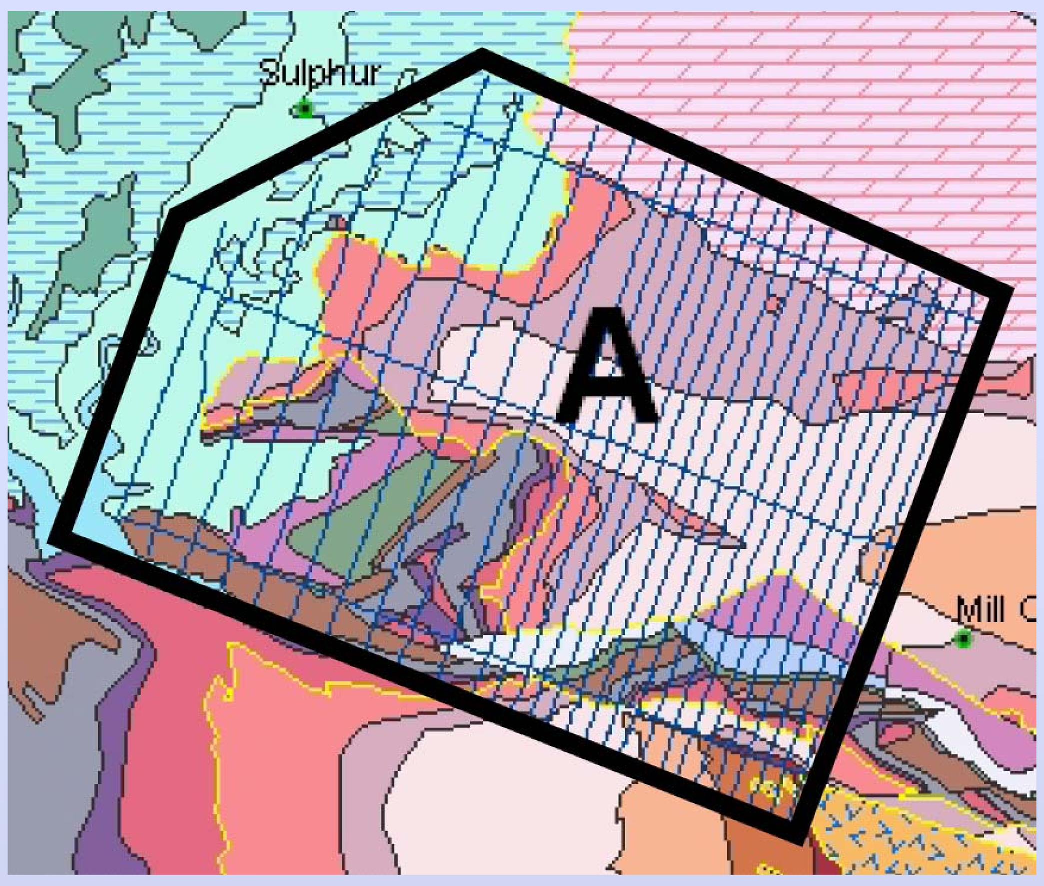
H51G-0933

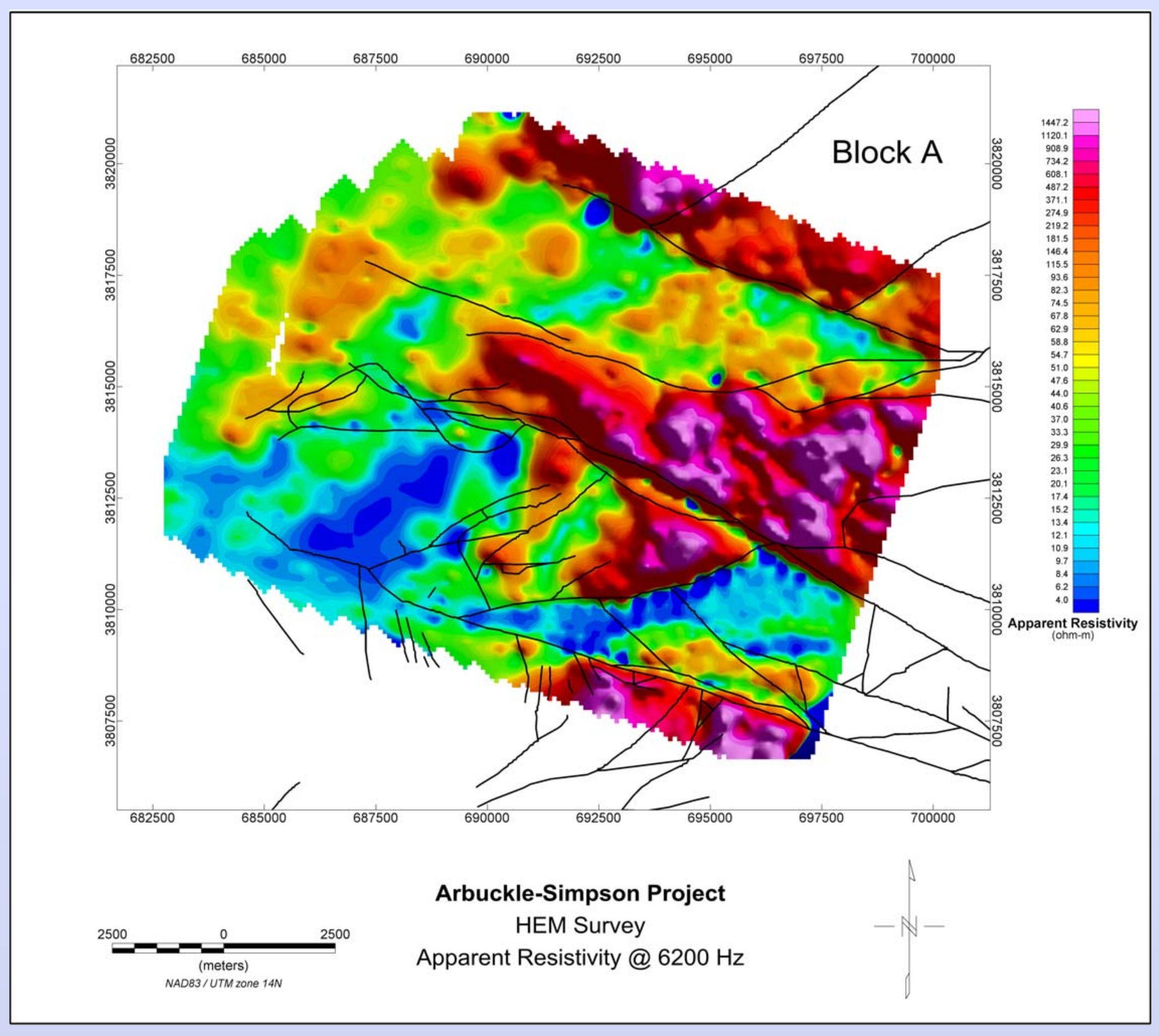
AGU Annual Meeting
December 19, 2008

State of Oklahoma OWRB Water Resources Board the water agency

