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EXPLORATION GEOPHYSICS

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15 July 2006

No: 13

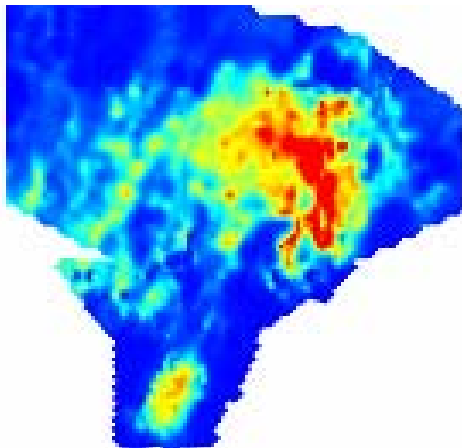
CASE HISTORY

Subject: TargetTEM™ – Salinity (HOISTEM)

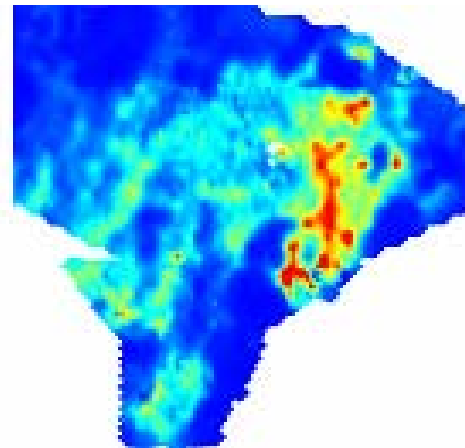
Lake Gore, Esperance, Western Australia

HOISTEM survey (flown 2004) with survey lines oriented 090-180 degrees and spaced 200 metres to investigate the distribution of saline water in the sediments beneath and surrounding Lake Gore. Area is 9.3kms x 8.7kms, north to top of page. Data shown are the HOISTEM dB/dt vertical (Z) component, 21 channels. See Vector Research Technical Note No. 9 for details of TargetTEM™.

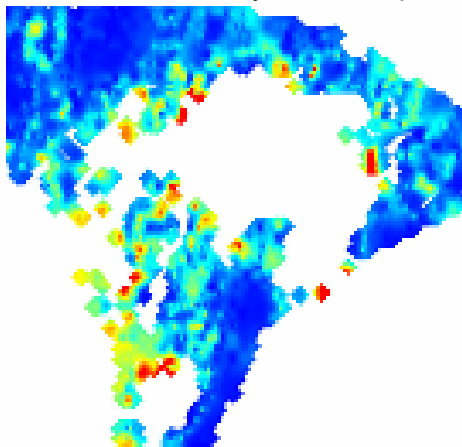
Data courtesy of Department of Conservation and Land Management (CALM), Western Australia.



