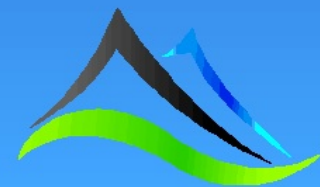


Processing IP data

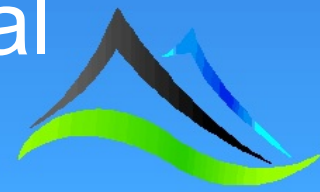
Kim Frankcombe
ExploreGeo

Workshop - ASEG Conference
Adelaide 2016
Addendum - post workshop



Inversion mesh size

During the workshop there was some discussion about my choice of cell size in the mesh as I had used a cell size of one electrode and line spacing and half a dipole spacing (50 x 200 x 50m) while others had used 50x50x20-25m. In order to determine the effect of this choice on the model I re-ran the same data using the same inversion settings but with different mesh sizes. The results are presented here as RL slices and a section through the central drill hole

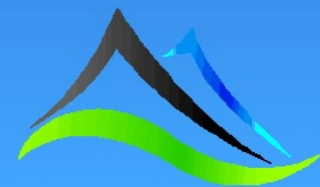


Plot properties

All views use the same colour LUT and contour interval. The resistivity contours are spaced logarithmically at 10 per decade while the chargeability contours are spaced linearly at an interval of 1 mV/V

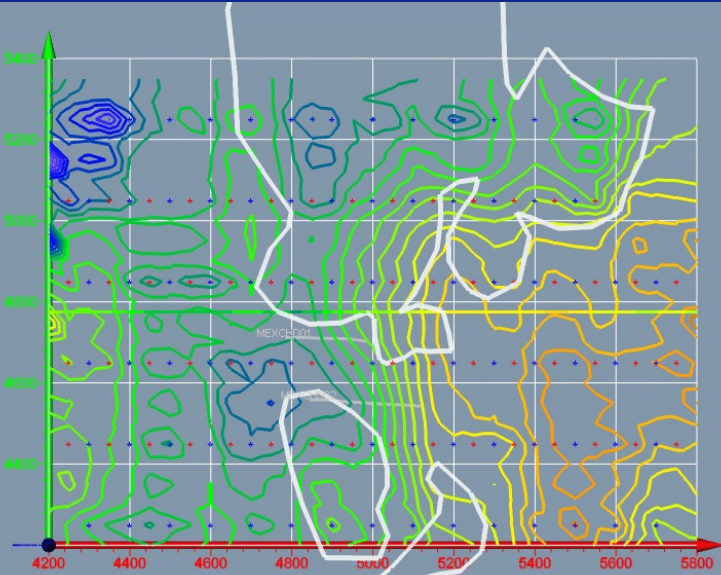
The RL slices start at RL 500m which is between 50 and 75m below surface

Planned pit outlines from a 2012 GCR presentation are overlain on the images for reference

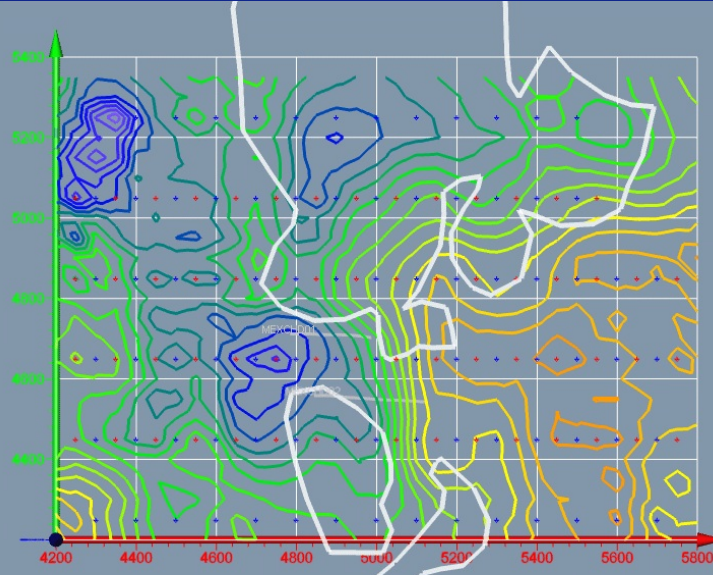


Resistivity RL 500

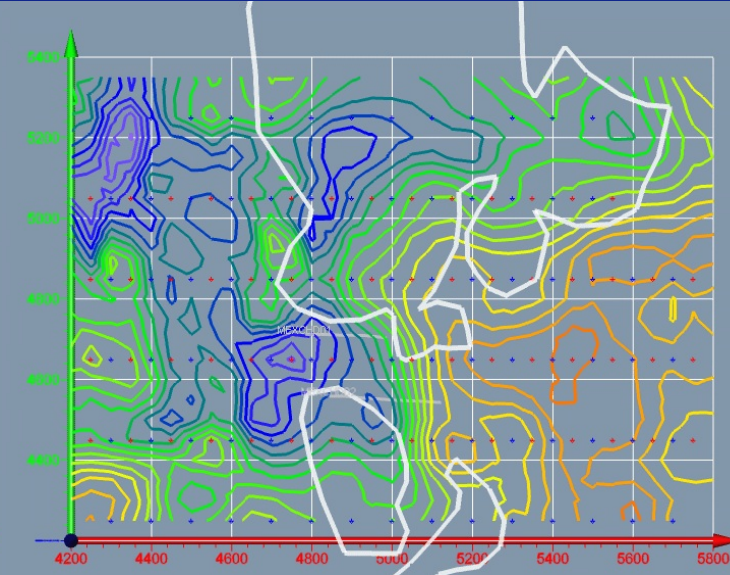
50 x 200 x 50m



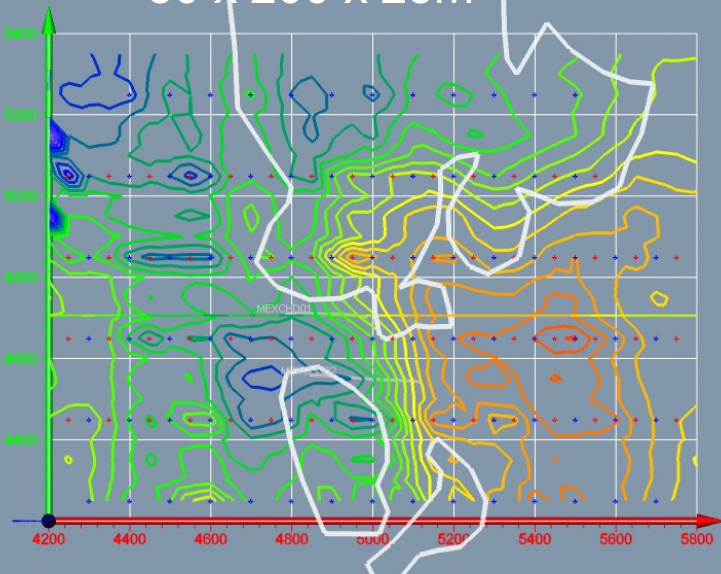
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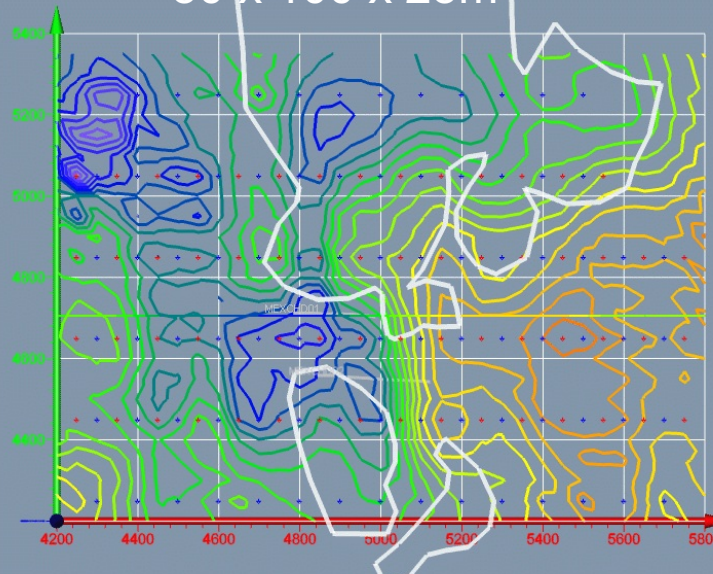
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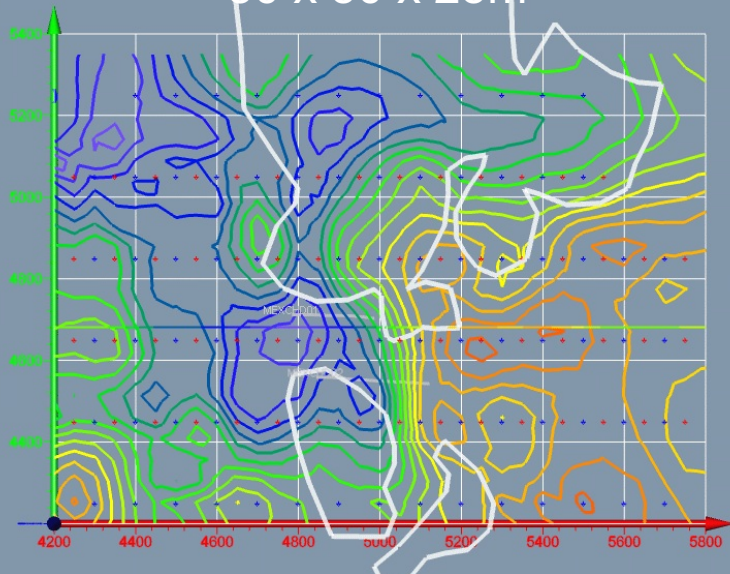
50 x 200 x 25m