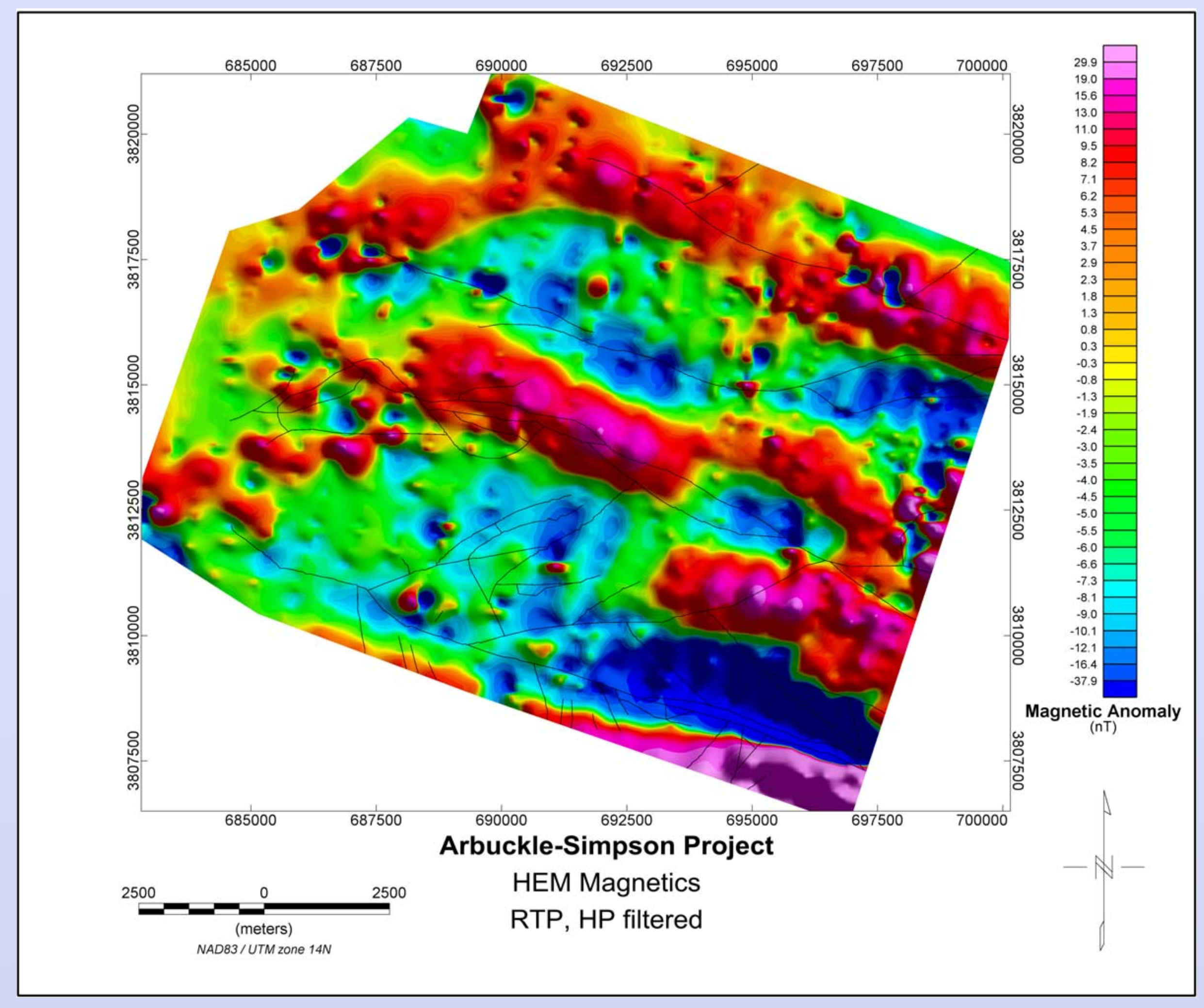
PANEL 3 Block A Structure



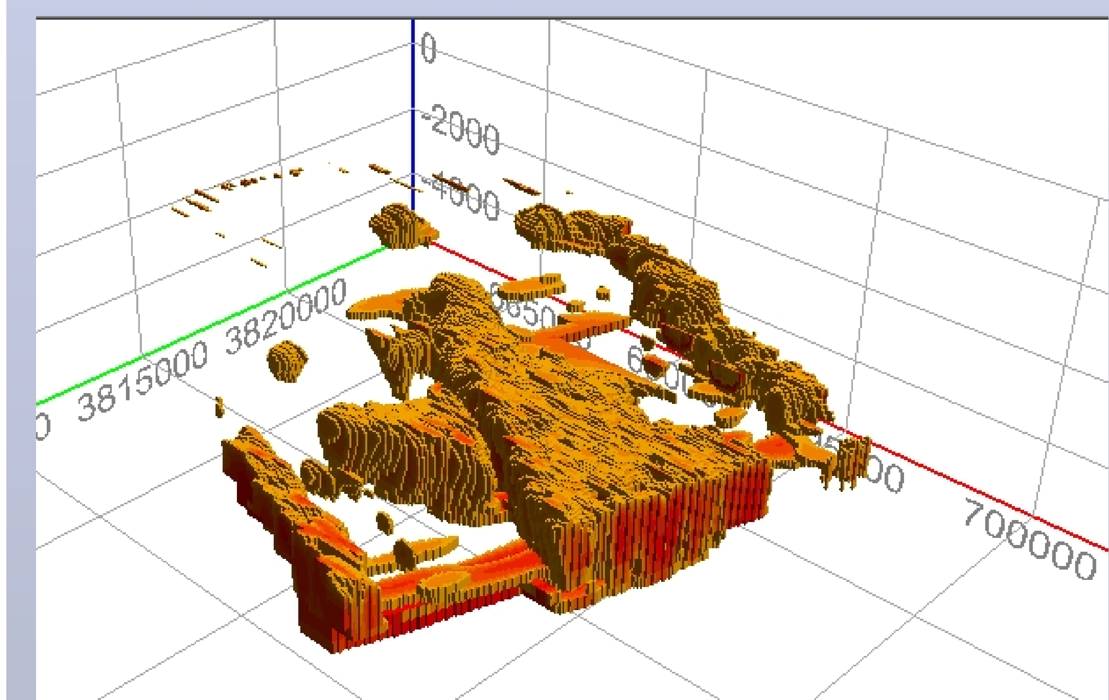
Flightlines in HEM Block A superimposed on geologic map (Ham, 1954). Block A was a prime study area because of the complex geology and its proximity to Chickasaw National Recreation Aarea, a sensitive public resource dependent on groundwater discharge from the Arbuckle-Simpson aquifer.