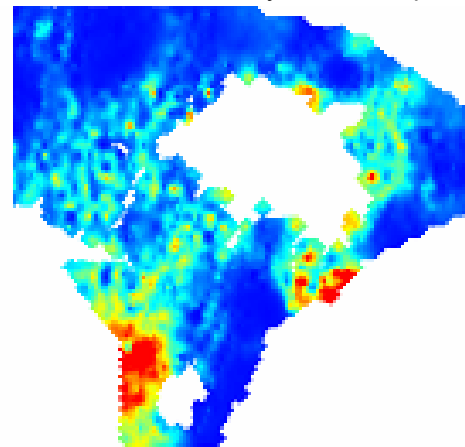
Calculated conductivity at 35 m depth



Calculated conductivity at 50 m depth



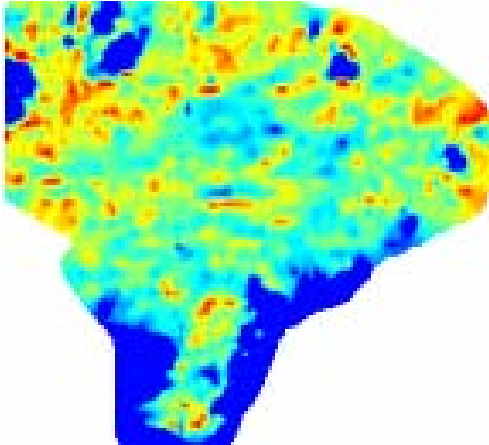
Calculated conductivity at 150 m depth



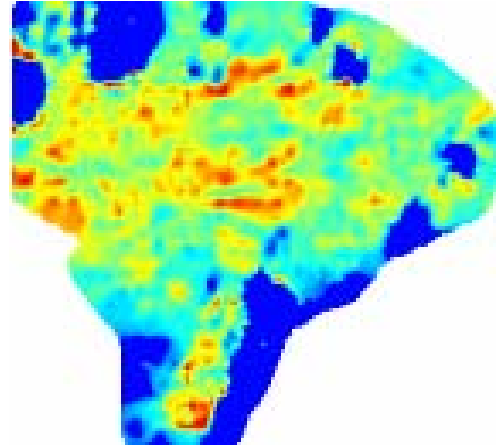
Calculated conductivity at 100 m depth

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 clearly show the strong electrical contrast between the highly conductive saline lake-water (the large circular yellow-red zone in the centre of the area) and the surrounding sediments, but they lack important detail. The highly conductive saline water limits the penetration of the EM system and the conductivity-depth algorithm is unable to determine the conductivity at greater depths. Compare these with the detail resolved in the TargetTEM™ SPATIAL and TEMPORAL responses.

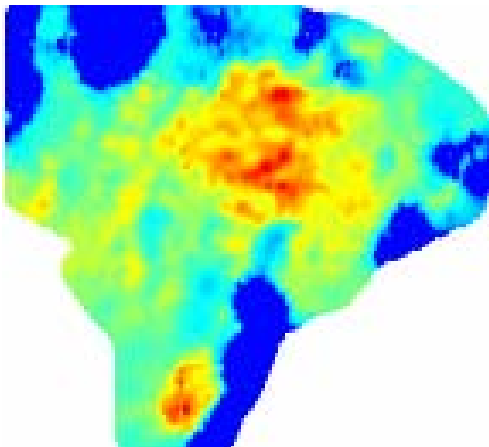
Lake Gore, Esperance, Western Australia (continued).



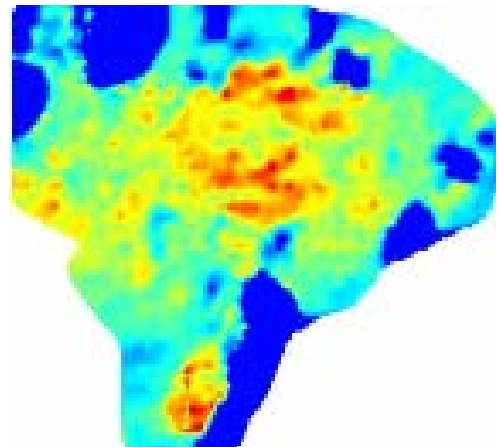
TargetTEM™ early-time SPATIAL response



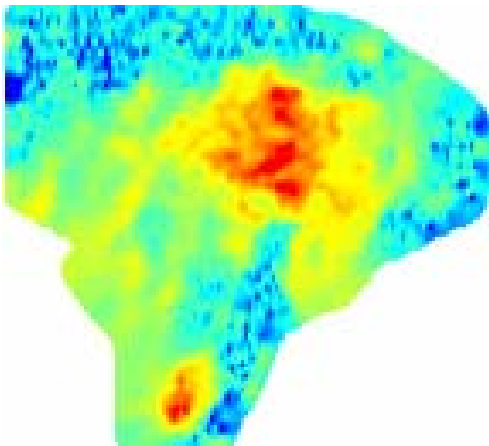
TargetTEM™ mid1-time SPATIAL response



TargetTEM™ mid3-time SPATIAL response



TargetTEM™ mid2-time SPATIAL response



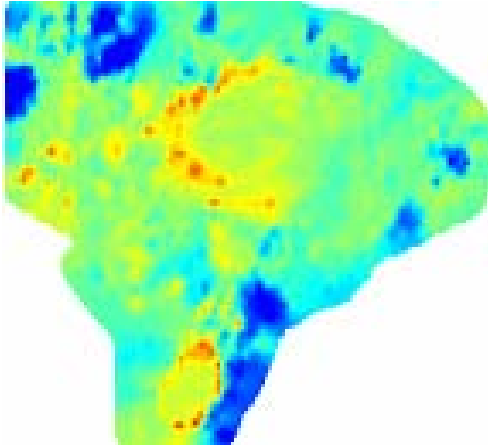
TargetTEM™ late-time SPATIAL response

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.

