# Geophysical Exploration for Geothermal Pre-Feasibility Studies in Nevis

## Gravity and Self Potential Geophysics

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# Gravity and Self Potential Results In the OAS Report

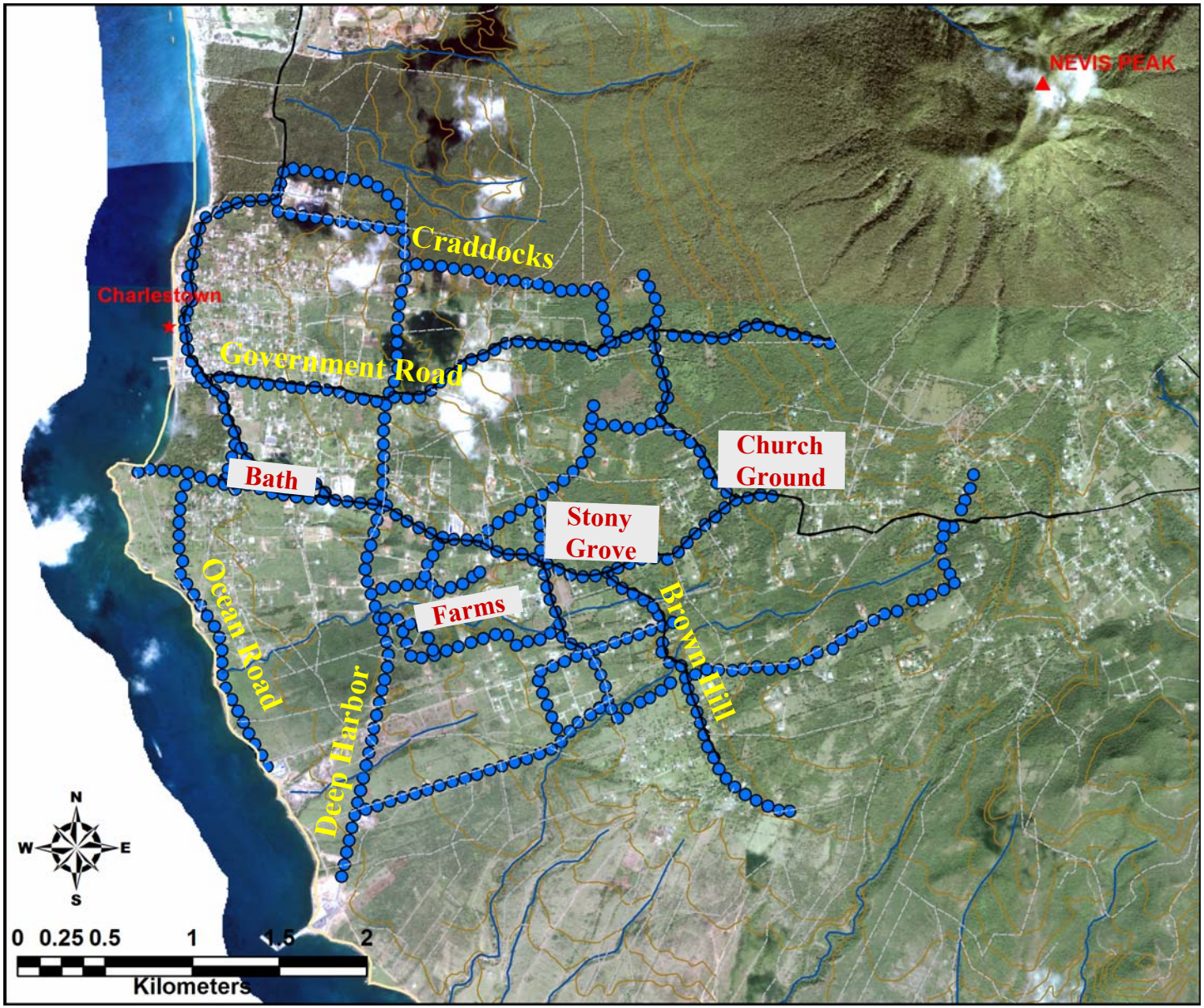



**Figure 1: Map of Study Area with Data Stations.**

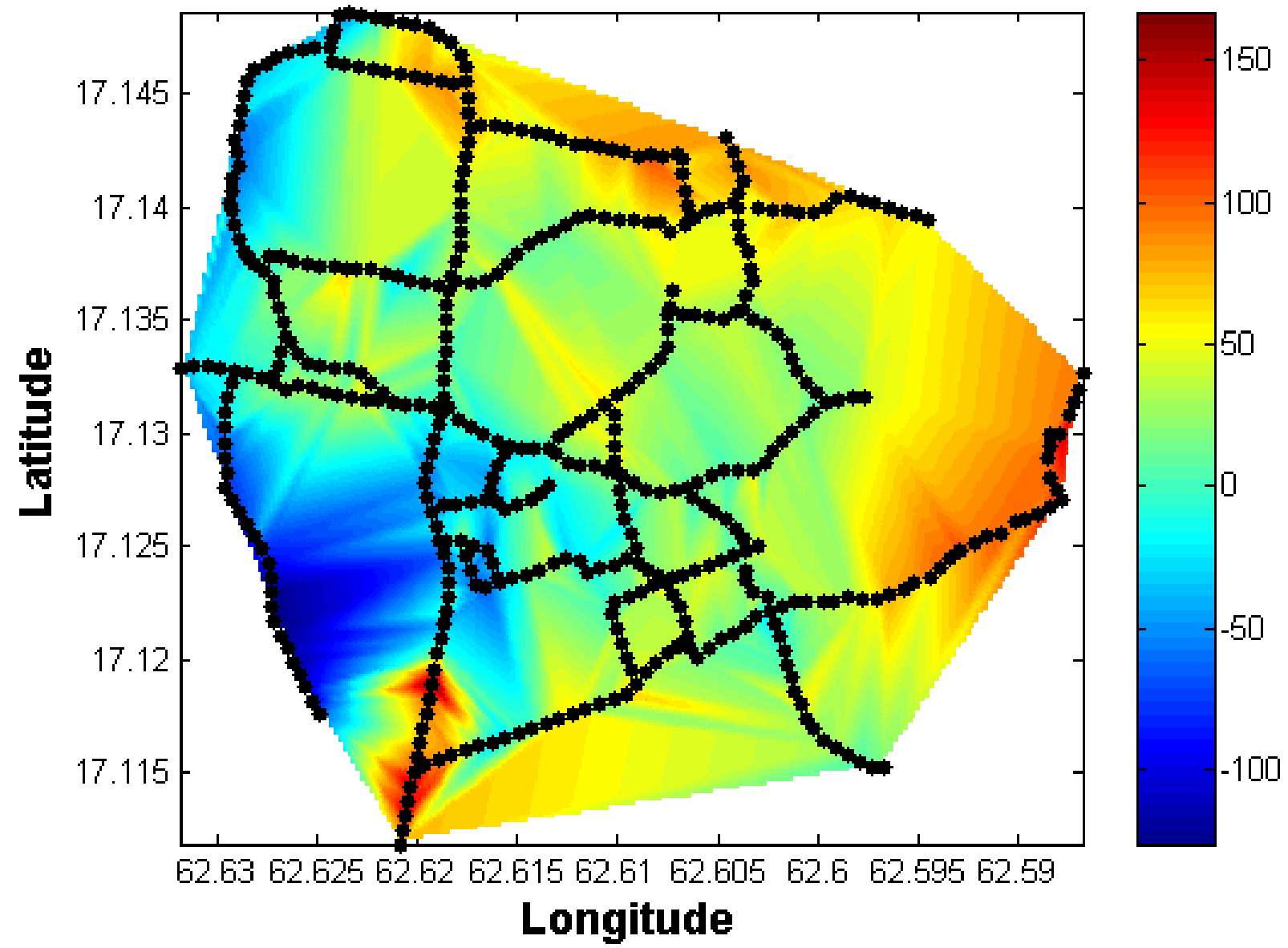



**Figure 2: SP Map (mV) from "Network Method".**

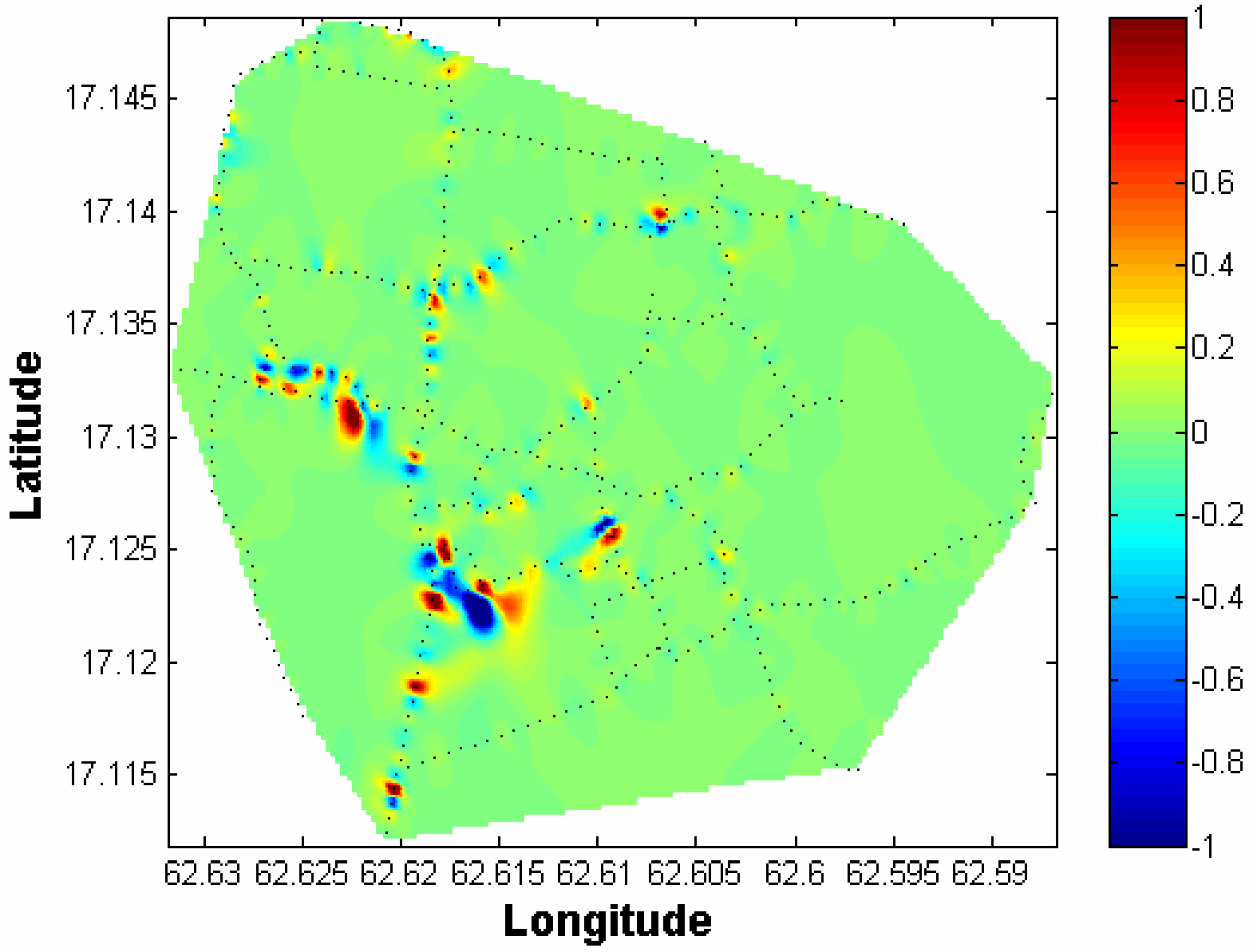



**Figure 3: Normalized 2D SP Current Source Locations.**

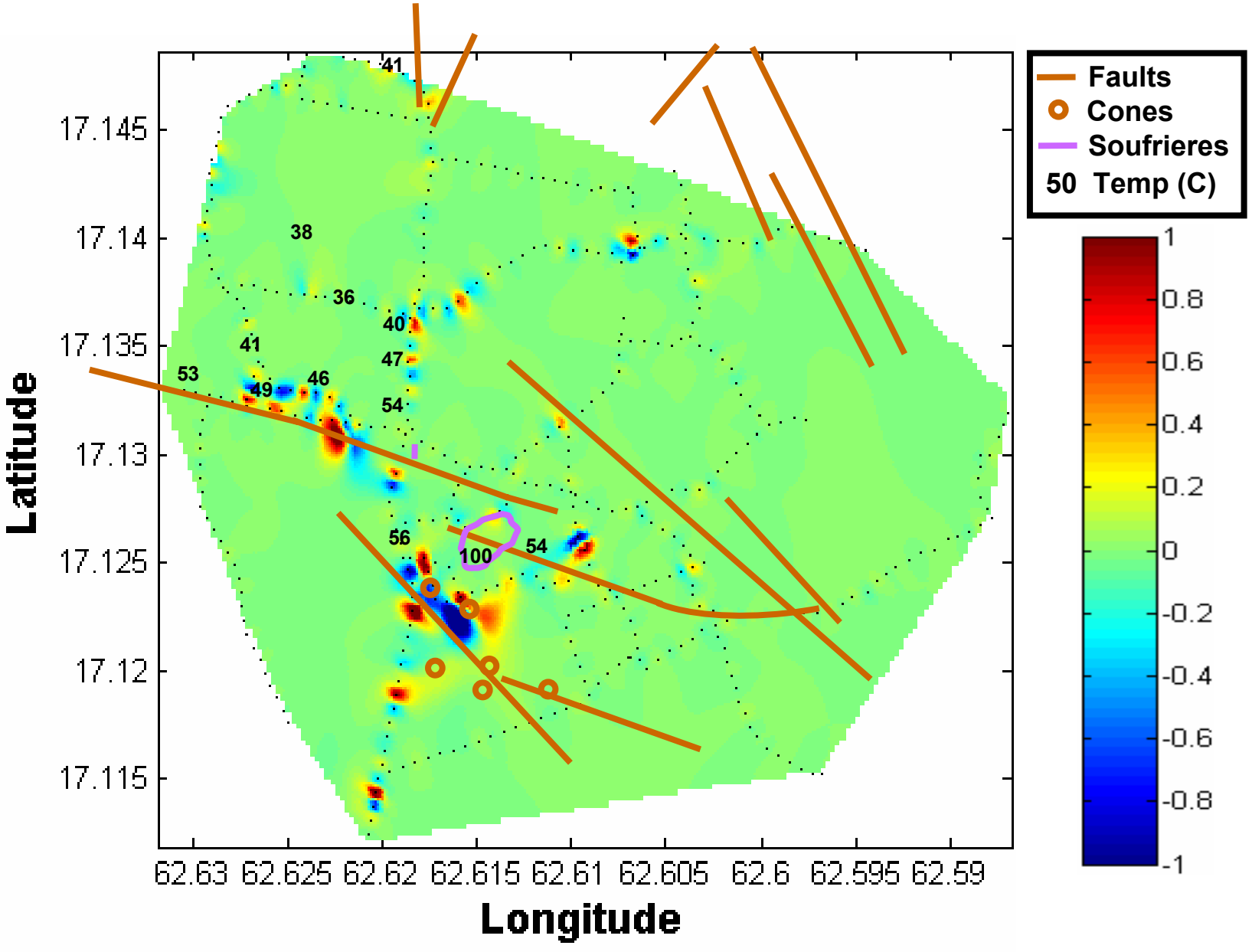



**Figure 4: Normalized SP Current Sources. Faults and Cones from Huttrer (1998) and Temperatures from GeothermEx (2004).**

