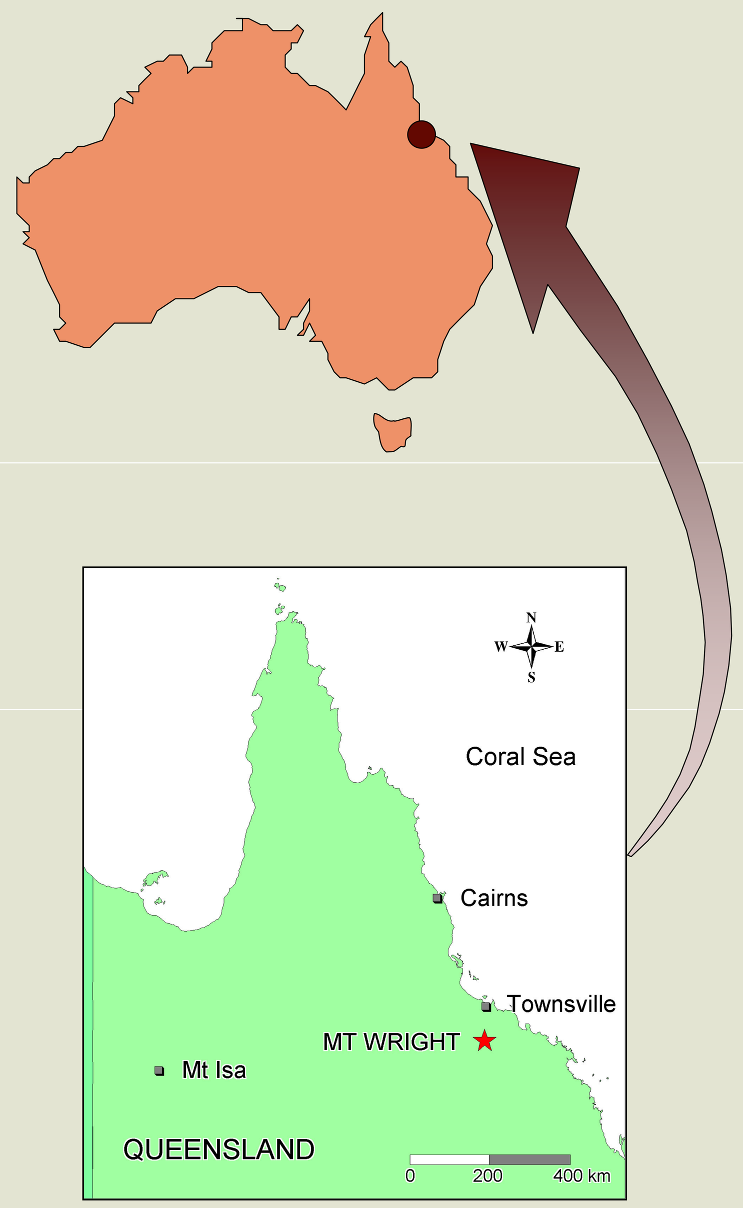

Map of north Queensland, showing approx. location of Mt Wright

USING DEPOSIT-SCALE ALTERATION AND GEOCHEMICAL SIGNATURES TO EXPLORE FOR ANALOGUE GOLD DEPOSITS: A CASE STUDY FROM MT WRIGHT, QLD

