Ore minerals in stream sediments from North Greenland

Martin Ghisler

Open File Series 94/17

December 1994

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Ujarassiortut Kalaallit Nunaanni Misissuisoqarfiat
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ISSN 0903-7322

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Abstract

Ore minerals in stream sediments have been used to determine distinct areas of interest for mineral exploration. Although the sample coverage is not homogeneous, the study indicates areas of interest for base metals along the lineament through Federick E. Hyde Fjord. High concentrations of pyrite with framboidal textures but without accompanying galena or sphalerite may be pathfinders for zinc deposits. Occurrences of pyrrotite is restricted to areas of highest metamorphic grade.

Contents

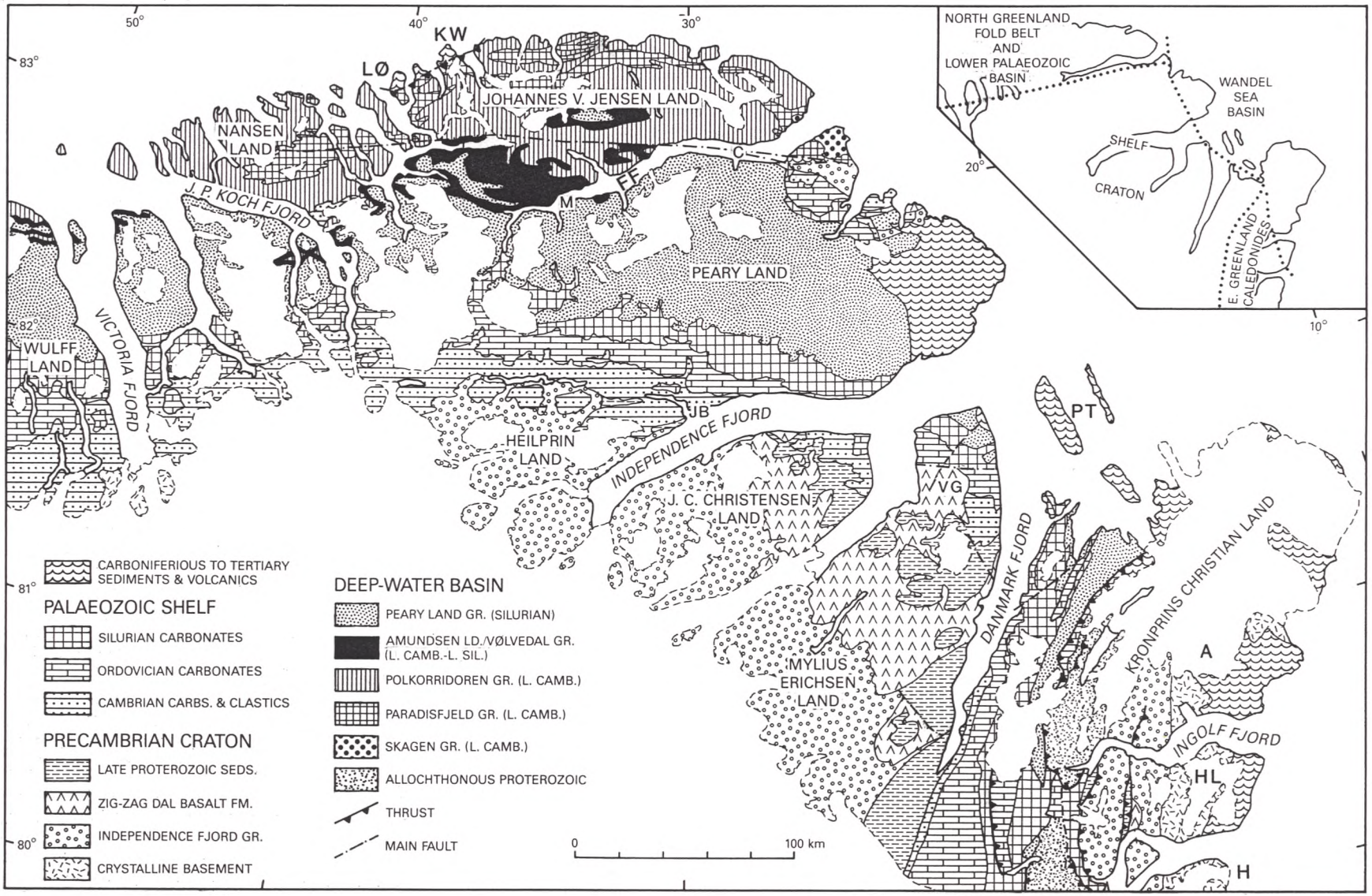


Fig. 1. Simplified geological map of eastern North Greenland, indicating the area under investigation (from Higgins, 1986, fig. 2) A: Amdrup Land, C: Citronen Fjord, FF: Frederick E. Hyde Fjord, H: Hovgaard Ø, HL: Holm Land, JB: Jørgen Brønlund Fjord, KW: Kap Washington, LØ: Lockwood Ø, M: Midtkap, PT: Prinsesse Thyra Ø, VG: Valdemar Glückstadt Land.

Introduction

As part of the regional geological mapping programme in North Greenland (Fig. 1) in the years 1978 to 1980 (Henriksen, 1980, 1981), a great number of stream sediment samples were collected. The purpose was to provide a reconnaissance survey for an evaluation of the mineral potential of the region and to obtain general geochemical data on bedrock composition and element distribution anomalies.

The present report deals with the results of an ore microscopic study of heavy mineral concentrates from the sand fraction of stream sediments. Preliminary results have been presented by Ghisler *et al.* (1979), Ghisler & Stendal (1980) and Ghisler *et al.* (1983). Results from the geochemical investigation of the silt fraction of stream sediments were given by Steenfelt (1980).

Geology

The geology of the major part of the area under consideration is covered by the Geological map of Greenland 1:500 000 Peary Land, sheet no. 8 (1986), and a descriptive text to this map is given by Henriksen (1992). Four detailed map sheets at scale 1:100 000 cover a transept from J. C. Christensen Land in the south to Nansen Land in the north (Special geological maps 1:100 000, North Greenland, 1986).

The investigated area (Fig. 1) includes representatives of nearly all periods of the geological column: remnants of the Precambrian Greenland shield, Proterozoic sediments and volcanics, Palaeozoic and Mesozoic sediments, Tertiary sediments and volcanics and Quaternary deposits (Table 1).

Precambrian crystalline rocks are exposed in the eastern parts of Kronprins Christian Land. They are largely of Early Proterozoic age of formation, but have been reworked during the Caledonian orogeny.

To the south-west, along the Greenland Inland Ice margin, thick sequences of Middle Proterozoic fluvial and lacustrine sediments belonging to the Independence Fjord Group are found. In J. C. Christensen Land and Mylius-Erichsen Land these sediments are overlain by plateau basalts of the Zig-Zag Dal Basalt Formation of Middle Proterozoic age. Probable contemporaneous with these basalts are the numerous dykes and sills which cut the sandstones of the Independence Fjord Group. After a hiatus of more than 400 million

Table 1. Main tectonic-stratigraphic divisions of eastern North Greenland

(after Henriksen, 1992)

Quaternary	Complete glaciation and succeeding deglaciation
Early Tertiary Early Triassic	Wandel Sea Basin area Eurekan orogeny - thrusting in the north Kap Washington Group - volcanic activity NW-SE strike-slip fault belt several local sedimentary basins
Late Permian Early Carboniferous	Wandel Sea Basin area fluviatile and marine sediments
Devonian/Carboniferous	Ellesmerian orogeny - North Greenland fold belt
Silurian	Caledonian orogeny - fold belt in East Greenland
Late Silurian Early Cambrian	Franklinian Basin shelf and deep water sediments
Late Proterozoic	Hagen Fjord Group shelf sediments (600-800 Ma?) and deep water correlatives
Middle Proterozoic	Zig-Zag Dal Basalt Formation plateau basalts (c. 1230 Ma) and basic sills and dykes (Midsommersø Dolerites) Independence Fjord Group continental clastic sediments (c. 1380 Ma)
Early Proterozoic	Orogenic event in the crystalline Greenland shield (c. 1800-2000 Ma)
Archaean	Orogenic event in the crystalline shield (c. 3000 Ma)

years the late Proterozoic Hagen Fjord Group was deposited, in the central part of the region as shelf sediments, to the east as deep water correlatives. To the west, the Moræneső Formation records a Late Proterozoic glacial event, probably of the same age as the Vendian tillites in Scandinavia. The relationship between the Hagen Fjord Group and the Moræneső Formation is unclear.

During Early Palaeozoic time thick sedimentary sequences accumulated across all of North Greenland. Deposition can be divided into a southern shelf succession dominated by carbonates, and a northern deep water succession of mainly siliciclastic sediments. Ellesmerian orogenic deformation in the Devonian – Early Carboniferous mainly affected and metamorphosed the deep water sequence of the northern part of the basin. The deformed region, conventionally known as the North Greenland fold belt, covers all of Johannes V. Jensen Land with the southern limit of folding following approximately the south side of Frederick E. Hyde Fjord.

Late Palaeozoic to Tertiary sediments, known as the Wandel Sea Basin sequence, were deposited across the north-eastern corner of Greenland. Volcanics of varying composition erupted in late Cretaceous time are found at Kap Washington and Lockwood Ø, and intrusions occur in the Midtkap area. New deformation also took place (Eurekan orogeny).

Structually the region is dominated by the N–S trending Caledonian fold belt to the east, and the E–W trending North Greenland fold belt to the north. Prominent lineaments strike east–west in the northern part of the area, north–south in the eastern part, whereas north-west–south-east lineaments characterize the north-eastern area.

Sampling programme and sample preparation

Samples were collected in connection with the geological mapping programme; accordingly there is no systematic coverage. Samples were taken from as many lithological and stratigraphical units as possible. Each sample consisted of 1 litre of unsieved stream sediment. Sampling was undertaken from streams of medium to small size belonging to the local drainage system, as these offer the best possibility for correlation to a specific source area.

Duplicate samples were taken at 47 localities within 10–100 m distance from each other to evaluate the significance of variation. A total of 431 samples were collected at 384 different localities.

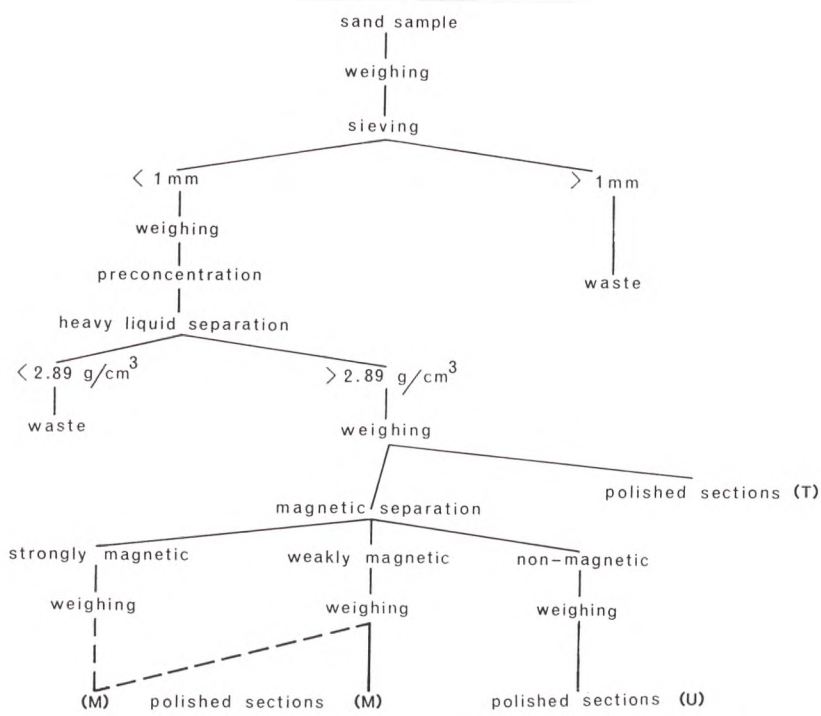


Fig. 2. Flow sheet showing the laboratory procedure for the stream sediment samples and the preparation of polished sections.

In the laboratory in Copenhagen the samples were sieved through a 1 mm screen (flow sheet Fig. 2). The minus 1 mm fraction was preconcentrated by hand with a pan ("chapeau chinois") and further separated by heavy liquid (bromoform d = 2.89 g/cm^3). The heavy mineral fraction formed on average 0.5 per cent (by weight) of the minus 1 mm fraction, varying from 0.001% to a maximum of 5%.

Concentrates with a medium to high content of heavy minerals were separated with a hand Wilke magnet (Bentz & Martini, 1968, p. 33) into three different fractions: (1) a strongly magnetic magnetite-titanomagnetite fraction, (2) a weakly magnetic ilmenite-hematite fraction and (3) a non-magnetic fraction. Polished sections from heavy mineral concentrates were prepared for microscopic investigation under reflected light.

Ore microscopy

A total of 588 polished sections were investigated. For the major part of the samples only one heavy fraction was studied: the total heavy fraction (T: no magnetic separation), or the non-magnetic fraction (U). For one third of the samples two fractions were studied: the total heavy fractions (T) and the non-magnetic (U) fractions or a magnetic (M) and the

non-magnetic fraction (U). The magnetic fraction studied was mostly the ilmenite-hematite fraction (fraction 2 above) with omission of most of the magnetite and titanomagnetite grains. Where only a little material was present the magnetic fraction comprised both fractions 1 and 2.

The polished sections with a square surface of 2.5 cm × 2.5 cm or a circular surface with a diameter of 3 cm were examined systematically. The relative amounts of the iron-titanium oxides were estimated into three categories dominant (+++), frequent (++) or present in minor amounts (+). The amounts of sulphides and other ore minerals of exploration interest were determined by grain counting.

Iron-titanium oxides are the most abundant opaque minerals of nearly all heavy mineral concentrates, in order of decreasing amounts: titanomagnetite, hematite, magnetite, ilmenite and rutile. Limonite is frequently very abundant as an alteration product of iron sulphides, mostly pyrite.

Chromite is found in nearly 40% of all samples either as individual grains or as inclusions in silicates. The distribution of chromite reflects bedrock composition; high values are found in samples from the crystalline basement or near dolerite dykes and peak values from samples originating from the Cretaceous Midtkap intrusion.