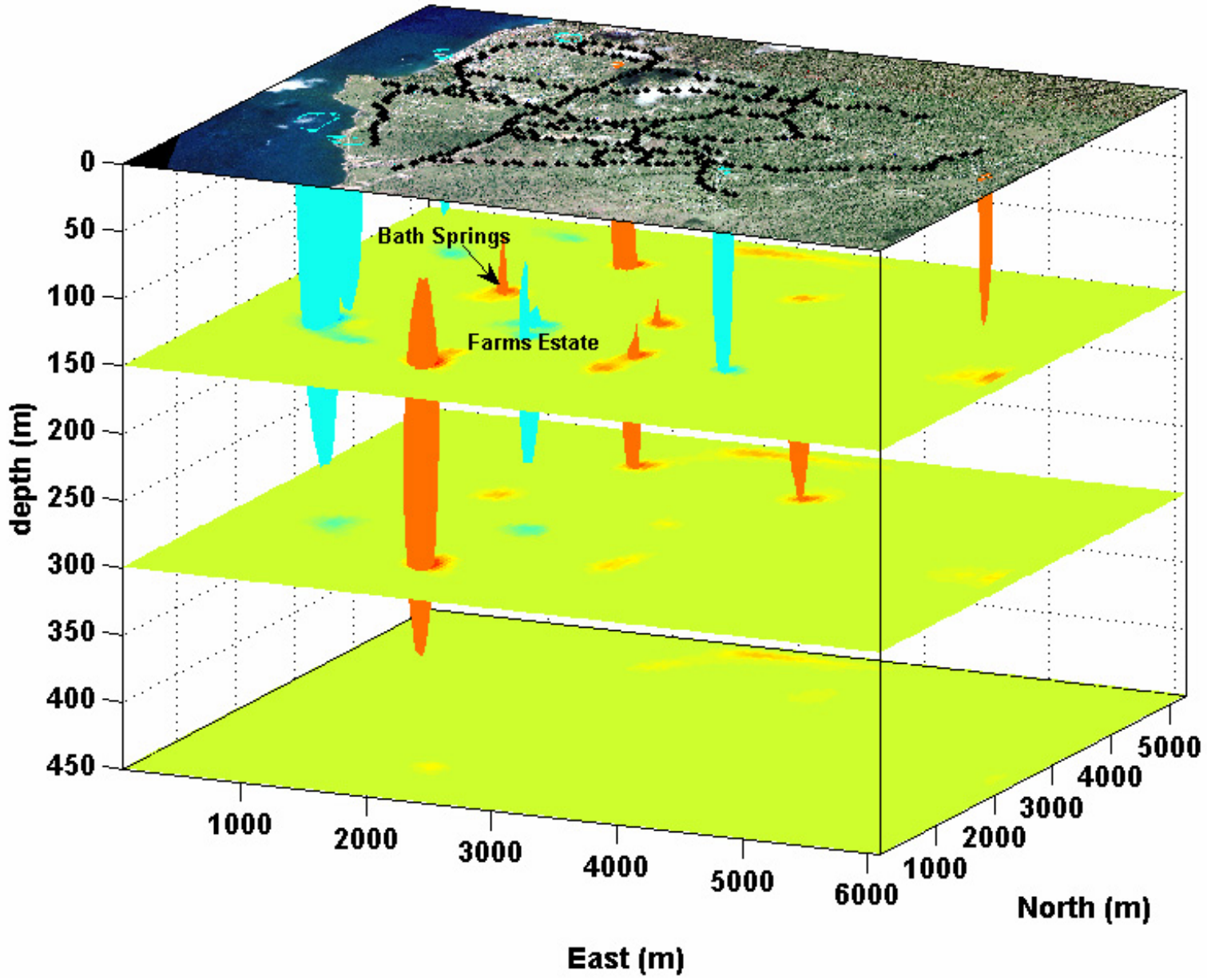



**Figure 5: SP Inversion Current Sources in 3D Using Homogeneous Resistivity Assumption (10x vertical exaggeration)**

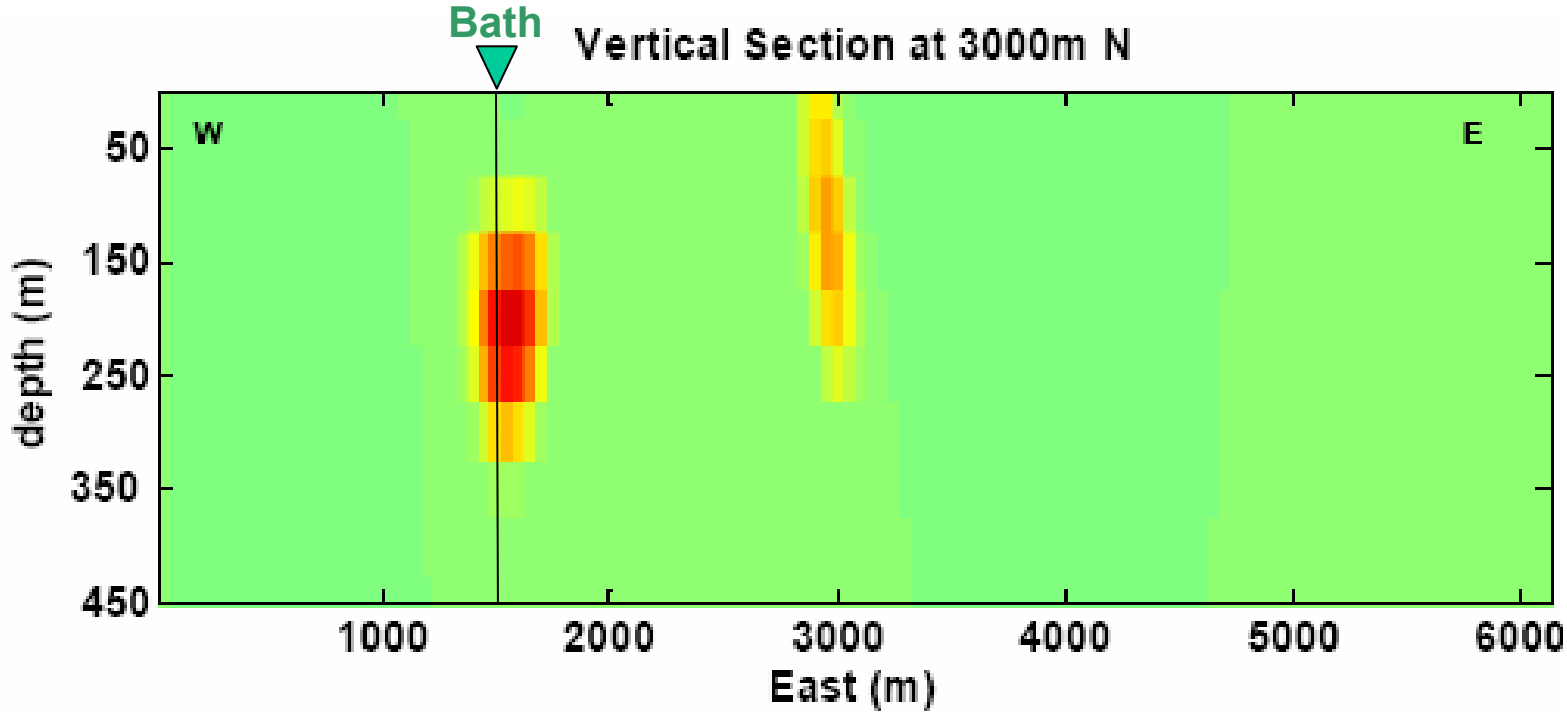



**Figure 6: Vertical W-E Section of 3D Current Sources. Bath Springs at ~1500m.**

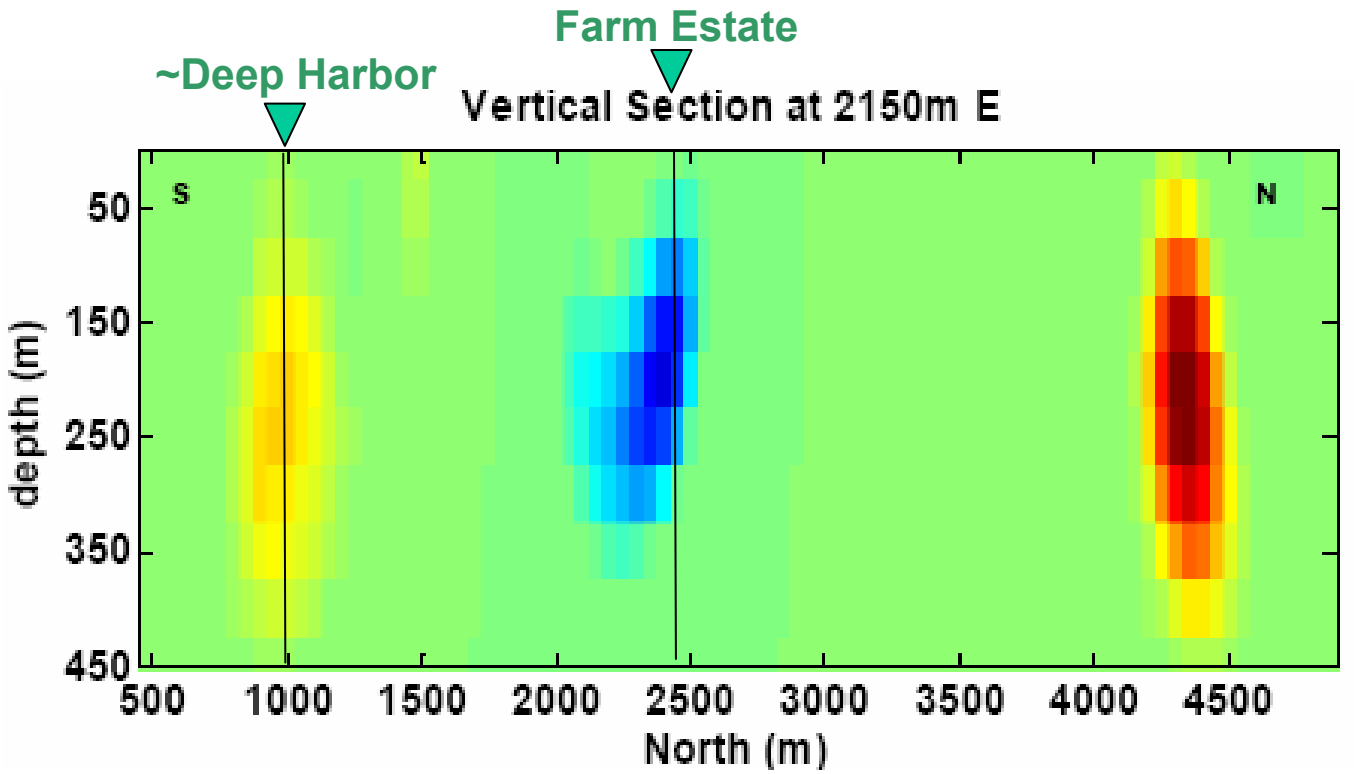



**Figure 7: Vertical S-N Section of 3D Current Sources. Farms Soufriere ~2500m.**

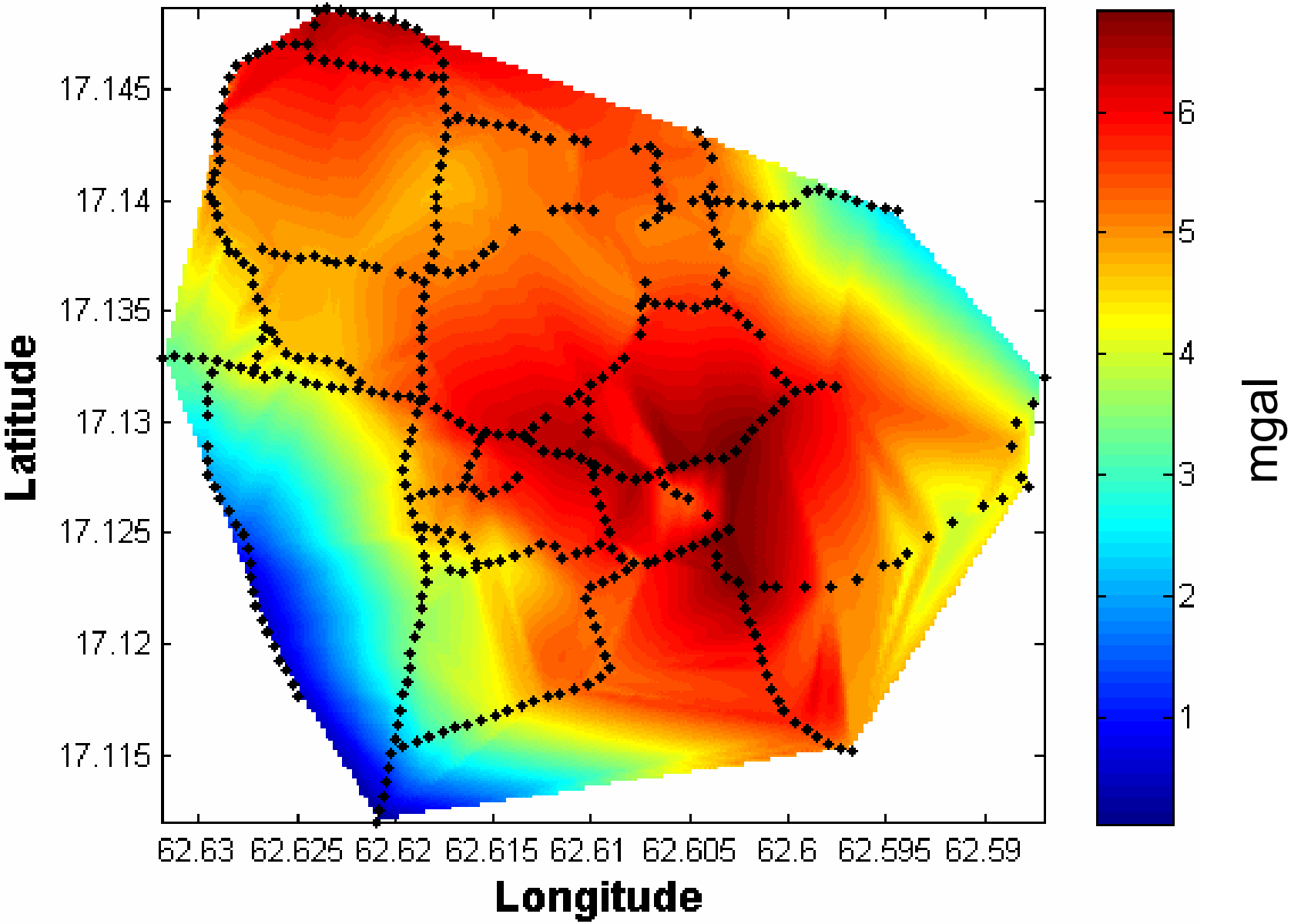



