



Airborne Electromagnetic Survey of portions of the Middle Republican Natural Resources District

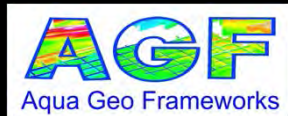
April 13, 2021

Curtis, Nebraska

Jared D. Abraham PG #0422

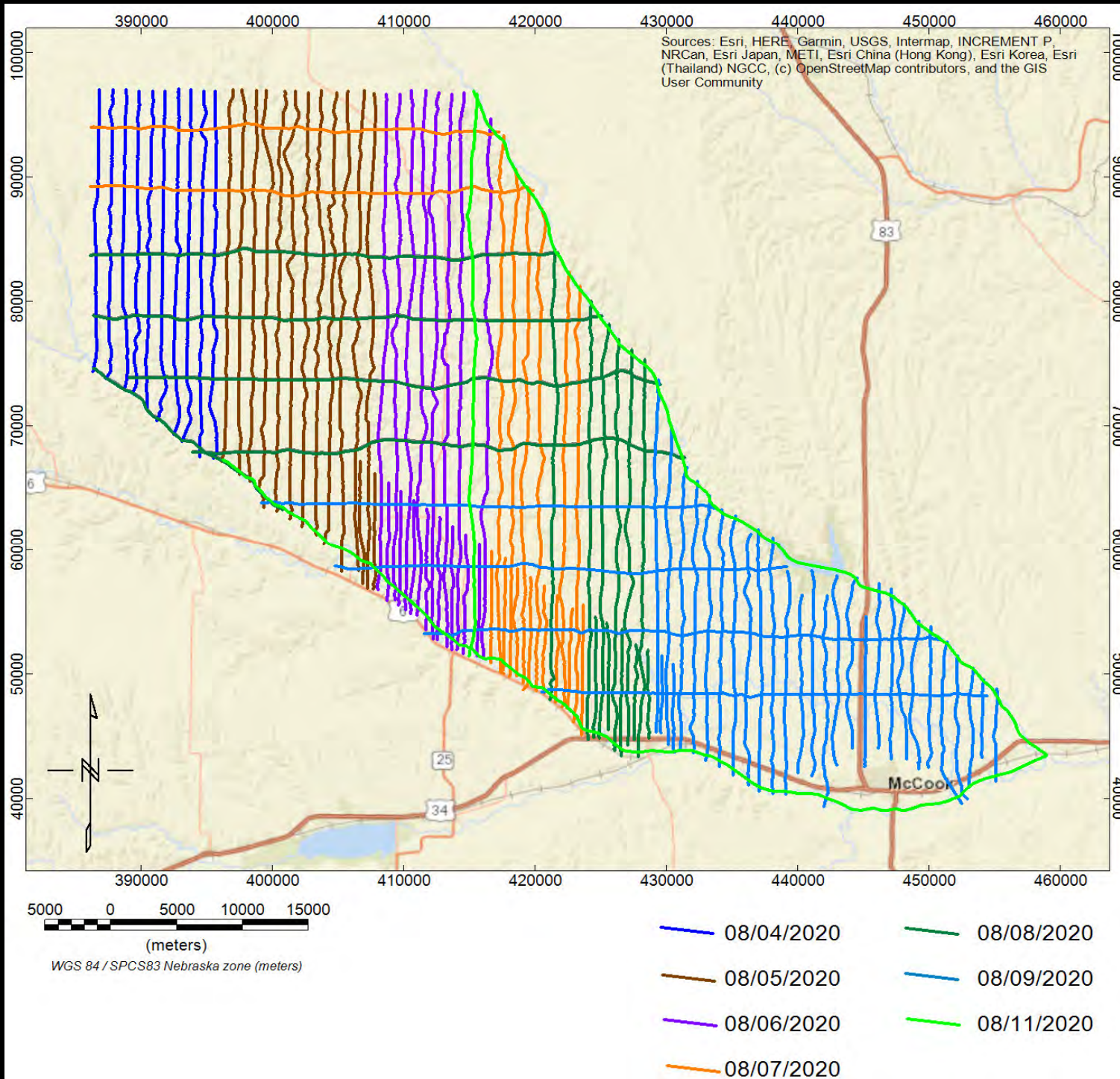
Aqua Geo Frameworks, LLC

Fort Laramie, WY



Project Schedule

- Project signed January 27, 2020
- Mobilization to Palisade, Nebraska July 31, 2020
- Data acquisition August 4-11, 2020
- Preliminary data delivered to MRNRD and CSD August 5-13, 2020
- Final Spatial-constrained Inversions and final report were delivered to MRNRD and CSD on Nov 6, 2020
- Presentation to MRNRD Board April 13, 2021



- 1,677.1 line-miles (2,716.9 line-km)
- Contracted 1,477 line-miles or (2,393 line-km)
- 200.1 line-miles bonus

