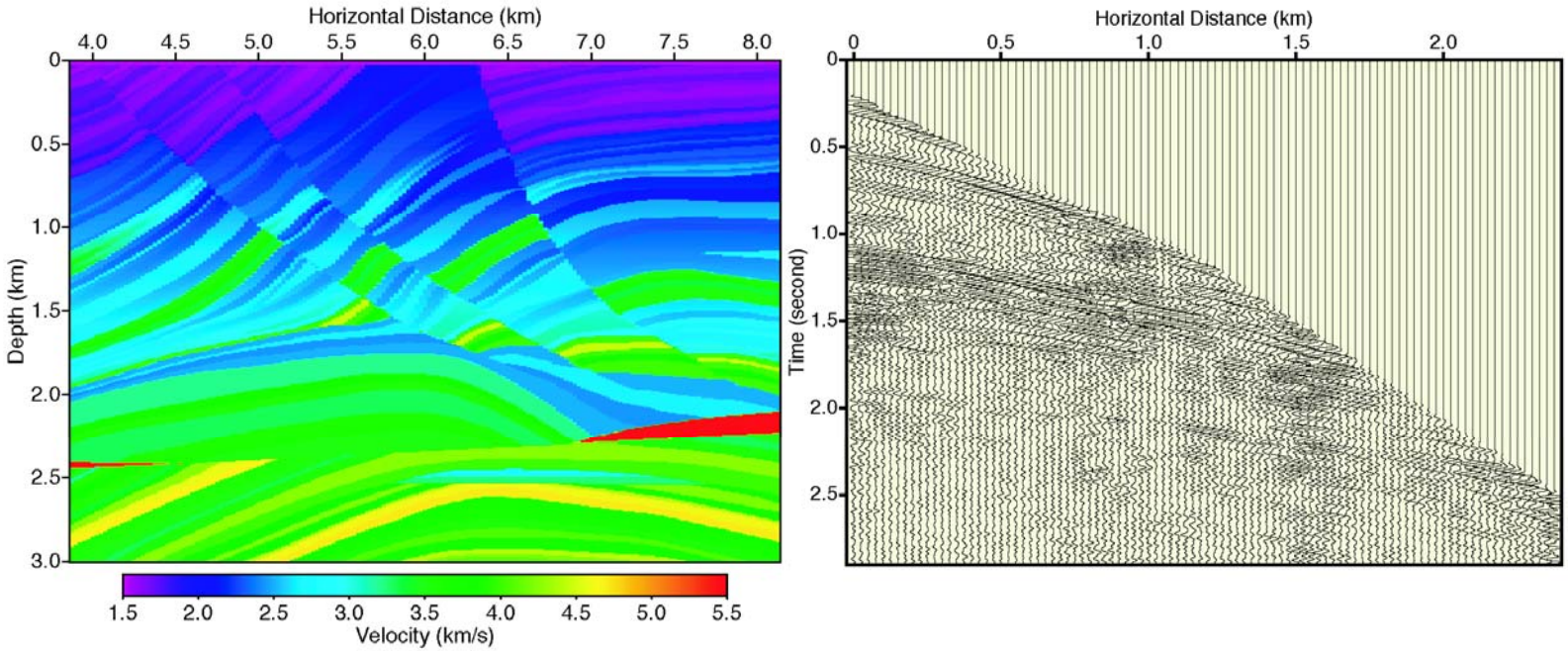
Amplitude – Preserving Kirchhoff Migration

Objective of the Project:

- Provide a definitive assessment of the utility and applicability of stimulation
- **Obtain improved seismic images of complex structures**



Example structure and numerically-generated seismic data used to obtain image of structure

Los Alamos National Lab

FEW 04FE02

Source: LANL

Amplitude – Preserving Kirchhoff Migration

Image Obtained with Conventional Kirchhoff Migration (Eikonal Solver)

