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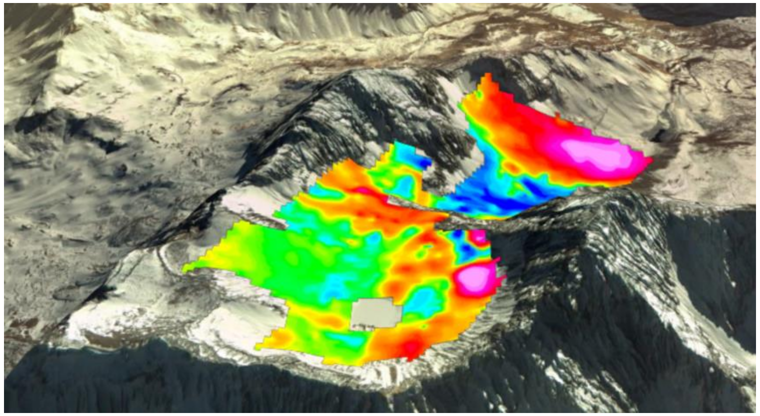
Geoscience

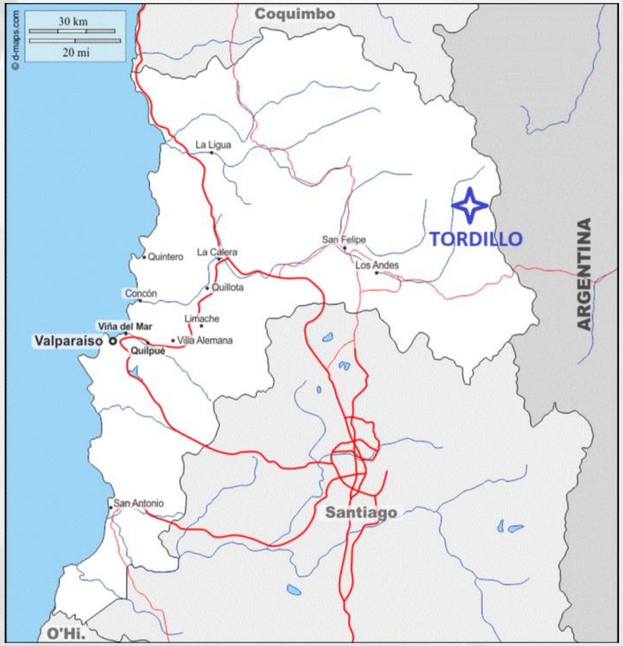
MAG and DCIP Surveys
TORDILLO PROJECT
(Region de Valparaiso, CHILE)

