hydroGEOPHYSICS, Inc.

Geophysical
Consulting
and
Services

High Resolution Resistivity

Applications & Case Histories

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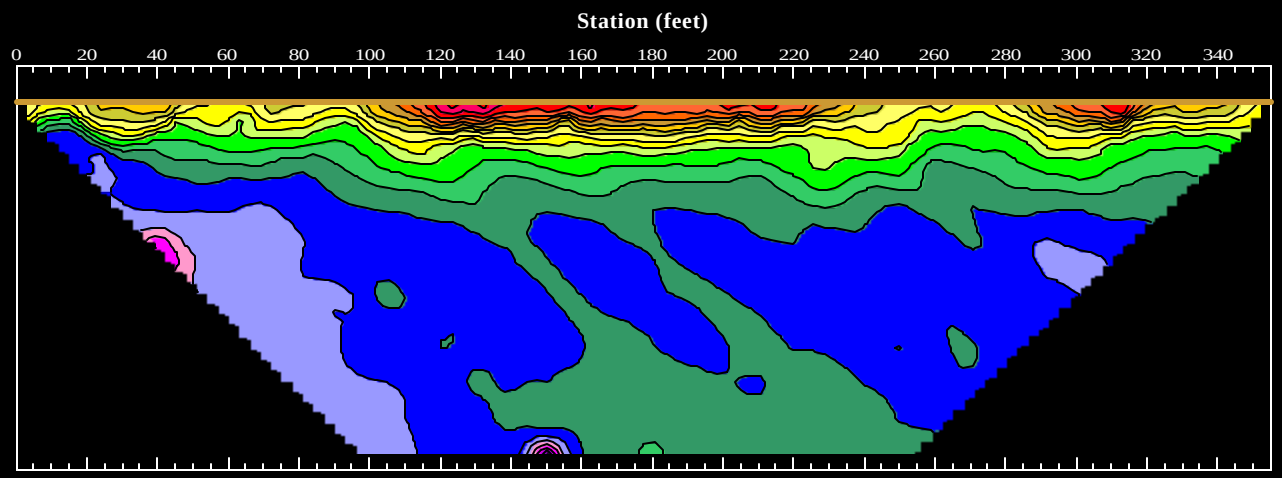
Introduction

General Overview

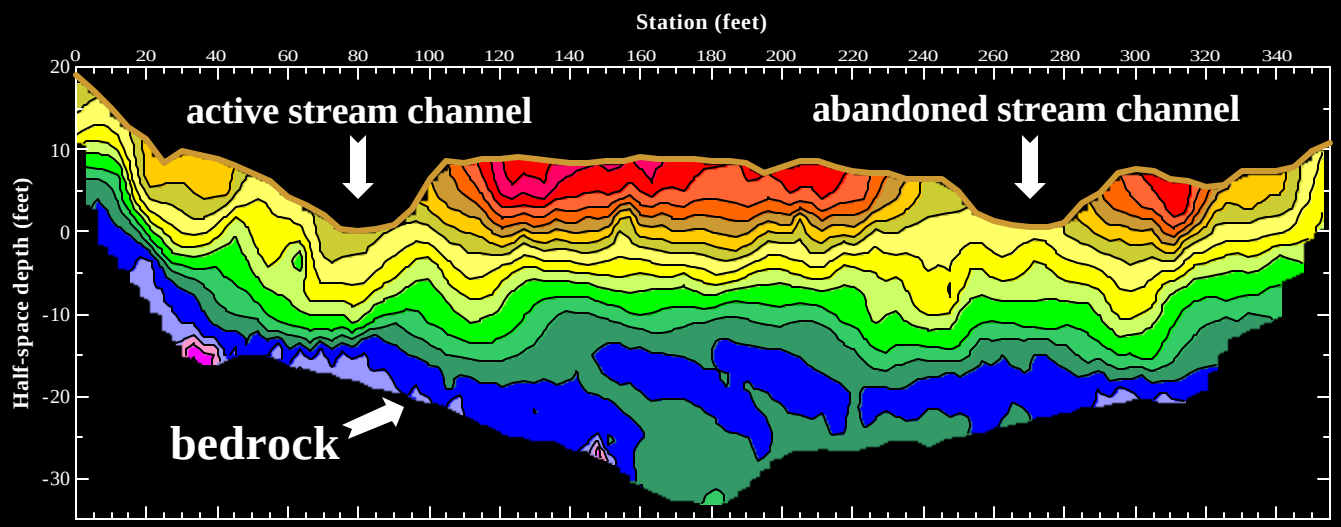
1. Topographic correction of HRR data
2. *SafteyNet*™, earthen dam monitoring
3. Basin delineation
4. Plume mapping
5. Lithologic characterization
6. Landfill detection and delineation
7. Alluvial characterization
8. HRR vs. Electromagnetics comparison
9. Grand Canyon Sand Bar study
10. Buried object detection

Topographic Incorporation



Conventional Representation

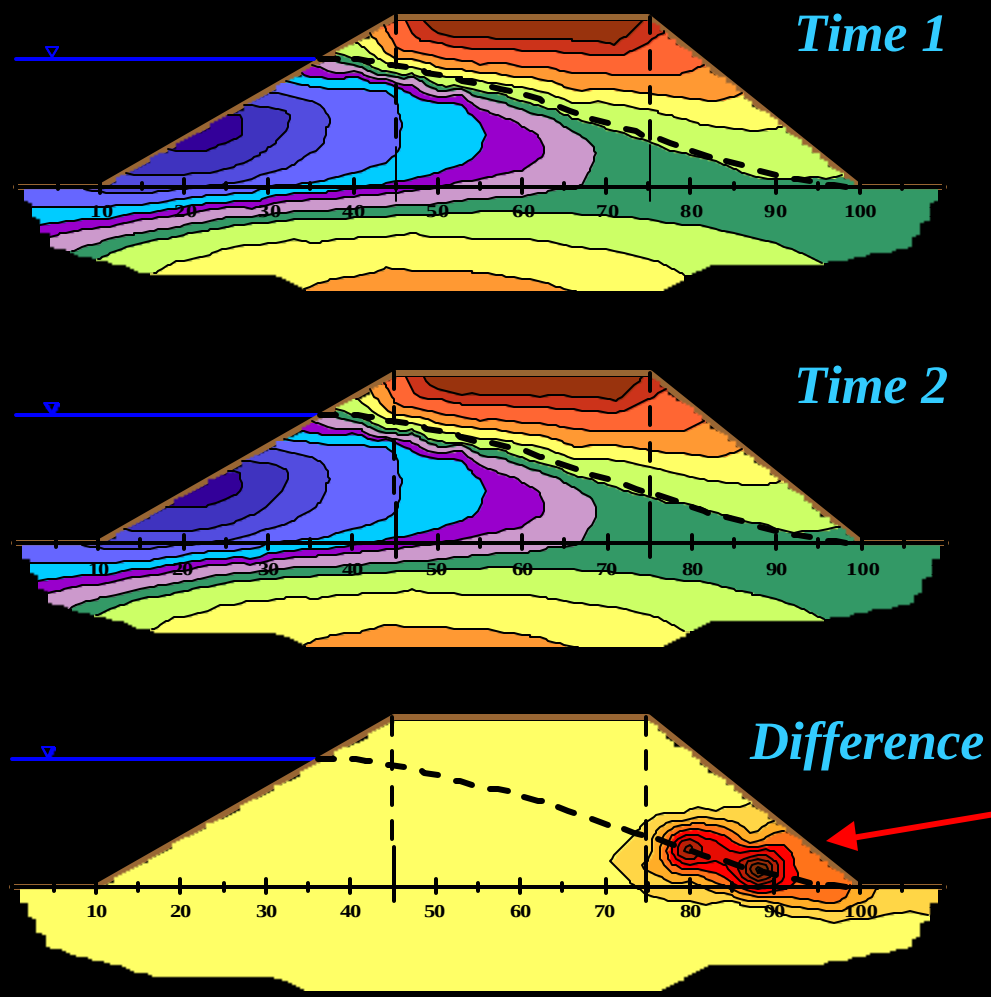
- no topographic correction
- no depth information
- exaggerated characteristics



