

Ken Witherly

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3pm Rm 265 McCone Hall UCB Campus

What Lies Beneath?

Mapping Conductive Zones within Porphyry Copper Systems

Abstract: The classical geophysical definition of a porphyry copper system is a large tonnage of rock with an extensive amount of disseminated sulfide mineralization that comprises the alteration and ore content of the deposit. The concentration of such sulfides is typically so low (0.5-5%) that it has a negligible effect on the bulk resistivity of the rock but can typically be mapped with the IP technique. There are numerous examples of such responses dating back to the earliest days of the development of the IP technique. Less well documented are zones of sulfides which are sufficiently connected that the bulk resistivity is reduced to the point these zones can potentially be mapped with resistivity techniques, either DC resistivity (acquired in the course of carrying out an IP survey) or EM techniques.

In the course of assessing MT and AFMAG data over a number of porphyry deposits, anomalously conductive features, often quite deep, have been defined. While these are believed to potentially represent zones with much higher sulfide concentrations, there could be other geological sources causing the lower resistivity including fault gouge (clays) and conductive ground water. However, evidence of higher concentrations of sulfides appears common. There does not appear to be a consistent depth or shape to these features. Also, the economic significance (sulfides containing ore minerals) is not universally established but higher concentrations of copper appear common.

While some degree of heterogeneity of the geology of porphyry systems is expected, there appears to be little prior published evidence that such zones are potentially mappable with resistivity/EM techniques to considerable depths, often well below established drilling. Further work on both the geophysical aspects of these systems and most importantly, the geology is required to establish a complete exploration/target model.

Speaker Bio: **Ken Witherly** graduated from UBC (Vancouver Canada) with a BSc in geophysics and physics in 1971.

He then spent 27 years with the Utah/BHP Minerals company during which time as Chief Geophysicist, he championed BHP's programs in airborne geophysics which resulted in the development of the MegaTEM and Falcon technologies.

In 1999, Ken helped form a technology-focused service company that specializes in the application of innovative processing and data analysis to help drive the discovery of new mineral deposits.

After Ken's talk we will gather at Matiki Island BBQ and Brew (no host) 1828 Euclid St (300ft from North Gate entrance.)

