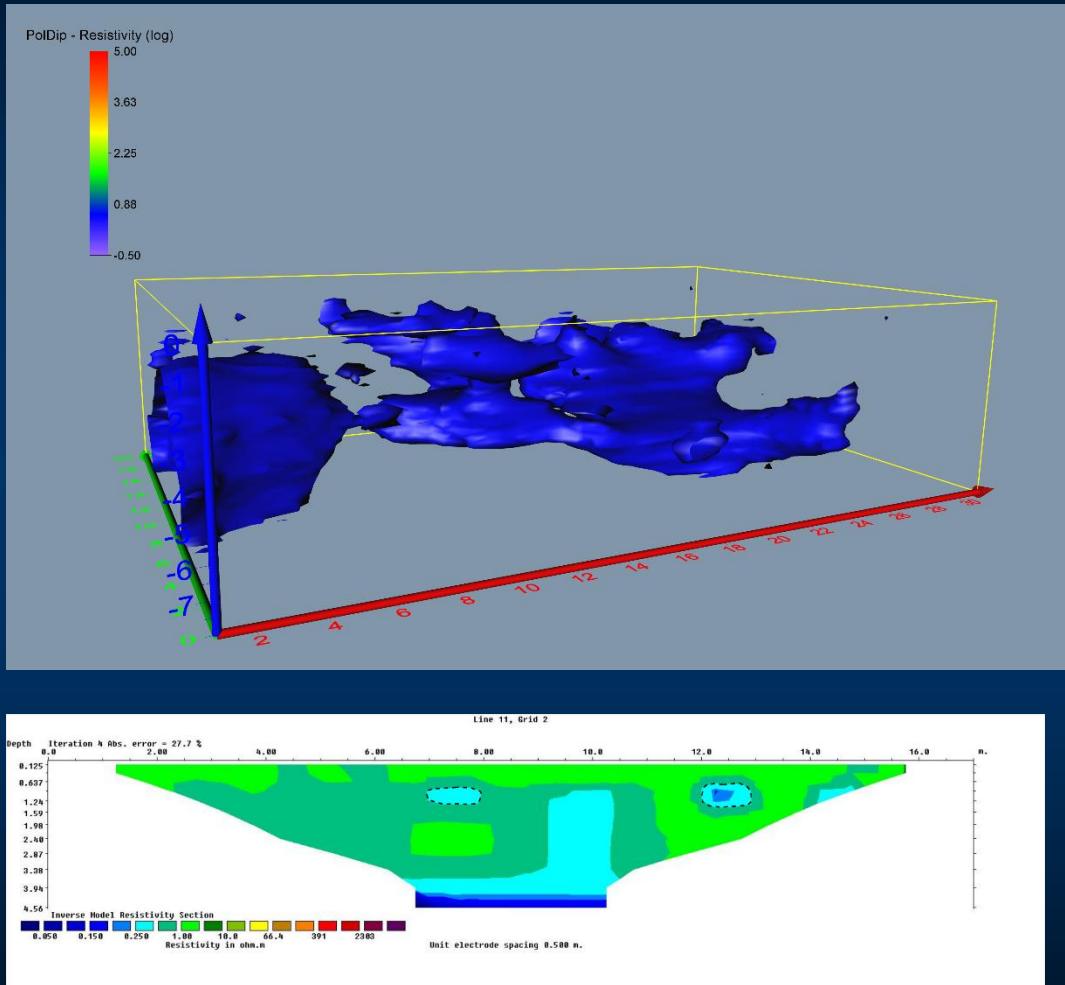


An Introduction to ERT

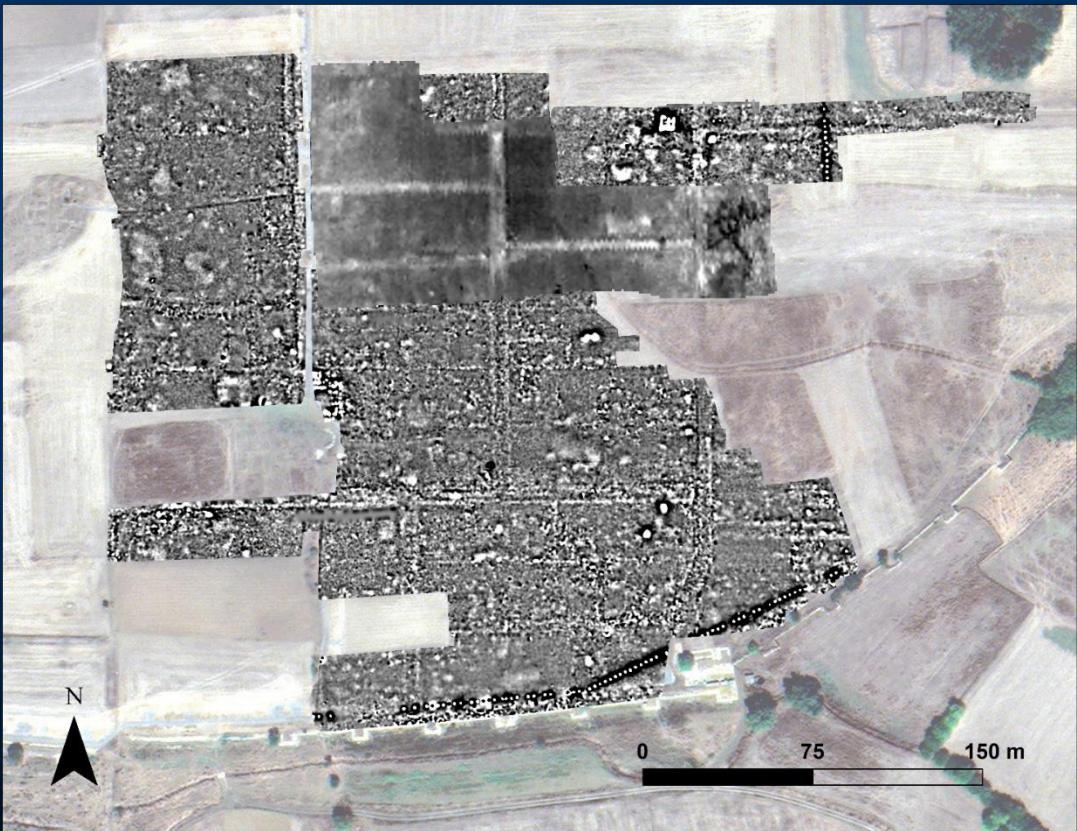


Who am I?

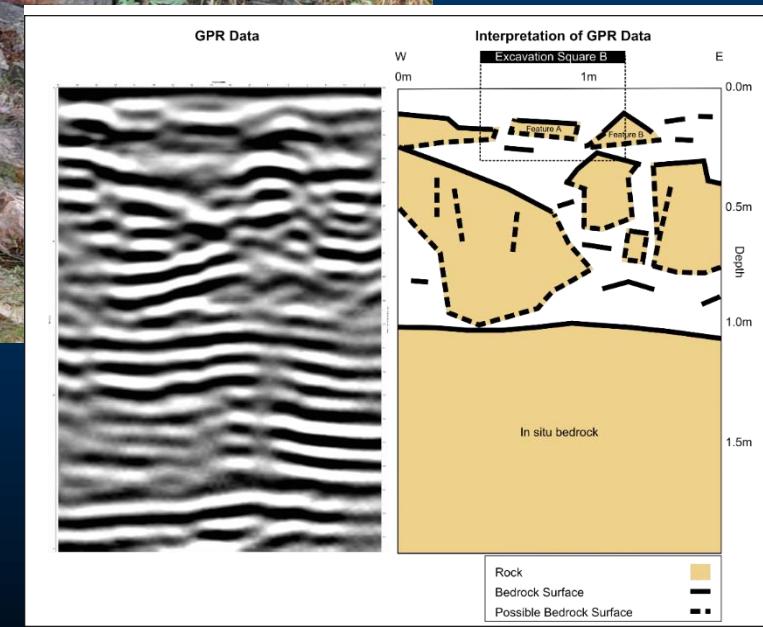
- Commonwealth Rutherford Fellow at the University of Cambridge
- ARC DECRA Research Fellow in Archaeological Science at Flinders University
- Former Postdoctoral Researcher at IMS-FORTH in Crete
- PhD from ANU in archaeological geochemistry
- BA (History and English) and BSc (Hons) (Earth Science) from UQ



