DANMARKS OG GRØNLANDS GEOLOGISKE UNDERSØGELSE RAPPORT 2013/57

Magmatic nickel potential in Greenland

Reporting the mineral ressource assessement workshop 27- 29 November 2012

Diogo Rosa, Bo Møller Stensgaard & Lars Lund Sørensen

GEOLOGICAL SURVEY OF DENMARK AND GREENLAND
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G E U S

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(1 CD-ROM included)

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GEUS

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Executive summary

Within the framework of the Global Mineral Resource Assessment Project, Greenlandic magmatic nickel resources were estimated down to a depth of 1 km (1.5 km for conduit-type). Three magmatic nickel deposit types, and respective grade/tonnage models, were considered. Seventeen permissive tracts were assessed for the komatiite-hosted deposits, three for contact-type deposits and twelve for deposits related to picritic and/or tholeiitic basalt dyke/sill complexes (classified as conduit-type deposits).

The statistical mean estimate number of undiscovered komatiite-hosted and conduit-type deposits are 4 for each type, with 0 expected undiscovered deposits of the contact-type. At a 50% probability, these are estimated to contain 1.9 million tons of Ni. The best potential for high grade / low tonnage deposits of the komatiite-hosted is located at Ikertoq, part of the Niaqornarssuit complex in West Greenland. The best potential for conduit-type deposits is related to the Norite Belt, East of Maniitsoq, in southern West Greenland, and to the flood basalts in the Disko Bay area.

While the assessment process is formalised into models and methodology in order to reduce bias, and make these results comparable with those obtained elsewhere, the estimated total should be used with caution and should be regarded as a statistical estimate that reflects the present level of knowledge and investigations that have been undertaken in the assessed tracts. New information, new discoveries, new investigations etc. within a tract should thus, whenever possible, be taken into account while evaluating an area, as this could either decrease or increase its estimated potential.

Introduction

Quantitative information on mineral resources availability and distribution is required among decision makers from governmental agencies and from the private mining sector. For this reason, the United States Geological Survey (USGS) in 2002 launched the 'Global Mineral Resource Assessment Project' (GMRAP), aimed primarily at identifying the main areas in the world with potential for undiscovered mineral resources, down to a depth of one kilometre.

The GMRAP makes use of available compiled information about geology, geochemistry, geophysics, and previous exploration results in the context of modern quantitative grade/tonnage statistical models. The GMRAP is being conducted on a regional-multinational basis for selected deposit models and commodities, and on a global scale, coordinated by the USGS, by compiling information from the regional assessments.

The Greenlandic Bureau of Minerals and Petroleum (BMP) and the Geological Survey of Denmark and Greenland (GEUS) participate in GMRAP. As result, workshops were held for the assessment of the copper, rare-earth element and sediment-hosted zinc potential in Greenland, in 2009, 2010 and 2011, respectively. Within the same framework, GEUS and BMP organised a workshop held in Copenhagen 27 - 29 November 2012, to assess the potential for undiscovered magmatic nickel deposits in Greenland. Nickel resources related to laterites, hydrothermal veins and in Ni-Zn-Mo-rich shales, were not part of the assessment.

It is expected that the results of this workshop, described in this report, will constitute a useful tool for the selection of areas for the exploration of nickel and can promote mineral exploration in Greenland.

Methods

The standardized methodology of the 'Three-Part Form' mineral resource assessment approach (Singer 1993, Singer & Menzie 2010) was followed, namely:

i) delineation of tracts of land where the geology is permissive for the formation of predefined types of magmatic nickel deposits;
ii) selection of appropriate grade/tonnage models for each tract; and
iii) estimation of the number of undiscovered magmatic nickel deposits in each tract consistent with the grade and tonnage model. The obtained number of deposits is combined with the grade and tonnage model to assess the total undiscovered nickel endowment.

Mineral deposit models/systems assessed

The types of nickel deposit model that were assessed were:

- Komatiite-hosted deposit
- Conduit-type deposit
- Contact-type deposit

In addition to the descriptive deposit models, associated mineralising systems were also described and discussed.

Each deposit model was associated with one or several key publications which were considered during the workshop, these are:

Komatiite-hosted deposit model:

- Barnes, S.J. 2006: Komatiites: Petrology, Volcanology, Metamorphism, and Geochemistry. Society of Economic Geologists, Special Publication 13, p. 13-49.
- Barnes, S.J. 2006: Komatiite-Hosted Nickel Sulfide Deposits: Geology, Geochemistry, and Genesis. Society of Economic Geologists Special Publication 13, 2006, p. 51-97.
- Barnes, S.J. & Fiorentini, M.L. 2012: Komatiite Magmas and Sulfide Nickel Deposits: A Comparison of Variably Endowed Archean Terranes. Economic Geology 107, p. 755-780.

Conduit-type deposit model:

- Schulz, K.J., Chandler, V.W., Nicholson, S.W., Piatak, Nadine, Seall, II, R.R., Woodruff, L.G. & Zientek, M.L. 2010: Magmatic sulfide-rich nickel-copper deposits related to picrite and (or) tholeiitic basalt dike-sill complexes - A preliminary deposit model. U.S. Geological Survey Open-File Report 2010–1179, 25 pp.
(Available at: http://pubs.usgs.gov/of/2010/1179/)

Contact-type deposit model:

- Zientek, M.L. 2012: Magmatic ore deposits in layered intrusions-Descriptive model for reef-type PGE and contact-type Cu-Ni-PGE deposits, U.S. Geological Survey Open-File Report 2012–1010, 48 pp.
(Available at: http://pubs.usgs.gov/of/2012/1010/)

Summaries of the descriptive deposit models and mineralising systems are presented in later sections.

Tract delineation

Tracts, with potential of hosting non-discovered magmatic nickel deposits were defined and delineated by an internal GEUS assessment group prior to the workshop. The tract proposals covered areas with geological settings found to be permissive to host komatiite-hosted deposits, contact-type deposits and/or deposits related to picritic and/or tholeiitic basalt dyke-sill complexes.

The general primary factors for the permissive tracts are:

- Komatiite-hosted deposit tracts are largely controlled by the distribution of Archaean and Palaeoproterozoic supracrustal (undifferentiated) sequences.
- Contact-type deposit tracts are associated with large layered mafic-ultramafic intrusions.
- Conduit-type deposit tracts are associated with large igneous provinces/activity. It was decided initially to focus on areas with an established direct-link to large igneous provinces, such as the Paleogene flood basalts of eastern and western Greenland. However, subsequently, other areas with a large number of smaller intrusions (dyke-sill-like complexes), characteristic of conduit-style deposits, were also considered at the workshop.

For the contact-type, a preliminary evaluation of the potential was made, considering size and geochemical character of the intrusions and the level of geological knowledge (included as Appendix D). Alhough the focus of this evaluation was for the contact-type deposits, it was also utilized when the conduit-type deposit were considered.

The assessment was carried out to a depth of 1 km beneath the present day surface for the komatiite- and contact-type tracts, while the assessment for the conduit-type were carried out to a depth of 1.5 km beneath the sea-level. The latter was done to take into account that several of the tracts in Greenland defined for the conduit-style nickel mineralisation had a thick present-day cover of flood-basalts that are cut by deep valleys.

In the course of the workshop, some of the tracts proposed by the internal GEUS assessment group, were modified according to the consensus view of the assessment panel team, and in some cases, additional tracts were added. All tracts were defined in a GIS environment and digitally accessible data relevant for the assessment was compiled.

Grade/tonnage models used

Grade/tonnage models were obtained through the compilation of published data from known deposits that are formed through the same genetic process and can be mined and processed using similar methods, considering careful aggregation procedures. The models are used as input to the estimation of undiscovered nickel endowment for the different tracts and deposits models.

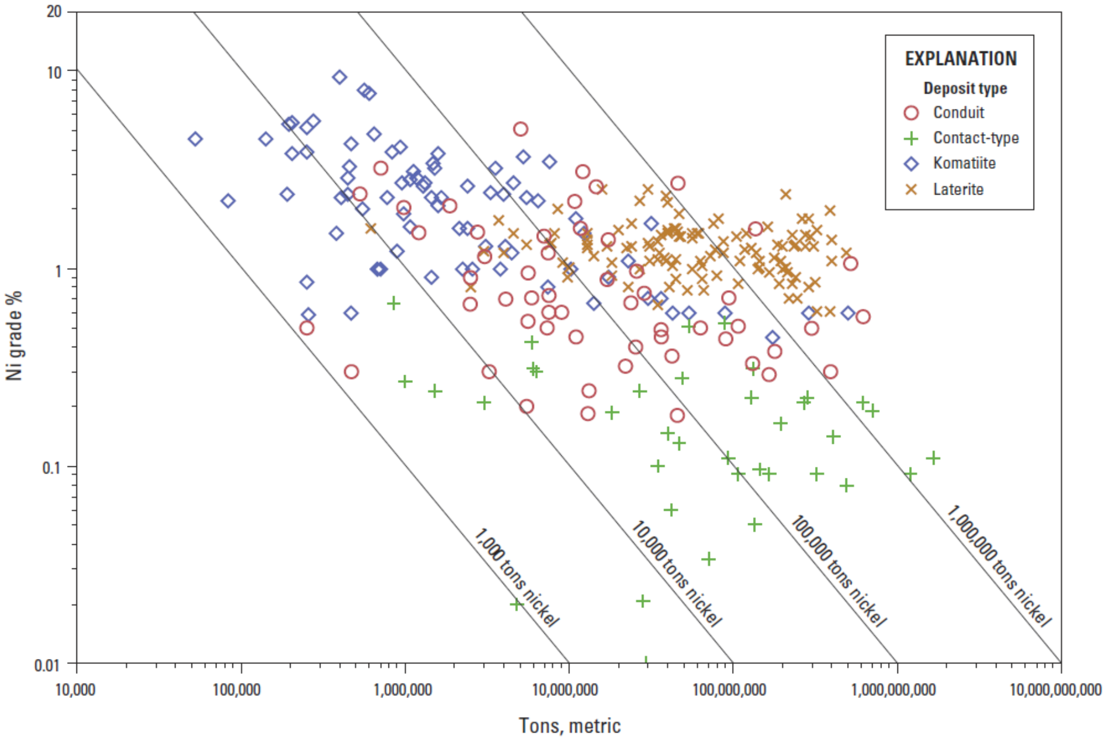
The used grade/tonnage models were kindly compiled and made available by Michael Zientek from the USGS. The models are partly based on published data compilations, partly on unpublished ongoing USGS data compilations.

As seen on Figure 1, grades/tonnage and total resource varies depending on the nickel deposit type. The three deposit types, komatiite-hosted, contact and conduit deposit types, show a trend from large tonnages and low grade (contact type) to smaller tonnage and high grade (komatiite-hosted type). Table 1 summarizes the mean tonnage and grade for the different deposit models. The data compilations are available in Appendix A and included on the CD-ROM accompanying this report.

Table 1. *Worldwide summary statistics for the mean tonnage and grade for the komatiite-hosted, conduit and contact nickel deposits. Based on data from Barnes (2006), Schulz et al. (2010) and Zientek (2012). Data extracted from presentation given by Zientek (2012) at the workshop.*

Deposit type means	Tonnage ore metric tons	Nickel grade per cent	Copper grade per cent	Number of deposits
Peridotite-subtype Komatiite	2.8	3.14	low	51
Dunitic-subtype Komatiite	148	0.69	low	7
Conduit-type	62	1.00	0.64	55
Contact-type	206	0.19	0.26	37

A.



B.

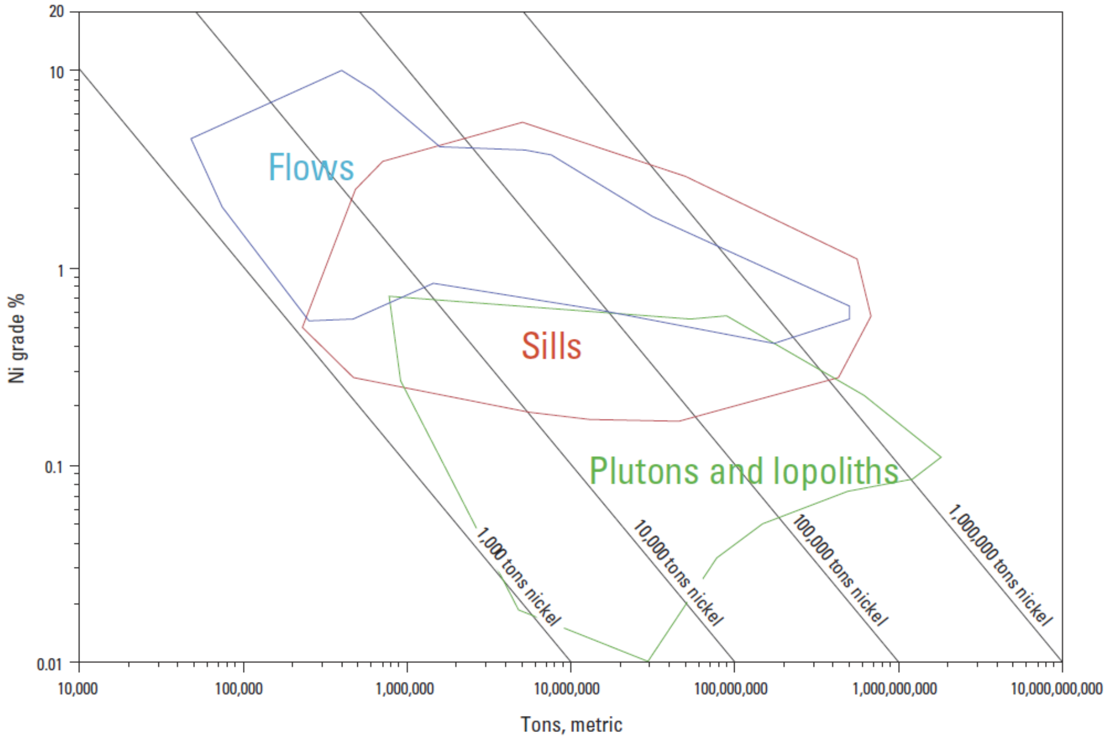


Figure 1. A.) *Grade and tonnage for the different mineral deposit types assessed. Data for the conduit, contact and komatiite deposit types can be found in Table 73.* **B**.) *Outline of the deposit types, here referred to as flows (komatiite mineral deposit type), sills (conduit mineral deposit type) and plutons and lopoliths (contact deposit type). Figure from workshop presentation by Zientek (2012) (see Appendix C).*

For the komatiite-hosted deposits, the grade/tonnage models data presented in Barnes (2006) were considered. The komatiite-hosted deposit type is subdivide into two subtypes; a peridotite-subtype ("komatiite") and a dunitic-subtype that represents different facies of a volcanic flow system, with the peridotite-subtype being distal and channelized flow while the dunite-type is proximal and sheet flow. The peridotite-type is smaller in tonnage but has higher grades, compared to the dunitic-type that contains larger tonnage of low-grade ore. The dunite-subtype only has seven examples meaning that the grade/tonnage model for this subtype is not as robust as the peridotite-subtype which has 51 examples. The grade/tonnage data that were used originates from Archaean deposits in Western Australia and by utilizing this model it is assumed that undiscovered deposits in Greenland will be similar as those in Western Australia. The statistics of the komatiite-hosted deposit models are shown in Table 2. The mean deposit of the peridotite-subtype is reported to be 2.8 Mt ore with 3.14% Ni, while the mean deposit for the dunite-related subtype, which only considers eight examples, is reported to be 148 Mt ore with 0.69% Ni.

Table 2. *Summary statistics for worldwide komatiite-hosted nickel deposits. Based on data from Barnes (2006). Data extracted from Zientek (2012) workshop presentation.*

Komatiite nickel deposit model	**Peridotite-subtype (komatiite)**		**Dunitic-subtype**	
	Tonnage ore Metric tons	Nickel grade %	Tonnage ore Metric tons	Nickel grade %
# of deposits	51	51	7	7
10th percentile	206,000	1.30	30,820,000	0.60
Median	1,186,000	2.70	53,500,000	0.60
Mean	2,821,843	3.14	148,342,857	0.69
90th percentile	5,590,000	5.41	396,500,000	0.65

For the deposits related to picritic and/or tholeiitic basalt dyke/sill complexes, a grade/tonnage model based on data from Schulz *et al.* (2010) was considered. Alternative names for the this deposit type include tholeiitic basal segregation type, gabbroid-associated layered intrusive type, mafic-ultramafic intrusion-hosted type, flood basalt-related type, and feeder/conduit type deposits. In addition, these deposits have also been named after giant deposits of that type, such as Noril'sk type or Voisey's Bay type. The statistics of the conduit-hosted deposit model is shown in Table 3. The mean deposit of this type, excluding Sudbury which is believed to be astroblem related (see review by Naldrett 2004), is described to be 62 Mt ore with 1.0% Ni.

Table 3. *Summary statistics for worldwide conduit-hosted nickel deposits. Based on data from Schulz et al. (2010). Data extracted from Zientek (2012) workshop presentation.*

Conduit nickel deposit model	Ton-nage ore Million metric tons	Nickel grade %	Copper grade %	Cobalt grade %	Plati-num grade g/t	Palla-dium grade g/t	Gold grade g/t	PGE grade g/t
# of deposits	55	54	52	21	13	12	5	24
10 percen-tile	1.1	0.3	0.15	0.014	0.05	0.039	0.020	0.033
25 percen-tile	5.5	0.43	0.24	0.021	0.20	0.120	0.045	0.110
50 percen-tile	13.0	0.67	0.46	0.031	0.23	0.280	0.087	0.420
75 percen-tile	46.0	1.4	0.77	0.100	0.41	0.680	0.160	0.890
Mean	62	1	0.64	0.063	0.34	0.380	0.100	0.600
90 percen-tile	170.0	2.5	1.4	0.190	1.00	0.920	0.200	1.600

For the contact–type deposits, also known as layered intrusion-related deposits, the grade/tonnage model of Zientek (2012) was used. The statistics of the contact-hosted deposit model is shown in Table 4. The mean deposit of this type is reported to be 206 Mt with 0.19% Ni.

Table 4. *Summary statistics for worldwide contact-hosted nickel deposits. Based on data from Schulz et al. (2010). Data extracted from Zientek (2012) workshop presentation.*

Contact nickel deposit model	Tonnage ore Metric tons	Nickel grade %	Copper grade %	Platinum grade g/t	Palladium grade g/t	Gold grade g/t
# of deposits	37	37	37	33	33	26
Minimum	850,000	0.01	0.03	0.0032	0.0087	0.0080
25 percen-tile	22,564,000	0.09	0.13	0.1234	0.2832	0.0529
Median	70,200,000	0.16	0.25	0.2450	0.6200	0.0846
Mean	206,497,877	0.19	0.26	0.3212	0.6825	0.1019
75 percen-tile	232,602,000	0.26	0.33	0.3746	0.9346	0.1539
Maximum	1,667,914,500	0.67	0.88	1.4400	2.0250	0.2160

Assessment panel

At the workshop, the estimation of the number of undiscovered deposits within each tract was done by an assessment panel that included nineteen geologists from the USGS, GEUS, BMP, University of Aarhus and exploration companies, each of whom have knowledge on aspects of Greenlandic geology and/or expertise in magmatic nickel deposits. The following persons were part of the assessment panel:

- Bjørn Thomassen, Avannaa Resources (Special invitation)
- Bo Møller Stensgaard, GEUS
- Christian Tegner, Aarhus University
- Claus Østergaard, 21st North
- Denis Schlatter, Helvetica Exploration Services GmbH
- Diogo Rosa, GEUS
- Frank Santaguida, First Quantum Minerals
- Henrik Stendal, BMP
- Jochen Kolb, GEUS
- John Pattison, North American Nickel
- Johen Pedersen, private Consultant
- Marco Fiorentini, CET – University of Western Australia
- Michael Zientek, USGS
- Ole Christiansen, NunaMinerals A/S
- Per Kalvig, GEUS
- Stefan Bernstein, Avannaa Resources
- Søren Lund Jensen, Scandinavian Highlands
- Thomas Kokfelt, GEUS
- Troels Nielsen, GEUS

Key literature

Key literature on the deposit models covered by this assessment and on the assessment procedure, as well as the initial tract proposals, was forwarded to the team members prior to the workshop. The full bibliography is available in Appendix B.

Workshop presentations

At the workshop, presentations on the assessment procedure, deposit models and regional geology were given by selected speakers. This constituted an opportunity to review the important facts, before providing individual estimates. The presentations of this review are listed in Appendix C and included as PDF files on the CD-ROM accompanying this report.

Process at the Workshop

The first day of the workshop was used to present and discuss the mineral deposit types and mineralising systems that were chosen to be assessed. This was done to ensure that the assessment panel had a common understanding of the premises for the evaluation procedures and to identify key criterias. After that the assessment panel assessed the deposit models one at a time. Each assessment was started with presentations of the tract distribution, the regional geological settings that were relevant for the tracts and the known nickel mineralisation/exploration history within the tracts.

Following the pertinent presentations and discussions of the information/data available, the tract outline was discussed and the outline was then, based on a decision of the assessment panel, either kept or changed.

Each of the panel members was subsequently asked to provide independent estimates on how many deposits of median size and grade would be possible to find in the various 'tracts', under the best possible circumstances, in the uppermost 1 km of the crust (1.5 km for conduit-type). Each expert independently estimated the number of undiscovered deposits at the 90%, 50%, 10%, 5% and 1% probability levels. Subsequent to the discussions, and the opportunity for panel members to adjust their estimate, a consensus bid was obtained for each tract.

After the workshop, each of the consensus bids was used as input for a series of Monte Carlo simulations. This was achieved by using the EMINERS software (Duval 2012, Bawiec & Spanski 2010), which combines the probability distributions of the estimated number of undiscovered deposits, the grades, and the tonnages of the selected models to obtain the probability distribution of ore and metal tonnages in undiscovered deposits within each tract.

Assessment of komatiite-hosted nickel deposits

Descriptive model

Komatiite-hosted nickel deposits tend to be the higher grade, yet lower tonnage, magmatic nickel deposits (Figure 1), and are represented by the deposits of Western Australia, namely Kambalda. They correspond to the more extrusive settings of the magmatic continuum and are therefore hosted by effusive volcanic rocks. This type of nickel deposit has been traditionally sub-divided, according to their host-rock and corresponding facies of the volcanic flow system. This led to the definition of subtype 1 (or peridotite) deposits, related to komatiite lava flows, in more distal settings, and type 2 (or dunite) deposits, related to dunite bodies, in more proximal settings (Marston 1984; Lesher 1989). Since only a limited amount of type 2 deposits is known, their corresponding grade/tonnage model is not as robust as the model obtained for type 1 deposits.

Similarly to what happens in other magmatic nickel deposits, appropriate fertile (= high Ni) magma and sulphide saturation are needed for the formation of komatiite- and dunite-related nickel deposits. Therefore, large and dynamic crustal structures are needed for the ascension of mantle derived magmas. Magma sulphide saturation can be achieved through crystal fractionation, magma mixing or crustal contamination. These processes promote a very effective concentration of chalcophile elements (such as Ni), due to their high partition coefficient between sulphide and silicate liquids. Assimilation of exhalative sulphides, previously formed in shared plumbing systems, is particularly important in ultramafic systems, since mafic systems cannot reach sulphide saturation without crustal sulphur. Subsequently, the segregation of sulphide liquids is achieved through gravity or migration to low-flow regimes. Some of the characteristics of the descriptive deposit model are outlined in Table 5.

The mineralising system for komatiite-hosted nickel-copper mineral system and the associated targeting elements that were discussed by the assessment panel, together with the characteristics of the more descriptive mineral deposit model for each tract, is outlined in Figure 2.

Table 5. *Characteristics of komatiite-hosted nickel deposits at various scales. Based on Fiorentini (2012) workshop presentation and Fiorentini et al. (2012), Barnes & Fiorentini (2012).*

Scale	Task	Characteristics
Province/ District (craton to specific greenstone belt)	Identify prospective greenstone belts	• Greenstone belts on stable continental crust • Structural interpretation of geological, geochronological and potential field data – proximity/presence of structures • Translithospheric fault controls on original extensional architecture
Camp	Evaluate for permissive komatiites, komatiite column and identify potential rifts	• Evaluate volcanic system present • Ultramafic volume (a proxy for flux) • Identify inverted rift (felsic volcanics, exhalative sulphides) and proximal facies komatiites, facies variations • Targeted lithogeochemistry and PGE • Establish working stratigraphy • Distal footprints of camps and deposits - hydrogeochemistry • Early petrology (understand the style, tenor, confirm sulphides are magmatic etc.)
Prospect/ deposit	Screen for mineralising system. Direct evidence of mineralisation	• Optimise geochemical and geophysical exporation strategy for desposit style – detailed interpretation of these data • Identifying channelized komatiites (buffered distances around disseminated and channels positions). Care required in talc altered and attenuated belts • Maximise in hole data • Structural controls on geometry (keep open mind to plunge) • Detailed structural understanding • 3D tenor, nickel in footwall • Deformation. Any remobilization?

Tract distribution

The tracts were based on an extraction of supracrustal (undifferentiated), mafic and ultramafic units displayed on the 1:500 000 scale geological map[1]. The units were extracted as georeferenced polygons. To take into account the uncertainty on the exact boundary location of the polygons, considering the small scale from which these were extracted, and to account for possible deformation and remobilization of sulphides into other rock units that host the extracted units, a buffer zone of 500 m was applied and added to the polygons.

[1] http://data.geus.dk/map2/geogreen

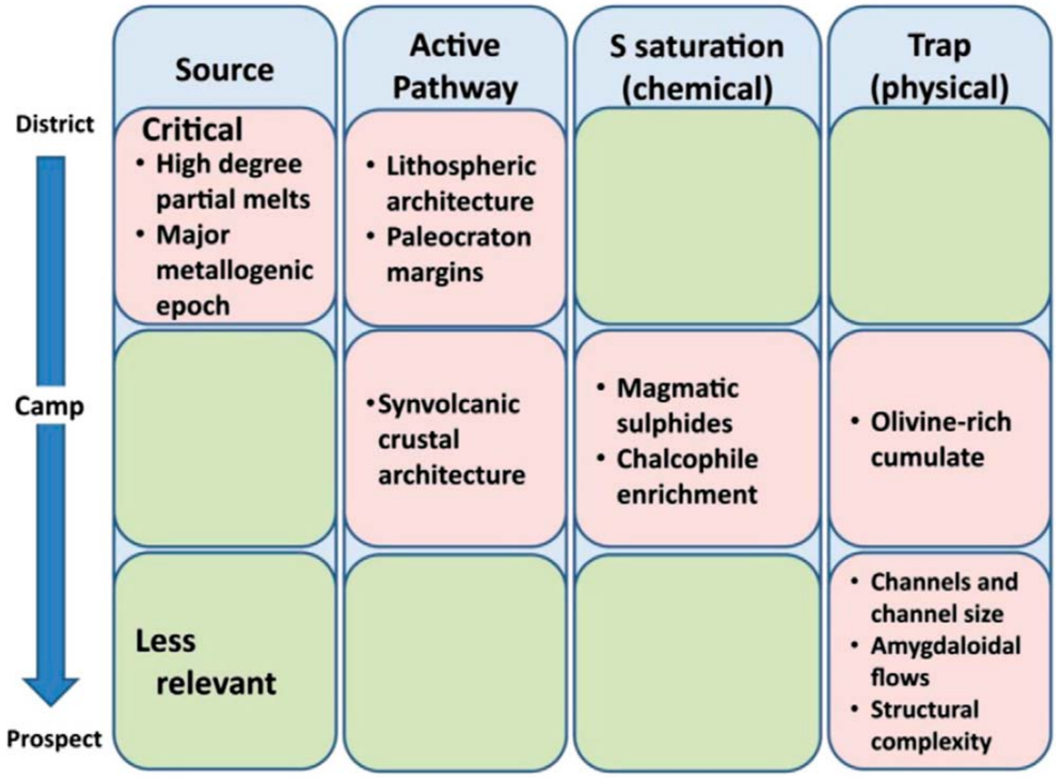


Figure 2. *Targeting elements for komatiite-hosted nickel-copper sulphide mineral systems. The relative importance of targeting elements at various scales are denoted by box color: pink = critical, green = less relevant. Especially the elements in the district and camp scale are relevant for the assessed tract sizes. Figure from McCauig et al. (2010).*

Areas for which extracted units were found to represent similar permissive geology for komatiite-hosted nickel deposits, and included similar geological settings and similar level of knowledge/investigation, were subsequently grouped together into the same tract group.

A total of 6574 initial individual polygons representing supracrustal (undifferentiated), mafic and ultramafic rock units with permissive geology for komatiite-hosted nickel deposits were extracted for entire Greenland (Figure 3). These were subsequently grouped into 21 proposed tract groups (Table 6 and Figure 3), that were then presented to the assessment panel.

The assessment panel subsequently decided to split three of these initial tract groups into two groups (groups 2, 3 and 12), considering the identified differences in knowledge level and geological settings. Furthermore, seven of the proposed tract groups were not assessed by the assessment panel due to time limitations and limited potential. As a result, a total of 17 tract groups were considered for assessment during the workshop (Table 6 and Figure 3).

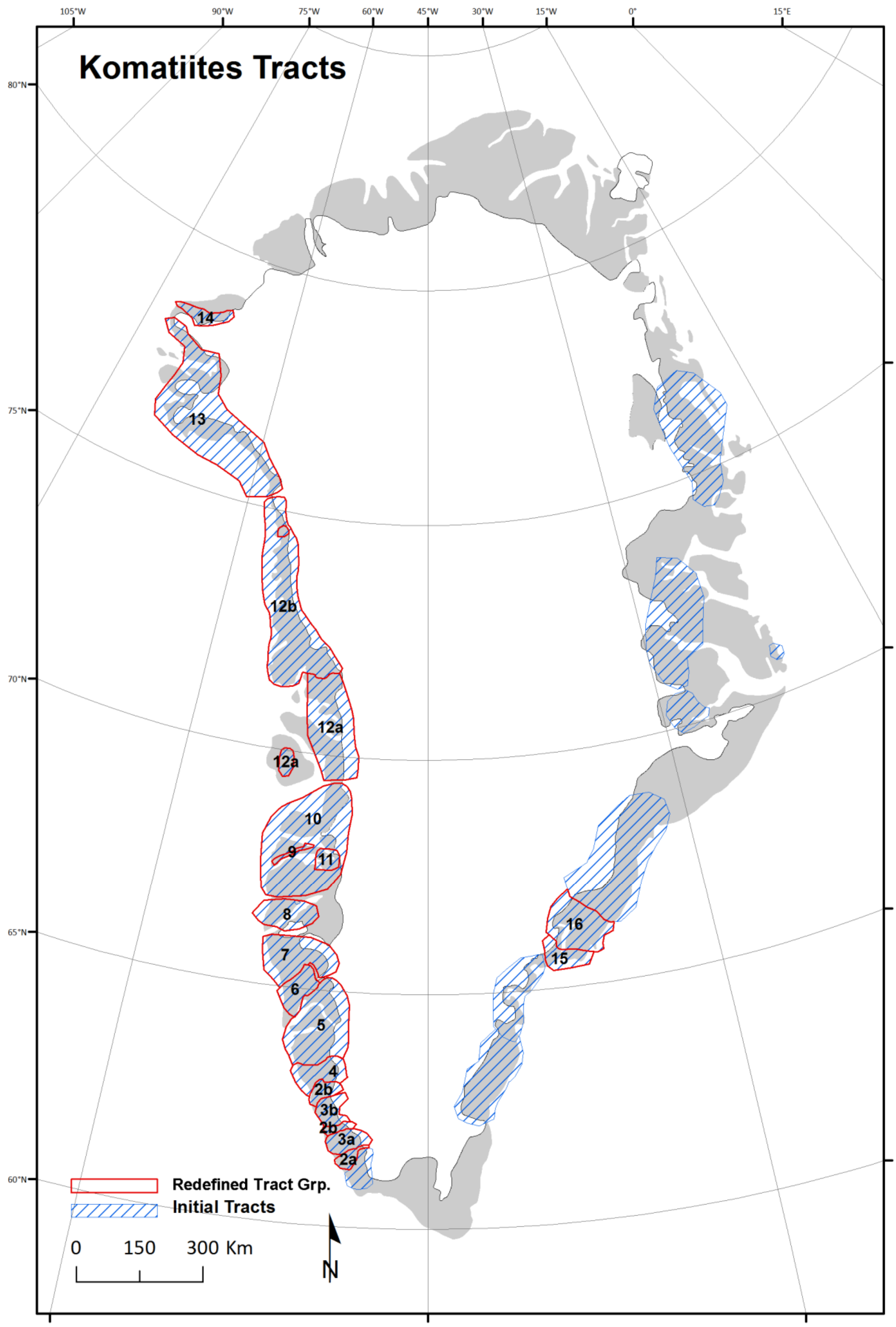


Figure 3. *Overview of the initial and redefined tract groups. Initial tract groups 2, 3 and 12 were subdivided into two tract groups because of differences in knowledge level and geology. See Table 6 to get an overview of the initial tract groups that were defined and delineated by the internal GEUS assessment group prior to the workshop.*

Table 6. *Overview of the initially proposed and the actually assessed tracts with the potential of hosting non-discovered komatiite-hosted nickel deposits. The initial tracts are listed as they were defined and delineated by the internal GEUS assessment group prior to the workshop.*

Initial tract group number	Number of polygons in initial tract groups	Areal size of initial tract groups km^2	Assessed tract group code	Assessed full tract group name	Comment from the assessment panel
1	168	821	*None*	***Not assessed;*** *Arsuk*	Not assessed due to time limitations; assessed for conduit-type nickel deposits, within tract C4
2	174	1,395	K2a K2b	K2a Taartoq K2b Bjørnesund and Kvanefjord	Group subdivided into two tract groups because of differences in knowledge level and geology
3	362	1,414	K3a K3b	K3a south of Paamiut K3b north of Paamiut	Group subdivided into two tract groups because of differences in knowledge level and geology
4	170	576	K4	K4 Fiskenæsset	Not including the Fiskenæsset intrusive complex
5	508	3,139	K5	K5 greater Godthåbsfjord	
6	342	1,897	*None*	***Not assessed*** *Fiskefjord*	The mafic-ultramafic units in this tract are more likely to host contact- and possibly, also conduit-type deposits; assesssed within tract C3.
7	272	1,122	K7	K7 Maniitsoq east	
8	82	333	K8	K8 Ikertoq–Niaqornarssuit	
9	60	197	K9	K9 Nordre Strømfjord	
10	1,020	3,421	K10	K10 Sisimiut–Illulissat	
11	66	81	K11	K11 inner Nordre Strømfjord	
12	380	1,232	K12a K12b	K12a Eqi–Disko K12b Karrat Group	Group subdivided into two tract groups because of differences in knowledge level and geology
13	304	947	K13	K13 Melville Bugt	
14	60	164	K14	K14 Inglefield Land	
15	544	1,438	*None*	***Not assessed;*** *east of Scoresby Sund – Kong Oscar Fjord*	Not assessed due to time limitation

16	80	223	*None*	***Not assessed;*** *Gåseland*	Not assessed due to time limitation
17	256	669	*None*	***Not assessed;*** *Kangerlussuaq–Kap Gustav Holm*	Not assessed due to time limitation
18	584	1,934	K16	K16 Tasiilaq - supra crustals North of contact halo	
19	250	1,480	*K15*	*K15 Tasiilaq – supra crustals contact halo surrounding the norite intrusions*	The nickel potential within the norite intrusions of the initial tract group was believed to be more related to contact- and conduit-style nickel mineralisation type. The norites are thus not included in K15, but are assessed for conduit-type nickel deposits under tract C5.
20	216	581	None	***Not assessed;*** Skjoldungen – Timmiarmiut	The mafic-ultramafic units in this tract are more likely to host contact- and possibly also conduit-style nickel deposits. The two tracts were thus assessed for conduit- type nickel deposits under tract C12.
21	676	1,593	None		
Total	**6,574**	**24,657**			

Individual tracts assessed during the workshop

K1 Arsuk region, southern West Greenland

Area north of the Ketilidian orogen, within the southernmost part of the Archaean craton. Not assessed due to time limitations. The area was believed to have greater potential for conduit-type nickel deposits (see later section).

K2a Taartoq

The initial K2 tract group, which included supracrustal (undifferentiated), mafic and ultramafic units at Taartoq, Paamiut and Bjørnesund was decided to be subdivided into two tracts, K2a and K2b, based on differential distribution of metasedimentary rocks, including exhalative sulphides and level of knowledge (which is greater at Taartoq compared to the other areas). The K2a tract group represents ultramafic rocks, amphibolite and metasedimentary rock units mapped in the Taartoq area.

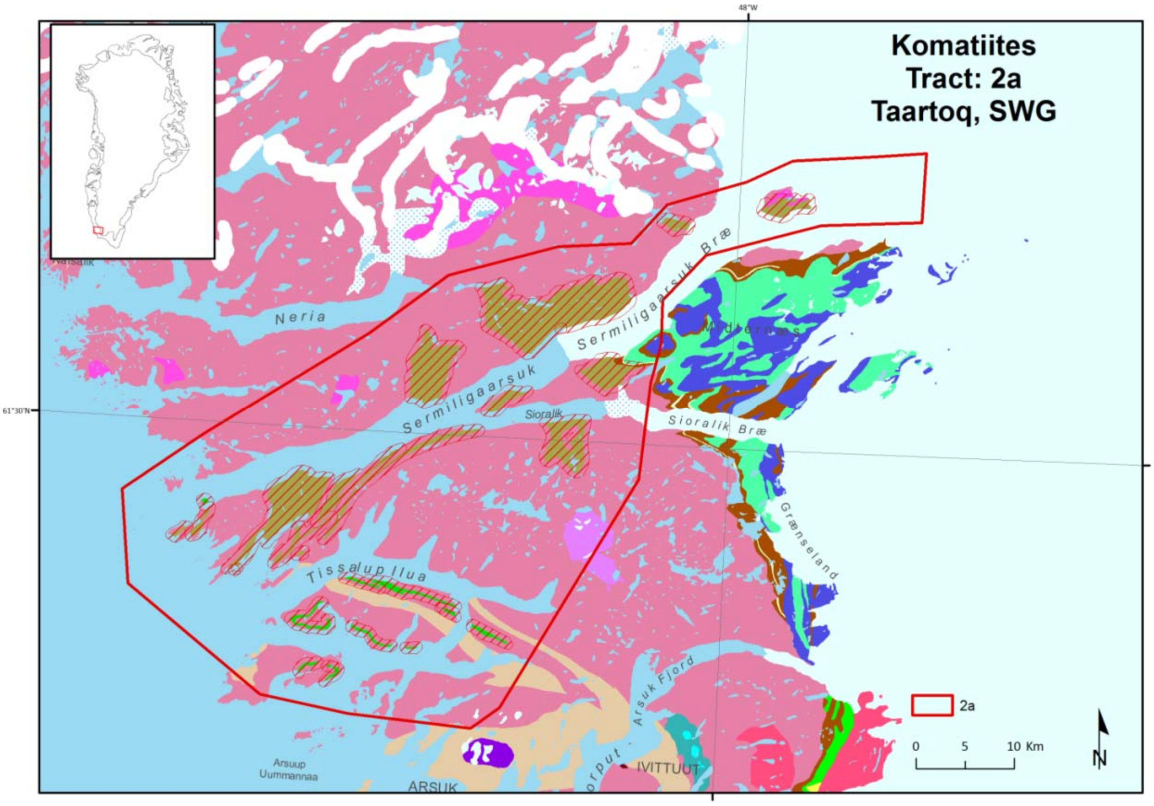


Figure 4. *Location of the K2a (=2a on the map) tract group in SW Greenland. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

The K2a tract group is situated on a craton margin - a possible major pathway for magmas. Igneous geochemistry indicates an island-arc or back-arc environment, at approximately 3.2 Ga (Szilas *et al.* 2012). Tract K2a includes ultramafic rocks, mafic granulites and metasedimentary rocks. Spinifex textures are not reported in the ultramafic rocks, yet nickel-rich flows can have little or no spinifex textures, while a very large proportion of the komatiites are barren. The metasedimentary rocks include iron formations, graphite and, significantly, exhalative massive sulphide bodies, which are key as they contribute sulphur to magmas that assimilate them, favouring sulphide saturation and liquid immiscibility. Gold mineralisation is known in the area. Finally, although the area has been extensively explored, it is also quite large and therefore still holds the potential for undiscovered deposits.

