

Internal structure of the San Andreas fault at Parkfield, California

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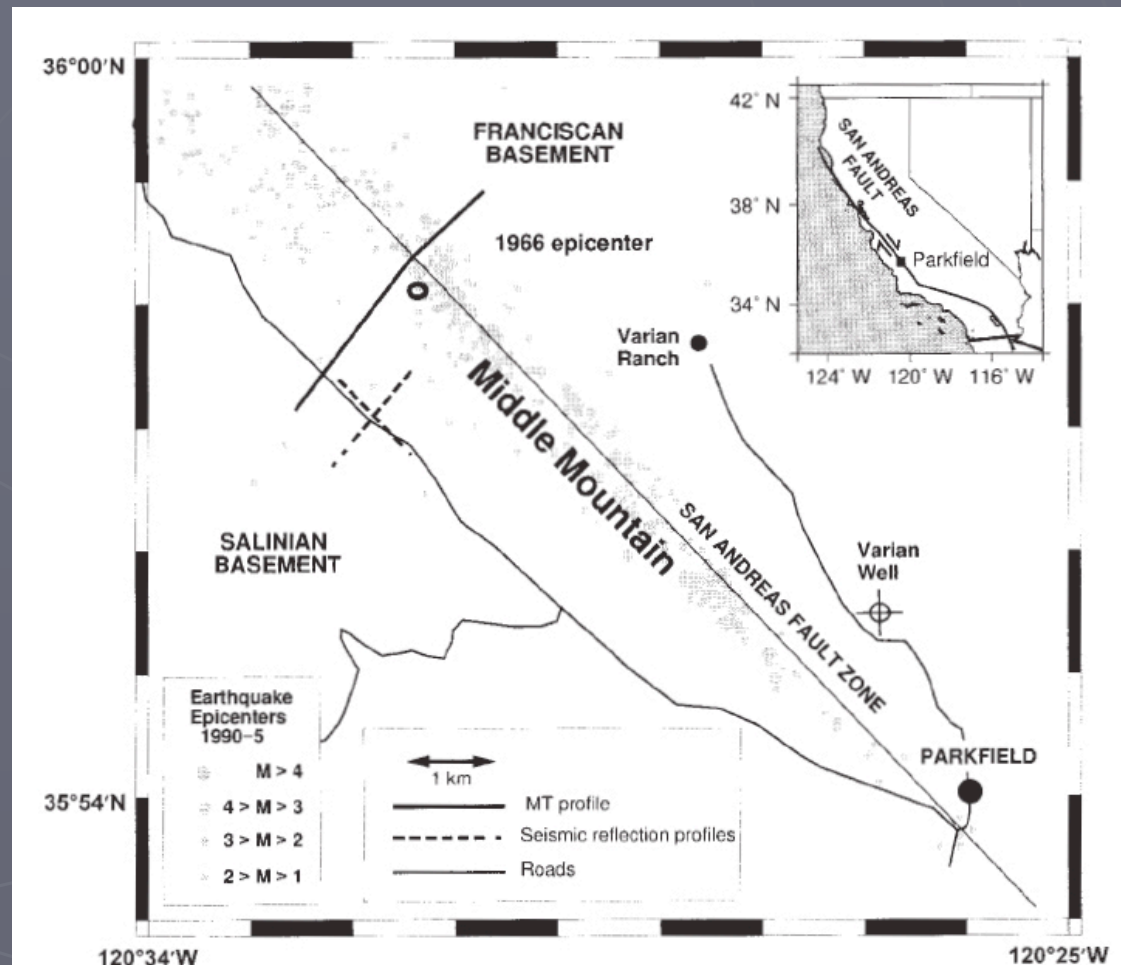
Motivation

- ▶ Interesting near-surface direct current (DC) resistivity measurements in the Parkfield area.
- ▶ Low seismic velocities near this area.
- ▶ This is the location of 6 moderate earthquakes within the last 150 years



