

The Basil Cu-Co deposit, Huckitta
project area, Harts Range, N.T.,
Australia: a possible metamorphosed
volcanogenic massive sulphide
deposit.

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THE BASIL CU-CO DEPOSIT, HUCKITTA PROJECT AREA, HARTS RANGE, N.T., AUSTRALIA: A POSSIBLE METAMORPHOSED VOLCANOGENIC MASSIVE SULPHIDE DEPOSIT.

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ABSTRACT

Contemporary exploration models that link the common characteristics of a certain ore type depend upon an understanding of the mechanisms of ore formation and how these relate to the geological environment in which they occur. The Basil Cu-Co deposit located in the Harts Range, Central Australia. The deposit is hosted by a sequence that has been metamorphosed to amphibolite and granulite facies conditions twice (480-460 Ma and 450-300 Ma). As a result, many of the primary mineralisation textures and other characterising features have been destroyed, thus making it difficult to place the deposit within traditional genetic categories. Mineralogical, petrographic and geochemical studies of host rocks and sulphides in the zone of mineralisation, focussing on preserved textures and mineral relationships, allow some constraints to be placed on the genetic history of the deposit.

Results permit several genetic models to be ruled out. Firstly, whole rock geochemistry and garnet compositions suggest that the deposit is not a hydrothermal skarn system. Secondly, the lack of any significant Ni-signature, and presence of abundant zircons in amphibolite (indicating that not all host rocks are mafic in character), makes a magmatic-hosted Ni-Cu-(PGE) system unlikely. Tentatively, Basil is assigned to a volcanogenic massive sulphide (VMS)-style of mineralisation, formed on the seafloor, within basaltic, sedimentary and mixed tuffaceous host rocks typical of such deposit settings. The lack of a recognisable hydrothermal alteration zone is consistent either with destruction of the alteration zone during metamorphism or detachment of the ore from alteration either following formation, or during syn-metamorphic deformation.

The occurrence of sulphide inclusions within garnet and amphibole infers that the sulphides must be syn-metamorphic or earlier. Partitioning of trace elements between pyrite and co-existing pyrrhotite suggests (re)crystallisation occurred under equilibrium conditions. The composition of sphalerite coexisting with pyrite and pyrrhotite, points to crystallisation at pressures of 10 kbar.

CU-CO DEPOSIT, HARTS RANGE, REGIONAL METAMORPHOSED, SULPHIDE PETROGRAPHY, ORE GENESIS, LARAPINTA EVENT, VOLCANOGENIC MASSIVE SULPHIDE

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