

**BRITISH GEOLOGICAL SURVEY**

# Port Stanley Observatory Monthly Magnetic Bulletin

**April 2009**

**09/04/PS**



**British  
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

# PORT STANLEY OBSERVATORY MAGNETIC DATA

## 1. Introduction

Port Stanley Observatory was installed by BGS with financial support from a consortium of oil companies and became operational in February 1994.

This bulletin is published to meet the needs of users of geomagnetic data. Magnetic observatory data is presented as a series of plots of one-minute, hourly and daily values, followed by a tabulation 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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Edinburgh EH9 3LA  
Scotland, UK

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Fax: +44 (0) 131 650 0265  
E-mail: [orba@bgs.ac.uk](mailto:orba@bgs.ac.uk)  
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°42.24'S 302°06.42'E  
*Geomagnetic:* 41°40.92'S 11°25.98'E  
*Height above mean sea level:* 135 m

The geomagnetic co-ordinates are calculated using the 10th generation International Geomagnetic Reference Field at epoch 2009.5.

## 3. The Observatory Operation

### 3.1 GDAS

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

There are two sets of sensors used for making magnetic measurements. A triaxial 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 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 whilst the total field intensity samples are filtered using a 7-point cosine filter.

### 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 once per week. 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. Data Presentation

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 a page and show the 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 on the surface of the Sun may recur after 27 days: the same is true for geomagnetically quiet intervals. Plotting the data in this way highlights this recurrence, and also illustrates seasonal and diurnal variations throughout the year.

### **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. This data is provisional. It is anticipated that provisional values will not be altered by more than a few nT or tenths of arcminutes before being made definitive.





