Numerical Modelling for predictive mineral discovery

Project Code: M9
Project Leader: Mr Paul Roberts

The modelling program continues to build on its capabilities to numerically simulate ore forming processes.

This developing service aims to provide real time and cost savings to both explorers and miners in target generation.

In a range of ore environments, the modelling program will be able to:

Directly predict location of ore from a 3D computer model of geology, where the geology is both simple and well understood enough to be modelled directly.

Provide a range of testable scenarios for the probable location of ore in 3D space by translating a spatially predictive understanding of ore control derived from existing 3D interpretations where the geology is well enough understood to generate a 3D interpretation.

Predict the detectable geological, geochemical and geophysical signatures of ore (and ore related alteration) through the use of generic computer models to maximise the likelihood of successful discovery at minimal cost, where a 3D geological interpretation is not possible.

The Modelling Workflow

Streamlining the expert user workflow has led to significant improvements in efficiency. The workflow consists of:

+ Analysis of the exploration/geological problem
+ Construction of geometry in suitable format for 3D computational simulation
+ Run computational simulations
+ Visualise results
+ Interpret results and report back to client.

Stage 2 Modelling Outputs

Widen the range of soluble problems

+ Realistic predictions of fracture formation and fluid flow in fractured rocks able to be made for a wide range of ore systems in the upper crust.
+ Spatial predictions of alteration assemblages in a range of ore environments as well as sulphide mineral distribution via chemical and reactive transport modelling.
+ Targeting efficiency improvements for most (but not all) hydrothermal ore systems for both precious and/or base metals in most exploration environments.
+ Improvements in targeting efficiencies across multiple scales.

Increased Modelling Efficiency

+ Total improvements in modelling efficiency by end of CRC life to 100 times that at start of CRC life.
+ Adding coupled software applications to the software framework e.g. mechanical/fluid flow and reactive transport codes to increase speed and accuracy of modelling on high performance computing systems.
+ Development of robust, efficient systems for analysing exploration targeting problems along with interpreting and reporting results back to clients.

Industry Awareness of Capabilities

+ Develop and deliver a series of workshop and training opportunities for industry to help them understand modelling capabilities and applications.
+ Provide an on-line resource "modelling library" that is accessible and relevant to industry geologists.
+ Ensure that the new generation of geoscience graduates at CRC partner universities understand and utiilise the outcomes of numerical modelling as part of their 'tool-box'.

Partnerships with Industry

The project team will work closely with industry sponsors to ensure that research is closely aligned with industry needs and delivers value.

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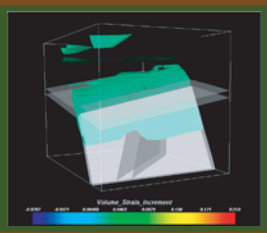

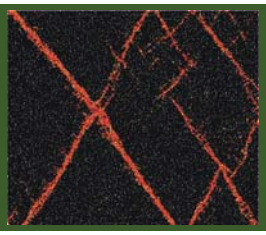
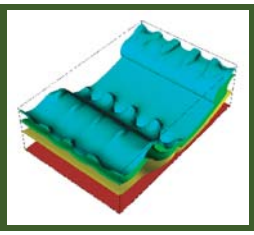


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