Data and Methods

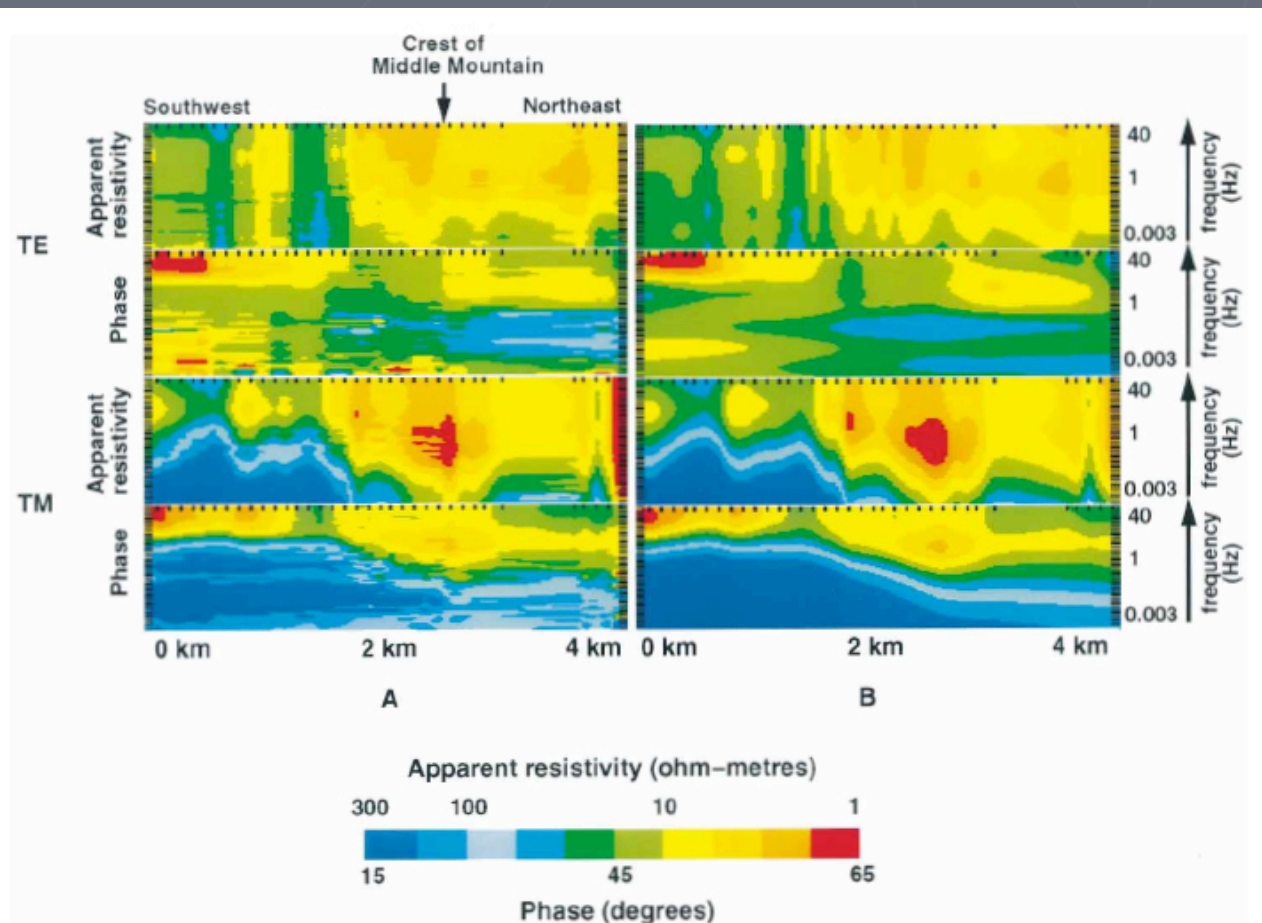
- ▶ Magnetotelluric (MT) data taken along a 4 km section of the San Andreas fault
 - Low frequencies sample deeper depths
- ▶ Seismic data taken for the SW portion



