

**BRITISH GEOLOGICAL SURVEY**

# **Port Stanley Observatory Monthly Magnetic Bulletin**

**October 2012**

**12/10/PS**



**British  
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

# PORT STANLEY OBSERVATORY MAGNETIC DATA

## 1. Introduction

Port Stanley observatory was installed by the British Geological Survey (BGS) with financial support from a consortium of oil companies and became operational in February 1994.

This bulletin is published to provide rapid access to the provisional geomagnetic observatory results. The information is freely available for personal, academic, educational and non-commercial research or use. Magnetic observatory data are presented as a series of plots of one-minute, hourly and daily values, followed by tabulations of monthly values. The operation of the observatory and presentation of data are described in the rest of this section.

Enquiries about the data should be addressed to:

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Internet: [www.geomag.bgs.ac.uk](http://www.geomag.bgs.ac.uk)

## 2. Position

Port Stanley Observatory, one of the geomagnetic observatories maintained and operated by the British Geological Survey (BGS), is situated on a site at Sapper Hill near Port Stanley in the Falkland Islands. The observatory co-ordinates are:

*Geographic:* 51°42'15"S 302°06'25"E  
*Geomagnetic:* 42°07'26"S 012°05'46"E  
*Height above mean sea level:* 135 m

The geomagnetic co-ordinates are approximations, calculated using the 11th generation International Geomagnetic Reference Field (IGRF) at epoch 2012.5. On-line access to models (including IGRF), charts and navigational data are available at [http://www.geomag.bgs.ac.uk/data\\_service/models\\_compass/home](http://www.geomag.bgs.ac.uk/data_service/models_compass/home)

## 3. The Observatory Operation

### 3.1 GDAS

The observatory operates under the control of the Geomagnetic Data Acquisition System (GDAS), which was developed by BGS staff, installed and became operational in August 2002. The data acquisition software, running on QNX operated computers, controls the data logging and the communications.

There are two sets of sensors used for making magnetic measurements. A tri-axial linear-core fluxgate magnetometer, manufactured by the Danish Meteorological Institute, is used to measure the variations in the horizontal (*H*) and vertical (*Z*) components of the field. The third sensor is oriented perpendicular to these, and measures variations, which are proportional to the changes in declination (*D*). Measurements are made at a rate of 1 Hz.

In addition to the fluxgate sensors there is a proton precession magnetometer (PPM) making measurements of the absolute total field intensity (*F*) at a rate of 0.1Hz.

The raw unfiltered data are retrieved automatically via Internet connections to the BGS office in Edinburgh in near real-time. The fluxgate data are filtered to produce one-minute values using a 61-point cosine filter and the total field intensity samples are filtered using a 7-point cosine filter. The one-minute values provide input for various data products, available on-line at [www.geomag.bgs.ac.uk/data\\_service/home](http://www.geomag.bgs.ac.uk/data_service/home)

### 3.2 Absolute Observations

The GDAS fluxgate magnetometers accurately measure variations in the components of the geomagnetic field, but not the absolute magnitudes. Two sets of absolute measurements of the field are made manually twice per month. A fluxgate sensor mounted on a theodolite is used to determine *D* and inclination (*I*); the GDAS PPM measurements, with a site difference correction applied, are used for *F*. The absolute observations are used in conjunction with the GDAS variometer measurements to produce a continuous record of the absolute values of the geomagnetic field elements as if they had been measured at the observatory reference pillar.

## 4. Observatory Results

The data presented in the bulletin are in the form of plots and tabulations described in the following sections.

### 4.1 Absolute Observations

The absolute observation measurements made during the month are tabulated. Also included are the corresponding baseline values, which are the differences between the absolute measurements and the variometer measurements of  $D$ ,  $H$  and  $Z$  (in the sense absolute–variometer). These are also plotted (markers) along with the derived preliminary daily baseline values (line) throughout the year. Daily mean differences between the measured absolute  $F$  and the  $F$  computed from the baseline corrected  $H$  and  $Z$  values are plotted in the fourth panel (in the sense measured–derived). The bottom panel shows the daily mean temperature in the fluxgate chamber.

### 4.2 Summary magnetograms

Small-scale magnetograms are plotted which allow the month's data to be viewed at a glance. They are plotted 16 days to a page and show the one-minute variations in  $D$ ,  $H$  and  $Z$ . The scales are shown on the right-hand side of the page. On disturbed days the scales are multiplied by a factor, which is indicated above the panel for that day. The variations are centred on the monthly mean value, shown on the left side of the page.

### 4.3 Magnetograms

The daily magnetograms are plotted using one-minute values of  $D$ ,  $H$  and  $Z$  from the fluxgate sensors, with any gaps filled using back-up data. The magnetograms are plotted to a variable scale; scale bars are shown to the right of each plot. The absolute level (the monthly mean value) is indicated on the left side of the plots.

### 4.4 Hourly Mean Value Plots

Hourly mean values of  $D$ ,  $H$  and  $Z$  for the past 12 months are plotted in 27-day segments corresponding to the Bartels solar rotation number. Magnetic disturbances associated with active regions and/or coronal holes on the Sun may recur after 27 days: the same is true for geomagnetically

quiet intervals. Plotting the data in this way highlights this recurrence. Diurnal variations are also clear in these plots and the amplitude changes throughout the year highlight the seasonal changes. Longer term secular variation is also illustrated.

### 4.5 Daily and Monthly Mean Values

Daily mean values of  $D$ ,  $H$ ,  $Z$  and  $F$  are plotted throughout the year. In addition, a table of monthly mean values of all the geomagnetic elements is provided. These values depend on accurate specification of the fluxgate sensor baselines. It is anticipated that these provisional values will not be altered by more than a few nT or tenths of arcminutes before being made definitive at the end of the year.

## 5. Conditions of Use

The data presented in this bulletin are provided for personal, academic, educational, non-commercial research or other non-commercial use and are not for sale or distribution to third parties without written permission from BGS.

Reproduction of any part of this bulletin should be accompanied by the statement: 'Reproduced with the permission of the British Geological Survey ©NERC. All rights Reserved'. Publications making use of the data should include an acknowledgment statement of the form: 'The results presented in this paper rely on the data collected at Port Stanley magnetic observatory, operated by the British Geological Survey.'

Commercial users can contact the geomagnetism team for information on the range of applications and services offered. Full contact details are available at [www.geomag.bgs.ac.uk/contactus/staff](http://www.geomag.bgs.ac.uk/contactus/staff)

# PORT STANLEY OBSERVATORY

## ABSOLUTE OBSERVATIONS

Date	Day Number	Declination			Inclination		Total Field		Horizontal Intensity		Vertical Intensity		Observer
		Time (UT)	Absolute (°)	Baseline (°)	Time (UT)	Absolute (°)	Site difference (nT)	Absolute corrected (nT)	Absolute (nT)	Baseline (nT)	Absolute (nT)	Baseline (nT)	
14-Oct-12	288	18:58	3.4228	3.6667	19:05	-49.6458	-31.4	28547.0	18484.5	18844.8	-21754.4	-21942.7	NB
14-Oct-12	288	19:11	3.4207	3.6667	19:18	-49.6492	-31.4	28546.2	18482.7	18845.3	-21754.9	-21942.5	NB
29-Oct-12	303	12:48	3.1674	3.6750	13:04	-49.5817	-31.4	28556.2	18514.8	18844.6	-21740.7	-21943.6	AS
29-Oct-12	303	13:20	3.1574	3.6650	13:32	-49.5897	-31.4	28552.5	18509.3	18845.5	-21740.5	-21942.7	AS
29-Oct-12	303	18:25	3.3502	3.6617	18:36	-49.5571	-31.4	28556.0	18524.0	18845.5	-21732.7	-21942.5	AS
29-Oct-12	303	18:45	3.3487	3.6667	18:55	-49.5603	-31.4	28557.9	18524.0	18845.0	-21735.1	-21942.9	AS
30-Oct-12	304	12:50	3.1642	3.6667	13:03	-49.5938	-31.4	28546.8	18504.1	18844.8	-21737.4	-21943.3	AS
30-Oct-12	304	13:18	3.1581	3.6567	13:30	-49.5979	-31.4	28542.8	18500.0	18843.9	-21735.8	-21944.3	AS
30-Oct-12	304	17:48	3.3649	3.6617	17:59	-49.5687	-31.4	28545.9	18513.0	18844.3	-21728.7	-21943.2	AS
30-Oct-12	304	18:11	3.3492	3.6550	18:21	-49.5656	-31.4	28546.9	18514.8	18844.5	-21728.4	-21943.1	AS

# Falkland Island 2012

Declination : Absolute - Variometer (markers) and Baseline Applied (line)

220.2

5min

Horizontal Intensity : Absolute - Variometer (markers) and Baseline Applied (line)

18845

20nT

Vertical Intensity : Absolute - Variometer (markers) and Baseline Applied (line)

-21943

20nT

Total Intensity : Absolute (Proton F) - Baseline Adjusted Variometer (derived F)

31.4

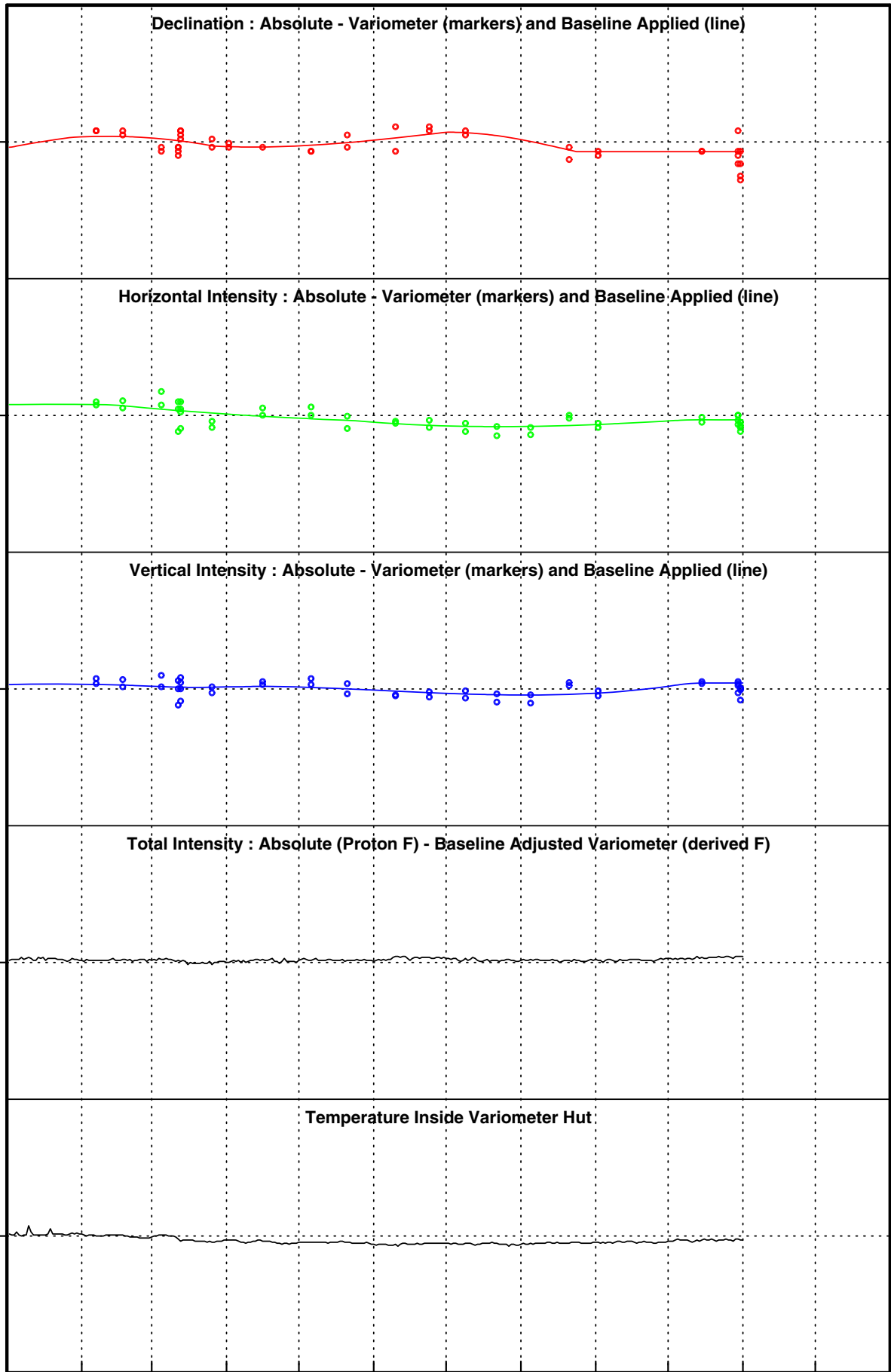
20nT

Temperature Inside Variometer Hut

23.2

20°C

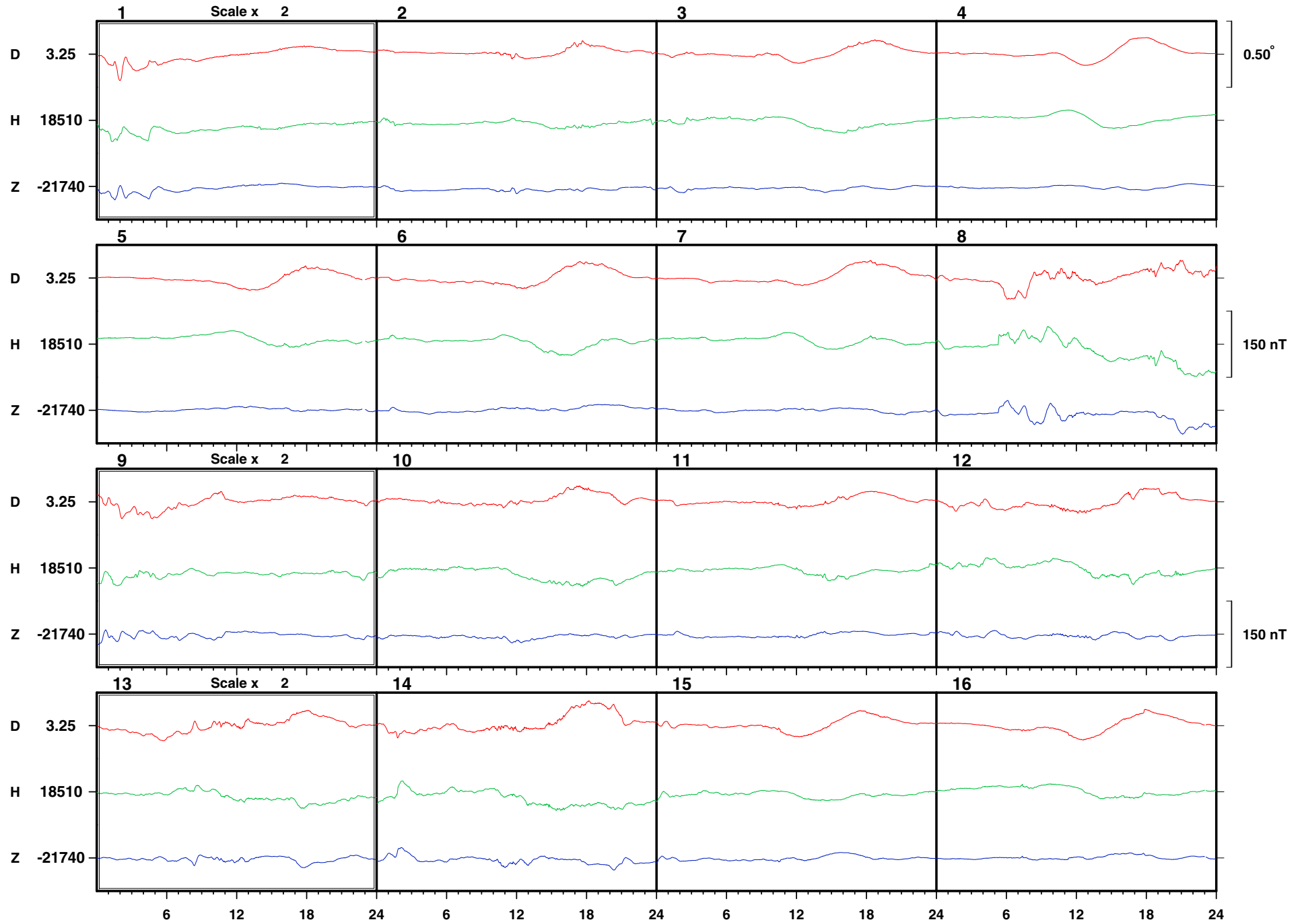
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

