Gold and platinum-group element anomalies in the Fiskenæsset stratiform anorthosite complex, West Greenland

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ABSTRACT

Platinum group element (PGE) contents in the Fiskenæsset anorthosite complex show a distinct relation to specific lithologies. PGE appear in highest amounts in ultramafics, chromitites and in sulphide-rich parts of the anorthosite. Exploration by A/S Platinomino in 1969-71 revealed platinum grades in grab samples up to 2.4 ppm and up to 3.1 ppm gold. In addition up to 57 ppm silver was encountered in a grab sample of a chromite banded bronzitite.

During field season 1991 a team from the Geological Survey of Greenland (GGU) collected channel, chip and a few grab samples across those ultramafics which during the previous exploration had yielded gold and platinum anomalies. The samples were analysed by Activation laboratories Ltd. (Actlabs), Canada. Channel sampling of a bronzitite which previously yielded values of 3 ppm Au, 0.6 ppm Pt, 3 ppm Pd and 57 ppm Ag in a grab sample, now yielded 59 ppb Au, 74 ppb Pt, 115 ppb Pd and <5 ppm Ag! The best values obtained was a channel sample over two metres of ultrabasic rocks and basic rocks on a small island at the coast which ran 1.37 ppm gold, 4.6 ppm silver and 0.27 % copper over 2 metres. Check analyses were carried out on selected samples by Chemex Labs Ltd, Canada. The results are within the same order of magnitude.

Several of the chromitite horizons in the Fiskenæsset anorthosite complex are cut by up to metre wide fuchsite-chrome-epidote-bearing alteration zones associated with shear zones. A few zones were chip sampled and analysed for gold, platinum and palladium, but no values above detection limits were found.

INTRODUCTION

The Fiskenæsset area is situated about 100 km south of Nuuk, the capital of Greenland. The area is easy accessible during most of the year. Ice rarely prevents sailing except in the inner part of the fiords where during late winter and early spring passage may be difficult with small vessels.

Limited amount of exploration has taken place in the Fiskenæsset area. Platinomino A/S, a subsidiary of the Canadian Renzy Mines Ltd., carried out mineral exploration during the 70's and early 80's (see list of relevant company reports). The exploration was primarily focused on platinum group elements (PGE) as well as chromite. At a later stage rubies became the prime target of the Platinomino A/S exploration activities. Later Greenex under a prospecting licence carried out a short reconnaissance programme in the southern part of the Fiskenæsset area. Company reports covering these activities are available for inspection at GGU (see List of relevant company reports in the Reference list).

GGU carried out between 1971 and 1975 geological mapping at a scale of 1:20 000 as part of the systematic mapping programme. The results are published in 1:100 000 scale geologic maps covering the whole Fiskenæsset area (62 V.1 Nord Bjørnesund, 1985, 63 V.1 Syd Grædefjord, 1982, 63 V.2 Syd Sinarsuk, 1980). During the mid-80's GGU carried out a regional stream sediment programme of heavy mineral concentrates in the Nuuk region, including the Fiskenæsset area. The sampling in the Fiskenæsset area was carried out by boat, thus only the coastal areas were covered. The heavy mineral concentrates from the stream sediments were investigated for scheelite and analysed by neutron activation for gold as well as Sc, Cr, Fe, Co, Ni, Zn, As, Se, Rb, Mo, Ag, Cd, Sb, Cs, Ba, La, Eu, Tb, Yb, Hf, Ta, W, Ir, Th and U by Bondar-Clegg Laboratories, Canada. The results which revealed a few gold anomalies in the Bjørnesund area and one in Grædefjorden are published in an Open File report (Appel, 1989).

During field season 1991 GGU carried out a regional sampling programme of stream sediment samples and heavy mineral concentrates from stream sediments. The samples were analysed for gold + 34 elements by Actlabs,

Canada. Furthermore a number of samples were analysed for platinum and palladium. The results are published in GGU's Open File series 91/9 and 92/1 (Erfurt et al., 1991, 1992). These geochemical investigations revealed gold anomalies in streams draining supracrustal enclaves, but no anomalies in streams draining the Fiskenæsset anorthosite complex.

Selected ultramafic bodies belonging to the Fiskenæsset anorthosite complex were channel and chip sampled by GGU during summer 1991. The samples were analysed by Actlabs, Canada for platinum, palladium and gold. One sample was furthermore analysed for the following platinum group elements: Os, Ir, Ru, Rh, Re. As well all samples were analysed for Au + 34 elements by Actlabs, Canada by INNA and for Cu, Zn, Ni, Ag by IGC by the same company.

GENERAL GEOLOGY

A recent description of the geology of the Nuuk region has been presented by Kalsbeek & Garde (1989). This description also contains an up-to-date reference list. The following is thus only a brief account and the reader is referred to Kalsbeek & Garde (1989) for details.

The dominating rock type of the area is the Mid-Archaean quartzo-feldspathic Nûk gneiss, derived by deformation and metamorphism from tonalite, granodiorite and granite. The Archaean of the Nuuk area has been divided into terranes, with ages 3300 to 3000 Ma, but the temporal and spatial relationships between these terranes are still uncertain (Friend et al., 1990). The terranes all host supracrustal enclaves and the relationships between these supracrustals are also uncertain. The supracrustals will, however, for the matter of simplicity collectively be termed Malene supracrustal rocks. They outcrop from the southern part of the Fiskenæsset area up to the Nuuk area in the north over an area of 45 000 km^2.

