

A/S SULFIDMALM
INTER-OFFICE MEMORANDUM

Date: 12th October, 1977
To: Falconbridge Nikkelverk A/S
cc: W. D. Harrison, H. T. Berry, R. Jahnsen,
F. Nixon, E. Kreivi
From: J. B. Gammon
Subject:

Report No. 368/75/17. Salgganjokka East Grid, Masi.

Please find attached a belated summary of work carried out on this grid during 1975. Drilling at the main Salgganjokka showing gave dissapointing results and this whole area was downgraded. The presence of these geochemical anomalies in an interesting geological milieu should not be forgotten if we become active in this area again.

J. B. Gammon

FOR FALCONBRIDGE NIKKELVERK A/S
A/S SULFIDMALM

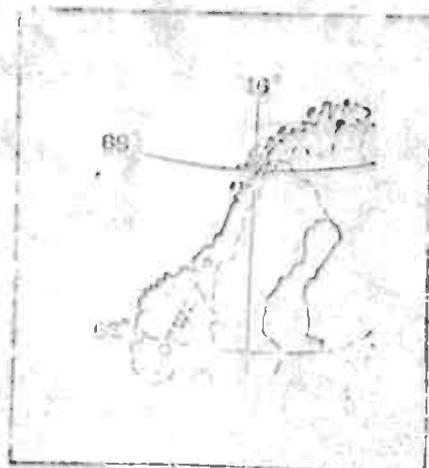
PROJECT 905-17

Geological and geochemical investigations
in the Salgganjokka East Grid, Masi 1975.

By

E. Kreivi

P. Ericson



Report No. 368/75/17

1. INTRODUCTION

The "Salgganjokka East" grid is an extension to the main Salgganjokka Grid. It was laid-out in 1975 to trace the north-eastward extension of the Salgganjokka conductor zone, and was covered first with a VLF-EM survey, and subsequently by a shallow till geochemistry survey. The grid was also mapped geologically by P. Ericson. Fig.1 shows the location of the Salgganjokka East grid in relation to other targets in the Masi area, and summarizes the reconnaissance indications leading to the selection of this locality as an exploration target. After the negative results of the 1975 diamond drilling programme the Slagganjokka locality has been down-graded and no further major work is planned there.

2. GEOLOGICAL MAPPING RESULTS

Geological mapping results are presented in Figs. 2 and 3. The dominant rock type is an amphibolite-gabbro-pyroxenite suite. This is in marked contrast to the main Salgganjokka grid where gabbroic rocks are of only minor importance. Outcrops of the quartz-keratophyre unit, which at Salgganjokka carries abundant pyrite, have only minor pyrite (generally < 1%) in the Salgganjokka East Grid. Similarly, the graphite schist outcrops in the Salgganjokka East grid, although strongly rusted, contain no visible sulphides.

Two large blocks of almost massive sulphide were found during the course of the geological mapping programme (coordinates 3140N/0E and 3040N/400E). These consist of pyrite, pyrrhotite with minor chalcopyrite.

GEOCHEMISTRY (Fig.3)

A distinctive, 200 m wide Ni-Zn-anomalous area was found between the two main VLF-EM -anomalies between profiles 2750N and 3000N from 50E to 250E.

Max value for Ni was	800 ppm Ni	at	2850N/175E
" " "	Zn "	825 ppm Zn	at 2850N/125E
" " "	Cu "	510 ppm Cu	at 2850N/500E
" " "	Pb "	92 ppm Pb	at 3000N/275E

The highest Cu-values are 150 ms east of the eastermost main VLF-anomaly, but just in this area there are several short VLF-anomalies.

CONCLUSIONS

The relatively high values of Ni and Zn related to VLF-EM-anomalies are interesting in the area, where gabbroic blocks are in a contact with acid volcanics and acid weathering sediments. Should be checked more carefully.