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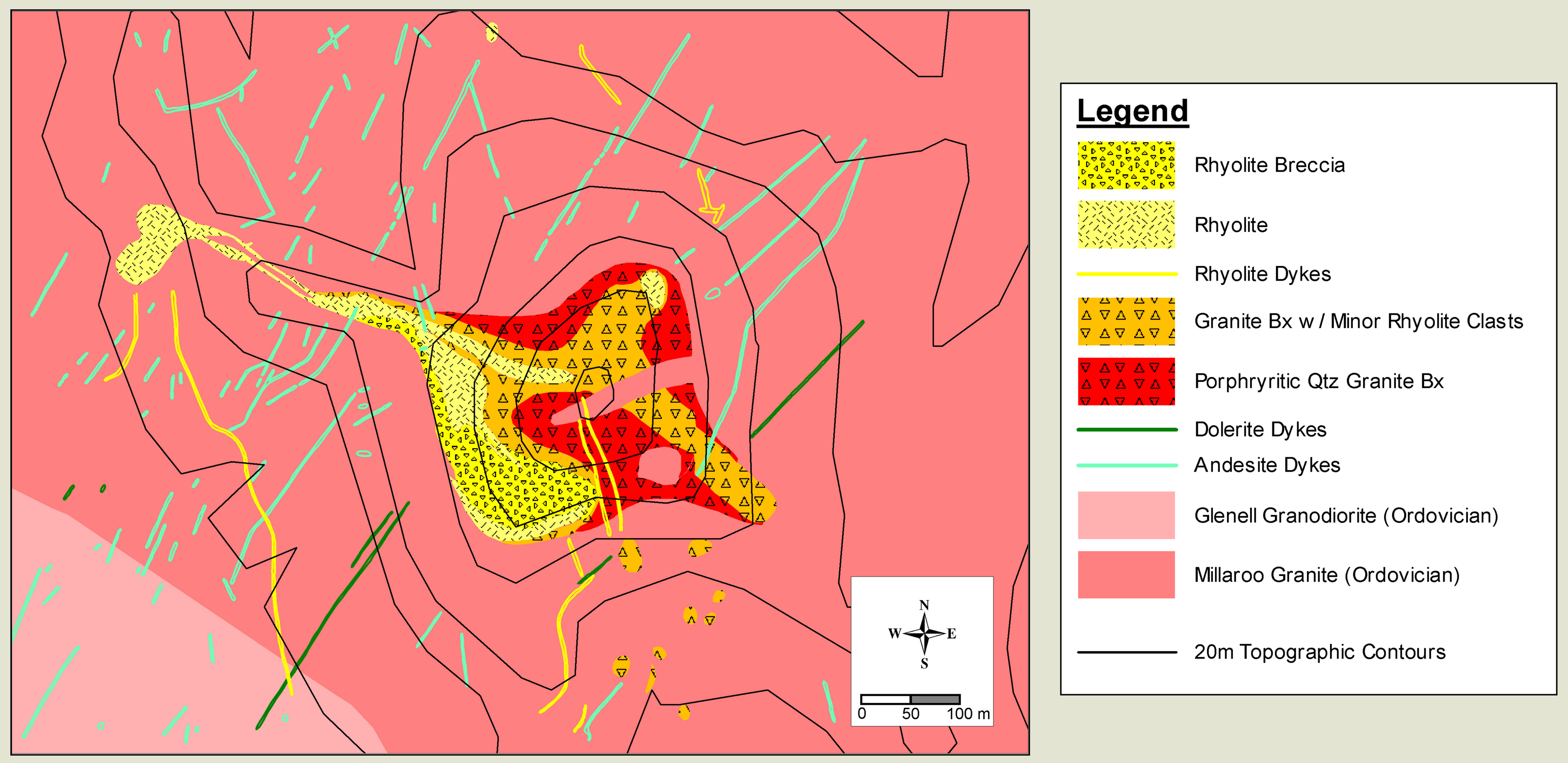
EXPLORATION HISTORY