50 x 100 x 25m

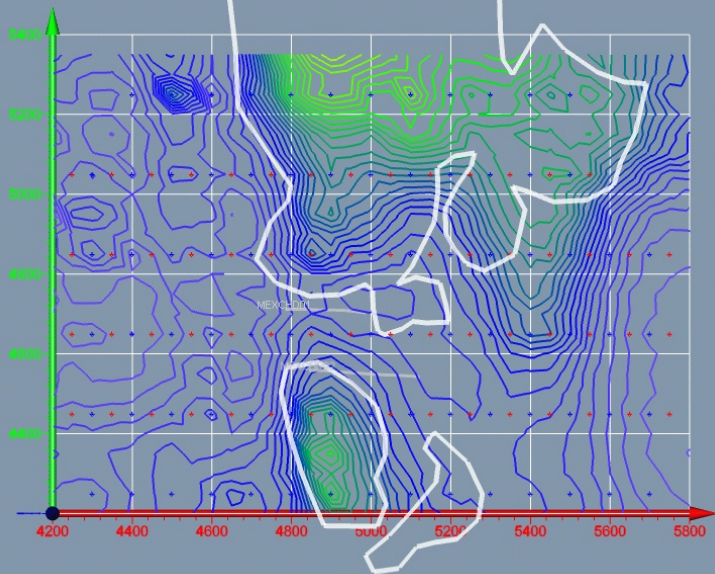


50 x 50 x 25m

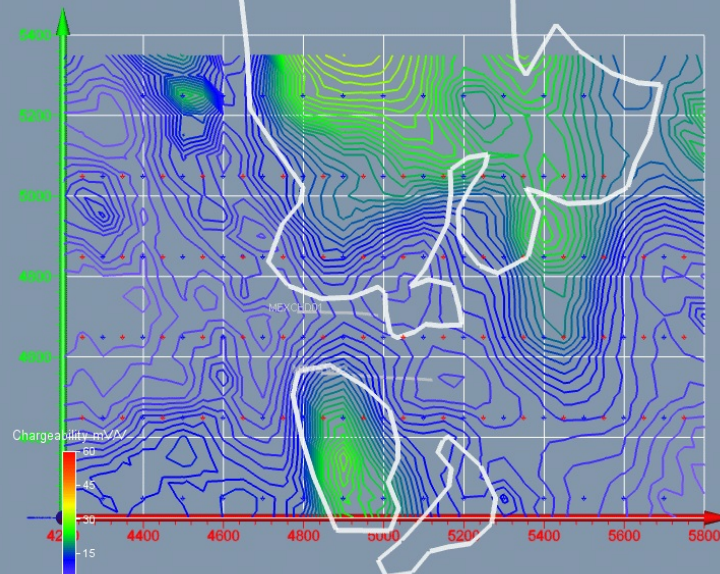


Chargeability RL 500

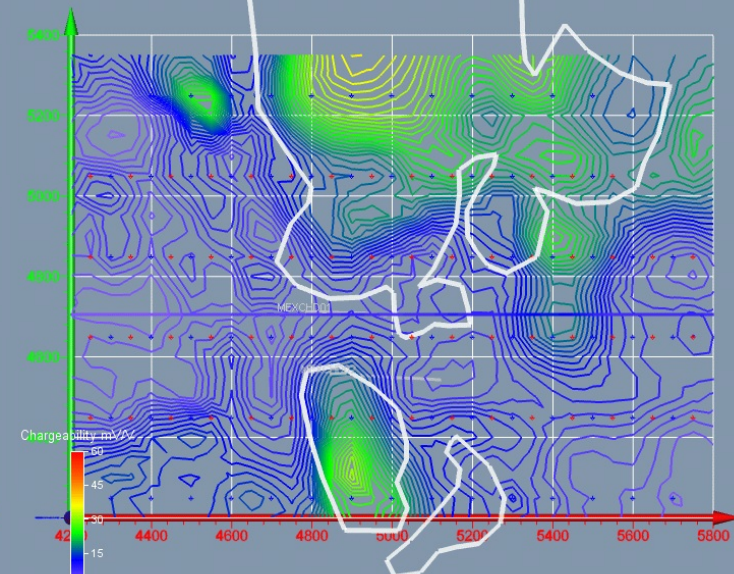
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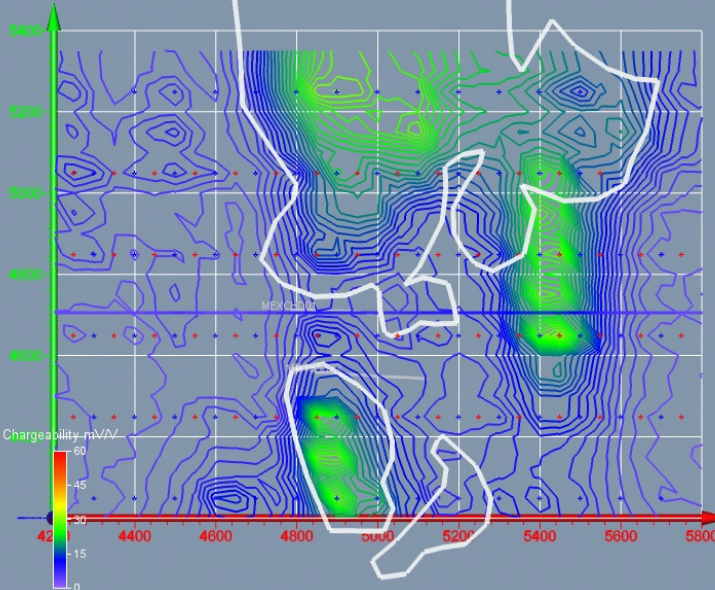
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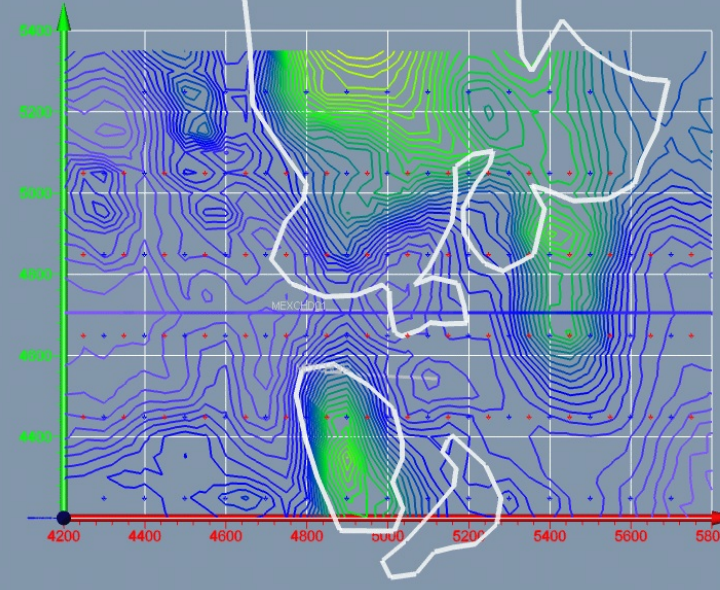
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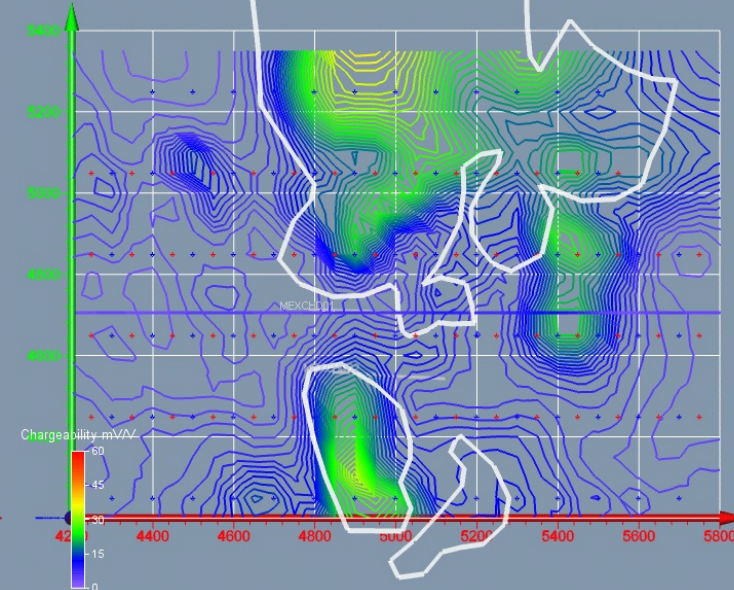
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50 x 100 x 25m