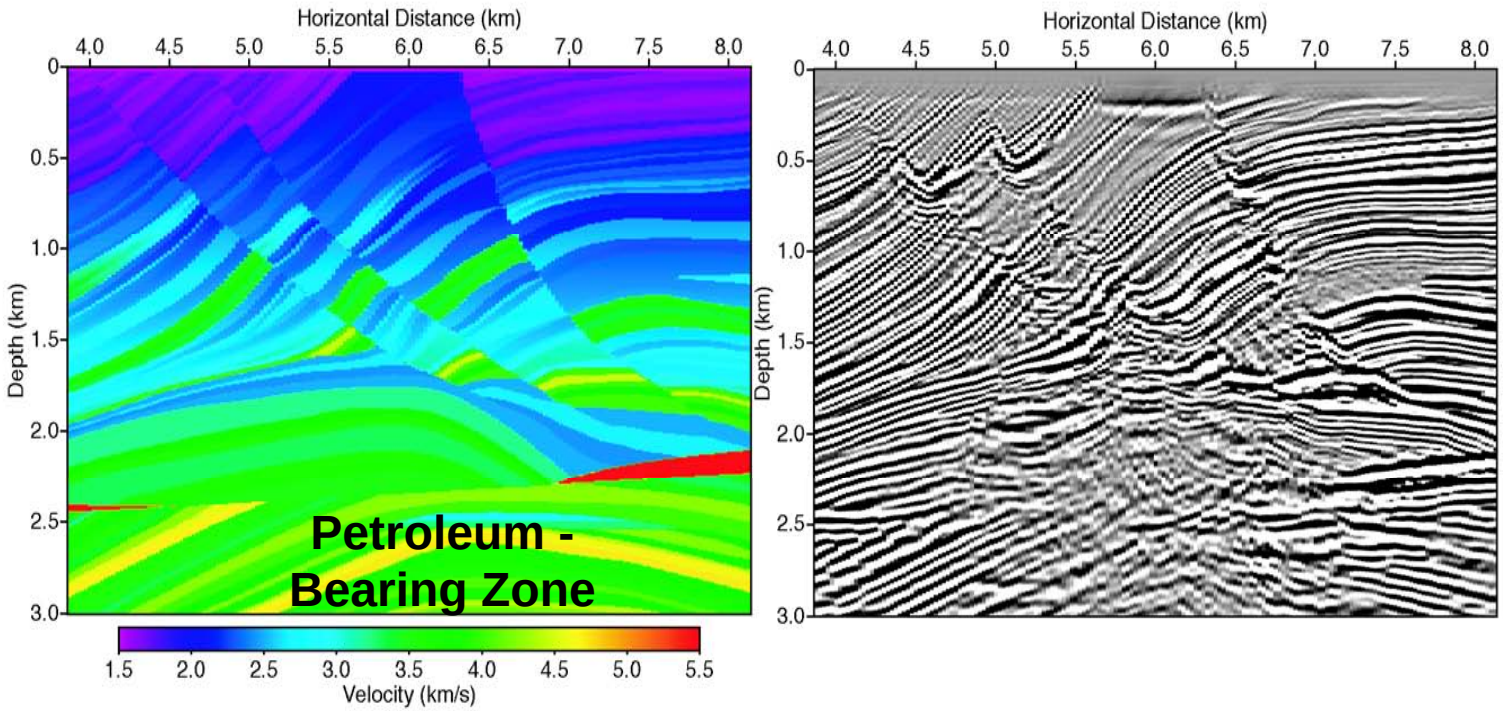


Image obtained using conventional approach is poor particularly in zone where petroleum is located.