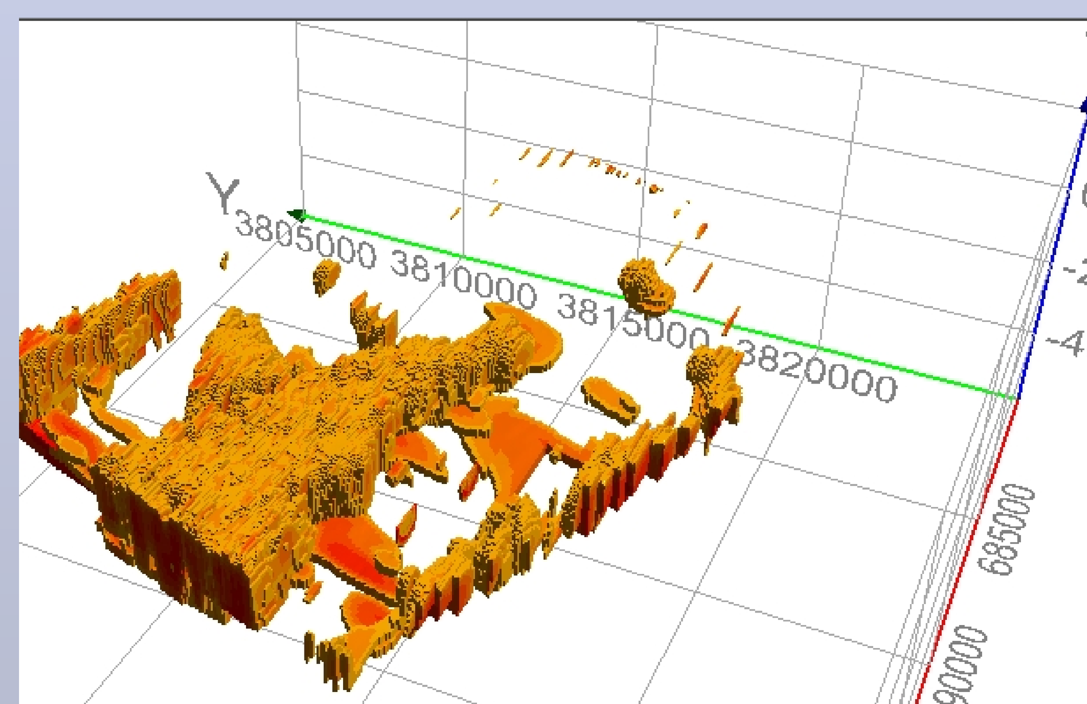


The apparent resistivity maps clearly delineate major faults and geologic contacts. Discrepancies between the HEM geophysics and the geologic map reveal areas where revisions in the geologic map may be required.