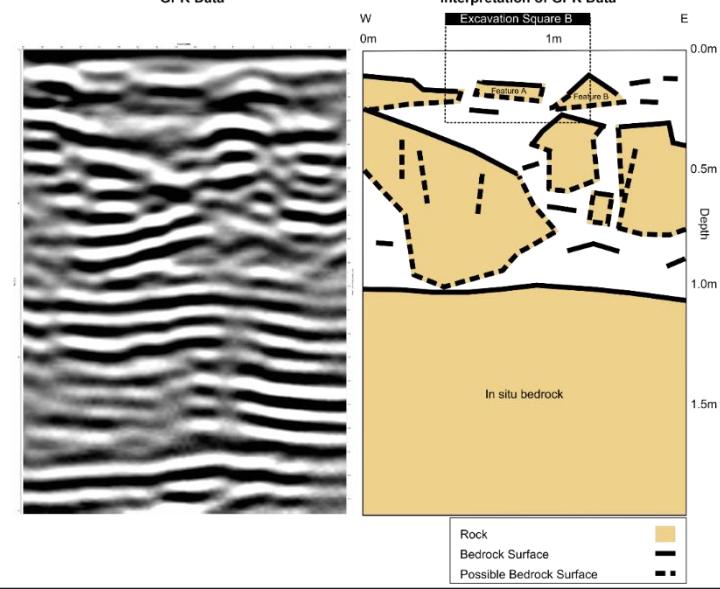
Landscape Scale Geophysical Survey



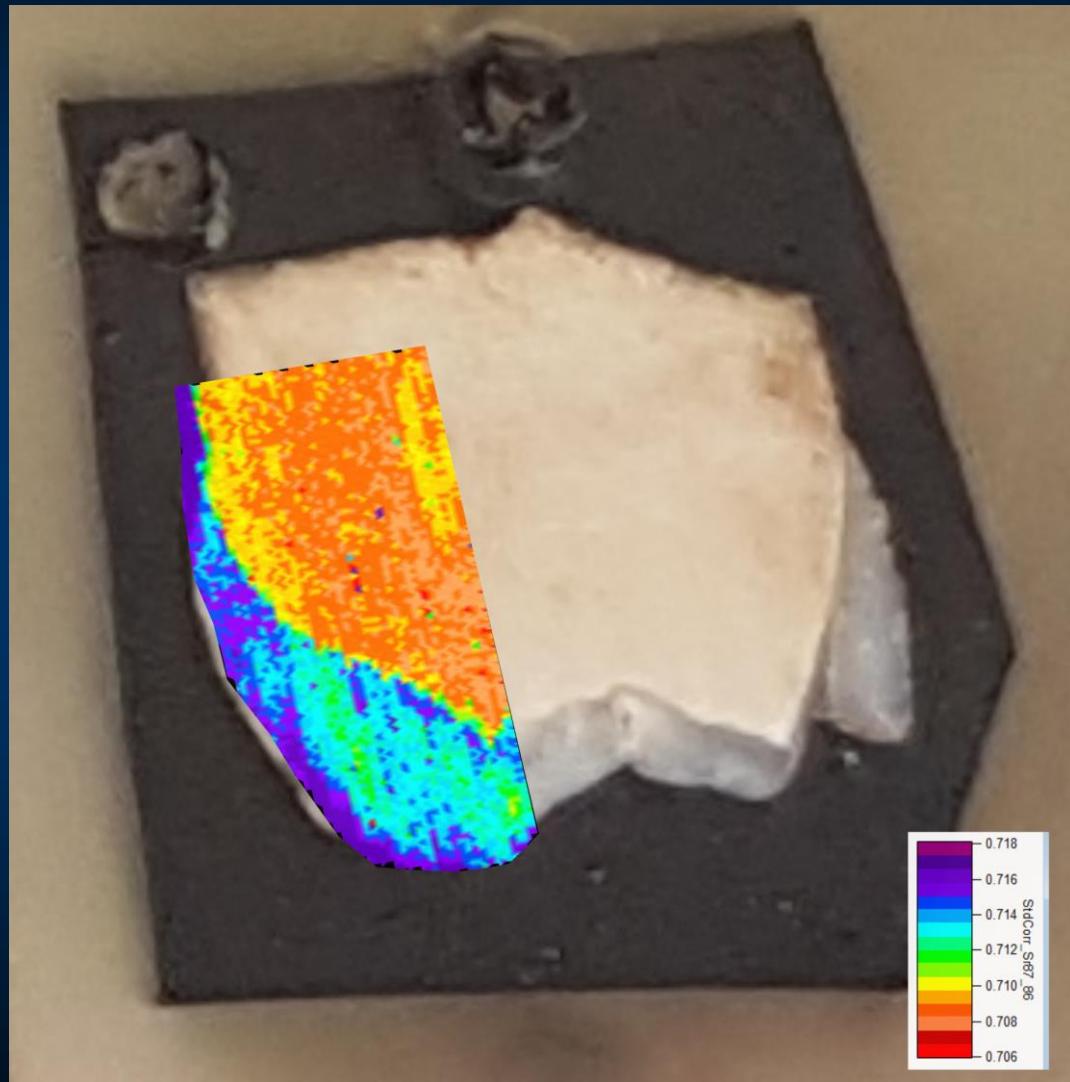
Understanding Archaeological Caves



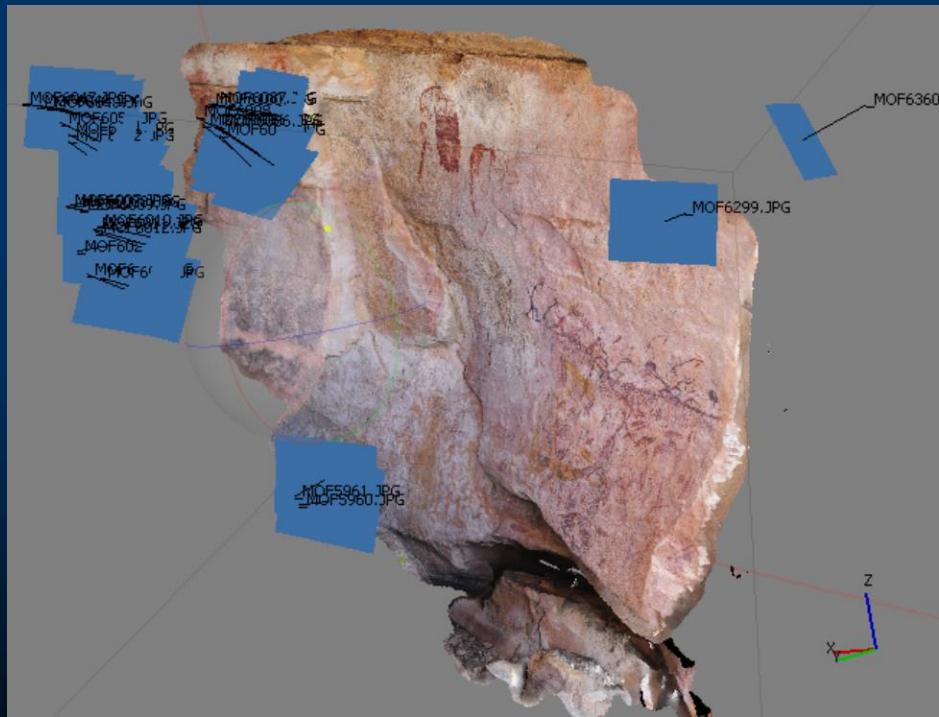
Interpretation of GPR Data



Geochemistry of Biogenic Carbonates



3D Modeling of Archaeological Sites



What is geophysics?

The measurement and interpretation of the earth's physical properties, often by remote means.



Advantages

100% Site Coverage
Non Invasive
Rapid
Quantitative
Multi-technique



The Caveat

Geophysical techniques
simply detect variations
in physical properties.
The interpretation of
how these variations
represent subsurface
conditions is critical



A Practical Demonstration



This?



Or This?

Resistivity

- Measures the resistance of the subsurface in profiles or as 1D soundings.
- Practically approximately 70m penetration in urban areas dependant on electrode spacing and array length.
- Electrode spacing governs possible target size.
- Expensive because of slow line kilometer rate and requires specialist interpretation.

