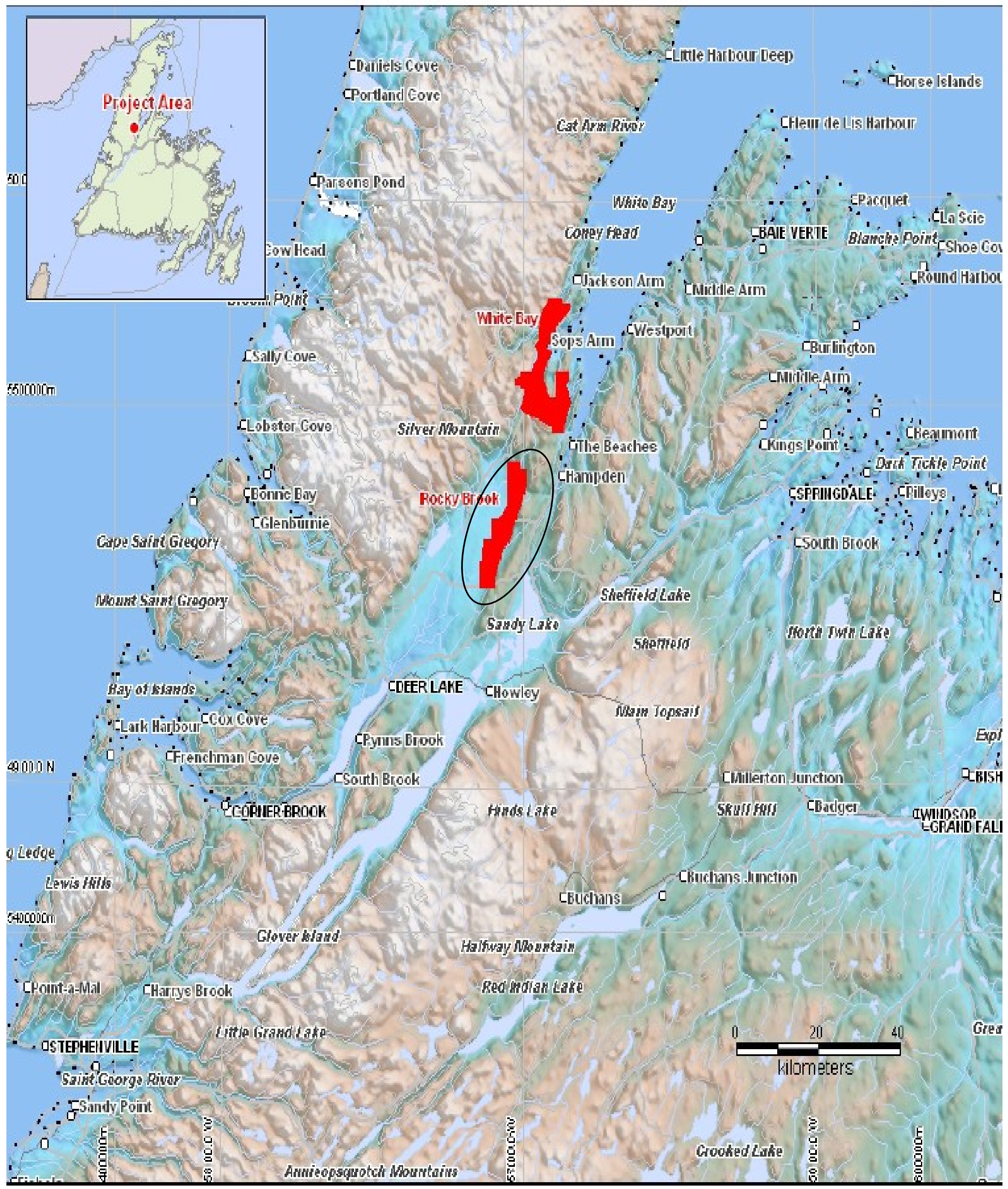
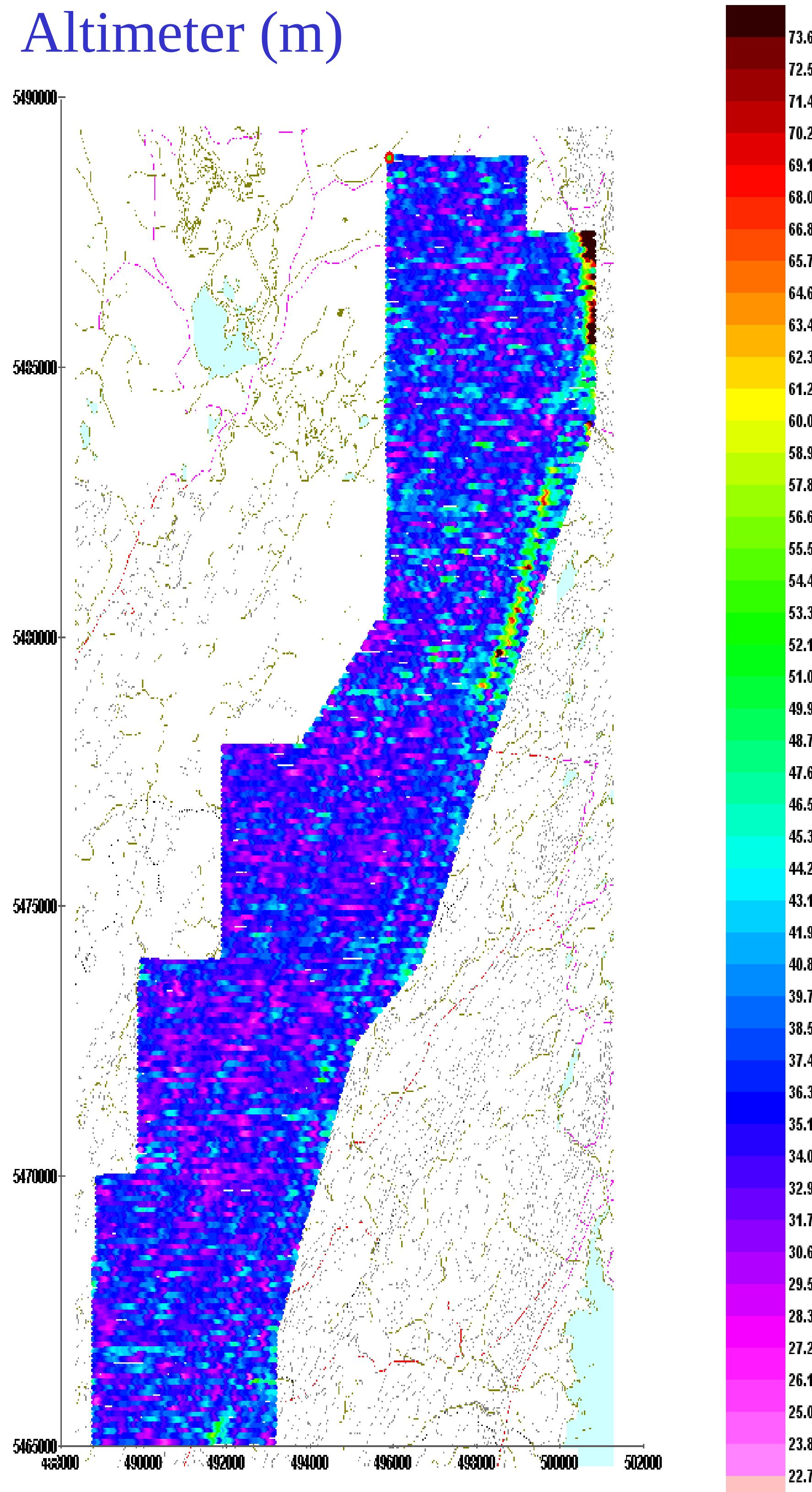
Rocky Brook Aeroquest EM and Magnetics Analyses



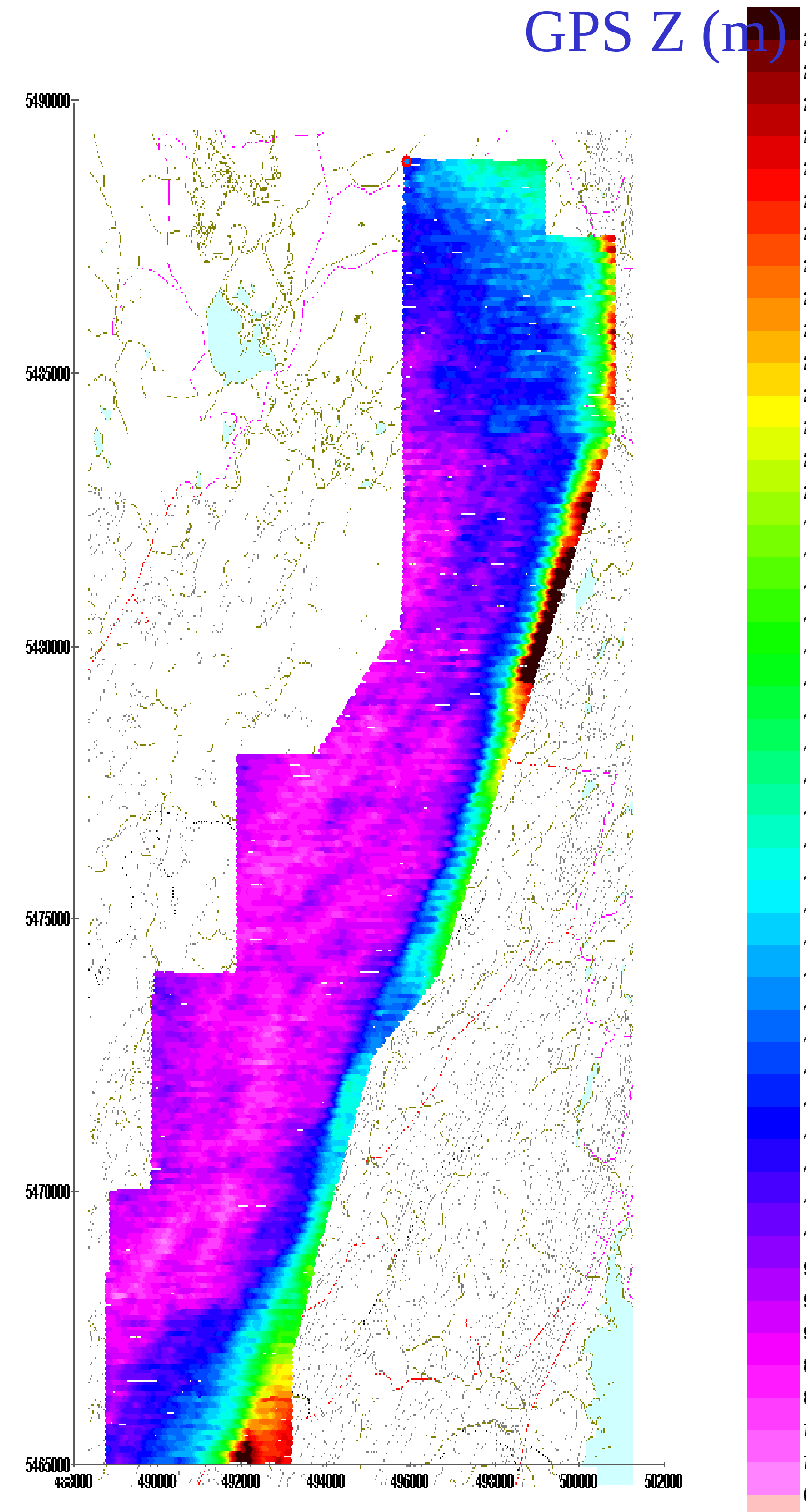
Ross Groom, EiKon Technologies, Laurel, ON

Altitude Information

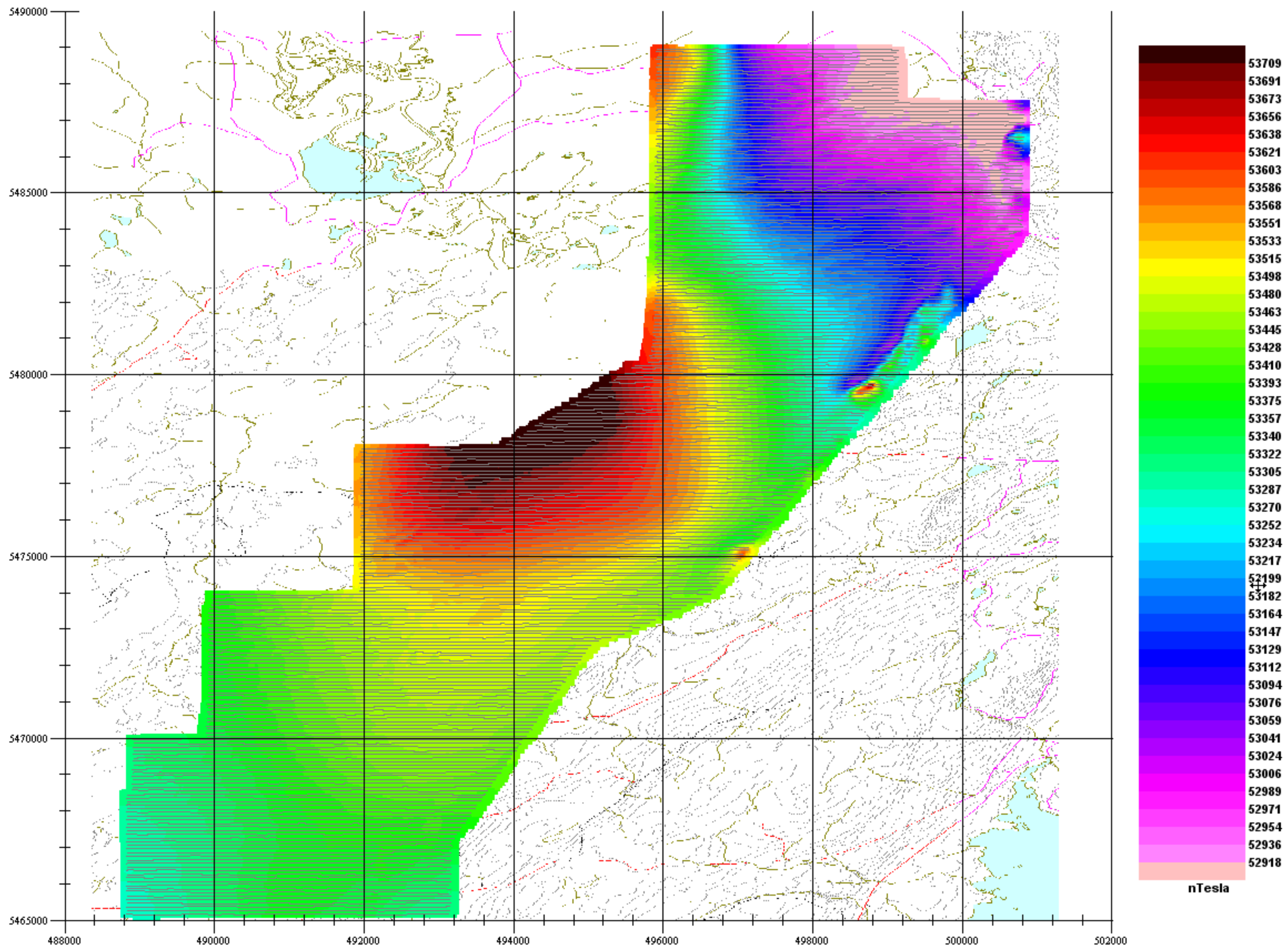
Altimeter (m)



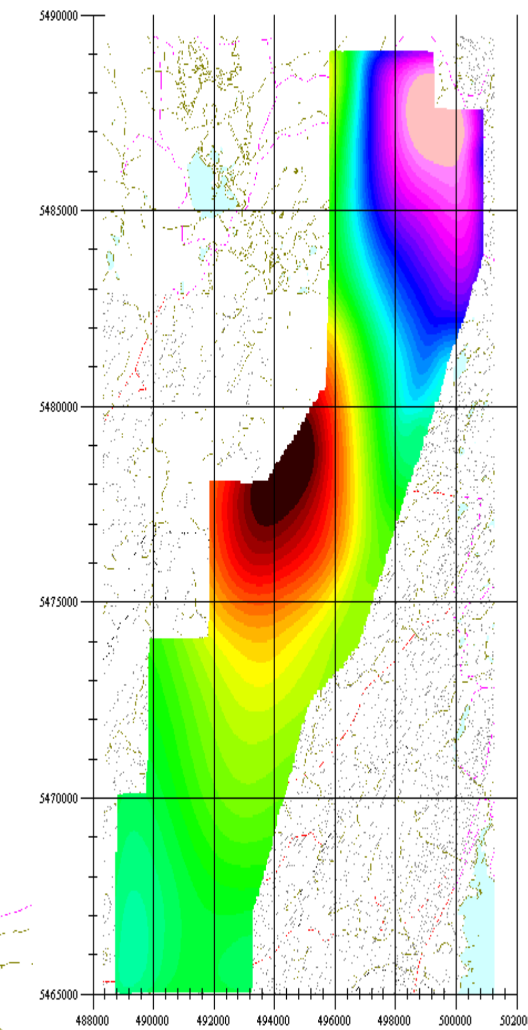
GPS Z (m)