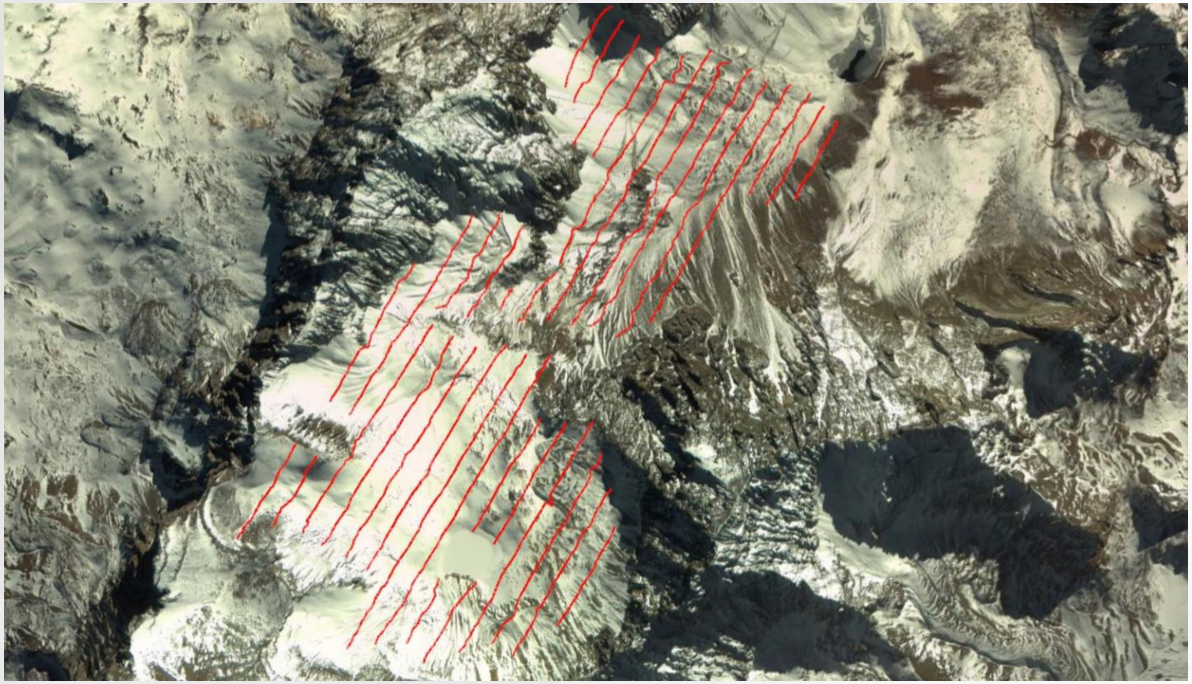


CERRO GRANDE MINING CORP

2D Inversion
Results & Discussions

Project Area and Objective



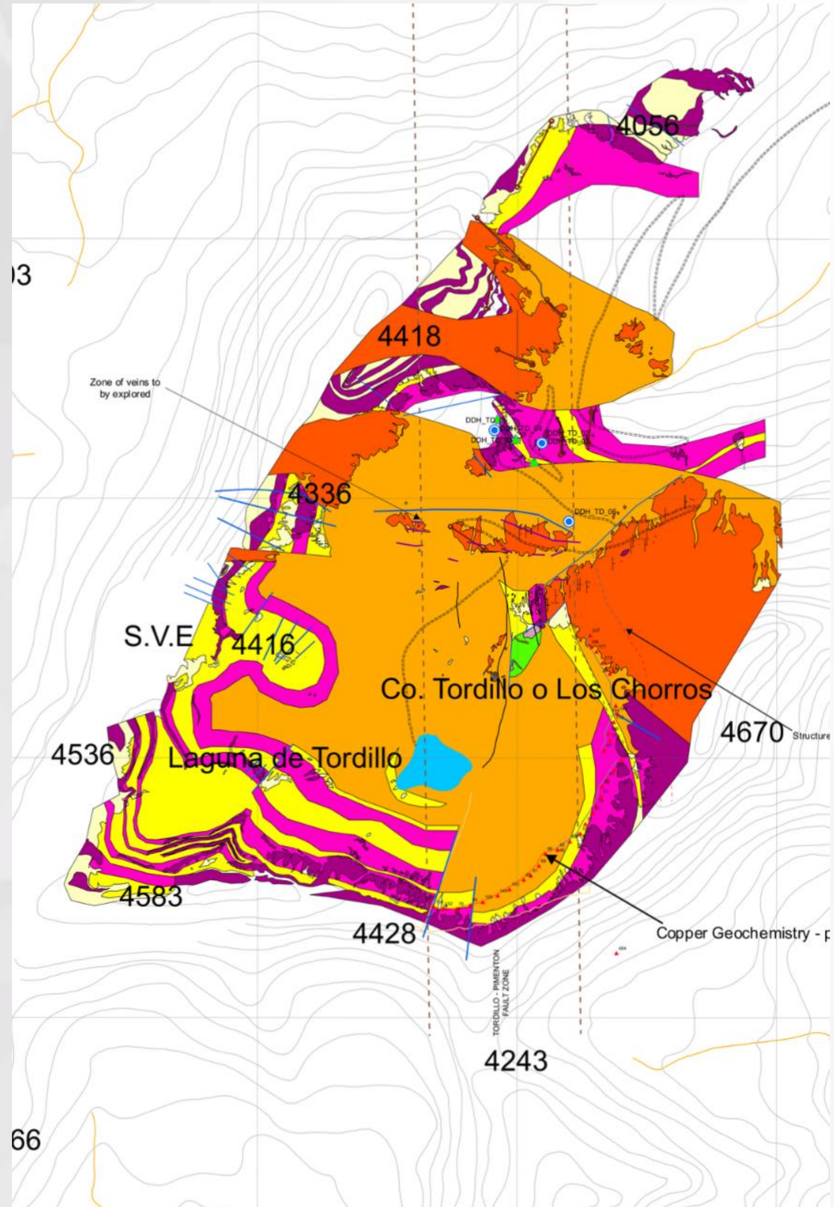


MAG Survey coverage map

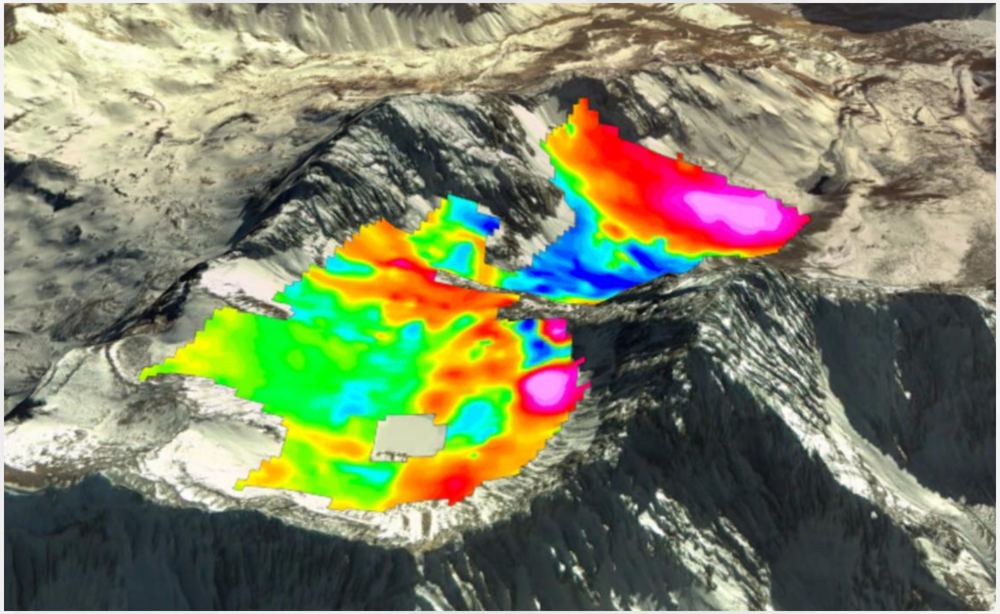
- The exploration objective of the DCIP and MAG survey at Tordillo project is to detect the source of porphyry/IOCG copper mineralization. The DCIP P-DP provides two in-dependent datasets, capable of measuring subsurface resistivity (structure, alteration & lithology) and chargeability (mineralization) to depth. The MAG survey provides variations of the magnetic field capable of mapping structure, alteration and lithology. The project is located in the Valparaiso region, Los Andes province, approximately 50 km east-northeast of the city of San Felipe, Chile.

Geological Setting

The main feature at Tordillo is a strongly leached silicified, sericitized and brecciated dacite-porphyry intrusive within an amphitheatre, measuring 1.5 km across. The breccias carry disseminated limonite and specularite together with tourmaline, some local copper oxides, chalcopyrite and pyrite. At the northern contact of the dacitic intrusive with silicified volcanics there is a zone of reddish alteration that extends over a distance exceeding 1 km in length and 600 m in width. This zone hosts narrow, surface-leached, siliceous veins containing massive specularite and chalcopyrite.



MAG SURVEY



- Mineralization in **porphyry Cu-Au** deposits is commonly associated with magnetite that can produce strong discrete magnetic anomalies. This is usually within a zone of magnetite destructive alteration that can be identified with a magnetic low anomaly.
- Magnetite-rich iron oxide copper-gold deposits (**IOCGs**) are geologically and geochemically complex and present major challenges to magnetic investigation. They often sit beneath significant cover, exhibit magnetic remanence, and suffer from self-demagnetization effects. IOCGs cannot be modeled definitively using only geophysics.

