

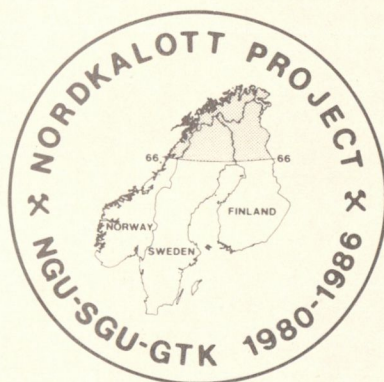
GEOCHEMICAL ATLAS OF NORTHERN FENNOSCANDIA

SCALE 1:4,000 000

MAPPED BY THE GEOLOGICAL SURVEYS OF
FINLAND (GTK), NORWAY (NGU) AND SWEDEN (SGU)
IN COOPERATION WITH SWEDISH GEOLOGICAL CO
(SGAB) AND THE GEOLOGICAL SURVEY OF
GREENLAND (GGU)

COMPILED BY

Subproject leader: B. Bølviken (NGU)
Members: J. Bergstrøm (SGAB), A. Bjørklund (GTK), M. Kontio (GTK),
P. Lehmuspelto (GTK), T. Lindholm (SGAB), J. Magnusson (SGAB),
R. T. Ottesen (NGU), A. Steenfelt (GGU), T. Volden (NGU)



Project leader: G. Kautsky (SGU)

THIS ATLAS IS THE RESULT OF NORDIC
COLLABORATION SUPPORTED BY THE NORDIC
COUNCIL OF MINISTERS

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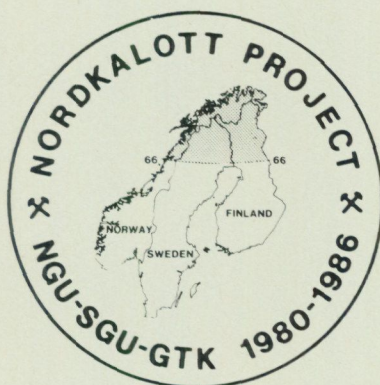
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MAPS, SCALE 1:4 MILL

TOTAL CONTENTS OF ELEMENTS IN TILL, FINE FRACTION

Co	Cobalt	Map No.	1	Ni	Nickel	Map No.	7
Cr	Chromium		2	Pb	Lead		8
Cu	Copper		3	Ti	Titanium		9
K	Potassium		4	V	Vanadium		10
Mg	Magnesium		5	Zn	Zinc		11
Mn	Manganese		6				

TOTAL CONTENTS OF ELEMENTS IN TILL, FINE FRACTION,
COMBINED SAMPLES

As	Arsenic	Map No.	12	Rb	Rubidium	Map No.	20
Au	Gold		13	Sb	Antimony		21
Ba	Barium		14	Sc	Scandium		22
Br	Bromine		15	Sm	Samarium		23
Cs	Cesium		16	Ta	Tantalum		24
Fe	Iron		17	Th	Thorium		25
La	Lanthanum		18	W	Tungsten		26
Na	Sodium		19	U	Uranium		27

TOTAL CONTENTS OF ELEMENTS IN TILL, HEAVY MINERAL FRACTION,
COMBINED SAMPLES

Al	Aluminium	Map No.	28	Nb	Niobium	Map No.	41
Ba	Barium		29	Ni	Nickel		42
Ca	Calcium		30	P	Phosphorus		43
Cl	Chlorine		31	Rb	Rubidium		44
Co	Cobalt		32	Si	Silicon		45
Cr	Chromium		33	Sr	Strontium		46
Cu	Copper		34	Th	Thorium		47
Fe	Iron		35	Ti	Titanium		48
K	Potassium		36	V	Vanadium		49
Mg	Magnesium		37	Y	Yttrium		50
Mn	Manganese		38	Zn	Zinc		51
Mo	Molybdenum		39	Zr	Zirconium		52
Na	Sodium		40				

**CONTENTS OF NITRIC-ACID SOLUBLE ELEMENTS IN STREAM SEDIMENTS,
FINE FRACTION**

Ag	Silver	Map No.	53	Li	Lithium	Map No.	64
Al	Aluminium		54	Mg	Magnesium		65
Ba	Barium		55	Mn	Manganese		66
Ca	Calcium		56	Mo	Molybdenum		67
Ce	Cerium		57	Ni	Nickel		68
Co	Cobalt		58	P	Phosphorus		69
Cr	Chromium		59	Sc	Scandium		70
Cu	Copper		60	Sr	Strontium		71
Fe	Iron		61	V	Vanadium		72
K	Potassium		62	Zn	Zinc		73
La	Lanthanum		63	Zr	Zirconium		74

**TOTAL CONTENTS OF ELEMENTS IN STREAM SEDIMENTS, HEAVY MINERAL
FRACTION, COMBINED SAMPLES**

Al	Aluminium	Map No.	75	Ni	Nickel	Map No.	87
Ba	Barium		76	P	Phosphorus		88
Ca	Calcium		77	Si	Silicon		89
Cl	Chlorine		78	Sn	Tin		90
Cr	Chromium		79	Sr	Strontium		91
Cu	Copper		80	Ti	Titanium		92
Fe	Iron		81	V	Vanadium		93
K	Potassium		82	W	Tungsten		94
Mg	Magnesium		83	Y	Yttrium		95
Mn	Manganese		84	Zn	Zinc		96
Na	Sodium		85	Zr	Zirconium		97
Nb	Niobium		86				

**TOTAL CONTENTS OF ELEMENTS IN ASH OF STREAM ORGANIC MATTER,
COMBINED SAMPLES**

Al	Aluminium	Map No.	98	Ni	Nickel	Map No.	111
Ba	Barium		99	P	Phosphorus		112
Ca	Calcium		100	Rb	Rubidium		113
Cl	Chlorine		101	S	Sulphur		114
Co	Cobalt		102	Si	Silicon		115
Cr	Chromium		103	Sr	Strontium		116
Cu	Copper		104	Th	Thorium		117
Fe	Iron		105	Ti	Titanium		118
K	Potassium		106	U	Uranium		119
Mg	Magnesium		107	V	Vanadium		120
Mn	Manganese		108	Y	Yttrium		121
Mo	Molybdenum		109	Zn	Zinc		122
Na	Sodium		110				

TOTAL CONTENTS OF ELEMENTS IN ASH OF STREAM MOSS, COMBINED SAMPLES

As	<i>Arsenic</i>	Map No. 123	Lu	<i>Lutetium</i>	Map No. 130
Au	<i>Gold</i>	124	Mo	<i>Molybdenum</i>	131
Ba	<i>Barium</i>	125	Sb	<i>Antimony</i>	132
Br	<i>Bromine</i>	126	Sc	<i>Scandium</i>	133
Co	<i>Cobalt</i>	127	Sm	<i>Samarium</i>	134
Fe	<i>Iron</i>	128	Th	<i>Thorium</i>	135
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**GEOCHEMICAL ATLAS OF
NORTHERN FENNOSCANDIA**

INTRODUCTION

The Nordkalott Project was initiated in 1980 with the support of the Nordic Council of Ministers for the main purpose of defining structures and formations bearing a potential for economic mineralization. The survey region includes the areas north of the 66° latitude in Finland, Norway and Sweden. The project also gathered data of interest to other sciences related to the environment, such as public health and agriculture. Field and laboratory work was carried out by the Geological Surveys of Finland (GTK), Norway (NGU) and Sweden (SGU),* while the Geological Survey of Greenland (GGU) has had the status of observer.

Five subprojects were defined (1) Bedrock geology, (2) Quaternary geology, (3) Geophysics, (4) Geochemistry, and (5) Data interpretation. The projects resulted in the compilation of a number of different thematic maps distributed by GTK, NGU and SGU, most of them presented at the scale of 1:1 mill. The compilation includes a geochemical interpretation map at this scale. The present atlas, at the scale of 1:4 mill., contains all the geochemical maps produced by the geochemistry subproject, which were ready for publication per 1 Jan. 1987. In addition to the geochemical data, accompanying maps from the other subprojects are included in the atlas in order to facilitate the interpretation of the geochemical results.

Following a geochemical pilot project in 1980 (Bergström et al. 1981), a multimedia/multielement low-density geochemical reconnaissance survey was carried out within an area of 250,000 km².

Up to six different types of geochemical samples were collected at altogether 7267 sample stations. Four of these sample types (till, stream sediments, stream organic matter and stream moss) are treated in this account.

The sampling was carried out during 1980-1983 (Fig. 1) by teams from the GTK in Finland, NGU in Norway and SGAB in Sweden, all teams following common instructions for sampling. The samples were analysed in 1981 - 1985 by the geological surveys and as contract work by SGAB and the Reactor Laboratory of the Technical Research Center of Finland (VTT/REA). All the analyses of a certain type were done in one and the same laboratory regardless of the origin of the samples. A number of field and laboratory duplicate samples were used to check for possible sampling and analytical errors. All the data were recorded on magnetic tape for computerized processing and map drawing as well as for storage and future retrieval.

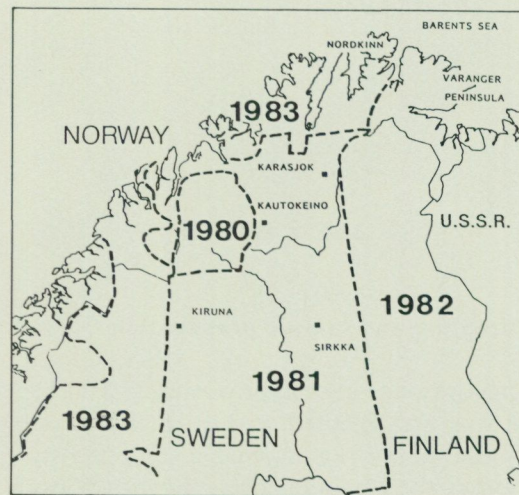


FIG. 1 Areas and years of geochemical sampling in the Nordkalott Project.

* In 1982 the Geological Survey of Sweden was divided into two parts: the Geological Survey of Sweden (SGU) and the Swedish Geological Co. (SGAB). SGAB has carried out the Swedish part of the geochemistry subproject as contract work for SGU.

GEOLOGICAL SETTING

Geologically the Nordkalott region comprises the northern part of the Precambrian Baltic Shield bordered by the Caledonian fold belt towards the north and west (Map 145). The Precambrian basement can be divided into 3 main provinces: 1) the Archaean Kola-Karelian province in the northeast comprising gneisses and supracrustal belts intruded by Proterozoic gabbro, anorthosite and granite, 2) the central NW-SE trending Archaean Karelian province dominated by two greenstone and schist belts divided by Proterozoic gneiss and granite, and 3) the large southwestern Proterozoic Svecofennian province of supracrustal rocks intruded by felsic and mafic plutons. The Caledonian fold belt, which includes Precambrian and Palaeozoic sediments and volcanites has been thrust over the Precambrian basement.

For further information on the bedrock geology of the Nordkalott region, see the list of references.

METHODS

Sampling and sample preparation

One drainage area approximately 10 km² in size was selected within each 30 km² of the survey region, with a sampling station at the apex (downstream end) of each drainage area (Fig. 2). Till, stream sediments, stream organic matter and stream moss were sampled at all stations where material was available (Table 1).

Whenever practicable each field sample representing a sample station was composed of several subsamples taken at various sites within the sample station, (see examples from station 3 in Fig. 2).

To reduce the costs of chemical analysis, combined samples from 100 - 200 km² cells were prepared by mixing equal amounts of each sample from 3-7 neighbouring sample stations (Fig. 2).

Till (mostly basal) was collected from the C-horizon of the soil at the bottom of 50 - 60 cm deep pits dug by spade. After drying, the till was sieved through nylon screens into two grain-size fractions, -0.062 mm and 0.062 - 0.500 mm.

Stream sediments consisting of mixtures of stream bed and stream bank material were collected at 5-10 sites within a 50m section of the stream. The samples were wet sieved into two grain-size fractions, -0.18 mm, and 0.18 - 0.60 mm.

Stream organic matter consisting of mixtures of humic material, plant roots, leaf litter, etc., with varying amounts of mineral matter, was sampled from the stream banks at 5-10 sites within a 50 m section of the stream. After drying, the samples were ashed at 450 °C and sieved to obtain a minus 0.1 mm fraction, which was then ground in a steel mill before analysis.

Stream moss, consisting of mixtures of various species of aquatic bryophytes growing in the stream bed, was collected along a 50 m section of the stream. The samples were rinsed with stream water in order to get rid of mineral material trapped in the moss. After drying, the remaining fine-grained mineral matter in the sample was removed by sieving through a 0.5 mm nylon screen. The plus 0.5 mm material was ashed at 450 °C. In order to remove coarse-grained mineral matter, the ash was sieved through a 0.1 mm sieve. The obtained fine fraction of the ash was analysed.

Heavy mineral fractions (more than 2.96 g/cm³) were produced from the 0.062 - 0.500 mm fraction of till and from the 0.180 - 0.600 mm fraction of stream sediments using a heavy liquid continuous overflow centrifuge separator described by Brundin and Bergström (1977).

TABLE 1. The Nordkalott Project. Number of samples collected 1980-1983.

	1980	1981	1982	1983	Total
Till	317	2004	1095	1984	5400
Stream sediments	324	2226	1200	2023	5773
Stream organic matter	330	2258	1186	2047	5821
Stream moss	326	2001	1118	2030	5475

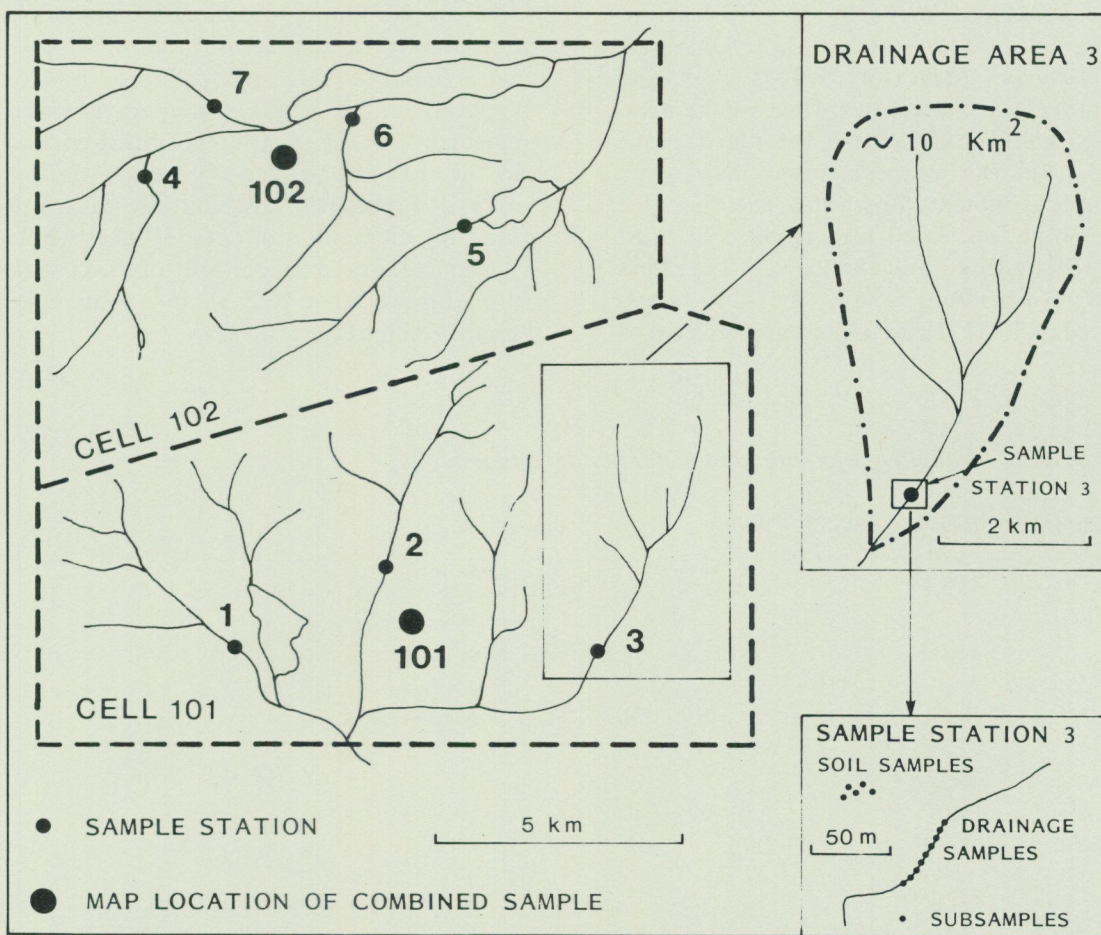


FIG. 2. Principles applied for sampling and combining of samples. Each drainage area is approximately 10 km². Planned sampling density: 1 sample station per 30 km².

Chemical analysis

Fine and heavy mineral fractions and ash of the organic samples were analysed for their contents of total and/or acid-soluble elements using the methods indicated in Table 2.

Quality control

Field-sample duplicates were collected at every 30th sample station. Laboratory duplicates were obtained by splitting one of the samples in each set of field duplicates into two subsamples. The samples

were analysed in yearly batches (see Fig. 1 and Table 2). The reproducibility within and between batches was registered by scatter diagrams of the duplicate determinations, and final analytical results were rejected/accepted/adjusted depending on the characteristics of the obtained plots.

Map presentation

The coordinates of the sample stations were digitized using the Universal Transversal Mercator (UTM) grid and Lambert's projections. The geochemical maps were produced by automatic plotters. On the single element maps each sample is indicated by a dot, the diameter of which increases logarithmically with log-increasing concentration (Björklund and Gustavsson 1987, Björklund and Lumaa 1981). Principal component maps

were produced using SIMCA (Soft Independent Modelling of Class Analogies) (Esbensen et al. 1987). A geochemical interpretation map was prepared by visual inspection of the single element and principal component maps. The maps were plotted at scales of 1:1 mill, 1:1.5 mill., or 1:2.5 mill., and reduced photographically for this atlas at the scale of 1:4 mill.

The geochemical data are presented on 143 maps. The single element maps are numbered in alphabetical order of chemical symbol within groups according to type of sample, sample preparation and method of analysis. Colour coding is used in the margins to identify each group of maps. Frequency distribution diagrams for the element contents of the whole survey region are plotted on Gaussian probability paper and included on each single element map sheet.

TABLE 2. Analytical methods and elements determined.

Sample type	Fraction (mm)	Method	Lab.	Elements
Till	-0.062	OES, T, R	GSF	Co Cr Cu K Mg Mn Ni Pb Ti V Zn
	-0.062	NAA, T, C, B	TRCF	As Au Ba Br Cs Fe La Na Rb Sb Sc Sm Ta Th U W
	0.062 - 0.50	HM XRF, T, C, B	SGAB	Al Ba Ca Cl Co Cr Cu Fe K Mg Mn Mo Na Nb Ni P Rb Si Sr Th Ti V Y Zn Zr
Stream sediments	-0.18	ICP, HNO ₃ , R	GSN	Ag Al Ba Ca Ce Co Cr Cu Fe K La Li Mg Mn Mo Ni P Sc Sr V Zn Zr
	0.18 - 0.60	HM XRF, T, C, B	SGAB	Al Ba Ca Cl Cr Cu Fe K Mg Mn Na Nb Ni P Si Sn Sr Ti V W Y Zn Zr
Stream organic material	-0.1 Ash	XRF, T, C, B	SGAB	Al Ba Ca Cl Co Cr Cu Fe K Mg Mn Mo Na Ni P Rb S Si Sr Th Ti U V Y Zn
Stream moss	-0.1 Ash	NAA, T, C, B	TRCF	As Au Ba Br Co Fe La Lu Mo Sb Sc Sm Th U

Laboratories:

GSF Geological Survey of Finland
 GSN Geological Survey of Norway
 SGAB Swedish Geological Company
 TRCF Technical Research Centre of Finland

Methods:

ICP Inductiv. coupled argon plasma spectrom. (Ødegård 1981, 1983)
 NAA Neutron activation analysis. (Rosenberg et al. 1983)
 OES Optical emission spectrometry. (Danielson 1967)
 XRF X-ray fluorescence. (Leake and Aucott 1973)

HM: Heavy mineral fraction (>2.96 g/cm³) T: Totals; HNO₃: Acid-soluble; C: Combined samples;
 R: Analyzed in random order. B: Analyzed in batches in order of sample number within each batch.

GEOCHEMICAL DISTRIBUTION PATTERNS

The survey region is sparsely populated, little industrialized and remote from main source-areas of anthropogenic pollution. The obtained geochemical distribution patterns are therefore thought to be predominantly natural, and caused mainly by variations in the chemical/mineralogical composition of the bedrock. There might, however, be some natural influence from (1) recent long transported airborne elements of marine, volcanic and other derivation (Pacyna 1986), (2) elements in gases and fluids of deep seated origin (Björklund in press, Kozlovsky 1985, Malmquist and Kristiansson 1984), and (3) environmental conditions such as topography and climate.

Only exceptionally are dispersion patterns thought to be an effect of local pollution. An example is seen on Map 111. The pattern of high contents of Ni in stream organic matter close to the Norwegian-Soviet border (893ON, 148OW) is not reproduced in any of the mineral samples, and may be an effect of air-borne pollutants from the large nickel refinery at Nikel, a few kilometres to the southeast in the USSR. Ni pollution from this source has previously been demonstrated in the area by Hagen (1986) and Schjoldager et al. (1983).

Geochemical provinces

Most of the geochemical maps show broad distribution patterns including regions and provinces with characteristic element concentrations. These large-scale patterns are most evident on the maps of the element contents in the heavy mineral fractions and on the principal component maps. Based on the con-

tents in the heavy mineral fraction of till, 18 geochemical provinces were defined (Map 143). Enrichment factors were calculated for each of 22 elements, defined as the ratio between (1) the average content in the heavy mineral fraction of till within each province and (2) the average for the whole survey region. The enrichment factors vary between 0.1 and 3.0 (see Map 143). Province No. 18 shows the most extreme enrichment factors. This province includes the Barents Sea Group (Map 145), which is thought to have been emplaced from a remote origin outside the Baltic Shield (Kjøde et al. 1978, Roberts 1985, Siedlecka 1975).

In many cases the geochemical distribution patterns coincide with known geological units. In other cases there are discrepancies, the most striking being: (1) Geochemical province No. 18 includes a part of the Kalak Nappe on the Nordkinn Peninsula in addition to the Barents Sea Group (Fig. 1, Maps 143 and 145), (2) The eastern (Kautokeino-Sirkka) greenstone belt has geochemical characteristics different from those of the western (Karasjok-Kiruna) greenstone belt (see Fig. 1, Maps 2, 7, 42, 59, 70, 83, 103, 107, 120, 122 and 145), and (3) some geochemical provinces encompass areas of both Precambrian rocks and rocks belonging to the Caledonian Fold Belt (see e.g. Maps 15, 23, 28, 29, and 81).

A northeast-southwest change of concentrations appears on several of the maps of element contents in the heavy mineral fractions. This trend, is abrupt along the western and southern margin of the Granulite Belt (Map 145) and smoother both to the southwest and to the northeast of this border (Maps 28, 30, 32, 35, 37, 50, 75, 80, 81, 89, and 95) thus agreeing with suggestions about a south-westward accretion of the Baltic Shield (Gaal 1986). More detailed descriptions of the geochemical provinces are given by Ottesen et al. (1985) and Steinfeld et al. in prep.

Geochemical anomalies

The anomalous areas (Map 143) can be divided into two types: (1) zonal, rectilinear types of patterns and (2) local to regional areas of more irregular shapes.

Zonal patterns. A NW-trending, some 120 km wide belt of high concentrations of mafic elements crosses the northeastern part of the survey region (e.g. Maps 32, 37 and 42). The concentrations decrease rather abruptly at the northeastern side of the belt and more stepwise toward the NE. This NW-trending belt is intersected by a NE trending zonality of concentration changes that can be seen on several of the maps (e.g. Maps 5, 7 and 103). Combined, these and other structures give a pattern of rectangular blocks, the edges of which often follow gradients or discontinuities on the gravity and magnetic maps (Maps 146, 147 and 148).

In many cases the structures cross borders between lithological units and related geochemical patterns. Some coincide with lineaments on LANDSAT images. Chalcophile elements such as Cu, Co and Zn are enriched in the fine fraction of till and drainage samples from a number of these zones. Similar zonal patterns have also been found by the Geological Survey of Finland for *aqua regia* extractable elements in the fine fraction of till, (Geochemical Atlas of Finland, in preparation). For further discussion of the zonal patterns, see Björklund (in press).

Local anomalies. Clusters of samples with high contents of certain elements occur in various places. Some of the clusters coincide with provinces where economic deposits are known, while others are located in areas where no economic mineralization has been recorded. (Table 3 and Maps 149-155).

TABLE 3. *Geochemical anomalies in areas of mines and examples of anomalies in areas where economic mineralization has not been recorded prior to the project.*

Coordinates	Mine or Area	Elements (Map No.).	Geochemical Province No. (Map No.)
MINING AREAS			
1300 8460	Kemi, Finland	Cr (2,33,59,79,103); Ni (111); Ti (92); V (93,120)	
1160 8670	Bidjovagge, Norway	Au (13,124); Ba (55); Ca (30); Cl (31); Co (32); Cu (60,104); Na (85)	
1139 8610	Aitik, Sweden	Ag (53); Ba (55,99,125); Cl (31); Cu (3,60); Fe (61,105); K (4); La (63); Mn (66,108); Mo (53,67,109); Rb (113); Th (117)	
1120 8690	Viscaria, Sweden	Ag (53); Ba (55); Ca (100); Cl (31); Co (1,32,58); Cu (3,66,104); Fe (61,105); Mn (66,108); Mo (53,67,109); Rb (113); Th (117)	
980 8430	Laisvall, Sweden	As (12); Ba (29,55,99,125); Cs (16); K (4,62); Li (64); Mn (38,84); Nb (41,86); P (43); Pb (8); Rb (20); Sb (21); Sr (46,71,91); Ti (92); Zn (11,73,122).	
EXAMPLES OF NEW ANOMALIES			
1050 8550	Jokkmokk - Arjeplog	As, Ba, Lu, Nb, Mo, S, Sb, Sn, Ta, W, Zn, Zr.	Province 12 (143)
1400 8770	Ivalo	Au, Ba, Ce, Cu, La, Th	Province 4 (143)
1450 9020	Varanger Peninsula	Ba, Mo, Nb, Ti, W, Y.	Province 18 (143)

Reproducibility of geochemical patterns

The broad-scale patterns on the geochemical maps indicate that main geochemical provinces in the survey area could have been detected by a sampling density of less than 1 sample site per 30 km², (see Figs. 3-5).

The reproducibility of geochemical patterns with different sampling media is sometimes remarkable. There are, for example, obvious similarities in both the concentration levels (Table 5) and in the spatial distributions of the individual elements for the heavy mineral fractions of till and stream sediments. Ba forms an exception having a median value in the heavy mineral fraction of stream sediments twice that in the heavy mineral fraction of till. The contents of Zr are significantly higher in the heavy mineral fraction of till than in that of stream sediments. For some elements the fine fraction of mineral samples and the ash of organic samples produce similar distribution patterns (e.g. Cr on Maps 2, 59 and 103); for other elements the patterns may vary with the sample type (e.g. La on Map 18 versus La on Map 129). In some cases the fine fraction and the heavy mineral fraction produce similar distribution patterns, in others not (see for example, Maps 7 and 68 versus Maps 42 and 87, respectively, and Maps 3 and 34 versus Maps 60 and 80, respectively).

A study of the reproducibility of the contents of nitric-acid soluble elements in stream sediments showed that the between site variability dominates over variability due to different times of sampling, sampling methods and methods of chemical analysis (Skilbrei et al. in prep.).

Some of the geochemical patterns obtained in the Nordkalott Project are verified by results from more detailed surveys (see Figs. 6, 7 and 8).



FIG. 3. Nitric-acid soluble Li in stream sediments in all 5773 sample sites. Reduction of Map 64.

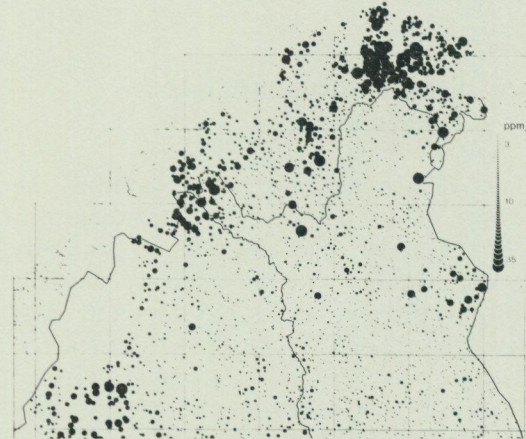


FIG. 4. Nitric-acid soluble Li in stream sediments in a random selection of 50% of the samples in Fig. 3.

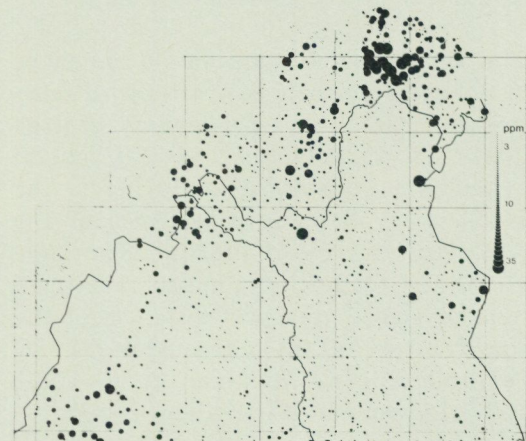


FIG. 5. Nitric-acid soluble Li in stream sediments in a random selection of 25% of the samples in Fig. 3.

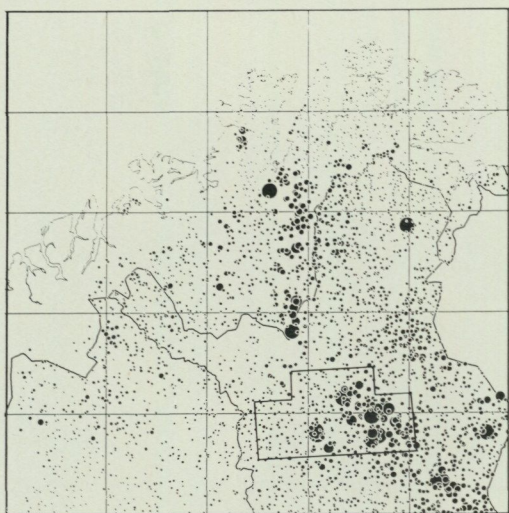


FIG. 6. Contents of total Ni in till. Reduction of Map 7. The inset shows location of Figs 7 and 8.

Geochemical patterns in relation to glaciation

The Pleistocene ice sheet covered the whole of the Baltic Shield. Except for coastal areas the bedrock is generally poorly exposed due to extensive deposits of glacial drift. There have been at least five periods of glaciation with different direction of ice flow (Hirvas 1977 and Map 144). However, the glacial displacement of the geochemical patterns in the fine fractions of till and, consequently, in stream sediments and organic samples seem to be negligible in relation to the scale of the geochemical maps.

This conclusion is based on (1) the shape of obtained geochemical patterns in relation to bedrock and Quaternary geology (Maps 28, 45, 144 and 145), (2) general experience gathered during the geochemical mapping programme of the Geological Survey of Finland (Kauranne 1975) and (3) several Finnish investigations of glacial transport distances of the fine fraction of till (Lehmuspelto 1986, Peuraniemi 1982, Pulkinen et al. 1980, and Salminen and Hartikainen 1985).

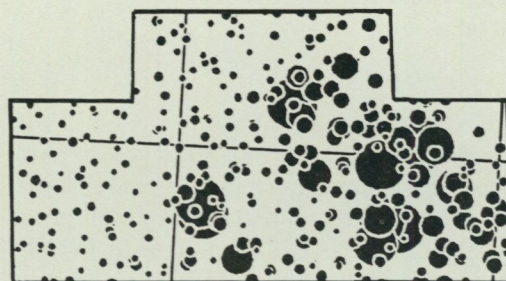


FIG. 7. Contents of total Ni in till in an enlargement of the subarea in Fig 6. 1 sample per 50 km².

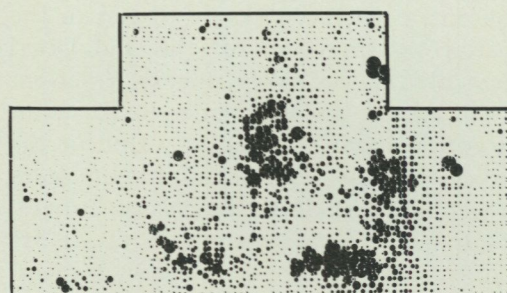


FIG. 8. Contents of aqua-regia soluble Ni in till from the same area as in Fig. 7. The data have been obtained by the Geological Survey of Finland independent-ly of the Nordkalott Project. 1 sample per 4 km².

These studies show that the minus 0.06 mm grain size fraction of till has generally been displaced no more than a few hundred metres.

Short distances of glacial displacement in coarser fractions (20-200mm) of till have also been demonstrated in Finland. Hirvas (1977) carried out stone counts and found normal displacements of 1-4 km. Salonen (1986) collected data on boulder transport in 464 indicator trains and concluded that the length of boulder fans generally varies between 1 and 20 km, 3 km being the median value.

In some areas products of preglacial weathering have survived the glaciation, forming up to several metre thick deposits of unconsolidated residual material under the glacial sediments (Bjørlykke 1966, Hirvas 1977, and Lehmuspelto 1985). The extension of these areas of presumably Tertiary weathering and their effects on the geochemical dispersion patterns are not known.

Podzolization is frequent in the survey region, but the bleached layer of podzols can be as thin as a millimetre or so. Other types of postglacial weathering have also taken place, especially in the north-eastern coastal districts of Norway, where there is considerable frost action. In such areas there are deposits of glacial sediments as well as deposits of recent weathering products, both of which are being heavily eroded by surface run off (Bogen in prep.). The effect of these processes on the geochemical patterns have not been investigated within the project.

USE OF THE GEOCHEMICAL DATA

Mineral resource appraisal is the main objective of the Nordkalott Project. The data obtained are also of interest in other fields such as pollution, medicine and public health, agriculture and areal planning.

Use in mineral exploration

The data can be used to define areas with potential for economic mineralization. This is indicated by several follow-up surveys within the project area. Two of these are briefly described below as known per 1 Jan. 1987:

1. In Finland a tungsten anomaly (Map 94, 8680N, 1320E) is being investigated. Detailed sampling of stream sediments had been carried out prior to the Nordkalott project, but the samples had not been analysed for tungsten. Reanalyses of the old samples gave high W-contents which lead to till sampling. The contents of tungsten and gold in the till showed an anomaly, which is being followed up by a diamond drilling programme (Johansson et al. 1986).

2. In Norway Ba-provinces on the Varanger Peninsula (Fig. 1, Maps 29, 55, 76 and 99, coordinates 9000N, 1400W) have been further investigated by geochemical, geological and geophysical methods. Hitherto unknown occurrences of barite have been found as cement in sandstones, as vein fillings and as a matrix in a breccia. Drilling is planned for 1987 in an area where the last mentioned type occurs (Bølviken et al. 1986).

Other uses

Regional geochemical maps such as those produced by the Nordkalott Project can be used to document pollution (see Map 111 and page 7). They also provide basic data about the natural distributions of elements and chemical components against which the effects of pollution can be evaluated.

The fallout of ^{137}Cs and ^{134}Cs from atomic bomb explosions and accidents in nuclear power plants can be used as an example. The harmful effects of these nuclides are not only a function of their amount. The extent of uptake by living organisms will also depend upon the availability of the chemically identical natural isotope ^{133}Cs (Map 16) as well as upon similar elements, e.g., those of the alkaline and alkaline earth groups (see Maps 4, 5, 14, 19, 20, 55, 56, 62, 64, 65, 71, 99, 100, 106, 107, 110, 113, 116 and 125).

The survey region constitutes one of the least polluted parts of Europe. The geochemical data obtained in the Nordkalott Project can therefore be used for environmental reference in this and other regions. Of particular interest is their use in geomedicine (environmental geochemistry and health). It is well known that the epidemiology of diseases such as dental caries and goiter are related to deficiencies in the natural environment of fluorine and iodine, respectively. Excess of these two elements can also be harmful. A number of analogous associations have been shown or suggested for other elements and several diseases, amongst them cardiovascular diseases and various types of cancer.

An extensive research activity in geomedicine is taking place in Scandinavia and other places in the world, see for example, Flaten, (1986), Låg (1980a,b, 1984), Thornton (1983, 1986), and Thornton and Howarth (1986). The Nordkalott Project data can be utilized in this type of research (Björklund and Bølviken 1983, Bølviken et al. 1982).

For forestry and agriculture the geochemical maps of this atlas provide data about the distribution of elements some of which are thought to be essential (Table 4), and others (Maps 8, 12, 25, 27, 117, 119, 123, 135 and 136) possibly harmful for plants or animals, when occurring in too high concentrations.

TABLE 4. *List of maps of elements thought to be essential for plants or animals (Bowen 1966, Underwood 1971).*

Element	Map numbers
Ca	56, 100
Cl	101
Co	1, 58, 102, 127
Cr	2, 59, 103
Cu	3, 60, 104
Fe	17, 61, 105, 128
K	4, 62, 106
Mg	5, 65, 107
Mn	6, 66, 108
Mo	67, 109, 131
Na	19, 110
P	69, 112
S	114
Si	115
V	10, 72, 120
Zn	11, 73, 122

AVAILABILITY OF DATA

The geochemical data of the Nordkalott Project are all digitized and recorded on magnetic tapes. Users may have access to the data on terms defined by the Geological Surveys of Finland, Norway and Sweden, (for addresses, see inside cover).

TABLE 5. *The Nordkalott Project. Statistics for the contents of elements in geochemical samples.*

- X_i : Content in the i'th sample.
- N : Number of samples analysed.
- Min. : Minimum value obtained by the indicated method.
- Max. : Maximum value obtained by the indicated method.
- Mean : Arithmetic mean $\bar{X} = \frac{\sum X_i}{N}$
- S.D. : Standard deviation $\sqrt{\frac{\sum (X_i - \bar{X})^2}{N-1}}$
- * : Contents below the detection limit (DL) constituting less than 10% of the values are defined as $\frac{2(DL)}{3}$ and included in the calculations of the mean and standard deviation.
- ** : Mean and standard deviation are not calculated because the number of values below the detection limit constitutes more than 10% of the total number of samples.

The percentiles show cumulative frequencies of element contents beginning with the lowest value.

TOTAL CONTENTS OF ELEMENTS IN TILL. GRAIN SIZE: MINUS 0.062 MM. ANALYTICAL METHOD: OPTICAL EMISSION SPECTROGRAPHY (Danielson 1967). N = 5400

Element	Min.	Max.	Mean	S.D.	Percentiles	
					50%	95%
Co ppm	10	117	26.4	7.53	26	38
Cr ppm	13	4120	103.49	104.04	84	250
Cu ppm	1	978	17.2	25.67	11	48
K %	0.01	7.9	1.68	0.99	1.48	3.65
Mg %	0.01	6.31	1.47	0.75	1.43	2.77
Mn ppm	1	7430	605.34	546.04	483	1600
Ni ppm	1	1670	40.84	47.09	31	90
Pb ppm	2	224	17.49	8.16	16	29
Ti ppm	1000	24000	6101.51	1724.59	6090	8600
V ppm	10	1950	224.45	109.93	218	360
Zn ppm	1	208	29.77	18.67	24	67

TOTAL CONTENTS OF ELEMENTS IN COMBINED SAMPLES OF TILL. GRAIN SIZE: MINUS 0.062 MM.
ANALYTICAL METHOD: NEUTRON ACTIVATION ANALYSIS (Rosenberg et al. 1983). N = 1040

Element	Min.	Max.	Mean	S.D.	Percentiles	
					50%	95%
As ppm	<1	74	2.4 *	3.52*	1.3	8.5
Au ppb	<3	436	**	**	**	9.5
Ba ppm	<100	1200	636.11*	153.29*	630	900
Br ppm	<0.3	98	11.28*	11.12*	7.8	33
Cs ppm	<0.6	13	1.85*	1.39*	1.6	4.7
Fe %	<0.5	10.4	4.86*	1.27*	4.8	7
La ppm	<1.8	133	36.72*	14.67*	33	61
Na %	<0.01	4.99	2.44*	0.57*	2.5	3.2
Rb ppm	<15	182	64.36*	20.41*	61	99
Sb ppm	<0.1	115	0.41*	3.58*	0.2	0.9
Sc ppm	<0.6	130	19.84*	5.71*	20	28
Sm ppm	<0.1	37	6.28*	2.52*	6	10.4
Ta ppm	<0.5	39	1.22*	1.25*	1.1	1.8
Th ppm	<0.3	45	10.11*	4.06*	9.5	18
W ppm	<0.6	9	**	**	**	1.9
U ppm	<0.2	11	3.01*	1.28*	2.8	5.2

TOTAL CONTENTS OF ELEMENTS IN A HEAVY FRACTION (sp.gr. >2.96 g/cm₃) OF COMBINED SAMPLES OF TILL. GRAIN SIZE: 0.062 - 0.5 0 MM. ANALYTICAL METHOD: X-RAY FLUORESCENCE (Leake and Aucott 1973). N = 1034

Element	Min.	Max.	Mean	S.D.	Percentiles	
					50%	95%
Al %	3.39	16.3	6.2	2.07	5.56	11
Ba ppm	<46	3730	**	**	86	226.
Ca %	0.6	10.6	7.24	2.13	7.93	9.2
Cl ppm	39	1680	584.88	261.28	528	1000
Co ppm	20	152	78.18	11.08	79	92
Cr ppm	82	6290	497.34	304.74	453	95
Cu ppm	<10	787	41.56	38.52	32	88
Fe %	9.79	30.4	15.98	2.6	15.5	20
K %	0.11	1.78	0.46	0.17	0.45	0.71
Mg %	0.83	9.17	5.66	1.17	5.93	7.2
Mn %	0.1	1.93	0.31	0.15	0.28	0.53
Mo ppm	22	146	45.58	12.08	45	63
Na %	0.12	1.56	0.76	0.21	0.78	1.03
Nb ppm	20	500	51.34	35.87	41	100
Ni ppm	34	352	112.45	44.44	109	200
P ppm	0.02	1.27	0.18	0.14	0.15	0.42
Rb ppm	32	1770	125.42	79.52	109	250
Si %	13.6	29.3	19.45	1.42	19.6	21.3
Sr ppm	13	1070	195.48	120.94	174	420
Th ppm	38	418	107.35	37.14	100	170
Ti %	0.83	9.59	1.98	0.84	1.85	3.11
V ppm	80	688	333.47	73.22	331	441
Y ppm	25	470	89.03	50.87	79	180
Zn ppm	36	391	131.52	44.98	121	200
Zr ppm	198	18800	1221.71	1157.31	953	2800

CONTENTS OF NITRIC-ACID SOLUBLE (7N, 110°C, 3 HOURS) ELEMENTS IN STREAM SEDIMENTS.
GRAIN SIZE: MINUS 0.18 MM. ANALYTICAL METHOD: INDUCTIVELY COUPLED ARGON PLASMA
SPECTROMETRY (Ødegård 1981, 1983). N = 5773

Element	Min.	Max.	Mean	S.D.	Percentiles	
					50%	95%
Ag ppm	<.8	6	**	**	**	1.3
Al %	0.07	5.4	0.79	0.49	0.66	1.7
Ba ppm	1	1700	40.77	55.12	27.9	113.5
Ca %	0.03	7.12	0.33	0.23	0.3	0.65
Ce ppm	3	721	55.47	45.62	43.6	131.
Co ppm	0.6	242	6.83	6.99	5.3	16.4
Cr ppm	0.3	668	19.04	22.2	14.2	44.1
Cu ppm	<10	741	**	**	**	28.3
Fe %	0.05	31.9	1.59	2.02	1.1	4
La ppm	3.5	317	29.65	20.31	24.6	64.3
Li ppm	0.3	62	6.85	6.58	4.7	19.8
Mg %	0.01	4.38	0.29	0.24	0.24	0.7
Mn ppm	6.5	118000	317.97	1741.1	141	828.2
Mo ppm	<1	117	**	**	**	4.4
Ni ppm	1	617	9.99	12.87	6.99	26.4
P ppm	29	21500	539.45	559.42	442	1200
Sc ppm	0.1	24	2.41	1.28	2.21	4.5
Sr ppm	1.6	569	14.85	13.81	12.1	32.9
V ppm	1	225	23.33	14.77	19.8	50.3
Zn ppm	1.2	608	23.27	24.85	15.6	66.6
Zr ppm	<5	51	**	**	**	17

TOTAL CONTENTS OF ELEMENTS IN A HEAVY FRACTION (Sp.gr. > 2.96 g/cm³) OF COMBINED SAMPLES
OF STREAM SEDIMENTS. GRAIN SIZE: 0.18 - 0.6 MM. ANALYTICAL METHOD: X-RAY
FLUORESCENCE (Leake and Aucott 1973). N = 1056

Element	Min.	Max.	Mean.	S.D.	Percentiles	
					50%	95%
Al %	2.89	16.7	5.98	2.01	5.28	10.2
Ba ppm	44	17600	187.71	559.49	165	272
Ca %	0.55	11.1	7.47	2.22	8.22	9.5
Cl ppm	100	1990	444.91	238.94	415	834
Cr ppm	13	32600	486.09	1017.34	428	853
Cu ppm	<10	186	**	**	**	87
Fe %	7.97	39.9	14.62	2.95	13.7	20.1
K %	0.09	2.03	0.45	0.18	0.43	0.69
Mg %	0.79	9.11	5.99	1.26	6.27	7.6
Mn %	0.15	2.97	0.37	0.24	0.3	0.71
Na %	0.11	1.39	0.8	0.23	0.83	1.1
Nb ppm	20	363	40.55	25.64	33	83
Ni ppm	30	296	97.62	43.32	94	166
P %	0.01	1 53	0.14	0.13	0.11	0.35
Si %	10.8	32.6	20.18	1.7	20.6	22.3
Sn ppm	<100	334	**	**	**	136
Sr ppm	10	1150	175.21	115.74	160	370
Ti %	0.49	10.1	1.92	0.95	1.67	3.5
V ppm	20	770	292.13	66.96	295	389
W ppm	20	240	22.64	12.35	20	36.1
Y ppm	10	656	78.7	61.66	65	183
Zn ppm	54	424	156.47	47.3	144	242
Zr ppm	84	6190	735.38	615.6	548	1936

TOTAL CONTENTS OF ELEMENTS IN ASH OF COMBINED SAMPLES OF STREAM ORGANIC MATTER. GRAIN SIZE OF ASH: MINUS 0.1 MM. ANALYTICAL METHOD: X-RAY FLUORESCENCE (Leake and Aucott 1973). N = 1096

Element	Min.	Max.	Mean	S.D.	Percentiles	
					50%	95%
Al %	2.28	10.4	5.98	1.02	6.03	7.5
Ba %	0.02	0.18	0.06	0.02	0.06	0.1
Ca %	0.45	14.7	3.28	1.47	3.03	5.9
Cl ppm	100	9420	514.51	384.09	434	1000
Co ppm	10	169	56.31	20.33	53	94
Cr ppm	10	1860	122.65	104.00	98	290
Cu ppm	10	847	65.33	51.96	50	150
Fe ppm	1.8	36.2	9.53	5.19	7.83	21
K %	0.35	4.13	1.52	0.58	1.42	2.5
Mg %	0.35	3.34	1.41	0.47	1.34	2.5
Mn ppm	<1	3.8	0.43*	0.47*	0.22	1.5
Mo ppm	10	286	26.33	15.97	22	53
Na %	0.29	2.92	1.63	0.57	1.68	2.4
Ni ppm	10	556	59.51	39.49	49	120
P %	0.08	0.92	0.27	0.13	0.24	0.5
Rb ppm	10	282	94.33	37.59	89	180
S %	0.04	3.28	0.48	0.35	0.39	10000
Si %	9.72	38.2	29.01	3.8	29.7	33.6
Sr ppm	86	821	262.56	76.97	255	400
Th ppm	10	259	79.84	40.78	71	180
Ti %	0.11	0.93	0.44	0.12	0.43	0.65
U ppm	20	1110	35.21	51.46	21	85
V ppm	62	955	146.29	55.26	135	220
Y ppm	10	264	52.47	30.23	45	110
Zn ppm	20	901	138.71	88.11	115	310

TOTAL CONTENTS OF ELEMENTS IN ASH OF COMBINED SAMPLES OF STREAM MOSS. GRAIN SIZE OF ASH: MINUS 0.1 MM. ANALYTICAL METHOD: NEUTRON ACTIVATION ANALYSIS (Rosenberg et al. 1983). N = 1095

Element	Min.	Max.	Mean	S.D.	Percentiles	
					50%	95%
As ppm	<42	652	**	**	**	60
Au ppb	<63	785	**	**	**	78
Ba ppm	8.6	6810	1228	658.6	1070	2400
Br ppm	0.1	3380	204.3	294.3	109	800
Co ppm	4.3	897	111.5	89.9	85.6	230
Fe %	1.73	43	13.3	6.2	12.3	27
La ppm	2.4	1680	71.1	92.9	45.9	190
Lu ppm	0.4	86.9	2.5	4.6	1.3	7.5
Mo ppm	<1	123	**	**	**	34
Sb ppm	0.2	4.8	0.65	0.49	0.52	1.5
Sc ppm	0.8	43	12.8	5.50	12.2	23
Sm ppm	0.2	289	12.9	17	8.2	35
Th ppm	0.9	118	8	6	6.8	17
U ppm	0.3	1110	27.7	58.4	11.4	85

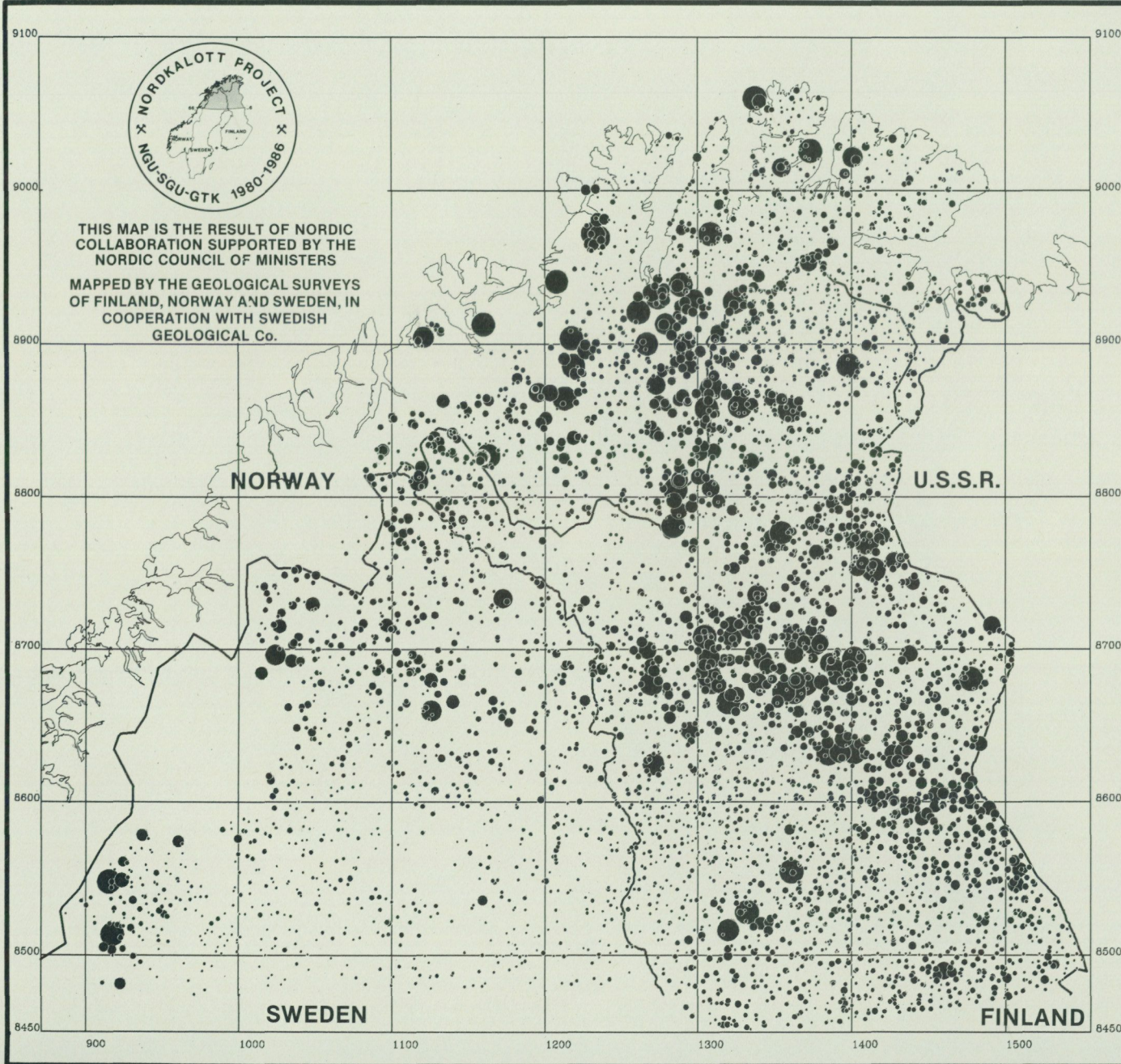
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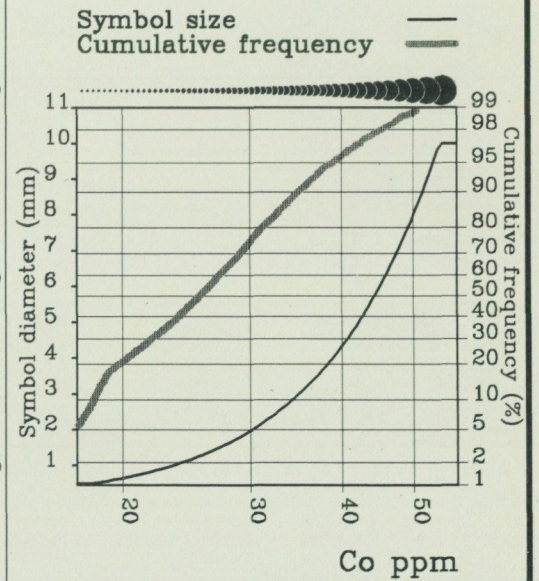
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Nordkalott project Geochemistry TILL Co

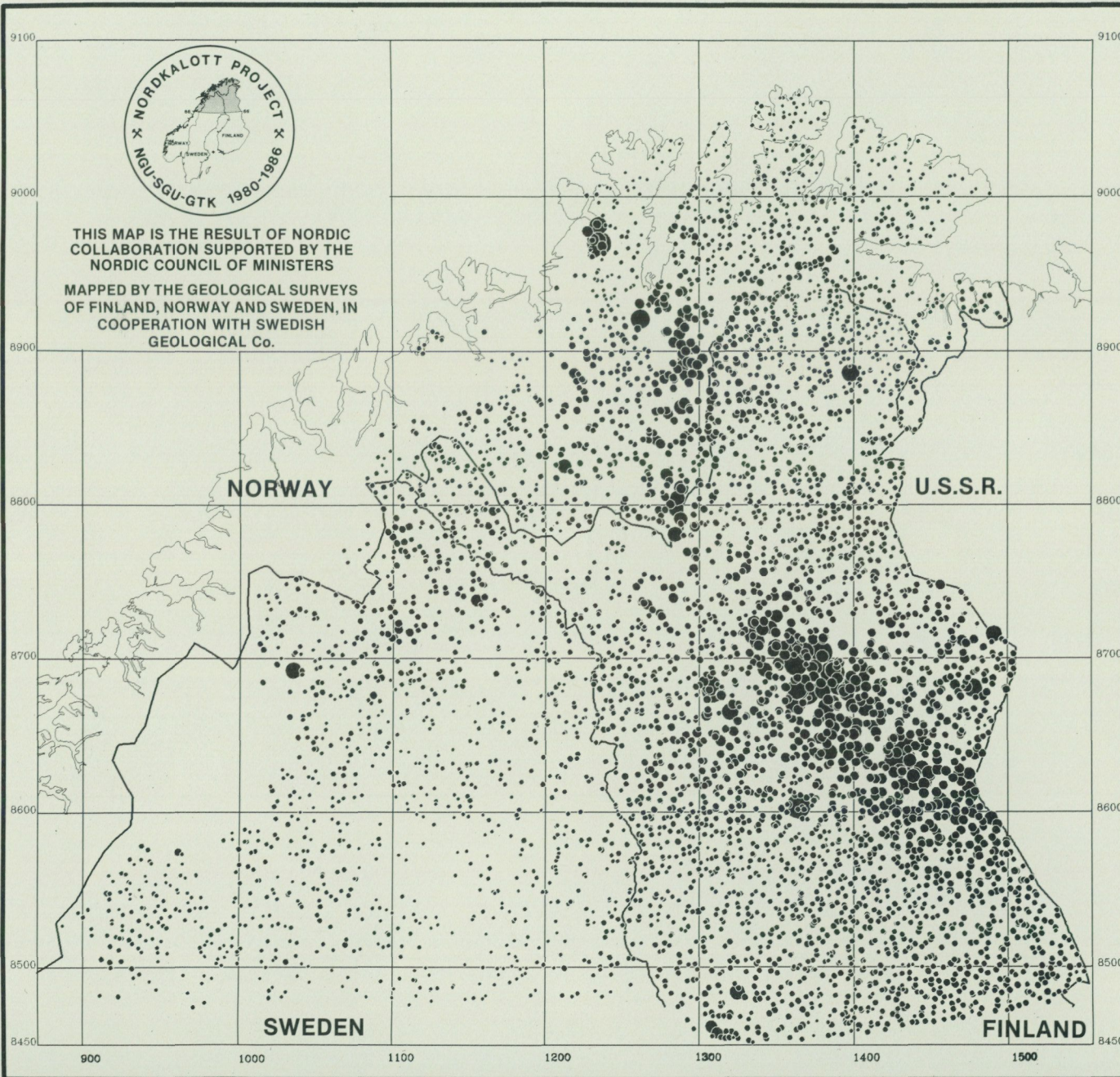
Size fraction (μm): -62
 Method of analysis: OES
 Laboratory: GTK
 No. of samples: 5399



1: 4 000 000
 100 km

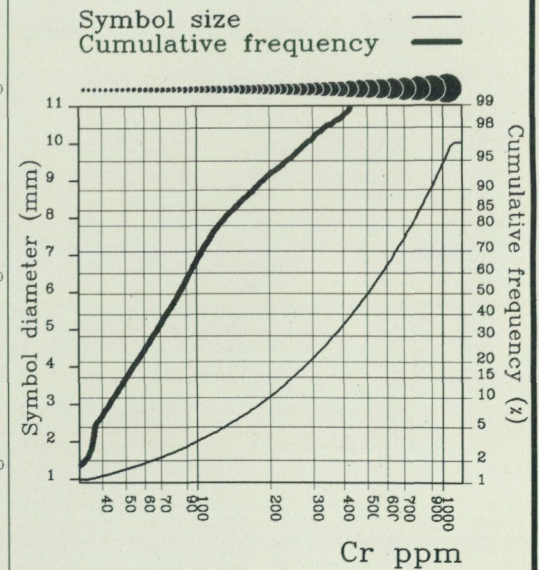
Projection: Lambert conformal
 Date of plotting: 04.11.1985

MAP 1



Nordkalott project Geochemistry TILL Cr

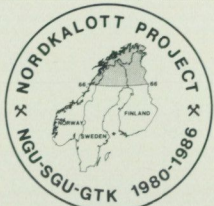
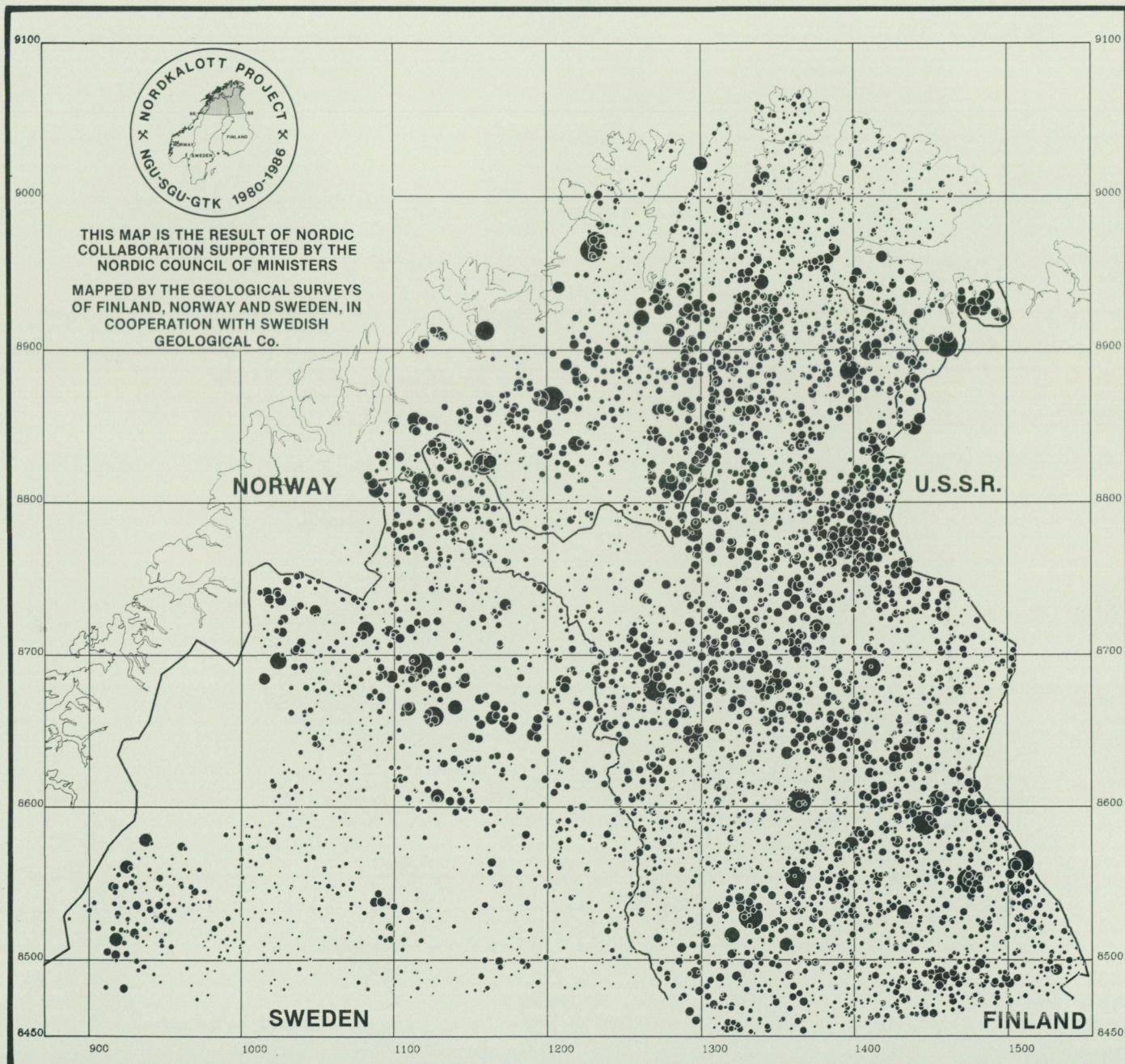
Size fraction (μm): -62
Method of analysis: OES
Laboratory: GSF
No. of samples: 5399



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100 km

Projection: Lambert conformal
Date of plotting: 16.10.1984

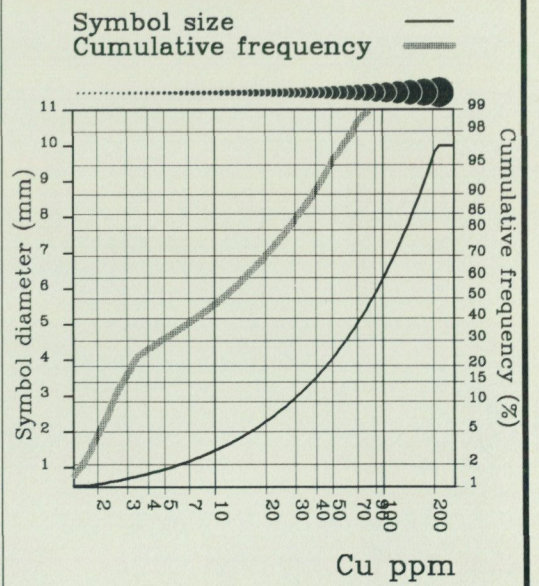
MAP 2



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Cu

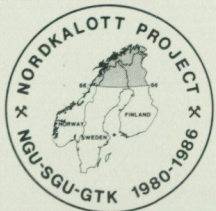
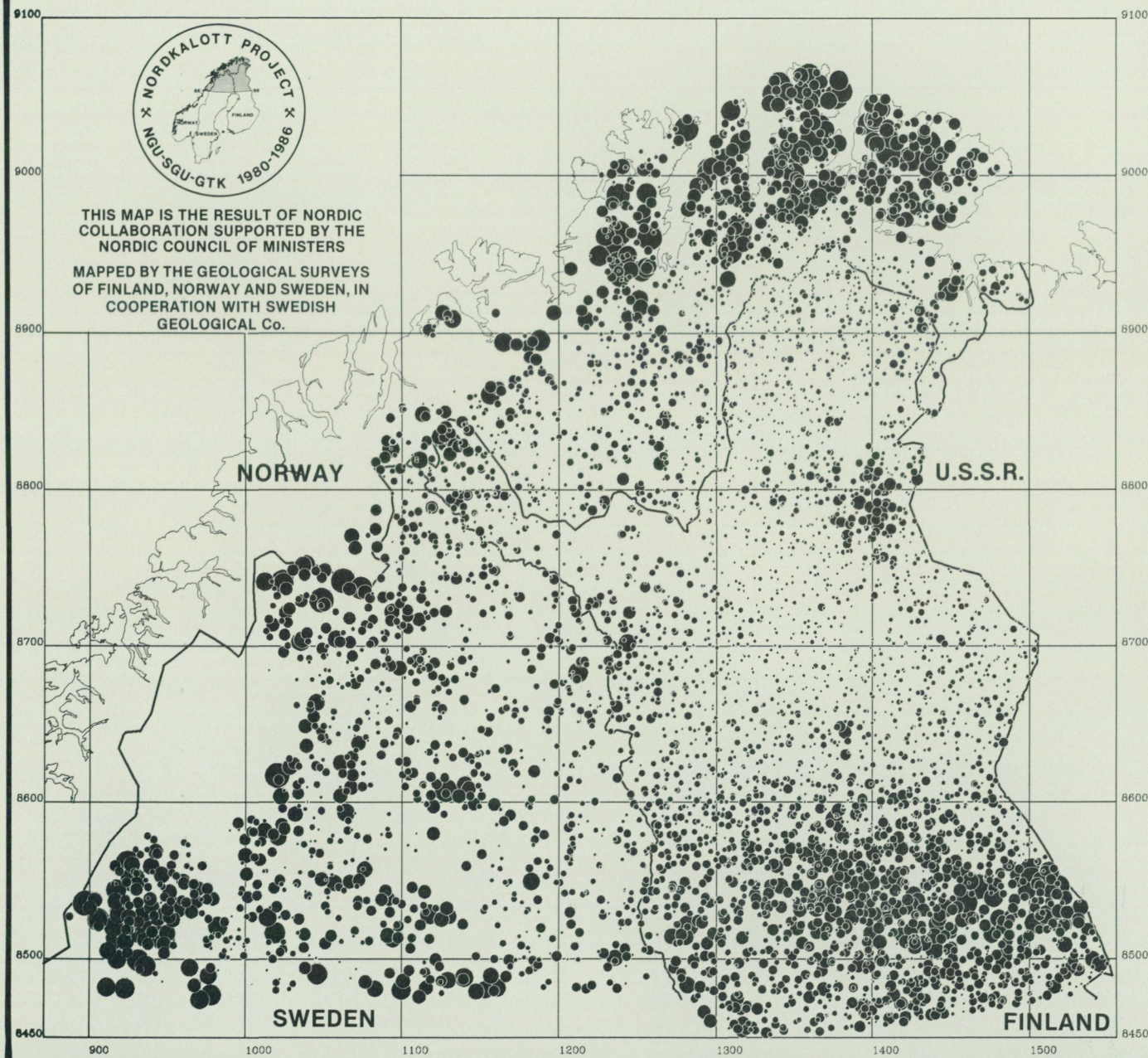
Size fraction (μm): -62
 Method of analysis: OES
 Laboratory: GTK
 No. of samples: 5400



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 21.03.1985

MAP 3

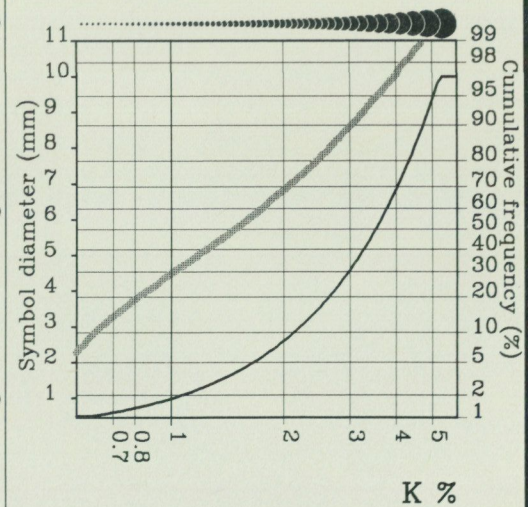


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL K

Size fraction (μm): -62
 Method of analysis: OES
 Laboratory: GTK
 No. of samples: 5399

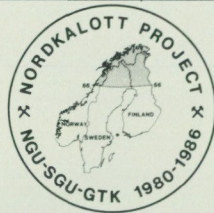
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

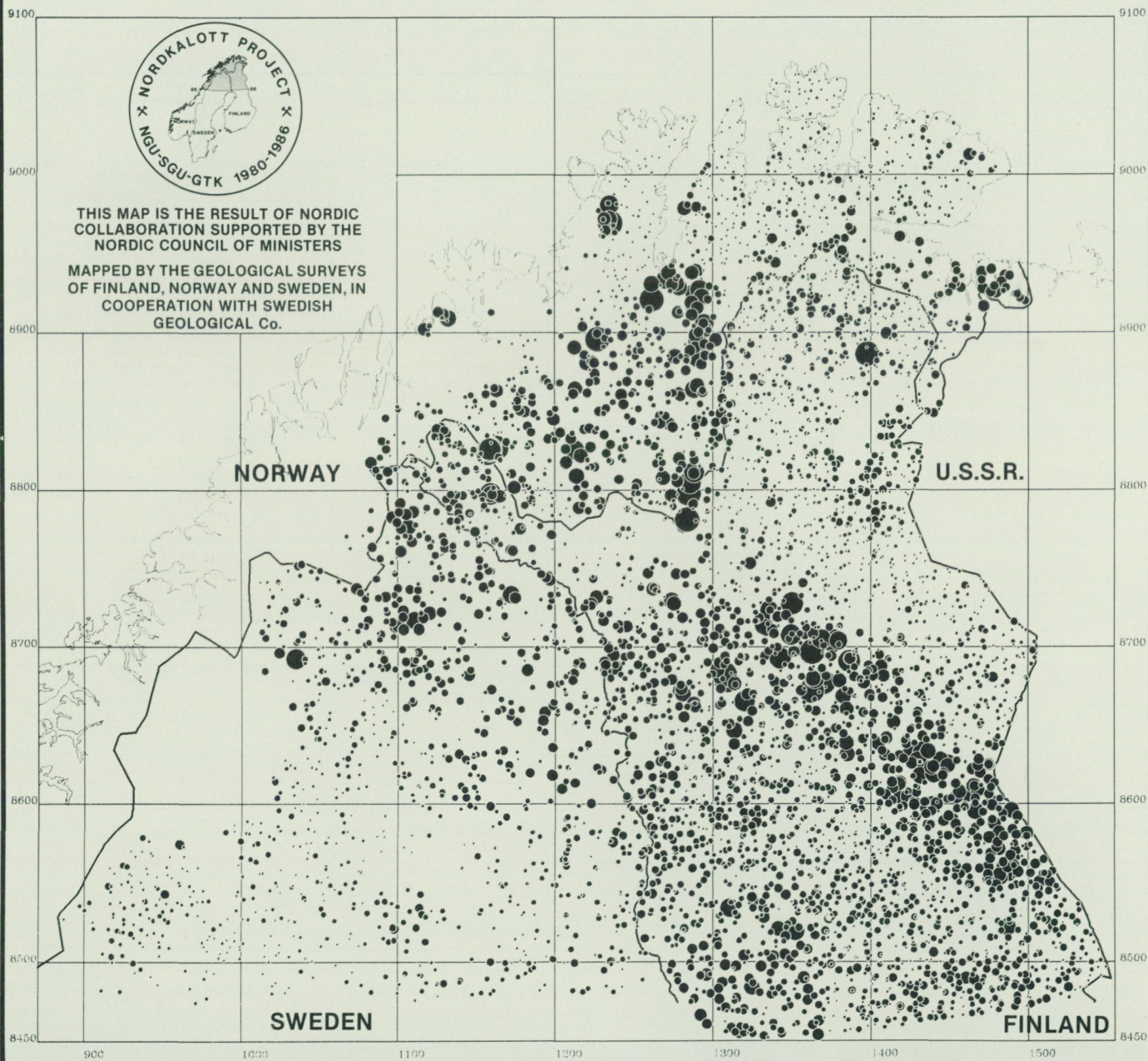
Projection: Lambert conformal
 Date of plotting: 04.11.1985

MAP 4



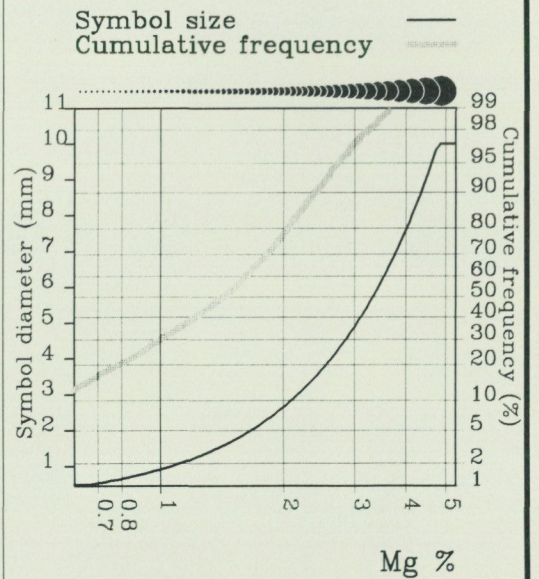
THIS MAP IS THE RESULT OF NORDIC
COLLABORATION SUPPORTED BY THE
NORDIC COUNCIL OF MINISTERS

MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
COOPERATION WITH SWEDISH
GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Mg

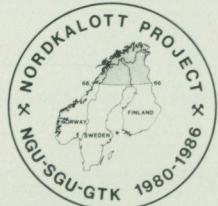
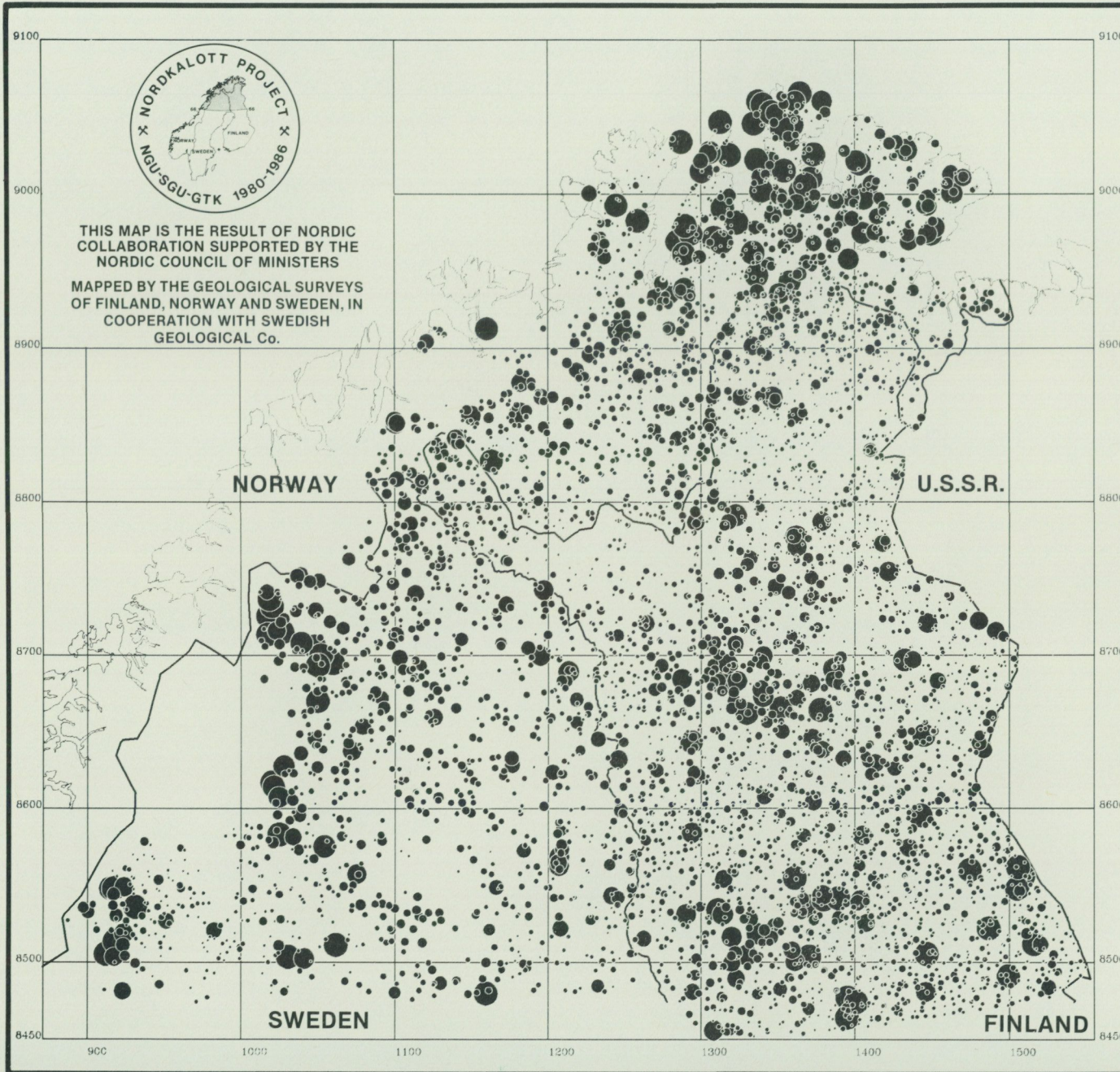
Size fraction (μm): -62
Method of analysis: OES
Laboratory: GTK
No. of samples: 5400



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 01.07.1985

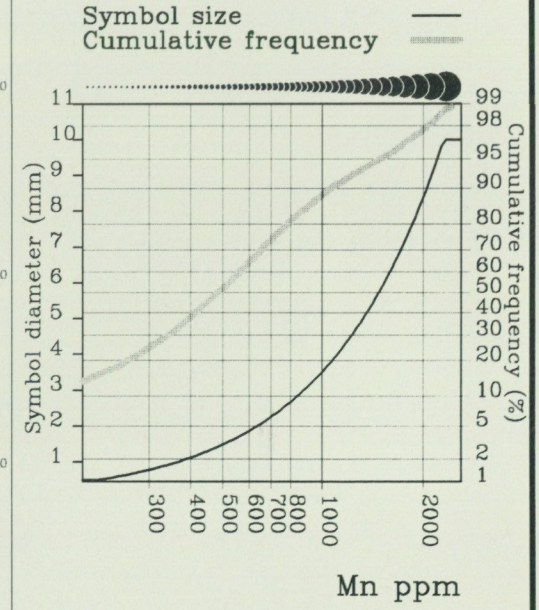
MAP 5



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Mn

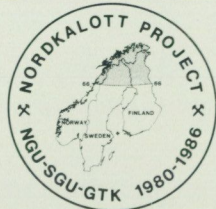
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 Method of analysis: OES
 Laboratory: GTK
 No. of samples: 5400



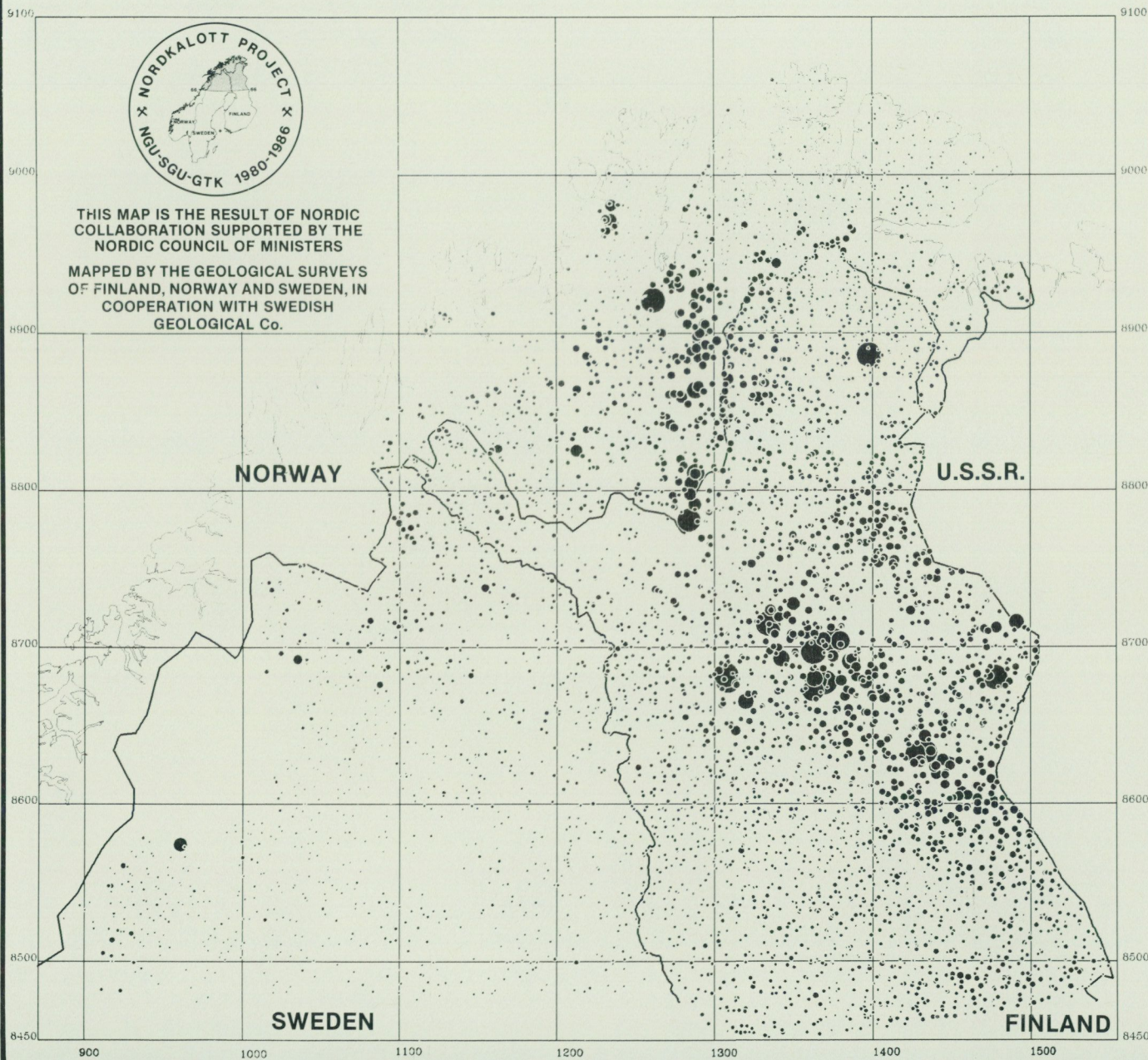
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 01.07.1985

MAP 6



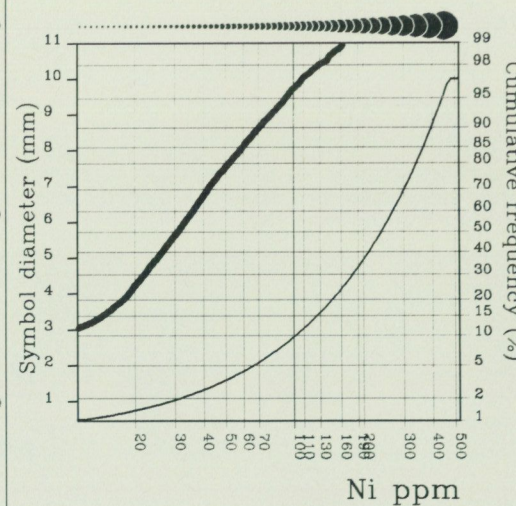
THIS MAP IS THE RESULT OF NORDIC
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GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Ni

Size fraction (lm): -62
Method of analysis: OES
Laboratory: GSF
No. of samples: 5399

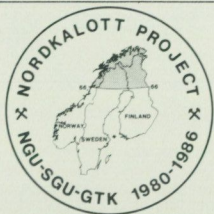
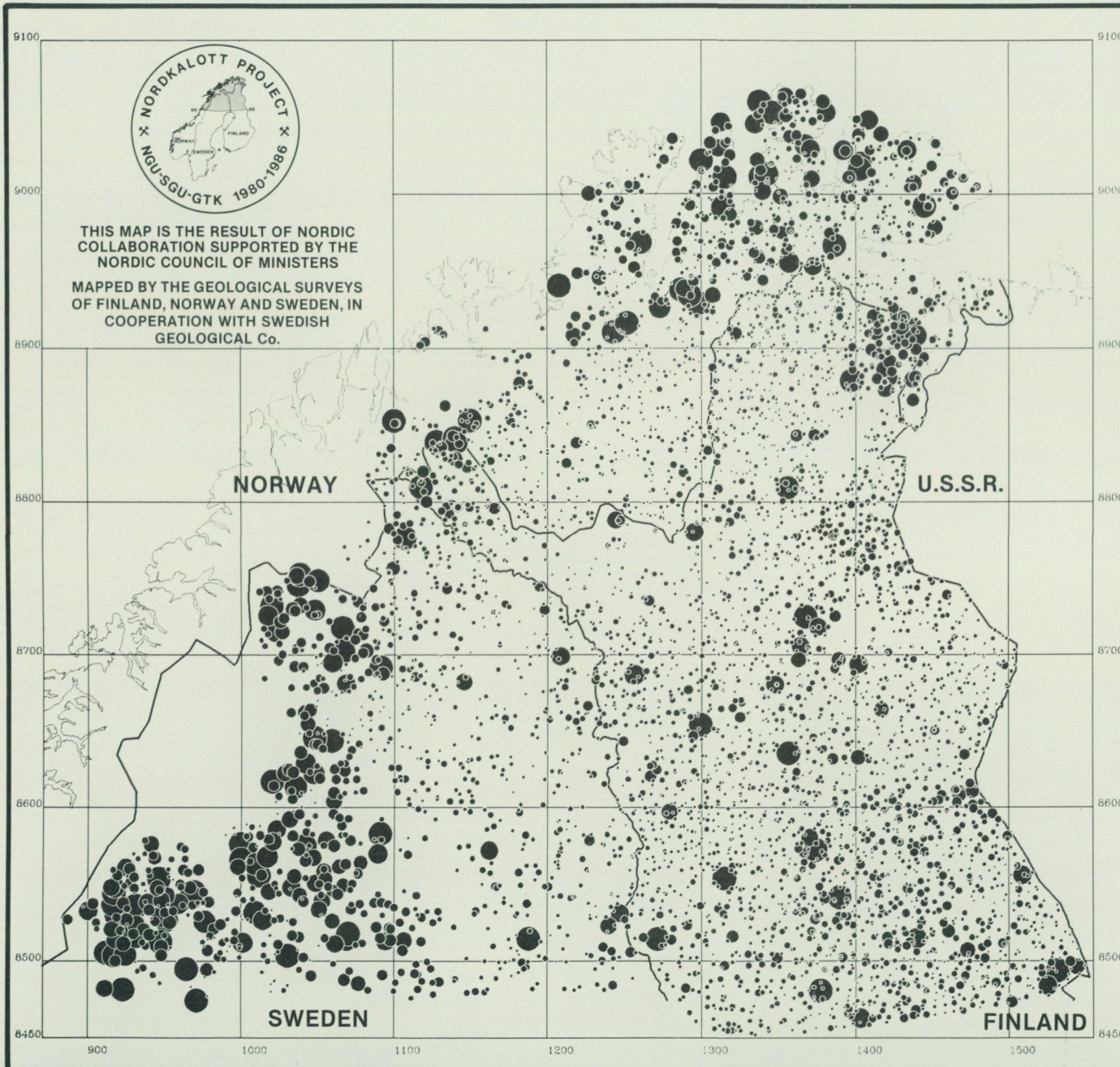
Symbol size
Cumulative frequency



1 : 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 04.02.1985

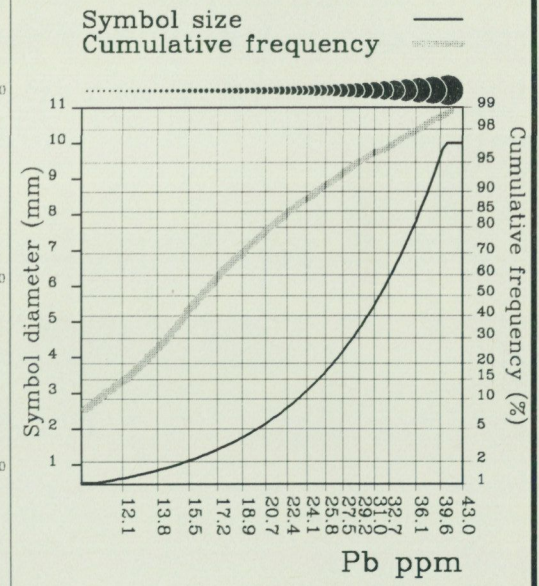
MAP 7



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Pb

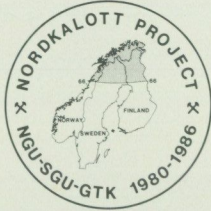
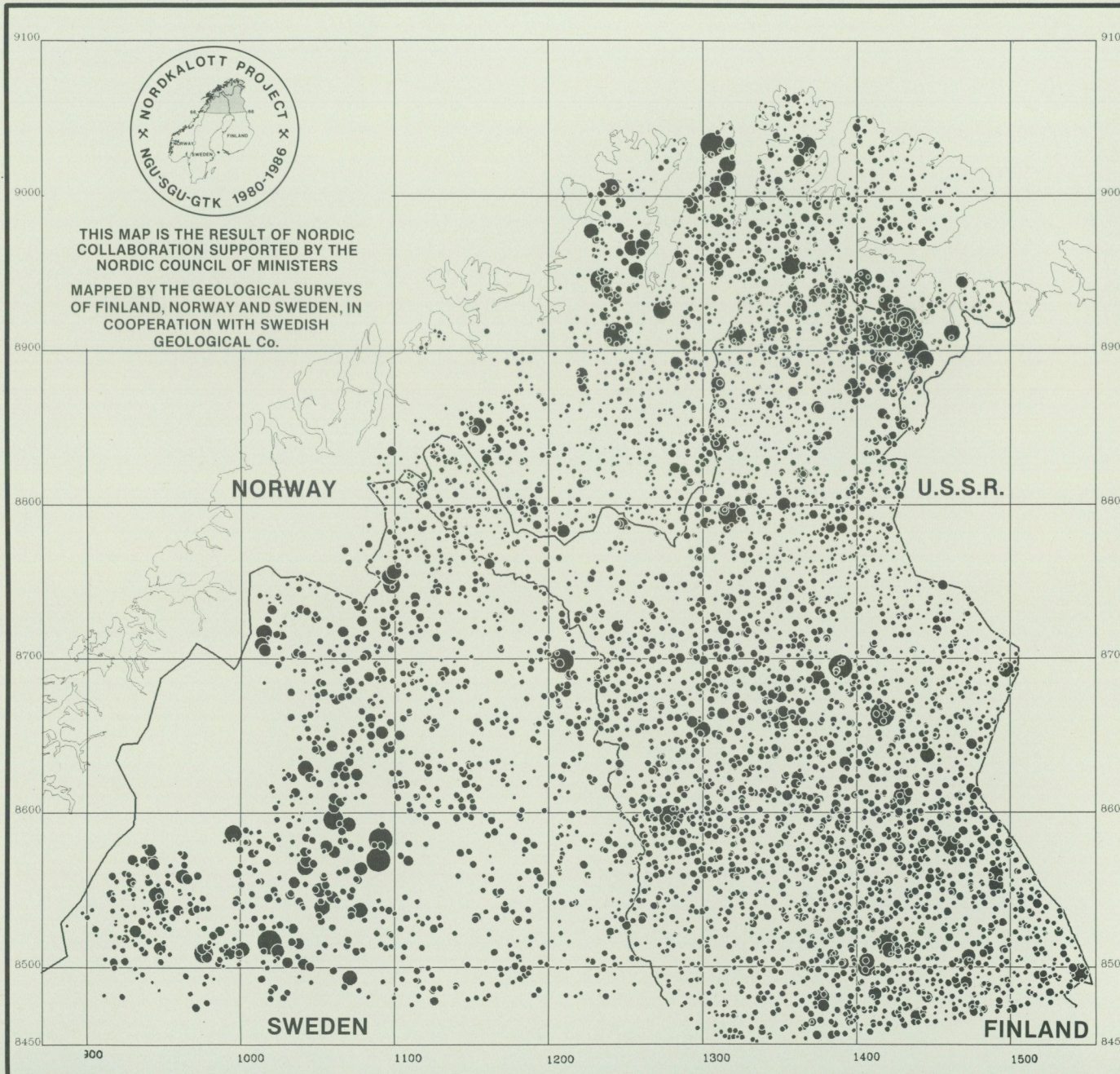
Size fraction (μm): -62
 Method of analysis: OES
 Laboratory: GTK
 No. of samples: 5400



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 21.03.1985

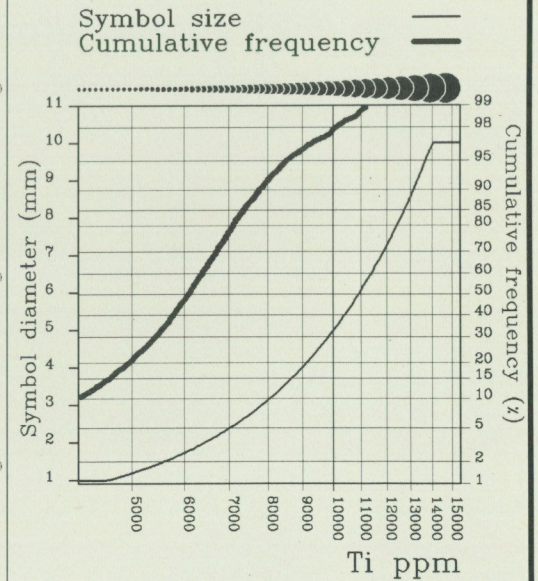
MAP 8



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Ti

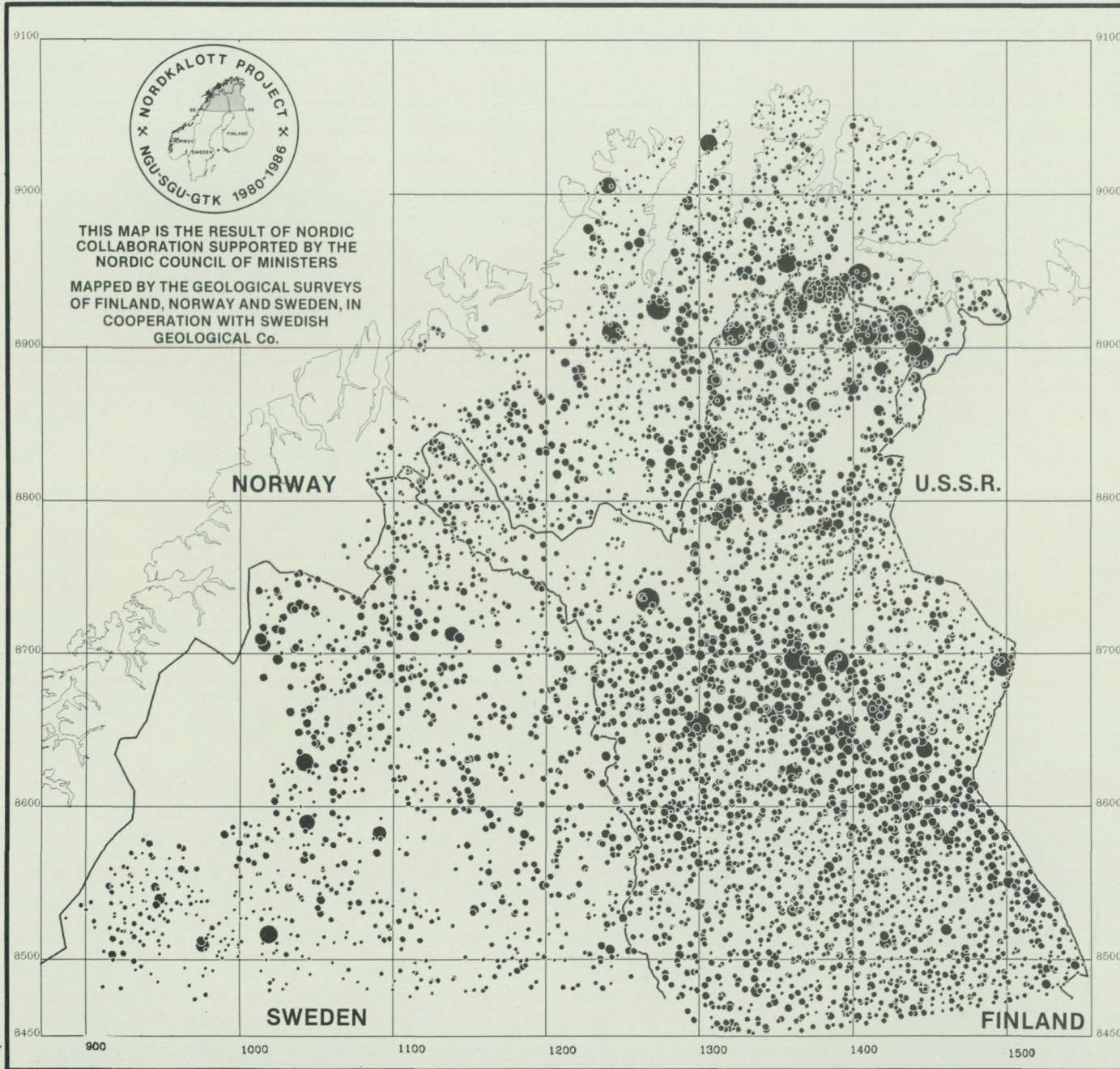
Size fraction (μm): -62
Method of analysis: OES
Laboratory: GSF
No. of samples: 5399



1: 4 000 000
100 km

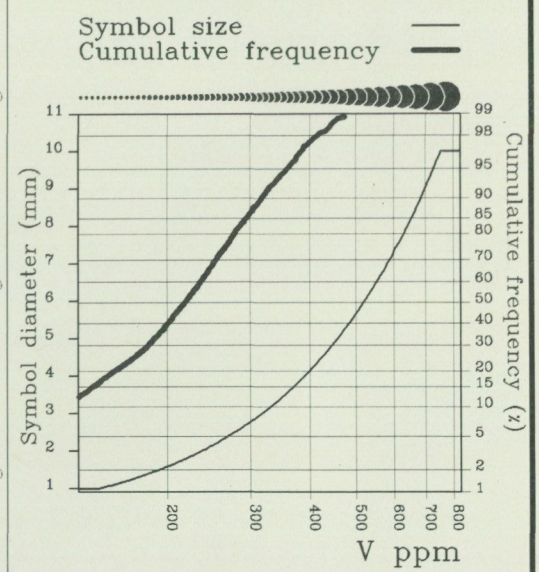
Projection: Lambert conformal
Date of plotting: 29.10.1984

MAP 9



Nordkalott project Geochemistry TILL V

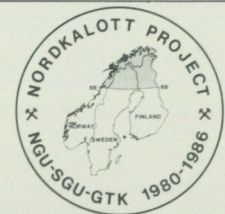
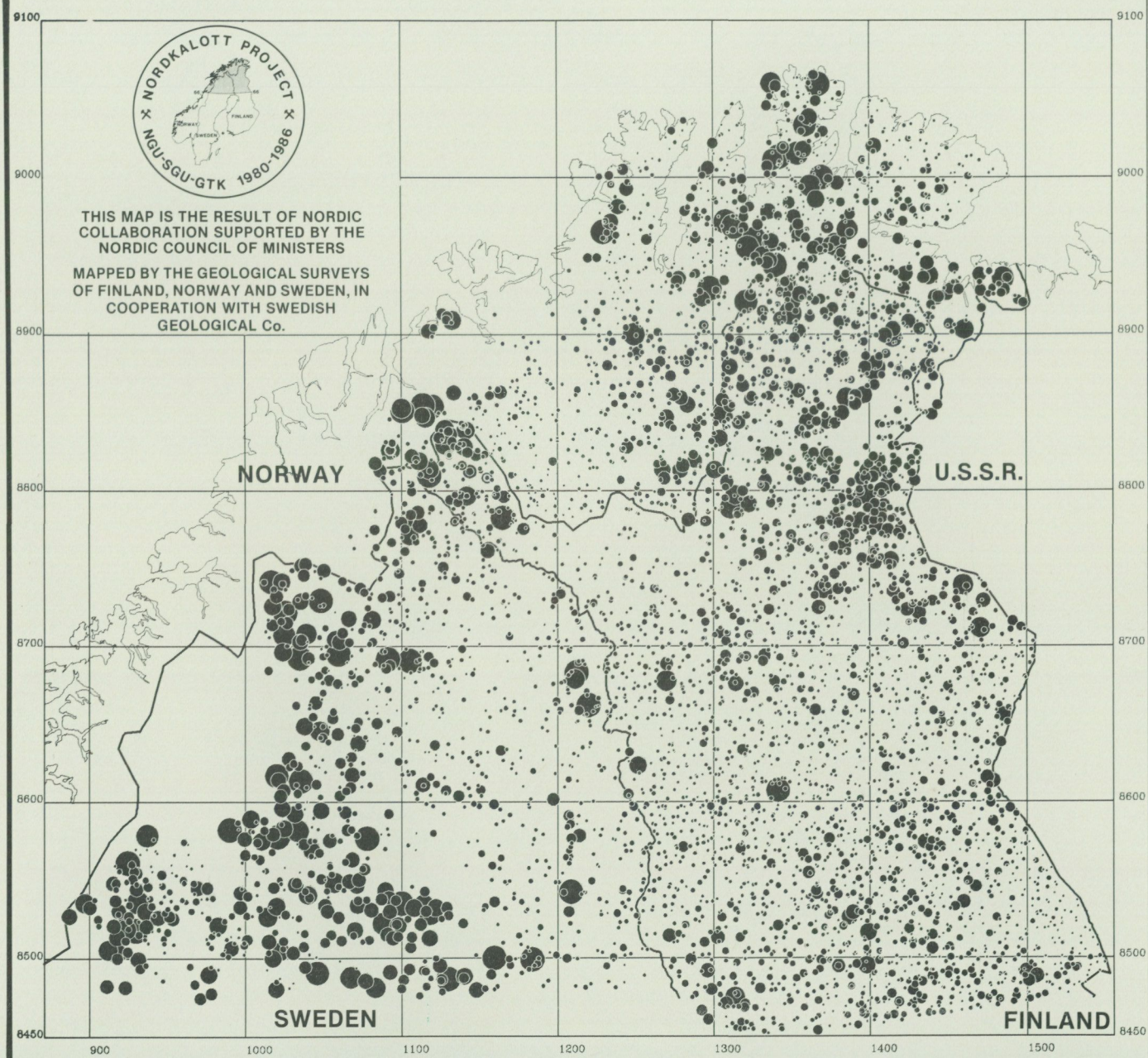
Size fraction (μm): -62
 Method of analysis: OES
 Laboratory: GSF
 No. of samples: 5399



