Caracle Creek

Adding Value to Geophysical Data:

Processing
Modelling
Interpretation

Jenna McKenzie, Hon.B.Sc., P.Geo.

Who We Are

- Jenna McKenzie, Hon.B.Sc.,P.Geo.
- Julie Palich, M.Sc.,P.Geo.
- Wei Qian, PhD.,P.Geo.
- Rob Gordon, MBA, P.Eng.

Who We Are – Collective Experience

- Airborne: Magnetics, TDEM, FDEM, ZTEM, Gravity Gradiometry
- Ground: Magnetics, Gravity, HLEM, IP/Resistivity, GPR, TDEM, MT, Titan, Seismic

Backed by an experienced team of geologists

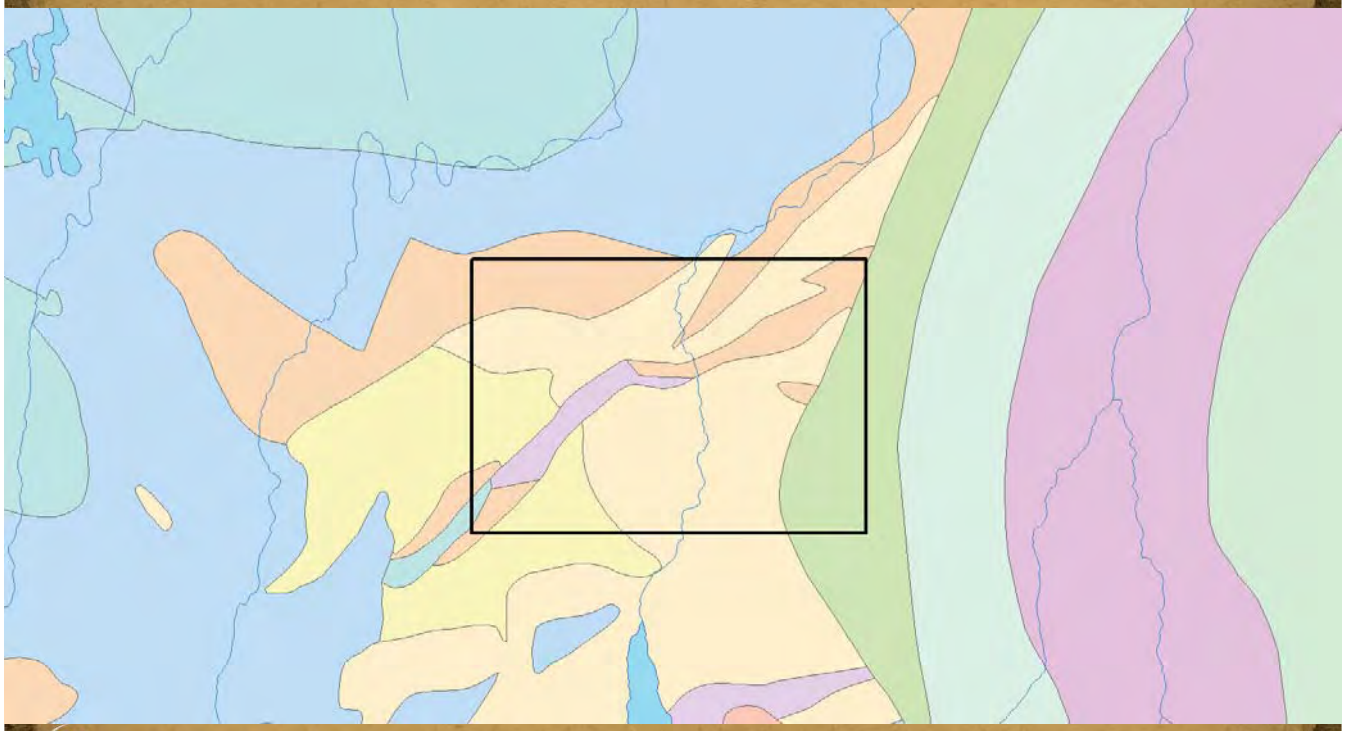
Caracle Creek

Adding Value to Geophysical Data

SURVEY DESIGN

Caracle Creek

Survey Design



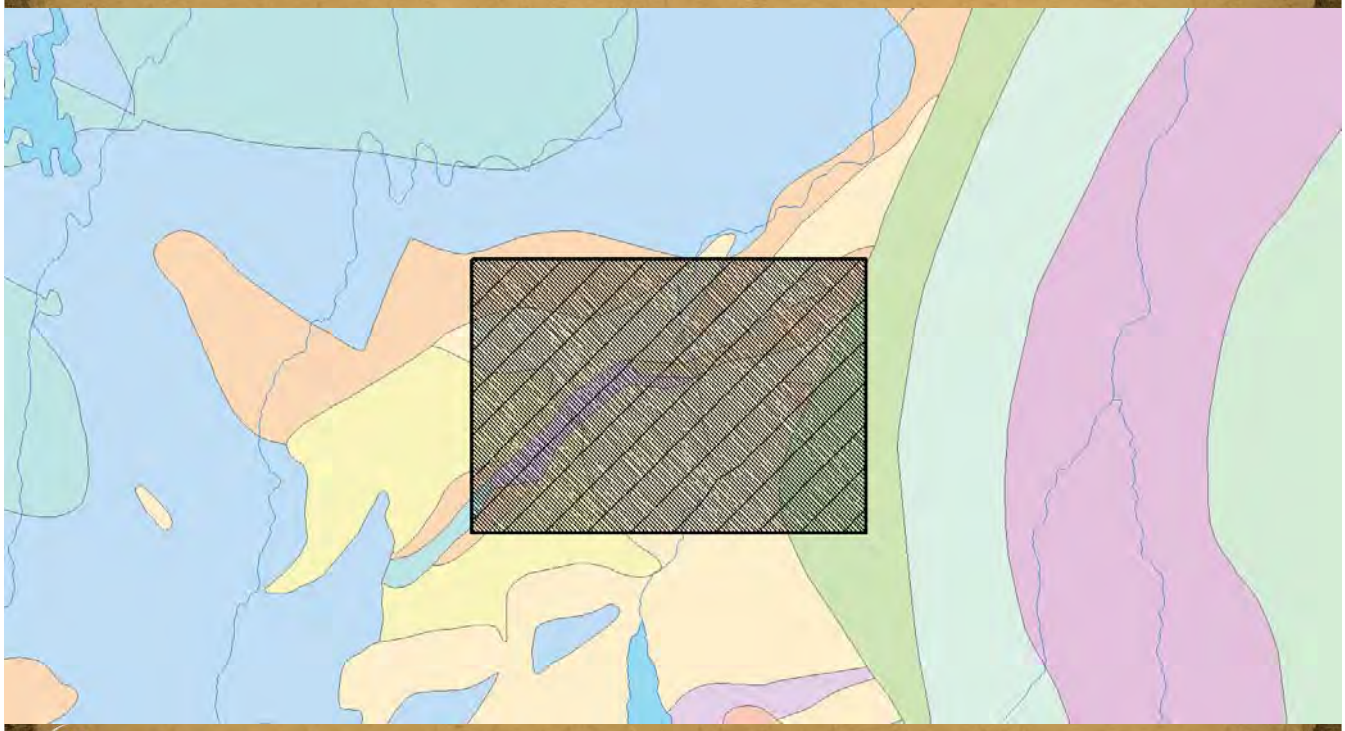
Caracle Creek

Survey Design

- Commitment requirements
- Geological knowledge
- Exploration strategy
- Develop best way forward

