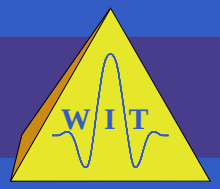


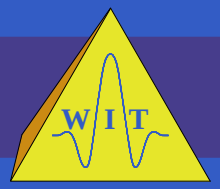
The Finite-Offset Common-Reflection-Surface (CRS) Stack: an alternative stacking tool for subsalt imaging

Steffen Bergler*, Jürgen Mann, German Höcht, and Peter Hubral

Wave Inversion Technology

Geophysical Institute

University of Karlsruhe, Germany

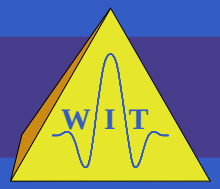


Overview

- Motivation

Overview

- Motivation
- Development of the CRS Stack



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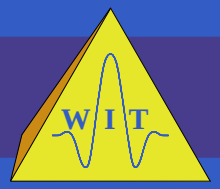

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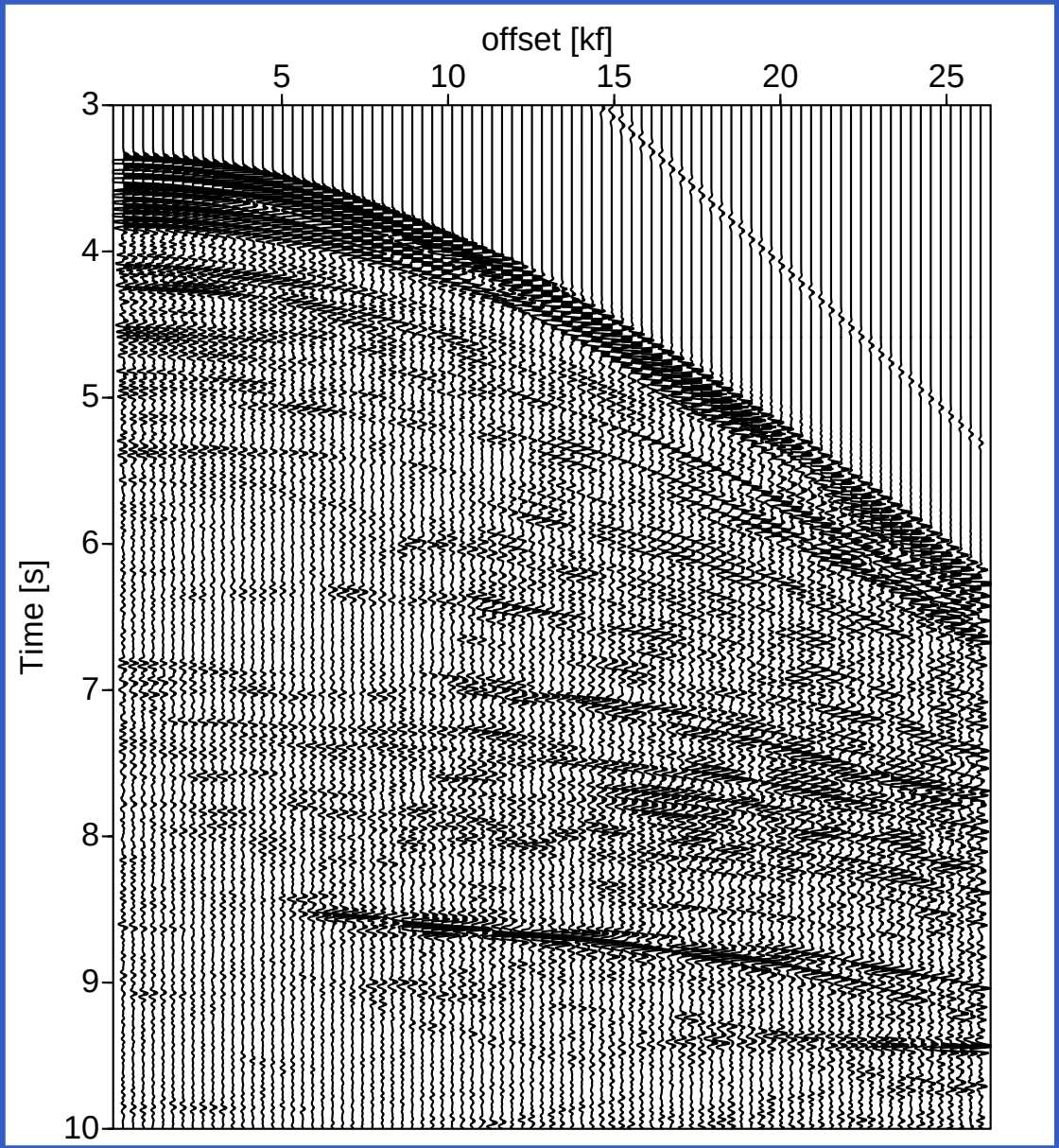
- Conclusions

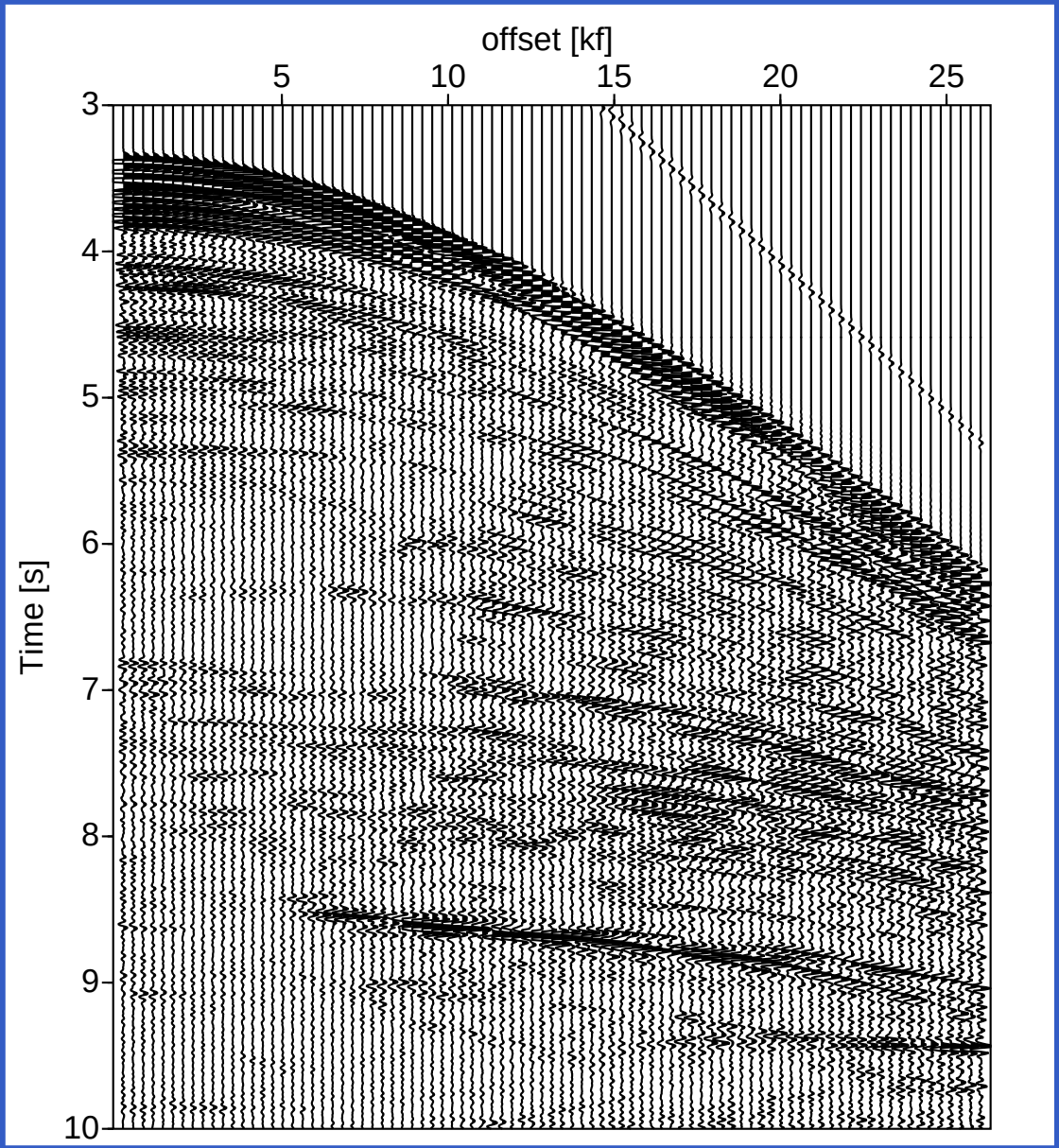
Motivation



Goal:

- Use far-offset reflections

Motivation



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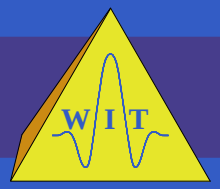
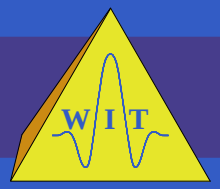