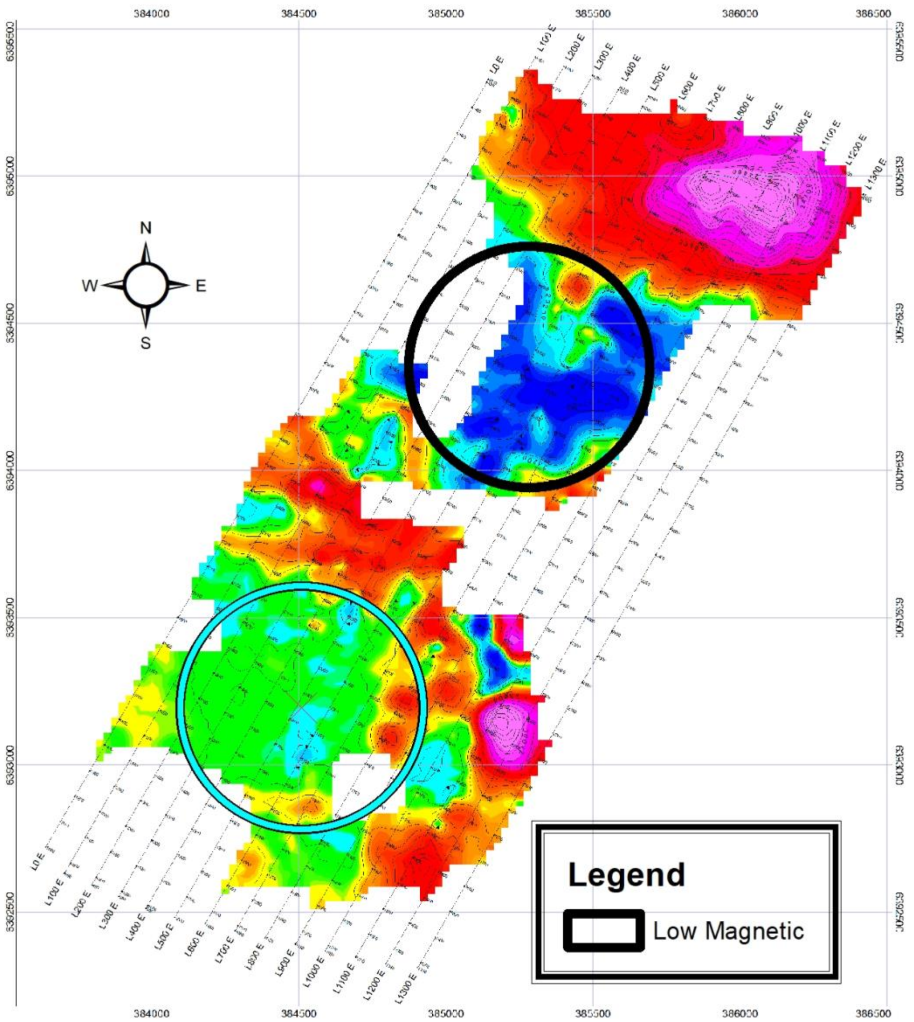
Magnetic Survey. Reduction to Pole Map

Pole Reduction

The reduction to the pole operation is a data processing technique that recalculates total magnetic intensity data as if the inducing magnetic field had a 90° inclination, i.e. anomalies take approximately the same form that would be observed at the magnetic pole. Pole reduction procedures can be difficult to apply successfully near the magnetic equator (<±10° inclination) because the north-south amplitude corrections tend to amplify noise and some minor north-south features unreasonably. Further, the reduction to pole calculation does not produce a meaningful result in the presence of remanent magnetization. The magnetic total field is inclined from the horizontal, thus the result induced by the earth's field would be a shift of the expected high south of the magnetic bodies and a magnetic low would be located to the north of the magnetic body. Pole reduced maps may help in correlating magnetic data with geology.

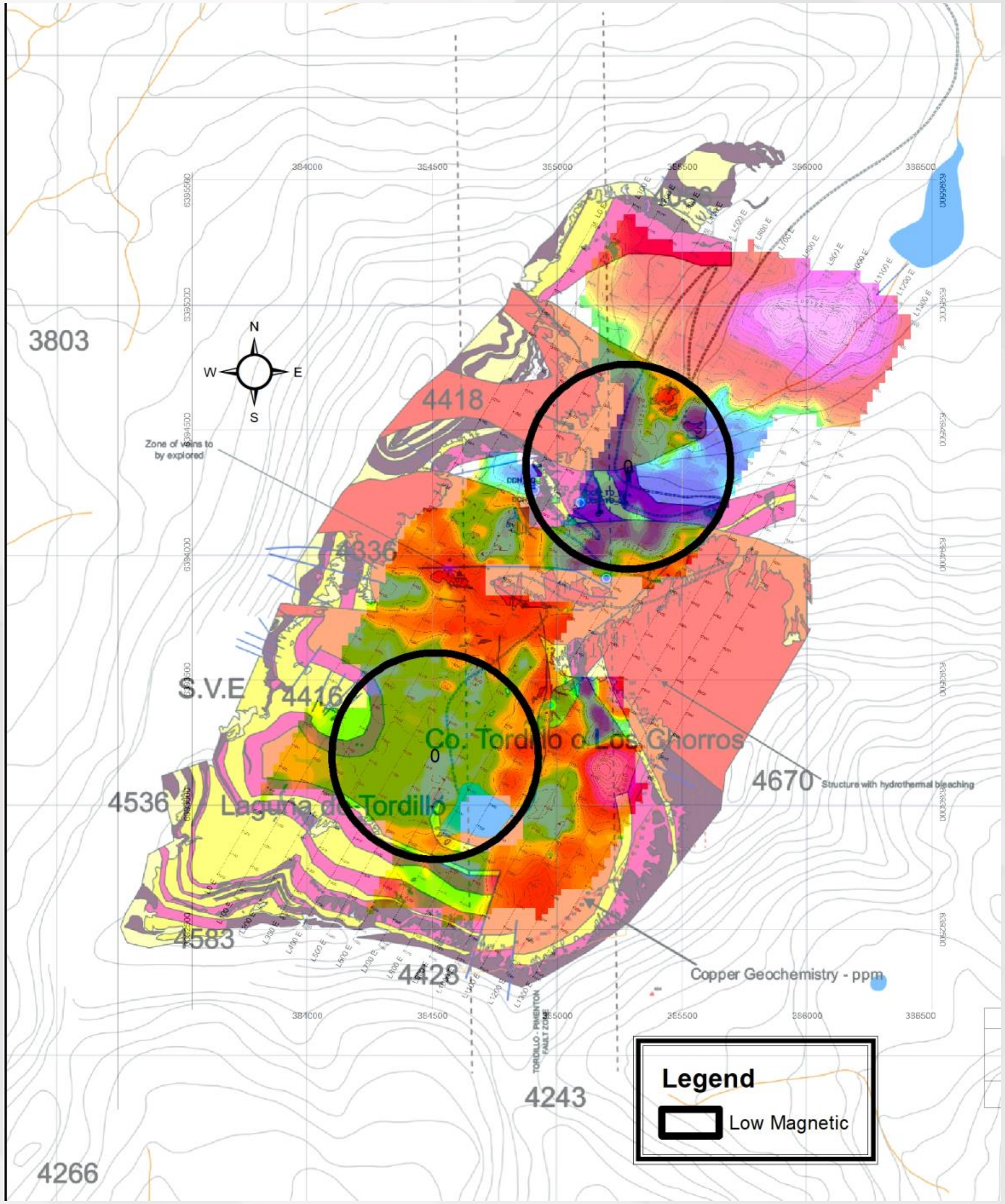
RTP can be a useful parameter, during the initial stages of exploration, in identifying hydrothermally altered rocks and zones of hydrothermal alteration. An anomaly of low magnetic susceptibility values of rocks in a homogenous litho unit characterized by moderate - high magnetic susceptibility may suggest hydrothermal alteration.