Caracle Creek

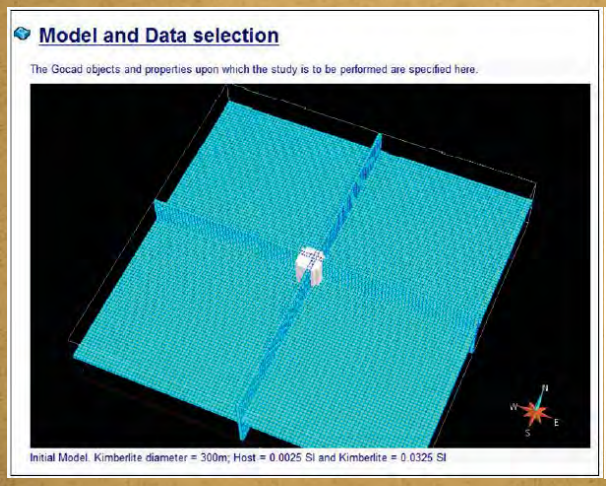
Survey Design

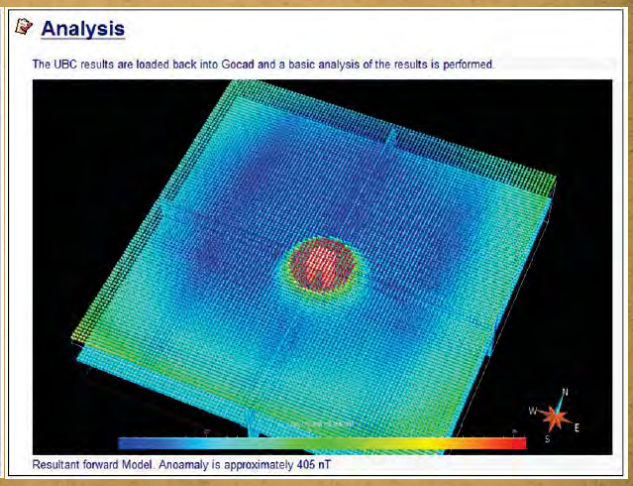


Caracle Creek

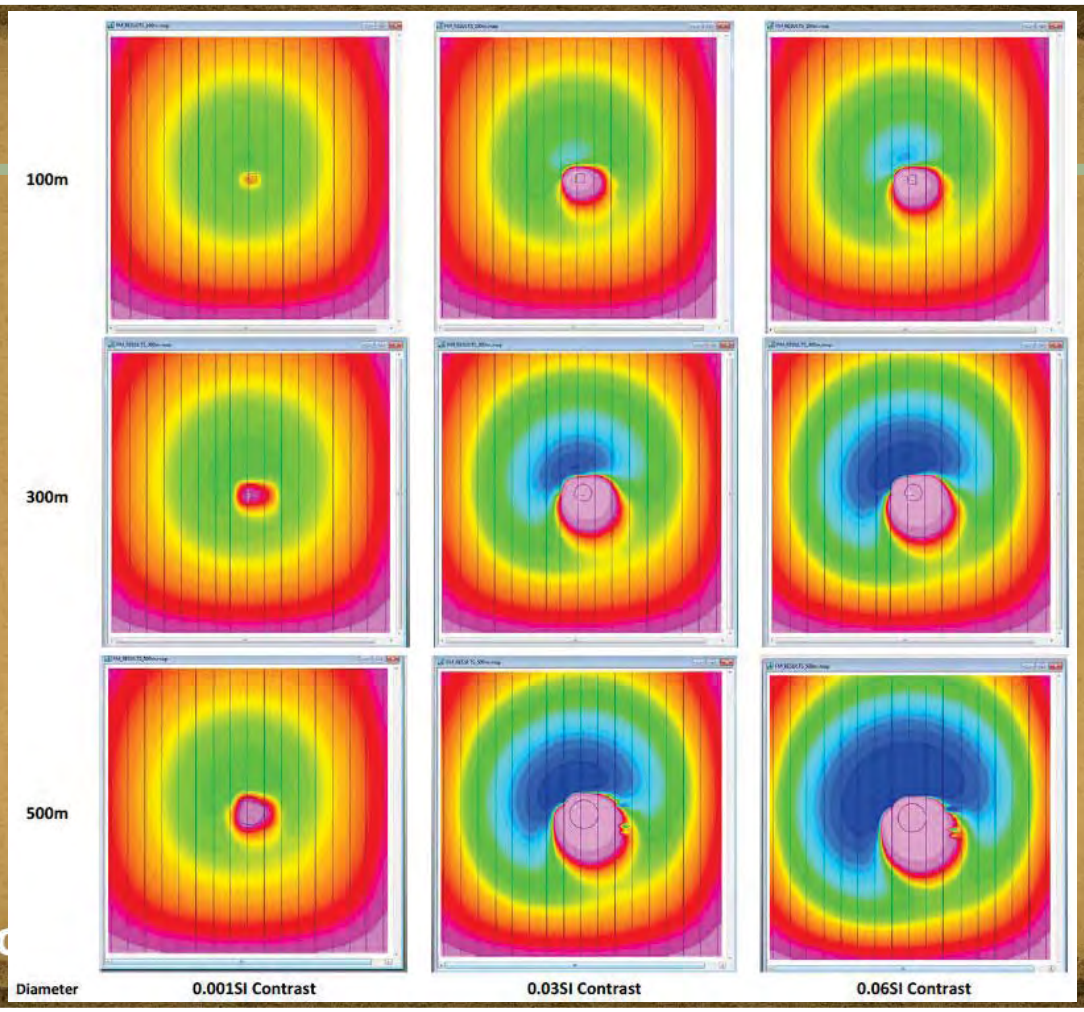
Survey Design

- Forward modelling
- Geologic section – what could I reasonably expect to see?

