Reinfjord drilling and mapping campaigns in 2012 –

geochemical observations, discussion on ore genesis and exploration implications

for

NORDIC MINING ASA

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1. Executive summary

The drilling programme was targeted to get geological information on the conductor suggested by the interpretations based on SkyTEM helicopter survey and ground-TEM measurements. Drilling was supported by concurrent drill hole TEM measurements and later by mapping and surface sampling campaign.

Drilling encountered two metal enriched sections, one enriched in base metals (BM), especially in nickel, and the other more enriched in Platinum-Group Elements (PGE). These mineralised sections are in *Reef* position, which was formerly unknown mineralisation type in the Reinfjord Intrusion. Following average metal concentrations are calculated for the two intersections:

Hole ID	From (m)	To (m)	Meters (m)	Nickel %	Copper %	Cobalt %	Gold g/t	Palladium g/t	Platinum g/t	PGE+Au g/t	Sulphur %
RF-1	86	93	7	0.38	0.12	0.02	0.03	0.03	0.03	0.09	0.61
RF-1*	107.75	117	9.25	0.27	0.06	0.02	0.07	0.20	0.15	0.42	0.58
*including	107.75	113	5.25	0.24	0.05	0.01	0.10	0.31	0.23	0.64	0.41

Following metal and mineral concentrations can be calculated from the sulphide specific assay results for the composition of the sulphide fraction:

Element concentrations	**BM section**	**PGE section**
	Average of 86-88 m and 91-93 m	Average of 107-113 m
Fe	42.9 wt.%	47.9 wt.%
Ni	14.7	11.7
Cu	7.1	4.5
Co	0.4	0.4
S	34.9	35.6
Au+Pd+Pt	6.9 ppm	50.6 ppm
Mineral compositions		
Pyrrhotite	35.5 wt.%	51.9 wt.%
Pentlandite	44.0	35.3
Chalcopyrite	20.5	12.9
Amount of sulphides in the rock		
	1.6 wt.%	1.2 wt.%

Calculated metal concentrations suggest good quality for composite sulphide concentrate in sulphide flotation, if that is assumed for concentration method. Ni and Cu concentrations in the sulphide fraction are also irrespective of the total amount of sulphides. This leads positive expectations as finding of more sulphides would consequently mean higher Ni and Cu concentrations in the same respect.

Surface sampling didn't reveal any PGE enrichments. This and the structural interpretation based on outcrop observations suggest that at least the PGE enriched section does not outcrop on the present erosion surface. Proposed genesis model (Fig. 12) calls for dissolution sulphides into an immiscible siliceous and volatile enriched melt phase passing through sulphide bearing Central Series magma followed by precipitation of metals as the upward rising melts encountered more impermeable roof of partially consolidated Layered Series. This suggests the bottom of the Layered Series to control the mineralisation and *further exploration to target this structural environment*. The stratigraphic level or site where Central Series magma reached sulphide saturation forms *another target for exploration*.

Comparison of the six-PGE patterns of the Reinfjord and Lokkarfjord PGE enrichments refer similar ore forming process for both deposits. This leads to following expectations in exploration:

- Reinfjord may have massive sulphide bodies similar to those found in Lokkarfjord.
- The Lokkarfjord mineralised field can be larger in its areal extent as known this far.

2. Drilling operation 2012

Nordic Mining (NOM) contracted Finland based OY KATI AB to perform core drilling at its Reinfjord prospect in northern Norway. The drilling was consulted and supervised at site by Markku Iljina also based in Finland. Drilling was executed by a rig customised by the drilling company transportable by a helicopter, which was used due to the remote location of the drilling site. Also the move between the holes was done by the helicopter.

Aim of the drilling was to get geological information on the geophysical conductors indicated by airborne geophysics made by SkyTEM and ground TEM measurements by Geovista AB. Nordic Mining was prepared to drill 500-1,000 meters into several drill holes. However, results of the first two drill holes suggested that the conductors were satisfyingly explained and a decision was made to wait the results of the chemical analyses before further exploration. This was supported by drill hole TEM measurements done in both holes as these measurements indicated no additional conductors in the vicinity of the holes. This survey was done by Astrock Oy and its daughter company Ageos Oy, both Finland based survey companies.

Technical information of drilling:

-Two drill holes, RF-1 and RF-2

-*Equipment:* NQ2, core Ø 50.7mm / hole Ø 75.7 mm

	RF-1	RF-2
Collar:	E 525667 (WGS84/zone 34) N 7777021	E 525449 N 7777166
Azimuth/dip:	305/85	325/80
Overburden:	0.00 m	2.00 m
EOH:	242.50 m	169.20 m
Start:	30.4.2012	5.5.2012
End:	3.5.2013	6.5.2012

No oriented samples were taken and no dip/azimuth deviation measurements were done. Drilling company delivered the core to the drill core storage of the Geological Survey of Finland (GTK) in Rovaniemi. At the time of signing this report the core is in GTK storage at Rovaniemi.

3. Core logging, sampling and chemical assays

The core logging was done by the signer of this report at the core storage and core logging facility of GTK in Rovaniemi. Logging concentrated visual identification of rock types and amount of sulphides. The contract included also reviewing of lithological rock names after receiving assay results of the core samples.

Sampling was done in several phases and the core of both drill holes were completely sampled the common sample length being 1-2 m. A ¼ core samples were taken, in the case of resampling, another ¼ core sample was taken. This results that there is at least ½ core left throughout the entire length of the holes. About 5 cm long samples were taken for thin sections by the signer and NTNU. Core cutting was done by GTK in Rovaniemi.

Assays were done by Finland based accredited laboratory Labtium. The principal assay methods were ICP-OES after Aqua Regia Digestion (Labtium code 510P) for base metals and IPC-OES after Pb-Fire Assay preconcentration for precious metals (codes 704P/705P). The principal mineralised sections were also analysed by sulphide specific method (code 240P, ICP-OES after Ammonium Citrate-H_2O_2 - leach). In order to study the petrology of the rocks a number samples were also subjected into XRF analyses (code 175X) complemented by carbon determinations (code 811L) and Loss on Ignition, LOI (code 813G). In addition, eight samples (six from Reinfjord and two from Lokkarfjord) were submitted to six-PGE (Os, Ir, Ru, Rh, Pt, and Pd) assays (code 714M, ICP-MS after NiS-Fire Assay). This six-PGE package included also gold.

GTK was further contracted to measure the petrophysical properties of the core; properties measured included density, susceptibility, remanence, and conductivity/resistivity determinations by galvanic method. These measurements were done in Rovaniemi and Espoo laboratories of GTK.

4. Mapping and bedrock sampling 2012

A field mapping and sampling operation was executed between 28.8.-2.9.2012 (full days on site) by NOM staff, the signer, and NTNU (Norwegian University of Science and Technology) students. Mapping and sampling efforts were concentrated in the area of interpreted electric conductor and drilling site. Samples collected by the signer were cut by GTK at Rovaniemi and send for whole-rock analyses to Labtium. Applied assay methods were XRF (code 175X) and Pb-Fire-Assay/ICP-OES (704P) complemented by carbon and LOI determinations (811L and 813G). Samples collected by the students were taken to NTNU.

5. Geology of the study area

Figure 1 depicts generalised geological map and stratigraphic units of the Reinfjord Intrusion. Figure 2

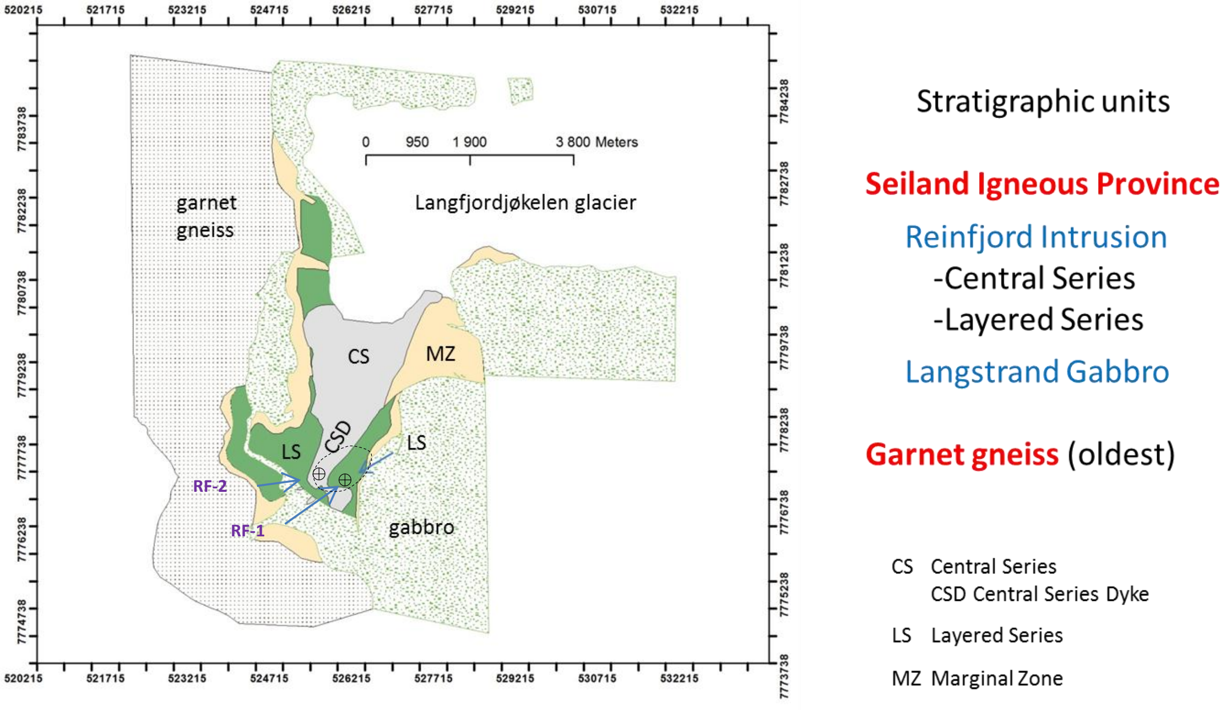


Fig. 1. Geological map of the Reinfjord ultramafic intrusion and the location of drill holes RF-1 and RF-2. Surface projection of flat lying conductor by dashed line. Modified by Nordic Mining based on several sources and own mapping data.

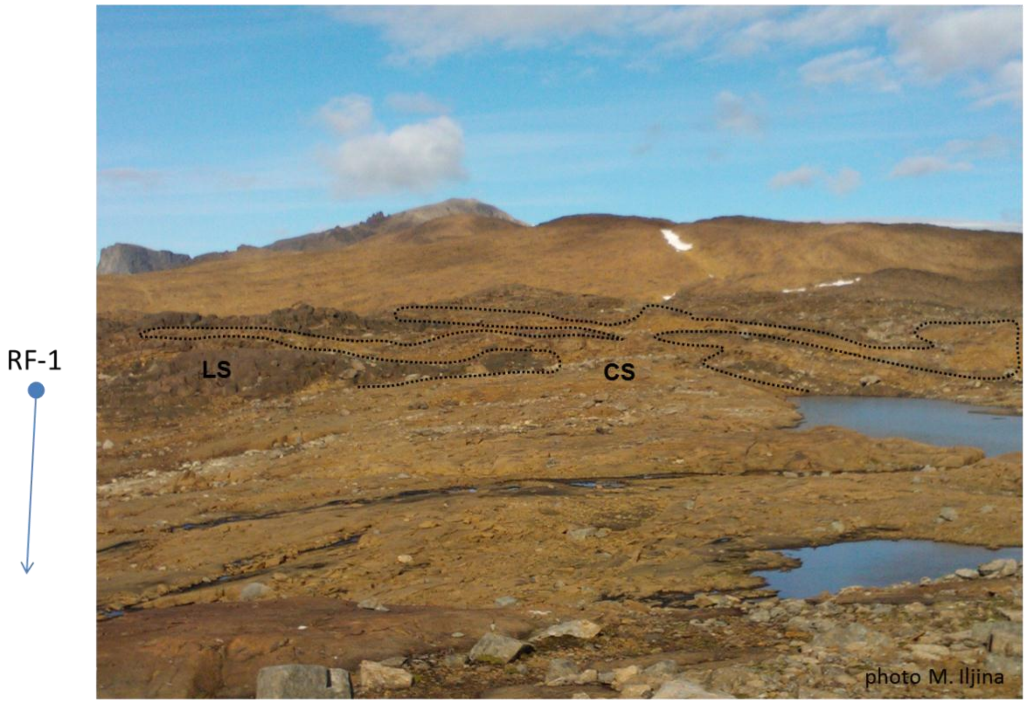


Fig. 2. Landscape photo showing Central Series (CS) dunite intruding Upper Layered Series (LS) cumulates. Approximate location of drill hole RF-1 also shown.

shows physical relationship between the Layered Series (LS) and slightly younger Central Series (CS) cumulates (stratigraphic names after Emblin 1985). Mineralogically CS rocks are almost exclusively pure olivine adcumulates, dunites, while LS contains increased amounts of clino- and orthopyroxenes often in intercumulus positions making rock meso-orthocumulate in texture. The LS cumulates are mainly olivine pyroxenites.