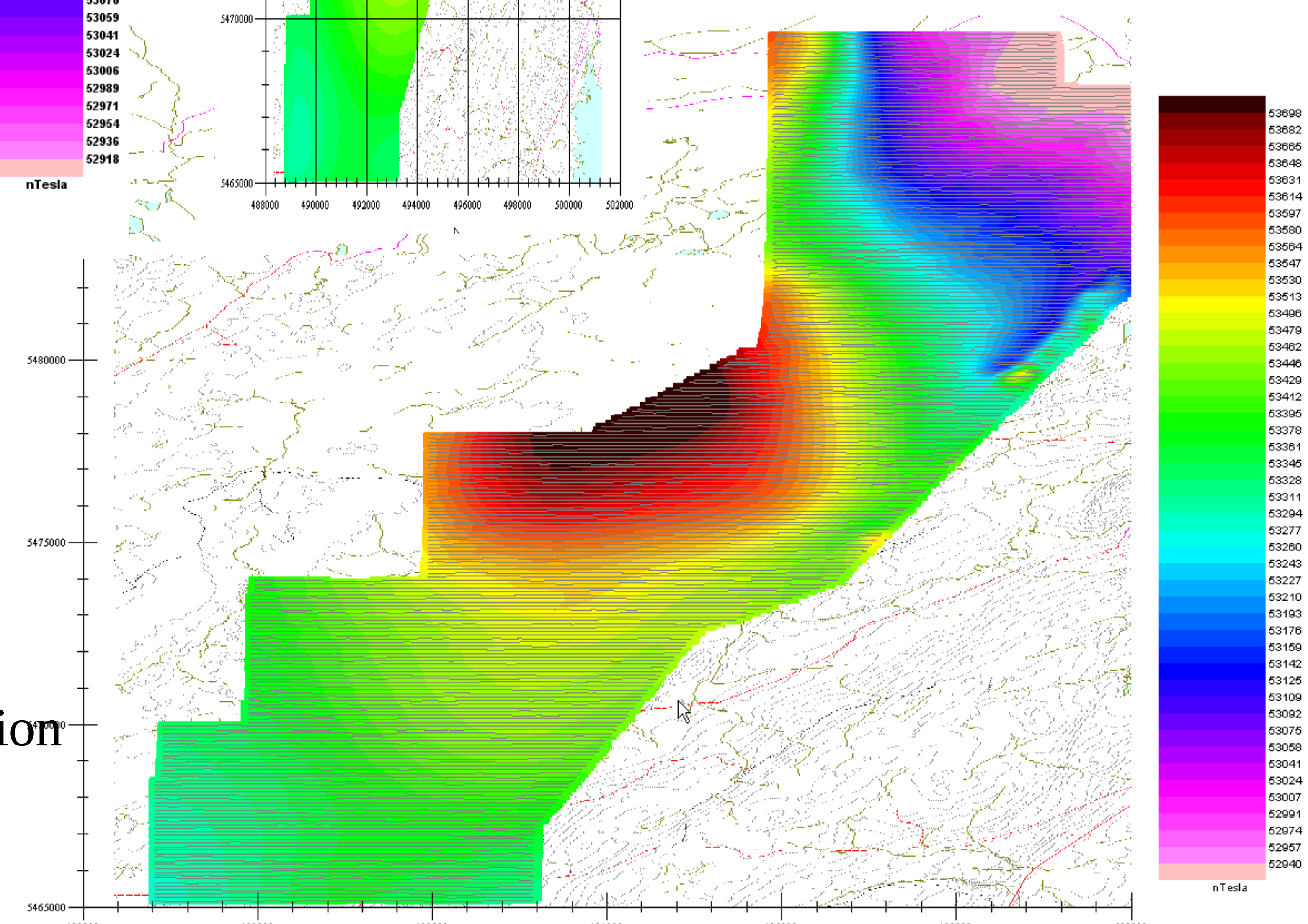
Magnetics



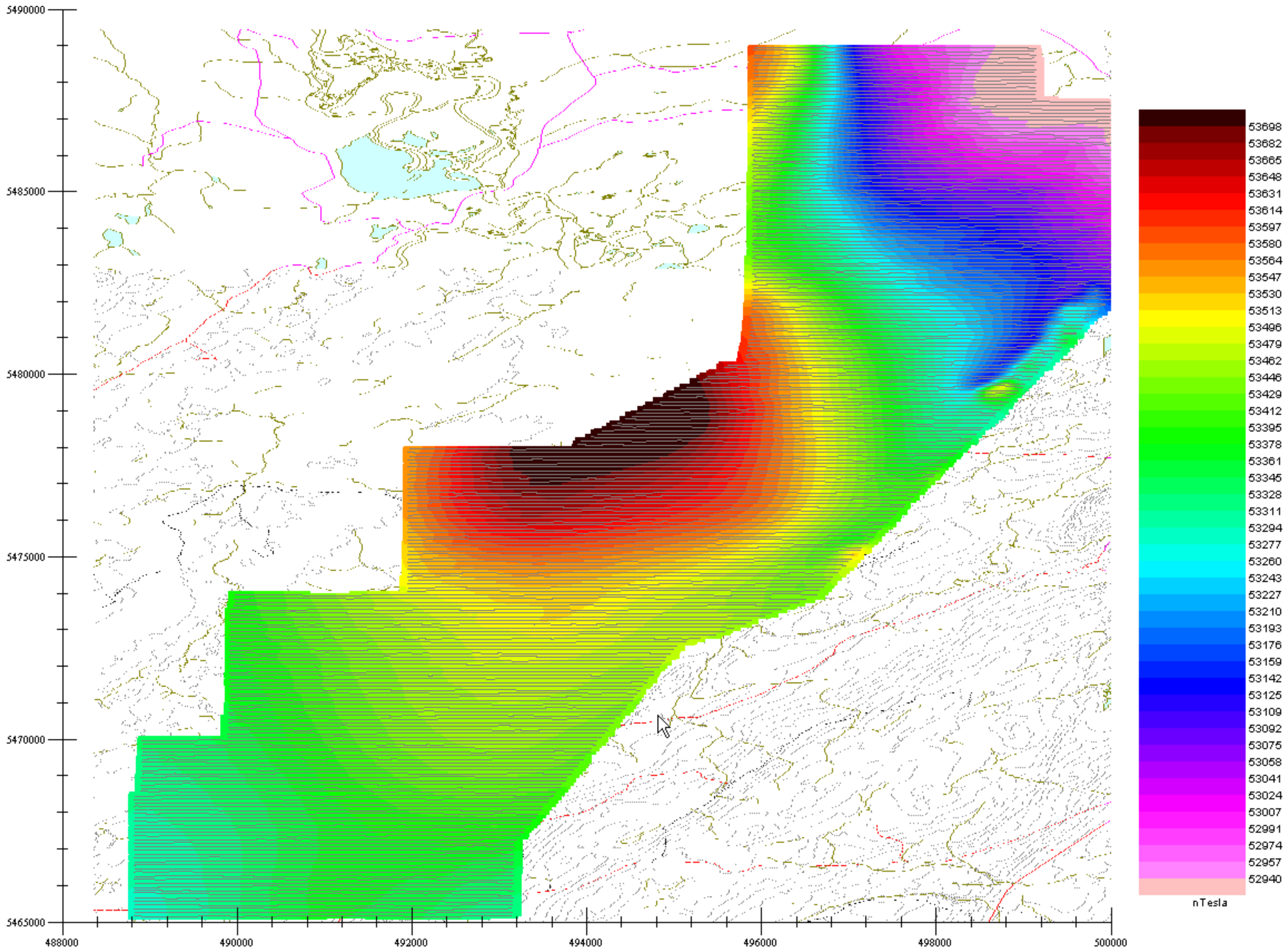
TMI at survey height



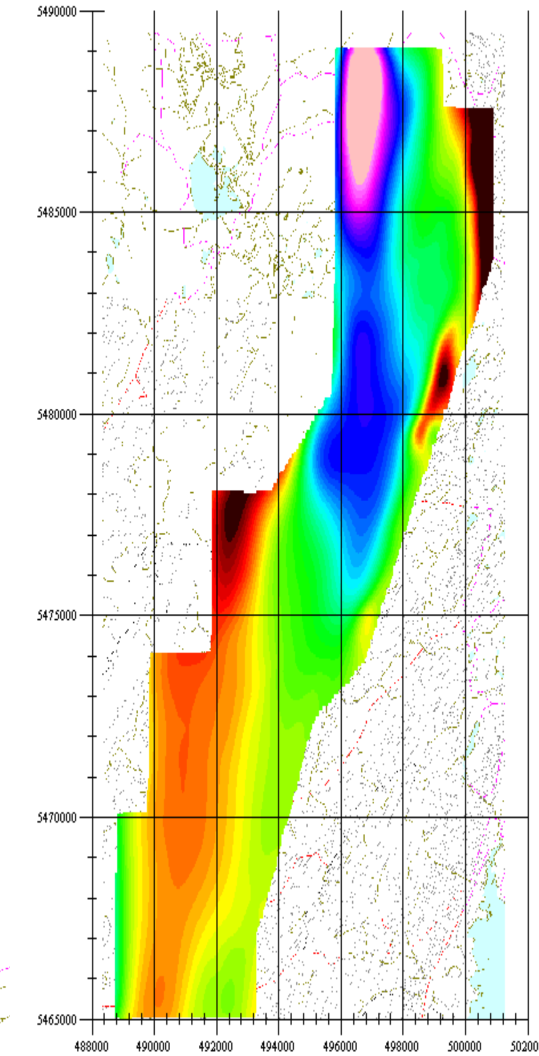
TMI
upward continuation
at 500m



TMI
upward continuation
at 100m

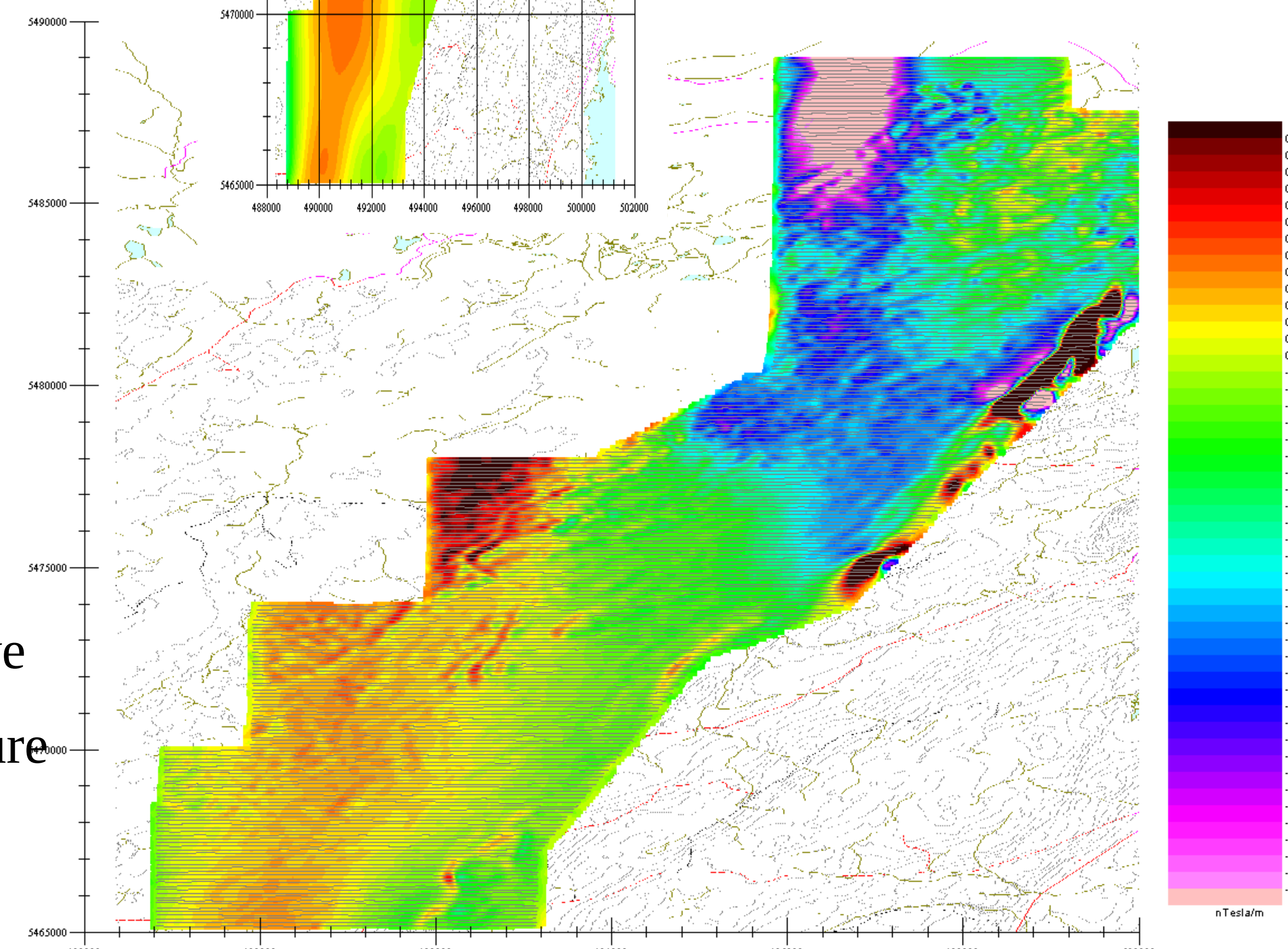


TMI



East Derivative
at 500m
no SW-NE texture

Magnetics at 100m

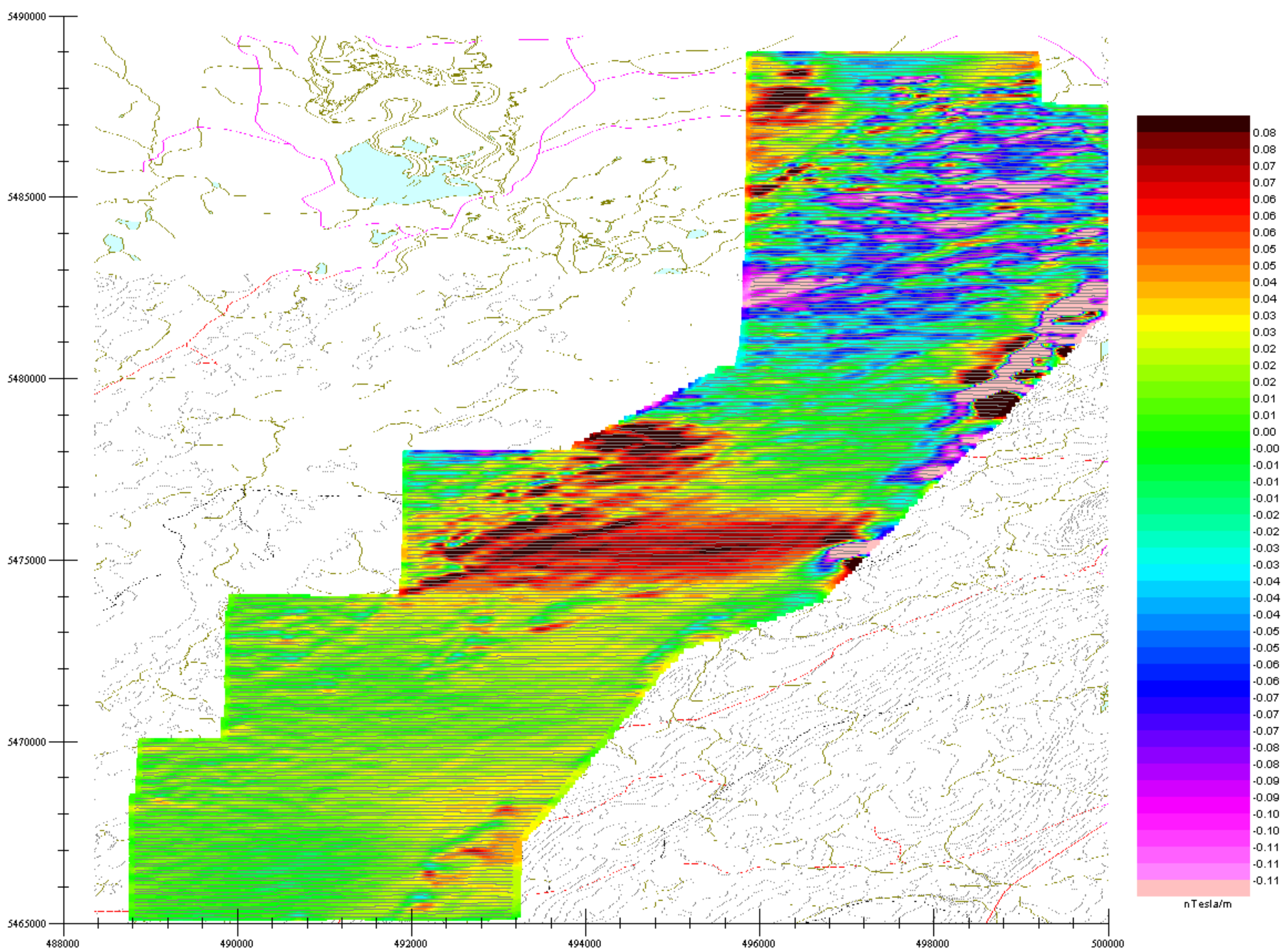


East Derivative

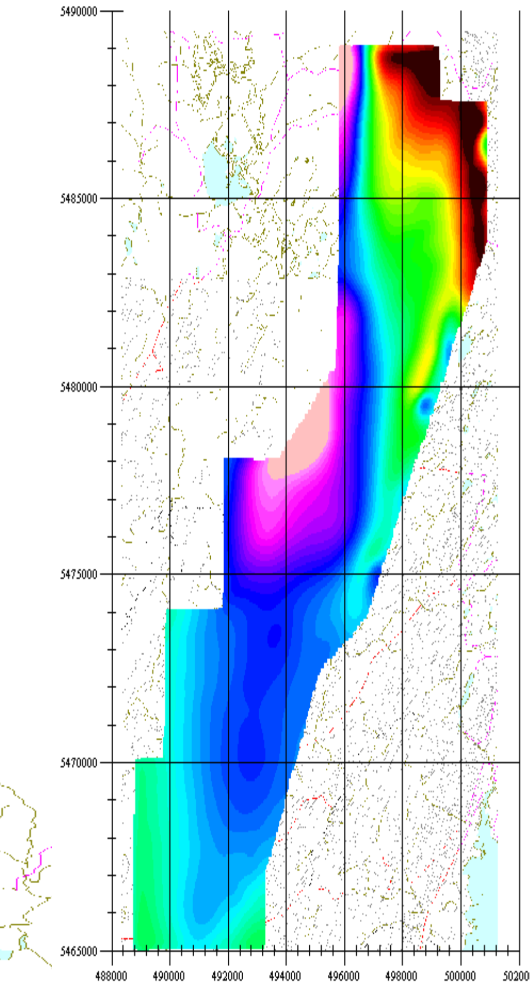
note SW to NE texture

SW to NE texture is apparently shallow
how shallow?

