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Lotte Melchior Larsen

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Abstract

Kimberlite, lamproite and ultramafic lamprophyre may be host rocks for diamonds. Localities with occurrences of such rocks in Greenland have been compiled in an overview table given here as appendix 1, and in more detailed tables that are available on request from GGU.

The rocks in question are concentrated in West Greenland. West Greenland from 60°N to 72°N houses at least four swarms of kimberlite, one swarm of lamproite and one lamproite pipe, and seven swarms of ultramafic or strongly potassic lamprophyre. Ages range from Proterozoic (c. 1800 Ma) to Mesozoic (120 Ma).

The field relations and petrography of each swarm is reviewed. The whole-rock geochemistry of each rock group is discussed and illustrated in a few plots. Many swarms tend to possess individual chemical characteristics, distinct for each swarm. Of the kimberlites, the Sukkertoppen swarm seems to have originated at the deepest level in the mantle, in accordance with its occurrence well within the undisturbed Archaean craton.

Sparse microdiamonds have been found in connection with the Pyramidefjeld-Midternæs and Sarfartôq swarms and in an unsupported occurrence near Fiskenæsset. The best diamond potential is considered to be possessed by the Sukkertoppen kimberlite swarm and a dyke swarm in the Disko Bugt region of ultramafic lamprophyre with affinities to olivine lamproite.

Contents

1. Introduction

Occurrences of kimberlite have been reported from several localities in Greenland. Kimberlite is the classical host rock for diamonds, and consequently diamond prospecting has been carried out over large parts of West Greenland, resulting in the recovery of some few microdiamonds. In recent years other rock types have been found to host diamonds, notably lamproites (Scott-Smith & Skinner, 1984), and in a few cases scarce diamonds have been reported from ultramafic lamprophyres (Rock; 1986, Hamilton & Rock, 1990). Such rocks also occur in Greenland.

In the field kimberlites, lamproites and ultramafic lamprophyres tend to be very elusive. They mostly occur as narrow dykes and sheets which weather quite easily, and they are therefore often covered by soil and vegetation. In West Greenland, occurrences of such rocks have been reported from 61°N to 72°N, a stretch of around 1300 km. They tend to come in swarms, but the systematic distribution patterns are often unclear, and some whole swarms may perhaps still await discovery.

At the Geological Survey of Greenland information on occurrences of kimberlites and related rocks is slowly accumulating. The information resides in various places ranging from field diaries and field maps through internal reports, reports from prospecting companies (now released), PhD and other theses to published scientific papers. Owing to the scattered character of the information it is difficult to obtain an overview, and it has therefore been considered worthwhile to compile much of it in one place. This report reviews the data and presents a list of the known localities together with simplified distribution maps.

2. Data compilation

The compilation is primarily concerned with kimberlites, lamproites and ultramafic lamprophyres. Carbonatites and other lamprophyres are excluded; the boundaries to these rock groups are gradational which causes some boundary problems as discussed in the section on nomenclature. On the other hand there are some localities where the identity of the rock is not certain but is probably of the 'right' kind, and these have been included. Further, a few cases of strongly potassic lamprophyres have also been included. Stream sediment samples that tested positive for diamonds have also been included.

The map basis for the compilation is Kort- og Matrikelstyrelsen's (former Geodetic Institute's) series of 1:250 000 maps, and each locality is given a number which consists of the map number (e.g. 65V1) followed by a consecutive number. This allows the number of localities within a given map sheet to increase with time if needed.

For each locality details of information, as far as they exist, are compiled in a standard form as shown by the example in Table 1.

Table 1. Example of detailed information registered for a locality

Locality no:	65V1.2
Coordinates:	65.392 -52.400
Place name:	Alanguarssuk, Søndre Isortoq south coast.
Rock type:	Kimberlite
Field description:	Dyke 0.6-2 m thick, orientation 46/90, coast parallel. Exposed over c. 150 m.
Primary locality:	
Samples:	GGU 87739 - 87745
Rock analyses:	87739, 87745. Trace elements: 87739, 87740, 87742
Mineral analyses:	Olivine, garnet, orthopyroxene, clinopyroxene, mica, ilmenite.
Modal analyses:	
Rb-Sr data:	
K-Ar data:	
Comments:	
References:	Goff (1973).

Coordinates: Latitude and longitude in decimal degrees. The minus sign indicates western longitude.

The coordinates were read from available maps with as high precision as possible; however the precision varies quite a lot. For the use of rock names see the section on nomenclature below. The 'primary locality' gives direct access to original field diaries. The 'comments' may include information about correlations, naming, diamond investigations, geophysical investigations etc. The minimum amount of information in some instances is only a locality and a reference, while at the other extreme a whole thesis may be written on one locality.

At present the total number of localities is around 500. This report includes as appendix 1 a list giving locality numbers, coordinates and rock types of all registered localities. The detailed information on the localities, as show by the example in Table 1, is rather bulky, with c. two localities per page. The whole list, or parts of it as desired, are available on request.

3. Nomenclature

The compilation includes kimberlites, lamproites and ultramafic (and in a few cases other) lamprophyres, and does not include carbonatites and alkaline and calc-alcaline lamprophyres. But there are inevitable boundary problems both internally and externally. The rocks in question are all of deep-seated origin and are volatile-rich and potassic. Distinction between groups is often complex and involves both mineralogical and geochemical criteria, besides considerations of genetic association, and these are sometimes in conflict. Thus, carbonatites are by mineralogical and geochemical criteria easy to distinguish from the other rocks because they by definition contain more than 50% modal carbonate (Streckeisen, 1979; Le Maitre, 1989). However, the carbonate-rich chilled facies of some kimberlite dykes, which by mineralogical and geochemical criteria are carbonatites, are an integral part of the kimberlites and are here classified as kimberlite. Genetic association is thus often given priority over strict classification criteria. At the other end of the spectrum the 'cut-off-level' is also problematical because distinction between ultramafic and mafic alkaline lamprophyres cannot always be made, and ultramafic magmas may differentiate into more salic types. A group of lamprophyre dykes in the region of Ravn Storø comprises both ultramafic and mafic alkaline types, and the most primitive of the mafic types have been included in the compilation because the distinction towards the ultramafic group is not clear, and they may be differentiated from ultramafic parents.

3.1. Distinction between the main rock groups

Distinction between kimberlites and ultramafic lamprophyres is complex and involves both mineralogical and geochemical characters (e.g. Rock, 1986), but basically kimberlites are very MgO-rich rocks which carry mantle-derived nodules of peridotite with pyrope garnet and chromian pyroxene, while ultramafic lamprophyres contain less MgO and have andradite garnet and chrome-poor pyroxene. There may be a complete gradation between the two groups. Lamproites are not ultramafic and are characterized by high concentrations of SiO_2 and K_2O and low Al_2O_3, and a number of rare potassium minerals like priderite and wadeite (e.g. Bergman, 1987); they may grade into potassic lamprophyres at one end and via olivine lamproites into kimberlite at the other end.

Ideally, both mineralogical and geochemical data should be used to classify a rock properly, but for the Greenlandic rocks geochemical analyses are far more abundant than mineral analyses. However, the geochemical analyses alone provide a fairly clear distinction between the main types, as shown in a scatter plot of K_2O *vs* MgO (Fig. 1). (It should be noted that the differentiated kimberlites from Sarfartôq with MgO <21% have not been included in this diagram - they plot in the field of ultramafic lamprophyres where also carbonatites plot). According to this diagram the kimberlites have MgO >21% and K_2O <4%, lamproites have K_2O >5%, and ultramafic lamprophyres have MgO <21% (except for one case) and K_2O <5%. A group of potassic lamprophyres shows mixed relations in this as in many other diagrams; mineralogically and chemically these rocks resemble the shonkinites from Shonkin Sag (Nash & Wilkinson, 1970, 1971) and they have therefore been termed shonkinites.

The main groups in Fig. 1 are so well separated that it looks easier to distinguish between the groups than it actually is. Some lamproites in other parts of the world have less than 5% K_2O, and if such rocks occur in Greenland they would be misclassified in Fig. 1, because only their mineralogy will show that they are lamproites. There may be one or two Greenlandic examples of this, as discussed later, and it is precisely the low-K lamproites that may carry diamonds (Bergman, 1987).

Similar difficulties exist regarding the distinction between kimberlites and ultramafic lamprophyres in Fig. 1: What if some of the rocks with MgO >21% do not contain pyrope garnet and chromian diopside, and *vice versa* ? Hamilton & Rock (1990) have published a simple geochemical diagram (MgO/CaO *vs* SiO_2/Al_2O_3) which they claim is capable of separating a field where only kimberlites may plot from a field with ultramafic lamprophyres and some (more differentiated) kimberlites. This diagram is shown in Fig. 2 with the Greenlandic analyses, and it shows that many Greenlandic rocks which are termed kimberlites on a perhaps somewhat loose basis *do* plot in the field of kimberlites proper.

3.2. Naming of rocks in the present compilation

The rock names given to the localities in appendix 1 represent a necessary compromise. When there are no data except field data the name field is either left blank or the original rock name used by the finder is

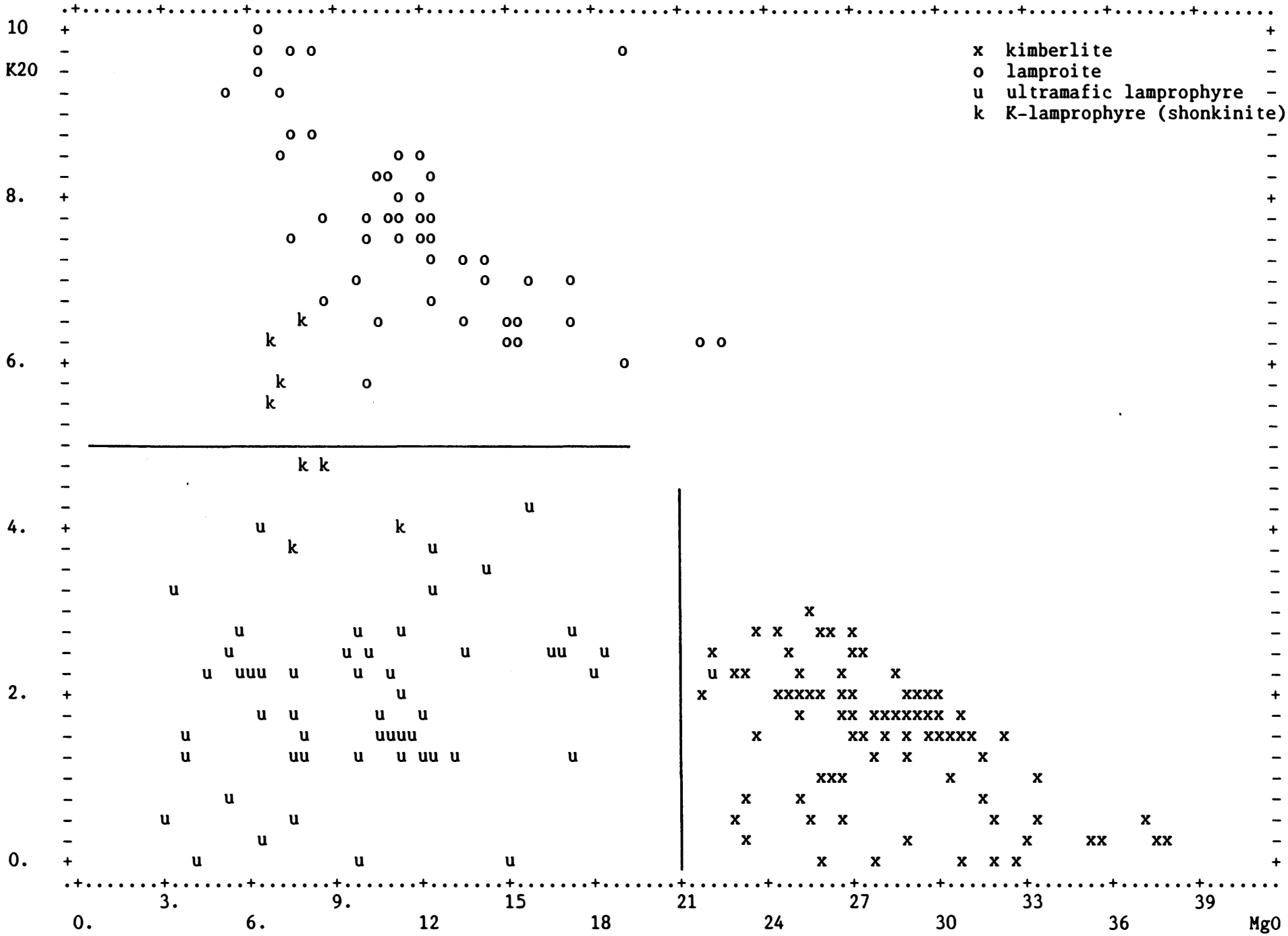


Fig. 1. K20 vs MgO for the main rock groups in Greenland, showing a fairly clear distinction between groups.

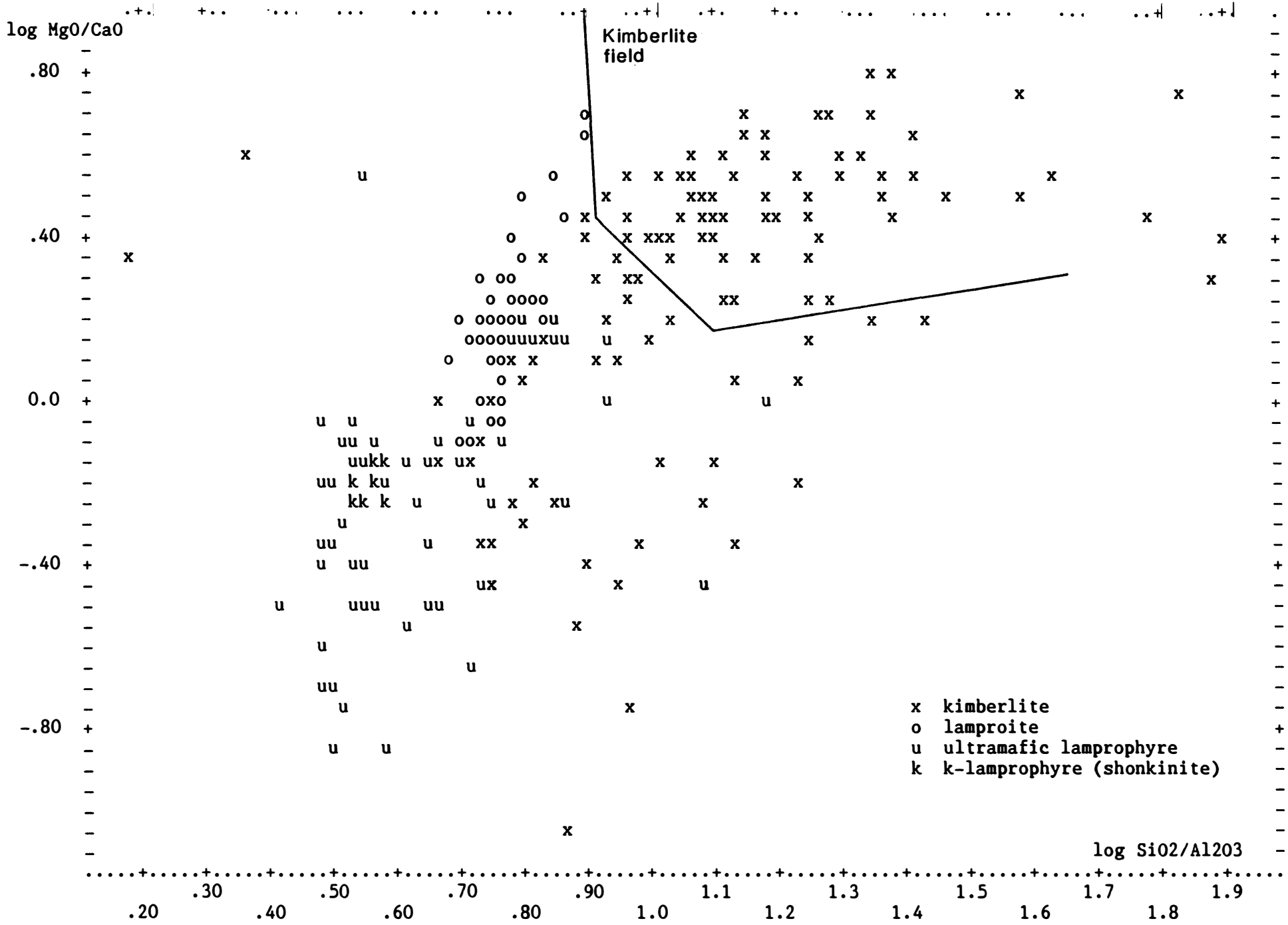


Fig. 2. Kimberlite - ultramafic lamprophyre discrimination diagram, with Greenland data.

given. This applies even though the term may now be obsolete, e.g. the term 'kersantite' used by Noe-Nygaard & Ramberg (1961) for both kimberlites and lamproites. Many of the 'blank' name fields in the compilation for map sheet 66V1 Holsteinsborg probably represent lamproites, but because there are also a few other lamprophyre dykes in the area one cannot be certain which name should apply to a locality where no sample was taken.

