

Data report, experiment “201333: Beam-Gradient”

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This experiment was a part of an undergraduate research project which had the objective of comparing the results of seismic beam forming with seismic gradiometry. We conducted the experiment on the Summerville campus of Georgia Regents University in June, 2013. There are two stages to this experiment:

- 1) **Beam:** For this stage of the experiment, we deployed 24 single channel, vertical component geophones into an array of approximately 10m aperture. The source was a sledge-hammer-on-a-metal-plate, and was triggered. The source was approximately 70m from the array center. There are a total of ten shots, each of which occurred within a few seconds of one another. The goal of this experiment was to determine an apparent slowness vector of the surface waves for the ten shots.
- 2) **Gradient:** For this experiment, we re-configured the array so that it contained nine vertical-component geophones. The shot was located in the same location as the Beam experiment, as was the array center. The big difference is that for this experiment, the nine stations were arranged into an array with an aperture of ~0.4 meters. We again recorded ten shots, consisting of a triggered hammer-on-plate.

For both experiments, we collected data at a sample rate of 1000 samples/sec, and the source and arrays were on a flat, grassy field in front of Science Hall. The data were recorded on a 24-channel Geometrics Geode and the sensors were vertical-component, 40Hz geophones manufactured by Sercel.

Relevant information for the arrays are shown in the tables on the following pages.

Experiment: BEAM

Lat/Lon of site is ~33.172N, -81.62W

(reference for x and y coordinates)

Elevation of site is approximately 60m MSL

All coordinates in meters, with origin being arbitrary.

North direction is roughly in the -x direction

Station	ycoord	xcoord
1	7.36	15.79
2	4.84	14.82
3	2.64	13.70
4	0.68	12.52
5	1.60	10.23
6	3.59	11.40
7	6.09	12.43
8	8.21	13.55
9	10.45	14.65
10	11.53	12.28
11	9.24	11.20
12	7.65	10.93
13	4.85	9.05
14	2.43	7.91
15	3.37	5.59
16	5.81	6.68
17	7.87	7.87
18	10.17	8.87
19	12.68	9.73
20	13.29	7.99
21	10.99	6.87
22	8.86	5.56
23	6.61	4.46
24	4.39	3.32
Shot	63.49	47.67

Experiment: GRADIENT

Lat/Lon of site is ~33.172N, -81.62W

(reference for x and y coordinates)

Elevation of site is approximately 60m MSL

All coordinates in meters, with origin being arbitrary.

North direction is roughly in the -x direction

channel	ycoord (0)	xcoord (m)
1	0.40	0.15
2	0.30	0.17
3	0.21	0.13
4	0.21	0.03
5	0.33	0.03
6	0.42	0.05
7	0.42	-0.05
8	0.32	-0.06
9	0.24	-0.05
shot	74.26	16.19