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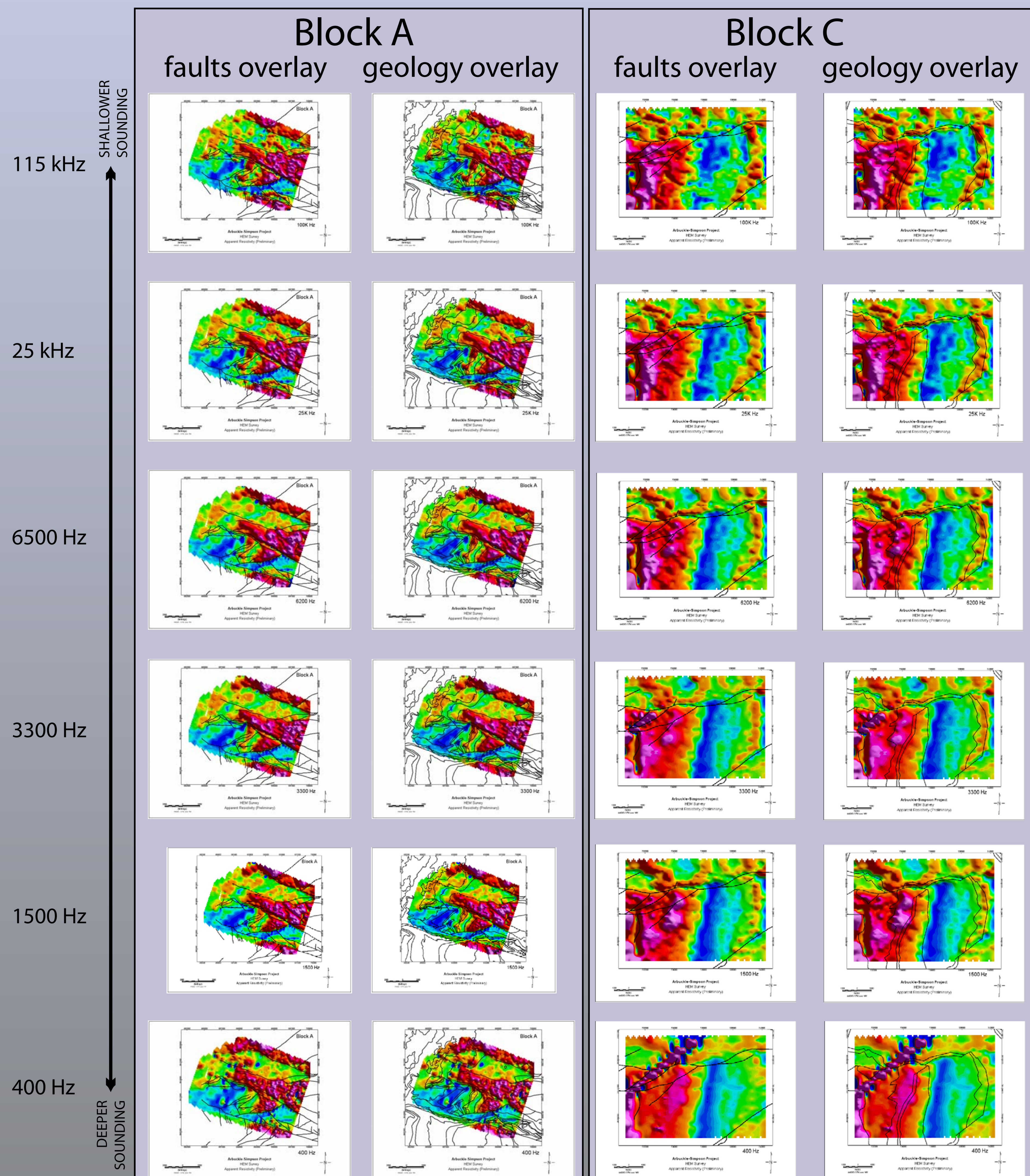
PANEL 2 Resistivity and Magnetic Data

