Surface Reflection Response

Marchenko Equations

Macro-Velocity

$G^+$

$G^-$

Redatumbed RTM
- retrieve Green’s function
- image not contaminated by artifacts from multiples
Strategies for imaging with Marchenko-retrieved Green’s functions

Satyan Singh and Roel Snieder

Center for Wave Phenomena
Key points

- wrong imaging condition = artifacts
Key points

- wrong imaging condition = artifacts
- only primaries construct the image
1D Model

Free surface

$\rho_1 = 2 \text{ g/cm}^3 \quad v = 3 \text{ km/s}$

1.5 km

$\rho_2 = 4.5 \text{ g/cm}^3 \quad v = 3 \text{ km/s}$

2.2 km

Homogeneous half-space
Green’s functions

Free surface

$G^+$

$G^-$
Correlation Imaging

![Correlation Imaging Graph](image-url)
Imaging

\[ G^- = R_0 \, G^+ \]
Deconvolution Imaging
Imaging

\[ G^- = R_0 \ G^+ \]
Imaging

\[ G^- = R_0 \ G^+ \]
$G^- = R_0 G^+$

Homogeneous half-space
Redatuming
Correlation Imaging with $G_f^+$ and $G^-$
Deconvolution Imaging with $G_f^+$ and $G^-$
Target
Velocity input
Correlation image
Comparison

Depth (km)

Amplitude

True  MDD  Cor  Dec
Comparison

![Comparison Diagram]

- **Depth (km)**
- **Amplitude**

- True
- MDD
- FA

**MDD**

**FA**
Depth (km)

x (km)
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