

Mapping Aquifers and Hydrogeologic Frameworks Near Tulare California

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December 18, 2018



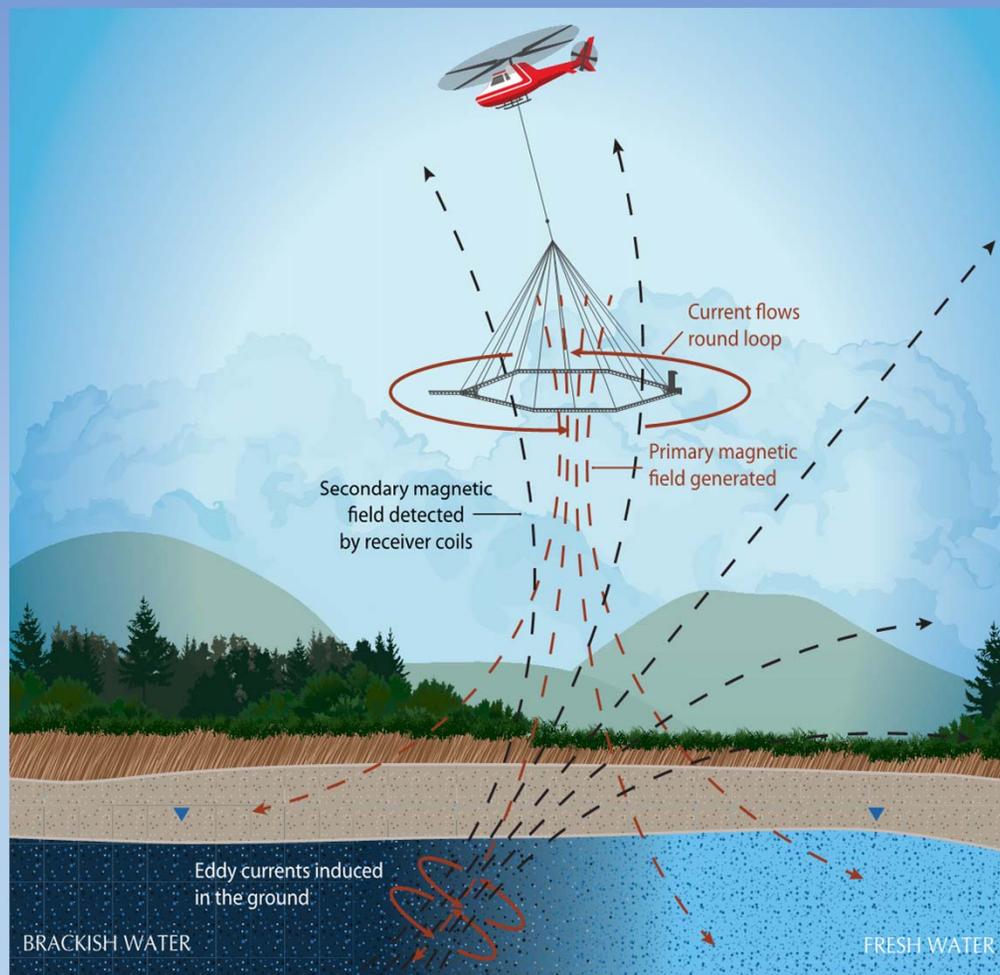
Presentation Outline

- Investigation Objectives
- Airborne Electromagnetic Geophysics (AEM) Data Acquisition
- Survey As Flown Survey Map
- Field QA/QC
- Examples From Survey
 - 2D Resistivity Profiles
 - 3D Fence Diagrams of Resistivity
 - Hydrogeologic Frameworks