What's happening in the earth

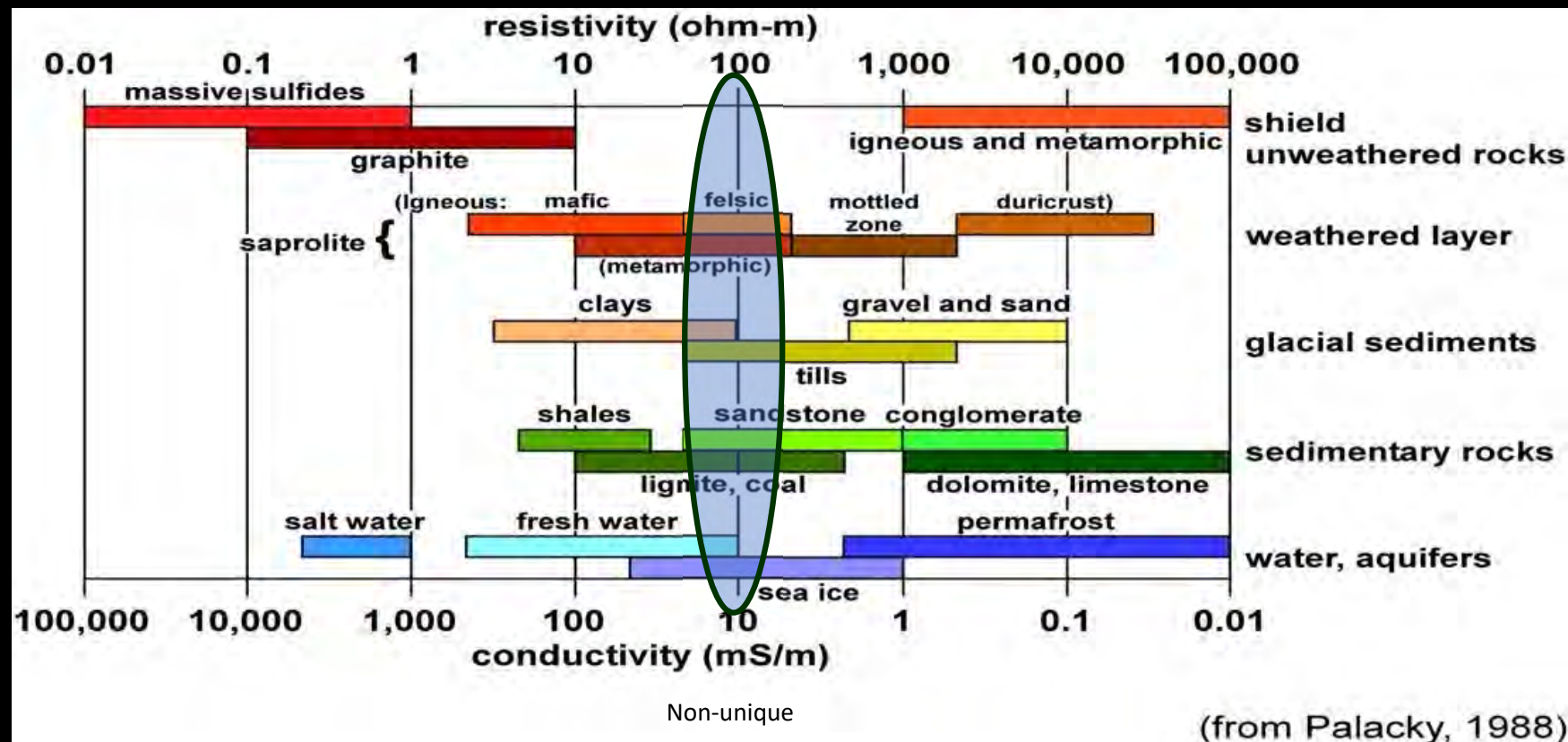


The current induced in the earth diffuses downward and outward

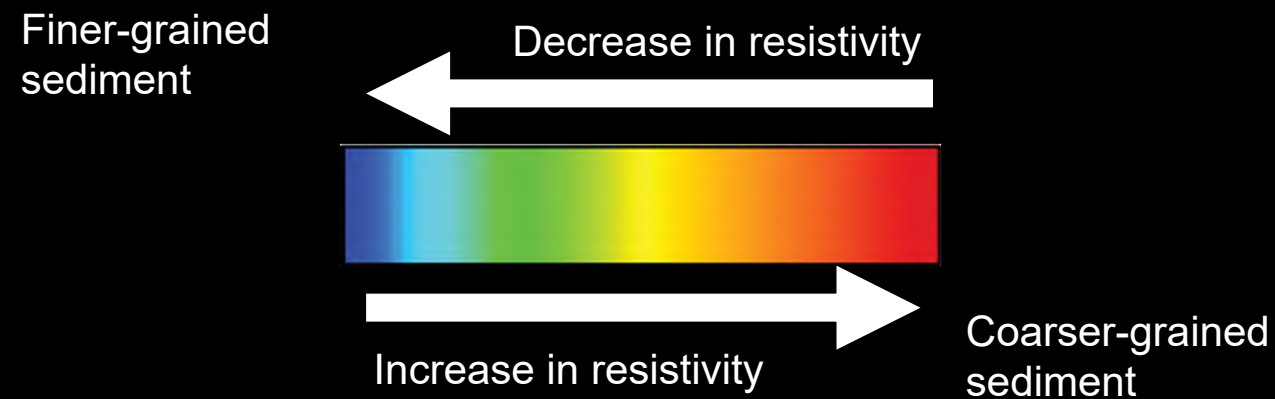
