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Reconnaissance for noble and base metals in the Ivigtut-Kobberminebugt area, South Greenland: analytical results

Peter Erfurt and Mogens Lind

July 1990

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ABSTRACT

In the Ivigtut-Kobberminebugt area, a Proterozoic greenstone belt unconformably overlie Archaean gneisses and greenstones. The greenstones comprise four Groups of metavolcanics and metasediments. Stratabound sulphide mineralisation occurs at several levels in the supracrustal pile. An epigenetic bornite-chalcocite deposit containing discrete grains of native gold and electrum occurs in the southern part of the area. This small deposit was mined at the beginning of this century (the Josva Mine). Signs of further epigenetic mineralisation, believed to be a result of reworking of syngenetic stratabound occurrences, are evident elsewhere in the area.

This report presents, in table and map form, the analyses of rock samples collected by GGU during a reconnaissance for gold and base metals in the supracrustals of the area. Analyses for Au, As, Cu, Zn, Ba, Ag, and W are presented. The highest gold value recorded is 5 ppm.

The Ivigtut-Kobberminebugt area is considered to have a potential for noble/base metal deposits of syngenetic stratabound type or epigenetic type.

CONTENTS

1. INTRODUCTION

This report presents analyses of rock samples collected during a reconnaissance for noble and base metal mineralisation performed by the GGU within the Precambrian supracrustal sequences in the Ivigtut-Kobberminebugt area, South-West Greenland.

The investigation was focused on the supracrustal sequence between Arsuk Fjord and Nunarssuit (Map 1), with special emphasis on the areas neighbouring the known gold-bearing copper showings at the Josva Mine where discrete grains of electrum and gold in bornite ore were reported by Harry & Oen (1964).

In order to locate potential sources of noble metals, the rock sampling of lithologies and mineral showings within the supracrustal sequences was made with particular attention to transitions between sedimentary and volcanic suites and to structural breaks (Secher & Kalvig 1987).

2. SUMMARY OF THE GEOLOGY

2.1 REGIONAL GEOLOGY

The Ivigtut-Kobberminebugt area is part of the "Northern border zone" of the Proterozoic Ketilidian mobile belt. Ketilidian sediments and volcanic rocks unconformably overlie Archaean gneisses and supracrustal rocks. From north to south the rocks of the border zone are increasingly affected by metamorphism, deformation and plutonism (Allaart, 1976).
A mid-Proterozoic alkaline igneous province (Gardar province) pierces the older rocks.

2.2 THE SUPRACRUSTAL ROCKS OF THE IVIGTUT-KOBBERMINEBUGT AREA (Map 1)

The supracrustal sequences in the study area, forming greenstone belts, are divided into four main groups (fig. 1).

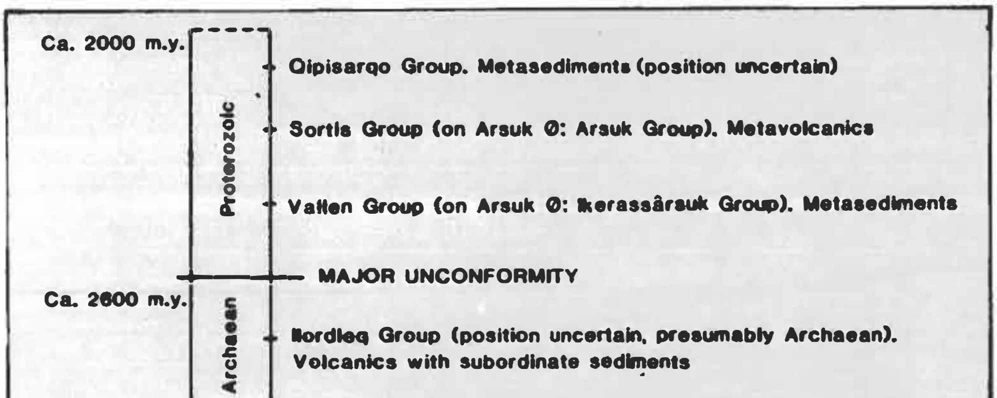
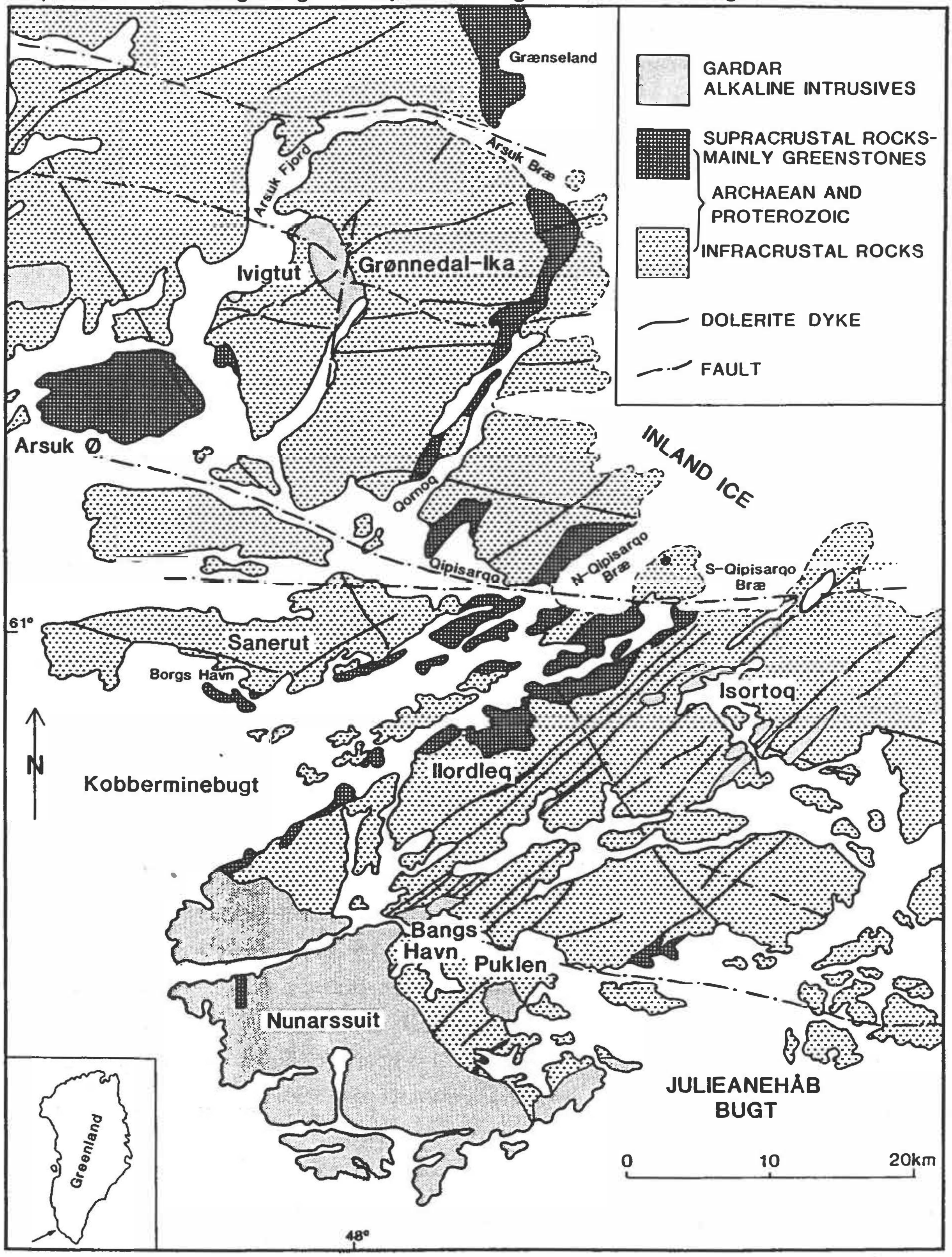


Fig. 1. Stratigraphic positions of the supracrustal units in the study area. (After Allaart, 1976).

Map 1. Generalised geological map of the Ivigtut–Kobberminebugt area.



Dissecting fjords and an increasing amount of invading granite and pegmatite material towards the southern part of the area breaks the succesion up into isolated fragments. Correlation between the fragments are difficult or uncertain (Secher & Kalvig, 1987).

The distribution and lithlogy of the main groups of the area are summarised below.

Archaean (?)

The Ilordleq Group comprises an ENE-trending greenstone belt extending along the southern shore of Kobberminebugt towards the Inland Ice (Allaart, 1976). It consists of intermediate and basic volcanic rocks with intercalated metasediments (black shale, pelite, graywacke), pyroclastic material and a few calcareous units. It is metamorphosed in upper greenschist facies. An upper unit consists of homogenous metavolcanic rocks and porphyritic metabasalts. In South-western Kobberminebugt pillow structures are recognisable in metavolcanic rocks, and several shear zones marked by the development of mylonitic schists are concordant with the lithological layering (Harry & Oen, 1964).

The precise age of the Ilordleq Group is unknown; it possibly has a pre-Ketilidian (Archaean) stratigraphic position (Secher & Kalvig, 1987).

Ketilidian

The Ketilidian supracrustal belt occurs along the ice margin from Grænseland (not considered here) in the north to the northern shore of Kobberminebugt in the south. A smaller part of the belt occurs on and around Arsuk Ø. The estimated thickness of the intire supracrustal belt is around 6000 m (Allaart, 1976).

The Vallen and Sortis Groups extend south of Arsuk Bræ, rapidly thinning out towards Qipisarqo (Allaart, 1976; Berthelsen & Henriksen 1975). The sedimentary Vallen Group here consists of mica schists with often prominent intercalations of quartzite, calcareous schists and dolomitic marble. It is succeeded by the Sortis Group consisting of tuffitic/rhyolitic rocks and basic metavolcanics. The latter occur as fine to medium grained amphibolitic greenstones and greenschists.

On Arsuk Ø, the sedimentary Ikerassârsuk Group and the overlying mainly volcanic Arsuk Group show similarities to,and can be correlated with, the Vallen and Sortis Groups respectively (Allaart, 1976).

At Qipisarqo the width of the exposed area of the Vallen and Sortis Groups is less than a 1000 m. Here the presumed southern extension of the Sortis Group is succeded by the predominantly sedimentary rocks of the Qipisarqo Group, which consists of 100-200 m of conglomerate overlain by pelite and semipelite (Allaart, 1976). Most of the supracrustal rocks south of

Qornoq, along the western margin of North-Qipisarqo Bræ, and on the northern shores of Kobberminebugt belong to the Qipisarqo Group.

The supracrustal units have been isoclinally folded and fractured on a small to large scale. Tectonic breccia zones are observed frequently and conglomerate pebbles are severely flattened, indicating a high degree of regional deformation (Secher & Kalvig, 1987). The Ketilidian supracrustal sequence is characterised by metamorphism increasing southwards and ranging from low greenschist facies in the north to amphibolite facies in the Qipisarqo-Borgs Havn area.

Basic, intermediate and acid dykes cut all the supracrustal units. They are generally rather narrow (0.2-2 m), but fairly consistent along strike. Pegmatites with muscovite, garnet and black tourmaline are widespread and may reach a width of 50 m. Dykes and pegmatites usually strike in an E-W direction.

2.3 MINERALISATION (after Secher & Kalvig, 1987; Harry & Oen, 1964)

Sulphide mineralisation occurs in both volcanic and sedimentary layers as stratabound disseminated mineralisation. The parageneses encountered are simple and dominated by pyrite and chalcopyrite. They are grouped by Secher & Kalvig (1987) into types, as follows:

I: Pyrite ± magnetite.
II: Pyrite + chalcopyrite.
IIa: Pyrrhotite-pyrite ± chalcopyrite.
III: Chalcopyrite ± galena.
IV: Bornite-chalcocite-chalcopyrite.

Type I occurs in schists. Locally the rock can be termed greenschist, and this rock at one place includes a BIF horizon traceable for several km's along strike and up to 1 m wide.

Type II is hosted by greenschist and quartzite. Late quartz veins are common and often mineralised where cutting the sulphide enriched schist.

Type IIa is found in micaceous and graphitic schists. The graphite content may reach 20% by volume. Pyrrhotite is the dominant sulphide mineral.

Type III occurs in marble horizons. Sulphides occur disseminated, galena however, is rare and locally found as nodules.

Type IV is the only paragenesis apparently influenced by hydrothermal activity. It is often accompanied by a suite of accessory minerals such as epidote and fluorite.

Gold has been found in types III and IV (Kinâlik, Josva Mine).
Malachite is common as coatings on the copper sulphide-bearing rocks,

although many chalcopyrite occurrences have not been affected by supergene alteration. Fig. 2 and Table 1 (Secher & Kalvig, 1987) summarises the known mineralisations in the supracrustal rocks in the area.

2.3.1 BORNITE-CHALCOCITE-(CHALCOPYRITE) MINERALISATION (TYPE IV) IN THE ILORDLEQ GROUP (Harry & Oen, 1964 ; Ghisler, 1968)

The best known economic mineral occurrence in the Kobberminebugt area is the copper ore (bornite-chalcocite) at Josva Mine, which was mined 1853-1855 and again 1905-1914. During the latest venture the Lillian Mine was also explored. It was situated about 1.5 km SW of the main Josva Vein and presumably representing the continuation of the latter. An adit was driven, but as far as is known no copper ore was at all extracted. Total production from the Josva Mine did not exceed 90 tons of copper with small additional amounts of gold and silver.

Important concentrations of bornite and chalcocite occur only along major faults and shear zones. The Josva Vein is a mineralised fault breccia. The fault is concordant with host rock layering. It separates mylonitised felsitic schists in the footwall from amphibole schists in the hanging wall. The fault zone is about 130 cm's thick, hereof sulphides make up 0-30 cm occurring as lenses about 10x8x5 cm. The lenses consist of bornite with appreciable amounts of chalcocite and accessory ilmenite, magnetite, haematite, chalcopyrite, electrum and native copper. They contain streaks and pockets of epidote and actinolite.

At the Lillian Mine the presumed prolongation of the Josva Vein is bordered on both sides by amphibole schist. The fault zone is much thinner and lacks the bornite-rich zone with sulphide lenses. Strongly mylonitised schists are impregnated with alkali feldspar, epidote, actinolite and garnet. Bornite and chalcocite occur in the actinolite streaks and pockets and are also found interstitially between the other minerals.