HRR Representation

- topographic correction
- reliable depth information
- logical characteristics

Safety Net™ data - time based sections



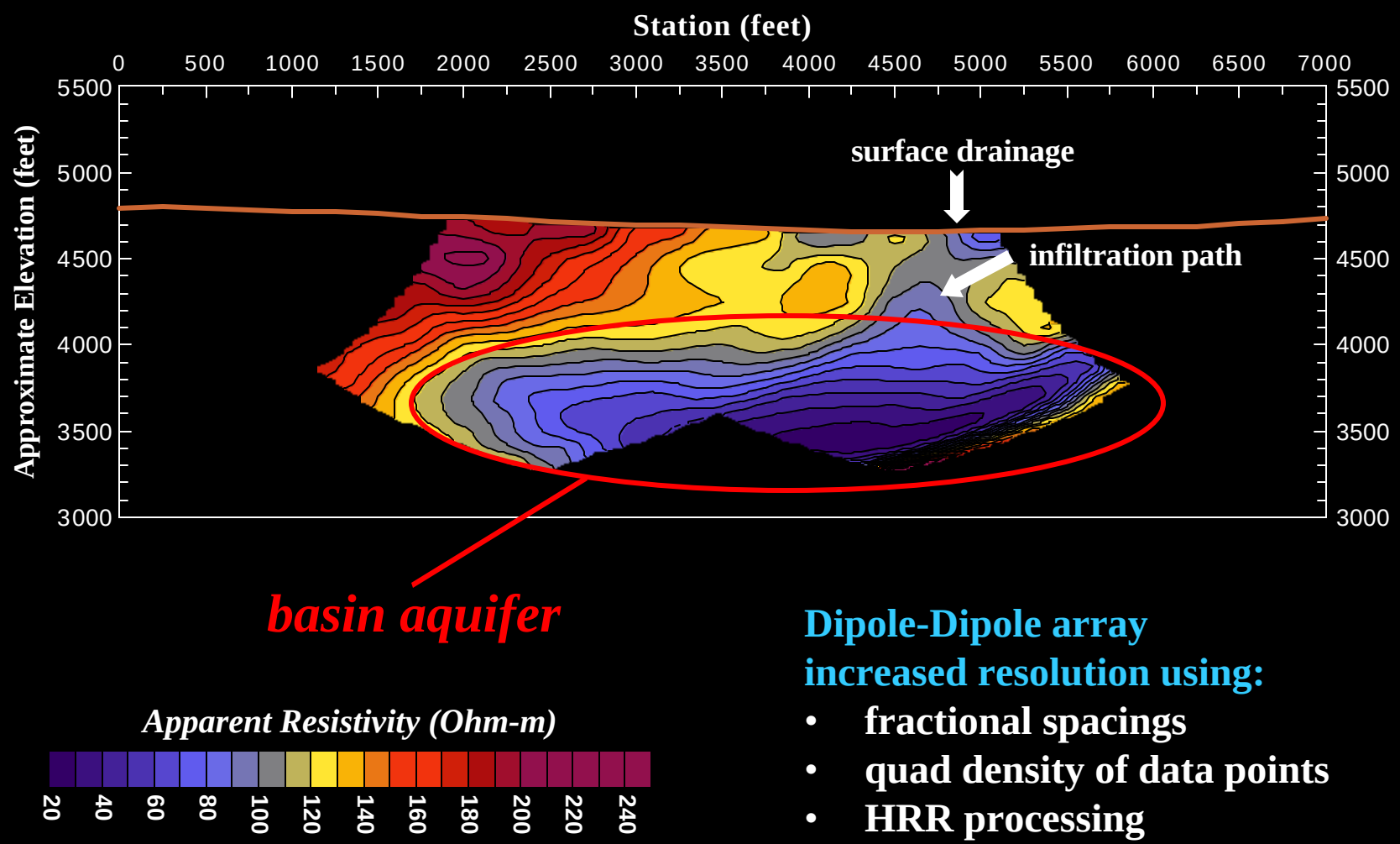
Advantages of *Safety Net™*

- enhance dam safety
- accurately monitor moisture distribution within dam
- phreatic surface mapping
- early warning capabilities
- non-invasive measurements
- high data resolution
- continuous coverage
- sensitive to small changes

Time 2 - Time 1 = Difference

potential leak
(possible failure)