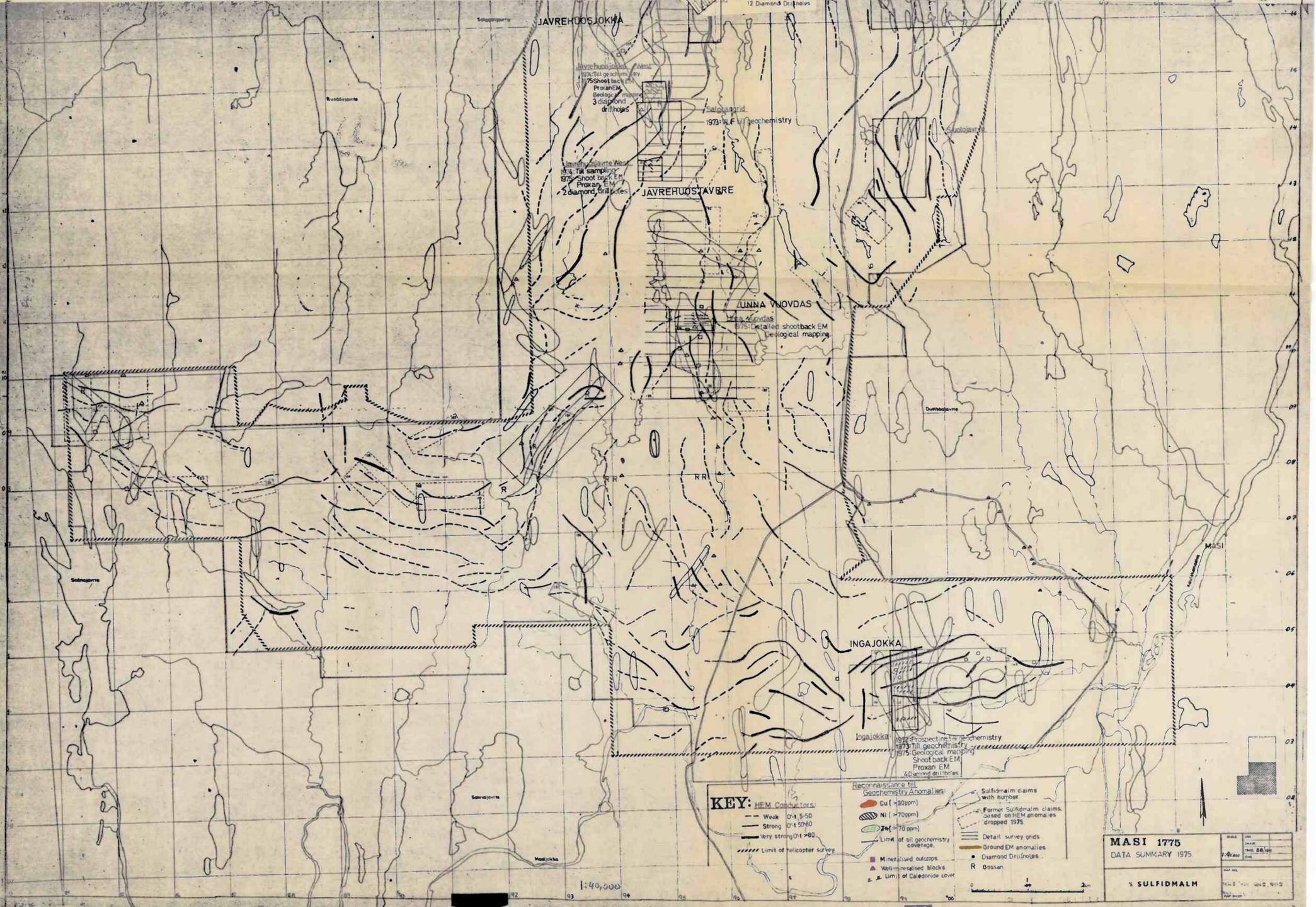
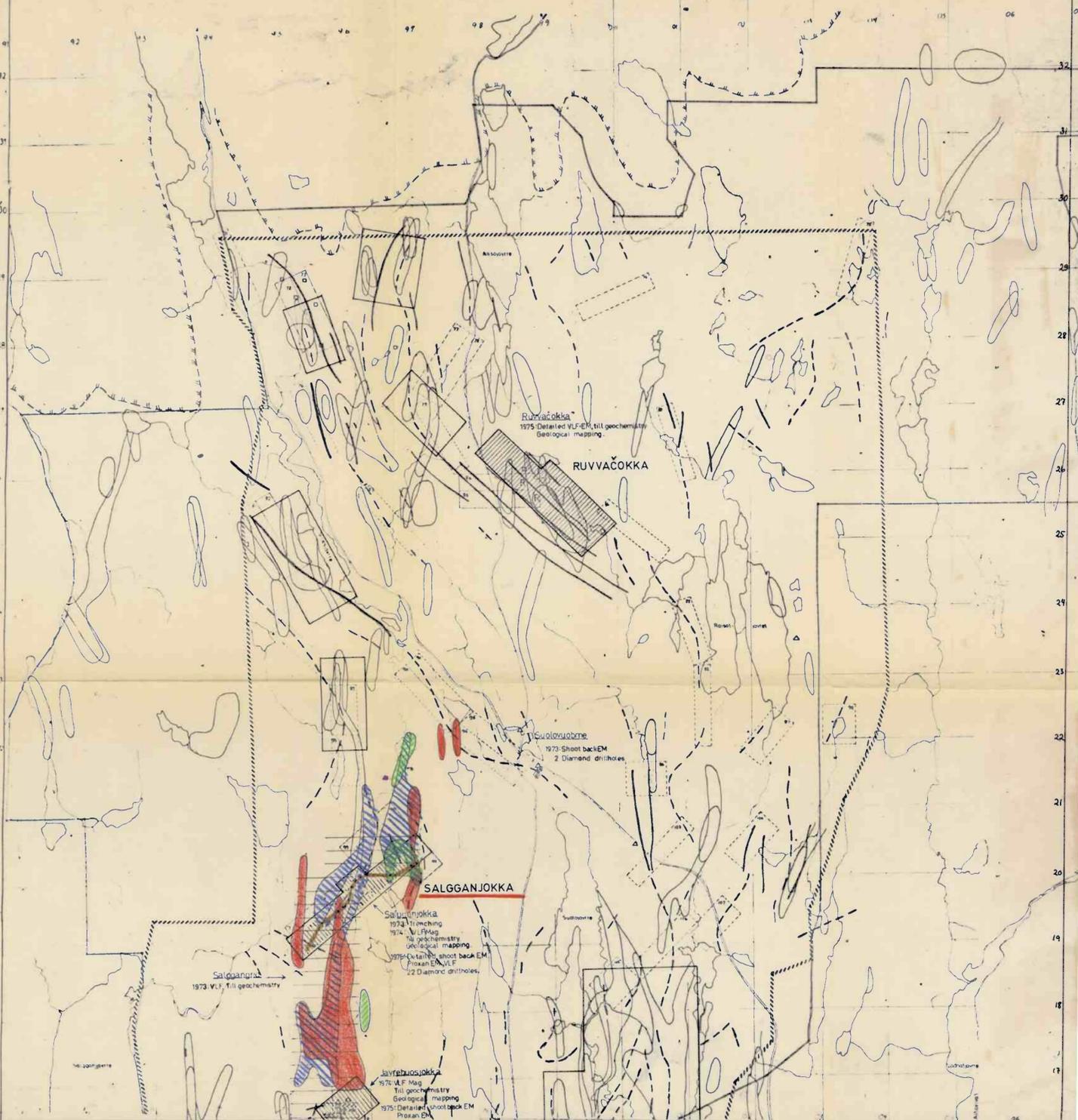
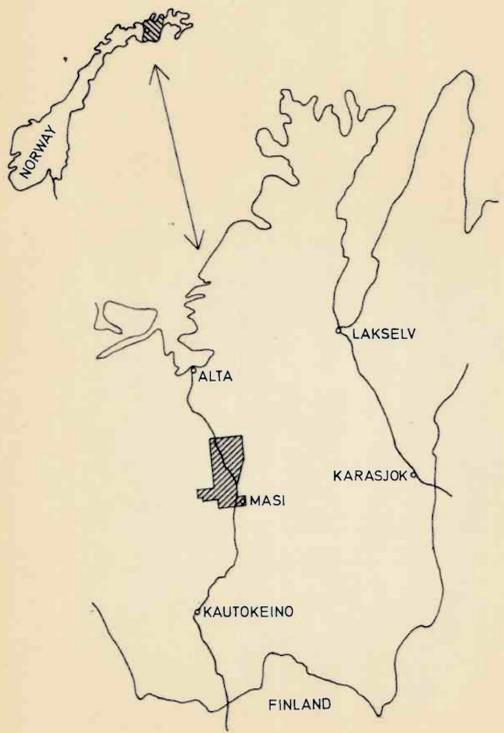
SALGGANJOKKA -E/PER ERICSSON/1775.

1. Quartz/mica schist, tend to quartzite, S175/53W. Upon is an monzonitic gabbro, the contact zone is a fine grained amphibolite. This fine grained amphibolite brecciates both the schist and the gabbro.
2. Coarse grained dioritic amphibolite, S190/27W, ↓190/∞0. Some py.
3. Coarse amphibolite, some py, S160/30W.
4. Medium grained amphibolite, some py, S40/24N.
5. Quartz/mica-schist, some py, S150/30SW.
6. Gabbro, tend. to pyroxenite.
7. Fine grained amphibolite, S140/32W.
8. Quartz/mica schist, some rust, S205/30W. Fine-grained amphibolite on top, some schistosity.
9. Fine grained amphibolite with thin carbonate veins, S190/30W.
10. Fine grained amphibolite.
11. Coarse amphibolite.
12. Gabbro/pyroxen., slightly sheared, 2% py+po, towards E chlorite schist, carbonate filled veinlets.
13. Gabbro
14. Gabbro/pyroxenite, 0.5% py + po in patches.

