

FOR FALCONBRIDGE NIKKELVERK A/S
A/S SULFIDMALM

Masi Status Report, 1975

376
Report No. 271/75/17

Introduction

1. INTRODUCTION

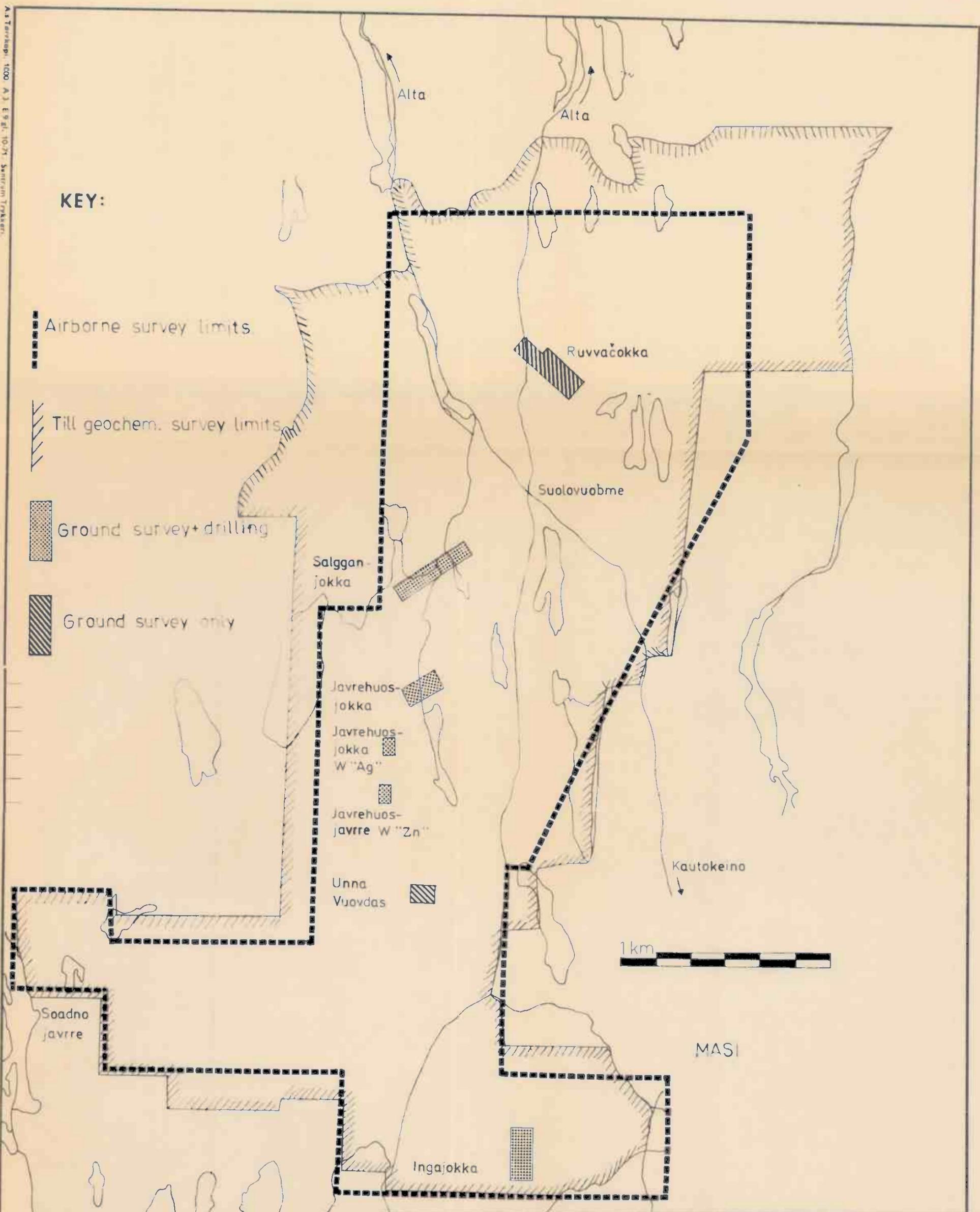
Sulfidmalm has had an active exploration programme in the Masi - Kautokeino areas since 1971. Initially (1971-73) the programme concentrated on the Gaessamaras, Buollanjavrre and Vuolmasjavrre properties near Kautokeino (Proj. 02). In 1972 it was decided to expand this programme to the north and a new project, the Masi project, was started. The programme began with a regional compilation study covering almost the whole Precambrian area of W. Finnmark. In 1973, geophysical and till geochemical surveys were carried out over a number of targets (Mieronjokka, Ingajokka, Gaessjavrre and Bråkvann (Rpts. 274, 275, 276/17/73), target selection being based on stream sediment anomalies from a survey carried out by NGU in 1960. In late 1973 promising prospecting discoveries were made at three separate localities; Salgganjokka, Javrehuosjokka and Unna Vuovdas. These discoveries were followed up the same year with a coarse-scale VLF and till geochemistry grid (the Salggan grid) covering an area of 12 km². In 1974 an area of 250 km² between Masi and Suolovuobme, including the prospecting discoveries, was selected for more intensive reconnaissance, using a combination of helicopter-borne geophysics, wide interval till geochemistry and reconnaissance prospecting. Fig. 1 shows the locations of the various areas and figs. 2 and 3 summarize the results of 1974's more intensive reconnaissance work.

1975 was essentially the first follow-up year to this major reconnaissance project. The 1975 programme concentrated on testing mineralized localities discovered during the course of the initial reconnaissance prospecting.

The following localities were tested by detailed geophysical and geochemical surveys followed by diamond drilling: Salgganjokka, Javrehuosjokka, Ingajokka. Two other localities (Javrehuosjokka west and Javrehuosjavrre west) were covered by smaller follow-up grids and tested by short diamond drill holes using Sulfidmalm's Winkie diamond drill. Detailed ground surveys were also carried out over an additional two targets (Ruvvaçokka and Unna Vuovdas) in preparation for diamond drill testing in 1976. Locations of all areas are shown on fig. 2 and 3.

This report is a summary of the results of the 1975 programme. It is also intended as a review of the present status of the Masi project.

A: Teräskivi, 1:100 000 A.3 E.9.61.10.71. Suomalainen Topografia.