Table 7. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K2a tract.*
[NXX - Estimated number of deposits associated with the xxth percentile, N_{und} – expected number of undiscovered deposits, s – standard deviation, Cv% - coefficient of variance, N_{known} – number of known deposits in the tract that are included in the grade and tonnage model, N_{total} – total of expected number of deposits plus known deposits, area – area of permissive tract in square kilometers, density – deposit density reported as the total number of deposits per km^2. N_{und}, S, and Cv% are calculated using a regression equation (Singer and Menzie 2005). In cases where individual estimates were tallied in addition to the consensus estimate, individual estimates are listed]

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	**N50**	**N10**	**N05**	**N01**	**N_{und}**	**s**	**Cv%**	**N_{known}**	**N_{total}**		
0	0	0	2	2	0.15	0.51	340.0	0	0.15	380	0.000390

Estimator	Estimated number of undiscovered deposits				
	N90	**N50**	**N10**	**N05**	**N01**
Individual 1	0	0	1	1	3
Individual 2	0	0	0	1	5
Individual 3	0	0	0	1	2
Individual 4	0	0	1	2	3
Individual 5	0	0	1	2	2
Individual 6	0	0	0	0	1
Individual 7	0	0	0	1	2
Individual 8	0	0	0	2	5
Individual 9	0	0	0	1	2
Individual 10	0	0	5	10	10
Individual 11	0	0	0	0	2
Individual 12	0	0	1	1	2
Individual 13	0	0	0	1	1
Individual 14	0	1	1	2	2
Individual 15	0	0	1	1	1
Individual 16	0	0	0	1	2
Individual 17	0	0	0	1	1
Individual 18	0	0	0	0	1
Individual 19	0	1	2	2	2
Consensus	**0**	**0**	**0**	**2**	**2**

Table 8. *Results of Monte Carlo simulations of undiscovered resources in the tract K2a.*
[t = metric tons; Mt; megatonne or million tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	62,000	9,200	0.08	0.91
Rock (Mt)	0	0	0	0	2	0	0.08	0.91

K2b Paamiut – Bjørnesund

The initial K2 tract group, which included supracrustal (undifferentiated), mafic and ultramafic units at Taartoq, Paamiut and Bjørnesund was decided to be subdivided into two tract groups, K2a and K2b, based on differential distribution of metasedimentary rocks, including exhalative sulphides and level of knowledge (which is greater at Taartoq compared to the other areas). The K2b tract group represent mapped out ultramafic rocks, amphibolite but no metasedimentary rock units in the Paamiut and Bjørnesund area.

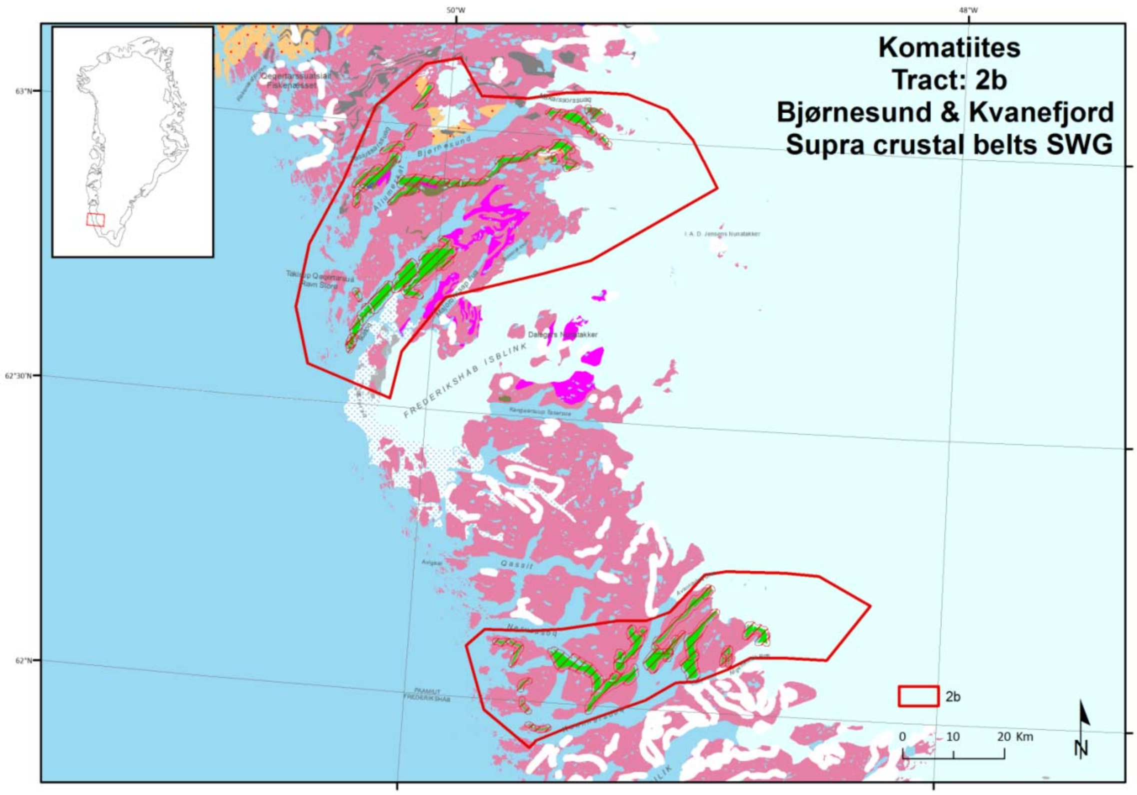


Figure 5. *Location of the K2b tract group in SW Greenland. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Spinifex textures are reported from the Paamiut area (see workshop presentation by Kolb), but their relevance to mineralisation is uncertain. Although there are acid volcanic rocks, no exhalative massive sulphides have been documented, so the potential for the ultramafic magmas to have reached sulphur saturation is limited. Au mineralisation and one pentlandite occurrence has been reported from the Bjørnesund area. Also, the area has been quite explored and the lack of exhalative sulphur sources that could have led to ultramafic magma sulphur saturation was considered to diminish its potential.

Table 9. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K2b tracts. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	1	2	3	0.41	0.82	200.0	0	0.41	560	0.000730

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	1	2	3
Individual 2	0	1	2	3	5
Individual 3	0	0	0	1	3
Individual 4	0	0	0	1	2
Individual 5	0	0	1	2	3
Individual 6	0	1	2	5	5
Individual 7	0	0	1	2	2
Individual 8	0	0	0	1	2
Individual 9	0	0	1	3	6
Individual 10	0	0	5	5	5
Individual 11	0	0	0	0	3
Individual 12	0	0	0	0	2
Individual 13	0	0	0	0	1
Individual 14	0	1	2	2	2
Individual 15	0	1	2	3	5
Individual 16	0	0	0	1	3
Individual 17	0	0	1	1	3
Individual 18	0	0	0	0	1
Individual 19	0	0	0	1	1
Consensus	**0**	**0**	**1**	**2**	**3**

Table 10. *Results of Monte Carlo simulations of undiscovered resources in the K2b tracts. [t = metric tons; Mt; megatonne or million tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	72,000	130,000	22,000	0.22	0.70
Rock (Mt)	0	0	0	4	6	1	0.18	0.70

K3a South of Paamiut

The initially outlined K3 tract group, which included supracrustal (undifferentiated), mafic and ultramafic rock units north and south of the Paamiut was decided to be subdivided into two tract groups, K3a and K3b, based on differential distribution of metasedimentary rocks and different levels of knowledge. K3a is located south of Paamiut and the individual tracts represent supracrustal (undifferentiated), mafic and ultramafic rock units in the area between Taartooq and Paamiut.

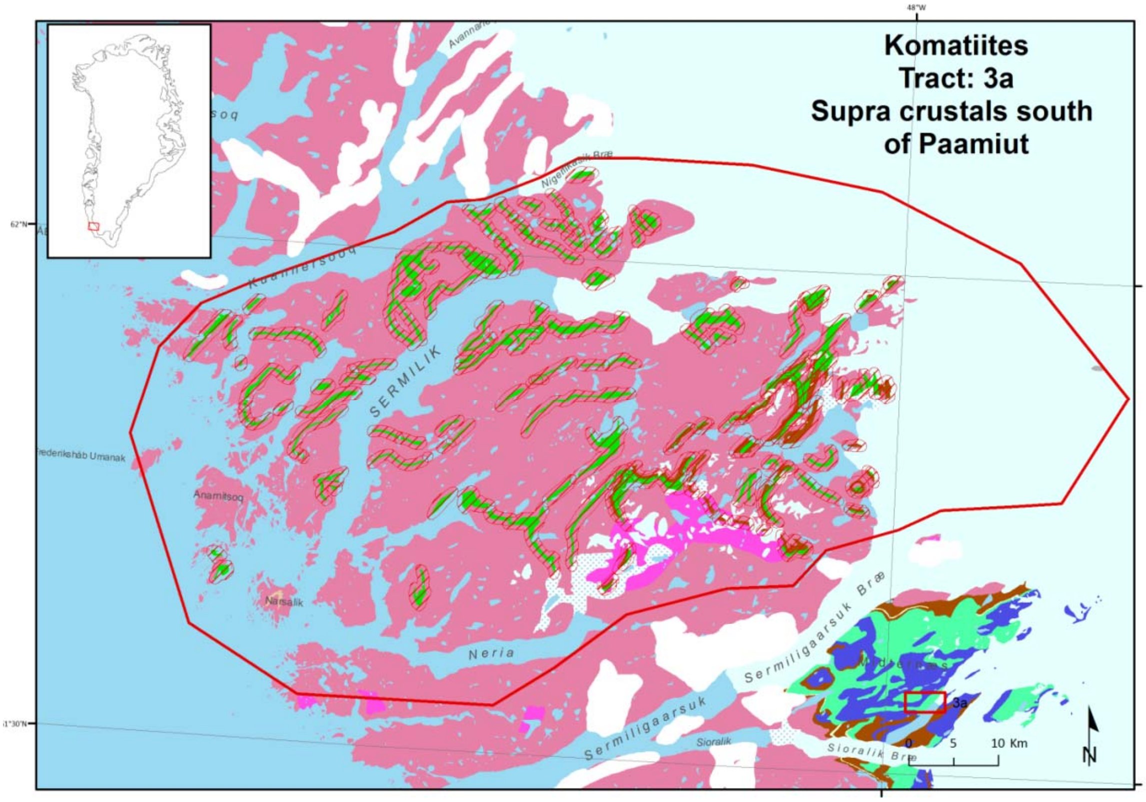


Figure 6. *Location of the K3a tract group in SW Greenland. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Tract group K3a is likely not related to any terrane boundary. While it includes metasedimentary rocks and felsic volcanic rocks, it has less ultramafic rocks. The presence of both metasedimentary rocks and felsic volcanic rocks, suggests that exhalative sulphides can be present, which, through assimilation by ultramafic magmas, could have led to sulphur saturation in the latter. This, coupled, with limited exploration, was considered to give this area some potential.

Table 11. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K3a tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420.0	0	0.11	930	0.000110

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	1	1
Individual 2	0	0	1	1	1
Individual 3	0	0	0	0	2
Individual 4	0	0	0	3	5
Individual 5	0	0	0	1	2
Individual 6	0	0	0	0	2
Individual 7	0	0	0	0	3
Individual 8	0	0	0	1	1
Individual 9	0	0	0	1	3
Individual 10	0	0	1	3	5
Individual 11	0	0	0	1	2
Individual 12	0	0	0	2	3
Individual 13	0	0	0	0	2
Individual 14	0	1	2	2	2
Individual 15	0	0	1	1	2
Individual 16	0	0	0	1	1
Individual 17	0	0	0	0	1
Individual 18	0	0	0	0	0
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**1**	**2**

Table 12. *Results of Monte Carlo simulations of undiscovered resources in the K3a tract. [t = metric tons; Mt; megatonne or million tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	32,000	6,200	0.07	0.92
Rock (Mt)	0	0	0	0	1	0	0.07	0.92

K3b North of Paamiut

The initial outlined K3 tract group, which included supracrustal (undifferentiated), mafic and ultramafic rock units north and south of the Paamiut was decided to be subdivided in to two tract groups, K3a and K3b, based on differential distribution of metasedimentary rocks and levels of knowledge. K3b is located north of Paamiut and the individual tracts represent supracrustal (undifferentiated), mafic and ultramafic rock units in the area between Paamiut and Frederikshåb Isblink.

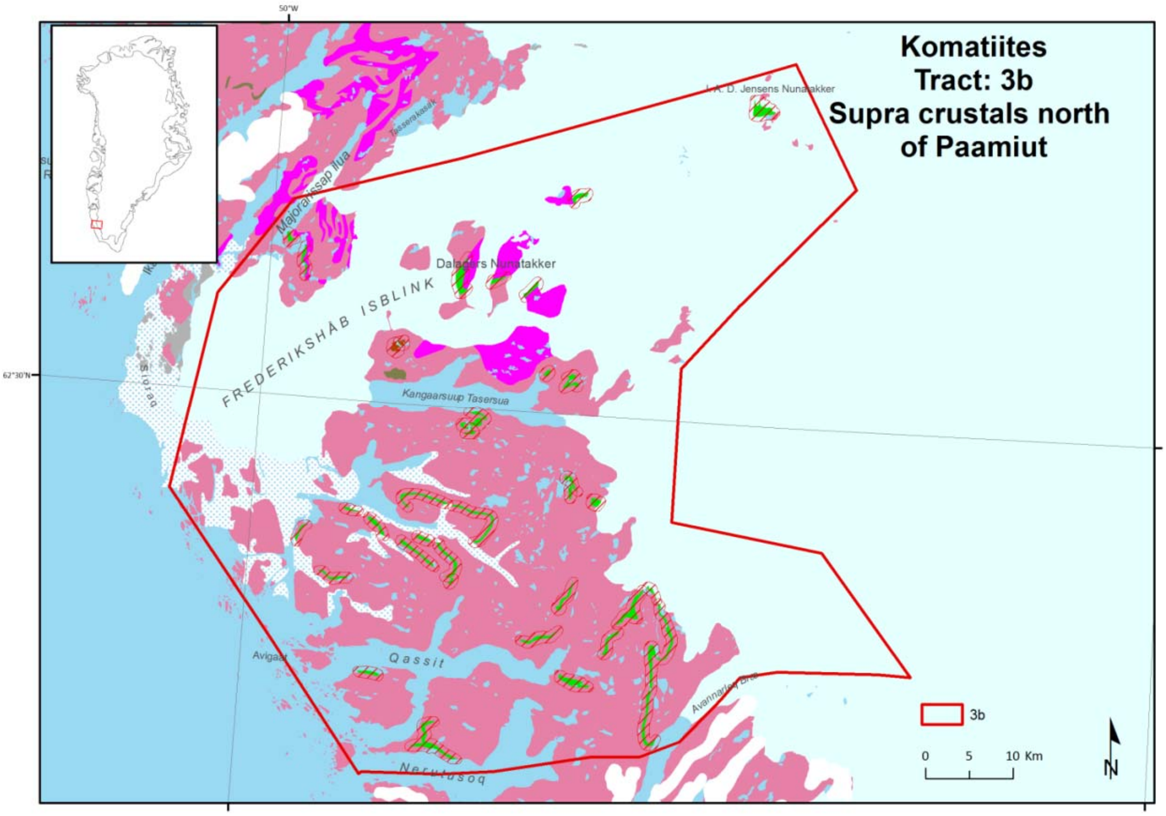


Figure 7. *The K3b tract group is located north of Paamiut. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

This tract is likely not related to any terrane boundary. The absence of known supracrustal rocks, which could have contributed with sulphur, in what is a relatively well explored area, gives this area a low potential, despite the existence of significant amounts of ultramafic rocks.

Table 13. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K3b tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					**Summary statistics**					**Tract Area (km^2)**	**Deposit density (N_{total}/km^2)**
N90	**N50**	**N10**	**N05**	**N01**	**N_{und}**	**s**	**Cv%**	**N_{known}**	**N_{total}**		
0	0	0	0	2	0.06	0.37	610.0	0	0.06	220	0.000270

Estimator	**Estimated number of undiscovered deposits**				
	N90	**N50**	**N10**	**N05**	**N01**
Individual 1	0	0	0	1	1
Individual 2	0	0	1	1	2
Individual 3	0	0	0	0	1
Individual 4	0	0	0	2	3
Individual 5	0	0	0	0	1
Individual 6	0	0	0	0	1
Individual 7	0	0	0	0	2
Individual 8	0	0	0	0	1
Individual 9	0	0	0	1	3
Individual 10	0	0	1	2	3
Individual 11	0	0	0	1	2
Individual 12	0	0	0	1	2
Individual 13	0	0	0	0	2
Individual 14	0	0	1	2	2
Individual 15	0	0	1	2	5
Individual 16	0	0	0	0	1
Individual 17	0	0	0	0	0
Individual 18	0	0	0	0	0
Individual 19	0	0	0	0	0
Consensus	**0**	**0**	**0**	**0**	**2**

Table 14. *Results of Monte Carlo simulations of undiscovered resources in the K3b tract. [t = metric tons; Mt; megatonne or million tons]*

Material	**Probability of at least the indicated amount**						**Probability of**	
	0.95	**0.9**	**0.5**	**0.1**	**0.05**	**Mean**	**Mean or greater**	**None**
Ni (T)	0	0	0	0	0	4,300	0.04	0.96
Rock (Mt)	0	0	0	0	0	0	0.04	0.96

K4 Fiskenæsset

This tract includes supracrustal (undifferentiated), mafic and ultramafic rock units in the Fiskenæsset area (not including rock units that belongs to the intrusive Fiskenæsset Complex which was evaluated for conduit type nickel mineralisation – see tract C3). This tract is not related to any terrane boundary and no ultramafic rocks or metasedimentary rocks are known, only amphibolites. There is an important shear zone and there are sulphide occurrences, but these are not exhalative, so the potential of this area was judged to be low.

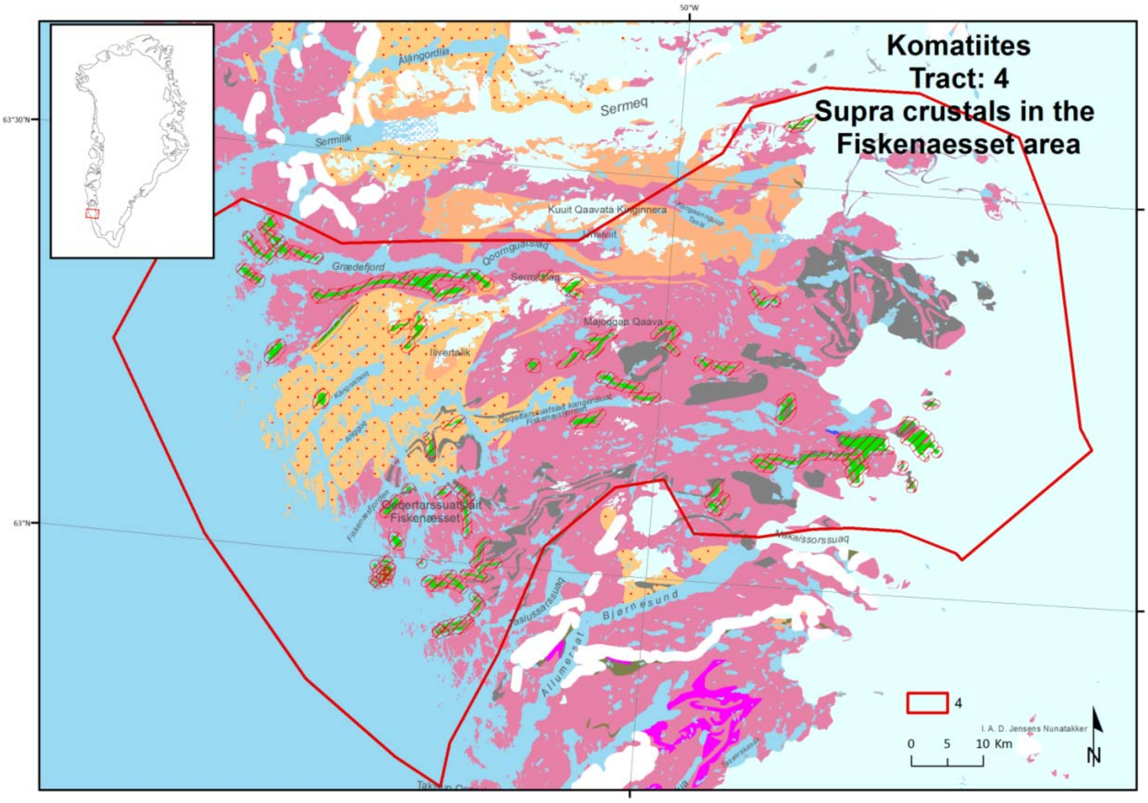


Figure 8. *Location of the K4 tract group. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Table 15. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K4 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	0	1	0.03	0.24	810.0	0	0.03	460	0.000065

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	1
Individual 2	0	0	0	0	1
Individual 3	0	0	0	0	0
Individual 4	0	0	0	0	1
Individual 5	0	0	0	0	0
Individual 6	0	0	0	0	2
Individual 7	0	0	0	0	1
Individual 8	0	0	0	0	0
Individual 9	0	0	0	0	1
Individual 10	0	0	1	2	2
Individual 11	0	0	0	0	1
Individual 12	0	0	0	0	1
Individual 13	0	0	0	0	2
Individual 14	0	0	1	1	1
Individual 15	0	0	0	0	0
Individual 16	0	0	0	0	0
Individual 17	0	0	0	0	0
Individual 18	0	0	0	0	0
Individual 19	0	0	0	0	0
Consensus	**0**	**0**	**0**	**0**	**1**

Table 16. *Results of Monte Carlo simulations of undiscovered resources in the K4 tract. [t = metric tons; Mt; megatonne or million tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	0	2,100	0.03	0.97
Rock (Mt)	0	0	0	0	0	0	0.03	0.97

K5 Nuuk – Akia

Tract group K5 includes supracrustal (undifferentiated), mafic and ultramafic rock units within a very large tract that stretches from just north of Fiskenæsset to Godthaabsfjord. The area includes several terrane boundaries and contains many well-known ultramafic rock units, with komatiites, as well as exhalative sulphides. While some of the ultramafic rocks are Neoarchean, deemed to be a more favourable period for komatiitic nickel, known pentlandite showings in the area are actually related to Mesoarchean gabbroic mafic granulites and serpentine schists. Au mineralisation is also well-known from the area. The presence of Neoarchean ultramafic rocks and VMS showings along the same general area extending along approximately 150 km near a terrane boundary was deemed quite favourable for nickel deposits.

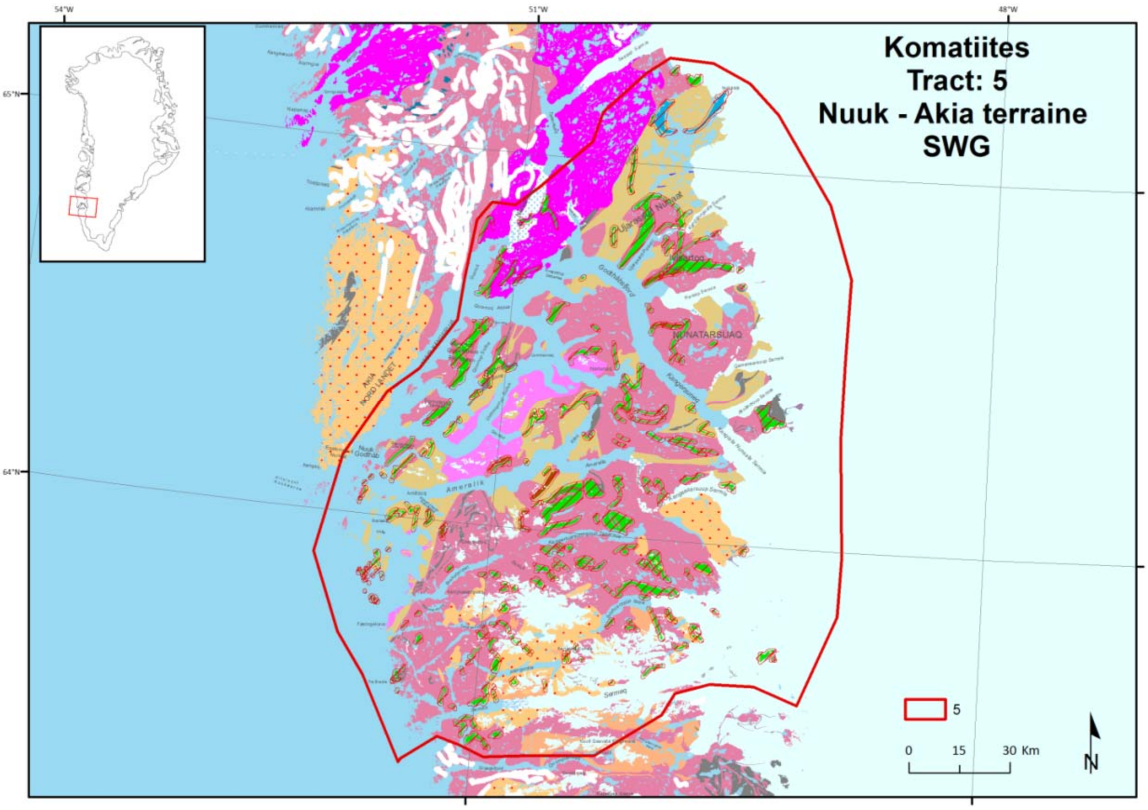


Figure 9. *Location of the K5 tract group. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Table 17. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K5 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	2	3	4	0.71	1.20	170.0	0	0.71	2,540	0.000280

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	1	3	5	8
Individual 2	0	1	2	2	2
Individual 3	0	1	2	4	7
Individual 4	0	1	2	3	4
Individual 5	0	0	1	2	3
Individual 6	0	0	5	5	5
Individual 7	0	0	3	3	5
Individual 8	0	0	1	2	4
Individual 9	0	1	1	1	3
Individual 10	0	0	5	10	10
Individual 11	0	0	1	3	5
Individual 12	0	1	2	2	3
Individual 13	0	1	2	4	5
Individual 14	0	0	5	5	5
Individual 15	0	1	2	3	5
Individual 16	0	1	2	2	4
Individual 17	0	0	0	1	2
Individual 18	0	0	0	1	3
Individual 19	0	0	1	2	3
Consensus	**0**	**0**	**2**	**3**	**4**

Table 18. Results of Monte Carlo simulations of undiscovered resources in the K5 tract.
[t = metric tons; Mt; megatonne or million tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	140,000	220,000	43,000	0.27	0.59
Rock (Mt)	0	0	0	7	11	2	0.23	0.59

K6 Fiskefjord

The rock units, mostly comprising mafic and ultramafic units (none or very small amounts of metasedimentary units are known) of this tract group are described as layered intrusions rather than directly relatable to extrusive flows. Some of the ultramafics may also represent tectonic emplaced lenses derived from lower crust/upper mantle settings. Since this corresponds to a lower crustal level, the assessment panel decided to treat this tract group for the model for conduit-type nickel mineralisation (see section on tract group C2).

K7 Maniitsoq

The large area that is covered by tract group K7, stretching from north of Fiskefjord to south of Sukkertoppen Iskappe, includes a terrane boundary, with large metasedimentary units and ultramafic rocks (possible komatiites). The rock units considered are especially concentrated in a W-E oriented corridor from Maniitsoq to the margin of the Inland Ice, the Majorqaq valley, and an area north of Isukasia near the Inland Ice. The tracts are only sparsely explored and investigated. The rock units that belong to the Maniitsoq Norite Belt, which lies within the area defined by the K7 tract group, are not included but will be treated for conduit-type mineralisation (see section on tract group C1). Stream sediment anomalies, that could be indicative for a nickel potential, are present, but it is uncertain whether they are related to ultramafic rocks or norite.

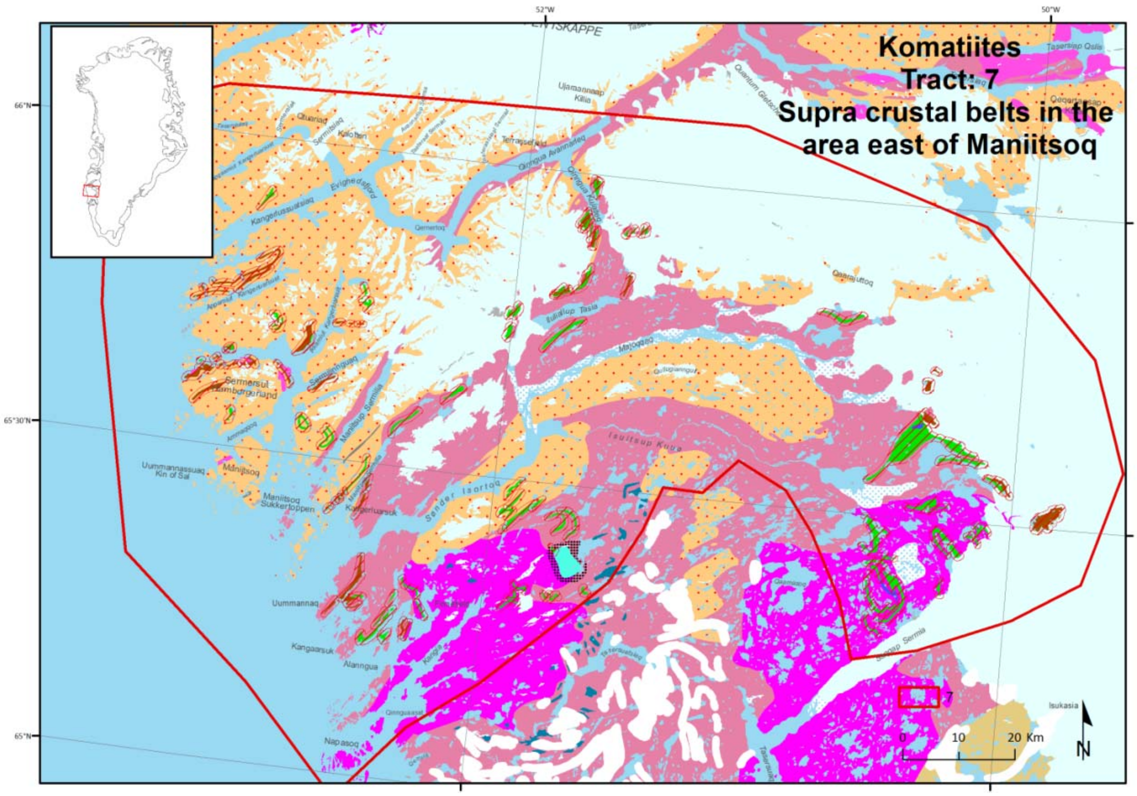


Figure 10. *Location of tract group K7. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Table 19. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K7 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420.0	0	0.11	890	0.000120

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	1
Individual 2	0	0	0	0	1
Individual 3	0	0	0	1	3
Individual 4	0	0	1	2	2
Individual 5	0	0	0	1	1
Individual 6	0	0	0	0	0
Individual 7	0	0	0	0	4
Individual 8	0	0	0	1	2
Individual 9	0	0	1	2	3
Individual 10	0	0	2	2	5
Individual 11	0	0	0	1	2
Individual 12	0	0	2	2	3
Individual 13	0	0	1	2	3
Individual 14	0	0	1	2	2
Individual 15	0	0	1	1	2
Individual 16	0	0	0	0	0
Individual 17	0	0	0	0	1
Individual 18	0	0	0	1	2
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**1**	**2**

Table 20. Results of Monte Carlo simulations of undiscovered resources in the K7 tract. [t = metric tons; Mt; megatonne or million tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	33,000	5,900	0.08	0.92
Rock (Mt)	0	0	0	0	1	0	0.07	0.92

K8 Søndre Strømfjord – Ikertoq

It was widely discussed whether to subdivide this tract group or not - depending on the mineral deposit model to be applied to the Ikertoq deposit (part of the Niaqornarssuit Complex). It was discussed whether this deposit is subtype 1 (also known as peridotite-subtype, related to komatiite lava flows) or subtype 2 (also known as the dunite-type, related to dunite intrusive bodies) of the komatiite-hosted model. The subtype 2 deposits are lower grade than the subtype 1 deposits and should therefore not be assessed according to the same model. Upon establishing comparisons with Perseverance and Mount Keith, it was considered that the whole tract could be assessed together within the subtype 1 model, similarly to the other tracts being discussed, instead of having an additional tract for subtype 2 deposits, which also have a less robust grade/tonnage model.

The rock units comprised by the tract group correspond to Archaean rocks reworked during the Palaeoproterozoic, during the Nagssugtoqidian orogeny. The area defined by the tract group lies within the foreland of the Nagssugtoqidian orogen, bounded to the south, at Sukkertoppen Iskappe by the North Atlantic craton.

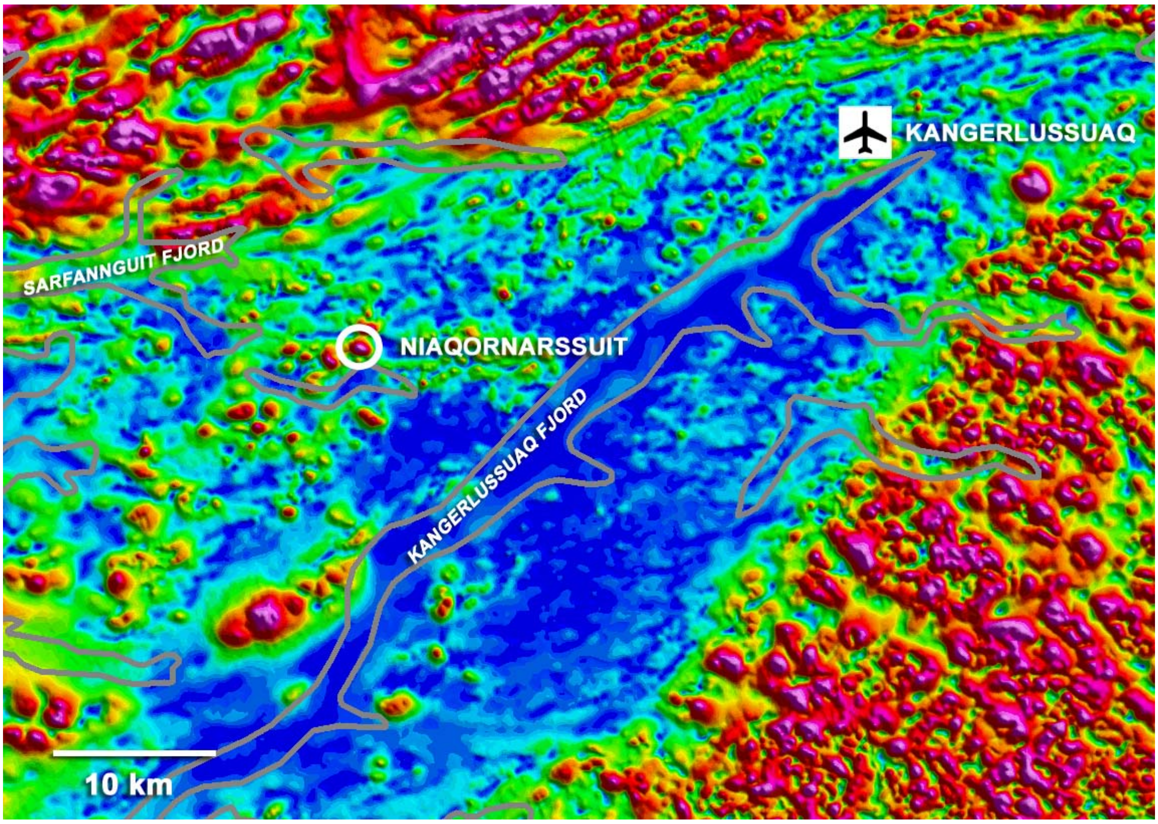


Figure 11. *Total magnetic intensity field (Aeromag 1999 data; 500 m line-spacing, fixed-winged, draped 300 m above ground) for the greater Søndre Strømfjord area (the fjord is orientated SSW–NNE). The Niaqornarssuit complex which hosts the Ikertoq Ni-Cu-(Co) deposit is encircled. Several other distinct high magnetic anomalies can be observed south-east and north-west of complex. The larger anomaly south of the complex is related to an anorthosite complex. Figure from workshop presentation by 21st North (Østergaard 2012).*

The vicinity of the Ikertoq deposit is relatively well explored and in addition to the deposit, 9 other clusters of conductors have been identified through geophysics. Further away from the Ikertoq deposit, south of the central part of Søndre Strømfjord (Kangerlussuaq Fjord), but still within the area covered by tract group K8, drilling on possible kimberlite targets identified from geophysics accidentally intersected Ni-bearing semi-massive sulphides (Ferguson 2002). This showing is named the Kakilisattooq showing.

Outside the smaller area around Ikertoq deposit only very sparse exploration have been carried out and the greater area east of the deposit towards the Inland Ice is poorly known.

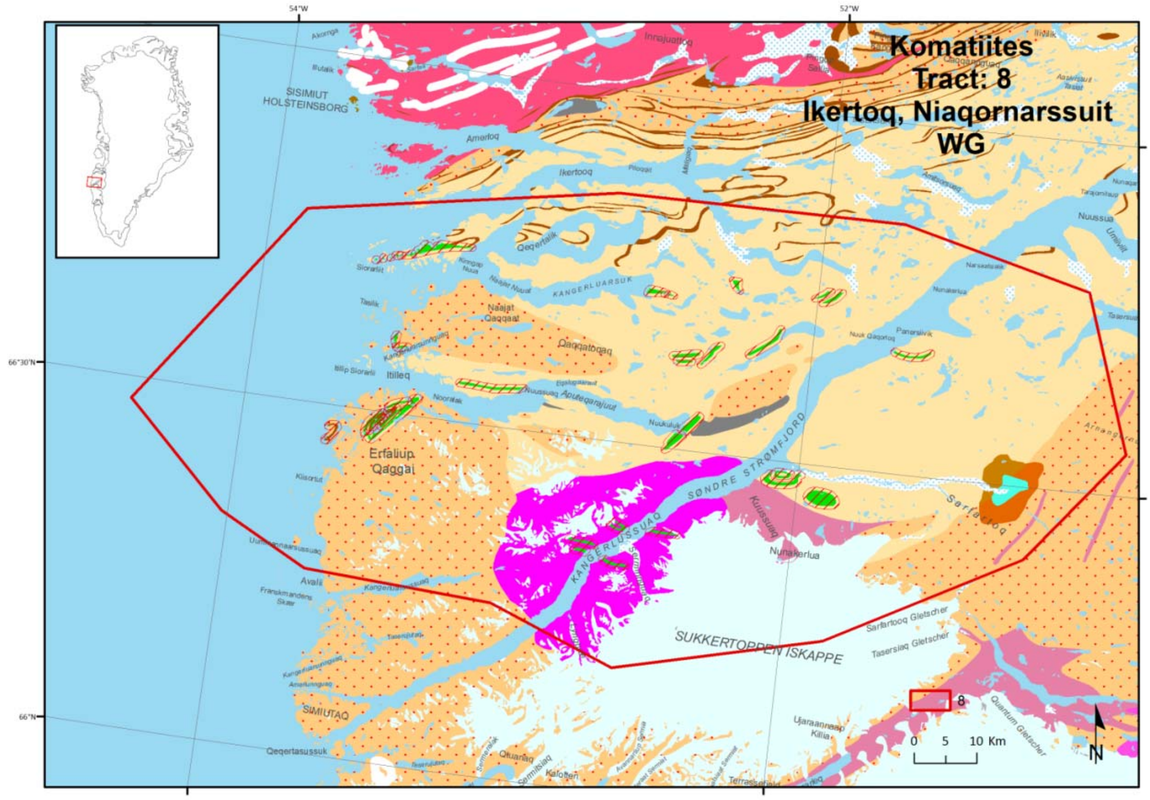


Figure 12. *Location of the K8 tract group in SW Greenland. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Table 21. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K8 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					**Summary statistics**					**Tract Area (km^2)**	**Deposit density (N_{total}/km^2)**
N90	**N50**	**N10**	**N05**	**N01**	**N_{und}**	**s**	**Cv%**	**N_{known}**	**N_{total}**		
0	1	3	3	5	1.40	1.40	100.0	0	1.40	260	0.005200

Estimator	**Estimated number of undiscovered deposits**				
	N90	**N50**	**N10**	**N05**	**N01**
Individual 1	1	3	7	10	20
Individual 2	0	1	1	3	5
Individual 3	0	0	0	1	4
Individual 4	0	0	2	4	6
Individual 5	0	1	2	2	2
Individual 6	0	2	2	2	2
Individual 7	0	2	4	6	8
Individual 8	0	1	2	3	4
Individual 9	0	1	1	2	3
Individual 10	0	0	1	5	5
Individual 11	0	0	1	2	3
Individual 12	0	1	2	2	3
Individual 13	0	0	2	2	4
Individual 14	0	1	1	1	5
Individual 15	1	3	5	5	5
Individual 16	0	0	0	0	0
Individual 17	0	0	2	2	2
Individual 18	0	0	2	4	6
Individual 19	0	1	2	3	4
Consensus	**0**	**1**	**3**	**3**	**5**

Table 22. Results of Monte Carlo simulations of undiscovered resources in the K8 tract.
[t = metric tons; Mt; megatonne or million tons]

Material	**Probability of at least the indicated amount**						**Probability of**	
	0.95	**0.9**	**0.5**	**0.1**	**0.05**	**Mean**	**Mean or greater**	**None**
Ni (T)	0	0	38,000	210,000	290,000	79,000	0.33	0.30
Rock (Mt)	0	0	1	11	17	4	0.31	0.30

K9 Nordre Strømfjord

Tract group K9 is defined by the supracrustals (undifferentiated), mafic and ultramafic rock units found in the areas between Sisimiut – Nordre Strømfjord and Nordre Strømfjord – Illulissat. Tract group K9 is situated within the tract group K10 (see Figure 16). This relatively small tract includes a possible suture of an orogen, and contains komatiites and metasedimentary rocks. The individual tracts represent metasedimentary, mafic and ultramafic units. There are numerous known occurrences of semi- to massive iron-sulphide mineralisation that are continuous for kilometres.

