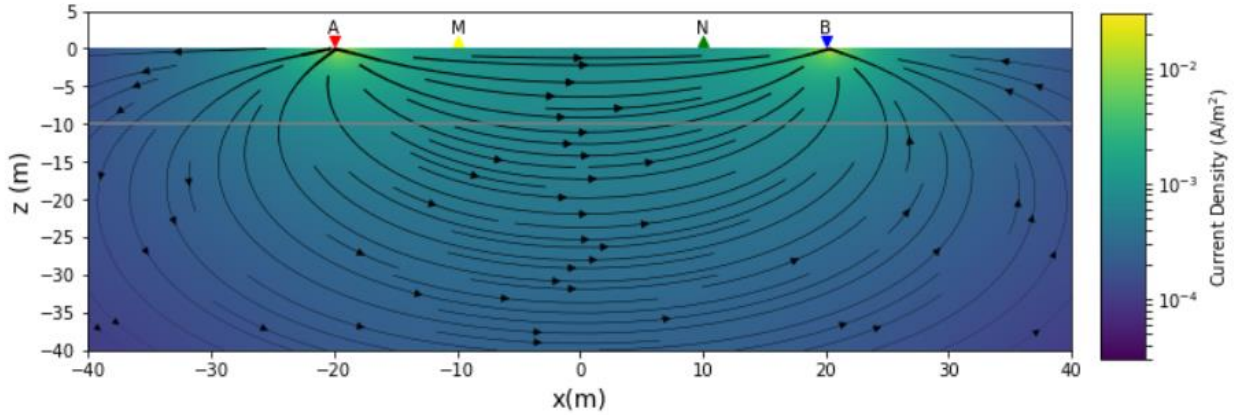
Current in 2 Layer Earth

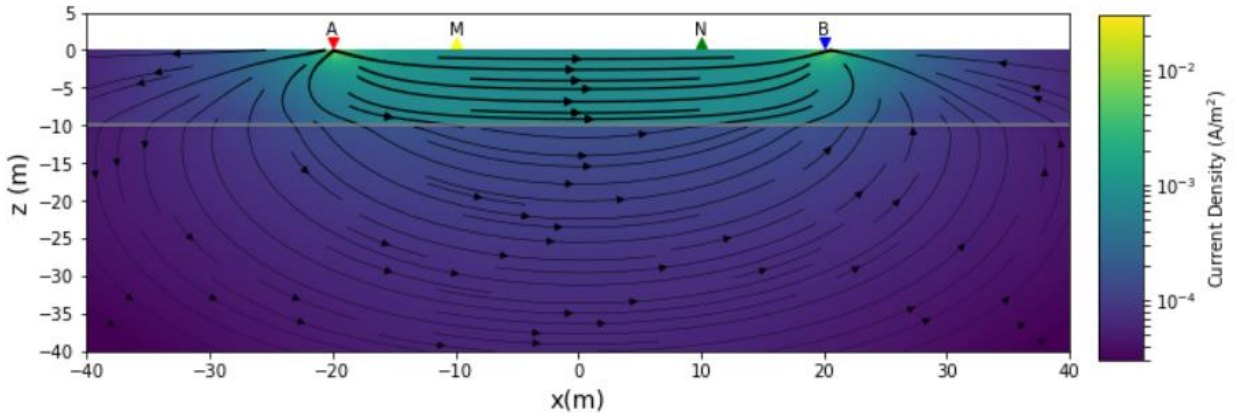
Half-space

- Current path depends on distance between electrodes



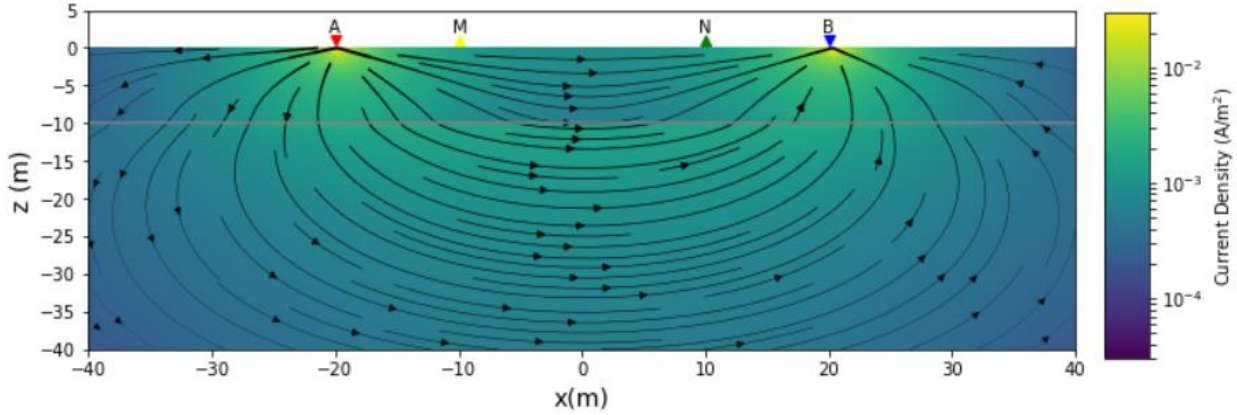
Less resistive top layer (ρ1 < ρ2)

