



Lithological 3D grid model of the Vuonos area built by using geostatistical simulation honoring the 3D fault model and structural trends of the Outokumpu association rocks in Eastern Finland

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The Outokumpu mining district - a metallogenic province about 100 km long x 60 km wide - hosts a Palaeoproterozoic sulfide deposit characterized by an unusual lithological association. It is located in the North Karelia Schist Belt, which was thrust on the late Archaean gneissic-granitoid basement of the Karelian craton during the early stages of the Svecofennian Orogeny between 1.92 and 1.87 Ga (Koistinen 1981). Two major tectono-stratigraphic units can be distinguished, a lower, parautochthonous 'Lower Kaleva' unit and an upper, allochthonous 'upper Kaleva' unit or 'Outokumpu allochthon'. The latter consists of tightly-folded deep marine turbiditic mica schists and metagraywackes containing intercalations of black schist, and the Outokumpu assemblage, which comprises ca. 1950 Ma old, serpentinized peridotites surrounded by carbonate-calc-silicate ('skarn')-quartz rocks. The ore body is enclosed in the Outokumpu assemblage, which is thought to be part of a disrupted and incomplete ophiolite complex (Vuollo & Piirainen 1989) that can be traced to the Kainuu schist belt further north where the well-preserved Jormua ophiolite is exposed (Kontinen 1987, Peltonen & Kontinen 2004). Outokumpu can be divided into blocks divided by faults and shear zones (Saalman and Laine, 2014). The aim of this study was to make a 3D lithological model of a small part of the Outokumpu association rocks in the Vuonos area honoring the 3D fault model built by Saalman and Laine (2014). The Vuonos study area is also a part of the Outokumpu mining camp area (Aatos et al. 2013, 2014). Fault and shear structures were used in geostatistical gridding and simulation of the lithologies. Several possible realizations of the structural grids, conforming the main lithological trends were built. Accordingly, it was possible to build a 3D structural grid containing information of the distribution of the possible lithologies and an estimation of the associated uncertainties.

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