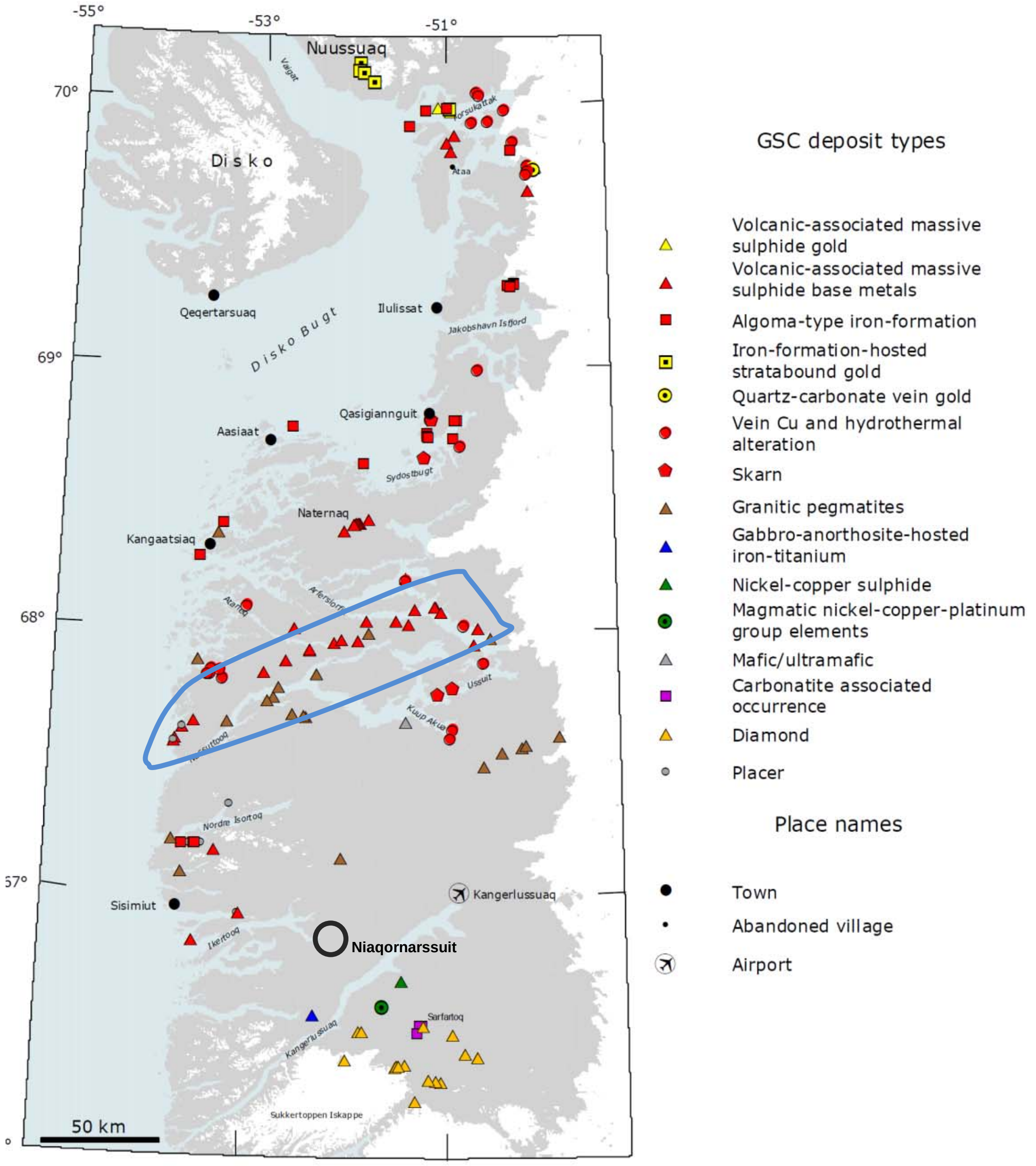


Figure 13. *Distribution of known mineralisations in the Nagssuqtoqidian orogen, central west & southern West Greenland. The approximately outline of the tract group K9 is shown in blue. The Niaqornarssuit complex, which hosts the Ikertoq nickel-bearing deposit in tract group K8 is marked by a black circle. Map from workshop presentation by 21stNorth (Østergaard 2012).*

The metasedimentary units are also very rich in graphite. The area is quite well known, with exploration by Kryolitselskabet Øresund, NunaOil (1990-92), INCO (1996) and NunaMinerals (2006-7) and on-going (2012) exploration by 21st North. NunaMinerals has found a significant nickel anomaly in a stream sediment sample (with heavy mineral concentrate yielding 2.6% Ni and fine fraction stream sediment geochemistry yielding 1.4% Ni).

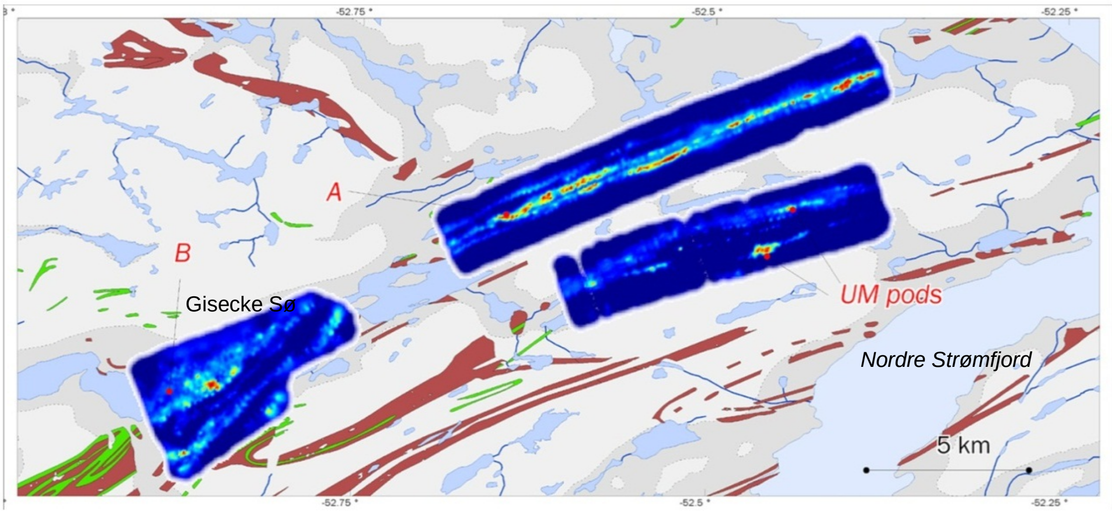


Figure 14. *Results from transient electromagnetic surveys (SkyTEM) carried out by NunaMinerals in 2007 in the Giesecke Sø, central Nordre Strømfjord area (100 m line-spacing). Long conductors have been identified. Figure from workshop presentation by 21st North (Østergaard 2012).*

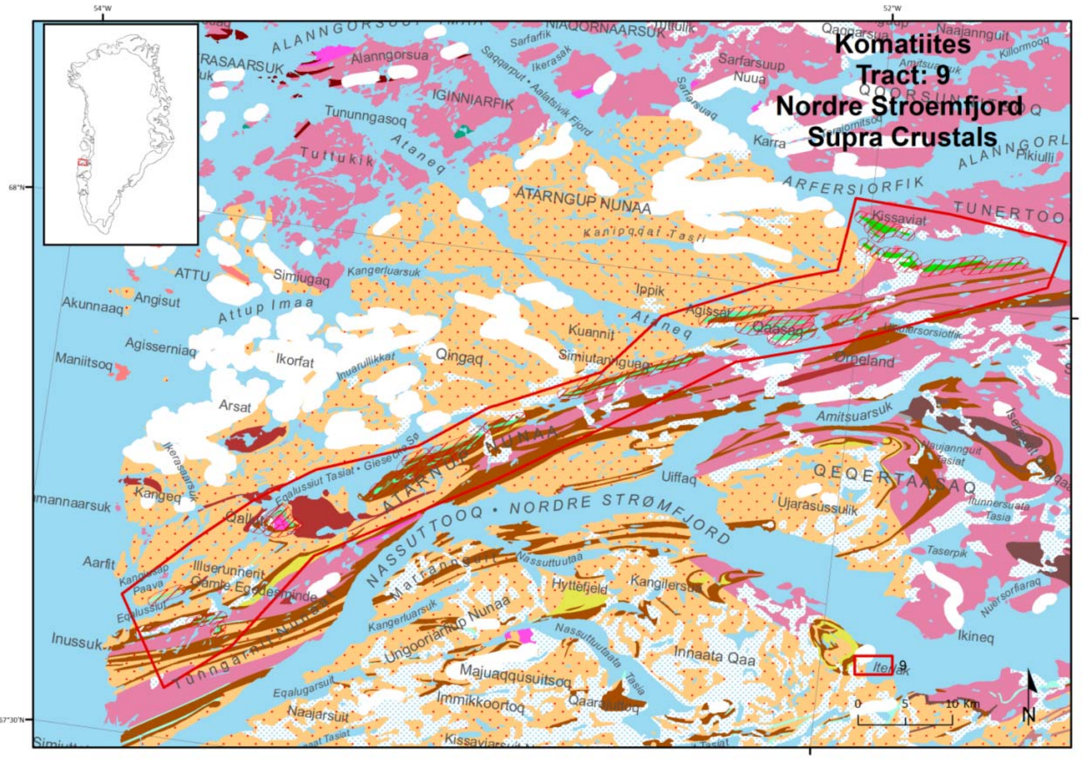


Figure 15. *Location of tract group K9 in SW Greenland. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Geophysical work has been carried out and long conductors with responding magnetic anomalies have been identified. However, no drilling was done and therefore the area is considered to hold good potential.

Table 23. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K9 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420.0	0	0.11	170	0.000620

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	1	2	2
Individual 2	0	0	0	0	1
Individual 3	0	0	0	0	2
Individual 4	0	0	1	1	2
Individual 5	0	0	1	1	2
Individual 6	0	0	1	1	1
Individual 7	0	0	1	1	2
Individual 8	0	0	0	1	2
Individual 9	0	0	0	2	3
Individual 10	0	0	1	2	5
Individual 11	0	0	0	1	1
Individual 12	0	0	1	2	3
Individual 13	0	0	0	1	2
Individual 14	0	1	1	1	1
Individual 15	0	1	1	2	5
Individual 16	0	0	0	1	1
Individual 17	0	0	0	0	1
Individual 18	0	0	0	1	2
Individual 19	0	0	0	0	2
Consensus	**0**	**0**	**0**	**1**	**2**

Table 24. Results of Monte Carlo simulations of undiscovered resources in the K9 tract. [t = metric tons; Mt; megatonne or million tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	29,000	6,000	0.07	0.93
Rock (Mt)	0	0	0	0	1	0	0.07	0.93

K10 Sisimiut – Illulissat

K10 comprises a very large area with amphibolites, some ultramafic rocks (but no komatiite reported) and metasedimentary rocks (including exhalative sulphides and iron formations). Metasedimentary rocks are less abundant and the supracrustal rock units are not as continuous, when compared with K9. A suture zone has been suggested as being located in the Nordre Strømfjord area or in a zone just north of Illulissat (van Gool 2002; Connelly *et al.* 2006). No pentlandite has however been reported.

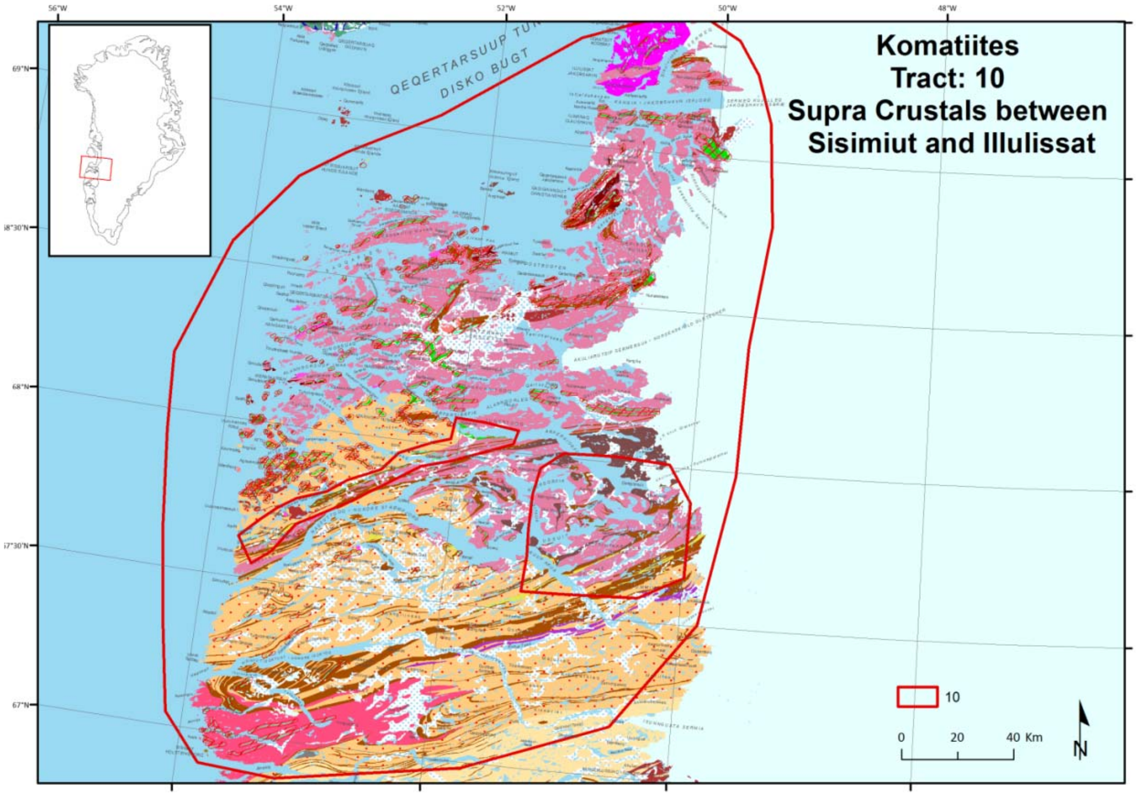


Figure 16. *Location of tract group K10 in southern West & central West Greenland. Hatched areas correspond to individual tracts. Tract K9 and K11 is located within the K10 tract. For full map legend refer to Kokfelt et al. (2013).*

Table 25. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K10 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					**Summary statistics**					**Tract Area (km^2)**	**Deposit density (N_{total}/km^2)**
N90	**N50**	**N10**	**N05**	**N01**	**N_{und}**	**s**	**Cv%**	**N_{known}**	**N_{total}**		
0	0	0	1	2	0.11	0.44	420.0	0	0.11	2,800	0.000038

Estimator	**Estimated number of undiscovered deposits**				
	N90	**N50**	**N10**	**N05**	**N01**
Individual 1	0	0	1	2	3
Individual 2	0	0	0	0	1
Individual 3	0	0	1	2	6
Individual 4	0	0	0	1	1
Individual 5	0	0	1	2	2
Individual 6	0	0	0	0	2
Individual 7	0	0	0	0	1
Individual 8	0	0	0	0	1
Individual 9	0	0	0	0	3
Individual 10	0	0	0	1	2
Individual 11	0	0	0	1	2
Individual 12	0	0	0	1	2
Individual 13	0	0	0	1	2
Individual 14	0	0	0	0	1
Individual 15	0	0	2	2	3
Individual 16	0	0	0	0	0
Individual 17	0	0	0	0	1
Individual 18	0	0	0	0	2
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**1**	**2**

Table 26. Results of Monte Carlo simulations of undiscovered resources for the K10 tract. [t = metric tons; Mt; megatonne or million tons]

Material	**Probability of at least the indicated amount**						**Probability of**	
	0.95	**0.9**	**0.5**	**0.1**	**0.05**	**Mean**	**Mean or greater**	**None**
Ni (T)	0	0	0	0	39,000	6,800	0.07	0.92
Rock (Mt)	0	0	0	0	1	0	0.07	0.92

K11 Ussuit – inner Nordre Strømfjord

Tract group K11 is situated within tract group K10 (see Figure 16).Tract group K11 is defined by several rather large ultramafic lenses (sizes from several metres up to c. 100 m in length, some up to several hundreds of metres long) that are located in the Ussuit area in the inner part of Nordre Strømfjord. Two types of ultramafic are described from the area (van Gool 2007; Kalsbeek & Manatschal 1999). One type is mainly dunitic to harzburgitic and is interpreted by Kalsbeek & Manatschal (1999) to represent mantle peridotites. The second type of ultramafic rocks is hornblendite which forms lenses within amphibolites and metasedimentary rocks. The amphibolites are reported to have preserved pillow-structures. The chemical composition of the latter type is reminiscent of komatiitic or picritic high-magnesium basalts (Kalsbeek & Manatschal 1999).

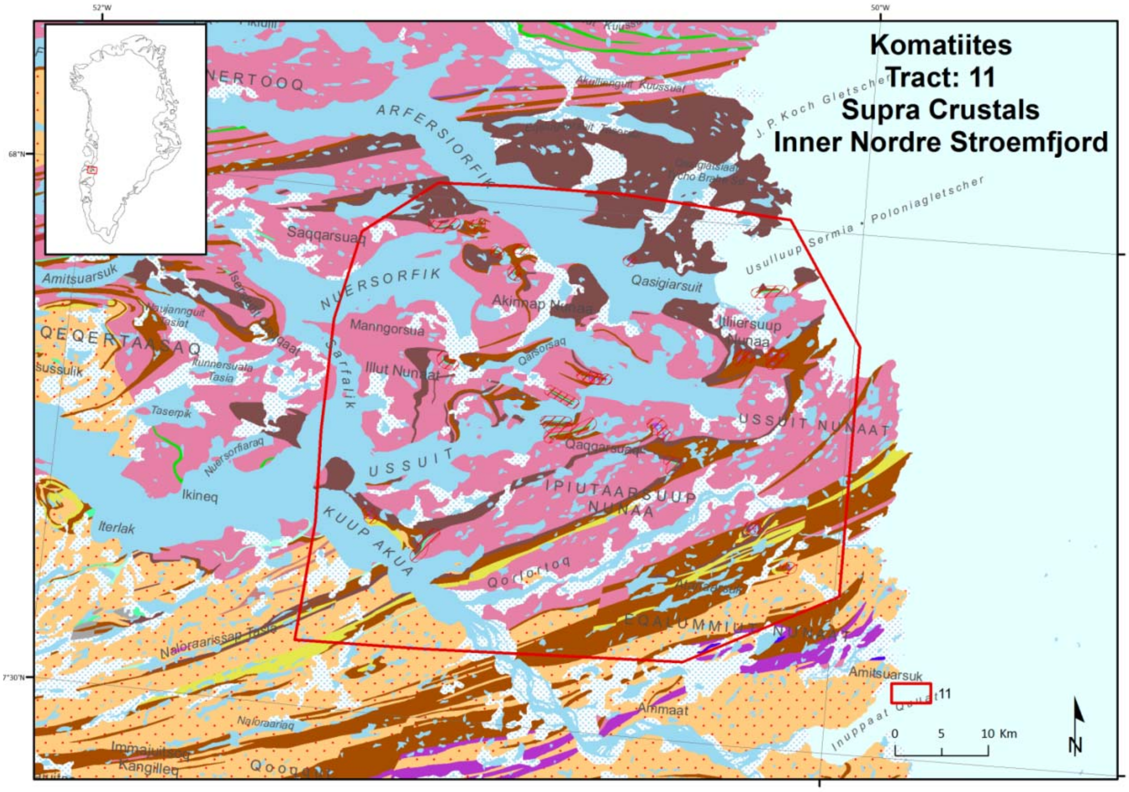


Figure 17. *Location of tract group K11 in southern West & central West Greenland. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Table 27. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K11 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	0	1	0.03	0.24	810.0	0	0.03	80	0.000400

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	1	2	5
Individual 2	0	0	0	0	1
Individual 3	0	0	0	0	1
Individual 4	0	0	0	0	1
Individual 5	0	0	0	0	1
Individual 6	0	0	0	0	2
Individual 7	0	0	0	0	0
Individual 8	0	0	0	0	1
Individual 9	0	0	0	0	1
Individual 10	0	0	0	0	1
Individual 11	0	0	0	0	1
Individual 12	0	0	0	0	1
Individual 13	0	0	0	1	1
Individual 14	0	0	0	0	1
Individual 15	0	0	0	1	1
Individual 16	0	0	0	1	1
Individual 17	0	0	0	0	0
Individual 18	0	0	0	0	1
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**0**	**1**

Table 28. Results of Monte Carlo simulations of undiscovered resources in the K11 tract. [t = metric tons; Mt; megatonne or million tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	0	2,100	0.03	0.97
Rock (Mt)	0	0	0	0	0	0	0.03	0.97

K12a Disko Bugt

The assessment panel decided to subdivide the initial tract group K12 into two tract groups: K12a and K12b. The first group, K12a, is defined from the distribution of Archaean supracrustal (undifferentiated), mafic and ultramafic units at the Disko Island and the north-eastern part of the Disko Bugt area, the greater Eqi area and at Kullorsuaq. The second group, K12b, is defined for the distribution of ultramafic rock units (lavas) within the basal part of Palaeoproterozoic Karrat Group.

Although tracts in the Eqi area, north-eastern part of the Disko Bugt, have seen some exploration, the potential for nickel deposits within the tracts is poorly known. The tracts include Archaean metasedimentary rocks and amphibolites in Disko Island, but also banded iron formation, exhalative sulphides and gold in the mainland. Ultramafic rocks are known, but no komatiites have been reported. There are stream sediment anomalies, but these are probably related to Ni-As sulphides in shear zones, which are hosted within ultramafic rocks. Many of the areas are not easily accessible.

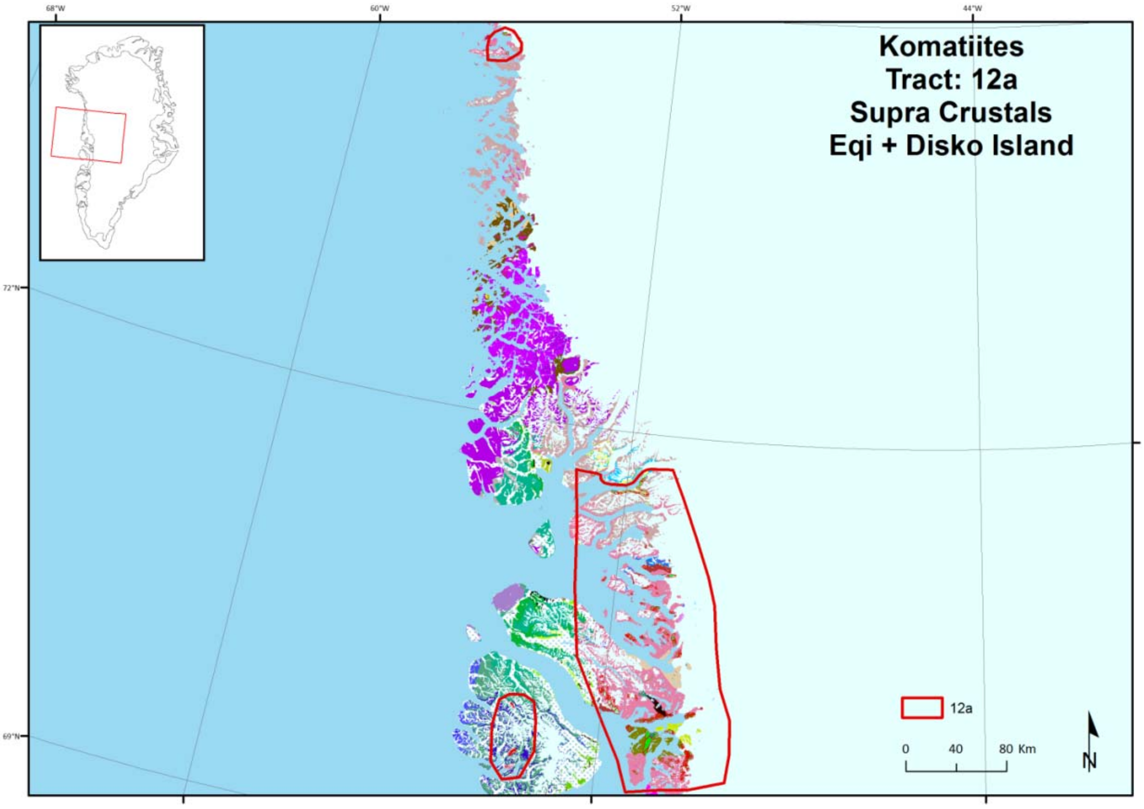


Figure 18. Location of the tract group K12a in central West and North-West Greenland. *For full map legend refer to Kokfelt et al. (2013).*

Table 29. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K12a tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	**N50**	**N10**	**N05**	**N01**	N_{und}	**s**	**Cv%**	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420.0	0	0.11	960	0.000110

Estimator	Estimated number of undiscovered deposits				
	N90	**N50**	**N10**	**N05**	**N01**
Individual 1	0	0	0	0	1
Individual 2	0	0	0	0	1
Individual 3	0	0	1	1	4
Individual 4	0	0	0	1	2
Individual 5	0	0	0	1	1
Individual 6	0	0	0	1	2
Individual 7	0	0	0	0	1
Individual 8	0	0	0	0	1
Individual 9	0	0	0	2	3
Individual 10	0	0	0	1	2
Individual 11	0	0	0	1	2
Individual 12	0	0	0	0	1
Individual 13	0	0	1	2	3
Individual 14	0	0	0	1	1
Individual 15	0	0	1	1	1
Individual 16	0	0	0	0	2
Individual 17	0	0	0	0	1
Individual 18	0	0	0	1	2
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**1**	**2**

Table 30. Results of Monte Carlo simulations of undiscovered resources in the K12a tract. [t = metric tons; Mt; megatonne or million tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	**0.9**	**0.5**	**0.1**	**0.05**	**Mean**	**Mean or greater**	**None**
Ni (T)	0	0	0	0	35,000	6,800	0.08	0.92
Rock (Mt)	0	0	0	0	1	0	0.07	0.92

K12b Karrat Group

See K12a for description of the subdivision of the initial tract group K12. Tract group K12b is defined from the distribution of ultramafic rocks (komatiitic, according to Cominco), in the basal part of Karrat Group. The Karrat Group was deposited in an early Proterozoic epicontinental basin, formed by rifting of the underlying Archaean gneiss basement, with a platform and shelf to deep basin sedimentary basin transition. The basal part consists of an extensive agglomeratic and pillow breccia sheet of tholeiite to komatiite composition, with thickness variations form 25-75 m to 400-600 m. Anomalous nickel values in stream sediment can possible be related to Tertiary lavas. The Karrat Group was also investigated by the company Cominco Ltd. for nickel mineralisation (Mosher & von Guttenberg 1994). VMS-type base metal mineralisation, banded iron formation and MVT-type base metal mineralisation is all well-known from the Karrat Group.

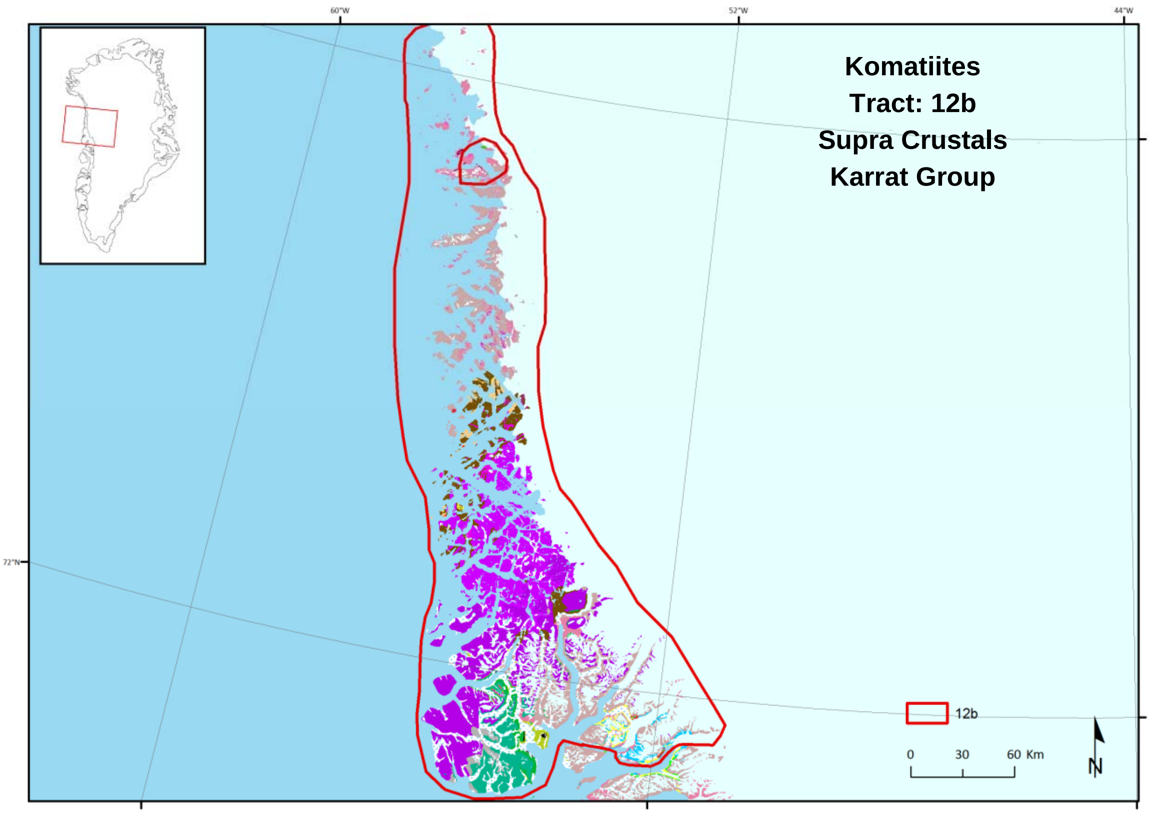


Figure 19. *Location of the 12b tract group in central West-North-West Greenland. For full map legend refer to Kokfelt et al. (2013).*

Table 31. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K12b tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420.0	0	0.11	20	0.005800

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	1	2	3
Individual 2	0	0	0	0	1
Individual 3	0	0	2	4	5
Individual 4	0	0	0	0	2
Individual 5	0	0	0	1	2
Individual 6	0	0	0	1	3
Individual 7	0	0	0	1	2
Individual 8	0	0	0	1	2
Individual 9	0	0	0	1	2
Individual 10	0	0	1	2	5
Individual 11	0	0	0	2	3
Individual 12	0	0	0	2	2
Individual 13	0	0	1	2	2
Individual 14	0	0	1	1	1
Individual 15	0	1	1	3	3
Individual 16	0	0	0	1	3
Individual 17	0	0	0	2	2
Individual 18	0	0	0	1	2
Individual 19	0	0	0	1	2
Consensus	**0**	**0**	**0**	**1**	**2**

Table 32. Results of Monte Carlo simulations of undiscovered resources in the K12b tract. [t = metric tons; Mt; megatonne or million tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	28,000	6,100	0.07	0.93
Rock (Mt)	0	0	0	0	1	0	0.07	0.93

K13 Melville Bugt

The Melville Bugt area constitutes a large and poorly known tract. The K13 tract includes amphibolite and banded iron formation. No ultramafics and metasedimentary rocks are known from the area. Additional information is needed to raise confidence in the potential of this tract.

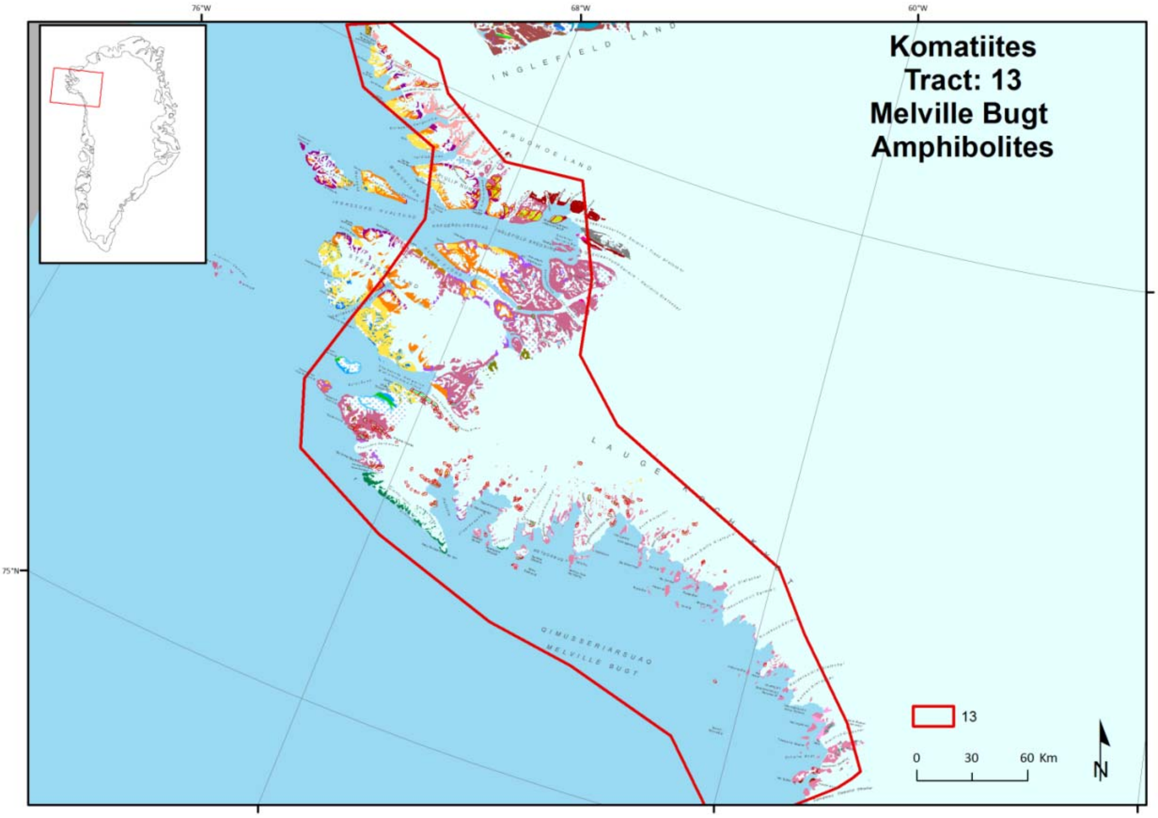


Figure 20. *Location of the K13 tract in North-West Greenland. For full map legend refer to Kokfelt et al. (2013).*

Table 33. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K13 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	0	1	0.03	0.24	810.0	0	0.03	730	0.000041

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	1
Individual 2	0	0	0	0	1
Individual 3	0	0	0	0	0
Individual 4	0	0	0	0	1
Individual 5	0	0	0	1	1
Individual 6	0	0	0	0	2
Individual 7	0	0	0	0	1
Individual 8	0	0	0	0	2
Individual 9	0	0	0	0	2
Individual 10	0	0	0	0	3
Individual 11	0	0	0	0	1
Individual 12	0	0	0	0	1
Individual 13	0	0	0	2	2
Individual 14	0	0	1	1	1
Individual 15	0	0	0	1	1
Individual 16	0	0	0	1	2
Individual 17	0	0	0	0	0
Individual 18	0	0	0	0	1
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**0**	**1**

Table 34. Results of Monte Carlo simulations of undiscovered resources in the K13 tract. [t = metric tons; Mt; megatonne or million tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	0	1,800	0.03	0.97
Rock (Mt)	0	0	0	0	0	0	0.03	0.97

K14 Inglefield Land

The tract group represents the Paleoproterozoic Inglefield Land mobile belt which is dominated by a complex intercalation of metasediments and meta-igneous rocks, forming an E–W-trending belt. The orogeny is characterized by polyphase magmatism, deformation and high-grade metamorphism (Dawes 2004). The individual tracts within the group represent mapped out mafic and ultramafic rock units. Two occurrences of pentlandite within ultramafic rocks and many gossans are known, but it is uncertain whether the potential lies with a komatiite-related mineralisation or a conduit-type mineralisation.