The Malene supracrustal rocks comprise mainly mafic and ultramafic volcanic rocks. Locally well-preserved pillow structures have been observed. Intercalated in the mafic and ultramafic volcanics are thin layers of presumed acid volcanics as well as sedimentary horizons. These are mainly: micaschists, quartz-sillimanite-cordierite schists locally with remnants of staurolite. The

schists frequently contain anthophyllite-gedrite as well as tourmaline (Appel, 1988a). The latter furthermore occur as tourmalinites consisting of tourmaline, plagioclase, sometimes with scheelite (Appel, 1988b). Anthophyllite-gedrite schists with appreciable amounts of sulphides such as pyrrhotite, chalcopyrite, sphalerite and molybdenite are found in several places (Appel, 1988a). These anthophyllite-gedrite schists are interpreted as hydrothermal alteration zones. The Malene supracrustal rocks also host extensive stratabound scheelite mineralizations (Appel, 1990a).

The Malene supracrustal rocks display scattered gold anomalies as well as several copper-zinc showings (Appel, 1990b, c).

Intrusive into the Malene supracrustal rocks is the Fiskenæsset anorthosite complex, with a total strike length of well over 200 km and an average width of slightly less than 400 m. The anorthosite complex comprise anorthosites, leucogabbros, gabbros, peridotites and hornblendites with frequent bands of chromitite.

The rocks have been repeatedly deformed and metamorphosed. Amphibolite facies prevailed, but large areas were affected by granulite facies metamorphism. During metamorphism a peculiar mineral assemblage was developed at the contact between anorthosites and amphibolites with rocks consisting of sapphirine, pargasite, phlogopite, red spinel, corundum and kornerupine (Herd, 1973). The corundum is mostly pink, but locally it attains the dark red colour of ruby. Most of the rubies are heavily fractured. Unfractured rubies are rarely larger than a few millimetres. The ruby-bearing zones are up to tens of metres long and up to a few metres wide.

GEOLOGY OF THE ANORTHOSITE COMPLEX

The Fiskenæsset anorthosite complex has been described by various authors. The most detailed account by Myers (1985) also gives an up-to-date reference list. The chromite occurrences have been described in detail by Ghisler (1976). The reader is referred to these two papers for detailed accounts.

The Fiskenæsset anorthosite complex was intruded as a sheet into the basic and ultrabasic Malene volcanic rocks. The floor of the intrusion has not been

identified, but the roof has been found immediately below a flow of mafic pillow lavas (Myers, 1985). The anorthosite complex has a present strike length of more than 200 km and an average thickness of 400 m. A peculiar feature is the occurrence of molybdenite in the anorthosites. Molybdenite occurs in most rock units of the Nuuk region, but locally as in the Majorqap qâva area (Fig. 1) molybdenite is quite abundant (Myers, 1974). The Fiskenæsset anorthosite complex has been repeatedly metamorphosed in up to granulite facies metamorphism, and deformed by several fold phases. The deformation caused considerable thickening, thinning and boudinage. The latter feature is especially prominent in the chromitite layers. The layered anorthosite complex consists mainly of anorthositic and leucogabbroic rocks with minor gabbroic and ultramafic components.

Myers (1985) established a detailed stratigraphy of the complex (Fig. 2). This stratigraphy cannot be seen uninterrupted at a single locality, but is established from different sites within the complex.

1. The lower gabbro unit. This is often strongly deformed and preserved in up to 50 m thick layers.

2. Ultramafic unit. This overlays the lower gabbro unit and consists of a number of mineral-graded dunite, peridotites and hornblendites with a total thickness of about 40 m. In spite of strong deformation relict igneous textures have survived.

3. Lower leucogabbro unit. This consists of leucogabbro, gabbro and minor ultramafic layers with a total thickness of 50 m. In the upper part schlieren of anorthosite have been observed.

4. Middle gabbro unit. This is about 40 m thick unit consisting of gabbro together with minor layers of anorthosite and ultramafic layers of hornblende-orthopyroxene-spinel and peridotite.

5. Upper leucogabbro unit. Up to 60 m thick consists of mineral graded ultramafics interlayered with cumulus textured anorthosite. The cumulate plagioclase clusters are up to 20 cm in diameter. Several chromitite layers are found in the anorthosite and in the peridotites.

6. Anorthosite unit. This forms the main thickness of the intrusion - about 250 m. It shows only weak internal stratigraphy and no prominent layering. Cumulate textured layers up to 2 m thick with about 80 % cumulus plagioclase is seen. Chromitite bands are frequent.

7. Upper gabbro unit. This up to 50 m thick unit consisting of gabbro with layers of peridotite.

Chromite occurs in chromitite layers consisting of varying proportions of chromite, hornblende and plagioclase with minor amounts of rutile and locally with traces of sulphides. The chromitite layers compose both so-called augen chromitites as well as layered chromitites. The average width of chromitite layers is about 1.5 m. and they can be followed intermittently for kilometres along strike. Chromitite horizons up to 7 metres in width are found, but this width is probably due to tectonic thickening. Massive chromitites contain up to 57 % chromite together with hornblende and plagioclase. Chromite concentrates have 33 % Cr_2O_3, 34 % FeO and 21 % Al_2O_3 with a Cr/Fe ratio of 0.85:1 (Appel, 1992).

