Offset Dipole-Dipole Array

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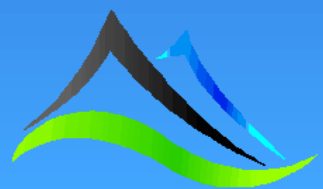
ExploreGeo

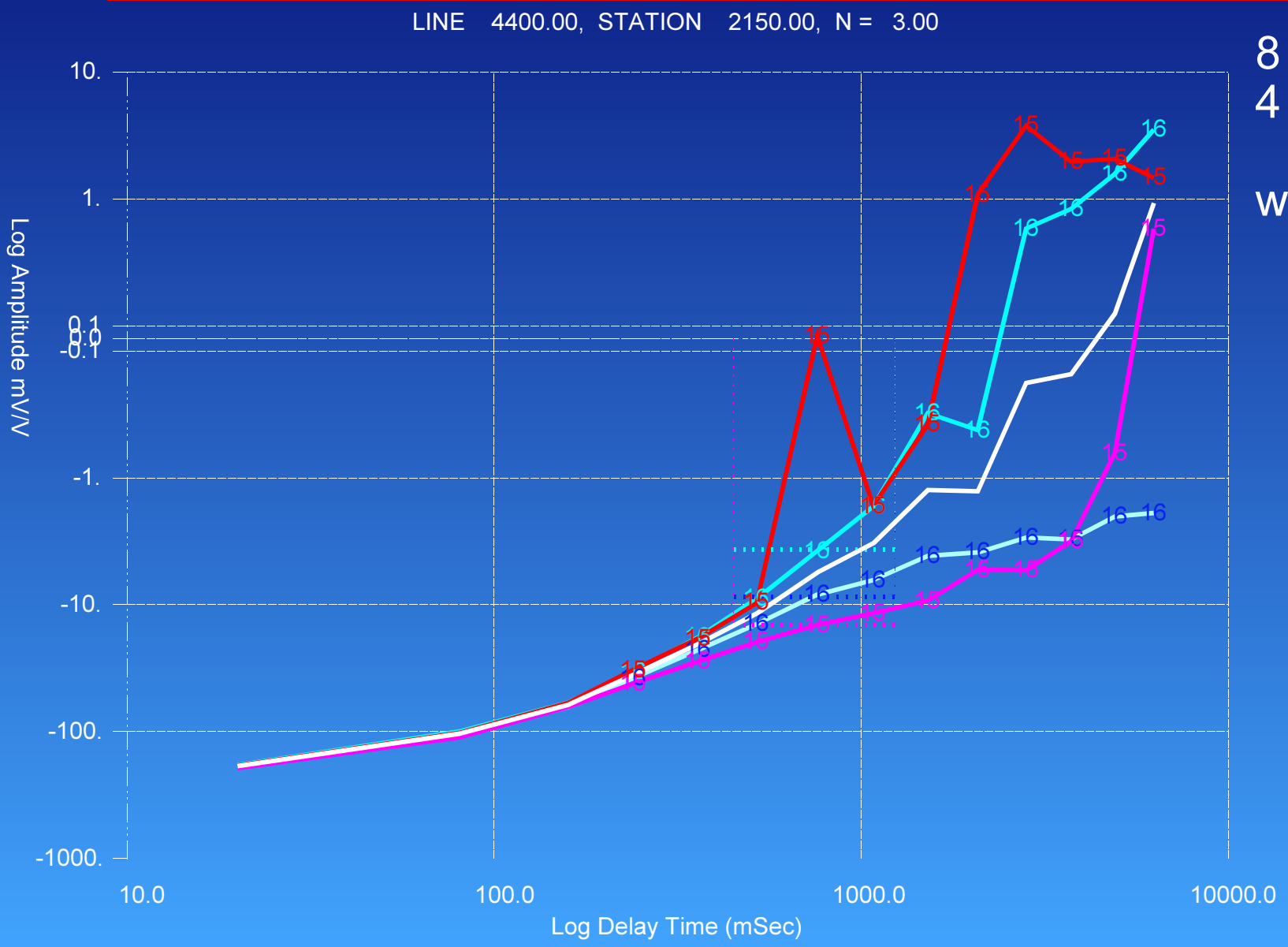
Modern 3D-IP surveying. Practical techniques and short cuts.

ASEG Conference - Perth 2015



What's wrong with just using Steve and Bob's OPD?

OPD and EM Coupling!



8 second cycle
4 repeat readings

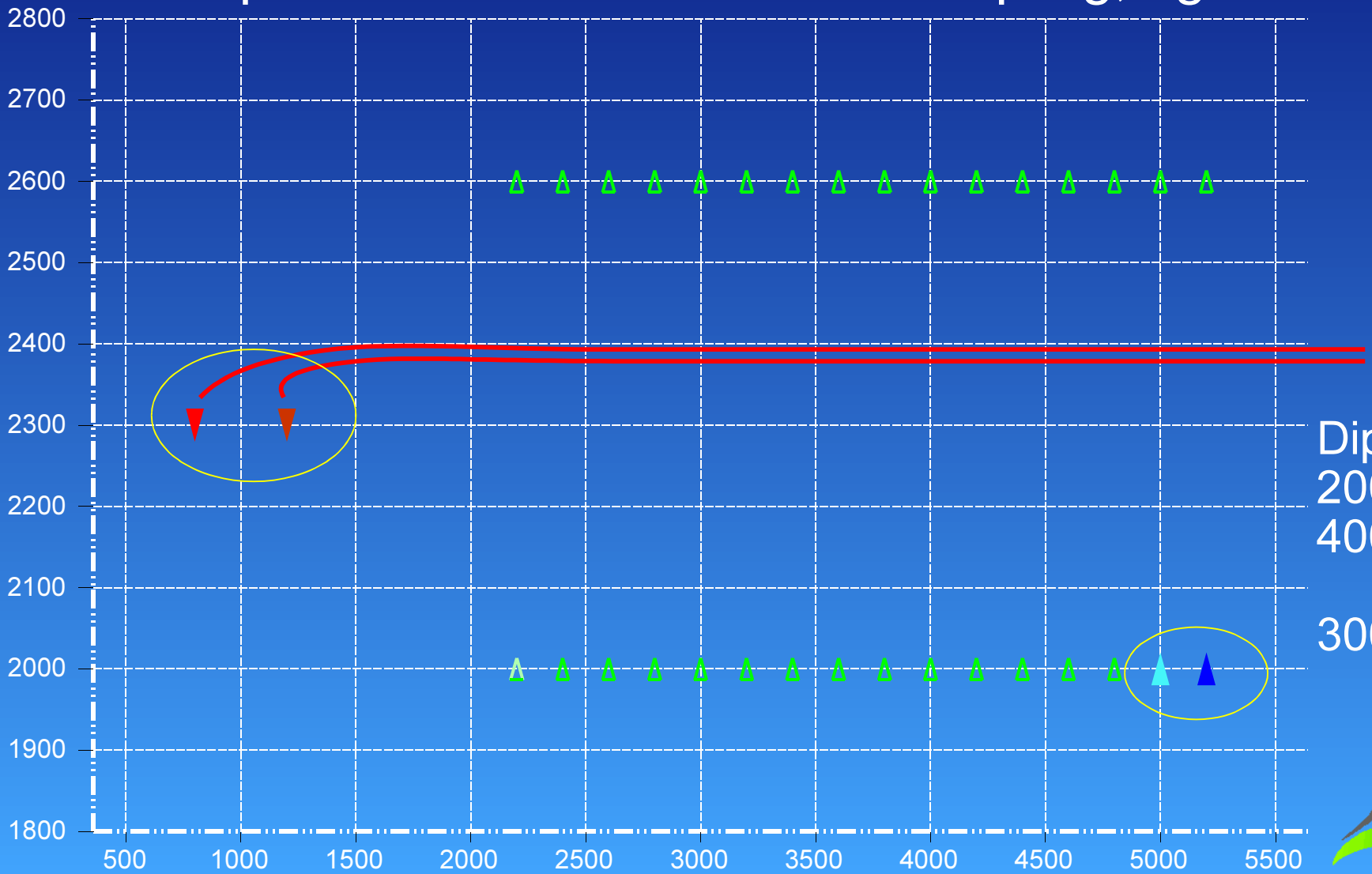
white line = median

Switch to Offset Dipole - Dipole

But vehicle access is a problem!