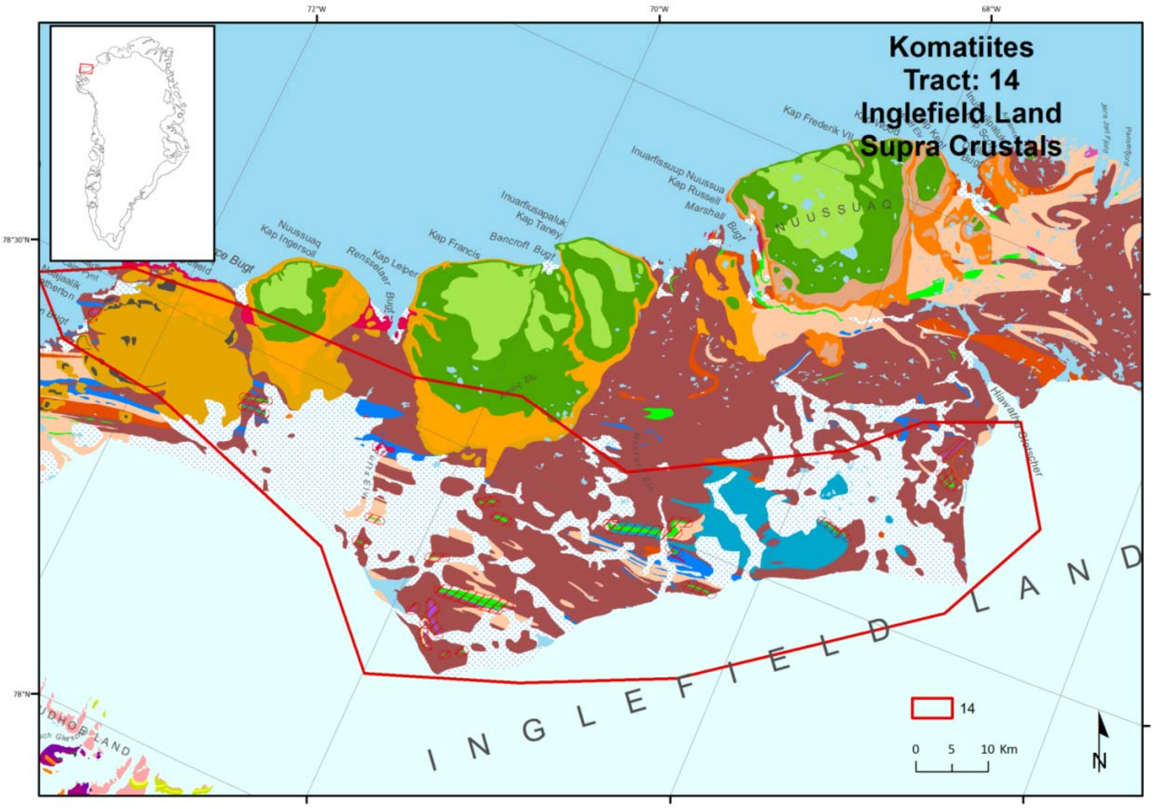


Figure 21. *Location of the K14 tract group in North-West Greenland. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Table 35. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K14 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area	Deposit density
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}	(km^2)	(N_{total}/km^2)
0	0	0	1	2	0.11	0.44	420.0	0	0.11	140	0.000770

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	1	2
Individual 2	0	0	0	0	1
Individual 3	0	0	0	1	1
Individual 4	0	0	1	2	3
Individual 5	0	0	0	1	2
Individual 6	0	0	0	2	3
Individual 7	0	0	0	0	3
Individual 8	0	0	0	0	1
Individual 9	0	0	0	1	3
Individual 10	0	0	1	3	5
Individual 11	0	0	0	0	1
Individual 12	0	0	0	2	2
Individual 13	0	0	0	1	2
Individual 14	0	0	0	1	1
Individual 15	0	0	0	1	1
Individual 16	0	0	0	1	2
Individual 17	0	0	0	0	2
Individual 18	0	0	0	1	2
Individual 19	0	0	0	1	1
Consensus	**0**	**0**	**0**	**1**	**2**

Table 36. *Results of Monte Carlo simulations of undiscovered resources in the K14 tract. [t = metric tons; Mt; megatonne or million tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	25,000	5,400	0.07	0.93
Rock (Mt)	0	0	0	0	1	0	0.06	0.93

K15 Tasiilaq – Contact halo

This tract is part of the Nagssugtoqidian Orogen in South-East Greenland and it contains the contact-halo of Paleoproterozoic supracrustal rocks surrounding the norite intrusions of the Ammassalik Igneous Complex. A suture zone has been suggested to be located just south of the igneous complex (Kalsbeek *et al*. 1993). Supracrustal rocks include sillimanite- and garnet-bearing paragneisses and komatiites pods or boudins. The latter hosts a concordant pentlandite-bearing mineralisation. Electromagnetic surveys over the mineralised settings have identified a good conductor which has not been drilled to date. Explored by NunaMinerals (1996 and 2007), INCO (2005) and is currently being explored by 21st North (2012).

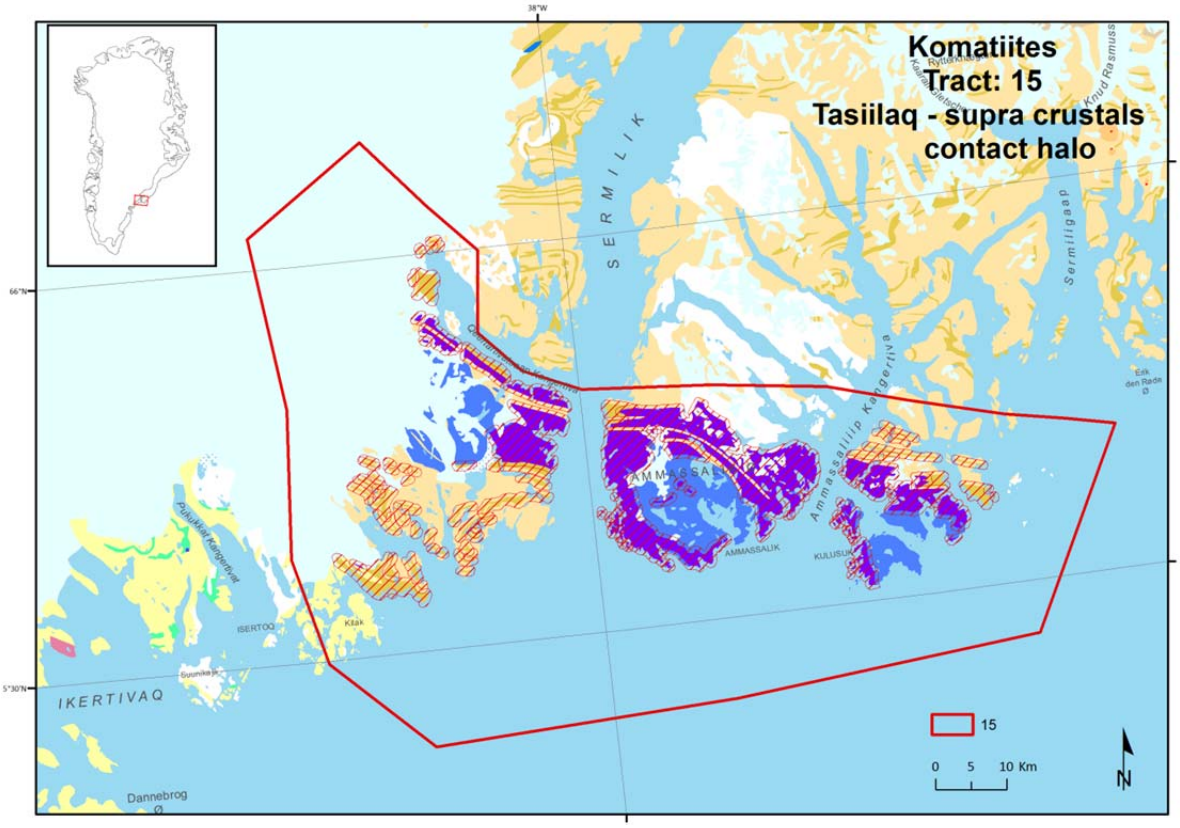


Figure 22. *Location of the K15 tract in South-East Greenland. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Table 37. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K15 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	1	1	3	0.36	0.75	210.0	0	0.36	1,040	0.000340

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	1	2	2	5
Individual 2	0	0	0	1	1
Individual 3	0	1	1	1	1
Individual 4	0	1	1	2	3
Individual 5	0	0	1	2	3
Individual 6	0	0	1	2	3
Individual 7	0	1	2	3	3
Individual 8	0	0	0	1	2
Individual 9	0	1	1	1	3
Individual 10	0	0	0	0	1
Individual 11	0	0	0	0	1
Individual 12	0	1	2	2	3
Individual 13	0	0	1	2	3
Individual 14	0	0	1	1	1
Individual 15	0	1	1	1	1
Individual 16	0	0	0	0	0
Individual 17	0	0	0	1	2
Individual 18	0	0	1	2	3
Individual 19	0	0	1	2	3
Consensus	**0**	**0**	**1**	**1**	**3**

Table 38. *Results of Monte Carlo simulations of undiscovered resources in the K15 tract.*
[t = metric tons; Mt; megatonne or million tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	64,000	120,000	21,000	0.21	0.70
Rock (Mt)	0	0	0	3	6	1	0.18	0.70

K16 Tasiilaq – N of contact halo

This tract is part of the Nagssugtoqidian orogen and contains the Paleoproterozoic supracrustal rocks to the north of the Ammassalik Igneous Complex. Similarly to K15, there is a conductor which has not been tested to date, despite the presence of boulders with nickel mineralisation and a nearby Proterozoic suture.

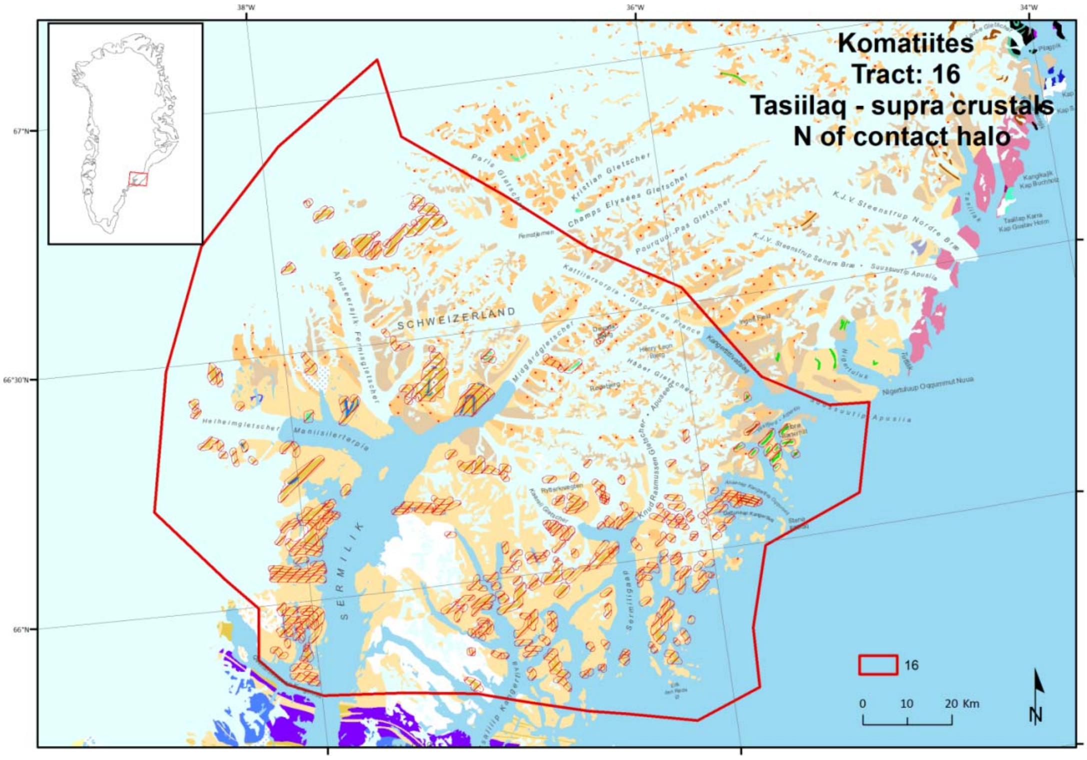


Figure 23. *Location of the K16 tract in South-East Greenland. Hatched areas correspond to individual tracts. For full map legend refer to Kokfelt et al. (2013).*

Table 39. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the K16 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420.0	0	0.11	1,550	0.000068

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	1	1	5
Individual 2	0	0	0	0	1
Individual 3	0	0	0	1	3
Individual 4	0	0	0	1	3
Individual 5	0	0	0	1	2
Individual 6	0	0	0	0	1
Individual 7	0	0	1	1	2
Individual 8	0	0	0	0	1
Individual 9	0	0	0	1	2
Individual 10	0	0	0	1	1
Individual 11	0	0	0	1	2
Individual 12	0	0	0	1	2
Individual 13	0	0	1	2	3
Individual 14	0	0	0	0	1
Individual 15	0	0	1	1	1
Individual 16	0	0	0	0	0
Individual 17	0	0	0	1	2
Individual 18	0	0	0	1	1
Individual 19	0	0	0	0	2
Consensus	**0**	**0**	**0**	**1**	**2**

Table 40. *Results of Monte Carlo simulations of undiscovered resources in the K16 tract. [t = metric tons; Mt; megatonne or million tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Ni (T)	0	0	0	0	32,000	5,700	0.07	0.93
Rock (Mt)	0	0	0	0	1	0	0.06	0.93

Assessment of contact-type deposits

Descriptive model

In contrast to the komatiite-hosted deposit type, the contact-type deposits tend to be of lower grade but higher tonnage nickel deposits. These deposits also have important PGE contents, and are mined mostly for these elements.

This deposit type corresponds to the intrusive settings of the magmatic continuum and is therefore hosted by plutonic rocks. These plutonic rocks are mafic to ultramafic and typically magmatically layered. Immiscible sulphide, which collects nickel, as well as other chalcophile elements such as copper and PGE, is formed as the result of fractional crystallization, magma mixing, assimilation of sulphur or contamination leading to increase in silica content. The nickel-copper-PGE enriched sulphides subsequently forms disseminated net-textured and massive sulphide concentrations, hosted by igneous rocks and country rocks, near the lower part or the margin of the layered intrusion. Irregular distribution of the sulphide concentrations in this deposit type makes it hard to establish volumes that are large enough to be mined and for this reason only the Platreef, in the Bushveld Complex, has been mined to date.

Tract distribution

The individual tracts represent an evaluation of known intrusions in Greenland. The intrusions are registered in the database of igneous intrusions in Greenland established by GEUS (www.greenmin.gl). A qualitative evaluation of the intrusions in the database, in order to identify intrusions with a potential for nickel prior to the workshop, was carried out by Troels F.D. Nielsen, GEUS (See Appendix D). Since the workshop was focused on nickel, intrusions with potential for copper over nickel, and likewise PGE over nickel (stratiform, reef-like, mineralisation), were filtered out during the evaluation and thus not included. The mineral deposit model that the evaluation focused on was the contract-type described by Zientek (2012). The filters that were applied can be summarized as:

Filter 1: Mafic and UM intrusive complexes with peridotites, norites, mafic gabbros and Mg-rich diorites are included (because Ni and Pt are lost during fractionation). The individual intrusions are assigned a size-classification of 0–10 km^2, 10-100 km^2 and >100 km^2 based on their judged/known extend.

Filter 2: The geochemical character is evaluated. Ultramafic and mafic melts are judged to have a higher potential for Ni over Cu and higher Pt/Pd ratio while more evolved basaltic melts are judged to have a higher potential for Cu over Ni and low Pt/Pd and Au.

Filter 3: The potential for contact-type (and stratiform) mineralisation. The potential for contact-type mineralisation occur in plugs, sills and feeder dyke systems as well as in larger non-layered and layered intrusions. However, in order to find a undiscovered deposit that will be large enough, considering the low-grade high-tonnage style that characterize the contact-type, it is judged that only the largest intrusions or intrusive complexes will have a potential. This means that smaller sized plugs, sills, feeder dykes and intrusions are discarded as having potential for contact-type undiscovered nickel mineralisation's large enough to form a deposit. The potential for stratiform mineralisations (reef-type) is considered to be linked to large and layered intrusions, which means that some of the larger intrusions judged to have a potential for conduit- type mineralisation also could have a potential for contact-type mineralisation.

Filter 4: A judgment of the level of knowledge for the different intrusions was carried out accordint to the classification schemes here below (Table 41).

Table 41. *Classification of level of knowledge for the different intrusions*

Knowledge level:	
0	No or very little information
1	Some information
2	Some information, also on mineralisation
3	Significant amounts of information

Filter 5: Classification and grouping of the overall potential for nickel was carried out, according to level of knowledge and geographical location (tracts that are grouped needed to be situated within the same regional setting) (Table 42).

Table 42. *Classification of overall potential for contact-type nickel mineralisation*

Overall potential	
1	Group expected to be without potential
2	Group that should be searched for potential
3	Group with signs of mineralisation, has potential

The polygons for the different tracts were defined as circles centered on the coordinates of the center of the intrusions/complexes as also given in the cited intrusion database. The size of the circle follows the division outlined in the Filter 1 step above. This crude division-was done because the outline of the intrusions very seldom is exact and in many cases not mapped out in the geological map at the scale of 1:500 000 that was used as the background map for the assessment (http://data.geus.dk/map2/geogreen/). Also, the assignment of the circles should take into account a possible extension to 1 km depth beneath the surface which was the threshold value for the assessment.

The defined initial individual tracts and tract groups for contact-type nickel mineralisation in Greenland can be seen in Figure 24. The intrusions that prior to the workshop were extracted as holding potential for contact-type nickel mineralisation are listed and described in more details in Appendix D.

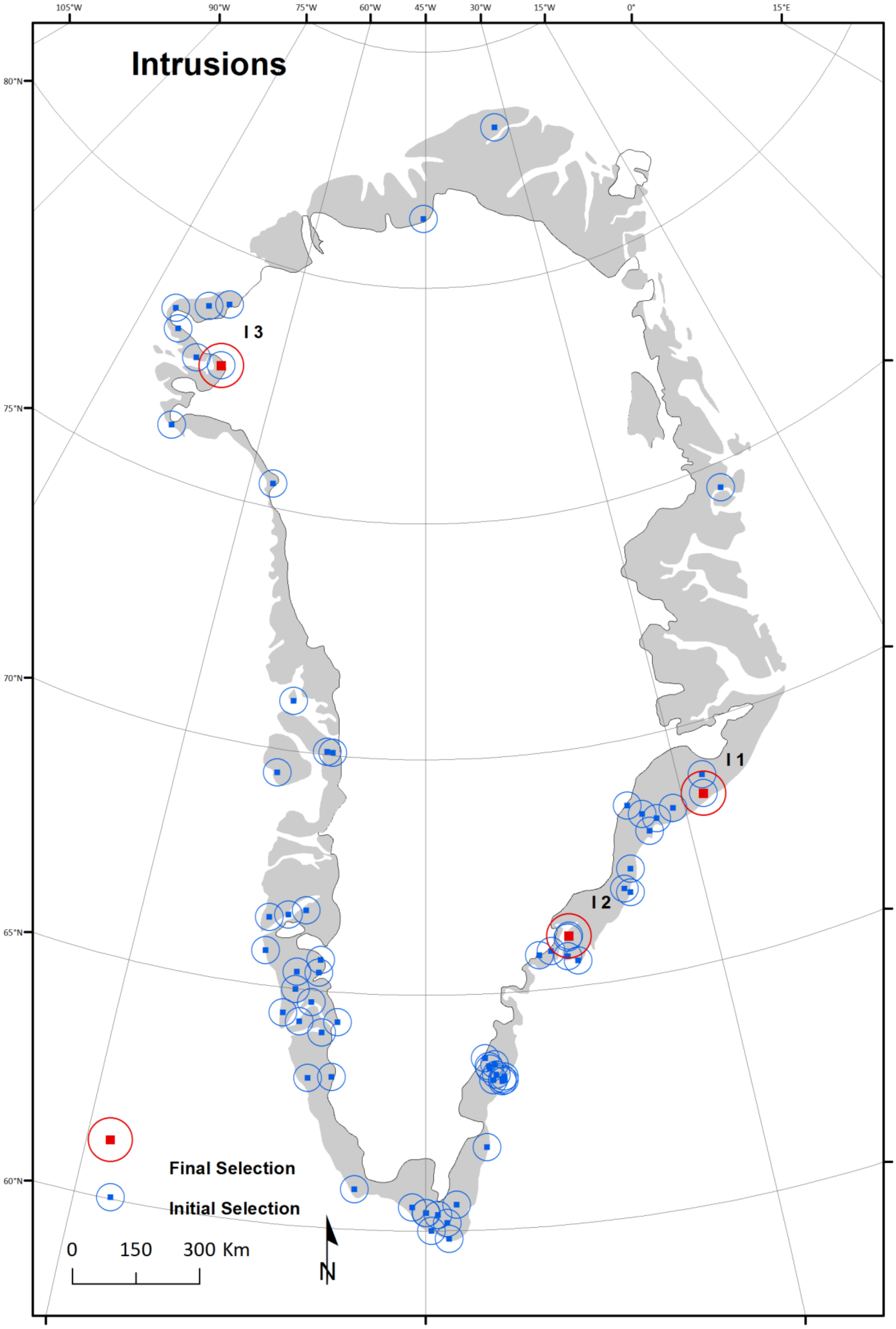


Figure 24. *Overview map of the defined initial and final individual tracts and tract groups for contact-type nickel mineralisation in Greenland.*

A total of 251 intrusions/intrusive complexes are registered in the database. Of these, 102 were judged prior to the workshop to have a potential for contact-type nickel mineralisation and 63 of these were judged to have a size larger than 100 km^2 (see Figure 24 and Appendix D).

During the discussion, the assessment panel found it most reasonable to only focus on very large intrusions/complexes and a threshold value of >500 km^2 was arbitrary chosen by the panel. It was also descided to take into account that large tonnages should be present to make a contact-type nickel deposit (pers. comm. by Zientek).

Only three intrusions were judged to be larger than 500 km^2. The three intrusions are: Innartivaq intrusive complex in the Tasiilaq area, South-East Greenland, Kap Edvard Holm intrusion in the Kangerlussuaq area, East Greenland and Qaqujârssuaq intrusion in the Thule area, North-West Greenland. These were the intrusions that were selected by the assessment panel to be assessed for undiscovered nickel deposits.

However, it should be mentioned that the selection of these three intrusions was based on a very quick assessment of their size, and that a more proper quantification of both the selected intrusions and those omitted should be considered in the future.

Individual tracts assessed during workshop

I1 Innartivaq intrusive complex

This tract includes the pre- to syntectonic Innartivaq intrusive complex gabbro-diorite-tonalite-granite intrusive complex, corresponding to a fertile magma, which was possibly contaminated by metasedimentary rocks. This complex was emplaced early in the Proterozoic evolution of the Tasiilaq region. It is exposed on the eastern shore of Sermilik Fjord and exposed in an approximately 10x10 km area. The deformation is used as evidence for it pre-deformation age. The complex also hosts a number of small gabbroic bodies, some of those showing minor sulphide mineralisation (unpublished, GEUS 2010). The complex has not been investigated.

Additionally, the large complex was emplaced near a terrane boundary to the south and, while pentlandite has been reported to occur associated with the gabbros, no geophysics or exploration has been carried out.

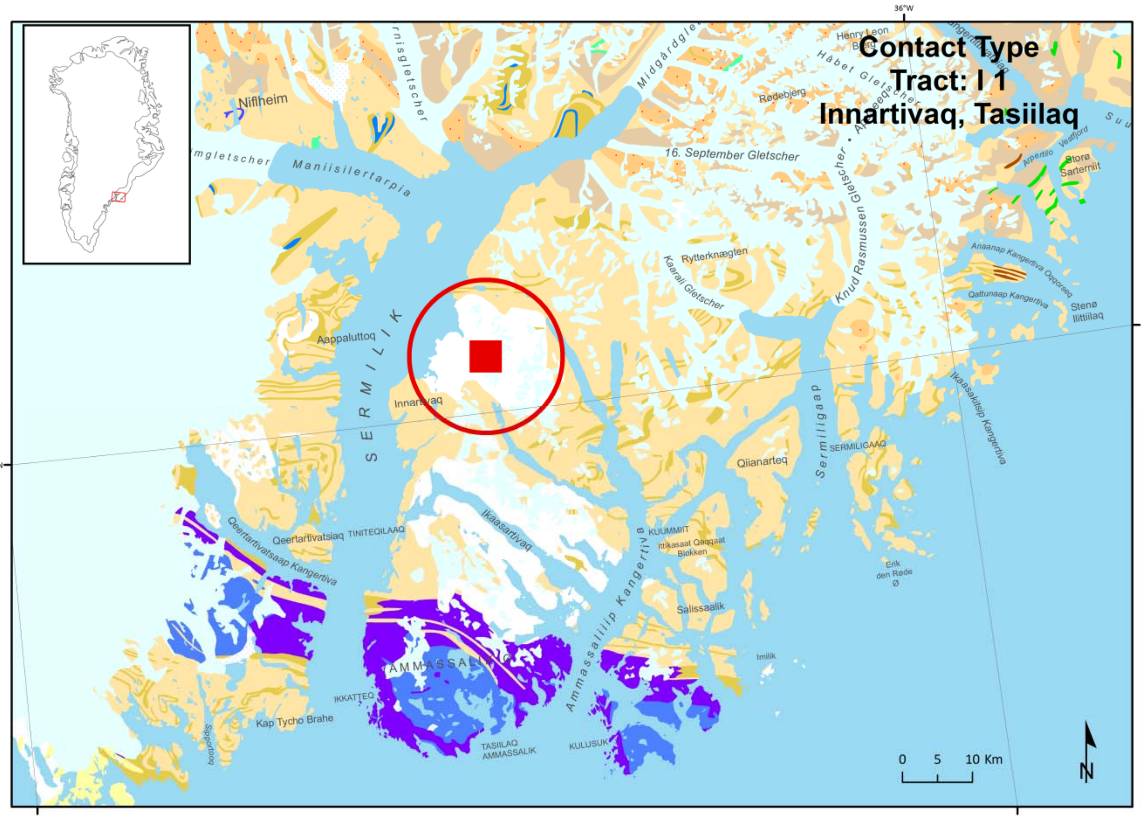


Figure 25. *Location of the I1 tract in South-East Greenland. For full map legend refer to Kokfelt et al. (2013).*

Table 43. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the I1 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420.0	0	0.11	500	0.000210

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	1
Individual 2	0	0	1	1	2
Individual 3	0	0	0	0	2
Individual 4	0	0	1	2	3
Individual 5	0	0	0	1	1
Individual 6	0	0	1	2	3
Individual 7	0	0	0	1	1
Individual 8	0	0	0	0	1
Individual 9	0	0	0	1	1
Individual 10	0	0	2	5	10
Individual 11	0	0	0	1	2
Individual 12	0	0	0	0	2
Individual 13	0	0	0	1	2
Individual 14	0	0	0	1	1
Individual 15	0	0	1	2	4
Individual 16	0	0	0	0	1
Individual 17	0	0	0	0	1
Individual 18	0	0	0	0	1
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**1**	**2**

Table 44. *Results of Monte Carlo simulations of undiscovered resources in the I1 tract. [t = metric tons; Mt; megatonne or million tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	0	130,000	53,000	0.06	0.92
Ni (T)	0	0	0	0	87,000	26,000	0.06	0.92
Rock (Mt)	0	0	0	0	55	20	0.06	0.92

I2 Kap Edvard Holm

The Kap Edvard Holm Paleogene Igneous Complex (~800 km^2) (Nevle *et al.* 1994; Tegner *et al.* 1998) is a large layered, tholeiitic gabbro complex, subsequently intruded by syenites, granite and wehrlite, corresponding to multiple magma pulses, injected over an extended time period (Bernstein *et al.* 1996). This igneous complex is hosted by Precambrian gneisses, near a triple junction. There is evidence for assimilation, namely contamination by S-rich sediments. Exploration by Platinova (1986-91) has led to the identification of ~40 km long zone with anomalous gold and platinum and a bonanza zone was drilled but its continuity was not confirmed. While the size and location of the system was considered as a positive aspect by some panel members, other saw the Tertiary age as negative aspect. Possibly because of this, the results of the individual estimates display a bimodal distribution, indicating that there is a minority of assessment panel members with a more optimistic view of the areas' potential, which is not necessarily evident in the consensus bid.

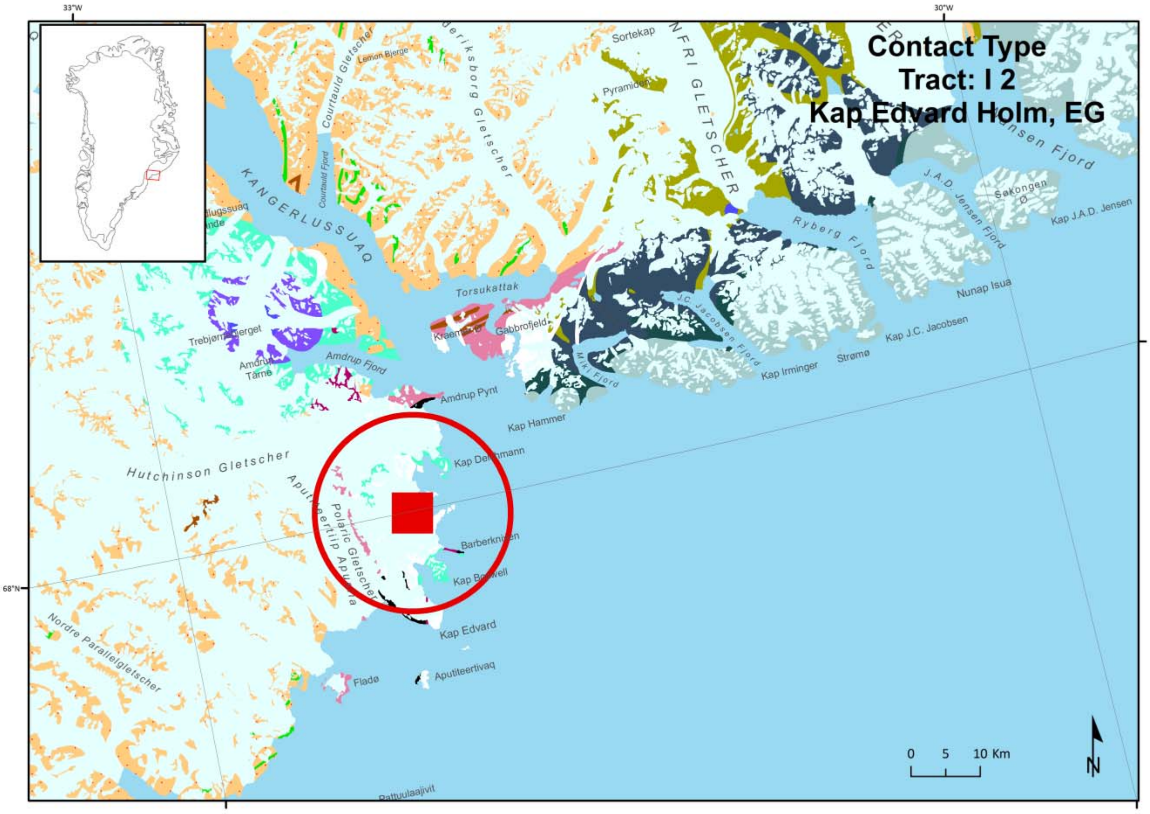


Figure 26. *Location of the I2 tract in the southern East Greenland. For full map legend refer to Kokfelt et al. (2013).*

Table 45. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the I2 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420.0	0	0.11	500	0.000210

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	1	1
Individual 2	0	0	1	1	2
Individual 3	0	0	0	0	2
Individual 4	0	0	0	1	2
Individual 5	0	0	1	1	2
Individual 6	0	0	1	2	3
Individual 7	0	0	0	0	0
Individual 8	0	0	0	0	0
Individual 9	0	0	1	1	1
Individual 10	0	0	1	2	3
Individual 11	0	0	0	1	2
Individual 12	0	0	1	1	3
Individual 13	0	0	0	1	2
Individual 14	0	0	0	1	2
Individual 15	0	0	0	1	1
Individual 16	0	0	0	1	1
Individual 17	0	0	0	0	2
Individual 18	0	0	0	1	2
Individual 19	0	0	0	0	2
Consensus	**0**	**0**	**0**	**1**	**2**

Table 46. *Results of Monte Carlo simulations of undiscovered resources in the I2 tract. [t = metric tons; Mt; megatonne or million tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	0	110,000	44,000	0.06	0.92
Ni (T)	0	0	0	0	84,000	26,000	0.06	0.92
Rock (Mt)	0	0	0	0	48	19	0.06	0.92

I3 Qaqujârssuaq intrusion

This Archean igneous complex (>1000 km^2) is mostly made of anorthosite with calcic plagioclase (An75), but also includes gabbro and leucogabbro (Dawes 1972; Dawes 2006; Nutman 1984). This igneous complex was intruded into gneisses, iron formations and other metasedimentary rocks. The tract is not cut by any terrane boundaries, and no large structures are known within the area. It has been very poorly explored.

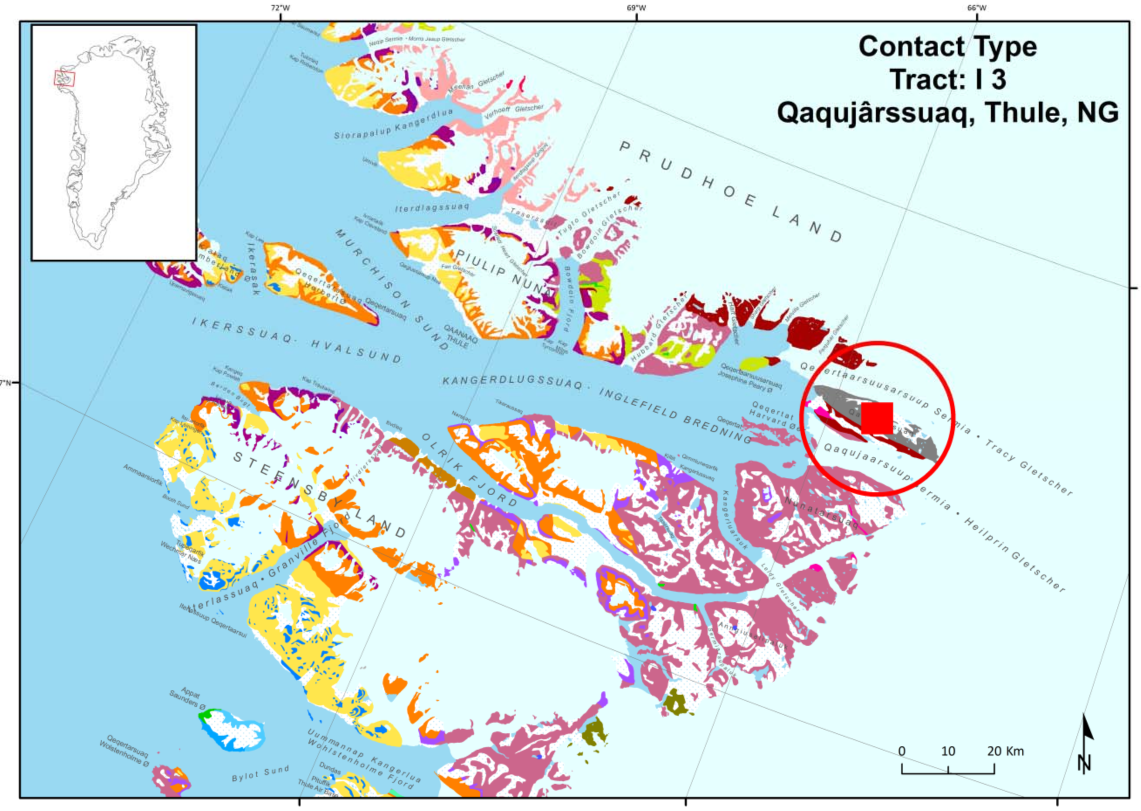


Figure 27. *Location of the I3 tract in North-West Greenland. For full map legend refer to Kokfelt et al. (2013).*

Table 47. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for the I3 tract. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					**Summary statistics**					**Tract Area (km^2)**	**Deposit density (N_{total}/km^2)**
N90	**N50**	**N10**	**N05**	**N01**	**N_{und}**	**s**	**Cv%**	**N_{known}**	**N_{total}**		
0	0	0	0	1	0.03	0.24	810.0	0	0.03	500	0.000060

Estimator	**Estimated number of undiscovered deposits**				
	N90	**N50**	**N10**	**N05**	**N01**
Individual 1	0	0	0	0	1
Individual 2	0	0	0	1	2
Individual 3	0	0	0	0	0
Individual 4	0	0	0	0	1
Individual 5	0	0	0	0	1
Individual 6	0	0	0	0	1
Individual 7	0	0	0	0	1
Individual 8	0	0	0	0	1
Individual 9	0	0	0	0	0
Individual 10	0	0	0	1	2
Individual 11	0	0	0	0	1
Individual 12	0	0	0	0	0
Individual 13	0	0	0	0	1
Individual 14	0	0	0	1	1
Individual 15	0	0	0	1	2
Individual 16	0	0	0	1	1
Individual 17	0	0	0	0	2
Individual 18	0	0	0	0	1
Individual 19	0	0	0	0	0
Consensus	**0**	**0**	**0**	**0**	**1**

Table 48. *Results of Monte Carlo simulations of undiscovered resources in the I2 tract. [t = metric tons; Mt; megatonne or million tons]*

Material	**Probability of at least the indicated amount**						**Probability of**	
	0.95	**0.9**	**0.5**	**0.1**	**0.05**	**Mean**	**Mean or greater**	**None**
Cu (T)	0	0	0	0	0	20,000	0.03	0.97
Ni (T)	0	0	0	0	0	8,100	0.03	0.97
Rock (Mt)	0	0	0	0	0	6	0.03	0.97

Assessment of deposits related to picrite and/or tholeiitic basalt dyke-sill complexes

Descriptive model

This deposit type typically has grades and tonnages that are intermediate between the komatiite-hosted type (high grade, low tonnage) and the contact-type deposits (low grade, high tonnage). Most of global nickel production can be accounted for by this deposit type. It includes deposits with the largest total nickel resource, among the magmatic nickel deposits, with giants such as Noril'sk and Pechenga (Russia), Jinchuan (China) and Voisey's Bay (Canada). The deposits of Sudbury (Canada) can also be considered to belong to this type; although a unique meteorite impact-related melt sheet has been proposed to be related to their emplacement (Naldrett 2004). For this reason, this latter deposit is not part of the grade/tonnage model.

This deposit type is associated with hypabyssal dykes or sills that are associated with large volumes of mafic magmatism (such as a continental flood basalt province). This style of mineralisation is also called conduit-type, a genetic name indicating that these deposits form in conduits in large magmatic systems. Since the amount of metal in the deposits cannot be derived from the limited volume of mafic melt in the associated intrusion this implies that some type of open system, with a large throughput of energy and matter, was present. The presence of such an open system can be recognized by the existence of bulk compositions which are not those of liquids and by the evidence for excess heat (thermal erosion and wide contact metamorphism aureoles). This means that nickel is effectively scavenged from streaming magma, through sulphide immiscibility driven by the assimilation with crustal sulphur.

Tract distribution

The initial tracts defined prior to the workshop were focussed on settings where large mafic magmatism has been documented in Greenland (figure 28). However, it was noted by the assessment panel that the conduit type deposits could have a more widespread potential in Greenland, and that many other regions could include prospective settings for this type of mineralisation.

Normally the permissive rock units would be used to delineate the individual tracts. But, as these are not truly reflected in regional map scales, it was therefore decided that it would be more appropriate to delineate the entire area that would be favourable for the settings and rock units that hold the potential for an undiscovered conduit-type nickel deposit.