PLATINUM GROUP ELEMENTS IN THE ANORTHOSITE COMPLEX

A detailed stratigraphic study of the PGE distribution through one stratigraphic section at Majorqap qâva (Fig. 1) was carried out by Page et al. (1980). This study showed that the Fiskenæsset complex at this locality generally has low PGE contents, that is < 0.1 ppb Pd, < 1 ppb Pt and < 0.05 ppb Rh. The PGE contents show a distinct relation to stratigraphy. PGE are concentrated mainly in ultramafic rocks and chromitites. Page et al. (1980) found concentrations in ultramafics of up to 81 ppb Pd, 96 ppb Pt and 11 ppb

Rh and in chromitites up to 175 ppb Pd, 310 ppb Pt and 220 ppb Rh. Similar concentrations also occur in anorthosites and leucograbbros rich in disseminated sulphides.

The relative proportions of the different PGE vary considerably throughout the complex, but there seems to be a general trend showing an increase of Pt:Pd+Pt from the ultramafic unit up to the upper gabbro unit. The Rh:Pd+Pt+Rh ratio tends to increase slightly from the bottom to the top of the complex (Page et al., 1980).

The highest PGE concentrations occur in ultramafic layers in the upper part of the lower leucogabbro and in the middle gabbro unit (Fig. 2). Chromitites generally carry low contents of PGE, but the lowermost chromitites seem to contain higher amounts than the chromitites higher in the succession (Page et al., 1980).

EXPLORATION FOR PGE AND GOLD IN THE ANORTHOSITE COMPLEX

Platinomino A/S carried out exploration for noble metals, and several rock samples were analysed. The sampling was surface grab sampling only. The most interesting results of this exploration programme are plotted on Fig. 5, and listed in Table 1 below.

Table 1. Assay results of grab samples collected by Platinomino.
Sites plotted on Fig. 5.

Loc.nr.	Rock type	Au ppm	Pt ppm	Pd ppm	Ag ppm
Au,PGE 83/1	Bronzitite	3.0	0.6	3	57
Au 83/13	Hornblendite	3.1			124
PGE 84/2	Peridotite	0.2	0.4	2	2.8
PGE 84/3	Peridotite	0.16	0.09	0.53	22.5
PGE 84/4	Ultramafic		0.25	0.74	124
PGE 84/6	Ultramafic		2.42		
PGE 84/7	Ultramafic		0.02	0.02	
Cr,PGE 81/4	Chromitite	0.04	0.04	0.04	5.1
Cr,PGE 81/7	Chromitite	0.04	0.04	0.04	1.7
Cr,PGE 81/25	Chromitite	0.04	0.04	0.04	2.0

Sample 83/1 is from an about 0.5 m wide bronzitite at central Qeqertarssuatsiaq with 1-5 % sulphides and thin chromite bands. The showing is 1.5 m long, and no along strike continuation of the bronzitite has been found so far.

Sample 83/13 From a hornblendite about one metre wide
Sample 84/2 From an about two metre wide peridotite
Sample 84/3 From a one metre wide peridotite
Sample 84/4 From a strongly boudinaged one metre wide ultramafic
Sample 84/6 From a fairly large complex of various types of ultramafic rocks, only briefly investigated
Sample 84/7 From an about one metre wide ultramafic
Sample 81/4 Chromitite hosted in anorthosite
Sample 81/7 Chromitite hosted in anorthosite
Sample 81/25 Chromitite hosted in anorthosite

GGU carried out channel and chip sampling of some ultramafic horizons at Qeqertarssuatsiaq, Kangatsiaq, Fiskenæsfjorden and Qagsse (Fig. 1, 4 and 5) during the field season 1991. The samples were analysed for platinum, palladium and gold as well as for base metals (see below).

INVESTIGATIONS ON QEQERTARSSUATSIAQ

On central Qeqertarssuatsiaq (Fig. 1 and 5) a chromitite banded bronzitite occurs. It is about 75 cm wide and traceable for about one metre along strike. It was grab sampled by Platinomino (Au,PGE 83/1 in Table 1). The chromitite bands are slightly diffuse and are up to a few centimetres wide. In the bronzitite small amounts of pyrrhotite, chalcopyrite and pentlandite occur (Ghisler, 1976). The bronzitite was channel sampled and analysed for all PGE as well as for gold, nickel and chromium (Table 2).

Table 2. Assay result of channel sample across the 0.5 m wide chromitite banded bronzitite at central Qeqertarssuatsiaq.

Sample No	Au ppb	Pt ppb	Pd ppb	Os ppb	Ir ppb	Ru ppb	Rh ppb	Re ppb	Ag ppm	Ni %	Cr %
393801	59	74	115	6	2.2	10	10	<5	<5	0.1	3.0

On northern Qeqertarssuatsiaq (Fig. 3 and 5) an ultrabasic body occurs. It was mapped in detail by Platinomino 1970 (Fig. 3), grab sampled and some of the samples were analysed for PGE (PGE 84/3 Table 1, Fig. 5). During 1991 GGU carried out a combination of channel and chip sampling across most of this ultrabasic body. The best assay value obtained was 83 ppb Pt, 693 ppb Pd and 84 ppb Au over a width of two metres. The location of the chip and channel samples is presented on Fig. 3. The collected samples were analysed for platinum, palladium, gold, nickel and base metals (see Table 3).