- Top layer is shortest and easiest path for current to travel
- Most current travels through top layer

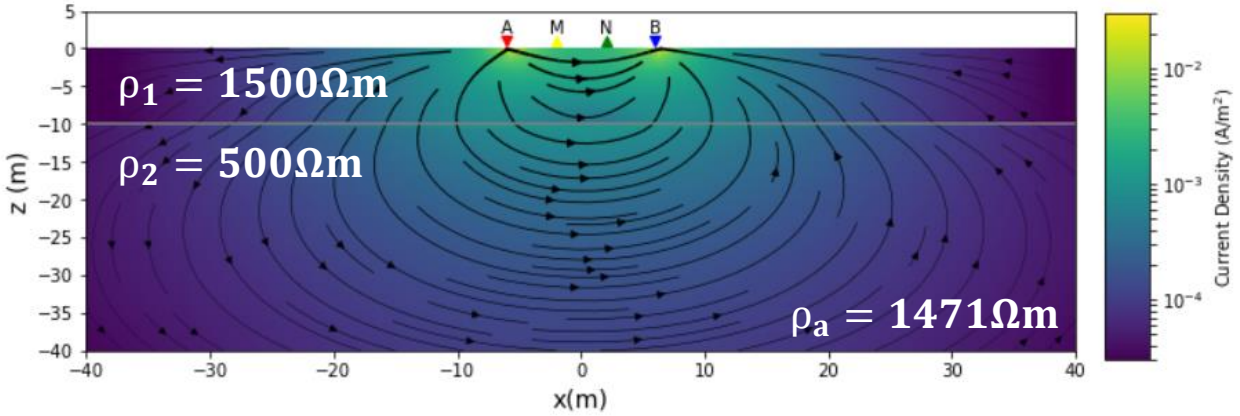


More resistive top layer (ρ1 > ρ2)

- Current cannot travel as easy in top layer
- Much of the current will try to travel more in the bottom layer