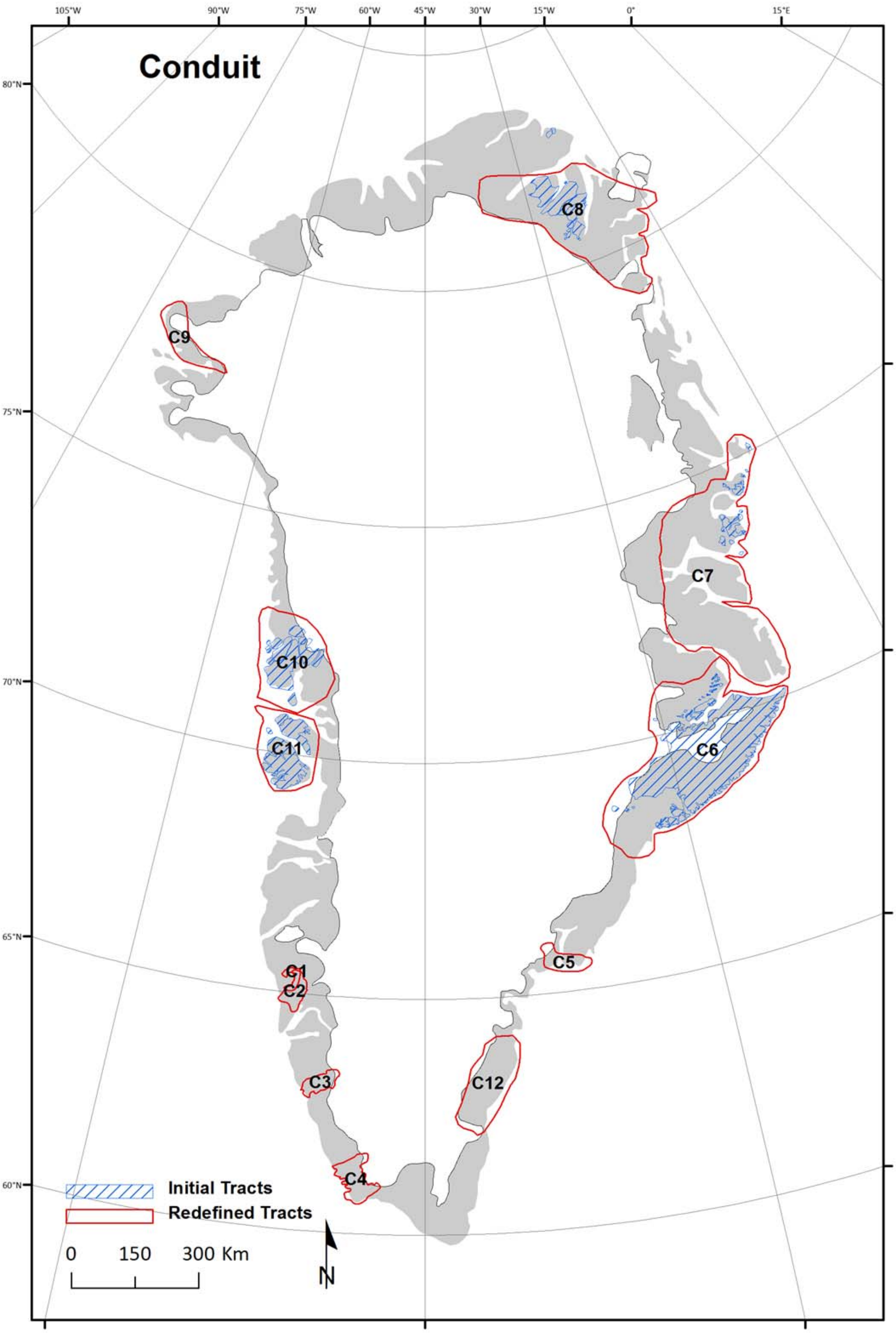


Figure 28. *Overview map of the initial and final redefined individual tracts and tract groups related to picrite and/or tholeiitic basalt dyke-sill complexes in Greenland.*

Individual tracts assessed during workshop

C1 Maniitsoq Norite Belt

The tract group C1 is defined by the distribution of rock units that are mapped out as belonging to the Maniitsoq Norite Belt; with the individual tracts representing these rock units. The Maniitsoq Norite Belt in southern West Greenland surrounds the impact structure described by Garde *et al.* (2012) (see also workshop presentation by Garde 2012). Although the meteorite impact was probably instantaneous, it triggered fracturing and magma ascension which was active for a long period (at least one magnetic reversal), so that different norite bodies have different compositions; predominately composed of norite and leucogabbro. Amphibolite layers are locally associated with the norites. There is evidence for crustal contamination of mafic to ultramafic magmas. Several nickel showings, associated with geophysical anomalies, have been reported, while other geophysical anomalies remain to be tested.

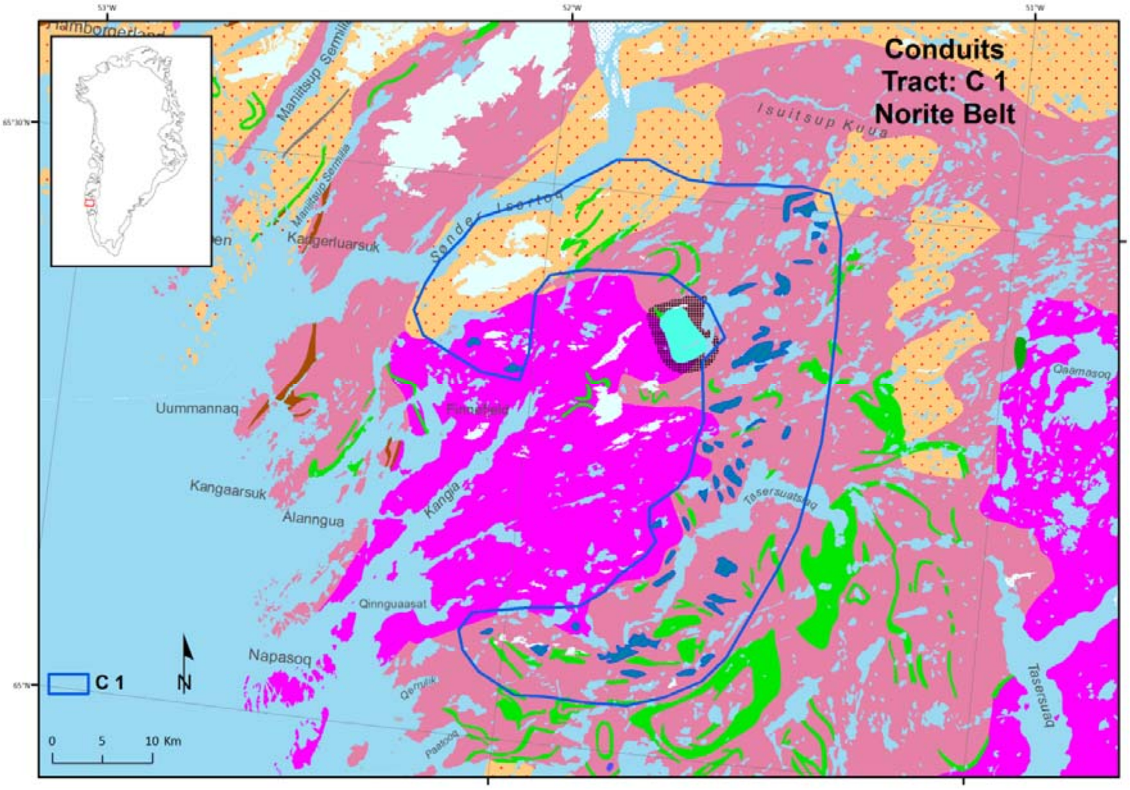


Figure 29. *Tract group C1 Maniitsoq Norite Belt. The individual norite bodies are shown in hatched blue. For full map legend refer to Kokfelt et al. (2013).*

In the 1950's and 1960's the company Kryolitselskabet Øresund investigated the area based on the identification of numerous rust zones derived from the mineralised norites and amphibolites in the area. Kryolitselskabet Øresund identified several surface nickel showings and conducted shallow electromagnetic anomalies. Based on this, the company drilled 119 shallow drill holes, which all but a few were drilled by portable Winkie drills. Average drill hole length was only 53 meters. Nevertheless, several nickel mineralised intersections were made. In 1995 the company Comico Ltd. flew a large portion of the Maniitsoq Norite

Belt with a GeoTEM fixed wing, airborne EM system. A few EM anomalies were detected and limited follow-up and surface geophysical surveys did not identify any drill targets.

Falconbridge Ltd. carried out work in 2000 but did not identify any drill targets. The company North American Nickel Inc. carried out follow-up on the historical results and new helicopter-borne TEM and magnetic surveying in 2011 and 2012. Several conductive bodies were identified and a few of them have also subsequently been drilled to-date. This work has identified several nickel prospects with encouraging results which North American Nickel Inc. is currently working on (see workshop presentation by Pattison 2012).

Table 49. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for tract C1. The tract area given here is the areal extent of all the individual norite bodies. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					**Summary statistics**					**Tract Area (km^2)**	**Deposit density (N_{total}/km^2)**
N90	**N50**	**N10**	**N05**	**N01**	**N_{und}**	**s**	**Cv%**	**N_{known}**	**N_{total}**		
0	1	2	3	5	1.1	1.2	110	0	1.1	50	0.025

Estimator	**Estimated number of undiscovered deposits**				
	N90	**N50**	**N10**	**N05**	**N01**
Individual 1	0	1	2	2	3
Individual 2	0	0	2	2	2
Individual 3	1	1	2	2	4
Individual 4	0	1	1	3	5
Individual 5	0	1	2	3	6
Individual 6	0	0	2	2	2
Individual 7	0	1	2	2	4
Individual 8	0	1	2	5	10
Individual 9	0	1	1	2	3
Individual 10	0	1	2	3	5
Individual 11	0	1	2	3	5
Individual 12	1	1	3	3	4
Individual 13	0	2	3	4	5
Individual 14	0	1	1	2	2
Individual 15	1	1	2	4	6
Individual 16	0	0	0	2	2
Individual 17	1	2	5	7	10
Individual 18	0	0	2	3	5
Individual 19	0	1	3	3	4
Consensus	**0**	**1**	**2**	**3**	**5**

Table 50. *Results of Monte Carlo simulations of undiscovered resources in Tract C1.*
[T – metric tons, Mt – million metric tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	44,000	770,000	1,300,000	270,000	0.22	0.33
Ni (T)	0	0	81,000	1,300,000	2,400,000	490,000	0.21	0.31
PGE (T)	0	0	0	46	99	19	0.17	0.60
Rock (Mt)	0	0	11	210	470	74	0.22	0.30

C2 Fiskefjord

The individual tracts in the C2 tract group represent several larger ultramafic bodies as well as layered and non-layered mafic to ultramafic complexes, which represent deformed layered intrusions. The ultramafic bodies are dominantly dunite and peridodite, with Mg-rich olivine. No nickel occurrences have been reported from the ultramafic bodies. These rocks are intruded in amphibolite and gneiss, with only very limited contact with metasedimentary rocks. The mafic-ultramafic complexes have been interpreted to represent layered intrusions. These are host to several PGE mineralisations which in some cases also are enriched in nickel with whole rock samples returning up to 2.8% Ni. However, no larger nickel mineralisation is known. There is a terrane boundary just to the south of this tract group. The Maniitsoq impact crater structure is located just north of the tract group. No apparent relationship to a large igneous province.

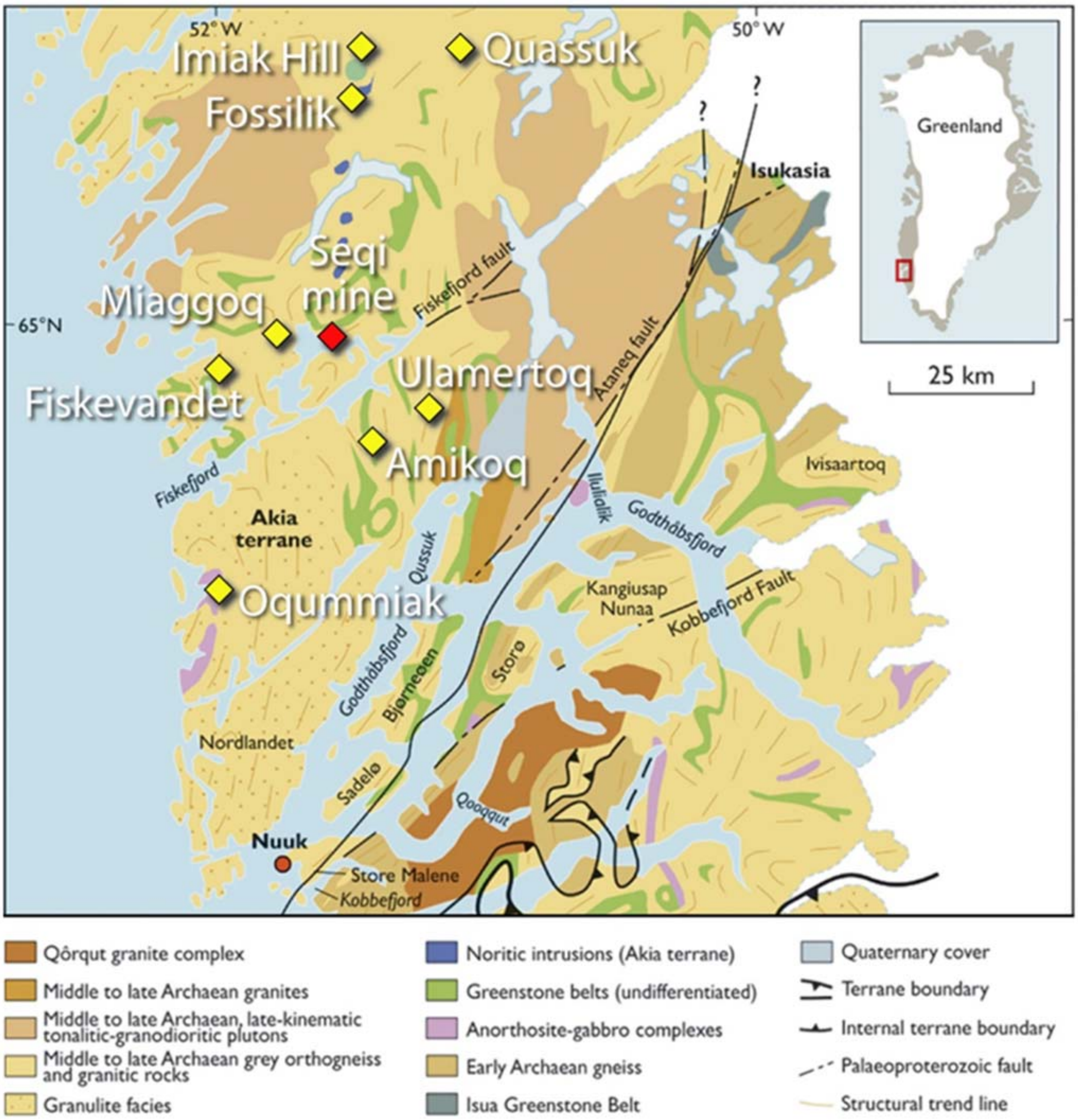


Figure 30. *Overview of the some of the major known nickel-PGE prospects in the Fiskefjord–Maniitsoq region. Map from workshop presentation by Christiansen (2012). Imiak Hill, Fossilik and Quassuk are all prospects in norites. The Miaggoq, Fiskevandet, Ulamertoq, Amikoq and Oqummiak are all nickel-PGE showings/prospects within mafic to ultramafic non-layered and layered rock units.*

Exploration in the period 2005–2009 by NunaMinerals A/S was focused on PGE; with secondary target being chromium and nickel mineralisation. NunaMinerals identified a large layered complex in the southern part of the tract. This is referred to as the Amikoq layered intrusions. A PGE-reef mineralisation was discovered in this intrusion. Other nickel-PGE targets were also identified by NunaMinerals in the tract. In the north-eastern part of Tract C2 there have been several exploration campaigns on the norite hosted mineralisation. Some of the mafic amphibolite units in this area are neighbouring the norites and may be associated with these. The Seqi Olivine Mine, now abandoned but in production from 2005 to 2009, is located in a large dunite body in the central part of Tract C2.

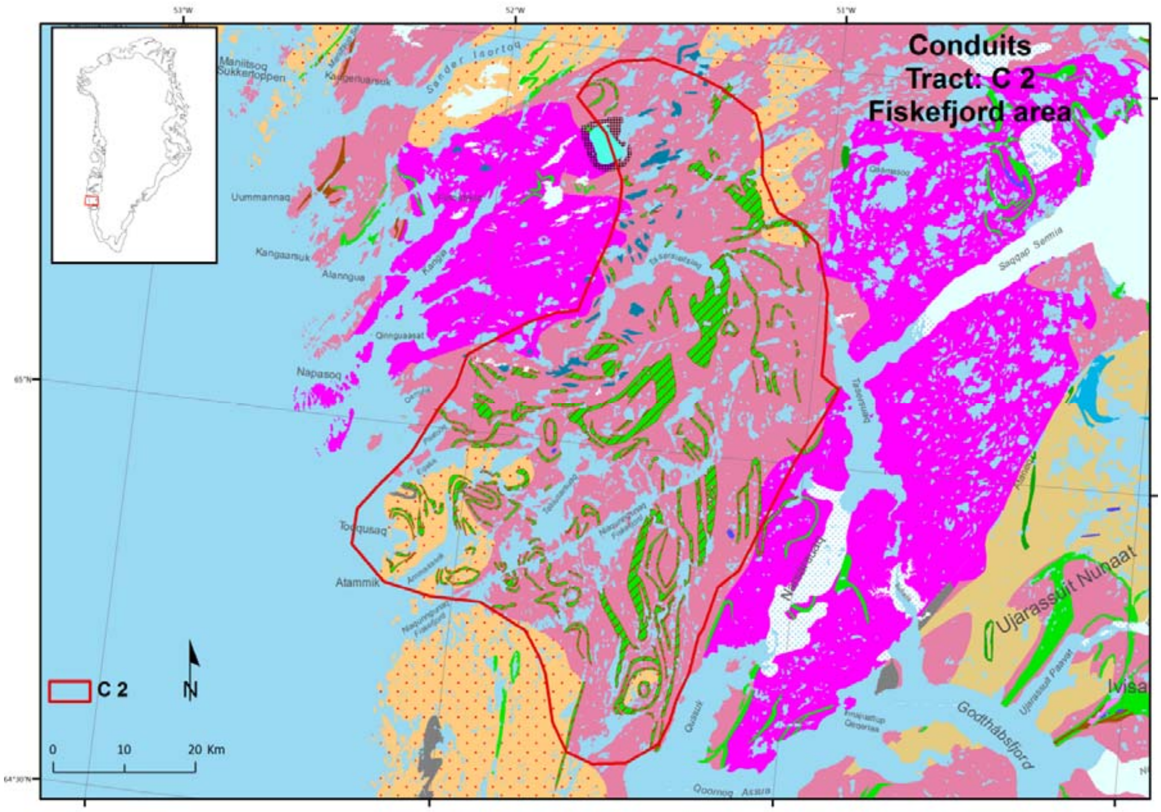


Figure 31. *Tract C2 Fiskefjord. The individual mafic and ultramafic rock units are shown by hatched green polygons. For full map legend refer to Kokfelt et al. (2013).*

Table 51. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for Tract C2. The tract area given here is the areal extent of all the individual mafic and ultramafic rock units. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	1	0.075	0.32	420	0	0.075	420	0.00018

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	0
Individual 2	0	0	0	1	2
Individual 3	0	0	0	1	2
Individual 4	0	0	0	0	1
Individual 5	0	0	0	0	1
Individual 6	0	0	0	2	2
Individual 7	0	0	0	0	1
Individual 8	0	0	0	1	2
Individual 9	0	0	0	1	2
Individual 10	0	0	0	0	1
Individual 11	0	0	0	0	2
Individual 12	0	0	0	0	1
Individual 13	0	0	0	1	2
Individual 14	0	0	0	1	1
Individual 15	0	0	0	1	1
Individual 16	0	0	0	1	2
Individual 17	0	0	0	0	1
Individual 18	0	0	0	1	3
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**1**	**1**

Table 52. *Results of Monte Carlo simulations of undiscovered resources in Tract C2. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	0	22,000	15,000	0.06	0.93
Ni (T)	0	0	0	0	44,000	27,000	0.06	0.93
PGE (T)	0	0	0	0	0	1	0.02	0.97
Rock (Mt)	0	0	0	0	6	5	0.05	0.93

C3 Fiskenæsset

The Fiskenæsset intrusion was considered too small to host a median-sized contact deposit-type deposit (the threshold value was chosen to be 500 km^2). However, the assessment panel found it reasonable to evaluate this tract for the conduit-type nickel mineralisation. This is a rather large layered anorthosite complex with a present-day exposed strike of over 200 km (with anorthosites, leucogabbros, gabbros and ultramafic rocks), with some dykes interpreted to be feeders to it. The complex has likely been connected with a large igneous event/system. The complex is hosted in a high-grade tonalitic gneiss basement. The roof of the complex is found immediately below flows of mafic amphibolite units that in some cases have preserved lava pillow-structures. Ultramafic units are also part of the succession overlying the complex. The complex was emplaced at 2973±28 Ma (Polat *et al.* 2010). The complex was intruded by tonalitic-granodioritic sheets (TTG) and subsequently strongly deformed, so that individual layers are discontinuous.

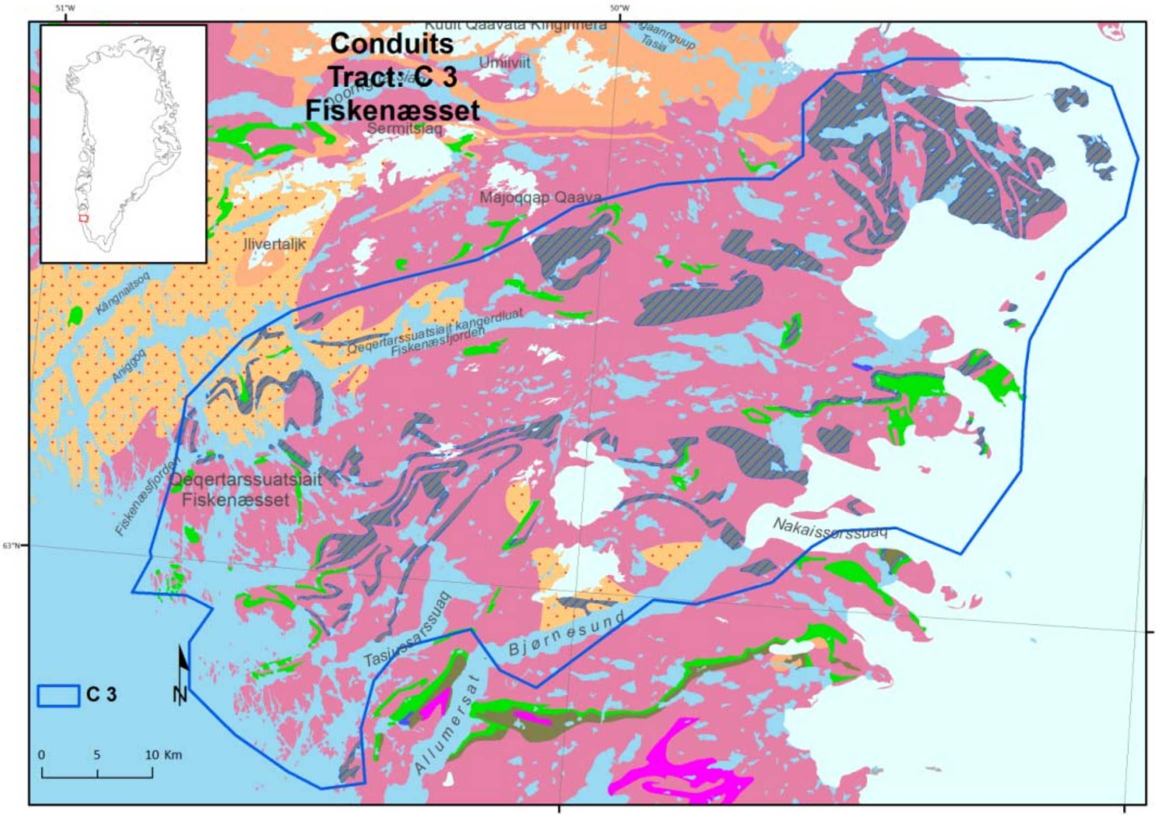


Figure 32. *Tract C3 Fiskenæsset. The individual anorthosites, leucogabbros, gabbros and ultramafic rocks units of the Fiskenæsset intrusion are shown by hatched gray polygons. For full map legend refer to Kokfelt et al. (2013).*

In the 1970's the exploration company Platinomino A/S (1969–72) searched for Ni-PGE deposits within the complex. This work lead to the discovery of PGE and chromite occurrences. However, these occurrences were only slightly anomalous in nickel, and therefore most of the subsequent work was focused on the PGE and chromite potential. Many of the areas with significant ultramafic bodies are still uninvestigated for their nickel potential. GGU/GEUS carried out work in 1991 and 2008–9. This work was also mostly focused on the PGE potential. The exploration company 21st North carried out work in 2010 and could add (C. Østergaard pers. comm.) that they, during their work in the coastal part of the area, had found smaller massive sulphide pods with nickel values above 1% and copper values up to 0.8% within the ultramafics from the lower part of the Fiskenæsset Anorthosite complex itself.

Table 53. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for Tract C3. The tract area given here is the areal extent of all the individual anorthosites, leucogabbros, gabbros and ultramafic rocks units. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420	0	0.11	350	0.0003

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	2
Individual 2	0	0	0	0	1
Individual 3	0	0	1	2	3
Individual 4	0	0	1	2	3
Individual 5	0	0	0	0	1
Individual 6	0	0	1	2	5
Individual 7	0	0	0	0	1
Individual 8	0	0	1	2	3
Individual 9	0	0	1	2	3
Individual 10	0	0	0	1	2
Individual 11	0	0	0	0	1
Individual 12	0	0	0	1	2
Individual 13	0	0	0	1	2
Individual 14	0	0	1	2	2
Individual 15	0	0	0	0	1
Individual 16	0	0	0	1	1
Individual 17	0	0	0	0	1
Individual 18	0	0	1	1	2
Individual 19	0	0	0	0	2
Consensus	**0**	**0**	**0**	**1**	**2**

Table 54. *Results of Monte Carlo simulations of undiscovered resources in Tract C3. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	0	76,000	26,000	0.07	0.92
Ni (T)	0	0	0	0	130,000	46,000	0.07	0.92
PGE (T)	0	0	0	0	0	1	0.03	0.96
Rock (Mt)	0	0	0	0	18	7	0.07	0.92

C4 Older Gardar dykes

The older, less evolved, Gardar dykes intruded Archaean basement rocks, at ~1350 Ma. The younger Gardar dykes were by the assessment panel considered too evolved to hold the potential to host nickel mineralisation of the conduit-type. The tract group is defined by the extent of the older part of the Gardar dykes. The Gardar dyke suite is known to comprise troctolite and syenite dykes. The troctolite dykes are similar to the host lithology of the Voisey's Bay nickel intrusion in Labrador. The tract group is located north of the proposed failed Gardar rift-strucure itself of the Gardar Province which has been regarded as the Greenland counterpart of the Nain Plutonic Suite that hosts the Voiseys' Bay Nickel-Copper deposit. But, this correlation is mainly based on location and ages of the rocks, but both the tectonic settings (Gardar rift versus Nain Plutonic Suite back-arc or anorgenic-arc settings) and lithological characteristics (alkaline suite versus anorthosite-mangerite-charnockite-granite) are different. The emplacement of the Gardar dykes within an extensional regime is considered less favorable for the formation of nickel deposits, as energy and flux gets dispersed. However, the assessment panel found that the spatial proximity and contemporaneity with the Voisey's Bay intrusions warrants an assessment. The area has been well explored but no occurrences have been documented to date.

The companies; Diamond Fields Resources and Inco. Ltd. carried out reconnaissance work in 1995–1996 for Voisey's Bay type nickel mineralisation in the area. No larger nickel mineralisations were recorded. However, the extent of the work carried out was rather limited.

In 2005, the Australian company Hunter Minerals Pty Ltd, inspired by the location of the Voisey's Bay nickel-copper deposit in Labrador and possible similar mineral accumulations in the Proterozoic Gardar Province, identified several hitherto unknown magnetic and electro-magnetic geophysical anomalies in the Isortoq area east of the Nunarsuit peninsula, in South Greenland. However, drilling did not identify any nickel mineralisation, but rather confirmed the presense of quite extensive magnetite-rich troctolites contained within graben-faulted lopolithlic intrusions.

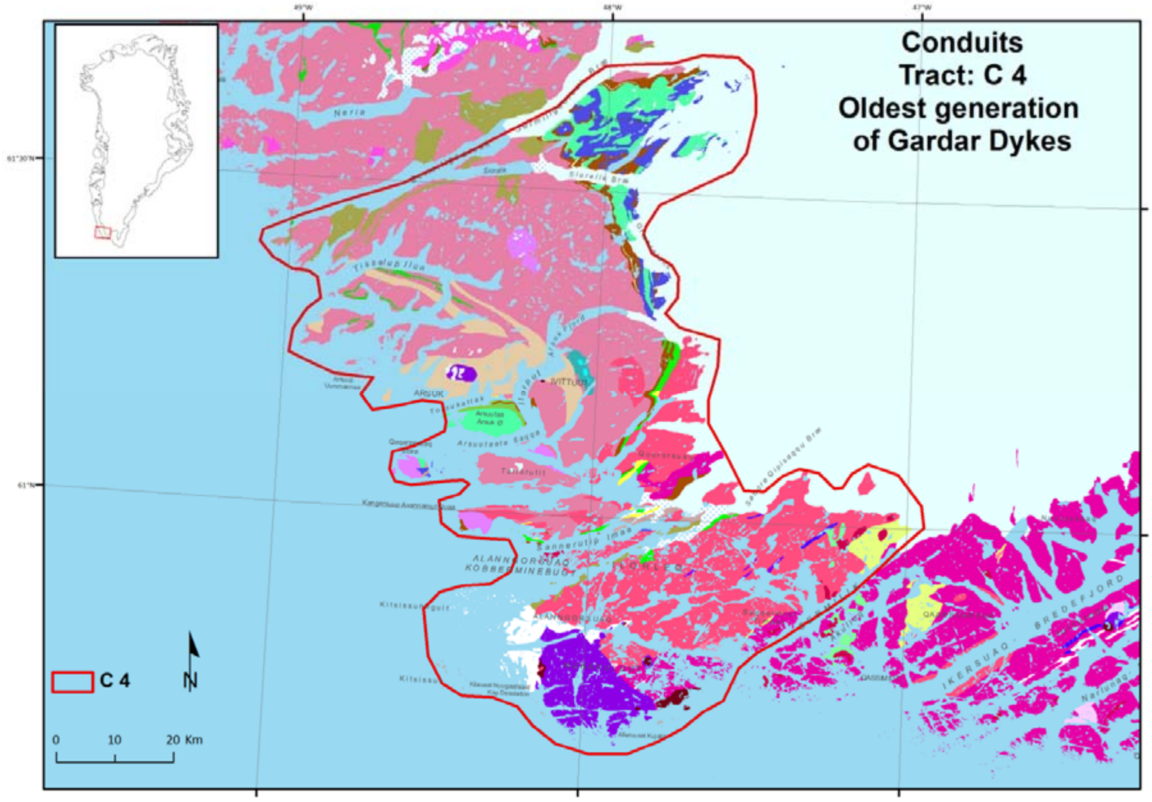


Figure 33. *Tract C4 Older Gardar dykes. The outline in red defines the extent of the part of the older generation of Gardar dykes which were assessed during the workshop for conduit-style nickel mineralisation. For full map legend refer to Kokfelt et al. (2013).*

Table 55. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for Tract C4. The tract area given here is the areal extent comprises by the outlined tract group in Figure 33. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420	0	0.11	6,570	0.000016

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	1
Individual 2	0	0	0	0	1
Individual 3	0	0	1	1	3
Individual 4	0	0	1	2	3
Individual 5	0	0	0	0	1
Individual 6	0	0	0	1	2
Individual 7	0	0	0	0	1
Individual 8	0	0	0	1	2
Individual 9	0	0	0	0	2
Individual 10	0	0	1	1	1
Individual 11	0	0	0	2	3
Individual 12	0	0	1	1	2
Individual 13	0	0	0	0	1
Individual 14	0	0	0	0	1
Individual 15	0	0	0	1	1
Individual 16	0	0	0	0	0
Individual 17	0	0	0	0	1
Individual 18	0	0	0	0	1
Individual 19	0	0	0	0	2
Consensus	**0**	**0**	**0**	**1**	**2**

Table 56. *Results of Monte Carlo simulations of undiscovered resources in Tract C4. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	0	48,000	23,000	0.06	0.93
Ni (T)	0	0	0	0	87,000	43,000	0.06	0.93
PGE (T)	0	0	0	0	0	2	0.03	0.96
Rock (Mt)	0	0	0	0	11	6	0.06	0.92

C5 Ammassalik Igneous Complex

In addition to the nickel potential within the contact halo of supracrustal rocks surrounding the Ammassalik Igneous Complex, assessed as part of tracts K15 and K16, there is also evidence for nickel mineralisation within the diorite, granodiorite and hybrid rocks of the intrusions of the igneous complex itself. These syntectonic intrusive bodies were emplaced at 1886 Ma (Hansen & Kalsbeek 1989), right on the trace of an important suture. The complex is composed of three exposed slightly ovoid formed plutonic centers arranged in an echelon pattern about 35 km apart on a WNW-ESE trend. These centers are voluminous, covering an area of ~100 km^2 (possibly more under water or under inland ice), and interpreted to be mantle-derived. Their roof zones bear evidence of hydrothermal activity, and are filled with inclusions of assimilated country rocks and there is also evidence for back-veining, which indicate that the magma has been contaminated. The assimilated country rocks include supracrustal rocks, namely sillimanite- and garnet-bearing paragneisses, likely to have contributed sulphur. Pentlandite has been reported. Most of the exploration and geophysical surveys in the area has been limited and focused on the country rocks (the contact halo of supracrustal rocks) for komatiite-related deposits, rather than in the norite bodies, for deposits related to conduit-type nickel mineralisation. The stream sediment coverage is poor, due to the rugged nature of the terrain and small catchment areas.

Most of the exploration in the Ammassalik area has been focused on the southern half of the Ammassalik Island, especially within the southern contact aureole of the Ammassalik Igneous Complex. However, regional geochemistry programs have identified several other anomalous areas in nickel, copper, cobalt and gold. NunaOil A/S conducted work in the region in 1995–1997. Before that, rock samples from the public hunt for minerals program Ujarrassiorit had produced several elevated nickel and gold values from the area. NunaOil A/S conducted an extensive stream sediment/scree sediment geochemical exploration program in this period and identified several areas with elevated nickel, copper and cobalt as well as gold. In 1997, now under the name NunaMinerals A/S, during follow-up on the regional geochemical exploration program, floats of serpentinite with massive sulphide mineralisation with up to 1% Ni, 0.5% Cu and 615 ppm Co were discovered on the south coast of Ammassalik Island. The findings were followed-up in 1998, leading to the identification of the source of the mineralisation in form of a 90 m long exposed mineralised sulphide lens. A Winkie-drill program was unsuccessful, due to logistical problems and lack of funding, ultimately forcing NunaMinerals A/S to leave the project.

In 2003, the companies PF&U and Diamond Fields Int. went into a joint-venture and acquired an exploration license covering the southern half of Ammassalik- and Kulusuk Island. Besides geological follow-up on the earlier discovered mineralisation, helicopter-borne combined magnetic and electromagnetic surveys were also carried out by these companies. These investigations identified several other nickel-mineralised targets along strike on the southern half of Ammassalik Island, and also identified a new nickel prospective area on the eastern side of Sermilik fjord, east of Ammassalik Island. The work was continued in 2005, now also with Inco Inc. as a partner in the joint-ventrue. A short drilling program on the south coast of Ammassalik Island was carried out, but failed to intersect significant mineralisation. However, it is thought that this failure could be due to a misinterpretation of the mineralised structure (pers. comm. Anders Lie, 21st North 2012). After the failed drilling program the joint venture partners gave up the license.

NunaMinerals A/S took up the license again in 2007 and did a mobile metal ion (MMI) soil sampling survey over the mineralised zones on the southern Ammassalik Island. This survey suggested that the isolated nickel mineralisations at surface might be connect at depth. Additional mineralisation was found along strike by NunaMinerals A/S. No further work was conducted by NunaMinerals A/S and the license was relinquished, until 21st North took up the license again in 2012.

The nickel mineralisation has been described as being a komatiitic-hosted nickel occurrence. It was noted by members of the assessment panel that not much work had been done within the granodiorite-diorite-norite rocks of the Ammassalik Igneous Complex, even though also mineralised samples and geochemical anomalies were known from this setting. Also, it was noted that most work had been concentrated on the southern part of Ammassalik Island and that similar host rock units were found throughout the island and further to the north.

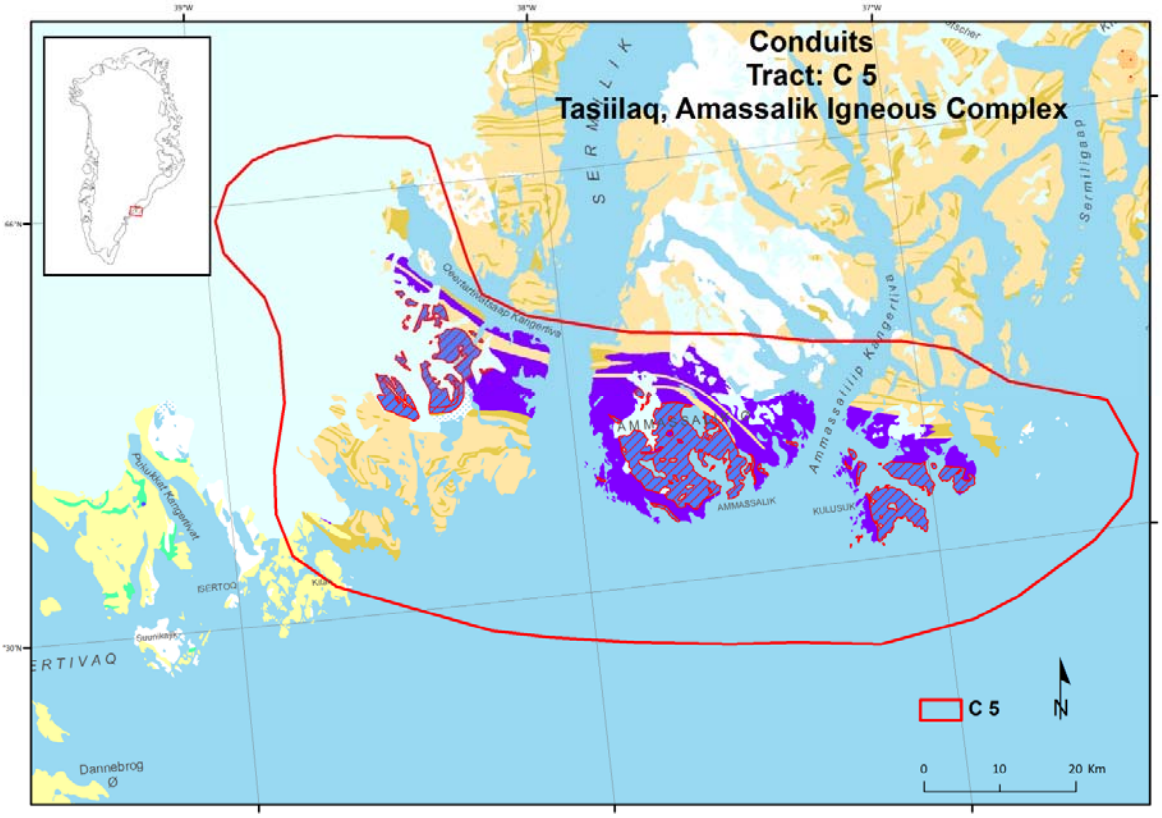


Figure 34. *Tract C5 Ammassalik Igneous Complex. The exposed mapped out intrusive rocks of the complex are shown as red-hatched areas. For full map legend refer to Kokfelt et al. (2013).*

Table 57. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for tract C5. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	1	2	3	0.41	0.82	200	0	0.41	250	0.0017

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	1	1	3
Individual 2	0	0	0	0	1
Individual 3	0	1	1	2	3
Individual 4	0	1	1	2	2
Individual 5	0	0	1	2	3
Individual 6	0	0	0	2	2
Individual 7	0	0	0	2	2
Individual 8	0	0	0	0	1
Individual 9	0	0	2	3	4
Individual 10	0	0	0	1	2
Individual 11	0	0	1	2	3
Individual 12	0	0	1	1	3
Individual 13	0	0	1	2	3
Individual 14	0	1	2	3	5
Individual 15	0	0	0	0	1
Individual 16	0	0	1	2	3
Individual 17	0	0	0	2	2
Individual 18	0	0	0	1	2
Individual 19	0	0	0	1	3
Consensus	**0**	**0**	**1**	**2**	**3**

Table 58. *Results of Monte Carlo simulations of undiscovered resources in Tract C5. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	170,000	440,000	90,000	0.15	0.72
Ni (T)	0	0	0	290,000	840,000	160,000	0.15	0.71
PGE (T)	0	0	0	4	23	7	0.09	0.86
Rock (Mt)	0	0	0	44	150	25	0.13	0.71

C6 Southern part of the East Greenland Flood Basalt Province

A large tract defined by the presence of Paleogene flood basalts and associated intrusions (including dykes and sills), which largely reflect depleted and uncontaminated magmas, mostly intruded into crystalline basement. As the setting in which the Paleogene flood basalts are emplaced into is different to the north and to the south of Scoresby Sund, the panel established a boundary at this fjord. To the south of this fjord, the Palaeogene intrusions and lavas were emplaced in a narrow and rather shallow sedimentary basin (tract C6), while to the north they were emplaced in a more extensive and deep sedimentary basin, with successions up to 18 km thick (tract C7).