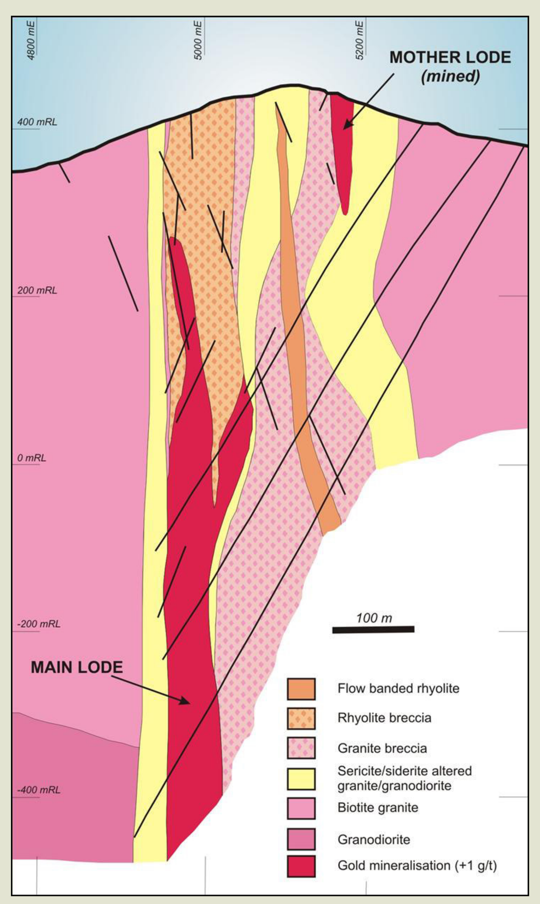
Mt Wright is a prominent conical high, with it's peak more than 100m above the surrounding countryside. A "pod" of mineralised granite breccia (the Mother Lode) was initially discovered in the early 1900's, and worked intermittently up to the 1950's. In 1992, 104,000 t @ 4.6 g/t was mined by Carpentaria Gold and fed through the Ravenswood plant. During this period, it was decided to drill-test the weakly mineralised rhyolite breccia at depth (on the opposite side of the hill). The first diamond drill hole in this program returned an intercept of 372m @ 2.33 g/t and the Main Lode was discovered.

OVERVIEW OF DEPOSIT

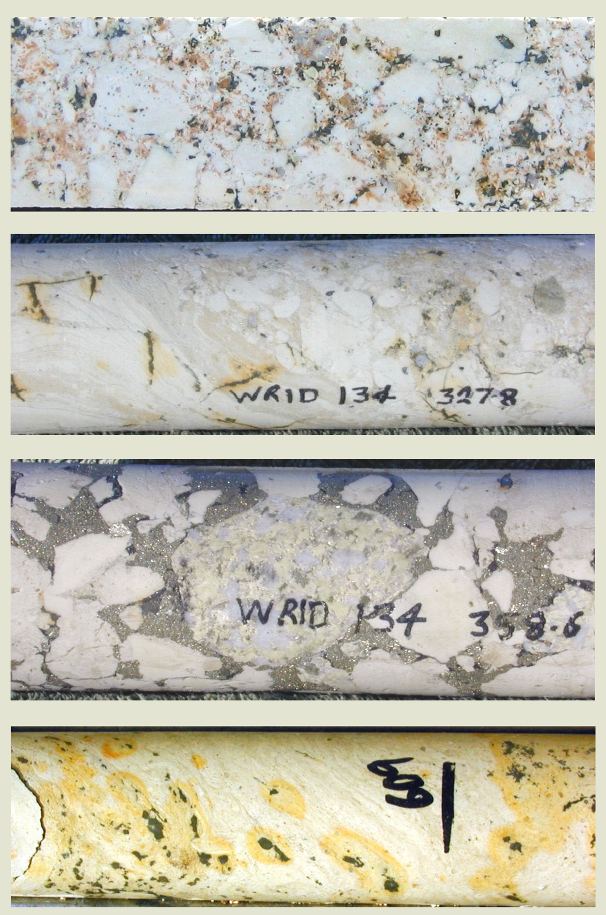
The Mt Wright gold deposit (Total Resource ~ 1 Moz @ 3.3 g/t), is hosted within an approximately 200x60 m wide, vertical, rhyolite breccia pipe, located in northeast Queensland, Australia. The deposit is characterised by a series of overprinting, structurally-focused rhyolite intrusions and hydrothermal breccias, hosted within the Ordovician Millaroo Granite (Furniss, 1998). Mineralisation of the complex (~305 Ma) occurred subsequent to, but essentially coeval with the final rhyolite brecciation stage (Perkins and Kennedy, 1998), and is characterized by pyrite-marcasite (after pyrrhotite) veining and intense sericite alteration. The pipe itself is weakly mineralized at surface (approx 0.2-0.5 g/t), but grades increase with depth and average around 4 g/t between 500-800 m below the surface. Development of the underground mine began in 2006, with the first ore trucked to the nearby Ravenswood plant in early-mid 2007.