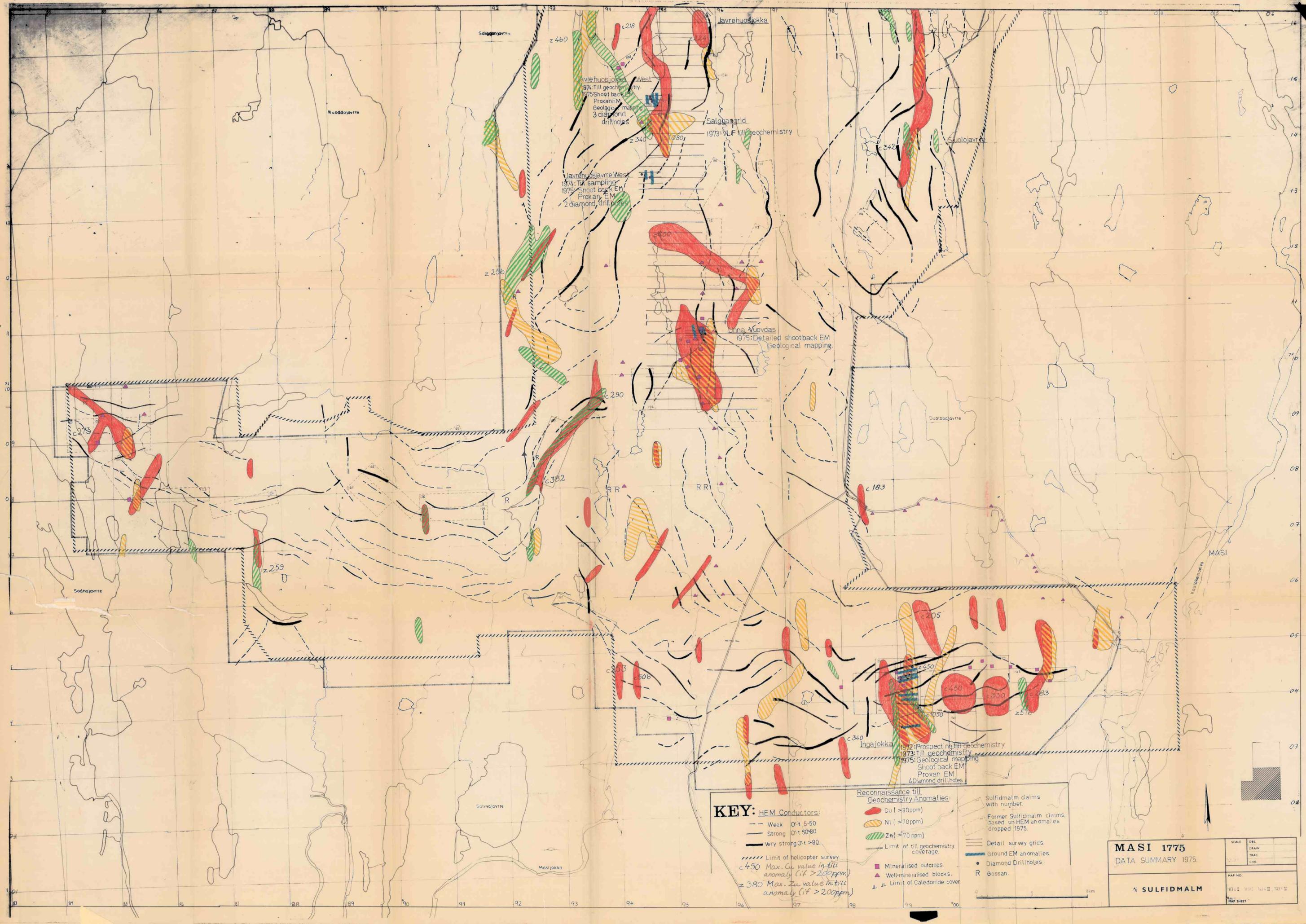
KEY:

- Airborne survey limits
- Till geochem. survey limits
- Ground survey+drilling
- Ground survey only

MASI area:
Location map-
1975 investigations.

1/5 SULFIDMALM

SCALE	OBS. EK	
	DRAW. RK	3-76
1:100,000	TRAC. KG/BB	3-76
	CHK.	
MAP NO.		
MAP SHEET		



Javrehuosiokka
 1974: Till geochemistry
 1975: Shoot back EM
 Proxan EM
 Geological mapping
 3 diamond drillholes

Salvojavre
 1973: VLF till geochemistry

Javrehuosiavre West
 1974: Till sampling
 1975: Shoot back EM
 Proxan EM
 2 diamond drillholes

Anna Vuovdas
 1975: Detailed shootback EM
 Geological mapping

Ingajokka
 1972: Prospect till geochemistry
 1973: Till geochemistry
 1975: Geological mapping
 Shoot back EM
 Proxan EM
 4 Diamond drillholes

KEY: HEM Conductors:
 - - Weak σ_t 5-50
 - - Strong σ_t 50-80
 - - Very strong σ_t >80
 - - Limit of helicopter survey
 c 450 Max. Cu value in till anomaly (if >200ppm)
 z 380 Max. Zn value in till anomaly (if >200ppm)