When there are additional data, e.g. thin sections to show whether a 'kersantite' is a kimberlite or a lamproite, the name has been changed accordingly. The names of some described dykes have also been changed to be in accordance with modern terminology. The dykes on Ravn Storø were oritinally described as nephelinites (Hansen, 1979, 1980, 1981, 1984), but they are too volatile-rich for that and have here been termed monchiquites. The 'lamprophyric carbonatite' dykes from south of Frederikshåb described by Walter & Arnold (1970) are here changed to 'ultramafic lamprophyre' which is a sack term that is often convenient. A more precise term for these would probably be aillikite, but more restrictive naming necessitates petrographic studies.

In possible later, updated versions of this compilation rock names may be changed to be in accordance with data acquired in the meantime.

4. Distribution

The geographical distribution of kimberlites, lamproites and ultramafic lamprophyres in West Greenland is shown in overview in Fig. 3 and in more detail on the 1:1 million maps in appendix 2. These figures cover West Greenland from 60°N to 72°N, and outside this area occurrences of the rocks in question are extremely scarce; they are known only from the Caledonian potassic-ultramafic Batbjerg complex from Kangerdlugssuaq, East Greenland (Brooks et al., 1981) and as a few ultramafic lamprophyre dykes of Tertiary age from Scoresby Sund (Larsen et al., 1989).

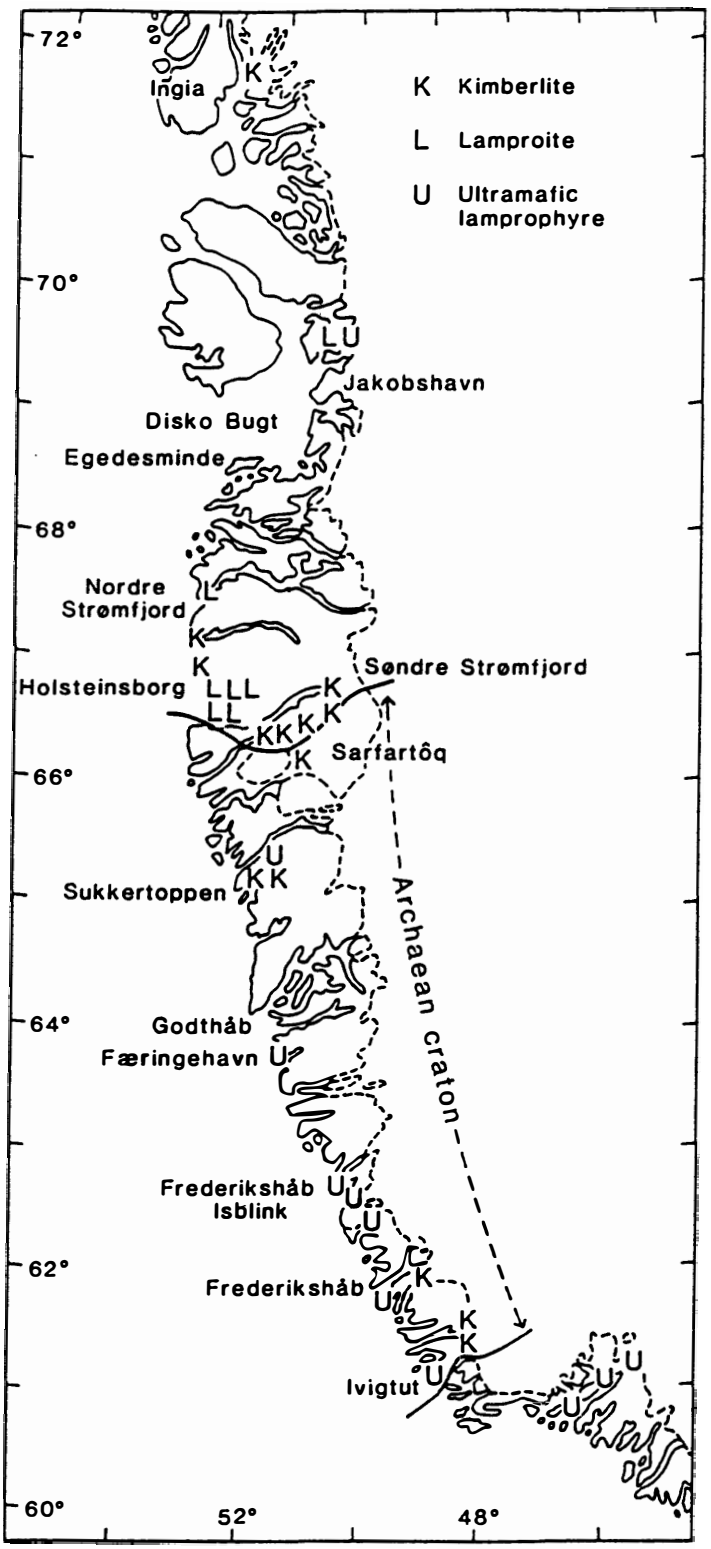


Fig. 3. Distribution of kimberlites, lamproites and ultramafic lamprophyres in Greenland.

Table 2. Number of localities with kimberlite, lamproite and ultramafic lamprophyre in West Greenland

Geodetic Institute 1:250 000 map sheet	kimberlite	lamproite	ultramafic lamprophyre	total
60V1 Julianehåb			12	12
60V2 Nanortalik			4	4
61V1 Ivigtut	26		40	66
61V3 Narssarssuaq			44	44
62V1 Frederikshåb Isblink	1		36	37
63V1 Færingehavn	1?		5	6
65V1 Sukkertoppen	10		2	12
65V2 Majorqaq	7		5	12
66V1 Holsteinsborg	37	24	5	103
66V2 Søndre Strømfjord	115		11	128
67V1 Nordre Strømfjord vest	5	6		11
69V2 Jakobshavn		1	56	57
71V1 Svartenhuk Halvø	4		2	6
Total	206	31	218	494

The total number of localities on a map sheet is in some cases larger than the sum of kimberlites, lamproites and ultramafic lamprophyres, because in some localities the proper rock name cannot be identified.

The name 'ultramafic lamprophyre' is used *sensu lato* and includes a rather large variety of types.

On the map sheets not listed there are no registered localities. For western Greenland these comprise 59V1, 61V2, 63V2, 64V1, 64V2, 67V2, 68V1, 68V2, 69V1, 70V1, 70V2, 71V2 and all sheets north of 72°N.

Within West Greenland the localities are very unevenly distributed, depending on the fact that the rocks often occur in swarms, and on the degree of detail with which an area is investigated. Table 2 shows the number of localities on the various 1:250 000 map sheets in West Greenland. The large number of kimberlite occurrences on map sheet 66V2 Søndre Strømfjord is due to a combination of the two factors mentioned above: There *is* a large kimberlite swarm, *and* the rocks have been systematically prospected for (Larsen, 1980). The absence of reported occurrences from the map sheets 67V2, 68V1 and 68V2, covering eastern Nordre Strømfjord and the Egedesminde and Christianshåb districts, may be more due to lack of detailed work than to absence of occurrences - this is simply not known at present. On the other hand the absence of reports from the very well investigated Godthåbsfjord region (map sheets 64V1 and 64V2) must reflect a real absence of occurrences there.

5. Carbonatites in Greenland

Some of the rocks are related to carbonatite occurrences which are excluded from the present compilation, and because of this and the possible close genetic relations between carbonatites and the rocks in question, the occurrences of carbonatite in Greenland are listed below.

Name	Location	Age	References
Tupertalik	65.49°N,51.84°W	2650Ma	Larsen & Pedersen, 1982
Singertât	63.25°N,42.00°W	2680Ma	Nielsen & Rosing, 1990
Two dykes	62.85°N,49.63°W	Archaean	Bollingberg et al., 1976
Dykes	SE Greenland	unknown	Andrews et al., 1971, 1973
Qagssiarssuk	61.14°N,45.53°W	c.1300Ma	Stewart, 1970
Dykes	Igaliko complexes	c.1300Ma?	Pearce, 1988
Grønnedal-Ika	61.23°N,48.07°W	1300Ma	Emeleus, 1964
Sarfartôq	66.50°N,51.25°W	600Ma	Secher & Larsen, 1980
Qaqarssuk	65.38°N,51.68°W	173Ma	Knudsen, 1986, 1989a,b
Gardiner	68.62°N,33.20°W	c. 50Ma	Nielsen, 1980

The locations are given in decimal degrees.

6. Kimberlites

Kimberlites occur in three main 'swarms' in western Greenland. 1) The Holsteinsborg-Sarfartôq region at the northern boundary of the Archaean craton. 2) The Sukkertoppen region within the Archaean craton. 3) The Frederikshåb-Ivigtut region at the southern boundary of the Archaean craton. Kimberlite dykes have also been reported from Ingia, within the Rinkian mobile belt.

6.1 Holsteinsborg-Sarfartôq region (map sheets 66V1, 66V2, 67V1)

The kimberlite dykes in this region occur in two separate swarms (see app. 2, map 4). One swarm is concentrated in the Holsteinsborg area and presumably continues northward to Nordre Isortoq, although the connection is not clear. The other swarm occurs in the inland areas around and south-east of Søndre Strømfjord and is quite extensive. Lamproite dykes occur in the intervening areas but are characteristically absent, or nearly absent, from the areas where the kimberlites occur.

The Holsteinsborg swarm has been dated by the Rb-Sr method to 587±24 Ma (Scott, 1981), whereas the Sarfartôq swarm has been dated by the K-Ar method to 589±18 - 656±20 Ma (average 615 Ma; Larsen et al., 1983). Any age difference between the two swarms is thus not discernible, and neither is there any discernible age difference to the kimberlites from Sukkertoppen (section 6.2).

6.1.1. Holsteinsborg kimberlite swarm

This swarm occurs in a c. 60 km long and 15-20 km broad coastal strip from the islands south of Holsteinsborg to Nordre Isortoq (app. 2, map 4). The northern part of the swarm may continue further towards the east than presently known. The dykes are situated in Proterozoic (Nagssugtoqidian, reworked Archaean) basement in granulite facies, outside the major shear zones in the area. They strike mainly E-W. They have been described by Scott (1977, 1979, 1981).

The Holsteinsborg kimberlite dykes vary in thickness from a few centimetres to 2 m, and are generally less than 1 m thick. The wider dykes may have central zones rich in ultramafic nodules, and dunite, lherzolite, wehrlite, harzburgite, eclogite and granulite nodules have been found.

The rock is a phlogopite kimberlite with macrocrysts of olivine and rarely garnet and ilmenite, smaller phenocrysts of olivine and phlogopite, and a groundmass composed of phlogopite, magnetite, clinopyroxene, carbonate, apatite and sometimes perovskite. The mineral compositions are typical for kimberlites. The geochemistry is discussed below.

6.1.2. Sarfartôq kimberlite swarm

This swarm occurs in a c. 80 x 80 km large area between Søndre Strømfjord and the Inland Ice. (app. 2, map 4). The swarm is not well delimited, especially not towards the Inland Ice and in the south, where no observations have been made. The swarm straddles the boundary between the Archaean block to the south and the Proterozoic Nagssugtoqidian mobile belt with reworked Archaean rocks to the north. (Fig. 3). It has been preliminarily described by Larsen (1980). The works of Scott (1977, 1979, 1981) included a few localities in Sarfartûp nunâ which form part of the Sarfartôq swarm.

The Sarfartôq kimberlites are related to the coeval Sarfartôq carbonatite complex. The kimberlites form an extensive swarm of cone sheets centered on the carbonatite and dipping 20-60^{o} towards it. This cone sheet swarm extends to at least 25 km distance from the carbonatite; beyond this distance the strikes and dips become variable and the relation to the carbonatite more uncertain.

The Sarfartôq kimberlite dykes vary in thickness from a few centimetres to 2 m, and are generally less than 1 m thick, just like the Holsteinsborg dykes. They may likewise have central zones rich in ultramafic nodules, and dunite, lherzolite and granulite nodules have been found.

Many of the Sarfartôq rocks are phlogopite kimberlites just like those described above for Holsteinsborg. However, the Sarfartôq kimberlites also include phlogopite-poor rocks consisting mainly of close-lying olivine macrocrysts and phenocrysts, with groundmass carbonate, magnetite, sparse colourless phlogopite, and sometimes perovskite. The Sarfartôq group further includes more carbonate-rich rocks than the Holsteinsborg group; these rocks occur in narrow dykelets and as marginal facies in wider dykes with normal kimberlite centres. They consist of sparse olivine, Fe-Ti oxides and sometimes phlogopite in a matrix of carbonate, and they include rocks which are mineralogically indistinguishable from carbonatite.

6.2. Sukkertoppen region (map sheet 65V1, 65V2).

Kimberlite dykes have been found in this region within an area of c. 50 x 50 km (app. 2, map 3), emplaced into rocks of the Archaean block. The dykes have been dated by the K-Ar method to 586-613 Ma (D. Rex, unpublished data), i.e. they are of the same age as the Holsteinsborg-Sarfartôq kimberlites (section 6.1). They have thus no direct genetic connection with the Qaqarssuk carbonatite complex in the same region, because this is of Mesozoic age (section 5). Most of the kimberlites have been found by Kryolitselskabet Øresund A/S, and there is no published account on them. The following descriptions are based on field diaries from Kryolitselskabet Øresund A/S, and on the author's own data and petrographic observations.

At present 17 localities with kimberlite are known from the Sukkertoppen region. All occurrences are dykes which are 10 cm to 2 m thick and usually only traceable over short distances. Strike directions are quite variable, but the majority of the dykes have directions between NE and E. The area possesses prominent lineaments directed at 60°NE, seen in the directions of many fjords, and the kimberlites may be structurally related to these. Movements along the lineaments have taken place recurrently since the Proterozoic, latest in the Mesozoic.

The Sukkertoppen kimberlites contain megacrysts/macrocrysts of olivine, garnet and an opaque oxide, and abundant phenocrysts of olivine in a groundmass of carbonate and Fe-Ti oxides. Phlogopite occurs sparsely in the groundmass as small colourless flakes. Only one phlogopite kimberlite, with phenocrysts of brown phlogopite, has been found. The Sukkertoppen kimberlites are thus mainly similar to the phlogopite-poor kimberlites from Sarfartôq described in section 6.1.2, but garnet megacrysts appear to be much more frequent in the Sukkertoppen rocks.

One locality (65V1.1) is a very mica-rich ultramafic rock that is either a differentiated phlogopite kimberlite or an ultramafic lamprophyre. It is of the same age as the kimberlites, but is here treated together with the ultramafic lamprophyres.

6.3 Frederikshåb-Ivigtut region (map sheets 61V1, 62V1).

The kimberlite dykes in this region comprise a single dyke at Nigerdlikasik 43 km ENE of Frederikshåb, and groups of 'stacked' kimberlite sheets in the Pyramidefjeld-Midternæs area 70-80 km south of Nigerdlikasik (app. 2 maps 1 and 2).

The Nigerdlikasik dyke is emplaced into undisturbed Archaean rocks, while the Pyramidefjeld-Midternæs sheets are emplaced into the northern border zone of the Ketilidian mobile belt, where the Archaean basement is slightly affected by the Ketilidian deformation.

The rocks have been dated by ^{40}Ar-^{39}Ar and Rb-Sr methods to 193±6 - 220±17 Ma (Bridgwater, 1970; Andrews & Emeleus, 1971), i.e. Mesozoic (Triassic-Jurassic). They have been described together by Andrews & Emeleus (1971, 1975) and Emeleus & Andrews (1975).

6.3.1 Nigerdlikasik kimberlite dyke

The dyke (loc. 62V1.1) is 0.5 m thick, vertical, trending 140°, and can be followed over c. 500 m. Besides various xenoliths of crustal derivation it contains rounded nodules of both garnet and spinel peridotites. The dyke rock contains megacrysts/phenocrysts of olivine in a groundmass composed of carbonate, serpentine, phlogopite and Fe-Ti oxides, with accessory clinopyroxene, perovskite and apatite.