Pyrite, often more or less altered to limonite, is by far the most common and most abundant sulphide mineral, and is observed in 77 per cent of all samples. The number of grains varies considerably from only a few to several thousands per polished section. The Middle Proterozoic areas consisting mainly of sandstones, dolerites and basalts are poor in pyrite, which means 1-5 grains per section, with maximum figures of some 30 grains. Stream sediments from Heilprin Land show the highest contents. Distinctly higher pyrite contents occur in the samples from the Upper Proterozoic Hagen Fjord Group and Moræneső Formation. Of particular interest is framboidal pyrite. Framboidal textures, commonly also preserved as limonite framboids with relict pyrite cores, are common throughout the area reaching a maximum of several thousand grains per section.

Marcasite occurring mainly as an alteration product of pyrite, is rather scarce throughout the region. High contents, up to 1500 grains per section are, however, found in two samples from north-east Peary Land.

Pyrrhotite is, except for a few grains or inclusions from the Proterozoic areas, limited to the fold belt. It occurs always together with and subordinate to pyrite.

Chalcopyrite is present in 46% of all samples; one to four grains per sample are common. Samples with more than 4 grains are regarded as anomalous, with peak values of 50-75 grains.

Galena is found in 25 samples representing 6% of the "population", mostly as one or a few single grains or as inclusions in other sulphides.

Sphalerite is only found in 14 samples. It is, however, very difficult to identify during a routine microscopic study, as its reflectivity is very close to that of magnetite. Accordingly, sphalerite may be present in more samples and in higher amounts than indicated by this study.

Native copper is found in samples originating from the Zig-Zag Dal Basalt Formation in Mylius-Erichsen Land and J. C. Christensen Land. It occurs as small inclusions in silicate grains, probably epidote. The inclusions are mostly a few microns in size, but inclusions 10-15 μm across are not uncommon and may reach a maximum of 40 μm. 80 per cent of the samples originating from central J. C. Christensen Land contain native copper, in four cases associated with covellite, in some cases with cuprite and in one case with bornite. From Mylius-Erichsen Land 54 per cent of the samples from the basalts contain native copper, in three samples accompanied by covellite and cuprite.

Pyrolusite has been identified by the microprobe in one sample (GGU 196463) originating from the Midtkap intrusion. Pyrolusite was observed in three additional samples.

Native iron (identified on the microprobe) was found in one sample (GGU 270372) from the basalts in J. C. Christensen Land.

Native tin was identified on the microprobe in one sample (GGU 271008) from north-east Peary Land.

The examination of the heavy mineral concentrates under ultra-violet light did not reveal any flourescent minerals except zircon, which is widespread and abundant. High contents were found in one sample (GGU 273566) from a structurally complex area in Mylius-Erichsen Land.

Data presentation

The semiquantitative results of the microscopic study are presented in Tables 2 to 8 arranged geographically as follows. Table 2 - Heilprin Land and surroundings, Table 3 -

J. C. Christensen Land, Table 4 - Mylius-Erichsen Land and Valdemar Glückstadt Land, Table 5 - central Peary Land, Table 6 - Johannes V. Jensen Land and south coast of Frederick E. Hyde Fjord, Table 7 - eastern Peary Land and Prinsesse Thyra Ø and Table 8 - Kronprins Christian Land with Holm Land, Amdrup Land and Hovgaard Ø. Tables 2-4 are subdivided according to stratigraphic origin of the samples into: Independence Fjord Group, Zig-Zag Dal Basalt Formation, Hagen Fjord Group or Moræneso Formation, and Portfjeld and Buen Formations (both from the Lower Cambrian), whereas Tables 5–8 are samples geographically grouped without any stratigraphic subdivisions.

Duplicate samples collected from one and the same locality are grouped together by a bracket.

A locality map (Map 2) in the scale of 1:2 million showing the distribution of samples is enclosed together with the geological map in the scale of 1:500 000 (Map 1). Coordinates of all sample localities are given in Table 9.

The localities were originally plotted on now outdated topographic maps. The localities were later transferred by hand to the new maps and then digitized. The absolute accuracy of sample localization accordingly is regarded as not better than ± 50 metres.

Anomaly distribution maps in the scale of 1:2 million are presented for chalcopyrite, galena, sphalerite, native copper, total iron sulphides (pyrite, marcasite, pyrrhotite) and for pyrrhotite (Maps 3–8).

More detailed specific information on sample location, as well as stratigraphic and lithologic source of the stream sediment samples can be studied in the survey archives.

Discussion of results

Duplicate samples were collected at 13% of the sampling localities in order to test the variation in mineral composition. The amount of heavy minerals varies considerably due to different sedimentation conditions in the small rivers. In 85% of the samples, however, the relative variation from the average value of the total heavy mineral content of duplicate samples lies within ± 50%.

The amount of pyrite and other iron sulphides in the duplicates shows some variation. For 80% of the samples, the numbers of grains counted in the two samples lie within the same anomaly ranges. In 20% both duplicates were anomalous (more than 50 grains), but with different values. The chalcopyrite distribution showed consistancy for 94% of the

duplicates. In the 47 duplicate sets investigated 5 anomalous samples (more than 4 grains) were found; 3 of these 5 anomalies would have been missed if only one sample had been taken at these 5 localities. Galena and sphalerite were observed in 7 of the 49 duplicates, but only in 2 cases were they present in both samples from each locality.

Native copper was found in samples from 7 duplicate localities; in 6 cases it was present in both samples.

A comparison of the duplicate samples collected close to each other shows a considerable variation in number and composition of the opaque minerals. The microscopic study of the stream sediments is considered significant for the qualitative identification of important ore minerals and quantitatively for the order of scale. The quantitative significance of minerals represented by only a few grains in a sample is of only limited value, but can be used to identify groups of samples or areas indicating anomalies.

Samples with more than 50 grains of iron sulphides (pyrite, marcasite, pyrrhotite) are considered anomalous and are plotted on Map 7. The distribution of iron sulphides shows a concentration of anomalies on both sides of the western part of Frederick E. Hyde Fjord. They are considered to be associated with the main east–west trending lineament. Relatively high contents of pyrite and limonite in the heavy fraction of sand samples collected at the north side of Frederick E. Hyde Fjord were already reported by Ellitsgaard-Rasmussen (1955). After the discovery of a large pyrite-sphalerite deposit at Citronen Fjord (Schønwandt, 1994), special attention should be given to samples rich in pyrite with framboidal textures. High concentrations of pyrite are also found along an east–west zone north of Heilprin Land at the border between the Proterozoic platform and the Cambrian sediments. A third group of anomalies is found along the north-west – south-east faults in eastern Peary Land.

Anomalous concentrations (more than 4 grains) of pyrrhotite (Map 8) all appear north of the chlorite-muscovite line (Henriksen, 1992, fig. 14) of the North Greenland fold belt. The occurrence of pyrrhotite is restricted to the area with the highest metamorphic grades.

Samples with more than 4 grains of chalcopyrite are considered anomalous and plotted on Map 3, whereas samples with only 1 grain of galena or sphalerite are considered as anomalous and plotted on Maps 4 and 5, respectively.

Anomalies of chalcopyrite, sphalerite and galena are concentrated along the lineament around Frederick E. Hyde Fjord with a few scattered anomalous values in Heilprin Land.

A significant but isolated chalcopyrite anomaly with 58 grains (GGU 198707) is found in southern Mylius-Erichsen Land at Campanuladal associated with the Hagen Fjord Group sediments. A 20 cm thick pyrite-chalcopyrite impregnated sandstone layer has been identified as the source for this anomaly (Lind & Tukiainen, 1994).

Samples with 1 grain of native copper are regarded as anomalous and plotted on Map 6. The distribution of native copper follows the basalt areas, with the highest anomalies (more than 50 grains) in north-east J. C. Christensen Land.

The identification of an isolated grain of native iron from J. C. Christensen Land may be due to laboratory contamination, but a natural origin from the basalts cannot be excluded. In a similar way the identification of one grain of native tin may be due to laboratory contamination. On the other hand, native tin as an alluvial mineral is reported from Australia and several places in the USSR (Taylor, 1979).

Conclusions

1. The study of opaque minerals in stream sediments from North Greenland delineates distinct areas of interest for mineral exploration.
2. The sample coverage of the study is not homogeneous. No sand fractions from stream sediments are available from a vast area in central Peary Land, where it was only possible to get silt samples. These areas should not be excluded with respect to prospectivity.
3. The study of duplicate samples shows that it is in general sufficient to collect one sample at each locality in order to identify anomalies.
4. The most interesting area for base metals seems to be a zone along the east–west lineament around Frederick E. Hyde Fjord.
5. High concentrations of pyrite with framboidal textures but without accompanying galena or sphalerite may be pathfinders to areas with a high potential for zinc deposits.
6. The east–west striking zone from Jørgen Brønlund Fjord with pyrite-bearing "solfataras" described by Troelsen (1949), and further to the west to the innermost J. P. Koch Fjord is worthy of special mention. However, framboidal textures are relatively rare here.
7. The occurrence of pyrrhotite is restricted to the areas with the highest metamorphic

grade in the North Greenland Fold Belt.

8. The occurrences of native copper in the Zig-Zag Dal Basalt Formation can be used to select areas for more detailed investigations.
9. Since the investigation of the heavy mineral fractions a number of mineral occurrences and a major sulphide deposit at Citronen Fjord (Fig. 3) have been identified (Lind *et al.*, 1994).
10. The result of the ore microscope study combined with a careful study of the geochemical analyses of the silt samples is a valuable tool in defining the most prospective areas of the region under consideration.

Acknowledgements

Thanks to the expedition leader Niels Henriksen for organising the collection of numerous sand samples, and to the laboratory staff at the Geological Institute of the University of Copenhagen for the sample separation and preparation and microprobe identification. This study was supported by the Danish Natural Science Research Council (Grant 511.16/69).

References

Bentz, A. & Martini, H. J. 1968: *Lehrbuch der angewandten Geologie.* **2**(1), 1355 pp. Stuttgart: Ferdinand Enke.

Ellitsgaard-Rasmussen, K. 1955: Features of the geology of the folding range of Peary Land, North Greenland. *Meddr Grønland* **127** (7), 44-48.

Geological Survey of Greenland, 1986: Geological map of Greenland 1:500 000, sheet 8, Peary Land.

Geological Survey of Greenland, 1986: Special geological maps 1:100 000. J. C. Christensen Land 81 Ø. Nord; Nordkronen 82 Ø. Syd; Wandel Dal 82 Ø. Nord; Harder Fjord 83 Ø. Syd.

Ghisler, M., Henriksen, N., Steenfelt, A. & Stendal, H. 1979: A reconnaissance geochemical survey in the Proterozoic-Phanerozoic platform succession of the Peary Land region, North Greenland. *Rapp. Grønlands geol. Unders.* **88**, 85-91.

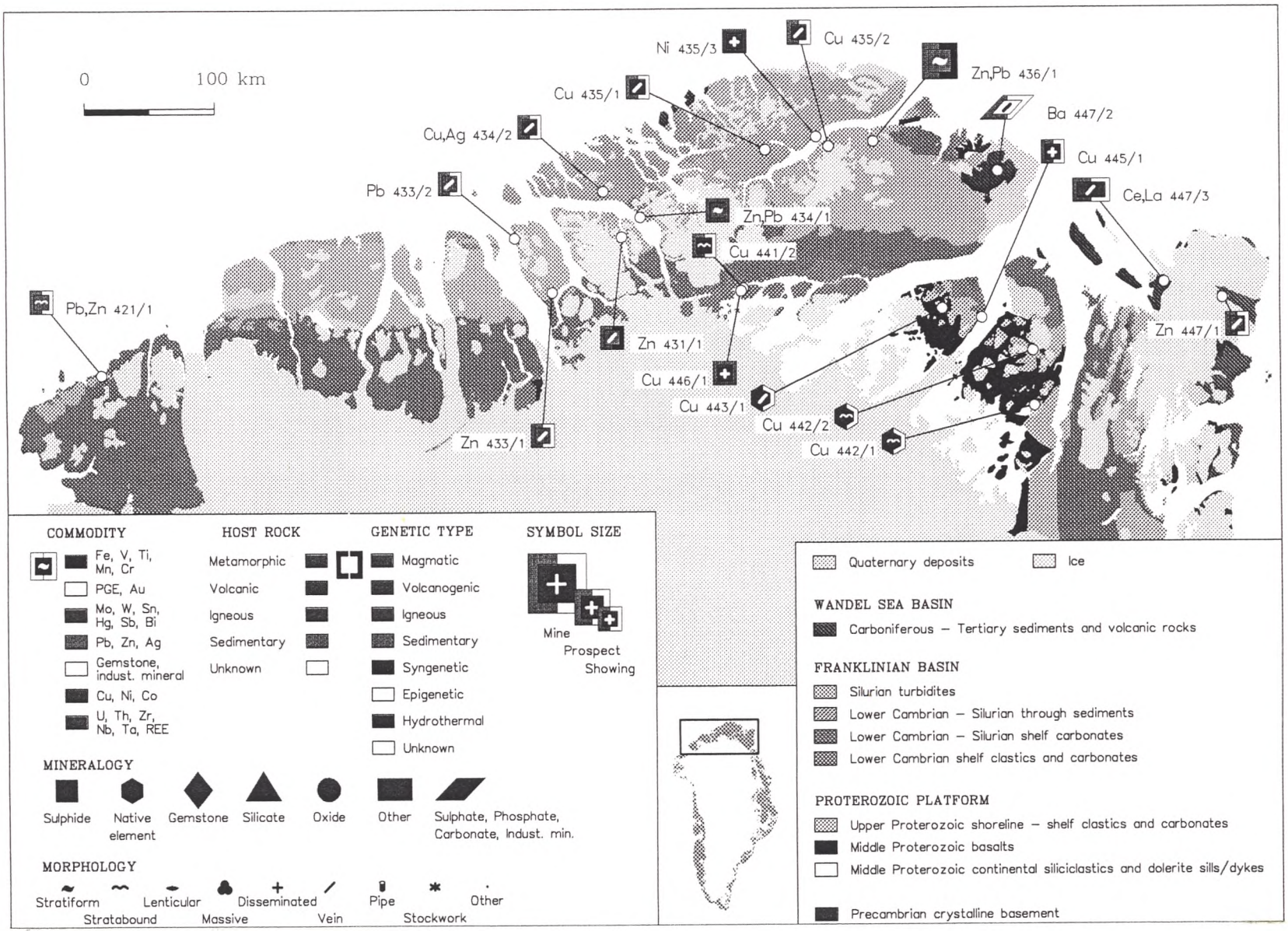


Fig. 3. North Greenland mineral occurrence map based on GGU's Mineral database system (from Lind *et al.*, 1994, fig. 2). Original in colour.