Run the wires from one end?

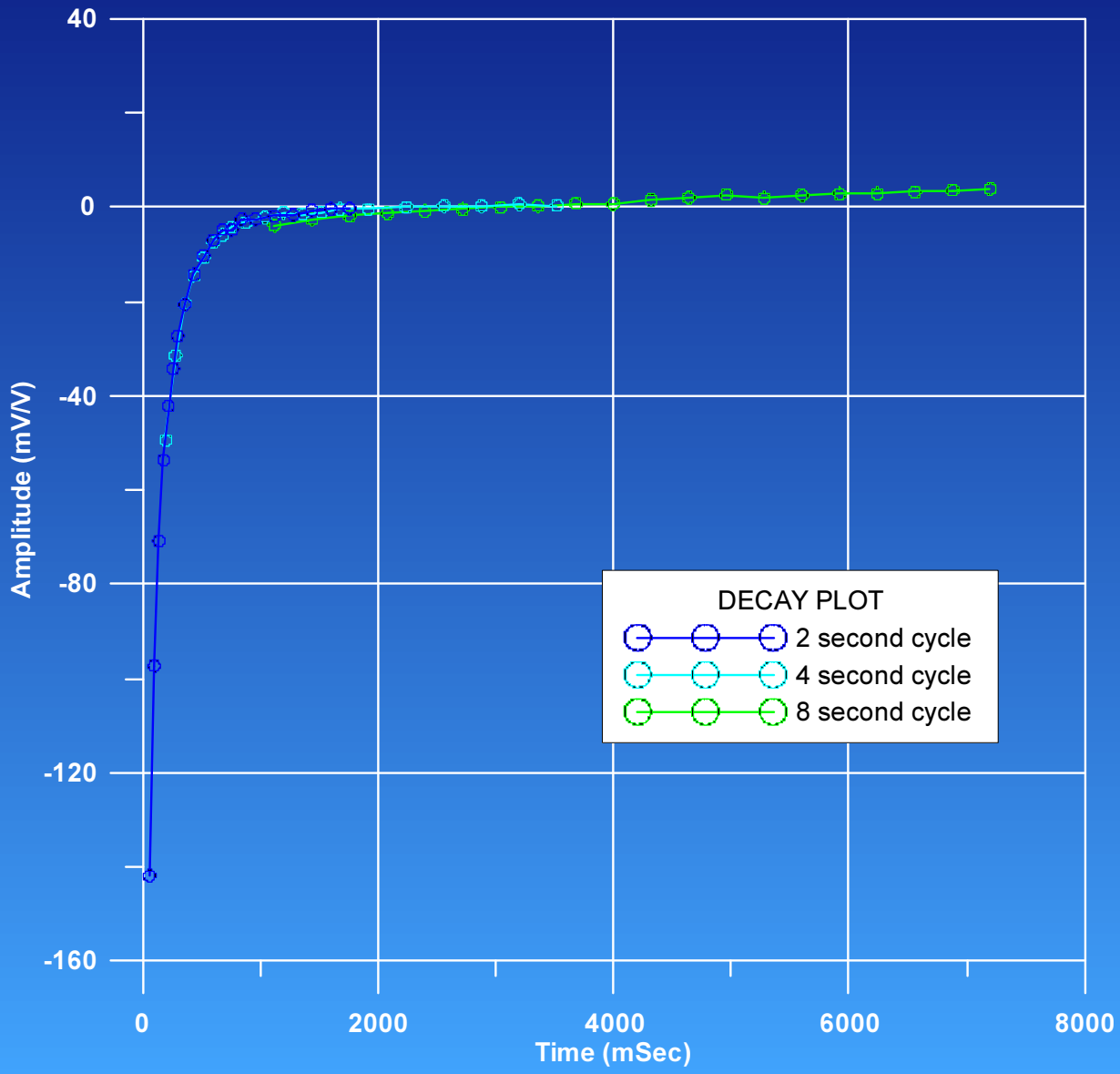
Return path should cancel out the coupling, right??