6.3.2 Pyramidefjeld-Midternæs kimberlite sheets

The sheets occur in three areas some 3-10 km apart: Around Kedelsø ('Grydesø') (locs. 61V1.1-.9), around Pyramidefjeld (locs. 61V1.10-.21) and in Midternæs (locs. 61V1.22-.26). In all three areas the kimberlites form flat-lying sheets with dips of 10-20°. The sheets are generally less than 1 m thick and occur in several levels with 20-50 m vertical intervals, and they can be followed continuously for around 1 km. The rocks contain peridotite nodules like those at Nigerdlikasik, and the kimberlite rocks are petrographically also similar to that at Nigerdlikasik.

The minerals from the kimberlites and peridotite nodules from Nigerdlikasik and Pyramidefjeld have been investigated by Emeleus & Andrews

(1975). A few microdiamonds have been found in bulk rock samples (Geisler, 1972).

6.4 Ingia (map sheet 71V1)

Six samples of ultramafic dykes were collected from the Ingia area around 72°N,53°W by Charter Consolidation Limited. Their petrography and mineralogy was investigated by Smith (1981) who described four of the dykes as phlogopite kimberlites.

6.5 Whole-rock geochemistry of the kimberlites

Analytical data for the Greenlandic kimberlites are shown in Table 3 and in Fig. 4, which is a simple plot of Al_2O_3 *vs* MgO. This diagram illustrates the following features:

1. The Sarfartôq swarm includes a number of differentiated kimberlites which grade into carbonatite mineralogically and chemically (cf. section 6.1.2).
2. The Holsteinsborg dykes all have Al_2O_3 >2%, whereas comparable dykes of the Sarfartôq swarm (with MgO >21%) in addition comprise some with lower Al_2O_3. This corresponds to the mineralogical differences between phlogopite-rich and olivine-rich kimberlites noted earlier (section 6.1.2). The Sukkertoppen and Pyramidefjeld kimberlites are fairly low in Al_2O_3.
3. The most Mg-rich kimberlites are those from Sukkertoppen, with up to 37.7% MgO. They are followed by those from Sarfartôq (up to 35.7% MgO) and Holsteinsborg (up to 32.1% MgO), while those from Pyramidefjeld-Nigerdlikasik only come up to 28.0% MgO.

The Mg-ratio (atomic $Mg/(Mg + Fe^{2+})$) of a kimberlite may reflect the magma's depth of equilibration within the mantle (Eggler, 1989). The Sukkertoppen kimberlites have the highest Mg-ratios (0.84-0.88) which may indicate pressures of 55-60 Kbar, i.e. depths of 180-200 km. Despite their low MgO contents, the Pyramidefjeld-Nigerdlikasik kimberlites come next, with Mg-ratios of 0.81-0.87, corresponding to slightly lower pressures and depths. The Sarfartôq kimberlites with MgO >21% and the Holsteinsborg kimberlites have Mg-ratios in the interval 0.78-0.85, with more Sarfartôq samples with high values. This may indicate pressures of 50-55 Kbar, i.e. depths of 160-180 km. This inferred depth sequence corresponds well with the tectonic settings of the various groups, respectively well within the Archaean craton (Sukkertoppen), in the outer part of the Archaean craton (Pyramidefjeld-Nigerdlikasik), at the margin of the craton (Sarfartôq) and just outside it (Holsteinsborg).

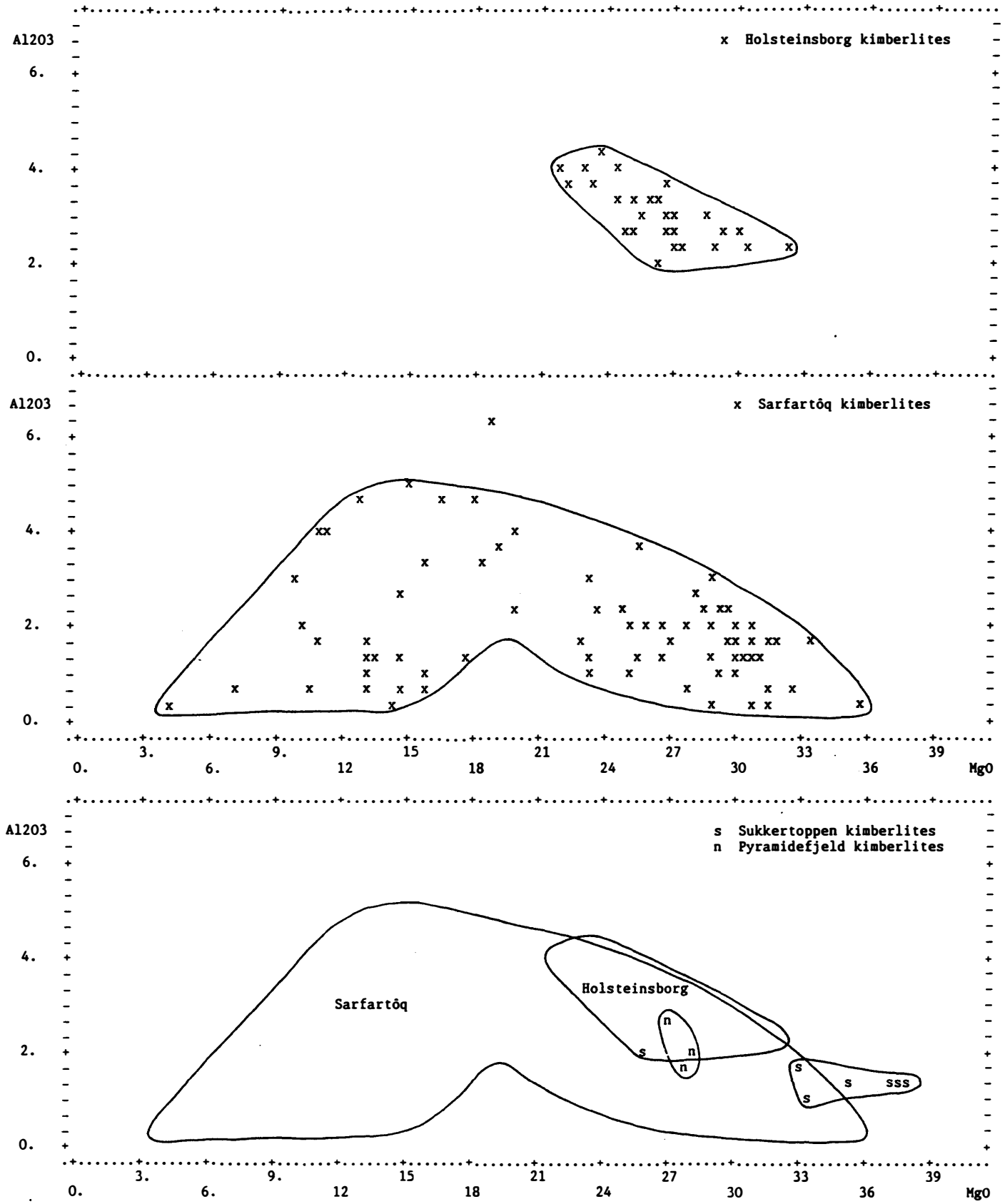


Fig. 4. Al2O3 vs. MgO for Greenland kimberlite swarms.

Table 3 Representative compositions of kimberlites and lamproites from Greenland

	1	2	3	4	5	6	7
SiO_2	29.27	28.23	8.48	28.44	29.5	46.05	39.65
TiO_2	2.35	2.98	1.58	3.32	1.81	3.36	1.33
Al_2O_3	2.74	1.22	1.50	1.27	2.7	7.40	11.38
Fe_2O_3	2.49	3.33	2.67	4.82	5.6	2.27	1.19
FeO	8.40	9.26	5.37	6.38	7.9	5.28	3.42
MnO	0.19	0.19	0.25	0.20	0.21	0.12	0.05
MgO	27.01	30.28	10.95	37.76	27.1	12.12	19.15
CaO	10.53	8.65	32.57	5.88	10.7	5.31	5.38
Na_2O	0.31	0.14	0.15	0.18	0.47	1.69	0.37
K_2O	2.38	0.69	0.69	0.21	1.76	8.49	9.71
P_2O_5	0.60	0.42	1.76	0.27	0.54	1.47	2.80
H_2O	2.76	2.56	1.63	4.51	3.2	4.68	2.73
CO_2	11.02	11.28	29.97	6.86	7.8		
Sum	100.05	99.23	97.57	100.10	99.3	98.24	97.16
Cr	1396	1679	371	1472		455	1034
Ni	842	1056	53	1333		390	808
Sc		15	29	14		15	
V	268	140	192	153		115	32
Cu	77	46	102	105		66	33
Zn	72	74	71	55		83	76
Ga		7	6	5		19	
Ba	1094	723	4679	1025		2580	4647
Sr	1227	956	1952	507	780	2050	3579
Rb	94	42	38	25	50	165	348
Y	15	10	34	5		22	
Zr	141	201	393	89	270	924	
Nb		163	311	152		153	
La	217	86	274	70		222	
Ce	271	128	506	121		399	
Nd		53	196	43		162	
Pb		<2	16	5		26	
Th		12	23	8		10	

1. Li5530 (Univ.of Liverpool number system), kimberlite from the Holsteinsborg swarm, compilation loc. 66V1.16. From Scott (1977, 1981).
2. 265845 Kimberlite from the Sarfartôq swarm, center of dyke, compilation loc. 66V2.9. GGU-data.
3. 265844 Differentiated kimberlite, chilled margin on previous. GGU-data.
4. 265421 Kimberlite from the Sukkertoppen swarm, compilation loc. 65V1.5. GGU-data.
5. Kimberlite from Pyramidefjeld, average of six analyses, compilation locs 61V1.10-.21. From Emeleus & Andrews (1975).
6. 311003 Lamproite dyke from the Holsteinsborg region, compilation loc. 66V1.45. GGU-data.
7. 269766 Lamproite pipe from the Disko Bugt region, compilation loc. 69V2.56. GGU-data.

7. Lamproites

Lamproites have been identified in two areas. 1: Widespread lamproite dykes occur in intermittent swarms in the coastal area between Itivdleq and Nordre Strømfjord ('Holsteinsborg lamproites'). 2: A small lamproite pipe occurs in the Disko Bugt region north of Jakobshavn. There may be other, possible lamproites in the same region, but these are grouped with the ultramafic lamprophyres until further tests have been made.

7.1 Holsteinsborg lamproites (map sheets 66V1, 67V1)

In the Holsteinsborg region lamproite dykes have been intruded into the Nagssugtoqidian (reworked Archaean) basement north of the Archaean craton. They are quite narrowly confined to large shear zones, and usually they do not occur in the same areas as the kimberlite dykes in the region (app. 2, map 4). The Itivdleq and Ikertôq shear zones housing these dykes south of Holsteinsborg trend E-W, and so do the lamproite dykes, while the Nordre Strømfjord shear zone and the lamproite dykes in it trend NE-SW. There are few lamproites outside these shear zones. The shear zones have been described by Bak et al. (1975), Korstgård (1979), Nash (1979) and Sørensen (1983). The lamproites have been described by Winther (1971), Brooks et al. (1978), Scott (1977, 1979, 1981) and Thy et al. (1987). Those in the Itivdleq and Ikertôq zones have been dated at 1227±12 Ma (Rb-Sr, Scott, 1981), and one lamproite dyke in the Nordre Strømfjord zone has been dated at 1240±130 Ma (K-Ar, Winther, 1974). The lamproites are described together below.

The lamproites occur as thin brownish dykes usually less than 1 m thick, often with en echelon displacements. They are often zoned, showing signs of multiple intrusion. The rock is porphyritic, and phenocrysts may include phlogopite (ubiquitous), pseudoleucite, olivine and clinopyroxene, while groundmass phases reported are phlogopite, clinopyroxene, amphibole, K-feldspar, carbonate, apatite, quartz, rutile, ilmenite and priderite; serpentine and chlorite may be secondary. Thy et al. (1987) distinguished between leucite lamproites and amphibole lamproites.

Mantle nodules are not reported from the lamproites, but Thy et al. (1987) reported occasional pyrope xenocrysts.

7.2 Oqaitsúnguit lamproite pipe, Disko Bugt (map sheet 69V2)

Two small volcanic pipes, which probably merge to one body at depth, cut the Archaean Atâ granite at Oqaitsúnguit c. 65 km NNE of Jakobshavn (loc.

69V2.56). They occur in the same region that is cut by a large swarm of ultramafic lamprophyre dykes (section 8.7). The pipe was found in 1989 during regional geological investigations, and it is presently being described by Lilian Skjernaa (unpublished data). It has been dated by the K-Ar method at 1743±52 Ma (D. Rex, unpublished data).

The lamproite pipes are 50x70 m and 15x20 m large, and the distance between them is only 20 m. The rock is extremely rich in phlogopite and consists of close-lying coarse phlogopite crystals poikilitically enclosed in a matrix of microcline and potassic richterite. Euhedral apatite crystals are frequent. Diopside is subordinate in the centre of the pipes and increases in abundance toward the margins. The rock contains conspicuous 1-3 cm large ovoid phlogopite nodules that look like small chocolate eggs.

7.3 Whole-rock geochemistry of the lamproites

Bergman's (1987) review of lamproites shows large variations in chemical composition within the group. The fairly clear distinction of the Greenlandic lamproites from the other rocks in Fig. 1 is probably connected with the fact that all analyses except one come from the Holsteinsborg lamproites. These are of the same compositional type and are fairly typical although they are low in SiO_2, with on average 41.8% SiO_2 against Bergman's general range of 45-55% SiO_2. They have fairly low MgO and high K_2O centents (Table 3 and Fig. 1).

The one analysed sample of Oqaitsúnguit lamproite (Table 3) is very rich in MgO (19.1%) and K_2O (9.7%) and may be phlogopite-accumulative. Even with correction for this the rock still classifies chemically as a lamproite, as it also does mineralogically (potassic richterite is diagnostic).

Bergman (1987) compared the chemical compositions of diamondiferous and non-diamondiferous lamproites. Known diamondiferous lamproites have higher MgO and lower SiO_2, Al_2O_3, Na_2O and K_2O than non-diamondiferous lamproites. The Holsteinsborg lamproites are compositionally similar to the non-diamondiferous group, whereas the Oqaitsúnguit lamproite shows more mixed relations; its high MgO-content and Mg-ratio (atomic $Mg/(Mg+Fe^{2+})$) of 0.89 indicate that it may be of sufficiently deep-seated origin to be potentially diamondiferous.

8. Ultramafic lamprophyres (UML) and other groups

Ultramafic lamprophyres have been reported from several areas in West Greenland, usually as localised dyke swarms. From south to north they occur

in South Greenland (Gardar), south of Frederikshåb, at Frederikshåb Isblink, at Færingehavn, Sukkertoppen, Sarfartôq and in the Disko Bugt region, and probably in the Umanak region. They cut both the Archaean craton and the Proterozoic mobile belts south and north of the craton, and their ages range from Proterozoic to Mesozoic. In the following they are mentioned from south to north.

8.1 UML from the Gardar Province, South Greenland

(map sheets 60V1, 60V2, 61V1, 61V3)

Ultramafic lamprophyres occur as a very subordinate part of the Gardar igneous rocks in South Greenland. The Gardar period lasted from c. 1300 Ma to c. 1100 Ma, and given this time interval it is most probable that the occurrences mentioned below were produced in several separate events.

UML dykes have been reported from the vicinity of Arsuk (locs 61V1.63-.66: Upton & Emeleus, 1987, and unpublished data); on Tugtutôq island (locs 60V1.1 and 60V1.9-.12: Martin, 1985; Upton & Emeleus, 1987) where one strongly altered dyke is loaded with ultramafic nodules (Scott-Smith, 1987; Upton, in press); in and around the Igaliko intrusions (locs 61V3.29-.40 and 60V2.1-.4: Emeleus & Harry; 1970, Pearce, 1988); and on Mellemlandet and on G.F. Holm Nunatak (Upton & Fitton, 1985).

A number of small intrusions of ultramafic rocks (pyroxenites) occur in the vicinity of Narssaq (locs 60V1.2-.8) and have been described in some detail by Ussing (1912), Upton & Thomas (1973) and Craven (1985).