Development of the CRS Stack

Multi-parameter moveout operators
for data-driven stacking



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Multi-parameter moveout operators
for data-driven stacking

2-D zero-offset
3 parameters

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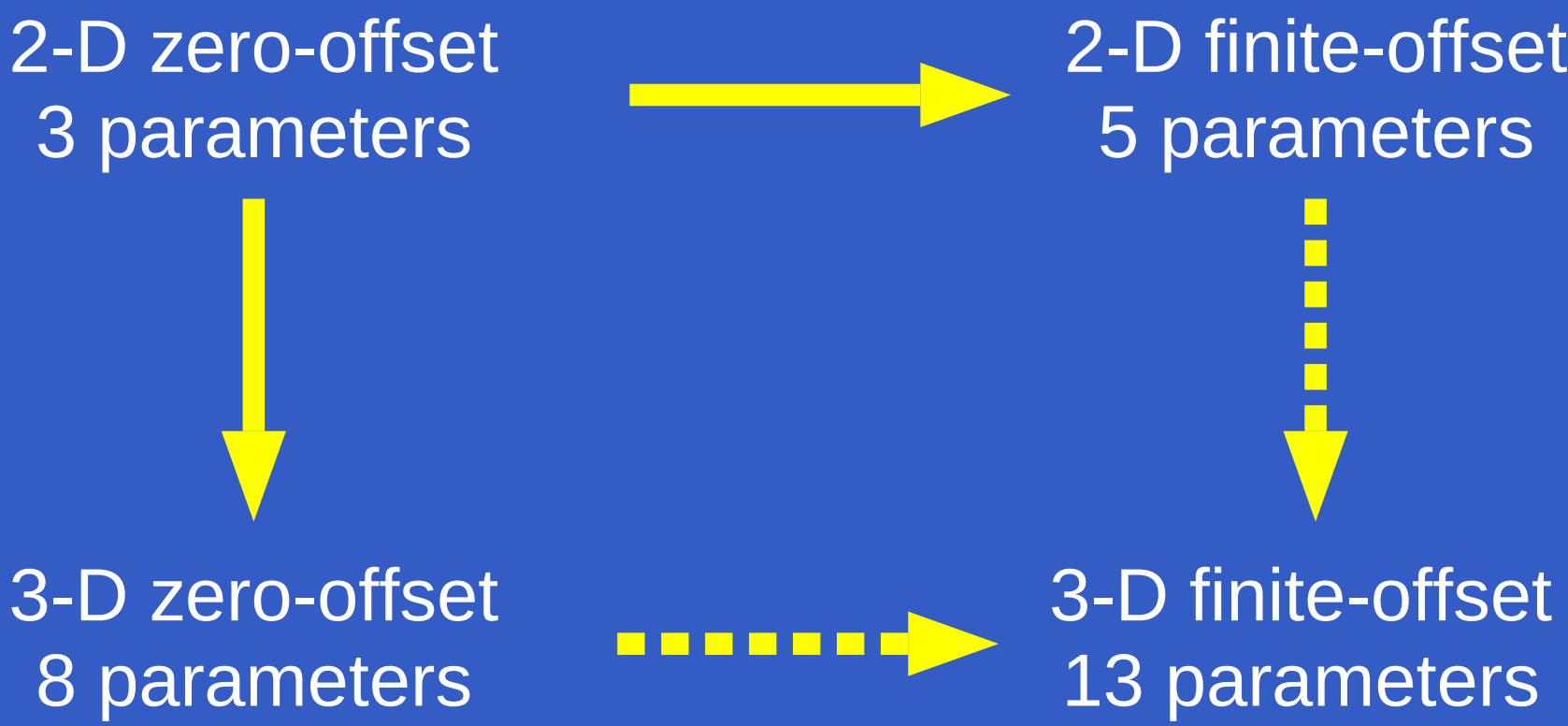
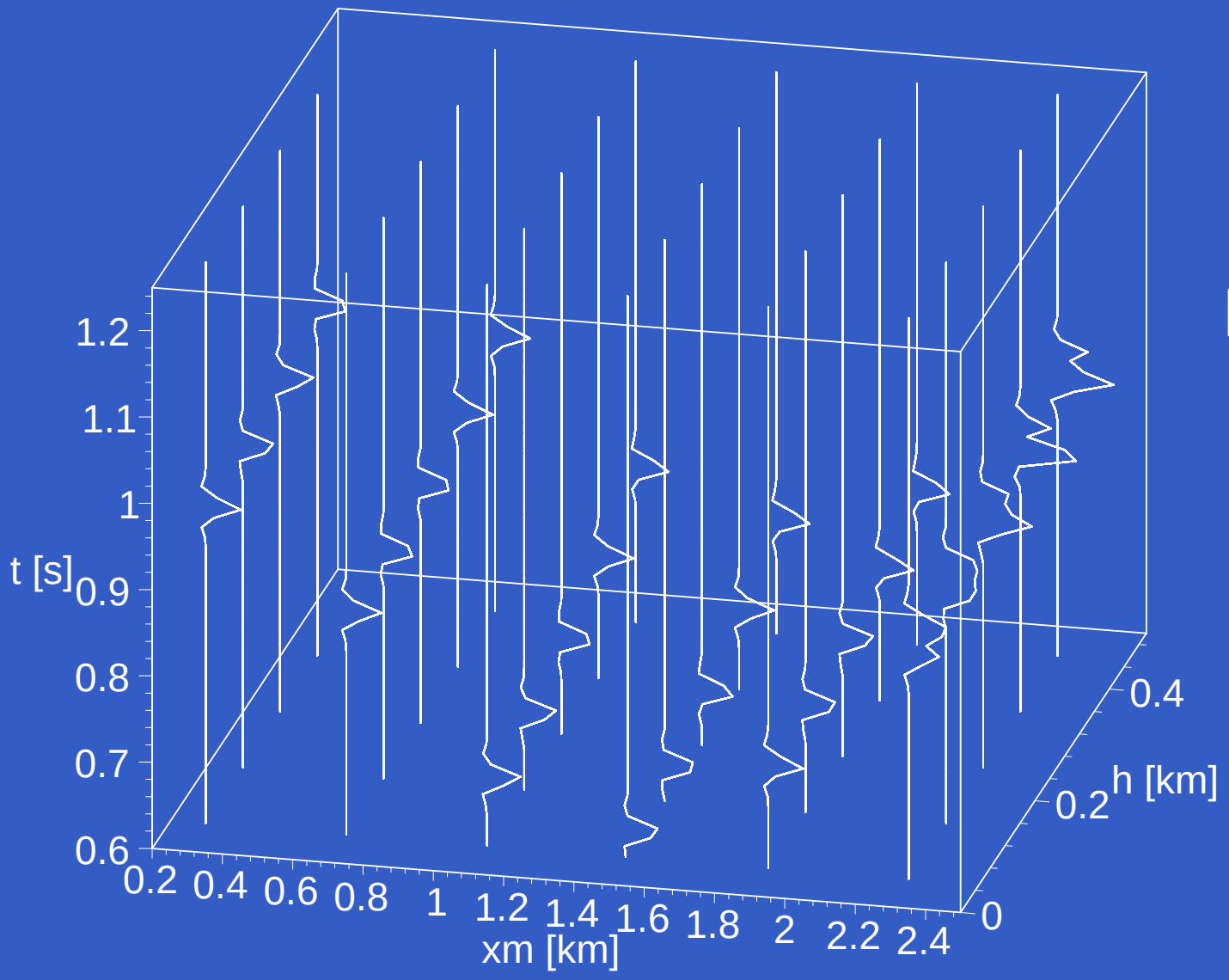
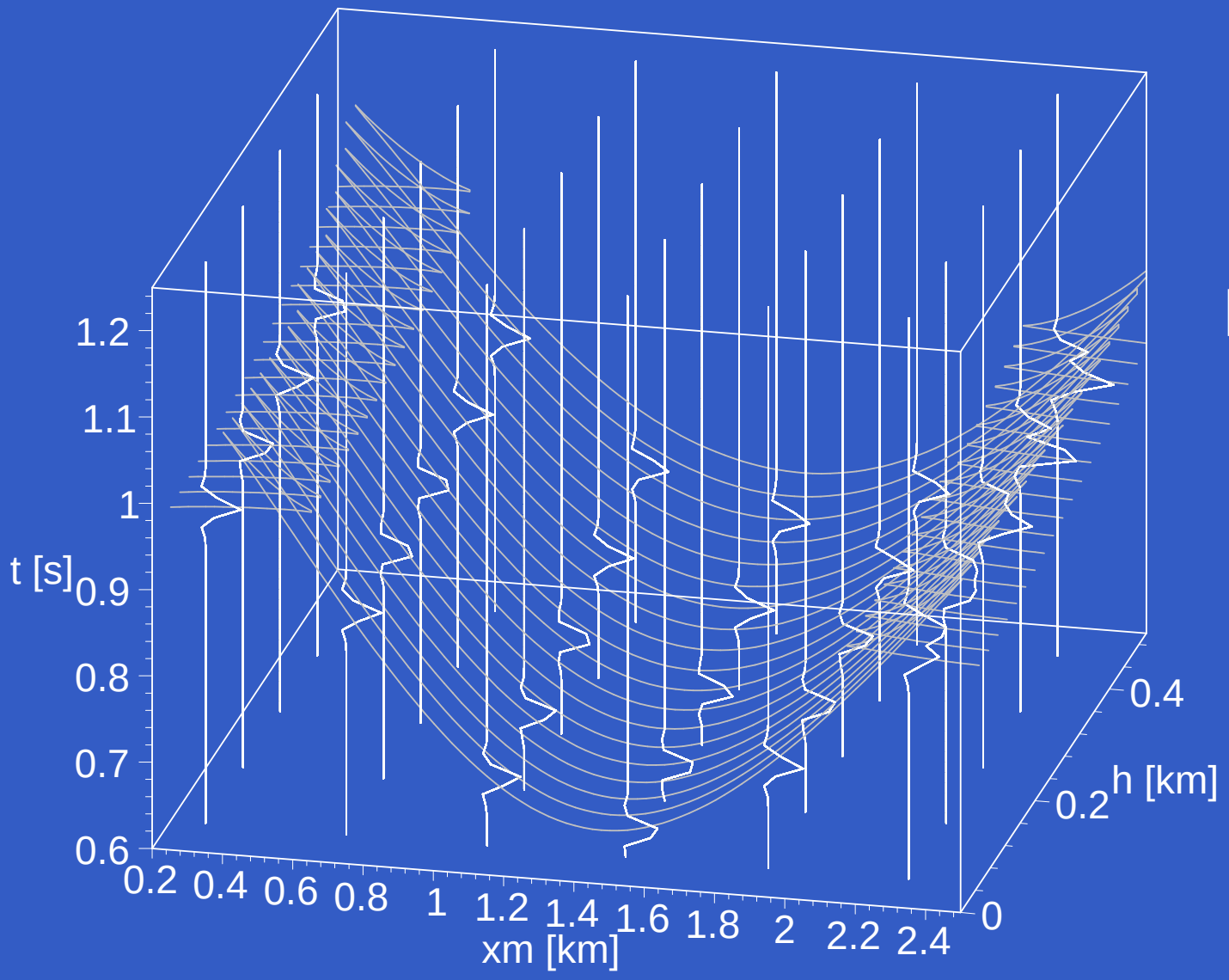


