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The Nosib Polymetallic Mineral Deposit in the Otavi Mountain Land of Namibia – New Deposit Type or Variation on a Theme?

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Nosib polymetallic (Cu-Ag) sulphide and secondary (Cu-Pb-V-Zn-Ag) oxide deposit is located in the Otavi Mountain Land (OML) district of Namibia. The OML includes major historic mines such as Tsumeb, 40km NW of Nosib (30Mt grading 4.3% Cu, 10% Pb, 3.5% Zn produced).

The majority of the mineral deposits in the OML are primary, polymetallic (Cu-Pb-Zn) sulphide deposits hosted by Otavi Group carbonate successions of the Neoproterozoic Damara Sequence. “Tsumeb type” deposits, which include the nearby Khusib Springs deposit 15km east of Nosib, are described as pipe-like orogenic-hydrothermal deposits hosted by collapse breccias, which transgress stratigraphy.

The Nosib deposit is unusual for the OML as primary sulphide mineralisation is hosted by pebbly quartzite and phyllite/shale of the Nosib Group at the base of the Damara Sequence.

The mineralisation at Nosib is up to 50m thick and generally stratabound within the pebbly quartzite. Sulphides morphology ranges from disseminated chalcopyrite, bornite and tennantite in the matrix of the pebbly quartzite beds, to massive sulphide veins and bands conformable and cross cutting bedding. Unlike other OML carbonate hosted deposits, collapse breccias are absent and sulphides display different, generally disseminated sulphide morphology. However, the sulphide mineralisation at Nosib has similar mineralogy and geochemistry to the nearby “Tsumeb type” Khusib Springs (Cu-Ag-Zn) sulphide deposit. This indicates a similar timing and fluid source to Khusib Springs and a similar orogenic / hydrothermal mineralising event which has likely utilised porosity in interbedded units and intergranular porosity which may have also included dissolvable carbonate minerals. Veined sulphides which transgress bedding confirm a structural orogenic-hydrothermal control on mineralisation, although veining may be remobilisation of the stratabound mineralisation.

The Nosib deposit is considered to be orogenic-hydrothermal in origin but displays an unusual stratabound – pebbly quartzite host rock control due to interbed and matrix porosity rather than carbonate collapse breccia control.