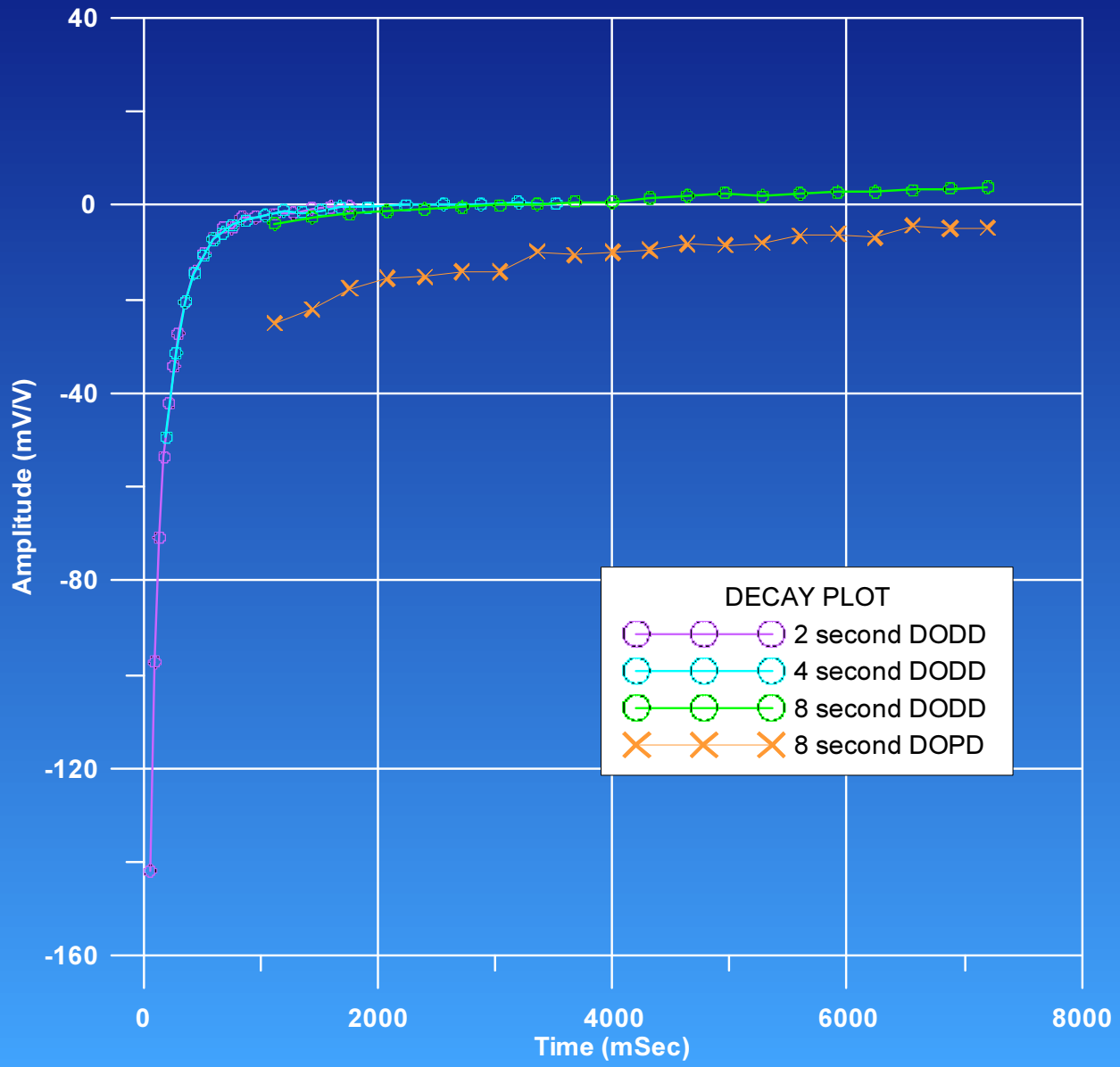
Dipoles
200m Rx
400m Tx

300m lines

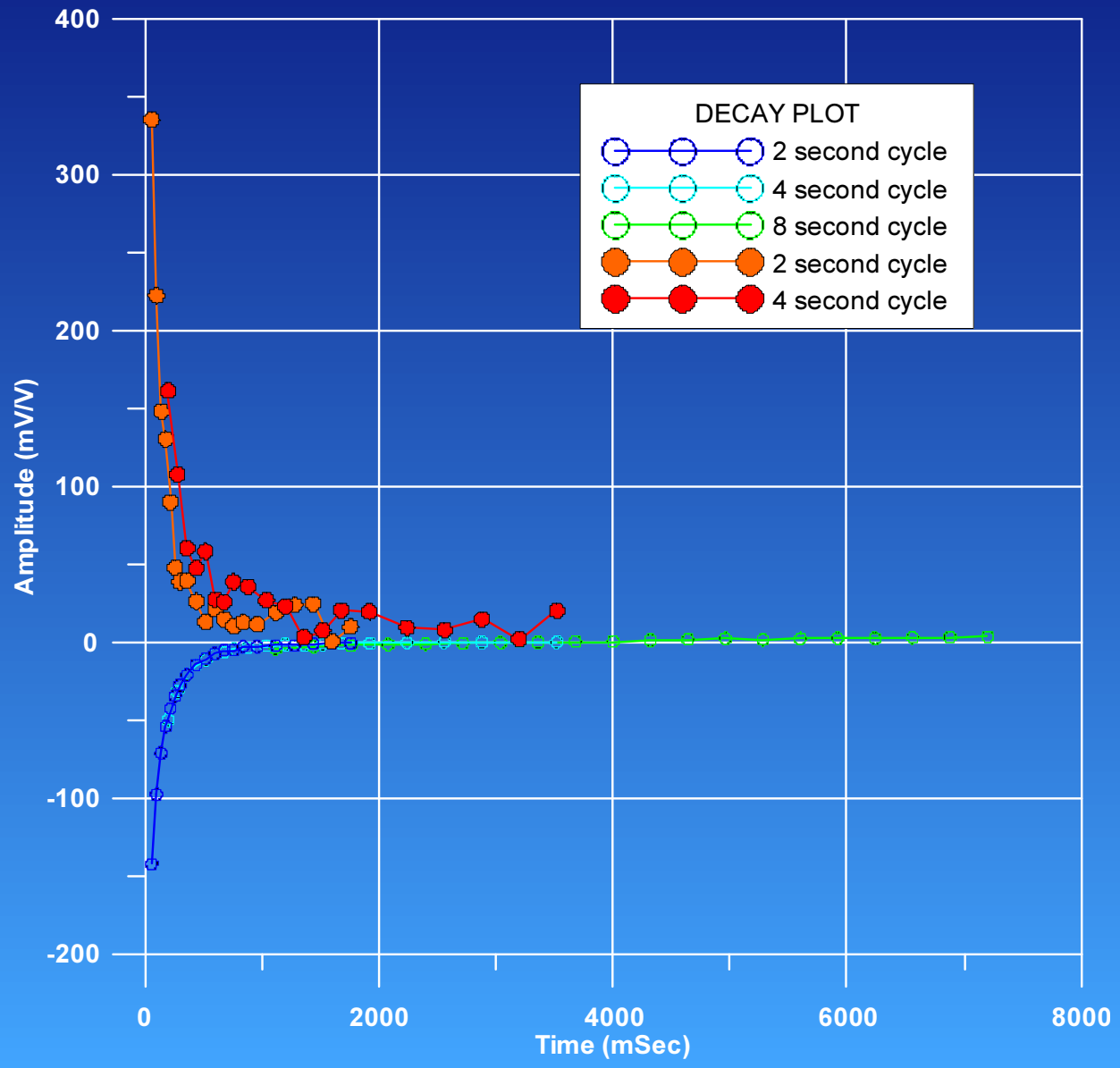
WRONG!


40
0
-40
-80
-120
-160
Amplitude (mV/V)
0
2000
4000
6000
8000
Time (mSec)
DECAY PLOT
2 second cycle
4 second cycle
8 second cycle

Is it better than DOPD?

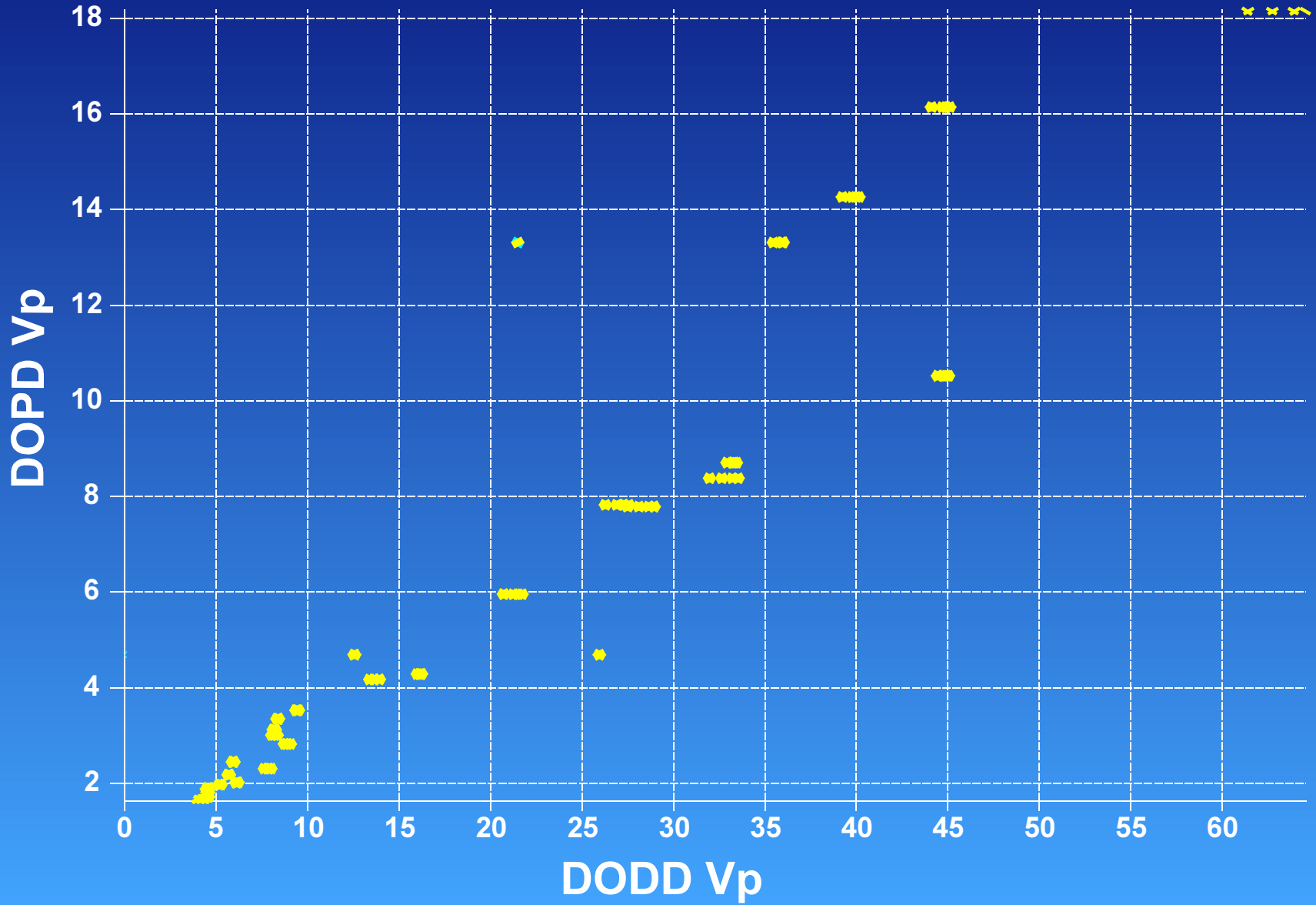


What happens if we put the Tx at the dipole as we normally would?