Implementation



Data volume

Implementation



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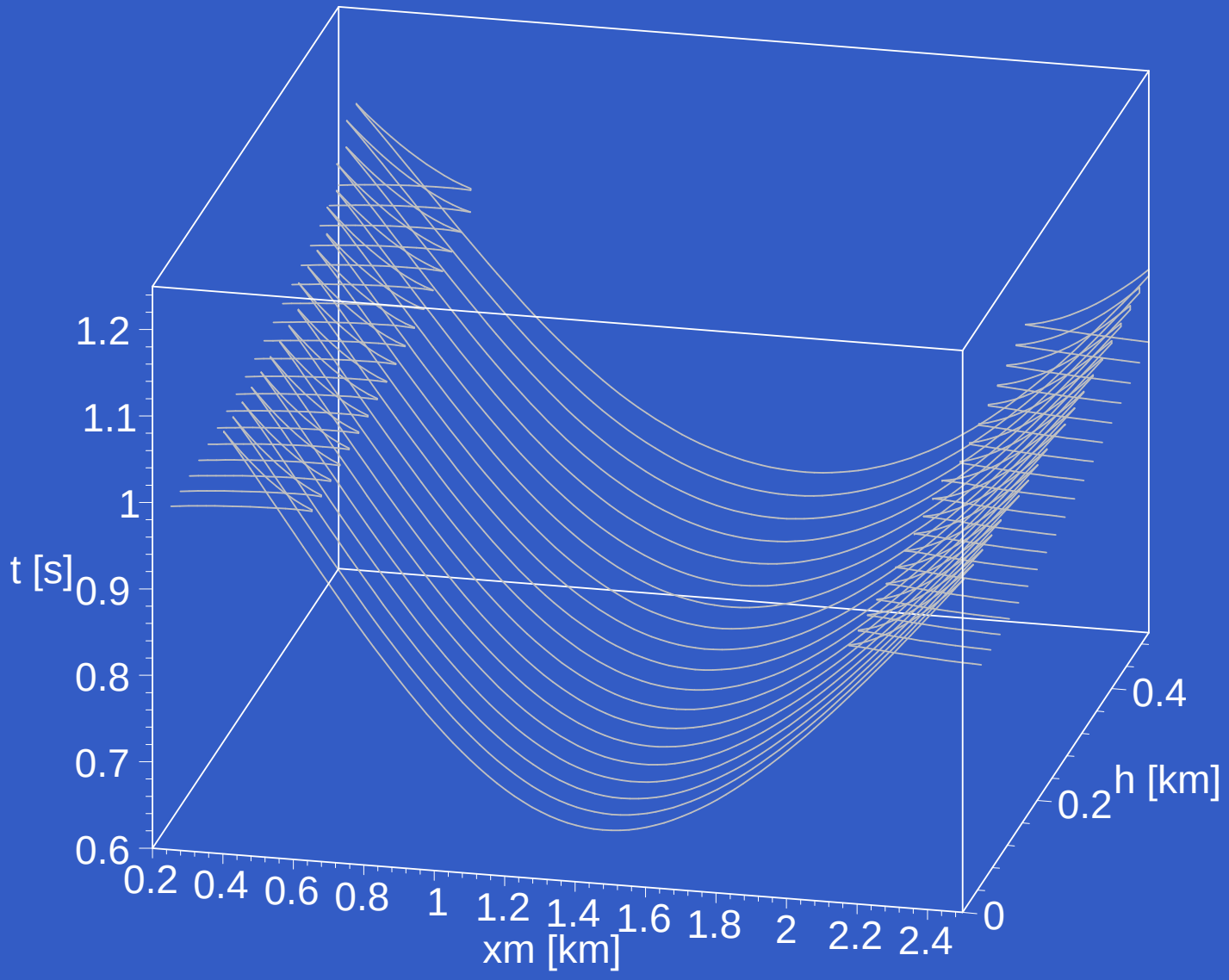