West of the Lillian Mine, at Rødtop, a number of smaller mylonite zones occur in greenstones and porphyritic aplite. Chalcocite is the dominant ore mineral, although magnetite locally dominates the ore paragenesis.
A few small rounded grains of native gold have been observed as inclusions in bornite and chalcocite.

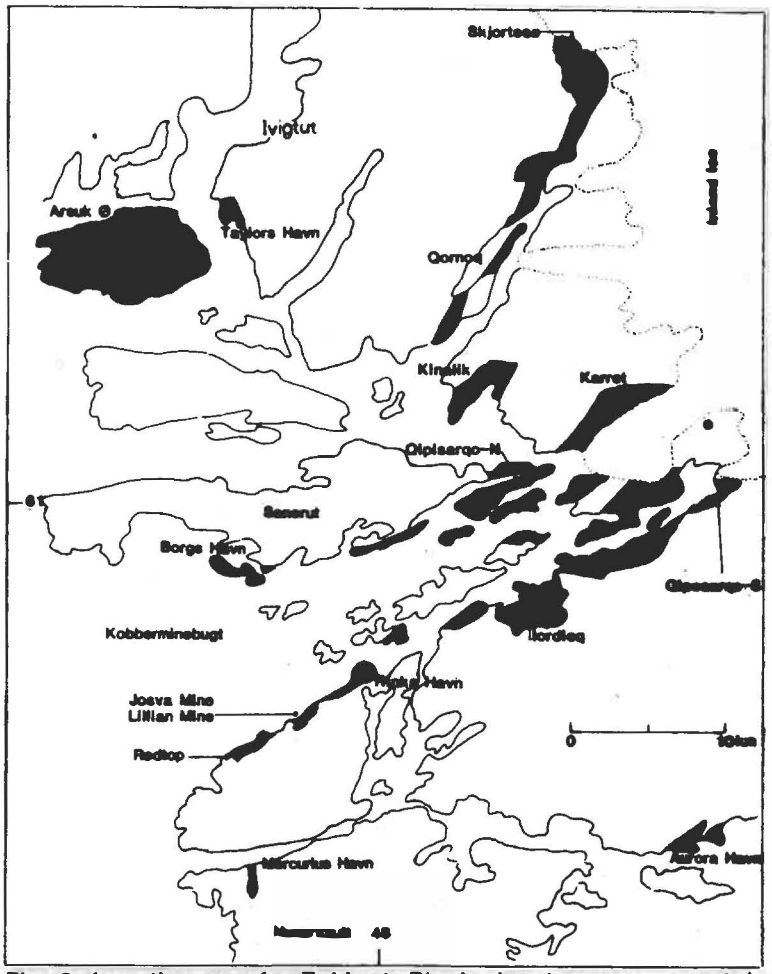


Fig. 2. Location map for Table 1. Black signature = supracrustals. Modified from Secher & Kalvig, 1987.

Table 1. Sulphide occurrences in the Ivigtut–Kobberminebugt area.

Locality	Ore minerals	Para-genesis	Host rock	Texture of ore minerals	Sulphide vol.%	Thickness m
Skjortesø	py, cp	II	Marble	dissem, massive	5 – 50	A
Skjortesø	py	I	Phyrite schist	dissem	5 – 10	B
Skjortesø	py, cp	II	Quartzite	dissem	5 – 15	A
Skjortesø	py, cp	II	Q-vein	patchy	1 – 5	A
Qôrnoq	cp, ga	III	Marble	patchy	< 1	A
Qôrnoq	py, mg	I	Schist	stringer	< 1	A
Qôrnoq	py	I	Mica schist	dissem	1 – 5	B
Kînâlik	cp	III	Marble	dissem	1 – 5	A
Kînâlik	cp	II	Q-vein	patchy	< 1	A
Karret	py, ph	IIa	Mica schist	dissem, massive	5 – 25	B
Qipisarqo-N	cp	II	Conglomerate	dissem	1 – 5	B
Qipisarqo-N	py	I	Quartzite	dissem, stringer	1 – 5	B
Qipisarqo-N	py, mg	I	Greenschist	dissem	1 – 5	A
Qipisarqo-S	cp, py, ph	IIa	Black schist	dissem, massive	10 – 20	B
Borgs Havn	cp, py	IIN	'Tectonite'	massive	10 – 50	B
Borgs Havn	cp, py	II	Greenschist	dissem, massive	5 – 15	B
Borgs Havn	py	I	Quartzite	dissem	1 – 10	B
Ilordleq	cp, py	II	Greenschist	dissem	< 1	A
Rinks Havn	cp, bo	IV	Mica schist	stringer, dissem	5 – 10	A
Josva Mine	cp, bo, mg	II – IV	Greenschist	dissem, stringer	1 – 5	B
Josva Mine	cp, bo, co	IV	Q-vein	patchy	5 – 20	B
Lillian Mine	cp, bo, co	IV	Q-vein	patchy	< 1	A
Rødtop	cp, co	IV	Q-vein	patchy	1 – 5	B
Rødtop	py	I	Rhyolite	dissem	< 1	A
Mercurius Havn	py, py	II	Greenstone	dissem	1 – 5	A
Aurora Havn	py	I	Metabasite	dissem	1 – 5	A
Taylors Havn	py	I	Graphite schist	dissem	5 – 10	B

1. Ore minerals
2. Paragenesis
3. Host rock
4. Texture of the ore minerals
5. Estimated sulphide vol. percent
6. Thickness of mineralised sequence: A = < 1 m, B = > 1 m

py pyrite
cp chalcopyrite
ga galena
ph pyrrhotite
mg magnetite
bo bornite
co chalcocite

Secher & Kalvig, 1987.

3. SAMPLING-ANALYSIS

The analysed samples total 378. All are rock samples, i.e. grab samples of sulphide-bearing rocks or specimens of characteristic rock types. Multi-element analyses have been performed - table 2.

Table 2. Analytical methods and detection limits.

1. Instrumental Neutron activation analysis by Bondar-Clegg & Co. Ltd, Ontario:

Element	Detection limit
Au	2 or 5 ppb
As	0.5 or 1 ppm
Zn	100 or 200 ppm
Ba	50 or 100 ppm
Ag	2 or 5 ppm
W	1 or 2 ppm

2. X-ray fluorescence by the Geological Survey of Greenland:
   In this report the method applies to Cu, Zn and Ba values in all samples analysed for copper.

Element	Detection limit
Cu	25 ppm
Zn	5 ppm
Ba	50 ppm

0 in the analytical results indicates a value below the detection limit.

4. PRESENTATION OF DATA

Enclosed are:

Table 3 presents analyses for the individual samples, with a short rock description of each sample.

Map 2 shows the sample localities in 1:100 000. Sections A and B are dense sampled areas, enlarged for clarity.

Maps 3 & 4 are semi-transparent maps in 1:100 000 of gold and silver in the rock samples. The radius of the circles is linear proportional to the metal concentration of the sample (see scaling factors (sc) on the maps).

Map 3: Gold. Maximum radius (1 cm) equals 500 ppb. Gold concentrations above 500 ppb are written in the circles.

Map 4: Silver. Maximum radius equals 20 ppm. Higher concentrations are not quantified on the map.

Maps 5 to 11 are semi-transparent 1:350 000 maps of Au, As, Cu, Zn, Ba, Ag and W in rock samples. They are presented for easy-to-handle comparison with each other. Maximum radius (0.25 cm) equals: Au: 500 ppb, As: 100 ppm, Cu: 500 ppm, Zn: 500 ppm, Ba: 1000 ppm, Ag: 20 ppm, W: 500 ppm.

Steenfelt (1990) has published regional geochemical data, i.e. 1:500 000 maps showing gold and arsenic content of stream sediment samples from South Greenland.
Maps 12 & 13 are parts of these 1:500 000 maps shown in the same scale and covering the same area as maps 5-11. They are presented for comparison.
Map 12: Gold. Maximum radius equals 100 ppb.
Map 13: Arsenic. Maximum radius equals 100 ppm.

Maps 3 to 13: Element concentration $= \frac{\text{radius}}{\text{scaling factor}}$.

5. DISCUSSION

Mineralisation in the supracrustal rocks of the Ivigtut-Kobberminebugt area is divided into two main types.

A. An epigenetic stratabound low-sulphur copper sulphide type related to faults and shear zones in the Ilordleq Group (see 2.3.1). According to Ghisler (1968) iron and copper were leached from the greenschist host rocks by circulating hydrothermal fluids. Faults and shear zones proved ample passageways for the mineralising fluids, and bornite, chalcocite and magnetite with minor gold and silver were deposited within these zones of movement.

The existence of minor pyrite-chalcopyrite mineralisation in the Ilordleq Group supports the assumption that the copper source was pre-existing mineralisation in the greenschists. Thus the bornite-chalcocite mineralisation with its raised gold and silver contents is an example of a high grade epigenetic copper deposit formed by reworking of older low grade disseminated mineralisation.

Ghisler (1968) connects the mineralising hydrothermal system to a late Gardar (post Ketilidian) intrusion of biotite granite. Another possibility is a hydrothermal system comprising circulation of fluids during metamorphism and deformation.

B. Syngenetic statabound pyrite-chalcopyrite-dominated volcanic-sedimentary exhalative mineralisation in the Qipisarqo and Vallen-Sortis Groups. The mineralisation commonly occurs in schists, quartzites, amphibolites and marble horizons. It seems related to basic metavolcanics (Secher & Kalvig, 1987). Gold and silver are locally enriched in the rock samples, silver not always in connection with gold but occasionally with arsenic. Also copper and tungsten are found in elevated concentrations, the latter very locally.

The barium content of the rock samples is generally lower than in the Ilordleq Group, but occasional high values are found. These often represent lamprophyre dykes, but relatively high Ba-values are also seen in sulphide mineralised schists and amphibolites. At present, however, no relation between Cu-Zn-Ba has been established indicating a zoning pattern.

While the syngenetic disseminated mineralisation is widespread, locally with pyrite-chalcopyrite grading into massive sulphide deposits, high concentrations of gold, silver and tungsten are found only in a few samples from a small number of localities. Mostly the host rocks are pegmatites, veins and skarn/marble horizons. Minor enrichment is seen in zones of movement. In a single instance a high gold value is seen in a sulphide mineralised schist. The implication is that deformation and metamorphism-induced hydrothermal activity gave rise to the concentration of metals, and upgraded mineralisation.

The economic significance of the mineralisation thus is twofold:

1) The disseminated exhalative mineralisation may grade into larger massive sulphide deposits.

2) The disseminated sulphides may have acted as a source from which base/ noble metals have been remobilised and reprecipitated in epigenetic structures.

In conclusion:

A. The mineralisation potential in the investigated area comprises in the Ilordleq Group the possibility of further epigenetic copper-gold mineralisation in faults and shear zones.

B. In the Qipisarqo and Vallen-Sortis Groups there is the potential of syngenetic stratabound massive sulphide mineralisation. Furthermore there is a potential for epigenetic gold deposits associated with veins and faults/shear zones.

Finally there seems to be a possibility for the existence of gold-tungsten skarn-related deposits.

C. Whatever the cause of the hydrothermal activity forming the epigenetic mineralisation in the supracrustal sequence, the association of metal concentration with faults and shear zones necessitate a full understanding of the structural pattern in the area.

D. Testing of the extension of localities with higher metal grades found in the rock samples point towards a chip sampling programme.

6. ACKNOWLEDGEMENTS

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Table 3. Noble and base metal analytical results with short rock descriptions.
Pyrite=py, bornite=bo, chalcocite=ch, chalcopyrite=cp, magnetite=mg, pyrrhotite=ph, hematite=he, galena=ga.

LITHOLOGY	SAMPLE	DESCRIPTION	Au (ppb)	As (ppm)	Cu	Zn	Ba	Ag	W
ILORDLEQ GROUP ↓	333737	Greenstone with some py.	<5	2		<200	830	<5	<2
	343212	Metabasite with epidote cracks. Surrounded by granite.			570	151	735		
	343213	Rock with mg from contact metabasite-granite.	<5	4		450	170	<2	<3
	343214	Metabasite with disseminated mg.	<2	13		240	540	<2	<1
	343215	Ultramafic lens (0.3x0.7m) from metabasite. Mg-rich layers.			392	127	1072		
	343216	Metabasite with epidote spots/cracks. Cp 1-5 %.	<5	13		260	<100	<5	7
	343218	Metabasite.	<2	5	159	<100	1100	<2	<1
	343220	Greenstone with cavity filling of he.	<2	5		270	250	<2	4
	343222	Ph vein in greenstone. Gradual change from syenite pegmatite.	<2	5		1200	94	<2	4
	343224	Greenstone with epidote nests and veins.	<2	19	805	140	410	<2	<1
	343226	Greenstone with epidote. In epidote 1-5 % py.	<5	10		<200	210	<5	5
	343227	Greenstone with spherules of polymineral crystals.			501	89	483		
	343228	Granite with lens of soft minerals.			0	58	403		
	343229	Homogeneous greenstone.			293	389	383		
	283101	Hornblende porphyrite.			29	118	608		
	283102	Hornblende porphyrite.			41	492	1121		

283103	Epidotised greenstone.			151	337	793		
283105	Metadolerite.			101	124	1725		
283108	Josva Vein breccia. Bo 5-10 %.	995	2		250	680	450	<36
283109	Josva Vein breccia. Bo 5-10 %.	140	3		220	930	55	<61
283110	Mafic felsite.			114	103	1370		
283112	Mafic felsite.			243	97	1765		
283114	Altered dolerite with bo-stringers.			5596	66	1470		
283119	Calcite vein with cp.	14	2		<200	310	<5	6
283121	Felsite with sporadic disseminated cp <<1 %.			492	6	772		
283137	Quartz porphyrite.	28	<1		<200	450	<5	344
283138	Fissured greenstone.	42	<1		420	1700	<5	52
283139	Epidotised greenstone.	10	4		320	1200	<5	41
283140	Greenstone with py+cp 1-5 % over 1 m zone.	<5	1		<200	950	<5	110
283142	Quartz porphyrite with 3mm fissure filled by quartz + Ch.	15	<1		<200	560	16	401
283143	Fine-banded quartz porphyrite.			185	0	126		
283144	Greenstone, hornblende and plagioclase porphyritic.	12	2		210	920	<5	73
283148	Greenstone, south flank of 283150.	12	5		<200	2000	<5	120
283150	Cu-mineralisation. Epidote-mg-bo 10-30 %.	120	7		250	<100	53	<60
283151	Uralitizised greenstone, flank of 283150.	11	11		240	2500	<5	100