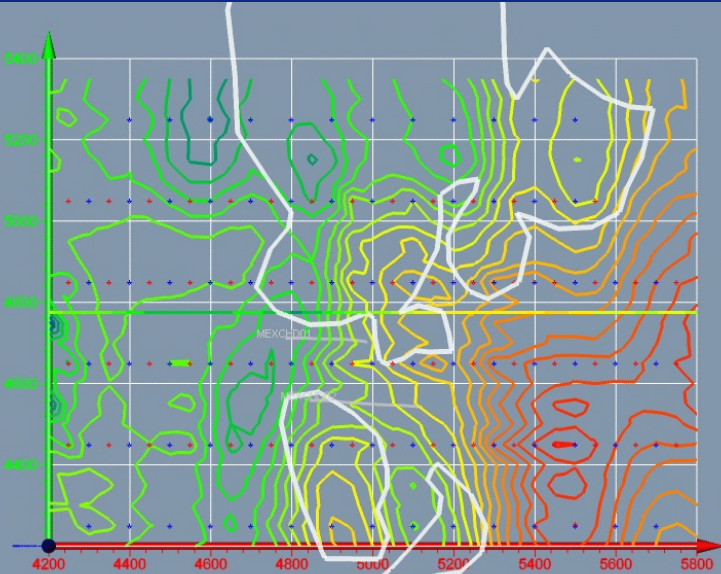


50 x 50 x 25m

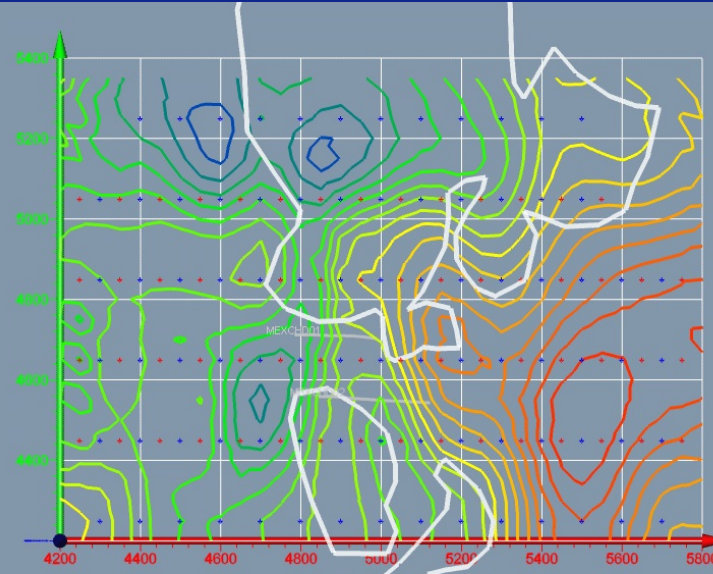


Resistivity RL 400

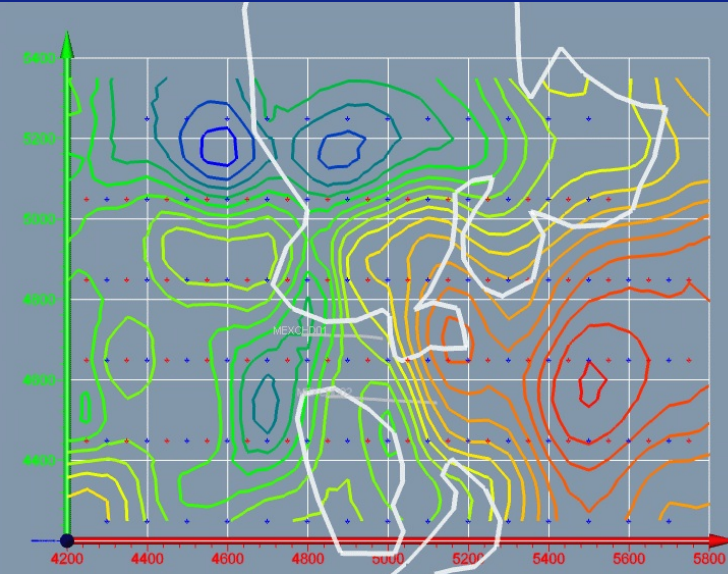
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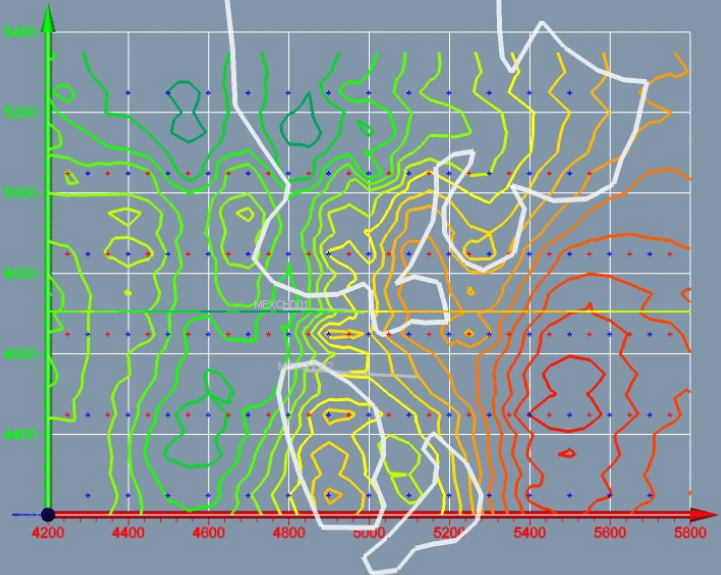
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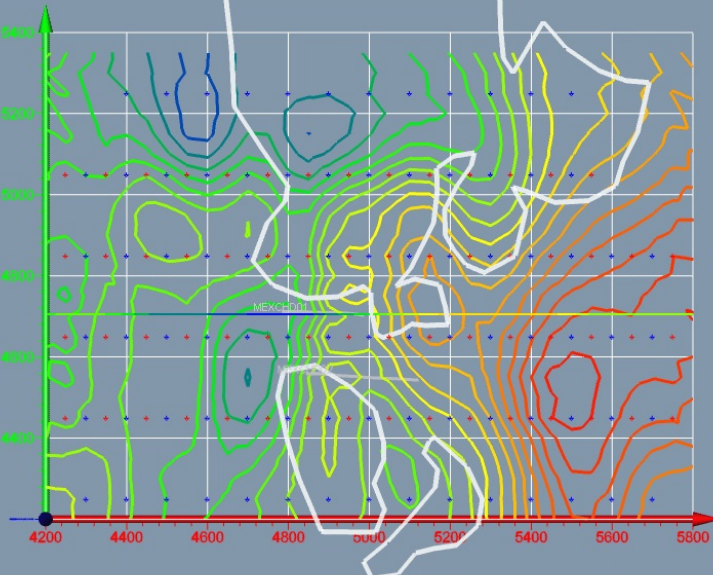
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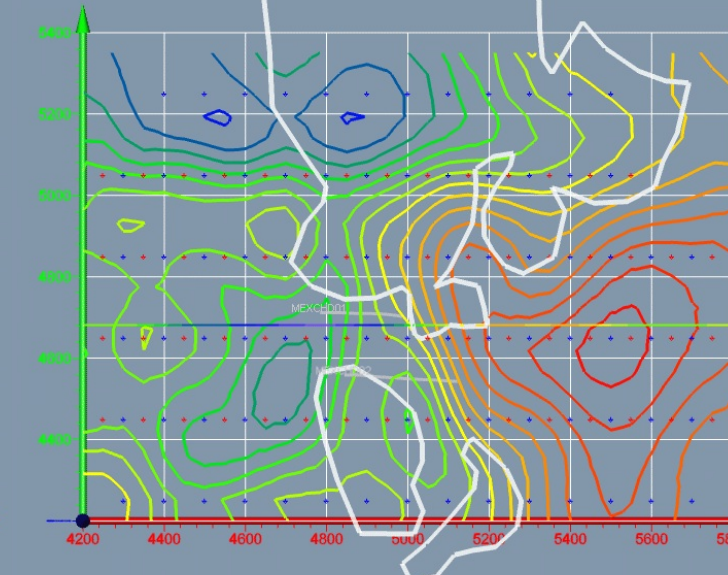
50 x 200 x 25m



50 x 100 x 25m



50 x 50 x 25m

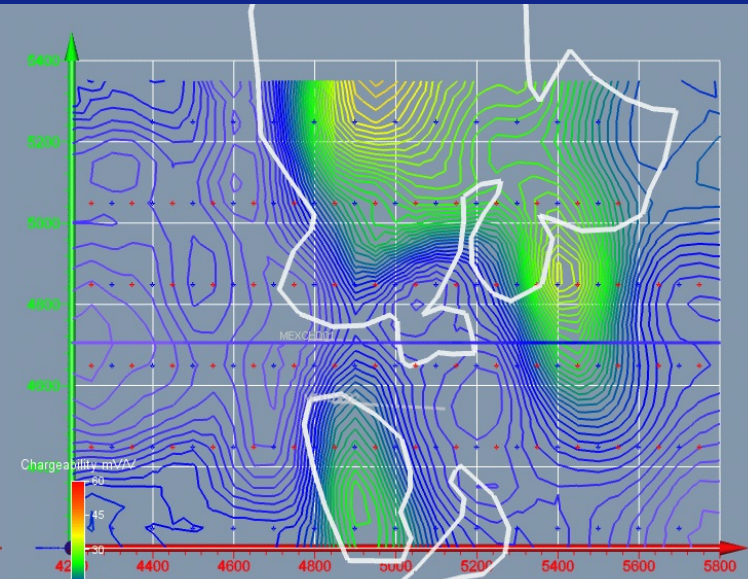
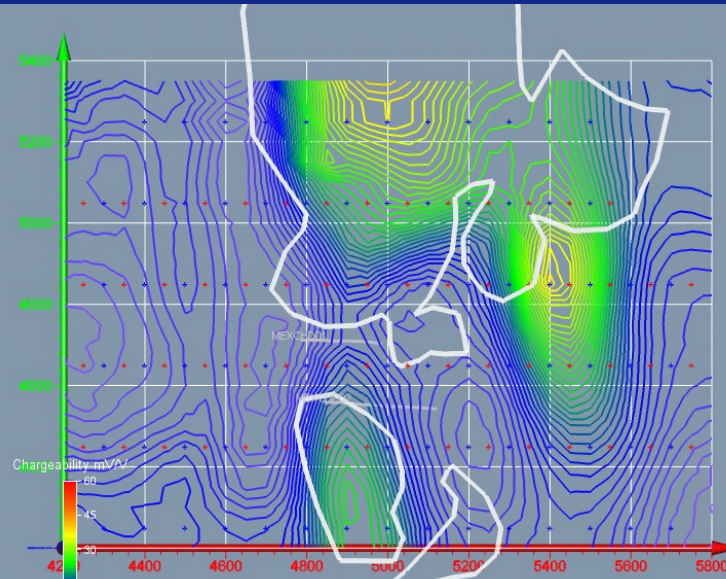
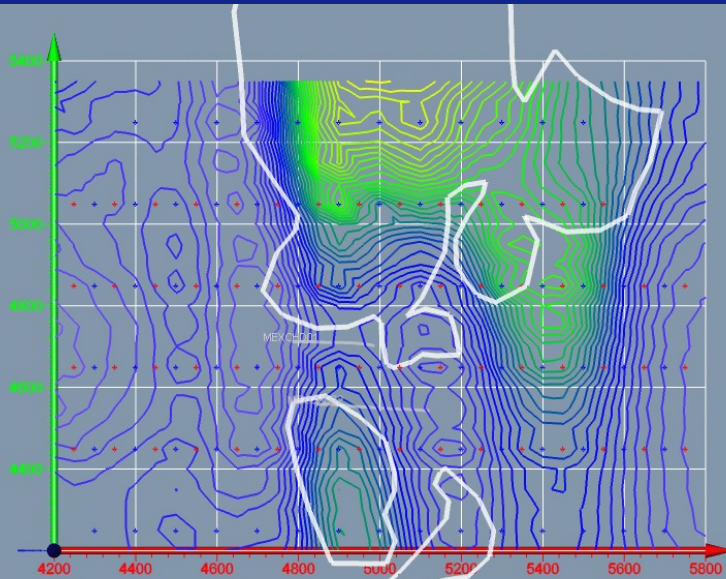