Ghisler, M., Henriksen, N., Steenfelt, A. & Stendal, H. 1983: Reconnaissance geochemical survey in North Greenland. *In* Björklund, A. & Koljonen, T. (ed.) *Abstracts 10th int. Explor. Symp; 3rd Symp. Methods of Geochem. Prosp., Espoo/Helsinki, 1983,* 28-29.

Ghisler, M. & Stendal, H. 1980: Geochemical and ore microscopic investigations on drainage sands from the Peary Land region, North Greenland. *Rapp. Grønlands geol. Unders.* **99**, 5 only.

Henriksen, N. 1980: Systematic geological mapping in 1979 in the Peary Land region, North Greenland. *Rapp. Grønlands geol. Unders.* **99**, 5 only.

Henriksen, N. 1981: Systematic geological mapping in the Peary Land – Kronprins Christian Land region, North Greenland. *Rapp. Grønlands geol. Unders.* **106**, 5-6.

Henriksen, N. 1992: Geological map of Greenland 1:500 000, sheets 7 & 8. Nyboe Land and Peary Land. Map sheet descriptions. Copenhagen: Grønlands Geologiske Undersøgelse, 40 pp.

Higgins, A. K. 1986: Geology of central and eastern North Greenland. *Rapp. Grønlands geol. Unders.* **128**, 37-54.

Lind, M. & Tukiainen, T. 1994: Mineral resource reconnaissance programme: eastern North Greenland 1994. *In* Henriksen, N. (ed.) Express report. Eastern North Greenland and North-East Greenland 1994, 77-83. Internal report Grønlands Geologiske Undersøgelse.

Lind, M., Tukainen, T. & Thomassen, B. 1994: Greenmin-database system for the registration of Greenland mineral occurrences. *Rapp. Grønlands geol. Unders.* **160**, 32-36.

Schønwandt, H. K. 1994: Mineral resource activities 1993: spectrum of research and services. *Rapp. Grønlands geol. Unders.* **160**, 18-21.

Steenfelt, A. 1980: The geochemistry of stream silt, North Greenland. *Rapp. Grønlands geol. Unders.* **99**, 129-135.

Taylor, R. G. 1979: *Geology of tin deposits. Developments in economic geology* **11**, 331-334. Amsterdam, Oxford, New York: Elsevier.

Troelsen, J. C. 1949: Contributions to the geology of the area around Jørgen Brønlunds Fjord, Peary Land, North Greenland. *Meddr Grønland* **149** (2), 25-27.

Table 2. Distribution of opaque minerals from Heilprin Land and surroundings

GEOLOGY: Independence Fjord Group									REGION: Heilprin Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	% Heavy minerals (by weight)
198501	TU	+	+	+	+	+		+	5	1	1	1				0.47
198503	TU	+	+++		+	+		+	18			2				0.45
198505	TU	+	+		+++	+			7		1	3				3.22
198507	TU	+	+		+++				1							2.21
211644	MU	+++	+	+++	+++	+	34		1							0.17
211645	MU	+++		+++	+++	+	31									0.16
211646	MU	+++	+	+++	+++	+	12	++								0.14
211648	MU	+++	+	+++	+++	+	1									0.11
211651	MU	+++		+++	+++	+	35	++	1							0.19
211652	MU	+++	+	++	+++	+	17	+	3			2				0.06
233103	U	++	+	+++		+	2	+	1							0.10
233106	U	+				++		+	1							0.29
233107	U	+	+	+		++	1		1							0.55
233108	U	+	+	+		++	1	+								0.63
270327	TU	+	+	+		+	+	+	1			1				5.34
270329	TU	+	+	++	++	+++	++	+	35	1	11	7				0.72
273237	TU	+	+	+	+	+	+	+	11			7				2.30
273249	TU	+	+	+	+	+	+		12		1	3	1			1.11

Table 2 (2). Cont.

GEOLOGY: Independence Fjord Group									REGION: Heilprin Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	% Heavy minerals (by weight)
273256	TU	+	+	+	+	+	+	+	3			2				0.15
273297	TU	+	+	+	+	+		+	18		3	8				1.32
GEOLOGY: Moræneso Formation									REGION: Heilprin Land							
196802	MU	+	++	+++	+			+++	227		102	1				0.73
196804	MU	++	+	+++	+			+++	94		45					0.36
198509	TU	+++		+		+		+	28		5	1				0.65
208803	T	+++		++	+	+	3	+	52	2						0.02
208806	T	+++		+	+	+	1	+				1				0.02
208810	U	++				+	6	+	3		1					0.03
208812	U	+	+			+	7	+	1			1				0.04
208813	U	+	+	+		++										0.08
208817	U	+	+	+		+	3	+	2			3				0.06
233101	U	++		+++		+		+	15							0.24
233102	U	+++	+	+++		+		+	14							0.33
233104	T	++	+	+++	+			++	86	9						0.02
233105	T	+	+		++	+		+++	421	11						0.03
270319	TU	+	+	+	+	+	1	+	26	5	7	1			1	0.23

Table 2 (3). Cont.

GEOLOGY: Moræneso Formation									REGION: Heilprin Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	% Heavy minerals (by weight)
270322	TU	+	+	+	+	+	3	+	26	9	7	2				1.01
270324	TU	+	+	+	+	+	++	+	735	3	7	11				2.04
270325	TU	+	+	+	+	+	+	+	12		2	1				0.24
270351	TU	+	+		+	+	+		5		1	1				1.29
270352	TU	+	+	+	+	+	+		14	1	5	3				1.61
270353	TU	+	+		+	+	+	+	3	1	1	1				0.84
270354	TU	+	+	+	+	+	+	+	105		3	8				1.67
271909	TU	+	+	+++	+	+	+	+	7			1				3.79
271910	TU	+	+	+++	+	+		+	8							1.35
Geology: Portfjeld Formation									Region: Heilprin Land							
198092	U					+		+	1500	+		2				0.27
208835	T	+	+	+	+	+		++	540	3						0.02
208836	T		+	+		+		+++	2200		+	1				0.02
208846	U	+	+			+	15	++	10	1	2					0.28
208847	U	+	+			+	10	++	35		5			1		0.23
208848	U	+				+	21	++	75		12			1		0.32
208850	U	+	+			++	12	+++	30		4					0.14

Table 2 (4). Cont.

Geology: Portfjeld Formation									Region: Heilprin Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	% Heavy minerals (by weight)
208851	U	+	+			++	17	+++	80		6					0.31
208852	U	+	+			+	14	+++	23		2					0.13
208853	U	+	+			+	7	+++	65		10					0.25
208854	U	+	+			+	16	+++	115		6	1				0.17
208855	U	+	+			+++	5	+++	35		5	1				0.06
208856	U	+	+			+++	4	+++	80	1	1					0.13
208857	U	+	+			++	8	+++	45		8					0.12
208858	U	+	+			++	9	++	10							0.05
211656	MU	+	+	+	+++	+		+++	1400		+					0.04
211657	T	+			+	+		+++	1000		50					0.03
211658	T		+		+	+		+++	1000		214					0.03
211661	T		+	+	+	+		+++	800		25	1				0.02
256295	U	+	+	+++				+	11			2				0.06
256296	U	+	+	+++		+	1	+	38	1						0.06
270335	TU	+	+	+	+	+	+	+	100		17	2				2.33
270337	TU	+	+	+		+	+	+	67		4	1				0.53

Table 2 (5). Cont.

Geology: Portfjeld Formation									Region: Heilprin Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	% Heavy minerals (by weight)
270338	TU	+	+	+	+			+	11							0.53
270339	U	++		+	+	+		+	130	+	+					0.03
270341	TU	+	+	+	+	+		+	800		1					0.20
270342	U	+	+			+		+	30	+						0.06
270343	TU	+	+	+		+		+	42		1					0.30
270345	U					++		+	102	+		1				0.05
270346	TU	+	+	+	+	++		+	116	1		1				0.21
270350	TU	+	+	+	+	++		+	20			5				0.31
271913	TU	+	+	+	+	+		+	200		8	1				0.40
271914	TU	+	+	+		+	+	+	92		3					0.31
GEOLOGY: Buen Formation									REGION: Heilprin Land							
198109	U							+	12	+						0.03
198111	U							+	11							0.29
208839	U	+				+		++	2							0.37
208840	U	+	+	+		+	1	+	3							0.52
208841	U	+	+			+	2	+++	9							0.26

Table 2 (6). Cont.

GEOLOGY: Buen Formation									REGION: Heilprin Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	% Heavy minerals (by weight)
208843	U	+	+			+	1	++								0.22
208844	U	+		+		+	3	+	6							0.43
208845	U	+	+	+		+	6	+++	10							0.09
211531	U	++	+			+		+++	4	1						0.32
211534	U	+	+			+	3	+++	5							0.48
211535	U	+				+		+++	20							0.36
211536	U	+	+			+	6	+++	23							0.63
211537	U	++	+			++		+++	35		2					0.45
245428	T	+	+	+	+			+++	251	244	21	3				0.02
245429	U	+	+	+	+			+++	250	240	20	1				0.04
245432	T	+		+	+	+		+++	26	4		1	1			0.01
Geology: Wandel Valley Fm (Ordovicean)									Region: Heilprin Land							
208833	T	+	+	+	+	+	2	+++	3							0.003

Table 3. Distribution of opaque minerals from J. C. Christensen Land

Geology: Independence Fjord Group									Region: J. C. Christensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite / Bornite	Cuprite	% Heavy minerals (by weight)
197277	TU	+	++	+++				+	5			2	1					2.80
197287	TU	+	+	+	+	+			3									4.48
208859	T	+	+	+	+		1	+										0.01
208860	T	++	+	++		+		++										0.01
208861	T	+++	+	++	+			+										0.02
208862	U	+	+															0.04
208863	U																	0.05
208864	T	+	++	+++	+			+				1						0.03
208865	U	+	+															0.07
208866	U	+																0.07
208867	U	No opaque minerals in this fraction																0.04
208868	U	+							+									0.15
208869	T	+	++	+++	+	+												0.03
208870	U																	0.79
208871	U																	0.93
208872	U		+															1.58
208876	U							+	3			1						0.37
208877	U	+	+					+	1									0.29

Table 3 (2). Cont.

Geology: Independence Fjord Group									Region: J. C. Christensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite / Bornite	Cuprite	% Heavy minerals (by weight)
208878	U	+	+					+										0.48
208882	U	+				+												0.69
208883	U	+				+												0.50
208889	U	+																0.11
208891	U	+																2.24
208892	U	+						+	1									0.12
208893	U	+	+			+		+	1									0.78
208894	U	+		+			2											1.54
208896	U	+	+						1									1.40
208898	U	+	+			+	2											0.74
208899	U	+				+	2		1									0.17
208900	U	+				+	2											0.57
211501	U	+				+	1											0.18
211503	U	+				+	1	+										0.54
211505	U	+				+	5											0.25
211506	T	+++	+++		+++	+		+										0.02
211507	U	+							1									0.55
211508	U	+							1									0.60

Table 3 (3). Cont.

Geology: Independence Fjord Group									Region: J. C. Christensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite / Bornite	Cuprite	% Heavy minerals (by weight)
211509	U	+	+			+	1											0.58
211511	U	+				+												0.25
211512	U	+				+		+										0.36
211514	U	+	+			+	1	+	1									0.27
211516	U	+	+				3		1									0.41
211517	U	+	+				2		1									0.39
211538	T	++	+	+++	+			++										0.003
211539	U	+				+		+										0.08
211540	T	++	+	++		+		++										0.003
211542	T	+	+	+++	+													0.02
211544	T	++	+	+++	+	+		+										0.01
211546	U	+	+	+		+		+	1									0.04
211547	T	++	+	+++	+	+	1	+										0.02
211548	U	+		+		+		+										0.23
211549	T	++	+	+++	+	+	1	+										0.02
211550	U	+				+		+										0.05
211551	T	+++	+	+	+	+		+										0.01
211552	U	++	+			+		+										0.03

Table 3 (4). Cont.

Geology: Independence Fjord Group									Region: J. C. Christensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite / Bornite	Cuprite	% Heavy minerals (by weight)
211553	T	+++	+	+	+	+	2	+				1						0.02
211554	T	+++	+	++	+	++		+++										0.01
211555	T	+++	+	+	+	+	2	++	1									0.02
211556	T	++	+	+		++		++										0.002
211558	T	+				+												0.000
211562	U	+			+			+										0.10
211564	T	+++	+	+	+	+	3	+	2									0.01
211571	U	+++				+	1	+										0.12
211572	U	+++	+	+		+	1	++	1									0.15
271903	TU	+	+	+	+	+	+	+	5			1						1.10
271904	TU	+	+	+	+	+		+	25			3				1		2.61
271906	TU	+	+	+++	+	+			4			1						2.38
271908	TU	+	+	+++		+			12		1	3						1.16
271915	U	+++	+			+	1	+										0.10
271916	TU	+	+	+	+	+	+	+	10			1						0.21
271917	TU	+	+	+	+	+	+	+	1							1		1.80

Table 3 (5). Cont.