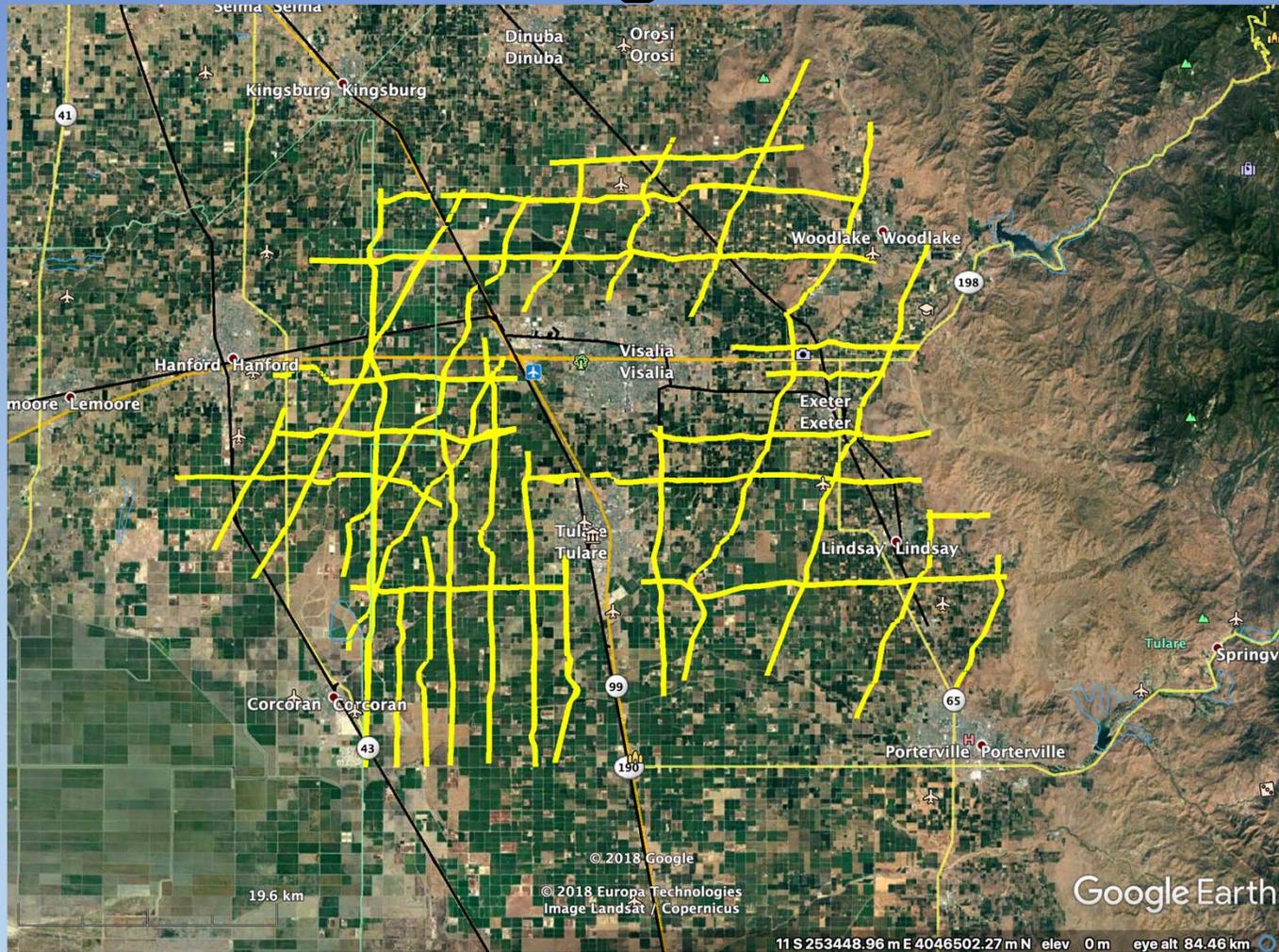
Investigation Objectives

- 1) Develop a 3D hydrogeological framework to assist in water resources management.
- 2) Produce maps of aquifer materials along the flight lines
- 3) Locate potential Managed Aquifer Recharge (MAR) areas along the flight lines
- 4) Identify optimal drilling locations for production, monitoring, and test wells

How the AEM System Works

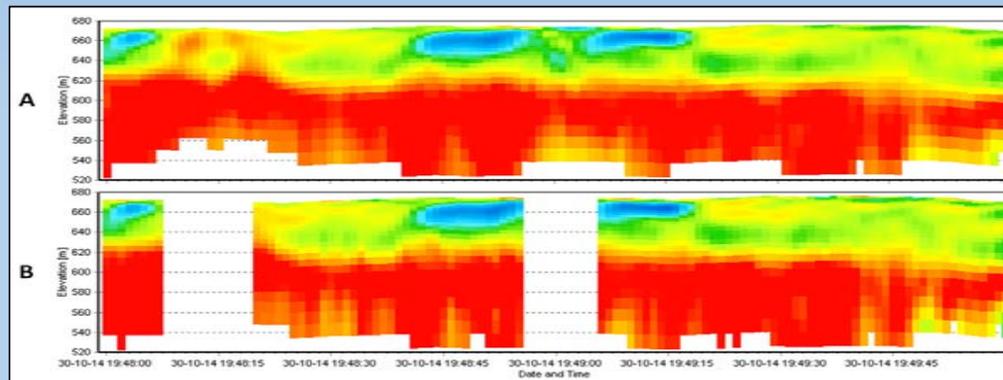
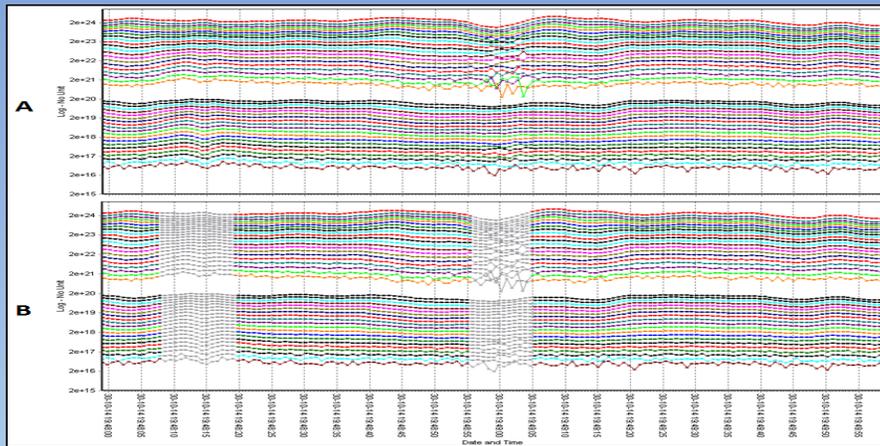