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 25.10.1984

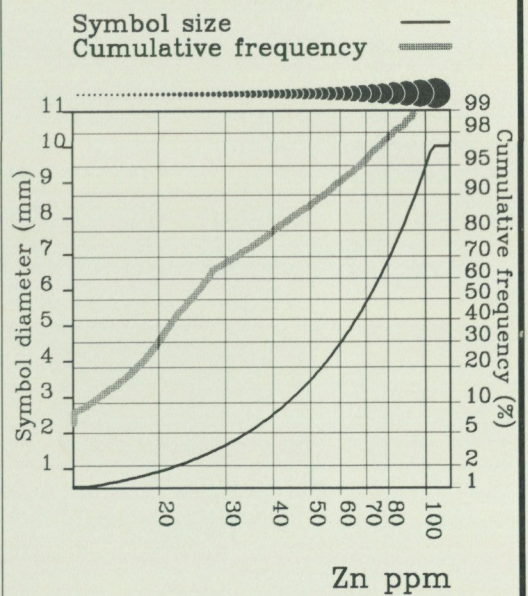
MAP 10



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Zn

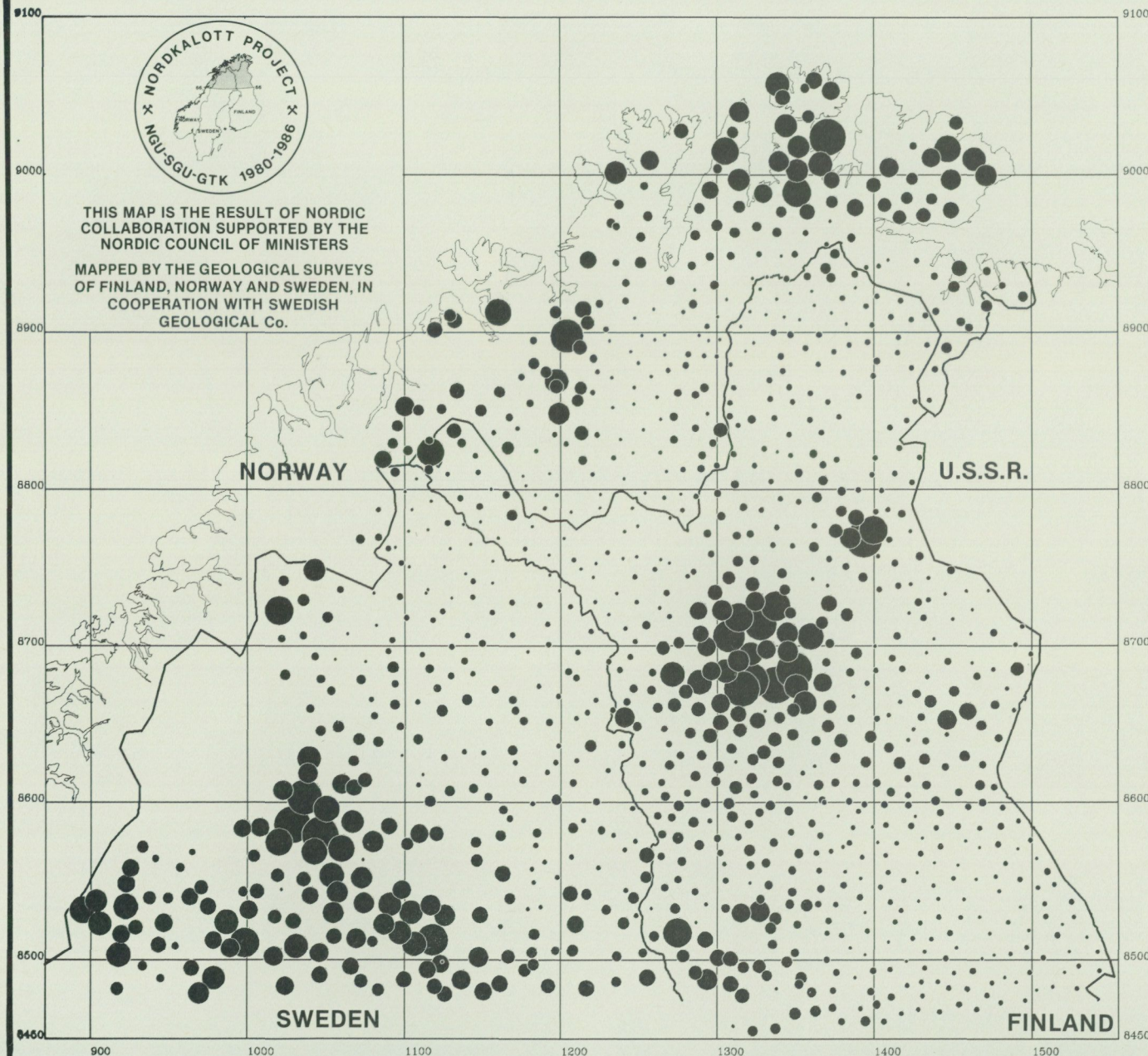
Size fraction (μm): -62
 Method of analysis: OES
 Laboratory: GTK
 No. of samples: 5400



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 02.07.1985

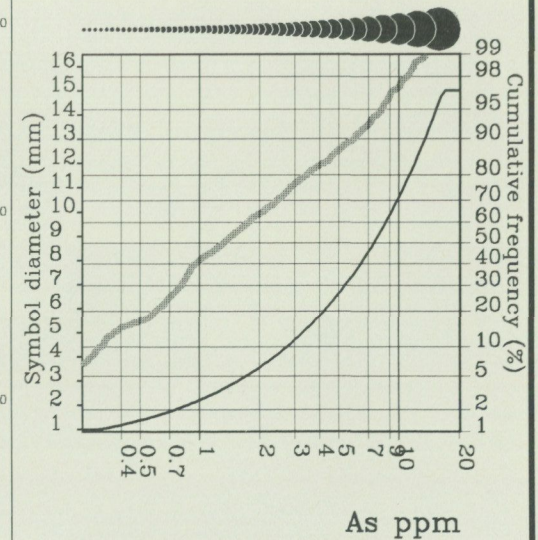
MAP 11



Nordkalott project Geochemistry TILL As

Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040

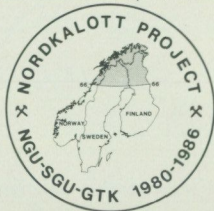
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

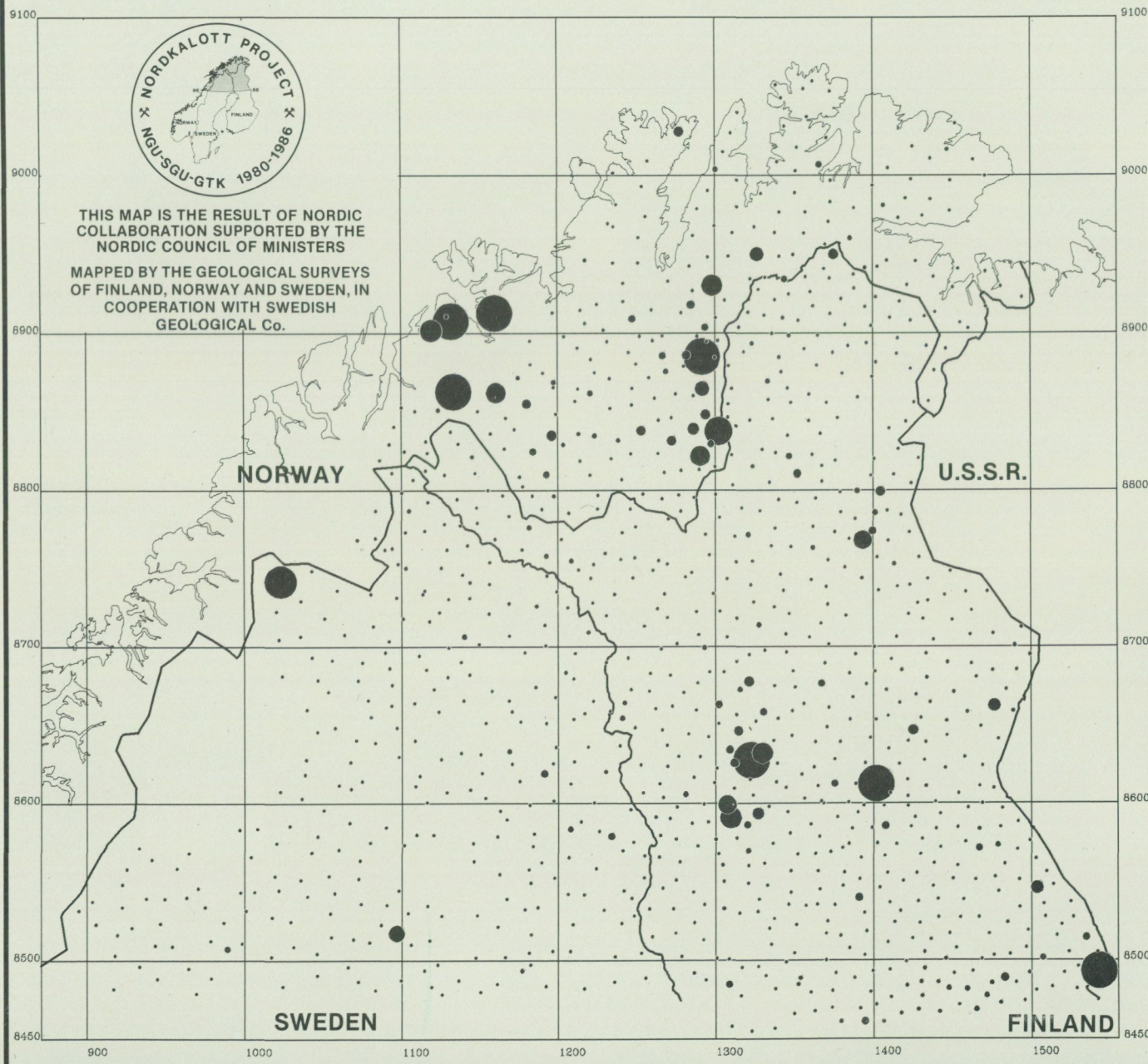
Projection: Lambert conformal
 Date of plotting: 31.10.1985

MAP 12



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

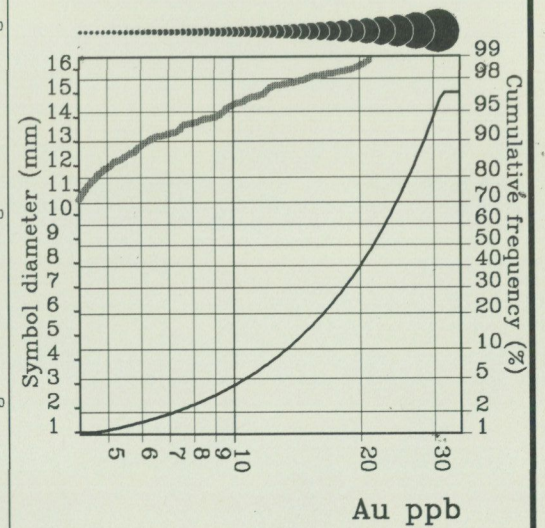
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Au

Size fraction (μm): -62
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1036

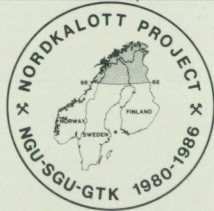
Symbol size — Cumulative frequency —



1: 4 000 000
100 km

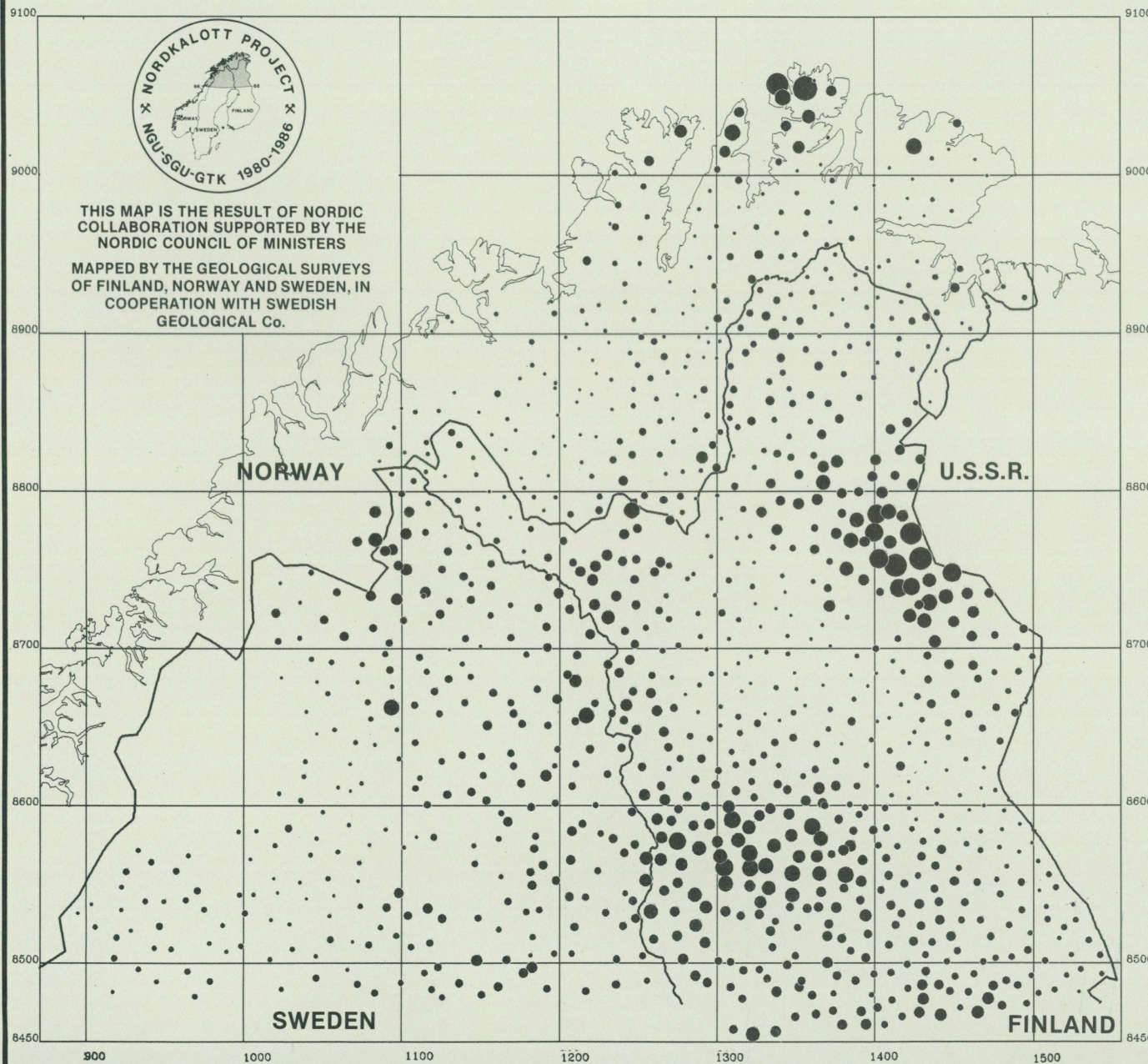
Projection: Lambert conformal
Date of plotting: 23.09.1985

MAP 13



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

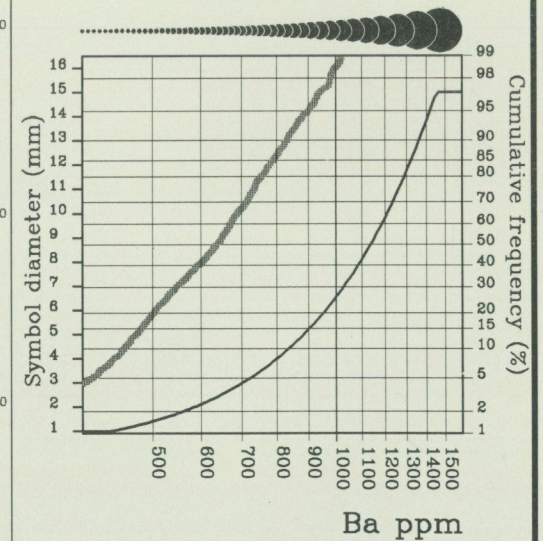
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Ba

Size fraction (μm): -62
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1040

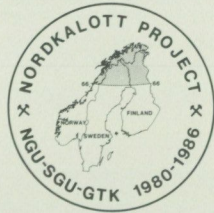
Symbol size —
Cumulative frequency —



1: 4 000 000
100 km

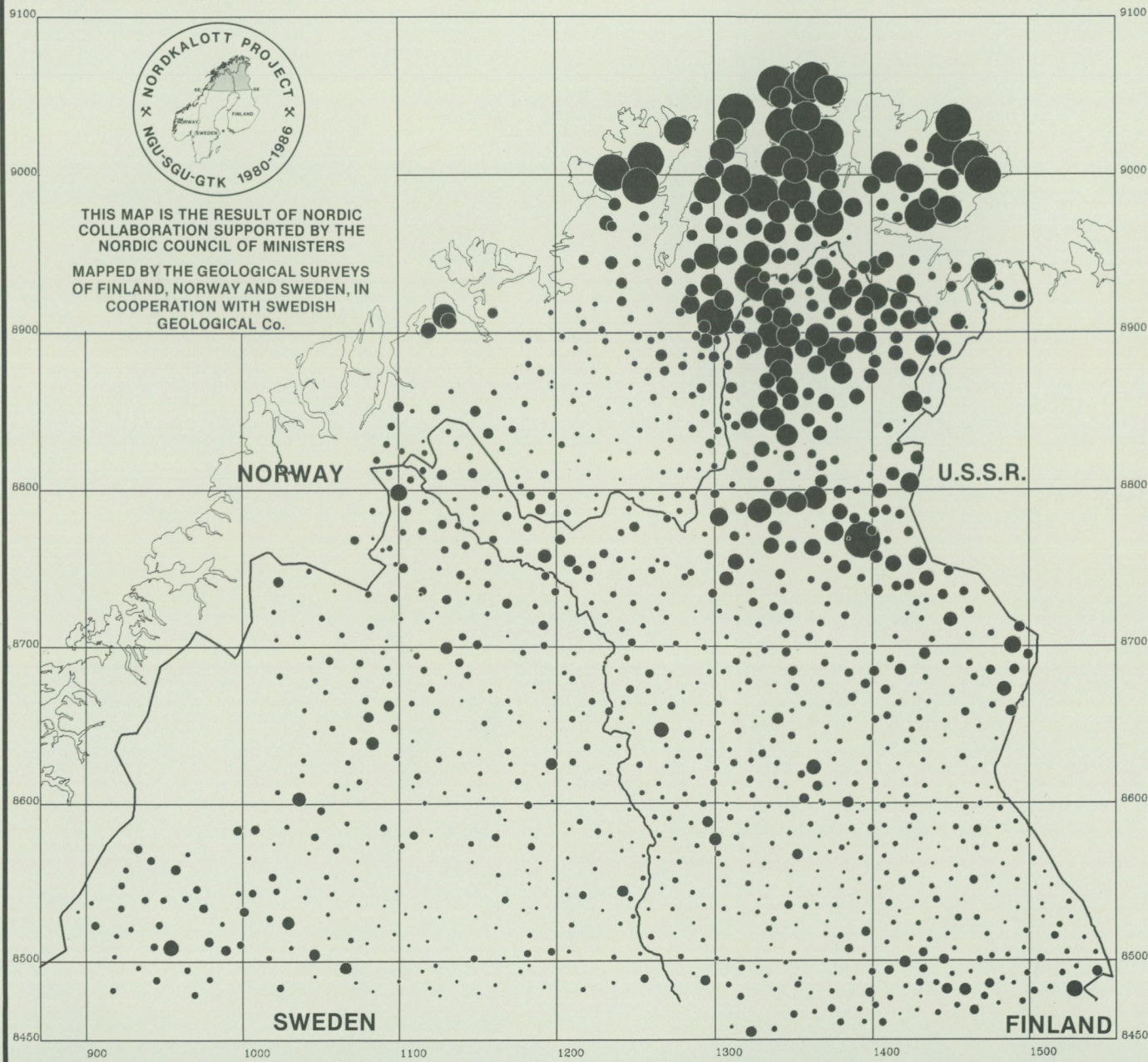
Projection: Lambert conformal
Date of plotting: 13.03.1985

MAP 14



THIS MAP IS THE RESULT OF NORDIC
COLLABORATION SUPPORTED BY THE
NORDIC COUNCIL OF MINISTERS

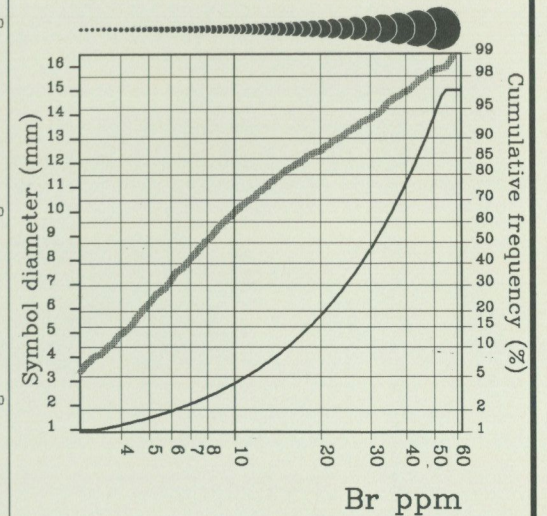
MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
COOPERATION WITH SWEDISH
GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Br

Size fraction (μm): -62
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1040

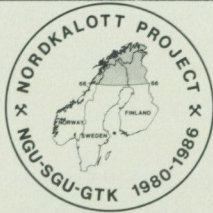
Symbol size —
Cumulative frequency —



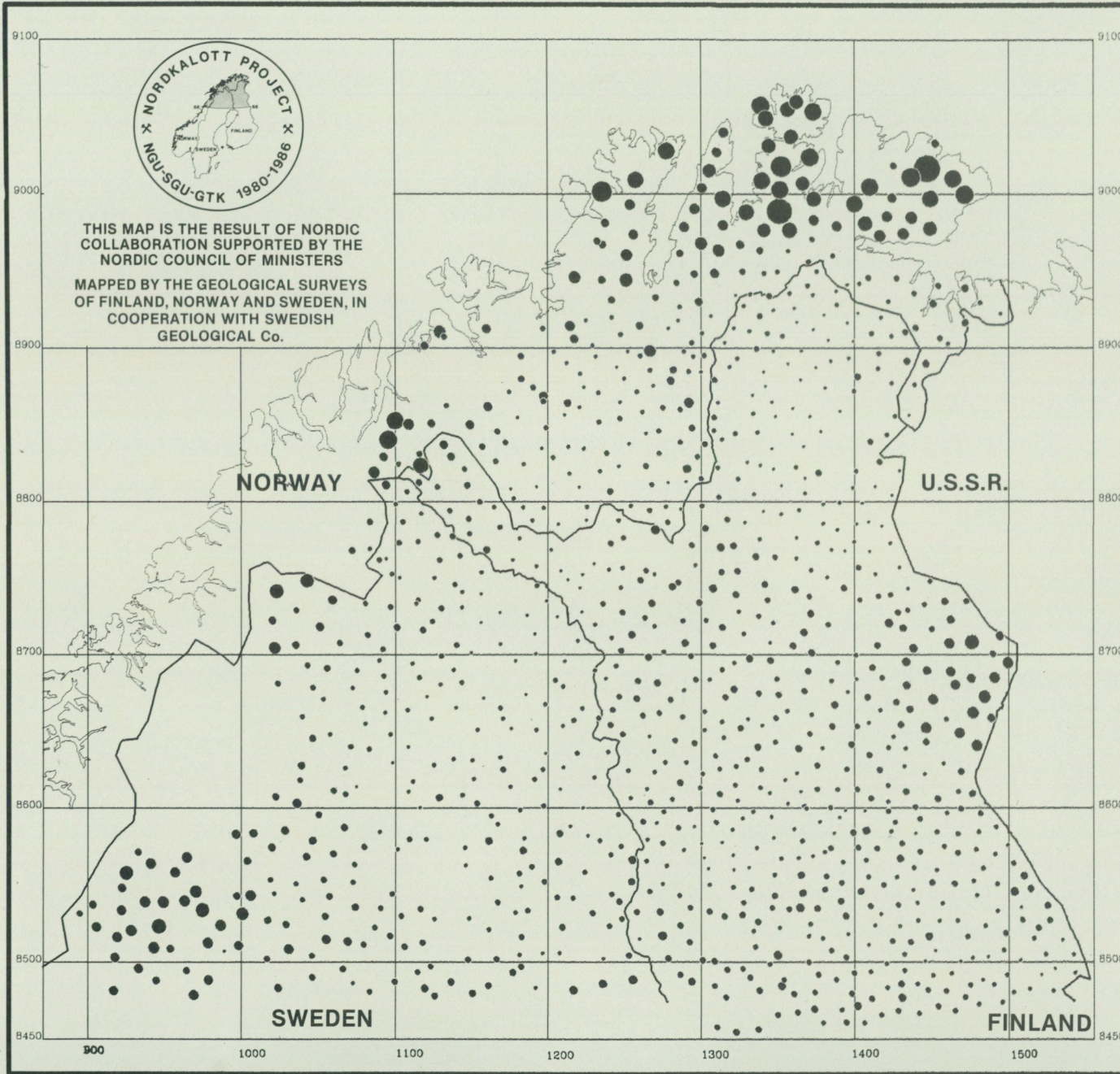
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 25.03.1985

MAP 15



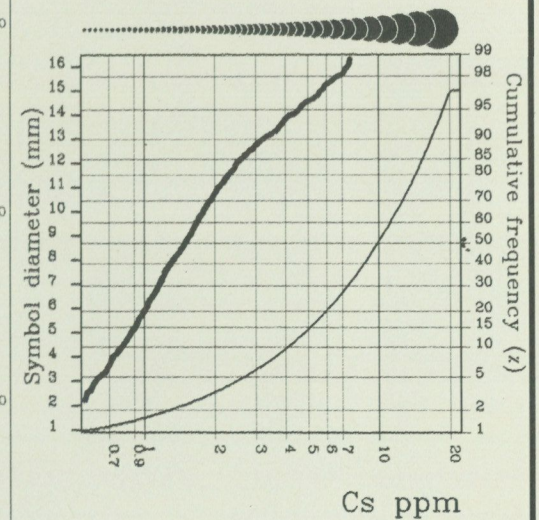
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Cs

Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040

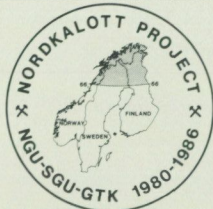
Symbol size —
 Cumulative frequency —



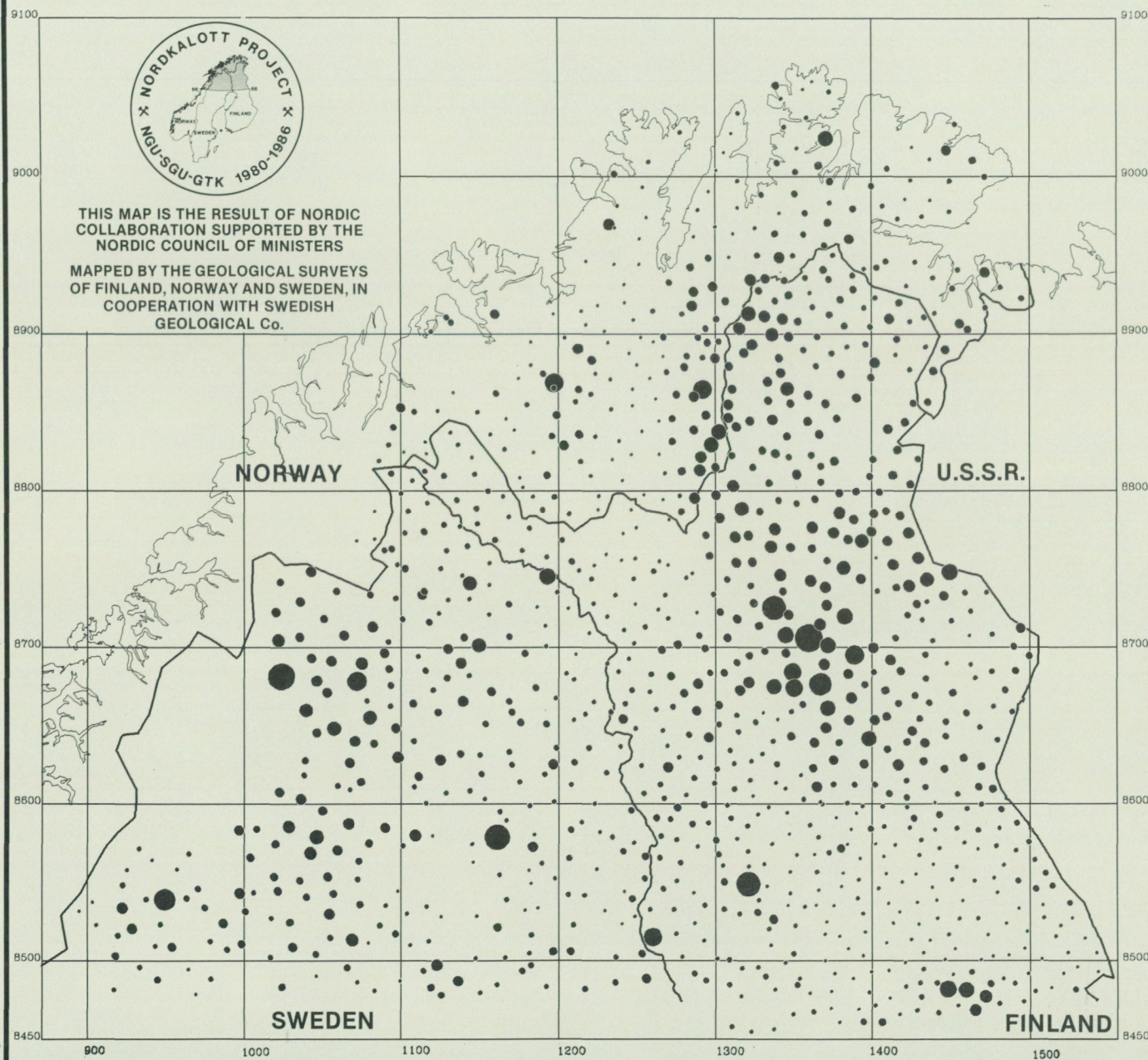
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 26.11.1984

MAP 16



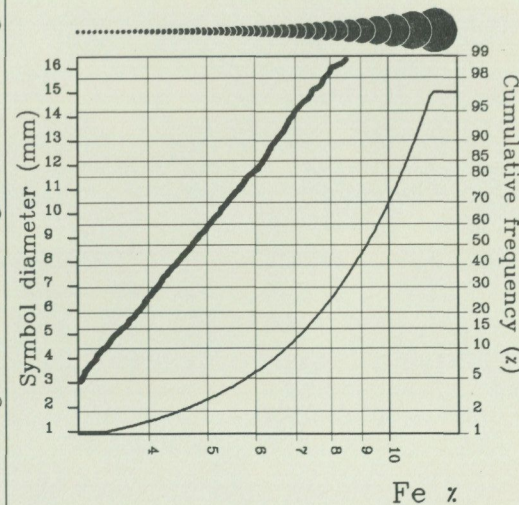
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Fe

Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040

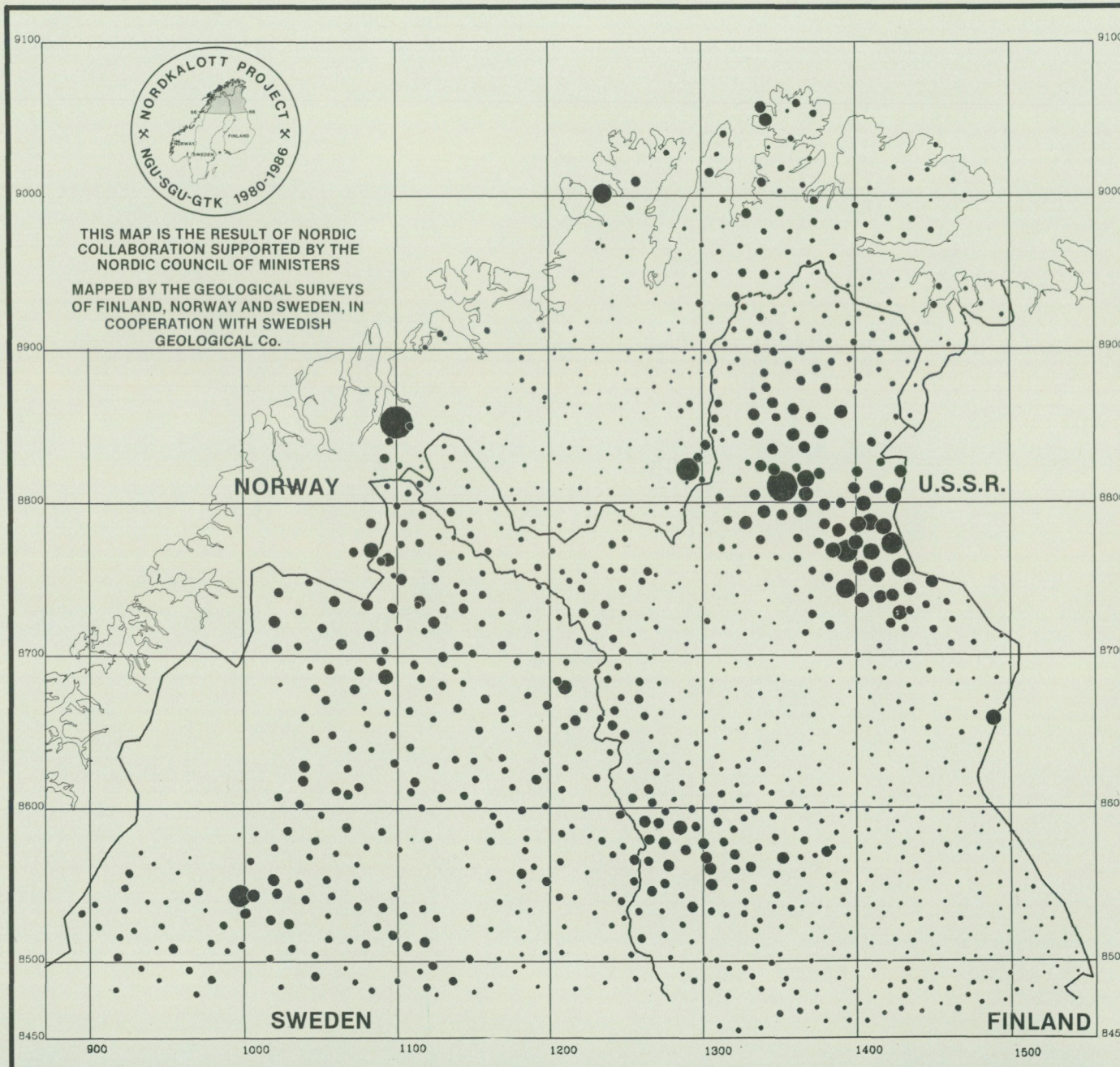
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 27.11.1984

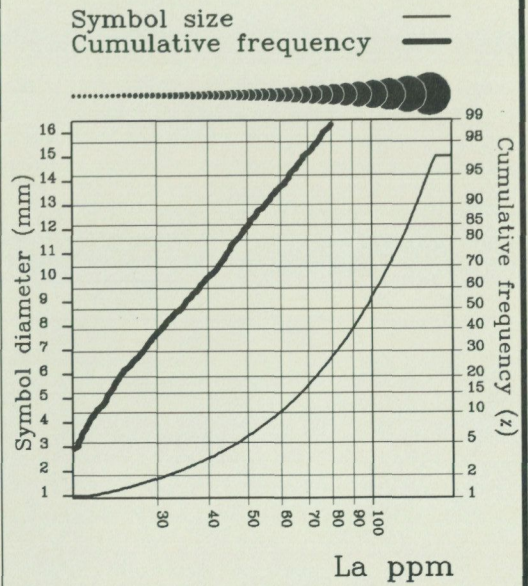
MAP 17



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL La

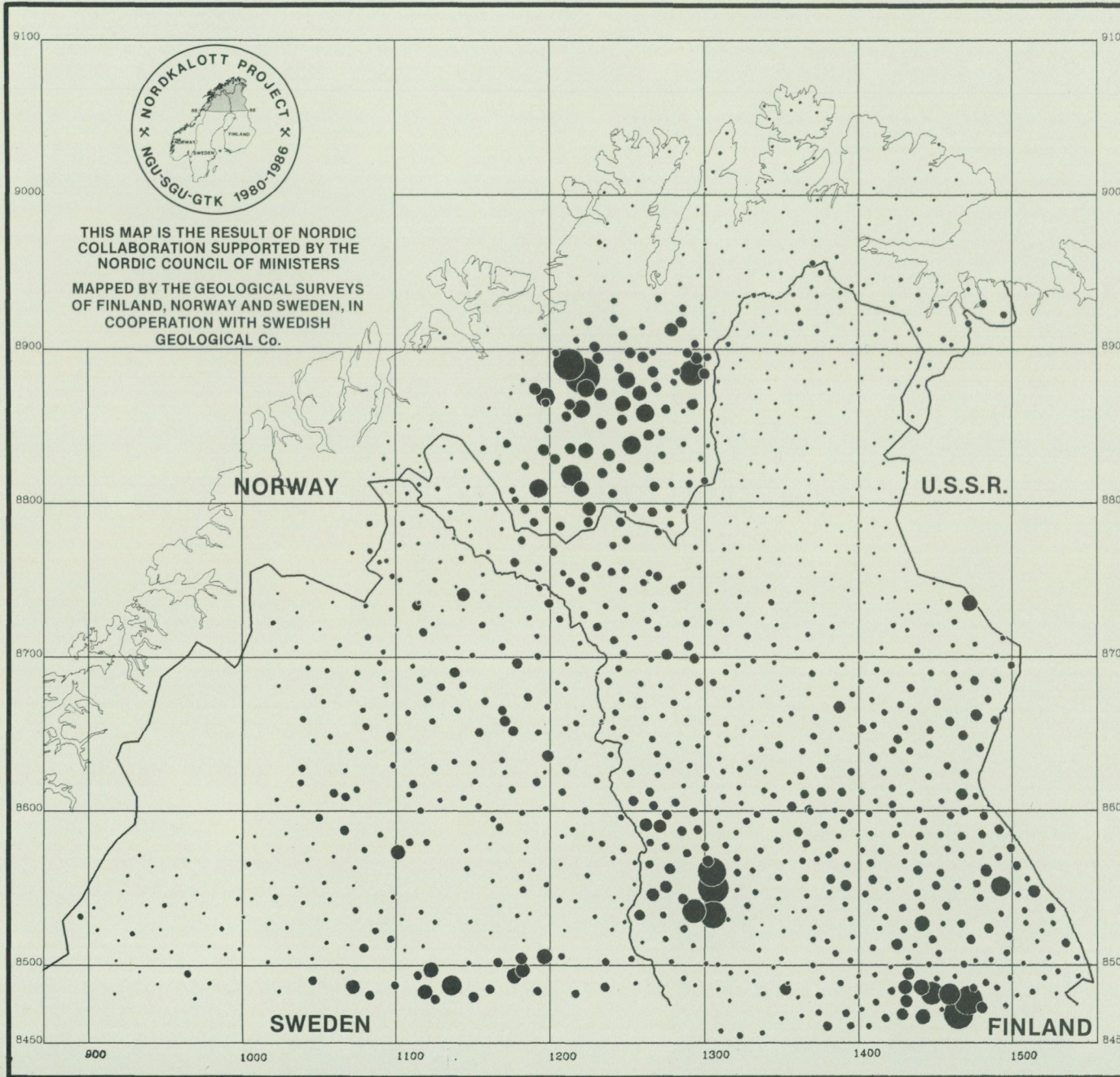
Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 28.11.1984

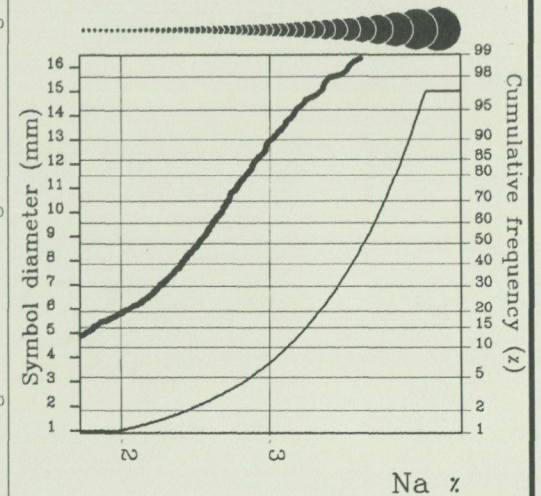
MAP 18



Nordkalott project Geochemistry TILL Na

Size fraction (μm): -62
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1040

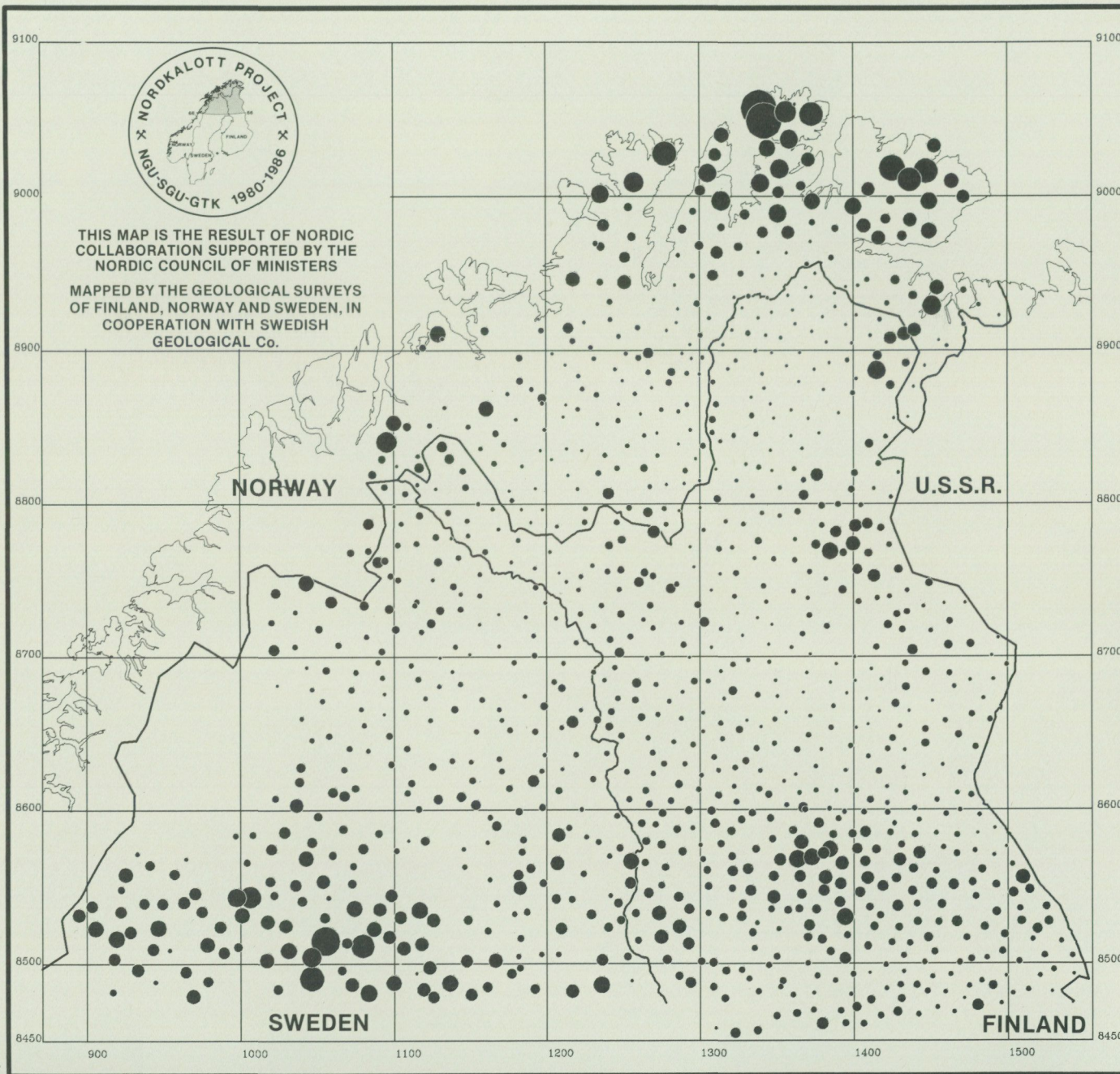
Symbol size —
Cumulative frequency —



1: 4 000 000
100 km

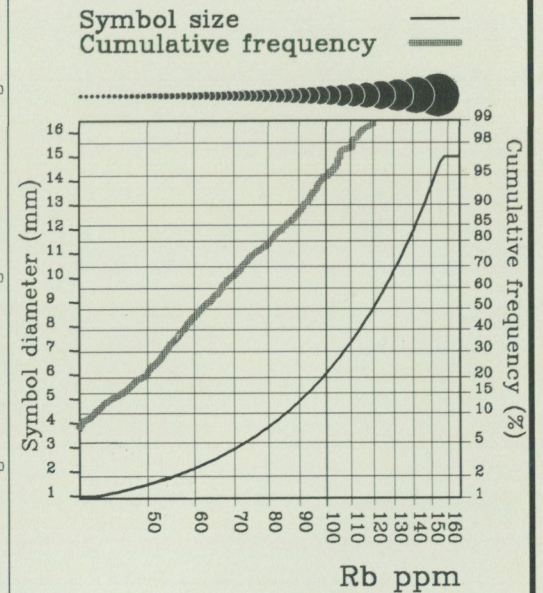
Projection: Lambert conformal
Date of plotting: 27.11.1984

MAP 19



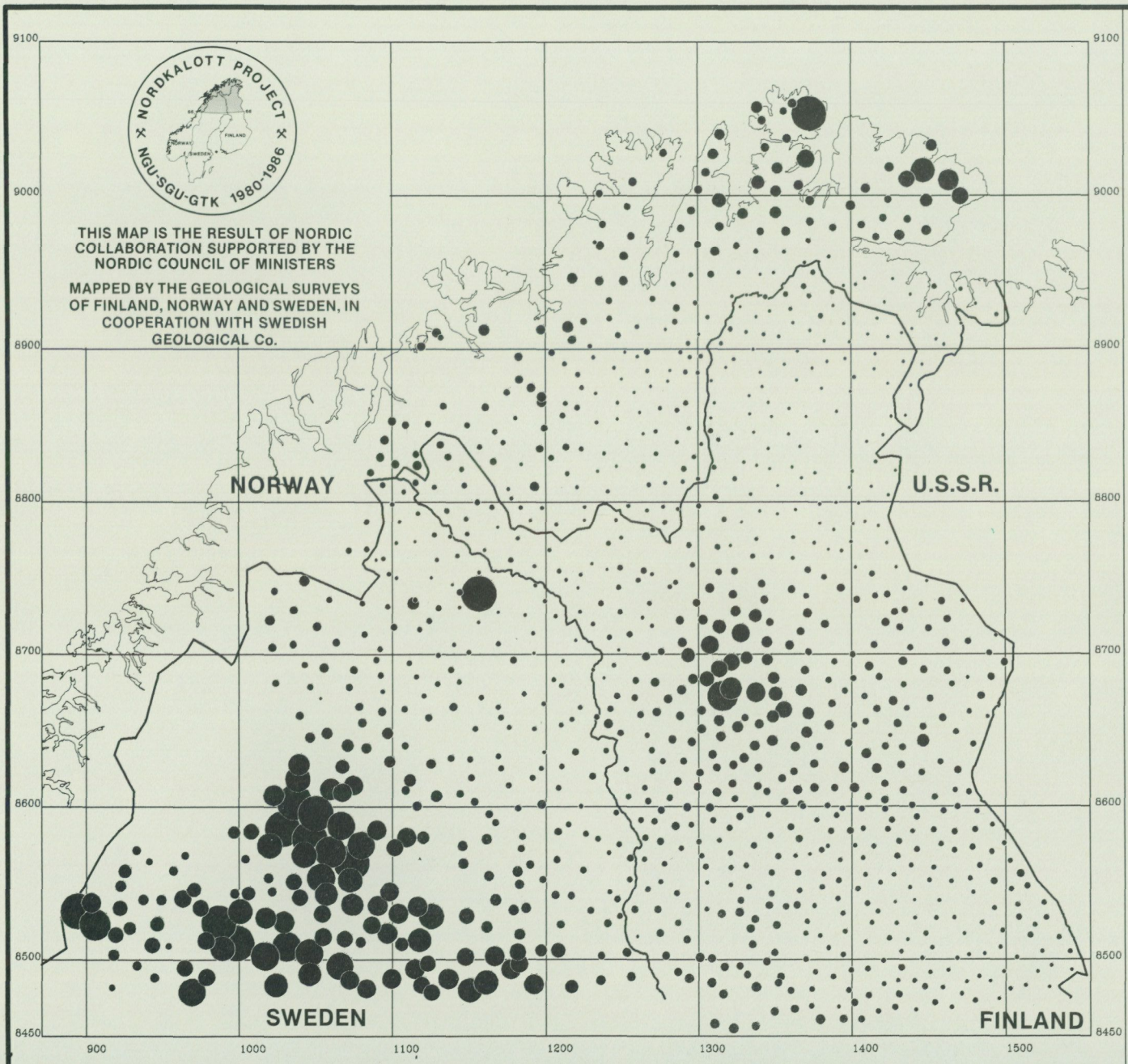
Nordkalott project Geochemistry TILL Rb

Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040



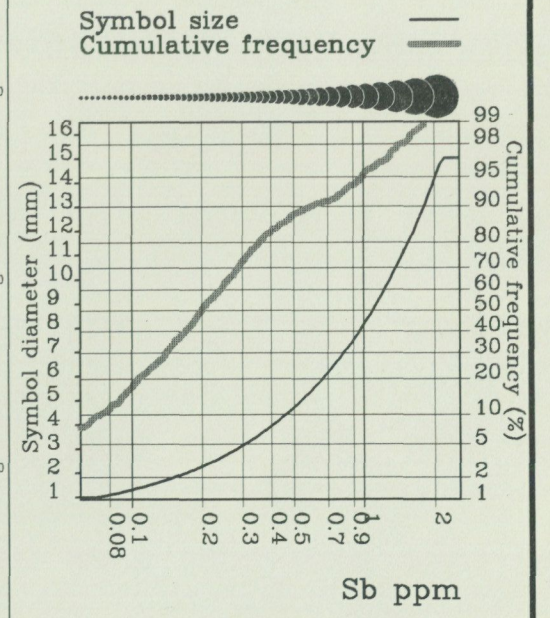
Projection: Lambert conformal
 Date of plotting: 21.03.1985

MAP 20



Nordkalott project Geochemistry TILL Sb

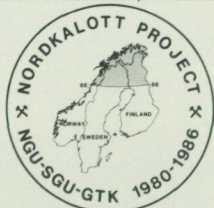
Size fraction (μm): -62
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1040



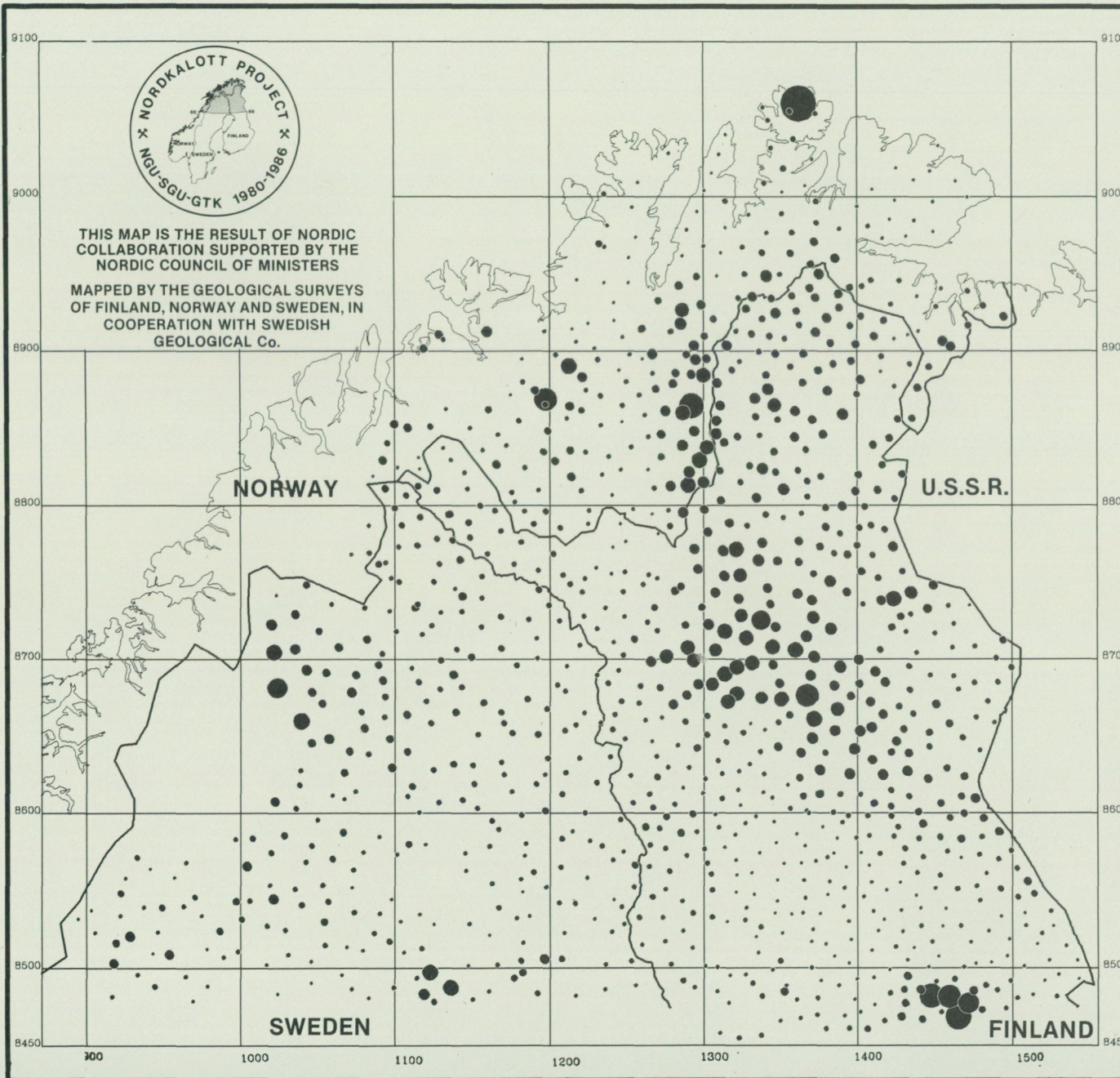
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 31.10.1985

MAP 21



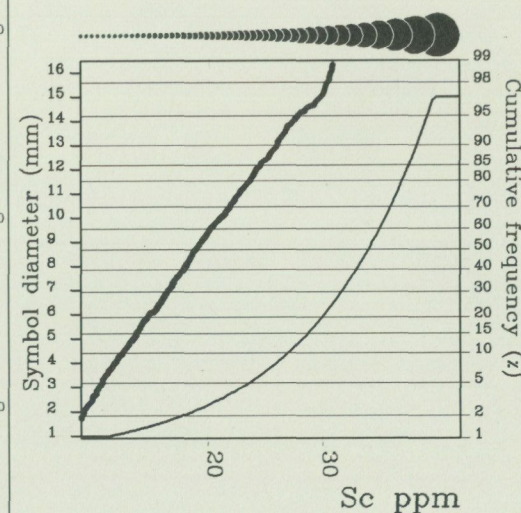
THIS MAP IS THE RESULT OF NORDIC
COLLABORATION SUPPORTED BY THE
NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
COOPERATION WITH SWEDISH
GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Sc

Size fraction (μm): -62
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1040

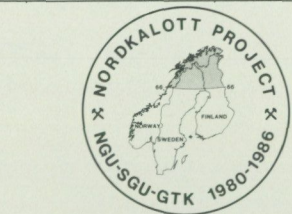
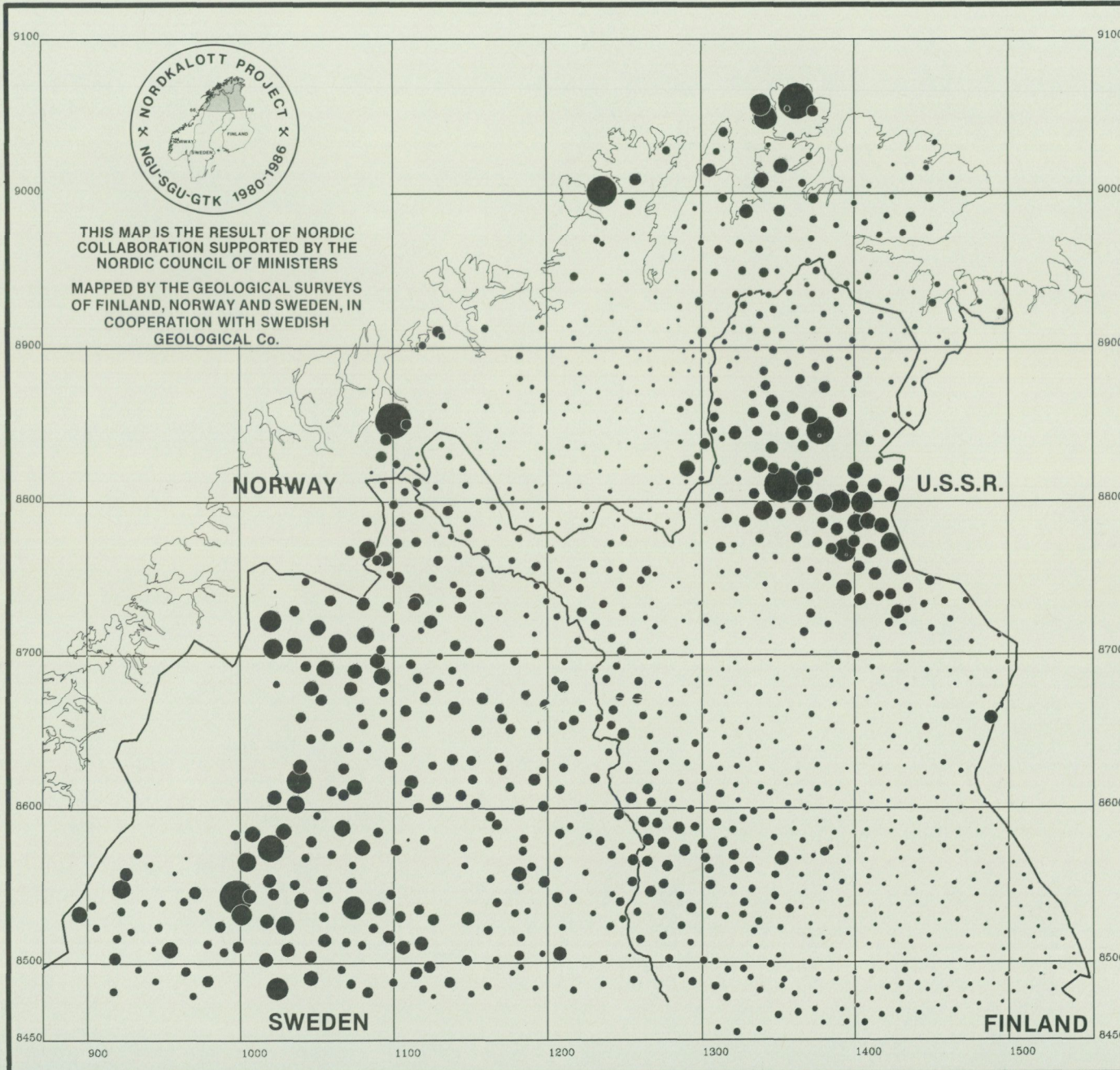
Symbol size —
Cumulative frequency —



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 27.11.1984

MAP 22

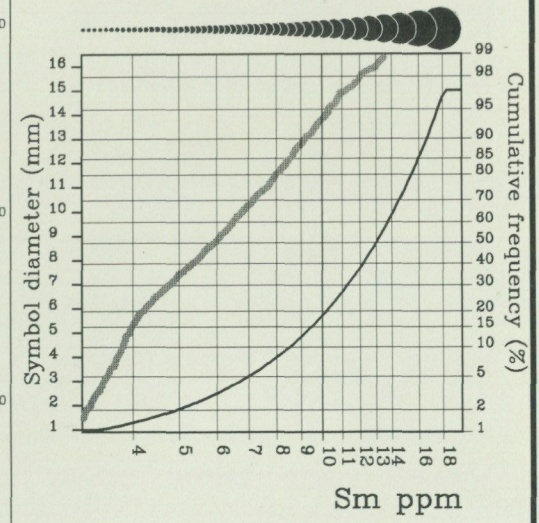


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Sm

Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040

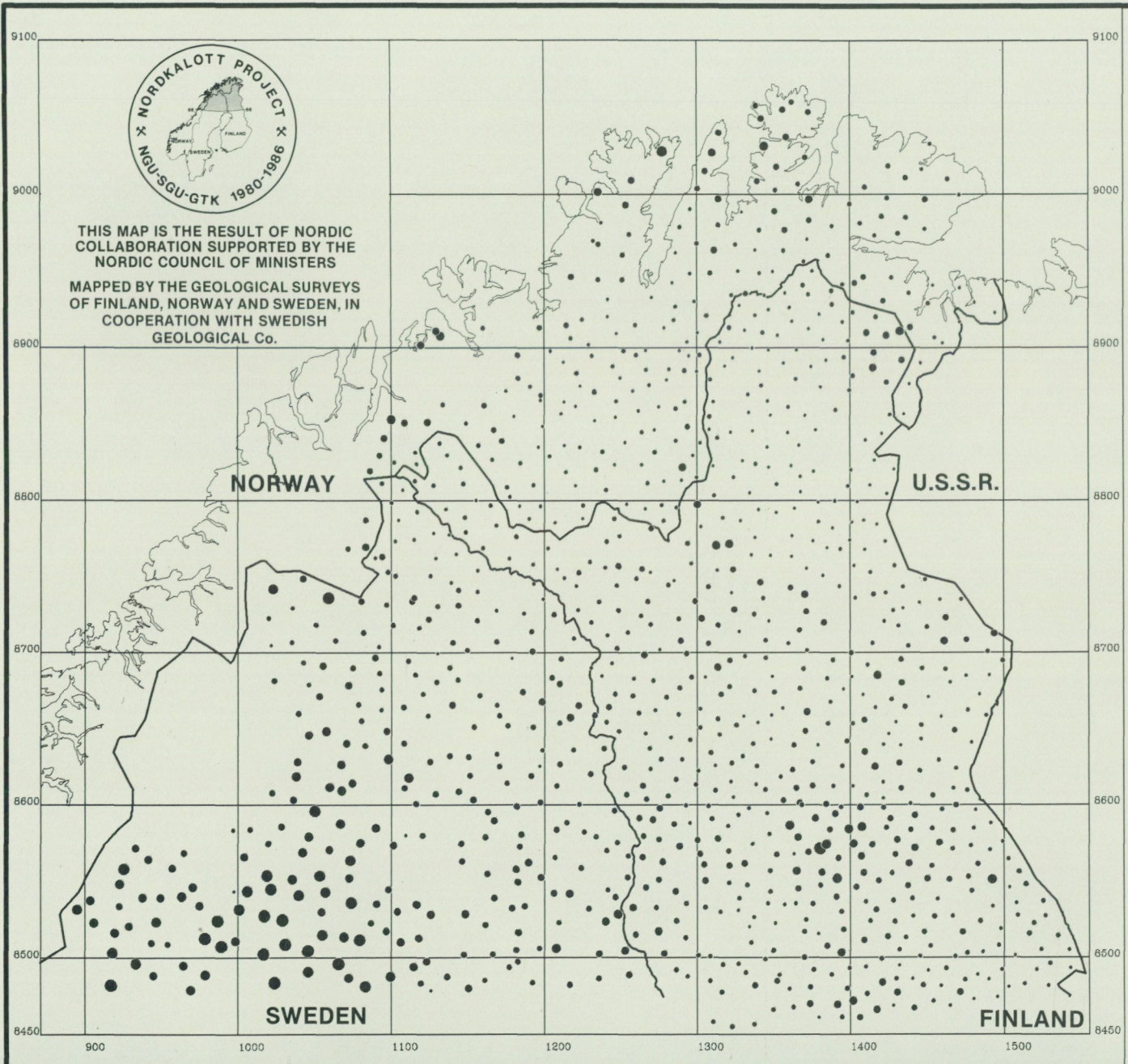
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 25.03.1985

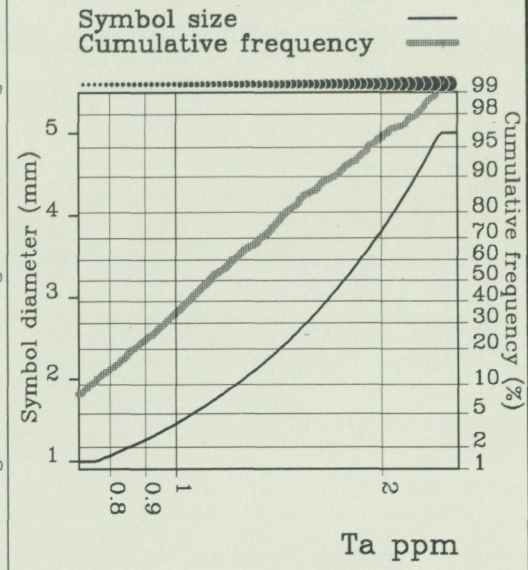
MAP 23



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Ta

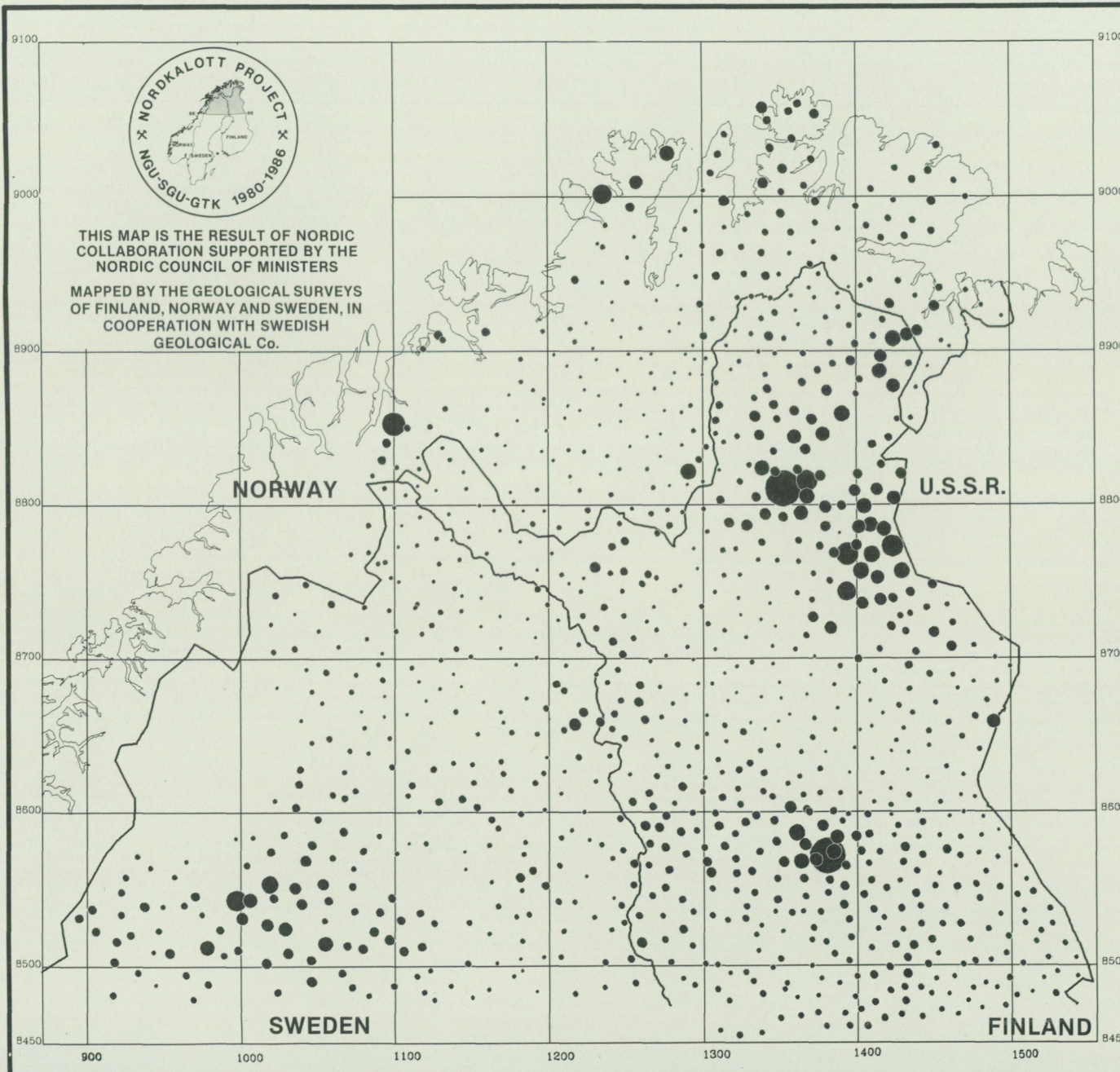
Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040



1:4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 15.07.1985

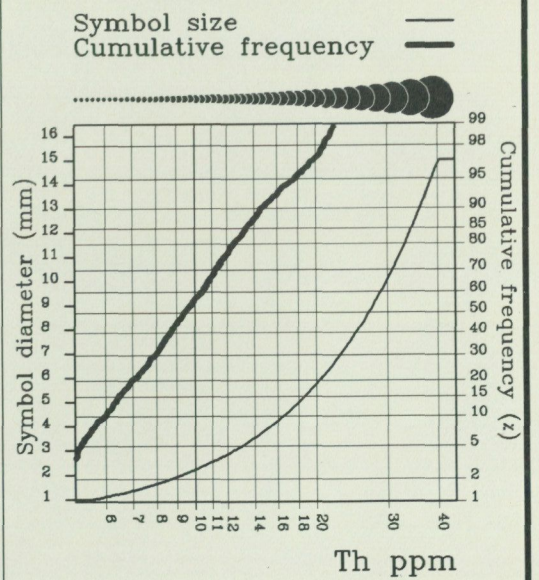
MAP 24



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Th

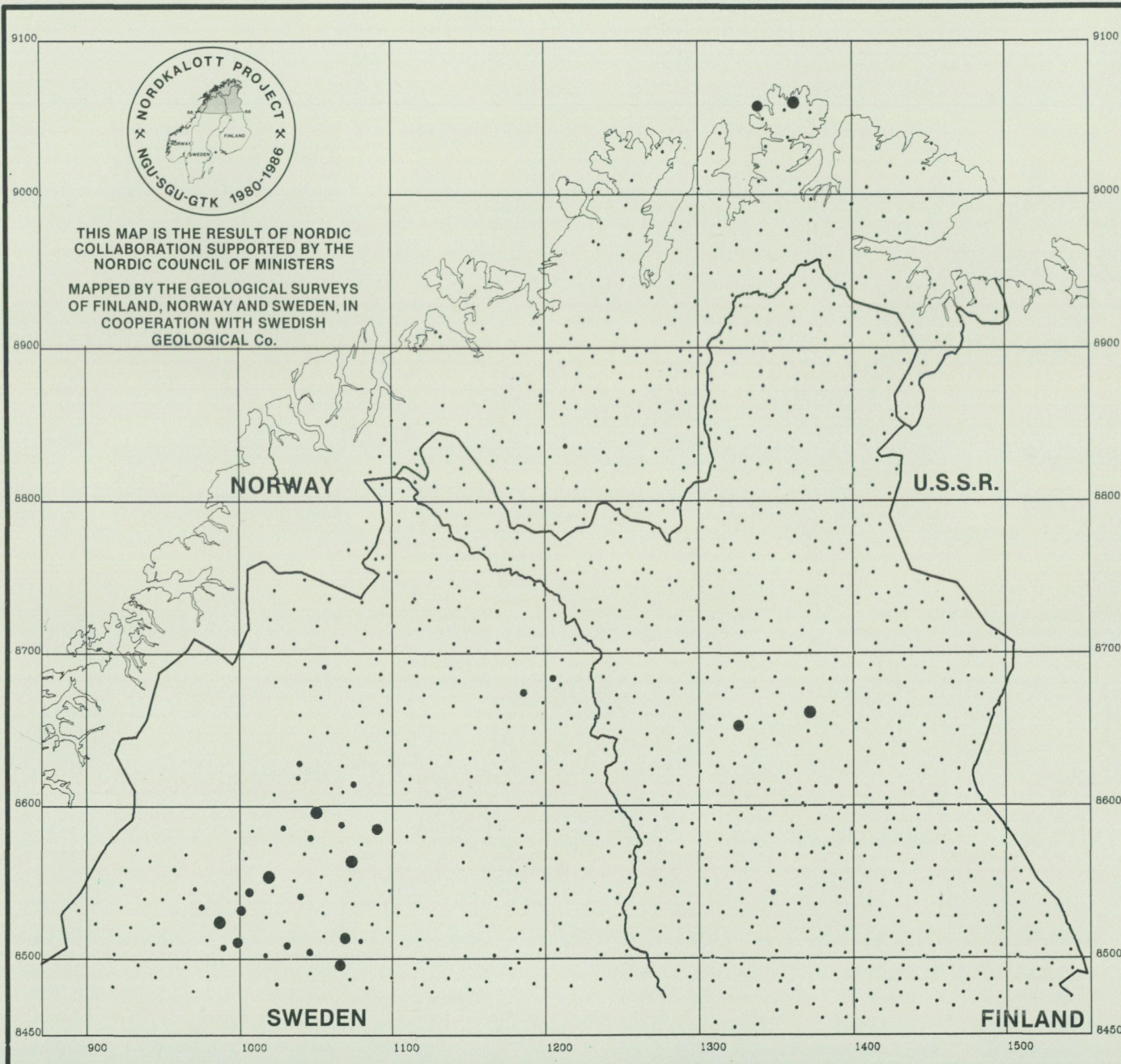
Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040



1: 4 000 000
 100 km

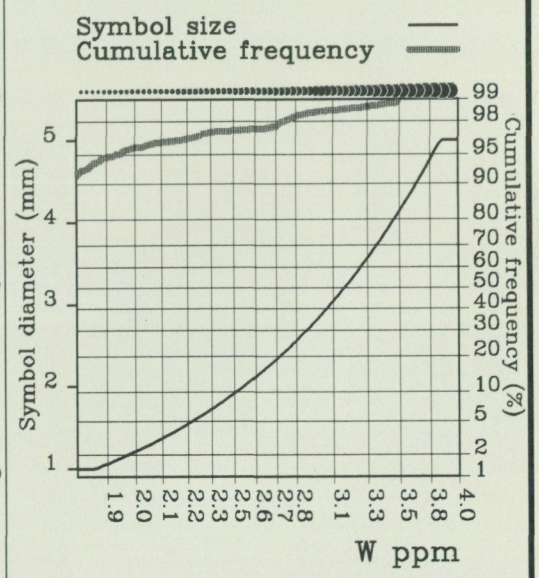
Projection: Lambert conformal
 Date of plotting: 28.11.1984

MAP 25



Nordkalott project Geochemistry TILL W

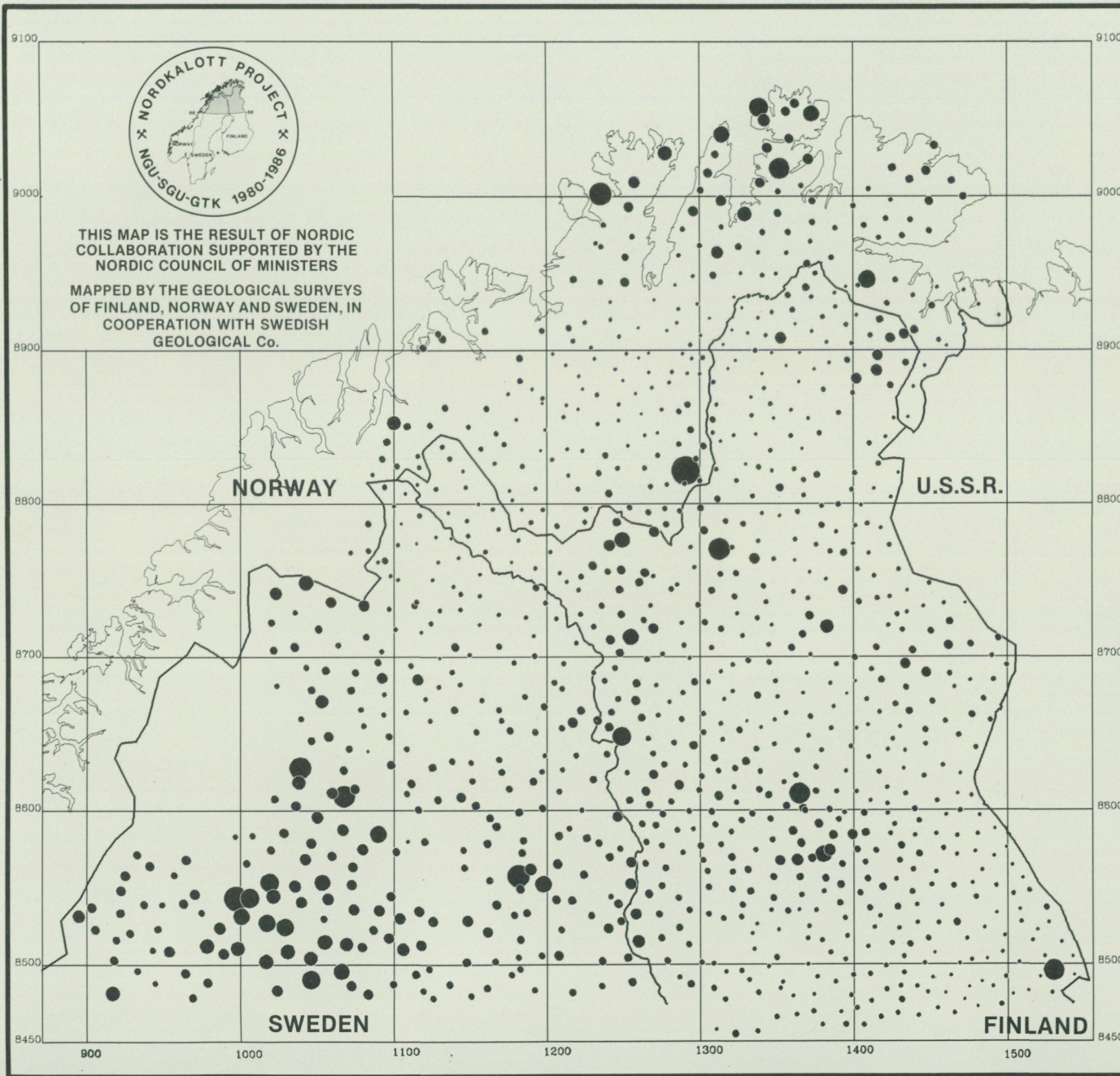
Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040



1: 4 000 000
 100 km

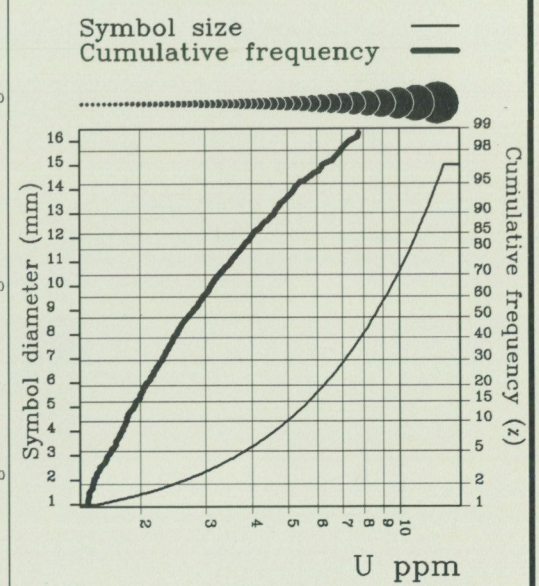
Projection: Lambert conformal
 Date of plotting: 11.07.1985

MAP 26



Nordkalott project Geochemistry TILL U

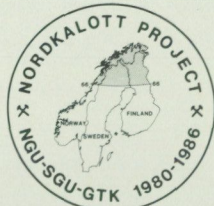
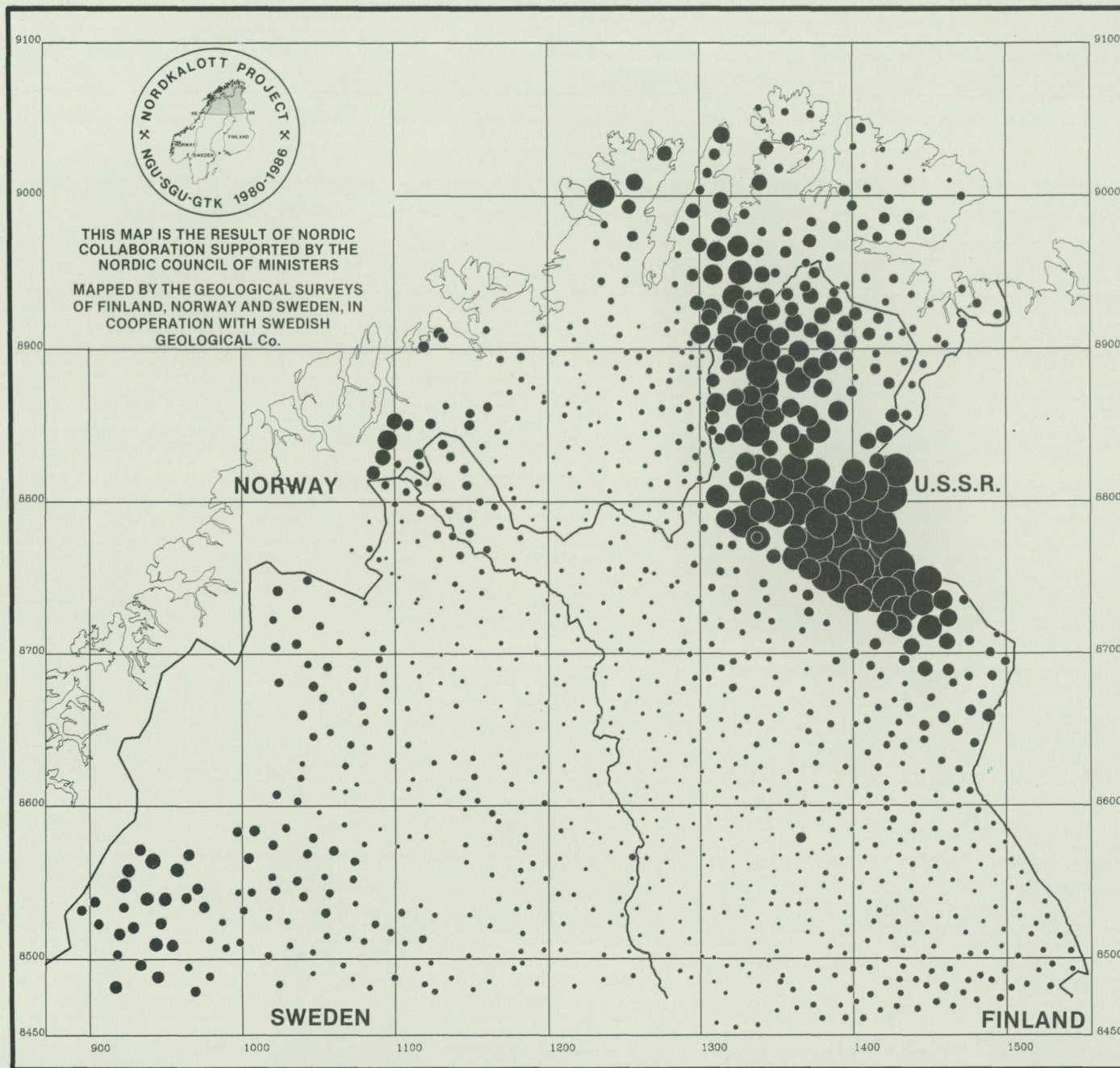
Size fraction (μm): -62
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1040



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 27.11.1984

MAP 27

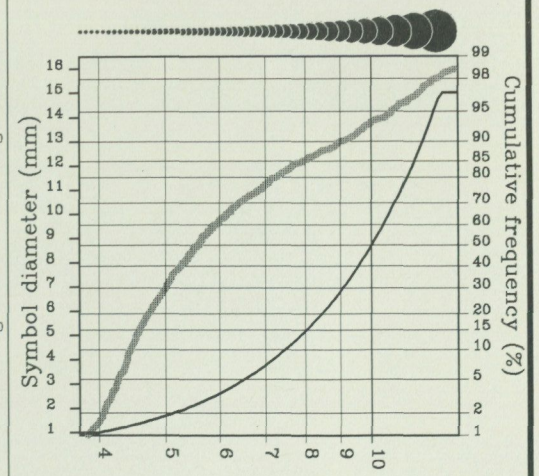


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals Al

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

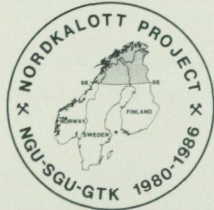
Symbol size —
 Cumulative frequency —



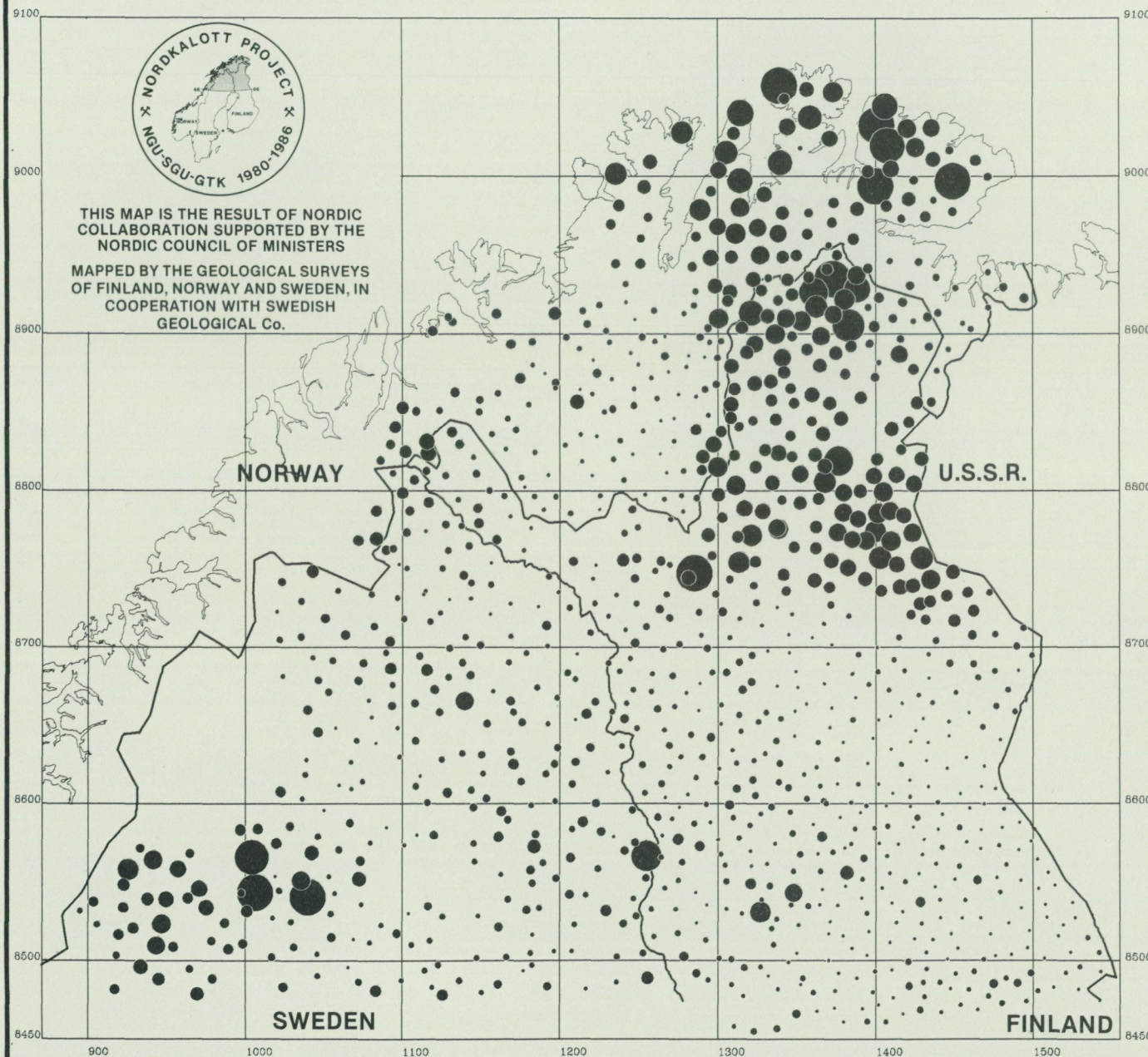
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 20.03.1985

MAP 28



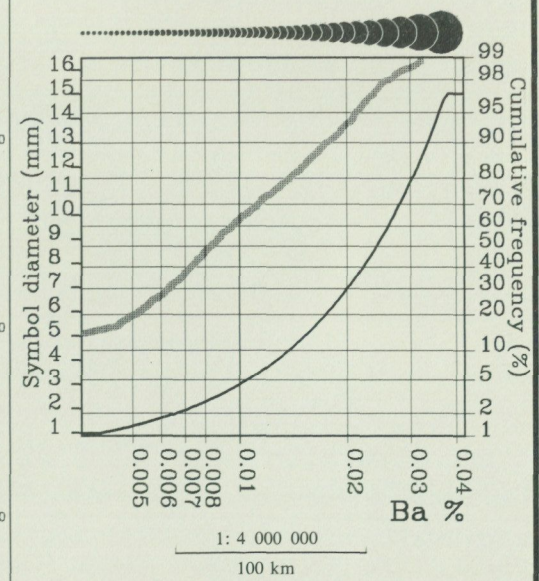
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Ba

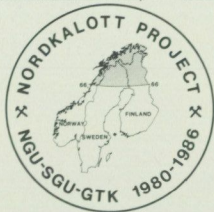
Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

Symbol size ———
 Cumulative frequency ———



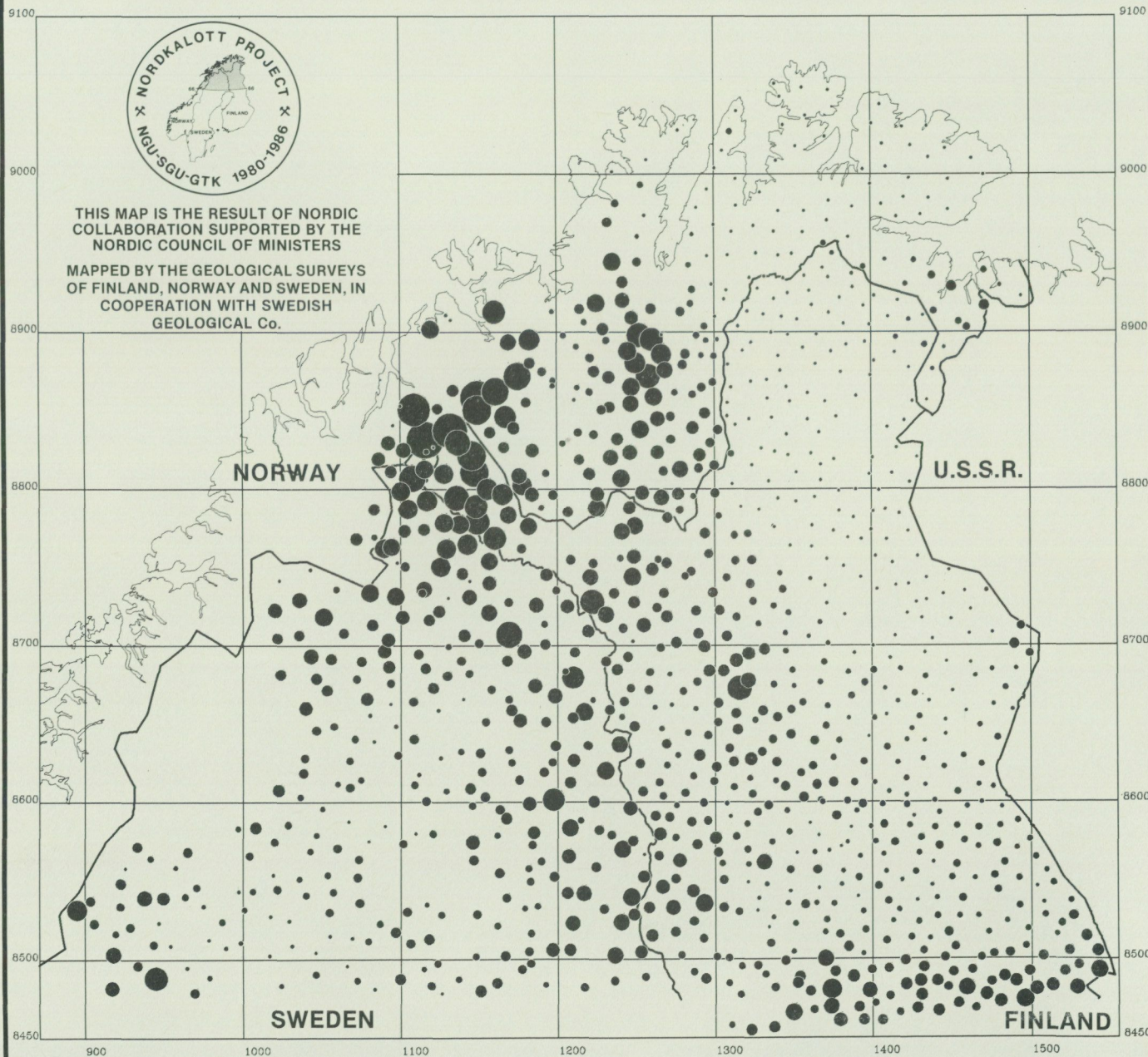
Projection: Lambert conformal
 Date of plotting: 24.07.1985

MAP 29



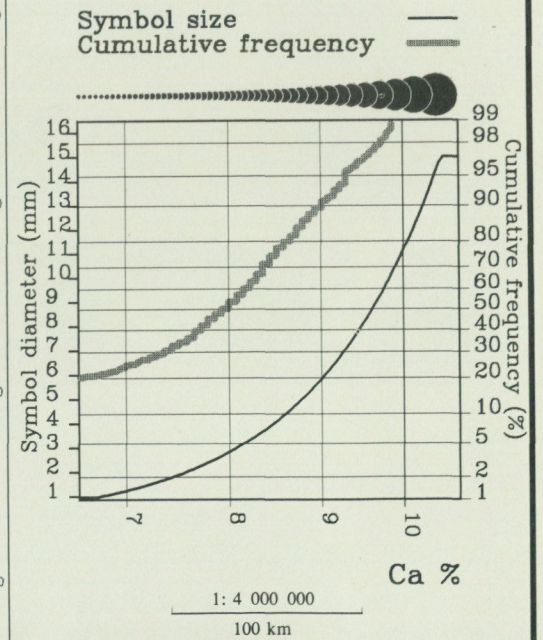
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



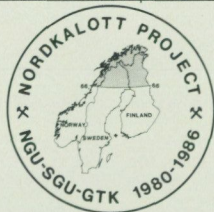
Nordkalott project Geochemistry TILL Heavy minerals Ca

Size fraction (μm): 62...500
Heavier than 2.96 g/cm^3
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1034

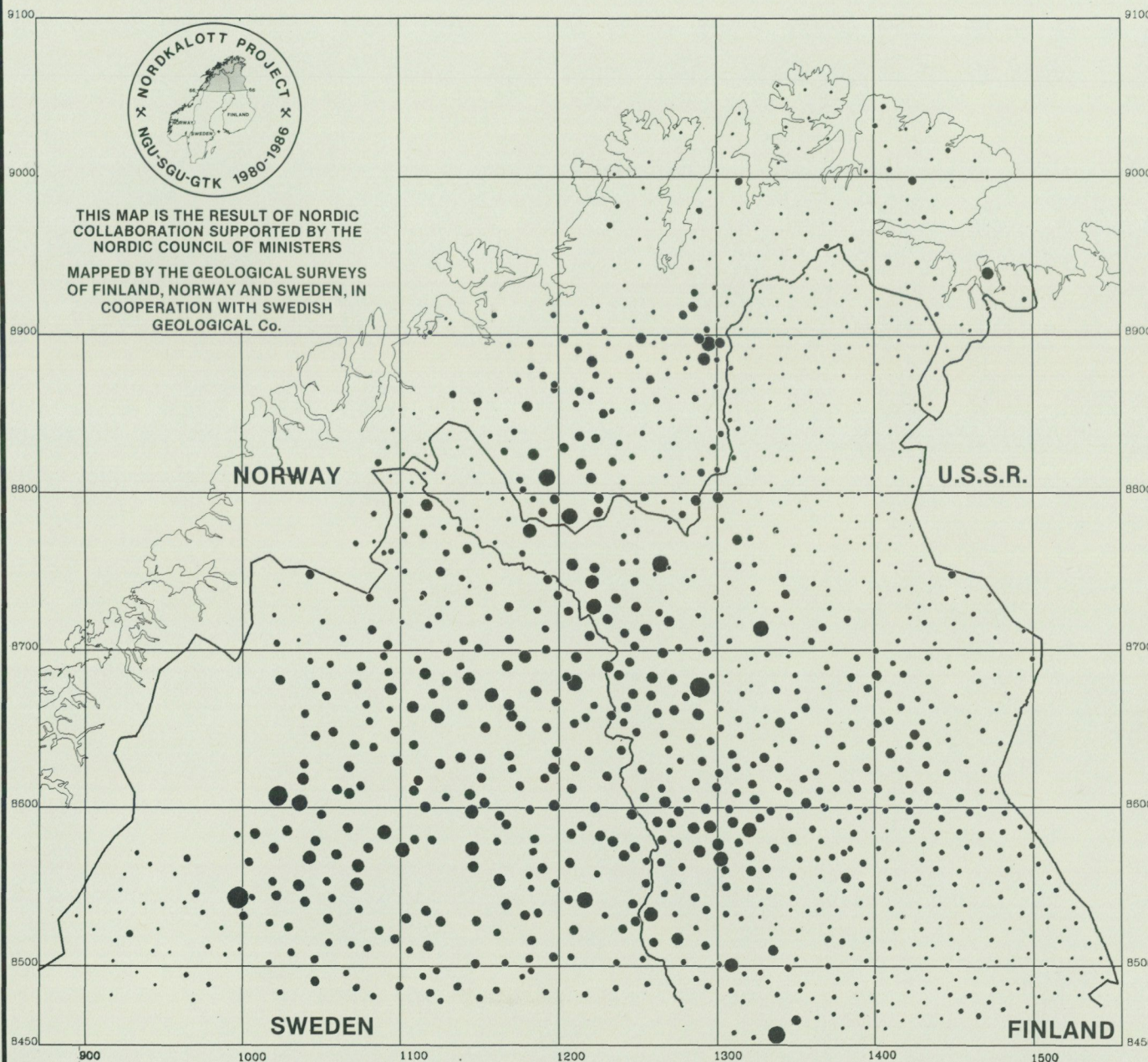


Projection: Lambert conformal
Date of plotting: 24.07.1985

MAP 30



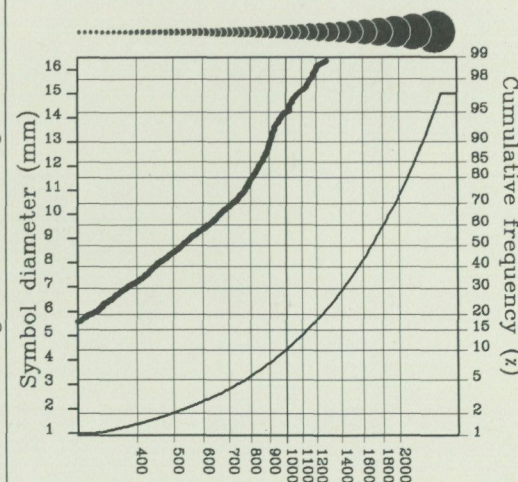
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Cl

