Projects on Volve data

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Assignment

Implement a basic processing step from the seismic reflection processing flow using the open Volve dataset – the data will be introduced it in the next lab and can be obtained from:
https://drive.google.com/drive/folders/1rq5x_GJxPhV5v111aPG7BHbVPAVgRiH0?usp=share_link

In the next pages you can find some suggestions. Alternatively, you may choose a processing step of your choice – please check with me before starting to read the paper.

Past projects

Past projects can be found at https://github.com/DIG-Kaust/Seismology-Projects

Feel free to build on top of those projects (e.g., time migration requires V_{rms} model with NMO analysis)

BUT

Do not do the same project (can be the same problem but must be tackled in a fundamentally different way – <u>check with me</u>)

Ideas for processing of Volve data

Simple:

- FK filtering

- Source wavelet designature

- Dead trace identification and replacement

- ~~Semblance analysis and NMO Moveout correction~~

- Time2depth conversion of migration stacks

Ideas for processing of Volve data

Challenging:

- ~~Multiple removal by moveout in parabolic Radon domain~~

- Predictive deconvolution

- ~~Post-stack time migration (can use the Volve velocity model converted into VRMS)~~

- Pre-stack time migration (can use the Volve velocity model converted into VRMS)

- P/VZ calibration with refractions (not covered in class)[1]

- ~~Wavefield separation (not covered in class)[2]~~

- ~~Deblending (not covered in class)[3]~~

- Post-stack depth migration (can use our raytracer and Volve velocity model - 2 people)

- Pre-stack depth migration (can use our raytracer and Volve velocity model - 2 people)

- First break picking and refraction traveltime tomography (can start from https://github.com/DIG-Kaust/RefrTomo - 2 people)

- More??

Ideas for processing of Volve data

References:

1
- Melbo, A. H. S, Robertsson, J. O. A. and Van Manen, D. J. [2002], PZ calibration by applying the equation of motion to critically refracted waves. 72nd Meeting, Society of Exploration Geophysicists, Expanded Abstract, 1030-1033.
-Vector Fidelity of OBC Data and Seafloor Coupling of the Vertical Component J. Gaiser, A. Melbø, F. Barr, J. Robertsson, D. Van Manen/WesternGeco; and J. Paffenholz.

2
Chu, M.; Yu, P. Wavefield Decomposition of Ocean-Bottom Multicomponent Seismic Data with Composite Calibration Filters

2
Abma et al., 2010, High Quality Separation of Simultaneous Sources by Sparse Inversion, Geophysics.