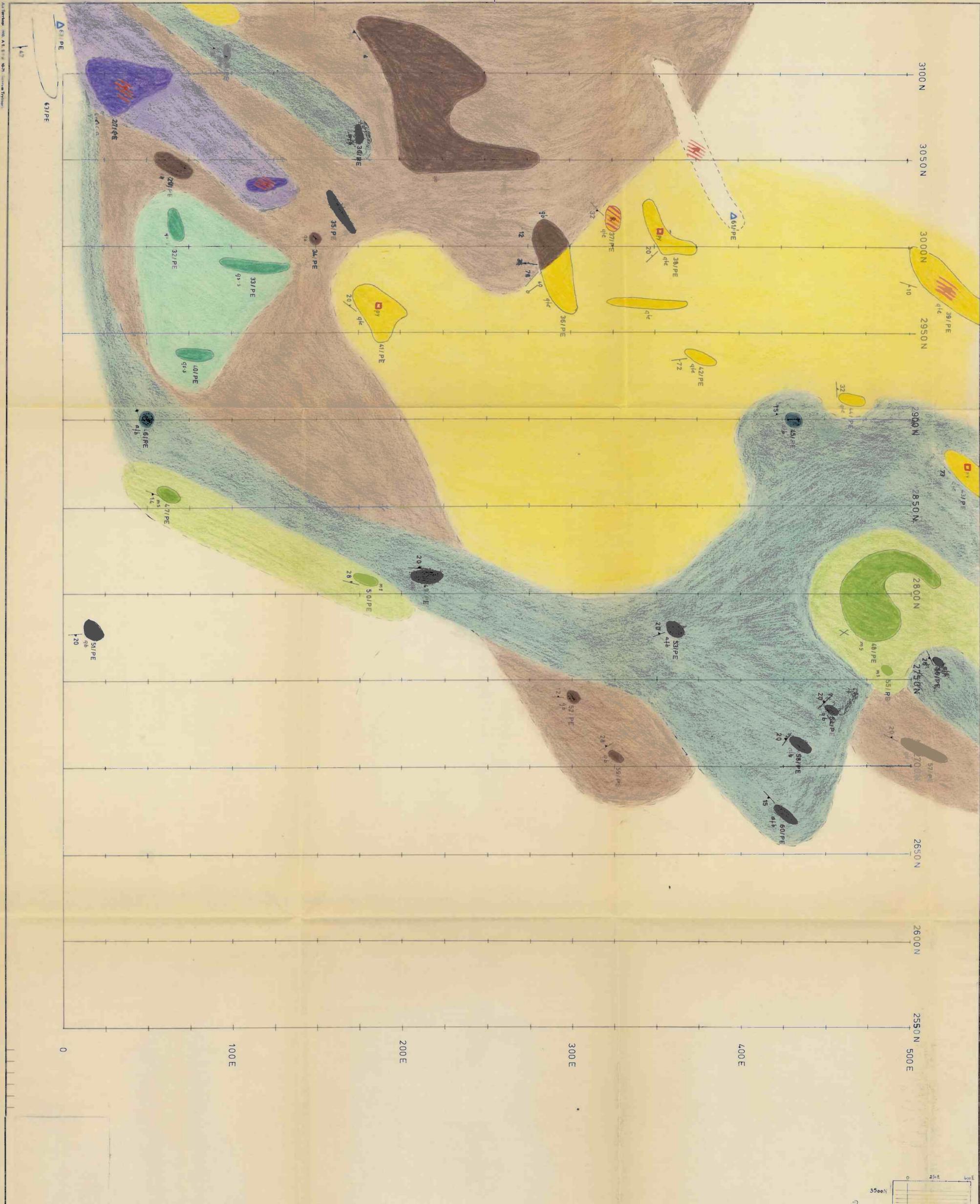
15. Gabbro, some py
16. Gabbro, slightly sheared, S170/12W. In joints actinolite, py, carbonate.
17. Sheared gabbro, S190/20N.
18. Gabbro
19. "
20. "
21. "
22. " , under: very rusty graphite/quartz breccia.
23. Quartz/mica-schist, ~1% py on top is a gabbro, SX.
24. Gabbro, slightly sheared, S180/40W.
25. Coarse amphibolite, S110/20S. Some secondary qz-veins.
26. Quartzite or qz-keratophyre, very rusty, B(?) 75/20N. On top is a chlorite schist.
27. Very rusty graphite-breccia. Sub-outcrop.
28. Fine grained amphibolite, tend to chlorite-schist, S160/34SW.
29. Gabbro, carbonate/albite altered, some rust.
30. Same as 28, carbonate veins.

31. Gabbro
32. Chlorite-schist
33. " , some rust.
34. Gabbro, rust
35. "
36. Quartz-keratophyre, some rust B76/78N, P 90/60N, 130/36W, towards N contact via carbonate altered gabbro to fresh gabbro, S162/12W. The contact runs along the layering of the keratophyre.
37. Quartz-keratophyre, rusty, S170/32SW.
38. " " , 0.5% py, B82/20N.
39. " " , rusty, B140/10W.
40. Chlorite-schist, partly rusty.
41. Quartz-keratophyre, some py, S160/20E.
42. Quartz-keratophyre, B(?) 118/72S.
43. " " , tend. to quartz/mica-schist, secondary qz-veinlets, some py, B(?) 172/73W.
44. Same rock as 43, S30/32E.
45. Fine-grained amphibolite, S110/15N.

46. Fine-grained amphibolite, tend. to chlorite-schist, S18/90.
47. Quartz/mica-schist (?) somewhat rusty, S144/14SW.
48. Same as 47, Sx
49. Amphibolite, S130/40N.
50. Same as 47, some rust, S140/28SE.
51. Gabbro/amphibolite, S120/20S.
52. Gabbro/amphibolite, S130/12NE.
53. Fine grained amphibolite, tend. to chlorite-schist, S105/20N.
54. Gabbro/amphibolite, S82/20N.
55. Quartz/mica-schist (??), plag. megagrains.
56. Same as 53, S10/26NV.
57. Coarse amphibolite, very plag. rich, S160/20NE.
58. Fine grained amphibolite, S70/20N.
59. Gabbro/amphibolite, S100/28N.
60. Same as 53, S170/15W.
61. Block ~ 50 kg heavily mineralized.
62. ", ~100 kg " ", py, po, cp, graphite-breccia
63. Gabbro+amphibolite, S118/42S.

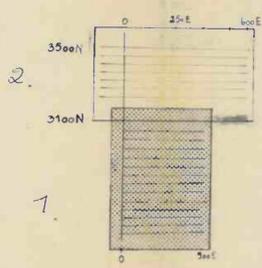
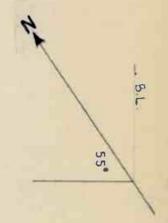


Geology



KEY:

