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EXPLORATION GEOPHYSICS

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15 July 2006

No: 15

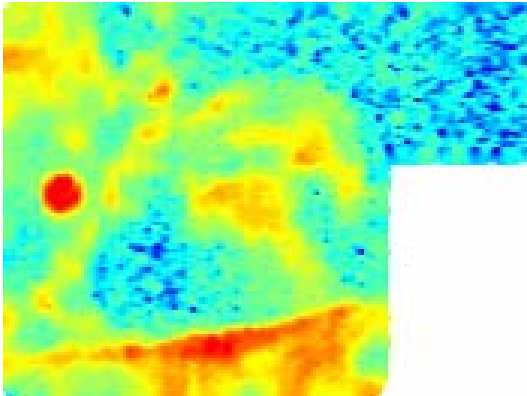
CASE HISTORY

Subject: TargetTEM™ – Greenstone belt (HOISTEM)

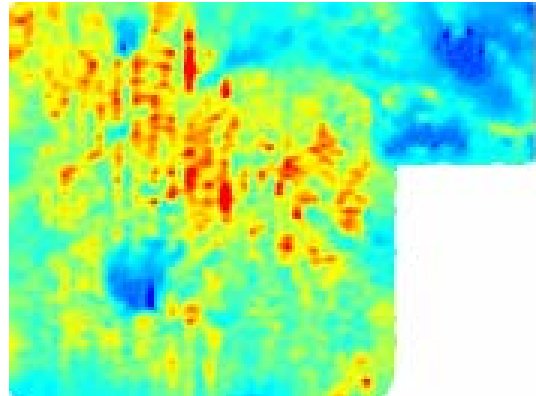
Harts Range, Arunta Province, Northern Territory, Australia.

HOISTEM survey (flown 2002) with survey lines oriented 0-180 degrees and spaced 200 metres apart over Proterozoic greenstones. The area hosts nickel sulphide mineralisation. Area is 11.8kms x 8.8kms, north to top of page. Data shown are the HOISTEM dB/dt vertical (Z) component, 27 channels. See Vector Research Technical Note No. 9 for details of TargetTEM™.

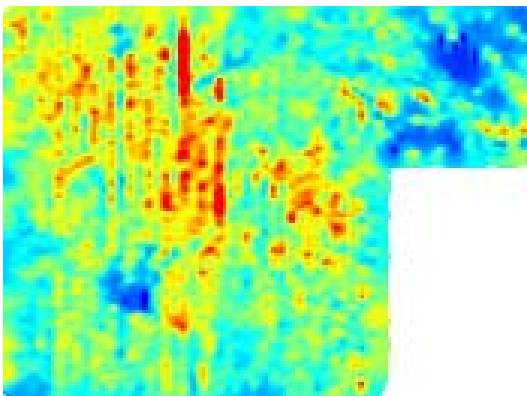
Data courtesy of Northern Territory Geological Survey, Australia.