Geological map of Mt Wright



Generalised cross-section of the Mt Wright deposit



Examples of different mineralisation styles within the main pipe

RECENT WORK

Although Mt Wright is a topographic high, the small and low-grade surface expression of the deposit makes exploring for analogues difficult, particularly where outcrop is poor. As such, characterising the alteration and geochemical signature is important so that surface and/or drill samples in areas of interest can be compared to those associated with this style of mineralisation. To achieve this, a combined Short Wavelength Infrared (SWIR) spectral analysis and multi-element (ME) study was conducted. The results of this investigation are already being applied to regional exploration.

METHODS

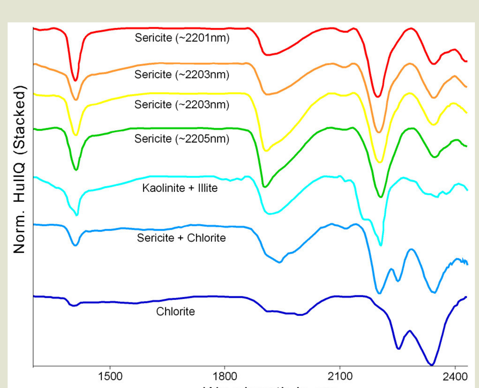
An ASD (Analytical Spectral Devices) TerraSpec® was used to collect SWIR spectra from a combination of RC chips and diamond core. Approximately 9000 spectra were obtained from 35 drill holes, with the RC chips / diamond core analysed at either 1 or 2 metre intervals. The spectral data was processed in The Spectral Geologist Pro® software (TSG), where four major mineral groups/assemblages were identified:

- Sericite-illite
- Kaolinite-illite
- Sericite-chlorite
- Chlorite

Samples within the sericite-illite group were then split into four sub-sets based on the wavelength ranges of the 2200 nm absorption feature. The resulting seven "mineral groups" were plotted on down-hole drill traces in the software package MineSight 3D® to visualize the alteration mineral distribution in three dimensions.

Several of the above drill holes were selected for multi-element (ME) analysis. Samples were taken at 2-3 m intervals, within and adjacent to the ore zone, with sampling intervals gradually increasing up to 20 m further away from the mineralisation. Where possible, samples in the wallrock avoided veining and other small-scale (non representative) features. All samples were submitted to ALS Chemex and analysed for a suite of 48 elements using method ME-MS61 (four acid digest with combined ICP-MS/AES analysis).


Collection of spectral data with ASD TerraSpec



Representative spectra from the "main" mineral classes identified at Mt Wright

ALTERATION MINERALOGY WITHIN & ADJACENT TO MT WRIGHT

The SWIR spectral data appears to indicate that there is some zonation of the alteration mineralogy within and adjacent to the deposit. In particular:

1) The upper portion of the rhyolite breccia pipe is dominated by short wavelength (<2201 nm) white mica alteration, whereas the lower part is characterized by sericite in the (2201-2203 nm) range;
2) In the surrounding Millaroo Granite, the kaolinite-illite mineral group (plus minor long wavelength sericite) forms an annulus around the rhyolite breccia pipe and parts of the granite breccia;
3) Pervasive sericite-chlorite alteration exists beyond the kaolinite-illite halo, in the surrounding granite.

