Analysis Methodology

• In MT, assuming a simple planar geometry, the apparent resistivity as a function of frequency, $\rho_a$, is determined from $E$ & $B$ (1), with each wave penetrating the subsurface according to its skin depth, $\delta$ (2).

\[ \rho_a = \frac{1}{5f}\frac{E^2(\mu V/m)}{B^2(nT)} \text{ ohm-m} \tag{1} \]

\[ \delta = \frac{1}{\sqrt{\pi f \mu \sigma}} \sim 500 \left( \frac{L}{f} \right)^2 \text{ m} \tag{2} \]

• Using (1) and (2), standard inversion procedures convert apparent resistivity, $\rho_a$, to true resistivity as a function of depth, $\rho(z)$.

• This result can be generalized to apply to spherical geometries at longer wavelengths using a response function, $c(\omega)$, as outlined by Weidelt [1972]:

\[ c(\omega) = \frac{E(r_c, \omega)}{i0B(r_c, \omega)} \rightarrow \rho_a = \omega |c(\omega)|^2 \]

Again, the apparent resistivity, $\rho_a$, can be inverted to find conductivity vs. depth.

Missions/Instrumentation

• E & B sensor suite on Lunette lunar lander (see Neal et al., poster DI43A-1939, this session)