2D SEISMIC UTILITIES – PROGRAMS
aaspi_segy_read_batch, aaspi_2d_combine, aaspi_pseudo3d_split
aaspi_mega2d_split, aaspi_segy_write_batch

Contents

Introduction

Most of AASPI utilities, such as **dip3d**, **spec_cwt**, and **som3d**, are designed to work on both 2D and 3D single datasets. However, for surveys containing hundreds of 2D lines, running attribute calculation for each line can be a tedious job. These 2D Seismic Utilities are designed to group such a large amount of 2D lines into a single pseudo-3D seismic volume or a mega-2D line so that the user can perform attribute analysis on all the lines at once, and then split the results back to 2D lines.

A pseudo-3D seismic volume is a seismic cube in which each inline is an input 2D seismic line. Inline length is defined as the length of the longest input line. All other shorter lines will be padded with zero traces to match the inline length.

A mega-2D seismic line is simply all the input 2D lines merged together, sequentially.
We recommend pseudo-3D approach for best compatibility, even though the pseudo-3D volume can have a lot of padded traces (and thus results in lower computational efficiency). The mega-2D approach is useful, only if you need to run spectral decomposition. This is because spectral decomposition operates trace-by-trace, while other attribute programs (such as **dip3d**) consider the entire mega-2D line as one single line and will load the entire line to the memory of the computer at once, which is too costly.

Convert multiple SEGY files to AASPI-formatted files and combine: Program aaspi_segy_read_batch

This tool will help you convert multiple 2D or 3D SEGY datasets into AASPI-formatted files. If the inputs are 2D lines, the program also helps you to group them into a pseudo-3D volume and/or a mega-2D line.

In the main **AASPI Utility GUI**, go to *Other Utilities* → *2D seismic utilities* → *convert multiple segy to AASPI and combine (*1A).
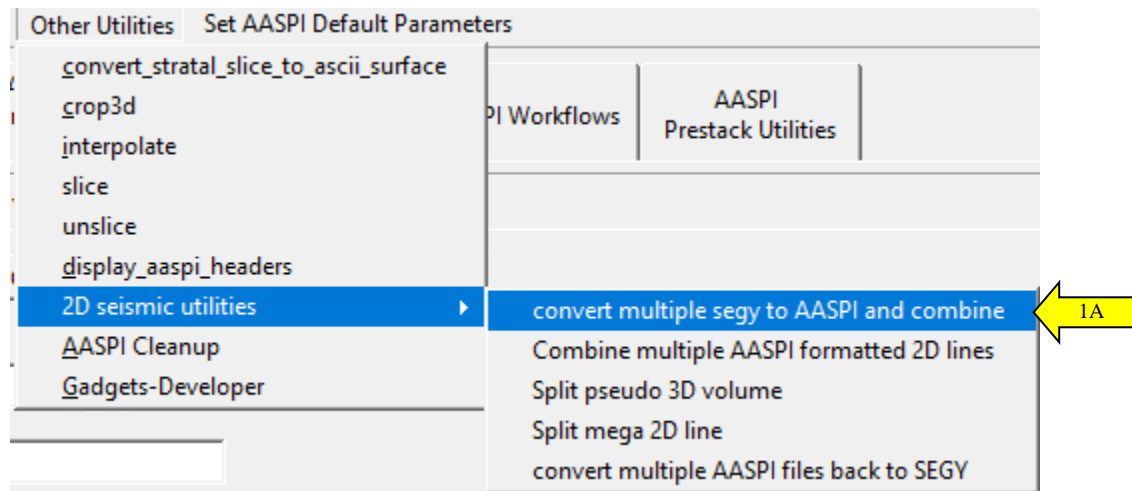
The aaspi_segy_read_batch GUI will be displayed (see next page):