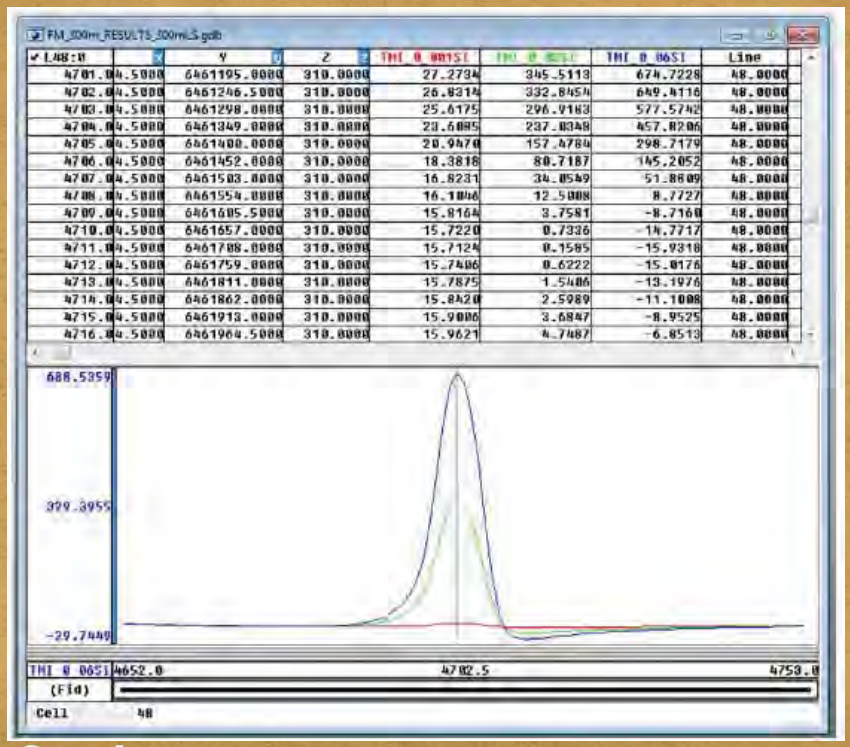




Caracle Creek

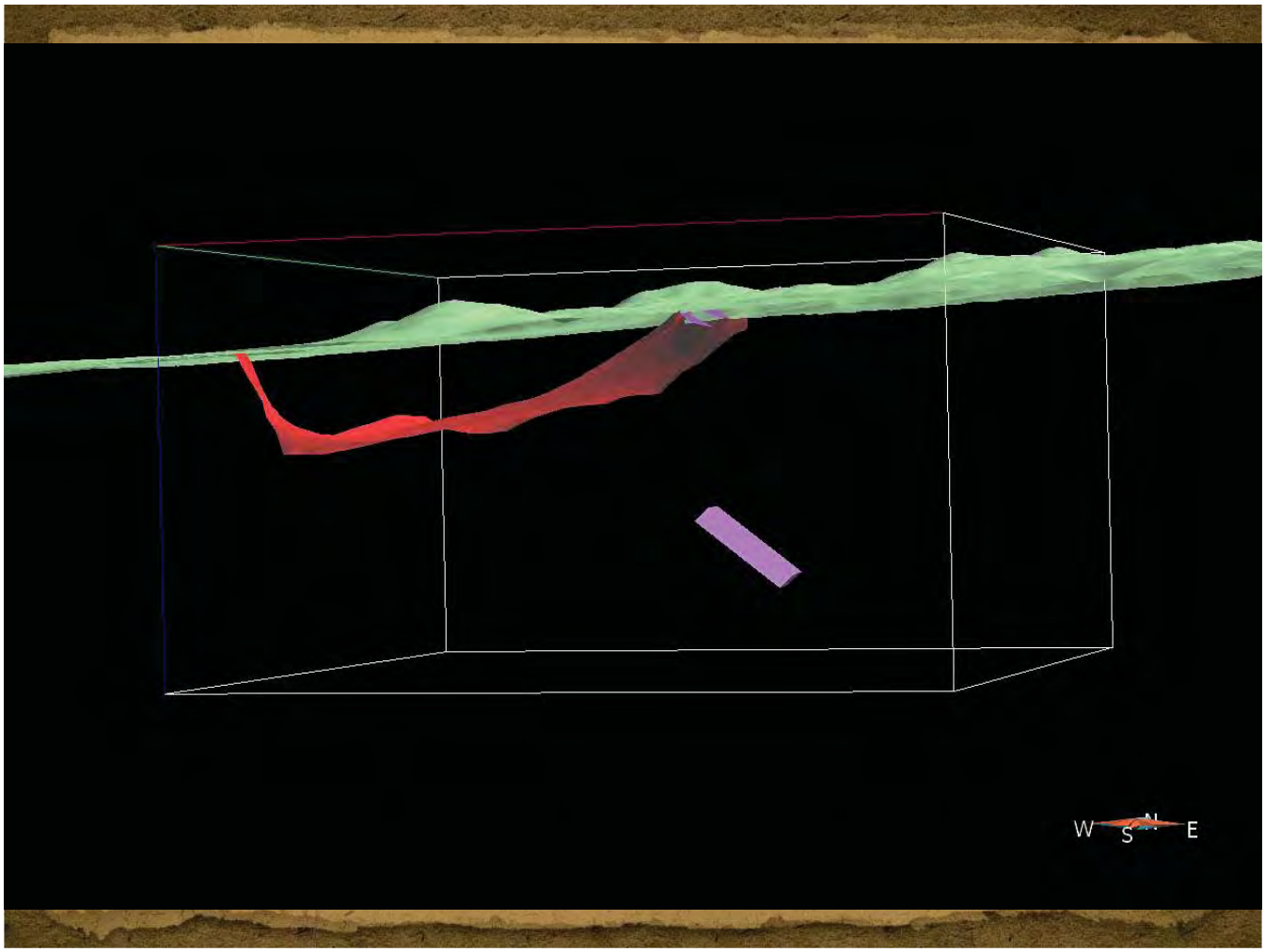


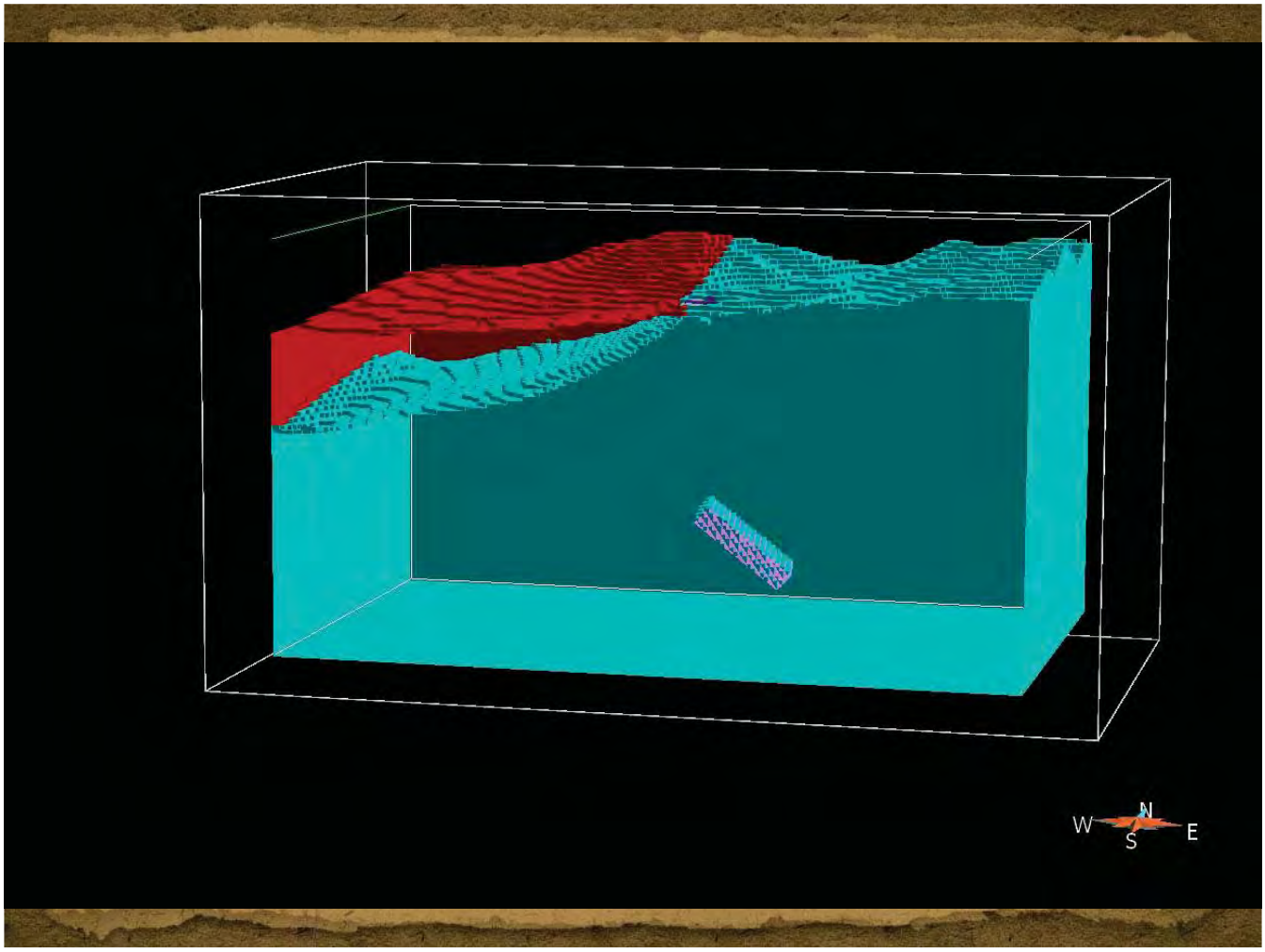
Survey Design

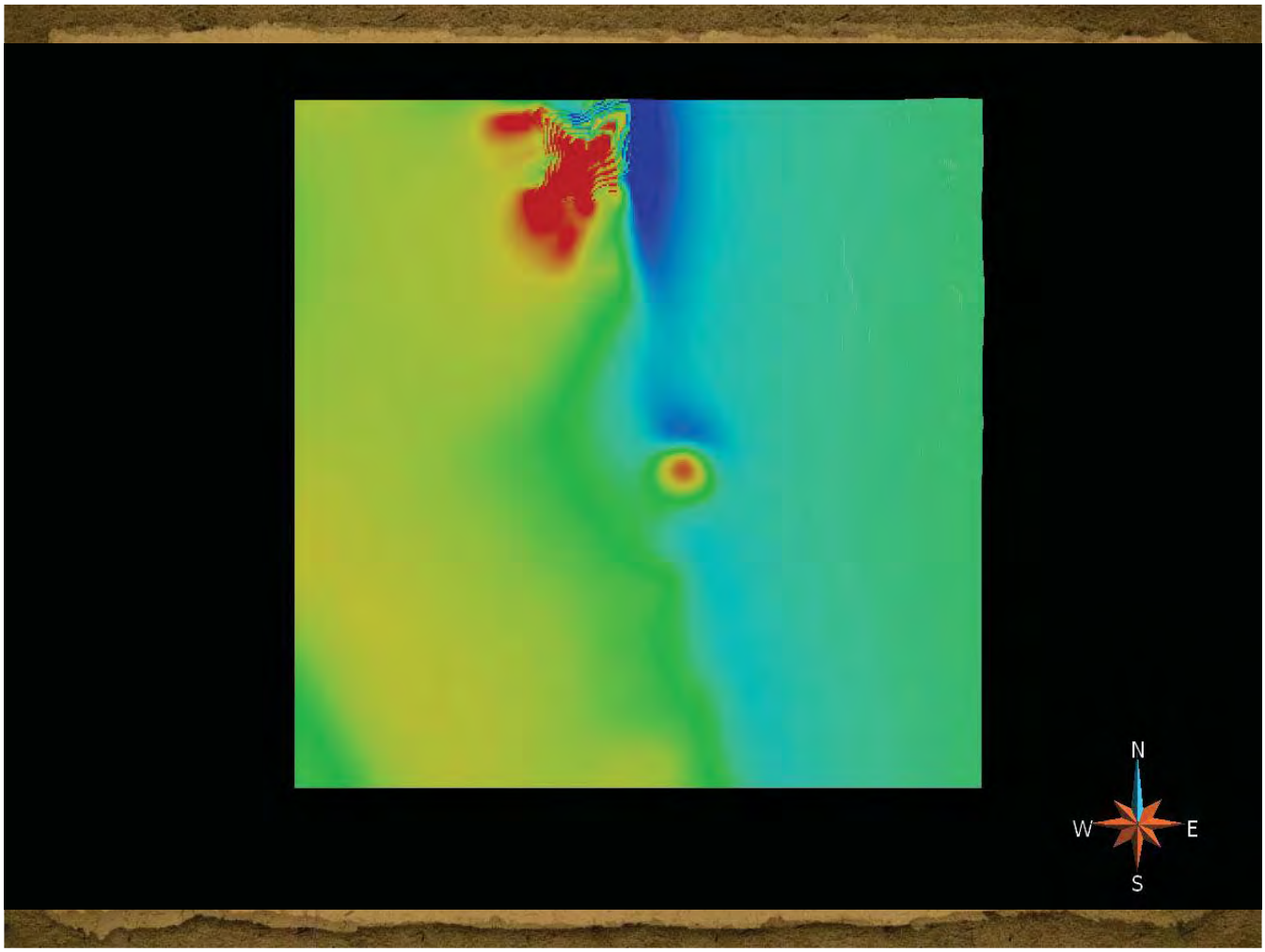


L48:0		Y	Z	TMI_0_001SI	TMI_0_03SI	TMI_0_06SI	Line
4701.0	4.5000	6461195.0000	310.0000	27.2734	345.5113	674.7228	48.0000
4702.0	4.5000	6461246.5000	310.0000	26.8314	332.8454	649.4116	48.0000
4703.0	4.5000	6461298.0000	310.0000	25.6175	296.9183	577.5742	48.0000
4704.0	4.5000	6461349.0000	310.0000	23.6085	237.0348	457.8206	48.0000
4705.0	4.5000	6461400.0000	310.0000	20.9470	157.4784	298.7179	48.0000
4706.0	4.5000	6461452.0000	310.0000	18.3818	80.7187	145.2052	48.0000
4707.0	4.5000	6461503.0000	310.0000	16.8231	34.0549	51.8809	48.0000
4708.0	4.5000	6461554.0000	310.0000	16.1046	12.5008	8.7727	48.0000
