

NGU Report 2000.066

Magnetic, VLF and Slingram measurements in  
the Tjønnvollmyra area, Holtålen, Norway, 2000

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Title: Magnetic, VLF and Slingram measurements in Tjønnvollmyra area, Holtålen, Norway, 2000				
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Fieldwork carried out: April 2000	Date of report: 29.05 2000	Project no. 2850.01	Person responsible: <i>Jens S. Kvernberg</i>	
Summary:				
<p>On behalf of CREW DEVELOPMENT CORPORATION the Geological Survey of Norway have executed a Magnetic, VLF and Slingram survey over Tjønnvollmyra area. Tjønnvollmyra is located 20 km east of Ålen in Sør-Trøndelag county.</p> <p>The purpose of the survey was to follow up the Helicopter EM survey done over the same area in 1999.</p>				
Keywords: Geofysikk		Elektromagnetisk måling		Magnetometri
Sulfid				
				Fagrapport

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## 1. INTRODUCTION

On behalf of CREW DEVELOPMENT CORPORATION the Geological Survey of Norway have executed a Magnetic, VLF and Slingram survey over Tjønnvollmyra area.

Tjønnvollmyra is located 20 km east of Ålen in Sør-Trøndelag county. The investigated area are shown in the overview map 2000.066-01.

The purpose of the survey was to follow up the Helicopter EM survey done over the same area in 1999.

The survey was executed in April 2000. According to the agreements, no interpretation should be done within the project.

## 2. MEASUREMENTS

The VLF-measurements were carried out using NGUs homemade instrument. The transmitter used was GBZ (GBR) with the frequency 19.6 kHz. The direction of the magnetic field from the transmitter was  $125^\circ$ . Both tilt angle and quadrature were measured. The sampling interval was 12.5 meters.

The magnetic survey was carried out using the Scintrex ENVI-MAG magnetometer (accuracy 1nT). The sampling interval was 12.5 meters. During the measurement the diurnal variation were measured in a base station using Scintrex MP3 magnetometer (accuracy 1nT). The location of the base station were 20 km from the area.

After correction of the magnetic readings with values from the base station magnetometer, level errors can be seen on gridded data. In order to correct for this, a differential median filter was applied.

Prior to differential median filtering, a residual grid was produced from the magnetic total field data in order to remove the regional field. This was carried out using a Butterworth high pass filter with a filter length of 400 m (4 times the line distance). The residual grid was then sampled to the lines in the database. The residual values were then processed using a non-linear filter (median). These values were input to a program running the differential median filter routine. Output values from this routine were added to the magnetic regional field anomalies to give the corrected total field anomalies.

The Slingram measurements were carried out using an APEX MAXMIN II Portable EM. All five frequencies (222, 444, 888, 1777 and 3555Hz) were used, and the coil separation was 100 meters. The sampling interval was normally 50 meters, but was 25 meters over anomalous areas.

To fix the profiles, all ends of the profiles in the grid were measured with differential GPS with accuracy better than +/- 1m. The UTM co-ordinates (WGS-84) for all stations were calculated and these are presented in the data-files.

### 3. RESULTS

The results of the Slingram measurements are presented as curves in figures 1a – 16a. The magnetic measurements (total field) are presented as curves in figures 3b – 15b, and as contoured colour-shaded map in scale 1: 5000 in map 2000.066-02. The VLF measurements are presented as curves in figures 3b – 15b, and as Fraser-filtered maps in scale 1 : 5000 in maps 2000-066 – 03 and –04.

Colour maps were produced using Geosoft Montaj software version 4.1. The Grid cell size was 20 meter.

Digital data are available from NGU. The file format is Geosoft xyz-format, with the following content:

magdata.xyz	X	Y	UTM_E	UTM_N	MAG_TOT	GRADIENT
vlfdata.xyz	X	Y	UTM_E	UTM_N	REAL_K.	IMAG_K.
sldata.xyz	X	Y	UTM_E	UTM_N	RE_222	IM_222
			RE_444	IM_444	RE_888	IM_888
			RE_1777	IM_1777	RE_3555	IM_3555

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 9800 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

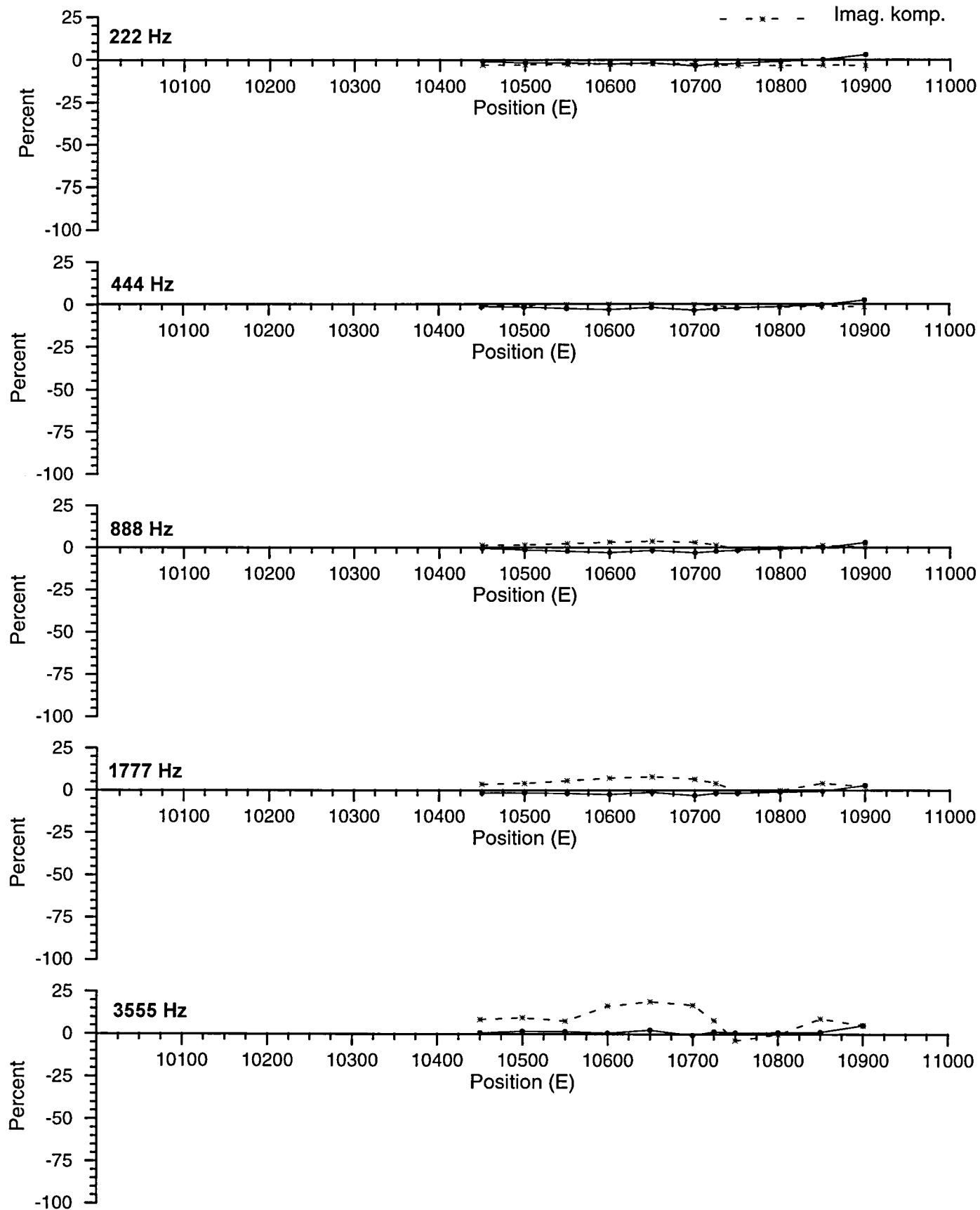


Figure 1a. Slingram MaxMin profile 9800 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 9900 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

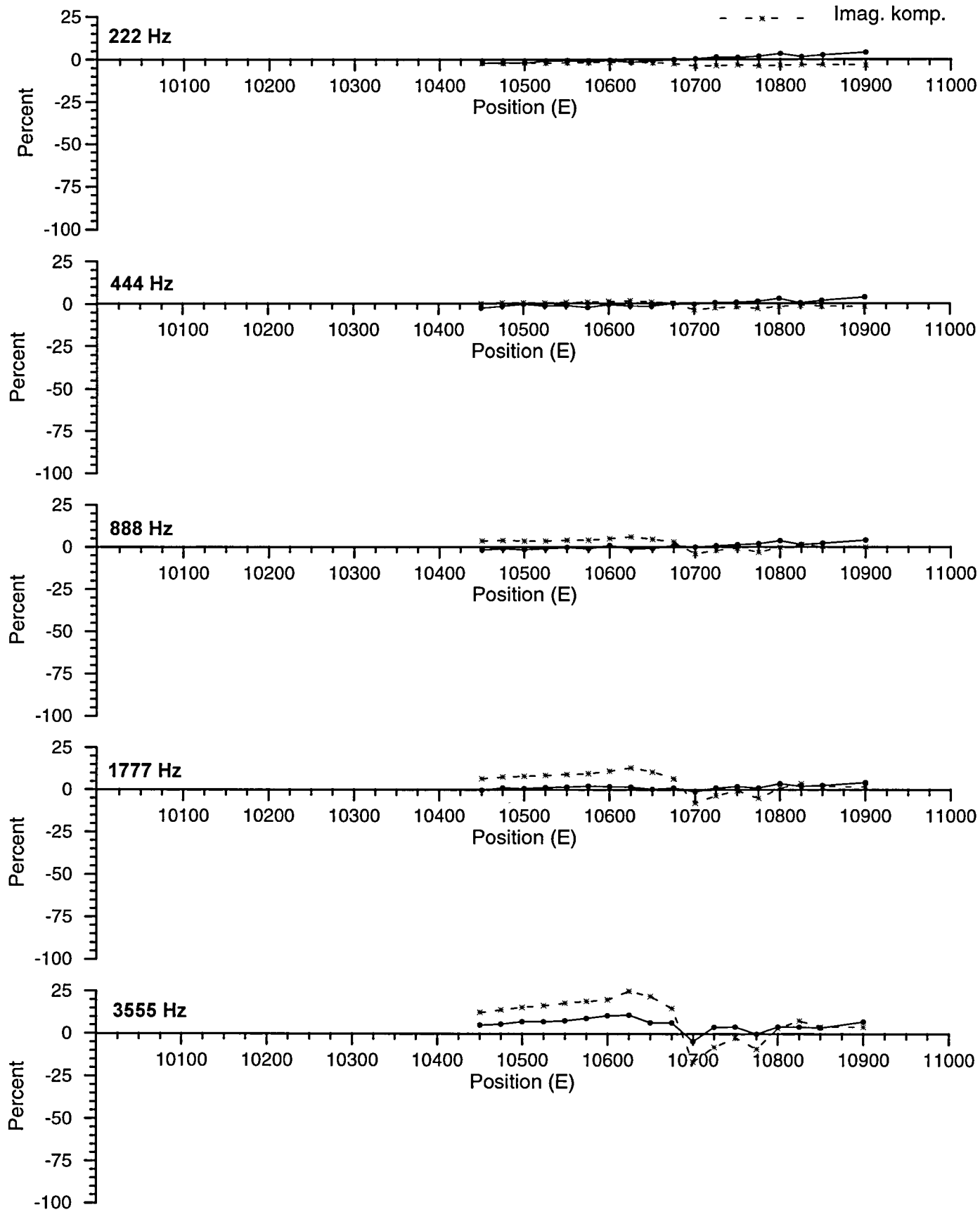


Figure 2a. Slingram MaxMin profile 9900 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10000 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

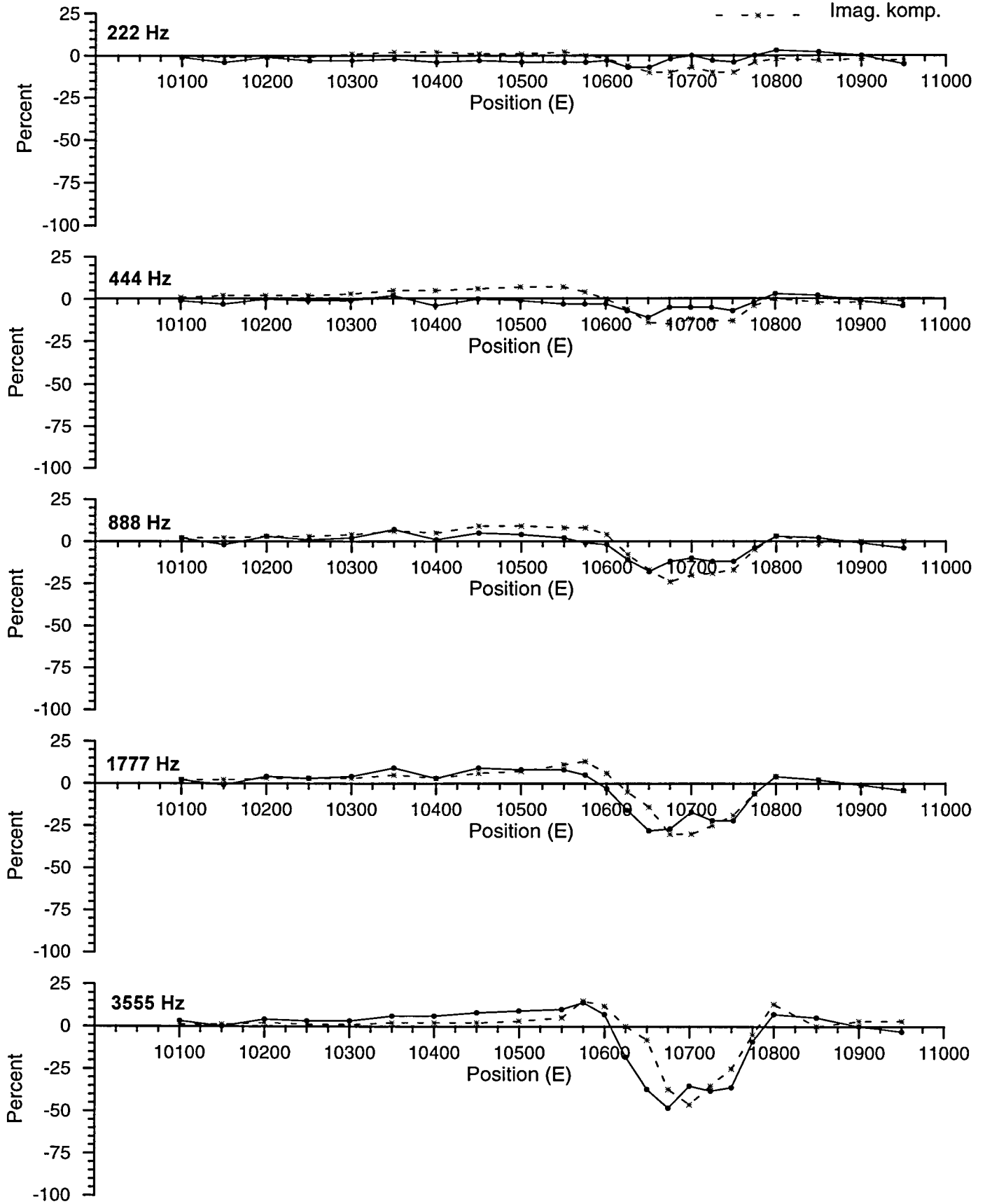
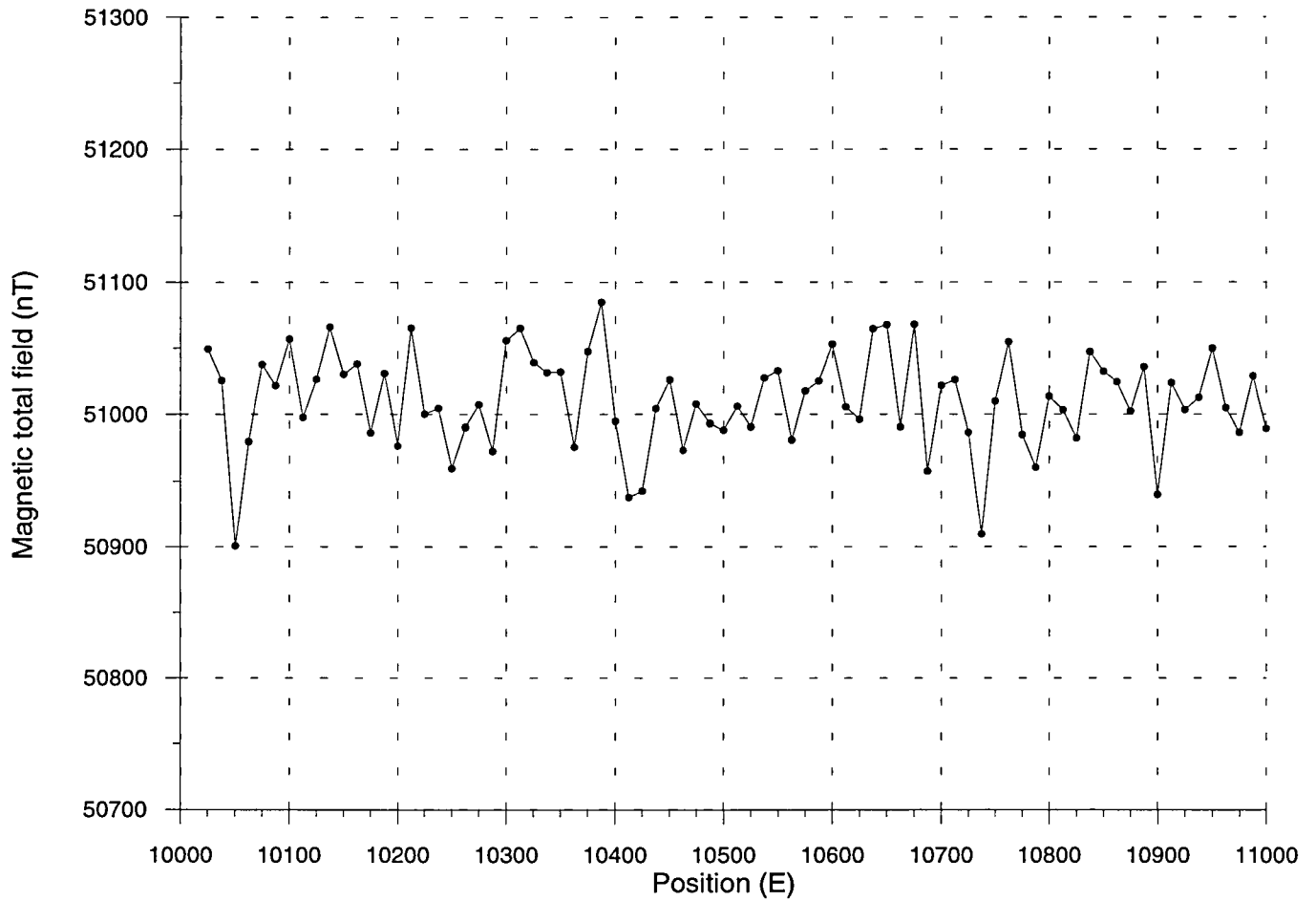


Figure 3a. Slingram MaxMin profile 10000 N.