**Figure 8: Bouguer Anomaly Map (mGal). (2.6 g/cc background)**

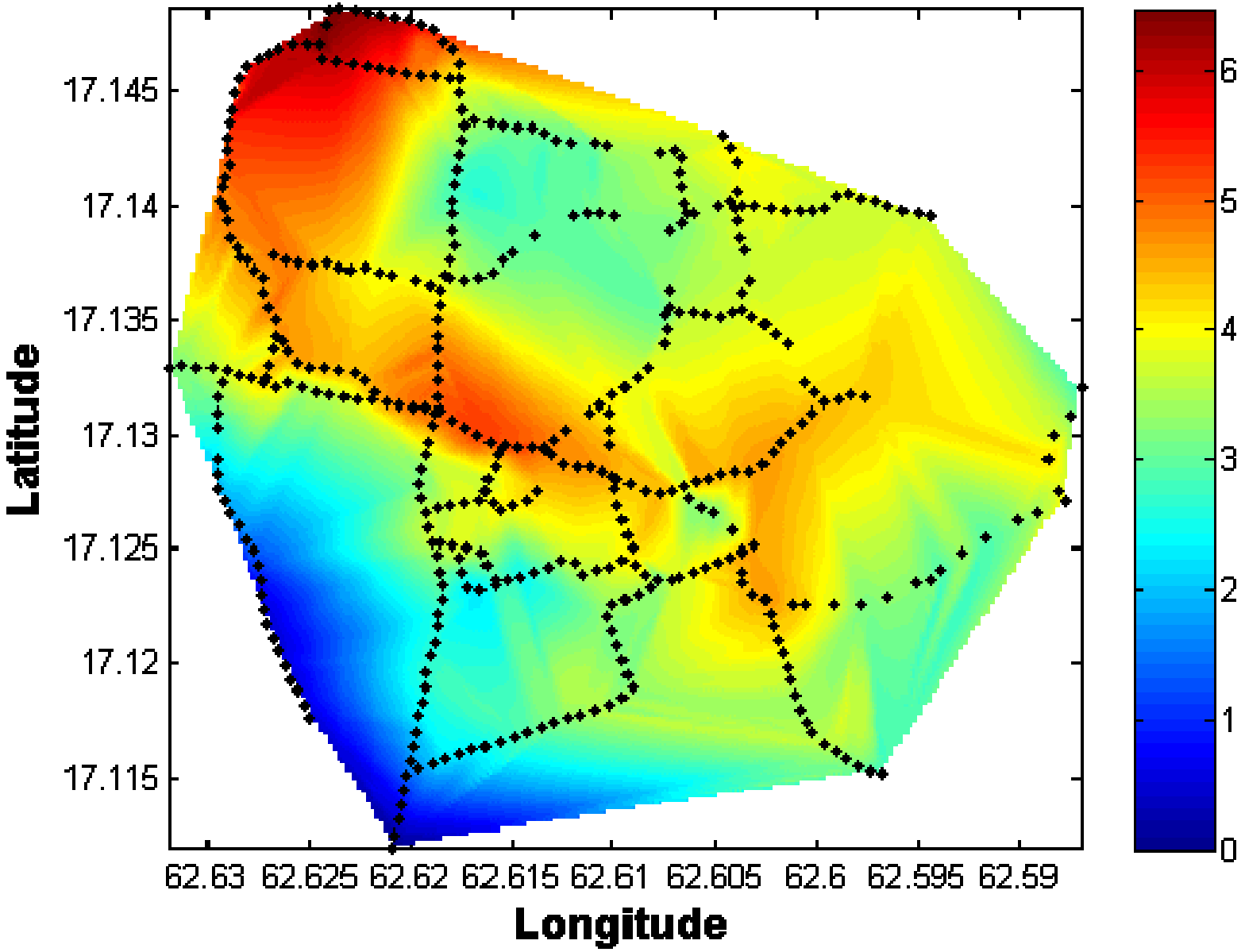



**Figure 9: Polynomial Residual Gravity Map (mGal).**

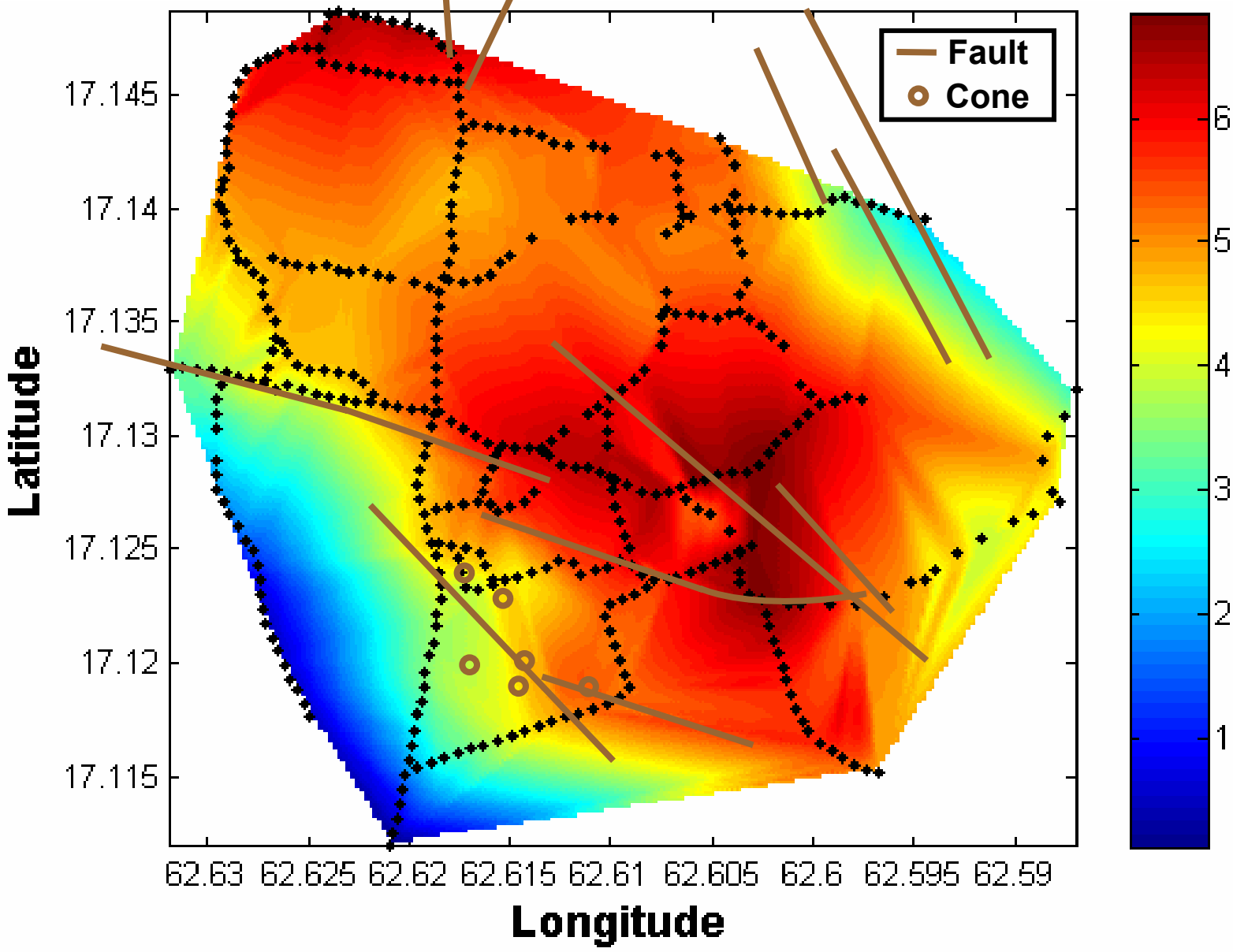



**Figure 10: Bouguer Gravity Map with Faults and Cones from Huttrer (1998).**

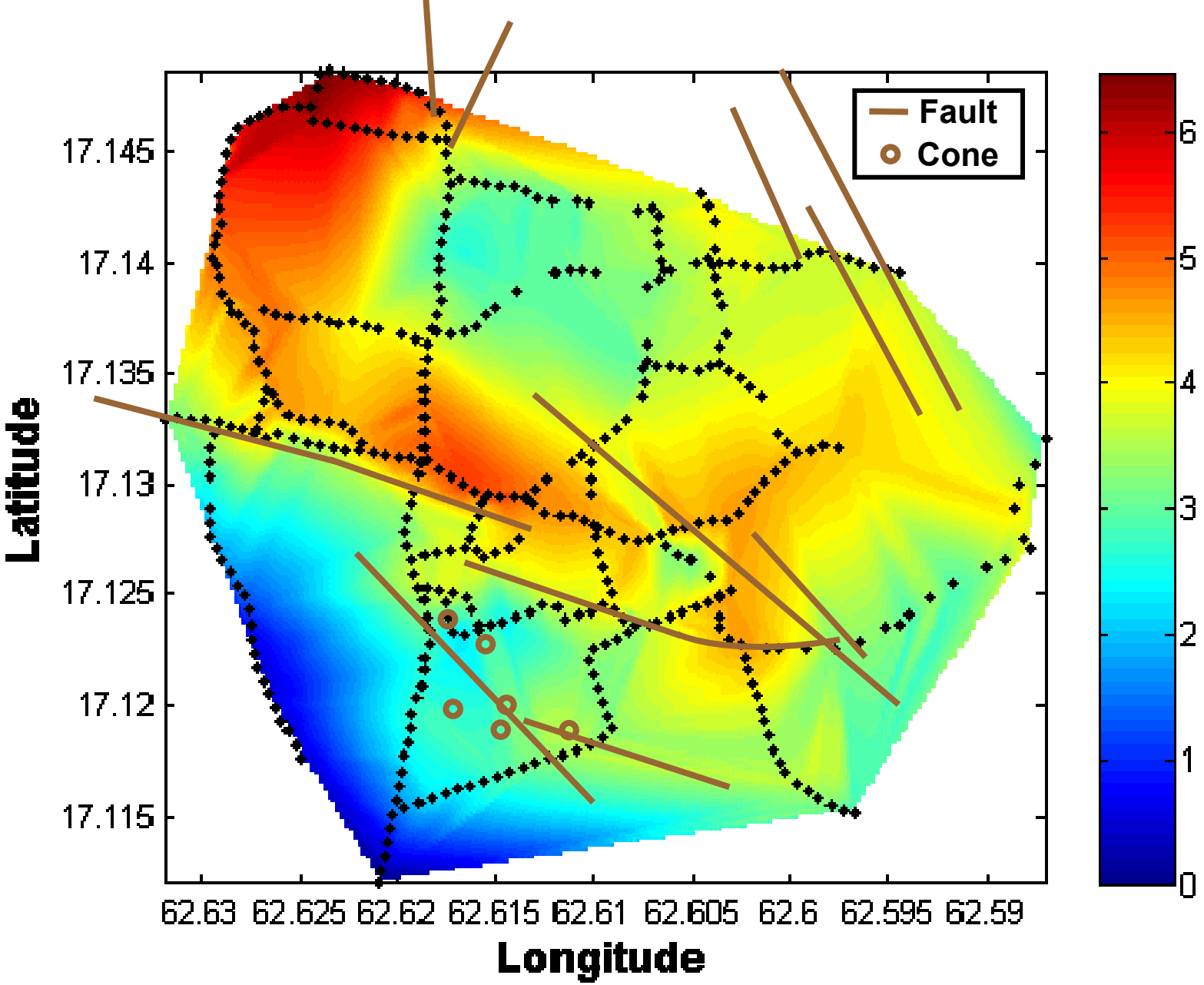