283152	Greenstone with hornblende rosettes, near 283150.	15	6		290	1300	<5	83
283153	Hornblende porphyrite.			304	138	1132		
283155	Massive bo. From 10 cm quartz vein in coarse-grained hornblende porphyritic greenstone.	2410	1		<200	470	522	<140
283156	Coarse-grained hornblende porphyrite.	14	6		<200	690	<5	52
283157	Hornblende porphyrite with <1 % disseminated bo.	67	6		220	800	<5	82
283158	Epidotised hornblende porphyrite.	55	17		<200	100	<5	170
283160	Uralite greenstone.			239	103	992		
283164	Flattened plagioclase porphyrite.			315	118	2198		
283166	Agglomeratic greenstone.			127	84	1388		
283168	Mafic felsite.			155	112	1094		
283172	Epidotised felsite.	22	2	685	45	1433	<5	365
283173	Epidotised felsite with mg+malachite on contact to greenstone.	21	3		<200	2000	68	<110
283176	Feldspar porphyrite with <1 % bo on contact to greenstone.	<5	<1		910	230	22	230
283177	Feldspar porphyrite with with disseminated ph+cp 5-10%.	9	<1		220	1200	<5	247
283178	Greenschist. Cp 1-5 %.	<5	10		260	1100	<5	69
283179	Greenschist. Cp 1-5 % + cp in fissures.	<5	12		350	1800	<5	63
283180	Greenschist. Cp 1-5 %.	5	11		360	1200	6	51
283181	Hornblende greenschist with coarse-grained part. Cp+bo 1-5 %.	11	7		460	1900	<5	42

283182	Epidotised greenschist. Cp 1-5 %.	21	12	380	2000	<5	46
283183	Flattened plagioclase porphyrite. Cp+bo <1 %.	<5	12	450	1100	<5	59
283184	Epidotised plagioclase greenschist. Cp+bo 1-5 %.	<5	11	630	1600	7	53
283185	Fine-grained mica greenschist. Cp+bo 1-5 %.	14	9	640	1400	12	35
283186	Mica greenschist. Cp 5-10 %.	10	8	820	1400	10	32
283187	Pegmatite in greenschist. Cp 1-5 %.	9	5	<200	560	<5	207
283188	Mica greenschist. Cp+bo 5-10 %.	22	9	650	1800	34	<49
283189	Greenschist. Bo 1-5 %.	13	8	600	1800	13	43
283190	Greenstone.	<5	7	690	1700	<5	47
283191	Fine-grained granite.	<5	2	230	3600	<5	130
283193	Epidotised greenstone.	<5	9	470	250	<5	98
283194	Greenstone with red feldspar stringers. Bo 1-5 %.	14	7	640	1100	21	79
283195	Epidotised greenstone with <1 % disseminated bo and bo in veinlets.	8	10	580	2100	<5	77
283196	Epidotised greenstone with bo in veinlets.	10	10	430	3900	<5	88
283197	Greenstone. Bo+cp <1 %.	<5	11	540	580	<5	58
283198	Granite lens. Bo <1 %.	8	2	210	2800	<5	110
283199	Fine-grained granite with ph specks.	<5	<1	<200	790	<5	200
283200	Epidotised greenstone.	9	11	270	870	<5	56
283201	Epidotised greenstone. Bo 1-5 %.	10	10	490	680	<5	59

283202	Epidotised greenstone.	10	11		520	250	<5	58
283203	Grey fine-grained hornblende carrying granite.	7	1		<200	1500	<5	248
283204	Epidote lens with 1- 5% bo.	28	11		430	460	<5	82
283205	Epidotised greenstone with ch+bo (from mine shaft).	6	8		510	1900	<5	120
283206	Greenstone, cataclasis.	26	2		260	640	<5	46
283207	Hematitisised crushed dyke rock.	19	2		230	1500	<5	28
293209	Cataclastic greenstone from crushed contact.	7	3		<200	900	<5	13
283212	Epidotised plagioclase porphyrite with bo <<1 %.	30	9	248	55	670	<5	201
283213	Calcite-he vein filling.	6	3		<200	650	<5	96
283214	Quartz-filled gash with sporadic bo, cp, mg.	130	<1		<200	<100	8	904
283215	Fracture filled with red calcite.	14	<1		<200	<100	<4	49
283217	Fracture with orange calcite. Wall rock brecciated.	9	<1		<200	<100	<5	10
283218	Bo+covellite nest in shearzone in epidote-greenstone.	120	<1		300	<100	1280	<49
283219	Greenstone from mineralised shearzone, with malachite.	<5	<1		450	130	<5	50
283221	Black calcite, from fracture in greenstone.	24	1		780	160	<5	59
283222	Flattened plagioclase porphyrite.	12	6		<200	1600	<5	64
283223	Carbonate-quartz rock layer in greenstone.	10	4	42	145	250	<5	61
283246	Felsite.	<5	<1	132	<200	280	<5	259
283247	Epidotised greenstone.	5	2	213	<200	<100	<5	63

283250	Pale banded felsite, py+cp <1 %.			56	0	328		
283252	Granite with patchy chalcopyrite.	9	<1		<200	470	<5	319
283253	Xenolite from dyke with 1-5 % cp. Xen= quartzitic gneiss + gabbro.	370	<1		<200	<100	<5	913
283254	Felsite, mafic with disseminated bo 1-5 %.	83	2		310	1100	17	120
283256	Greenstone, cp+bo 1-5 %.	300	11		290	180	22	75
283257	Vein material, cp+bo 1-5 %.	41	20		290	180	<5	110
283258	Epidotised felsite, cp+bo <1 %.	10	7		<200	3000	<5	90
283262	Hornblende-porphyritic greenstone.			168	70	918		
283263	Hornblende-porphyritic greenstone, in situ epidotised.			256	62	569		
283264	Flowbanded quartz-feldspar porphyrite.			93	208	597		
283265	Quartz-feldspar porphyrite, cracks filled with cp+bo.			246	71	434		
283266	Crushed rock near felsite with carbonate matrix.	<5	<1		<200	440	<5	23
283267	Contact Feldspar-Quartz porphyrite/greenstone. Cp <1 %.			455	294	1529		
283269	Pelitic-felsitic greenschist with disseminated bo+ch in 2 m thick layer.	51	4		<200	740	36	<54
283270	Pelite greenschist. Quartz-biotite nests with bo.	16	4		290	640	17	47
283271	Felsite-schist, cp 1-5 %.	49	2	1139	145	971	<5	86
283272	Flattened hornblende porphyrite. 1 m layer with 5-10 % bo+cp.	57	<1		<200	2300	73	<130
283279	10 cm quartz-vein with sporadic ½-1 mm bo grains.			80	12	0		

333614	Cu-mineralised greenstone.	33	<1		<200	390	<5	5
333771	Quartzitic metaarkose with malachite.	23	2		<200	1000	<5	<2
333772	Quartzitic metaarkose with cp+malachite.	15	1		<200	1200	<5	<2
333777	Quartzite with Cu-sulphides+malachite.	250	4		280	1100	<5	<2
343014	Greenschist.			77	160	3079		
343015	Mg-nest from mineralised zone.	120	7		210	160	24	20
343016	Epidote, Cu-minerals + mg from mineralised zone.	99	12		<200	<100	27	2
343017	Epidotised greenschist, Cu-mineralised.	83	8		130	120	5	2
343018	Cu-mineralisation.	1270	5		120	270	1310	<55
343019	Greenstone.			545	206	442		
343020	Cu-mineralisation in aplite.	988	<1		<200	1300	450	15
343022	Bo-veins in greenstone.	79	3		250	360	49	<1
343023	Mylonite in felsitic rock.			53	85	2802		
343024	Greenstone with K-feldspar and epidote.	30	5		120	930	10	<1
343026	Vein-type bo-mineralisation.	2760	<2		<200	310	904	<66
343027	Disseminated bo-mineralisation.	2320	<1		<200	200	610	<22
343028	Breccia-type bo+fluorite mineralisation.	628	1		130	920	180	<1
343029	Breccia-type bo-ore.	457	<1		<100	1200	120	<1
343030	Felsitic greenstone.			354	244	504		

343031	Cu-mineralisation of varying types.	251	4		160	2900	35	<1
343032	**MINE SLAG**, Josva mine.	224	9		2100	2000	20	<1
343037	Greenschist with malachite from ore zone (Josva vein).	54	14	19374	490	870	39	<1
343038	Schistose greenstone with disseminated bo+malachite.	150	7		380	400	98	5
343039	Epidote vein, 5 cm.	5	78		180	1500	4	<1
343041	Hornblende porphyritic greenstone, <<1% Sulphides.			145	64	2097		
343043	Greenschist with epidote vein. Cu-minerals <1 %.	46	11	1428	210	1813	3	<1
343044	Greenschist with malachite staining.	65	7		160	600	6	<1
343046	Hornblende porphyritic greenschist.			134	86	983		
343047	Schistose porphyritic greenstone with malachite.			163	85	1556		
343049	Massive greenstone.			123	88	1694		
343050	Quartz-vein, 1 m wide with 1-5 % bo.	5220	6		280	1400	190	<1
343051	Bo-mineralisation in contact between greenschist and quartz vein.	531	1		<100	<50	44	<1
343052	Ch from boudinaged quartz vein.	100	1		<100	<50	26	<1
343053	Ch-mineralisation from contact boudinaged quartz vein/greenstone.	12	<1		<200	<100	5	<2
343054	Greenstone near contact to boudinaged quartz vein.			125	185	1133		
343055	Dark gabbro.			108	111	888		
343056	Monzonite with sporadic malachite staining of isolated feldspar crystals.			325	18	2205		
343057	Greenstone.			62	120	1064		

343058	Brecciated Cu-mineralised quartz-calcite vein.	38	<1		200	550	40	<1
343059	Epidotised greenschist with mg from flank of Quartz-calcite vein.	120	1		300	63	62	<1
343060	Homogenous greenstone.			290	154	827		
343061	Deformed greenschist with elongated hornblende blasts.			1354	108	1672		
343062	Quartz porphyrite layer in greenschist.			76	57	139		
343063	Greenschist on contact to quartz porphyrite.			537	115	1383		
333617	Cu-mineralised aplite.	110	2		<200	2100	31	12
343252	Pelitic mica schist, bo <1 %.	25	3		240	1200	25	<1
343253	Epidotised pelitic mica schist.	<2	12	54	<100	2400	<2	<1
343254	Pelite with 1 % cp, from 1 m wide zone.	5	2		<200	1600	<5	<2
343255	Greenschist with 1 % cp from 1 m wide zone.	32	4		110	2000	<2	5
343256	Schistose greenstone.			309	252	739		
343257	Epidotised felsic pelite, malachite staining.	11	2		<100	310	<2	<1
343258	Plagioclase porphyritic greenstone.			92	108	1320		
343259	Hornblende porphyritic greenschist.			186	179	633		
343201	Semipelite. 5-10 % py+cp.	<5	2		<200	330	<5	62
343202	Black, fine-grained schist. 5-10% py+cp.	<8	>3000		<100	740	<2	<3
343203	Graphite schist (partly gossan). 5-10 % py.	<4	592		<100	470	<2	<1
343230	Felsic greenschist with epidote.	<2	4	123	<100	160	<2	5

343231	Greenschist with epidote veins with 1 % cp.	5	3		<200	<100	<5	3
343232	Felsite with disseminated cp <1 %.	4	2	309	<100	1800	<2	<1
343233	Hornblende porphyritic mica schist.			64	63	513		
343234	Hornblende- mica schist with epidote veinlets.			114	57	2183		
343235	Fissured schistose amphibolite. Malachite on joints.	7	4		<200	370	<5	<2
343236	Pelitic amphibolite.			251	143	932		
343237	Mylonite with he-staining + brown mineral in cavities.	<2	2		<100	2000	<2	<1
343238	Mylonite with epidote in mica schist.			85	21	1828		
343240	Felsic greenschist.			57	168	1667		
343241	Micaceous amphibolite.			76	69	1726		
343242	Amphibolite.			112	59	592		
343245	Micaceous felsic amphibolite.			58	58	3163		
343247	Mica schist.	<2	48	172	110	300	<2	<1
343248	Epidote nest.	<2	19		<100	87	<2	<1
333726	Greenschist with disseminated py.	<5	1		210	680	<5	<2
333749	Greenstone with py+cp.	<5	4		<200	<100	<5	<2
333752	Dark "greenstone" with py.	<5	<1		<200	1200	<5	<2
333754	Greenschist with malachite, azurite and py.	30	1		<200	770	<5	<2
333756	Aplite with malachite, azurite, cp+py.	30	2		<200	1200	<5	<2

333759	Greenstone with malachite staining.	33	3		<200	300	11	<2
333763	Dark grey quartzite with py.	<5	16		<200	110	<5	<2
333766	Shale with disseminated py.	<5	3		<200	<100	<5	<2
283126	Metagabbro, 1-5 % ph (boulder).	10	<1		<200	600	<5	49
283127	Foliated metabasite, 1-5 % ph (boulder).	11	46		<200	270	<5	<73
283128	Metagabbro, 5-10 % ph (boulder).	14	31		240	300	<5	52
283129	Brecciated black shale with ph+cp+py 1-5 % (boulder).	5	<1		<200	620	<5	251
283130	Quartzitic rock with epidote and 5-10 % mg (boulder).	33	<1		<200	<100	<5	213
283131A	Dolomite limestone (boulder).	<5	<1		<200	270	<5	33
283131B	Dolomite limestone (boulder).	<5	1		<200	5000	<5	35
283135	Greenschist with py-nests. Py <1 %.	22	1		<200	660	<5	92
283136	Quartzite from flank of marble layer. <1 % py.	<5	<1		<200	32200	<5	41
283227	Amphibolite.	7	<1	128	<200	1600	<5	55
283228	Metagabbro.	15	2	373	<200	1500	<5	110
283229	Hornblenditic pelite rock.			137	<200	2008		
283230	Metabasite.	12	2		<200	1200	<5	51
283231	Metabasite, py+ph 1-5 %.	12	2		260	630	<5	75
283232	Layered carbonate rock.	7	4		<200	510	<5	26
283233	Carbonate-calc silicate-serpentine rock from carbonate sequence.	<5	3		<200	150	<5	22

