Importing Bathy2010 sub-bottom profile into Petrel

Introduction

Petrel will load the SEG-Y files generated by the SyQwest Bathy2010 CHIRP sub-bottom profiling system so that these can be incorporated into a project that includes the site survey seismic, core and logging data. This assumes that a project already exists with at least the basic information that is needed (map projection etc) – these are covered in the Petrel manuals if not.

The principles are the same, whether you are loading the raw, processed or OCD-converted SEGY files.

Procedures

1. Start Petrel and load the existing project
2. Right click on the appropriate seismic data folder in the Petrel project. Choose "Import (on selection)" with the "SEGY Toolbox" option (**Fig. 1**). The other SEG-Y load options are unable to extract the navigation information.
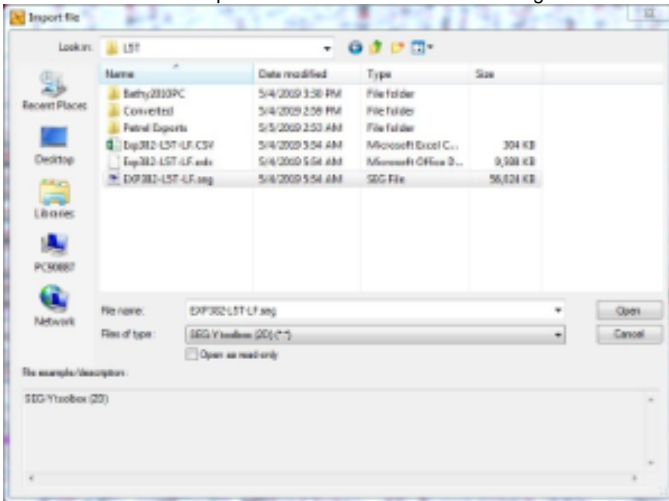

Figure 1: SEG-Y file selected for import into Petrel using the SEG-Y toolbox (2D) workflow.
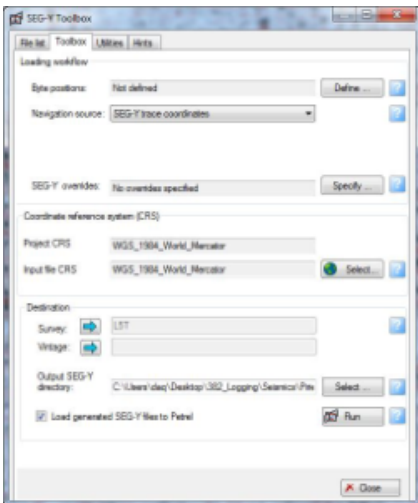

Figure 2: Main window of the the SEG-Y toolbox (2D) workflow

3. When the SEG-Y toolbox starts (**Fig. 2**), the first thing is to sort out Byte positions – click on the "Define" button. Set Trace number, SP number, CDP number all to 9 – this is the only trace header that is properly set (**Fig. 3**). Leave X and Y coordinate as they are. Don't do anything with the "advanced" options. If you click "scan" you will get line graphs that hopefully relate to what you think you collected. Then click OK.
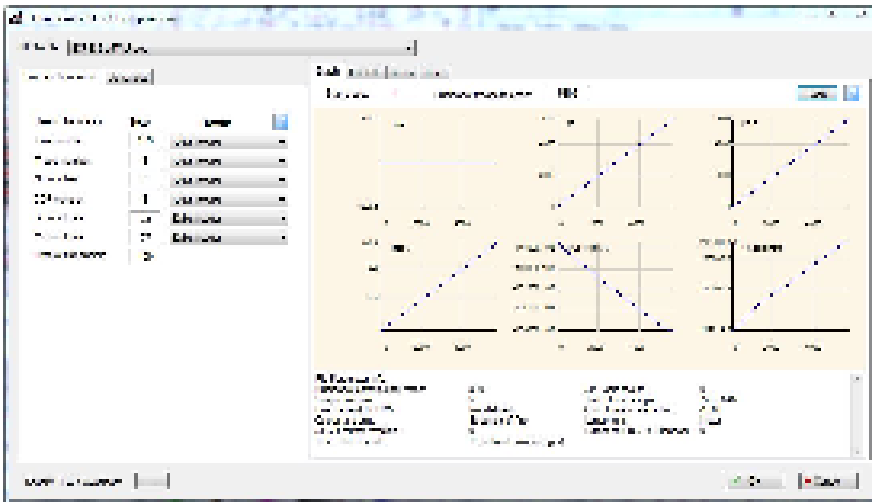
Figure 3: Definition of SEG-Y byte positions.

