Technical Assignment: Data Gridding Exercise

Making a grid and map from the MagAnomaly data in the DataBoxTest.csv file

Assumptions of the Data

- Quality Control
- Time Lag Correction
- Topography Correction
- Sensor Drop-outs
- DGRF was removed for the original date of each survey
- Working with multiple survey data, were some using surface-towed magnetometers, or near-bottom magnetometers, resulting in lower sensitivities

- Based on the size of the survey, we have to ask if we are doing mapping of shipwerecks, geologic structure mapping, etc.
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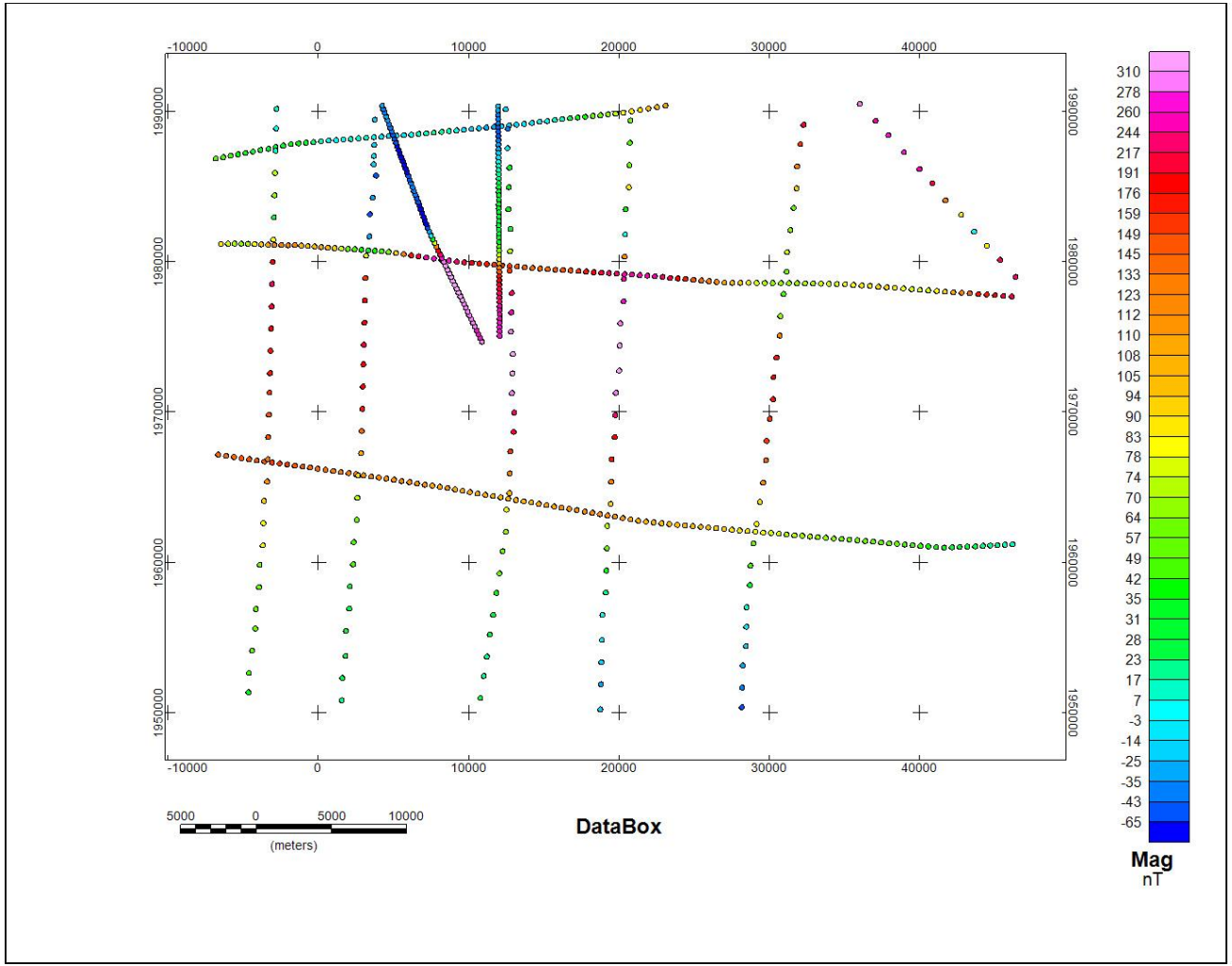
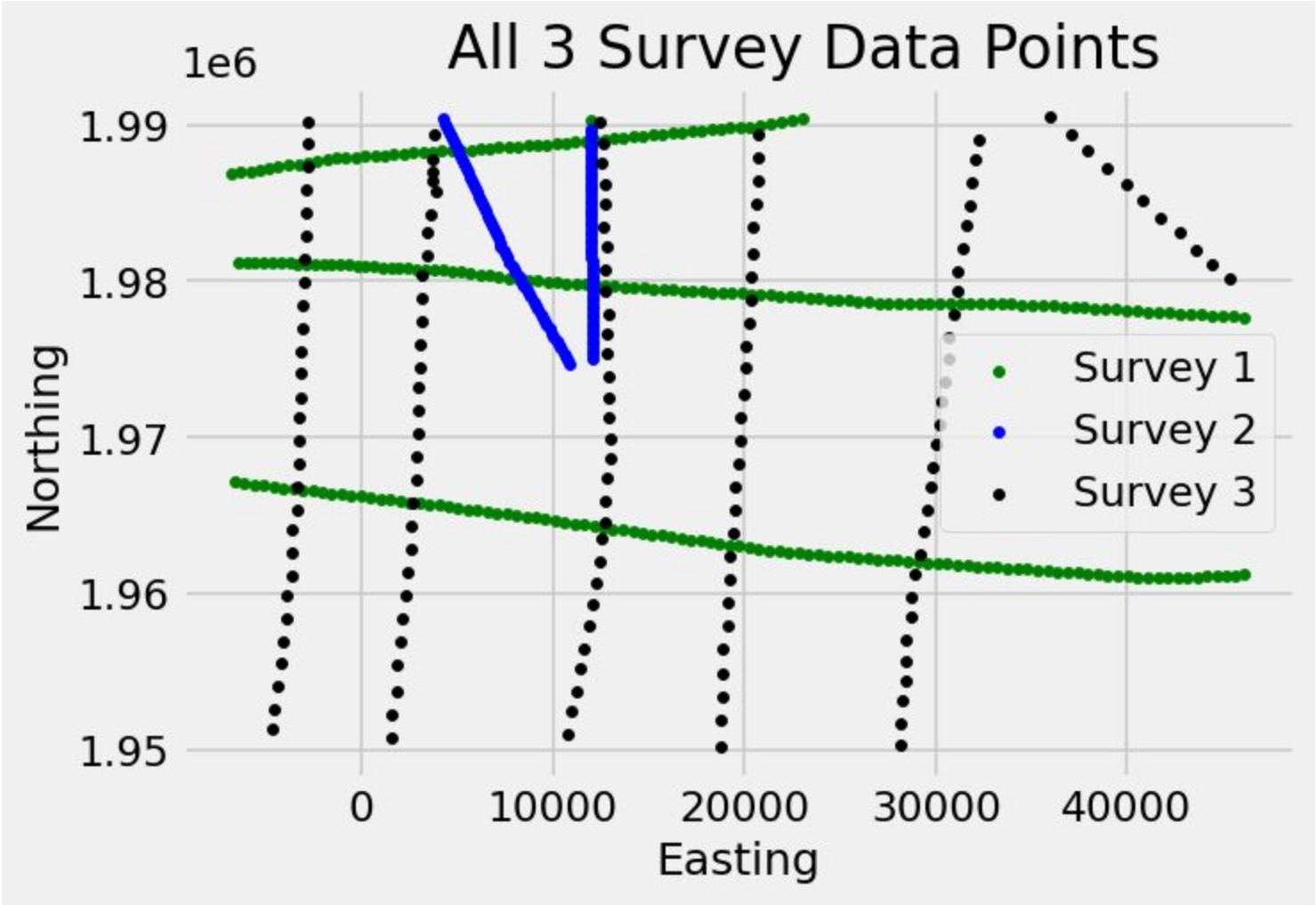
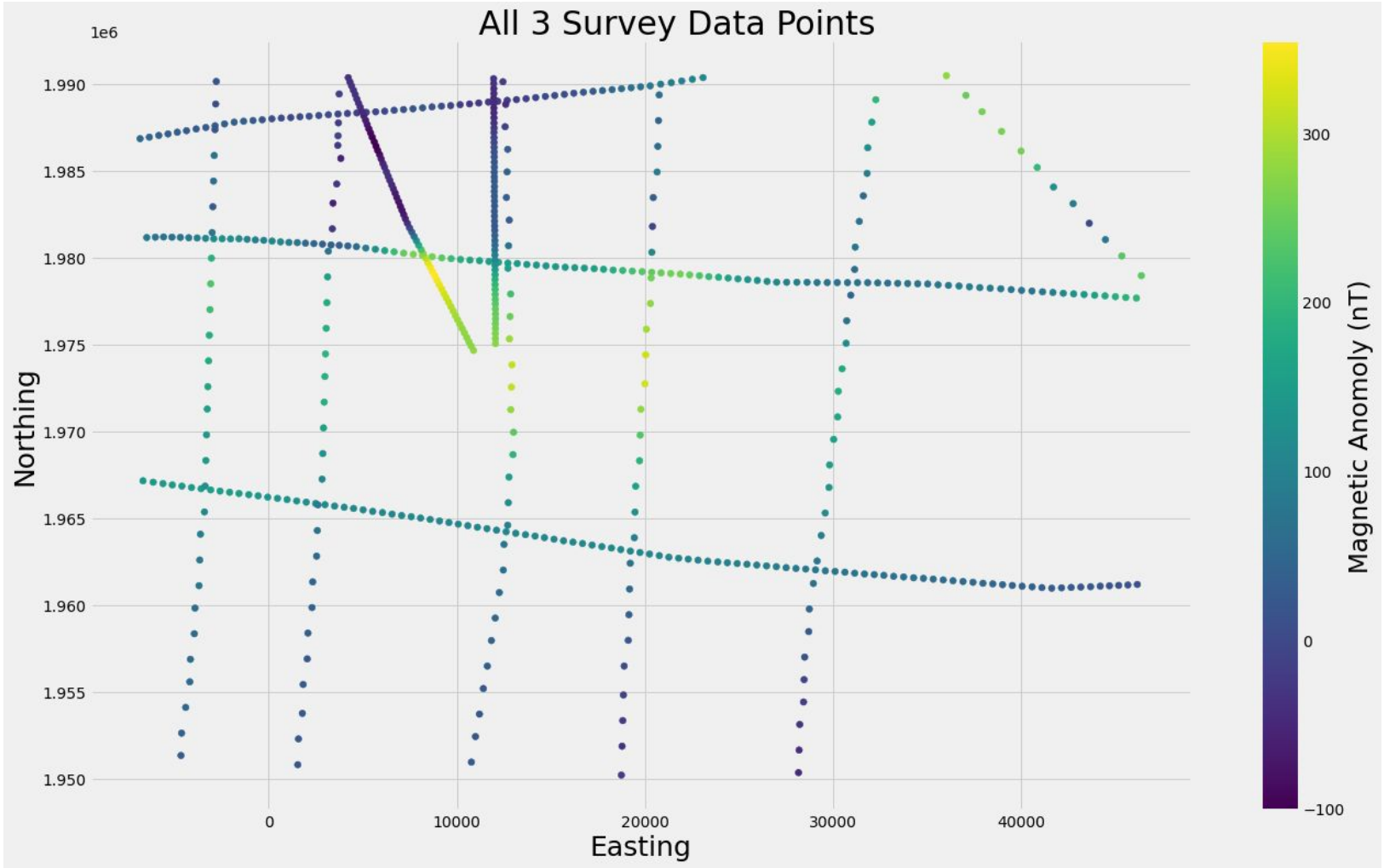
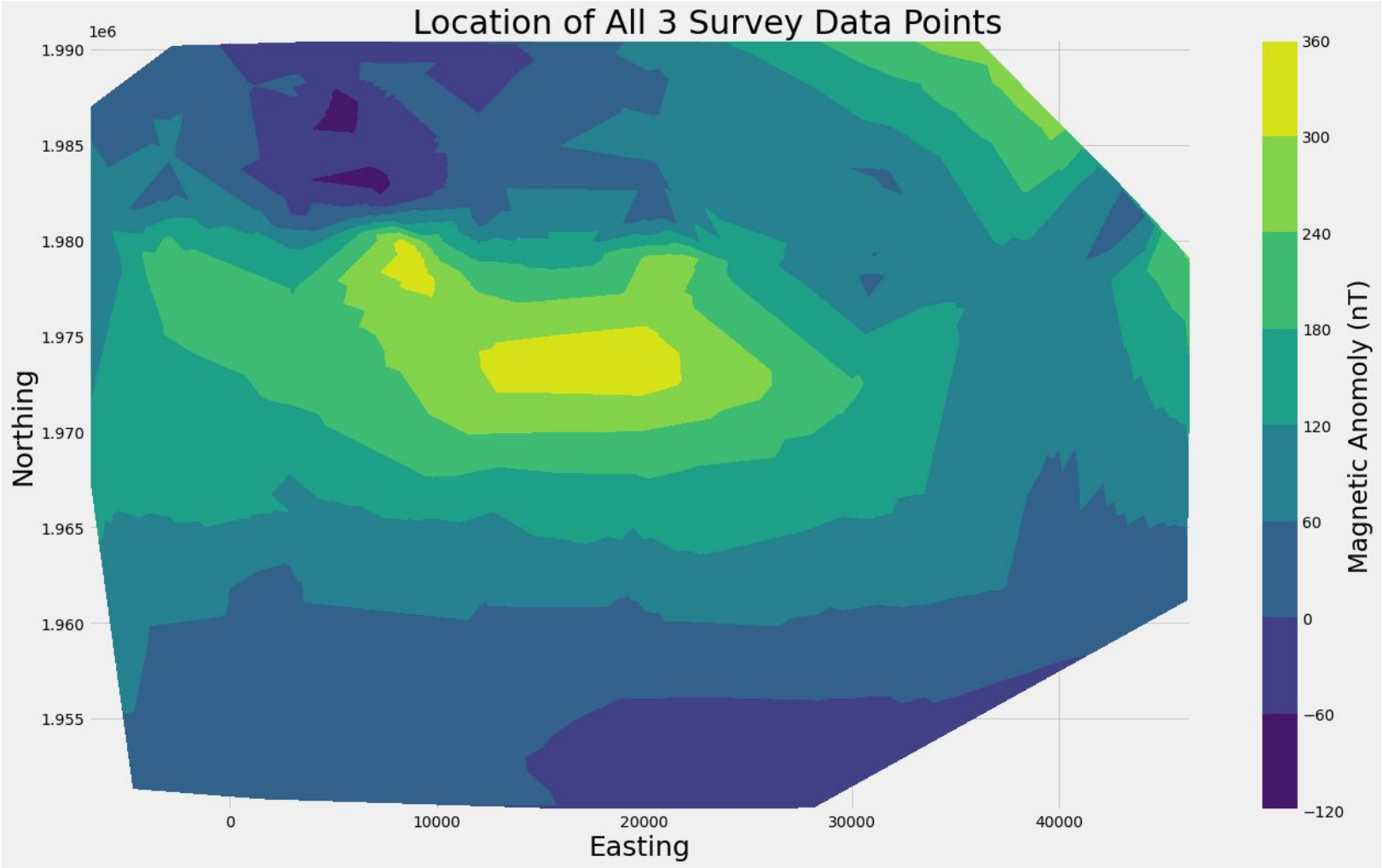
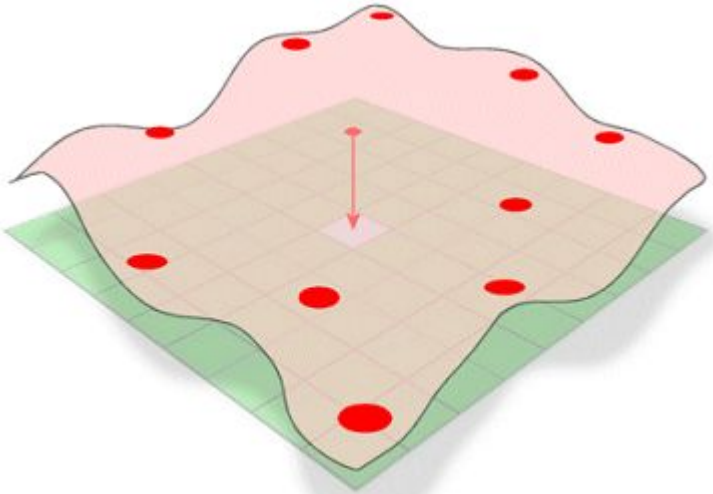