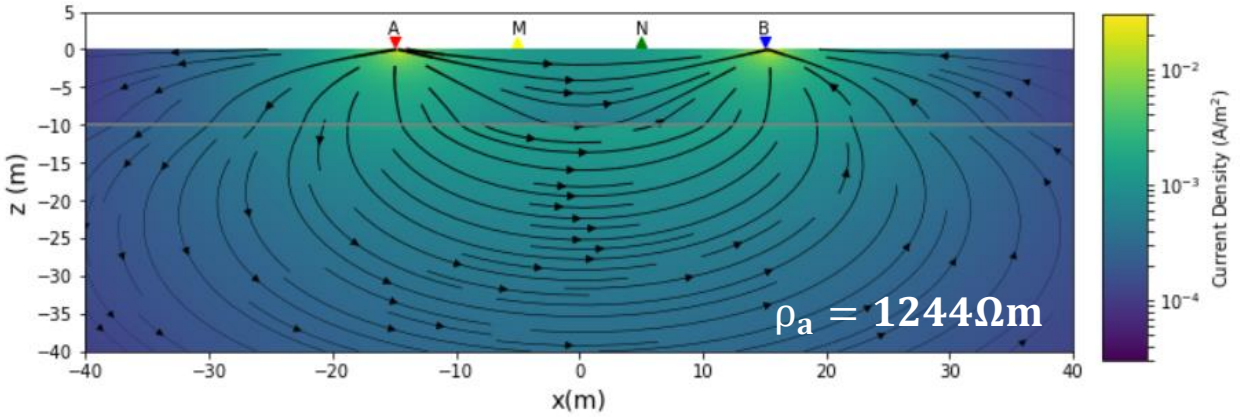


Sounding Measurements: 2 Layer Earth



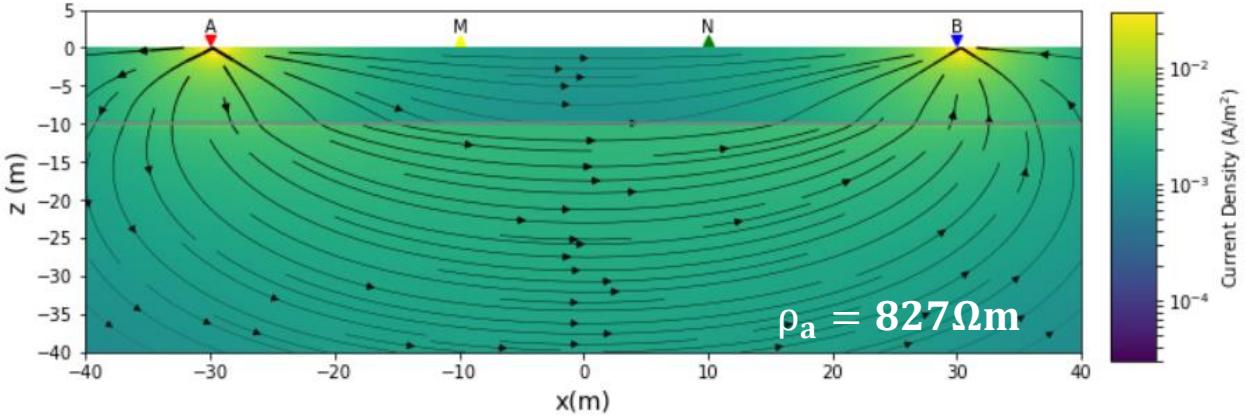
Electrodes very close

- Most currents stays very close to surface and do not go into lower layer
- Lower layer does not impact apparent resistivity
- Apparent resistivity close to top layer resistivity



Electrodes more spaced

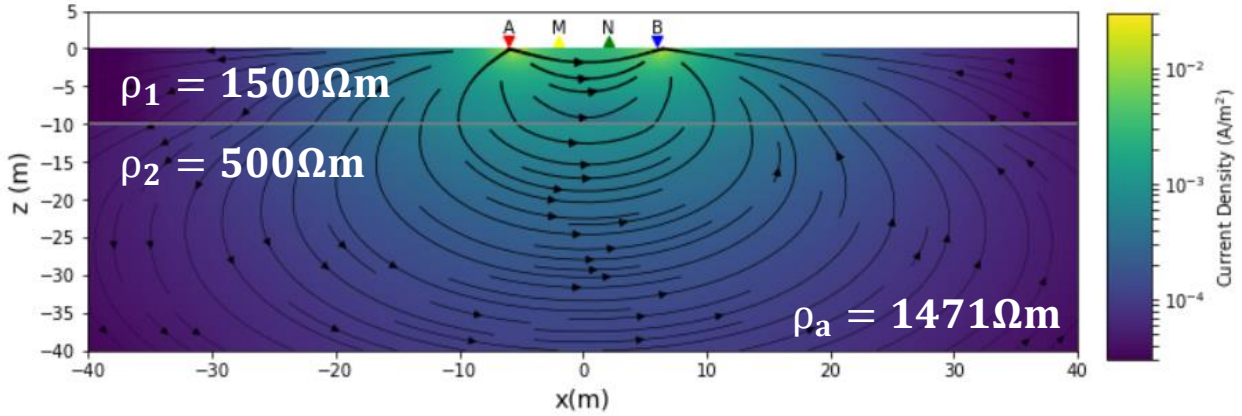
- Some currents in lower layer
- Lower layer impacts apparent resistivity value
- Apparent resistivity value lower than previous one