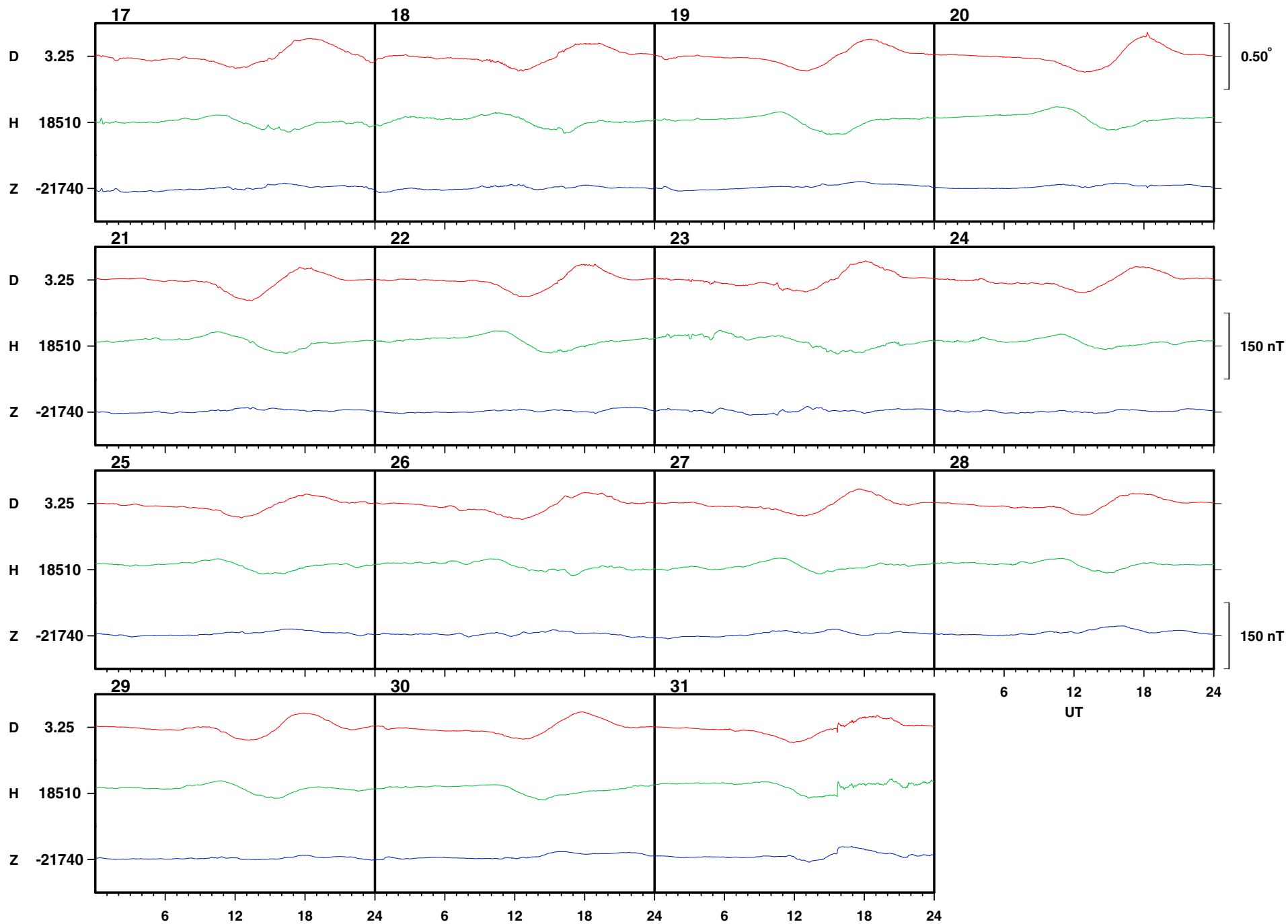


# Falkland Islands

# October

# 2012



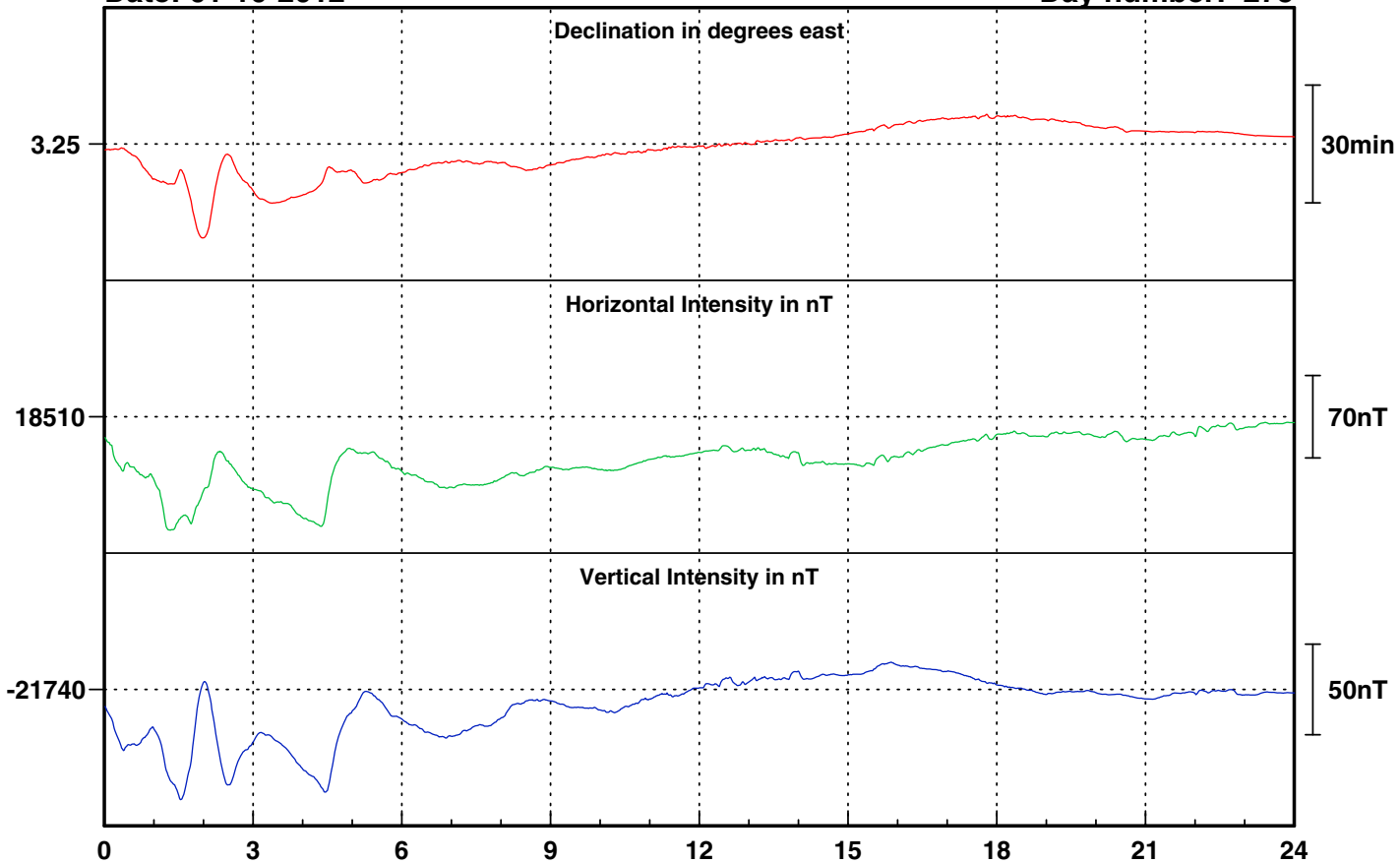


Falkland Islands                      October                      2012

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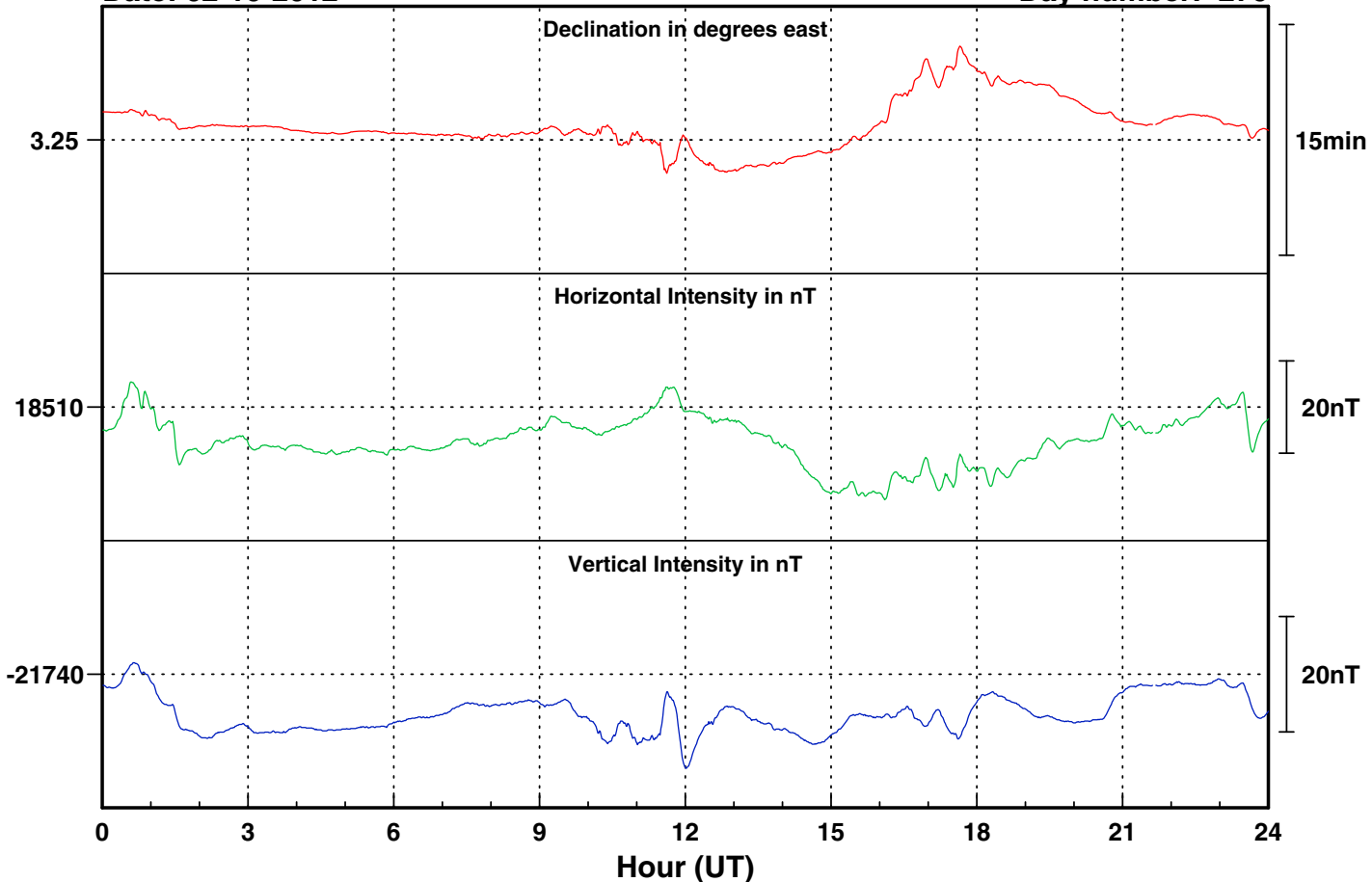
# Falkland Islands

Day number: 275



Date: 02-10-2012

Day number: 276

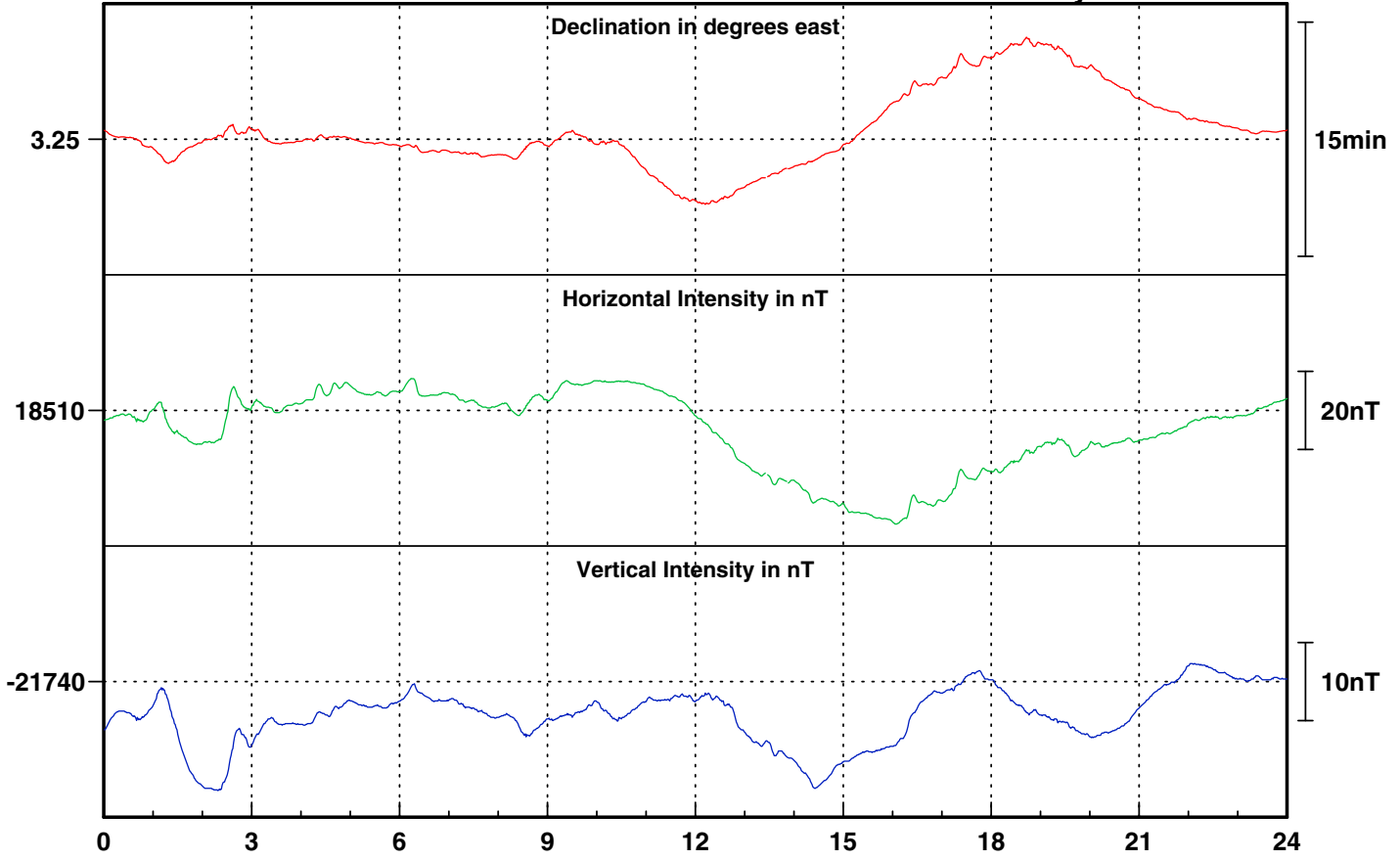




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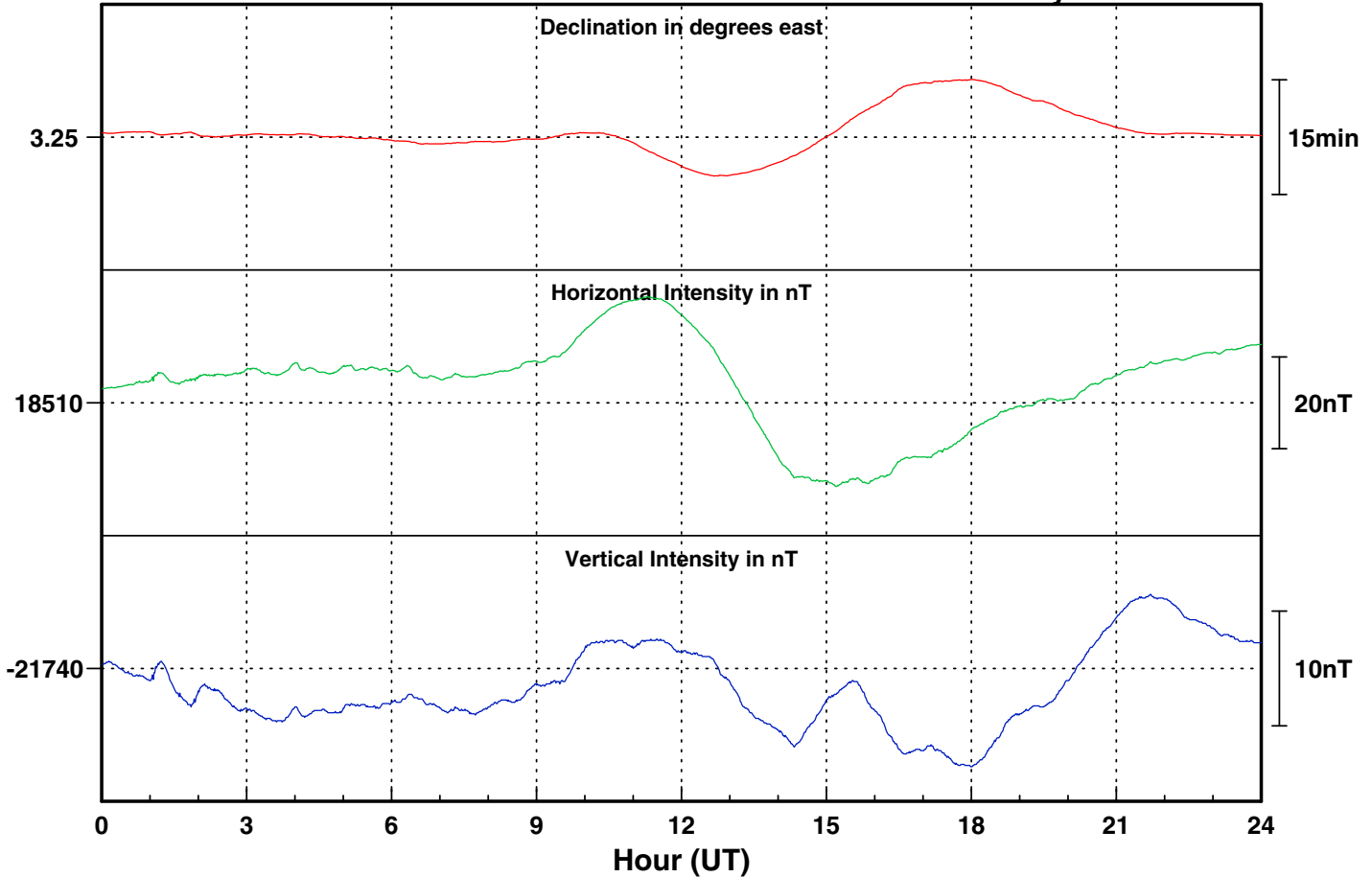
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Day number: 277



Date: 04-10-2012

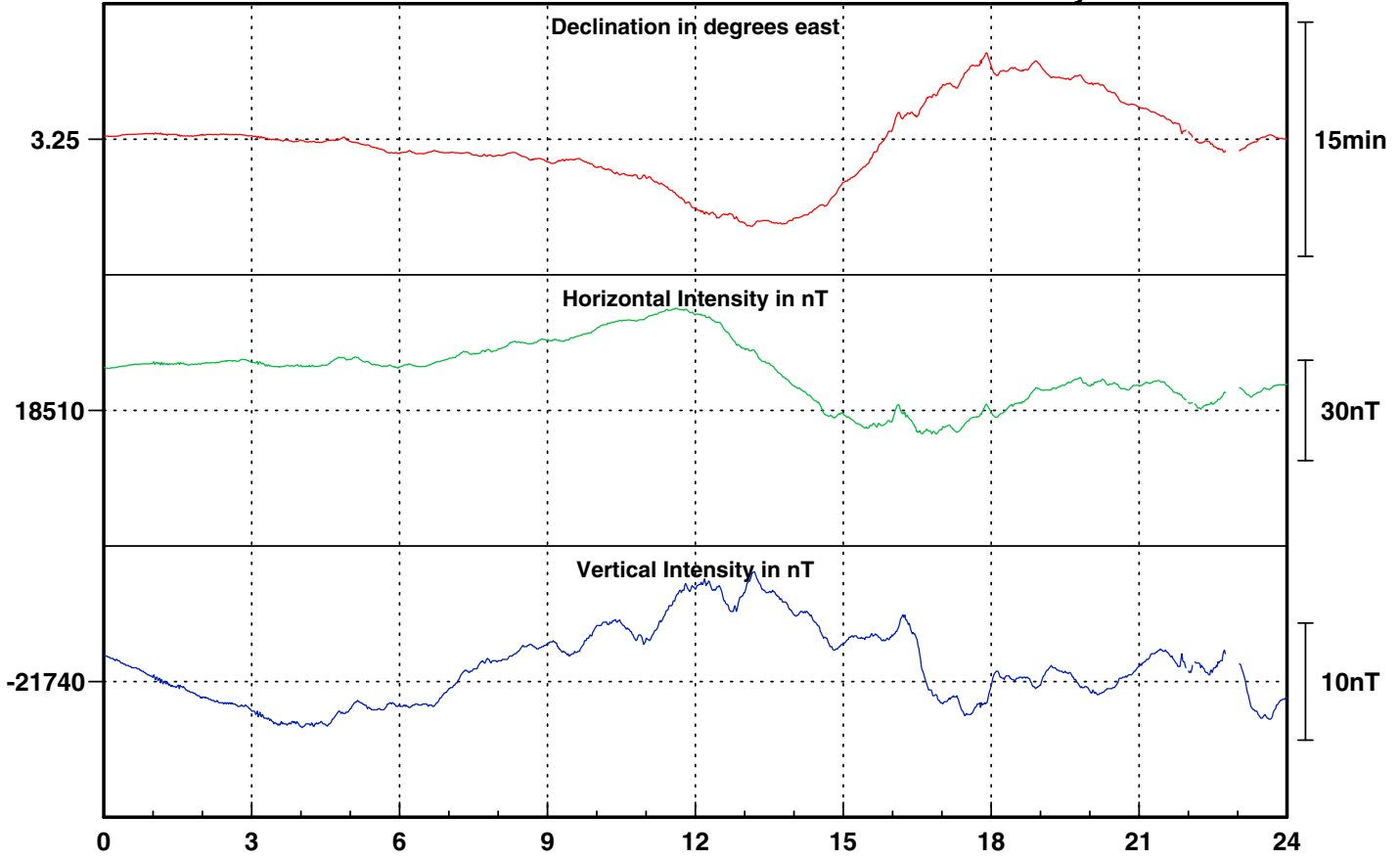
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Date: 05-10-2012