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

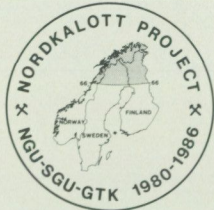
Symbol size
 Cumulative frequency



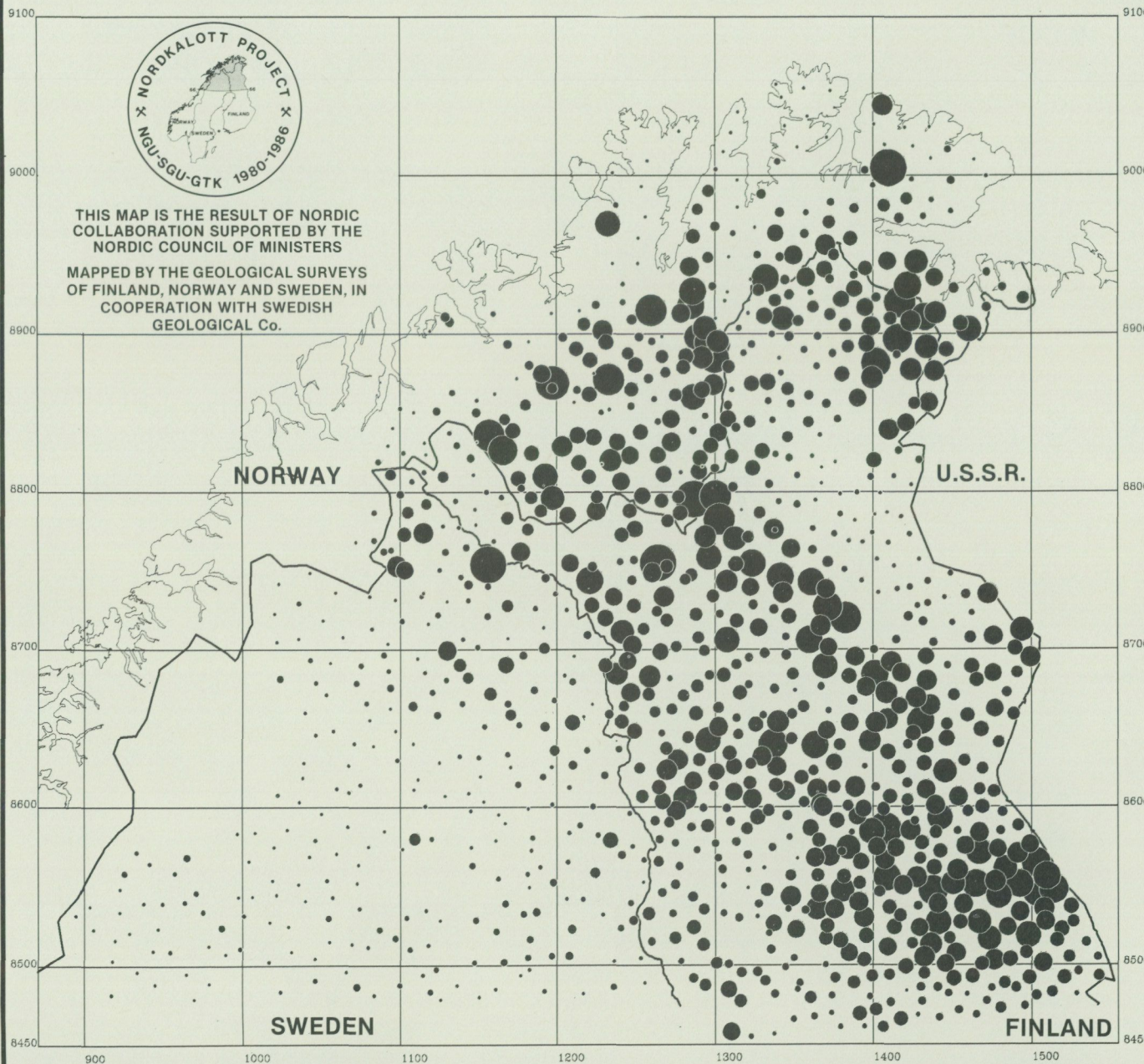
Cl ppm
 1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 15.11.1984

MAP 31



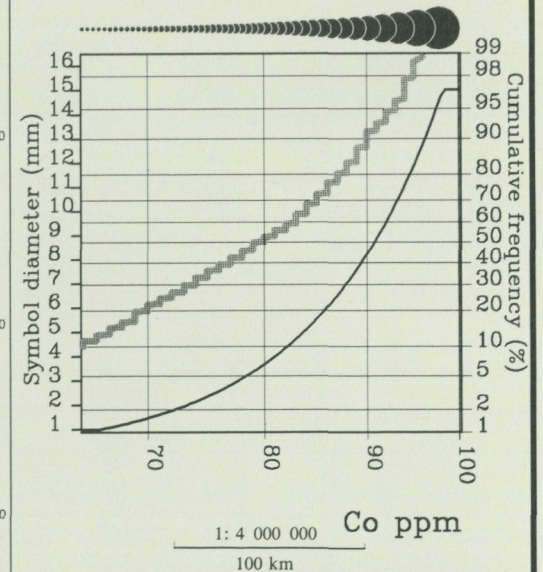
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Co

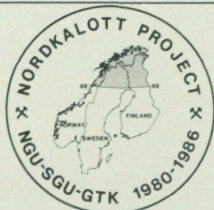
Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

Symbol size —
 Cumulative frequency —

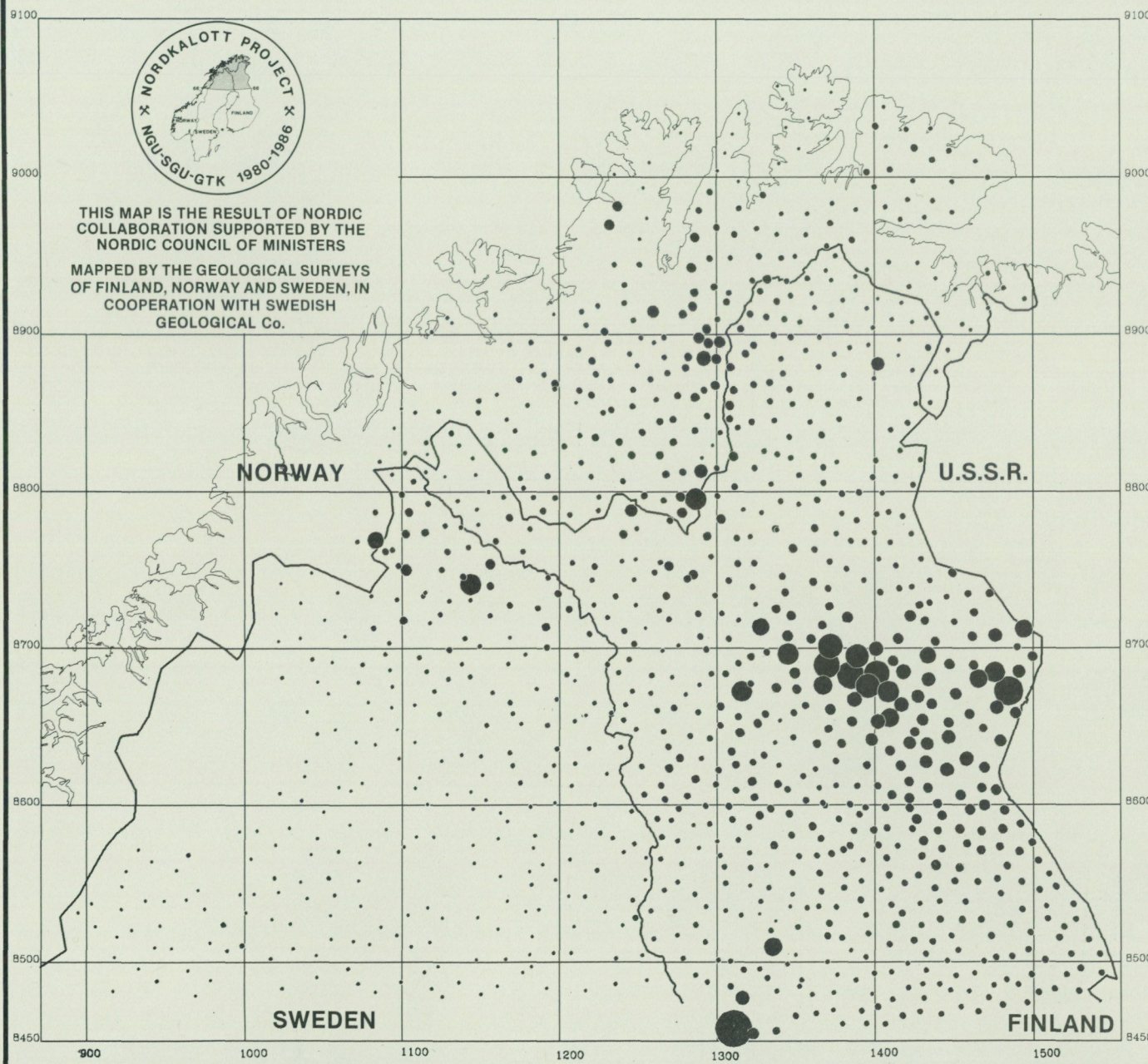


Projection: Lambert conformal
 Date of plotting: 18.07.1985

MAP 32



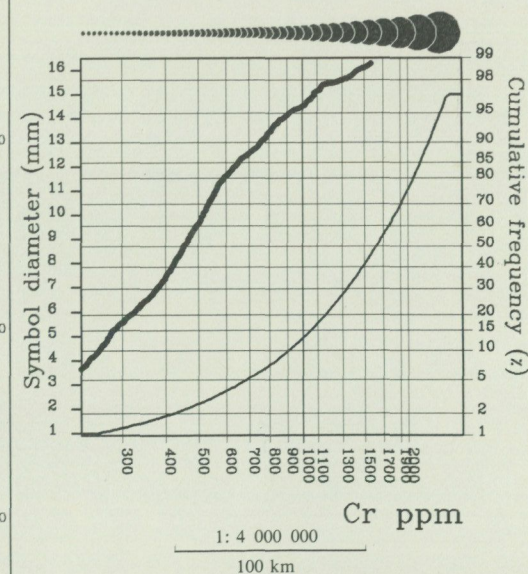
THIS MAP IS THE RESULT OF NORDIC
COLLABORATION SUPPORTED BY THE
NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
COOPERATION WITH SWEDISH
GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Cr

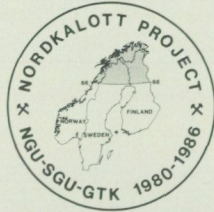
Size fraction (μm): 62...500
Heavier than 2.96 g/cm^3
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1034

Symbol size —
Cumulative frequency —

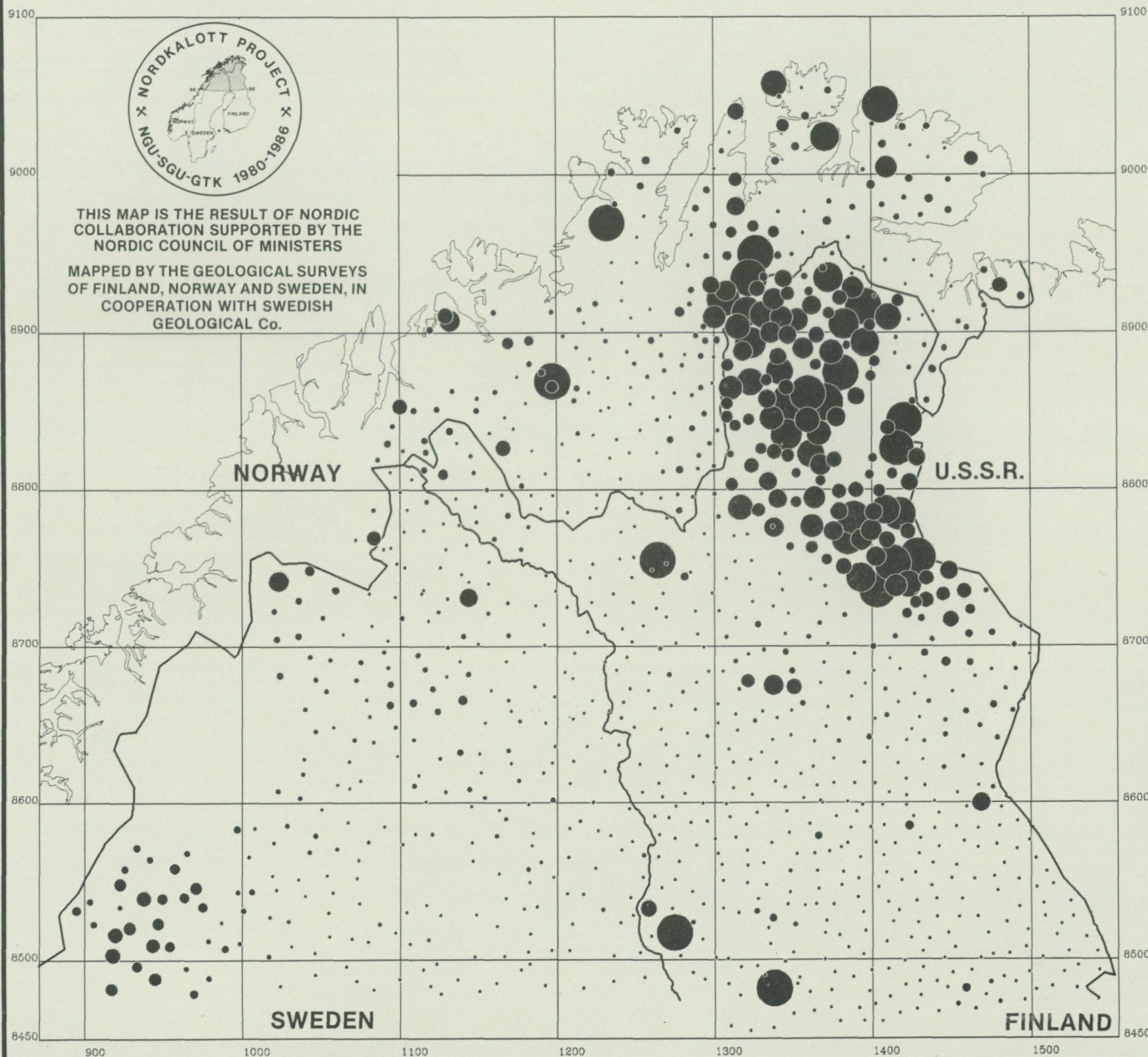


Projection: Lambert conformal
Date of plotting: 22.11.1984

MAP 33

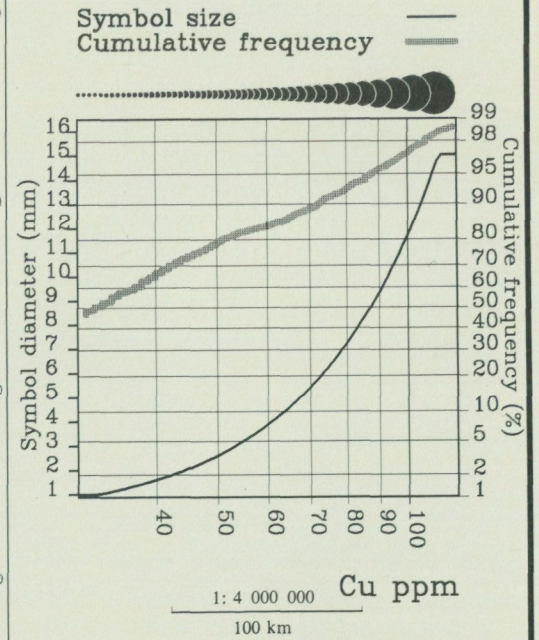


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



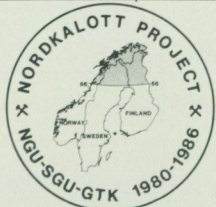
Nordkalott project Geochemistry TILL Heavy minerals Cu

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm³
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

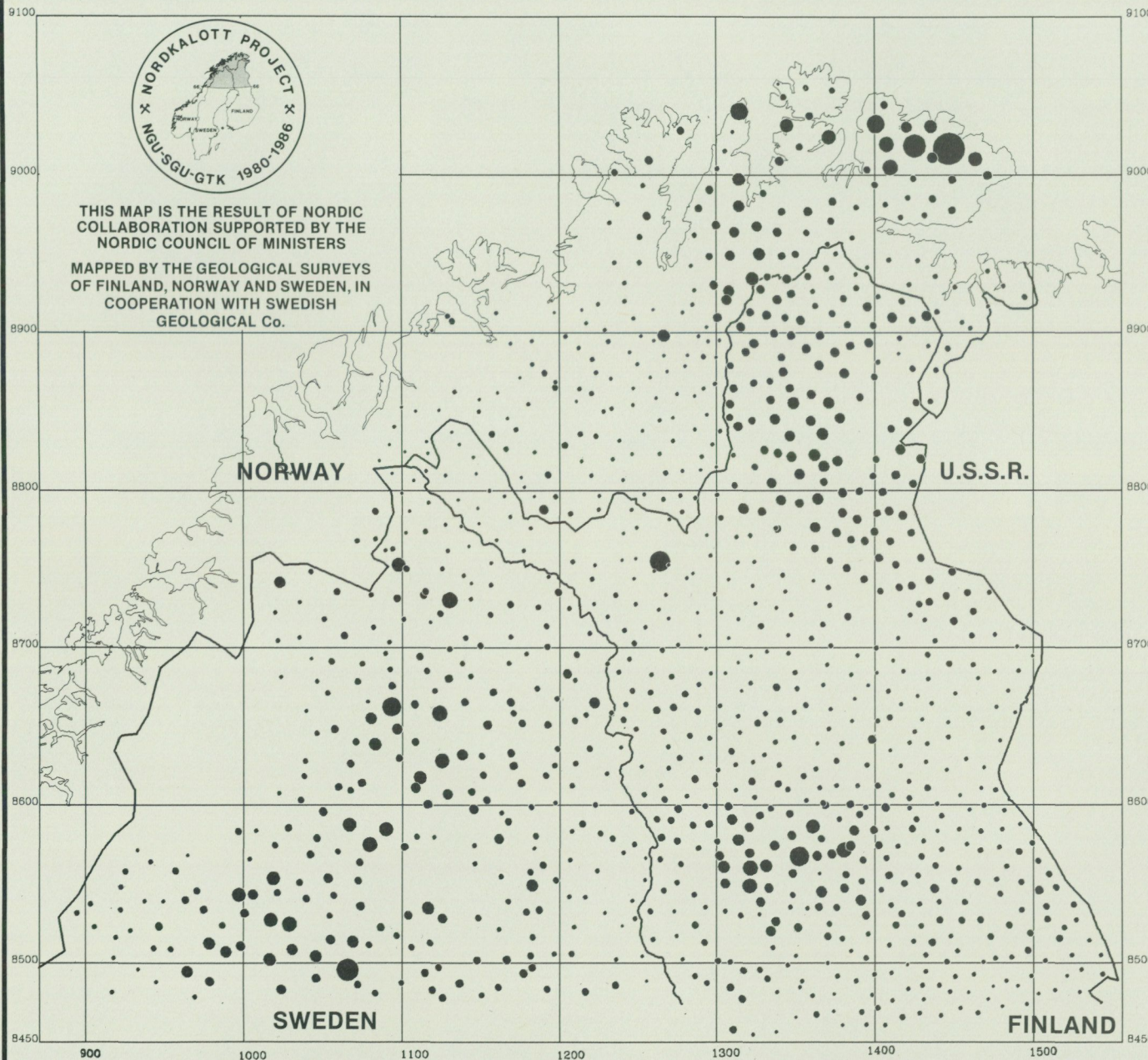


Projection: Lambert conformal
 Date of plotting: 18.07.1985

MAP 34



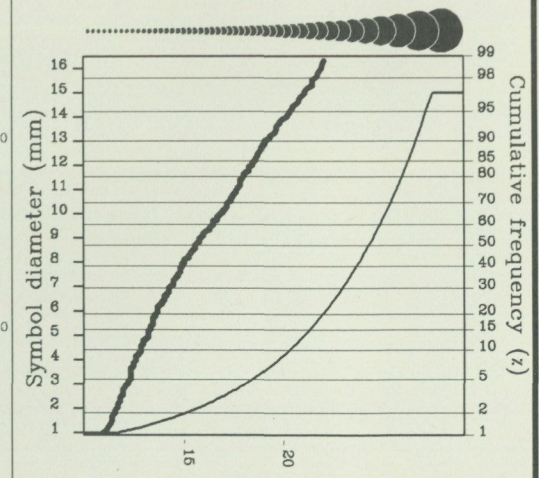
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Fe

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

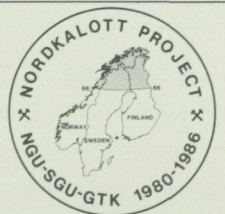
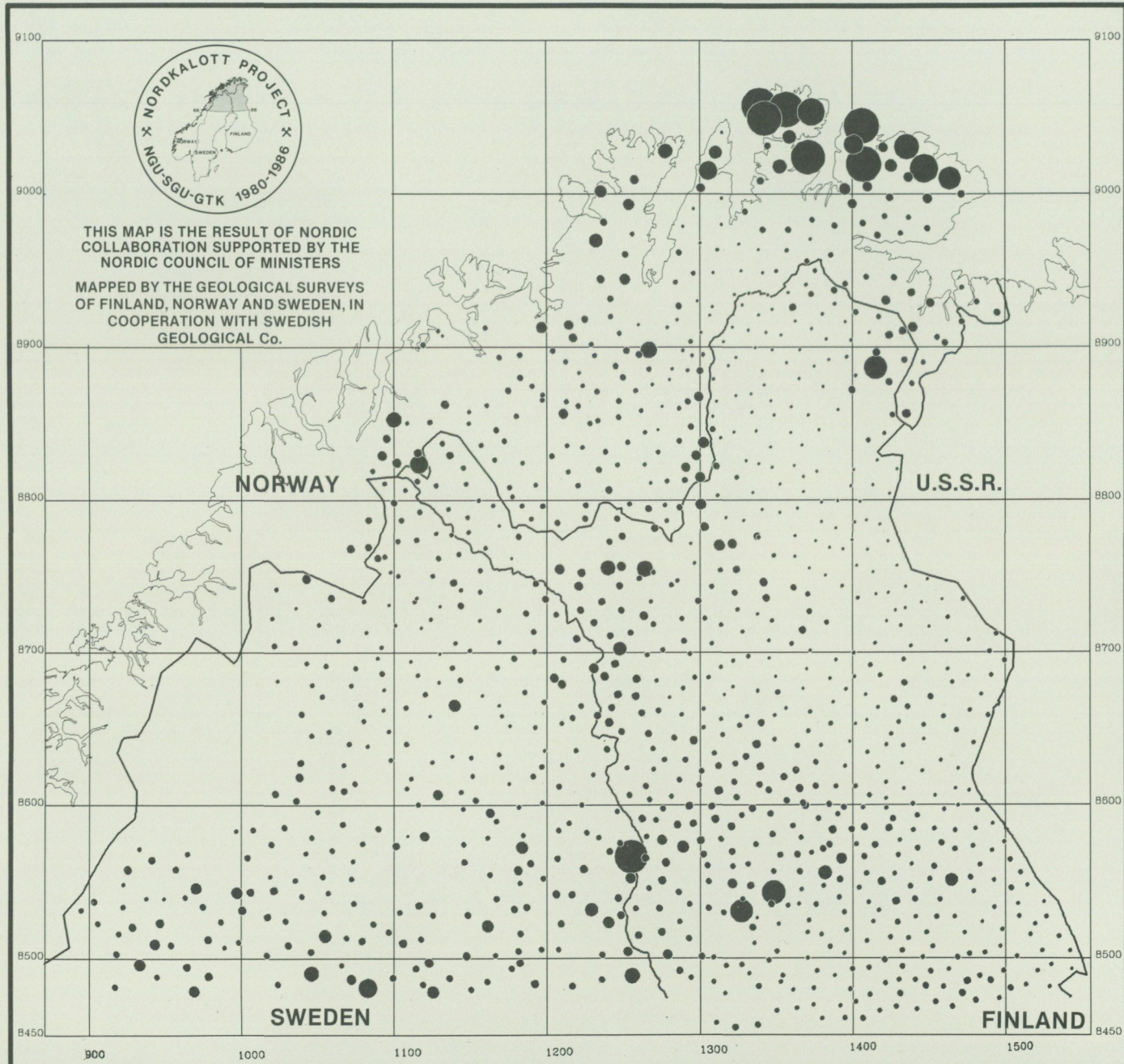
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 27.11.1984

MAP 35

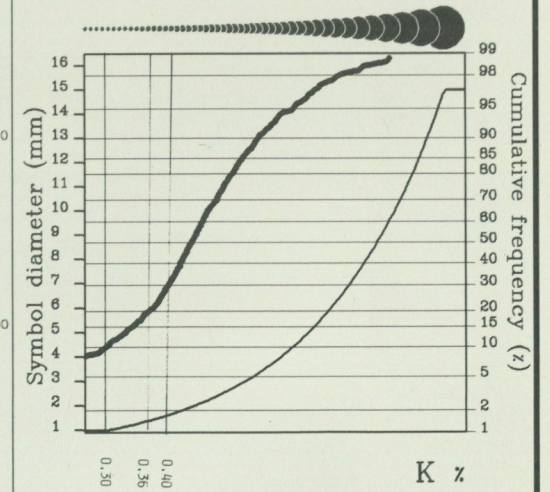


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals K

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

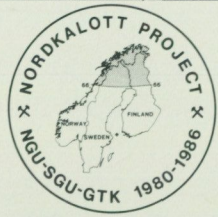
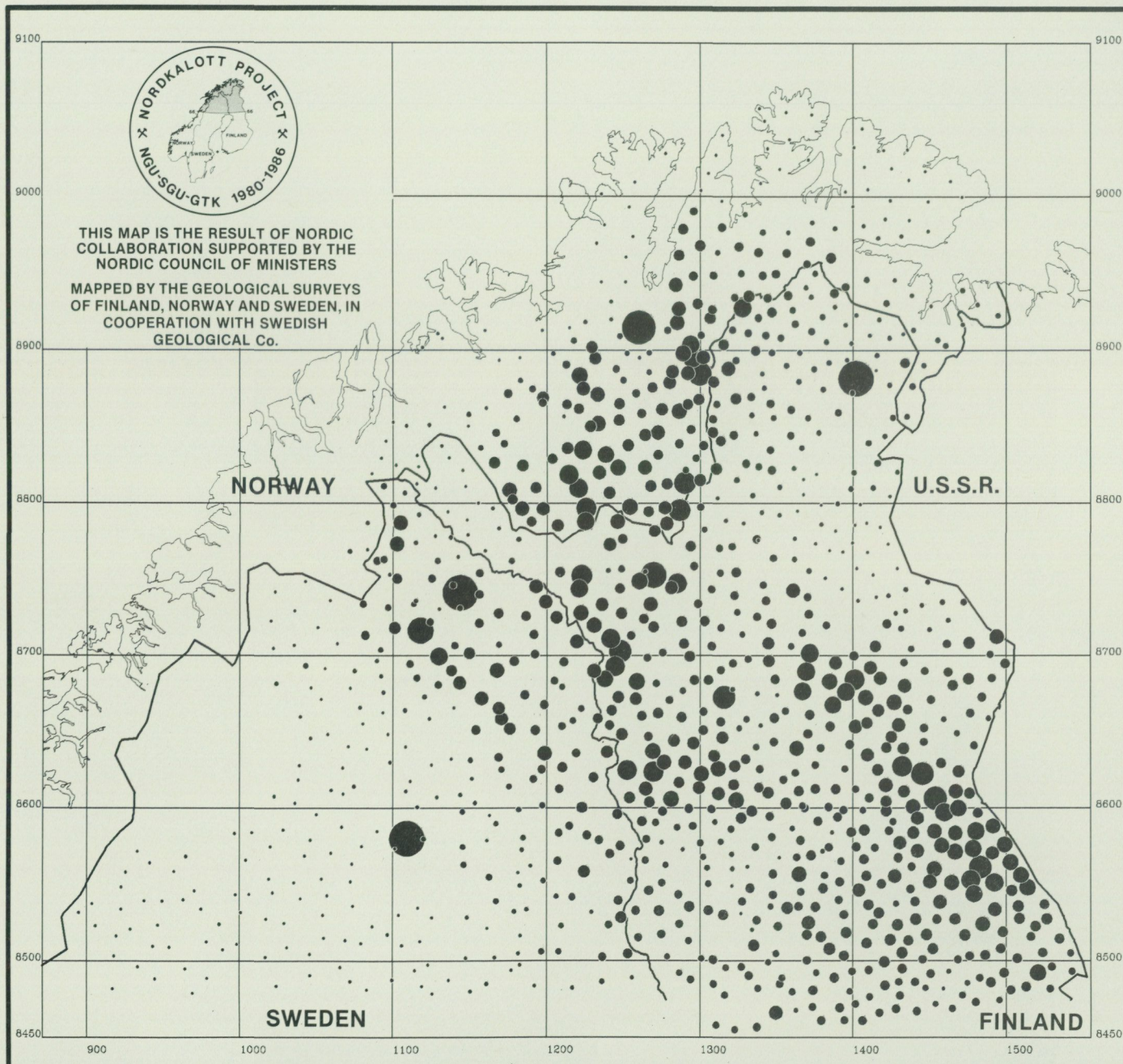
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 21.11.1984

MAP 36

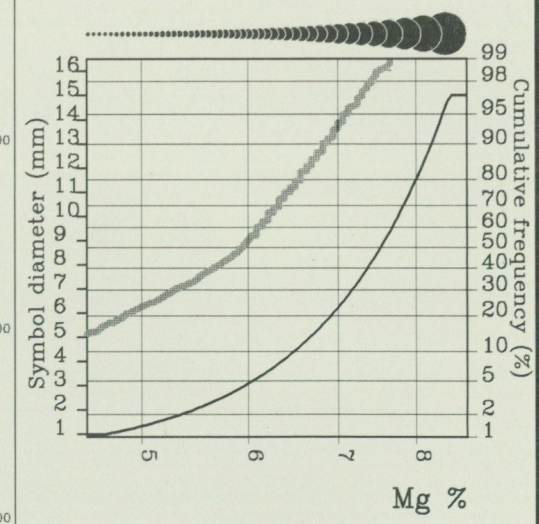


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals Mg

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

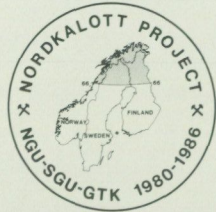
Symbol size —
 Cumulative frequency —



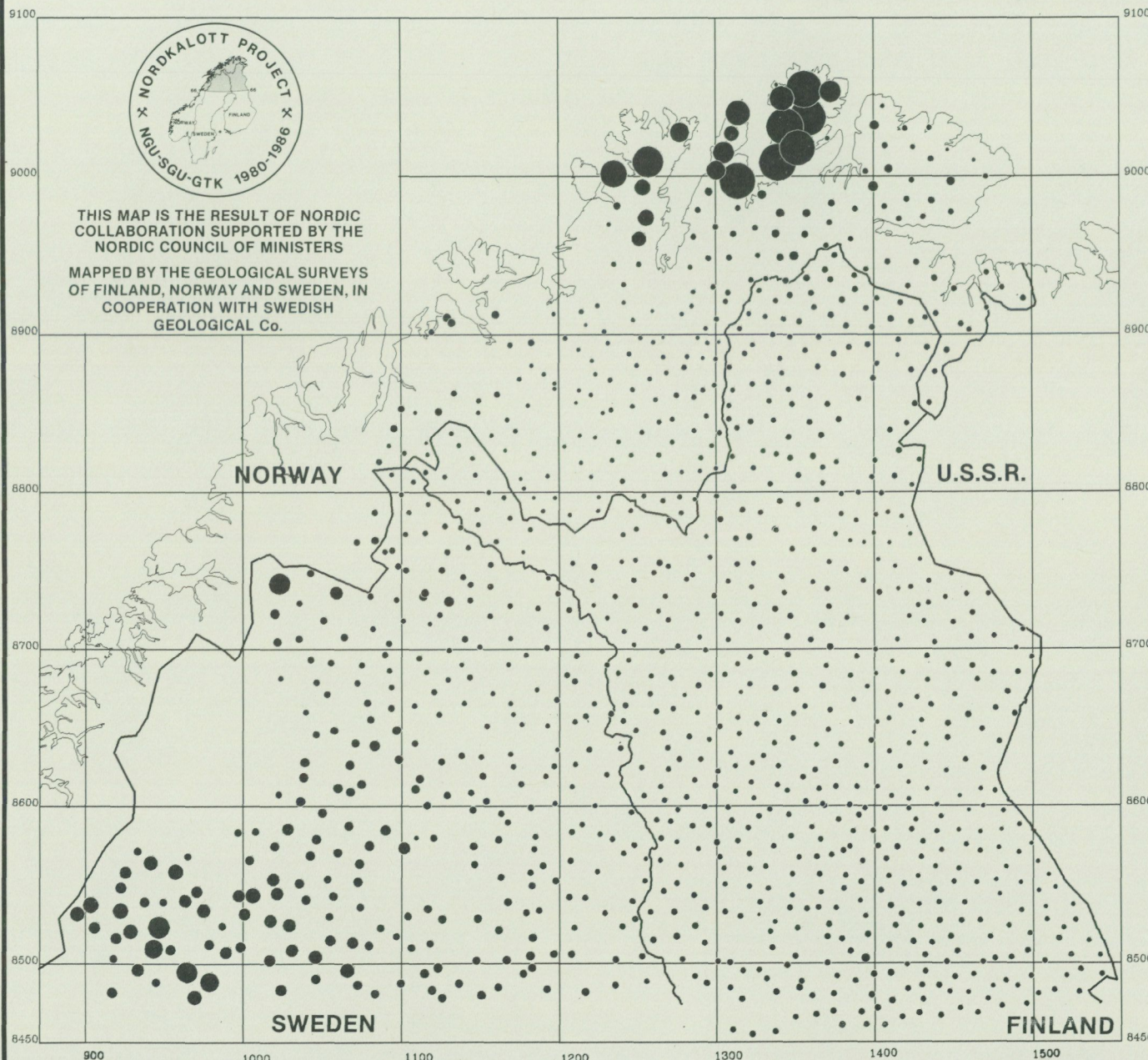
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 18.07.1985

MAP 37



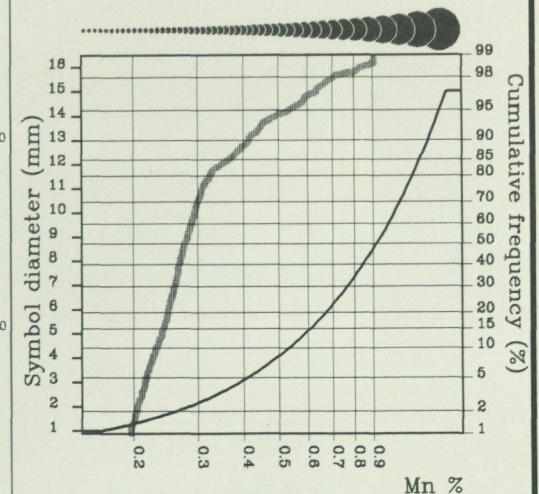
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Mn

Size fraction (1m): 62...500
 Heavier than 2.96 g/cm³
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

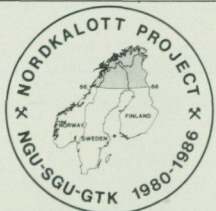
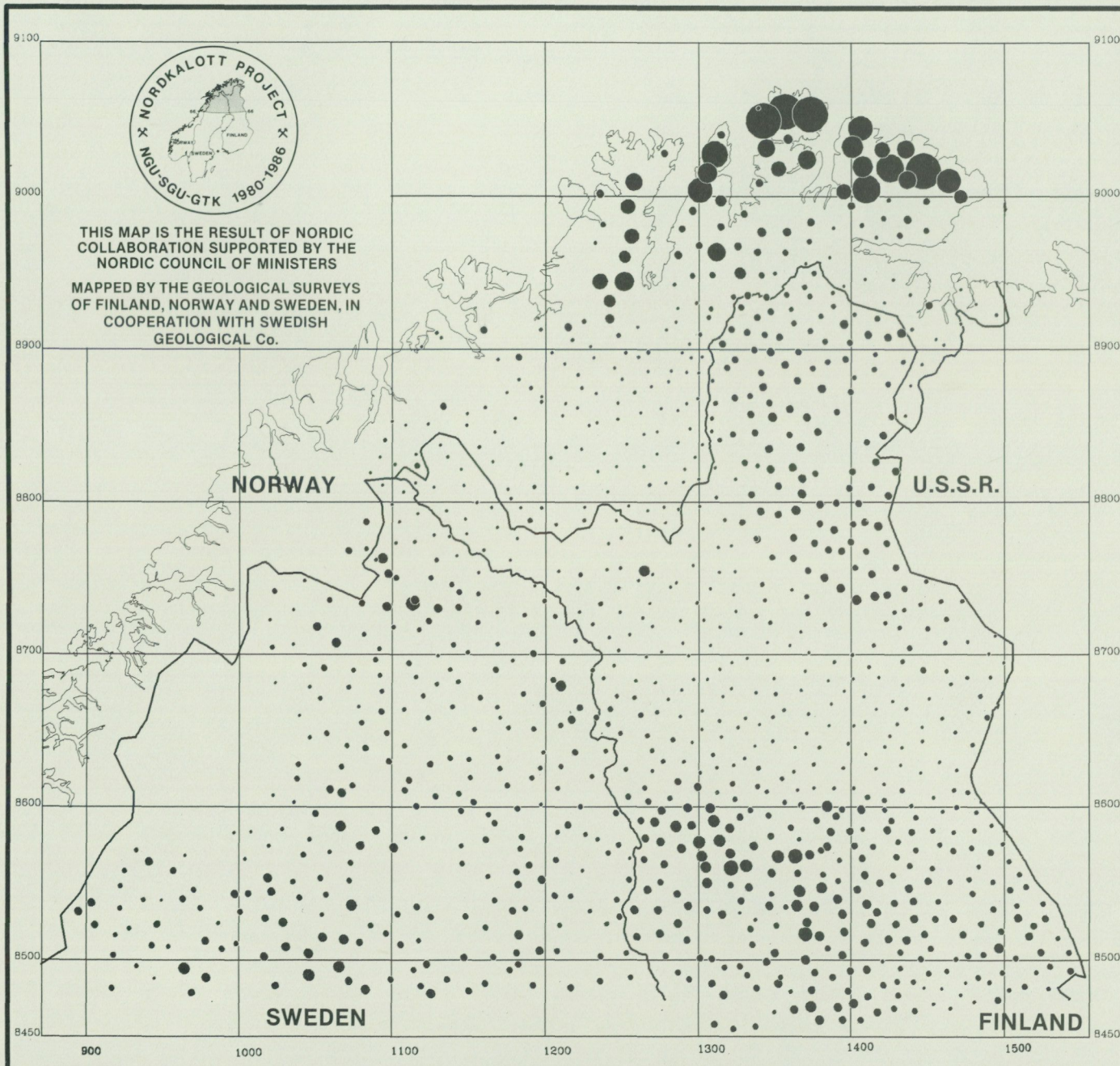
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 21.01.1985

MAP 38

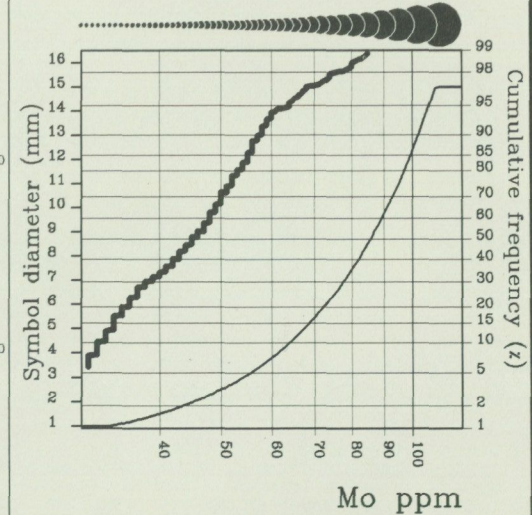


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals Mo

Size fraction (μm): 62...500
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

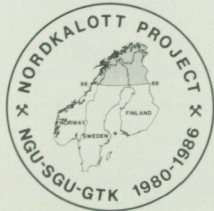
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

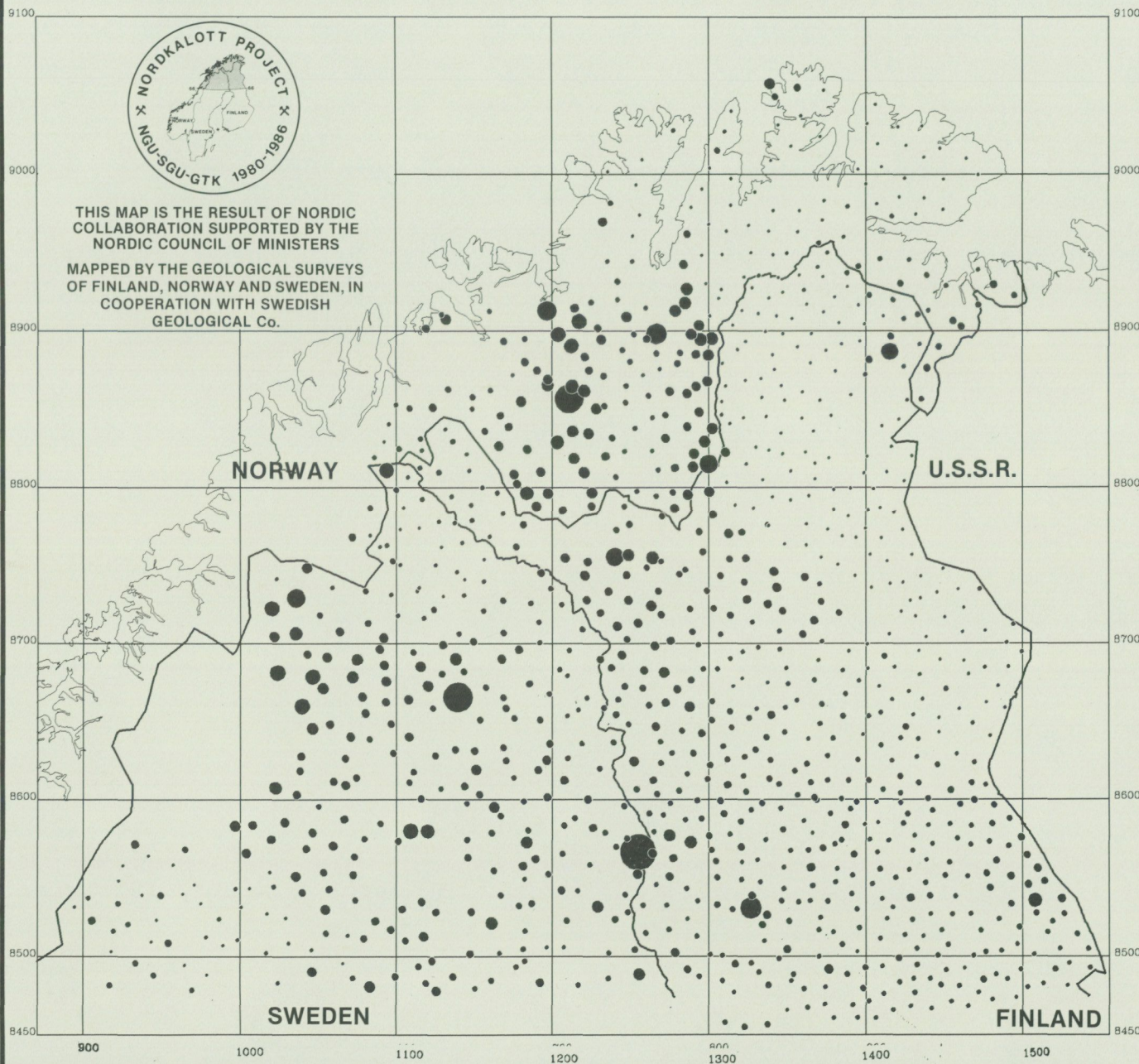
Projection: Lambert conformal
 Date of plotting: 12.11.1984

MAP 39



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

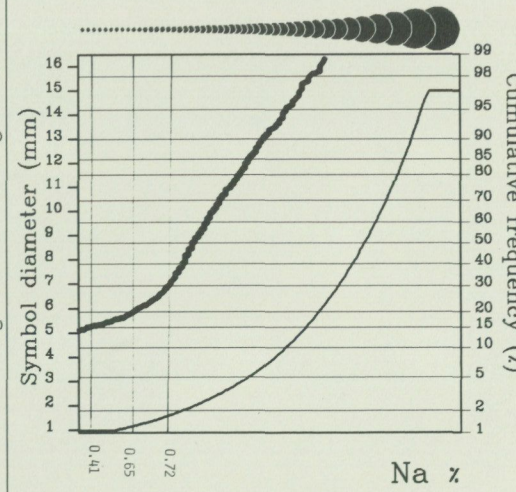
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Na

Size fraction (μm): 62...500
Heavier than 2.96 g/cm^3
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1034

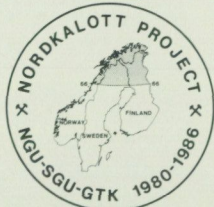
Symbol size —
Cumulative frequency —



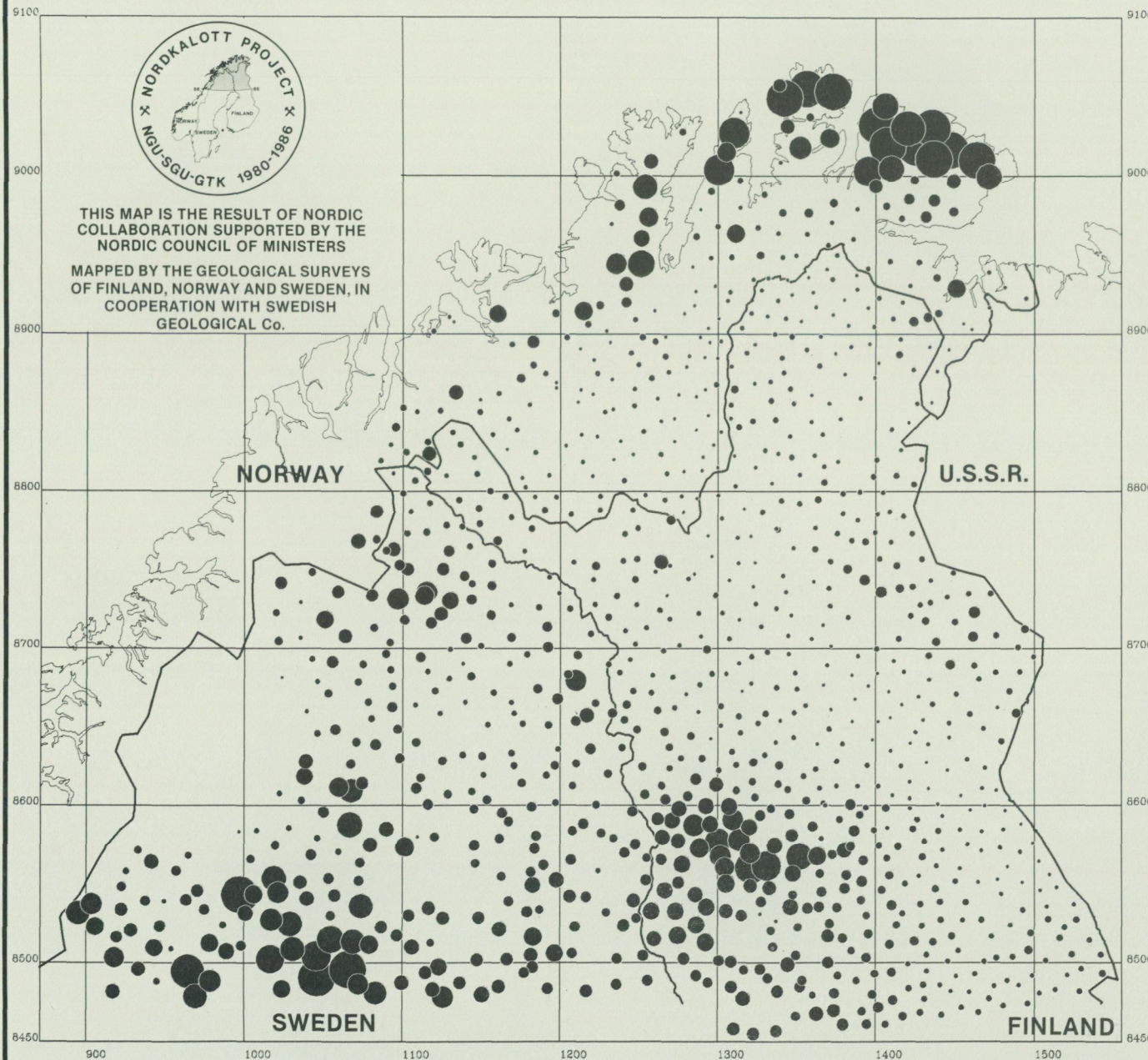
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 16.11.1984

MAP 40



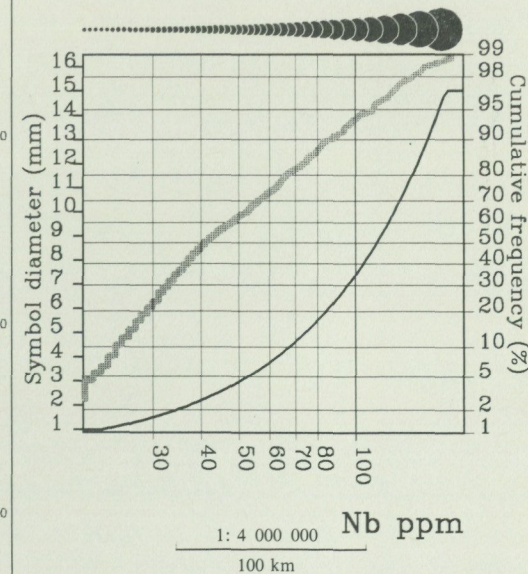
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Nb

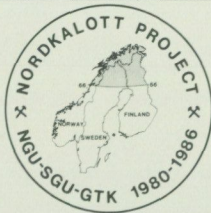
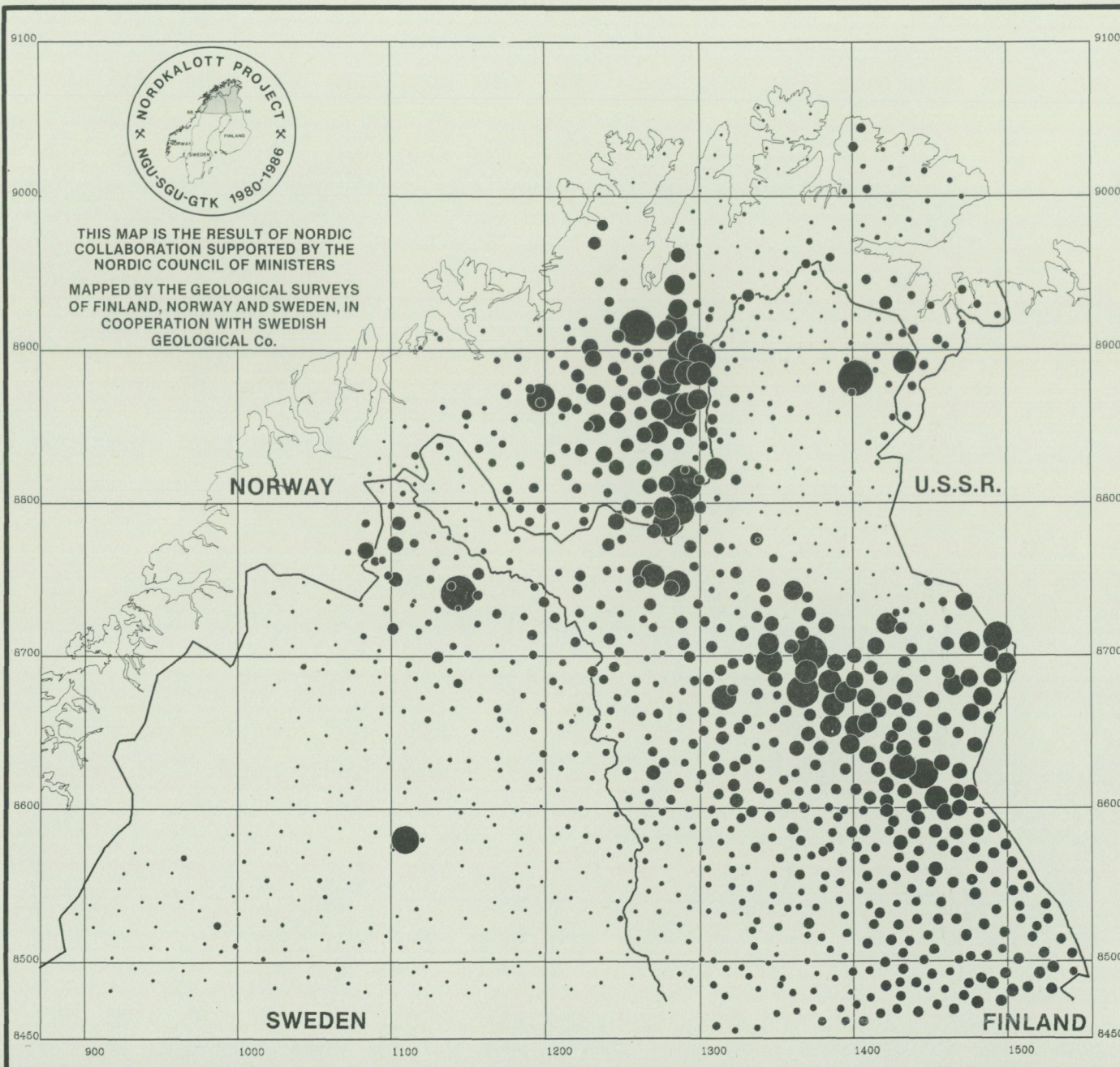
Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

Symbol size —
 Cumulative frequency —



Projection: Lambert conformal
 Date of plotting: 24.07.1985

MAP 41

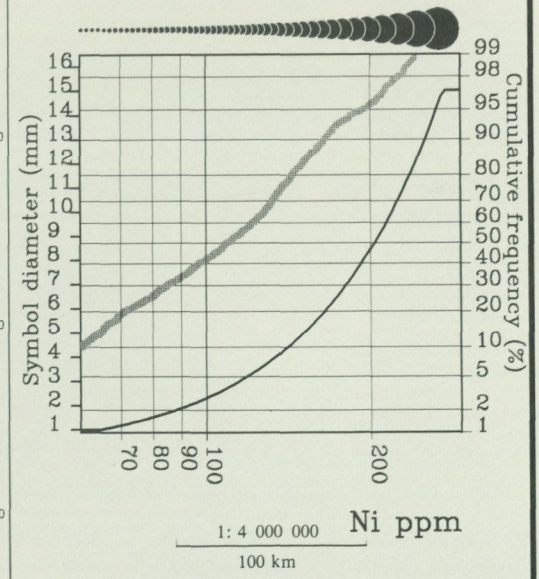


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals Ni

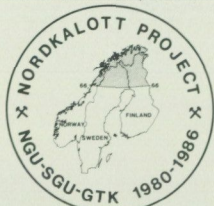
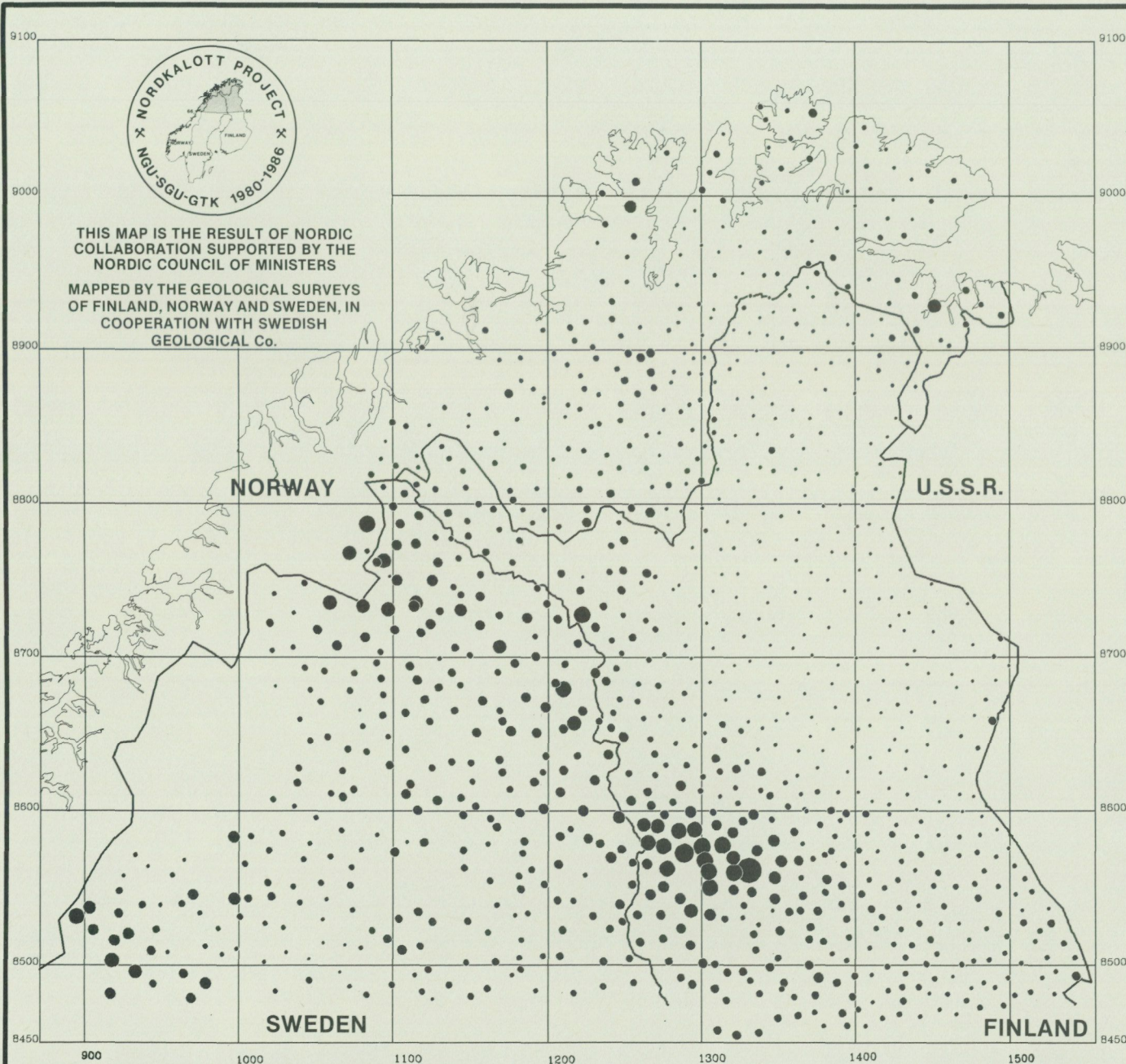
Size fraction (μm): 62...500
 Heavier than 2.96 g/cm³
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

Symbol size —
 Cumulative frequency —



Projection: Lambert conformal
 Date of plotting: 24.07.1985

MAP 42

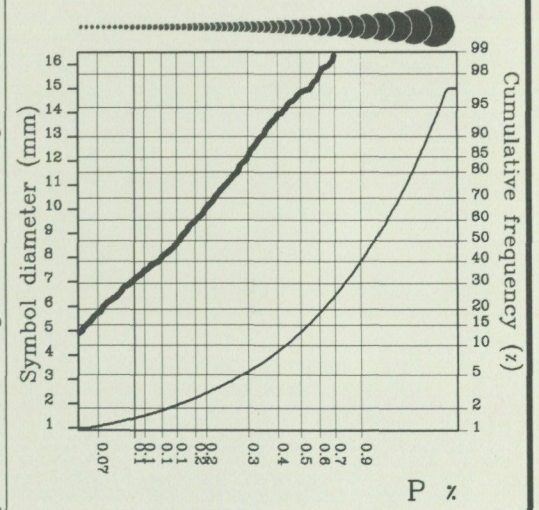


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals P

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

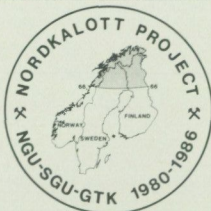
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

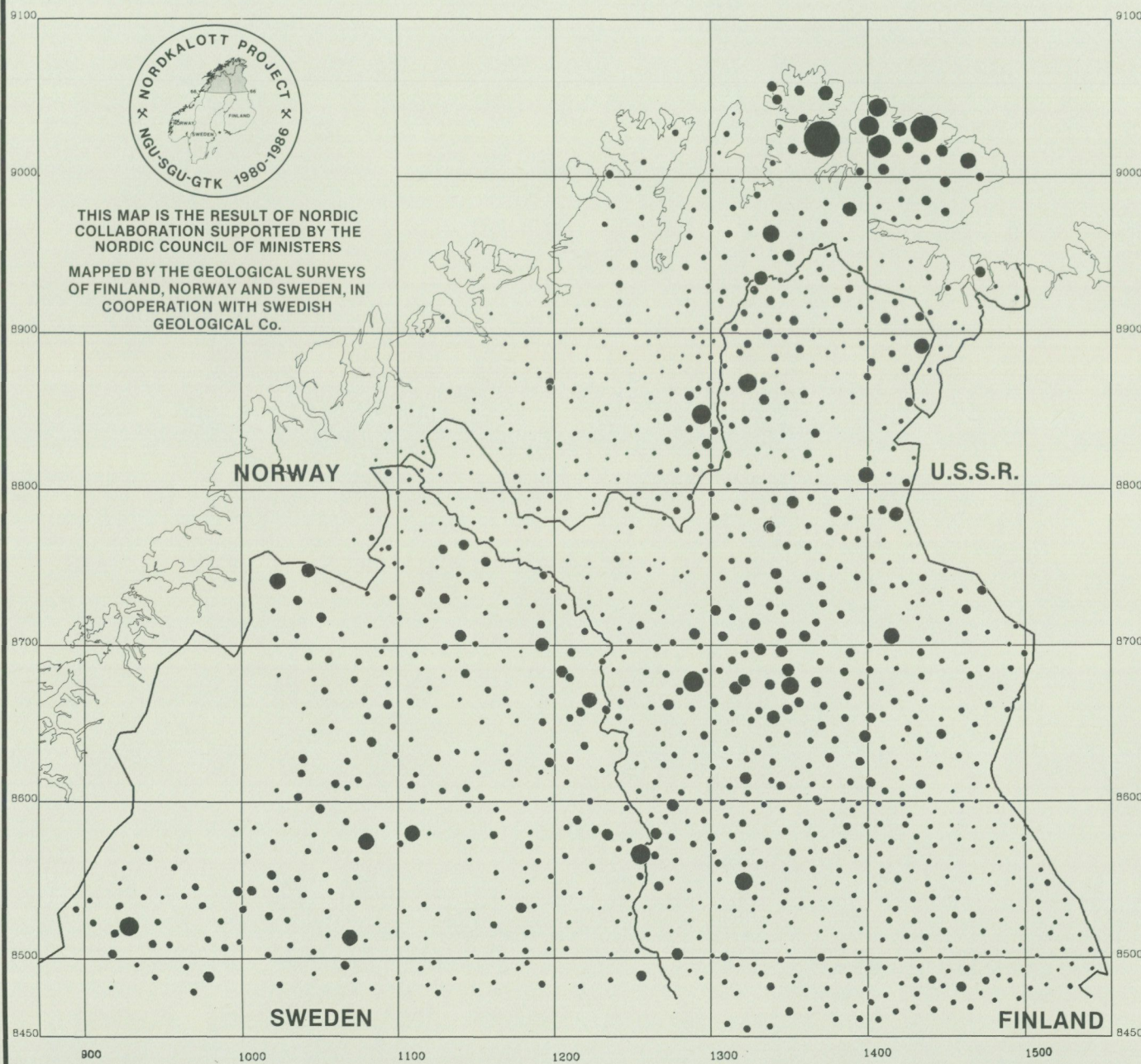
Projection: Lambert conformal
 Date of plotting: 21.11.1984

MAP 43



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

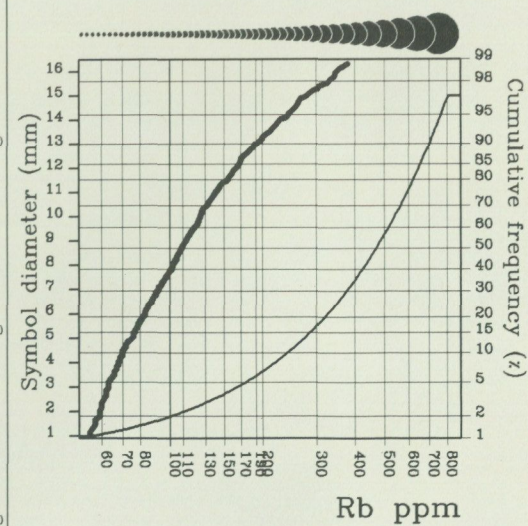
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Rb

Size fraction (μm): 62...500
Heavier than 2.96 g/cm^3
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1034

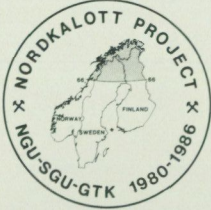
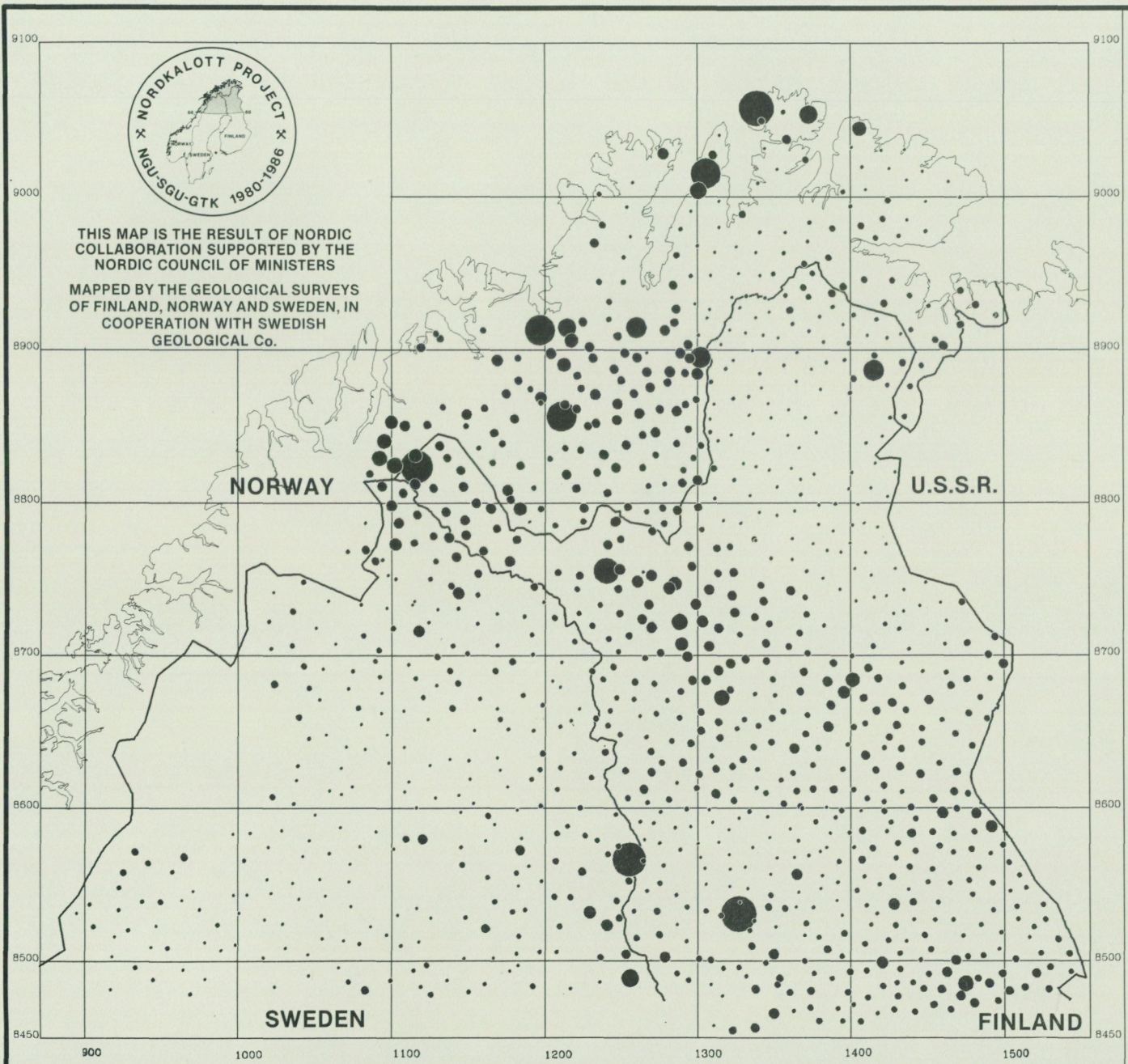
Symbol size —
Cumulative frequency —



1 : 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 28.11.1984

MAP 44

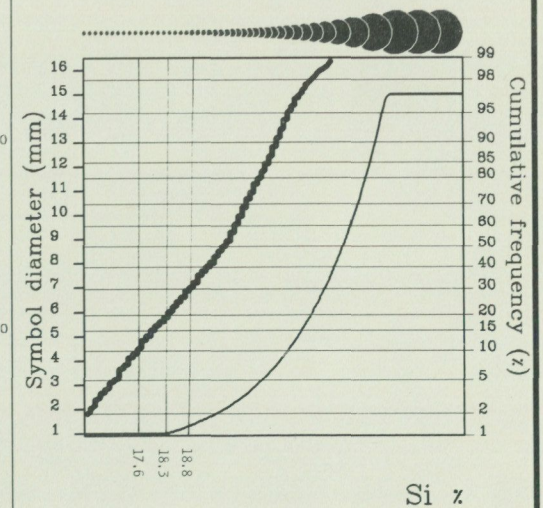


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals Si

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

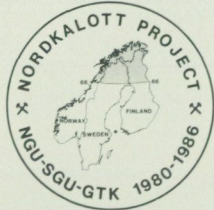
Symbol size —
 Cumulative frequency —



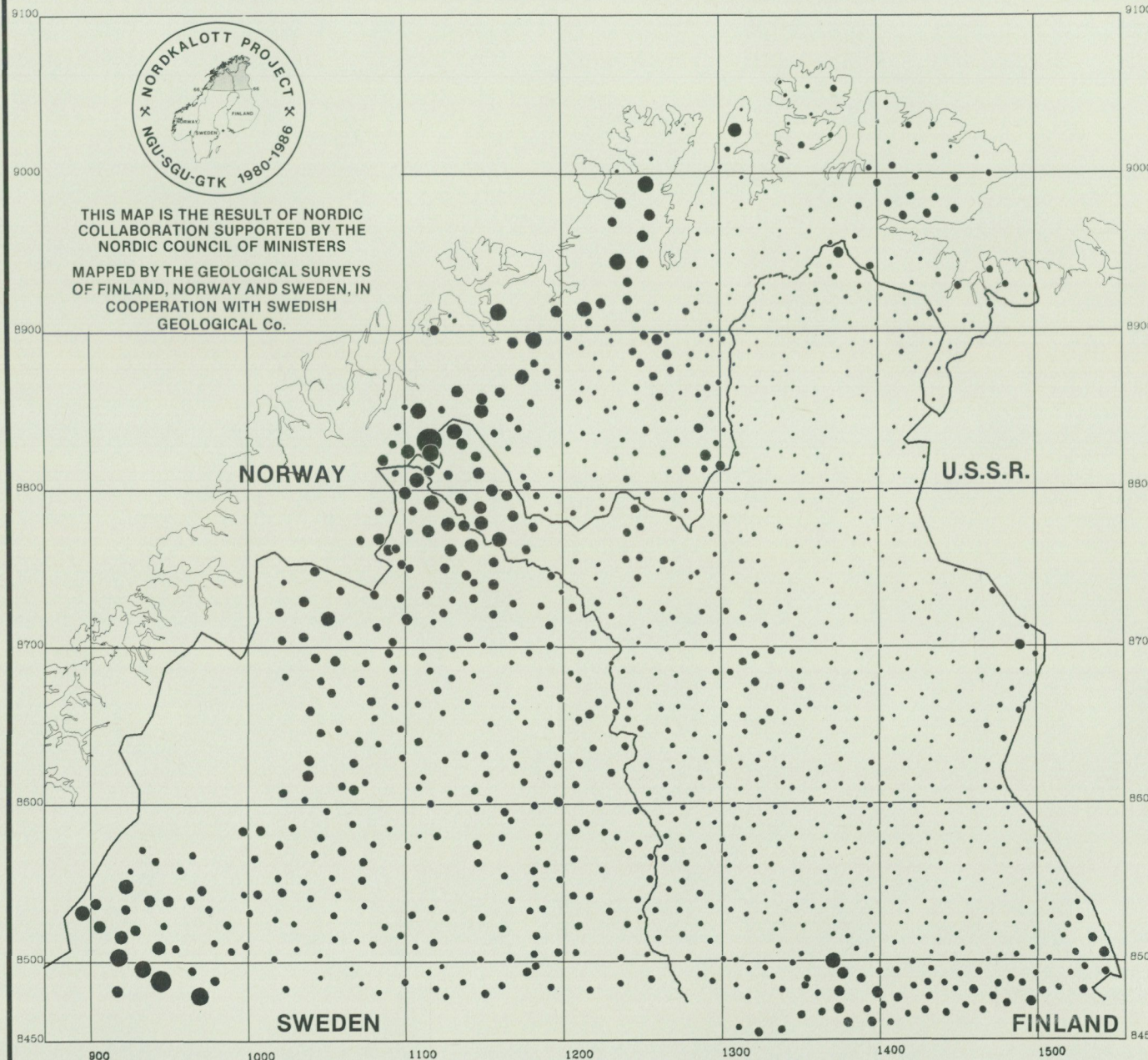
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 21.11.1984

MAP 45



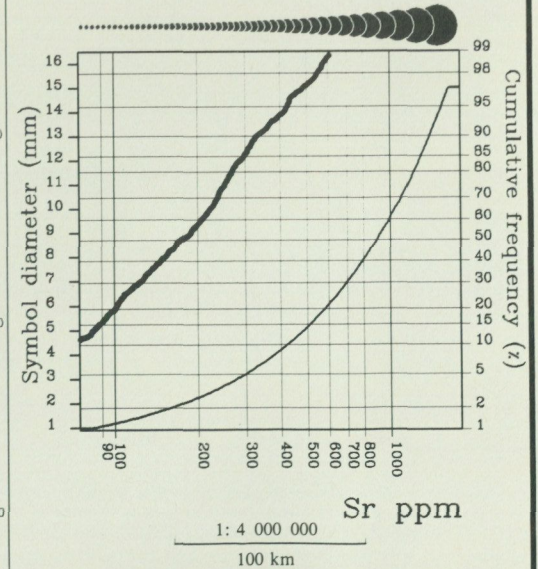
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Sr

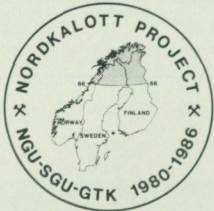
Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

Symbol size —
 Cumulative frequency —

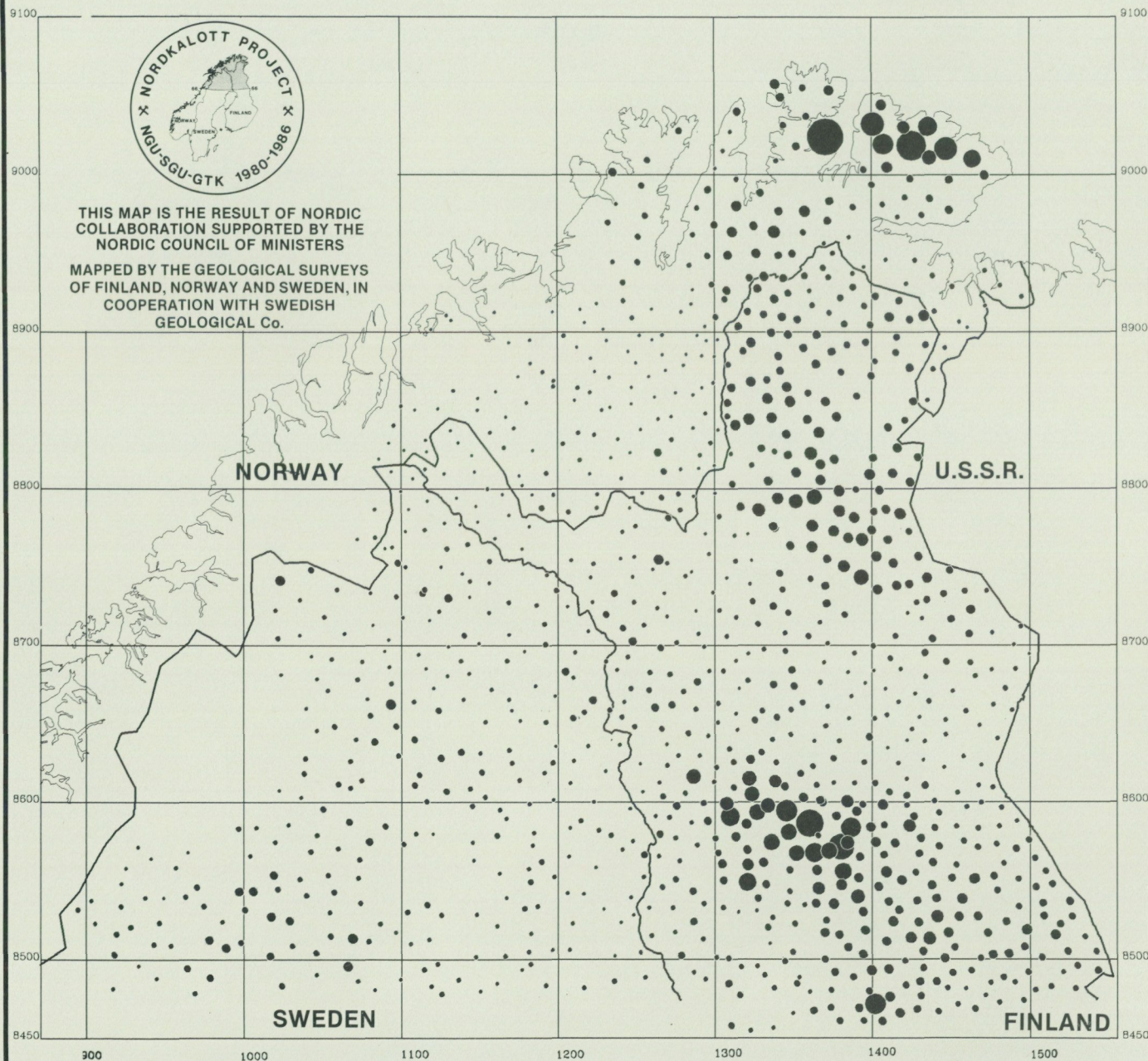


Projection: Lambert conformal
 Date of plotting: 28.11.1984

MAP 46



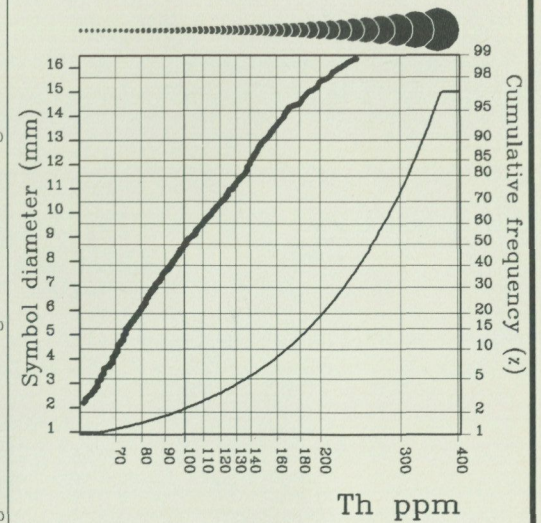
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Th

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

Symbol size —
 Cumulative frequency —

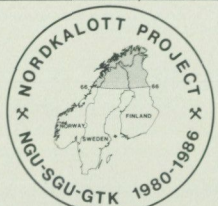
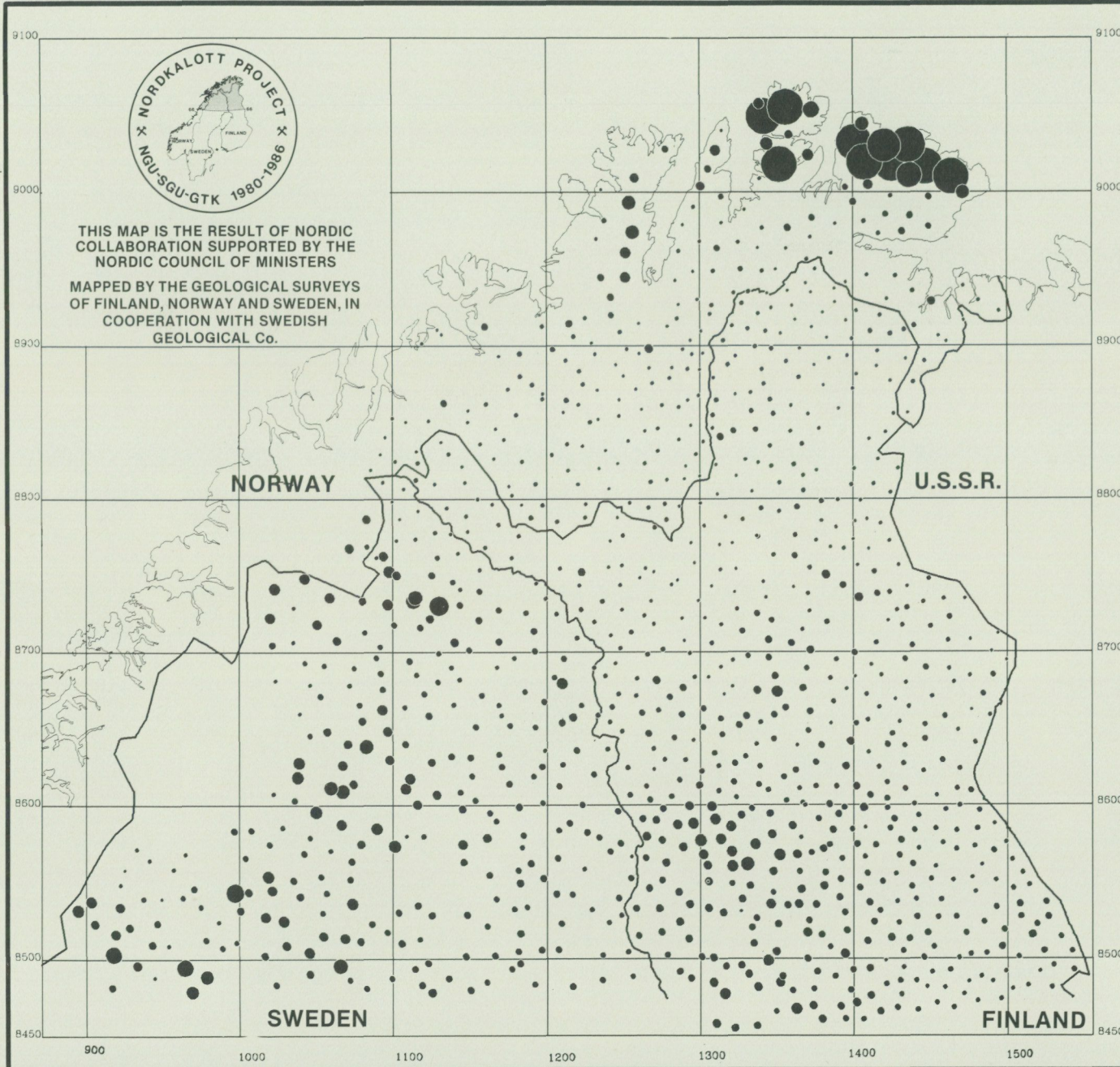


Th ppm

1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 28.11.1984

MAP 47

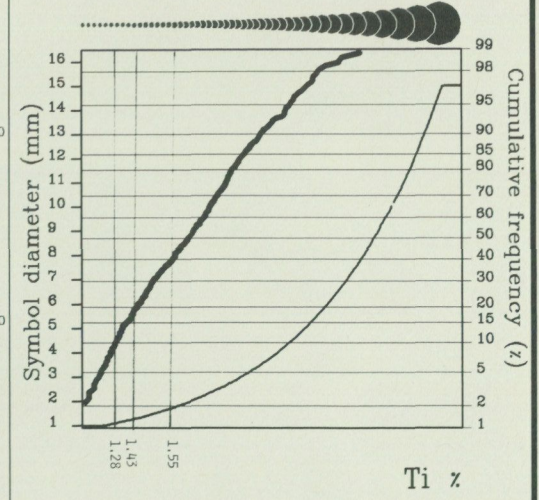


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals Ti

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

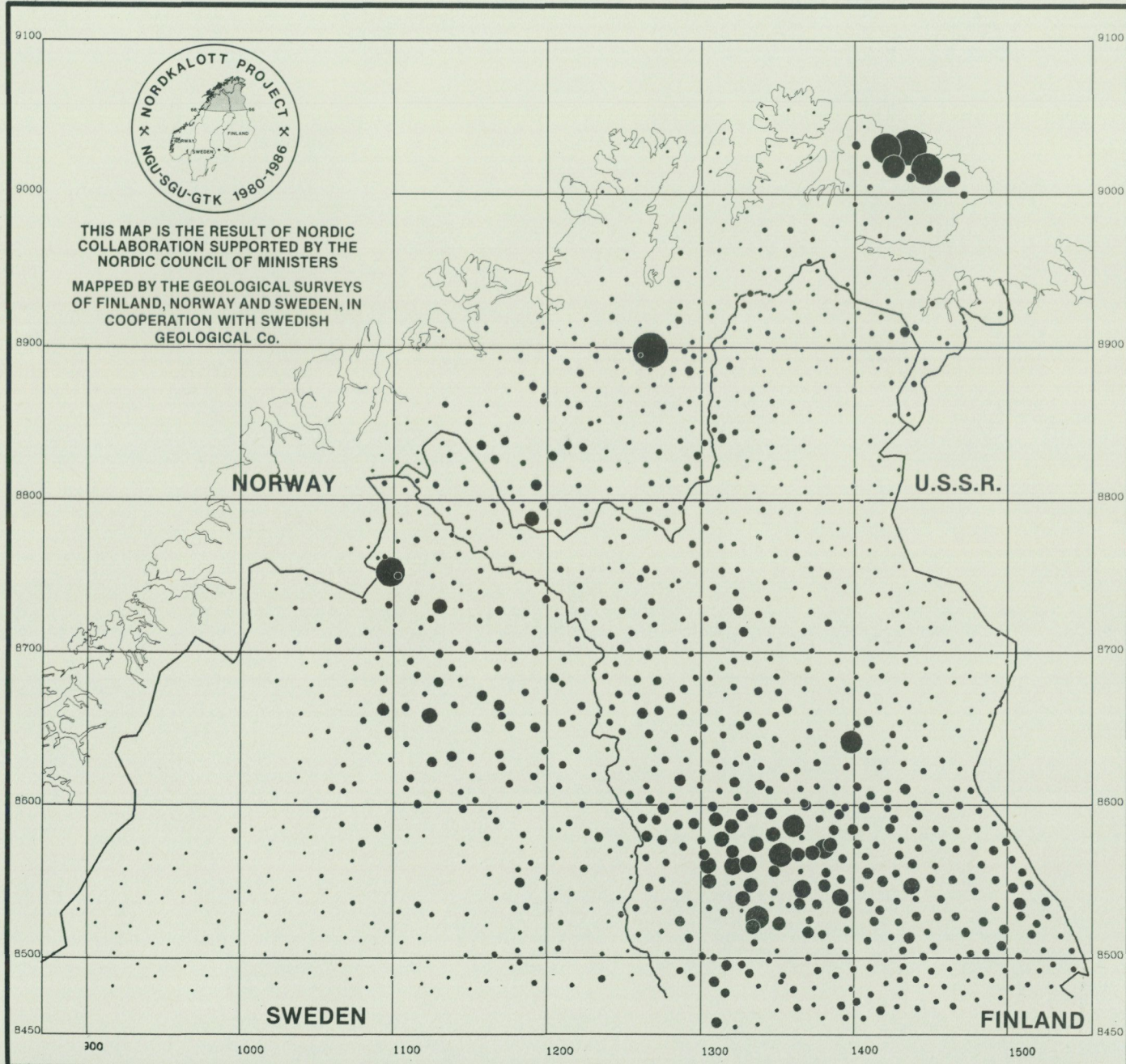
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 22.11.1984

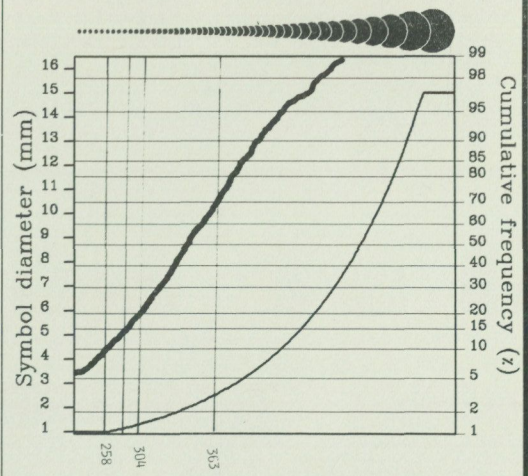
MAP 48



Nordkalott project Geochemistry TILL Heavy minerals V

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

Symbol size
 Cumulative frequency

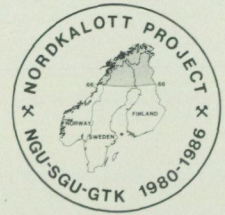
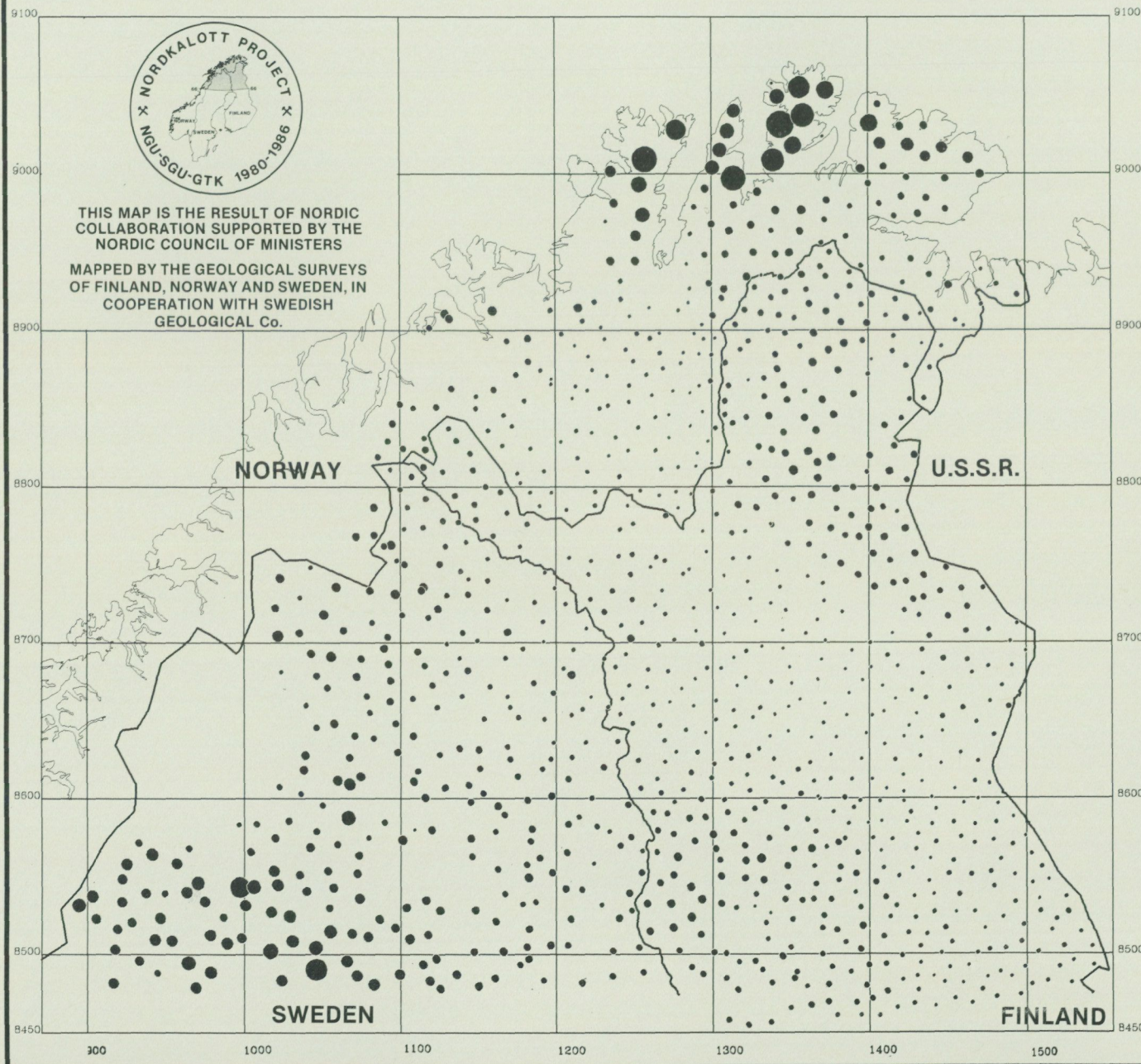


V ppm

1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 22.11.1984

MAP 49

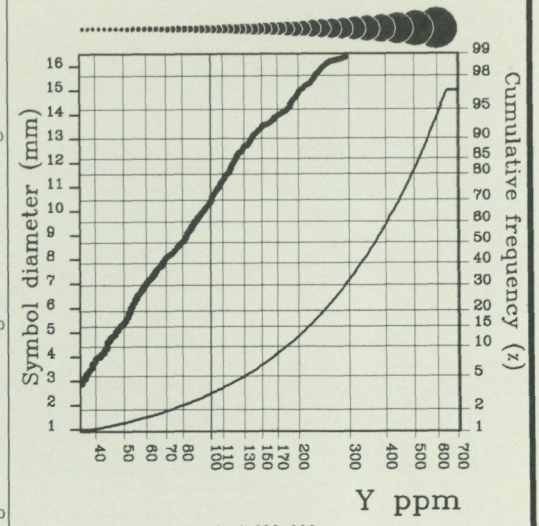


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals Y

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

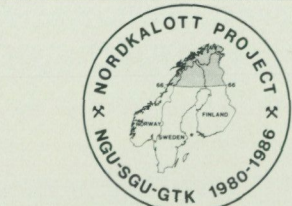
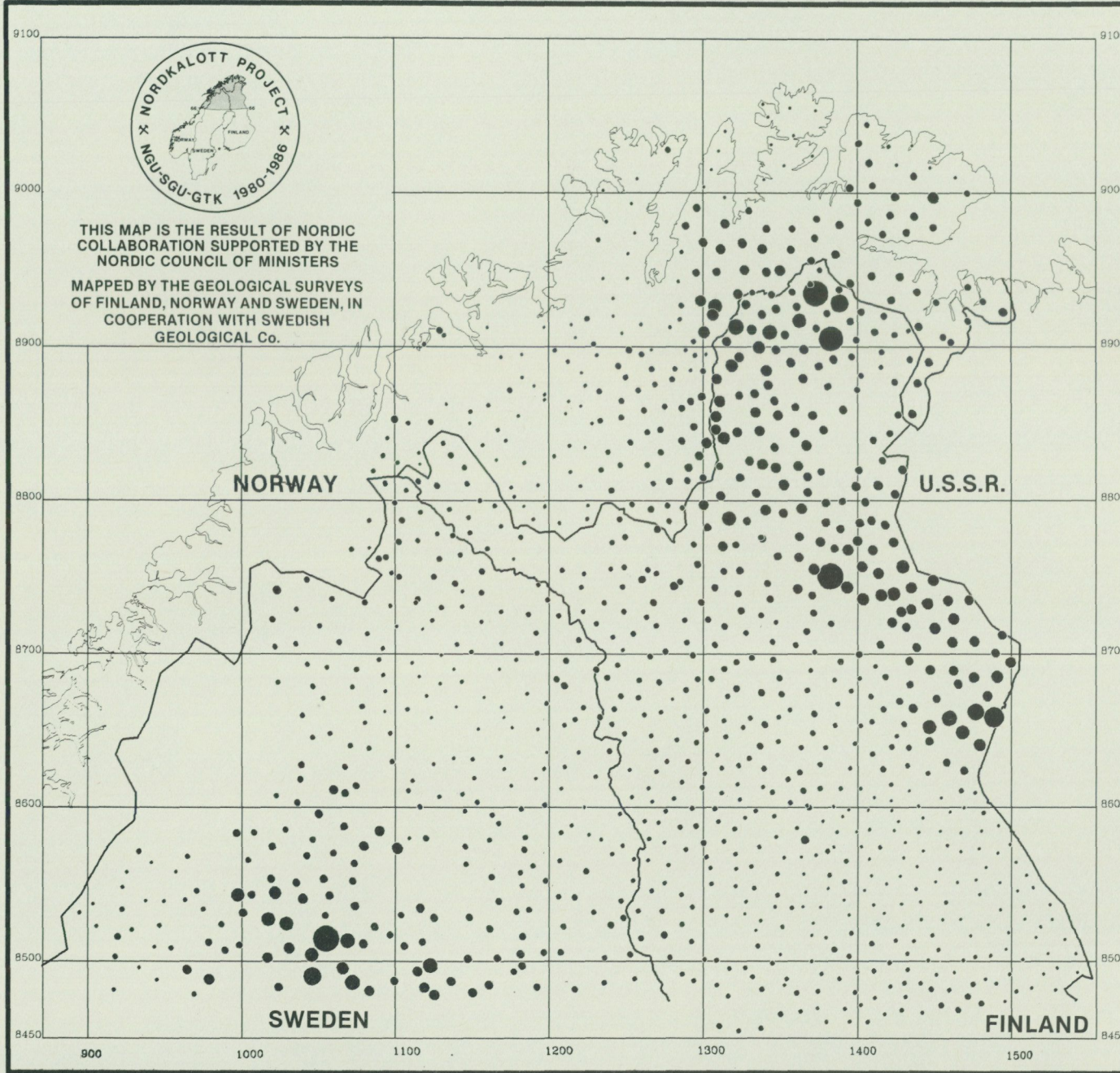
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 15.11.1984

MAP 50

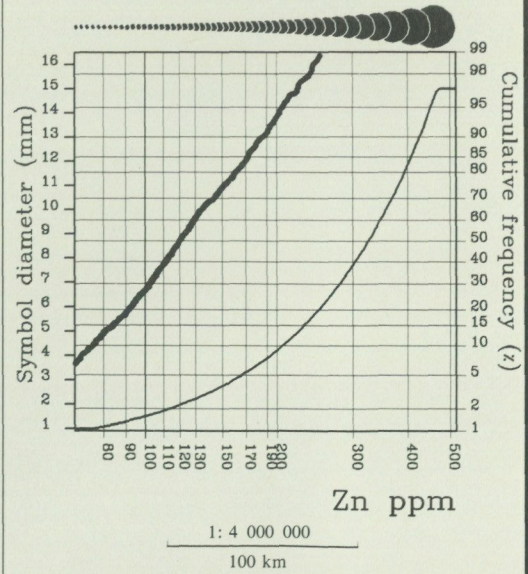


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry TILL Heavy minerals Zn

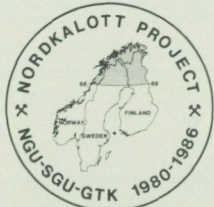
Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

Symbol size —
 Cumulative frequency —

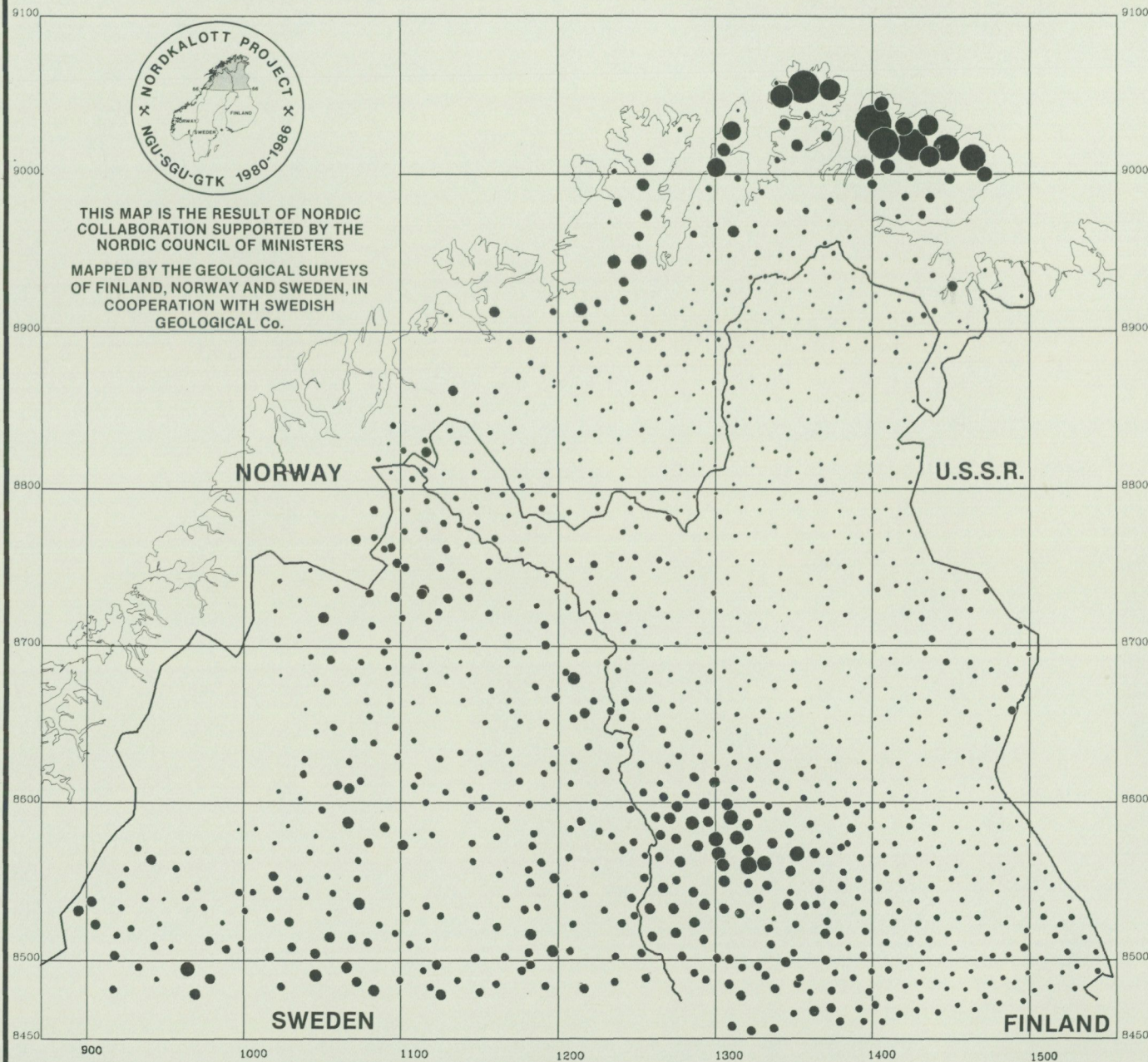


Projection: Lambert conformal
 Date of plotting: 28.11.1984

MAP 51



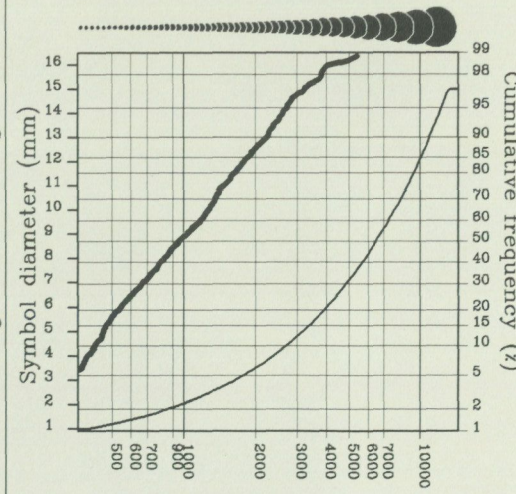
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry TILL Heavy minerals Zr

