Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
7303	240/76			
Kommer fra ..arkiv Nordland	Ekstern rapport nr Soum 23-53	Oversendt fra Nordland	Fortrolig pga	Fortrolig fra dato:

Tittel

VLF-magnetic measurements in the Bleikvassli area in spring 1975

Forfatter	Dato År	Bedrift (Oppdragsgiver og/eller oppdragstaker)
Mikkola Pekka	17.10 1975	A/S Bleikvassli Gruber

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Hemnes	Nordland		19261	Mosjøen

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Geofysikk		Bleikvassli gruber

Råstoffgruppe	Råstofftype
Malm/metall	Zn, Pb

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

Det ble utført 122,5 km med VLF-og magnetiske målinger og 7,68 km slingrammålinger. Tilsammen 11,8 km2 er dekket sør for Bleikvassli gruve.
VLF-målingene registrerte en rekke relativt gode ledere. De magnetiske målingene bekrefter de gelogiske strukturene som VLF viser. Uten geologiske hint, er det umulig å skille grafittskifer fra anomalier som kan komme fra mineraliseringer.
Alternative målemetoder blir foreslått.

23 - 53

VLF-MAGNETIC MEASUREMENTS IN THE BLEIKVASSLI AREA IN SPRING 1975

SUOMEN MALMI OY

1975-10-17

PEKKA MIKKOLA

VLF-Magnetic Measurements in the Bleikvassli Area in Spring 1975

Appendices

1. INTRODUCTION

According to the contract between Bleikvassli Gruber A/S and Geobor A/S, Suomen Malmi Oy carried out VLF-magnetic measurements (122.5 km) and slingram measurements (7.68 km) and staked out lines (32 km) covering an area of 11.8 km^2 to the south of the Bleikvassli Mine during the period 1975-03-03...04-19. These measurements continued the work done by Suomen Malmi Oy in Bleikvassli in 1974 (Report 23-59, 1974-08-07).

As before, the aim was to locate conductors on regional scale mainly by means of the VLF method. In order to aid the interpretation of VLF conductors and to ascertain geological structures a magnetic survey was carried out, too. The purpose of the slingram measurements was, on the other hand, to control some VLF anomalies through quantitative interpretations and, on the other hand, to obtain preliminary information about overburden thickness for geochemical sampling.

The results of the measurements are portrayed in the form of contour maps on scale 1:10 000 and slingram profiles drawn together with the corresponding VLF results. The qualitative interpretation of the VLF anomalies has been based chiefly on the relation on the real component to the imaginary component. The slingram profiles have been interpreted by means of charasteristic curves obtained in laboratory measurements. In the interpretation of the magnetic profiles a curve-fitting technique and platelike models were used. The results of the interpretations are given in the appendix 2 as an interpretation map and as interpretation profiles in the appendices 23 - 26.

The field crew consisted ofageophysicist (part of the time), a foreman and three observers. The line spacing was 100 m and the interval between adjacent observation points along lines was 20 m in the case of VLF measurements and 10 m in the case of magnetic measurements.

2. VLF MEASUREMENTS

The radio station FUO (15.1 kHz) situated in France was used as the transmitter. The receiving apparatus was a Ronka EM 16 by Geonics Ltd. The tilt angle results have been fraser-filtered. The measuring and filtering techniques were described in detail in the report 23-93/73, 1973-12-10.

The filtered VLF results have been drawn on scale 1:5000 andoptically reduced to scale 1:10 000 and appended to this report (Appendices 3a,b - 8a,b).

The VLF map points out several long conducting zones, whose strikes vary from the nearly NS strike inthe western part to the nearly WE strike in the northern part. Most frequently the conductors strike NE and, on the basis of the slingram interpretations, dip 80^{o}-30^{o} NW.

According to the conductors the area can be divided into parts, which obviously correlate with geological formations. The most western part is rather void: there are only short and weak anomalies (for example No. 24, Appendix 2) in addition to the anomalies caused by civilization. Besides the type of bedrock, this state of affairs may be due to thick overburden which suppresses possible VLF anomalies. The part between the anomalies

25 and 29 contains most of the dominant conductors in the measured area. Nearly all the conductors in this subarea are good and are not accompanied by magnetic disturbances. Exceptionally, magnetic disturbances are associated with the anomaly 29 along all its length. The third distinct subarea is situated to the southeast of the anomalies 29 and 31. Here the VLF anomalies are short and broken and strike nearly WE.
The appendix 1 contains a list and short descriptions of the most outstanding VLF anomalies.

3. MAGNETIC MEASUREMENTS

The magnetic survey was made using a Scintrex MP2 proton magnetometer, which can be read with an accuracy of 1 gamma. The diurnal variations of the geomagnetic field were eliminated by means of base lines. The contour maps have been drawn on scale 1:5000 on the basis of the drift corrected data and optically reduced to scale 1:10 000 and appended to this report (Appendices 9 - 14).

As a whole the measured area is very weakly magnetized. Most of the anomalies are between 50 and 300 gammas and the biggest ones only about 1000 gammas. According to the intensities of the anomalies magnetization of rocks seems to increase from the east to the west. On the other hand, this increase in the intensity may be due to the corresponding decrease in overburden thickness. The magnetized zones strike generally in the same direction as the conductors discovered by the VLF measurements. On the basis of the magnetic map the measured area can also be divided into three distinct subareas. The most unmistakeble correlation between conductivity and mag-

netization is associated with the anomaly 29: the magnetic and VLF anomalies are clearly caused by the same formation. It seems, that elsewhere conductivity and magnetization are not related in this manner.

In order to obtain quantitative information concerning the sources of the anomalies, selected magnetic profiles have been interpreted by fitting curves. The models were built up of platelike bodies whose horizontal location (X,m), dip (φ,1^{o}), depth to the upper surface (z,m), width of the plate (D,m) and effective susceptibility (K, 10^{-6}cgs) were variable. The appended interpretation profiles and interpretation map show the results.

The accuracy of the interpretations may be diminished by simplicity of the models and possible remanent magnetization that has been overlooked. Interpretation of magnetic anomalies is never totally unambiguous. Accordingly, the effective susceptibilities, for example, should be looked upon as general but not precise information.

4. SLINGRAM MEASUREMENTS

The slingram measurements were carried out using an EMGUN apparatus made by ABEM. The frequency of 3520 Hz and the coil separation of 40 metres were chosen. The results of the measurements are given as profiles on scale 1:5000 together with the corresponding filtered VLF profiles in the appendices 15 - 22. The slingram profiles have also been drawn as continuous lines on the VLF real component maps (Appendices 4 and 7).

The slingram results correlate well with the VLF results, which suggests that VLF anomalies are caused explicitly by bedrock conductors. The slingram profiles have been interpreted by means of characteristic curves obtained in laboratory measurements. In the ideal case the interpretation gives the following parameters of a platelike formation: depth to the upper surface (h,m), dip (φ,1^g), conductivity x thickness (σ d, $1\Omega^{-1}$) and the width of a thick plate (d,m). The parameters are given as four numbers arranged vertically in the order mentioned above by each interpreted anomaly in the appendices 15 - 22. The conductivity x thickness products indicate frequently excellent conductivity. The slingram measurements pointed out that the anomaly No. 30, which appeared to be interesting in the light of the VLF results, is caused by an iron-wire fence. The interpretation results concerning overburden thickness have been handed over earlier in a separate report.

5. STAKING

Lines were staked out at intervals of 500 meters throughout the measured area using both a Wild II theodolite and prisms. The lines staked out previously and the lines staked out this time were checked using an electro-optical distance meter Wild DI 3 Distomat. The local coordinate system (K,L) was tied to the state coordinate system (X,Y) with an estimated accuracy of about 20 cm. A list of the (X,Y)-coordinates of the (K,L)-stakes is given in the appendix 27.

6. SUMMARY AND RECOMMENDATIONS

VLF measurements pointed out a great number of conductors, whose conductivity is generally good. The magnetic map confirms the information concerning the geological structures in the measured area/ obtained through the VLF conductors. It must be remembered that the geological conductors are not generally accompanied by magnetic disturbances and the area as a whole shows weak magnetization. Without geological hints it is impossible to separate the anomalies caused by graphite schists from the anomalies caused by possible mineralizations. If interesting anomalies can be picked up on other grounds, additional information about them can be obtained by IP measurements. For detailed investigation of the VLF anomalies slingram method can be recommended in even topography and a so-called "shoot-back" method in rough terrain. These inductive measurements yield more precise information about the dimensions and type of the anomaly source in case where the source does not lie deeper than 20 meters.

Espoo 1975-10-17

Suomen Malmi Oy
Geophysical Department

Pekka Mikkola
Geophysicist

LIST OF MAJOR ANOMALIES

no.	R_f (%)	I_f (%)	ΔT (γ)	lenght (km)	Remarks
24	+ 52	+ 16	+ 71	1.2	Conductivity varies from moderate to poor. Connected to a weak magnetic anomaly. No slingram-indication (deep ?)
25	+ 74	- 3	- 2	> 1	Excellent conductor without any magnetic anomaly. Gives a clear slingram-anomaly.
26	+ 73	+ 37	- 11	1.3	Two moderate parallel conductors without magnetization. Clear slingram-anomaly.
27A	+ 94	+ 1	- 8	> 2	Excellent conductor running through the area. Without magnetization. Clear slingram-anomaly.
27B	+100	- 12	+ 27	1.7	Excellent conductor parallel to 27A. No magnetization. Clear slingram-anomaly.
28A	+157	- 45	- 1	> 3	Excellent conductor in the SW but weakens to good in the NE. No magnetization. Clear slingram-anomaly.
28B	+153	+ 31	- 24	> 1.3	Conductivity varies between good and moderate. No magnetic anomaly.
29	+140	+ 5	+213	> 3.3	Conductivity varies fromexcellent to poor. The zone clearly though inhomogenously magnetized (Anomaly-maximum over 2500γ). Clear slingram-anomaly.

no.	R_f (%)	I_f (%)	ΔT (γ)	lenght (km)	Remarks
30	+162	+ 50	0	0.7	The VLF-anomaly caused by an iron fence and an iron wire on the ground. Weak slingram-indication.
31	+183	+ 2	+249	>2.2	Conductivity varying between excellent and poor. The conductor is situated on the NW-edge of a magnetized zone. Clear slingram-anomaly.
32	+168	+ 37	+ 33	>2	Conductivity varies from moderate to poor. Lies on the SE-boarder of a magnetized zone.
33	+128	- 23	+703	>2.6	Conductivity varies between moderate and poor. Lies on the N-edge of slightly magnetized area.
34	+ 80	+ 7	+ 34	1.1	Conductivity varies between moderate and poor. Situated outside magnetic regions. Small slingram- anomaly.
35	+118	+ 18	- 1	>1.9	Conductivity varies between excellent and poor. No magnetization. Clear slingram-anomaly.

Magnetic zones

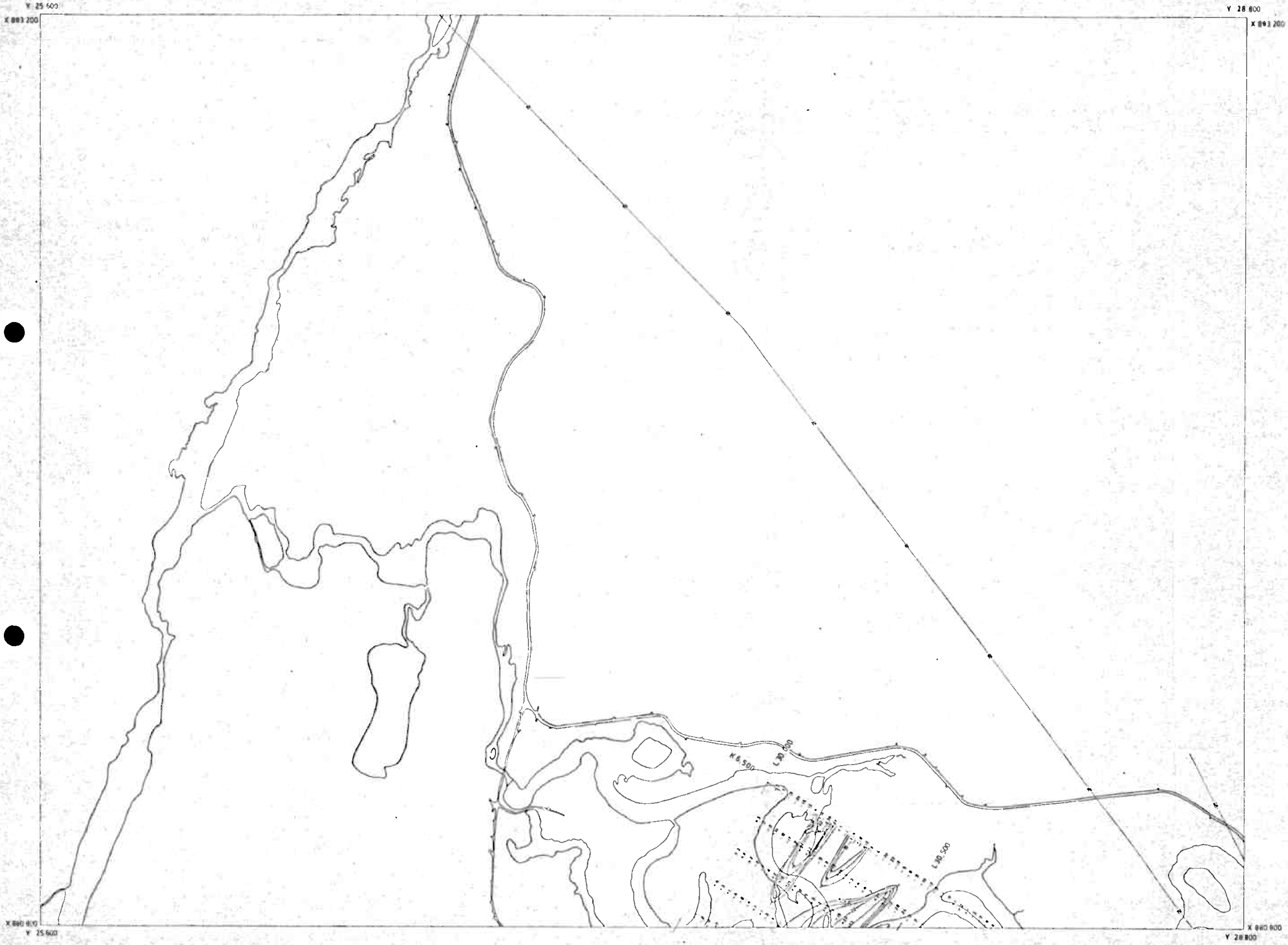
- $K \geq 1500 \times 10^{-6}$ cgs
- $500 \leq K < 1500 \times 10^{-6}$ cgs
- $K < 500 \times 10^{-6}$ cgs

Conductive zones

- excellent conductor
- good to moderate conductor
- poor conductor

(30) etc. anomalies referred in the text and App. 1.

SUOMEN MALMI OY	1:10 000	trans.			
		draw.	AS	9.75	
		insp.	PM	9.75	
Interpretation map					
BLEIKVASSLI					



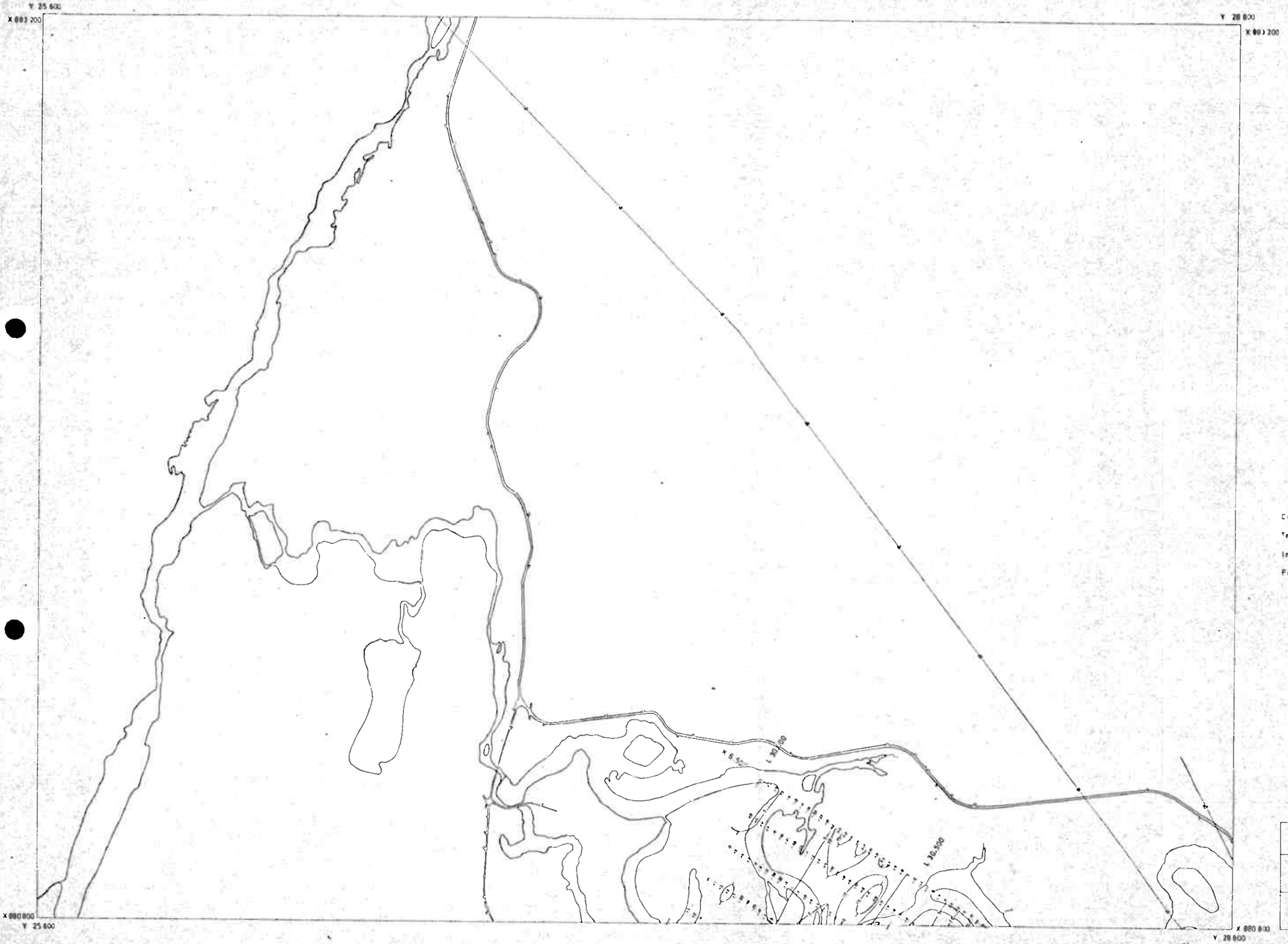
Contours : +5, +10, +15, +20, +30, +50, +75, +100, +150 %

Transmitter : FUO 15,1 kHz

Instrument : GEONICS EM-16

Fraser - filtered

SUOMEN MALMI OY	1:10000
VLF - map Real component	
BLEIKVASSLI	DS 184-5-1



Contours: +5, +10, +15, +20, +30, +50, +75, +100, +150 %

Transmitter: FUO 15,1 kHz

Instrument: GEONICS EM-16

Fraser-filtered

DS185-5-4	DS185-5-3	DS185-5-4
DS184-5-2	DS184-5-1	DS184-5-2
DS184-5-4	DS184-5-3	DS184-5-4

SUOMEN MALMI OY	1:10 000	KMP 4.75 GM 6.75 PM 6.75
VLF-map Imaginary component		
BLEIKVASSLI	DS 184-5-1	