Geology: Zig-Zag Dal Basalt Formation									Region: J. C. Christensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite / Bornite	Cuprite	% Heavy minerals (by weight)
211565	U	+		+											1			0.51
211573	U	+++	+	+		++	4	++	2									0.33
235202	U	+++		+		+		++										0.03
235221	U	+++	+			+		+										0.12
235223	U	+++	+					++	2		1		1					0.20
235225	U	+++	+	+		+		+	+									0.03
235232	U	++				+		+	9						1		1	0.15
235234	U	+++	+			+		++	1						2		2	0.81
235236	U	+++				+		+	1									0.04
256266	U	++	+	+		++	3	+	1									0.12
256267	U	++	+			++	1	+										0.87
256270	T	+	+	+++	+	+		+	4			4						0.02
270260	TU	+	+	+	+			+				1						1.23
270262	TU	+	+	+	+	+						1			2			2.04
270264	TU	+	+	+	+	+			1			1						1.43
270367	TU	+++	+			+	+	+	3			2			>10	1		1.30
270368	TU	+++	+		+	+		+	3		1	2			>50			0.61

Table 3 (6). Cont.

Geology: Zig-Zag Dal Basalt Formation									Region: J. C. Christensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite / Bornite	Cuprite	% Heavy minerals (by weight)
270371	TU	+++		+	+	+		+	6			1			>10			1.22
270372	TU	+	+	+	+	+		+	5			2			>10			0.39
270373	U	+		+		+			2						+			0.11
270374	TU	+	+	+	+	+	+	+	22		1	1			2	1		0.23
270375	TU	+++	+	+	+	+		+	+						+			1.33
270376	TU	+++	+	+	+	+		+	2			1			>50			1.33
270378	TU	+++	+	+	+	+	+	+	34			3			>10	2		1.58
270380	TU	++	+	+	+	+	+	+	2									0.14
270381	TU	++	+	+	+	+		+	2			2			3	2		1.16
270387	TU	+++	+	+	+	+		+	2						3			2.32
270388	TU	+++	+	+	+	+		+	2						2			2.28
270389	TU	+++	+		+			+	6			2			3			2.16
Geology: Hagen Fjord Group									Region: J. C. Christensen Land									
198512	TU	+++	+++		+	+++			1									0.41
198515	TU	+	+			+			60	+	50	1						0.90
211574	U	+++			+	+						1						0.09
211575	U	+++	+			++	+	+										0.08
211576	U	+++	+		+	++		+	1									0.04

Table 3 (7). Cont.

Geology: Hagen Fjord Group									Region: J. C. Christensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite / Bornite	Cuprite	% Heavy minerals (by weight)
211577	U	++	+	+			+	+										0.04
211578	U	+++	+			+	1	+										0.06
211579	U	+++				+		+										0.04
211580	U	+++		+	+	+		+										0.07
211602	MU	+++	+	+++	++	+		4			1				3			0.07
211603	T	+++	+	+++	+	+		+		1		1						0.007
211608	T	++	+	+++	+	+		+	4									0.004
211609	T	+	++	+++	+		2	+	3			2						0.011
211611	T	+	+	+++	+		4											0.011
211613	T	++	+	+++	++		2	+	1									0.015
211616	MU	++	+	+++	+++	+	3	+	5									0.09
211619	MU	+++	+	++	++			+	8			5						0.03
211622	T	+	+	+++	++			+	79	10		3						0.009
211623	MU	+++	+	+++	++	+		++	141	21	1	11						0.06
211626	MU	+++	+	++	+++	+												0.05
211630	MU	+++	+	++	+++		4											0.03
211632	MU	+++	+	++	+++		3	+	1	3		1						0.05
211639	MU	+++	+	++	+++	+	10											0.08

Table 3 (8). Cont.

Geology: Hagen Fjord Group									Region: J. C. Christensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite / Bornite	Cuprite	% Heavy minerals (by weight)
211676	MU	+++	+	+++		+	20	+				1						0.24
211678	MU	+++	+	+++	+++		25	+										0.19
211679	MU	+++	+	+++	++	+	16	+	1									0.27
211680	MU	+++	+	+++	+++	+	15	+										0.16
211681	MU	+++	+	++	+++	+	12	+	2									0.20
211683	MU	+++	+	+++	+++	+	17	+										0.18
235226	U	+++		+		+++	1	++	100	23		4						0.23
235228	T	++		+	+	+		++	15	9								0.01
235230	U	++		+	+	+		+	31	2		3						0.04
270360	U	+	+	+		+		+				1						0.06
270365	U	+	+	+		+												0.07
270391	TU	+	+	+	+	+		+										0.16
270392	TU	+	+	+	+	+	+	+	1						1			0.37
270393	U	+++	+	+		+	1	+	9									0.09
270394	U	++						+	10	3								0.03
270396	TU	+	+	+	+	+	+	+	85	23		2			1			0.13
270397	U	+	+	+		+		+	89	+	5	3						0.03

Table 3 (9). Cont.

Geology: Portfjeld and Buen Formations									Region: J. C. Christensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite / Bornite	Cuprite	% Heavy minerals (by weight)
198516	U	+	+		+	+		+	3		1							0.03
211666	MU	+++	+	+++	++	+												0.07
211668	MU	+++	++	+++	++		6	+++										0.21
211670	MU	+++	+	+++	++		14	++	1									0.25
211671	MU	+++	+	+++	+	+	1	+										0.21
211674	MU	+++	+	+++	++		8	+	1									0.21

Table 4. Distribution of opaque minerals from Mylius-Erichsen Land and Valdemar Glückstadt Land

Geology: Independence Fjord Group									Region: Mylius-Erichsen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite	Cuprite	% Heavy minerals (by weight)
233109	T	+++	+		+	+		+++	3									0.01
233110	T	+++	+	++		+		+++										0.01
233111	T	+	+	+++	+	+		++										0.01
273574	TU	+	+	+++	++	+			2			1						2.31
273576	TU	+	+	+	+	+			16			1						4.44
273578	TU	+	+	+	+	+			7			5						4.31
273580	TU	+	+	+++	+	+	1		1									3.90
273582	TU	+	+	+	+	+		+	3									0.51
273584	TU	+	+	+	+	+		+	1			1						1.03
273586	TU	+	+	+	+	+		+	2			2						0.43
273588	U	+				+		+										0.07
273590	TU	+	+	+	+	+	+		2			1						0.86
273592	TU	+	+	+	+	+	+	+	3			1						1.37
273594	TU	+	+	+	+	+		+	3									0.94
273596	TU	+	+	+	+	+	1		3									0.28

Table 4 (2). Cont.

Geology: Zig-Zag Dal Basalt Formation									Region: Mylius-Erichsen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite	Cuprite	% Heavy minerals (by weight)
197295	TU	+	+	+	+	+		+	5			1			4	1	+	3.01
197296	TU	+	+	+		+			1								+	0.99
197298	TU	+	+	+		+			4			1					+	1.89
197300	TU	+	+	+	+	+			3			3						1.80
235204	U	+++			+	+		+	2									0.48
235208	U	+++	+				+	+	1						5			0.36
235209	U	+++	+			+		++	7						2			0.67
235210	U	+++			+	+		++							4			0.61
235213	U	+++		+				++	4			1			3	1	+	0.33
235215	U	+++		+	+	+	+	++	2			2			3			0.35
235217	U	+++	+	+		+	+	++				1						0.17
256054	U	+++	+			+		+	3			3			1			0.66
256056	U	+	+			+									1			0.08
256135	U	++	+	+		+	1	+	15			2						0.48
256136	U	++				+	+	+	4			1						0.41
273559	TU	+++	+++	+	+	+	+	+						3				0.43
273561	TU	+	+	+	+	+	+		1			1			1			0.36
273563	TU	+	+	+	+	+	+	+	5			1			1			0.89

Table 4 (3). Cont.

Geology: Zig-Zag Dal Basalt Formation									Region: Mylius-Erichsen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Native copper	Covellite	Cuprite	% Heavy minerals (by weight)
273566	TU	+++		+		++												0.11
273568	TU	+	+	+		+			2						3			0.80
273570	TU	+	+	+	+	+						1			24			1.78
273572	TU	+	+	+++	+	+	1	+	8		2	2			1	3		1.78
273598	TU	+	+	+	+	+	2	+	3			1			2			1.03
273600	TU	+	+	+	+	+	+	+	5			1						1.35
Geology: Hagen Fjord Group									Region: Mylius-Erichsen Land									
198518	U					+		+										0.09
198520	TU	+				+		+	2									0.07
198522	TU	+				+		+										0.16
198524	TU	+				+		+										0.15
198526	U					+		+										0.07
198528	U	+			+	+		+	300	+	1	1						0.05
198701	TU	+	+			+		+	1			1						0.17
198703	TU	+				+			17			2						0.31
198705	TU	+				+		+	23			1						0.40
198707	TU	+	+	+	+	+		+	300	300	+	58						0.31

Table 5. Distribution of opaque minerals from central Peary Land

GEOLOGY: Silurian shelf sequence									REGION: Central Peary Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	% Heavy minerals (by weight)
198141	U					+		+++	25	25		1			3	0.05
198143	U					+		+++	25	25						0.09
211685	U	+		++		+++		+++	24	112		3				0.002
211689	U		+	+		+++		+++	150	250		23				0.003
211691	U	+		+	+	+++		+++	225	250		14				0.005
211692	U	+		+	+	+++	2	+++	200	200		7				0.009
211694	U			+		+++		+++	21	36		2				0.002
211695	U		+	+		+++		+++	71	58		1				0.008
211696	U			+	+	++	3	+	+	8						0.002
211699	U			+	+	+++		+++	5	24	+					0.002
270218	TU		+		+	+++		+++	58	+		1				0.13
270658	U	+	+++			+		+++	160	+	2					0.053
270730	U	+	+		+	+		+++	200	200		13				0.021
270732	U		+					+	+	17		1				0.002
270734	U		+			+		+++	200	1700		15				0.057
270738	U		+		+	+		+++	200	200		3				0.01
303901	T		+	+	+	++	2		4	1						0.004
303902	T		+	+	+	+		+	2	1						0.002

Table 5 (2). Cont.

GEOLOGY: Silurian shelf sequence									REGION: Central Peary Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	% Heavy minerals (by weight)
303904	T			+	+	+++	2	+	16	8		1				0.001
303907	T			+	+	+++			1							0.0006
303910	T			+	+	+++		+++	152	70		15				0.006
303912	T			+	+	+++	3		64	50		13				0.005
303913	T			+	+	+++	2	+++	353	169		47				0.007
303914	T					+++	6	+++	156	306	+	10	1			0.004
303917	T					+++	1	+++	72	131		8				0.006
303918	T		+	+	+	+++	15	+++	1050	1000		57	2			0.013
303920	T					+++	2	++	20	83		2				0.003
303927	T		+	+		+++	2	+++	46	30		8				0.005
303928	T					+++	3	++	24	27		1				0.003
303929	T		++	+		+++	1	++	346	190		21				0.008
303931	T		+		+	+++		+++	156	155		11				0.006
303933	T		+	+		+++		+++	47	33		11				0.002

Table 6. Distribution of opaque minerals from Johannes V. Jensens Land and south coast of Frederick E. Hyde Fjord

Geology: North Greenland Foldbelt									Region: Johannes V. Jensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Covellite / Bornite	Pyrrhotite	Pyrolusite	% Heavy minerals (by weight)
196463	U	+	+++	+	+	+	200	+++	227	3		23					3	0.04
196469	U	++	+		++	+	60	+++	23	+		21						0.08
196505	T		+		+	++	150	+++	35		2	24						0.04
196550	MU		+++	++		+		+++	800			14				41		0.42
196552	MU	+	+++	++		++	4	+++	500			11				6		0.26
196587	MU	+	+++	++	+	++		+++	62			3				4		0.71
217702	U		++			+		++	38	35	+	12						0.10
217717	T		+		+			+++	700	+	10							0.02
217723	U		++			+	8	+	20	20	+	2		2				0.05
217735	U		+			+	1	+	150	150	30							0.04
217737	T		+++	+	+++	+		+	1000	400	50	12						0.02
217752	T		+	+	+	+++	3	+	150	130		7	1					0.01
217762	U		++			+		+	3	2			1					0.06
217767	U					+		++	120	100	50	50	10					0.04
217769	U					+		++	210	84	15	63	1	1	2			0.07
217785	T		+			+		+++	916	57	30	27	20	10				0.02
217798	T	++	++	+++		+		+++	410	121		43						0.03

Table 6 (2). Cont.

Geology: North Greenland Foldbelt									Region: Johannes V. Jensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Covellite / Bornite	Pyrrhotite	Pyrolusite	% Heavy minerals (by weight)
217811	T	+	++	++	+	+		+++	560	50		71						0.02
218907	U		+		+	+++		+++	319	9		10						0.09
218909	U		+			+++		+++	1137	8		17	3		1			0.11
218919	T	++	+	+++		+		+++	43	5		3						0.04
218924	U	++	+					+++	451			22	1	1				0.07
218935	U	+				+++		+++	12	1								0.05
218938	U	+				+++		+++	6	+								0.05
218947	U		+			+++		+++	31									0.34
218948	U		++			+++		+++	120			3						0.16
218955	U		+			+++		+++	214			1						0.09
218956	U	+	+			+++		+++	11			1						0.60
218971	U		+			+++		++	570			2	1			+		0.10
218993	T	+	++	+++	+	+						1						0.03
218996	U	+	+			++		++	18	1								0.08
245305	T		++	++	+	+		+++	110	95	2	10						0.049
245315	T		+	+		+	1	+++	648	16	5	54		1				0.037
255649	U		++	+		+++		++	281			1						0.06

Table 6 (3). Cont.

Geology: North Greenland Foldbelt									Region: Johannes V. Jensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Covellite / Bornite	Pyrrhotite	Pyrolusite	% Heavy minerals (by weight)
255709	U	++				+++		++	19			1						0.40
255717	U	++				+++		++	54			1						0.15
255721	U	+				++		++	11									0.05
255742	T		+			+		+++	2									0.03
255743	U	+	++			+		+++	15									0.07
255744	U	+	+			++		+++	2									0.07
255776	U	++				+		+	16	4	+	1						0.24
270807	U					+			700	1000		16						0.03
270821	U					+	+	+	+	+		2						0.02
275505	T					++		+++	205	+		2	5					0.052
275517	T					+		+++	404			7				1		0.035
275522	MU		+++	+++	+			+++	1500	150	3	5	3					0.17
275544	T		+++			+		+++	425			4	1			15		0.18
275553	T		+++			++		+++	182			4						0.071
275578	U		+++			+		+++	182							6		0.30
275586	MU		+++	+++	+	+		+++	1200			1				97		0.36
275591	U		+++		++	+		+++	650			8				106		0.34
275595	U		+++		++	+		+++	117			2				4		0.23

Table 6 (4). Cont.