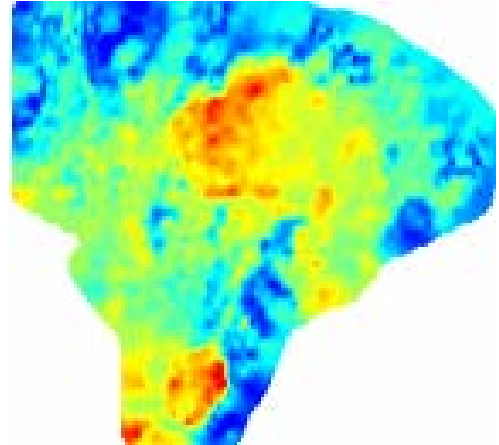
Note the significant improvement in resolution of detail compared to the conductivity-depth images. The SPATIAL responses also resolve the affects of variations in survey height. Areas producing stronger responses than the background are shown in red whilst those producing weaker responses than the background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

Several north-east striking linear features have been resolved in the early- and mid1-time responses.

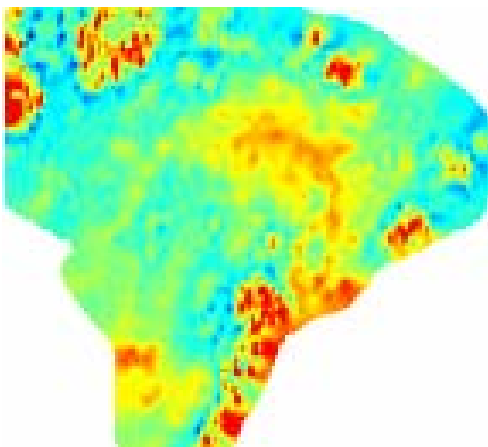
Lake Gore, Esperance, Western Australia (continued).



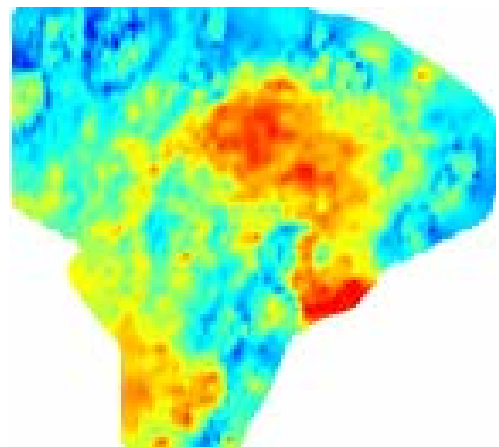
TargetTEM™ early-time TEMPORAL response



TargetTEM™ mid1-time TEMPORAL response

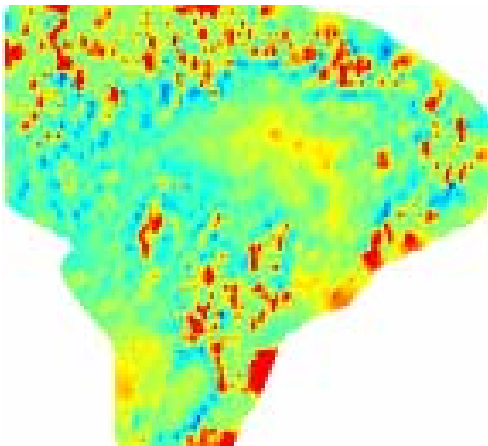


TargetTEM™ mid3-time TEMPORAL response



TargetTEM™ mid2-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).



TargetTEM™ late-time TEMPORAL response

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.

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