



Potential Field, Geoelectrical and Reflection Seismic Investigations for Massive Sulphide Exploration in the Skellefte Mining District, Northern Sweden

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Abstract

Multi-scale geophysical studies were conducted in the central Skellefte district (CSD) in order to delineate the geometry of the upper crust (down to maximum ~ 4.5 km depth) for prospecting volcanic massive sulphide (VMS) mineralization. These geophysical investigations include potential field, resistivity/induced polarization (IP), reflection seismic and magnetotelluric (MT) data which were collected between 2009 and 2010. The interpretations were divided in two scales: (i) shallow (~ 1.5 km) and (ii) deep (~ 4.5 km). Physical properties of the rocks, including density, magnetic susceptibility, resistivity and chargeability, were also used to improve interpretations. The study result delineates the geometry of the upper crust in the CSD and new models were suggested based on new and joint geophysical interpretation which can benefit VMS prospecting in the area. The result also indicates that a strongly

conductive zone detected by resistivity/IP data may have been missed using other geophysical data.

Key words: potential field data, seismic reflection, resistivity, induced polarization, magnetotelluric, 3D modeling.