Goodbye EM Coupling!

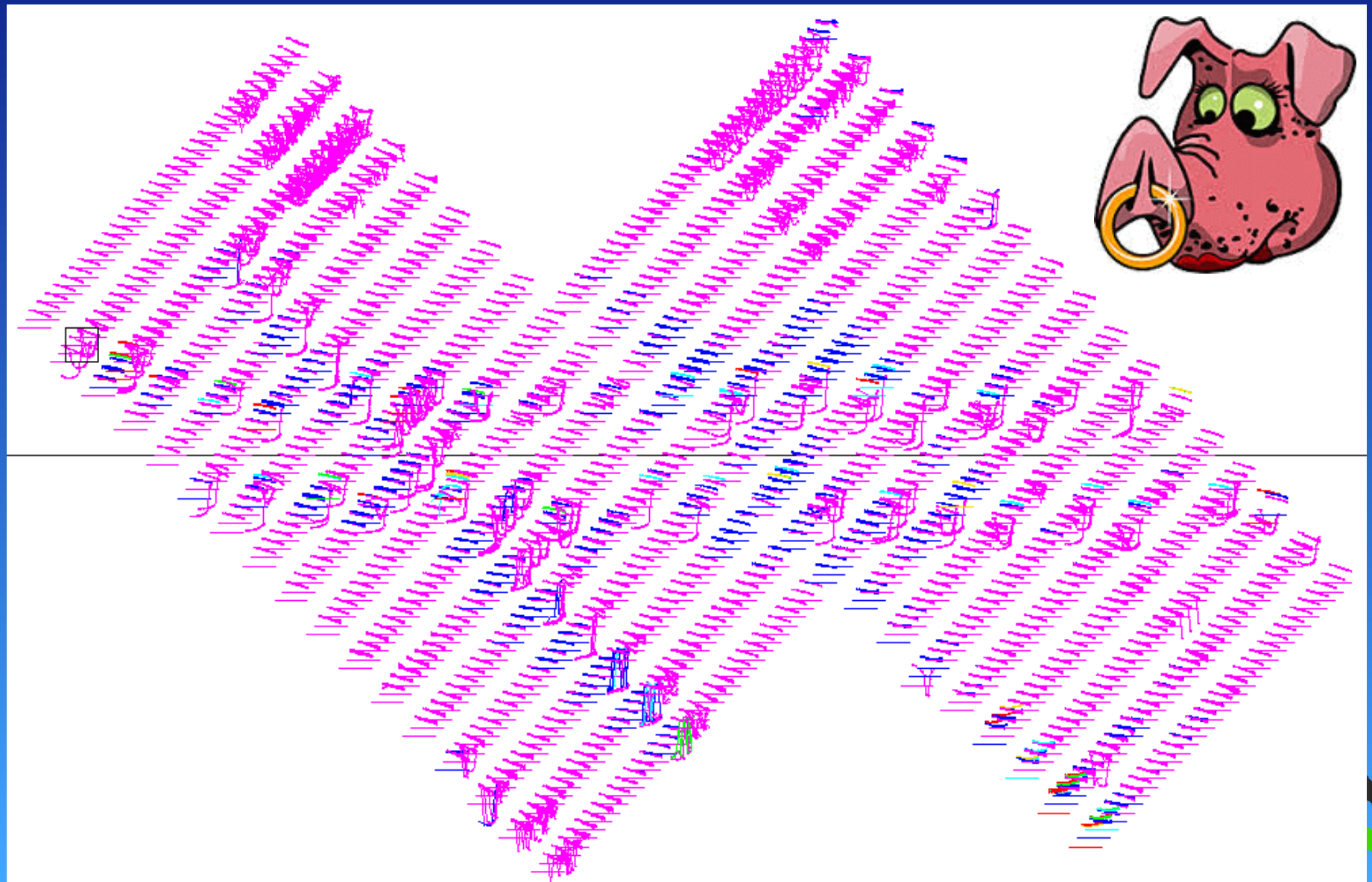
Myth 1 - Pole-Dipole has more signal!



Not always!

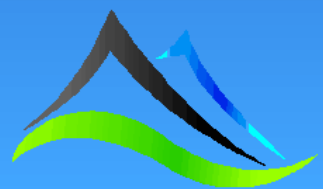
32 dipoles same C1 position for DOPD as DODD

Myth 2 - Because it is offset you can't interpret it in the field?



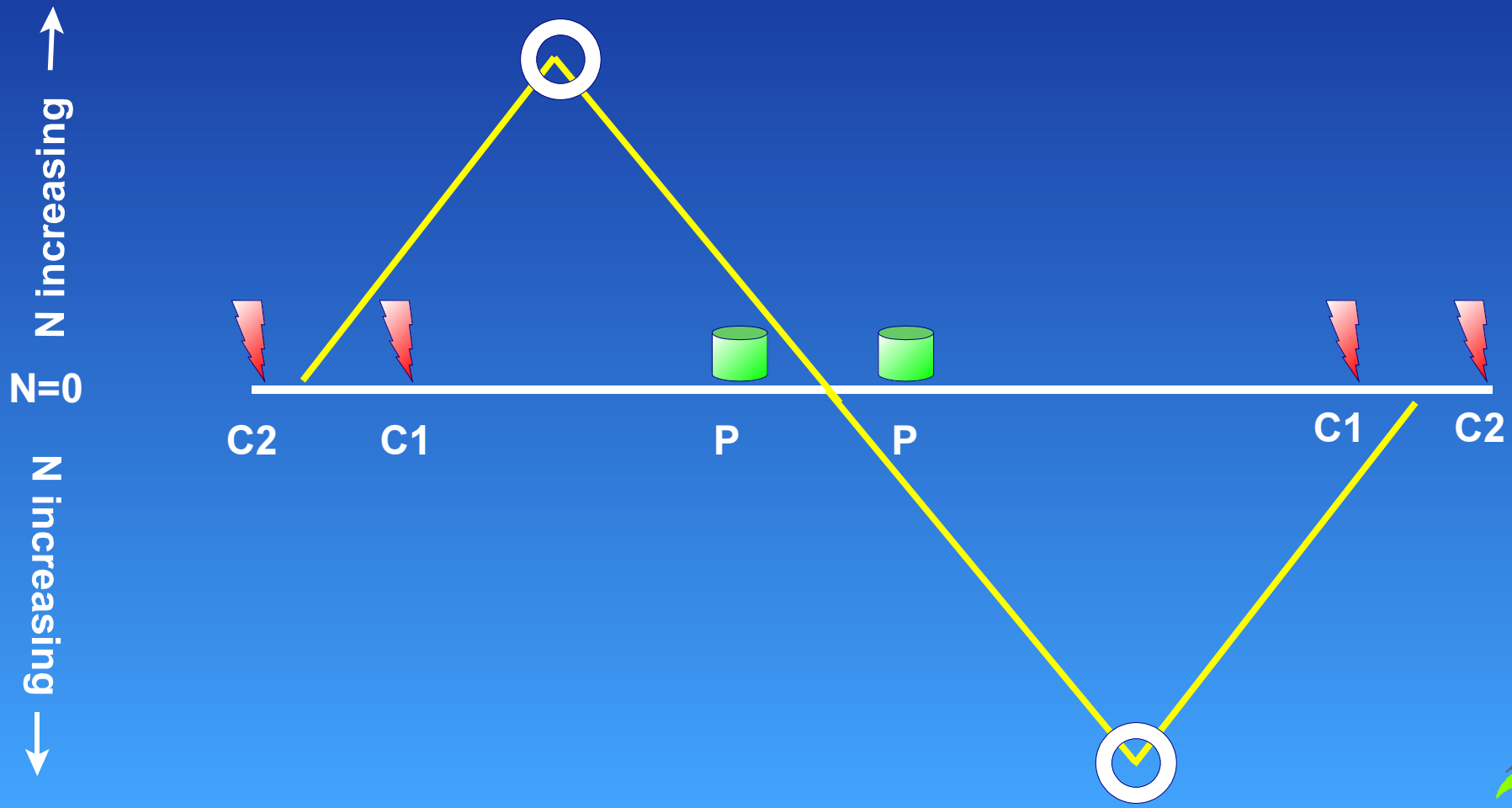
This is raw data.