Resistivity

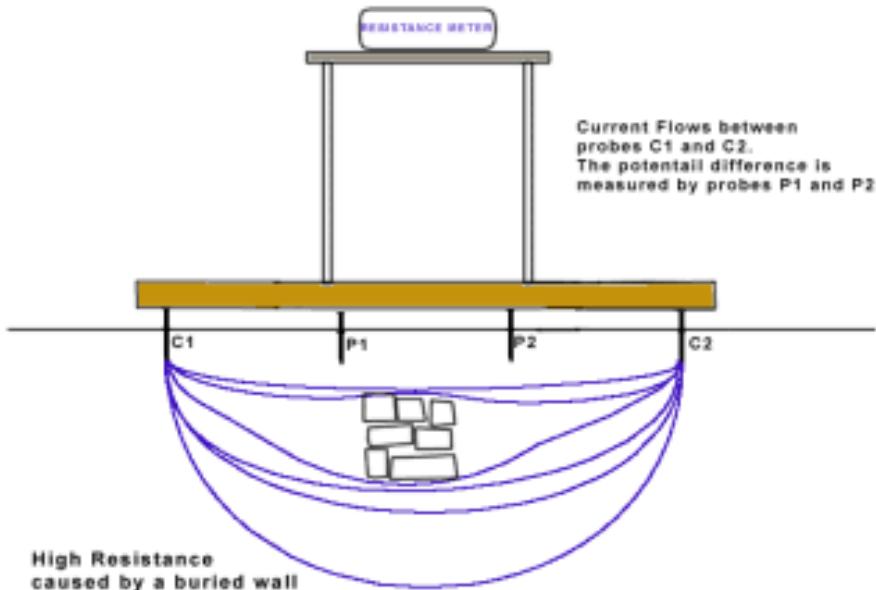
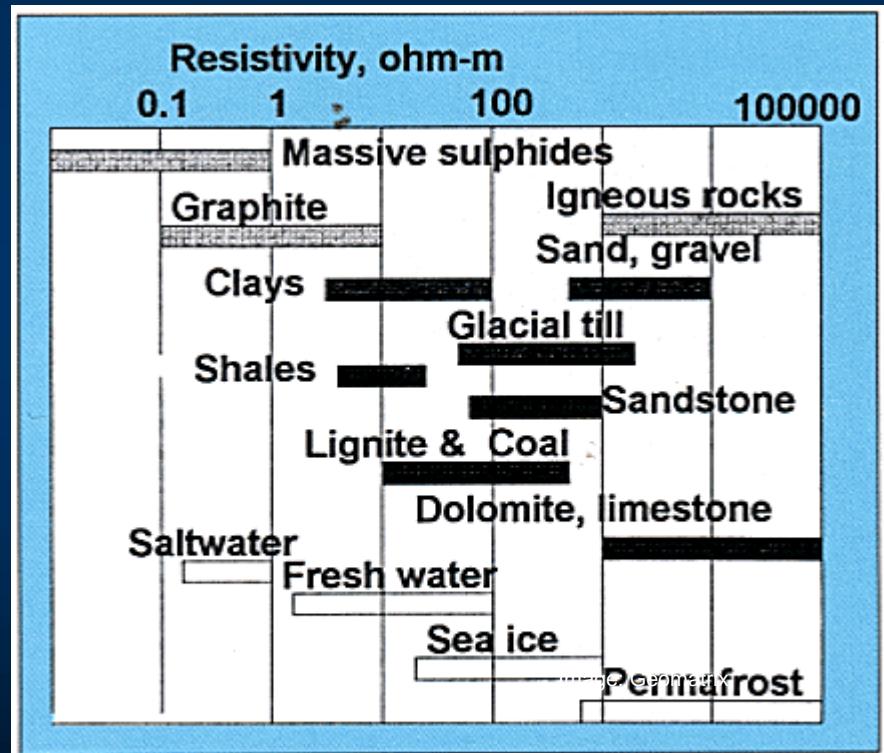


Image: J.M. Leigh Surveys

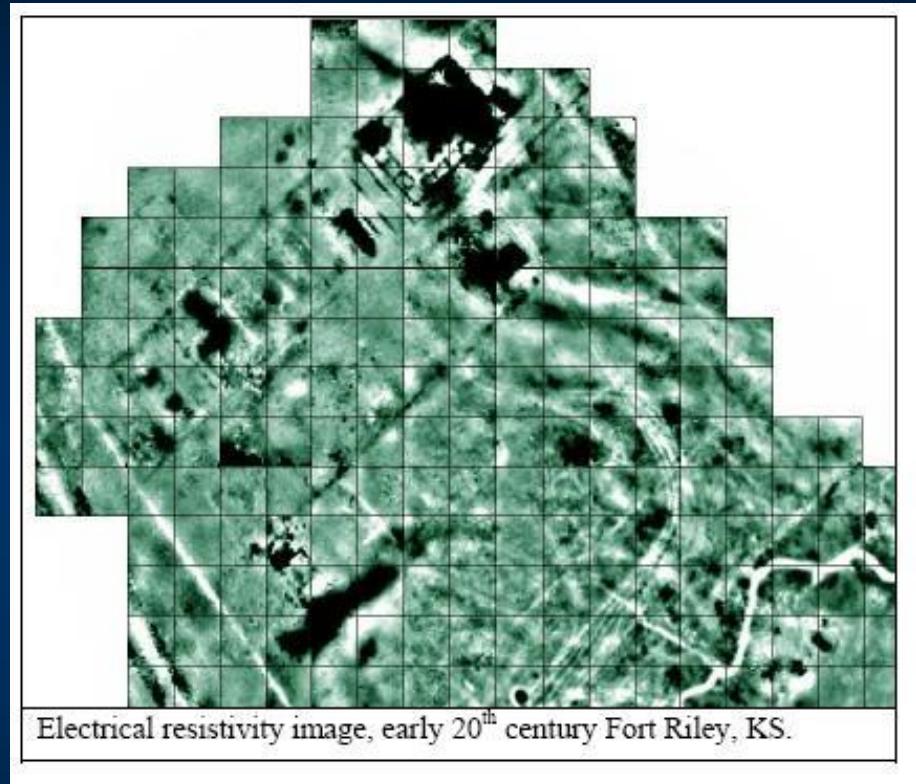


Approximate electrical resistivity ranges for different types of rock, soil and water

Resistivity Mapping



Image: Archaeology South East

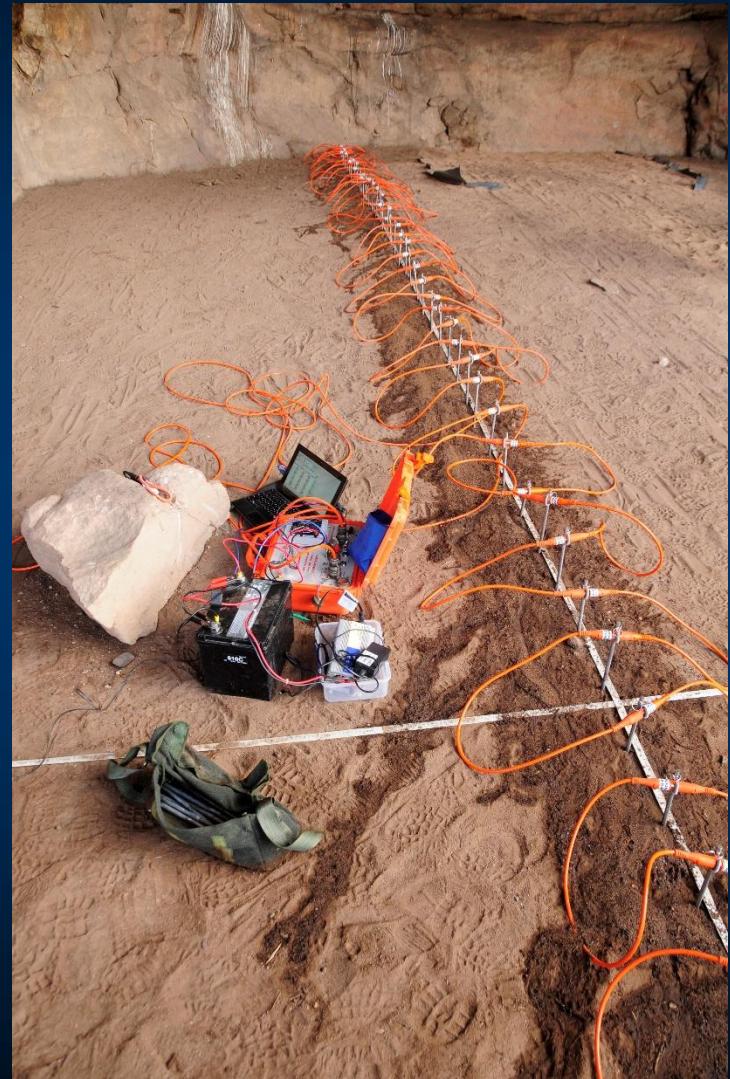


Electrical resistivity image, early 20th century Fort Riley, KS.