Geology: North Greenland Foldbelt									Region: Johannes V. Jensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Covellite / Bornite	Pyrrhotite	Pyrolusite	% Heavy minerals (by weight)
275600	U		+++		+	+		+++	257									0.17
275617	U	+	+++	+	++	+		+	16			1				3		0.45
275622	U	+	+++		+	+		++	133		1					9		0.34
275639	MU		+++	+++	+	++		+++	766		17	7	1	1		119		0.08
275656	MU	+	+++	+++		+		++	1200	250	+	54	5	2	4	311		0.14
303530	T	+	+	+++	+	+		+++	700	10		5				1		0.017
303557	T	+	+	+++	+	+		+++	500			1				1		0.014
303563	T	+	+	+++	+	+		+++	213			1				1		0.031
303582	MU	+	+++	+++			5	+++	116									0.23
303584	MU	+	+++	+		+	32	+	717			5	6			2		0.43
303606	MU	+	+++	+++	+	+	1	++	292		1	1				1		0.20
303632	MU	+	++	+++	+	+++		+	442								2	0.19
303645	MU	++	+++	+++		+		++	92								1	0.11
303655	MU		+++	+		+		++	1200			6	2			19		0.19
303674	T	+	++	+	+	+		++	41	1					1			0.025
303908	T		+		+	+++	3	+++	122	75		12						0.004
303921	T					+++	7	+++	248	251	+	24						0.005
303923	T		+		+	+++	14	+++	800	460		42						0.010

Table 6 (5). Cont.

Geology: North Greenland Foldbelt									Region: Johannes V. Jensen Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Covellite / Bornite	Pyrrhotite	Pyrolusite	% Heavy minerals (by weight)
303924	T					+++	3	+++	65	57		5						0.005
303925	T					+++	2	+++	18	54		6	1					0.005

Table 7. Distribution of opaque minerals from eastern Peary Land and Princesse Thyra Ø

GEOLOGY: Different Formations									REGION: Eastern Peary Land									
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Bornite	Pyrrhotite	Pyrolusite	% Heavy minerals (by weight)
196074	U	+	+	+				+++										n.d.
196077	U			+				+	11	192	+							n.d.
196078	U			+				+	10	200	+							n.d.
196093	TU	++	+++		+	+	+	+	900			1						1.26
196094	TU		+			+++			1400				2					1.08
196282	TU	+	+	+	+	+		+	50	60	13							0.42
196283	TU	+	+	+	+	+	+	+	50	60	13							0.21
196318	U					+++		+	70	20								0.03
196319	U					+++		+	70	20								0.02
197320	TU		+		+	+		+	1000	1	+	12				+		0.45
197321	TU	+	+	+	+	+		+	89	+	+	3						0.48
235218	U	+++	+	+		+		+										1.89
271008	TU	+				+		+	6									1.91
271009	TU	+	+	+	+	+		+	280	+	+							0.95
271010	TU	+	+		+	+		+	900	+		2						0.61
271013	TU				+	+		+	500	+	1000	3			1			0.19
271014	TU	+	+	+	+	+		+++	700	+	1300	1						0.16
271017	TU	+	+			+			158		+		1	1			3	0.08

Table 8. Distribution of opaque minerals from Kronprins Christian Land with Holm Land and Hovgaard Ø

GEOLOGY: Different formations									REGION: Kronprins Christian Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	Heavy minerals (by weight)
213731	MU	+++	+++	++	+++	+	59	+	7		1					1.45
213732	MU	+++	++	++	+++	+	120	+	15			2				1.72
213738	MU	++	++	++	+++	+	10	+	319	16	5	5			2	0.75
213739	MU	++	++	++	+++	+	29	+	335	9	2	8	1	1		0.45
213751	MU	++	++	++	+++	+	19	++	5	5		2				0.38
213752	MU	++	+	++	+++	+	8	+	9			2				0.41
213758	T					+		+++	389	191						0.02
213759	T					+	+	+++	222	124						0.01
213766	MU	+++	++	+++	+++	+	7	++	112	48	2					0.06
213767	MU	+++	++	++	+++		3	+++	84	43	+					0.11
213774	U		+		+	+		+	420	2500	5	1		2		0.07
213775	U		+					+	500	2000	5			10		0.08
213795	T		+	++	+	+	2	+++	742	8	1					0.23
213796	T	++	+	++	+	+		+++	740	3		1		7		0.22
213798	T	+	+	++	+	+		+++	2000	10		1				0.19
213799	T		+	++	+	+	3	+++	2000	15		5				0.20
273903	MU	++	++	+	+++	+	5	+	12	22	1	2				0.17
273906	MU	+++	+	++	+++	+		+	7							0.44

Table 8 (2). Cont.

GEOLOGY: Different formations									REGION: Kronprins Christian Land							
GGU No.	Fractions studied	Hematite	Ilmenite	Ti-magnetite	Magnetite	Rutile	Chromite	Limonite	Pyrite	Framboids	Marcasite	Chalcopyrite	Galena	Sphalerite	Pyrrhotite	Heavy minerals (by weight)
273910	MU	++	+	+++	++	+	1	++	72						1	0.07
273913	MU	++	+	+++	++	+	9	++	6			1				0.25
273915	MU	++	+	+++	++	+	4	++	26	6	1	1				0.12
273917	U	+	+			++		+	53		2				+	0.39

Table 9. Coordinates of stream sediment sample localities

GGU No	Long.	Lat.
196074	−22.576	82.692
196077	−21.973	82.772
196078	−21.969	82.772
196093	−24.445	82.203
196094	−24.445	82.204
196282	−19.056	81.855
196283	−19.053	81.856
196318	−22.748	82.578
196319	−22.750	82.579
196463	−32.159	83.169
196469	−31.871	83.167
196505	−31.600	83.174
196550	−39.588	83.239
196552	−39.581	83.230
196587	−39.552	83.220
196802	−30.797	82.033
196804	−30.838	82.038
197277	−30.391	81.624
197287	−30.113	81.641
197295	−24.491	81.253
197296	−24.044	81.253
197298	−24.727	81.226
197300	−24.948	81.191
197320	−26.381	83.127
197321	−26.381	83.128
198092	−34.011	82.262
198109	−33.942	82.267
198111	−33.940	82.267
198141	−29.635	82.501
198143	−29.635	82.501
198501	−34.555	81.992
198503	−34.555	81.992
198505	−34.424	82.004
198507	−34.424	82.004
198509	−36.381	82.199
198512	−26.877	82.005
198515	−24.920	81.734
198516	−24.716	81.819
198518	−22.717	81.615
198520	−22.701	81.540
198522	−22.737	81.646
198524	−22.738	81.646
198526	−22.739	81.646
198528	−21.279	81.533
198701	−24.623	80.630
198703	−24.618	80.628
198705	−24.618	80.628
198707	−24.618	80.628
208803	−32.364	82.150
208806	−32.290	82.154
208810	−32.224	82.158
208812	−32.221	82.158
208813	−32.199	82.160
208817	−32.183	82.169
208833	−34.081	82.321
208835	−33.763	82.259
208836	−33.732	82.256
208839	−30.756	82.116
208840	−30.751	82.118
208841	−30.748	82.119
208843	−30.749	82.122
208844	−30.746	82.124
208845	−30.746	82.127
208846	−30.744	82.129
208847	−30.735	82.131
208848	−30.718	82.136
208850	−30.686	82.139
208851	−30.681	82.140
208852	−30.673	82.143
208853	−30.667	82.144
208854	−30.659	82.146
208855	−30.660	82.148
208856	−30.650	82.150
208857	−30.606	82.154
208858	−30.566	82.154
208859	−29.712	81.705
208860	−29.703	81.707
208861	−29.663	81.706
208862	−29.637	81.706
208863	−29.614	81.707
208864	−29.583	81.707
208865	−29.574	81.709
208866	−29.573	81.711
208867	−29.571	81.712
208868	−29.576	81.715
208869	−29.588	81.718
208870	−29.993	81.658
208871	−30.194	81.652
208872	−30.198	81.652
208876	−29.484	81.793
208877	−29.485	81.793
208878	−29.387	81.839
208882	−29.858	81.862
208883	−29.850	81.863
208889	−30.094	81.824
208891	−30.236	81.767
208892	−30.294	81.742
208893	−30.290	81.742
208894	−30.260	81.711
208896	−30.329	81.660
208898	−30.314	81.586
208899	−30.309	81.567
208900	−30.309	81.567
211501	−30.371	81.527
211503	−31.556	81.604
211505	−31.800	81.639
211506	−31.513	81.656
211507	−31.383	81.667
211508	−31.383	81.667
211509	−31.313	81.682
211511	−31.255	81.713
211512	−31.191	81.749
211514	−31.162	81.771
211516	−30.999	81.843
211517	−31.000	81.843
211531	−30.438	82.103
211534	−30.358	82.113
211535	−30.339	82.118
211536	−30.312	82.119
211537	−30.283	82.119
211538	−29.030	81.742
211539	−29.155	81.686
211540	−29.106	81.668
211542	−29.153	81.619
211544	−29.152	81.624
211546	−29.135	81.624
211547	−29.142	81.626
211548	−29.140	81.626
211549	−29.157	81.629
211550	−28.720	81.664
211551	−28.680	81.682
211552	−28.686	81.683
211553	−28.417	81.709
211554	−28.224	81.680
211555	−28.241	81.681
211556	−28.236	81.685
211558	−28.259	81.697
211562	−28.253	81.715
211564	−28.044	81.650
211565	−27.680	81.654
211571	−27.663	81.631
211572	−26.932	81.632
211573	−26.762	81.655
211574	−26.400	81.761
211575	−26.382	81.757
211576	−26.382	81.757
211577	−26.370	81.758
211578	−26.348	81.756
211579	−26.313	81.757
211580	−26.293	81.756
211602	−25.995	81.950
211603	−26.076	81.923
211608	−26.013	81.881
211609	−26.003	81.881
211611	−25.994	81.883
211613	−25.989	81.885
211616	−25.915	81.889
211619	−25.876	81.889
211622	−25.876	81.889
211623	−25.876	81.889
211626	−25.883	81.817
211630	−25.810	81.821
211632	−25.501	81.846
211639	−26.007	81.802
211644	−34.928	82.051
211645	−34.884	82.055
211646	−34.856	82.058
211648	−34.836	82.066
211651	−34.784	82.073
211652	−34.775	82.073
211656	−35.714	82.171
211657	−35.674	82.173
211658	−35.639	82.174
211661	−35.503	82.207
211666	−25.936	81.925
211668	−25.969	81.924
211670	−25.977	81.924
211671	−25.994	81.922
211674	−26.024	81.917
211676	−26.052	81.914
211678	−26.078	81.915
211679	−26.117	81.911
211680	−26.149	81.906
211681	−26.172	81.907
211683	−26.216	81.909
211685	−32.593	82.702
211689	−32.708	82.722
211691	−32.735	82.728
211692	−32.758	82.735
211694	−32.779	82.746
211695	−32.788	82.752
211696	−33.326	82.866
211699	−33.354	82.875
213731	−17.170	80.780
213732	−17.170	80.780
213738	−16.893	80.658
213739	−16.893	80.658
213751	−16.317	80.647
213752	−16.317	80.647
213758	−13.932	81.260
213759	−13.932	81.259
213766	−16.950	81.426
213767	−16.950	81.426
213774	−16.640	81.515
213775	−16.641	81.514
213795	−16.184	81.533
213796	−16.184	81.533
213798	−16.185	81.548
213799	−16.185	81.547
217702	−34.080	83.039
217717	−35.307	82.906
217723	−34.106	83.052
217735	−36.514	82.898
217737	−36.555	82.889
217752	−33.822	82.959
217762	−34.010	83.073
217767	−34.094	83.114
217769	−34.097	83.114
217785	−34.431	83.097
217798	−33.459	83.078
217811	−35.505	83.104
218907	−34.279	83.243
218909	−34.458	83.247
218919	−32.009	83.284
218924	−32.219	83.299
218935	−30.781	83.250
218938	−30.784	83.250
218947	−33.936	83.574
218948	−33.872	83.572
218955	−34.038	83.557
218956	−34.367	83.568
218971	−32.864	83.549
218993	−27.680	83.228
218996	−28.008	83.254

Table 9. cont.