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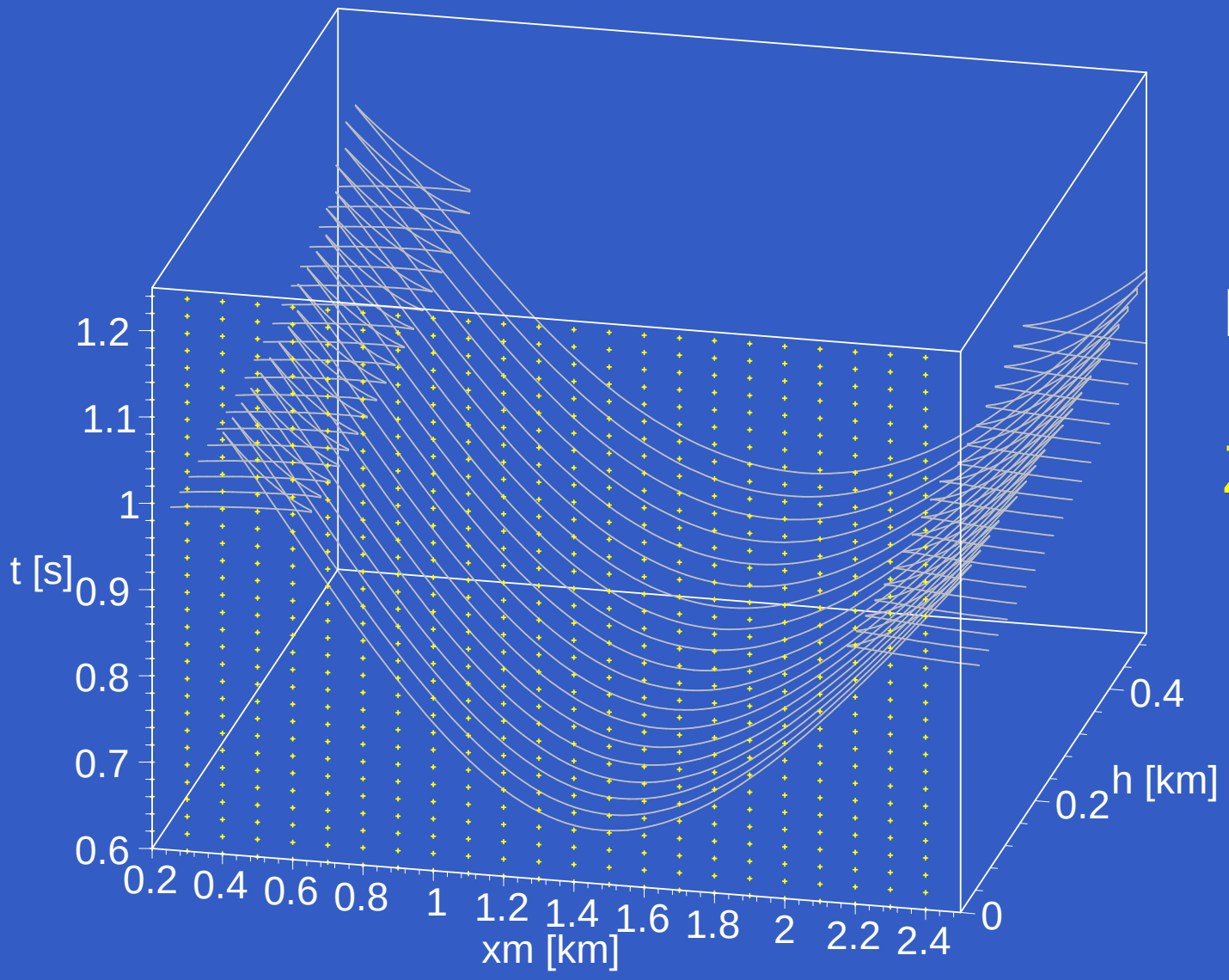
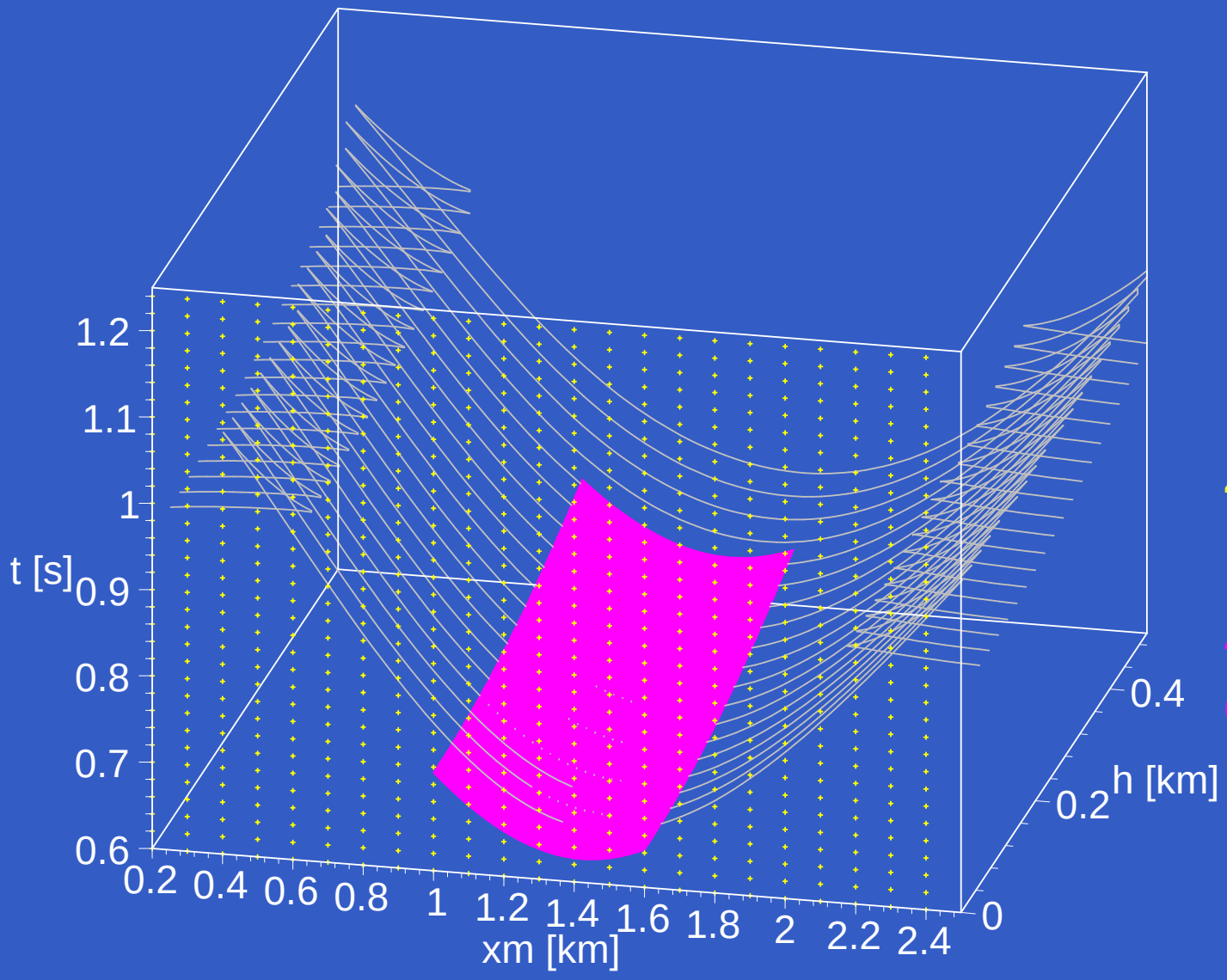