Chargeability RL 400

50 x 200 x 50m

50 x 100 x 50m

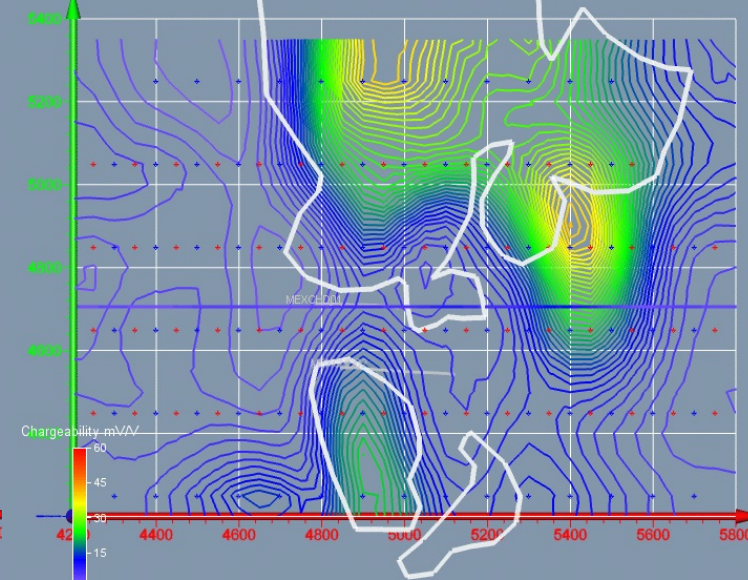
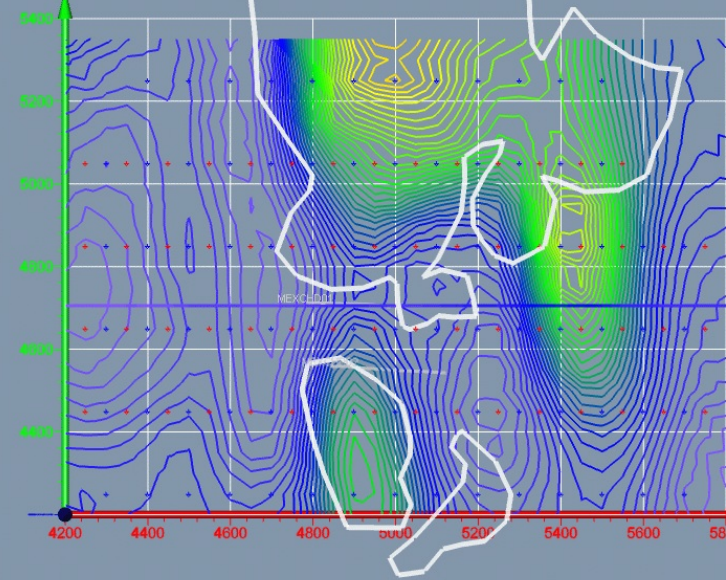
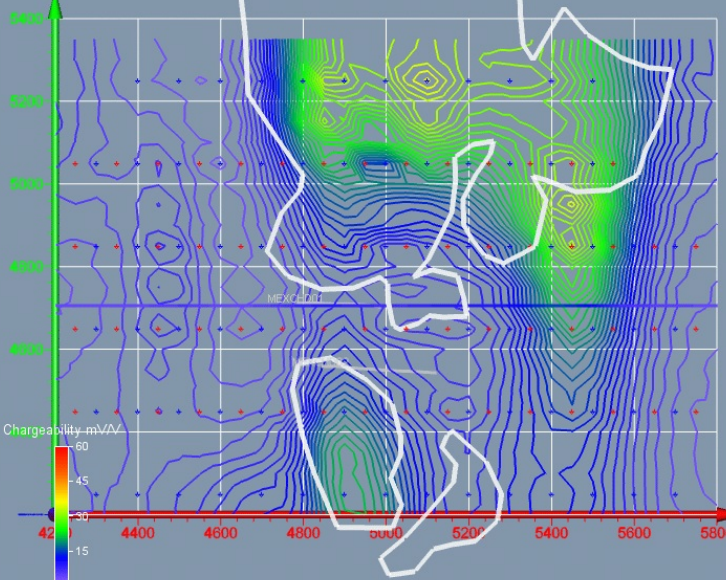
50 x 50 x 50m