4709.0	4.5000	6461605.5000	310.0000	15.8164	3.7581	-8.7160	48.0000
4710.0	4.5000	6461657.0000	310.0000	15.7220	0.7336	-14.7717	48.0000
4711.0	4.5000	6461708.0000	310.0000	15.7124	0.1585	-15.9318	48.0000
4712.0	4.5000	6461759.0000	310.0000	15.7406	0.6222	-15.0176	48.0000
4713.0	4.5000	6461811.0000	310.0000	15.7875	1.5406	-13.1976	48.0000
4714.0	4.5000	6461862.0000	310.0000	15.8420	2.5989	-11.1008	48.0000
4715.0	4.5000	6461913.0000	310.0000	15.9006	3.6847	-8.9525	48.0000
4716.0	4.5000	6461964.5000	310.0000	15.9621	4.7487	-6.8513	48.0000

Caracle Creek

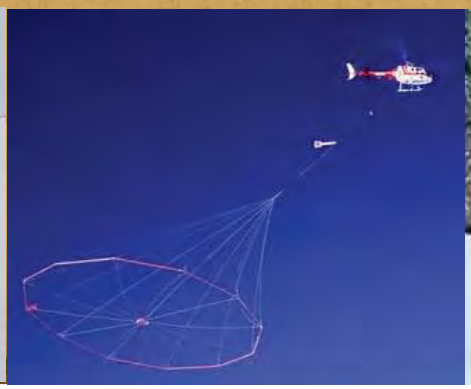

W
S
N
E


W
S
N
E



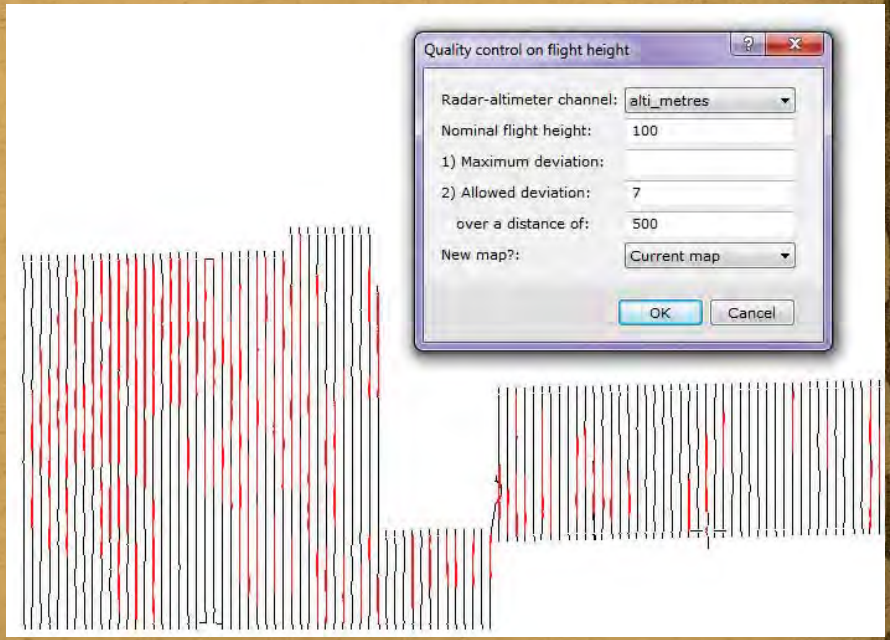
Survey Design

- Engage Contractors
- Design line spacing, line direction, survey parameters, contract specifications
- Submit requests for quotes
- Present results and recommend contractor