As Flown Flight Lines 2018



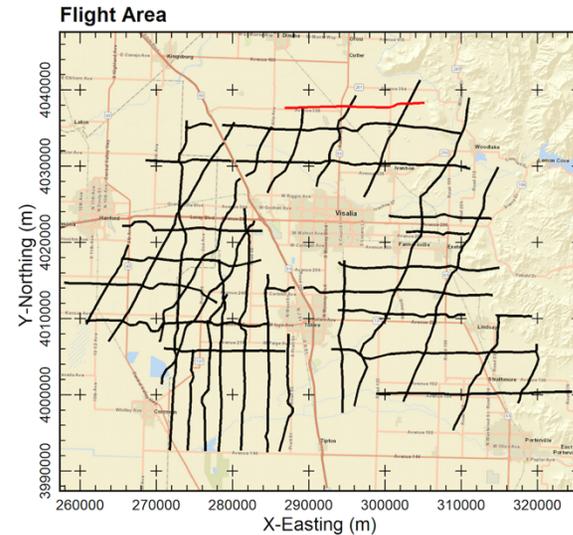
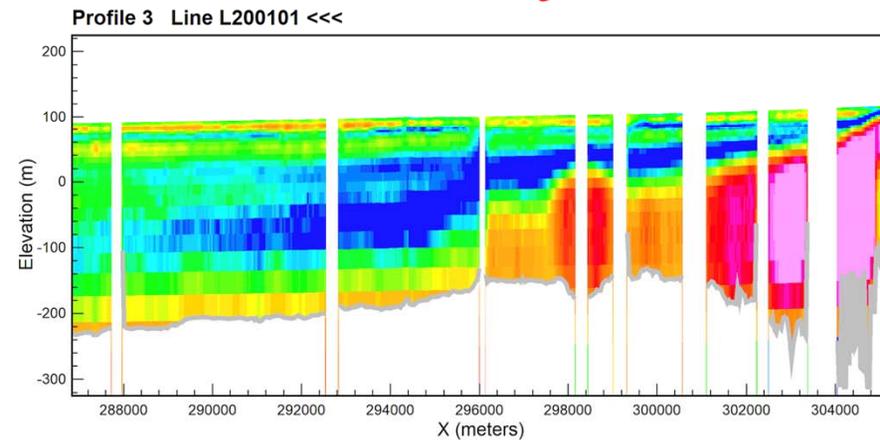
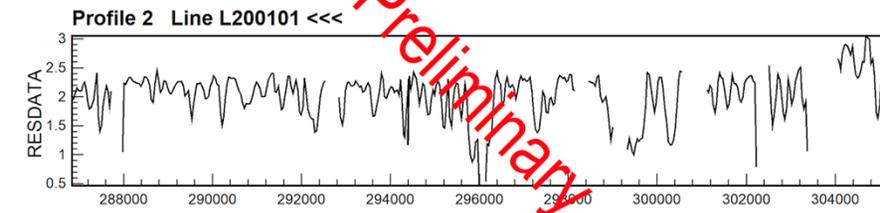
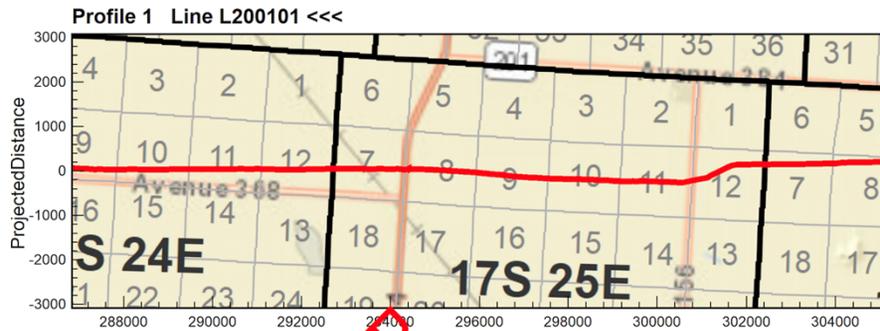
In Field QA/QC and Inversion

