Mira Geoscience
...modelling the earth

eNewsletter Q3-2018

Subscribe » Unsubscribe »

In this issue:

Don't miss out!

Here is a quick glance at our Upcoming Events Calendar:

» **August 2-8** Gold18@Perth in Perth, Australia

- **September 22-25** SEG2018 in Colorado, USA

- **October 10-11** Evolution2018 in Santiago, Chile

- **October 15-17** Caving2018 in Vancouver, Canada

…more details on our Upcoming Events page

Welcome to the 2018, Q3 eNewsletter. In this edition, we report on integrated interpretation through our interactive approach to modelling and inversion as well as the amazing potential of geophysical interpretation to highlight subtle exploration targets. On the software side, we are proud to share news of an Award of Excellence granted to us by UDMN for the commercial success of Geoscience INTEGRATOR. We have also been busy with new releases of GOCAD® Mining Suite, Geoscience INTEGRATOR, Geoscience ANALYST, and, finally, VPmg, VPem1D, and the launch of VP Utility. We present new team members and celebrate those who have been with Mira Geoscience for over 15 years! Finally, we cover the tips of the month, as well as news and upcoming events.

UDMN Award of Excellence – Geoscience INTEGRATOR

Last December, the Ultra Deep Mining Network (UDMN) presented us with an Outstanding Achievement in Commercialization award for the technical innovation and commercial sale of Geoscience INTEGRATOR, our integrated data management and machine learning software for mining and exploration. UDMN highlighted this software as the industry's most comprehensive and advanced geotechnical data management and hazard computation system.

Bora Ugurgel, Managing Director, Ultra Deep Mining Network, remarks, "Mira Geoscience's UDMN project is a stellar example of implementing and adopting a technology in the mining industry. This market ready technology successfully closed commercial sales between $500 and $1 million in 2017. With R&D case studies in progress at Glencore's Nickel Rim South; commercial deployment at JSC Apatit's three underground phosphate mines in Russia for rockburst hazard assessment; commercial agreements for mid-2018 deployment for another Canadian mining company and additional pilot projects at two major Australian mining groups, Mira Geoscience is a Canadian mining innovation success story and UDMN is proud of this collaboration."

John McGaughey, President, Mira Geoscience states, "We are immensely proud of this technology, which brings the benefits of 4D data integration and predictive analytics to the challenging field of geotechnical engineering in deep underground mines. We look forward to its continuing global deployment and positive impact on mine safety and production, particularly addressing formidable challenges such as rockburst hazard using the multitude of data streams that are typically available but not fully used. The support and industry network provided through CEMI and UDMN, through several phases of R&D, ensured that this innovation was industry-led, and that its outcome is industry-relevant."

Press release available here »

An interactive approach to forward modelling and inversion

Presented at Exploration17 by Glenn Pears, Principal Geophysicist, Mira Geoscience

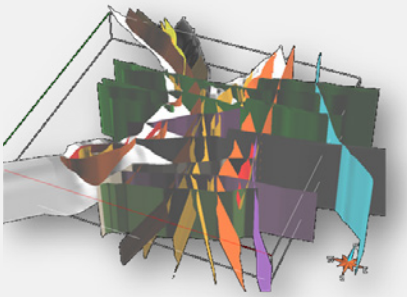
Exploration is becoming harder, with greater focus at depth or under cover. Decisions must be made to eliminate ambiguity and maximize the benefits from various types of collected data. In terms of integrating geological and geophysical data, the essential goal is to interpret the available geophysical data based on a 3D geological model populated with physical properties. The key is to develop an understanding of the relationships between geology, geophysical responses, and rock properties. That information can then be used to create 3D geological domains with very little ancillary information, and often no drillhole data whatsoever.

Geologically-based forward modelling and inversion of geophysical data plays a vital role in quantifying these relationships, but it is important to emphasize that inversion is only one part of the interpretation process. Integrated interpretation requires an interactive approach to forward modelling and inversion. Therefore, the process demands a shift in mindset when it comes to geophysical inversion. Rather than inverting a geophysical data set once, forward modelling and inversion are performed according to the required geological hypotheses that need to be tested. Integrating geological and geophysical data, particularly in cases with limited subsurface control, also requires a practical, adaptive, and objective-driven approach to interpretation.

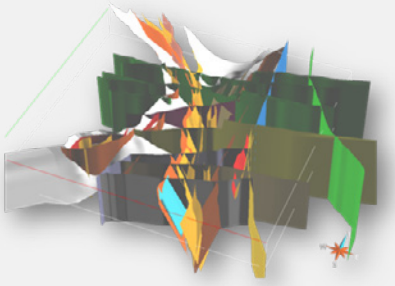
CASE STUDY: Cave Rocks nickel and gold project area, Australia

This is a great example of producing an integrated 3D geological model based on existing geological mapping, very sparse exploration drilling, and airborne geophysical data. When tested against geophysics, the gravity, magnetics, and AEM data conflicted with the originally modelled geology. The objective was to first combine the modelled geological contacts and structural surfaces, and overburden cover, in a 3D geological block model, attribute it with homogeneous properties, optimize it through inversion, and assess the computed gravity and magnetic responses. The first impression was that the correlation between the measured and calculated responses was reasonable, but areas existed where the geophysical data conflicted with the modelled geology.