What we measure in the receiver coil



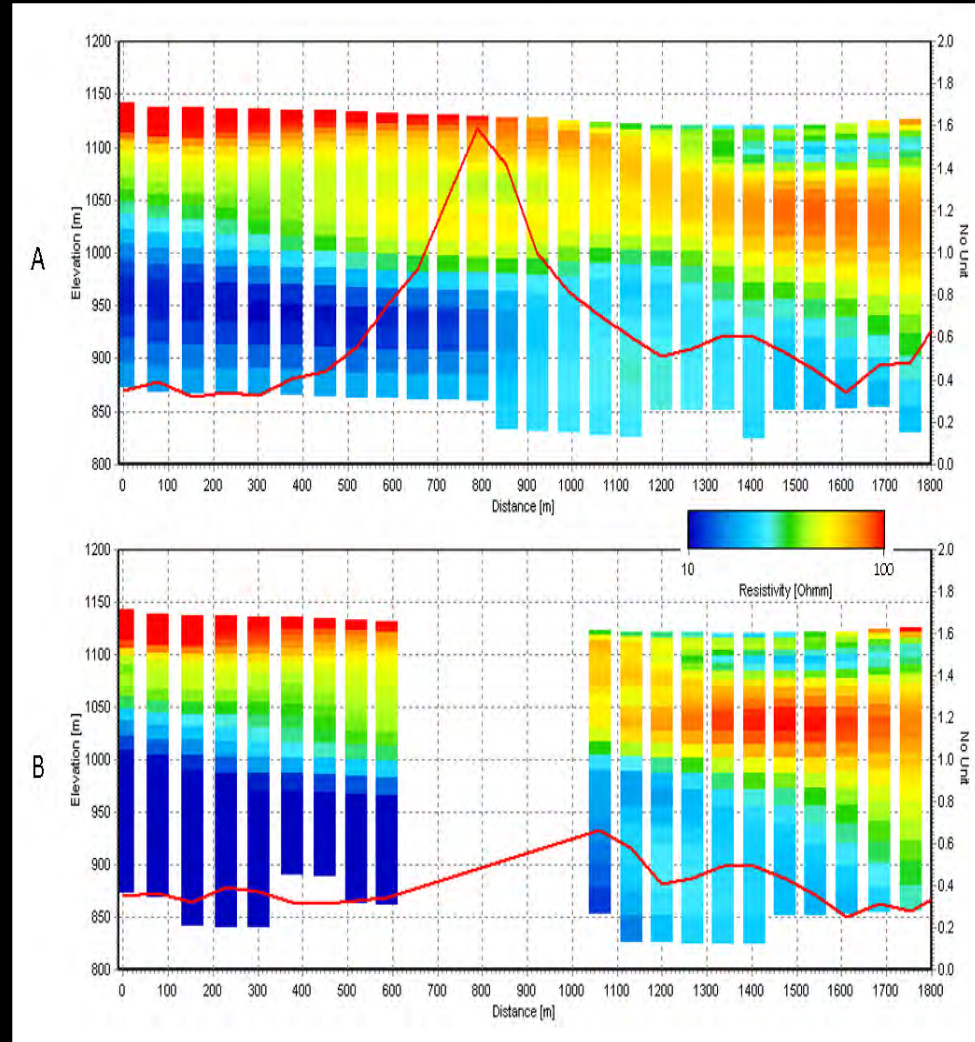
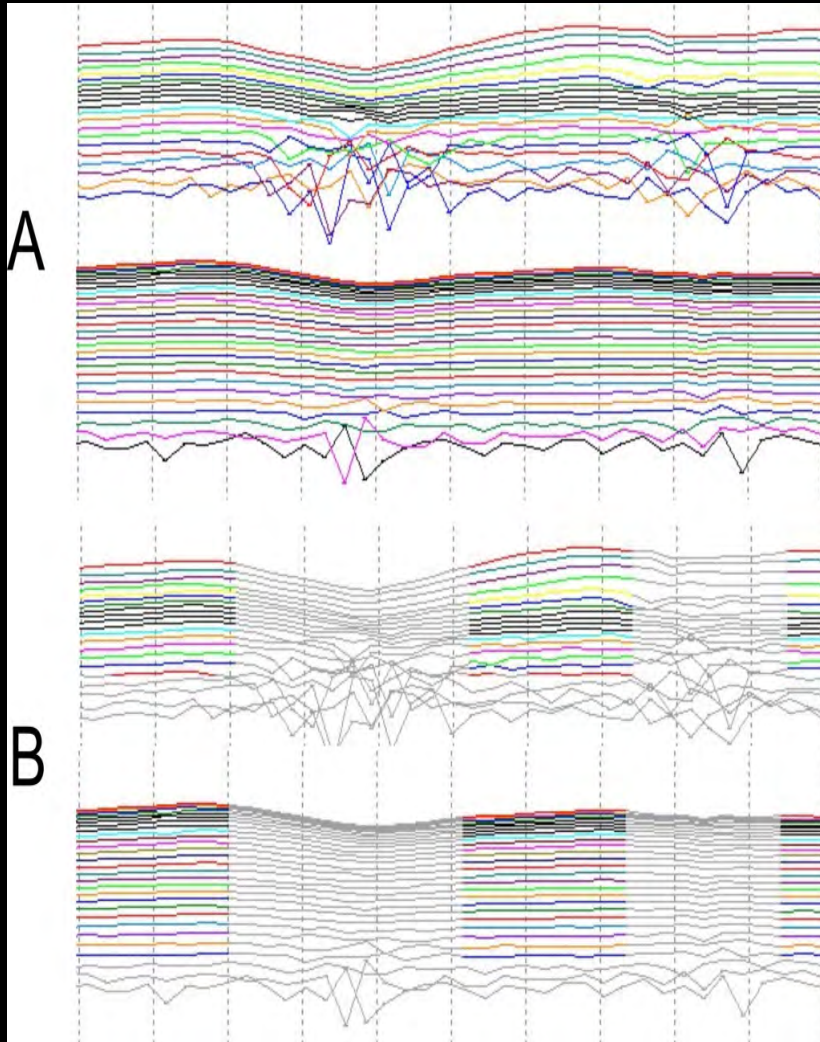
Resistivity and Rocks