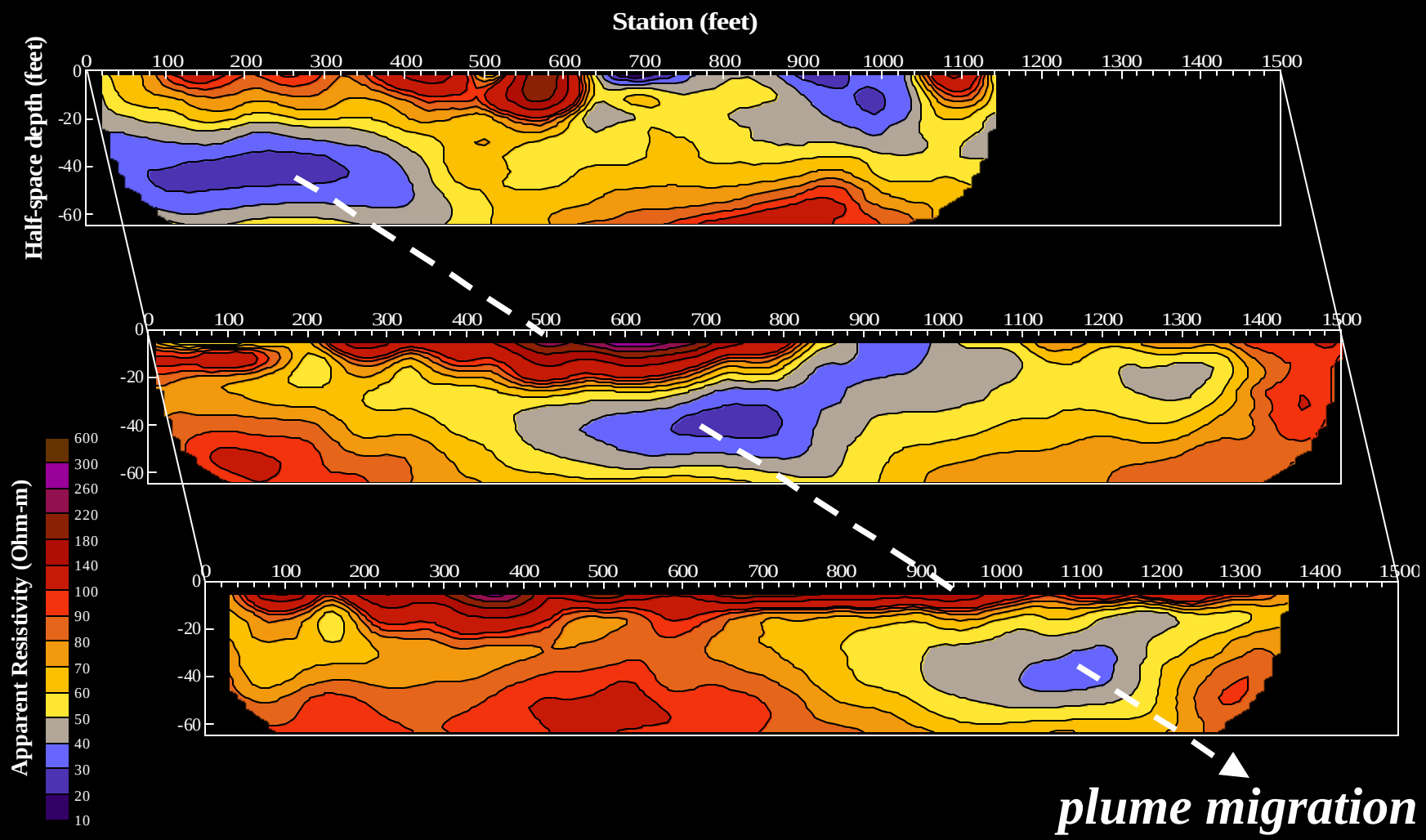
Aquifer Detection



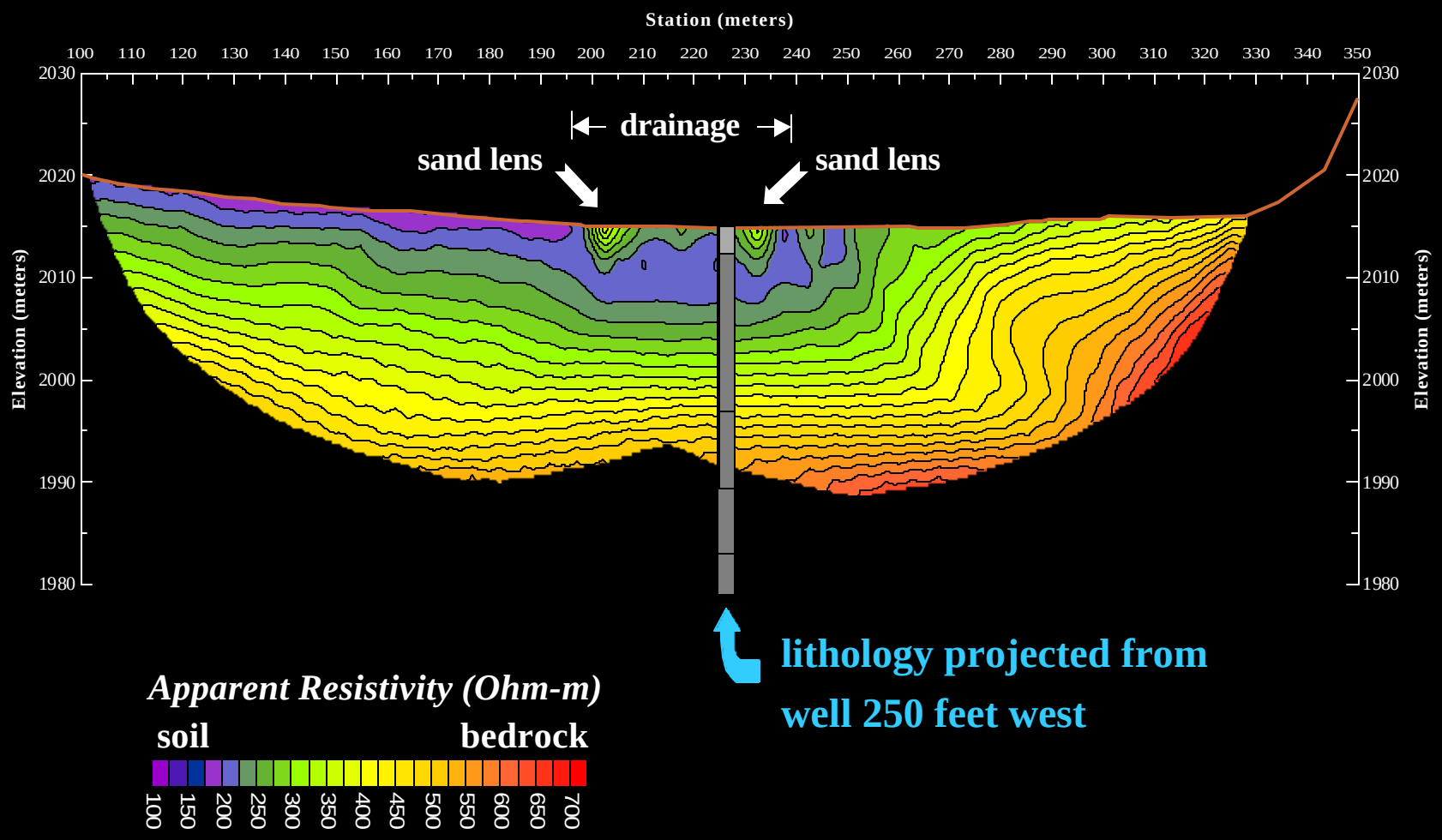
Dipole-Dipole array increased resolution using:

- **fractional spacings**
- **quad density of data points**
- **HRR processing**

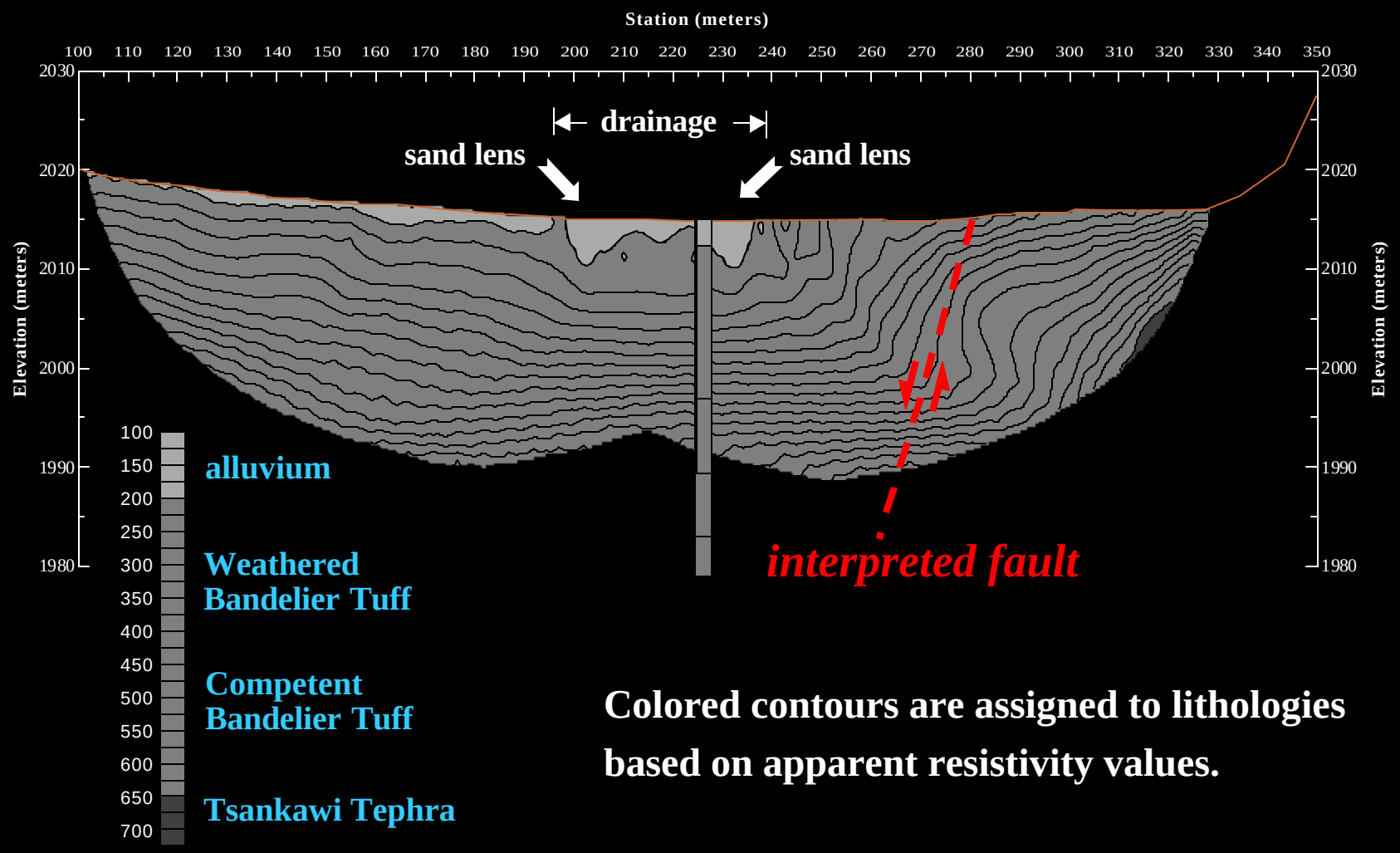
Plume Mapping



Lithologic Characterization

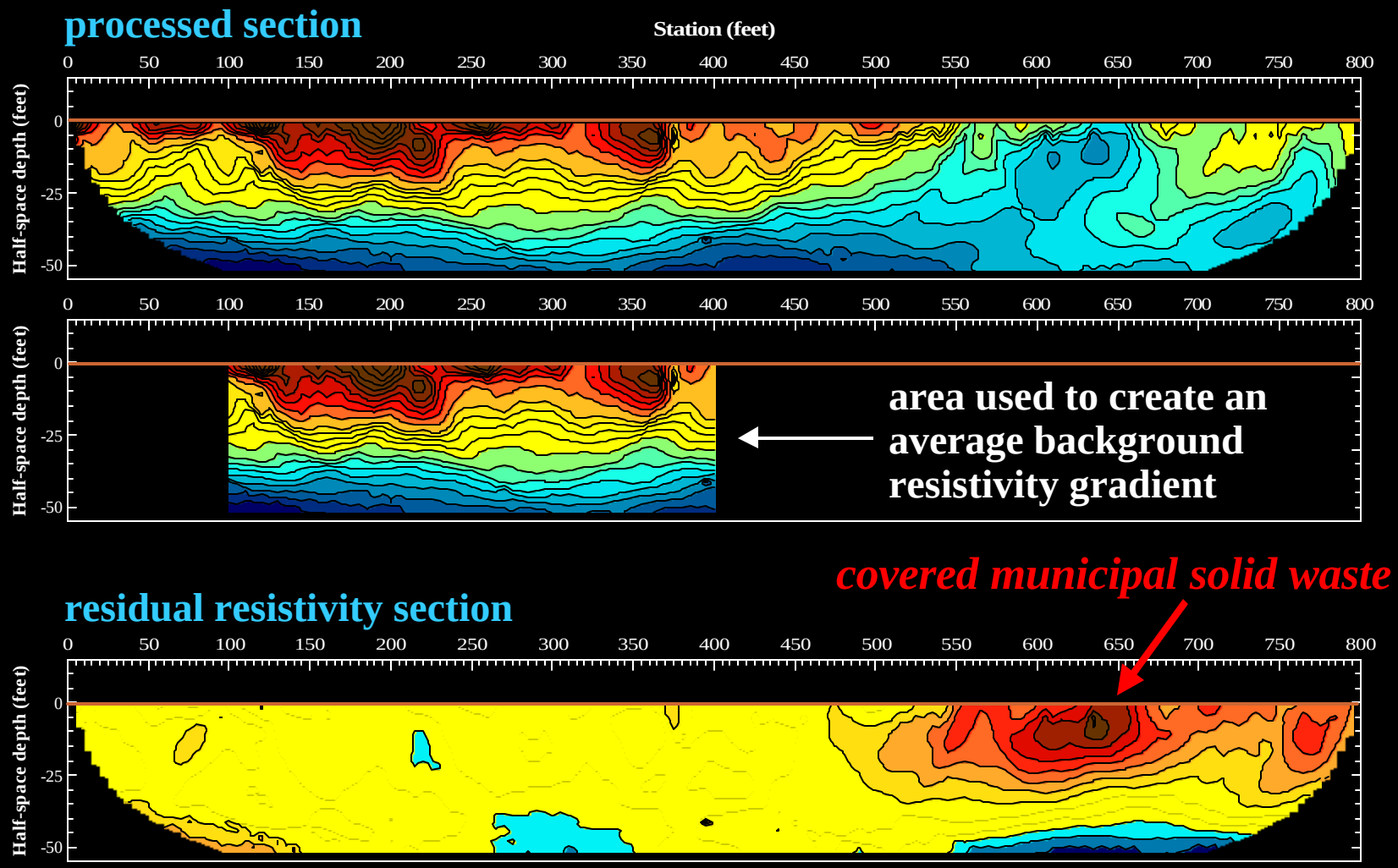


Lithologic Characterization



Colored contours are assigned to lithologies based on apparent resistivity values.