TJØNNVOLLMYRA  
Magnetic total field  
Profile 10000 N



TJØNNVOLLMYRA  
VLF  
Profile 10000 N

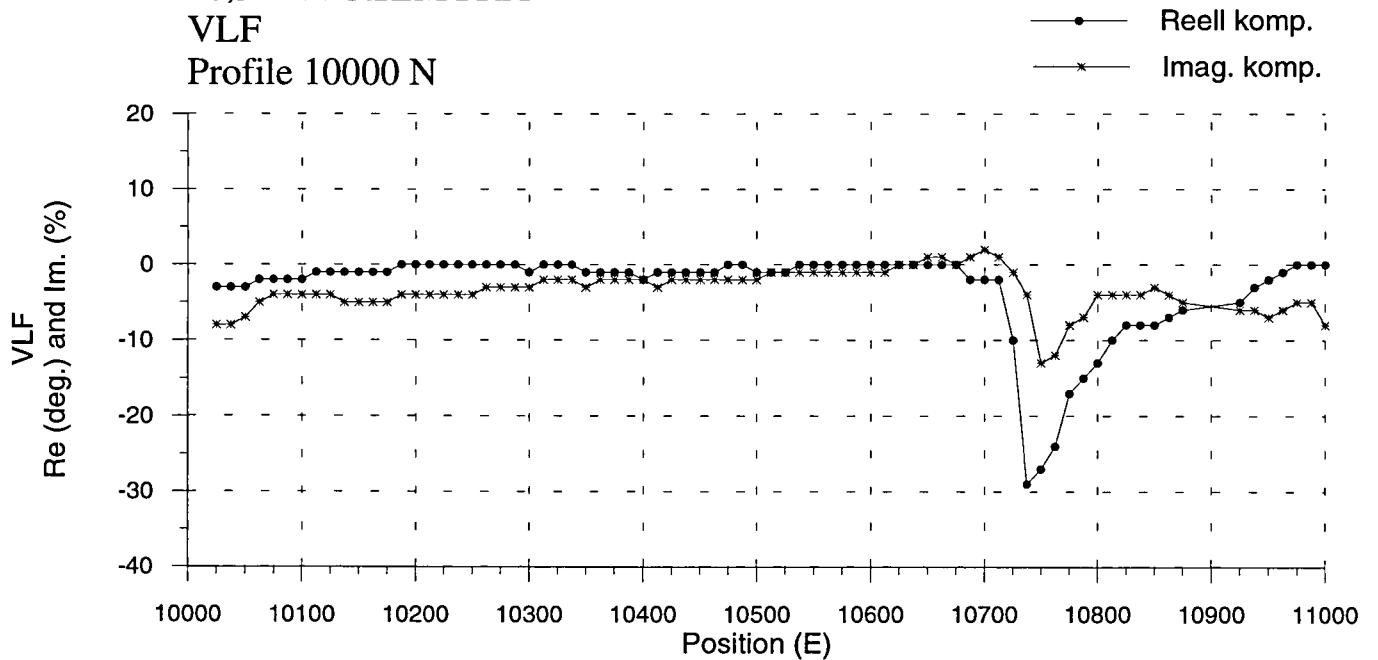


Figure 3b. Magnetic total field and VLF profile 10000 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10100 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

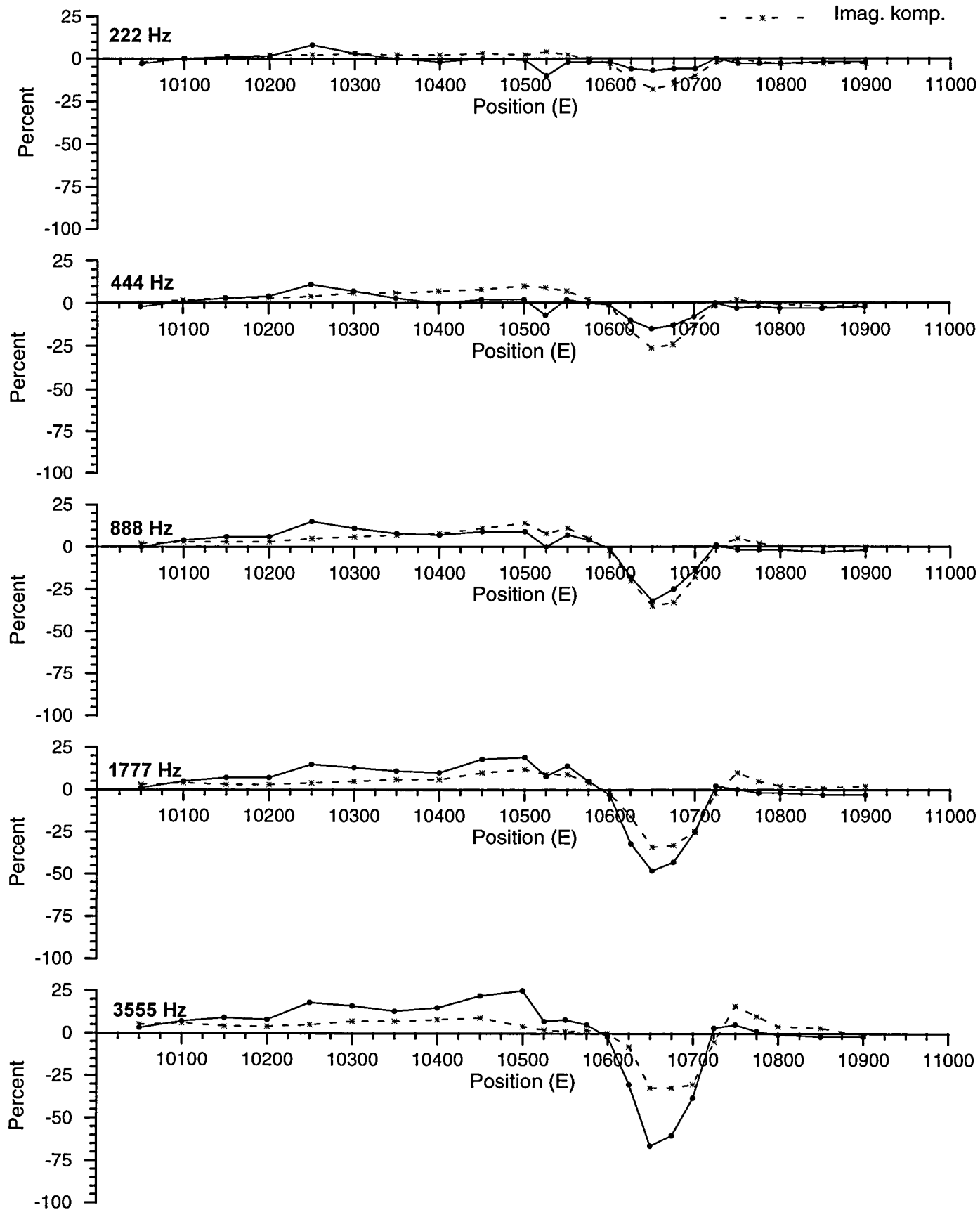
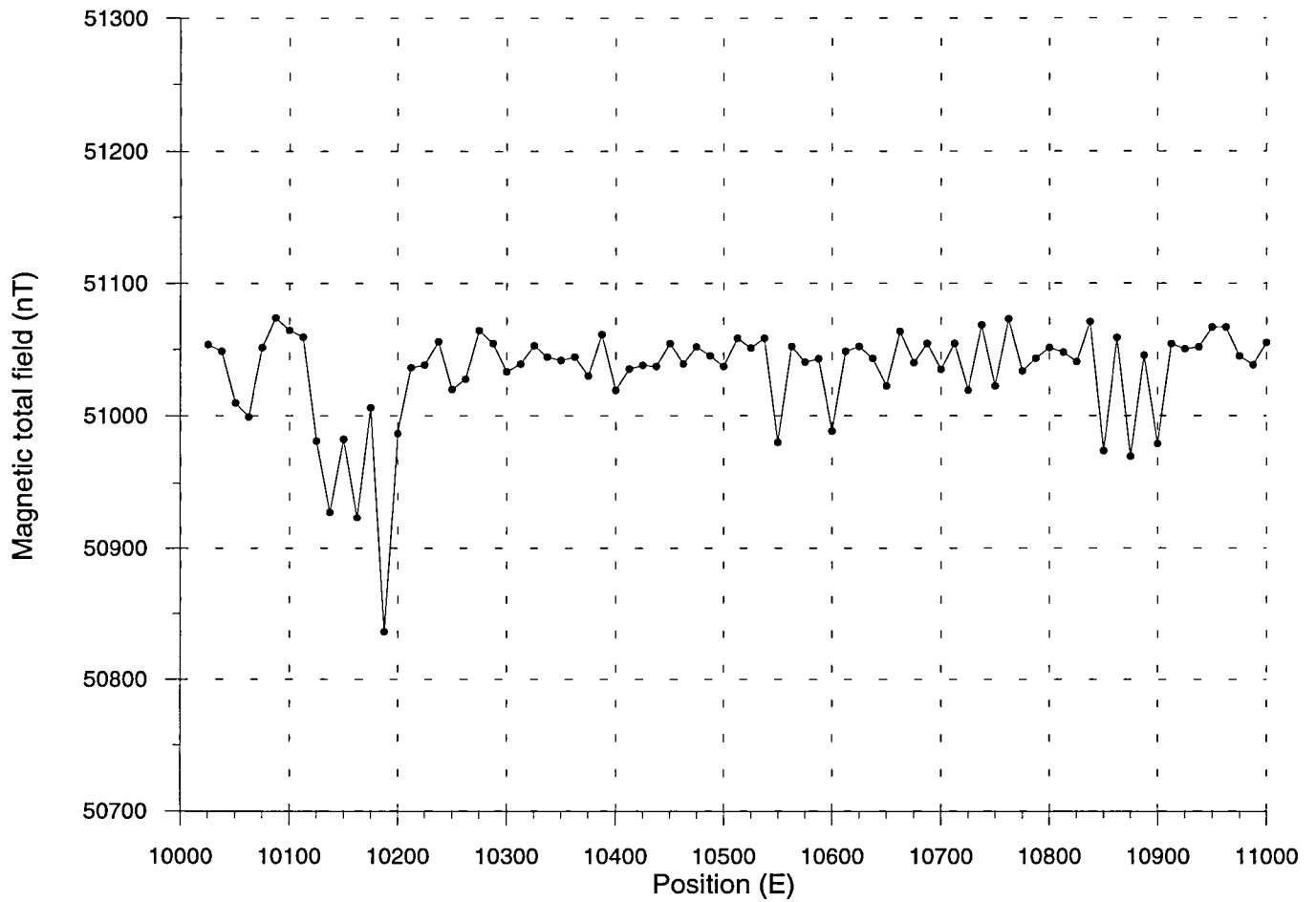


Figure 4a. Slingram MaxMin profile 10100 N.

TJØNNVOLLMYRA  
Magnetic total field  
Profile 10100 N



TJØNNVOLLMYRA  
VLF  
Profile 10100 N

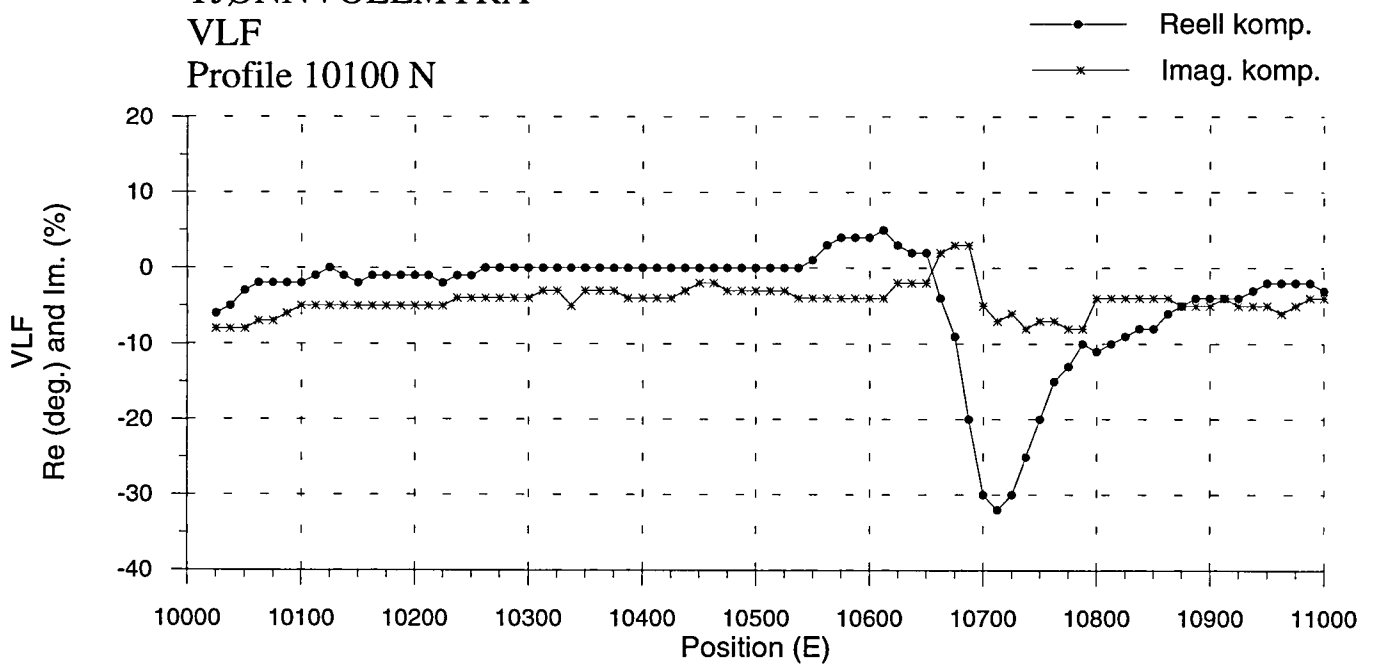


Figure 4b. Magnetic total field and VLF profile 10100 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10200 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

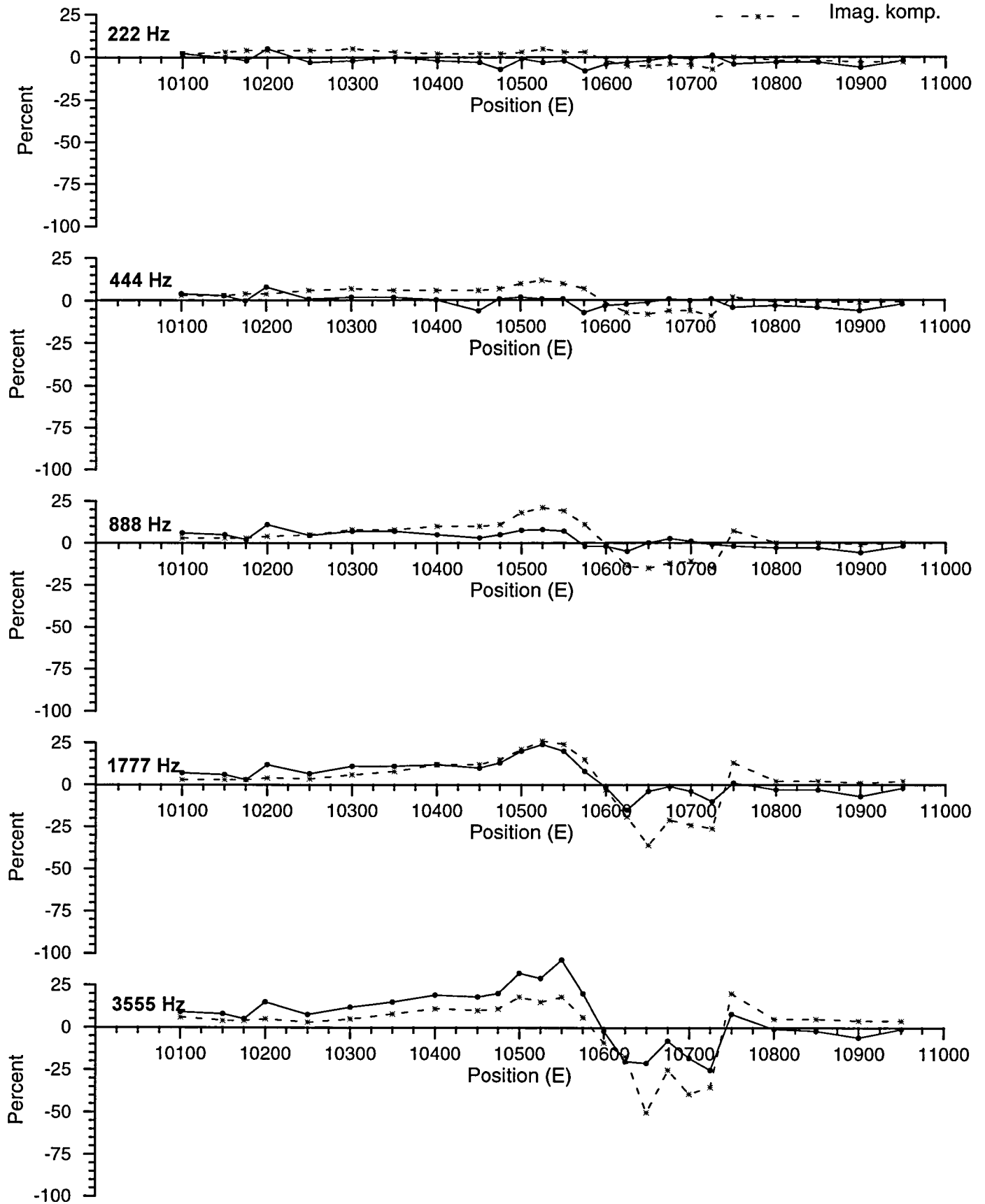
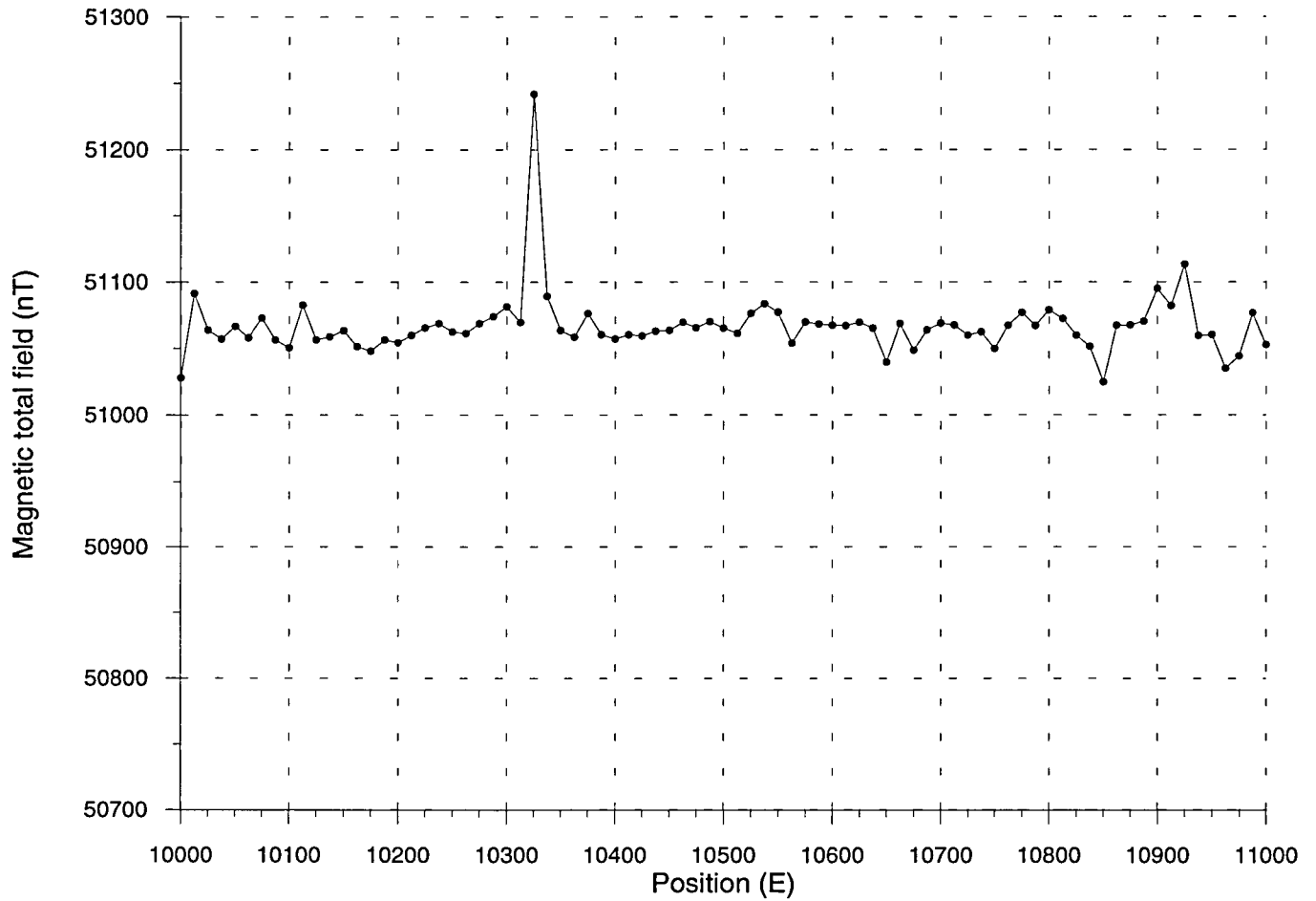


Figure 5a. Slingram MaxMin profile 10200 N.