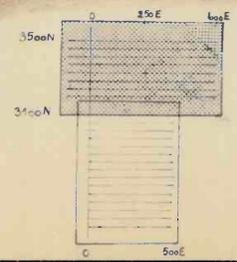
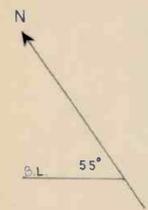
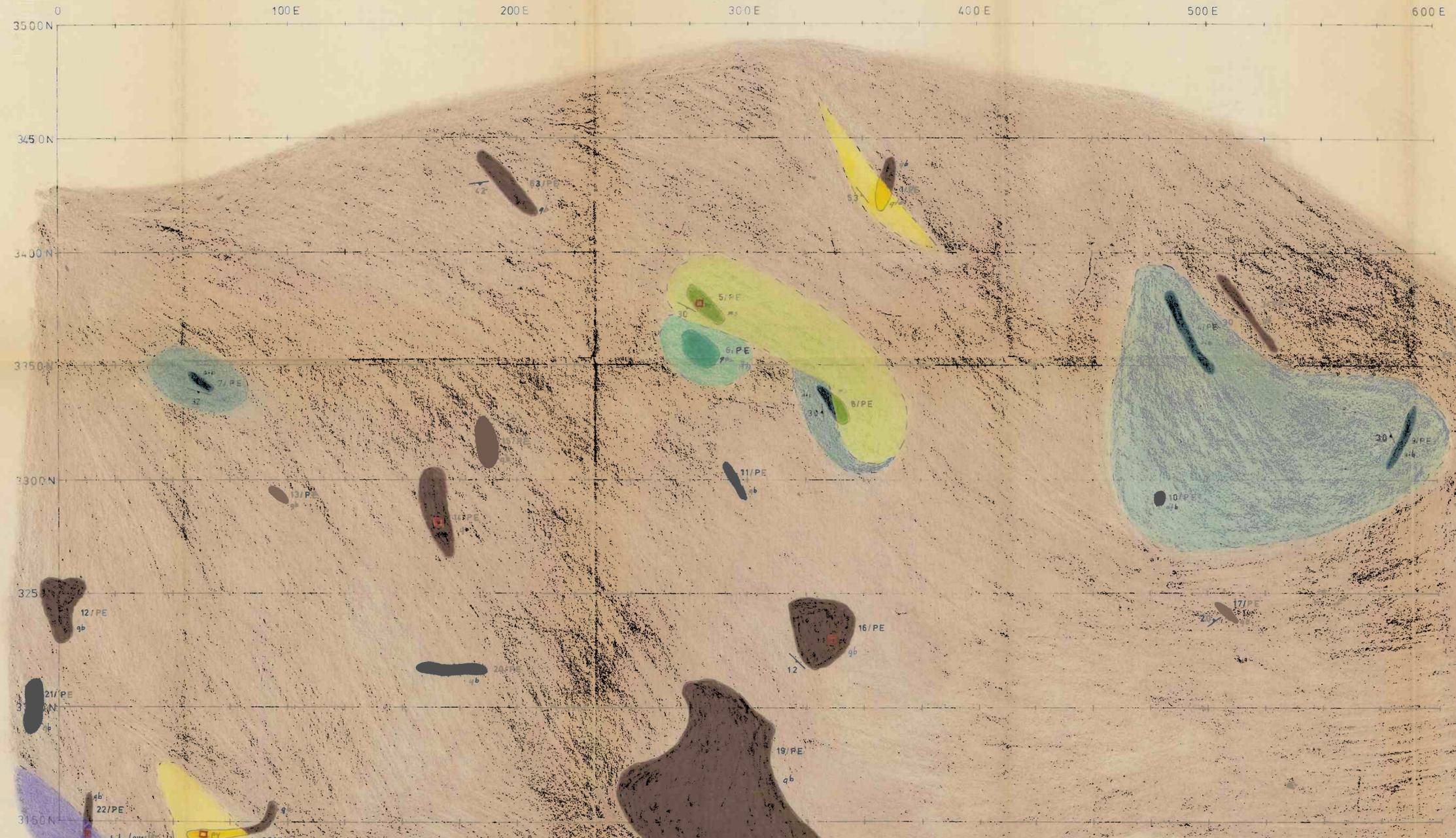
- GRANITIC ROCK
- QUARTZITE, CHERT
QUARTZ XERATOPHYRE
CONGLOMERATE
- MICA SCHIST, GREYWACKE
- ALBITE CARBONATE ROCK
- GRAPHITIC SCHIST
- AMPHIBOLITE
- GABBROIC ROCK
- ULTRABASIC ROCK
- SULFIDES IN BEDROCK
- SULPHIDES IN ROCK
- RUSTY AREA, GOSSAN
- CONTACT BETWEEN ROCK-TYPES



SALGGANJOKKA, MASI 1775		SCALE 1:1000	OBS. DRAW. TRAC. CHK.	PE 7-75 PE 7-75 PE 7-75 EK 7-75
Lithological map				
% SULFIDMALM				
		MAP NO. 368/75/17		MAP SHEET

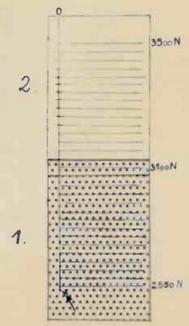
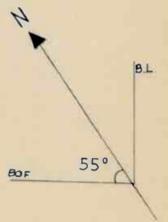
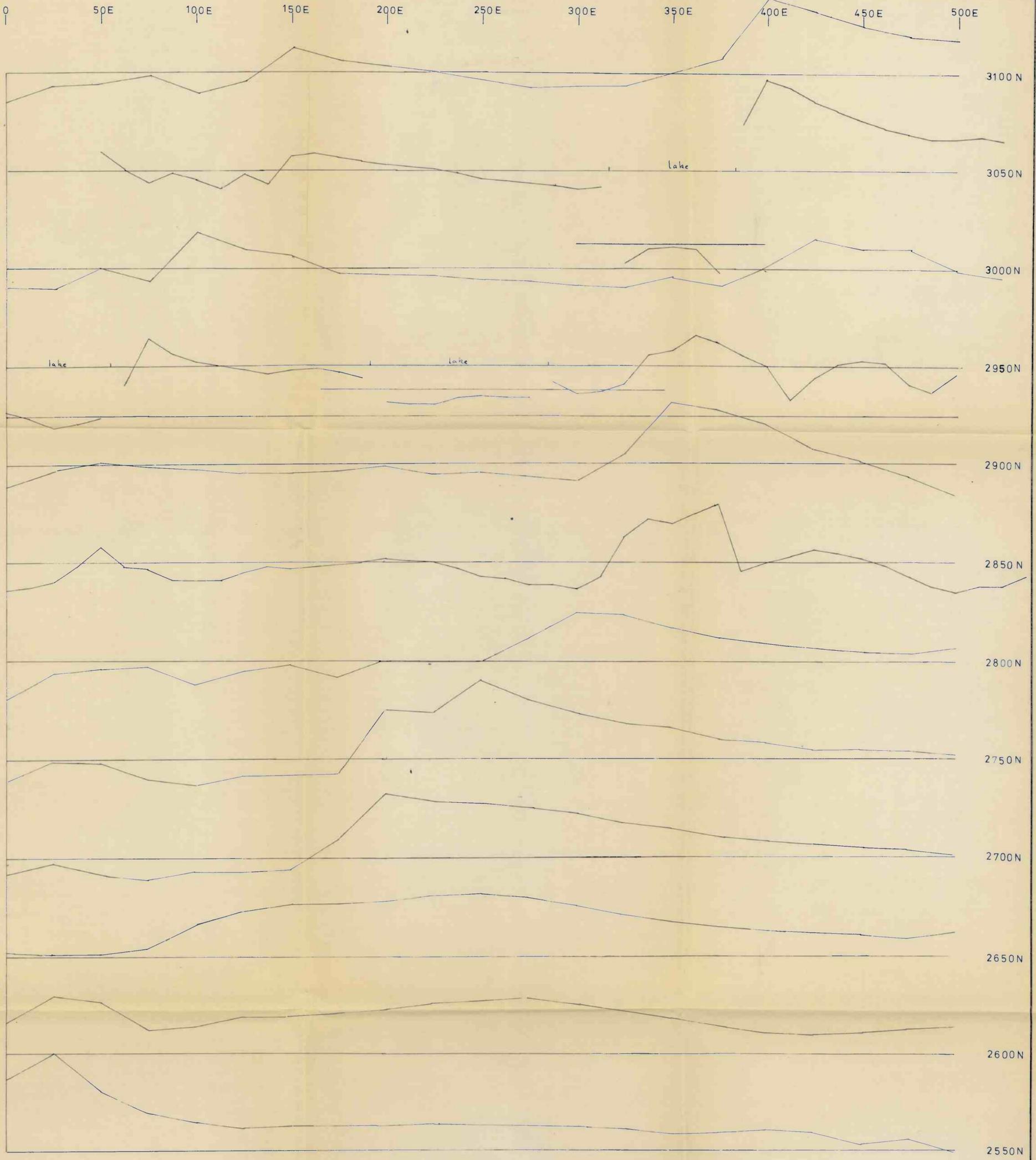
KEY:

- GRANITIC ROCK
- QUARTZITE, CHERT
- QUARTZ, KERATOPHYRE CONGLOMERATE
- MICA SCHIST, GREYWACKE
- ALBITE CARBONATE ROCK
- GRAPHIC SCHIST
- AMPHIBOLITE
- GREENSTONE SCHIST
- GABBROIC ROCK
- ULTRABASIC ROCK
- SULFIDES IN BEDROCK
- SULPHIDES IN ROCK
- RUSTY AREA, GOSSAN
- CONTACT BETWEEN ROCK-TYPES



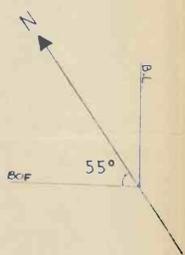
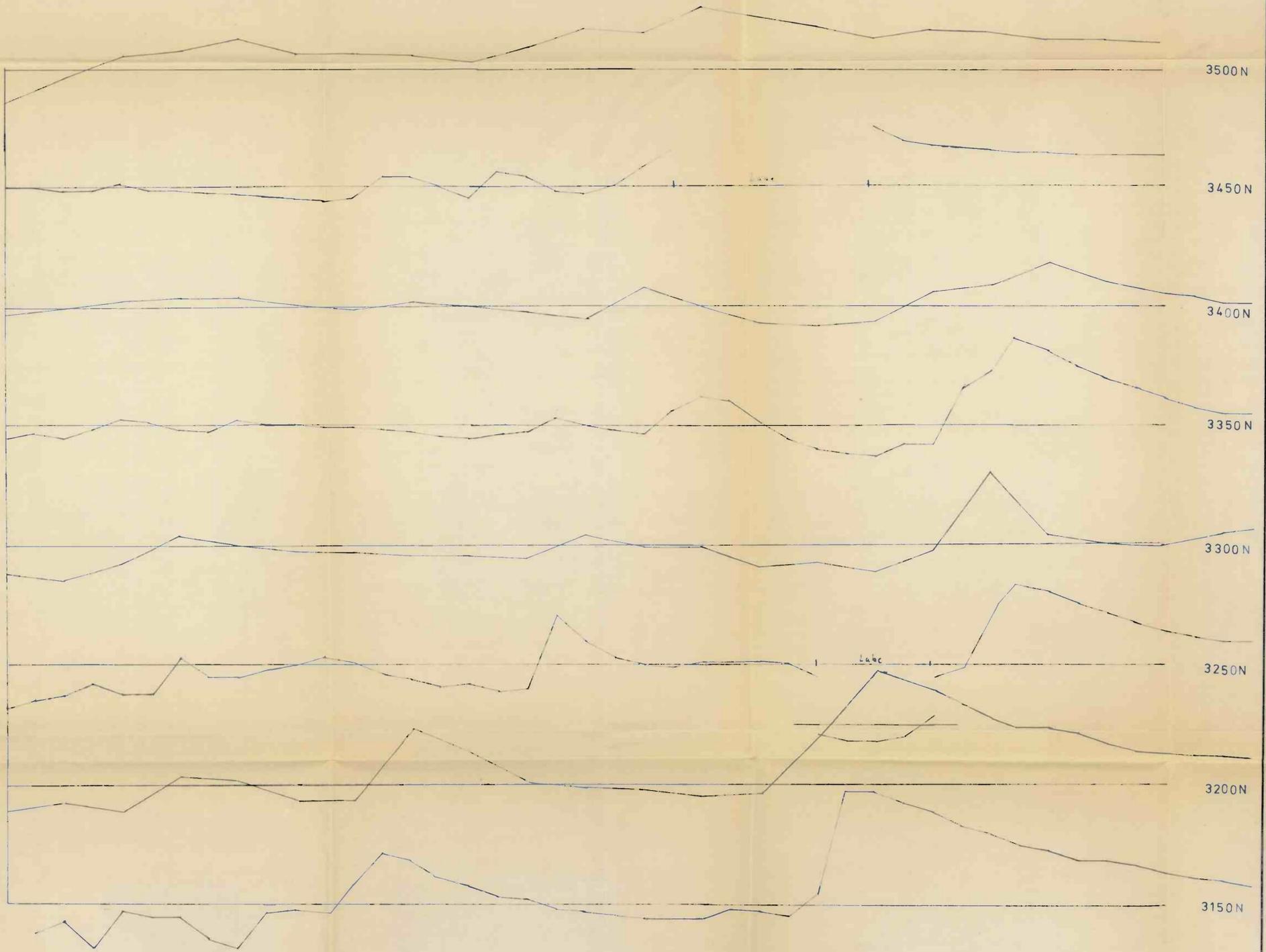
SALGGANJOKKA-E MASI 1775 Lithological map		SCALE	OBS. PE 7-75
		1:1000	DRAW. PE 7-75
1/2 SULFIDMALM		TRAC. PE 7-75	CHK. EK 7-75
		MAP NO. 368/75/17	
		MAP SHEET	

Geophysics



SALGANJOKKA-E VLF-data 2550N-3100N 0-500E	SCALE	OBS. MP	7-75
	1:1000	DRAW. MP	7-75
1/2 SULFIDMALM		TRAC. MP	7-75
		CHK. EV	7-76
	MAP NO.		368-75-17
	MAP SHEET		

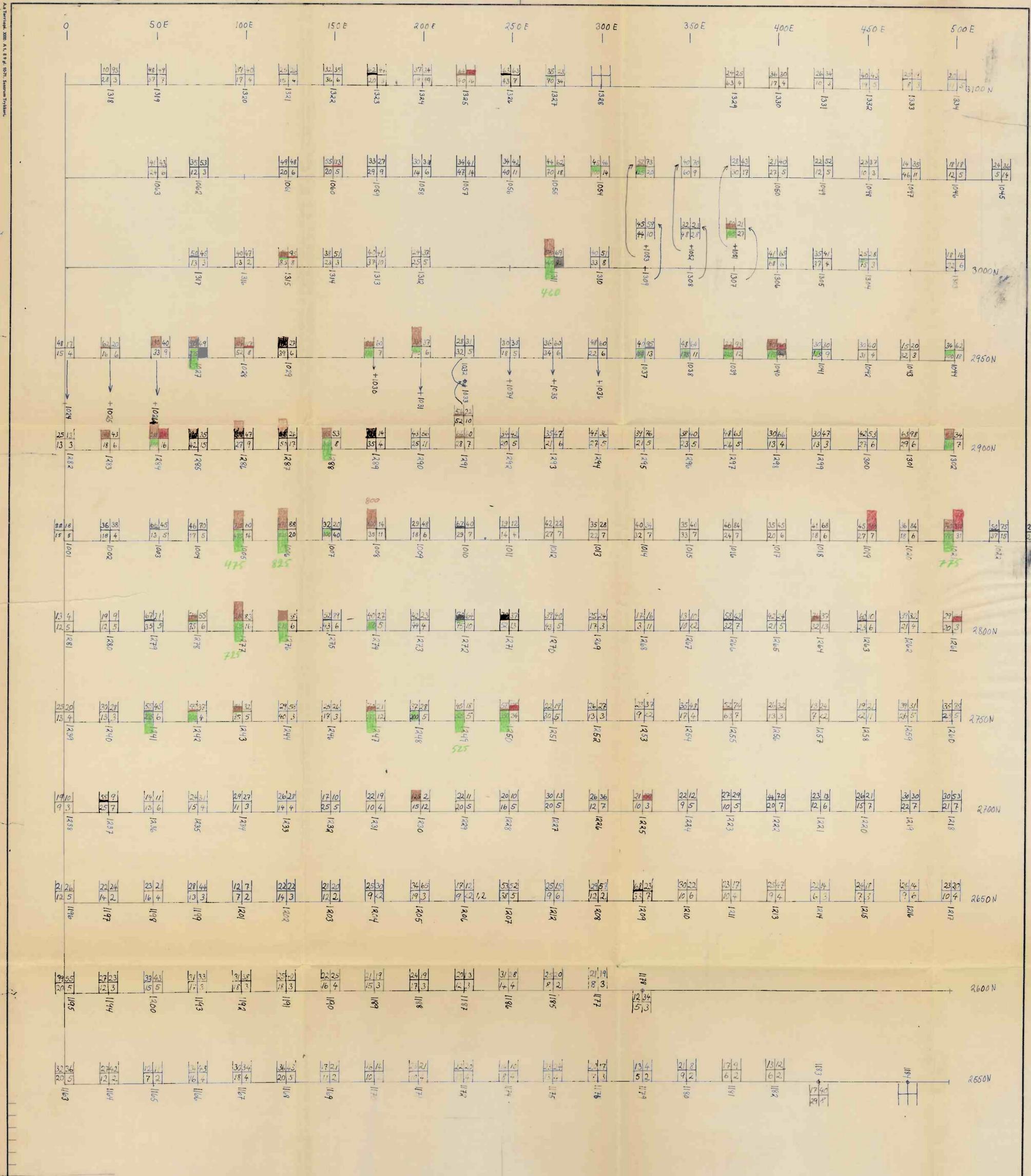
0 50E 100E 150E 200E 250E 300E 350E 400E 450E 500E



