

The Reinfjord Ultramafic complex; Petrology and Geochemistry

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The Reinfjord Ultramafic Complex is part of the 5500 km² Seiland Igneous Province (SIP), in northern Norway. The Reinfjord magmas intruded between 560-570 (Roberts 2006) Ma and the complex could represent a deep-seated plumbing system of a large igneous province (Larsen et al. 2012). The Reinfjord ultramafic complex (15 km²) is one out of four major ultramafic complexes in SIP, and consists of three series of ultramafic cumulates that formed Websterite (LLS), Lherzolite-Wehrlite (ULS) and dunite (CS) that are either modally and cryptically layered. Central parts of the intrusion are composed of cryptically layered dunite (F₀₈₃₋₈₅), which contains one Ni-Cu reef with 0,38wt% Ni and 0,12wt% Cu and one Ni-Cu-PGE reef with 0,63ppm of total Pt+Pd+Au and 0,27wt% Ni.

The aim with this study is to understand the evolution of the dunite forming melts and to see if the cryptic variations leading to formation of a Ni-Cu reef may be linked to ore genesis. This will be done by analysing drill core and field samples with various geochemical analytic methods on whole rock samples and in situ studies of in olivine and pyroxene by SEM and EPMA. We also want to look at how the magma fractionate and the magma chamber processes leading to the formation of the cumulate sequence. The Reinfjord area is excellent due to extremely fresh surfaces and primary features being well preserved. To improve our understanding of the evolution of the intrusion, the entire area was re-mapped. Major revisions from previous work include a reinterpretation of a large part of the intrusion and fault zones. Contrary to previous studies we see that the CS is larger than previously mapped, the ULS is smaller and large portions are assimilated by CS. Also the NE marginal series does not exist. A significant result of our studies so far is that the Reinfjord complex is a wide open magmatic system supporting >10 replenishment events. Fieldwork also unravelled what may be the roof zone of the intrusion in north east at 900 m.a.s.l.

References:

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