50 x 200 x 25m

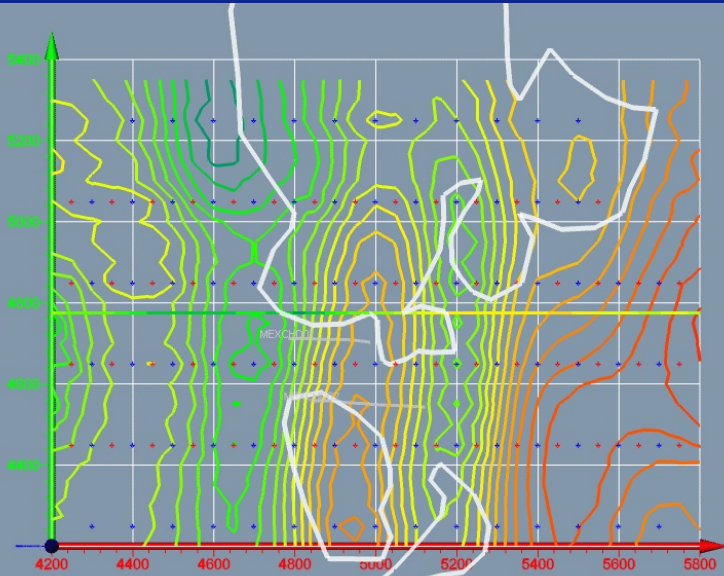
50 x 100 x 25m

50 x 50 x 25m

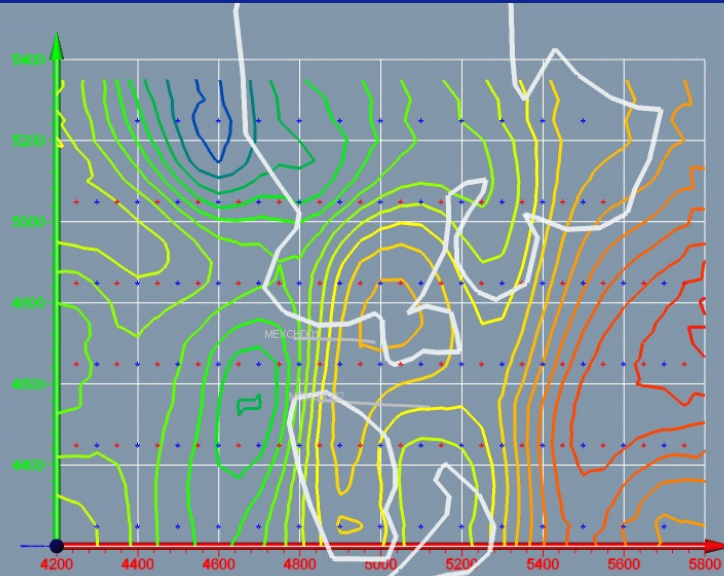


Resistivity RL 300

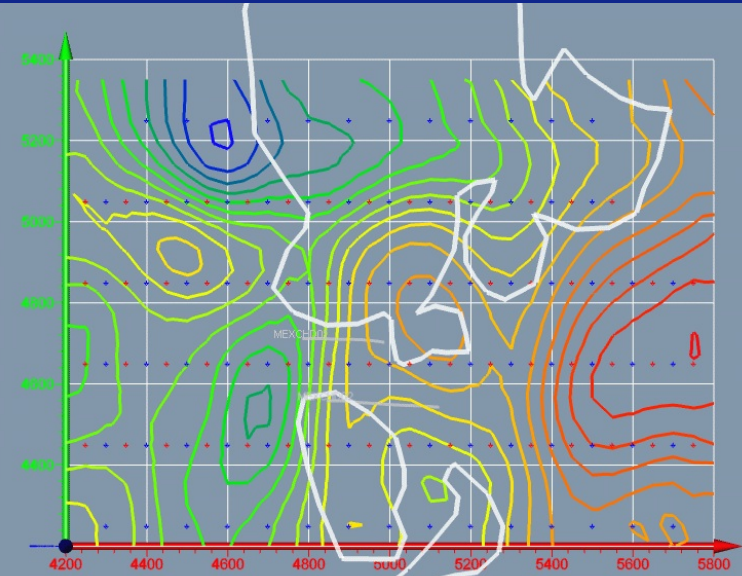
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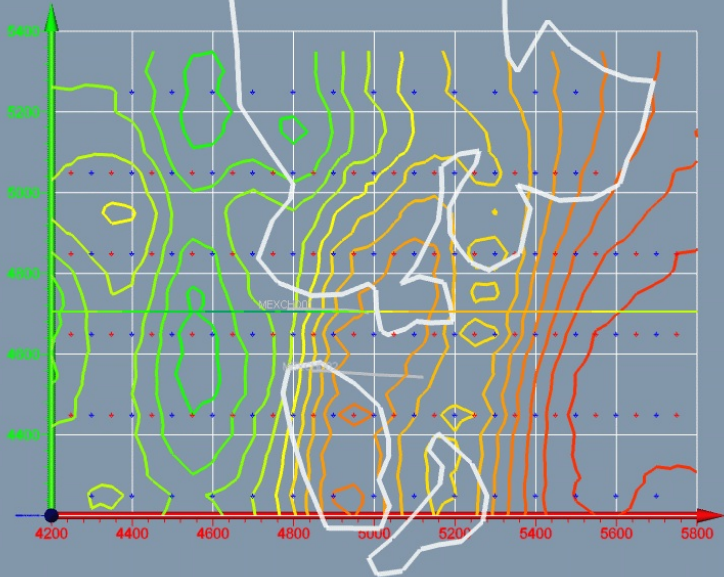
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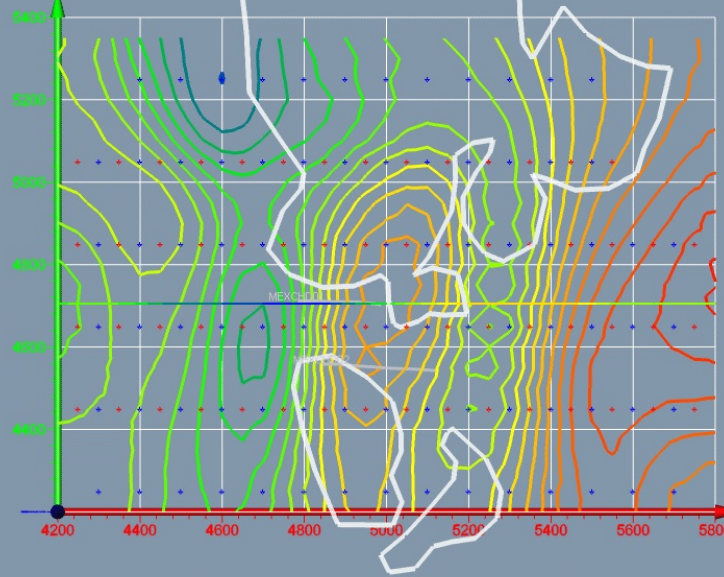
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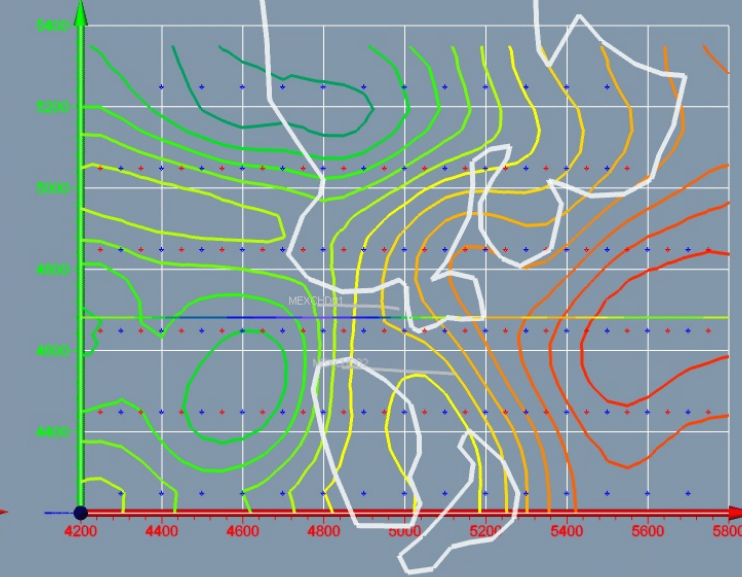
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50 x 100 x 25m



50 x 50 x 25m

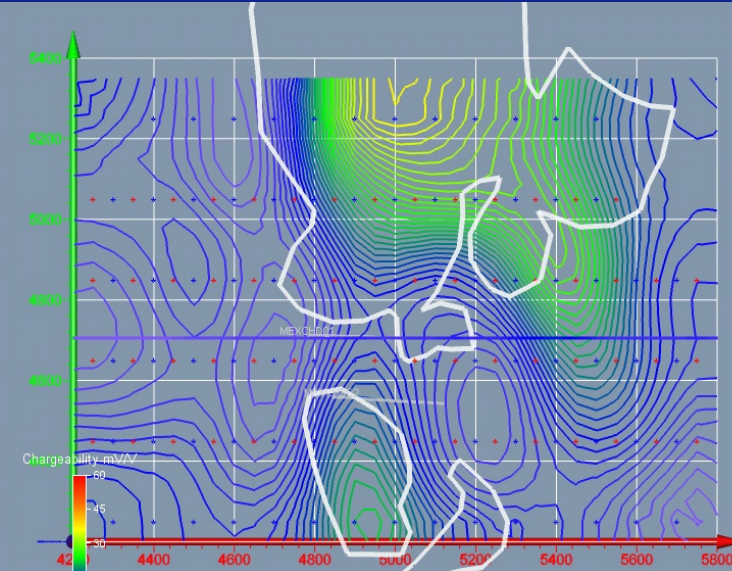
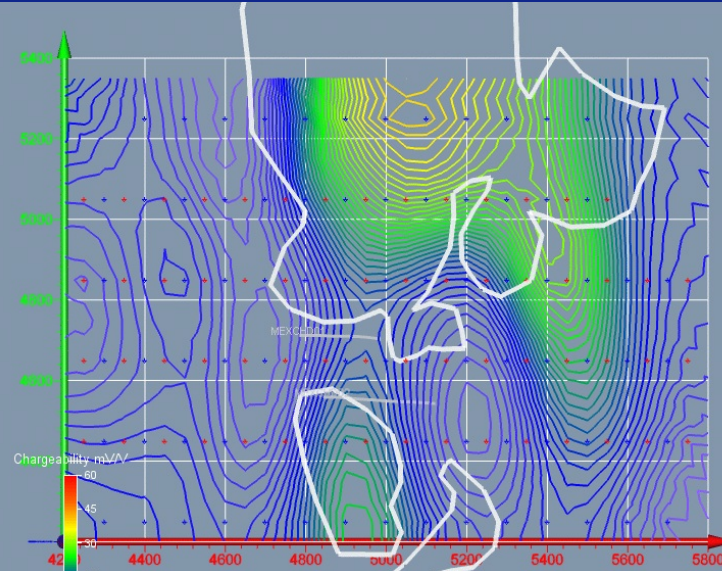
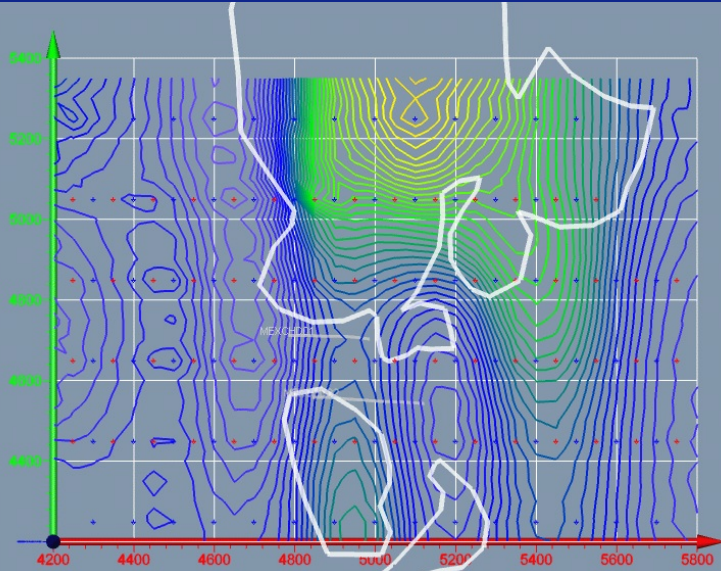