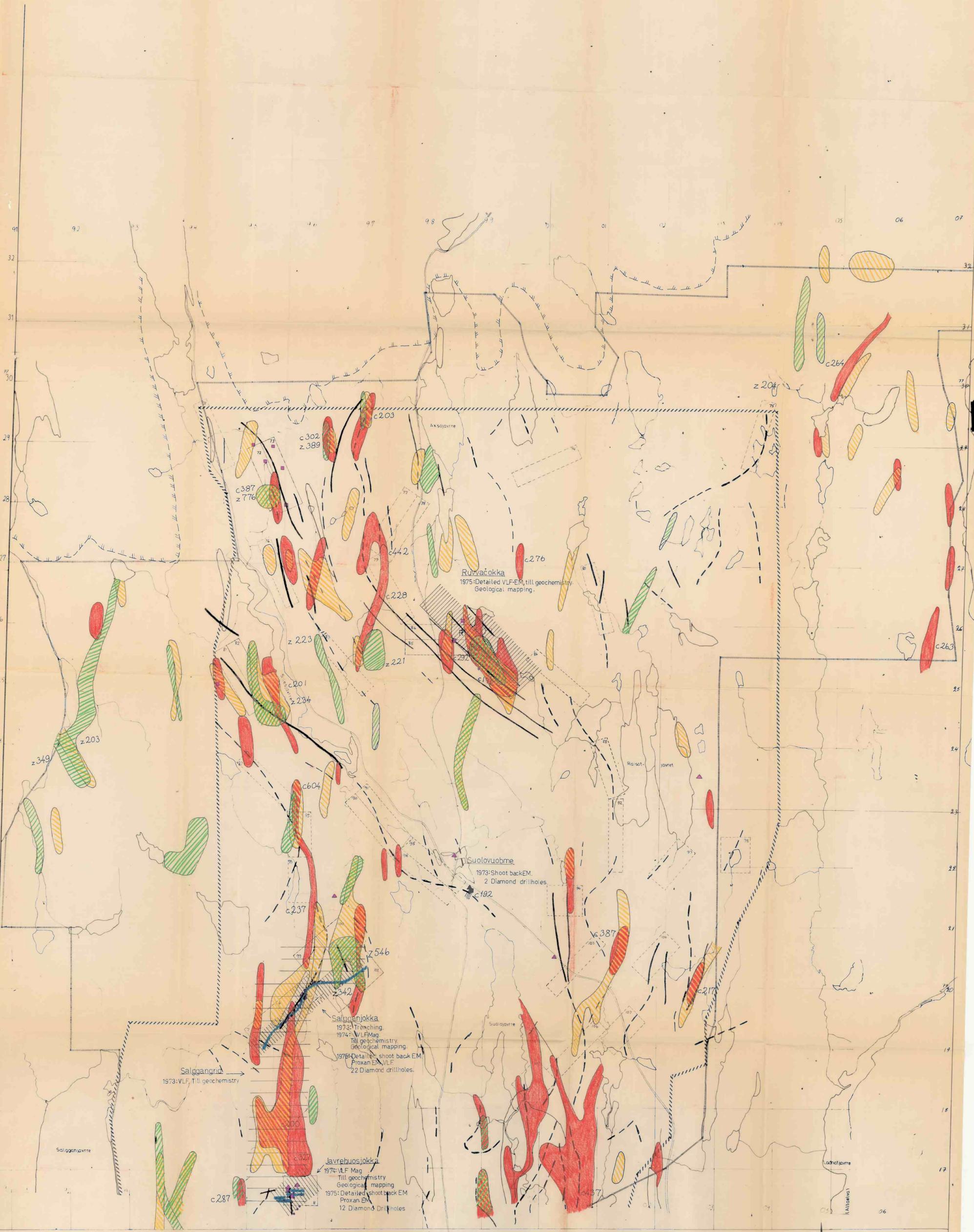
Reconnaissance till Geochemistry Anomalies:
 - - Cu (>90ppm)
 - - Ni (>70ppm)
 - - Zn (>70ppm)
 - - Limit of till geochemistry coverage
 ■ Mineralised outcrops
 ▲ Well-mineralised blocks
 || Limit of Caledonide cover

Sulfidmalm claims with number.
 - - Former Sulfidmalm claims based on HEM anomalies dropped 1975.
 - - Detail survey grids.
 - - Ground EM anomalies
 ● Diamond Drillholes
 R Gossan.

MASI 1775
 DATA SUMMARY 1975.

% SULFIDMALM

SCALE	1:50,000
DRAWN	
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MAP NO.	
SCALE 1:50,000	
MAP SHEET	



KEY:

HEM Conductors:

- - Weak for + values not calculated for
- Strong

Reconnaissance till Geochemistry Anomalies:

- Red: Cu (>90ppm)
- Yellow: Ni (>70ppm)
- Green: Zn (>70ppm)

Other Symbols:

- Limit of helicopter survey
- Limit of till geochemistry coverage
- ▨ Limit of Caledonide cover
- Mineralised outcrops
- ▲ Well-mineralised blocks

Sulfidalm claims with number:

- ▭ Former Sulfidalm claims based on HEM anomalies dropped 1975
- ▭ Detail survey grids
- Ground EM anomalies
- Diamond Drillholes
- R Gossan

Additional Data:

- c.450 Max. Cu value in till anomaly (if >200ppm)
- z.380 Max. Zn value in till anomaly (if >200ppm)

MASI 1775
DATA SUMMARY 1975.

SULFIDALM

SCALE 1:20000	DRAW RAC
MAP NO.	MAP SHEET

Diamond drilling
results 1975

2. DIAMOND DRILLING RESULTS 1975

a) Salgganjokka:

Copper mineralization was discovered in the banks of the Salgganjokka River in 1973, in the course of reconnaissance prospecting. A trench dug across the mineralization gave an average assay of 1.21% Cu over 11 m. Detailed geophysical surveys carried out in 1974 and 1975 showed that the exposed mineralization is connected to a strong conductive zone with a strike length of over 2000 m. 22 diamond drill holes, with a combined length of 538.3 m, were put down to test this zone. Drilling was concentrated in the vicinity of the mineralized showing, but the conductor was also probed along a strike length of 1000 m.

Fig. 4 summarizes the geophysical, geochemical and drilling results for the Salgganjokka locality. Copper mineralization was intersected during the drilling, with values of up to 2.41% Cu over 0.50 m. High copper values were very erratically distributed however, and confined to drill holes in the intermediate vicinity of the original mineralized discovery. The combination of detailed geophysics and diamond drilling has shown that copper mineralization is confined to a gently plunging fold hinge. Elsewhere in the conducting zone mineralization consists of pyrite and/or pyrrhotite with only traces of chalcopyrite. It is concluded that while the Salgganjokka mineralization is locally rich, the dimensions of the structurally-controlled, copper-rich section are too small to be of economic interest.

b) Javrehuosjokka:

In the course of reconnaissance prospecting in 1973 rich copper-bearing blocks (up to 4.0% Cu) were found near Javrehuosjokka River north of Javrehuosjavre. This discovery area was covered with detailed geophysical surveys in 1974 and 1975, outlining a series of parallel, strong conducting zones. Detailed prospecting in the geophysical grid led to the discovery of compact pyrite-pyrrhotite mineralization in graphitic horizons. These carried only traces of chalcopyrite however. A till geochemistry survey carried out in 1974 outlined a strong anomalous dispersion train crossing the grid, with a maximum value of 1220 ppm Cu.

In 1975 the Javrehuosjokka locality was tested with 12 diamond drill holes, totalling 369.8 m. Fig. 5 summarizes the geophysical, geochemical and diamond drilling results. Drill holes were placed to probe each one of the group of parallel conductors with emphasis on testing for possible structurally controlled mineralization. DDH 6J, 7J, 10J and 11J were also in part sited to test the main till geochemical anomaly.

All the holes drilled at Javrehuosjokka intersected sulphide mineralization, in the form of pyrite and/or pyrrhotite, associated with graphitic tuff of felsic volcanics. Only minor chalcopyrite was present in the sulphide horizons however, with a max copper value, over only 20 cms, of 0.48% Cu. Nothing resembling the rich copper-mineralization found in blocks was intersected during the 1975 drill programme.

