Illumination compensation for subsalt image-domain wavefield tomography

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Objective function

\[ J = \frac{1}{2} \| P(\lambda) R(x, \lambda) \|_{\lambda,x}^2 \]

*\( R(x, \lambda) \): space-lag extended images
*\( P(\lambda) \): penalty

(Symes, 2009)
\[ P = |\lambda_x| \]
updated
partial data

updated
full data

updated
\[ P = |\lambda_x| \]

assuming good illumination
Illumination-based penalty

\[ P_e (x, \lambda_x) = \frac{1}{E[R_e (x, \lambda_x)]]} \]

\( R_e \): illumination gathers

\( E \): envelope
migrate with initial model ...
... keep zero-lag extended images only ...
... demigrate/migrate with same model ...
... construct penalty operator
w/o illumination

updated
w/ illumination

updated
w/o illumination

updated
Conclusions

- DSO penalty assumes good illumination
- Poor illumination degrades tomography
- Include illumination information in penalty
Acknowledgments

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