The flood basalts are up to c. 7 km thick and consist of more than 260 flows that cover an area of more than 65,000 km^2. Major sill complexes occur in the Mesozoic to Palaeocene sediments below the flood basalts. More than sixty layered gabbro intrusions associated with the Palaeogene volcanic rift have been recorded in East Greenland. The plutonic suite range from ultramafic to felsic, from depleted basaltic to highly alkaline, and from upper crustal intrusion to sub-volcanic centres and breccia pipes with related epithermal vein systems. The magmas were sulphur undersaturated and, for most magmas, nickel seems to be controlled by olivine fractionation, only the Urbjerget Lavas depart from the olivine line of control on the MgO-Ni diagram (See Figure 35), suggesting that Ni may have been lost to sulphides in these rocks (see workshop presentation by Tegner 2012).

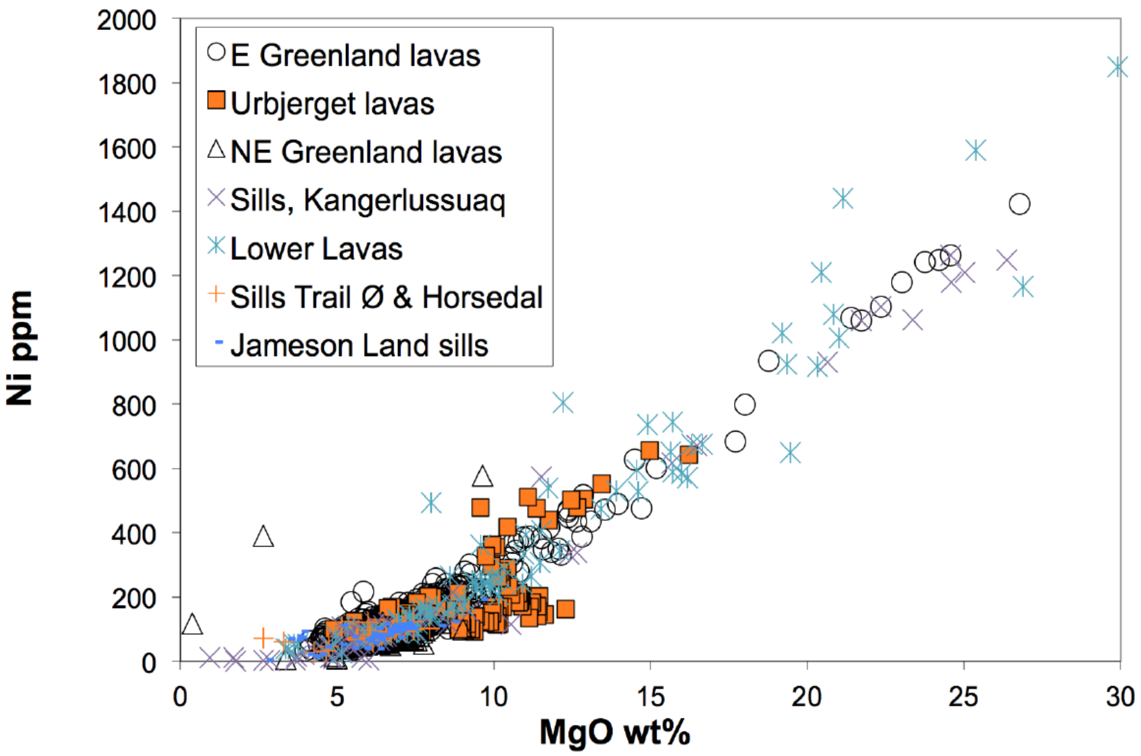


Figure 35. *Ni versus MgO diagram. Only the Urbjerget lavas depart from the olivine line of control, suggesting that Ni may have been lost to sulphides (see workshop presentation by Tegner 2012).*

The so-called Macro dykes, which is a voluminous dyke swarm that radiate away from the supposed centre for the mantle-plume head at the time of continental breakup, is also part of this tract. These dykes are up to 500 m wide and continuous. They show good signs for crustal assimilations and hybridization, and they are intruded into sandstone and black shales. Copper and nickel mineralisations are known from the Macro dykes, e.g. from the Miki Fjord Dyke, near the Skaergaard layered intrusion discovered and worked by the company Platina Resources Plc in 2008–2009, which returned grades of up to 1 g/t Pt, 3.3 g/t Pd 2.09% Cu and 0.74% Ni. However, no larger continuous mineralisation has been found. Geophysical targets have been identified in one of the Macro dykes by Platina Resources. There has been a long history of exploration, especially in the Kangerlussuaq (68°N) and to some extent down to Nualik (67°N). Most of this work has focused on the PGE exploration with the discovery of the PGE and gold mineralised Skaergaard layered intrusion as the main discovery. However, several other mafic intrusions in the area show PGE mineralisation, but so far no nickel mineralisation has been found.

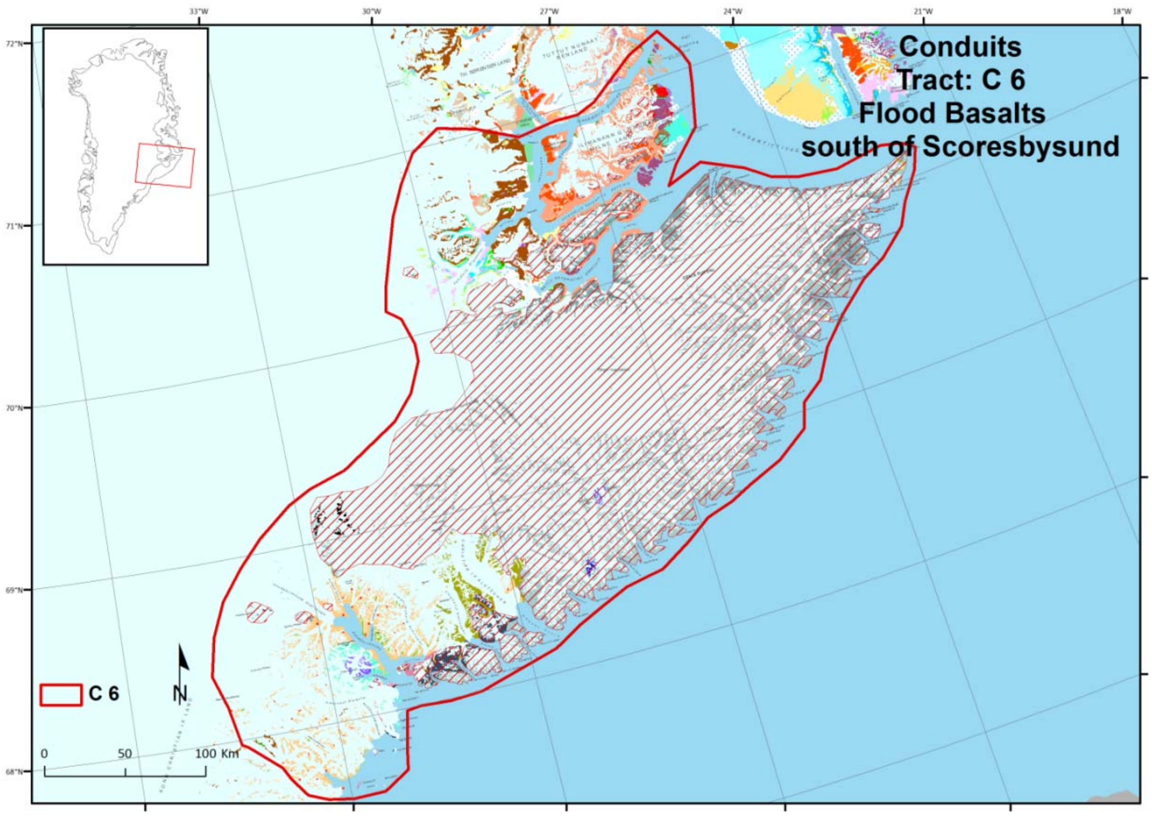


Figure 36. *Location of the Tract C6 in the southern part of the East Greenland Flood Basalt Province. The exposed mapped out flood basalts are shown as red-hatched polygons. For full map legend refer to Kokfelt et al. (2013).*

Table 59. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for tract C6. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420	0	0.11	50,790	0.0000021

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	1
Individual 2	0	0	1	1	1
Individual 3	0	0	0	1	3
Individual 4	0	0	0	1	1
Individual 5	0	0	0	1	2
Individual 6	0	0	0	1	2
Individual 7	0	0	0	0	0
Individual 8	0	0	0	0	1
Individual 9	0	0	0	0	2
Individual 10	0	0	0	1	1
Individual 11	0	0	0	0	1
Individual 12	0	0	0	0	2
Individual 13	0	0	1	2	3
Individual 14	0	0	0	0	1
Individual 15	0	0	0	1	2
Individual 16	0	0	0	0	1
Individual 17	0	0	0	1	2
Individual 18	0	0	0	1	3
Individual 19	0	0	0	1	3
Consensus	**0**	**0**	**0**	**1**	**2**

Table 60. *Results of Monte Carlo simulations of undiscovered resources in Tract C6. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	0	56,000	24,000	0.06	0.92
Ni (T)	0	0	0	0	95,000	43,000	0.06	0.92
PGE (T)	0	0	0	0	0	2	0.04	0.96
Rock (Mt)	0	0	0	0	13	6	0.06	0.92

C7 Northern part of the East Greenland Flood Basalt Province

This tract group includes the northern part of the East Greenland Flood Basalt Province. The southern boundary of the tract group is situated at the fjord Scoresby Sund (70°N) whereas the northern boundary is defined as the northernmost outcrops of flood basalts at Shannon Ø (75°N). The entire tract has presumably been covered by flood basalts but, presently, these have been eroded and there is a gap in the flood basalt cover between Scoresby Sund fjord and Kong Oscars Fjord; north of here these are only partly missing. The flood basalt in the C7 tract group were largely deposited on top of Precambrian to lower Palaeozoic basement rocks and a large Devonian to Carboniferous sedimentary rift-basin. The sedimentary successions reach a thickness of 16–18 km. Large Palaeogene (52 Ma) tholeiitic sill- and dyke complexes are intruded throughout the region. Seismic surveys have shown that the tholeiitic sheets of the sill-complexes in the central part of the sedimentary basin reach thicknesses of 300 m; with decreasing thickness towards the margin of the basin. The dyke- and sill-complexes are apparently younger than the flood basalts. The flood basalts reflect largely depleted, uncontaminated and sulphur undersaturated magmas (see Figure 35).

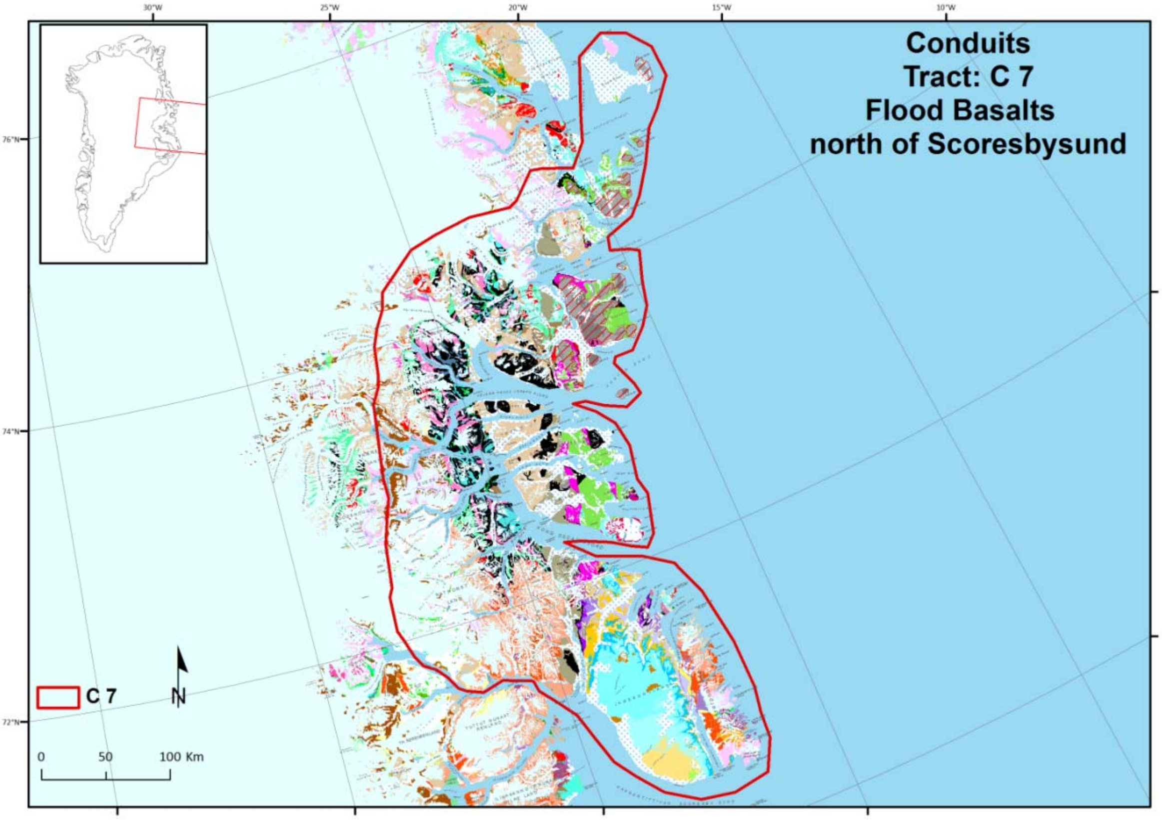


Figure 37. *Location of the Tract C7 in the central part of East Greenland. The exposed and mapped out flood basalts are shown as red-hatched polygons. For full map legend refer to Kokfelt et al. (2013).*

Between 1952 and 1984 the whole of East Greenland, between latitudes 70°N and 74°30'N, was held as an exclusive exploration and exploitation concession by Nordisk Mineselskab A/S (Nordmine). The large body of data that accumulated in Nordmine's archives during this period has been well summarized in a review by Harpøth *et al.* (1986). These exploration activities resulted in the discovery of many mineral showings distributed throughout the geological time range represented in NE Greenland (early Archaean to mid-Tertiary) – however only a few are associated with the East Greenland Flood Basalt Province and none of these includes nickel. After 1984, there has been very limited exploration in NE Greenland. The few programs that have been carried out can be summarized as follows:

In 1991 RTZ Mining and Exploration ran an exploration program in Jameson Land and the northernmost part of the Blosseville coast lavas, aimed at finding Cu-Ni and platinum group metal deposits (Coppard 1991). Numerous sills were examined including a previously undiscovered 200 meter thick sill in northern Jameson Land. All were found to be barren and stream sediment surveys also failed to return interesting results. The concession was subsequently dropped.

During the summer of 1992, the Nunaoil A/S and Pasminco Australia Ltd in joint venture conducted reconnaissance exploration in the Kap Simpson and Kap Parry volcanic complexes. No major finds were identified and the concession was subsequently dropped.

Between 1996 and 1998 Tertiary Gold Ltd and Inco Ltd. explored the magmatic Ni, Cu, Co and platinum group mineralisation potential at Hold With Hope, including the intrusive centres at Myggebugta and Kap Broer Ruys. Only a few samples anomalous in gold were identified but no interesting Ni-results.

Table 61. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for tract C7. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	2	0.11	0.44	420	0	0.11	2,510	0.000042

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	1	1
Individual 2	0	0	0	1	1
Individual 3	0	1	1	2	4
Individual 4	0	0	0	2	3
Individual 5	0	0	0	0	1
Individual 6	0	0	0	1	2
Individual 7	0	0	0	0	0
Individual 8	0	0	0	0	1
Individual 9	0	0	0	0	1
Individual 10	0	0	1	2	2
Individual 11	0	0	0	0	2
Individual 12	0	0	0	1	1
Individual 13	0	0	0	1	2
Individual 14	0	0	0	1	2
Individual 15	0	0	2	3	4
Individual 16	0	0	0	0	2
Individual 17	0	0	1	2	3
Individual 18	0	0	0	1	3
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**1**	**2**

Table 62. *Results of Monte Carlo simulations of undiscovered resources in Tract C7. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	0	62,000	22,000	0.07	0.92
Ni (T)	0	0	0	0	110,000	40,000	0.07	0.92
PGE (T)	0	0	0	0	0	1	0.04	0.95
Rock (Mt)	0	0	0	0	13	6	0.06	0.92

C8 Eastern North Greenland Zig-Zag Dal Basalt Formation

A large tract defined by the distribution of the Zig Zag Dal Basalt Formation and Midsommersø Dolerites, emplaced during Mesoproterozoic rifting in the Independence Fjord Basin. Most magmas appear to have been sulphur undersaturated, as the occurrence of native copper in the flood basalts testifies. However, a showing of pentlandite and bornite has been reported (Tapani Tukiainen pers. comm.). The presumably plume-related tholeiitic flood basalt sequence is ca. 1350 m thick and extends over an area of ~10,000 km^2. There is little evidence for feeder dykes, however, the E-W trending extensive 1382 Ma old Midsommersø dolerite dyke swarm are presumed to be contemporaneous with the Zig-Zag Dal basalts. The overall variation of Ni-MgO points to an olivine control, however, a few more primitive samples, including some with low Ni, from the lowermost part of the Zig-Zag Dal are present and might indicate that nickel was removed via an immiscible sulphide liquid (figure 38). Sulphur saturation might have been reached as a result of interaction between the bottom-part lavas of the flood basalts and sediments of the Independence Fjord sedimentary basin. The tract has seen very little exploration. Avannaa Resources are currently exploring part of the tract for sedimentary-hosted or volcanic-hosted reduced-facies copper mineralisation.

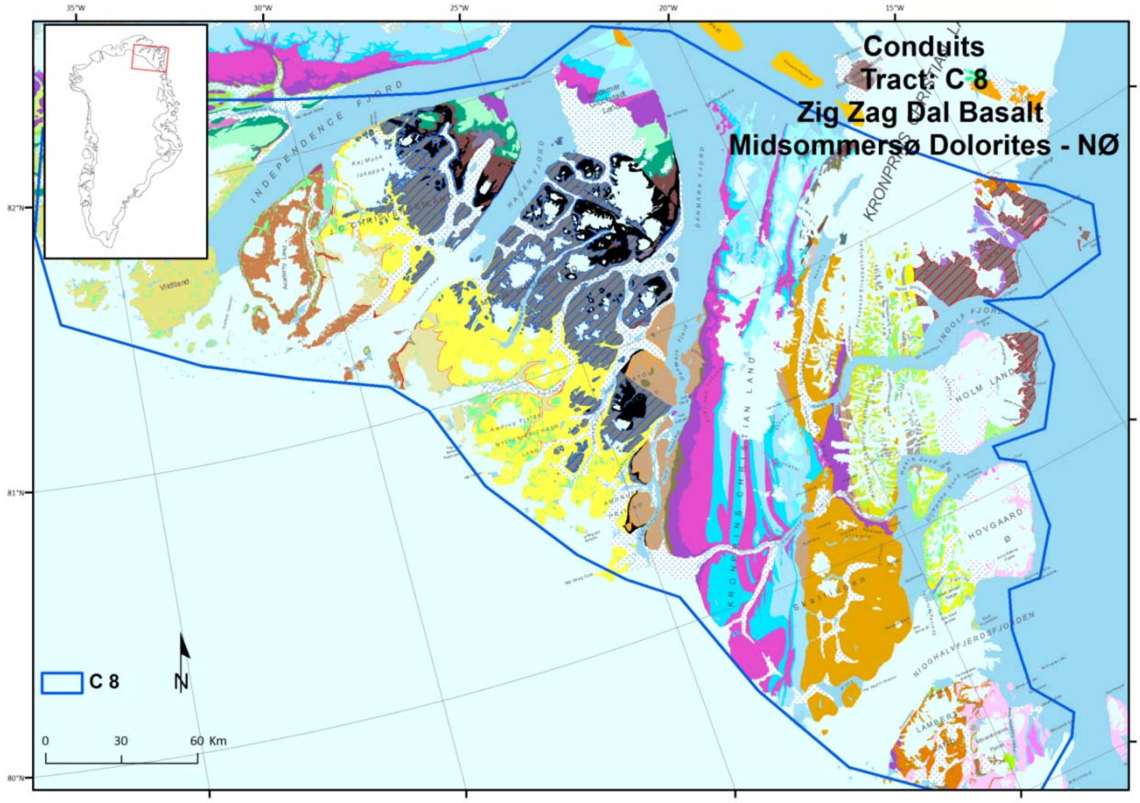


Figure 38. *Location of tract C8 in eastern North Greenland. The tract includes the possible distribution of the Zig Zag Dal Basalt Formation and Midsommersø Dolerites, emplaced during Mesoproterozoic rifting in the Independence Fjord Basin. For full map legend refer to Kokfelt et al. (2013).*

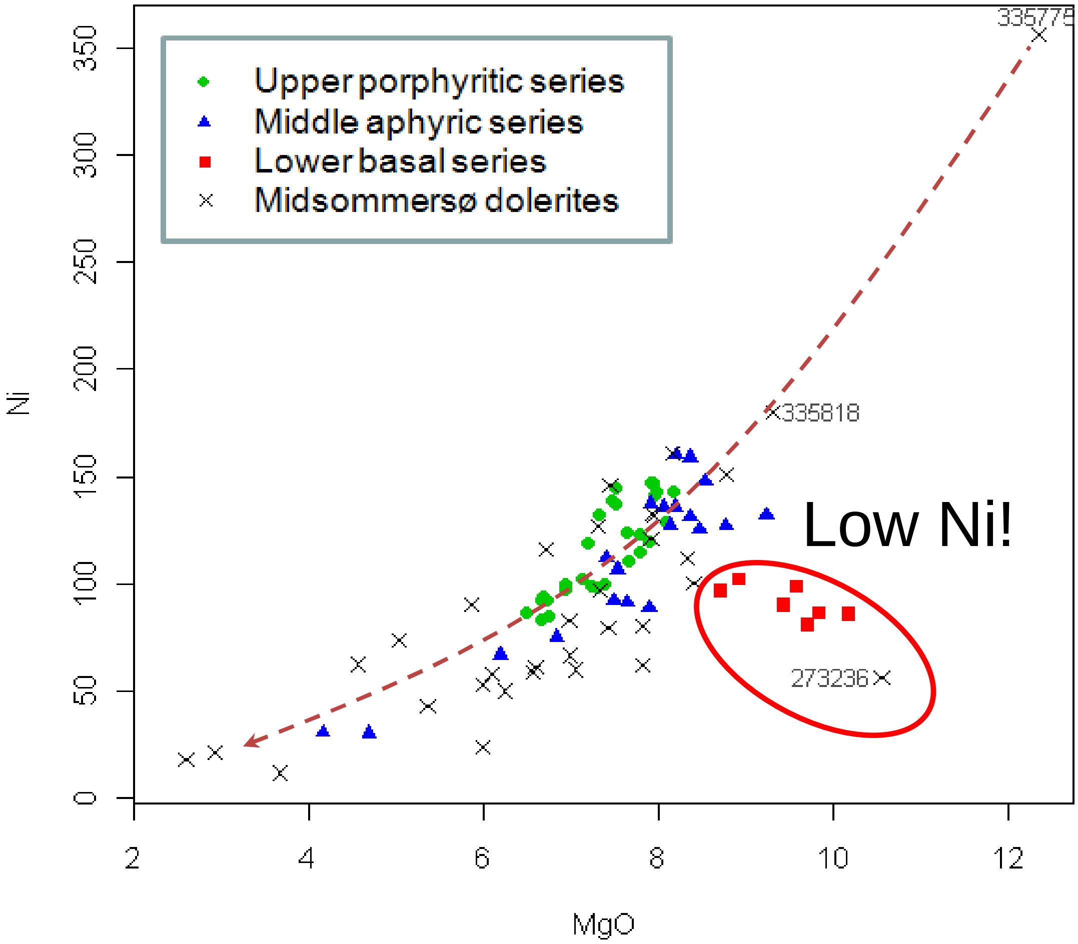


Figure 39. *Ni versus MgO diagram. Only samples of the lower basal series of the Zig-Zag Dal basalt formation depart from the olivine line of control, suggesting that Ni may have been lost to sulphides (see workshop presentation by Kokfelt 2012).*

Table 63. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for tract C8. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	0	1	0.03	0.24	810	0	0.03	4,400	0.0000068

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	0
Individual 2	0	0	0	1	1
Individual 3	0	0	0	0	1
Individual 4	0	0	0	0	1
Individual 5	0	0	0	0	1
Individual 6	0	0	0	2	2
Individual 7	0	0	0	0	1
Individual 8	0	0	0	0	1
Individual 9	0	0	0	1	2
Individual 10	0	0	0	0	1
Individual 11	0	0	0	0	1
Individual 12	0	0	0	0	1
Individual 13	0	0	0	1	2
Individual 14	0	0	0	1	2
Individual 15	0	0	0	1	1
Individual 16	0	0	0	0	1
Individual 17	0	0	0	0	1
Individual 18	0	0	0	0	1
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**0**	**1**

Table 64. *Results of Monte Carlo simulations of undiscovered resources in Tract C8. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	0	0	7,800	0.03	0.97
Ni (T)	0	0	0	0	0	12,000	0.03	0.97
PGE (T)	0	0	0	0	0	0	0.01	0.99
Rock (Mt)	0	0	0	0	0	2	0.03	0.97

C9 Inglefield Land sills

The large tract that stretches from eastern part of Inglefield Land to Smithson Bjerge southeast of Qaanaaq is defined by the distribution of the sills within the Smith Sound Group (part of Thule Supergroup)

According to Dawes (2004) the basaltic sills yield whole-rock K-Ar ages in the range 1190-1170 but their intrusive age may be as old as the c. 1270 Ma volcanics of the Nares Strait Group. The sills are 10 to 70 m thick, homogeneous to microphyritic, rarely vesicular, with chilled margins; central parts of sills are often gabbroic.

No mineralisations have been observed in connection with the sills but the area is very poorly explored and difficult to access. However, the assessment panel believed that the area could have a potential for magmatic nickel deposits related to sills intruding the Thule Basin.

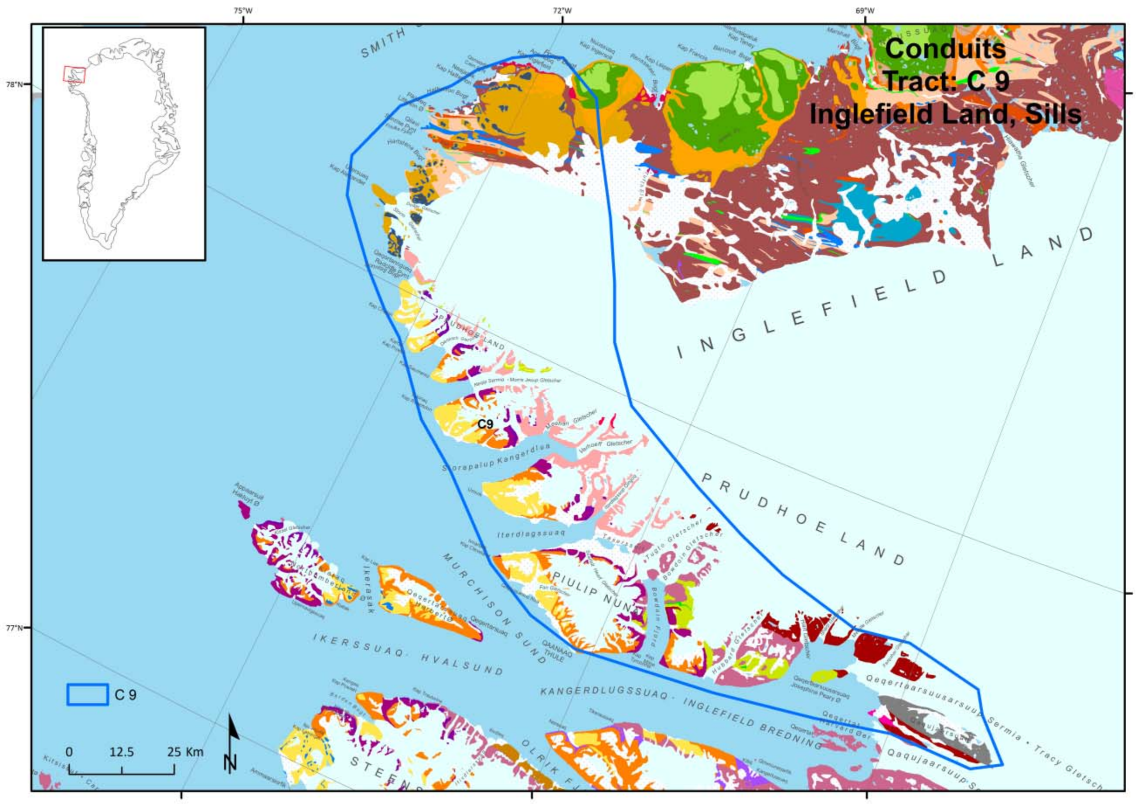


Figure 40. *Location of tract C9 in Inglefield Land - Thule region. The tract includes the possible distribution of sills intruded into the Thule Basin. For full map legend refer to Kokfelt et al. (2013).*

Table 65. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for tract C9. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	0	1	1	0.075	0.32	420	0	0.075	460	0.00016

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	1	2
Individual 2	0	0	0	0	1
Individual 3	0	0	1	1	2
Individual 4	0	0	0	1	1
Individual 5	0	0	0	0	0
Individual 6	0	0	0	1	1
Individual 7	0	0	0	0	1
Individual 8	0	0	0	0	1
Individual 9	0	0	0	1	2
Individual 10	0	0	1	2	5
Individual 11	0	0	1	2	3
Individual 12	0	0	0	0	1
Individual 13	0	0	0	0	1
Individual 14	0	0	0	0	1
Individual 15	0	0	0	1	1
Individual 16	0	0	0	0	0
Individual 17	0	0	0	0	1
Individual 18	0	0	0	0	1
Individual 19	0	0	0	0	1
Consensus	**0**	**0**	**0**	**1**	**1**

Table 66. *Results of Monte Carlo simulations of undiscovered resources in Tract C9. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	0	33,000	18,000	0.06	0.93
Ni (T)	0	0	0	0	62,000	32,000	0.06	0.93
PGE (T)	0	0	0	0	0	1	0.03	0.97
Rock (Mt)	0	0	0	0	7	5	0.06	0.92

C10 Northern part of the West Greenland Flood Basalt Province

The West Greenland Flood Basalt Province is considered to be an analogue of the Siberian Traps, to which the giant Norilsk deposit is related (Keys & Lightfoot 2007). It covers at least 68,000 km^2 (the extent of the Maligât and Svartenhuk Formations; see workshop presentation by Larsen 2012). The volcanic rocks were deposited on a substrate of 6–8 km thick sediments in a Cretaceous–Palaeocene subsiding basin. Three volcanic formations are recoignised; the Maligât and Svartenhuk Formations consisting of tholeiitic basalts and the Vaigat Formation that mainly consists of picritic lavas. Crustally contaminated units are known from both the Maligât and the Vaigat Formations.

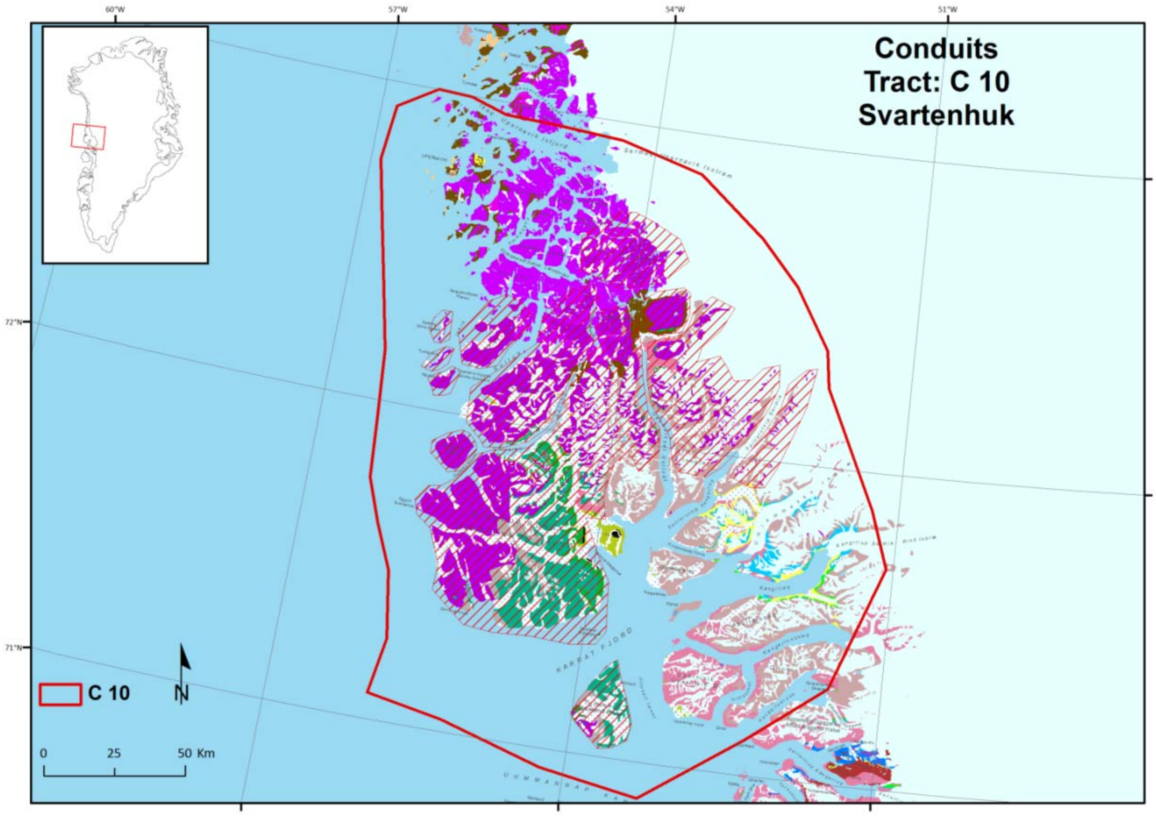


Figure 41. *Location of Tract C10 in North-West and central West Greenland.Tract C10 outlines the northern part of the West Greenland Flood basalt province from Ubekendt Island to northern part of Svartenhuk peninsula. For full map legend refer to Kokfelt et al. (2013).*

In the 1980's the West Greenland Flood Basalt Province in general and the Hammers Dal area on Disko Island in particular was extensively explored with the aim of locating Norilsk-type intrusions on the boundary between sediments and overlying plateau basalts. An extensive nickel exploration programme was carried out by Greenex/Cominco Limited from 1985 to 1991. From 1991 to 1996, a Platinova A/S-Falconbridge Greenland A/S joint venture conducted an extensive exploration programme for Ni, Cu and PGEs that included regional geology, mapping and sampling, plus follow-up diamond drilling. However, these programmes focused more on the southern part than on the northern part of the province. Because of differences in the level of knowledge, the West Greenland Flood Basalt Province was therefore divided into two different tracts; a better known and more extensively explored tract to the south (Tract C11), and a less known tract to the north (Tract C10).

Tract C10 outlines the northern part of the West Greenland Flood basalt province from Ubekendt Island to the northern part of Svartenhuk peninsula. In contrast to Tract C11, only the Svartenhuk Formations and the uppermost, un-contaminated member of the Vaigat Formation are exposed in the Tract C10 (Larsen & Pedersen 2009). No occurrences of native iron or Fe-Ni-Cu-Co sulphides, as boulders or in-situ mineralisation, have been found in Tract C10 to date.

Table 67. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for tract C10. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	1	2	3	0.41	0.82	200	0	0.41	10,730	0.000038

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	0	0	2
Individual 2	0	0	0	1	2
Individual 3	0	0	1	2	3
Individual 4	0	0	0	0	3
Individual 5	0	0	1	3	5
Individual 6	0	0	0	1	1
Individual 7	0	0	1	2	4
Individual 8	0	0	1	2	2
Individual 9	0	0	0	2	3
Individual 10	0	0	0	1	3
Individual 11	0	0	0	1	2
Individual 12	0	0	1	1	3
Individual 13	0	0	1	2	3
Individual 14	0	0	1	2	2
Individual 15	0	0	1	2	2
Individual 16	0	0	0	2	2
Individual 17	0	0	1	2	3
Individual 18	0	0	0	2	4
Individual 19	0	0	2	2	4
Consensus	**0**	**0**	**1**	**2**	**3**

Table 68. *Results of Monte Carlo simulations of undiscovered resources in Tract C10. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	170,000	430,000	88,000	0.15	0.71
Ni (T)	0	0	0	310,000	790,000	160,000	0.15	0.71
PGE (T)	0	0	0	5	29	7	0.09	0.85
Rock (Mt)	0	0	0	46	150	27	0.13	0.70

C11 Southern part of the Western Greenland Flood Basalt Province

Tract C11 outlines the southern part of the West Greenland Flood basalt province, namely Nuussuaq peninsula and Disko Island. See general description of the West Greenland Flood Basalt Province under the section on Tract C10.

Within this tract, the entire Vaigat Formation, which comprises one of the largest volumes of picritic MgO-rich lavas known globally, is present. It has also been documented that basaltic and picritic magmas have undergone contamination by sedimentary rocks and reached sulphur saturation. Two members of the lower part of the Vaigat Formation, in particular, are of significant volume and underwent contamination (Larsen & Pedersen 2009). These magmas ascended along known focused magma conduits, distributed along the N-S Kuugannguaq-Qunnilik fault system (Dam *et al.* 2009). These conduits host native iron and Fe-Ni-Cu-Co-sulphide occurrences, suggesting a nickel potential.The sulphur saturation, however, likely took place at relatively high levels of the crust.

Native iron occurrences and nickel sulphide showings have been documented in the flood basalt province as early as the 1870’s by A.E. Nordenskiöld and K.J.V. Steenstrup.

In the 1930’s 28 tons of massive nickel sulphide were extracted from the Igdlukunguaq dyke, located on northeast Disko Island. The ore mineral is nickeliferous pyrrhotite. The nickel content of the ore varied from 1.91 to 4.72% and the copper content from 0.80 to 2.35%. The genesis of the Igdlukunguaq dyke and mineralisation has been described by Pauly (1958).