Other Utilities: 2D Seismic Utilities
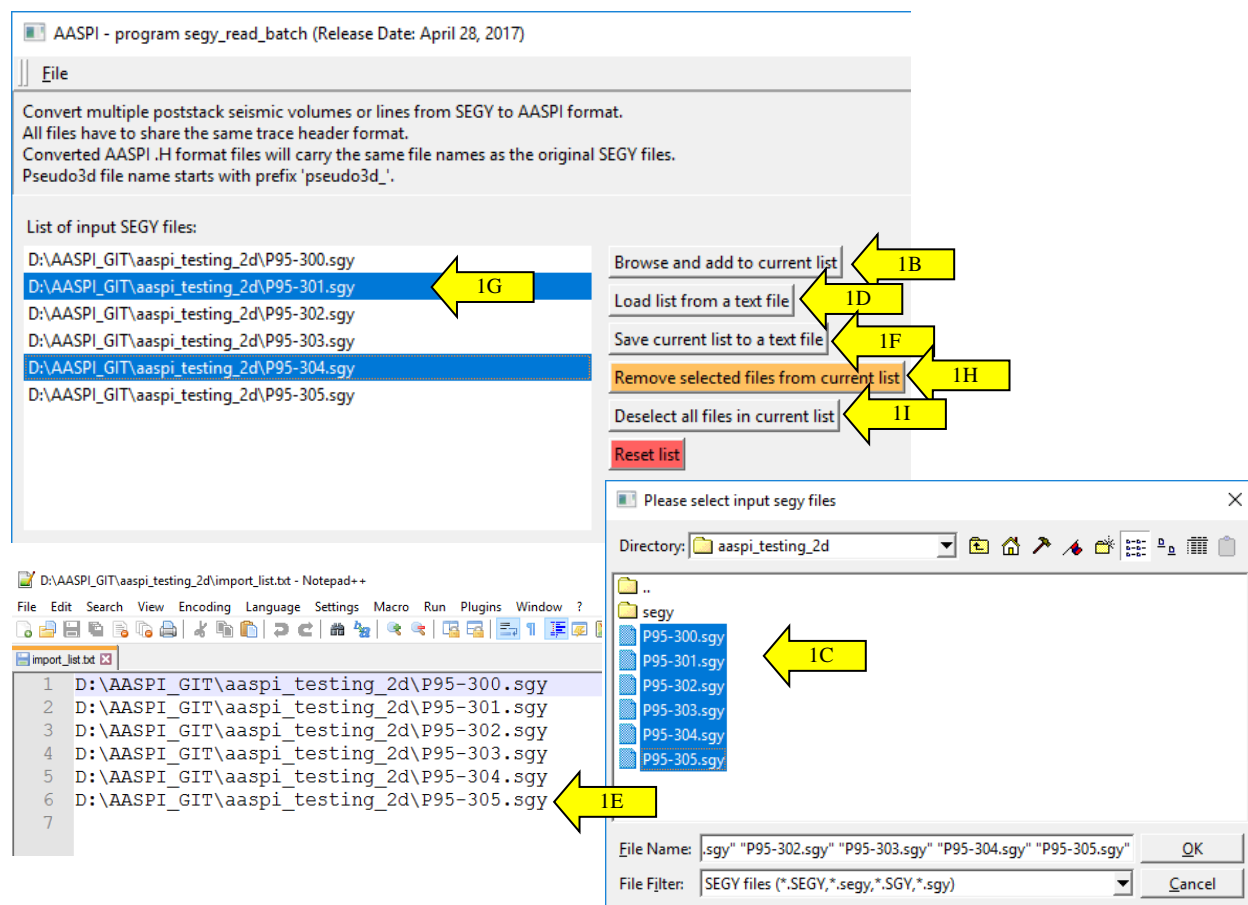
***A general guide of input list:***

Click "*Browse and add to current list*" button (1B) to select input files. You can select multiple files (1C).

You can also choose to load the list from a text file (1D). The text list should be formatted in such a way that each line of the text represents the full path to an input file (1E).

After you have selected multiple input files, you can save the list to a text file (1F), in case you want to load it later.

Within the list box, left click an item to select it (1G). You can select multiple items in the list by holding Ctrl + left click (or Shift + left click to select a chunk of adjacent items). To remove selected item, click (1H). You can deselect all items by clicking (1I). If you want to clean the list and start over, click "*Reset list*" (1J).