A re-examination of the data, summarized in fig. 5, suggests that the source of the prominent anomalous copper dispersion train in the moraine at Javrehuosjokka has still not been adequately tested. It is planned to extend the survey grid to the south (up-ice) using deep till geochemistry in the first instance to define the source of this anomaly. Plans for further work will depend on the results of this geochemistry study, to be carried out in early 1976.

c) Ingajokka:

In 1972 massive pyrrhotite mineralization was discovered in outcrops in the Njakkalavzzejokka River (a tributary to the Ingajokka River). Detailed mapping showed that there were at least five sulphide-bearing horizons in the flat-lying Njakkalavzzejokka succession. The results of the 1974 helicopter-borne EM survey showed a group of parallel strong conductors striking EW through the Ingajokka claims. Reconnaissance till geochemistry data pointed to the westernmost portion of the conducting zone as being the most promising, with strong Cu, Ni and Zn till anomalies. This western area was covered with a detailed ground EM survey, detecting at least 13 individual conductors, within a broad conductive zone, more than 800 m wide. Four diamond drill holes, totalling 198 m were put down to test these conductors. Fig. 6 summarizes the results for the Ingajokka area. Each of the drill holes intersected zones of almost massive, but barren pyrrhotite/pyrite varying in thickness from 3.00 - 15.00. Very little chalcopyrite was present in the mineralization, which gave a maximum copper assay of 0.48% Cu. No further work is planned on the Ingajokka locality.

d) Javrehuosjokka West: ("Ag Anomaly")

This area was selected on the basis of a reconnaissance till geochemistry anomaly with up to 6ppm Ag, coinciding in part with a strong gossan zone. Ground EM Surveys were followed by three short diamond drill holes, totalling 51 m.

Sulfidmalm's light-weight prospecting drill was used for this. Each of the holes was drilled down to the capacity of the light-weight drill, and in each case the hole had to be stopped while still in mineralization. Mineralized intersections consisted of graphitic phyllite containing 20-30% pyrrhotite with rare chalcopyrite and sphalerite. Best assays were 0.7% Zn and 5 g/t Ag.

e) Javrehuosjavrre West: ("Zn Anomaly")

This area was selected on the basis of a reconnaissance till anomaly for Zn. Again limited ground EM surveys were followed by two short diamond drill holes totalling 31.5 m using the light-weight prospecting drill. Both holes showed zones up to 1 m wide containing very thin alternating graphite - pyrrhotite layers. There were no minerals of economic interest visible in the core. The drilling to date has not explained the cause of the Zn till anomaly.

200 w 100w 100E 200E 300E

2500 N
2400 N
2300 N
2200 N
2100 N
2000 N
1900 N
1800 N
1700 N

4^m Acid pyroclastic diss. py-po
Best assay 24% Cu, 35% Ni.

5^m Graphite-po horizon, 50-70% po
Best assay 36% Cu, 30% Ni
3^m Qtz-keratophyre 30% po

1^m Graphite-sulphide horizon, 70% po
Best assay 46% Cu, 29% Ni

3^m Graphite-py horizon, 70-80% py
Best assay 40% Cu, 49% Ni

2^m Albite fels 20% py, Best assay 72% Cu, 20% Ni
6^m Graphite-py breccia, average 39% Cu, 13% Ni

5^m Graphite sulphide horizon, py-po-cp breccia
Best assay 68% Cu, 18% Ni
Average (25m) 47% Cu, 27% Ni

TRENCH EXCAVATED 1973
Average value 12% Cu over 11m

6^m Graphite sulphide horizon, 30-50% py
Best assay 48% Cu, 27% Ni

3^m Acid pyroclastic 30% py

5^m Graphite-sulphide horizon 40-60% po
Best assay 64% Cu, 12% Ni
Average 45% Cu, 30% Ni (2^m)

4^m Graphite-py-po horizon
Best assay 41% Cu, 16% Ni
Average 34% Cu, 13% Ni (5m)

2^m Acid pyroclastics minor py

6^m Acid pyroclastic 5% py cp
Best assay 100% Cu, 16% Ni

0^m Graphite pybreccia

8^m Graphite sulphide horizon
Best assay 24% Cu, 20% Ni
Average (4m) 89% Cu, 12% Ni

1^m Graphite sulphide breccia
Best assay 10% Cu, 37% Ni

2^m Qtz-keratophyre 50% py
0^m Graphite-sulphide horizon 60% py
3^m Qtz-keratophyre 30% py

13^m Qtz-keratophyre, minor py breccia bands

3^m Qtz-keratophyre, minor py-breccia

8^m Qtz-keratophyre, 10-20% py

7^m Qtz-keratophyre, including 2^m py-breccia

0^m Graphite-po-py breccia

KEY:

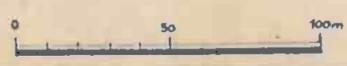
— Conductor trace (shoot-back EM)
Till geochemistry anomaly:

150 ppm Cu
>300 ppm Cu

□ mineralized outcrop
△ block
po pyrrhotite
py pyrite
cp chalcopyrite
(cp) minor chalcopyrite

Outerop graphite schist
Qtz lite/Qtz keratophyre
Albite carbonate rock
Amphibolite
Greenschist

o12s Diamond drillhole (NGU contact)
o1w (Winkie drill)
● Diamond drillhole with best assay >100% Cu
13^m mineralised intersection width