The Qagssiarssuk-Narssarssuaq area hosts a rather famous occurrence of alkaline ultramafic and carbonatitic rocks occurring as lavas, tuffs, pipes, sheets and dykes (locs. 61V3.1-.28), described by Walton (1965), Stewart (1970), Emeleus & Harry (1970) and Knudsen (1986). Many of these occurrences are shown on the geological map 1:100 000 61V.3 Syd Narssarssuaq.

The petrography and geochemistry of the gardar UML rocks are very variable, and the different groups of occurrences should probably best be treated separately. The data coverage of the groups is, however, quite uneven, and these rocks warrant further study before they can be properly reviewed.

8.2 UML from South of Frederikshåb (map sheet 61V1)

A swarm of UML dykes occurs in a 25x10 km large area immediately south of the town Frederikshåb (localities 61V1.27-.62). They were described by Walton (1966) and Walton & Arnold (1970), and dated by the K-Ar method at

166-172 Ma (Larsen & Møller, 1968; Bridgwater, 1970; Larsen et al., 1983).

The dykes trend NW-SE (i.e. coast-parallel) and have thicknesses varying from a few millimetres to 1.5 m. They were described as 'lamprophyric carbonatites'; following Rock (1986) the more modern group name 'aillikite' may be appropriate. The dykes have megacrysts of phlogopite, salite, hornblende and olivine in a groundmass consisting of carbonate, magnetite and mafic minerals. Local accumulations of plutonic nodules occur: Olivine megacrysts and hornblende-olivine-pyroxenite may be of mantle origin, while garnet granulite, hypersthene granulite, pyroxene hornblendite, amphibole hornblendite, biotite pyroxenite and glimmerite may be of lower crustal origin.

8.3 UML from Frederikshåb Isblink (map sheet 62V1)

Several occurrences of lamprophyre dykes have been reported from the vicinity of Frederikshåb Isblink. They have been described by Hansen (1979, 1980, 1981, 1984) and dated by the K-Ar method at 119-141 Ma by Hansen & Larsen (1974). Many of these dykes are alkaline and not ultramafic and are thus outside the scope of the present compilation. However, two groups of 'melilitites' and 'carbonatitic lamprophyres' are relevant. A group of 'olivine nephelinites' may also be considered ultramafic, and this group seems to have differentiated into a group called 'nephelinites'. These four groups have been included in the compilation (locs. 62V1.2-.37) under the more modern names of, respectively, alnöite, aillikite, olivine monchiquite and monchiquite.

The dykes form a comparatively loose, ill-defined swarm whose general trend is N-S, i.e. approximately coast-parallel. Thicknesses vary from 0.1 m to 2 m. The alnöites contain abundant carbonate, melilite and zeolites, clinopyroxene, magnetite, perovskite and apatite. The aillikites contain abundant carbonate, phlogopite, magnetite, perovskite, apatite and melanite. The olivine monchiquites have phenocrysts of clinopyroxene, phlogopite and olivine in a finegrained to aphanitic carbonate-rich groundmass. The monchiquites have phenocrysts of clinopyroxene, phlogopite, leucite, magnetite and apatite in a finegrained groundmass with ocelli with carbonate and zeolites. The four rock groups show a clear geochemical grouping (section 8.8).

8.4 UML from the Færingehavn area (map sheet 63V1)

Six localities with ultramafic lamprophyre dykes have been found in the coastal region between Færingehavn and Buksefjord (C.R.L. Friend and A.P. Nutman, personal communication; locs. 63V1.1-.6). They have been dated by the K-Ar method at 175-196 Ma (D. Rex, unpublished data).

The UML dykes are 15-50 cm wide and usually trend NE-SW. One locality (63V1.6) is an assemblage of carbonate-rich veins which strictly speaking are carbonatites, with a SiO_2 concentration of 10%. The other UML dykes are all mica-rich, with phenocrysts of brown phlogopite, olivine and clinopyroxene, and groundmasses composed of phlogopite, clinopyroxene, Fe-Ti oxides, perovskite, apatite and abundant carbonate.

One dyke (at loc. 63V1.3) was reported as a kimberlite. It has a typical kimberlite appearance with rounded centimetre-sized ultramafic nodules with garnet. The nodules consist of pyroxenite, amphibole-clinopyroxene-apatite rocks, dunite and garnet granulite, an association similar to the nodules in the UML dykes south of Frederikshåb (section 8.2). Geochemically, the rock is not a typical kimberlite (see section 8.7). All the Færingehavn UML may therefore be termed aillikites.

8.5 UML from the Sukkertoppen region (map sheets 65V1, 65V2)

A single dyke of mica-rich UML is reported from near the town Sukkertoppen (loc. 65V1.1). It has been dated by the K-Ar method at 586 Ma (D. Rex, unpublished data), i.e. the same age as the Sukkertoppen kimberlites and the Sarfartôq-Holsteinsborg carbonatite and kimberlites. The rock contains abundant phenocrysts of brown phlogopite in a coarse-grained groundmass with carbonate, amphibole, Fe-Ti oxides, and zeolites after olivine.

A group of mica-carbonate-rich lamprophyre dykes occurs in the vicinity of the Qaqarssuk carbonatite complex (locs. 65V2.1-.4, 65V2.12). One of these dykes cuts the carbonatite complex and has been dated by the K-Ar method at 174±7 Ma, i.e. the same age as the carbonatite (Larsen et al., 1983). The other dykes occur in a fault zone with preserved downthrown Ordovician limestones, and the age of both dykes and faulting is probably Mesozoic. The chemical composition of the dykes shows that they belong to the alkaline rather than the ultramafic lamprophyre clan, and they are best classified as monchiquites.

8.6 Potassic lamprophyres (shonkinites) from Sarfartôq (map sheet 66V2)

Dykes of potassic lamprophyre occur immediately east of the Sarfartôq carbonatite complex. They were dated by the K-Ar method at 1786-1974 Ma by Larsen et al., 1983. Some six to ten dykes occur within a c. 12x6 km large area, but their true distribution is unknown. The dykes trend NNW-SSE and dip 70-80°WSW; they are 0.3-3 m thick and are sometimes sheared. The rock contains megacrysts of anorthoclase, phlogopite and green clinopyroxene, and phenocrysts of phlogopite, clinopyroxene, magnetite and apatite in a groundmass of phlogopite, green amphibole, apatite, alkali feldspar and carbonate.

This rock type is not ultramafic. It is difficult to classify because it shows resemblances to both lamproites, calc-alkaline and alkaline lamprophyres (e.g. Rock, 1987). Mineralogically and chemically it resembles the shonkinites from Shonkin Sag (Nash & Wilkinson, 1970, 1971), and it has therefore been called shonkinite: this conveys that the rock is distinctly different from the other lamprophyres in Greenland.

8.7 UML from the Disko Bugt region (map sheet 69V2)

A swarm of ultramafic lamprophyre dykes occurs on the mainland north of Jakobshavn (locs. 69V2.1-.55). They were found during a detailed regional geological investigation in 1988-1989 and were described by Marker & Knudsen (1989). One dyke has been dated by the K-Ar method at c. 1750 Ma (D. Rex, unpublished data), the same age as the lamproite pipe described in section 7.2.

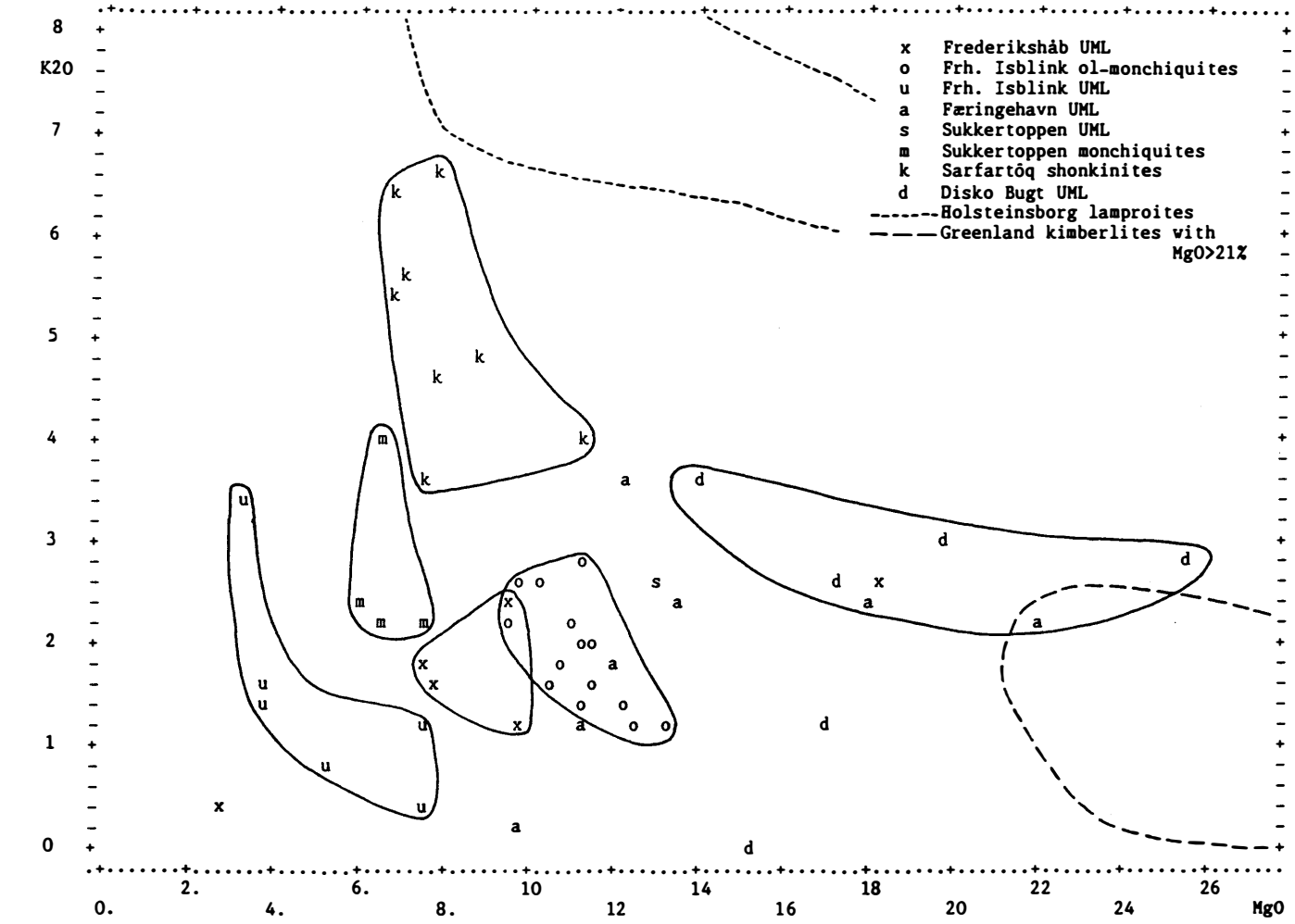
The dykes crop out in an area of 20x27 km, but the limits of the swarm are not yet clear. In the eastern part of the area the dykes trend consistently E-W, whereas the trends are much more variable in the western part (L. Skjernaa, personal communication, 1980). The dykes are 0.1-5 m thick, usually 1-2 m, and are often sheared and recrystallised, especially along the margins. Often the dykes have central parts with phlogopite phenocrysts in a carbonate-rich groundmass, and marginal parts rich in amphibole and mica. The rocks further contain considerable proportions of tremolite, magnetite and accessory apatite and sphene. Minerals diagnostic for lamproites (K-richterite, priderite etc.) have not been found. The dyke sidewalls are always metasomatically altered, enriched in mica and devoid of quartz.

At one locality an olivine-bearing dyke contains rounded inclusions of spinel peridotite and pyroxenite.

Table 4 Representative compositions of ultramafic and potassic lamprophyres from Greenland

	1	2	3	4	5	6	7	8
SiO_2	22.91	34.92	25.94	30.42	28.43	38.60	37.64	34.28
TiO_2	2.74	3.63	2.46	3.97	1.72	0.38	1.43	4.27
Al_2O_3	4.18	9.99	8.01	5.25	4.18	8.66	9.69	3.89
Fe_2O_3	4.62	4.39	1.83	5.35	5.01	2.74	3.04	10.61
FeO	5.48	9.26	10.38	7.24	8.53	3.50	5.90	7.70
MnO	0.25	0.14	0.42	0.21	0.26	0.23	0.16	0.24
MgO	9.55	11.28	3.87	13.56	22.08	5.96	8.77	19.71
CaO	26.19	15.87	20.91	16.79	13.86	17.87	14.99	8.90
Na_2O	0.53	0.60	3.15	1.03	0.39	3.82	1.56	0.22
K_2O	2.40	1.39	1.33	2.47	2.24	2.32	4.79	3.03
P_2O_5	0.20	0.91	2.93	0.35	0.63	1.68	3.95	0.29
H_2O	2.54	4.14	2.67	0.71	2.83	11.55	0.61	6.28
CO_2	16.0	3.60	15.36	11.62	9.10		4.09	
Sum	97.6	100.12	99.26	98.97	99.26	97.31	96.62	99.42
Cr		263	23	292	758	79	176	559
Ni		97	14	165	394	34	177	550
Sc		47	25	52	28	13	11	
V		373	170	237	195	107	116	249
Cu		93	16	128	60	17	119	677
Zn				83	100	153	139	65
Ga				17	10	13	14	
Ba	1000	570	1400	1630	1030	5801	6990	821
Sr	2000	393	3994	830	1123	2086	3580	128
Rb		42	25	117	84	42	102	228
Y		21	72	40	19	35	48	
Zr		267	482	520	309	348	476	
Nb		86	245	159	134	345	21	
La				147	94	269	684	
Ce				271	169	500	1340	
Nd				117	77	214	676	
Pb				<2	4	3	83	
Th				55	12	16	28	

1. 73642, UML dyke from south of Frederikshåb, compilation loc. 61V1.29-.62. From Walton & Arnold (1970).
2. 120366r, olivine monchiquite dyke from Frederikshåb Isblink, compilation loc. 62V1.9. From Hansen (1979).
3. 131205, alnöite dyke from Frederikshåb Isblink, compilation loc. 62V1.22. From Hansen (1979).
4. 265872, UML dyke from the Færingehavn area, compilation loc. 63V1.5. GGU-data.
5. 265876, aillikite or kimberlite dyke from the Færingehavn area, compilation loc. 63V1.3. GGU-data.
6. 266105, monchiquite dyke from the Sukkertoppen region, compilation loc. 65V2.1. From Knudsen (1986).
7. 265197, shonkinite dyke from the Sarfartôq area, compilation loc. 66V2.43. GGU-data.
8. 269734, UML dyke from the Disko Bugt region, compilation loc. 69V2.1-.44. GGU-data.