Other Utilities: 2D Seismic Utilities
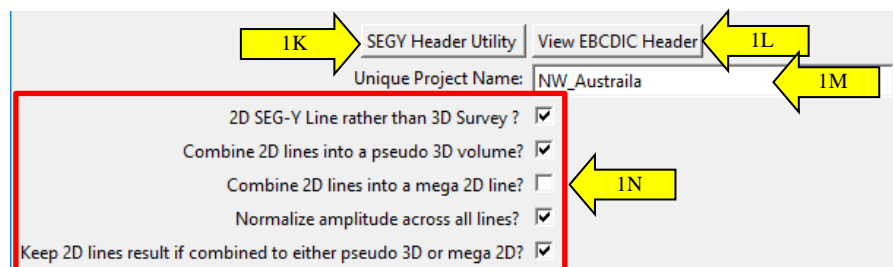
After you are done with the input list, you can use python SEGY header utility (1K) to quickly see important header values (such as inline, xline, cdp_x, cdp_y), or you can click on *View EBCDIC Header* button (1L) to see the ascii text header of the **first** SEGY file in the list. Then give the project a unique name (1M). This name will be used to construct the output file names.

Several options related to the grouping of multiple 2D input lines are in area (1N). By default, if you select 2D inputs, the "2D SEGY Line rather than 3D survey" will be automatically checked. Otherwise, if the input are 3D volumes, it will be automatically unchecked.

If the inputs are 2D lines, you can specify the grouping result to be a pseudo-3D volume and/or a mega-2D line, depend on your need. By default, for best compatibility, only pseudo-3D option is checked. The "*Normalize amplitude across all lines*" are set by default in order to make sure the grouped results have approximately the same amplitude range (otherwise, in future attribute calculations, you may encounter too many "spike detected" warning due to amplitude differences across the volume). By default, AASPI will keep the converted but ungrouped results.

After you have identified the header byte locations, specify them in (1O). If the inputs are 2D lines, byte location of inline is disabled since there is only one inline per line, by definition of a 2D line. When importing SEGY, it is crucial to know the parameters in (1P). Some datasets store cdp_x and cdp_y coordinates in an order of magnitude difference than the actual coordinates for precision and thus will need to have those headers scaled back to correct values. Similarly, the top and bottom mute headers might not be stored correctly and may cause problems down the road if not ignored.

After all parameters and options are set, click *Execute* (1Q). The individually converted results will have the same name with the corresponding input SEGY files, with extension ".H".

The grouped result will be named:

"pseudo3d_<unique_project_name>.H"
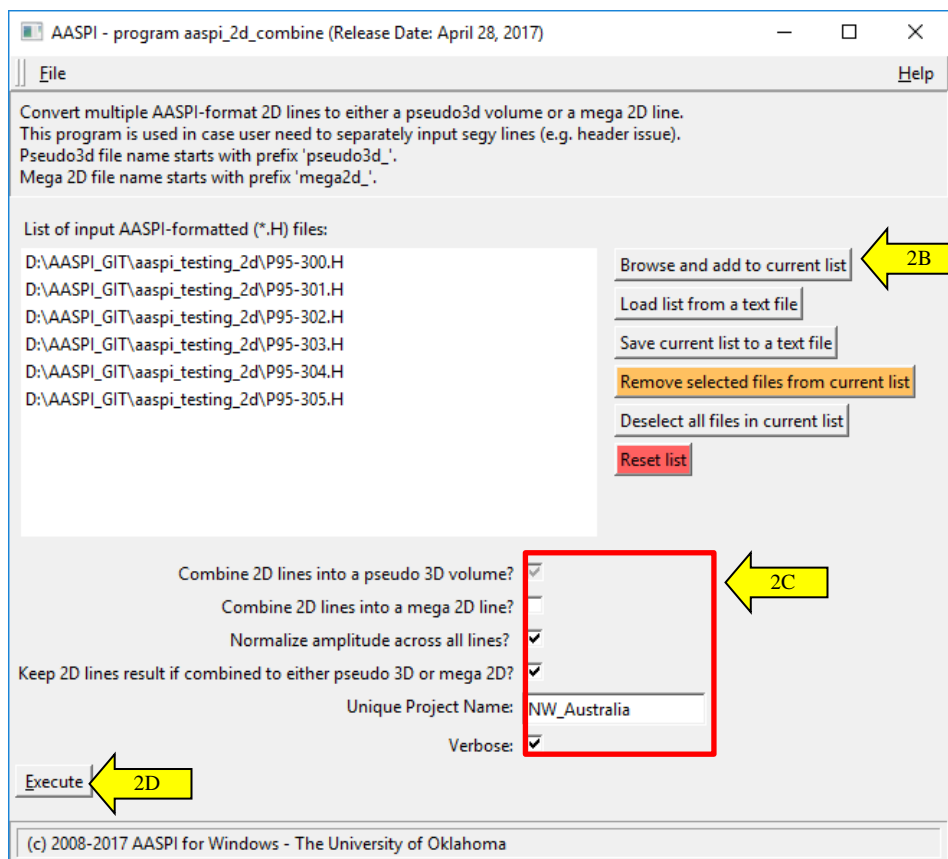 **and/or**
"mega2d_<unique_project_name>.H".