Resistivity Applied to Sediments

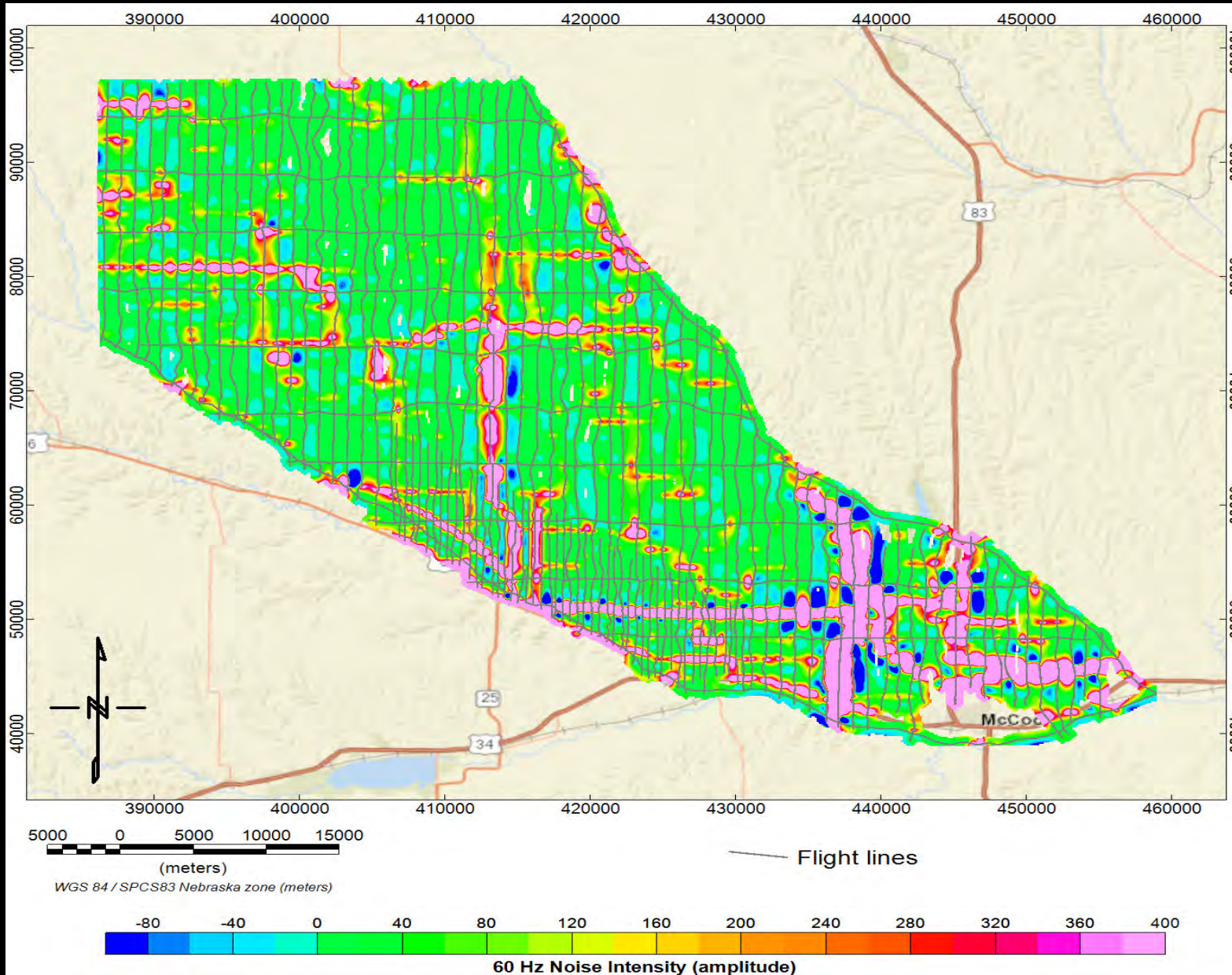


Processing to remove EM coupling

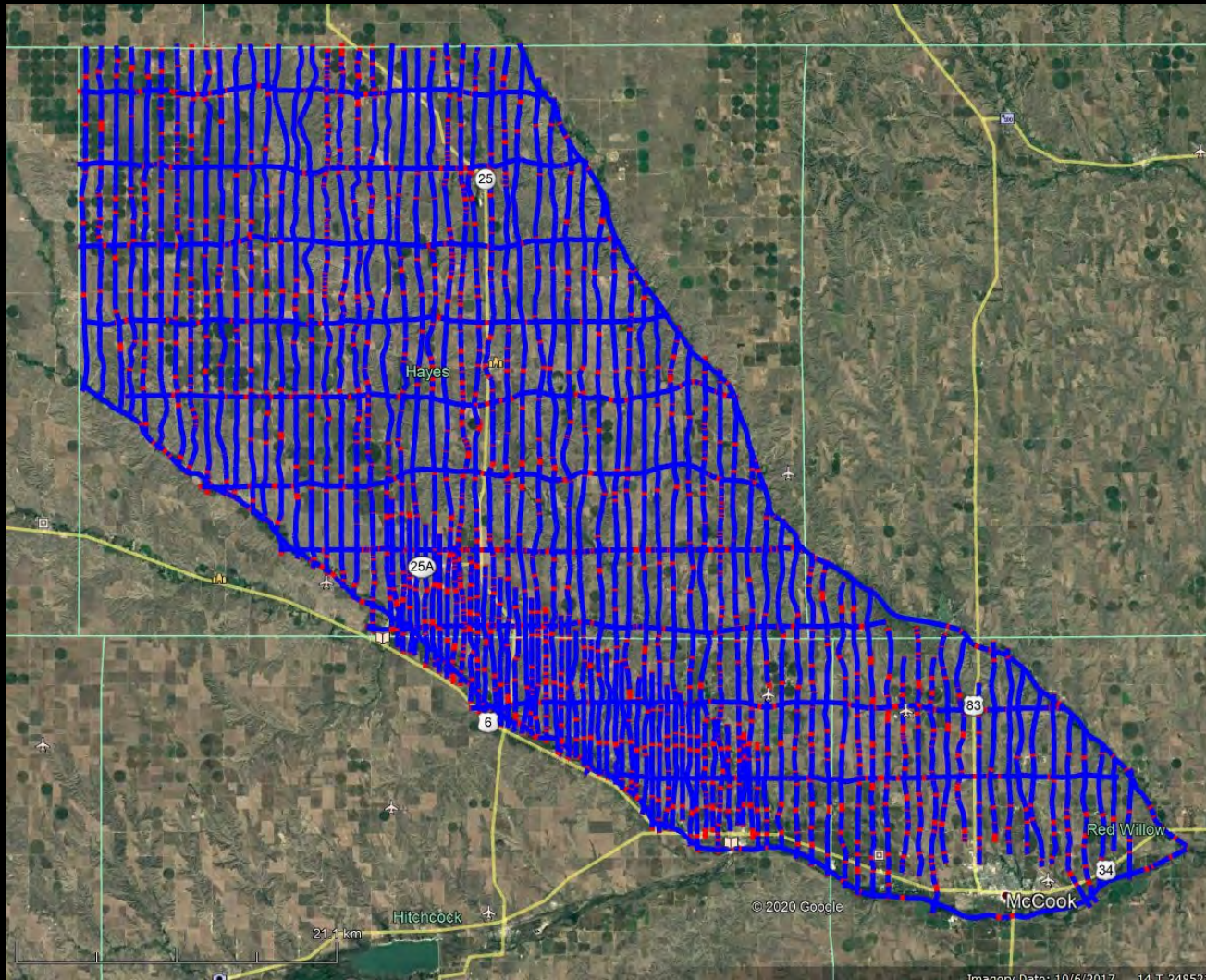


- Cutting or culling out EM coupling
- EM coupling will impact the model results

Powerline Monitor



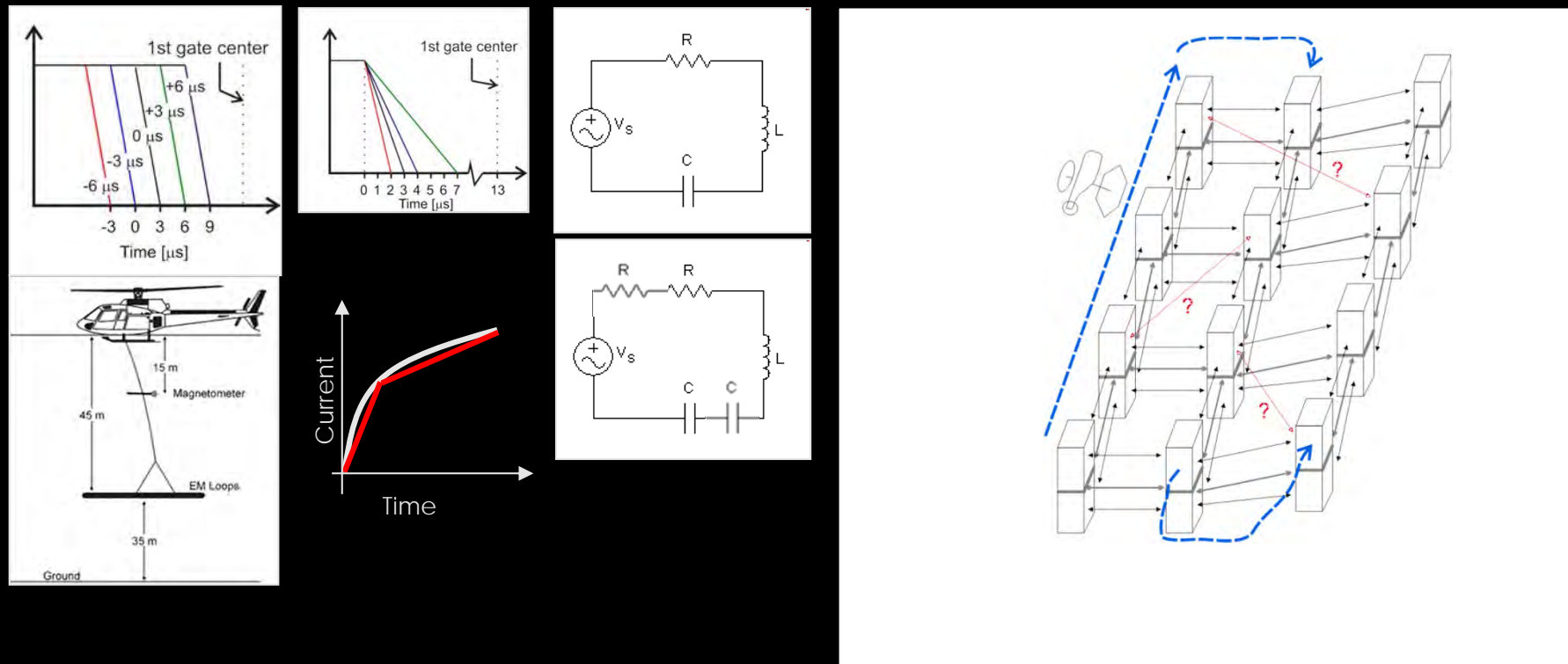
AEM data retained after processing



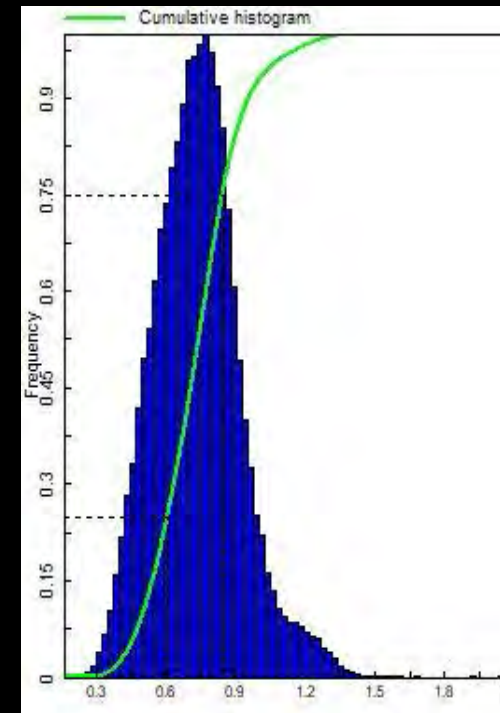