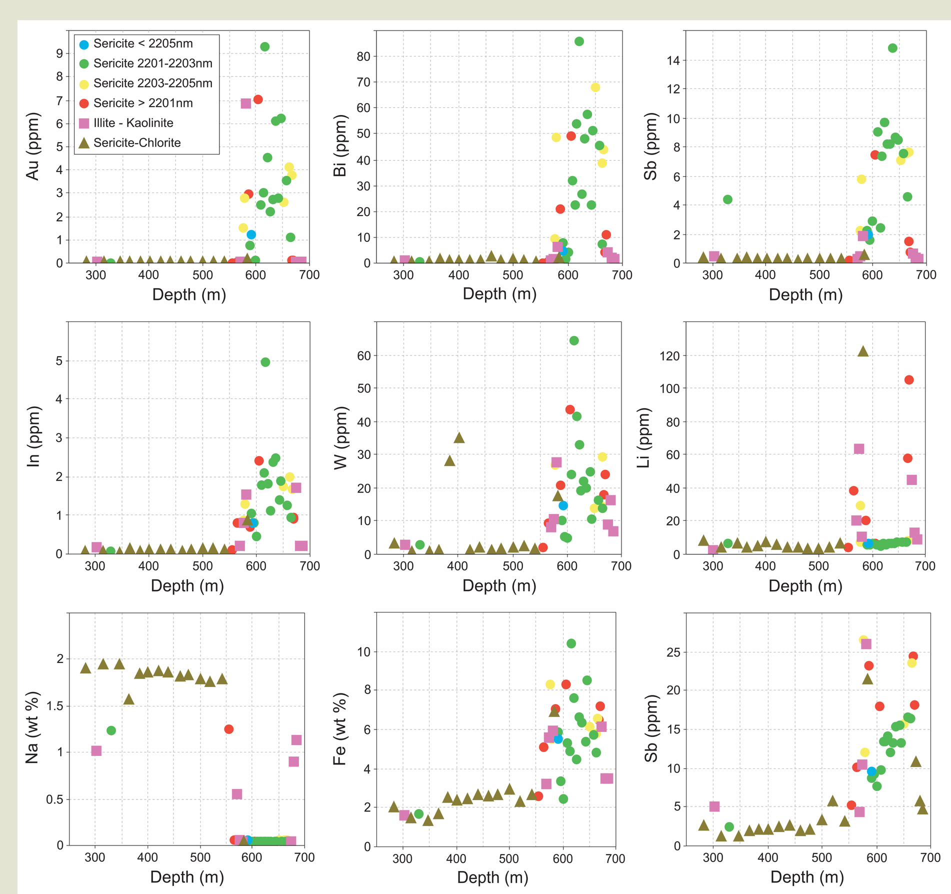
The wavelength variation around 2200 nm is controlled by the substitution of Fe and Mg for Al in the sericite structure (Herrmann et al., 2001). Muscovites (low Fe, Mg) exhibit absorption around 2200 nm, whereas phengites (high Fe, Mg) display absorption around 2210(+) nm. Therefore the wavelength of the absorption feature is a function of pH, as muscovites form in more acidic environments relative to the neutral-alkaline conditions required for phengites. As such, the variation in the wavelength of the 2200 nm feature essentially maps a pH gradient within the hydrothermal system. In this case, the pH of the fluids may have some relationship to grades (i.e. precipitation of gold) within the pipe.

The origin of the kaolinite-illite zone is yet to be determined. It appears to be associated with steep fractures/faults and may be supergene, although it's presence up to 700m below the current erosion level, could indicate the kaolinite-illite is hydrothermal.