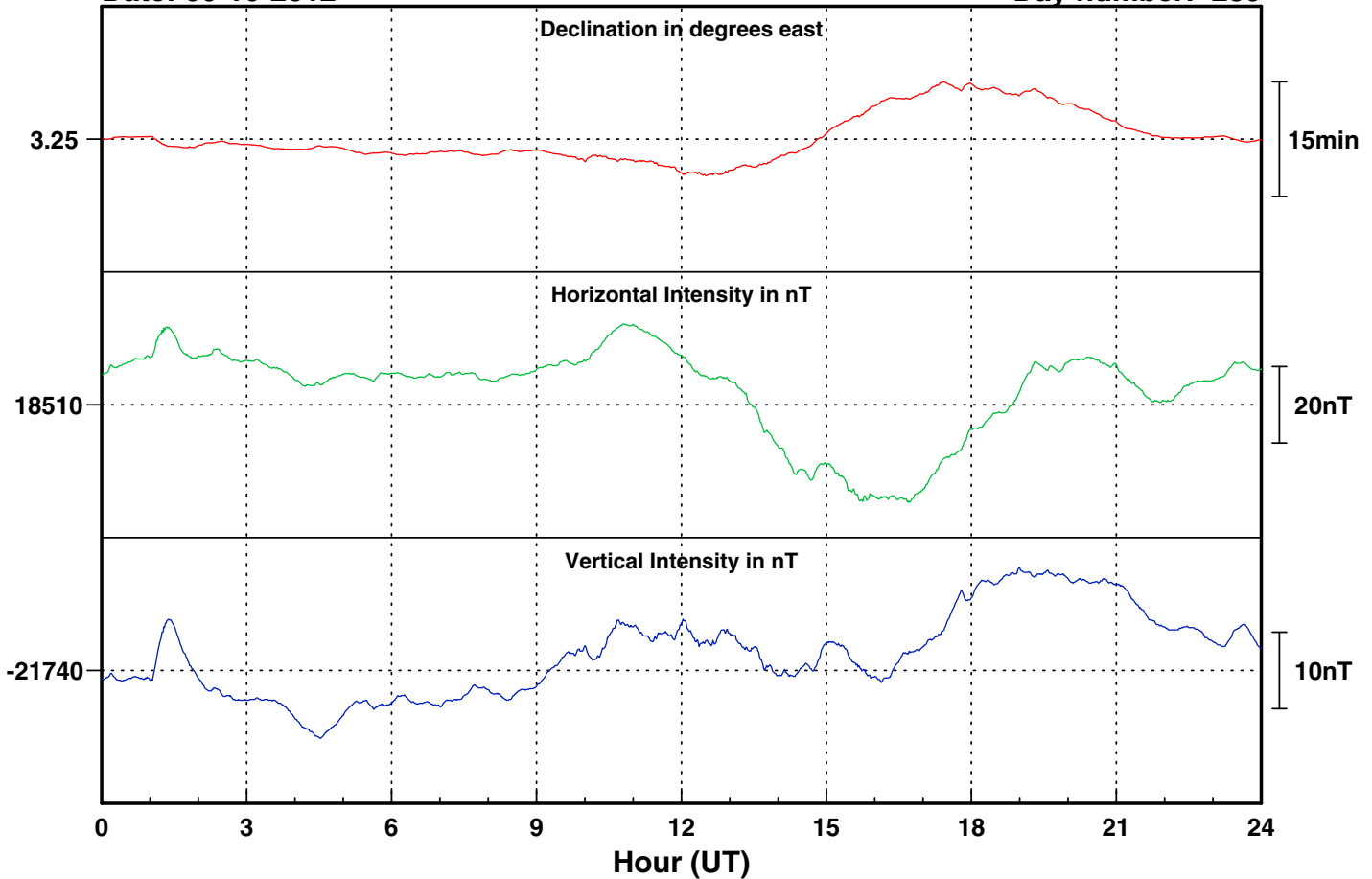
# Falkland Islands

Day number: 279



Date: 06-10-2012

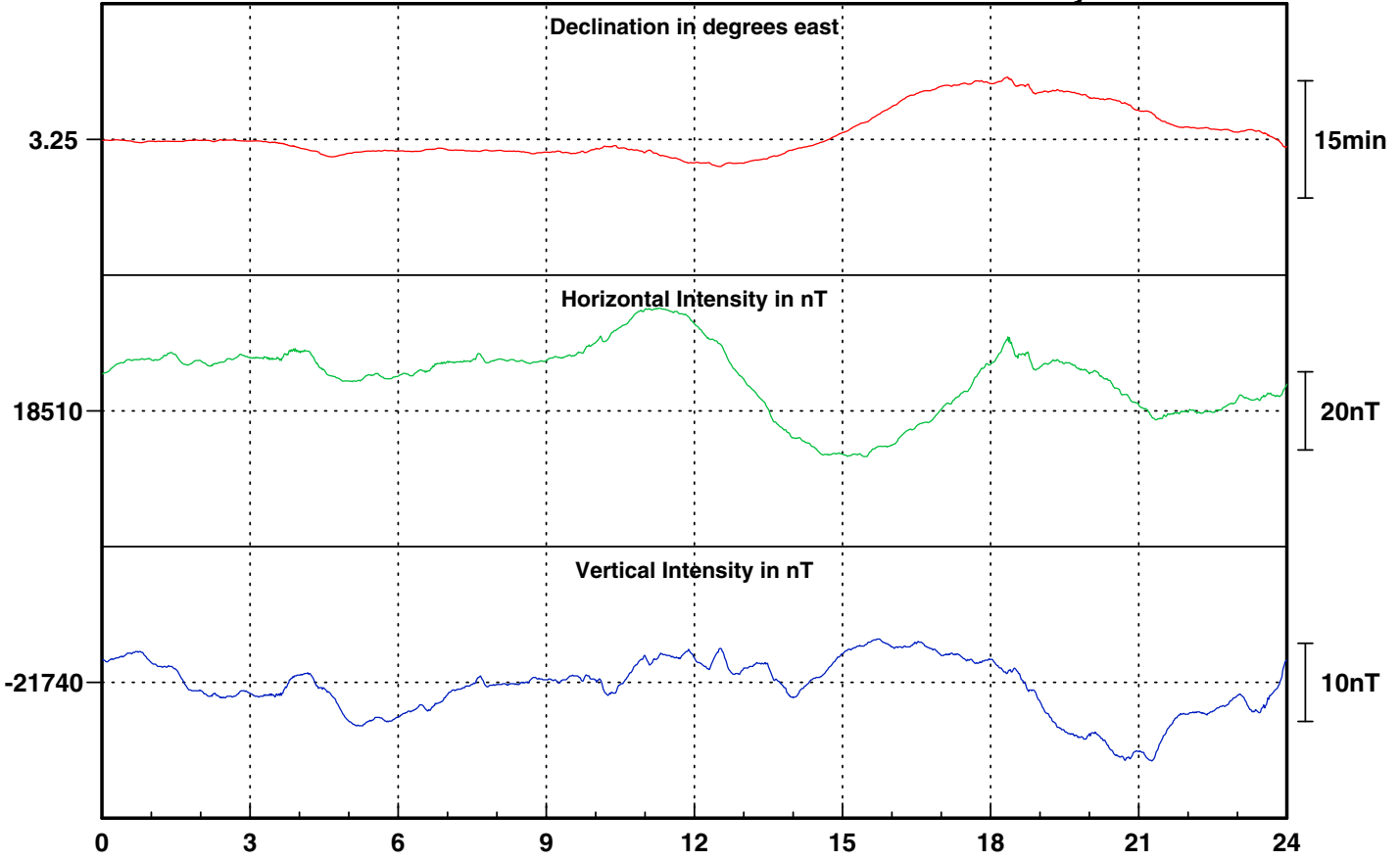
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Date: 07-10-2012