Size fraction (μm): 62...500
 Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1034

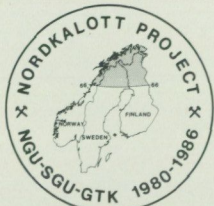
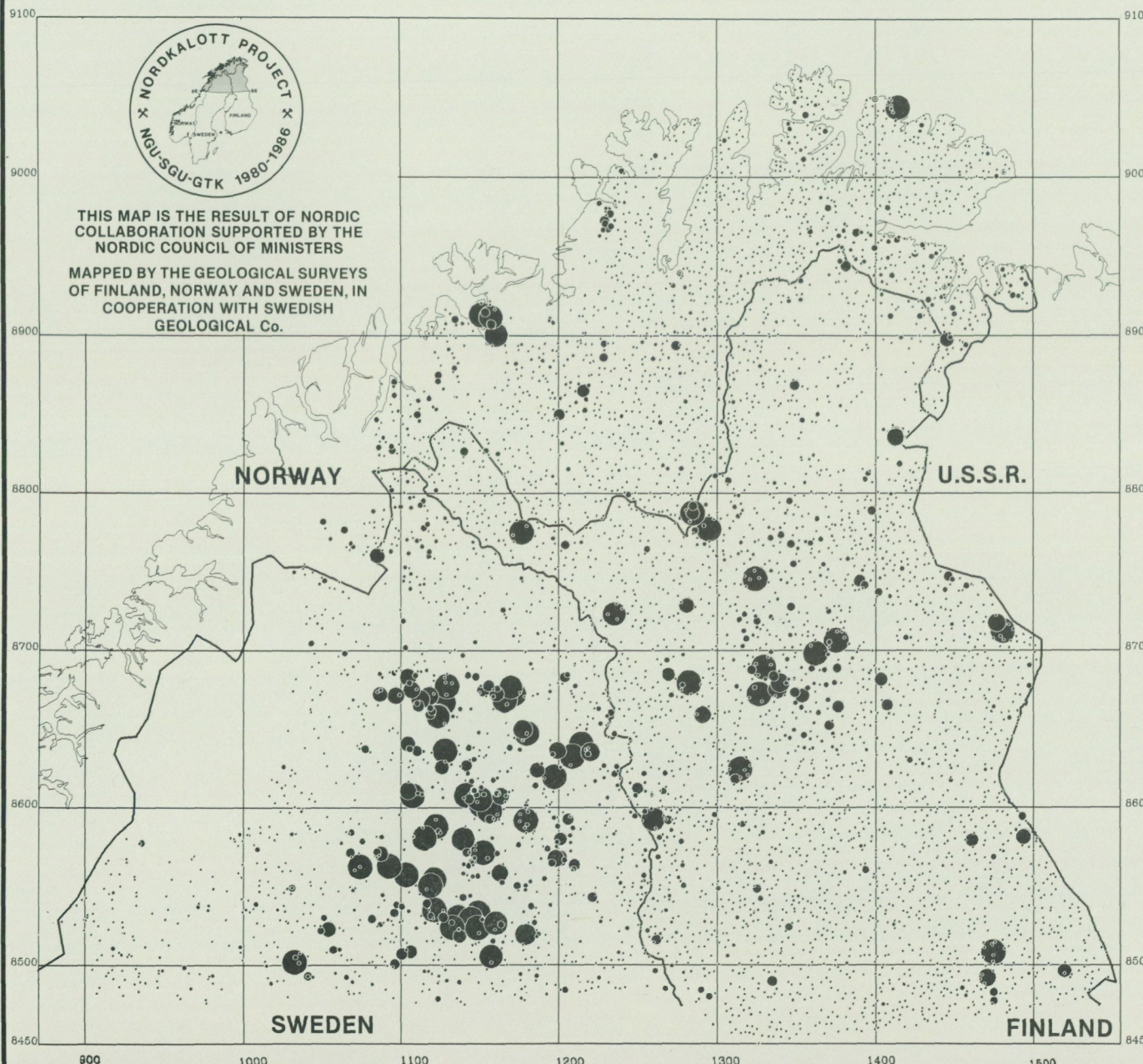
Symbol size —
 Cumulative frequency —



1 : 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 29.11.1984

MAP 52

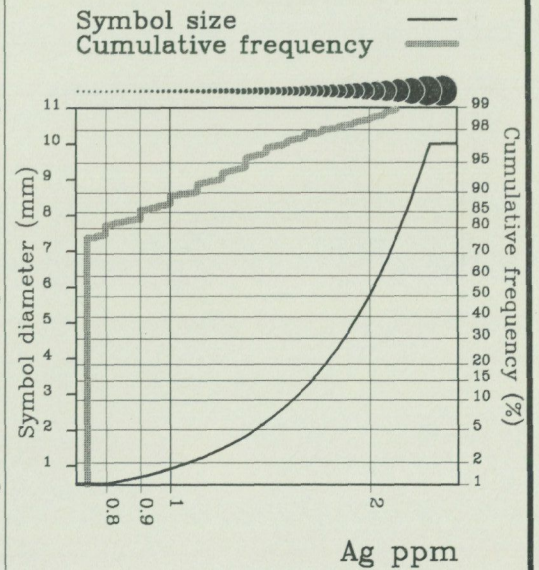


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT

Ag

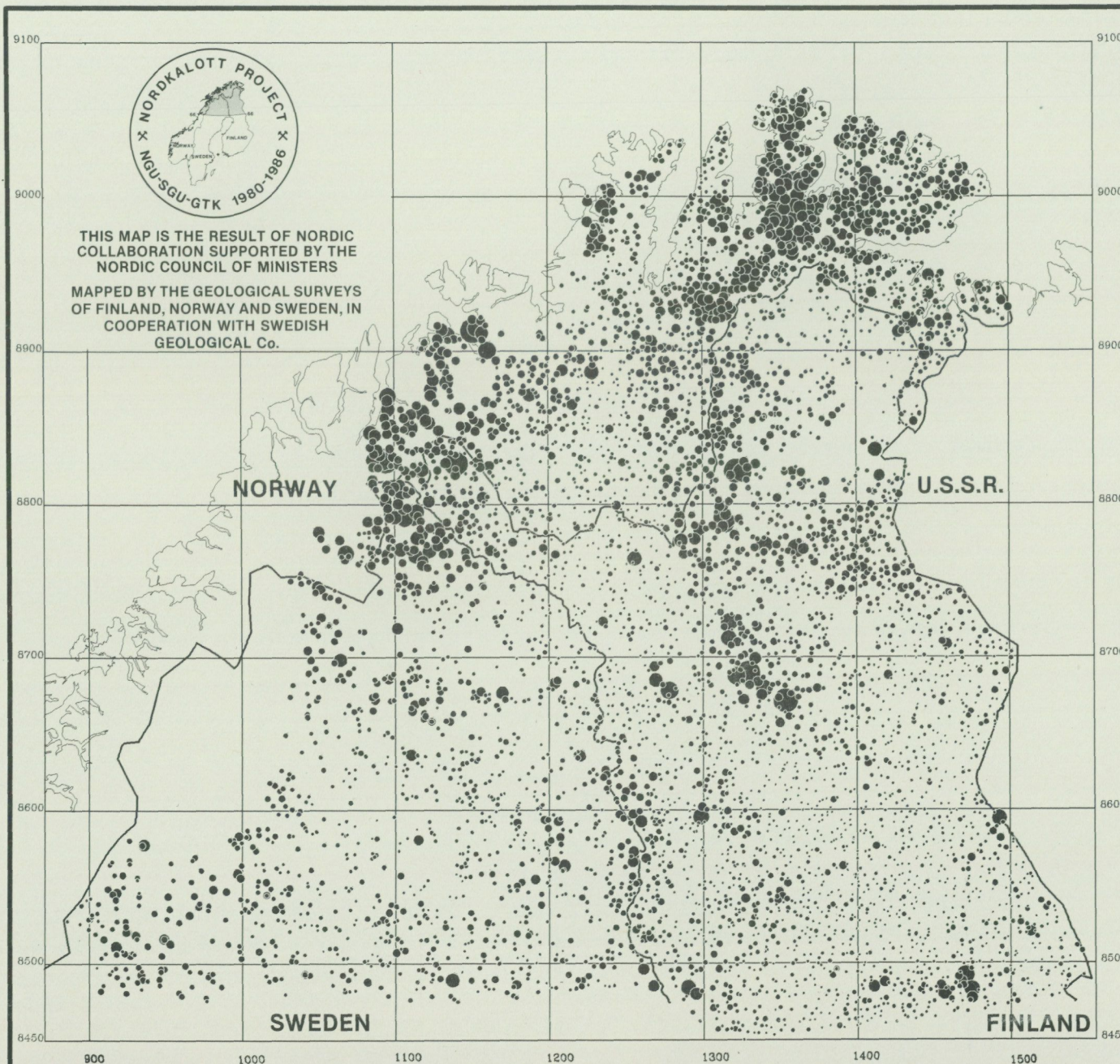
Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 18.03.1985

MAP 53

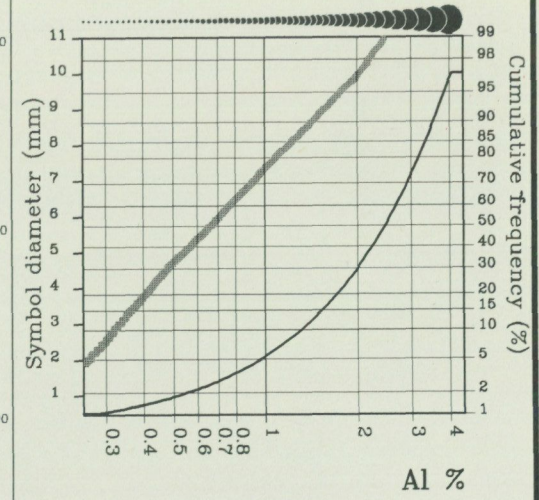


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Al

Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773

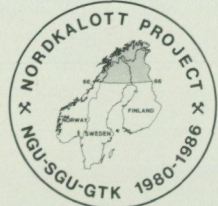
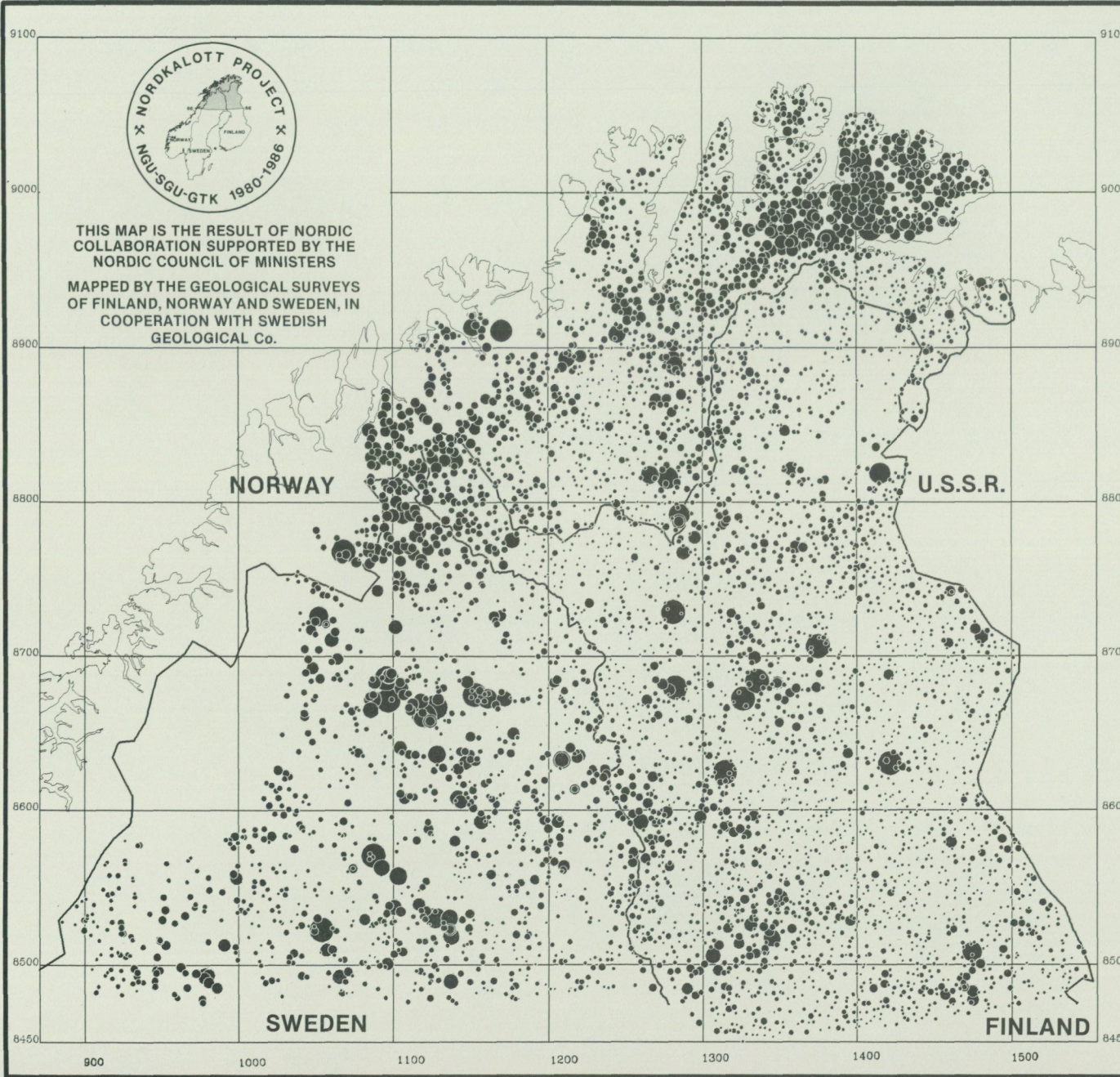
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 06.03.1985

MAP 54

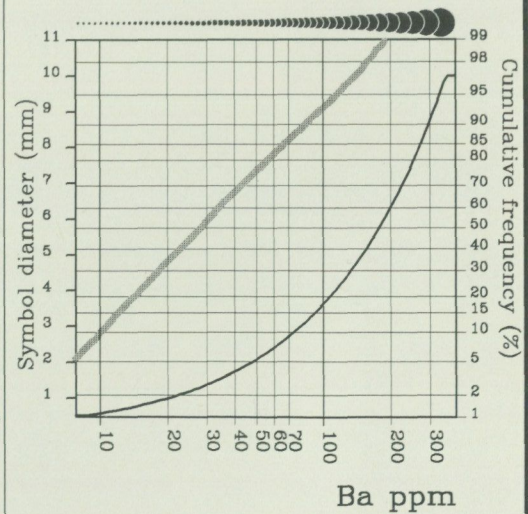


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Ba

Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773

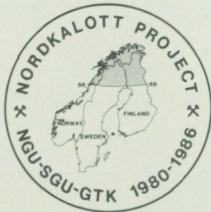
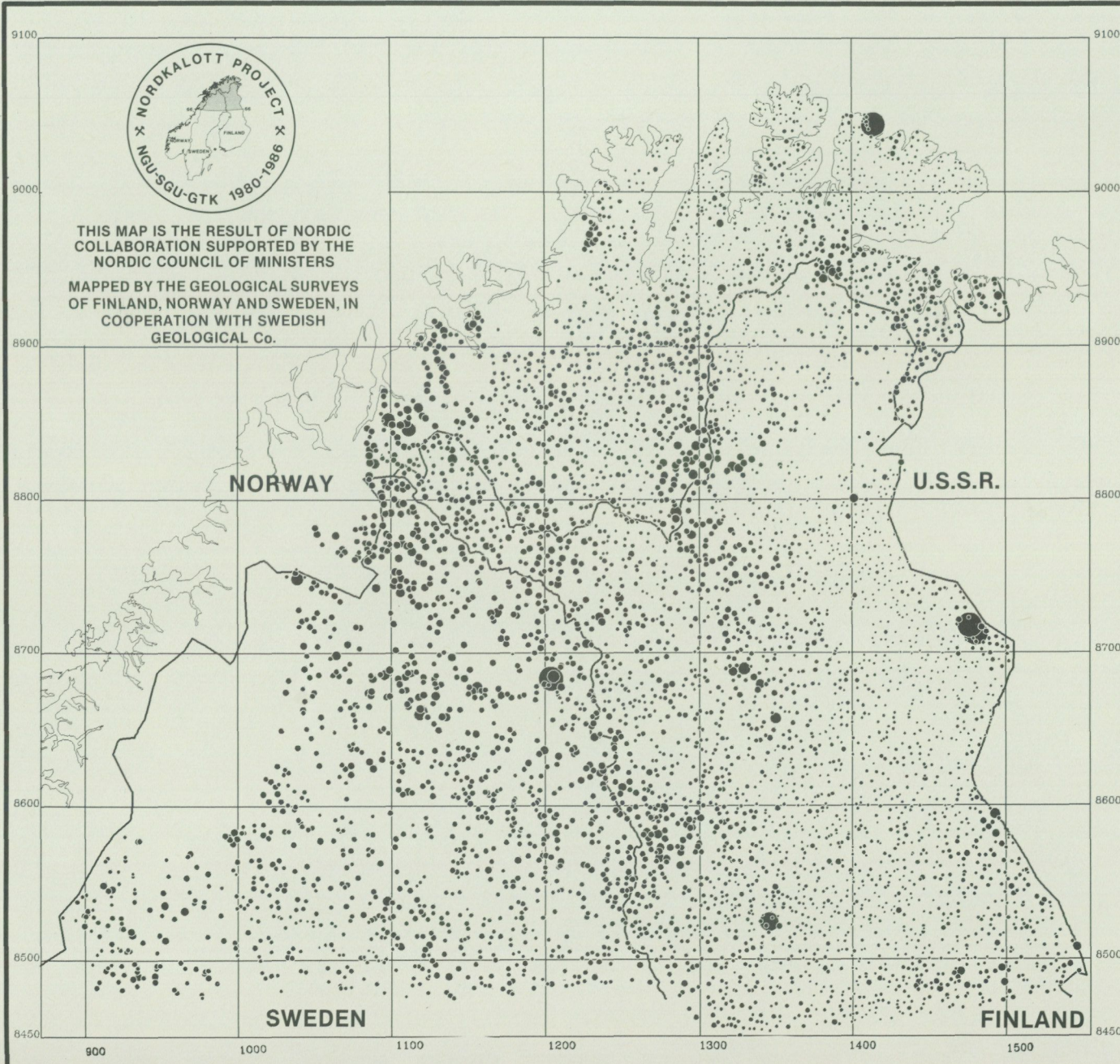
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 13.03.1985

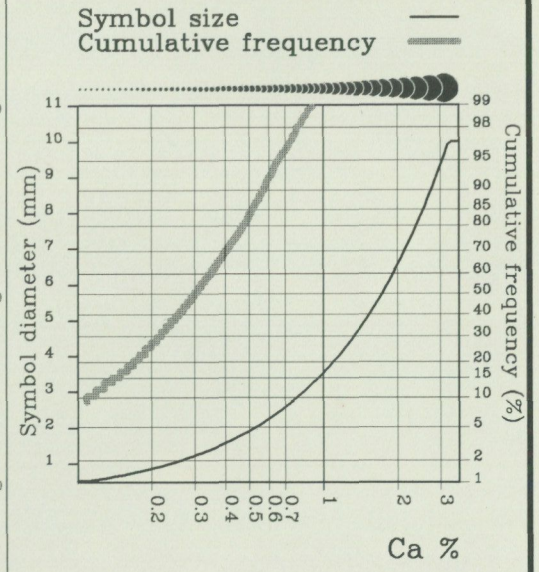
MAP 55



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Ca

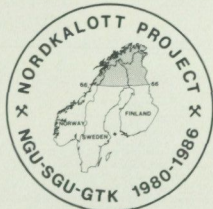
Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773



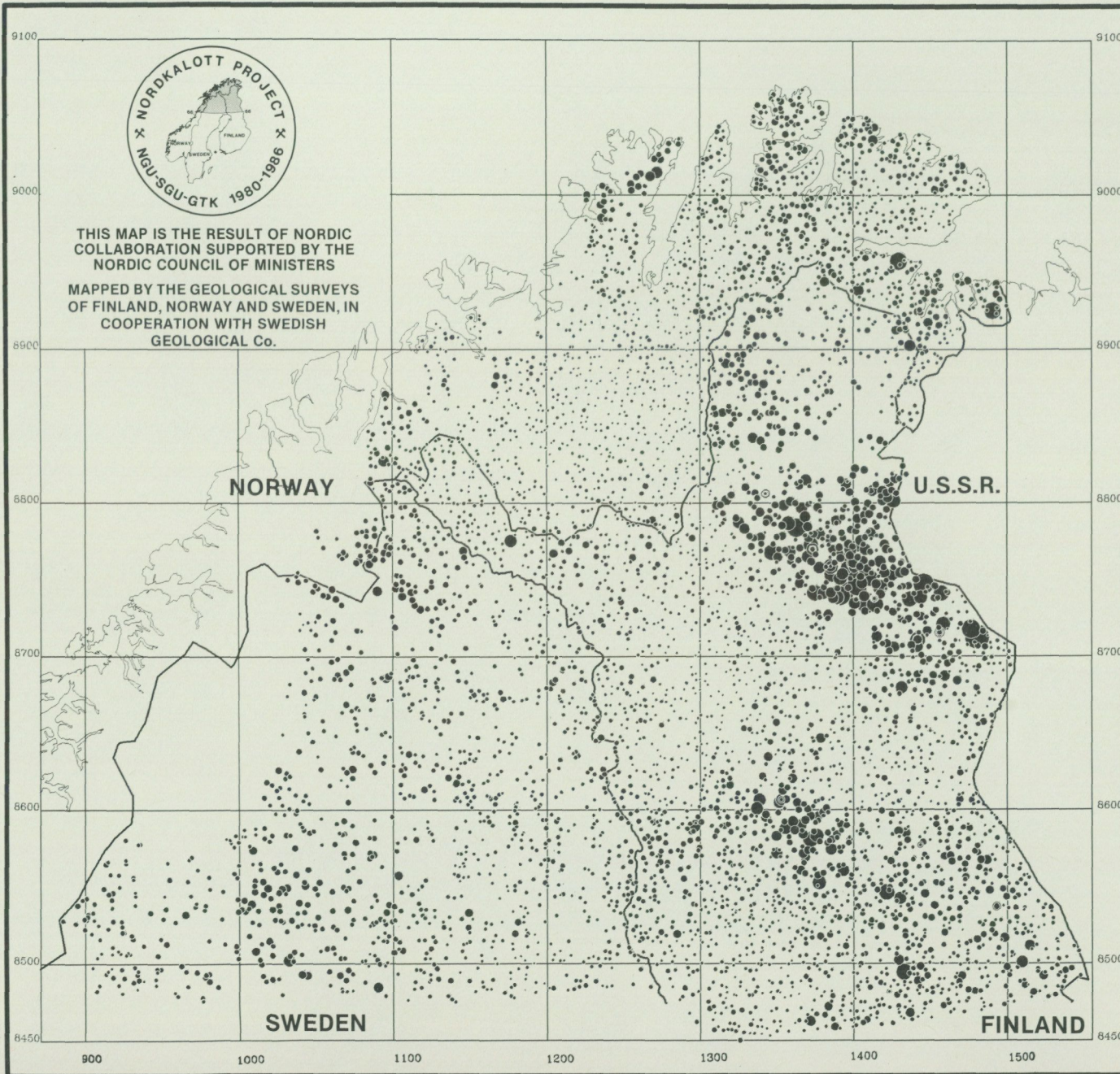
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 06.03.1985

MAP 56



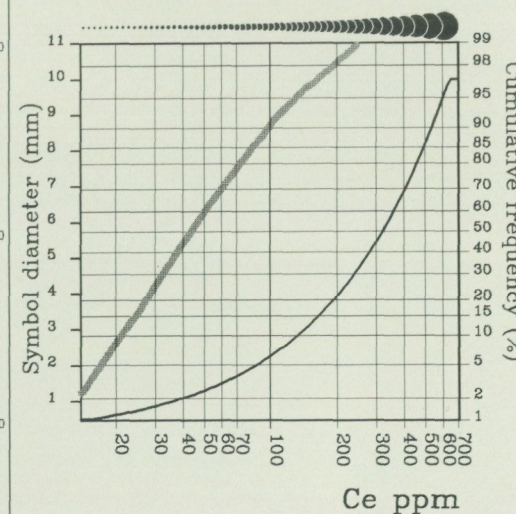
THIS MAP IS THE RESULT OF NORDIC
COLLABORATION SUPPORTED BY THE
NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
COOPERATION WITH SWEDISH
GEOLOGICAL Co.



Nordkalott project Geochemistry STREAM SEDIMENT Ce

Leaching: Hot 7M HNO₃
Method of analysis: ICP
Laboratory: NGU
No. of samples: 5773

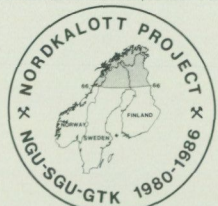
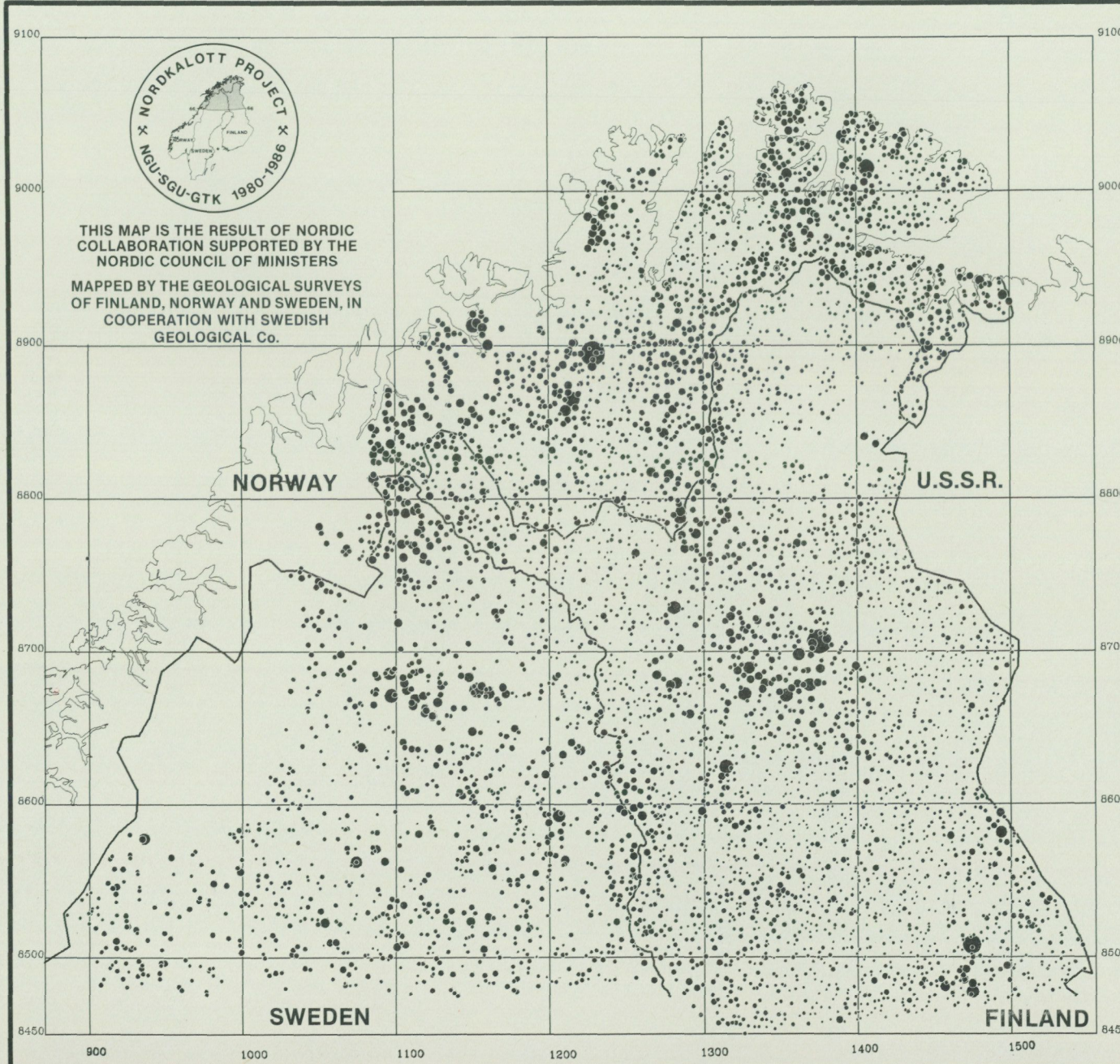
Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 08.03.1985

MAP 57

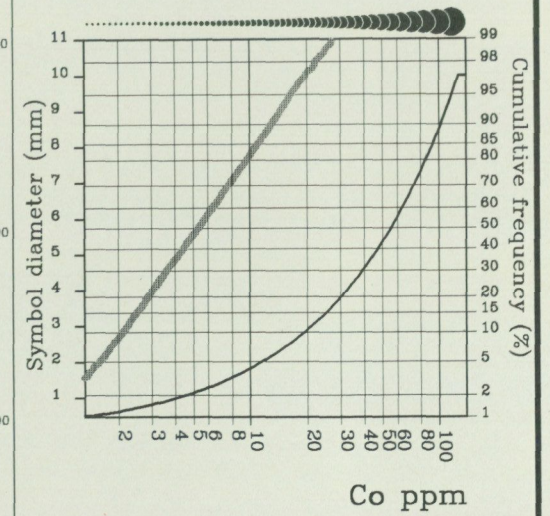


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Co

Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773

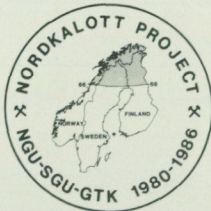
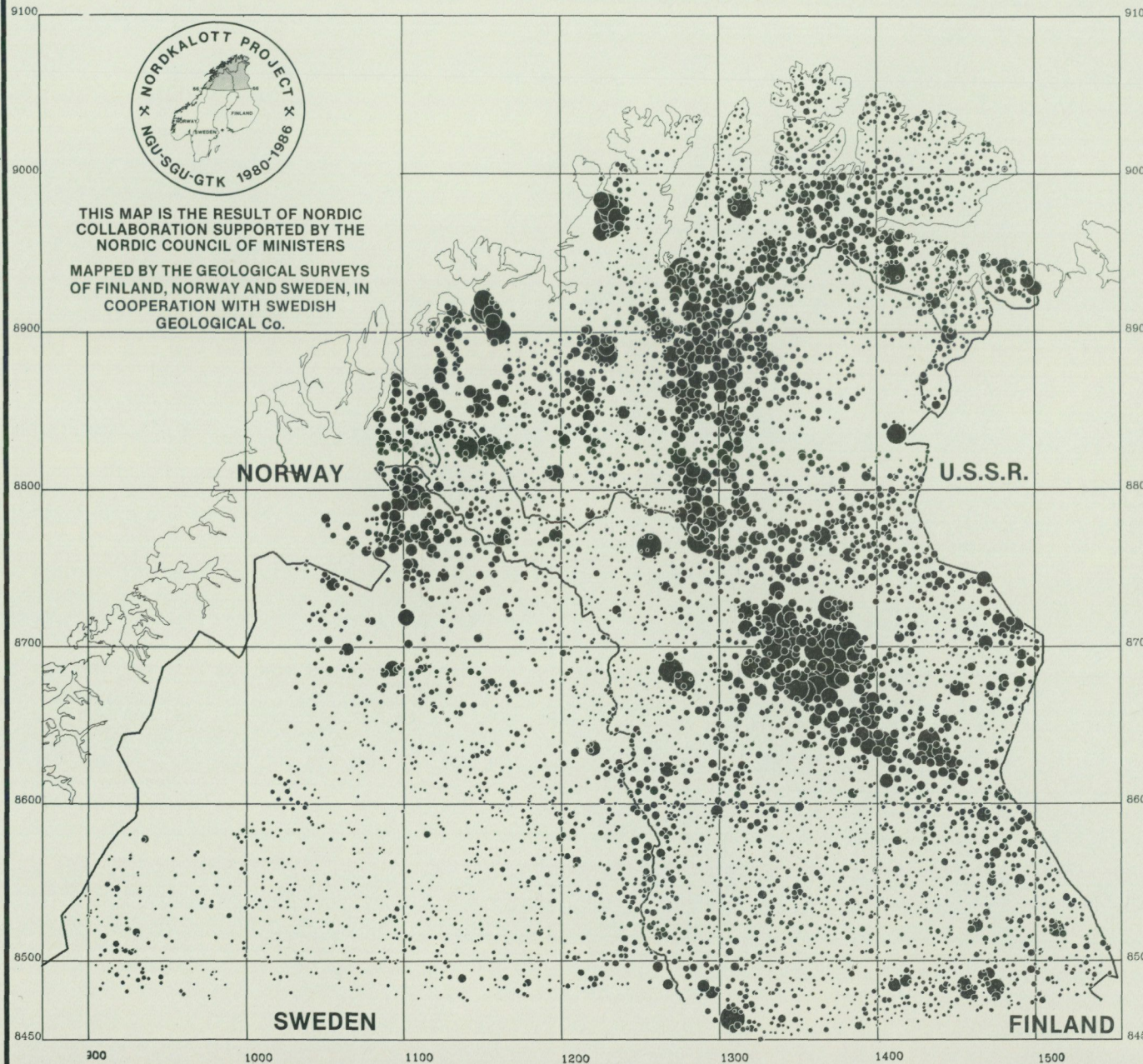
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 06.03.1985

MAP 58

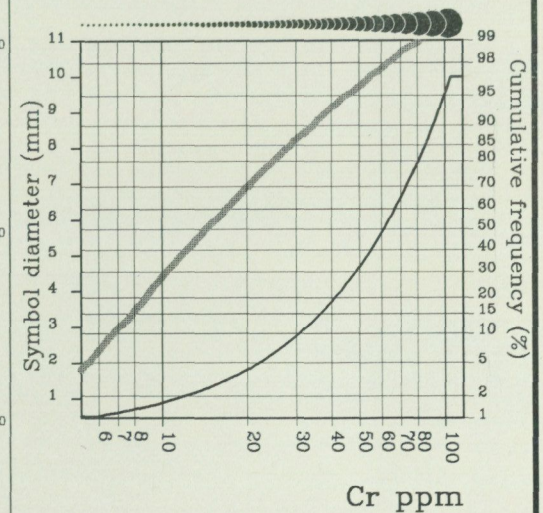


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Cr

Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773

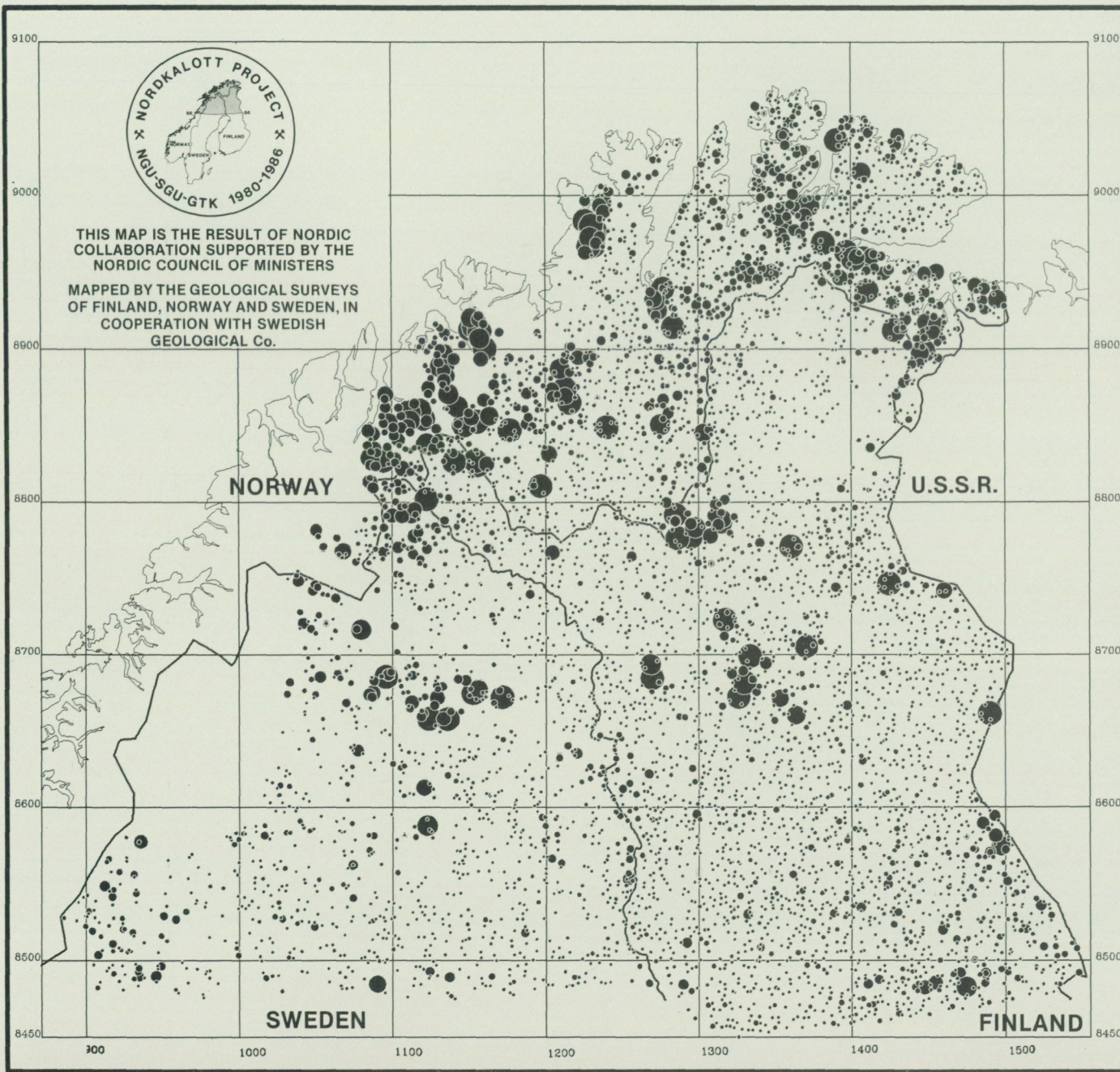
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

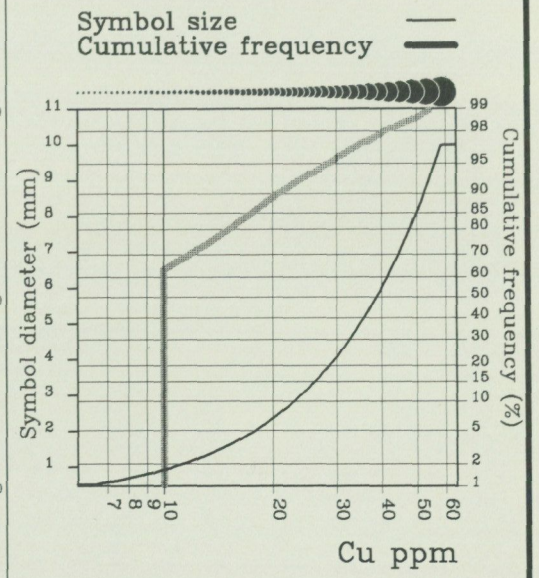
Projection: Lambert conformal
 Date of plotting: 07.03.1985

MAP 59



Nordkalott project Geochemistry STREAM SEDIMENT Cu

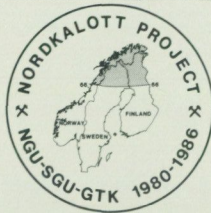
Leaching: Hot 7M HNO₃
Method of analysis: ICP
Laboratory: NGU
No. of samples: 5773



1: 4 000 000
100 km

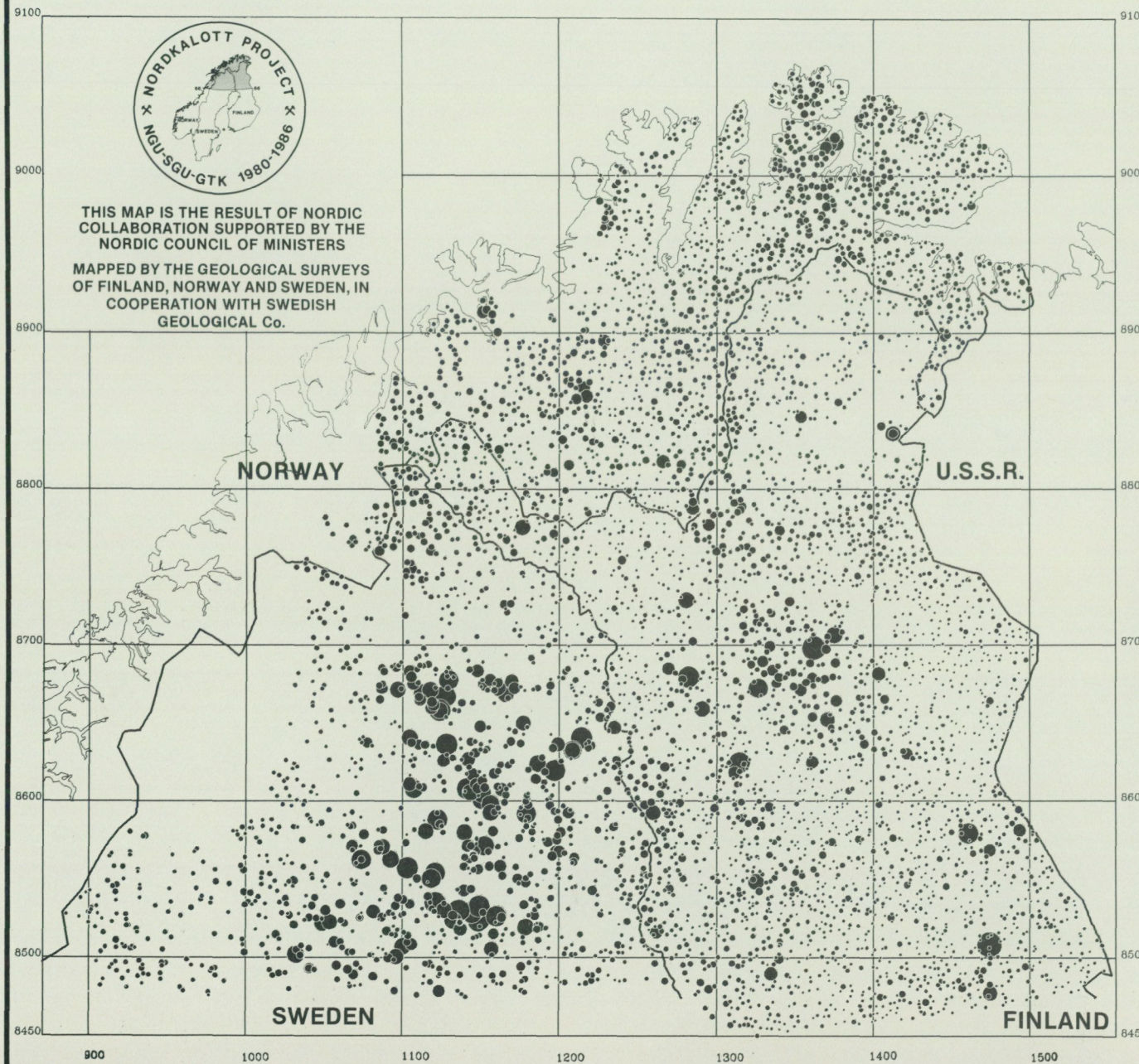
Projection: Lambert conformal
Date of plotting: 05.03.1985

MAP 60



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

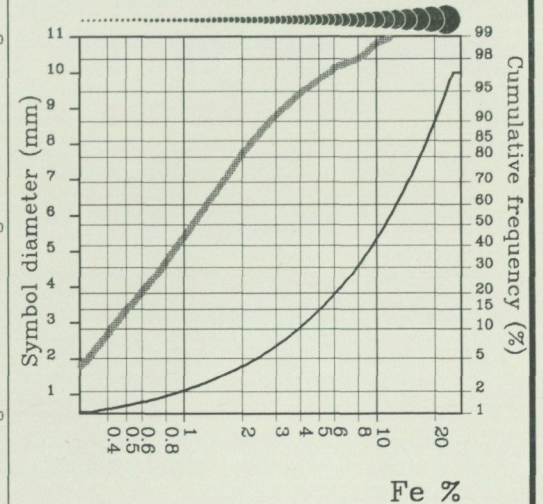
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry STREAM SEDIMENT Fe

Leaching: Hot 7M HNO₃
Method of analysis: ICP
Laboratory: NGU
No. of samples: 5773

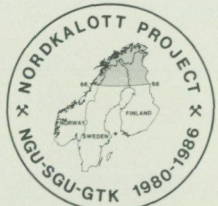
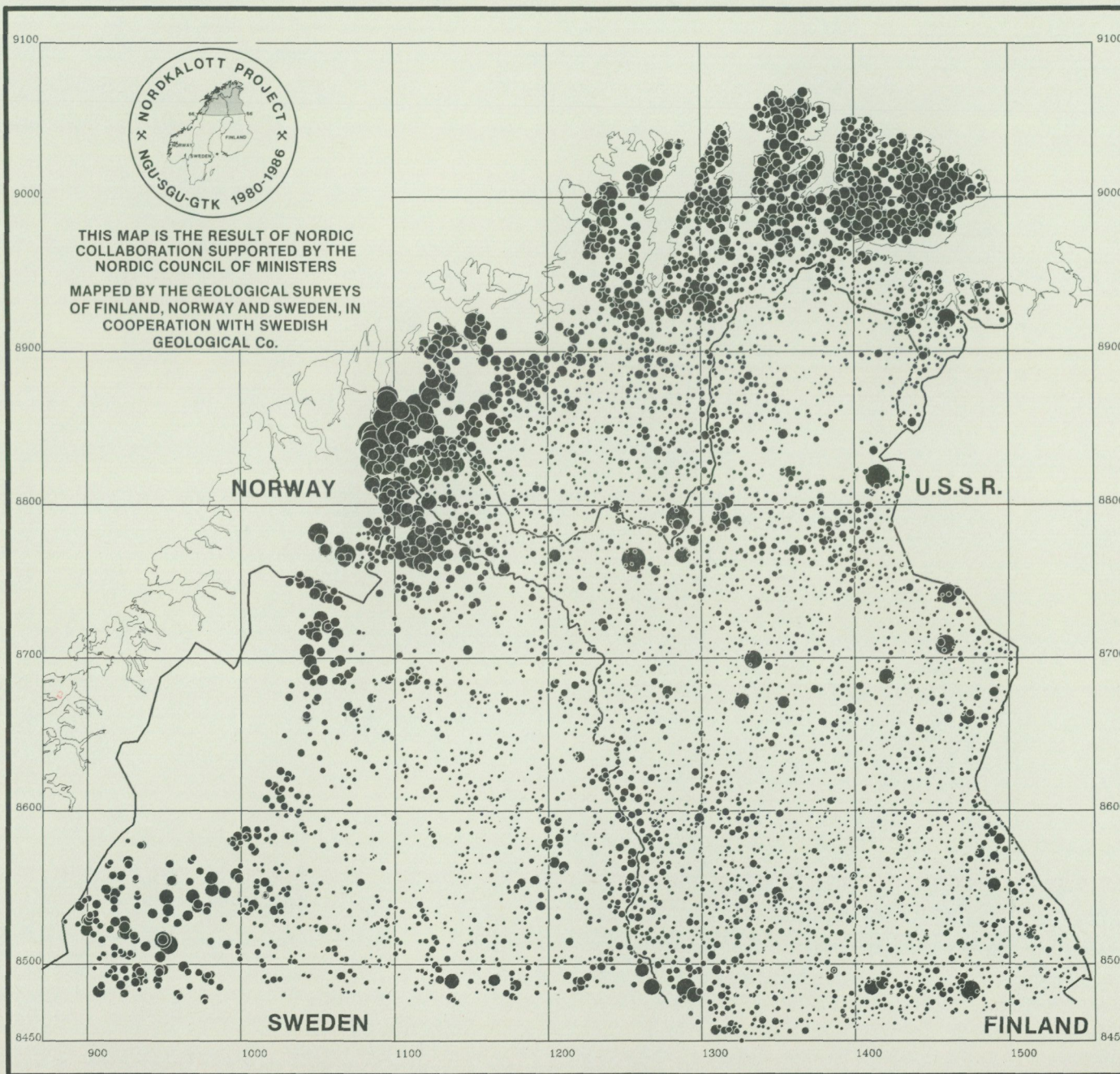
Symbol size —
Cumulative frequency —



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 06.03.1985

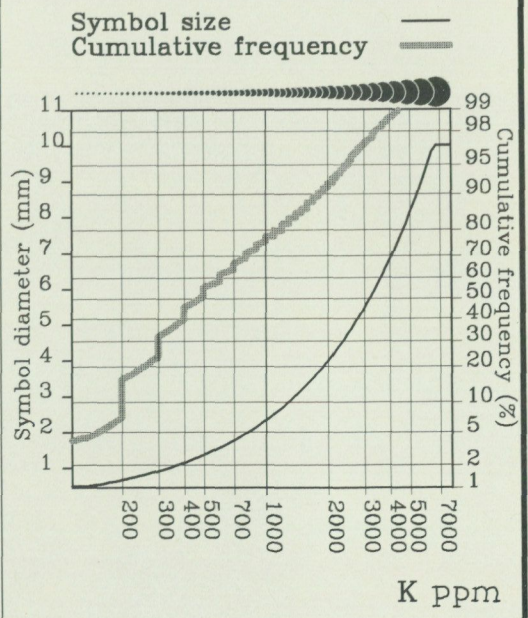
MAP 61



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT K

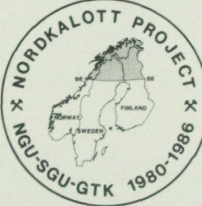
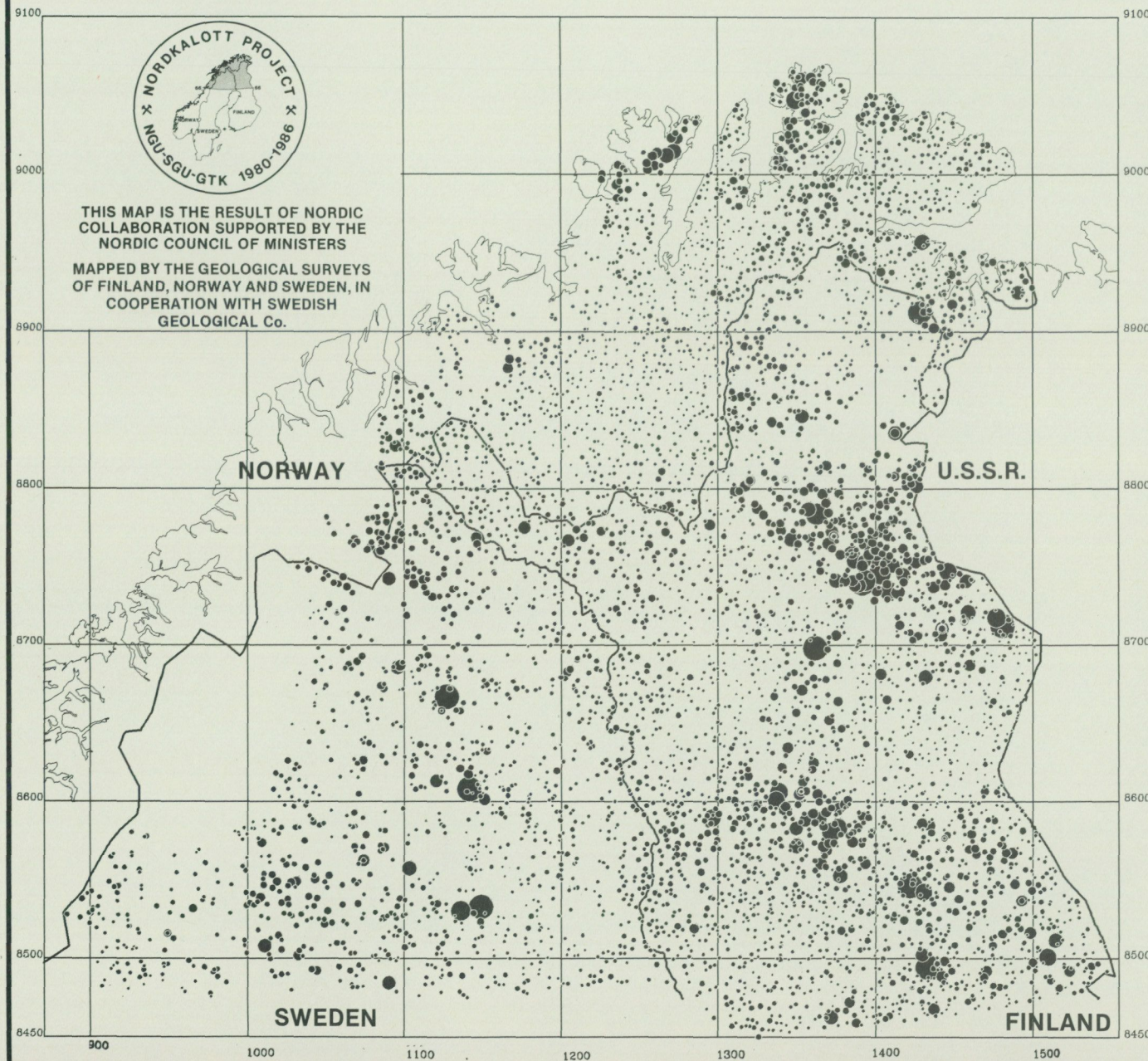
Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 11.06.1985

MAP 62

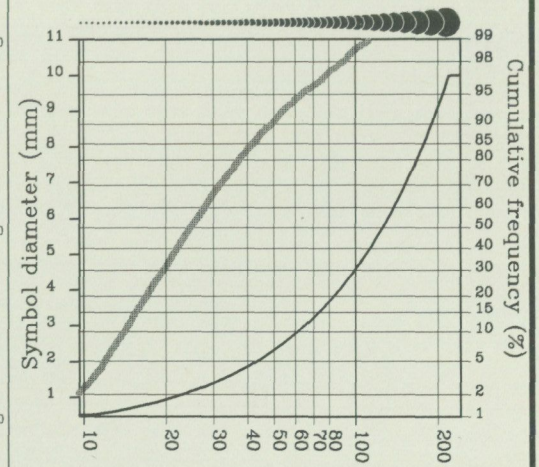


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT La

Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773

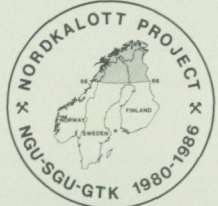
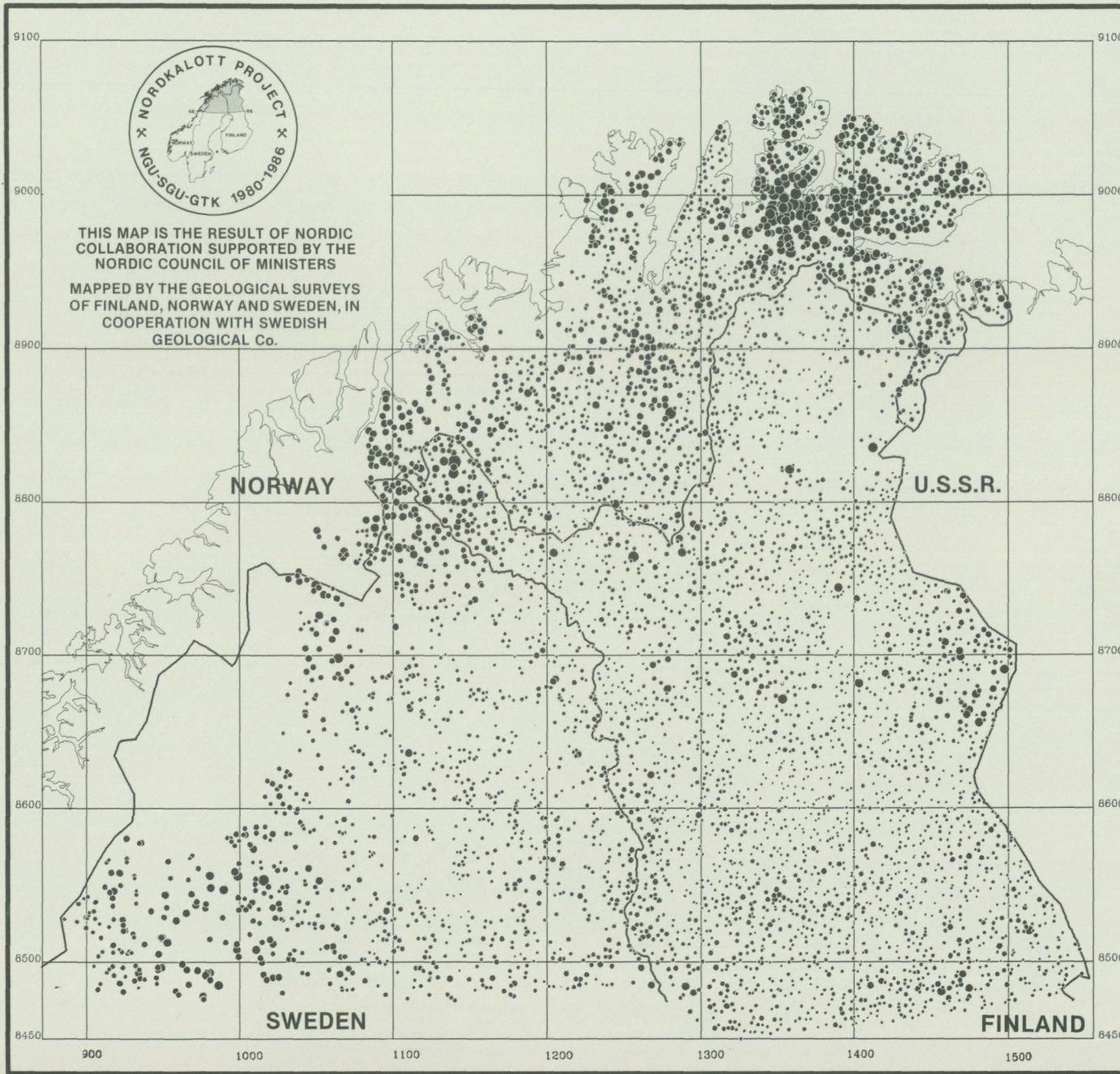
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 05.03.1985

MAP 63

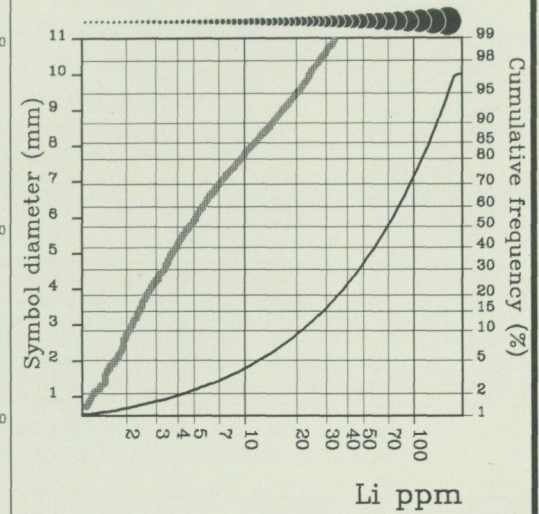


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Li

Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773

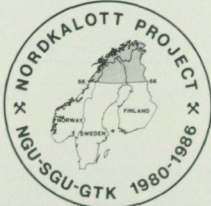
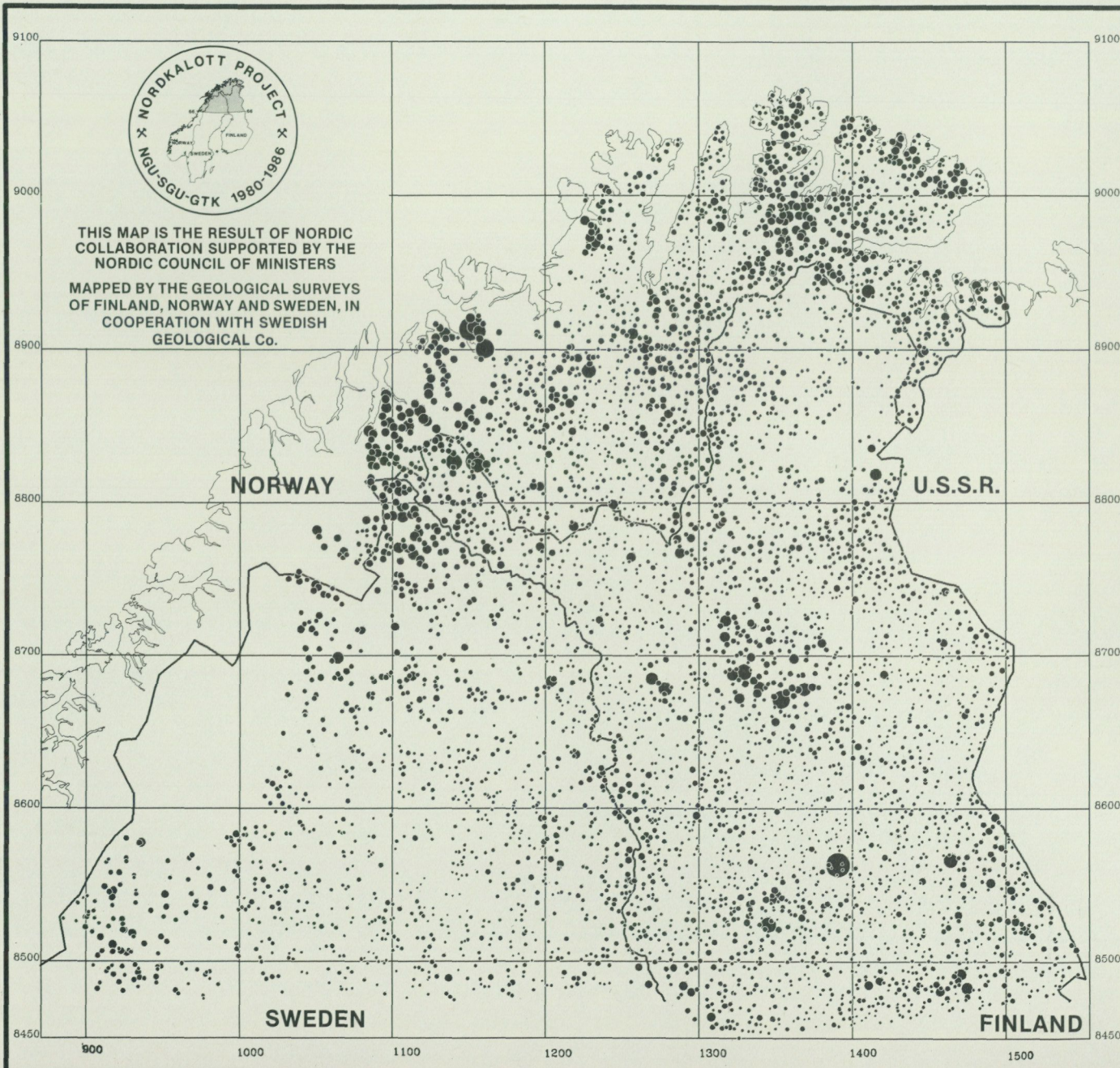
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 08.03.1985

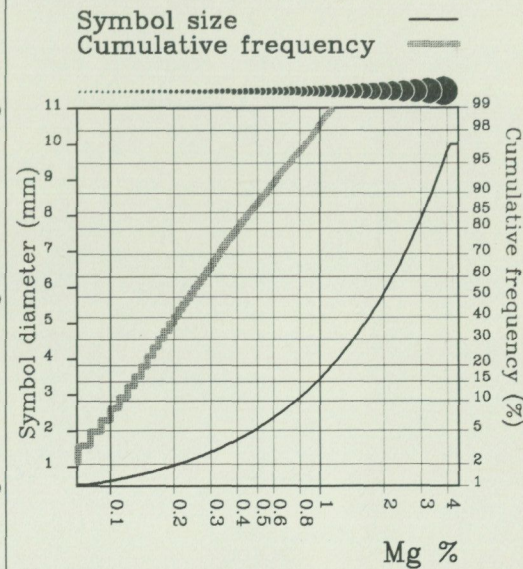
MAP 64



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Mg

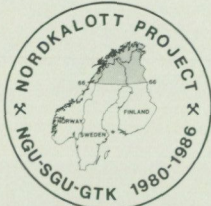
Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773



1: 4 000 000
 100 km

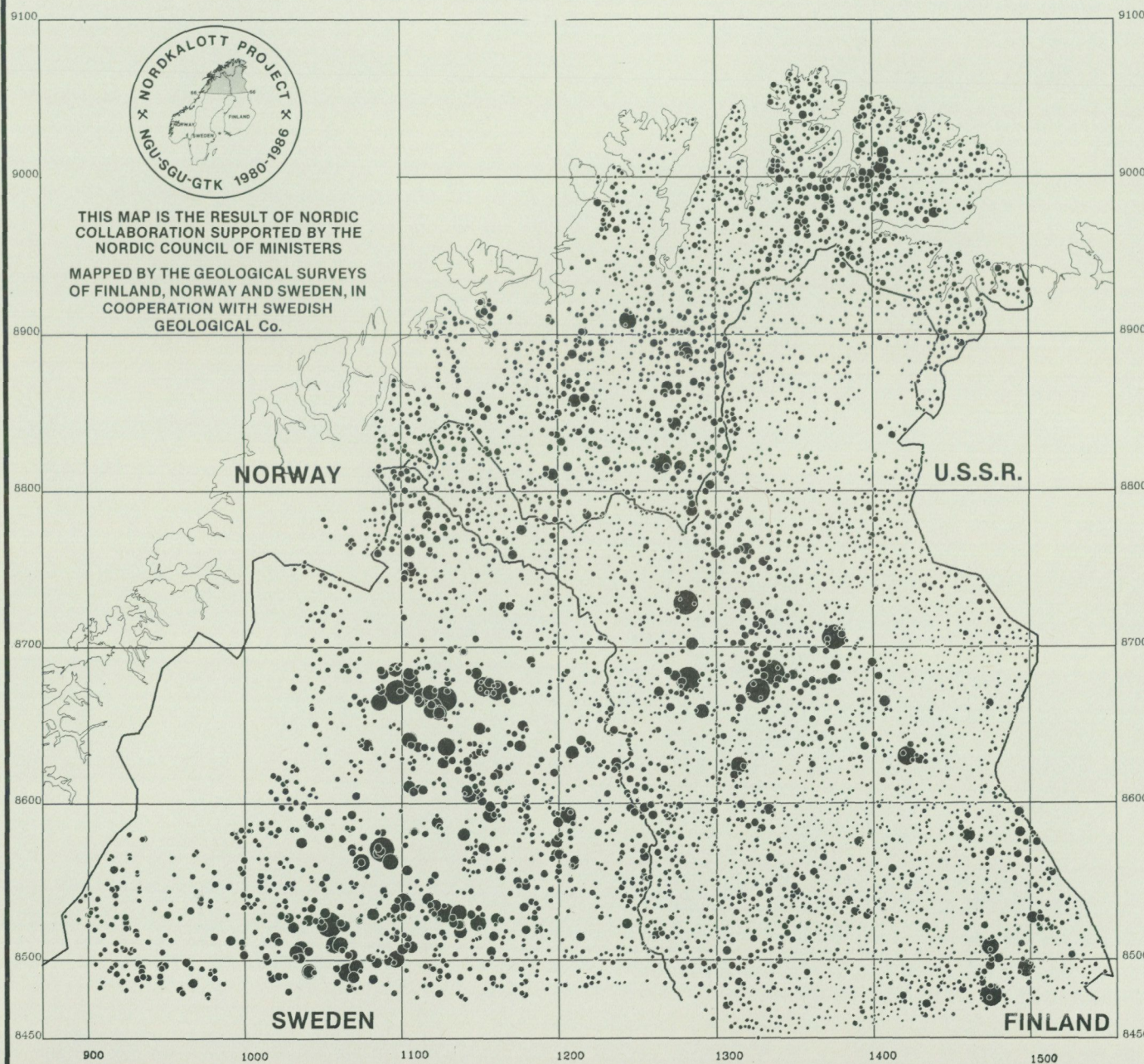
Projection: Lambert conformal
 Date of plotting: 08.03.1985

MAP 65



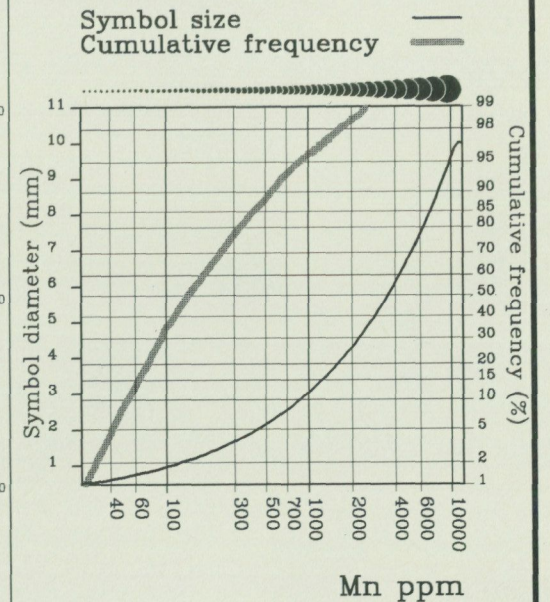
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry STREAM SEDIMENT Mn

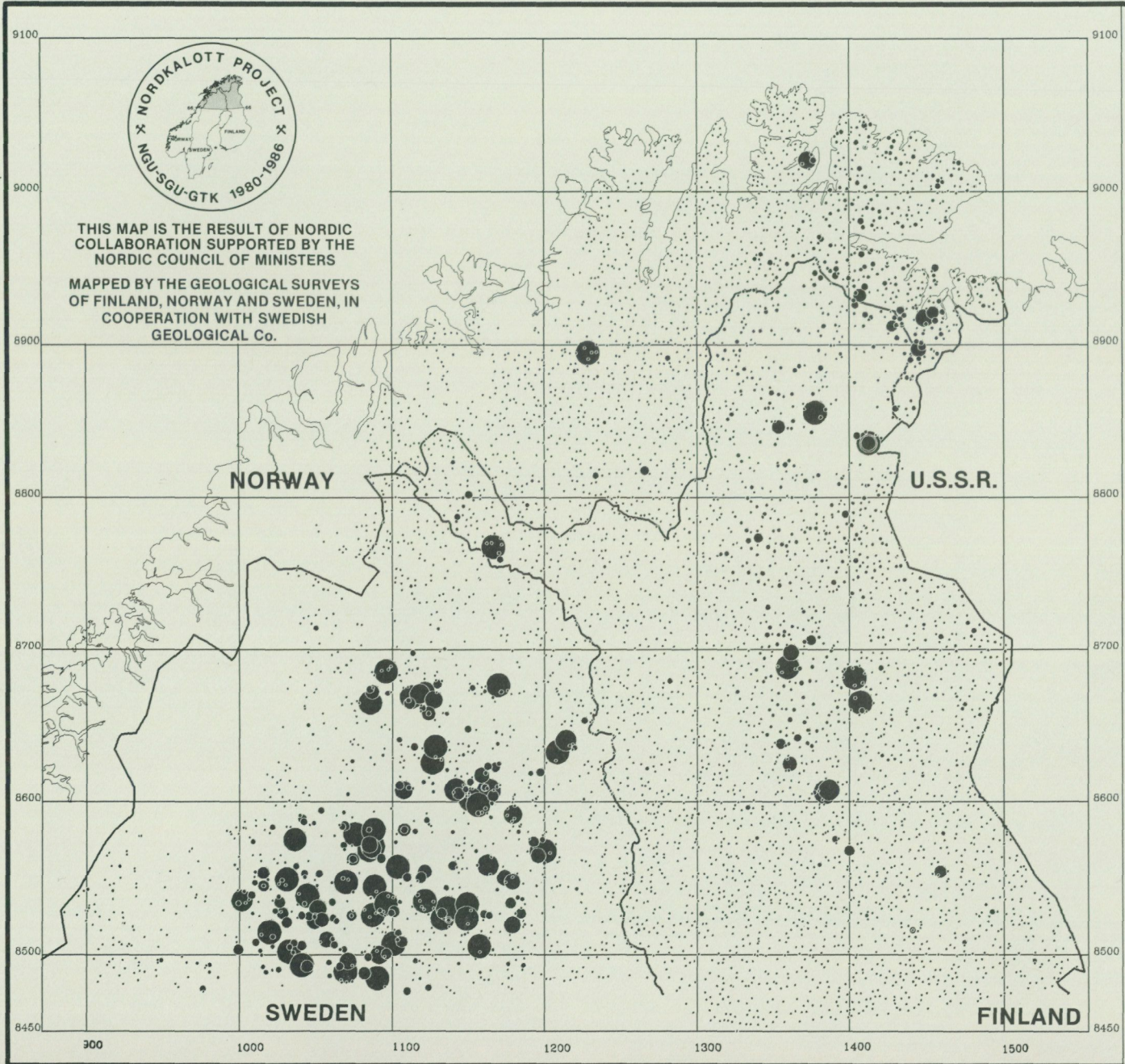
Leaching: Hot 7M HNO₃
Method of analysis: ICP
Laboratory: NGU
No. of samples: 5773



1: 4 000 000
100 km

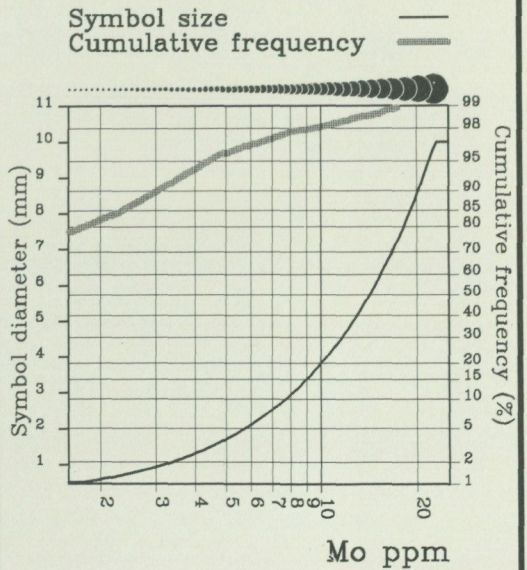
Projection: Lambert conformal
Date of plotting: 07.03.1985

MAP 66



Nordkalott project Geochemistry STREAM SEDIMENT Mo

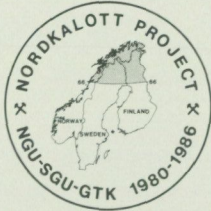
Leaching: Hot 7M HNO₃
Method of analysis: ICP
Laboratory: NGU
No. of samples: 5773



1: 4 000 000
100 km

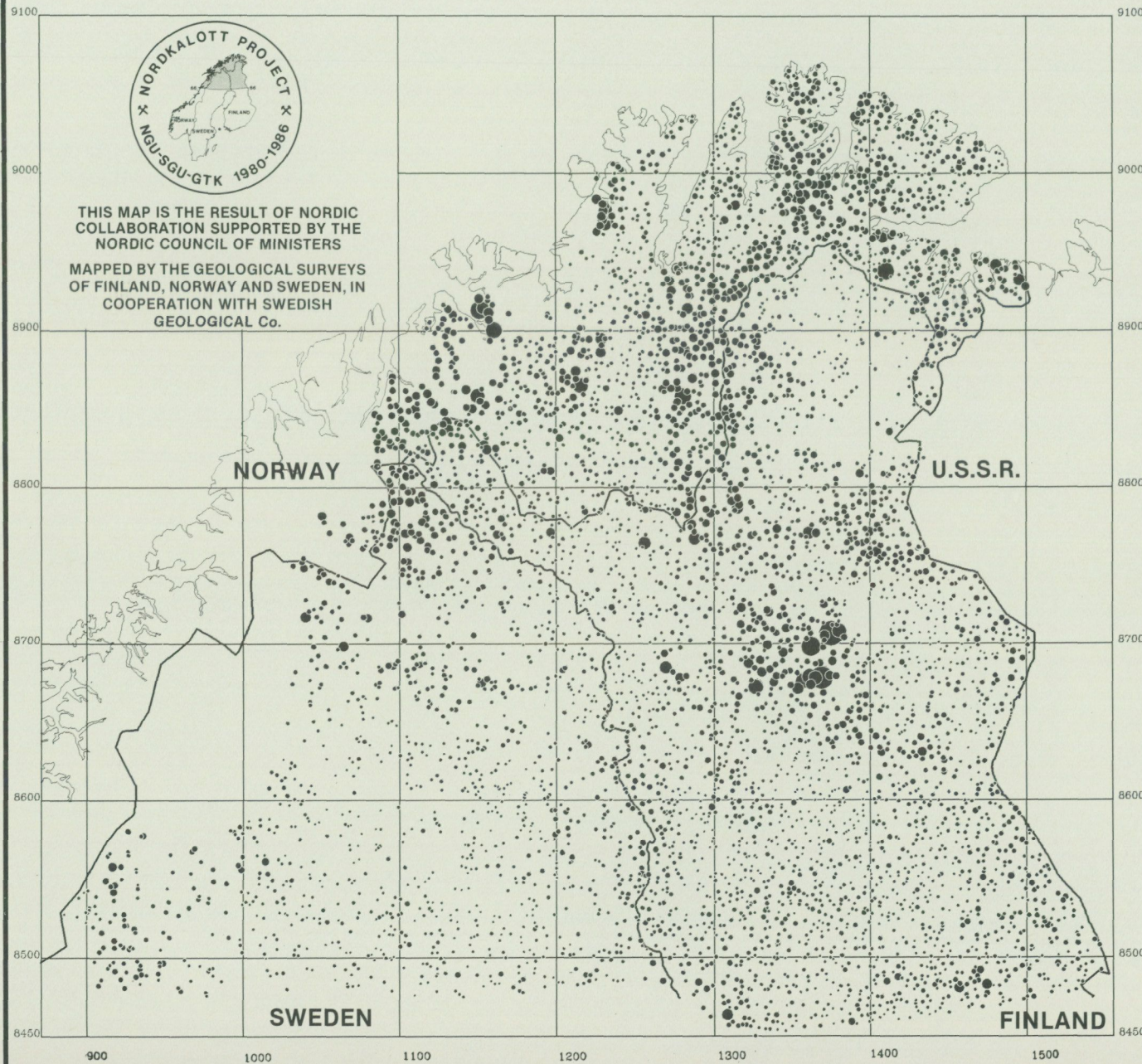
Projection: Lambert conformal
Date of plotting: 18.03.1985

MAP 67



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

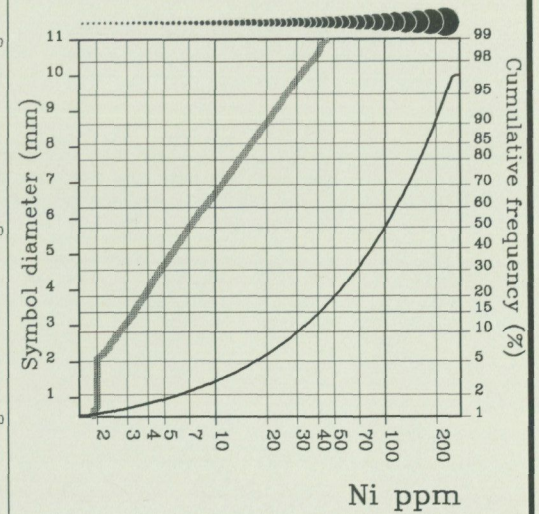
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry STREAM SEDIMENT Ni

Leaching: Hot 7M HNO₃
Method of analysis: ICP
Laboratory: NGU
No. of samples: 5773

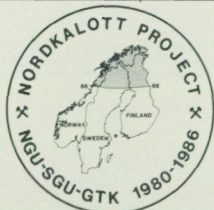
Symbol size
Cumulative frequency



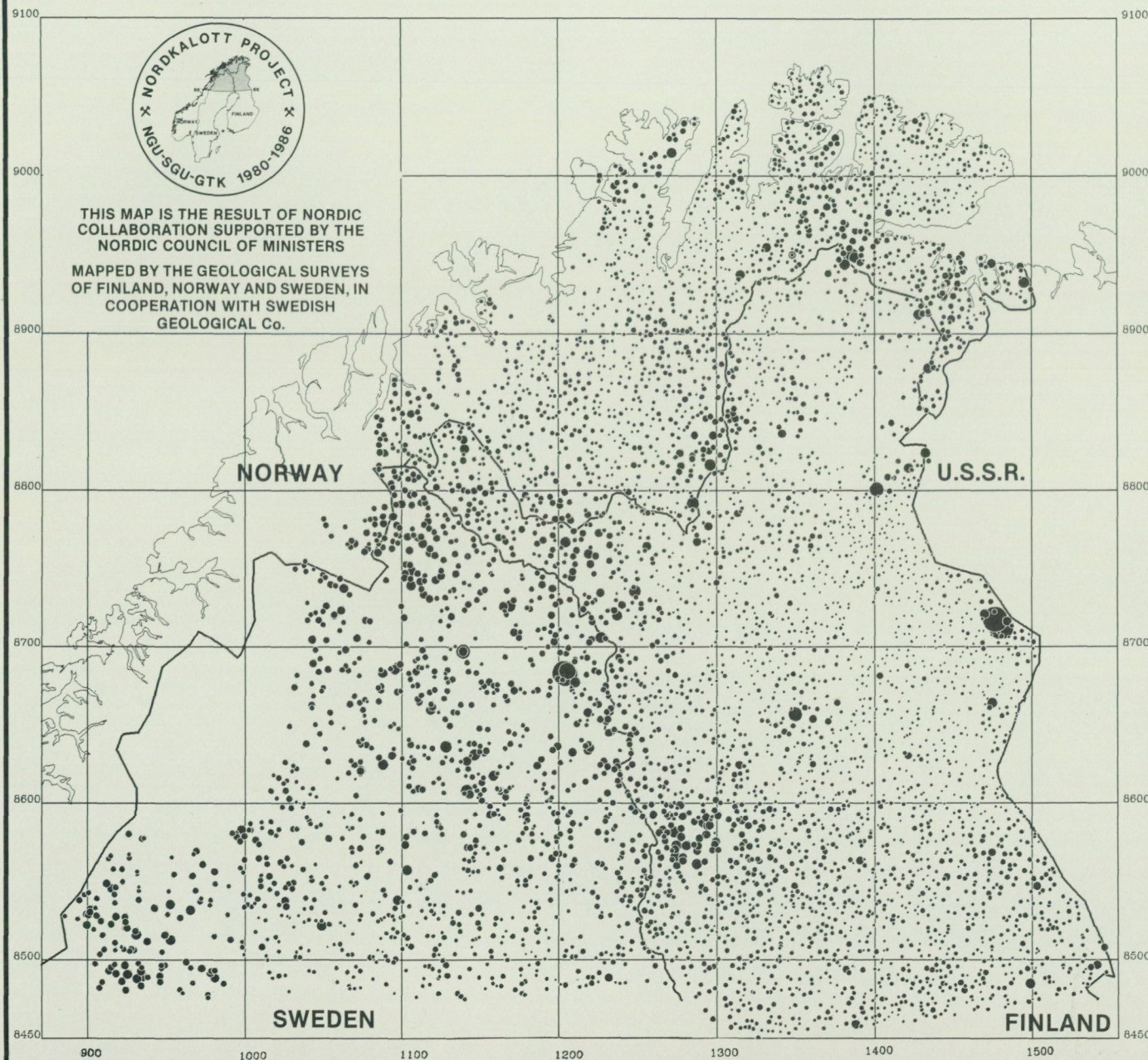
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 07.03.1985

MAP 68



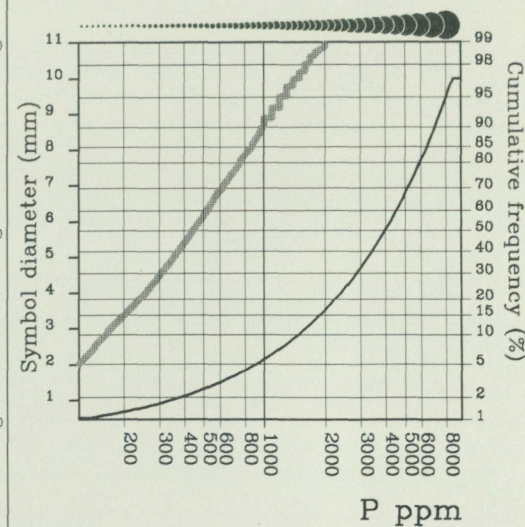
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry STREAM SEDIMENT P

Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773

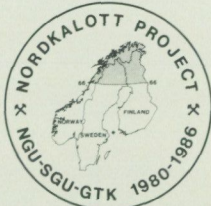
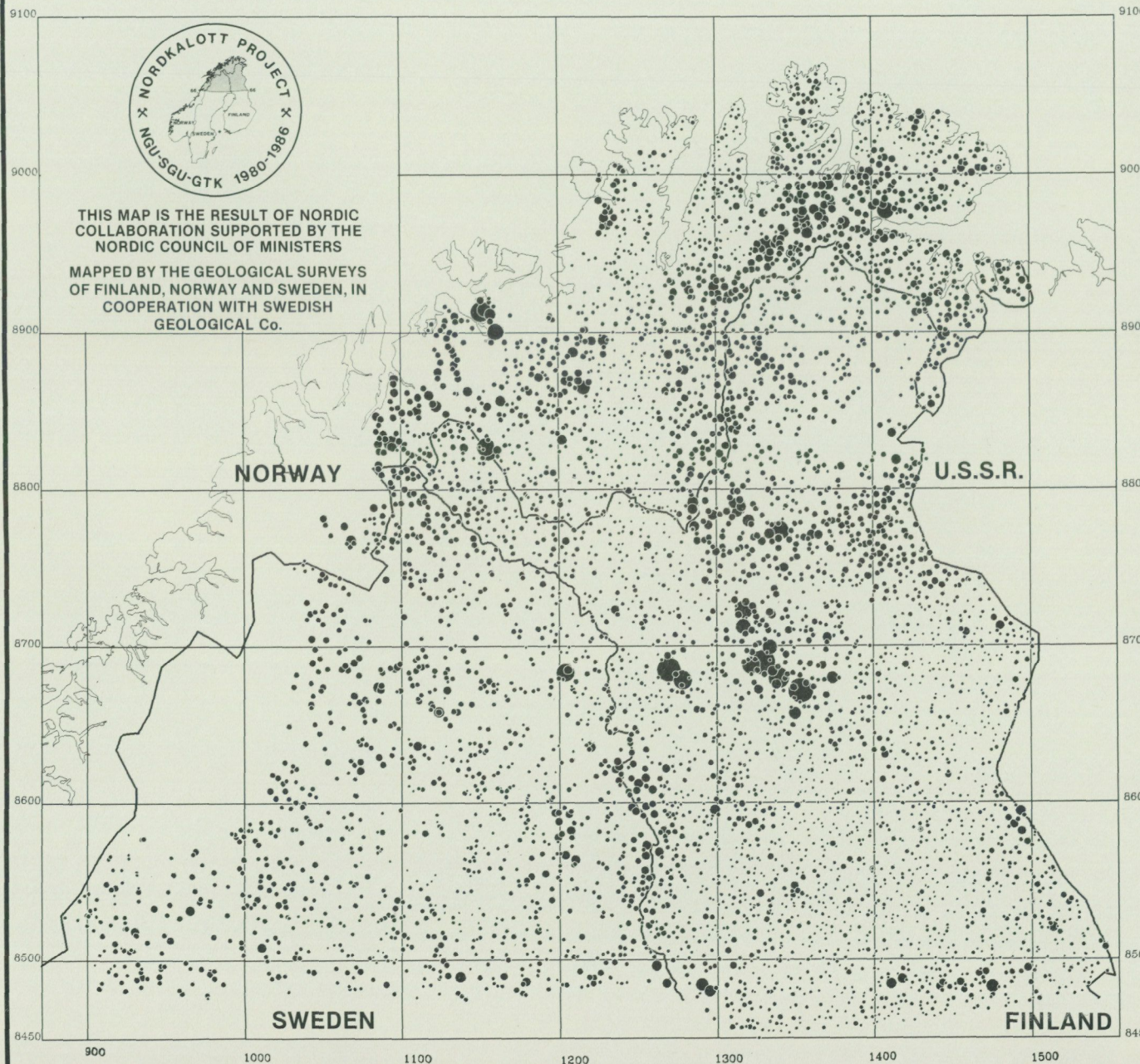
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 06.03.1985

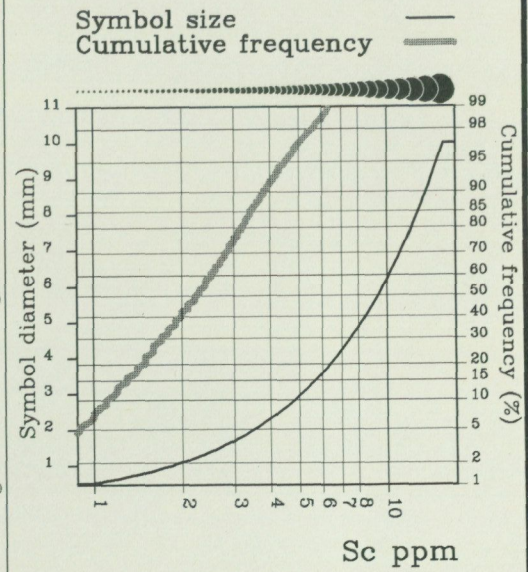
MAP 69



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Sc

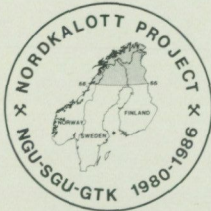
Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773



1: 4 000 000
 100 km

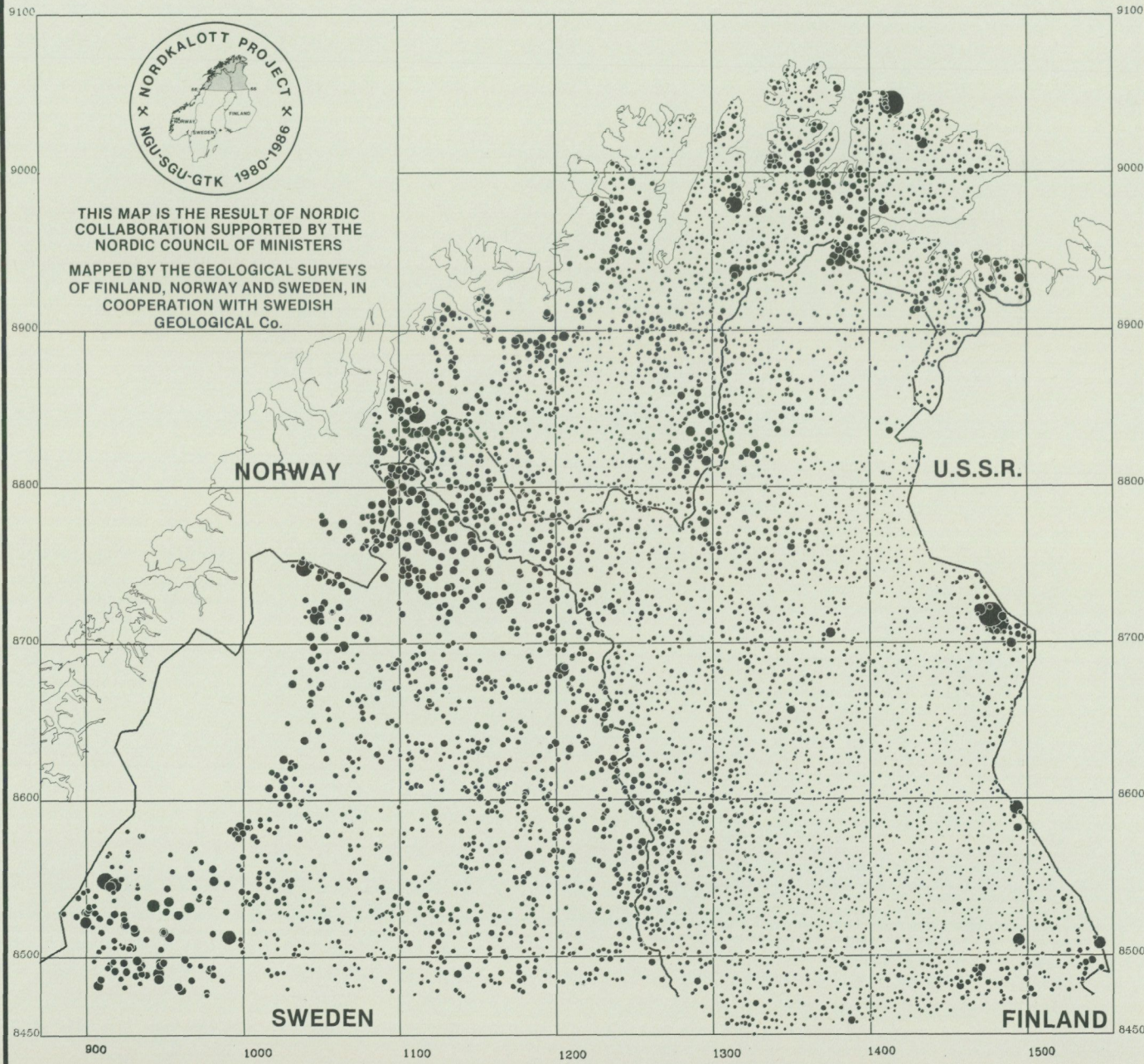
Projection: Lambert conformal
 Date of plotting: 08.03.1985

MAP 70



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

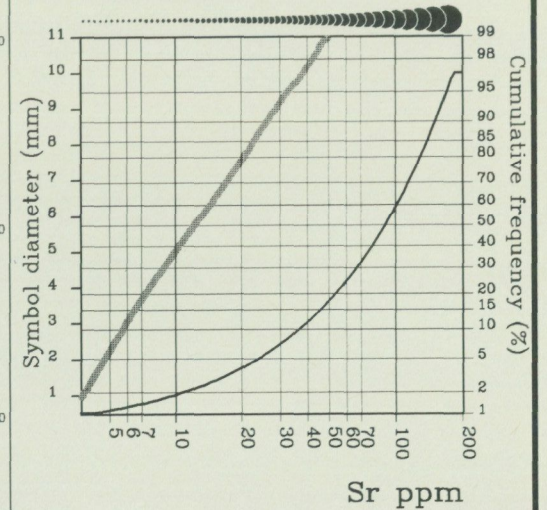
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry STREAM SEDIMENT Sr

Leaching: Hot 7M HNO₃
Method of analysis: ICP
Laboratory: NGU
No. of samples: 5773

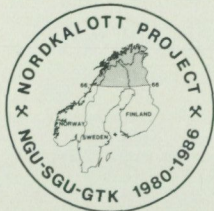
Symbol size — Cumulative frequency



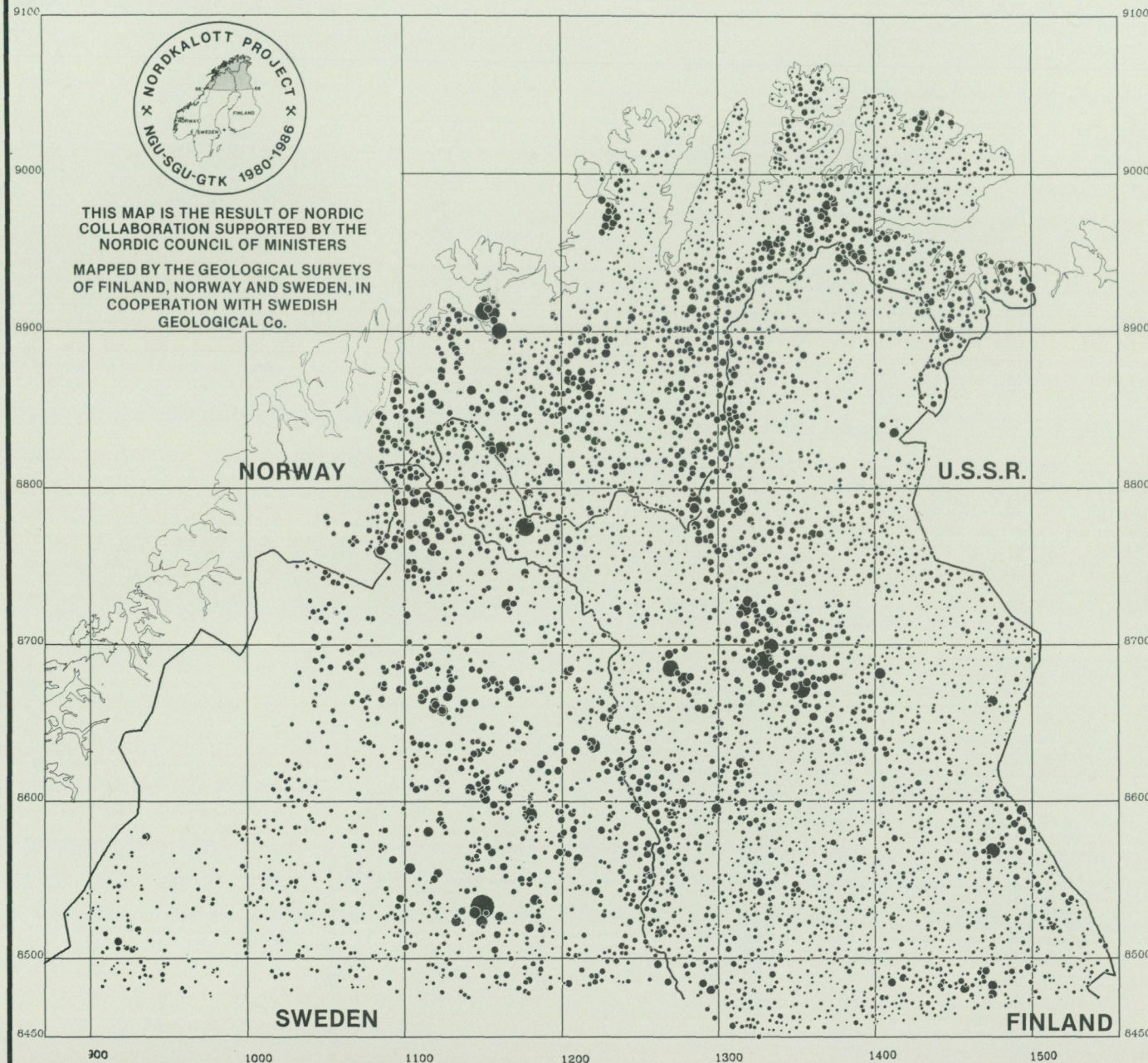
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 07.03.1985

MAP 71



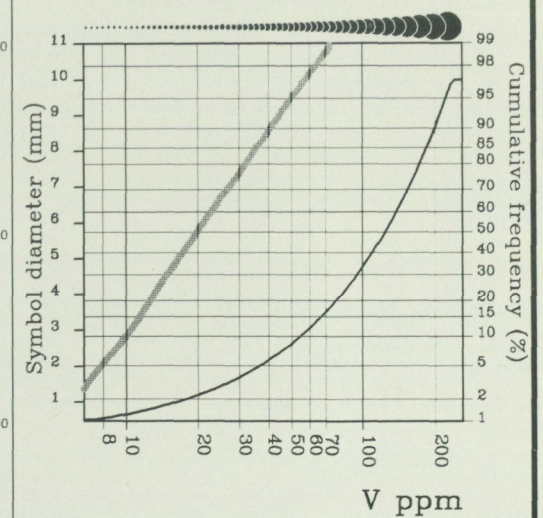
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry STREAM SEDIMENT V

Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773

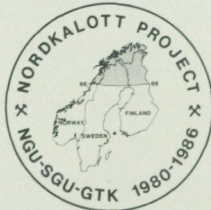
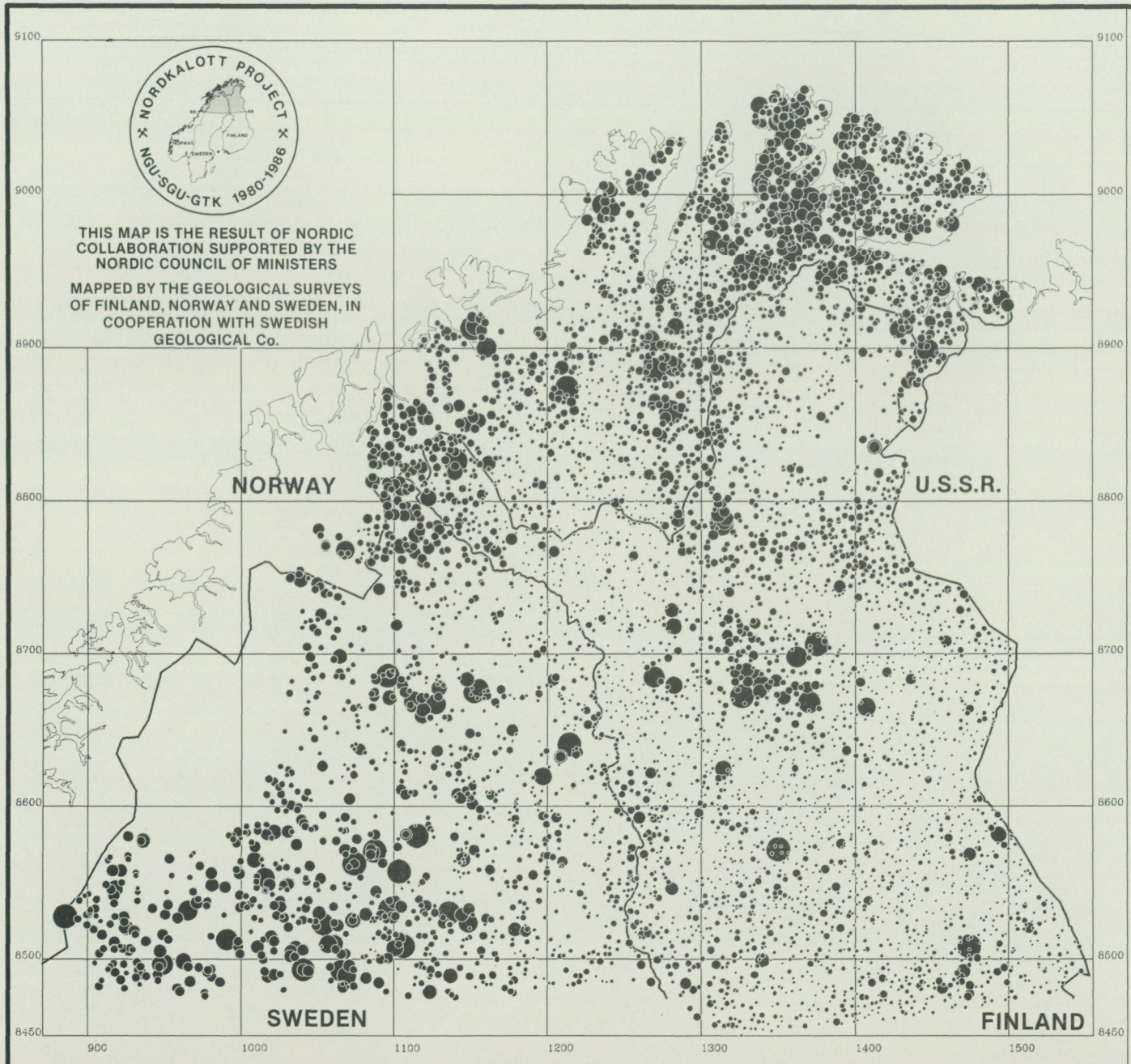
Symbol size —
 Cumulative frequency —



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 07.03.1985

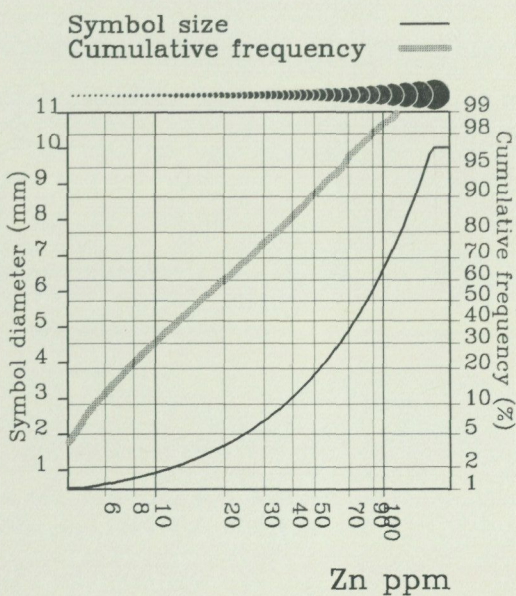
MAP 72



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Zn

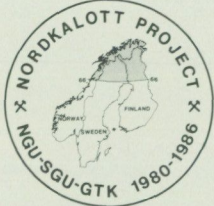
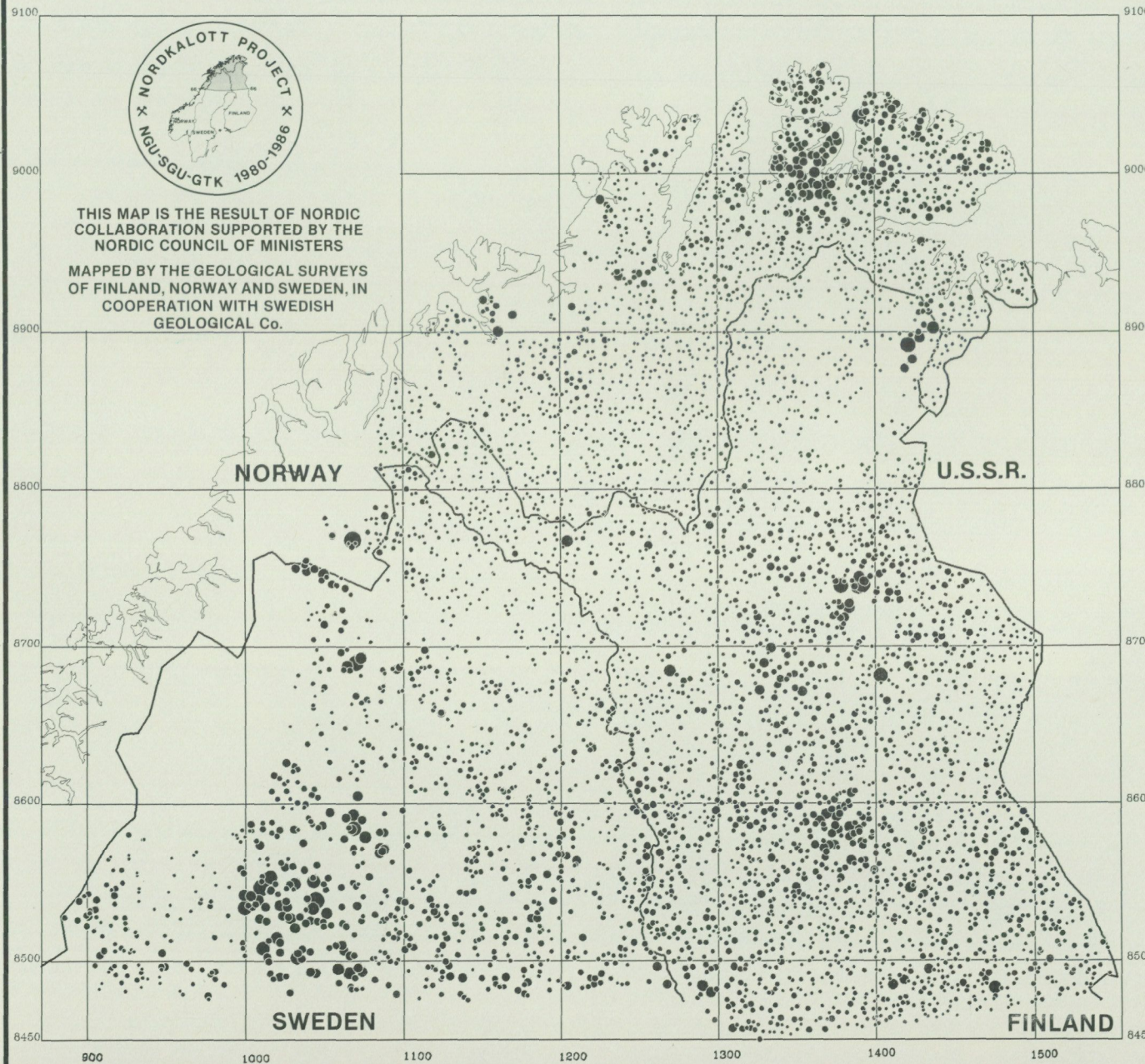
Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 12.08.1985

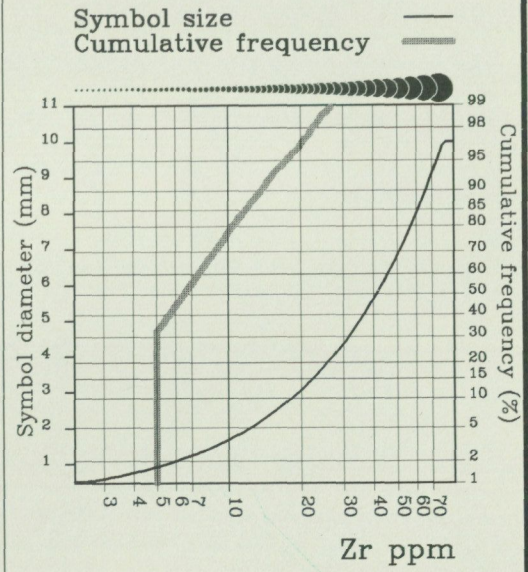
MAP 73



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT Zr

Leaching: Hot 7M HNO₃
 Method of analysis: ICP
 Laboratory: NGU
 No. of samples: 5773



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 08.03.1985

MAP 74

Nordkalott project
Geochemistry
STREAM SEDIMENT
 Heavy minerals

Al

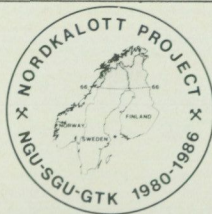
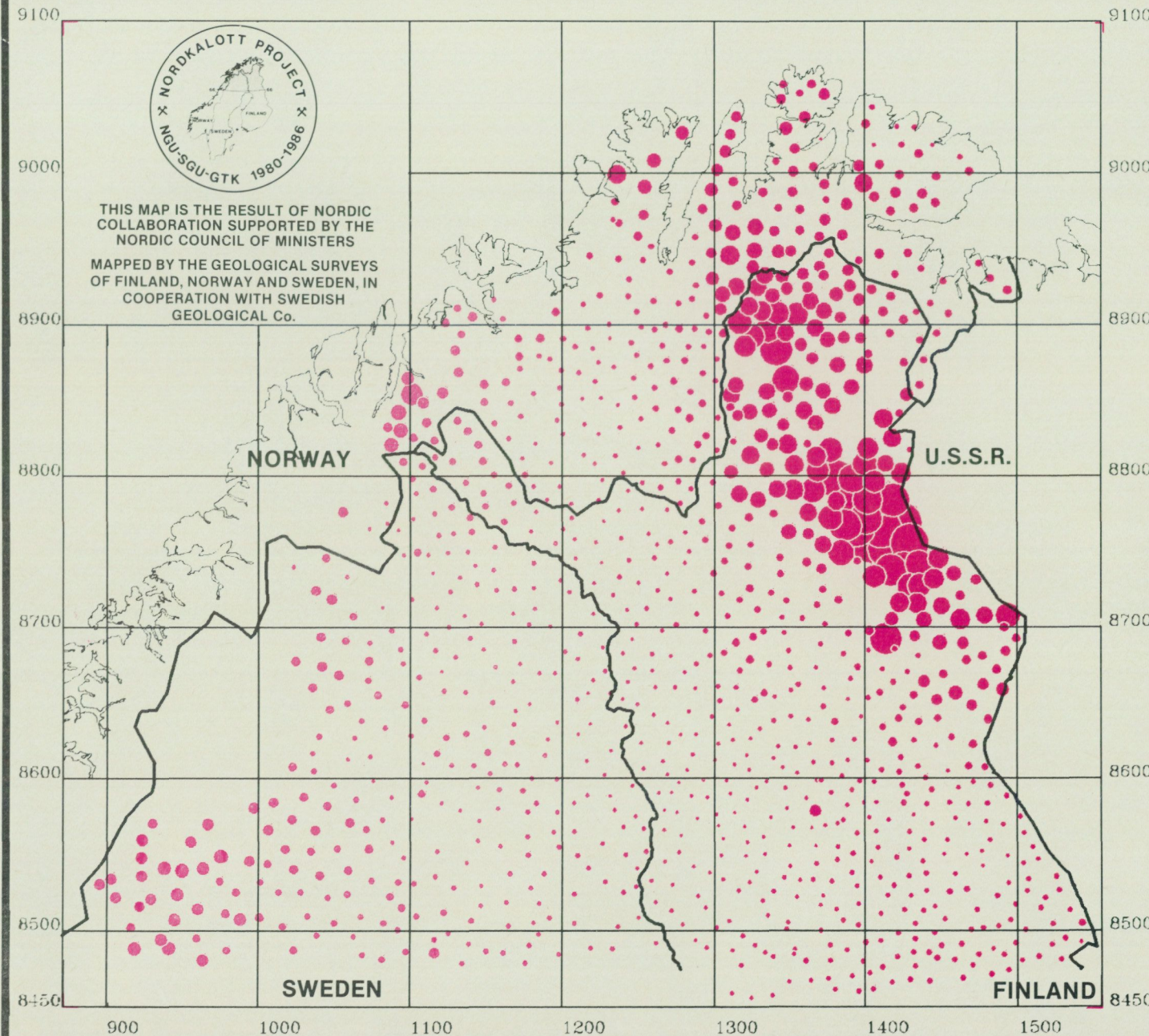
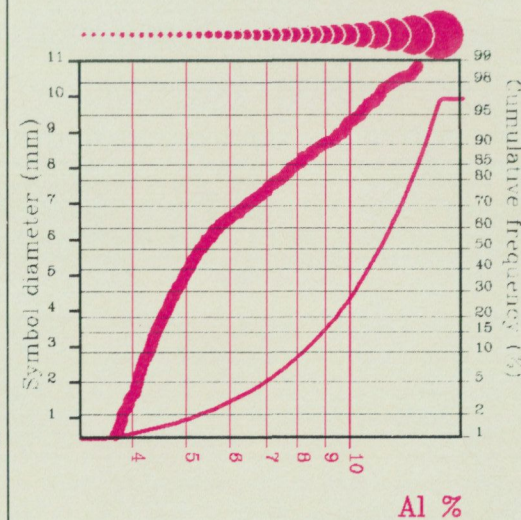
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
 Cumulative frequency



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Bolviken, M. Kontio, P. Lehmspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden.