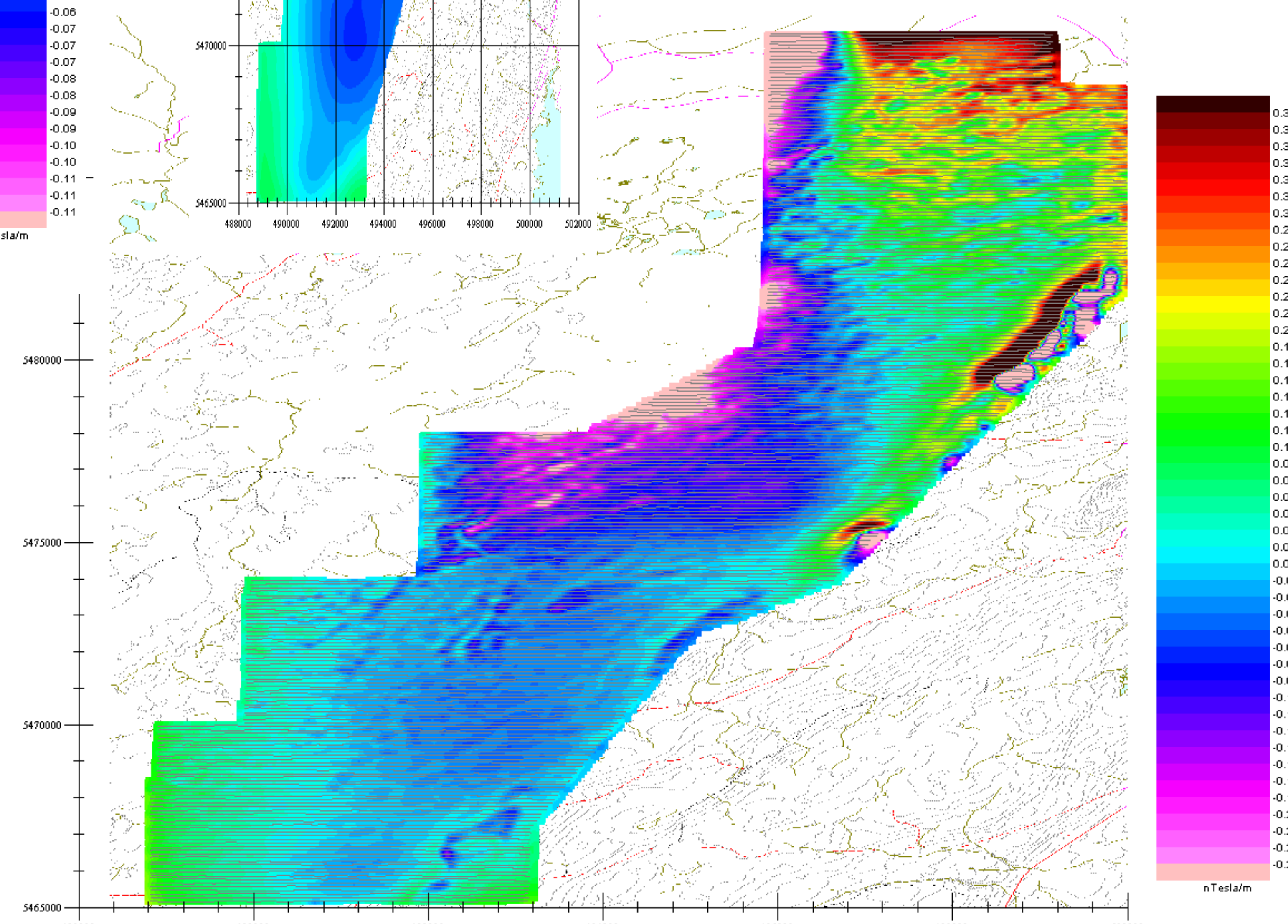
Magnetics at 100m



North Derivative

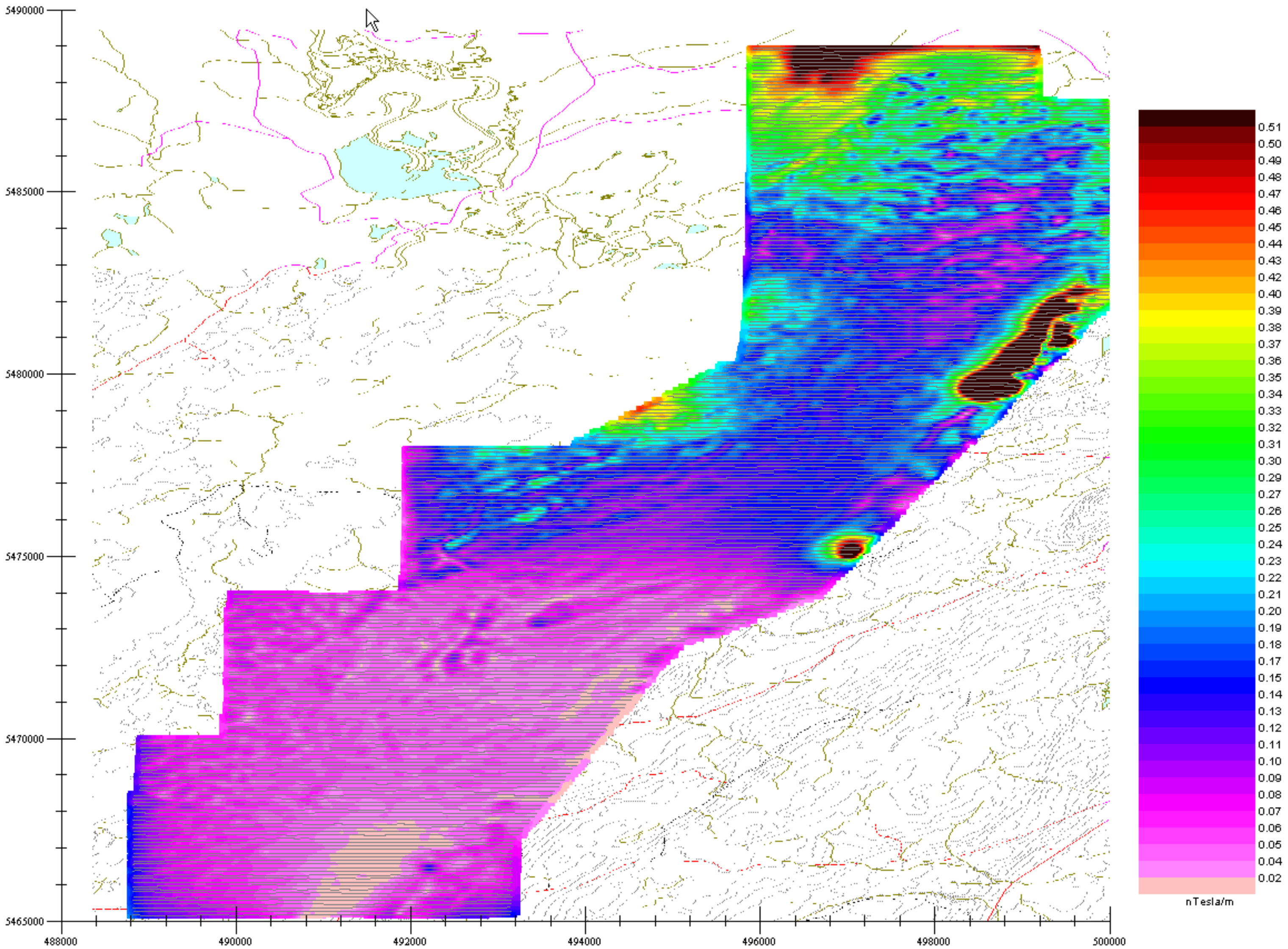


Vertical Derivative at 500m

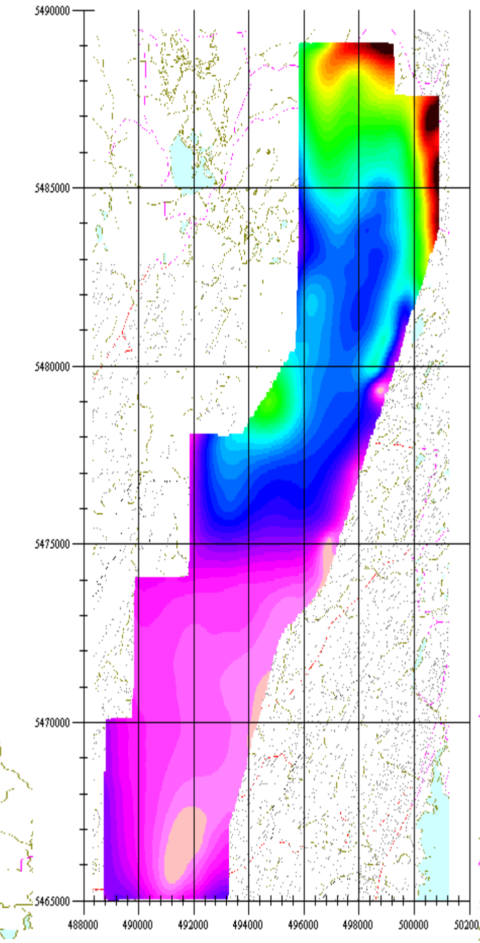


Vertical Derivative

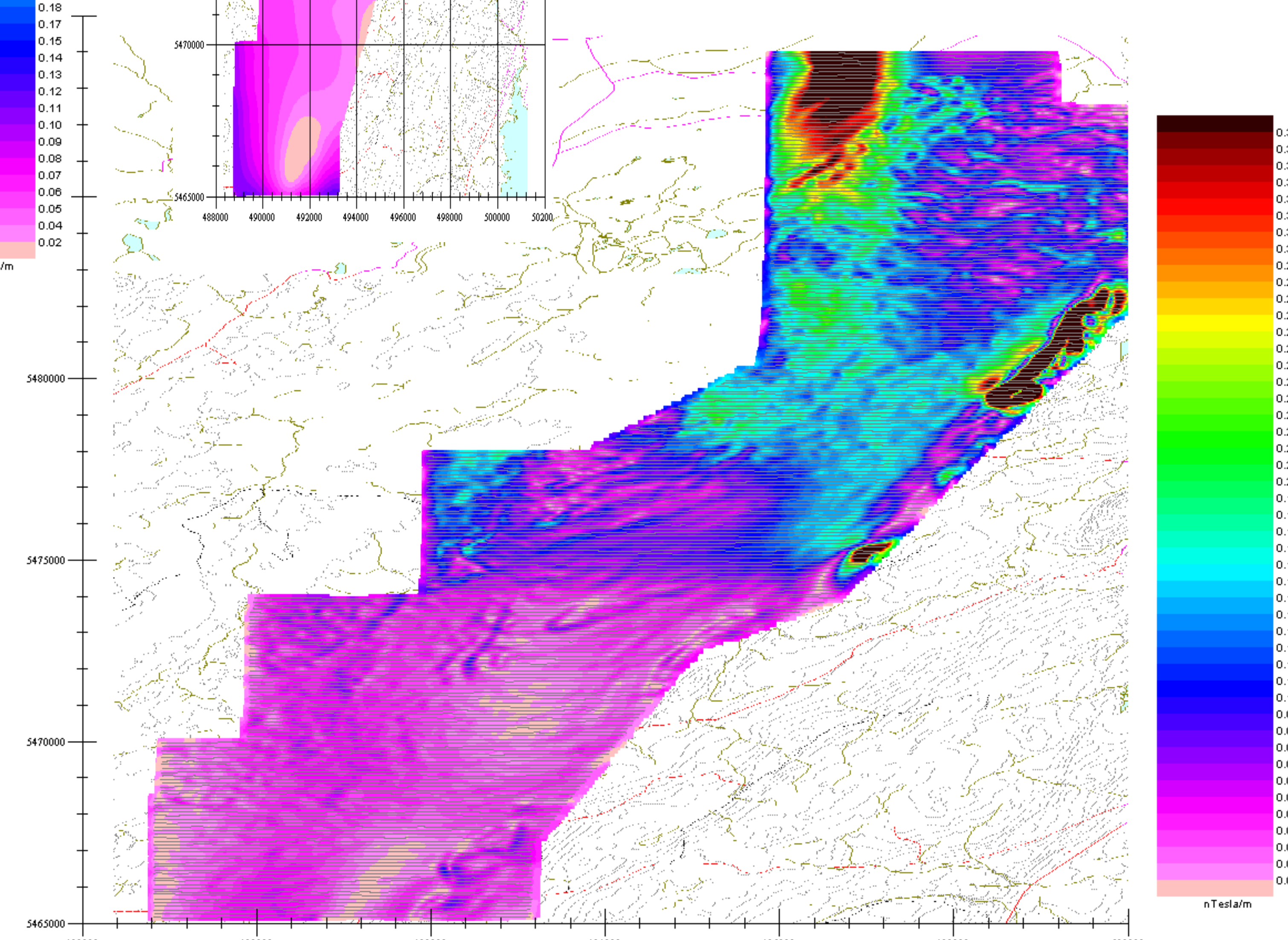
Magnetics at 100m



Analytical Signal

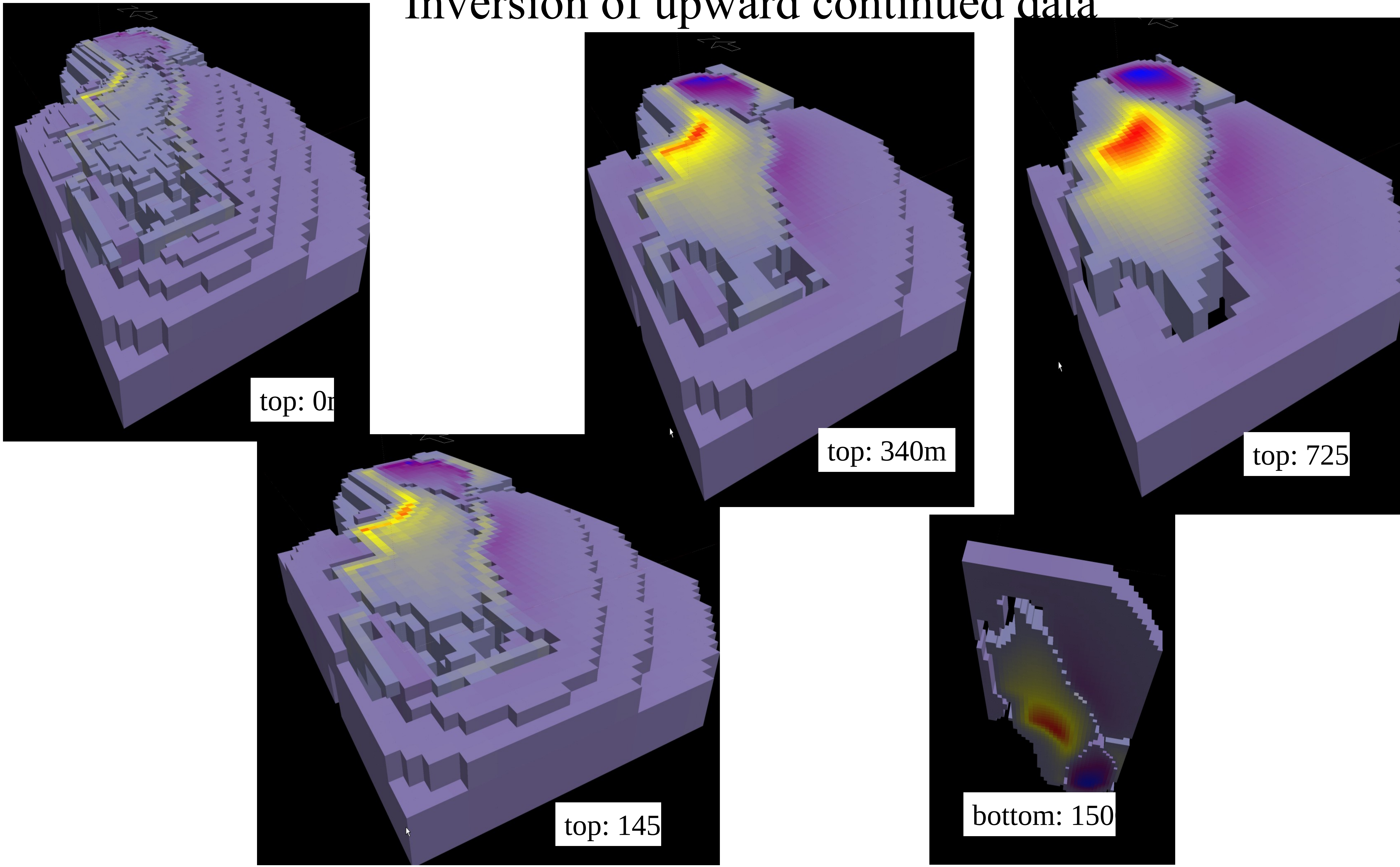


Analytical Signal
at 500m

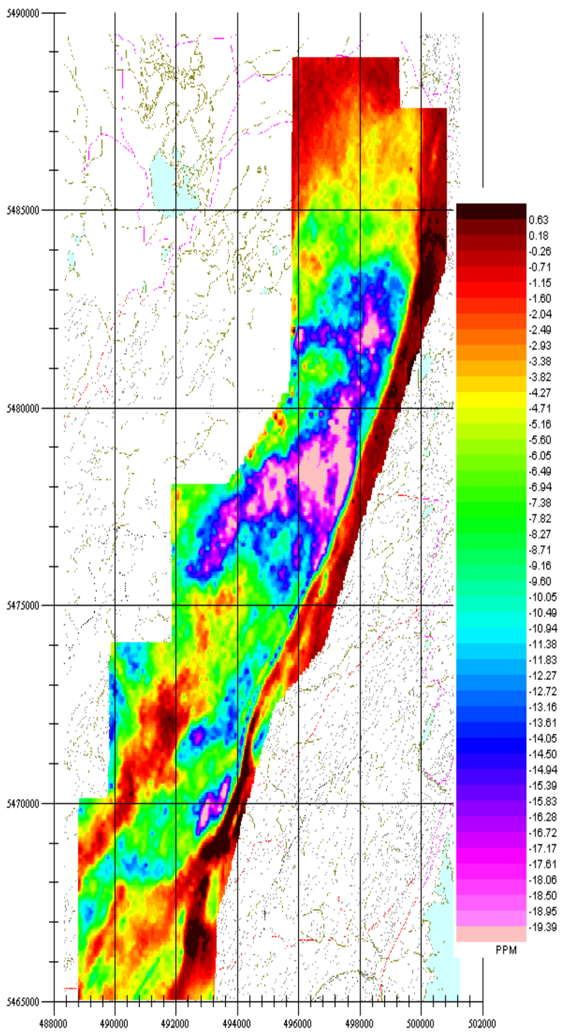


Horizontal Analytical Signal

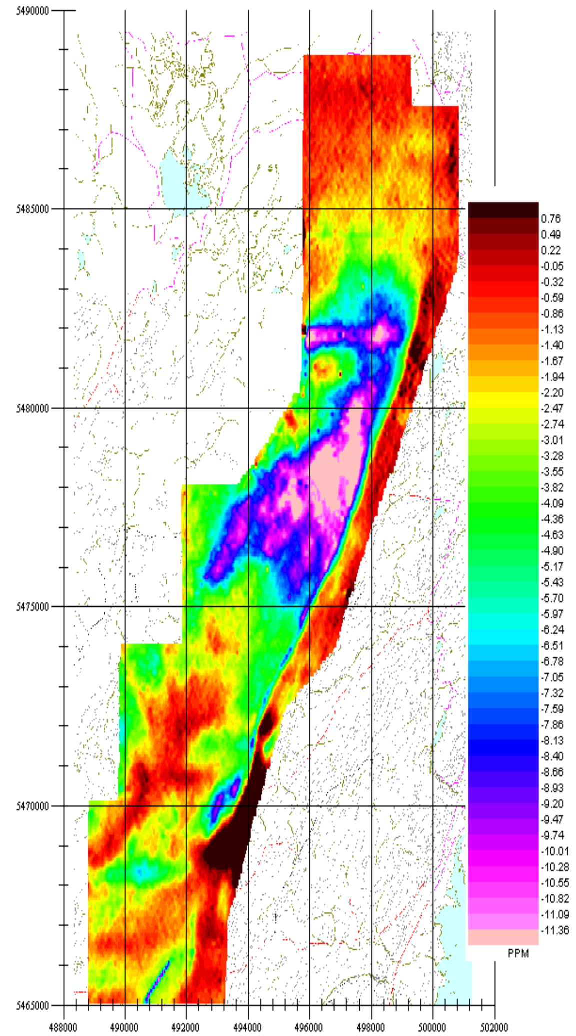
Inversion of upward continued data



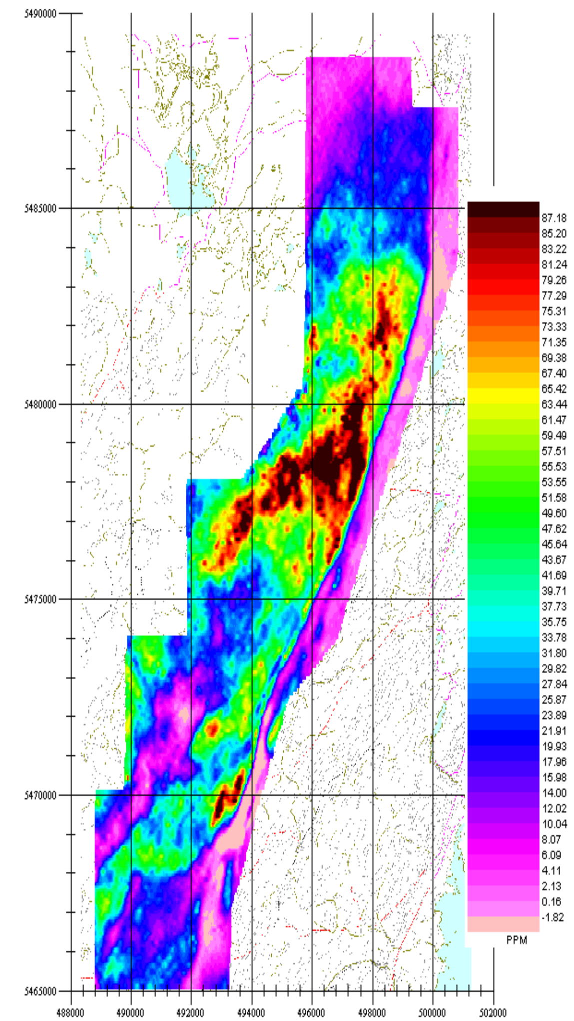
EM low frequencies



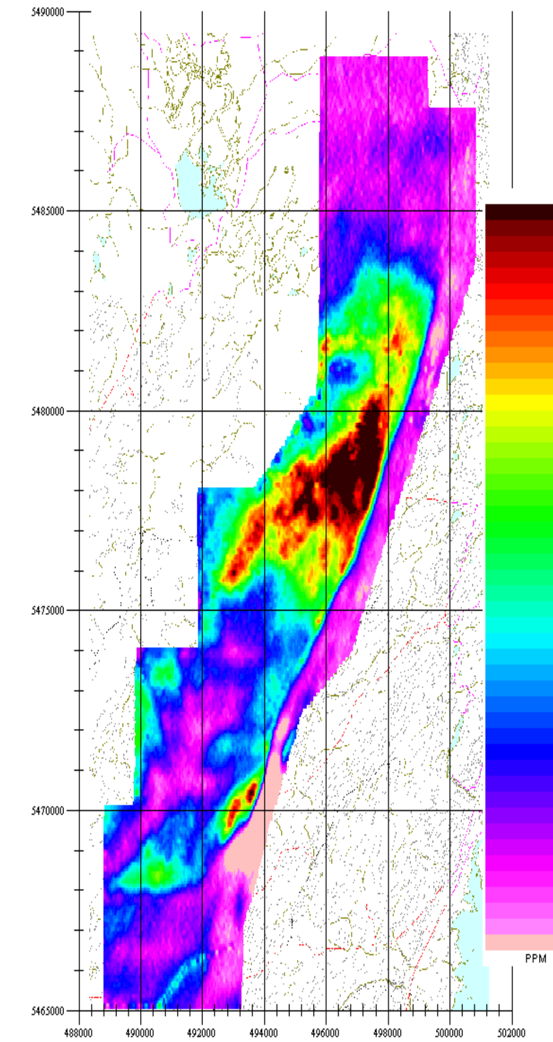
Co-Ax Quad 870Hz



Co-Ax InPhase 870Hz



Co-Planar Quad 930Hz

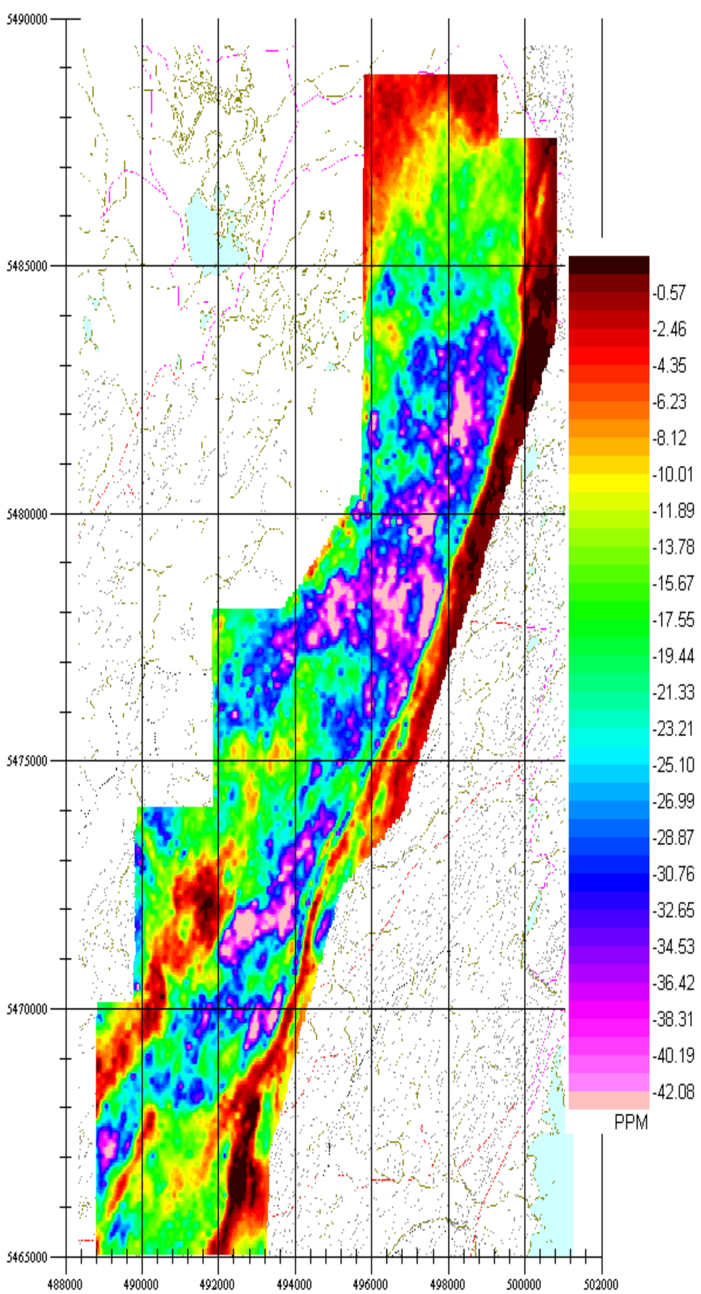


Co-Planar Inphase 930Hz

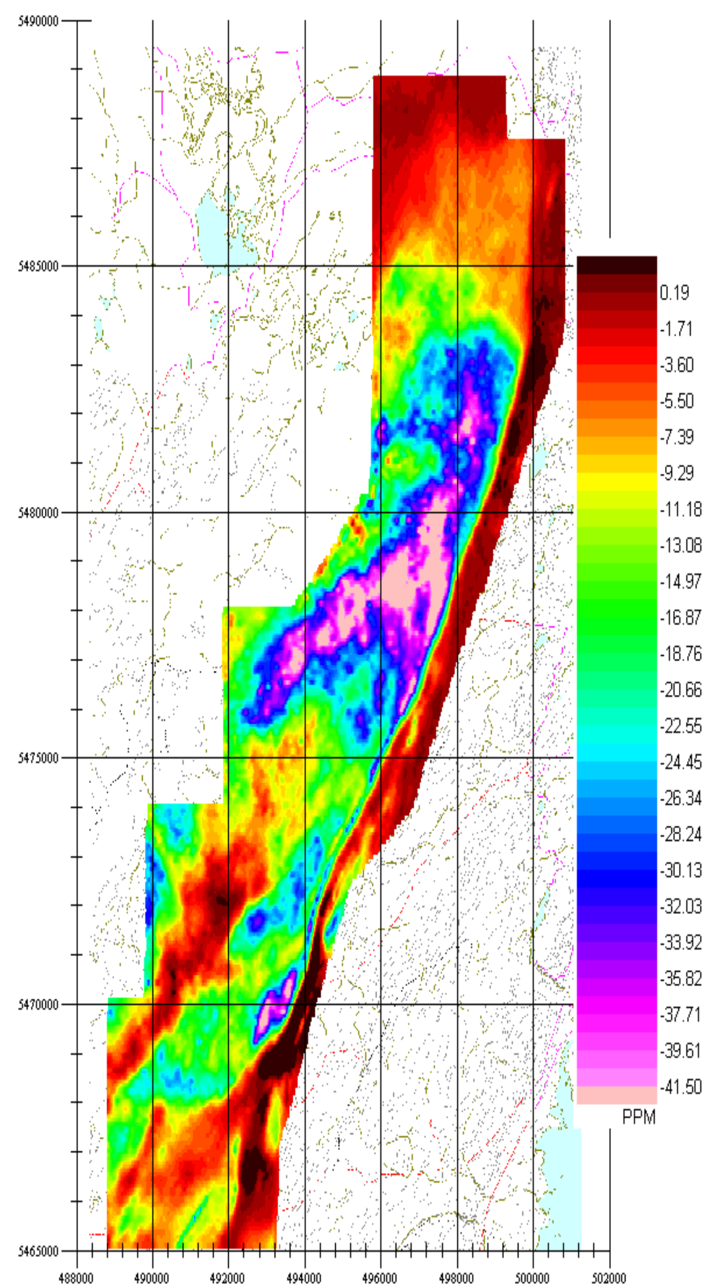
Note 1: There is a remarkable similarily in the character of the co-axial to coplanar responses. Not an expected result

Note 2: Appears to be no correlation in the low-frequency inphase EM with shallow magnetics – also not expected

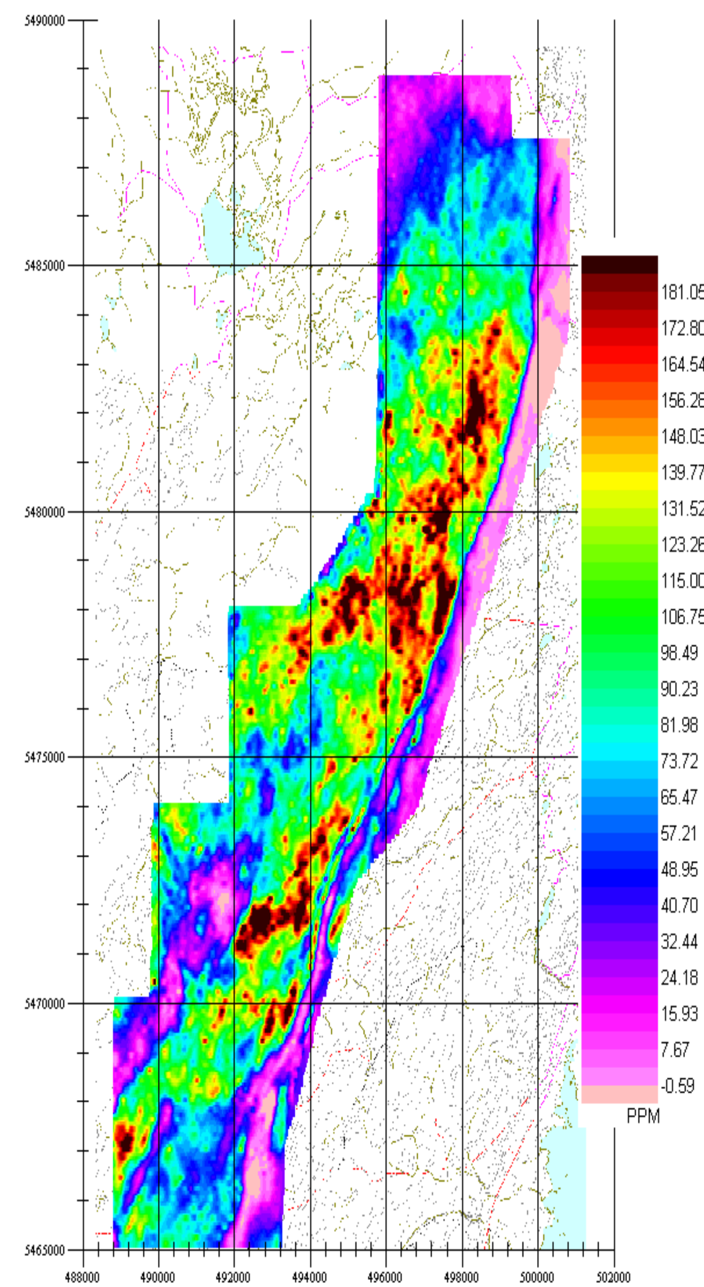
EM mid-frequencies



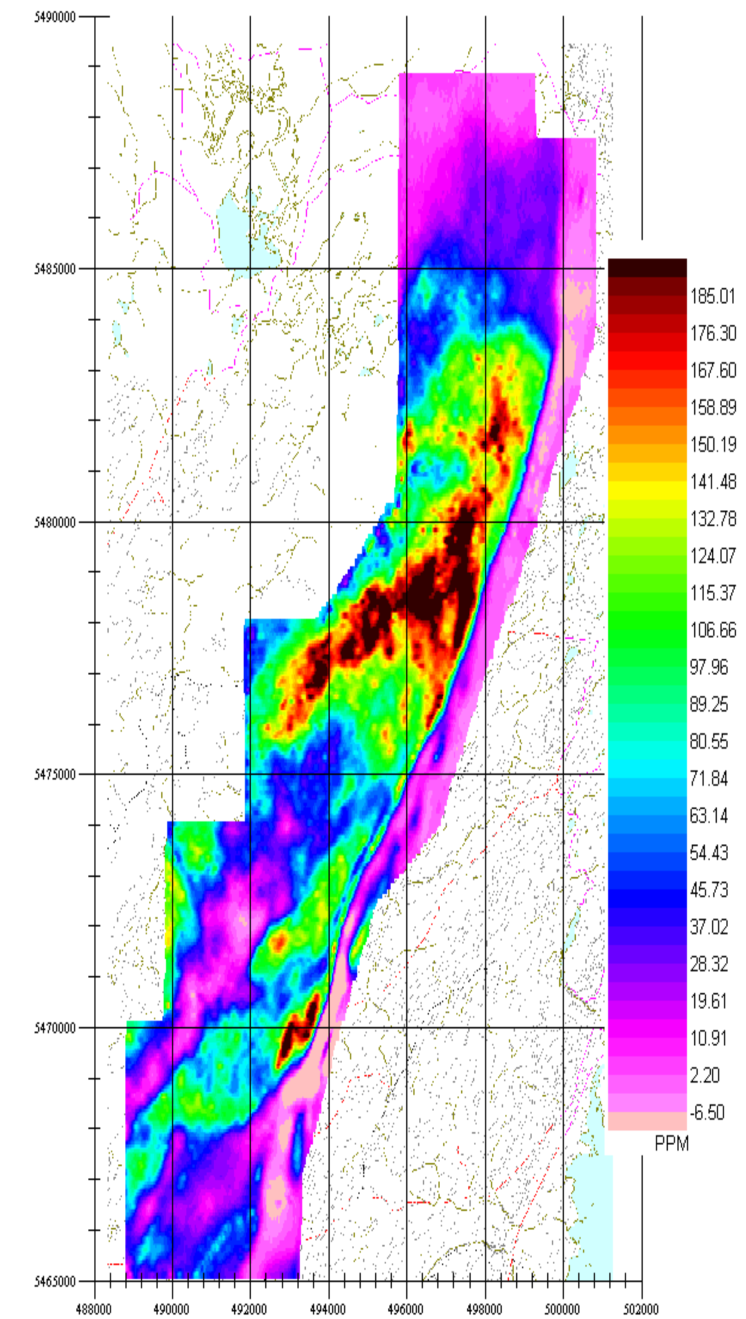
Co-Ax Quad 4350Hz



Co-Ax InPhase 4350Hz



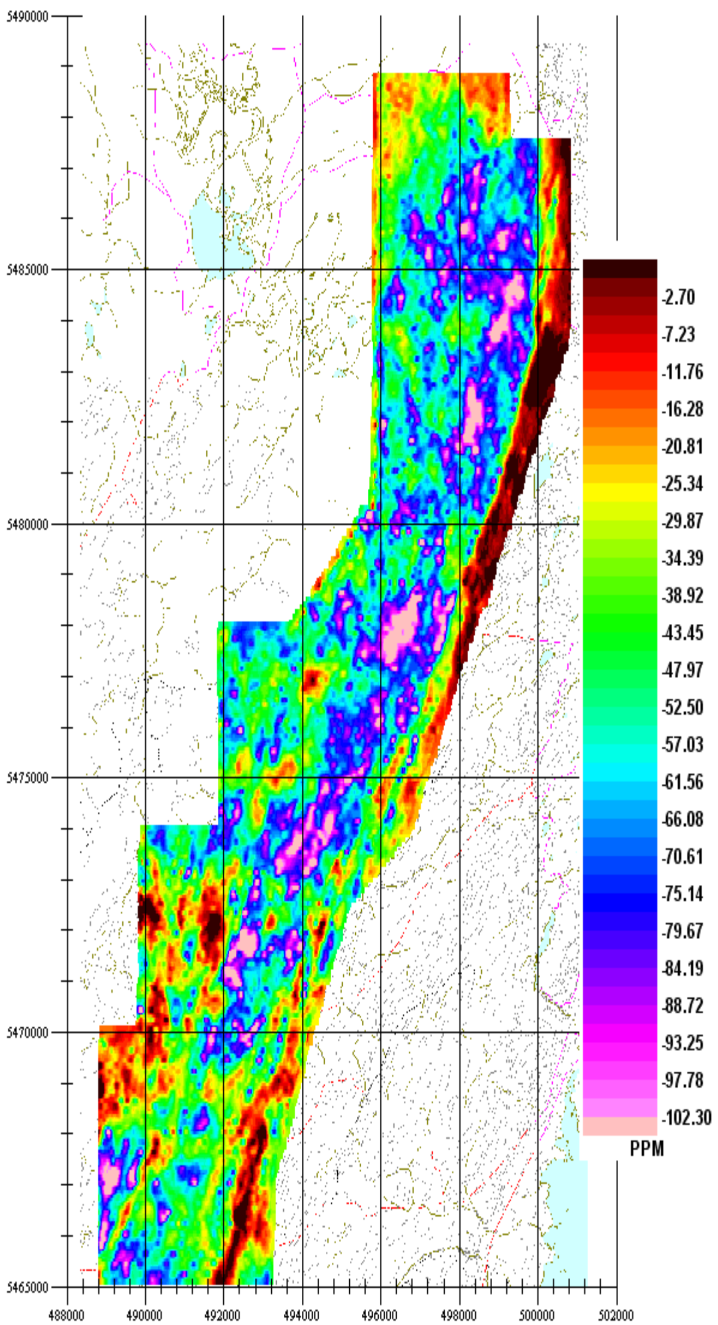
Co-Planar Quad 4650Hz



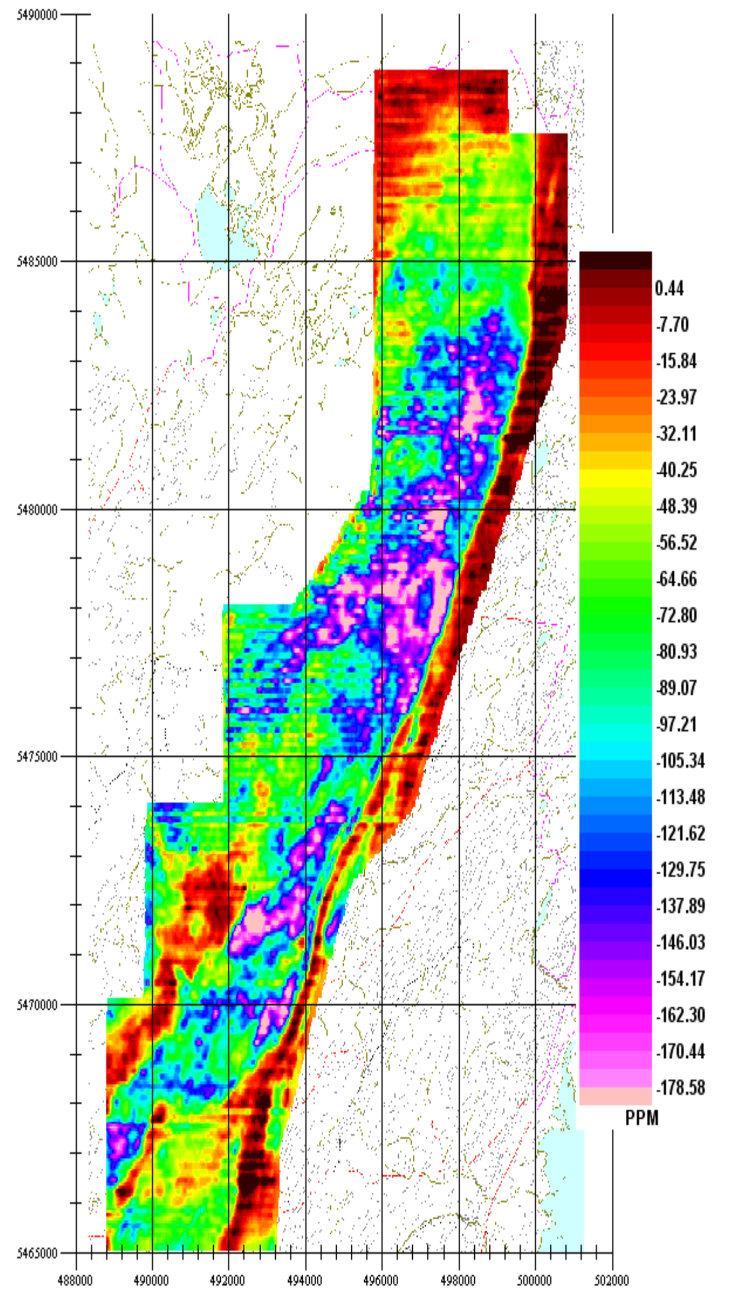
Co-Planar Inphase 4650Hz

Note 1: Again, there is a remarkable similarily in the character of the co-axial to coplanar responses.
Not an expected result particularly in the very fine features.