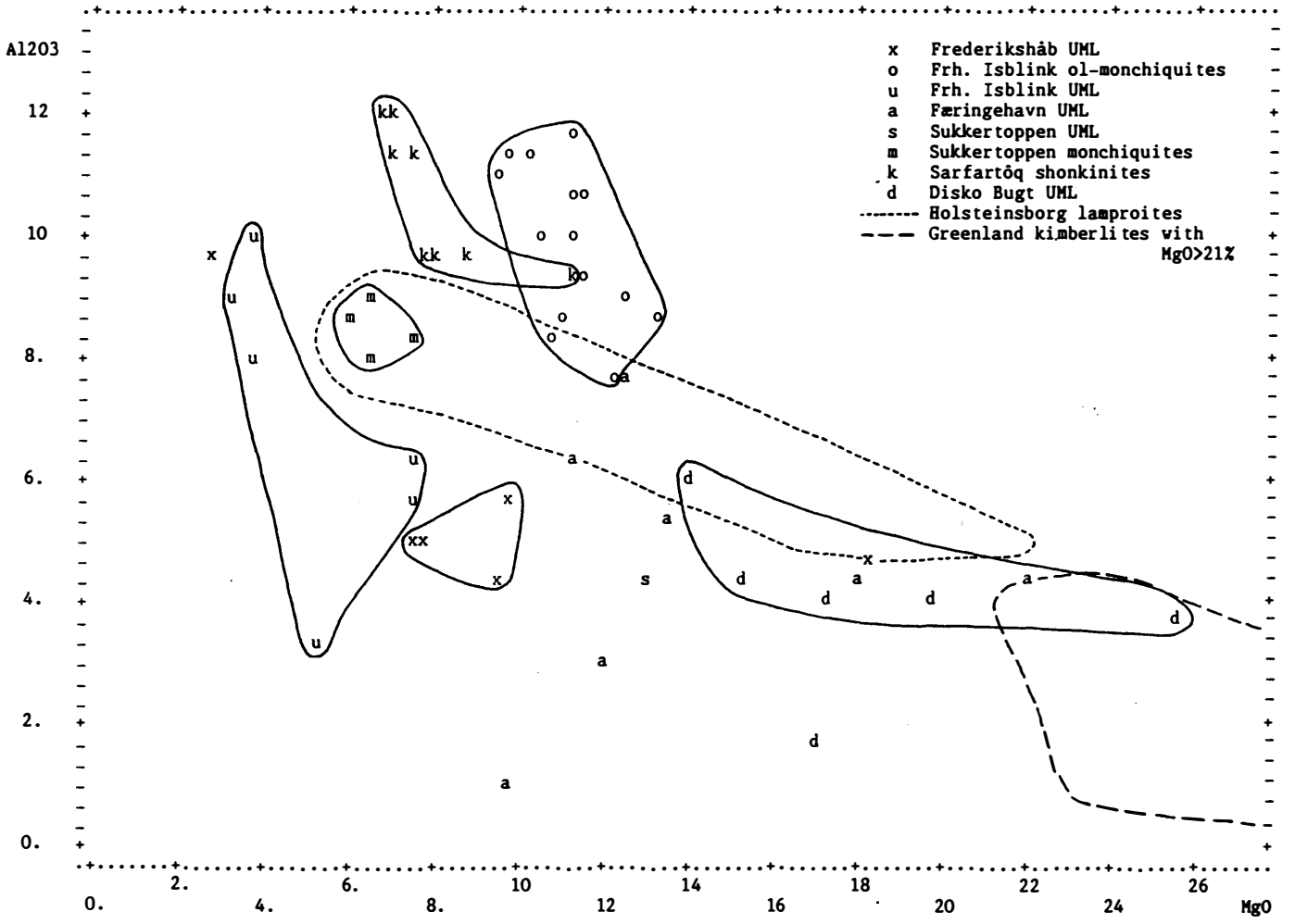


Fig. 5a. K20 and Al2O3 vs MgO for Greenland ultramafic and potassic lamprophyres. The members of each swarm tend to cluster in a group.

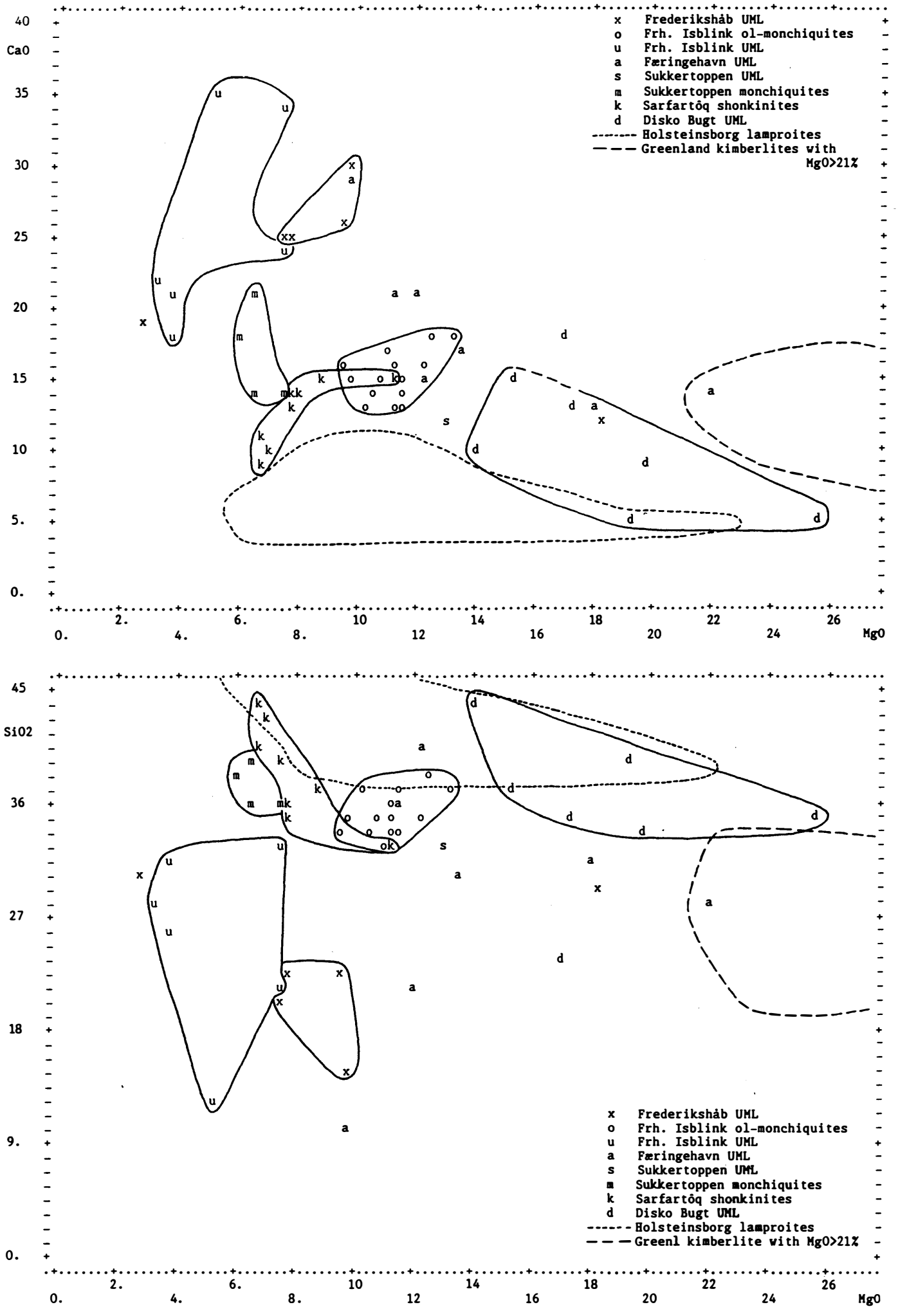


Fig. 5b. CaO and SiO2 vs MgO for Greenland ultramafic and potassic lamprophyres. The members of each swarm tend to cluster in a group.

8.8 Whole rock geochemistry of the UML and other lamprophyres

Analytical data for the ultramafic lamprophyres, monchiquites and shonkites are shown in Table 4 and in four scatter plots of K_2O, Al_2O_3, CaO and SiO *vs* MgO in Fig. 5a and 5b. (Data for the Gardar UML are excluded because the data coverage of this heterogeneous group is very uneven.) The diagrams illustrate the following features:

1. The dykes of each swarm have compositions that are chemically fairly similar and distinct from those of the other swarms. This is accentuated by the contours drawn around each group. The exception is the Færingehavn group, where the analyses show a very large scatter. The Frederikshåb UML include one analysis which is very similar to the alnöites at Frederikshåb Isblink, and one analysis that is very similar to one in the Færingehavn group.
2. If a chemical criterion of SiO_2 <35% for UML is applied (following Rock, 1986) the monchiquites and shonkinites correctly plot outside the UML field. The same do, however, the dykes from Disko Bugt.
3. In all plots the Disko Bugt dykes (except for one altered sample) occupy a field that is intermediate between the lamproites and the kimberlites. They share certain geochemical features with the lamproites, notably the combination of relatively high SiO_2 with low CaO and Al_2O_3. They are akin to olivine lamproites which share features both with other lamproites and with type II kimberlites (Dawson, 1987), and which may be diamondiferous. An analysis of a diamondiferous lamproite from Chelima, India (Rock & Paul, 1989) is fairly similar to the Disko Bugt dykes.

9. Diamond prospecting in Greenland

In the period 1971-1974 Renzy Mines Ltd investigated the Pyramidefjeld -Midternæs-Nigerdlikasik kimberlites. At both Pyramidefjeld and Midternæs two bulk rock samples out of four examined contained microscopic diamonds, eight in all. Two bulk rock samples from Nigerdlikasik did not yield any diamonds (Geisler, 1972).

Platinomino A/S collected stream sediment samples from the Fiskenæsset region in 1972-1974. Many of these were investigated for diamonds, and in 1973 two near-lying samples yielded respectively 1 and 9 microdiamonds (Geisler, 1973). Follow-up work in 1974 did not produce any diamonds (Geisler, 1974). There are no known kimberlites in the neighbourhood; the

distance to the UML dykes at Frederikshåb Isblink is around 50 km, and the distance to the UML dykes at Færingehavn is around 70 km. This diamond find is not understood, and the possibility of sample contamination must be considered.

Charter Consolidated Limited made regional collections of heavy-mineral concentrates from stream sediments in West Greenland between 63°30'N and 76°N in the period 1973-1981. The kimberlites at Holsteinsborg and Sarfartôq yielded kimberlite indicator minerals (pyrope, Mg-ilmenite and Cr-diopside), and two large stream sediment samples from the mouth of the Sarfartôq river valley yielded one microdiamond each (Brunet, 1974, 1976). Kimberlite indicator minerals were also found in east Disko, probably long-distance transported from occurrences beneath the Inland Ice. Pyrope and Cr-diopside of suggested local origin was found on the mainland east of Disko, where UML dykes and lamproite are now known to occur. No samples yielded any diamonds (Brunet, 1980).

Kryolitselskabet Øresund A/S investigated the kimberlites in the Sukkertoppen region. They used geophysical methods (magnetic, landsat images) in an attempt to localise kimberlite pipes, but none were found.

10. Conclusions

West Greenland from 60°N to 72°N is cut by at least four swarms of kimberlite, one swarm of lamproite, and seven swarms of ultramafic or strongly potassic lamprophyre. Ages range from Proterozoic (c. 1800 Ma) to Mesozoic (175 Ma). Sparse microdiamonds have been found in connection with the Pyramidefjeld-Midternæs and Sarfartôq kimberlite swarms.

According to Clifford (1966) kimberlites with economic contents of diamonds occur mainly within Archaean cratons, whereas kimberlites within younger accreted belts, like the Holsteinsborg kimberlite swarm, tend not to be economic. The Pyramidefjeld-Midternæs and Sarfartôq kimberlite swarms are both situated at the margin of the Archaean craton. The Sukkertoppen kimberlite swarm, situated well within the Archaean craton, may have a better diamond potential. It has not been investigated for diamonds. In section 6.5 it was shown that the Sukkertoppen kimberlites equilibrated at deeper levels than the other Greenlandic kimberlites.

The Holsteinsborg lamproites are of the non-diamondiferous type, whereas the Oqaitsúnguit lamproite pipe is more akin to the diamondiferous lamproites.

Of the ultramafic lamprophyre swarms those that occur in the Archaean craton at Frederikshåb, Frederikshåb Isblink and Færingehavn may perhaps have some diamond potential depending on their depth of generation. The best prospect is the Færingehavn swarm which includes kimberlite-like dykes. However, the Disko Bugt swarm is considered to be a better prospect because of the rocks' affinities to olivine lamproites of diamondiferous type, and the situation within relatively undisturbed Archaean rocks. UML from large continental rifts as the Gardar province are usually generated at too shallow depths in the mantle to be diamondiferous.

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APPENDIX 1

Registered localities with occurrences of kimberlite, lamproite, ultramafic lamprophyre and related rocks in Greenland.

Map sheets are Geodetic Institute's 1:250 000 topographic maps. Geographical coordinates are given in decimal degrees. Minus signs indicate western longitude.

Map sheet 60V1 Julianehåb

Loc. no.		Lat. (N)	Long. (W)	Rock type
60V1	1	60.86382	-46.15289	Ultramafic lamprophyre
60V1	2	60.92615	-46.07998	Pyroxenite
60V1	3	60.92317	-46.07484	Pyroxenite
60V1	4	60.92128	-46.07265	Pyroxenite
60V1	5	60.91650	-46.06588	Pyroxenite
60V1	6	60.91023	-46.04180	Pyroxenite
60V1	7	60.89615	-46.25105	Pyroxenite
60V1	8	60.90782	-46.19011	Pyroxenite
60V1	9	60.91457	-46.20370	Ultramafic lamprophyre
60V1	10	60.90751	-46.17130	Ultramafic lamprophyre
60V1	11	60.90508	-46.17022	Ultramafic lamprophyre
60V1	12	60.88601	-46.08321	Ultramafic lamprophyre

Map sheet 60V2 Nanortalik

Loc. no.		Lat. (N)	Long. (W)	Rock type
60V2	1	60.97183	-45.11909	Ultramafic lamprophyre
60V2	2	60.96815	-45.11978	Ultramafic lamprophyre
60V2	3	60.96379	-45.10033	Ultramafic lamprophyre
60V2	4	60.96002	-45.10306	Ultramafic lamprophyre

Map sheet 61V1 Ivigtut

Loc. no.		Lat. (N)	Long. (W)	Rock type
61V1	1	61.36614	-48.19861	Kimberlite
61V1	2	61.37225	-48.19836	Kimberlite
61V1	3	61.37838	-48.19886	Kimberlite
61V1	4	61.38233	-48.19712	Kimberlite
61V1	5	61.38691	-48.19520	Kimberlite
61V1	6	61.38756	-48.20756	Kimberlite
61V1	7	61.38220	-48.21811	Kimberlite
61V1	8	61.37544	-48.21201	Kimberlite
61V1	9	61.37259	-48.22009	Kimberlite
61V1	10	61.40201	-48.27305	Kimberlite
61V1	11	61.41293	-48.25063	Kimberlite
61V1	12	61.42056	-48.24362	Kimberlite
61V1	13	61.42442	-48.24527	Kimberlite
61V1	14	61.42714	-48.25369	Kimberlite
61V1	15	61.43199	-48.24801	Kimberlite
61V1	16	61.44597	-48.23079	Kimberlite
61V1	17	61.45057	-48.23657	Kimberlite
61V1	18	61.45016	-48.25010	Kimberlite
61V1	19	61.43526	-48.26394	Kimberlite
61V1	20	61.42508	-48.29988	Kimberlite
61V1	21	61.42078	-48.30967	Kimberlite
61V1	22	61.54172	-48.17663	Kimberlite
61V1	23	61.53792	-48.16480	Kimberlite
61V1	24	61.54207	-48.13142	Kimberlite
61V1	25	61.54857	-48.13984	Kimberlite
61V1	26	61.55263	-48.14771	Kimberlite
61V1	27	61.98607	-49.68454	Lamprophyre
61V1	28	61.94991	-49.55439	Lamprophyre

61V1	29	61.93059	-49.64781	Ultramafic lamprophyre
61V1	30	61.93146	-49.60477	Ultramafic lamprophyre
61V1	31	61.91416	-49.64803	Ultramafic lamprophyre
61V1	32	61.91667	-49.62385	Ultramafic lamprophyre
61V1	33	61.90402	-49.65205	Ultramafic lamprophyre
61V1	34	61.90428	-49.62788	Ultramafic lamprophyre
61V1	35	61.91391	-49.55304	Ultramafic lamprophyre
61V1	36	61.89757	-49.66614	Ultramafic lamprophyre
61V1	37	61.89353	-49.65759	Ultramafic lamprophyre
61V1	38	61.88787	-49.65740	Ultramafic lamprophyre
61V1	39	61.88804	-49.64371	Ultramafic lamprophyre
61V1	40	61.88678	-49.63230	Ultramafic lamprophyre
61V1	41	61.87969	-49.63498	Ultramafic lamprophyre
61V1	42	61.89304	-49.60755	Ultramafic lamprophyre
61V1	43	61.89007	-49.59729	Ultramafic lamprophyre
61V1	44	61.89115	-49.58892	Ultramafic lamprophyre
61V1	45	61.89994	-49.59116	Ultramafic lamprophyre
61V1	46	61.89957	-49.57214	Ultramafic lamprophyre
61V1	47	61.89723	-49.56397	Ultramafic lamprophyre
61V1	48	61.88548	-49.57030	Ultramafic lamprophyre
61V1	49	61.88224	-49.56955	Ultramafic lamprophyre
61V1	50	61.87910	-49.56444	Ultramafic lamprophyre
61V1	51	61.86616	-49.55575	Ultramafic lamprophyre
61V1	52	61.86337	-49.54816	Ultramafic lamprophyre
61V1	53	61.85898	-49.55255	Ultramafic lamprophyre
61V1	54	61.85224	-49.54689	Ultramafic lamprophyre
61V1	55	61.85249	-49.53719	Ultramafic lamprophyre
61V1	56	61.86281	-49.46663	Ultramafic lamprophyre
61V1	57	61.85957	-49.46153	Ultramafic lamprophyre
61V1	58	61.84009	-49.46548	Ultramafic lamprophyre
61V1	59	61.83572	-49.43020	Ultramafic lamprophyre
61V1	60	61.83131	-49.42264	Ultramafic lamprophyre
61V1	61	61.82213	-49.41532	Ultramafic lamprophyre
61V1	62	61.81714	-49.43093	Ultramafic lamprophyre
61V1	63	61.19313	-48.37544	Ultramafic lamprophyre
61V1	64	61.18215	-48.47606	Ultramafic lamprophyre
61V1	65	61.16966	-48.48465	Ultramafic lamprophyre
61V1	66	61.17100	-48.47460	Ultramafic lamprophyre