-10000
0
10000
20000
30000
40000
1990000
1980000
1970000
1960000
1950000
5000
0
5000
10000
(meters)
DataBox
310
278
260
244
217
191
176
159
149
145
133
123
112
110
108
105
94
90
83
78
74
70
64
57
49
42
35
31
28
23
17
7
-3
-14
-25
-35
-43
-65
Mag
nT

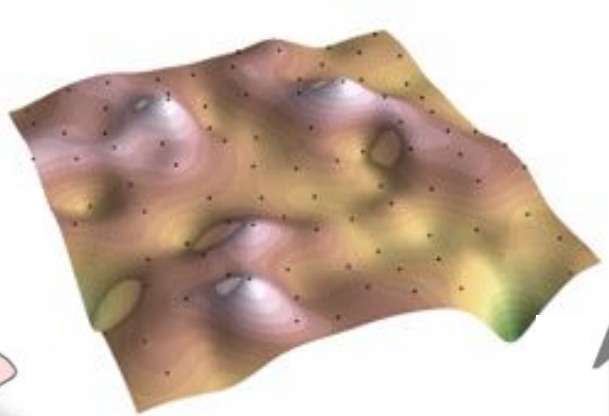

All 3 Survey Data Points
1e6
1.99
1.98
1.97
1.96
1.95
Northing
0
10000
20000
30000
40000
Easting
Survey 1
Survey 2
Survey 3

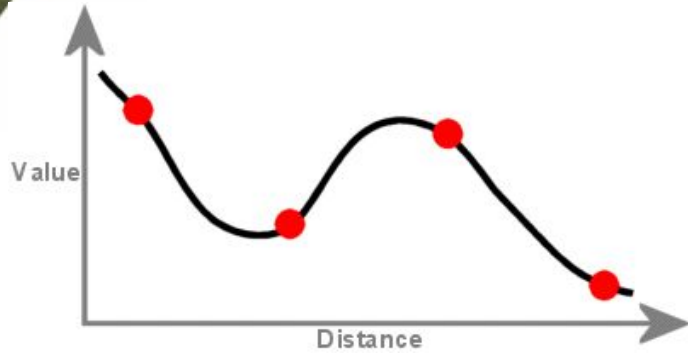

All 3 Survey Data Points
1e6
1.990
1.985
1.980
1.975
1.970
1.965
1.960
1.955
1.950
Northing
0
10000
20000
30000
40000
Easting
300
200
100
0
−100
Magnetic Anomoly (nT)


Location of All 3 Survey Data Points
1e6
1.990
1.985
1.980
1.975
1.970
1.965
1.960
1.955
Northing
0
10000
20000
30000
40000
Easting
360
300
240
180
120
60
0
−60
−120
Magnetic Anomoly (nT)