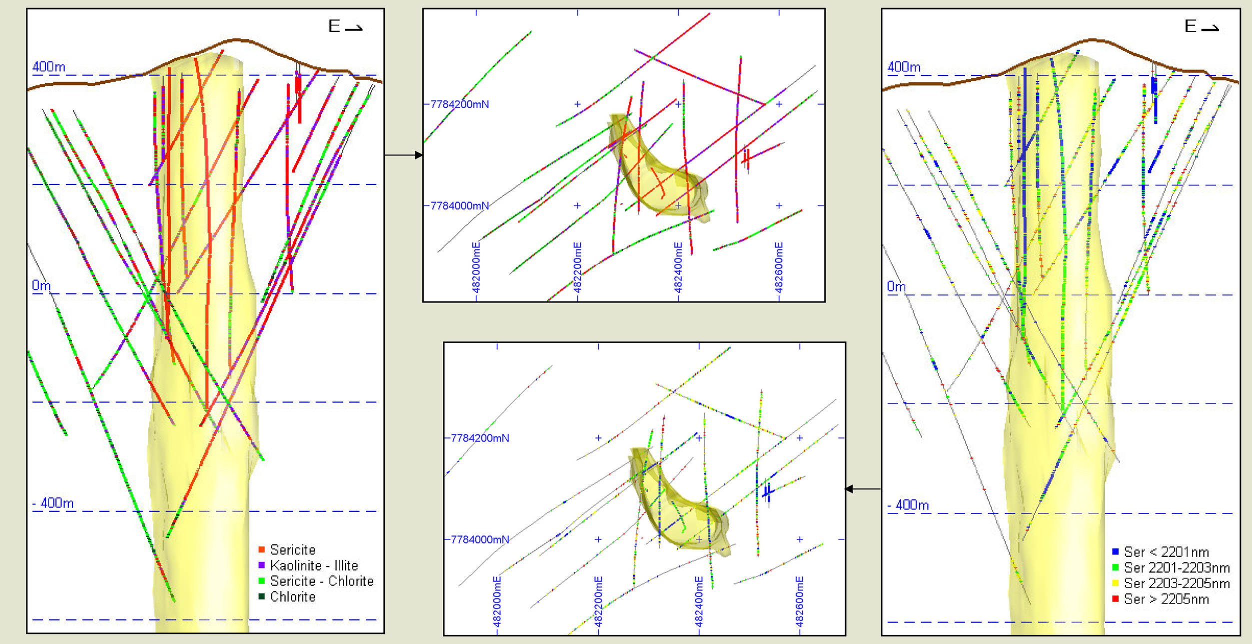
Sericite-chlorite alteration is persistent within the surrounding granite more than 1km away from the ore body (limit of drilling). The wavelength of the sericite 2200 nm absorption feature appears to be longer (i.e. more phengitic composition) closer to the mineralisation and decreases with increasing distance.

MULTIELEMENT DATA

By combining the ME and SWIR data for a representative drill hole through the deposit, it appears that most of the enrichment of pathfinder elements is constrained within the pipe and surrounding kaolinite-illite halo (i.e. within 50m from the edge of the deposit). Elements including Bi and Sb are clearly enriched within the ore zone, elevated In and W exist within both the kaolinite-illite halo and the pipe, whereas Li appears to be most enriched within the kaolinite zone (possibly substituting for K or Mg in the associated illite). The ore zone is also totally sodium depleted, reflecting the total sericitisation of the feldspars within the rhyolite breccia. Within the sericite-chlorite zone of the granite, elements such as Fe and Sn appear to increase approaching the ore zone and are also enriched within the ore body.