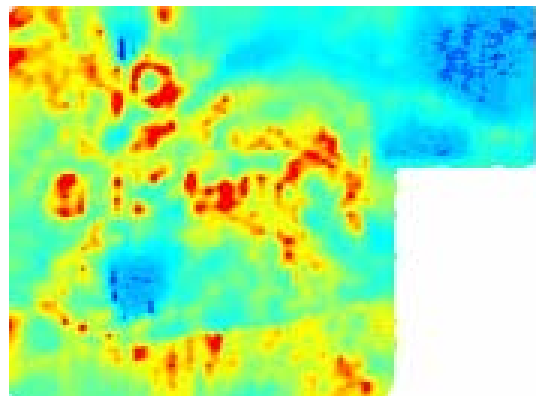
HOISTEM channel 3



HOISTEM channel 10



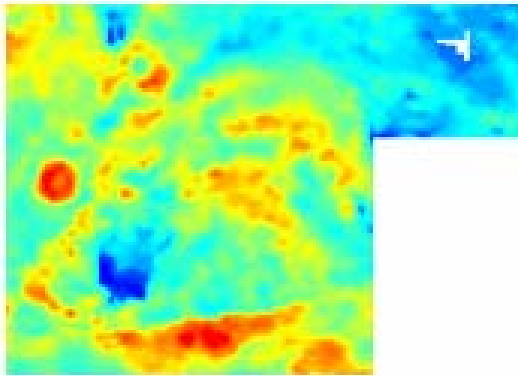
HOISTEM channel 24



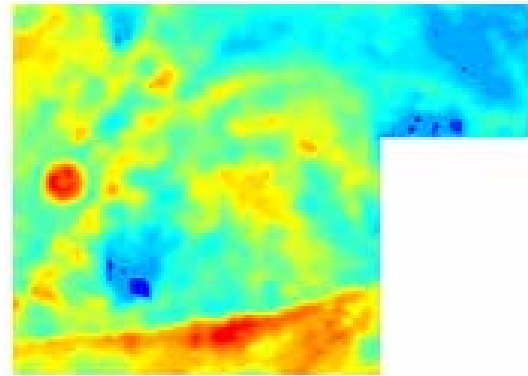
HOISTEM channel 17

Compare these raw channel images with the detail resolved in the TargetTEM™ SPATIAL and TEMPORAL responses.

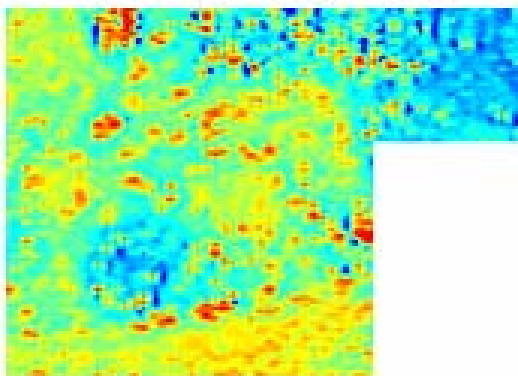
Harts Range nickel prospect, Arunta Province, Northern Territory (continued).



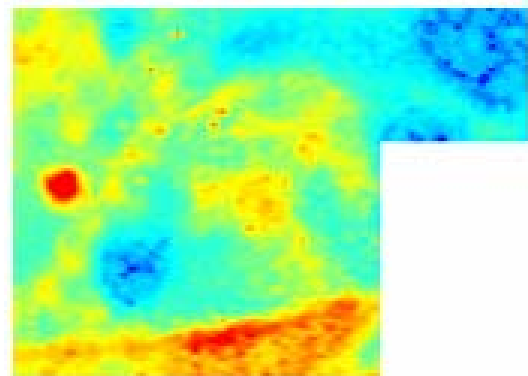
Calculated conductivity at 30 m depth



Calculated conductivity at 50 m depth



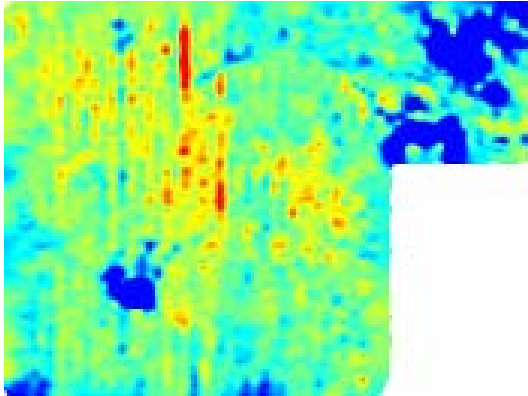
Calculated conductivity at 200 m depth



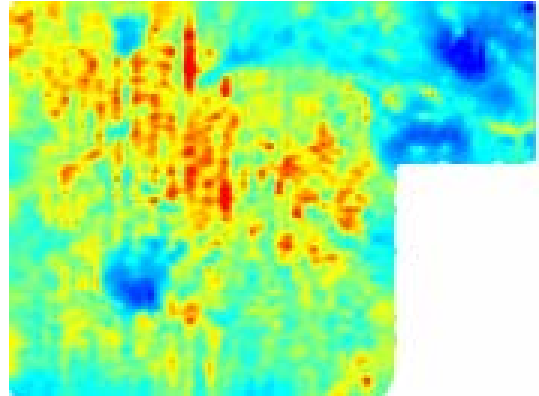
Calculated conductivity at 100 m depth

These conductivity-depth images were calculated from the HOISTEM data using a conductivity-depth imaging algorithm and attempt to show the conductivity at particular depths. They show the large electrical contrasts of the prominent geological features, but lack important detail necessary for drill-targeting. Compare these with the detail resolved in the TargetTEM™ SPATIAL and TEMPORAL responses.

