AFMAG FOR PORPHYRY COPPER DEPOSITS
There are two commercial AFMAG systems in operation; ZTEM since 2008, offered by Geotech Ltd. and MMT, offered by Expert Geophysics since 2017.
The nine examples of ZTEM over PCDs are presented (Condor currently has no MMT over a PCD). The adjacent table summarizes these outcomes.

<table>
<thead>
<tr>
<th>Deposit</th>
<th>Mag</th>
<th>AFMAG-Linear</th>
<th>AFMAG-Circular</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lone Star-AZ</td>
<td>On gradient</td>
<td>TBD</td>
<td>Yes, according to the Lo and Zang paper (2008)</td>
<td>First ZTEM over PCD</td>
</tr>
<tr>
<td>Pebble-AK</td>
<td>On gradient</td>
<td>Bounding linears on either side of Pebble West</td>
<td>Circular feature (resistive center) over Pebble West</td>
<td>Intrusive bodies well mapped</td>
</tr>
<tr>
<td>Babine Lake-BC</td>
<td>high</td>
<td>Linears map structures and contacts quite well</td>
<td>Circular feature associated with mineralized intrusives; at low frequency resistive, high frequency conductive</td>
<td>Good correlation of structures inferred from DC resistivity and ZTEM linears</td>
</tr>
<tr>
<td>Kemess-BC</td>
<td>KN-high, KS low</td>
<td>KN and KS associated with conductive linear trends</td>
<td>None apparent</td>
<td>Titan MT coverage over KN</td>
</tr>
<tr>
<td>Morrison-BC</td>
<td>high</td>
<td>Bounding linears with NW-SE trend adjacent to the strong of Morrison intrusives</td>
<td>Morrison intrusives form NW-SE trending low</td>
<td>Hearne Hill breccia, adjacent to Morrison is ZTEM conductive zone. Some MT coverage</td>
</tr>
<tr>
<td>Mt Milligan-BC</td>
<td>Subtle high on flank of larger high</td>
<td>Strong lines associated with contacts and faults</td>
<td>Discrete resistivity highs associated with separate intrusives</td>
<td>Quite complex patterns</td>
</tr>
<tr>
<td>Thompson Ck.-ID</td>
<td>Discrete low</td>
<td>A number of linears, thought to be contacts</td>
<td>Deposit is a discrete resistivity high</td>
<td>Fairly clear signature</td>
</tr>
<tr>
<td>EL Cobre-Panama</td>
<td>Blotchy mag highs associated with deposit</td>
<td>Major NW-SE faults do not shown in ZTEM</td>
<td>Various intrusive bodies show as discrete conductive bodies</td>
<td>Survey possibly too restricted spatially to adequately map mineral system</td>
</tr>
<tr>
<td>La Mina-Colombia</td>
<td>Two of three intrusives mag highs</td>
<td>Linears not well developed</td>
<td>Power line noise affects results but zones of resistivity highs noted</td>
<td>Intrusives are of limited aerial and depth extend.</td>
</tr>
</tbody>
</table>
Sulfides (orange) Expect to be conductive
Oxides (blue) Expect to be resistive

AFMAG & PCDs-Lone Star-AZ

DC Resistivity Section (2D inversion)

ZTEM Inverted Conductivity Section

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M Thoman
The first field work over PCDs was undertaken in 2008 in Arizona over the Lone Star deposit held by FMX (Phelps Dodge). This work showed that the large semi-circular intrusive bodies with moderate variations in bulk resistivity could be mapped with AFMAG, in this case ZTEM.
The deposit sits on a low gradient magnetic shelf. The DT shows similar results to the TPR.
The TPR shows a discrete resistivity high associated with the Pebble West deposit. As well a number of structures are apparent. The 180 Hz TPR shows more detail than the 30 Hz TPR in the large resistive zones surrounding the deposit.
There are two intrusive bodies at Babine; the Nak (northern body) and Dorothy. Both bodies show a coincident magnetic high as well. The DT results are somewhat noisy but the TPR 30 Hz shows roughly circular resistive zones where the intrusives are outline. Major linear highs in both the DT and TRP images correlate with mapped structures that also appear in the IP-resistivity results.
AFMAG & PCDs-Babine Deposit, BC

The higher frequency DT and TPR show the core of the Nak and Dorothy to be conductive. Linear highs show the structures in the area to be extensive and complex.
The Kemess situation is different in that the mineralized intrusive is associated with a conductive feature rather than resistive one. As well for Kemess South, the deposit appears almost to be part of a conduit or channel that trends ENE from the NW trending Duncan Fault.
The TPR response for 180 Hz shows a discrete conductive zone at the east end of the Kemess North pit outline. This is believed to correlate an earlier defined DIGHEM conductor that is attributed to vein sulfides and supergene mineralization.
The mineralized intrusive is broken up into a number of discrete bodies which shows up well in the magnetic results. The overall deposit area on the 45 Hz images shows as a resistivity high, bounded by two NW-trending conductive linears. A major orthogonal NE-trending thick conductive zone is as well apparent and this hosts the Hearne Hill breccia pipe.
While the NW-trending linears are less intense for 180 Hz images.
The TMI-Tilt shows the various mineralized intrusives are locally magnetic. The 45 Hz DT shows the deposit area to be a roughly conformable circular resistivity zone. A number of structures as well show up as linear features.

AFMAG & PCDs-Mt. Milligan, BC
The 180 Hz results are quite similar to the 45 Hz patterns but smoother.
The main intrusive body is a magnetic low. Within the outline of the mineralized intrusive, there is a strong discrete resistive zone.
The 180 Hz images show more continuity of the linear features (contacts/structures).
AFMAG & PCDs-EL Cobre-Panama

The magnetic patterns associated with the mineralized intrusives is irregular. The available ZTEM show the mineralized zones are conductive. Little evidence of structures is apparent in the results.
AFMAG & PCDs-EL Cobre-Panama
AFMAG & PCDs-La Minas-Colombia

Of the three main intrusives, two show a discrete magnetic high response. The 30 Hz TPR show some zones of high resistivity associated with the intrusives; power lines responses hinder the quality of the results.
AFMAG & PCDs-La Minas-Colombia

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