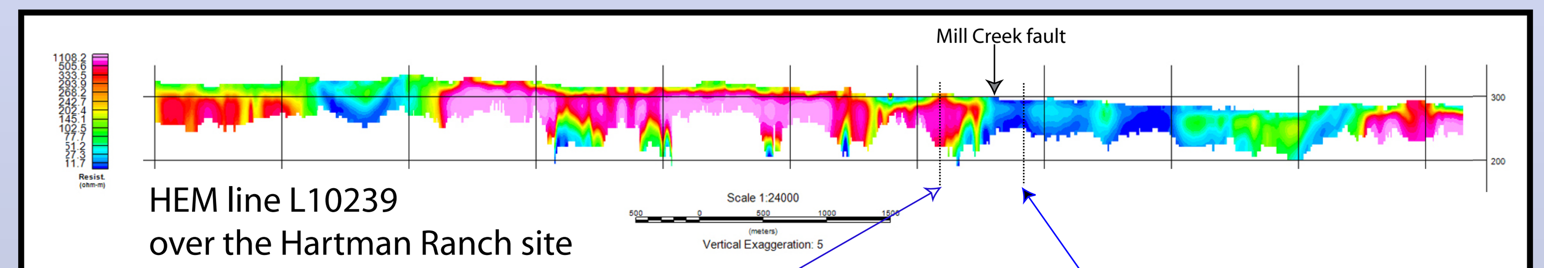
APPARENT RESISTIVITY MAPS

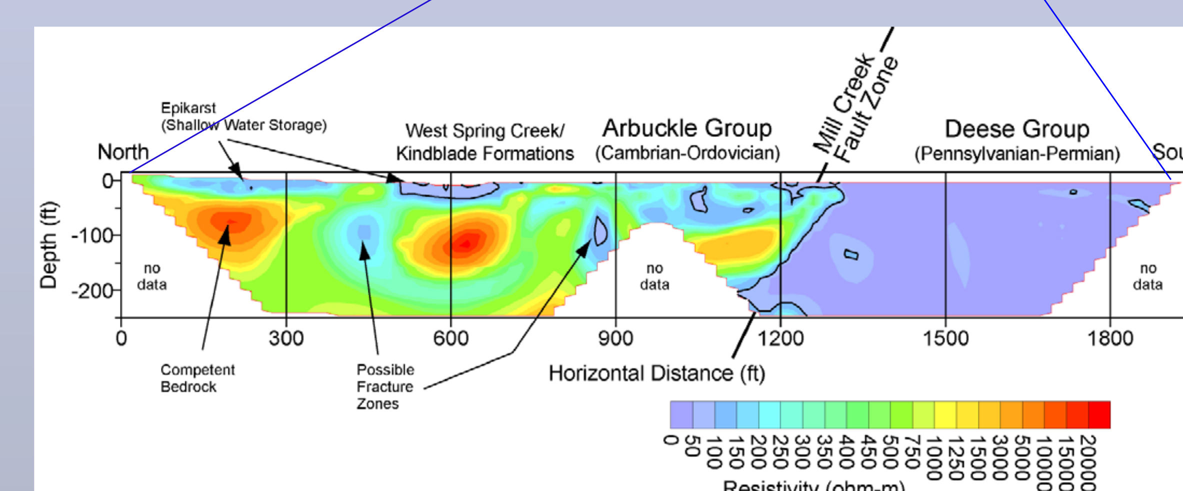
Apparent resistivity maps are shown with color scales that reflect maximum (red) and minimum (blue) values for the indicated frequency. Thus particular color scales are unique to each map. The specific frequencies and configuration of electromagnetic coils are given in the table in panel 1. Decreasing frequency probes deeper, with specific depth of investigation depending on the resistivity of the subsurface. At the highest frequency (100 kHz), the exploration depth is only a few meters at most. The maximum exploration depth at the lowest frequency (400 Hz) is on the order of 100 meters in areas of highest resistivity. The figures below show the correlation of mapped resistivity to mapped faults and geology. Block A exhibits more variation due to the high occurrance of faults, whereas variations in Block C are due more to varying lithology exposed in dipping strata in the horst block on the east flank of the anticline.



RESISTIVITY-DEPTH SECTIONS

Resistivity-depth sections display the variation of electrical resistivity along flight lines. At each measurement location along the flight line a resistivity profile is estimated with a 1-D inversion (EM1DFM) that uses information from all six frequencies. When assembled side-by-side, these 1-D profiles create a two-dimensional resistivity section along the line.