Landfill Detection and Delineation



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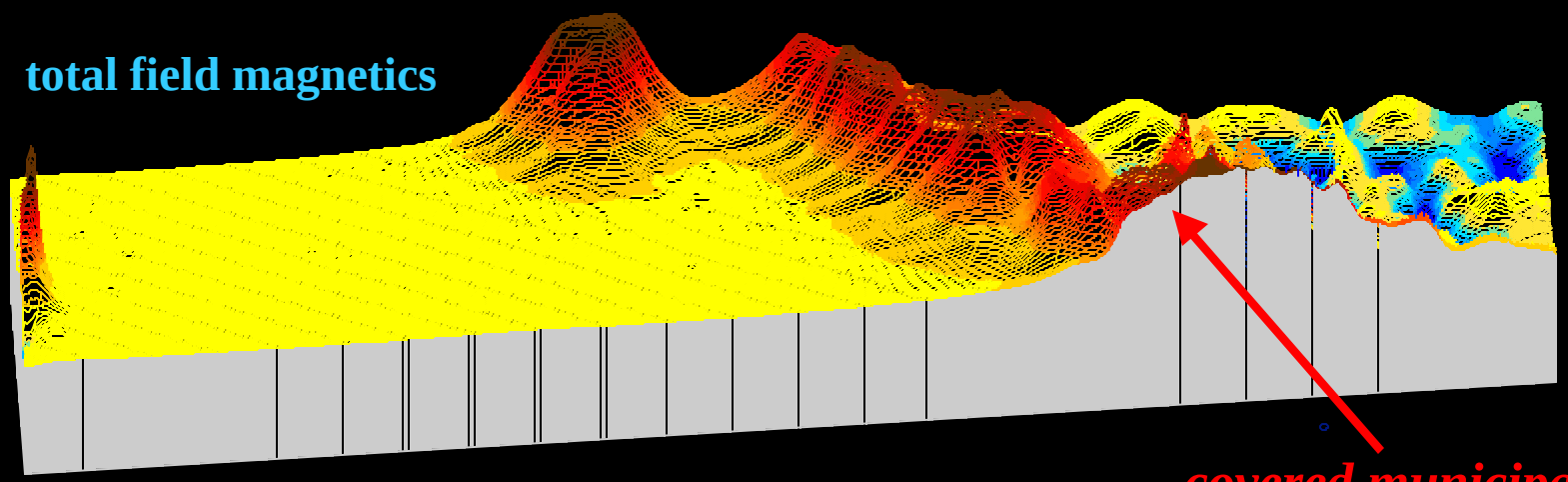
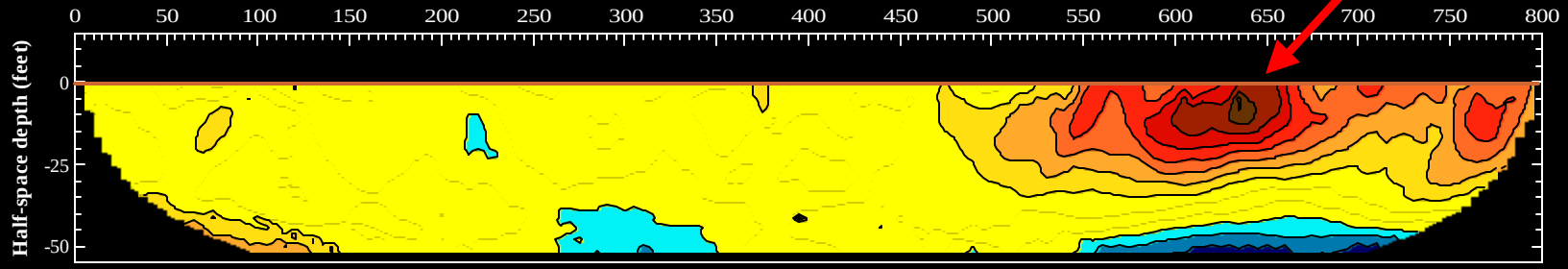
Landfill Detection and Delineation