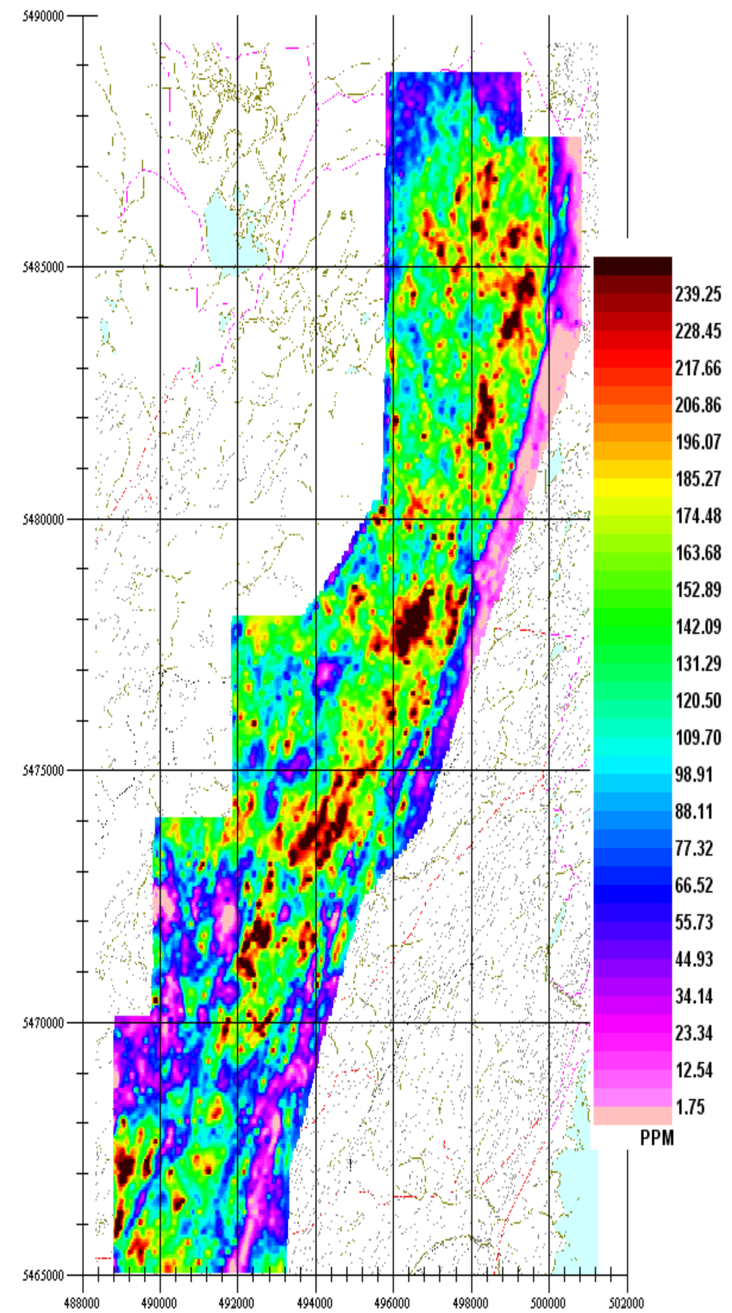
EM high-frequencies



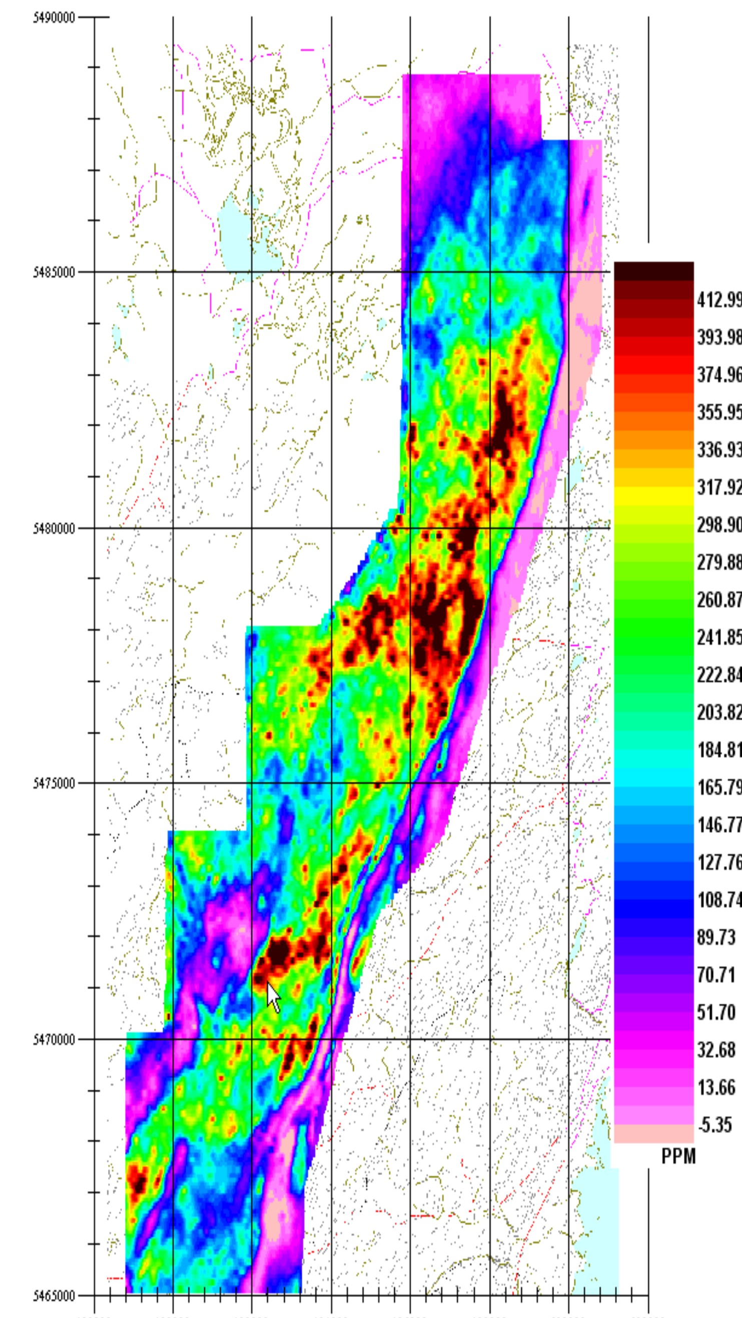
Co-Ax Quad 21750Hz



Co-Ax InPhase 21750Hz



Co-Planar Quad 23250Hz

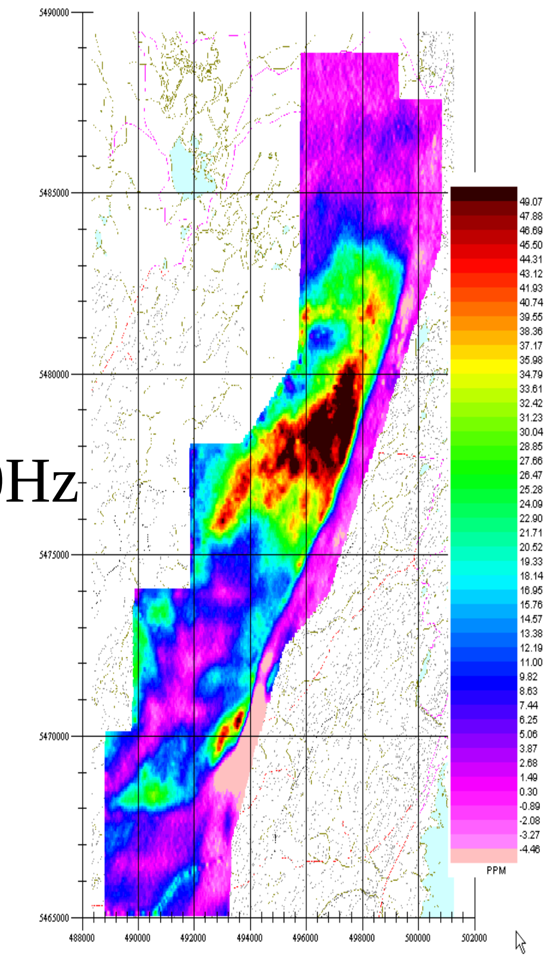


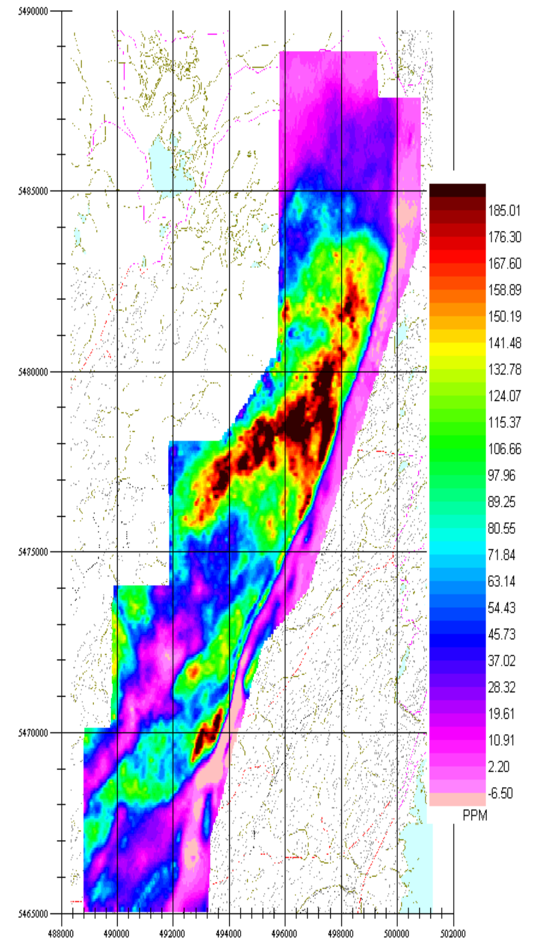
Co-Planar Inphase 23250Hz

Note 1: Again, there is a remarkable similarily in the character of the co-axial to coplanar responses. Not an expected result particularly in the very fine features.

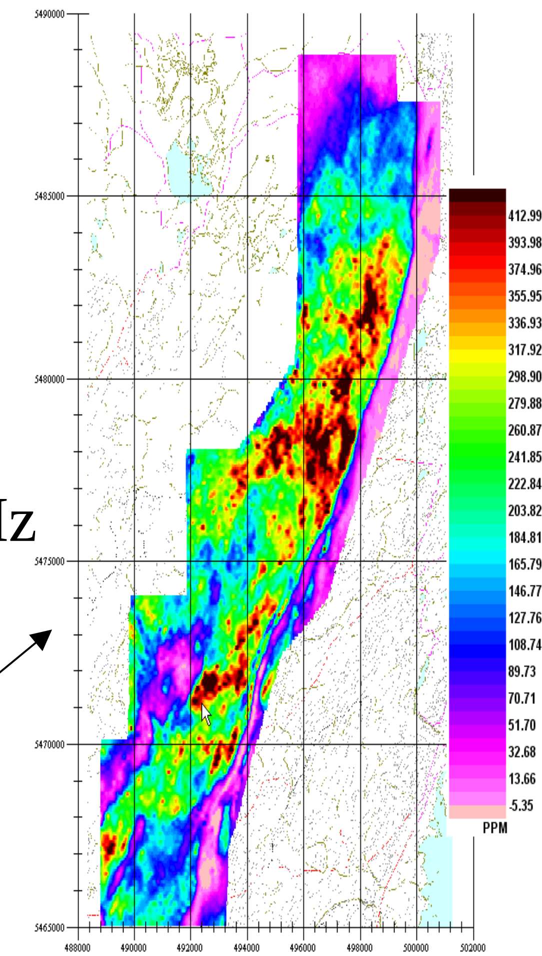
CoPlanar

CP IP 930Hz



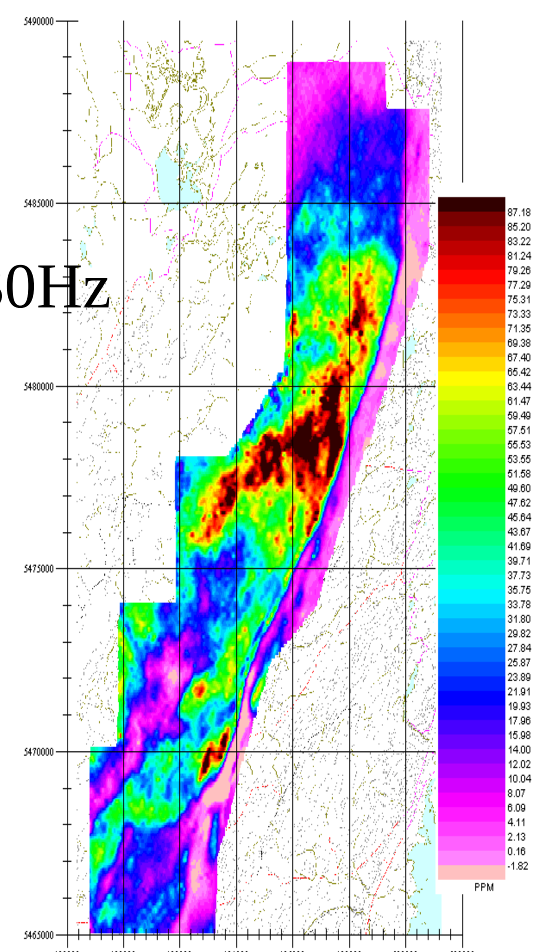


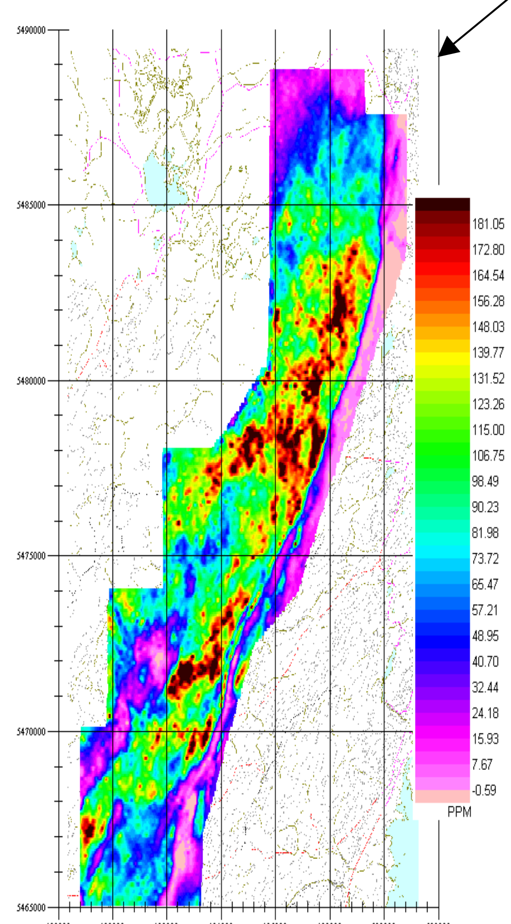
CP IP 4650Hz



CP IP 23250Hz

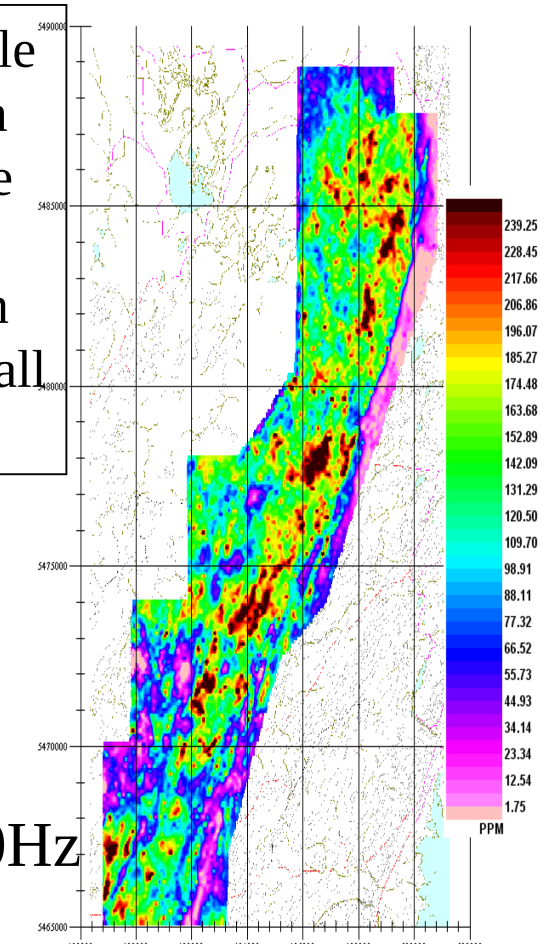
CP Quad 930Hz





a truly unbelievable similarity between the IP 23K and the Quad 4.6K! Note the similarity even in many,many small features

CP Quad 4650Hz

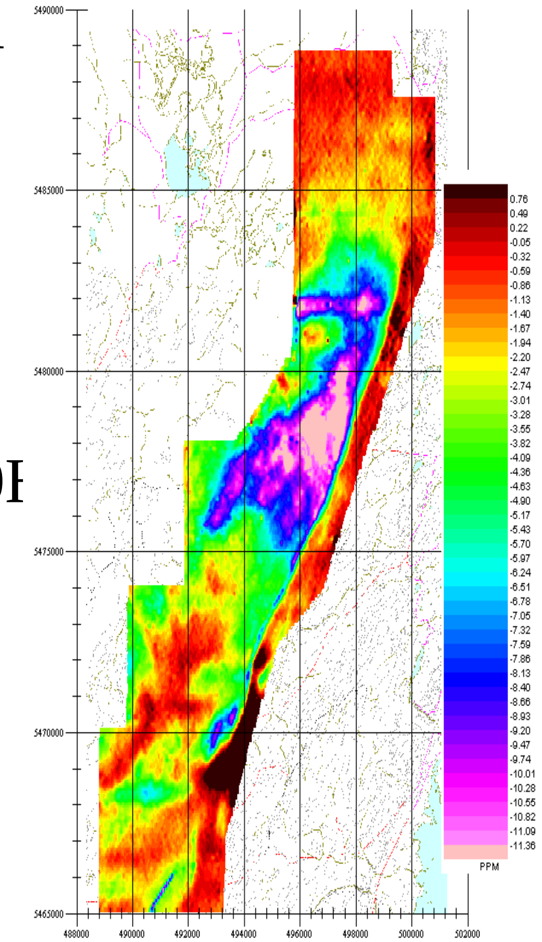


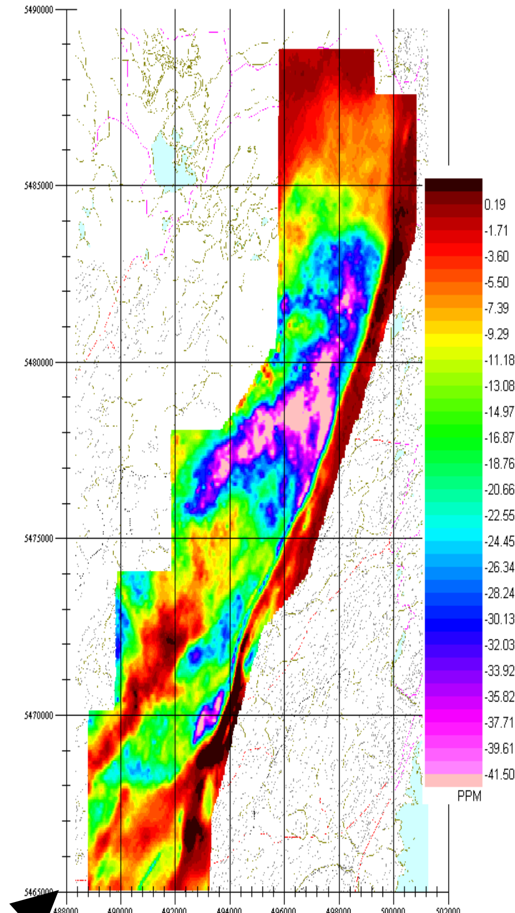
CP Quad 23250Hz

CoAxial

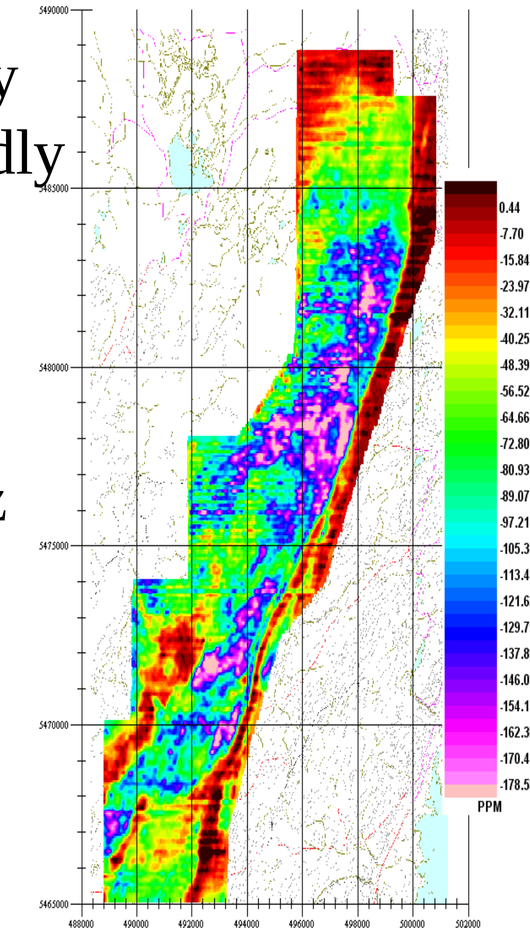
tremendous similarity in details of supposedly independent data

