EARTHSCOPE SEMINAR
DISCUSSION SUMMARY
APRIL 2, 2007
PRESENTER: Meghan Graham
NOTE-TAKER: Nick Schmerr

PAPER TITLE: Internal structure of the San Andreas fault at Parkfield, California
Authors: Unsworth, M.J., P.E. Malin, G.D. Egbert, and J.R. Booker

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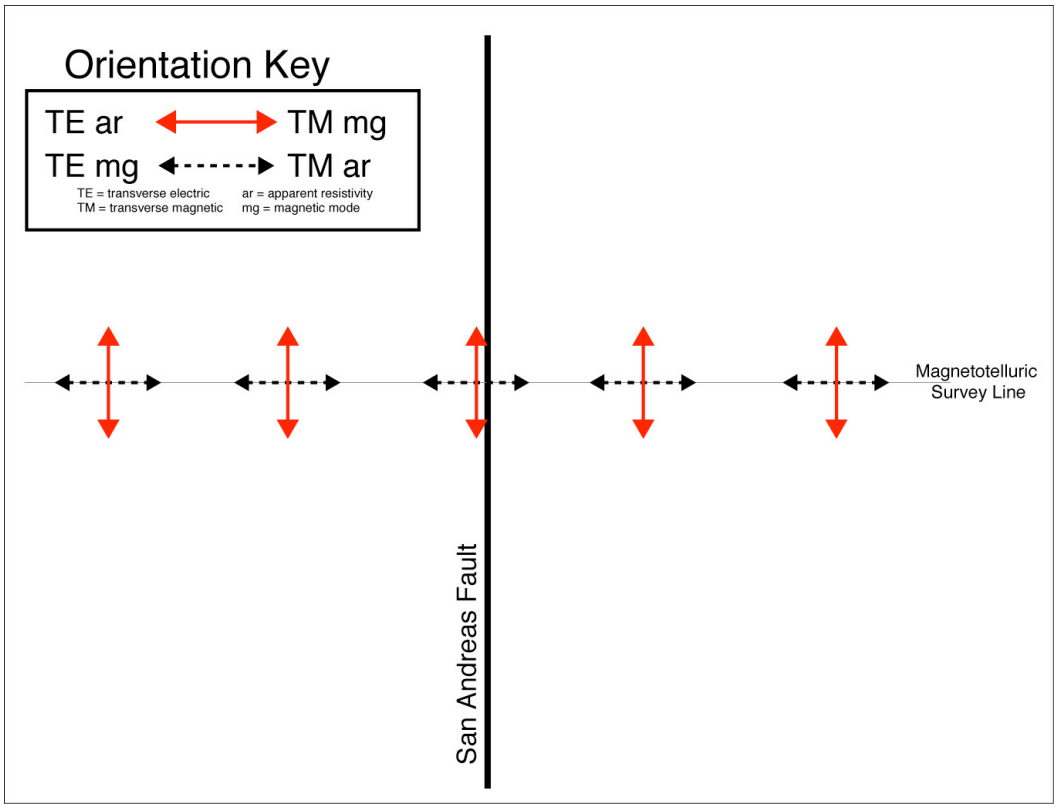
This paper utilizes magnetotelluric and seismic reflection data to illustrate the electrical resistivity and subsurface structure of the San Andreas Fault near Parkfield California. A zone of low electrical resistivity is detected along the fault that extends to nearly 4 km in depth, and is approximately 0.5 km wide. The authors attribute this low electrical resistance region to saline fluids in highly porous materials within the damage zone of the fault. They also speculate that seismicity within the fault zone could be controlled by the presence of fluids and note that earthquakes are coincidentally co-located within regions with low resistivities, and inferred to have a high fluid content.

The discussion of the paper focused primarily on the proper interpretation of the images in Figures 2 and 3 (see figure outlining the orientations of each electromagnetic field at the study stations below). The region over which each station is sensitive to resistivity grows with depth.



Fault parallel apparent resistivity is shown in the TE images, and fault perpendicular apparent resistivity is shown in the TM images. In general, the seminar participants agreed that there was a low resistivity feature under the Middle Mountain region.

Discussion then focused on Figure 3 in the paper. It was agreed that an un-interpreted version of Figure 3A would have been useful, as it was difficult to determine how the lines were drawn to infer structure in the seismic data. It was also pointed out that the northeast section of Figure 3B is unconstrained due to lack of data coverage, and as such, care should be taken when interpreting this region of the author's best fitting model.

An important point rose about the paper that centered on the interpretation of fluid within the fault zone. It seems unclear if fluid would remain confined to the damage zone of the fault and if or why it would not migrate into/from the surrounding country rock. It also seemed unclear to participants if fluid was responsible for earthquake activity in the low resistivity region. These questions were left open-ended for future discussions.