Precambrian iron-sulphide mineralization of NE Estonia

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The magnetic anomaly, representing magnetite bearing iron ore in Jõhvi area, North-East Estonia was discovered in early 1930. The Precambrian rocks are covered by 250-metre thick complex of Lower Paleozoic sedimentary rocks and Quaternary sediments. The ore body is represented by banded magnetite bearing quartzites that occur as bands, lenses and inter-beds in subvertical granulitic gneisses which are cut by granitic veins. In addition, sulphide minerals such as pyrite and pyrrhotite occur. Metamorphic conditions indicate temperature range of 650 to 750 C and calculated pressures of 4.3 to 5.6 kbar. The age of iron mineralization is unknown, however cutting granitic veins yield age of 1.80 Ga. In magnetite quartzite SiO₂ content ranges between 41 wt% to 50 wt%; Al₂O₃ ranges from 2.3 wt% to 12.7 wt% and total iron content ranges from 21.7 wt% to 45.2 wt%; P₂O₅ content can be as high as 0.36 wt%. Manganese content is very high ranging from 1.14 wt% to 6.8 wt% and is in good positive correlation with iron. This rock complex can be compared with that of the Bergslagen area in Sweden. The earlier estimates indicate the resource more than 1 billion tons of iron as calculated to the depth of 800 m. The Jõhvi deposit is a complex ore body of iron and sulphide minerals and need to be further investigated.