

1. GEOMAGNETIC METHODS

- Measure change in Earth's mag. field
∴ Locates ferrous targets
- Response proportional to
 1. Mass of target, M .
 2. $\frac{1}{r^3}$ separation of target.
- Susceptibility to urban utilities
∴ rural areas better

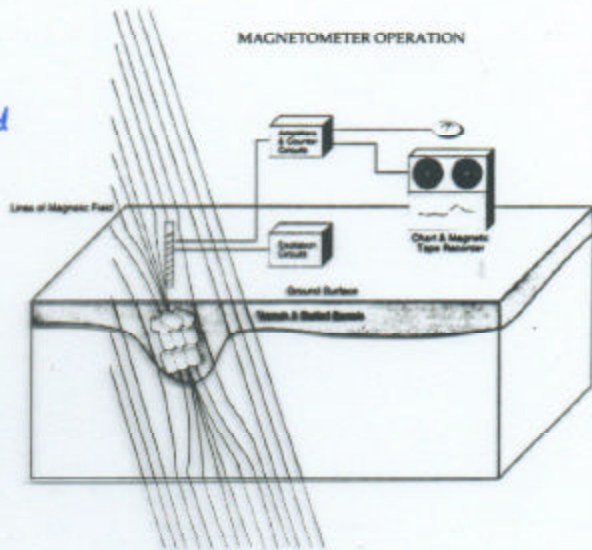


Figure 3-20 Magnetometry

- Measurement in nTeslas
i.e. 10^{-9} Teslas
- Resolution ↓ with
↑ target depth since $\frac{1}{r^3}$

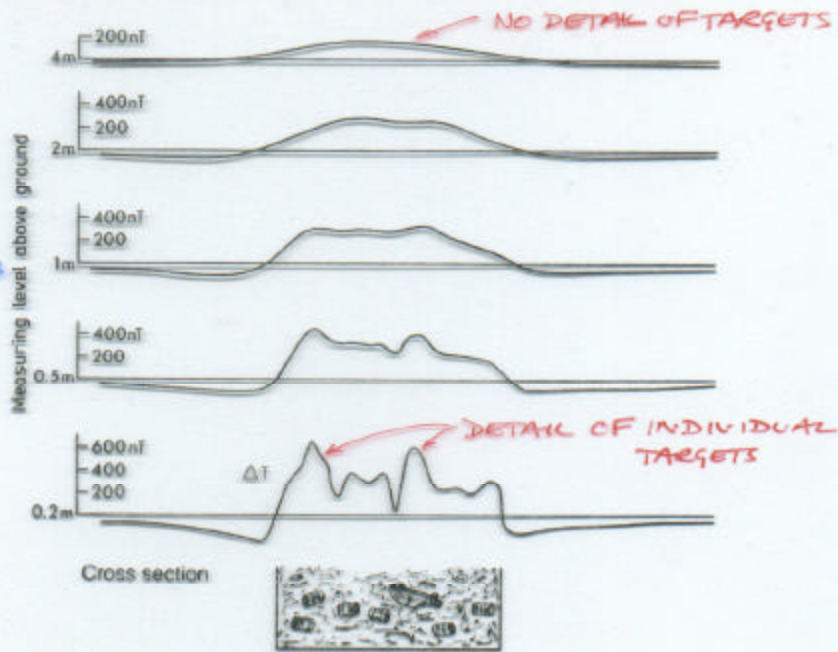


Fig. 2.1. Magnetic anomalies at different heights above ground

Max Depths

- 1 drum @ 10-ft.
- Multi-drum @ 30ft.

Anomaly influenced by inclination of Earth's mag. field. (60° in U.S.)

Max to South
Depth = $\frac{1}{2}L$.

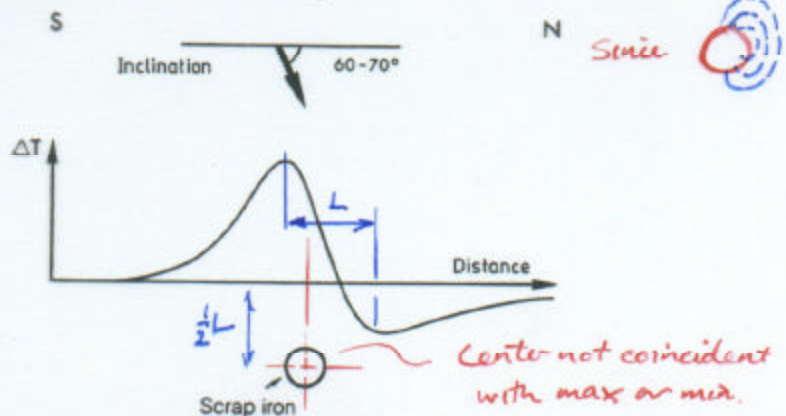


Fig. 2.2. Magnetic section of the total intensity DT over a globe-shaped concentration of scrap iron at 65° latitude

Two types of magnetometers

1. Permanent Magnet Magnetometers

{ Magnetic field balance
Torsion magnetometer

- Measures \uparrow and \rightarrow magnetic components
- Accuracy 1 nT
- Slow but v. accurate

2. Proton Magnetometers

- Measures total field, T, or variations, ΔT .
- Principle:
 - Apply a strong 1 second duration magnetic field
 - Causes hydrogen protons to spin (changes spin)
 - Shut off magnetic field and measure spin frequency.
- Fast, but records only max field component
- Accuracy $\frac{1}{2}$ nT

