Experiment Overview

The data described here were collected on 30 May, 2011 at a privately owned farm in Edgefield County, South Carolina. The site is located on the coastal plain of the southeastern United States, and within a few kilometers of the so-called Fall Line (the boundary between the coastal plain and the Piedmont Plateau). The near surface geology is characterized by sandy soil overlying Cretaceous-aged sandstones and siltstones. Bedrock is located within three meters of the surface.

The primary goal of the experiment was to quantify the spatial coherence of rotational seismic motions. To do this, we deployed 21 Mark Products L28 3-component seismometers (4.5 Hz natural frequency) and recorded the data on a Geometrics Stratavisor NZXP 64-channel seismograph hooked inline with a Geometrics Geode 24-channel seismograph. This gave us a total of 88 channels available for recording, however, we used only 63 for the actual experiment. This was an awkward arrangement; however our original goal was to include more stations in the array. Time limitations prevented this. The end result is that channels 61-85 in the data are "dead" channels, and should be discarded.

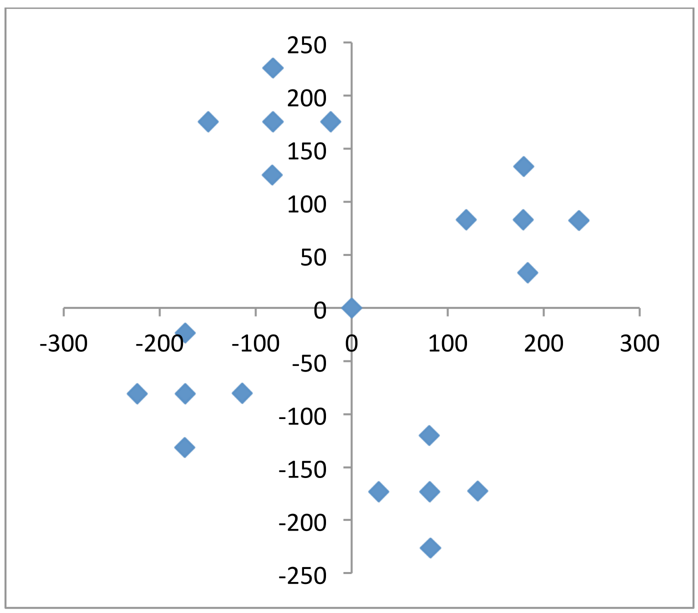

Figure 1: The geometry of the array. All units are in centimeters, with the origin being the exact center of the array. North is to the top. The array recorded eighteen shots, all located to the northwest of the array. The distance of the shots relative to the array center varied from 15 to 280 meters.

The array was designed as four arrays within a single array (Figure 1). Because the array is so small, we used a tape measure to determine the location of all the stations. The measurement uncertainty of the stations is approximately 1 cm. To determine the coordinates of the shot points, we stretched a heavy string from the center of the array to a point located approximately 300 m from the array center. The azimuth of the string was N45W. We then used a tape measure to locate shot points (along the string) at 50 foot intervals. It's not possible to know the actual uncertainty of the shot coordinates, but we estimate that the coordinates are accurate to within one meter of the stated values.

We recorded 18 shots, using a sledgehammer source. Because the triggering mechanism was not functioning, the absolute timing of the data isn't good. We simply turned on the data logger, and hit the ground with the hammer, and recorded for 8 seconds total (the sample interval of the data is 1ms). However, the relative timing of the data is excellent.

Data Organization

The data are in segy format. Each shot is a separate file, and the naming convention is designed to indicate the distance of the shot from the array center. For example, file "150.sgy" indicates that the file contains the data from the shot point that is located 150 feet from the array center. The following table gives the shot number, location, and file names for all 18 shots

file name and shot information				
shot number	shot x coord (cm)	shot y coord (cm)	shot z coord (cm)	file name
1	-1139	1012	0	50.sgy
2	-2279	2024	0	100.sgy
3	-3418	3037	0	150.sgy
4	-4557	4049	0	200.sgy
5	-5697	5061	0	250.sgy
6	-6836	6073	0	300.sgy
7	-7975	7085	0	350.sgy
8	-9114	8098	0	400.sgy
9	-10254	9110	0	450.sgy
10	-11393	10122	0	500.sgy
11	-12532	11134	0	550.sgy
12	-13672	12146	0	600.sgy
13	-14811	13159	0	650.sgy
14	-15950	14171	0	700.sgy
15	-17090	15183	0	750.sgy
16	-18229	16195	0	800.sgy
17	-19368	17207	0	850.sgy
18	-20508	18220	0	900.sgy

The trace headers DO NOT contain the correct trace coordinates, as we were using the Stratavisor/Geodes in a way that they were not designed for. We could not figure out how to enter the actual *x-y* coordinates of the traces into the headers, which is why I provide the information in the table above. To process the data, we simply converted each trace in the SEGY file to an individual ASCII file and reformatted to our internal Matlab format.

See the spreadsheet for the station coordinates and channel information.