- Within 24 hours we invert the data



Abraham et al., 2016

Preliminary AEM Resistivity Profiles



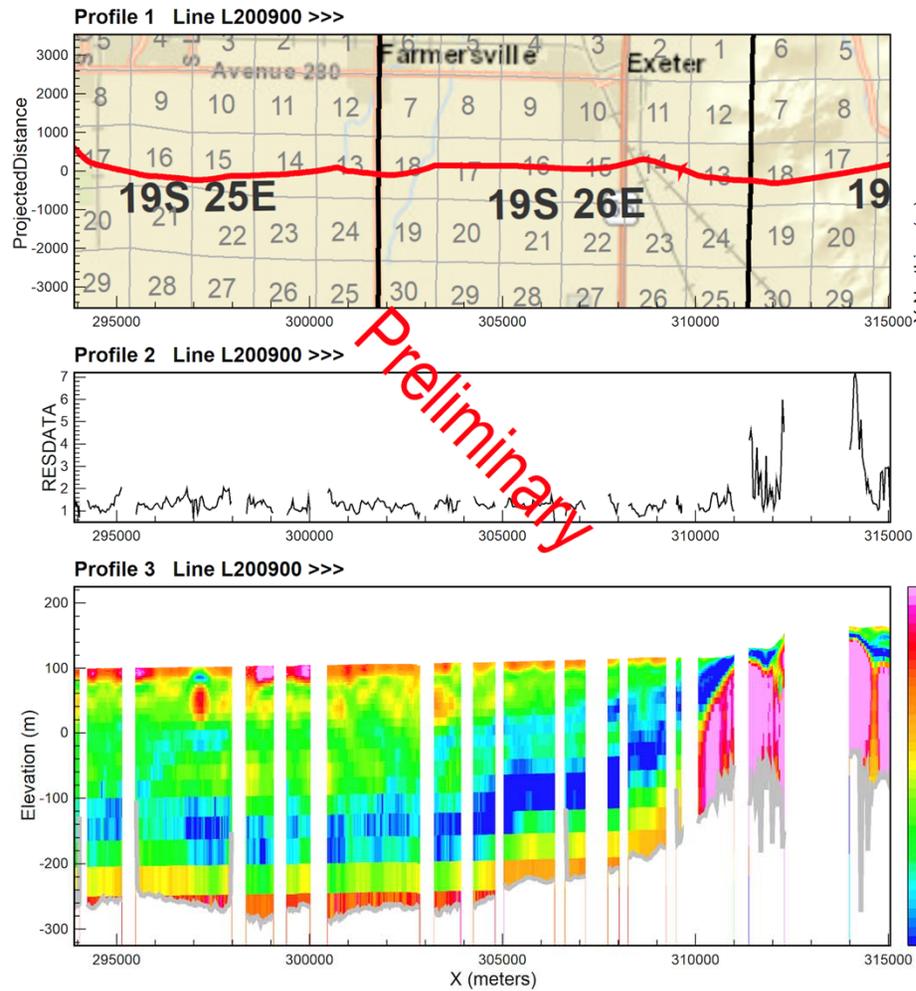
Results of the Preliminary inversion of Airborne Electromagnetic (AEM) data collected along flight lines within the Kaweah Area November 2018. The inversions shown are Laterally-Constrained using the Aarhus Geo Software Workbench version 5.8.3.0. Prepared for the East Kaweah Groundwater Sustainability Agency, Greater Kaweah Groundwater Sustainability Agency, Mid-Kaweah Groundwater Sustainability Agency, and Stanford University by Aqua Geo Frameworks, LLC.

The flight area map indicates the location of the flight lines on a general area map. The current displayed flight line in the profiles is indicated in red.