Magnetic Survey:Low Magnetic Target definition



- The magnetic data shows two main alteration zones defined by a zone of low magnetic anomalies interpreted to be caused by magnetite destruction from later stage overprinting hydrothermal alteration along north and north-east structure lineaments.
- The mapped zones at surface (see geological map) occur close to intrusive rocks (dioritic porphyry)
- High magnetic anomalies are related to andesitic rocks
- These low magnetic areas are priority targets for further exploration to test extensions of mineralization within this complex system.

Magnetic Survey: Correlation Geology vs RTP



These low magnetic areas are priority targets for further exploration to test extensions of mineralization

Magnetic Survey: Analytic Signal Map

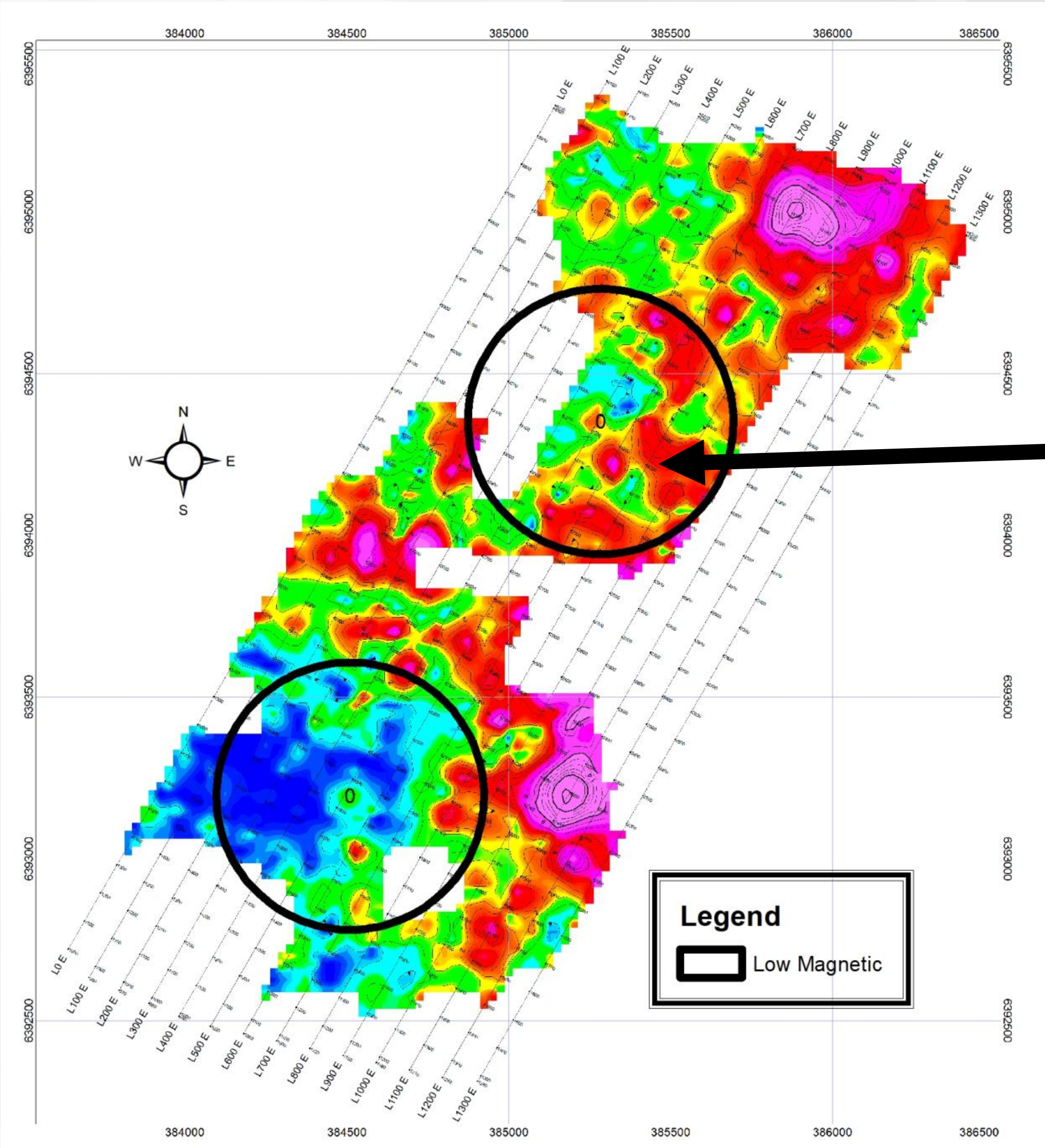
Analytic Signal

The process of calculating an analytic signal of the total magnetic field can improve the interpretation of magnetic data. This may be particularly useful at low magnetic latitudes. The amplitude of analytic signal anomalies combines all vector components of the field (X, Y, and Z) into a constant positive value.

The analytic signal is useful in locating the edges of magnetic source bodies, particularly where remanence and/or low magnetic latitude complicates interpretation. Analytic signal maxima have the useful property that they occur directly over magnetic contrasts, regardless of structural dip, and independent of the direction of the induced and/or remanent body magnetizations. The direction of magnetization, which may vary depending on the level of induced magnetization, remanent magnetization and magnetic anisotropy, are removed by the process of calculating the analytic signal.