Chargeability RL 300

50 x 200 x 50m

50 x 100 x 50m

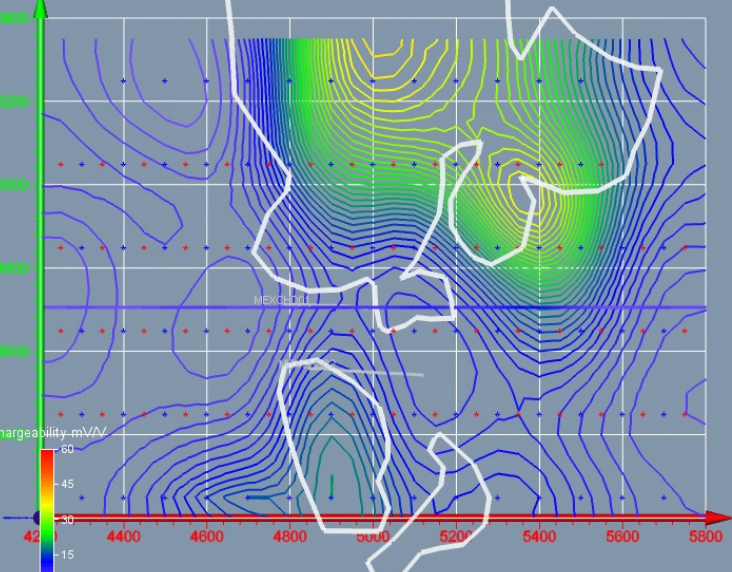
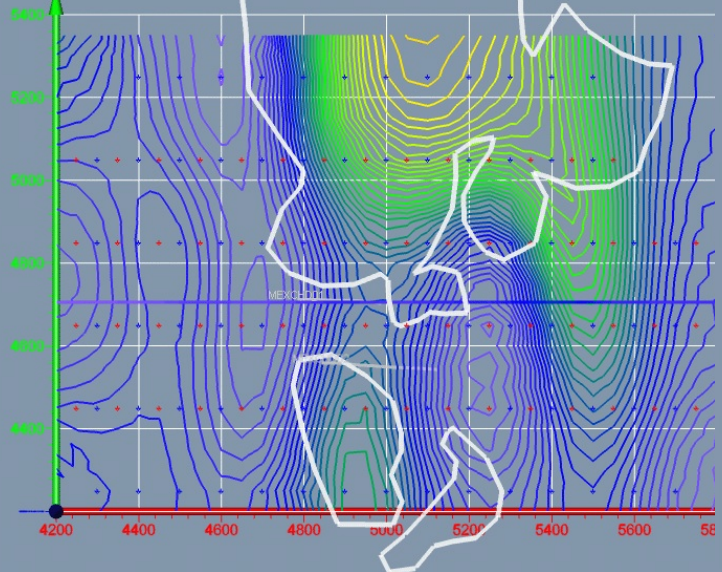
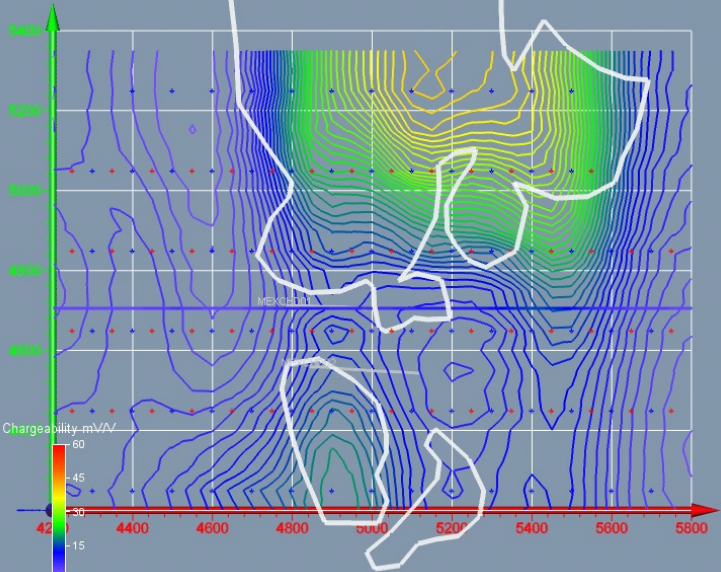
50 x 50 x 50m



50 x 200 x 25m

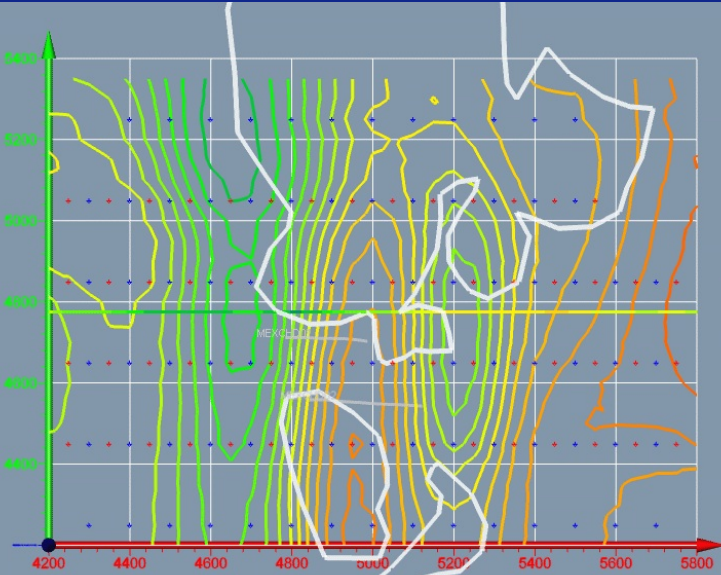
50 x 100 x 25m

50 x 50 x 25m

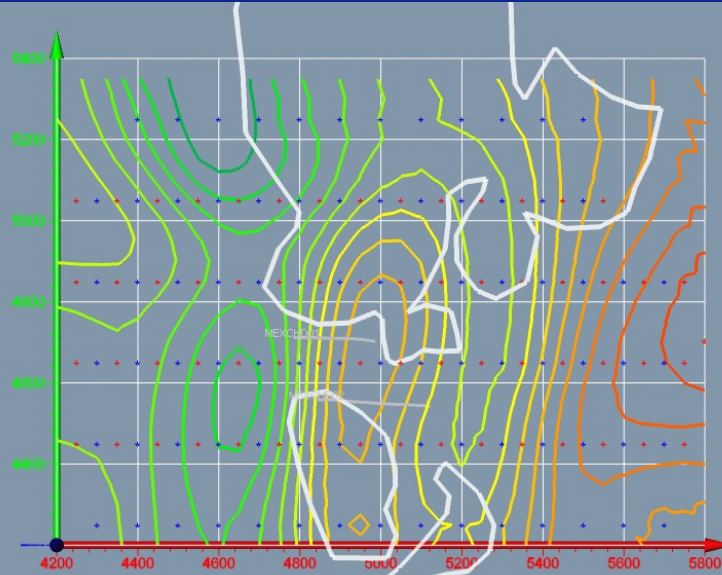


Resistivity RL 200

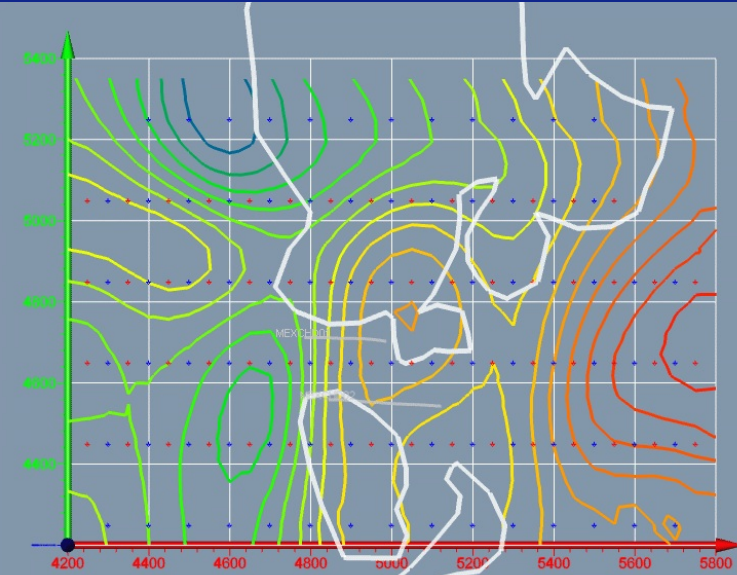
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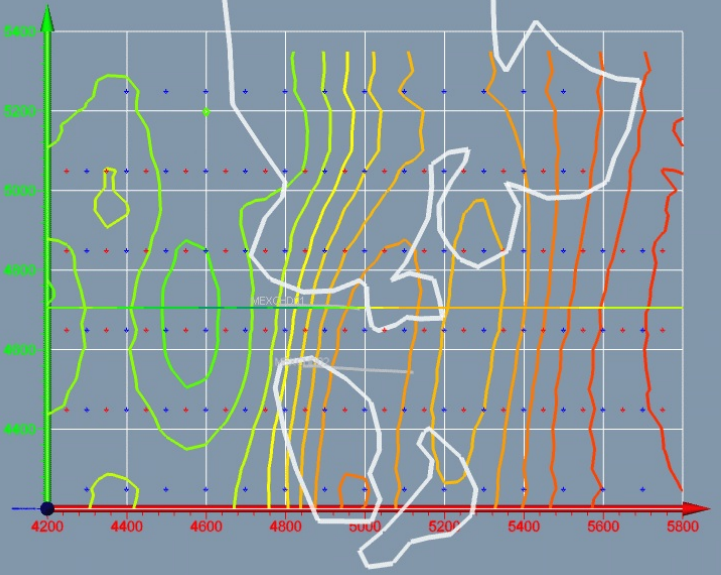
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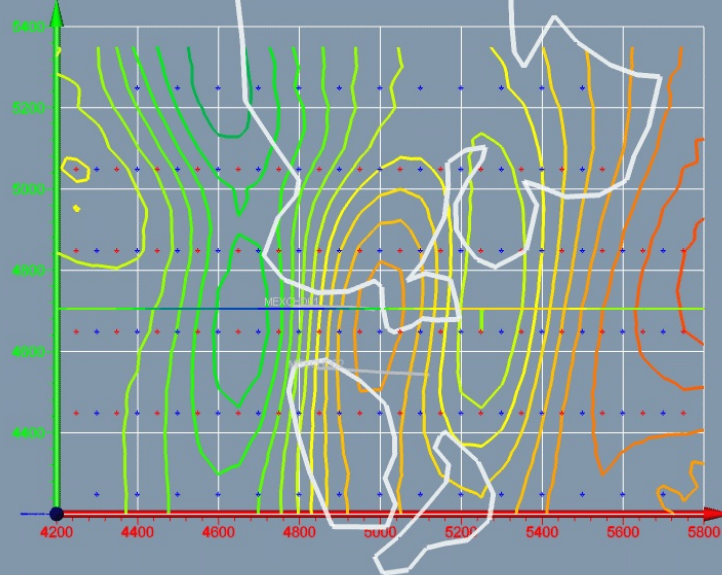
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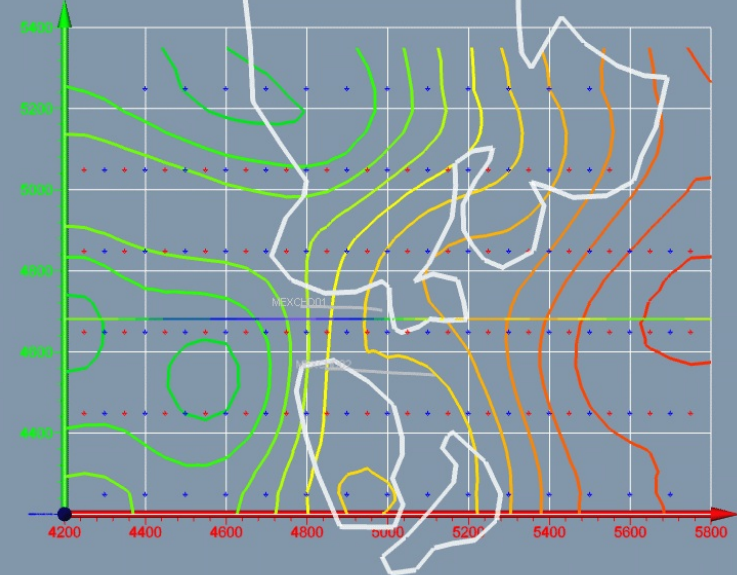
50 x 200 x 25m