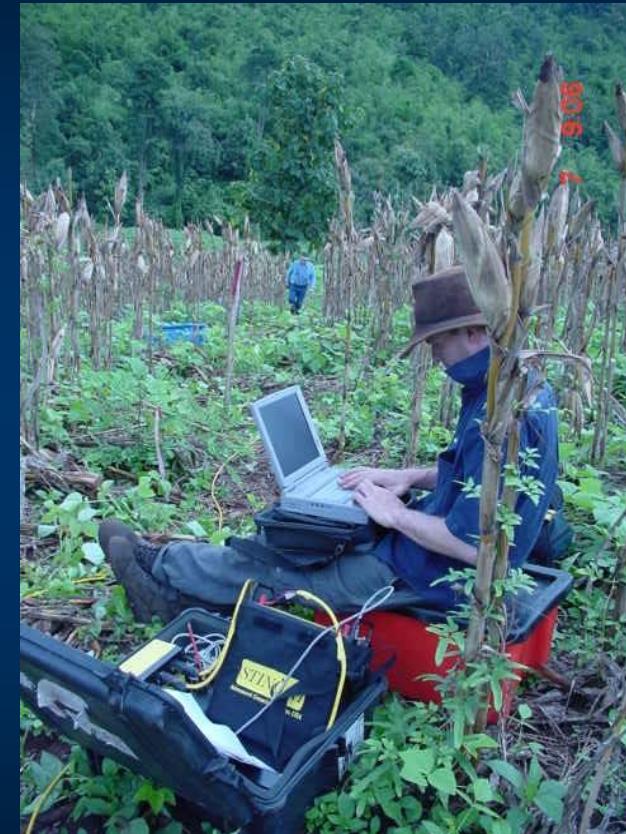
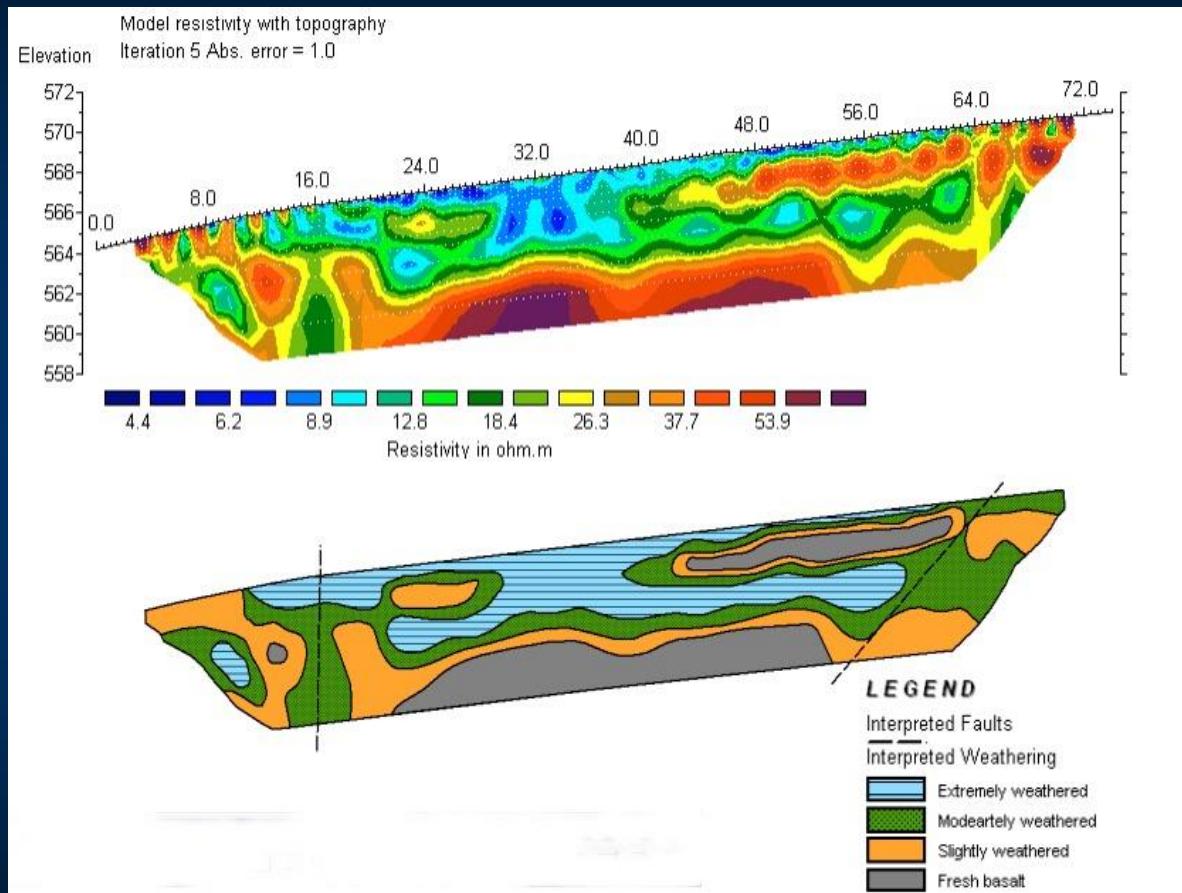
Image: CAST

Electrical Resistivity Tomography (ERT)

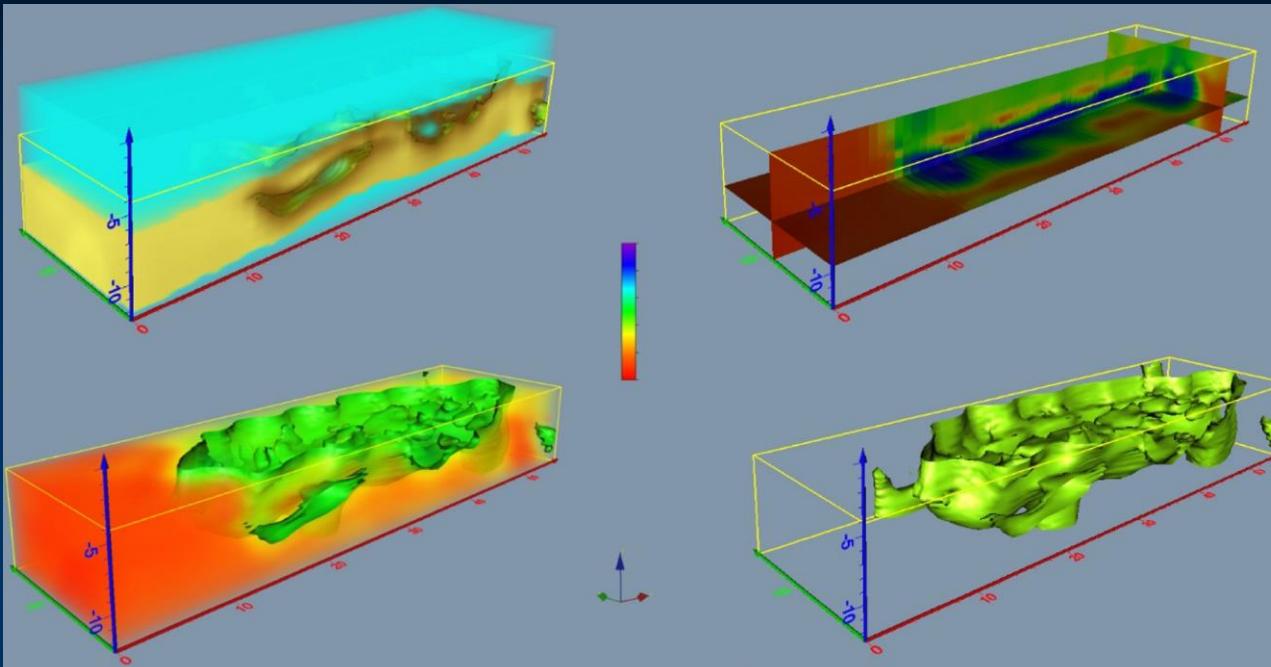
- Uses multiple electrodes to create a much denser data set
- Produces 2D or 3D data
- Slow and labor intensive to collect but excellent for sites where depth is a problem for GPR



