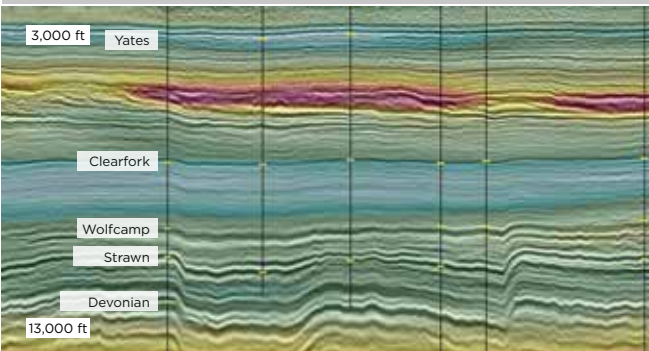
KIRCHHOFF MIGRATION:	DUG WAVE RTM:	HIGH RESOLUTION TOMOGRAPHY:
<ul style="list-style-type: none"> <li>› <b>Least-squares imaging</b></li> </ul>	<ul style="list-style-type: none"> <li>› <b>Least-squares imaging</b></li> </ul>	<ul style="list-style-type: none"> <li>› <b>Refraction and reflection</b></li> </ul>
<ul style="list-style-type: none"> <li>› <b>PreSTM</b> - isotropic, VTI and HTI / orthorhombic</li> </ul>	<ul style="list-style-type: none"> <li>› <b>Isotropic and anisotropic (VTI / TTI)</b></li> </ul>	<ul style="list-style-type: none"> <li>› <b>Multi-azimuth</b></li> </ul>
<ul style="list-style-type: none"> <li>› <b>PreSDM</b> - isotropic, VTI, TTI or tilted orthorhombic</li> </ul>	<ul style="list-style-type: none"> <li>› <b>DUG Q-RTM</b> - to compensate for laterally and vertically varying Q</li> </ul>	<ul style="list-style-type: none"> <li>› <b>Structurally conformable updates</b></li> </ul>
<ul style="list-style-type: none"> <li>› <b>DUG MigQ</b> - to compensate for laterally and vertically varying Q</li> </ul>	<ul style="list-style-type: none"> <li>› <b>DUG MigM</b> - migrating using multiples for improved shallow imaging</li> </ul>	<ul style="list-style-type: none"> <li>› <b>Fault constrained</b></li> </ul>
<ul style="list-style-type: none"> <li>› <b>Diffraction imaging</b> - for imaging of faults and discontinuities</li> </ul>	<ul style="list-style-type: none"> <li>› <b>Vector offset output (VOO)</b> - cartesian and polar</li> </ul>	<ul style="list-style-type: none"> <li>› <b>Complete control</b> over which part of the model is updated</li> </ul>

## IMAGING UPLIFT WITH LEAST-SQUARES MIGRATION



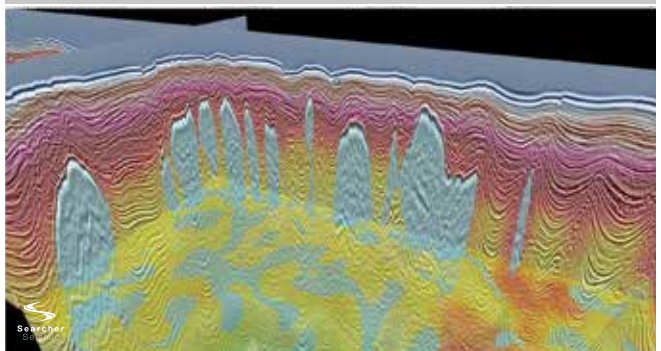
**01.** Least-squares RTM (right) offers a number of benefits over conventional RTM (left) including improved bandwidth and illumination plus a reduction in migration noise and acquisition footprint.

## LAND IMAGING - ANISOTROPIC KIRCHHOFF PreSDM



**02.** Anisotropic (TTI) pre-stack Kirchhoff depth-migrated section from onshore Texas. Final velocity model and corresponding migrated stack after six iterations of anisotropic reflection tomography. Note the excellent match to the well markers over a range of depths. Multi-client data presented with permission from Geophysical Pursuit, Inc.

## SALT IMAGING WITH DUG RTM



**03.** Anisotropic (TTI) pre-stack Kirchhoff depth-migrated section from offshore Gabon. The final stack and interval velocity model after five iterations of anisotropic reflection tomography are shown. Image is courtesy of Harvest Natural Resources Inc.