The originally supplied geological information depicted the main, central fold as a south-plunging anticline, but from modelling the geophysical data, it became clear that the overall plunge direction was a north-plunging syncline. Considering that a key aim was attempting to identify the basal contact of the ultramafics, this overall change in geological understanding had a major impact on the targeting strategy and any subsequent drillhole planning. Surfaces were remodelled, the geological model was attributed with optimised homogeneous properties, and the computed response was assessed. Comparison between observed and calculated responses improved, particularly where the syncline plunges towards the north.



First geological model with anticline fold.



Updated synclinal geological model.

James Reid, PhD - Principal Geophysicist with Mira Geoscience

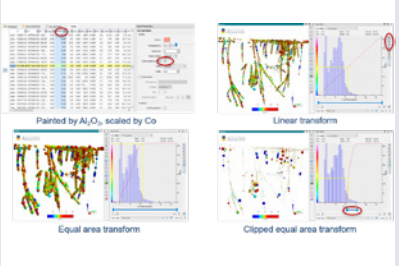
James worked closely on the project with Tim Chalke and Daniel Eden. He has extensive expertise in the planning and quantitative interpretation of electromagnetic and electrical methods, particularly the application of airborne electromagnetics to mineral exploration. James has broad experience in airborne, surface, and downhole geophysics, including survey design, data acquisition, processing, and interpretation using GOCAD, Geoscience Analyst, and the UBC and VP Suite inversion codes.

Geoscience ANALYST:

July's tip

Scale nodes by data

Point object nodes and orientation symbols can be scaled by any numerical data attached to the object and defined by data colour.



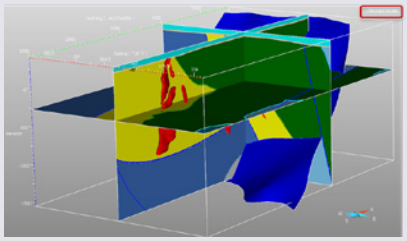
To receive full tip or to view previous ones, visit our site. »

GOCAD® Mining Suite:

July's tip

Restricted view

The visualization of points, curves, and surfaces can be restricted to where they intersect displayed Voxet sections and Seismic Line objects, and the restriction for a specific object can be removed.

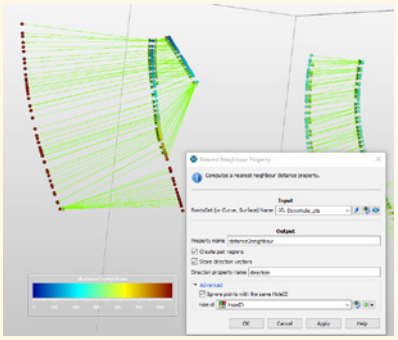


To receive full tip or to view previous ones, visit our site. »

What's new – Software release:

GOCAD Mining Suite version 17update 1.1

Released in May, this version will definitely improve your modelling experience. The focus here is on user experience and stability. We have introduced a new taskpane for more efficient digitizing and editing of objects. Computing distance to the nearest neighbour can now ignore points with the same drillhole (HoleID) or discrete property. The Targeting Workflow now allows you to use the same source Voxet as input to multiple workflow instances, and offers improved methods of computing target probability in cases of missing data. The Potential Fields module has replaced wizards and macros to generate starting models for unconstrained heterogeneous VPmg inversions with a scriptable dialog box, as well as a new tool to create or remove data from the edges of models. A new Electromagnetics command generates SGrids with expanding vertical cell sizes in depth and allows draping beneath topographic surface or at a constant elevation. We have made several updates on importers/exporters such as: ODBC drillhole importer; ASCII file importer; Geosoft GDB importer; Geoscience ANALYST .goeh5 exporter.



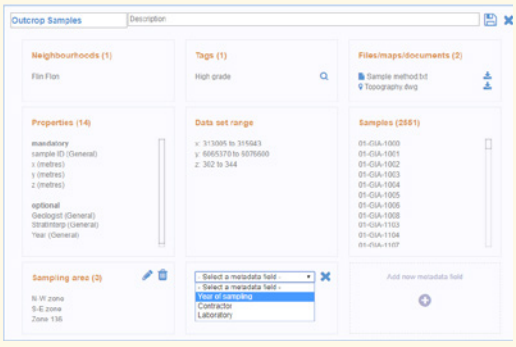
Compute distance to nearest neighbor.