GGU No	Long.	Lat.
233101	−36.393	82.199
233102	−36.393	82.199
233103	−36.436	82.199
233104	−35.779	82.222
233105	−35.536	82.211
233106	−34.099	81.674
233107	−34.430	81.683
233108	−34.474	81.649
233109	−27.441	81.287
233110	−27.441	81.287
233111	−28.747	81.247
235202	−26.743	81.783
235204	−26.504	81.383
235208	−25.833	81.448
235209	−25.836	81.446
235210	−25.645	81.440
235213	−24.003	81.096
235215	−23.853	81.128
235217	−23.806	81.134
235218	−23.161	82.847
235221	−27.211	81.993
235223	−27.212	81.992
235225	−27.159	81.998
235226	−26.219	81.981
235228	−25.798	81.906
235230	−25.815	81.899
235232	−27.006	81.632
235234	−26.768	81.663
235236	−27.790	81.761
245305	−35.548	83.092
245315	−35.539	83.089
245428	−40.314	82.245
245429	−40.314	82.245
245432	−37.014	82.306
255649	−34.062	83.557
255709	−30.776	83.364
255717	−31.573	83.353
255721	−31.632	83.471
255742	−27.314	83.336
255743	−27.317	83.336
255744	−27.319	83.336
255776	−31.184	83.186
256054	−24.511	81.263
256056	−24.495	81.268
256135	−25.225	81.188
256136	−25.226	81.188
256266	−28.239	81.429
256267	−28.238	81.429
256270	−28.381	81.414
256295	−32.565	82.210
256296	−32.565	82.211
270218	−30.115	82.238
270260	−26.301	81.839
270262	−26.332	81.839
270264	−26.323	81.838
270319	−32.855	82.126
270322	−33.134	82.086
270324	−33.134	82.086
270325	−33.133	82.087
270327	−33.561	82.049
270329	−33.702	82.038
270335	−33.187	82.183
270337	−33.187	82.183
270338	−33.179	82.183
270339	−33.178	82.183
270341	−33.171	82.183
270342	−33.171	82.183
270343	−33.163	82.183
270345	−33.162	82.183
270346	−33.065	82.175
270350	−32.578	82.213
270351	−31.724	82.166
270352	−31.722	82.167
270353	−31.430	82.171
270354	−31.429	82.172
270360	−26.418	81.984
270365	−26.858	81.938
270367	−26.856	81.913
270368	−26.853	81.913
270371	−27.131	81.905
270372	−27.131	81.905
270373	−27.251	81.895
270374	−27.250	81.895
270375	−27.250	81.894
270376	−27.251	81.895
270378	−26.420	81.927
270380	−26.420	81.927
270381	−26.249	81.882
270387	−26.947	81.797
270388	−26.948	81.798
270389	−27.195	81.778
270391	−26.392	81.759
270392	−26.392	81.759
270393	−25.901	81.837
270394	−25.851	81.861
270396	−25.747	81.889
270397	−25.747	81.889
270658	−35.343	82.313
270730	−34.104	82.909
270732	−34.161	82.903
270734	−34.147	82.893
270738	−34.525	82.844
270807	−32.649	82.988
270821	−29.322	82.984
271008	−22.138	82.835
271009	−22.527	82.890
271010	−22.526	82.890
271013	−24.123	82.822
271014	−24.124	82.823
271017	−25.811	82.993
271903	−27.877	82.003
271904	−27.877	82.003
271906	−29.586	81.773
271908	−29.586	81.773
271909	−31.217	82.000
271910	−31.217	82.000
271913	−32.527	82.204
271914	−32.525	82.205
271915	−28.220	81.431
271916	−28.720	81.391
271917	−30.080	81.650
273237	−56.373	75.692
273249	−56.466	75.636
273256	−56.479	75.658
273297	−33.083	81.816
273559	−24.684	80.850
273561	−24.744	80.836
273563	−24.708	80.847
273566	−24.299	81.266
273568	−23.968	81.259
273570	−24.139	81.248
273572	−24.360	81.264
273574	−27.245	80.963
273576	−27.245	80.963
273578	−26.685	80.998
273580	−26.372	80.972
273582	−25.993	80.893
273584	−25.663	80.940
273586	−25.667	80.955
273588	−25.189	80.978
273590	−25.181	81.046
273592	−25.274	81.048
273594	−25.624	81.054
273596	−25.341	81.123
273598	−25.073	81.170
273600	−25.087	81.189
273903	−19.663	80.588
273906	−18.809	80.609
273910	−20.406	80.009
273913	−21.901	79.812
273915	−22.232	79.866
273917	−16.719	80.524
275505	−37.743	83.158
275517	−36.656	83.369
275522	−31.949	83.204
275544	−37.628	83.428
275553	−37.054	83.404
275578	−35.706	83.537
275586	−35.635	83.519
275591	−34.877	83.534
275595	−35.085	83.561
275600	−35.071	83.541
275617	−34.527	83.634
275622	−34.063	83.616
275639	−36.406	83.206
275656	−34.753	83.192
303530	−39.797	83.119
303557	−40.818	83.046
303563	−40.818	83.041
303582	−40.865	83.240
303584	−40.865	83.240
303606	−39.676	83.357
303632	−40.023	83.139
303645	−39.646	83.413
303655	−38.652	83.422
303674	−38.755	83.150
303901	−33.368	82.880
303902	−33.361	82.886
303904	−33.366	82.890
303907	−33.372	82.896
303908	−33.330	82.930
303910	−33.326	82.944
303912	−33.281	82.945
303913	−33.245	82.946
303914	−32.606	82.921
303917	−32.606	82.924
303918	−32.596	82.930
303920	−32.582	82.934
303921	−32.638	82.993
303923	−32.642	82.997
303924	−32.648	82.999
303925	−32.668	83.002
303927	−33.002	82.769
303928	−33.028	82.769
303929	−33.050	82.770
303931	−33.086	82.771
303933	−33.116	82.771

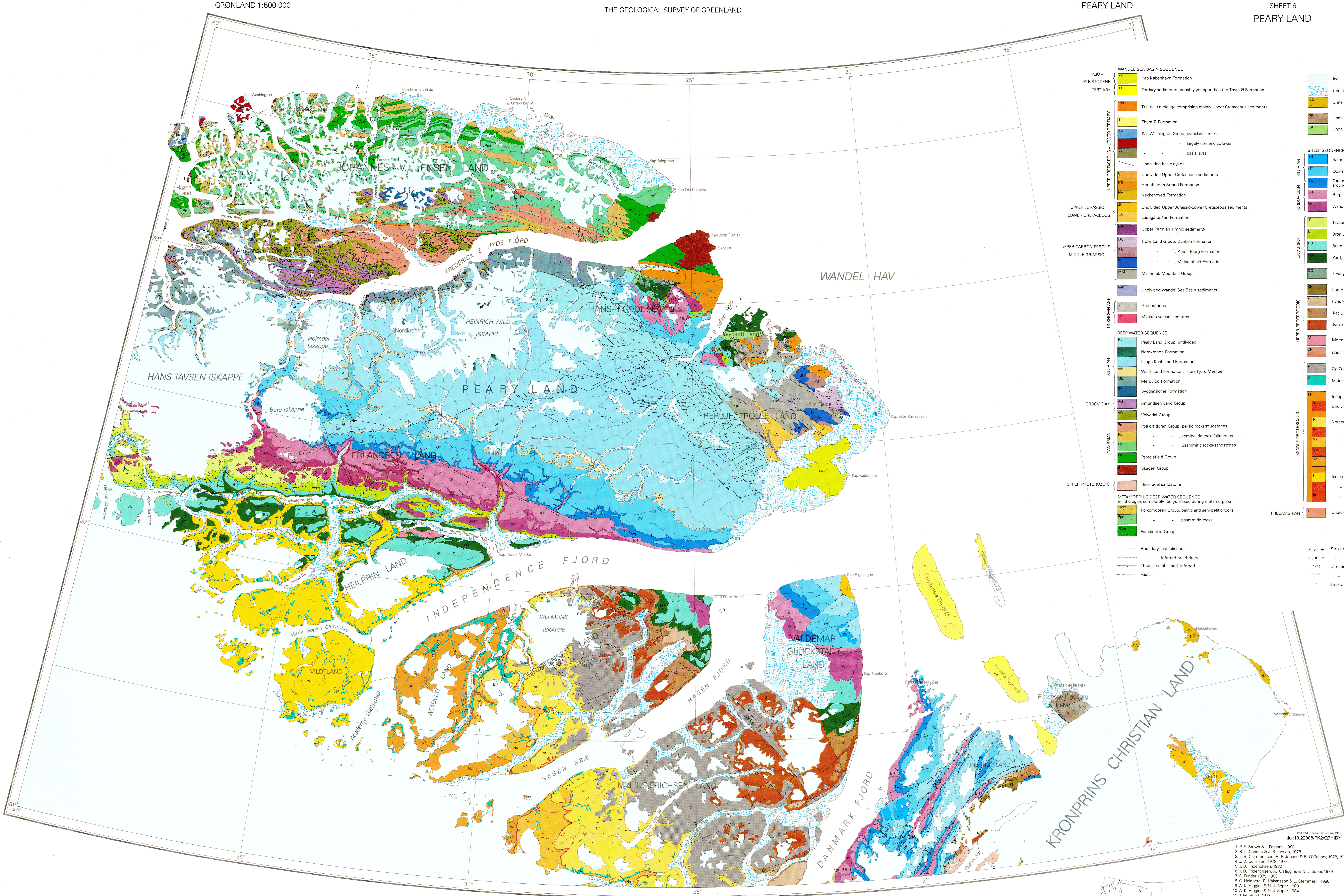
DANMARK
GRØNLAND 1:500 000

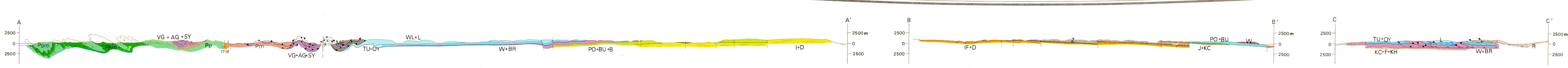
GRØNLANDS GEOLOGISKE UNDERSØGELSE
THE GEOLOGICAL SURVEY OF GREENLAND

GEOLOGISK KORT OVER GRØNLAND
PEARY LAND

GEOLOGICAL MAP OF GREENLAND
SHEET 8

PEARY LAND





WANDEL SEA BASIN SEQUENCE

PLIO – PLEISTOCENE
- KK Kap København Formation

TERTIARY
- Ts Tertiary sediments probably younger than the Thyra Ø Formation

UPPER CRETACEOUS – LOWER TERTIARY
- me Tectonic melange comprising mainly Upper Cretaceous sediments
- Th Thyra Ø Formation
- py Kap Washington Group, pyroclastic rocks
- co " " " , largely comenditic lavas
- ba " " " , basis lavas
- δ Undivided basic dykes
- C Undivided Upper Cretaceous sediments
- HS Herlufsholm Strand Formation
- NA Nakkehoved Formation

UPPER JURASSIC – LOWER CRETACEOUS
- JC Undivided Upper Jurassic-Lower Cretaceous sediments
- LA Ladegårdsåen Formation

UPPER CARBONIFEROUS MIDDLE TRIASSIC
- UP Upper Permian limnic sediments
- DU Trolle Land Group, Dunken Formation
- PB " " " , Parish Bjerg Formation
- MI " " " , Midnatsfjeld Formation
- MM Mallemuk Mountain Group
- WS Undivided Wandel Sea Basin sediments

UNKNOWN AGE
- gr Greenstones
- vc Midtkap volcanic centres

DEEP WATER SEQUENCE

SILURIAN
- PL Peary Land Group, undivided
- NK Nordkronen Formation
- L Lauge Koch Land Formation
- WL Wulff Land Formation, Thors Fjord Member
- ME Merqujôq Formation
- SY Sydgletscher Formation

ORDOVICIAN
- AG Amundsen Land Group

CAMBRIAN
- VG Vølvedal Group
- Pm Polkorridoren Group, pelitic rocks/mudstones
- Ps " " , semipelitic rocks/siltstones
- Pp " " , psammitic rocks/sandstones
- PA Paradisfjeld Group
- S Skagen Group

UPPER PROTEROZOIC
- R Rivieradal sandstone

METAMORPHIC DEEP WATER SEQUENCE
all lithologies completely recrystallised during metamorphism

- Pmm Polkorridoren Group, pelitic and semipelitic rocks
- Ppm " " , psammitic rocks
- PAm Paradisfjeld Group

- Ice
- Undifferentiated Quaternary cover
- NA Units largely covered by superficial deposits, e.g. Nakkehoved Formation
- PP Undivided Upper Proterozoic to Lower Palaeozoic sediments
- LP Undivided Lower Palaeozoic sediments

SHELF SEQUENCE

SILURIAN
- SH Samuelsen Høj Formation
- OY Odins Fjord Formation and Ymers Gletscher Formation, undivided
- TU Turesø Formation (included in Børglum River Formation and Odins Fjord Formation around G. B. Schley Fjord)

ORDOVICIAN
- BR Børglum River Formation (including Sjælland Fjelde Formation in Kronprins Christian Land)
- W Wandel Valley Formation

CAMBRIAN
- T Tavsens Iskappe Group
- B Brønlund Fjord Group
- BU Buen Formation
- PO Portfjeld Formation
- DC ? Early Cambrian dark clastic sediments

UPPER PROTEROZOIC
- KH Kap Holbæk Formation
- F Fyns Sø Formation
- KC Kap Bernhard Formation and Campanuladal Formation undivided
- J Jyske Ås Formation
- M Moræneso Formation
- CF Catalinafjeld Formation

MIDDLE PROTEROZOIC
- Z Zig-Zag-Dal Basalt Formation
- D Midsommersø Dolerites
- IF Independence Fjord Group
- rs Undivided red siltstone
- Nf Norsemandal Formation, Fiil Fjord Member
- Nk " " , Kap Stadil Member
- Na " " , Astrup Fjord Member
- Nh " " , Hagen Bræ Member
- Nc " " , Academy Gletscher Member
- I Inuiteq Sø Formation
- Ih " " , Himmerlanddal Member
- Ib " " , Baggården Member

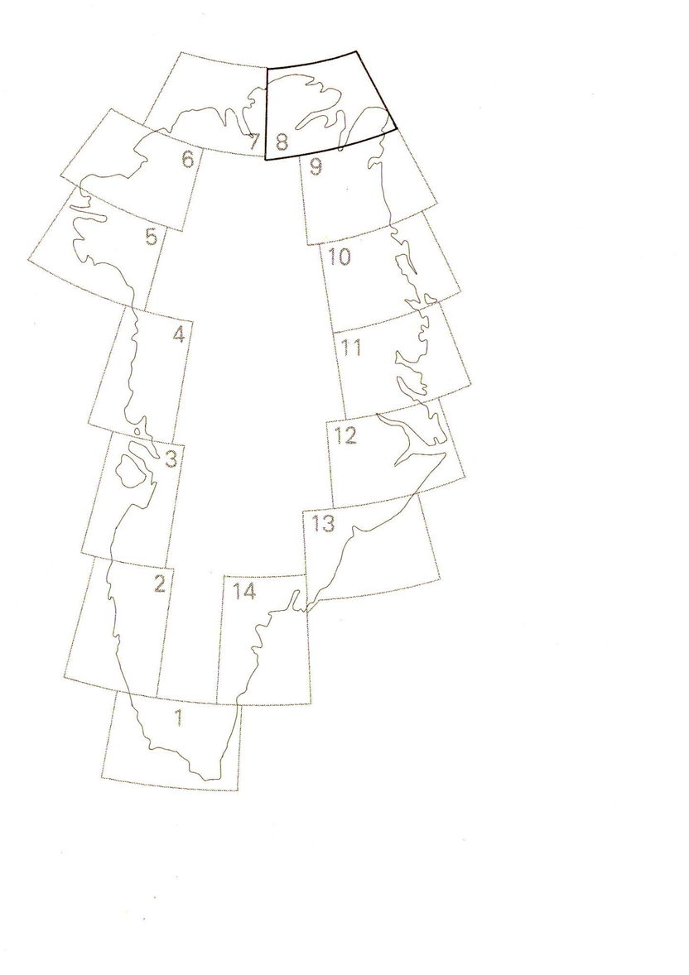
PRECAMBRIAN
- gn Undivided crystalline rocks