4. Navigation source will be SEGY trace coordinates
5. In the SEG-Y overrides, click on the "Trace header coordinate unit' and set it to "Arc seconds" (**Fig. 4**). Although this is selected by default, and a geographic coordinate system is later specified, an error message may appear when the import process is executed.
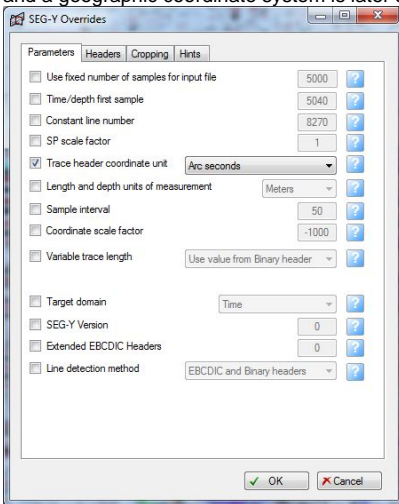

Figure 4: SEG-Y Overrides, Parameters tab.

6. In the "Headers" tab of the SEG-Y Overrides window, check the box for "Zero coordinates', and you can keep the default "Interpolate from neighboring traces", as the link to navigation is often problematic (**Fig. 5**).
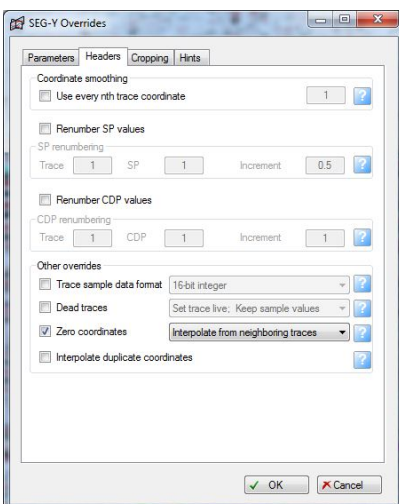

Figure 5: SEG-Y Overrides, Headers tab.

7. For the Coordinate reference system (CRS), click "Select" (**Fig. 2**). The Input File CRS will be WGS84 – the easiest way to choose this is to click on Select and type "geodet" into the filter (**Fig. 6**).
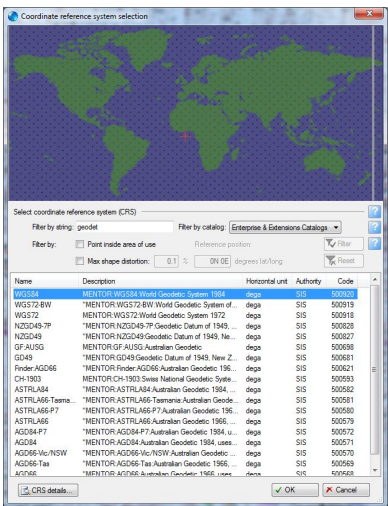
Figure 6: Window for selecting the coordinate reference system (CRS).

8. Finally, in the main SEG-Y toolbox window, click "Run" and the SEGY toolbox will translate the coordinates into the trace headers in the correct CRS for your project, and as long as you have "Load generated SEGY files to Petrel" checked the data will appear immediately in your catalogue (**Fig. 7**).
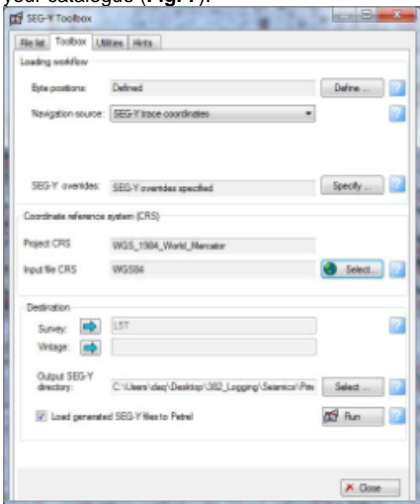

Figure 7: Main SEG-Y toolbox window, with the required settings for importing a CHIRP sub-bottom profile.