Survey Design

- Quality Control
- Determine if the data is acceptable



Caracle Creek

Adding Value to Geophysical Data

PROCESSING

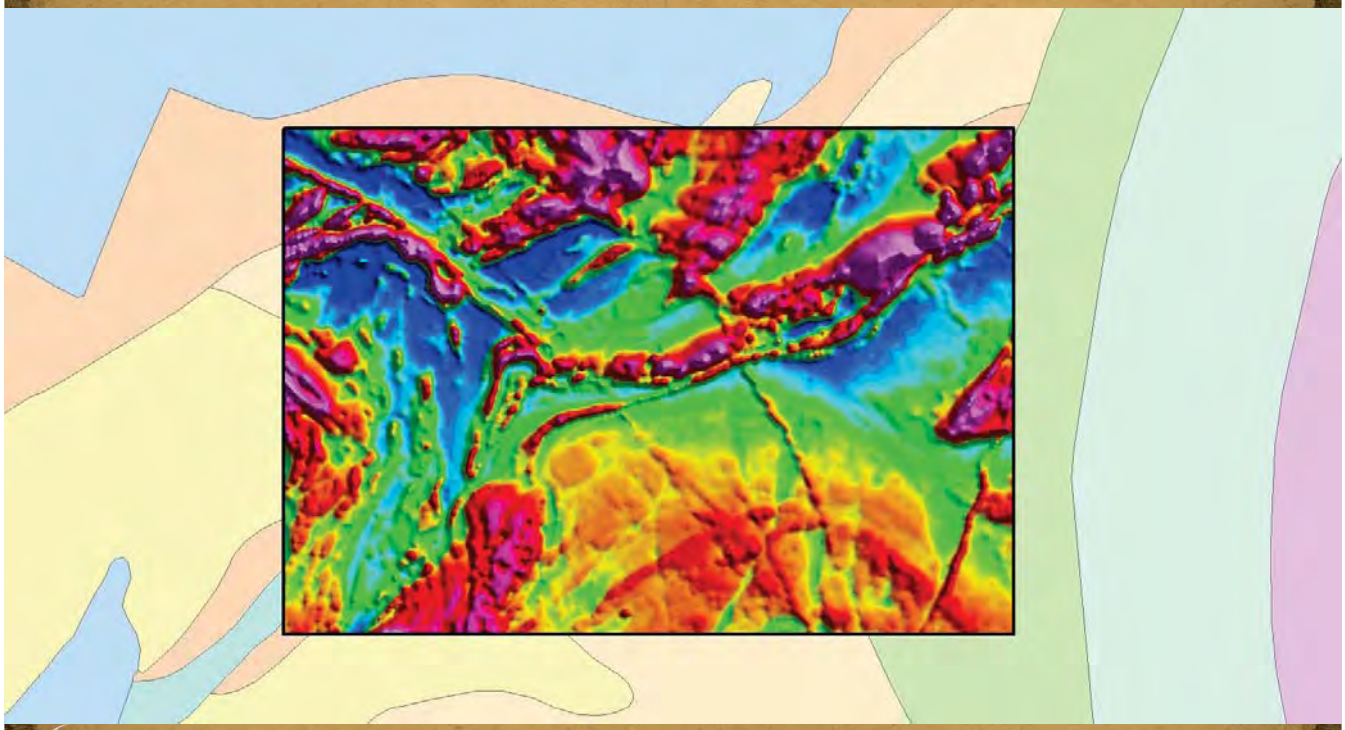
Caracle Creek

Processing

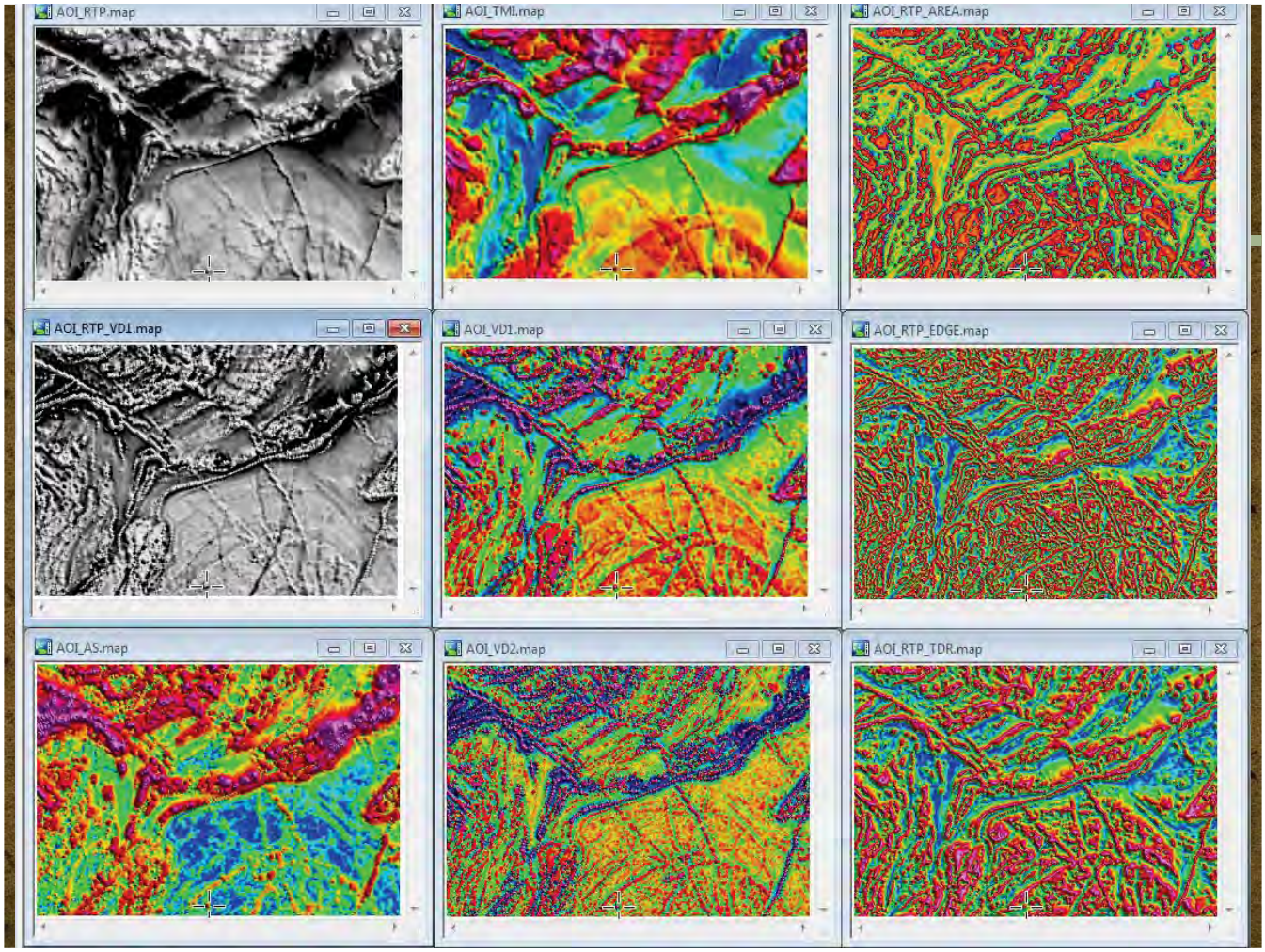
- Usually standard products are received from a contractor
- Logistics report
- Apply several filters to enhance the data, highlight structure, changes in lithology
- Colour vs Black and White

Caracle Creek

Processing

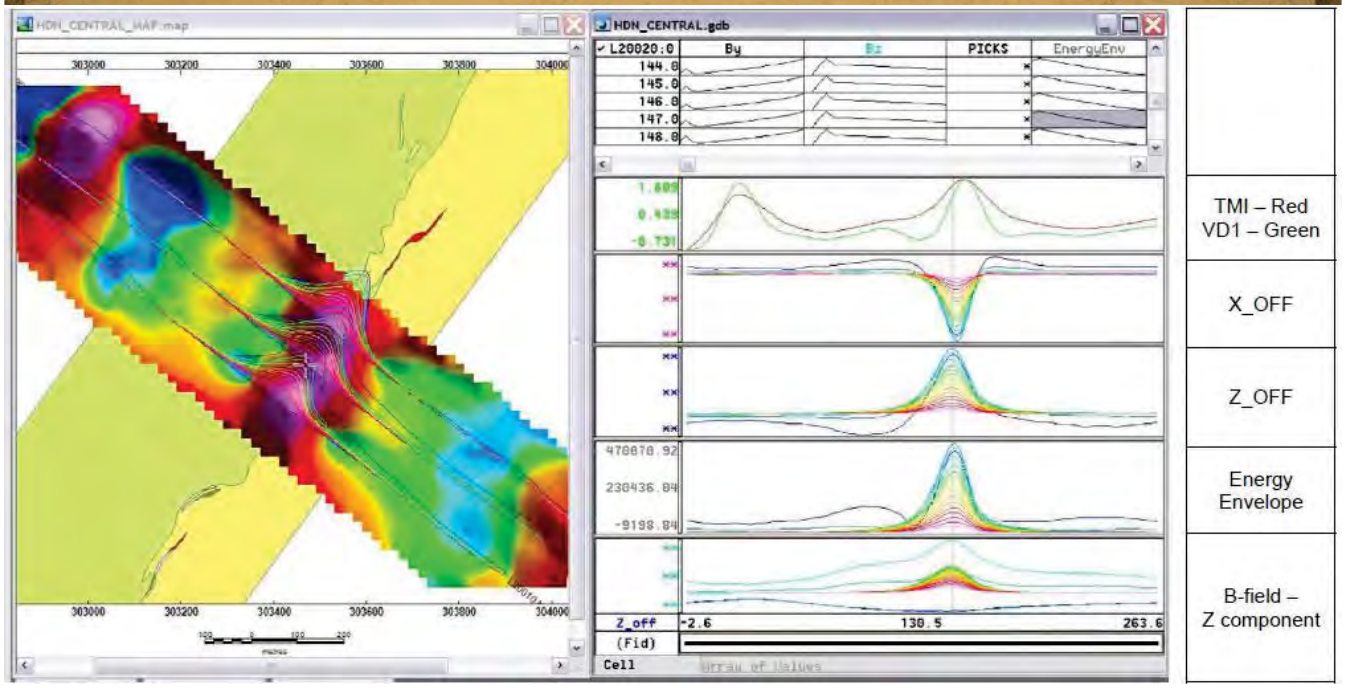


Caracle Creek



Processing

- Electromagnetics: Displaying profiles in such a way that is useful



Processing

- Gravity: calculate the complete bouguer
- IP: forward model, process
- Historical data: Digitize maps