ISBN 91-7158-383-1

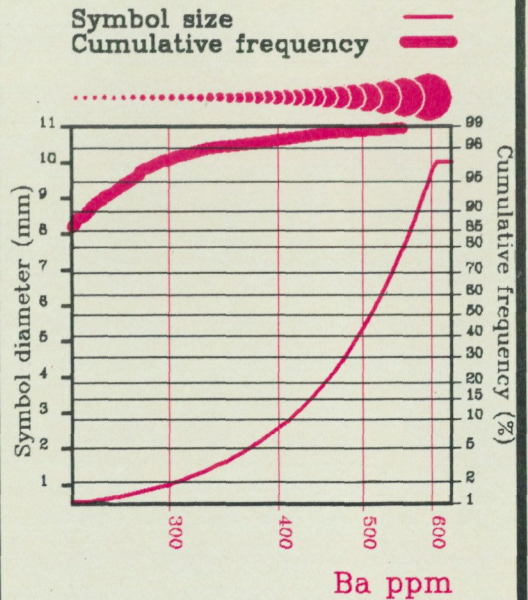
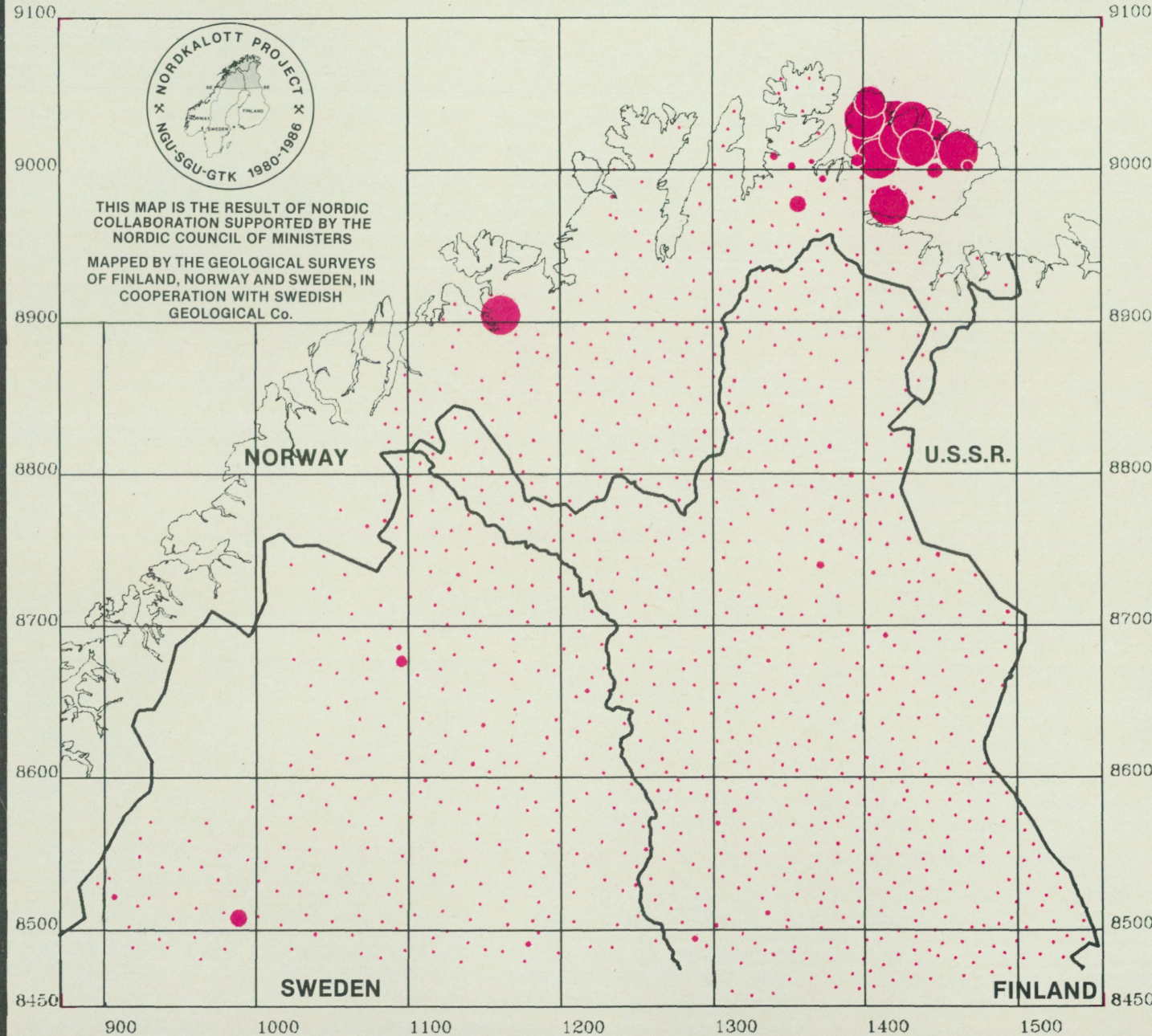
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 05.03.1985

MAP 75

Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals
Ba

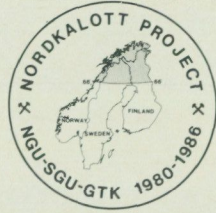
Heavier than 2.96 g/cm³
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1056



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 31.10.1986

MAP 76



THIS MAP IS THE RESULT OF NORDIC
 COLLABORATION SUPPORTED BY THE
 NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS
 OF FINLAND, NORWAY AND SWEDEN, IN
 COOPERATION WITH SWEDISH
 GEOLOGICAL Co.

Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals

Ca

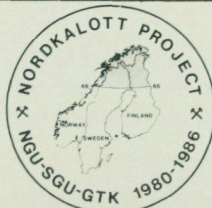
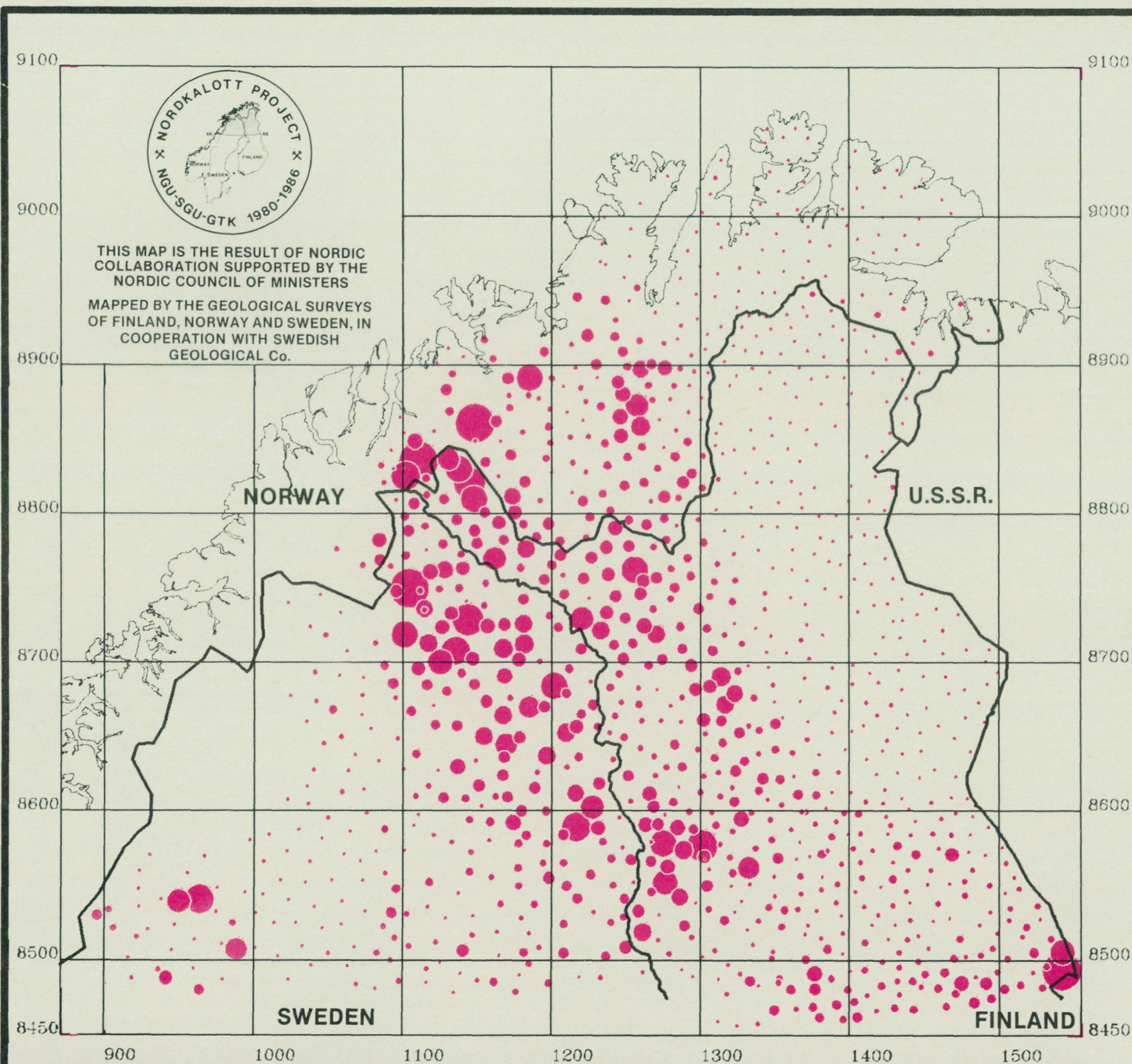
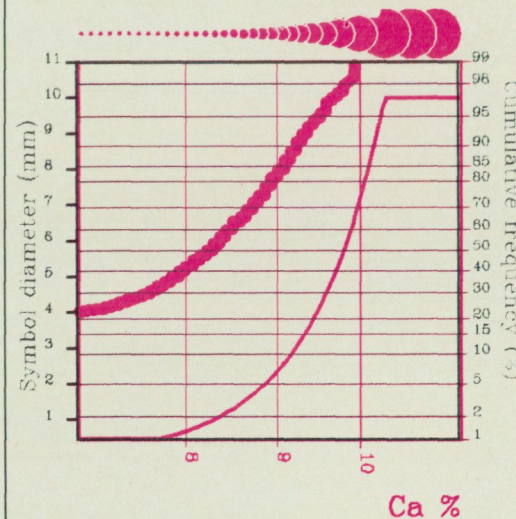
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
 Cumulative frequency



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project
Geochemistry
STREAM SEDIMENT

Heavy minerals

Cl

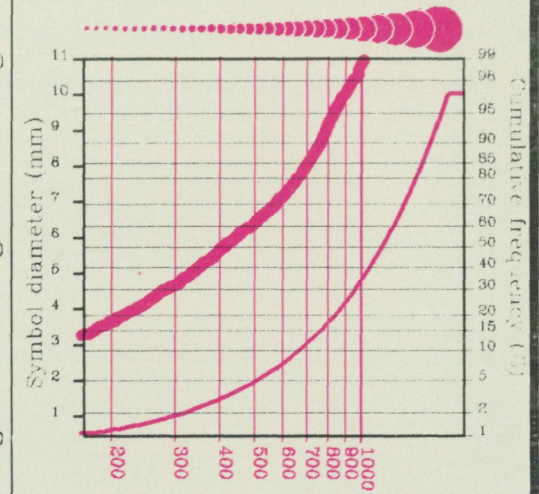
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
 Cumulative frequency

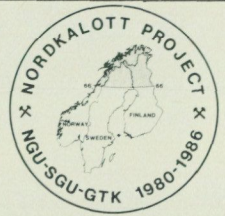
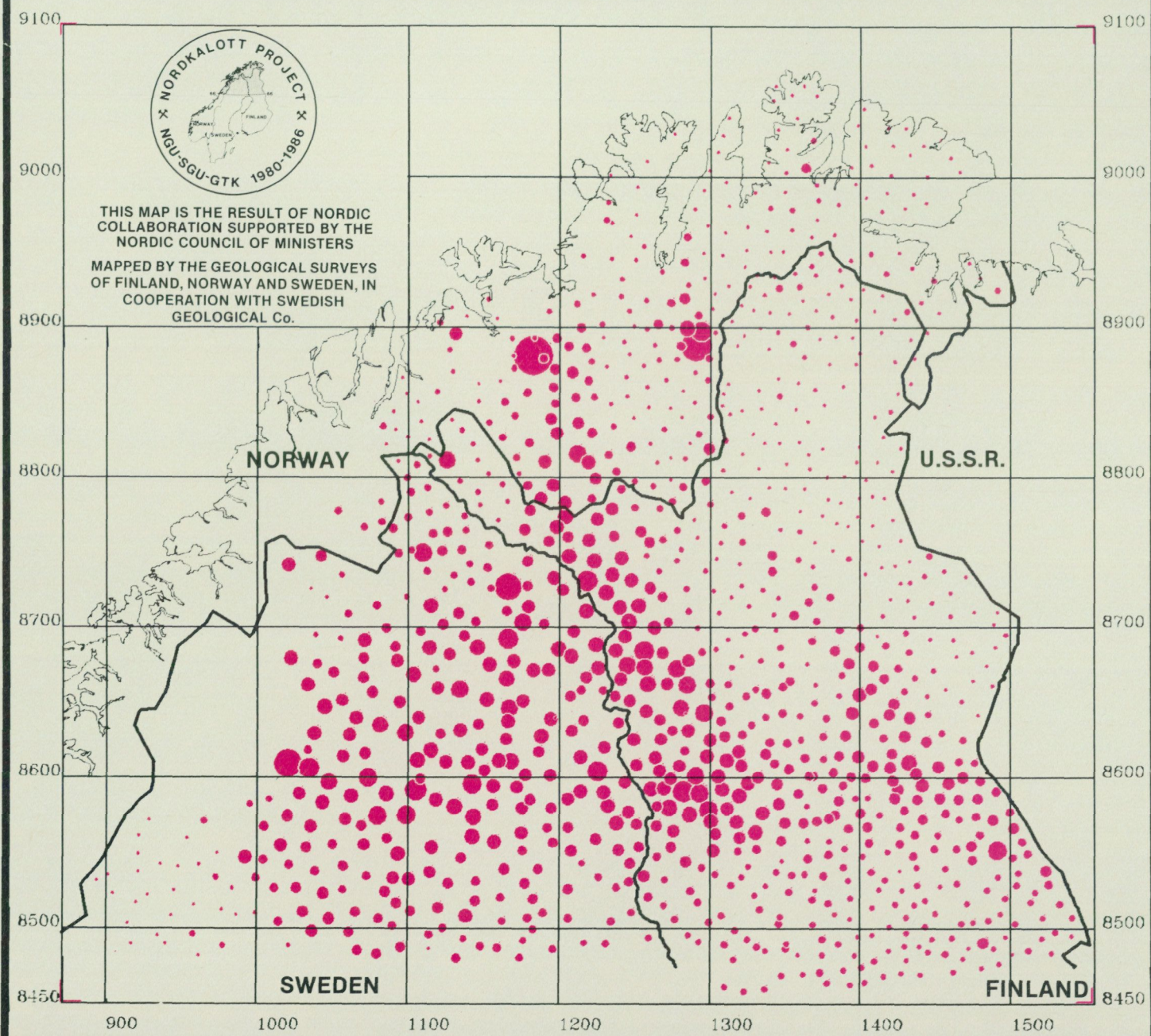


Cl ppm

1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 11.03.1986

MAP 78



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT

Heavy minerals

Cr

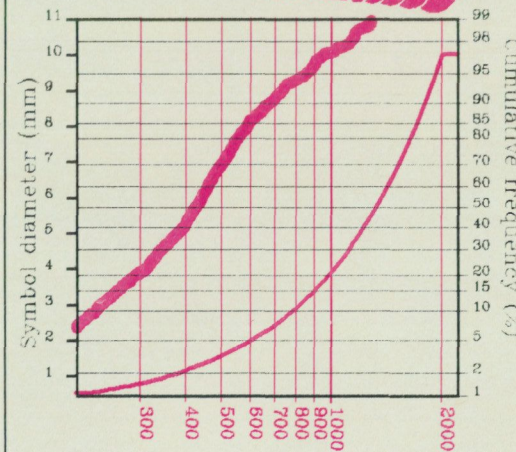
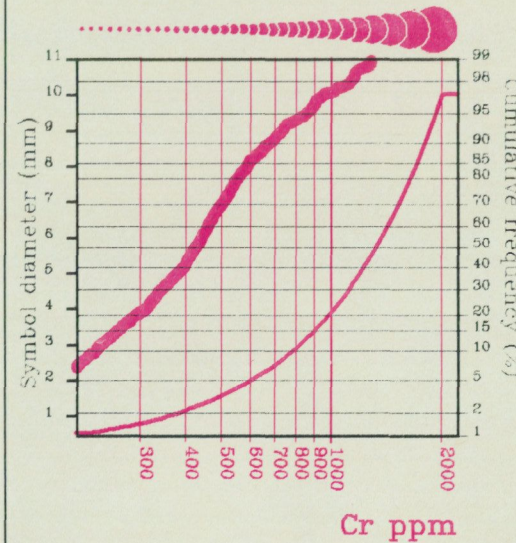
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

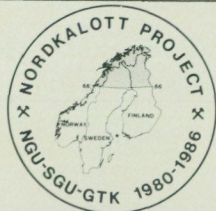
Symbol size
Cumulative frequency



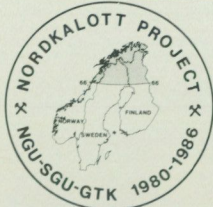
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 04.03.1986

MAP 79



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



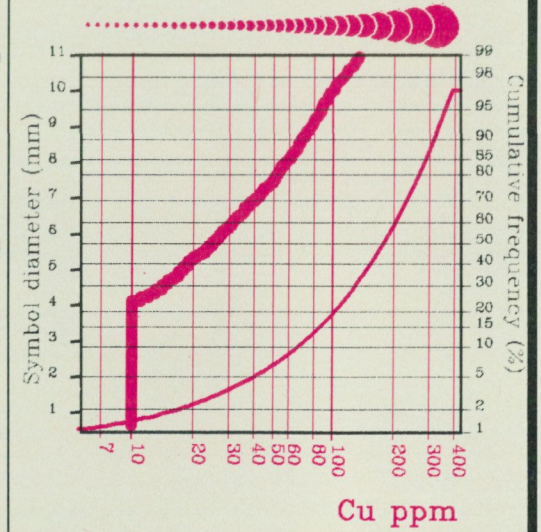
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals

Cu

Heavier than 2.96 g/cm^3
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1056

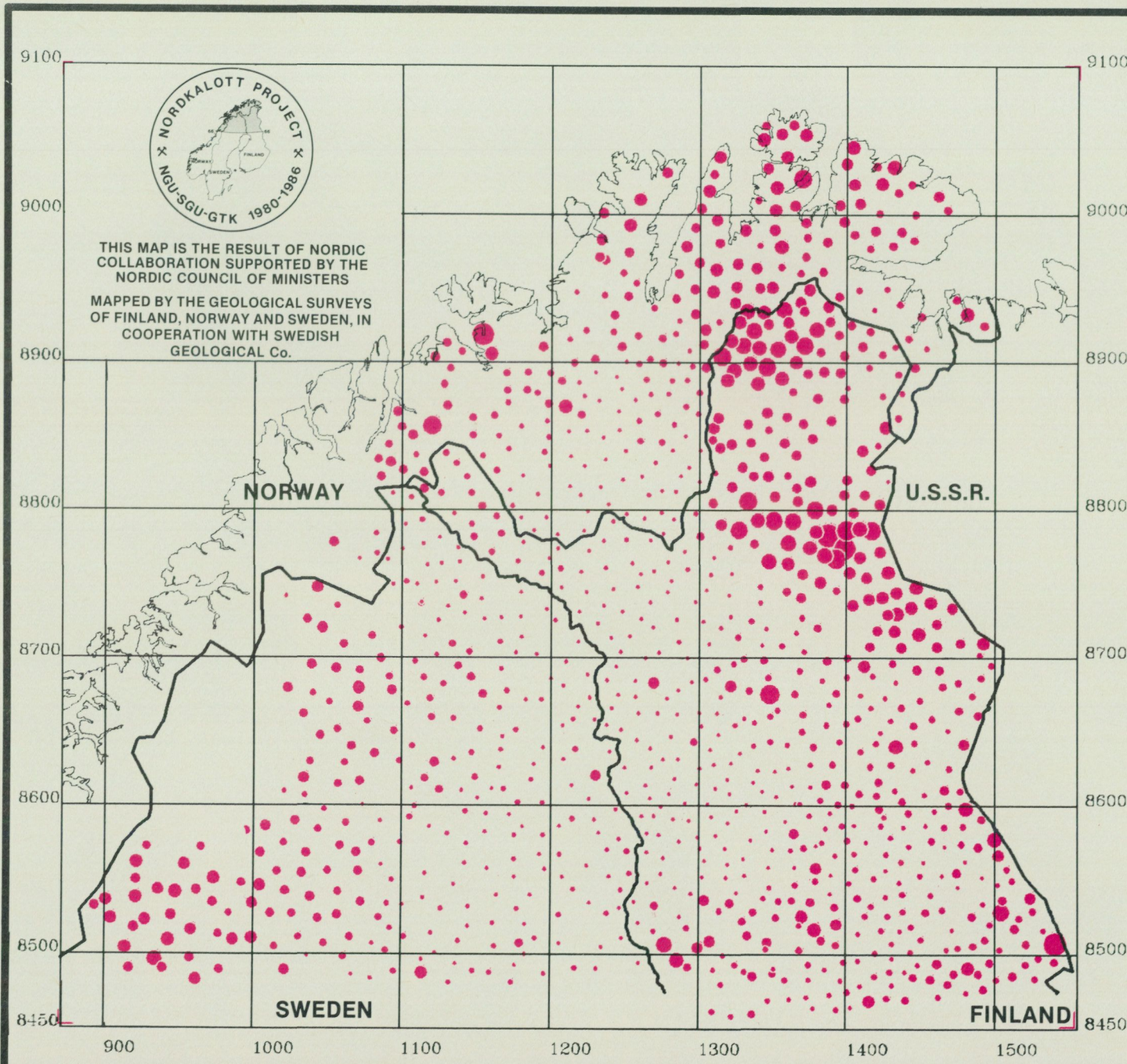
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

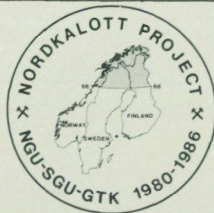
Projection: Lambert conformal
 Date of plotting: 06.03.1986

MAP 80



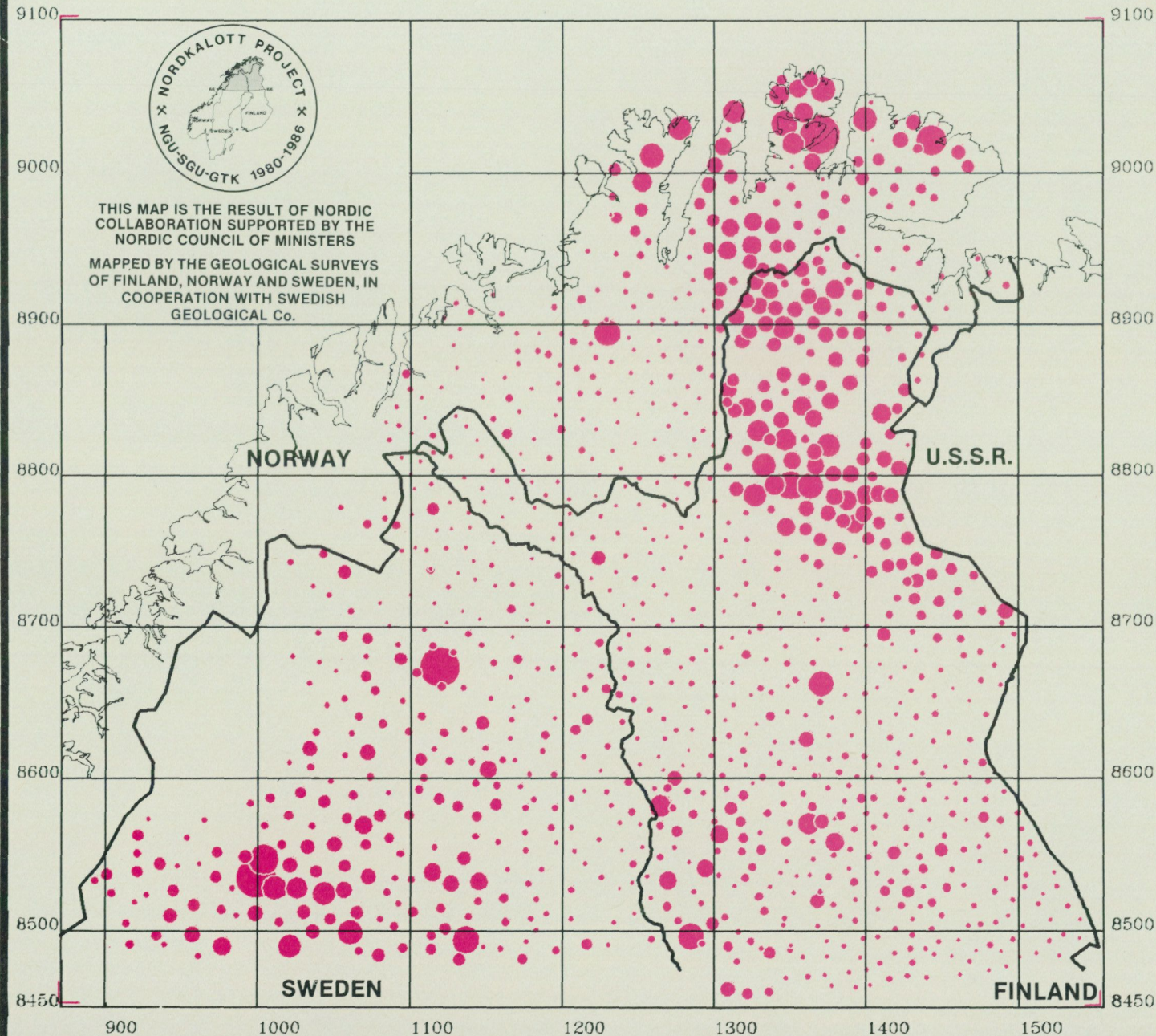
Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steenfelt, and T. Volden.

ISBN 91-7158-383-1



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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Compiled by: J. Bergström, A. Björklund, B. Bølviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden.

ISBN 91-7158-383-1

Nordkalott project Geochemistry STREAM SEDIMENT

Heavy minerals

Fe

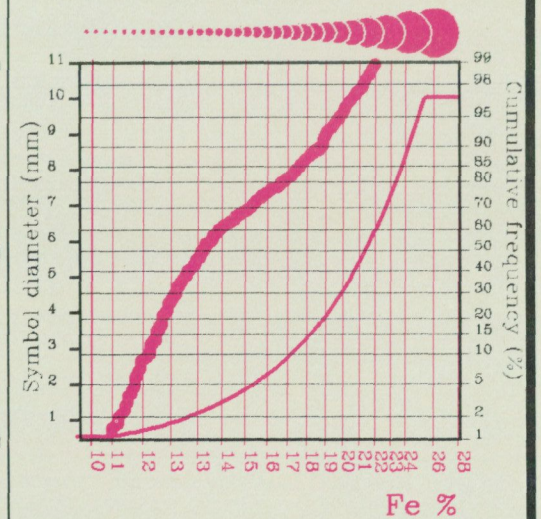
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 16.03.1986

MAP 81

Nordkalott project Geochemistry STREAM SEDIMENT

Heavy minerals

K

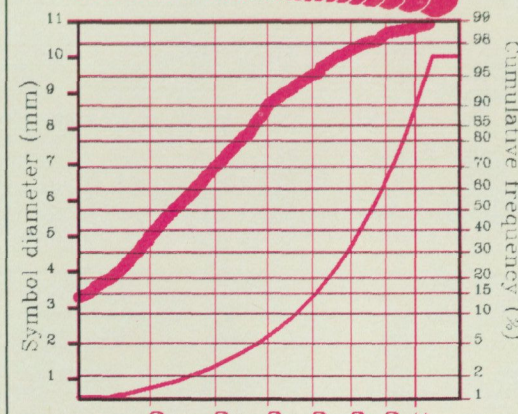
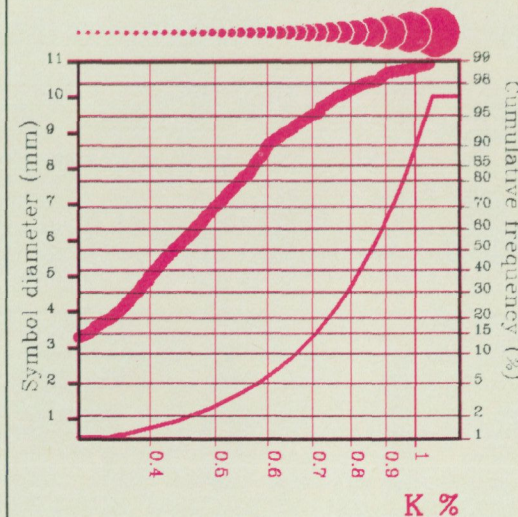
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

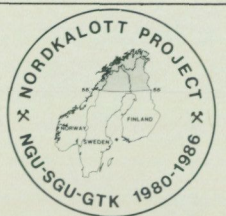
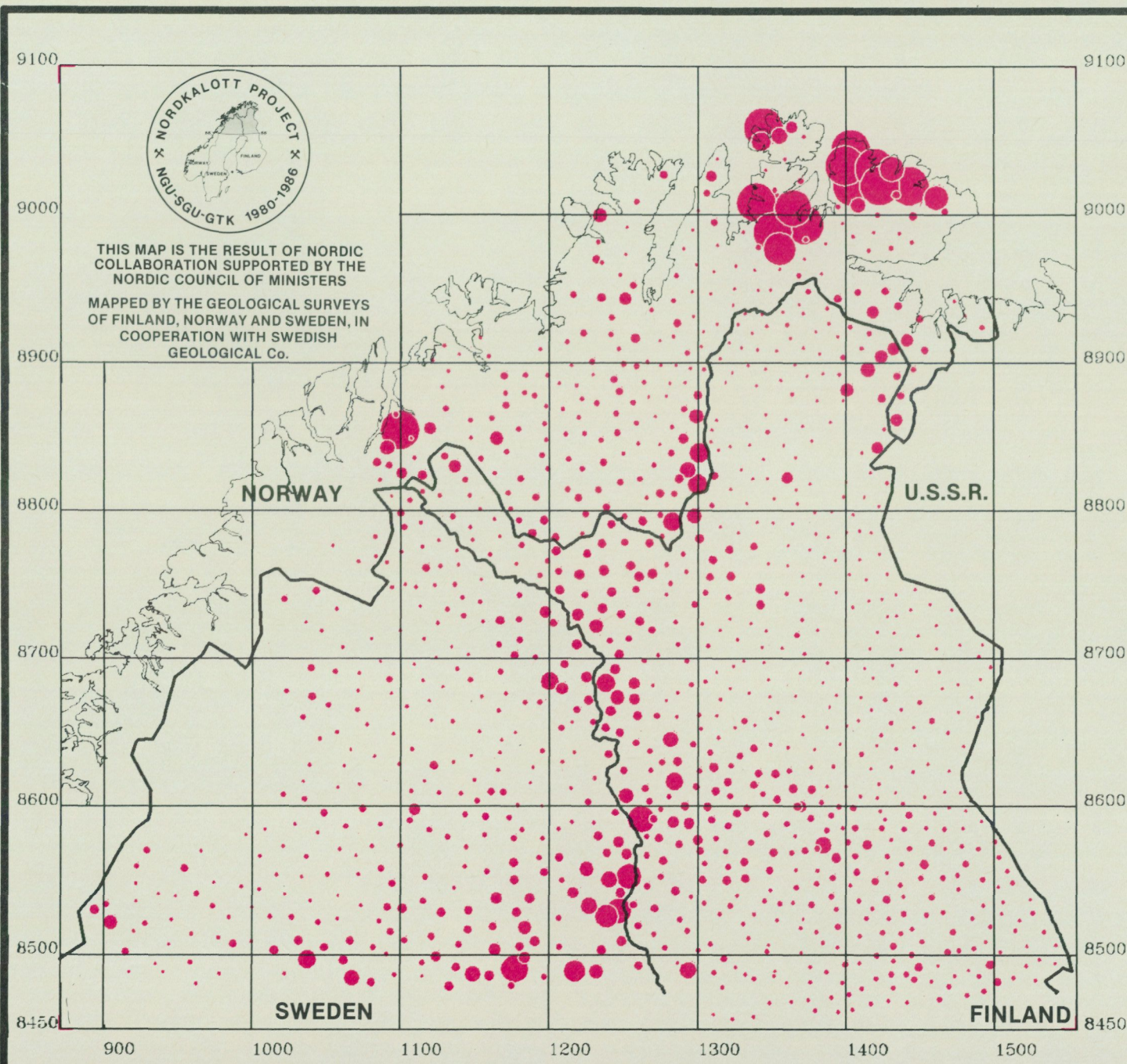
Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 05.03.1985

MAP 82



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden.

ISBN 91-7158-383-1

Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals

Mg

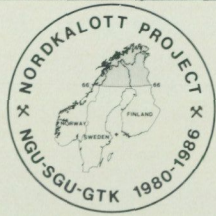
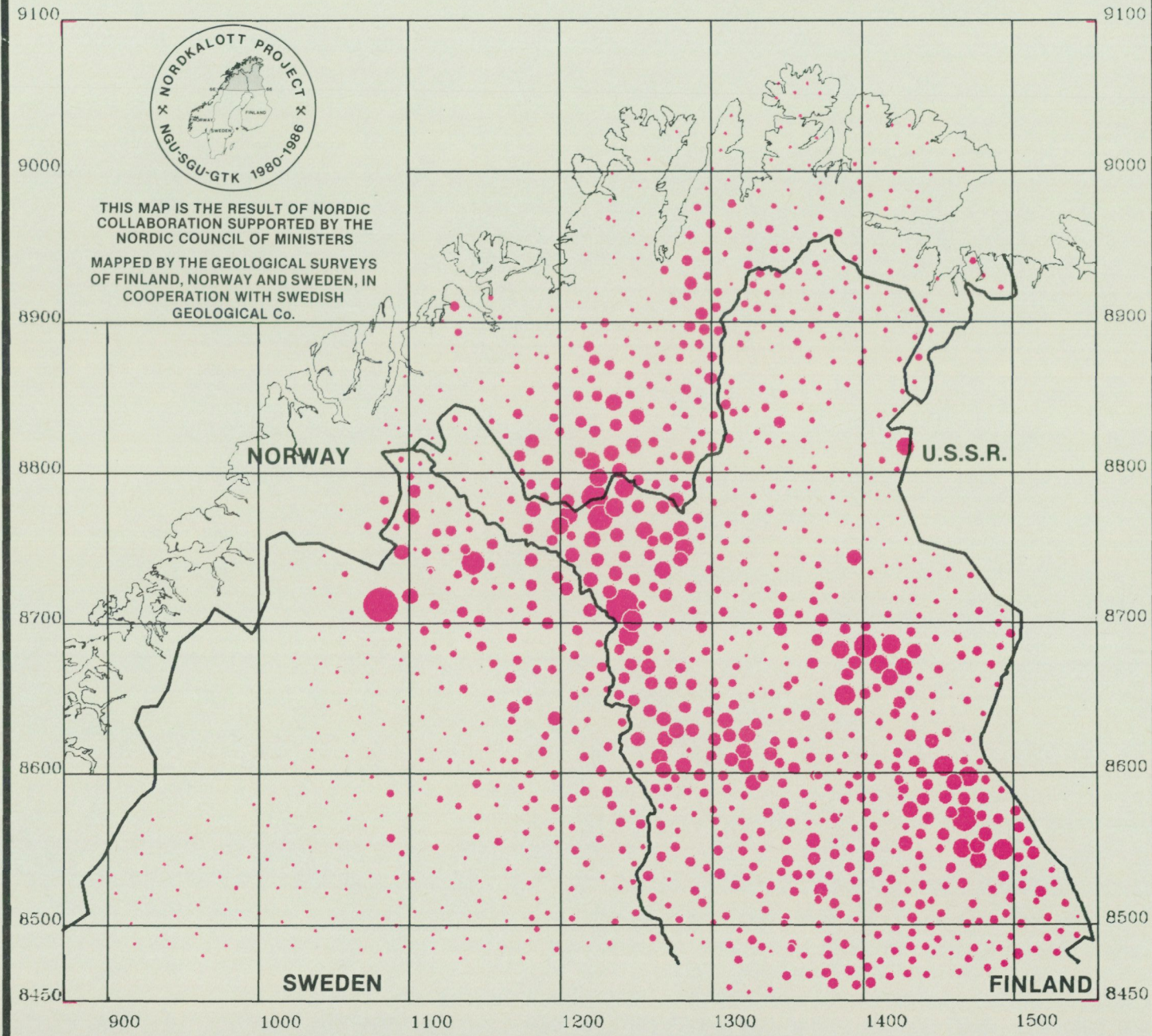
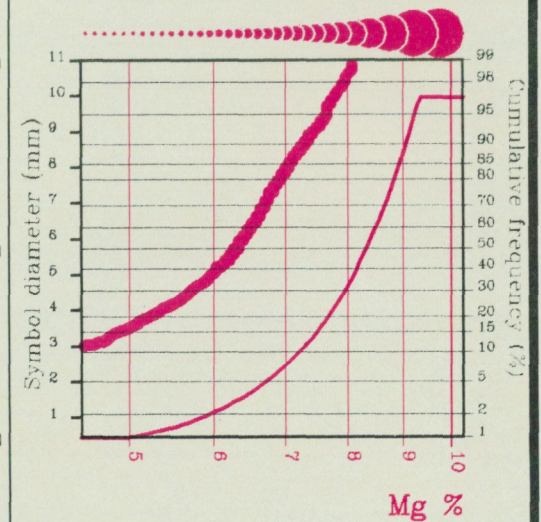
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
 Cumulative frequency



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS

MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 05.03.1985

MAP 83

Nordkalott project
Geochemistry
STREAM SEDIMENT
 Heavy minerals

Mn

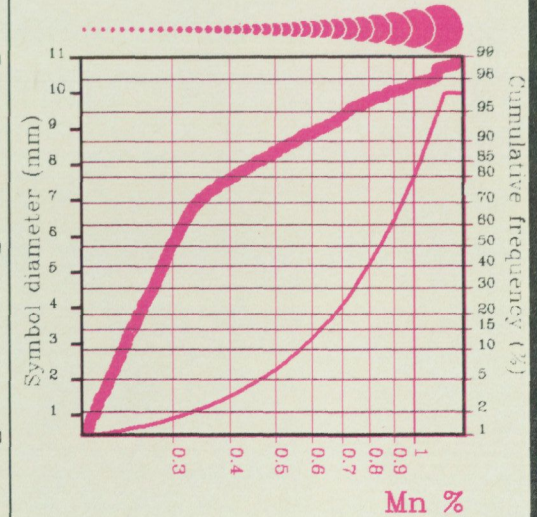
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
 Cumulative frequency

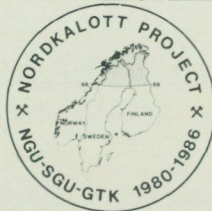
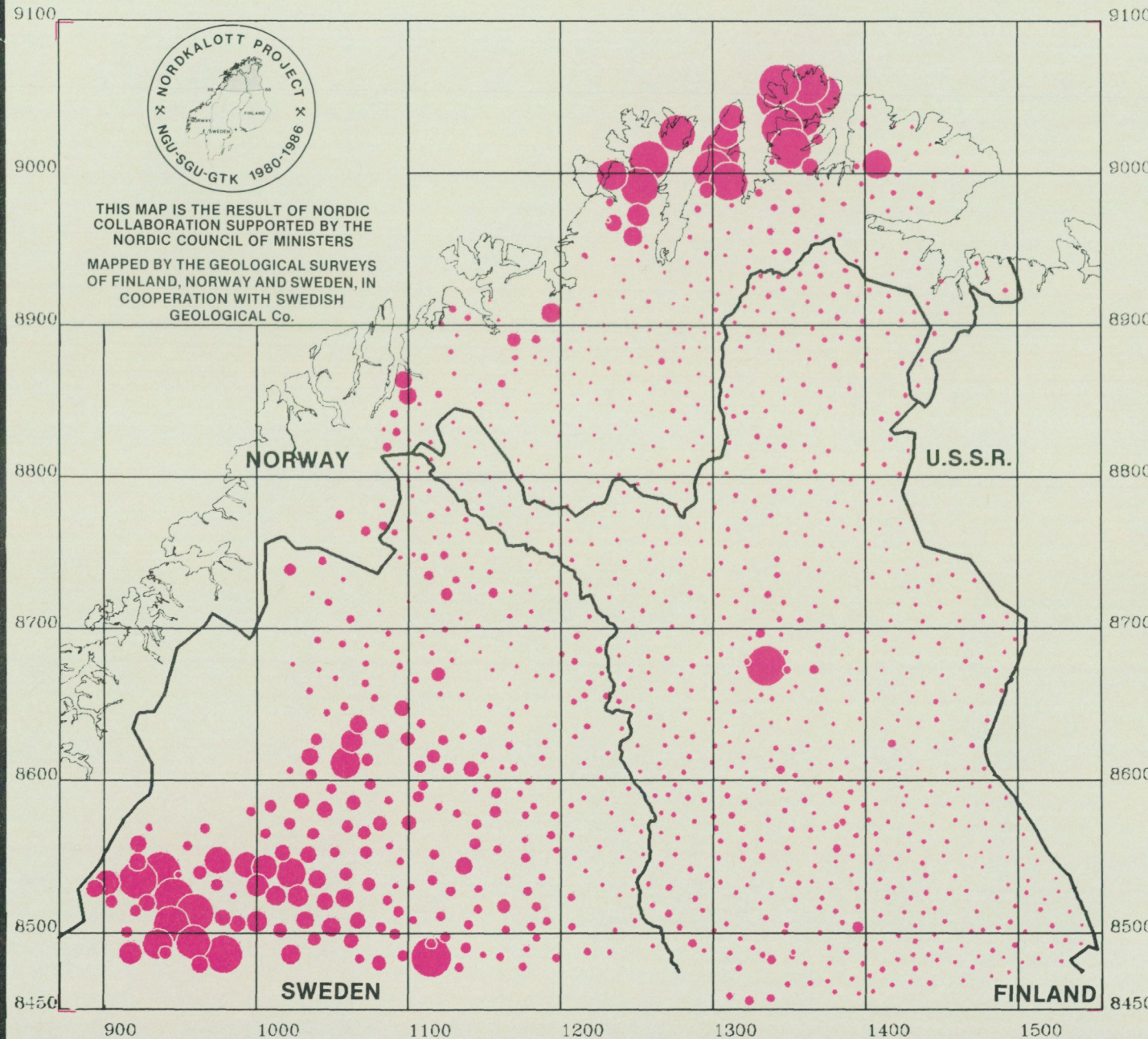


1: 4 000 000

100 km

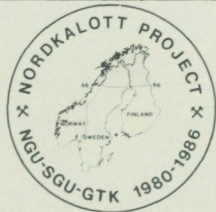
Projection: Lambert conformal
 Date of plotting: 06.03.1985

MAP 84



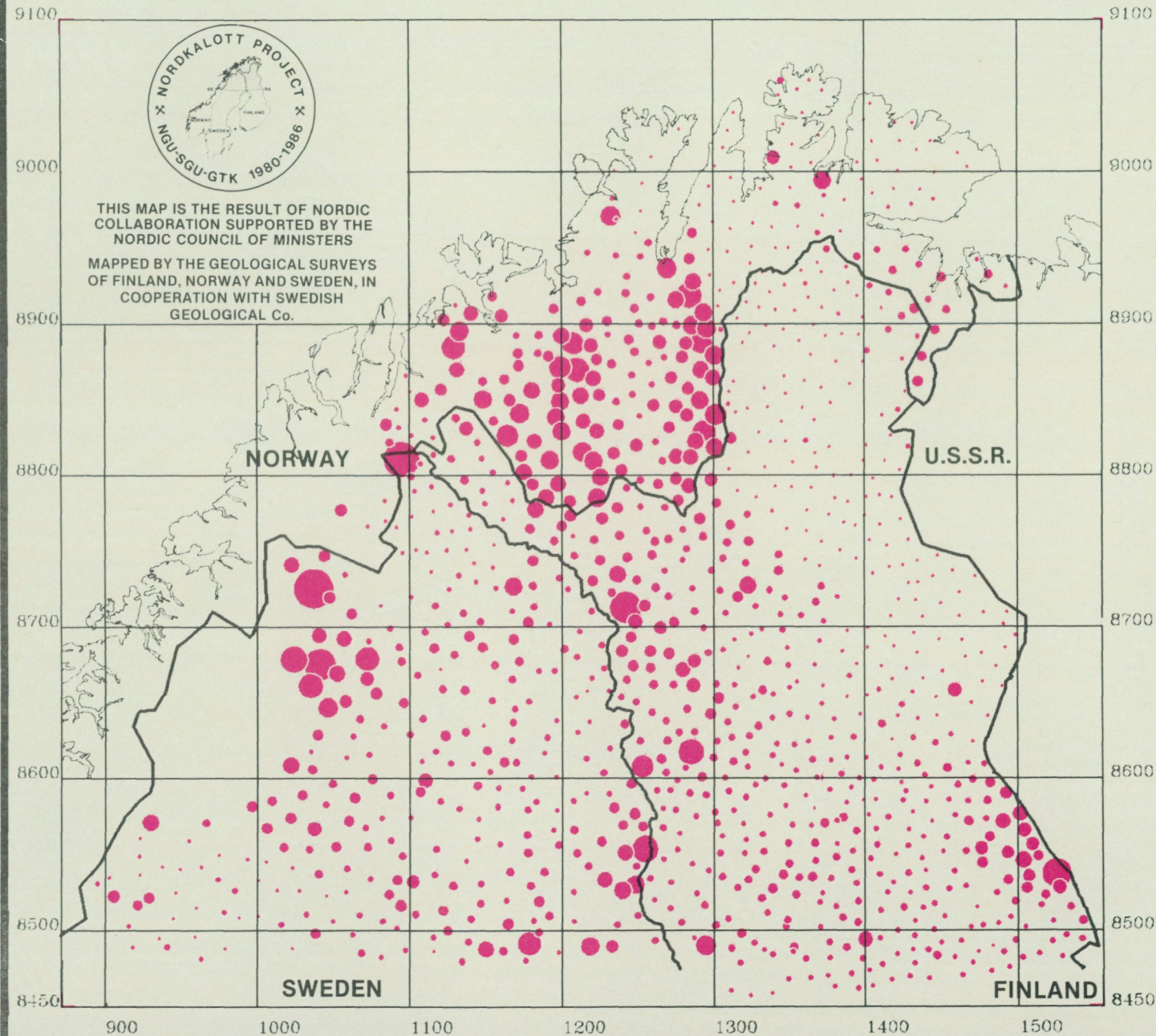
THIS MAP IS THE RESULT OF NORDIC
 COLLABORATION SUPPORTED BY THE
 NORDIC COUNCIL OF MINISTERS

MAPPED BY THE GEOLOGICAL SURVEYS
 OF FINLAND, NORWAY AND SWEDEN, IN
 COOPERATION WITH SWEDISH
 GEOLOGICAL Co.



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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry STREAM SEDIMENT

Heavy minerals

Na

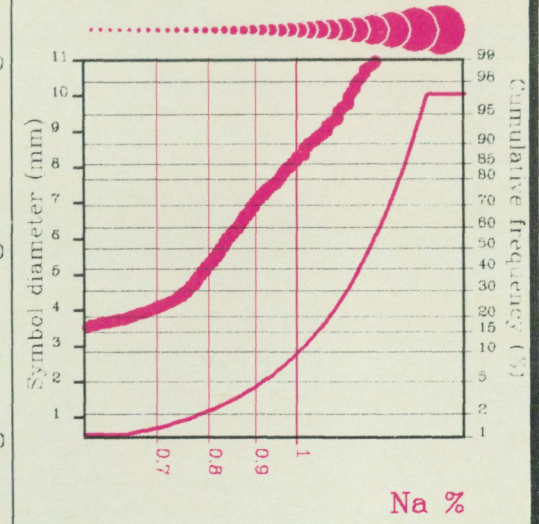
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 05.03.1985

MAP 85

Compiled by: J. Bergström, A. Björklund, B. Bølviken, M. Kontio, P. Lehmuspeto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden. ISBN 91-7158-383-1

Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals

Nb

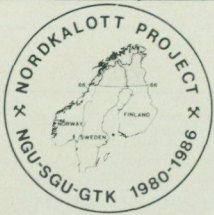
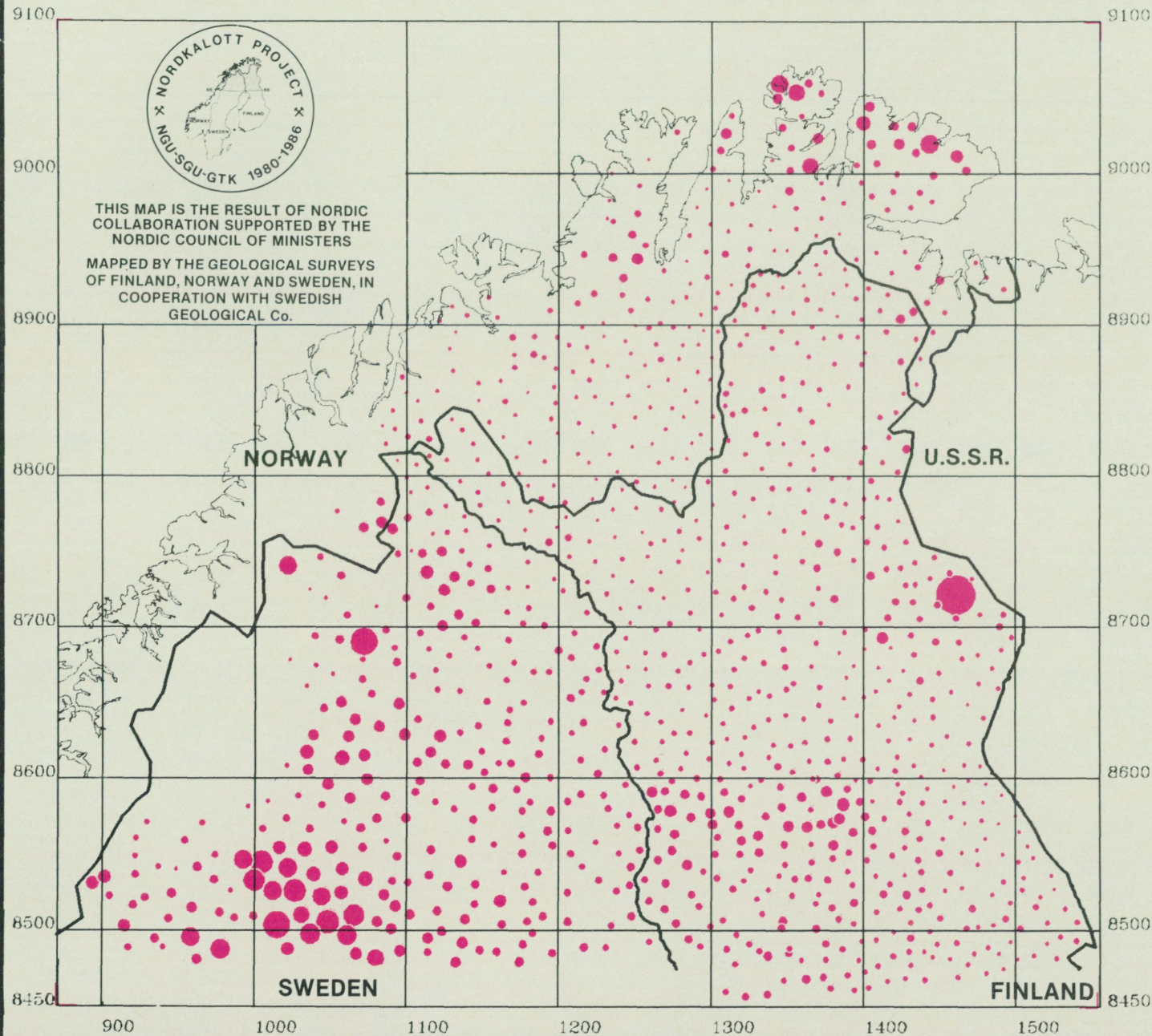
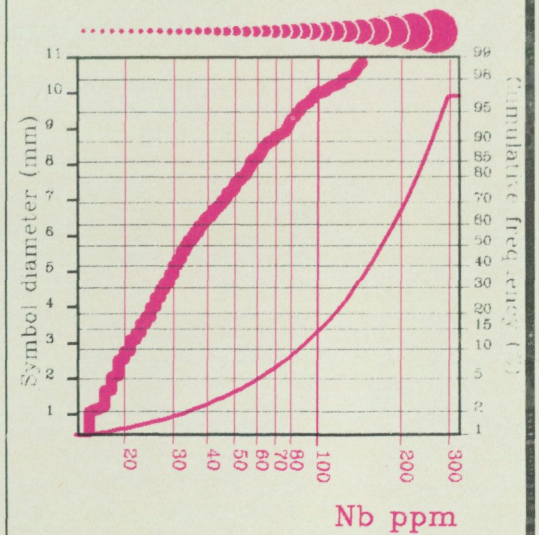
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
 Cumulative frequency



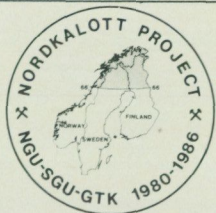
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden. ISBN 91-7158-383-1

1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 04.03.1985

MAP 86



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM SEDIMENT

Heavy minerals

Ni

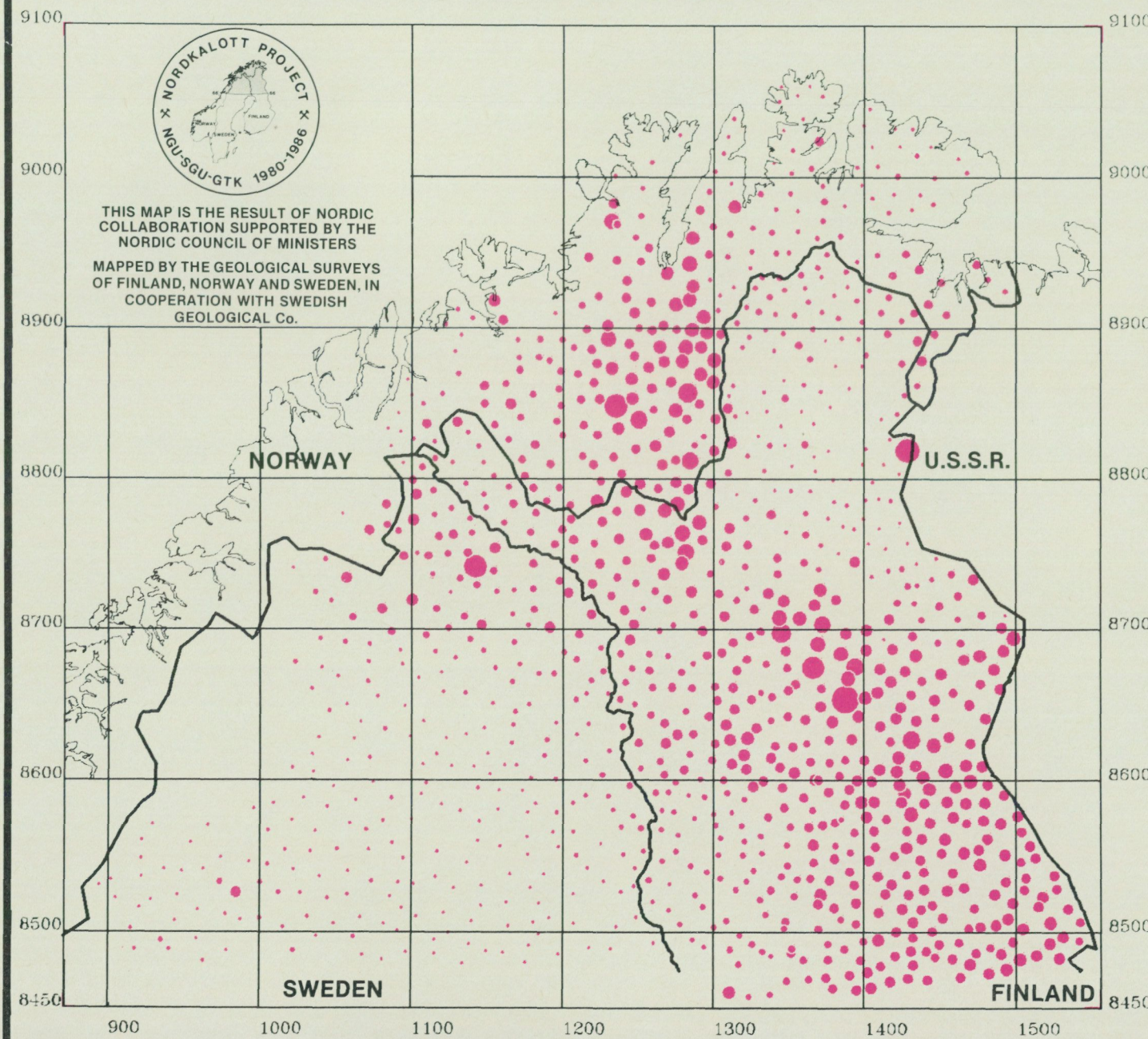
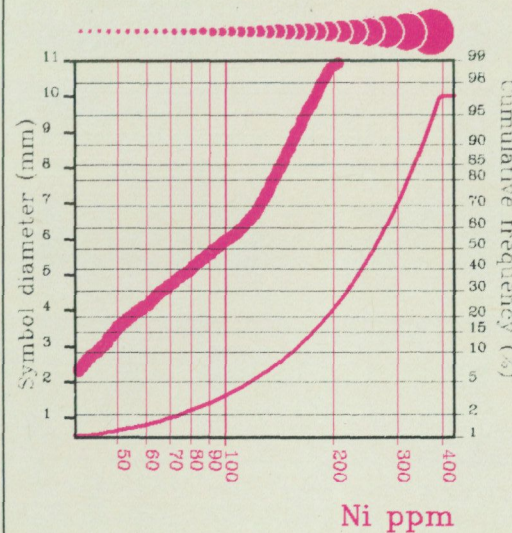
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
 Cumulative frequency



Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden. ISBN 91-7158-383-1

1: 4 000 000
 100 km
 Projection: Lambert conformal
 Date of plotting: 08.03.1986

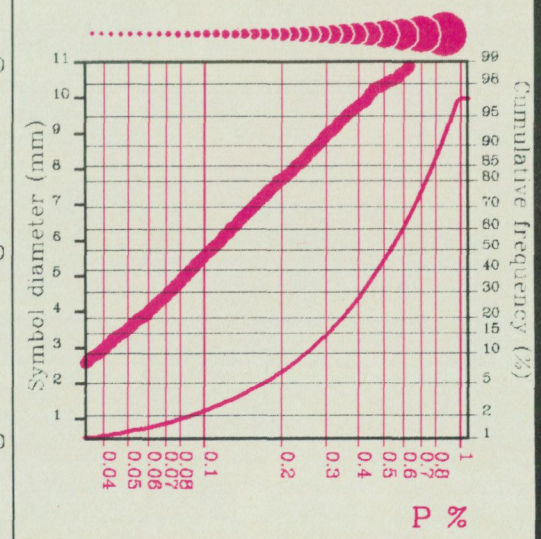
MAP 87

Nordkalott project Geochemistry STREAM SEDIMENT Heavy minerals

P

Heavier than 2.96 g/cm³
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1056

Symbol size
Cumulative frequency

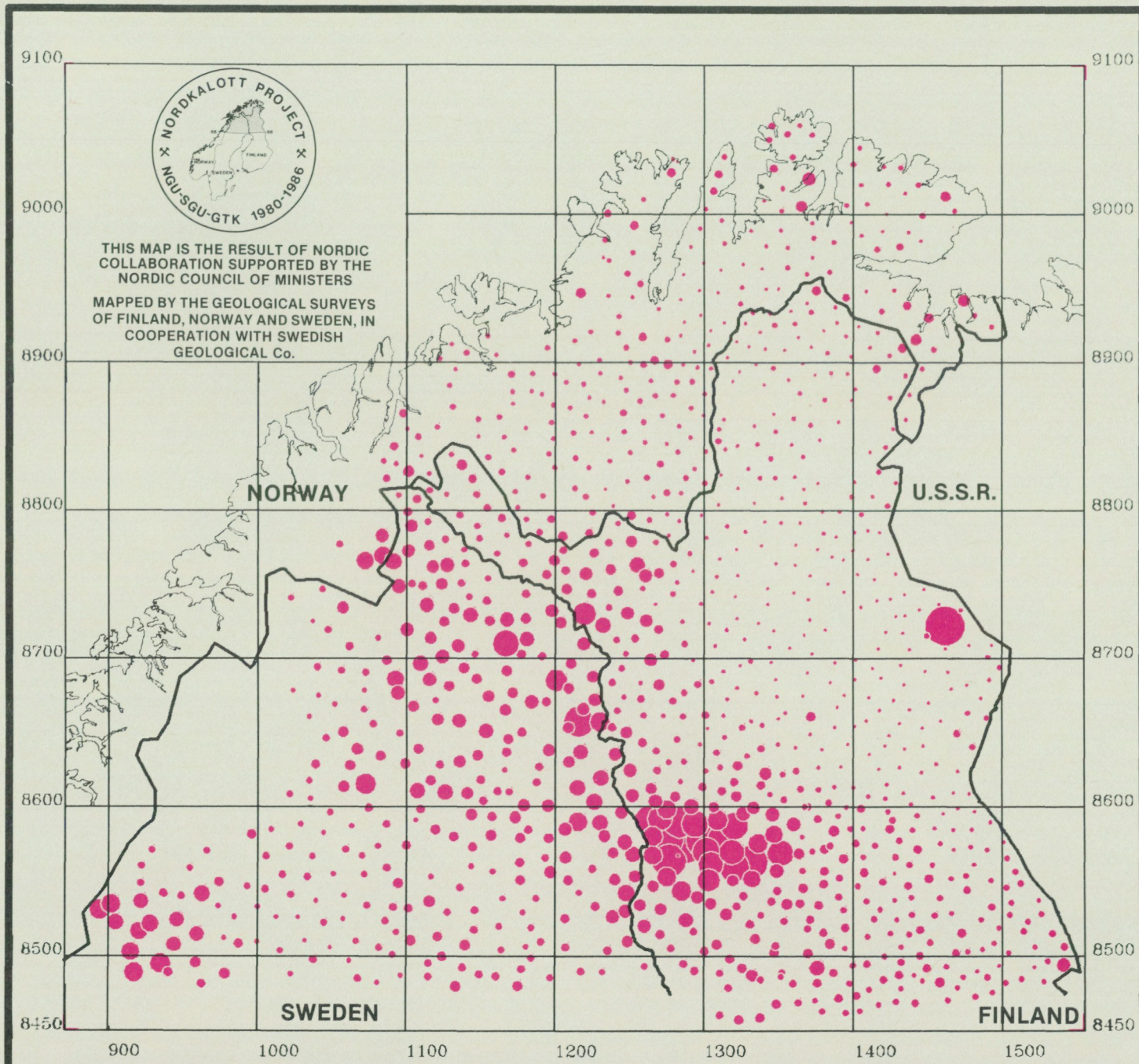


1: 4 000 000

100 km

Projection: Lambert conformal
Date of plotting: 04.03.1985

MAP 88



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COLLABORATION SUPPORTED BY THE
NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
COOPERATION WITH SWEDISH
GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Bølviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden.

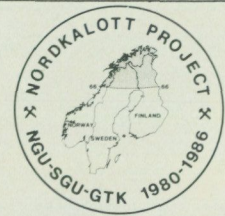
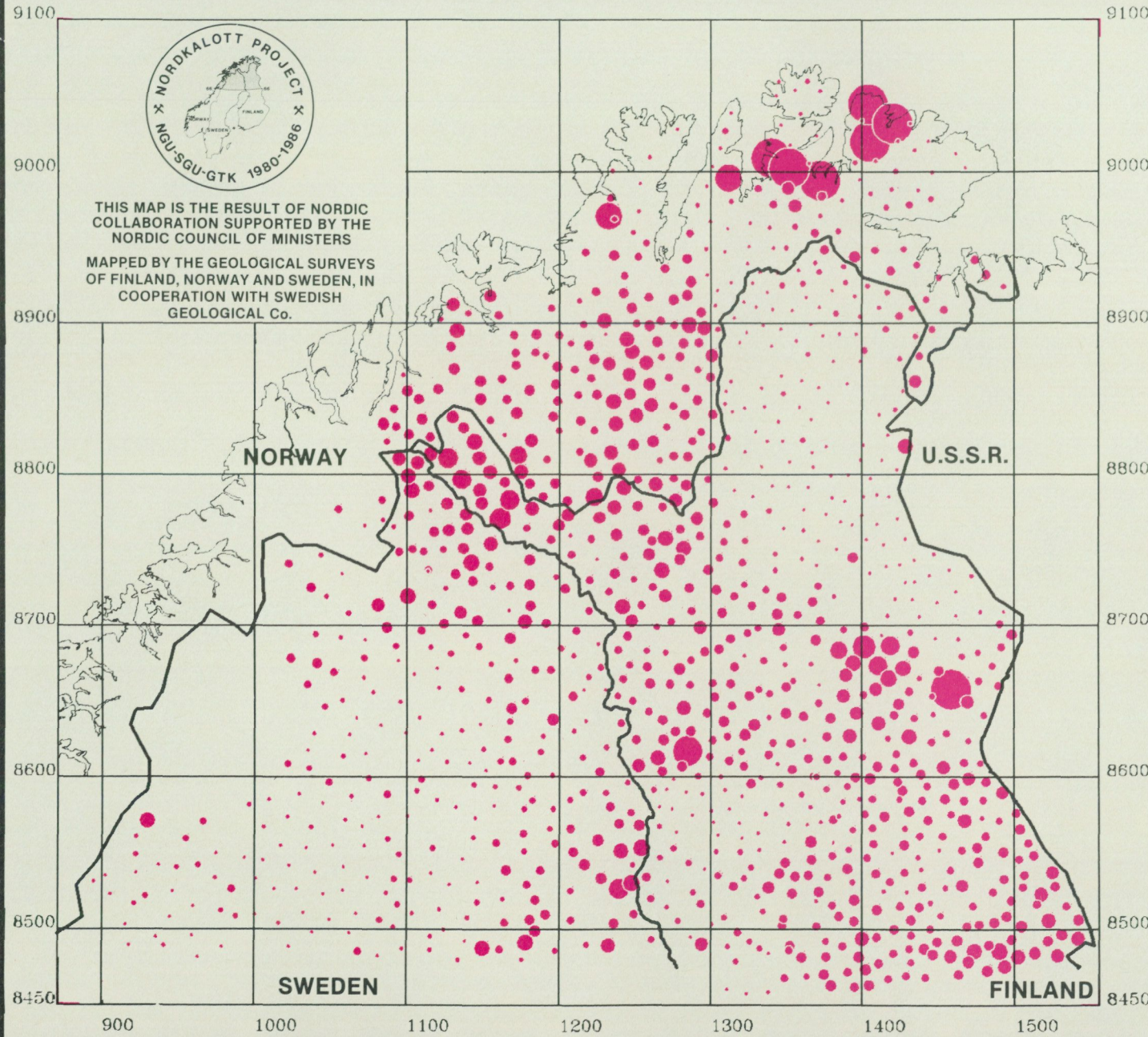
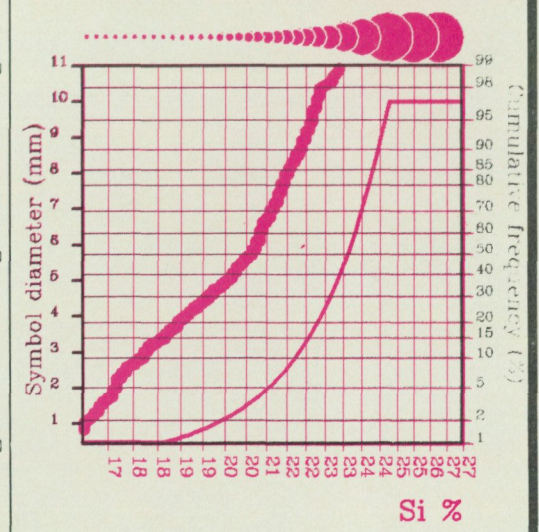
ISBN 91-7158-383-1

Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals

Si

Heavier than 2.96 g/cm³
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1056

Symbol size
 Cumulative frequency

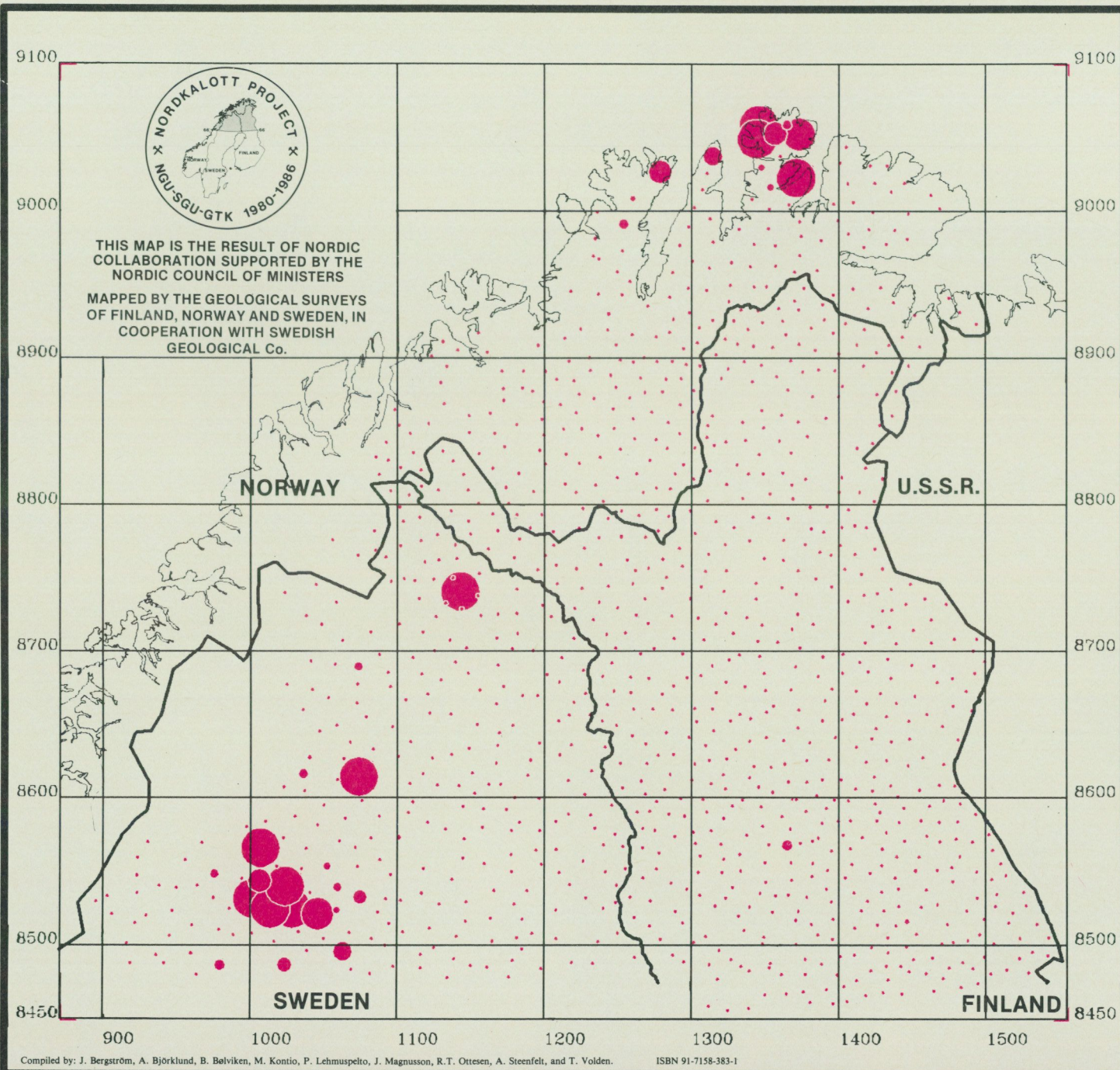


THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden. ISBN 91-7158-383-1

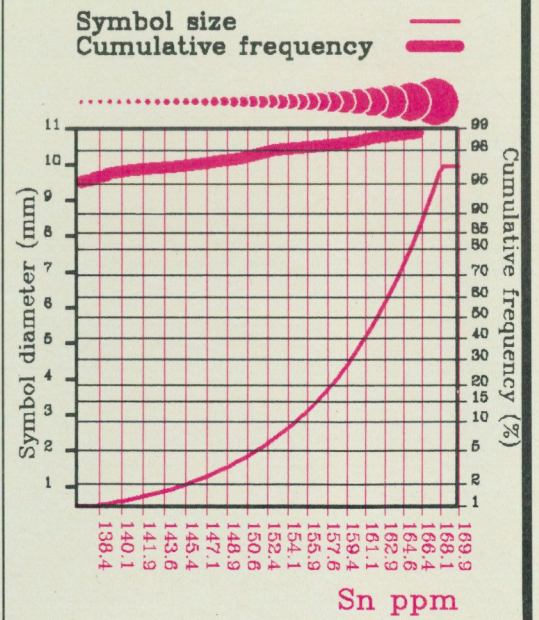
1: 4 000 000
 100 km
 Projection: Lambert conformal
 Date of plotting: 05.03.1986

MAP 89



Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals
Sn

Heavier than 2.96 g/cm³
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1056

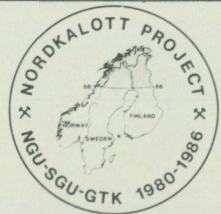


1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 31.10.1986

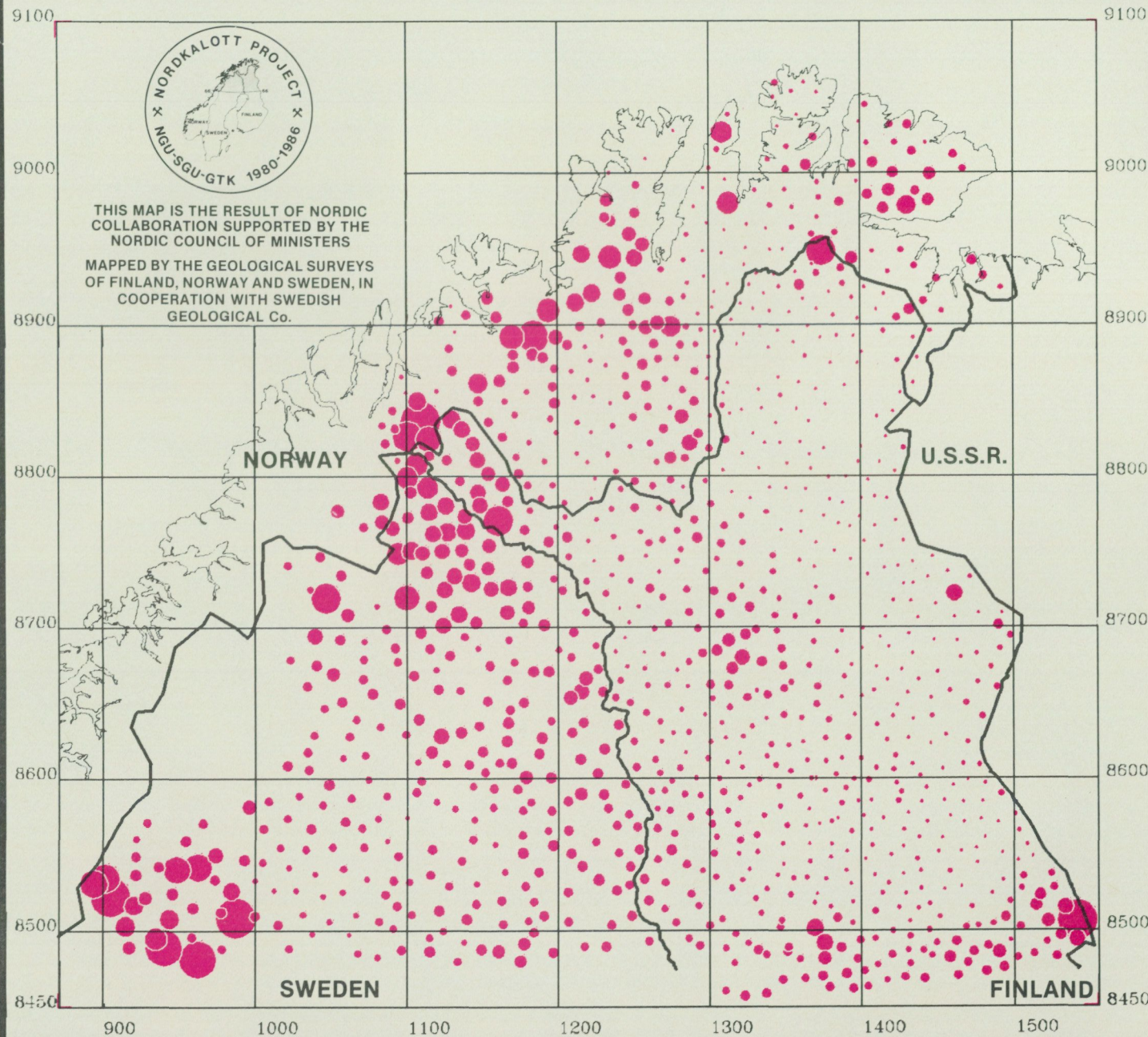
MAP 90

Compiled by: J. Bergström, A. Björklund, B. Bolviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden. ISBN 91-7158-383-1



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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry STREAM SEDIMENT Heavy minerals

Sr

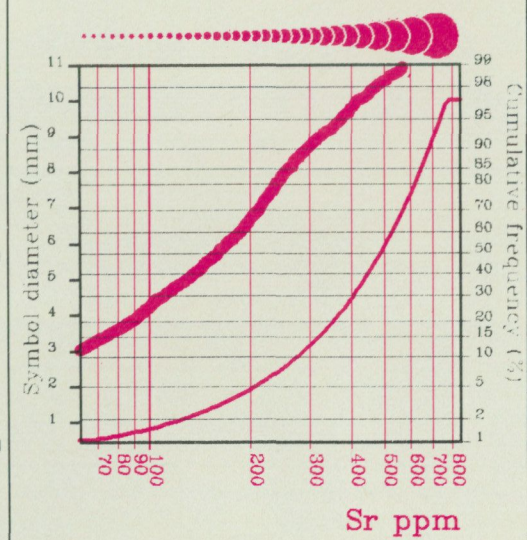
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 12.03.1985

MAP 91

Compiled by: J. Bergström, A. Björklund, B. Bølviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden. ISBN 91-7158-383-1

Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals

Ti

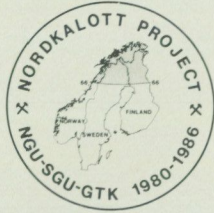
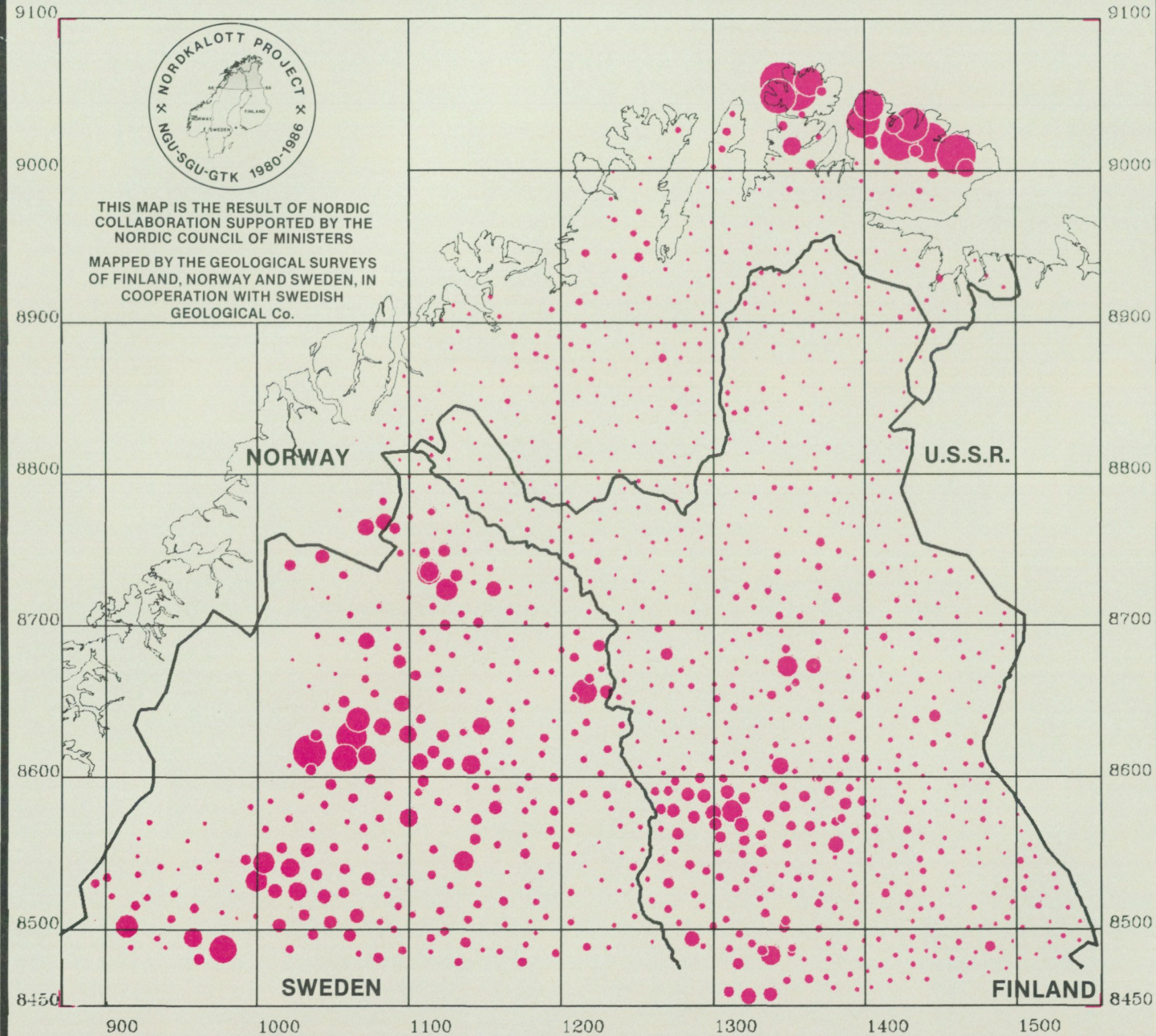
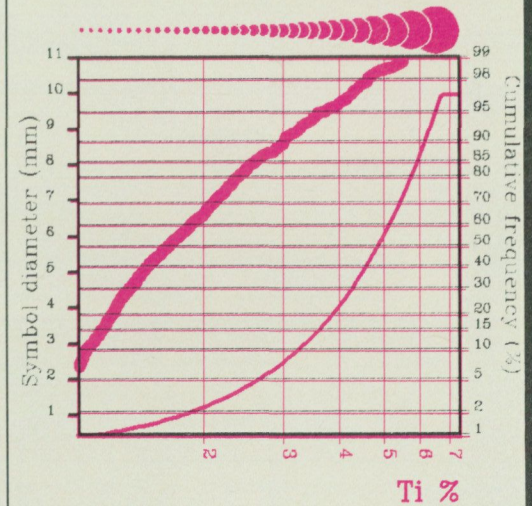
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
 Cumulative frequency



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

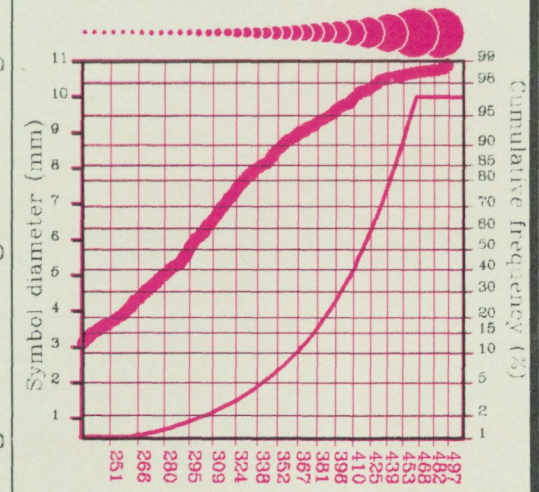
Nordkalott project Geochemistry STREAM SEDIMENT

Heavy minerals

V

Heavier than 2.96 g/cm³
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1056

Symbol size
Cumulative frequency



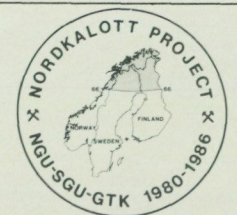
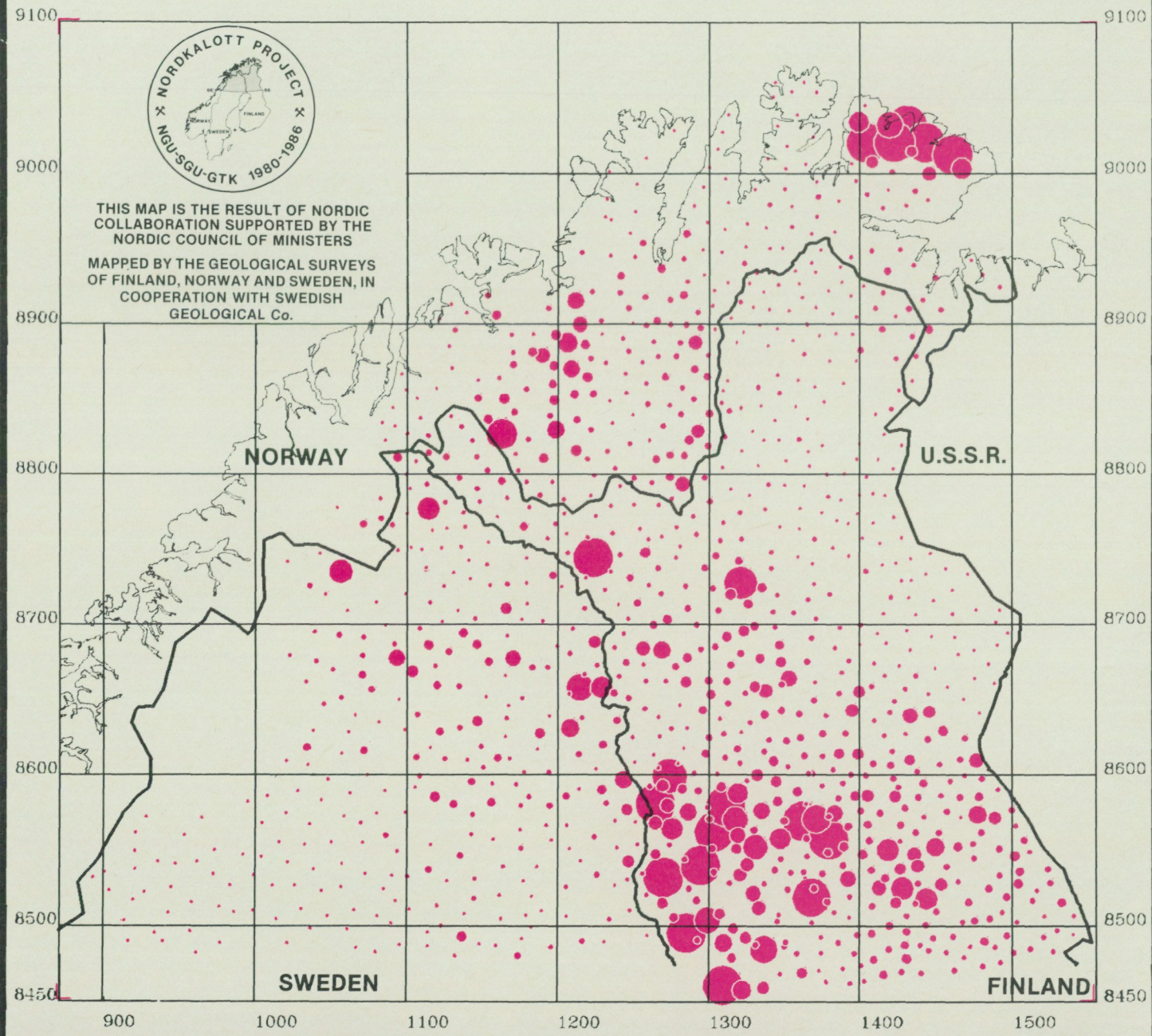
V ppm

1: 4 000 000

100 km

Projection: Lambert conformal

MAP 93



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Bolviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden.