The principal observation is that CS intrudes LS and many (if not all) dunitic olivine cumulate 'layers' in LS Domain are related to infiltration of CS magma into LS, which obviously had only some residual interstitial liquid at the time of intrusion of CS magma.

6. Petrological observations

6.1. Theoretical background

PGE and base metal sulphide enrichments are basically found in two structural positions in the layered intrusions. One is *the Contact Type*, which is confined to intrusion margins. The Småvatna and Bonjikdalen deposits in the Reinfjord Intrusion represent this type (Iljina 2011). The other type is so called *Reef Type*, which occurs as laterally extensive layer-like enrichments within the layered sequence inside the intrusion body.

Interpretation of the structural position of the conductor as based on geophysical measurements and logging of drill core refers to *Reef* position of the mineralized body intersected by the hole RF-1. This type of metal enrichment was formerly unknown in the Reinfjord Intrusion.

In classic models the formation of reef type is generally understood to be part of the fractionational crystallisation taking place in the magma chamber or related to replenishments of new magma. Crystallisation Fe-Mg silicates from ultramafic/mafic magma leads at some point the residual magma to reach sulphide saturation and excess sulphur forms immiscible sulphide liquid. The sulphur content of the magma at the point, when the magma is no more capable to dissolve any more sulphur, is called Sulphur Content at Sulphide Saturation (**SCSS**, Fig. 3). SCSS has negative correlation with the pressure and high crystallisation depth (25 km, 7 kbar) of Reinfjord intrusion can be approximated to have lowered the SCSS by 200-300 ppm.

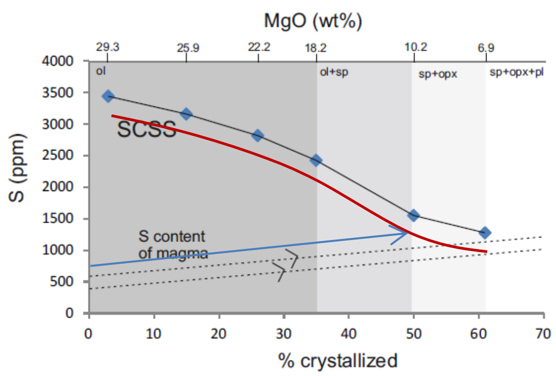


Fig. 3. Sulphur Content at Sulphide Saturation (SCSS) and sulphur content of residual magma as a function of crystallisation of model komatiitic magma. Upper curve with blue diamonds depicts surface conditions; lower red curve approximates SCSS at about 7 kbar. Arrowed black lines indicate the development of residual magma starting from 400 and 500 ppm of sulphur content corresponding to 50% partial melting of the mantle. Blue arrow indicates magma to reach SCSS earlier if external sulphur is added; more sulphur added, the earlier magma reaches SCSS. Calculations made for model komatiite based on equation of Li and Ripley (2009) and consulted by prof. W. Maier 2012 at Oulu University, Finland.

The immiscible sulphide liquid formed at the point when the silicate melt has reached SCSS is very effective in scavenging base metals like Cu and Ni and especially Platinum-Group Elements (PGE). Note that fractional crystallisation will further reduce SCSS and the system will stay at sulphur saturation and precipitate sulphides. The partitioning coefficients (D) of PGE are very strongly in favour of sulphide melt in the system of immiscible sulphide and silicate melts. This leads that the very first sulphides drain the silicate magma effectively from PGE and hence first sulphides are most PGE enriched. Ds of PGE are also about a hundred times higher than those of the base metals. This results in any later formed sulphides to have lower Cu/PGE ratio. This phenomenon has been successfully used in exploration of reef type PGE enrichments (Fig. 4).

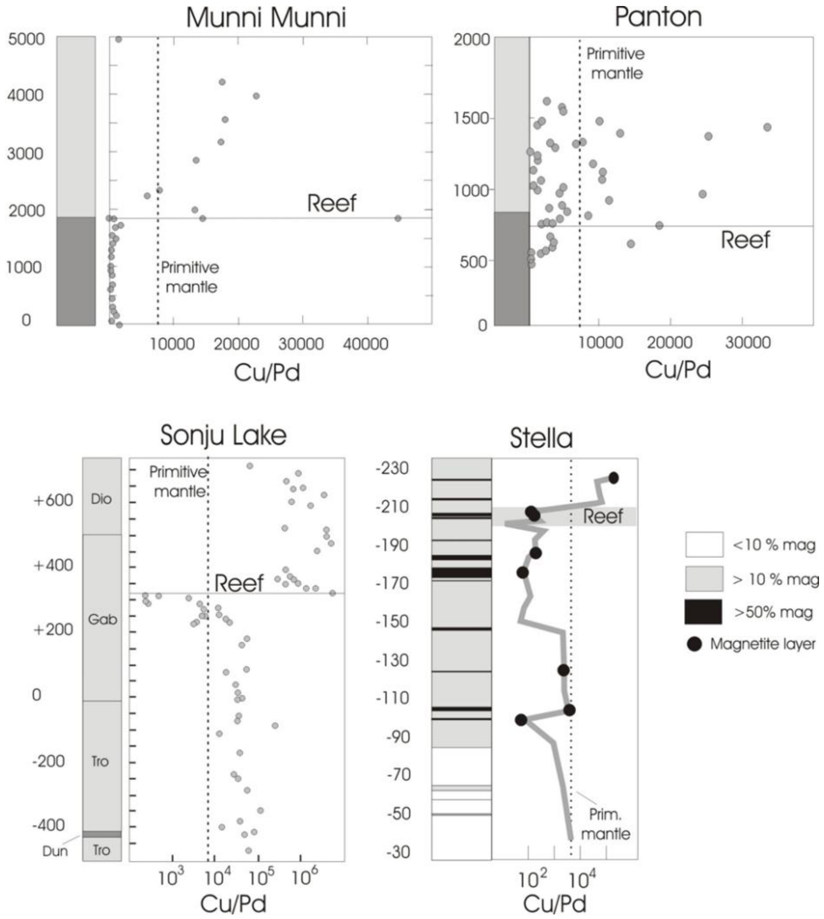


Fig. 4. Use of Cu/Pd ratio in locating PGE reefs in four different intrusions. From Maier 2005.

6.2. Reinfjord mineralogy

Layered and Central Series cumulates are in practise exclusively composed of three Fe-Mg silicates. These are olivine, clinopyroxene, and orthopyroxene. Chemical compositions of these minerals are presented in Table 1.

Table 1. Compositions of the three prevailing Fe-Mg silicates in Reinfjord Intrusion after Emblin 1985.

	MgO, wt.%	FeO	CaO	Al_2O_3	SiO_2	TiO_2	Ni, Cr, Mn,…	MgO:FeO
Olivine	44	15	0	0	40	0	1	2.9
Orthopyroxene	29	12	2	2	53	1	1	2.4
Clinopyroxene	17	4	23	3	51	1	1*	4.3

*clinopyroxene carries often 1-2 wt.% Cr only.

Whole-rock chemistry of the rocks is basically controlled by these three silicates. Key conclusions are:

- Amount of CaO is exclusively controlled by the modal amount of clinopyroxene in the rock.
- Both pyroxenes can account few percent of Al_2O_3 in the rock.
- Excess of 30 wt.% of MgO in whole-rock analyse presumes modal olivine.

6.3. Drill hole chemistry

Figures 5-6 depict variation of selected elements in drill holes RF-1 and RF-2. Figures show also approximated rock names based on whole-rock chemistry, core logs, and mineral chemistry.

depth	Na2O %	MgO %	Al2O3 %	SiO2 %	CaO %	TiO2 %	Fe2O3 %	S %	V %	Cr %	
3.20	0.39	21.00	2.81	47.60	15.36	0.730	8.17	0.140	0.015	0.406	Olivine pyroxenite (Layered Series)
12.55	0.32	23.80	2.17	47.1	14.01	0.510	8.40	0.090	0.0111	0.3826	
14.50	0.32	23.80	2.07	46.70	13.77	0.476	8.30	0.088	0.011	0.365	
16.60	0.06	38.20	0.42	38.00	2.75	0.098	14.60	0.470	<0.003	0.081	
24.75	0.28	27.60	2.03	44.80	10.99	0.520	9.94	0.192	0.010	0.299	
29.20	0.24	29.40	1.78	44.0	9.68	0.446	10.80	0.277	0.0096	0.2791	
31.90	0.09	38.40	0.67	39.7	3.30	0.168	14.00	0.169	0.0038	0.1492	Central Series: Fe-dunite
39.75	0.07	39.80	0.47	38.10	1.75	0.112	16.10	0.247	<0.003	0.092	
45.40	0.07	39.00	0.68	38.10	2.02	0.163	16.30	0.220	0.004	0.220	
52.00	0.05	40.90	0.39	38.00	1.43	0.088	15.20	0.221	<0.003	0.095	
58.00	0.05	39.40	0.52	37.50	1.70	0.119	16.60	0.426	0.004	0.222	
62.00	0.04	39.90	0.34	37.40	1.34	0.076	16.70	0.413	<0.003	0.148	
66.00	0.11	35.80	0.68	39.20	4.01	0.158	15.90	0.683	0.004	0.157	
72.00	0.10	37.20	0.70	38.80	3.34	0.171	15.40	0.427	0.005	0.290	
76.00	0.05	41.20	0.41	37.20	0.62	0.109	16.70	0.314	<0.003	0.157	
80.00	<0.0337	41.30	0.38	36.70	0.51	0.101	16.40	0.404	<0.003	0.218	
84.00	0.039	40.6	0.44	37.2	0.830	0.121	16.8	0.259	0.0035	0.235	
86.00	0.036	41.3	0.46	37.3	0.690	0.121	16.5	0.245	0.0034	0.252	
88.00	0.065	41.5	0.48	36.9	0.530	0.092	16.0	0.909	<0.003	0.156	
88.45	<0.0337	42.4	0.37	37.0	0.540	0.082	15.3	0.663	0.0032	0.182	Ni+Cu
89.13	0.173	40.0	1.21	37.4	1.230	0.210	15.3	0.809	0.0035	0.150	Ni+Cu
91.00	<0.0337	42.5	0.33	37.1	0.427	0.078	15.3	0.668	<0.003	0.175	Ni+Cu
93.00	0.070	42.4	0.57	37.4	0.460	0.110	14.6	0.281	<0.003	0.203	Ni+Cu
95.00	0.061	41.0	0.66	37.2	0.770	0.152	15.8	0.131	0.0038	0.232	
97.00	<0.0337	38.9	0.23	36.6	0.620	0.072	19.3	0.347	<0.003	0.032	
99.00	<0.0337	38.3	0.21	36.4	0.540	0.066	20.1	0.267	<0.003	0.025	
101.00	0.043	38.6	0.38	36.8	0.990	0.106	18.6	0.403	<0.003	0.049	
103.00	0.059	40.5	0.60	37.0	0.700	0.142	16.9	0.632	<0.003	0.129	
105.00	0.054	40.7	0.74	36.6	0.520	0.164	16.9	0.471	0.0042	0.259	
107.00	0.064	40.0	0.47	37.2	0.484	0.092	17.8	0.094	<0.003	0.052	
107.75	0.041	38.4	0.30	36.5	0.550	0.100	20.1	0.138	<0.003	0.031	pegmatite bearing interval
109.45	0.086	32.4	1.80	43.2	1.290	0.361	17.4	0.360	0.0082	0.127	pegmatite bearing interval
110.20	<0.0337	37.4	0.68	36.1	0.660	0.230	21.0	0.432	0.0058	0.271	pegmatite bearing interval
110.60	0.174	28.0	2.89	47.9	1.830	0.560	15.4	0.494	0.0118	0.180	PGE; Fe-dunite
111.00	0.042	36.5	0.85	36.1	0.730	0.308	21.2	0.477	0.0074	0.319	PGE
113.00	0.073	37.3	0.74	36.7	0.790	0.204	20.5	0.472	0.0040	0.152	PGE
115.00	0.055	38.5	0.66	35.9	0.530	0.186	19.9	0.465	0.0051	0.258	PGE
117.00	0.115	36.9	1.01	36.6	0.950	0.249	20.0	0.648	0.0058	0.230	
119.00	0.051	38.3	0.99	36.1	0.800	0.267	19.3	0.325	0.0073	0.455	
127.00	0.05	38.10	0.66	36.10	0.72	0.205	20.20	0.480	0.005	0.239	
135.00	0.05	42.00	0.48	37.40	0.54	0.121	15.50	0.502	<0.003	0.121	
142.10	0.049	40.9	0.48	36.8	0.750	0.117	14.4	0.024	0.0033	0.098	Dunite
147.00	<0.0337	40.0	0.40	35.3	0.660	0.076	12.9	0.025	<0.003	0.236	
150.30	0.04	40.10	0.39	36.0	0.82	0.090	13.10	0.032	<0.003	0.1939	
155.45	<0.0337	39.90	0.32	36.40	0.62	0.085	17.40	0.418	<0.003	0.125	
160.87	0.04	40.70	0.38	37.00	0.99	0.089	15.80	0.189	<0.003	0.188	
166.52	0.04	40.60	0.37	37.50	1.18	0.085	15.60	0.101	<0.003	0.134	
174.00	0.08	40.10	0.69	38.00	1.70	0.133	15.40	0.173	0.004	0.265	
180.13	<0.0337	42.00	0.35	37.10	0.52	0.076	16.00	0.166	<0.003	0.240	
186.26	<0.0337	42.80	0.47	37.60	0.68	0.083	14.70	0.234	0.003	0.330	
190.45	0.04	41.70	0.58	37.7	0.88	0.108	15.20	0.192	0.0039	0.3549	
197.00	0.06	42.30	0.57	38.10	1.11	0.148	14.30	0.135	0.004	0.242	
201.00	0.04	42.40	0.54	38.00	1.06	0.111	14.00	0.144	0.004	0.414	
207.00	<0.0337	42.30	0.45	37.50	0.84	0.078	14.80	0.325	0.003	0.320	
213.00	0.05	41.60	0.56	37.60	1.22	0.109	14.40	0.221	0.004	0.408	
217.92	0.05	40.50	0.44	37.6	1.09	0.112	16.20	0.322	<0.003	0.3164	
224.00	0.08	40.10	0.66	37.30	1.17	0.186	16.10	0.151	0.004	0.231	
230.00	0.04	41.10	0.39	37.40	0.98	0.084	15.90	0.159	<0.003	0.228	
238.00	0.05	41.40	0.44	37.60	1.09	0.091	15.00	0.165	<0.003	0.251	
242.50	0.05	41.10	0.35	38.4	1.46	0.079	14.90	0.129	<0.003	0.0820	

Fig. 5. Variation in whole-rock chemistry in the drill hole RF-1. Black horizontal lines indicate visually identified lithological boundaries. Dykes removed from the log. Vertical axis not in scale.

depth	Na2O %	MgO %	Al2O3 %	SiO2 %	K2O %	CaO %	TiO2 %	MnO %	Fe2O3 %	S %	Cl %	Sc %	V %	Cr %	Ni %	Cu %	Zn %	Sr %	Y %	Zr %
4.01	<0.0337	38.9	0.29	35.5	0.005	0.74	0.063	0.177	15.9	0.236	0.047	<0.002	<0.003	0.100	0.246	0.030	0.011	<0.001	<0.0007	<0.001
13.50	<0.0337	40.3	0.31	36.9	0.005	0.54	0.059	0.185	16.6	0.139	0.017	<0.002	<0.003	0.114	0.233	0.017	0.011	<0.001	<0.0007	<0.001
17.00	<0.0337	40.8	0.33	36.5	0.004	0.52	0.057	0.181	16.9	0.327	0.007	<0.002	<0.003	0.132	0.275	0.042	0.011	<0.001	<0.0007	<0.001
25.20	<0.0337	40.3	0.26	36.7	0.007	0.47	0.051	0.194	17.6	0.142	<0.006	<0.002	<0.003	0.094	0.211	0.017	0.012	<0.001	<0.0007	<0.001
30.75	<0.0337	40.6	0.52	36.3	0.015	0.52	0.082	0.184	16.7	0.128	<0.006	<0.002	0.003	0.397	0.191	0.018	0.011	<0.001	<0.0007	<0.001
36.00	0.036	40.5	0.32	37.4	0.007	0.86	0.063	0.185	16.9	0.171	<0.006	<0.002	<0.003	0.106	0.176	0.024	0.011	<0.001	<0.0007	<0.001
41.4	0.0420	39.3	0.59	36.2	0.010	0.74	0.121	0.1940	18.4	0.477	<0.006	<0.002	0.003	0.313	0.253	0.054	0.013	<0.001	<0.0007	<0.001
47.96	0.0410	39.2	0.55	36.4	0.010	1.08	0.090	0.1860	17.7	0.705	0.006	<0.002	0.0035	0.279	0.295	0.084	0.012	<0.001	<0.0007	<0.001
53.60	0.165	38.5	1.23	38.0	0.015	1.65	0.269	0.181	16.5	0.151	<0.006	<0.002	0.004	0.078	0.191	0.018	0.012	0.0025	<0.0007	<0.001
59.30	<0.0337	41.0	0.38	37.4	<0.003614	0.84	0.064	0.182	16.5	0.147	<0.006	<0.002	<0.003	0.166	0.216	0.019	0.011	<0.001	<0.0007	<0.001
65.38	0.037	41.0	0.38	37.7	0.016	0.89	0.059	0.178	16.3	0.087	<0.006	<0.002	<0.003	0.098	0.225	0.009	0.012	<0.001	<0.0007	<0.001
72.57	0.101	37.2	1.18	38.6	0.011	3.23	0.248	0.179	16.2	0.147	<0.006	<0.002	0.006	0.280	0.202	0.017	0.011	<0.001	<0.0007	<0.001
76.2	0.101	37.7	0.80	39.7	0.029	3.36	0.128	0.172	14.7	0.082	<0.006	<0.002	0.0034	0.147	0.194	0.011	0.010	0.0014	<0.0007	<0.001
80.00	0.159	36.1	1.11	39.6	0.006	4.13	0.172	0.172	14.7	0.155	<0.006	<0.002	0.005	0.264	0.182	0.025	0.011	0.0020	<0.0007	<0.001
88.00	0.076	38.2	0.84	37.3	<0.003614	2.27	0.157	0.174	16.2	0.503	<0.006	<0.002	0.005	0.539	0.284	0.078	0.011	<0.001	<0.0007	<0.001
91.20	0.302	34.0	2.31	38.5	0.016	3.86	0.500	0.164	14.8	0.345	0.022	<0.002	0.007	0.205	0.198	0.057	0.010	0.0056	<0.0007	0.0011
93.05	0.0440	36.5	0.67	35.1	<0.003614	1.61	0.142	0.1720	15.9	0.370	0.033	<0.002	0.0046	0.532	0.345	0.063	0.012	<0.001	<0.0007	<0.001
94.00	0.037	34.5	0.95	35.7	0.004	2.07	0.192	0.169	15.4	0.446	0.042	<0.002	0.005	0.438	0.364	0.058	0.010	0.0015	<0.0007	<0.001
96.00	0.047	34.8	0.72	34.8	0.004	2.20	0.127	0.168	15.0	0.355	0.038	<0.002	0.004	0.319	0.311	0.043	0.011	0.0028	<0.0007	<0.001
98.00	0.058	35.8	0.53	36.1	0.004	2.33	0.106	0.167	14.8	0.197	0.024	<0.002	<0.003	0.107	0.289	0.032	0.009	0.0017	<0.0007	<0.001
100.00	0.080	35.0	1.75	35.8	0.007	2.61	0.204	0.160	14.3	0.636	0.019	<0.002	0.004	0.099	0.342	0.080	0.009	0.0026	<0.0007	<0.001
102.50	0.0430	37.5	0.42	35.6	<0.003614	1.30	0.097	0.1740	15.7	0.230	0.021	<0.002	<0.003	0.096	0.291	0.032	0.009	<0.001	<0.0007	<0.001
104.00	0.069	37.7	0.61	35.2	0.004	1.06	0.081	0.176	15.9	0.730	0.019	<0.002	<0.003	0.072	0.348	0.050	0.010	<0.001	<0.0007	<0.001
108.00	<0.0337	39.7	0.22	35.6	<0.003614	0.61	0.049	0.177	16.3	0.410	0.014	<0.002	<0.003	0.075	0.314	0.065	0.011	<0.001	<0.0007	<0.001
110.80	<0.0337	40.2	0.25	36.4	<0.003614	0.59	0.057	0.1790	16.7	0.427	0.012	<0.002	<0.003	0.105	0.290	0.057	0.010	<0.001	<0.0007	<0.001
112.00	<0.0337	40.4	0.29	36.3	<0.003614	0.59	0.064	0.183	16.8	0.542	0.009	<0.002	<0.003	0.195	0.331	0.072	0.011	<0.001	<0.0007	<0.001
118.00	0.035	40.1	0.54	36.2	<0.003614	0.72	0.105	0.181	17.1	0.422	0.008	<0.002	<0.003	0.408	0.246	0.049	0.010	<0.001	<0.0007	<0.001
124.00	0.052	39.0	0.57	36.9	<0.003614	1.49	0.112	0.182	16.9	0.363	0.006	<0.002	0.003	0.212	0.195	0.045	0.011	<0.001	<0.0007	<0.001
130.00	0.117	34.7	0.80	39.4	<0.003614	4.64	0.164	0.168	15.1	0.392	0.006	<0.002	0.005	0.151	0.152	0.024	0.011	<0.001	<0.0007	<0.001
135.2	0.064	38.7	0.50	37.5	0.022	1.85	0.080	0.178	16.6	0.503	0.006	<0.002	<0.003	0.150	0.172	0.041	0.012	<0.001	<0.0007	<0.001
139.20	0.041	40.0	0.44	37.0	<0.003614	0.99	0.083	0.180	17.3	0.489	<0.006	<0.002	0.003	0.192	0.199	0.038	0.011	<0.001	<0.0007	<0.001
143.75	0.463	18.7	5.15	45.5	0.008	16.42	1.180	0.138	9.7	0.250	<0.006	0.004	0.023	0.229	0.065	0.022	0.006	0.0041	0.00	0.0042
144.78	0.328	24.7	3.71	43.1	0.009	11.90	0.840	0.151	11.8	0.367	<0.006	0.004	0.015	0.235	0.103	0.025	0.007	0.0023	<0.0007	0.0031
149.15	0.181	31.1	1.38	41.4	<0.003614	7.48	0.260	0.161	13.9	0.490	<0.006	<0.002	0.007	0.336	0.130	0.034	0.009	0.0014	<0.0007	<0.001
151.20	0.620	18.5	5.90	44.8	0.017	15.43	1.160	0.132	10.3	0.476	0.011	0.006	0.022	0.155	0.097	0.046	0.005	0.0072	<0.0007	0.0036
158.30	0.086	37.9	0.74	37.4	<0.003614	2.24	0.164	0.179	17.0	0.730	<0.006	<0.002	0.004	0.213	0.185	0.044	0.012	<0.001	<0.0007	0.0011
167.50	0.090	36.4	0.81	38.3	<0.003614	3.25	0.162	0.181	17.2	0.620	<0.006	<0.002	0.005	0.342	0.171	0.038	0.013	0.0010	<0.0007	<0.001

Dunite

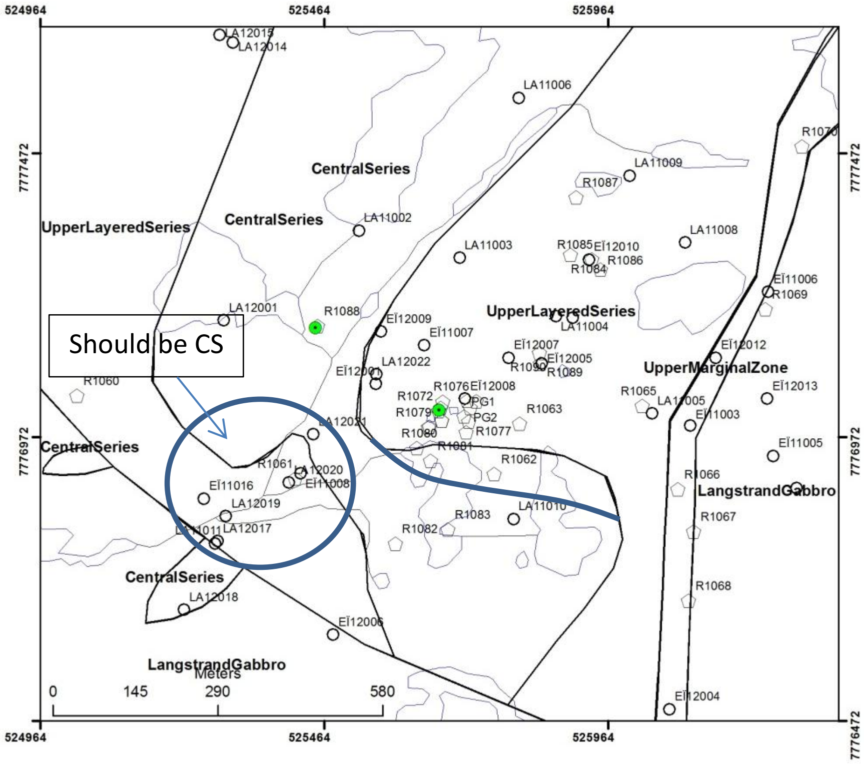
Fig. 6. Variation in whole-rock chemistry in the drill hole RF-2. Black horizontal lines indicate visually identified lithological boundaries. Lines in blue are fine-grained mafic rocks. Vertical axis not in scale.

Observations on drill hole whole-rock chemistry depicted in Figs 5 and 6:

- Visually located lithological boundaries are well identifiable in whole-rock chemistry in the hole RF-1.
- Visually logged rock type boundaries are less definable by whole-rock chemistry in the hole RF-2. Some elements show gradual increase or decrease within visually identified rock body referring fractionation in a cyclic unit.
- Rock in both drill holes are constantly sulphide bearing, especially the lower half of the hole RF-2.
- The additional iron in rock type named as "Fe-dunite" (RF-1) is most likely due to **spinel**, which is described to be present in Reinfjord Intrusion (Emblin 1985). Available mineral analyses refer to Mg and Cr bearing Fe-Al spinel, hercynite.
  Composition of spinel: Available spinel analyses refer to hercynite. However, whole-rock Cr concentrations over 0.4 wt.% and some intervals of elevated susceptibility refer also to the local presence of chromite and magnetite, respectively. This suggests composition of the spinel to vary in the space defined by hercynite-chromite-magnetite.

6.4. Chemistry of surface samples

Location of surface samples is presented in Fig. 7. Collection of chemical analyses is presented in Table 2.



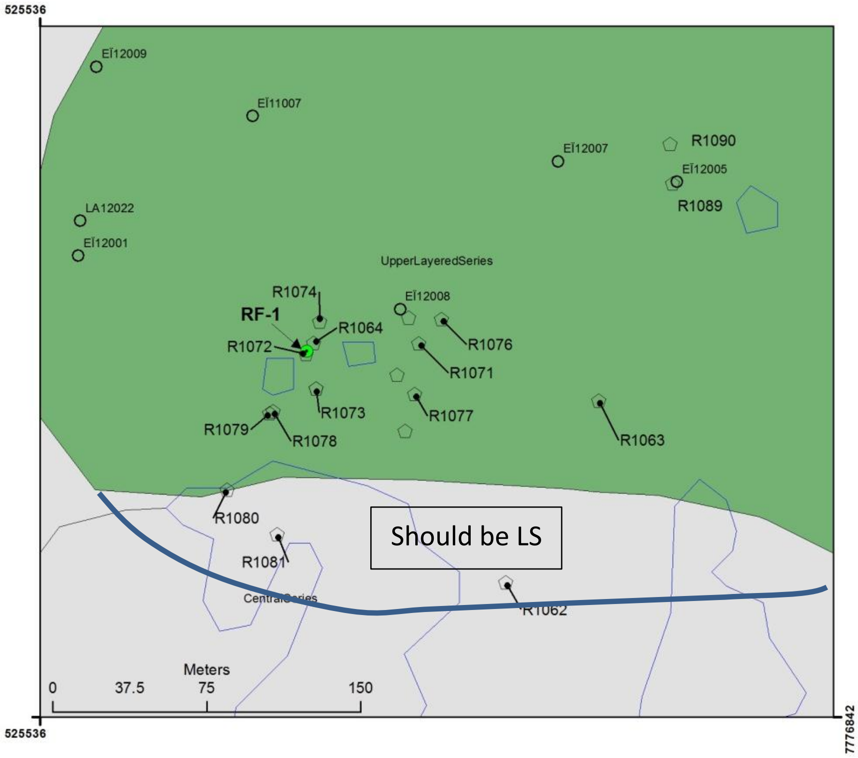


Fig. 7. Outcrop sample locations on geological map. Lakes and rivers shown. Suggested corrections for current geological map indicated.

Table 2. Chemical compositions of surface samples grouped lithologically.

	Na2O	MgO	Al2O3	SiO2	P2O5	K2O	CaO	TiO2	MnO	Fe2O3	S	V	Cr	Ni	Cu	Zn	Sr	Zr	Au	Pd	Pt	C	LOI
Pyroxene pegmatites	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	ppb	ppb	ppb	%	%
R1062	0.194	26.2	3.03	48.7	0.023	0.025	2.19	0.620	0.207	15.30	0.305	0.013	0.166	0.111	0.065	0.0106	<0.001	0.0015	32	18	29	0.07	0.36
R1063	0.165	25.7	3.18	47.9	0.017	0.019	2.73	0.800	0.211	15.40	0.321	0.014	0.257	0.112	0.040	0.0111	0.0013	0.0021	<10	<10	<10	0.06	0.16
R1064	0.103	28.1	2.76	49.1	<0.01375	0.010	1.81	0.500	0.225	14.90	0.110	0.011	0.206	0.066	0.012	0.0114	<0.001	0.0010	<10	<10	<10	0.11	<0.01
R1065	0.387	21.6	3.31	45.3	<0.01375	0.005	12.44	0.800	0.172	12.30	0.405	0.017	0.223	0.091	0.037	0.0078	0.0037	0.0024	<10	<10	<10	0.11	0.08
R1071	0.181	27.0	3.06	48.1	0.017	0.020	1.98	0.540	0.216	15.20	0.391	0.011	0.153	0.085	0.023	0.0119	0.0015	0.0012	<10	<10	<10	0.32	0.26
R1074	0.149	26.4	3.33	49.6	<0.01375	0.013	2.44	0.650	0.215	14.20	0.201	0.013	0.246	0.070	0.018	0.0112	0.0016	0.0015	<10	<10	<10	0.07	0.10
R1076	0.204	27.5	2.53	46.4	0.014	0.010	5.67	0.520	0.192	13.80	0.171	0.011	0.206	0.079	0.019	0.0096	0.0012	0.0016	<10	<10	<10	0.10	<0.01
R1077	0.101	31.2	1.94	44.5	0.015	0.011	2.23	0.372	0.216	16.90	0.192	0.008	0.152	0.102	0.016	0.0133	0.0011	0.0011	<10	<10	<10	<0.05	<0.01
R1084	0.313	22.5	3.07	43.0	0.016	0.011	11.01	0.710	0.131	10.30	0.310	0.013	0.288	0.115	0.028	0.0068	0.0031	0.0027	<10	<10	<10	0.12	5.67
R1087	0.570	16.6	5.56	46.7	<0.01375	0.011	16.40	1.130	0.144	9.33	0.210	0.022	0.196	0.041	0.016	0.0064	0.0069	0.0031	<10	<10	<10	0.21	0.77
R1089	0.176	27.5	2.50	44.6	0.014	0.011	4.11	0.520	0.207	16.00	0.768	0.011	0.207	0.161	0.075	0.0128	0.0013	0.0012	11	<10	14	0.10	0.35
R1090	0.500	21.1	3.75	45.9	0.031	0.019	12.90	0.820	0.158	11.10	0.316	0.015	0.235	0.092	0.039	0.0075	0.0064	0.0034	13	<10	<10	0.08	0.31
R1082	0.287	24.8	3.88	49.0	0.041	0.057	2.01	0.860	0.210	15.10	0.106	0.014	0.193	0.046	0.036	0.0098	0.0030	0.0027	<10	<10	<10	0.09	0.26
Cumulates in LS Domain																							
R1073 intruding CS vein	0.044	39.9	0.30	37.9	0.016	<0.003614	1.76	0.066	0.159	13.60	0.101	<0.003	0.068	0.167	0.030	0.0086	<0.001	<0.001	<10	<10	<10	0.12	3.85
R1079 intruding CS vein	<0.0337	39.9	0.24	36.9	<0.01375	<0.003614	0.86	0.065	0.187	16.40	0.098	<0.003	0.030	0.135	0.021	0.0130	<0.001	<0.001	<10	<10	<10	0.08	1.13
R1078 intrud. px-rich vein	0.185	31.9	1.47	41.4	0.014	0.004	6.47	0.321	0.178	14.50	0.150	0.007	0.153	0.094	0.012	0.0113	0.0023	<0.001	<10	<10	<10	0.09	0.27
R1075 LS cumulate	0.338	22.9	2.74	47.1	<0.01375	0.005	13.91	0.660	0.131	8.41	0.102	0.013	0.334	0.063	0.008	0.0047	0.0035	0.0018	<10	<10	<10	0.14	0.17
R1080	0.269	28.0	2.27	43.8	<0.01375	0.005	10.17	0.560	0.144	10.40	0.203	0.011	0.315	0.109	0.026	0.0063	0.0023	0.0018	<10	<10	<10	0.10	0.51
R1081	0.287	26.5	2.10	44.9	<0.01375	0.008	11.15	0.500	0.144	10.50	0.197	0.011	0.249	0.084	0.017	0.0068	0.0030	0.0013	<10	<10	<10	0.09	0.09
R1072	0.331	24.7	2.67	45.4	<0.01375	0.005	12.16	0.660	0.140	10.20	0.122	0.011	0.329	0.082	0.017	0.0084	0.0035	0.0023	<10	<10	<10	0.20	0.34
RF-1/2.30-3.20m	0.393	21.0	2.81	47.6	<0.01375	0.008	15.36	0.730	0.129	8.17	0.140	0.015	0.406	0.051	0.008	0.0057	0.0040	0.0019	<10	<10	<10	<0.05	0.09
RF-1/11.60-12.55m	0.316	23.8	2.17	47.1	<0.01375	0.006	14.01	0.510	0.128	8.40	0.090	0.011	0.383	0.066	0.016	0.0049	0.0036	0.0014					
Cumulates in CS Domain																							
R1083	0.154	36.4	1.16	36.6	0.015	0.009	0.70	0.115	0.204	20.10	0.813	<0.003	0.043	0.270	0.065	0.0141	0.0020	<0.001	21	30	27	0.07	<0.01
R1088	0.038	38.8	0.40	36.4	<0.01375	0.004	0.74	0.074	0.170	15.80	0.119	<0.003	0.155	0.201	0.020	0.0109	<0.001	<0.001	<10	<10	<10	0.08	4.11
R1061	0.060	39.9	0.58	37.1	<0.01375	0.006	0.89	0.150	0.178	17.30	0.790	0.004	0.317	0.221	0.076	0.0119	<0.001	0.0010	<10	<10	<10	0.10	0.09
EØ11008	0.120	40.8	1.30	37.3	0.030	0.020	0.82	0.390	0.220	17.50	0.030	0.009	0.152	0.155	0.002	0.0131	0.0014	0.0016	0	3	0	0.06	2.90
LA11011	0.070	35.1	0.23	39.2	0.060	0.020	4.02	0.080	0.180	17.20	1.000	0.000	0.144	0.263	0.081	0.0106	0.0003	0.0002	8	13	10	0.08	1.20
Black pyroxenite with rough surface																							
R1085	0.281	25.4	2.35	45.4	<0.01375	<0.003614	12.20	0.468	0.131	9.27	0.164	0.011	0.307	0.091	0.012	0.0060	0.0024	0.0014	<10	<10	<10	0.10	1.08
R1086	0.248	27.3	2.12	44.1	<0.01375	<0.003614	10.54	0.476	0.141	10.70	0.127	0.010	0.228	0.093	0.008	0.0072	0.0023	0.0014	<10	<10	<10	0.10	0.54
Marginal Zone																							
R1060	0.459	16.1	4.82	46.7	<0.01375	0.017	15.59	1.170	0.152	10.60	0.773	0.025	0.270	0.095	0.047	0.0059	0.0043	0.0029	<10	<10	<10	0.13	1.21
R1066	0.354	20.4	4.34	47.9	0.015	0.017	7.95	0.940	0.188	13.70	0.301	0.019	0.226	0.062	0.055	0.0086	0.0037	0.0026	<10	<10	<10	0.11	0.84
R1067	0.332	23.4	3.51	44.3	0.017	0.029	8.68	0.870	0.184	14.40	0.458	0.016	0.184	0.111	0.027	0.0099	0.0041	0.0026	<10	<10	<10	0.07	0.24
R1068	0.302	27.1	2.68	41.8	0.019	0.016	7.63	0.690	0.184	15.10	0.145	0.013	0.238	0.109	0.013	0.0117	0.0033	0.0020	<10	19	11	0.22	1.25
R1070	0.367	19.2	4.11	45.0	<0.01375	0.004	12.80	0.940	0.162	12.80	0.503	0.020	0.190	0.105	0.060	0.0069	0.0037	0.0024	<10	<10	<10	<0.05	0.96
Langstrand gabbro																							
R1069	0.680	21.2	6.48	44.4	<0.01375	0.022	11.68	0.740	0.155	12.00	0.188	0.015	0.123	0.047	0.010	0.0083	0.0120	0.0018	<10	<10	<10	0.15	0.26

Observations on the whole-rock chemistry of surface samples:

- Pyroxene pegmatites numerous in LS Domain form a heterogenous family as expected.
- Outcrop observations supported by the chemistry refer to need of review of the geological map in the places indicated in the Fig. 7.
- There is a clear chemical difference in LS and CS chemistry, especially in CaO and MgO.
- Samples R1073, R1078, and R1079 are dunites, which intrude LS. These dunite 'layers' infiltrate more calcareous pyroxenitic LS cumulates.
- Sample R1072 represents the collar spot of RF-1.
- Sample R1088 represents the collar spot of RF-2.
- Note the location of highly sulphide bearing samples R1061 and LA11011. These samples show low-CaO and high-MgO chemistry typical for CS and correspond cumulates especially in the lower half of the drill hole RF-2. These two samples represent rather large area of rusty outcrop surface. Considering the topography, modelled TEM conductor, and structural interpretation, the sulphurous dunite in the end (125-169 m) of RF-2 may have its surface exposure in the area of samples R1061 and LA11011.
- Surface samples are devoid of PGE despite of rather constant sulphide content.

6.5. Base and precious metal variations in drill holes

Drilling encountered two metal enriched intersections, one enriched in base metals, especially in nickel, and the other more enriched in Platinum-Group Elements (PGE). These mineralised sections are in *Reef* position, which was formerly unknown mineralisation type in Reinfjord Intrusion. Following average metal concentrations are calculated for the two intersections (Schanche *et al* 2012 and Iljina and Schanche 2012):

Hole ID	From (m)	To (m)	Meters (m)	Nickel %	Copper %	Cobalt %	Gold g/t	Palladium g/t	Platinum g/t	PGE+Au g/t	Sulphur %
RF-1	86	93	7	0.38	0.12	0.02	0.03	0.03	0.03	0.09	0.61
RF-1*	107.75	117	9.25	0.27	0.06	0.02	0.07	0.20	0.15	0.42	0.58
*including	107.75	113	5.25	0.24	0.05	0.01	0.10	0.31	0.23	0.64	0.41

Figures 8 and 9 show variations of base and precious metal concentrations in drill holes RF-1 and RF-2. Copper/precious metals ratios in the same drill holes are depicted in Appendix A.

To [m]	Ni	Cu	Co	S	Au	Pd	Pt	3PM
3.20	0.051	0.008		0.140	<10	<10	<10	
6.00	0.071	0.023	60.7	0.124	6	<5	<5	6
8.00	0.108	0.034	94.8	0.17	<5	<5	<5	
11.60	0.126	0.073	85.5	0.319	5	<5	<5	5
12.55	0.066	0.016		0.090	<10	<10	<10	
13.78	0.061	0.013	62.3	0.078	<5	<5	<5	
14.50	0.057	0.007		0.088	<10	<10	<10	
15.40	0.117	0.044	93.8	0.227	<5	<5	<5	
16.60	0.212	0.076		0.470	<10	13	<10	13
20.00	0.050	0.015	44.9	0.097	<5	<5	<5	
23.50	0.061	0.011	63.7	0.11	<5	<5	<5	
24.75	0.091	0.016		0.192	<10	<10	<10	
28.65	0.091	0.026	84.9	0.235	<5	<5	<5	
29.20	0.113	0.031		0.277	<10	<10	<10	
31.45	0.101	0.017	96.2	0.231	<5	<5	<5	
31.90	0.154	0.009		0.169	<10	<10	<10	
35.00	0.151	0.016	143	0.263	<5	<5	<5	
38.50	0.135	0.014	149	0.213	<5	<5	<5	
39.75	0.154	0.015		0.247	<10	<10	<10	
44.50	0.173	0.020	154	0.209	<5	<5	<5	
45.40	0.190	0.028		0.220	<10	<10	<10	
50.00	0.197	0.032	146	0.202	<5	9	7	16
52.00	0.194	0.020	151	0.166	<5	<5	<5	
54.00	0.223	0.031	151	0.3	7	5	8	21
56.00	0.223	0.035	149	0.337	26	<10	13	39
58.00	0.270	0.041		0.426	6	9	12	28
60.00	0.204	0.014	145	0.153	<5	7	7	14
62.00	0.297	0.032		0.413	8	9	15	32
64.00	0.239	0.041	153	0.388	11	9	16	37
66.00	0.301	0.066		0.683	11	<5	14	25
68.00	0.198	0.035	123	0.364	7	15	14	35
70.00	0.189	0.012	139		<5	6	<5	6
72.00	0.206	0.048	146	0.359	<5	<5	6	6
74.00	0.184	0.022	156	0.169	<5	6	7	13
76.00	0.192	0.029	156	0.215	<5	7	8	15
78.00	0.240	0.063	162	0.361	6	11	11	27
80.00	0.241	0.052	162	0.316	6	17	16	39
82.00	0.233	0.041	153	0.284	9	11	10	30
84.00	0.232	0.040	152	0.25	7	32	34	73
86.00	0.226	0.034	153	0.227	5	26	21	52
88.00	0.407	0.166	187	0.878	24	39	32	95
88.45	0.344	0.127	179	0.627	28	19	17	64
89.13	0.378	0.122	175	0.775	30	14	14	58
91.00	0.410	0.134	176	0.636	31	17	18	66
93.00	0.348	0.053	145	0.26	43	50	36	129
95.00	0.265	0.016	136	0.127	5	14	18	37
97.00	0.279	0.040	160	0.331	7	15	18	39
99.00	0.243	0.030	164	0.253	6	11	19	37
101.00	0.327	0.055	153	0.39	40	38	41	119
103.00	0.441	0.100	160	0.608	37	<10	26	63
105.00	0.386	0.068	155	0.452	64	215	166	445
107.00	0.242	0.009	145	0.089	<5	16	17	33
107.75	0.209	0.016	163	0.131	<5	8	10	18
109.45	0.162	0.041	106	0.345	22	297	271	590
110.20	0.269	0.036	165	0.425	213	730	419	1362
110.60	0.155	0.083	58.9	0.467	47	117	69	233
111.00	0.283	0.051	164	0.45	135	116	96	347
113.00	0.296	0.055	159	0.45	129	243	180	552
115.00	0.308	0.063	157	0.433	32	63	47	142
117.00	0.342	0.091	160	0.615	29	43	34	106
119.00	0.269	0.047	137	0.303	8	10	8	27
121.00	0.221	0.034	146	0.341	10	8	7	25
123.00	0.254	0.047	158	0.496	25	45	34	103
125.00	0.275	0.038	147	0.317	17	29	24	70
127.00	0.290	0.039	149	0.329	17	29	22	69
129.00	0.265	0.039	146	0.331	12	22	17	51
131.00	0.262	0.078	132	0.418	12	11	11	34
133.00	0.374	0.074	139	0.488	15	10	8	32
135.00	0.357	0.050	140	0.245	26	34	31	91
137.00	0.249	0.008	141	0.098	<5	<5	<5	
139.00	0.238	0.013	135	0.145	<5	<5	5	5
140.05	0.258	0.001	134	0.01	<5	18	19	38
142.10	0.261	0.002	130	0.021	<5	<5	<5	
142.80	0.230	0.007	122	0.128	<5	13	18	30
144.00	0.026	0.007	35.7	0.136	<5	<5	<5	
145.00	0.091	0.005	74.4	0.113	<5	<5	<5	
147.00	0.199	0.001	126	0.024	<5	<5	<5	
149.00	0.198	0.002	135	0.03	<5	<5	<5	
151.00	0.208	0.003	136	0.038	<5	<5	<5	
154.65	0.218	0.013	150	0.154	<5	<5	<5	
155.45	0.186	0.016		0.418	<10	<10	<10	
157.90	0.168	0.023	154	0.172	<5	<5	<5	
159.88	0.190	0.034	154	0.282	<5	5	<5	5
160.87	0.223	0.026		0.189	<10	<10	<10	
163.25	0.185	0.014	150	0.104	<5	<5	<5	
165.77	0.168	0.014	153	0.108	<5	<5	<5	
166.52	0.172	0.015		0.101	<10	<10	<10	
170.00	0.157	0.020	145	0.146	<5	<5	<5	
172.00	0.156	0.021	142	0.14	<5	<5	<5	
174.00	0.170	0.022	144	0.167	<5	<5	<5	
176.50	0.190	0.014	148	0.114	<5	<5	<5	
179.28	0.182	0.011	148	0.11	<10	<10	<10	
180.13	0.173	0.016		0.166	<10	<10	<10	
182.50	0.179	0.023	152	0.181	<10	<10	<10	
185.28	0.169	0.021	148	0.156	<5	<5	<5	
186.26	0.212	0.035		0.234	<10	<10	<10	
189.70	0.225	0.014	144	0.132	<5	7	<5	7
190.45	0.255	0.016		0.192	<10	12	<10	12
191.00	0.250	0.017	145	0.18	<5	8	5	13
193.00	0.142	0.015	92.9	0.224	<5	<5	<5	
195.00	0.268	0.011	135	0.144	<5	<5	5	5
197.00	0.250	0.009	131	0.119	<5	12	<5	12
199.00	0.282	0.020	141	0.177	14	13	6	33
201.00	0.266	0.014	134	0.129	18	28	11	57
203.00	0.321	0.026	142	0.266	25	8	6	39
205.00	0.260	0.018	138	0.152	<5	<5	<5	
207.00	0.330	0.027	145	0.297	9	8	8	24
209.00	0.240	0.011	135	0.096	8	<5	<5	8
211.00	0.266	0.017	138	0.139	6	5	<5	11
213.00	0.299	0.021	144	0.197	7	7	<5	14
215.00	0.284	0.022	145	0.206	16	9	<5	25
216.00	0.274	0.038	152	0.32	26	11	7	44
218.00	0.277	0.027	147	0.249	34	122	74	230
220.00	0.260	0.025	140	0.249	40	91	84	216
222.00	0.201	0.012	131	0.153	<5	7	7	14
224.00	0.199	0.014	136	0.136	<5	8	<5	8
226.00	0.202	0.010	143	0.112	<5	<5	<5	
228.00	0.198	0.012	141	0.137	<5	<5	<5	
230.00	0.199	0.012	140	0.145	<5	<5	7	7
232.00	0.229	0.017	142	0.191	<5	41	23	64
234.00	0.216	0.015	135	0.159	<5	31	25	56
236.00	0.191	0.011	130	0.133	<5	28	19	46
238.00	0.223	0.014	137	0.148	<5	54	34	88
240.00	0.204	0.012	131	0.103	<5	23	24	47
242.50	0.201	0.011	134	0.104	<5	20	22	42

Olivine pyroxenite

Layered Series

Central Series

Fe-dunite

Ni+Cu

86.00-93.00 m:
7.00 m @ 0.38 % Ni, 0.12 Cu,
0.03 ppm Au, 0.03 Pd, 0.03 Pt, 0.09 3PM

pegmatite bearing

PGE

107.75-113.00 m:
5.25 m @ 0.27 % Ni, 0.05 Cu,
0.10 ppm Au, 0.31 Pd, 0.23 Pt, 0.64 3PM

occacional plagioclase and blue quartz

Dunite

Fig. 8. Base and precious metal chemistry in the drill hole RF-1. Ni, Cu and S in wt.%; Co in ppm; Au, Pd, Pt and 3PM in ppb. 3PM=Au+Pd+Pt. Vertical axis not in scale.

Dunite

To [m]	Ni	Cu	Co	S	Au	Pd	Pt	3PM
4.01	0.247	0.038	151	0.252	<10	<10	<10	
5.24	0.246	0.030		0.236	<10	<10	<10	
8.05	0.203	0.019	140	0.156	<10	<10	<10	
9.50	0.221	0.025	147	0.186	<5	<5	<5	
11.50	0.231	0.029	151	0.219	<5	<5	7	7
13.50	0.277	0.047	160	0.353	7	<5	6	13
14.30	0.233	0.017		0.139	<10	<10	<10	
17.00	0.235	0.026	156	0.196	<10	<10	<10	
19.00	0.255	0.039	163	0.315	<5	8	7	15
21.00	0.314	0.071	173	0.588	24	<10	14	38
23.10	0.209	0.027	154	0.163	<5	<5	<5	
25.20	0.206	0.019	158	0.145	<10	<10	<10	
26.35	0.211	0.017		0.142	<10	<10	<10	
28.60	0.222	0.022	156	0.177	<5	<5	<5	
30.75	0.218	0.030	158	0.195	<10	<10	<10	
32.00	0.191	0.018		0.128	<10	<10	<10	
34.00	0.271	0.059	167	0.420	<10	<10	<10	
36.00	0.186	0.017	157	0.129	<5	<5	<5	
37.20	0.176	0.024		0.171	<10	<10	<10	
39.15	0.176	0.029	160	0.260	<5	<5	<5	
41.40	0.169	0.021	160	0.182	<10	<10	<10	
42.60	0.253	0.054		0.477	<10	<10	<10	
44.90	0.217	0.060	150	0.509	5	13	9	27
47.96	0.241	0.061	167	0.475	9	18	18	44
49.00	0.295	0.084		0.705	15	33	45	93
51.30	0.206	0.041	162	0.326	<5	6	<5	6
53.60	0.193	0.024	158	0.202	<5	7	<5	7
54.40	0.191	0.018		0.151	<10	<10	<10	
56.95	0.180	0.020	139	0.187	<5	<5	<5	
59.30	0.216	0.022	157	0.177	<10	<10	12	12
61.30	0.200	0.017	149	0.135	<5	12	10	21
63.20	0.213	0.009	147	0.089	<10	25	16	42
65.38	0.217	0.007	156	0.082	<10	18	17	35
66.66	0.225	0.009		0.087	<10	<10	19	19
69.70	0.174	0.015	133	0.158	<5	<5	<5	
72.57	0.179	0.020	132	0.173	<5	17	16	32
73.80	0.202	0.017		0.147	<10	17	16	33
76.20	0.201	0.011	141	0.112	<5	9	10	19
77.50	0.194	0.011		0.082	<10	<10	<10	
80.00	0.169	0.032	129	0.228	5	8	5	19
82.00	0.171	0.024	135	0.141	26	<10	12	38
84.00	0.198	0.034	146	0.214	10	17	13	41
86.00	0.254	0.074	145	0.518	17	11	17	45
88.00	0.265	0.082	148	0.563	22	<10	<10	22
90.00	0.259	0.077	147	0.482	8	<5	8	16
92.00	0.198	0.058	133	0.352	6	5	8	20
94.00	0.266	0.066	133	0.366	25	<10	<10	25
96.00	0.316	0.054	137	0.436	24	<10	<10	24
98.00	0.281	0.039	129	0.346	24	<10	<10	24
100.00	0.257	0.030	127	0.187	9	9	11	29
102.00	0.310	0.074	136	0.372	30	35	58	123
104.00	0.275	0.030	134	0.201	12	34	30	77
106.00	0.318	0.048	146	0.325	13	34	39	87
108.00	0.336	0.066	152	0.450	41	12	30	83
110.00	0.288	0.065	155	0.385	13	22	26	62
112.00	0.300	0.072	157	0.480	21	<10	11	32
114.00	0.286	0.063	159	0.453	21	<10	13	34
116.00	0.234	0.049	159	0.345	29	28	31	88
118.00	0.213	0.053	151	0.431	10	16	18	44
120.00	0.224	0.044	161	0.417	9	7	9	25
122.00	0.230	0.056	162	0.423	<5	10	8	18
124.00	0.213	0.052	159	0.440	<5	5	6	11
126.00	0.185	0.055	156	0.354	<5	6	8	13
128.00	0.272	0.090	172	0.751	10	10	12	32
130.00	0.202	0.059	145	0.488	7	10	10	27
132.00	0.145	0.022	134	0.391	<5	<5	<5	
134.00	0.171	0.041	139	0.471	<5	<5	5	5
135.20	0.166	0.044	162	0.515	<5	<5	<5	
136.70	0.172	0.041		0.503	<10	<10	<10	
139.20	0.220	0.052	179	0.660	<5	<5	<5	
139.83	0.199	0.038		0.489	<10	<10	<10	
141.75	0.196	0.048	178	0.638	<5	6	<5	6
143.75	0.105	0.031	122	0.437	<5	<5	<5	
146.00	0.068	0.028	57	0.343	5	8	7	19
148.20	0.084	0.048	49	0.504	6	6	7	19
150.50	0.122	0.038	116	0.528	<5	<5	<5	
152.30	0.083	0.045	62	0.497	<5	<5	7	7
154.30	0.153	0.042	148	0.599	<5	<5	<5	
156.30	0.152	0.036	138	0.639	<5	<5	<5	
158.30	0.171	0.038	169	0.638	7	<5	6	14
160.30	0.177	0.040	170	0.716	5	<5	<5	5
164.10	0.191	0.046	181	0.733	<5	<5	<5	
167.50	0.189	0.045	183	0.730	<5	<5	<5	
168.15	0.171	0.038		0.620	<10	<10	<10	
169.20	0.176	0.042	171	0.636	<5	<5	<5	

Fig. 9. Base and precious metal chemistry in the drill hole RF-2. Ni, Cu and S in wt.%; Co in ppm; Au, Pd, Pt and 3PM in ppb. 3PM=Au+Pd+Pt. Vertical axis not in scale.

Following conclusions can be drawn from base and precious metal variations in drill holes:

- Drill hole RF-1 intersects two distinct mineralised sections, one more precious metal enriched and another more base metal enriched locating about 20 m above the former.
- The PGE enriched sequence contains ultramafic pegmatite intercalations.
- PGE enriched section locates at the top of much thicker cumulate sequence containing occasional blue quartz and plagioclase.
- The rock type named as Fe-dunite (c. 30-140 m) in RF-1 is anomalous in PGE except the topmost 20 m.
- Base and especially precious metal levels are lower in the drill hole RF-2 than in RF-1.
- Anomalous base metal levels are found between 84 – 128 m in RF-2.
- The whole-rock sulphur concentrations are distinctly higher in RF-2. Lower half of the hole contains almost constantly S 0.4-0.7 wt.%.
- Cu/Pd and Cu/(Pd+Pt+Au) ratios vary between 10^3-10^4 without distinct abrupt shifts to higher or lower values (except few anomalous values), or any systematic change with increasing depth (App. A). An interval of elevated Cu/precious metal ratios and depleted PGE+Au is however located between 144-186 m of RF-1 i.e under the rock type named as Fe-dunite.

7. Composition of the sulphide fraction

Sixteen two-meter long samples were sent to sulphide specific analyses to Labtium (code 240P). This was necessary to do as the hosting ultramafic rock presumably contains considerable amount of nickel in silicates and in order to assess the metal concentration recoverable in sulphide flotation a sulphide specific digest was applied. Sulphide specific method gives metal concentration bound in sulphides amenable to recovery in sulphide flotation.

Definition of the terms:

Sulphidic metal content, M_{sp}	The amount of metal bound in sulphide minerals
Silicate metal content	The amount of metal bound in silicate minerals
Total metal/element content, M_{wr}	The amount of metal or other element in the rock
Metal/element concentration in the sulphide fraction, M_{sf}	The amount of metal or element in 100% sulphides (in present case the sulphide fraction is practically exclusively composed of S, Ni, and Cu)

Preliminary ore mineral study made in NTNU indicates principal sulphide minerals to be pyrrhotite, pentlandite, and chalcopyrite; this assemblage was also used as the basis for sulphide fraction calculations.

The composition of the sulphide fraction was calculated by calculating first the sulphur required to make pentlandite and chalcopyrite and then assigning the remaining sulphur to pyrrhotite[1]. Following mineral compositions were used:

	Fe, wt.%	Ni+Co	Cu	S
pyrrhotite	62.3			37.7
pentlandite	32.6	34.2		33.2
chalcopyrite	30.4		34.6	35.0

This method resulted in metal and mineral compositions of the sulphide fractions depicted in the Table 3.

[1] The amount of Co and 3PM were calculated using the mass fraction of sulphides. Received Co_{sf} was subtracted from that of Ni_{sf}.

Table 3. Metal, sulphur and mineral compositions of the sulphide fraction calculated separately for the base and precious metal enriched sections. For method see text.

Element concentrations in the rock		
	Average of 86-88 m and 91-93 m	Average of 107-113 m
Ni_{sp}	2390 ppm	1350
Cu_{sp}	1154	514
Co_{sp}	63	42
S_{wr}	5690	4113
Element concentrations in the sulphide fraction		
Fe_{sf}	42.9 wt.%	47.9 wt.%
Ni_{sf}	14.7	11.7
Cu_{sf}	7.1	4.5
Co_{sf}	0.4	0.4
S_{sf}	34.9	35.6
$(Au+Pd+Pt)_{sf}$	6.9 ppm	50.6 ppm
Mineral composition of the sulphide fraction		
Pyrrhotite	35.5 wt.%	51.9 wt.%
Pentlandite	44.0	35.3
Chalcopyrite	20.5	12.9
Amount of sulphides in the rock		
	1.6 wt.%	1.2 wt.%

Approximate compositions were also calculated for all samples and depicted in the Table 4. Nickel and copper concentrations in the sulphide fraction as a function of total amount of sulphides are shown in the Figure 10.

Table 4. Results of sulphide specific analyses and approximated metal concentrations in 100% sulphides (M_{sf}) based on assumption of 35 wt.% S in the sulphide fraction. Drill hole RF-1.

From	To	S_{wr}	Ni_{sp}	Cu_{sp}	Co_{sp}	$3PM_{wr}$	Ni_{sf}	Cu_{sf}	Co_{sf}	$3PM_{sf}$
m	m	ppm	ppm	ppm	ppm	ppb	wt.%	wt.%	wt.%	ppm
86.00	88.00	8780	3230	1750	92.6	95	12.9	7.0	0.4	3.8
91.00	93.00	2600	1550	557	32.6	129	20.9	7.5	0.4	17.3
107.00	109.00	3350	1000	428	33.5	329	10.4	4.5	0.4	34.3
109.00	111.00	4490	1410	520	44.4	873	11.0	4.1	0.3	68.1
111.00	113.00	4500	1640	594	48.8	552	12.8	4.6	0.4	42.9
113.00	115.00	4330	1720	698	47.3	142	13.9	5.6	0.4	11.5
115.00	117.00	6150	2240	961	63.4	106	12.7	5.5	0.4	6.0
117.00	119.00	3030	1230	507	33.5	27	14.2	5.9	0.4	3.1
119.00	121.00	3410	1180	386	42.6	25	12.1	4.0	0.4	2.6
121.00	123.00	4960	1550	527	56	103	10.9	3.7	0.4	7.3
123.00	125.00	3170	1280	409	36.6	70	14.1	4.5	0.4	7.7
125.00	127.00	3290	1400	438	38.8	69	14.9	4.7	0.4	7.3
127.00	129.00	3310	1260	402	37.8	51	13.3	4.3	0.4	5.4
129.00	131.00	4180	1430	815	40.5	34	12.0	6.8	0.3	2.9
131.00	133.00	4880	2230	779	46.5	32	16.0	5.6	0.3	2.3
133.00	135.00	2450	1480	519	30.1	91	21.1	7.4	0.4	13.0

3PM=Au+Pd+Pt

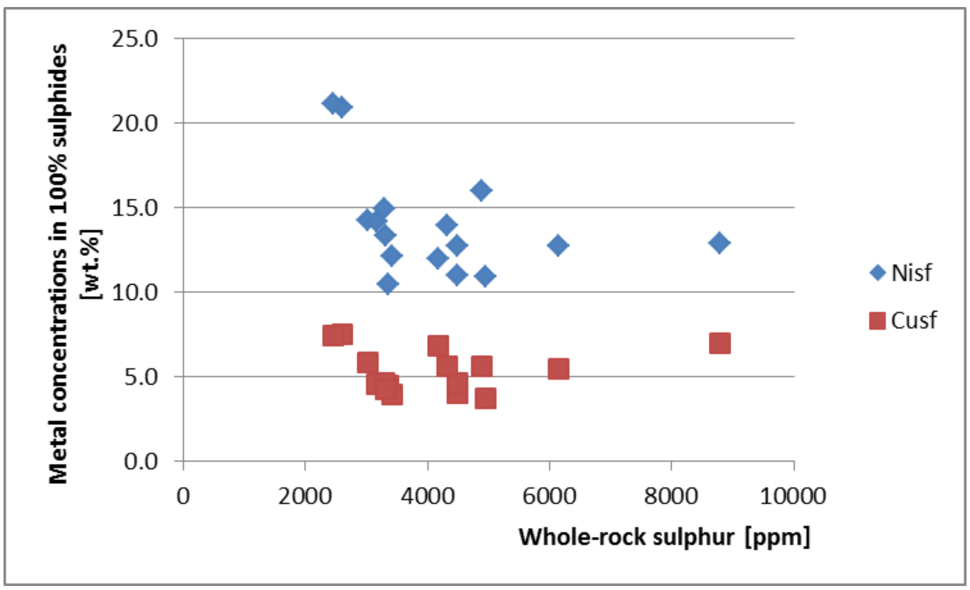


Fig. 10. Ni and Cu concentrations in 100% sulphides versus whole-rock sulphur.

Observations on the composition of the sulphide fraction:

- Expected Ni concentration in the concentrate after sulphide flotation is very good i.e. 12-15 wt.%.
- Expected PGE content of the sulphide concentrate of the PGE enriched section is acceptable 50 ppm.
- Cu_{sf} is rather constantly 4-6 wt.%.
- Ni and Cu concentrations in the sulphide fraction are irrespective of the total amount of sulphides. *This leads positive expectations as finding more sulphides would consequently mean higher Ni and Cu concentrations in the same respect.*

8. Chondrite normalised six-PGE patterns

Chondrite normalised six-PGE patterns are often used to describe the mineralising processes. The patterns are also used as a quantitative evidence of genetic link between mineralisation and they can be used in classification of mineralisation types within an intrusive complex or within a deposit. In order to study above objects six samples from Reinfjord together with two samples from Lokkarfjord were submitted to 6PGE-Au assays. Results of these assays are presented in the Table 5 and Fig. 11.

Table 5. Results of six-PGE assays, some metal ratios, and comparison with Merensky Reef (Naldrett and Cabri 1976) and JM-Reef (Barnes *et al.* 1985) data.

	Os	Ir	Ru	Rh	Pt	Pd	Au	Pd/Ir	(Pt+Pd)/ (Os+Ir+Ru)
	ppb	ppb	ppb	ppb	ppb	ppb	ppb		
RF-1/PGE Zone, 107.75-109.45 m	144	37.1	65.9	15.2	262	208	18.7	5.6	1.9
RF-1/PGE Zone, 109.45-110.20 m	56.5	14.9	20.3	6.29	393	512	227	34.4	9.9
Lokkarfjord, L1	84.8	37.6	64.7	34.7	187	1010	339	26.9	6.4
Lokkarfjord, L1003	61.7	18	19.9	27.1	187	483	59.8	26.8	6.7
RF-1/BM Zone, 86.00-88.00 m	21.8	3.49	5.52	1.33	25.5	20.1	19.3	5.8	1.5
RF-1/BM Zone, 89.13-91.00 m	12.8	2.48	3.92	1.16	19.5	16	17.6	6.5	1.8
RF-2/100.00-102.00 m	13	6.49	10.7	2.83	69.9	41.9	19.9	6.5	3.7
RF-2/104.00-106.00 m	12.3	4.92	9.85	1.98	38.2	28.6	13.1	5.8	2.5
Merensky Reef, South Africa	63	74	430	240	3740	1530	310	20.7	9.3
JM Reef, Stillwater Complex, USA	22	19	50	150	5000	17300	640	911	245

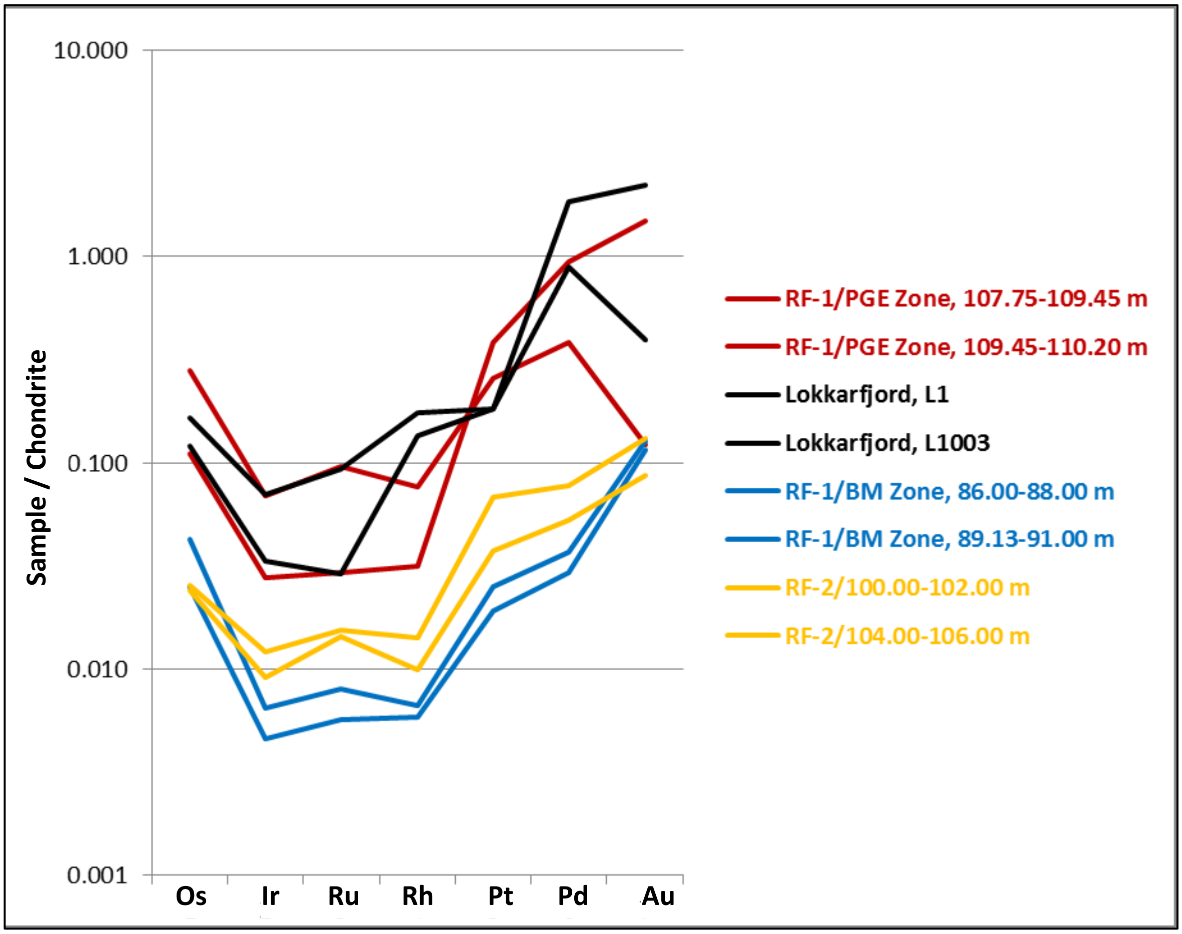


Fig. 11. Chondrite (C1, Naldrett 1981) normalised six-PGE-Au patterns.

Following observations can be made on the six-PGE assays and patterns:

- Pd/Ir and (Pt+Pd)/(Os+Ir+Ru) ratios are about equal or below those of the Merensky Reef, Bushveld Complex, RSA.
- Pd/Ir and (Pt+Pd)/(Os+Ir+Ru) ratios are significantly lower than those in the Stillwater Complex, USA.
- Six-PGE patterns are rather uniform in their shape.
- Patterns show W-shape in their left end (Os-->Pt).
- Patterns show rather low degree of fractionation.

In general low degree of fractionation is attributed to precipitation of Platinum-Group Minerals (PGM) from an immiscible sulphide liquid and not from fluids, which often strongly enrich Pd and Pt over other PGE. Strong relative Pd-Pt enrichment can also be a result of the fractionation of sulphide melt, which also tends to enrich copper over nickel (like also the precipitation of sulphides from the fluids). Reinfjord six-PGE ratios and patterns resemble PGE enrichments associated with some chromite and massive pyrrhotite deposits. Patterns together with high Ni/Cu ratio refer Reinfjord sulphides to represent the early pyrrhotite-pentlandite end of the crystallisation process of monosulphide solid-solution (mss).

9. Discussion on ore genesis

The base and precious metal enrichments intersected in the hole RF-1 have most likely a *Reef* position. Surface samples (Table 2) as well as core samples reveal all cumulates in the study area to carry reasonable amounts of sulphides. Especially noteworthy is the lower half of the drill hole RF-2. High Ni/Cu ratio and the six-PGE patterns refer sulphides to represent early pyrrhotite-pentlandite end of the fractionation of immiscible magmatic sulphide liquid. However, the PGE do have a poor correlation with the total amount of sulphides except the very position of the PGE enriched section. This overall sulphide richness and rather steady copper/precious metals ratio (Appendix A) suggest system to have been at sulphide saturation at the time of crystallisation. Also, system has reached sulphide saturation (SCSS) rather early in fractional crystallisation (in ol+sp field, Fig. 3); this recalls at least some addition of external sulphur into the magma (blue arrow in Fig. 3).

As discussed earlier in this report, the first sulphides that formed when magma reaches sulphide saturation, will scavenge most of the PGE from the magma and any later sulphides are lower in PGE. The position of the encountered reef is therefore in contrast to that model, which has shown to be applicable in many natural cases (Fig. 4). A more customised model is suggested below.

The PGE enriched section is characterised by occasional pegmatitic textures, blue quartz, and plagioclase. These characteristics refer to increased amounts of siliceous and volatile enriched material not being fully homogenised with the hosting ultramafic magma. It can be postulated that this melt extracted metals from CS magma and earlier sulphide enrichments locating in lower levels of the stratigraphy and transported metals to present site of deposition. Structurally the reef is locating underneath the Layered Series meso/orthocumulates, which due to this cementing texture may have acted as a less permeable barrier for the upward rising melts (Fig. 12). LS was also partially consolidated at the time of the intrusion of CS.

Sulphur isotope studies of pyrrhotite (provided by prof. Rune Larsen, NTNU) indicate an intermediate $\delta^{34}S$ value (+0.01) for the PGE reef in respect to BM reef (-4.17) and Langstrand gabbro (+2.19). The $\delta^{34}S$ value of PGE reef is also the same as the heavily contaminated Marginal Series (+0.02). These results are in line with the presence of more siliceous component in the PGE reef as this component possibly derived due to assimilation of Langstrand gabbro. This siliceous and volatile enriched melt phase passed through CS dissolving also some of the sulphides already present in the CS. This is supported by observation (RL/NTNU) of extensive replacement of sulphides by silicates in CS cumulates.

A selective leach of PGE from MZ sulphides may also have resulted in PGE deficiency and extraordinary high Cu/Pd ratio of the MZ as noted by Iljina 2011.

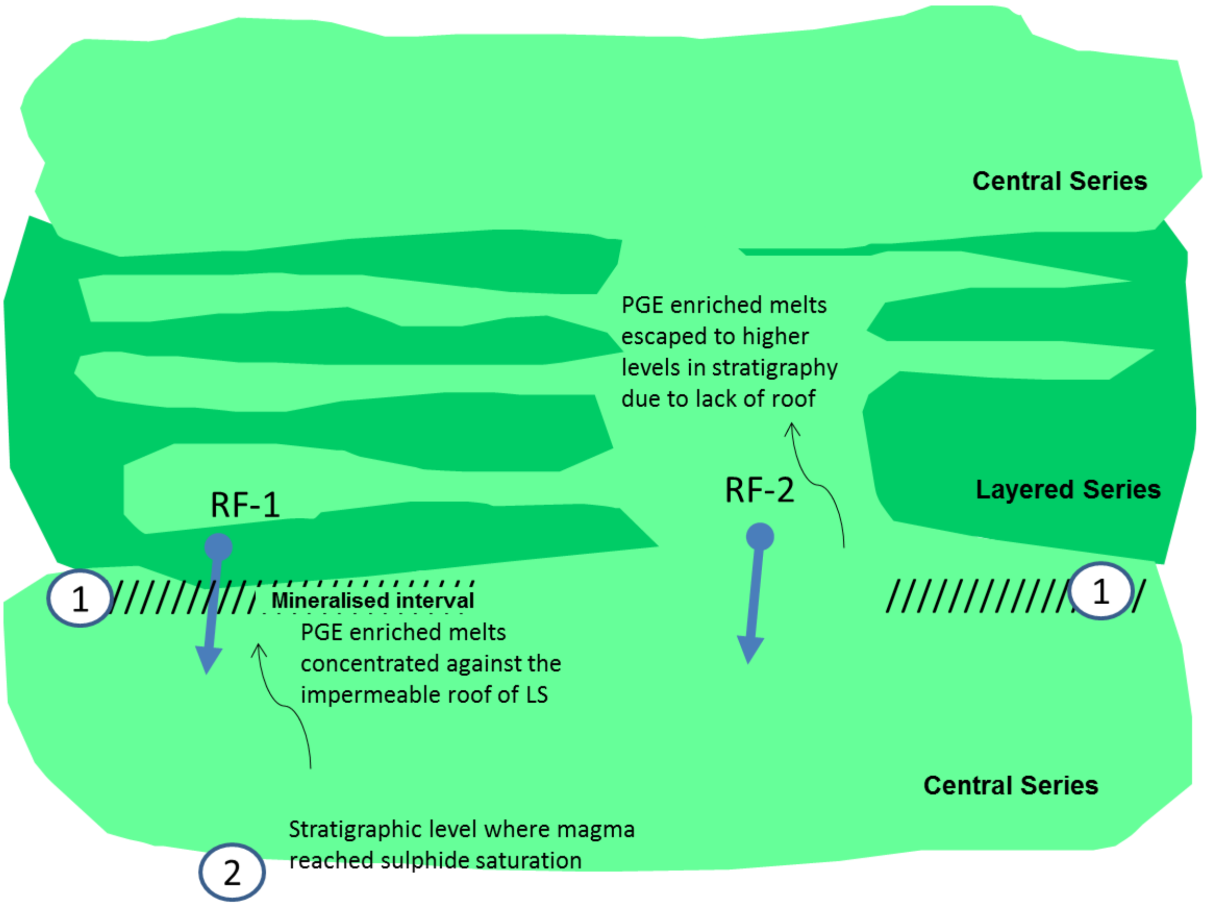


Fig. 12. Ore genesis model for the metal enrichments. Circled numbers 1 and 2 refer to suggested sites for further exploration:

- 1 Structural positions below of the Layered Series
- 2 The stratigraphic level or site where Central Series magma had reached sulphide saturation

9.1. Exploration outcome

Surface sampling didn't reveal any PGE enrichments. This and the structural interpretation based on outcrop observations suggest that at least the PGE enriched section does not outcrop on present erosion surface. Proposed genesis model (Fig. 12) calls for dissolution sulphides into an immiscible siliceous and volatile enriched melt phase passing through sulphide bearing Central Series magma followed by precipitation of metals as the upward rising melts encountered more impermeable roof of partially consolidated Layered Series. This suggests the bottom of the Layered Series to control the mineralisation and *further exploration to target this structural environment*. The stratigraphic level or site where Central Series magma had reached sulphide saturation forms *another target for exploration*.

Comparison of the six-PGE patterns of the Reinfjord and Lokkarfjord PGE enrichments refer similar concentrating process for both deposits. This leads to following expectations in the exploration:

- Reinfjord may have massive sulphide bodies similar to those found in Lokkarfjord.
- The Lokkarfjord mineralised field can be larger in areal extent as known this far.

10. References

Sarne, S.-J., Naldrett, A. Gorton, M. 1985. The origin of the fractionation of Platinum-Group Elements in terrestial magmas. Chem. Geol. 53, 303-323.

Iljina, M., 2011. Exploration report on Reinfjord, Lokkarfjord and Tappeluft Intrusions of the Seiland Igneous Province, Norway. In-house report for Nordic Mining.

Iljina, M. and Schanche, M., 2012. New nickel and PGE deposit types in Seiland Igneous Province, north Norway. Geochemistry and ore deposit models seminar. Program and abstracts. Publication of Finnish Association of Mining and Metallurgical Engineers, Serie B, No B94, pp 13-16.

Li, C. and Ripley, E.M., 2009. Sulfur Contents at Sulfide-Liquid or Anhydrite Saturation in Silicate Melts: Empirical Equations and Example Applications, Econ. Geol. 104, 405–412.

Maier, W.D., 2005. Platinum-group element (PGE) deposits and occurrences: mineralization styles, genetic concepts, and exploration criteria. Invited presidential review, Journal of African Earth Sciences, 41, 165-191.

Naldrett, A.J., 1981. Platinum-group element deposit. in Cabri, L.J., (ed.) Platinum-group elements: mineralogy, geology, recovery. Montreal. Canadian Institute of Mining and Metallurgy, 197-231. (CIM Spec. vol. 23).

Naldrett, A.J. and Cabri, L.J., 1976. Ultramafic and related mafic rocks: their classification and genesis with special reference to the concentration of nickel sulfides and Platinum-Group Elements. Econ. Geol. 71, 1131-1158.

Schanche, M., Iljina, M. and Larsen, R., 2012. New nickel, copper and platinum-group element discoveries in northern Norway. Mineralproduksjon 2 (2012), 91-99. Norsk Bergforening.

APPENDIX A

Whole-rock Cu/Pd and Cu/3PM ratios (following page) along drill holes RF-1 and RF-2. 3PM = Pd+Pt+Au.

RF-1

To [m]	Cu/Pd [10^3]
3.20	
6.00	
8.00	
11.60	
12.55	
13.78	
14.50	
15.40	
16.60	58.8
20.00	
23.50	
24.75	
28.65	
29.20	
31.45	
31.90	
35.00	
38.50	
39.75	
44.50	
45.40	
50.00	35.4
52.00	
54.00	59.4
56.00	
58.00	42.9
60.00	20.0
62.00	34.8
64.00	46.2
66.00	
68.00	24.1
70.00	20.9
72.00	
74.00	36.5
76.00	41.2
78.00	58.1
80.00	30.2
82.00	36.0
84.00	12.6
86.00	13.2
88.00	42.1
88.45	66.5
89.13	86.5
91.00	78.8
93.00	10.8
95.00	11.5
97.00	27.4
99.00	27.6
101.00	14.2
103.00	
105.00	3.2
107.00	5.4
107.75	19.0
109.45	1.4
110.20	0.5
110.60	7.1
111.00	4.4
113.00	2.3
115.00	10.0
117.00	21.3
119.00	46.5
121.00	44.8
123.00	10.7
125.00	13.3
127.00	13.4
129.00	17.4
131.00	69.6
133.00	77.9
135.00	14.9
137.00	
139.00	
140.05	0.8
142.10	
142.80	5.6
144.00	
145.00	
147.00	
149.00	
151.00	
154.65	
155.45	
157.90	
159.88	64.3
160.87	
163.25	
165.77	
166.52	
170.00	
172.00	
174.00	
176.50	
179.28	
180.13	
182.50	
185.28	
186.26	
189.70	18.7
190.45	13.7
191.00	21.1
193.00	
195.00	
197.00	7.8
199.00	15.6
201.00	4.9
203.00	32.1
205.00	
207.00	34.9
209.00	
211.00	32.1
213.00	30.9
215.00	24.1
216.00	33.7
218.00	2.2
220.00	2.8
222.00	16.7
224.00	17.8
226.00	
228.00	
230.00	
232.00	4.1
234.00	4.8
236.00	4.1
238.00	2.6
240.00	5.0
242.50	5.2

RF-2

To [m]	Cu/Pd [10^3]
4.01	
5.24	
8.05	
9.50	
11.50	
13.50	
14.30	
17.00	
19.00	48.5
21.00	
23.10	
25.20	
26.35	
28.60	
30.75	
32.00	
34.00	
36.00	
37.20	
39.15	
41.40	
42.60	
44.90	47.7
47.96	34.4
49.00	25.3
51.30	71.8
53.60	33.2
54.40	
56.95	
59.30	
61.30	15.0
63.20	3.6
65.38	4.1
66.66	
69.70	
72.57	11.9
73.80	
76.20	11.9
77.50	
80.00	38.5
82.00	
84.00	19.7
86.00	70.1
88.00	
90.00	
92.00	110.6
94.00	
96.00	
98.00	
100.00	33.3
102.00	21.1
104.00	8.7
106.00	13.9
108.00	53.9
110.00	29.0
112.00	
114.00	
116.00	17.8
118.00	32.5
120.00	58.3
122.00	58.4
124.00	102.6
126.00	99.1
128.00	92.3
130.00	59.3
132.00	
134.00	
135.20	
136.70	
139.20	
139.83	
141.75	85.4
143.75	
146.00	37.6
148.20	85.6
150.50	
152.30	
154.30	
156.30	
158.30	
160.30	
164.10	
167.50	
168.15	
169.20	

RF-1

To [m]	Cu/3PM
3.20	
6.00	3.66E+04
8.00	
11.60	1.43E+05
12.55	
13.78	
14.50	
15.40	
16.60	5.88E+04
20.00	
23.50	
24.75	
28.65	
29.20	
31.45	
31.90	
35.00	
38.50	
39.75	
44.50	
45.40	
50.00	2.04E+04
52.00	
54.00	1.50E+04
56.00	8.86E+03
58.00	1.47E+04
60.00	1.00E+04
62.00	1.02E+04
64.00	1.12E+04
66.00	2.69E+04
68.00	9.97E+03
70.00	2.09E+04
72.00	8.68E+04
74.00	1.76E+04
76.00	1.98E+04
78.00	2.30E+04
80.00	1.34E+04
82.00	1.34E+04
84.00	5.53E+03
86.00	6.52E+03
88.00	1.74E+04
88.45	1.98E+04
89.13	2.10E+04
91.00	2.04E+04
93.00	4.16E+03
95.00	4.31E+03
97.00	1.03E+04
99.00	8.27E+03
101.00	4.60E+03
103.00	1.58E+04
105.00	1.53E+03
107.00	2.67E+03
107.75	8.63E+03
109.45	7.00E+02
110.20	2.61E+02
110.60	3.57E+03
111.00	1.46E+03
113.00	1.00E+03
115.00	4.46E+03
117.00	8.54E+03
119.00	1.73E+04
121.00	1.37E+04
123.00	4.60E+03
125.00	5.49E+03
127.00	5.71E+03
129.00	7.54E+03
131.00	2.28E+04
133.00	2.29E+04
135.00	5.55E+03
137.00	
139.00	2.46E+04
140.05	3.85E+02
142.10	
142.80	2.34E+03
144.00	
145.00	
147.00	
149.00	
151.00	
154.65	
155.45	
157.90	
159.88	6.43E+04
160.87	
163.25	
165.77	
166.52	
170.00	
172.00	
174.00	
176.50	
179.28	
180.13	
182.50	
185.28	
186.26	
189.70	1.87E+04
190.45	1.37E+04
191.00	1.27E+04
193.00	
195.00	2.09E+04
197.00	7.77E+03
199.00	6.16E+03
201.00	2.43E+03
203.00	6.70E+03
205.00	
207.00	1.11E+04
209.00	1.35E+04
211.00	1.55E+04
213.00	1.50E+04
215.00	8.91E+03
216.00	8.64E+03
218.00	1.17E+03
220.00	1.17E+03
222.00	8.10E+03
224.00	1.78E+04
226.00	
228.00	
230.00	1.68E+04
232.00	2.61E+03
234.00	2.68E+03
236.00	2.44E+03
238.00	1.63E+03
240.00	2.50E+03
242.50	2.50E+03

RF-2

To [m]	Cu/3PM
4.01	
5.24	
8.05	
9.50	
11.50	4.17E+04
13.50	3.62E+04
14.30	
17.00	
19.00	2.56E+04
21.00	1.88E+04
23.10	
25.20	
26.35	
28.60	
30.75	
32.00	
34.00	
36.00	
37.20	
39.15	
41.40	
42.60	
44.90	2.25E+04
47.96	1.38E+04
49.00	9.04E+03
51.30	7.18E+04
53.60	3.32E+04
54.40	
56.95	
59.30	1.80E+04
61.30	8.08E+03
63.20	2.21E+03
65.38	2.15E+03
66.66	4.53E+03
69.70	
72.57	6.11E+03
73.80	5.18E+03
76.20	5.83E+03
77.50	
80.00	1.70E+04
82.00	6.36E+03
84.00	8.41E+03
86.00	1.66E+04
88.00	3.72E+04
90.00	4.85E+04
92.00	2.99E+04
94.00	2.69E+04
96.00	2.24E+04
98.00	1.67E+04
100.00	1.04E+04
102.00	6.02E+03
104.00	3.89E+03
106.00	5.53E+03
108.00	7.88E+03
110.00	1.06E+04
112.00	2.28E+04
114.00	1.87E+04
116.00	5.58E+03
118.00	1.21E+04
120.00	1.73E+04
122.00	3.13E+04
124.00	4.72E+04
126.00	4.11E+04
128.00	2.80E+04
130.00	2.18E+04
132.00	
134.00	8.12E+04
135.20	
136.70	
139.20	
139.83	
141.75	8.54E+04
143.75	
146.00	1.47E+04
148.20	2.49E+04
150.50	
152.30	6.48E+04
154.30	
156.30	
158.30	2.81E+04
160.30	7.87E+04
164.10	
167.50	
168.15	
169.20	