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Lumwana Mine: Evolution of a World-Class Copper Deposit, a Structural View

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Lumwana (Malundwe and Chimiwungo Pits) is a world-class sedimentary-hosted Cu deposit situated in the Katanga basin, Central African Copperbelt, Northwestern Province, Zambia. As of December 31, 2024, the total Proven and Probable Mineral Reserves are estimated to be 1,600Mt at 0.52% Cu for 8.3Mt contained Cu (NI-43-101, Barrick, 2024) with the deposit currently undergoing a significant expansion – incorporating two new open pits (Kamisengo and Kababisa).

Hosted by Mesoproterozoic basement on the Mwombezhi Dome, Lumwana is closely associated with a tectonized unconformity within a pre-Katanga décollement (KD). Mineralization in the KD zone is typically < 60m thick, localized within laterally-extensive shear zones in– mica schists, between kilometer-scale thrust sheets of Paleoproterozoic gneiss which form the hangingwall and footwall of the deposit (Koegelenberg et al. 2019). The timing of mineralization is interpreted to be introduced prior to or synchronous with M1 metamorphism with sulfides clearly deformed by the S1 fabric and overprinted by kyanite porphyroblasts developed during peak Lufilian metamorphism (530Ma) interpreted to have reached $\sim 750 \pm 25$ °C and $\sim 13 \pm 1$ kbar (Bernau, 2007). Kyanite poikiloblasts (Ky1) preserve an inherited S0 - S1 foliation defined by graphite, micas and sulfides grains developed during prograde D1 deformation-metamorphism (Turlin et al. 2016). Sulfides are remobilized into low-strain sites associated with passive fold hinges and related asymmetric boudin necks during D2 deformation (Koegelenberg et al. 2019). NW-trending D3 shear zones are developed along relict pre-Katanga sediments and reactivated D1-2 mylonitic horizons.

This Poster will provide a geological and structural summary, supporting its position as one of Zambia's key copper-producing assets.