The ultrabasic body on northern Qeqertarssuatsiaq is a complex body consisting of various types of ultramafics ranging from olivine peridotites through hornblende-pyroxene peridotites to hornblendites. The rocks are generally medium to coarse grained and pegmatitic phases mostly hornblende pegmatites are quite common. Sulphides mainly pyrrhotite and chalcopyrite occur throughout the ultrabasic body as disseminated grains generally amounting to a few percent. Locally sulphide-rich zones up to half a metre wide occur. Here the sulphides amount to as much as 5 to 10 %. These sulphide-rich zones can be traced with intervals for well over hundred metres. No carbonate alteration has been observed in this ultrabasite, but scattered examples of silicification have been noted. The silicification occurs as hairline quartz stringers occurring in metre wide zones traceable for tens of metres. These silicification zones are clearly discordant to the igneous layering of the ultrabasite.

INVESTIGATIONS ON KANGATSIAQ

On the islands of Kangatsiaq (Fig. 4 and 5) south of the Fiskenæsset settlement (Qeqertarssuatsiat) a large ultrabasite occurs. This was grab sampled after percussion drilling and blasting by Platinomino (PGE 84/6 in Table 1 and on Fig. 5). During the 1991 field season GGU carried out two combined channel and chip samplings across large parts of the ultrabasite, as well as a few other channel and grab samplings. The sample sites are shown on Fig. 4. The samples were analysed for platinum, palladium, gold, nickel and for base metals, and the results are listed in Table 3. The best result obtained was 1.37 ppm Au, 4.6 ppm Ag and 0.27 % Cu over a width of two metres. Field investigations did not reveal any carbonate alterations in the ultrabasite or in the enveloping amphibolite. However, silicification as hairline quartz stringers occurs in metre wide discordant zones at several locations. Sulphides are generally sparse amounting to a few percent in most part of the ultrabasite. The northern part of the ultrabasite bordering the amphibolites is, however, quite rich in sulphides. This sulphide-rich zone, which is capped by rust and locally gossan, can be traced continuously along the total strike length of the northern ultrabasite-amphibolite contact. This rust-zone locally display malachite staining. Furthermore many minor rust-zones occur in the amphibolites. But most only seem to carry pyrrhotite.

INVESTIGATIONS IN FISKENÆSFJORDEN

Immediately south of Midgård (Fig. 1 and 5) a sulphide mineralised ultrabasite occurs. Previous grab sampling by Platinomino yielded some interesting Pt values (PGE 84/2 in Fig. 5 and Table 1). This showing was briefly visited by GGU during the 1991 campaign. This ultrabasite is the along strike continuation of the north Qeqertarssuatsiaq ultrabasite described above (Fig. 3). The Midgård ultra-basite was chipped across one fairly narrow zone only. Some grab sampling was also carried out. The samples were analysed for platinum, palladium, gold, nickel and base metals, and the results are presented in Table 3. This ultrabasite is cut by numerous pegmatite and some gneiss sheets which

may be up to several metres wide. The individual ultrabasite sheets are up to several tens of metres wide and kilometres long. In this area carbonate alteration is locally seen as up to 10 cm wide zones with very thin brownish carbonate veinlets, where the veinlets, which are clearly discordant rarely are found more than a few millimetres wide. Carbonate alteration is, however, a rare feature in this part of the Fiskenæsset area. The Midgård ultrabasite is not uncommonly silicified. The silicification appears as hairline quartz stringers arranged in parallel zones up to a few metres in width. There are sometimes several sets of silicification zones cutting each other. All silicification features are discordant to the igneous layering of the ultrabasite.

INVESTIGATIONS IN THE QAGSSE AREA

A horizon of fuchsite stained chromitites as well as some irregular pods and schlieren of fuchsite and epidote stained anorthosites were chip sampled and analysed for platinum, palladium and gold in the Qagsse area (Fig. 1). Six chip samples were analysed but yielded low results, that is 1 to 3 ppb gold, <5 ppb Pt and <2 ppb Pd.

Check analyses of selected samples were carried out by Chemex Labs. Ltd., Canada. The results, which are shown in Table 4, are generally 10 to 20 % higher than the Actlab results, but all are within the same order of magnitude.

CONCLUSIONS

In spite of the limited amount of work which has been carried out on PGE and gold in the anorthosite complex some samples were located with anomalous precious metal contents came up. It should also be noted that the stream sediment sampling revealed a few platinum and palladium anomalies in the interior of the Fiskenæsset area close to the Inland Ice. It must thus be considered worth while to carry out more exploration for these elements. It seems warranted, however, that the exploration is done in a more systematic way than hitherto, involving detailed geochemical sampling profiles across the most promising stratigraphic levels of the anorthosite intrusion. Detailed

stream sediment sampling in the minor streams which cross cut the anorthosite complex should also be carried out.

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Table 3. Assay results of chip (chi), channel (cha) and grab (g) samples from Northern Qeqertarssuatsiaq (Q), Kangatsiaq (K) and south of Midgård (M). Not analysed (n.a.).