TJØNNVOLLMYRA  
Magnetic total field  
Profile 10200 N



TJØNNVOLLMYRA  
VLF  
Profile 10200 N

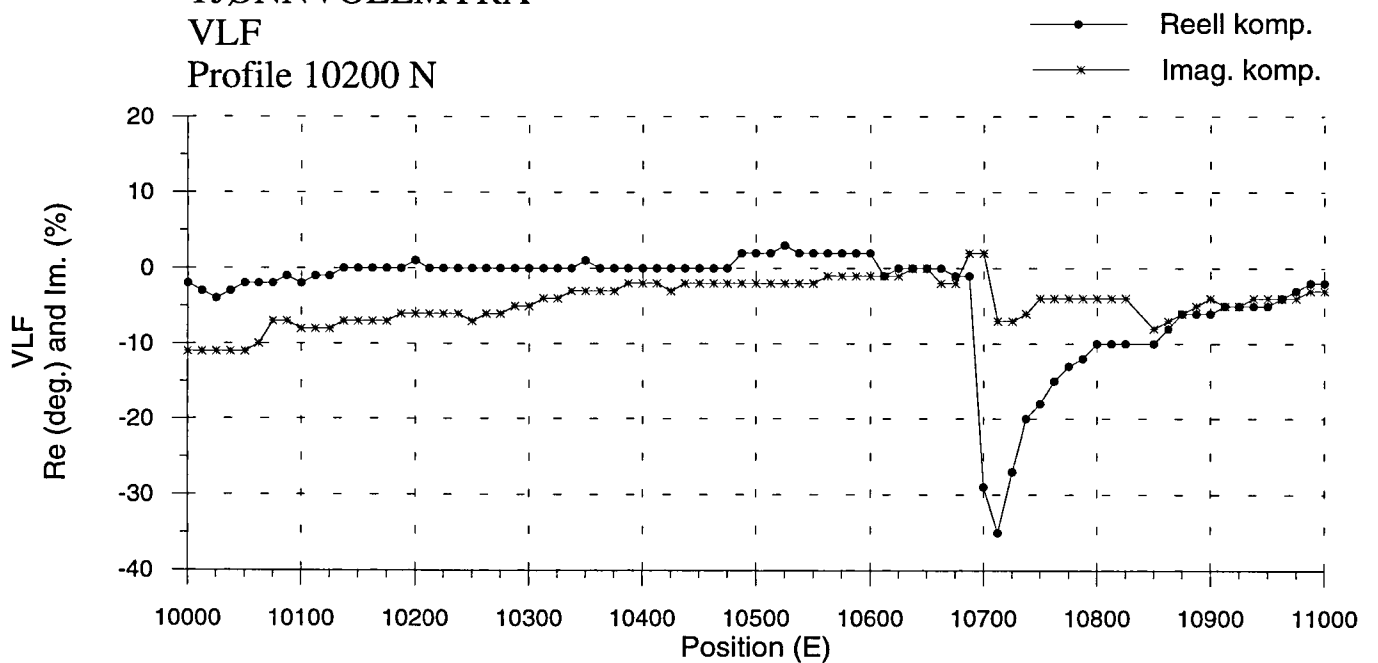


Figure 5b. Magnetic total field and VLF profile 10200 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10300 N

Tx ----- Rx 100m

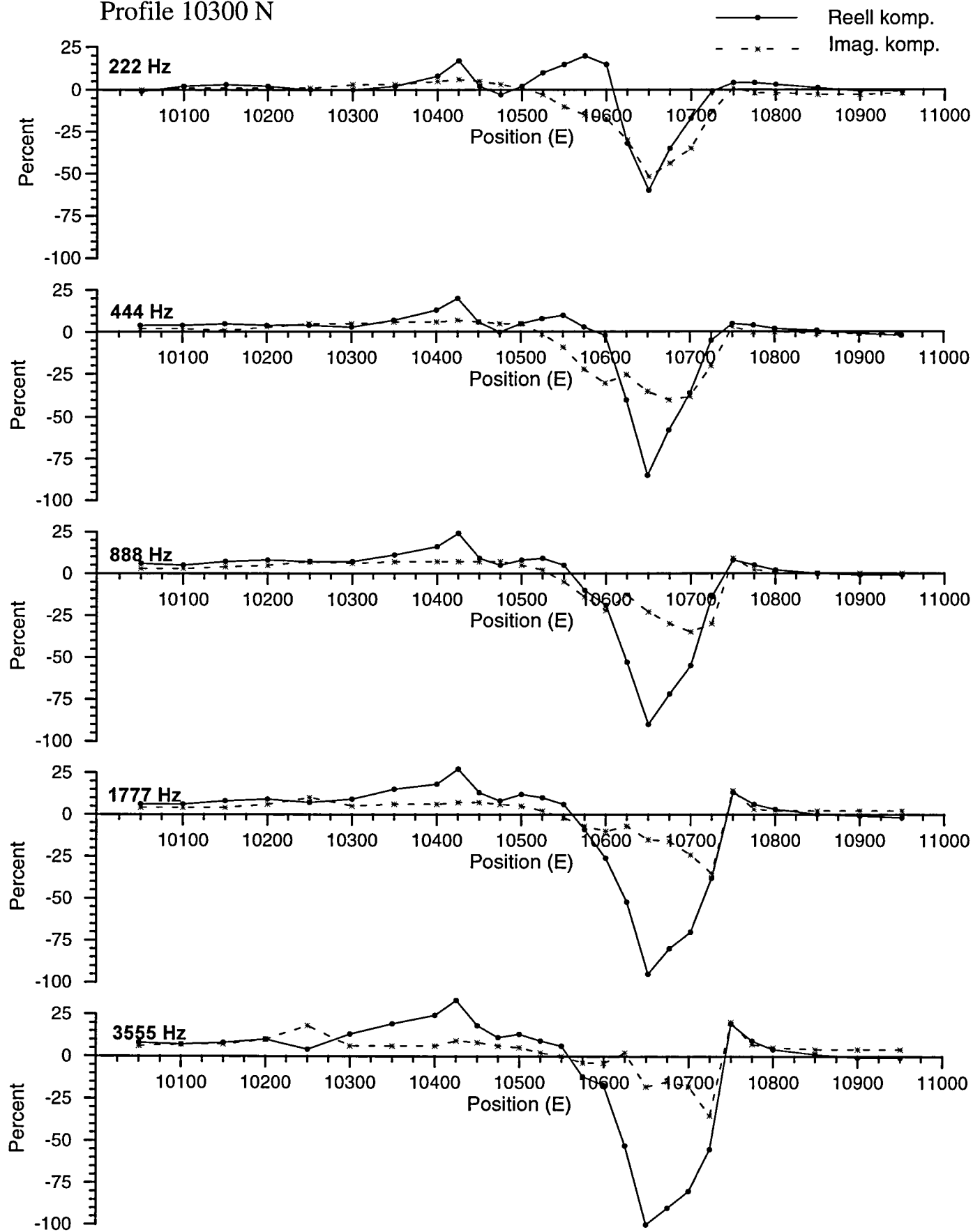
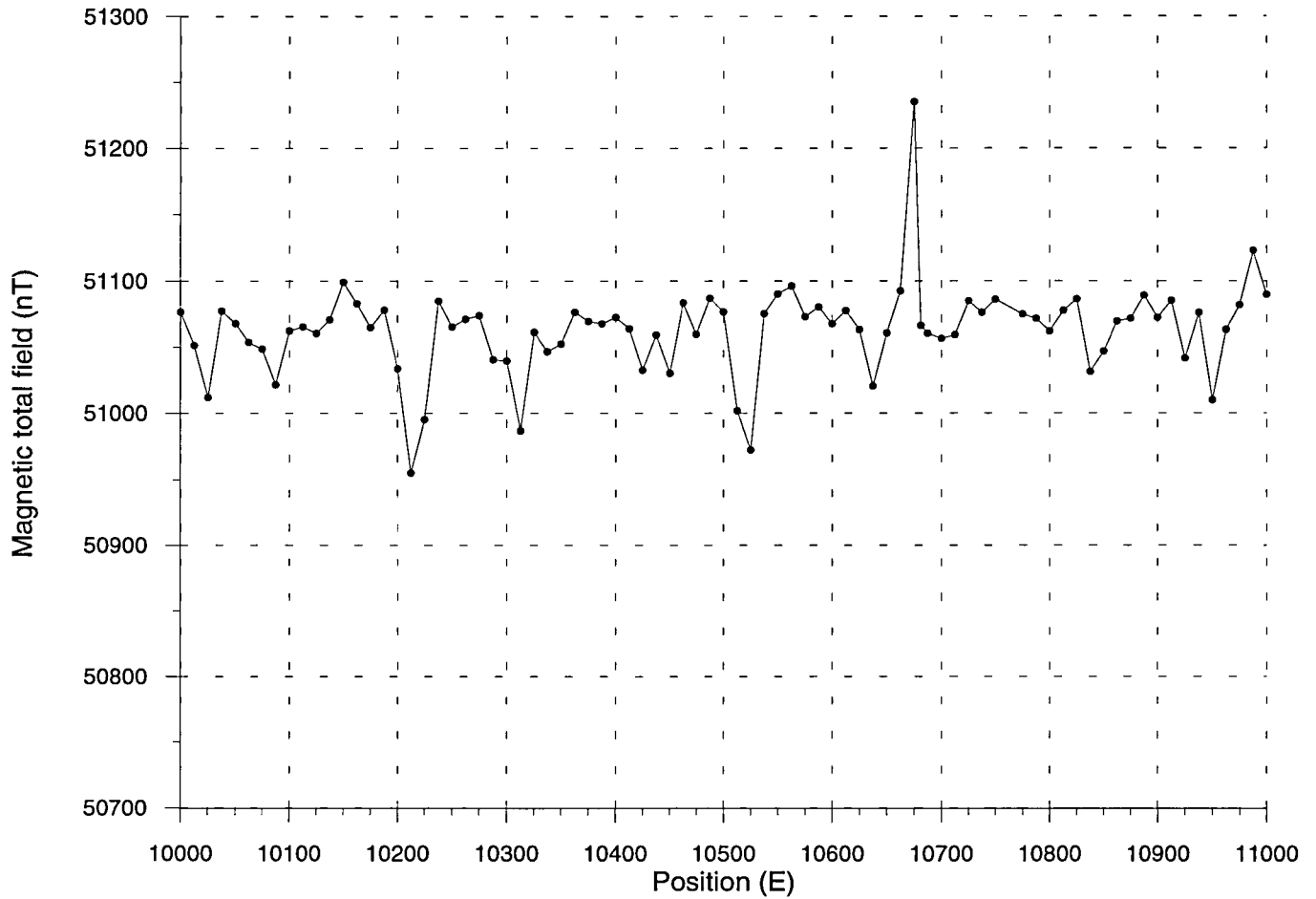


Figure 6a. Slingram MaxMin profile 10300 N.

TJØNNVOLLMYRA  
Magnetic total field  
Profile 10300 N



TJØNNVOLLMYRA  
VLF  
Profile 10300 N

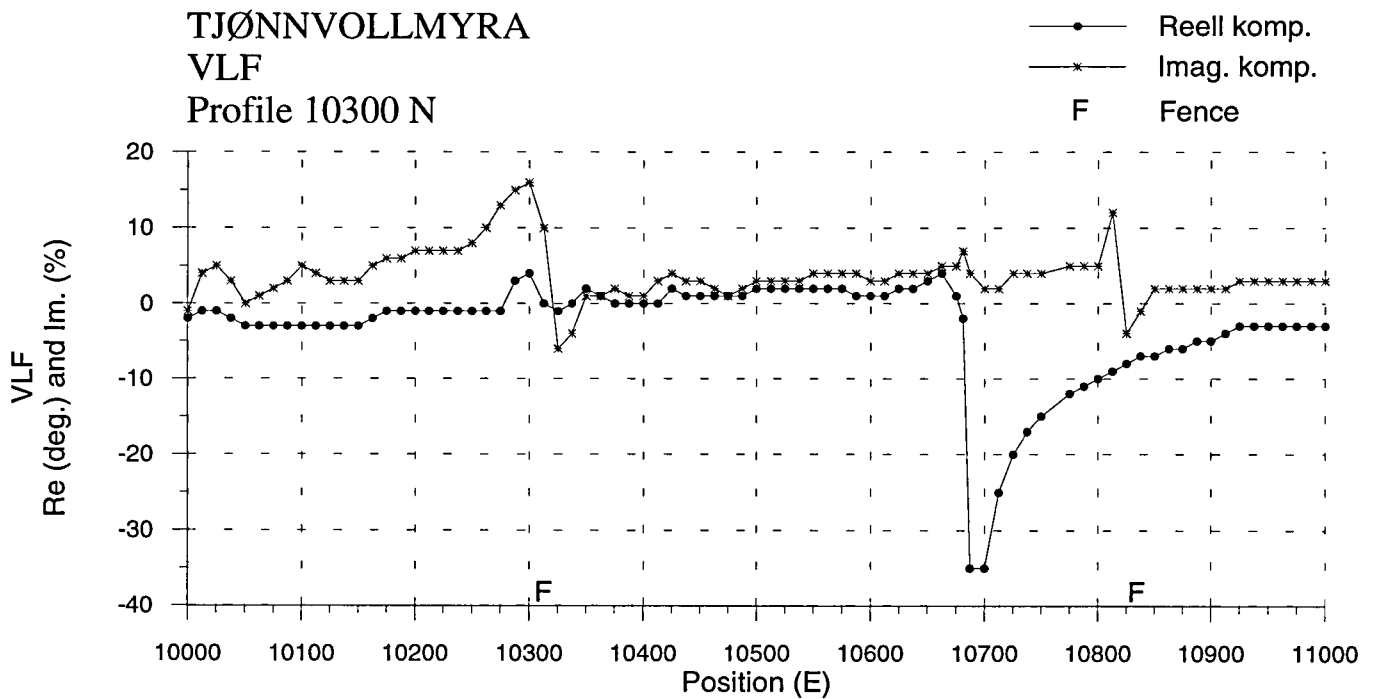


Figure 6b. Magnetic total field and VLF profile 10300 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10400 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

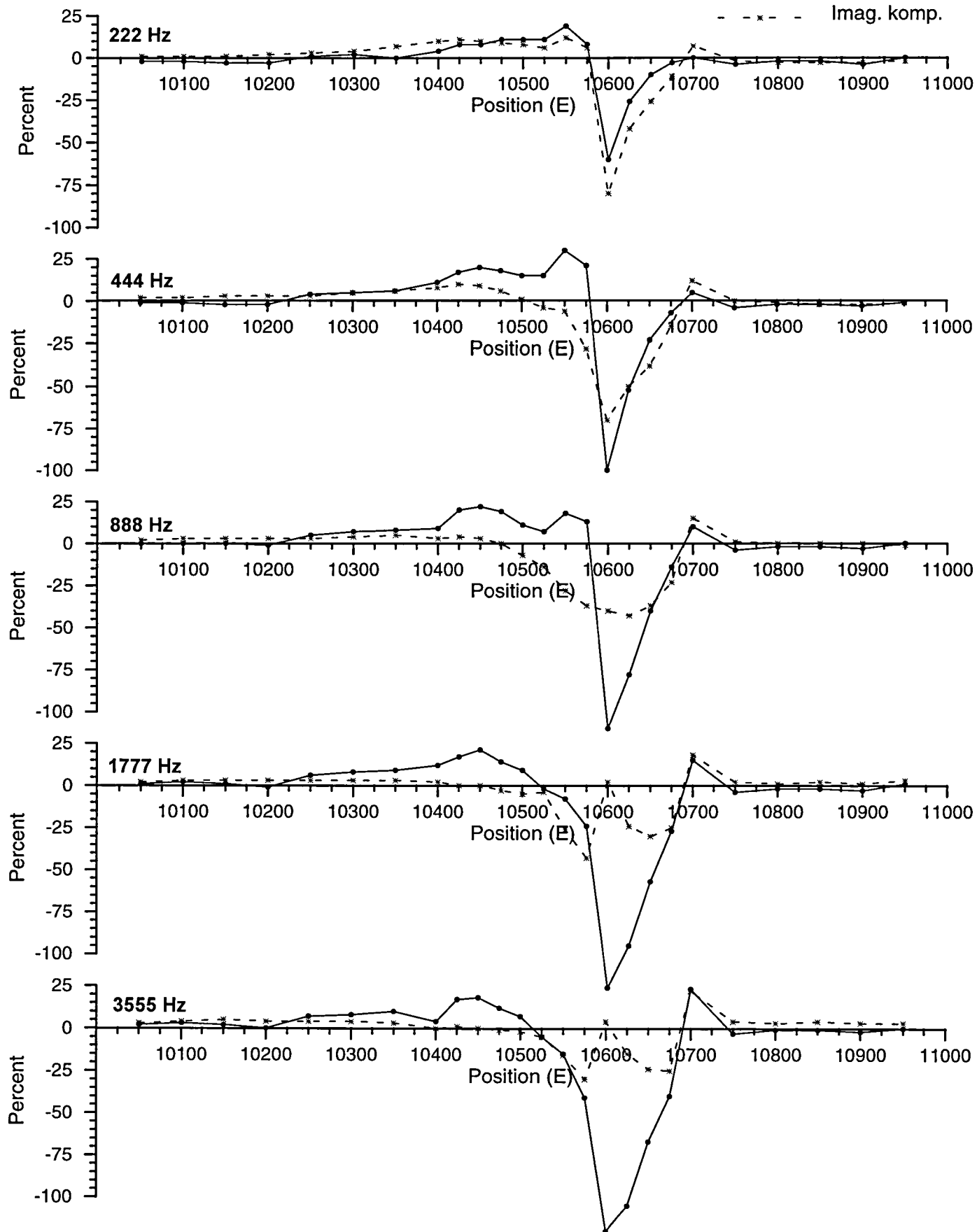
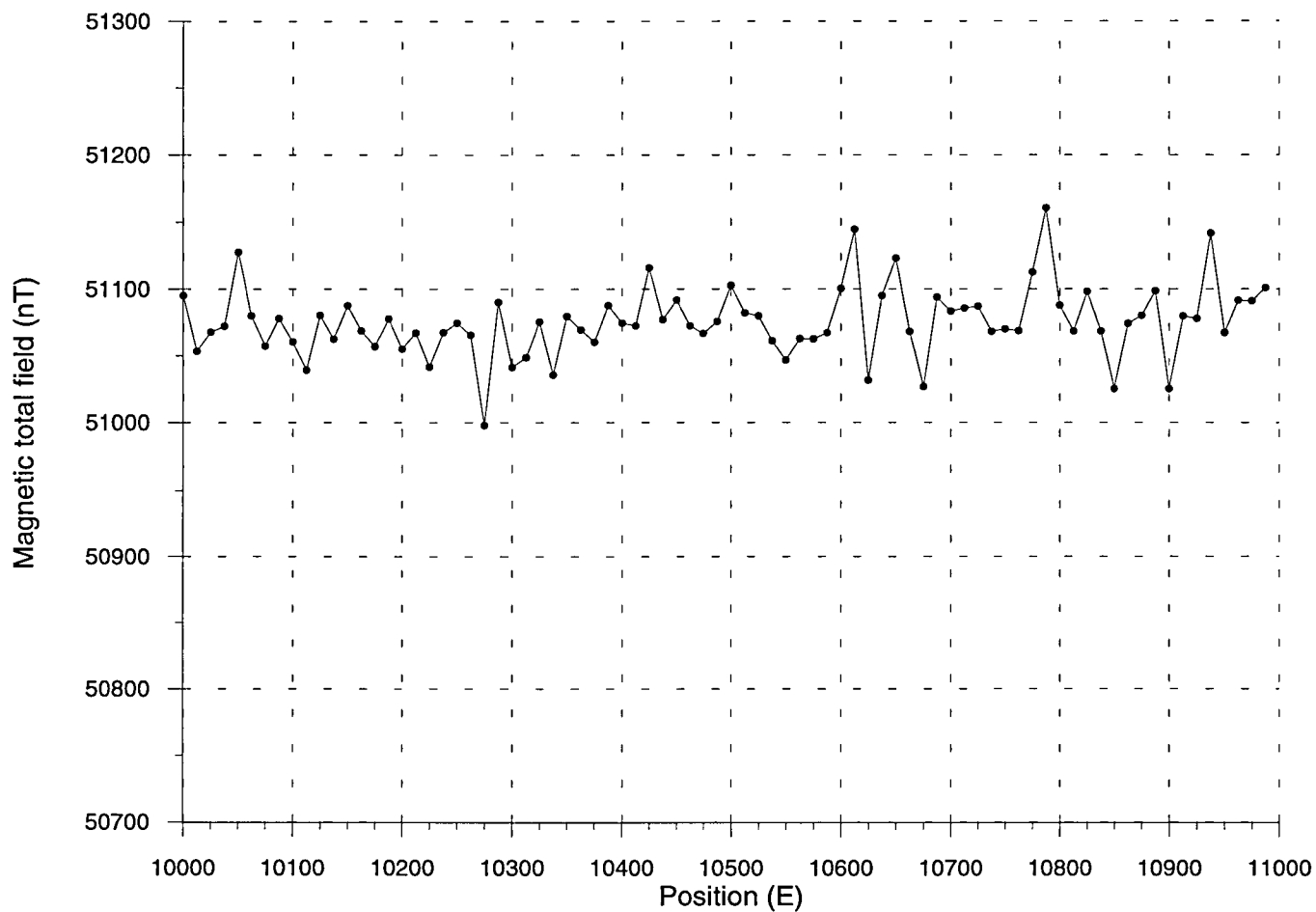


Figure 7a. Slingram MaxMin profile 10400 N.