total field magnetics

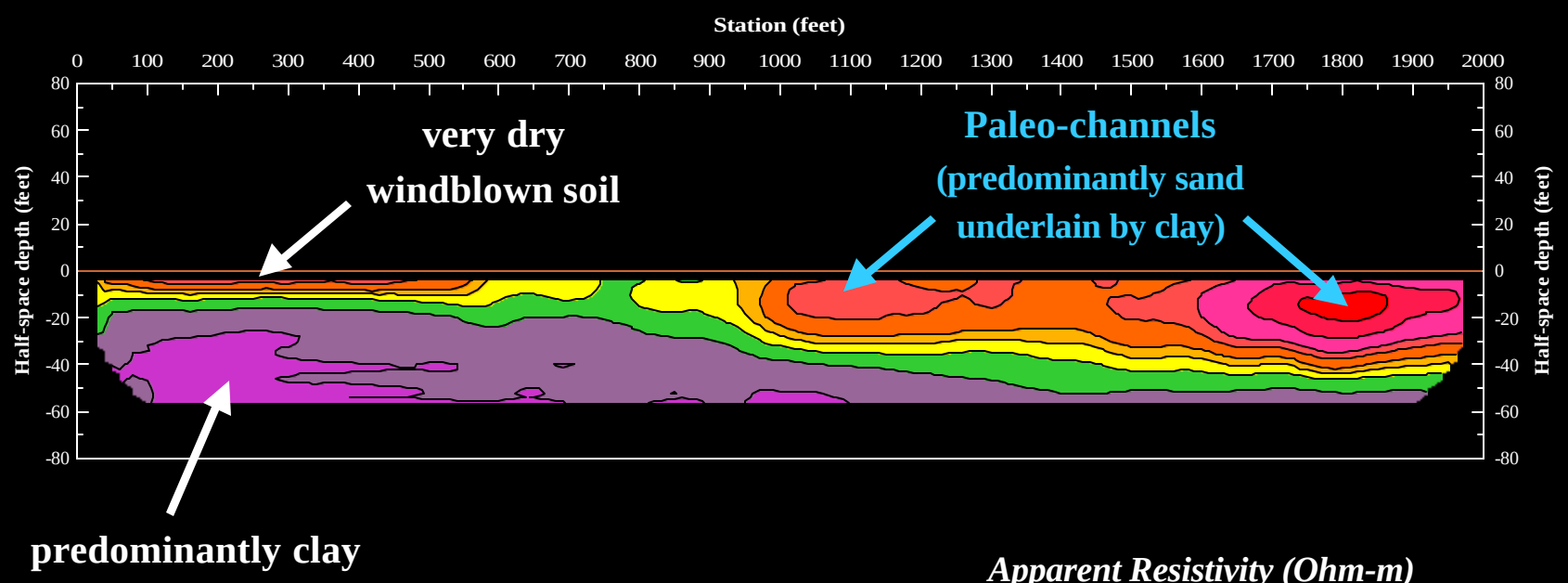


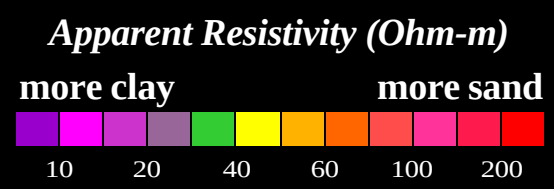
covered municipal solid waste

high resolution resistivity



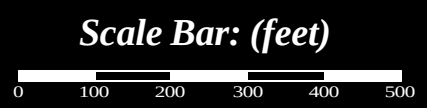
Alluvial Characterization



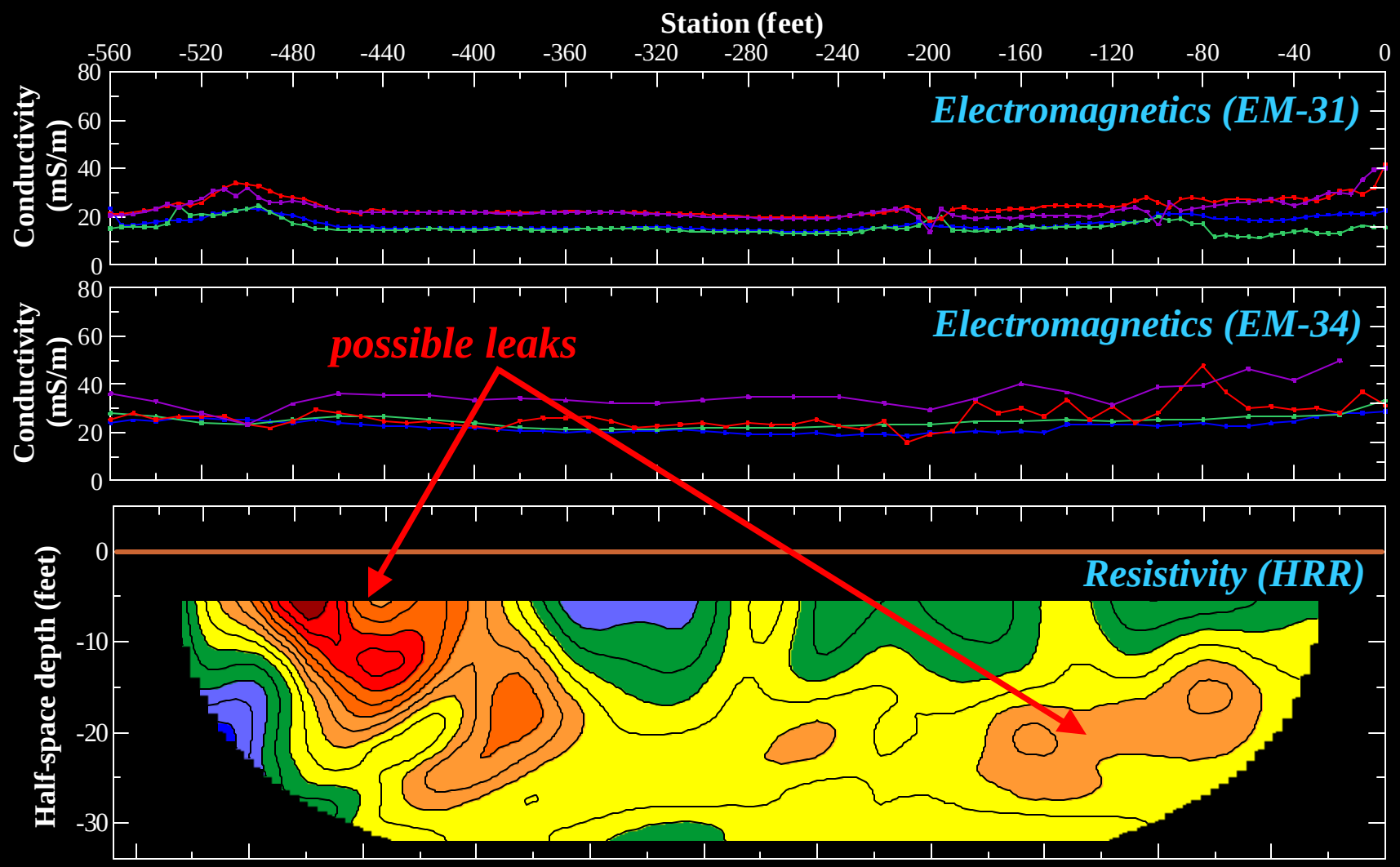


Applications of alluvial characterization:

- **recharge / infiltration site location**
- **perched aquifer delineation**



Method Comparison



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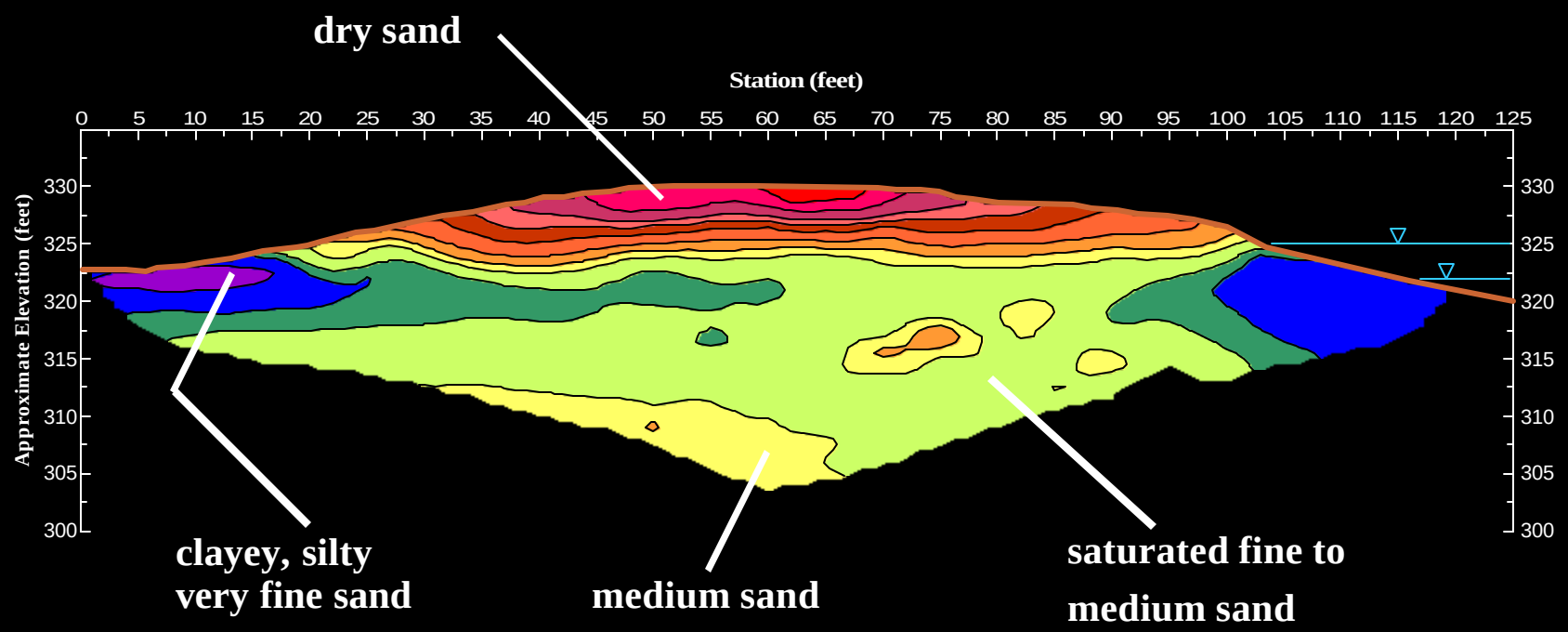
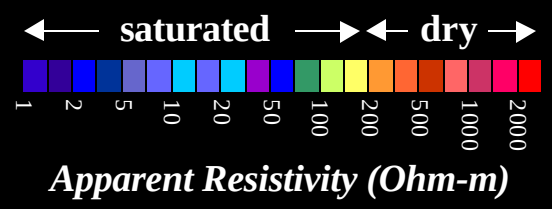
Grand Canyon Sand Bar Study