9. Check as for any other new import: (a) location of profile in 2D map window; (b) interpretation window (**Fig. 8**). Note that the data are processed to be the envelope, ie only positive amplitude values. Also, the vertical exaggeration in the Interpretation window should be set

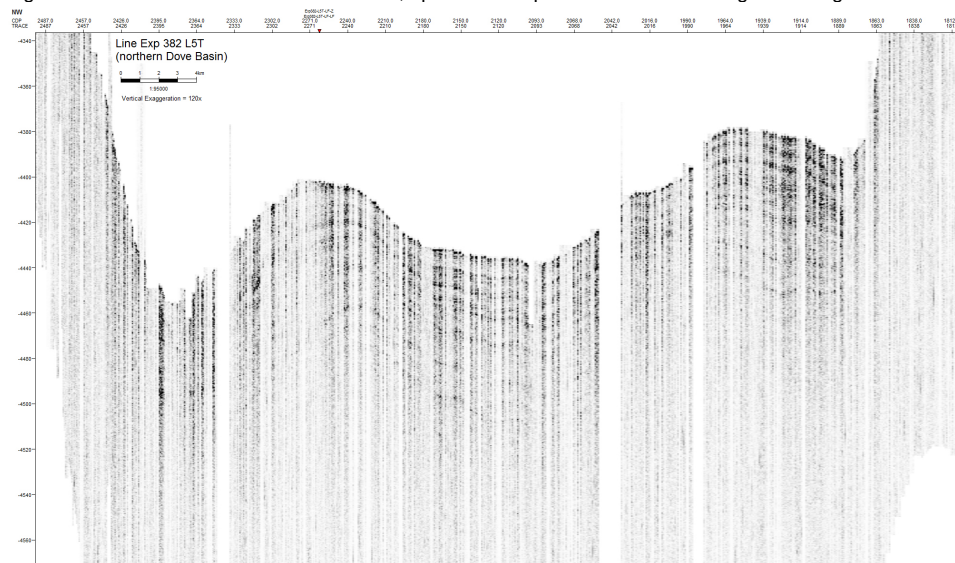high in order to see the reflectors. To do this, open the Interpretation window settings > Settings tab.

Figure 8: Example of a Bathy2010 CHIRP sub-bottom profile displayed in an Interpretation window in Petrel.

Other notes:

1. If you are using data from the SEG-Y conversion you will probably encounter a range of problems. The most serious is that the program occasionally puts in traces with different length or sample interval or both. You might be able to handle some of these with the SEGY overrides. Otherwise you will need to use a seismic processing package to fix the problems. For example this is a set of commands I used in Seismic Unix (a free processing package) to clean up data during Exp362:

 segyread tape=20161001134130P_zoom-LF-2.seg endian=0 | suwind key=fldr min=400 max=6120 | suwind key=dt min=200 max=300 | sushift tmin=5.4 tmax=5.7 | suximage perc=97

 segyread tape=20161001134130P_zoom-LF-2.seg endian=0 | suwind key=fldr min=400 max=6120 | suwind key=dt min=200 max=300 | sushift tmin=5.4 tmax=5.7 | segyhdrs bfile=binary2a

 segyread tape=20161001134130P_zoom-LF-2.seg endian=0 | suwind key=fldr min=400 max=6120 | suwind key=dt min=200 max=300 | sushift tmin=5.4 tmax=5.7 | segywrite tape=fixed_chirp2.seg endian=0 bfile=binary2a

Credits

This guide was originally written by Timothy Henstock (2016; Exp. 362 Logging Scientist)

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