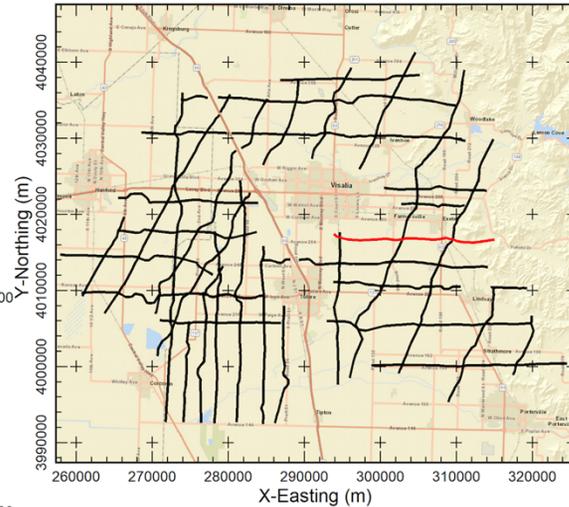
Profile 1 indicates the flight path on the local survey system map as a red line. Profile 2 indicates the LCI inversion data residual along the flight line.

Profile 3 is the LCI electrical resistivity along the flight line. Gaps in the resistivity profile are a result of editing areas of EM-coupling out of the data or of areas that were not over flown due to infrastructure. The gray line is the preliminary depth of investigation.

Preliminary AEM Resistivity Profiles



Flight Area



Results of the Preliminary inversion of Airborne Electromagnetic (AEM) data collected along flight lines within the Kaweah Area November 2018. The inversions shown are Laterally-Constrained using the Aarhus Geo Software Workbench version 5.8.3.0. Prepared for the East Kaweah Groundwater Sustainability Agency, Greater Kaweah Groundwater Sustainability Agency, Mid-Kaweah Groundwater Sustainability Agency, and Stanford University by Aqua Geo Frameworks, LLC.

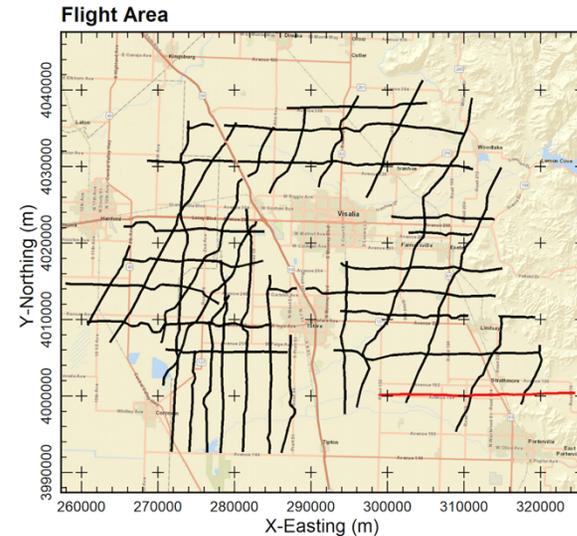
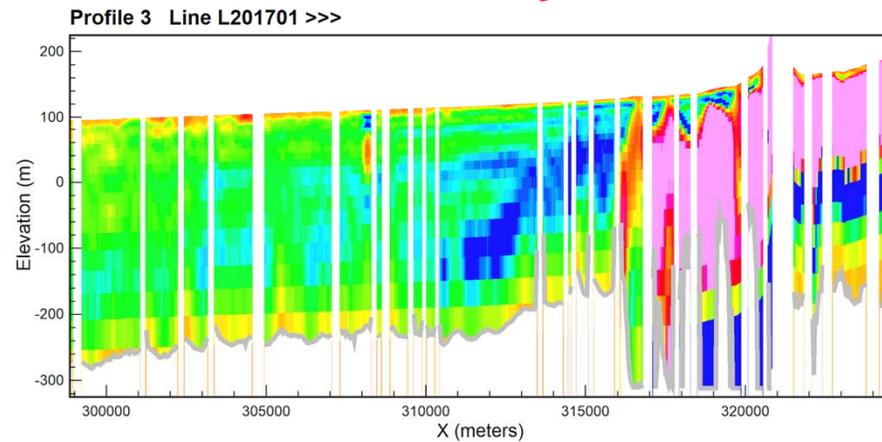
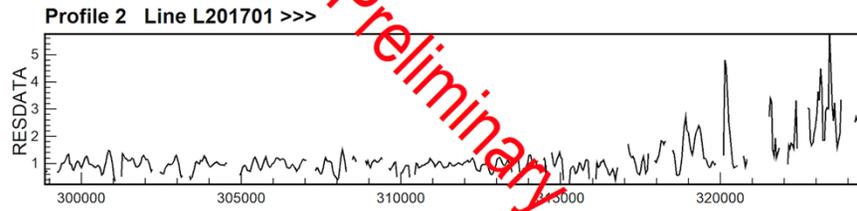
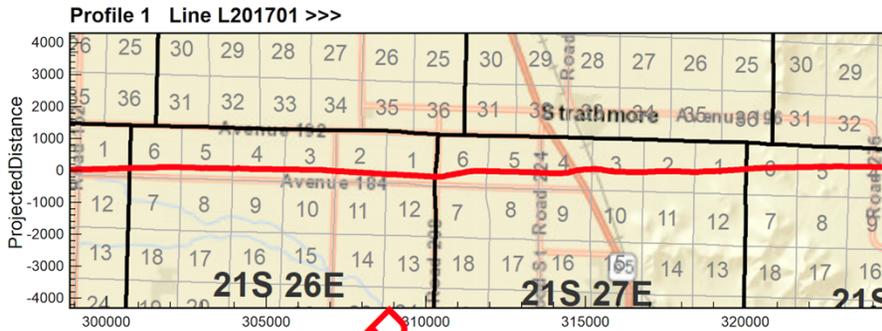
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Preliminary AEM Resistivity Profiles