Data volume

ZO grid

Implementation

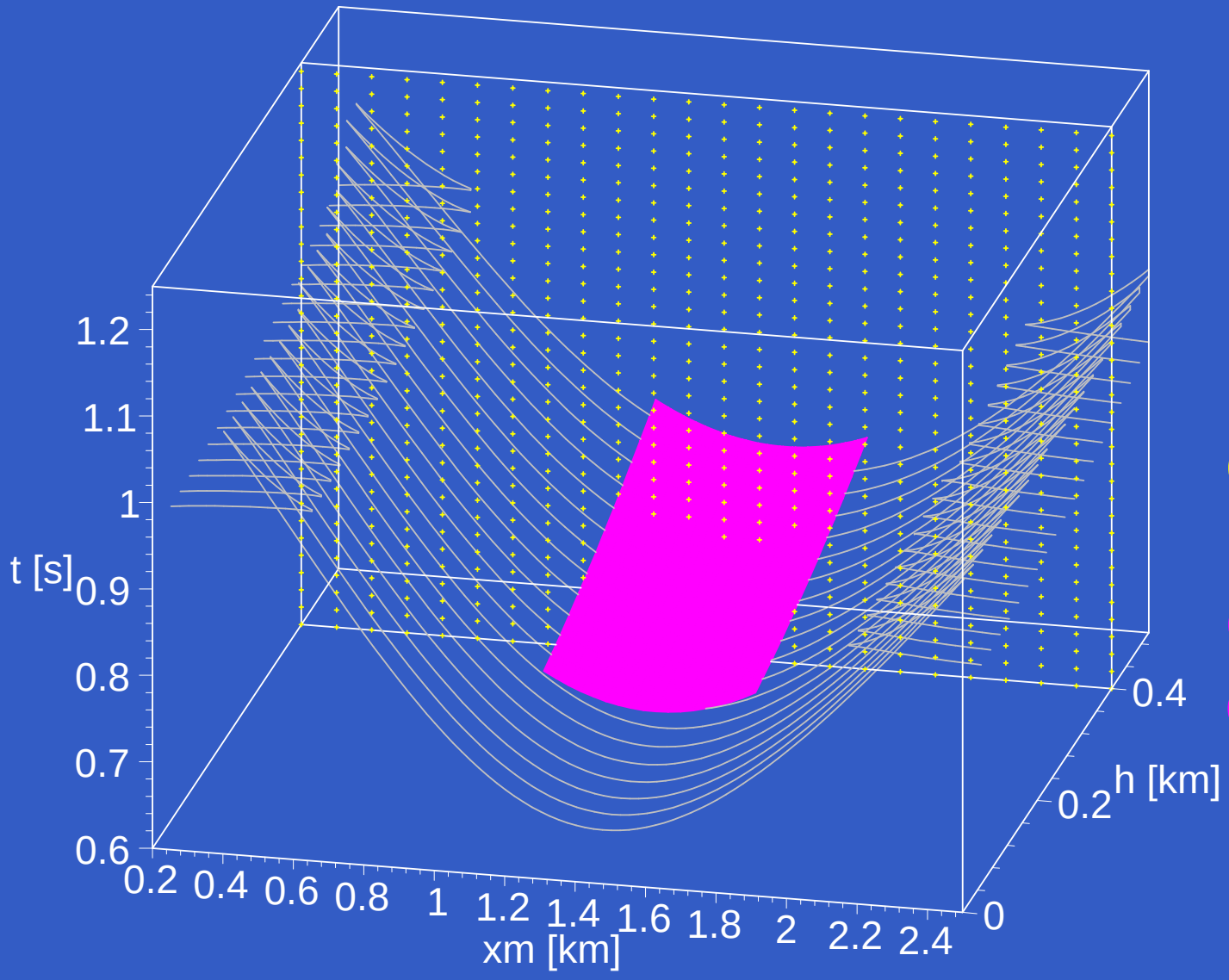


Data volume

ZO grid

ZO CRS operator

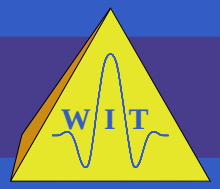
Implementation



Data volume

CO grid

CO CRS operator



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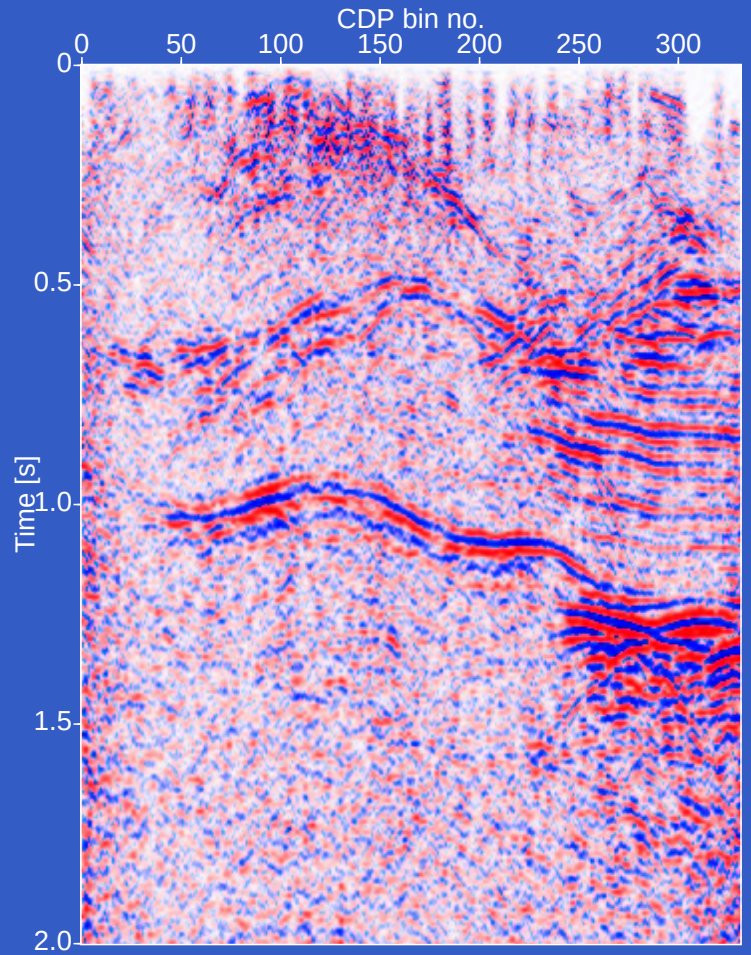
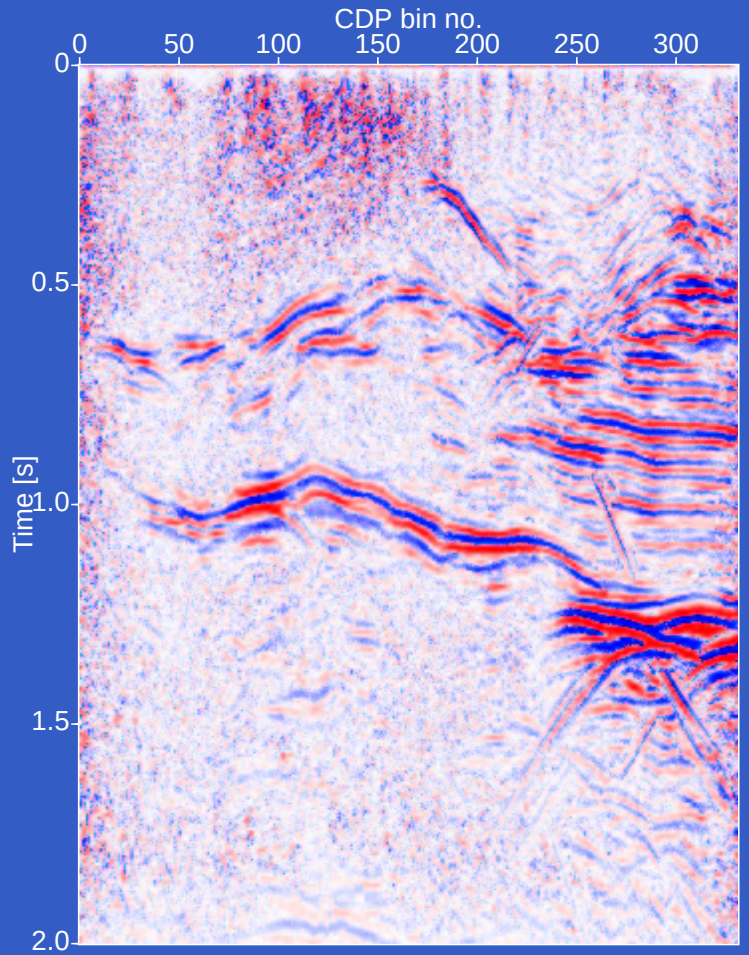
Real data example

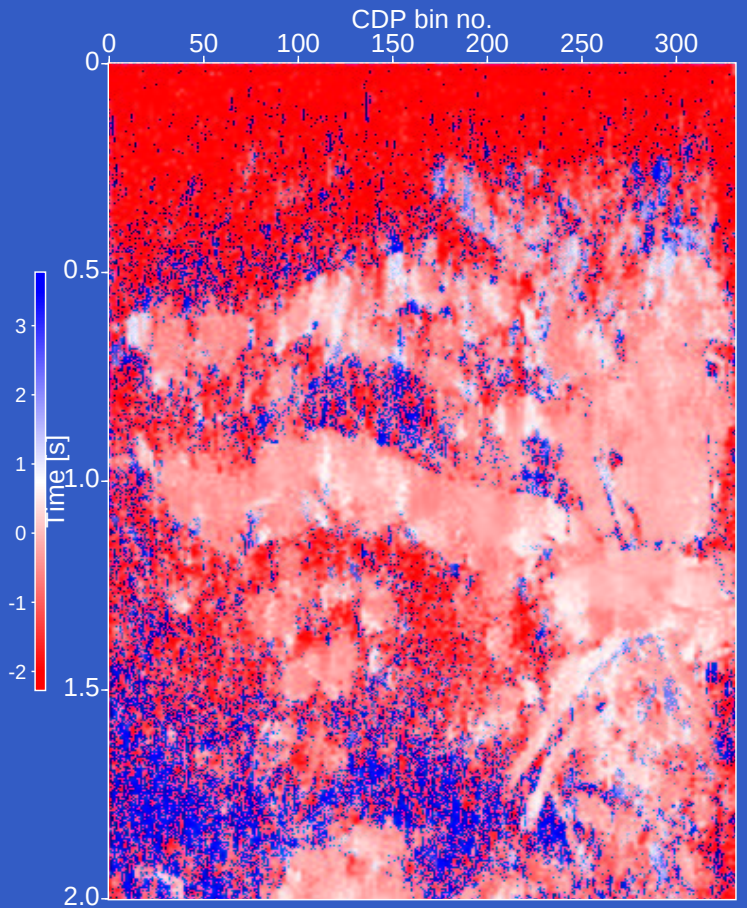


3D NMO/DMO

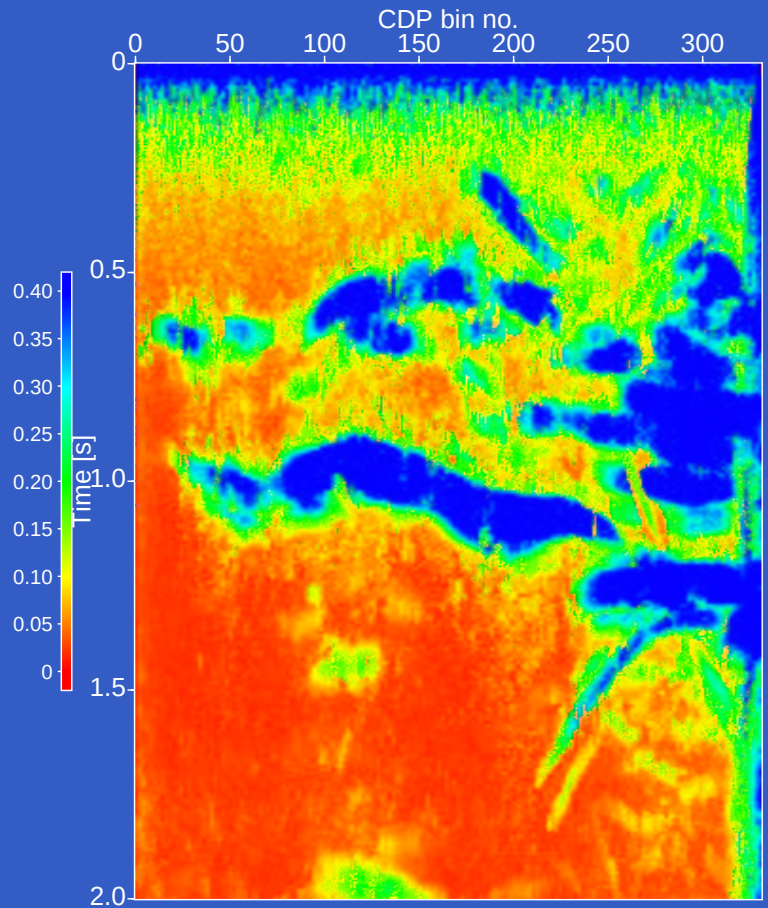


3D ZO CRS

Real data example



Curvature [1/km]