High and low magnetic anomaly Reduced to pole is combined with Analytic Signal to ensure the data has been clear from regional and deep magnetic source. High magnetic anomaly with strong analytic signal may associate with young rocks. Low magnetic anomaly with strong analytic signal is identified as shallow alteration rock since hydrothermal alteration process happened intensively

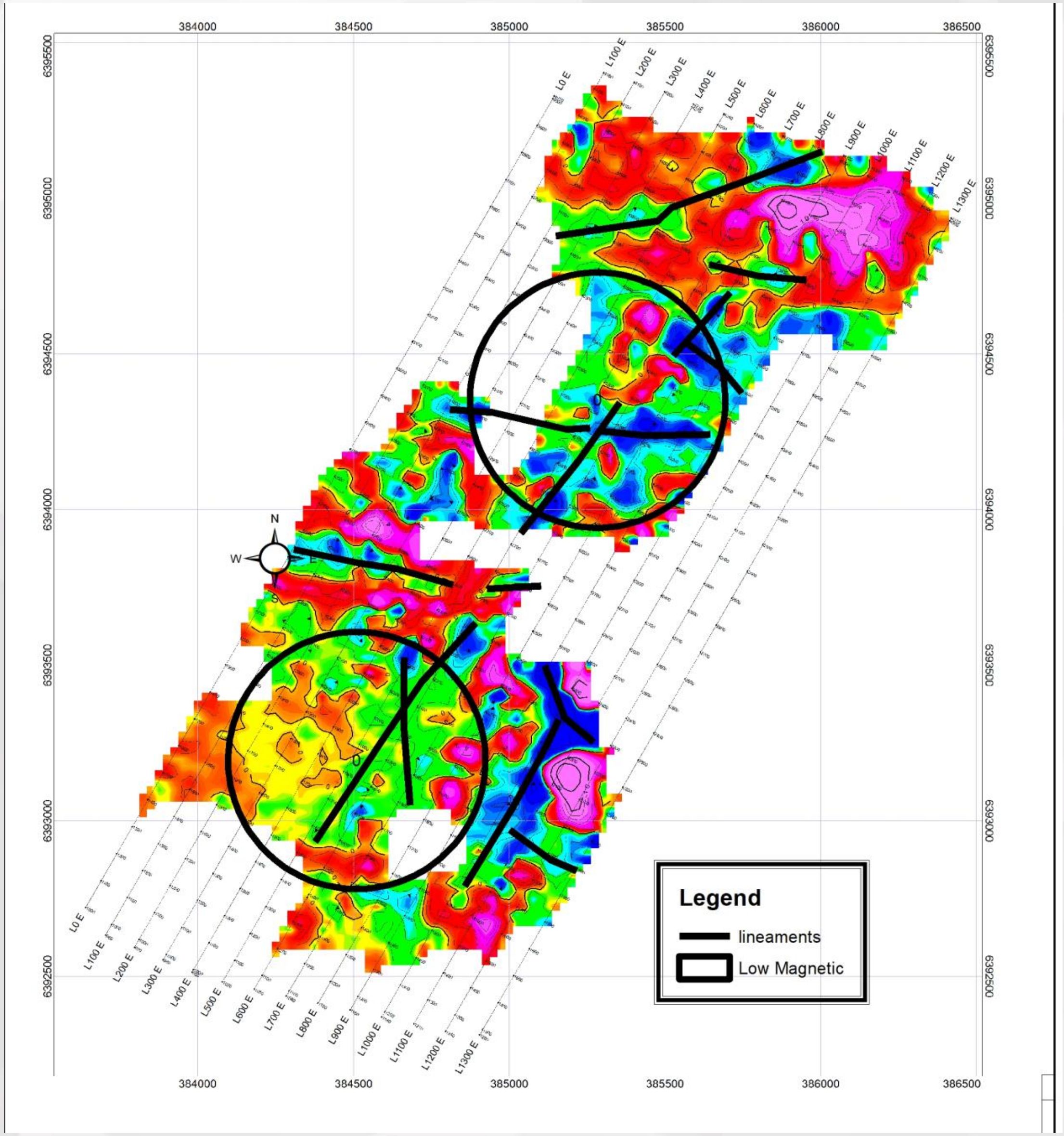
Magnetic Survey: Analytic Signal Map



PRIORITY TARGET

- Low magnetic anomaly with strong analytic signal is identified as shallow alteration rock since hydrothermal alteration process happened intensively
- This area with a low reduced to pole magnetic anomaly and strong analytic signal is the main priority target un the project

Magnetic Survey: First Vertical Derivative Map



The grid of the first vertical derivative (or calculated, versus measured, vertical gradient) is calculated from the pole reduced magnetic field grid. The vertical gradient enhances responses due to near-surface sources and structures. In some cases, the '0' contour may outline body edges. The first vertical derivative filter helped to delineate folds, contact zones and faults of the formations that host the main mineralization. Lineament analysis of the structures, reveals that the main tectonic episodes in the area is NE-SW.
Mineralization within this area could be localized or related to this NE-SW structures or at the intersection of NE-SW and NW-SE trending regional structures.

