ORION 3D

Case Study IOCG Systems

Zambia, Africa

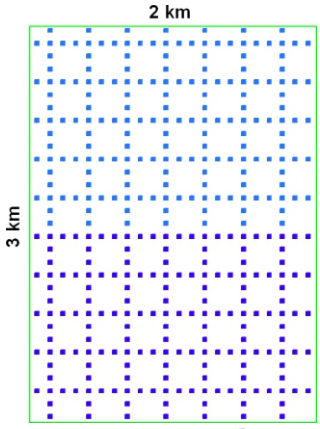
Overview

A range of geophysical techniques has been used at various stages of the discovery and delineation of the Kitumba deposit in Central Zambia. Early era magnetics, geologic mapping, artisanal Cu plays, and the application of an iron oxide copper gold (IOCG) exploration model led explorers to the area in the 1990s. An AGG survey in 2004 accurately delineated the spatial extents of two target areas referred to as the Kitumba and Mutoya systems.

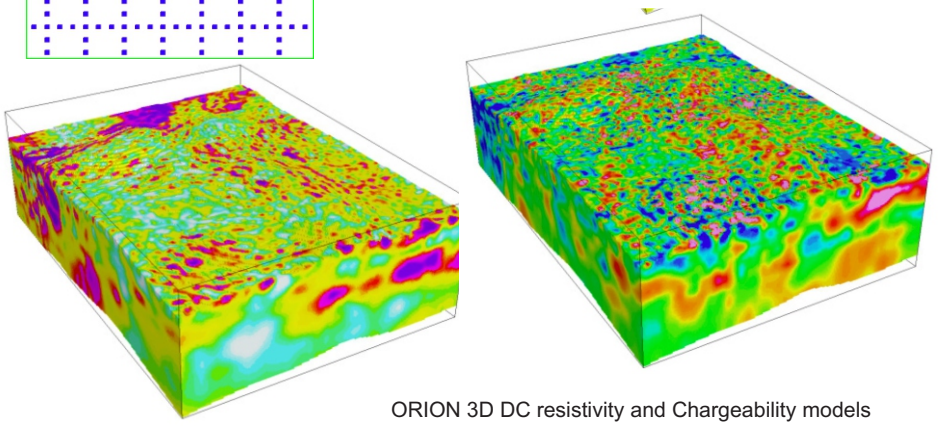
In 2012, an ORION 3D direct current resistivity and induced polarization survey was conducted over a large area surrounding Kitumba. The survey results provided 3D models of induced polarization chargeability & resistivity and allowed successful delineation of sulfide material within the known deposit. The survey also provided an enhanced understanding of the 3D geometry of the mineralization as it continued to depth. This improved understanding allowed a refocusing of drilling activities to best target extensions to existing mineralization.

ORION 3D is a multi-parameter geophysical technology providing DC resistivity, IP chargeability and deep MT resistivity, designed to provide detailed information in complex geological environments.

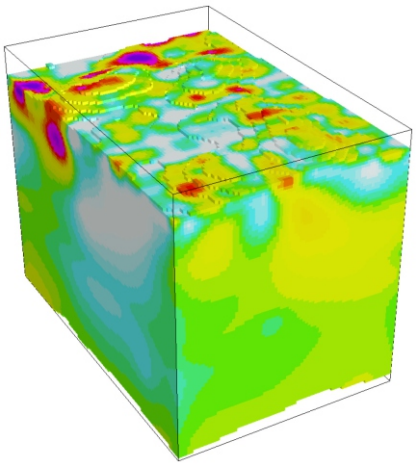
Distributed network of receivers covers area of 2 km x 3km



Data at Kitumba were collected using a layout consisting of 210 100 m dipoles. Two adjacent layouts were surveyed, resulting in approximately 160,000 data samples over a 6 km2 survey area (left). Data were processed with Quantec's proprietary software, and the DCIP results were inverted using the UBC 3D inversion code (Li and Oldenburg, 2000). The resulting DC resistivity and chargeability models provided information to 750 m depth. The MT data were inverted using the WSMT3D code (Weerachai, 2005), and resulted in an MT resistivity model to 2 km depth (Below).



