Inversion Implementation

Forward Simulation

Survey:		Problem:
Airborne (Figure 9)	← Pair →	TDEM (eq. 5)

$$\sigma_i = \exp(m_i)$$

Mesh:
- 2D Cylindrical Coordinates
- 3D tensor mesh

Inversion Elements

Data Misfit:

$$\phi_d(\mathbf{m}) = \frac{1}{2}\|\mathbf{W}_\mathrm{d}(F[\mathbf{m}] - \mathbf{d}_\mathrm{obs})\|_2^2$$

Regularization:

$$\phi_m(\mathbf{m}) = \frac{1}{2}\|\mathbf{W}_\mathrm{m}(\mathbf{m} - \mathbf{m}_\mathrm{ref})\|_2^2$$

Inversion as Optimization

Inverse Problem:

$$\underset{\mathbf{m}}{\text{minimize}} \quad \phi(\mathbf{m}) = \phi_d(\mathbf{m}) + \beta\phi_m(\mathbf{m})$$

$$\text{s.t.} \quad \phi_\mathrm{d} \leq \phi_\mathrm{d}^*$$

Optimization:
Inexact Gauss Newton

Inversion
Tikhonov with cooling on β