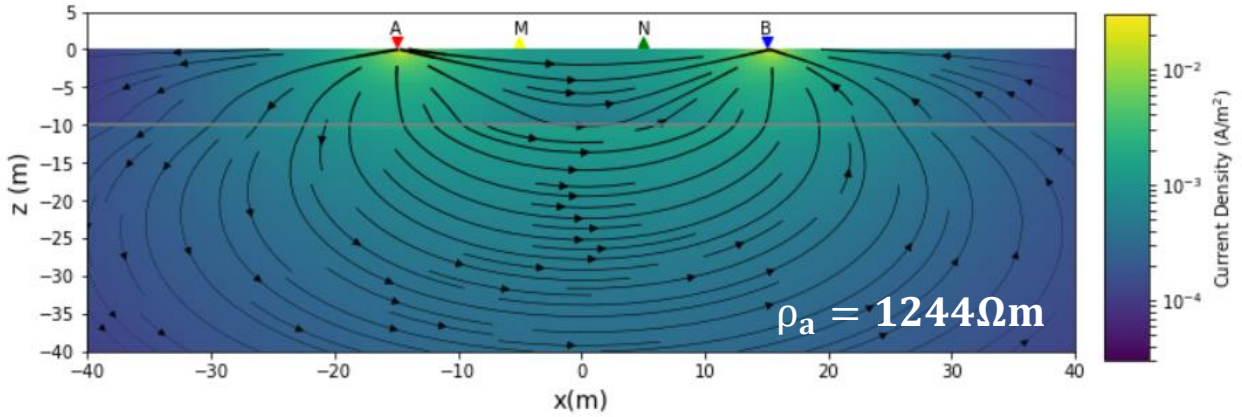


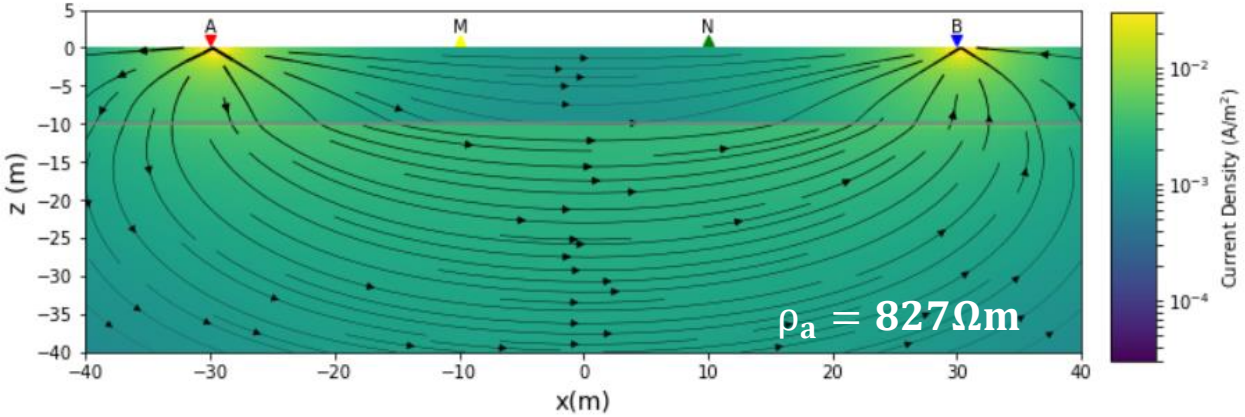
Large electrode spacing

- Much more current in lower layer because it is conductive AND spacing is large
- Lower layer has big impact on apparent resistivity
- Apparent resistivity is closer to bottom layer value