283234	Sandstone(?) layer from carbonate sequence, 1-5 % py.	<5	6	165	<200	2300	<5	71
333716	Greenschist with fine disseminated py.	<5	2		<200	3900	<5	<2
333717	Rusty greenstone with stratabound and disseminated py.	5	2		<200	1100	<5	<2
333718	Sulphide rich rock with massive ph+cp (boulder).	<5	14		<200	1200	<5	4
333722	Greenstone with ph+py+cp.	13	1		<200	710	<5	<2
343197	Pelitic amphibolite, 1-5 % py+ph.	<2	2		<100	390	<5	4
343198	Graphite schist, 5-10 % py+cp	<2	2		<100	340	<5	4
343200	Metagabbroid rock, 1 % py+ph+cp.	<2	2		150	1400	<5	<1
343250	Coarse grained mica schist with 1-5 % bo.	546	1		410	700	23	<2
343251	Mica schist with quartz veins with bo.	150	2		<200	320	6	4

Pyrite=py, bornite=bo, chalcocite=ch, chalcopyrite=cp, magnetite=mg, pyrrhotite=ph, hematite=he, galena=ga

LITHOLOGY	SAMPLE	DESCRIPTION	Au (ppb)	As	Cu	Zn (ppm)	Ba	Ag	W
QIPISARQO GROUP ↓	343097	Mica schist with rusty phyllitic lens, py 1-5 %.	<5	1	162	240	540	<5	<2
	343098	Mica schist with rusty phyllitic lens, py 1-5 %.	<2	14	107	190	590	<2	3
	343099	Banded amphibolite with mg+cp+py 1-5 %. 0.4 m sequence.	16	7	521	<200	<100	<5	4
	343100	Pegmatite with contact-parallel lines of fine-grained tourmaline.			60	35	45		
	343101	Fine-banded amphibolite with mg from 0.1 m sequence.	<2	1		<100	120	<2	<1
	343102	Quartz streaks with limonite, from banded amphibolite.	<5	<1		<200	<100	<5	<2
	343104	Pelite with garnet from transition between amphibolite and conglomerate.	21	1	959	<100	82	<2	<1
	343105	Rusty lens from amphibolite, cp <1 %.	5	1		110	54	<2	<1
	343107	Pelite with quartz veins.			49	24	1198		
	343108	Chlorite schist.			52	39	1092		
	343111	Mica schist, crenulation cleavage. Fractures filled with zeolite + 1-5 % py.	<2	1		<100	960	<2	2
	343112	Amphibolitic schist with py-stringers.	<5	4		390	320	<5	<2
	343113	Graphite-rich dark schist, py 5-10 %, (boulder).	<5	35		<200	430	<5	3
	343114	2 m rusty zone in amphibolitic layer.	5	7		160	1100	<2	4
	343287	Quartzite, locally with 1 % disseminated cp.	3	2		<100	290	<2	2
	343288	Rusty zone in amphibolitic greenstone. 1 % ph.	6	1		170	80	<2	<1

343289	Quartzite lens from greenstone. 1 % py.	22	1		<100	<50	<2	<1
343290	Greenstone.			137	85	171		
343191	Schistose greenstone with 1 % cp in quartz vein.	19	1		<200	<100	<5	2
343204	Mica schist, ph 1 %.	<2	171		240	200	<2	2
343205	Amphibolite, ph 1 %.	<2	16		150	570	<2	5
343206	Pelite with mica filling fractures. Ph 1 %.	<2	10		200	150	<2	<1
343094	Schistose amphibolite with epidote-quartz-calcite-malachite in veinlets.	<5	<1		<200	<100	<5	<2
333631	Rusty schist.	<5	<1		<200	130	<5	2
333633	Rusty dark schist with sulphides.	1160	1		<200	1300	<5	<2
333644	Schist with sulphides.	<5	4		220	330	<5	<2
333646	Massive ph with cp+py (boulder).	9	13		1300	<100	<5	55
333649	Phyllitic schist with mg.	36	5		<200	<100	<5	5
333651	Schist with sulphides from yellow coloured fault(?)-zone.	29	105		<200	420	<5	<2
333652	Schist with pyrite. 0.3m x 50m rusty zone.	38	38		<200	130	<5	<2
333656	Dark graphite-rich rock with massive ph+cp.	9	2		<200	<100	<5	3
343116	Quartzite with basic material, contains mg.	<2	2		<100	150	<2	<1
343118	Chloritised quartzite.	<2	3		<100	96	<2	<1
343119	Quartzite from shearzone. 1-5 % py.	<5	1		<200	360	<5	<2
343120	Mica schist from shearzone. 1-5 % py.	<5	<1		<200	740	<5	3

343121	Amphibolite from shearzone. 1-5 % py.				95	154	345	
343123	Rusty part of fold core in quartzite sequence.	4	5		170	<50	<2	1
343124	Amphibolite with 1-5 % disseminated py.	<2	5	151	300	340	<2	2
343125	10-50 % cp+ph+py (boulder).	<2	26		140	97	<2	6
343127	Slightly deformed conglomerate with greywacke matrix. Malachite on clasts.	<5	4		<200	1000	<5	<2
343129	Strongly flattened conglomerate, epidotised with 1-5 % cp.	<5	2		<200	<100	<5	<2
343130	Flattened conglomerate, epidotised with 1-5 % cp.	15	8		<200	<100	<5	6
343131	Folded and flattened conglomerate. Fractures filled with carbonate. <1 % cp.	<2	2		<100	180	<2	<1
343132	Fractured amphibolite.	<2	1	547	100	180	<2	<1
343133	0.2m x 2m marble lens from fault zone.	<2	0		<100	<50	<2	<1
343135	Amphibolitic mica schist. 3m rusty zone with 1-5 % py+cp.	<5	2		210	440	<5	5
343136	Epidotised amphibolite with rusty spots. 1 % py.	<2	5		<100	730	<2	<1
343139	Fine banded felsic epidote rock.			99	0	317		
343140	Rusty amphibolite. 1 % py in felsic layer.	<2	2		180	1200	<2	3
343151	Quartzitic mica schist, <1 % py.	<2	4		<100	460	<2	1
343152	Mica schist from zone of movement. 1 % py.	<2	4		<100	1700	<2	2
343066	Lamprophyre dyke, 0.5 m. Euhedral py-crystals.			130	170	1521		
343069	Pegmatite with Cu-sulphides + red mineral.	440	1		<200	170	27	<2

343070	Pegmatite with Cu-minerals + black mineral.	1970	5		<200	160	120	3
343071	Mineral vein with Cu-sulphides.	2900	14		230	200	150	143
343072	Marble from ultrabasic rock.			1807	33	164		
343073	Hornblendite with carbonate.			102	21	184		
343074	Skarn with garnet + Cu-minerals.	1080	3		540	<150	38	3430
343075	Mica schist.	21	1	1085	<100	1286	<2	3
343076	Schistose metapelite.	8	5	325	110	730	<2	3
343078	Epidote-quartz-garnet vein in conglomerate. <1 % py.	7	2		<100	430	<2	2
343079	Lamprophyre dyke, 0.5 m.			789	177	1305		
333788	Dark quartzitic schist with disseminated py+cp and <0.5 cm qz+cp veinlet/recrystallisation.	<5	<1		<200	250	<5	<2
333793	Quartzitic schist with py+cp.	<5	<1		<200	<100	<5	<2
333794	Pegmatite with cp.	130	<1		<200	<100	<7	<3
333796	Quartzite with py+cp.	24	4		<200	<100	<5	<2
333800	Amphibolite with appreciable ph+py+cp.	25	490		200	610	<5	<2
333808	Quartzitic schist with py+cp.	5	33		210	<100	<5	<2
333820	Different types of sulphide mineralisation.	<5	2		<200	110	<5	<2
333825	———————— " ————————.	<5	5		<200	650	<5	3
343260	Garnet greenschist.			204	126	482		
343261	Zone of movement in greenschist, 1-5 % cp+ph+py.	13	2		<200	260	<5	3

343263	Amphibolite with 1-5 % py+ph+cp.	5	1		190	<50	<2	<1
343264	Pegmatite with 1-5 % cp.	68	2		<100	<50	<2	2
343265	Amphibolite with 1-5 % py.	<5	1		<200	130	<5	2
343266	Mica schist <1 % sulphide.	<2	2		<100	590	<2	2
343268	Greenstone, micaceous. 1-5 % cp+ph+py.	11	<1		<200	<100	<5	4
343269	Al-schist. Pelite with sillimanite, garnet, cordierite.			25	67	986		
343270	Flattened conglomerate with matrix of mica and sulphide. 10-25 % cp+ph.	13	2		<200	240	<5	4
343271	Mica schist with sillimanite, garnet and cordierite.			73	52	896		
343272	Mica schist with 5-10 % cp+ph.	7	3		<200	630	<5	<2
343273	Cordierite layer from mica schist.			189	78	470		
343275	Quartzite-chert nodule from shear zone with 5-10 % py+cp+ph in the matrix.	<5	2		<200	550	<5	<2
343276	Quartzite layer from mineralised shear zone. 5-10% sulphide.	10	37		<200	460	<5	<2
343277	Amphibolite near shearzone. 1 % disseminated ph.	<2	2		<100	780	<2	4
343278	Amphibolite with 10-25 % disseminated sulphide.	<5	13		<200	650	<5	5
343280	Locally hornblende-porphyritic garnet amphibolite. 5-10 % disseminated sulphide.	9	2		220	<100	<5	2
343281	Locally hornblende-porphyritic amphibolite with 1 % disseminated sulphide.	<2	1		100	68	<2	<1
343286	Grey banded mica schist.			0	58	1135		

343080a	Amphibolite dyke.		206	75	433
343081	Conglomerate with epidote in matrix.		102	56	700

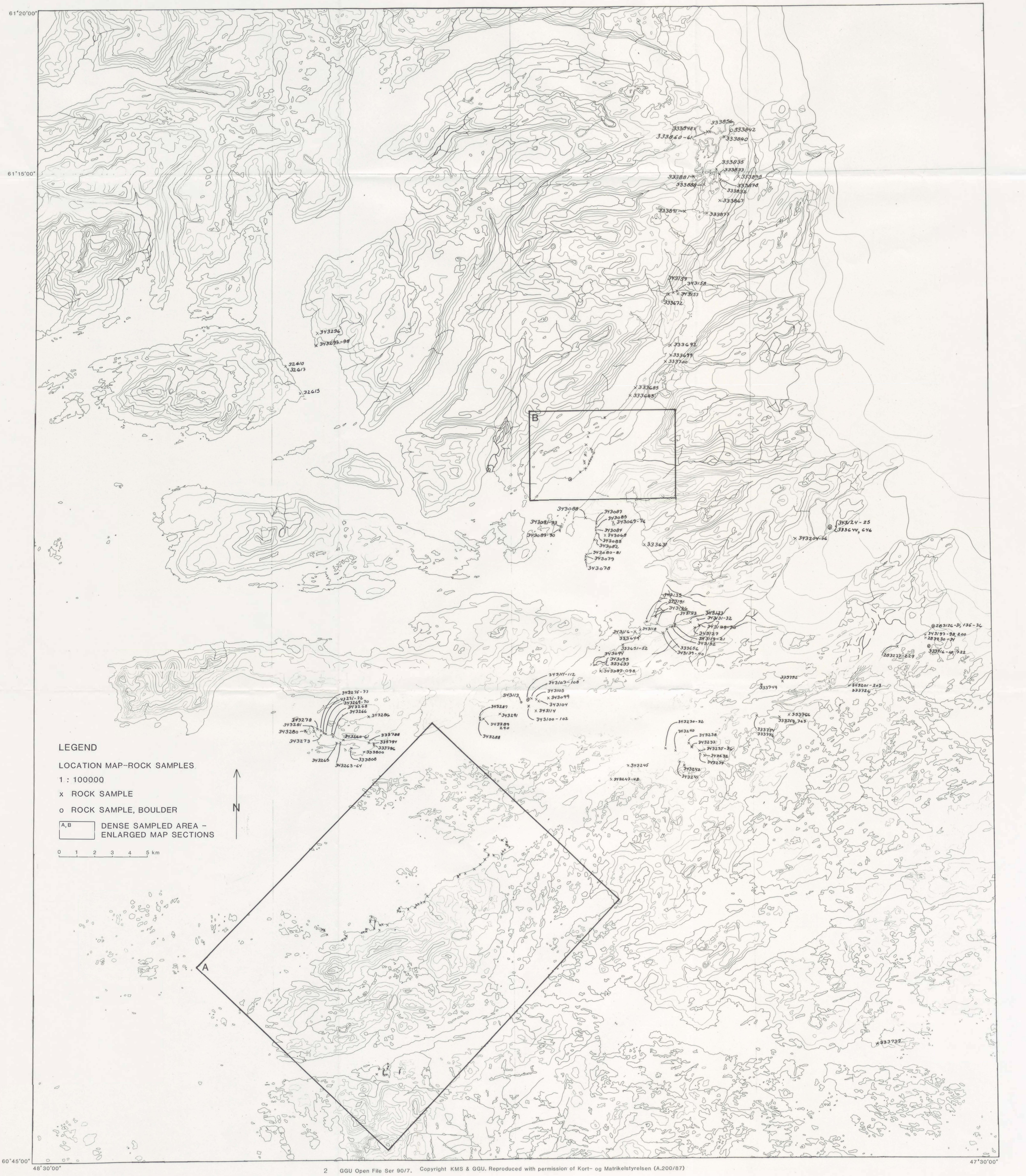
Pyrite=py, bornite=bo, Chalcosite=ch, chalcopyrite=cp, magnetite=mg, pyrrhotite=ph, hematite=he, galena=ga.