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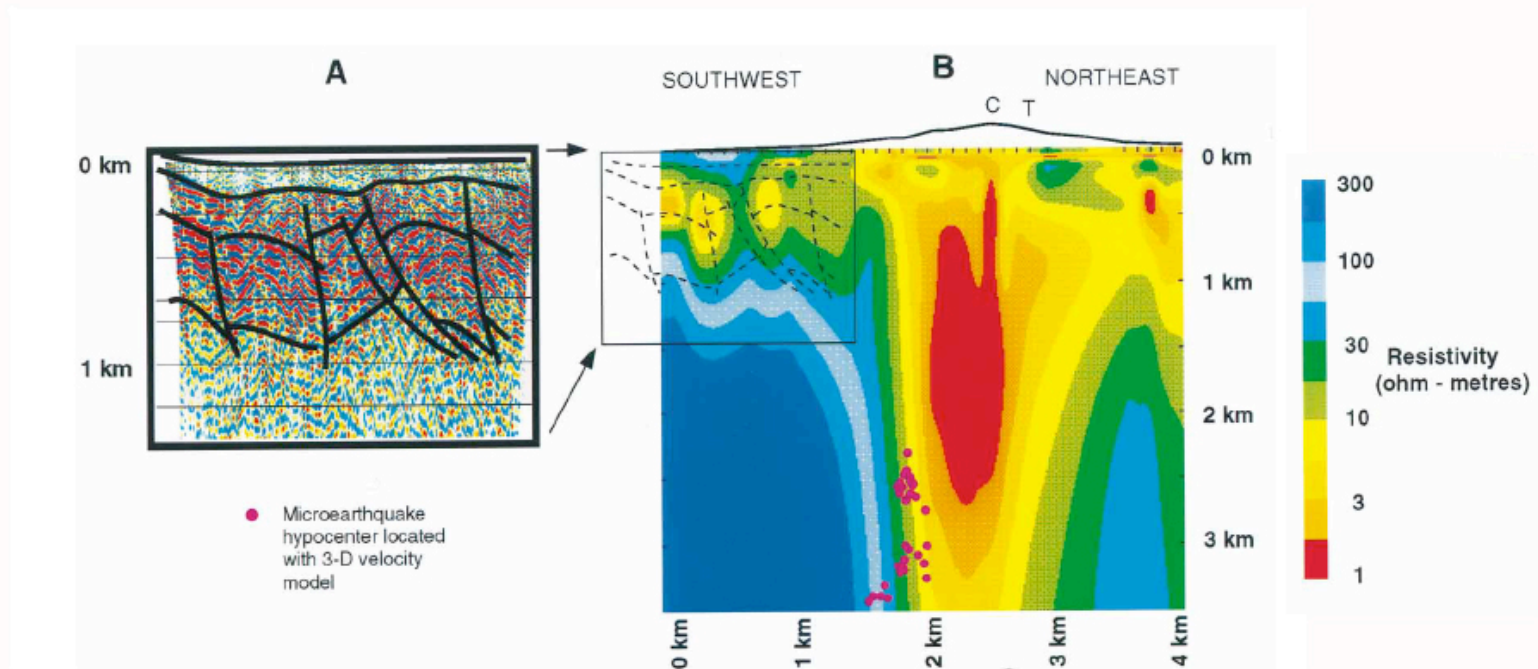
Data and Methods Continued

- ▶ Resistivity is plotted versus frequency
- ▶ Smoothing models are used to make best fit predictions