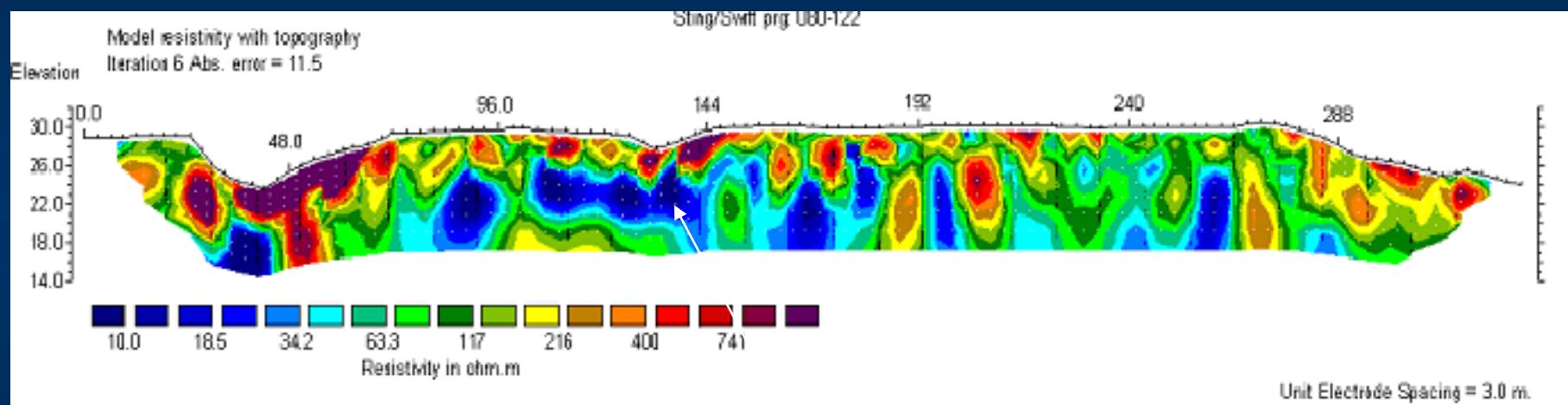
2D ERT



3D ERT

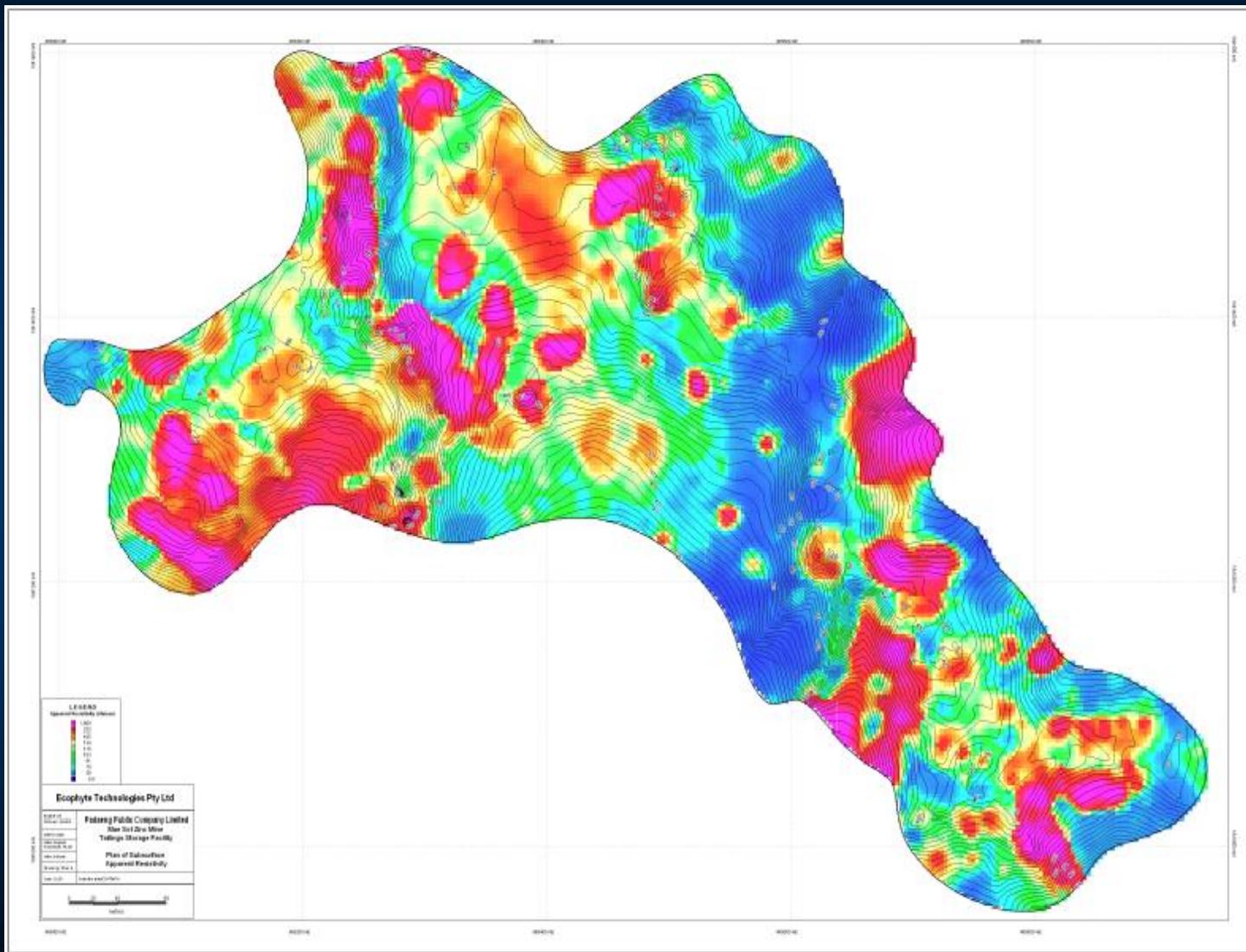


Abandoned Mine Detection

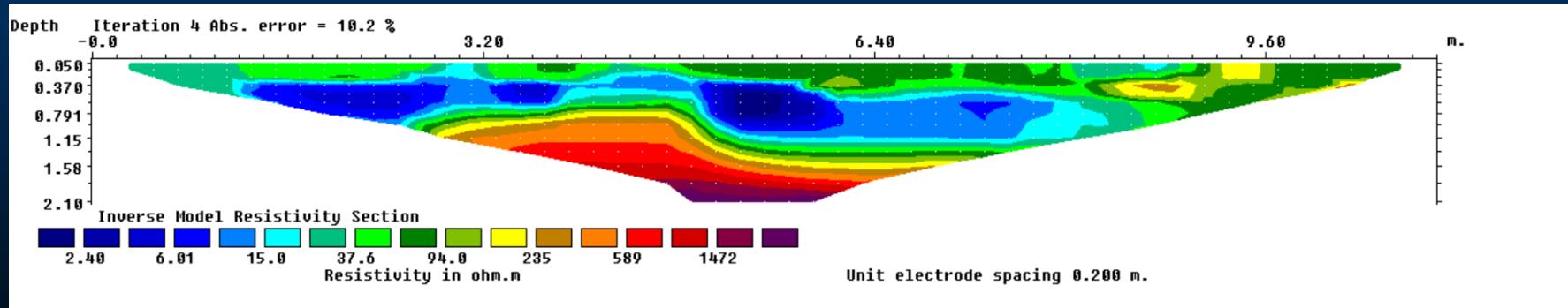


Abandoned Coal Mine

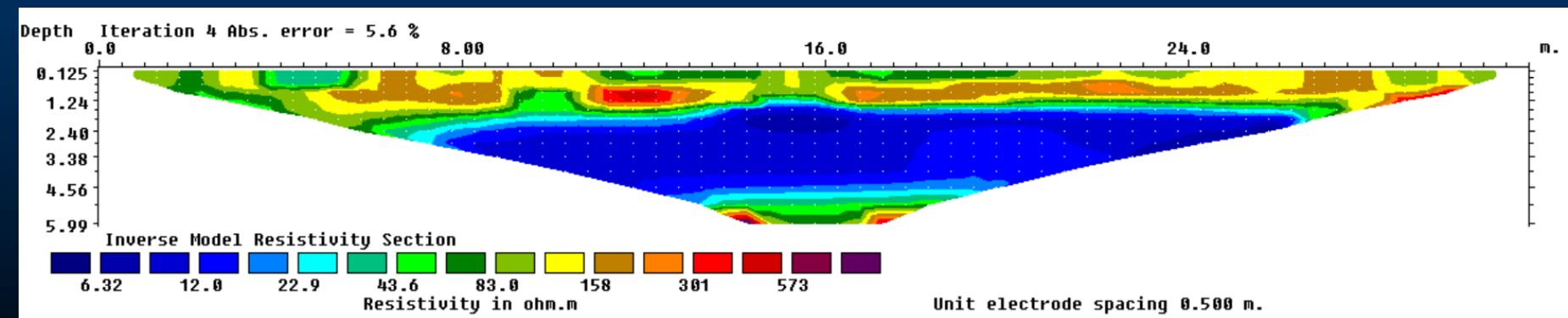
Mapping Karst in Plan View



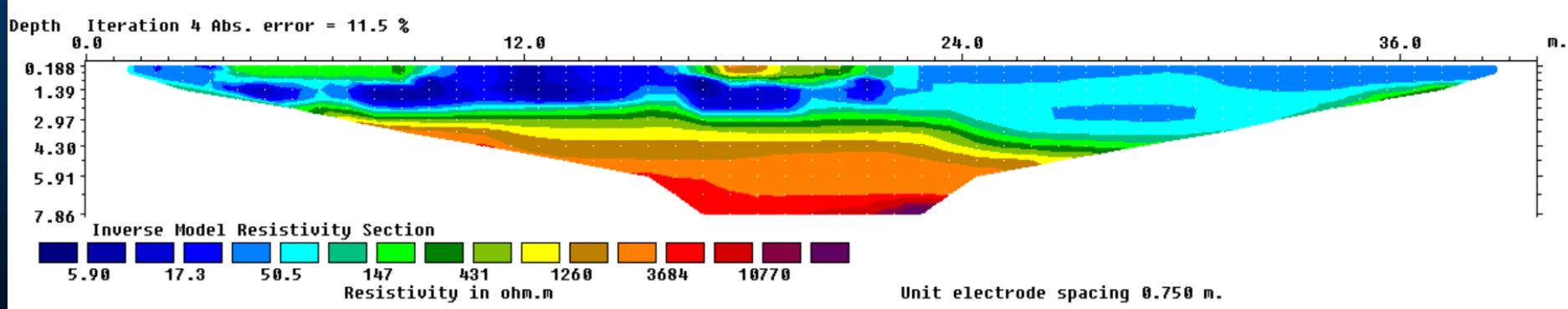
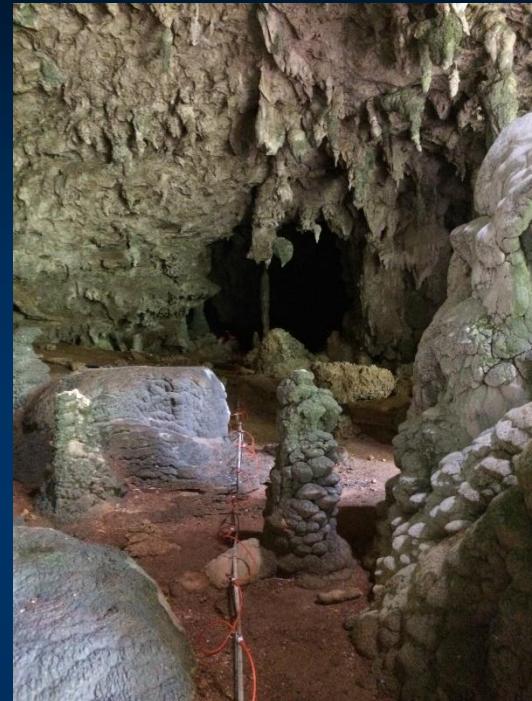
Moro Gorge Bedrock Detection