Sample No	Loc	Sample type	Width metres	Pt ppb	Pd ppb	Au ppb	Ag ppm	Ni %	Cr %	Cu %
393869	Q	g		n.a	n.a	20	<5	0.12	0.3	0.17
393870	Q	cha	1.8	<5	7	2	0.2	0.08	n.a	0.00
393871	Q	cha	1.3	7	15	1	<0.2	0.05	n.a	0.00
393872	Q	cha	2.5	<5	2	8	0.2	0.10	n.a	0.01
393873	Q	chi	2.0	109	483	35	0.6	0.06	n.a.	0.19
393874	Q	chi	3.0	110	311	19	<0.2	0.11	n.a.	0.11
393875	Q	chi	2.0	88	353	24	0.2	0.07	n.a.	0.12
393876	Q	chi	2.0	46	214	21	<0.2	0.05	n.a.	0.11
393877	Q	chi	2.0	83	693	84	0.5	0.05	n.a.	0.18
393878	Q	chi	2.0	54	363	41	0.5	0.03	n.a.	0.13
393879	Q	cha	2.5	20	100	7	<0.2	0.04	n.a	0.08
393880	Q	cha	2.5	9	55	5	<0.2	0.01	n.a	0.04
393881	Q	cha	1.0	10	55	4	<0.2	0.02	n.a	0.04
393882	Q	cha	1.8	67	337	8	<0.2	0.05	n.a	0.08
393883	K	cha	2.0	<5	10	1371	4.6	0.05	n.a.	0.27
393884	K	cha	1.7	6	9	9	<0.2	0.05	n.a.	0.02
393885	K	cha	0.75	<5	12	1	<0.2	0.09	n.a	0.02
393886	K	cha	0.8	<5	6	1	<0.2	0.09	n.a	0.08
393887	K	cha	0.5	<5	8	1	<0.2	0.08	n.a	0.13
393888	K	cha	0.4	<5	2	1	0.4	0.02	n.a	0.19
393889	K	cha	1.3	<5	6	6	0.4	0.04	n.a	0.16
393890	K	cha	0.65	<5	2	11	0.5	0.04	n.a	0.21
393891	K	cha	0.75	<5	8	1	<0.2	0.08	n.a	0.09
393892	K	cha	0.4	<5	7	2	<0.2	0.07	n.a	0.10
393893	K	chi	2.6	<5	5	38	1.2	0.01	n.a.	0.12
393894	K	cha	1.0	<5	2	6	0.4	0.14	n.a	0.04
393895	K	cha	1.5	<5	10	2	<0.2	0.12	n.a	0.02
393896	K	cha	1.0	<5	4	2	<0.2	0.11	n.a	0.01
393897	K	cha	1.2	<5	4	3	0.3	0.11	n.a	0.02
393898	K	cha	1.0	<5	2	5	1.0	0.11	n.a	0.15
393899	K	cha	1.5	<5	2	1	<0.2	0.11	n.a	0.02
393900	K	cha	1.5	<5	2	1	<0.2	0.10	n.a	0.01
393901	K	cha	1.3	<5	2	1	<0.2	0.10	n.a	0.01
393902	K	cha	1.5	<5	7	3	<0.2	0.09	n.a	0.02
393903	K	cha	1.7	<5	6	2	<0.2	0.09	n.a	0.02
393904	K	cha	1.5	<5	6	2	<0.2	0.08	n.a	0.02
393905	K	cha	0.7	<5	<2	5	0.5	0.00	n.a	0.09
393906	K	cha	0.3	<5	8	12	0.6	0.00	n.a	0.11
393907	K	cha	0.8	<5	2	14	0.7	0.00	n.a	0.18
393908	K	chi	0.8	<5	<2	8	0.6	0.01	n.a.	0.07
393909	K	chi	2.6	<5	5	8	0.4	0.03	n.a.	0.07
393912	K	g		n.a	n.a	18	<5	0.07	0.17	0.06
393913	K	g		n.a.	n.a.	18	<5	0.06	0.16	n.a.
393914	M	g		n.a.	n.a.	10	<5	0.03	0.01	0.06
393915	M	chi	1.5	11	33	4	<0.2	0.08	n.a.	0.08
393917	M	chi	1.0	68	361	8	0.2	0.01	n.a.	0.11
393918	M	g		n.a.	n.a.	<5	<5	0.00	0.05	0.01
393919	M	g		n.a.	n.a.	14	<5	0.07	0.18	0.02

Table 4. Check assay results from Chemex Labs of selected chip (chi) and channel (cha) samples from Qeqertarssuatsiaq (Q) and Kangatsiaq (K) compared with the results obtained by Actlabs.

			Chemex Labs			Actlabs		
Sample No	Loc	Sample type	Pt ppb	Pd ppb	Au ppb	Pt ppb	Pd ppb	Au ppb
393801	Q	cha	65	90	4	74	115	59
393873	Q	chi	160	750	52	109	483	35
393874	Q	chi	110	420	22	110	311	19
393875	Q	chi	76	360	24	88	353	24
393876	Q	chi	60	300	12	46	214	21
393877	Q	chi	100	850	56	83	693	84
393878	Q	chi	90	430	42	54	363	41
393879	Q	cha	20	150	8	20	100	7
393880	Q	cha	80	100	6	9	55	5
393881	Q	cha	<10	86	10	10	55	4
393882	Q	cha	50	360	14	67	337	8
393883	K	cha	<10	8	2000	<5	10	1371
393890	K	cha	<10	12	20	<5	2	11
393891	K	cha	<10	10	<4	<5	8	1
393892	K	cha	<10	12	46	<5	7	2
393893	K	chi	<10	<4	44	<5	5	38
393906	K	cha	<10	4	12	<5	8	12