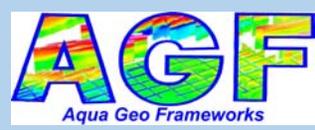
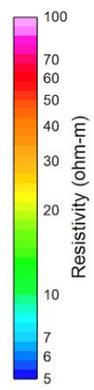
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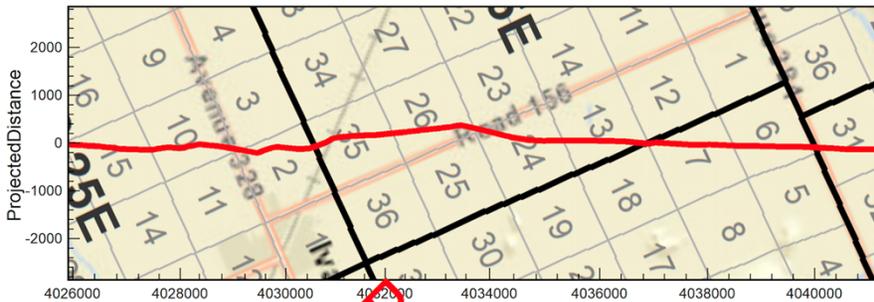
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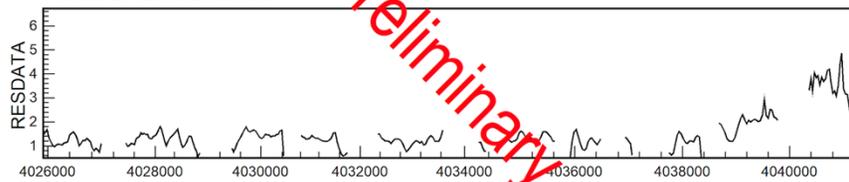