Data and Methods Continued

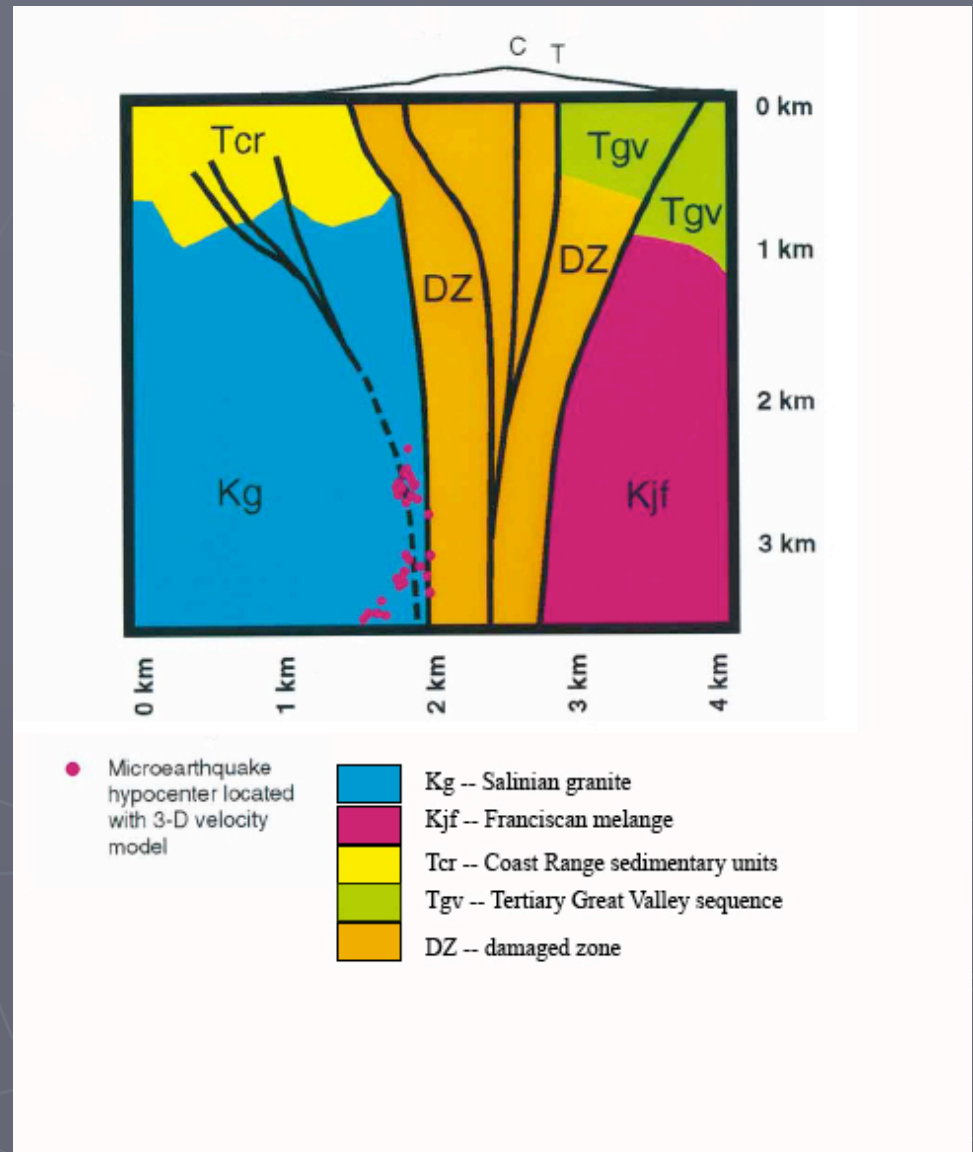
- ▶ A low resistivity zone beneath Middle Mountain
 - Around 500 m wide
 - Extend to around 4 km
- ▶ Seismic reflection data showing the top of Salinian Granite



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Implications

- ▶ Fluid present in the rock
 - Brine with 30,000 ppm chloride
 - Require a porosity between 9-30% or a 30 m wide zone of fluid
- ▶ A very porous rock layer contributing to the fluid content
- ▶ Active contribution to the earthquakes and topography in this area



Additional Thoughts

- ▶ How do the processes in this study help to find and identify electromagnetic precursors to major earthquakes?
- ▶ How active is the role of the fluid in the earthquake cycle of this area?
- ▶ How precise are the deeper observations of resistivity?