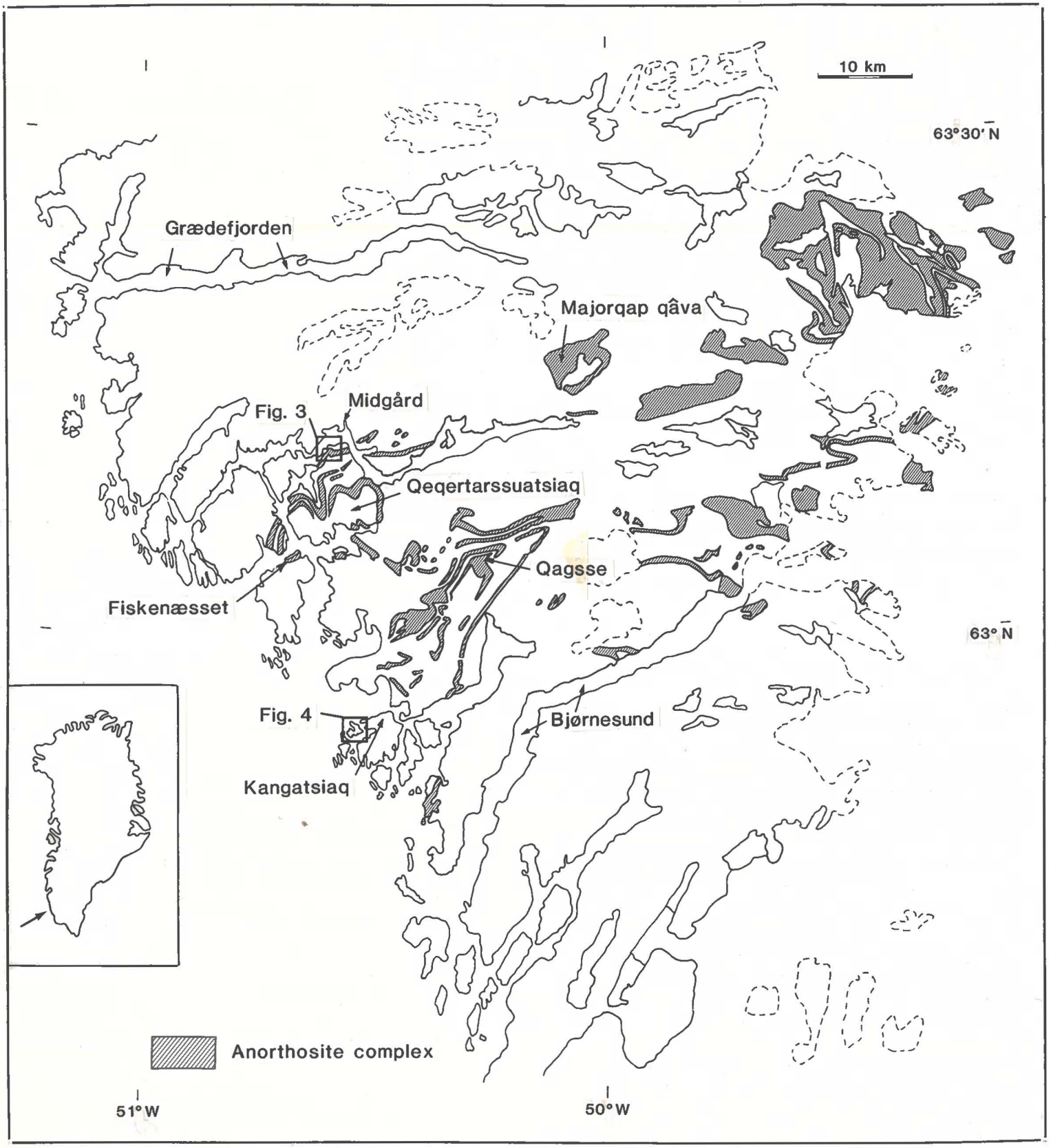

Fig. 1 Sketch map of the Fiskenæsset area showing distribution of major anorthosite bodies.