Gridding Interpolation Method: Spline





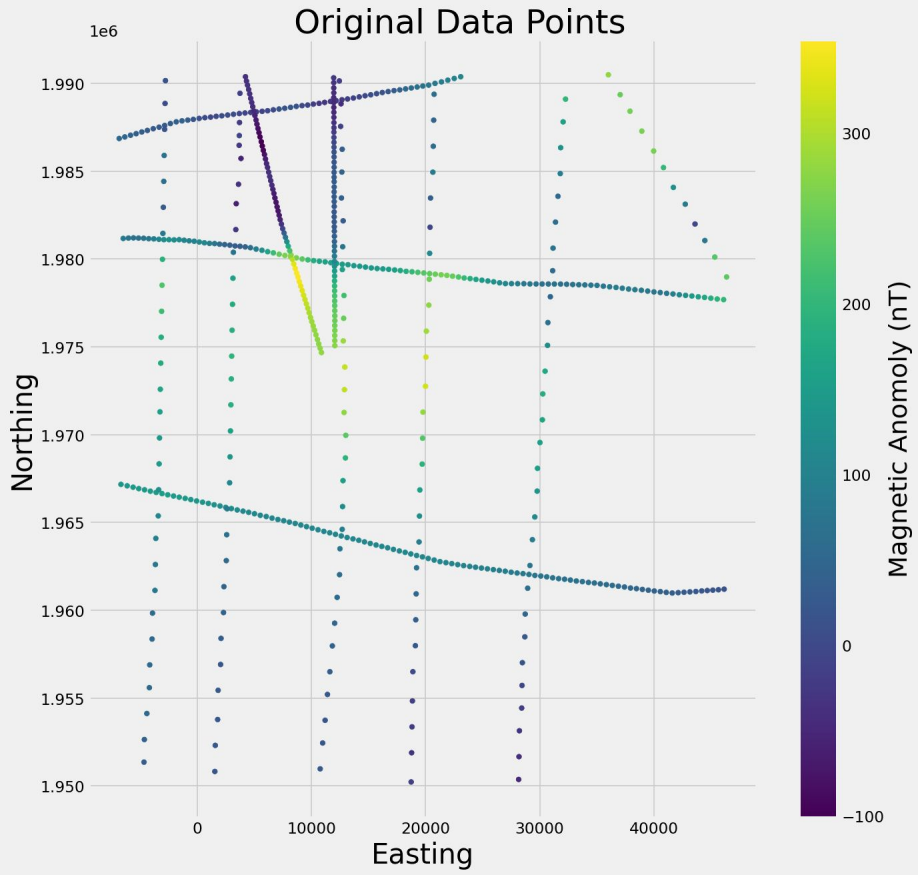


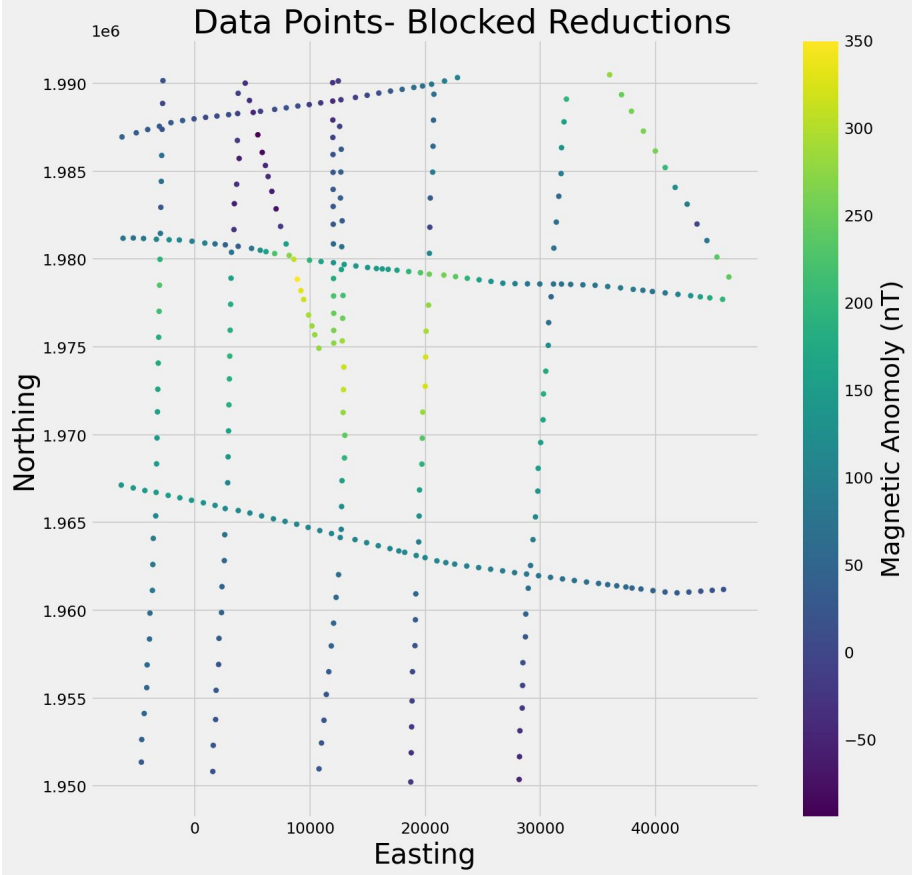
GIS Resources. “Types of Interpolation Methods.” *GIS Resources*, 7 Oct. 2013, gisresources.com/types-of-interpolation-methods_2.