CX IP 870I



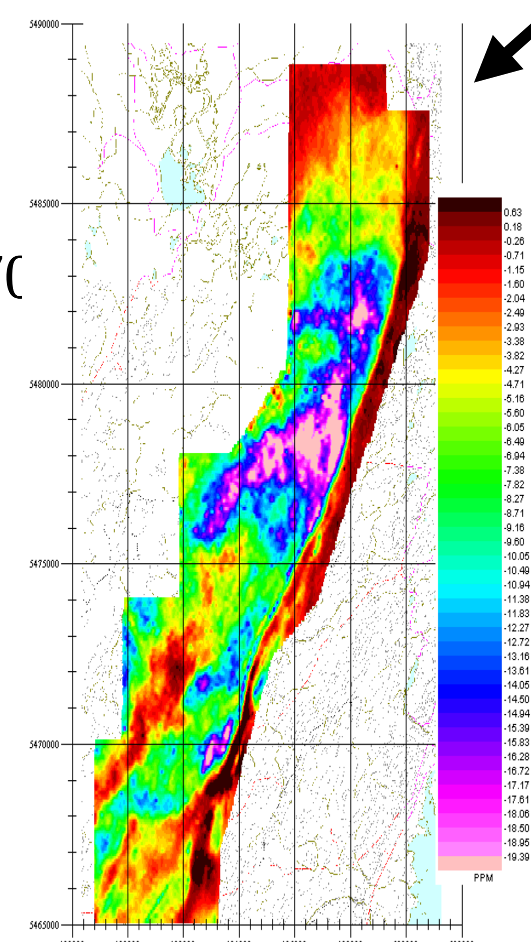


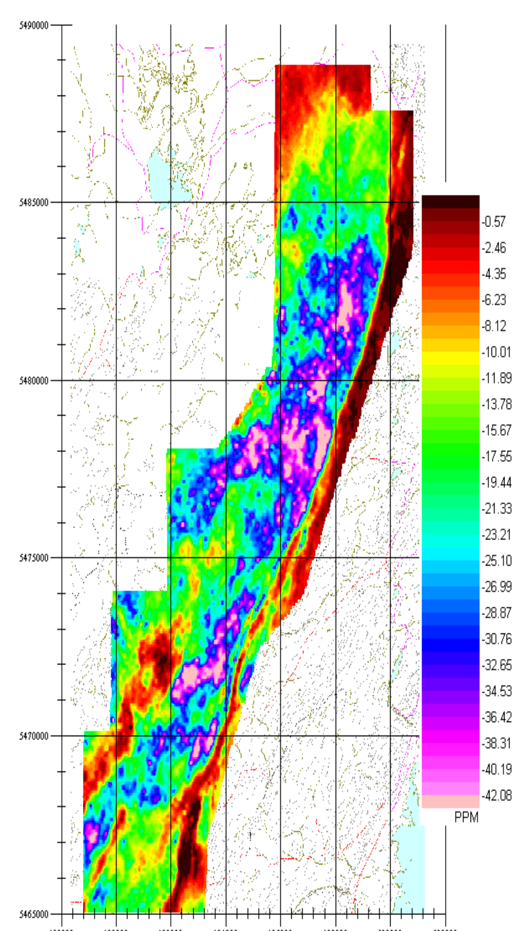
CX IP 4350Hz



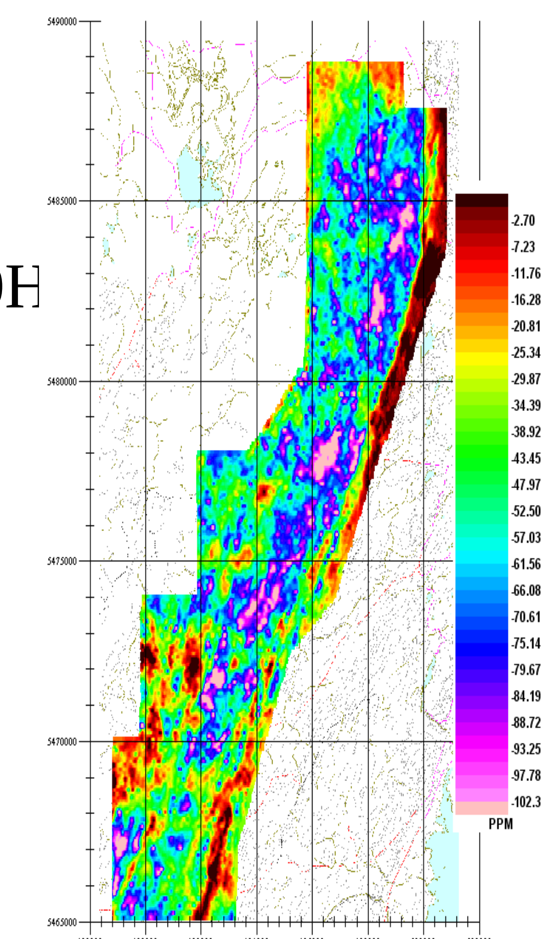
CX IP 21750Hz

CX Quad 87(

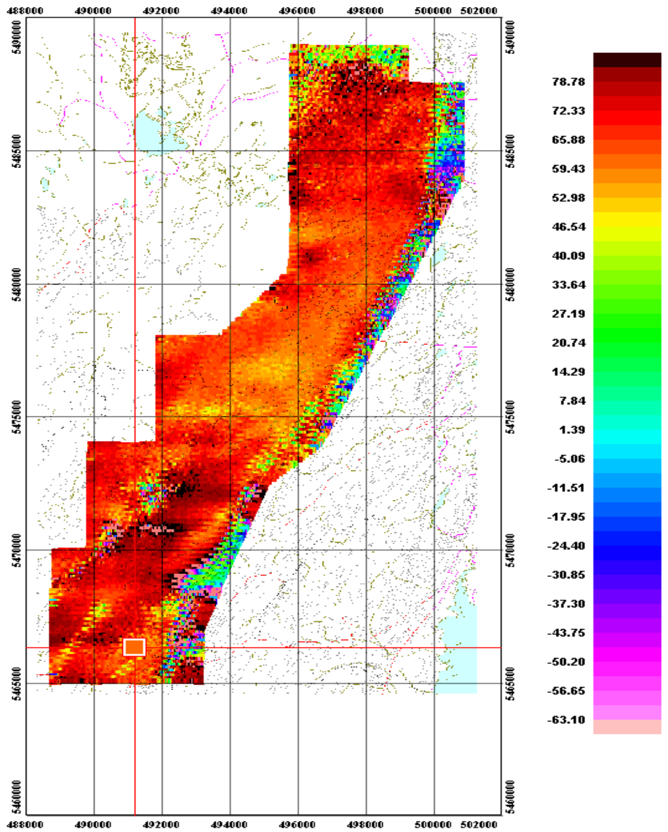




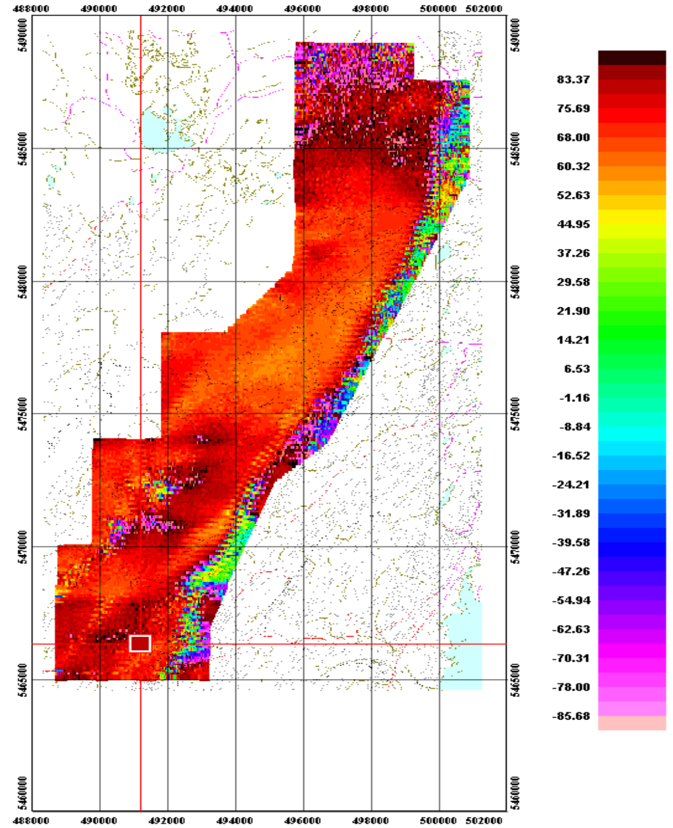
CX Quad 4350H



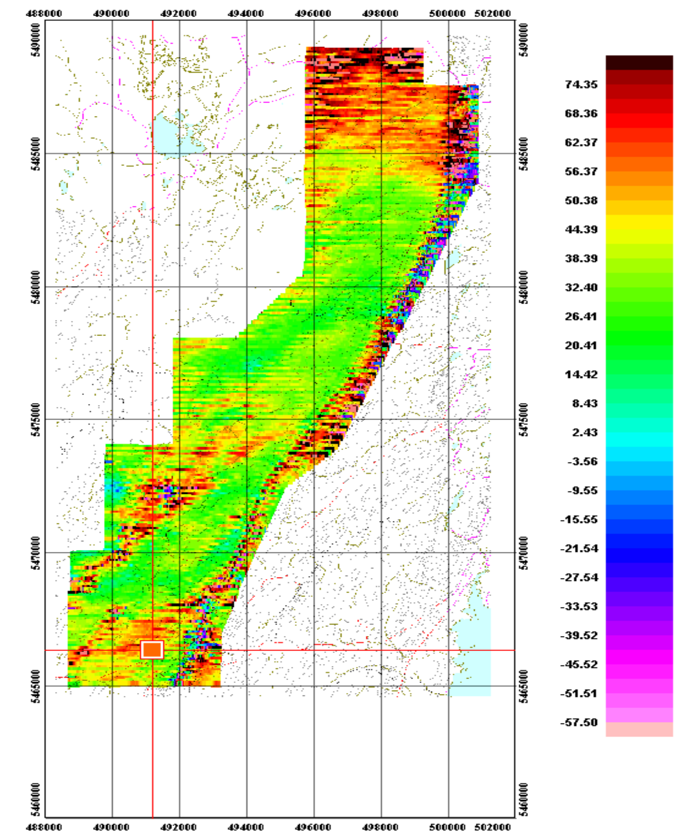
CX Quad 21750Hz



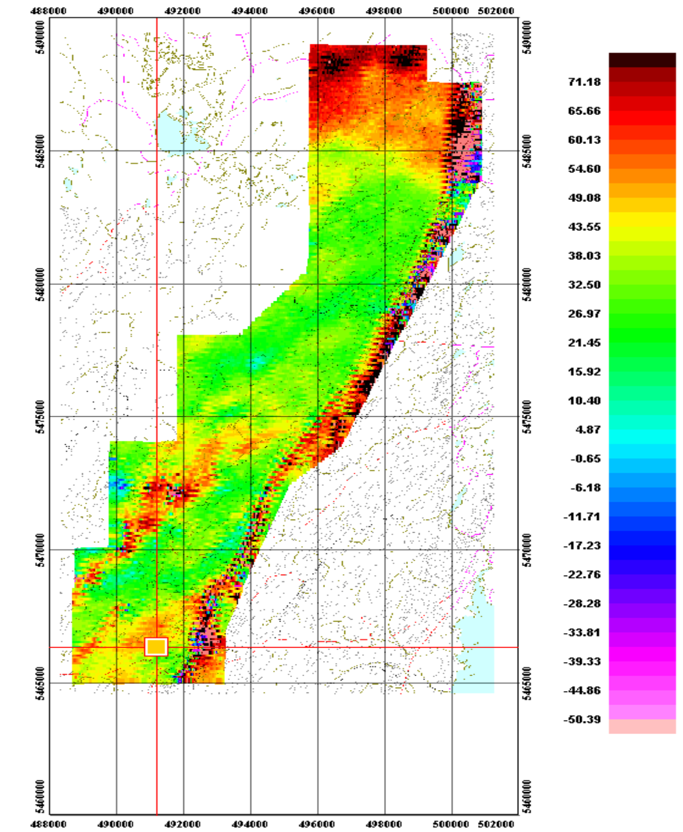
CX 870Hz



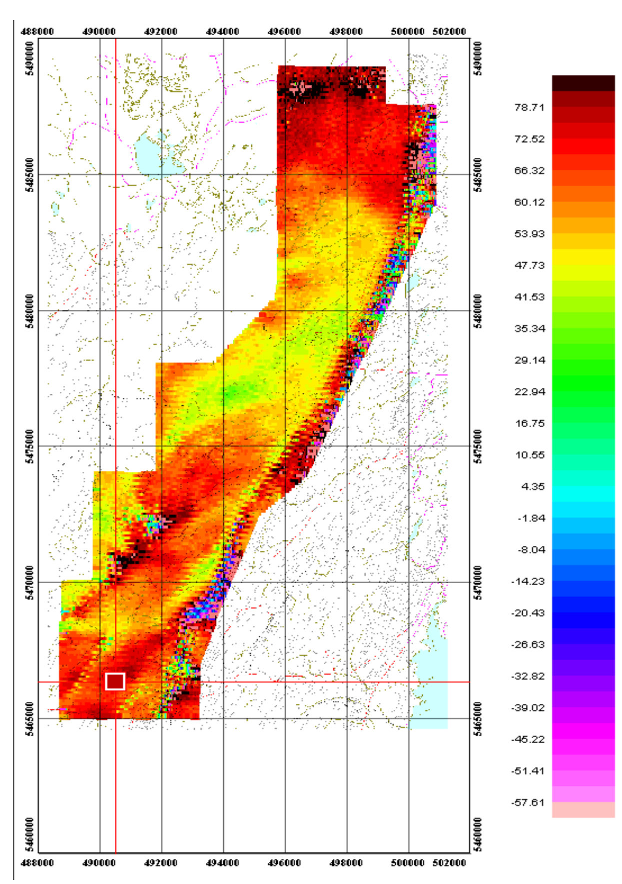
CP 930Hz



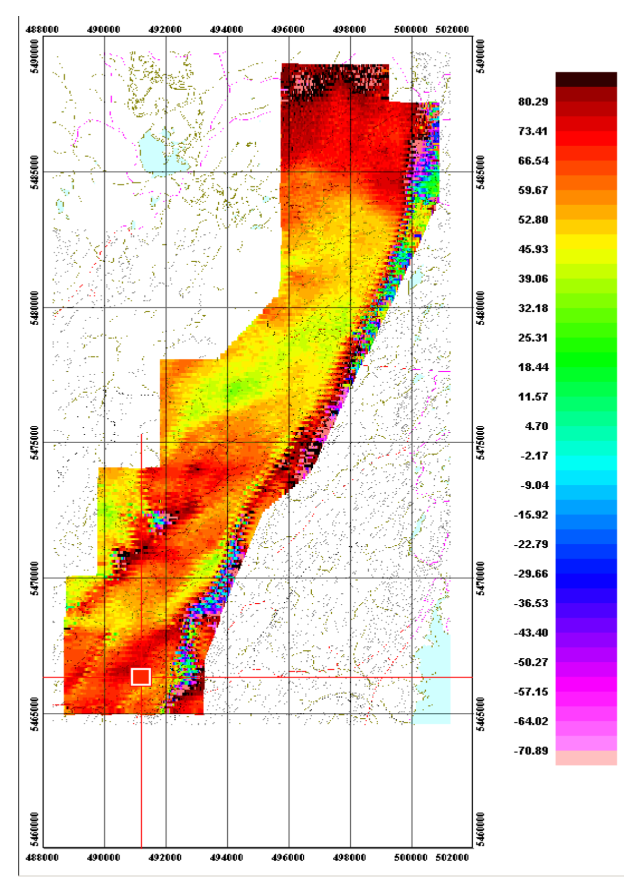
CX 21750Hz



CP 23250Hz



CX 4350Hz



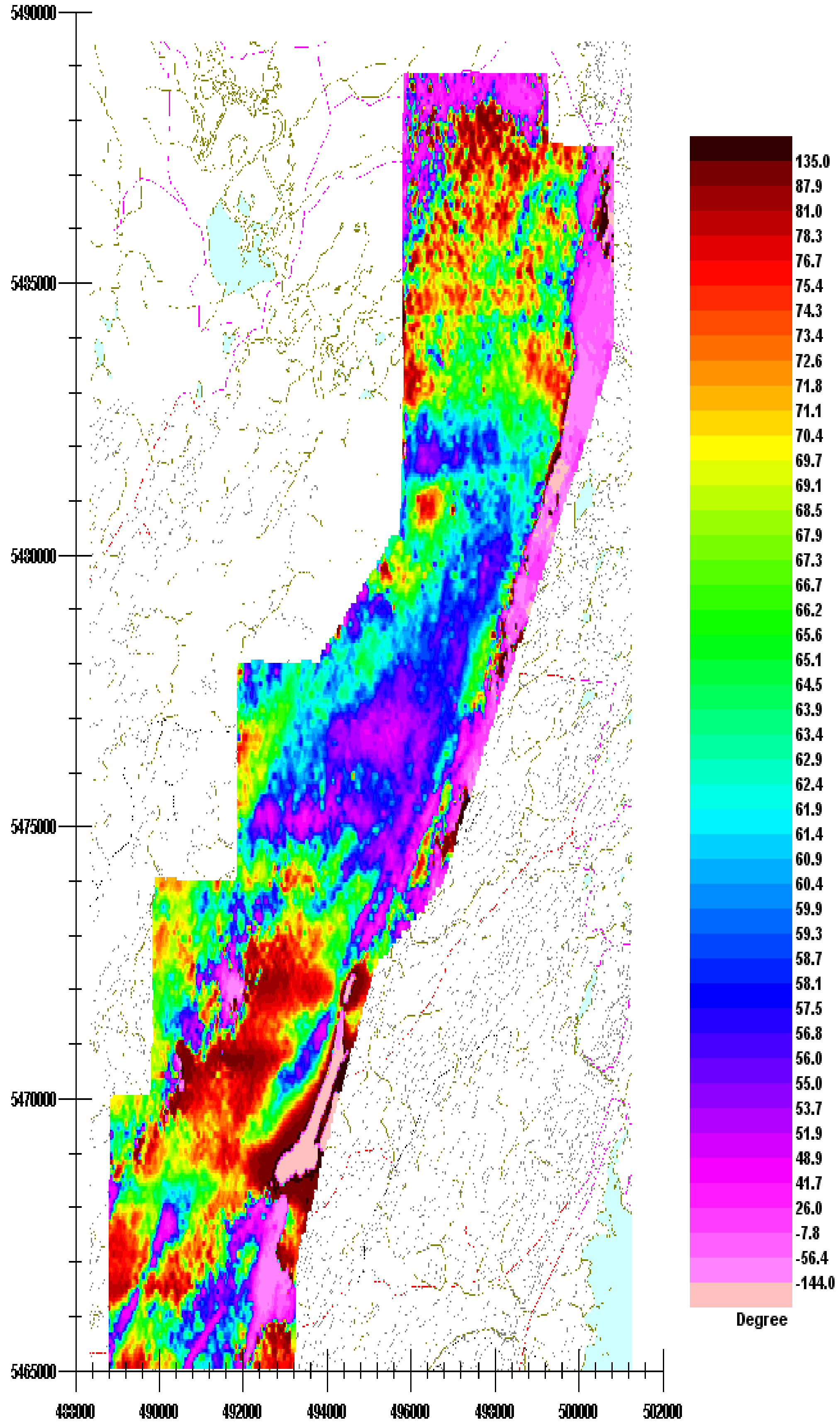
CP 4650Hz

again an unexpected result, the phases maps for the coaxial and coplanar data are virtually indistinguishable.

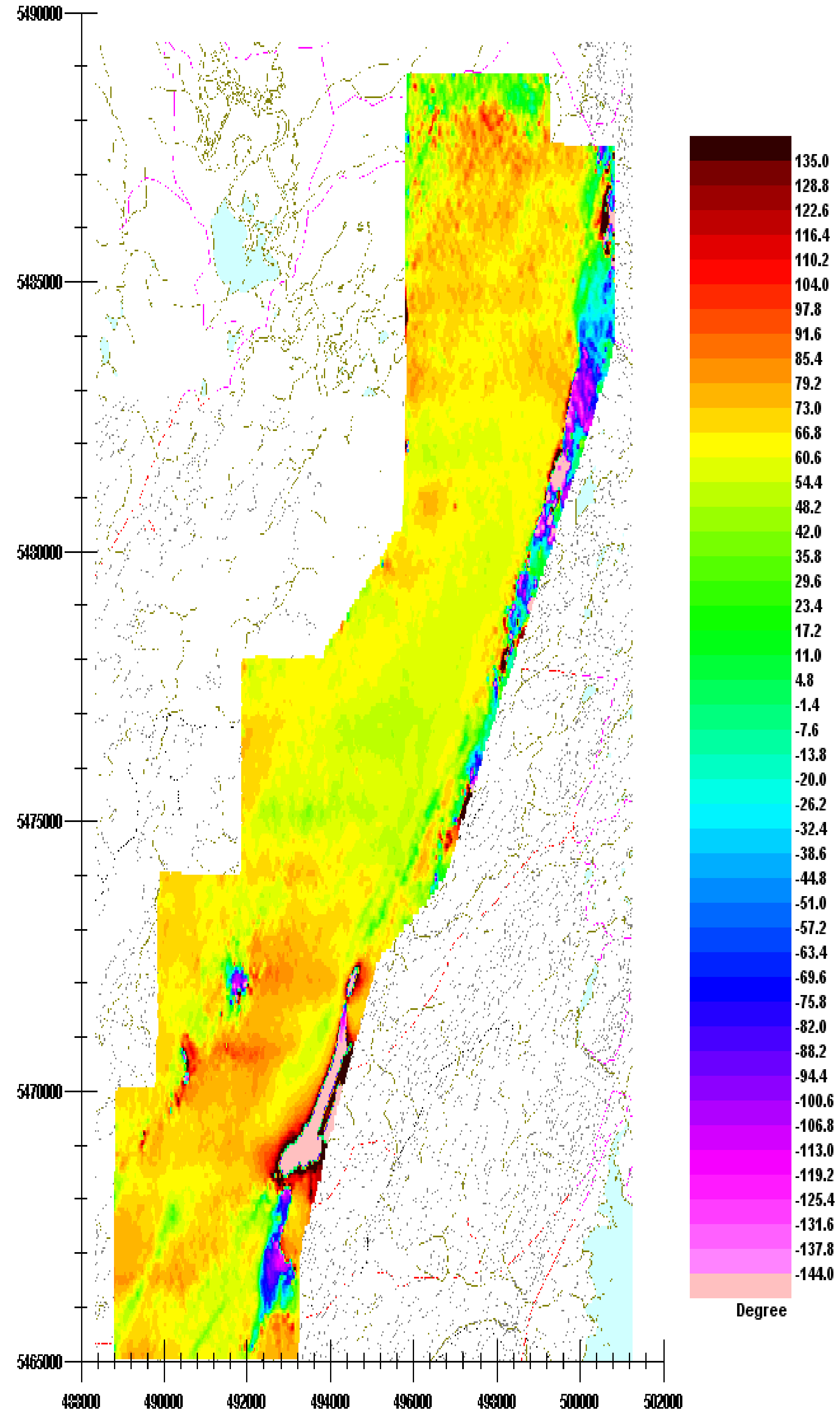
this is only possible in a very few types of resistivity models but the result would imply no shallow (depth of penetration) 3D variations in resistivity distribution?!

