

## The Palaeoproterozoic Vannareid VMS occurrence in the northern Fennoscandian Shield

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The Vannareid Cu-Zn occurrence is within the West Troms Basement Complex (WTBC) in Troms, northern Norway. WTBC is a collage of Archaean to Palaeoproterozoic crustal blocks made up of a wide range of plutonic and metamorphic. In the Vanna island, the complex includes various tonalitic to anorthositic and migmatitic gabbroic gneisses older than 2.8 Ga overlain by Archaean and Palaeoproterozoic meta-supracrustal rocks. A mafic dyke swarm dated at  $2403\pm 3$  Ma cut the tonalites and dioritic sill dated at  $2221\pm 3$  Ma cut the supracrustal rock gives the evidence for a Paleoproterozoic depositional age.

The Vannareid Cu-Zn occurrence was located by Store Norske Gull AS, and a reconnaissance drilling campaign was conducted in summer 2012 to test a Zn showing along a E-W trending fault zone. The zinc showing in a road cut was originally detected at Vannareid by Kåre Kullerud in 2008. The exploration campaign revealed almost one km long Cu-Zn mineralisation along a fault zone between tonalite gneisses and supracrustal rocks. The Cu-Zn mineralisation is hosted by quartz-carbonate-chlorite veins in tonalite gneisses, mafic sills and sericite schists. All rocks are deformed and metamorphosed at upper-greenschist to lower-amphibolite facies conditions.

Surface expression of the mineralisation is almost one km long Cu-Zn soil anomaly. In addition, quartz-chlorite breccia and vein system with sulphide dissemination is sub-cropping in the centre of the soil geochemical anomaly. IP survey detects the disseminated sulphides north of the fault and marine clays south of the fault. Reconnaissance drilling included six drill holes to test the soil geochemical anomaly. Drilling intersected a zone of quartz-carbonate-chlorite-sulphide alteration and veins in a package of sericite schists, mafic sills and tonalite. Under the strongest soil Cu anomaly, a stringer zone with the highest Cu/Zn ratio and silica-chlorite alteration was intersected.

The Cu-Zn occurrence discovered at Vannareid is new style of mineralisation in the area. The geological setting and current exploration results suggest that the mapped part of the Cu-Zn mineralization may be a stringer zone of a volcanic hosted massive sulphide (VMS) mineralization. The stringer zone shows higher Cu grades in the core with silica-chlorite alteration and higher Zn grades related to carbonate alteration at the flanks. Extensive mafic sills in and north of the stringer zone represent magmatic stage of the rifting. Consequently, the geological framework then represents favourable geological setting for a VMS system.