Map sheet 61V3 Narssarssuaq

Loc.	no.	Lat. (N)	Long. (W)	Rock type
61V3	1	61.14000	-45.53000	Alkaline-ultramafic/carbonatitic rock
61V3	2	61.15740	-45.57499	Alkaline-ultramafic/carbonatitic rock
61V3	3	61.16672	-45.58735	Alkaline-ultramafic/carbonatitic rock
61V3	4	61.17155	-45.55202	Alkaline-ultramafic/carbonatitic rock
61V3	5	61.18559	-45.53927	Alkaline-ultramafic/carbonatitic rock
61V3	6	61.18710	-45.55195	Alkaline-ultramafic/carbonatitic rock
61V3	7	61.19523	-45.53227	Alkaline-ultramafic/carbonatitic rock
61V3	8	61.20093	-45.56063	Alkaline-ultramafic/carbonatitic rock
61V3	9	61.19142	-45.63656	Alkaline-ultramafic/carbonatitic rock
61V3	10	61.19711	-45.63065	Alkaline-ultramafic/carbonatitic rock
61V3	11	61.19899	-45.62583	Alkaline-ultramafic/carbonatitic rock
61V3	12	61.20123	-45.63516	Alkaline-ultramafic/carbonatitic rock
61V3	13	61.20516	-45.60166	Alkaline-ultramafic/carbonatitic rock
61V3	14	61.20885	-45.60169	Alkaline-ultramafic/carbonatitic rock
61V3	15	61.21929	-45.60235	Alkaline-ultramafic/carbonatitic rock
61V3	16	61.22937	-45.63340	Alkaline-ultramafic/carbonatitic rock
61V3	17	61.20897	-45.66693	Alkaline-ultramafic/carbonatitic rock
61V3	18	61.18616	-45.45100	Alkaline-ultramafic/carbonatitic rock
61V3	19	61.18966	-45.45642	Alkaline-ultramafic/carbonatitic rock
61V3	20	61.18932	-45.43686	Alkaline-ultramafic/carbonatitic rock

61V3	21	61.19202	-45.43333	Alkaline-ultramafic/carbonatitic rock
61V3	22	61.19652	-45.43353	Alkaline-ultramafic/carbonatitic rock
61V3	23	61.21275	-45.47628	Alkaline-ultramafic/carbonatitic rock
61V3	24	61.21412	-45.45485	Alkaline-ultramafic/carbonatitic rock
61V3	25	61.21341	-45.44684	Alkaline-ultramafic/carbonatitic rock
61V3	26	61.21714	-45.39427	Alkaline-ultramafic/carbonatitic rock
61V3	27	61.25725	-45.36787	Alkaline-ultramafic/carbonatitic rock
61V3	28	61.26088	-45.44050	Alkaline-ultramafic/carbonatitic rock
61V3	29	61.14664	-45.22929	Ultramafic lamprophyre
61V3	30	61.14816	-45.20883	Ultramafic lamprophyre
61V3	31	61.14394	-45.21107	Ultramafic lamprophyre
61V3	32	61.10555	-45.02561	Ultramafic lamprophyre
61V3	33	61.10209	-45.04961	Ultramafic lamprophyre
61V3	34	61.09902	-45.04313	Ultramafic lamprophyre
61V3	35	61.09603	-45.03294	Ultramafic lamprophyre
61V3	36	61.12508	-44.89718	Ultramafite
61V3	37	61.15239	-44.83541	Ultramafite
61V3	38	61.14928	-44.82244	Ultramafite
61V3	39	61.03067	-45.39584	Ultramafic lamprophyre
61V3	40	61.00884	-45.36690	Ultramafic lamprophyre
61V3	41	61.25629	-45.18563	Ultramafic lamprophyre
61V3	42	61.35522	-44.81823	Ultramafic lamprophyre
61V3	43	61.36016	-44.77068	Ultramafic lamprophyre
61V3	44	61.37275	-44.78853	Ultramafic lamprophyre

Map sheet 62V1 Frederikshåbs Isblink

Loc.	no.	Lat. (N)	Long. (W)	Rock type
62V1	1	62.04240	-48.86500	Kimberlite
62V1	2	62.87630	-50.53870	Monchiquite
62V1	3	62.73370	-50.37830	Monchiquite
62V1	4	62.72400	-50.38280	Olivine monchiquite
62V1	5	62.70070	-50.35490	Olivine monchiquite
62V1	6	62.67650	-50.40140	Olivine monchiquite
62V1	7	62.67350	-50.40230	Olivine monchiquite
62V1	8	62.66650	-50.35350	Olivine monchiquite
62V1	9	62.64500	-50.34090	Olivine monchiquite
62V1	10	62.65660	-50.30350	Monchiquite
62V1	11	62.65770	-50.27810	Olivine monchiquite
62V1	12	62.74060	-50.18000	Monchiquite
62V1	13	62.72670	-50.10940	Alnöite
62V1	14	62.70480	-50.12110	Aillikite
62V1	15	62.70430	-50.10160	Monchiquite
62V1	16	62.78720	-49.95590	Monchiquite
62V1	17	62.72400	-49.96680	Olivine monchiquite
62V1	18	62.72160	-49.92540	Aillikite
62V1	19	62.69960	-49.87850	Monchiquite
62V1	20	62.68870	-49.88480	Aillikite
62V1	21	62.66580	-49.83220	Olivine monchiquite to Monchiquite
62V1	22	62.65340	-49.82830	Alnöite
62V1	23	62.67650	-49.93830	Monchiquite
62V1	24	62.65830	-50.00530	Monchiquite
62V1	25	62.65500	-50.01070	Olivine monchiquite
62V1	26	62.64520	-49.97520	Alnöite
62V1	27	62.63080	-49.97420	Alnöite
62V1	28	62.55240	-50.18450	Olivine monchiquite
62V1	29	62.56757	-49.75950	Alnöite?
62V1	30	62.56560	-49.72840	Olivine monchiquite
62V1	31	62.55293	-49.75380	Monchiquite
62V1	32	62.54617	-49.75700	Monchiquite
62V1	33	62.53294	-49.72900	Olivine monchiquite
62V1	34	62.55546	-49.69720	

62V1	35	62.55715	-49.65650	Alnöite
62V1	36	62.55011	-49.60810	Monchiquite
62V1	37	62.54364	-49.59478	Olivine monchiquite

Map sheet 63V1 Færingehavn

Loc.	no.	Lat. (N)	Long. (W)	Rock type
63V1	1	63.91339	-51.68420	Mica-rich ultramafic lamprophyre
63V1	2	63.91251	-51.60370	Mica-rich ultramafic lamprophyre
63V1	3	63.69713	-51.56980	Aillikite or micaceous kimberlite
63V1	4	63.66667	-51.52230	Carbonate-rich ultramafic lamprophyre
63V1	5	63.64830	-51.55870	Mica-rich ultramafic lamprophyre
63V1	6	63.63978	-51.56280	Carbonate-rich ultramafic lamprophyre

Map sheet 63V2 Fiskenæsset

Loc.	no.	Lat. (N)	Long. (W)	Rock type
63V2	1	63.20650	-50.69300	Stream sediment sample. Diamonds
63V2	2	63.21650	-50.66100	Stream sediment sample. Diamonds

Map sheet 65V1 Sukkertoppen

Loc.	no.	Lat. (N)	Long. (W)	Rock type
65V1	1	65.45880	-52.70780	Mica-rich ultramafic lamprophyre
65V1	2	65.39200	-52.40000	Kimberlite
65V1	3	65.35833	-51.88430	Kimberlite
65V1	4	65.30751	-52.30080	Kimberlite
65V1	5	65.30300	-52.26700	Kimberlite and alkali basalt
65V1	6	65.26129	-51.78240	Kimberlite
65V1	7	65.22633	-51.98730	Kimberlite
65V1	8	65.21247	-52.19800	Kimberlite
65V1	9	65.18161	-52.29650	Kimberlite
65V1	10	65.08441	-52.17940	Kimberlite
65V1	11	65.08306	-52.03280	Kimberlite
65V1	12	65.45000	-51.80000	Carbonatitic lamprophyre (kimberlite?)

Map sheet 65V2 Majorqaq

Loc.	no.	Lat. (N)	Long. (W)	Rock type
65V2	1	65.40225	-51.70130	Micaceous lamprophyre (monchiquite)
65V2	2	65.37000	-51.55180	Micaceous lamprophyre (monchiquite)
65V2	3	65.37560	-51.53810	Micaceous lamprophyre (monchiquite)
65V2	4	65.38238	-51.51850	Micaceous lamprophyre (monchiquite)
65V2	5	65.32469	-51.69050	Kimberlite
65V2	6	65.30165	-51.64600	Kimberlite
65V2	7	65.29249	-51.71140	Kimberlite
65V2	8	65.19748	-51.54210	Kimberlite
65V2	9	65.19843	-51.52860	Kimberlite
65V2	10	65.19373	-51.51980	Kimberlite
65V2	11	65.08149	-51.71480	Kimberlite
65V2	12	65.37806	-51.53190	Micaceous lamprophyre (monchiquite)

Map sheet 66V1 Holsteinsborg

Loc.	no.	Lat. (N)	Long. (W)	Rock type
66V1	1	66.97494	-53.78615	Kersantite (kimberlite?)
66V1	2	66.94993	-53.69821	Kimberlite
66V1	3	66.95338	-53.70863	Kimberlite
66V1	4	66.95051	-53.70945	Kimberlite
66V1	5	66.94746	-53.62386	Kersantite (Kimberlite?)
66V1	6	66.88973	-53.45403	Kimberlite
66V1	7	66.86909	-53.60354	Kimberlite
66V1	8	66.86606	-53.59638	Kimberlite
66V1	9	66.86599	-53.59089	Kimberlite
66V1	10	66.86449	-53.58560	Kimberlite
66V1	11	66.86339	-53.56936	Kimberlite

66V1	12	66.86467	-53.56230	Kimberlite
66V1	13	66.86118	-53.55674	Kimberlite
66V1	14	66.84871	-53.57425	Kimberlite
66V1	15	66.84592	-53.57602	Kimberlite
66V1	16	66.84385	-53.57825	Kimberlite
66V1	17	66.81132	-53.49927	Lamproite
66V1	18	66.82512	-53.42087	Lamprophyre
66V1	19	66.85797	-53.43720	Kimberlite
66V1	20	66.89676	-53.09638	
66V1	21	66.90891	-52.91493	Kersantite
66V1	22	66.89522	-52.87106	Kersantite
66V1	23	66.90794	-52.61535	Lamprophyre
66V1	24	66.94231	-52.59535	Lamprophyre
66V1	25	66.94004	-52.58667	Lamprophyre
66V1	26	66.85922	-52.50783	Lamproite
66V1	27	66.85850	-52.39890	
66V1	28	66.85345	-52.39673	
66V1	29	66.82049	-52.29080	Kersantite
66V1	30	66.81637	-52.81604	Lamproite
66V1	31	66.82366	-52.82784	
66V1	32	66.82354	-52.88874	
66V1	33	66.80571	-52.84551	
66V1	34	66.80385	-52.88381	
66V1	35	66.77204	-52.78653	Lamproite
66V1	36	66.76504	-52.79501	
66V1	37	66.75715	-52.80599	
66V1	38	66.75338	-52.82308	Lamproite
66V1	39	66.75097	-52.83082	Lamproite
66V1	40	66.74489	-52.77903	Lamproite
66V1	41	66.78501	-53.01710	
66V1	42	66.77656	-53.03166	
66V1	43	66.77224	-53.05965	
66V1	44	66.73557	-53.08408	Kersantite
66V1	45	66.73234	-53.17701	Lamproite
66V1	46	66.73581	-53.19772	
66V1	47	66.74393	-53.28872	
66V1	48	66.73887	-53.30662	
66V1	49	66.72577	-53.52702	Lamproite
66V1	50	66.71229	-53.47156	Lamproite
66V1	51	66.73043	-53.47896	Lamproite
66V1	52	66.73632	-53.46135	Lamprophyre
66V1	53	66.73455	-53.45540	Lamprophyre
66V1	54	66.73591	-53.44907	Lamprophyre
66V1	55	66.73266	-53.45537	Lamproite
66V1	56	66.72692	-53.44935	Lamproite
66V1	57	66.72530	-53.45387	Lamproite
66V1	58	66.68335	-53.37892	Lamproite
66V1	59	66.69755	-53.30041	Lamproite
66V1	60	66.70563	-53.25420	Lamproite
66V1	61	66.69958	-53.21261	Kersantite
66V1	62	66.71443	-53.11783	Lamproite
66V1	63	66.71383	-53.07605	Lamproite?
66V1	64	66.67592	-53.00836	
66V1	65	66.57705	-53.44769	Lamproite
66V1	66	66.57770	-53.43957	Lamproite
66V1	67	66.58119	-53.44257	Lamprophyre
66V1	68	66.57587	-53.41989	Micaceous lamprophyre
66V1	69	66.57069	-53.40648	Lamprophyre
66V1	70	66.56519	-53.41542	Lamproite
66V1	71	66.56595	-53.36352	Kersantite
66V1	72	66.56693	-53.32810	Kersantite

66V1	73	66.59949	-53.38889	
66V1	74	66.59282	-53.32145	
66V1	75	66.56274	-52.71559	
66V1	76	66.55489	-52.65408	
66V1	77	66.33045	-52.67325	Kimberlite
66V1	78	66.46560	-52.35684	Kimberlite
66V1	79	66.47159	-52.28834	
66V1	80	66.53047	-52.32401	Kimberlite
66V1	81	66.51830	-52.13263	Kimberlite
66V1	82	66.66330	-51.96102	
66V1	83	66.64575	-51.82927	
66V1	84	66.45746	-51.93368	Kimberlite and lamproite
66V1	85	66.41930	-51.83769	Kimberlite
66V1	86	66.41857	-51.83548	Kimberlite
66V1	87	66.41816	-51.84088	Kimberlite
66V1	88	66.41540	-51.83203	Kimberlite
66V1	89	66.41726	-51.83015	Kimberlite
66V1	90	66.41223	-51.85260	Kimberlite
66V1	91	66.41135	-51.86856	Kimberlite
66V1	92	66.50207	-51.83218	Kimberlite
66V1	93	66.50130	-51.80227	Kimberlite
66V1	94	66.49819	-51.78877	Kimberlite
66V1	95	66.49173	-51.77919	Kimberlite
66V1	96	66.50174	-51.77703	Kimberlite
66V1	97	66.49640	-51.75577	Kimberlite
66V1	98	66.47288	-52.04006	Kimberlite
66V1	99	66.49813	-51.85271	Stream sand/gravel. Diamond
66V1	100	66.48889	-51.81803	Stream sand/gravel. Diamond
66V1	101	66.85978	-53.49412	Kimberlite
66V1	102	66.60897	-53.40623	
66V1	103	66.71953	-52.62095	Kimberlite

Map sheet 66V2 Søndre Strømfjord øst

Loc.	no.	Lat. (N)	Long. (W)	Rock type
66V2	1	66.96943	-50.96285	Kimberlite
66V2	2	66.86061	-50.79300	Kimberlite
66V2	3	66.70634	-51.50087	Kimberlite
66V2	4	66.70573	-51.44595	Kimberlite
66V2	5	66.72626	-51.40278	Kimberlite
66V2	6	66.71734	-51.18944	Kimberlite
66V2	7	66.71451	-50.47870	Kimberlite
66V2	8	66.60783	-50.60221	Kimberlite
66V2	9	66.63147	-50.40848	Kimberlite
66V2	10	66.56925	-51.52632	Kimberlite
66V2	11	66.49137	-51.72888	Kimberlite
66V2	12	66.49861	-51.66840	Kimberlite
66V2	13	66.49379	-51.66245	Kimberlite
66V2	14	66.49242	-51.64602	Kimberlite
66V2	15	66.47725	-51.67305	Kimberlite
66V2	16	66.47451	-51.63730	Kimberlite
66V2	17	66.47532	-51.61105	Kimberlite
66V2	18	66.47262	-51.52975	Kimberlite
66V2	19	66.46850	-51.53214	Kimberlite
66V2	20	66.47113	-51.51962	Kimberlite
66V2	21	66.46530	-51.52041	Kimberlite
66V2	22	66.49701	-51.56053	Kimberlite
66V2	23	66.50179	-51.52691	Kimberlite
66V2	24	66.50620	-51.47570	Kimberlite
66V2	25	66.50852	-51.42871	Kimberlite
66V2	26	66.50909	-51.38820	Kimberlite
66V2	27	66.50976	-51.37583	Kimberlite