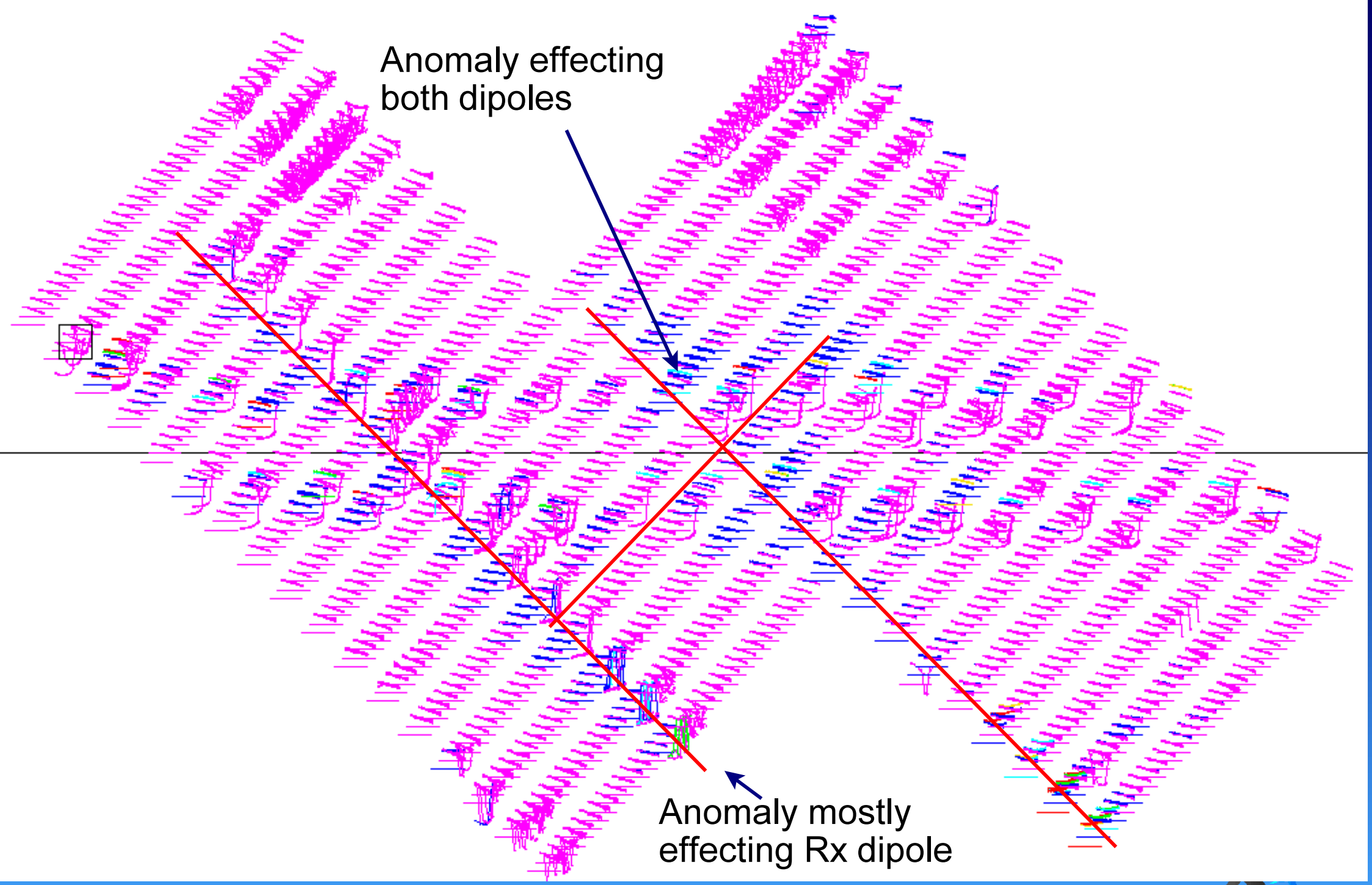
A spectral pseudosection (SPS) of an outer receiver line from a Quad Offset Dipole-Dipole array coloured by the amplitude of Window 9 = 820 to1082 mSec. Survey used multipoles and dual Tx spacing so we have 200m, 400m, 600m and 800m Rx dipoles and 400m and 1200m Tx dipoles recorded and plotted in one SPS. Tx-Rx offset 600m