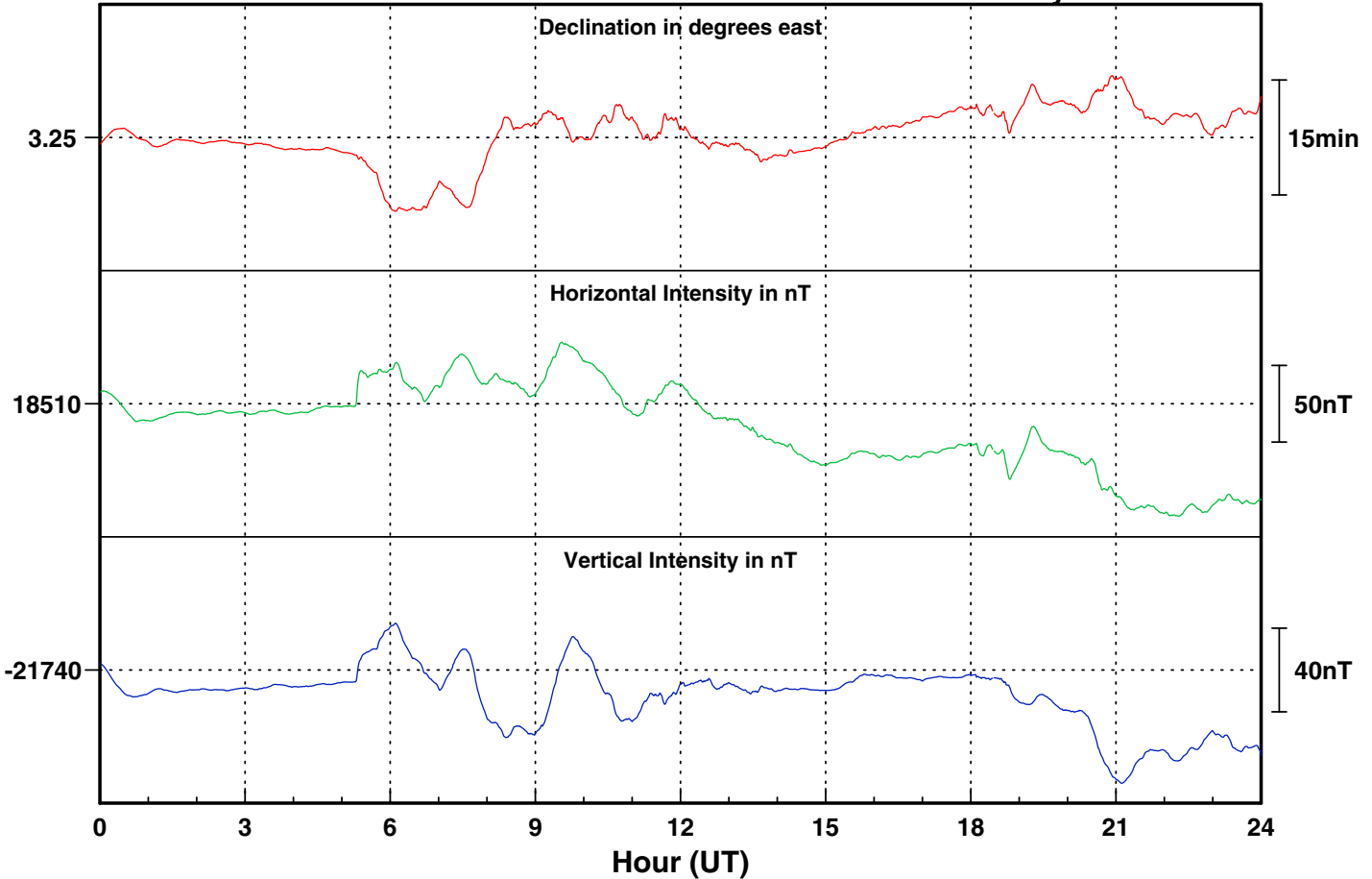
# Falkland Islands

Day number: 281



Date: 08-10-2012

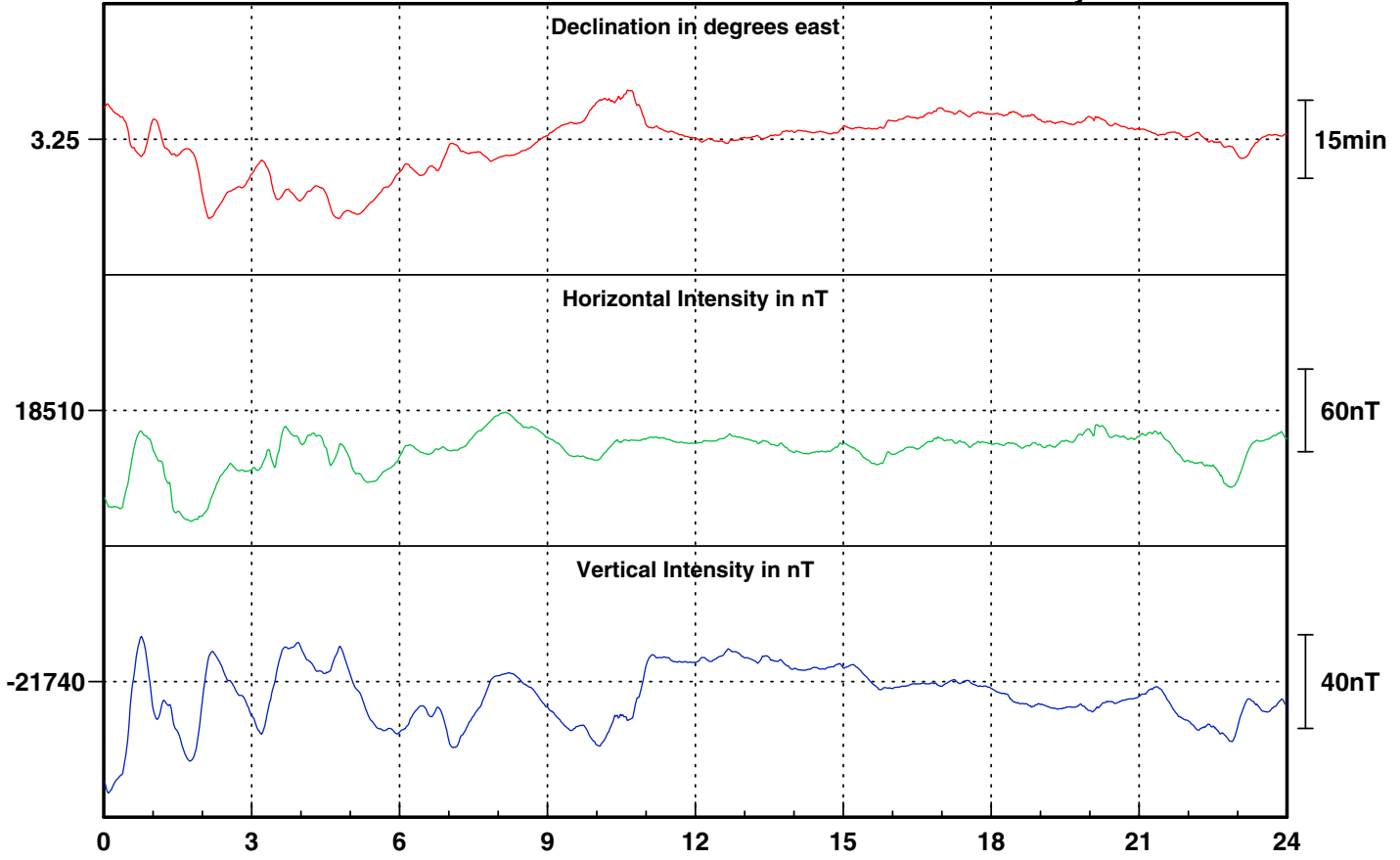
Day number: 282



Date: 09-10-2012

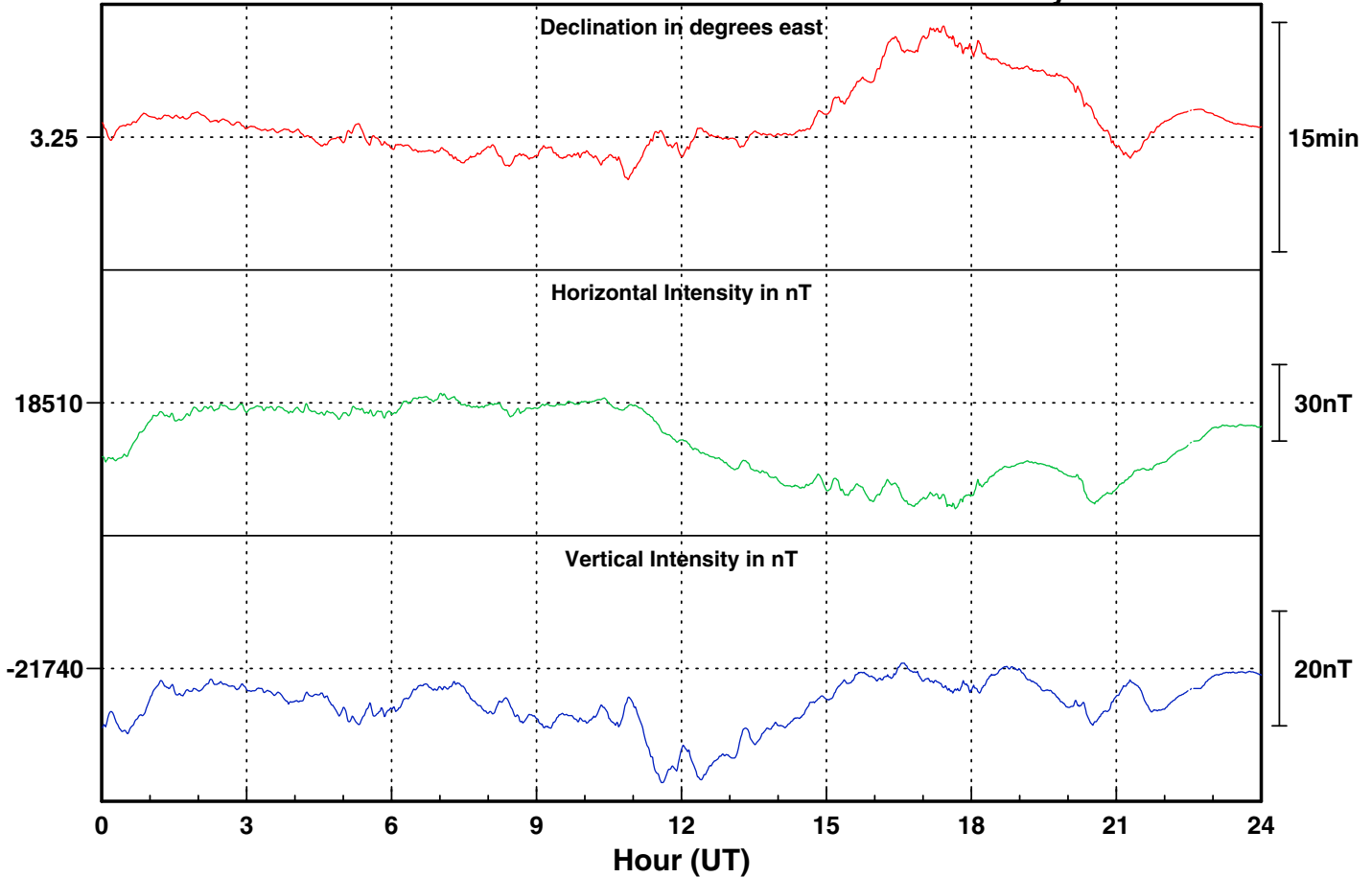
# Falkland Islands

Day number: 283



Date: 10-10-2012

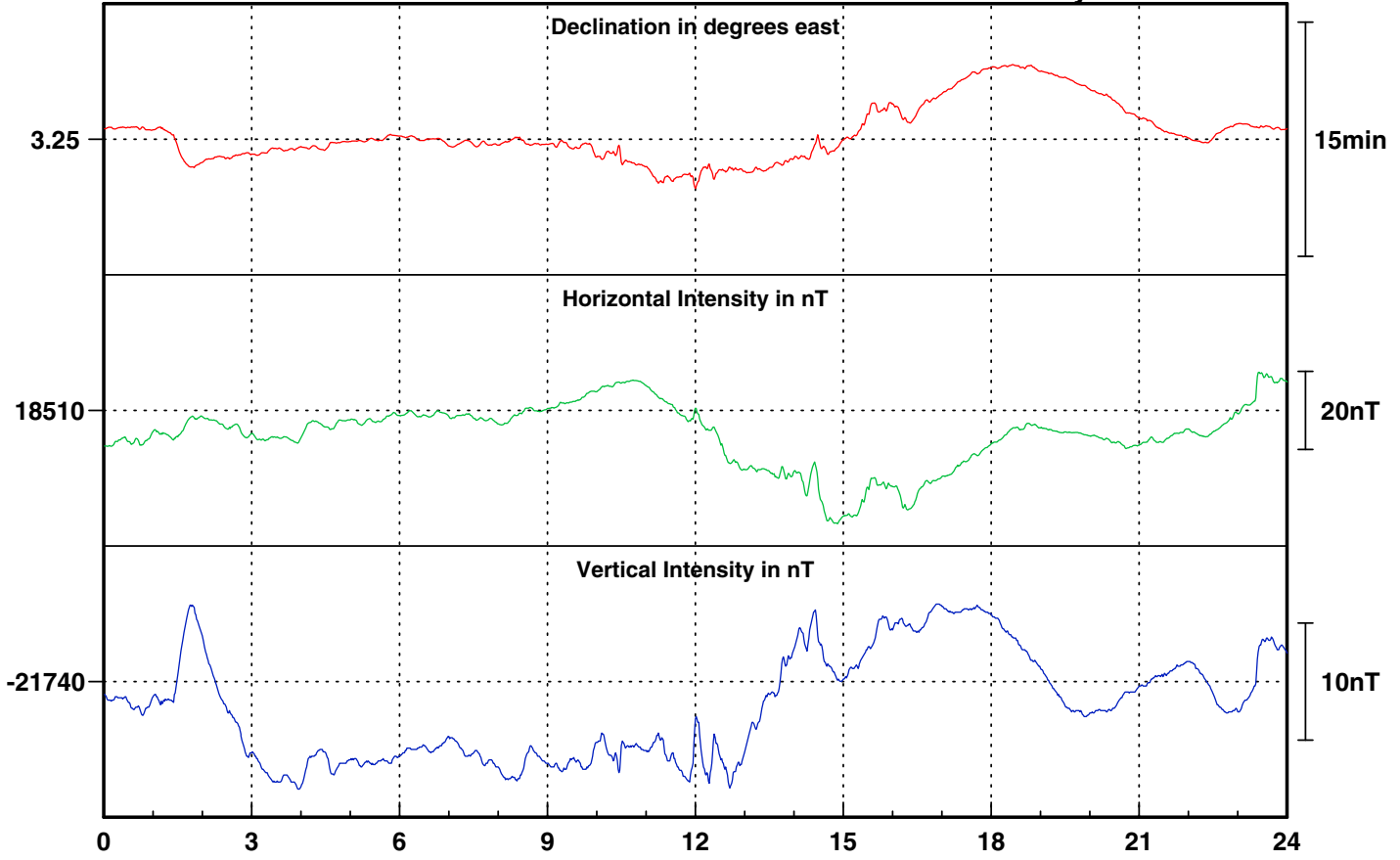
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Date: 11-10-2012

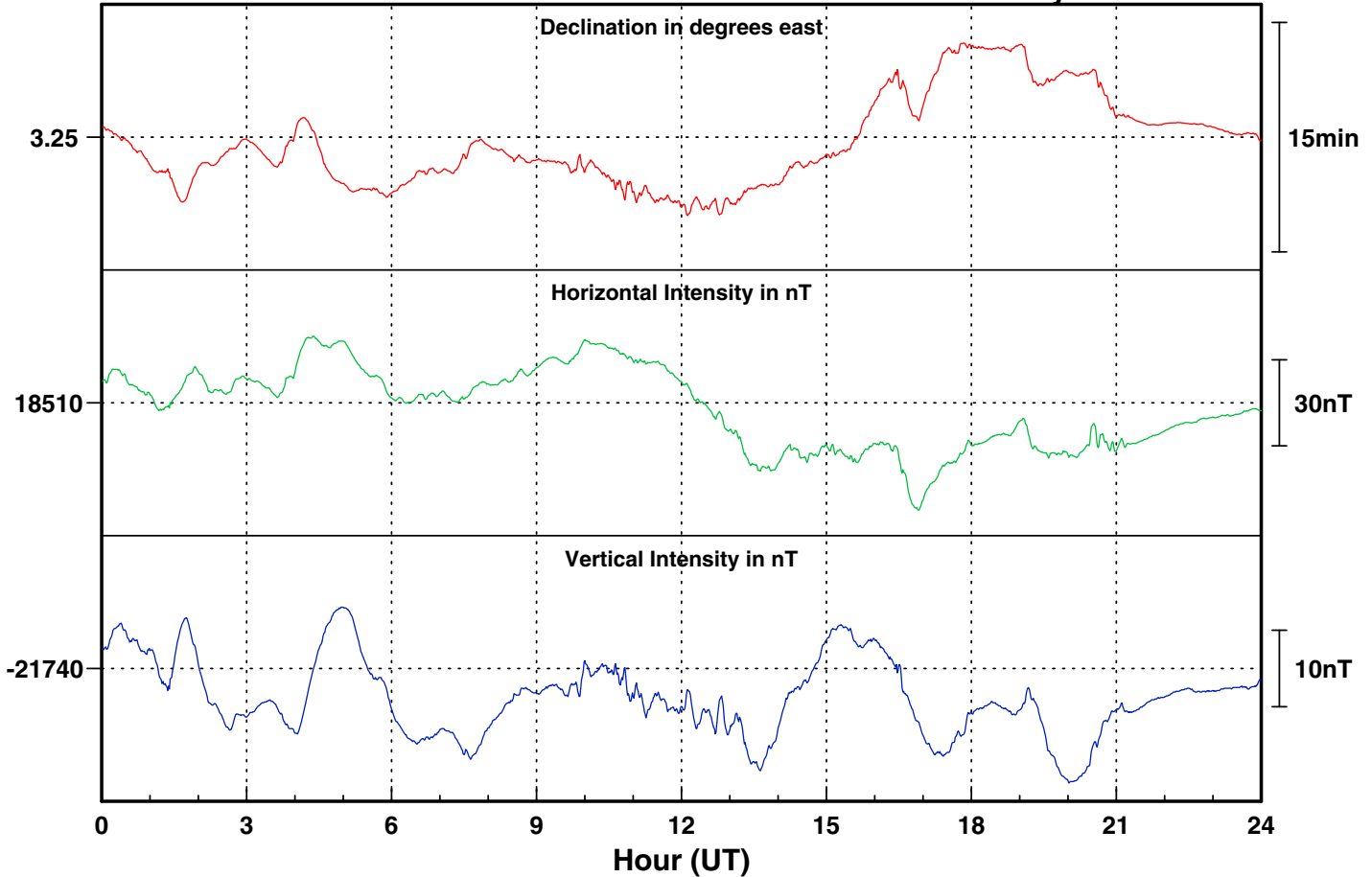
# Falkland Islands

Day number: 285



Date: 12-10-2012

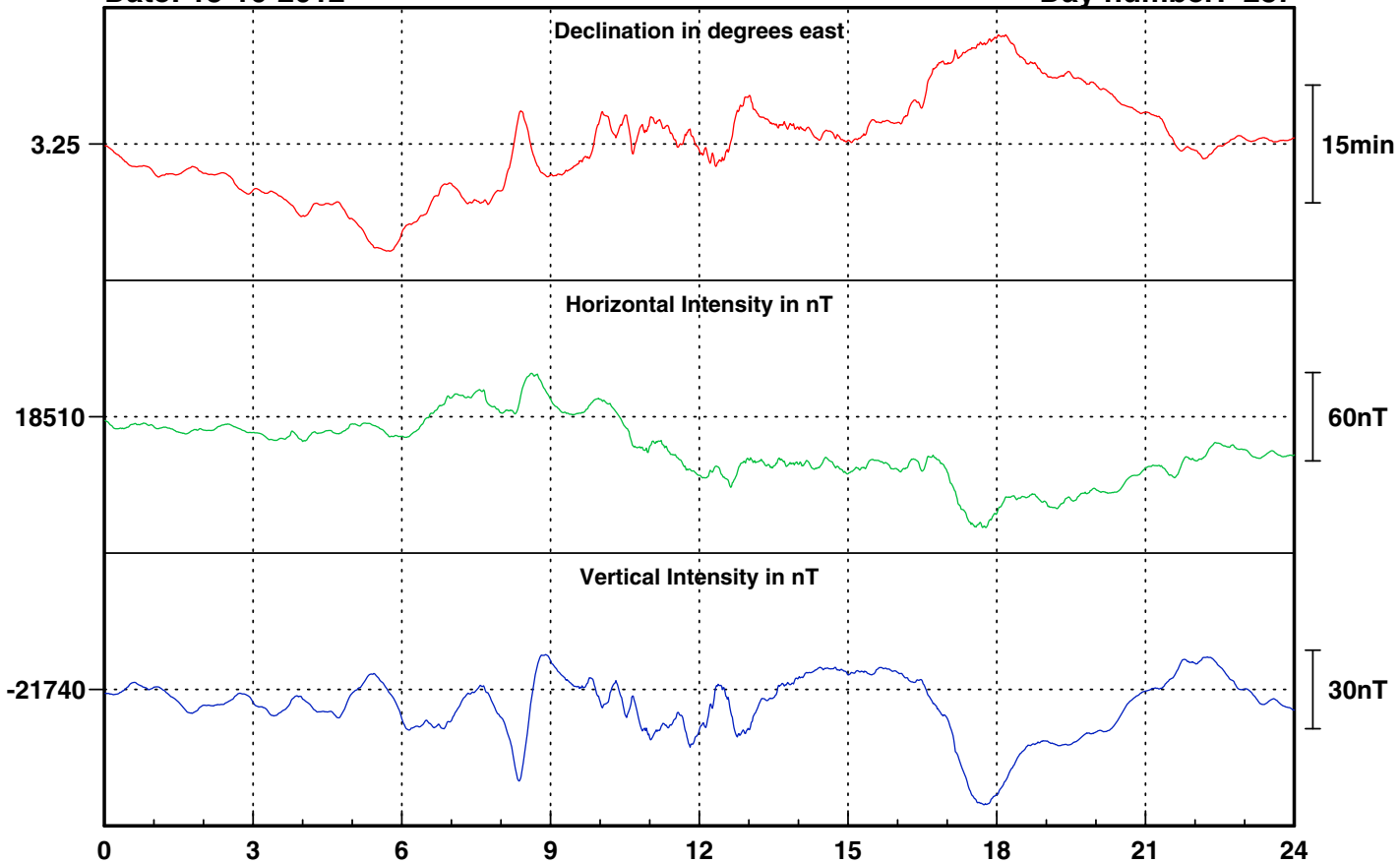
Day number: 286



Date: 13-10-2012

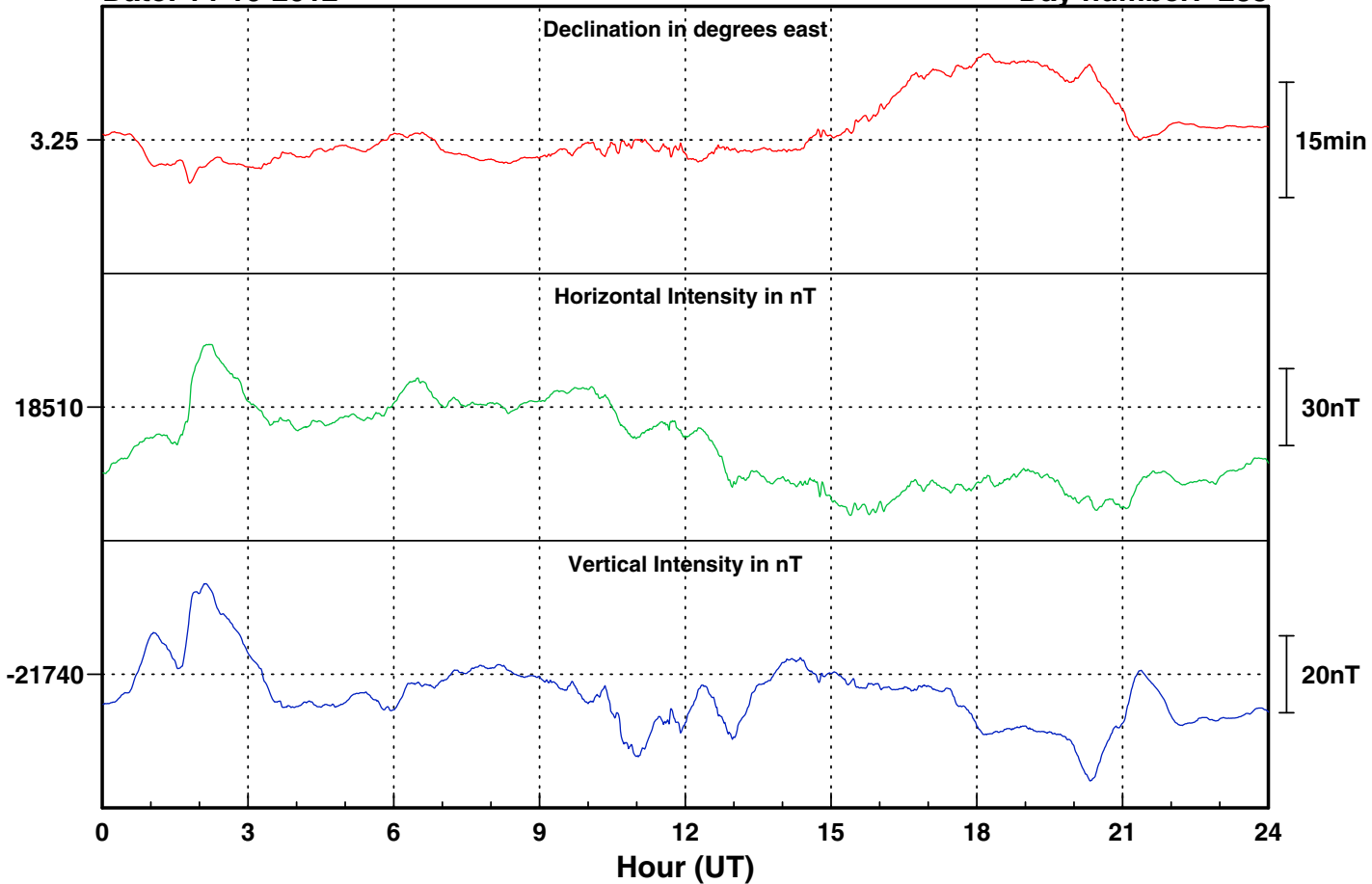
# Falkland Islands

Day number: 287



Date: 14-10-2012

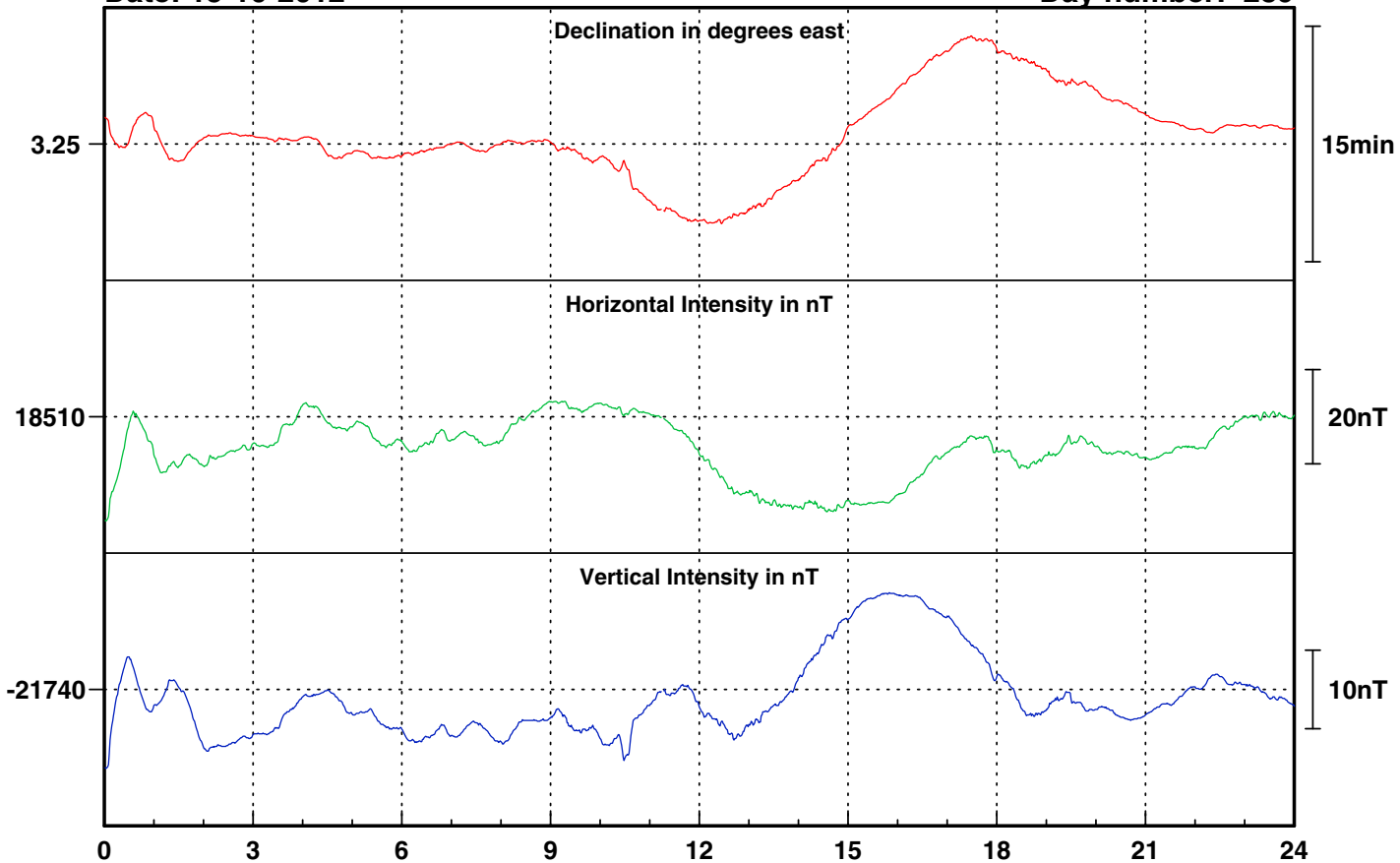
Day number: 288



# Falkland Islands

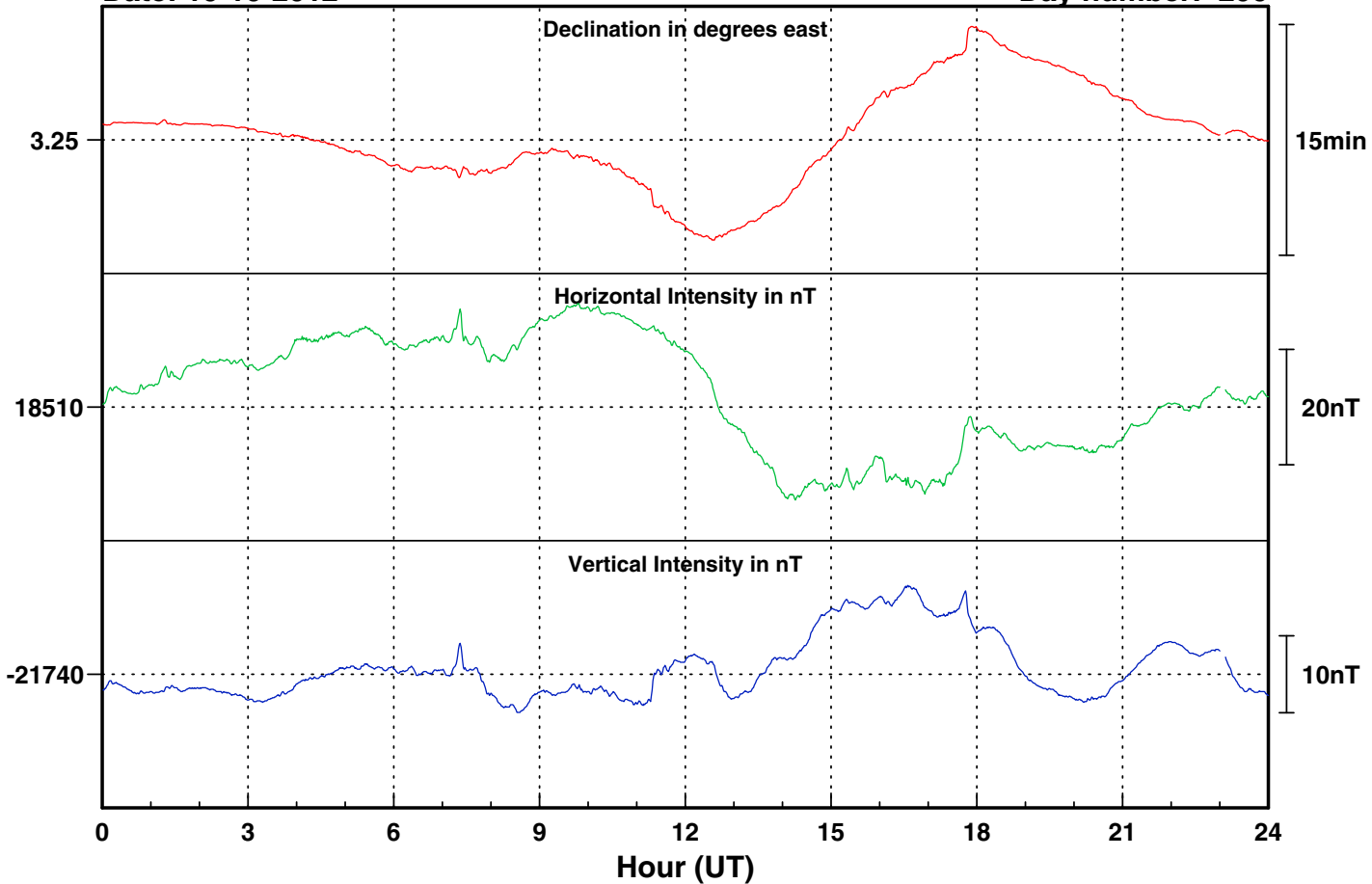
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Day number: 289



Date: 16-10-2012

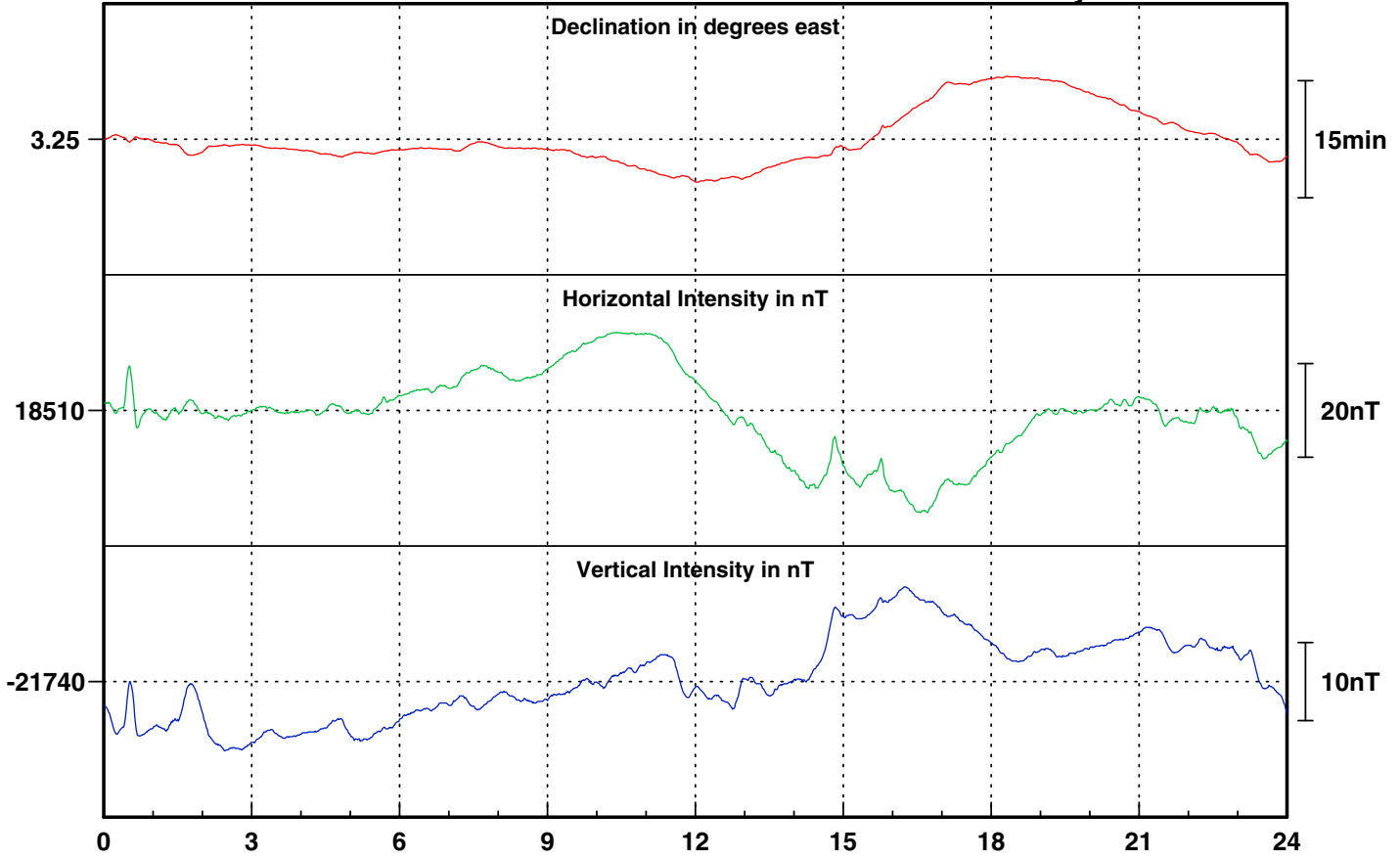
Day number: 290



Date: 17-10-2012

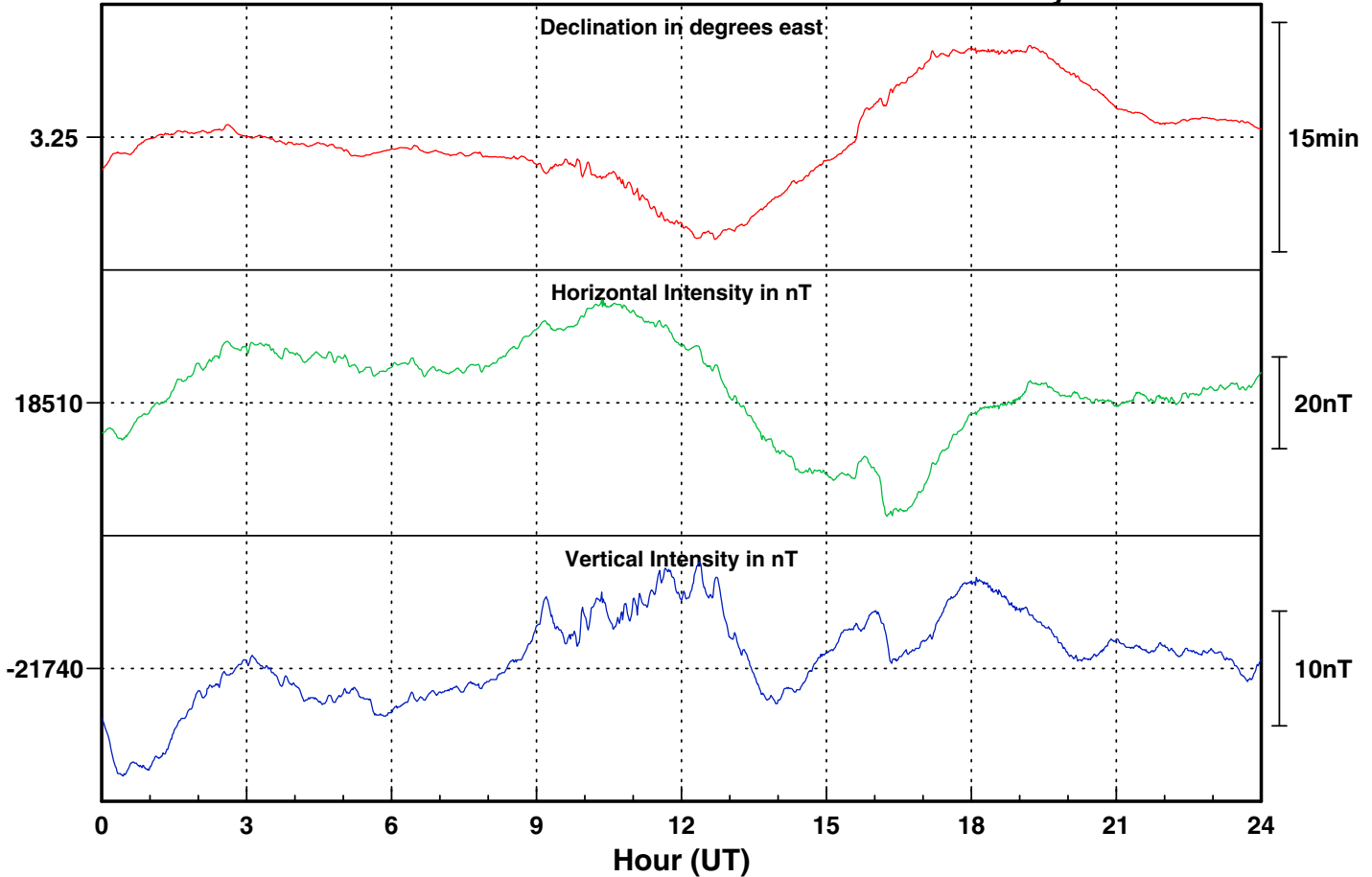
# Falkland Islands

Day number: 291



Date: 18-10-2012

Day number: 292

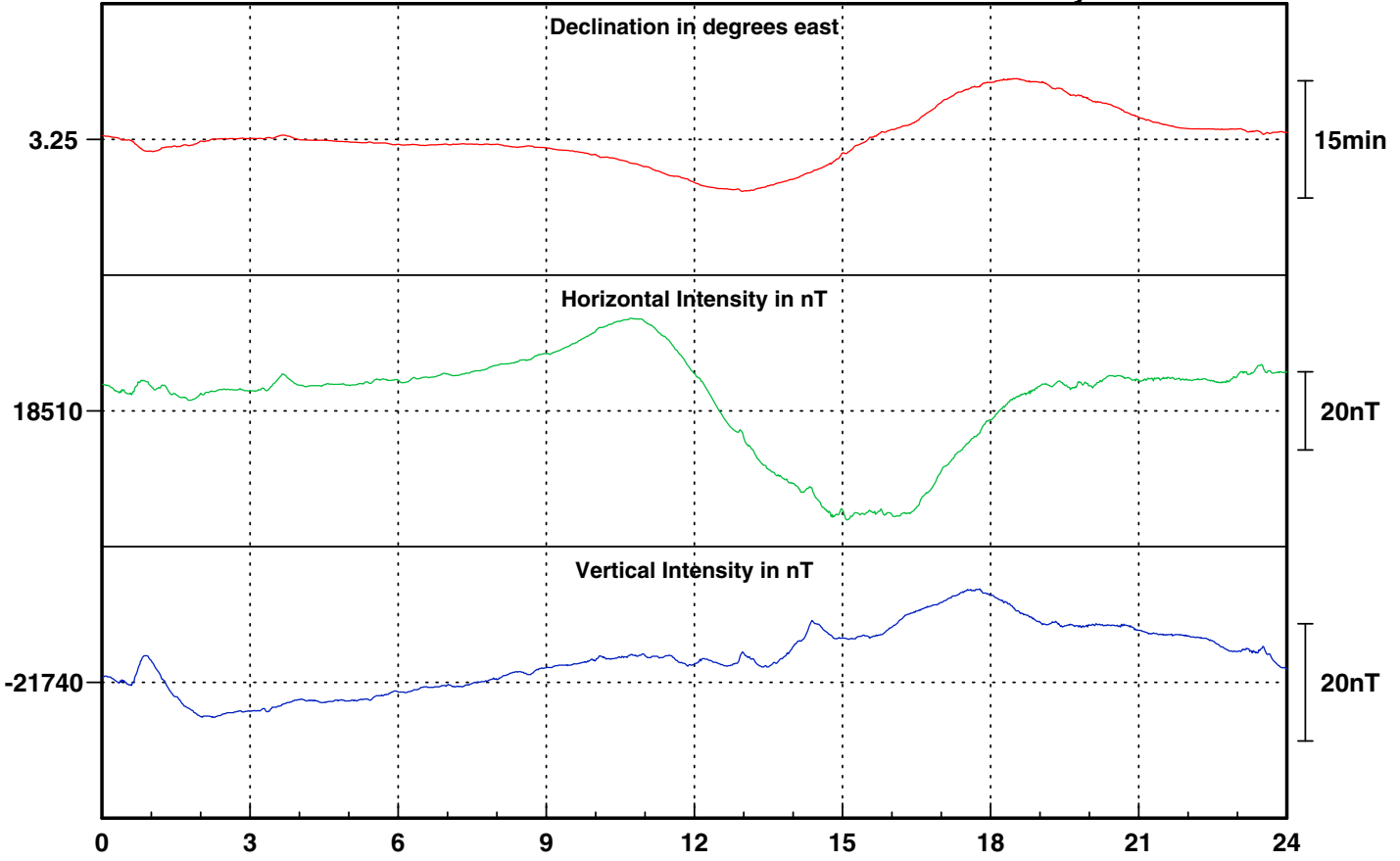




Date: 19-10-2012

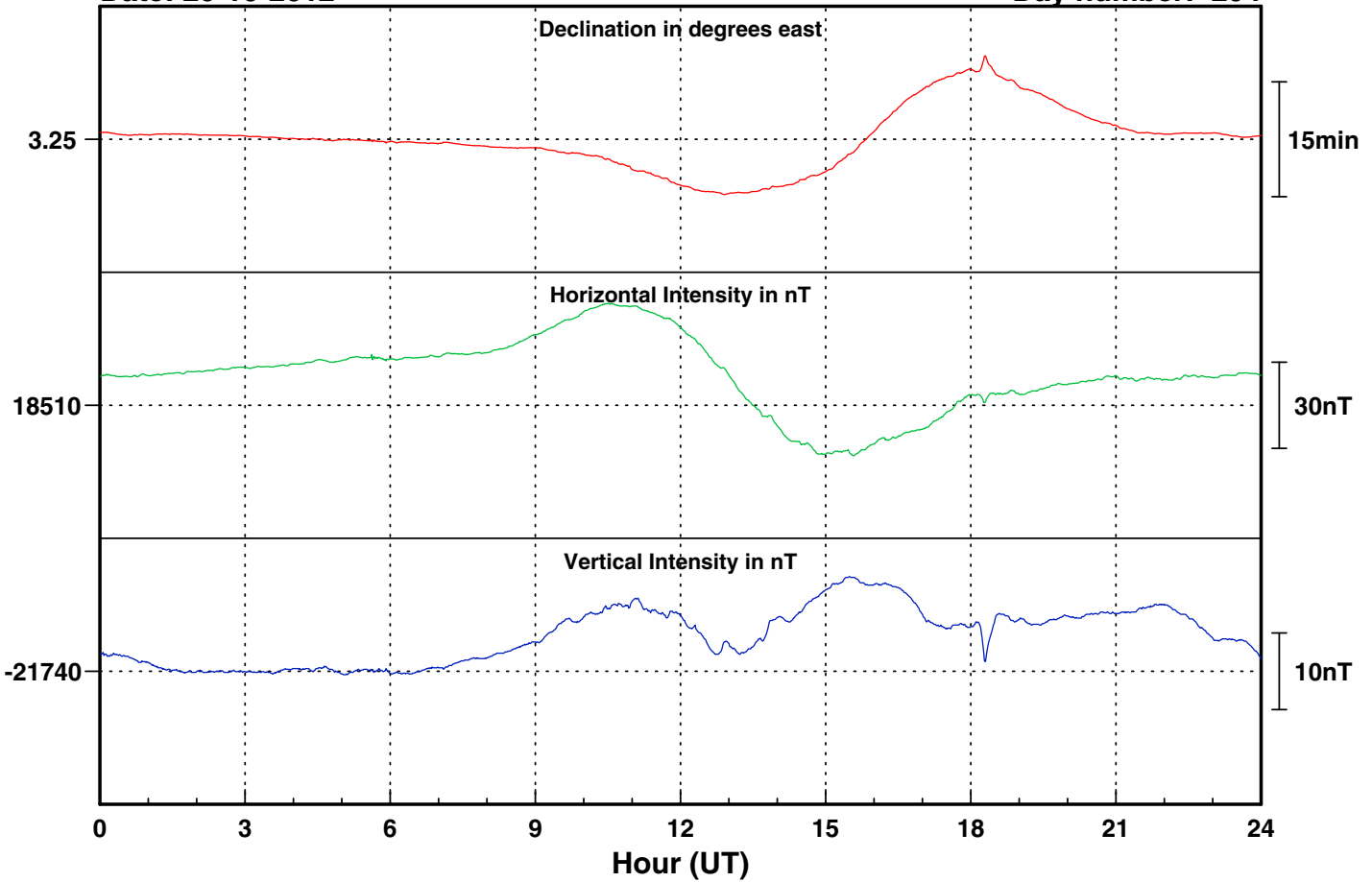
# Falkland Islands

Day number: 293



Date: 20-10-2012

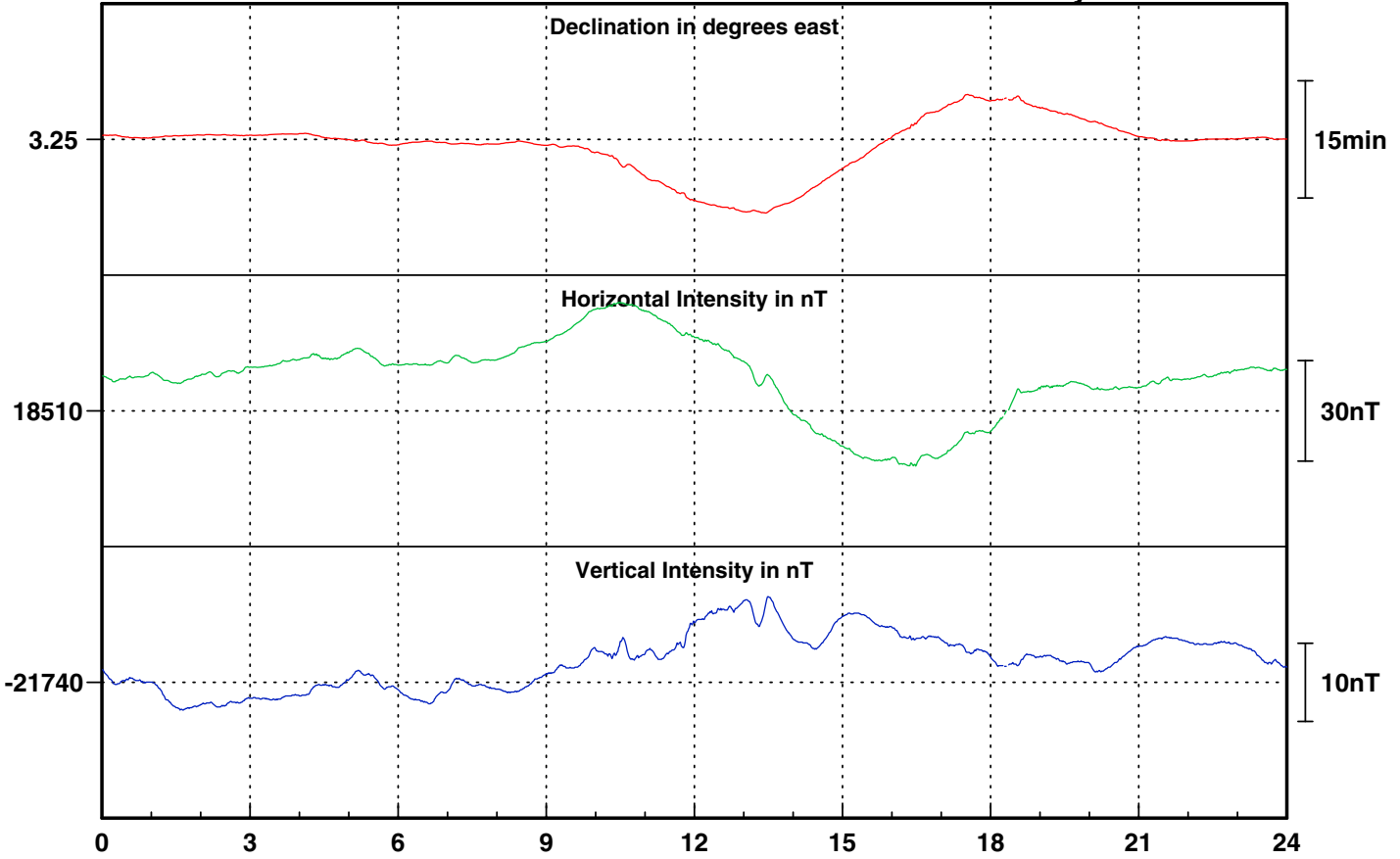
Day number: 294



Date: 21-10-2012

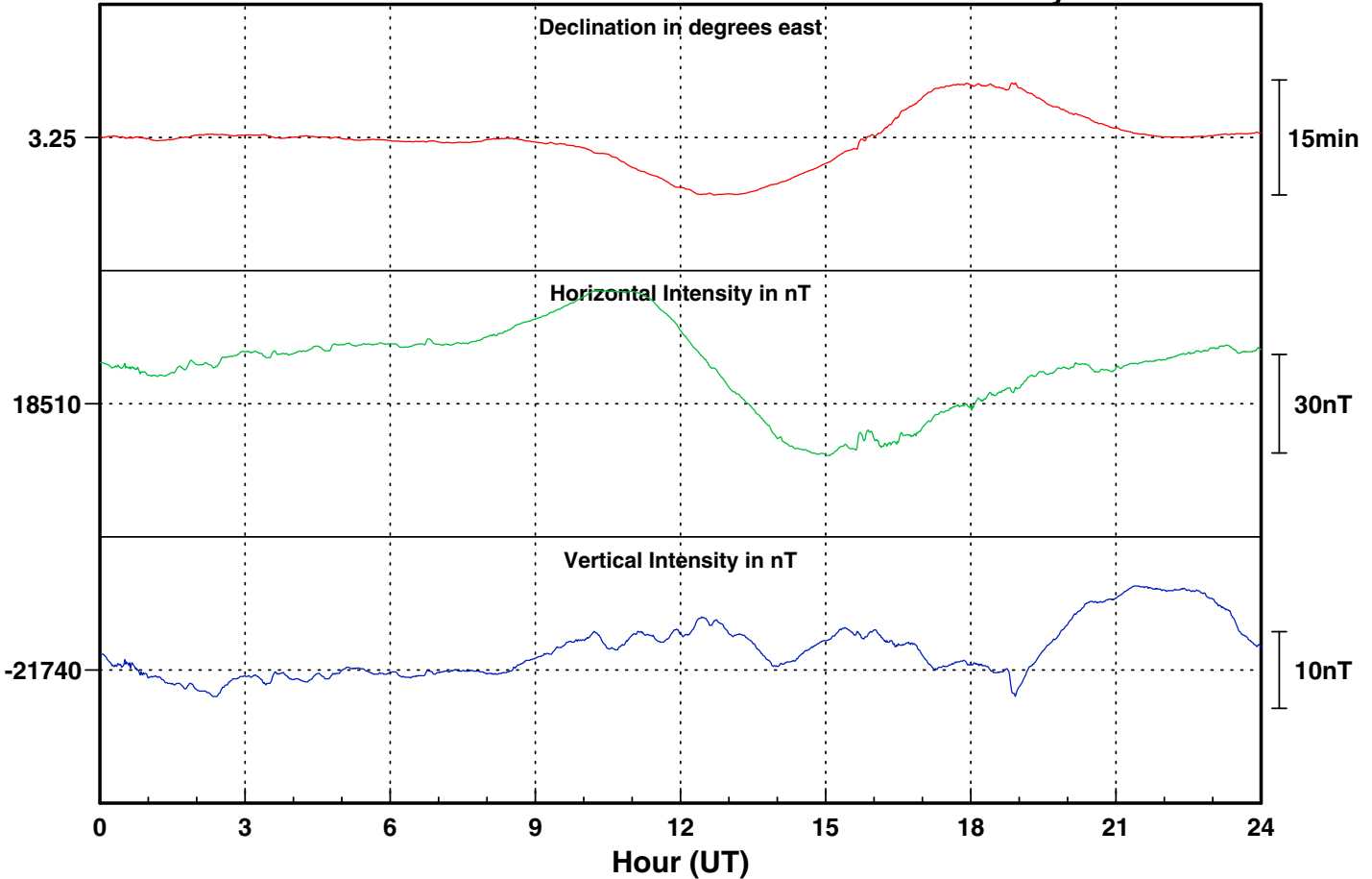
# Falkland Islands

Day number: 295



Date: 22-10-2012

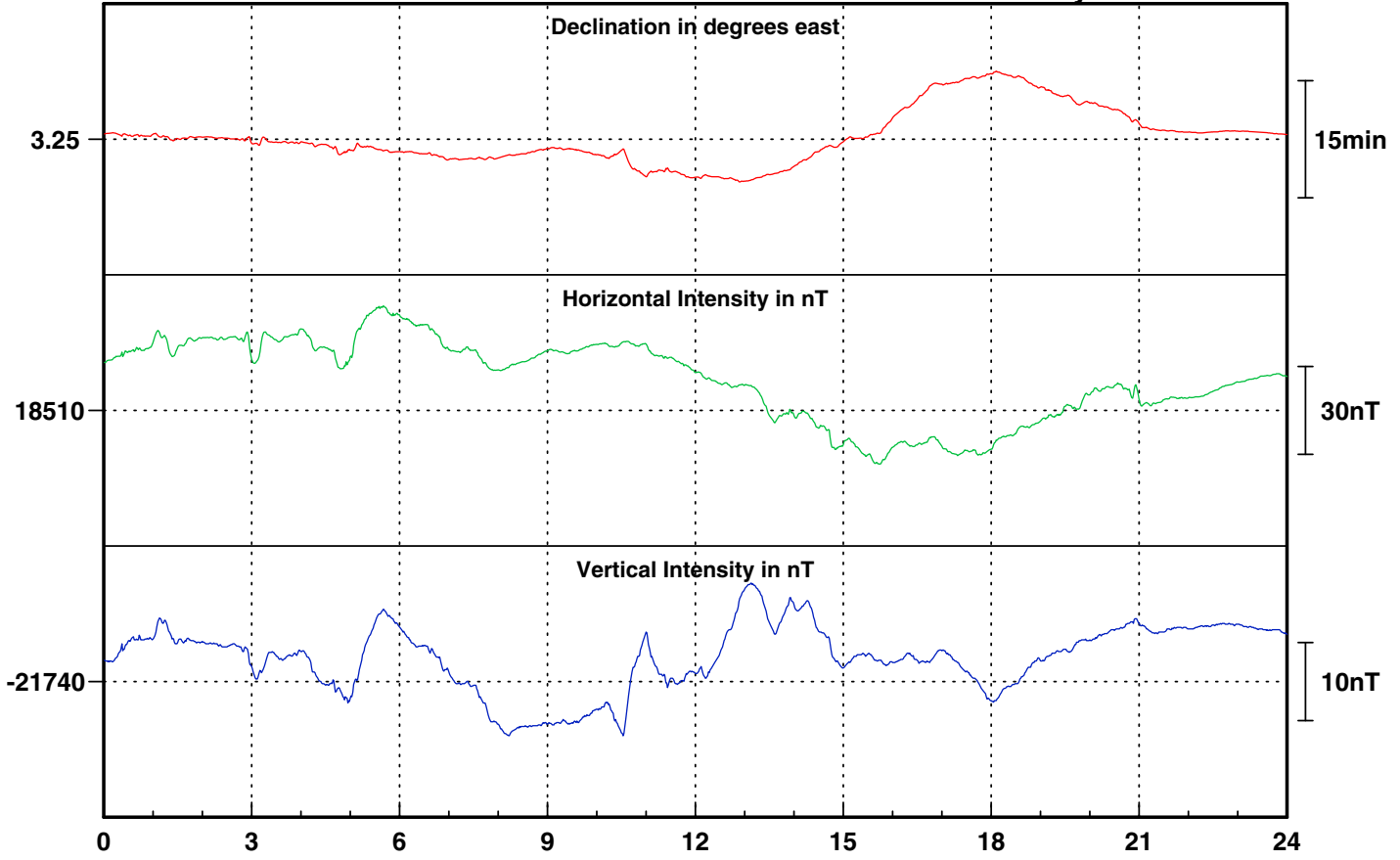
Day number: 296



Date: 23-10-2012

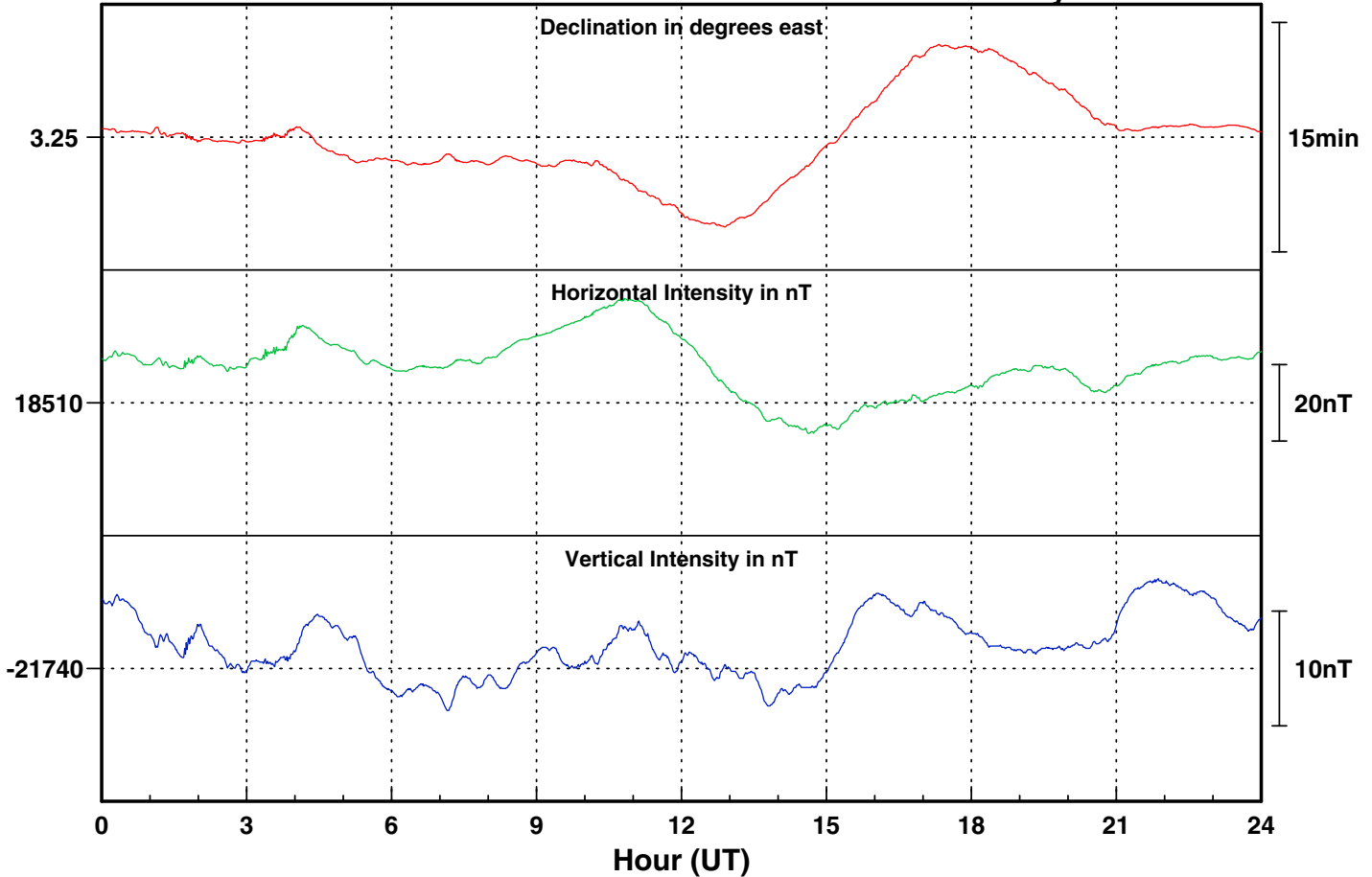
# Falkland Islands

Day number: 297



Date: 24-10-2012

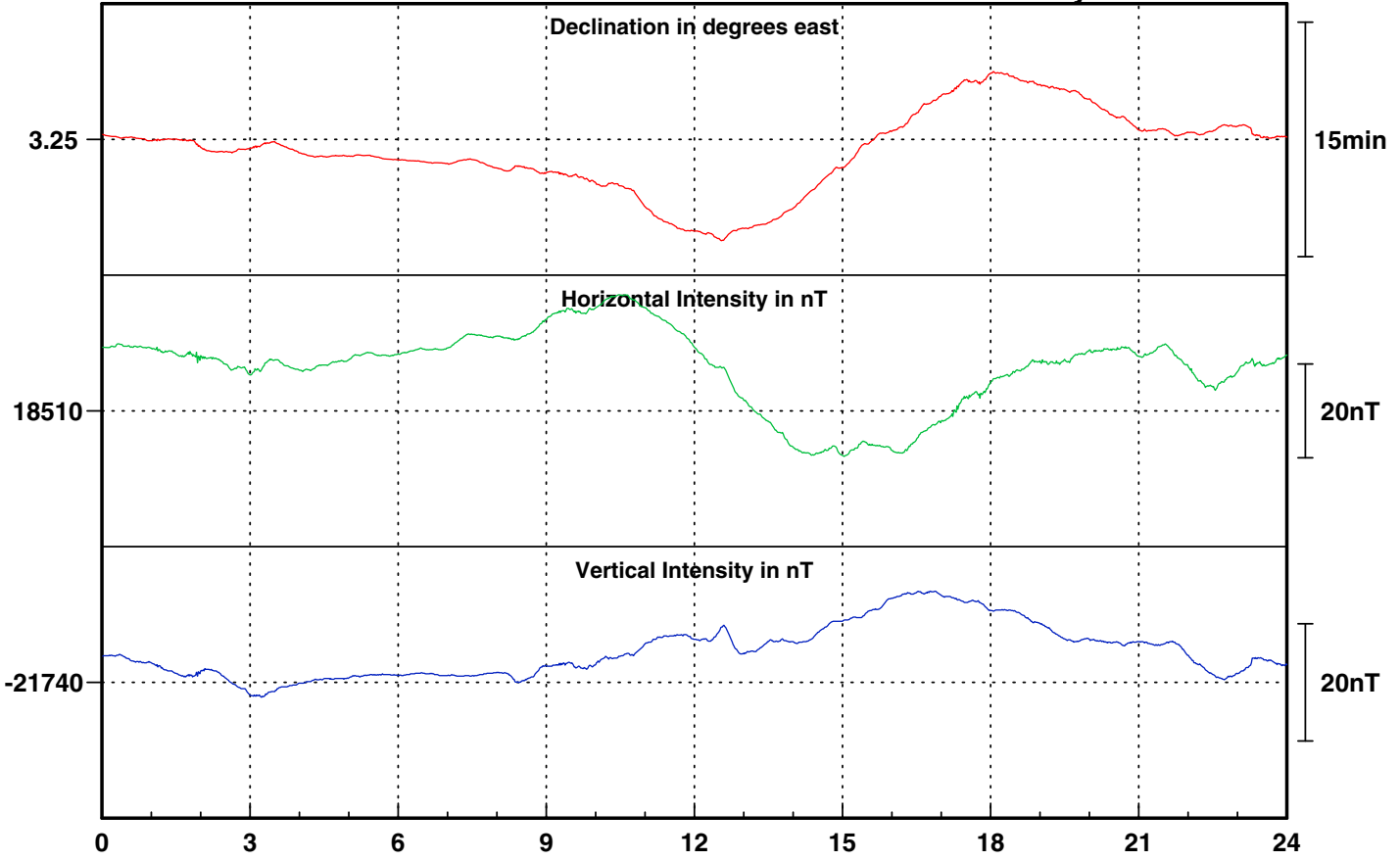
Day number: 298



Date: 25-10-2012

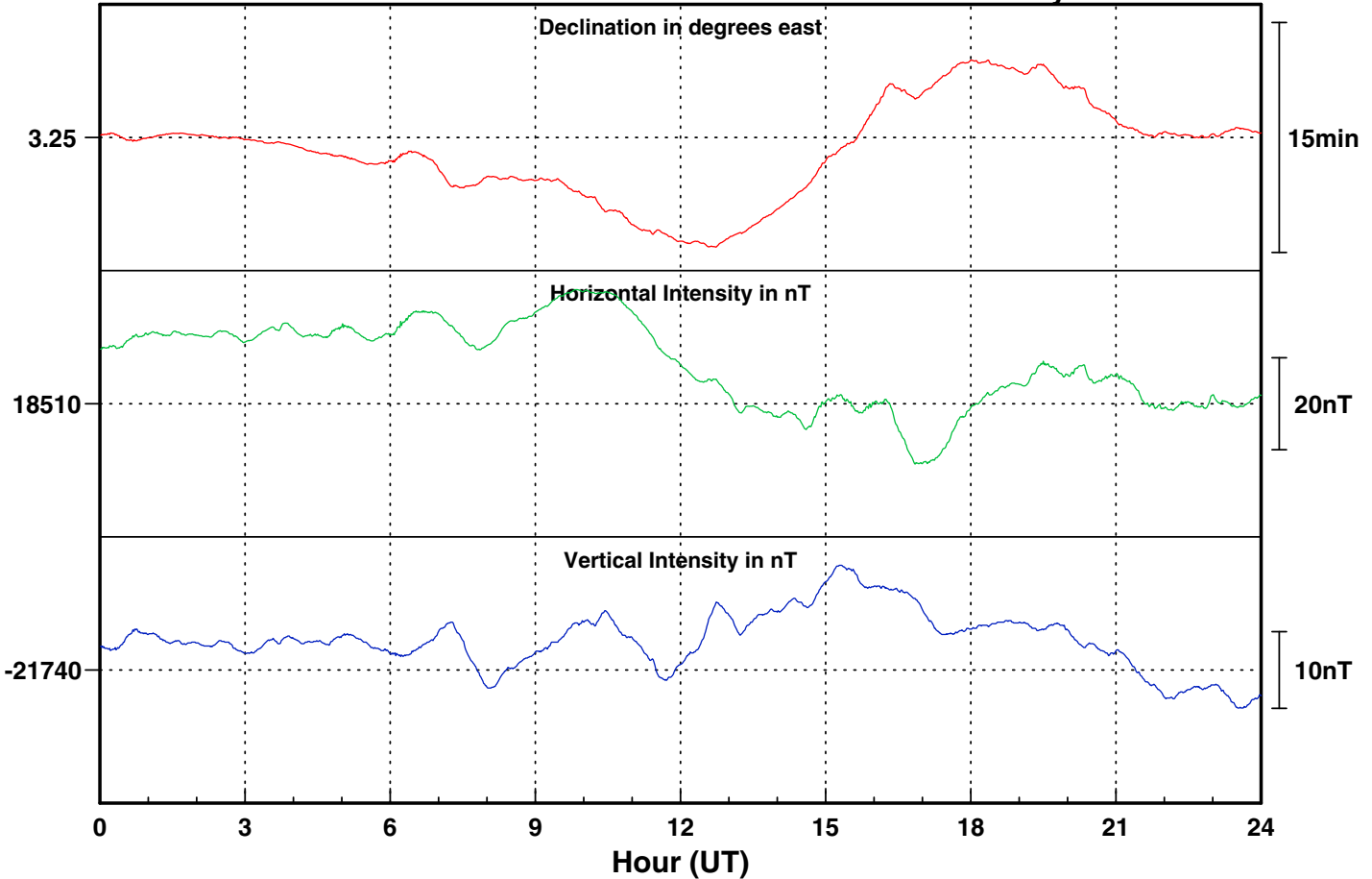
# Falkland Islands

Day number: 299



Date: 26-10-2012

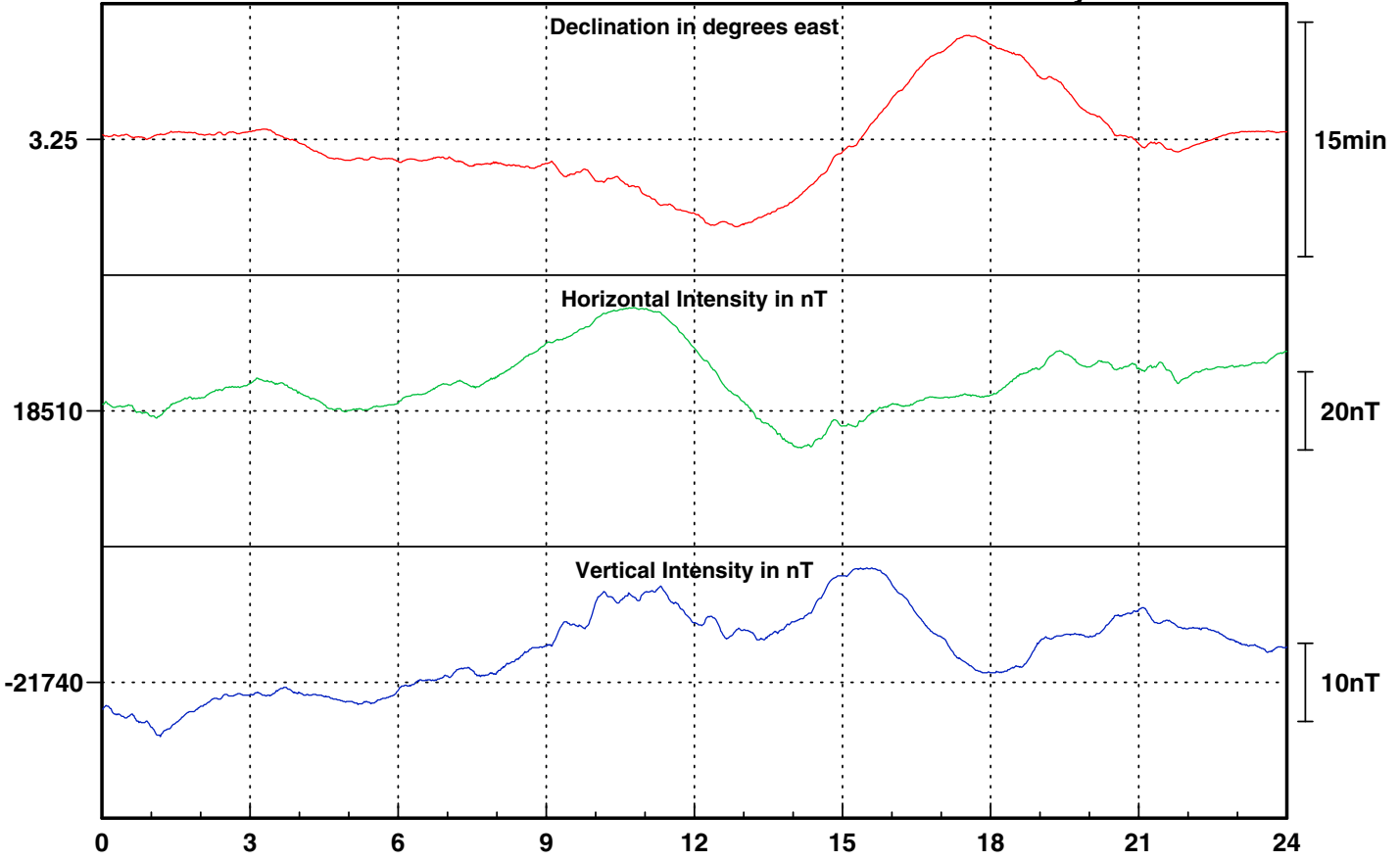
Day number: 300



Date: 27-10-2012

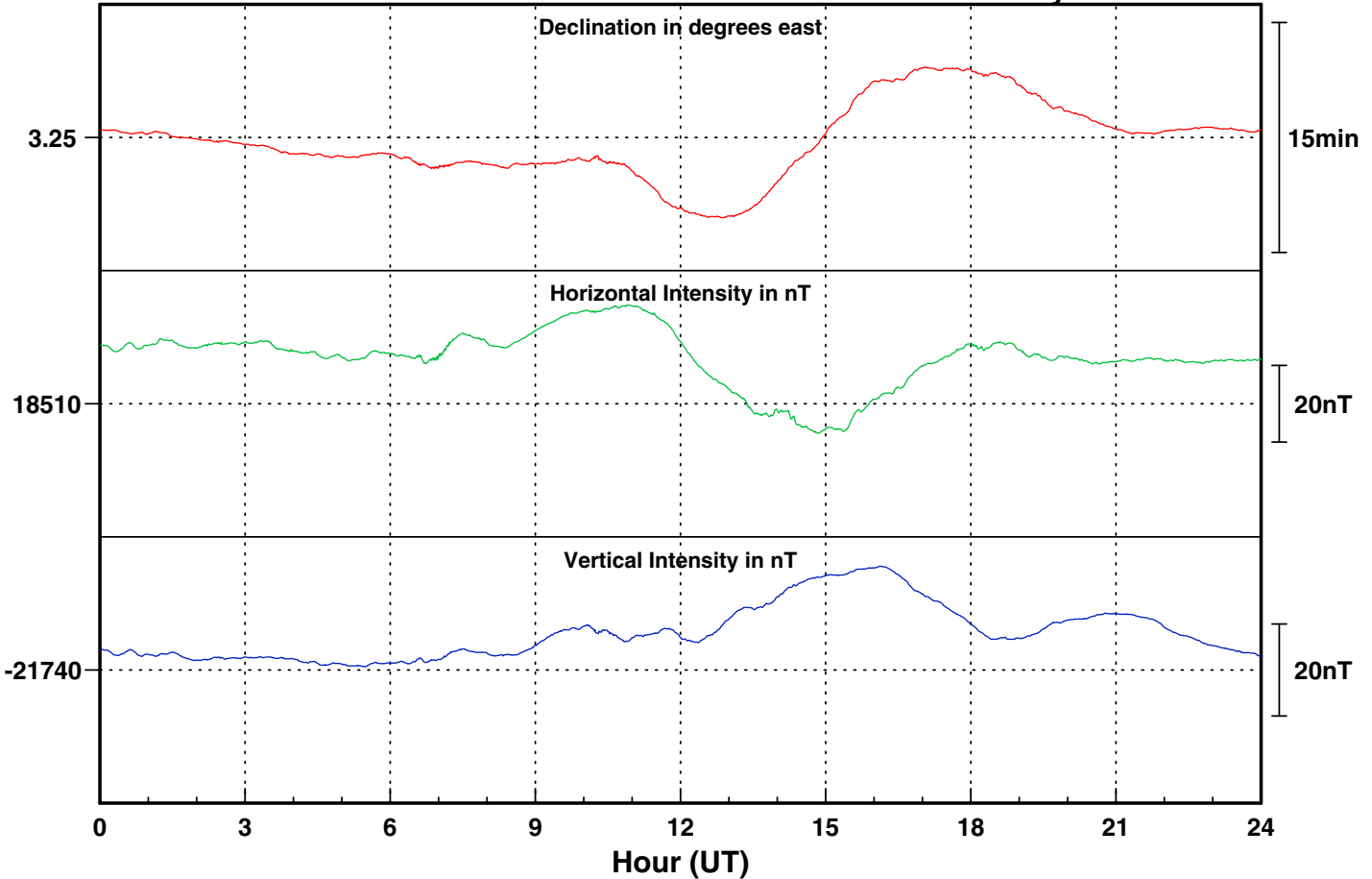
# Falkland Islands

Day number: 301



Date: 28-10-2012

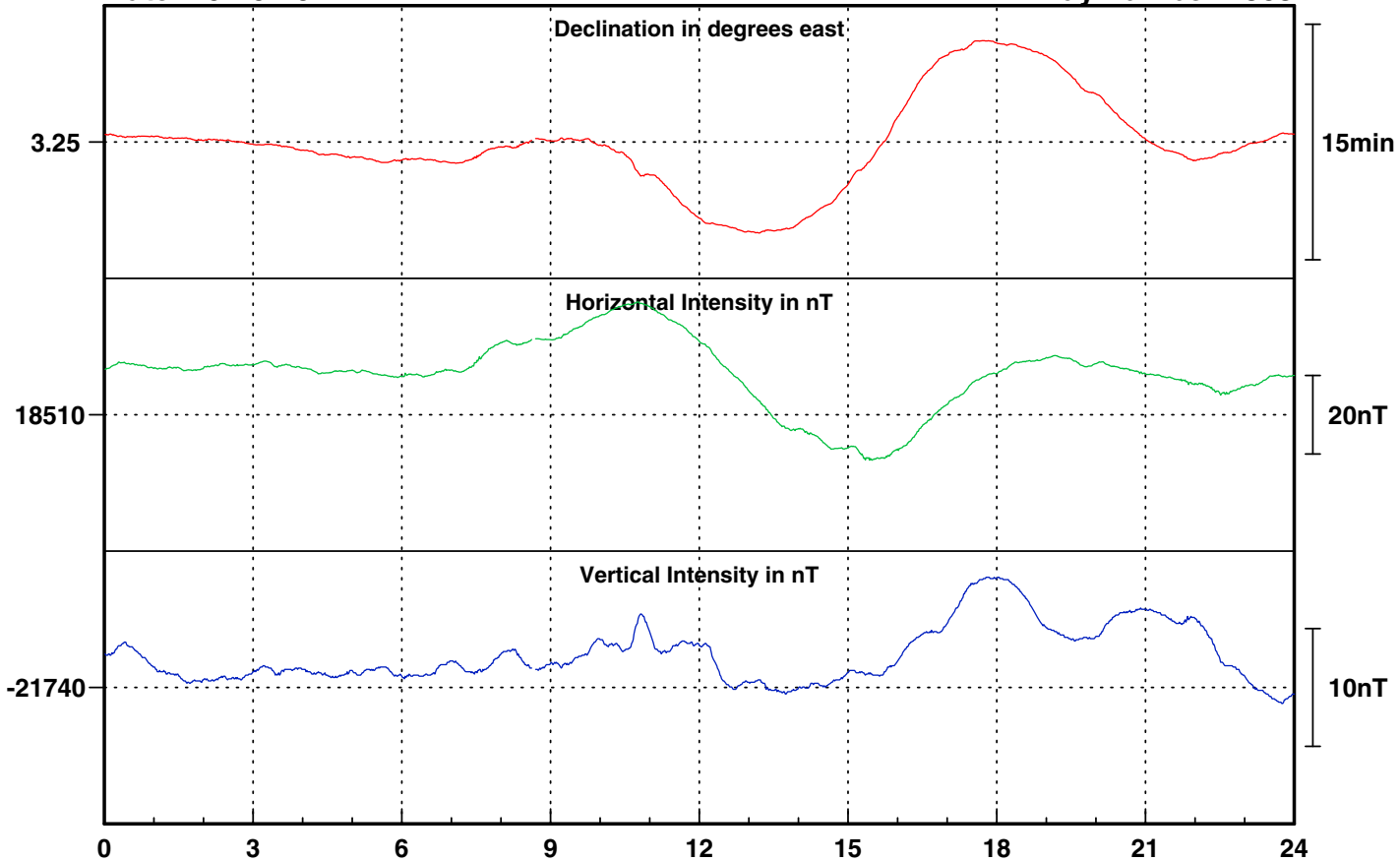
Day number: 302



Date: 29-10-2012

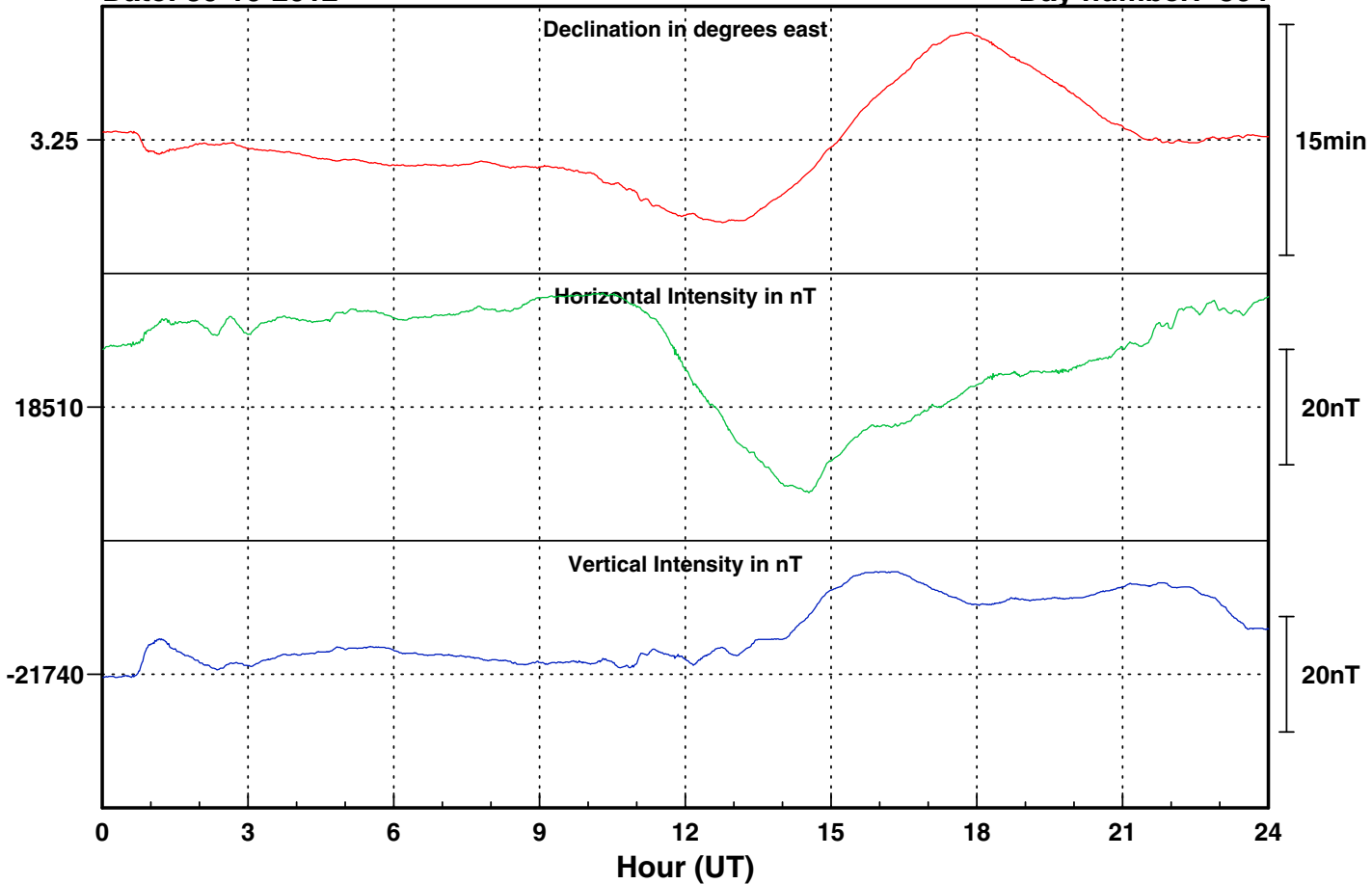
# Falkland Islands

Day number: 303



Date: 30-10-2012

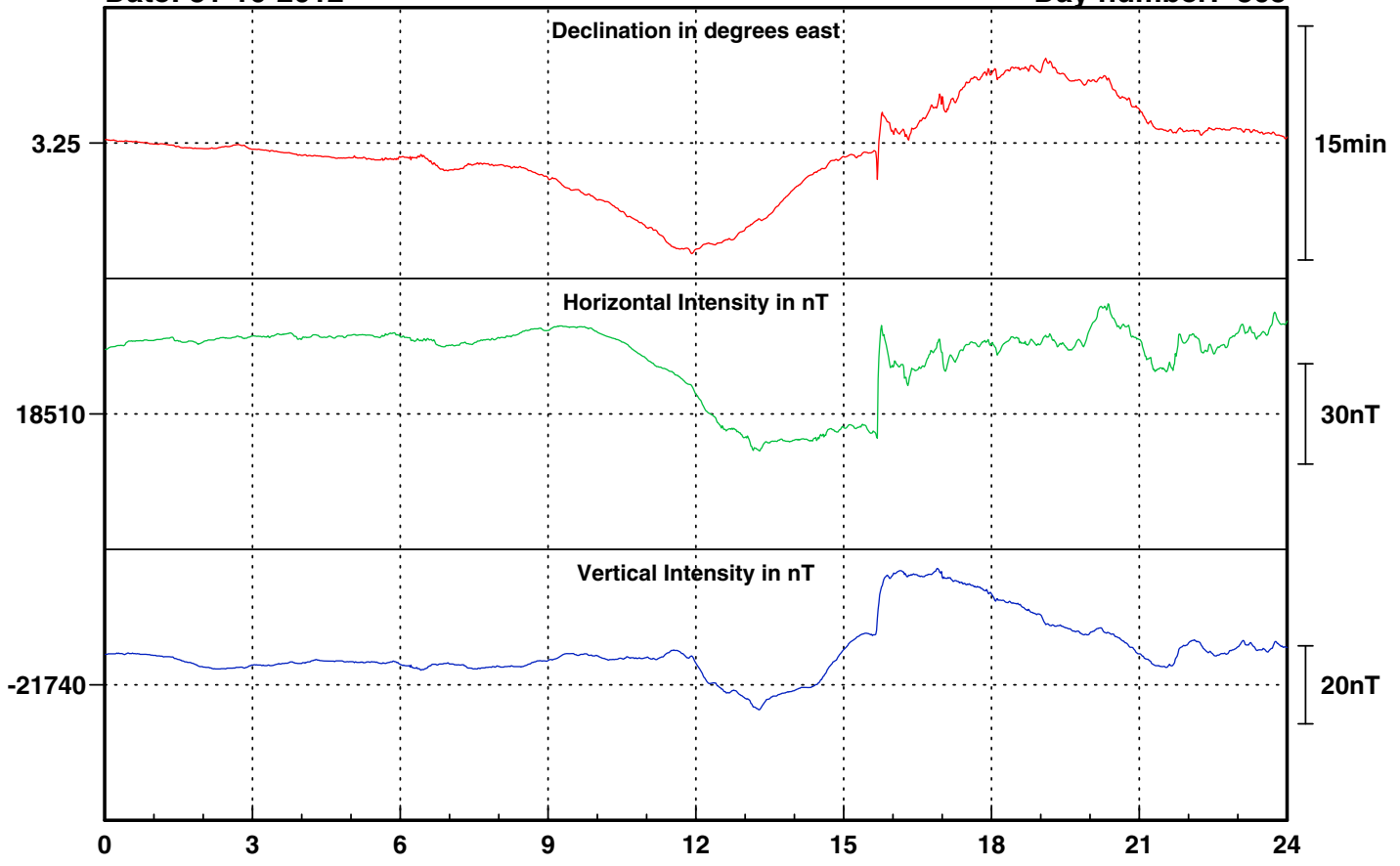
Day number: 304



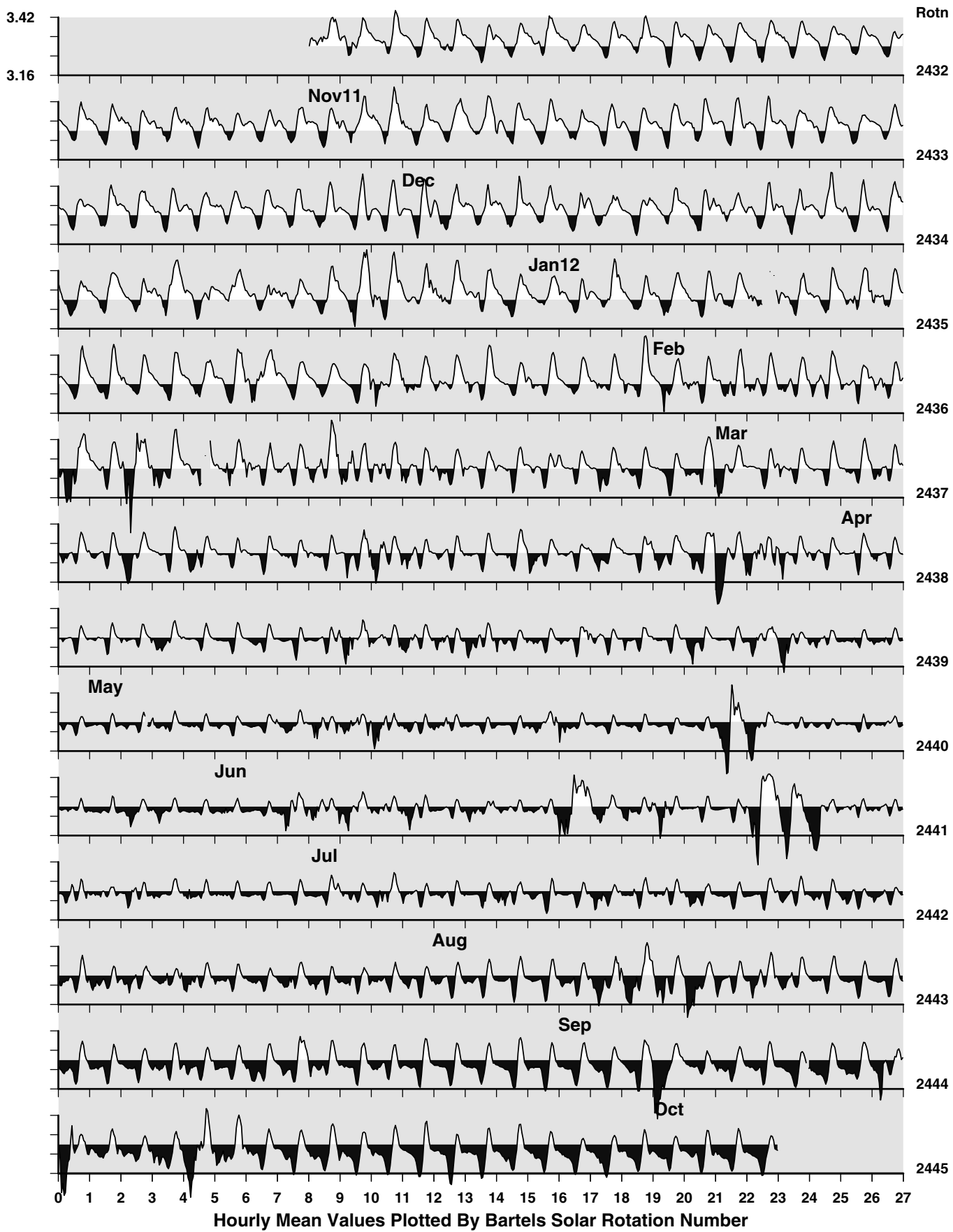
Date: 31-10-2012

# Falkland Islands

Day number: 305

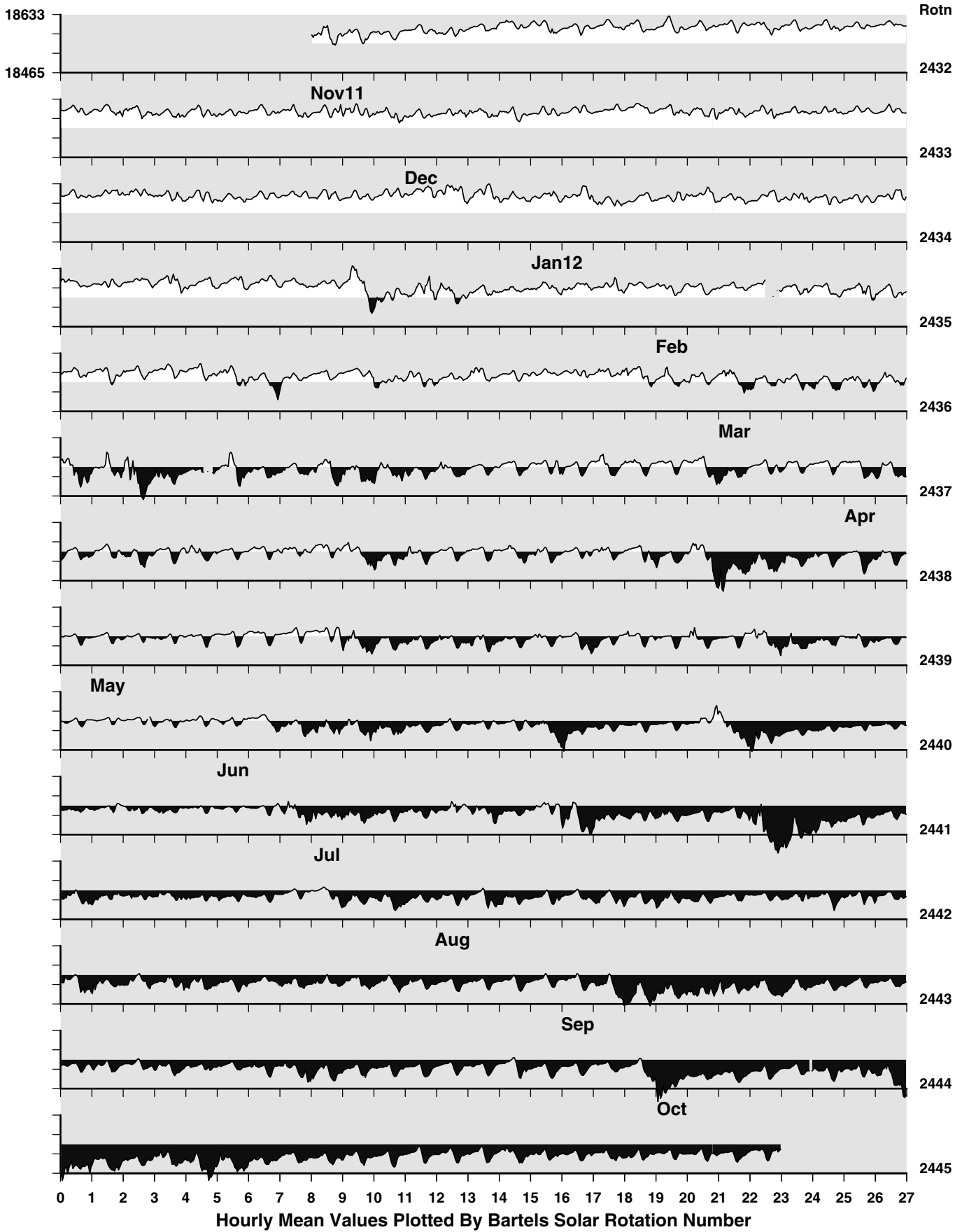


# Falkland Islands Observatory: Declination (degrees)

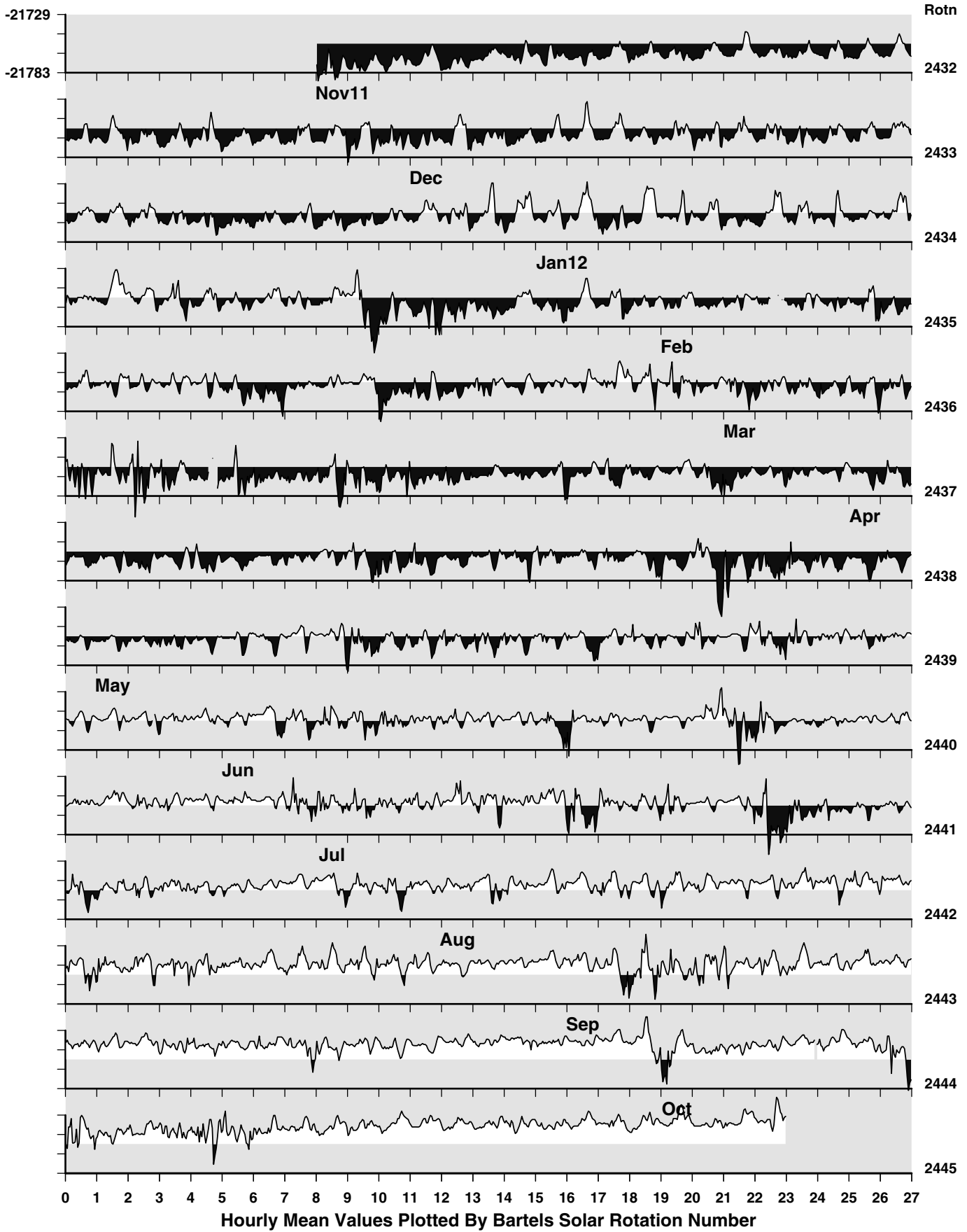




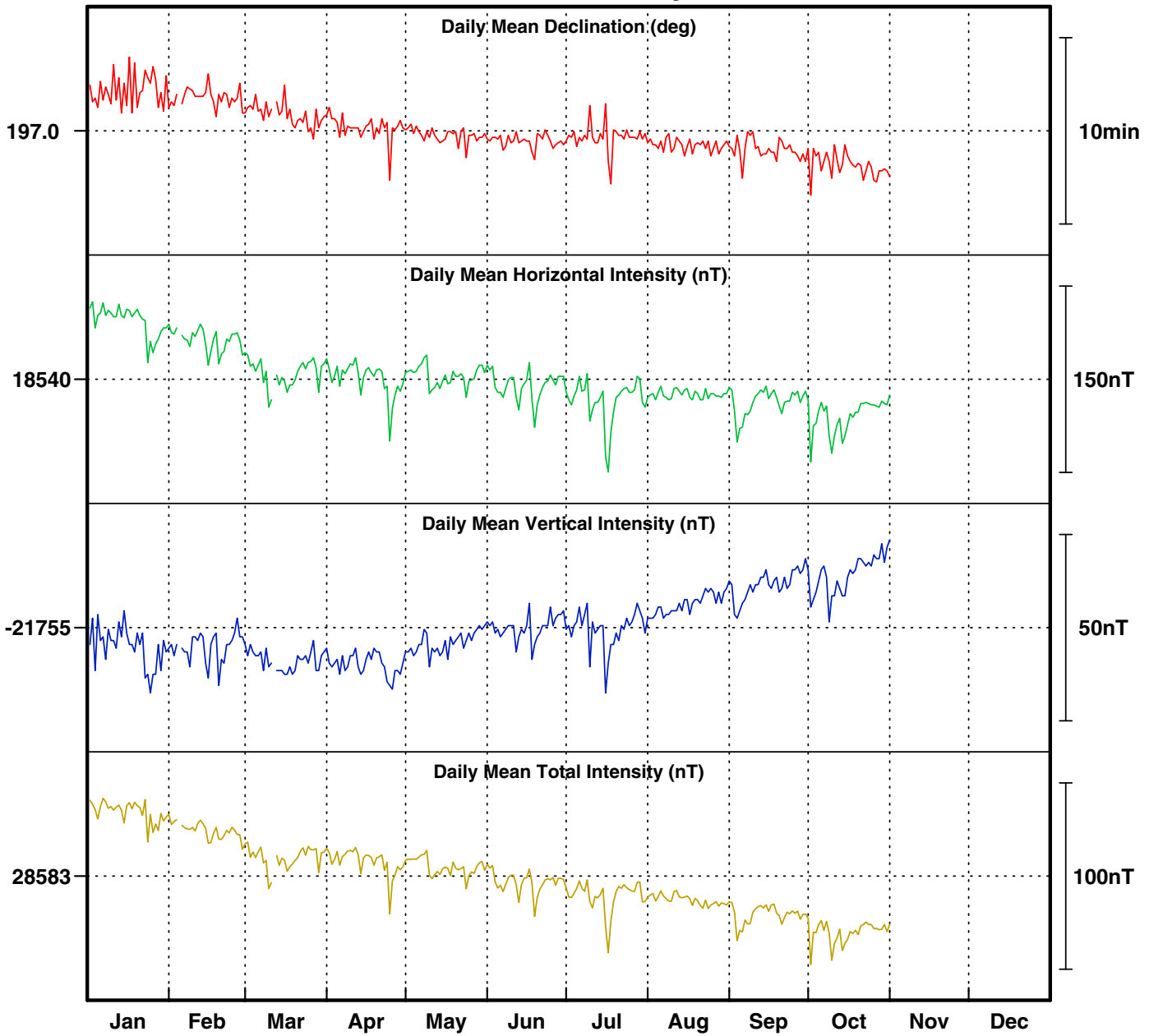
# Falkland Islands Observatory: Horizontal Intensity (nT)



# Falkland Islands Observatory: Vertical Intensity (nT)



# Falklands Is Observatory 2012



### Monthly Mean Values for Port Stanley Observatory 2012

Month	<i>D</i>	<i>H</i>	<i>I</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>F</i>
January	3° 19.2′	18587 nT	-49° 29.8′	18556 nT	1077 nT	-21760 nT	28617 nT
February	3° 18.8′	18571 nT	-49° 31.3′	18540 nT	1074 nT	-21760 nT	28607 nT
March	3° 17.9′	18544 nT	-49° 34.0′	18514 nT	1067 nT	-21763 nT	28593 nT
April	3° 17.2′	18540 nT	-49° 34.4′	18509 nT	1063 nT	-21764 nT	28590 nT
May	3° 16.8′	18542 nT	-49° 33.7′	18512 nT	1061 nT	-21758 nT	28588 nT
June	3° 16.5′	18534 nT	-49° 34.2′	18504 nT	1059 nT	-21755 nT	28579 nT
July	3° 16.7′	18522 nT	-49° 35.3′	18492 nT	1059 nT	-21755 nT	28572 nT
August	3° 16.3′	18528 nT	-49° 34.3′	18497 nT	1057 nT	-21748 nT	28570 nT
September	3° 16.0′	18521 nT	-49° 34.5′	18491 nT	1056 nT	-21743 nT	28562 nT
October	3° 15.2′	18510 nT	-49° 35.3′	18480 nT	1050 nT	-21740 nT	28552 nT

#### Note

i. The values shown here are provisional.