**Converting paper records to digital seg-y**

Paper seismic records were converted to digital images in tiff format using a large format printer at Imprints on UCSD main campus. In total, eight scrolls were scanned. Each scan was over a gigabyte in size, so the images were cropped into two or three individual images. The following is presented as a procedure to be used for anyone interested in converting paper seismic records to digital seg-y’s.

Latitudes and longitudes printed on the seismic profile should be entered into an excel spreadsheet or another text file. These then need to be converted to UTM (ours were converted using Matlab). The conversion from image file to seg-y is done using the code image2segy.m (Farran, 2008, http://gma.icm.csic.es/node/67) in Matlab. The script needs the Matlab library “SegyMAT” (Thomas Mejer Hansen, http://segymat.sourceforge.net/) in the Matlab path to work. For each image conversion, an input text file is needed. To acquire much of this information, the file should be opened up in Adobe Photoshop or another software that can give x,y pixel information. The first line of the file must be specific input about the seismic image. The order of the first line is: trace length in pixels, line number in numerics only, marine (0) or land (1) profile, seg-y revision format (0 or 1, but 1 is recommended), seg-y numeric format (1 for 32 bits IBM floating point, 3 for 16 bits IBM floating point, which is recommended, or 5 for IEEE format), and the UTM zone for the header. An example file is in supplemental file 1. Following the first line is a line for each navigation point on the seismic profile. Each line will have the Px, Py, X1, Y1, TD, and TL. Px is the horizontal location of the navigation point in pixels and Py is the vertical location of the top of the data window in pixels. Since scanning is not perfect, the data window will typically meander up and down throughout the image—the Py will fix this and create a straight profile. X1 and Y1 are the UTM coordinates for the navigation point. TD is the time delay in milliseconds for when profiles start below 0 seconds. TL is the time range in milliseconds, based on the end of trace time minus the time delay.

To run the script in Matlab, the image2segy\_253.m file should be in the same directory as the image files and the input text files for each image. The first box that pops up allows you to name the survey, the line, month, year, first trace offset, and institution name. The values that are the same throughout the scans being converted can be changed within the first line of the script. Next, a browser pops up to the select the input text file and then again to select the image file in .bmp, .jpg, or .tif. Then select if the image is grayscale or red, white, and blue. Finally, select the polarity as negative or positive. For the Block Island Sound scans, negative was selected. The process will start and a trackline location map will pop up. Exit out of this window when done viewing.

If UTM is needed for the digital seg-y’s, then the process is finished, but to return to latitude/longitude from UTM, the navigation needs to be extracted from the seg-y file. This can be done using SeiSee (http://www.dmng.ru/en/freeware.html), a freeware for the Windows platform. In SeiSee, open the directory containing the seg-y files and the select the seg-y to be edited. Under the “trace headers” tab select bytes 73 and 77. Under “file”, select export trace headers to ascii file. This exports a text file with a header, then columns of trace number and the UTM coordinates. Extract the UTM coordinates from the output file and use Matlab to convert back to longitude and latitude. Add these to a new file with the trace number, and the copied output file header. The resulting file can then be imported into SeiSee, replacing the UTM coordinates with the new longitudes and latitudes. To check everything in the process works, the seg-y’s can be imported into Kingdom Suite and checked relative to other datasets.