Metallogeny of the Precambrian West Troms Basement Complex, northern Norway

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The Neoarchaean to Palaeoproterozoic West Troms Basement Complex (WTBC), west of the Caledonian Nappes in northern Norway, is composed of TTG gneisses (2.9-2.6 Ga) intruded by mafic dyke swarms (2.4 Ga) and plutonic complexes (c. 1.8 Ga), and overlain by variously aged (2.8-1.9 Ga) greenstone belts (Bergh et al. 2010). The WTBC is thought to be a western continuation of the Fennoscandian shield (Bergh et al. 2012).

Whereas the Fennoscandian shield in Finland, Sweden and Russia is well endowed in both base and precious metal deposits, few economic deposits have been found in the WTBC. Limited historic mining (1860's) and exploration have mainly focused of base metals, but in the past 20 years interest has turned to gold exploration.

The WTBC has a complex architecture of metamorphic, igneous and supracrustal rocks subdivided into a series of segmented blocks, which were brought together during the Svecofennian and/or younger tectono-thermal events (c. 1.8-1.6 Ga). This has resulted in a complex metallogeny with known metal occurrences ranging from stratiform massive Fe-Cu sulphide deposits (assumed VMS and/or SEDEX) and several different precious metal type occurrences found within the 2.8(?) Ga Ringvassøya Greenstone Belt (RGB) (Zwaan 1989) and along the contact to the Neoarchean TTG gneisses, to Ni, Co, Cu ± PGE occurrences in layered mafic intrusions in the Hamm gabbro.

Despite recent advances in the geological knowledge of the region, both the syngenetic mineralisation processes and the hydrothermal alteration and remobilisation caused by the later Svecofennian deformation is still poorly understood.

The ongoing study of ore-bearing mineralisation in the WTBC includes further dating of the RGB, detailed mapping of mineralised zones, determination of relationships between the mineralisation, host rock assemblage and orogenic structures, and a wide spectrum of geochemical analyses, fluid inclusion data, etc. that should give an insight into ore-forming processes and P-T-X conditions responsible for mobilization and deposition of ore-bearing mineralisation.

References:

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