Prestack migration-driven 5D interpolation - Program interpolation5d

Computation flow chart

Theory

Inadequate sampling has always been a problem for seismic acquisition. Obstacles give rise to gaps during land seismic acquisition which can cause migration artifacts. Missing azimuths hinder AVAz analysis and prestack inversion, while missing offsets hinder AVO and prestack inversion analysis. To address these data sampling limitations, various methods of 5D interpolation have been applied to predict missing data in otherwise sparse seismic surveys. Ideally the result is a more uniform distribution, increasing the signal-to-noise ratio and suppressing acquisition footprint.
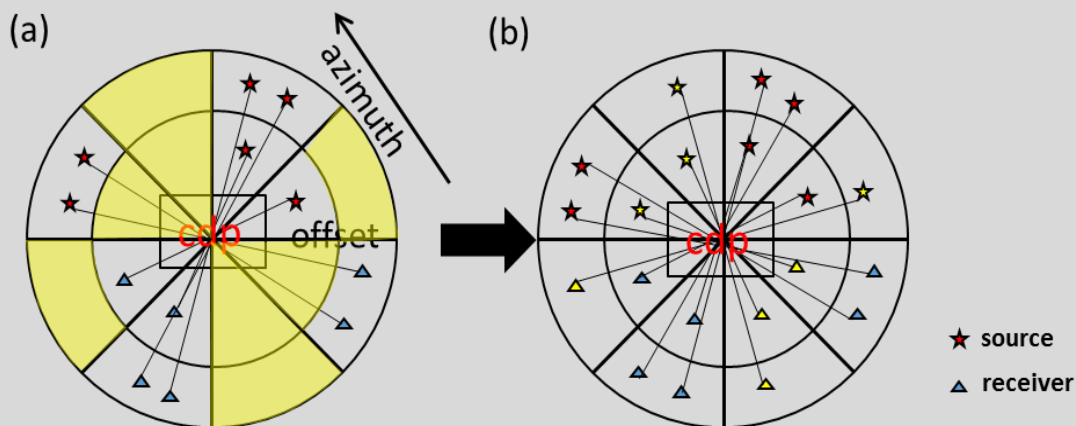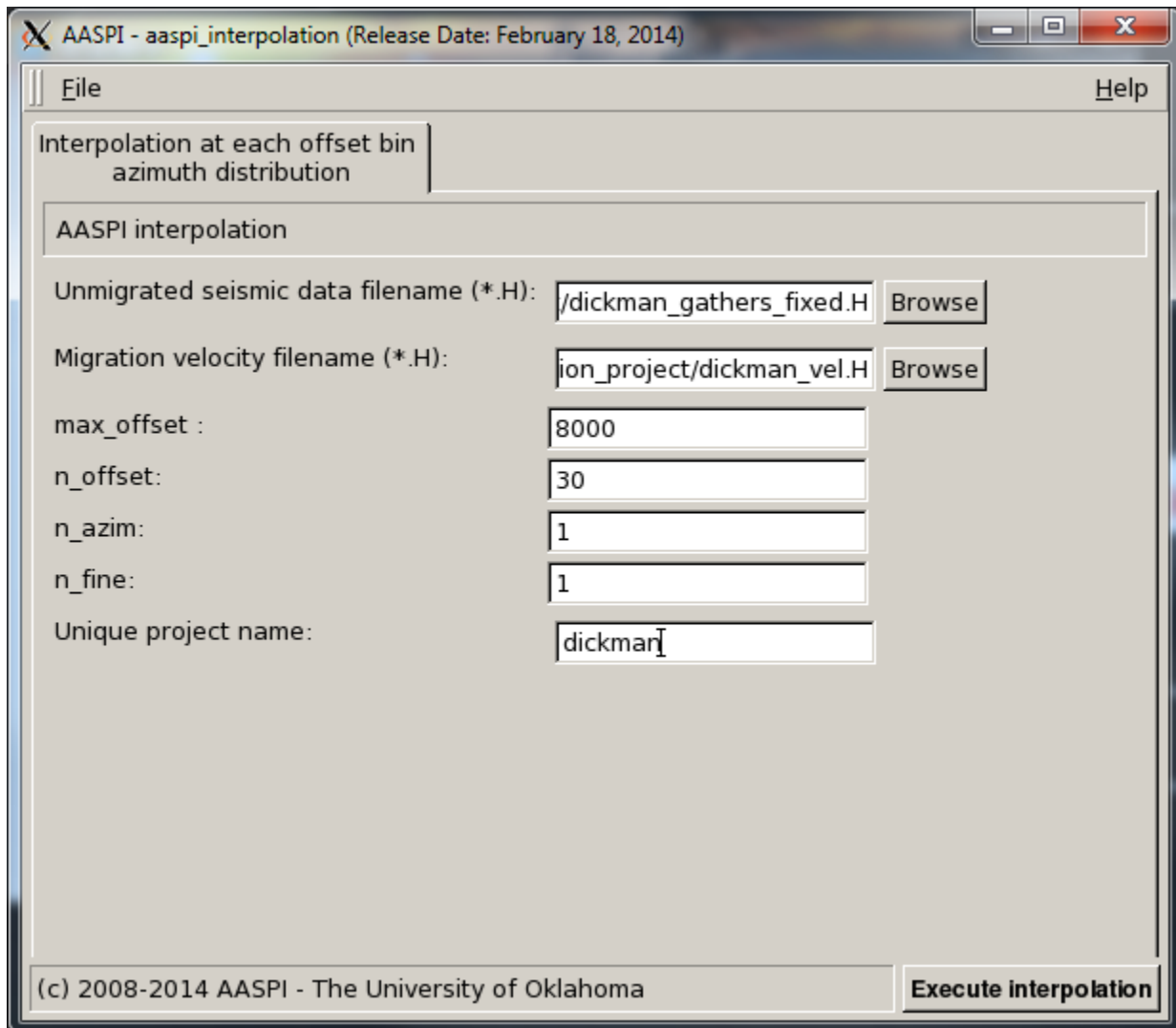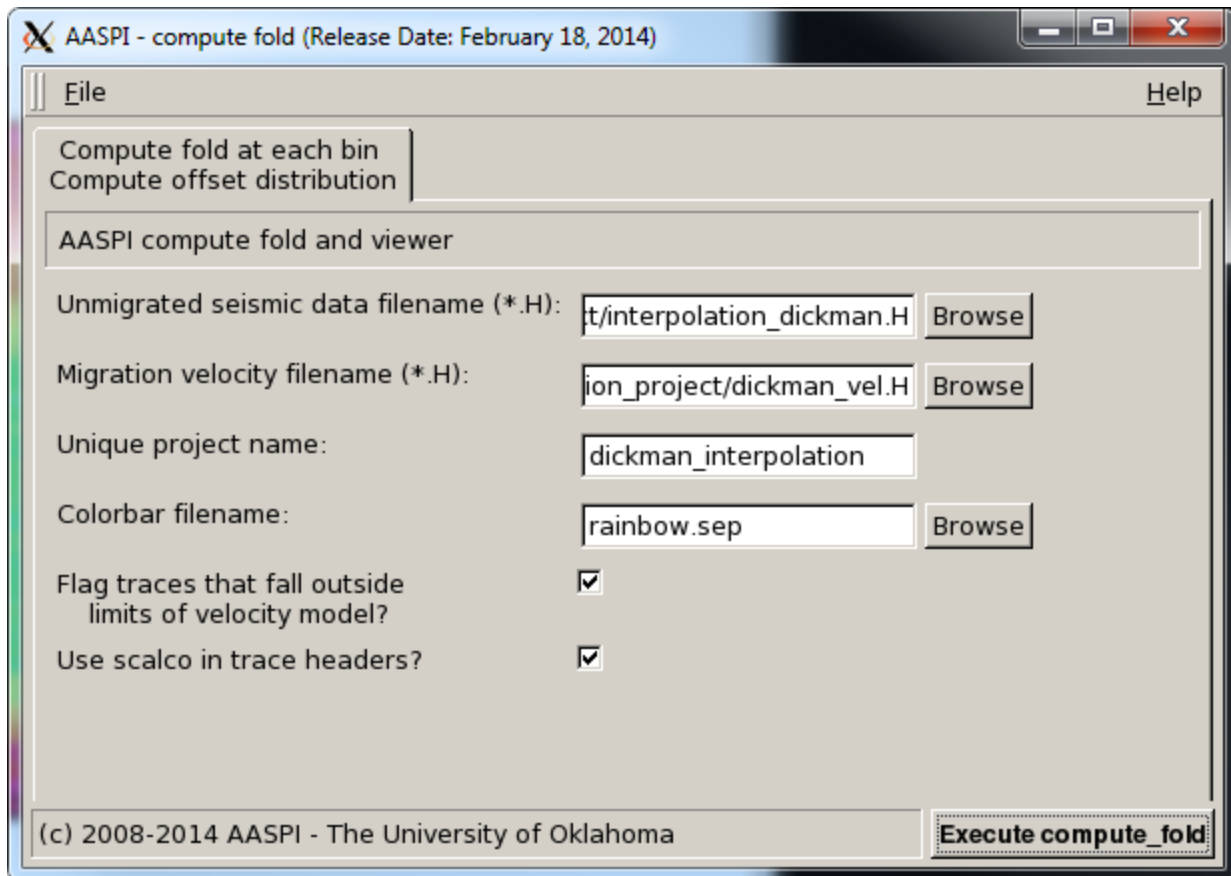

Figure 1, Cartoon showing a CMP with two offsets and four azimuthal sectors. (a) Measured data with four filled and four empty bins. (b) After interpolation each bin has at least one trace.