**Figure 11: Polynomial Gravity Map with Faults and Cones from Huttrer (1998).**

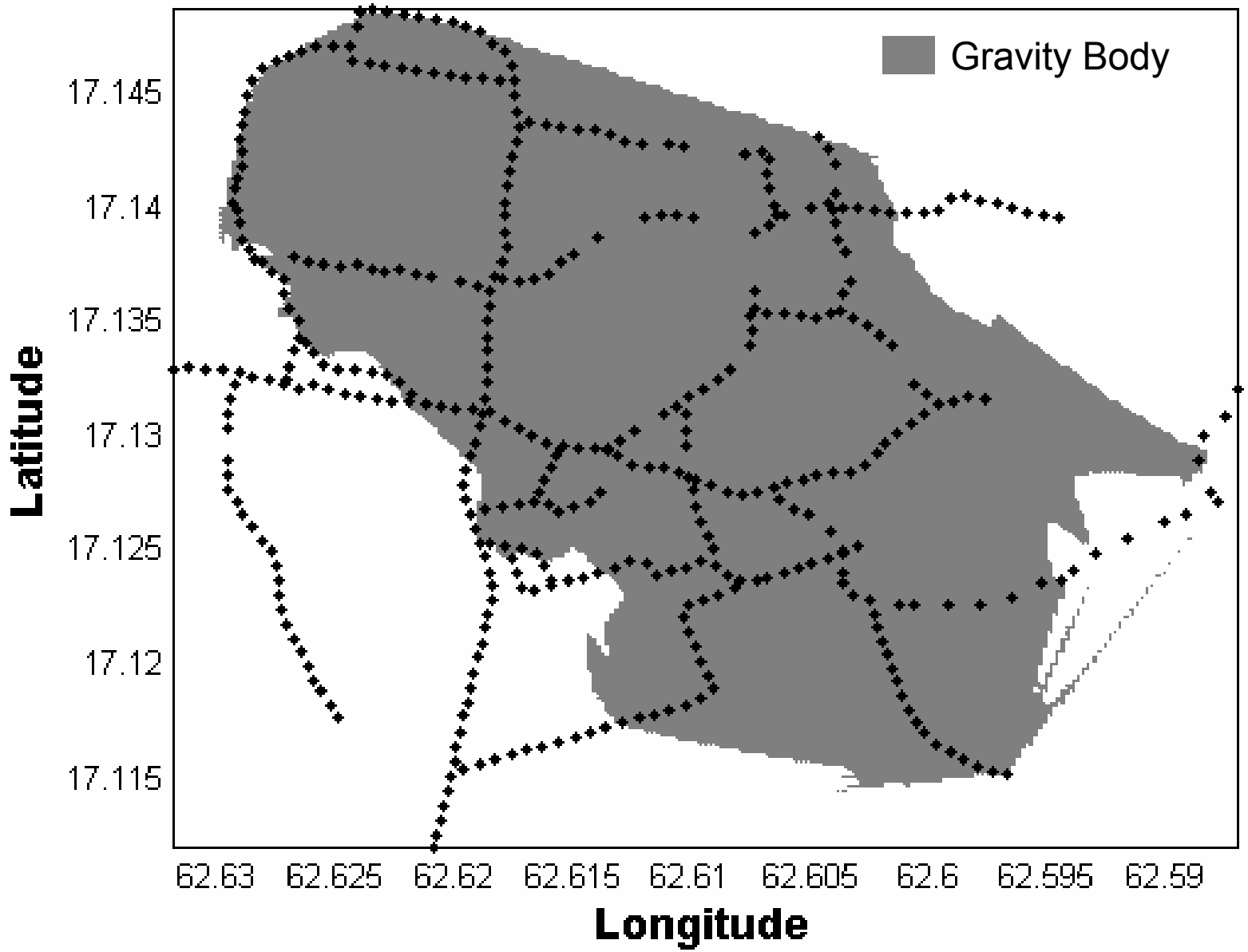



**Figure 12: Possible Extent of Gravity Body From Bouguer Map.**

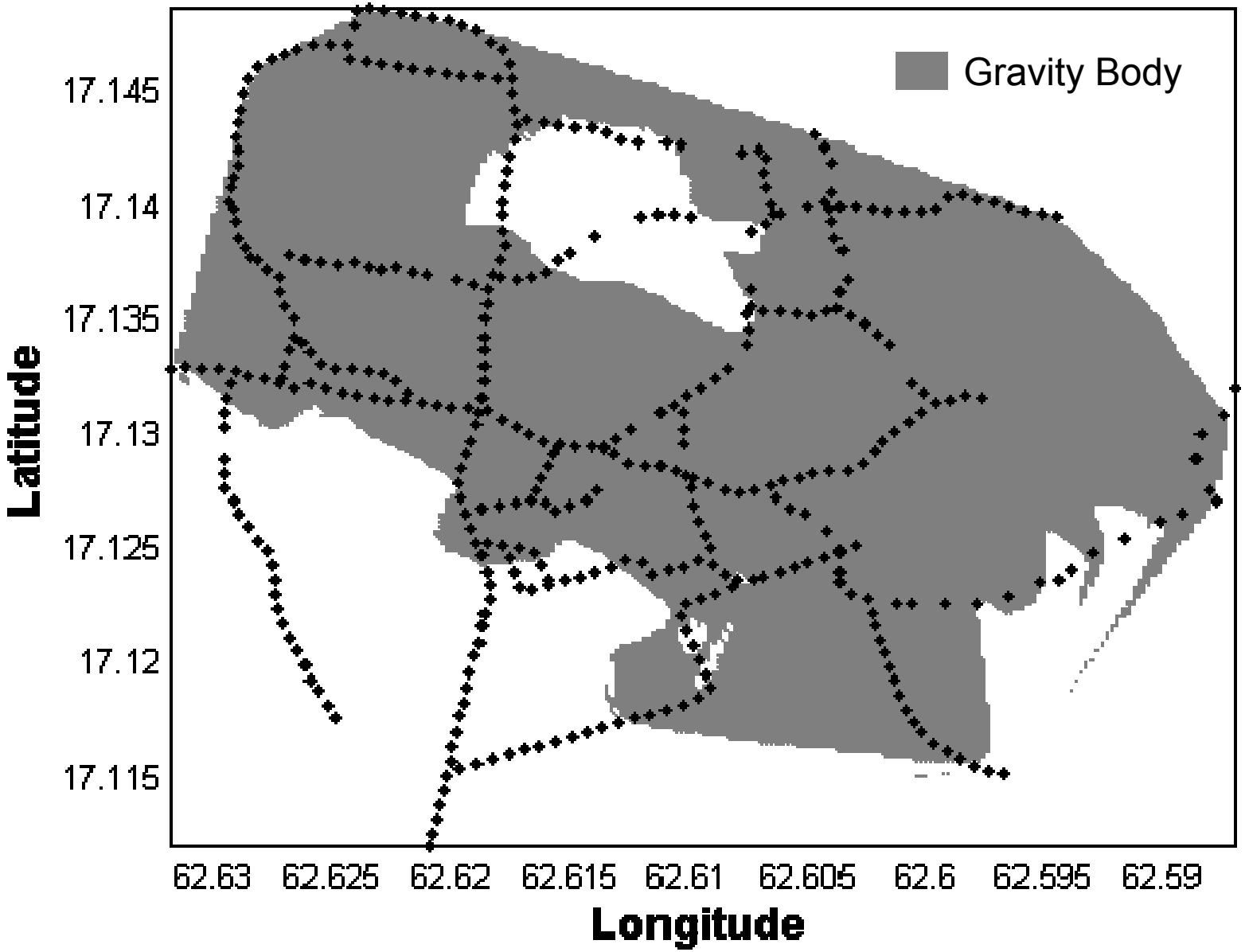



**Figure 13: Possible Extent of Gravity Body From Polynomial Gravity Map.**

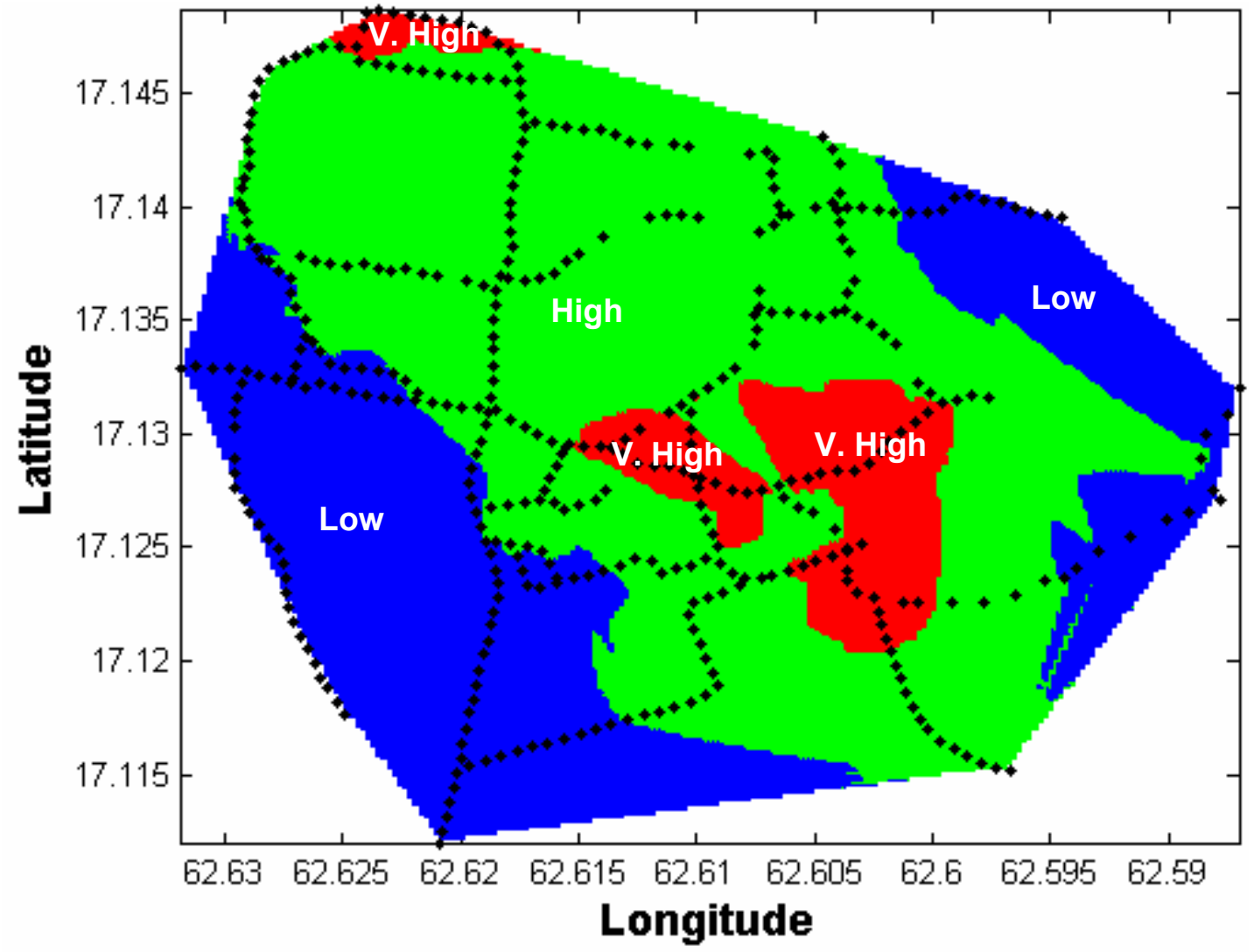



**Figure 14: Tertiary Map of Bouguer Gravity.**

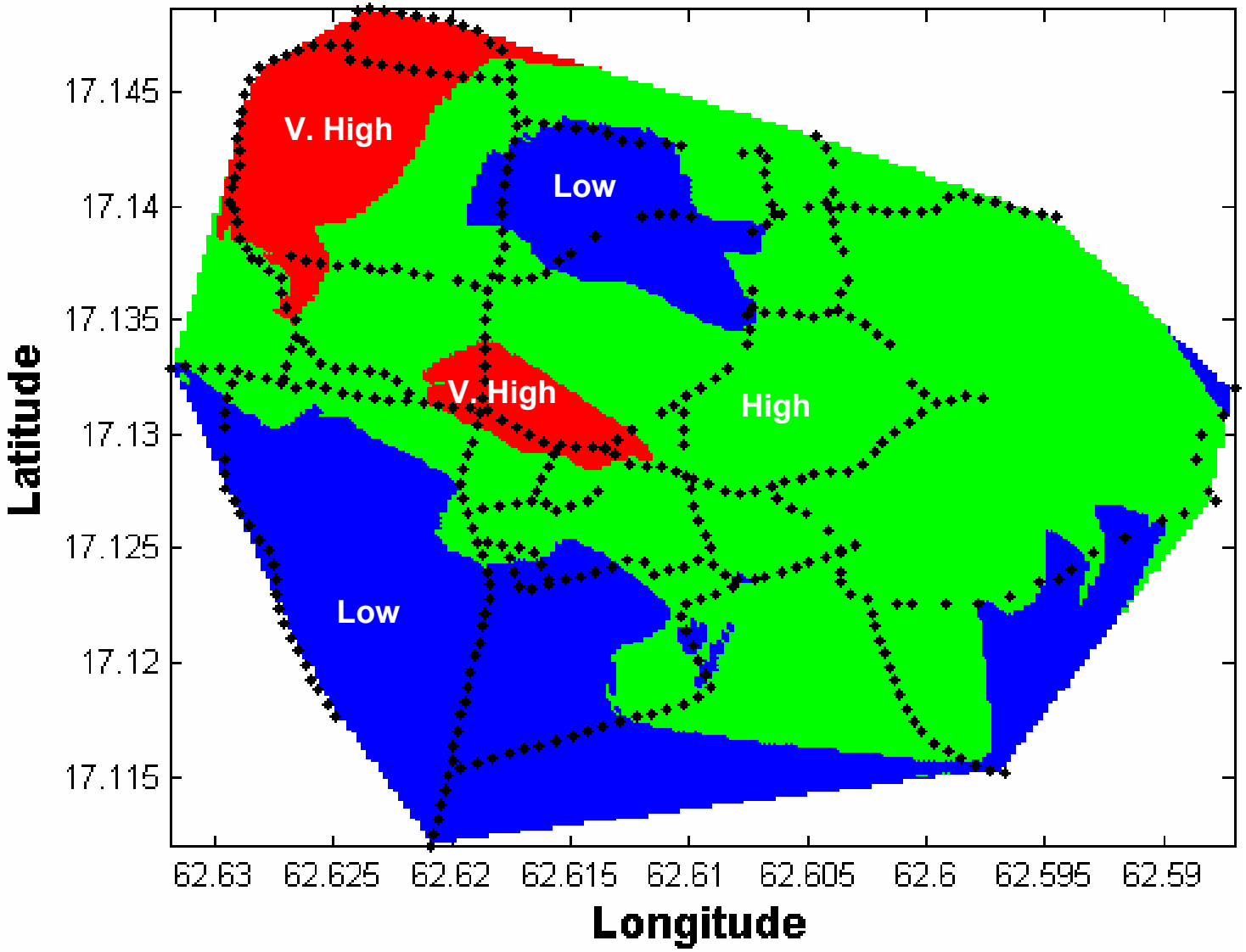