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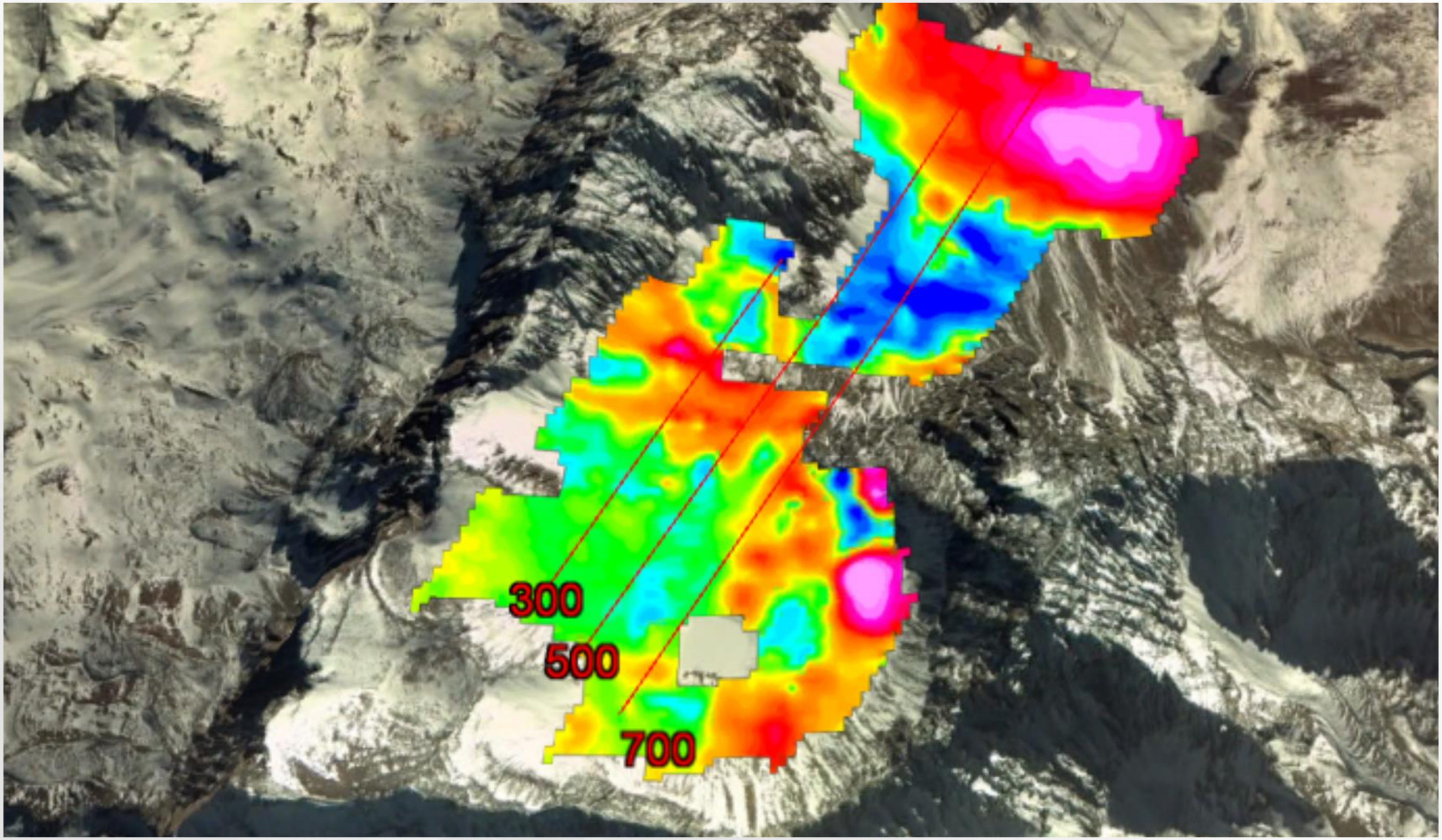
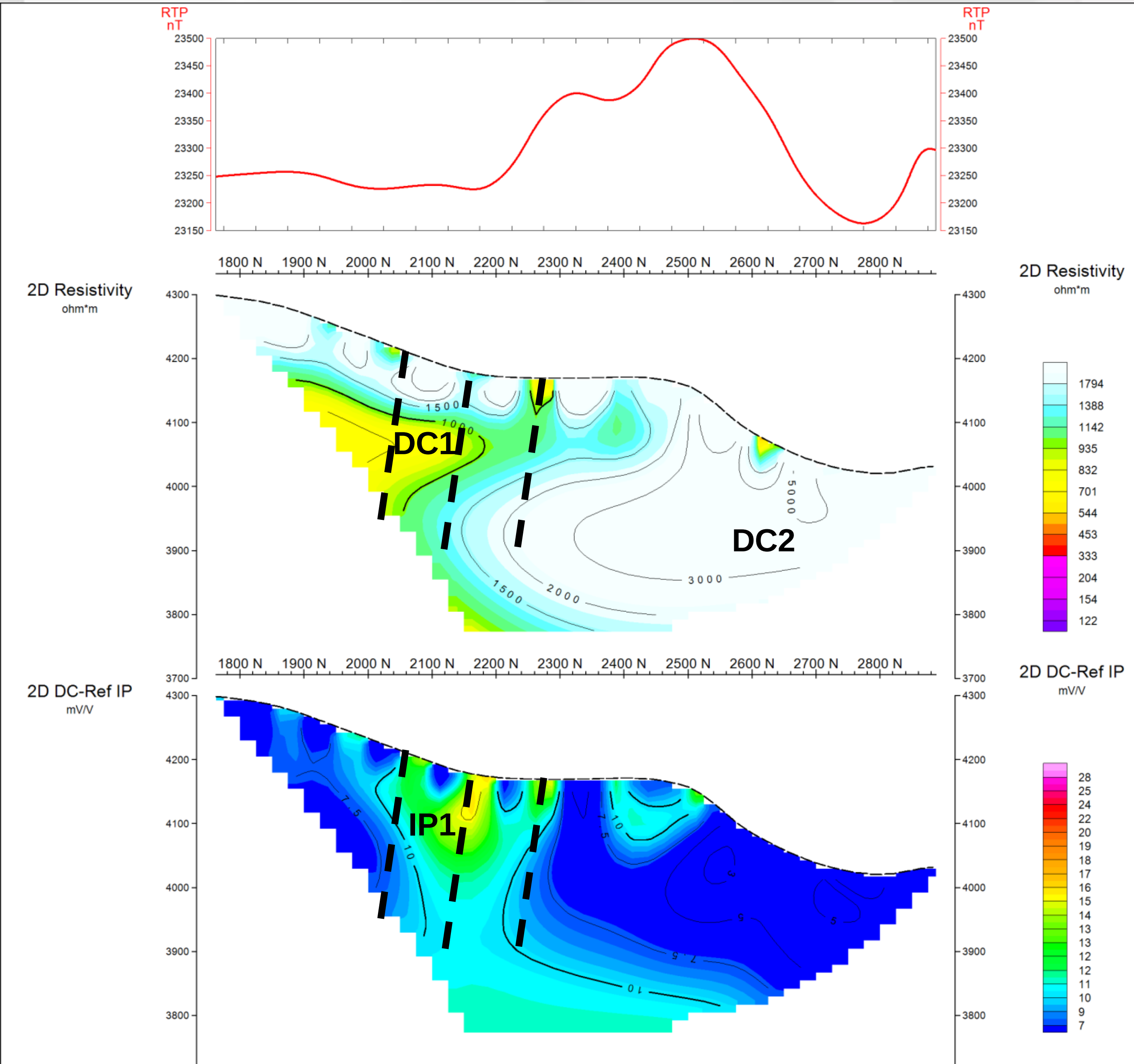
DCIP Survey