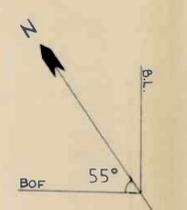
SALGANJOKKA - E VLF-data 3150N-3500N 0-550E	SCALE	OBS. MP	7-75
	1:1000	DRAW. MP	7-75
		TRAC. MP	7-75
	CHK. EK	1-76	
MAP NO.		368-75-17	
MAP SHEET			

1/2 SULFIDMALM

Geochemistry



+ 1229 Till-sampling
 1178 Lake/stream sediment-sampling



Till-sample location					
Ni	Cu	Zn	Pb	Ag	
Possible 90-95%	50-70 ppm	90-120 ppm	65-95 ppm	37-41 ppm	2 ppm
Probable 95-98%	70-90 ppm	120-170 ppm	95-127 ppm	41-48 ppm	3 ppm
Anomalous 98-100%	90-200 ppm	170-300 ppm	127-250 ppm	48-100 ppm	4-7 ppm
	> 200 ppm	> 300 ppm	> 250 ppm	> 100 ppm	> 7 ppm

MASI 1775 Saiggaanjokki-E Till-sampling Sample locations			
SCALE	OBS. OH	7-75	
1:1000	DRAW. OH	7-75	
	TRAC. OH	7-75	
	CHK. EK	1-76	
MAP NO.		368-75-17	
MAP SHEET			

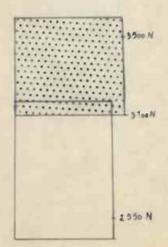
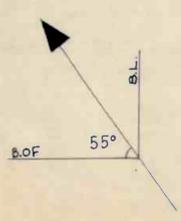
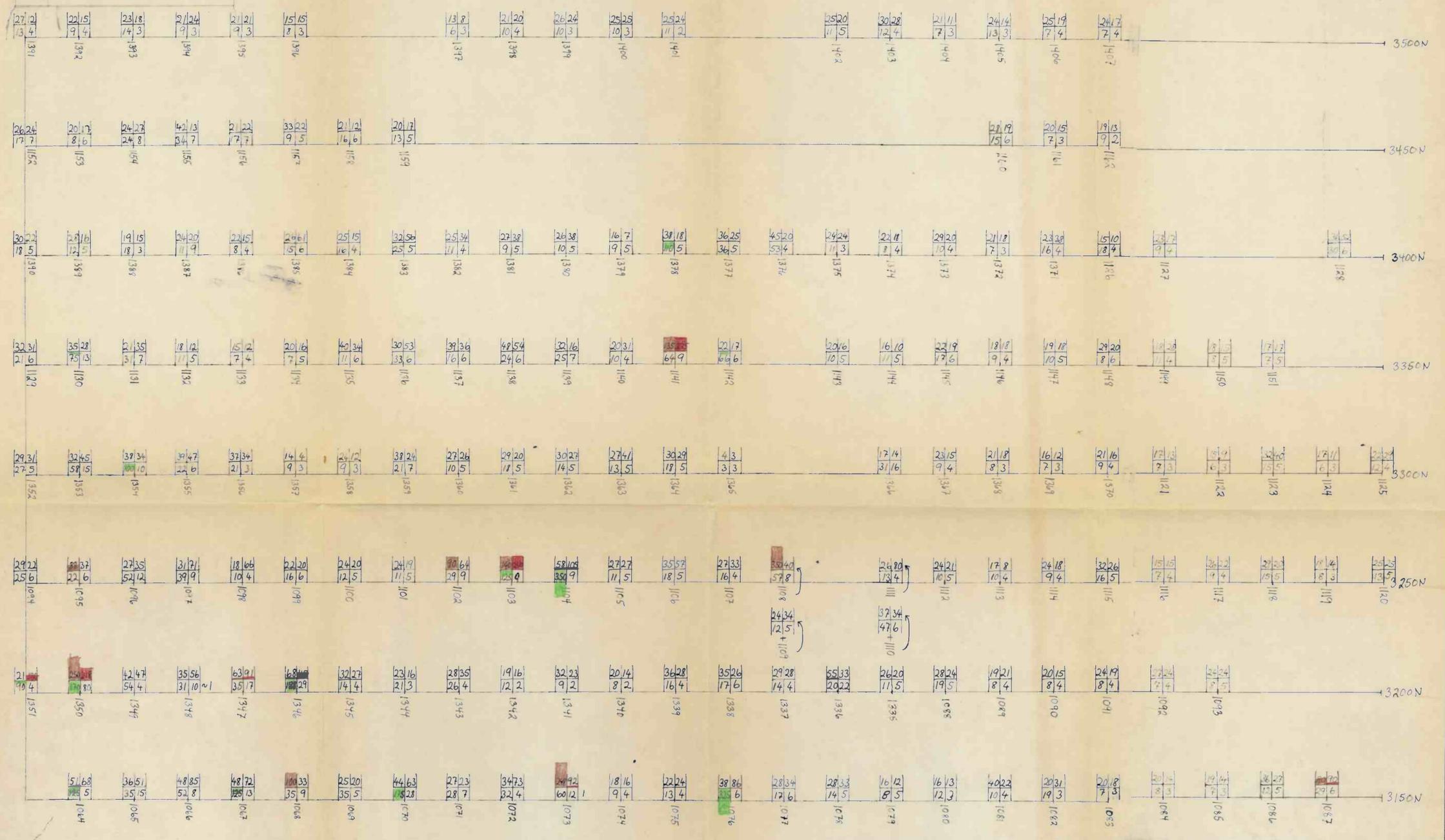
AL/7/19/00 AT 1:00 PM 1971, Salmi, Finland

0 50 E 100 E 150 E 200 E 250 E 300 E 350 E 400 E 450 E 500 E 550 E 600 E 650 E

Till-sample location

Stream/lake-sample location

	Ni ppm	Cu ppm	Zn ppm	Pb ppm	Ag ppm
Possible 90-95%	50-70	90-120	65-95	37-41	2
Probable 95-98%	70-90	120-170	95-127	41-48	3
Anomalous 98-100%	90-200	170-300	127-250	48-100	4-7
	> 200	> 300	> 250	> 100	> 7



MASI 1775 Salganjokka-E Till-sampling Samples' locations	SCALE	OBS. O.H.	7-75
	1:1000	DRAW. O.H.	7-75
% SULFIDMALM	TRAC. O.H.	7-76	
	CHK. EK	1-76	
MAP NO.	368-75-17		
MAP SHEET			

Report 368/75/17

Geological and geochemical investigations
in the Salqanjokka East Grid, Masi

(in 1975)

by E. Kieivi, P. Ericson.