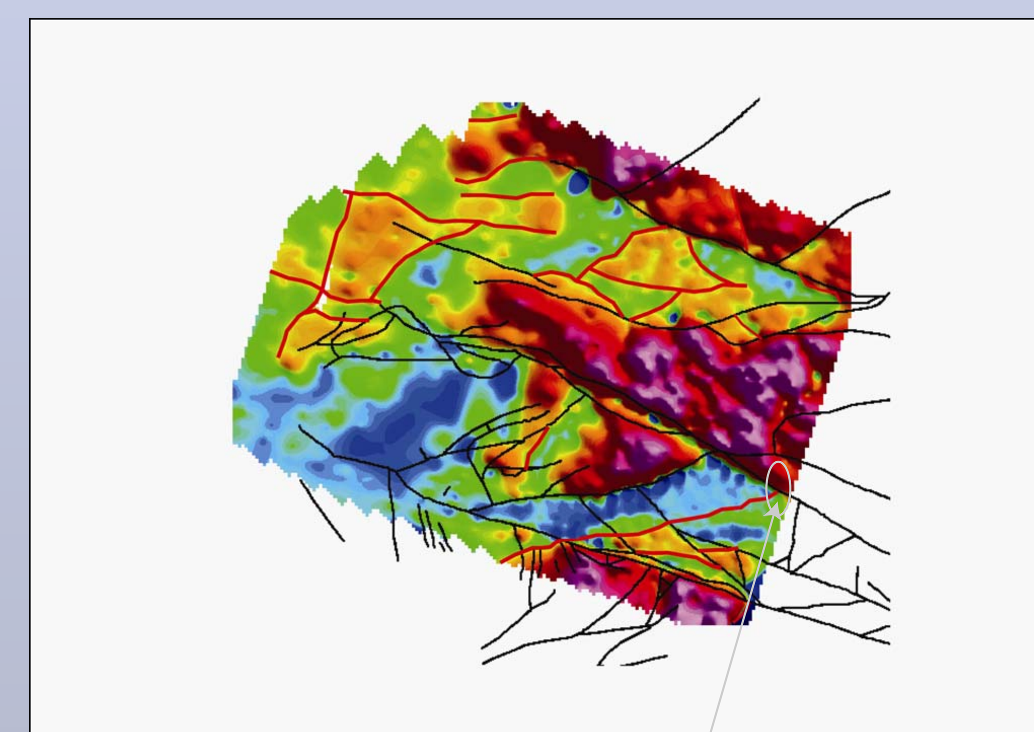


Different lithologies possess different magnetic susceptibilities, thus creating measurable magnetic anomalies. The juxtaposition of different lithologies across faults, as well as vertical offsets of geologic strata, make magnetic surveys useful in mapping sedimentary sequences.





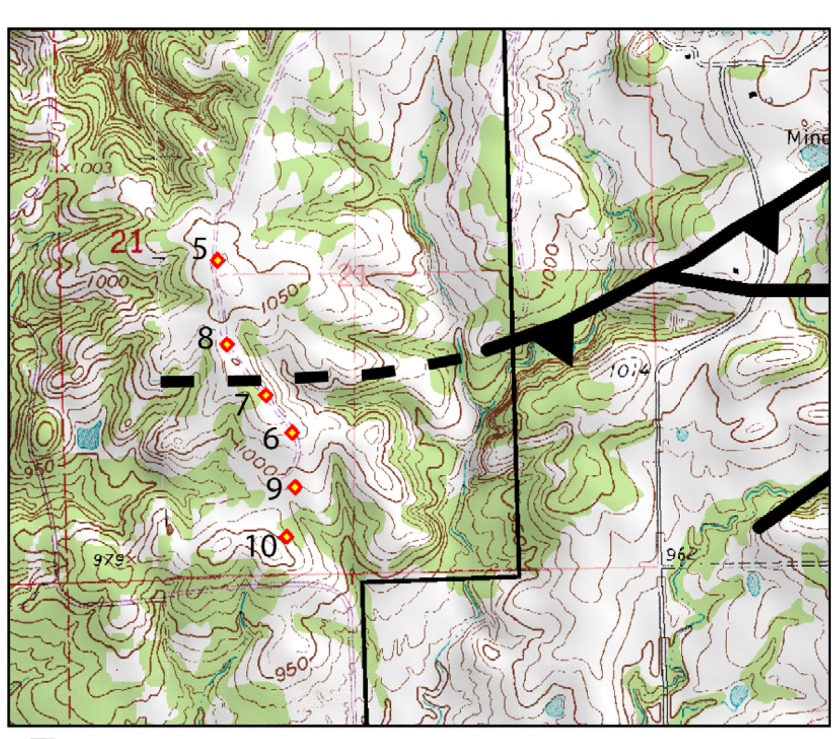
Three-dimensional structural views can be generated by plotting isosurfaces of a given apparent resistivity value, such as 200 ohm-m. These two plots show resistive limestone units from different view angles.



