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A Multi-Disciplinary Mineral Systems Approach to Regional Targeting: Identifying Hidden Potential at Kenorland Minerals' Tanacross Project[1]

Presented by

Francis MacDonald, Kenorland Minerals Ltd.

The application of a mineral systems approach is vital in identifying new and underexplored regions of mineral endowment. The critical elements to applying this approach include identifying favourable lithospheric architecture in regions of enhanced metal fertility combined with favourable transient geodynamics to allow ore fluid generation, migration and deposition into the mid- to upper crust (McCuaig & Hronsky, 2014; Figure 1). In this study, we exhibit how these critical elements of a mineral system have been identified in Kenorland Minerals' (Kenorland) Tanacross project of east central Alaska. This has been achieved through the mapping of lithospheric scale architecture using potential field geophysical data (gravity and magnetics), combined with terrane scale fertility and geochemical mapping in an area of favourable transient geodynamics qualified through whole-rock trace element geochemical analysis. Kenorland's approach is extremely cost effective and efficient as it has been achieved using open source geoscientific data integrated with published observations from The University of British Columbia's Mineral Deposit Research Unit (MDRU), The United States Geological Survey (USGS) and other researchers cited within this presentation.

The Tanacross project consists of an ~40,000 ha contiguous land package which is 100% owned by Kenorland, and occurs within the east central Alaskan portion of the Yukon-Tanana Terrane (YTT) of the North American Cordillera. The YTT is host to numerous significant Au and Cu-Au-Mo deposits, although the relationship between metallogenesis and tectonic framework had been poorly constrained until recent studies by the MDRU. The Tanacross project occurs at the intersection between the arc-parallel Big Creek Fault system and the Sixtymile Pika cross-orogen structure which control the emplacement of Cu-Au systems and Cu-Mo systems respectively (Allan et al., 2013 & Sanchez et al., 2014). A comparative study of Sr/Y ratios from whole rock geochemical analysis of intrusive rocks in the Tanacross project area indicates this segment of the North American Cordillera to have experienced anomalous compression during magmatic emplacement suggesting a favourable transient geodynamic setting to enhance magma fertility (Loucks, 2014). Furthermore, the investigation of regional gravimetric and filtered aeromagnetic data suggests the project area to be underlain by a granitic batholith of a similar scale to the Kaskanak batholith which is believed to control mineralisation of the giant Pebble Cu-Au-Mo deposit of south-western Alaska (Anderson et al., 2013). Although Cu-Au-Mo porphyry mineralisation with instances of overprinting epithermal Au-stockworks have been identified in the project area, most historic exploration was restricted to sparse outcropping exposures and shallow drilling of alteration restricted to ridgelines. The mineral system analysis undertaken by Kenorland suggests this area to be extremely underexplored and we believe the Tanacross project has the potential of a world-class porphyry district.

[1] Contributing authors: Francis MacDonald, Zach Flood, Scott Smits and D. B. Stevenson of Kenorlands; D.B. Stevenson is also a PhD candidate from Centre for Exploration Targeting and ARC Centre for Excellence for Core to Crust Fluid Systems (CCFS), The School of Earth and Environment, The University of Western Australia, 35 Stirling Highway, Crawley, WA 6009, Australia

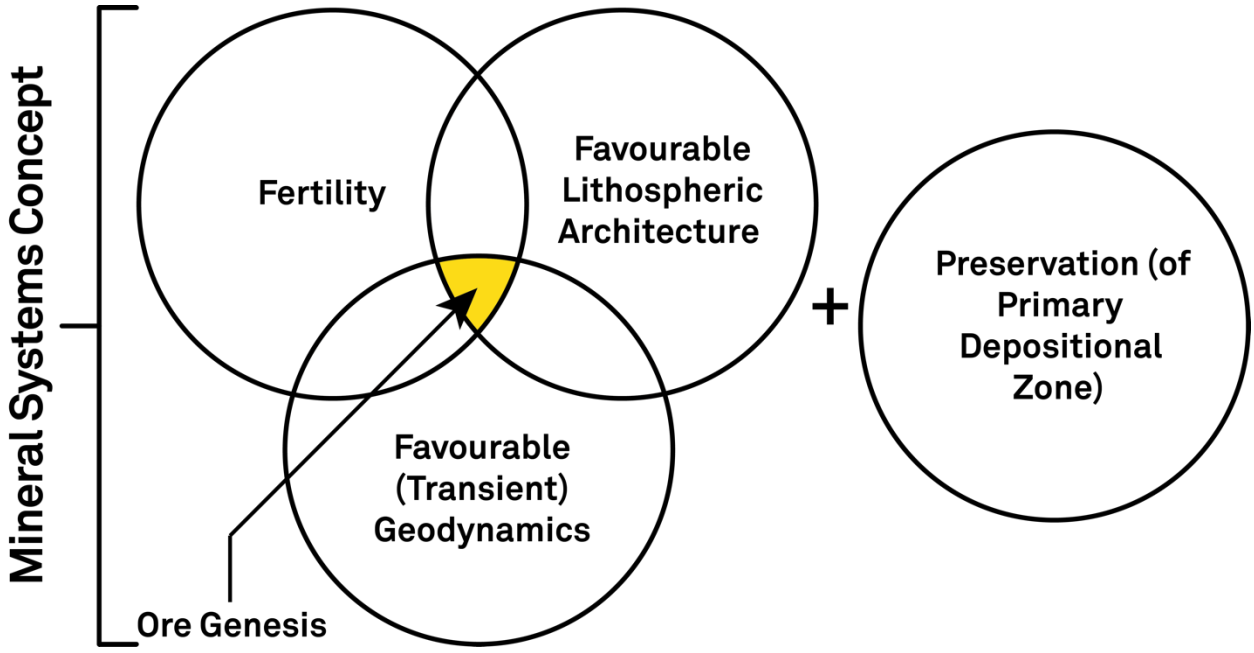

Figure 1: The mineral systems concept venn diagram illustrating the critical elements in ore genesis combined with the preservation of the primary depositional zone (modified from McCuaig & Hronsky, 2014).

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