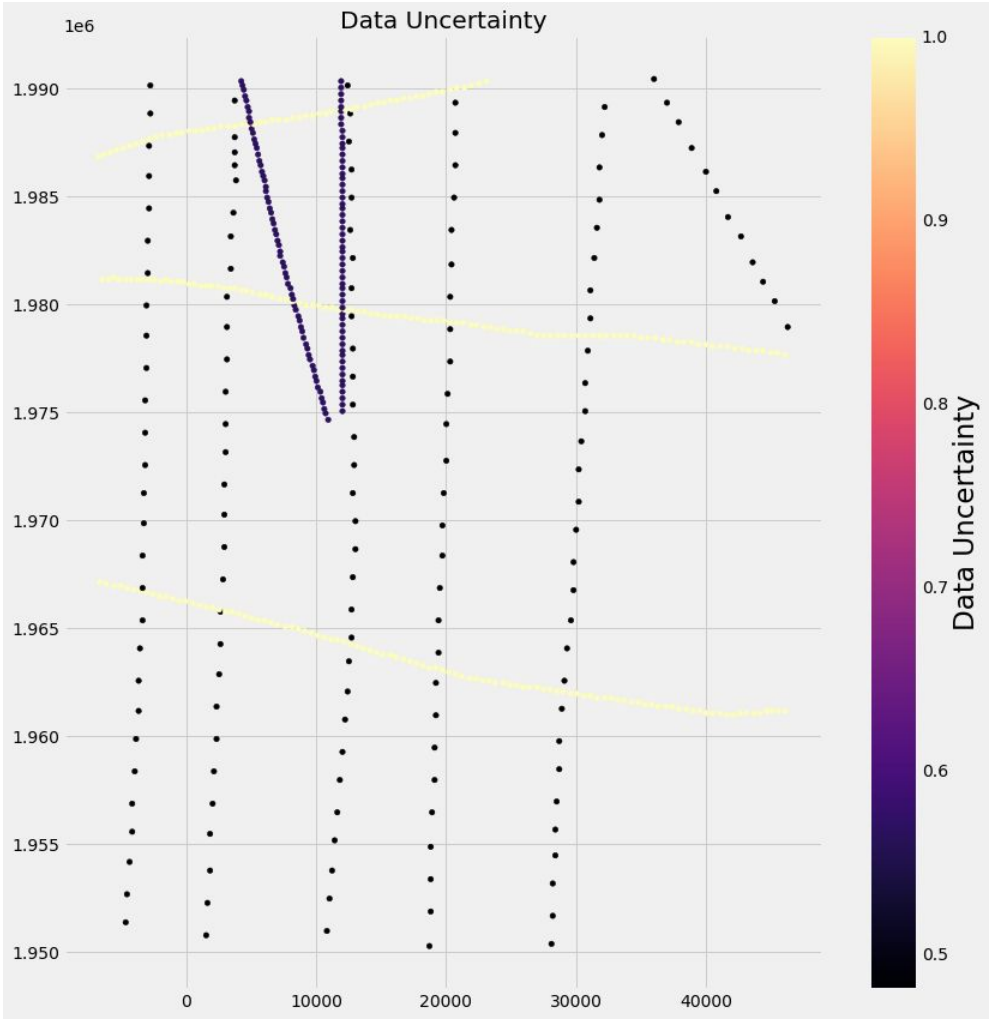
Next Steps

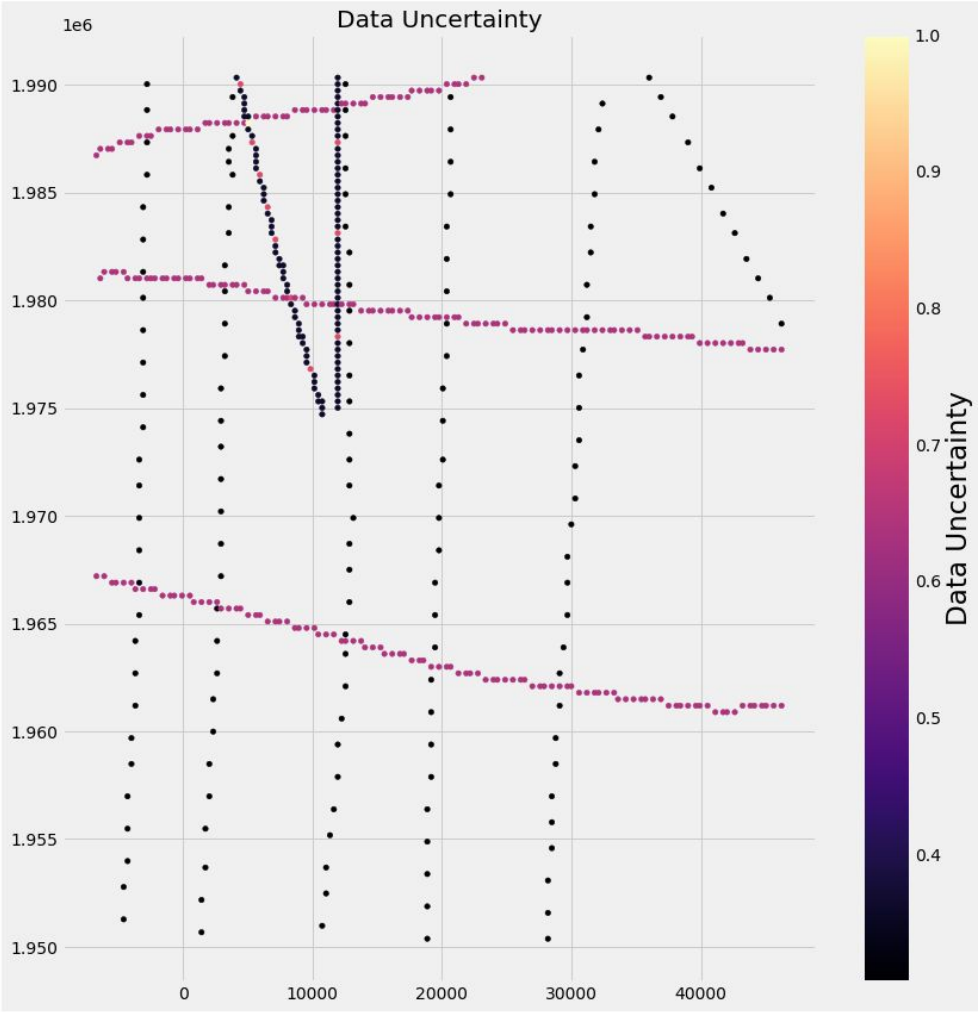
1. Removing 2D Polynomial trends