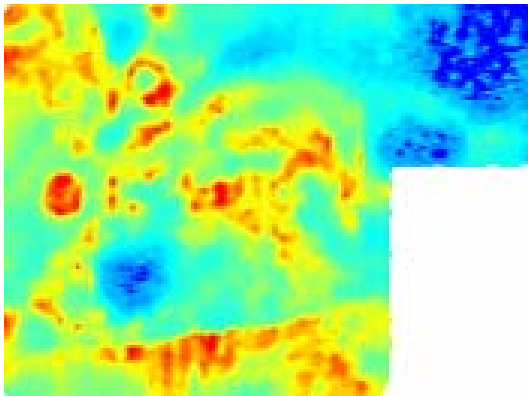
Harts Range nickel prospect, Arunta Province, Northern Territory (continued).



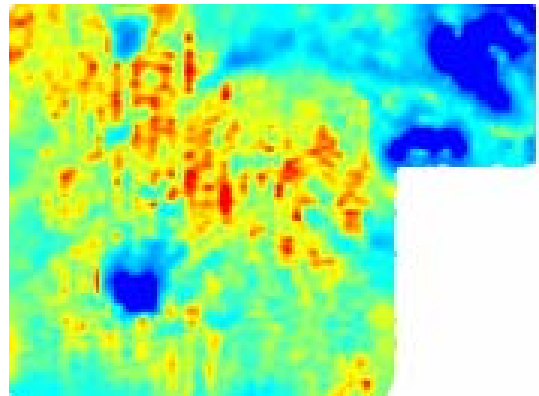
TargetTEM™ early-time SPATIAL response



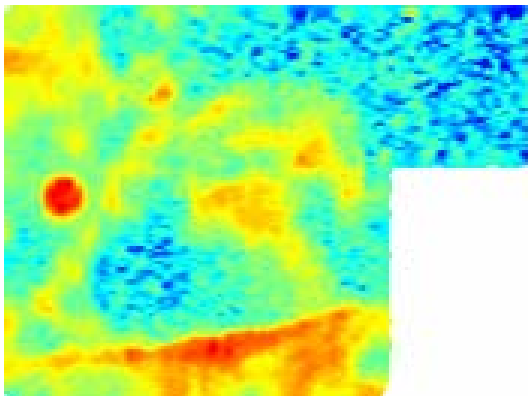
TargetTEM™ mid1-time SPATIAL response



TargetTEM™ mid3-time SPATIAL response



TargetTEM™ mid2-time SPATIAL response

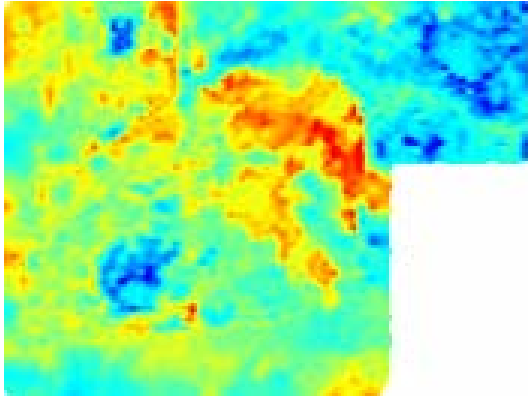


TargetTEM™ late-time SPATIAL response

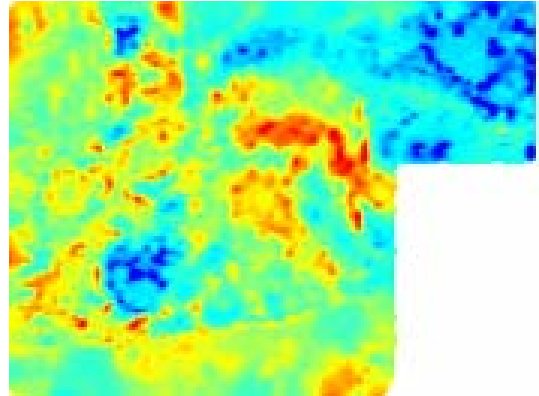
TargetTEM™ SPATIAL responses for each channel are calculated from the measured response. The background response for each channel, which includes the response of the host rocks and any conductive overburden present, is removed to reveal changes in the response along the survey lines. The depth, size and orientation of conductors strongly affect the amplitude of the measured responses. Early times depict the electrical response of shallow depths whilst later times depict deeper regions. Poor conductors are resolved at early times whilst the response of good conductors extends to later times.