50 x 100 x 25m



50 x 50 x 25m

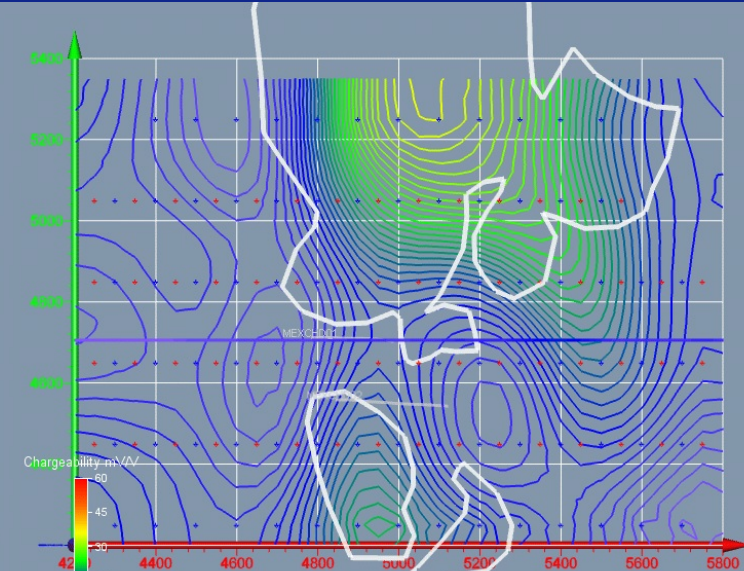
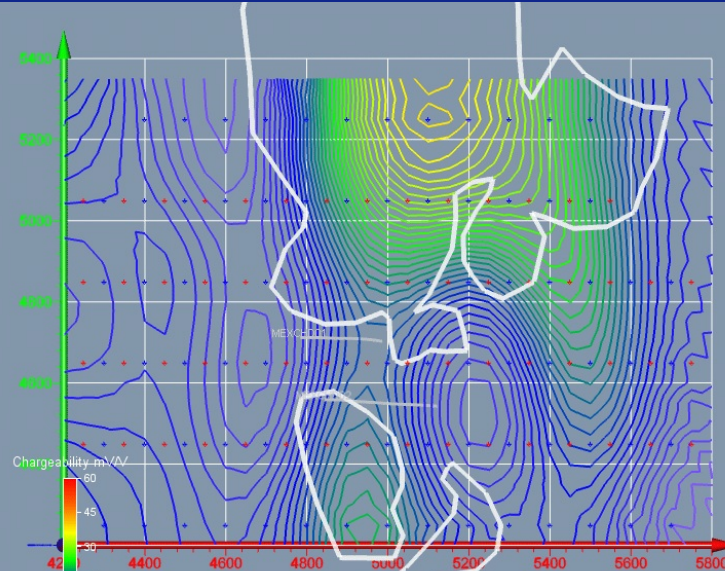
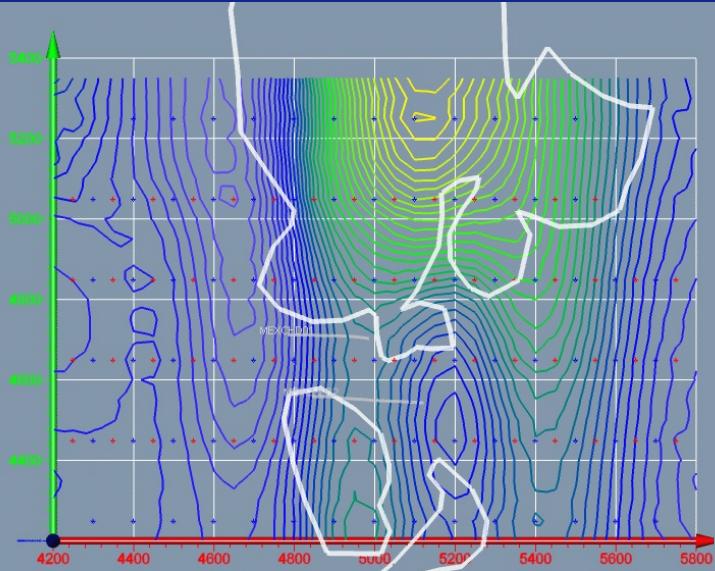


Chargeability RL 200

50 x 200 x 50m

50 x 100 x 50m

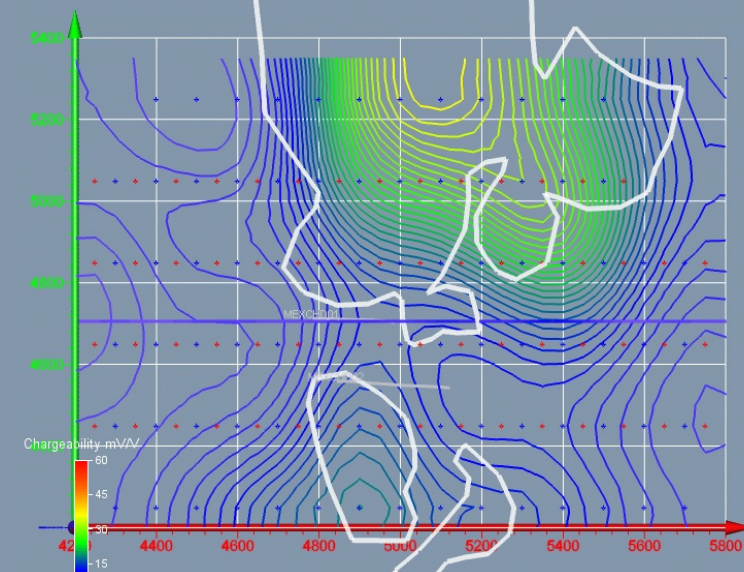
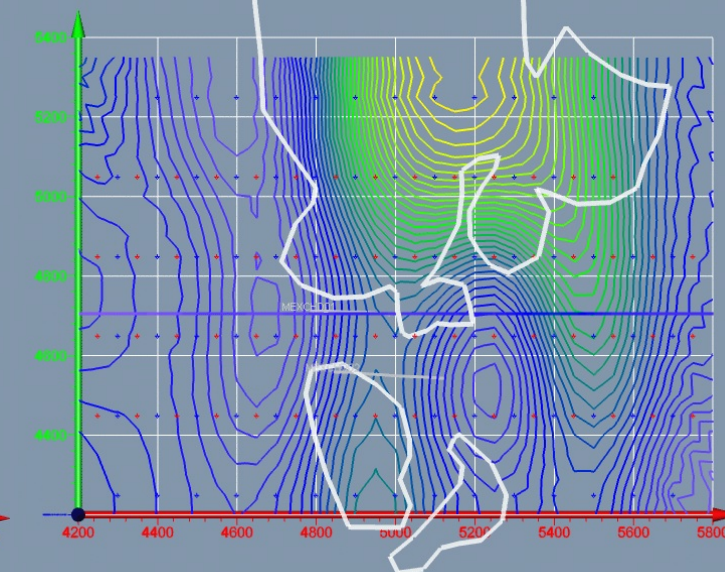
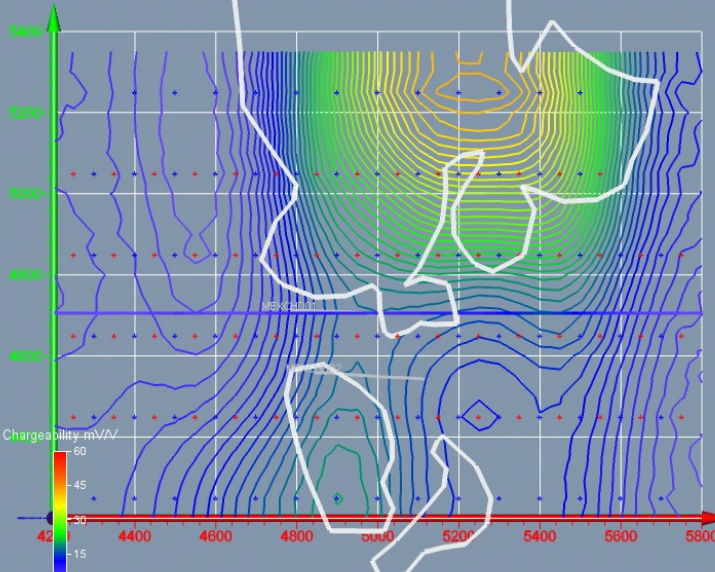
50 x 50 x 50m