ORION 3D DC resistivity and Chargeability models



ORION 3D MT model

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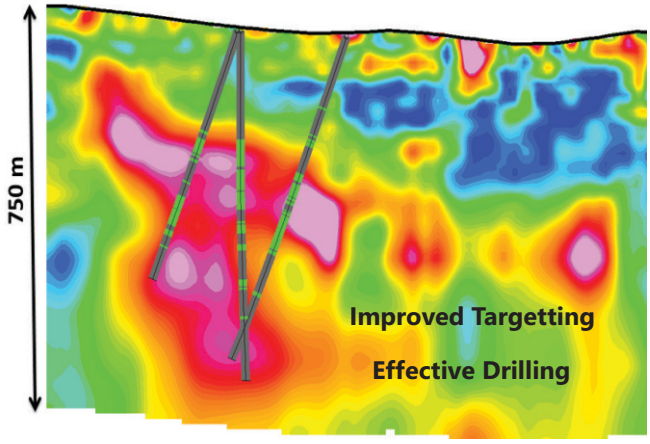
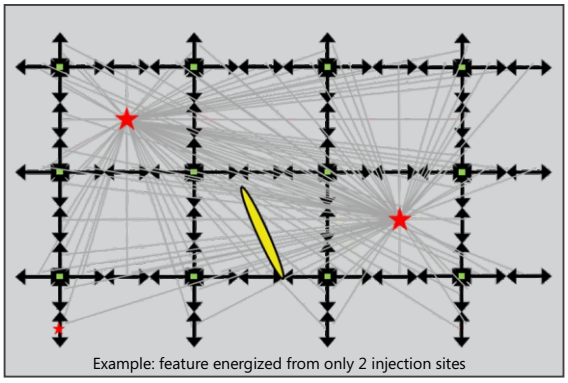
Powering Exploration since 1986

Unique advantages of an **ORION 3D** survey



N-S section through Kitumba deposit with drill holes (mineralized zones in green)

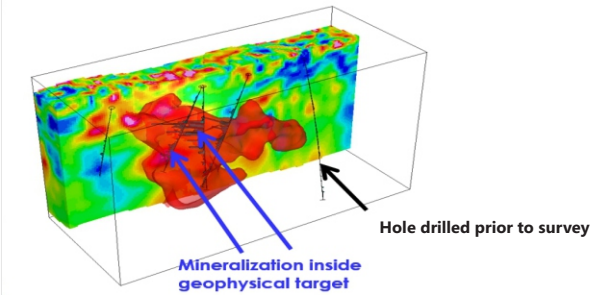
OMNI DIRECTIONAL CURRENT PATH
provides best coupling with all features in subsurface

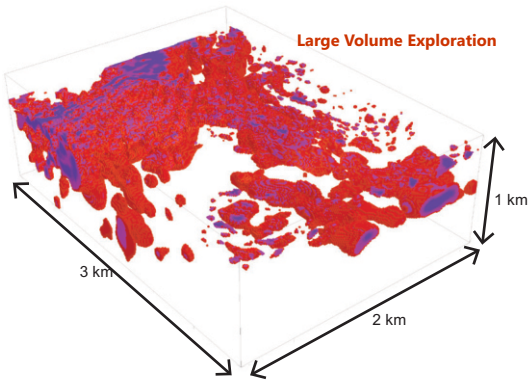


Simultaneous measurements at distributed receivers for every current injection

Results

- The main Kitumba deposit was clearly identified.
- An accurate mapping of sulphide distribution.
- Mineralized zone was efficiently expanded by drilling new targets.
- Increased understanding of 3D geometry.

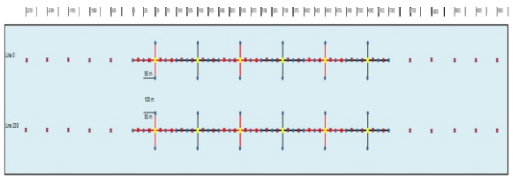




ORION 3D conductive zones

Flexible layouts and configurations

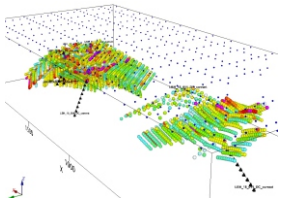
Quantec can design a survey to fit your exploration objectives. Our QRT-160 data receivers, at the heart of the ORION system are key to vast flexibility in survey design.



ORION SWATH

ORION SWATH

Technology configured on a 2D grid but providing 2.5 D results. Utilising cross line dipoles for better 3D coupling.



ORION PLUS

ORION PLUS

Utilise existing boreholes to energize the sub surface from below. Adding subsurface energy improves inversion results at depth.

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