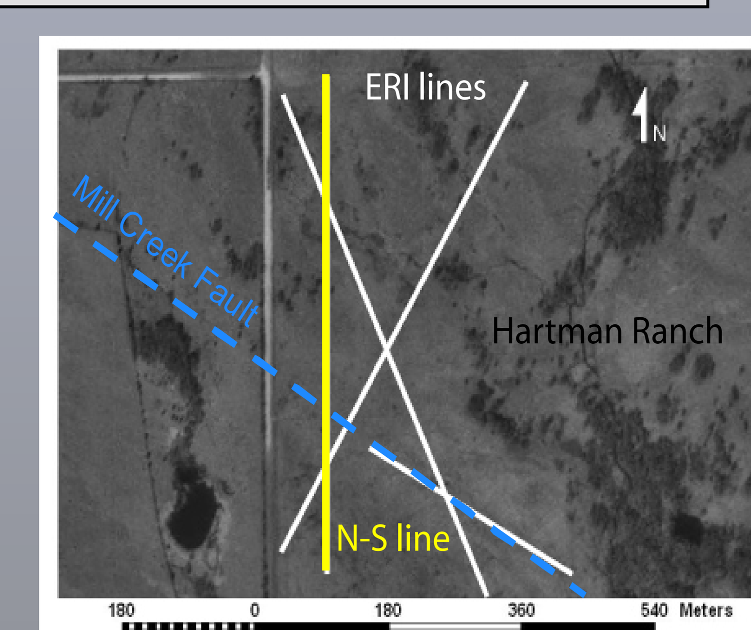




Electrical resistivity imaging data for the N-S line at an oblique angle to the Mill Creek fault on the Hartman Ranch site. This line was chosen because the HEM survey followed N-S flight lines. It is linked to the corresponding HEM line by two blue arrows. Note the similarity of the ERI image to the HEM section, particularly the sharp contrast at the Mill Creek fault between the high resistivity Arbuckle Group and the low resistivity Deese Group.

Electrical resistivity imaging (ERI) is a ground-based geophysical method used to map shallow (0 to 60 m) variations in earth resistivity. High quality data can be obtained inexpensively with ERI equipment, though the labor requirements are high.

Stakes for electrodes are hammered into the ground at equal intervals along a straight ERI survey line.



Several ERI lines were completed over the Mill Creek fault in an experiment to determine the effect of intersection angle on the fault's electrical signature in the profile. Perpendicular lines are best, as more acute angles smear the contact.

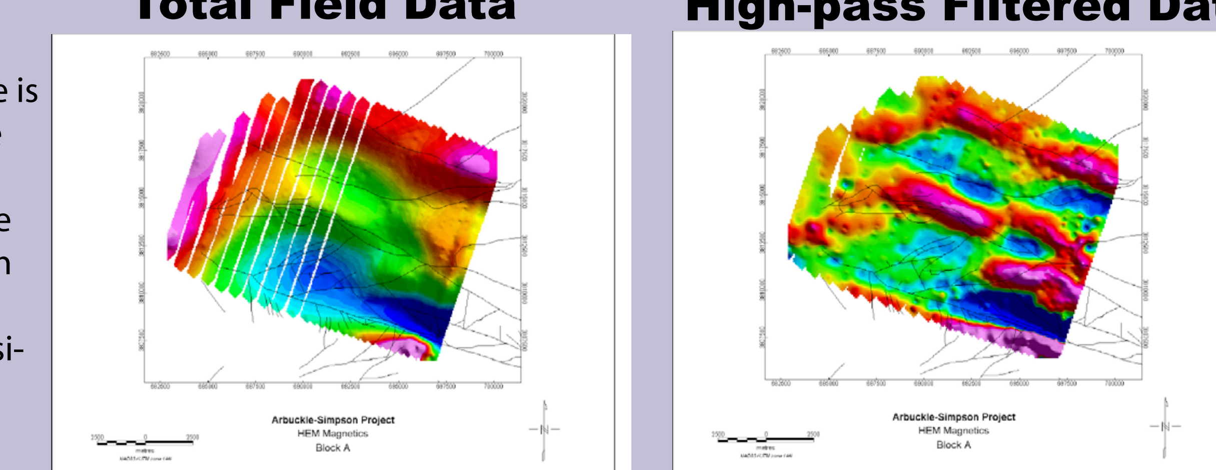
MAGNETIC FIELD MEASUREMENTS

Total magnetic field data was collected with a high precision magnetometer in the bird towed beneath the helicopter. Three processing steps were applied to the total magnetic field data. The first step removed the earth's main magnetic field by subtracting the International Geomagnetic Reference Field (IGRF). The second step reduced the main magnetic field to the pole, which shifts magnetic highs to be located directly over the causative body instead of being shifted slightly to the south. The third step removed a regional magnetic field. This was accomplished by applying a spatial high-pass filter. The remaining higher frequency magnetic anomalies are due to shallow geological features. With the rainbow color scale used in the maps below, red colors represent magnetic highs and blue colors represent magnetic lows.