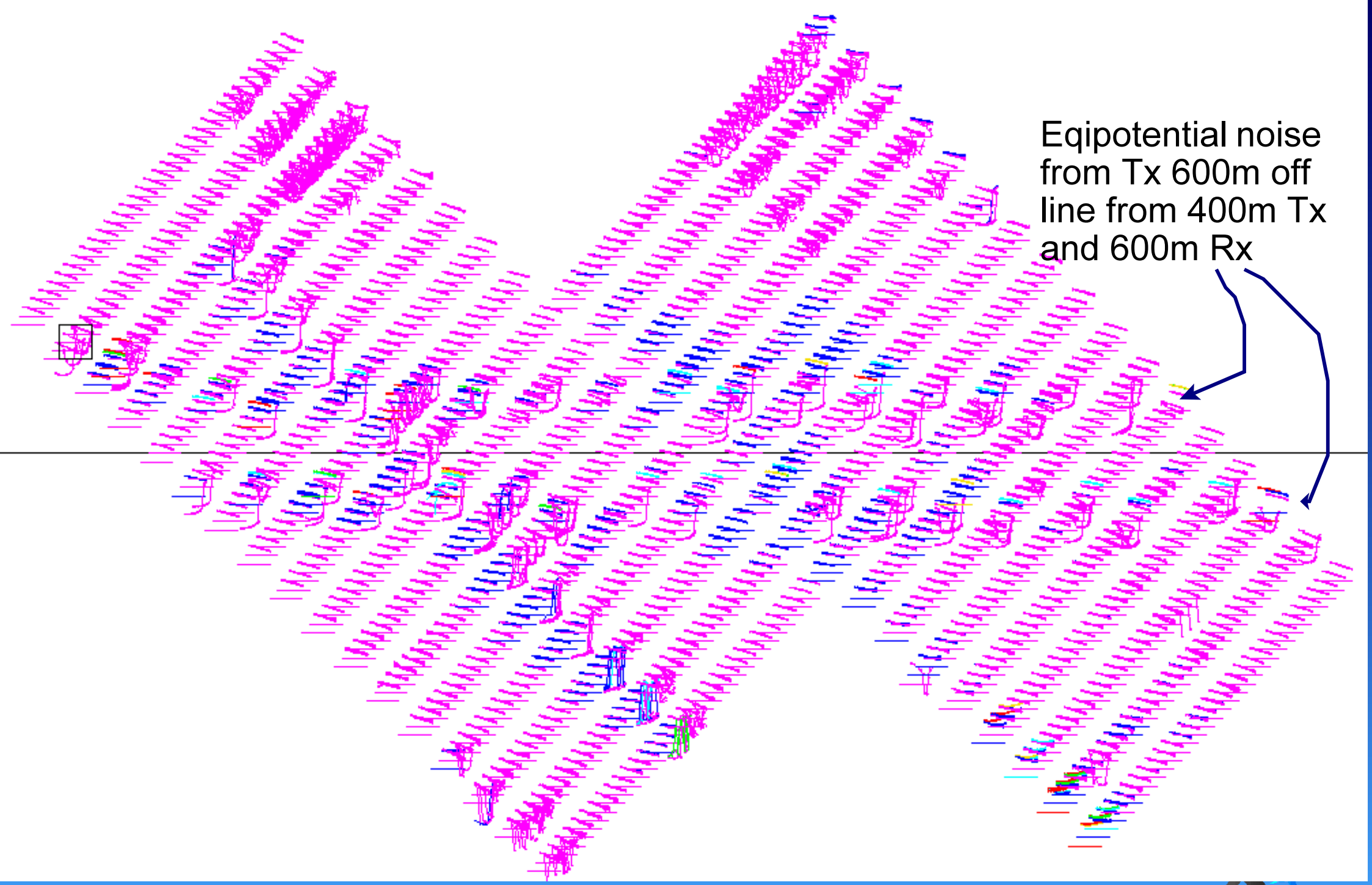


Plotting Convention

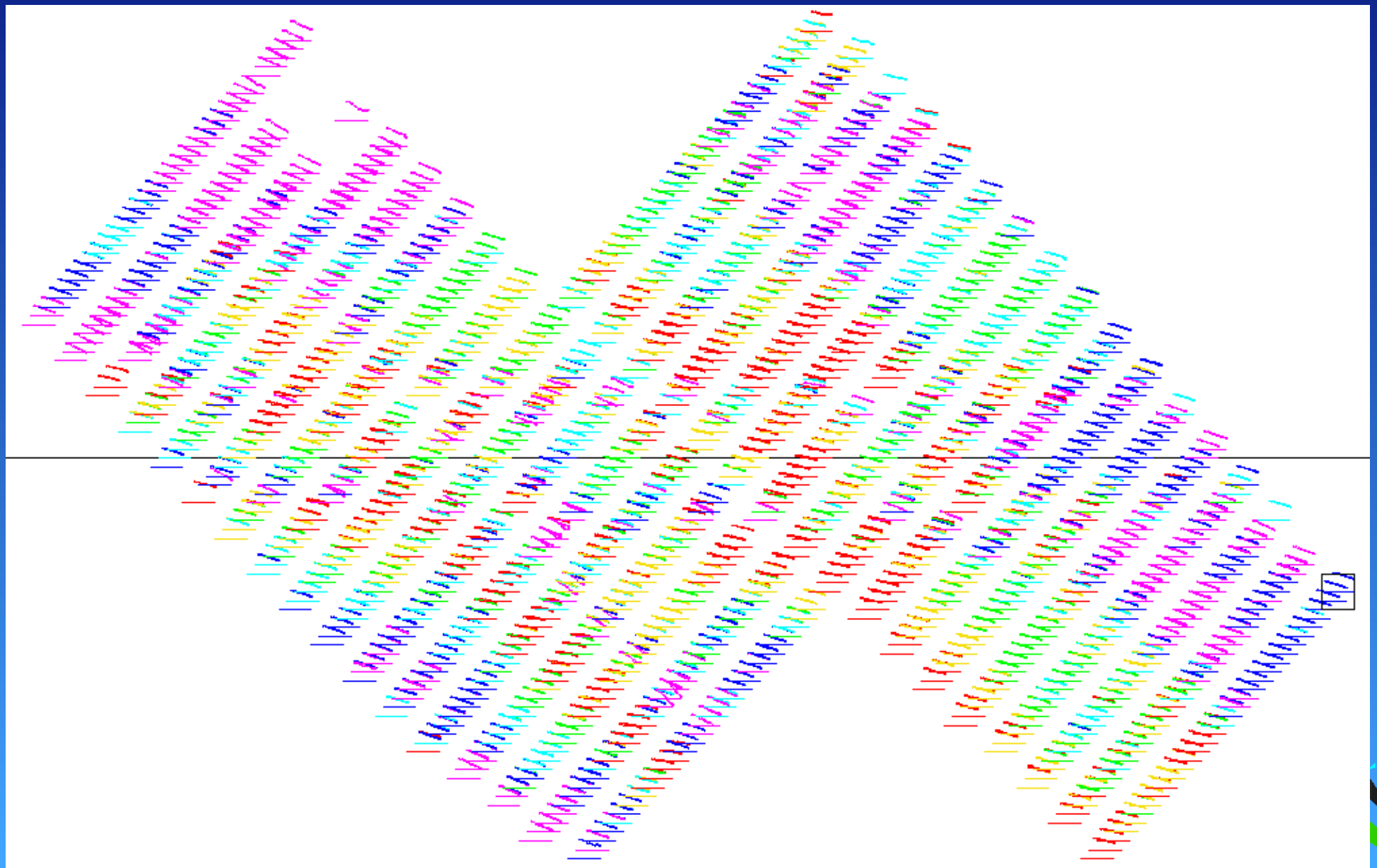
Because the lines are offset reciprocal station numbers do not mean the same plot point can be used.