66V2	28	66.50946	-51.35489	Kimberlite
66V2	29	66.52656	-51.34100	Kimberlite
66V2	30	66.53123	-51.27146	Kimberlite
66V2	31	66.50233	-51.29985	Kimberlite
66V2	32	66.51452	-51.27279	Kimberlite
66V2	33	66.51008	-51.24730	Kimberlite
66V2	34	66.50768	-51.23196	Kimberlite
66V2	35	66.50966	-51.18673	Shonkinite
66V2	36	66.56143	-51.09886	Kimberlite
66V2	37	66.55623	-51.09589	Kimberlite
66V2	38	66.55282	-51.09655	Kimberlite
66V2	39	66.54921	-51.10170	Kimberlite
66V2	40	66.54417	-51.10866	Shonkinite, kimberlite, basanite
66V2	41	66.53968	-51.11494	Shonkinite
66V2	42	66.54393	-51.09378	Kimberlite
66V2	43	66.53996	-51.09803	Shonkinite
66V2	44	66.53500	-51.11603	Kimberlite
66V2	45	66.53258	-51.11555	Kimberlite
66V2	46	66.53574	-51.10003	Kimberlite
66V2	47	66.53834	-51.10568	Shonkinite
66V2	48	66.54983	-51.00385	Kimberlite
66V2	49	66.55272	-50.99687	Shonkinite
66V2	50	66.55272	-50.98763	Kimberlite
66V2	51	66.53478	-51.14757	Kimberlite
66V2	52	66.52102	-51.15893	Kimberlite
66V2	53	66.51735	-51.15033	Shonkinite
66V2	54	66.51458	-51.14469	Kimberlite
66V2	55	66.51827	-51.13571	Shonkinite
66V2	56	66.51316	-51.13049	Shonkinite
66V2	57	66.51983	-51.11410	Kimberlite
66V2	58	66.51832	-51.09900	Kimberlite
66V2	59	66.51175	-51.11381	Kimberlite
66V2	60	66.51131	-51.09625	Kimberlite
66V2	61	66.51025	-51.08094	Kimberlite
66V2	62	66.50847	-51.07485	Kimberlite
66V2	63	66.50183	-51.05995	Kimberlite
66V2	64	66.50537	-51.01248	Kimberlite
66V2	65	66.50664	-50.99944	Kimberlite and shonkinite
66V2	66	66.50897	-50.98841	Kimberlite
66V2	67	66.50718	-50.95937	Kimberlite
66V2	68	66.51078	-50.94565	Kimberlite
66V2	69	66.51132	-50.93529	Kimberlite
66V2	70	66.51114	-50.92944	Shonkinite
66V2	71	66.51150	-50.92426	Kimberlite
66V2	72	66.51159	-50.91097	Kimberlite
66V2	73	66.51230	-50.89702	Kimberlite
66V2	74	66.51186	-50.88508	Kimberlite
66V2	75	66.50557	-50.87474	Kimberlite
66V2	76	66.50985	-50.81778	Kimberlite
66V2	77	66.50591	-50.82838	Kimberlite
66V2	78	66.50178	-50.84166	Kimberlite
66V2	79	66.49563	-50.83537	Kimberlite
66V2	80	66.49257	-50.82506	Kimberlite
66V2	81	66.48852	-50.81635	Kimberlite
66V2	82	66.48635	-50.80739	Kimberlite
66V2	83	66.48329	-50.80001	Kimberlite
66V2	84	66.48130	-50.79106	Kimberlite
66V2	85	66.44702	-51.09815	Kimberlite
66V2	86	66.44191	-51.08402	Kimberlite
66V2	87	66.44210	-51.07079	Kimberlite
66V2	88	66.43509	-51.06788	Kimberlite

66V2	89	66.47901	-51.38058	Lamprophyre
66V2	90	66.46674	-51.31469	Kimberlite
66V2	91	66.46151	-51.38328	Kimberlite
66V2	92	66.45472	-51.37243	Kimberlite
66V2	93	66.44481	-51.29295	Kimberlite
66V2	94	66.43972	-51.27677	Kimberlite
66V2	95	66.44333	-51.31804	Kimberlite
66V2	96	66.44075	-51.31129	Kimberlite
66V2	97	66.43833	-51.30477	Kimberlite
66V2	98	66.43565	-51.29713	Kimberlite
66V2	99	66.43396	-51.28860	Kimberlite
66V2	100	66.43147	-51.33294	Kimberlite
66V2	101	66.43126	-51.34728	Kimberlite
66V2	102	66.42390	-51.35033	Kimberlite
66V2	103	66.42647	-51.36671	Kimberlite
66V2	104	66.42325	-51.36981	Kimberlite
66V2	105	66.42100	-51.37135	Kimberlite
66V2	106	66.41652	-51.37085	Kimberlite
66V2	107	66.42334	-51.36175	Kimberlite
66V2	108	66.42111	-51.36239	Kimberlite
66V2	109	66.41679	-51.36368	Kimberlite
66V2	110	66.41414	-51.39321	Kimberlite
66V2	111	66.41153	-51.40101	Kimberlite
66V2	112	66.40944	-51.40546	Kimberlite
66V2	113	66.40603	-51.41280	Kimberlite
66V2	114	66.40008	-51.42212	Kimberlite
66V2	115	66.36930	-51.50170	Kimberlite
66V2	116	66.35980	-51.34090	Kimberlite
66V2	117	66.35097	-51.36403	Kimberlite
66V2	118	66.34782	-51.37158	Kimberlite
66V2	119	66.34574	-51.37670	Kimberlite
66V2	120	66.33979	-51.39113	Kimberlite
66V2	121	66.33441	-51.39464	Kimberlite
66V2	122	66.33436	-51.37321	Kimberlite
66V2	123	66.32836	-51.37024	Kimberlite
66V2	124	66.32667	-51.36464	Kimberlite
66V2	125	66.32300	-51.36147	Kimberlite
66V2	126	66.32138	-51.36168	Kimberlite
66V2	127	66.31708	-51.35806	Kimberlite
66V2	128	66.08249	-51.70958	Kimberlite

Map sheet 67V1 Nordre Strømfjord vest

Loc.	no.	Lat. (N)	Long. (W)	Rock type
67V1	1	67.64964	-53.00700	Lamproite
67V1	2	67.51254	-53.67060	Lamproite
67V1	3	67.51344	-53.60510	Lamproite
67V1	4	67.50630	-53.62620	Lamproite
67V1	5	67.44642	-53.72380	Lamproite
67V1	6	67.26004	-53.43060	Kimberlite
67V1	6	67.26116	-53.41620	Kimberlite
67V1	7	67.21428	-53.81500	Kimberlite
67V1	8	67.21763	-53.65320	Lamproite
67V1	9	67.20646	-53.56650	Kimberlite
67V1	10	67.08928	-53.92530	Kimberlite
67V1	11	67.07743	-53.81326	Kimberlite

Map sheet 69V2 Jakobshavn

Loc.	no.	Lat. (N)	Long. (W)	Rock type
69V2	1	69.75745	-50.26024	Ultramafic lamprophyre
69V2	2	69.76267	-50.16750	Ultramafic lamprophyre
69V2	3	69.76006	-50.16886	Ultramafic lamprophyre

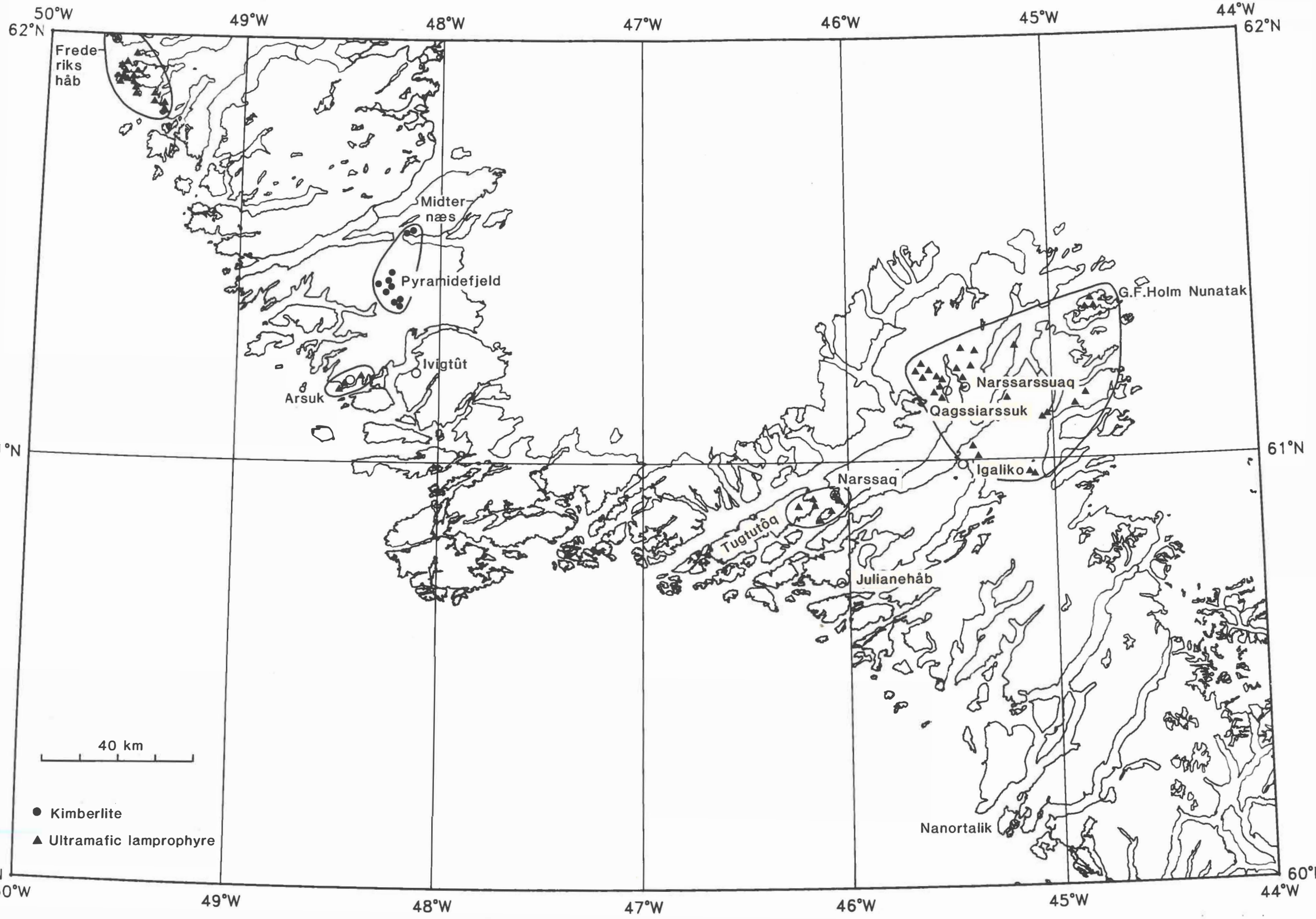
69V2	4	69.75728	-50.16686	Ultramafic lamprophyre
69V2	5	69.75319	-50.21105	Ultramafic lamprophyre
69V2	6	69.75052	-50.22226	Ultramafic lamprophyre
69V2	7	69.74999	-50.16419	Ultramafic lamprophyre
69V2	8	69.74114	-50.14757	Ultramafic lamprophyre
69V2	9	69.75893	-50.36138	Ultramafic lamprophyre
69V2	10	69.72035	-50.38246	Ultramafic lamprophyre
69V2	11	69.71435	-50.30308	Ultramafic lamprophyre
69V2	12	69.71385	-50.24821	Ultramafic lamprophyre
69V2	13	69.71671	-50.20931	Ultramafic lamprophyre
69V2	14	69.71422	-50.15837	Ultramafic lamprophyre
69V2	15	69.68918	-50.43826	Ultramafic lamprophyre
69V2	16	69.68951	-50.41628	Ultramafic lamprophyre
69V2	17	69.67659	-50.42447	Ultramafic lamprophyre
69V2	18	69.69838	-50.40219	Ultramafic lamprophyre
69V2	19	69.69933	-50.38304	Ultramafic lamprophyre
69V2	20	69.69912	-50.36674	Ultramafic lamprophyre
69V2	21	69.69785	-50.36081	Ultramafic lamprophyre
69V2	22	69.69200	-50.35677	Ultramafic lamprophyre
69V2	23	69.69271	-50.31047	Ultramafic lamprophyre
69V2	24	69.68820	-50.30124	Ultramafic lamprophyre
69V2	25	69.69011	-50.27561	Ultramafic lamprophyre
69V2	26	69.68895	-50.17893	Ultramafic lamprophyre
69V2	27	69.67386	-50.24261	Ultramafic lamprophyre
69V2	28	69.66565	-50.30193	Ultramafic lamprophyre
69V2	29	69.65954	-50.33587	Ultramafic lamprophyre
69V2	30	69.65888	-50.28244	Ultramafic lamprophyre
69V2	31	69.63975	-50.18350	Ultramafic lamprophyre
69V2	32	69.63969	-50.16442	Ultramafic lamprophyre
69V2	33	69.61607	-50.38584	Ultramafic lamprophyre
69V2	34	69.61625	-50.34178	Ultramafic lamprophyre
69V2	35	69.62726	-50.27997	Ultramafic lamprophyre
69V2	36	69.62179	-50.24967	Ultramafic lamprophyre
69V2	37	69.61947	-50.25384	Ultramafic lamprophyre
69V2	38	69.61410	-50.23077	Ultramafic lamprophyre
69V2	39	69.61296	-50.20735	Ultramafic lamprophyre
69V2	40	69.61409	-50.26168	Ultramafic lamprophyre
69V2	41	69.61540	-50.28073	Ultramafic lamprophyre
69V2	42	69.61039	-50.28932	Ultramafic lamprophyre
69V2	43	69.60308	-50.27505	Ultramafic lamprophyre
69V2	44	69.62098	-50.28835	Ultramafic lamprophyre
69V2	45	69.77509	-50.54492	Ultramafic lamprophyre
69V2	46	69.76321	-50.52711	Ultramafic lamprophyre
69V2	47	69.76431	-50.54941	Ultramafic lamprophyre
69V2	48	69.76712	-50.57197	Ultramafic lamprophyre
69V2	49	69.76139	-50.60547	Ultramafic lamprophyre
69V2	50	69.76697	-50.63607	Ultramafic lamprophyre
69V2	51	69.73842	-50.69862	Ultramafic lamprophyre
69V2	52	69.72450	-50.69448	Ultramafic lamprophyre
69V2	53	69.72998	-50.72401	Ultramafic lamprophyre
69V2	54	69.64068	-50.63751	Ultramafic lamprophyre
69V2	55	69.63511	-50.62179	Ultramafic lamprophyre
69V2	56	69.77703	-50.63526	Lamproite
69V2	57	69.91269	-50.45973	Ultramafic lamprophyre
69V2	58	69.90372	-51.33778	Ultramafic lamprophyre
69V2	59	69.76860	-51.06092	Ultramafic lamprophyre