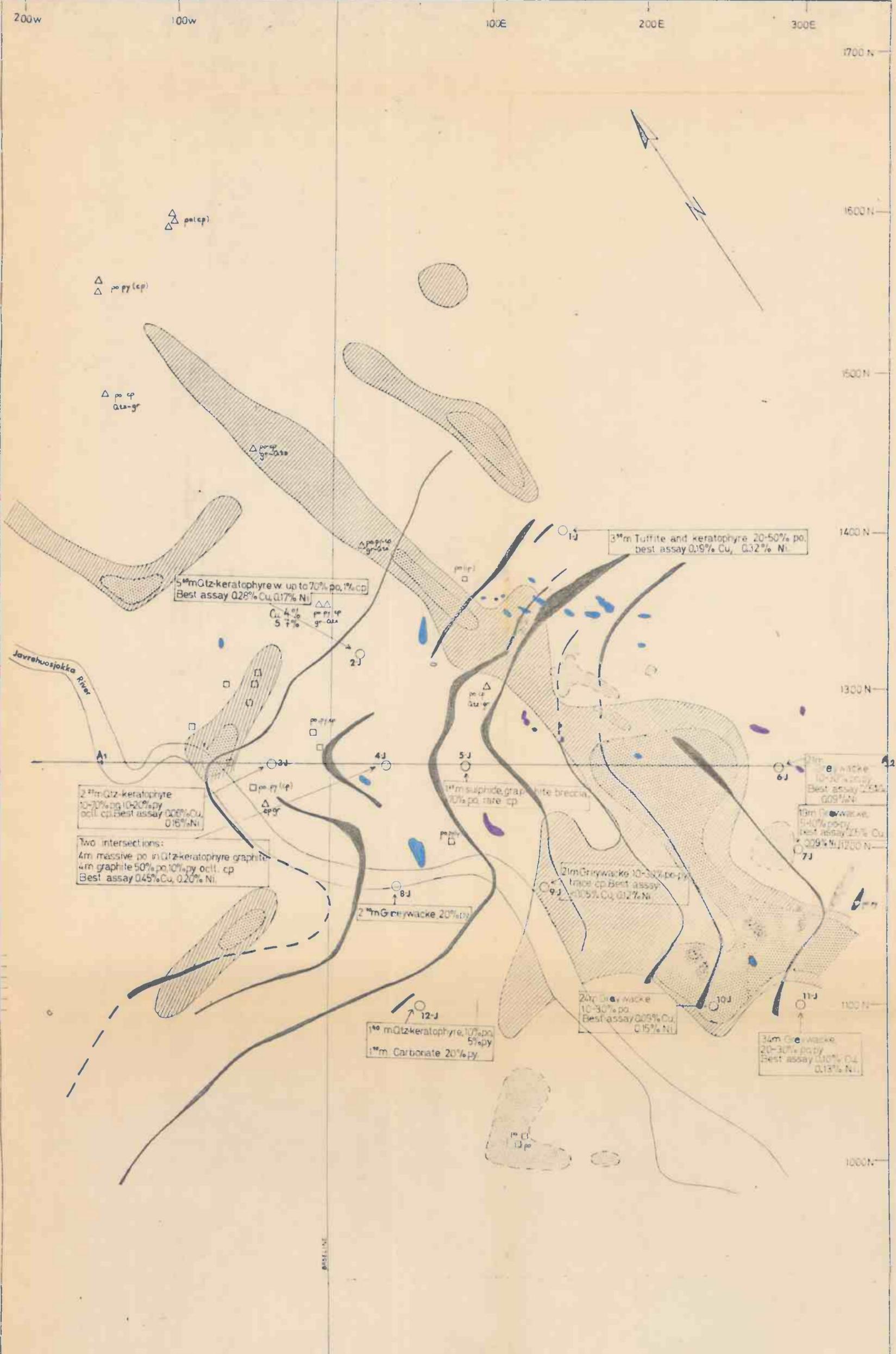
SALGGANJOKKA

Data Summary 1975.

SCALE 1:200

DATE	BY
1975	EK
1976	RBB
	B

MAP NO. 4 SULFIDMALM



5m Qtz-keratophyre w up to 70% po, 1% cp
Best assay 0.28% Cu, 0.17% Ni

3m Tuffite and keratophyre 20-50% po,
best assay 0.19% Cu, 0.32% Ni

2m Qtz-keratophyre
10-70% qz, 10-20% py
oct. cp, best assay 0.06% Cu,
0.16% Ni

Two intersections:
4m massive po in Qtz-keratophyre graphite
4m graphite 50% po, 10% py, oct. cp
Best assay 0.45% Cu, 0.20% Ni

1m sulphide, graphite breccia
70% po, rare cp

2m Greywacke 20% po

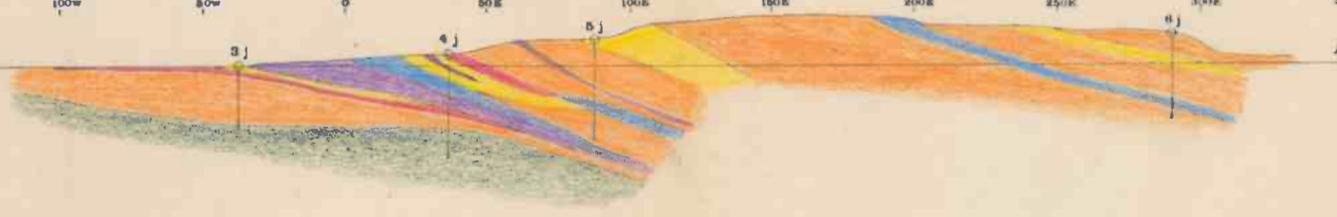
1m Carbonate 20% py

2m Greywacke
10-30% po, py
trace cp, Best assay
0.05% Cu, 0.12% Ni

3m Greywacke
20-30% po, py
Best assay 0.10% Cu,
0.13% Ni

1m Greywacke
10-20% po, py
Best assay 0.04% Cu,
0.09% Ni

1m Greywacke
5-10% po, py
Best assay 0.03% Cu,
0.09% Ni



SECTION A₁-A₂
JAVREHUOSJOKKA

KEY:

- Conductor trace (Shoot-back EM).
- Till geo chemistry anomaly:
- > 200ppm Cu.
- > 300ppm Cu.
- Gossan.
- Mineralised outcrop block
- pyrhotite
- pyrite
- chalcopyrite
- minor chalcopyrite
- 13m mineralised intersection width.
- 2J Diamond drill hole (vertical)
- Diamond drillhole with best assay > 1.0% Cu
- Outcrop graphite schist
- Quartzite/Qtz-keratophyre
- Albite carbonate rock
- Amphibolite
- Greenschist.