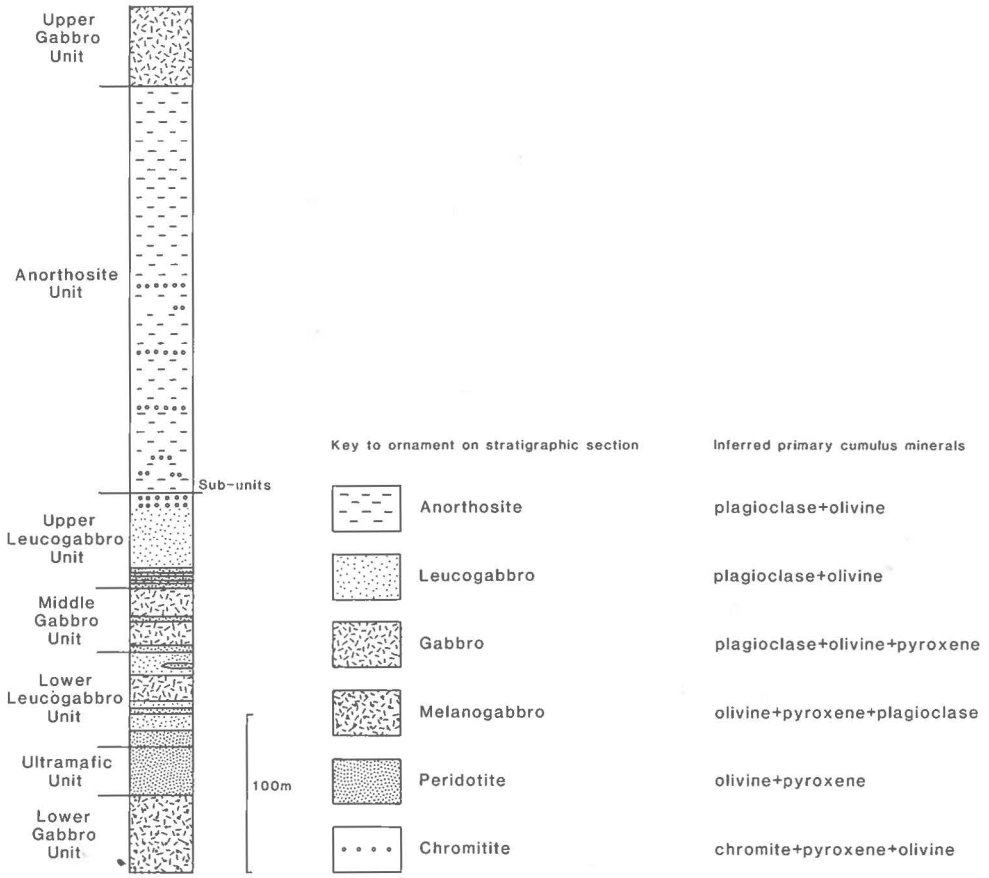

Fig. 2

Simplified stratigraphic succession of the anorthosite complex (from Myers, 1985)

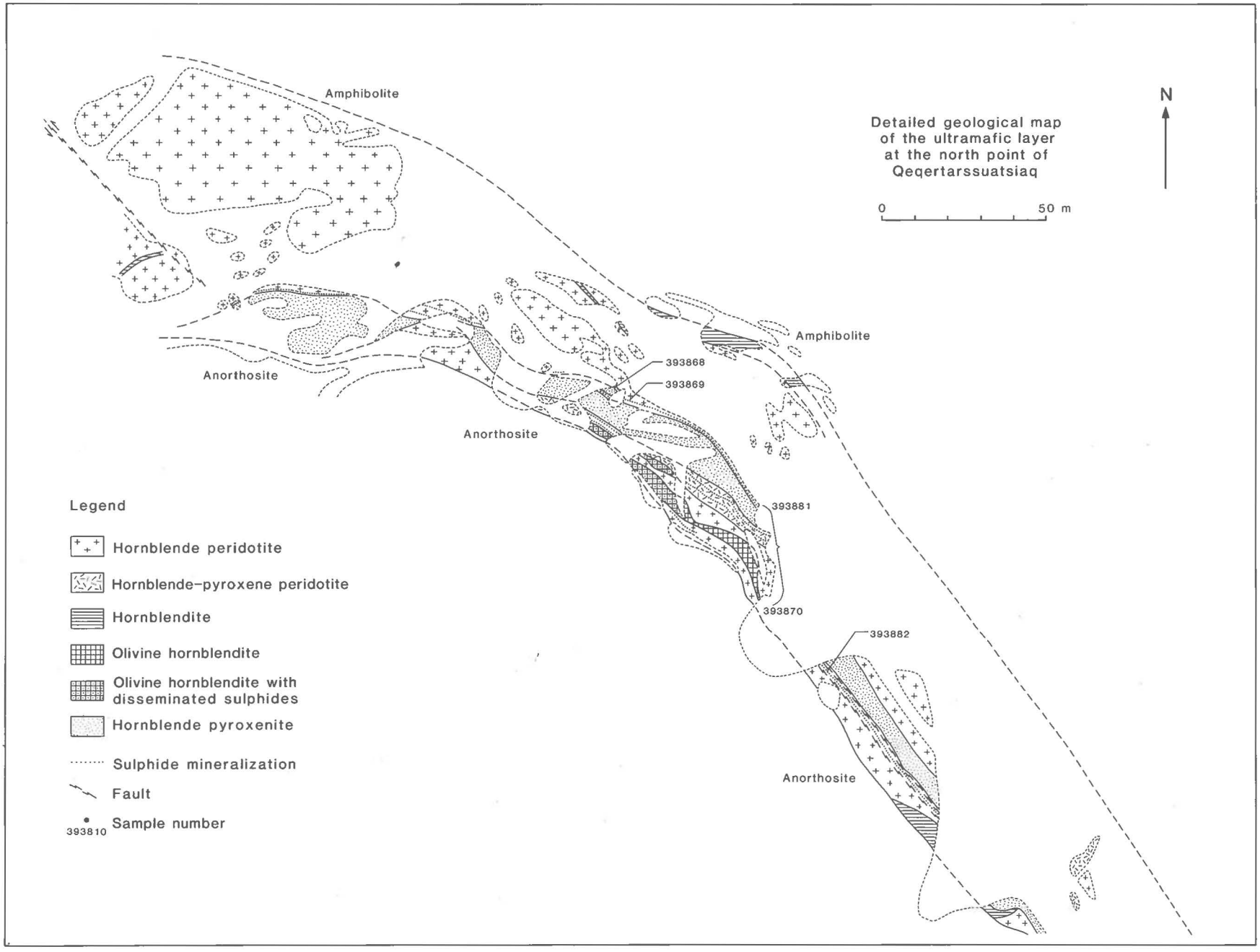

Fig. 3. Detailed geological map of the ultramafic layer at the north point of Qeqertarssuatsiaq.

Fig. 4. Sketch map of the Kangatsiaq islands showing sites of chip, channel and grab samples.