Coherence

Attributes

CRS Stack attributes have many applications:

- Macro-velocity inversion

  Tu. 2.10 pm: Tomographic velocity model inversion using kinematic wavefield attributes – E. Duveneck and P. Hubral, (IT 2.3)

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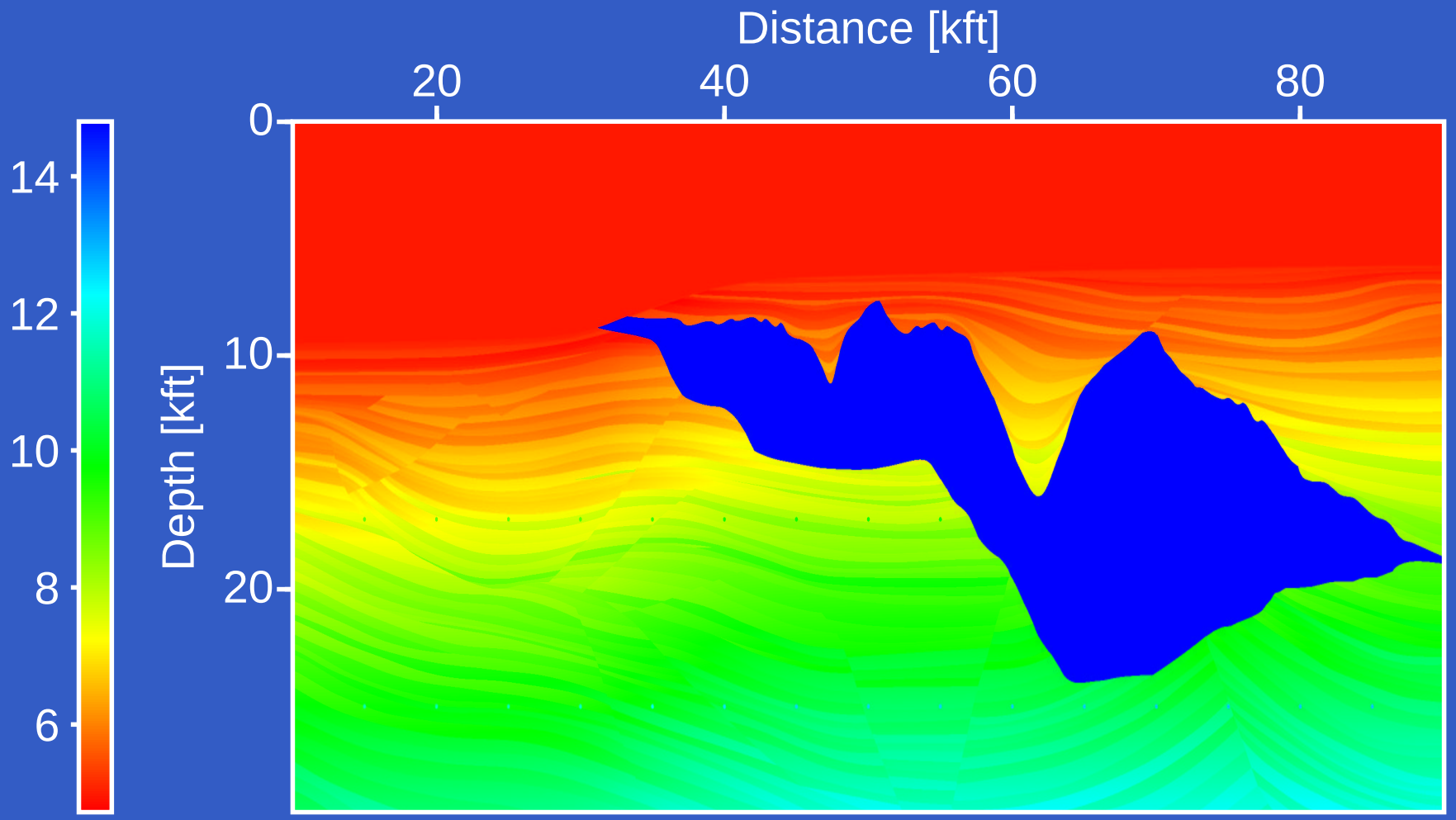
- Geometrical spreading factor
- Wavefield separation
- Model-independent time migration

Sigsbee 2A data



Interval velocity model [kft/s]

Sigsbee 2A data

Specific properties:

- Acoustic FD modeling of marine data

Model and data courtesy of SMAART JV.

Sigsbee 2A data

Specific properties:

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- No water-column related multiples

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Sigsbee 2A data

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Specific properties:

- Acoustic FD modeling of marine data
- No water-column related multiples
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- Virtually no uncorrelated noise
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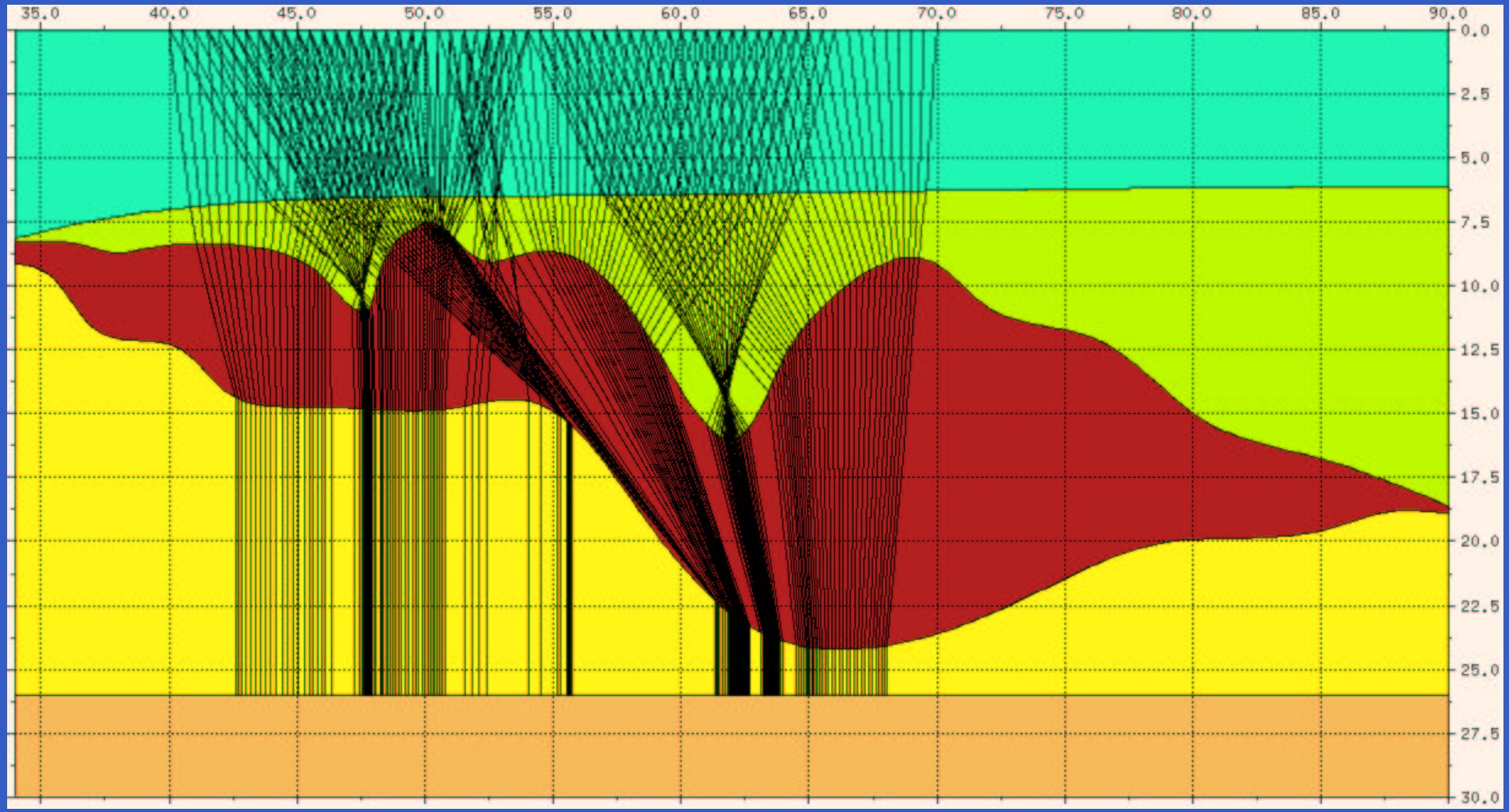
- Two rows of diffractors included

Model and data courtesy of SMAART JV.