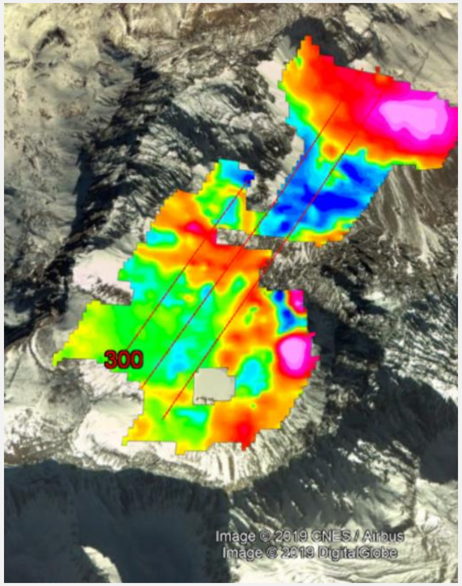
Results & Discussions

IPDC Lines over Reduce to Pole Map



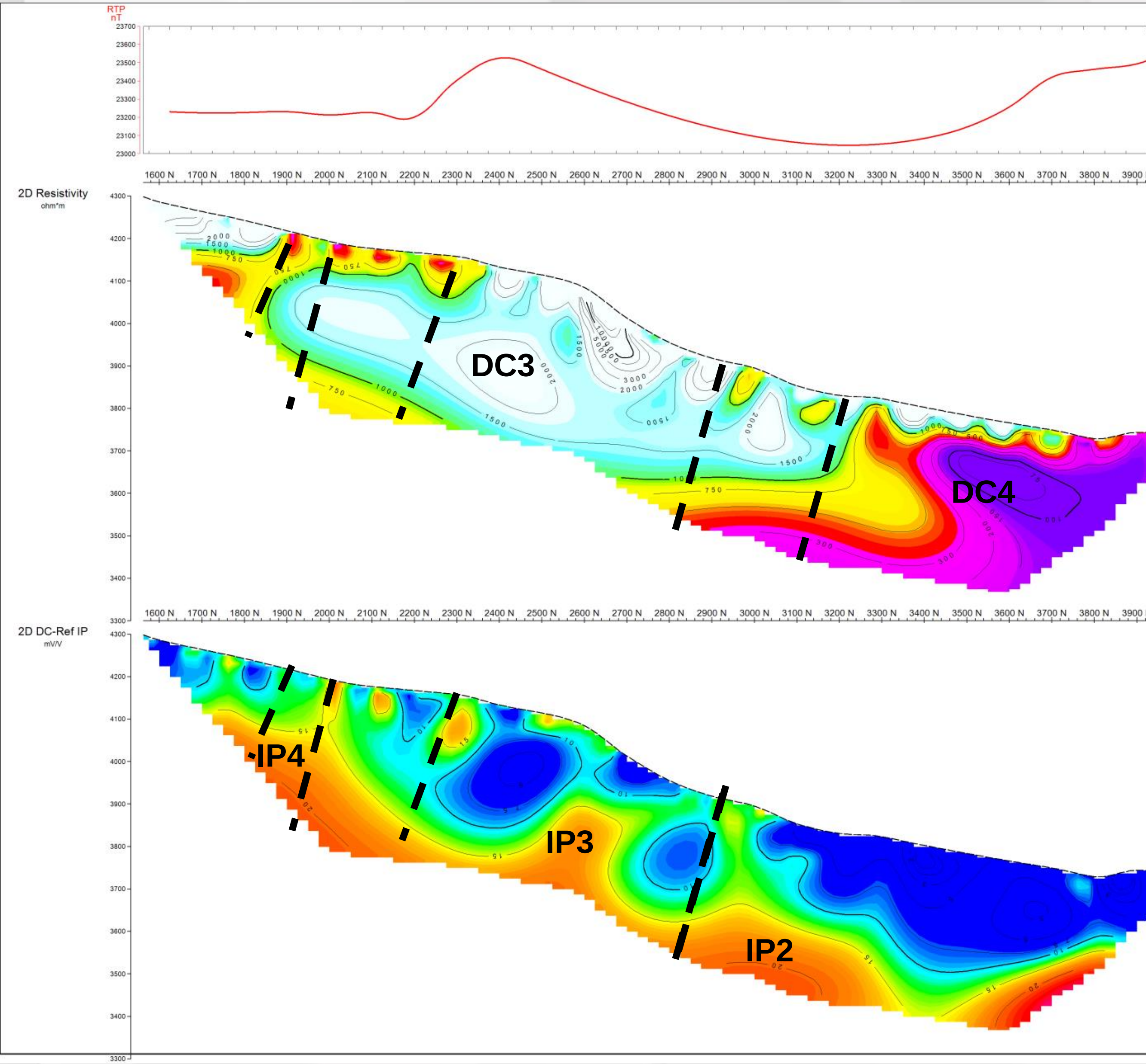
DCIP Sections – Line L300E

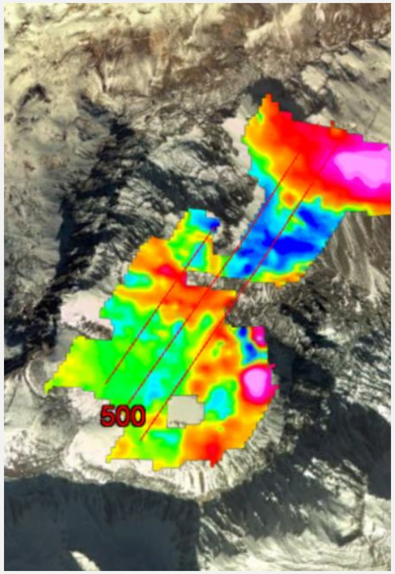




- Major faults are marked by resistivity contrast and chargeability lineaments.
- One conductivity (low resistivity) anomaly (DC1) associated with faults and moderate chargeability.
- One large interconnected high resistivity anomaly (DC2) associated with low magnetic anomaly
- One shallow chargeability zone (IP1) associated conductivity anomaly, faults and magnetic anomaly (main target)