Combine multiple AASPI-formatted 2D lines: Program aaspi_2d_combine

This tool will help you group multiple AASPI-formatted 2D lines (*.H) into a pseudo-3D volume and/or a mega-2D line. It is designed in case the input SEGY files have different header configurations and cannot be imported all at once using **aaspi_segy_read_batch**.

In the main **AASPI Utility GUI**, go to *Other Utilities → 2D seismic utilities → combine multiple AASPI-formatted 2D lines* (2A).
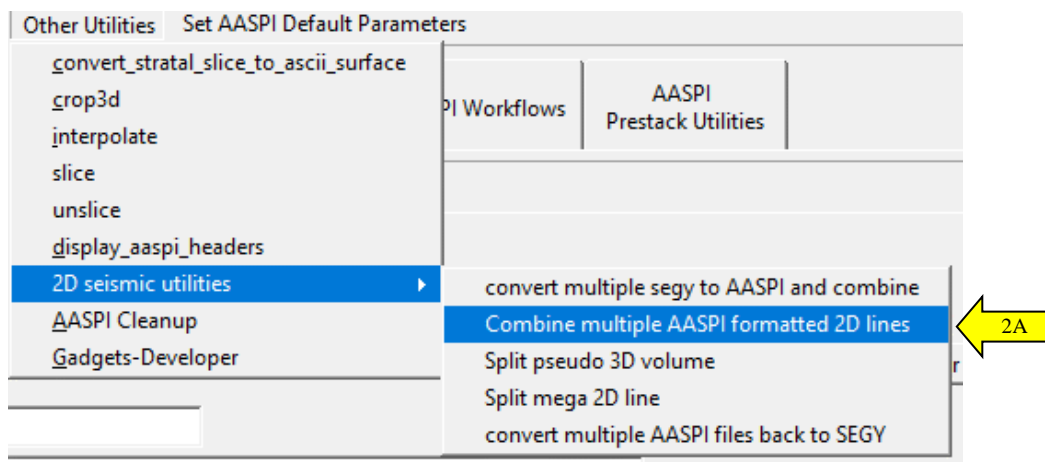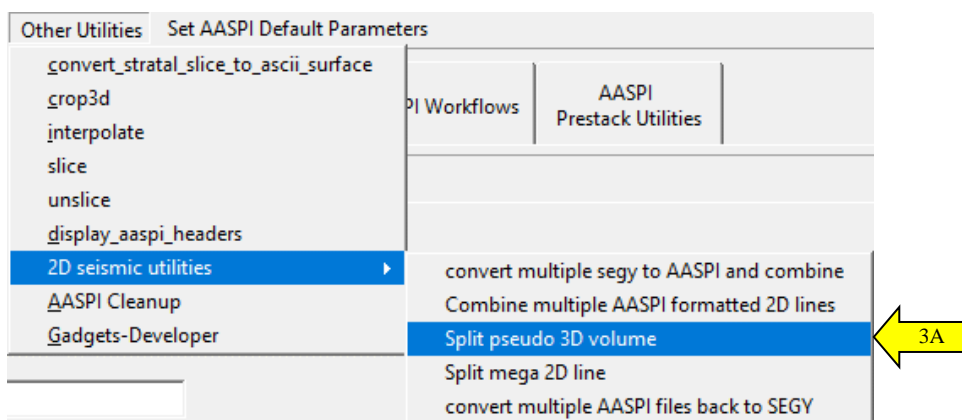

The **aaspi_2d_combine** will display as seen below:

Browse and select input AASPI-formatted 2D lines (2B). Refer to "A General Guide to input list" in section 1 for more details regarding the list box. You can choose to group the lines into pseudo-3D volume and/or mega-2D line (2C). By default, the input lines will be normalized to make sure they have the same amplitude range (in order for the despiking procedure to work correctly). After all parameters are set, click *Execute* (2D) to run the program.