Preliminary AEM Resistivity Profiles

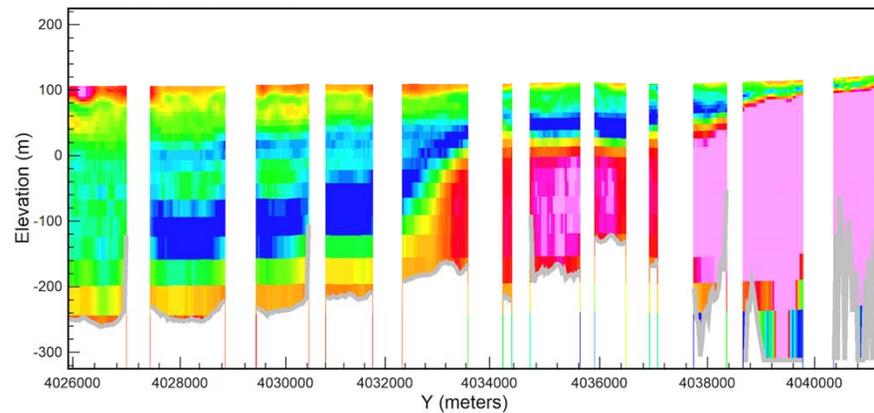
Profile 1 Line L100700 <<<



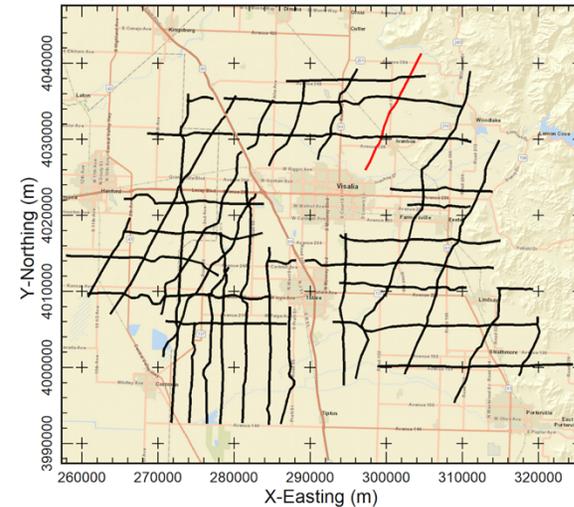
Profile 2 Line L100700 <<<



Profile 3 Line L100700 <<<



Flight Area

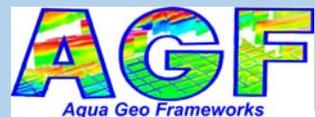


Results of the Preliminary inversion of Airborne Electromagnetic (AEM) data collected along flight lines within the Kaweah Area November 2018. The inversions shown are Laterally-Constrained using the Aarhus Geo Software Workbench version 5.8.3.0. Prepared for the East Kaweah Groundwater Sustainability Agency, Greater Kaweah Groundwater Sustainability Agency, Mid-Kaweah Groundwater Sustainability Agency, and Stanford University by Aqua Geo Frameworks, LLC.

