

## Lab assignment. Data Visualization (body waves)

*For most of the programs to work, you must complete the environment setup (once only for this term) using my “.bashrc” file (see early part of lab instructions)!!*

1. make a directory in your account called lab1  
**mkdir lab1**
2. go to the directory called lab3 by  
**cd lab1**  
then, copy event3 file into this directory by  
**cp ~ygu/seismolab/lab1\_2013/lab1.seed lab1.seed**
3. Use the *rdseed* program to open up the file (see the first handout), you should get a large number of files if done correctly.
4. Start up sac by typing  
**sac**
5. At the sac prompt, list all files that ends with .SAC (these are the data files)  
**ls \*.SAC**  
then  
**read \*.SUMG..BH\*.R.SAC**
6. list header information from the file by  
**listhdr**
7. find the station latitude, longitude (STLA, STLO) and Date by KZDATE, write below  
  
STLA =  
STLO =  
KZDATE =
8. Find the earthquake information in the CMT Search, goto website  
**<http://www.globalcmt.org/CMTsearch.html>**  
Write CMT solution of earthquake lat and lon.  
LAT =  
LON =  
DEPTH =  
Time =  
Did I make a mistake in requesting data?? Yes No  
If Yes, by how many minutes?
9. Run the finddelta program (arc distance calculator) by  
**finddelta**

write down distance in degrees

DIST =

Azimuth =

Back Azimuth =

10. Use another terminal xterm to run taup program (leave it open and leave taup running) to find out the predicted timing of phases, use PREM as the model of the Earth, by

**taup**

11. Now the earthquake records started at a time of \_\_\_\_\_ minutes after origin time, now identify all the phases on your SAC plot the timing of (please report the proper timing from the true ORIGIN time)

Pdiff =

PKiKP =

Sdiff =

SS =

To get SS time, you need to add SS phases to the taup program by clicking on Phases button and enter value, then must press return.

12. Find the corresponding peaks on your seismograms. Which component should you be looking at for? Answer here: \_\_\_\_\_ Also estimate on the seismogram your

**a. P times :**

**b. S times:**

13. Now we are going to take a look at particle motions and figure out the back azimuth (station-to-source orientation relative to north). In SAC, this is done by a command called "plotpm" (plot-particle-motion). BHE stands for Broad Band, High Gain, East-West component and BHN is north-south component.

Requirement: Must read in two components simultaneously!

> read 2005,087.16.18.15.3950.GE.SUMG..BHE.R.SAC

2005.087.16.18.15.1450.GE.SUMG..BHN.R.SAC

> p1

> xlim 300 500 (this zooms in on P wave)

> plotpm

Your estimated back-azimuth =

**The value from finddelta =**