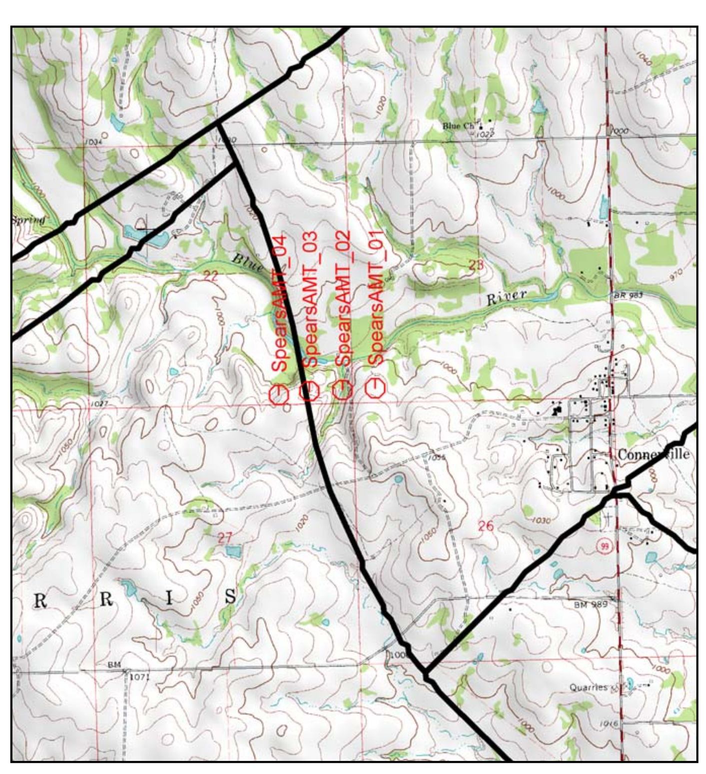
Ground dc resistivity surveys across Mill Creek fault

Ground dc electrical resistivity inversions correlate extremely well with the HEM inversions. Given the difficulties of conducting ground surveys, HEM methods offer a cost-effective approach to reconnaissance surveying.

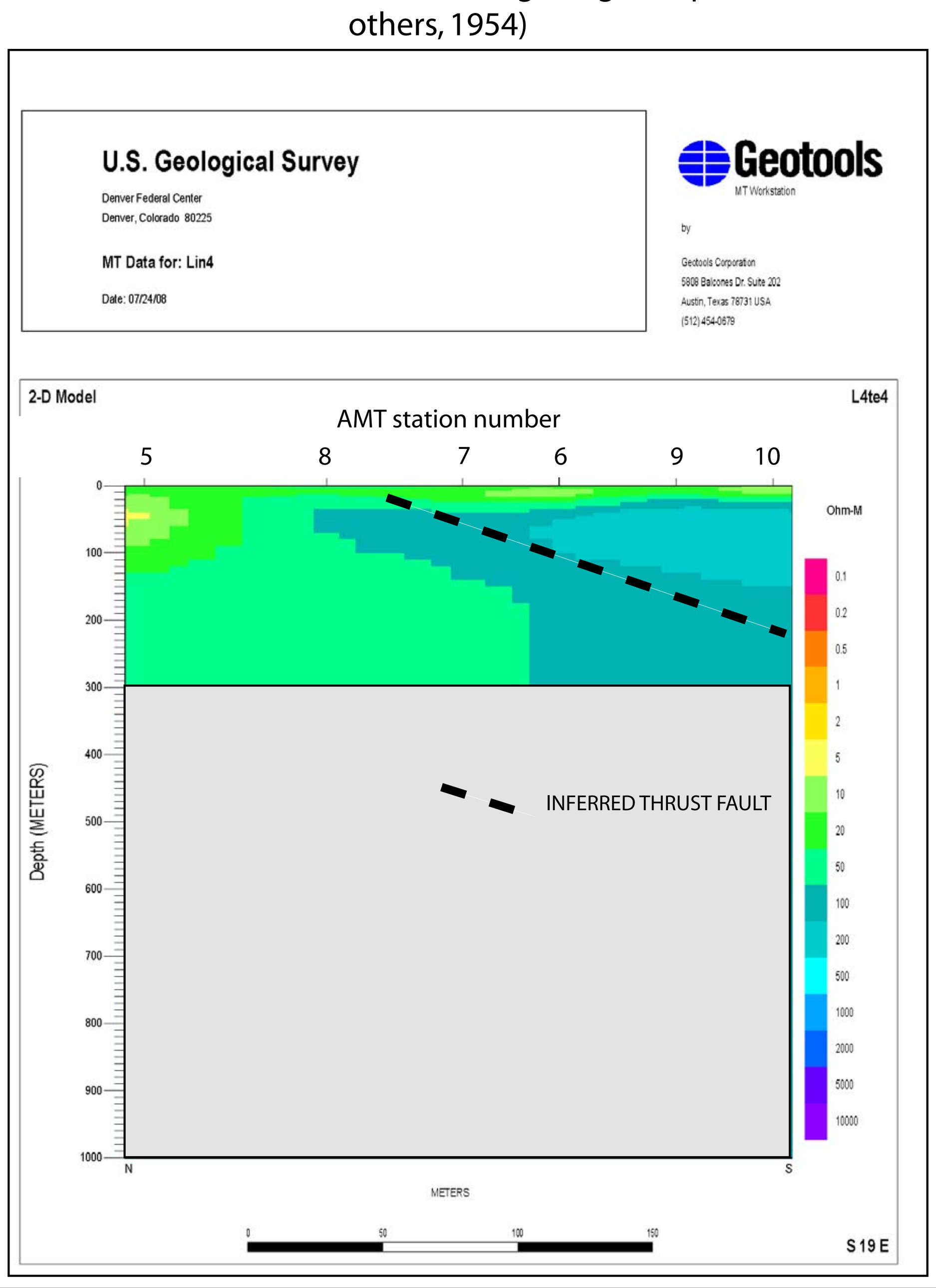
The Audio-Magneto-Telluric (AMT) method can detect faults under cover and give an indication of their dip.