Caracle Creek

Adding Value to Geophysical Data

ANOMALY SELECTION

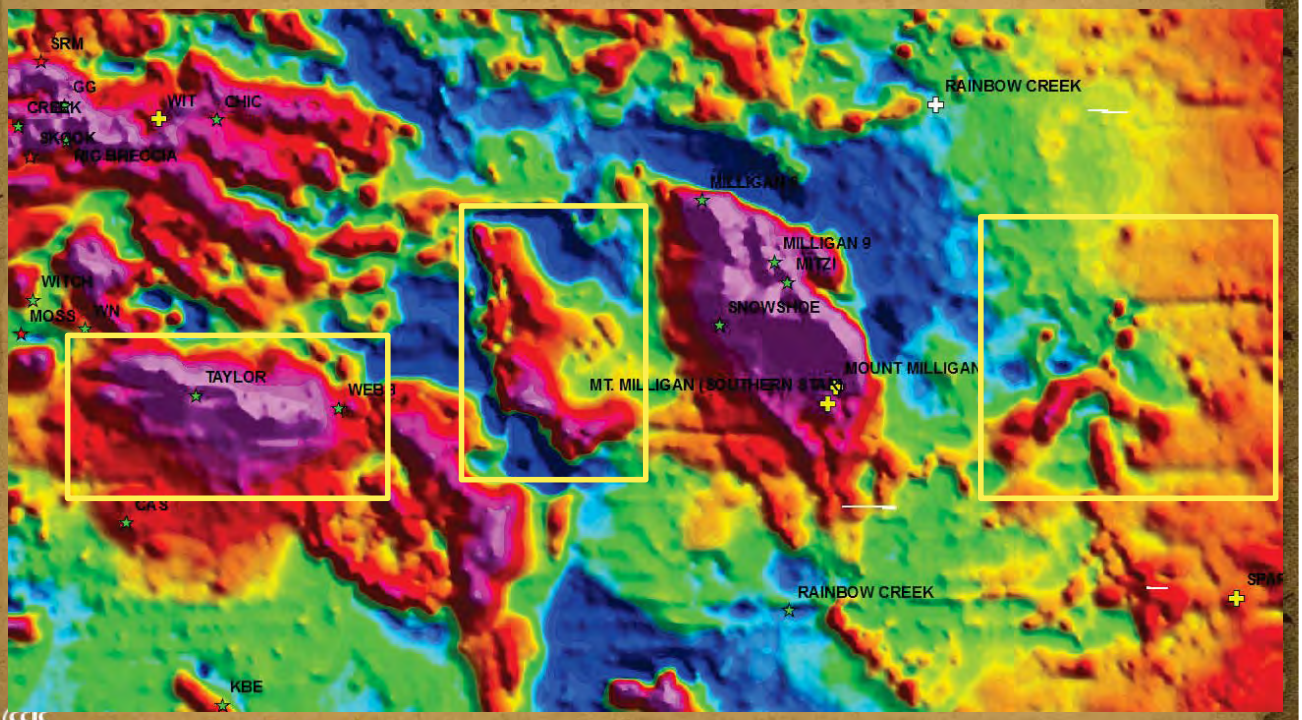
Caracle Creek

Anomaly Selection

- Direct detection
- Mag/Gravity: Porphyry, Kimberlite, IOCG
- TDEM: VMS
- IP/Resistivity: Disseminated sulphides

Caracle Creek

Anomaly Selection



Caracle Creek

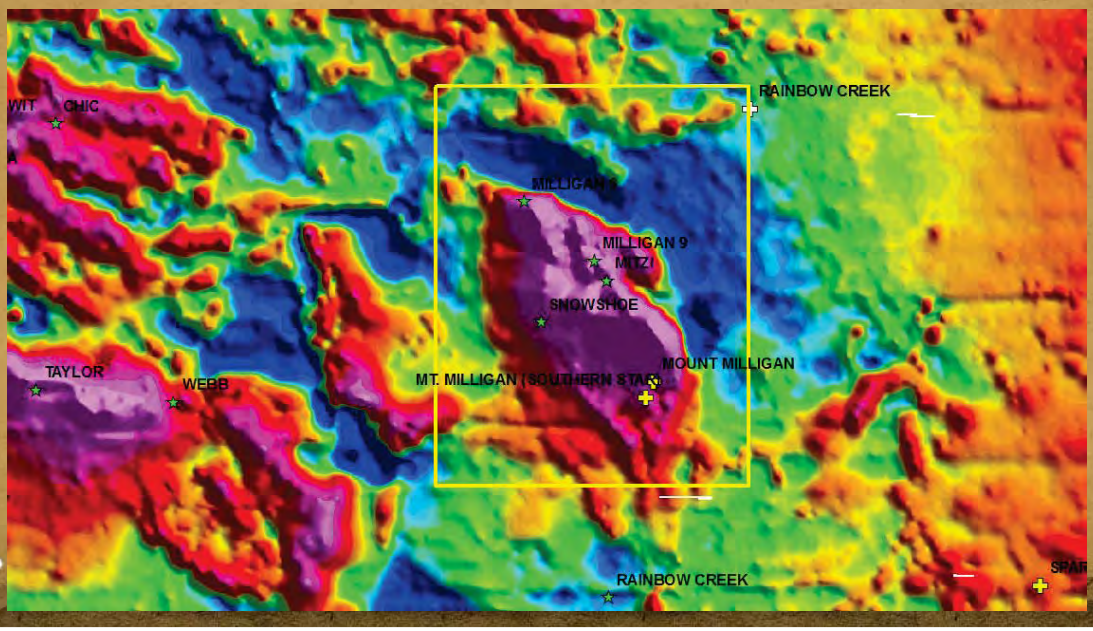
Adding Value to Geophysical Data

MODELLING

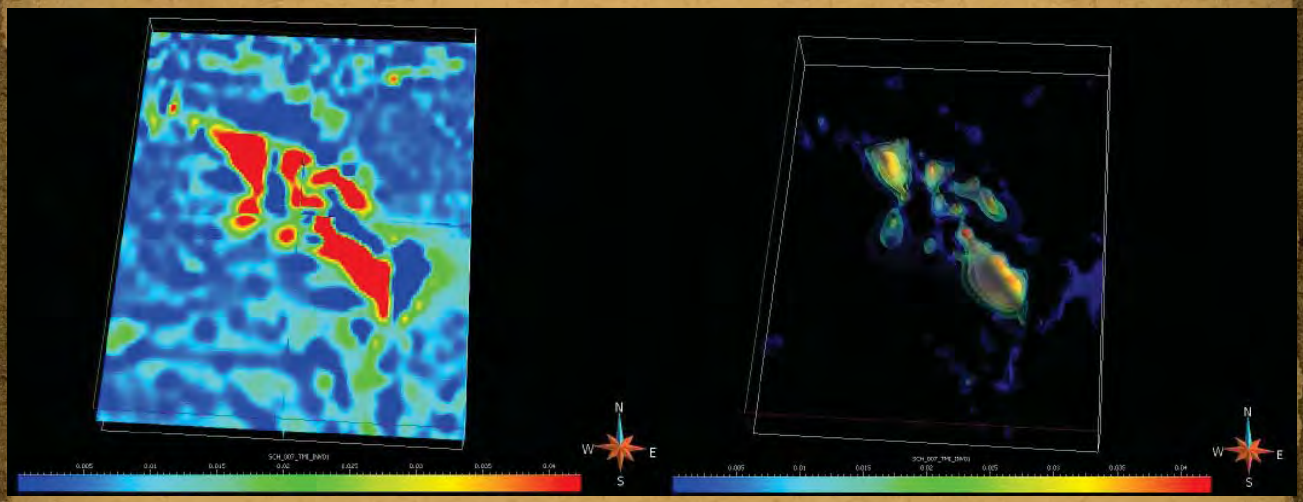
Caracle Creek

Modelling

- Inversion using UBC-GIF Code:
- MAG3D, GRAV3D, RES2D and 3D
- Best guess at size, depth, shape of target



