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Tittel

VLF Measurements in the Sulitjelma -area in oktober 1975.

Forfatter	Dato	Bedrift
SuomenMalmi	1975	Sulitjelma Gruber A/S

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad

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Råstofftype	Emneord	

Sammendrag

Rapport med kartbilag fra VLF måling utført av SUOMEN MALMI OY i Sulitjelma i 1975. Målingene ble utført i områdene NySulitjelma, Skoffedalen og KongOscar. Kort omtale av anomalier og anbefalinger til videre arbeid.

Vastaanottaja:

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Lähetyspvm:

30 01 1976

- ☐ Puhelinkeskustelun johdosta
- ☐ Allekirjoitettavaksi
- ☐ Toimenpiteitänne varten
- ☐ Tiedoksi
- ☒ Jää haltuunne
- ☐ Palautetaan lähettäjälle

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VLF MEASUREMENTS IN THE SULITJELMA-AREA IN OCTOBER, 1975

SUOMEN MALMI OY

1975-12-15

PEKKA MIKKOLA

VLF MEASUREMENTS IN THE SULITJELMA-AREA IN OCTOBER 1975

1. INTRODUCTION

According to the contract between Sulitjelma Gruber A/S and Geobor A/S, Suomen Malmi Oy carried out VLF measurements in the surroundings of the Sulitjelma Mine during the period 1975-10-06....09 on three separate areas, where the base lines were staked out by the client. Measuring profiles were 14.3 kilometers in total covering an area of 2 km^2. Suomen Malmi Oy has made corresponding measurements in 1974-08-06 (report 23 - 75).

The aim of the measurements was to locate conduntors in the surveyed areas. The results of the measurements are portrayed in the form of contour maps on scale 1 : 5000 on topographic elements and these maps have been appended to this report. The quantitative interpretation of the VLF anomalies has been chiefly based on the relation of the real component to the imaginary component. The conductive zones achieved as the results of the interpretation have been drawn on the real component maps and given numbers which have been referred in the text.

The field crew consisted of a foreman and two observers. The line spacing varied from 100 to 200 meters and the interval between adjacent points on observation profiles was 20 meters. The orientation was made with a compass and measuring of distance with the aid of steps. The parts which were too dangerous because of the topography had been left unmeasured.

2. MEASUREMENTS

The receiving apparatus was a Ronka EM 1G made by Geomics Ltd. The radio stations NAA (17.8 kHz) in Maine, USA and FUO (15.1 kHz) in France were used as transmitters. The measuring results are the tiltangle of the magnetic component of the electromagnetic field (real component) and a quantity proportional to the phase shift between the primary and secondary fields (imaginary component). The original data have been fraser-filtered and the inflection points are transformed to anomaly peaks. The filtering process

yields results which are easy to visualize as contour maps and reduces the effects of topography and regional anomalies.

The interpretated zones have been drawn on the real component maps. Thick line represents a good conductor, thin line a moderate conductor and dotted line a poor conductor.

2.1 Ny-Sulitjelma

Clear cut parallel conductive zones, which strike nearly in the same direction as the base line can be noticed in the area. However, the rough topography made it impossible to investigate the center parts of the area. Anomaly no.1 seems to be an excellent conductor which outcrops. No. 3 might be a continuation to no. 1. Also nos. 2 and 4 are quite sharp anomalies but indicate clearly poorer conductivity than no. 1. Especially no. 4 is very strong and thus probably outcrops.

2.2 Kong Oscar Malmfelt

Also this area has a very strong anomaly zone (no. 5) which is divided into two parts (nos. 6 and 7) towards the southwest. No. 5 shows quite poor conductivity in the northeast and thus produces only an imaginary anomaly. However, between profiles 6 and 7 the conductivity increases to good and the anomaly is very strong. Around profile 15 the anomaly pattern is quite unclear but anyway no. 5 seems to be divided into two parts the conductivities of which decreases quite rapidly towards the southwest.

2.3 Skoffeldal

The area is obviously quite disturbed if the geological strike is considered. This is indicated e.g. by the measuring profiles planned in three different directions. This idea is supported by the measuring results as well. No clear anomaly zones comparable to the ones mentioned in the earlier paragraphs are noticeable. No. 8 is a moderate conductor but runs only through the corner of the survey area. No. 9 is an excellent conductor but it is visible probably only on profile 7. It is quite possible that the strike of the conductor

is not the one that has been drawn on the maps but nearer to the eastwest direction and then it could not be noticed with a broad line spacing as in this case. Nos. 11 and 12 are very poor conductors and are probably caused by shear zones.

3. SUMMARY

Technically the work succeeded well if the difficulties caused by the rough terrain are not considered. The results show that the VLF method brings visible several conductors in the surveyed areas. However, without geological information it is not possible on the basis of only VLF results to distinguish e.g. between anomalies caused by graphite schists or sulfide mineralizations.

If some conductors located in this survey should turn out interesting and they should be investigated in more detail a suitable method would be the so called shootback electro-magnetic measurements. If a conductor outcrops or is penetrated by a drillhole most detailed information from it is achieved by charged potential (mise-a-la-masse) measurements.

Espoo 1975-12-15
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Geophysical Department

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Appendices:

1. Ny-Sulitjelma VLF-maps
2. Kong Oscar Malnfelt VLF-maps
3. Skoffeldal VLF-maps

Y-32 000
X 1020 100

Y-29 500
X 1020 100

X 1017 600
Y-32 000

X 1017 600
Y-29 500

Contours: +10, 25, 50, 100 %

Transmitter: NAA 17,8 kHz

Instrument: Geonics EM-16

Fraser-filtered

SUOMEN MALMI OY	1:5000	meas	TK	9.75
		draw	AS	11.75
		insp	PM	11.75
VLF-map Real component				
SULITJELMA Ny-Sulitjelma				

Y-32 000
X
1020 100

Y-29 500
X
1020 100

X
1017 600
Y-32 000

X
1017 600
Y-29 500

Contours: ± 0,5,15,30 %

Transmitter: NAA 17,8 kHz

Instrument: Geonics EM-16

Fraser-filtered

SUOMEN MALMI OY	1:5000	meas	TK	9.75
		draw	AS	11.75
		insp.	PM	11.75
VLF-map Imaginary component				
SULITJELMA Ny-Sulitjelma				

Y -45 000

X 26 500

Y -42 500

X 26 500

X 24 000

Y -45 000

Y -42 500

X 24 000

Contours: +10, 25, 50, 100 %

Transmitter: FUO 15,1 kHz

NAA 17,8 kHz (profiles 6-9)

Instrument: Geonics EM-16

Fraser-filtered

SUOMEN MALMI OY	1: 5000	meas	RK	10.75
		draw	AS	11.75
		insp.	PM	11.75
VLF-map Real component				
SULITJELMA Skoffeldal				

Y -45 000

X 26 500

Y -42 500

X 26 500

X 24 000

Y -45 000

X 24 000

Y -42 500

Contours: ± 0, 5, 15, 30 %

Transmitter: FUO 15,1 kHz

NAA 17,8 kHz (profiles 6-9)

Instrument: Geonics EM-16

Fraser-filtered

SUOMEN MALMI OY	1:5000	meas	RK	10.75
		draw	AS	11.75
		insp	PM	11.75
VLF-map Imaginary component				
SULITJELMA Skoffeldal				

Y -34 000

X 11 500

Y -31 500

X 11 500

X 9 000

Y -34 000

X 9 000

Y -31 500

Contours: +10, 25, 50, 100 %

Transmitter: FUO 15,1 kHz

Instrument: Geonics EM-16

Fraser-filtered

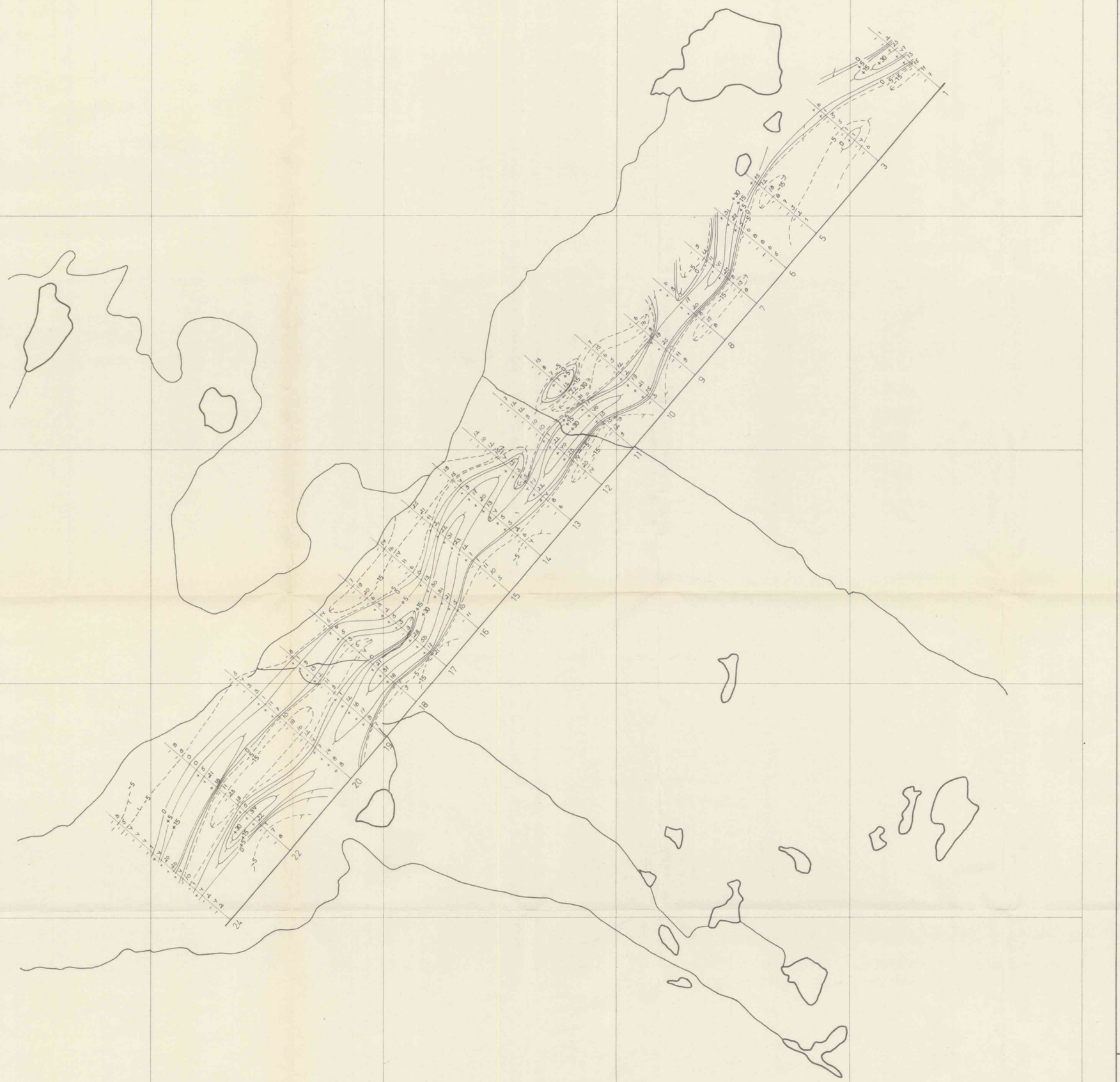
SUOMEN MALMI OY	1:5000	meas.	RK	10.75
		draw.	AS	11.75
		insp.	PM	11.75
VLF-map Real component				
SULITJELMA Kong Oscar Malmfelt				

Y -34000

X 11 500

Y -31500

X 11 500



X 9 000

Y -34000

Y -31500

X 9 000

Contours: ±0,5,15,30 %

Transmitter: FUO 15,1 kHz

Instrument: Geonics EM-16

Fraser-filtered

SUOMEN MALMI OY	1:5000	meas.	RK	10.75
		draw.	AS	11.75
		insp.	PM	11.75
VLF-map Imaginary component				
SULITJELMA Kong Oscar Malmfelt				