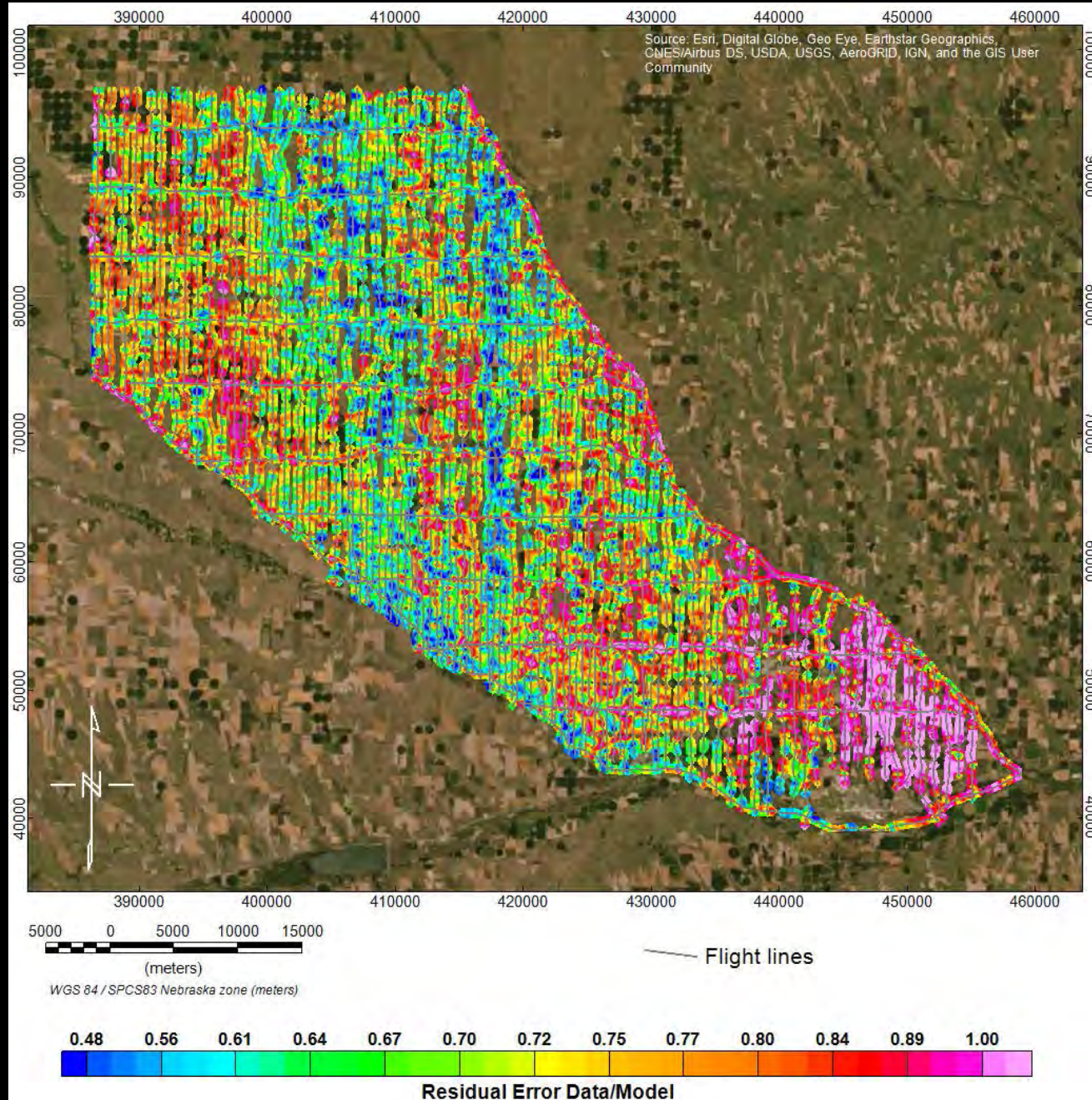
- 87.8 % of the data was retained
- This is due to flight planning and acquisition

Inversion

- Full non linear inversion, smooth and layered
- Exact 1D forward solution
- Entire system transfer function modelled
- Lateral 2D constraints in model domain
- Depth of investigation and sensitivity analysis