Note the significant improvement in resolution of detail compared to the conductivity-depth images. The SPATIAL responses also resolve the affects of variations in survey height. Areas producing stronger responses than the background are shown in red whilst those producing weaker responses than the background are shown in blue.

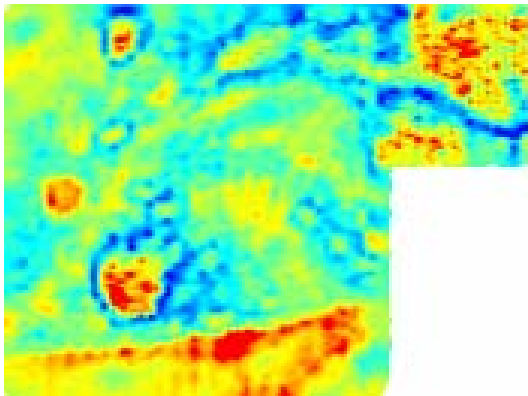
Harts Range nickel prospect, Arunta Province, Northern Territory (continued).



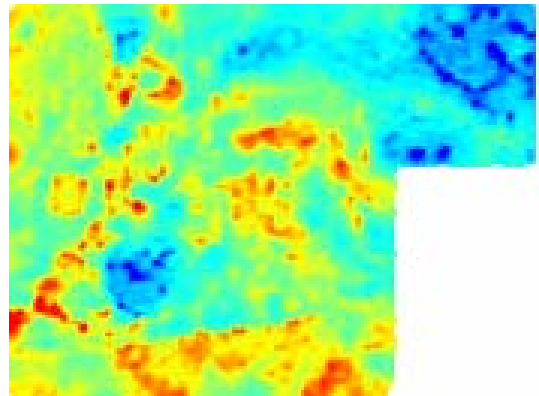
TargetTEM™ early-time TEMPORAL response



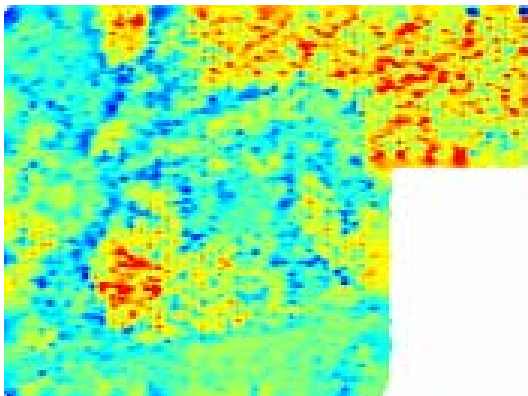
TargetTEM™ mid1-time TEMPORAL response



TargetTEM™ mid3-time TEMPORAL response



TargetTEM™ mid2-time TEMPORAL response



TargetTEM™ late-time TEMPORAL response

TargetTEM™ TEMPORAL responses for each channel are calculated from the time-varying transient decay. The background transient decay for each channel, which includes the response of the host rocks and any conductive overburden present, is removed to reveal changes in the decay along the survey lines. Early times depict the electrical response of shallow depths whilst later times depict deeper regions. Poor conductors are resolved at early times (they exhibit fast decays, ie short decay times) whilst the response of good conductors extends to later times (they exhibit slow decays, ie long decay times).

Note the significant improvement in resolution of detail compared to the conductivity-depth images. The TEMPORAL responses are relatively immune to the affects of variations in survey height and are therefore more reliable than the SPATIAL responses for exploration targeting. Areas having higher conductivity than the background are shown in red whilst those with lower conductivity than the background are shown in blue. TargetTEM™ does not resolve absolute conductivity or depth.

The raw channel data, the conductivity-depth images and the SPATIAL responses all show that the large area in the north-east and the circular area near the centre of the area (blue) are poor conductors. However the later time TEMPORAL responses reveal higher resolution of the relatively more conductive zones within these areas. In these high resistivity areas, the low signal strength decays quickly allowing noise to dominate the late-time SPATIAL and TEMPORAL responses, which characterises these areas.

The TargetTEM™ images have resolved features in the conductivity distribution of the geology which are either not apparent or not clear in the conductivity-depth images.