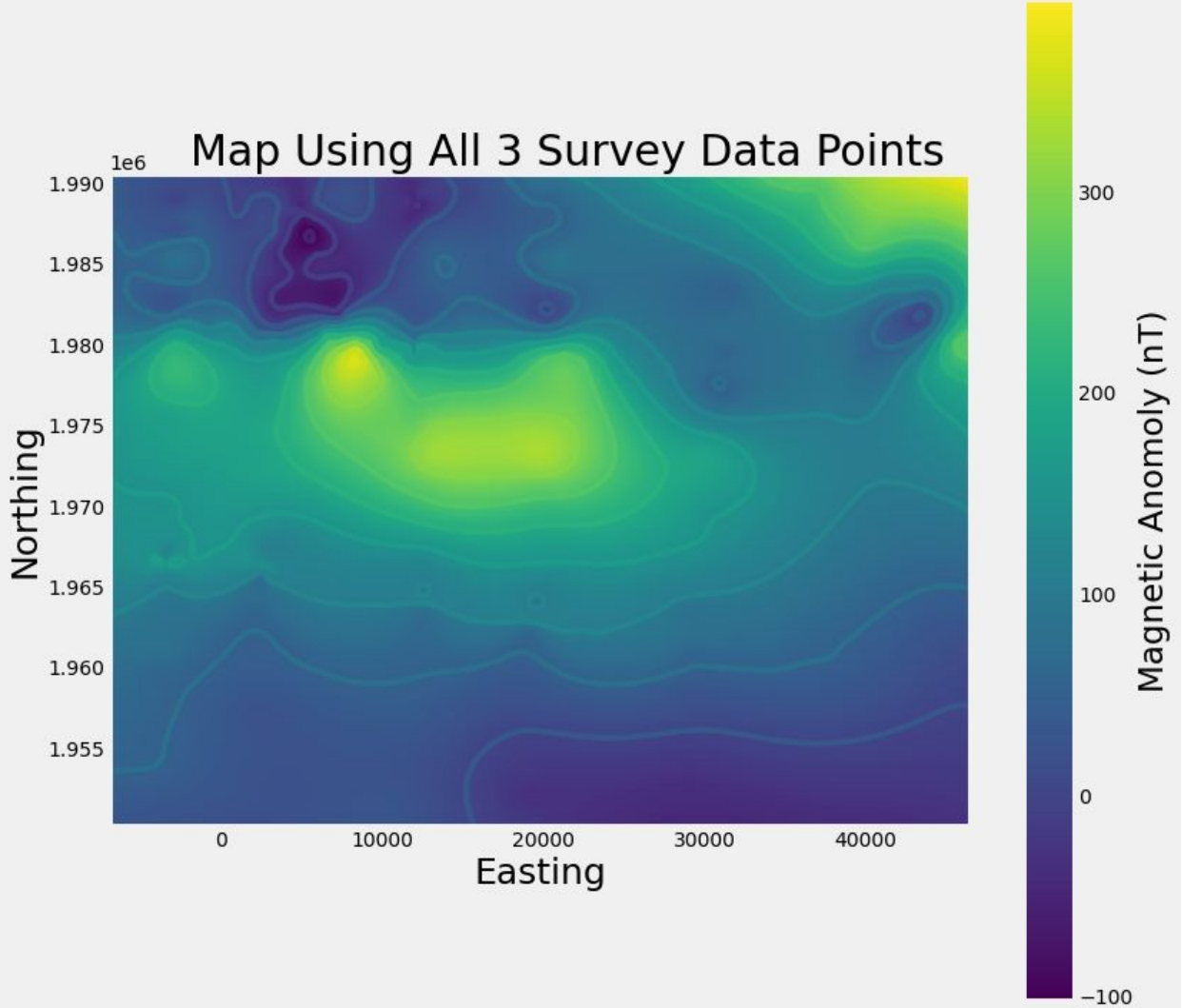
2. Blocked Reductions
   - Avoid Aliasing
   - Helpful for Spline
   - Uncertainty Impact

