Alteration Assemblages in the Southern Congolese Copperbelt: A Comparison of Background Stratigraphy with Cu-Vein-Hosted Mineralisation and Salt Dissolution Alteration

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Integrated drill hole logging, multielement geochemistry, and petrographic studies have been utilised to develop alteration maps that provide potential vectors to vein-fracture-hosted Cu and Zn-Cu-Pb massive sulphides in the Southern Congolese Copperbelt—an underexplored region of the Central African Copperbelt.

Defining hydrothermal alteration halos in sedimentary sequences is commonly difficult due to the heterogeneous nature of the rocks and diagenetic alteration. The siliciclastic, carbonate, and evaporite rocks of the Neoproterozic-Cambrian Katangan Supergroup have undergone multiple alteration events starting with diagenesis and continuing through alteration due to movement of residual brines from evaporite deposition, multiple episodes of basinal brine migration, halokinesis and evaporite dissolution, and metamorphism. A number of these alteration events were associated with base metal mineralisation including those associated with potassic, magnesian, and sodic alteration. In this study, drill hole intercepts of background/least-altered lithologies were compared with Cu-mineralised rocks, Cu distal alteration halos, and examples of alteration along the margins of Roan breccia after diapiric salt bodies to map different alteration halos and footprints. The Zn-Cu-Pb massive sulphide deposit at Kipushi was associated with magnesian, potassic, and barium alteration while supra-salt Cu-vein mineralisation was associated with sodic and magnesian alteration. Alteration focused along former salt walls and diapirs in the area was also extensive and is potentially misleading in the exploration for copper deposits.