Source: LANL

Amplitude – Preserving Kirchhoff Migration

Image Obtained with Amplitude-Preserving Multi-Arrival Kirchhoff Migration

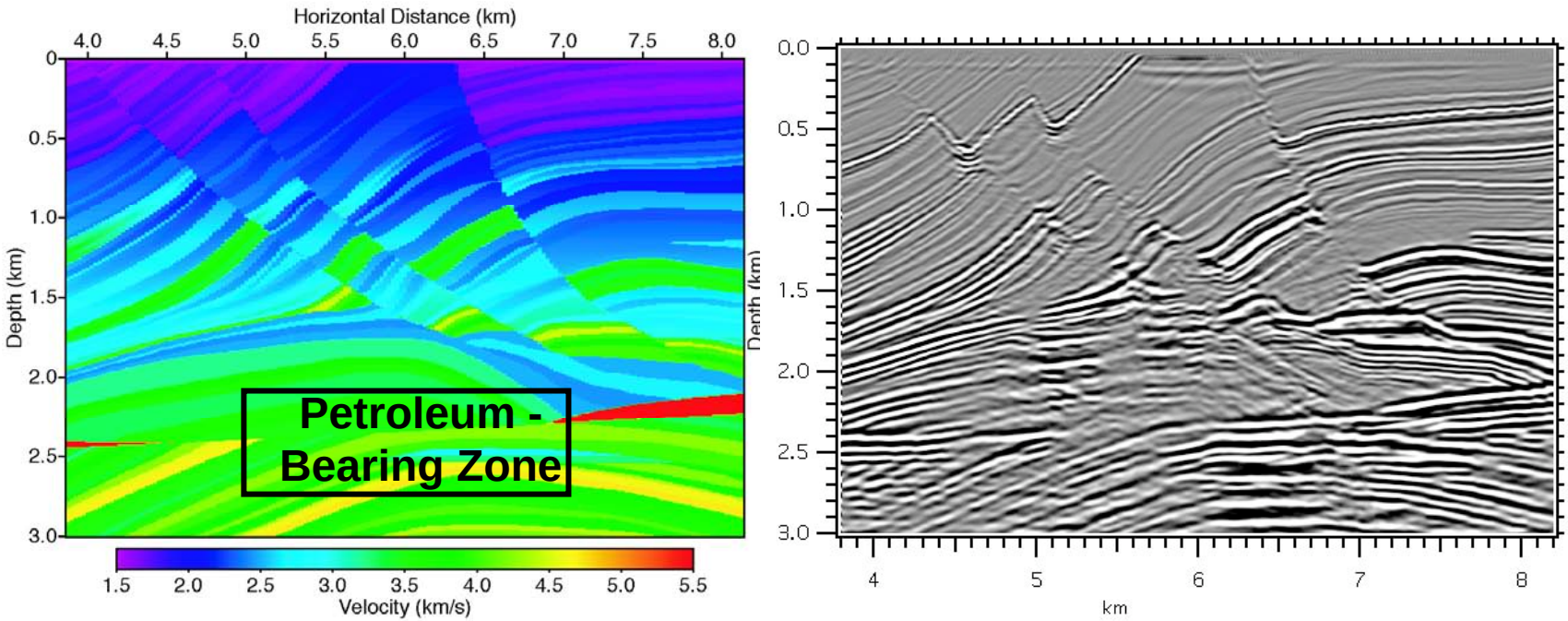
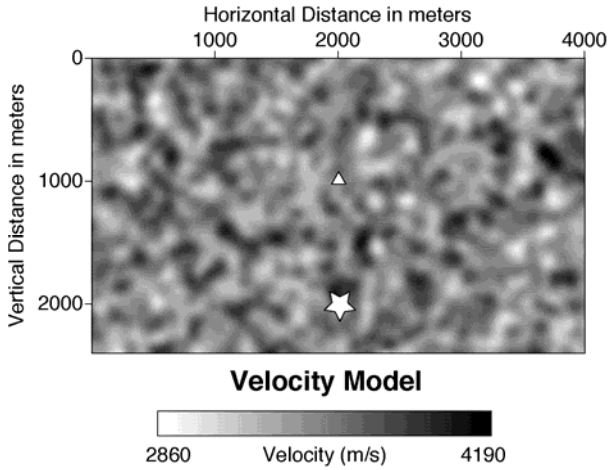
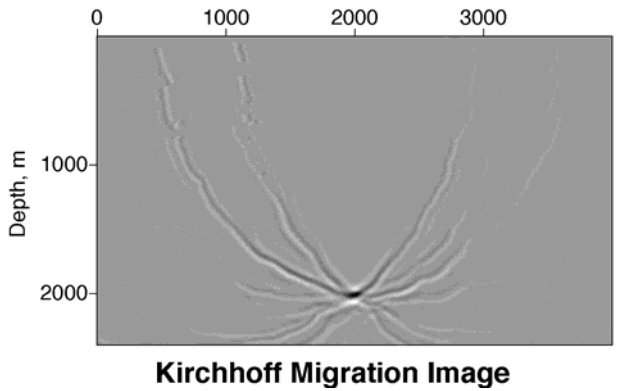


Image substantially improved in petroleum-bearing zone.

Source: LANL

Image Resolution:
How small a region can we reliably image?





Analyze imaging capability in randomly-heterogeneous medium. Assume point reflector at location of star.

Image obtained using first-arrival Kirchhoff migration

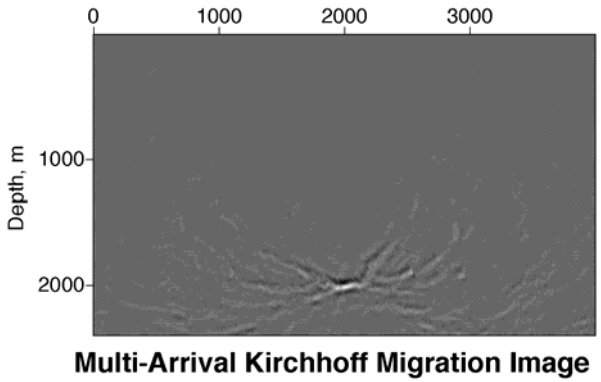


Image obtained using Amplitude-preserving multi-arrival Kirchhoff migration

Results of Project:

Initial Conclusion - Amplitude-preserving multi-arrival Kirchhoff migration gives fewer artifacts but has worse resolution than conventional Kirchhoff migration

Source: LANL