**Figure 15: Tertiary Map of Polynomial Gravity.**

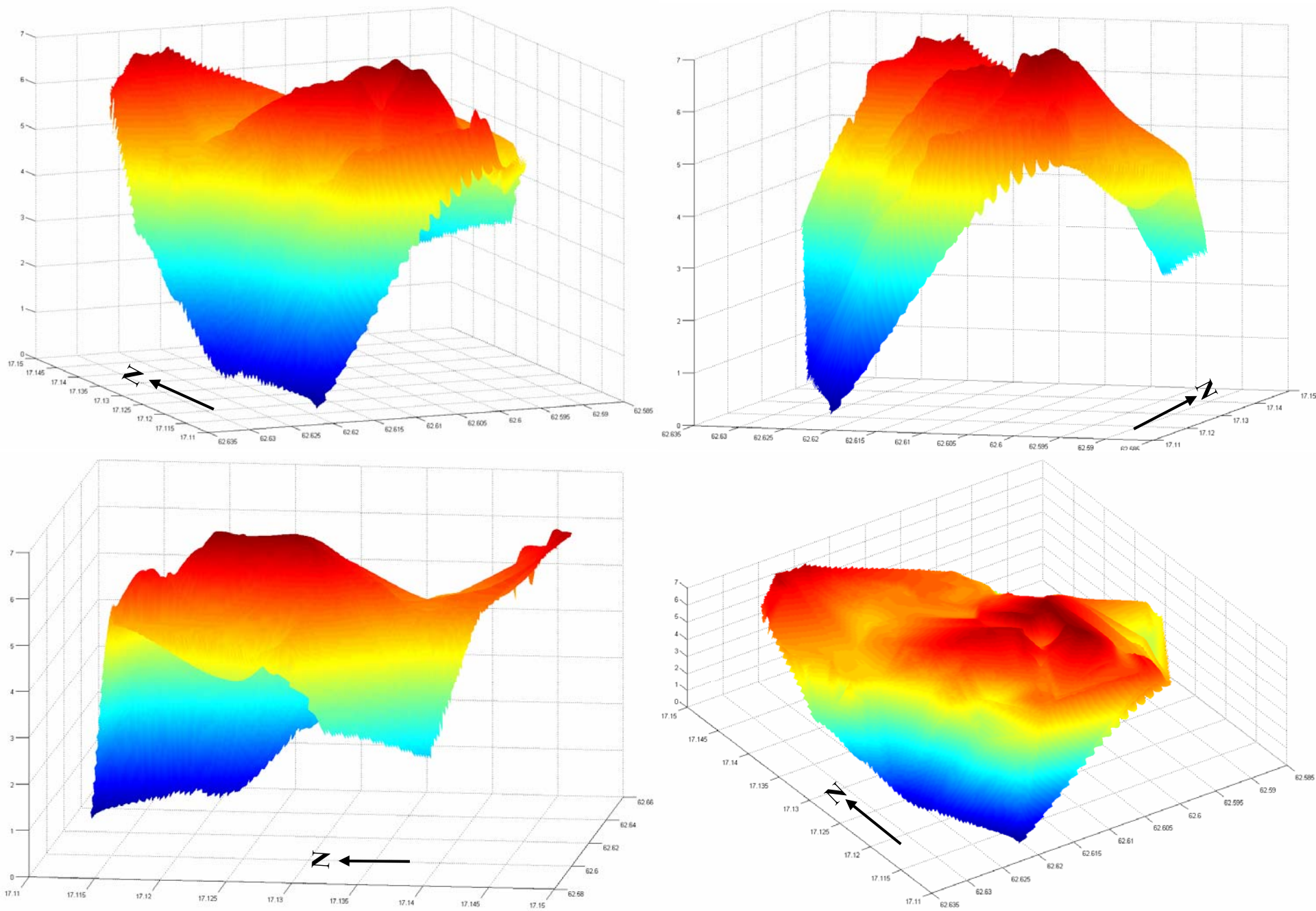



**Figure 16: Bouguer 3D Surface.**

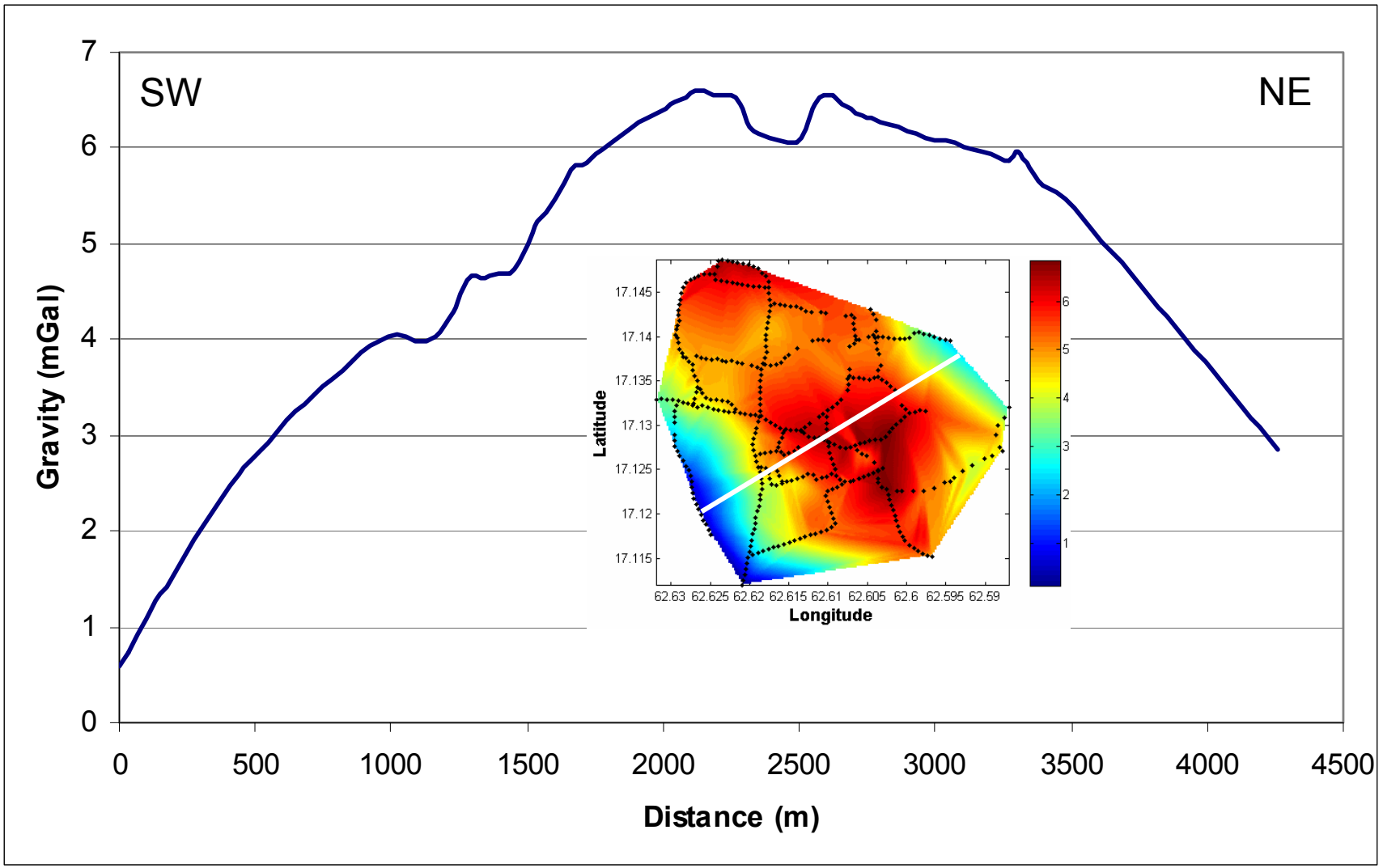
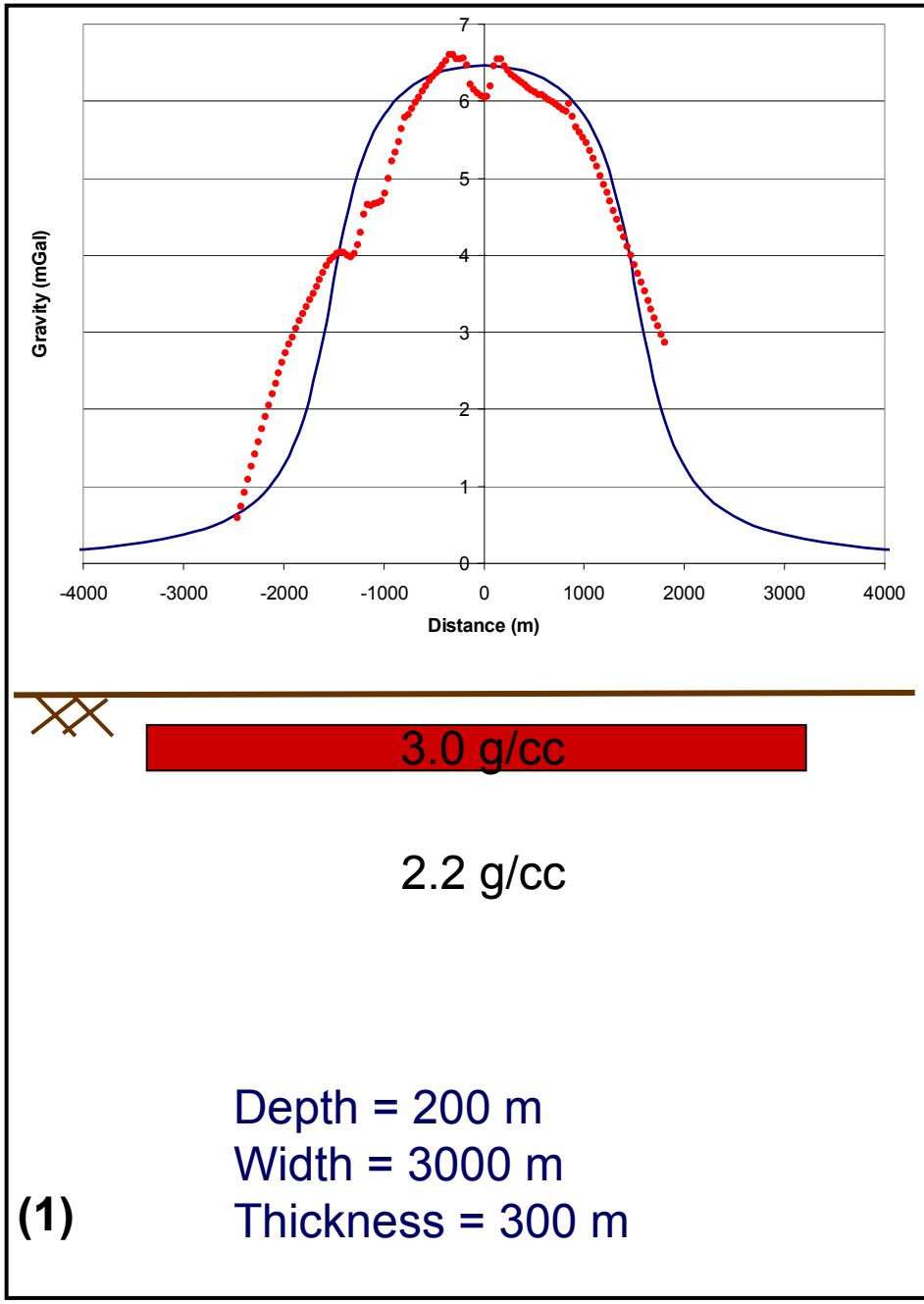



**Figure 17: Data Line for Gravity Modeling From Bouguer Map.**



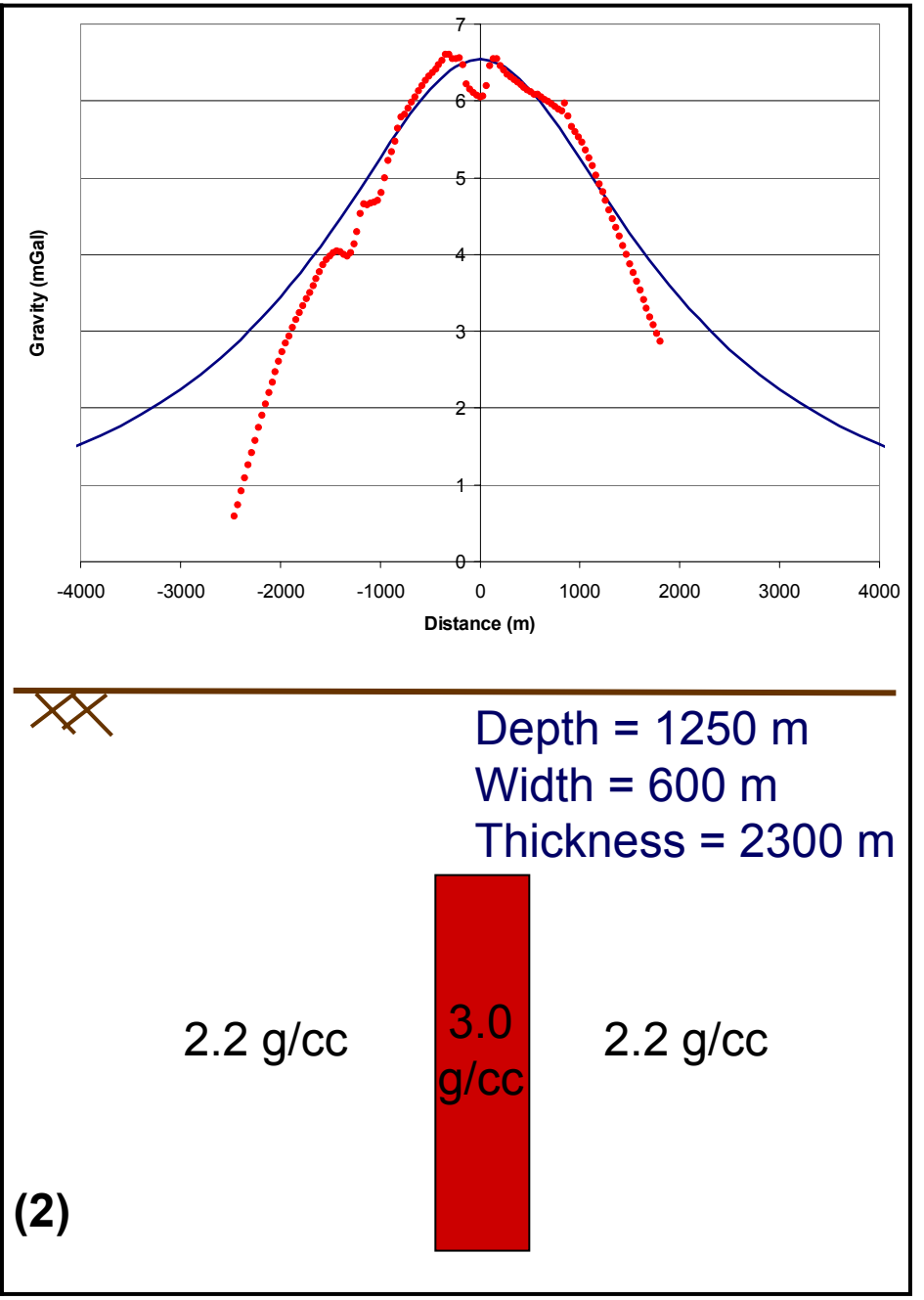
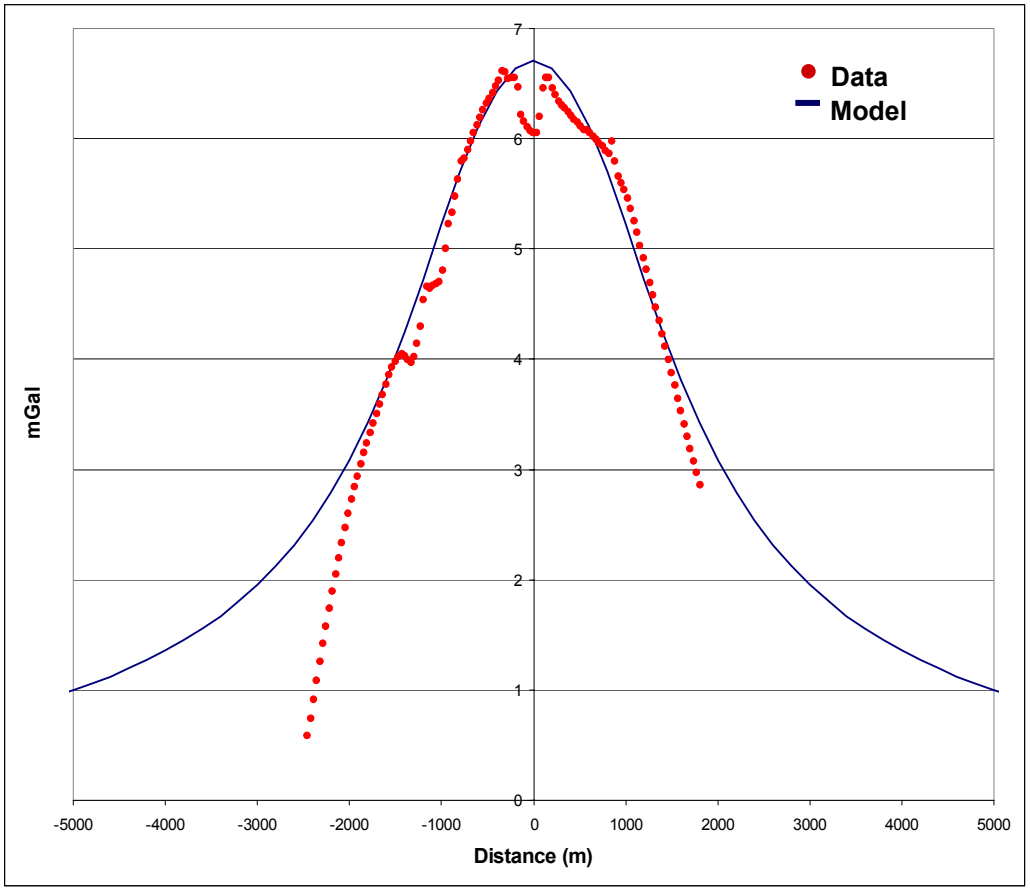




