

# SEG 2024 Conference: Sustainable Mineral Exploration and Development

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## Mitigating the Streetlight Effect: Stepping Into the Darkness is an Important Step in Understanding the Copperbelt

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Our capacity to explore successfully on the Copperbelt, and moreover to transfer exploration strategies to other basins, is dependent upon the robustness of our ore deposit models. In recent years, there have been important advances in constraining the nature and origin of ore fluids, as well as the scale and intensity of alteration systems. An appreciation of the vast time scales at which the mineralising process operated and the dynamic, evolving nature of hydrologic framework, have been demonstrated by discovery of “non-classical” ores hosted at stratigraphic levels previously considered nonprospective. Despite our progressively expanding knowledge of the basin’s form, facilitated partly through the assembly of modern geophysical data sets, deep drilling, and reinterrogation of geologic maps, notable exploration successes remain restricted to (or incrementally extending along) an arcuate “line of lode” defined some 100 years ago, or a subsidiary belt of high-tonnage, low-grade ores: the classical Cu arc and Domes Region, respectively. While we continue to explore outboard of these long-established mineralised domains, it seems our lack of success points towards limitations in our understanding of the mineral system. Even within this most spectacularly endowed, relatively data-rich basin, we are still not at a position to determine the prospectivity of a particular compartment.

Within the northern compartment, metal endowment is neither uniform nor ubiquitous, with the bifurcating mineralised corridors or the classical Cu arc and Domes Region enclosing an apparently barren lozenge-shaped domain that I refer to herein as the “empty quarter.”

In this paper, I present what we believe we understand about the links between basin compartmentalisation, hydrologic evolution, and ore distribution, but focus on what limited material we have on the empty quarter in an attempt to build a more complete picture of the mineral system.