LITHOLOGY	SAMPLE	DESCRIPTION	Au (ppb)	As	Cu	Zn	Ba (ppm)	Ag	W
VALLEN and SORTIS GROUPS ↓	343082	Metagabbro			134	97	522		
	343083	Amphibolite with 1–5 % py+cp.	10	2		<200	240	<5	26
	343084	Greenstone with epidote + stilbite filling cavities.			326	52	962		
	343085	Metapelite.			146	77	582		
	343087	Lamprophyre dyke with olivine phenocrysts.			832	214	1420		
	343088	0.5 m lamprophyre dyke.			212	116	1530		
	343089	Graphite schist, py 1–5 %.	<5	28		240	670	<5	5
	343090	Amphibolite, py 1–5 %.			123	58	605		
	343091	0.5 m lamprophyre dyke.			166	132	670		
	343092	Marble.	6	10	69	94	0	<2	1
	343093	Tourmaline pegmatite.			21	0	113		
	333666	Massive sulphide ore, 0.3^3 m^3. (Boulder).	36	65		7200	110	<5	<2
	333667	Quartzite with py.	<5	<1		<200	120	<5	10
	333672	Grey–green marble with semi–massive py.	<5	18		<200	660	<5	<2
	333677	Carbonate rock with sulphides.	<5	3		<200	480	<5	4
	333679	Epidote–chlorite mica schist with sulphides.	<5	2		<200	150	<5	4
	333683	Mica schist.	10	2		<200	<100	<5	7

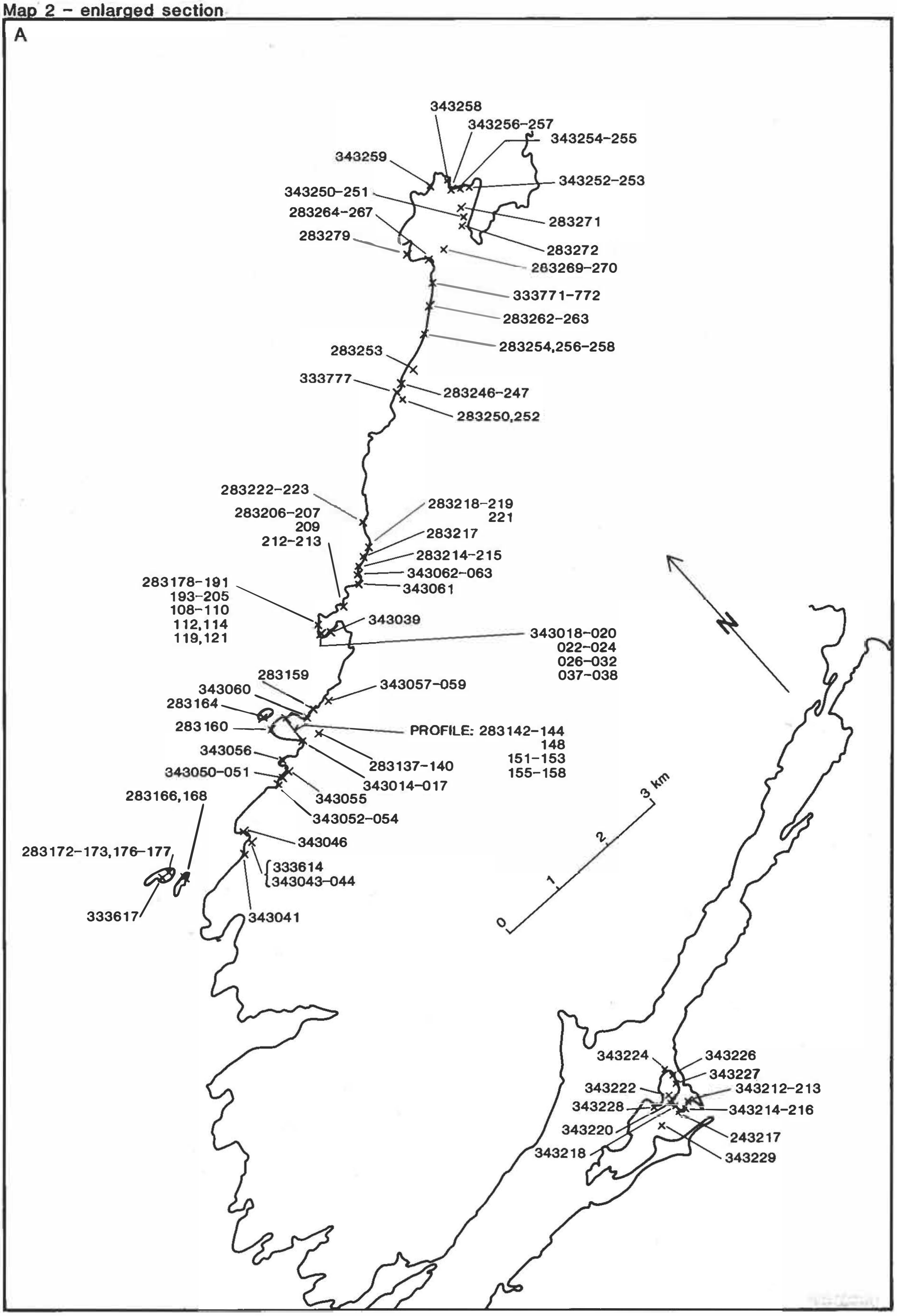
333685	Mica schist with disseminated py.	<5	<1		<200	230	<5	<2
333692	Quartzitic schist with pyrite.	<5	4		430	120	<5	4
333699	Schistose amphibolite with py+(cp).	<5	2		420	<100	<5	<2
333700	Quartz vein with py.	11	2		<200	<100	<5	<2
343154	Lamprophyre dyke, 10m.			168	131	1140		
343155	Marble, 0.5 x 10 m lens.	3	4		360	<50	<2	5
343156	Marble from 5 m skarn layer.	<5	<1		330	<50	<5	5
343157	Fractured amphibolite.			277	99	389		
343158	Rusty quartzite with 1-5 % py.	<5	<1		<200	<100	<5	<1
343159	White marble with green fibrous mineral.	<2	4	0	150	<50	<2	<1
343160	Amphibolite with epidote and skarn minerals.			469	93	313		
343161	Homogeneous greenstone.			83	97	1562		
343162	Hornblende schist.			160	35	148		
343164	Felsic amphibolite with mm-long mg-stringers.	<5	<1		260	3100	<5	<2
343165	Marble with 2 carbonates.			128	156	0		
343166	Serpentine/talc/antophyllite lens in marble.			109	220	0		
343168	Rusty mica schist from marble layer	<5	13		<200	1200	<5	4
343169	Rusty greenstone, <1 % py.	<2	2		<100	220	<2	<1
343170	Lamprophyre dyke, 0.3 m, with carbonate ocelli.			243	146	1231		

343171	Lamprophyre dyke, 1.5 m, with py-crystals and carbonate ocelli.	11	3	123	110	120	<2	<1
343172	Rusty part in mica schist, 1-5 % py.	4	34		<100	190	<2	<1
343173	Epidote-feldspar-garnet rock.			116	183	231		
343174	Small-scale folded amphibolitic greenstone, 1-5 % py.	<2	1		<100	180	<1	<1
343175	Marble with 1-5 % galena.	67	28	0	<200	<100	10	4
343176	Tremolite rock. Lens from marble.	7	2		260	200	<2	1710
343177	Rusty mica schist from contact to marble.	<2	9		<100	740	<2	21
343178	Marble with <1 % ga and <1 % py.	15	2		<200	<100	<5	3
343190	Ultrabasic lens from marble, with mg+malachite.	<5	2		220	100	<5	750
343191	Ultrabasic lens from marble, with mg.	4	2		230	<50	<2	406
343192	Rusty epidote rock. Lens from marble.	8	5		140	<50	<2	1120
343193	Serpentine lens from marble.	<2	2		150	<50	<2	100
343194	Marble.	<2	1	0	190	<50	<2	14
343195	Marble with ga+py spots.	<5	2		<200	<100	<5	16
343196	"Anorthite" lump from amphibolite.			4	0	1862		
333832	Dark schist with py+cp.	<5	2		<200	160	<5	<2
333833	Carbonate with disseminated py+cp.	<6	3		<200	690	<5	<2
333835	Quartzitic schist with disseminated py.	<5	<1		<200	190	<5	<2
333840	Graphite-carbonate rock.	<5	2		<200	<100	<5	<2

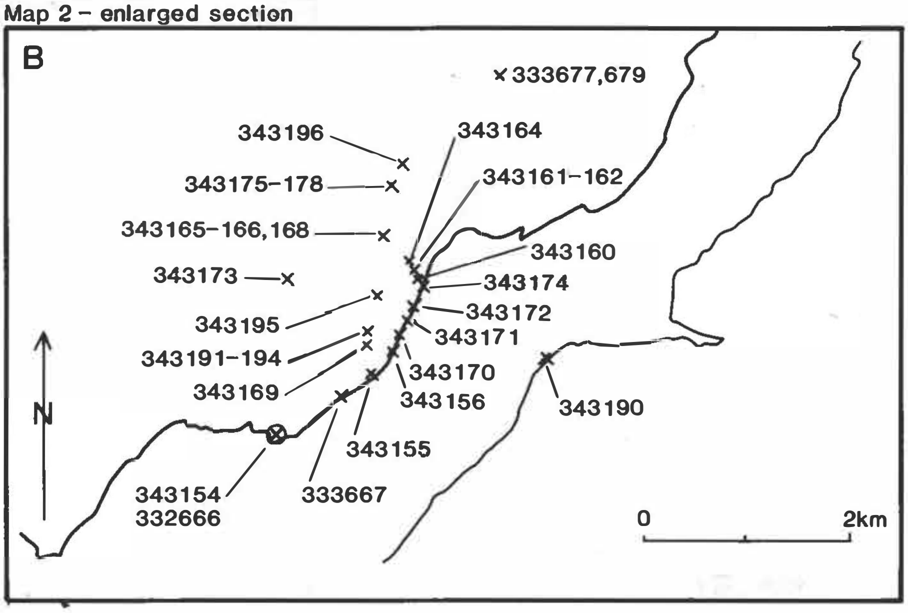
	333842	Rock with py+cp+bo (boulder).	7	<1		<200	<100	<5	<2
	333848	Quartzite with disseminated py.	<5	1		<200	530	<5	<2
	333856	Marble with massive py.	33	54		<200	<100	<5	<2
	333860	Py-mineralised quartz vein.	<5	53		<200	<100	<5	<2
	333861	Quartz and marble with massive py.	<5	3		<200	<100	<5	<2
	333867	Quartz vein with cp+py+malachite.	<5	4		<200	<100	11	<2
	333877	Dark carbonate rock with appreciable disseminated py.	13	132		<200	370	<5	<2
	333878	Fine-grained graphitic schist with appreciable py.	6	3		290	280	<5	<2
	333881	Brecciated rock with disseminated py in the matrix.	<5	2		<200	410	46	<2
	333888	Pelite with 5 mm thick quartz veins and disseminated py.	21	83		<200	610	<5	3
	333891	Dyke with dm-sized inclusions of fine-grained rock.	<7	4		<200	1500	<5	<2
	333895	Grey quartz vein with <<1 % py+cp.	<5	2		<200	<100	<5	<2
ARSUK AND IKERAS-SÂRSUK GROUPS ↓	343296	Graphite schist.	<2	1		100	260	<5	3
	343297	Sheared metagabbro.			164	82	243		
	343298	Graphite schist.	<2	1		<100	<50	<2	<1
	32610	Carbonate with epidote and <1 % py.	7	2		<200	420	<5	150
	32615	Intensively carbonatised fine-grained rock. 1-5 mm thick carbonate veinlets in several directions. <<1 % sulphides.	<5	2		<200	440	<5	10
	32617	Contact carbonatised dyke rock/black metapelite. Metapelite carbonate veined and brecciated.	10	2		<200	500	<5	53

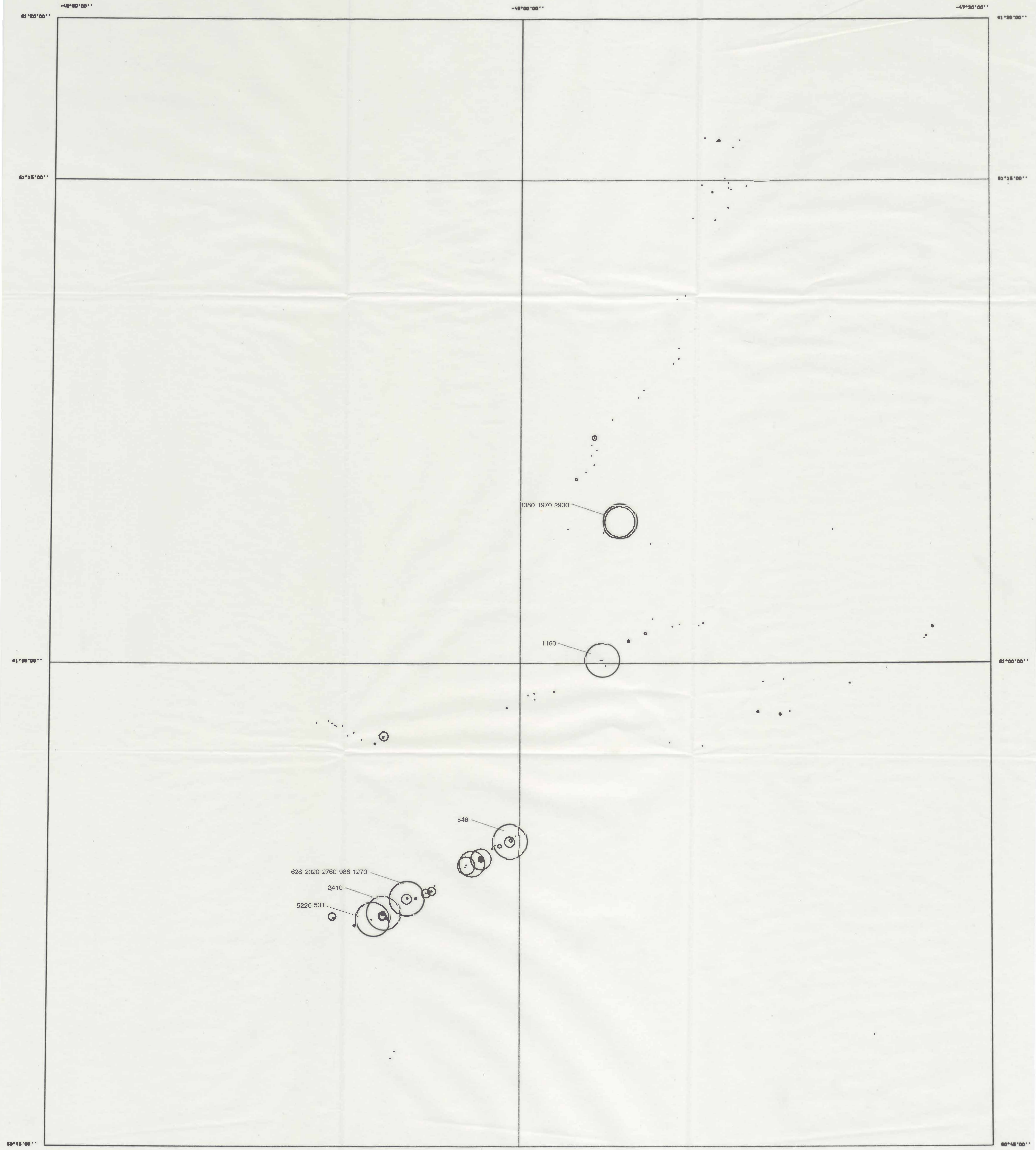

61°20'00"
61°15'00"
60°45'00"
48°30'00"
47°30'00"
B
A
LEGEND
LOCATION MAP–ROCK SAMPLES
1 : 100000
x ROCK SAMPLE
o ROCK SAMPLE, BOULDER
A,B DENSE SAMPLED AREA – ENLARGED MAP SECTIONS
0 1 2 3 4 5 km
N