Contours: +5, +10, +15, +20, +30, +50, +75, +100, +150 %

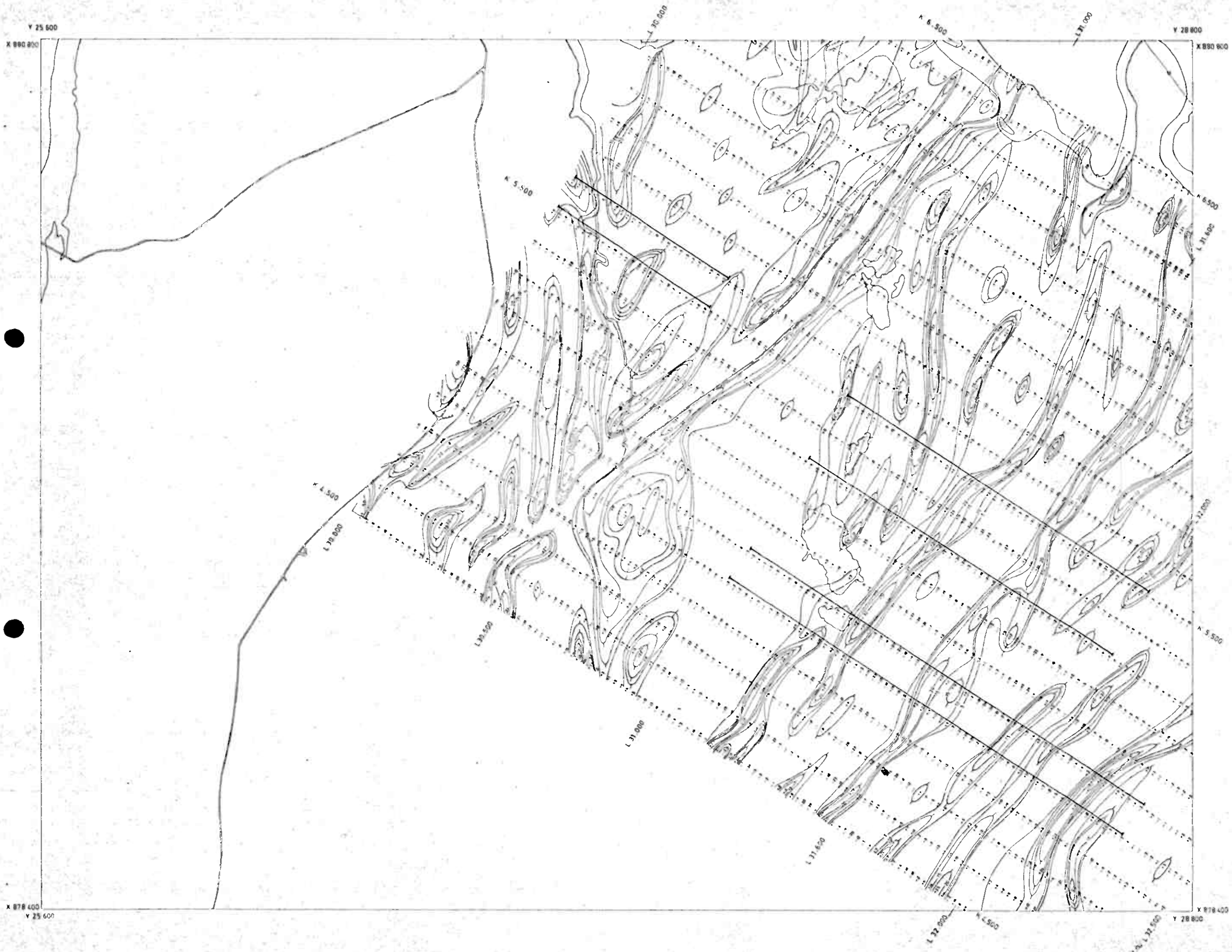
Transmitter: FUO 15,1 kHz

Instrument: GEONICS EM-16

Fraser - filtered

DR184-5-2	DS184-5-1	DS184-5-2
DR184-5-4	DS184-5-3	DS184-5-4

SUOMEN MALMI OY	1:10000	Mittaus	P.M.	6.75
		Piirros	S.M.	5.75
		Tark.	P.M.	6.75
VLF - map Real component				
BLEIKVASSLI	DS 184-5-3			



Contours: ±5, ±10, ±15, ±20, ±30, ±50, ±75, ±100, ±150 %

Transmitter: FUD 15,1 kHz

Instrument: GEONICS EM-16

Fraser-filtered

DS184-1-2	DS184-1-1	DS184-5-2
DS184-5-4	DS184-5-3	DS184-5-1

SUOMEN MALMI OY	1:10 000	T.M.	4.75
		S.M.	5.75
		P.M.	5.75
VLF-map Imaginary component			
BLEIKVASSLI	DS 184-5-3		

Y 25 500
X 878 400

L 32 000

L 32 500

Y 28 800
X 878 400

K 4,500

X 876 000

Y 25 600

X 876 000

Y 28 800

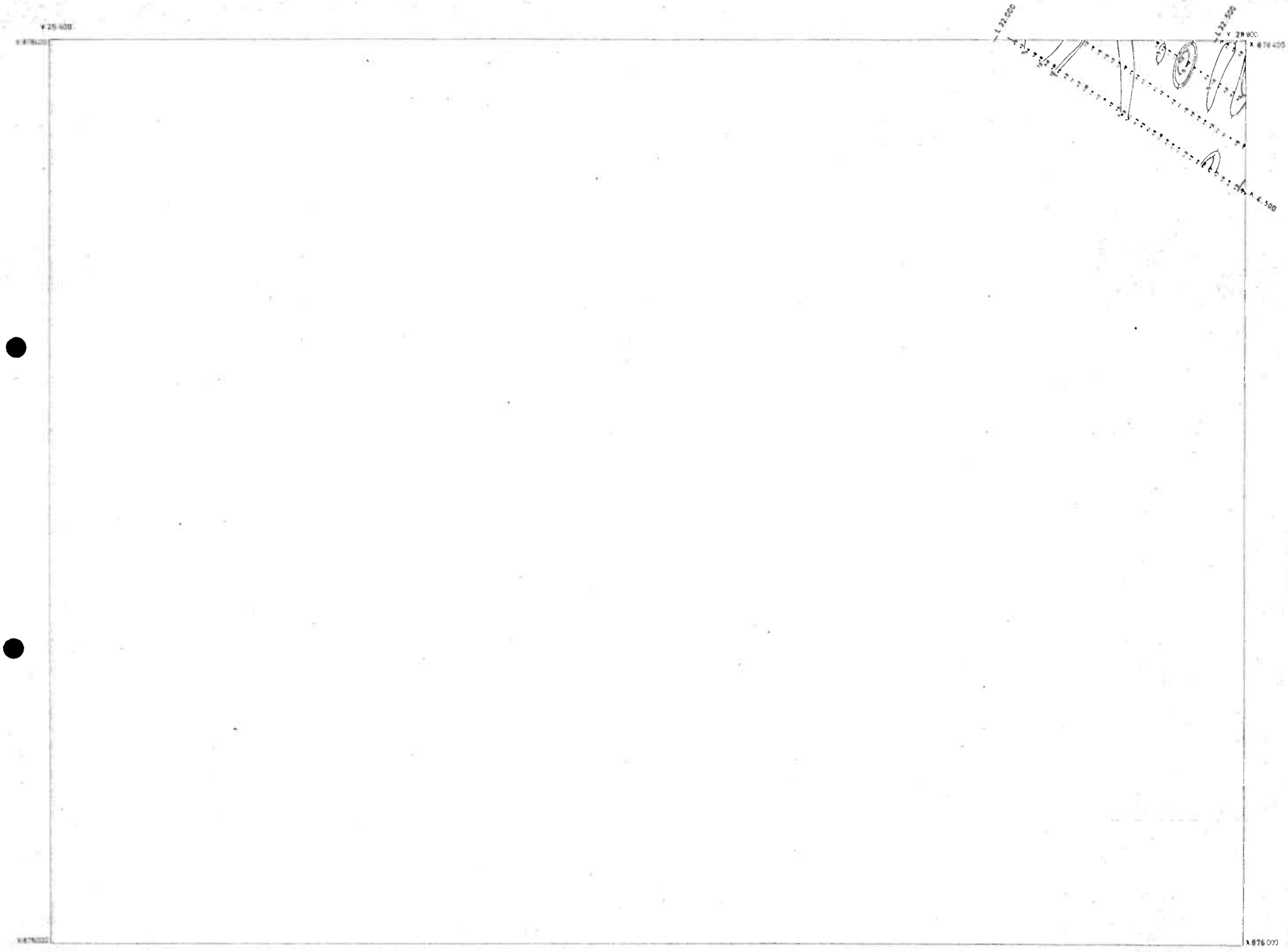
Contours: +5, +10, +15, +20, +30, +50, +75, +100, +150 %

Transmitter: FUO 15,1 kHz

Instrument: GEONICS EM-16

Fraser-filtered

SUOMEN MALMI OY	1:10 000	5 M 6.25 5 M 6.25 5 M 6.25
VLF-map Real component		
BLEIKVASSLI	DS 183-5-1	



Contours: +5, +10, +15, +20, +30, +50, +75, +100, -150 %

Transmitter: FUO 15,1 kHz

Instrument: GEONICS EM-16

Fraser - filtered

SUOMEN MALMI OY	1:10 000	Field	SM	6.75
		Drawn	SM	6.75
		Traced	PM	6.75
VLF - map Imaginary component				
BLEIKVASSLI	DS 183 - 5 - 1			

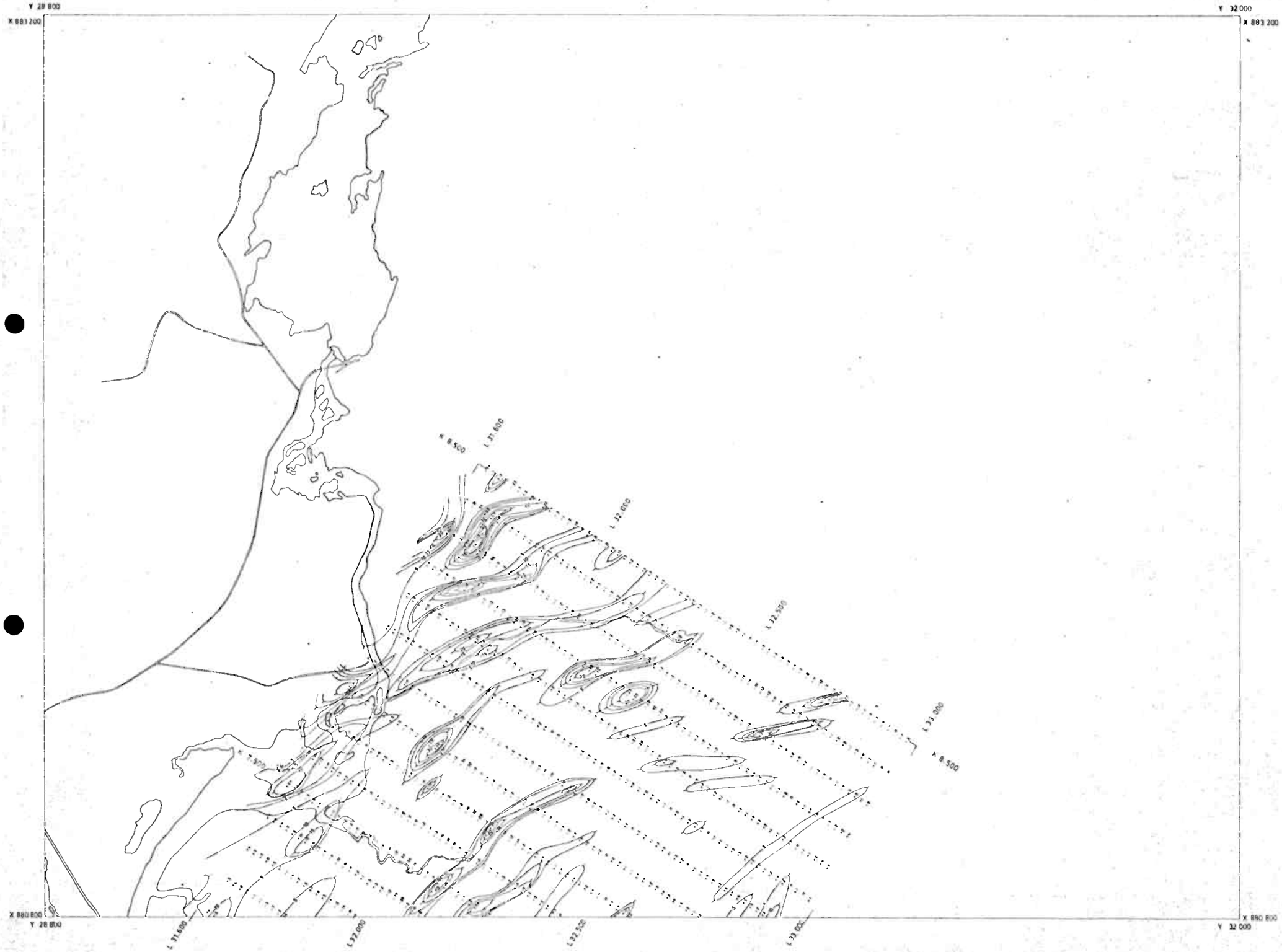
Contours : +5, +10, +15, +20, +30, +50, +75, +100, +150 %

Transmitter : FUO 15,1 kHz

Instrument : GEONICS EM-16

Fraser-filtered

SUOMEN MALMI OY	1:10000
VLF-map Real component	
BLEIKVASSLI	DS 184-5-2



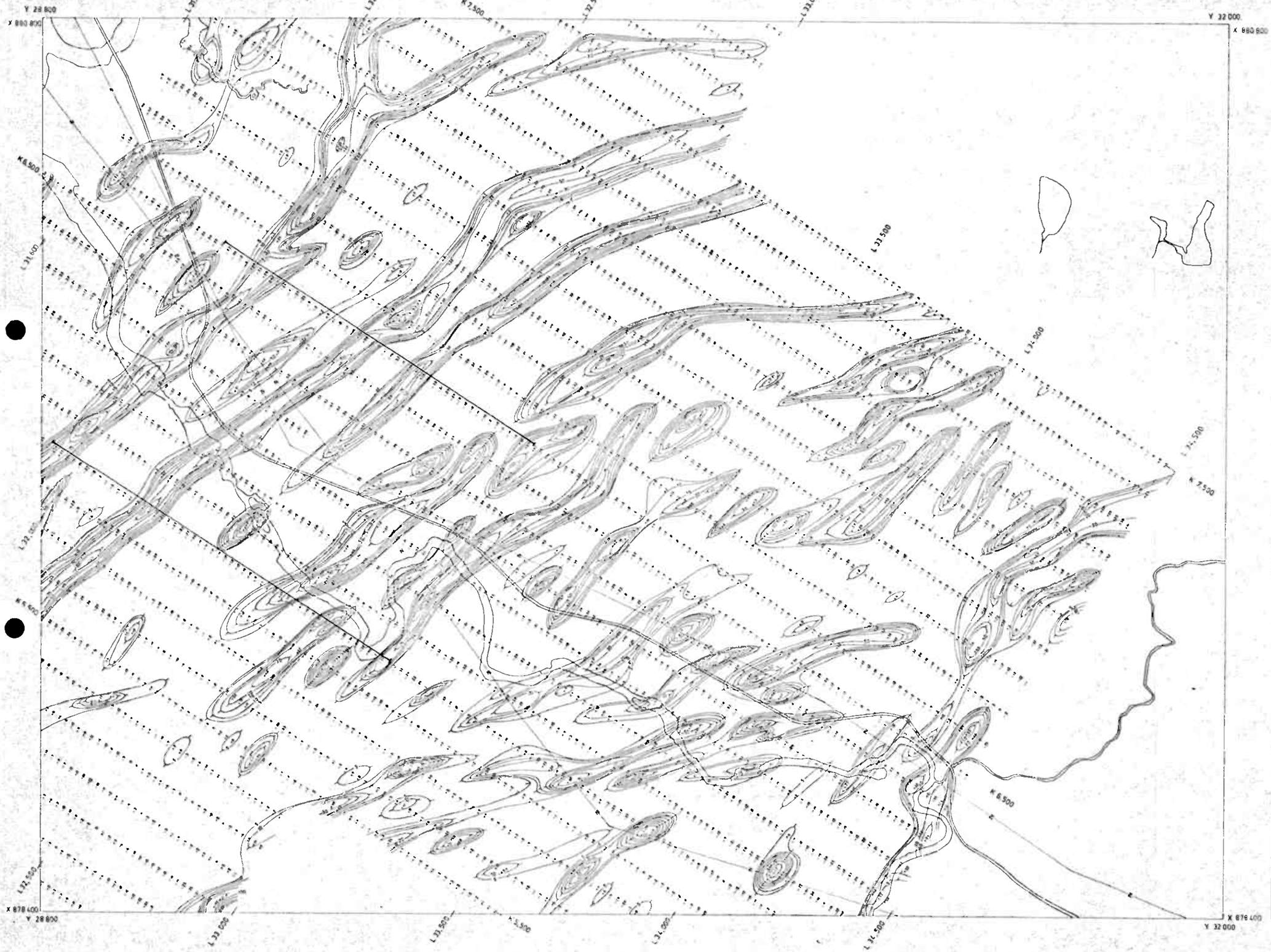
Contours : • 5, •10, • 15, • 20, • 30, • 50, • 75, • 100, • 150 %

Transmitter : FUO 15,1 kHz

Instrument : GEONICS EM-16

Fraser - filtered

SUOMEN MALMI OY	1:10 000	
VLF - map Imaginary component		
BLEIKVASSLI	DS 184-5-2	



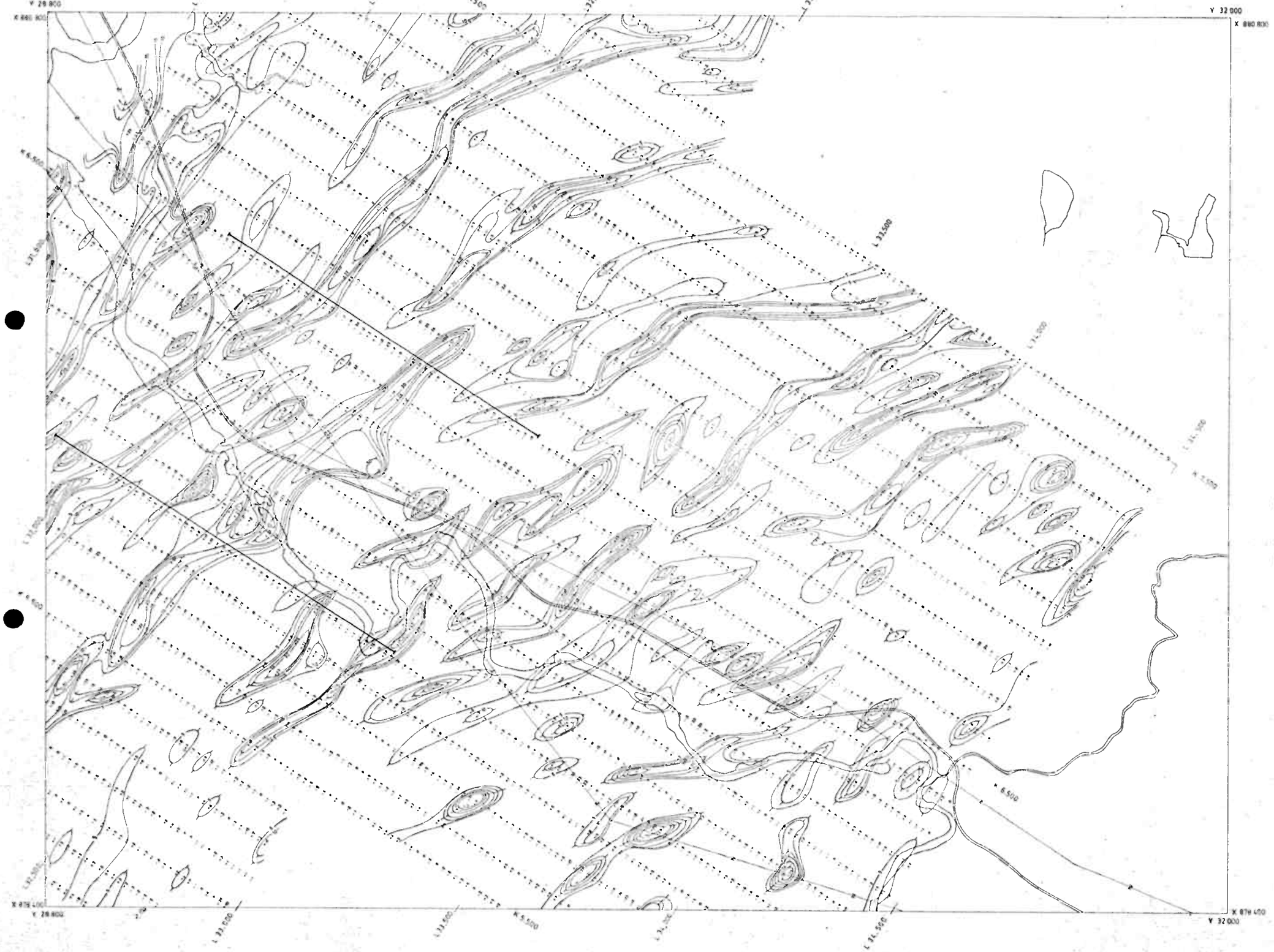
Contours : +5, +10, +15, +20, +30, +50, +75, +100, +150 %