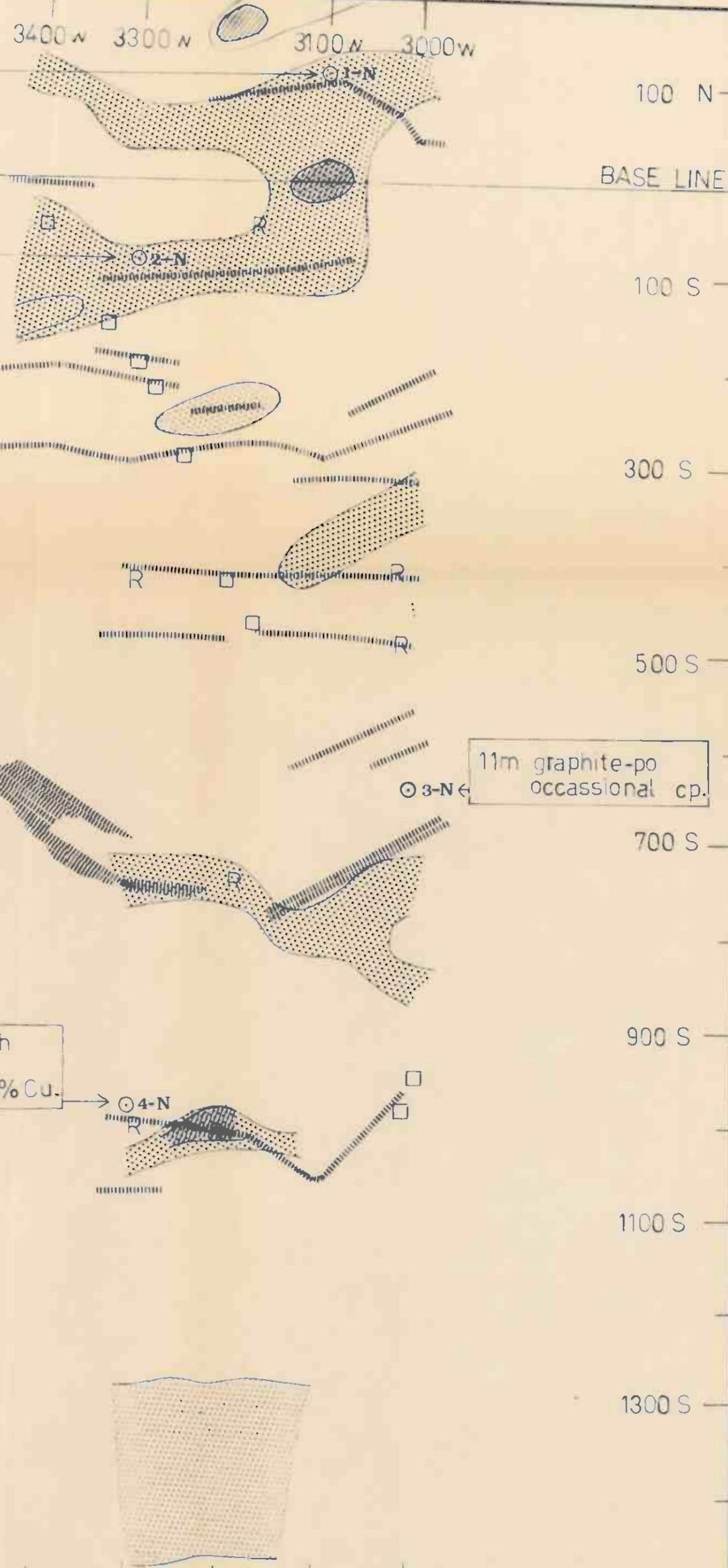
JAVREHUOSJOKKA,		SCALE: 1:2000	DATE: EK 1975
DATA SUMMARY 1975.		MAP NO. 58	DATE: RBG 1976
% SULFIDMALM		MAP SHEET	

15m graphite po
occl. cp
(2 horizons)

11²⁵m graphite - po,
with occasional cp
(2 horizons)

11m graphite-po
occasional cp.

3⁵⁰m graphite-po with
minor cp.
Best assay 0.48% Cu.



KEY:

- ⊙ 2-N Drill hole
- Cu-anomaly > 100 ppm
- " " > 300 " "
- Shoot-back-EM-anomaly
- Mineralized showing
- R Rusty area

Masi 1775
INGAJOKKA Data summary 1976.

SCALE	OBS. E K	1975
1: 5,000	DRAW. E K	1976
	TRAC. B B	—
	CHK.	—

MAP NO.

1/2 SULFIDMALM

MAP SHEET

Detailed survey.

3. DETAILED SURVEYS

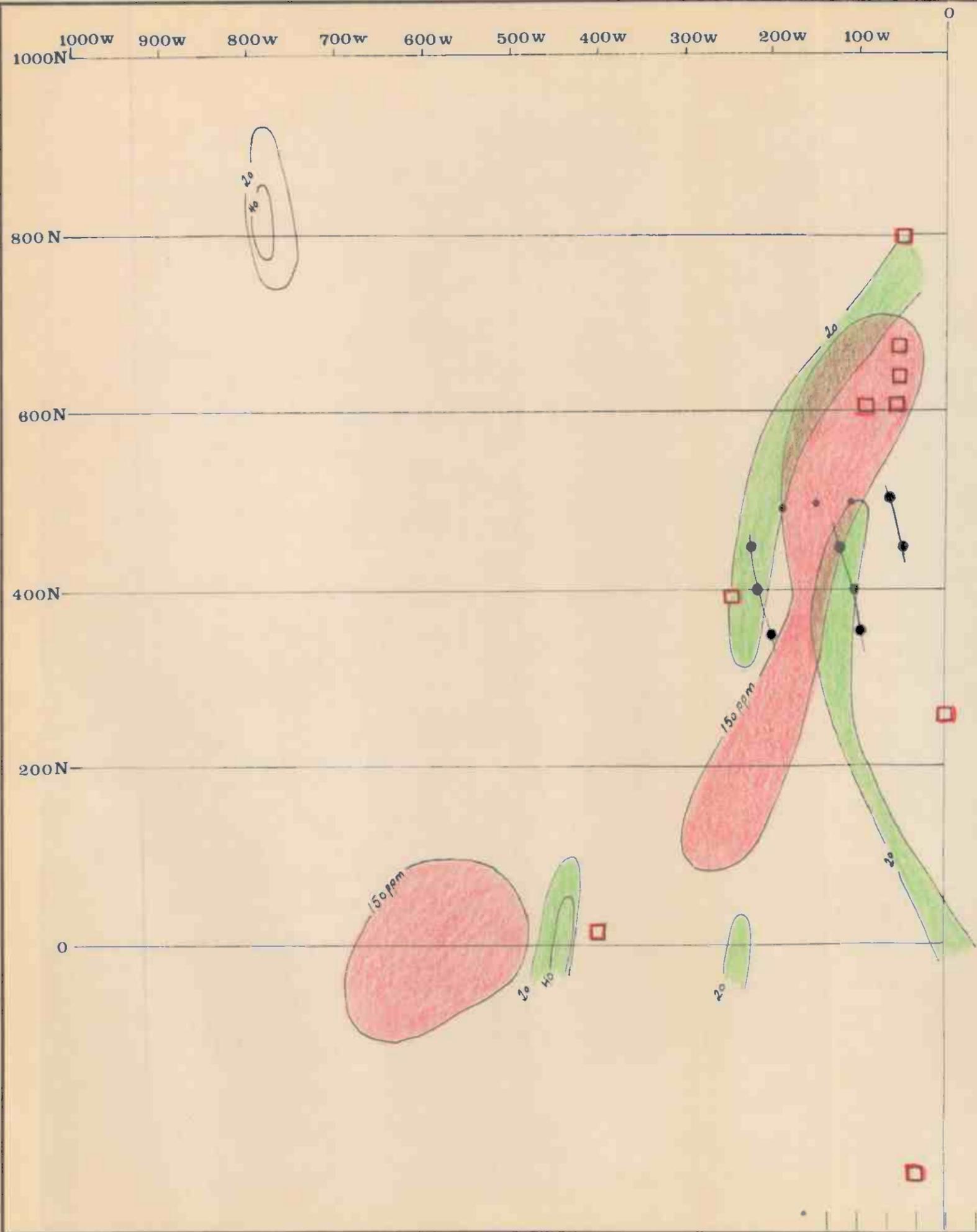
a) Unna Vuovdas:

During 1973's reconnaissance prospecting mineralized outcrops carrying massive pyrrhotite with chalcopyrite were found at Unna Vuovdas. Subsequent VLF and till geochemistry surveys outlined an area with high Cu and Co till values, associated with a strong conductor (Rpts. 277/17/73, 336/17/74).

