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TECHNICAL NOTE

Subject: TargetTEM™

Modern airborne transient electromagnetic (TEM) systems, such as GEOTEM, MEGATEM, HOISTEM, TEMPEST, SPECTREM, QUESTEM, AeroTEM, VTEM etc, are characterised by very large volumes of complex, multichannel data that are difficult and enormously time-consuming to analyse in terms of mineral targets.

Conventional data processing techniques, such as apparent conductivity, layered-earth inversion (LEI) and conductivity-depth imaging (CDI) algorithms, transform multichannel TEM data into conductivity-versus-depth images showing the absolute conductivity of the sub-surface at particular depths. These algorithms assume that the electrical structure of the ground is either homogeneous at particular decay times, or horizontally layered. However, this is usually not the case in mineral provinces and hence they provide only limited resolution of the underlying geology. They also fail to resolve small and subtle, conductive and resistive features which are often important exploration targets.

TargetTEM™ is a combined anomaly-detection and data-compression algorithm specifically for resolving detail in multichannel airborne TEM data. It is based on the premise that variations in the measured response and variations in the transient decay are more important as indicators of exploration targets than the absolute response of the underlying geology.

TargetTEM™ does not compute conductivity or depth and makes no assumptions about the underlying geology. Instead, it resolves conductive and resistive features with respect to the background response of the host rocks and any conductive overburden present. Hence, TargetTEM™ provides the highest resolution of subtle features in complex geological environments. It can be applied to all types of multichannel B-field (magnetic sensor) and dB/dt (coil sensor) TEM data.

TargetTEM™ operates on survey line data in preference to gridded data in order to preserve survey resolution. It compresses the multichannel data into two (2) unique responses; the SPATIAL response which is related to the orientation, size and depth of conductors, and the TEMPORAL response related to their conductivity. These can be displayed as pseudo-sections for each survey line, or selected channels can be displayed as 2-dimensional images. They are further reduced, or compressed, into five time-category responses, referred to as the **EARLY, MID and LATE (EML)** time responses, which are a convenient and accurate way of displaying and interpreting large volumes of multichannel TEM data. These can also resolve the electrical structure of the sub-surface at shallow and deeper depths, but the actual conductivities and depths remain undetermined.

TargetTEM™ is an accurate and convenient way to process and display large volumes of multichannel airborne TEM data. The various responses can be easily integrated with geological information using standard GIS systems allowing geologists to make their own interpretations of complex multichannel TEM data. Anomalous features can be quickly and accurately identified and targeted for further investigation. TargetTEM™ reduces the time and cost of interpreting TEM data and improves drill targeting.

TargetTEM™ is helping geologists use complex multichannel airborne TEM data for mapping and exploration targeting in a wide variety of geological environments. Some applications include: delineation of subtle conductive and resistive features in the sub-surface geology, detection of conductive zones and resistive zones in conductive environments, detection of "spot" or "bullseye" anomalies, delineation of linear and curvilinear features related to structures, bedding and stratigraphy, and mapping the electrical texture of the underlying geology.

TargetTEM™ is the basis for detecting and discriminating exploration targets in multichannel TEM data. It has been applied to airborne TEM data for base-metals, nickel sulphides, laterite nickel, gold, manganese, diamonds, uranium, coal, geological mapping, ground water and salinity studies, and environmental studies.

The TargetTEM™ standard processing package for each measured component (ie. dB/dt, B-field, X, Y and Z components) includes:

1. ASCII located data files containing the SPATIAL and TEMPORAL responses for all decay channels;
2. ASCII located data files containing the ten (10) SPATIAL and TEMPORAL EML responses;
3. ER Mapper grids of the ten (10) EML responses, plus survey height and DTM grids;
4. bitmap images of the ten (10) EML responses, plus survey height and DTM images; and
5. a TargetTEM™ processing report.

TargetTEM™, a new standard in the processing of airborne TEM data

- increases resolution of conductive and resistive features;
- discriminates conductive and resistive features from overburden and background responses;
- helps geologists to quickly analyse large volumes of complex multichannel TEM data;
- reduces interpretation costs;
- is applicable in all geological terrains; and
- is suitable for all types of multichannel, fixed-winged and helicopter airborne TEM data.

TargetTEM™ is the fastest and cheapest way of accurately analysing multichannel airborne TEM data. It is being used by an increasing number of mineral explorers to identify drill targets.

TargetTEM™ is a trade mark of Vector Research Pty Ltd

Another innovation from the research laboratory of Vector Research.