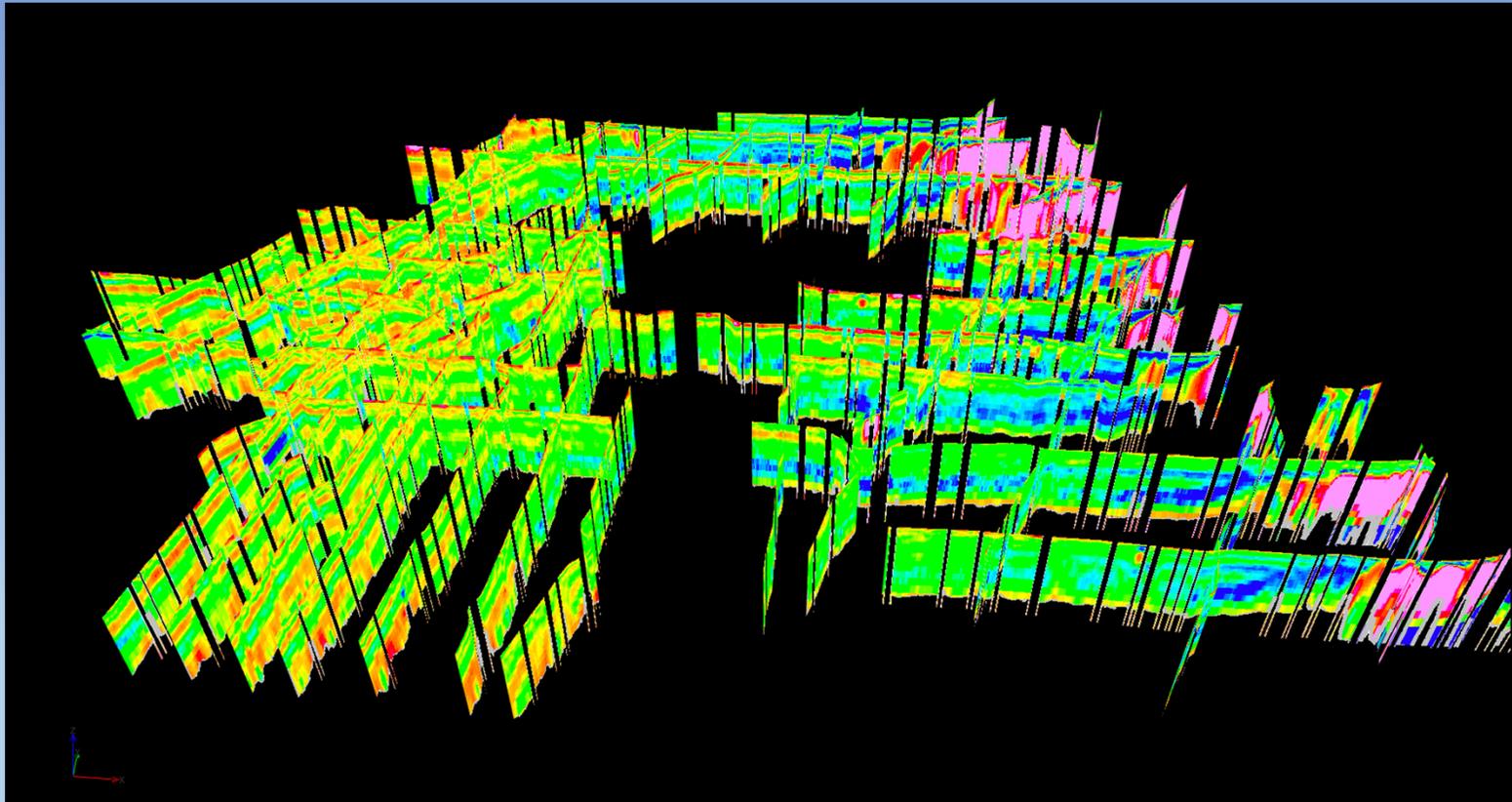
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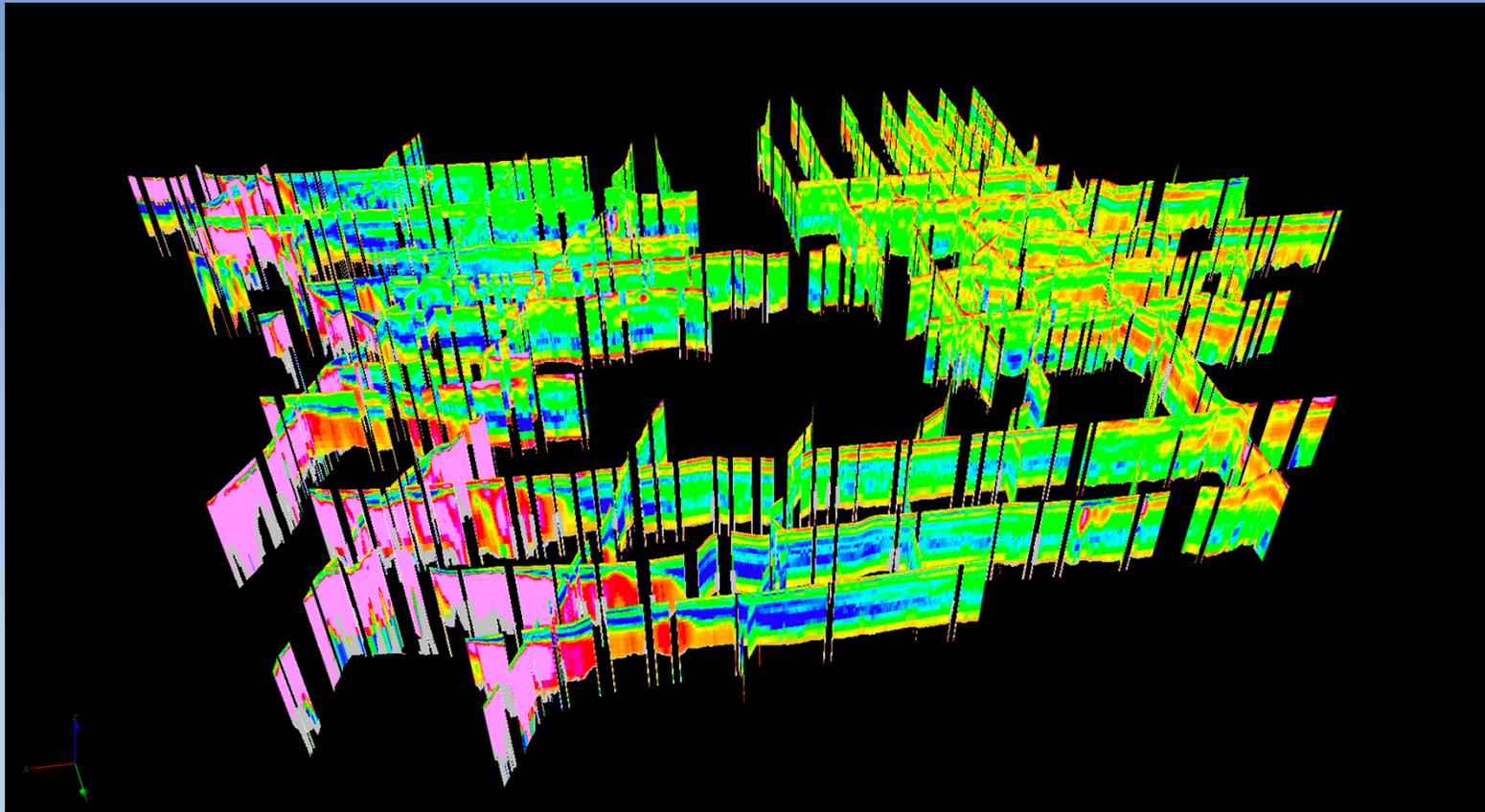
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Preliminary AEM Resistivity Fence Diagram



Preliminary AEM Resistivity Profiles



Summary for Mid Kaweah GSA

1. ~800 line-kilometers of AEM Data was completed by November 12, 2018.
2. There was some difficulty in setup and calibration which was corrected.
3. AEM data was processed, edited, and accepted by November 14, 2018.
4. Correlation was made on a preliminary basis between the AEM-inverted resistivity and local lithology based on inversion results, known local geology, and borehole logs.
5. Report will be completed on or before April 1, 2019. There is much left to do before then.

Questions?
Comments?



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