**Figure 18: Data and Model Fits. (1) Shallow Limit and (2) Deep Limit.**



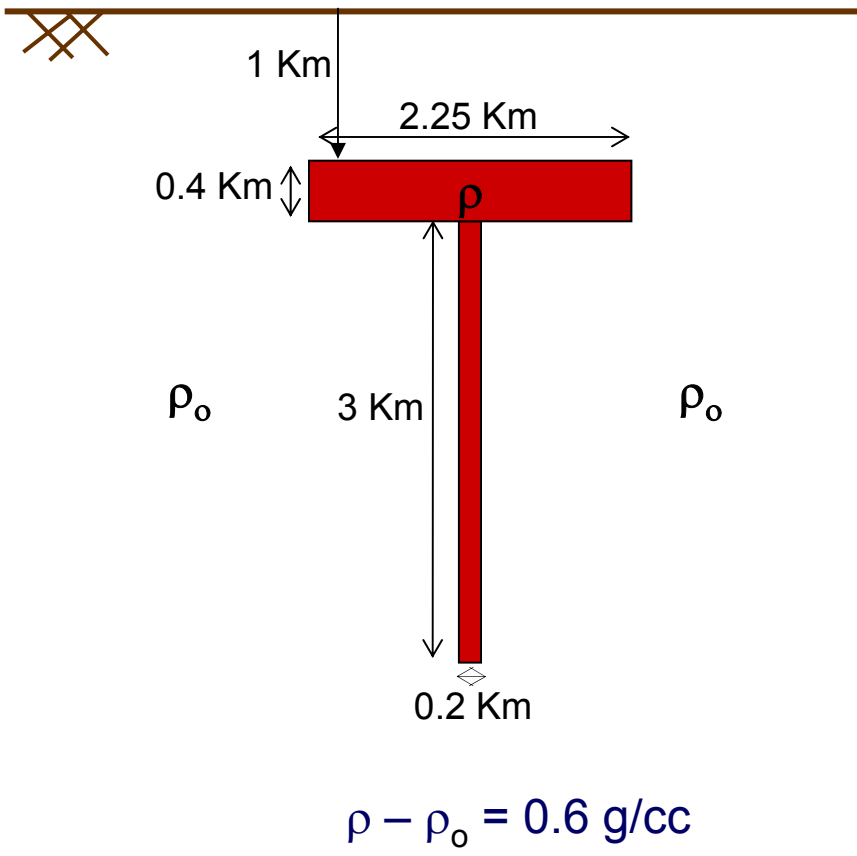




**Figure 19: Data and Model Fit for Realistic Gravity Body.**

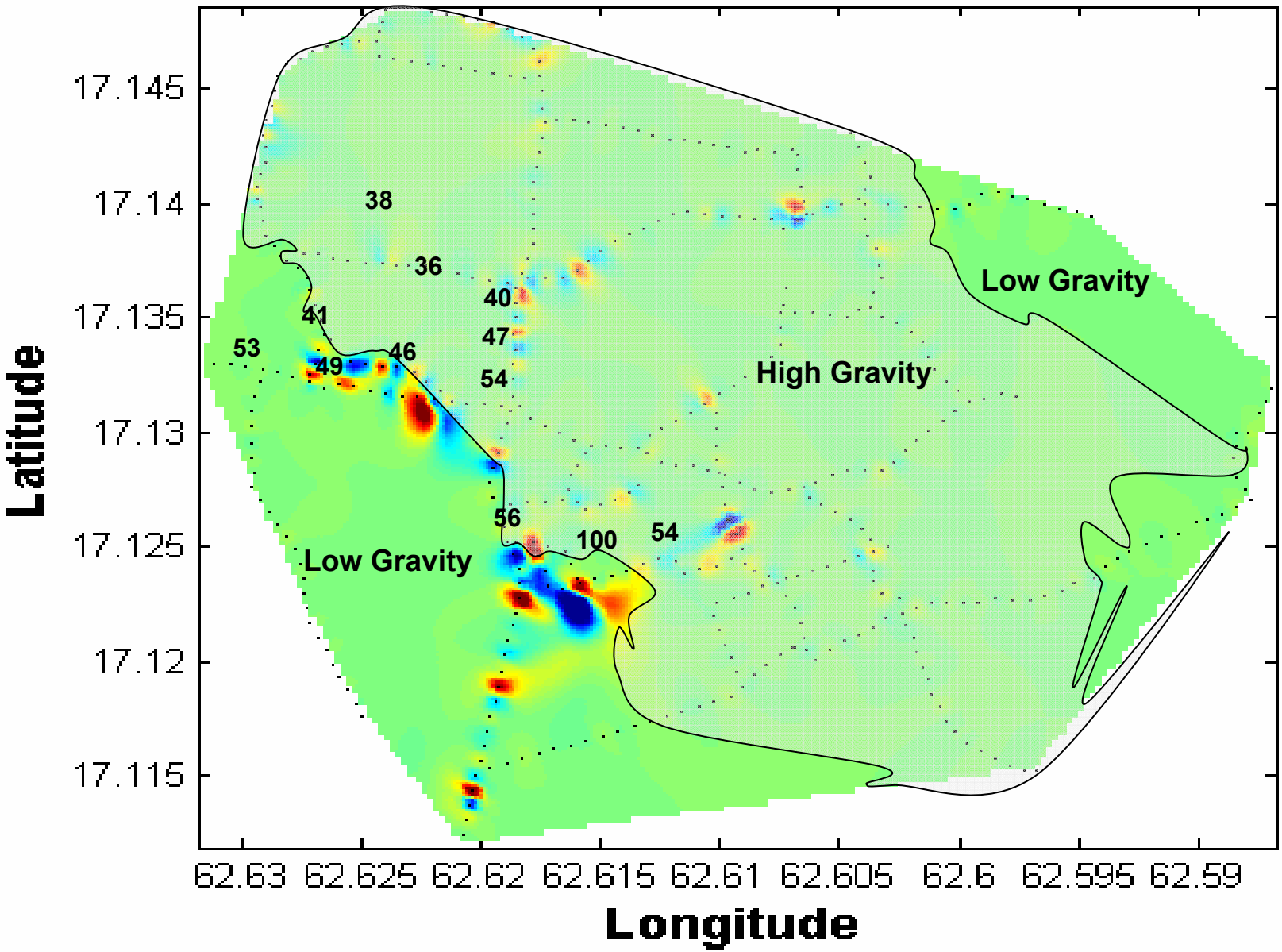



**Figure : Possible Extent of Bouguer Gravity Body with SP Current Sources.**

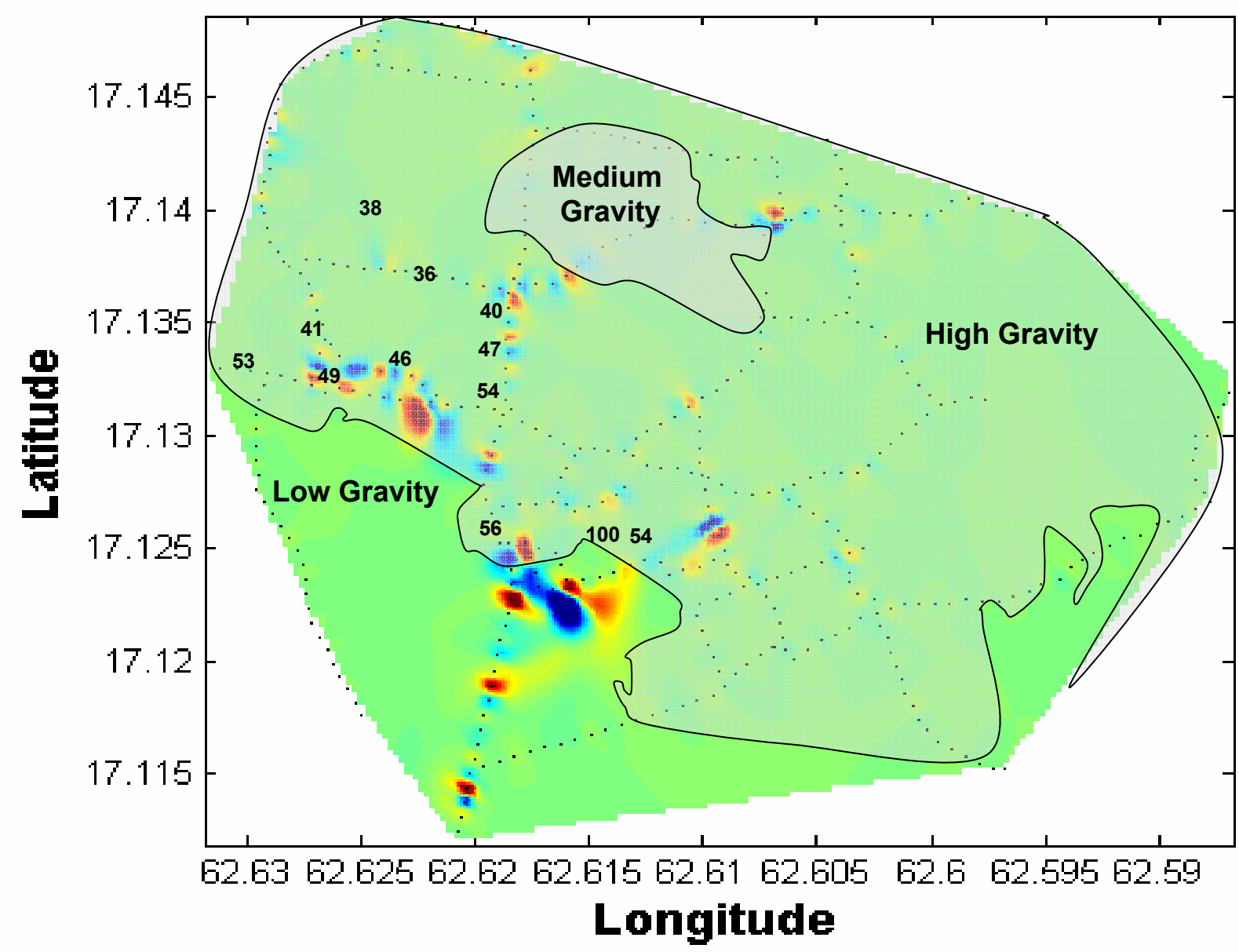
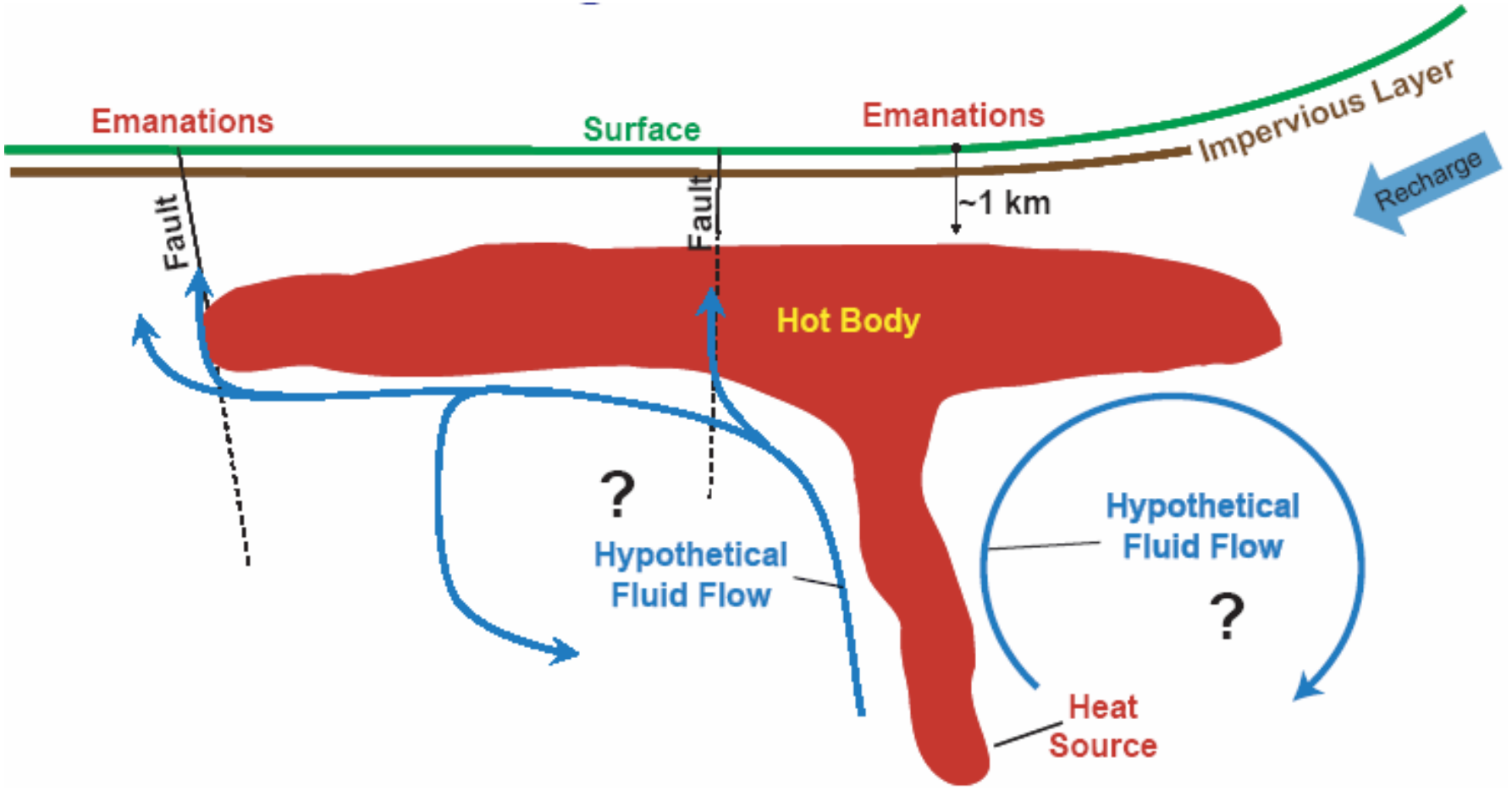
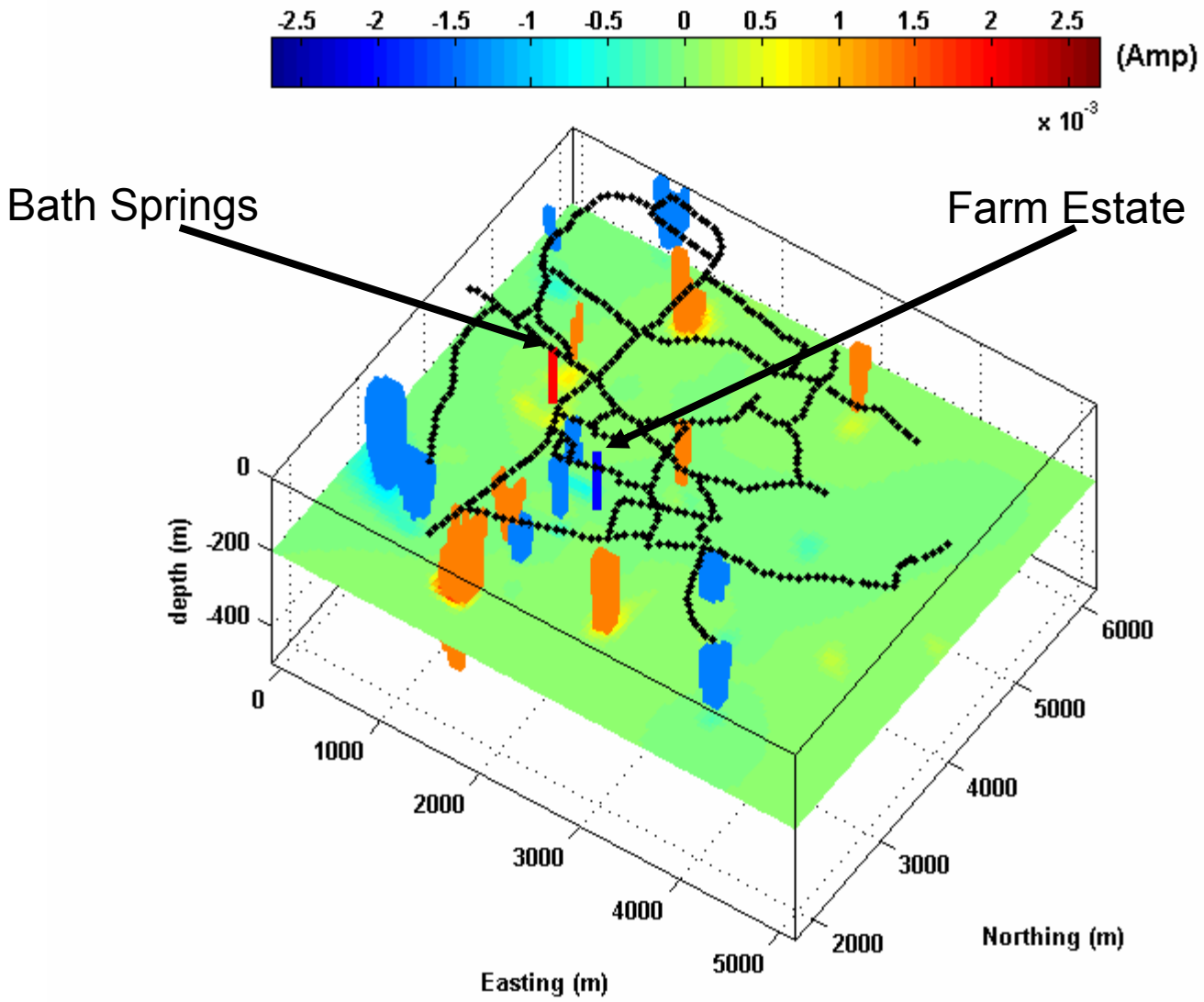