50 x 200 x 25m

50 x 100 x 25m

50 x 50 x 25m

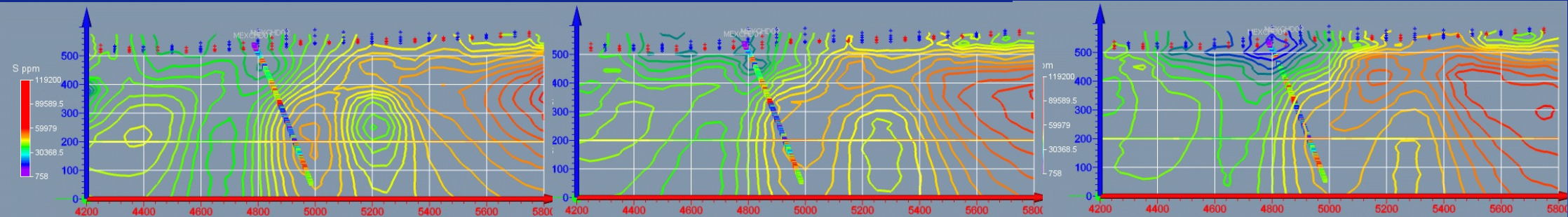


Resistivity Section

50 x 200 x 50m

50 x 100 x 50m

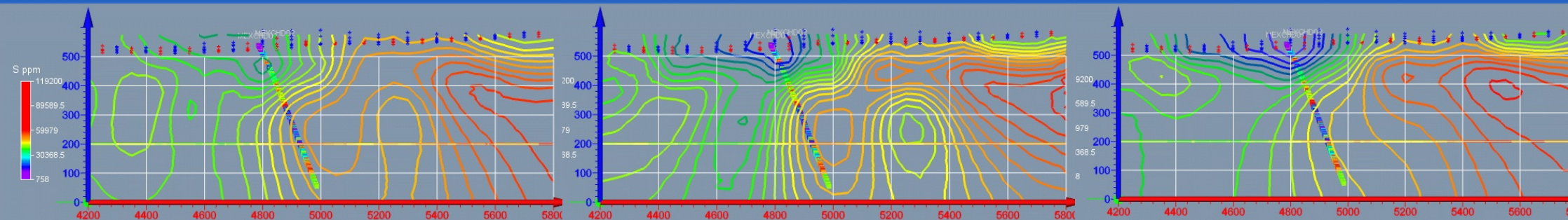
50 x 50 x 50m



50 x 200 x 25m

50 x 100 x 25m

50 x 50 x 25m



Drill trace coloured by Sulphur as a proxy for chargeability

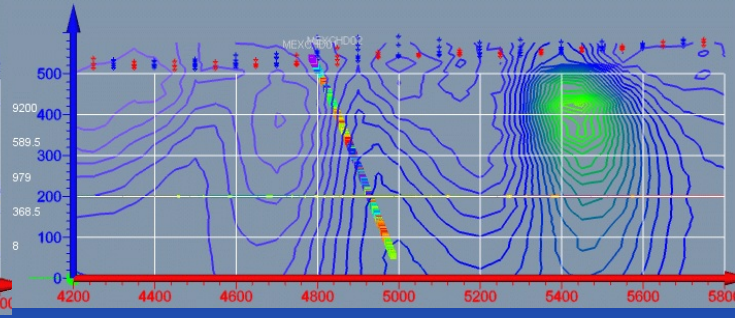
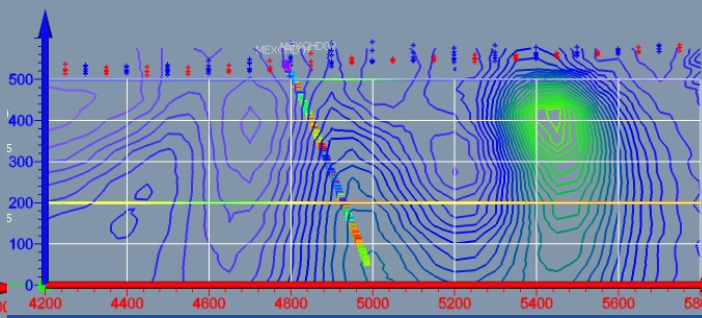
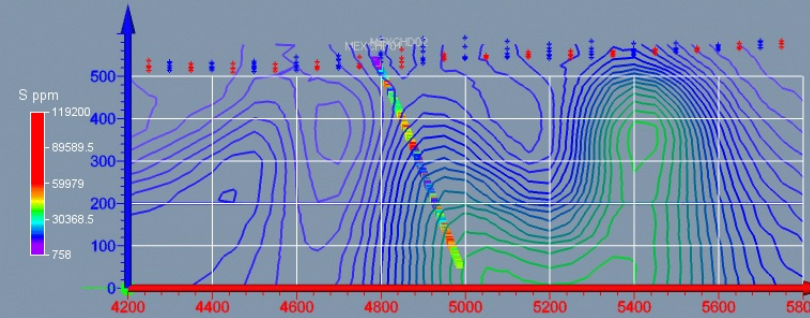


Chargeability Section

50 x 200 x 50m

50 x 100 x 50m

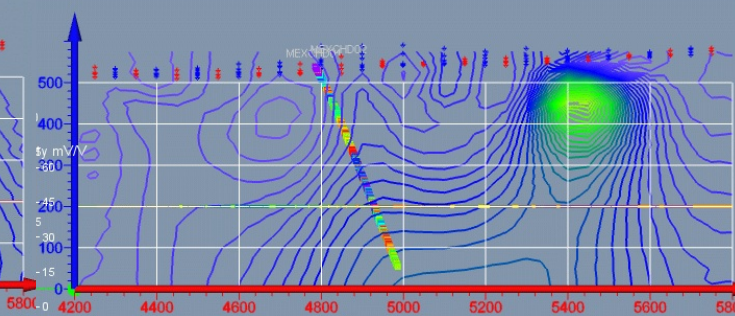
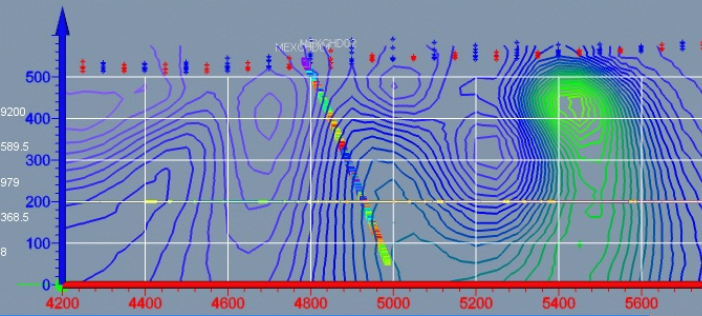
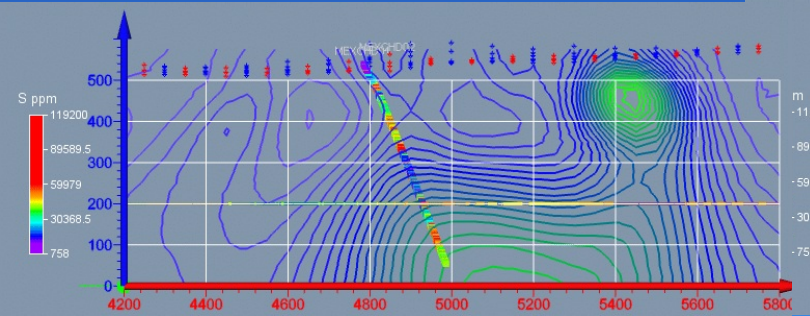
50 x 50 x 50m



50 x 200 x 25m

50 x 100 x 25m

50 x 50 x 25m



Drill trace coloured by Sulphur as a proxy for chargeability



Observations

Although there are differences between the models generated for the 6 different mesh sizes the differences are of the same order as the differences between using the Complex non-linear IP or Linear Perturbation algorithms or between L1 and L2 Norm inversions using the same mesh size. Note also that some of the differences observed here are gridding artefacts.

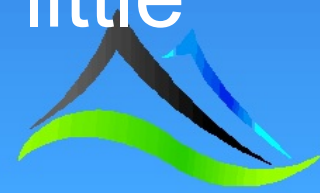
Using thinner layers at the surface smooths the model at depth. Note that the VOl indicated that the depth of investigation here was about 275m BGL = RL 300m so below this RL the sensitivity is low.



Observations

Using smaller cells in the mesh reduced the misfit. This was particularly evident when the first layer thickness was halved. Although the misfit was reduced it could be argued that the model was not significantly different.

From an exploration perspective I do not believe that we have gained anything in reducing the mesh cell size for these data. The modelled geology here is close to 2D in many places so reducing the cell size in the Y direction might be expected to have little effect.



Observations

In order to determine if 3D geology behaves the same I will run a series of synthetic models and upload these to www.exploregeo.com.au as a tech note. If others want to try the same experiment using the UBC 3D codes I'd be happy to share the synthetic models and forward calculations.