Modelling



Caracle Creek

Modelling

- Constrained inversion – known magnetic susceptibility, density, SCIP from drilling
- Known lithologies, measured properties
- Increase confidence that the result is reflecting the true subsurface

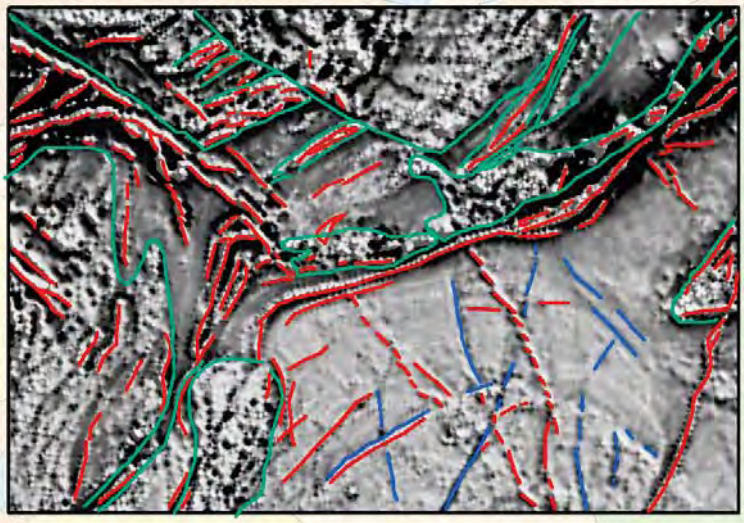
Caracle Creek

Adding Value to Geophysical Data

INTERPRETATION

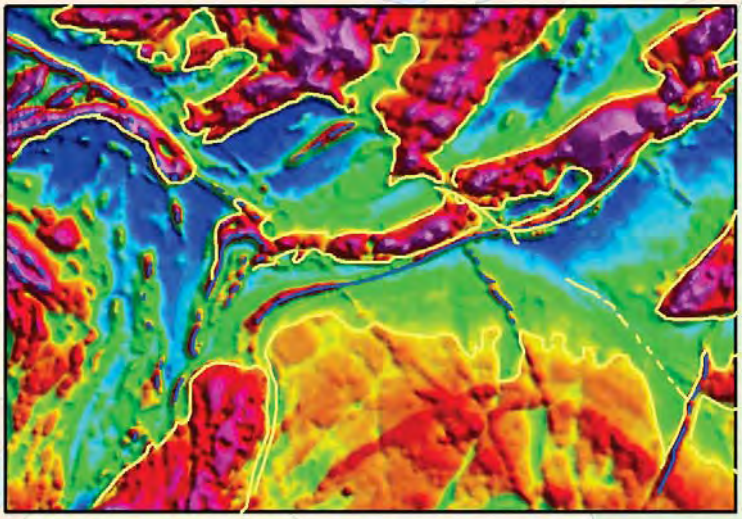
Caracle Creek

Interpretation



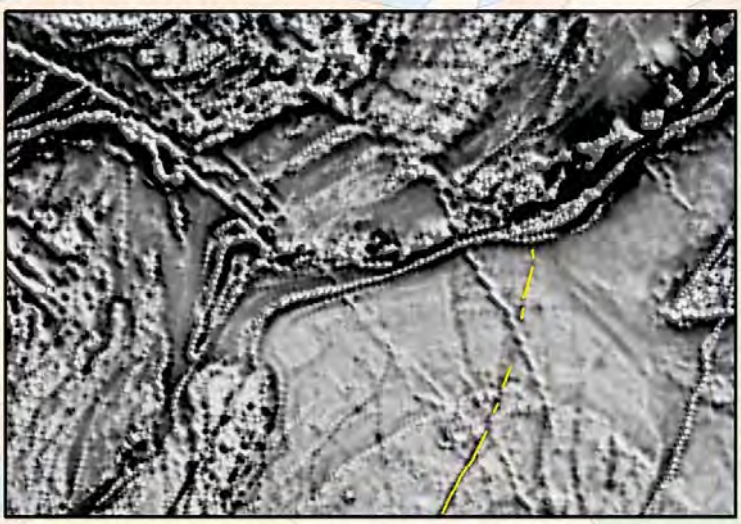
Caracle Creek

Interpretation



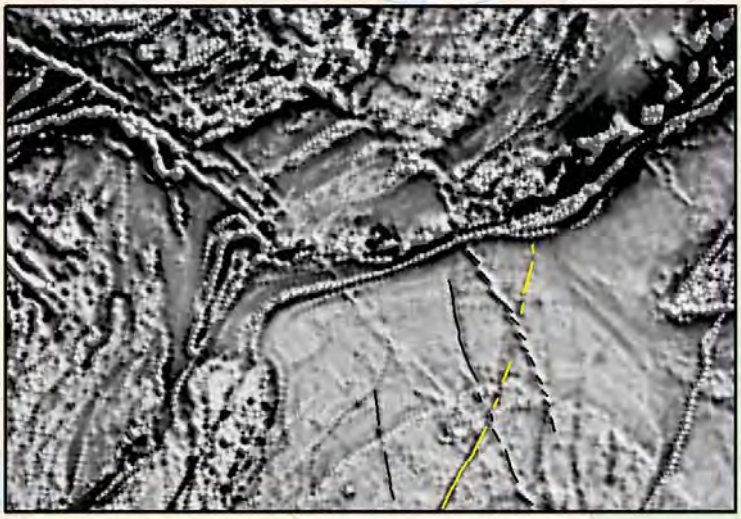
Caracle Creek

Interpretation



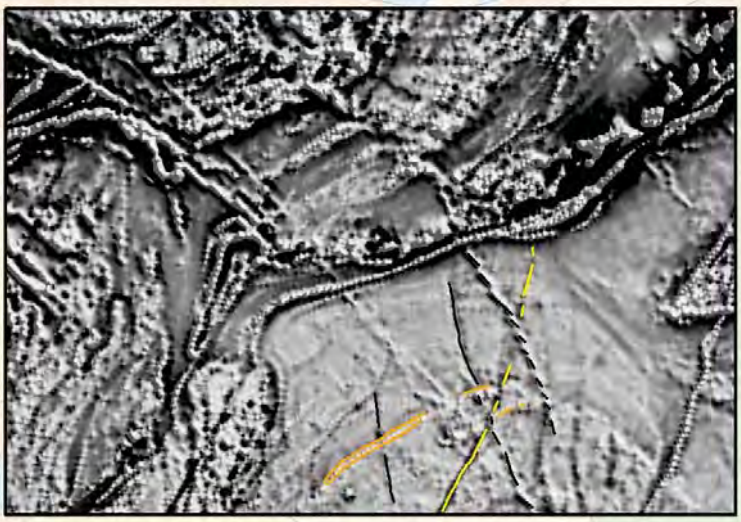
Caracle Creek

Interpretation



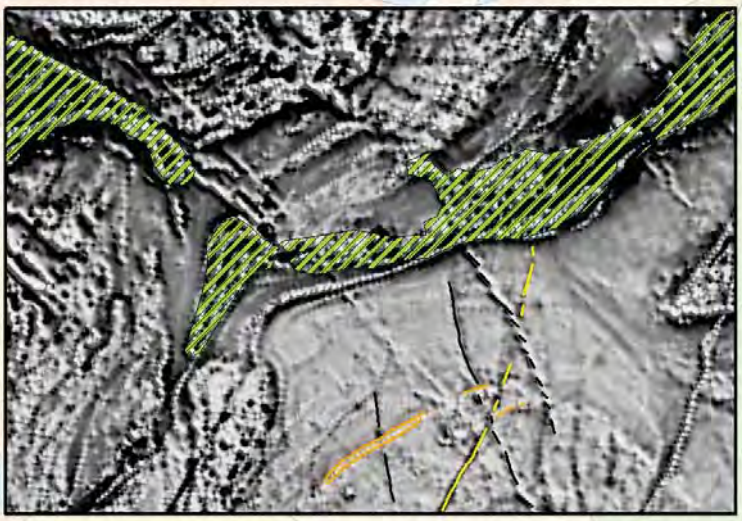
Caracle Creek

Interpretation



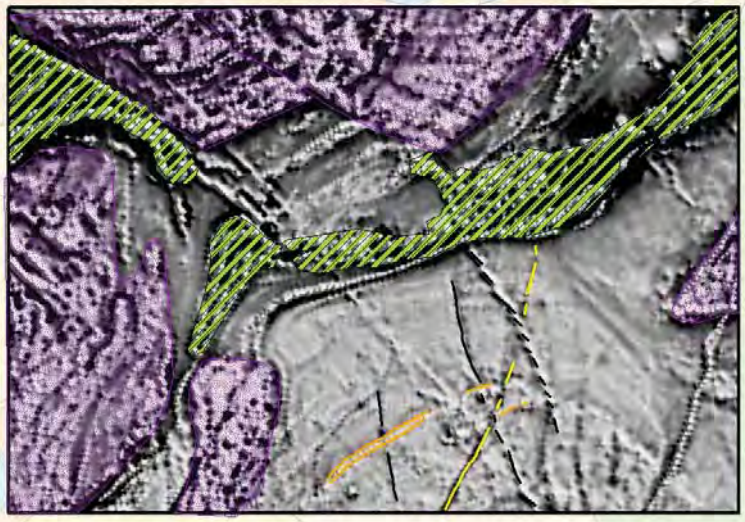
Caracle Creek

Interpretation



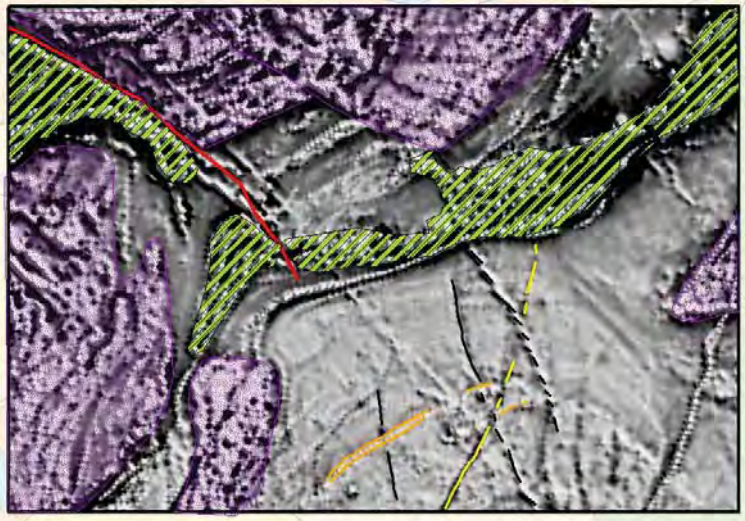
Caracle Creek

Interpretation



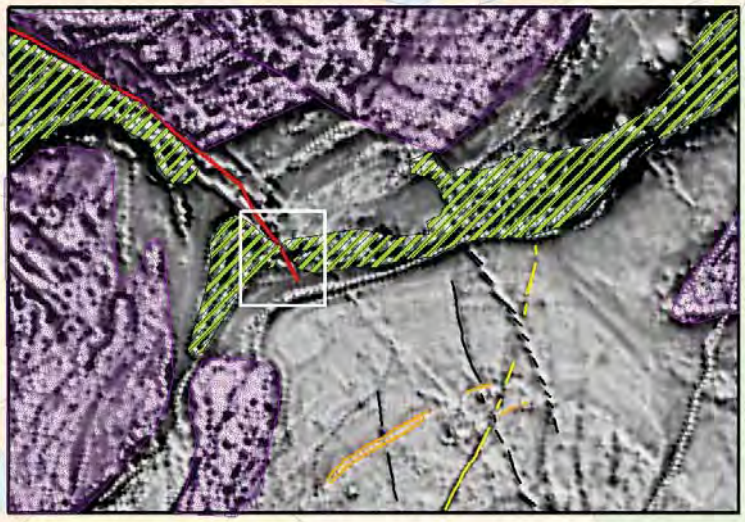
Caracle Creek

Interpretation



Caracle Creek

Interpretation



Caracle Creek

Interpretation

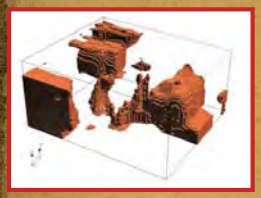