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Nordkalott project Geochemistry STREAM SEDIMENT

Heavy minerals

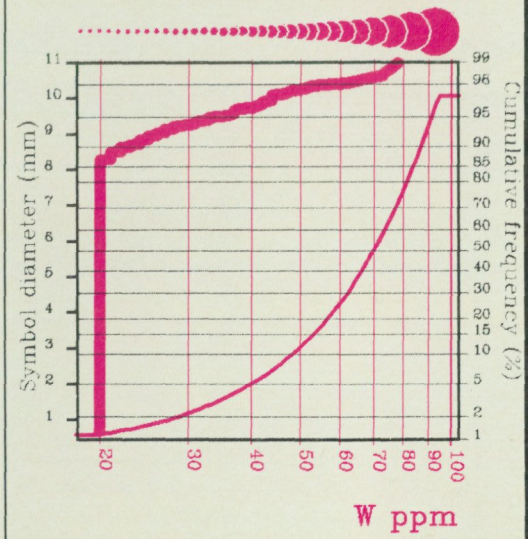
W

Heavier than 2.96 g/cm³
Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

Symbol size
Cumulative frequency

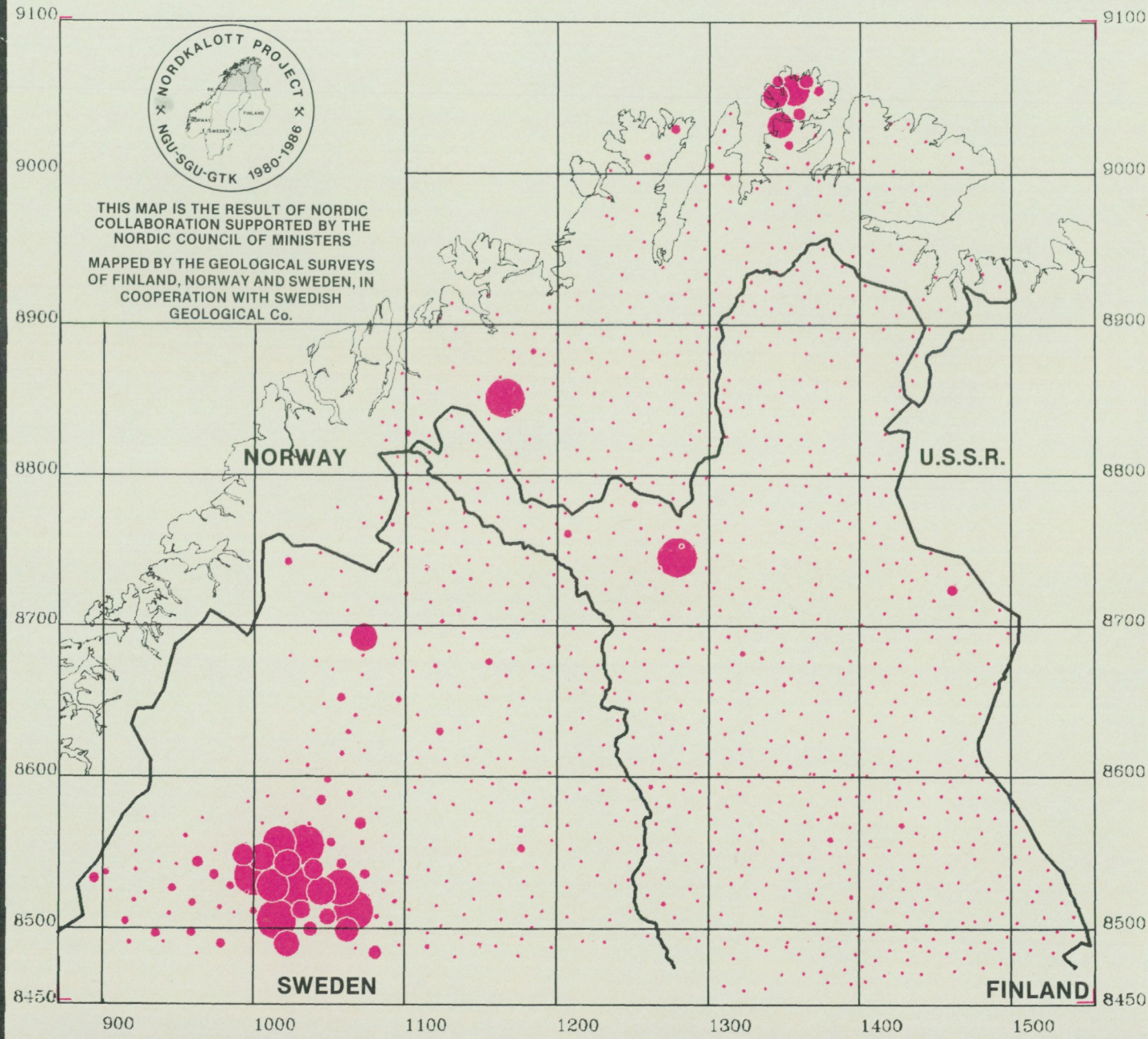


1: 4 000 000

100 km

Projection: Lambert conformal

MAP 94



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmušpelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden.

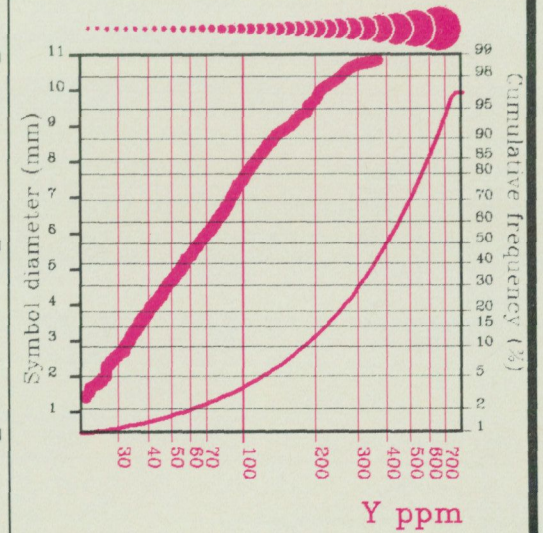
ISBN 91-7158-383-1

Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals

Y

Heavier than 2.96 g/cm³
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1056

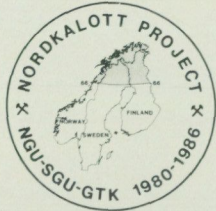
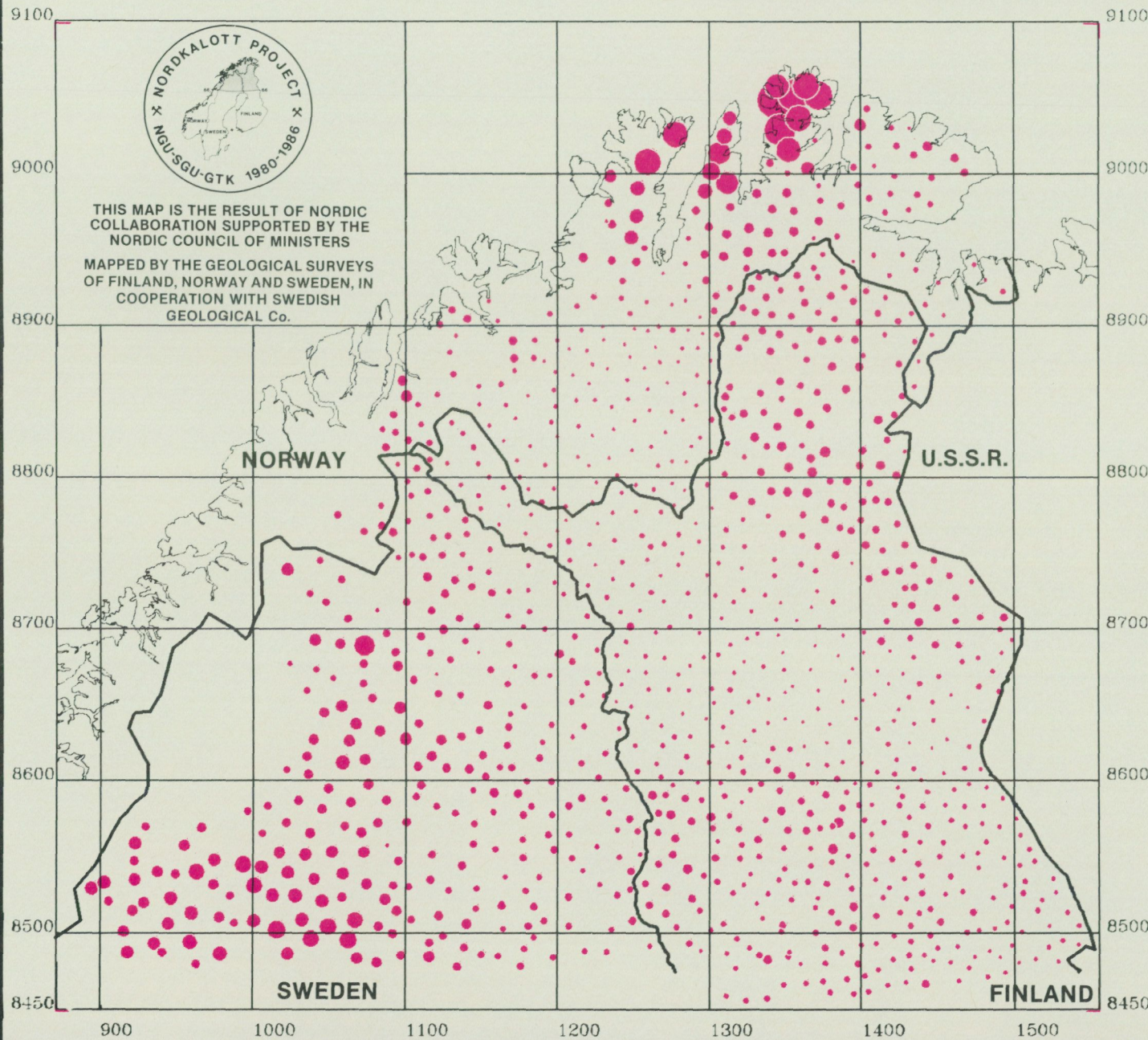
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal

MAP 95



THIS MAP IS THE RESULT OF NORDIC
 COLLABORATION SUPPORTED BY THE
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 OF FINLAND, NORWAY AND SWEDEN, IN
 COOPERATION WITH SWEDISH
 GEOLOGICAL Co.

Nordkalott project
 Geochemistry
STREAM SEDIMENT
 Heavy minerals

Zn

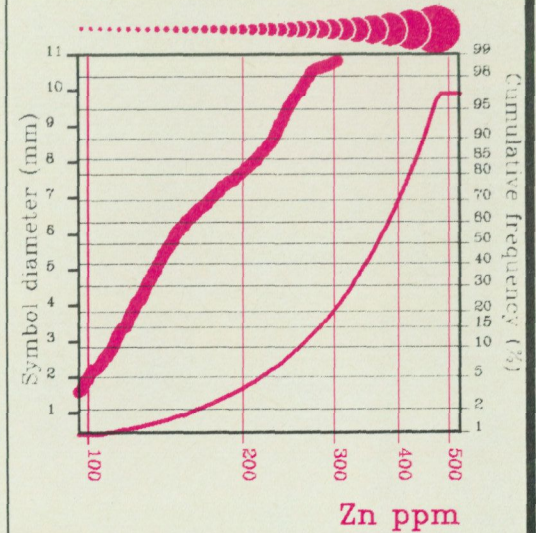
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

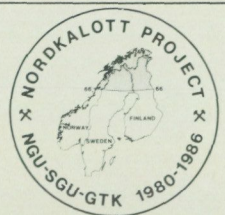
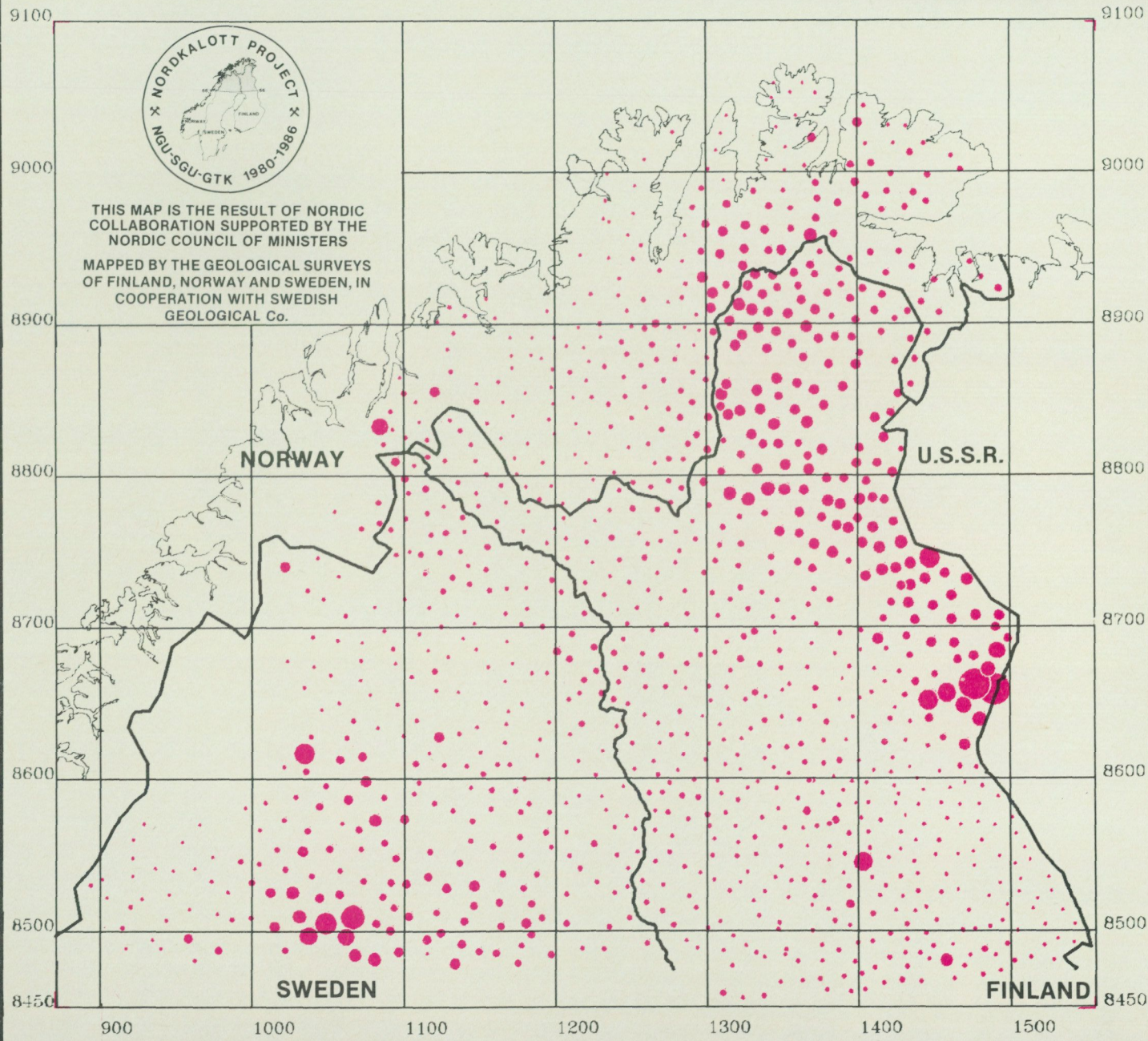
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal

MAP 96



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Bolviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden. ISBN 91-7158-383-1

Nordkalott project
Geochemistry
STREAM SEDIMENT

Heavy minerals

Zr

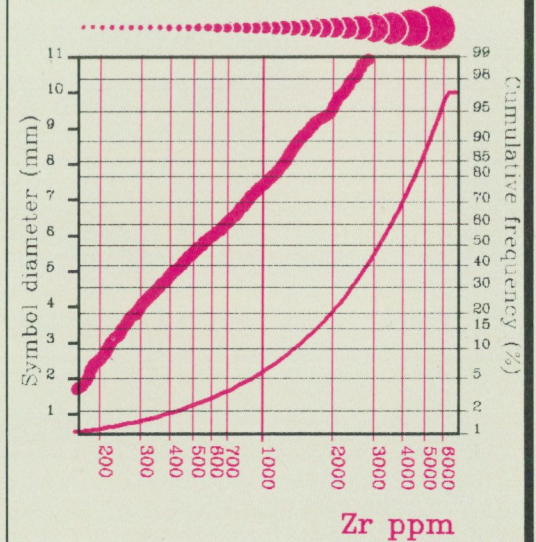
Heavier than 2.96 g/cm³

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1056

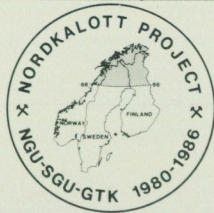
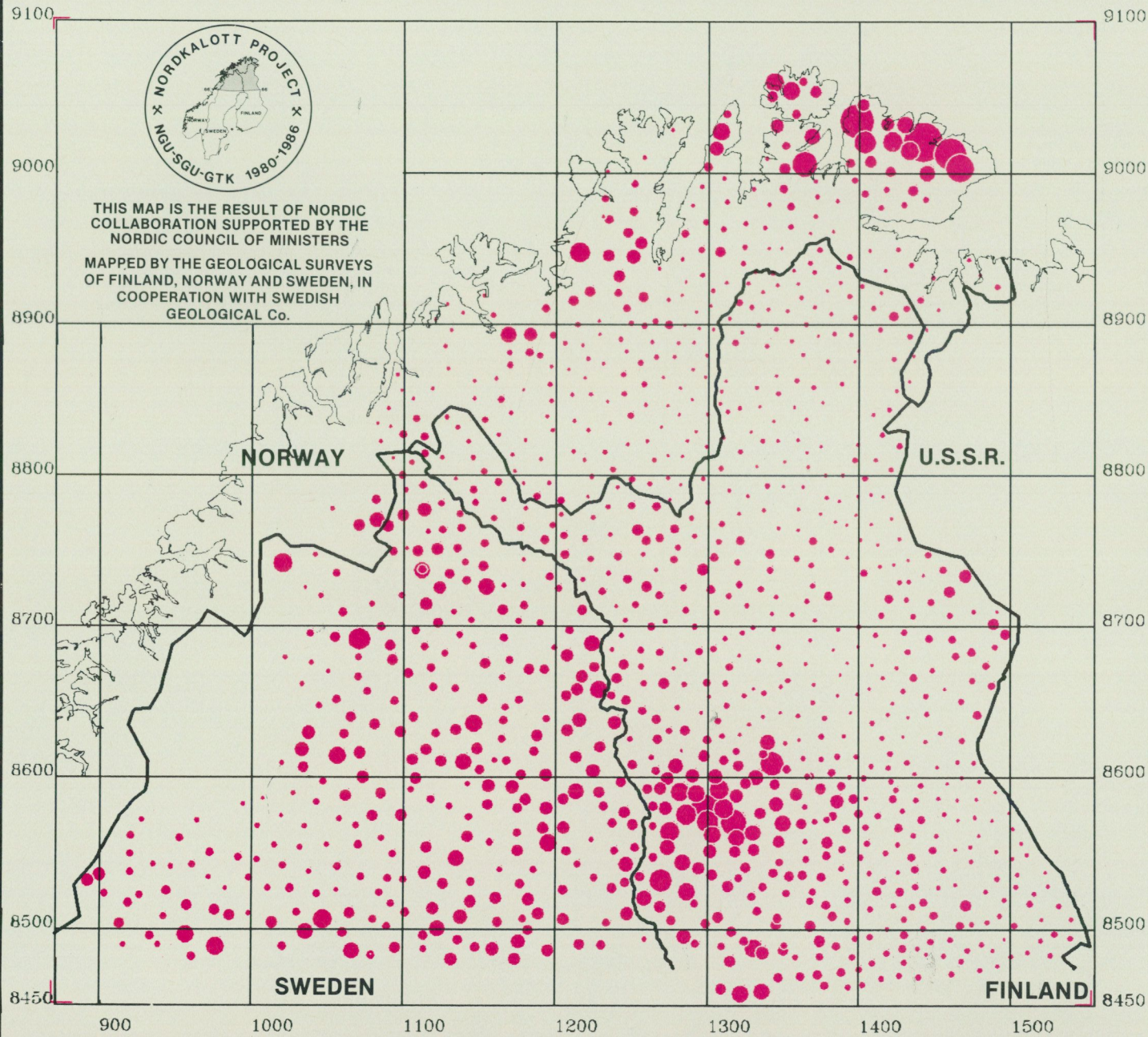
Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

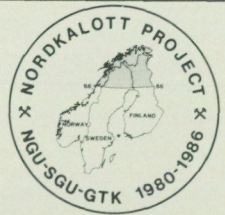
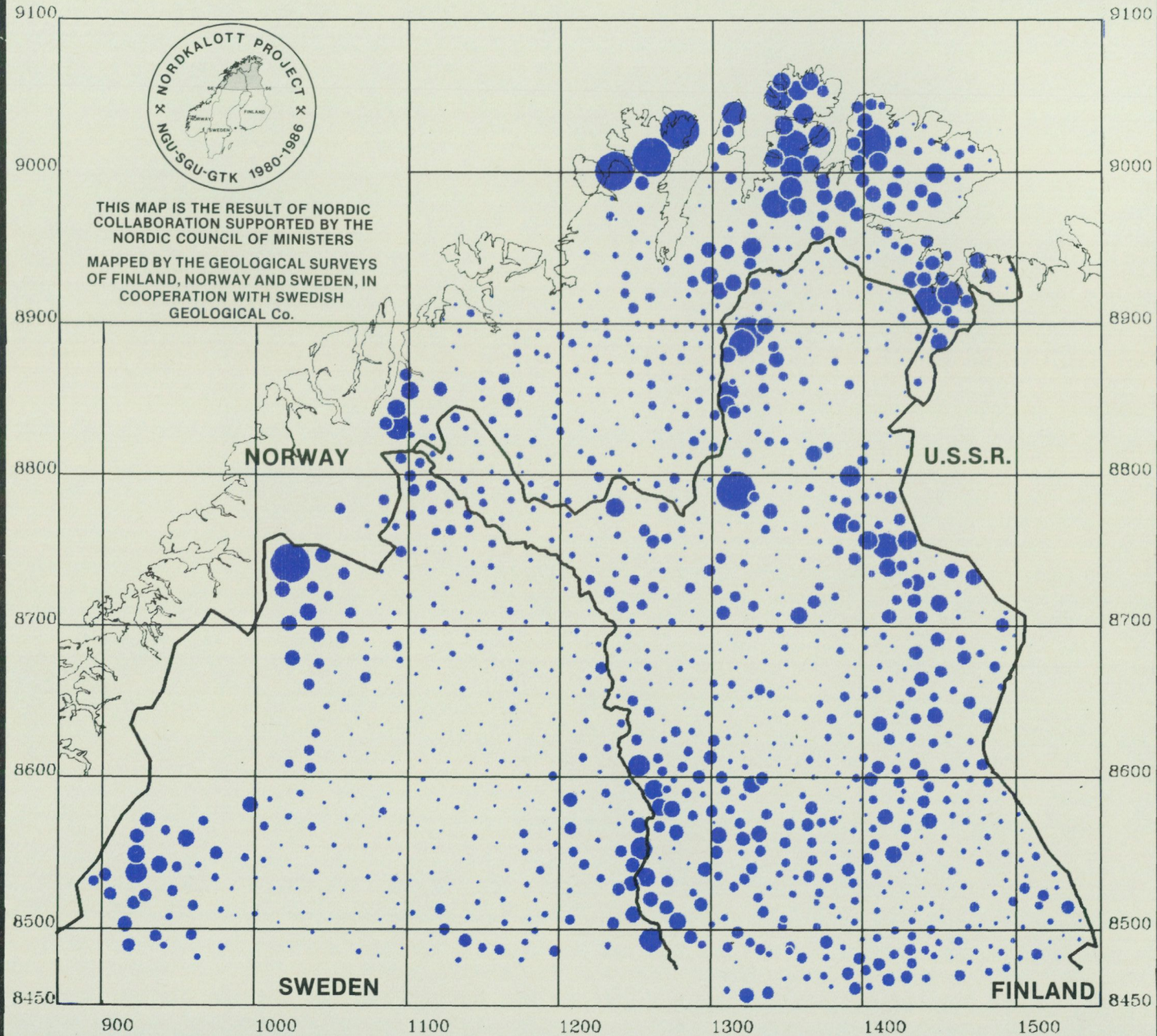
Projection: Lambert conformal
 Date of plotting: 12.03.1985

MAP 97



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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



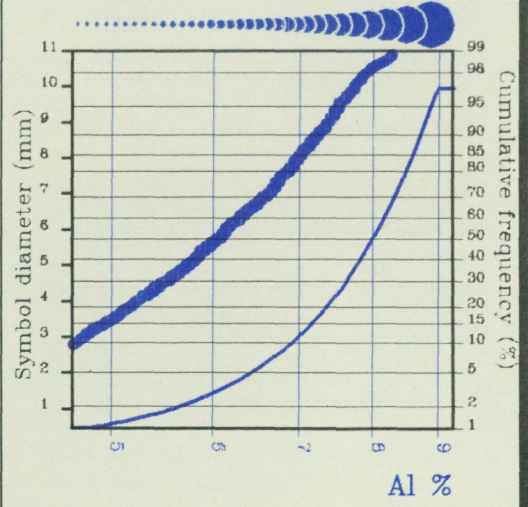
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry

STREAM ORGANIC MATTER Al

Content in ash
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1096

Symbol size
 Cumulative frequency



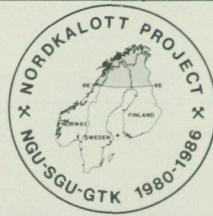
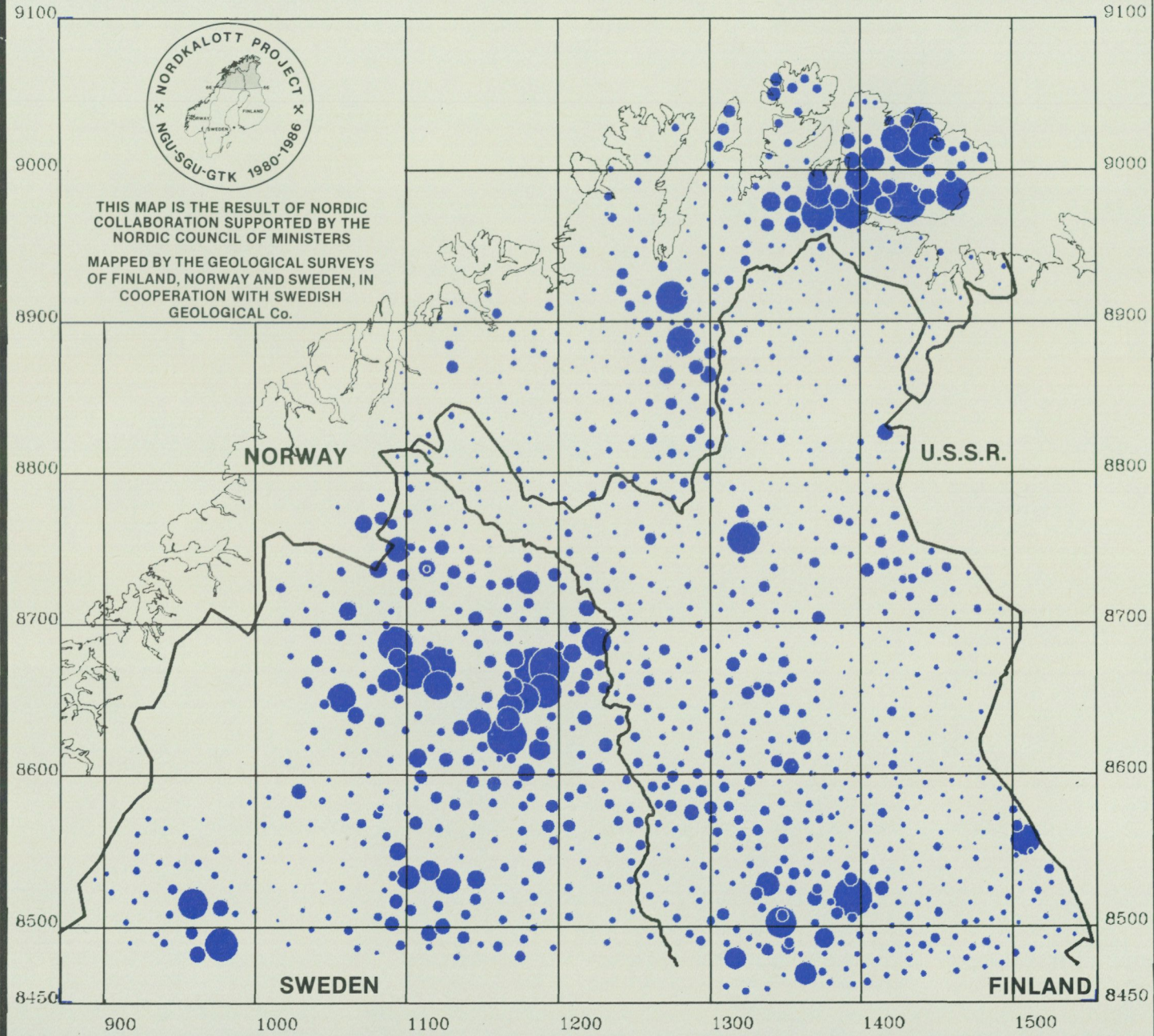
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 23.04.1985

MAP 98

Compiled by: J. Bergström, A. Björklund, B. Bølviiken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steenfelt, and T. Volden.

ISBN 91-7158-383-1



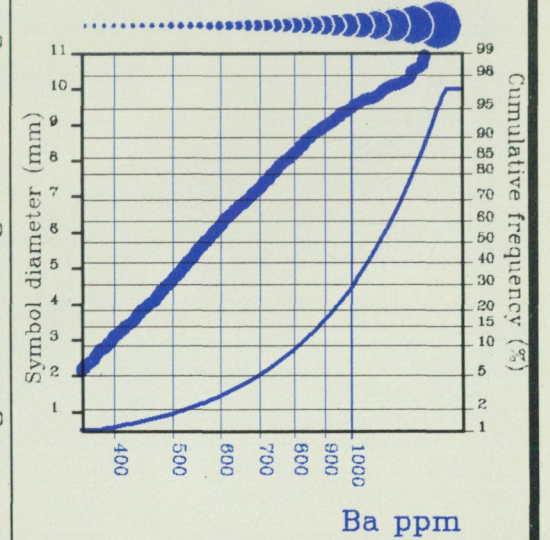
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Nordkalott project Geochemistry

STREAM ORGANIC MATTER Ba

Content in ash
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1096

Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 23.04.1986

MAP 99

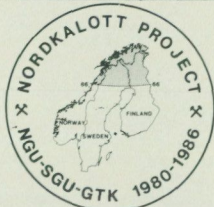
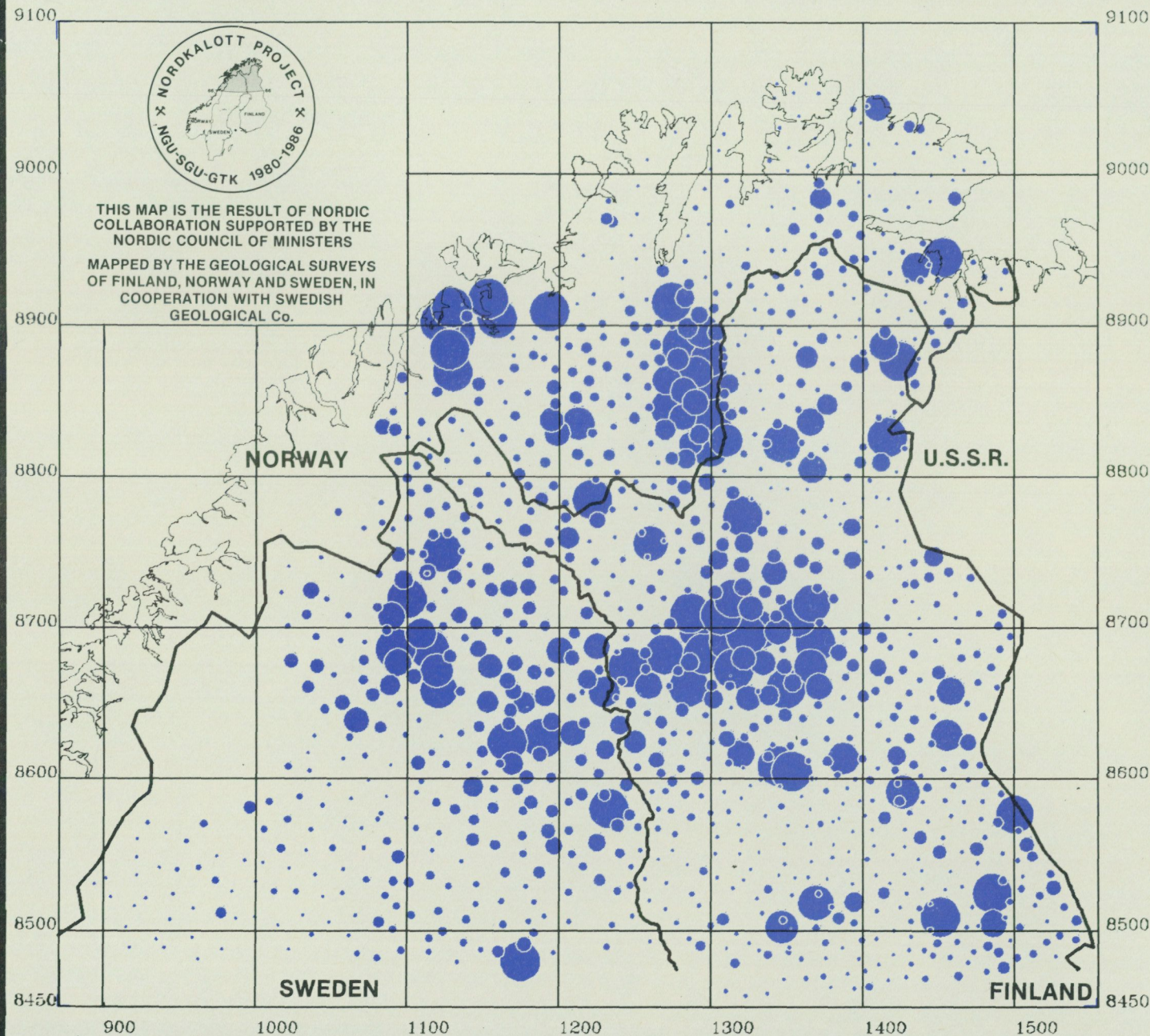
Compiled by: J. Bergström, A. Björklund, B. Bølviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden. ISBN 91-7158-383-1

Nordkalott project Geochemistry

STREAM ORGANIC MATTER

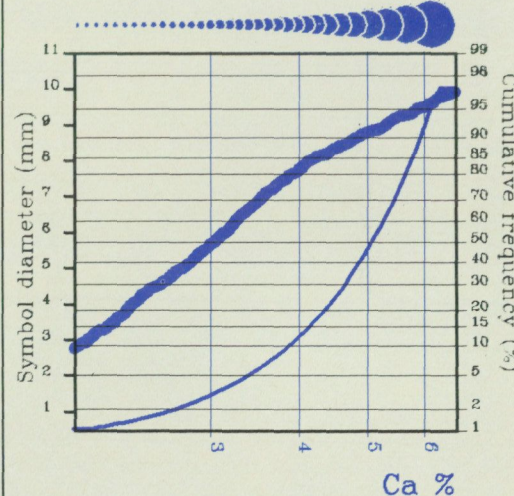
Ca

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096



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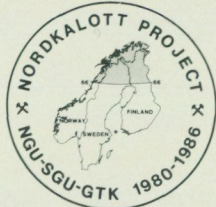
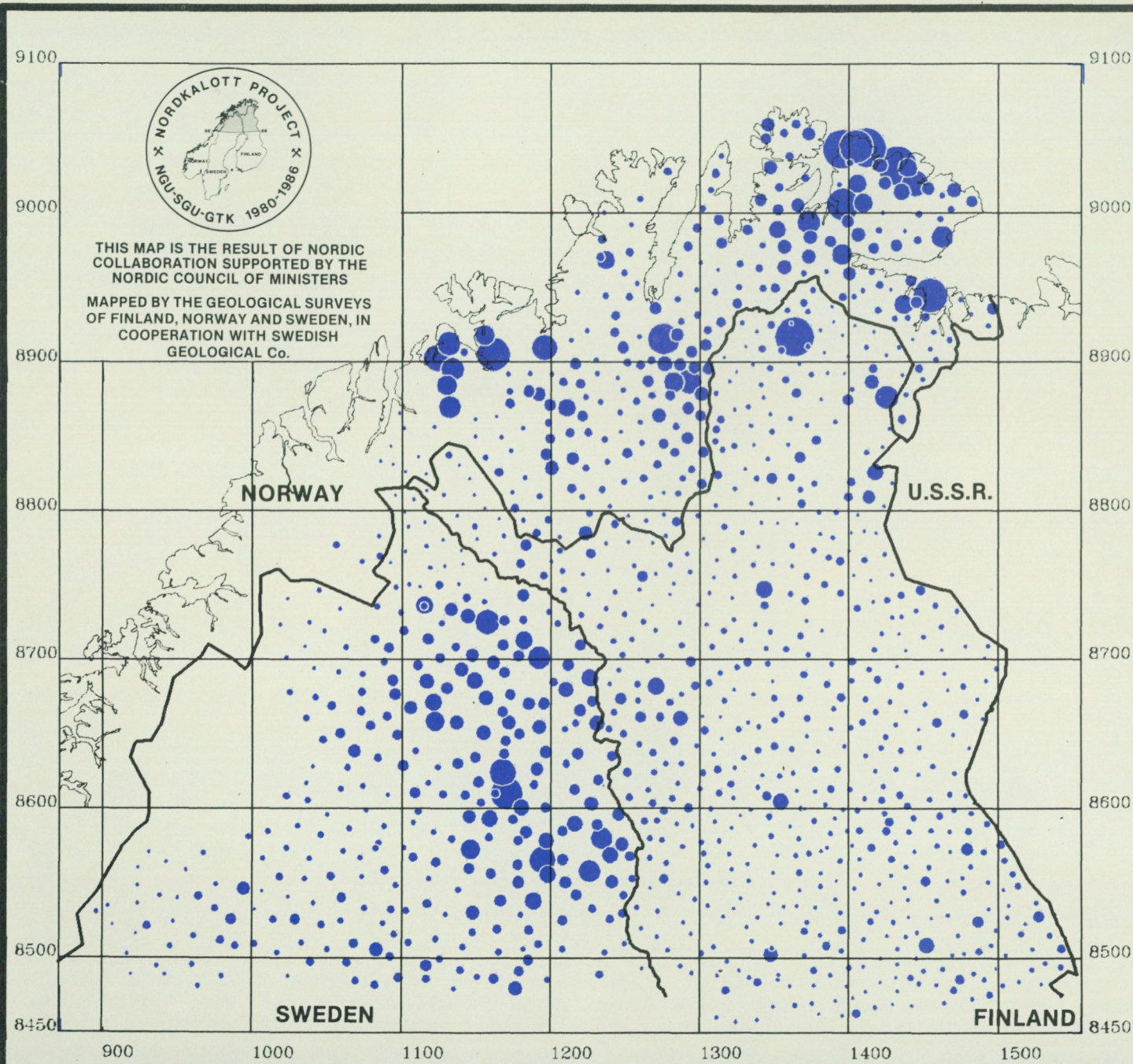
Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 03.04.1986

MAP 100

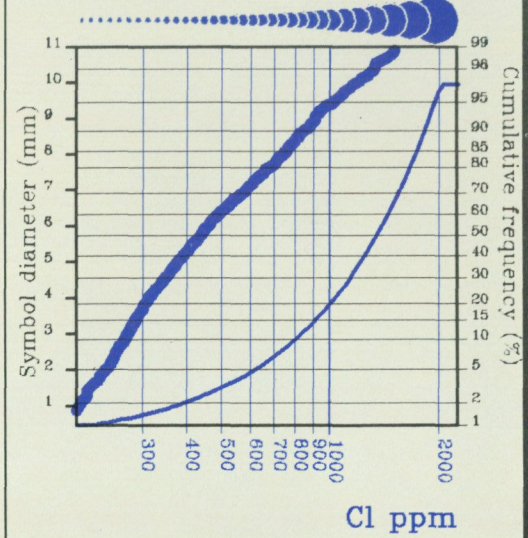


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Nordkalott project Geochemistry STREAM ORGANIC MATTER Cl

Content in ash
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1096

Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 23.04.1985
MAP 101

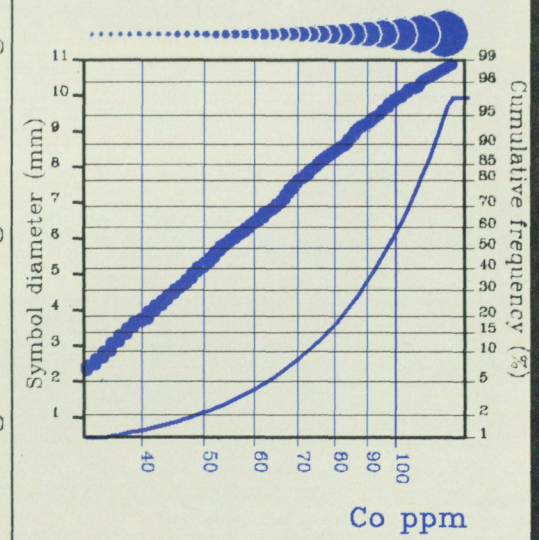
Compiled by: J. Bergström, A. Björklund, B. Bølviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden. ISBN 91-7158-383-1

Nordkalott project Geochemistry

STREAM ORGANIC MATTER Co

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096

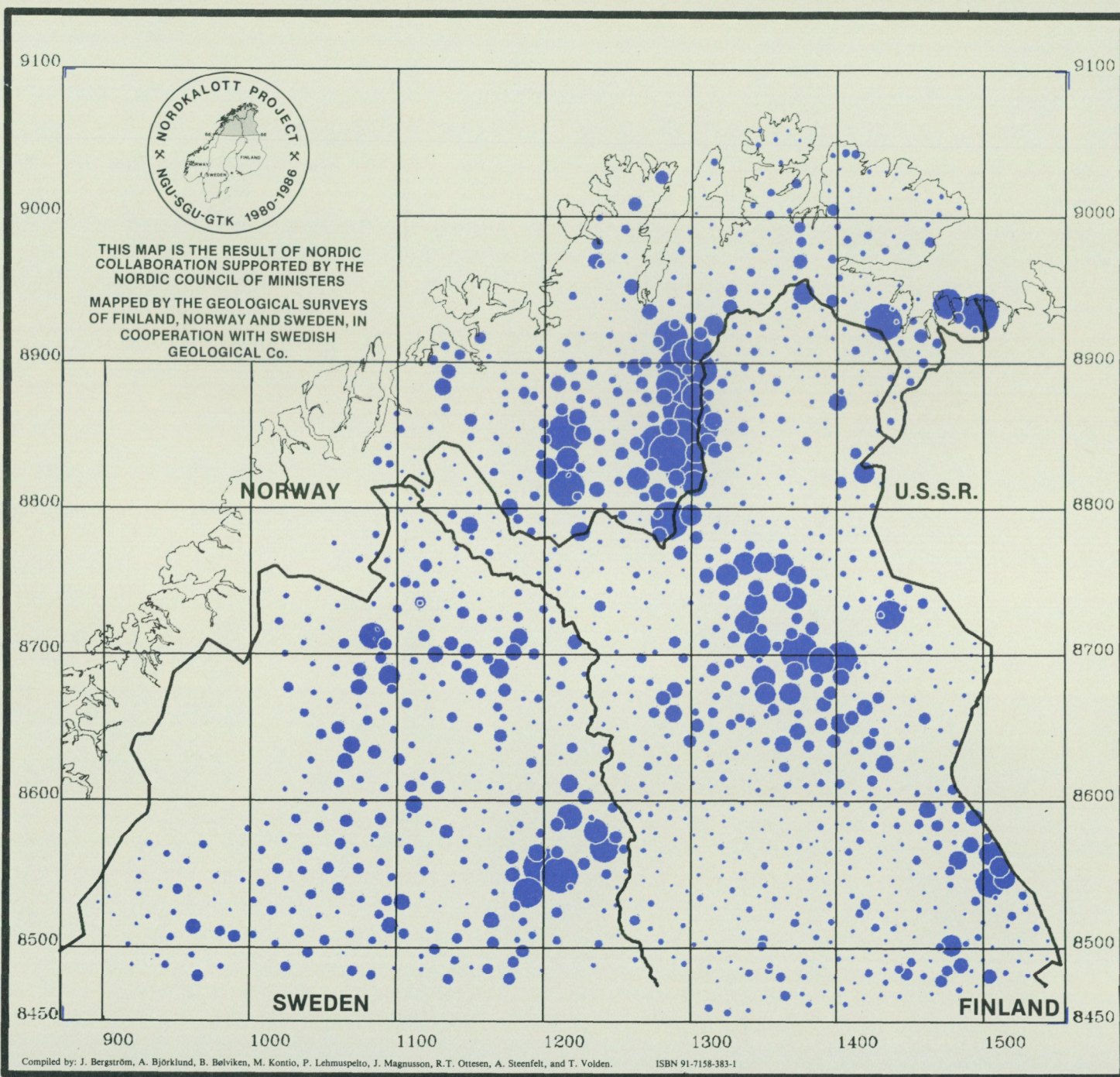
Symbol size
Cumulative frequency



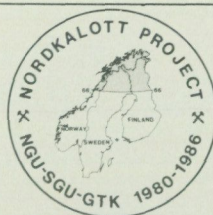
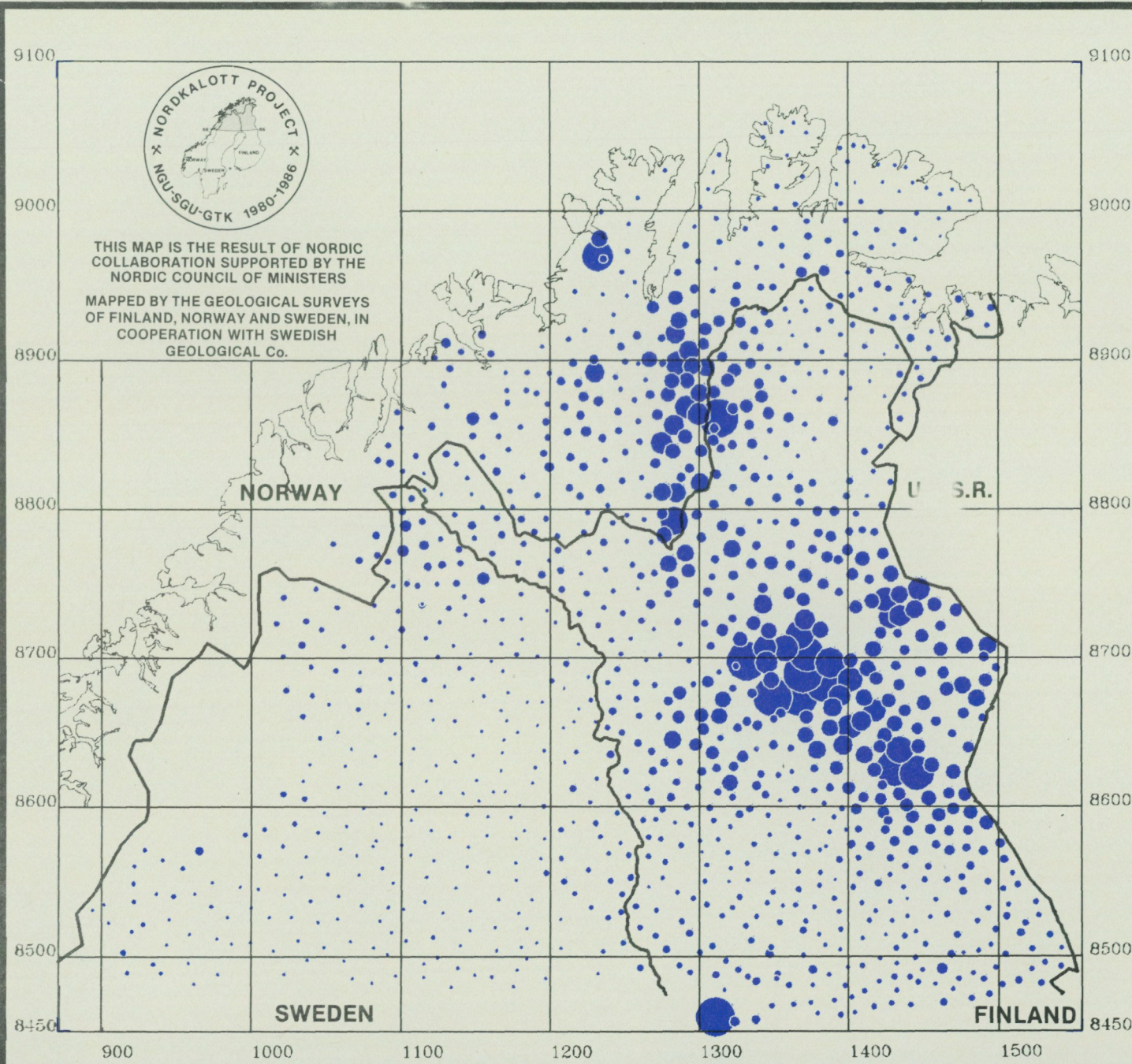
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 03.04.1986

MAP 102



Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden. ISBN 91-7158-383-1

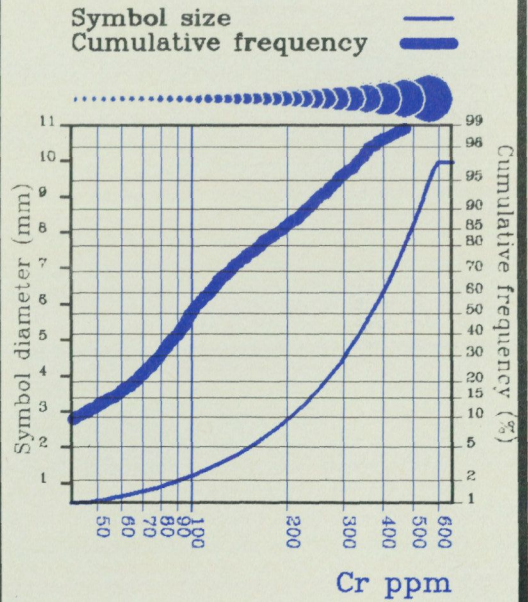


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Nordkalott project Geochemistry

STREAM ORGANIC MATTER Cr

Content in ash
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1096



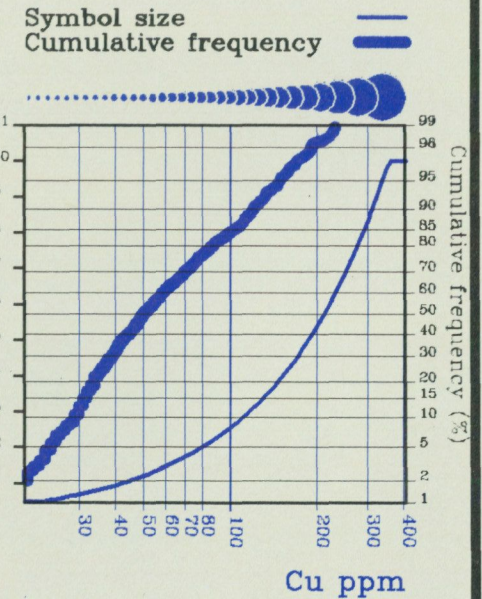
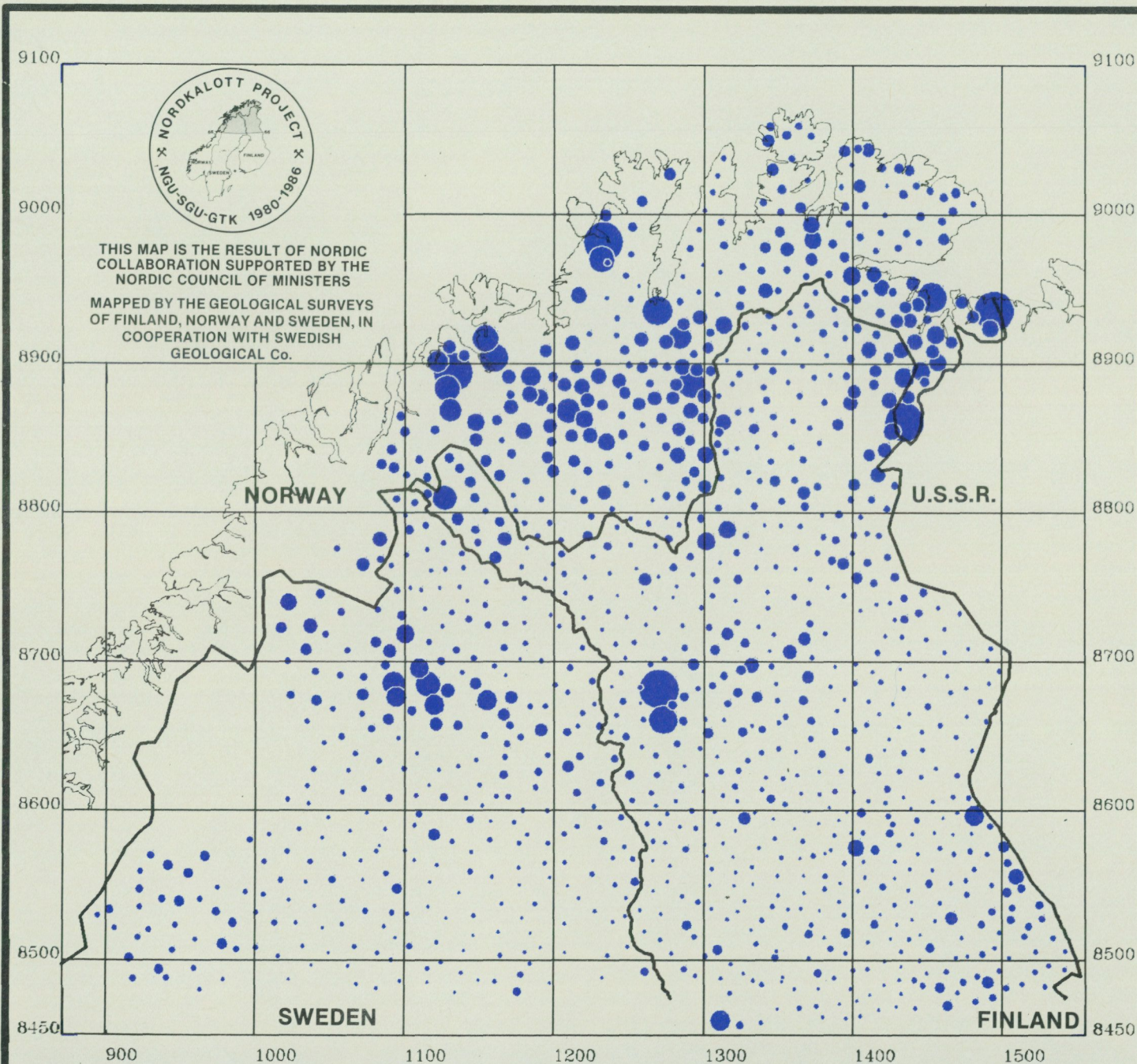
1: 4 000 000
 100 km
 Projection: Lambert conformal
 Date of plotting: 03.04.1986

MAP 103

Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ortesen, A. Steinfeldt, and T. Volden. ISBN 91-7158-383-1

Nordkalott project Geochemistry STREAM ORGANIC MATTER Cu

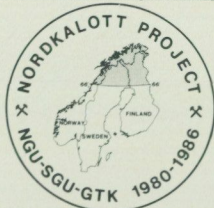
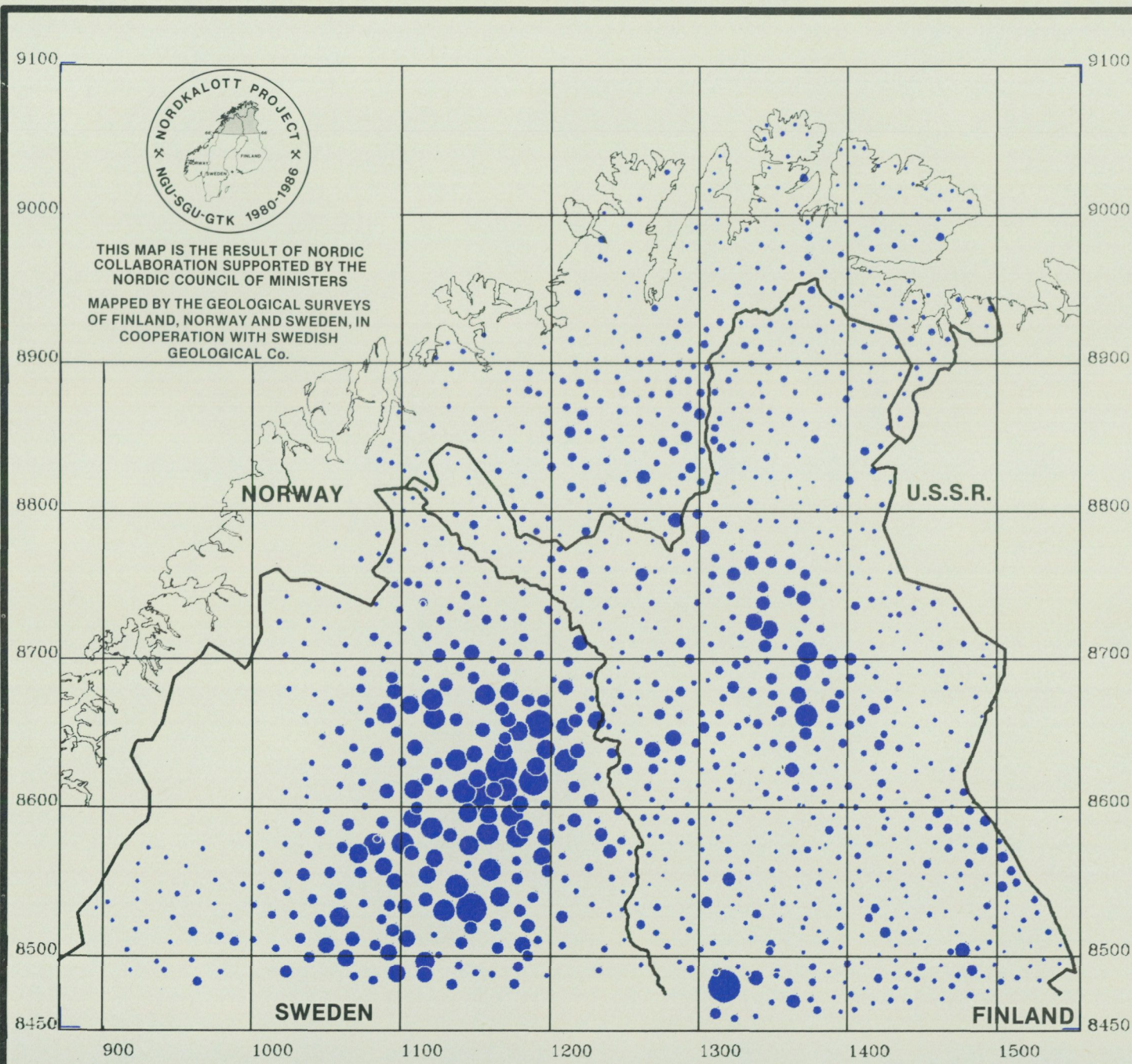
Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 23.04.1985

MAP 104

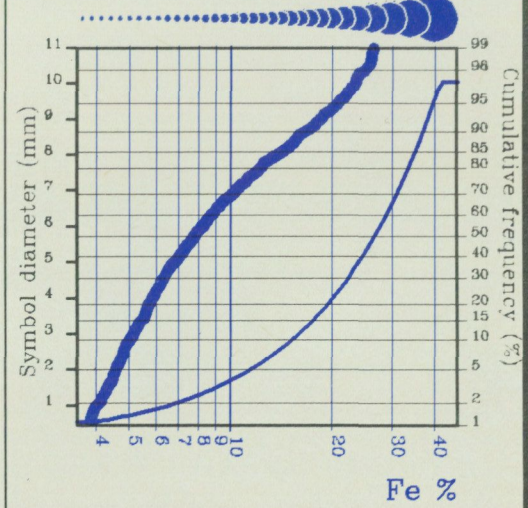


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Nordkalott project Geochemistry STREAM ORGANIC MATTER Fe

Content in ash
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1096

Symbol size
 Cumulative frequency



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 03.04.1986 **MAP 105**

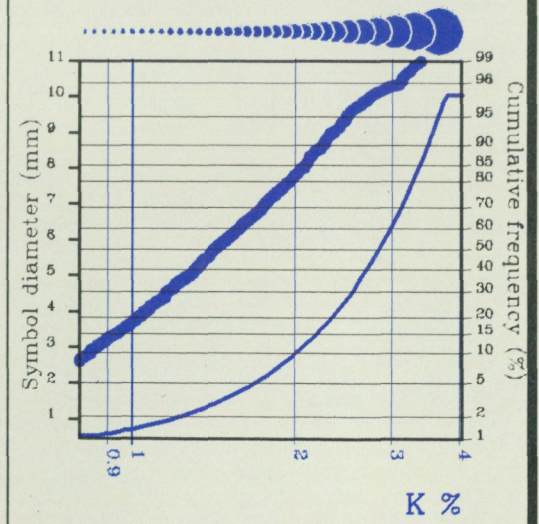
Nordkalott project Geochemistry

STREAM ORGANIC MATTER

K

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096

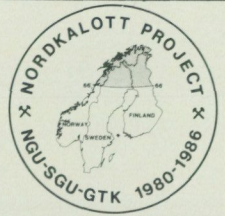
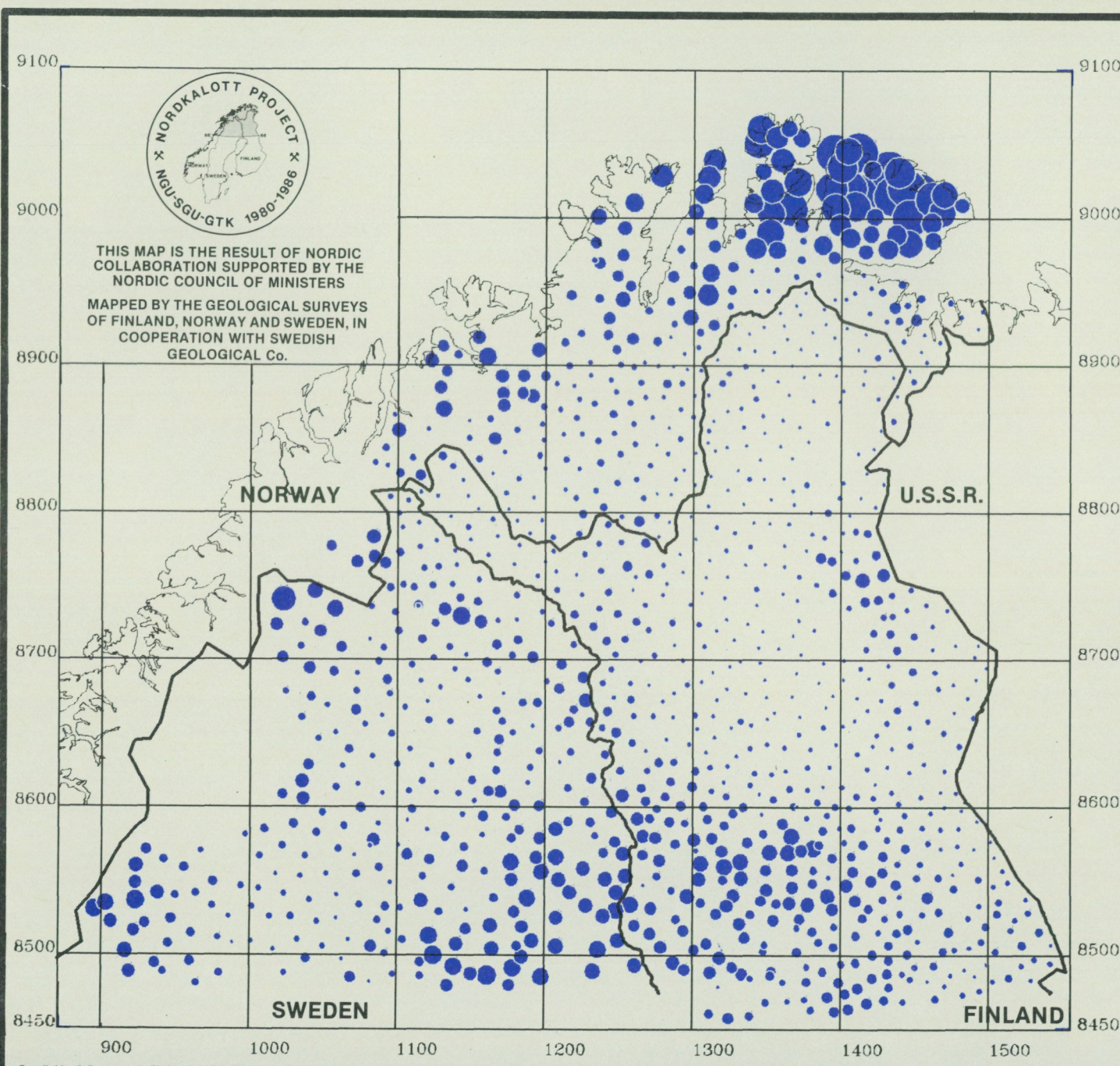
Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 23.04.1986

MAP 106



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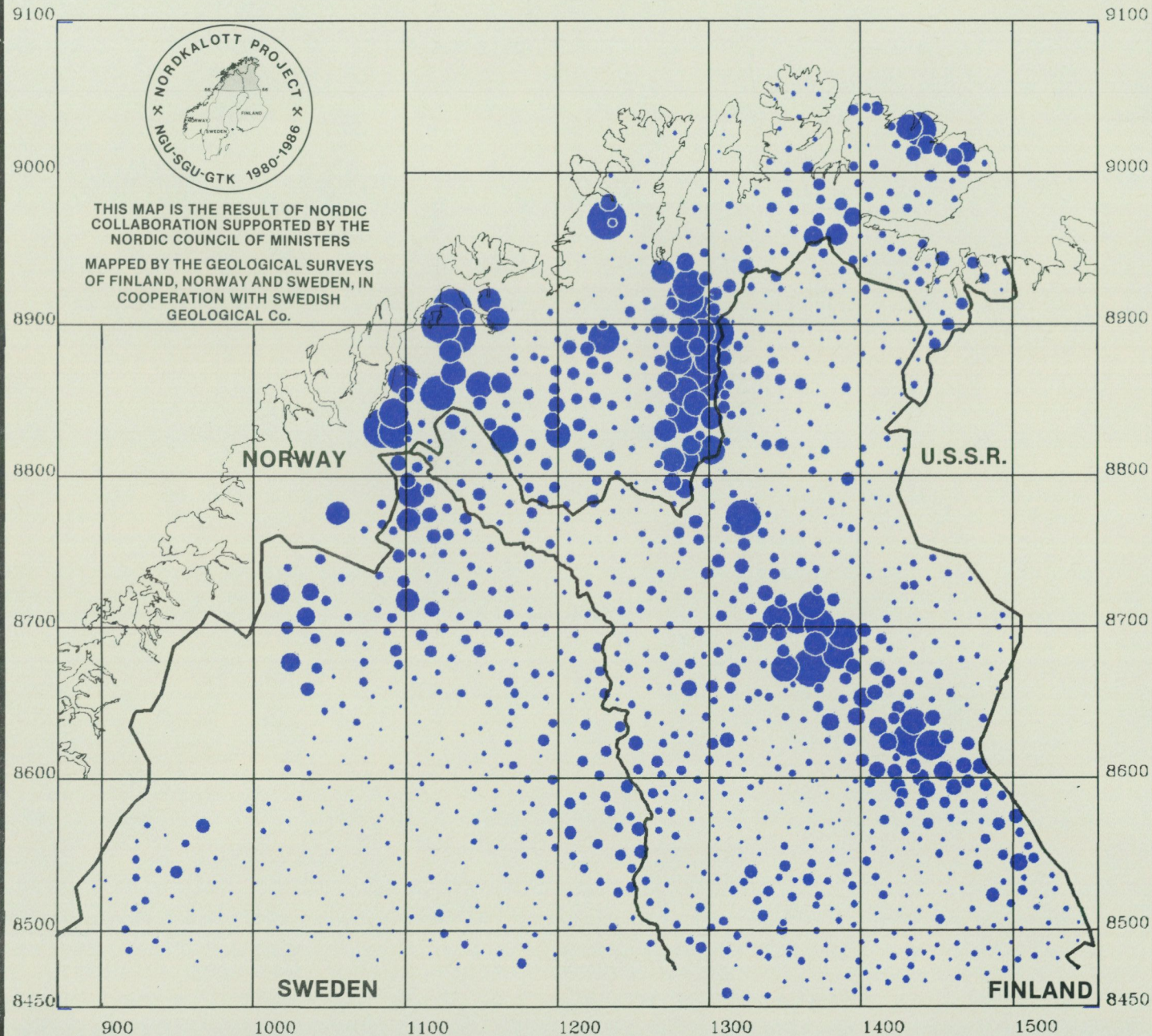
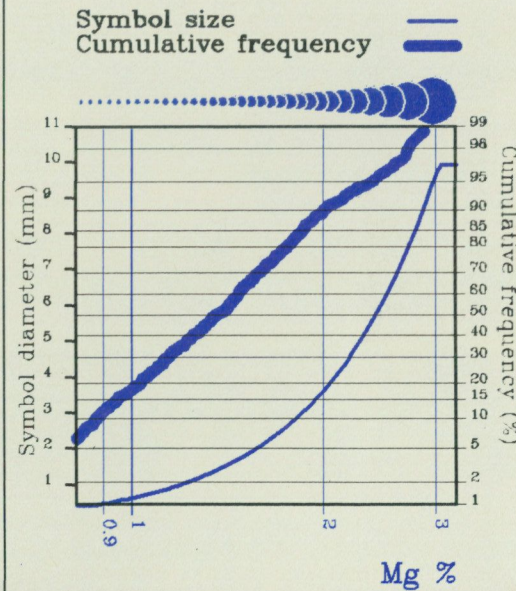
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Nordkalott project Geochemistry

STREAM ORGANIC MATTER Mg

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 23.04.1985

MAP 107

Nordkalott project Geochemistry

STREAM ORGANIC MATTER

Mn

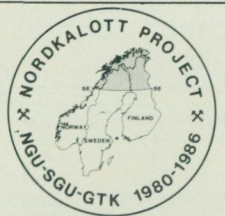
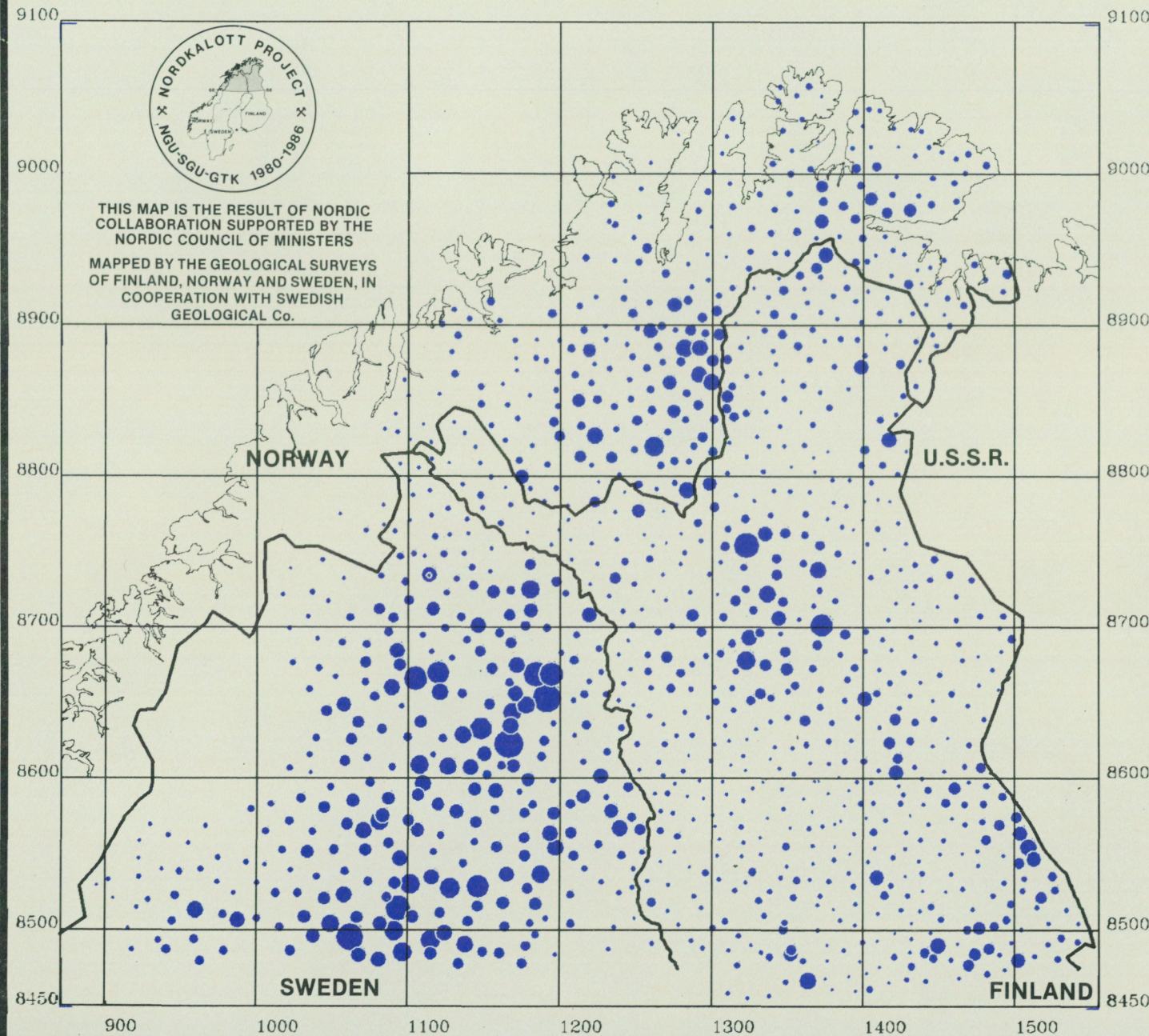
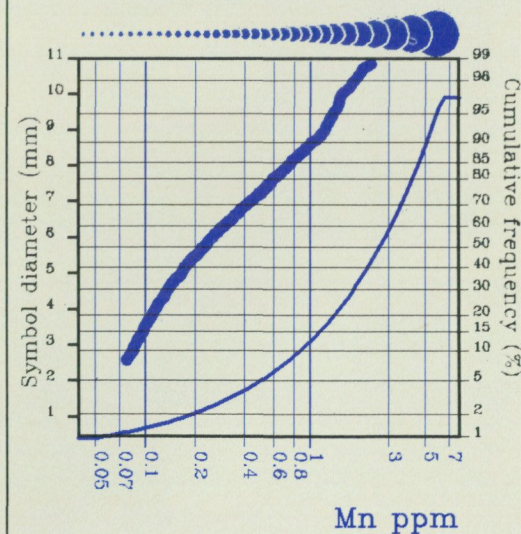
Content in ash

Method of analysis: XRF

Laboratory: SGAB

No. of samples: 1096

Symbol size
Cumulative frequency



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1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 03.04.1985

MAP 108

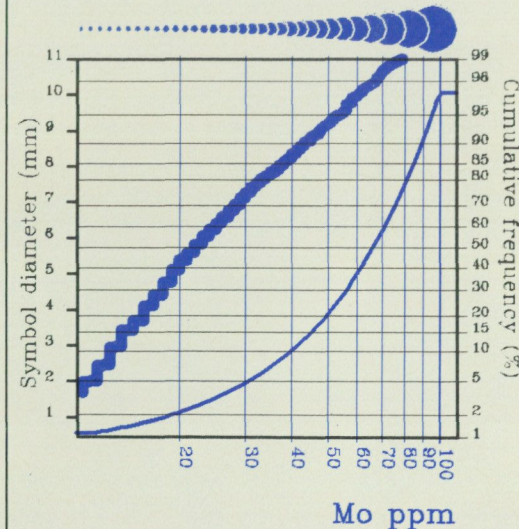
Nordkalott project Geochemistry

STREAM ORGANIC MATTER

Mo

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096

Symbol size
Cumulative frequency

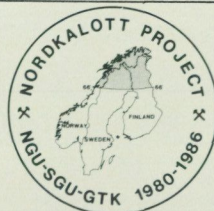
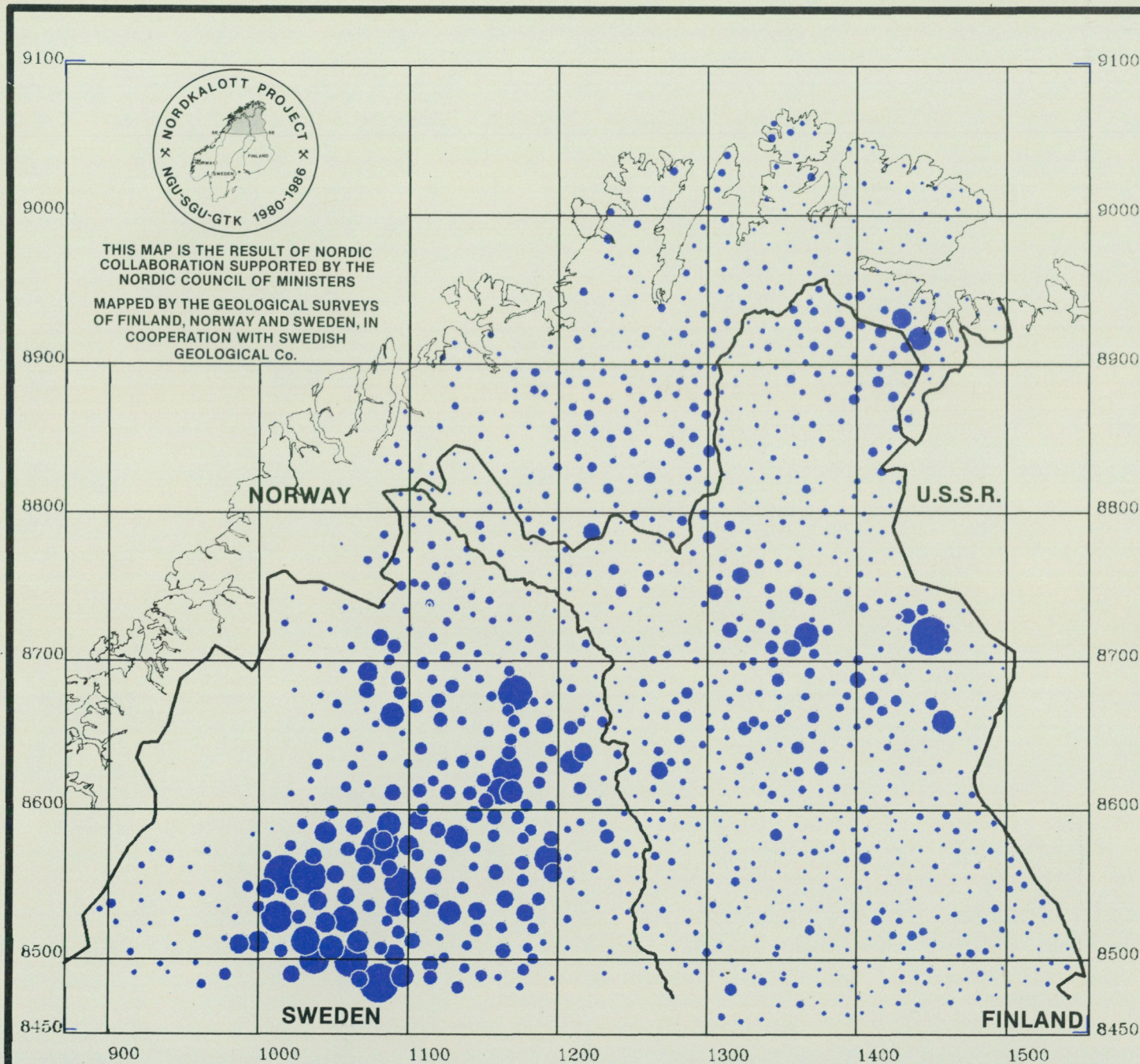


1: 4 000 000

100 km

Projection: Lambert conformal
Date of plotting: 04.04.1988

MAP 109

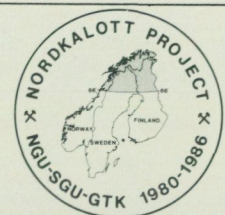
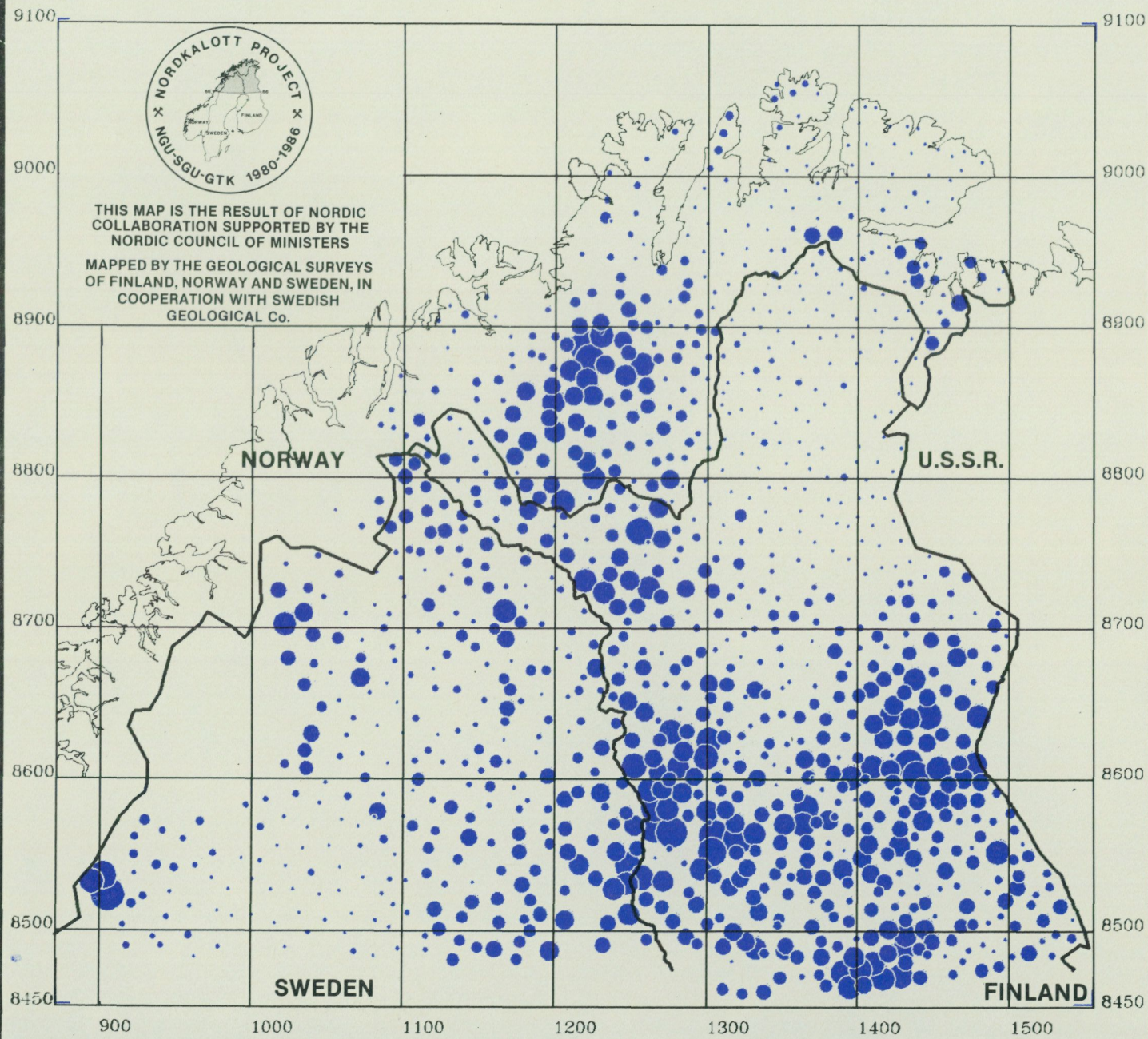
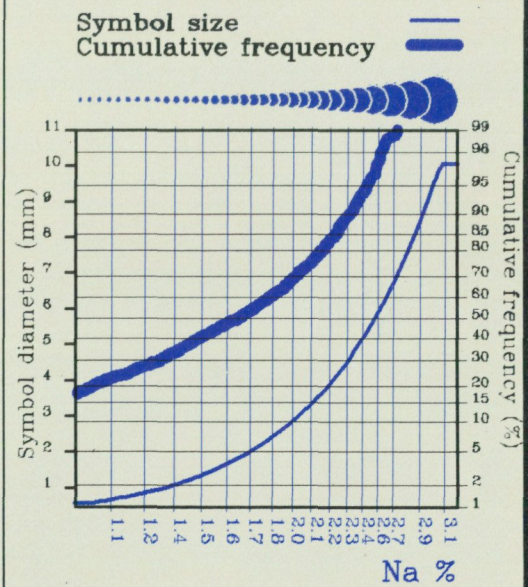


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MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
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GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM ORGANIC MATTER Na

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096



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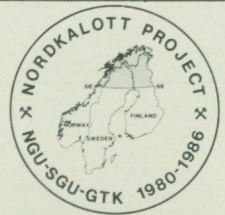
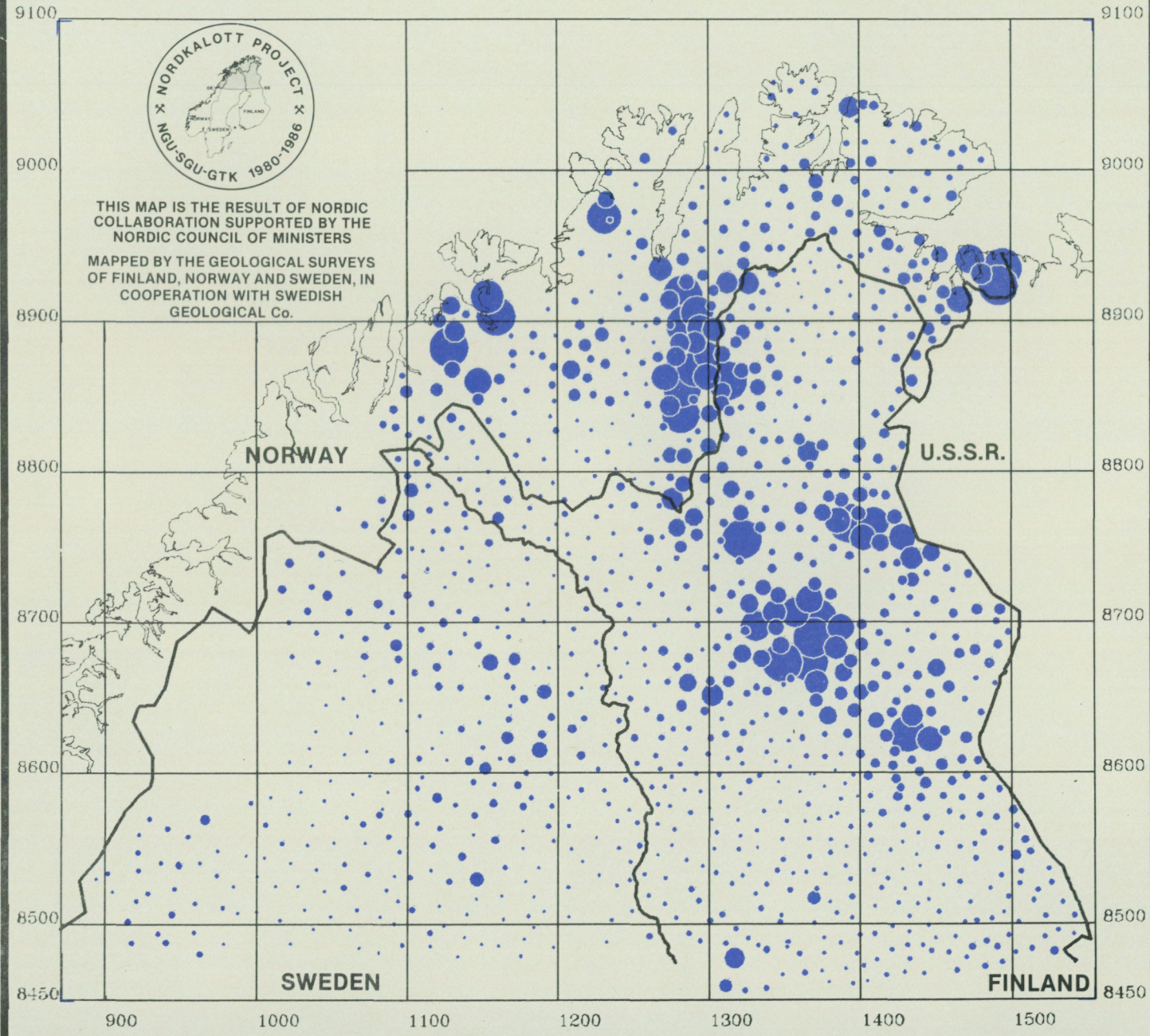
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ISBN 91-7158-383-1

1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 23.04.1986

MAP 110

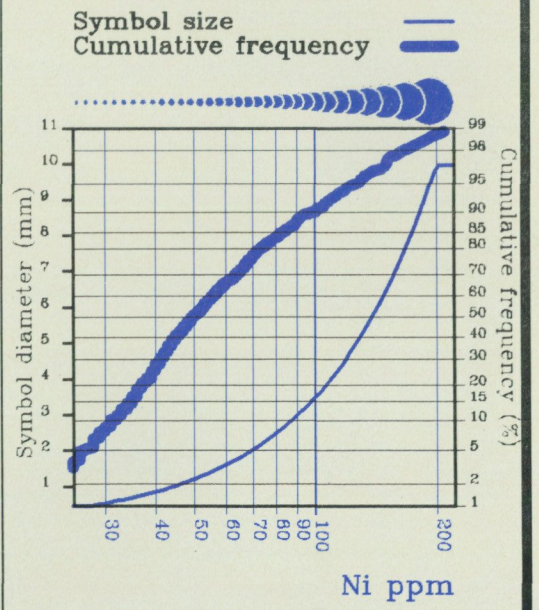


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Nordkalott project Geochemistry

STREAM ORGANIC MATTER Ni

Content in ash
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1096



1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 03.04.1985

MAP 111

Compiled by: J. Bergström, A. Björklund, B. Bølviiken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden.

ISBN 91-7158-383-1

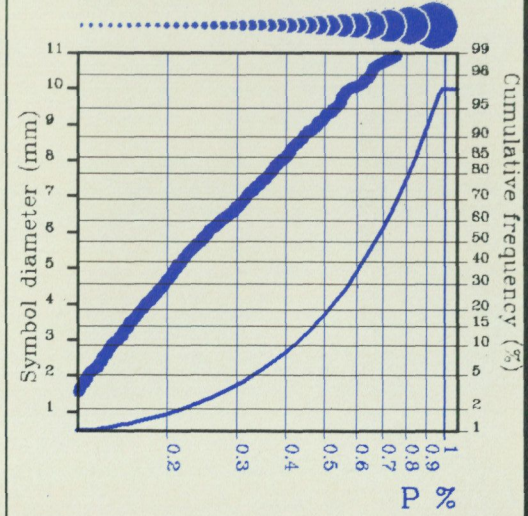
Nordkalott project Geochemistry

STREAM ORGANIC MATTER

P

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096

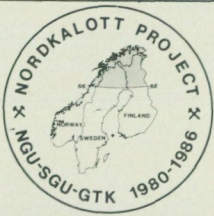
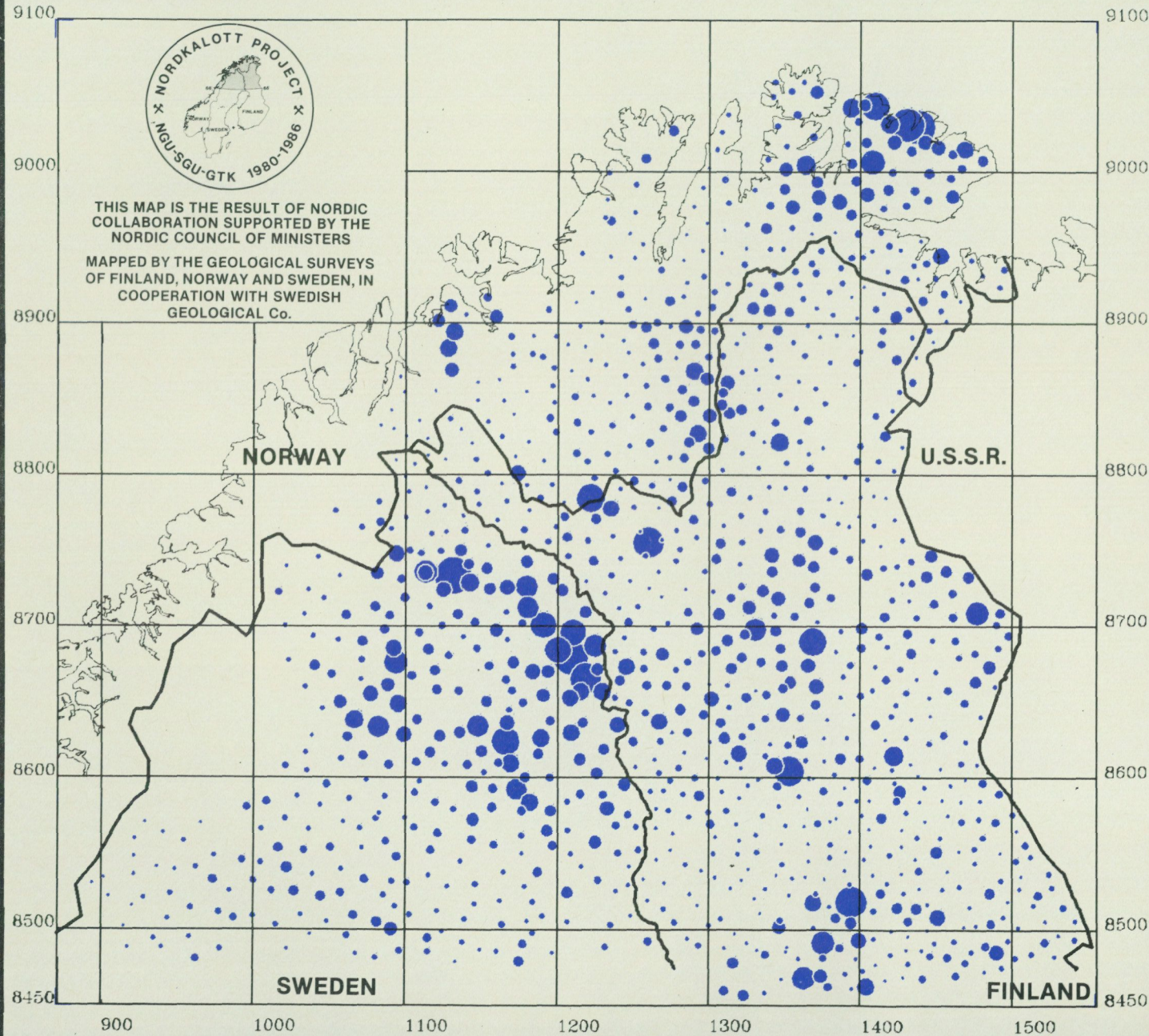
Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 02.04.1985

MAP 112



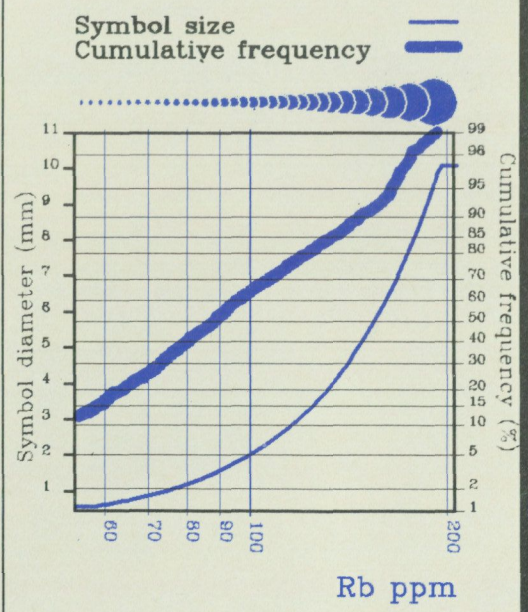
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Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden.

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Nordkalott project Geochemistry STREAM ORGANIC MATTER Rb

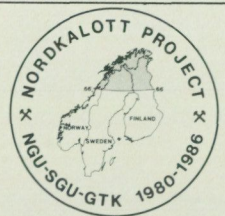
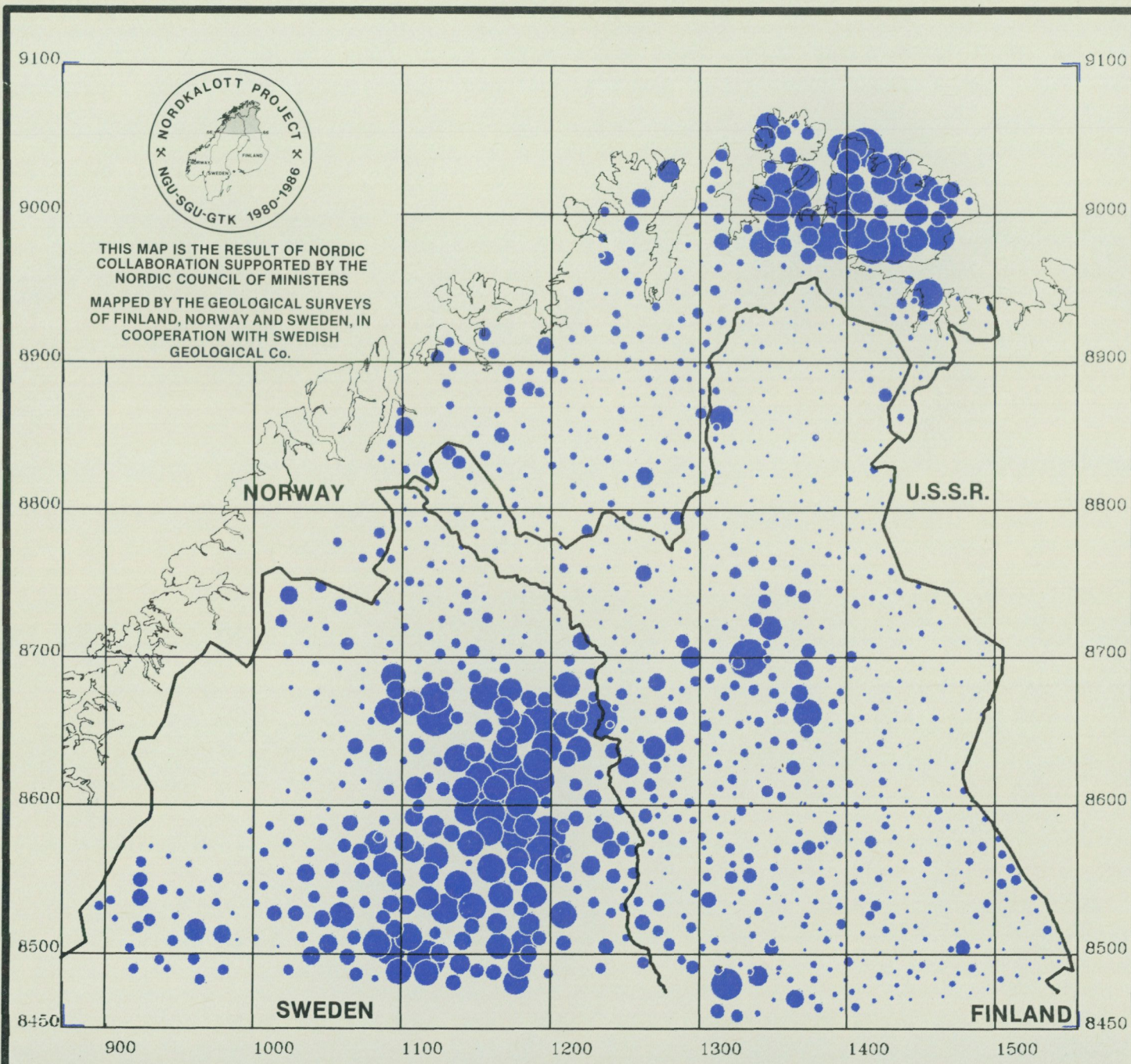
Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 23.04.1986

MAP 113



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Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden.