Map 2 - enlarged section



Map 2 – enlarged section





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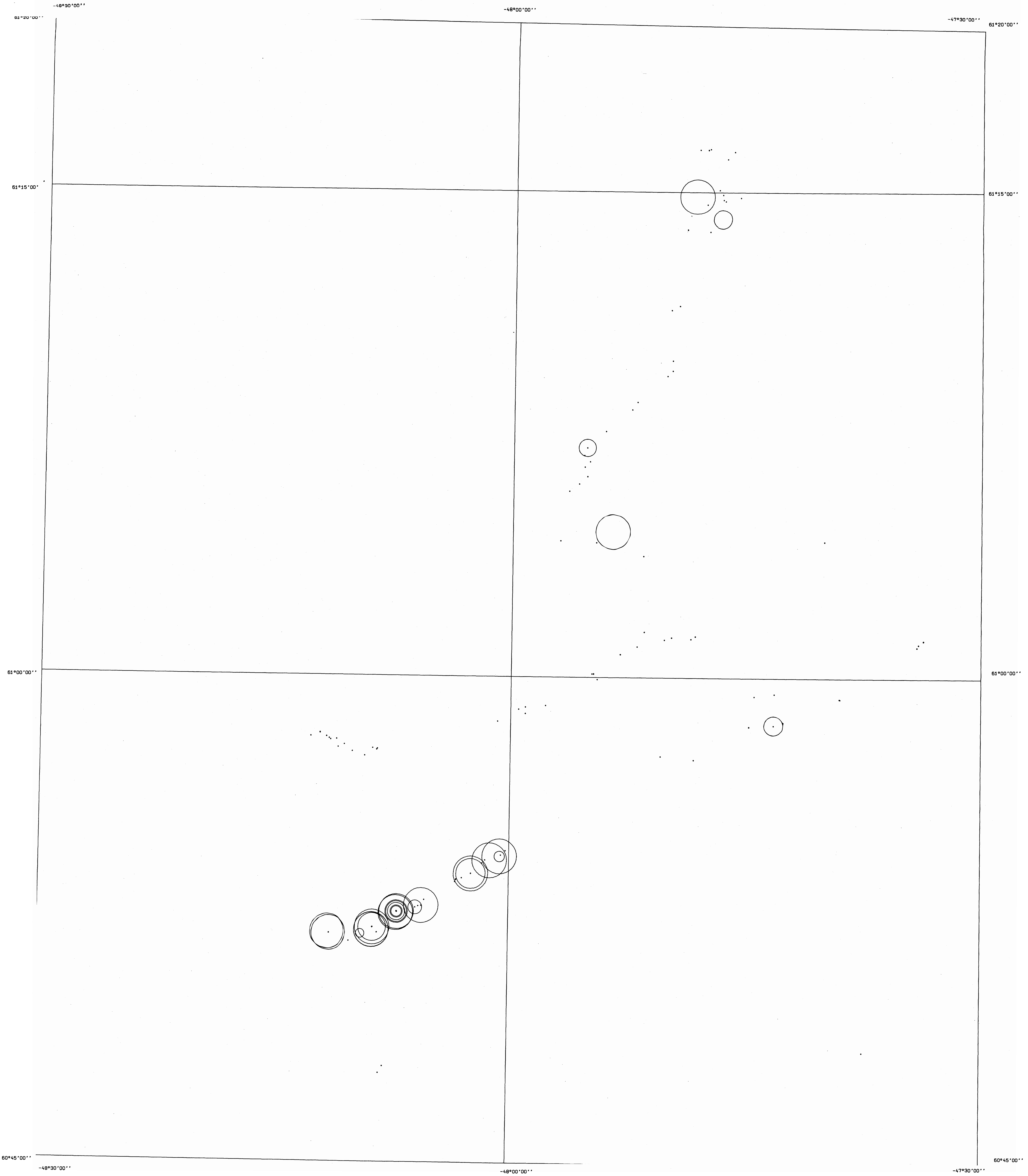
Map 3. GGU Open File Ser. 90/7

ROCK SAMPLES FROM KOBBERMINEBUGT

ELEMENT	UNIT	SC.FACT	MAX	MIN
AU	PPB	0.002	1.0	0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61$\,$30' 00' N



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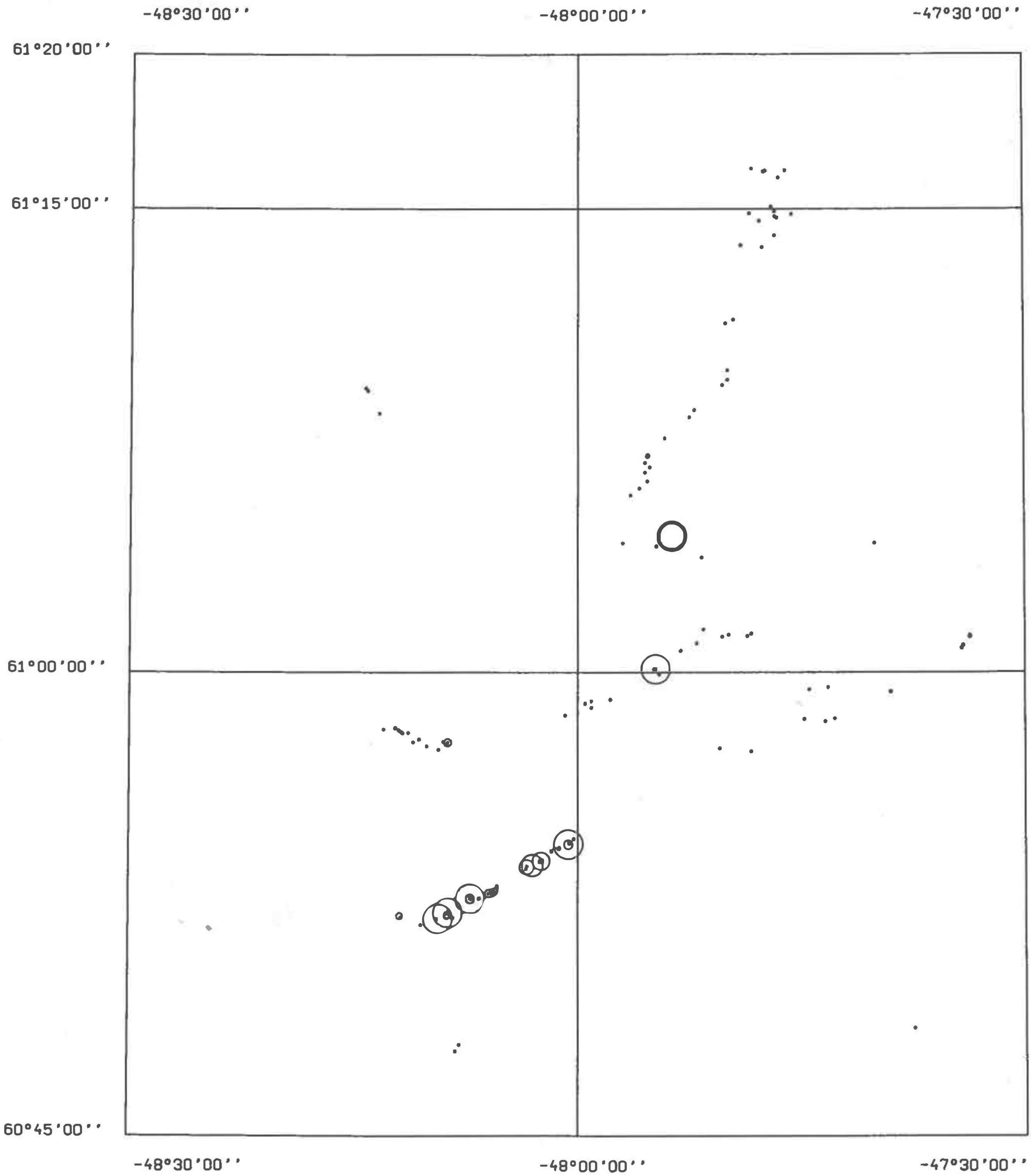
Map 4. GGU Open File Ser. 90/7

ROCK SAMPLES FROM KOBBERMINEBUGT

ELEMENT	UNIT	SC.FACT	MAX	MIN
AG	PPM	0.05	1.0	0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61G 30' 00' N

Map 5



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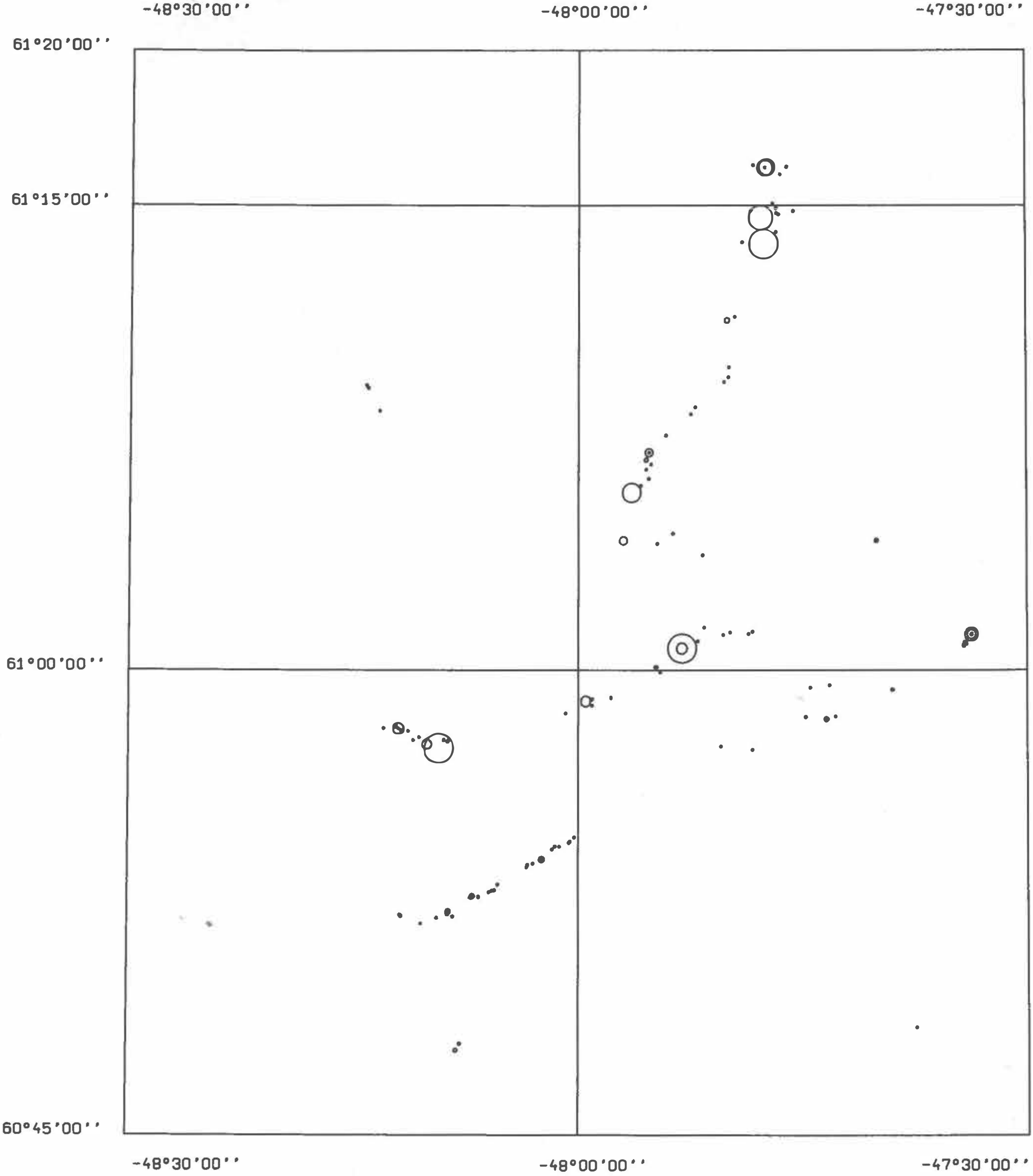
AU PPB
ROCK SAMPLES
KOBBERMINEBUGT
SC.FACT:0.0005 MAX 0.25 MIN 0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61G 30' 00" N

