ESCI 7205 – Data Analysis in Geophysics - Homework #3 – 9/17/13 – DUE 9/24/13.

Use of SAC

1 ) We will do the demo that failed that I tried in class. You can find the manual for SAC online as both webpages (html -- <http://www.iris.edu/files/sac-manual/>) or pdf files.

A)

Use the SAC command “funcgen” to make a delta function that is 10,000 points long.

Check it by plotting it.

Save the impulse time series to disk using the sac command write.

Use the SAC command “transfer” to produce the seismogram that a DWWSSN (Digital World Wide Standard Seismograph Network) seismometer would record if the ground moved with the impulse you just made.

Use the SAC commands “xlim” (to zoom in around the signal), “bg” and “p”, and the unix command “sgftops” to make a postscript figure showing the DWWSSN seismogram you just made (which is the impulse response)

Save the impulse response seismogram you made to disk.

B

Read the two files you made back in and plot them together on the same plot in different colors. Document the plot (grab it off the screen or make a sgf file, etc.)

C

Read in the impulse response seismogram.

Use transfer to “remove” the DWWSSN instrument response (the target response will be NONE).

Plot the result; does it look like the plot in A?

You should make 3 files, one each for sections A, B and C and then run them using the SAC macro feature. If you call your files A.macro, B.macro and C.macro you would run them using the SAC command line

macro A.macro

etc. (note the file extension “.macro” is not necessary, it is to help remember that this file is a sac macro). Each file would have the couple lines of SAC code needed for each step. They are broken into 3 files so one can see the results of the steps.

SAC macros are the SAC version of Matlab m files. You put exactly what you would type into the text file. You can then run it over and over using “macro *filename*”.

2) Now lets do this for real data. The original idea was to use the unix program “rdseed” to get all the data files out of the archive “maule.seed”, but you already have all those files from the directory “sac\_sample\_data” that you got from me (the file “maule.seed” is in the directory), so just use that.

A) Read in any single seismogram. Then remove the mean and trend from that seismogram and do the last preparatory step – taper it.

B) Plot it.

C) Now use the SAC command “transfer” to remove the full response (seismometer and electronics) using the evalresp files. The files you will use have RESP in the name (transfer looks for the response files using a formula to make the response file names from the seismogram names – rdseed makes RESP files corresponding to each SAC file with the correct names). You will also probably need to filter it at the end (the freqlimits parameter).

transfer from evalresp to none freqlimits .01 .015 .3 .4

Save it all as a SAC macro (introduced in 1).