Selected lines were re-run in 1975, using the Crone Shootback system, to confirm the position of the VLF anomalies. It is planned to extend this work further southwards in 1976 to fully cover the reconnaissance till anomaly. This target will be drilled tested in 1976. Fig. 7. Summarizes, the data for the Unna Vuovdas Locality.

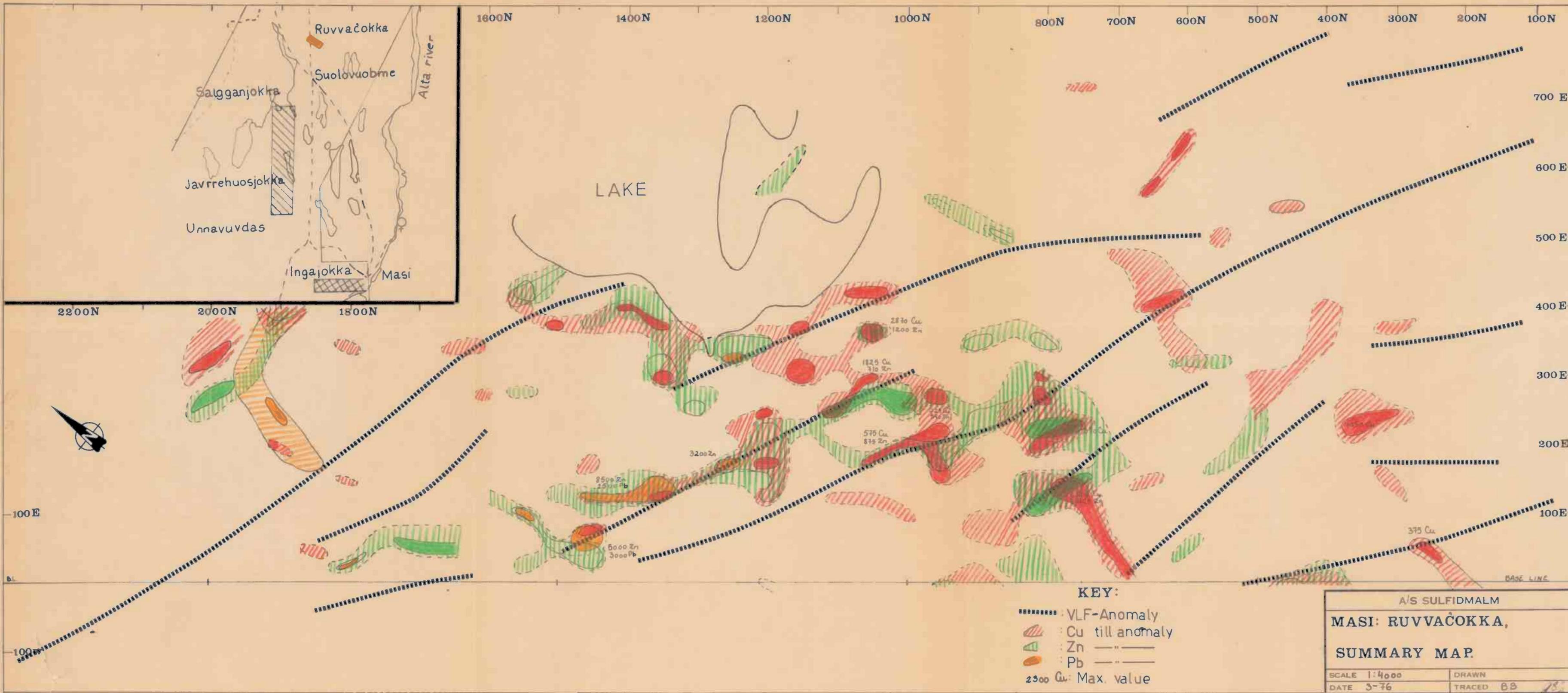
b) Ruvvačokka:

The Ruvvačokka grid was located to follow-up a reconnaissance till anomaly for Cu and Zn associated with strong HEM conductors. Detailed surveys showed very strong till anomalies with maximum values of 8500ppm Zn, 3000ppm Pb and 2870ppm Cu, associated with VLF-indicated conducting zones (fig. 8). Unfortunately the Ruvvačokka conductors are poorly oriented in relation to the only usable VLF-sender Station (BOF) and conductor definition using the VLF is bad. The geochemically indicated sections of the grid will be covered with a Crone Shootback EM survey in March 1976 in preparation for drill testing in the late summer of 1976.



- KEY:**
- MINERALIZATION IN BEDROCK
 - VLF-FRAZER-ANOMALY
 - ↔ SHOOT-BACK-ANOMALY
 - Cu-ANOMALY >150 ppm Cu

UNNA VUOVDAS Summary map.	MASI 1775	SCALE	OBS. EK	1973
		1:5000	DRAW. EK	1974
			TRAC. BB	1976
			CHK. JBG	---
1/5 SULFIDMALM		MAP NO.		
		MAP SHEET		



KEY:

- : VLF-Anomaly
- ▨ : Cu till anomaly
- ▨ : Zn
- ▨ : Pb
- 2300 Cu: Max. value

A/S SULFIDMALM	
MASI: RUVVAČOKKA,	
SUMMARY MAP.	
SCALE 1:4000	DRAWN
DATE 3-76	TRACED BB

Plans for 1976.