1. Introduction

The "Salqanjokka East" grid is an extension to the main Salqanjokka Grid. It was laid out in 1975 to trace the north-eastward extension of the Salqanjokka conductor zone, and was covered first with a VLF-EM survey (~~Rpt. 175/17~~) and subsequently by a shallow till geochemistry survey. The grid was also mapped geologically by P. Ericson. Fig. 1 shows the location of the Salqanjokka East grid in relation to other targets in the Masi area, and summarizes the reconnaissance indications leading to the selection of this locality as an exploration target. After the negative results of the 1975 diamond drilling program the Salqanjokka ~~locality~~ has been down-graded and no further major work is planned there.

2. Geological Mapping results

Geological mapping results are presented in ~~Fig. 2 and 3~~ Figs 2 and 3. The ~~main~~ dominant rock type is a amphibolite - gabbro - pyroxenite

suite. This is in ^{marked} contrast to the main Salqganjokka grid where ^{rocks} gabbroic ^{outcrops of the} are of only minor importance. The ~~Ben~~ quartz - keratophyre unit, which at ~~Salqganjokka~~ Salqganjokka carries abundant pyrite, have only minor pyrite (generally < 1%) in the Salqganjokka East Grid. Similarly, the ~~exposed~~ graphite schist ^{outcrops} in the Salqganjokka East grid, although ~~strongly~~ ^{strongly} rusted, contain no visible sulphides.

Two large blocks of almost massive sulphide were found during the course of the geological mapping program (coordinates 3140N/0E and 3040N/400E). These consist of pyrite, pyrrhotite with minor chalcopyrite / 2

Geochemistry Fig. 3-4
200m wide
A distinctive, Ni-Zn-anomalous area was found between the 2 main VLF-^{-EM} anomalies between the profiles 2750N and 3000N from 50E to 250E.
Max value for Ni was 800 ppm Ni at 2850N/175E
for Zn was 825 ppm Zn at 2850N/125E
for Cu was 510 ppm Cu at 2850N/500E
for Pb was 92 ppm Pb at 3000N/275E

The highest Cu-values are 150m east of the easternmost main VLF-anomaly, but just in this area there are several short VLF anomalies.

Conclusion
The relatively high values of Ni and Zn related to VLF-EM-anomalies ^{are interesting} (in the area, where gabbroic rocks are in a contact with acid volcanics and acid weathering sediments. Should be checked more carefully.

Salqqanjokka -E / Per Ericsson/1775

- 1 Quartz/mica schist, tend. to quartzite,
§ 175/53W. Upon is an monzonitic gabbro,
the contact zone is a fine grained amphibolite. This fine grained amphibolite brecciates both the schist and the gabbro.
- 2 Coarse grained dioritic amphibolite, § 190/27W,
↓ 190/20. Some py.
- 3 Coarse amphibolite, some py., § 160/30W
- 4 Medium grained amphibolite, some py., § 40/24N
- 5 Quartz/mica-schist, some py., § 150/30SW
- 6 Gabbro, tend. to pyroxenite
- 7 Fine grained amphibolite, § 140/32W
- 8 Quartz/mica schist, some rust, § 205/30W. Fine-grained amphibolite on top, same schistosity
- 9 Fine grained amphibolite with thin carbonate veins, § 190/30W
- 10 Fine grained amphibolite
- 11 coarse amphibolite
- 12 Gabbro/pyroxen, slightly sheared, 2% pyepo, towards E chlorite schist, carbonate filled veinlets

- 13 Gabbro
- 14 " pyroxenit, 0.5% py+po in patches
- 15 " some py
- ①6 " , slightly sheared, $\$ 170/12W$. In joints:
actinolite, py, carbonate
- 17 Sheared gabbro, $\$ 90/20N$
- 18 Gabbro
- 19 "
- 20 "
- 21 "
- 22 " , under: very rusty graphite/quartz-
breccia
- 23 Quartz/mica-schist, ~ 10% on top is a gabbro,
 $\$ X$
- 24 Gabbro, slightly sheared, $\$ 180/40W$
- 25 Coarse amphibolite, $\$ 110/20S$. Some secondary
qz-veins
- 26 Quartzite or qz-keratophyre, very rusty, $\$ (?)$
 $75/20N$. On top is a chlorite-schist ^B

27 Very rusty graphite-breccia. Sub-outcrop

28 Fine grained amphibolite, tend. to chlorite-schist,
S 160/34 SW

29 Gabbro, carbonate talcite altered, some rust

30 same as 28, carbonate veins

31 Gabbro

32 Chlorite-schist

33 — " — , some rust

34 Gabbro, rust

35 "

36 Quartz-keratofyre, some rust, ^B 76/78 N, 990/60 N,
130/30 W, towards N contact via carbonate
altered gabbro to fresh gabbro, ^S 162/12 W.
The contact runs along the layering of the
keratofyre

37 Quartz-keratofyre, rusty, ^S 170/32 SW

38 — " — , 0.5% py, ^B 82/20 N

39 — " — , rusty, ^B 140/10 W

40 Chlorite-schist, partly rusty

41 Quartz-keratofyre, some py, ^S ~~82/20 N~~ 160/20 E

42 Quartz-keratophyre, ^S 118/72 S

43 — " — , tend. to quartz/mica-schist,
secondary qz-veinlets, some py, ^S 172/73 W