- Boundary, established
- " , inferred or arbitrary
- Thrust, established, inferred
- Fault

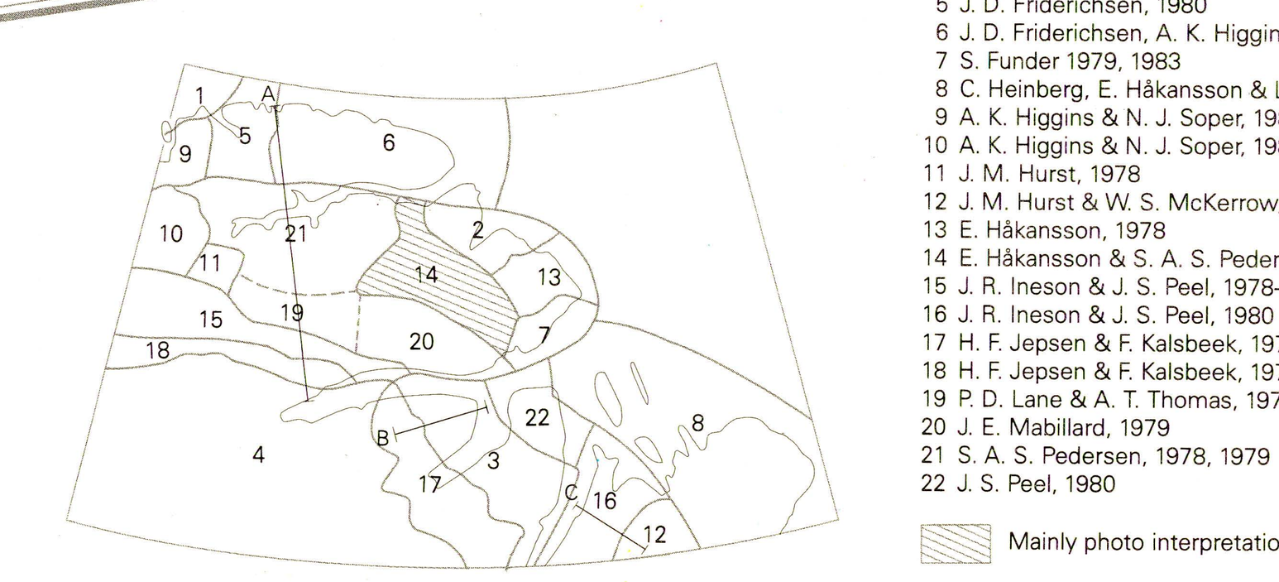
- Strike and dip of bedding
- " " " " foliation
- Direction and plunge of lineation
- " " " " fold axis
- Breccia

1:500 000

0 25 50 km



Trykt ved Geodætisk Institut 1986.
doi:10.22008/FK2/Q7HIDY



1 P. E. Brown & I. Parsons, 1980
2 R. L. Christie & J. R. Ineson, 1978
3 L. B. Clemmensen, H. F. Jepsen & B. O'Connor, 1978, 1979
4 J. D. Collinson, 1978, 1979
5 J. D. Friderichsen, 1980
6 J. D. Friderichsen, A. K. Higgins & N. J. Soper, 1979
7 S. Funder 1979, 1983
8 C. Heinberg, E. Håkansson & L. Stemmerik, 1980
9 A. K. Higgins & N. J. Soper, 1980
10 A. K. Higgins & N. J. Soper, 1984
11 J. M. Hurst, 1978
12 J. M. Hurst & W. S. McKerrow, 1980
13 E. Håkansson, 1978
14 E. Håkansson & S. A. S. Pedersen, 1983
15 J. R. Ineson & J. S. Peel, 1978-1980
16 J. R. Ineson & J. S. Peel, 1980
17 H. F. Jepsen & F. Kalsbeek, 1978, 1979
18 H. F. Jepsen & F. Kalsbeek, 1978, 1980
19 P. D. Lane & A. T. Thomas, 1978
20 J. E. Mabillard, 1979
21 S. A. S. Pedersen, 1978, 1979
22 J. S. Peel, 1980

Mainly photo interpretation with little ground control

Projection: International ellipsoid UTM zone 26

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Geological compilation: H. J. Bengaard and N. Henriksen, 1984

Draughtmanship and lithography: M. Christoffersen

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Map 2

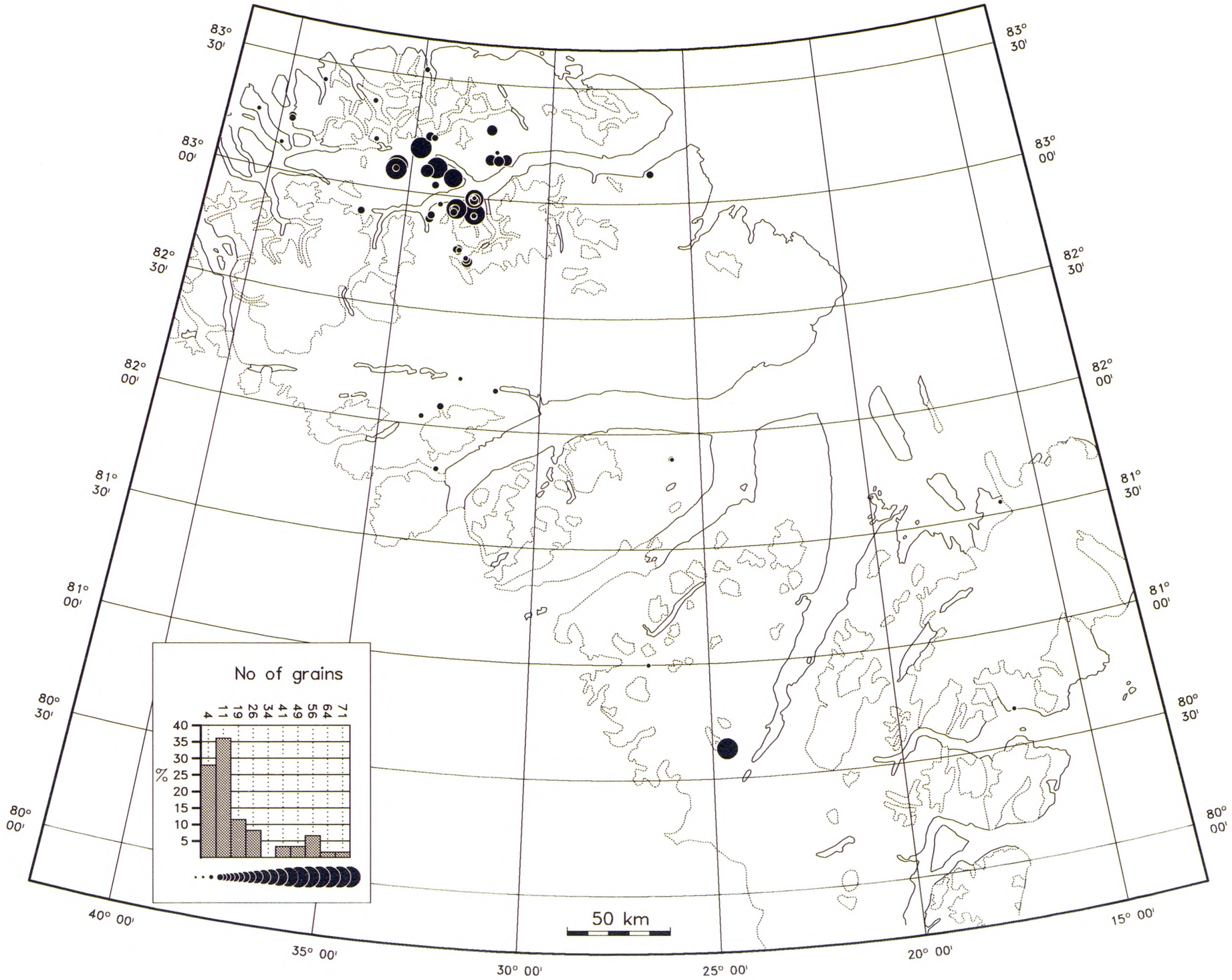
GRØNLANDS GEOLOGISKE UNDERSØGELSE

Sample locations

Map 3

GRØNLANDS GEOLOGISCHE UNDERSØGELSE

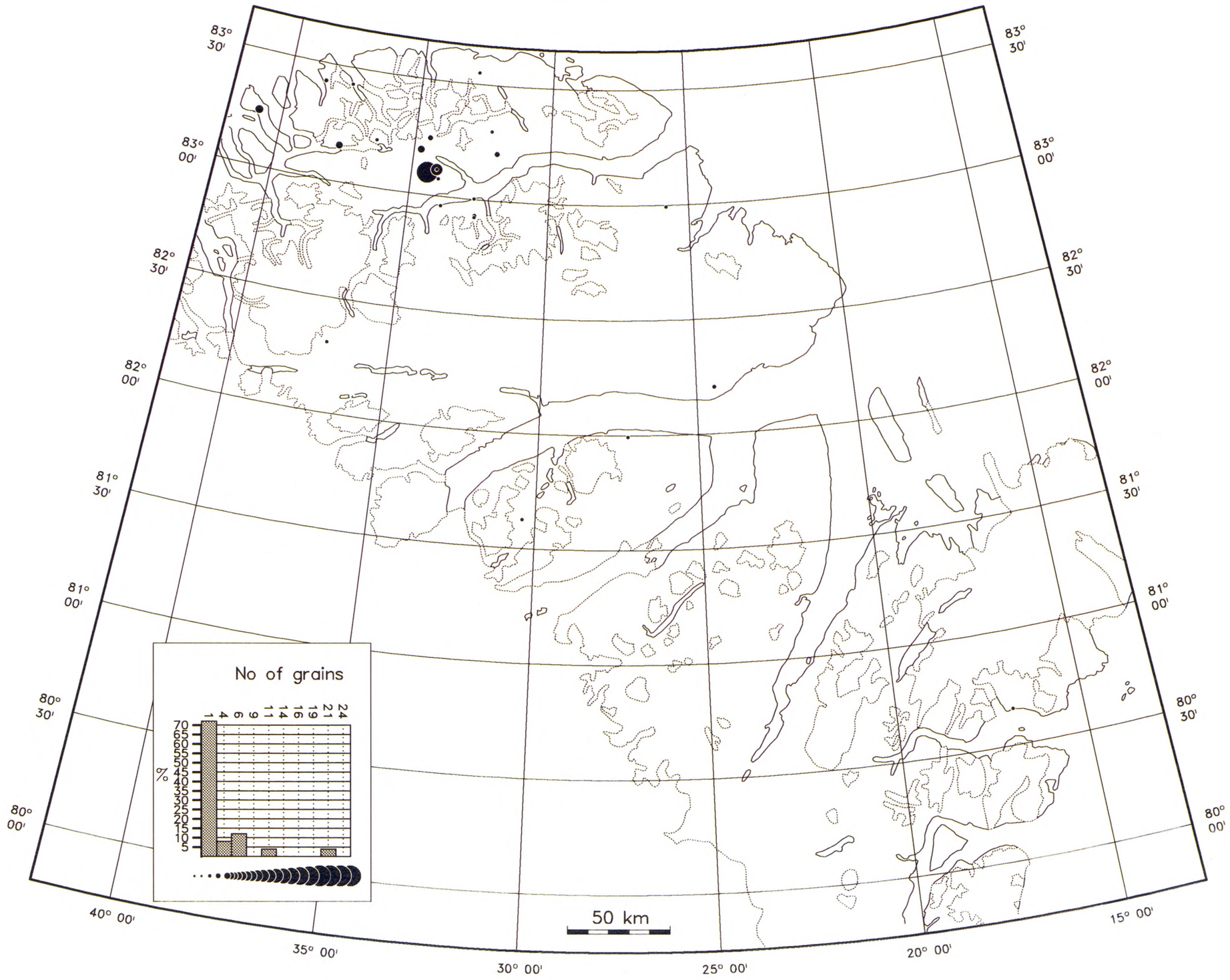
Chalcopyrite in heavy mineral concentrates



