Finding Copper
- Time for a seismic shift!

Greg Turner

Australian Copper Conference, June 2014
Typical Solution (Drilling)

- Detect point locations of contacts and structures
- (Resolution of conventional minerals geophysics degrades rapidly with depth)
- Each hole tests a small area and can provide limited context for further exploration
- ~1 x 1km hole per month
- ≈ $300K per km

Problem (Deep Exploration)

- Map contacts and structures in 3D
- Resolution is maintained at depth
- Each 3D seismic survey screens multiple km$^3$ and provides framework for subsequent exploration
- 10km$^2$ acquired and processed data in 3 months
- ≈ $200K/km$^2$ (0→2km$^4$)
- Cost effective!

Seismic Solution (Seismic +Drilling)

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Case History – Neves Corvo Copper–Zinc
6 known orebodies

Are there any more? 

Prospective geology 700m+
3D SURVEY GRID OVER MINE
3D Seismic Survey Depth Slice at 894 m

Lundin Mining

High Resolution
Rx 90 x 15m
Tx 90 x 45

Survey Block
6.4 x 4.6 km

Note faults cutting Lombador into segments
3D Seismic Survey at Neves-Corvo – Section

- Very good correlation between mineralization and strong reflectors
- Targeting more effective, saving time and money.

NW View of section through Semblana Massive Sulfide

massive sulphide footwall contact
Case History - Degrussa
Copper - Gold
Multiple orebodies, deep…
Are there more?
Degrussa 2D seismic

Exploration target
Drilling indicated reflector coincident with base of oxidation. DHEM testing planned

3 km
2 km
300 m

Base of cover

Shear?

C5 massive sulphides

Imaging off-section

Cross-section perpendicular to seismic section

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Case History - Rosebery
Zinc-Lead-Silver-Copper-Gold
Finding Copper

• Seismic reflection
  – demonstrated effectiveness at multiple sites to depths > 1km

• Not a panacea
  – recommend derisking

• Be wary of some common preconceptions

• Provides opportunity for a step change improvement in exploration

Copper discovery cost

Adapted from
Source: Richard Schodde, MinEx Consulting, 2012

Time for a seismic shift!