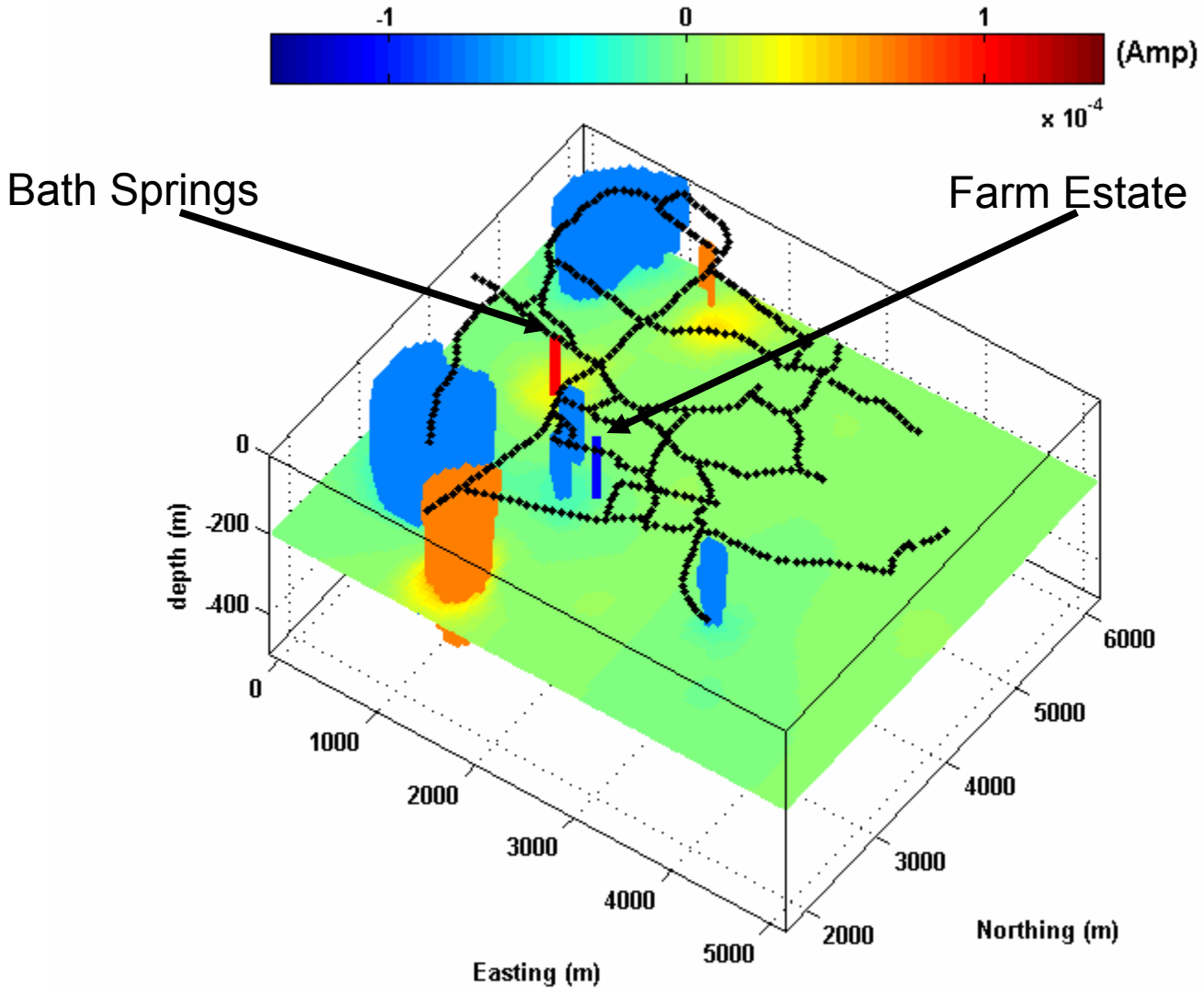

**Figure : Possible Extent of Polynomial Bouguer Body with SP Current Sources**


Emanations
Surface
Emanations
Impervious Layer
Recharge
Fault
Fault
~1 km
Hot Body
?
Hypothetical
Fluid Flow
Hypothetical
Fluid Flow
?
Heat
Source

# Self Potentials: Further Analysis

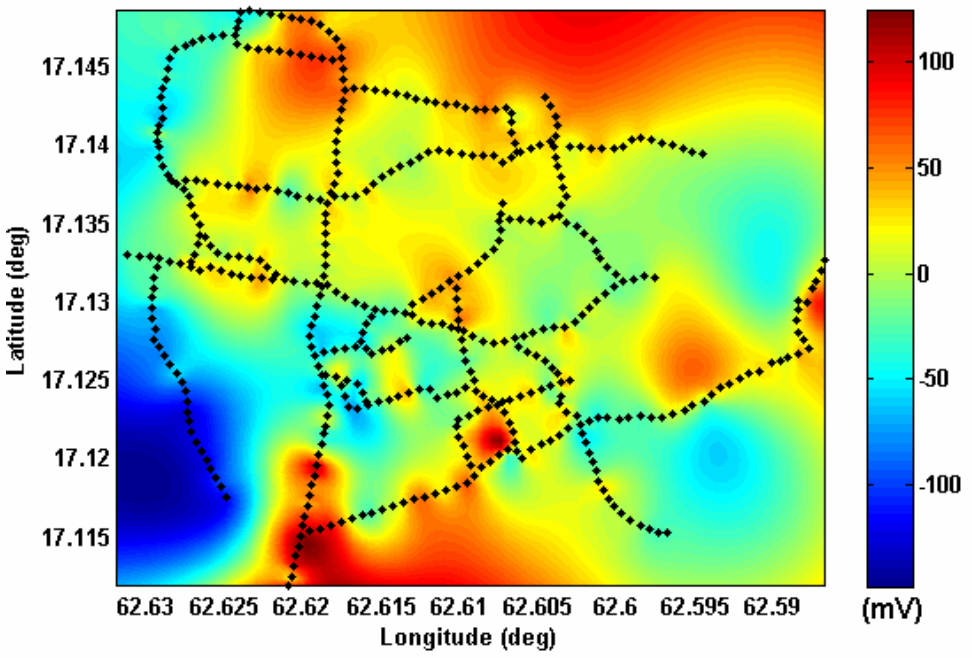



3D SP Source Inversion Using Homogeneous Resistivity Assumption (5x vertical exaggeration)

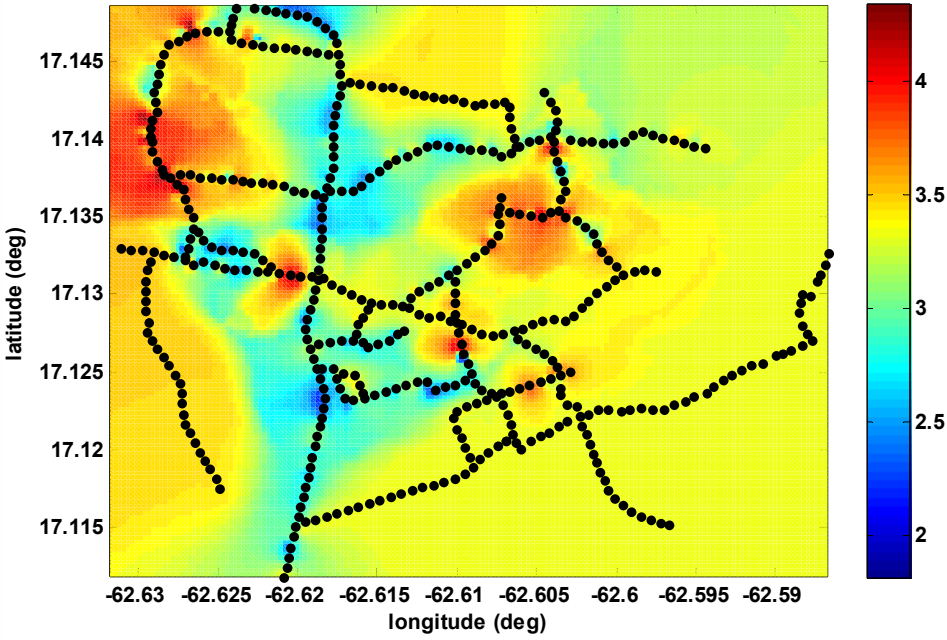


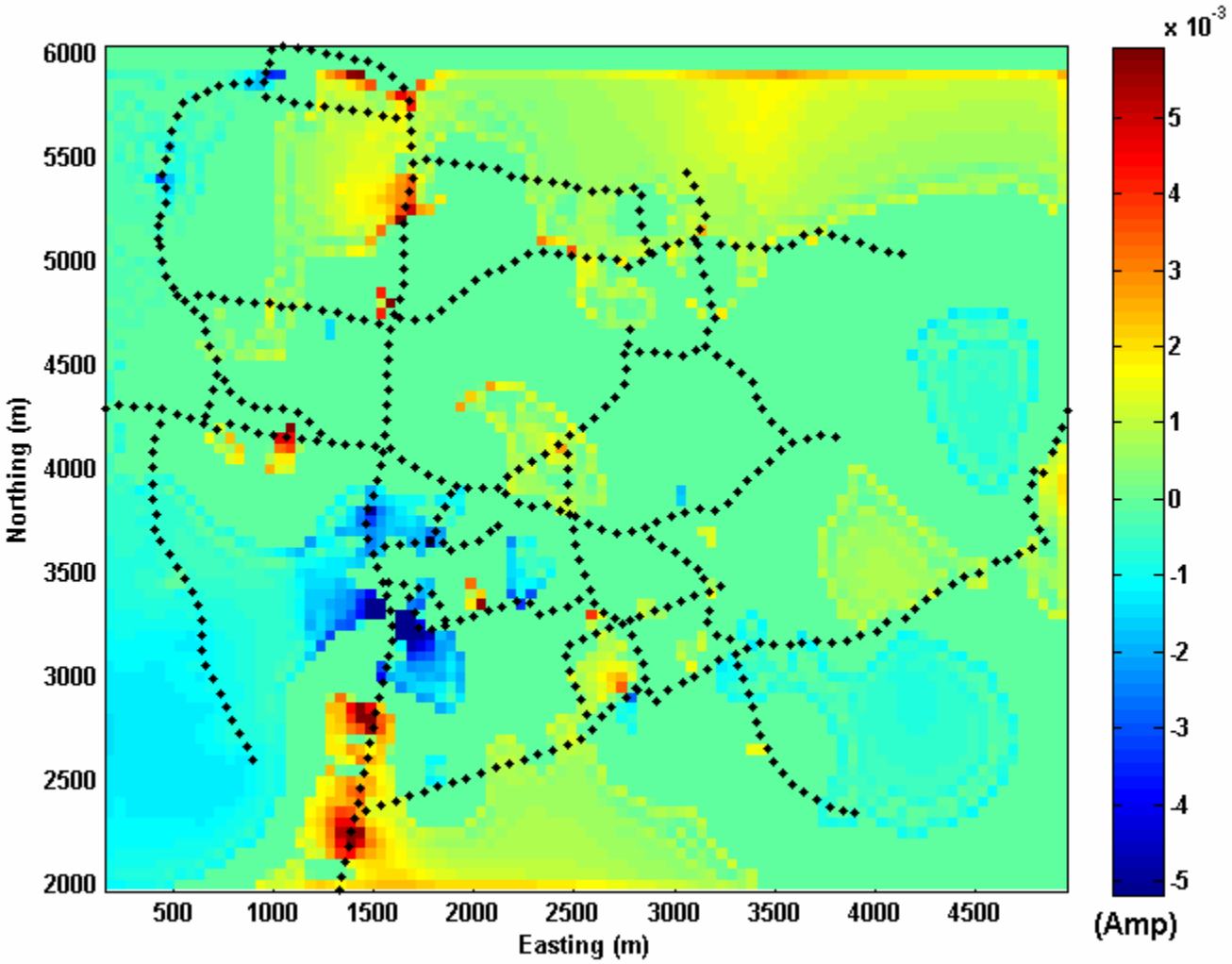

3D SP Source Inversion Using 2D Resistances Over a Homogeneous Halfspace (5x vertical exaggeration)