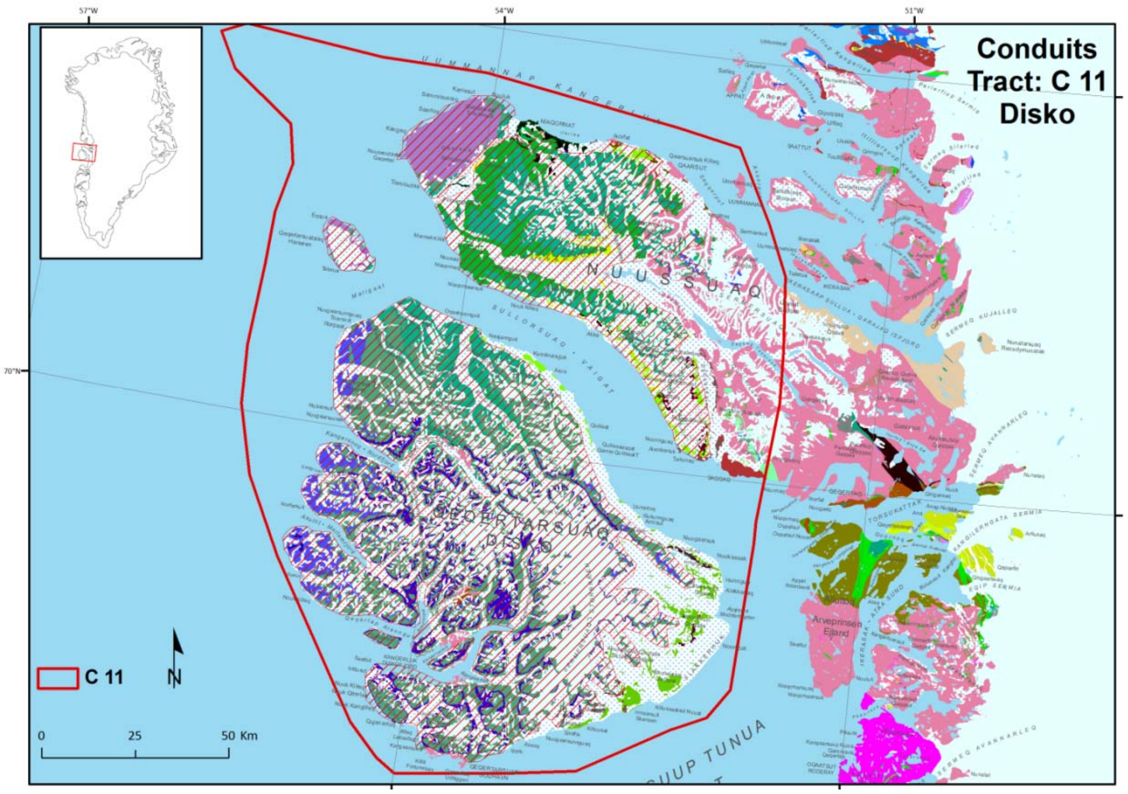


Figure 42. *Location of Tract C11 in central West Greenland. Tract C11 comprises the area from south of Ubekendt Island, Nuussuaq peninsula, to southern Disko Island. For full map legend refer to Kokfelt et al. (2013).*

The Igdlukunguaq dyke was subsequently investigated and drilled in the mid-1960's by the exploration company New Quebec Mining and Exploration Company. Later, in the 1980's, the companies INCO, Greenex (for Comico) and Falconbridge explored in the area. The latter also drilled the Igdlukunguaq dyke. In the 2000's, Vismand Exploration carried out new surveys, including MT-surveys over areas in the northwestern part of Disko Island and on Nuussuaq peninsula. These surveys have identified large conductors at a depth of 400–500 m below the present-day surface in two broad valleys. Deep drilling was attempted, but failed due to the risk of overpressure caused by natural gas build-up. Subsequently, after Vismand Exploration gave up their license, it was taken up by Avannaa Resources which has carried out additional geophysical surveys and further demonstrated the presence of conductive bodies at depth, which the company is planning to drill (see workshop presentation by Bernstein 2012).

Table 69. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for tract C11. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	1	2	3	5	1.1	1.2	110	0	1.1	10,880	0.0001

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	1	2	2	3
Individual 2	0	0	2	2	2
Individual 3	1	1	2	2	4
Individual 4	0	1	1	3	5
Individual 5	0	1	2	3	6
Individual 6	0	0	2	2	2
Individual 7	0	1	2	2	4
Individual 8	0	1	2	5	10
Individual 9	0	1	1	2	3
Individual 10	0	1	2	3	5
Individual 11	0	1	2	3	5
Individual 12	1	1	3	3	4
Individual 13	0	2	3	4	5
Individual 14	0	1	1	2	2
Individual 15	1	1	2	4	6
Individual 16	0	0	0	2	2
Individual 17	1	2	5	7	10
Individual 18	0	0	2	3	5
Individual 19	0	1	3	3	4
Consensus	**0**	**1**	**2**	**3**	**5**

Table 70. *Results of Monte Carlo simulations of undiscovered resources in Tract C11.*
[T – metric tons, Mt – million metric tons]

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	43,000	760,000	1,300,000	250,000	0.22	0.34
Ni (T)	0	0	77,000	1,200,000	2,400,000	460,000	0.21	0.32
PGE (T)	0	0	0	48	99	18	0.17	0.60
Rock (Mt)	0	0	10	200	440	71	0.22	0.31

C12 Skjoldungen

Tract C12 encompasses nickel occurrences in mafic and ultramafic rocks intruded in mafic granulites, traced over 10 km. The tract is located within the Archaean North Atlantic craton in South-East Greenland. The tract is dominated by migmatitic orthogneiss with narrow belts of mafic and ultramafic granulites and possible meta-sedimentary rocks. Also present is the intrusive suite of the late-tectonic alkaline intrusions of the Archaean Skjoldungen Alkaline Province. The metamorphic grade of the region is predominately granulite facies but retrogression to amphibolite facies is common. Locally, in the Graah Fjord to Bernstoff Isfjord area, disseminated to semi-massive nickel-copper-platinium group element sulphide mineralisations have been found at several localities within ultramafic rock in the form of pyroxenties and periodites lenses and bands (Stensgaard *et al.* 2010; Owen 2012). The ultramafic host rocks are intruded into gabbroic rocks from an (1) undepleted deep mantle source and (2) a depleted shallow mantle source in the deep crust (Owen 2012). The nickel-sulphide mineralisation is associated with the latter type. Petrological and geochemical evidence suggest that the nickel mineralising system involved interaction of the ultramafic melt with a volatile, incompatible element, S, Cu and Ni bearing fluid in the upper mantle rather than being related to a typical orthomagmatic system (Owen 2012).

Very limited geological investigation and mineral exploration have been done prior to 2009. In 2009, GEUS and BMP undertook regional stream sediment and water sampling as well as reconnaissance work. The nickel mineralisations in the Graah Fjord to Bernstoff Isfjord area were discovered during this work. In 2011 and 2012 GEUS and BMP undertook larger geological investigations and detailed follow-up in the entire region. Part of that was an investigation of the nickel mineralisations as reported in Owen (2012). The company Greenland Minerals and Energy took in 2010 an exploration license that covered the area with known nickel mineralisation. However, their work is still confidential. Prior to 2010, no licenses had been acquired in the region and only very limited mineral exploration reconnaissance had been undertaken:

- 1963: Kryolitselskabet Øresund A/S, arial prospecting from helicopter reconnaissance.
- 1999: Major General Resources Ltd., diamond exploration reconnaissance program in the central Skjouldungen region, ship-based trip.
- 2007: NunaMinerals A/S, ship- and helicopter-based reconnaissance, not finished because of helicopter break-down.

Geolgical investigations prior to 2009 have also been limited:

1960-1970:	British universities. Boat work along the shores.
Late 1960´es–early 1970´es:	GGU, reconnaissance for 1:2 500 000 map. Boat work along the shores.
1981-1982:	GGU reconnaissance for 1:500 000 map sheet. Boat work along the shores.
1987:	GGU reconnaissance for 1:500 000 map sheet. Helicopter supported.
~1990:	Small scientific expeditions focused on the Skjoldungen Alkaline Province.

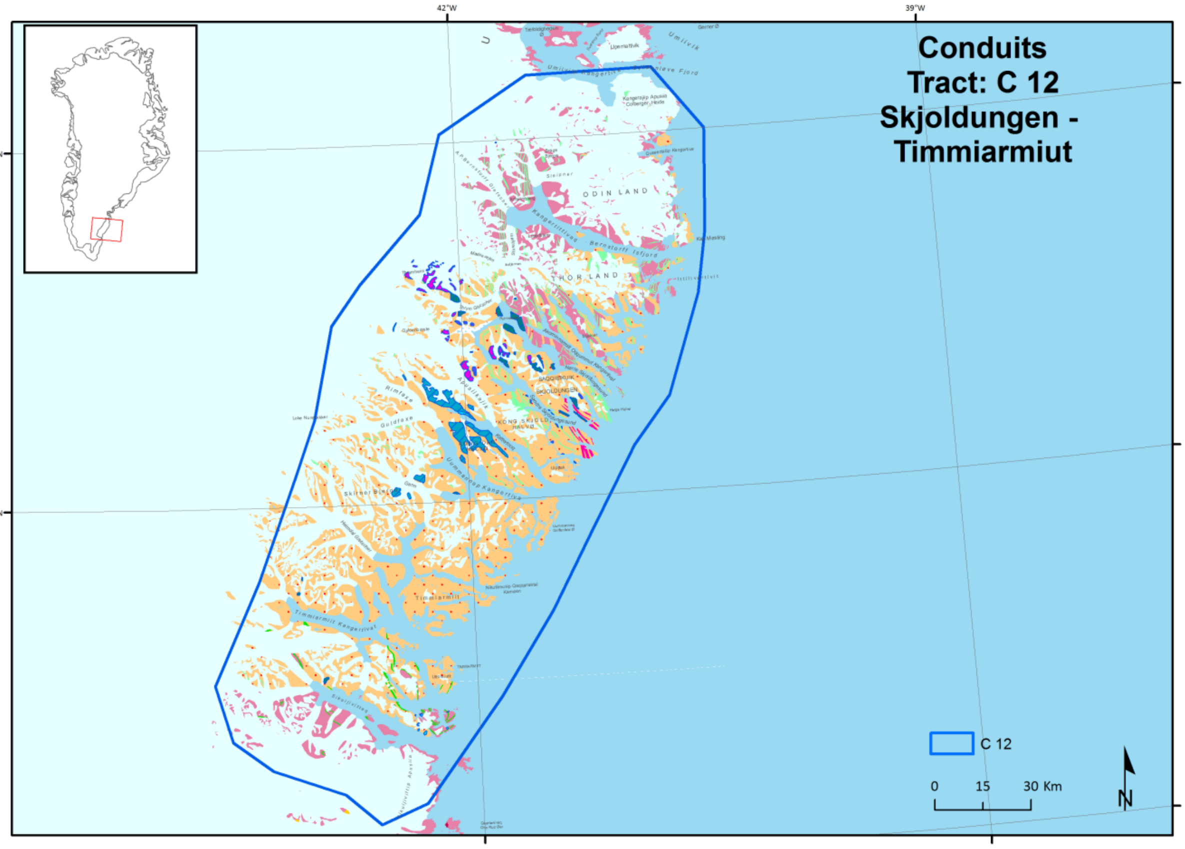


Figure 43. Location of tract group C12 in South-East Greenland. Hatched areas correspond to mafic and ultramafic rocks intruded in mafic granulites. *For full map legend refer to Kokfelt et al. (2013).*

Table 71. *Undiscovered deposit estimates, deposit numbers, tract area, and deposit density for tract C12. For further details see text connected to Table 7.*

Consensus undiscovered deposit estimates					Summary statistics					Tract Area (km^2)	Deposit density (N_{total}/km^2)
N90	N50	N10	N05	N01	N_{und}	s	Cv%	N_{known}	N_{total}		
0	0	1	1	2	0.33	0.62	190	0	0.33	270	0.0012

Estimator	Estimated number of undiscovered deposits				
	N90	N50	N10	N05	N01
Individual 1	0	0	1	1	3
Individual 2	0	0	1	1	1
Individual 3	0	0	1	2	4
Individual 4	0	0	1	1	2
Individual 5	0	0	0	1	2
Individual 6	0	0	1	2	3
Individual 7	0	0	0	0	1
Individual 8	n/a	n/a	n/a	n/a	n/a
Individual 9	0	0	0	1	3
Individual 10	0	0	1	2	2
Individual 11	n/a	n/a	n/a	n/a	n/a
Individual 12	0	0	1	1	3
Individual 13	0	0	0	1	2
Individual 14	0	0	1	2	2
Individual 15	0	0	1	1	2
Individual 16	0	0	1	2	2
Individual 17	0	0	0	0	2
Individual 18	0	0	0	1	2
Individual 19	0	0	0	1	2
Consensus	**0**	**0**	**1**	**1**	**2**

Table 72. *Results of Monte Carlo simulations of undiscovered resources in Tract C11. [T – metric tons, Mt – million metric tons]*

Material	Probability of at least the indicated amount						Probability of	
	0.95	0.9	0.5	0.1	0.05	Mean	Mean or greater	None
Cu (T)	0	0	0	120,000	320,000	73,000	0.14	0.72
Ni (T)	0	0	0	210,000	600,000	130,000	0.14	0.71
PGE (T)	0	0	0	3	18	5	0.08	0.87
Rock (Mt)	0	0	0	33	110	20	0.12	0.70

Conclusions

In the course of the workshop a total of 32 tracts were assessed for undiscovered magmatic nickel deposits, in strict accordance with the guidelines provided by the USGS. Three magmatic nickel deposit types, and respective grade/tonnage models, were considered: (1) komatiite-hosted deposits, (2) contact-type deposits, and (3) deposits related to picritic and/or tholeiitic basalt dyke/sill complexes (also known as conduit-type deposits).

The statistical mean estimate number of undiscovered komatiite-hosted and conduit-type deposits are 4 for each type, with 0 expected undiscovered deposits of the contact-type (summary in Table 73). At a 50% probability, these are estimated to contain 1.9 million tons of Ni. The vast majority of undiscovered resources are expected to be accounted for by conduit-type deposits, which account for 1.6 million tons of Ni. Among these, the best potential for conduit-type deposits is related to the Norite Belt, East of Maniitsoq, in southern West Greenland, and to the flood basalts in the Disko Bay area. While accounting for only a small fraction of the undiscovered resources, with 0.2 million tons of Ni, it is a komatiite-hosted deposit tract (Ikertoq, part of the Niaqornarssuit complex, in West Greenland), which was considered to have the best potential to include deposits. Finally, the larger but lower grade contact-type deposits were recognized as having less than 0.1 million tons of undiscovered nickel resources.

Considering the scarce information available for most of the tracts, which is mainly because of logistical constraints of undertaking exploration in Greenland, the estimate on the number of deposits and their nickel endowment can be considered significant. This warrants further exploration efforts which, it appears, should focus on conduit-type deposits, and to a lesser degree, komatiite-hosted deposits.

Table 73 Summary of assessment results including undiscovered deposit estimates, deposit numbers, tract area and deposit density for tracts.

GMRAP workshop 2012 - Consensus bids on the number of undiscovered nickel deposits per area																
			Areal extent	Number of undiscovered Ni deposits on different confidence levels					Number of known nickel deposits	Number of unknown nickel deposits	Deposit density	Known nickel resources	Mean estimate of undiscovered nickel resources	Mean estimate of undiscovered copper resources	Mean estimate of undiscovered PGE resources	Ranking within specific deposit model*
Tract type	Region	Tract name	Km2	N90	N50	N10	N5	N1				Metric tons	Metric tons	Metric tons	Metric tons	
Conduits	Norite Belt	C1	50	0	1	2	3	5	0	1.1	0.025	0	490000	270000	19	1
	Fiskefjord area	C2	420	0	0	0	1	1	0	0.07	0.00018	0	27000	15000	1	10
	Fiskenæsset	C3	350	0	0	0	1	2	0	0.11	0.0003	0	46000	26000	1	6
	Oldest generation of Gardar Dykes	C4	6570	0	0	0	1	2	0	0.11	0.000016	0	43000	23000	2	4
	Tasiilaq, Amassalik Igneous Complex	C5	250	0	0	1	2	3	0	0.41	0.0017	0	160000	90000	7	3
	Flood Basalts - south of Scoresbysund	C6	50790	0	0	0	1	2	0	0.11	0.0000021	0	43000	24000	2	7
	Flood Basalts - north of Scoresbysund	C7	2510	0	0	0	1	2	0	0.11	0.000042	0	40000	22000	1	8
	Zig Zag Dal Basalt + Midsommersø Dolorites	C8	4400	0	0	0	0	1	0	0.03	0.0000068	0	12000	7800		11
	Inglefield Land, Sills	C9	460	0	0	0	1	1	0	0.07	0.00016	0	32000	18000	1	9
	Svartenhuk	C10	10730	0	0	1	2	3	0	0.41	0.000038	0	160000	88000	7	4
	Disko	C11	10880	0	1	2	3	5	0	1.1	0.0001	0	460000	250000	18	2
	Skjoldungen	C12	270	0	0	1	1	2	0	0.33	0.0012	0	130000	73000	5	5
Total amount of undiscovered resources related to conduit-type deposits in Greenland(metric tons):													**1,643,000**	**906,800**	**64**	
Komatiites	Taartoq, SWG	2a	380	0	0	0	2	2	0	0.15	0.00034	0	9200	**	**	5
	Bjørnesund & Kvanefjord supra crustal belts	2b	560	0	0	1	2	3	0	0.41	0.00073	0	22000	**	**	3
	Supra crustals S of Paamiut	3a	932	0	0	0	1	2	0	0.11	0.00011	0	6200	**	**	8
	Supra crustals N of Paamiut	3b	220	0	0	0	0	2	0	0.06	0.00027	0	4300	**	**	14
	Supra crustals in the Fiskenaesset area	4	463	0	0	0	0	1	0	0.03	0.000065	0	2100	**	**	15
	Nuuk - Akia terraine, SWG	5	2535	0	0	2	3	4	0	0.71	0.00028	0	43000	**	**	2
	Supra crustal belts - area east of Maniitsoq	7	886	0	0	0	1	2	0	0.11	0.00012	0	5900	**	**	11
	Ikertoq, Niaqornarssuit complex, WG	8	263	0	1	3	3	5	0	1.4	0.005316	0	79000	**	**	1
	Nordre Stroemfjord Supra Crustals	9	169	0	0	0	1	2	0	0.11	0.00062	0	6000	**	**	10
	Supra Crustals between Sisimiut and Illulissat	10	2796	0	0	0	1	2	0	0.11	0.000038	0	6800	**	**	7
	Supra Crustals, Inner Nordre Stroemfjord	11	75	0	0	0	0	1	0	0.03	0.0004	0	2100	**	**	14
	Supra Crustals, Eqi, Disko Island & Kullorsuaq	12a	960	0	0	0	1	2	0	0.11	0.00011	0	6800	**	**	6
	Supra Crustals, Karrat Group	12b	20	0	0	0	1	2	0	0.11	0.0058	0	6100	**	**	9
	Melville Bugt Amphibolites	13	734	0	0	0	0	1	0	0.03	0.000041	0	1800	**	**	16
	Inglefield Land Supra Crustals	14	137	0	0	0	1	2	0	0.11	0.00077	0	5400	**	**	13
	Tasiilaq - supra crustals - Contact halo	15	1040	0	0	1	1	3	0	0.36	0.00034	0	21000	**	**	4
	Tasiilaq - supra crustals - N of contact halo	16	1550	0	0	0	1	2	0	0.11	0.000068	0	5700	**	**	12
Total amount of undiscovered resources related to komatiite-type deposits in Greenland(metric tons):													**233,400**	**	**	
Intrusions (Contact type)	Ivnartivaq (Tasiilaq)	I-1	>500	0	0	0	1	2	0	0.11	0.00021	0	26000	53000	**	1
	Kap Edvard Holm, EG	I-2	>500	0	0	0	1	2	0	0.11	0.00021	0	26000	44000	**	1
	Qaqujârssuaq, Thule, NG	I-3	>500	0	0	0	0	1	0	0.03	0.00006	0	8100	20000	**	2
Total amount of undiscovered resources related to contact-type deposits in Greenland(metric tons):													**60,100**	**117,000**	**	

***= Ranking is according to resource size (1st criteria) and deposit density (2nd criteria). ** Not calculated in the Eminer´s software**

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Appendix A: Grade/tonnage data used in the assessment

The grade/tonnage models used in the Eminers software were kindly compiled and made available by Michael Zientek from the USGS. The models are partly based on published data compilations, partly on unpublished ongoing data compilations.

Table 74-77 summarizes the mean tonnage and grade for the different deposit models used in the Eminers software. The full data compilation for each model is included on the CD-ROM accompanying this report.

Table 74. *Tonnages and average grades for known* ***contact-type*** *Cu-Ni deposits associated with layered mafic-ultramafic intrusions in the world. The tonnages are total resource estimates.*

Deposit	Country	Tonnage	Ni%	Cu%
Geordie Lake	CAD	29,800,000	0.01	0.33
Marathon	CAD	70,200,000	0.03	0.32
RiverValley-Varley	CAD	4,803,000	0.02	0.07
RivVly-Dana&Lismer	CAD	28,168,000	0.02	0.1
Ahmavaara	FIN	106,693,000	0.09	0.23
Haukiaho	FIN	27,000,000	0.24	0.36
Konttijärvi	FIN	42,110,000	0.06	0.13
Lavotta	FIN	3,000,000	0.21	0.26
Niittylampi	FIN	850,000	0.67	0.49
Rusamo	FIN	1,500,000	0.24	0.39
Suhanko	FIN	1,000,000	0.27	0.31
Vaaralampi	FIN	6,050,000	0.31	0.2
Akanani	SAFR	269,700,000	0.21	0.12
Aurora	SAFR	133,430,000	0.05	0.08
Grass Valley, N&S	SAFR	93,507,000	0.11	0.03
Mokopane	SAFR	39,740,000	0.15	0.09
PPRust-Boikgantsho	SAFR	1,667,914,500	0.11	0.15
Rooiport, M2&L3	SAFR	18,128,000	0.19	0.11
Sandsloot	SAFR	320,160,000	0.09	0.17
Sheba's Ridge	SAFR	716,000,000	0.19	0.07
War Springs	SAFR	46,965,000	0.13	0.1
Zwartfontein South	SAFR	145,720,000	0.1	0.19
Nunatak	USA	90,000,000	0.53	0.33
Birch Lake	USA	195,504,000	0.16	0.53
Maturi and Nokomis	USA	623,013,000	0.21	0.62
Mesaba	USA	1,200,000,000	0.09	0.43
Northmet	USA	492,300,000	0.08	0.27
Serpentine	USA	6,350,400	0.3	0.88
Spruce Road	USA	405,100,000	0.14	0.38
Wetlegs	USA	34,473,600	0.1	0.29
Benbow	USA	130,065,264	0.22	0.22
Camp deposit	USA	5,850,000	0.42	0.23
Mouat	USA	132,000,000	0.31	0.29
Nye Basin	USA	284,783,688	0.22	0.254
Rocky Claim Group	USA	49,000,000	0.28	0.26
Fedorovo	RUSA	166,210,000	0.09	0.15
Mt. General'skaya	RUSA	53,333,000	0.51	0.26

Table 75. *Tonnages and average grades for known **conduit-type** Cu-Ni-PGE deposits associated with magmatic dike-sill intrusions in the world. The tonnages are total resource estimates.*

Deposit	Country	Tonnage	Ni%	Cu%	PGE %
Baishiquan	CINA	22,036,458	0.32	0.48	0
Ban Phuc deposit	VTNM	23,765,000	0.67	0.09	0
Bystrinskoe	RUSA	36,300,000	0.49	0.26	0.0000086
Carr Boyd Rocks	AUWA	1,210,000	1.52	0.43	0
Cowarna Rocks	AUWA	980,000	2.04		0
Dikolati	BOTS	4,100,000	0.7	0.5	0.00012
Eagle Nickel	USA	12,100,000	3.1	2.6	0.0000617
Erhongwa	CINA	5,500,000	0.2	0.2	0
Great Lakes Nickel	CNOT	45,600,000	0.18	0.34	0.0000891
Ikenskoe	RUSA	36,400,000	0.45	0.14	0.00004
Jinbasoshan	CINA	13,000,000	0.18	0.19	0.000175769
Jinchuan	CINA	520,000,000	1.06	0.66	0.0000197
Kabanga	TNZN	46,000,000	2.71	0.38	5.95E-05
Kalatongke Dep I	CINA	17,035,714	0.88	1.4	0
Kalatongke Dep II	CINA	8,984,848	0.6	1.1	0
Kalatongke Dep III	CINA	7,515,152	0.6	1.1	0
Kanichee	CNON	251,437	0.5	0.72	0.00014
Kaula	RUSA	14,600,000	2.6	1.4	0
Kootsel'vaara-Kamm	RUSA	7,450,000	1.2	0.64	0.0000185
Lengshuiquing	CINA	2,500,000	0.9	0.5	0
Limahe deposit	CINA	2,490,000	0.66	0.92	0.000003
Lynn Lake	CNOT	25,750,000	0.97	0.71	0
Maly Krumkon	RUSA	11,000,000	0.45	0.14	0
Monchetundorvskoe	RUSA	38,000,000	0	0	0.00025
Montcalm gabbro	CNMT	7,020,000	1.46	0.71	0
Mt. Sholl	AUWA	5,600,000	0.54	0.68	0
Nebo-Babel	AUWA	392,000,000	0.3	0.3	0.000018
NittisKumuzhTravya	RUSA	5,060,000	5.1	2.9	0
Nkomati (all)	SAFR	300,527,100	0.5	0.2	0.000107508
Northern Onki	RUSA	3,050,000	1.15	0.5	0
Nyudaivench	RUSA	13,200,000	0.24	0.2	0
Pakhtajarvi	RUSA	28,670,000	0.75	0.3	0
Radio Hill	AUWA	2,758,000	1.53	1.49	0
Reid Brook	CNLB	11,700,000	1.6	0.7	0
Sally Malay	AUWA	5,620,000	0.95	0.68	0
Selebi-Phikwe	BTWA	94,000,000	0.71	0.77	0
Selkirk	BTWA	530,000	2.39	1.26	0
Semiletka	RUSA	7,520,000	0.73	0.35	0.000014
Sherlock Bay	AUWA	25,424,000	0.4	0	0
Sopcha (lode ores)	RUSA	710,000	3.23	2.06	0
Sopchuaivench	RUSA	131,200,000	0.33	0.17	0
Souker	RUSA	179,126,000	0.38	0.13	0
Sputnik	RUSA	17,300,000	1.4	0.77	0.0000035
Tati-Phoenix	BTWA	165,400,000	0.29	0.17	0
Tudun	CINA	3,250,000	0.3	0.2	0
Tundrovskoe	RUSA	107,200,000	0.51	0.26	0.0000022
Verkhnee	RUSA	63,080,000	0.5	0.24	0.0000099
Vodorazdelny	RUSA	5,900,000	0.71	0.13	0.00003
Voiseys Bay	CNNF	136,700,000	1.59	0.85	0
Insizwa	SAFR	470,000	0.3	0.25	0.000088
Wellgreen	CNYT	42,300,000	0.36	0.35	0.000085
Xiangshan	CINA	7,333,333	0.5	0.3	0
Yangliuping	CINA	90,000,000	0.44	0.26	0.0000563
Zapolyarnoe	RUSA	10,800,000	2.19	1.16	0.000043
Zhdanovskoe	RUSA	619,240,000	0.57	0.25	0.0000058

Table 76. Tonnages and average grades for known **Komatiite**-type Ni-deposits associated with magmatic **peridotite** intrusions in the world. The tonnages are total resource estimates.

Deposit	Country	Tonnage	Ni%
Black Swan dism	AUWA	7400000	0.8
Blair	AUWA	2240000	1
Carnilya Hill	AUWA	1474000	3.4
Cliffs Mount Keith	AUWA	5500000	2.3
Coronet	AUWA	446000	2.9
Cosmic Boy	AUWA	4000000	2.4
Cosmos	AUWA	601000	7.7
Cosmos Deeps	AUWA	560000	8.1
Cygnet	AUWA	3100000	1.3
Digger Rocks	AUWA	2400000	1.6
Diggers South	AUWA	2120000	1.6
Durkin	AUWA	3524000	3.2
Edwin	AUWA	141000	4.5
Eleven Mile Well	AUWA	544000	2
Emily Anne	AUWA	1597000	3.8
Fisher	AUWA	1651000	2.3
Flying Fox	AUWA	196000	5.4
Foster	AUWA	2375000	2.6
Harmony	AUWA	1500000	3.2
Helmut	AUWA	203000	3.8
Hunt-Beta	AUWA	1285000	2.6
Jan	AUWA	1074000	2.8
Ken	AUWA	468000	4.3
Long	AUWA	5254000	3.7
Lunnon	AUWA	4539000	2.7
Maggie Hays	AUWA	12284000	1.5
Mariners	AUWA	1318000	2.7
McMahon	AUWA	1186000	2.9
Miitel	AUWA	933000	4.1
Mount Edwards	AUWA	955000	2.7
Nepean	AUWA	409000	2.3
New Mrning/Dybk	AUWA	275000	5.6
North Dordie	AUWA	190000	2.4
North Miitel	AUWA	253000	3.9
Otter	AUWA	7500000	3.5
Perseverance 1A	AUWA	31300000	1.7
RAV 8	AUWA	206000	5.5
RAV1 to RAV5	AUWA	383000	1.5
Redross	AUWA	829000	3.9
Rocky's Reward	AUWA	6400000	2.2
Schmitz	AUWA	652000	4.8
Scotia	AUWA	1130000	3.1
Silver Swan	AUWA	400000	9.4
Skinner	AUWA	254000	5.2
South Windarra	AUWA	2561000	1
Spargoville	AUWA	442000	2.4
Wannaway	AUWA	4500000	1.2
Widgiemooltha 3	AUWA	83000	2.2
Widgiemooltha N	AUWA	10200000	1
Windarra Nickel	AUWA	4100000	1.3
Zabel	AUWA	979000	1.9

Table 77. Tonnages and average grades for known **Komatiite**-type Ni-deposits associated with magmatic **dunite** intrusions in the world. The tonnages are total resource estimates.

Deposit	Country	Tonnage	Ni%
Wedgetail	AUWA	22900000	1.1
Hannibals	AUWA	36100000	0.7
Harrier	AUWA	43000000	0.6
Corella	AUWA	53500000	0.6
Perseverance dism	AUWA	89900000	0.6
Yakabindi	AUWA	290000000	0.6
Mount Keith	AUWA	503000000	0.6

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Appendix C: CD-ROM - Presentations from workshop

Presenter	**Title**	**Presentation number** (on CD-ROM)
Bo M. Stensgaard (GEUS)	Objectives of the workshop and procedure for the assessment of magmatic nickel deposits in Greenland	1
Marco Fiorentini (CET-UWA) and Steve Beresford (CET)	Komatiite-hosted Ni-Cu-(PGE) deposits: understanding deposit and camp footprints	2
Michael Zientek (USGS)	Mineral deposit types	3
Michael Zientek (USGS)	Conduit-type deposits	4
Michael Zientek (USGS)	Contact-type deposits	5
Agnete Steenfelt (GEUS)	Ni potential of Greenland, evidence from reconnaissance scale stream sediment data	6
Thomas Kokfelt (GEUS)	Geological history and setting of the Archaean craton with focus on ultramafic and mafic rocks	7
Jochen Kolb (GEUS)	Ultramafic rocks of the North Atlantic and Rae cratons and related nickel mineral systems	8
Denis Schlatter (Helvetica Exploration Services GmbH)	The Bjørnesund Greenstone Belt – Evidence of Komatiite-hosted nickel mineralisations	9
Jochen Kolb (GEUS)	The Palaeoproterozoic orogens and nickel occurrences related to ultramafic and mafic rocks	10
Claus Østergaard (21st North)	The Niaqornarssuit ultrabasic complex and the Nordre Strømfjord region	11
Anders Lie (21st North)	The Ammassalik Ni-Cu-PGE sulphide prospect	12
Troels Nielsen (GEUS)	Potential for intrusion related Ni-Cu-PGE deposits in Greenland	13
Adam Garde (GEUS)	Norite Belt and Post-kinematic diorites in the Maniitsoq impact structure, SW Greenland	14
John Pattison (North American Nickel)	The Maniitsoq Ni-Cu-PGE project, SW Greenland	15

Ole Christiansen (NunaMinerals A/S)	Stendalen - Amikoq - Inglefield	16
Bo M. Stensgaard (GEUS)	Waldorf Amitsoq Sarqa intrusions	17
Martin Ghisler (GEUS)	The Fiskenaesset complex - its nickel potential as by-product from possible reef type or contact type PGE-Ni-Cu deposits	18
Lotte M. Larsen (GEUS)	Tertiary volcanics in West Greenland and potential for nickel mineralisations	19
Stefan Bernstein (Avannaa Resources)	Disko-Nuussuaq Ni-Cu-PGE	20
Christian Tegner (AU)	Flood basalts in East Greenland Review and possibilities for nickel mineralisation	21
Thomas Kokfelt (GEUS)	Zig-Zag Dal basalts and associated Midsommersø dolerites	22

Appendix D: Initial operational classification of intrusions with potential contact-type nickel deposits

A total of 251 intrusions/intrusive complexes in Greenland are registered in an intrusion database that can be accessed via the Greenland Mineral Resources Portal (www.greenmin.gl). Of these, 102 were judged prior to the workshop to have a potential for contact-type nickel mineralisation and 63 of these were judged to have a size larger than 100 km^2. A comprehensive list of the 63 intrusions/intrusive complexes is thus presented in this appendix. For more specific information about the individual intrusions and associated references please use the Greenland Mineral Resources Portal.

Id	Name	Region	Mineralisation	Ni>Cu	Cu>Ni	Pt>Pd	Pd>Pt	Contact	Strat	Knowledge (*1)	Group (*2)	Families	Size	Main references	Short description	Exploration activity
1	Basaltic sills	Palaeogene East Greenland	Basaltic sills. No mineralisations of significance recorded.	1	1	0	1	1	0	2	2	a	1	Noe-Nygaard (1976), Hald (1978), Upton *et* al. (1984b).	Remnants of the Tertiary flood basalts province occur throughout the region. In most coastal regions are Cretaceous to Palaeogene sediments below the flood basalts intruded by basaltic sills. Isolated basaltic units in some areas may be lavas or sills. Information is for some of these occurrences sparse. This does not reflect the volumetric importance of sills. Large volumes of basaltic magma is hosted in the sill complexes. Sills are exposed on Shannon Ø, Kuhn Ø, Wollaston Forland including Sabine Ø and Lille Pendulum Ø, Clavering Ø, the eastern part of Hudson Land, Hold with Hope, the eastern part of Gauss Halvø and a number of smaller islands. The best review is given by Noe-Nygaard (1976). The majority of the sills are basaltic, but alkaline varieties are described from several locations. Few detailed studies have been made. Sills are in all cases described in relation to more detailed investigations of flood basalts or intrusive centres. Picritic sills in the central areas of Hold with Hope have attracted special interest (Rose et al. 1998b). Further information in Noe-Nygaard (1976). More detailed studies for Giesecke Bjerge area, Gauss Halvø (73o25'N, 22o10'W) are presented by Hald (1978) and for Hold with Hope (73o45'N; 21oW) by Rose et al. (1998b). No mineralisations of significance have been reported to be related to the sills.	1997: The only exploration activity directed towards sills was conducted in 1997 by INCO Ltd. (Rose et al., 1998a and b).
6	Ejnar Mikkelsen intrusion	Palaeogene East Greenland	Dunite and peridotite intrusion. Minor chromite seams.	1	0	1	0	1	1	2	2	b	2	Nielsen et al. (2001).	Small exposure of dunite and peridotite on the east side of Ejnar Mikkelsen Fjeld. Dunites with veins of chromite and peridotite are exposed up to 1900 m a.s.l. Above 1900 m a.s.l. the intrusion is composed of peridotites. The intrusion was first located year 2000 and is only known from reconnaissance investigations. No age information is available.	No information is available
7	Lilloise intrusion	Palaeogene East Greenland	Layered, mafic to ultramafic complex intruded by syn-genetic hawaiite to quartz-trachyte. Syn-genetic deformation due to faulting. No significant mineralisations are observed.	1	1	1	1	1	1	2	2	b	3	Brown (1973), Chambers & Brown (1995).	Plutonics in Lilloise Bjerge were first reported by Wager (1934). The plutonics were first described and investigated much later (Brown, 1973) and (Chambers & Brown, 1995) on which the description is based. See also Nielsen (1987). The c. 8 x 4 km large layered, mafic to ultramafic, Lilloise Intrusion is emplaced into the East Greenland plateau basalts. Three petrographic zones are identified. A Lower Zone of olivine and clinopyroxene peridotites with equilibrium textures, a Middle Zone of olivine gabbros which in their upper parts carry liquidus Fe-Ti-oxides and an Upper Zone of laminated brown amphibole and plagioclase cumulates with cumulus Fe-Ti-oxides and apatite and minor biotite. Syn-solidification deformation is common. Upper Zone rocks, especially, are intruded by hawaiite to trachy-andesite sheets and sheets of quarts trachyte. The late sheets are suggested co-genetic with the amphibole-bearing cumulates of Upper Zone. The youngest sheets are quartz-microsyenite sheets that are believed derived from a sub-Lilliose intrusive complex. Brooks & Gleadow (1979) give fission-track ages for zircon and apatite of 52.5+/- 1.2 Ma and 51.0 +/1 1.2 Ma, Noble et al. (1988) give an amphibole K-Ar age of 49.4 +/-2 Ma.	1986: Reconnaissance by Platinova Resources Ltd. (Waters, 1987). 1989: Exploration and geological mapping by Platinova Resources Ltd. (Kelemen, 1990).
8	Sills in Kangerlussuaq basin	Palaeogene East Greenland	Picritic, basaltic and syenitic sills in sediments and lavas. No mineralisations are reported.	1	1	1	1	1	0	1	2	a	1	Wager (1947), Brooks & Nielsen (1982) and Gisselø (2002).	Major province of picritic, basaltic and syenitic sills. The sills are in part concordant with bedding in Kangerdlugssuaq series sediments and the lower formations in the regional lavas. The sills are often irregular and step up or down through the host rocks. The sills vary from <1m to >200m in thickness. Gisselø (2000) evaluates that up to 20% of the volume of basalt in the Paleaogene magmatic province in East Greenland can be hosted in sill complexes. Thick sills show internal differentiation whereas most sills show chemical variations due internal redistribution of intercumulus melt. The tholeiitic sills are assumed and known to becontemporaneous with the flood basalt magmatism along the Blosseville Kyst. No age information has yet been published.	Search for sulphide anomalies in the I.C. Jacobsen Fjord region by Platinova Resources Ltd. 1990 (see report by Della Valle, 1992 and GEUS GRF no. 21087).
13	Watkins Fjord Peridotite plug.	Palaeogene East Greenland	Ultramafic intrusion on the shore of Watkins Fjord. No mineralisation is reported.	1	0	1	0	1	0	1	1	c	1	Kays & McBirney, (1982).	Exposures in heavily moraine-covered low area on the south shore of Watkins Fjord. Very few details are available (Kays & McBirney, 1982) and Brooks & Nielsen (1982). In some references this intrusion has been named the Watkins Fjord picrite. In this report it is re-named to Watkins Fjord Peridotite. The known exposures only show a rather homogenous body of peridotite. The contacts have not been found.	No information is available

Id	Name	Region	Mineralisation	Ni>Cu	Cu>Ni	Pt>Pd	Pd>Pt	Contact	Strat	Knowledge (*1)	Group (*2)	Families	Size	Main references	Short description	Exploration activity
16	Gardiner complex	Palaeogene East Greenland	Subvolcanic melanephelintic complex with melilitolite and carbonatite. Major apatite mineralisation, immiscible REE-enriched Fe-Ti oxide breccias and veins and minor perovskite concentrations in seams.	1	0	1	0	1	0	2	1	d	2	Frisch & Keusen (1978), Nielsen (1980) and Nielsen (1981).	Zoned and replenished, 5 km wide, circular, melanephelinitic to melilititic subvolcanic (0.5-1 kbar) complex of very difficult access (Frisch & Keusen, 1978 and Nielsen 1980). The complex intrudes into Precambrian gneiss and the regional tholeiitic lavas. Several age determinations are given in the literature. They give an age of c. 50 Ma. The contact to the basement is chilled, e.g. Gleadow & Brooks, 1979. More recent age determinations (unpublished) suggests slightly older ages, i.e, 54 Ma. The oldest and dominating sequence of rings of ultramafic cumulates were formed by repeated influxes of melanephelinitic melt (Nielsen, 1981) in the open subvolcanic magma chamber. The ultramafics are during the waning stages of the magmatism intruded by: 1) a suite of nephelinitic to phonolitic dykes (Frisch & Keusen, 1978, Nielsen, 1979 and Nielsen 1994) and 2) late melilititic melt forming an up 400 m wide ring dyke and a sparsely exposed central unit of melilitolite (plutonic melilite-rich rock (Nielsen, 1980 and Nielsen, 1994). To the melilitolites are related peralkaline nephelinitic to phonolitic and carbonatitic dykes (Nielsen, 1980 and Nielsen et al, 1999). The melitolites includes a zone of marked magmatic layering, composed of alternating layers of melilitite–rich and perovskite-rich lithologies. Metasomatic alteration is extensive along contacts to melilitolites resulting in the formation of wide zones of glimmerite. Late irregular veins and dyke-like bodies in the form of a major ring dyke structure are composed of apatite-rich rocks (up to 90%, vol.) and believed formed by immiscible separation of apatite liquid and related Fe-oxide liquid.	*1971*: Exploration by Nordisk Mineselskab A/S (Frisch & Keusen, 1973). 1986: Reconnaissance by Platinova Resources Ltd. (Waters, 1987).
17	Kælvegletscher ultramafic intrusion	Palaeogene East Greenland	Little-known ultramafic intrusion. Minor supergene nickel mineralisation.	1	1	1	1	1	0	2	3	c	1	Prægel & Holm (2001).	The Kælvegletscher ultramafic intrusion is a little-known ultramafic body exposed along the heavily glaciated western shore of inner Kangerlusuaq Fjord, just north of the Kærven Syenite Intrusion. Prægel & Holm (1991, 1992 & 2001) describe the intrusion as mainly composed of dunite wehrlite. Prægel & Holm describe a possible feeder to the complex. A K-Ar age of 55 +/- 2 Ma is quoted in Brooks & Nielsen (1982). Two small mafic to ultramafic plugs are located just north of the Kælvegletscher (Kempe et al., 1970).	1970: Minor reconnaissance by Nordisk Mineselskab A/S (Vohryzka & Vohryzka, 1971). 1987: Reconnaissance investigations by Platinova Resources Ltd. (Goodwin & Turner, 1988).
20	Kap Edvard Holm Complex	Palaeogene East Greenland	Large, replenished tholeiitic gabbro complex. Anomalous values of PGE and Au in zone over 30 km.	1	1	1	1	1	1	2	3	e	3	Abbott & Deer (1972), Elsdon (1969) and Bernstein et al. (1992).	The Kap Edvard Holm complex is - a maybe - 800 km^2 layered, tholeiitic gabbro complex (Abbott & Deer, 1972). It is exposed in nunataks and coast exposures between Søndre Boswell Bugt and the mountains on the south shore of Amdrup Fjord. Large parts are hidden under Hutchinson Gletscher. The gabbros in the exposures just south of Amdrup Fjord could also belong to a separate gabbro intrusion. The Kap Edvard Holm comples is *c.* 50 Ma. old (Nevle *et* al., 1994) and Tegner *et* al. (1998). The complex was originally subdivided into the Lower, Middle and Upper Layered Series. More recently the consensus is that the Middle Layered series represent a separate body on the Kangerlussuaq fjord shore and that the Upper layered Series in the southern part of the complex are the lateral equivalents of the Lower Layered Series in the Kap Deichman/Hutchinson Gletscher area. The complex is intruded by the Boswell syenite complex, the Kap Deichman syenite complex, the Hutchinson I and II syenite intrusions, the Amdrup Fjord Biotite Granite and Kontaktbjerg breccia. Investigations in the Lower Series (Bernstein et al., 1992 and 1996) suggest the complex to be equivalent to ocean-floor type tholeiitic gabbro complexes characterised by repeated influx of new magma. Re-setting of mineral chemistry to more primitive compositions due to new influxes of magma is abundant and well documented (Bernstein et al., 1996). The gabbros are very well layered with abundant evidence of instability. Internal contact zones are described by Tegner et al. (1993). Major bodies of gabbro pegmatite are observed. The gabbros are intruded by late wehrlite bodies and sills that are reminiscent of similar ultramafic melts in ophiolite-hosted gabbro intrusions (Bernstein et al., 1996).	Exploration has been carried out between 1986 and 1991 by Platinova Resources Ltd and partners: 1986: Platinova Resources Ltd., stream sediment investigation and grab samples. 1987: Platinova Resources Ltd., stream sediment investigation and grab samples. 1988: Platinova Resources Ltd., stream sediment investigation and grab samples. 1989: Platinova Resources Ltd., stream sediment investigation and grab samples. 1990: Platinova Resources Ltd., systematic chip line sampling and minor packsack drilling. 1991: Platinova Resources Ltd. and RTZ, 12 BQ cores drilled from 6 locations.