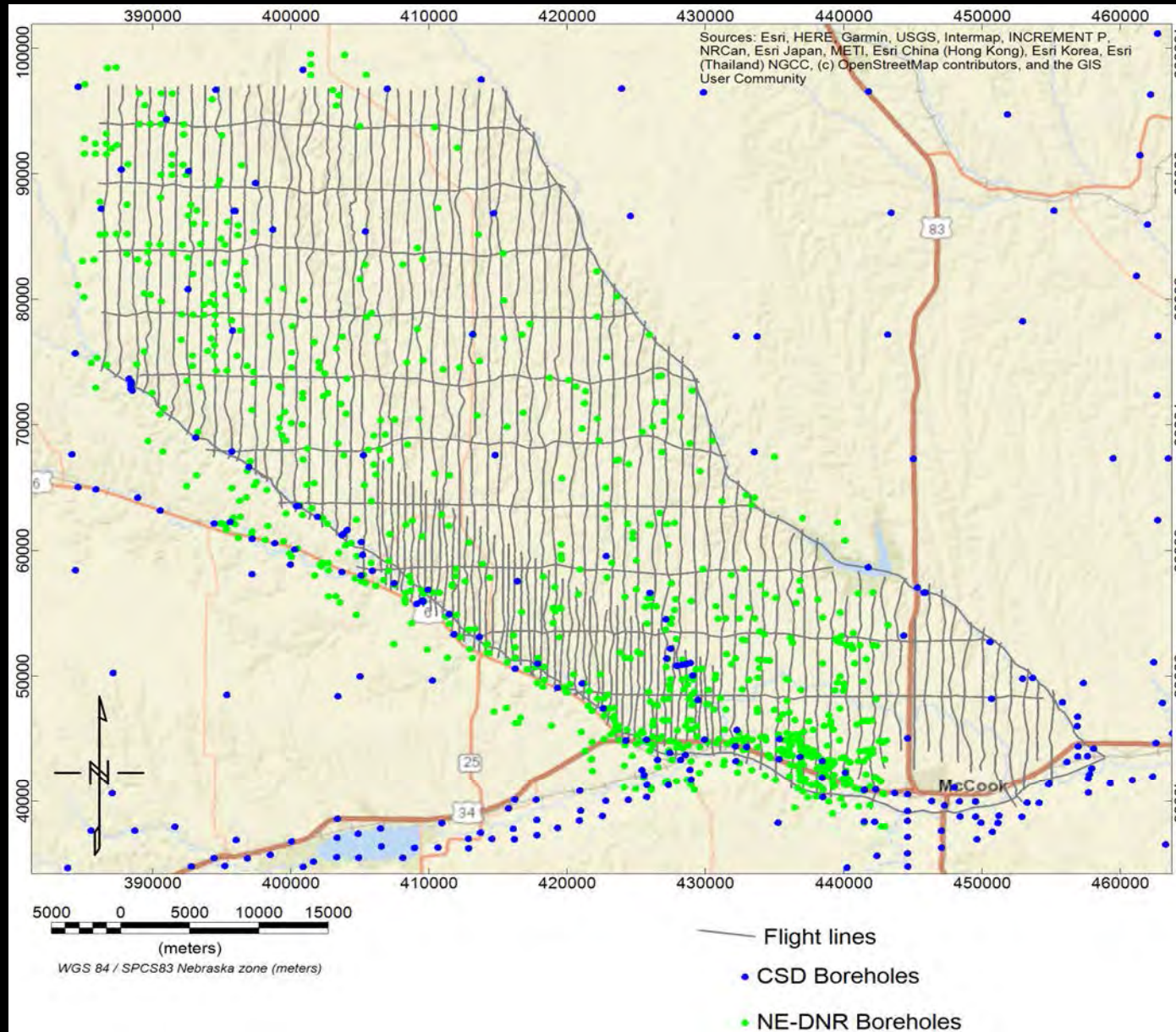


Inversions



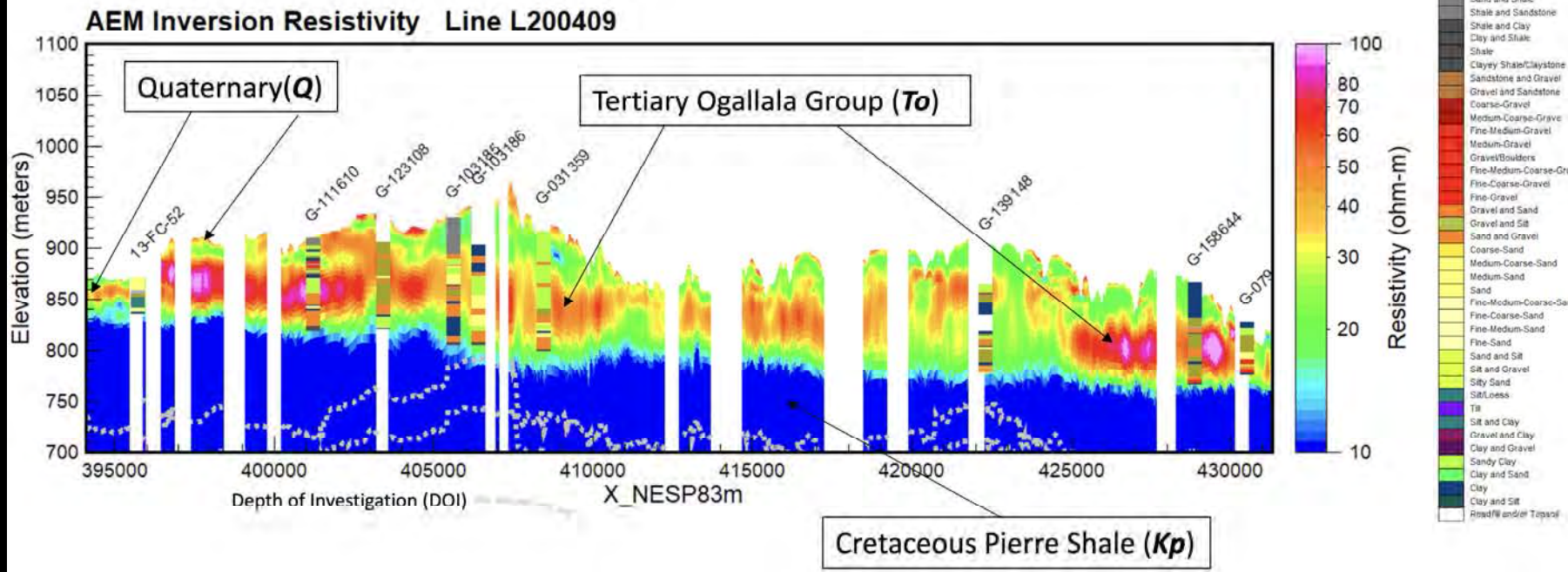
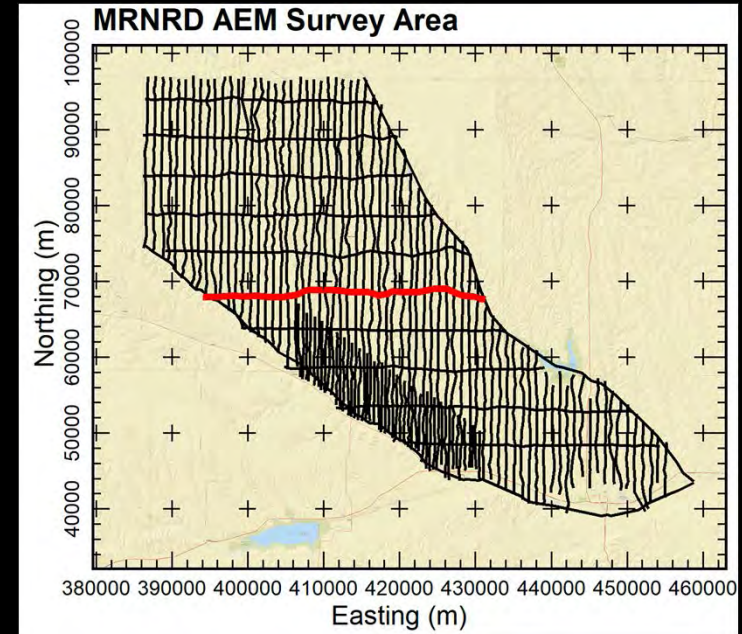
Residuals of < 1.0 are within error bars of the data