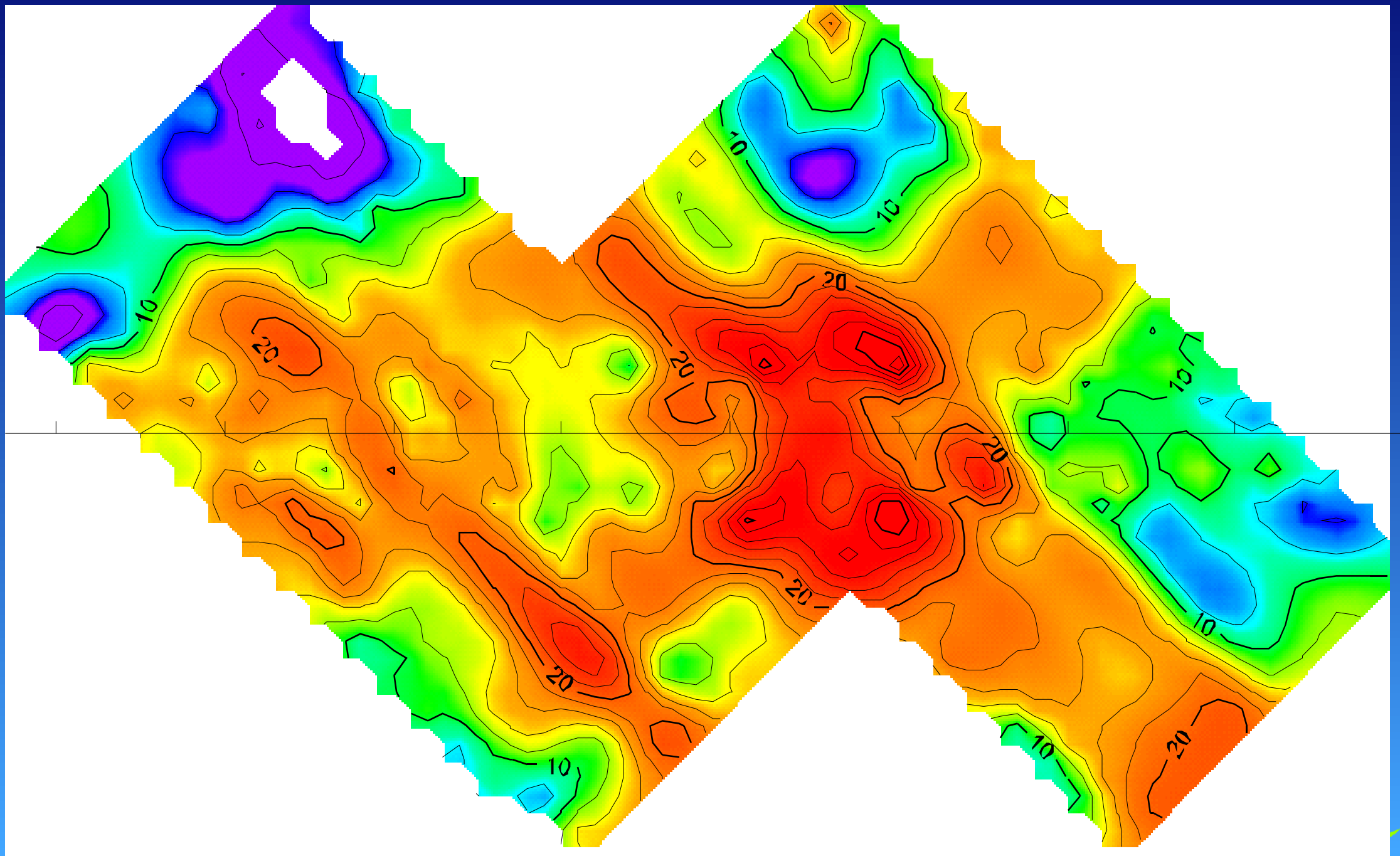

Anomaly effecting
both dipoles
Anomaly mostly
effecting Rx dipole


Eqipotential noise from Tx 600m off line from 400m Tx and 600m Rx

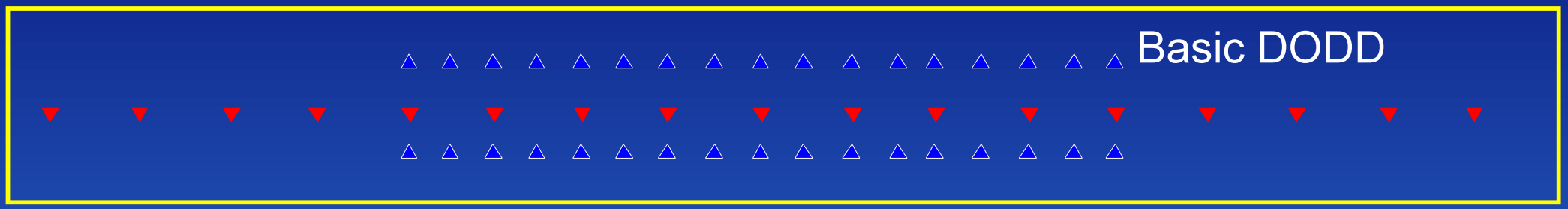
For the doubters - what it looks like cleaned up!