Map 6



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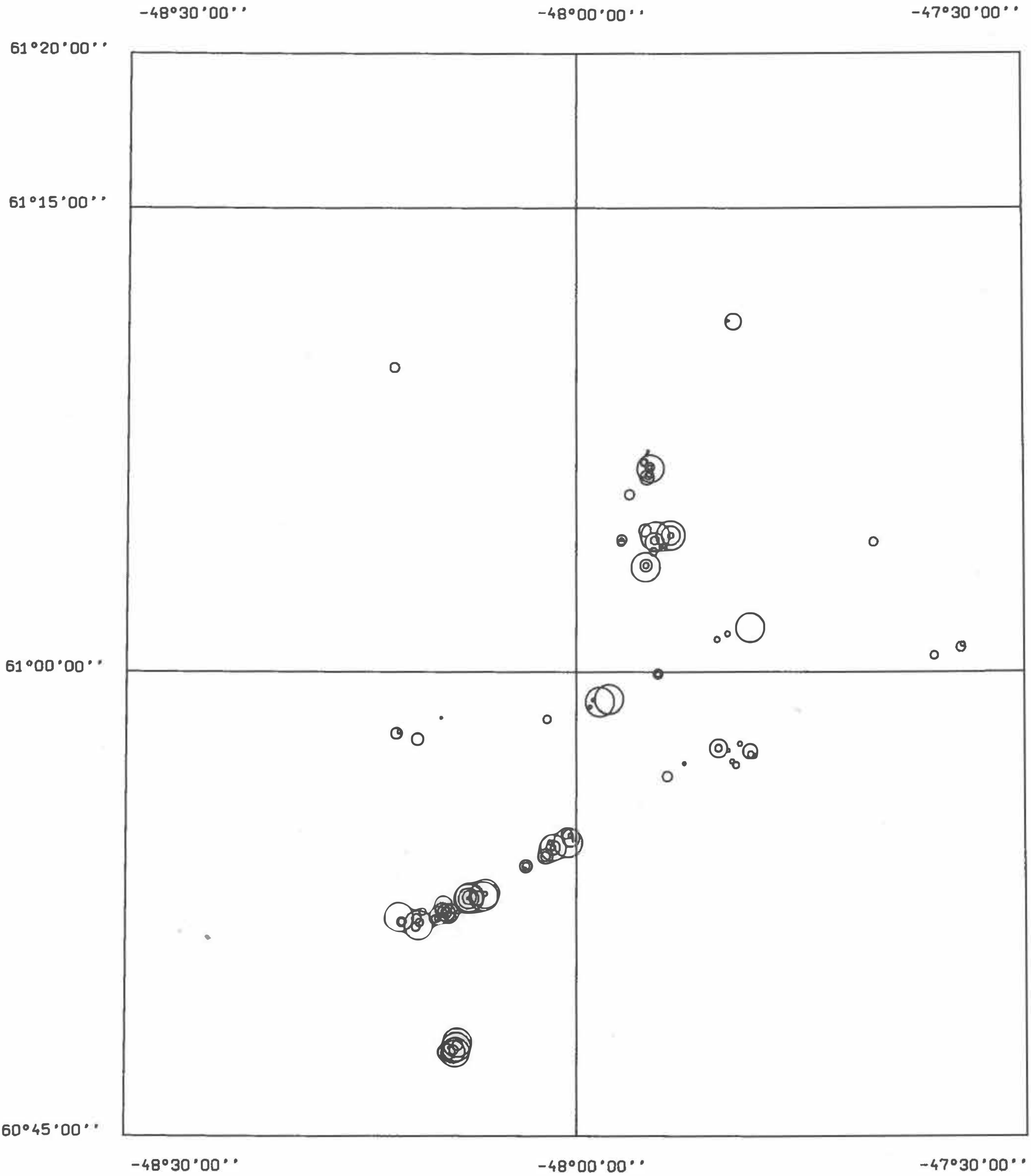
AS PPM
ROCK SAMPLES
KOBBERMINEBUGT
SC.FACT:0.0025 MAX 0.25 MIN 0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61G 30' 00" N

Map 7



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CU PPM
ROCK SAMPLES
KOBBERMINEBUGT
SC.FACT:0.0005 MAX 0.25 MIN 0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61G 30' 00' N

Map 8

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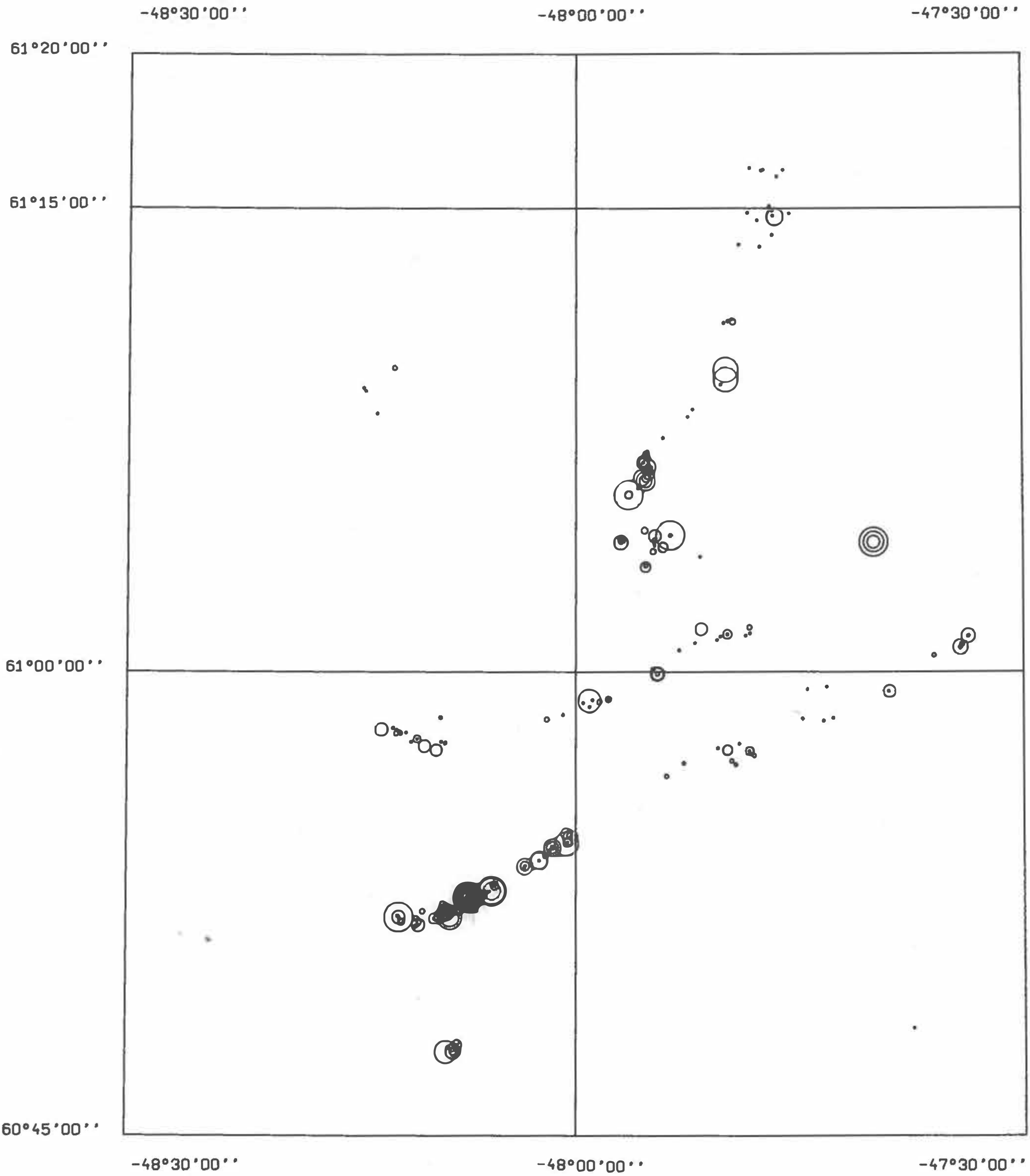

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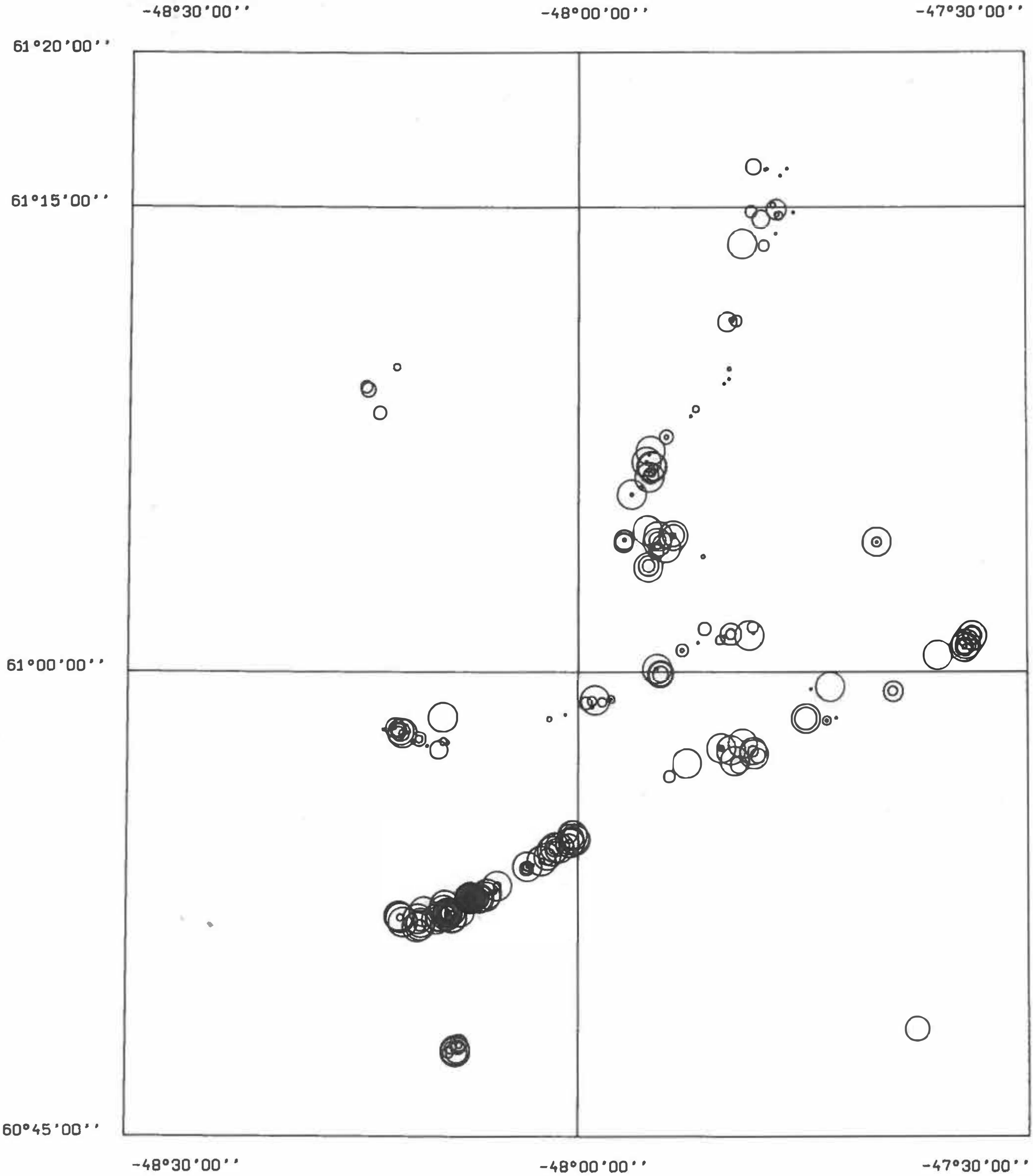
ZN PPM
ROCK SAMPLES
KOBBERMINEBUGT
SC.FACT:0.0005 MAX 0.25 MIN 0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61G 30' 00' N

Map 9

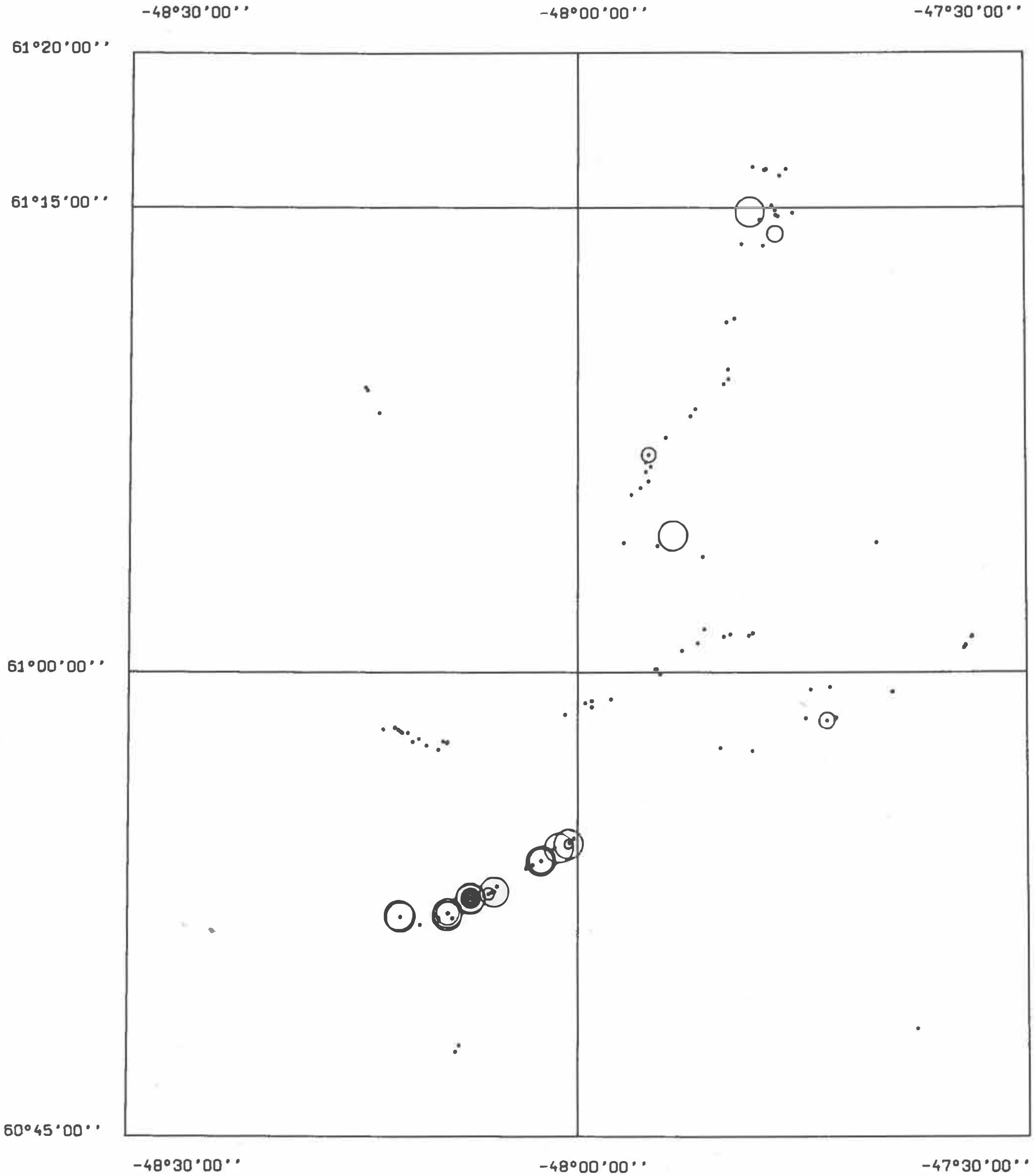


SCALE 1:350000

BA PPM
ROCK SAMPLES
KOBBERMINEBUGT
SC.FACT:0.00025 MAX 0.25 MIN 0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61G 30' 00" N