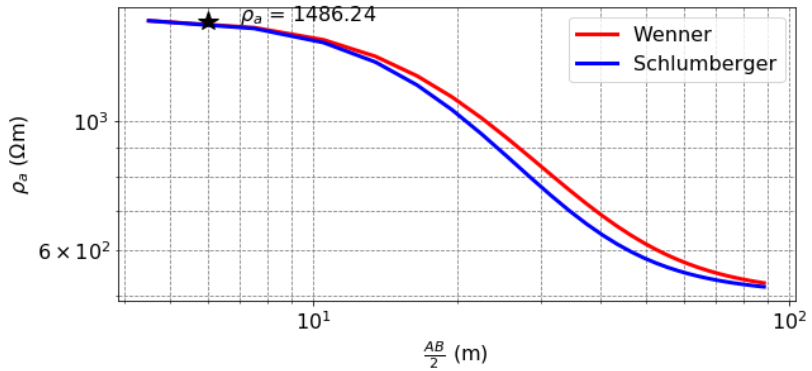
Sounding Measurements: 2 Layer Earth



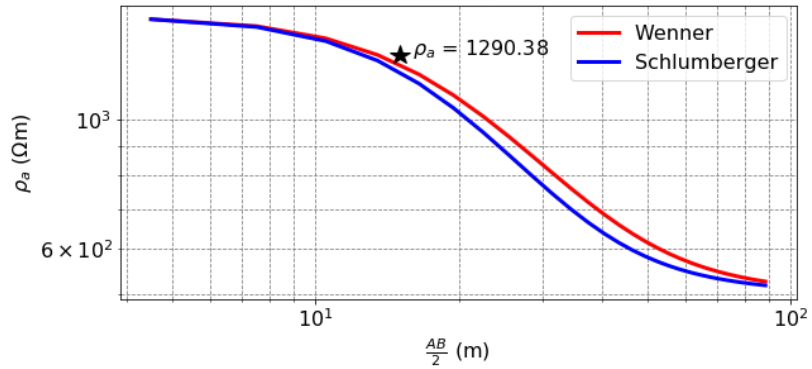




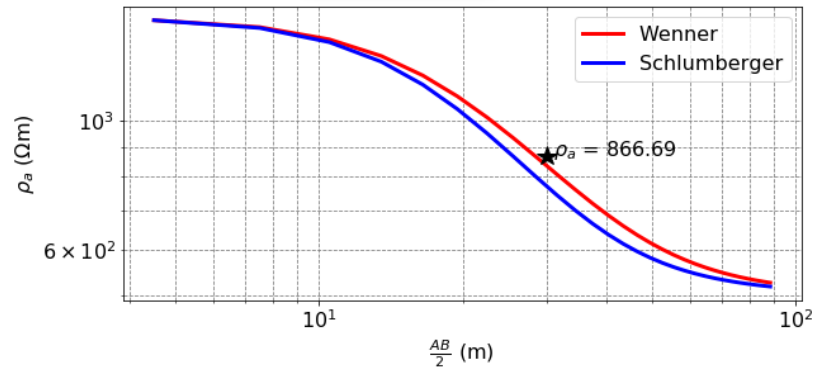
Electrodes very close



Electrodes more spaced



Large electrode spacing



Geophysical Inversion Concept

What inversion does:

Starting with geophysical data, inversion tries to find a resistivity model that:

1) Reproduces the field data well

2) Is similar enough to the true geology

What inversion does NOT do:

- It does not find the true resistivity of the Earth.
- It does not try to fit the data values perfectly, because we assume the data are have noise/errors