Transmitter : FUO 15,1 kHz

Instrument : GEONICS EM-16

Fraser - filtered

SUOMEN MALMI OY	1:10 000
VLF - map Real component	
BLEIKVASSLI	DS 184-5-4



Contours: +5, +10, +15, +20, +30, +50, +75, +100, +150 %

Transmitter: FUO 15,1 kHz

Instrument: GEONICS EM-16

Fraser - filtered

SUOMEN MALMI OY	1:10 000	
VLF - map Imaginary component		
BLEIKVASSLI	DS 184-5-4	

Y 28800
X 878400

Y 32000
X 878400

L 33.000
K 4.500

L 34.000
K 5.500

L 34.500
K 5.500

Contours : ±5, ±10, ±15, ±20, ±30, ±50, ±75, ±100, ±150 %

Transmitter : FUO 15,1 kHz

Instrument : GEONICS EM-16

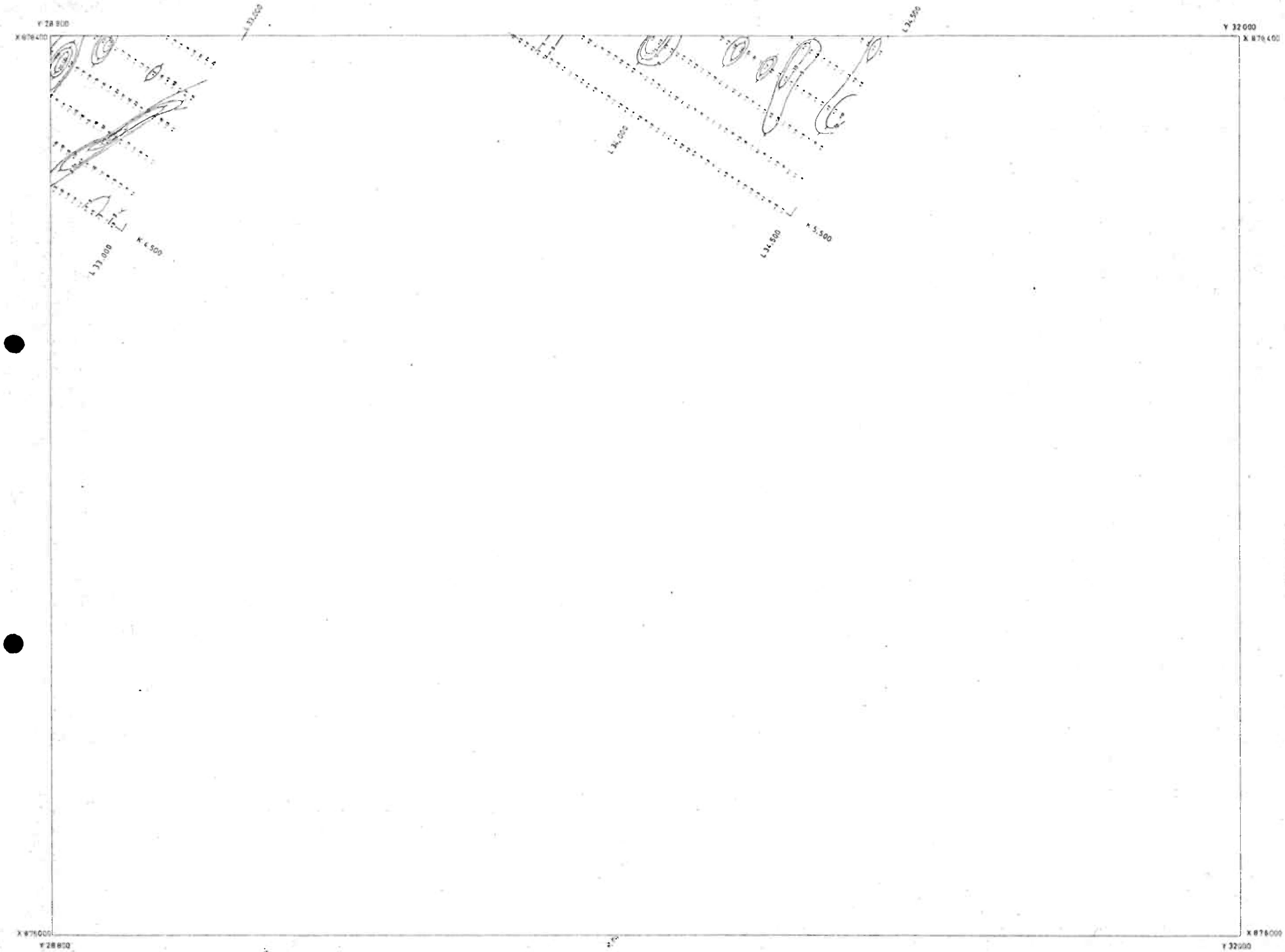
Fraser - filtered

SUOMEN MALMI OY	1:10000	K.P.P. 4.75 E.M. 4.75 P.M. 6.75
VLF - map Real component		
BLEIKVASSLI	DS 183-5-2	

X 876000
Y 28800

X 876000
Y 32000

App 8 b



Contours : +5, +10, +15, +20, +30, +50, +75, +100, +150 %

Transmitter : FUO 15,1 kHz

Instrument : GEONICS EM -16

Fraser - filtered

SUOMEN MALMI OY	1:10000
VLF - map Imaginary component	
BLEIKVASSLI	DS 183-5-2

Y 25 600
X 883 200

Y 28 800
X 883 200

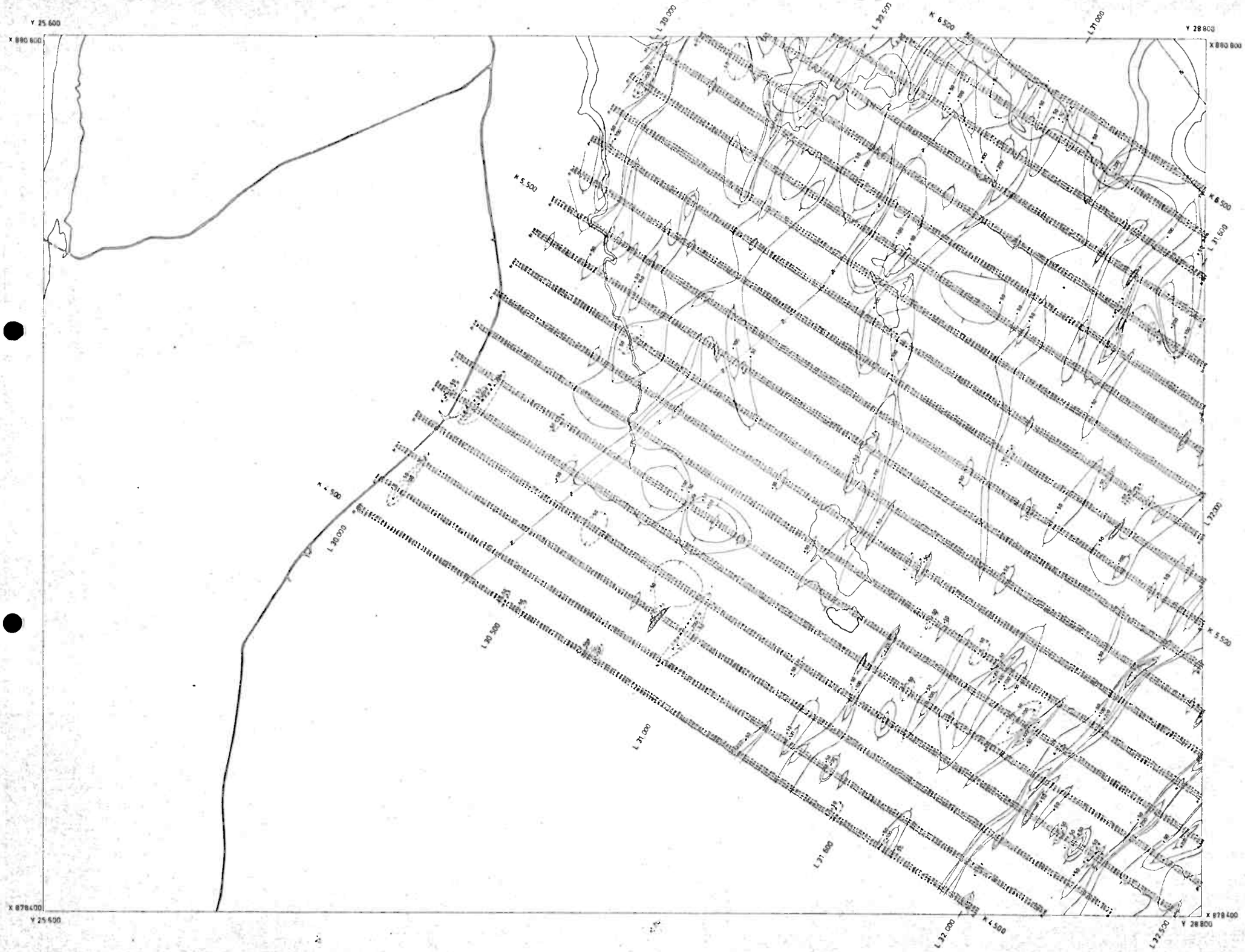
X 880 800
Y 25 500

X 880 800
Y 28 800

MAGNETIC ZERO LEVEL: 51500 γ
CONTOURS: ± 50, 100, 200, 400, 800, 1600 γ
INSTRUMENT: PROTON MAGNETOMETER MP-2

DS 184-5-1

SUOMEN MALMI OY	1:10 000	Drawn T. P. K. 14.75 Traced A. S. 5.75 Checked P. M. 7.75
MAGNETIC MAP		
BLEIKVASSLI	DS 184-5-1	



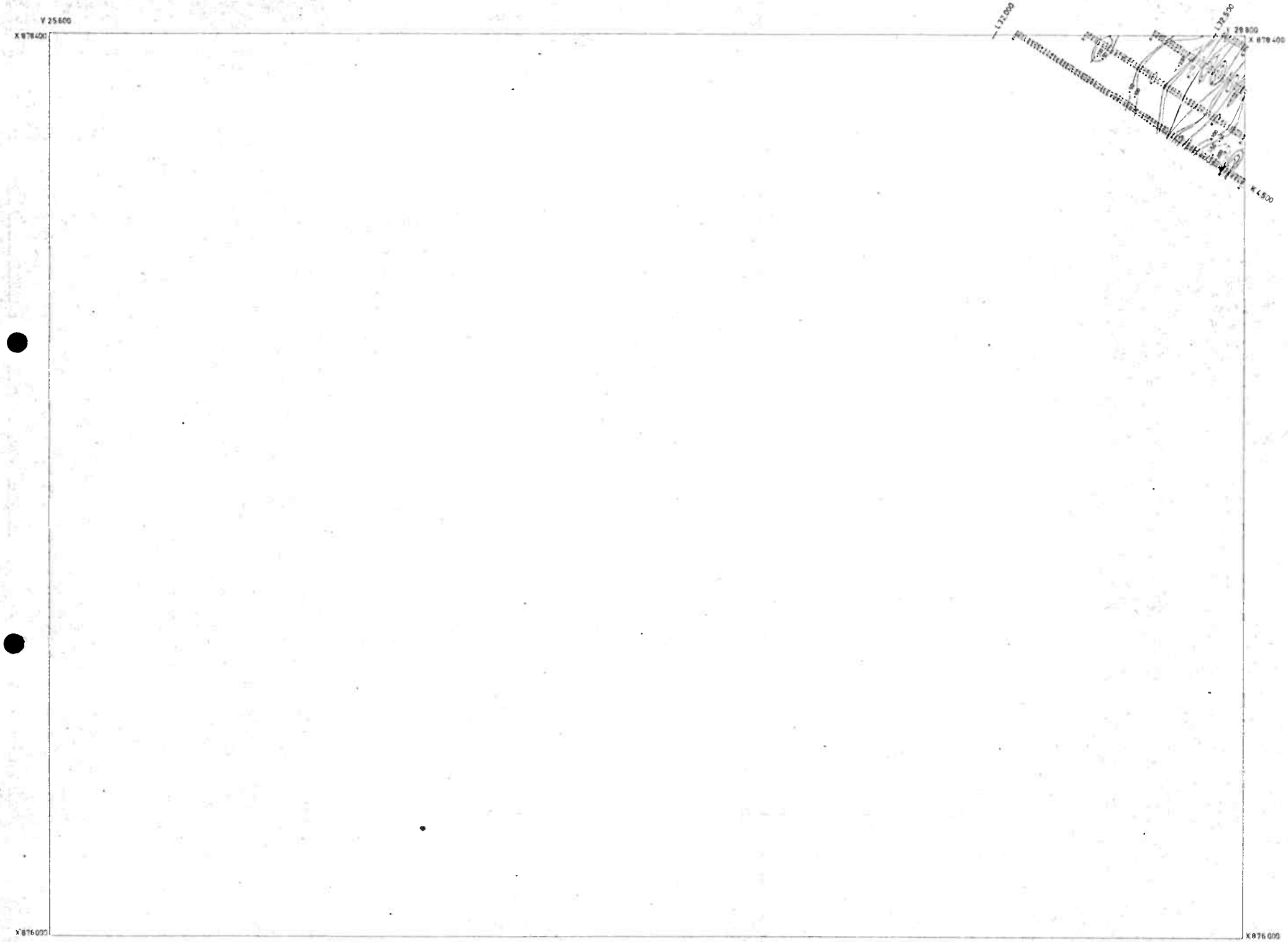
MAGNETIC ZERO LEVEL 51 500 γ

CONTOURS ∓ 50 100 200 400 800 1600 γ

INSTRUMENT PROTON MAGNETOMETER MP-2

DR 184-5-2	DS 184-6-1	DS 184-5-2
DR 184-5-4	DS 184-6-3	DS 184-6-4

SUOMEN MALMI OY	1:10000	1974	7.75
		AS	4.75
		PM	7.75
MAGNETIC MAP			
BLEIKVASSLI	DS 184 - 5 - 3		

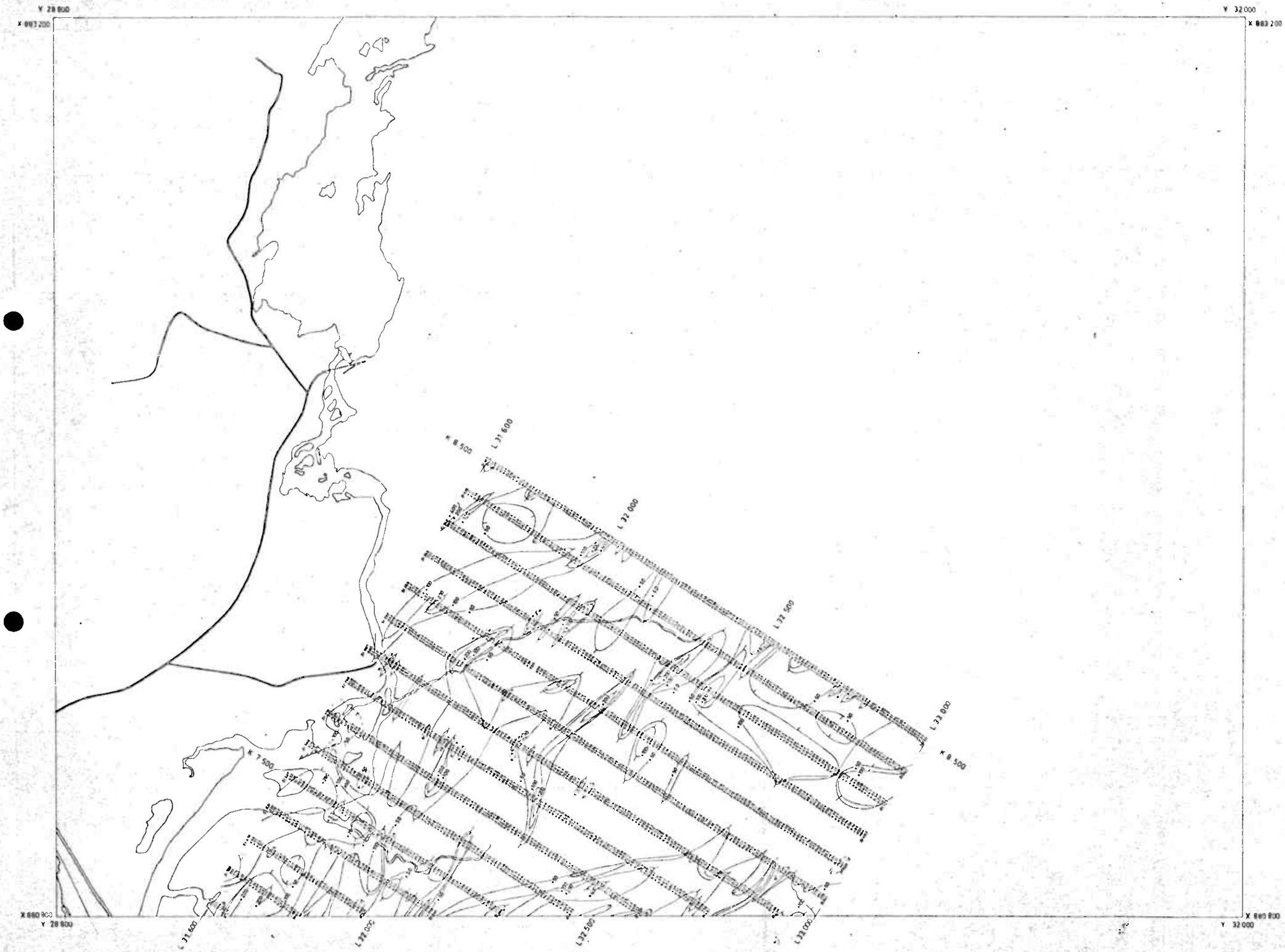


MAGNETIC ZERO LEVEL: 51 500 γ

CONTOURS: ± 50, 100, 200, 400, 800, 1600 γ

INSTRUMENT: PROTON MAGNETOMETER MP-2

SUOMEN MALMI OY	1:10 000	M.A. 24.75 A.S. 27.75 P.M. 7.75
MAGNETIC MAP		
BLEIKVASSLI	DS 183 - 5-1	

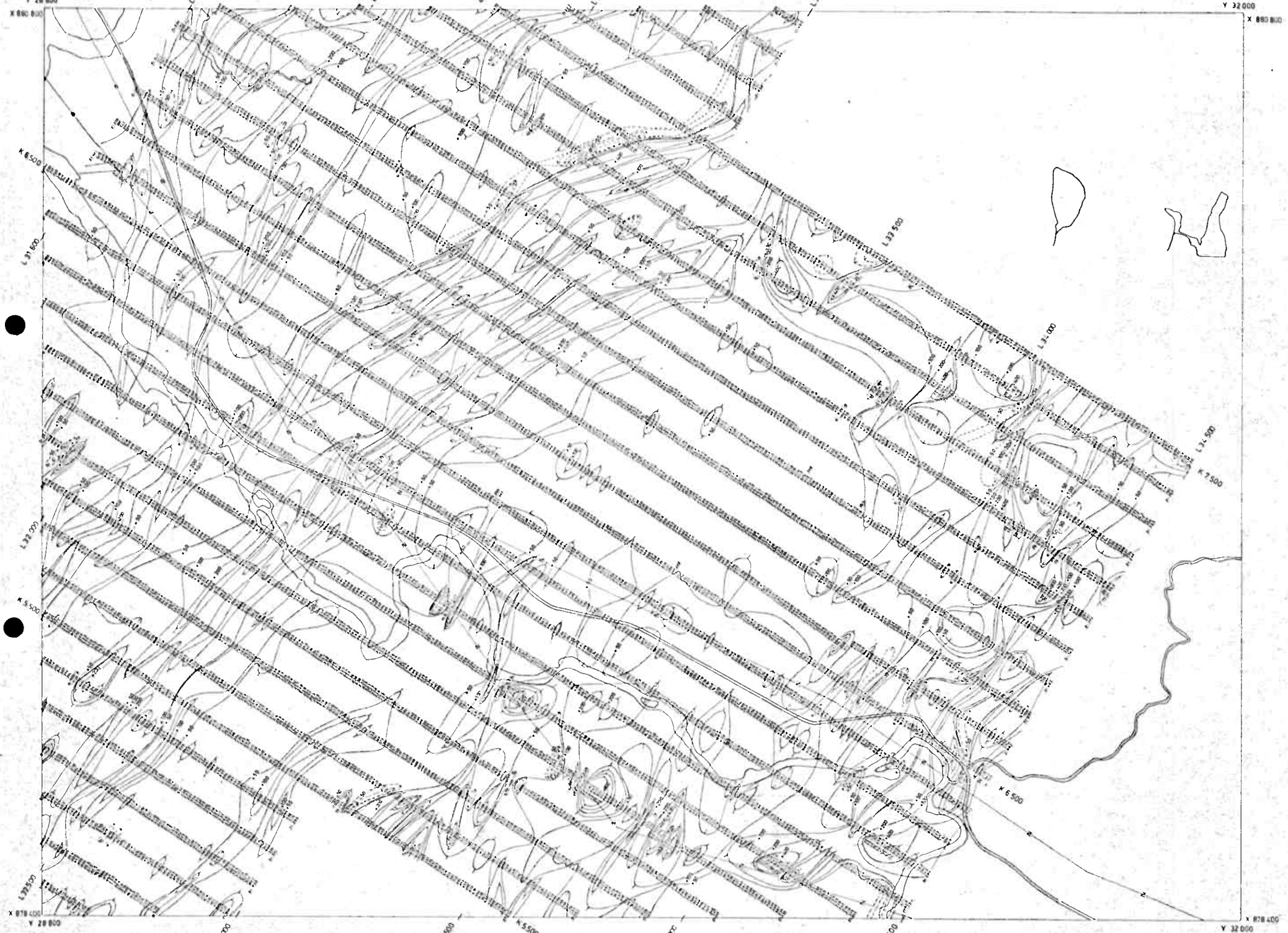


MAGNETIC ZERO LEVEL: 51 500 γ

CONTOURS: 50, 100, 200, 400, 800, 1600 γ

INSTRUMENT: PROTON MAGNETOMETER MP-2

SUOMEN MALMI OY	1:10 000	DRAWN 13.7.75 A.S. 5.7.75 P.M. 7.75
MAGNETIC MAP		
BLEIKVASSLI	DS 184-5-2	

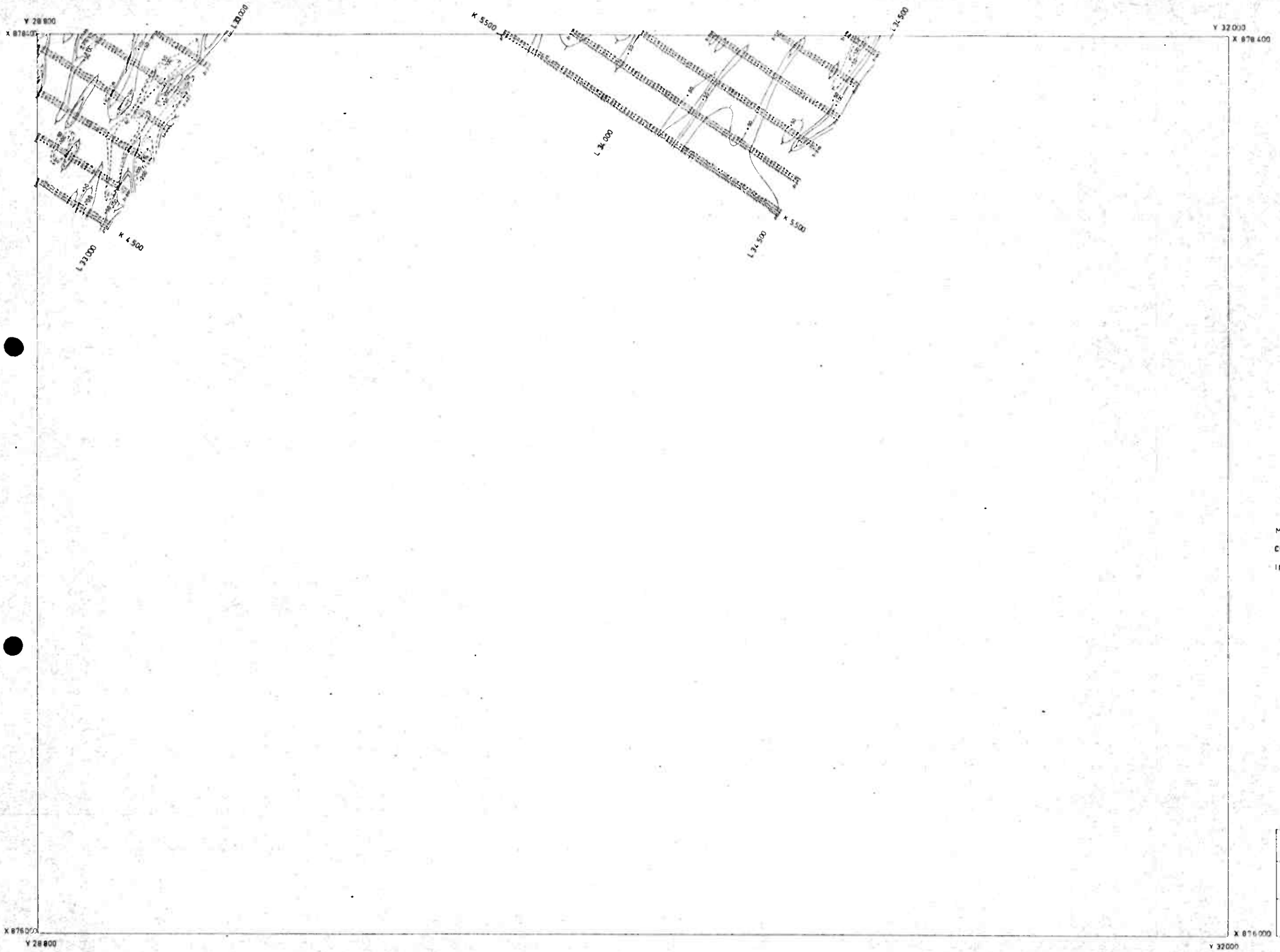


MAGNETIC ZERO LEVEL 51 500 γ

CONTOURS ± 50 100 200 400 800 1600 γ

INSTRUMENT PROTON MAGNETOMETER MP-2

SUOMEN MALMI OY	1:10 000	A 4 1975 AS 5 1975 PM 7 75
MAGNETIC MAP		
BLEIKVASSLI	DS 184-5-4	

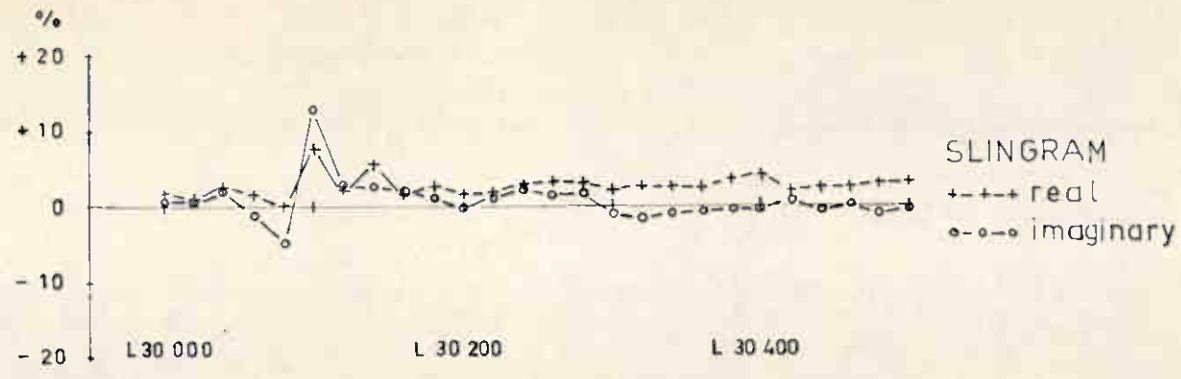


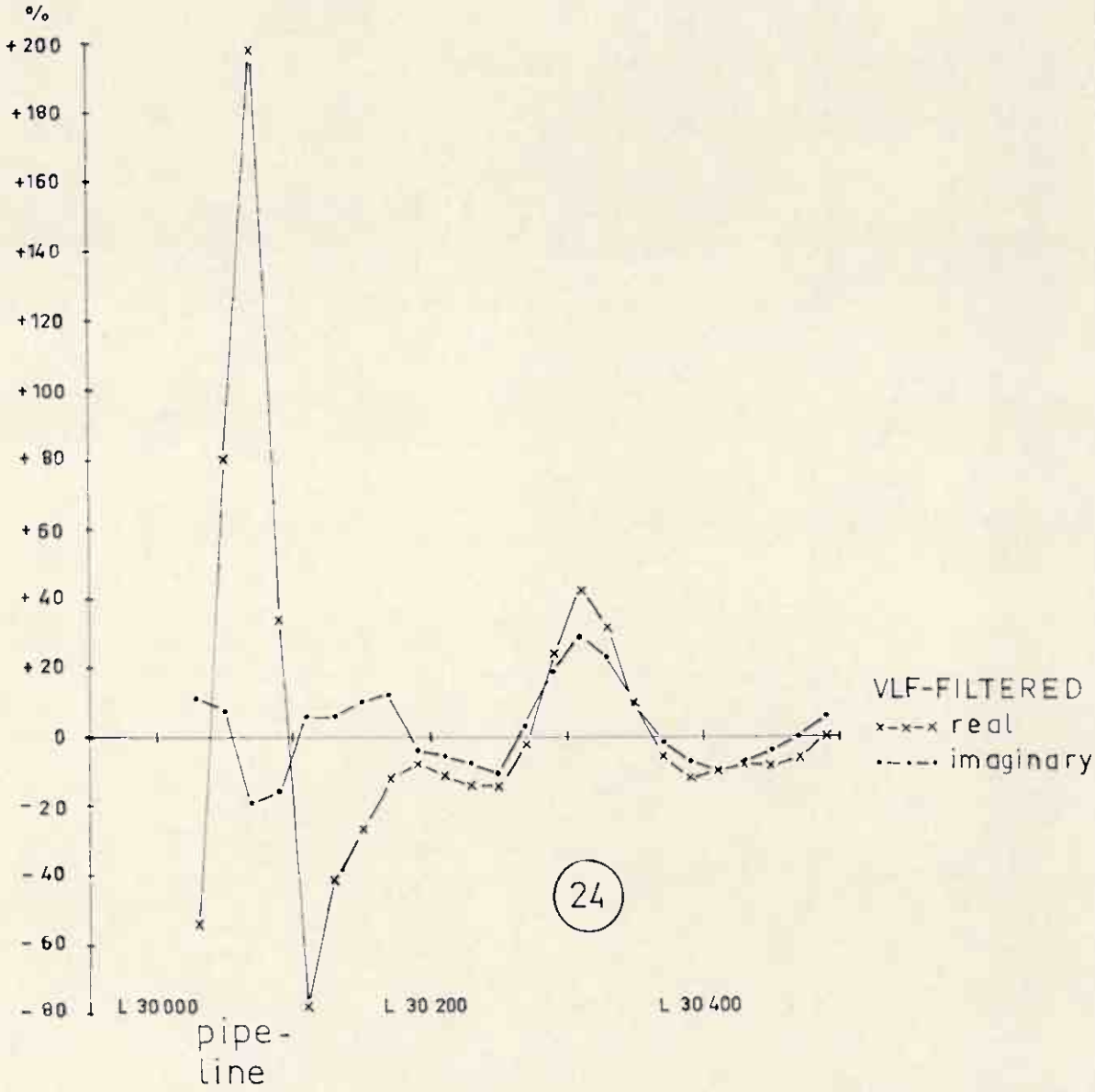
MAGNETIC ZERO LEVEL: 51500 γ

CONTOURS ± 50, 100, 200, 400, 300, 1600 γ

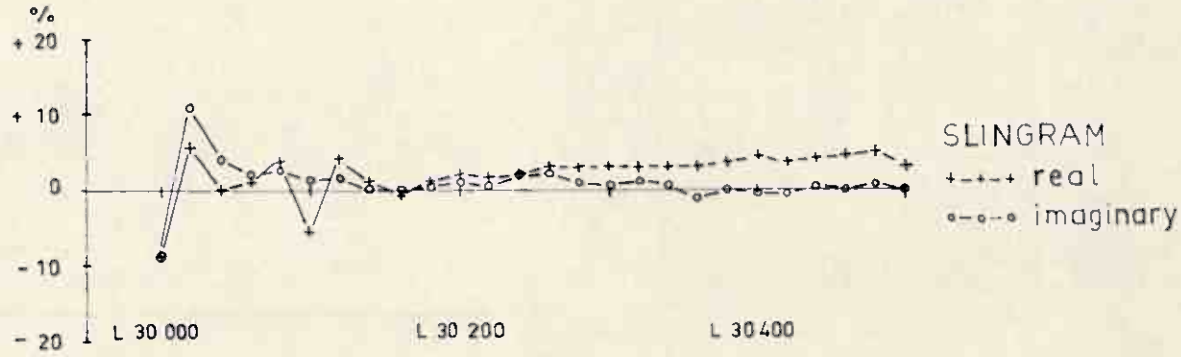
INSTRUMENT: PROTON MAGNETOMETER MP-2

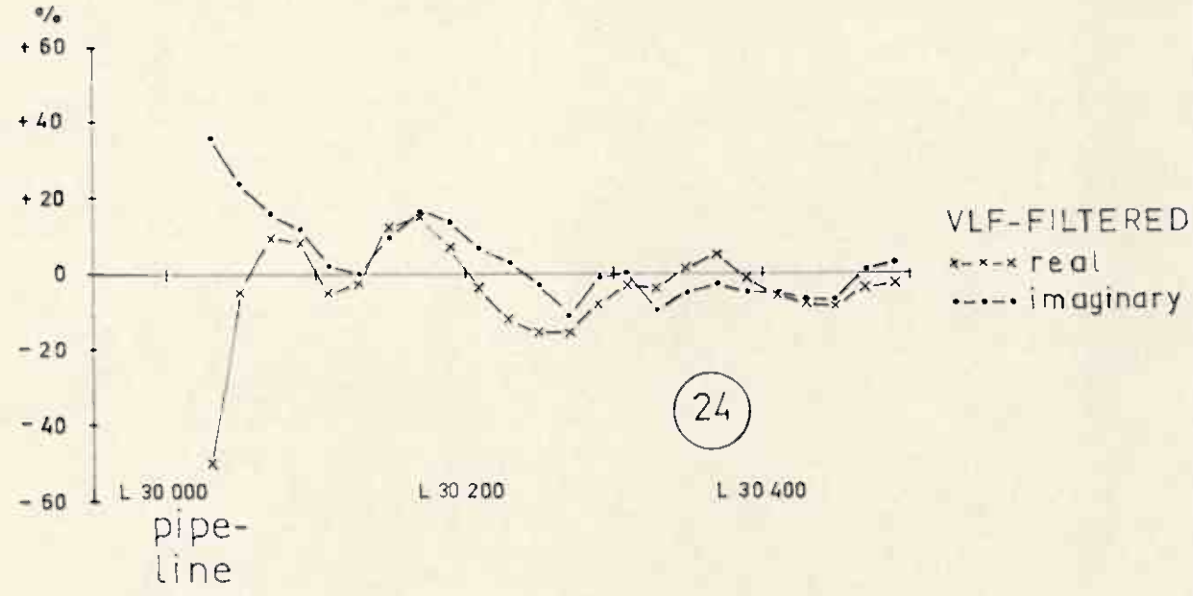
SUOMEN MALMI OY	1:10000	A.S. 6.73 P.M. 7.73
MAGNETIC MAP		
BLEIKVASSLI	DS 183-5-2	



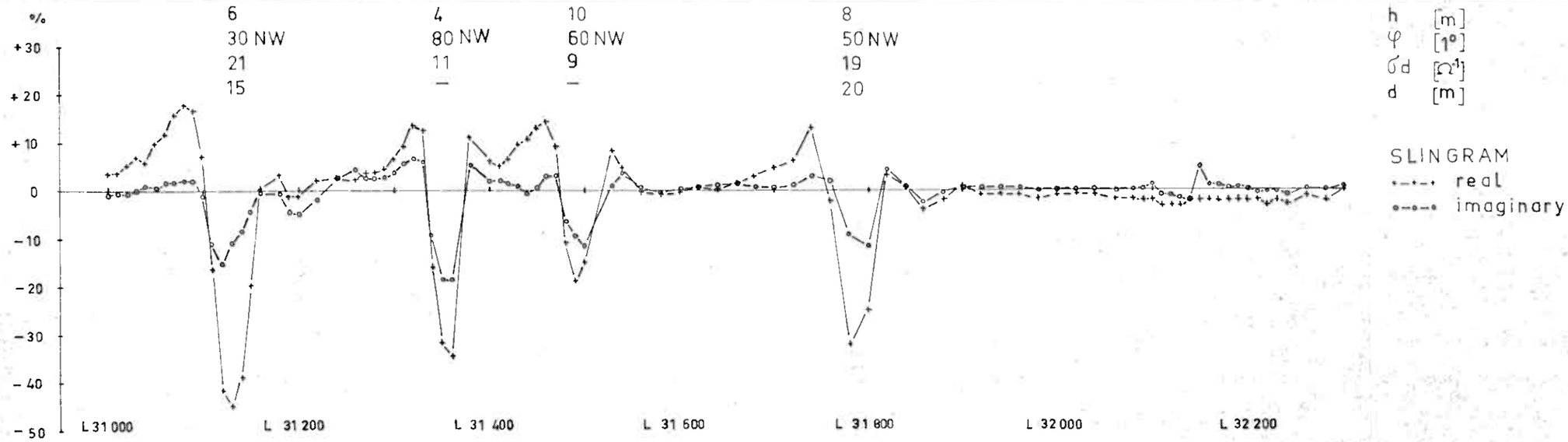


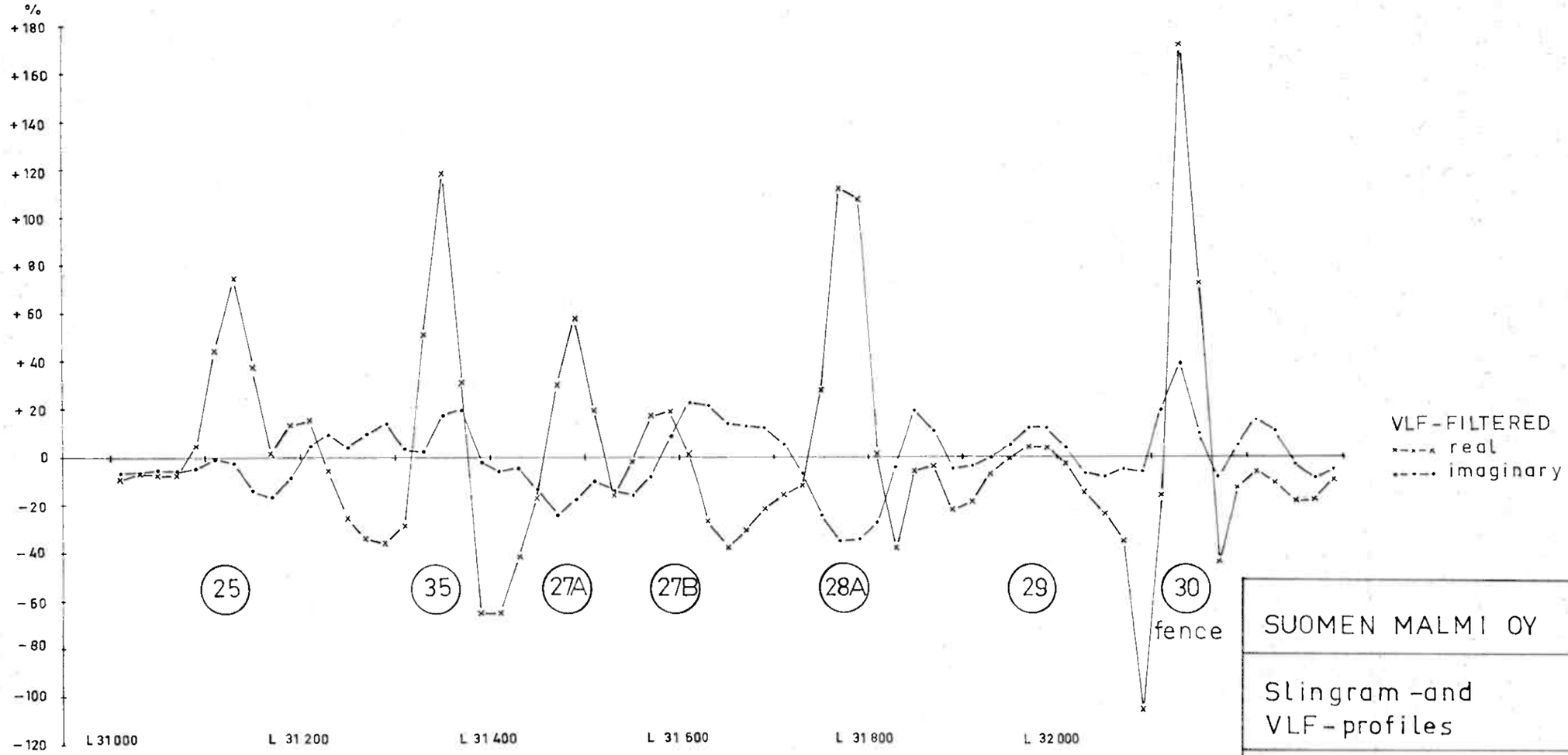
SUOMEN MALMI OY	1:5000	meas.	TK	4.75
		draw	AS	8.75
		insp	PM	8.75
Slingram-and VLF-profiles				
BLEIKVASSLI	K 5 500			



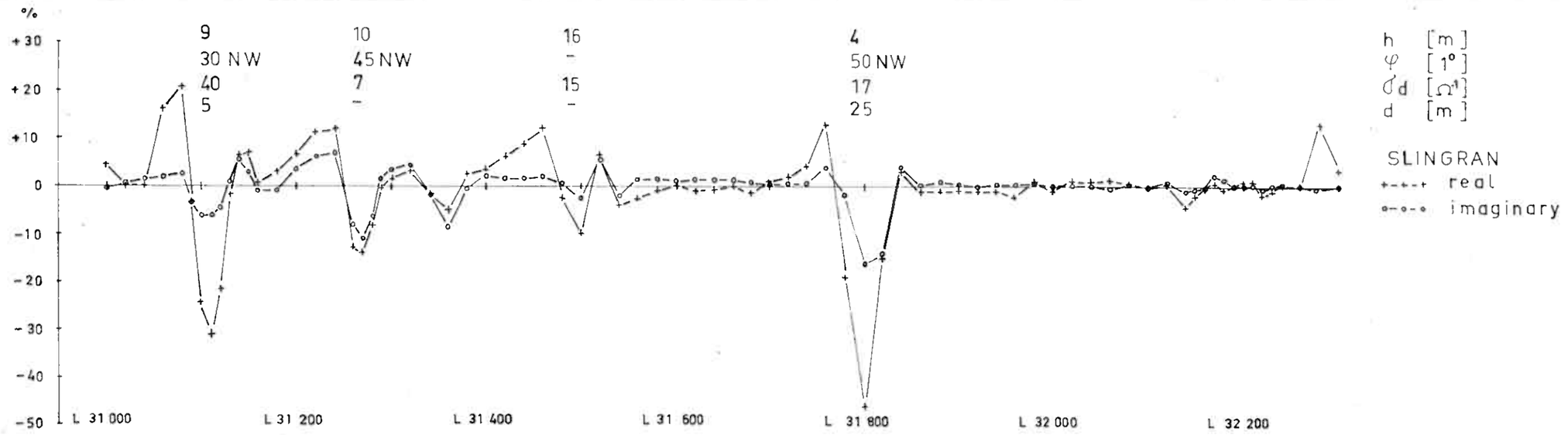


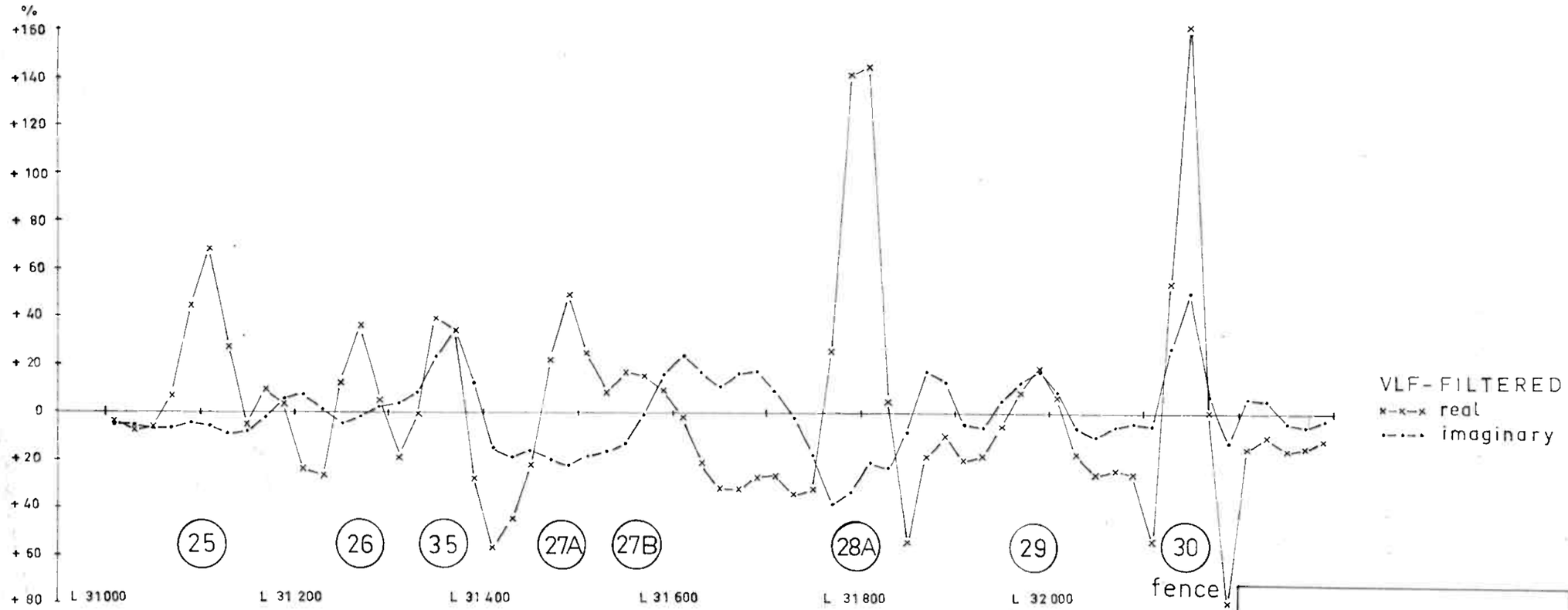
SUOMEN MALMI OY	1:5000	meas.	TK	4.75
		draw	AS	8.75
		insp	PM	8.75
Slingram-and VLF-profiles				
BLEIKVASSLI	K 5600			



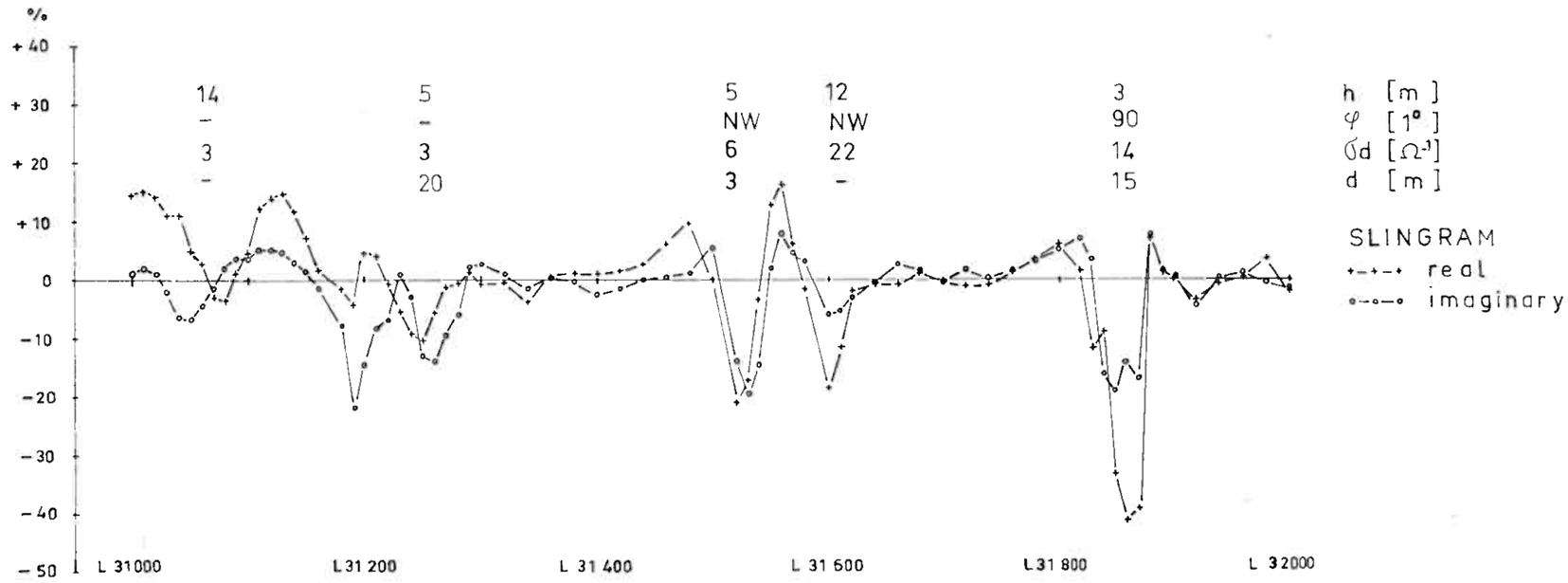


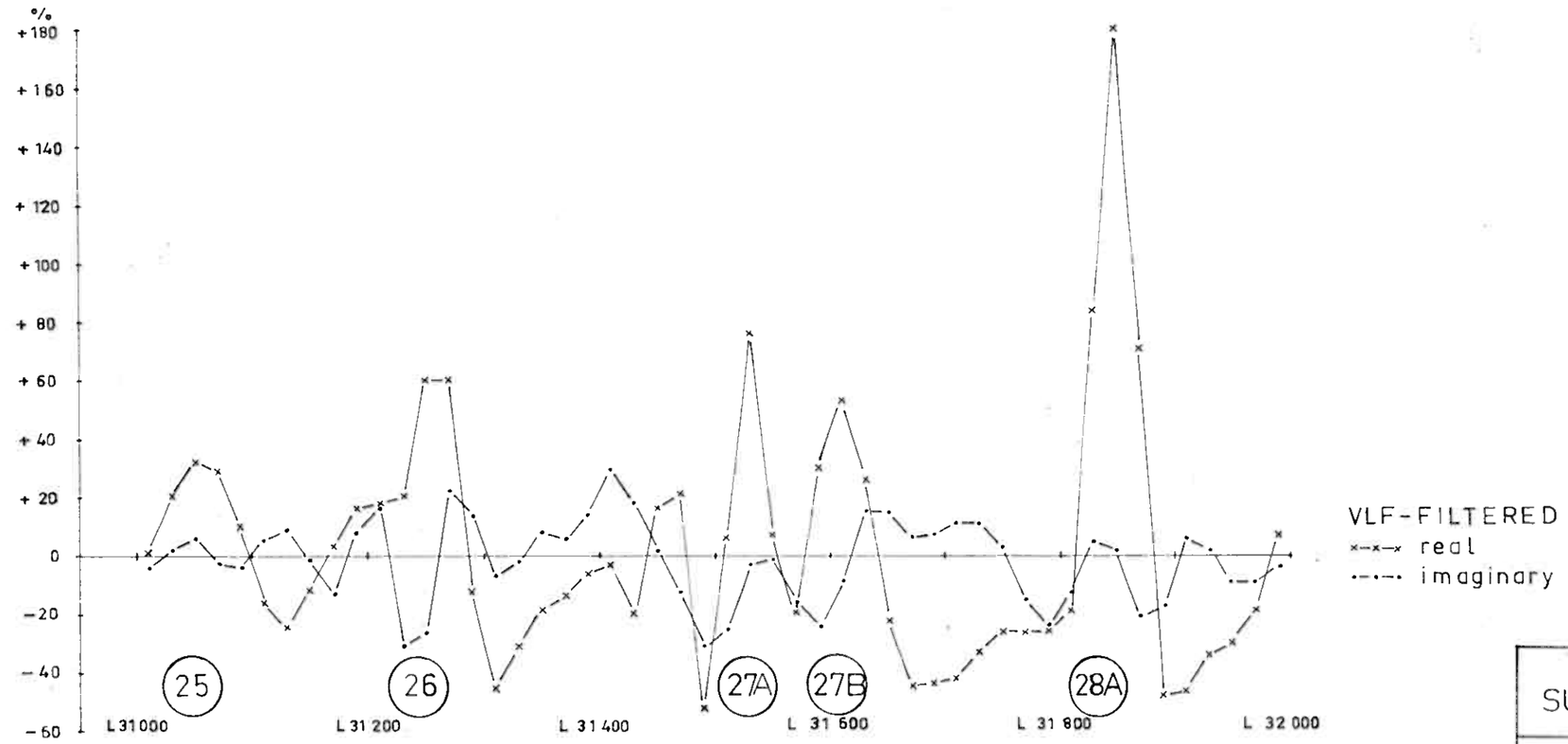
SUOMEN MALMI OY	1:5000	meas	TK	4.75
		draw.	AS	8.75
		insp.	PM	8.75
Slingram -and VLF-profiles				
BLEIKVASSLI	K 4 900			



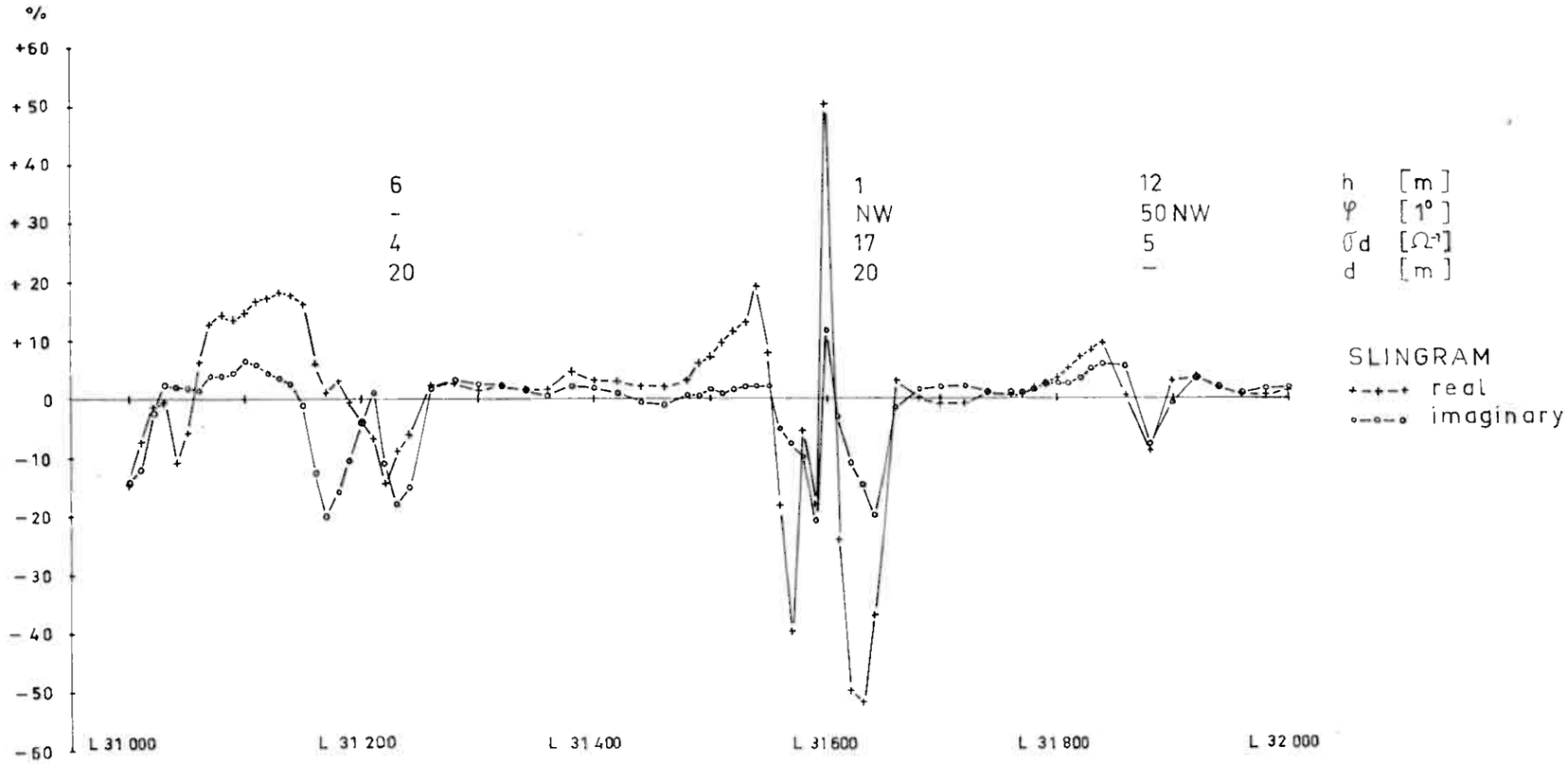


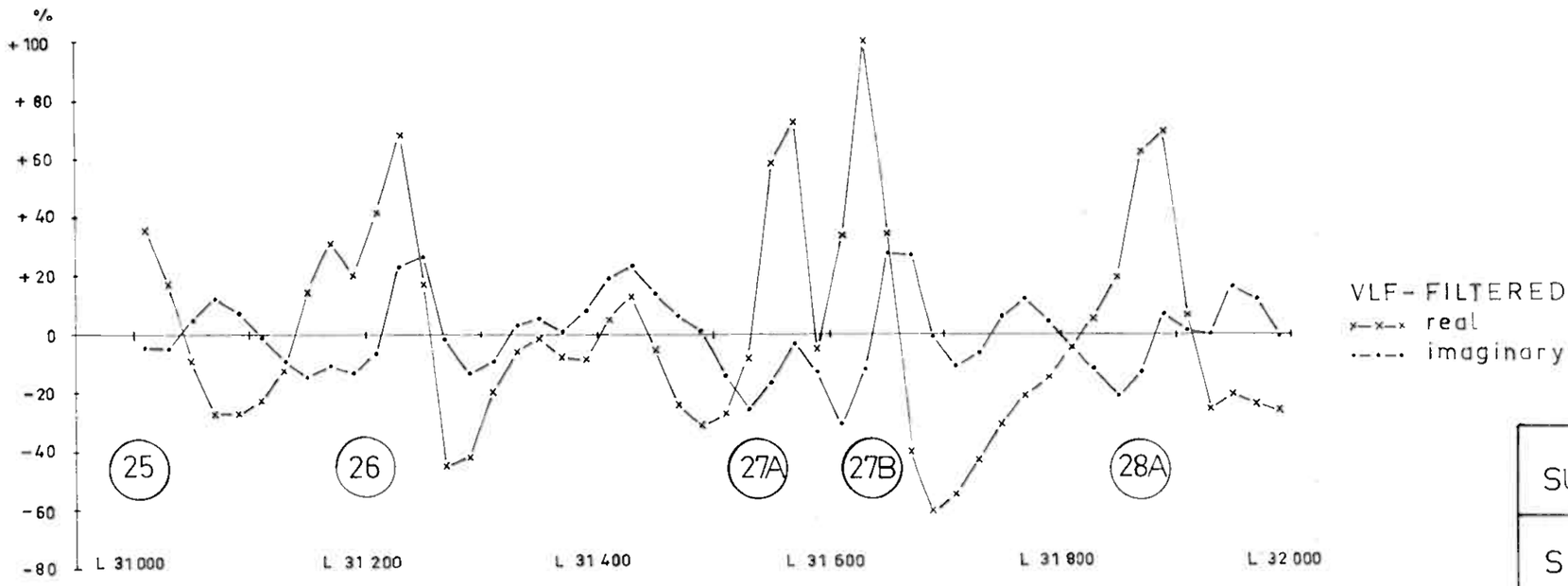
SUOMEN MALMI OY	1:5000	meas	T K	4.75
		draw.	A S	8.75
		insp.	P M	8.75
Slingram-and VLF-profiles				
BLEIKVASSLI	K 5 000			



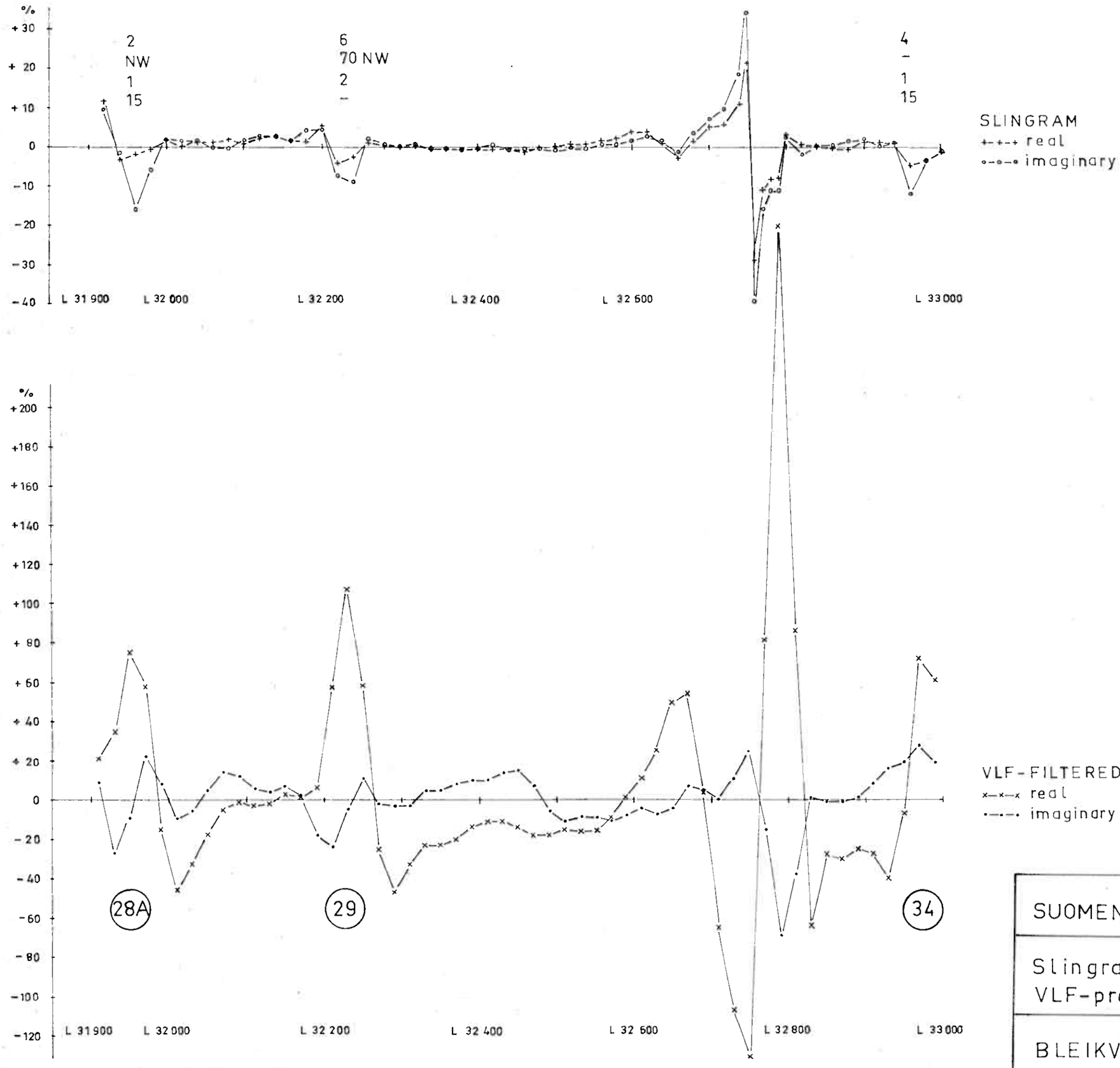


SUOMEN MALMI OY	1:5000	meas	TK	4.75
		draw.	AS	8.75
		insp.	PM	8.75
Slingram-and VLF-profiles				
BLEIKVASSLI	K 5 300			

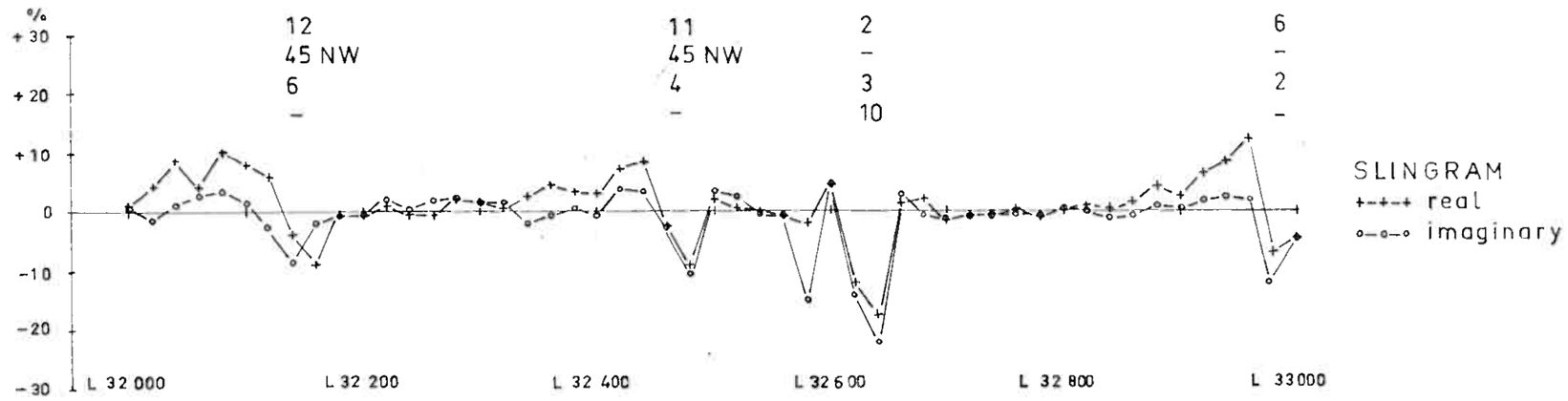


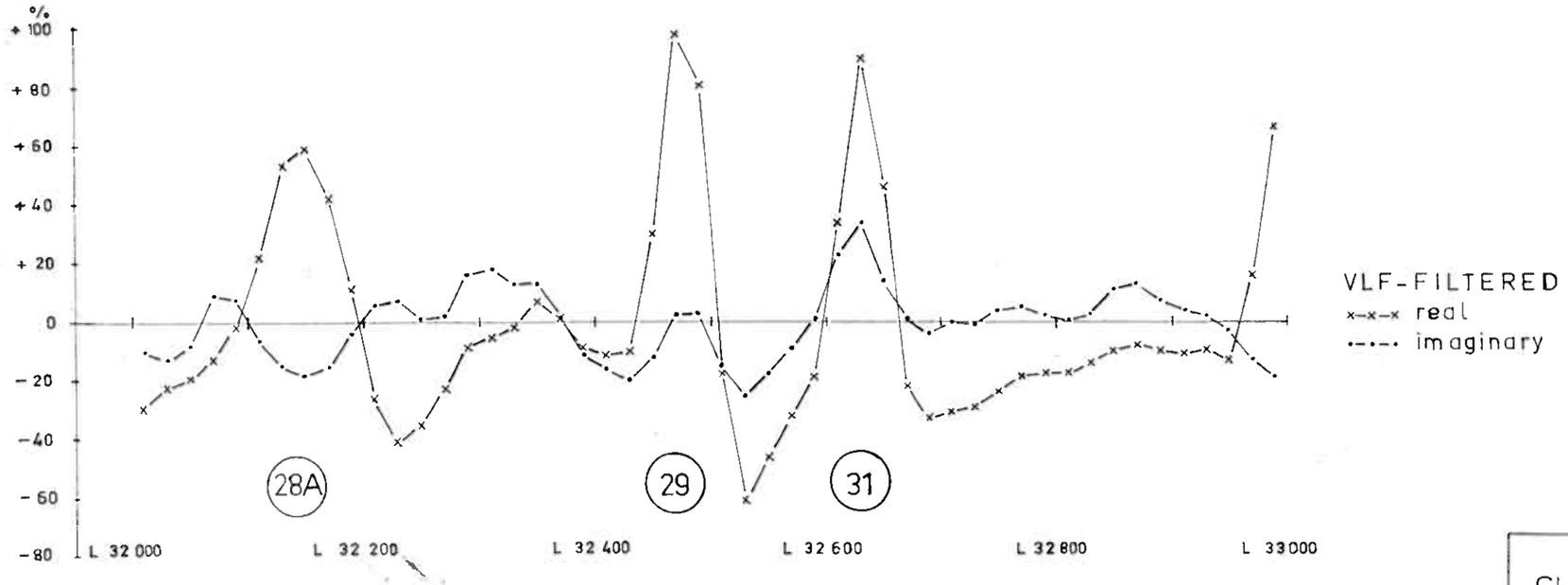


SUOMEN MALMI OY	1:5000	meas.	TK	4.75
		draw.	AS	8.75
		insp.	PM	8.75
Slingram-and VLF-profiles				
BLEIKVASSLI	K 5 500			



SUOMEN MALMI OY	1:5000	meas.	TK	4.75
		draw.	AS	8.75
		insp.	PM	8.75
Slingram-and VLF-profiles				
BLEIKVASSLI	K 5 900			



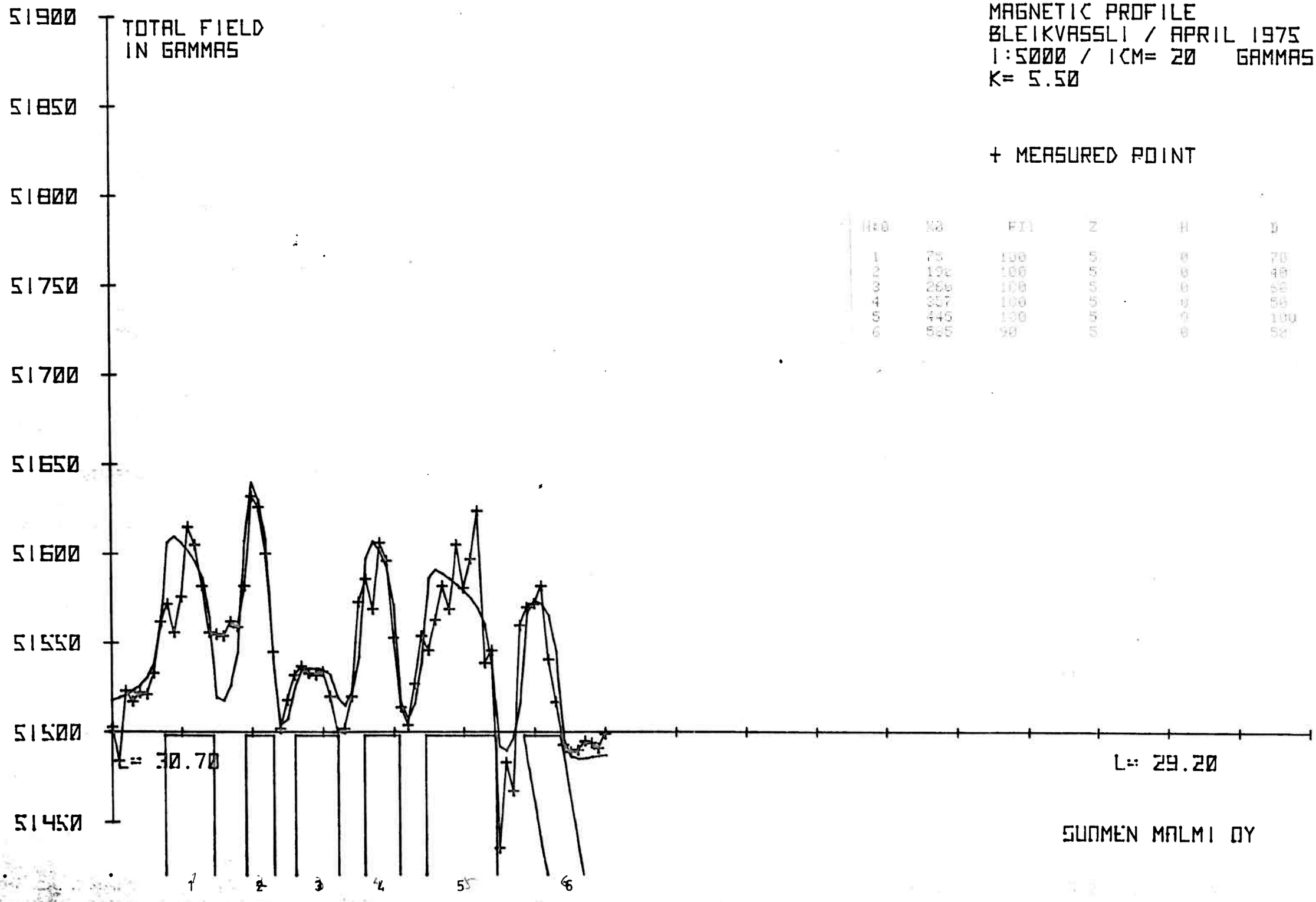


SUOMEN MALMI OY	1:5000	meas.	TK	4.75
		draw.	AS	8.75
		insp.	PM	8.75
Slingram-and VLF-profiles				
BLEIKVASSLI	K 6600			

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 5.50

+ MEASURED POINT

NRO	X0	FI	Z	H	D	A
1	75	100	5	0	70	320
2	190	100	5	0	40	500
3	280	100	5	0	50	120
4	357	100	5	0	50	170
5	445	100	5	0	100	320
6	585	90	5	0	50	330

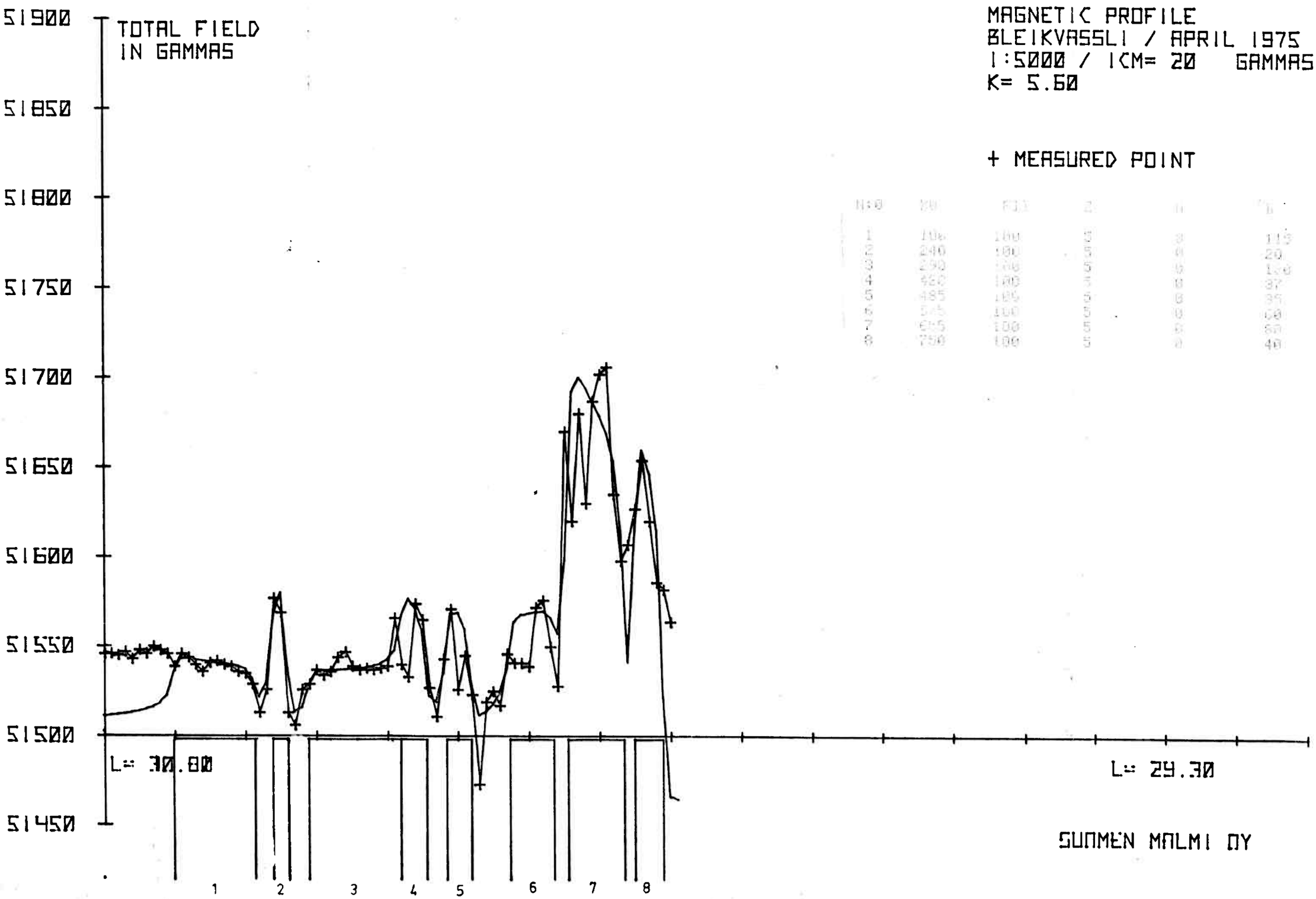


SUOMEN MALMI OY

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 5.60

+ MEASURED POINT

N:o	X0	F0	Z	H	b	K
1	100	100	5	0	110	100
2	240	100	5	0	20	330
3	290	100	5	0	140	30
4	460	100	5	0	37	250
5	485	100	5	0	35	140
6	565	100	5	0	60	170
7	615	100	5	0	80	650
8	750	100	5	0	40	700

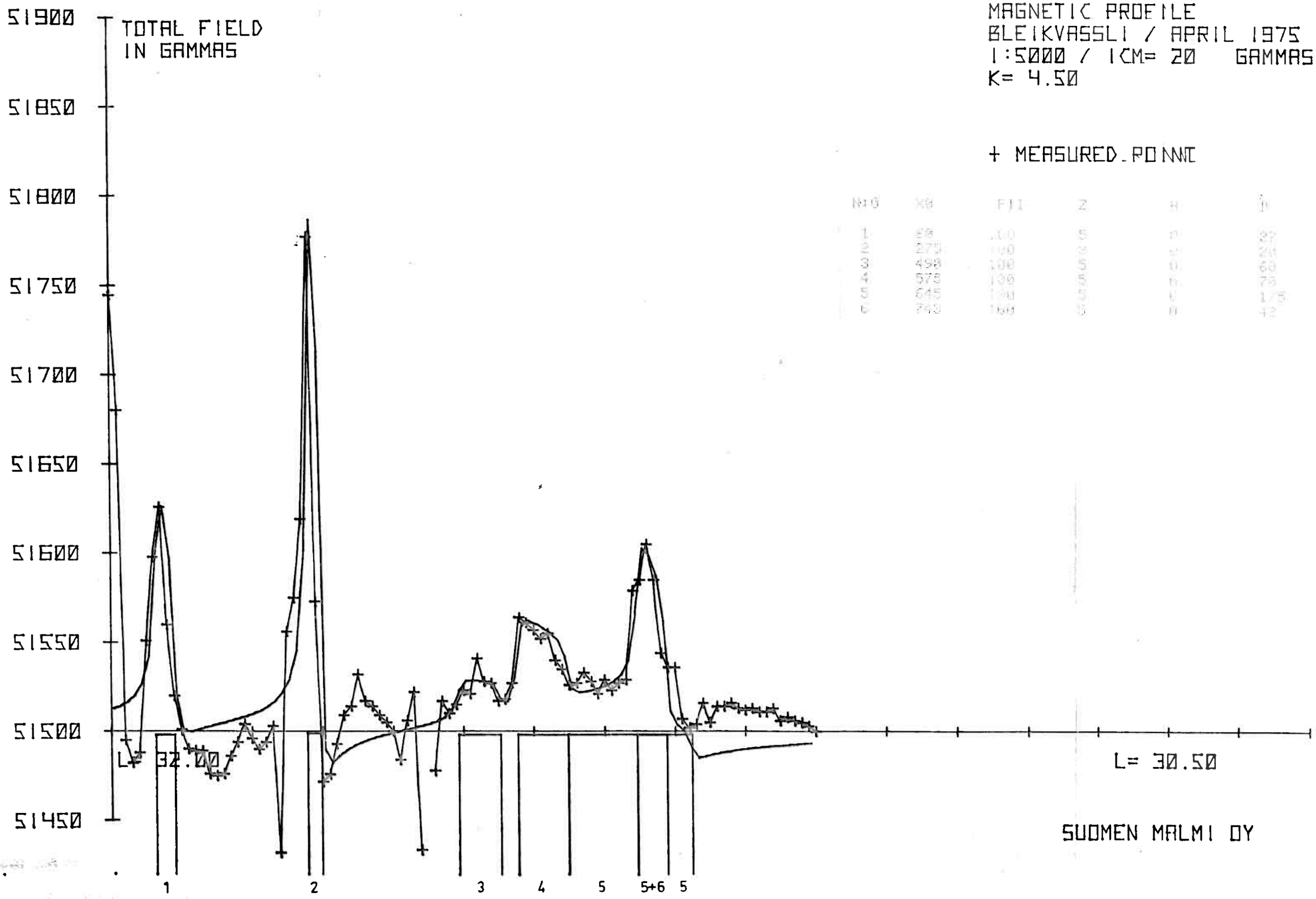


SUOMEN MALMI OY

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 4.50

+ MEASURED POINT

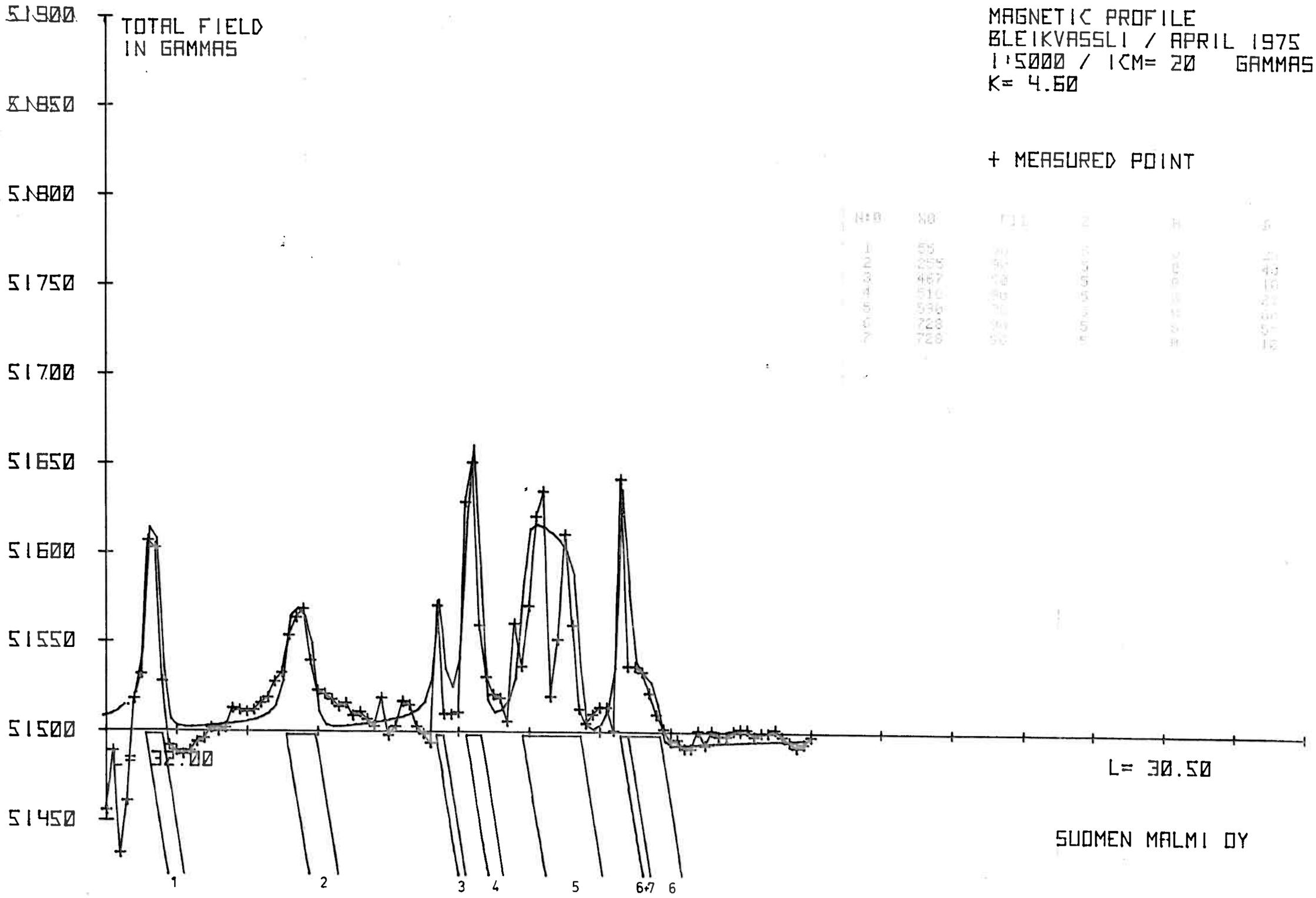
NR	KM	FI1	Z	H	D	I
1	50	150	5	0	27	736
2	275	190	0	0	20	1180
3	450	100	5	0	60	80
4	575	130	5	0	75	350
5	645	140	5	0	175	60
6	740	160	0	0	42	320



SUOMEN MALMI OY

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 4.60

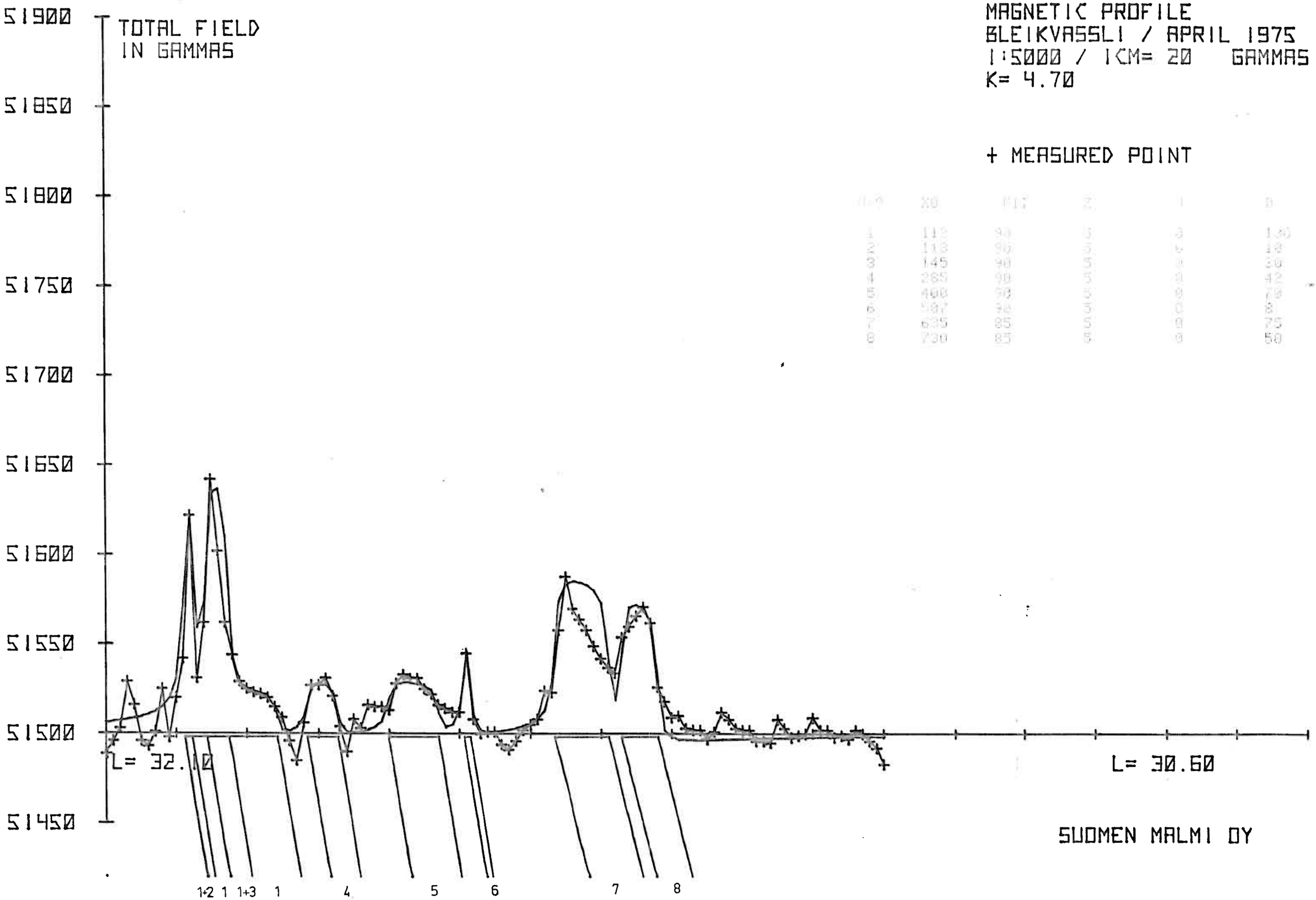
+ MEASURED POINT



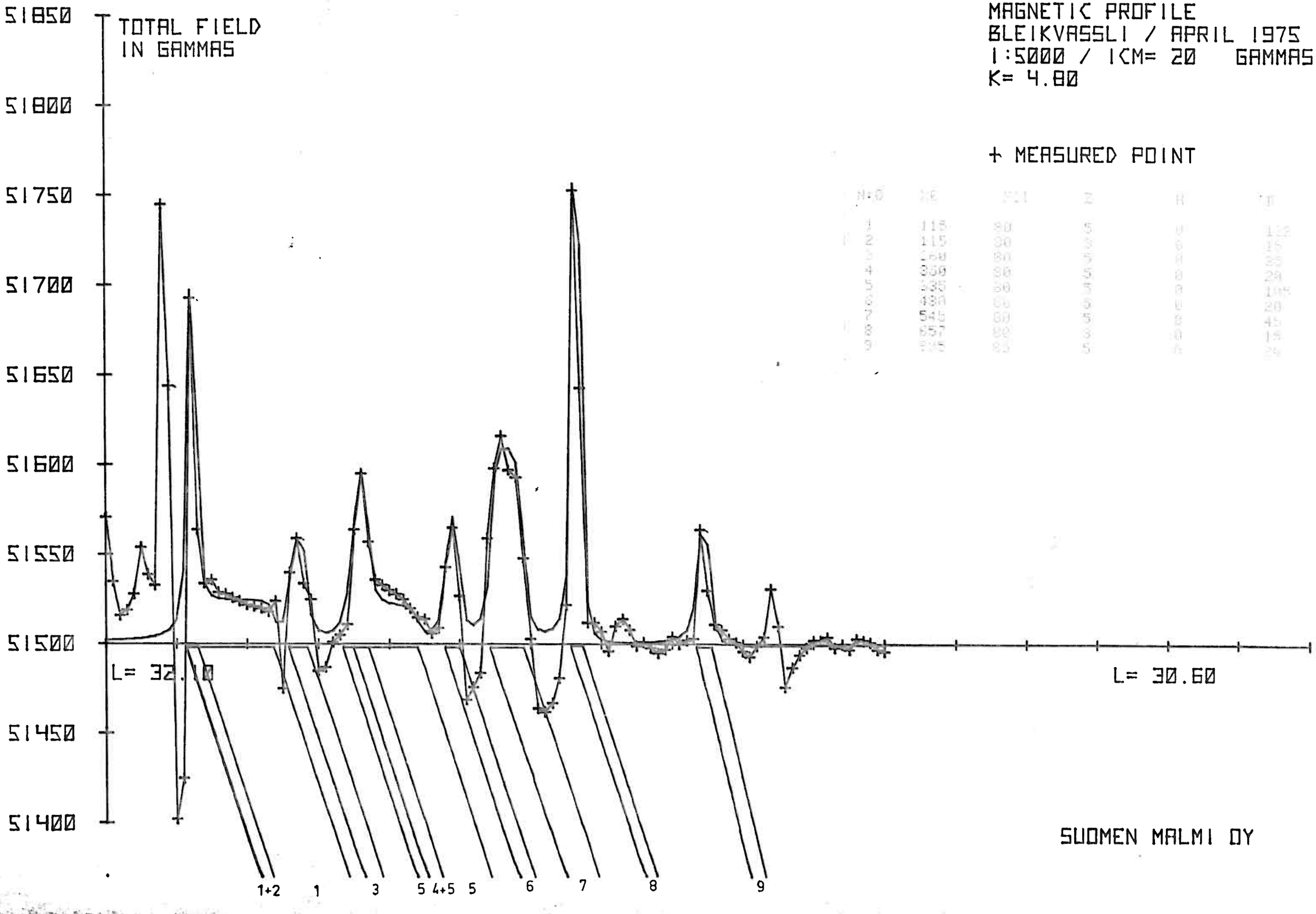
SUOMEN MALMI OY

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 4.70

+ MEASURED POINT



SUOMEN MALMI OY



MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 4.80

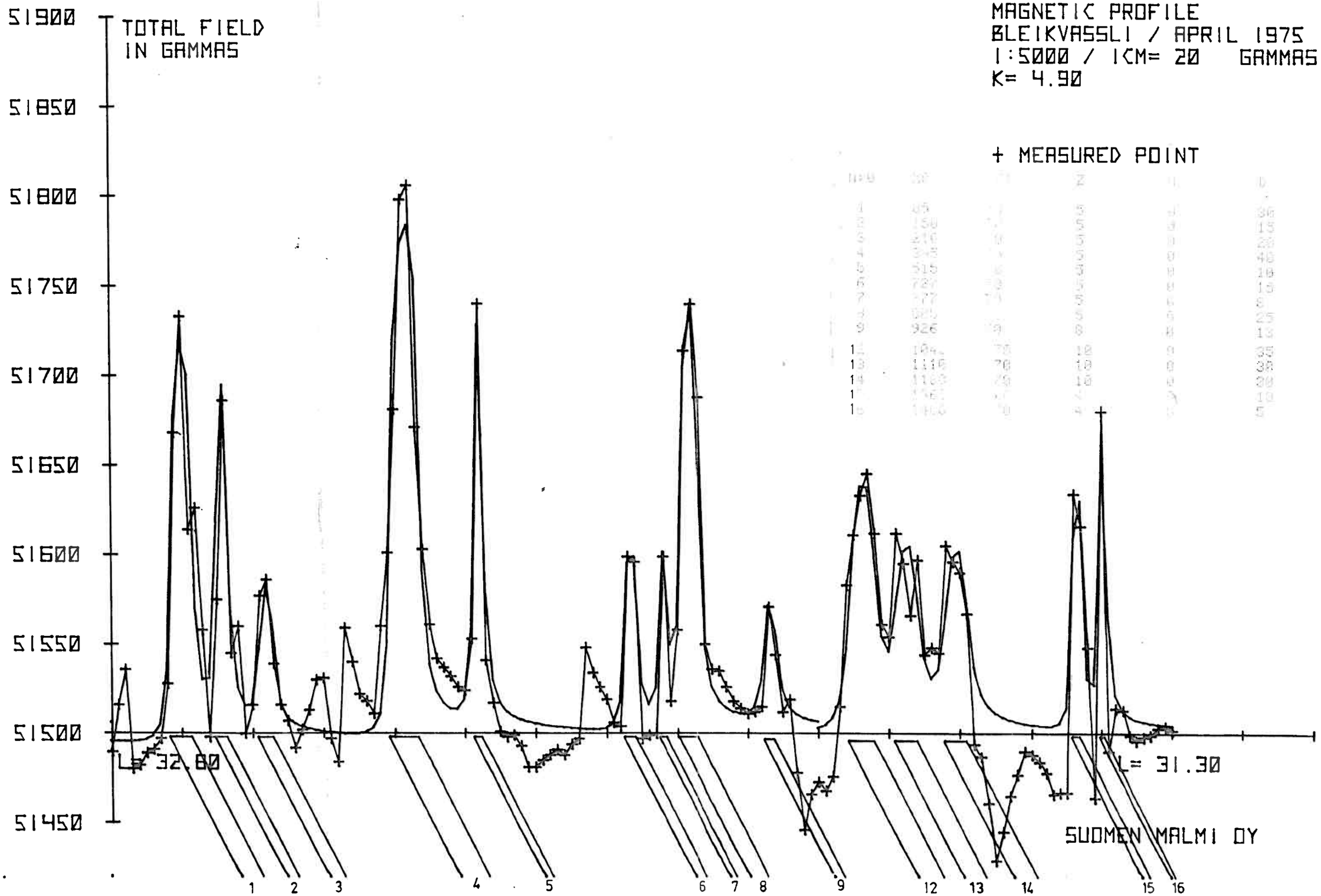
+ MEASURED POINT

N:O	DE	FI	Z	H	T	A
1	115	90	5	0	115	90
2	115	90	5	0	115	90
3	150	80	5	0	150	90
4	300	90	5	0	300	90
5	135	90	5	0	135	90
6	480	90	5	0	480	90
7	545	90	5	0	545	90
8	657	90	5	0	657	90
9	545	90	5	0	545	90

SUOMEN MALMI OY

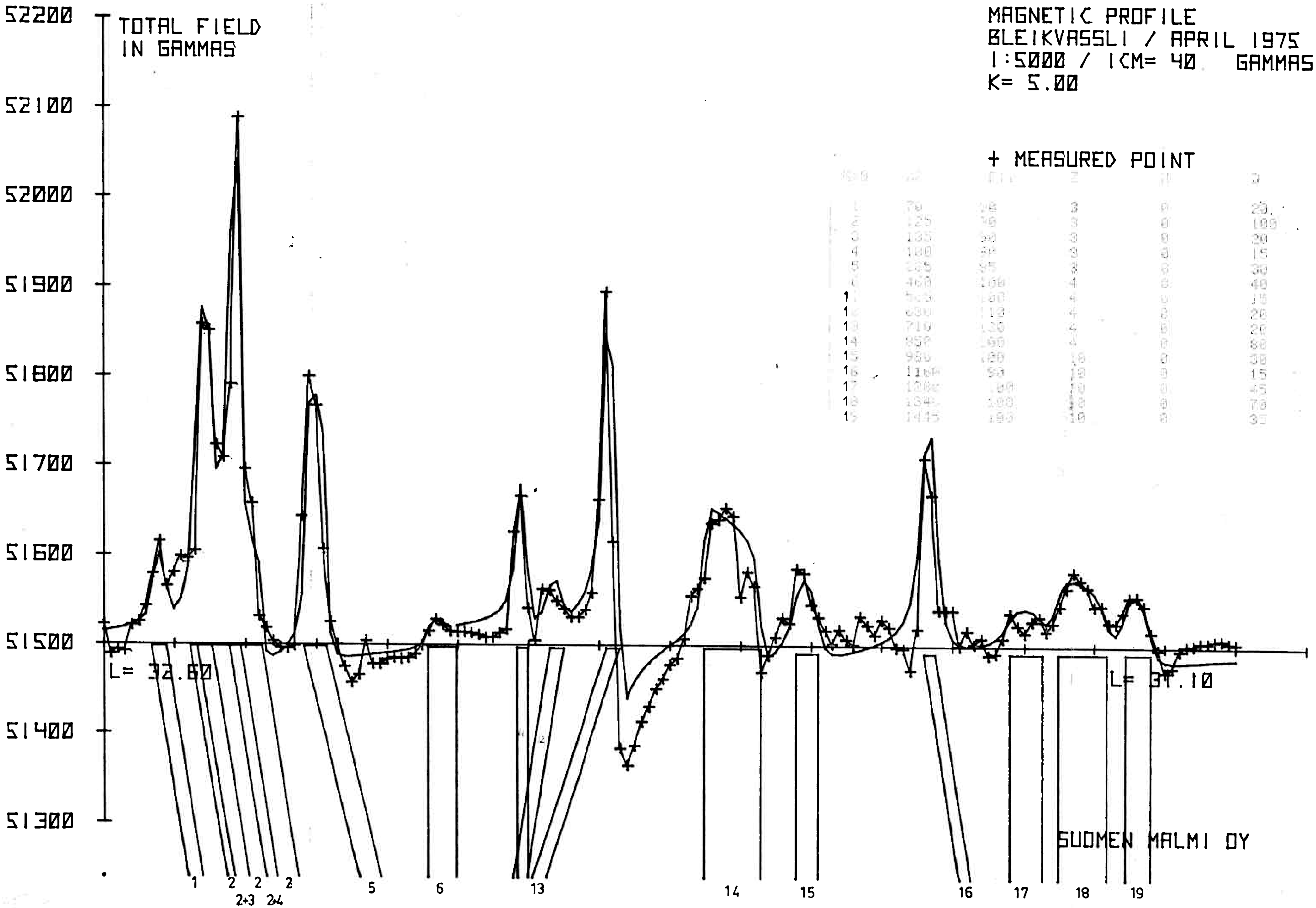
MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 4.90

+ MEASURED POINT



SUOMEN MALMI OY

App. 24f


TOTAL FIELD
IN GAMMAS
MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 40 GAMMAS
K= 5.00
+ MEASURED POINT
52200
52100
52000
51900
51800
51700
51600
51500
51400
51300
L= 32.60
SUOMEN MALMI OY
1
2
2
2
2+3
2+4
5
6
13
14
15
16
17
18
19

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 5.30

+ MEASURED POINT

N:o	AA	FII	Z	H	D	K
1	20	100	5	0	110	40
2	105	100	5	0	10	1000
3	160	100	5	0	140	100
4	240	100	5	0	1m	1500
5	350	100	0	0	150	100
6	430	100	5	0	10	1000
7	465	100	5	0	10	450
11	635	90	0	0	20	10000
12	740	100	5	0	25	300
13	800	100	10	0	240	100
14	1070	100	10	0	60	270
15	1160	100	10	0	15	525
16	1230	100	5	0	70	150
17	1400	100	5	0	15	900
18	1510	100	10	0	40	600
19	1585	100	10	0	30	700

51900
51850
51800
51750
51700
51650
51600
51550
51500
51450

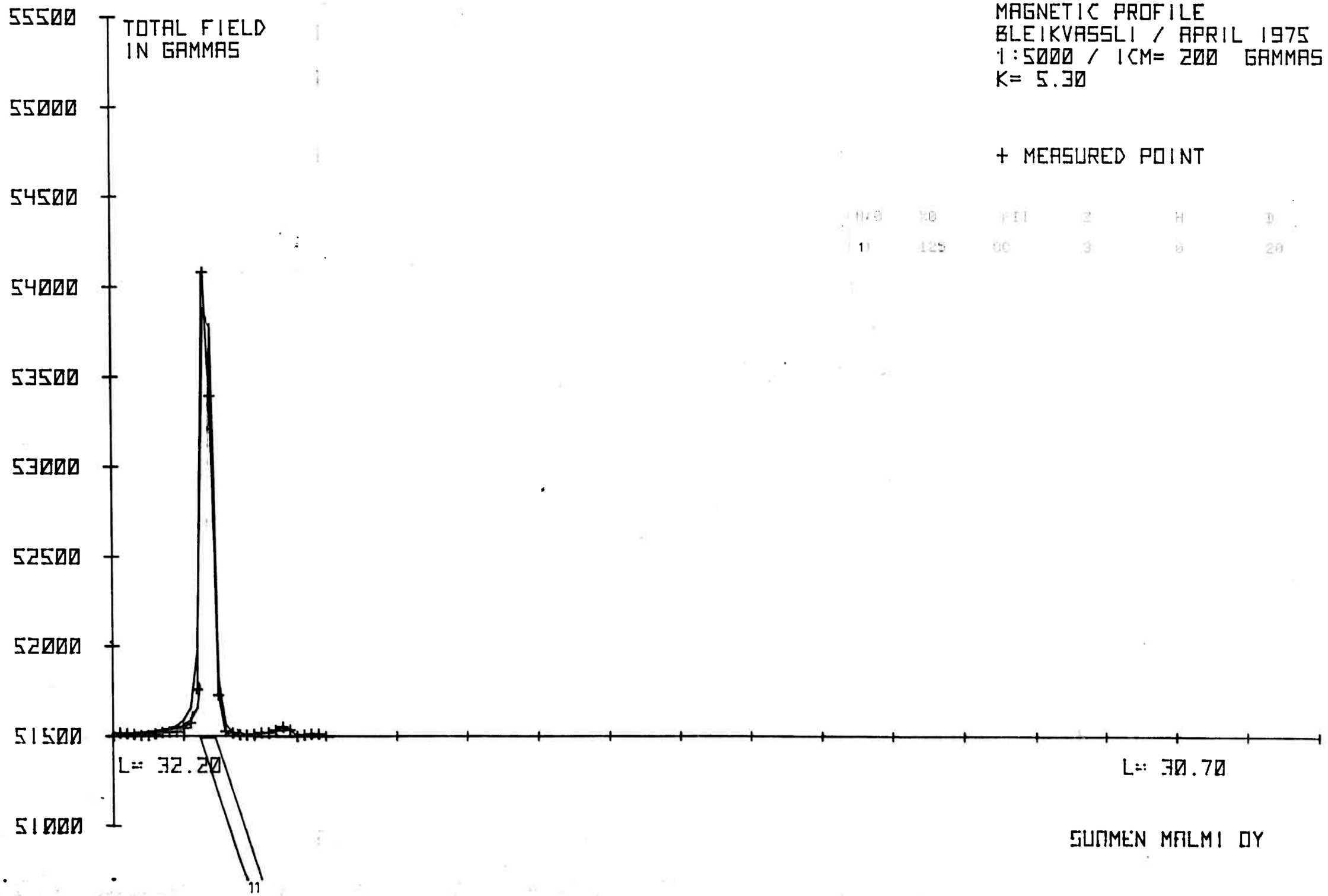
TOTAL FIELD
IN GAMMAS

L= 32.70

L= 31.20

SUOMEN MALMI OY

1 1+2 1 3 3+4 3 5 5 5+6 5+7 11 12 13 14 15 16 17 18 19



MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 200 GAMMAS
K= 5.30

+ MEASURED POINT

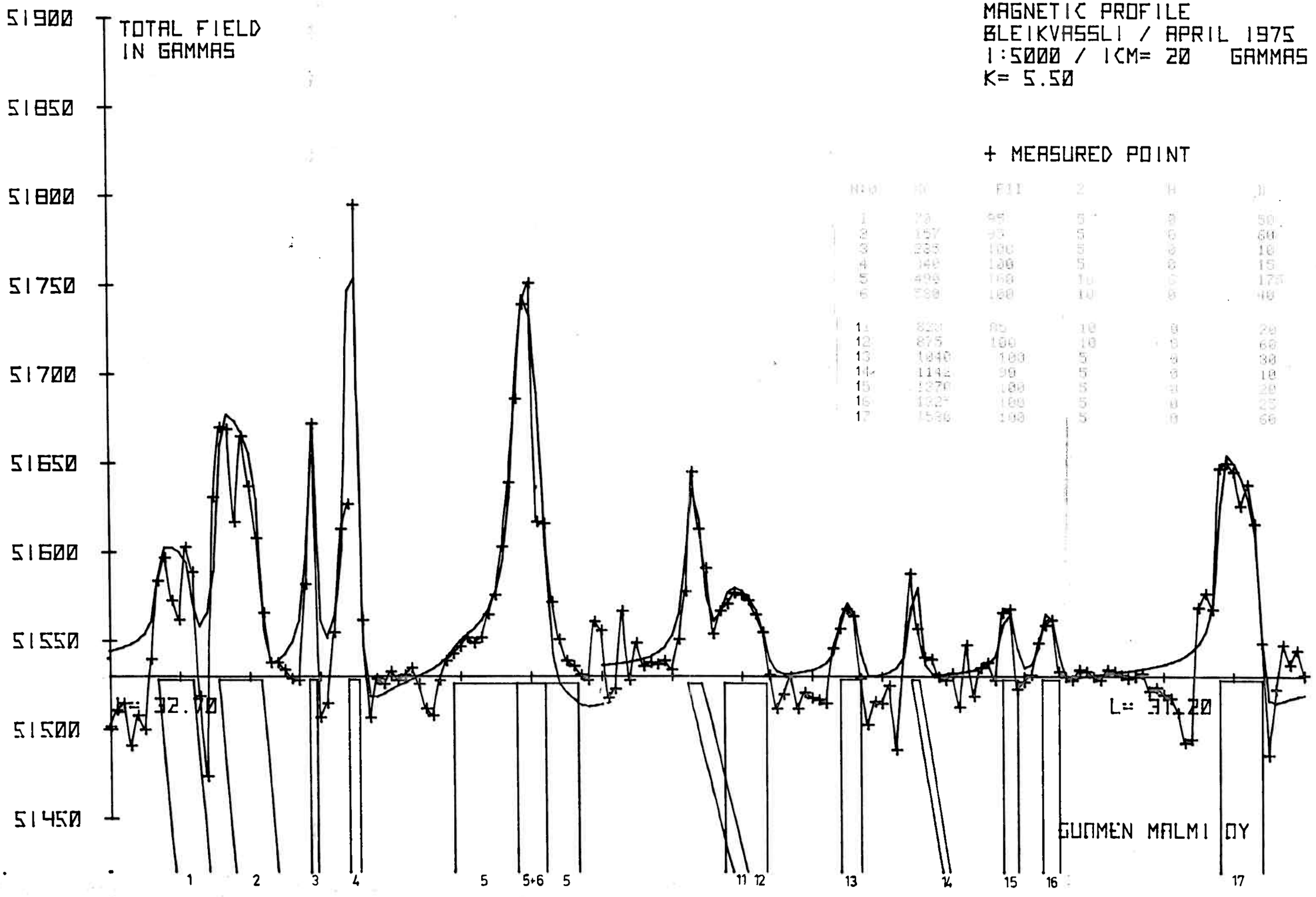
NRO	X0	FII	Z	H	D	K
11	125	90	3	0	20	16200

SUOMEN MALMI OY

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 5.50

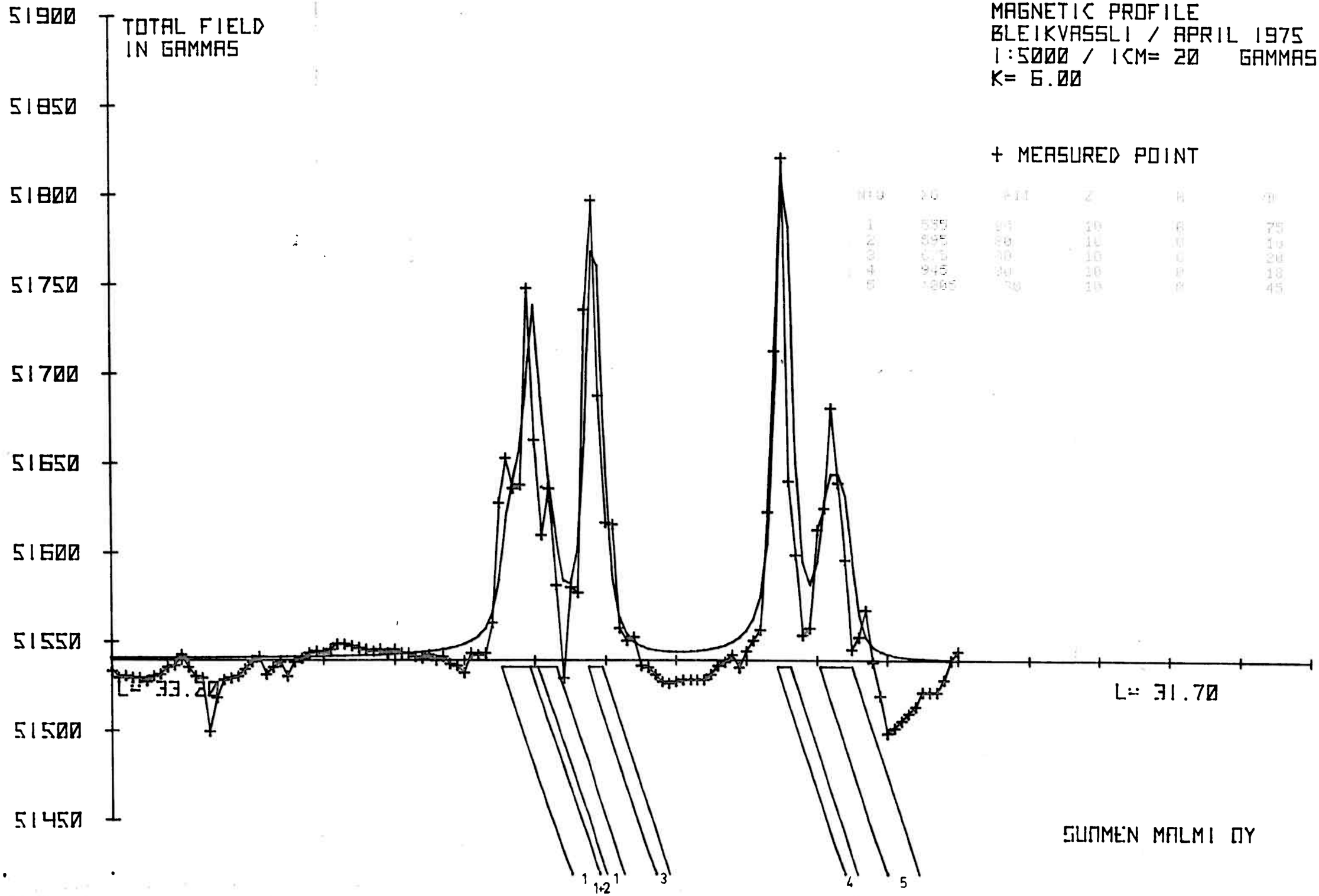
+ MEASURED POINT

NR	N	E	Z	H	D	L
1	70	55	5	0	50	200
2	157	95	5	0	60	430
3	285	100	5	0	10	350
4	340	130	5	0	15	1400
5	490	160	10	0	175	90
6	590	160	10	0	40	360
11	820	80	10	0	20	430
12	875	100	10	0	60	160
13	1040	100	5	0	30	160
14	1142	90	5	0	10	400
15	1270	100	5	0	20	150
16	1327	100	5	0	25	150
17	1530	100	5	0	60	450



MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 20 GAMMAS
K= 6.00

+ MEASURED POINT

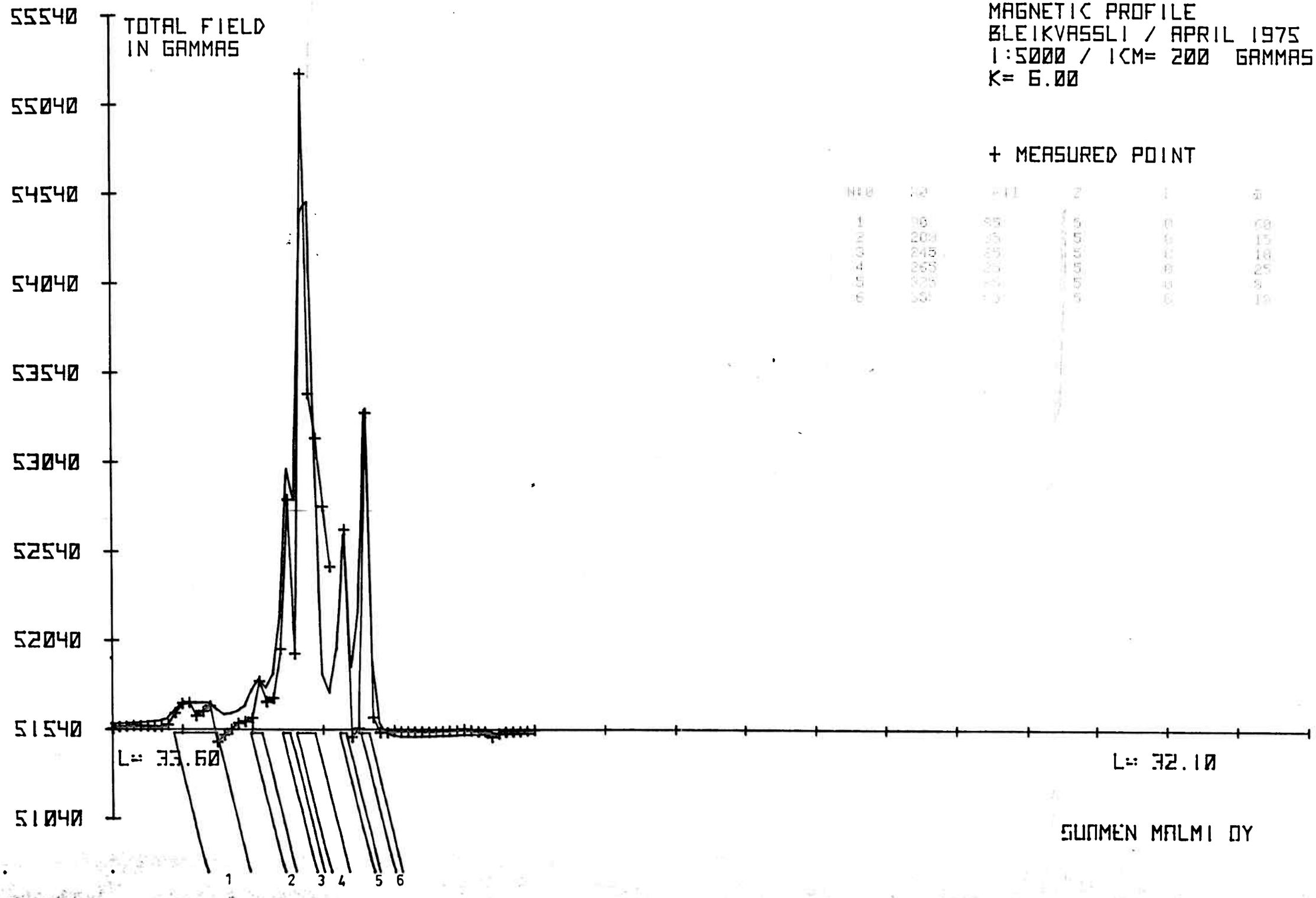


NRO	N	FIL	Z	E	N	E
1	595	90	10	0	75	350
2	895	80	10	0	10	1500
3	675	70	10	0	20	1000
4	945	30	10	0	10	2600
5	1265	70	10	0	45	150

SUOMEN MALMI OY

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 200 GAMMAS
K= 6.00

+ MEASURED POINT

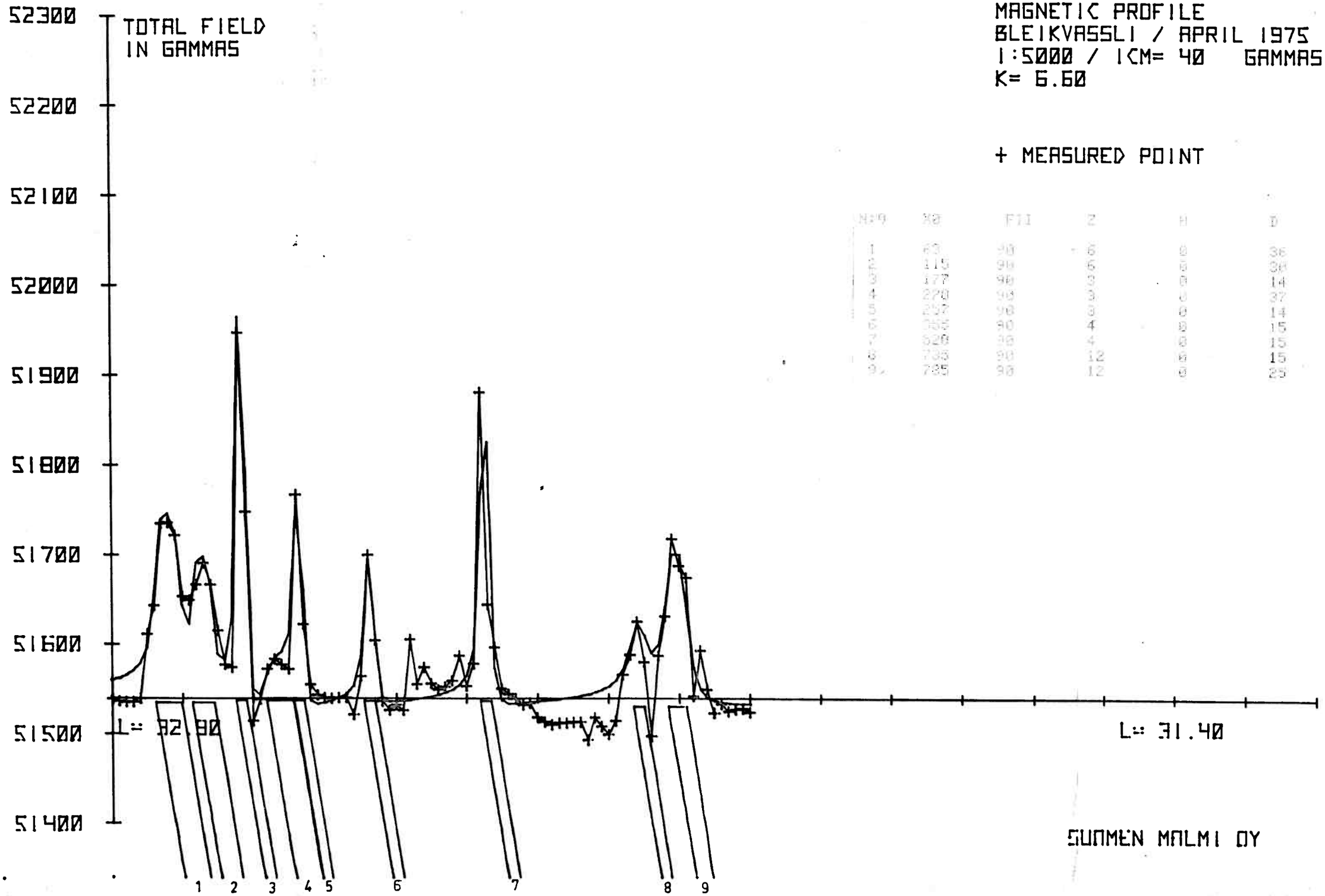


SUOMEN MALMI OY

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 40 GAMMAS
K= 6.60

+ MEASURED POINT

N:O	X0	FII	Z	H	D	K
1	60	90	6	0	36	750
2	115	90	6	0	38	620
3	177	90	3	0	14	1900
4	220	90	3	0	37	150
5	257	90	3	0	14	950
6	305	90	4	0	15	750
7	520	90	4	0	15	1500
8	733	90	12	0	15	650
9	785	90	12	0	25	1100



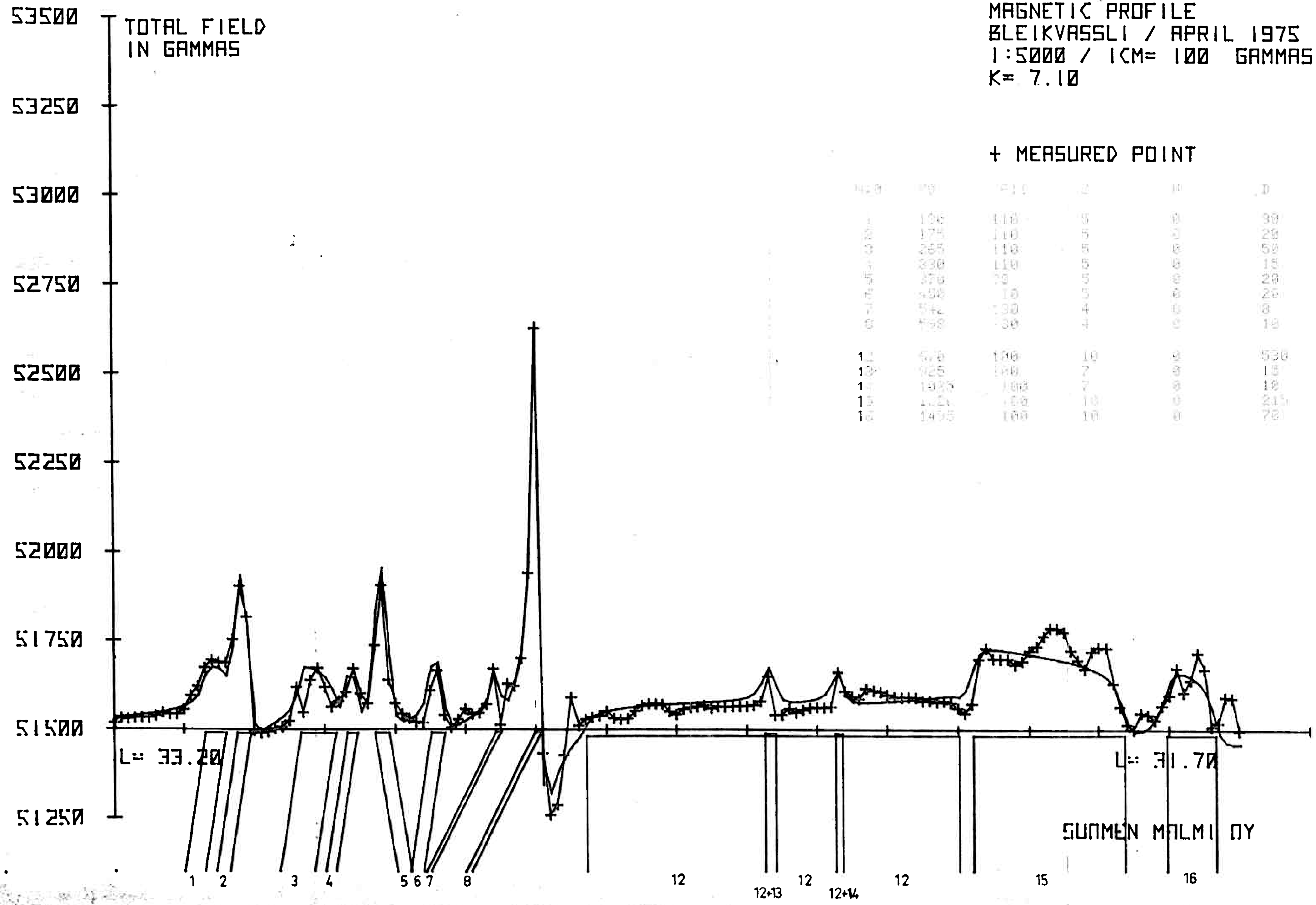
SUOMEN MALMI OY

App. 26 d

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 100 GAMMAS
K= 7.10

+ MEASURED POINT

1	100	110	5	0	30	400
2	175	110	5	0	20	1900
3	265	110	5	0	50	550
4	330	110	5	0	15	330
5	370	[illegible]	5	0	20	2100
6	450	10	5	0	26	300
7	542	130	4	0	8	1000
8	[illegible]	30	4	0	10	8500
12	[illegible]	100	10	0	530	240
13	925	100	7	0	15	600
14	1025	100	7	0	10	750
15	[illegible]	[illegible]	10	0	215	750
16	[illegible]	100	10	0	70	750



SUOMEN MALMI OY

52300
52200
52100
52000
51900
51800
51700
51600
51500
51400

TOTAL FIELD
IN GAMMAS

MAGNETIC PROFILE
BLEIKVASSLI / APRIL 1975
1:5000 / 1CM= 40 GAMMAS
K= 7.50

+ MEASURED POINT

No	cm	dip	z	h	D	K
1	80	+45	4	0	110	1600
2	315	125	5	0	20	550
3	360	125	5	0	60	550
4	430	100	4	0	40	450
5	480	100	4	0	10	1050
6	540	100	5	0	20	700
7	670	110	3	0	50	450
8	770	110	3	0	30	2500
12	1110	110	3	0	8	1000
13	1150	100	5	0	80	250
14	1280	105	3	0	20	1300
15	1340	90	3	0	190	400
16	1375	100	5	0	35	900
17	1430	100	5	0	20	900
18	1585	100	5	0	15	720
19	1650	100	5	0	20	400

L= 33.70

L= 32.20

SUOMEN MALMI OY

1 2 3 4 5 6 7 8 12 13 14 15+16 15+17 15 18 19

List of co-ordinates

Starting points	Y	X	L	K
N:o	29719.213	82753.732	31000.000	9000.000
	28698.285	81152.399	31000.000	7100.905
Buktliklubben	30273.84	82533.51	31586.055	9112.467
Gravkapell	27976.85	81076.86	30432.289	6649.376

Staked points

Y	X	L	K
26456.863	79496.881	30000.000	4500.000
6725.657	9918.485	"	5000.000
6994.450	80340.090	"	5500.000
7263.244	0761.694	"	6000.000
7532.037	1183.298	"	6500.000
6878.468	79228.088	30500.000	4500.000
7147.261	9649.692	"	5000.000
7416.055	80071.296	"	5500.000
7684.848	0492.900	"	6000.000
7953.641	0914.504	"	6500.000
7300.072	78959.294	31000.000	4500.000
7568.865	9380.898	"	5000.000
7837.659	9802.503	"	5500.000
8106.452	80224.107	"	6000.000
8375.246	0645.711	"	6500.000
27805.997	78636.742	31600.000	4500.000
8074.790	9058.346	"	5000.000

Y	X	L	K
8343.584	9479.951	31600.000	5500.000
8612.377	9901.555	"	6000.000
8881.171	80323.159	"	6500.000
9149.964	0744.763	"	7000.000
9418.758	1166.367	"	7500.000
9687.551	1587.971	"	8000.000
9956.344	2009.576	"	8500.000
8143.280	78421.707	32000.000	4500.000
8412.074	8843.312	"	5000.000
8680.867	9264.916	"	5500.000
8949.661	9686.520	"	6000.000
9218.454	80108.124	"	6500.000
9487.247	0529.728	"	7000.000
9756.041	0951.332	"	7500.000
30024.834	1372.937	"	8000.000
0293.628	1794.541	"	8500.000
28564.884	78152.914	32500.000	4500.000
8833.678	8574.518	"	5000.000
9102.471	8996.122	"	5500.000
9371.265	9417.726	"	6000.000
9640.058	9839.331	"	6500.000
9908.852	80260.935	"	7000.000
30177.645	0682.539	"	7500.000
0446.439	1104.143	"	8000.000
0715.232	1525.747	"	8500.000
28986.488	77884.120	33000.000	4500.000
9255.282	8305.725	"	5000.000
9524.075	8727.329	"	5500.000
9792.869	9148.933	"	6000.000
30061.662	9570.537	"	6500.000
0330.456	9992.141	"	7000.000
0599.249	80413.746	"	7500.000
0868.043	0835.350	"	8000.000
29945.680	78458.535	33500.000	5500.000
30214.473	8880.140	"	6000.000
0483.266	9301.744	"	6500.000

Y	X	L	K
0752.060	9723.348	33500.000	7000.000
1020.853	80144.952	"	7500.000
0367.284	78189.742	34000.000	5500.000
0636.077	8611.346	"	6000.000
0904.871	9032.950	"	6500.000
1173.664	9454.554	"	7000.000
1442.458	9876.159	"	7500.000
0788.888	7920.948	34500.000	5500.000
1057.681	8342.553	"	6000.000
1326.475	8764.157	"	6500.000
1595.268	9185.761	"	7000.000
1864.062	9607.365	"	7500.000