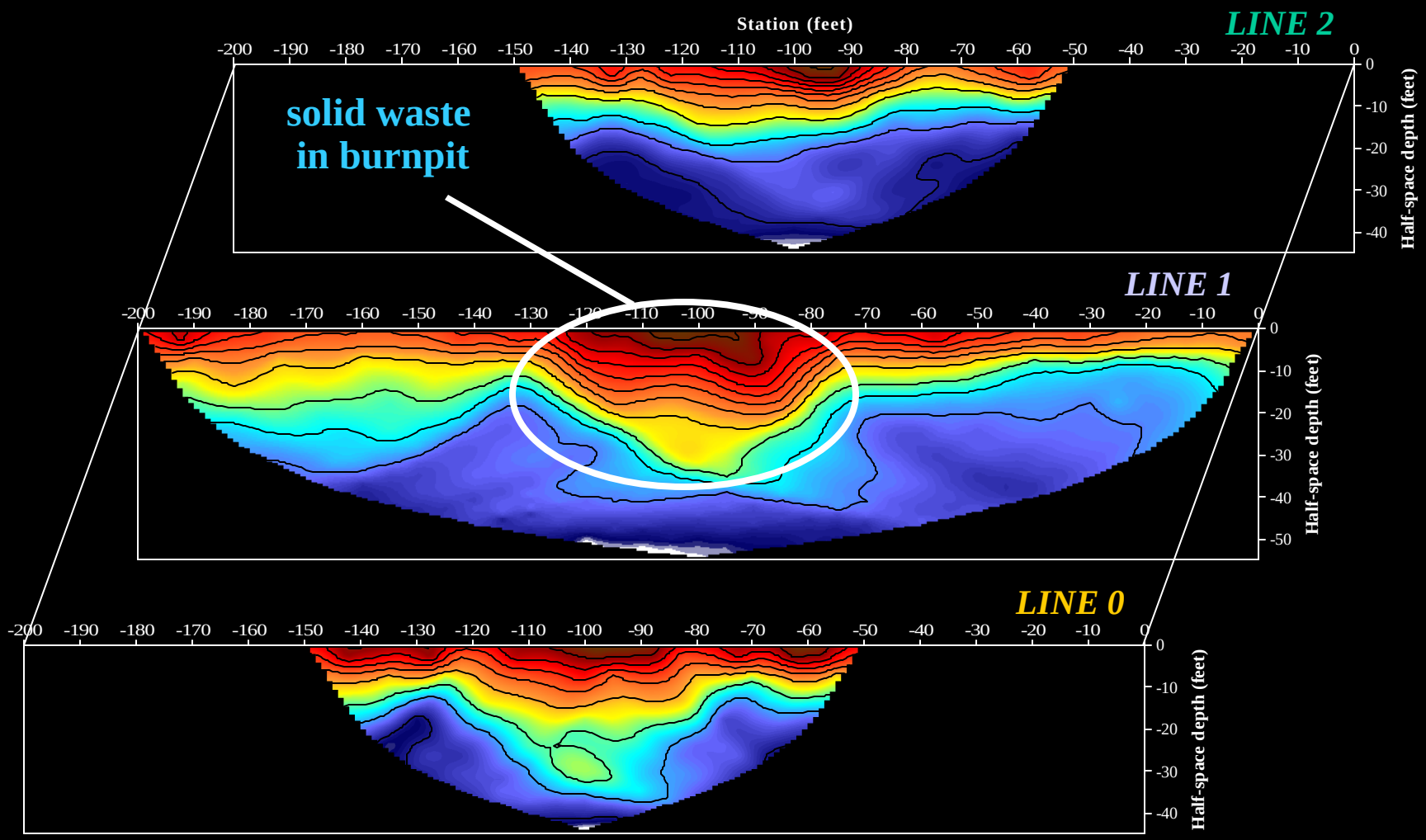


USGS sand bar erosion study

- Study the effects of erosion caused by dam control of the Colorado River
- Scouring versus dewatering