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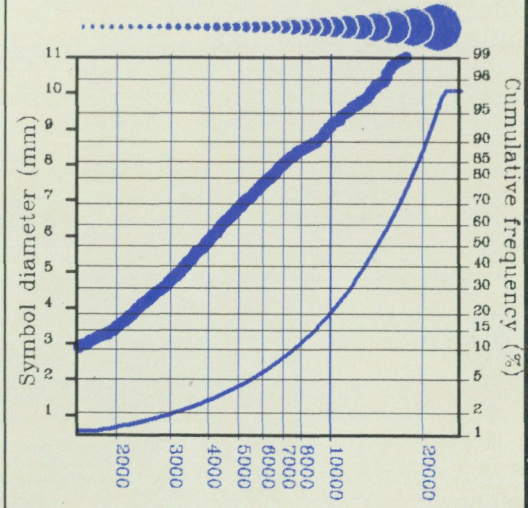
Nordkalott project Geochemistry

STREAM ORGANIC MATTER

S

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096

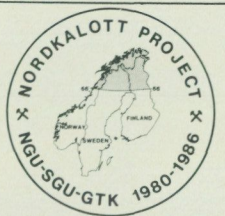
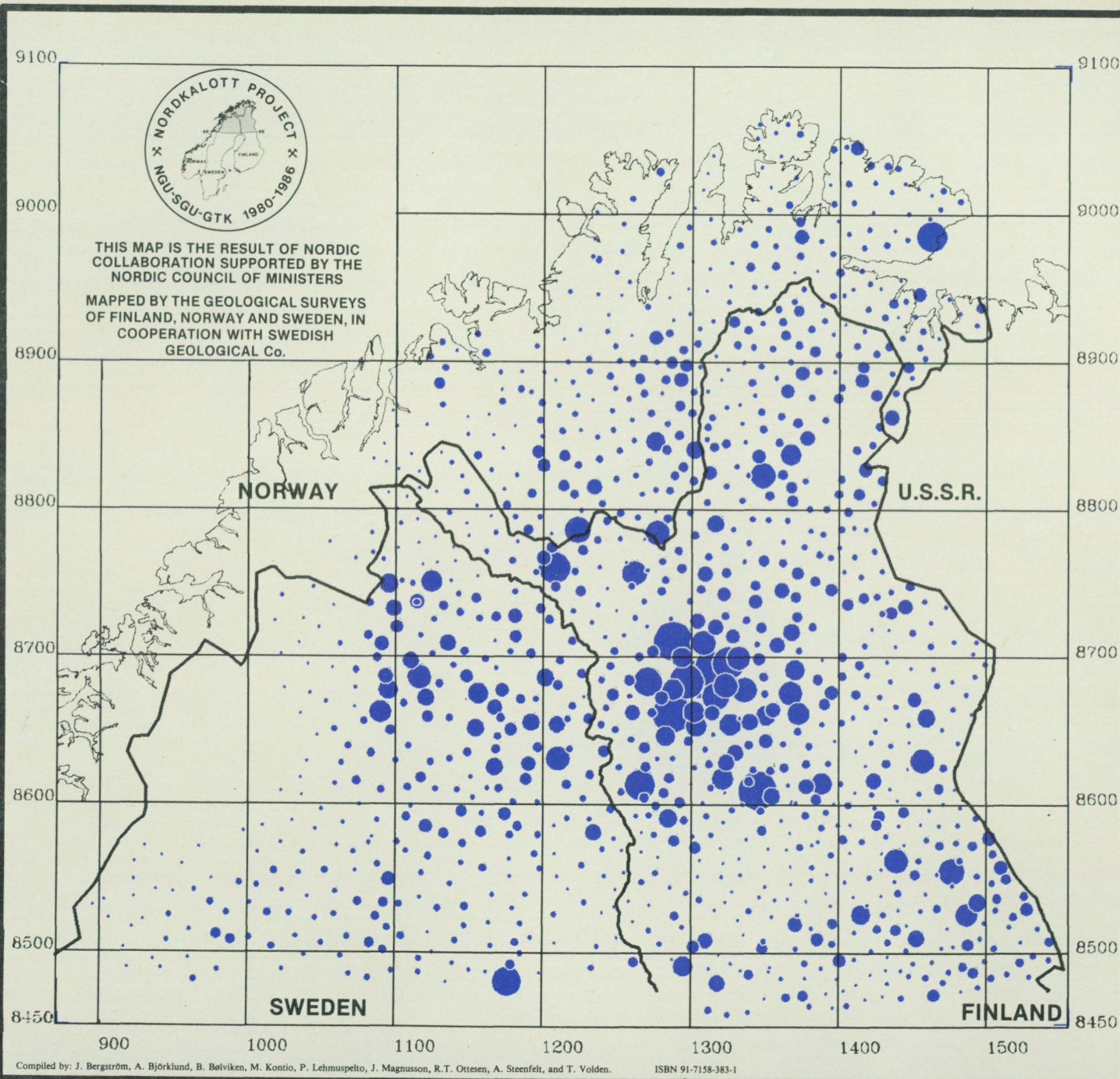
Symbol size
Cumulative frequency



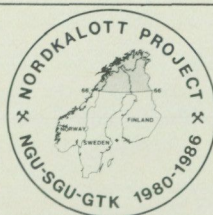
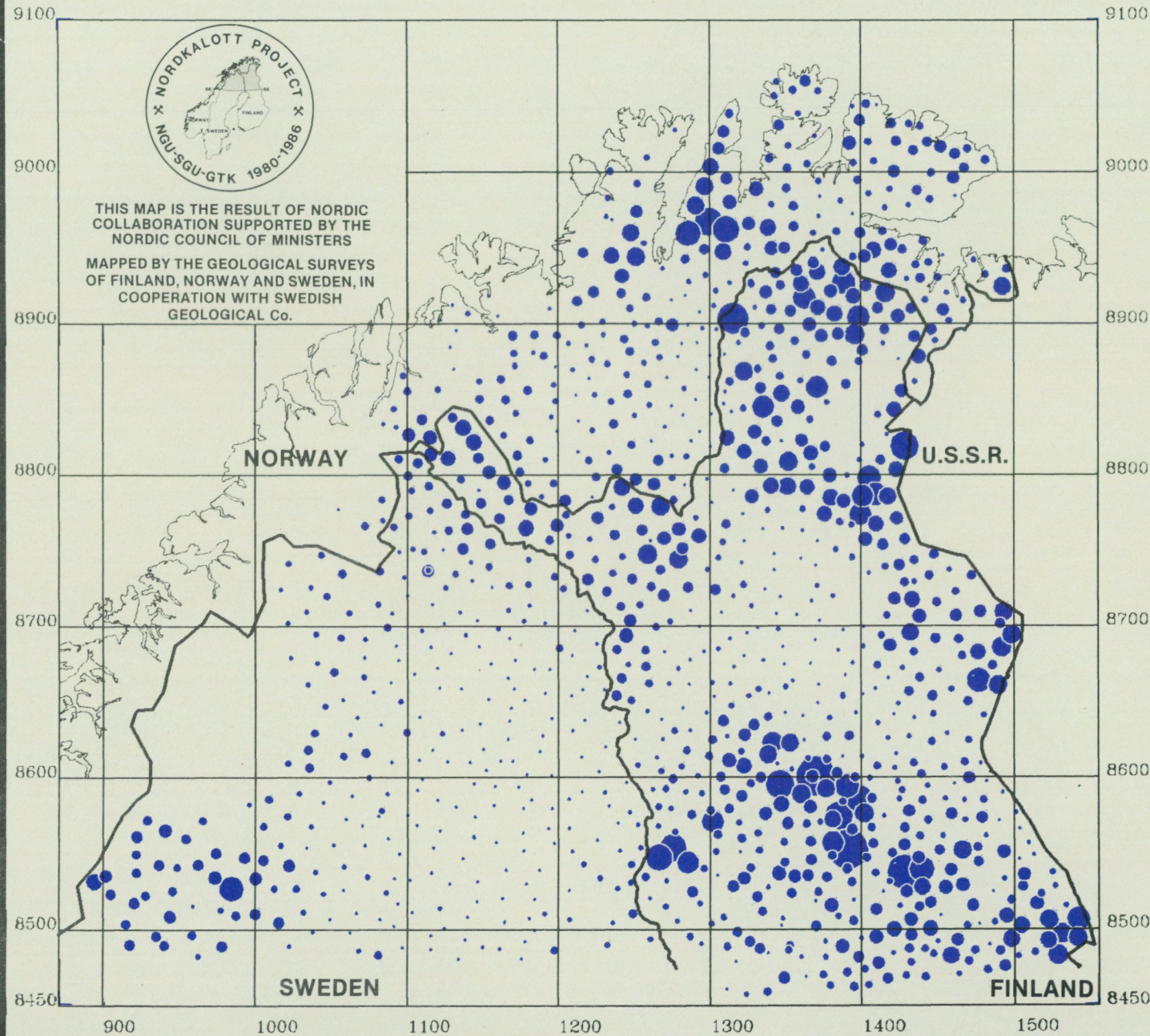
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 23.04.1986

MAP 114



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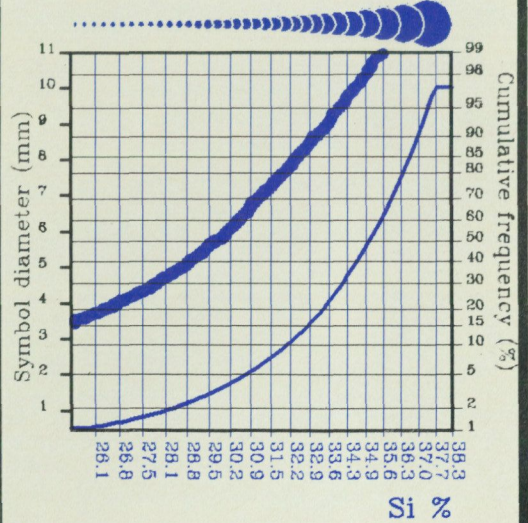
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 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry

STREAM ORGANIC MATTER Si

Content in ash
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1096

Symbol size
 Cumulative frequency



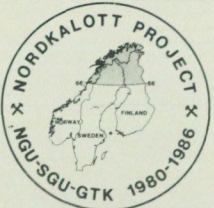
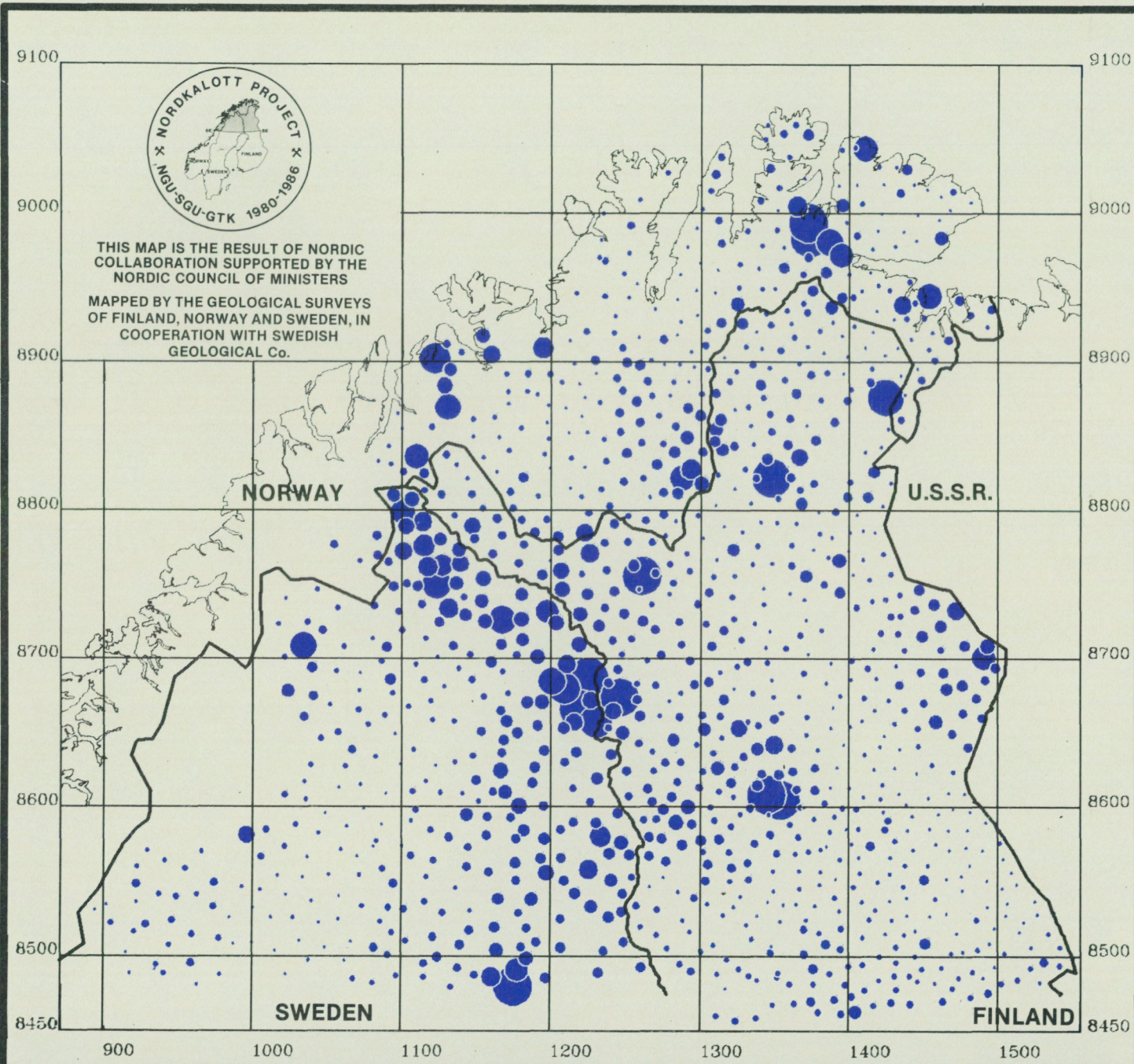
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 23.04.1985

MAP 115

Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden.

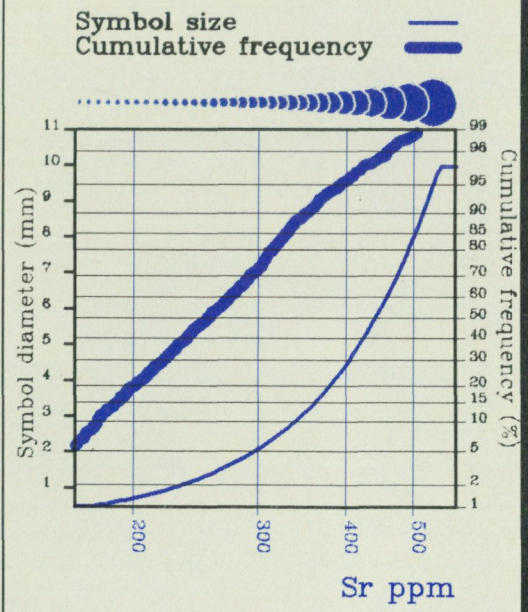
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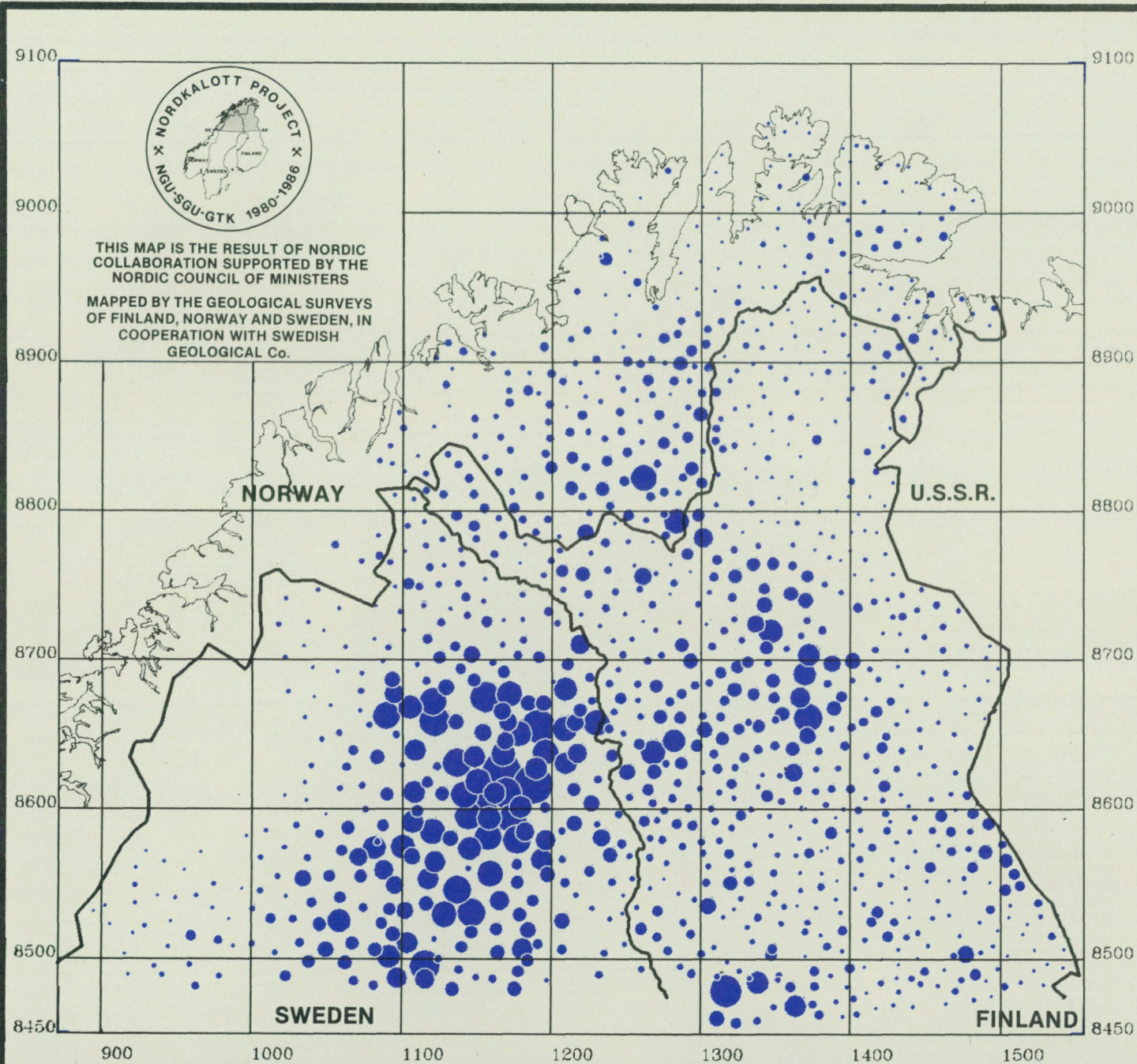
Nordkalott project Geochemistry STREAM ORGANIC MATTER Sr

Content in ash
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1096



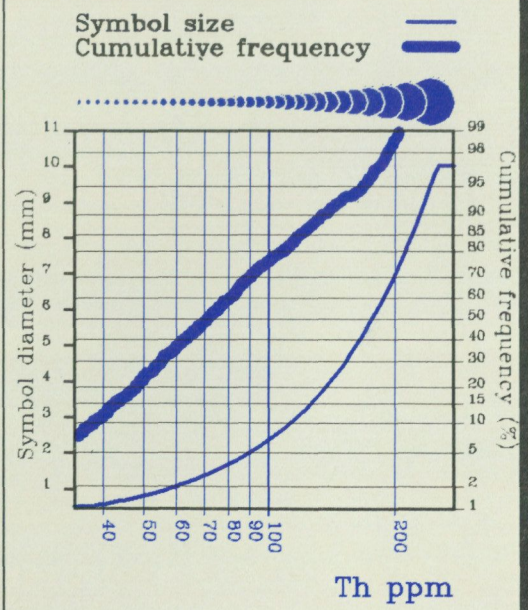
1: 4 000 000
 100 km

Projection: Lambert conformal
 Date of plotting: 23.04.1985
MAP 116



Nordkalott project Geochemistry STREAM ORGANIC MATTER Th

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 04.04.1986

MAP 117

Compiled by: J. Bergström, A. Björklund, B. Bølviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steenfelt, and T. Volden. ISBN 91-7158-383-1

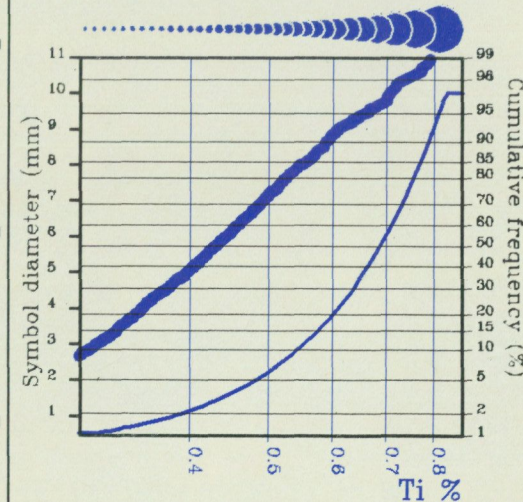
Nordkalott project Geochemistry

STREAM ORGANIC MATTER

Ti

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096

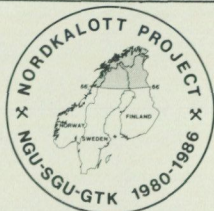
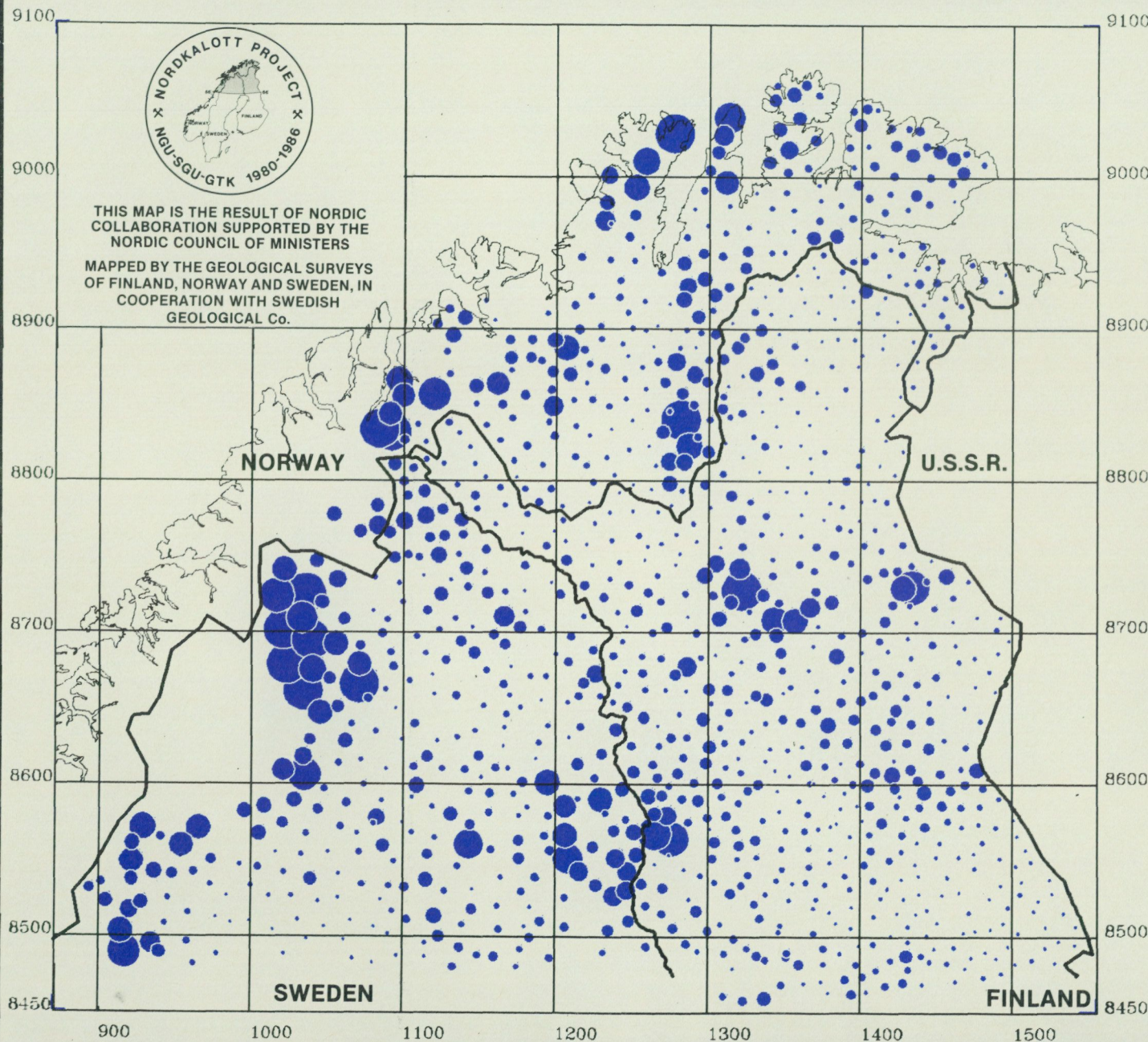
Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 03.04.1986

MAP 118



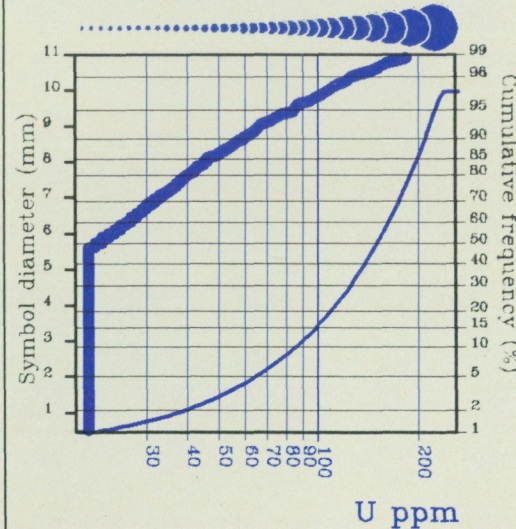
THIS MAP IS THE RESULT OF NORDIC
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MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
COOPERATION WITH SWEDISH
GEOLOGICAL Co.

Nordkalott project Geochemistry

STREAM ORGANIC MATTER U

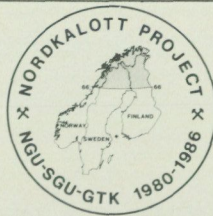
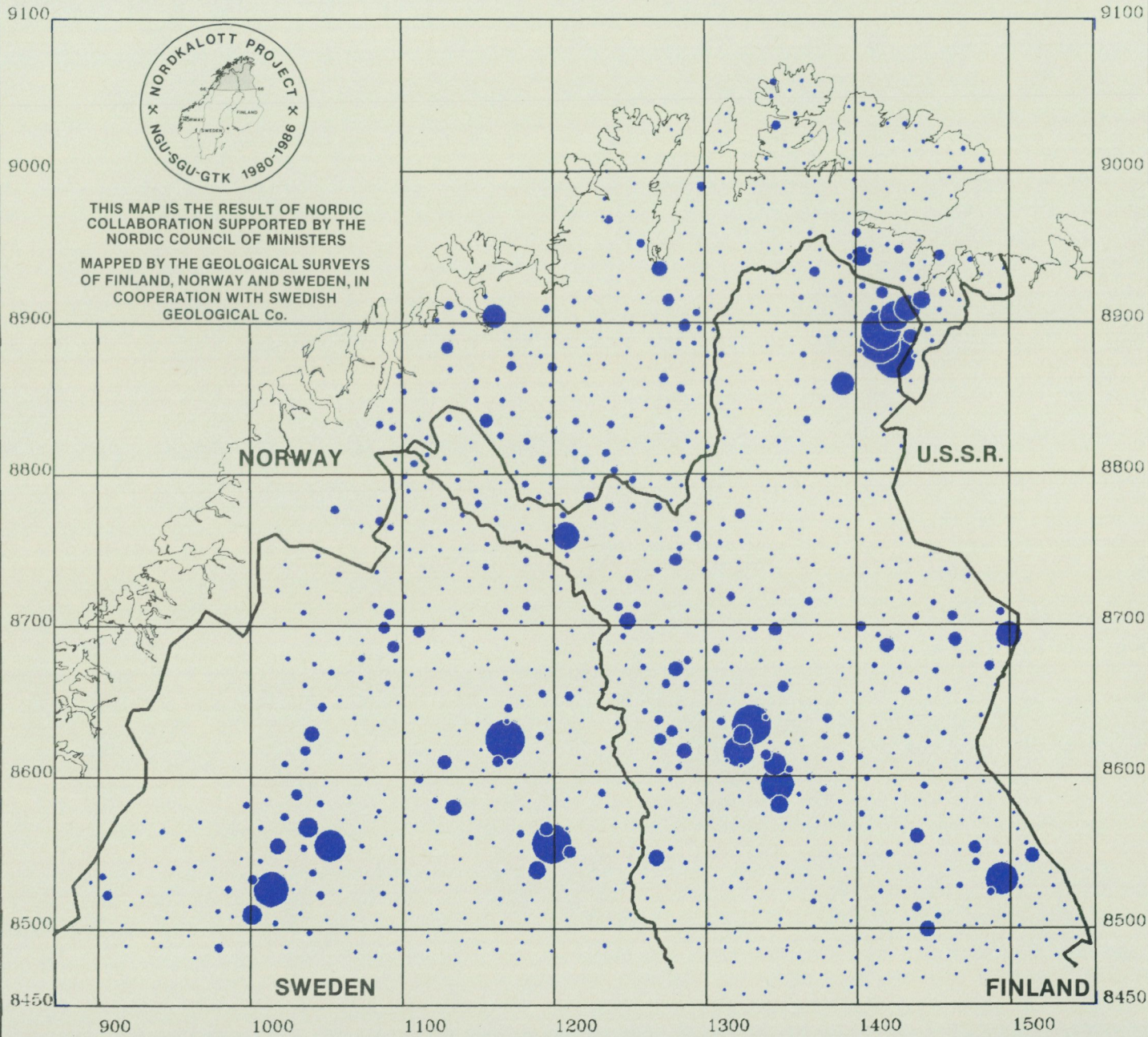
Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096

Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 04.04.1985 **MAP 119**



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

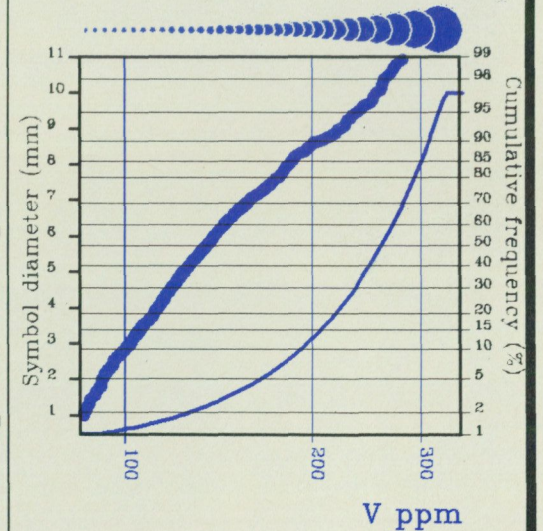
Nordkalott project Geochemistry

STREAM ORGANIC MATTER

V

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096

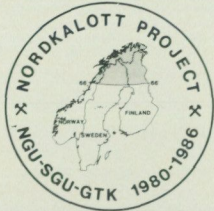
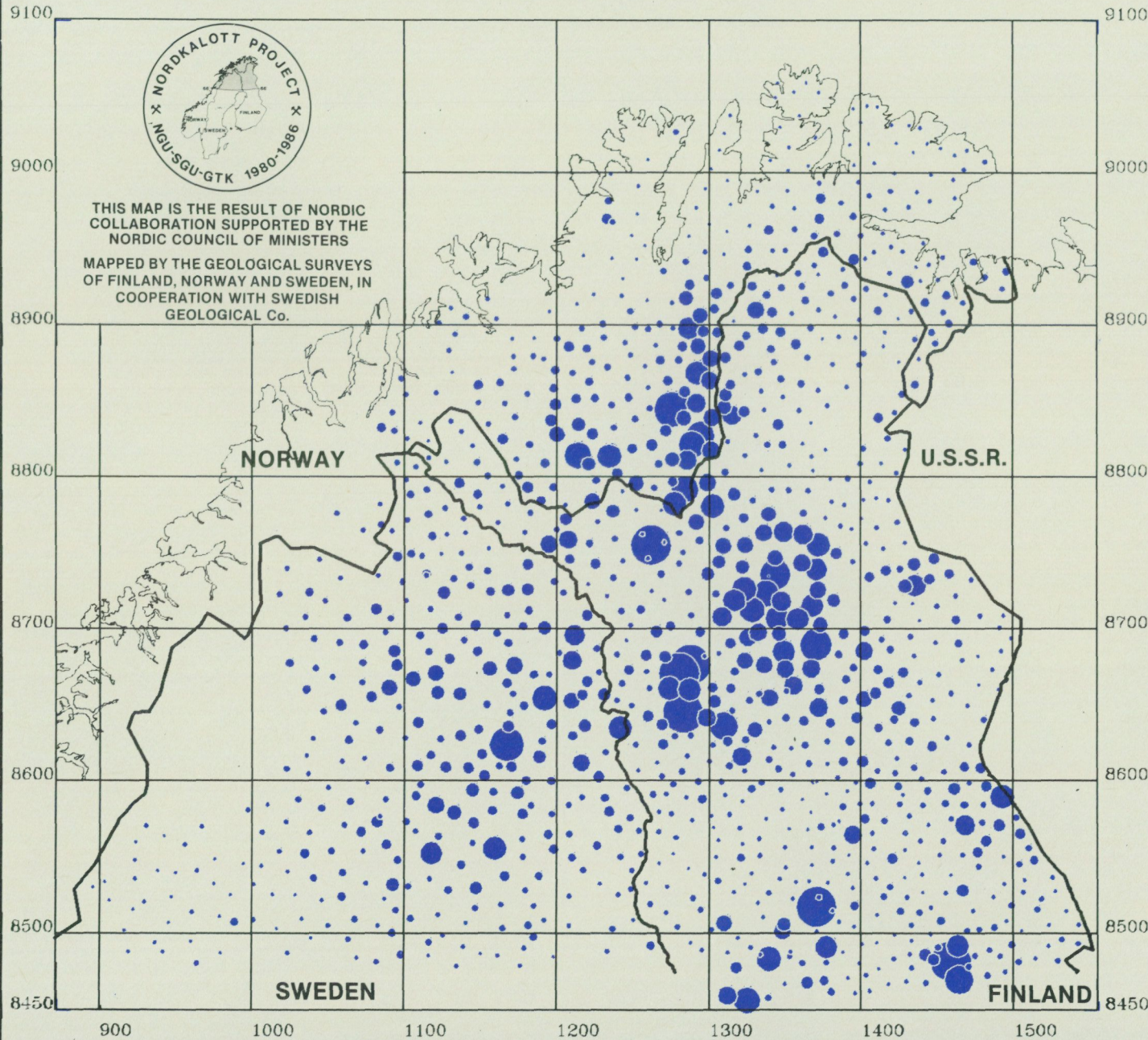
Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 03.04.1986

MAP 120



THIS MAP IS THE RESULT OF NORDIC
COLLABORATION SUPPORTED BY THE
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OF FINLAND, NORWAY AND SWEDEN, IN
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GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden.

ISBN 91-7158-383-1

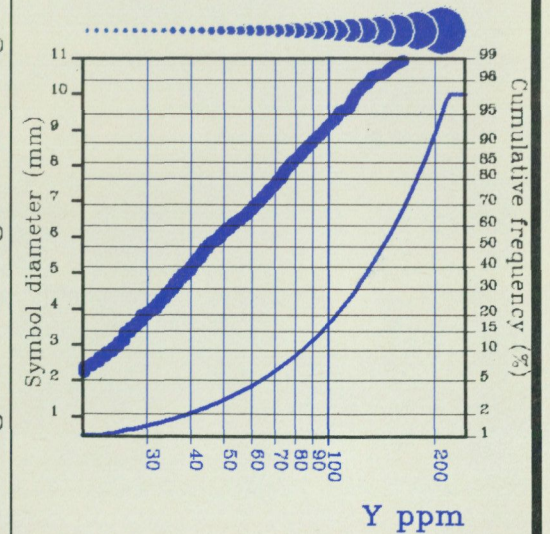
Nordkalott project Geochemistry

STREAM ORGANIC MATTER

Y

Content in ash
Method of analysis: XRF
Laboratory: SGAB
No. of samples: 1096

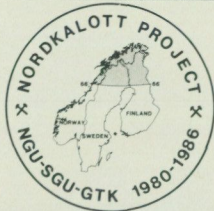
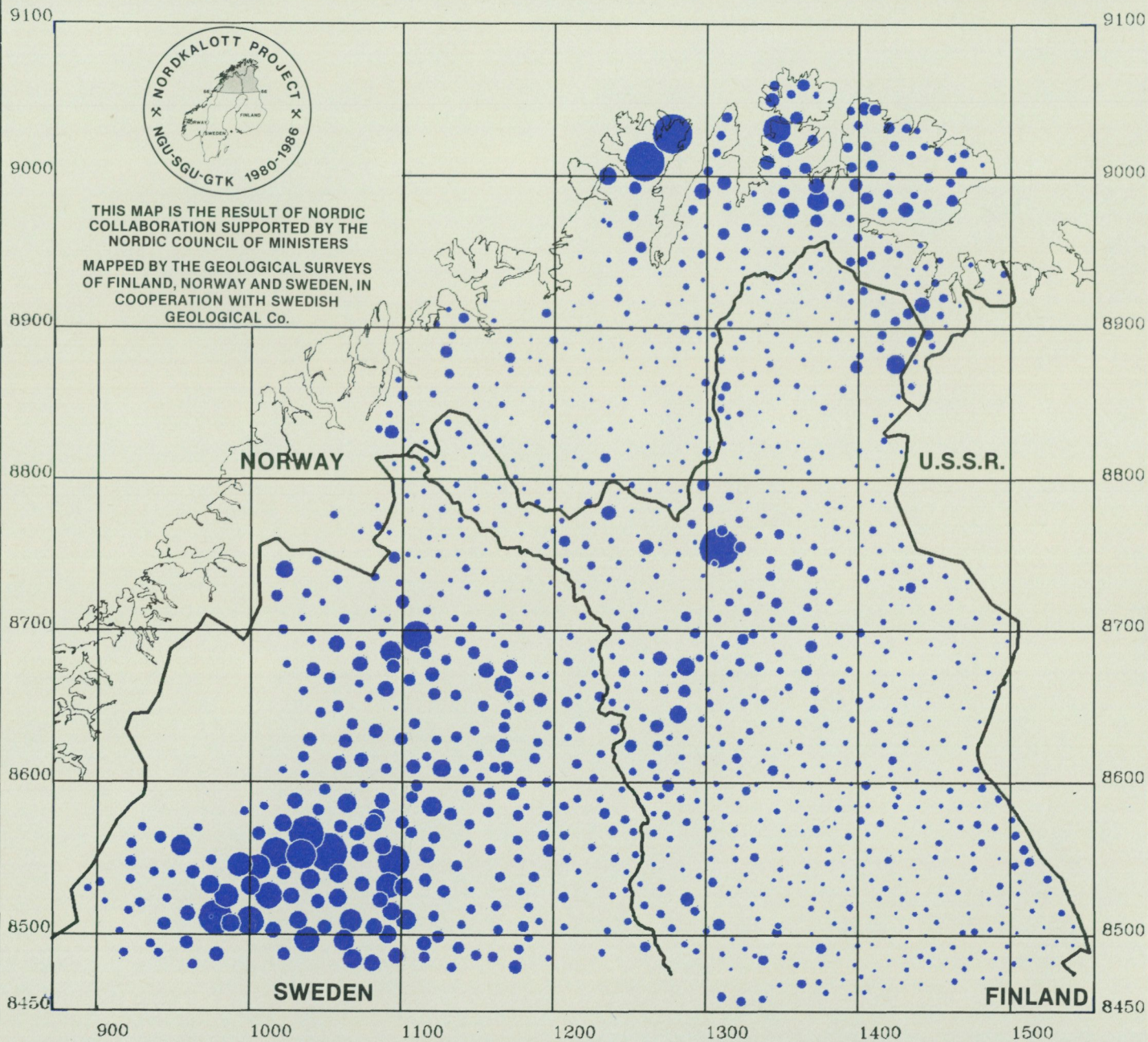
Symbol size
Cumulative frequency



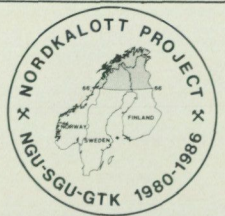
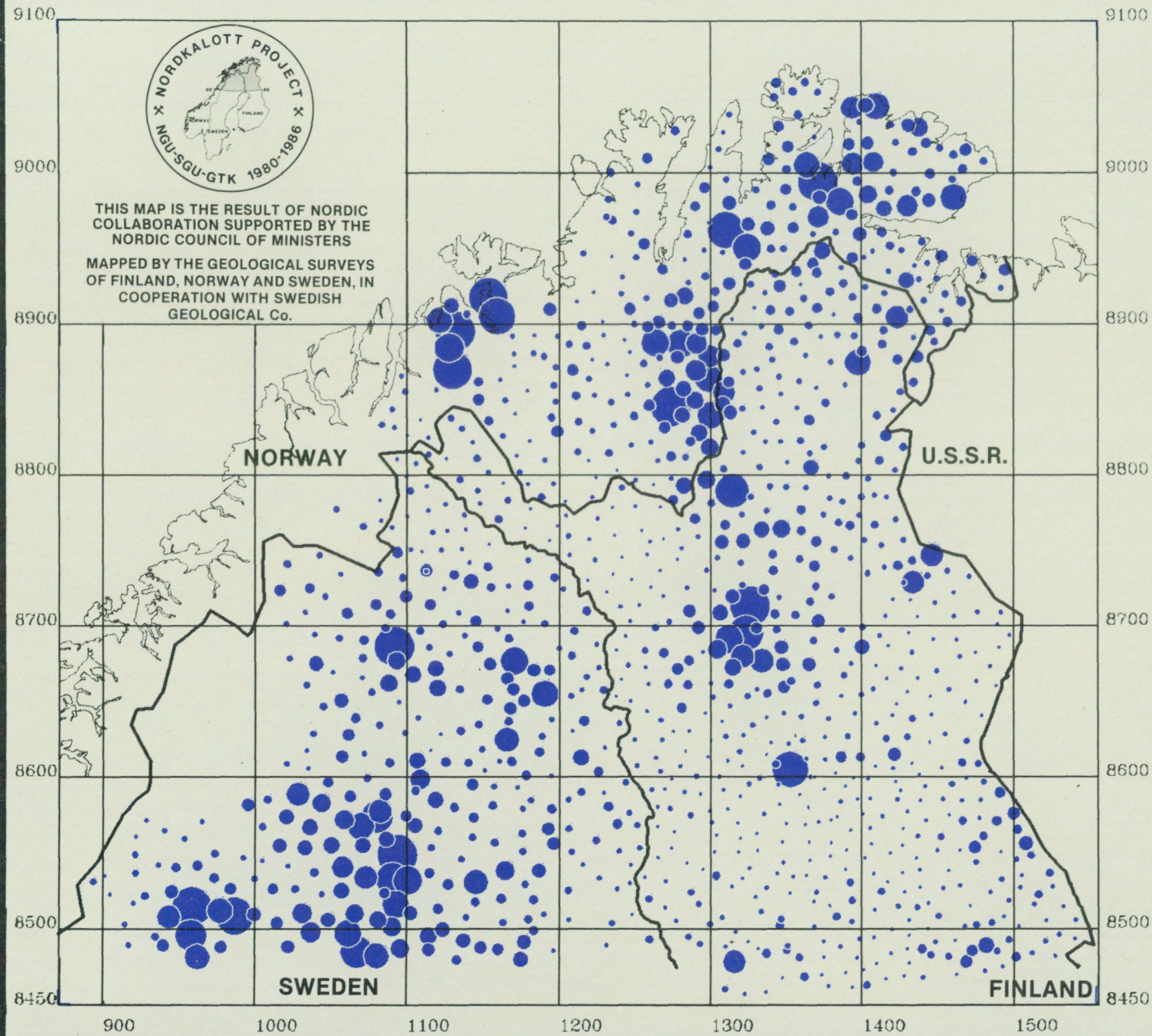
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 04.04.1986

MAP 121



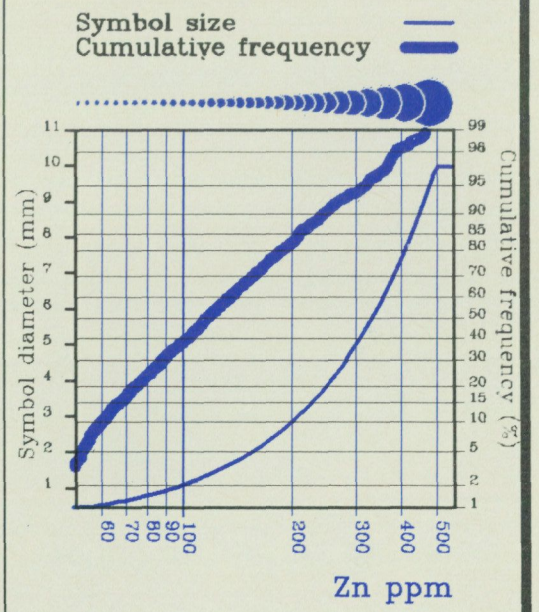
THIS MAP IS THE RESULT OF NORDIC
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Nordkalott project Geochemistry STREAM ORGANIC MATTER Zn

Content in ash
 Method of analysis: XRF
 Laboratory: SGAB
 No. of samples: 1096



1: 4 000 000
 100 km

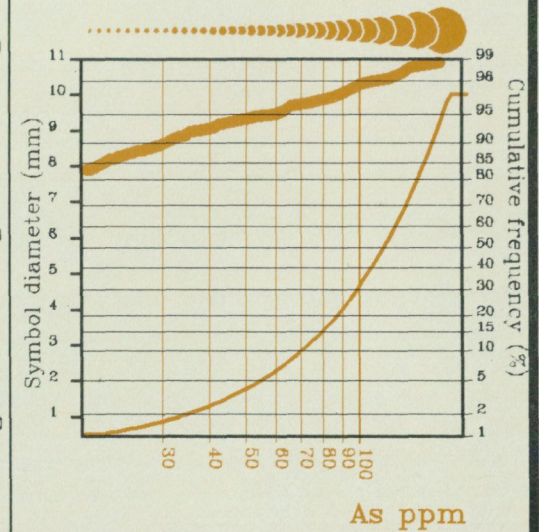
Projection: Lambert conformal
 Date of plotting: 03.04.1986
MAP 122

Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeld, and T. Volden. ISBN 91-7158-383-1

Nordkalott project Geochemistry STREAM MOSS As

Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095

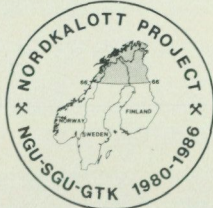
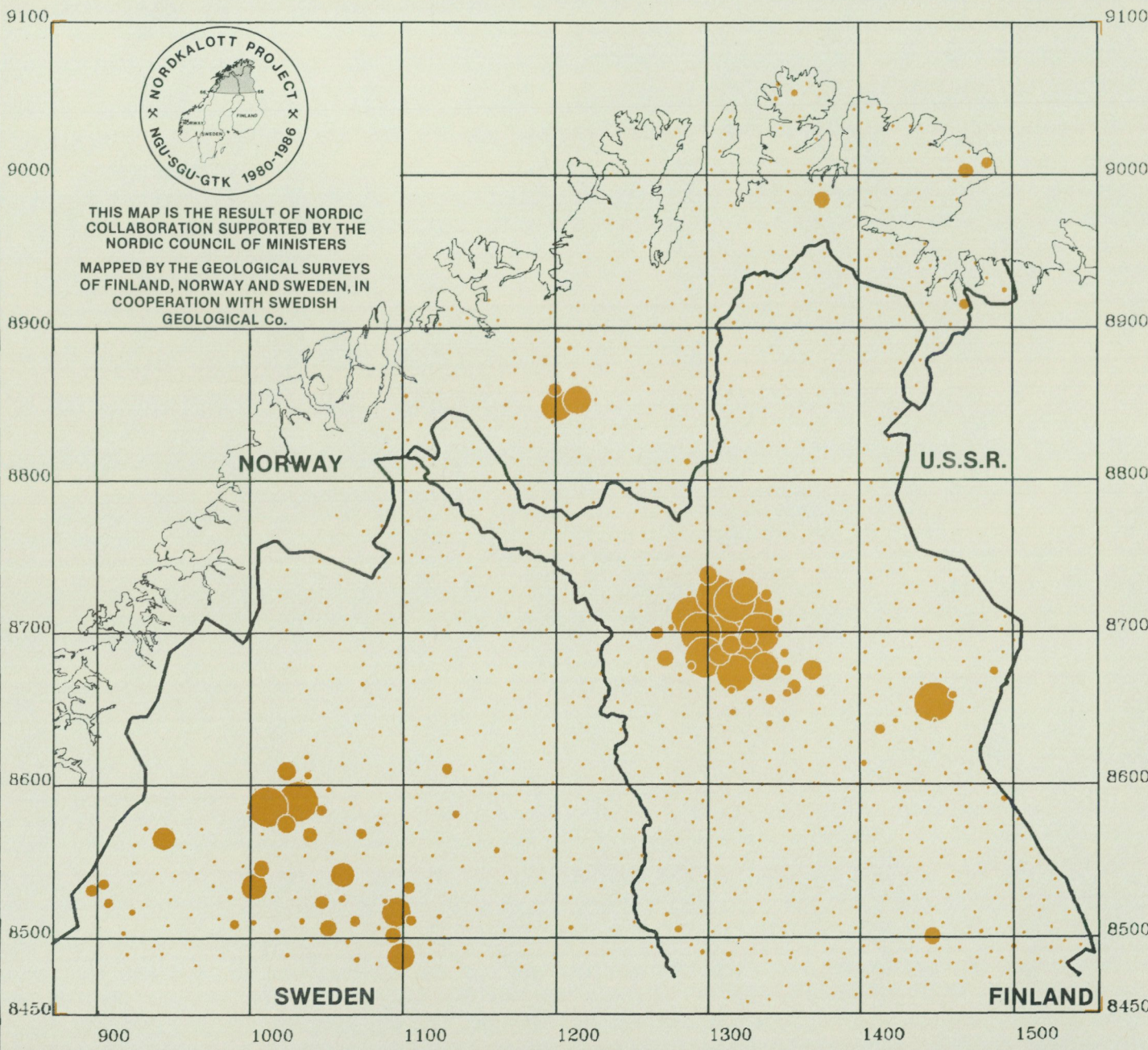
Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 11.08.1986

MAP 123

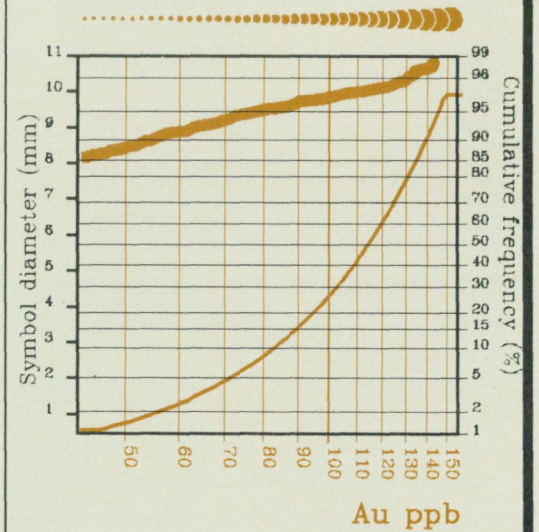


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Nordkalott project Geochemistry STREAM MOSS Au

Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095

Symbol size
Cumulative frequency

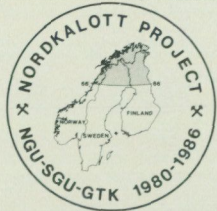
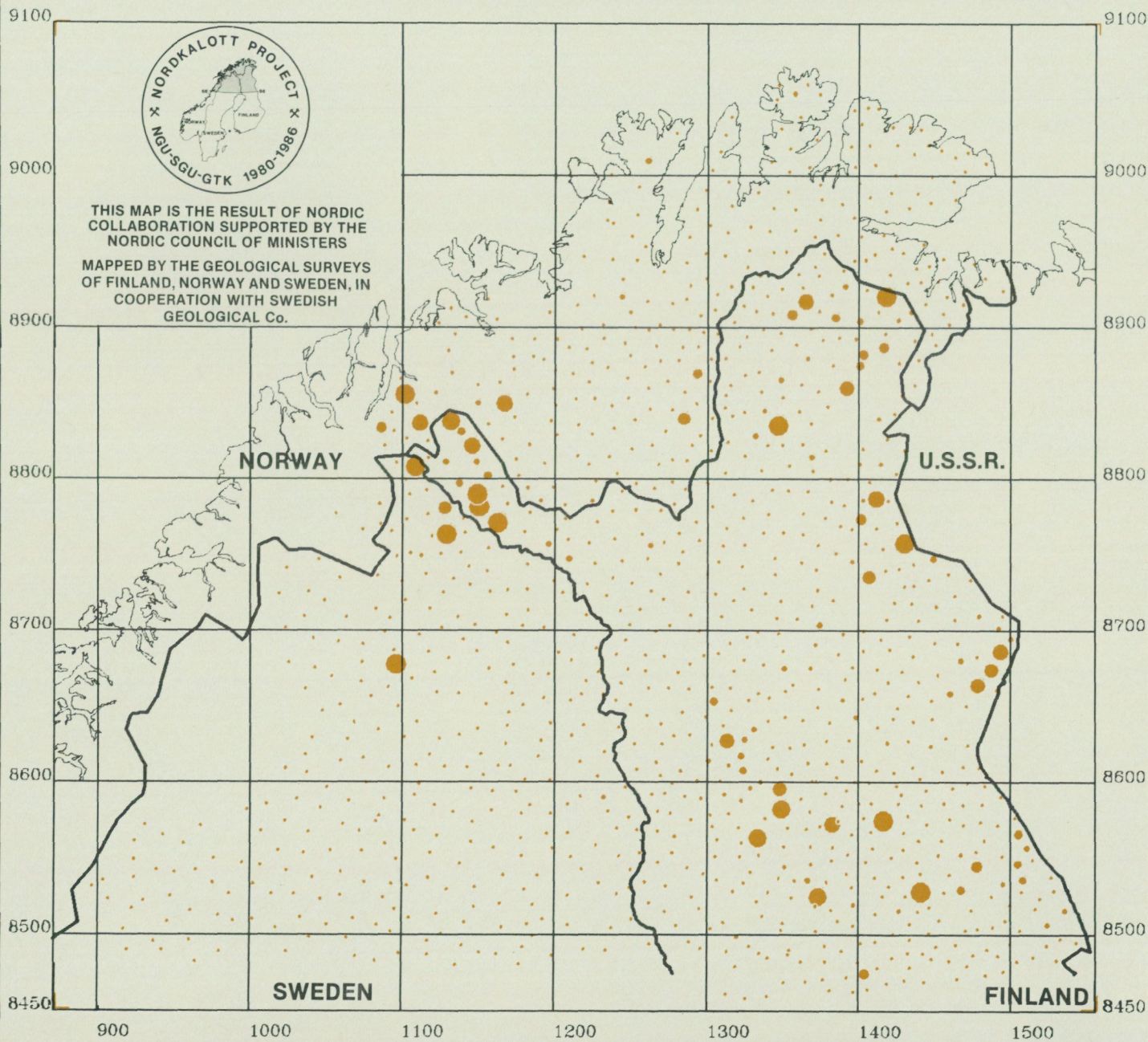


1: 4 000 000

100 km

Projection: Lambert conformal
Date of plotting: 11.06.1986

MAP 124

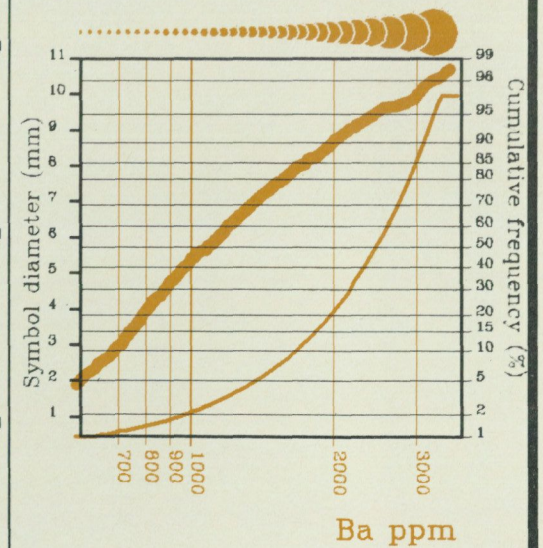


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GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM MOSS Ba

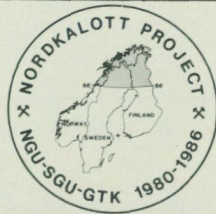
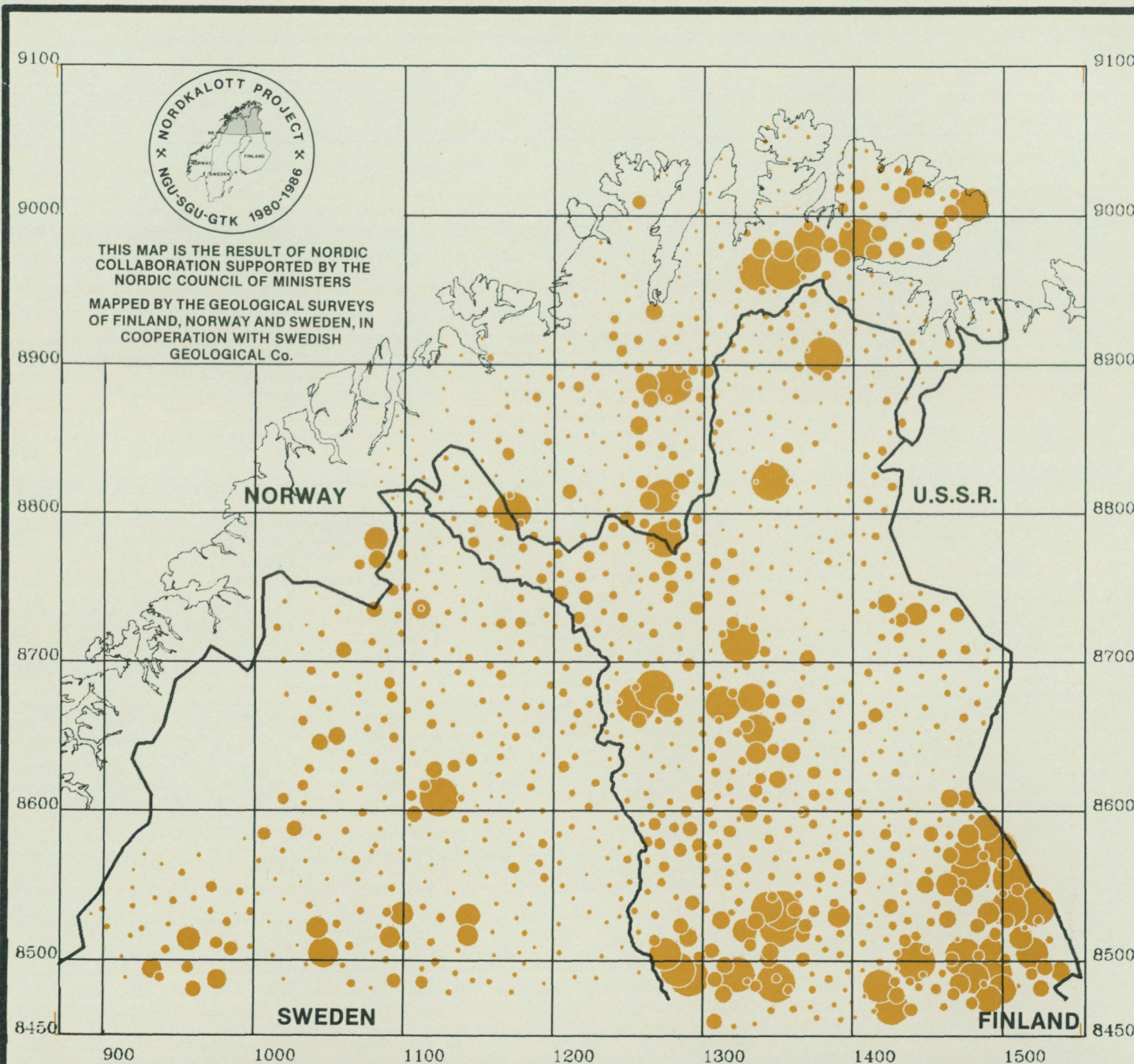
Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095

Symbol size
Cumulative frequency



1: 4 000 000
100 km
Projection: Lambert conformal

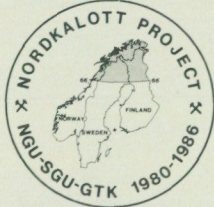
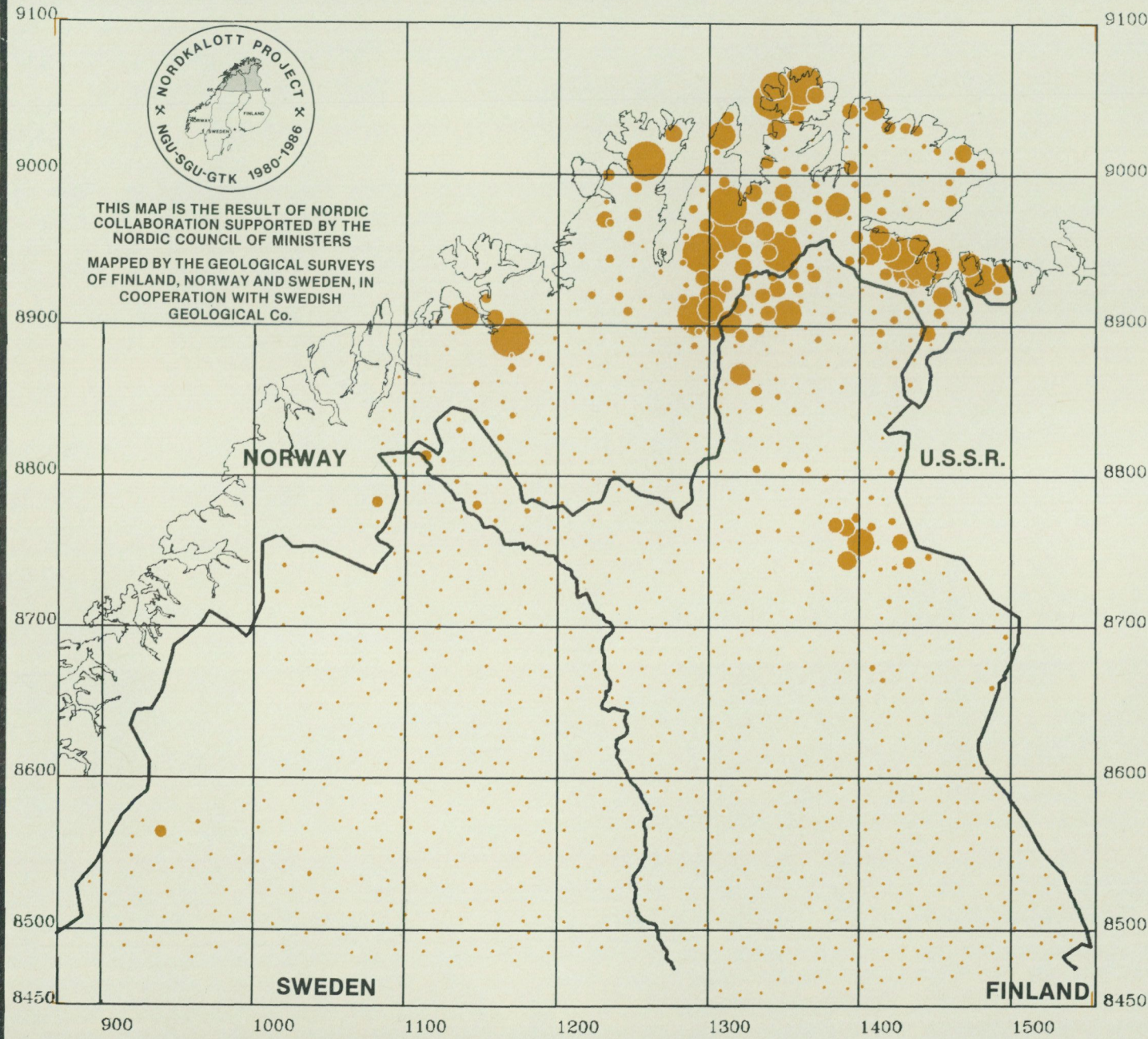
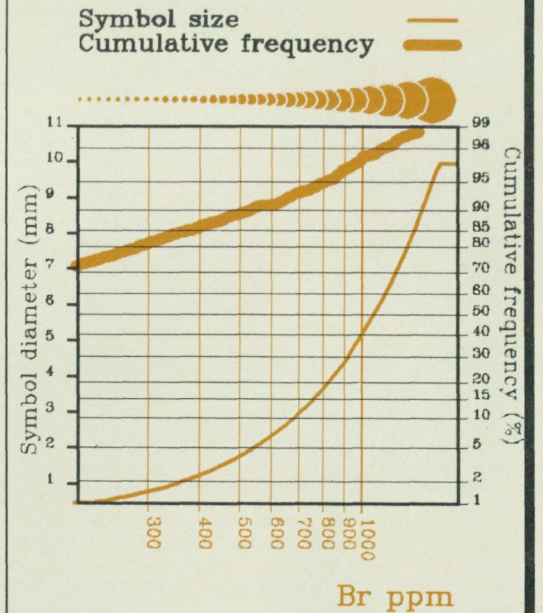
MAP 125



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Nordkalott project Geochemistry STREAM MOSS Br

Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095



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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Compiled by: J. Bergström, A. Björklund, B. Bølvién, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden.

ISBN 91-7158-383-1

1: 4 000 000
100 km

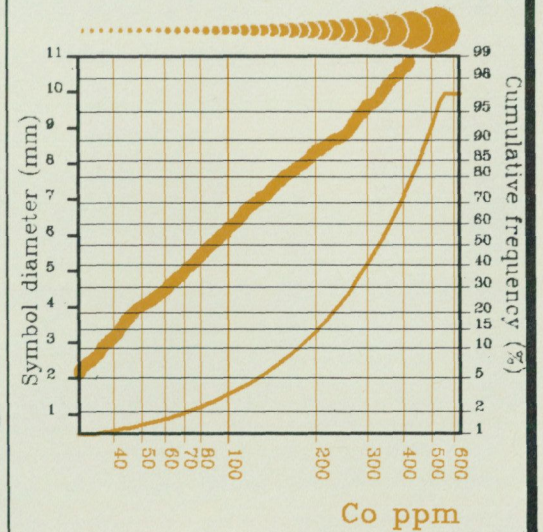
Projection: Lambert conformal
Date of plotting: 10.08.1985

MAP 126

Nordkalott project Geochemistry STREAM MOSS Co

Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095

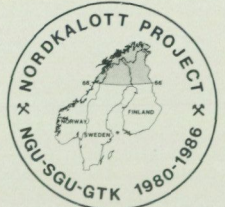
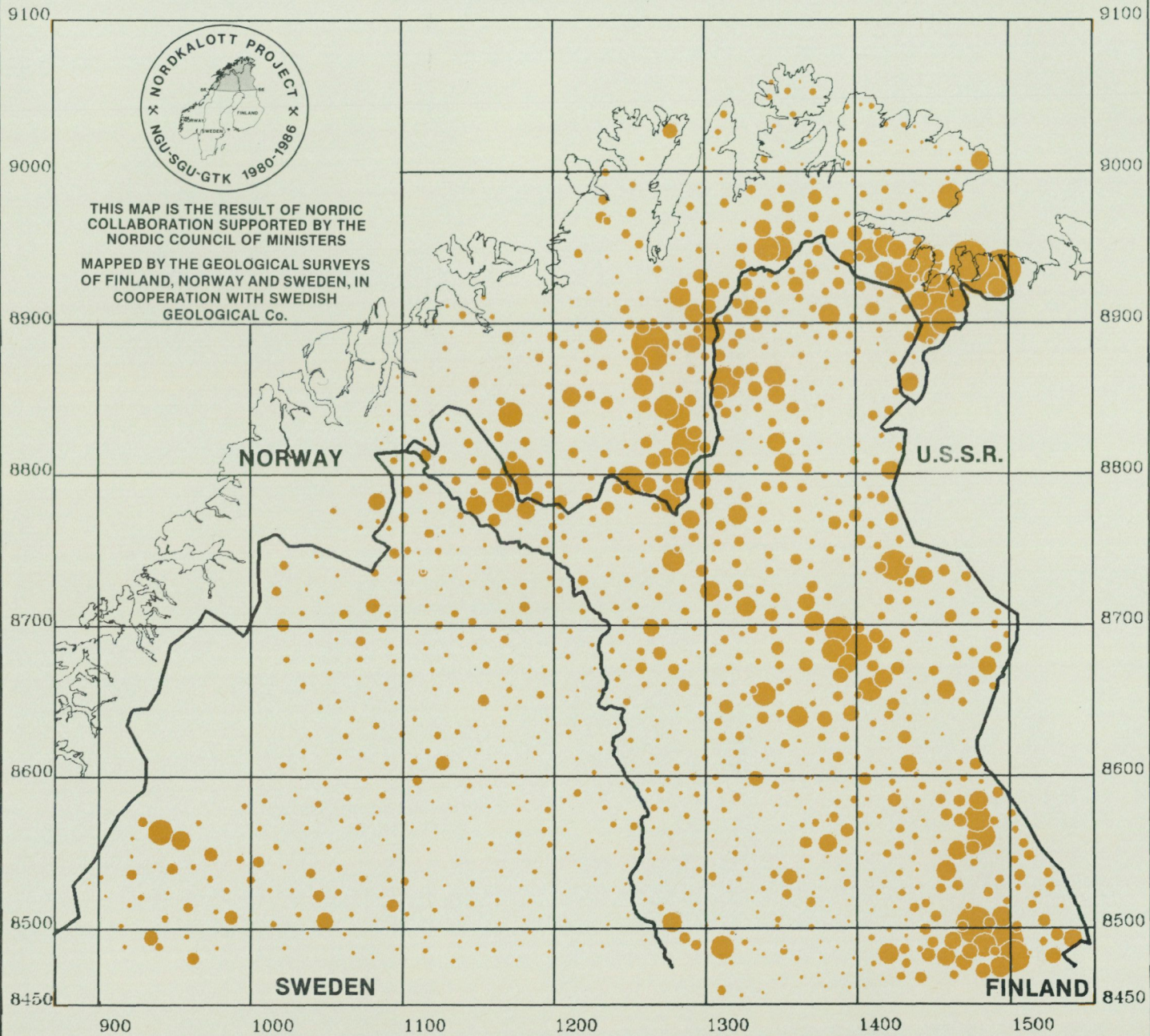
Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal

MAP 127



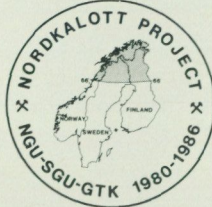
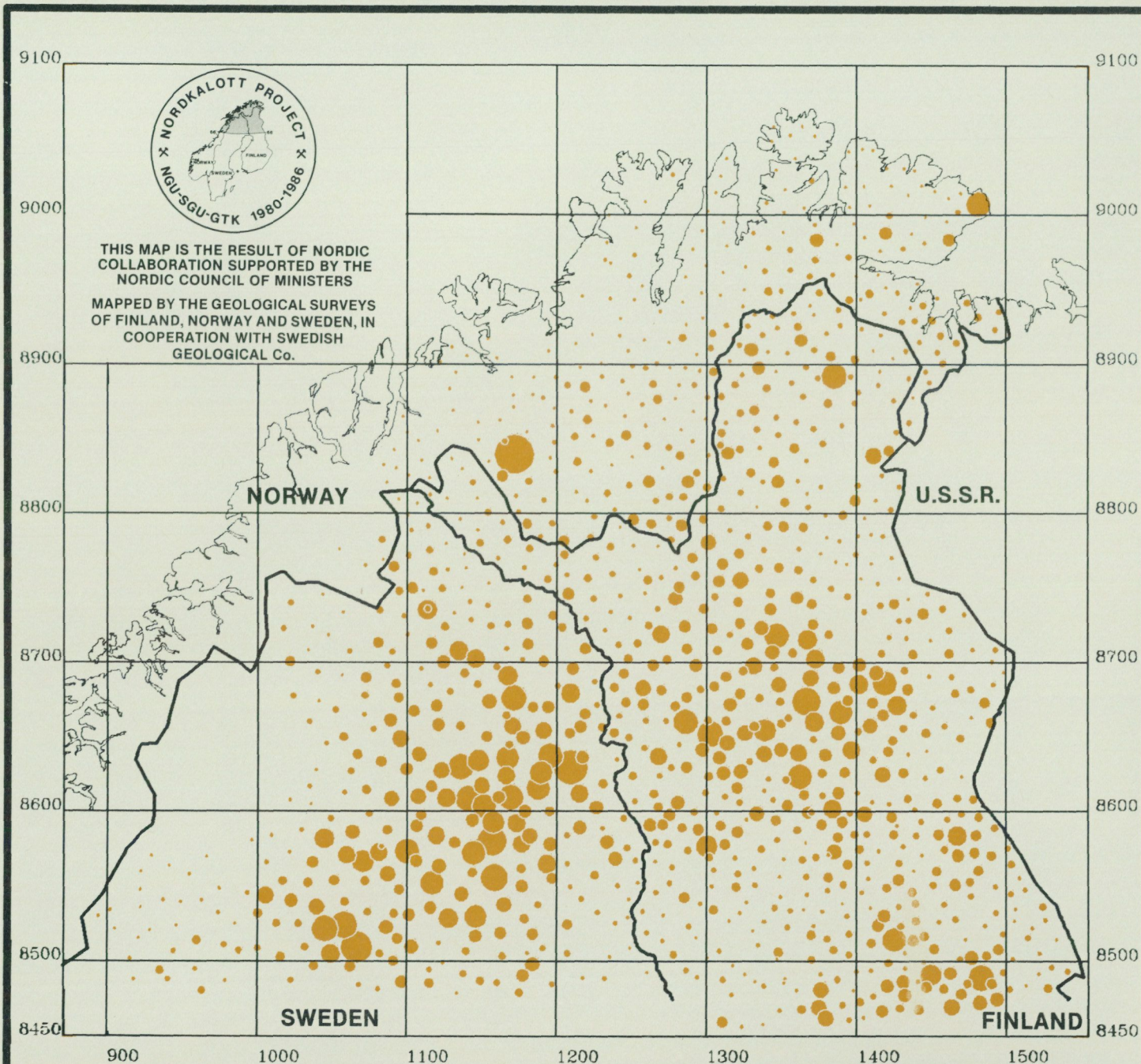
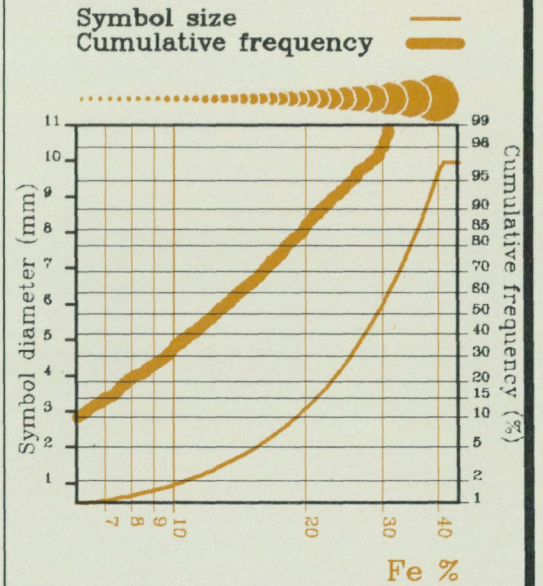
THIS MAP IS THE RESULT OF NORDIC
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Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden.

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Nordkalott project Geochemistry STREAM MOSS Fe

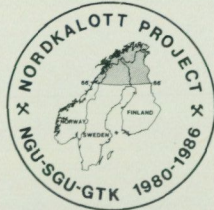
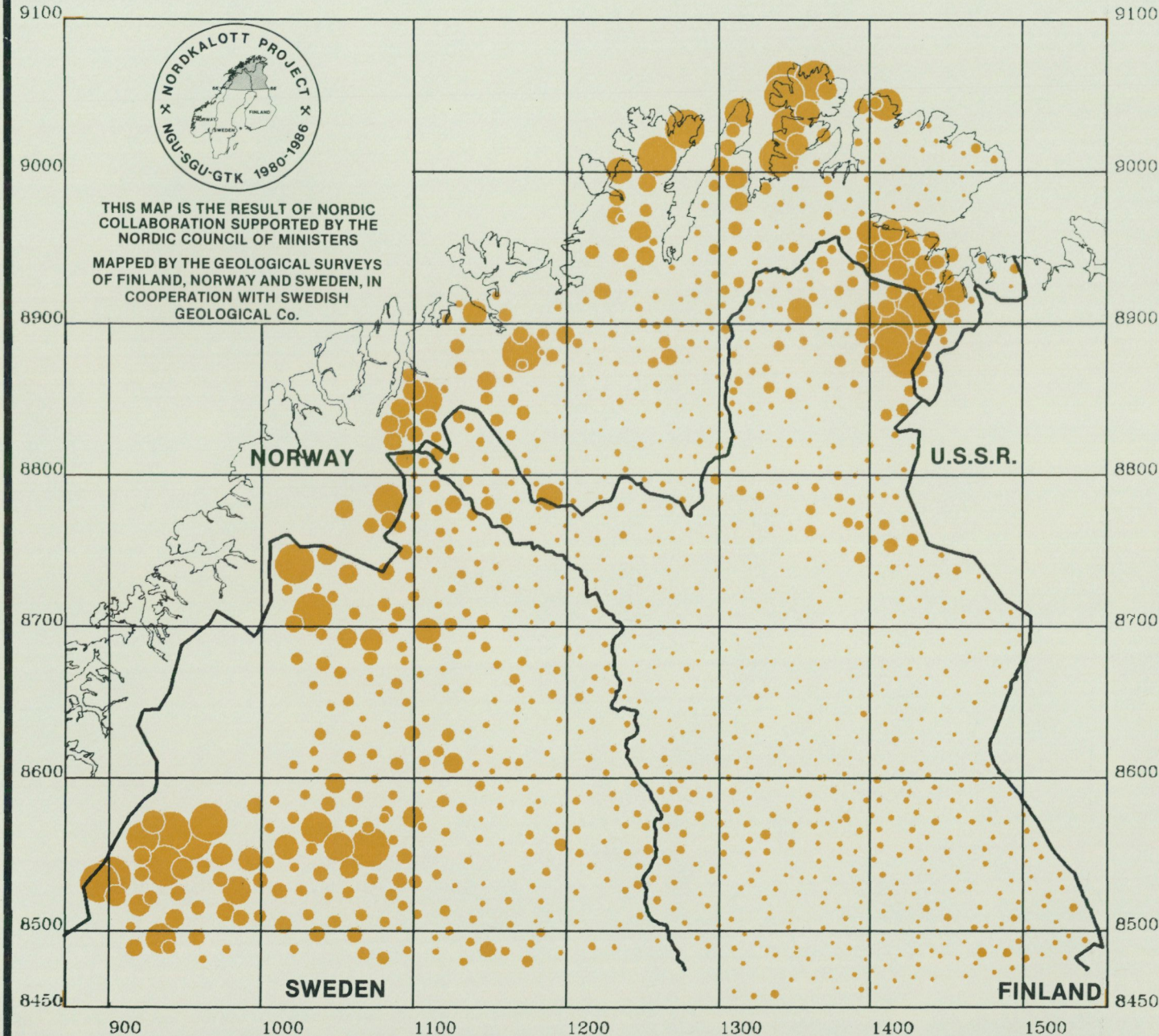
Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095



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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

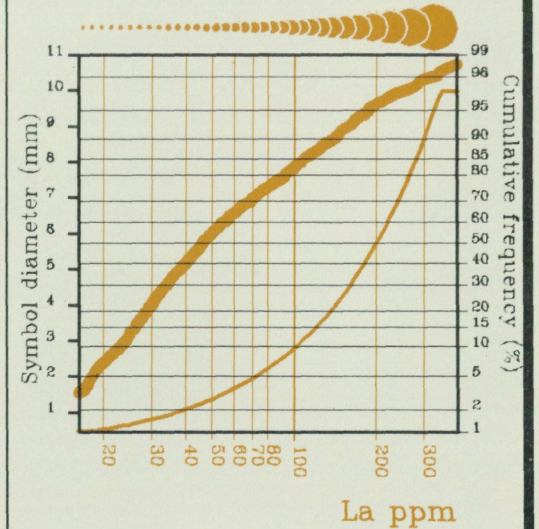
Nordkalott project Geochemistry STREAM MOSS La

Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095



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COLLABORATION SUPPORTED BY THE
NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
COOPERATION WITH SWEDISH
GEOLOGICAL Co.

Symbol size
Cumulative frequency

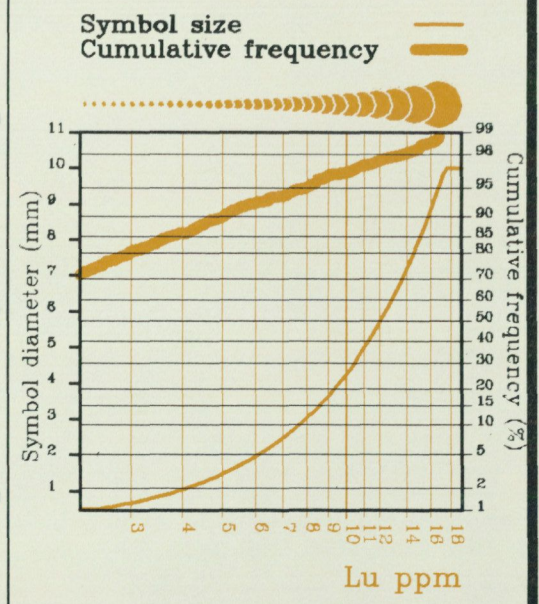


1: 4 000 000
100 km

Projection: Lambert conformal **MAP 129**

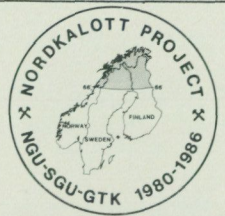
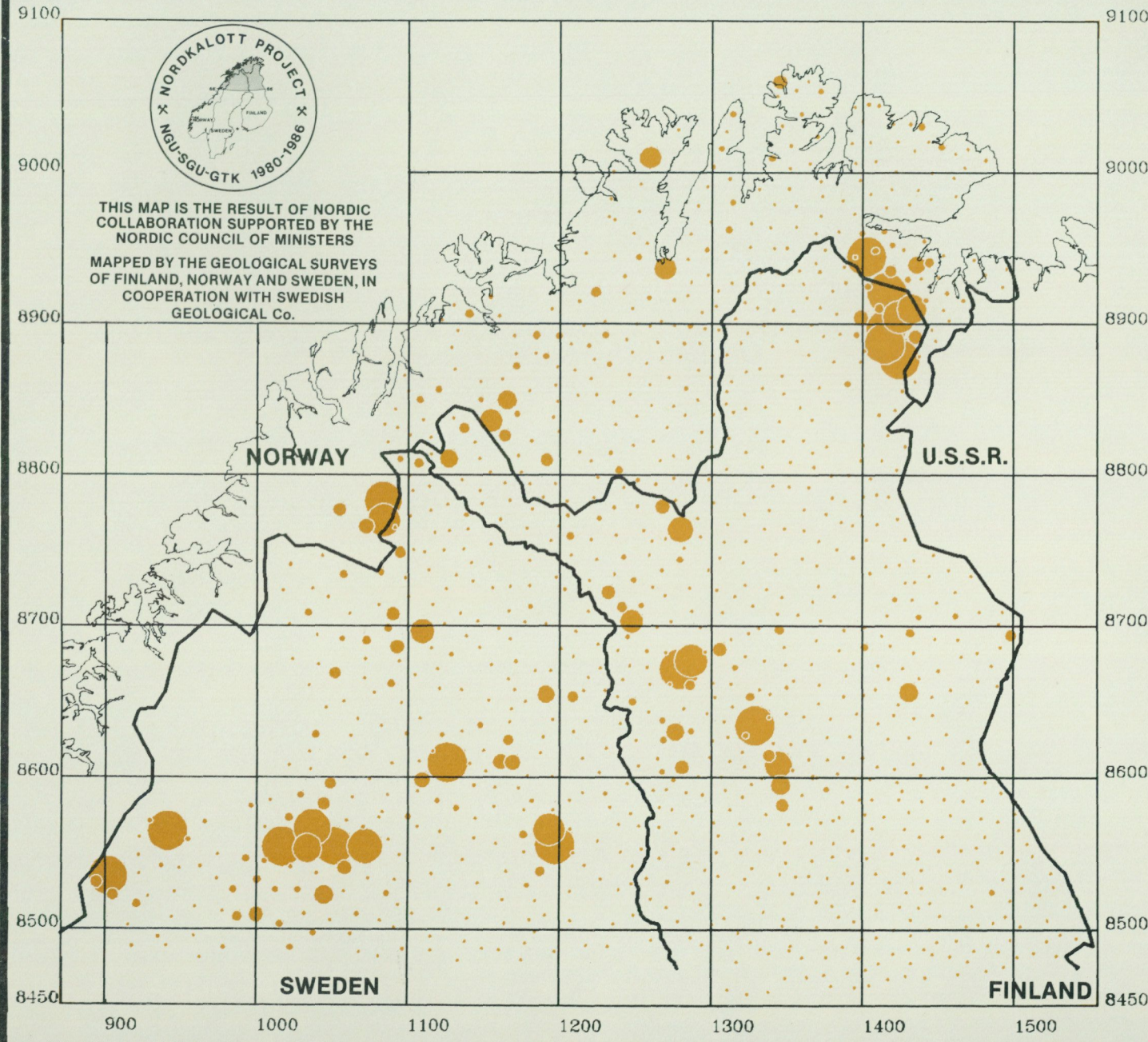
Nordkalott project Geochemistry STREAM MOSS Lu

Content in ash
 Method of analysis: NAA
 Laboratory: VTT/REA
 No. of samples: 1095



1: 4 000 000
 100 km

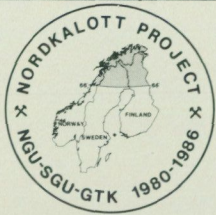
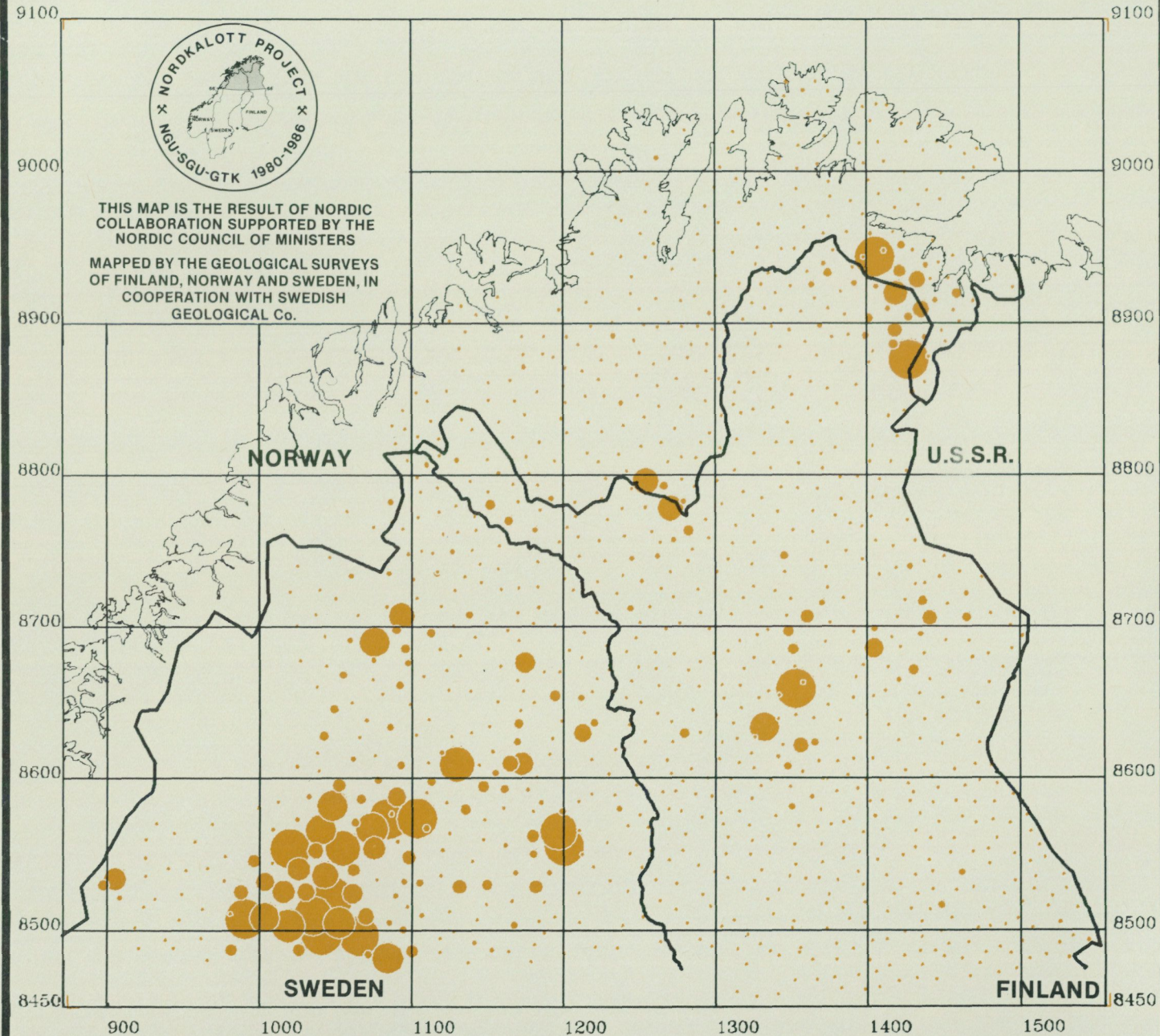
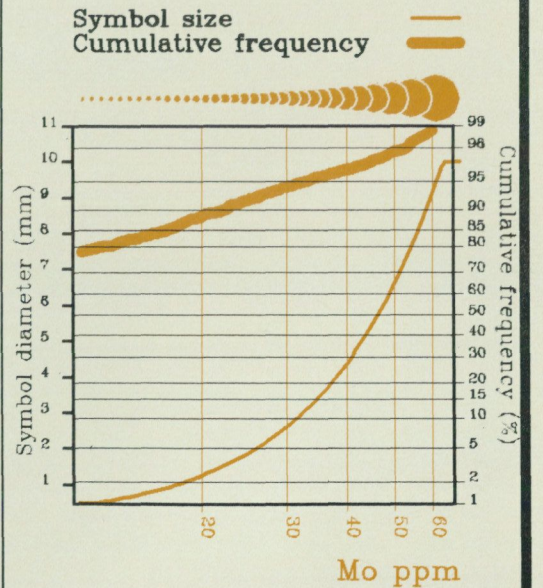
Projection: Lambert conformal
 Date of plotting: 10.06.1986
MAP 130



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 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM MOSS Mo

Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095



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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

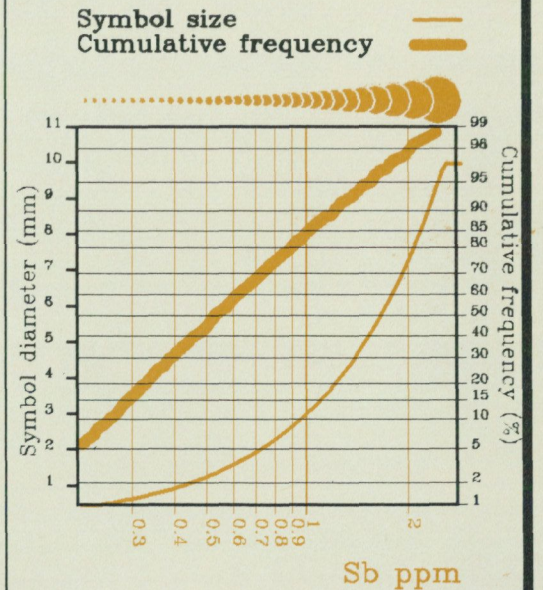
1: 4 000 000
100 km

Projection: Lambert conformal
Date of plotting: 11.08.1985

MAP 131

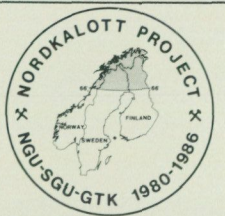
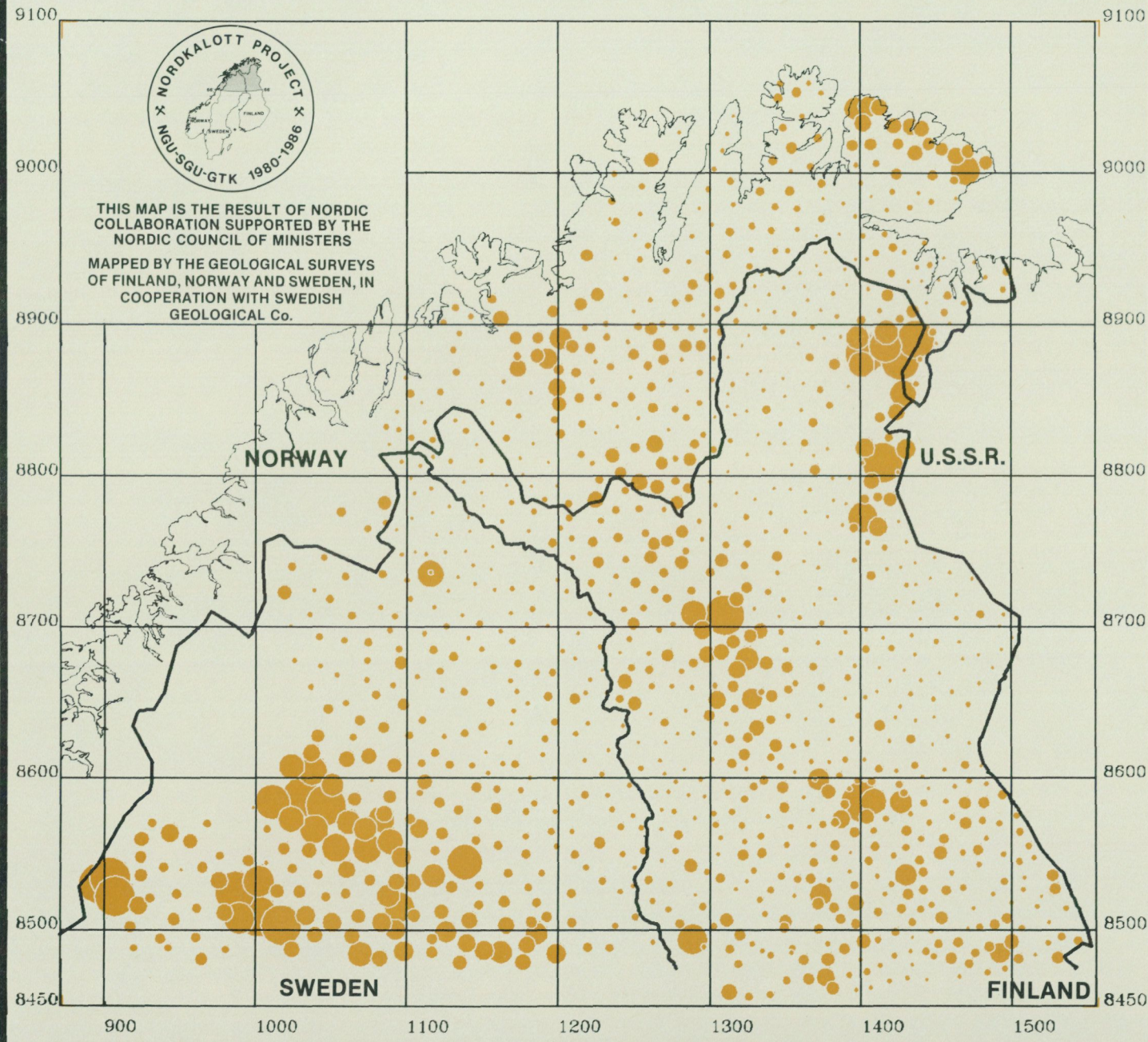
Nordkalott project Geochemistry STREAM MOSS Sb

Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095



1: 4 000 000
100 km

Projection: Lambert conformal **MAP 132**



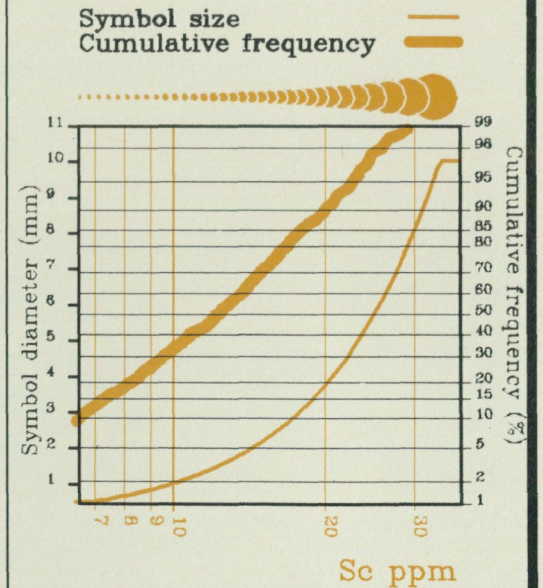
THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
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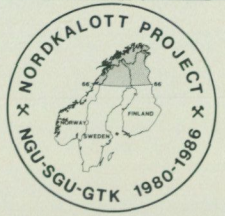
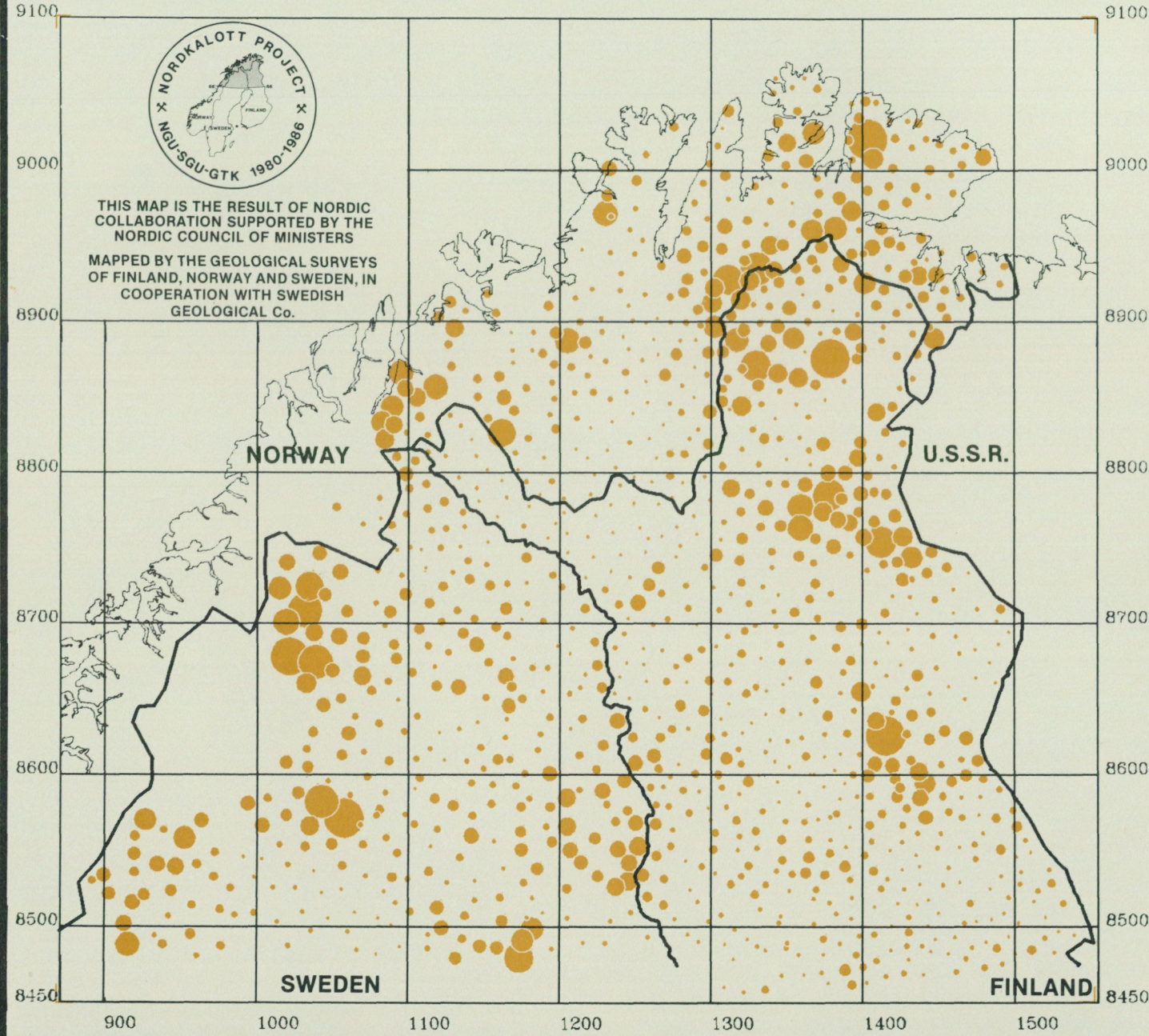
Nordkalott project Geochemistry STREAM MOSS Sc

Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095



1: 4 000 000
100 km

Projection: Lambert conformal **MAP 133**

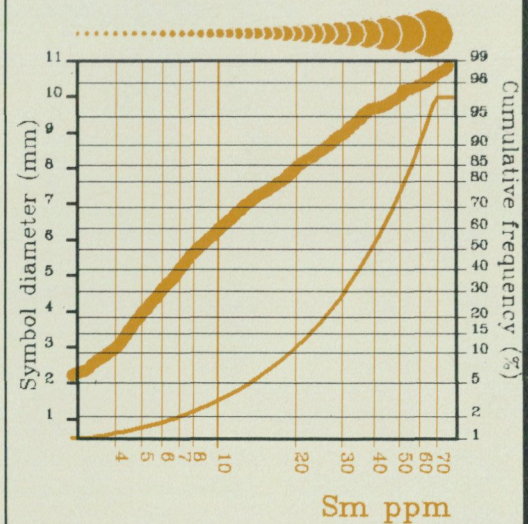


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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

Nordkalott project Geochemistry STREAM MOSS Sm

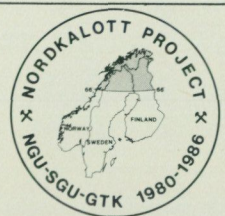
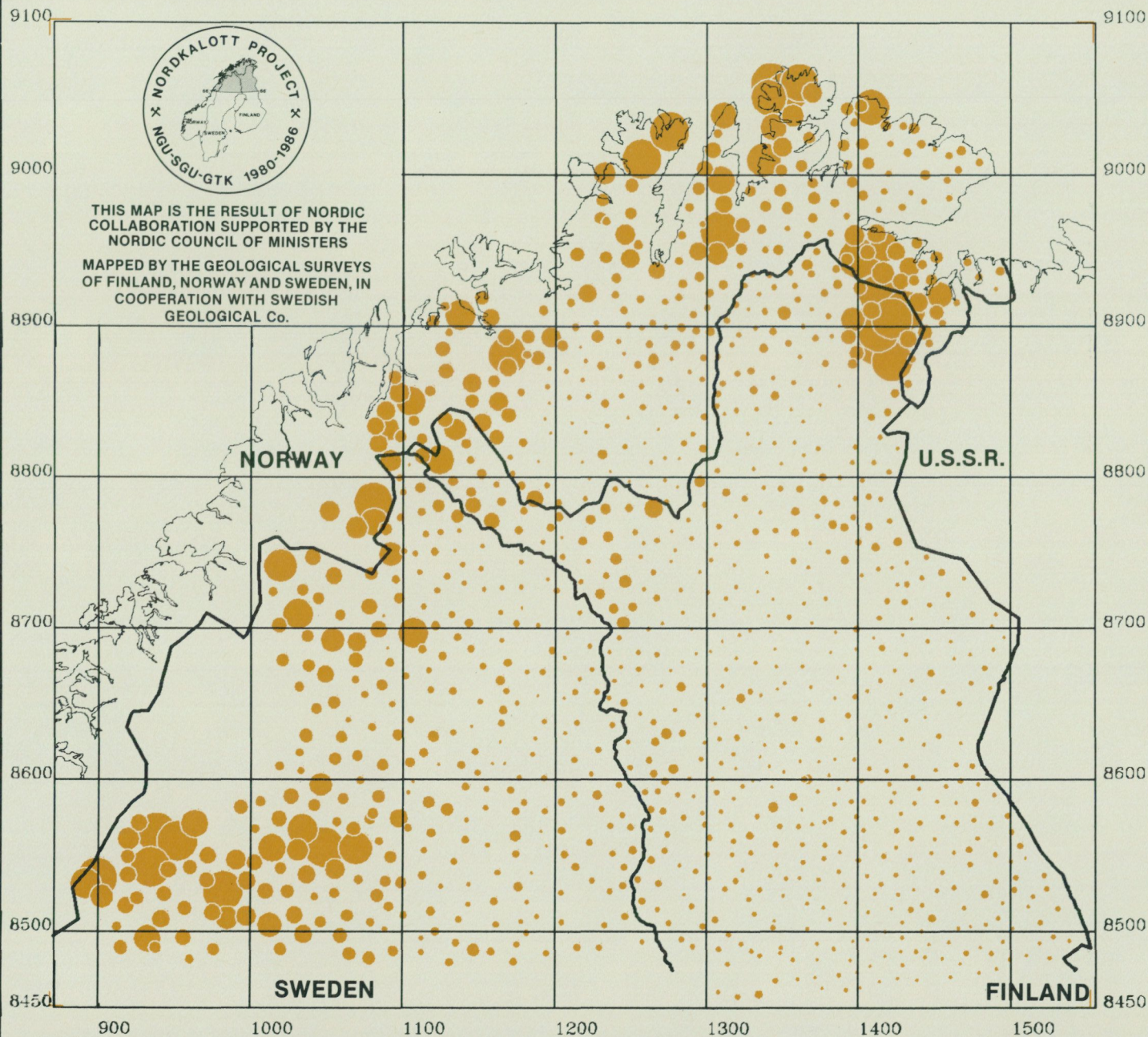
Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095

Symbol size
Cumulative frequency



1: 4 000 000
100 km

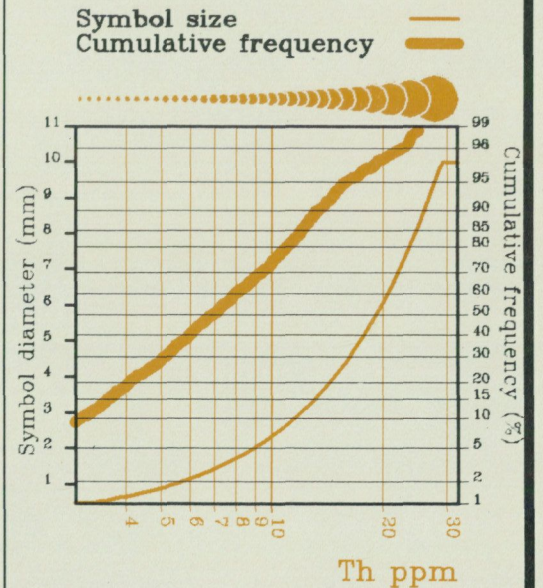
Projection: Lambert conformal **MAP 134**



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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

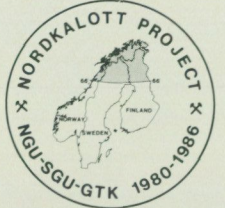
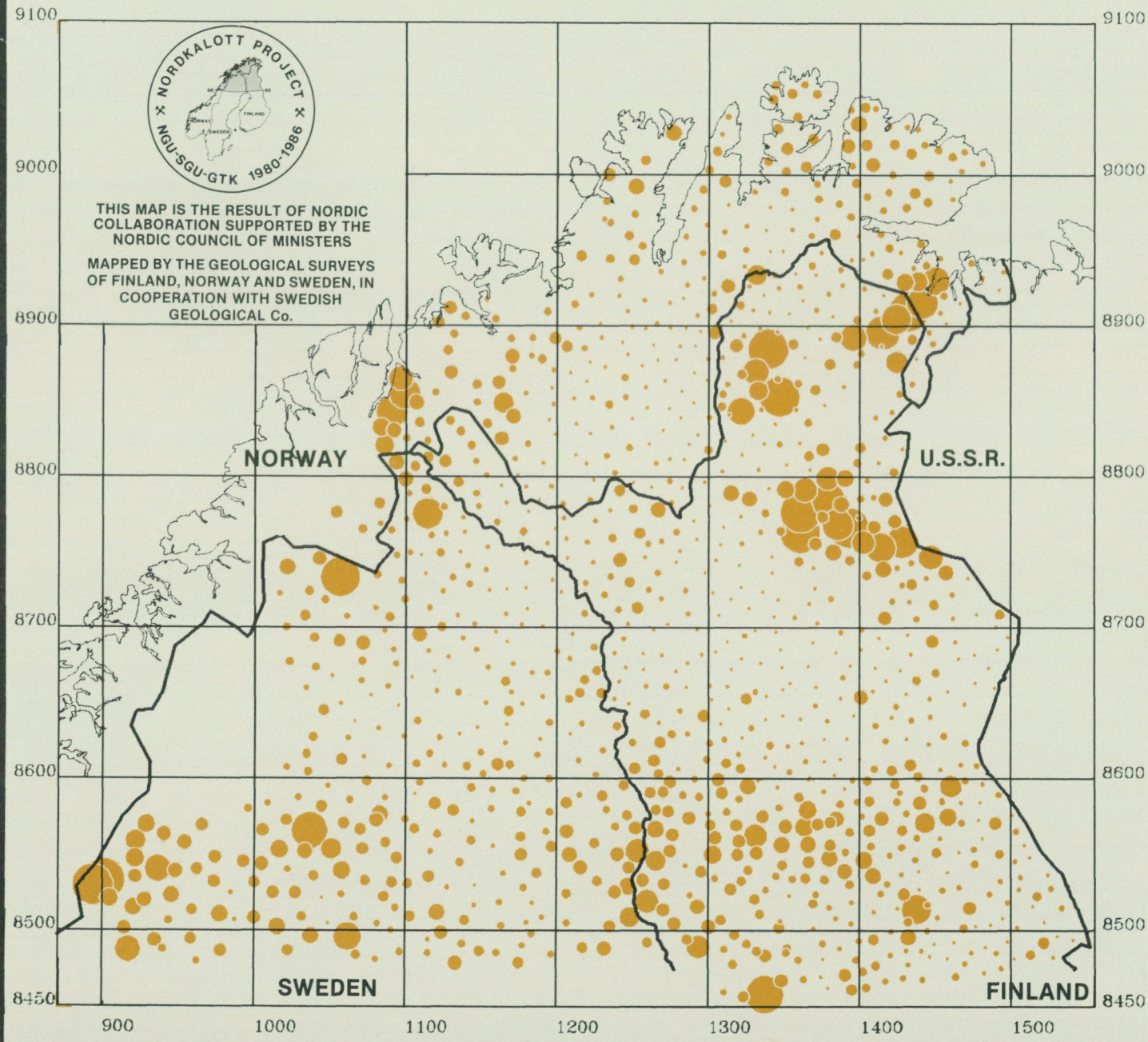
Nordkalott project Geochemistry STREAM MOSS Th

Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095



1: 4 000 000
100 km

Projection: Lambert conformal **MAP 135**



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MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

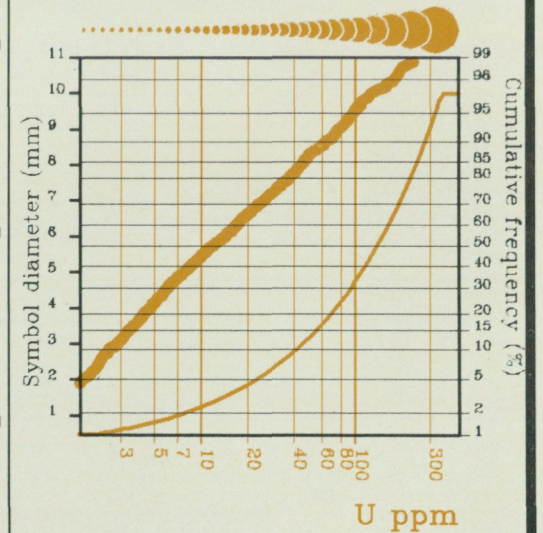
Compiled by: J. Bergström, A. Björklund, B. Belviken, M. Kontio, P. Lehmuspelto, J. Magnusson, R.T. Ottesen, A. Steinfeldt, and T. Volden.

