

THE APPLICATION OF MMI-M LEACH TO MINERALIZED PORPHYRY EXPLORATION

The geochemical patterns identified by the new multi-element leach (MMI-M) in both residual and transported surface soils burying porphyry systems, can reflect both the commodity metals and alteration zonation typical of such systems, thereby increasing the success rate and cost-effectiveness of drilling campaigns. The MMI-M leach provides high quality analyses for over 50 elements in soils with a wide pH range, including calcrete soils. Selected LLD's (ppb) include:

Cu 10, Pb 10, Zn 20, Mo 1, Au 0.1, Ag 0.1, As 1, Sb 1, Bi 0.1, Te 0.2, Co 0.25, Ni 3, Pd 0.1, U 1.

Sampling of transported and residual soils across porphyry (including Au/Cu) systems in South America, Australia and Scotland have shown distinctive multi-element responses reflecting mineralization styles, alteration halos and key lithologies. Some of these associations are summarized below. HOWEVER, these associations should be used as a guide only and could be expected to vary across differing mineralized systems and their respective geological settings.

PORPHYRY MODEL FACTORS (PMF)

While MMI™ surveys have clearly defined multi-element responses over buried porphyry systems, prioritizing the individual element responses (e.g. Cu) that are reflecting potentially economic drill targets can be more challenging. As shown with Ni exploration where mineralization settings can be complex, from an MMI™ perspective the individual elements may not necessarily be conclusive. It is the combination of a number of 'soil geochemical factors', coupled with a good understanding of the mineralized system (or the segment thereof) which is being explored, which allows the most effective definition of drill targets.

While the associations given above should be used as a guide only, interpretation for specific situations can be enhanced further by selecting principal and characteristic elements for incorporation and calculation of a multiplicative index termed a Porphyry Model Factor (PMF). This concept was developed from the MMI™ nickel sulphide program (see Latest News – Nickel Exploration).

An example of such application is shown below across a till and colluvium covered porphyry system in South America. The line extends for 2.8 km from the system's centre. Individual Cu and Mo responses are also shown.

Table 1: Key Geochemical Factors

Porphyry Model Component	Principal Element	Subsidiary Elements
Intrusive Stocks (mineralized)	Cu, Mo, Nd, Rb	Co, Y, Rb, Ce and Nd
Biotite Zone	Mg, Fe, La	Cu, Mo
Granodiorite Stocks (unmineralized)	Pb, U, Rb, Se	Other REE's
Peripheral Base Metal Zone	Pb, Ag, As, Co	Cu, Au, Zn
Mineralized Breccia	Cu, Ag, Co, Zn, and Pb	As
Intrusive Sills	Mg, La, Th, Nd, Ce	Y
Propylitic Alteration	Y, Ce, Se	Au, Pb, Ag
Exoskam	Cu, Mo, Zn, Cd and W	Ag, Au
Endoskam	Ag, Au, Se, Mg	Cu, As
Fault zones	Co, As, Ag	Zn, Pb
Pyritic units	Co	

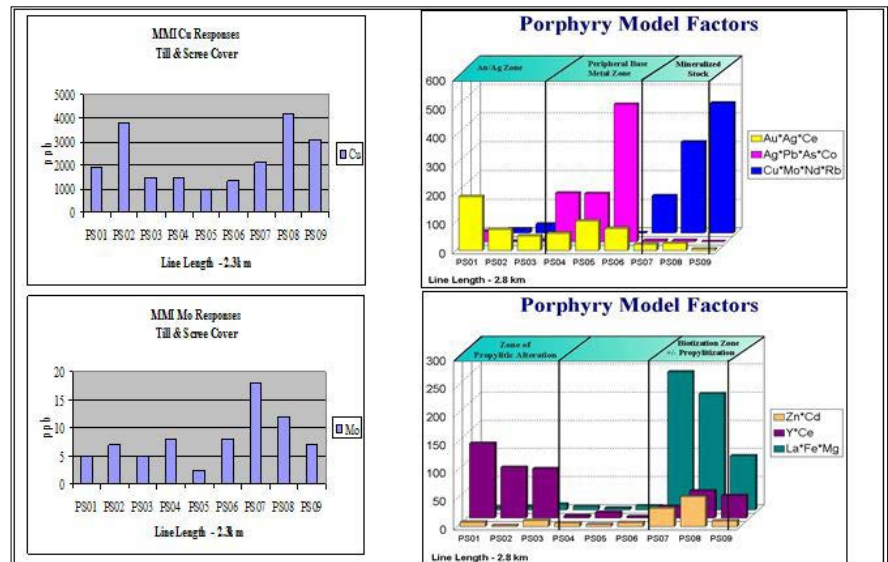


Figure 1: MMI-M Analyses and PMF data

MMI-M analyses and PMF data treatment can be applied very effectively to highlight critical zones within a porphyry system, based on the premise that moderate values of all components can be more indicative than high values of only one or two elements. Single element peaks within specific zones define more prospective drill targets. Single element plots alone while valuable, can lead to drilling lower priority targets.

MMI-M LEACH

MMI-M, a single multi-element leach, incorporates some 6 specific ligands to hold elements in the analyte solution, thereby resolving soil and solution pH issues recognised as problematic in other partial extraction geochemistry. With MMI-M, individual multi-element packages (using ANY of the 40 plus elements) can now be tailored for specific commodity targeting (e.g. diamond, PGE, uranium and porphyry exploration) as well as for geological and alteration mapping.

CONTACT INFORMATION

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Table 2: PMF Factors Applied

(1) $Cu \times Mo \times Nd \times Rb / 10^4$	Mineralized granodioritic stock.
(2) $Ag \times Pb \times As \times Co / 10^4$	Peripheral Base metal Zone
(3) $Au \times Ag \times Ce$	Peripheral gold zone
(4) $Mg \times Fe \times La$	Biotite zone
(5) $Y \times Ce \times Se$	Propylitic alteration zone
(6) $Zn \times Cd / 10^2$	Associated mineralization with the intrusive stock.