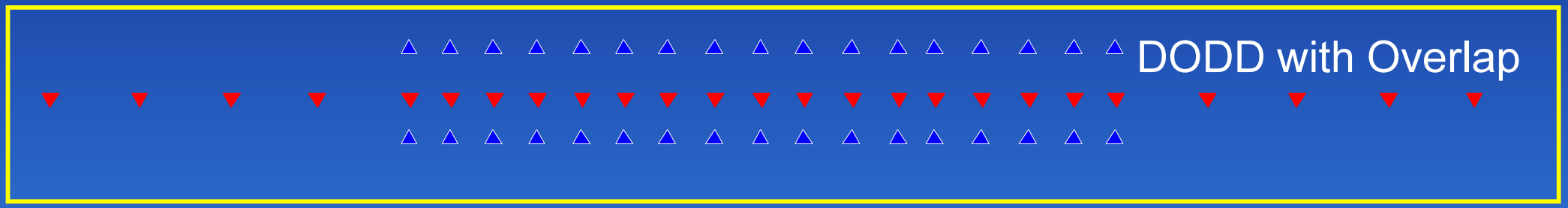


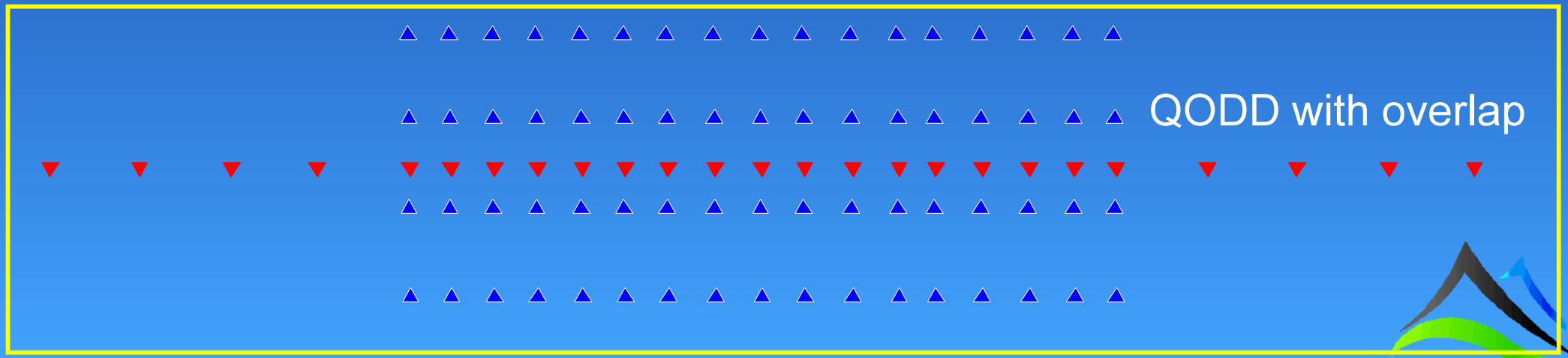
Or as an image



Variants

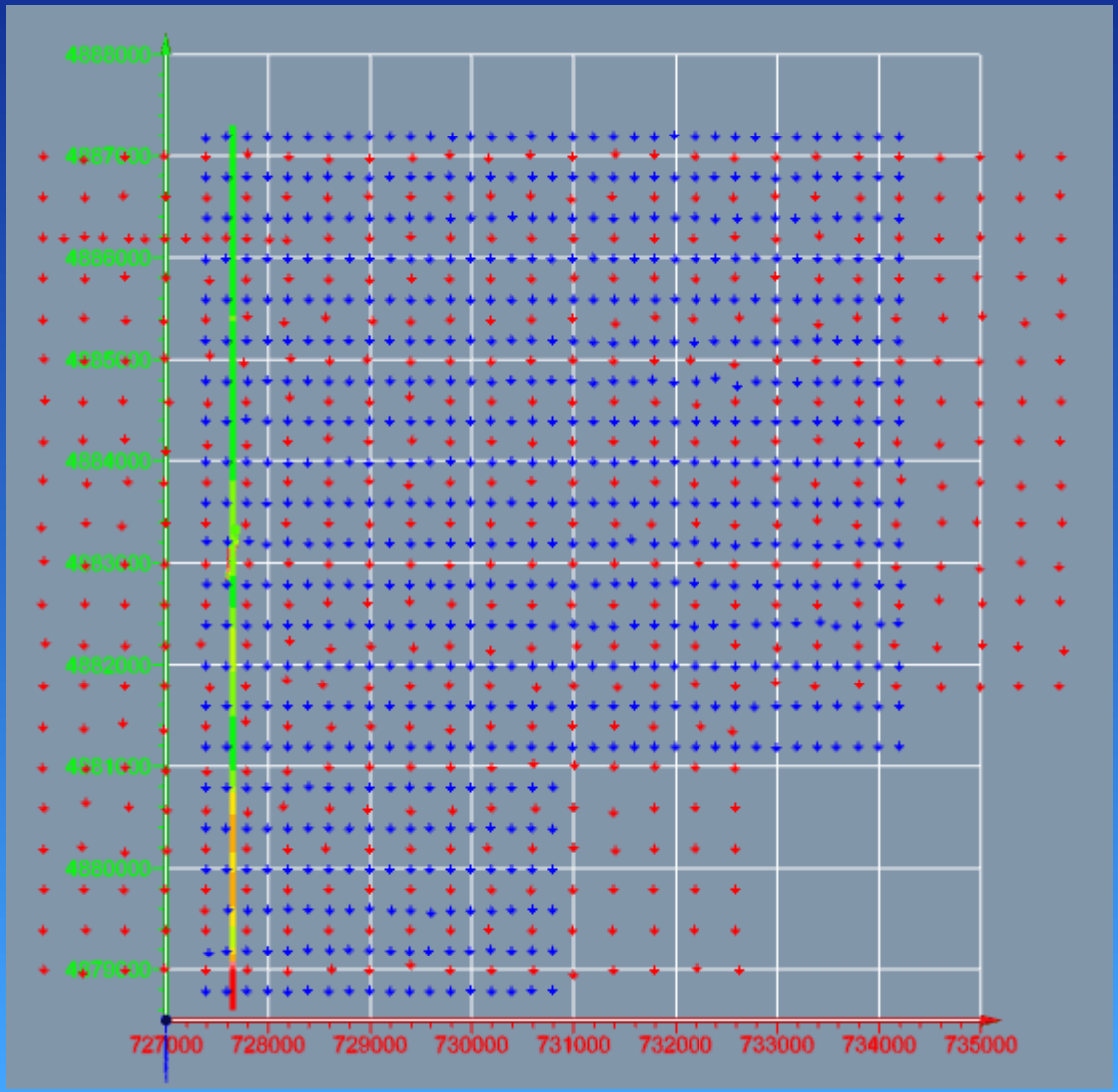






Productivity & Cost

Porphyry targeting in Mongolia - 50 km^2 area



Quad Offset dipole dipole array

200m Rx electrodes giving 200m, 400m, 600m and 800m Rx dipoles

400m Tx electrodes using 400m and 1200m dipoles

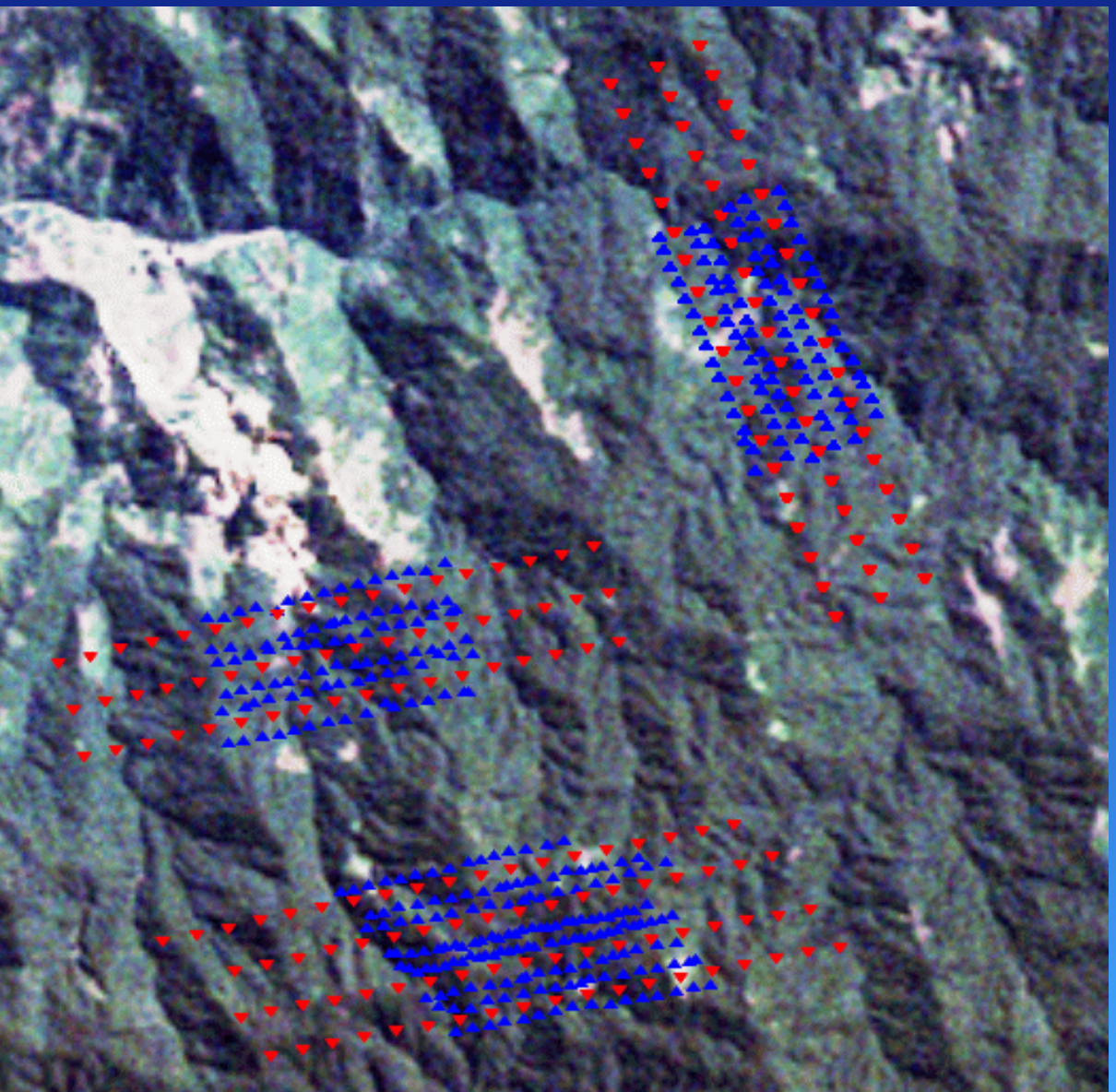
50 kVA transmitter injecting an average of 21A for the survey (6.6 to 66A)

1163 electrodes, 750,000 readings distilling to 230,000 readings after editing bad points and averaging repeats.

6 weeks to acquire - $600k all up including mob/demob of 2 tonnes of equipment from Australia and interpretation

Productivity and Cost

PNG Epithermal exploration. > 800m elevation difference



10 100m QODD arrays in 3 prospect areas.
3 separate landowner groups each requiring that their people be used as labour = 3 training campaigns
No roads - Full Helicopter support
All lines had to be surveyed and cut.
Crew of ~30 local labourers for each prospect, 2 local geos, 2 expat IP crew, 1 expat Birdog for first 2 weeks
2 tonnes of equipment freighted from Australia
4 weeks to acquire including line cutting delays, training and waiting on choppers.

$K1.3M ~=$600k

PNG reqiuirements