PHASE

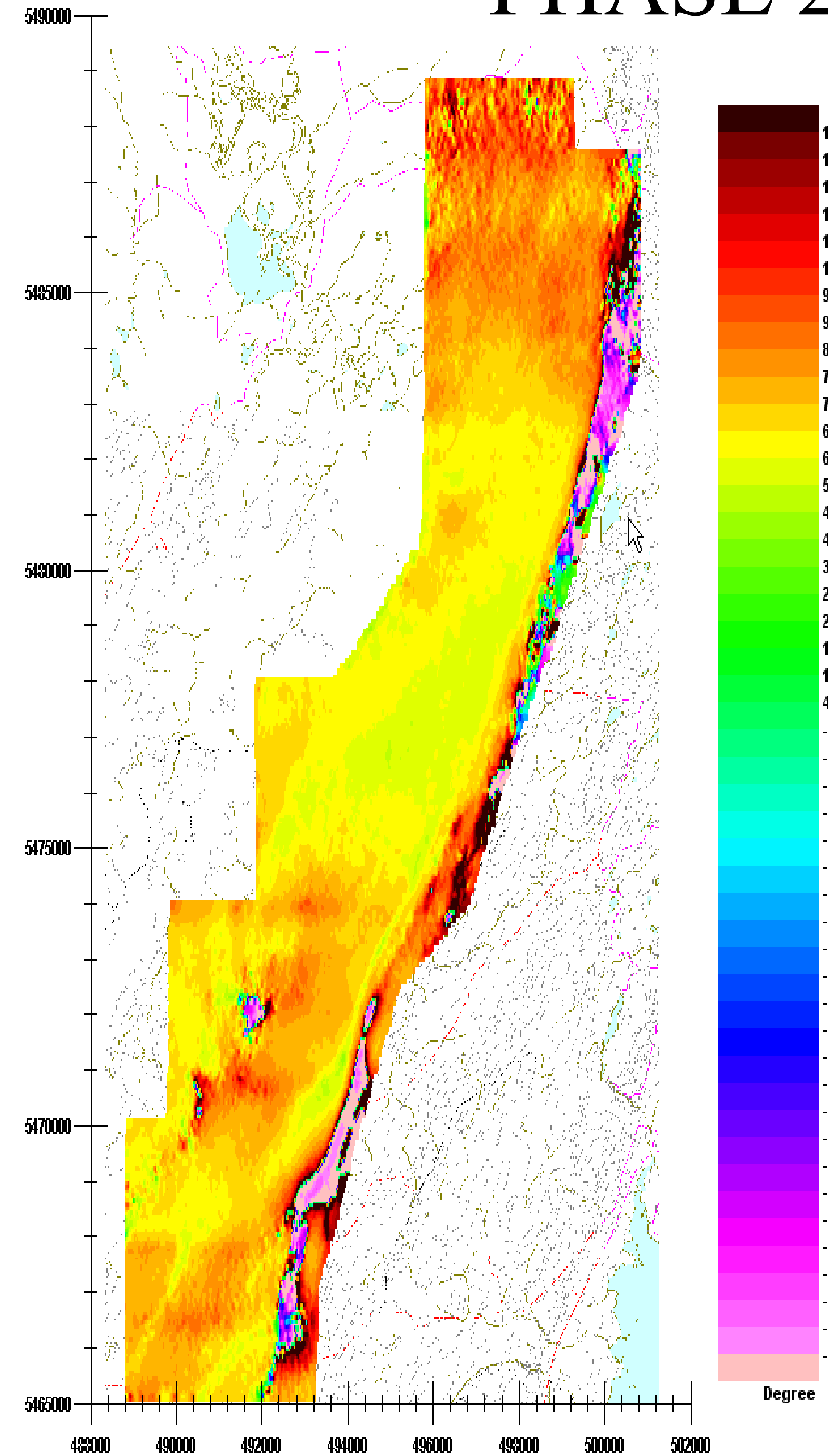
PHASE 2



CX 870Hz – Equal Weight

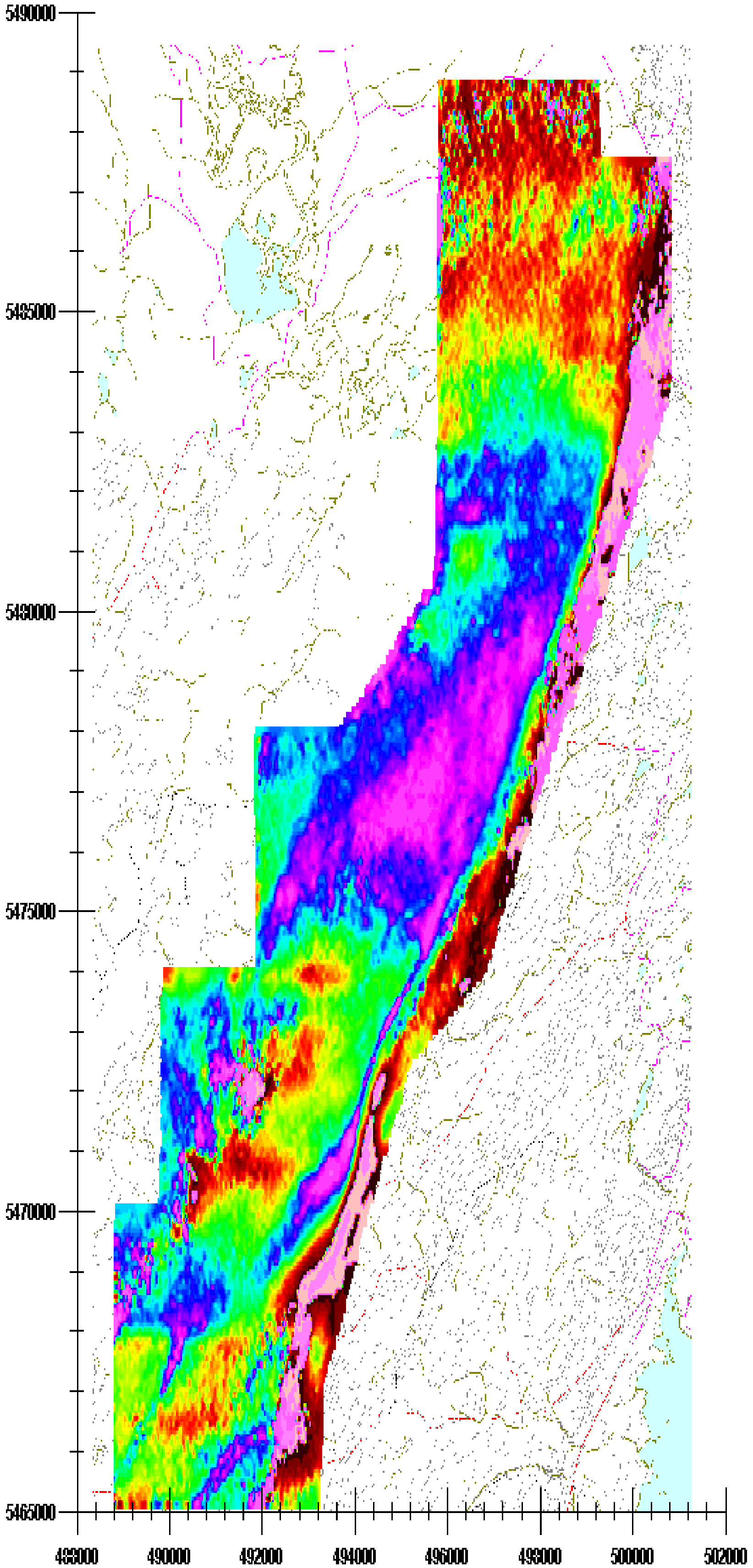


CX 870Hz – Equal Increments

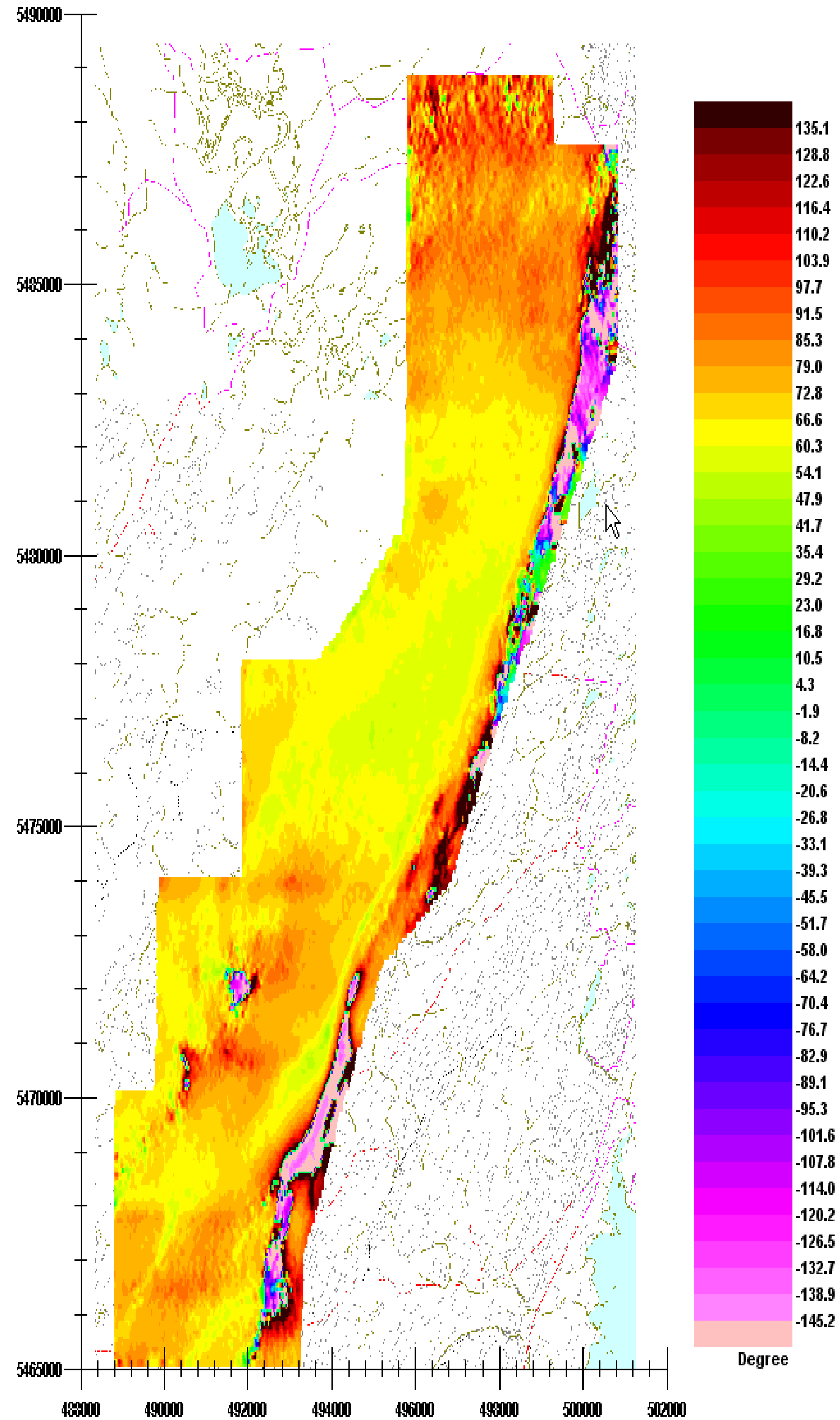


CP 930Hz Equal Increment

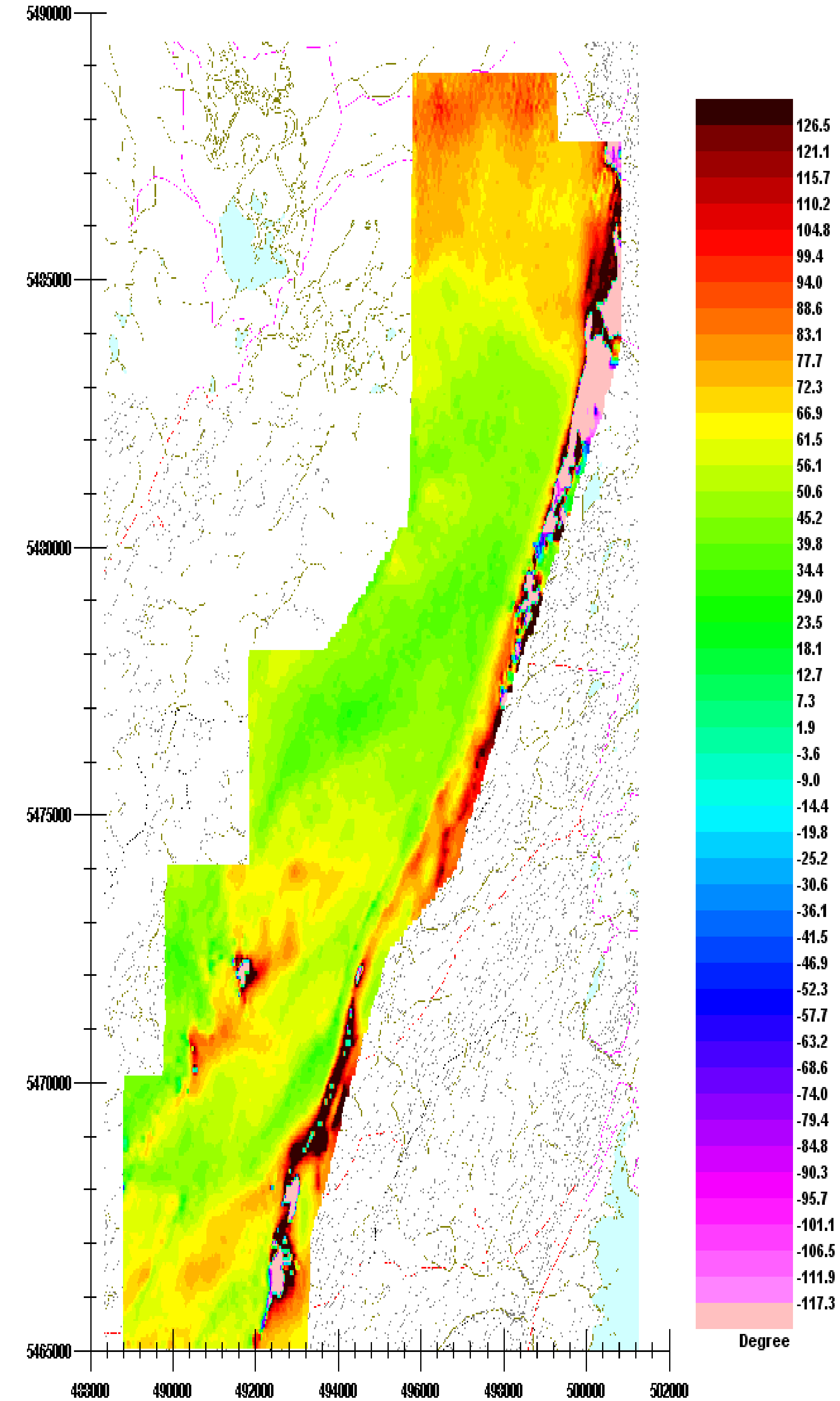
Phase 3



CP 930Hz – Equal Weight

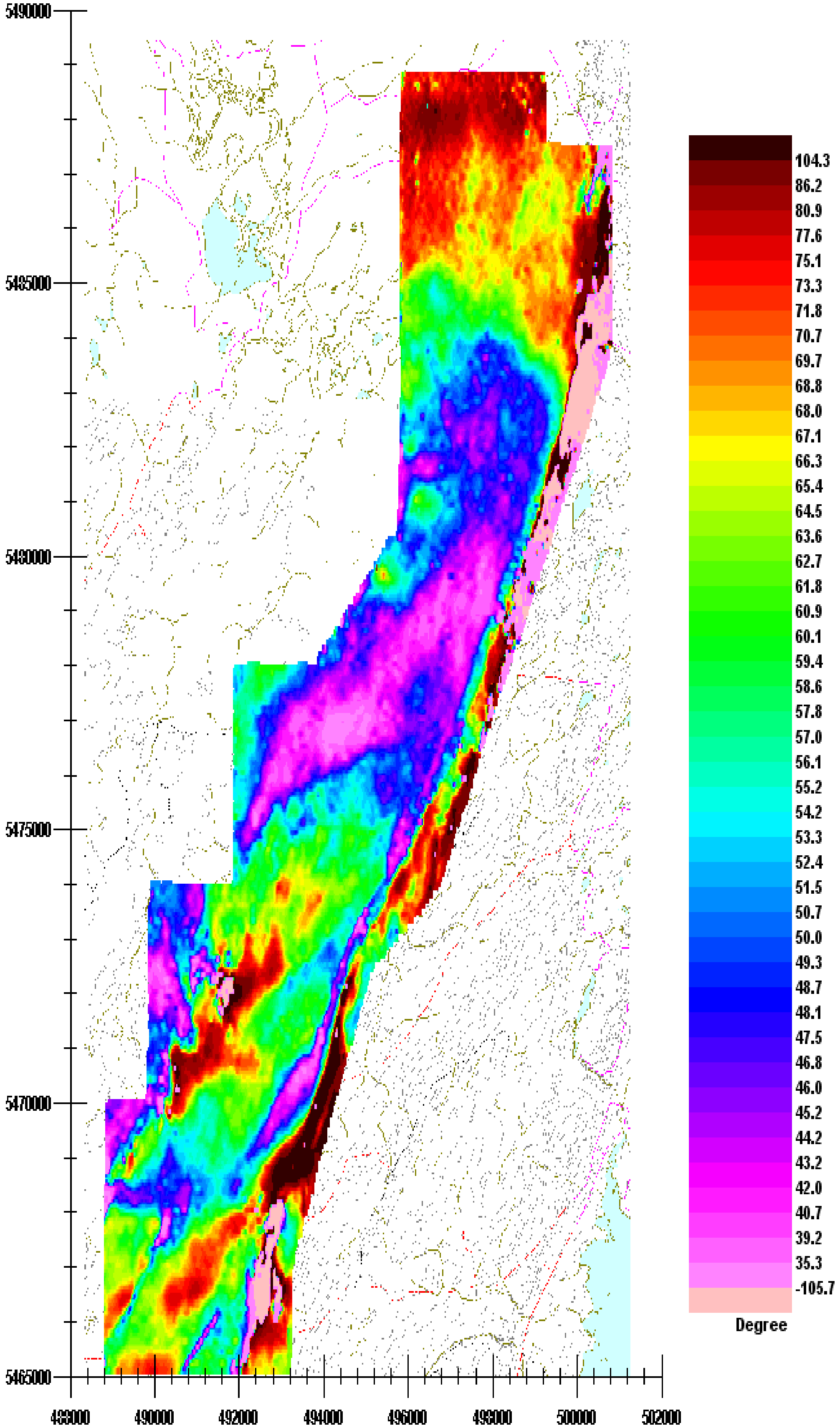


CP 930Hz – Equal Increments

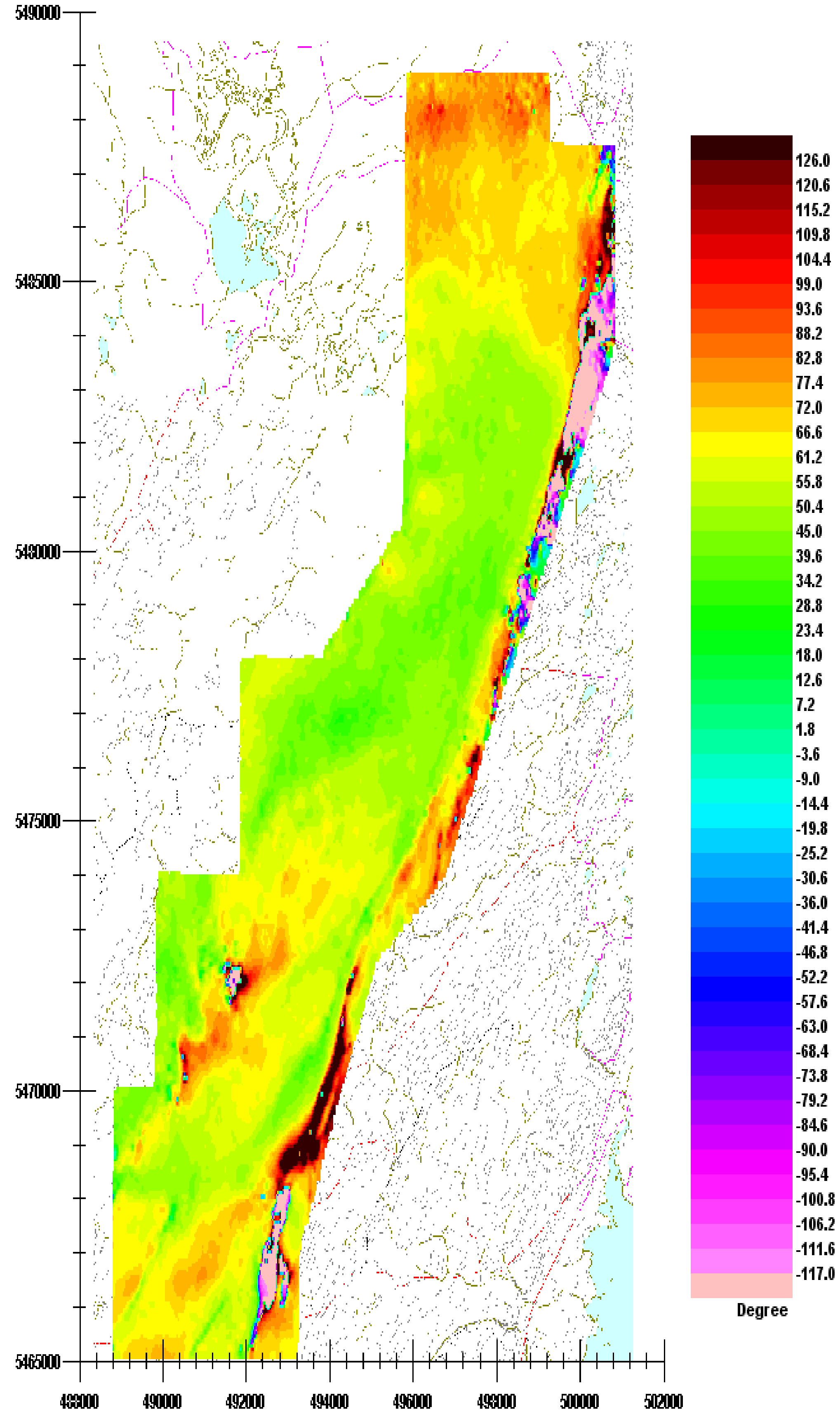


CP 4650Hz Equal Increme

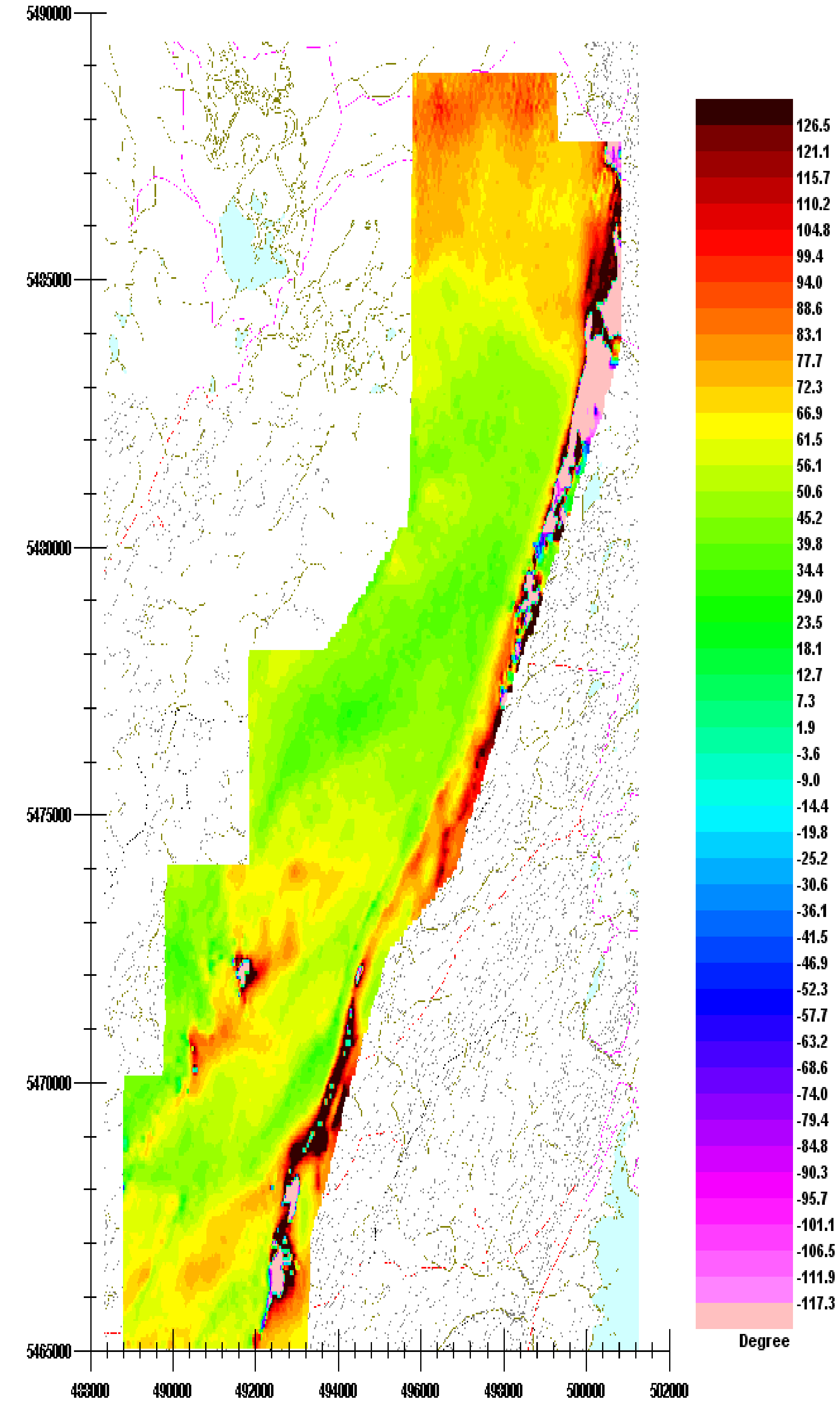
Phase 4



CX 4350Hz – Equal Weight

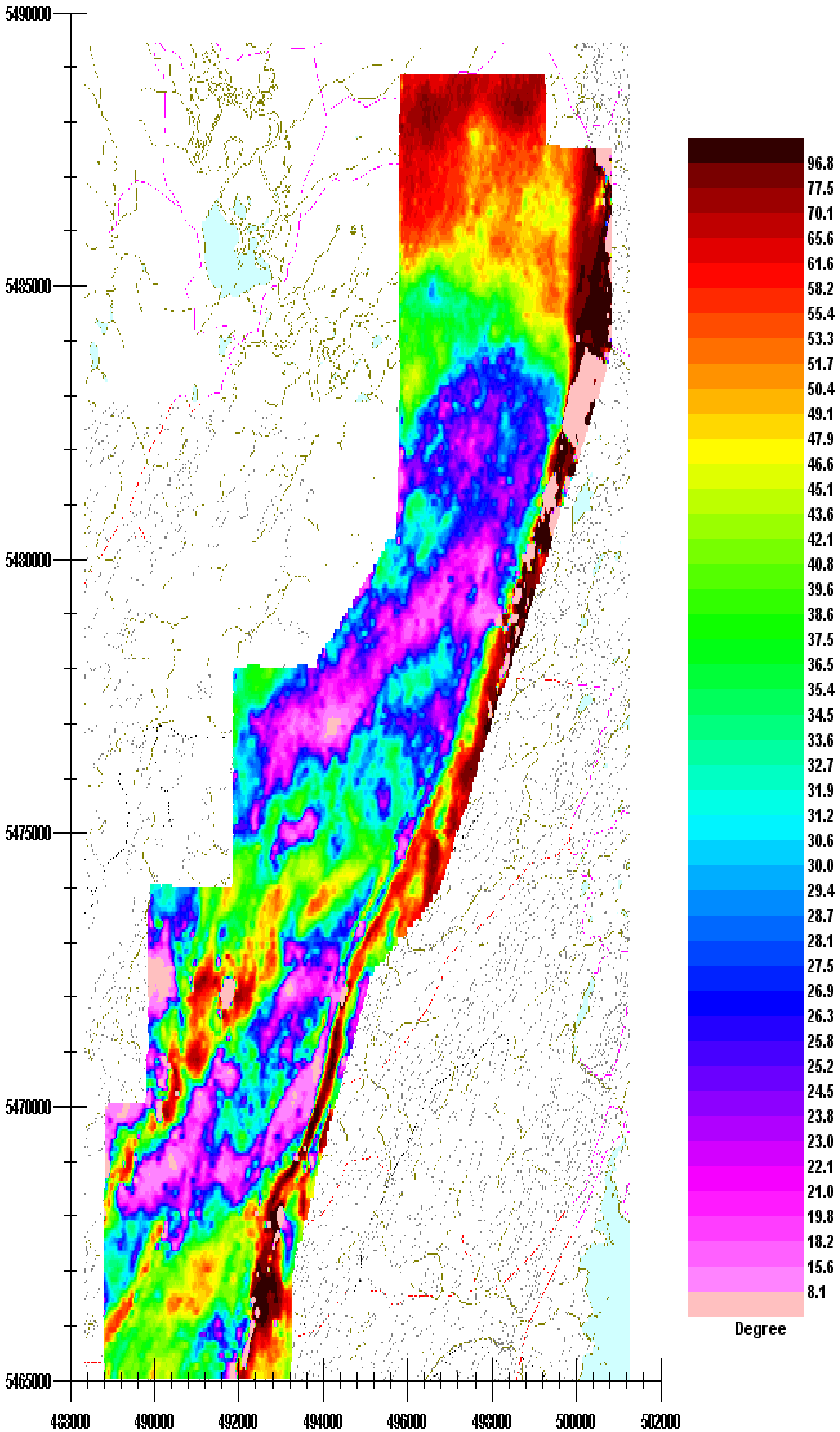


CX 4350Hz – Equal Increments

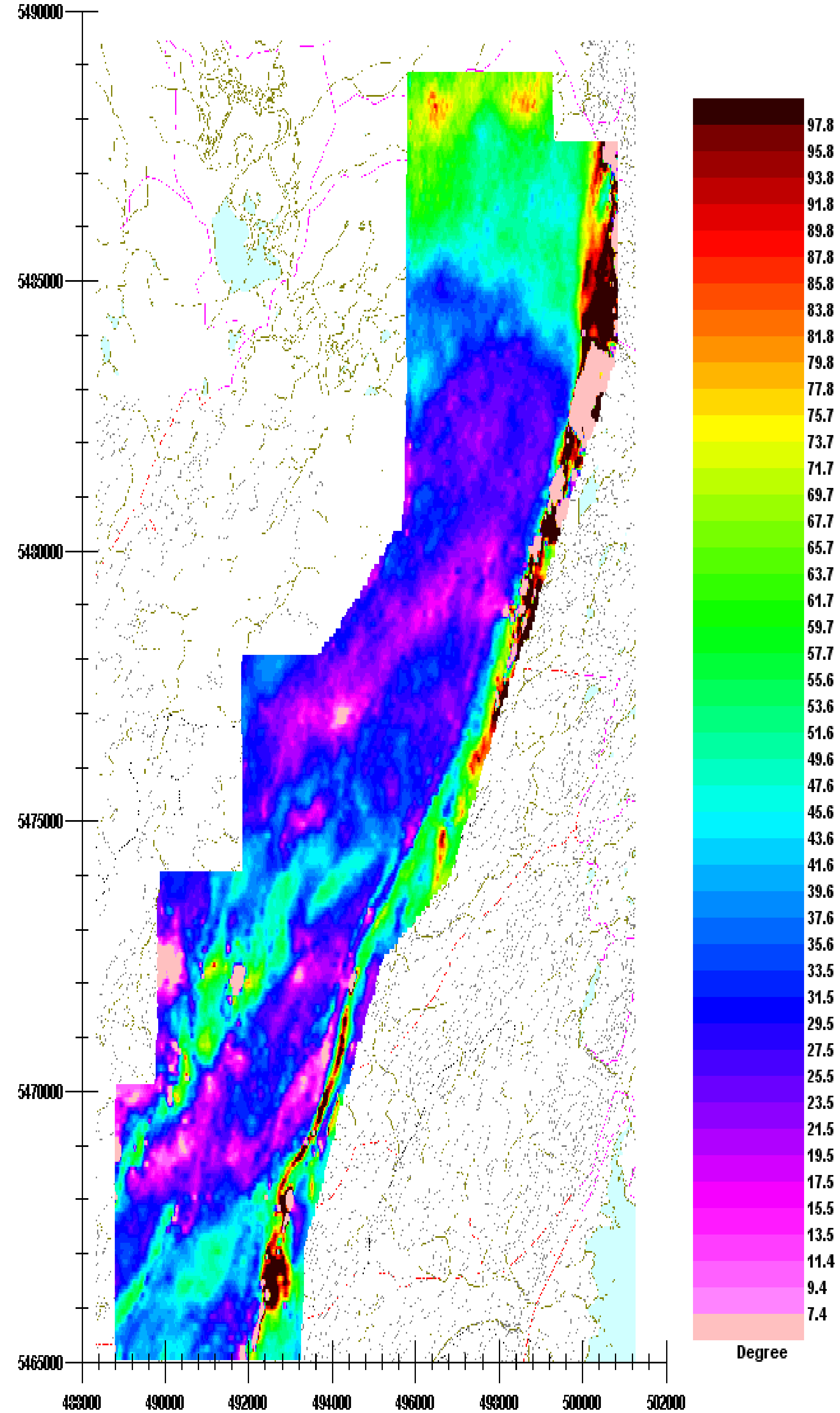


CP 4650Hz Equal Increments

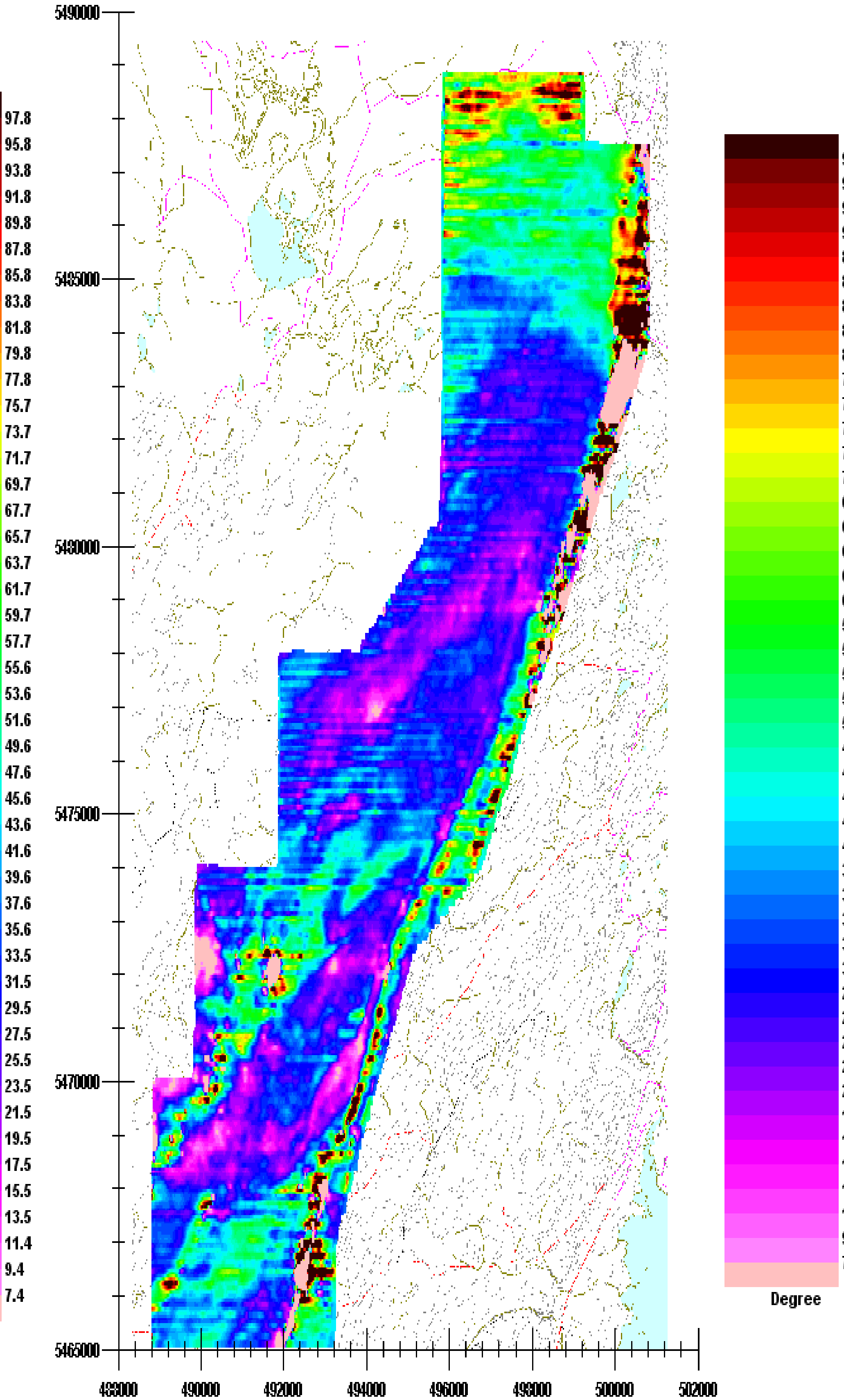
Phase 5



CP 23250Hz – Equal Weight



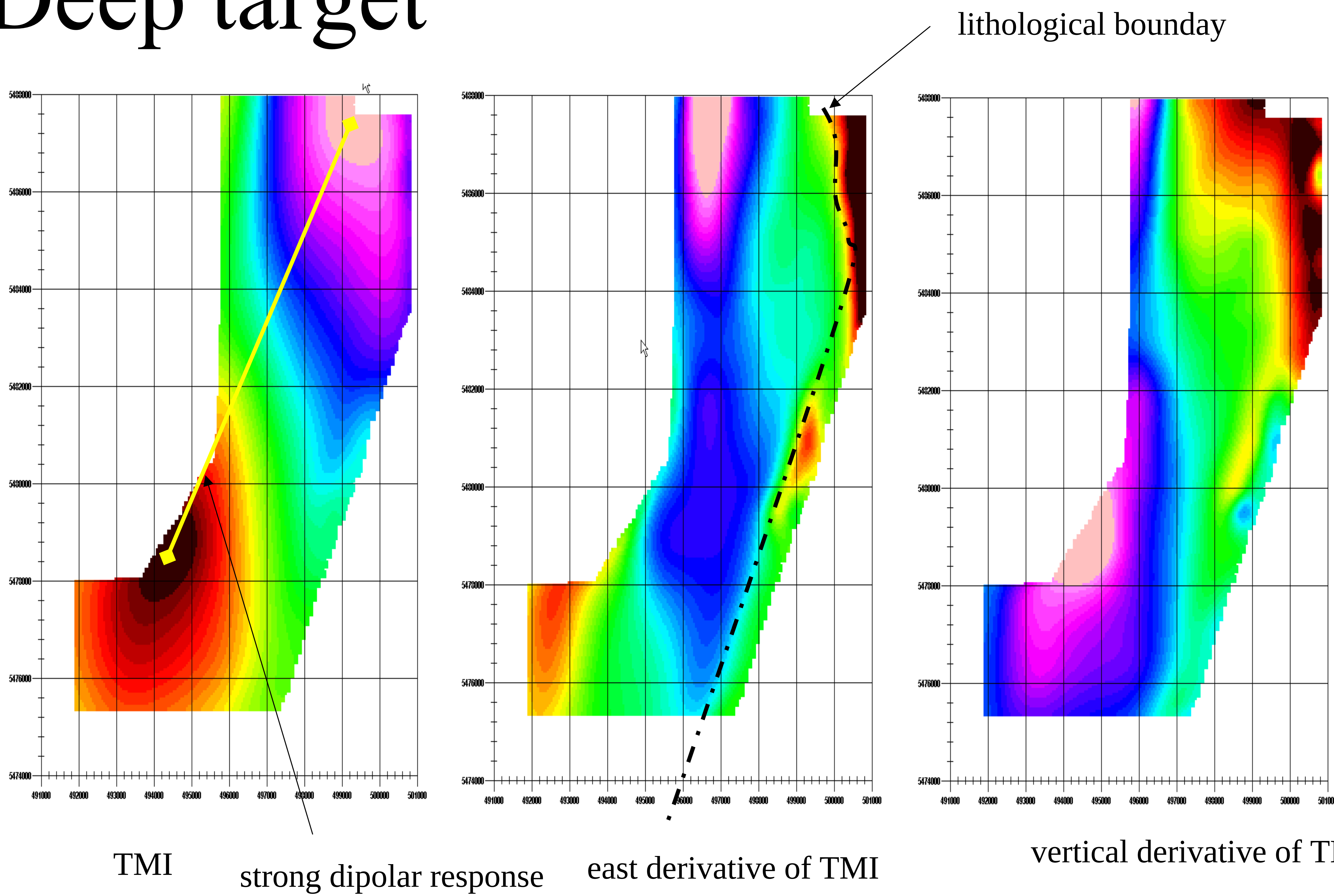
CP 23250Hz Equal Increments



CX 21750Hz – Equal Increments

Deep target

magnetic response at altitude 500m



the TMI and its derivatives are all consistent with a flat lying dipolar response

Comments on North Deep Magnetic Anomaly

Comments:

There are only 3 possibilities for the nature of the TMI response and its derivative:

1) a magnetic channelling dipolar response due to strong induced polarization
due to the orientation of the local earth's field this seems unlikely modelling shows that this possibility has to be ruled out

2) a low and high response caused by two (2) separated bodies