Details about the product available here »

Geoscience INTEGRATOR version 3.0

The release of Geoscience INTEGRATOR 3.0 is fast approaching. It will enhance your capacity to find, understand, integrate, and analyze your data, files, and documents. In this version you will be able to create your own metadata fields and search for data sets using keywords, dates, tags, file names, metadata values, or even draw a 3D box in the viewer to see all the data sets in an area of interest.

Additionally, 2D map views are now supported to facilitate analysis on mine level plans, topographic and geological maps, or other required map-based visualizations of models and data. Enhancements were made to the creation of input files for machine learning. Other updates include new exploration and mining themes, and access to layer names within DXF and DWG files.



Create metadata fields.

Details about the product available here »

New team members!

Jean-Philippe Paiement P.Geo. joined our Montreal team as a Senior Geologist. He brings 10 years of mineral exploration experience including expertise in geostatistics, structural, geological, and geochemical modelling and interpretation. He is skilled in the application of machine learning to overcome geological challenges and with new methods of reducing interpretational risks with geological data. He has a wide range of experience in mineral resource estimation for precious metals, base metals, and industrial minerals across diverse geological environments around the world. He obtained an MSc from Laval University.

Pablo Letelier joined our Perth team as a Senior Geologist. He brings 18 years of mining industry experience including expertise in geological interpretation, analysis and modelling using a vast array of software including SKUA-GOCAD. He has a wide range of project management experience in early stages of the resource cycle, including greenfield and brownfield exploration, operations, and resource estimation drilling programs for different commodities and deposit styles, including porphyry systems, epithermal, orogenic, and IOCG deposits around the world. He also brings deep experience in hydrogeological modelling and interpretation. He obtained an MSc in Geology from the University of Auckland.

Stephen Donovan joined our Vancouver team as a Consultant to further strengthen our 3D geological modelling group. Stephen has over 7 years of experience and specialist expertise in coal and metal resources development and exploration in Australia, Africa, and Canada.

Sterling Mitchell joined our Montreal team as a data management specialist for Geoscience INTEGRATOR customer deployments in both mine site and exploration applications. He will be analyzing a wide variety of data types, customizing solutions, and providing customer data management services.

In the news:

Accent: Probing the dark matter puzzle

The Sudbury Star

"One of the companies we support, **Mira Geoscience**, was awarded an Outstanding Achievement in Commercialization by CEMI for developing data management tools to minimize geo-hazards during mine development. In addition to the direct technology spin-outs that the work at SNOLAB supports…"

Read the article »

Osisko Metals Starts Aggressive Phase 1 Drill Program in the Bathurst Mining Camp

Benzinga

"This approach combines geological interpretation with geophysical and geochemical data sets that are merged into one common 3D-GIS (**GOCAD Mining Suite**) ..."

Read the article »

CEMI applies to feds for UDMN 2

Sudbury Mining Solution Journal

"Among the UDMN 1 wins celebrated by CEMI was the development of a 4D real-time geotechnical hazard assessment and reporting tool by **Mira Geoscience**…"

Read the article »

Geophysical detection of hydrothermal alteration footprints

Presented at AEGC2018 by John McGaughey, President, Mira Geoscience

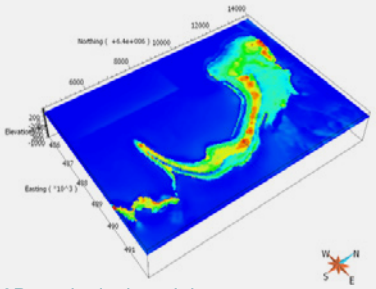
The use of geophysical data is appealing when exploring deep or under cover because, although it does not directly respond to rock chemistry, it often provides uniform areal data coverage. In deep and undercover exploration contexts, direct recognition of footprint-scale hydrothermal alteration from geophysical data is the ultimate goal of geophysical interpretation—there cannot be any expectation of a direct ore deposit signature in exploration data, yet we know that understanding footprint-scale alteration signatures can lead directly to targets.

The key to geophysical recognition of alteration at the ore system scale is the assumption, typically met in practice, that the primary control on physical property variation across the system is formational and structural, with hydrothermal alteration a contributing secondary effect. Specialized interpretation workflows, such as described in the article on page 2, can take advantage of this assumption to create physical property models composed of primary (formational and structural) and secondary (alteration) physical property signatures that are fully consistent with geophysical data and whatever level of geological data is available. The secondary physical property signatures are, in many cases, directly interpretable in terms of hydrothermal alteration domains.