Id	Name	Region	Mineralisation	Ni>Cu	Cu>Ni	Pt>Pd	Pd>Pt	Contact	Strat	Knowledge (*1)	Group (*2)	Families	Size	Main references	Short description	Exploration activity
26	Kruuse Fjord Gabbro complex	Palaeo-gene East Green-land	Composite and layered, open, gabbro and troctolite complex with subordinate ultramafic and trondhjemitic bodies. PGE mineralisati-on in internal contact zone.	1	1	1	1	1	1	2	3	d	3	Arnason *et* al. (1997).	Large, 180 km2, semi-circular, mafic to ultramafic layered complex exposed between and inland from the heads of Kruuse Fjord and Agtertia fjord in heavy glacier terrain. The complex consists of an outer ring of gabbros and a large core of troctolites separated by trondhjemite. The gabbros and troctolites are affected by syn-magmatic deformation and subsidence. An ultramafic intrusion near the head of Kruuse Fjord forms an up to 800 m wide and 5 km long body of wehrlite (Arnason et al., 1997). The complex post-dates the coast parallel flexure along the North Atlantic margin. Tegner et al. (1998) gives an age of 48.0 +/- 1.2 Ma for the gabbro supposed to be early in the development of the complex. The complex is suggested to be an example of bi-modal mafic-ultramatic magmatism in a rifting environment.	*1987*: Platinova Resources Ltd. (Goodwin & Turner, 1989). Reconnais-sance, profiling and assays of grab samples. Explora-tion activity: 1989: Platinova Re-sources Ltd. (Turner, 1990). Chip line sampling and reconnais-sance. 1993: Quadrant Re-sources PTY Ltd. (Bernstein, 1994). Chip line sampling from western part of the complex. 1995: Quadrant Resources PTY Ltd. (Bernstein, 1996) Chip line sampling from discovery area.
28	Noe-Nygaard intrusion	Palaeo-gene East Green-land	Gabbro and wehrlite stock. No mineralisa-tions are reported.	1	1	1	1	1	1	1	2	e	1	Bernstein & Bird (2000).	The Noe-Nygaard gabbro and wehrlite intrusion is ellipsoidal in shape and 4 km N-S and 2.5 km E-W. It is emplaced into Precambrian basement. The gabbros are rich in basaltic inclusions. The gabbro is replaced and intruded by wehrlite believed formed by dissolution of plagioclase in gabbros. No radiometric age information is available. Detailed information is given in Bernstein & Bird (2000).	No information is available
29	Imilik gabbro complex	Palaeo-gene East Green-land	Large, replenished, layered tholeiitic gabbro complex.No mineralisa-tions are reported.	0	1	0	1	1	1	1	2	e	3	Brown & Farmer (1972), Brown *et* al. (1977), Myers (1980) and Bernstein *et* al. (1998).	The Imilik gabbro complex has been known for several decades, but neverthe-less only quite limited information has been published. The gabbers are believed to represent 3 individual pulses of relatively It-poor, tholeiitic magma that produced three overlying successions of cumulates separated by unconformities (Myers, 1980). The Imilik gabbros are exposed on headlands and islands from Nûgtuaq, over Imilik island and the larger unnamed island to the west and possibly to the island Lille Tindholm about 16 km to the northeast. Tegner at al. (1998) refer to the three units in the Imilik Gabbro complex as Imilik Intrusions I-III. Imilik II has given an Ar-Ar age of 56.2 +/- 0.2 Ma, whereas Imilik intrusion III gives ages of 49-52 Ma. No age is available for the oldest unit, Imilik Intrusion I. Limited data in Brown & Farmer (1972) and Brown et al. (1977).	No information is available
31	Kulusuk centre	Ammas-salik moble belt	Syn-tectonic diorite compleks, sulphide mineralisa-tions in aureol	1	1	1	1	1	0	2	3	f	2	Friend & Nutman (1989)	Poly-phase complex dominated by orthopyroxene, amphibole, and biotite-bearing diorite and minor basic orthopy-roxene and clinopyroxene litholigies and granitic rocks, also orthopyroxene-bearing (Nutman & Friend, 1989).The intrusion is assumed to be contemporaneous with the Ammassalik centre and topre-date regional deformation (1870-1840 Ma, Nutman et al, 2008). It has retained its unity as it behaved as a rigid block in an envelop of garnet-rich anatectic gneiss derived from para- and orthogneisses. The core of the intrusion is well preserved magmatic diorite. The host paragneissses are characterized by sillimanite and garnet. As for the Ammassalik centre the basic rocks are believed to be mantle derived, whereas the granitic rock are believed to be rheomorphic and originat-ing from the supracrustals surrounding the intrusion. The diorite is cut by regional Proterozic dykes. No mineralisations are presently reported from the complex	Regional tream sediment mapping and follow-up investigations (Lie, 1997)
32	Ammas-salik centre	Ammas-salik moble belt	Syn-tectonic diorite compleks, sulphide mineralisa-tions in aureol	1	1	1	1	1	0	2	3	f	2	Friend & Nutman (1989)	Poly-phase complex dominated by orthopyroxene, amphibole, and biotite-bearing diorite and minor basic orthopy-roxene and clinopyroxene litholigies and granitic rocks, also orthopyroxene-bearing (Nutman & Friend, 1989).The intrusion (1900-1880 Ma, Nutman et al, 2008) pre-dates regional deformation (1870-1840 Ma, Nutman et al, 2008), but has retained its unity as it behaved as a rigid block in an envelop of garnet-rich anatectic gneiss derived from para- and orthogneisses. The core of the intrusion is well preserved magmatic diorite. The host paragneissses are characterized by sillimanite and garnet. The basic rocks are believed to be mantle derived, whereas the granitic rock are believed to be rheomorphic and originating from the supracrustals surrounding the intrusion. The diorite is cut by regional Proterozic dykes. Parts of the complex host dessiminated sulphide mineralisation. No details are available.	Regional tream sediment mapping and follow-up investigations (Lie, 1997)

Id	Name	Region	Mineralisation	Ni>Cu	Cu>Ni	Pt>Pd	Pd>Pt	Contact	Strat	Knowledge (*1)	Group (*2)	Families	Size	Main references	Short description	Exploration activity
33	Hobbs centre	Ammassalik moble belt	Syn-tectonic diorite compleks, sulphide mineralisations in aureole	1	1	1	1	1	0	2	2	f	2	Friend & Nutman (1989)	Poly-phase complex dominated by orthopyroxene, amphibole, and biotite-bearing diorite and minor basic orthopyroxene and clinopyroxene lithologies and granitic rocks, also orthopyroxene-bearing (Nutman and Friend, 1989).The intrusion is assumed to be contemporaneous with the Ammassalik centre and topre-date regional deformation (1870-1840 Ma, Nutman et al, 2008). It has retained its unity as it behaved as a rigid block in an envelope of garnet-rich anatectic gneiss derived from para- and orthogneisses. The core of the intrusion is well preserved magmatic diorite. The host paragneissses are characterized by sillimanite and garnet. As for the Ammassalik centre the basic rocks are believed to be mantle derived, whereas the granitic rock are believed to be rheomorphic and originating from the supracrustals surrounding the intrusion. The diorite is cut by regional Proterozic dykes. No mineralisations are presently reported from the complex	Regional tream sediment mapping and follow-up investigations (Lie, 1997)
35	Sermilik East diorite	Ammassalik moble belt	Pre- to syntectonic diorite intrusion with minor gabbro, basemetal sulphide mineralisation in gabbros.	1	1	1	1	1	0	1	3	g	3	Chadwick & Vasudev (1989)	The Sermilik East diorite is a large dioritic to tonastlitic intrusive complex that was emplace early in the Proterozoic evolution of the Tasiilaq region. It is exposed on the eastern shor of Sermilik Fjord and exposed in a app. 10 x 10 km area in land from the abandont village Paonakajit. The deformation is used as evidence for it pre-deformation age. The complex also hosts a number of small gabbroic bodies, some of those showing minor sulphide mineralisation (unpublished, GEUS 2010). The complex has not been investigated.	none
36	Ivnartivag complex	Ammassalik moble belt	Dunite intrusion with chromite and asbestos. Olivine and Cr-poor chromite	1	0	1	0	1	1	2	2	h	1	Brooks a& Stenstrop (1989)	Dunite intrusion, 300 x 800 m in size, elongated ESE with amphibilite horizons and Cr-poor chromite layers. The intrusion is extensively serpentinized and pre-dates regional deformation and metamorphism. Primary contacts are not preserved. Brooks & Stenstrop (1989) quote P.M. Holm for an early Proterozoic age of 1955±22 Ma. The intrusion contains horizons with asbestos.	General description by Brooks & Stenstrop (1989)
37	Isortoq diorite intrusion	Ammassalik moble belt	Little know diorite intrusion, mineral hunt base metal and Au samples of interest	1	1	1	1	1	1	1	1	i	2	Kalsbeek (1989)	The Isotoq granite pluton intrusion is on the mainland app. 25 km north of the village Isortoq, is unknown and unexplored. It probably belongs to the same suite as the larger granite pluton in the arcipelago around Isortoq village. The intrusions attract interest due to mineralised samples reported by Ujarasuit (mineral hunt, several years)	None
38	Roar Halvø and Halvdan Fjord gabbros	Skjoldungen Alkaline Province	gabbroic gneiss body, no mineralisation recorded	1	1	1	1	0	0	1	1	j	2	Nielsen & Rosing (1990), Blichert-Toft et al. (1995)	The intrusive mafic gneisses or broad bands of foliated gabbro in general with a NW-SE trend. As for many of the intrusions in the Skjoldungen area, these intrusions were emplaced during the deformation in the Skjoldungen region. Their relationship to the Skjoldungen Alkaline Province may be questioned due to the lack of qualitative and quantitative age information. However, the gabbroic gneiss is in chemical composition akind to that of other mafic intrusions in the Skoldungen region. The clear intrusive and relatively young suggested age may support a relationship to the Skjoldungen Alkaline Province. No detail investigations have been performed and no obvious mineralisations have been observe.	Regional helicopter reconnaissance by Kryolitselskabet Øresund A/S (1963), Della Valle (2000)
40	Stærkodder gabbro	Skjoldungen Alkaline Province	Little-known suite of disrupted mafic exposures, no mineralisation recorded	1	1	1	1	1	1	1	2	j	2	Nielsen & Rosing (1990), Blichert-Toft et al. (1995)	The Stærkodder gabbro has not been studied and is only known from reconnaissance. The plutonic body seems well-defined and a Late Archaean age is assumed. No details are available.	Regional helicopter reconnaissance by Kryolitselskabet Øresund A/S (1963), Della Valle (2000)
41	Rumleren ultramafic center	Skjoldungen Alkaline Province	Little-known suite of disrupted mafic exposures, no mineralisation recorded	1	1	1	1	1	1	1	2	j	1	Nielsen & Rosing (1990), Blichert-Toft et al. (1995)	The Rumlere ultramafic Center has not been studied and is only known from reconnaissance. The plutonic body seems well-defined and a Late Archaean age is assumed. No details are available.	Regional reconnaissance by kryolitselskabet Øresund A/S (1963), Della Valle (2000)
42	Marie Dal ultramafic center	Skjoldungen Alkaline Province	Little known suite of disrupted mafic exposures, no mineralisation recorded	1	1	1	1	1	1	1	1	k	1	Nielsen & Rosing (1990), Blichert-Toft et al. (1995)	The Marie Dal ultramafic Center has not been studied and is only known from reconnaissance. The plutonic body seems well-defined and a Late Archaean age is assumed. No details are available.	Regional helicopter reconnaissance by Kryolitselskabet Øresund A/S (1963), Della Valle (2000)
48	Thrymheim Ultramafic Complex	Skjoldungen Alkaline Province	Little-know mafic body, no mineralisation recorded	1	1	1	1	1	1	1	1	k	1	Nielsen & Rosing (1990), Blichert-Toft et al. (1995)	The Thrymheim ultramafic complex consists of a number of exposures in the nunatak zone inland from Skjoldungen island.The complex was observed during helicopter reconnaissance. no details are available. It may consist of one or more bodies and the extent of the complex is not known. The rocks are mafic to ultramafic. Based on analogy the complex is suspected to be Late Archaean.	Regional helicopter reconnaissance by Kryolitselskabet Øresund A/S (1963), Della Valle (2000)

Id	Name	Region	Mineralisation	Ni>Cu	Cu>Ni	Pt>Pd	Pd>Pt	Contact	Strat	Knowledge (*1)	Group (*2)	Families	Size	Main references	Short description	Exploration activity
51	Ruinnæs-set Intrusion	Skjoldun-gen Alkaline Province	Large dioritic intrusion, minor FeTi oxide and apatite	0	1	0	1	1	1	2	1	l	3	Nielsen & Rosing (1990), Blichert-Toft et al. (1995)	The Ruinnæsset intrusion is c. 12 km long and 5 km wide elliptical body (Rosing et al. 1988), elongated NW–SE. The contact to host gneisses is sharp and formed by a 2 m wide zone of coarse hornblendite grading inro mescratic hornblend-felspar rocks with up to 30 cm long crystals of hornblende. The crystals are perpendicu-lar to the contact of the intrusion.The intrusion spans the entire range from mafic and ultramafic rocks to feldspar rich lithologies including hypersthene-bearing honblendite, leucogabbro, monzodiorite, monzonite and syenite. The feldspar-rich rocks make up the main body of the intrusion, which often shows pronounced, near-vertical, modal layering with thin hornblende, pyroxene, biotite and oxide-rich layers alternating with broad bands rich in feldspar. Sopme feldsparcrystals are very large (> 10cm). Igneous lamination defined by well-orientated tabular plagioclase and alkali feldspar crystals. Monzonite and and syenite confined mostly to the western section. Locally ultramafic lenses and sheets up to 10 cm thick and several metres long (Blichert-Toft et al. 1995) The intrusion is Late Archaean and dated to 2699±4 Ma (Nutman & Rosing 1994)	Regional helicopter reconnaissance by Kryolitselskabet Øresund A/S (1963), Della Valle (2000)
52	Across Sound Intrusion	Skjoldun-gen Alkaline Province	Small hornblende peridotite intrusion, no mineralisa-tion recorded	1	1	1	1	1	1	1	1	k	1	Blichert-Toft et al. (1995), Thomsen (1998)	Small, *c.* 150 x 200 m, lozenge-shaped hornblende peridotite body, elongated N–S. The intrusion is assumed to be contemporaneous with similarintrusions in the Skjoldungen Alkaline Province and around 2700 Ma old. The intrusion belongs to a suite of such bodies emplaced into the Skjoldungen area during the late-Archaean. The contacts are strongly irregular consisting of metre-sized, angular fragments of pyroxenite and mafic hybrid rocks separated by veins of leucocratic and basement gneiss (Thomsen 1998).Further details in Thomsen (1998).	Regional helicopter reconnaissance by Kryolitselskabet Øresund A/S (1963), Della Valle (2000)
53	Balders Fjord Intrusion	Skjoldun-gen Alkaline Province	Hornblende gabbro intrusion	1	1	1	1	1	1	1	1	k	1	Blichert-Toft et al. (1995), Thomsen (1998)	Intrusive body of hornblende gabbro, hornblendite, and mafic and intermediate hornblende gabbro in blebby textures. The souteast contact is rimmed by a >10m wide hornblendite dyke. The intrusion is assumed to be contempora-neous with similarintrusions in the Skjoldungen Alkaline Province and around 2700 Ma old. The intrusion belongs to a suite of such bodies emplaced into the Skjoldungen area during the late-Archaean.	Regional helicopter reconnaissance by Kryolitselskabet Øresund A/S (1963), Della Valle (2000)
54	Rensdyr intrusion	Skjoldun-gen Alkaline Province	Little-know mafic body, no minerali-sation recorded	1	1	1	1	1	1	1	1	k	1	Thomsen (1998)	The Rensdyr intrusion consists of unevenly distributed patches of homoge-neous hornblendite and pyroxene-hornblende gabbros.The sheet-like body is c. 500 x 1000 m large and elongated NW–SE with a concave shaped outcrop The sheet margins with basement are brecciated with both hybrid mafic and basement gneiss (Thomsen, 1998). The age is supposed to be late Archaean: c. 2700 Ma on comparison to adjacent intrusions (Blichert-Toft et al. 1995).	Regional helicopter reconnaissance by Kryolitselskabet Øresund A/S (1963), Della Valle (2000)
55	Caroline Amalie intrusion	Skjoldun-gen Alkaline Province	Little-know mafic body, no minerali-sation recorded	0	1	0	0	1	1	1	1	k	1	Thomsen (1998)	Small, little-known hornblende pyroxenite body at the head of Caroline Amalie bugt. The contacts are not exposed. The age is supposed to be late Archaean: c. 2700 Ma on comparison to adjacent intrusions (Blichert-Toft et al. 1995).	Regional helicopter reconnaissance by Kryolitselskabet Øresund A/S (1963), Della Valle (2000)
56	Sarqâ ultramafic plutons	Ketilidian intrusions and comple-xes	Layered, 100 m - scale hornblende peridotites with internal magmatic differentia-tion and sulphide mineralisa-tion. Probably belonging to the Ketilidian plutonic development rather than the Gardar province.	1	0	1	0	1	1	2	3	m	1	Berrangé (1970), Schönwandt (1971)		Steenfelt et al. (2000), Schjøth et al. (2000)
57	Appinite intru-sions, Otto Rud Øer – Anorituup Kanger-lua	Ketilidian intrusions and comple-xes	Medium-grained hbl-biotite diorite and hornblende gabbro intrusions syngenetic with the felsic members of the Julianehåb batholith	1	1	1	1	1	0	1	1	n	1	Andrews et al. (1973)		Steenfelt et al. (2000), Schjøth et al. (2000)

Id	Name	Region	Mineralisation	Ni>Cu	Cu>Ni	Pt>Pd	Pd>Pt	Contact	Strat	Knowledge (*1)	Group (*2)	Families	Size	Main references	Short description	Exploration activity
58	Appinite intrusion, Lichtenau Fjord	Ketilidian intrusions and complexes	Large intermediate–mafic member of the julianehåb batholith characterised by hydrated mafic mineralogy (hornblende±biotite)	1	1	1	1	1	0	1	1	n	1	Persoz (1969)		Steenfelt et al. (2000), Schjøth et al. (2000)
59	Stendalen gabbro	Ketilidian intrusions and complexes	Layered gabbro intrusion including leucogabbroic rocks near its top and stratabound (?) sulphide mineralisation, emplaced into the Ketilidian fore arc during deformation of the latter, but largely preserving its original flat-lying structure.	0	1	0	1	1	1	2	2	o	1	Garde et al. (2002a), Stendal et al. (1997)		Steenfelt et al. (2000), Schjøth et al. (2000)
60	Rapakivi suite: norite, Prins Christian Sund	Ketilidian intrusions and complexes	Noritic member of the rapakivi suite	1	1	1	1	1	1	1	1	p	99	Chadwick et al. (2000), Grocott et al. (1999), Harrison et al. (1990)		Steenfelt et al. (2000), Schjøth et al. (2000)
61	Rapakivi suite: norite, Eggers Ø	Ketilidian intrusions and complexes	Noritic member of the rapakivi suite	1	1	1	1	1	1	1	1	p	99	Bridgwater et al. (1966), Grocott et al. (1999)		Steenfelt et al. (2000), Schjøth et al. (2000)
62	Rapakivi suite: norite, Frederiksdal	Ketilidian intrusions and complexes	Noritic member of the rapakivi suite	1	1	1	1	1	1	1	1	p	99	Bridgwater et al. (1966)		Steenfelt et al. (2000), Schjøth et al. (2000)
63	Alángorssuaq gabbro	Gardar Province	Oldest intrusive unit in the Nunarssuit complex	1	1	1	1	1	1	2	2	q	3	Harry & Pulvertaft (1963)	Part of the Nunarssuit complex. Medium grained olivine gabbro. The eastern outcrops are largely uralitized: olivine and pyroxene are replaced by biotite and amphibole and feldspar is saussuritized. In the south-west it is hybridized with abundant microperthite replacing plagioclase. Considered the earliest phase of the Nunarssuit complex (Harry & Pulvertaft 1963). The age is 1119 ±48 Ma (Rb-Sr, Blaxland et al. 1978, recalculated)	
70	Qeqertarsuatsiaat (Fiskenæsset) Complex, West	Archaean mafic intusions, etc., SW Greenland	Metamorphic layered chromitite-anorthosite complex	1	1	1	1	1	1	2	2	r	3	Polat et al. (2010), Myers (1985), Myers & Platt (1977)	Description not yet available. Please consult Myers (1985) and Polat et al. (2010) for descriptions and references.	
71	Qeqertarsuatsiaat (Fiskenæsset) Complex, Sinarsuk	Archaean mafic intusions, etc., SW Greenland	Metamorphic layered chromitite-anorthosite complex	1	1	1	1	1	1	2	2	r	3	Polat et al. (2010), Myers (1985), Myers & Platt (1977)	Description not yet available. Please consult Myers (1985) and Polat et al. (2010) for descriptions and references.	
72	Akullersuaq anorthosite	Archaean mafic intusions, etc., SW Greenland	Metamorphic anorthosite complex	1	1	1	1	1	1	2	1	s	2	Rehnstöm, E.F. (2011).	No description yet available	
73	Itilleq (Amer) anorthosite	Archaean mafic intusions, etc., SW Greenland	Metamorphic anorthosite complex	1	1	1	1	1	1	2	1	s	2	Rehnstöm, E.F. (2011).	No description yet available	
74	Storø anorthosite	Archaean mafic intusions, etc., SW Greenland	Metamorphic anorthosite complex	1	1	1	1	1	1	2	1	s	2	Chadwick et al. (1982)	No description yet available. Please consult Chadwick et al. (1982)	
75	Innajuattoq anorthosite	Archaean mafic intusions, etc., SW Greenland	Metamorphic anorthosite complex	1	1	1	1	1	1	1	1	s	1	Bridgwater et al. (1974), Owen & Dymek (1997)	No description yet available. Please consult Bridgwater et al. (1974) and Owen and Dymek (1997)	
76	Nordlandet anorthosite	Archaean mafic intusions, etc., SW Greenland	Metamorphic leucogabbro-anorthosite complex	1	1	1	1	1	1	1	1	s	3	Bridgwater et al. (1974), Owen & Dymek (1997), Dymek & Owen (2001)	No description yet available	

Id	Name	Region	Mineralisation	Ni>Cu	Cu>Ni	Pt>Pd	Pd>Pt	Contact	Strat	Knowledge (*1)	Group (*2)	Families	Size	Main references	Short description	Exploration activity
77	Seqi dunite complex	Archaean mafic intusions, etc., SW Greenland	Metamorhic dunite complex	1	1	1	1	1	1	2	2	t	3	Bridgwater et al. (1976)	No description yet available	
78	Itillup Qeqertaa dunite body	Archaean mafic intusions, etc., SW Greenland	Metamorhic dunite complex	1	1	1	1	1	1	1	2	t	1	Sørensen, H. (1954)	No description yet available	
79	Maniitsoq norite suite	Archaean mafic intusions, etc., SW Greenland	Metamorhic leuconorite complex	1	1	1	1	1	1	2	2	s	3	Hall & Hughes (1987)	No description yet available	
80	Asbestilik UM body	Archaean mafic intusions, etc., SW Greenland	Metamorphic ultrabasic complex	1	1	1	1	1	1	1	2	u	3	Kalsbeek & Garde (1989)	No description yet available	
81	Qaamassoq East UM	Archaean mafic intusions, etc., SW Greenland	Metamorphic ultrabasic complex	1	1	1	1	1	1	0	2	u	2	Kalsbeek & Garde (1989)	No description yet available	
82	Itilleq (Kang) alkaline body	Archaean mafic intusions, etc., SW Greenland	Metamorphic alkaline ultramafic complex	1	1	1	1	1	1	1	1	v	1	Jensen et al. (2002)	No description yet available	
83	Kakilisattooq amphiolite complex	Archaean mafic intusions, etc., SW Greenland	Metagabbro amphibolite complex	1	1	1	1	1	1	1	2	w	2	Stendal et al. (2004)	No description yet available	
84	Qaqortorssuaq anorthosite complex	Archaean mafic intusions, etc., SW Greenland	Metamorphic anorthosite complex	1	1	1	1	1	1	2	1	s	3	Ellitsgaard-Rasmussen & Mouritzen (1954)	No description yet available	
86	Itilli diorite	Archaean, Disko Bugt region	Large body of dioritic gneiss.	1	1	1	1	1	1	1	2	x	3	Garde & Steenfelt (1999)	The Itilli diorite is a large composite NW-trending body. It consists of homogeneous, medium to dark grey, biotite- and hornblende-bearing diorite and differs from other gneisses on Nuussuaq by its more mafic composition. It is clearly intrusive into a fine-grained supracrustal amphibolite. It yields a U-Pb zircon age of 3030 Ma (Connlly et al. 2006)	
87	Boye Sø anorthosite	Archaean, Disko Bugt region	Large metamorphosed and deformed mafic intrusion, peridotite to snowball anorthosite. Cr and Ni anomalies.	1	1	1	1	1	1	2	2	y	3	Garde & Steenfelt (1999)	The Boye Sø anorthosite complex is a large massif of metamorphosed snowball-type anorthosite, leucogabbro, gabbro and ultrabasic rocks. The complex is 25 km2 in outcrop size. Its structure appears to be a series of thrust slices, with a large synform fold in the north-eastern part. Stream sediment analyses show elevated Cr and Ni anomalies	
88	Sarqata qaqa	Palaeogene in West Greenland	Gabbro - granophyre complex, no mineralisations recorded	1	1	1	1	1	1	2	1	z	2	Clarke & Pedersen (1976), Beckinsale et al. (1974)	A c. 15 km2 gabbro intrusion with an overlying granophyric sheet. The gabbro intrusion has steep contacts. The information on the complex is limited to older descriptions and age dating (Clarke & Pedersen, 1976, Beckinsale et al., 1974). The reader is referred to these references for further information.	
89	Native iron in dykes	Palaeogene in West Greenland	Basic dyke-like bodies with native iron and sulphides, indicative of nickel and PGE potential	1	1	1	1	1	0	2	3	aa	2	Fundal, (1975), Clarke & Pedersen (1976), Ulff-Møller (1985 and 1990)	Classic occurrences of native iron and related sulphides are found in several locations on Disko Ø (e.g., Clarke & Pedersen , 1976, Ulff-Møller 1990). The largest occurrences are in the Hammerdal and ther Hanekammen dykes. The native iron and related sulphides are the result of sediment contamination of Mg- and Ni-rich basaltic to picritic magmas resulting in reduction and exsolution of Fe-rich melt. Although un-economic, the occurrences in the two dyke systems indicate a potential for larger occurrences of exsolved sulphide and iron bodies with Ni and PGE potentials in the large picrite-rich Palaeogene volcanic province in West Greenland.	
90	Diorite and granit orthogneiss in Victoria Fjord complex	Archaean in N and NW Greenland	Dioritic to granitic orthogneiss	1	1	1	1	0	0	0	0	bb	1	Henriksen & Jepsen (1985), Hansen et al. (1987)	The complex represents the northernmost in situ exposures of Precambrian shield in Greenland and the only known rocks of Palaeoarchaean age in Greenland. Two generations of diorites are mentioned by Henriksen and Jepsen (1985) and Hansen et al. (1987): the latter did the initial geochronology work on both diorite phases. One diorite (orthogneiss) sample from the younger(?) phase contains 3.4 Ga oscillatory-zoned zircons that probably date the rock (Nutman et al. 2008). Literature review in Nutman et al. (2008).	
91	Qaqujârssuaq anorthosite	Archaean in N and NW Greenland	Anorthosite complex	1	1	1	1	1	1	2	1	cc	3	Dawes (1972, 1976b), Nutman (1979, 1984)	Largest single anorthosite mass in Greenland. Part of the Smithson Bjerge magmatic association of Dawes (1991; 2006, p. 28). Discovered in 1971, the mass was named Qaqujârssuaq anorthosite by Dawes (1972), illustrated in Dawes (1976b, figs 226, 227) and (Dawes 2006, figs.10, 11). Main study and description is Nutman (1979, 1984) who mapped the semi-nunatak Smithson Bjerge at 1:20 000, the northern half of which is composed of the anorthosite. Stream-sediment geochemistry (Steenfelt et al. 2002). Literature cited in Dawes (2006).	
92	Heilprin Gletscher complex.	Archaean in N and NW Greenland	Metagabbro to granite intrusions	1	1	1	1	1	1	1	1	dd	2	Nutman (1984)	Basic to acidic intrusions forming the south-western peninsula of Smithson Bjerge: part of the Smithson Bjerge magmatic association of Dawes (1991; 2006, p. 28). The intrusives were mapped as metagabbro by Dawes (1972, fig. 3, p.12; 1976b, fig. 223). Named Heilprin Gletscher complex by Nutman (1979, p. 24). Main description is Nutman (1984, p.19–23). Maybe coeval with the meta-igneous rocks of Kap York meta-igneous complex (2.7 Ga). Literature cited in Dawes (2006).	

Id	Name	Region	Mineralisation	Ni>Cu	Cu>Ni	Pt>Pd	Pd>Pt	Contact	Strat	Knowledge (*1)	Group (*2)	Families	Size	Main references	Short description	Exploration activity
93	Kap York meta-igneous complex.	Archaean in N and NW Greenland	Regional basic to acid intrusions	1	1	1	1	1	0	1	1	dd	2	Dawes (2006)	Basic to acidic intrusions. Intrusive rocks mentioned by Koch (1920) and Davies et al. (1963), mapped by Dawes (1975, 1976a, 1979) and named Kap York meta-igneous complex by Dawes (1975, fig. 9, p. 36). Most recent description is Dawes (2006, p. 31–33). Rb–Sr whole-rock age by Kalsbeek & Dawes (1980) and Dawes et al. (1988). Literature cited in Dawes (2006). Basic to acidic intrusions.	
94	Melville Bugt meta-basites (regional).	Archaean in N and NW Greenland	Regional subconcordant metadolerite, metagabbro, and amphibolite	0	1	0	1	0	0	1	1	dd	1	Dawes (2006)	Subconcordant bodies of metadolerite, metagabbro, amphibolite recognised initially by Dawes (1979, p. 17) and included within map unit a2 of Dawes (1991). Main description in Dawes (2006, p. 45, fig. 27). Correlated by Dawes & Frisch (1981, table 1) to the Kap York meta-igneous complex.	
95	Sills in Prudhoe Land supra-crustal complex (regional)	Palaeo-proterozoic in NW Greenland	Ultramafic to basaltic sill like bodies in supracrustal siccession. Supposed to be source for titanium-rich placer deposits	1	1	1	1	1	0	1	2	ee	1	Dawes & Garde (2004), Dawes (2006)	Diverse metasedimentary rocks (pelitic and semi-pelitic schists, quartzites, marble, paragneiss) with metabasic and ultramafic intervals. Magmatic rocks (garnet amphibolites) were initially recognised in the Inglefield Bredning area as prominent units within a supracrustal sequence up to 1 km thick that is in a basement-cover relationship with Archaean gneisses (Dawes 1972). This relationship is illustrated in Dawes (1976b, fig. 226) and Dawes (2004, fig. 7); see also Thomassen et al. (2002a, fig. 3) and Thomassen et al. (2002b, fig. 4). Magmatic rocks are included in map units a (amphibolite) and p (pyribolites) on the 1:500 000 map sheet 5, Thule. Most recent reference is Dawes (2006) with description on p. 48–49 and photographic illustration in figs 7 and 29 (see also Dawes 2004, p. 14–15). SHRIMP zircon dating (Nutman et al. 2008) fix accumulation of the supracrustal pile to between 2250 and 1920 Ma. For stream-sediment geochemistry, see Steenfelt et al. (2002). MIneralisation related to the magmatic suites including coastal placers, see Ghisler &Thomsen (1971), Cooke (1984), Cooke (1978), Dawes (1989), Dawes (2006), Thomassen et al. (2002a and b), Thomassen and Tukiainen (2009), and Thomassen & Krebs (2004).	
96	Etah Group intrusions (regional)	Palaeo-proterozoic in NW Greenland	Regional ultramafic to intermediate sill-like bodies in supracrustal succession. Related Fe-Ti oxide and copper mineralisations.	1	1	1	1	1	0	1	2	ee	2	Dawes (2004)	Polyphase, high-grade gneissose plutonic complex representing an arc suite of mainly intermediate to felsic rocks, with subordinate basic and magnetite-rich intrusions. Deformation contrasts are illustrated in Dawes et al. (2000, fig. 4). Igneous rocks around Foulke Fjord, south-west Inglefield Land, were first recognised by Schei (1903) and early descriptions include Bugge (1910) and Koch (1933). Name Etah meta-igneous complex introduced by Dawes (1972) with the type area around Etah (Foulke Fjord) and coast to the north and south. Following comparative studies by Frisch (1981), the name Etah meta-igneous complex was extended by Frisch and Dawes (1982) to cover magmatic assemblages on both sides of Smith Sound. Early description and regional appraisal is Dawes (1988), most recent description and literature summary is Dawes (2004, p. 18–22). Early K–Ar and Rb–Sr dating establishing Proterozoic age by Larsen & Dawes (1974) and Dawes et al. (1988) with U–Pb zircon and monazite work from Ellesmere Island by Frisch & Hunt (1988). SHRIMP U–Pb zircon dating from Greenland suggests emplacement between 1.95 to 1.91 Ga (Nutman et al. 2008).They were initially shown in Dawes et al. (2000) and named in Dawes (2004, p. 20). Iron oxide mineralisation, including one major body, are mentioned in Thomassen & Dawes (1996, p. 66), and copper-gold indications are described in Pirajno et al. (2000, 2001). Regional investigation of economic potential by Thomassen et al. (2000a and b).	Reconnaissance investigations 1969-73 by Greenarctic Consortium and Internationalt Mineselskab A/S, 1991- 1995 by RTZ Mining and Exploration Limited (Sharp, 1991; Coppard, 1996), and 1995 by Nunaoil A/S (Gowern & Kelly 1996)
97	Hiawatha pluton.	Palaeo-proterozoic in NW Greenland	Hypersten quatrz diorite	0	1	0	1	0	0	1	2	ff	2	Dawes (2004)	Thick, folded sheet of hypersthene quartz diorite north of Hiawatha Gletscher included in map unit qd (Quartz diorite) of Dawes & Garde (2004). For description see Dawes (2004, p. 20). SHRIMP U-Pb zircon age of 1947 Ma regarded by Nutman et al. (2008) as age of intrusion. The hypersthene quartz diorites are comparable to Foulke Fjord pluton, a probable age equivalent.	
98	Foulke Fjord pluton.	Palaeo-proterozoic in NW Greenland	Hypersten quatrz diorite	0	1	0	1	0	0	1	2	ff	2	Bugge (1910), Dawes & Garde (2004)	Hypersthene quartz diorite from Foulke Fjord first described by Bugge (1910) represents a widespread and characteristic lithology of the Etah meta-igneous complex throughout Inglefield Land. Foulke Fjord is the type area of Etah meta-igneous complex. The Foulke Fjord pluton represents a highly deformed folded sheet-like body covered by the map unit qd (Quartz diorite) of Dawes & Garde (2004), probably coeval with the Hiawatha pluton.	
102	Midkap intrusives.	Mesozoic in N Greenland	Mafic to ultramafic plugs and small intrusions of unknown origin	1	1	1	1	1	0	1	1	gg	1	Pedersen (1980), Soper et al. (1980), Parsons (1981)	Partly quoted from Henriksen (1992): Between Frigg Fjord and Midtkap north of Frederick E. Hyde Fjord . occurs a line of small intrusive breccia bodies, the Midtkap volcanic centres (Pedersen, 1980, Soper et al., 1980, Parsons,1981). The pipes and necks consist of brecciated gabbro, diorite, granite(?), and serpentinite. The breccias also contain blocks of crystalline basement. Carbonate veining is common. The occurrences appear to be without economic interest, apart from very minor malachite staining. The magmatism is characcterised by mafic to ultramafic melts (now serpentinite), subvolcanic breccias(?), carbonate and explosive emplacement that carries blocks of crystalline basement deep below the present level of errosion. Pedersen & Holm (1983) report a K-Ar age of 380+/- 5 Ma.	

(*1) Knowledge
0= no or very little information
1= some information
2= some information also on mineralisation
3= significant amounts of information

(*2) Group
1= group exspected to be without potential
2= group that should be searched for potential
3= group with signs of mineralisation, has potential