Sigsbee 2A data

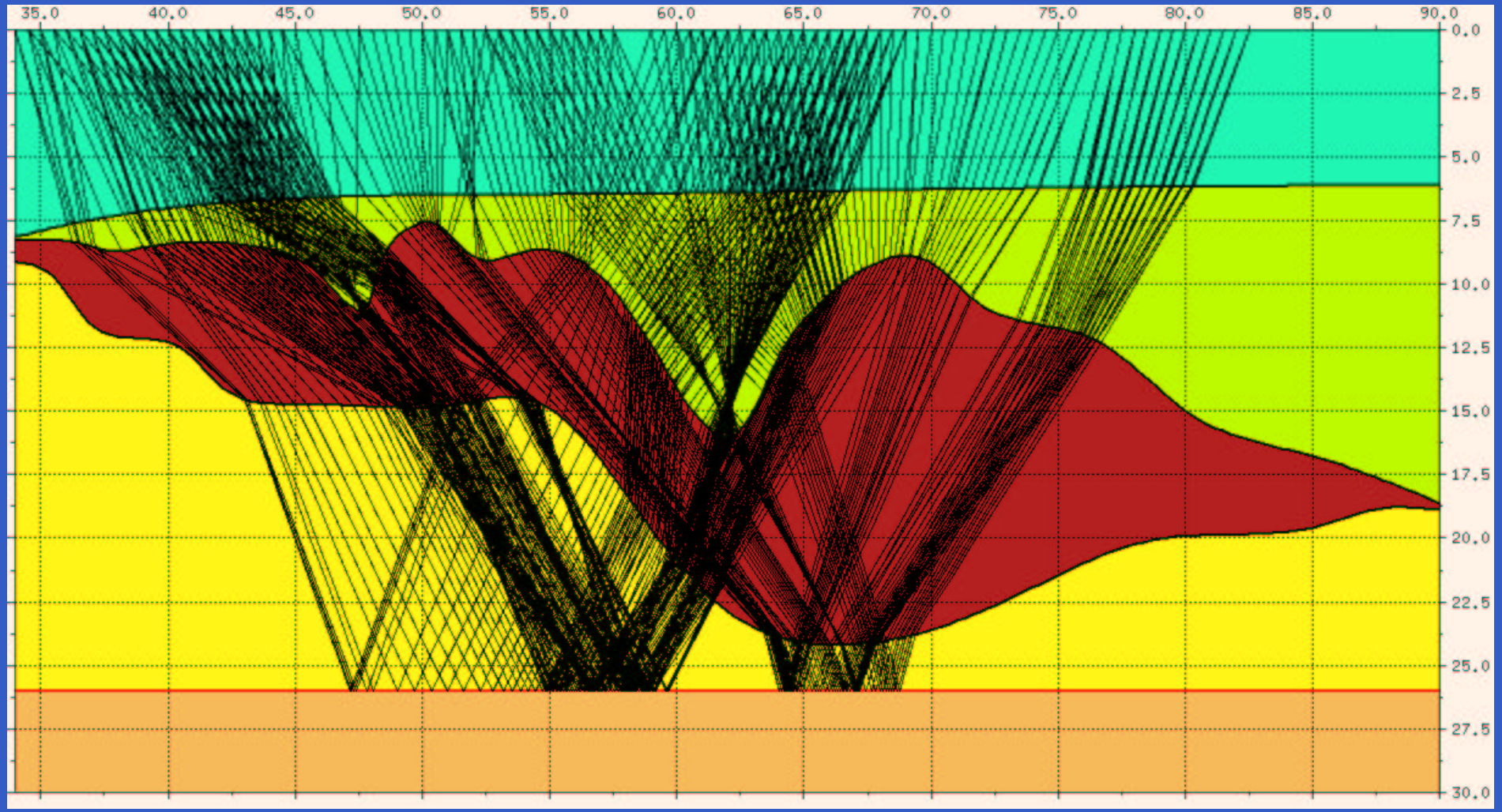
Normal rays



units in [kft]

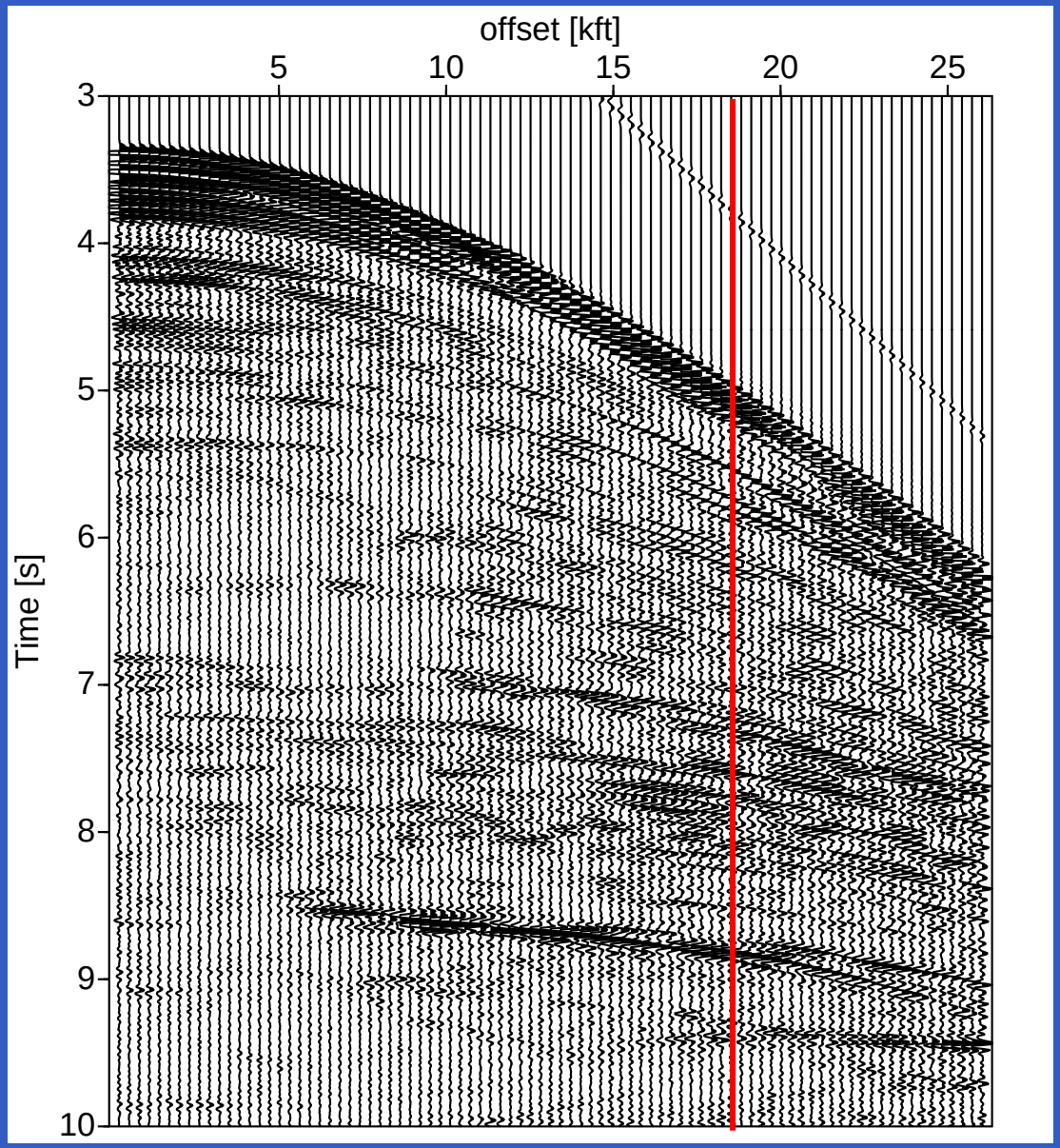
Sigsbee 2A data

CO rays (offset 25 kft)