- Relate results to geochemistry
- Relate anomaly shape, size, dip, depth to known geology
- Work with geologists to form an integrated interpretation
- Drill recommendations

Caracle Creek

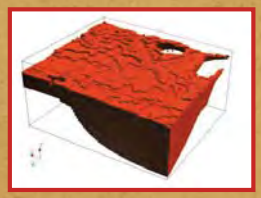
Interpretation

- Query the Model

$\{(R>400) \cap (D<0.25) \cap (L \neq \text{basement}) \cap (DI<500)\}$



Resistivity



Measured Density

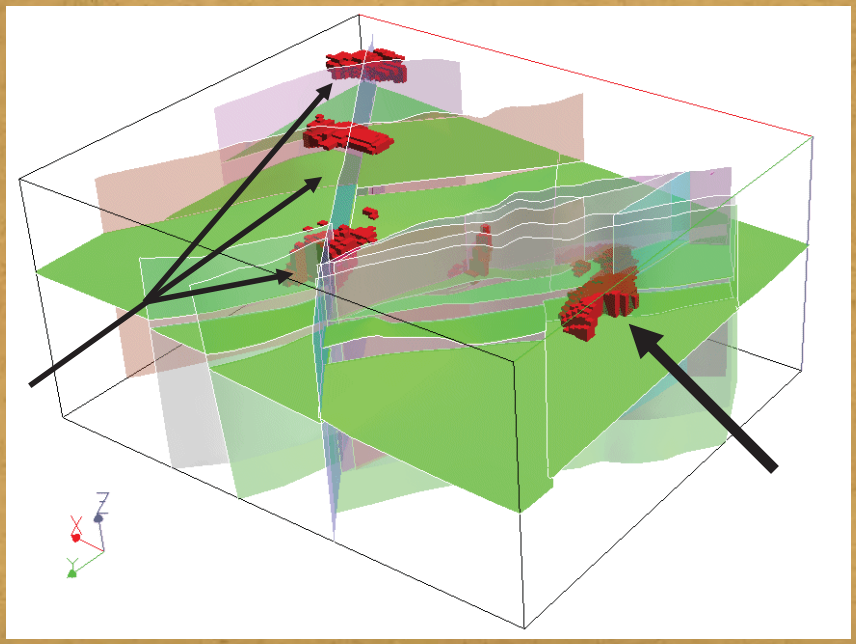
Geology Above the Basement

Distance From Fault Intersections

Caracle Creek

Interpretation

Drill hole planning is easier and efficient



Target is based on all information and everyone's input

Caracle Creek

Public Data From OMET Program

Adding Value to Geophysical Data

SUMMARY

Caracle Creek

Adding Value to Geophysical Data

- Wide range of knowledge
- We can assist with several aspects of geophysical data from collection to interpretation

THANK YOU

Caracle Creek

Caracle Creek

EarthProbe

Before you go too deep

Rob Gordon, MBA, P.Eng.
Toronto
rgordon@caraclecreek.com

Jenna McKenzie, Hon.B.Sc., P. Geo.
Toronto
jmckenzie@caraclecreek.com