44 Same rock as 43, ^S 30/32 E

45 Fine-grained amphibolite, ^S 110/15 N

46 — " — , tend. to chlorite-
schist, ^S 18/90

47 Quartz/mica-schist (?) somewhat rusty, ^S
144/14 SW

48 same as 47, ^S x

49 amphibolite, ^S 130/40 N

50 same as 47, some rust, ^S 140/28 SE

51 gabbro/amphibolite, ^S 120/20 S

52 gabbro/amphibolite, ^S 130/12 NE

53 fine grained amphibolite, tend. to chlorite-
schist, ^S 105/20 N

54 gabbro/amphibolite, ^S 82/20 N

55 Quartz/mica-schist (??), plag. mega grains

56 same as 53, ^S 10/26 NV

57 Coarse amphibolite, very plag. rich, $\$ 150/20NE$

58 fine grained amphibolite, $\$ 70/20N$

59 gabbro / amphibolite, $\$ 100/28N$

60 same as 53, $\$ 170/15W$

(61) block, ~ 50kg heavily mineralized

(62) " , ~ 100kg — " — 1 P4, P9, CP,

graphite-schist - breccia

63 gabbro / amphibolite, $\$ 118/42S$

ATTEHDYS

1. Tämä kartta on laadittu...
2. Kartan tarkkuus on...
3. Kartan mittakaava on...
4. Kartan laatija on...

Yleistä

1. Tämä kartta on laadittu...
2. Kartan tarkkuus on...
3. Kartan mittakaava on...
4. Kartan laatija on...

Yleistä

1. Tämä kartta on laadittu...
2. Kartan tarkkuus on...
3. Kartan mittakaava on...
4. Kartan laatija on...

Yleistä

1. Tämä kartta on laadittu...
2. Kartan tarkkuus on...
3. Kartan mittakaava on...
4. Kartan laatija on...

Yleistä

1. Tämä kartta on laadittu...
2. Kartan tarkkuus on...
3. Kartan mittakaava on...
4. Kartan laatija on...

Yleistä

1. Tämä kartta on laadittu...
2. Kartan tarkkuus on...
3. Kartan mittakaava on...
4. Kartan laatija on...



ATYVIAK ALVITE

1. Atyvialk alvite -
2. Atyvialk alvite -
3. Atyvialk alvite -
4. Atyvialk alvite -
5. Atyvialk alvite -
6. Atyvialk alvite -
7. Atyvialk alvite -
8. Atyvialk alvite -
9. Atyvialk alvite -
10. Atyvialk alvite -
11. Atyvialk alvite -
12. Atyvialk alvite -
13. Atyvialk alvite -
14. Atyvialk alvite -
15. Atyvialk alvite -
16. Atyvialk alvite -
17. Atyvialk alvite -
18. Atyvialk alvite -
19. Atyvialk alvite -
20. Atyvialk alvite -

ATYVIAK ALVITE

1. Atyvialk alvite -
2. Atyvialk alvite -
3. Atyvialk alvite -
4. Atyvialk alvite -
5. Atyvialk alvite -
6. Atyvialk alvite -
7. Atyvialk alvite -
8. Atyvialk alvite -
9. Atyvialk alvite -
10. Atyvialk alvite -
11. Atyvialk alvite -
12. Atyvialk alvite -
13. Atyvialk alvite -
14. Atyvialk alvite -
15. Atyvialk alvite -
16. Atyvialk alvite -
17. Atyvialk alvite -
18. Atyvialk alvite -
19. Atyvialk alvite -
20. Atyvialk alvite -

JAVTIAK ALVITE

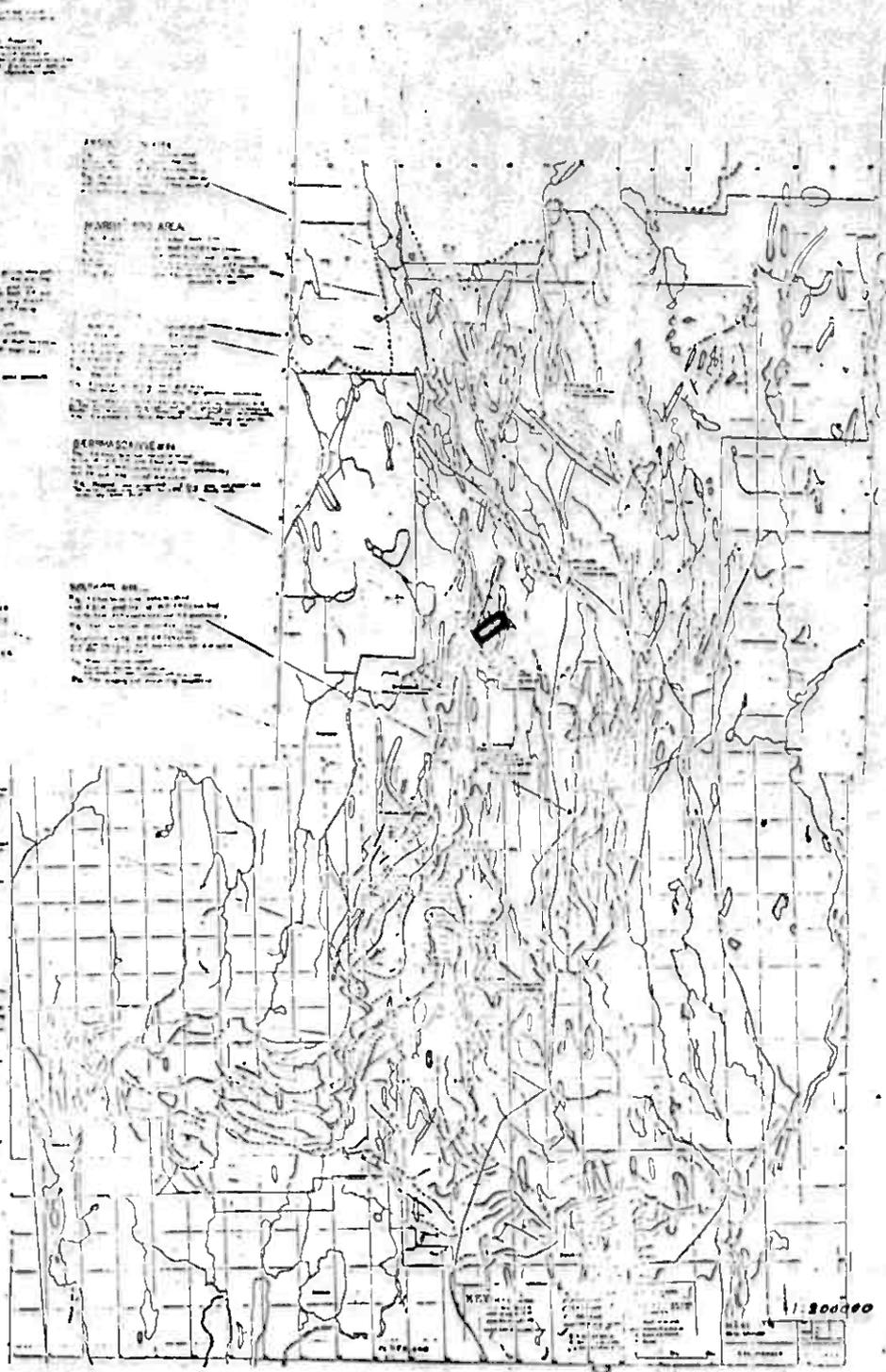
1. Javtia alvite -
2. Javtia alvite -
3. Javtia alvite -
4. Javtia alvite -
5. Javtia alvite -
6. Javtia alvite -
7. Javtia alvite -
8. Javtia alvite -
9. Javtia alvite -
10. Javtia alvite -
11. Javtia alvite -
12. Javtia alvite -
13. Javtia alvite -
14. Javtia alvite -
15. Javtia alvite -
16. Javtia alvite -
17. Javtia alvite -
18. Javtia alvite -
19. Javtia alvite -
20. Javtia alvite -

JAVTIAK ALVITE

1. Javtia alvite -
2. Javtia alvite -
3. Javtia alvite -
4. Javtia alvite -
5. Javtia alvite -
6. Javtia alvite -
7. Javtia alvite -
8. Javtia alvite -
9. Javtia alvite -
10. Javtia alvite -
11. Javtia alvite -
12. Javtia alvite -
13. Javtia alvite -
14. Javtia alvite -
15. Javtia alvite -
16. Javtia alvite -
17. Javtia alvite -
18. Javtia alvite -
19. Javtia alvite -
20. Javtia alvite -

JAVTIAK ALVITE

1. Javtia alvite -
2. Javtia alvite -
3. Javtia alvite -
4. Javtia alvite -
5. Javtia alvite -
6. Javtia alvite -
7. Javtia alvite -
8. Javtia alvite -
9. Javtia alvite -
10. Javtia alvite -
11. Javtia alvite -
12. Javtia alvite -
13. Javtia alvite -
14. Javtia alvite -
15. Javtia alvite -
16. Javtia alvite -
17. Javtia alvite -
18. Javtia alvite -
19. Javtia alvite -
20. Javtia alvite -



1. 80000