Boreholes



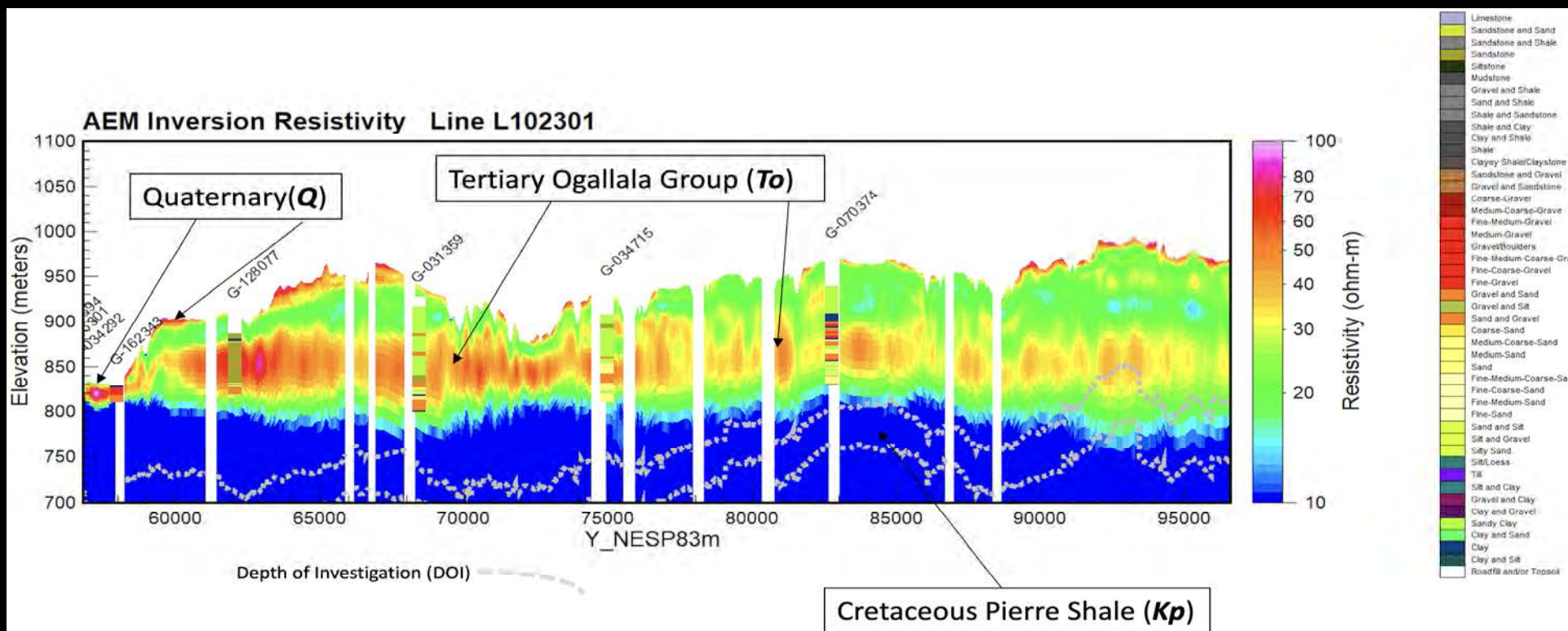
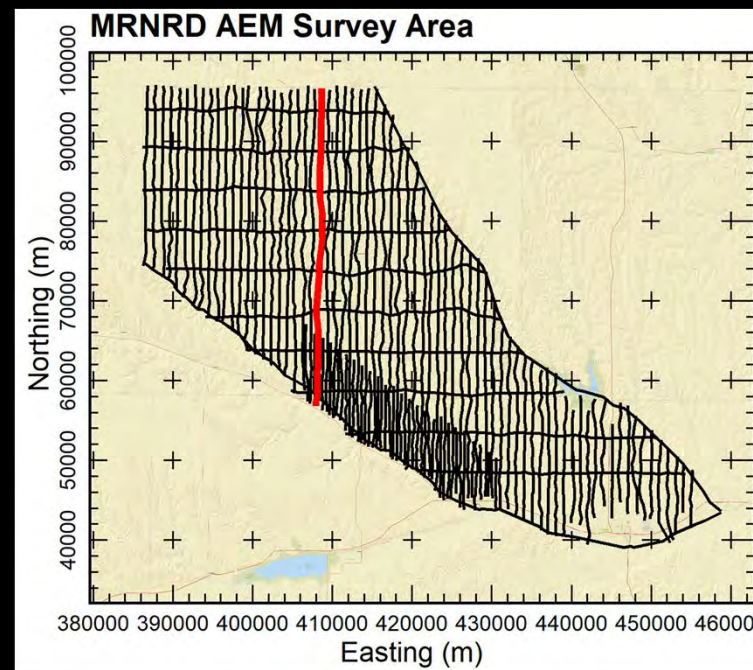
- CSD and NE-DNR Boreholes are used for QA/QC of preliminary data and final inversions

East-west Line



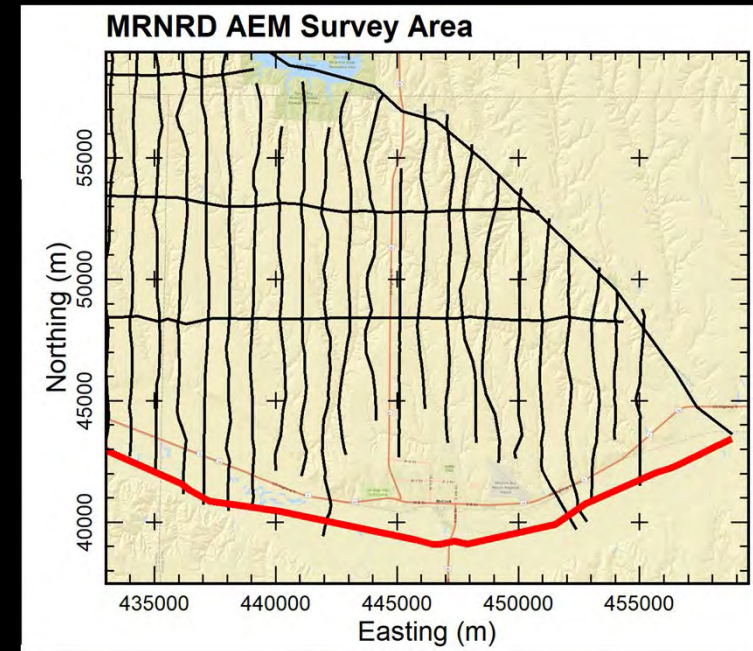
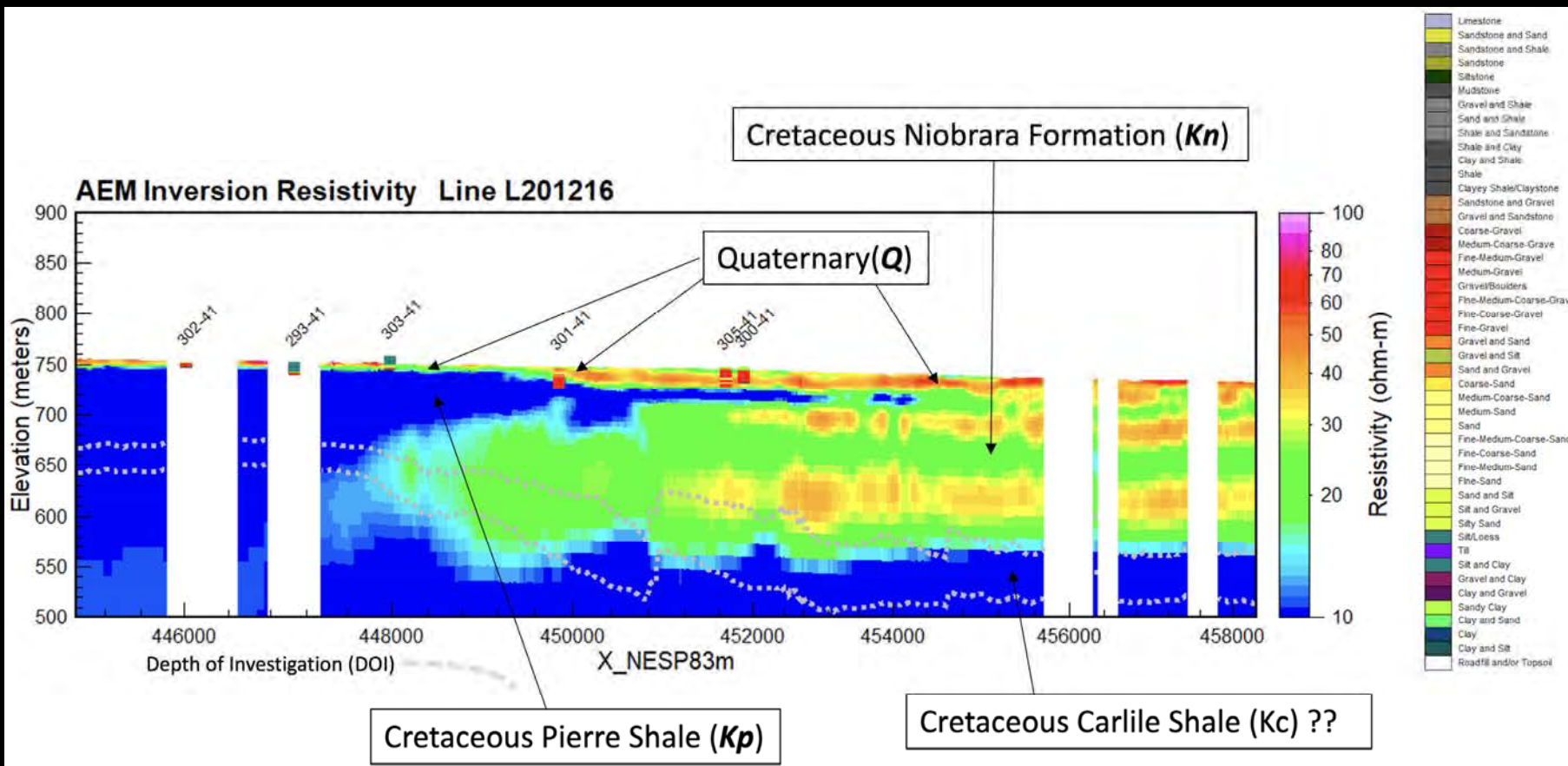
- Limestone
- Sandstone and Sand
- Sandstone and Shale
- Sandstone
- Siltstone
- Mudstone
- Gravel and Shale
- Sand and Shale
- Shale and Sandstone
- Shale and Clay
- Clay and Shale
- Shale
- Clayey Shale/Claystone
- Sandstone and Gravel
- Gravel and Sandstone
- Coarse-Gravel
- Medium-Coarse-Gravel
- Fine-Medium-Gravel
- Medium-Gravel
- Gravel/Boulders
- Fine-Medium-Coarse-Gravel
- Fine-Coarse-Gravel
- Fine-Gravel
- Gravel and Sand
- Gravel and Silt
- Sand and Gravel
- Coarse-Sand
- Medium-Coarse-Sand
- Medium-Sand
- Sand
- Fine-Medium-Coarse-Sand
- Fine-Coarse-Sand
- Fine-Medium-Sand
- Fine-Sand
- Sand and Silt
- Silt and Gravel
- Silty Sand
- Silt/Loess
- Till
- Silt and Clay
- Gravel and Clay
- Clay and Gravel
- Sandy Clay
- Clay and Sand
- Clay
- Clay and Silt
- Road/Well end/Trap