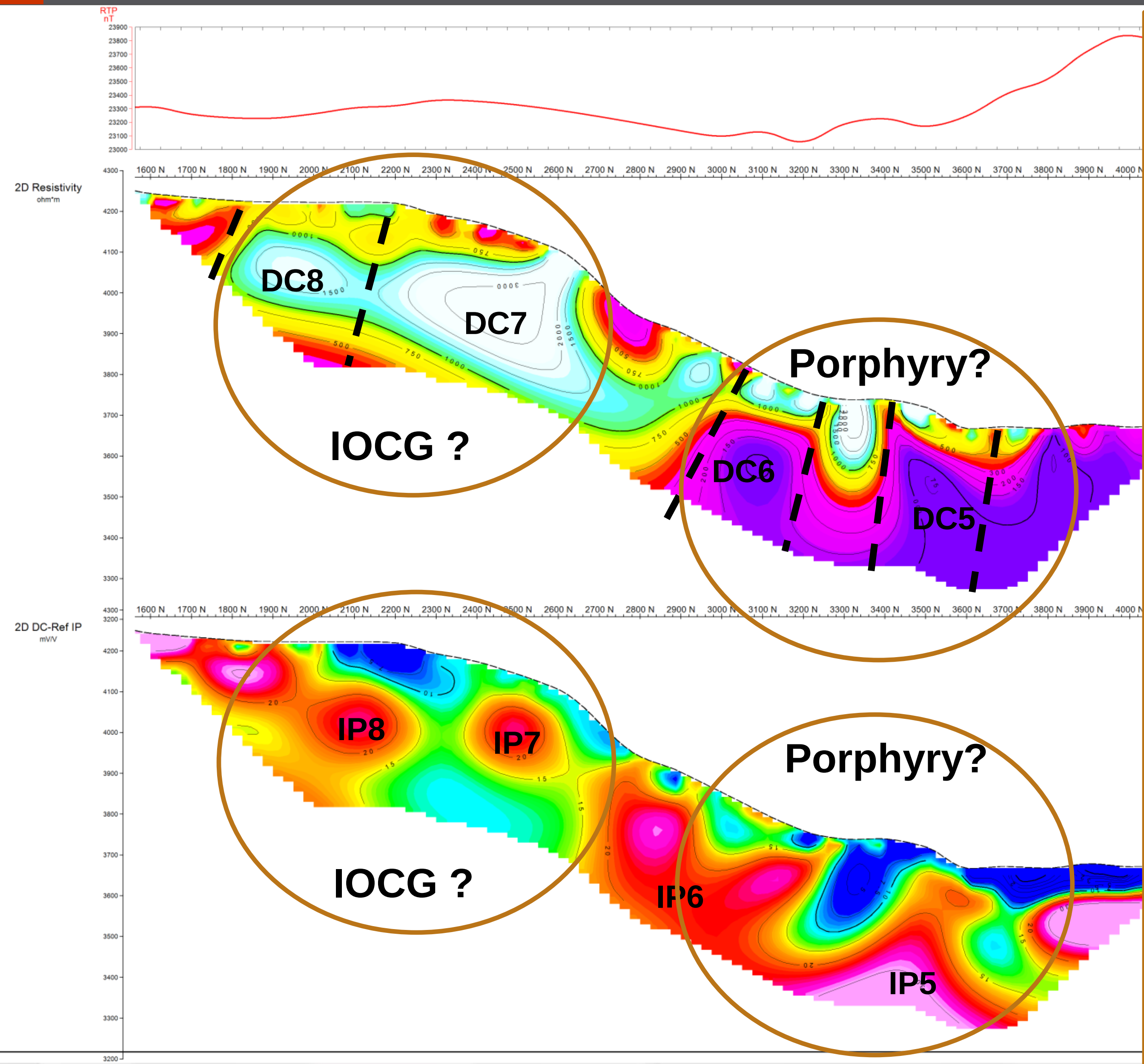
DCIP Sections – Line L500E

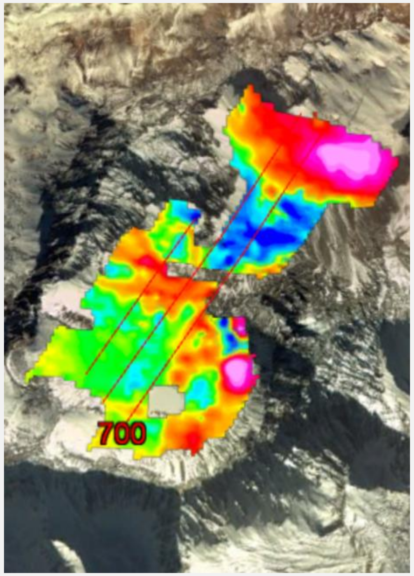




- Major faults are marked by resistivity contrast and chargeability lineaments.
- One conductivity (low resistivity) anomaly (DC4) associated with high magnetic and without IP anomaly (andesites?)
- One large interconnected high resistivity anomaly (DC3) associated with low magnetic anomaly
- 3 chargeability zones (IP2,3, 4) associated with faults
- IP2, 3 and 4 main targets

DCIP Sections – Line L700E





- 2 conductivity (low resistivity) anomalies (DC5 and 6) associated with faults and IP anomalies IP 5 and 6.
- One large interconnected high resistivity anomaly (DC7 and 8) associated with low magnetic anomaly and IP anomalies IP7 and 8.
- The zones around DC6 - IP6 is the main target (porphyry?)
- DC7,8 – IP7,8 target (IOCG?)

Conclusions

- The inversion models resolved high conductivity and resistivity zones and relatively high chargeability associated with faults. These areas are the main targets.
- 8 major IP chargeability anomalies and 8 DC anomalies have been Identified.
- IP and DC Anomalies are also associated or juxtaposed with fracture zones and faults. L700E is a good example of this.
- Significant anomalies along each line are also identified.
- Low magnetic anomaly with strong analytic signal is identified as shallow alteration rock since hydrothermal alteration process happened intensively. This area with IP and DC Anomalies (like DC6 - IP6) is the main target maybe related to a porphyry system.

Recommendations

- Use geophysical results to improve the mapping and geological model of the project.

- Carry out a field visit to sample and check the targets indicated in this study.

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Thank YOU!