

## **RELATIONSHIP BETWEEN VHMS, EPITHERMAL AU, AND PORPHYRY STYLE MINERALIZATION IN THE PALAEOPROTEROZOIC SKELLEFTE VOLCANIC ARC, NORTHERN SWEDEN**

PÄR WEIHED, Centre for applied ore studies (CTMG), Luleå University of Technology, S-971 87 Luleå, Sweden The Skellefte district in northern Sweden is a 1.9 Ga old volcanic arc, consisting of rhyolitic to basaltic submarine lavas, subvolcanic intrusions and volcanogenic sediments. These rocks are coeval with larger tonalitic to granitic I-type intrusions.

The volcanic units host several major VHMS deposits, varying in size from less than 100 000 to over 20 million tonnes. Most of these ores are spatially associated with quartz-feldspar porphyritic subvolcanic domes and lavas, which were emplaced pre-, syn- and postore formation. The VMS deposits cover a spectrum from exhalative to subseafloor replacement ores and some show evidence of epithermal style of mineralization. Although most VMS deposits are emplaced in subaqueous environments some are interpreted to have formed in shallow water or even subaerial environments and have characteristics of epithermal Au style mineralization. The majority of these deposits are hosted by 1885-1880 Ma volcanic rocks.

In the coeval tonalites, low grade porphyry Cu-Au deposits are related to high level quartz-feldspar porphyritic tonalites and granodiorites which are intrusive into a more equigranular synvolcanic tonalitic batholith. The porphyry deposits have low grade and large tonnage (0.3% Cu and 50 Mt), with both stockwork and disseminated sulphides and a large widespread phyllic to propylitic alteration. The age of host rocks and porphyritic intrusions associated with these deposits is 1890-1880 Ma.

The spatial and temporal relationships suggest a possible genetic link between deeper magmatic hydrothermal porphyry style systems and shallow hydrothermal systems associated with VHMS and epithermal Au deposits.