North-south Line

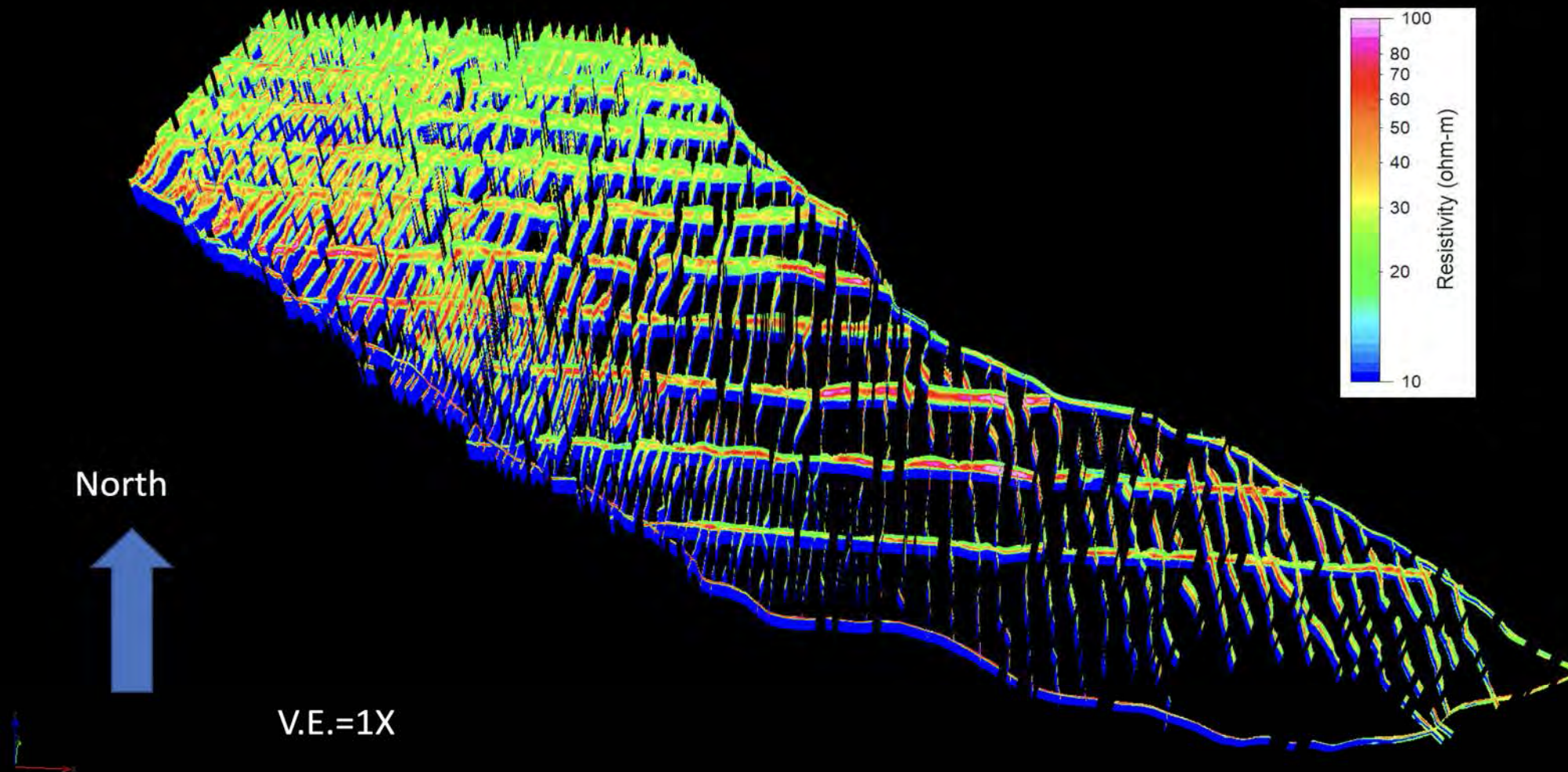


Cretaceous Pierre Shale (*Kp*) contact with Cretaceous Niobrara Formation (*Kn*)

Eastern portion of line L201216



3D Fence diagram





Thank You

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