Case study: The Mutooroo Iron Project area, Australia

This is a great example of developing a geologically-based magnetic model using a variety of interpretation, modelling, and inversion techniques. Due to limited constraining data on the magnetic units, construction of the starting model was based predominantly on interpretation of magnetic data. In this instance, the goal was to first develop a geologically plausible 3D representation of homogeneous magnetic domains beneath non-magnetic cover that explains the majority of the measured magnetic response. This was supported by the sparse geological data and magnetic susceptibility provided by the very limited available drilling under cover. The robustness of the magnetic domains are validated by assigning a homogeneous susceptibility to each domain, forward modelling, and observing a good correlation between the predicted and measured magnetic data. A final stage of inversion to solve for local susceptibility variations within the domains highlights magnetic anomalies that may be associated with alteration and therefore become potential targets or areas of geological complexity that require further investigation. This geologically-based model, consistent with geological constraints and geophysical survey data, provides a basis for confident decision making in technical and business realms, with the ability to adapt and accommodate new and evolving information as it becomes available.

Magnetic data



3D geological model

Glenn Pears - Principal Geophysicist with Mira Geoscience

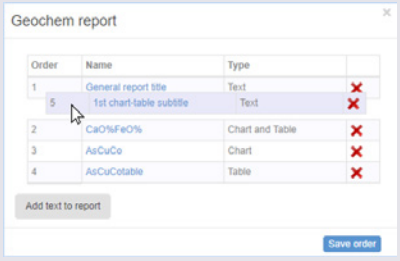
Glenn joined our team a little over 15 years ago! Glenn worked closely on this project with his colleague James Alderman. Glenn is a highly experienced geophysicist providing expertise in exploration data integration and interpretation projects. His strengths are in geologically-constrained geophysical interpretation and inversion using GOCAD Mining Suite, data assessment, QA/QC and exploration objective-based integrated interpretation.

Geoscience INTEGRATOR:

July's tip

Polishing reports

After adding charts or tables to a report, you can add text to provide more context and organize the content layout.



To receive full tip or to view previous ones, visit our site. »

Celebrating anniversaries!

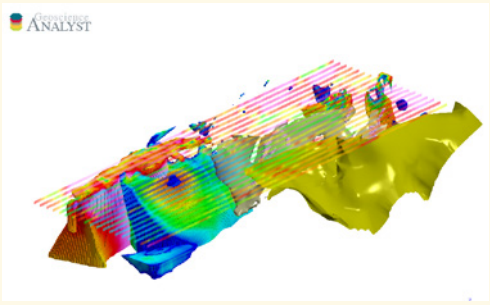
Mira Geoscience is heading towards 20 years of business and it warms our hearts to think that some people on our team have been with us for almost as long. We took the time to celebrate this and to give a heartfelt thank you to:

- Valérie Laflèche
- Jennifer Levett
- Michèle Mancini
- Robin McLeod
- Glenn Pears
- Gervais Perron
- Chrissy Williston

What's new – Software release:

VP Suite's VPmg version 9.1, VPem1D version 4.1 Launch of VP Utility version 1.0

Last June, we released VPmg 9.1 with enhancements made to help you better understand the inversion results. We have introduced further functionality to help with magnetic remanence and the ability to handle magnetic amplitude data that are weakly dependent on remanent magnetization. We also released VPem1D 4.1 with a focus on new capabilities with respect to data and transmitters. Additionally, we added the output of multiple measures of data misfit to the log file, and multi-moment transmitters can now be modelled or inverted. Finally, we launched VPutility - a new and free command line tool to help you create and modify VP models. It is compatible with all VP Suite products. Any VP model and its data can be written to a Geoscience ANALYST project file for visualizing and communicating in 3D.



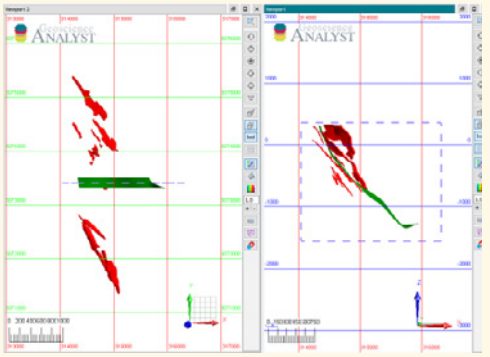
Open Government Licence – Canada

Create, modify and visualise VP models with VPutility.

More information about VP Suite available here »

Geoscience ANALYST version 2.60

In this new version, ASCII drillhole file importing is faster. 3D visualization of drillholes has improved in both accuracy and performance. Containers corresponding to each layer within DXF or DWG files are created during import. Additionally, you can open multiple 3D Viewports to visualize and compare data sets and objects side by side. Improved information exchange and communication tools facilitate a more collaborative approach. Saving views now includes all visual parameters, allowing you to capture every detail you want to share. You can export parts of workspace files or import existing workspace content in a Container Group within an active session.



Open Government Licence – Canada

Multiple 3D Viewports.

More information about the product available here »