Prestack Data Conditioning: 5D Interpolation – Program **interpolation5d**

Computing migration-driven 5D-interpolated data

Afterward you can get file of interpolation_dickman.H, afterward please open aaspi_compute_fold as below:

X AASPI - compute fold (Release Date: February 18, 2014)

File   Help

Compute fold at each bin
Compute offset distribution

AASPI compute fold and viewer

Unmigrated seismic data filename (*.H):   t/interpolation_dickman.H   Browse

Migration velocity filename (*.H):   ion_project/dickman_vel.H   Browse

Unique project name: dickman_interpolation

Colorbar filename: rainbow.sep   Browse

Flag traces that fall outside
   limits of velocity model?   ☑

Use scalco in trace headers?   ☑

(c) 2008-2014 AASPI - The University of Oklahoma   Execute compute_fold
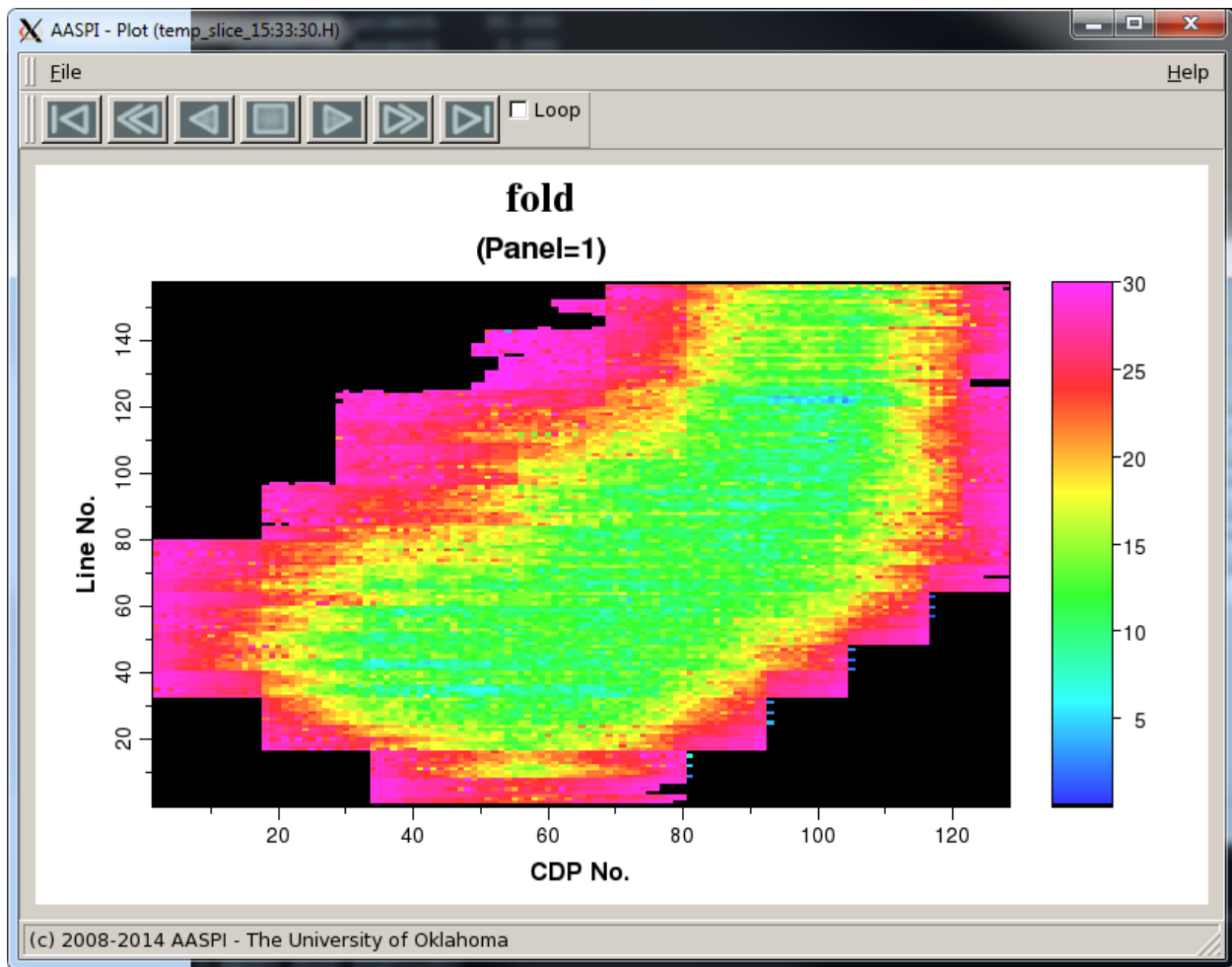
Then you can get the fold and offset distribution map of your interpolation file, then please open aaspi_azim_offset_demig program:

Prestack Data Conditioning: 5D Interpolation – Program **interpolation5d**

AASPI - program azim_offset_demig (Release Date: February 18, 2014)

File   Help

3D Kirchhoff prestack time migration into offset and azimuth bins

Input Unmigrated Seismic Gather File Name (*.H): | t/interpolation_dickman.H | Browse

Input Velocity Volume File Name (*.H): | ion_project/dickman_vel.H | Browse

Input Migration File Name (*.H): | man_migration_muted_0.H | Browse

Input Fold Map File Name (*.H): | d_dickman_interpolation.H | Browse

Input Offset Information (*.H): | t_dickman_interpolation.H | Browse

Mute Input (*.H): | | Browse

*Unique Project Name: | dickman_interpolation | Load default values

Suffix: | 0 |

| Typical | Coordinates | Extended |

Minimum frequency:	2
Maximum frequency:	120
Number of offset bins:	30
Minimum Offset:	0
Maximum Offset:	7982
nazim:	1
Taper length in time:	0.1
Max emerge angle:	30
Taper length for migration operator:	500
Migration Aperture:	10000
t_power:	-1

Want Migration Result?   ☑ required
Output amplitude weight file?   ☐
Output file showing maximum frequency imaged at each time-offset pair? ☐

(c) 2008-2014 AASPI - The University of Oklahoma   **Execute azim_offset_demig**

Prestack Data Conditioning: 5D Interpolation – Program **interpolation5d**

Afterward you can get your interpolation file from demigration, here we name it like mod_dickman_interpolation.H. Then we open aaspi_azim_offset_mig and use mod_dickman_interpolation.H for migration.

Prestack Data Conditioning: 5D Interpolation – Program **interpolation5d**

Then, you get your interpolated migrated result from your demigrated shot gathers. At last, you merge your original migrated prestack data d_mean_filt_dickman_migration_muted_0.H and interpolated migrated result d_mig_dickman_interpolation_0.H together by aaspi_merge_survey
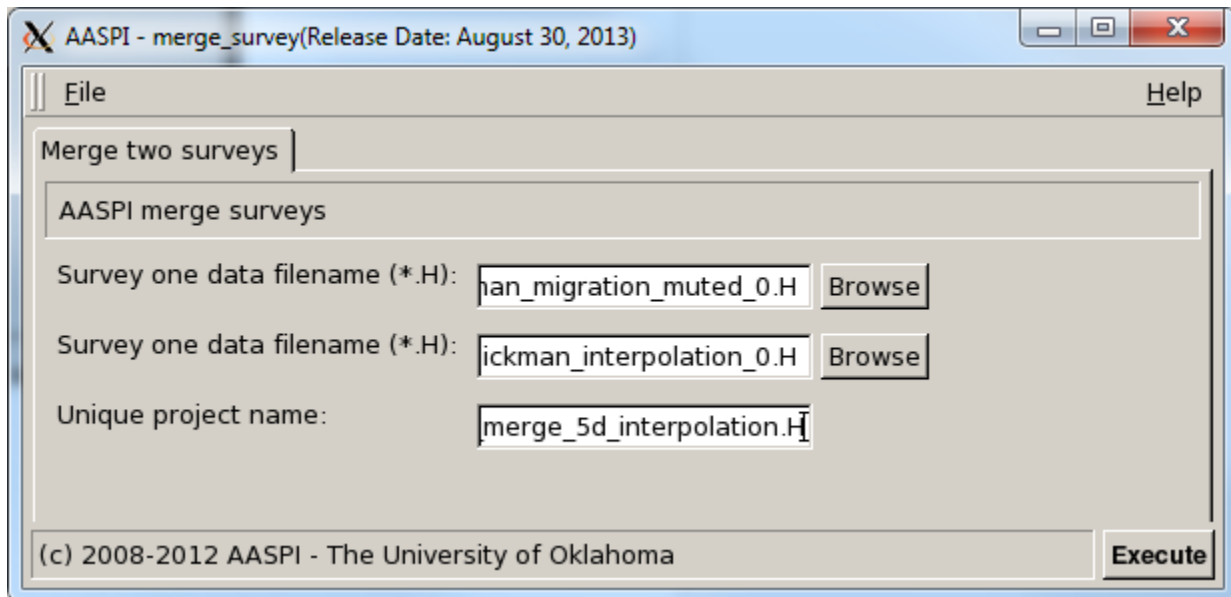
Ideally you can get result like this:

Prestack Data Conditioning: 5D Interpolation – Program **interpolation5d**