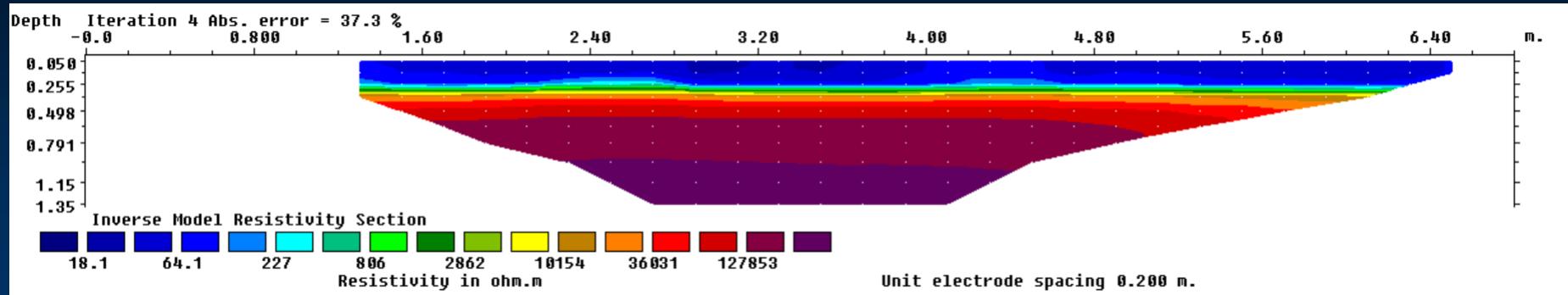
Leang Bulu Bettue



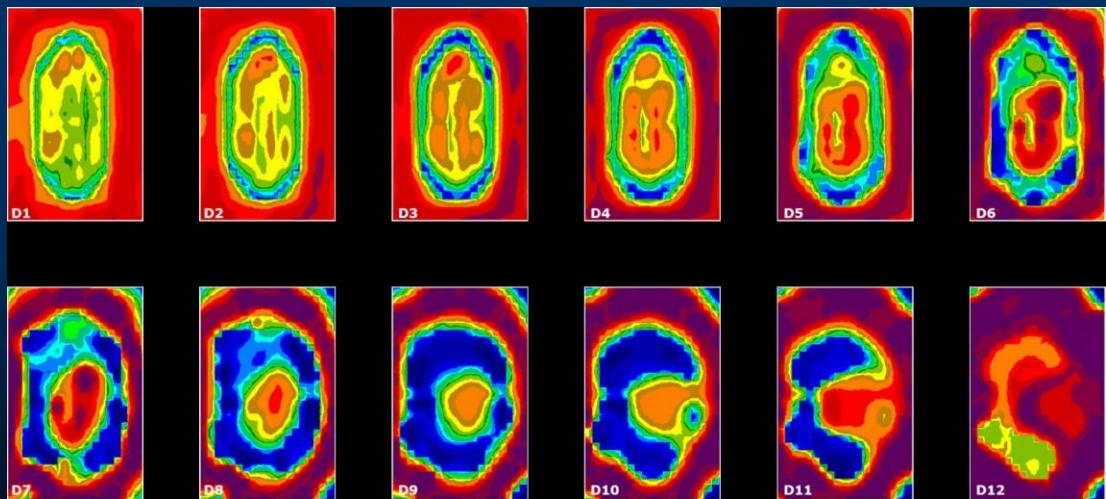
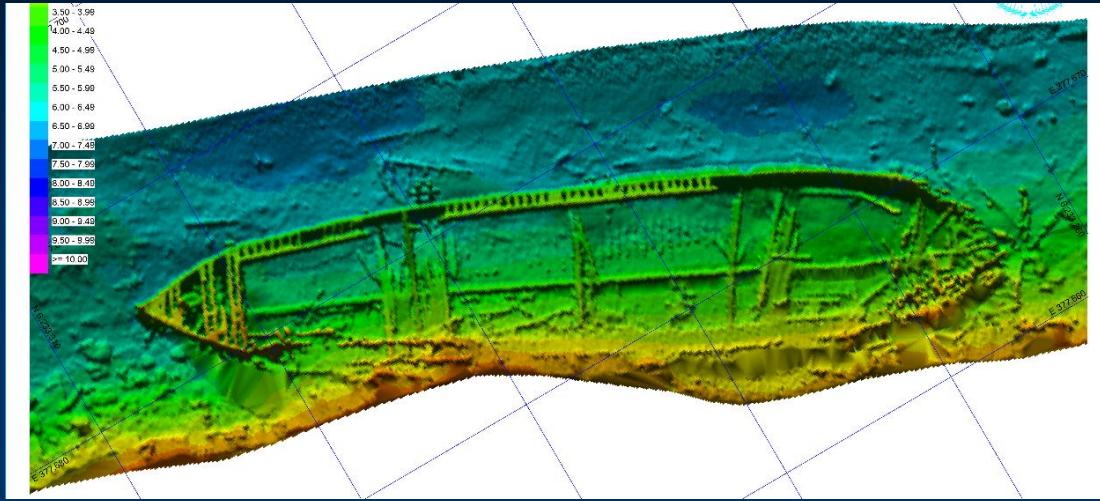
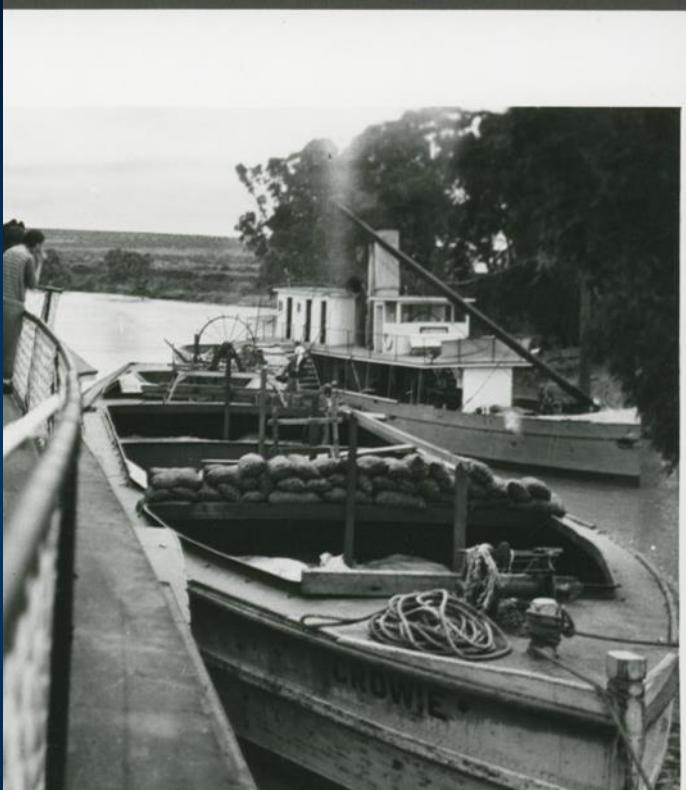
The “Other Cave”