TJØNNVOLLMYRA  
Magnetic total field  
Profile 10400 N



TJØNNVOLLMYRA  
VLF  
Profile 10400 N

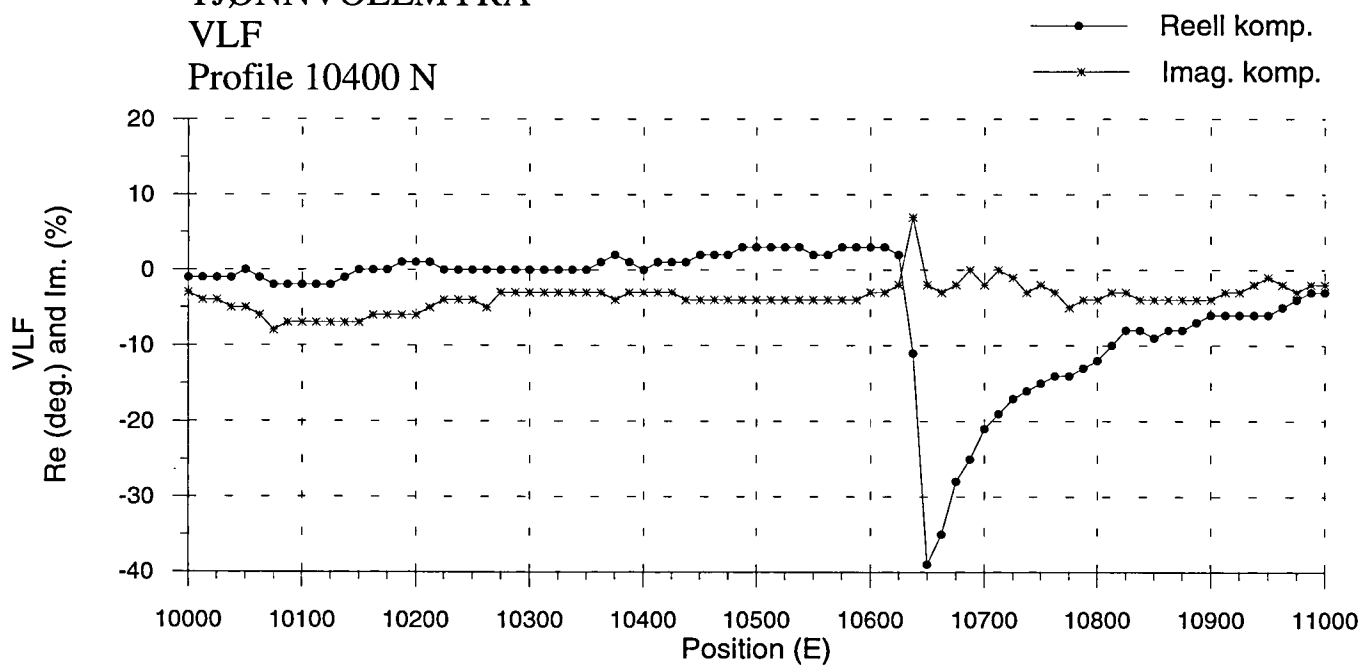


Figure 7b. Magnetic total field and VLF profile 10400 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10500 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

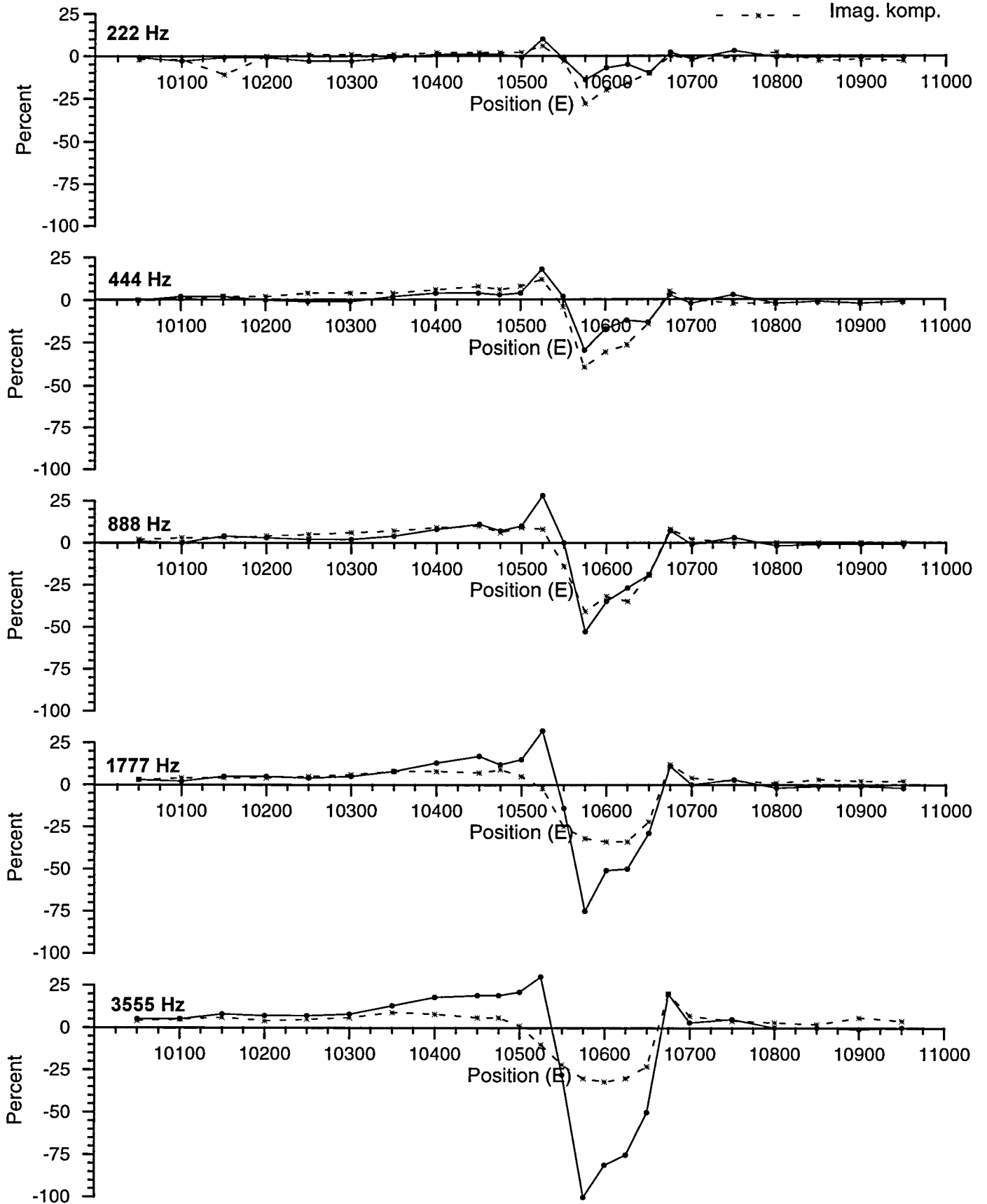
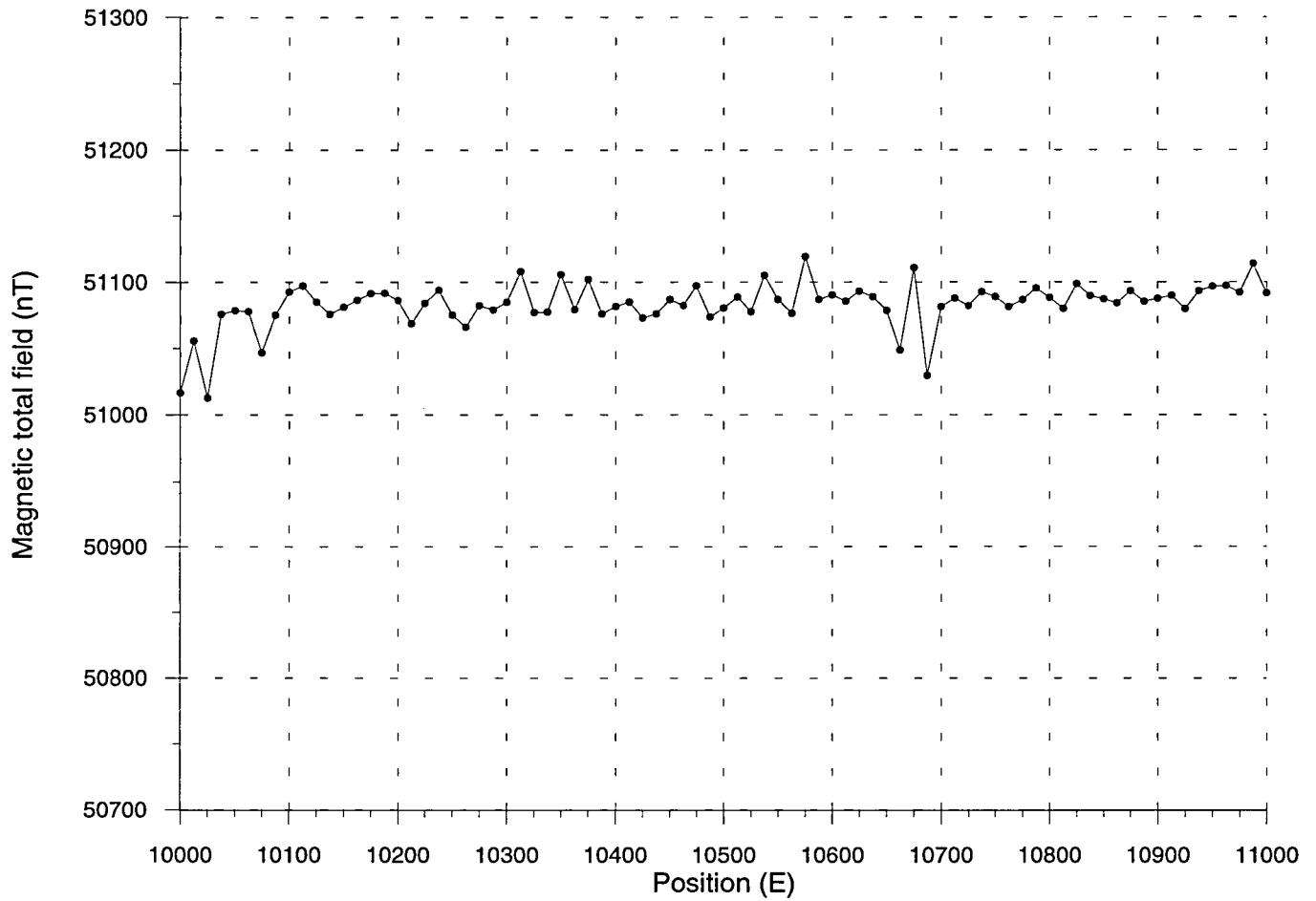


Figure 8a. Slingram MaxMin profile 10500 N.

TJØNNVOLLMYRA  
Magnetic total field  
Profile 10500 N



TJØNNVOLLMYRA  
VLF  
Profile 10500 N

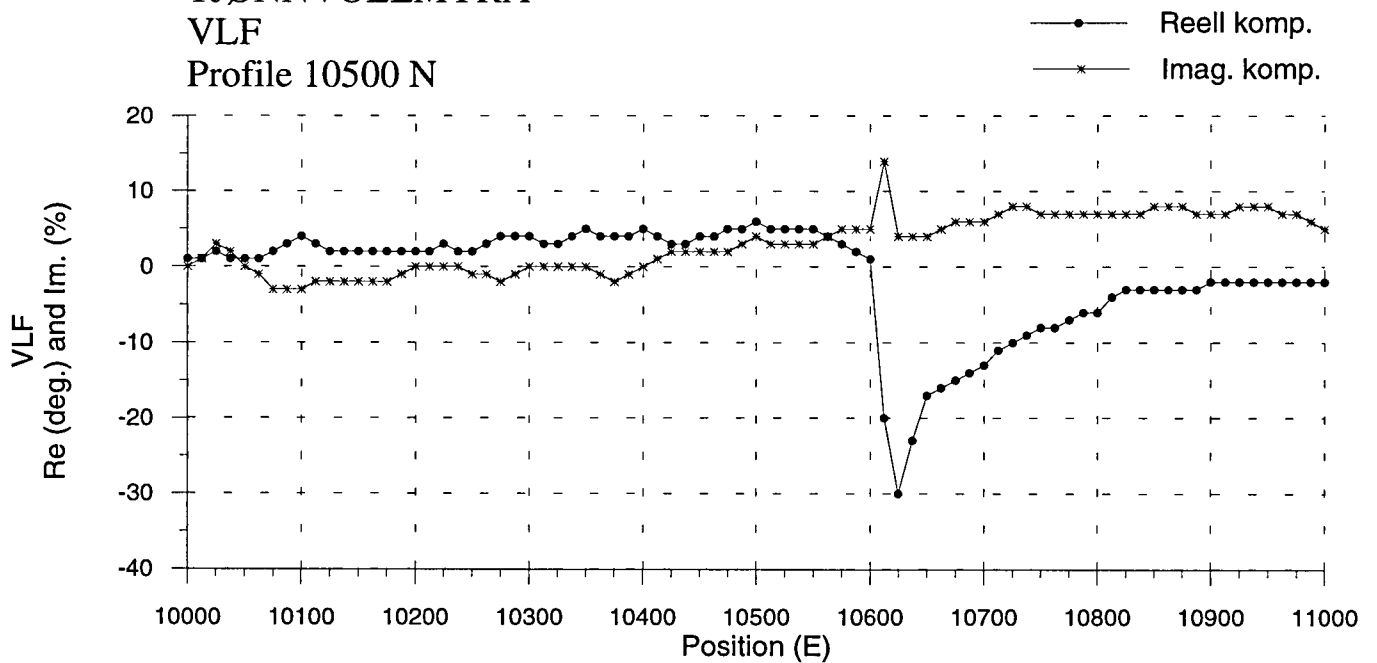


Figure 8b. Magnetic total field and VLF profile 10500 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10600 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

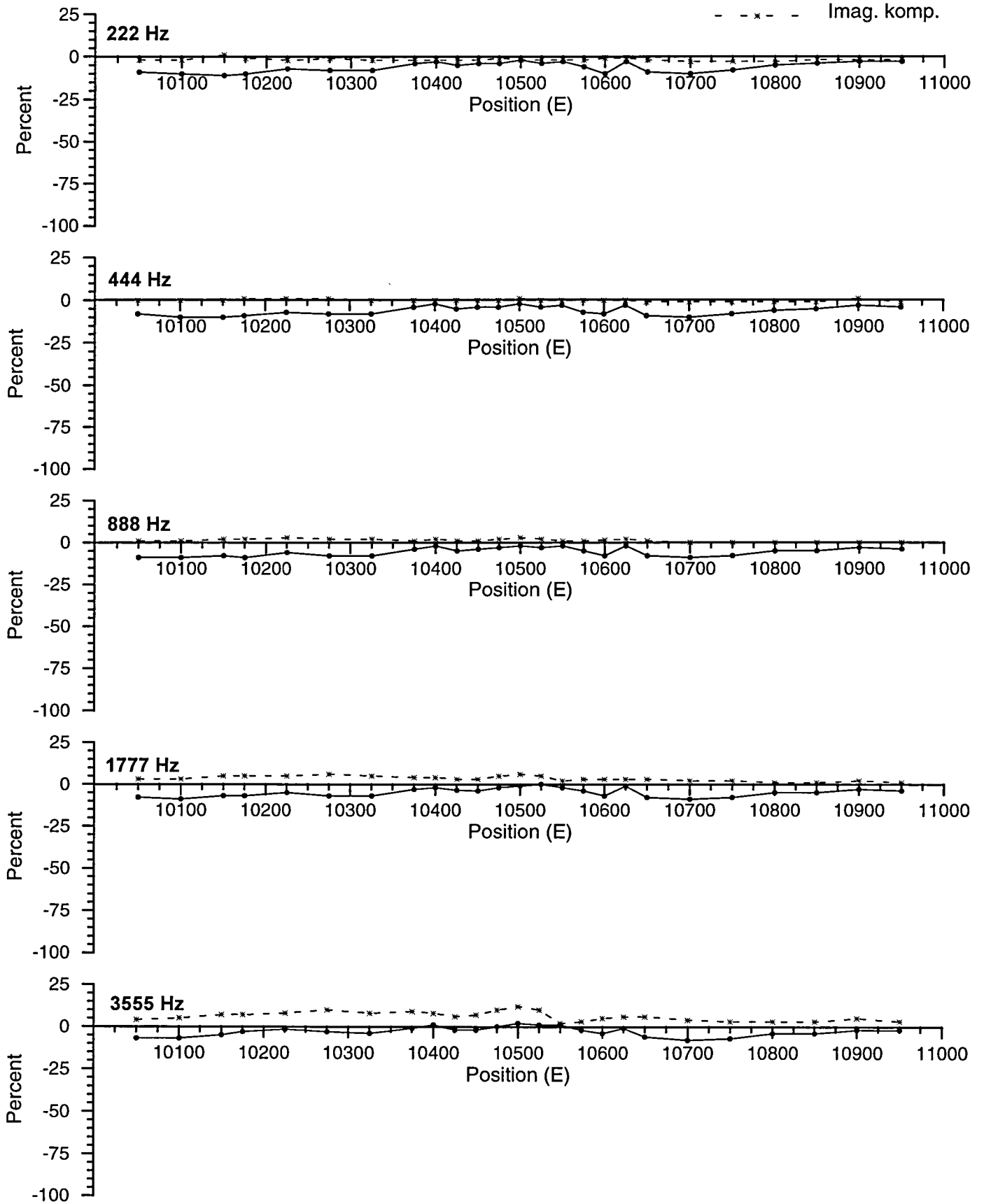
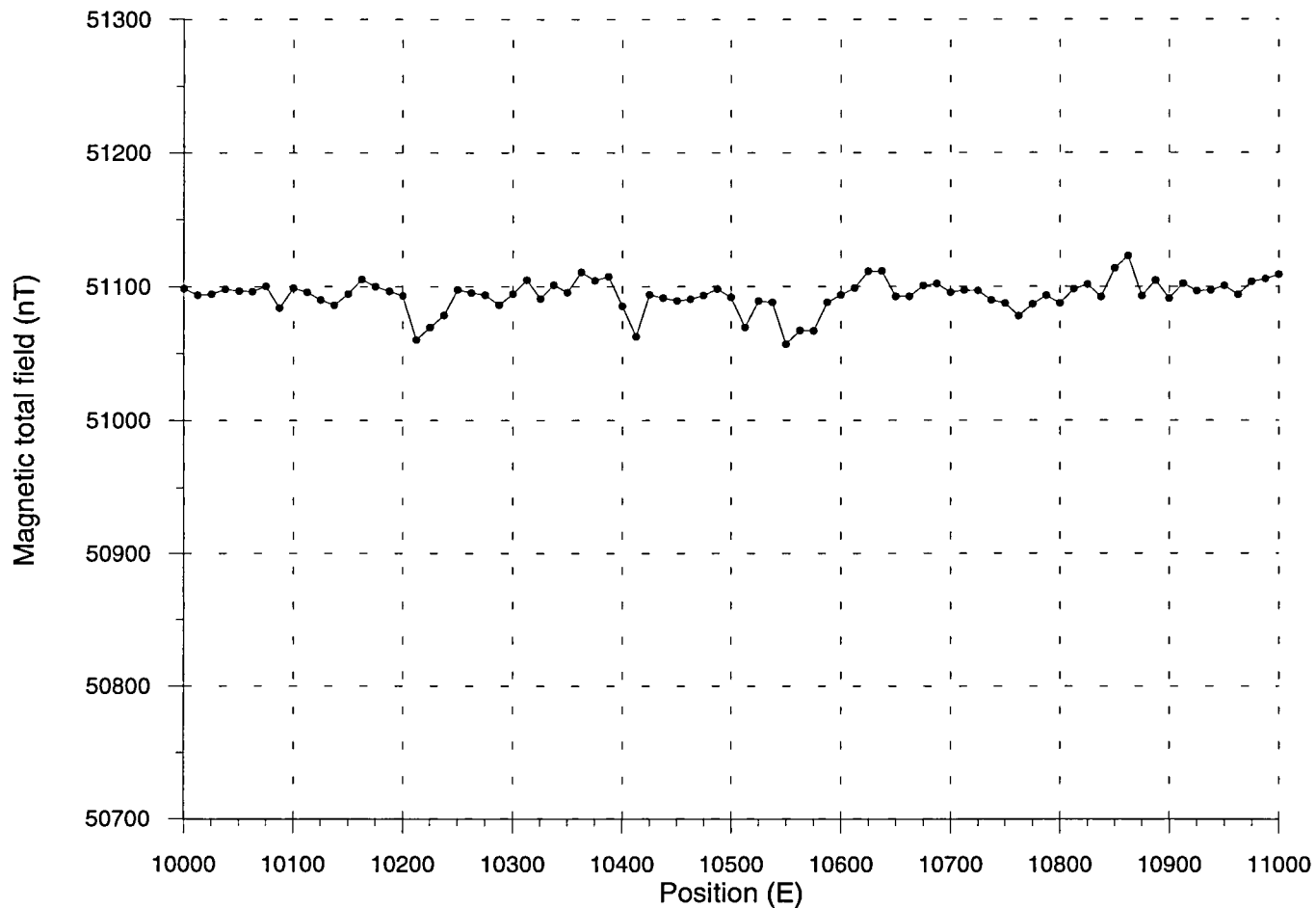


Figure 9a. Slingram MaxMin profile 10600 N.

TJØNNVOLLMYRA  
Magnetic total field  
Profile 10600 N



TJØNNVOLLMYRA  
VLF  
Profile 10600 N

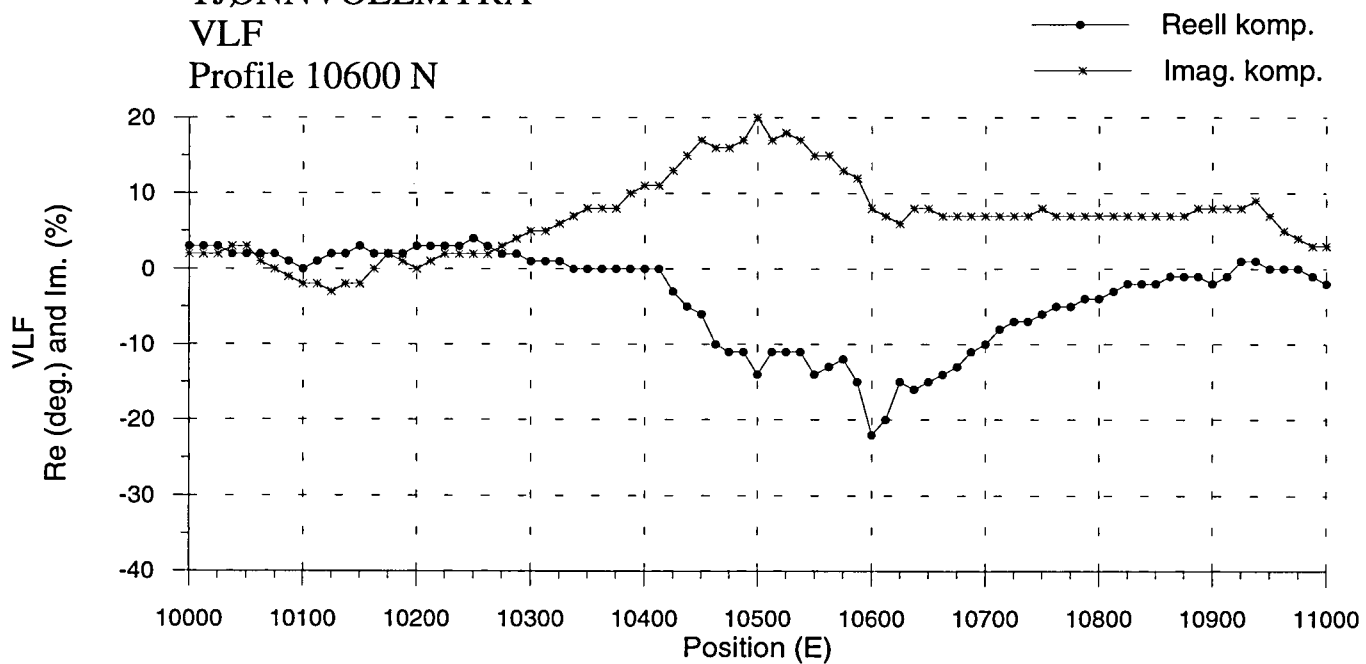


Figure 9b. Magnetic total field and VLF profile 10600 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10700 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

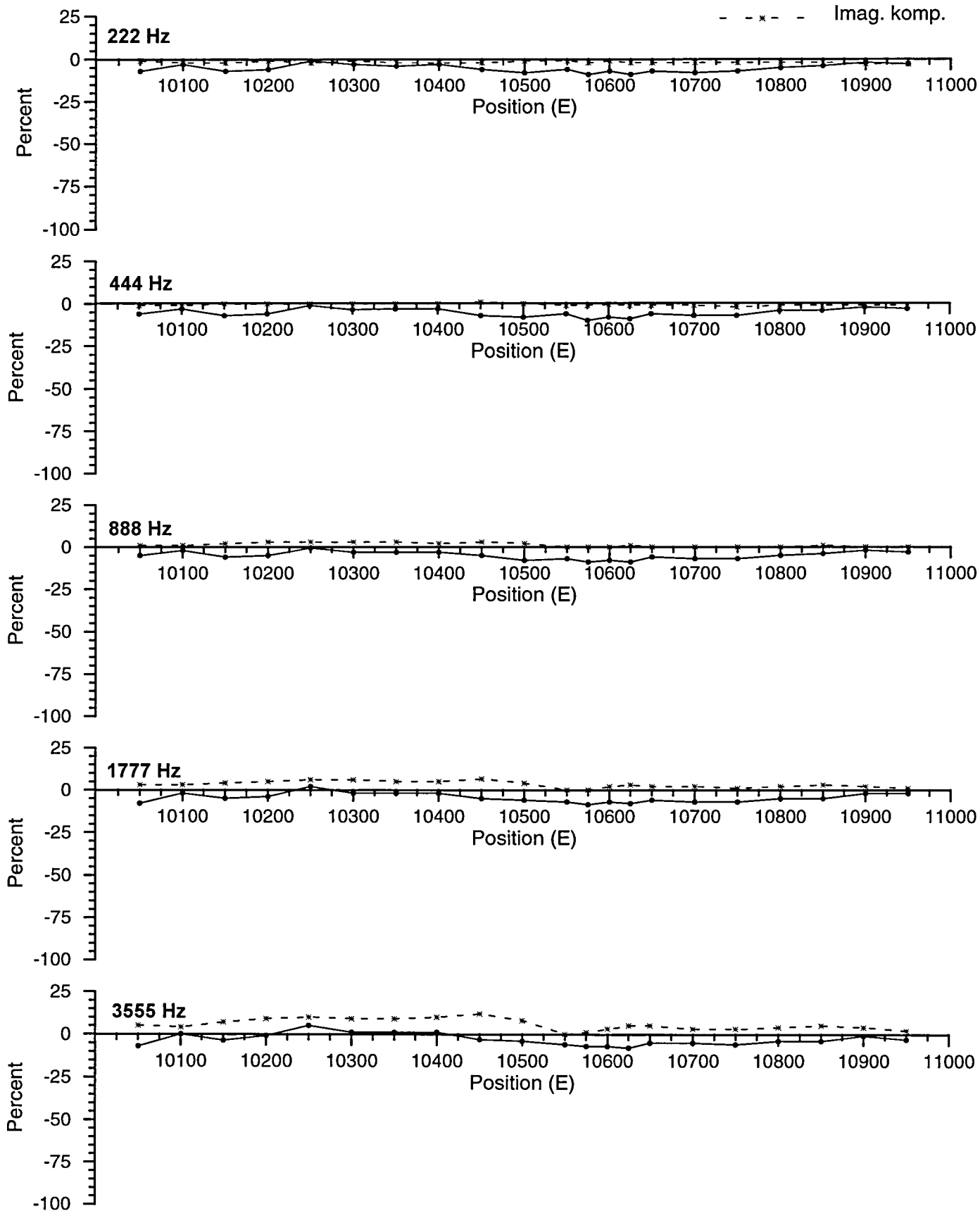
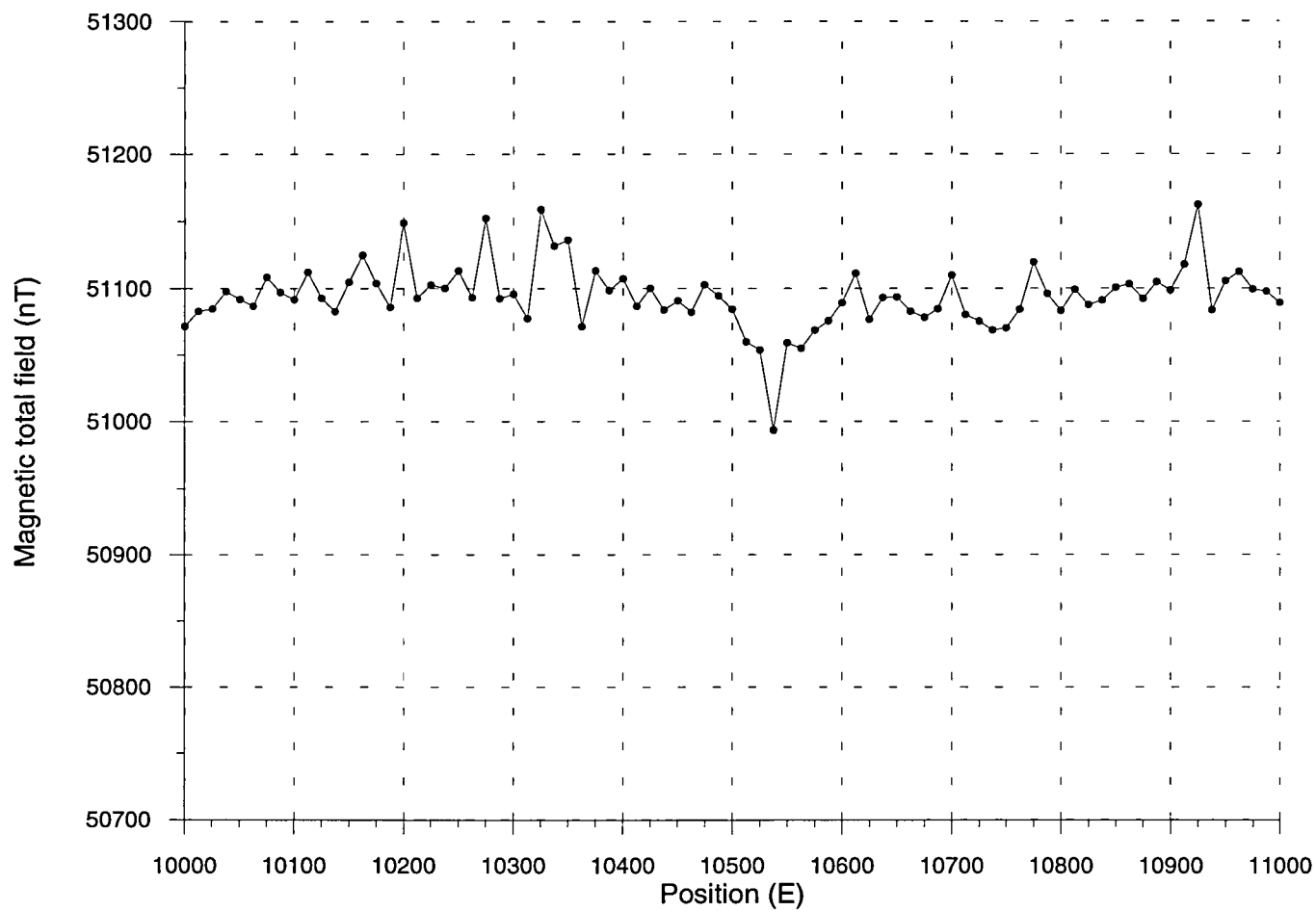


Figure 10a. Slingram MaxMin profile 10700 N.

TJØNNVOLLMYRA  
Magnetic total field  
Profile 10700 N



TJØNNVOLLMYRA  
VLF  
Profile 10700 N

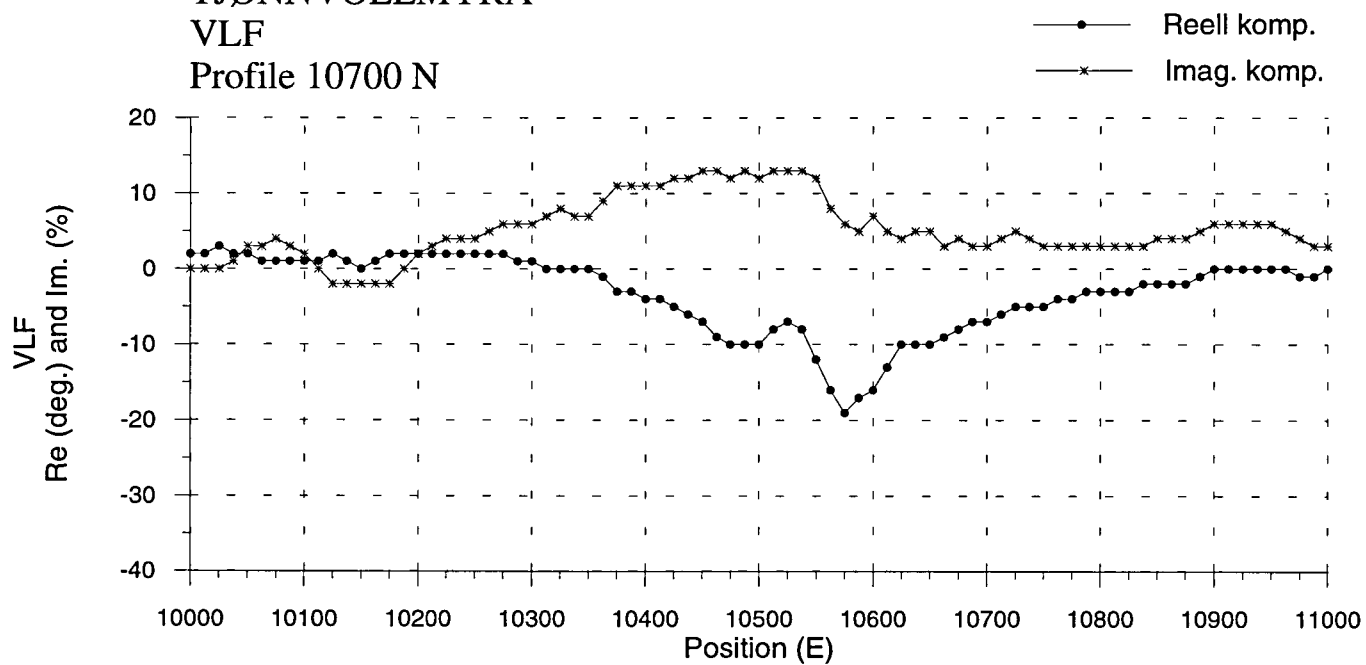


Figure 10b. Magnetic total field and VLF profile 10700 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10800 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

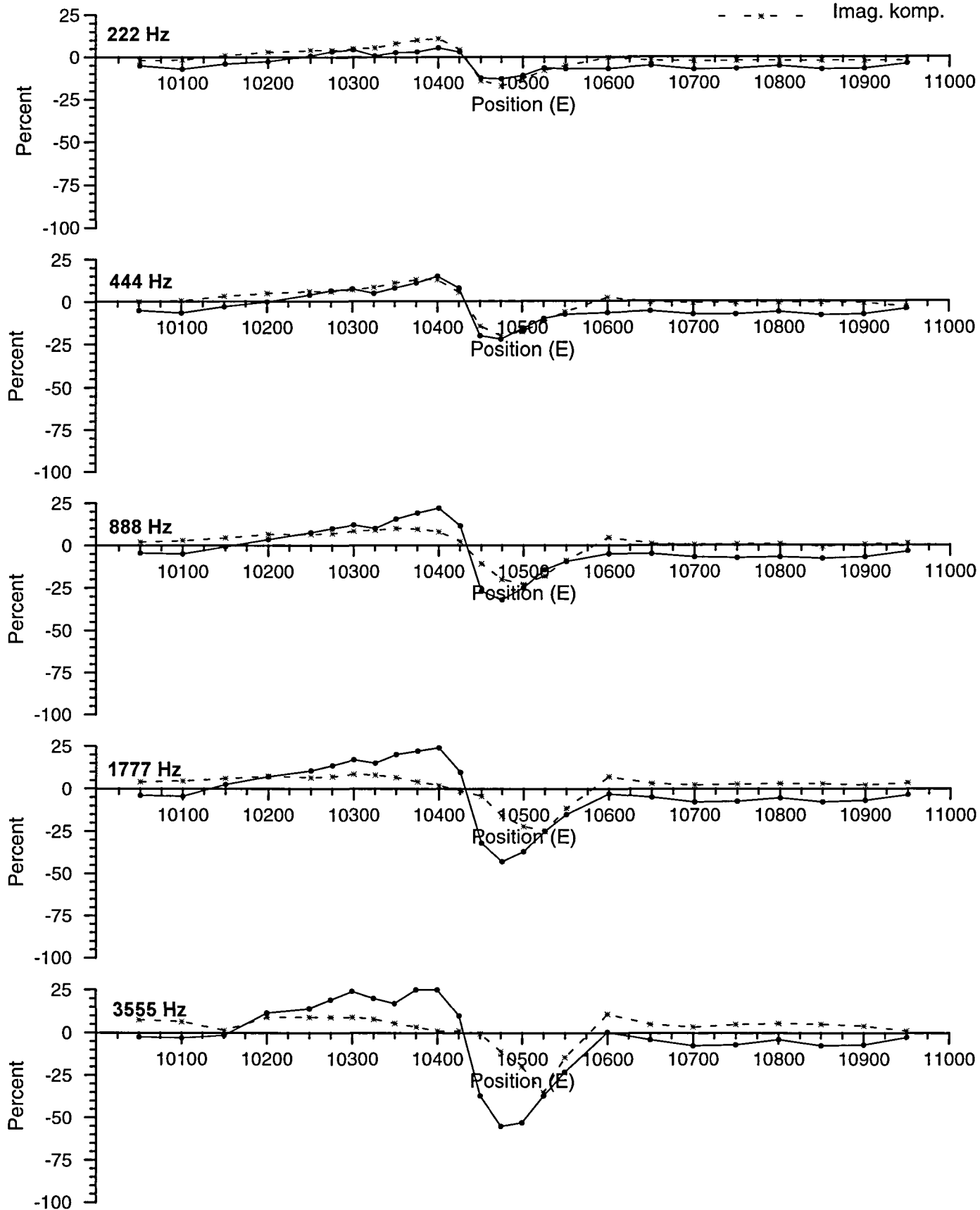
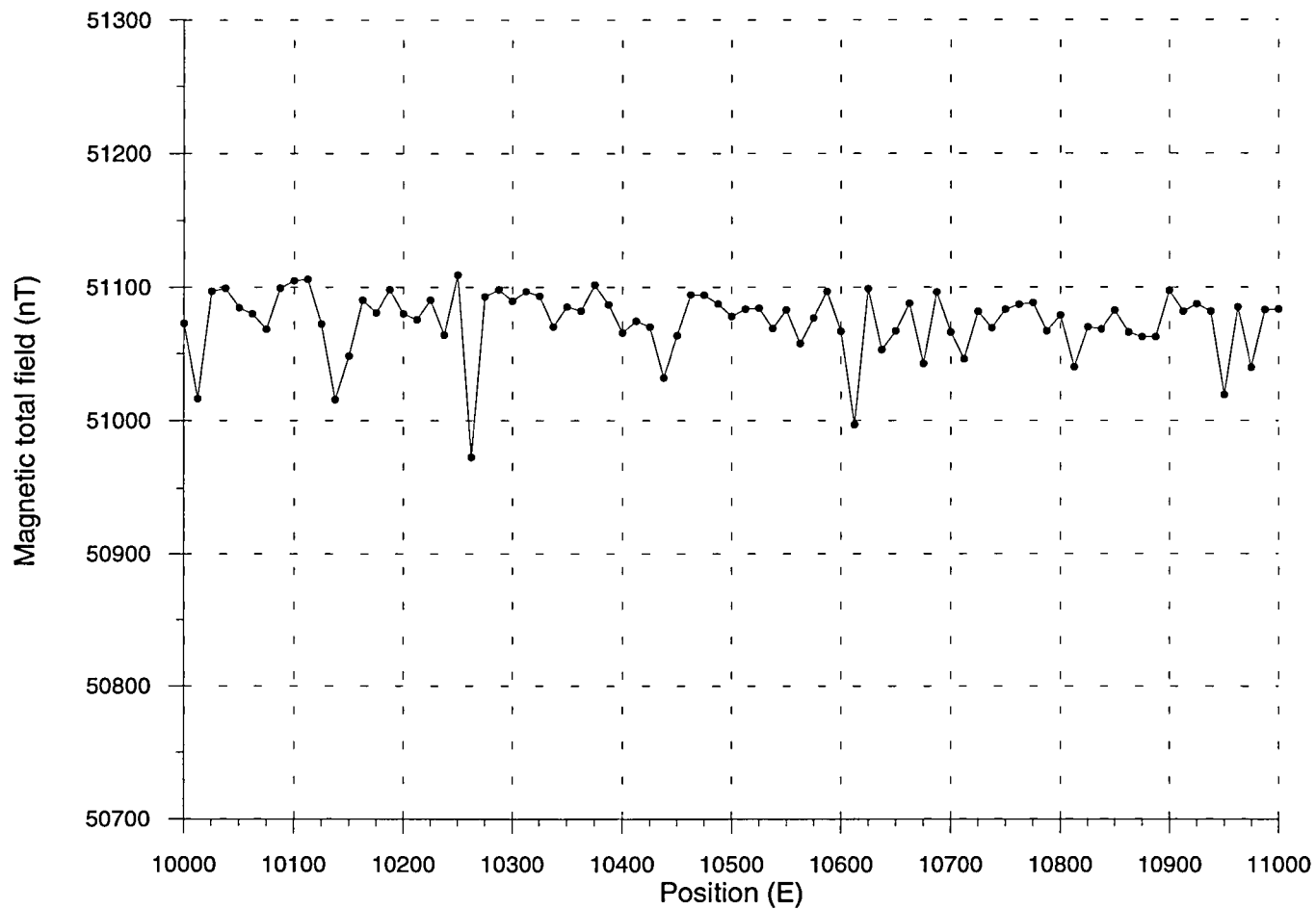


Figure 11a. Slingram MaxMin profile 10800 N.



TJØNNVOLLMYRA  
Magnetic total field  
Profile 10800 N



TJØNNVOLLMYRA  
VLF  
Profile 10800 N

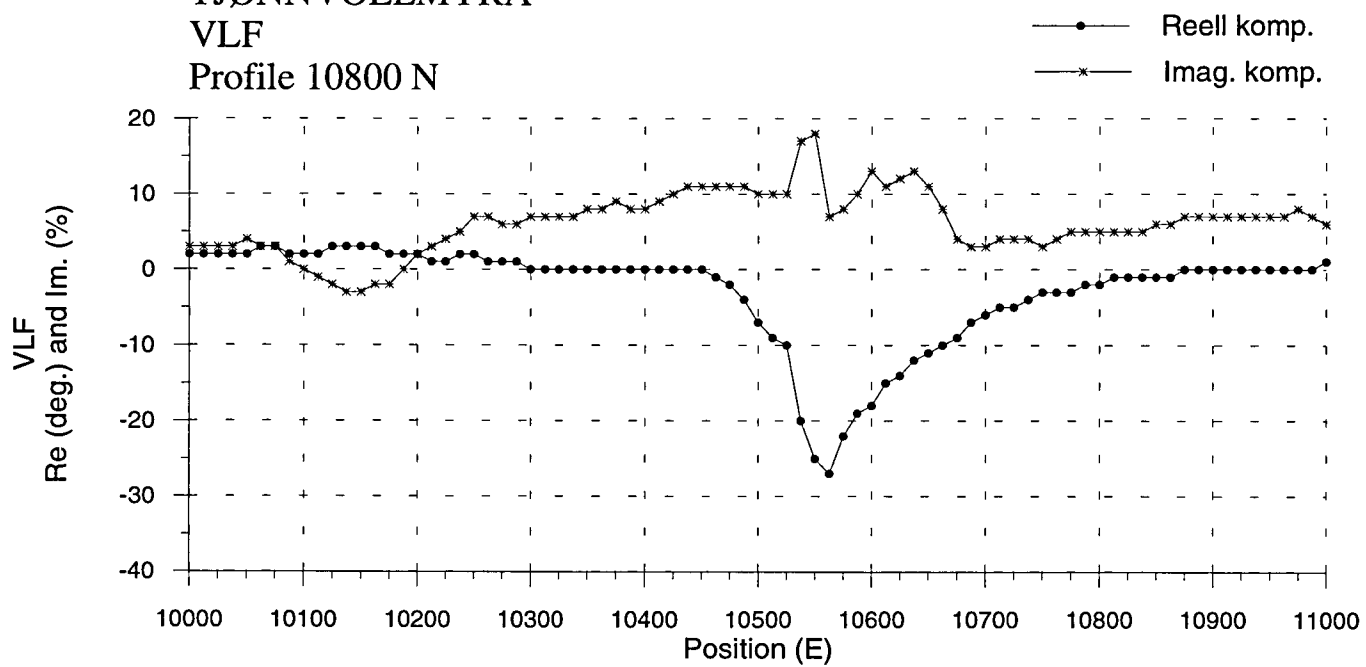


Figure 11b. Magnetic total field and VLF profile 10800 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 10900 N

Tx ----- Rx 100m

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- - \* - - Imag. komp.

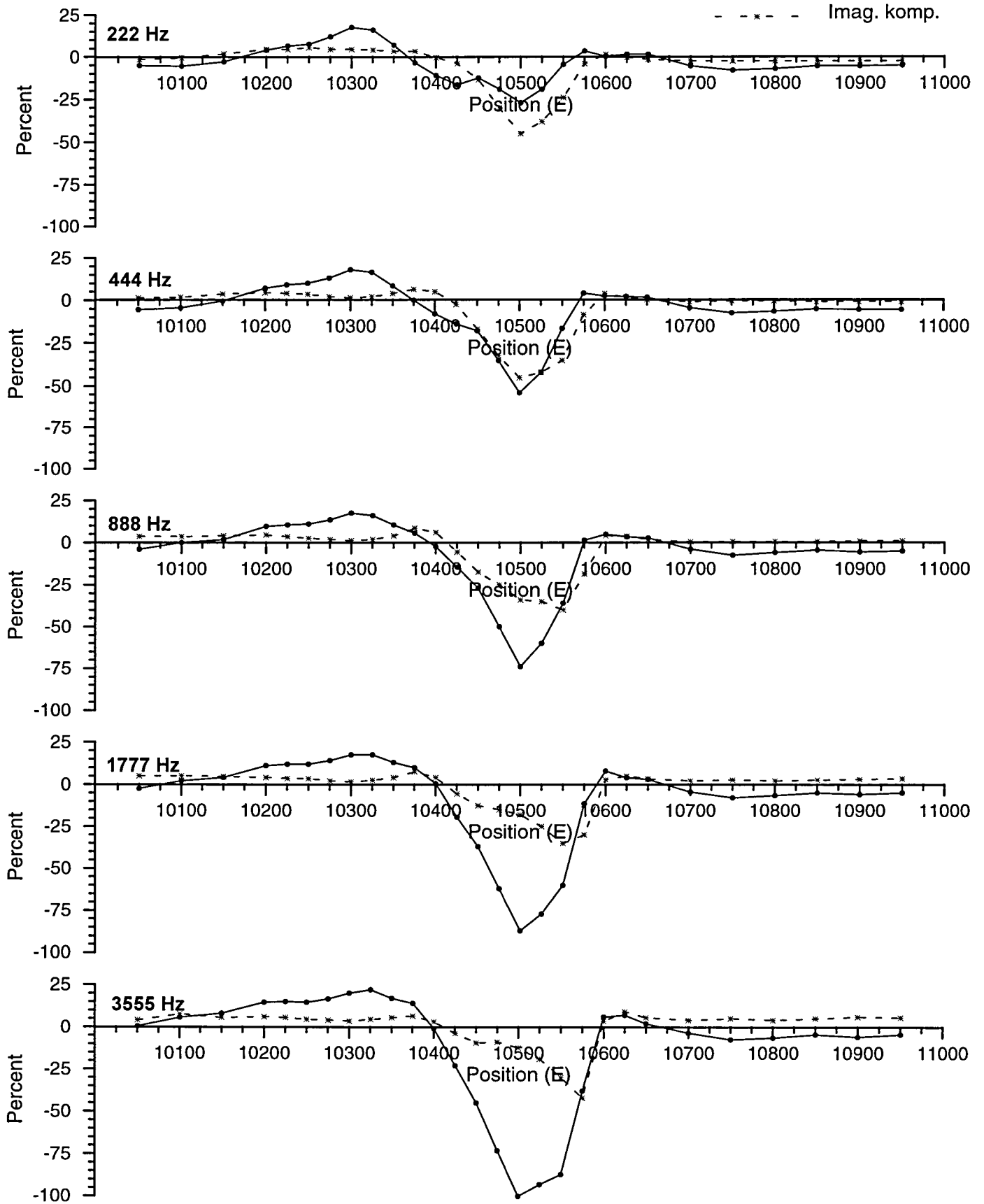
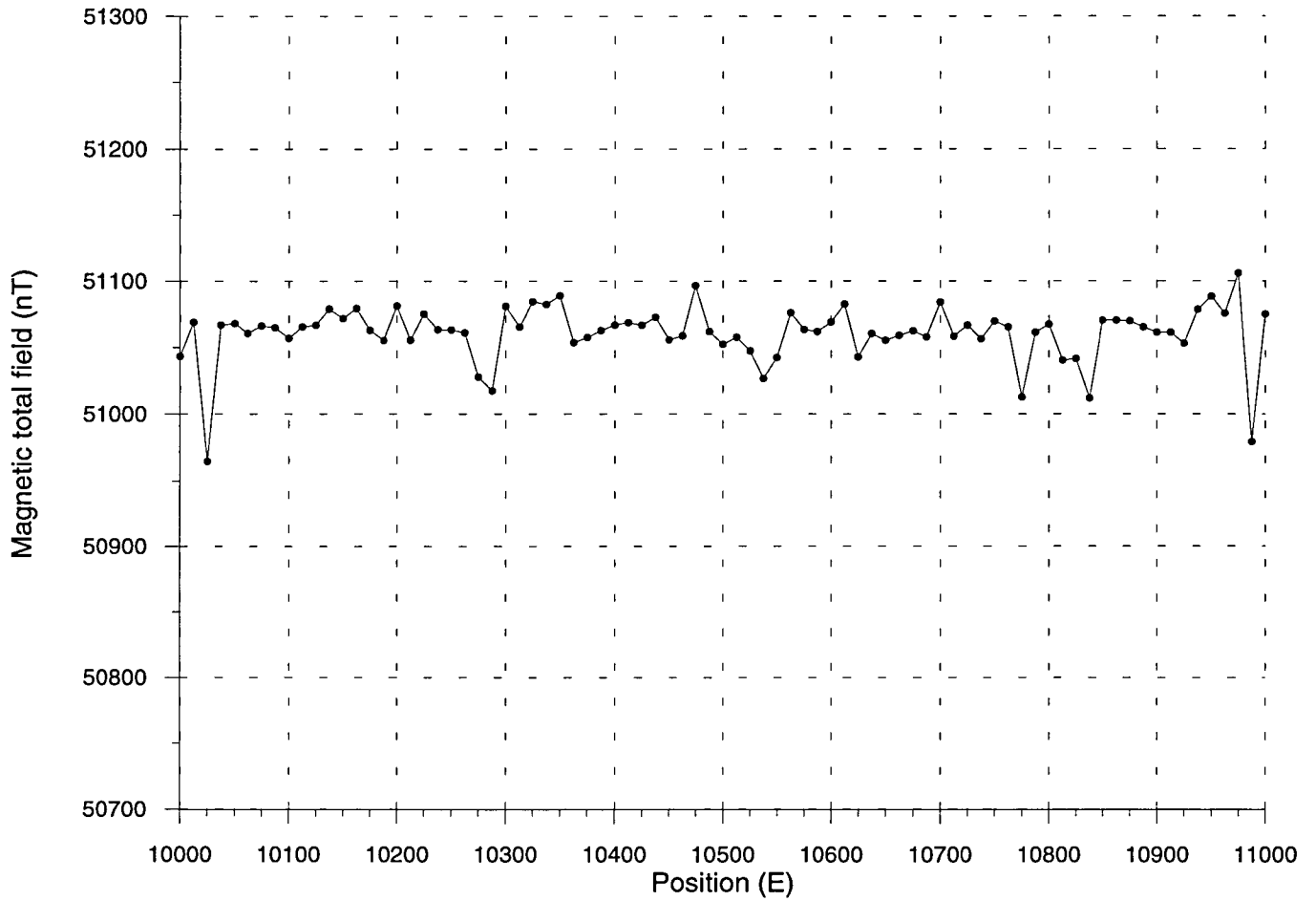


Figure 12a. Slingram MaxMin profile 10900 N.

TJØNNVOLLMYRA  
Magnetic total field  
Profile 10900 N



TJØNNVOLLMYRA  
VLF  
Profile 10900 N

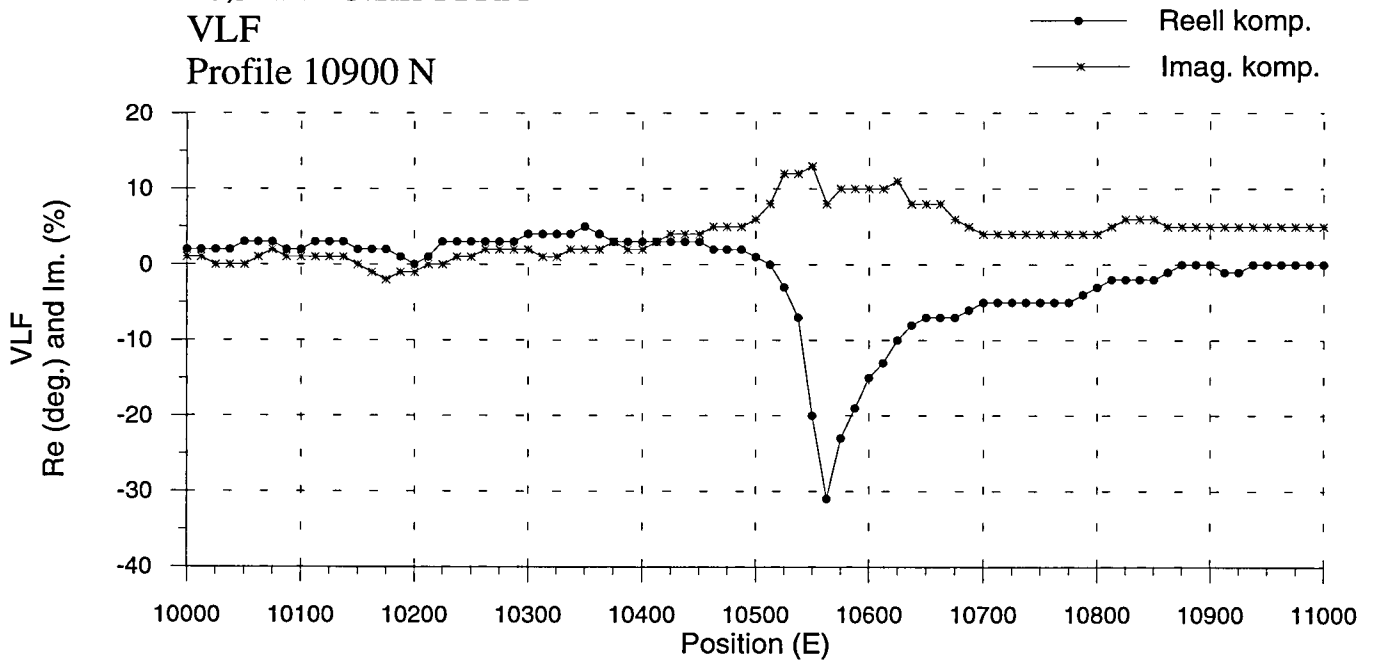


Figure 12b. Magnetic total field and VLF profile 10900 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 11000 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

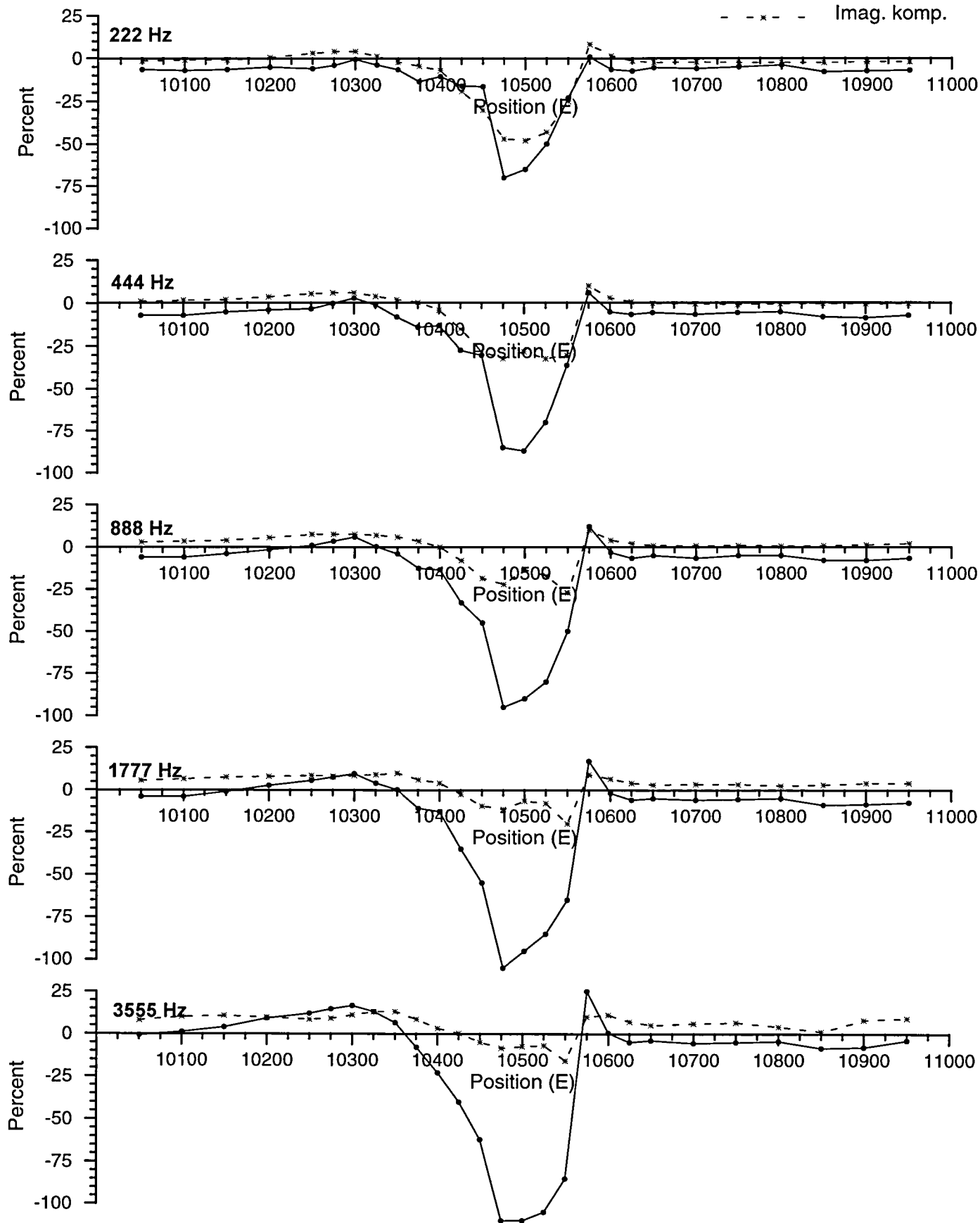
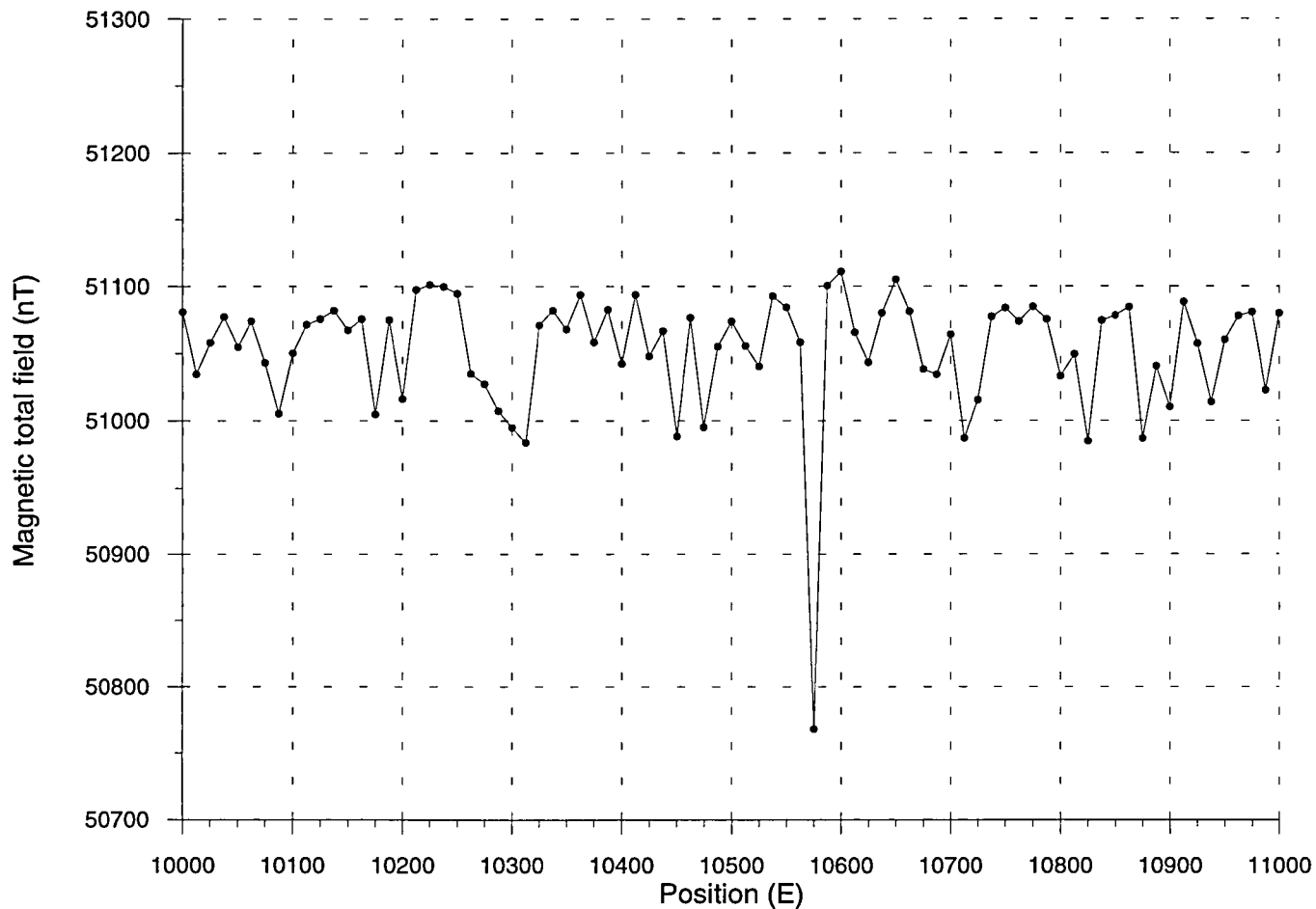


Figure 13a. Slingram MaxMin profile 11000 N.

TJØNNVOLLMYRA  
Magnetic total field  
Profile 11000 N



TJØNNVOLLMYRA  
VLF  
Profile 11000 N

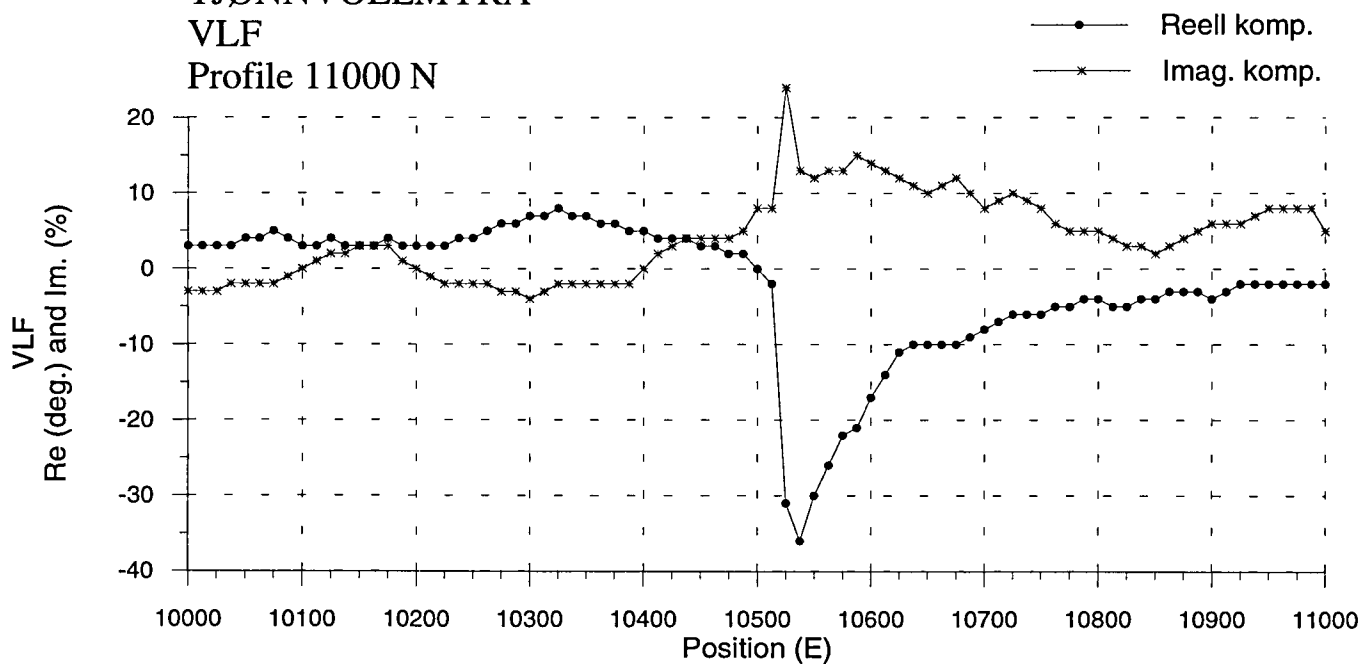


Figure 13b. Magnetic total field and VLF profile 11000 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 11100 N

Tx ----- Rx 100m

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- - \* - - Imag. komp.

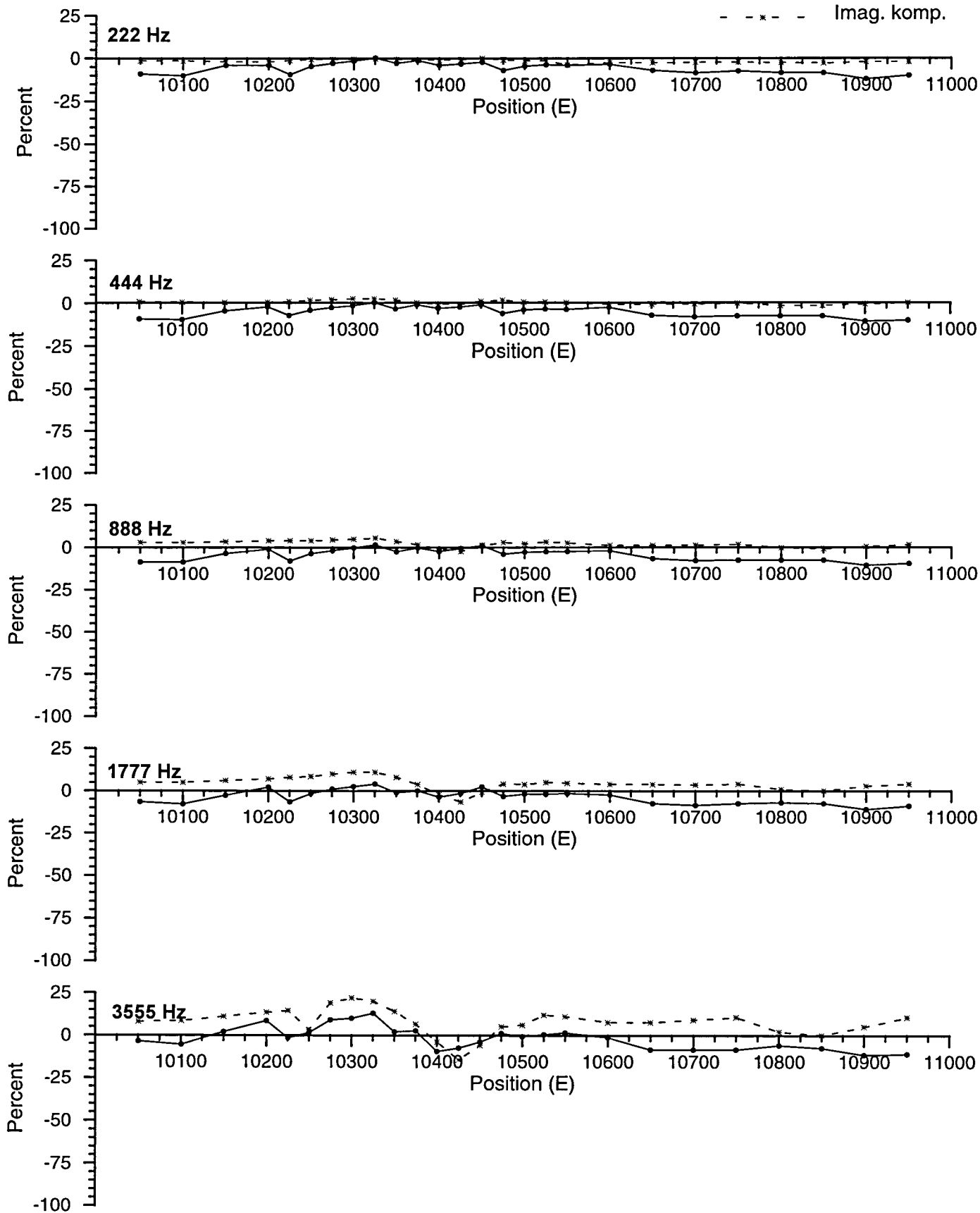
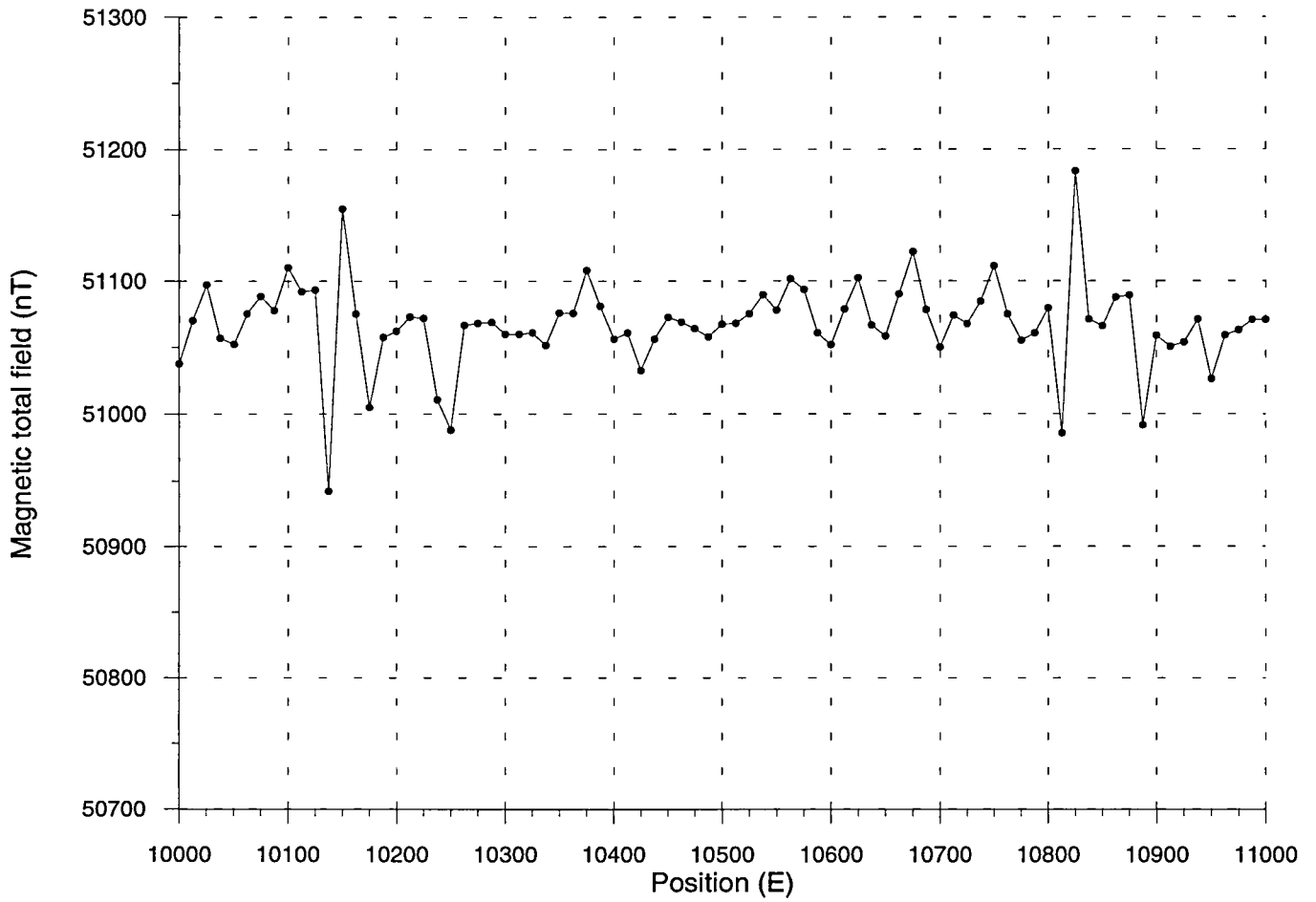


Figure 14a. Slingram MaxMin profile 11100 N.

TJØNNVOLLMYRA  
Magnetic total field  
Profile 11100 N



TJØNNVOLLMYRA  
VLF  
Profile 11100 N

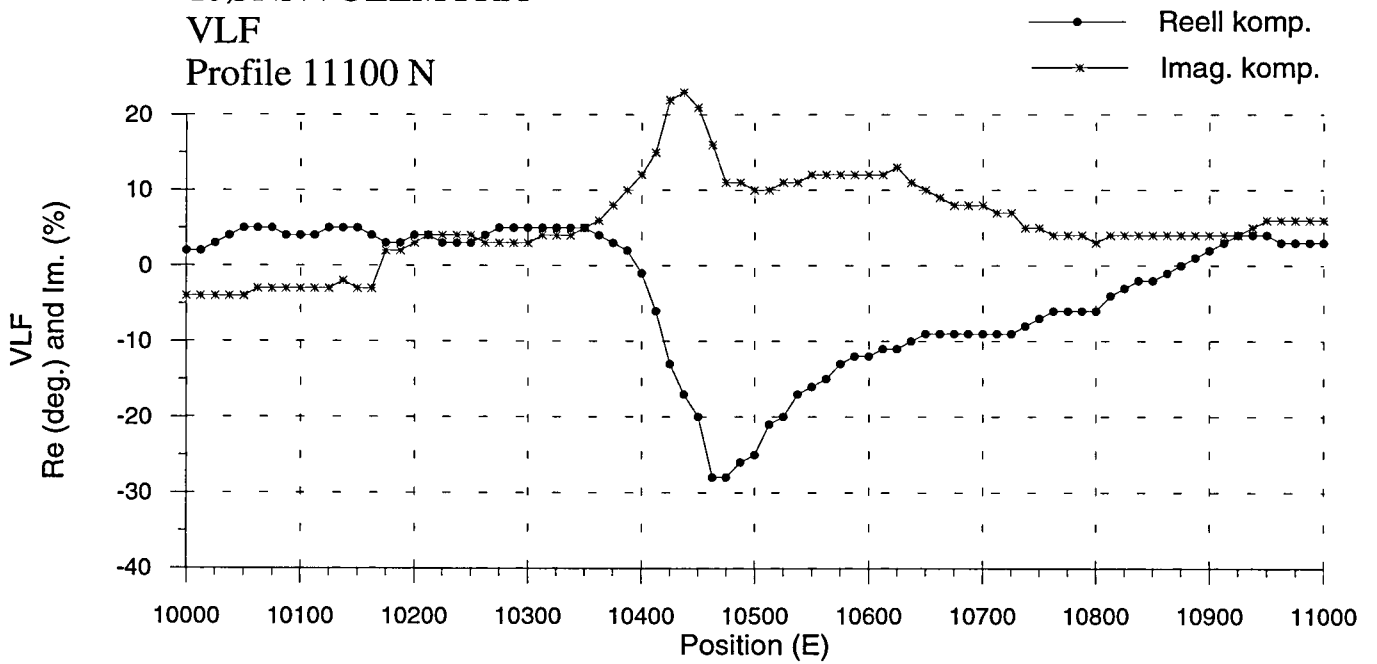


Figure 14b. Magnetic total field and VLF profile 11100 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 11200 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

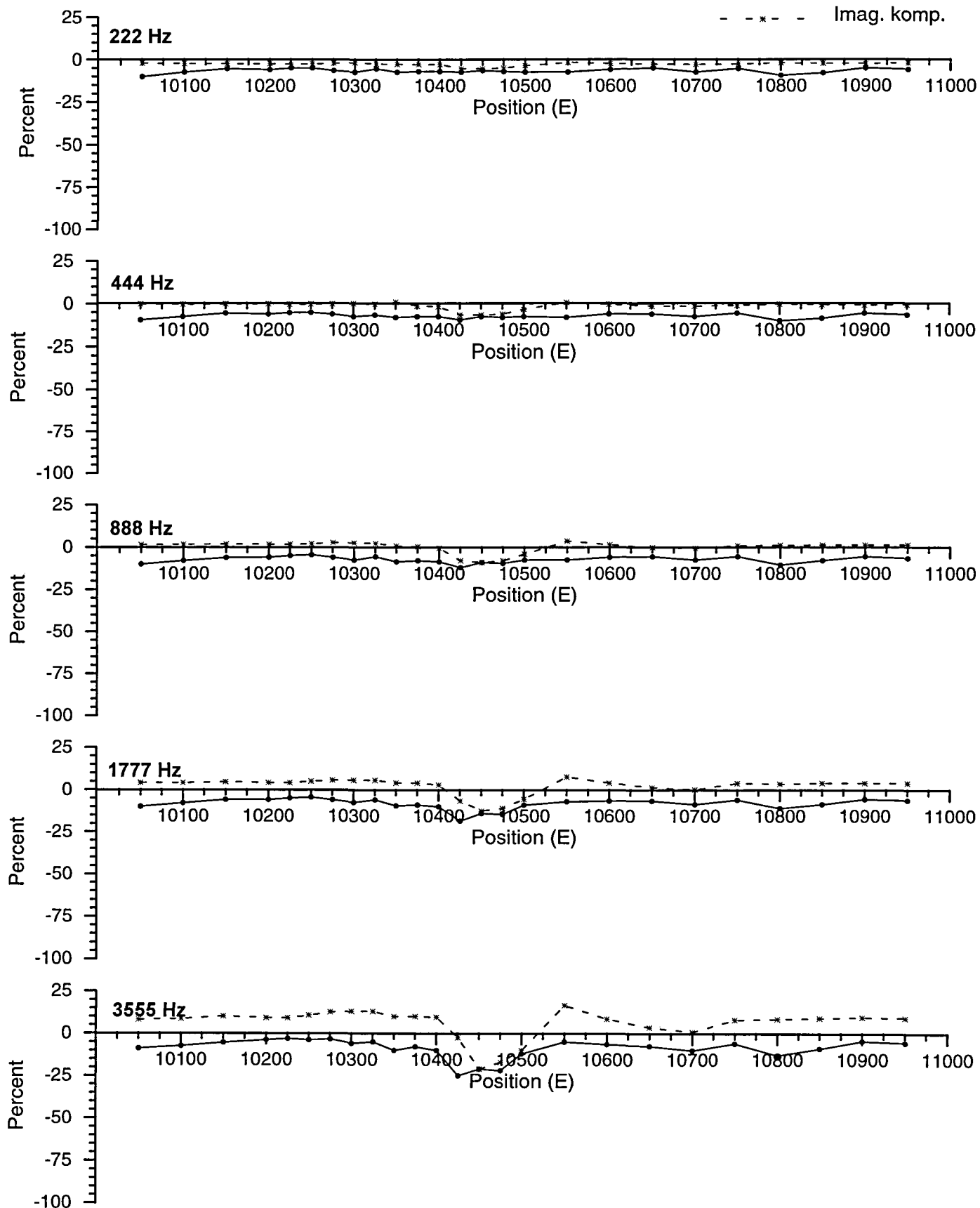
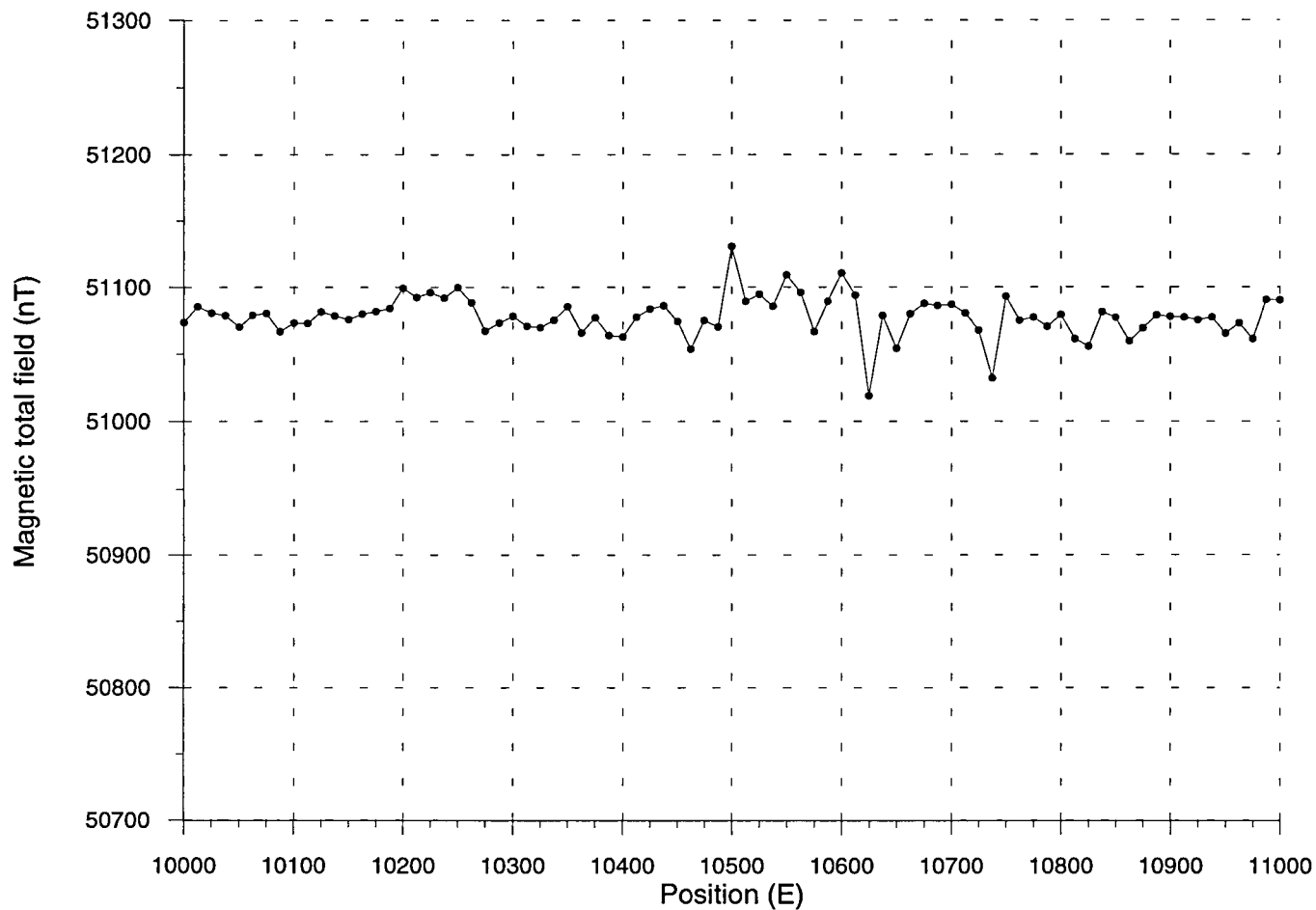


Figure 15a. Slingram MaxMin profile 11200 N.



TJØNNVOLLMYRA  
Magnetic total field  
Profile 11200 N



TJØNNVOLLMYRA  
VLF  
Profile 11200 N

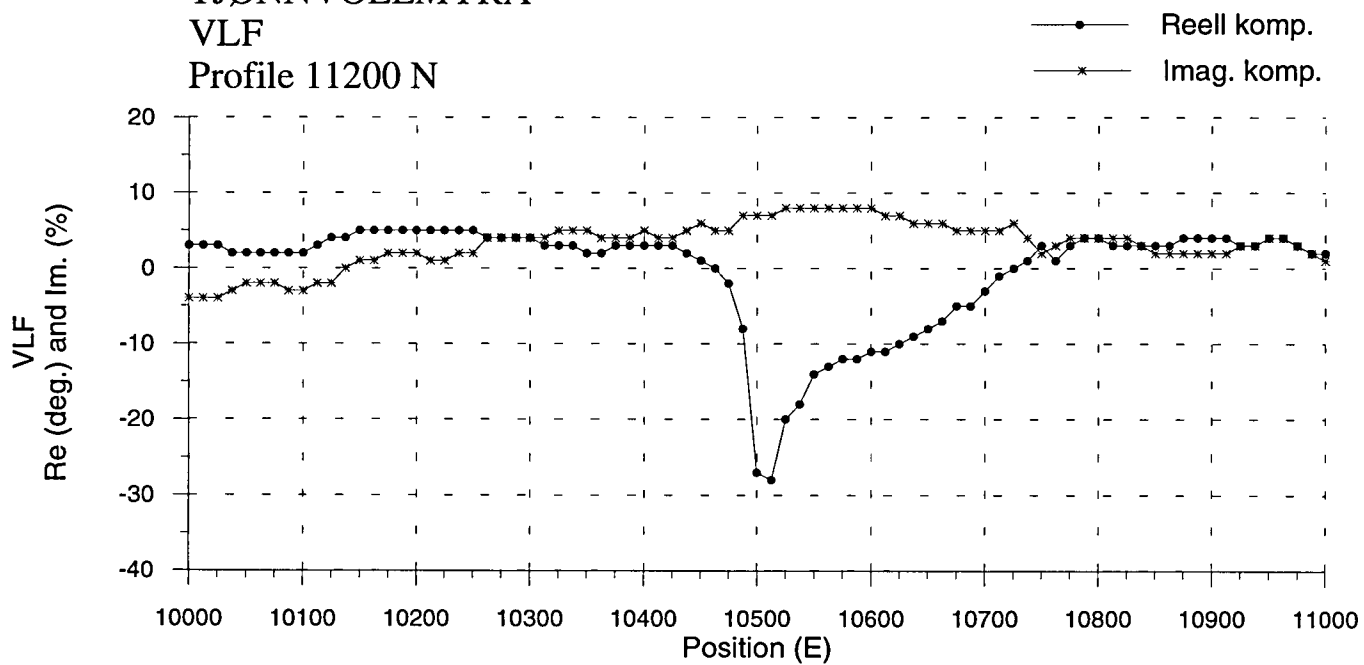


Figure 15b. Magnetic total field and VLF profile 11200 N.

TJØNNVOLLMYRA  
Slingram MaxMin  
Profile 11300 N

Tx ----- Rx 100m

—●— Reell komp.  
- - \* - - Imag. komp.

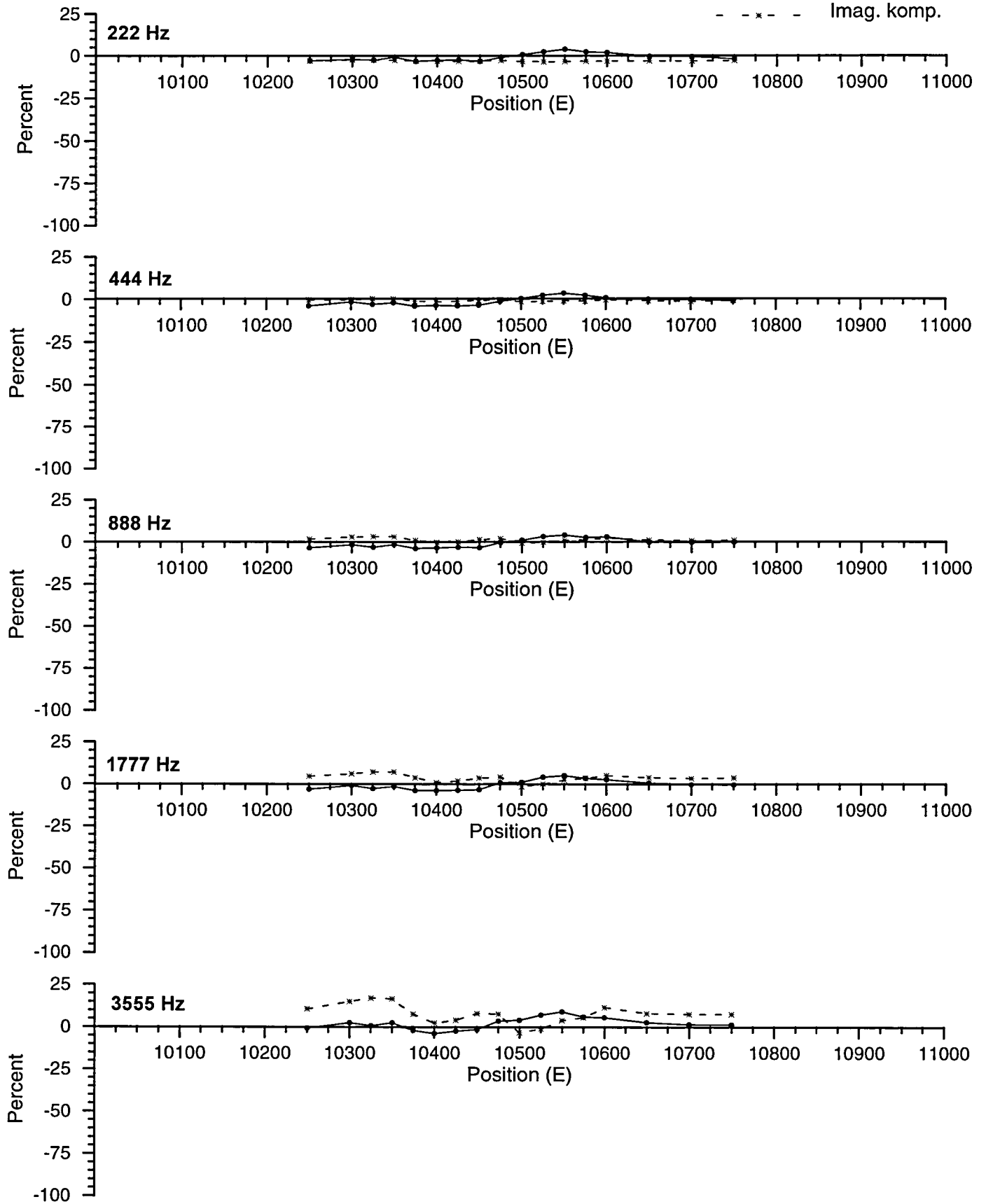


Figure 16a. Slingram MaxMin profile 11300 N.



INVESTIGATED AREA

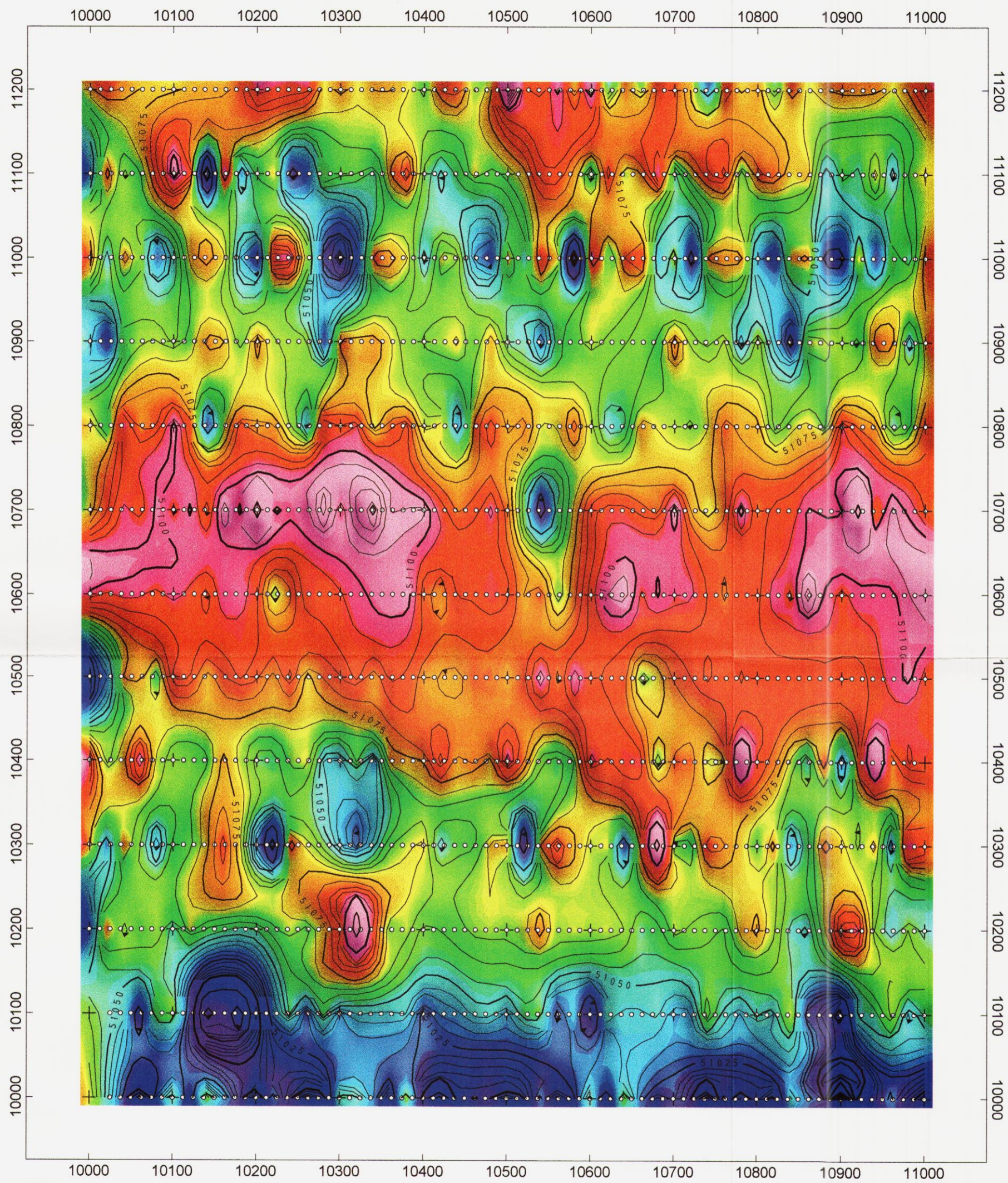
CREW DEVELOPMENT CORPORATION  
 INVESTIGATED AREA  
**TJØNNVOLLMYRA**  
 HOLTÅLEN, SØR-TRONDELAG

SCALE  1:50 000	OPER. E.D.	APRIL 2000
	DRAW E.D.	MAY 2000
	TRAC	

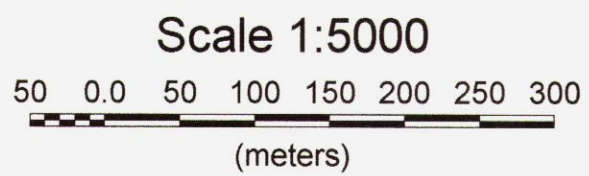
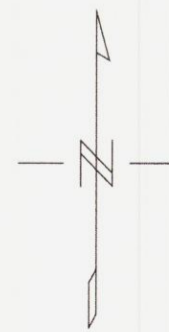
GEOLOGICAL SURVEY OF NORWAY  
 TRONDHEIM

MAP NO.  
 2000.066-01

MAP 1:50 000  
 1720 IV

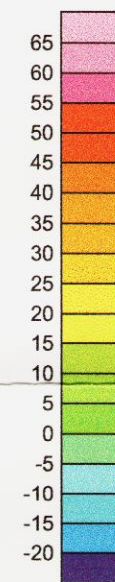
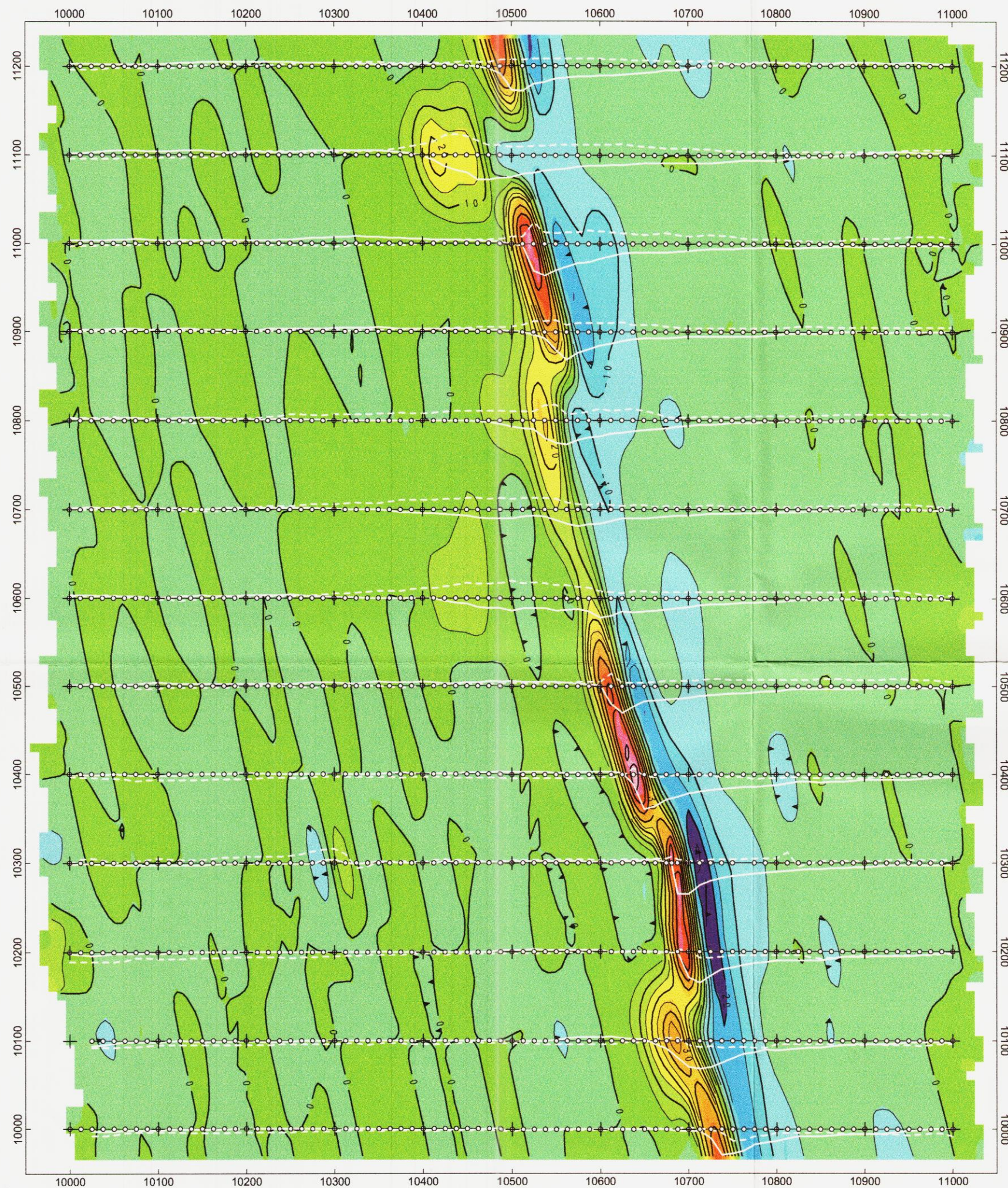


Mag.tot  
n.T.



**CREW**  
**DEVELOPMENT CORPORATION**  
**Magnetic total field**  
**TJØNNVOLLMYRA**  
**2000.066-02**

# VLF Fraser-filtered tilt angle



rel. units

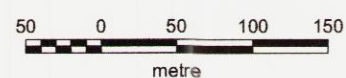


## VLF profile curves

Tilt angle: solid white, 5 degr./mm

Quadrature: white dashes, 5 % /mm

Scale 1 : 5000



**CREW**

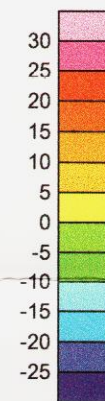
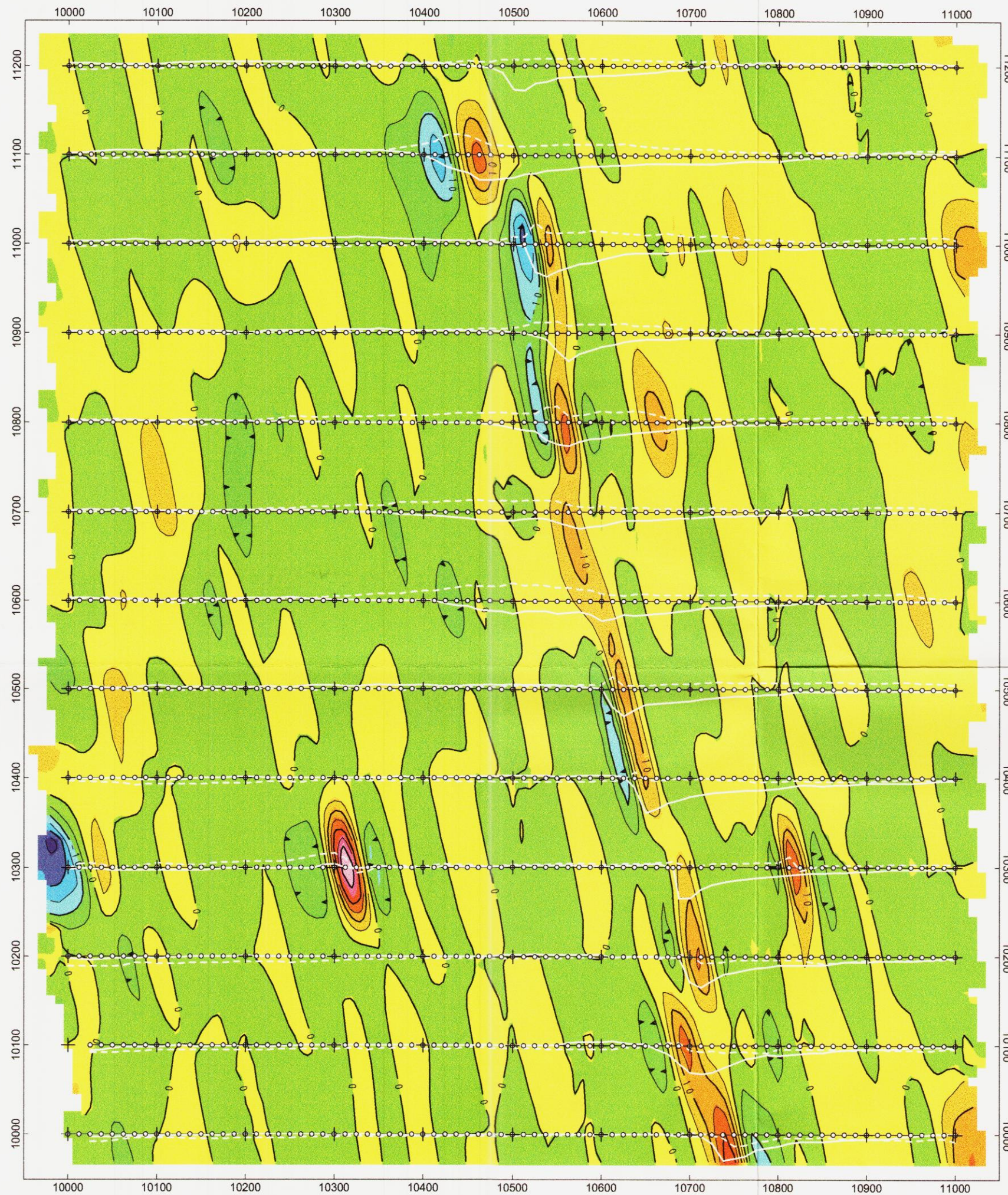
DEVELOPMENT CORPORATION

VLF Fraser-filtered tilt angle

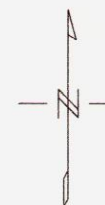
**TJØNNVOLLMYRA**

2000.066-03

# VLF Fraser-filtered quadrature



rel. units

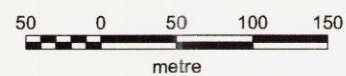


## VLF profile curves

Tilt angle: solid white, 5 degr./mm

Quadrature: white dashes, 5 % /mm

Scale 1 : 5000



# CREW

DEVELOPMENT CORPORATION

## VLF Fraser-filtered quadrature

## TJØNNVOLLMYRA

2000.066-04