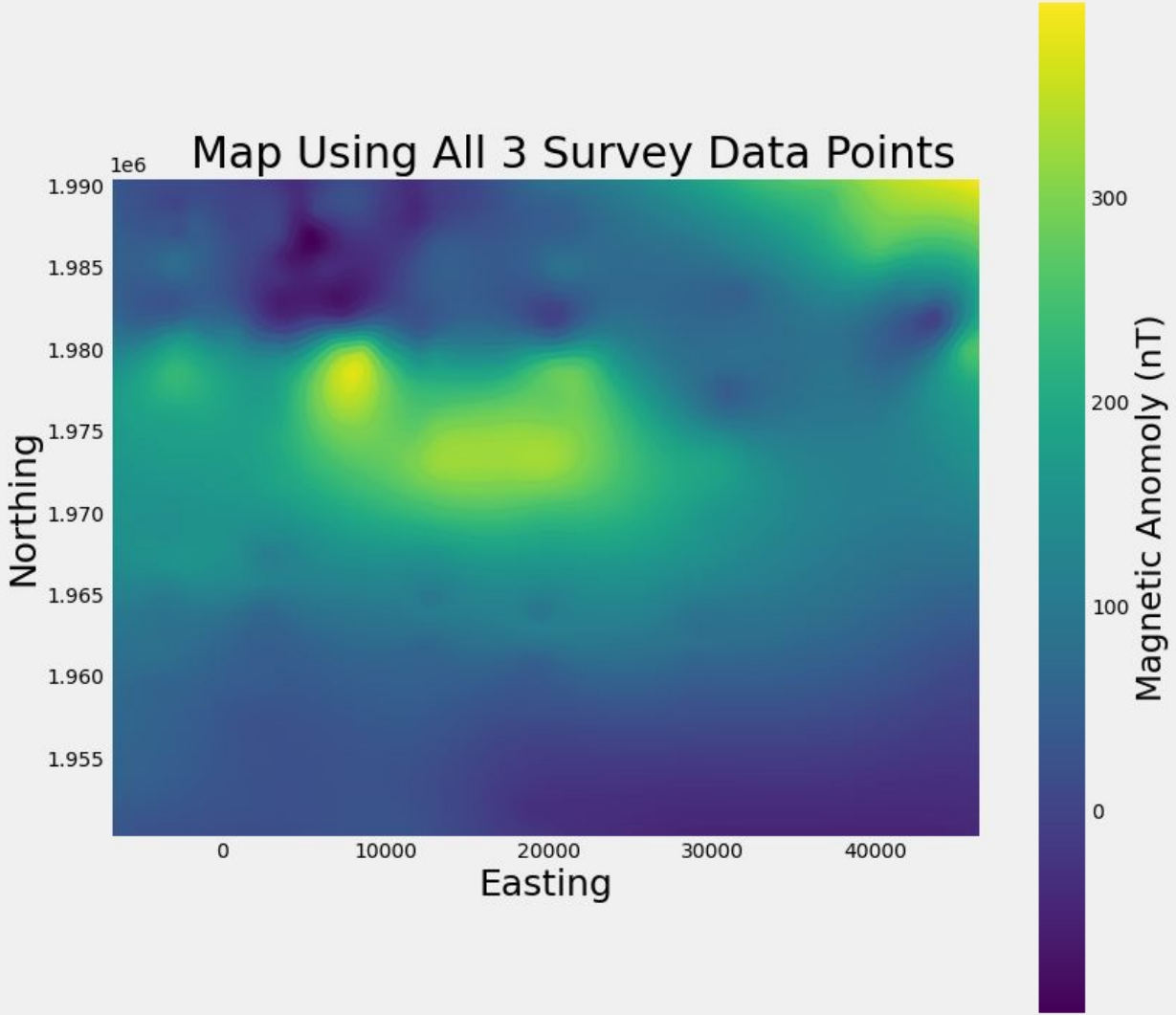

Original Data Points
1e6
1.990
1.985
1.980
1.975
1.970
1.965
1.960
1.955
1.950
Northing
0
10000
20000
30000
40000
Easting
300
200
100
0
−100
Magnetic Anomoly (nT)


Data Points- Blocked Reductions
1e6
1.990
1.985
1.980
1.975
1.970
1.965
1.960
1.955
1.950
Northing
0
10000
20000
30000
40000
Easting
350
300
250
200
150
100
50
0
−50
Magnetic Anomoly (nT)


Data Uncertainty
1e6
1.990
1.985
1.980
1.975
1.970
1.965
1.960
1.955
1.950
0
10000
20000
30000
40000
1.0
0.9
0.8
0.7
0.6
0.5
Data Uncertainty


Data Uncertainty
1e6
1.990
1.985
1.980
1.975
1.970
1.965
1.960
1.955
1.950
0
10000
20000
30000
40000
1.0
0.9
0.8
0.7
0.6
0.5
0.4
Data Uncertainty


Map Using All 3 Survey Data Points
1e6
1.990
1.985
1.980
1.975
1.970
1.965
1.960
1.955
Northing
0
10000
20000
30000
40000
Easting
300
200
100
0
−100
Magnetic Anomoly (nT)


Map Using All 3 Survey Data Points
1e6
1.990
1.985
1.980
1.975
1.970
1.965
1.960
1.955
Northing
0
10000
20000
30000
40000
Easting
300
200
100
0
Magnetic Anomoly (nT)

Things I would do with additional time or different software: