October 19 - Four Seasons Vancouver, Canada

Technology developments and case studies in **Integrated Interpretation**: Management, Modelling and Validation. Our Master of Ceremonies for the day is Peter Holmes - Director, Vancouver office, Mira Geoscience.

Opening note

Integrated Interpretation: Management, Modelling, Validation, Collaboration

John McGaughey
CEO/CTO Mira Geoscience

Our business is focused on mineral exploration targeting and geohazard assessment. Success in both depends on decisions based on knowledge, experience, and the analysis of complex, multi-disciplinary 3D or 4D data. Creating models from geological and geophysical data has never been easier, with many tools now commercially available for rapid geological modelling and easy geophysical inversion. Nevertheless, the business value remains elusive. The key lesson we have learned is that effective earth modelling in support of evidence-based decisions must be supported by disciplined planning, effective data and model management, quantitative validation, and collaboration processes and tools. It must be executed by a multi-disciplinary team of geoscientists taking responsibility for both the process and outcome of integrated interpretation.

Concept review and case studies - modelling process and validation

3D Integration of seismic, petrophysical and lithogeochemical data to elucidate the effects of hydrothermal alteration on the seismic response of the Lalor VMS footwall sequence

Ernst Schetselaar
Research Scientist 3D Earth Modelling, Geological Survey of Canada

Hard rock seismic exploration has been primarily focused on the direct detection of ore. Although ore deposits, such as massive sulphide deposits, can be relatively large in their entirety, individual ore zones may, dependent on their dimensions and orientation easily escape seismic detection. Hydrothermal alteration zones that potentially host deposits or are in proximal footwall contact with them and that are one to two orders of magnitude larger in volume can be considered additional targets in seismic exploration. In this study we report results from integrated modelling of 3D seismic, Vp, density petrophysical log and lithogeochemical data to assess the effects of hydrothermal alteration on seismic impedance contrasts of the volcanogenic host rock succession in the footwall of the Lalor VMS deposit, Manitoba, Canada.

A review of integrated geological and geophysical modelling techniques

Glenn Pears
Principal Geophysicist, Mira Geoscience

The modern mineral exploration context is increasingly one of targeting at depth or under cover and is moving beyond traditional 2D map view interpretation of data and towards integrated interpretation of 3D geological models. In terms of geological and geophysical data, the key stages in developing an integrated 3D interpretation are: (1) understand or interpret the relationships between geophysical signatures, geological domains or boundaries and rock properties; (2) define realistic geological objectives; (3) employ investigative geophysical modelling and inversion to validate geological hypotheses. The fundamental aim of the proposed integrated interpretation is to develop a 3D geological model that is consistent with conceptual understanding and quantitatively consistent (validated) with all available data. We review the principles of this common-sense integration framework with selected case study examples.
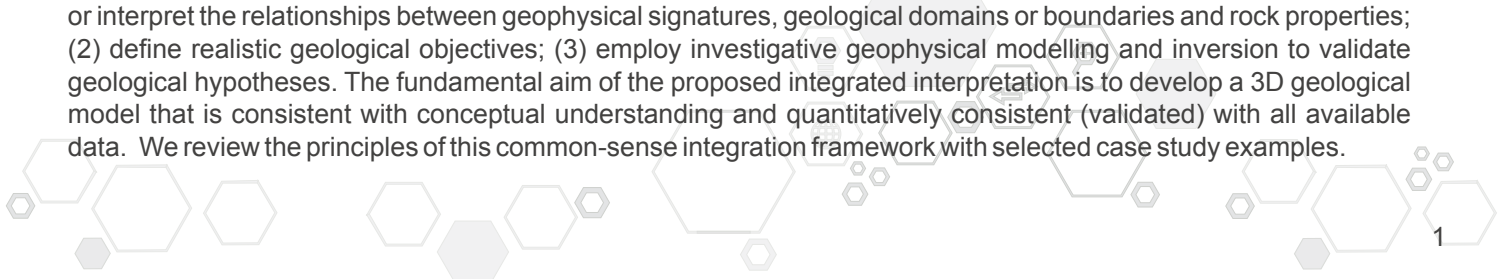
A common earth model for gold and water exploration, Zacatecas State, Mexico

Sally Goodman
Director, Geology & Mineral Resources, Goldcorp Inc.

In 2013 Goldcorp Inc acquired a large amount of high resolution airborne geophysical data over a land package in northern Zacatecas State, Mexico. The area runs from north of the company's Penasquito Mine to south of the Camino Rojo project, within the Sierra Madre Orientale, and comprises bedrock ridges of Jurassic to Cretaceous sediments intruded by Tertiary plutons, and wide alluvium-filled valleys. The new aeromagnetic, gravity gradient and ZTEM datasets, along with publicly available aeromagnetic data were integrated with geological information to produce a regional-scale 3D geological model over some 7500 square kilometers. Targeting criteria for gold mineralization and for sustainable water resources were developed based on local knowledge, and applied to the model to prioritize areas for future exploration.

[TMAC Hope Bay Project: Integration of Large Geoscience Datasets – an Essential Step in Shortening the Timeline to Discovery](#)

David King
Vice President, Exploration and Geoscience, TMAC Resources Inc.

This project hosts the Doris, Madrid, and Boston deposits; combined Measured and Indicated Resource totals ~4.5 million ounces gold (Au). Numerous additional Au showings occur throughout the 80 x 20 km greenstone belt. Historic exploration has resulted in an extensive geoscience database including: topography, bathymetry, geology , structure, alteration, geochemistry, rock properties, geophysics and mineralization. Visualizing and interrogating this data in a single integrated model is key to future exploration success. The known deposits have different geological settings with somewhat dissimilar geophysical characteristics. The integrated model positions better understanding of the controls on Au mineralization and overall geologic knowledge to identify other areas with potential to host additional deposits. Generating, prioritizing and evaluating exploration targets with all available data is essential to shorten the timeline to discovery.

Technology innovation - What's new

[GOCAD Mining Suite 14.1; Harvesting the power and flexibility of a new user interface](#)

Gervais Perron
Director, Software Solutions, Mira Geoscience

With the release of the GOCAD Mining Suite (GMS) v 14.1, Mira Geoscience is aligning its offering with the redesigned user interface/experience of the new generation of SKUA-GOCAD from Paradigm. The aim is to increase productivity by allowing users to organize how they access, visualize, document and classify their information while building their models/interpretations. A strong emphasis has been put on organizing work with the concepts of categories, classifications and features expressed using intuitive domain expert nomenclature. Visualization is now based on powerful and customizable templates to apply different display styles to different object types. Newly designed pages for data, results and notes brings additional analysis functionalities. Finally, the addition of a new macro engine allows users to get even more the software.

Earth Modelling 2015
Technology advancements and data integration forum

Integrated data and model management with Geoscience INTEGRATOR

Valérie Laflèche
Senior Geological Engineer, Mira Geoscience

Geoscience INTEGRATOR is our new 4D multi-disciplinary geoscience data management solution that interfaces with visualization, modelling, query, and analytics applications. It enables the management of multi-disciplinary spatial and temporal data in a flexible and easily extensible relational data model. Standard data import, real-time data feeds, ad hoc reporting, customized reporting and report scheduling are all easily controlled from a web interface. Drillholes, geological, geophysical, geochemical, and geotechnical data, earth models, mine models, fixed plant and mobile equipment activity, files and documents are all represented in the standard data model. 4D query and visualization is supported through its direct connection to Geoscience ANALYST.

3D for everyone! Visualize, query and share 3D models using Geoscience ANALYST

Gervais Perron
Director, Software Solutions, Mira Geoscience

Geoscience ANALYST is our new 3D software platform, free of charge, designed to compile, visualize and share 3D geoscientific data and models. Unlike other free software solutions, it is not restricted to a given file format attached to a specific application. A variety of import filters allow users to compile a 3D scene composed of multi-disciplinary data, interpretations and models. 3D models and data can then be visualized, queried and annotated within an intuitive and modern user interface. Geoscience ANALYST also allows users to save and share their workspaces. It provides an ideal companion application to a wide variety of 3D modelling packages, including the GOCAD Mining Suite. It also acts as the 3D front end to Geoscience INTEGRATOR, 3D and 4D data management solution for the mining industry.

Speed Geeking

Benefits of fast approximate 3D inversion with VPem3D

Scott Napier
Senior Consultant, Mira Geoscience

Playing tag with your data

Valérie Laflèche
Senior Geological Engineer, Mira Geoscience

GOCAD Mining Suite 14.1: New tips and tricks

Shannon Frey
Consultant, Mira Geoscience

Rapid 3D project compilation using Geoscience ANALYST

Gervais Perron
Director, Software Solutions, Mira Geoscience