# Structural and Lithological Overview of a Polygenetic Mélange in an Evolving Lufilian Arc Foreland Basin, Kolwezi, DRC

**Mr Michael McCall**[1], Dr Ian Basson[1,2]

[1]*Tect Geological Consulting, Somerset West, South Africa,* [2]*University of Stellenbosch, Stellenbosch, South Africa*

The Kolwezi area of the Democratic Republic of the Congo hosts world-class stratabound Cu-(Co) and U-(±Cu-Ni-Co-Pb-Zn) mineralisation in large écaille or fragments of coherent lower Roan Group units which are hosted in regional breccias. Long-debated genetic models for the development of these types of deposit involve halokinesis or salt tectonics, and/or the development of tectonic mélanges, friction breccias, sedimentary mélanges and olistostromes. Historical and new data at K.O.V. Mine, situated in the Kolwezi "Klippe", or sub-basin, has been re-analysed and used in the construction of a fully-constrained 3D implicit model of lithologies and major structures. This data, which spans 70 years, comprises diamond and reverse-circulation drilling, new structural and lithological face mapping, downhole televiewer data and macrostructural logging. In-pit observations and the new 3D model, presented herein, provide new insight into K.O.V.'s genesis.

The Kolwezi sub-basin, characterized by K.O.V. Mine, resulted from gravity-driven mass-transport processes, concomitant with the development of a polygenetic sedimentary mélange, within a folded foreland basin during orogenesis. The final configuration of K.O.V. Mine is primarily due to: 1) structures inherited from the residence time of fragments within the hinterland of the fold-and-thrust belt; 2) lateral extension due to loading and oblate flattening strain that caused chocolate tablet geometries in coherent units, which were initially exploited by veins; 3) variable geometries, sizes and attitudes of fragments; 4) block-in-matrix fabrics; 5) soft-sediment deformation structures; 6) matrix-supported, polymictic conglomerates; 7) discordant and unconformable sedimentary relationships; 8) multiple Roches Argilo-Talqueuses (R.A.T.) sub-types and "incursions" of R.A.T. and Roan Breccia into fragments which exploited the chocolate tablet geometries; 9) variable shearing in proximity to the base of fragments; and 10) large-scale juxtaposition of fragments, the configuration of which was complicated by late-kinematic tightening of the Kolwezi sub-basin and dewatering of the pile. This was probably accompanied by further remobilization of fluids and metals. Collectively these features suggest that the Kolwezi sub-basin comprises a foreland olistostrome.