Split pseudo-3D volume: Program aaspi_pseudo3d_split

This tool will help you separate a pseudo-3D volume back into individual lines and convert those particular lines to SEGY format if needed.

In the main **AASPI Utility GUI**, go to *Other Utilities* → *2D seismic utilities* → *split pseudo-3D volume* (3A).

The **aaspi_pseudo3d_split** GUI will be displayed (see next page):

Browse to the pseudo-3D volume you want to split (3B). By default, prefix is set to be the name of the attribute corresponding to the input, and unique project name is automatically loaded (3C). You only need to specify suffix. Prefix, unique project name, and suffix are used to construct output file names.
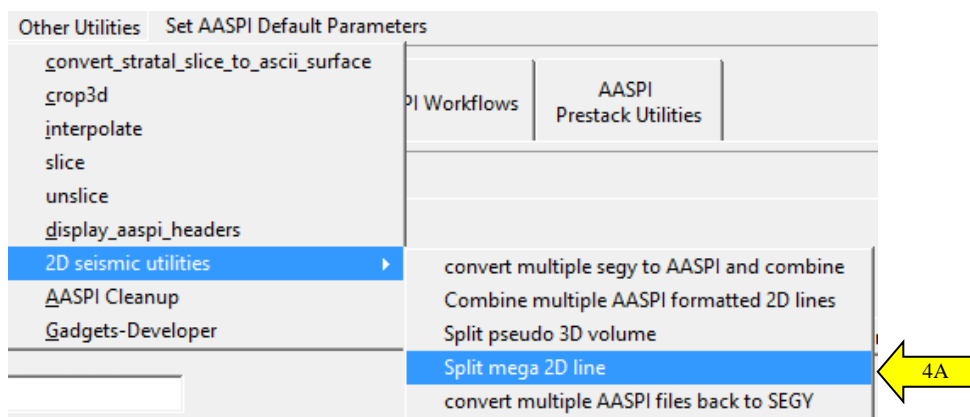
You can choose to convert the split lines into SEGY format (3D). If you choose to convert them into SEGY, browse to the directory where you want the SEGY to be output to (3E). You can choose to keep or remove the intermediate AASPI-formatted lines (3F) and then specify header byte locations of the output SEGY files (3G). After all parameters are set, click *Execute* (3H) to run the program.
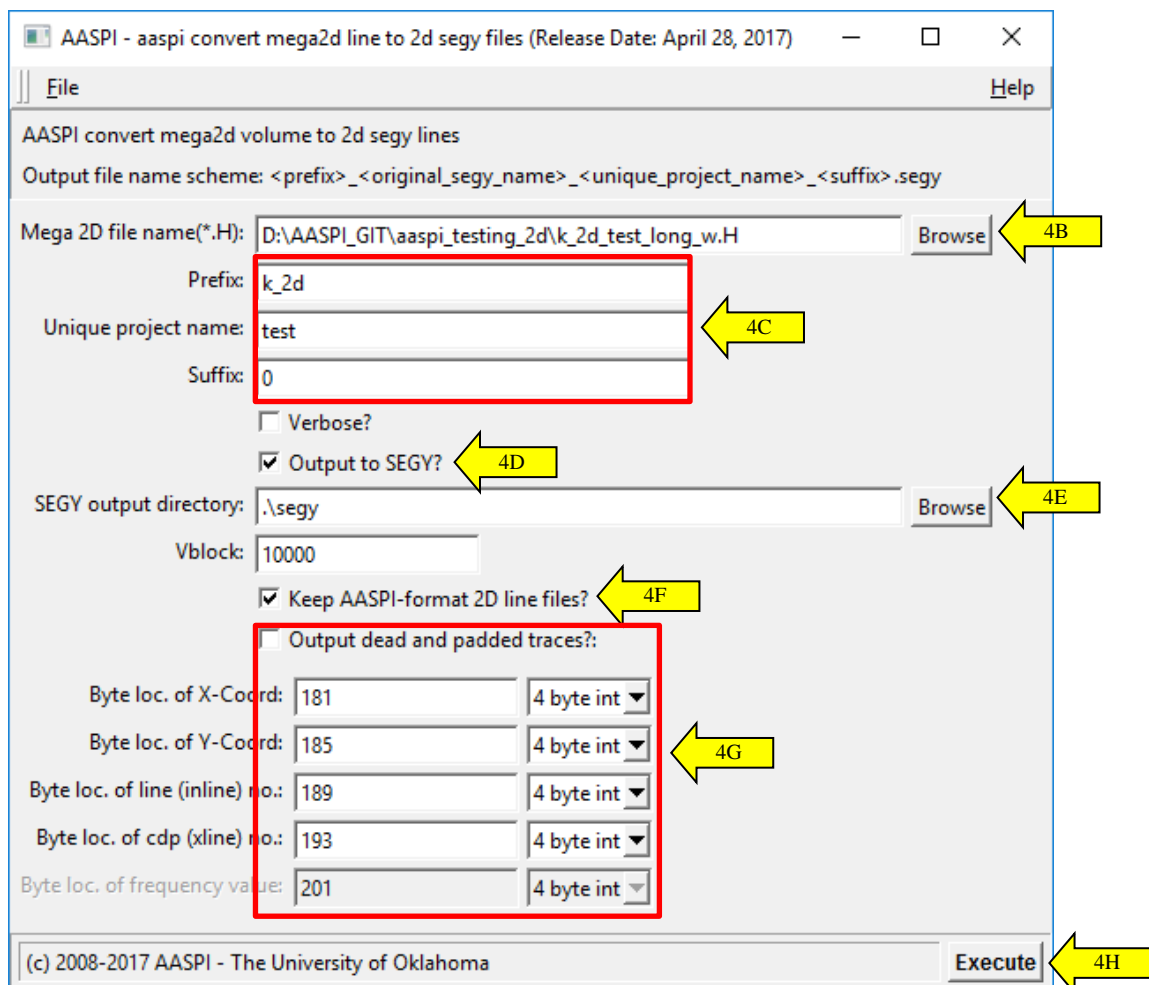
Split mega-2D volume: Program aaspi_mega2d_split