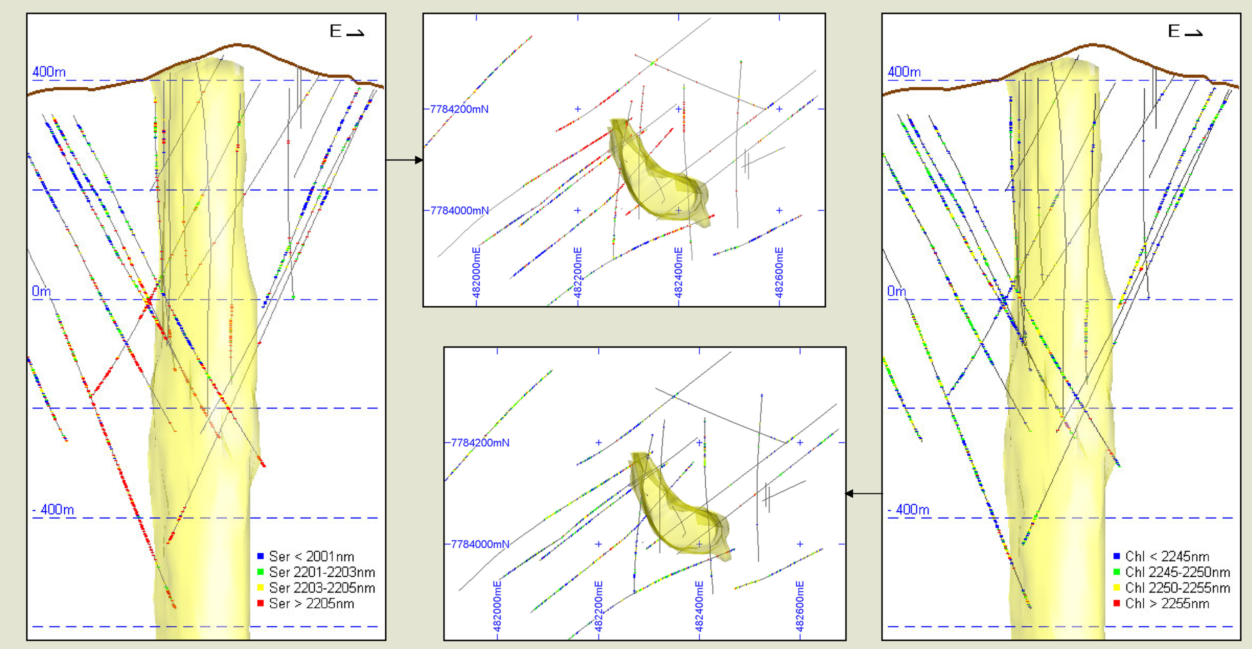


Plots of selected element concentrations for a representative drill hole that intercepts the Mt Wright ore body at depth. Individual data points are coloured by the alteration mineral group identified with SWIR.



Drill holes coloured by 4 "main" alteration mineral groups

Drill holes coloured by sericite wavelength variation (sericite mineral group only)



Drill holes coloured by sericite wavelength variation (sericite-chlorite mineral group only)

Drill holes coloured by chlorite wavelength variation

IMPLICATIONS FOR EXPLORATION

Multielement geochemistry from known deposits can be used in two ways. The first is to compare samples that have a similar style of mineralisation, but may or may not contain economic grades. In the case of Mt Wright-style deposits, ME analyses of rhyolite and/or brecciated samples from outcrop or drilling, may give confidence to drill a particular target, even if it's essentially barren at surface. On the other hand, examining subtle variations and/or trends in wallrocks of a potential deposit, may give clues as to where that sample is spatially, relative to mineralisation. Potential, "near-misses" during drilling campaigns may be able to be recognised using ME data (the closer the "miss", the more obvious it would be). Whilst costs may prevent systematic ME sampling of holes, selective sampling may still produce useful data and be a more cost-effective procedure.

Multielement data may have more use in early-stage exploration, particularly soil geochemistry. As a large proportion of the terrain surrounding Ravenswood/Mt Wright has thin residual cover, the existence of a buried deposit of similar type is possible. Soil sampling programs in the area now include the pathfinder elements that are expected to be anomalous in-line with the ME data obtained from drill samples, and soil orientation surveys around Mt Wright.

The collection of SWIR data from rock chips and drill samples (potentially during a drilling program) appears to be both an economical and potentially invaluable technique in exploring for similar deposits. Like ME data, characterising the alteration mineralogy by SWIR analysis of drill samples can be used to determine where a particular hole is spatially, relative to mineralisation. This process would be relatively straight forward when viewing the data in 3D modeling software. With a PIMA or ASD unit on-site, this data can be collected during a drilling program and interpreted immediately. The data can also be expanded to airborne spectral methods (e.g. HyMap) and alteration patterns can be examined regionally.

As such, drill samples from previously abandoned and new prospects will include SWIR analysis and selective ME sampling in order to understand the chemistry of the systems. The results of both will then be used to re-evaluate their propectivity.

ACKNOWLEDGEMENTS

The field technicians at Carpentaria Gold are thanked for their contribution to the collection of the SWIR data, and other past and present geologists that have contributed to the understanding of Mt Wright. Resolute Mining Ltd. is gratefully acknowledged for allowing presentation of project results.