4. PLANS FOR 1976

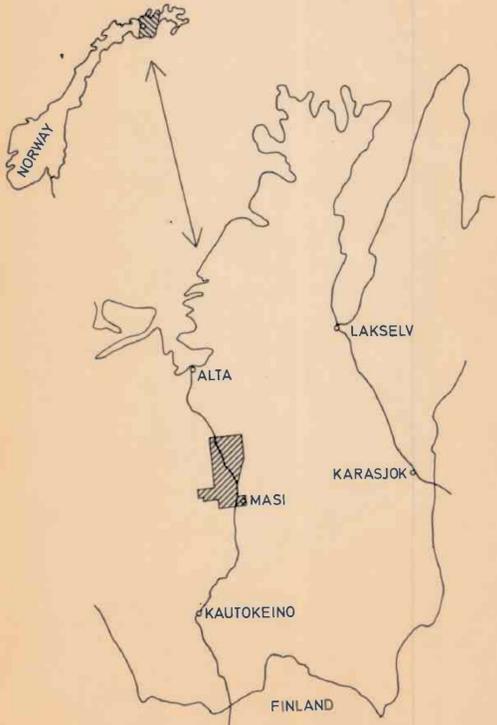
The programme planned for 1976 in Masi will consist of further follow-up work on selected targets from the reconnaissance surveys together with diamond drill-testing of the most promising targets.

Fig. 9 shows the reconnaissance targets selected for geophysical, geochemical and geological surveys in 1976. The selection is mainly based on the reconnaissance till geochemistry data, with emphasis on the highest Cu and Zn values. The airborne survey data was used to decide grid locations. The targets and map reference coordinates of the southernmost part of the planned grids are listed below:

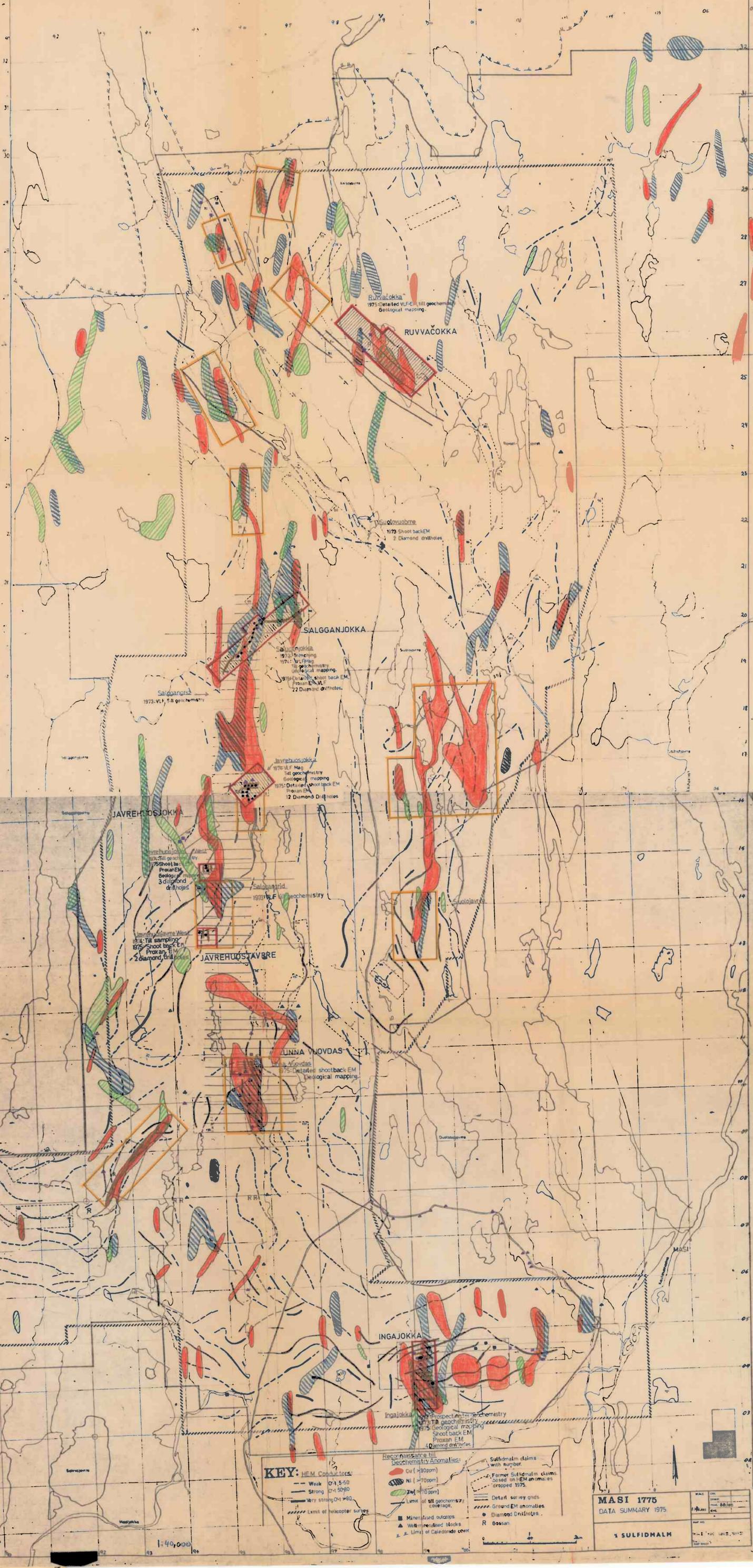
- | | | | | |
|----|---------------------------|---------|--------------------|--|
| a) | Havgganjavrre | (92/08) | Cu-Zn, with gossan | |
| b) | Suolojavrre | (99/13) | Cu-Zn-Ni | |
| c) | Gaerbmasoaiivve | (99/16) | Cu (max 846ppm) | |
| d) | Vuoidasvarre | (96/22) | Cu-Zn-Ni | |
| e) | Silesjavrre | (96/24) | Cu-Zn-Ni | × |
| f) | Aksoluobbal | (97/28) | Cu-Zn-Ni | × |
| g) | Buiggejavrre | (96/27) | Cu-Zn-Ni | × |
| h) | Muvrračorro
Pvalčarrut | (98/27) | Cu-Zn, | Block finds show massive pyrrhotite without chalcopyrite on strike with Ruvvačokka. This covers a Lapp settlement and is given a lower priority for this reason. |

Additional surveys will also be carried out at Javrehuosjokka (94/13; deep till sampling, additional EM to the south of area drilled in 1975), Ruvvacokka (99/25; Shootback-EM), Unna Vuovdas (95/09; EM) and Javrehuosjavrre (94/13 additional EM).

The Unna Vuovdas and Ruvvaâokka targets will be drill tested in 1976. The drilling budget will allow for testing a further 2-3 targets in 1976. Final selection of targets will be dependent on an evaluation of the results of the ground follow-up surveys.



(UNDERSØKT 1975) Investigated 1975.
 (PLANLAGT UNDERSØKT 1976) Planned investigation 1976.



MASI 1775
 DATA SUMMARY 1975
 1 SULFIDMALM