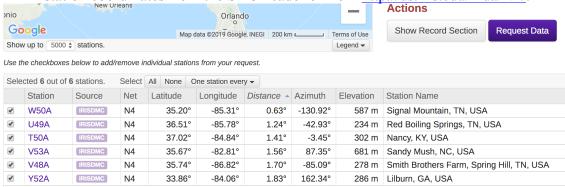Homework 5 (EAS 8803: OBS SEISMOLOGY - SPRING 2019)

Total points: 100. Due 04/23/2019

1. Please select the 2018 magnitude 4.4 earthquake occurred in Eastern Tennessee, and download waveforms (e.g., 1 min before the event time and 2 min after S arrival time) for the following 6 stations in the N4 network from IRIS DMC (http://ds.iris.edu/wilber3/find_stations/10984221). Please manually pick the P and S arrivals first. Then assume a half-space P and S velocity in the crust, and try to use the triangulation method to locate the longitude and latitude of this event. Please compare your results with the USGS official location. (50 point).

   a) You may assume the depth of this event to be at surface (e.g., depth = 0 km).
   b) You can either use a graphic method or write a computer to find the best-fitting location. Please print out your results in a map.
   c) You can use the assume P and S velocity and the measured P and S arrival time differences to estimate the distances between the source and stations. You can find the station coordinates from the SAC header or from http://ds.iris.edu/mda/N4/.

	Station	Source	Net	Latitude	Longitude	Distance ▲	Azimuth	Elevation	Station Name
☑	W50A	IRISDMC	N4	35.20°	-85.31°	0.63°	-130.92°	587 m	Signal Mountain, TN, USA
☑	U49A	IRISDMC	N4	36.51°	-85.78°	1.24°	-42.93°	234 m	Red Boiling Springs, TN, USA
☑	T50A	IRISDMC	N4	37.02°	-84.84°	1.41°	-3.45°	302 m	Nancy, KY, USA
☑	V53A	IRISDMC	N4	35.67°	-82.81°	1.56°	87.35°	681 m	Sandy Mush, NC, USA
☑	V48A	IRISDMC	N4	35.74°	-86.82°	1.70°	-85.09°	278 m	Smith Brothers Farm, Spring Hill, TN, USA
☑	Y52A	IRISDMC	N4	33.86°	-84.06°	1.83°	162.34°	286 m	Lilburn, GA, USA

3. A magnitude 2.3 earthquake occurred near Milledgeville, GA on 2019/04/01. The corresponding seismic data can be downloaded from the following website (http://ds.iris.edu/wilber3/find_stations/11020932), including several Raspberry Shake and Boom deployed by some students in our class. Please perform the following tasks:

   a) Please download all stations within 2 degrees of the epicenter, and with at least half an hour of seismic data. Please use the Taup program (https://www.seis.sc.edu/taup/) to predict the P and S arrivals at each station (15).
   b) Please manually pick the phase arrivals at each station, and compare your results with the predicted arrivals. You may need to filter your data before picking phases (15).
   c) Please compare the quality of seismic recording between permanent research-grade stations and the Shake and Boom station (network code: AM) (10).
   d) Please try to identify other seismic events that were recorded in this dataset. Is that new event occurred in the same region as the M2.3 event? Why? (10)