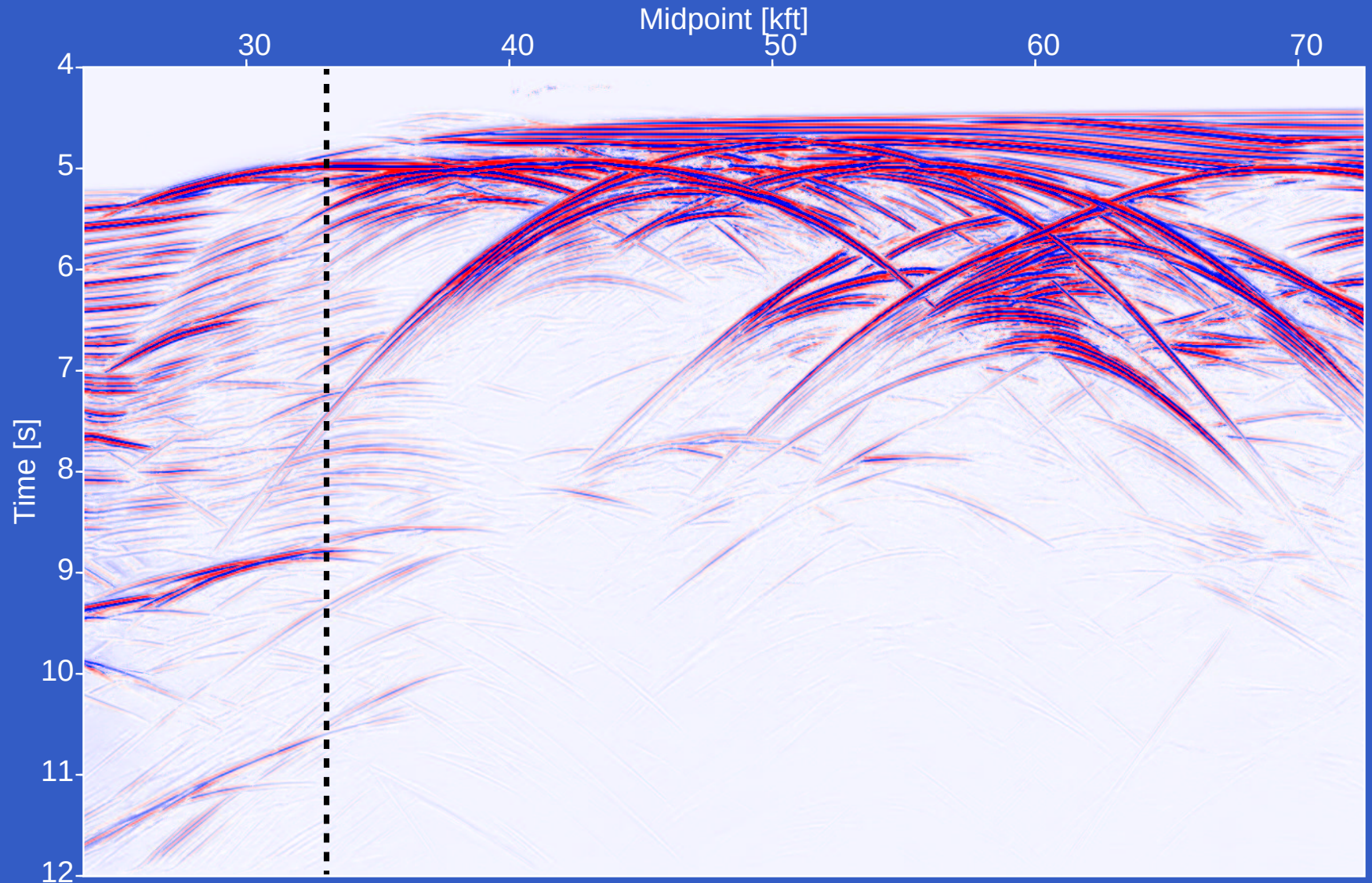
units in [kft]

Sigsbee 2A data



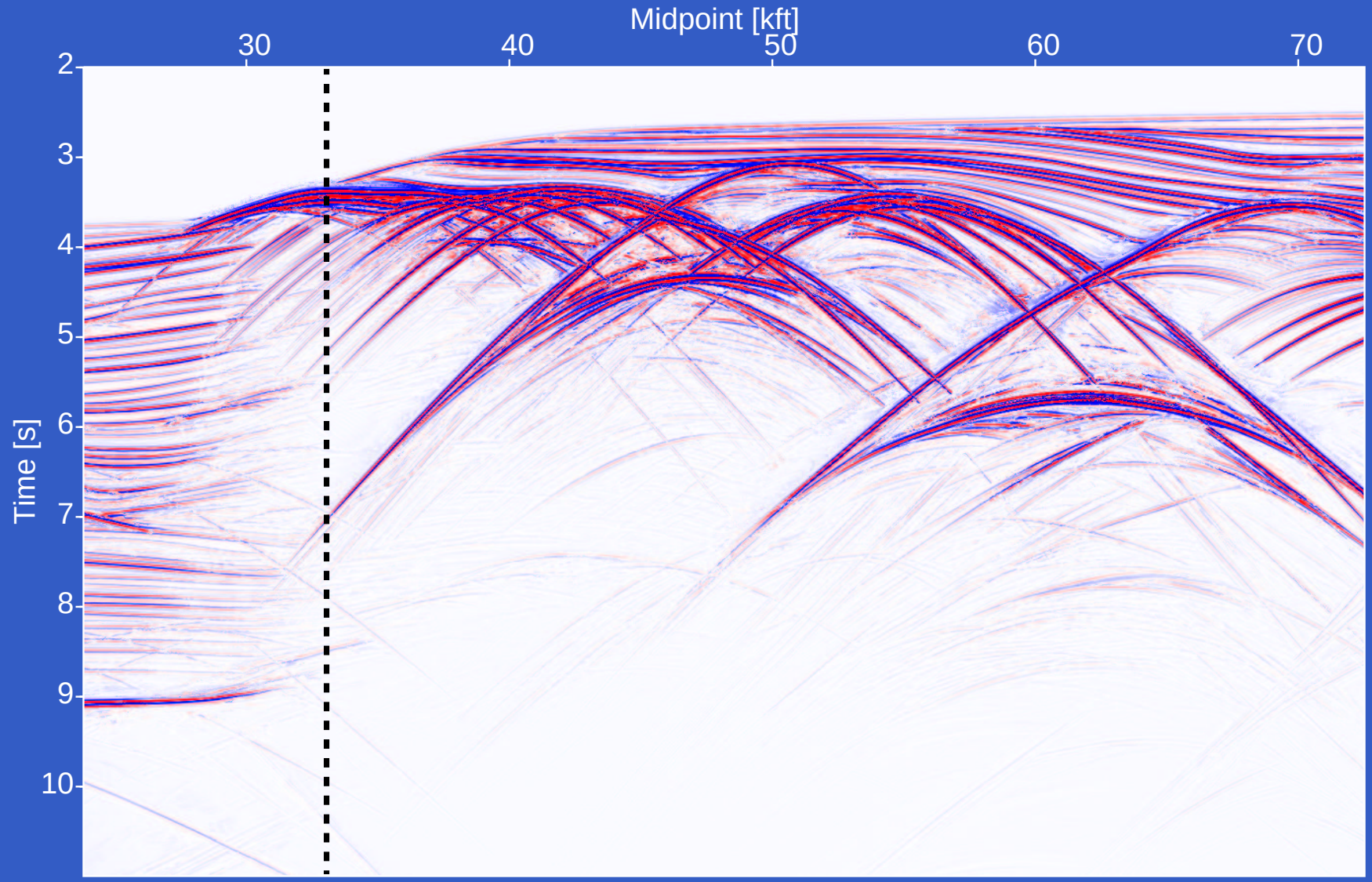
CMP gather
at 32487.5 ft

Sigsbee 2A data



CO CRS stack

Sigsbee 2A data



ZO CRS stack

Observations

- Subsalt energy at far-offset imaged

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- Depth migration of CO CRS Stack section yields additional information to depth migration of ZO CRS Stack section

Conclusions

The data-driven CRS Stack has:

- High signal-to-noise ratio

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Conclusions

CO CRS Stack:

- Local description of reflection events by hyperboloids at common-offset

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CO CRS Stack:

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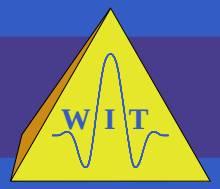

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CO CRS Stack:

- Local description of reflection events by hyperboloids at common-offset
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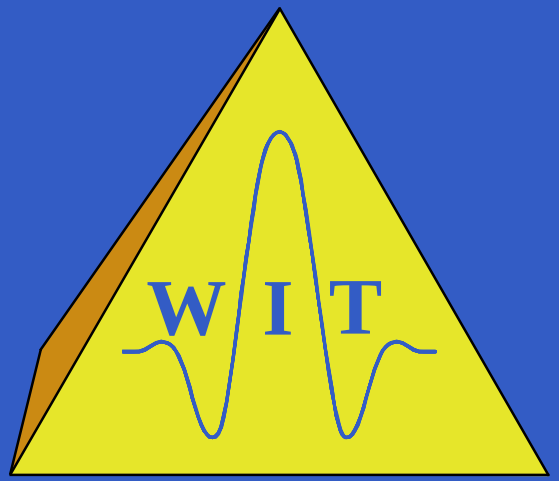
- Reflections with non-hyperbolic moveouts manageable
- Complicated subsalt reflections manageable

Acknowledgments



This work was supported by the sponsors of the *Wave Inversion Technology Consortium.*