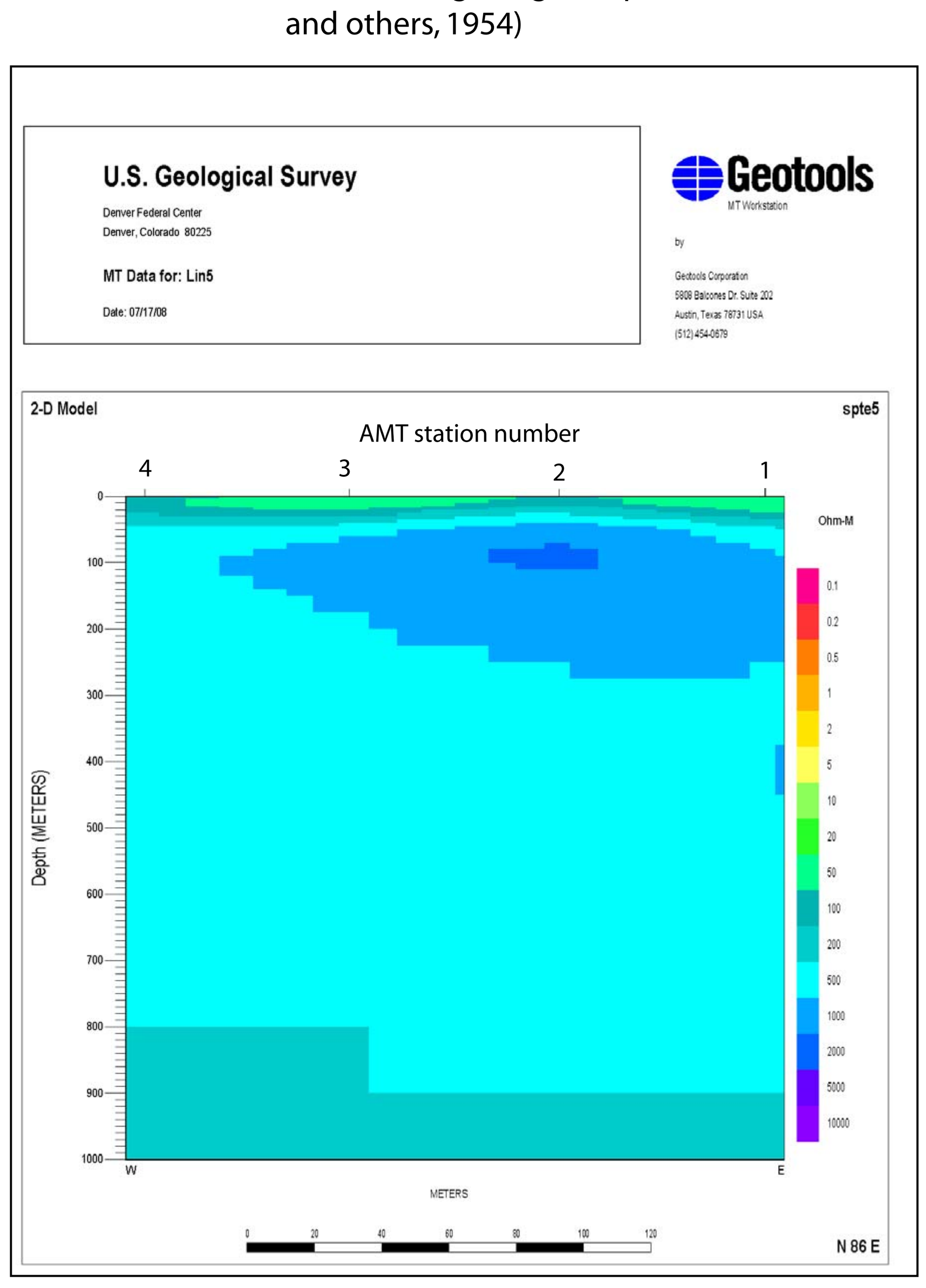


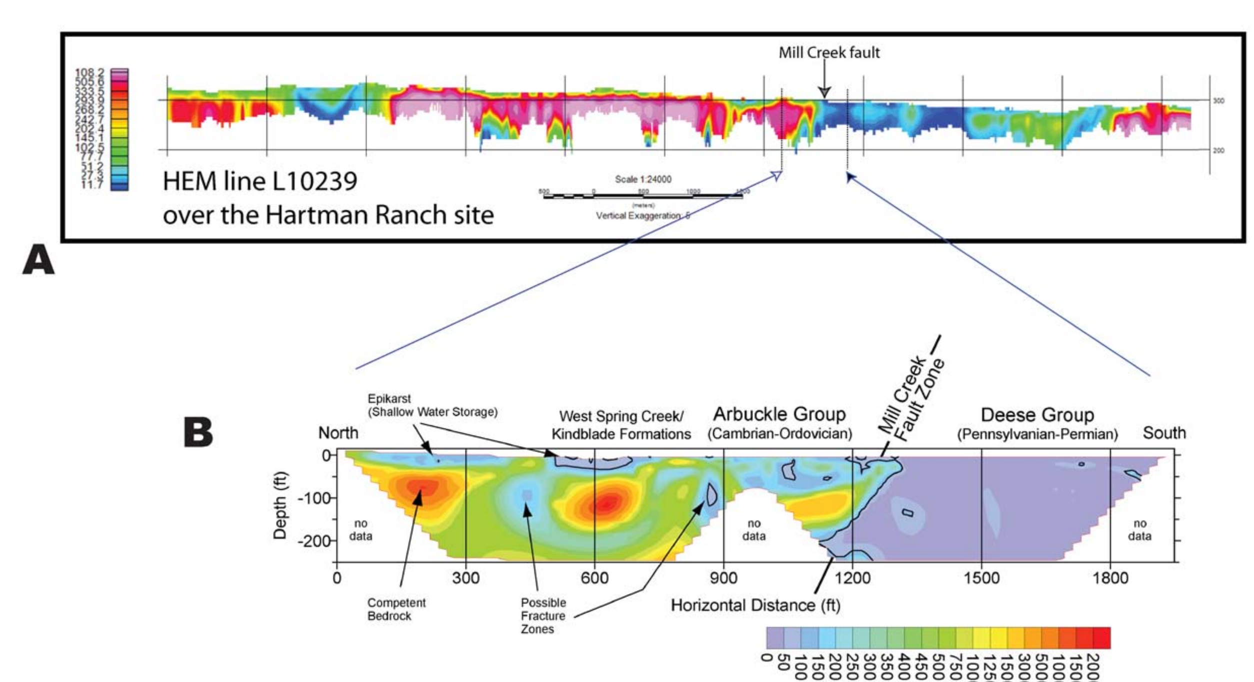
AMT station (faults from geologic map, Ham and others, 1954)



AMT station (faults from geologic map, Ham and others, 1954)







HEM and ground resistivity depth sections at the eastern side of Block A: A) Resistivity depth section from HEM survey over easternmost flight line, and B) Ground resistivity depth section over Mill Creek fault (adapted from Riley, 2007).