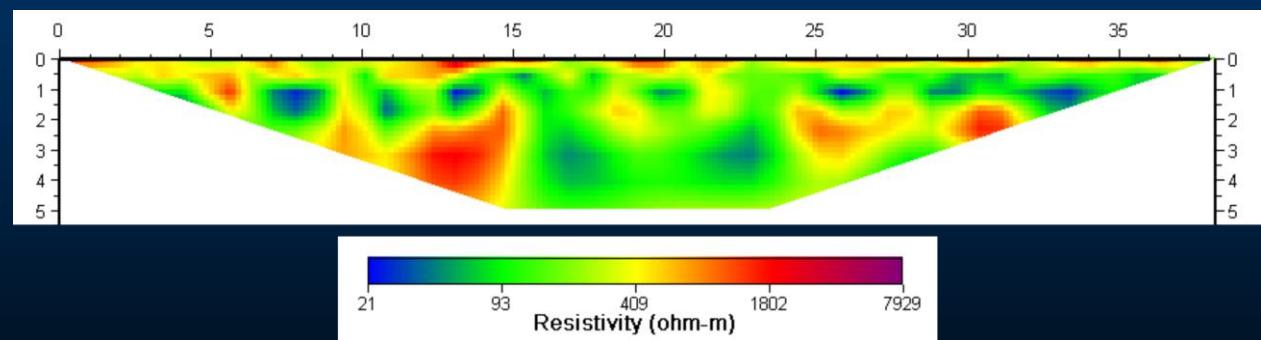
Mertenhof



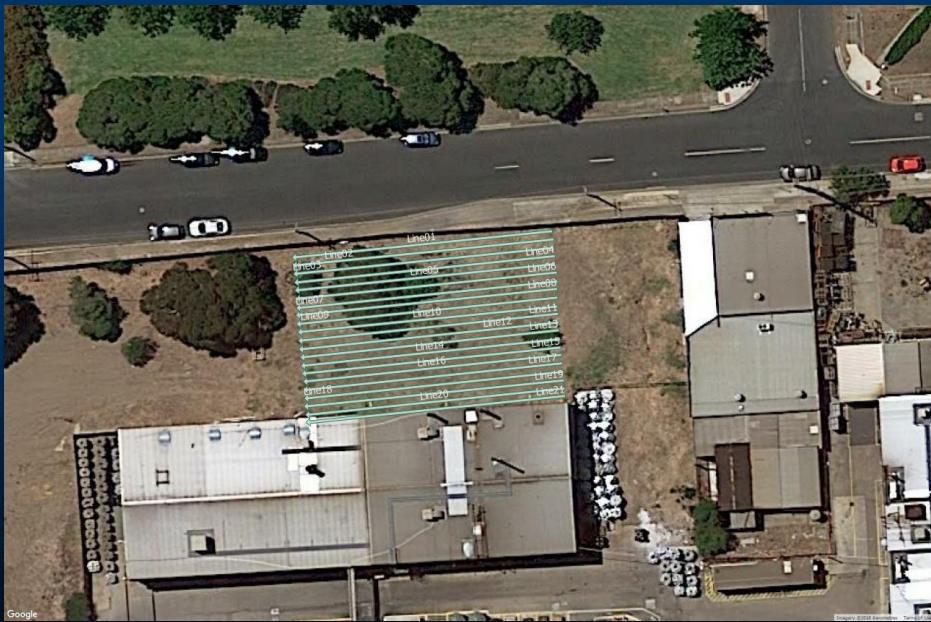
Crowie



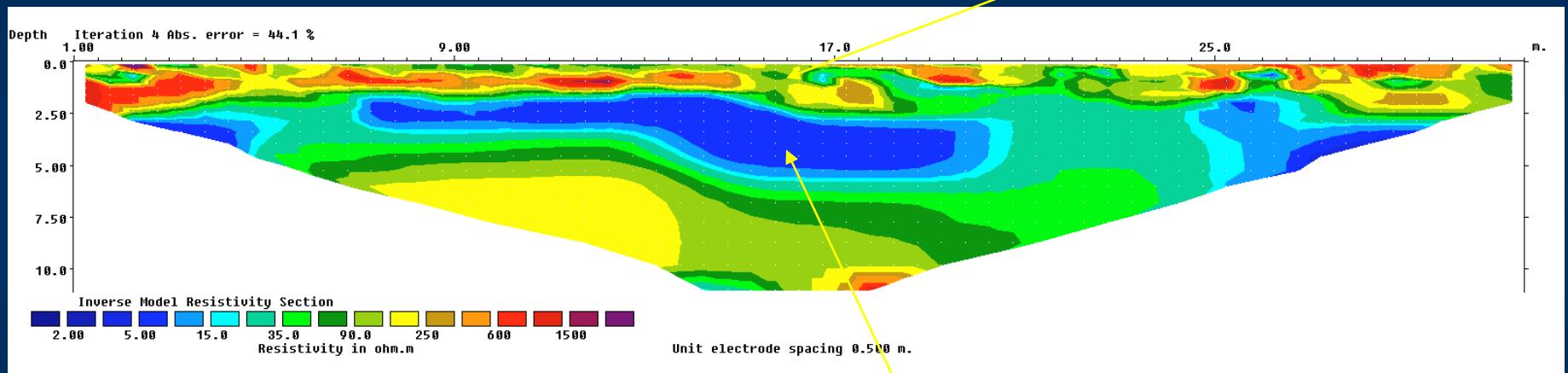
Burial Detection



Castalloy Site



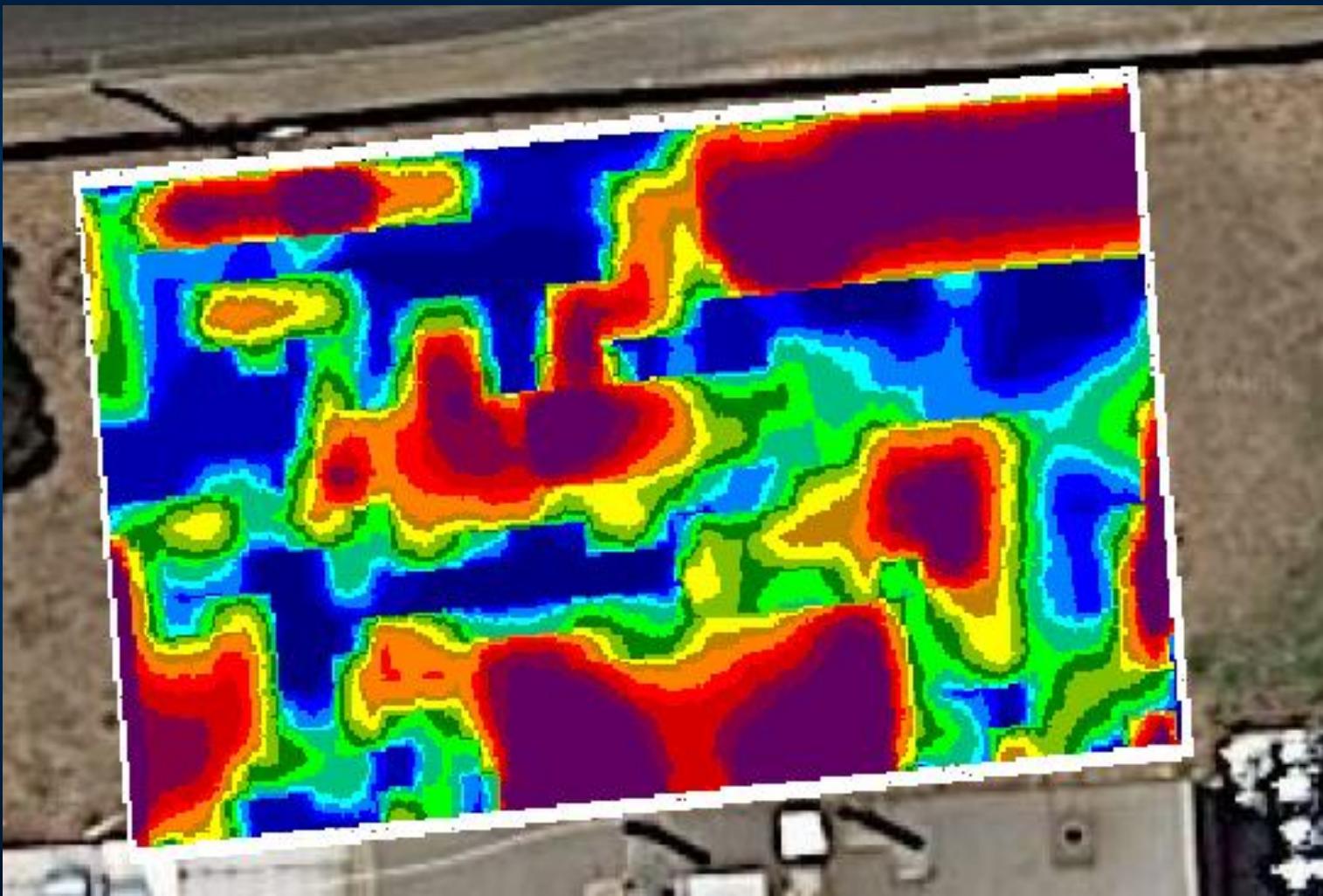
Castalloy 2D



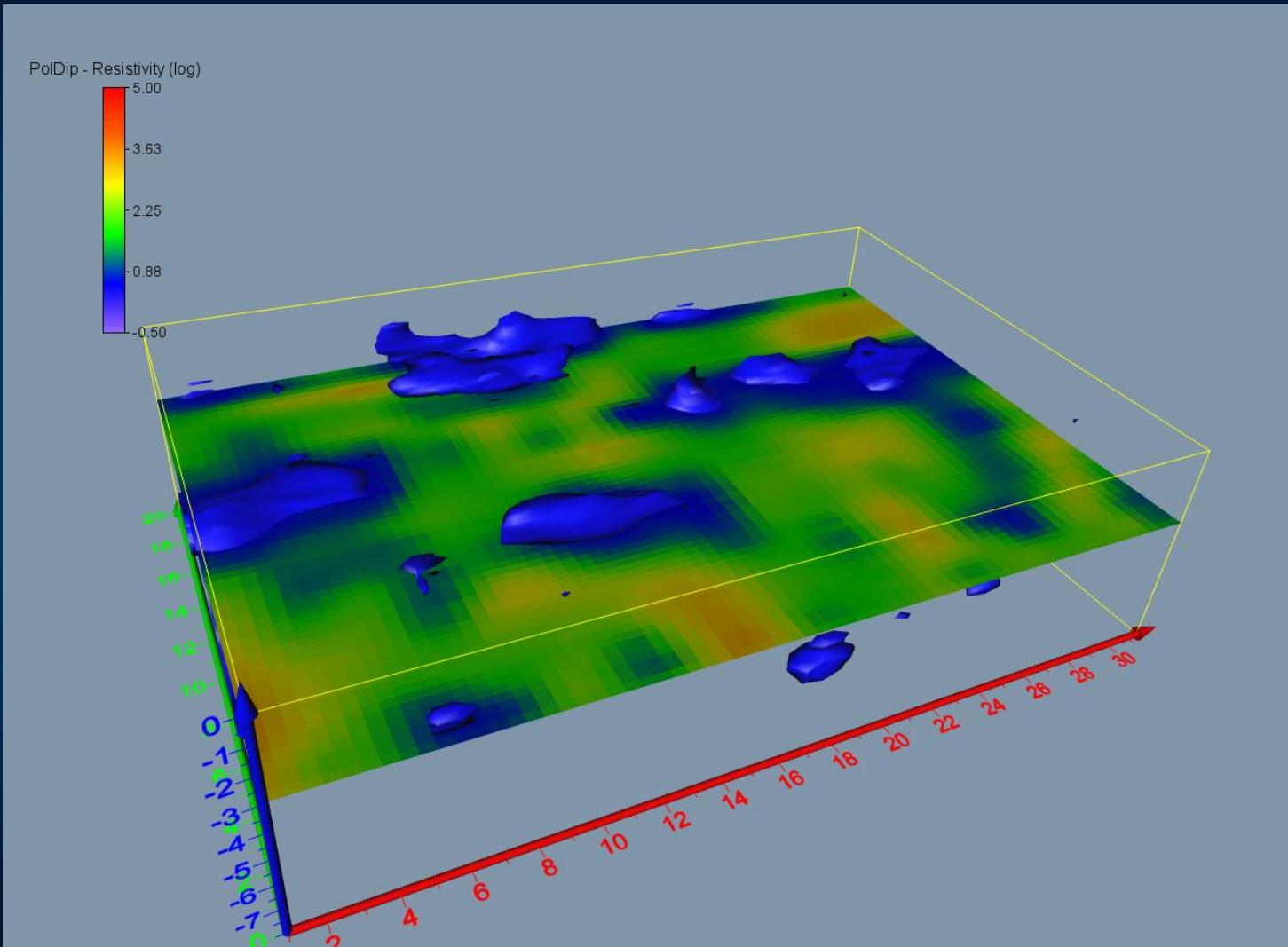
Soil and Fill

Conductive Unconsolidated Sediment

Castalloy Slice



Castalloy 3D



Acknowledgements

ARC Grant #DE160100703

Lisa and Barry from Morgan Waterfront Marina

ZZ Resistivity Imaging

Project Collaborators

Students and Postdocs