

Metamorphic Ore Remobilisation: Lessons from the Scandinavian Caledonides

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Massive sulphide deposits in the Scandinavian Caledonides have been mined for Cu, Zn and pyrite. Although there is no current exploitation, exploration activities are ongoing, thus necessitating continued research addressing the genesis and post-genetic evolution of the deposits. Many deposits display features recognisable as due to ore remobilisation during regional Scandian metamorphism. External remobilisation of ore components is most evident in those deposits metamorphosed at amphibolite facies. Concentrations of sulphides as deformed veins, lenses or pockets on the cm- to dm-scales are emplaced in wallrock adjacent to massive ore and are typified by a complex Ag-Au-Sb-Ni-As-(Co) mineral association. Scales of remobilisation do not generally exceed 10 m. Although volumetrically small compared to massive ores, high Cu-grades and strong enrichment in precious metals make them an attractive target. Mineral assemblages and parageneses have generally crystallised late in the metamorphic evolution. However, structural and textural analysis suggests that they represent only the final stage of a continuing process of remobilisation initiated during prograde metamorphism, coinciding with metamorphic dewatering of adjacent alteration zones. Although, on the hand-specimen scale, remobilisation has produced attractive, high-grade ores, in which, for example, gold is relatively common, transport and redeposition have actually lowered bulk ore grades. In contrast to the negative contribution of external mobilisation to bulk deposit grades, small- to medium-scale internal remobilisation within massive deposits has led to substantial local enrichment in Cu, Au and Ag. Assessment of metal distribution patterns must address both preserved primary metal zonation patterns and the superimposed effects of syn-metamorphic remobilisation.