Map 4

GRØNLANDS GEOLOGISKE UNDERSØGELSE

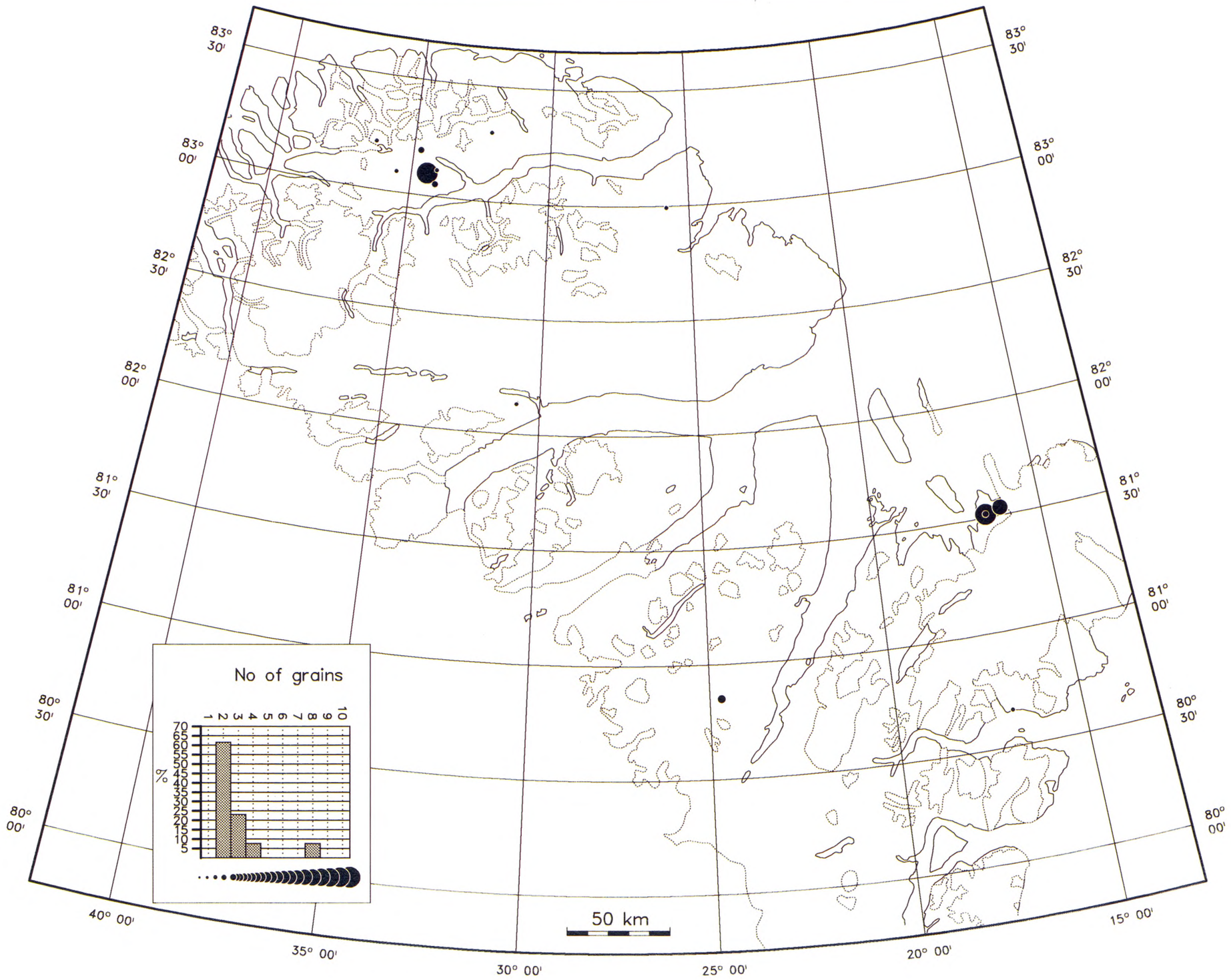
Galena in heavy mineral concentrates



Map 5

GRØNLANDS GEOLOGISCHE UNDERSØGELSE

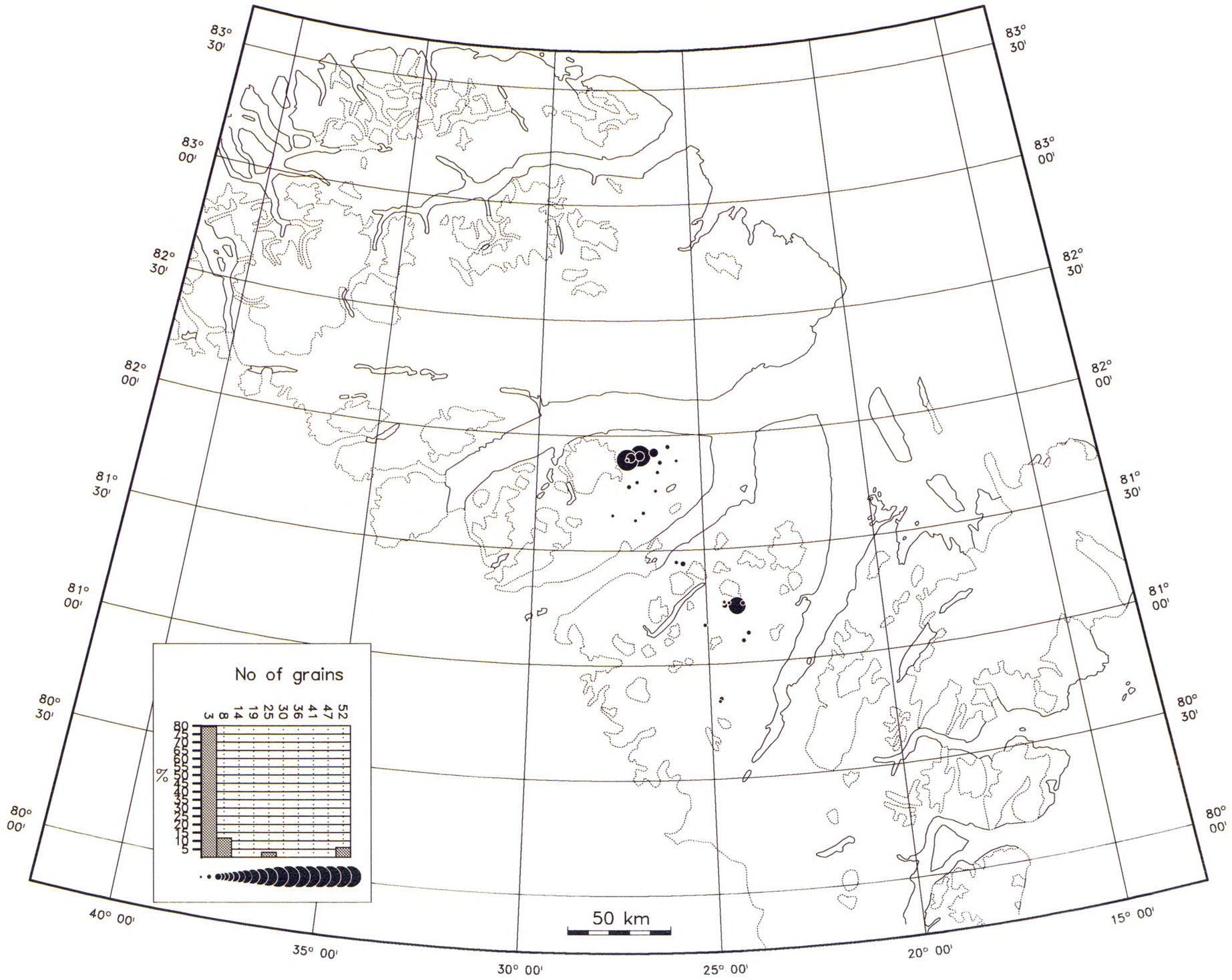
Sphalerite in heavy mineral concentrates



Map 6

GRØNLANDS GEOLOGISKE UNDERSØGELSE

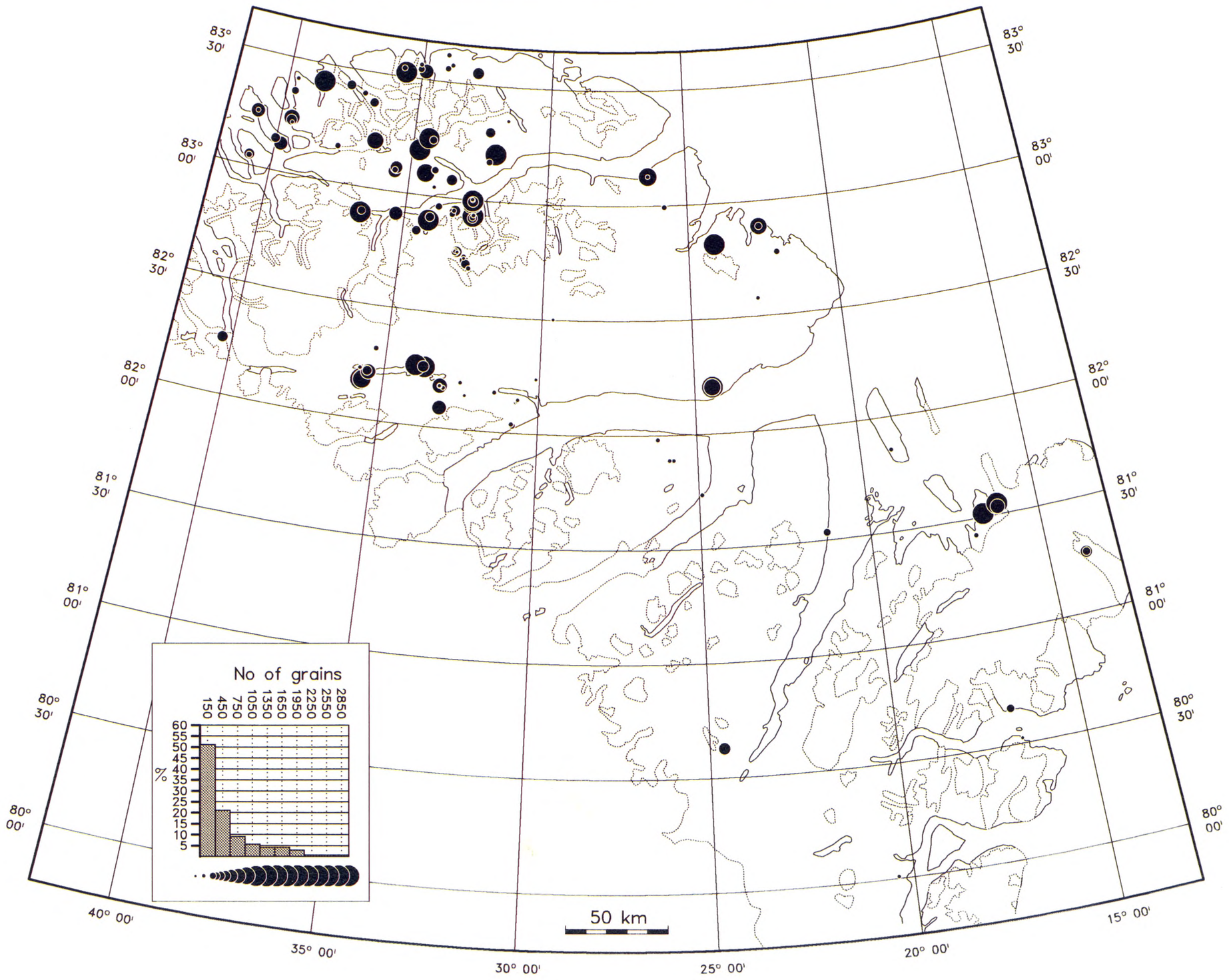
Native copper in heavy mineral concentrates



Map 7

GRØNLANDS GEOLOGISCHE UNDERSØGELSE

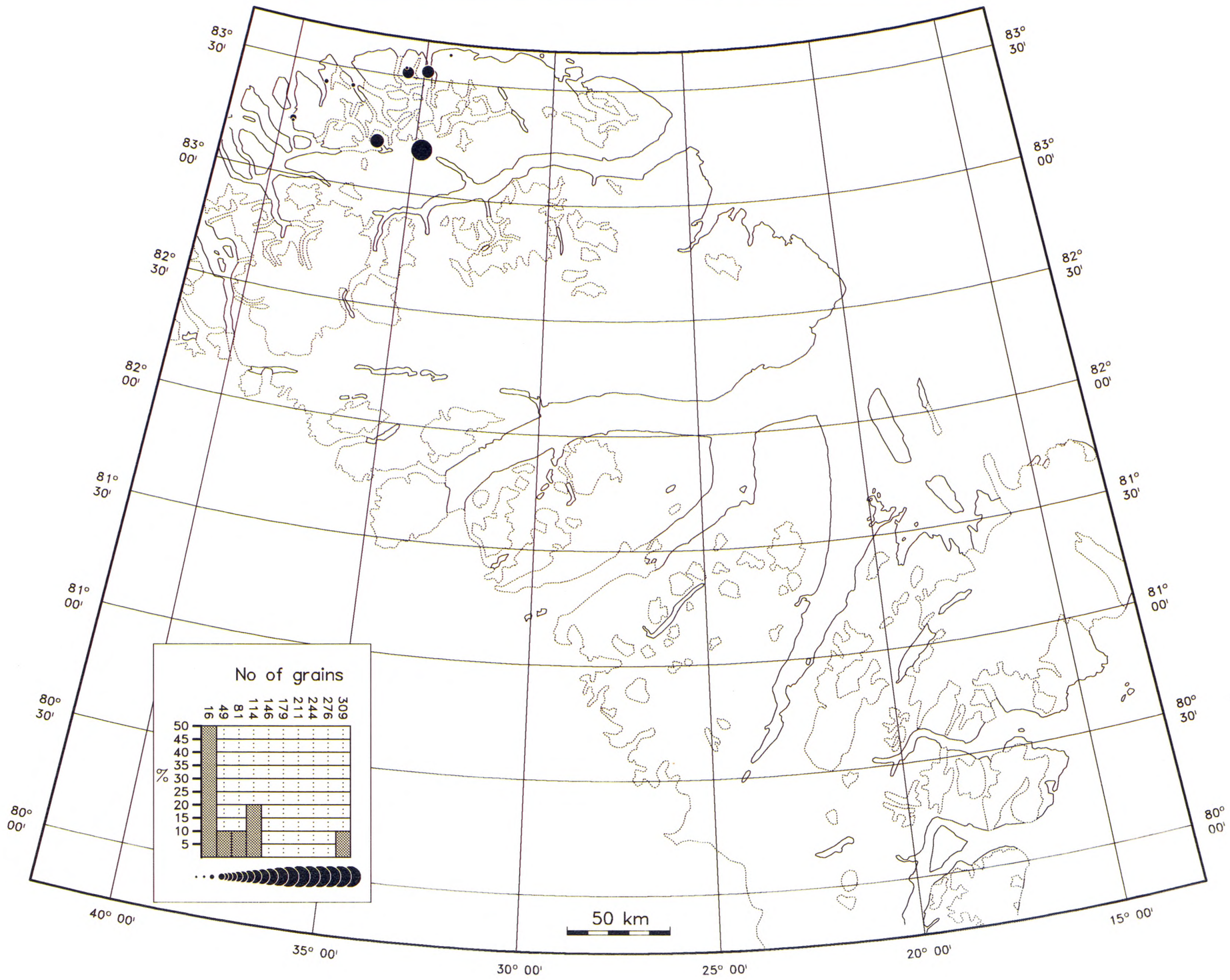
Total iron sulphides in heavy mineral concentrates



Map 8

GRØNLANDS GEOLOGISKE UNDERSØGELSE

Pyrrhotite in heavy mineral concentrates



ISSN 0903-7322