This tool will help you separate a mega-2D line back into individual lines and convert those lines to SEGY format if needed.

In the main AASPI Utility GUI, go to Other Utilies → 2D seismic utilites → split mega-2D line (4A).

The aaspi_mega2d_split GUI will pop up:

Other Utilities: 2D Seismic Utilities

Browse to the mega-2D line you want to split (4B). By default, *Prefix* is set to be the name of the attribute corresponding to the input, and *Unique Project Name* is automatically loaded (4C). You only need to specify *Suffix*. *Prefix*, *Unique Project Name*, and *Suffix* are used to construct output file names.

You can choose to convert the split lines into SEGY format (4D). If you choose to convert them into SEGY, browse to the directory where you want the SEGY to be output to (4E). You can choose to keep or remove the intermediate AASPI-formatted lines (4F) and then specify header byte locations of the output SEGY files (4G). After all parameters are set, click *Execute* (4H) to run the program.
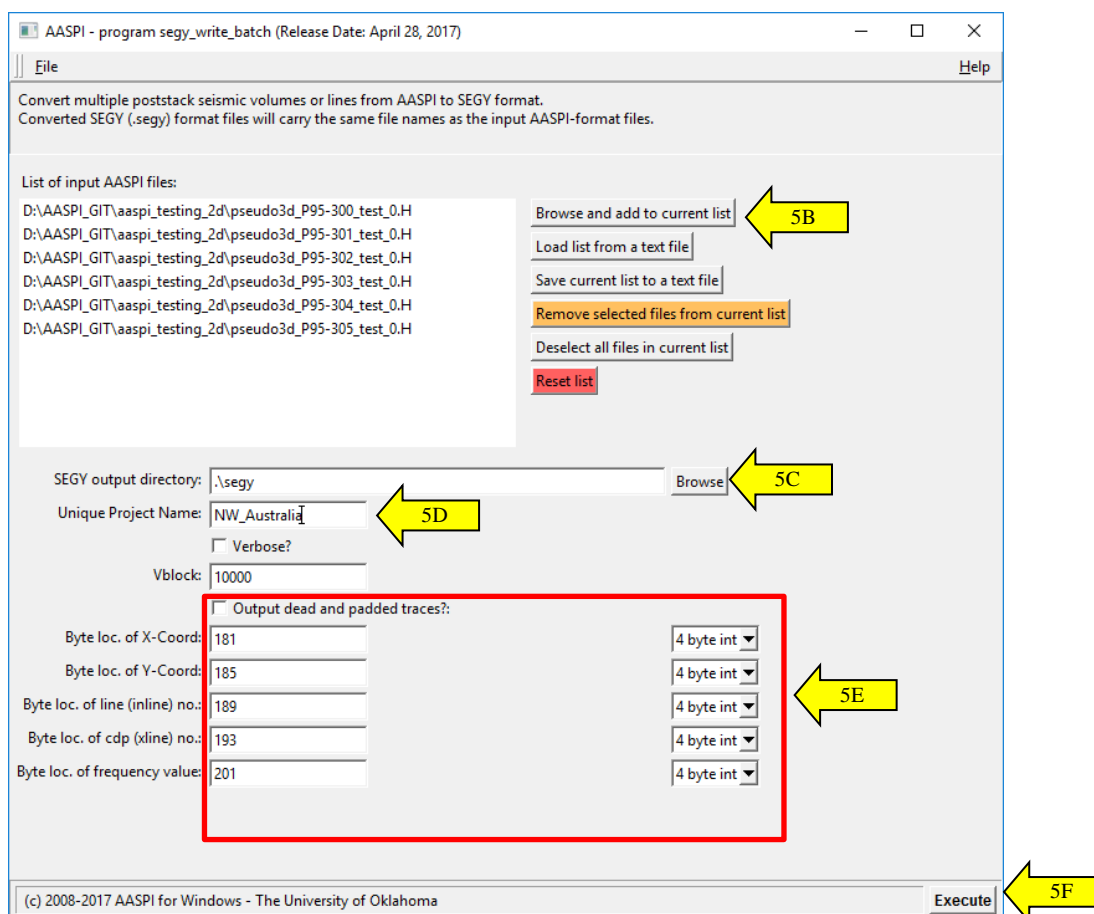
Convert multiple AASPI-formatted files back to SEGY: Program aaspi_segy_write_batch

This tool will help you convert multiple AASPI-formatted files back to SEGY. It works for both 2D and 3D post-stack datasets.

In the main **AASPI Utility GUI**, go to *Other Utilities → 2D seismic utilities → convert multiple AASPI files back to SEGY* (5A).
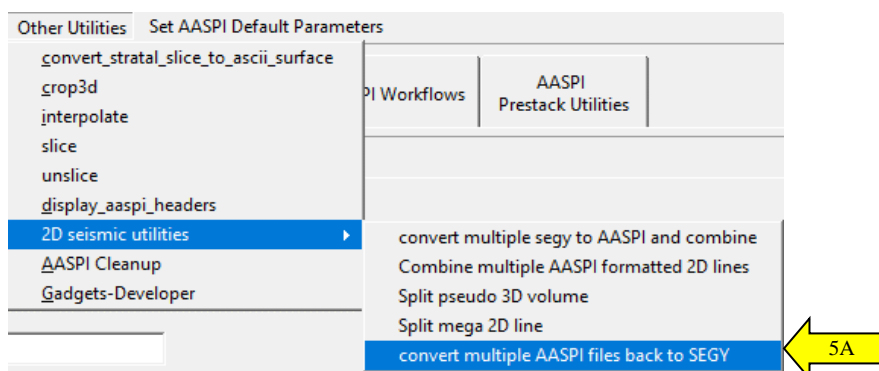
The **aaspi_segy_write_batch** GUI will pop up:

Browse and select AASPI-formatted files you want to convert to SEGY (5B). Then browse to the directory where you want the output SEGY files will be located (5C). Give it a *Unique Project Name* (5D). Specify header byte locations and types (5E).
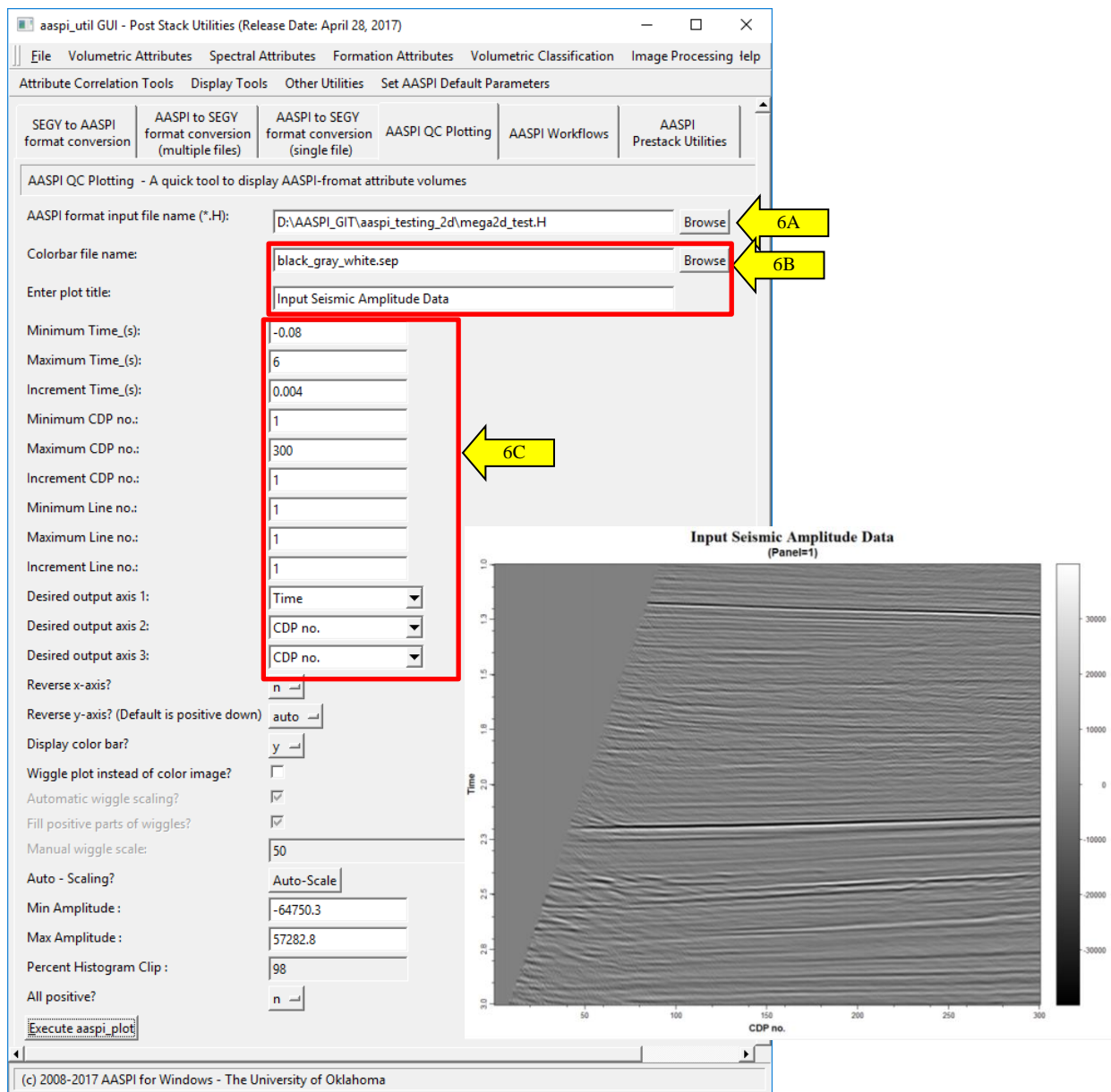After all parameters are set, click *Execute* button to run the program (5F).
The name of the output SEGY files will be the same with the name of the input AASPI files, with extension ".segy".

Display 2D or raw seismic data in general (including mega-2D line)

To display 2D seismic data or raw gathers, we use the *AASPI QC plot* tab in **aaspi_util** poststack GUI.

Browse to the 2D (or raw gathers) AASPI-formatted file (6A). Make sure the color bar is appropriate (6B). The most important thing (6C) is that the increment of the 3rd axis (in this case, line no) has to be greater than 0, and the CDP range is reasonable (max CDP – min CDP <= 1000, with CDP increment = 1 for a 1080p screen). Since we are displaying 2D data, DO NOT change the order of desired output axes.