ISBN 91-7158-383-1

Nordkalott project Geochemistry STREAM MOSS U

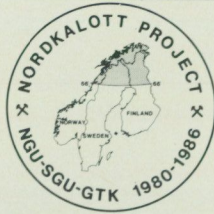
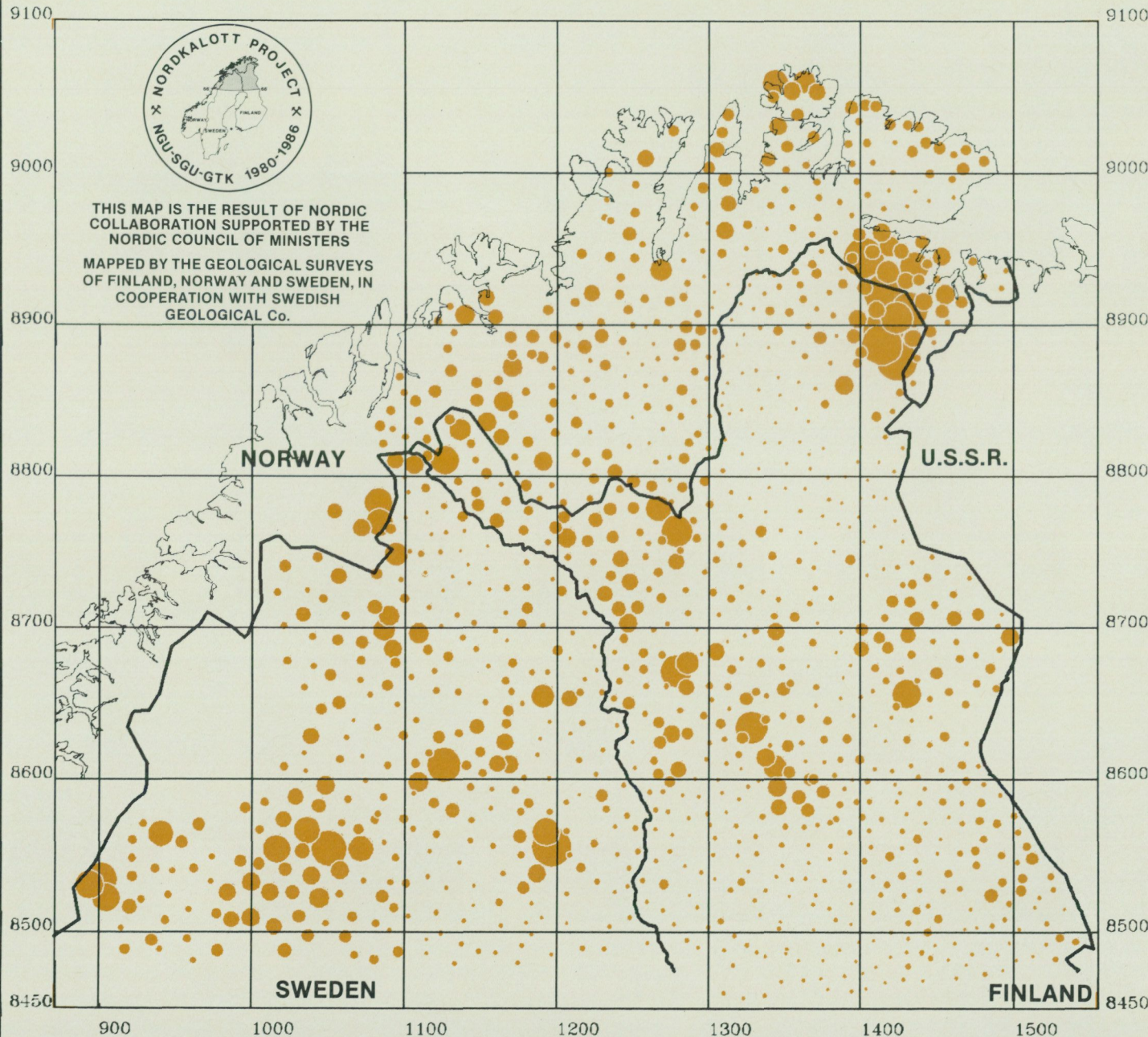
Content in ash
Method of analysis: NAA
Laboratory: VTT/REA
No. of samples: 1095

Symbol size
Cumulative frequency



1: 4 000 000
100 km

Projection: Lambert conformal **MAP 136**



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.

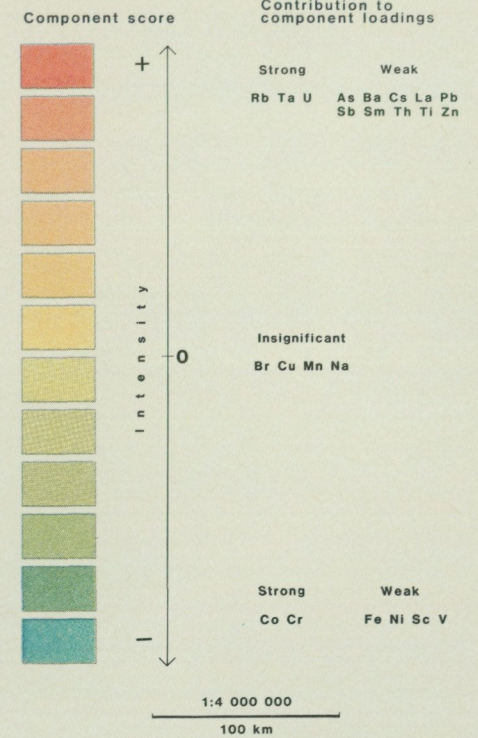
Nordkalott project Geochemistry

TILL
- 62 μm

Principal component analysis

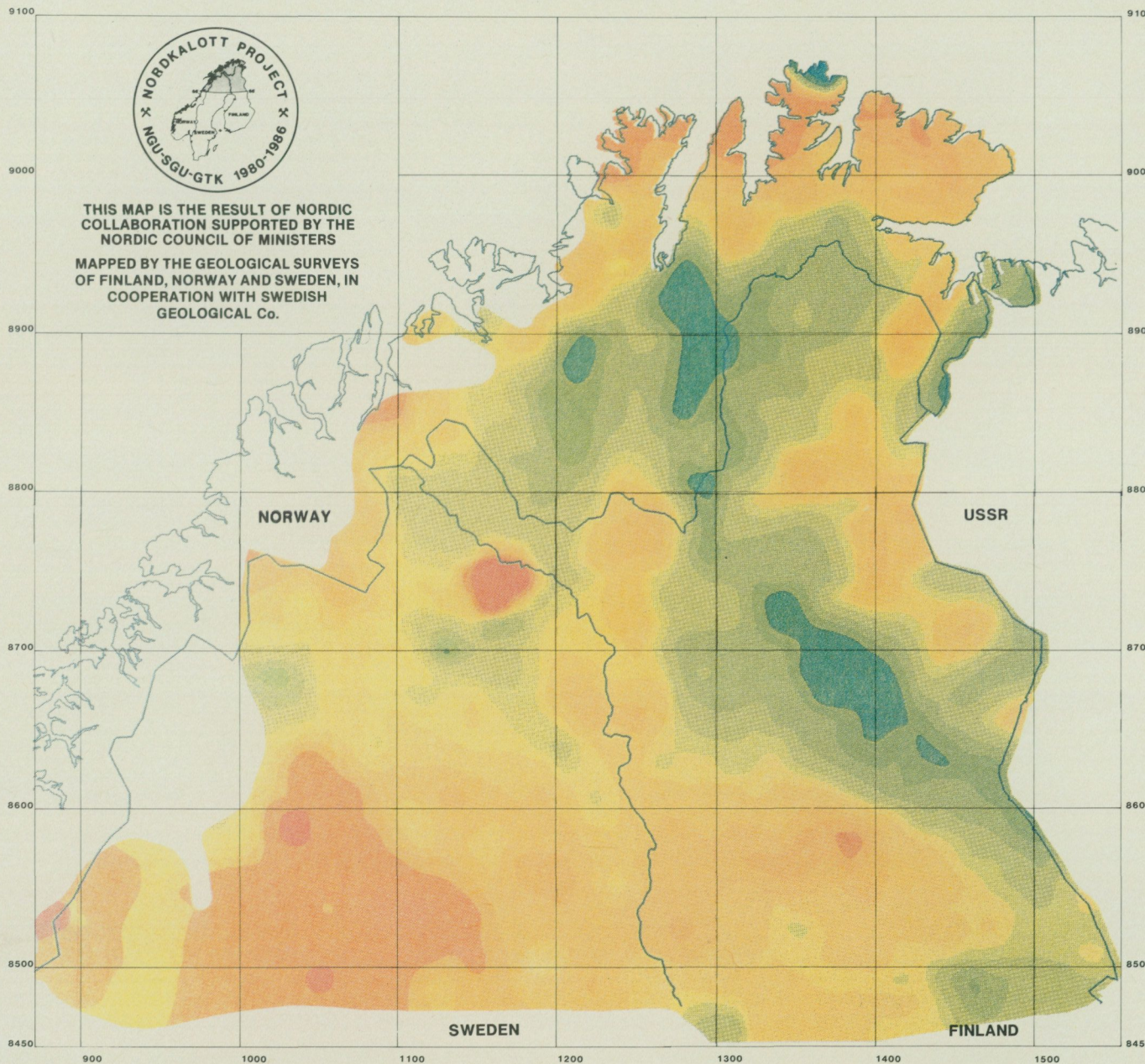
Soft Independent Modelling of Class Analogy (SIMCA)
Moving average by kriging

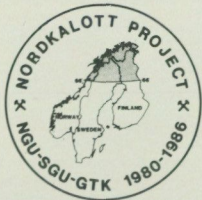
Explained variance: 20.0%



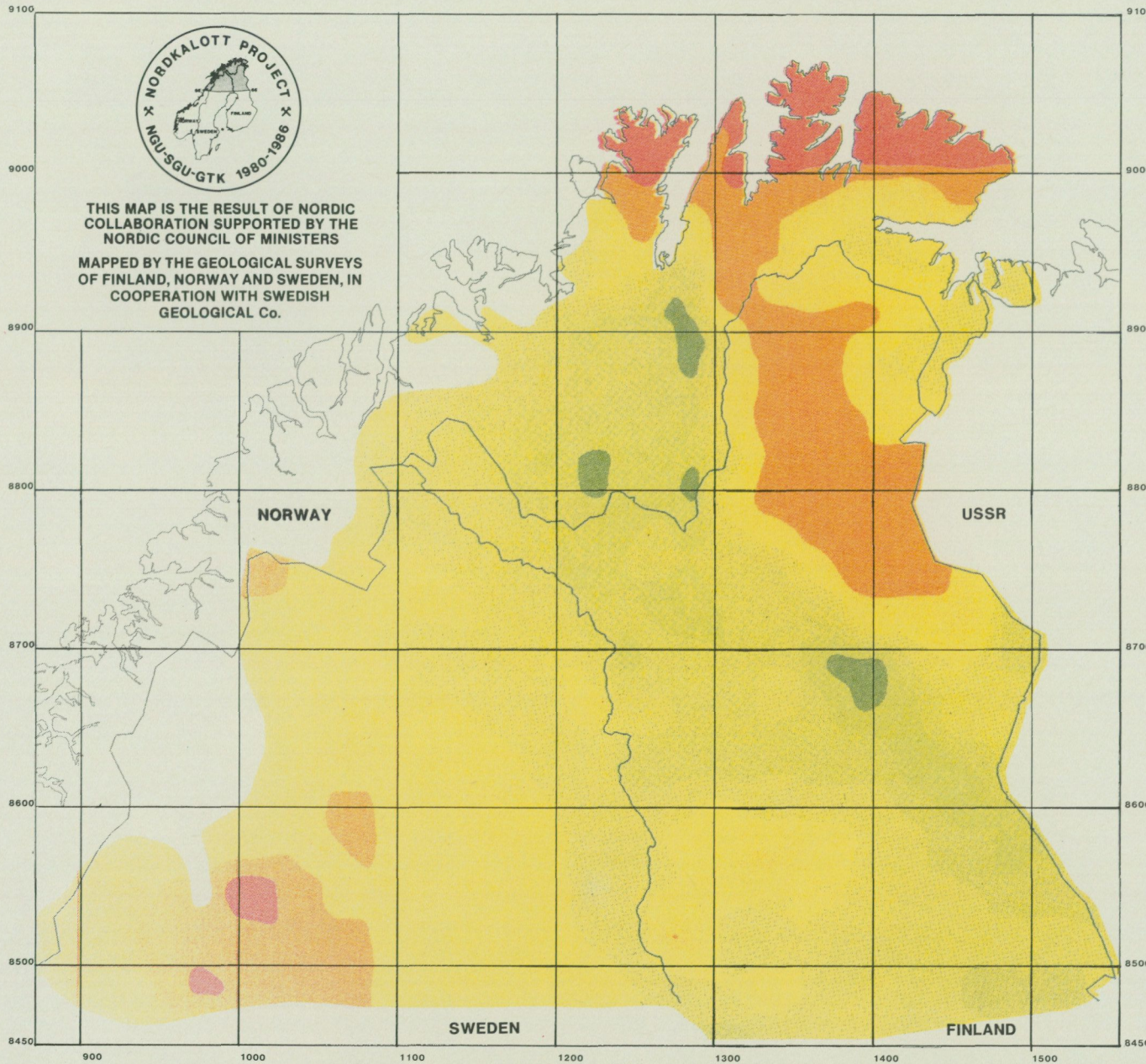
Projection: Lambert conformal
Processed at Swedish Geological Co 1986

MAP 137





THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



Nordkalott project Geochemistry

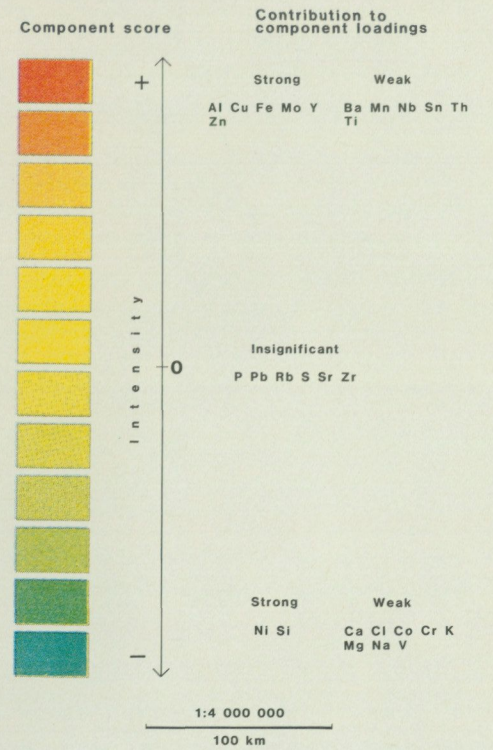
TILL

Heavy minerals 62 - 500 μm

Principal component analysis

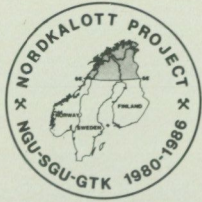
Soft Independent Modelling of Class Analogy (SIMCA)
 Moving average by kriging

Explained variance: 23.3%

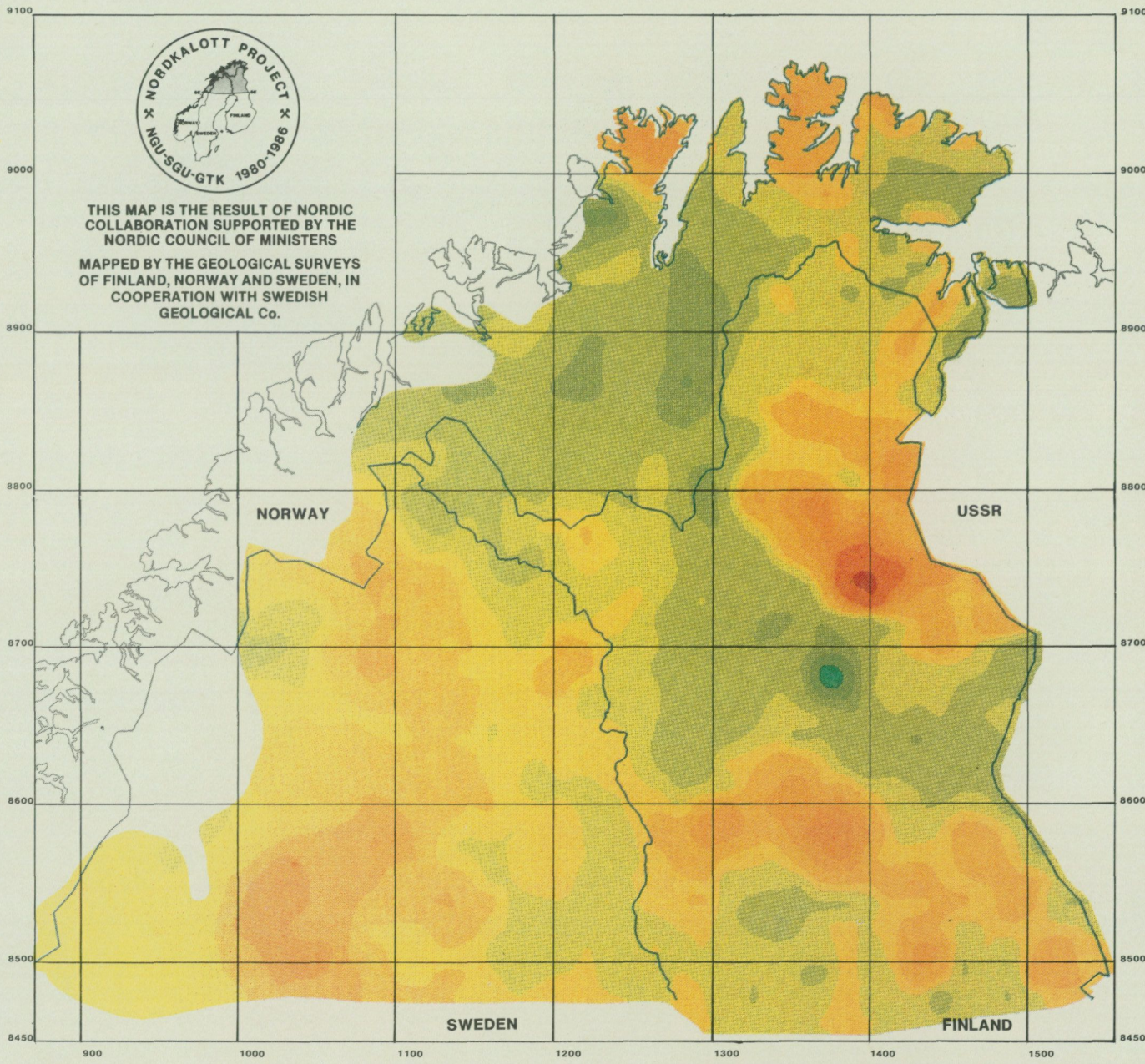


Projection: Lambert conformal
 Processed at Swedish Geological Co 1986

MAP 138



THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



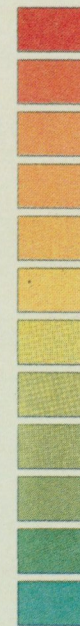
Nordkalott project Geochemistry

STREAM SEDIMENT
 - 180 μ m

Principal component analysis
 Soft Independent Modelling of Class Analogy (SIMCA)
 Moving average by kriging

Explained variance: 11.7%

Component score



Intensity

Contribution to component loadings

Strong Weak
 Ce La P Zr

Insignificant
 Al Ba Ca Fe Li Mn Sc Sr Zn

Strong Weak
 Cr Co Mg Ni V

1:4 000 000
 100 km

Projection: Lambert conformal
 Processed at Swedish Geological Co 1986

MAP 139

Nordkalott project Geochemistry

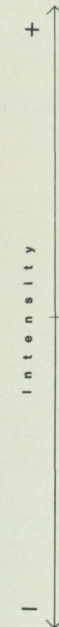
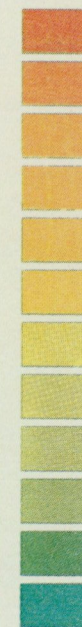
STREAM SEDIMENT
Heavy minerals 180 - 600 μm

Principal component analysis

Soft Independent Modelling of Class Analogy (SIMCA)
Moving average by kriging

Explained variance: 18.0%

Component score



Contribution to component loadings

Strong Weak
- Ca Cl K Mn Mo
 Na Nb P Pb Rb
 Sr Th W Y Zr

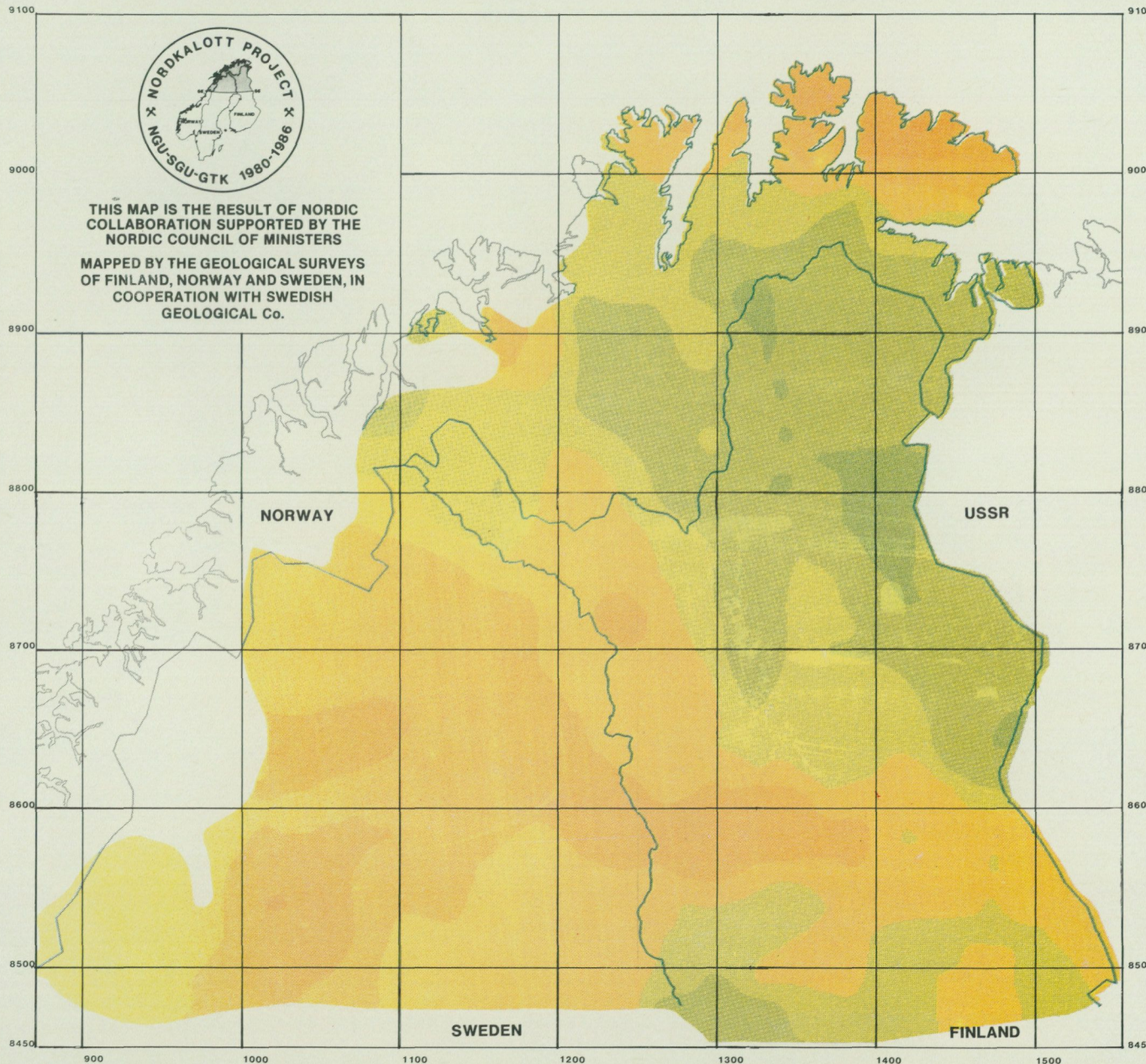
Insignificant
As Ba Co Fe Mg Ni S Si Sn U V

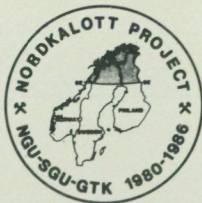
Strong Weak
- Al Cr Cu Zn

1:4 000 000
100 km

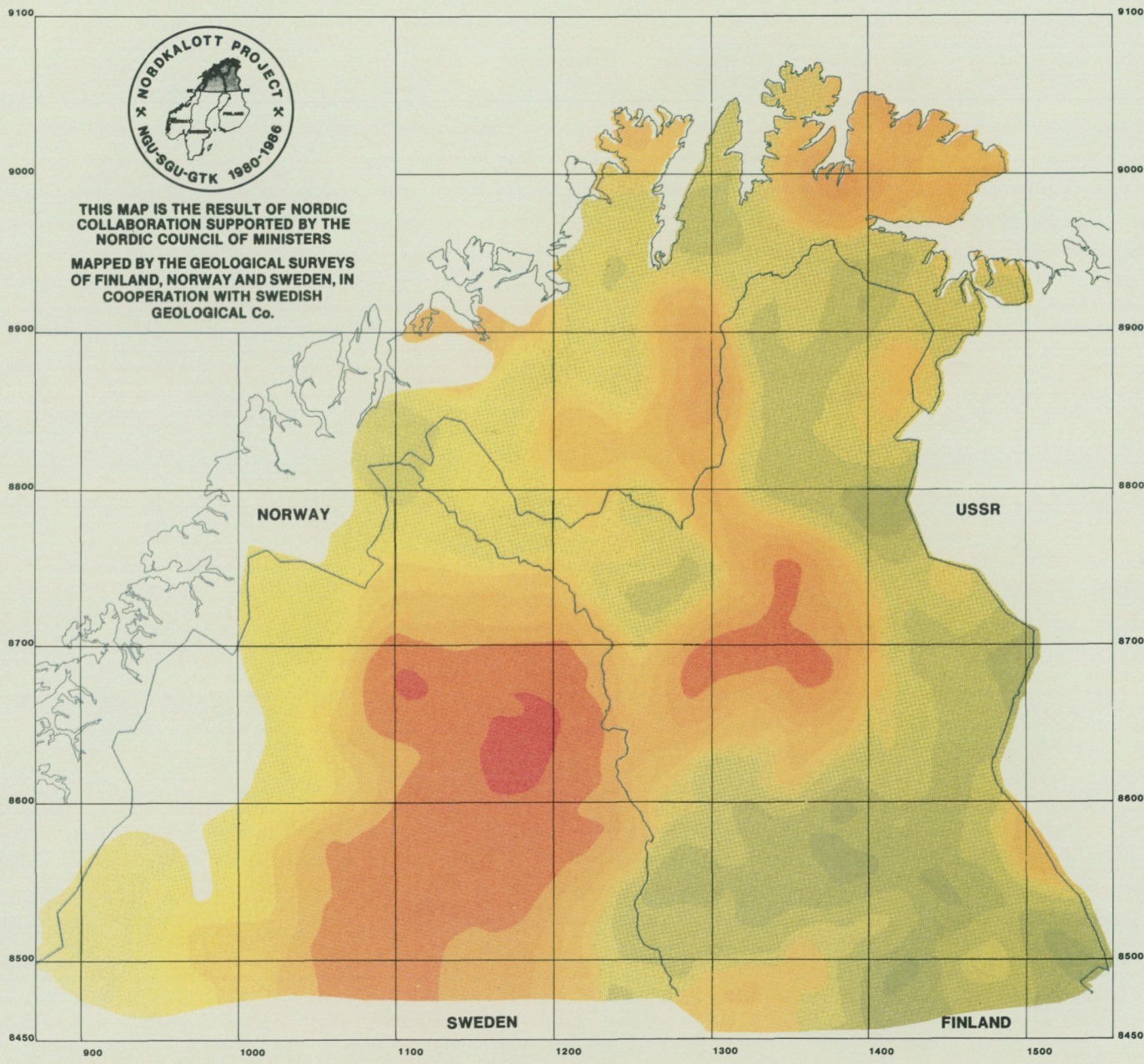
Projection: Lambert conformal
Processed at Swedish Geological Co 1986

MAP 140





THIS MAP IS THE RESULT OF NORDIC COLLABORATION SUPPORTED BY THE NORDIC COUNCIL OF MINISTERS
 MAPPED BY THE GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN, IN COOPERATION WITH SWEDISH GEOLOGICAL Co.



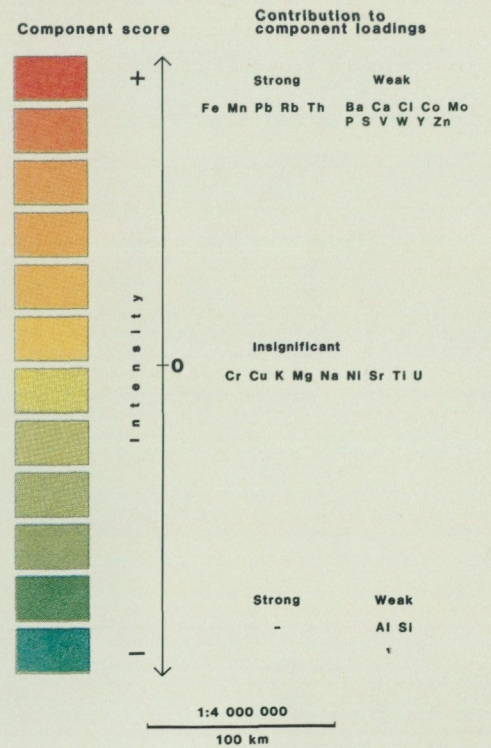
Nordkalott project Geochemistry

STREAM ORGANIC MATTER

Principal component analysis

Soft Independent Modelling of Class Analogy (SIMCA)
 Moving average by kriging

Explained variance: 27.3%



Projection: Lambert conformal
 Processed at Swedish Geological Co 1986

MAP 141

Nordkalott project Geochemistry

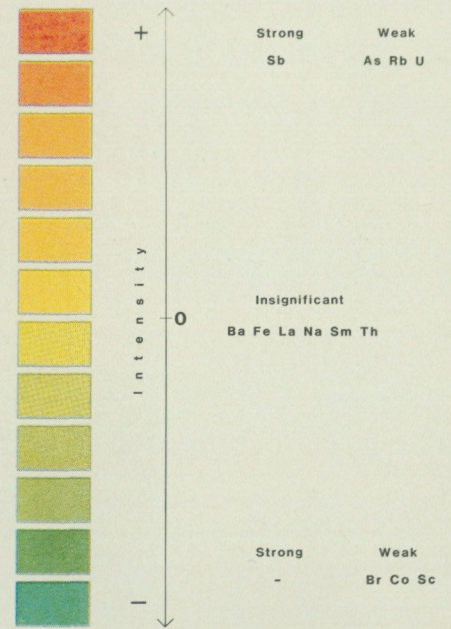
STREAM MOSS

Principal component analysis

Soft Independent Modelling of Class Analogy (SIMCA)
Moving average by kriging

Explained variance: 12.2%

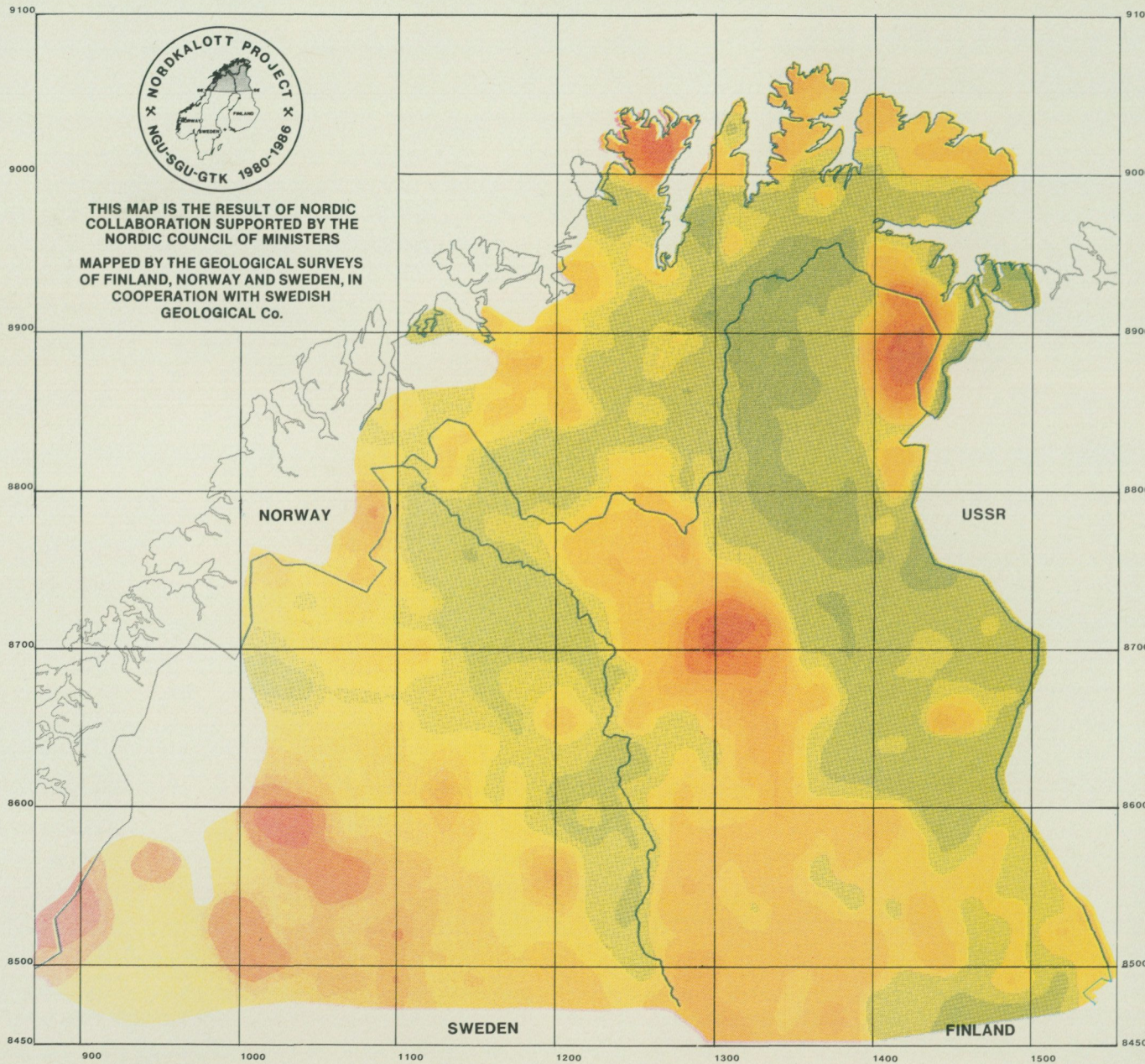
Component score Contribution to component loadings



1:4 000 000
100 km

Projection: Lambert conformal
Processed at Swedish Geological Co 1986

MAP 142



THIS MAP IS THE RESULT OF NORDIC
COLLABORATION SUPPORTED BY THE
NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN, IN
COOPERATION WITH SWEDISH
GEOLOGICAL Co.

GEOCHEMICAL INTERPRETATION MAP NORTHERN FENNOSCANDIA

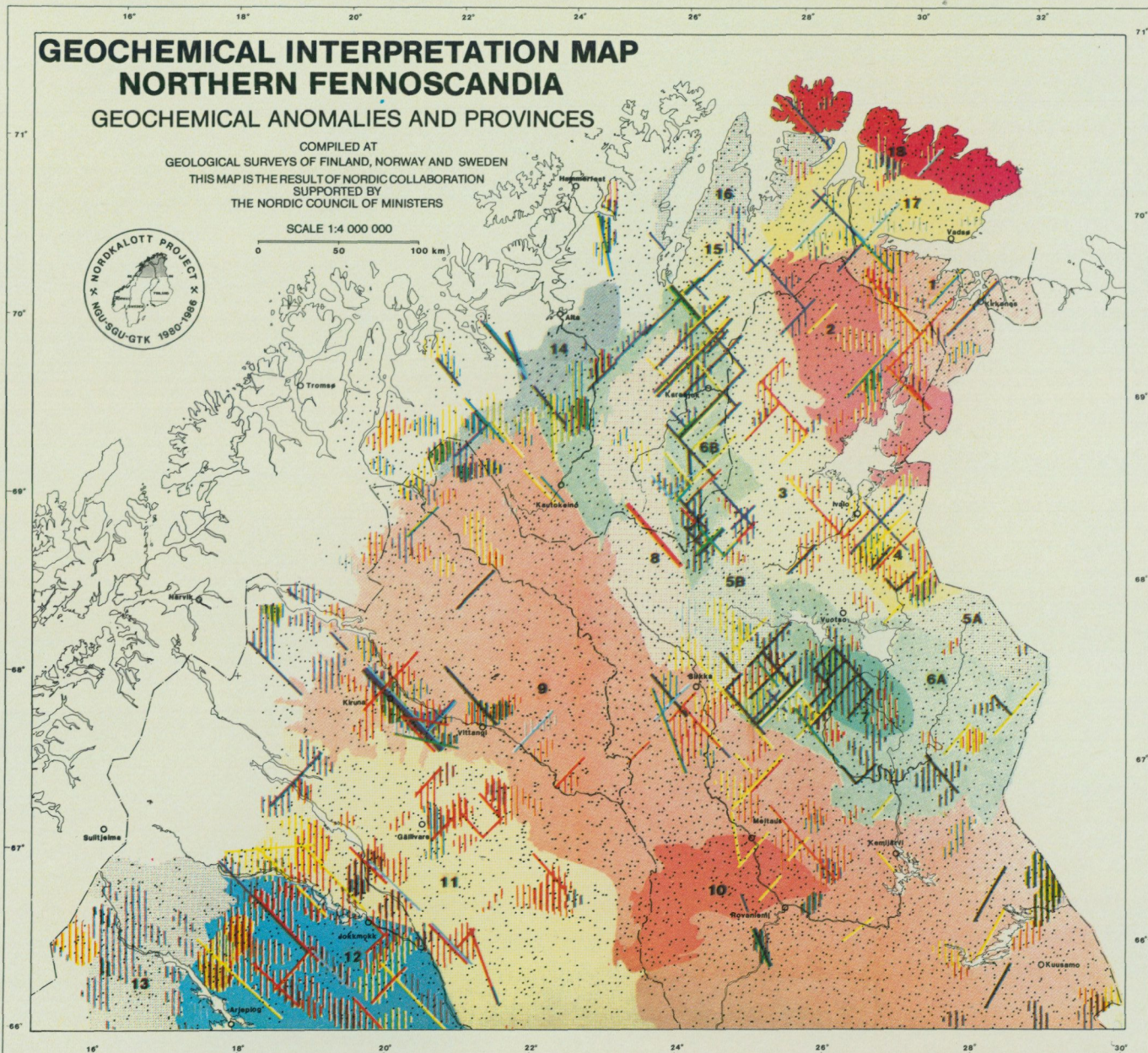
GEOCHEMICAL ANOMALIES AND PROVINCES

COMPILED AT
GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN
THIS MAP IS THE RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS



SCALE 1:4 000 000

0 50 100 km



EXPLANATION

FÖRKLARING

The interpretation map was arrived at through visual inspection of the single-element maps. Heavy lines on the map represent anomalies related to linear features, and hatched areas represent anomalies more irregular in shape. The diagrams show the ratios between the average of analyses within each province and the average of analyses in the whole project area.

Tolkningskartan baserar sig på en visuell granskning av singelelementkartorna. Grövre linjer indikerar anomalikontraster knutna till linjära strukturer och streckade områden visar anomalier av mera oregelbunden form. Diagrammen visar kvoten mellan elementens medelhalt i provinerna inom respektive provins och medelhalten inom hela projektområdet.

ANOMALIES

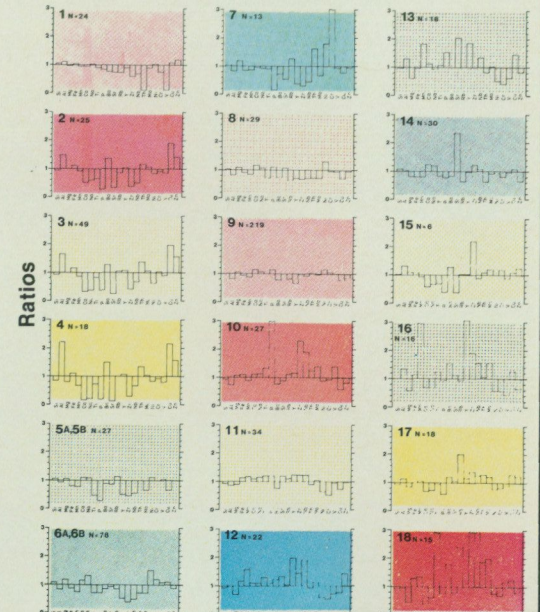
- As, Au, Sb
- Mo, W
- Th, U

ANOMALIER

- Cu
- Pb, Zn
- Co, Cr, Ni
- Ba
- SAMPLE SITES
PROVPUNKTER

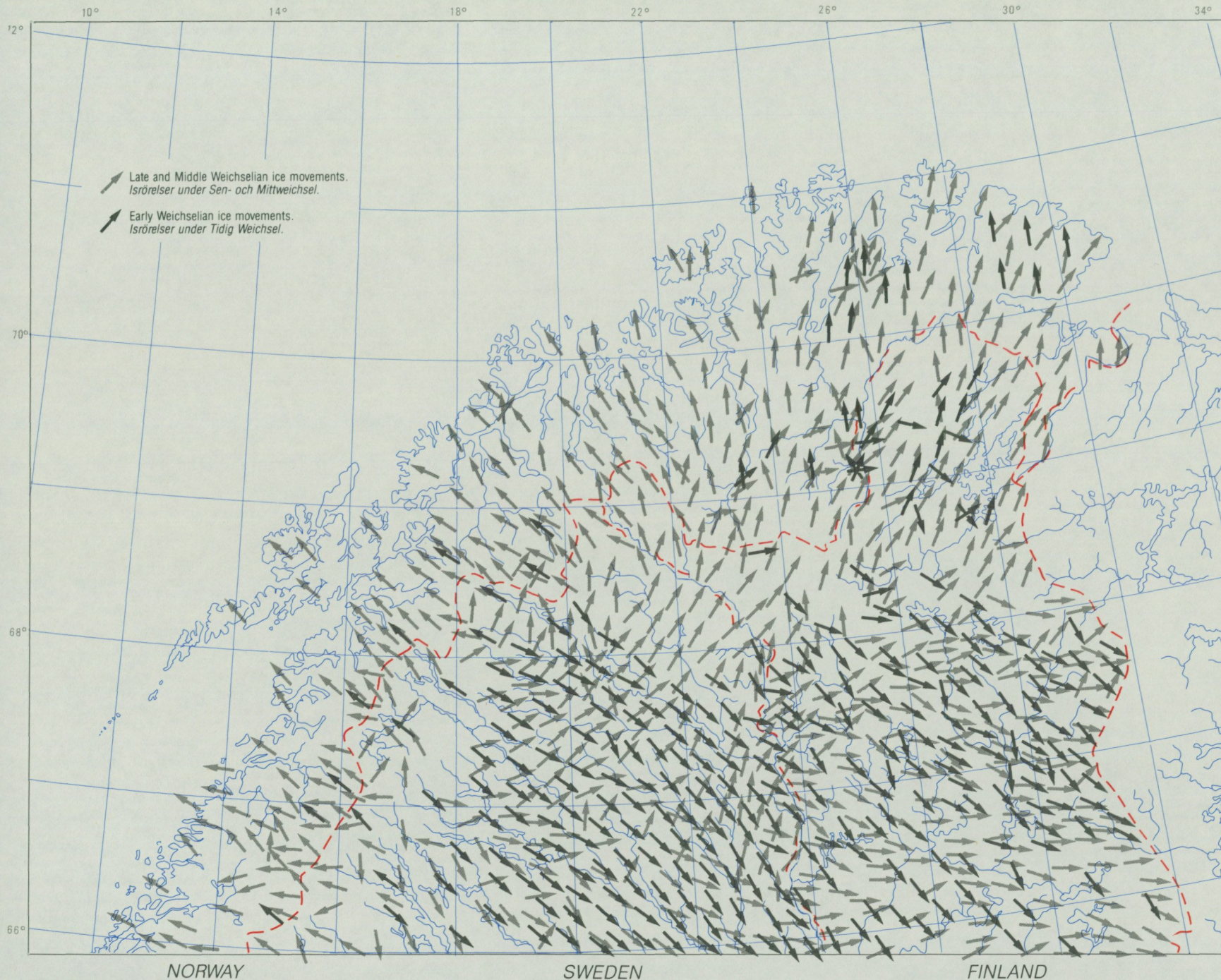
PROVINCES

PROVINSER



Order of elements along the abscissa:
Si, Al, Mg, Fe, Mn, Ca, Na, Ti, P, Ba, Sr,
Rb, Y, Zr, Nb, Th, Mo, Ni, Cr, V, Cu, Zn

Reduced from: Geochemical Interpretation Map, Northern Fennoscandia, 1:1 mill.
Geological Surveys of Finland, Norway, and Sweden, 1986. ISBN 91-7158-383-1

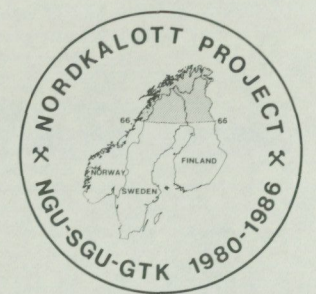


NORDKALOTT PROJECT

ICE FLOW DIRECTIONS NORTHERN FENNOSCANDIA

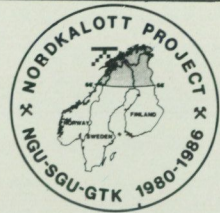
COMPILED BY
 H. Hirvas, R. Lagerbäck, K. Mäkinen,
 H. Minell, K. Nenonen, L. Olsen,
 L. Rodhe, R. Sutinen, M. Thoresen.

Scale 1:4 mill.
 100 km



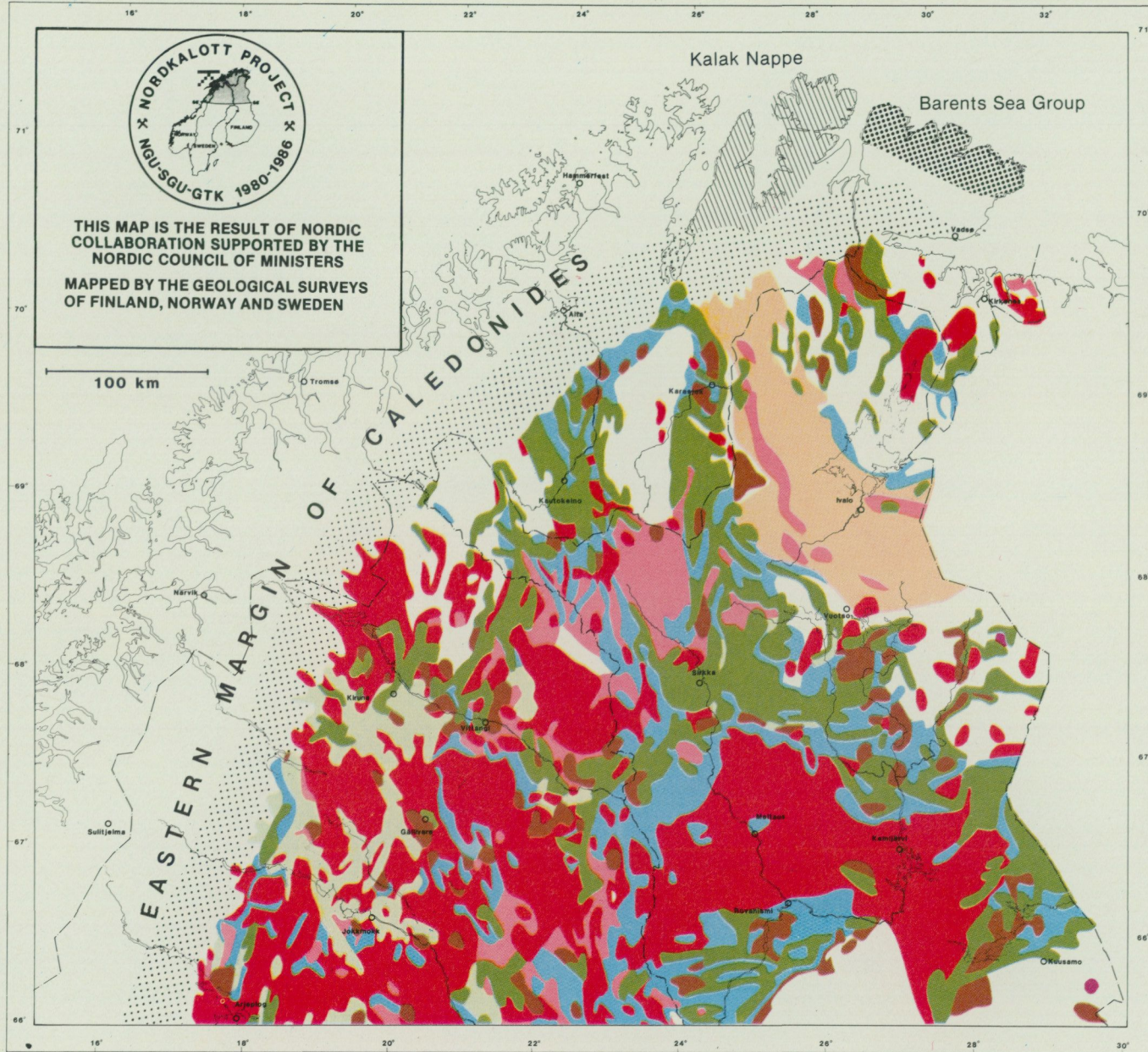
COMPILED AT THE
 GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN
 THIS MAP IS A RESULT OF NORDIC COLLABORATION
 SUPPORTED BY
 THE NORDIC COUNCIL OF MINISTERS

MAP 144



THIS MAP IS THE RESULT OF NORDIC
COLLABORATION SUPPORTED BY THE
NORDIC COUNCIL OF MINISTERS
MAPPED BY THE GEOLOGICAL SURVEYS
OF FINLAND, NORWAY AND SWEDEN

100 km



LITHOLOGY OF THE BALTIC SHIELD NORTHERN FENNOSCANDIA

SEDIMENTS



INTRUSIVES



Intermediate



Alkaline

VOLCANICS



Intermediate



UNDIFFERENTIATED
GNEISSES



This map is simplified and
reduced by M. Kontio and
V. Perttunen from:
Geological Map, Northern
Fennoscandia, 1:1 mill.

Compiled by

A. Silvennoinen (subproject leader),
M. Gustavson, V. Perttunen, A. Siedlecka,
T. Sjöstrand, E. Zachrisson
ISBN 91-7152-370-x

GRAVITY ANOMALY MAP NORTHERN FENNOSCANDIA

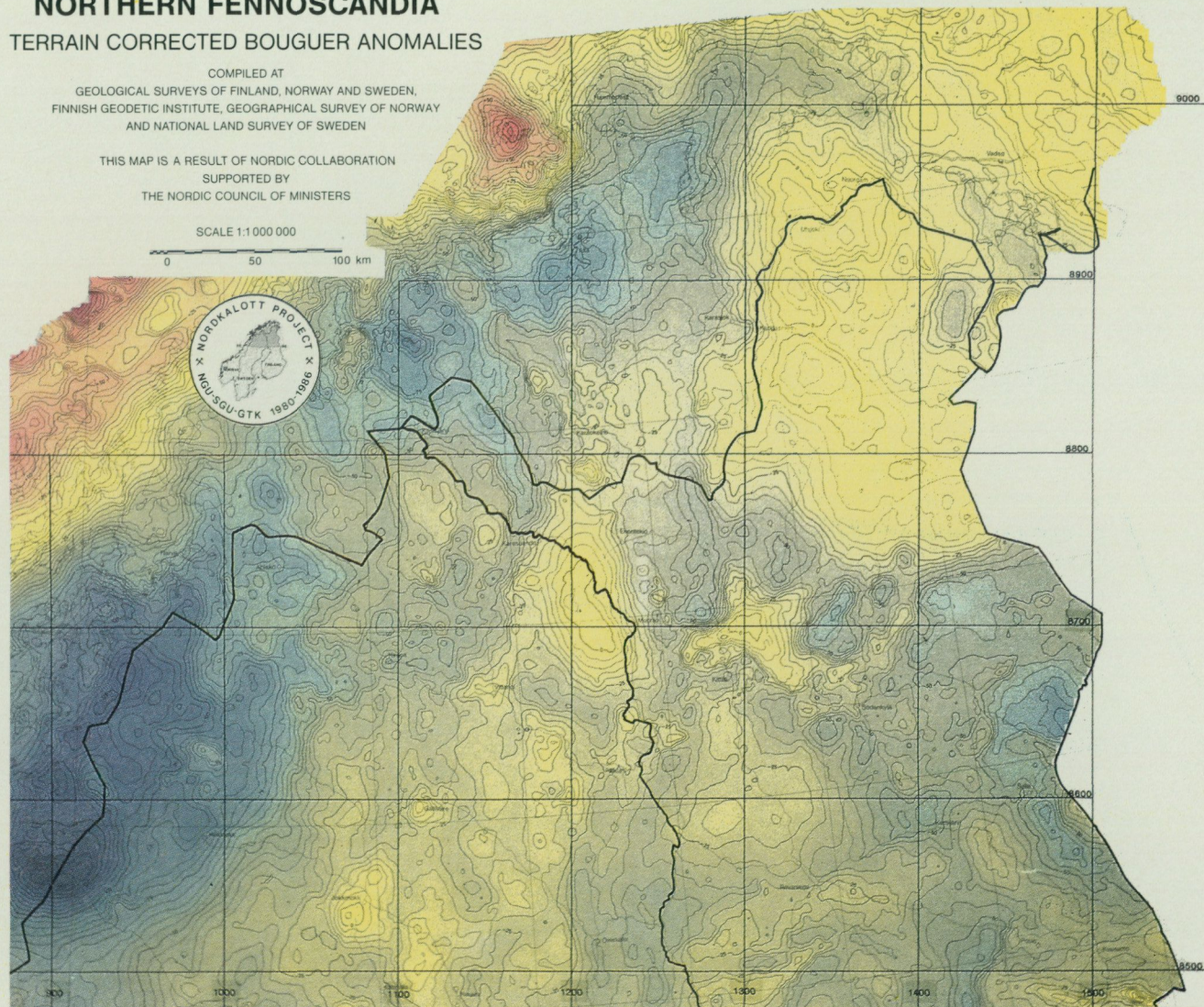
TERRAIN CORRECTED BOUGUER ANOMALIES

COMPILED AT
GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN,
FINNISH GEODETIC INSTITUTE, GEOGRAPHICAL SURVEY OF NORWAY
AND NATIONAL LAND SURVEY OF SWEDEN

THIS MAP IS A RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS

SCALE 1:1 000 000

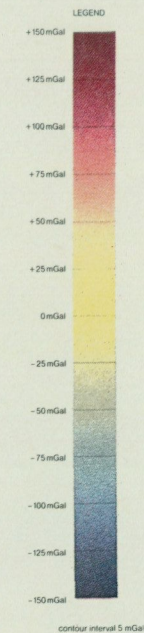
0 50 100 km



Reduced from: Gravity Anomaly Map,
Northern Fennoscandia, 1: 1 mill.
Geodetic institutes and Geological Surveys
of Finland, Norway and Sweden, 1986.
ISBN 91-7158-374-2.

Compiled by:
Geodetic institutes: A. Kiviniemi, L-Å. Haller,
Å. Midsundstad

Geological surveys: J. Korhonen, I. Aalstad,
S. Elo, L. Granar, B. Nylund, A. Sindre



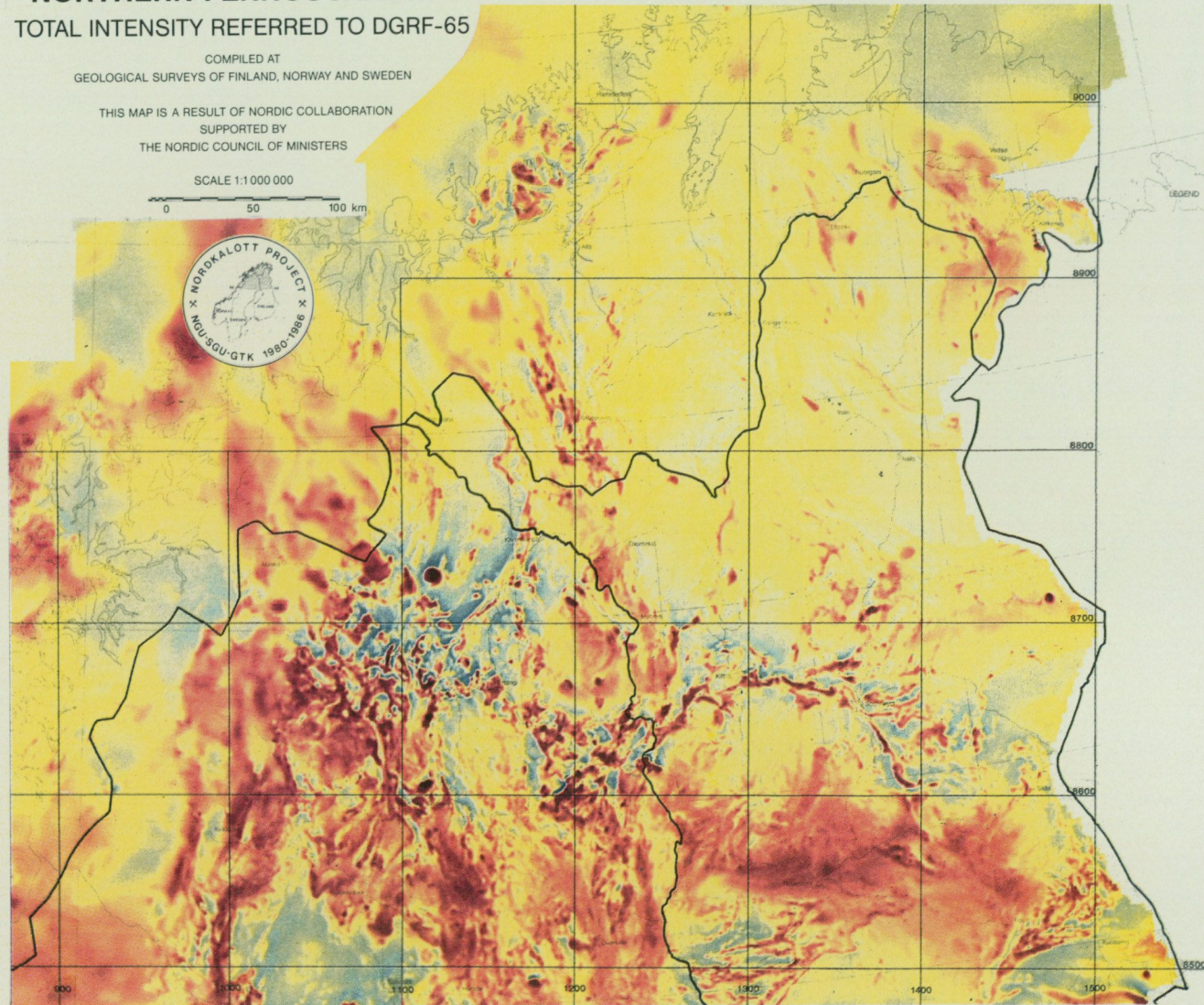
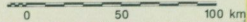
AEROMAGNETIC ANOMALY MAP NORTHERN FENNOSCANDIA

TOTAL INTENSITY REFERRED TO DGRF-65

COMPILED AT
GEOLOGICAL SURVEYS OF FINLAND, NORWAY AND SWEDEN

THIS MAP IS A RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS

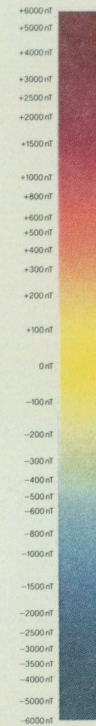
SCALE 1:1 000 000



Reduced from: Magnetic Anomaly Map,
Northern Fennoscandia, 1: 1 mill.
Geological Surveys of Finland, Norway and
Sweden, 1986.
ISBN 91-7158-375-0.

Compiled by: J. Korhonen, I. Aalstad,
V. Arkko, L. Granar, H. Henkel, B. Karlemo,
O. Kihle, L. Krook, J. Lind, E. Normann,
O. Olesen, M. Puranen, A. Sindre,
L. Thorning, S. Werner

LEGEND



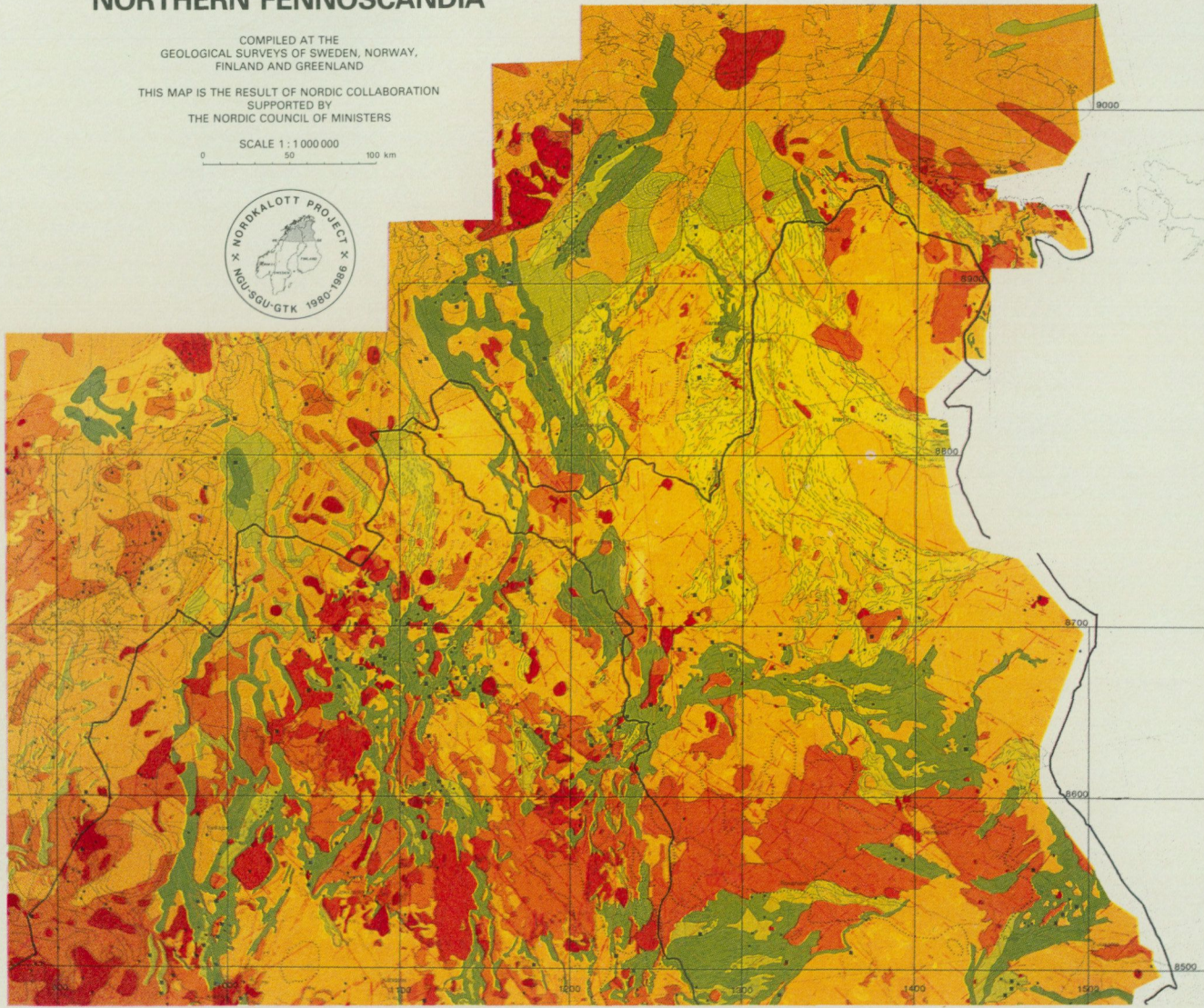
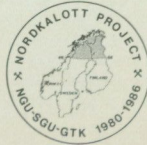
MAP 147

AEROMAGNETIC INTERPRETATION MAP NORTHERN FENNOSCANDIA

COMPILED AT THE
GEOLOGICAL SURVEYS OF SWEDEN, NORWAY,
FINLAND AND GREENLAND

THIS MAP IS THE RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS

SCALE 1:1 000 000
0 50 100 km



Reduced from: Aeromagnetic Interpretation
Map, Northern Fennoscandia, 1: 1 mill.
Geological Surveys of Finland, Norway and
Sweden, 1986.
ISBN 91-7158-376-9.

Compiled by: H. Henkel, V. Arkko, K. Hult,
O. Kihle, J. Korkealaakso, J. Lind, D. Nisca,
O. Olesen, A. Sindre, H. Säävuori,
I. Tahvanainen, L. Thorning

LEGEND

MAGNETIC PATTERNS	LEVEL OF MAGNETIZATION
banded pattern	high
	low
irregular pattern	high
	low

NORDKALOTT PROJECT MINES AND ORE PROSPECTS

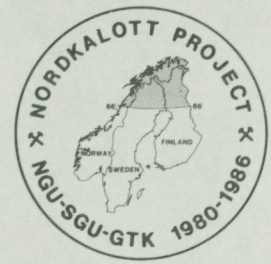
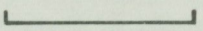
Fe, Mn, Ti, V

THE DATA ARE TAKEN FROM
METALLOGENETIC MAP OF
NORTHERN FENNOSCANDIA,
SCALE 1:1 MILL

COMPILED BY
R. FRIETSCH, I. LINDAHL, K. PUUSTINEN,
A. SUNDBERG AND E. ZACHRISSON

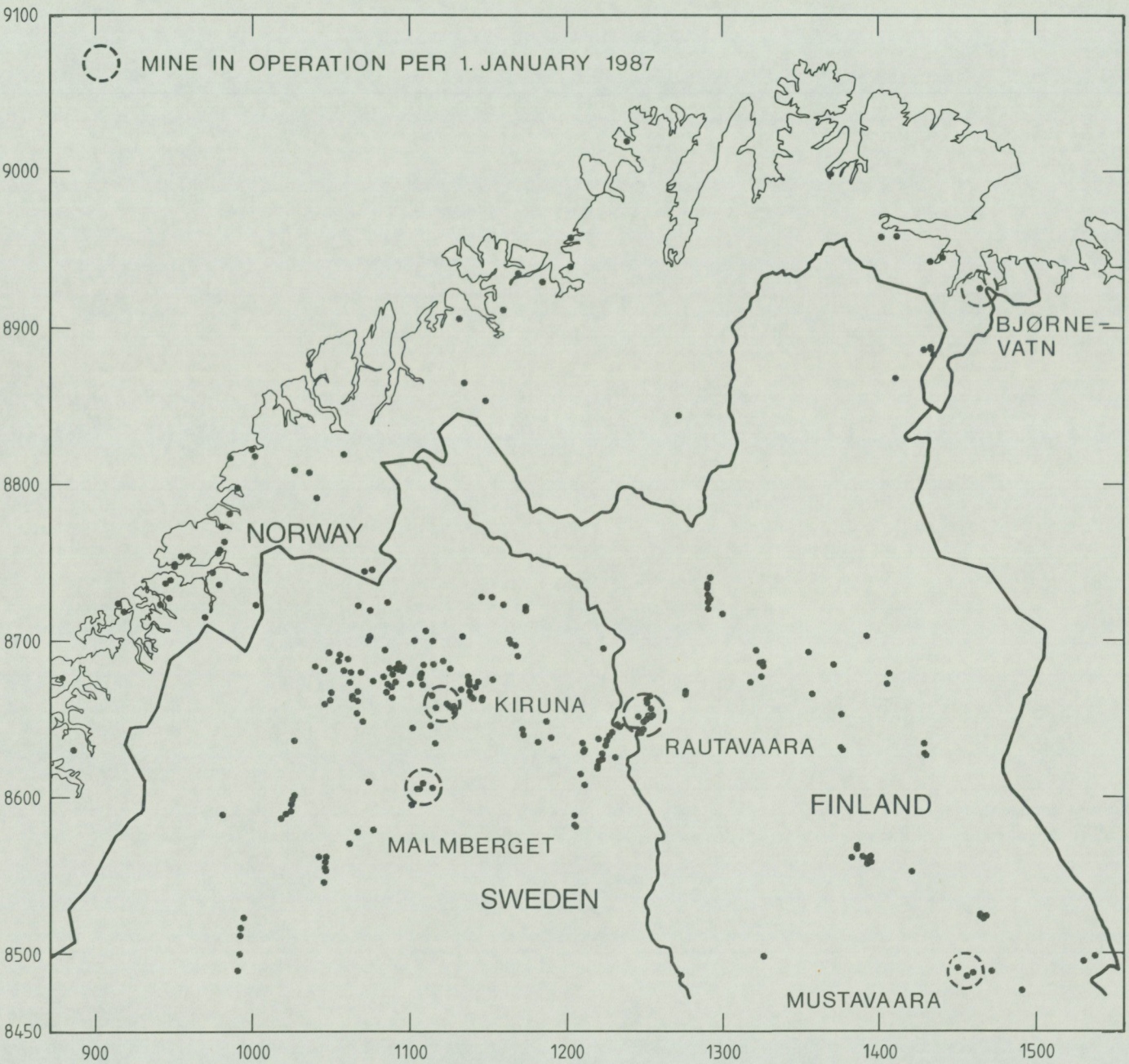
SCALE 1:4 MILL

100 km



COMPILED AT THE
GEOLOGICAL SURVEYS OF FINLAND, NORWAY,
AND SWEDEN

THIS MAP IS A RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS



MAP 149

NORDKALOTT PROJECT MINES AND ORE PROSPECTS

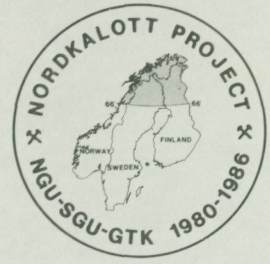
Co, Cr, Ni

THE DATA ARE TAKEN FROM
METALLOGENETIC MAP OF
NORTHERN FENNOSCANDIA,
SCALE 1:1 MILL

COMPILED BY
R. FRIETSCH, I. LINDAHL, K. PUUSTINEN,
A. SUNDBERG AND E. ZACHRISSON

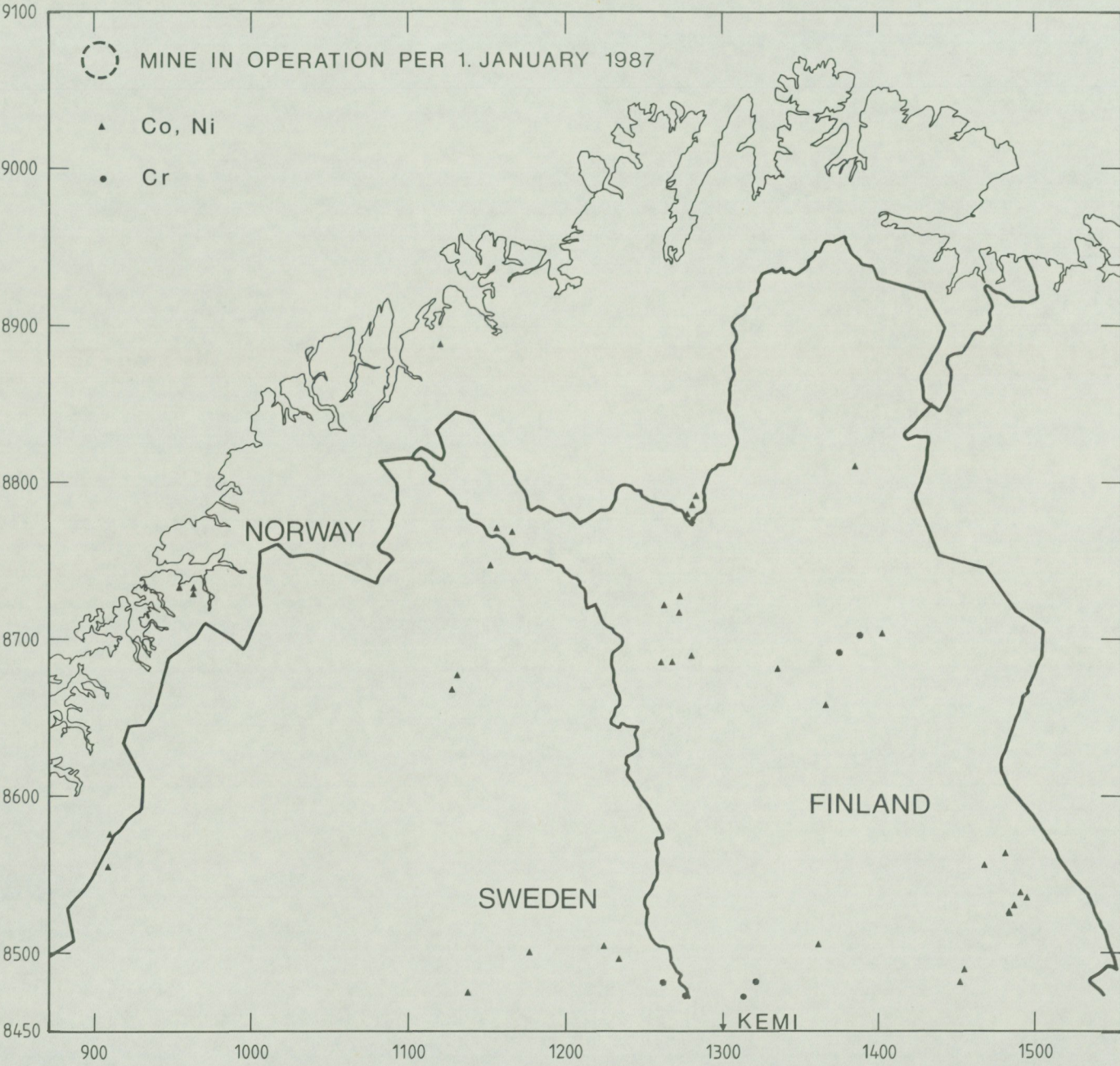
SCALE 1:4 MILL

100 km



COMPILED AT THE
GEOLOGICAL SURVEYS OF FINLAND, NORWAY,
AND SWEDEN

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SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS



MAP 150

NORDKALOTT PROJECT MINES AND ORE PROSPECTS

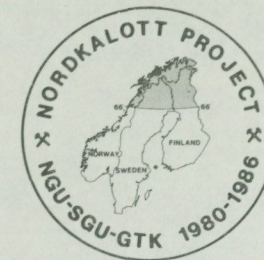
Pb, Zn

THE DATA ARE TAKEN FROM
METALLOGENETIC MAP OF
NORTHERN FENNOSCANDIA,
SCALE 1:1 MILL

COMPILED BY
R. FRIETSCH, I. LINDAHL, K. PUUSTINEN,
A. SUNDBERG AND E. ZACHRISSON

SCALE 1:4 MILL

100 km



COMPILED AT THE
GEOLOGICAL SURVEYS OF FINLAND, NORWAY,
AND SWEDEN

THIS MAP IS A RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS

9100

○ MINE IN OPERATION PER 1. JANUARY 1987

9000

8900

8800

8700

8600

8500

8450

900

1000

1100

1200

1300

1400

1500

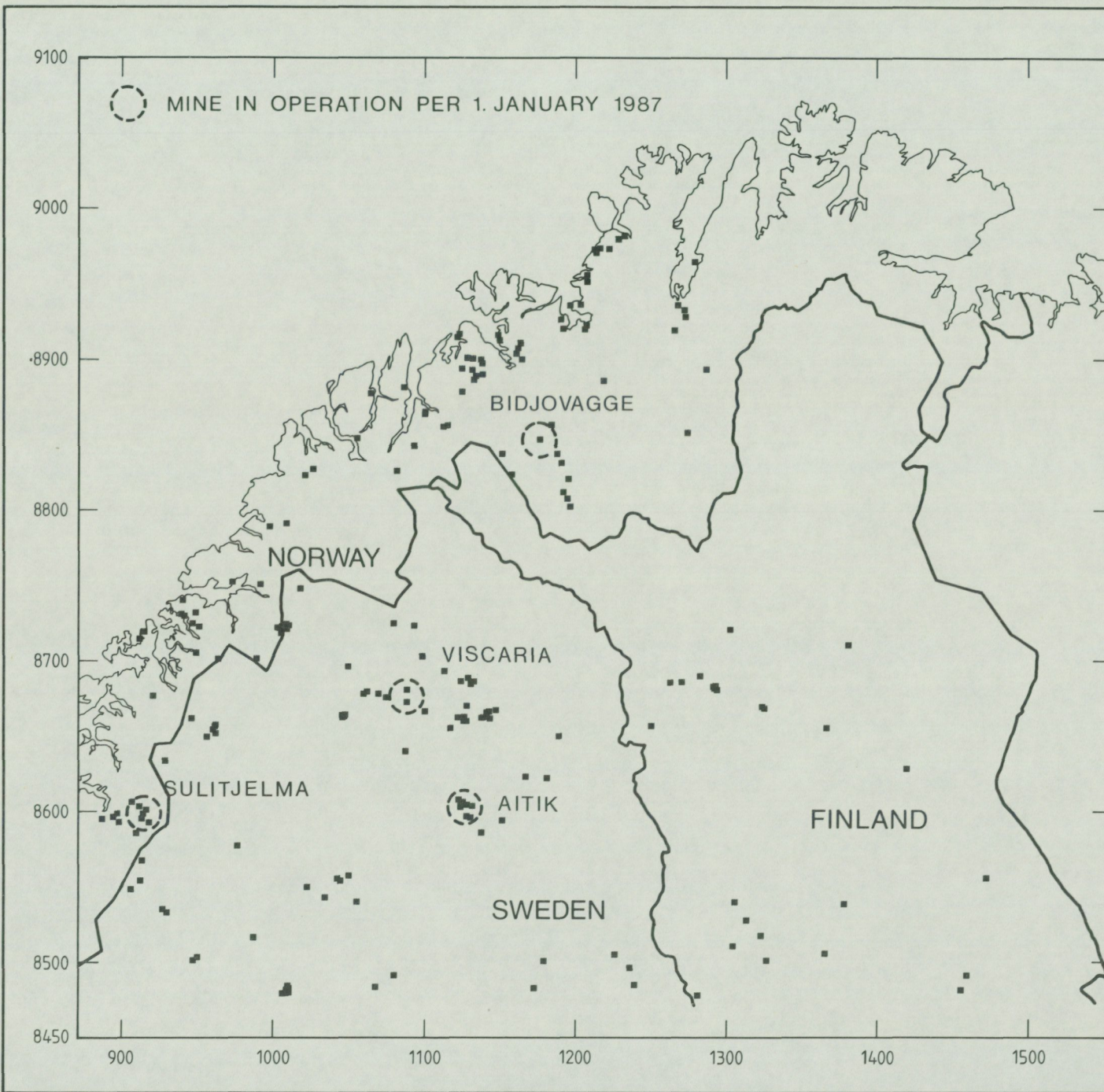
NORWAY

FINLAND

SWEDEN

LAISVALL

MAP 151



NORDKALOTT PROJECT MINES AND ORE PROSPECTS

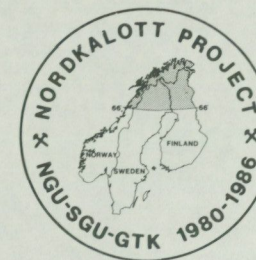
Cu

THE DATA ARE TAKEN FROM
METALLOGENETIC MAP OF
NORTHERN FENNOSCANDIA,
SCALE 1:1 MILL

COMPILED BY
R. FRIETSCH, I. LINDAHL, K. PUUSTINEN,
A. SUNDBERG AND E. ZACHRISSON

SCALE 1:4 MILL

100 km



COMPILED AT THE
GEOLOGICAL SURVEYS OF FINLAND, NORWAY,
AND SWEDEN

THIS MAP IS A RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS

MAP 152

NORDKALOTT PROJECT MINES AND ORE PROSPECTS

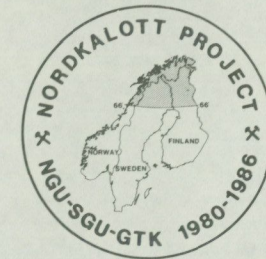
Mo, W

THE DATA ARE TAKEN FROM
METALLOGENETIC MAP OF
NORTHERN FENNOSCANDIA,
SCALE 1:1 MILL

COMPILED BY
R. FRIETSCH, I. LINDAHL, K. PUUSTINEN,
A. SUNDBERG AND E. ZACHRISSON

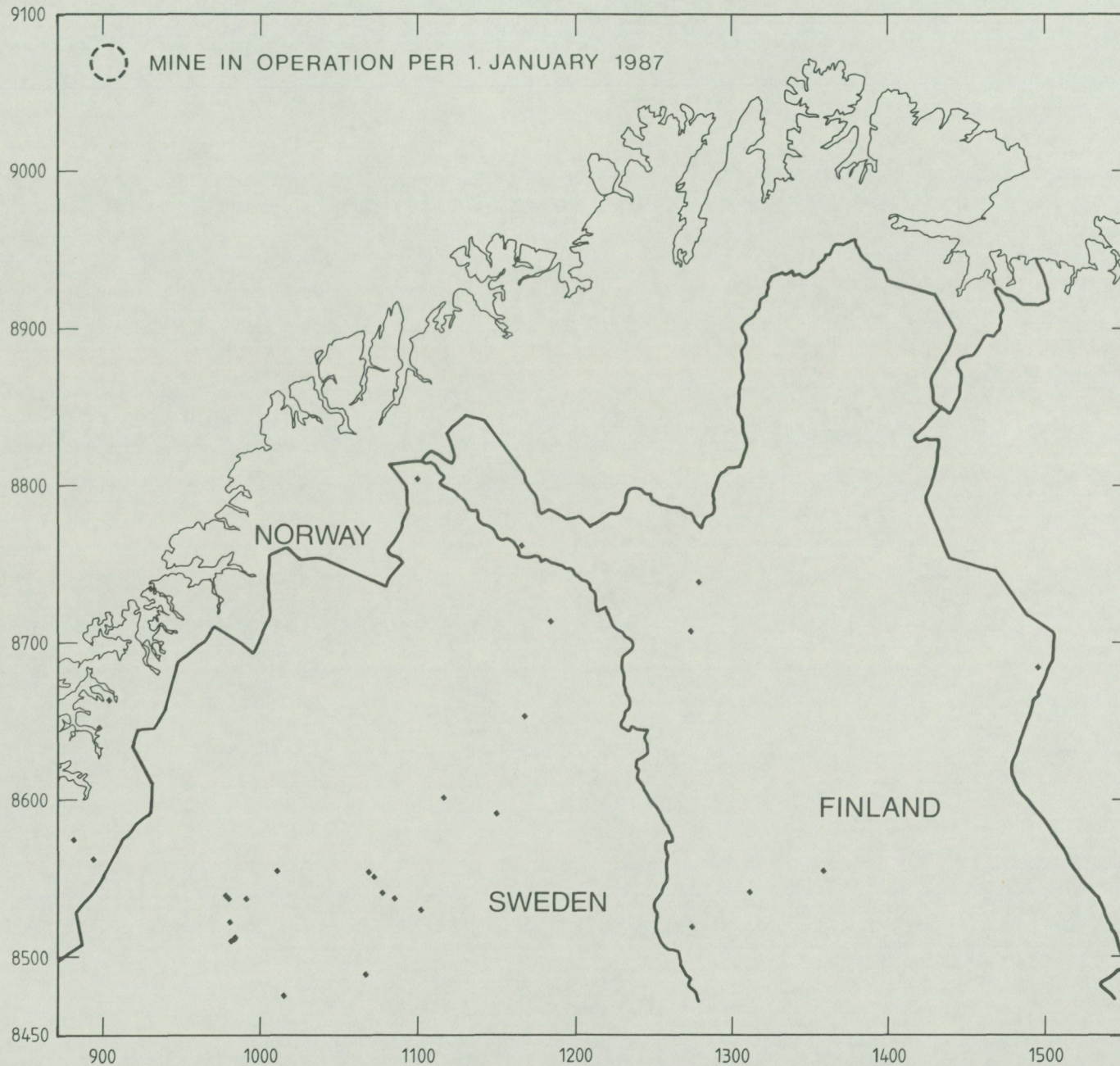
SCALE 1:4 MILL

100 km



COMPILED AT THE
GEOLOGICAL SURVEYS OF FINLAND, NORWAY,
AND SWEDEN

THIS MAP IS A RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS



MAP 153

NORDKALOTT PROJECT MINES AND ORE PROSPECTS

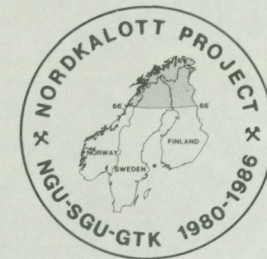
Nb, Th, U

THE DATA ARE TAKEN FROM
METALLOGENETIC MAP OF
NORTHERN FENNOSCANDIA,
SCALE 1:1 MILL

COMPILED BY
R. FRIETSCH, I. LINDAHL, K. PUUSTINEN,
A. SUNDBERG AND E. ZACHRISSON

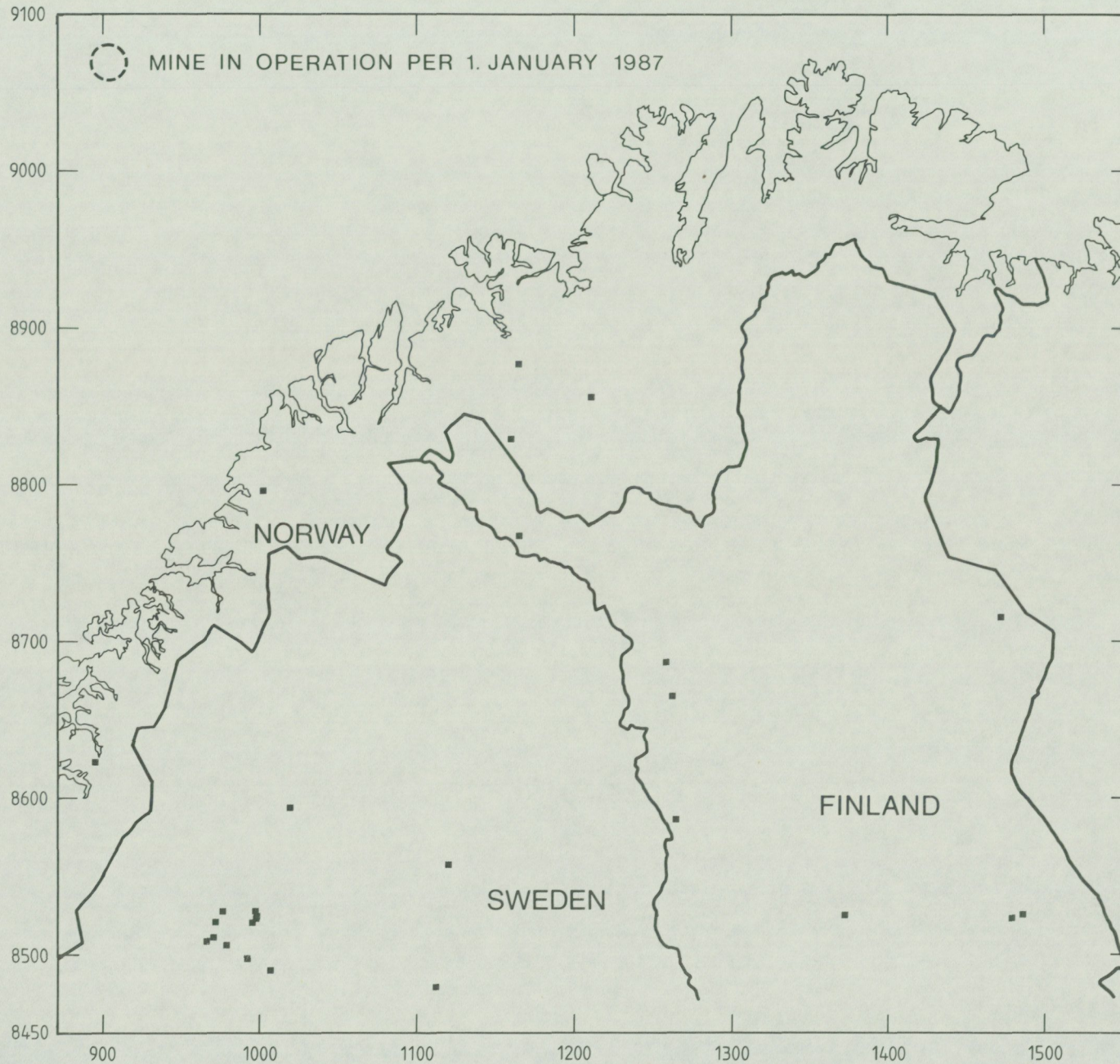
SCALE 1:4 MILL

100 km



COMPILED AT THE
GEOLOGICAL SURVEYS OF FINLAND, NORWAY,
AND SWEDEN

THIS MAP IS A RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS



MAP 154

NORDKALOTT PROJECT MINES AND ORE PROSPECTS

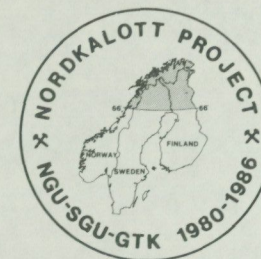
Ag, Au, Sb

THE DATA ARE TAKEN FROM
METALLOGENETIC MAP OF
NORTHERN FENNOSCANDIA,
SCALE 1:1 MILL

COMPILED BY
R. FRIETSCH, I. LINDAHL, K. PUUSTINEN,
A. SUNDBERG AND E. ZACHRISSON

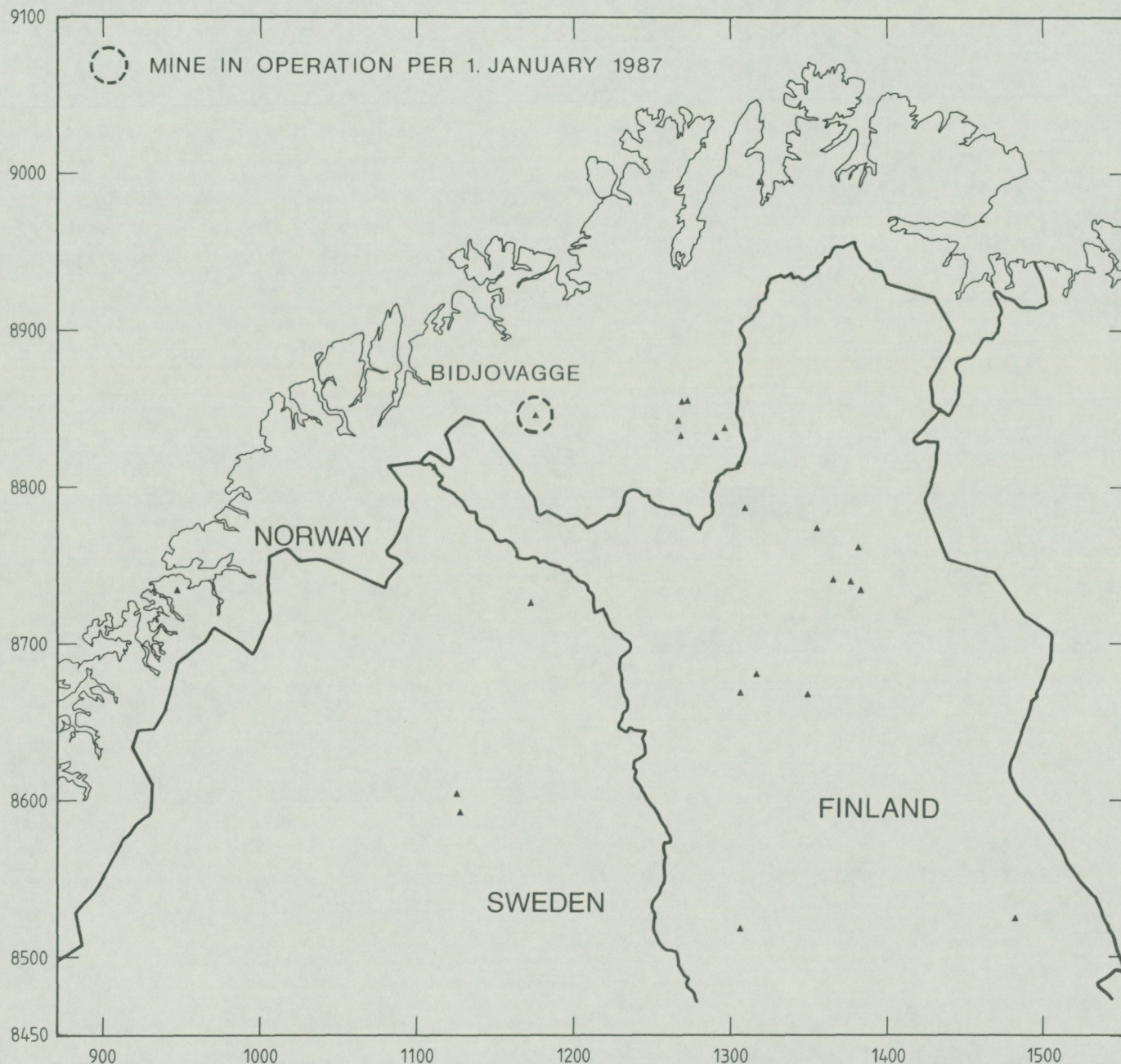
SCALE 1:4 MILL

100 km



COMPILED AT THE
GEOLOGICAL SURVEYS OF FINLAND, NORWAY,
AND SWEDEN

THIS MAP IS A RESULT OF NORDIC COLLABORATION
SUPPORTED BY
THE NORDIC COUNCIL OF MINISTERS



MAP 155