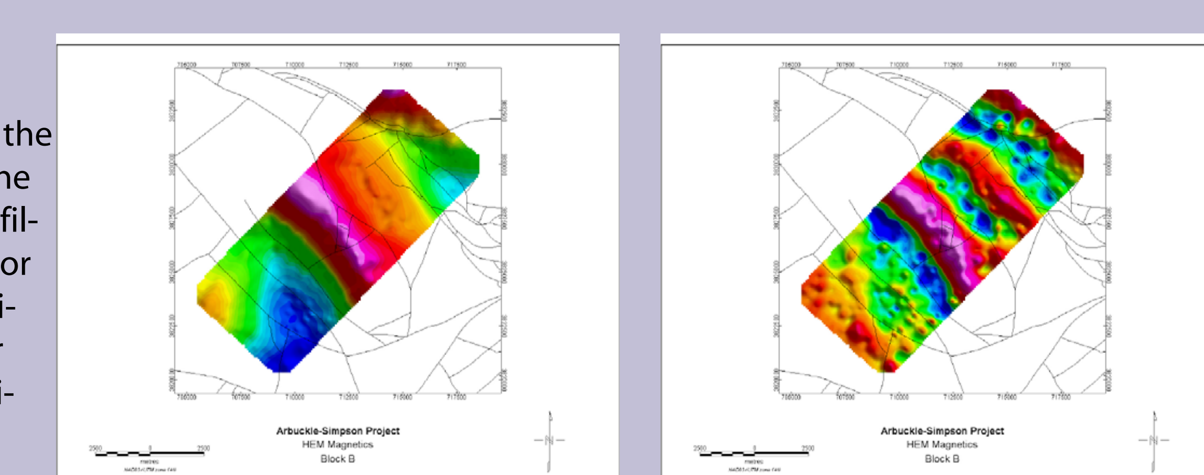
Airborne Magnetic Field Maps
(with faults overlay)

Total Field Data | **High-pass Filtered Data**

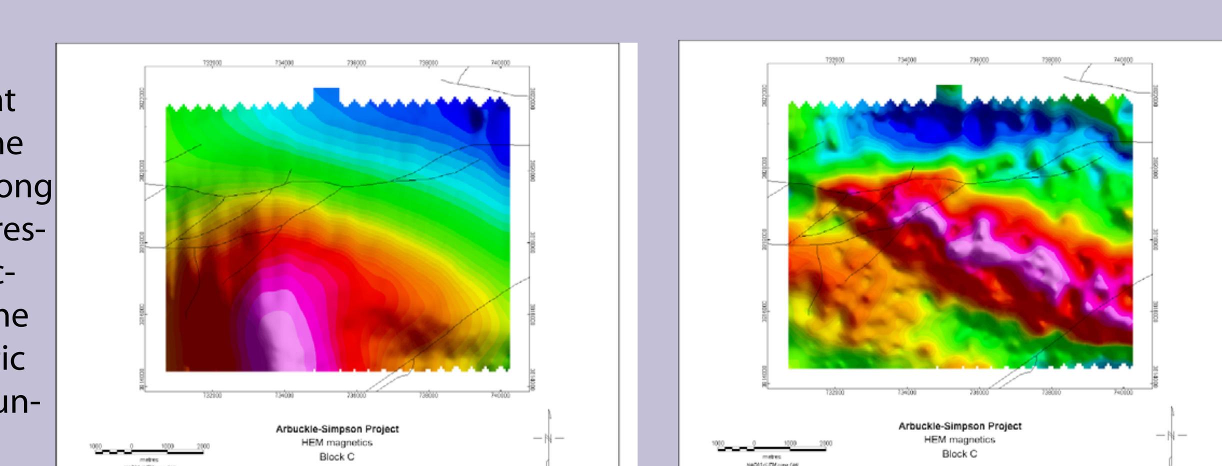
Block A
Much structure is revealed in the filtered data. Major faults are associated with strong, linear magnetic transitions.



Block B
Much structure can be seen on the north flank of the anticline in the filtered data. Major faults are associated with linear magnetic transitions.



Block C
A major fault at the north of the horst has a strong magnetic expression. The structure causing the broad magnetic high remains unexplained.



Block D
Very little structure is revealed in this small-scale survey. Perhaps this is due to the fairly uniform composition of the limestone, which has very little magnetic mineralization.