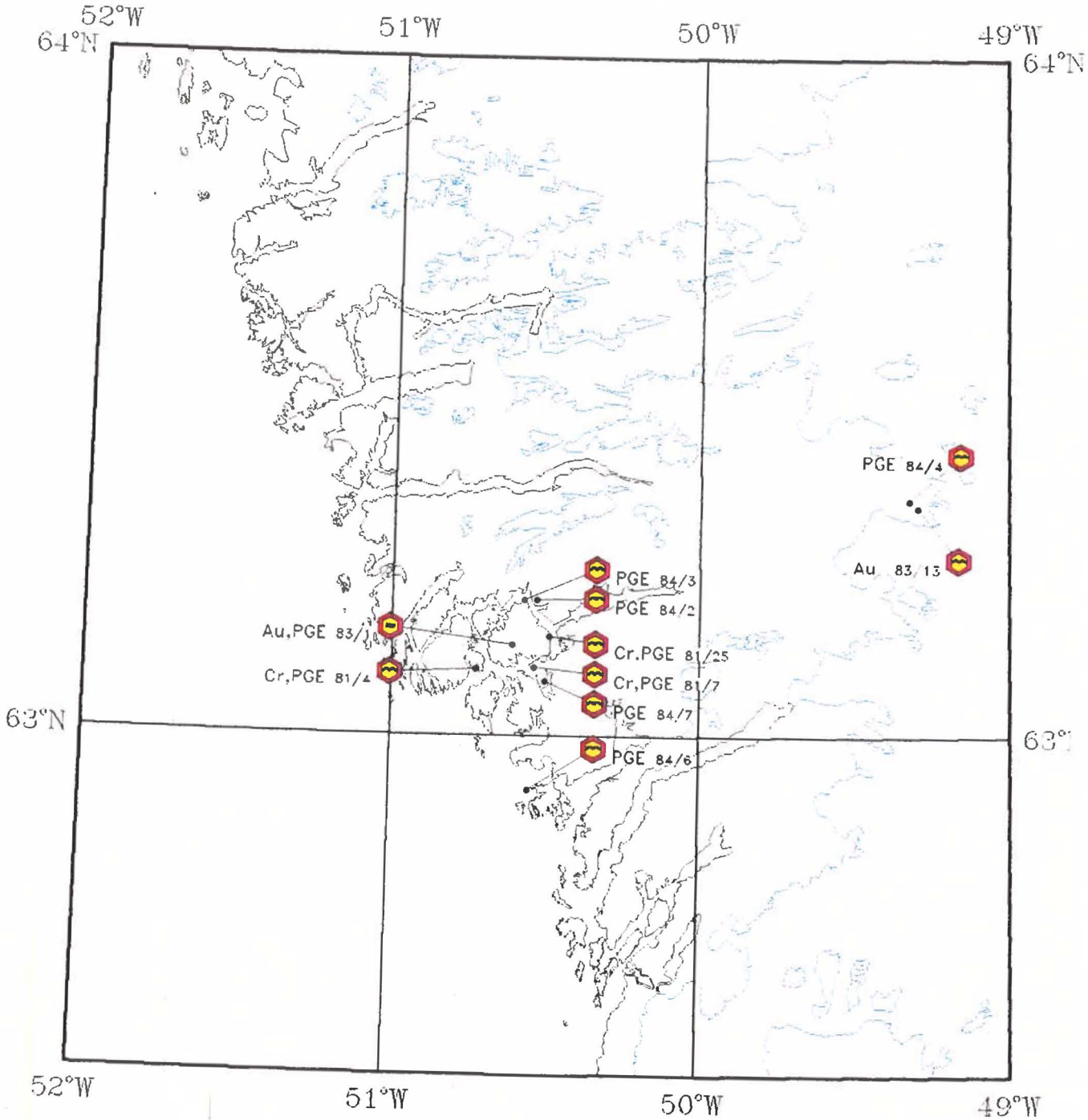

Fig. 5. Mineral occurrence map with Au and PGE anomalies.

Legend for mineral occurrence map

LEGEND

HOST ROCK

- Metamorphic
- Volcanic
- Igneous
- Sedimentary
- Unknown

GENETIC ENVIRONMENT

- Magmatic
- Volcanogenic
- Igneous
- Sedimentary
- Syngenetic
- Epigenetic
- Hydrothermal
- Unknown

MORPHOLOGY

- Stratiform
- Stratabound
- Lenticular
- Massive
- Disseminated
- Vein
- Pipe
- Stockwork
- Other

RESOURCE

- Fe, V, Ti, Mn, Cr
- PGE, Au
- Mo, W, Sn, Hg, Sb, Bi
- Pb, Zn, Ag
- Gemstone, indust. mineral
- Cu, Ni, Co
- U, Th, Zr, Nb, REE

MINERALOGY

- Sulphide
- Native element
- Gemstone
- Silicate
- Other
- Oxide
- Sulphate
- Phosphate
- Carbonate
- Indust. min.

DATA SOURCE

The Greenland mineral occurrence database.

The data have been compiled from Survey reports, industry mineral assessment reports and published and unpublished research data.

All localities represent mineral occurrences observed on surface, in drill holes or mine workings.

SYMBOL SIZE

ECONOMIC IMPORTANCE

Mine

Prospect

Showing

EXAMPLE

Disseminated lead sulphide(s) of hydrothermal origin hosted by volcanic rock(s). More detailed information available from the Greenland mineral occurrence database, occurrence ID: 24/13. Underlining indicates the presence of several occurrence IDs on the same site.

Pb 24/13

Projection: Lambert conformal conic
Standard parallel: 66° 30' N
Scale factor: 0.99700
Ellipsoid: Hayford
Datum: Qornoq
Scale: 1:1 000 000

Ice margins and coast lines digitized from 1:250 000 topographic maps.
Permission No: KMS A.200/87

Released: 01-DEC-90

GRØNLANDS GEOLOGISKE UNDERSØGELSE
Geological Survey of Greenland
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Fig. 6

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