Buried Object Detection



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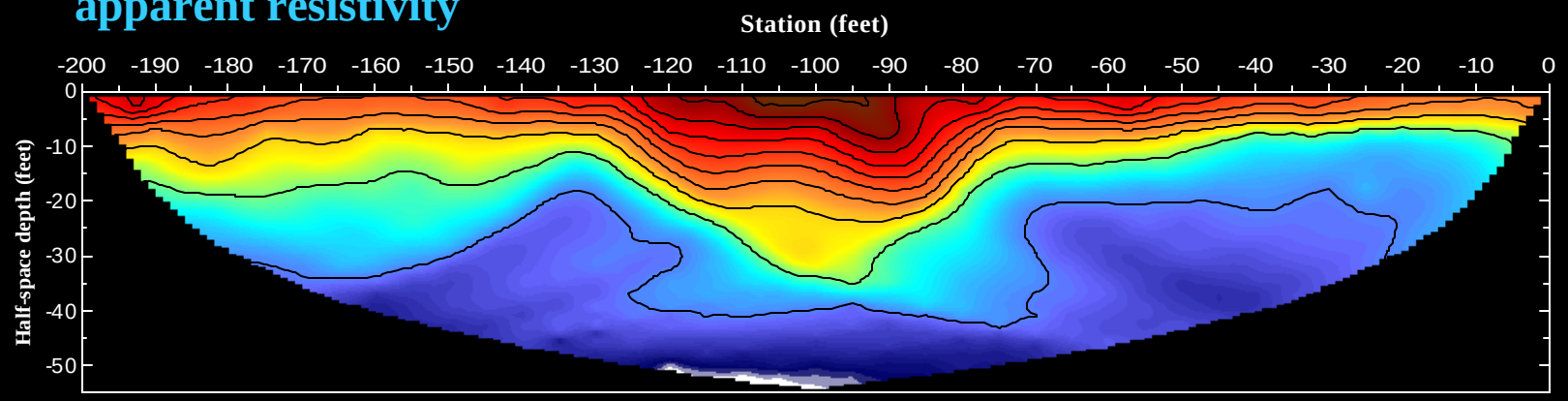
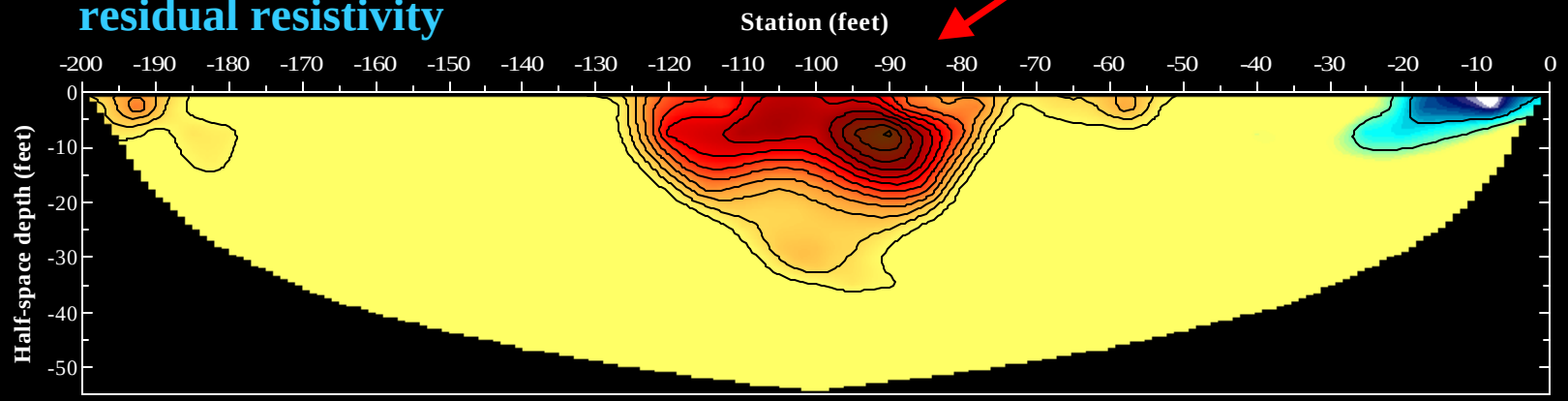
Background Removal

apparent resistivity

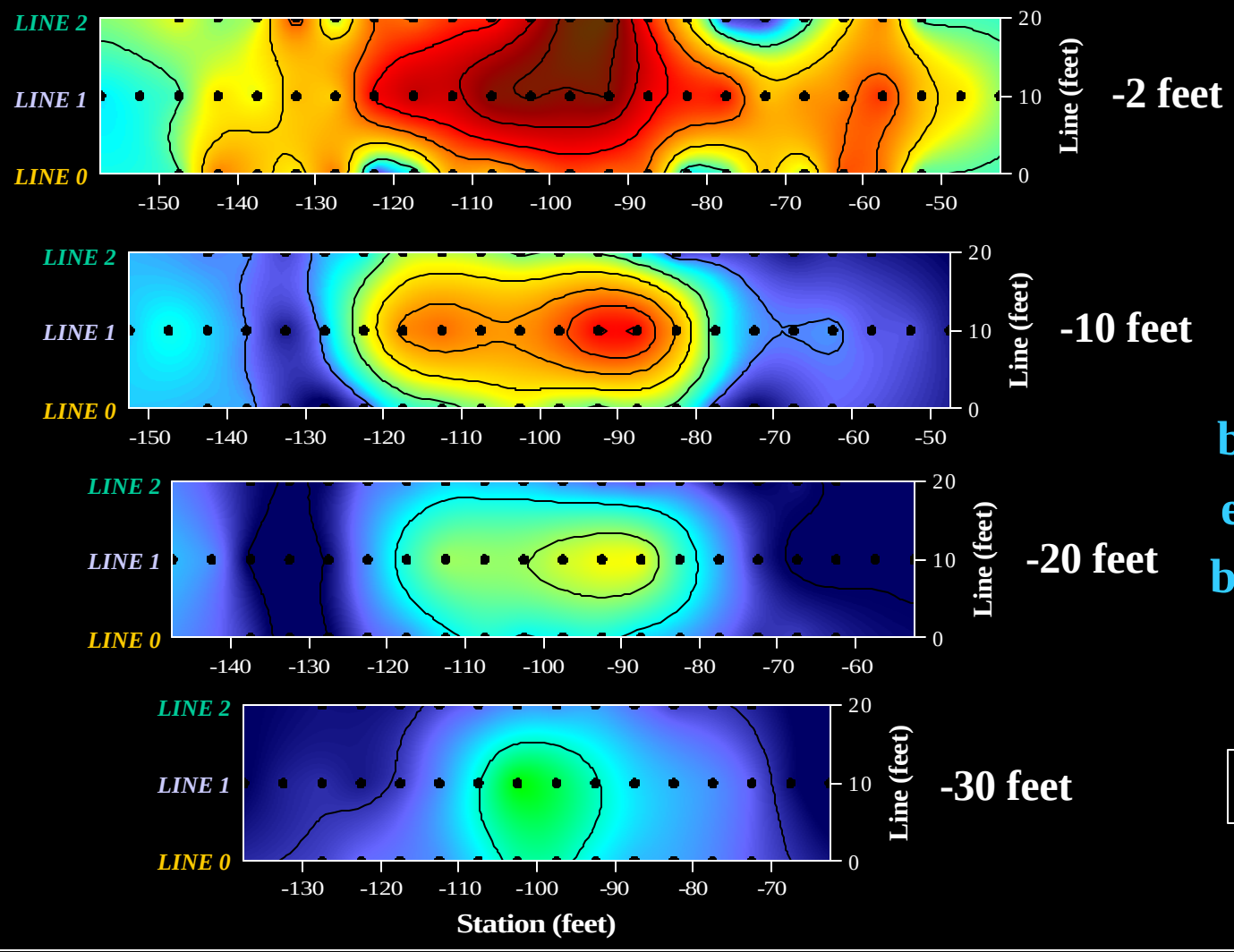


solid waste in burnpit

residual resistivity



Depth Cross Sections



Ability to map boundaries and effects at depth beneath burnpit

PLAN VIEW

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Summary

HRR Allows:

- **Better imaging of subsurface through increased resolution**
- **Topographic incorporation during reduction**
- **Non-invasive measurements**
- **Accurate depth estimates**
- **Diverse applications**
- **Fast and cost effective coverage**
- **Presentation in an easy-to-understand format**

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THANK YOU

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