this would require a distributed weak magnetization as indicated by the magnetic inversions. All present magnetic inversion techniques rely on the assumption of this weak distributed magnetization. While possible, this weak assumption is not strongly supported by the derivatives. In addition, this possibility seems improbable
statistically. <u>Most importantly, if this case of a very strong and a very unusual response should not be overlooked in the exploration as a significant deposit could be overlooked.</u>

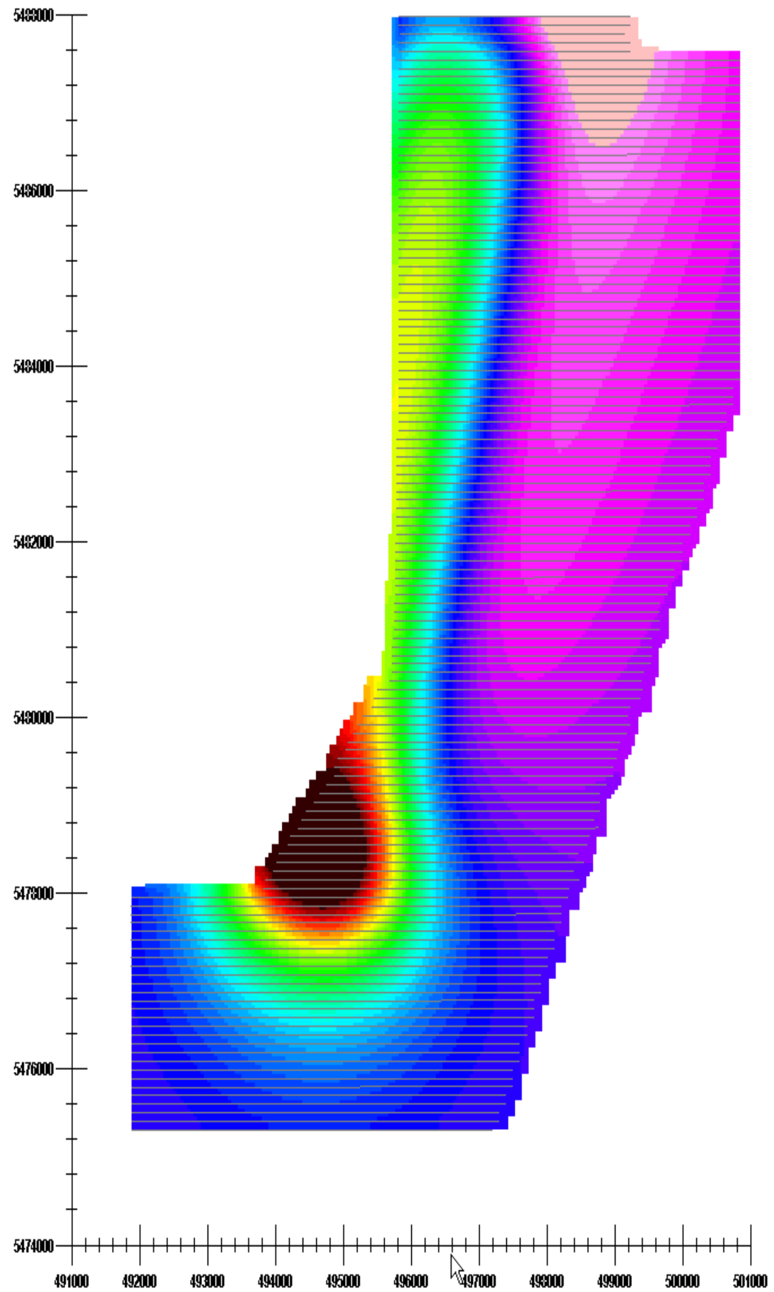
3) the third and most interesting possibility is of a large strongly remananently magnetized body of significant extent
it is this possibility that was investigated most extensively via 3D modelling. The conclusion of the modelling was that a large flatly dipping anomaly of extensive strike length and with a magnetization roughly in opposition to the earth's field could produce the TMI response and all of its derivatives

Deep Target Model

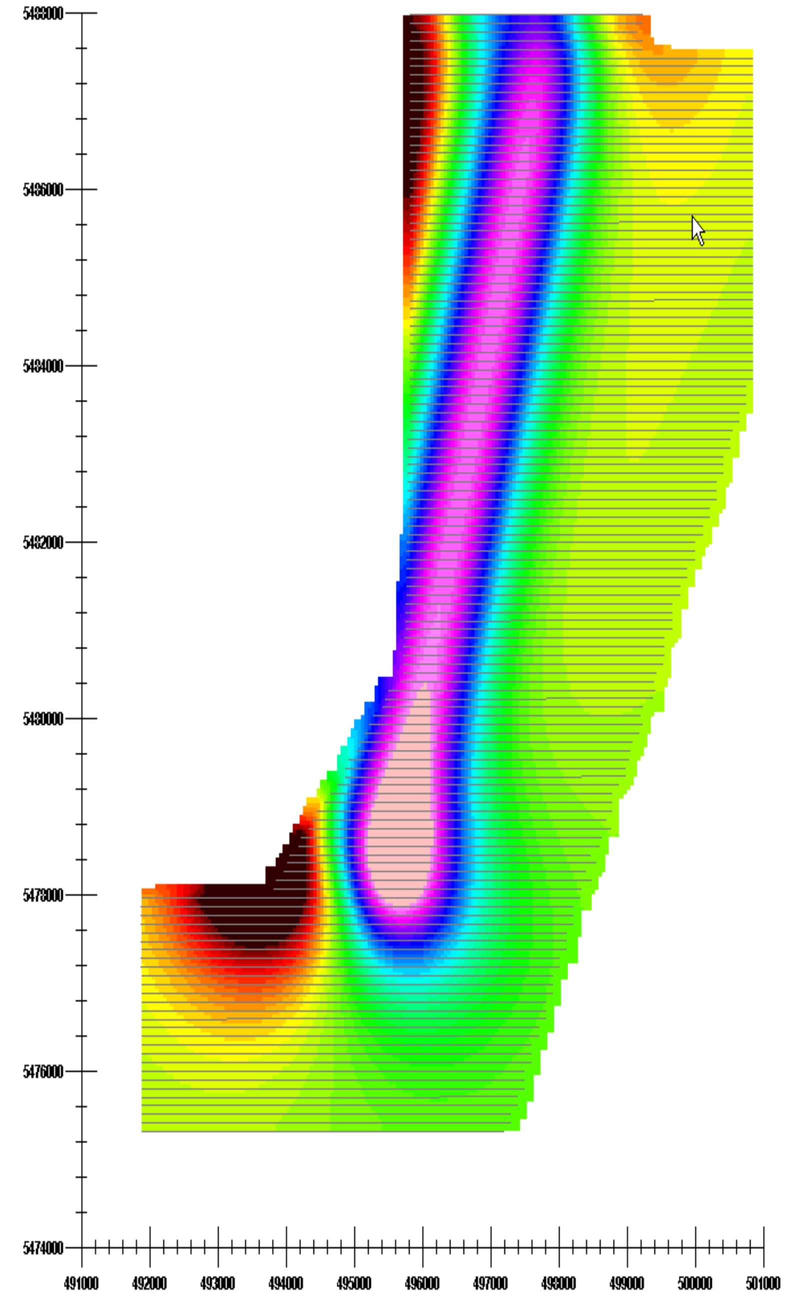
Strike Length : approx 11,000m
Width: approx 2000
Thickness: more than 100m
Depth to Top: approx 600m
Strike Angle: 14 degrees East of North
Dip Angle: approx flat lying
Magnetization: Permanent Declination: 25 degrees East of North, Inclination: 25 degrees Strength: 0.2 of local Earth's field