Map 10



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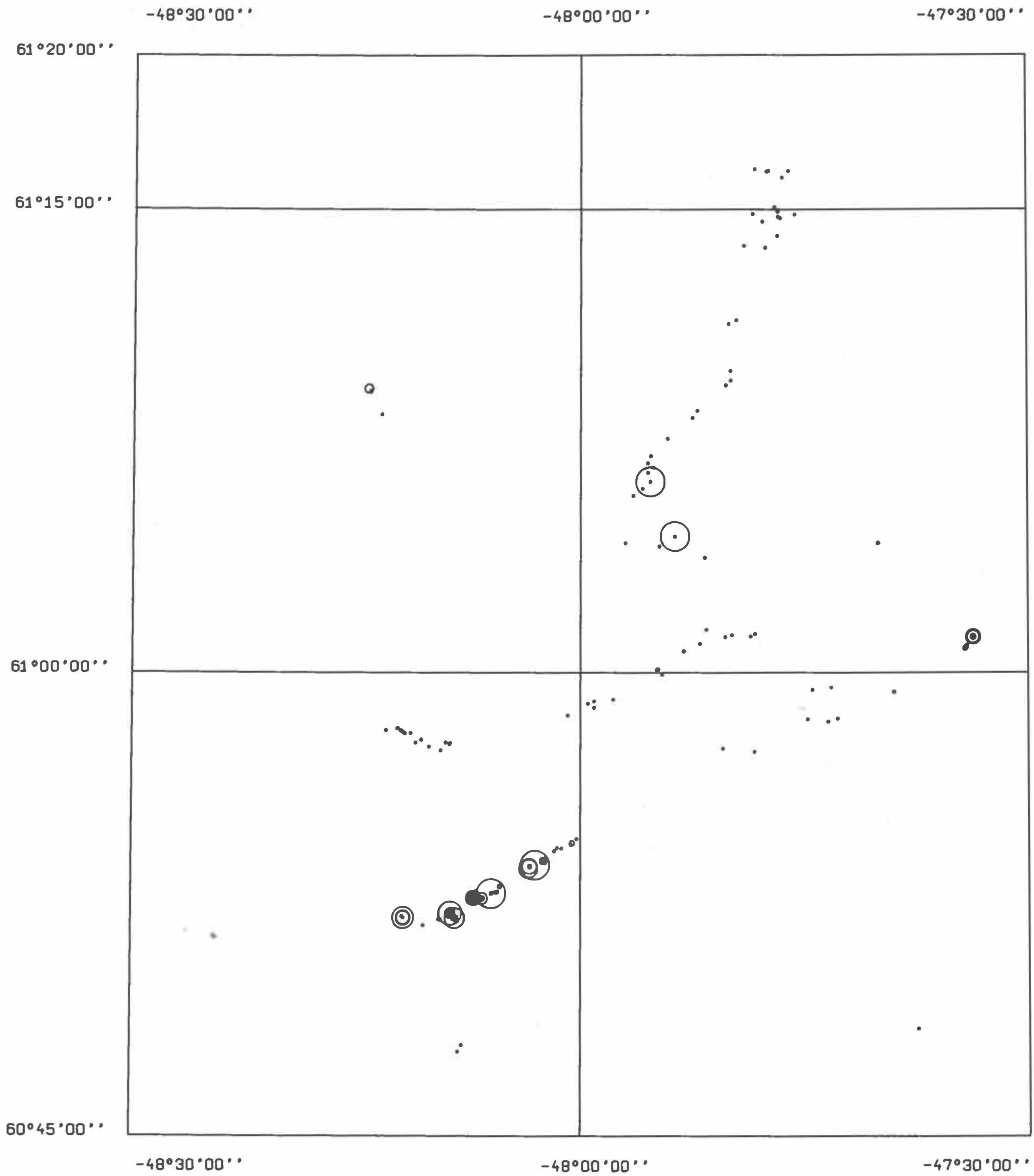
AG PPM
ROCK SAMPLES
KOBBERMINEBUGT
SC.FACT:0.0125 MAX 0.25 MIN 0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61G 30' 00' N

Map 11



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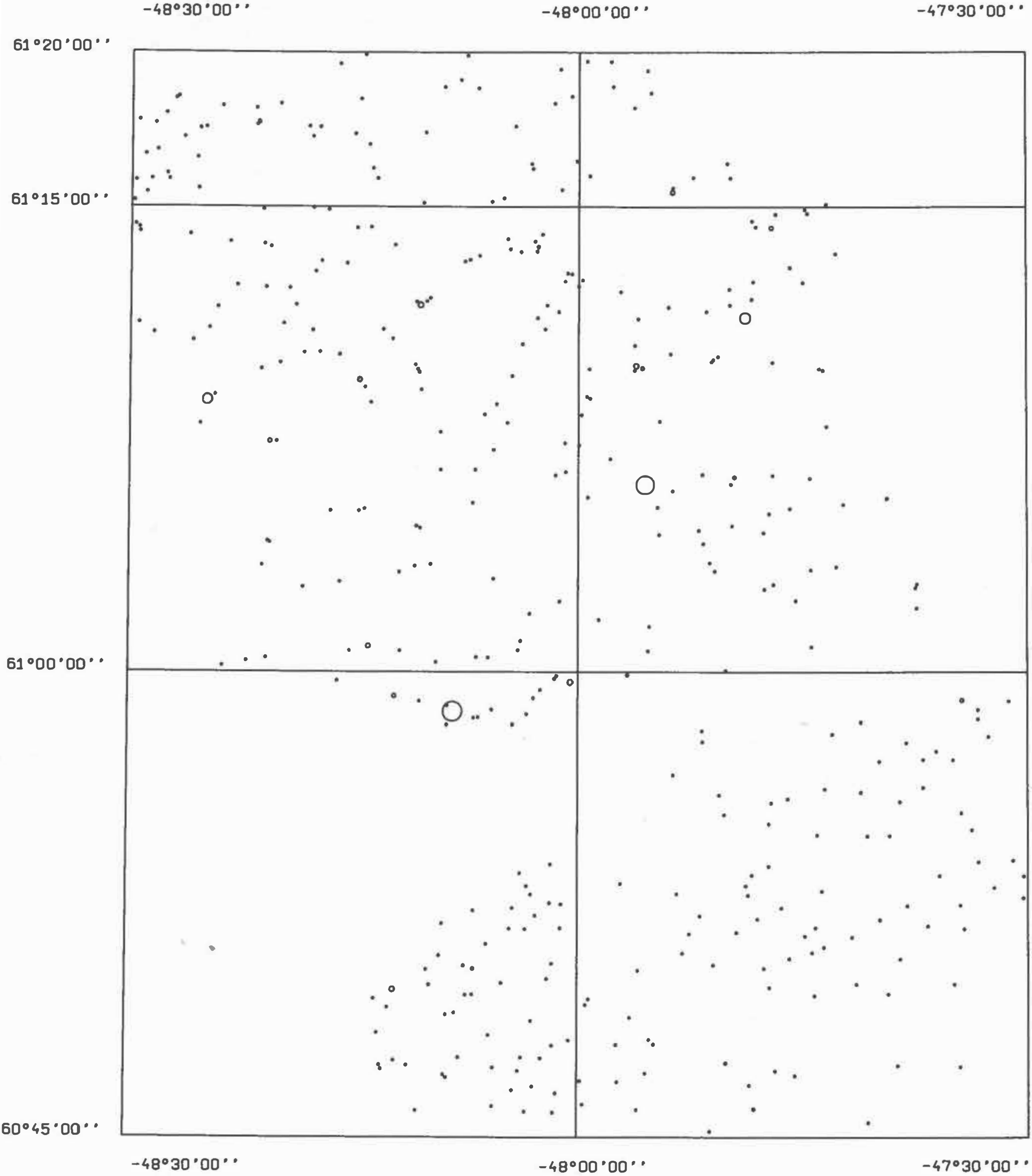
W PPM
ROCK SAMPLES
KOBBERMINEBUGT
SC.FACT:0.0005 MAX 0.25 MIN 0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61G 30' 00" N

Map 12



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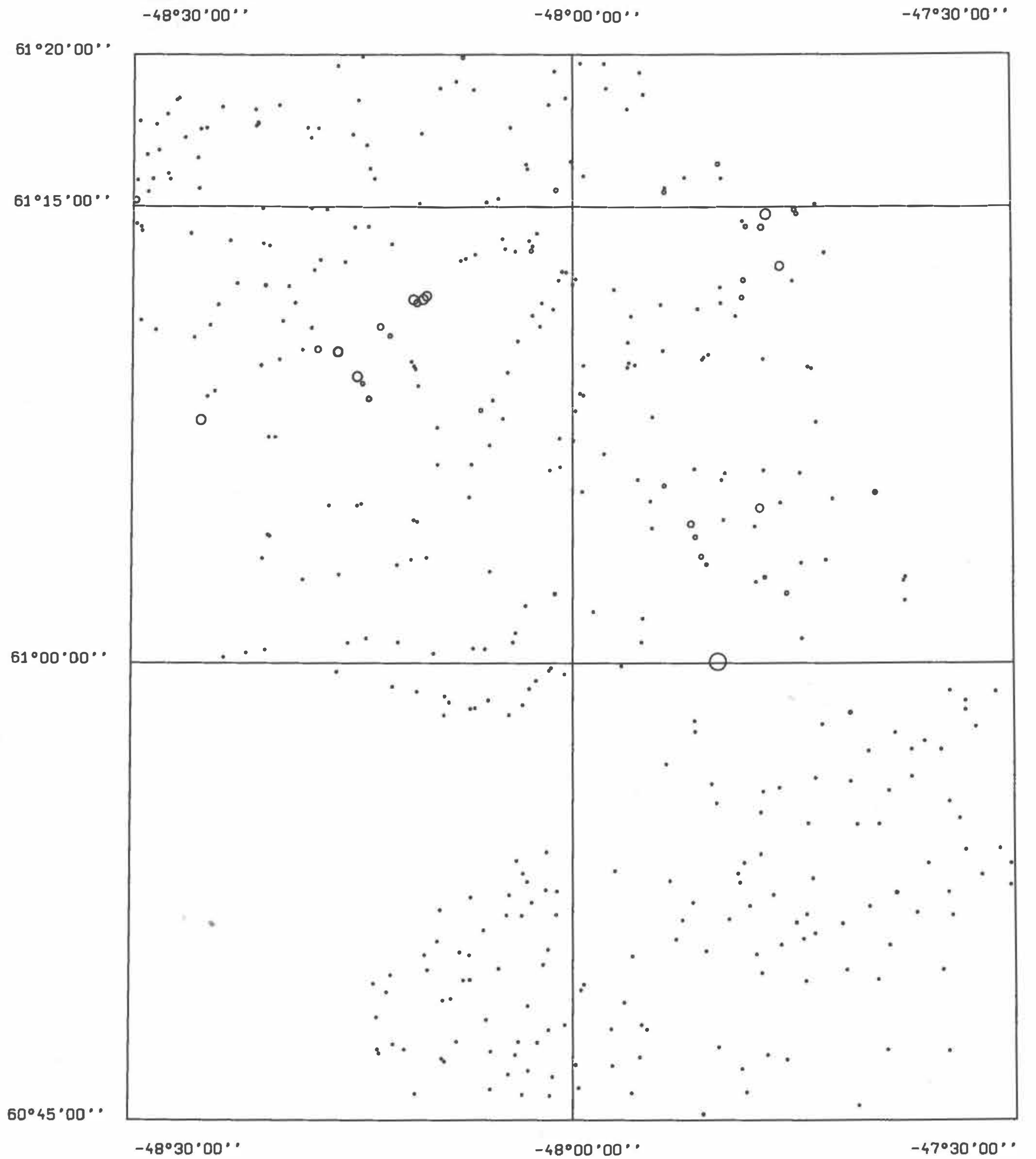
AU PPB
STREAM SEDIMENTS
KOBBERMINEBUGT
SC.FACT. 0.0025 MAX 0.25 MIN 0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
ELLIPSOID: INTERNATIONAL. A = 6378388M. F = 1/297.
STANDARD PARALLEL: 61G 30' 00" N

Map 13



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AS PPM
STREAM SEDIMENTS
KOBBERMINEBUGT
SC.FACT. 0.0025 MAX 0.25 MIN 0.02

PROJECTION: LAMBERT'S CONICAL ORTHOMORPHIC.
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STANDARD PARALLEL: 61G 30' 00" N

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