Map sheet 71V1 Svartenhuk Halvø

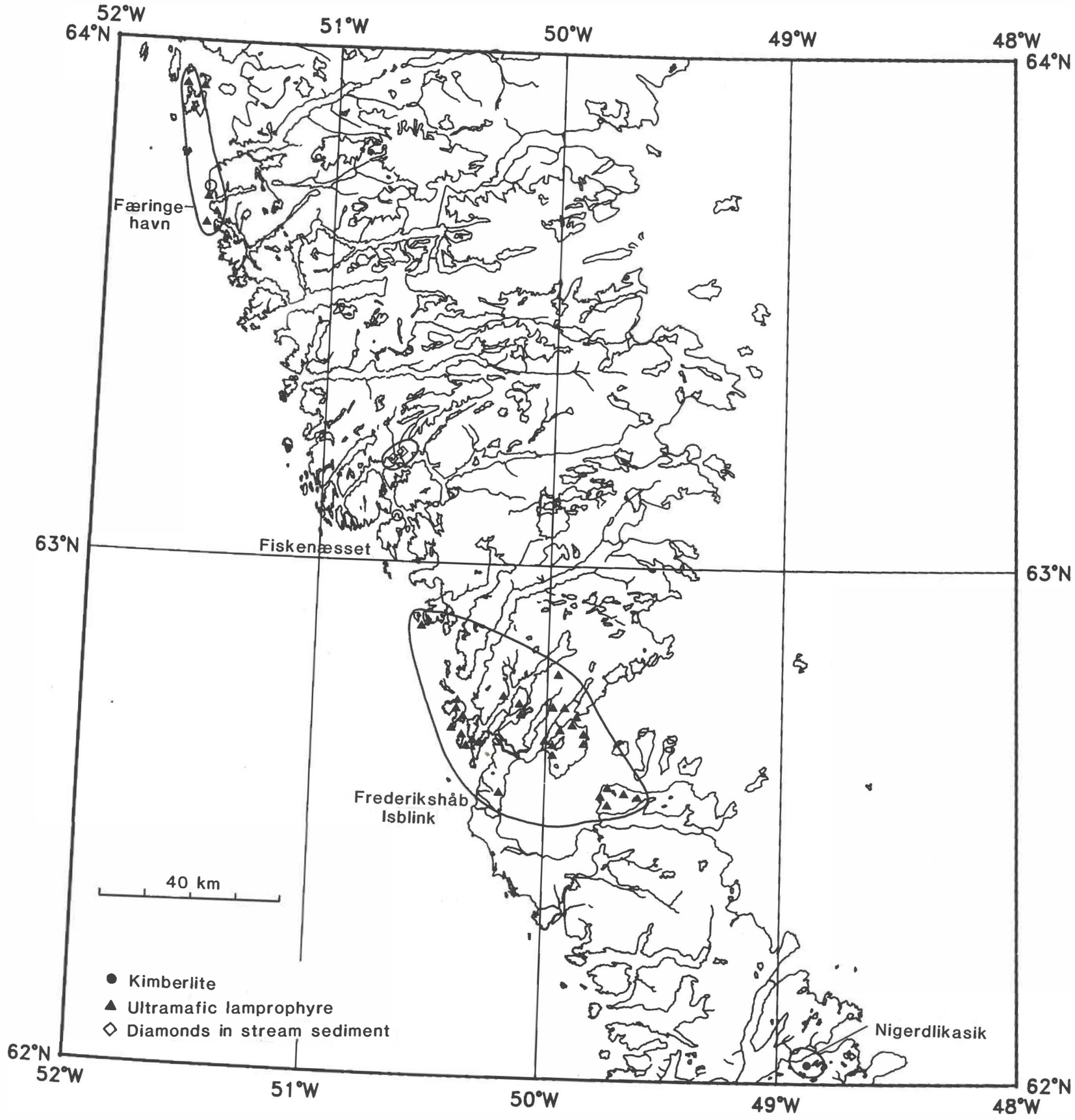
Loc. no.		Lat. (N)	Long. (W)	Rock type
71V1	1	71.90000	-53.20000	Kimberlite, lamprophyre

APPENDIX 2

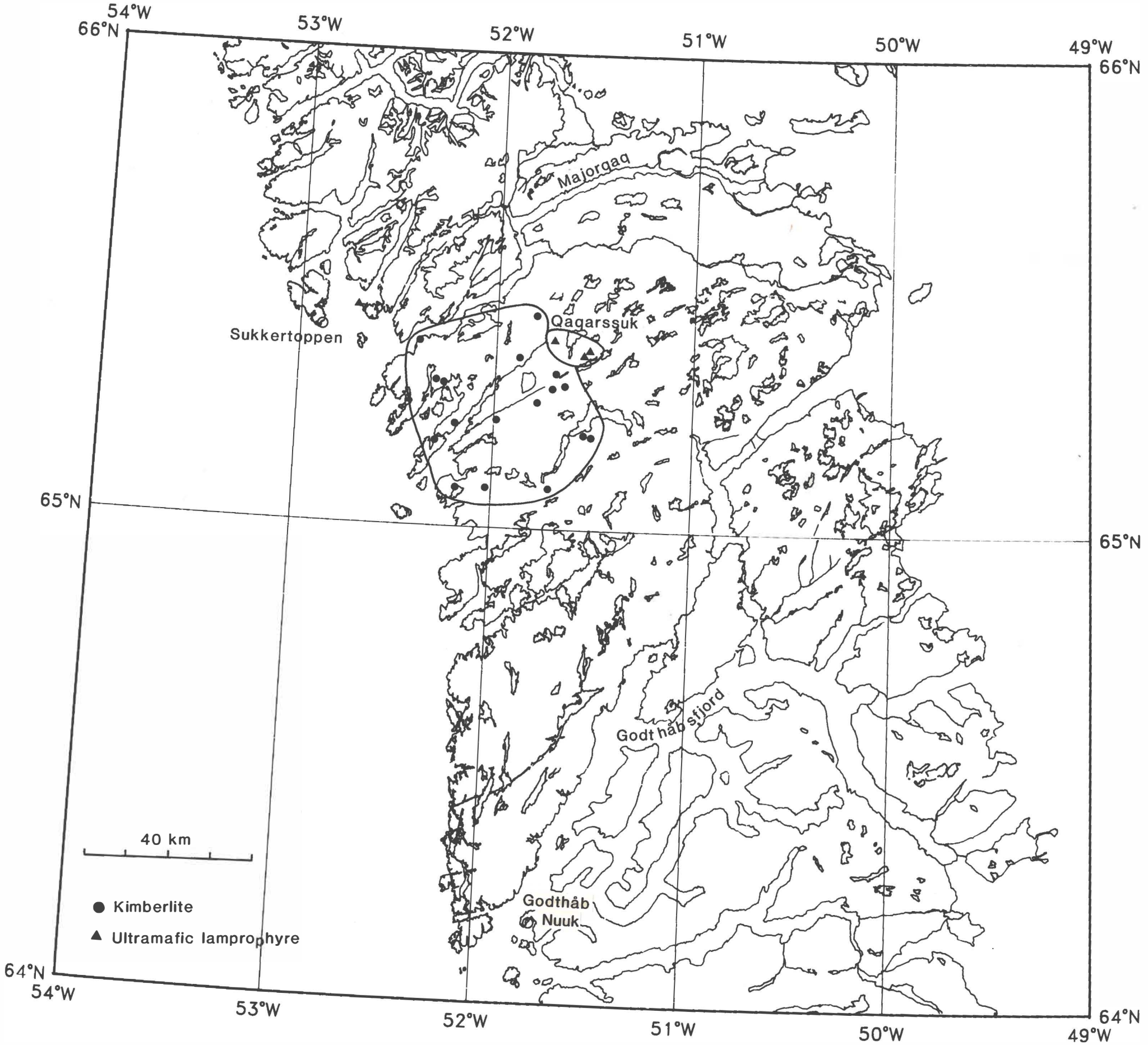
MAPS


50°W
62°N
49°W
48°W
47°W
46°W
45°W
44°W
62°N
Frede-
riks
håb
Midter-
næs
Pyramidefjeld
Ivigtût
Arsuk
G.F.Holm Nunatak
Narssarssuaq
Qagssiarssuk
Igaliko
Narssaq
Tugtutôq
Julianehåb
Nanortalik
61°N
61°N
40 km
Kimberlite
Ultramafic lamprophyre
60°N
50°W
49°W
48°W
47°W
46°W
45°W
44°W
60°N

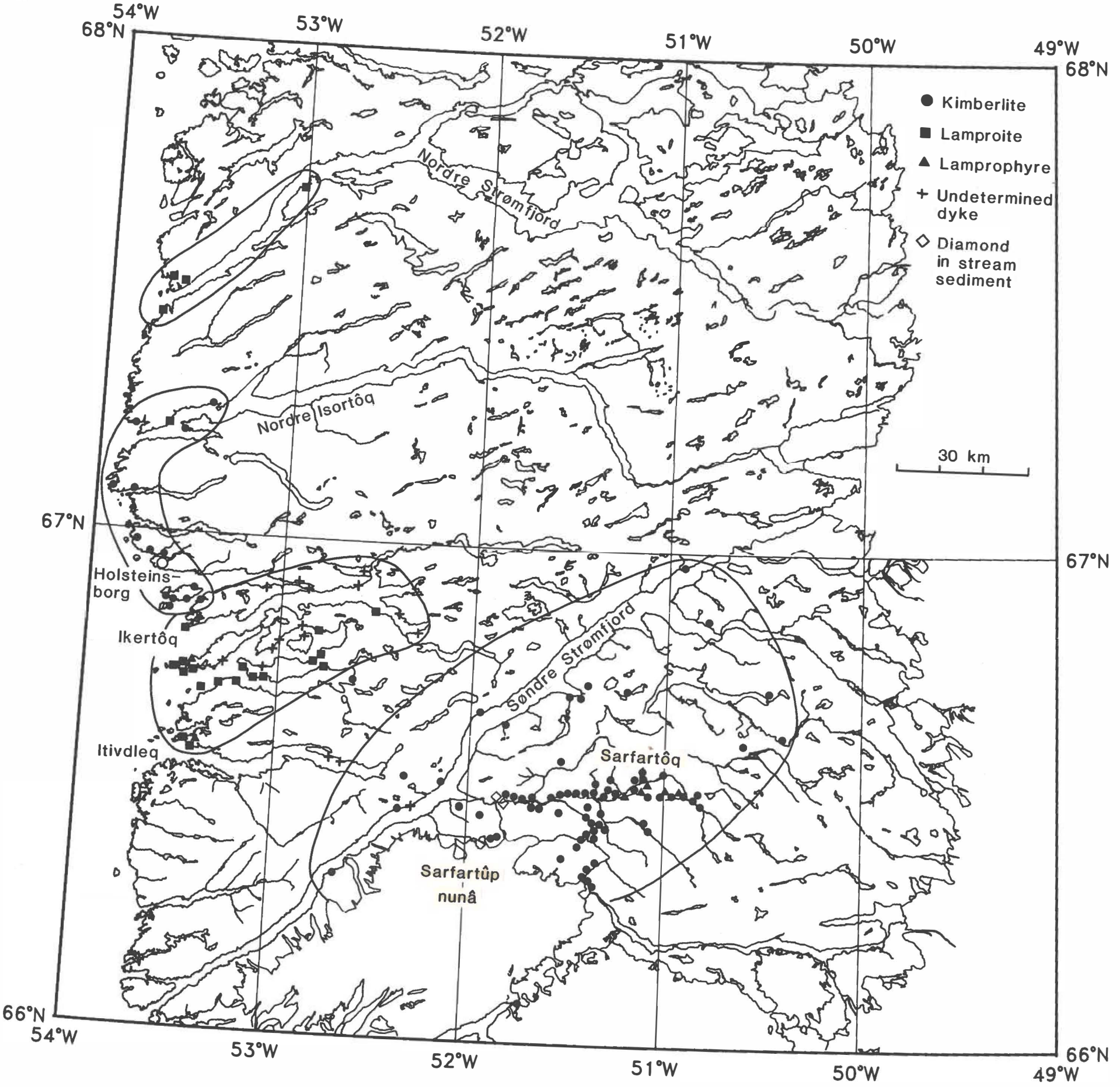
Map 1


52°W
64°N
51°W
50°W
49°W
48°W
64°N
Færinge-
havn
63°N
Fiskenæsset
63°N
Frederikshåb
Isblink
40 km
● Kimberlite
▲ Ultramafic lamprophyre
◇ Diamonds in stream sediment
Nigerdlikasik
62°N
52°W
51°W
50°W
49°W
48°W
62°N

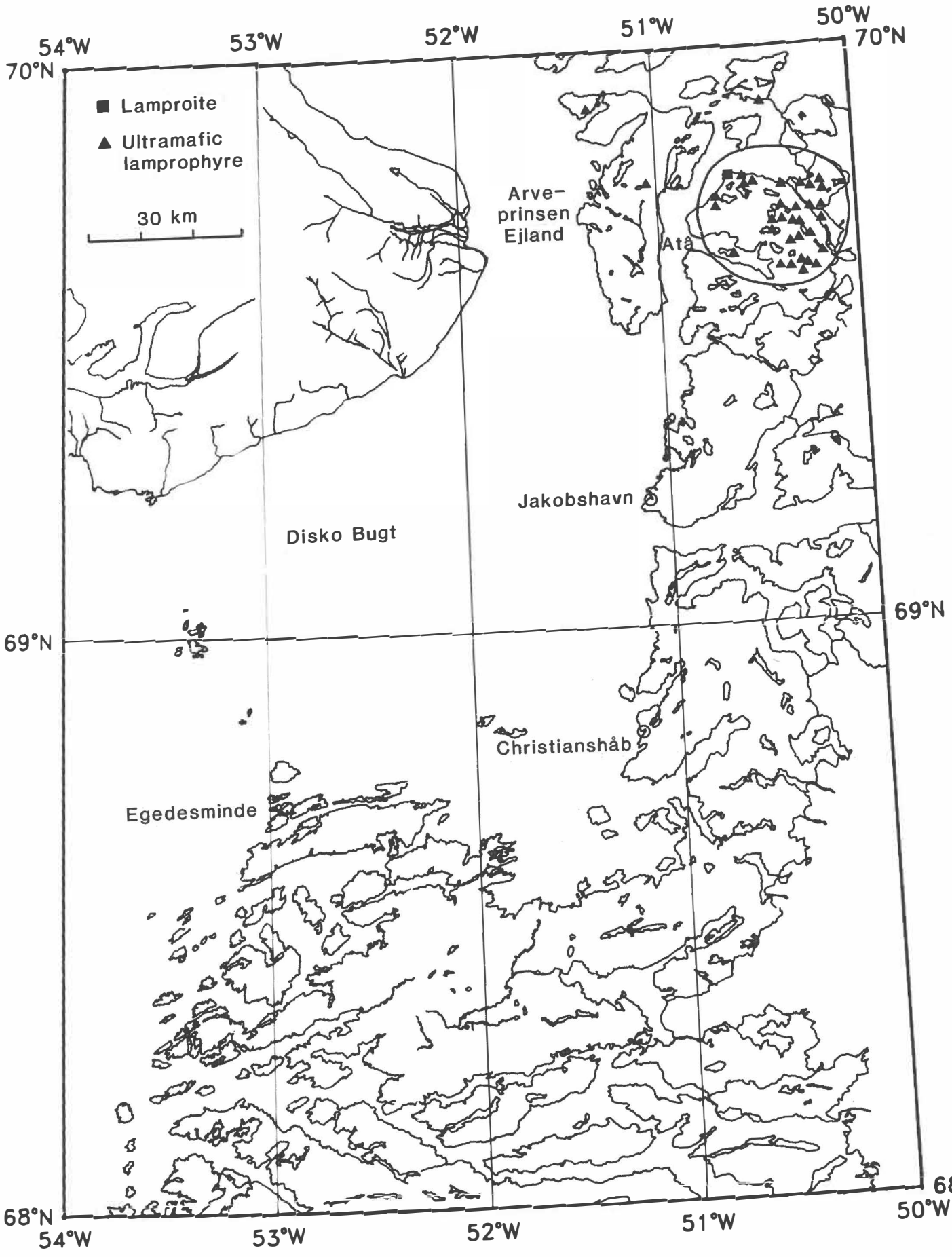
Map 2


54°W
53°W
52°W
51°W
50°W
49°W
66°N
65°N
64°N
Majorqaq
Qagarssuk
Sukkertoppen
Godthåbsfjord
Godthåb
Nuuk
40 km
Kimberlite
Ultramafic lamprophyre

Map 3


54°W
53°W
52°W
51°W
50°W
49°W
68°N
67°N
66°N
Kimberlite
Lamproite
Lamprophyre
Undetermined dyke
Diamond in stream sediment
30 km
Nordre Strømfjord
Nordre Isortôq
Holsteins-borg
Ikertôq
Itivdleq
Søndre Strømfjord
Sarfartôq
Sarfartûp nunâ

Map 4


54°W
53°W
52°W
51°W
50°W
70°N
69°N
68°N
Lamproite
Ultramafic lamprophyre
30 km
Arve-
prinsen
Ejland
Atâ
Jakobshavn
Disko Bugt
Christianshåb
Egedesminde

Map

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