## Interpolated SP Data (mV)



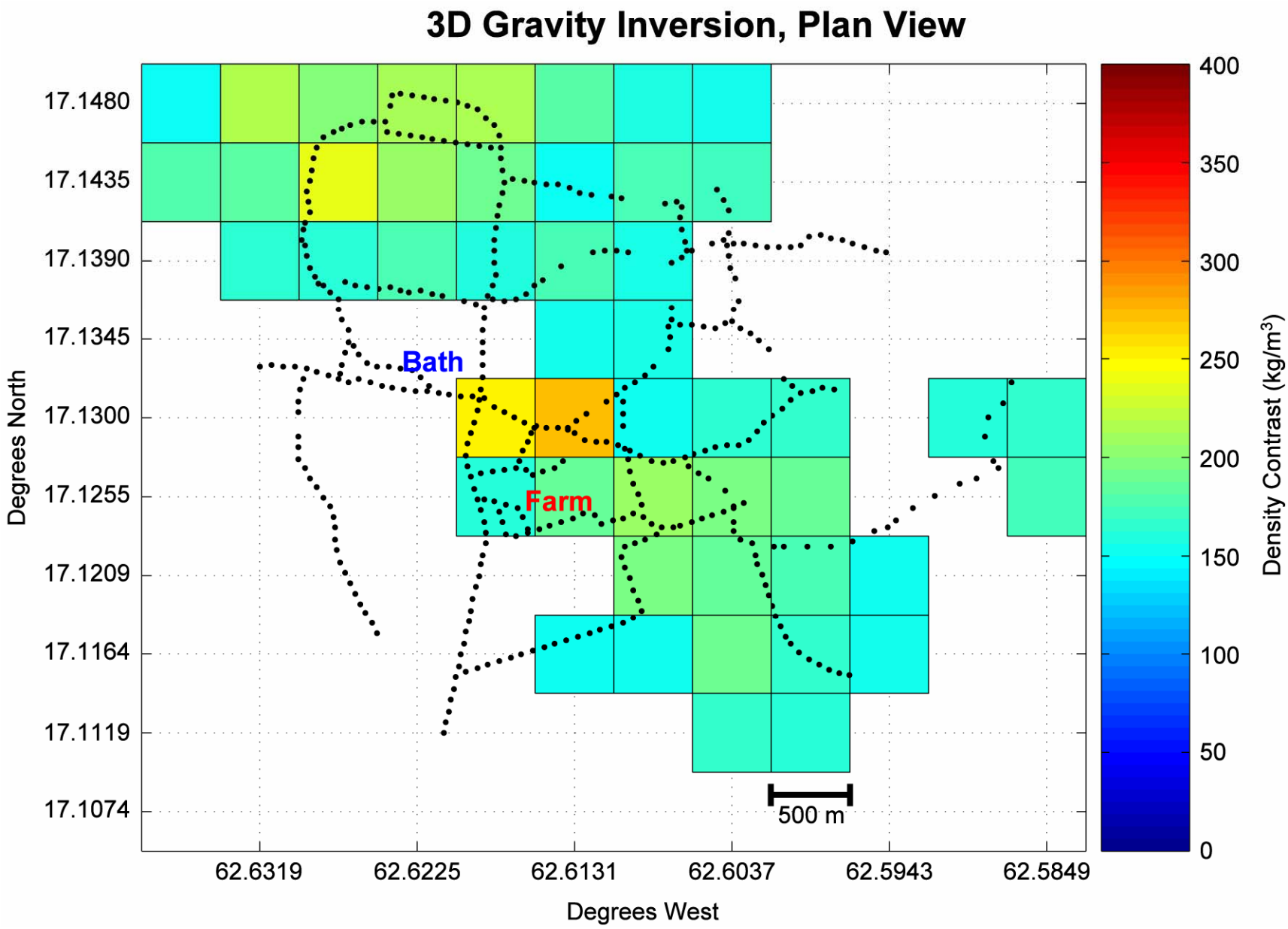

## Interpolated Resistance Data ($log_{10}$ Ohms)

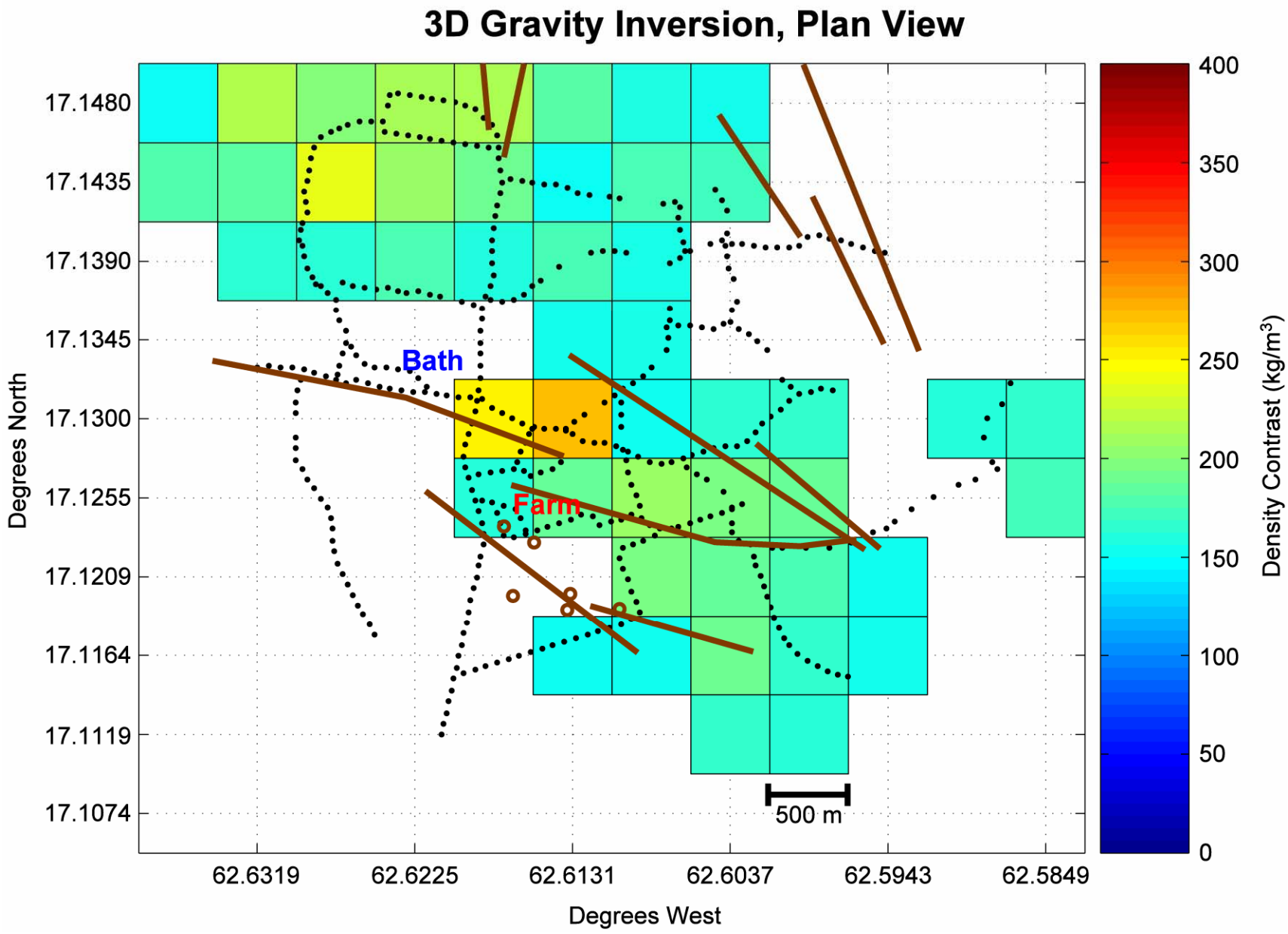


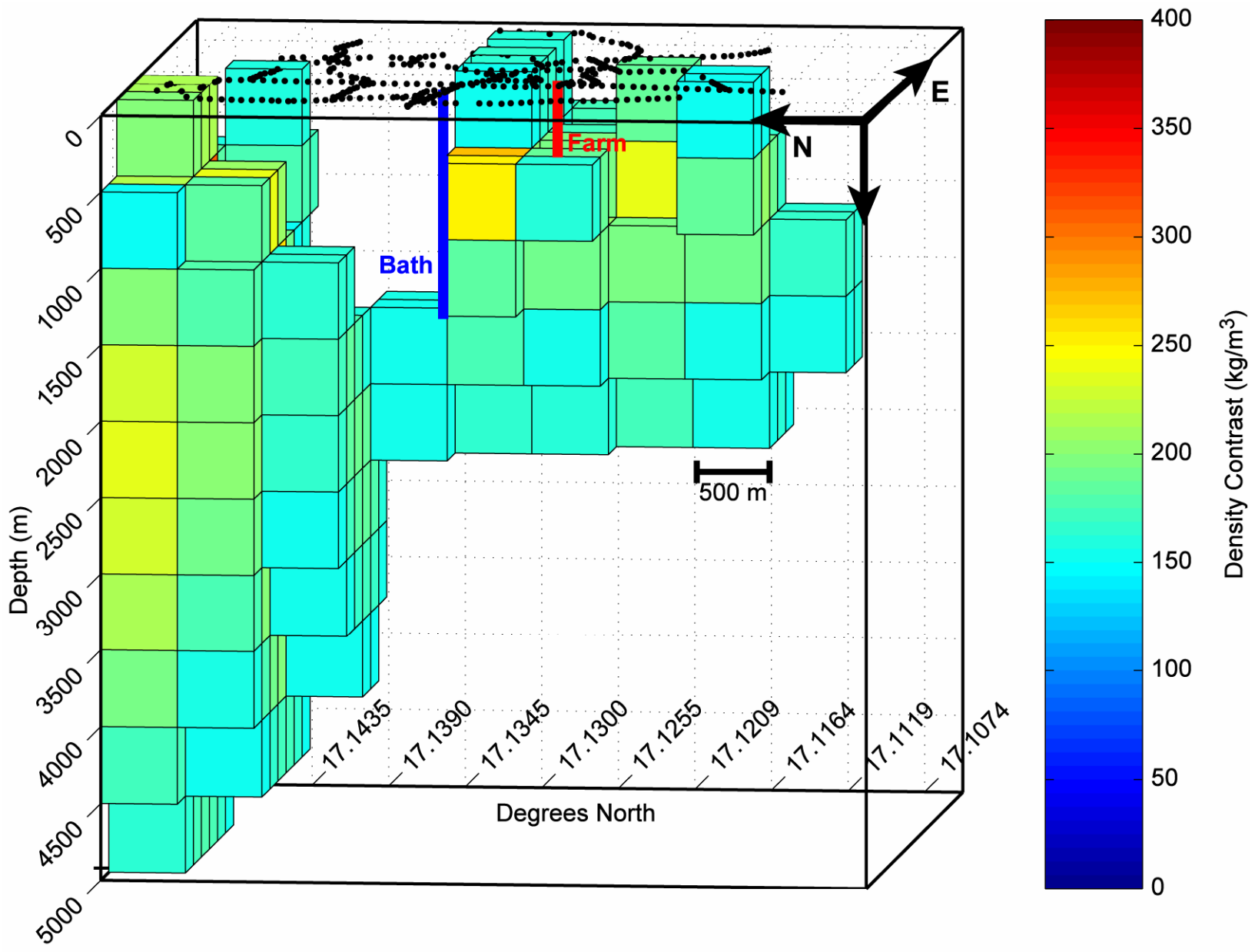


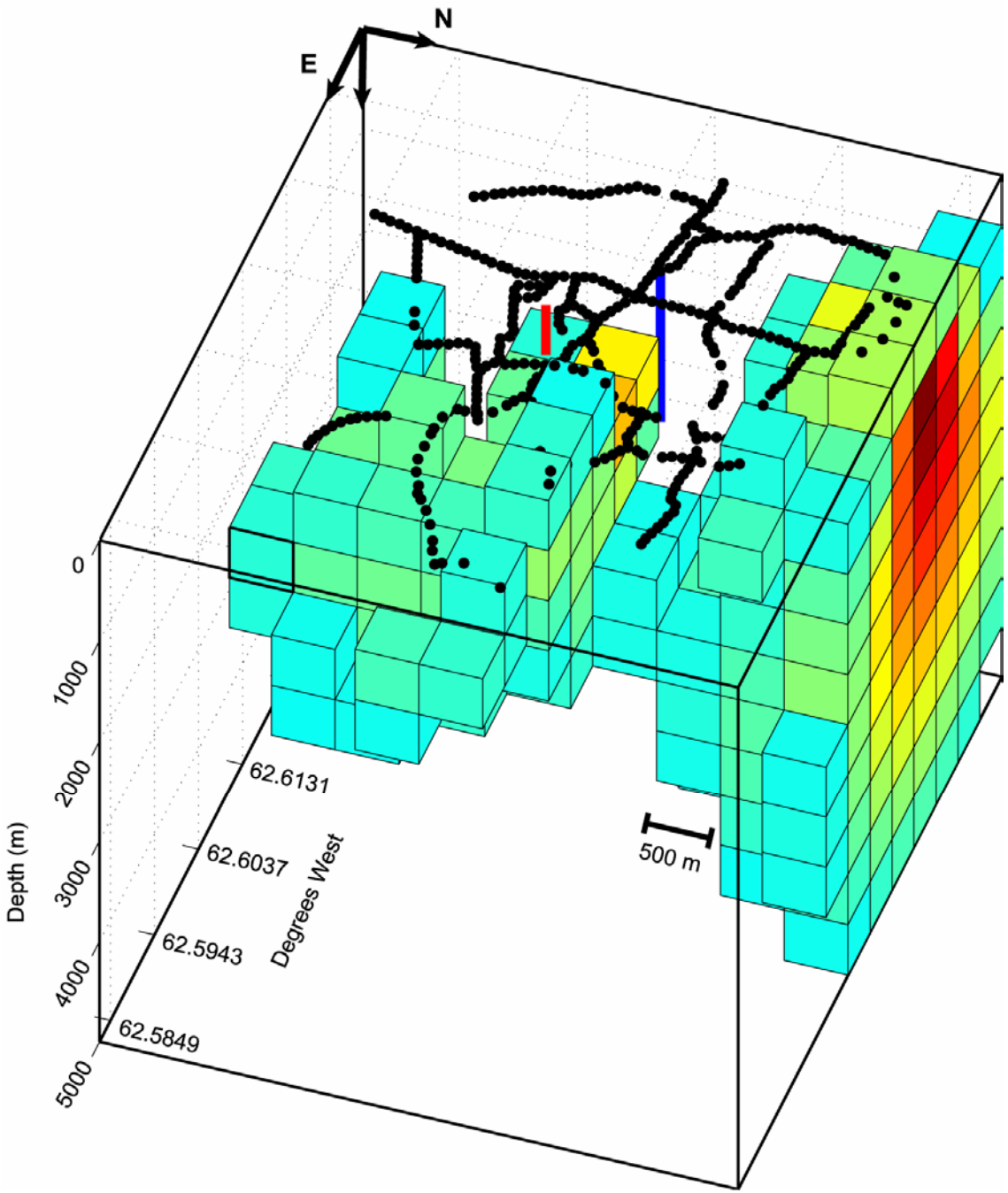

"3D" SP Source Inversion Using Interpolated SP Data and Interpolated Resistances in a Single Layer Model

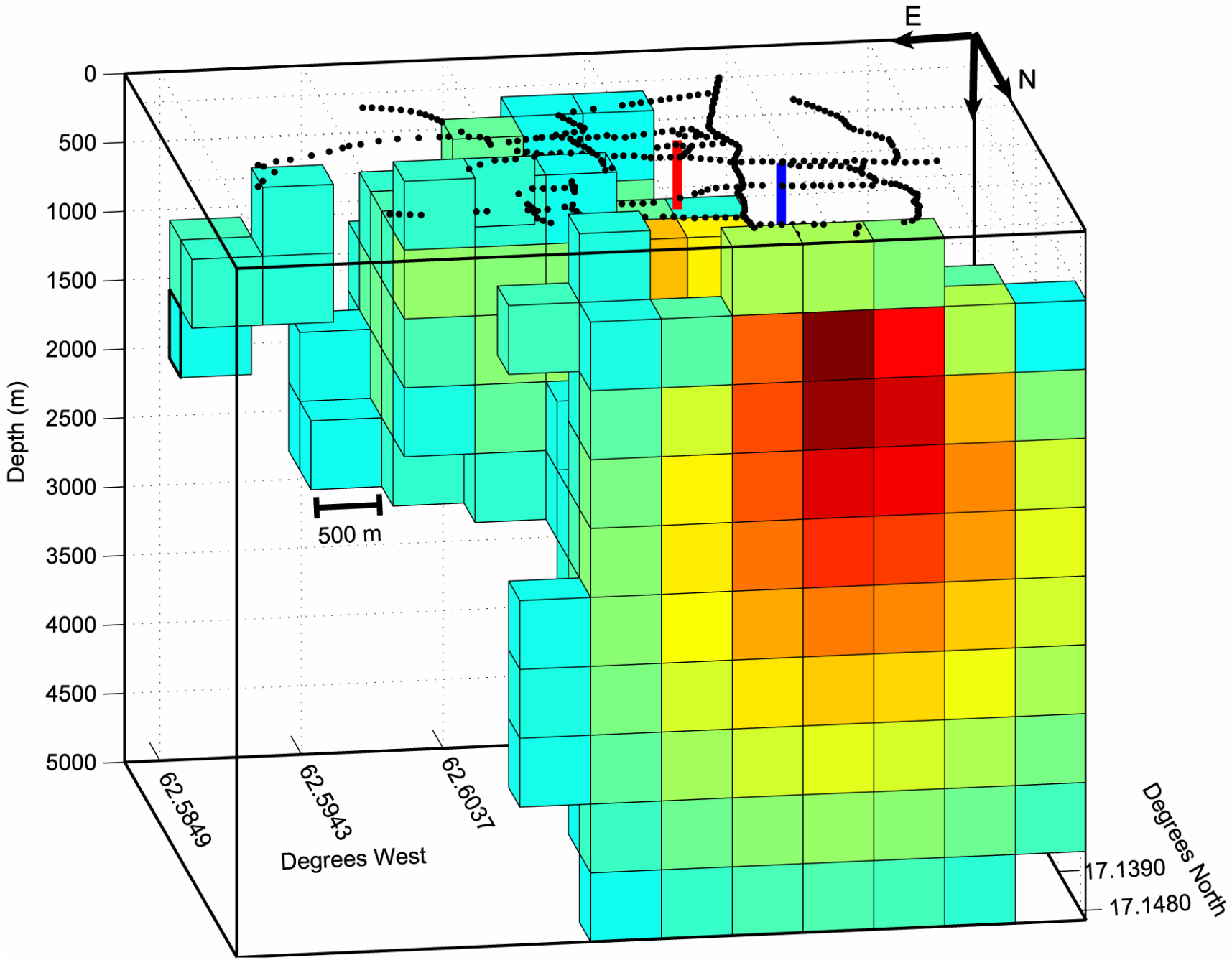
# Gravity: Further Analysis


3D Gravity Inversion, Plan View
Degrees North
17.1480
17.1435
17.1390
17.1345
17.1300
17.1255
17.1209
17.1164
17.1119
17.1074
Bath
Farm
500 m
62.6319
62.6225
62.6131
62.6037
62.5943
62.5849
Degrees West
Density Contrast (kg/m3)
400
350
300
250
200
150
100
50
0


3D Gravity Inversion, Plan View
Degrees North
17.1480
17.1435
17.1390
17.1345
17.1300
17.1255
17.1209
17.1164
17.1119
17.1074
Degrees West
62.6319
62.6225
62.6131
62.6037
62.5943
62.5849
Bath
Farm
500 m
Density Contrast (kg/m3)
400
350
300
250
200
150
100
50
0


Depth (m)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Bath
Farm
N
E
500 m
17.1435
17.1390
17.1345
17.1300
17.1255
17.1209
17.1164
17.1119
17.1074
Degrees North
Density Contrast (kg/m3)
400
350
300
250
200
150
100
50
0


N
E
0
1000
2000
3000
4000
5000
Depth (m)
62.6131
62.6037
62.5943
62.5849
Degrees West
500 m


E
N
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Depth (m)
500 m
62.5849
62.5943
62.6037
Degrees West
17.1390
17.1480
Degrees North