Local Earth Field: Declination: -21.5 degress, Inclination: 70.3 degrees

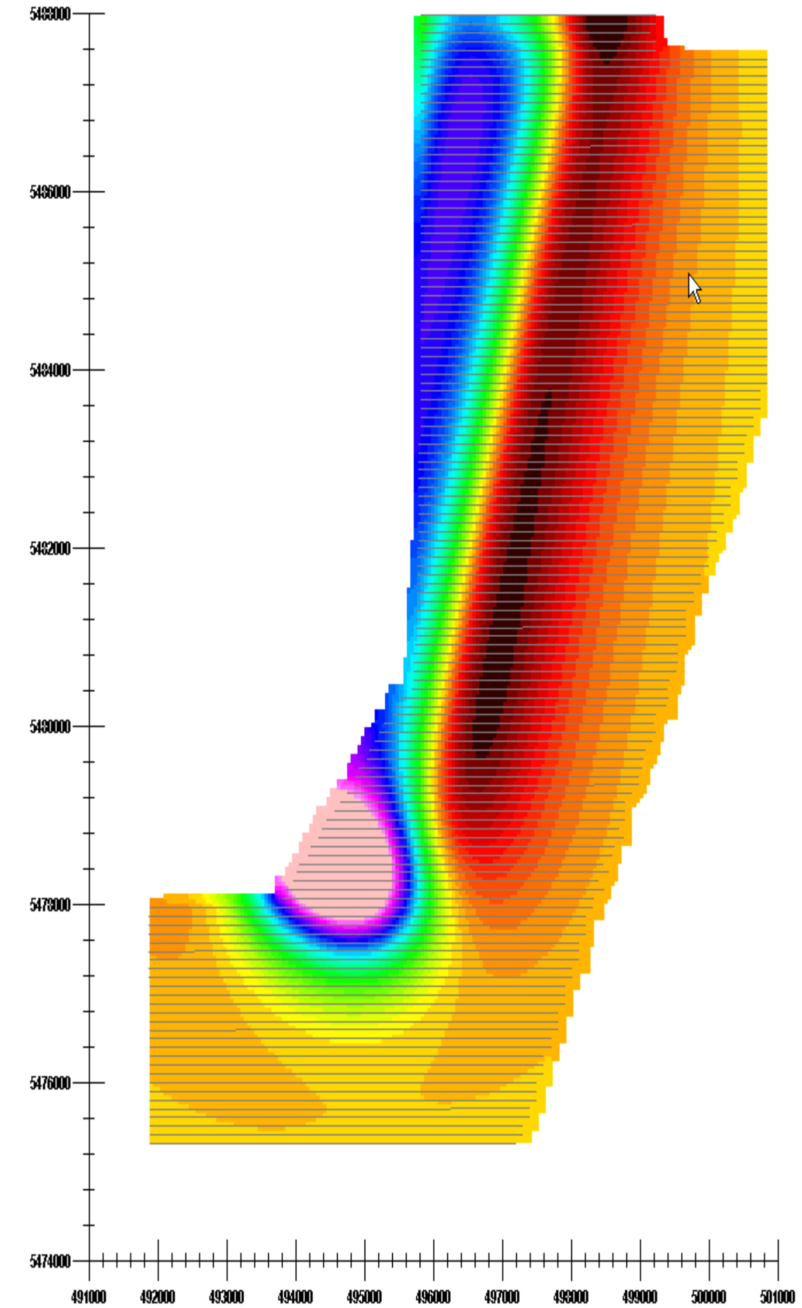
Model Response



TMI



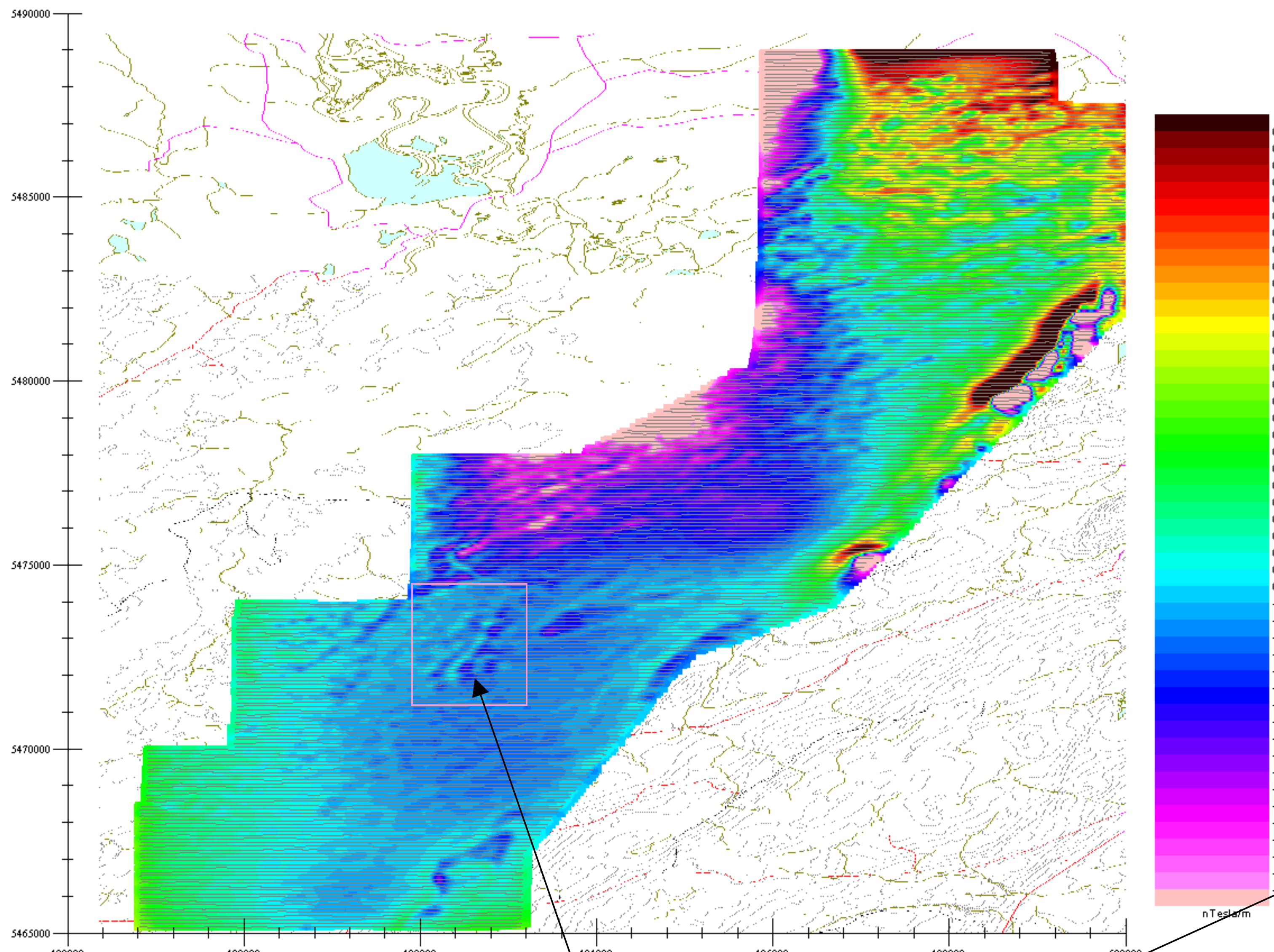
east derivative of TMI



vertical derivative of TMI

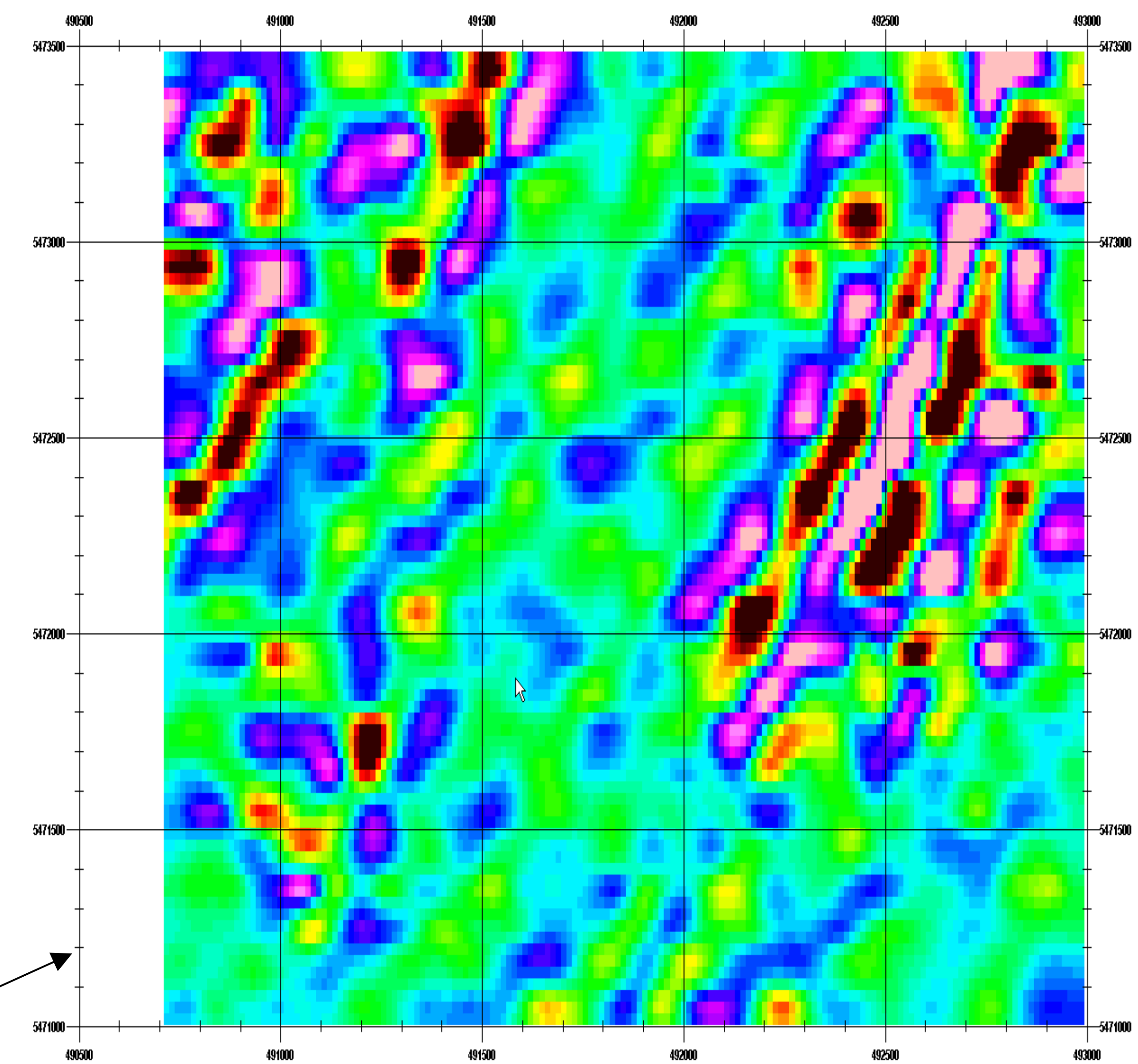
No attempt was made to make an exact model but rather an approximate model to show that with some small modifications the basic response of the anomaly could be matched with a target approximately with the givendimensions, geometry and magnetization. A detailed model was not considered to be necessary at this time.

Shallow Magnetics in South



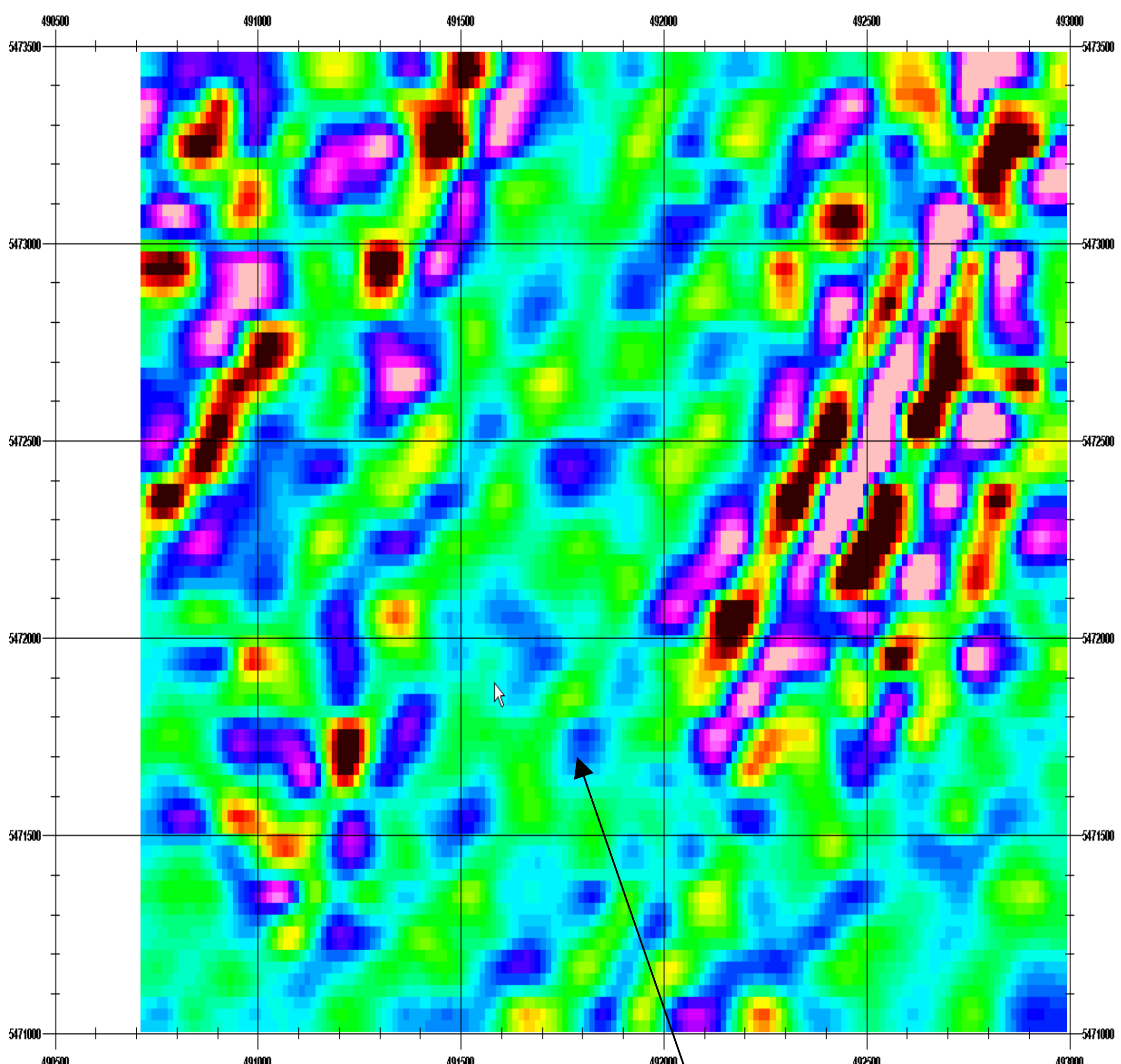
study area

Vertical Derivative



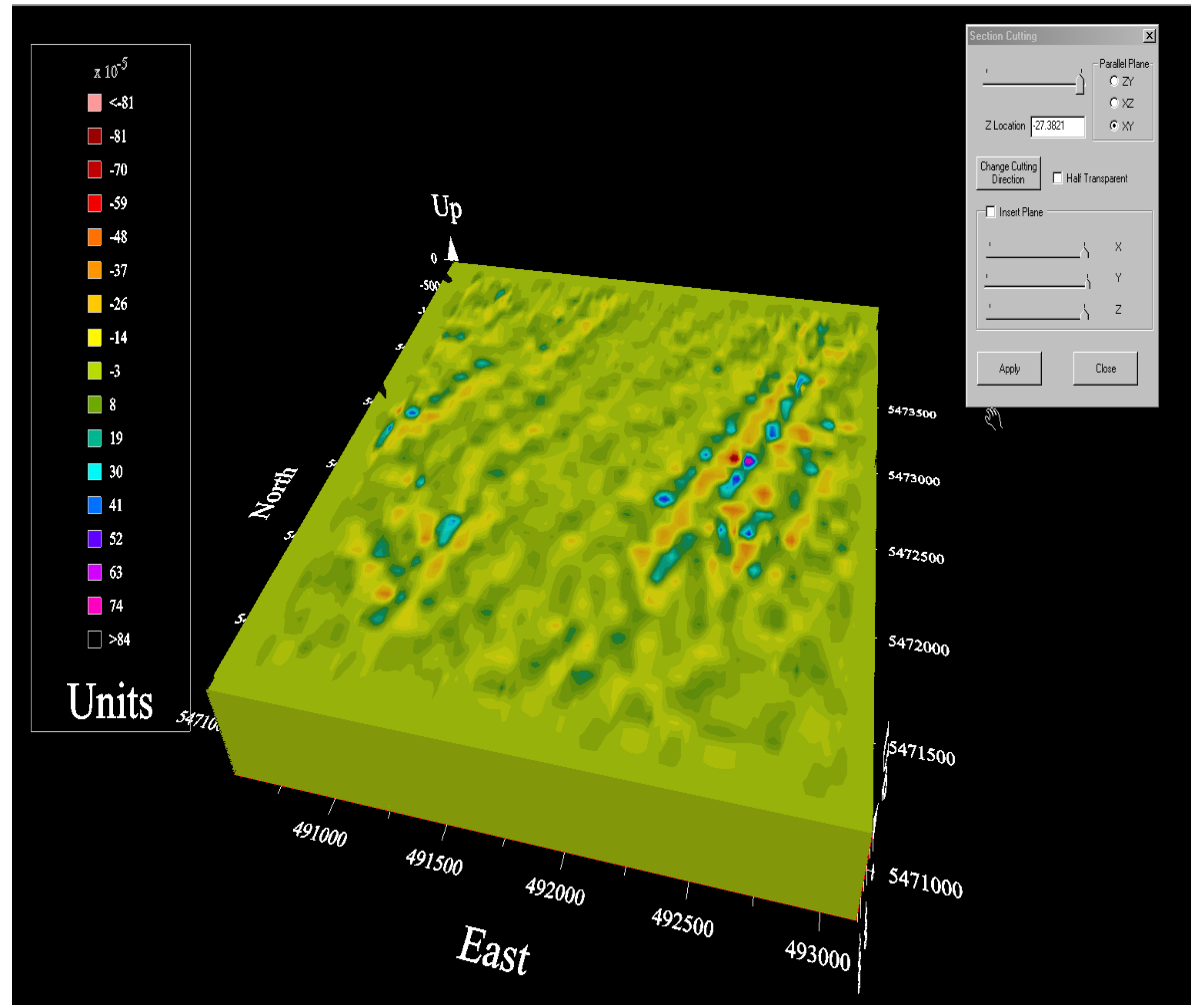
TMI high passed

Shallow Magnetics in South



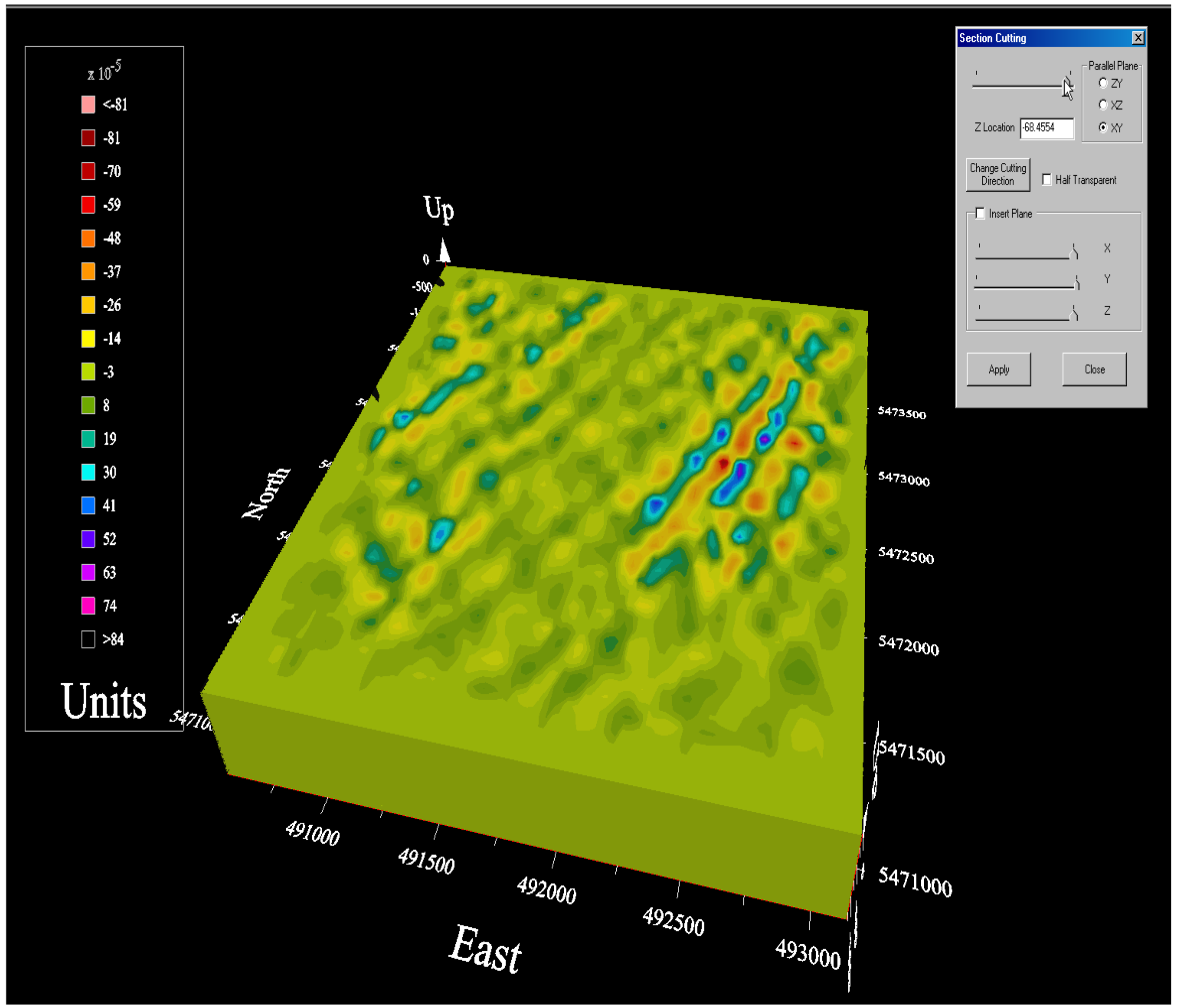
TMI high passed

study area

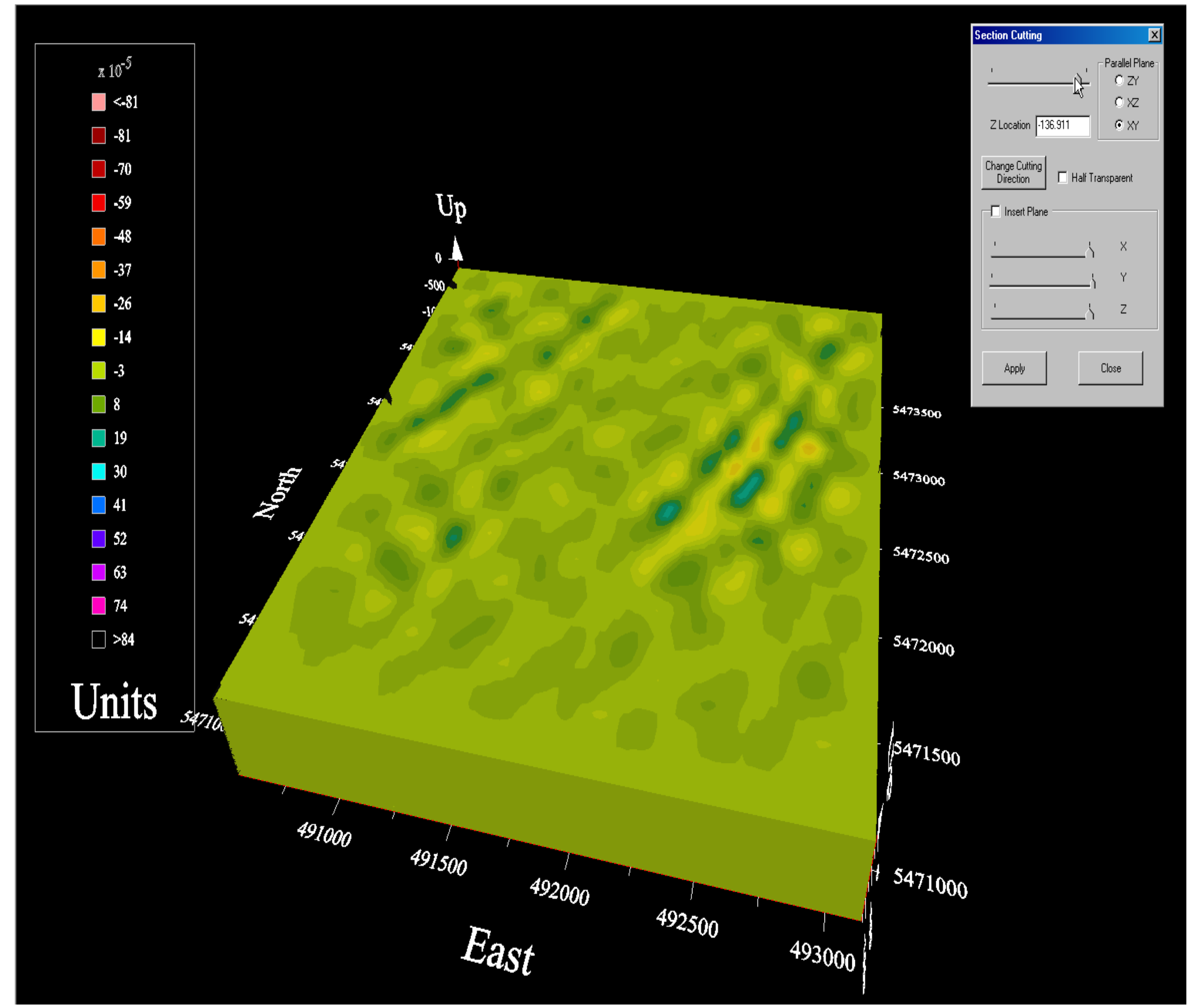


depth 27m

Shallow Magnetics in South



depth 68m



depth 137m

structures disappear at about 160m depth

Comments on shallow structure

Generally, the NE trending structures in the south are shallow. While the study area was picked as the most interesting anomaly, there are other anomalies of the same type. If these types of structures are interesting for the exploration process, then further investigations could be made into more of these types of anomalies.

SUMMARY

Electromagnetics: The electromagmetic data appears to be of very questionable quality. Certainly it is not of use quantitatively. However, it does appear to map variations in the surficial resistivity. These varations when analysed in combination with the surficial magnetics may be of help it understaning the shallow geology. However, the geophysical analyses requires more geological and exploration target inputs to further utilize this data.

Shallow Magnetics: The TMI and its derivatives, particularly the inline horizontal derivative, indicate different shallow patterns in trends in different regions of the survey especially between north and south. Processing of the magnetics to remove the long wavelength trends illuminates this trends and local anomalies more vividly. Again, whether these patterns are useful in the exploration process requires more geological input for the geophysicist to investigate further.

Deep Magnetics: There is clearly a very unusual moderately deep anomaly to the north which is likely due to remanent magnetization. The possible source of such an anomaly also requires more understanding of the regional geological setting.

Recommendations

It is strongly recommended that the strong, deep magnetic target be investigated more deeply both from the perspective of the geological setting and also with ground magnetic surveys. Further, a deeper understanding of the geological exploration objectives for uranium deposits would help the geophysical analyses of the shallow magnetics in conjunction with the shallow resistivity variations as indicated by the gross study of the electromagnetic data.