# Falkland Island 2009

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

219.2

5min

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

18848

20nT

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

-21941

20nT

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

31.0

20nT

Temperature Inside Variometer Hut

23.3

20°C

Jan

Feb

Mar

Apr

May

Jun

Jul

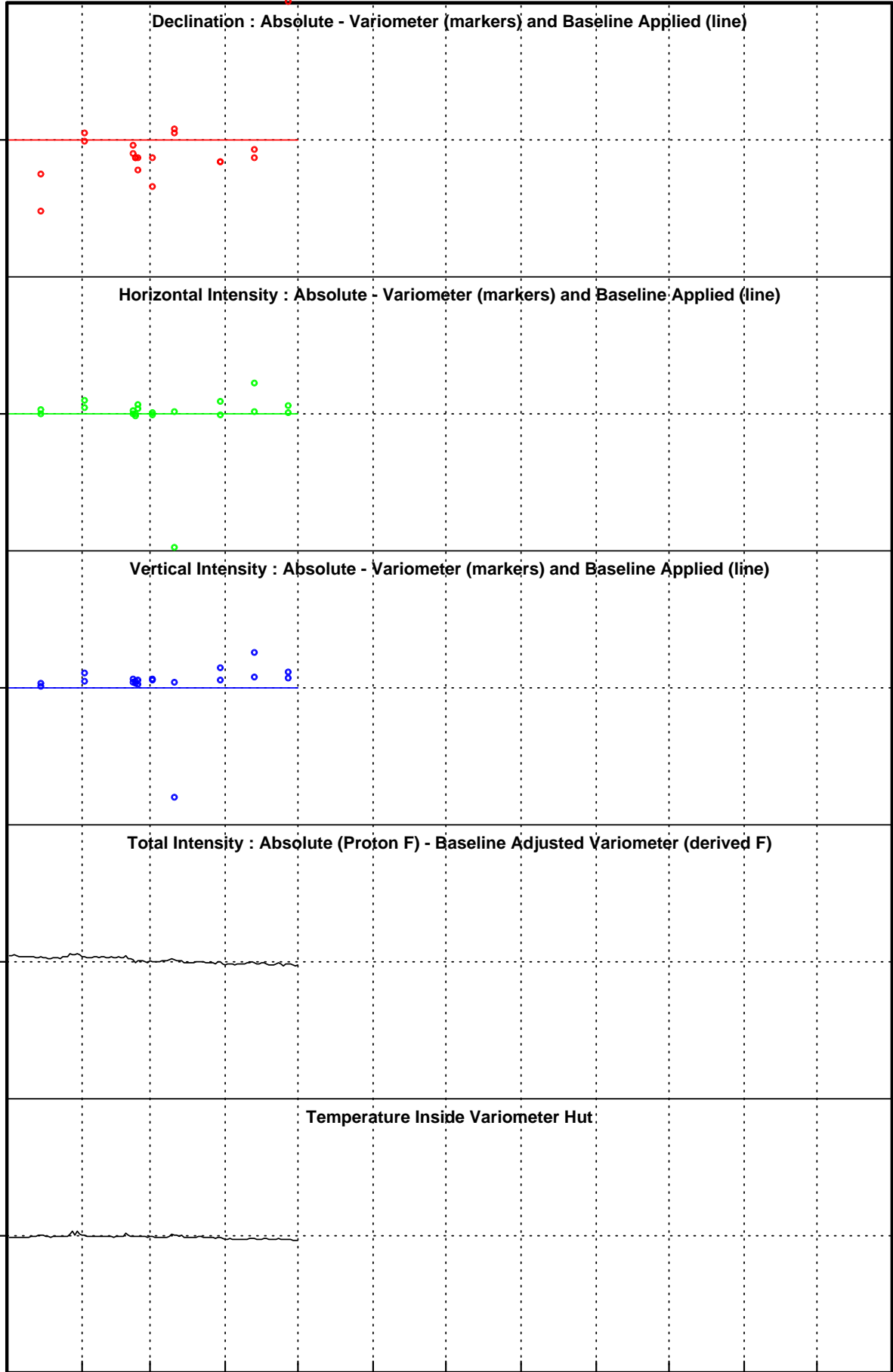
Aug

Sep

Oct

Nov

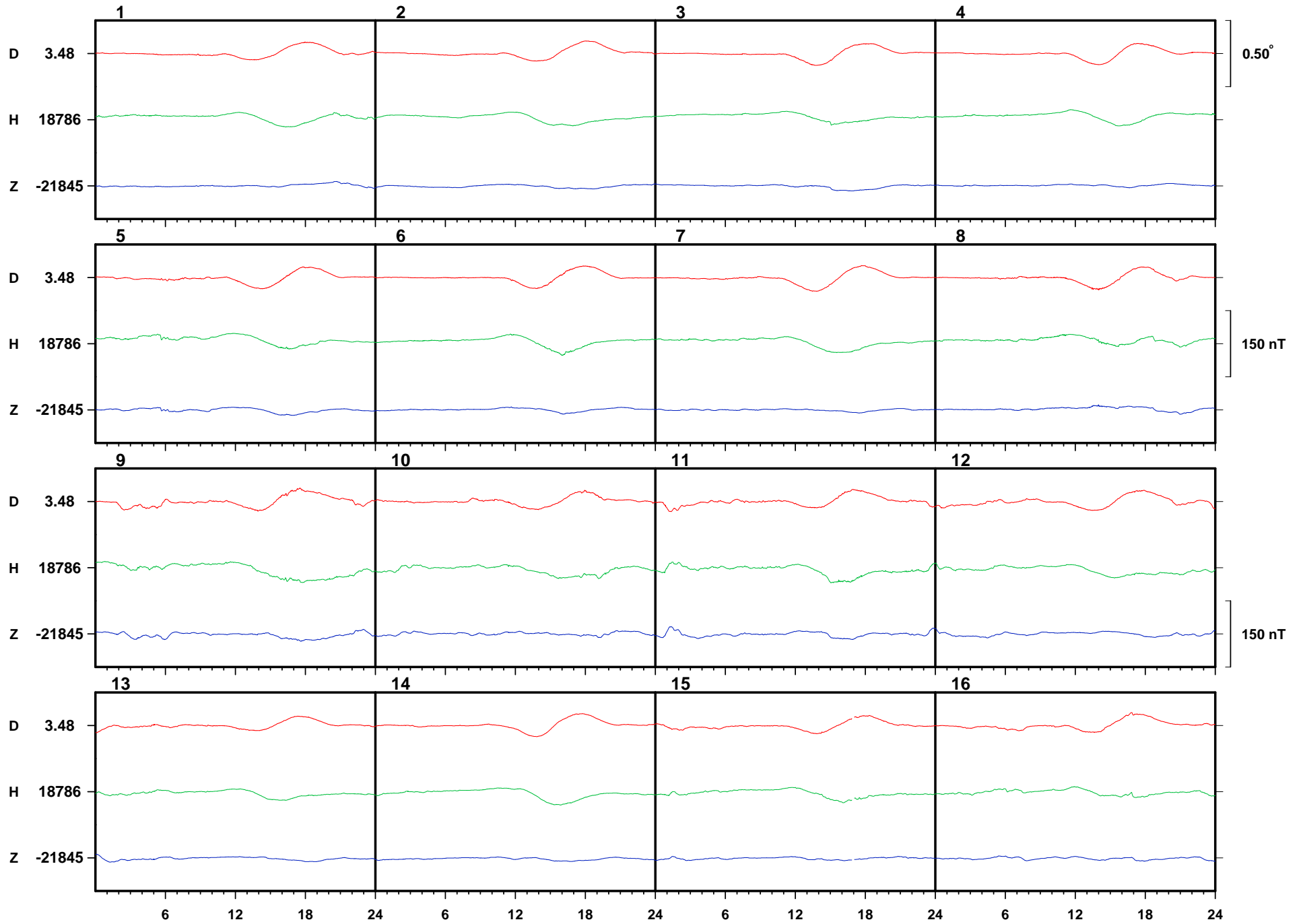
Dec

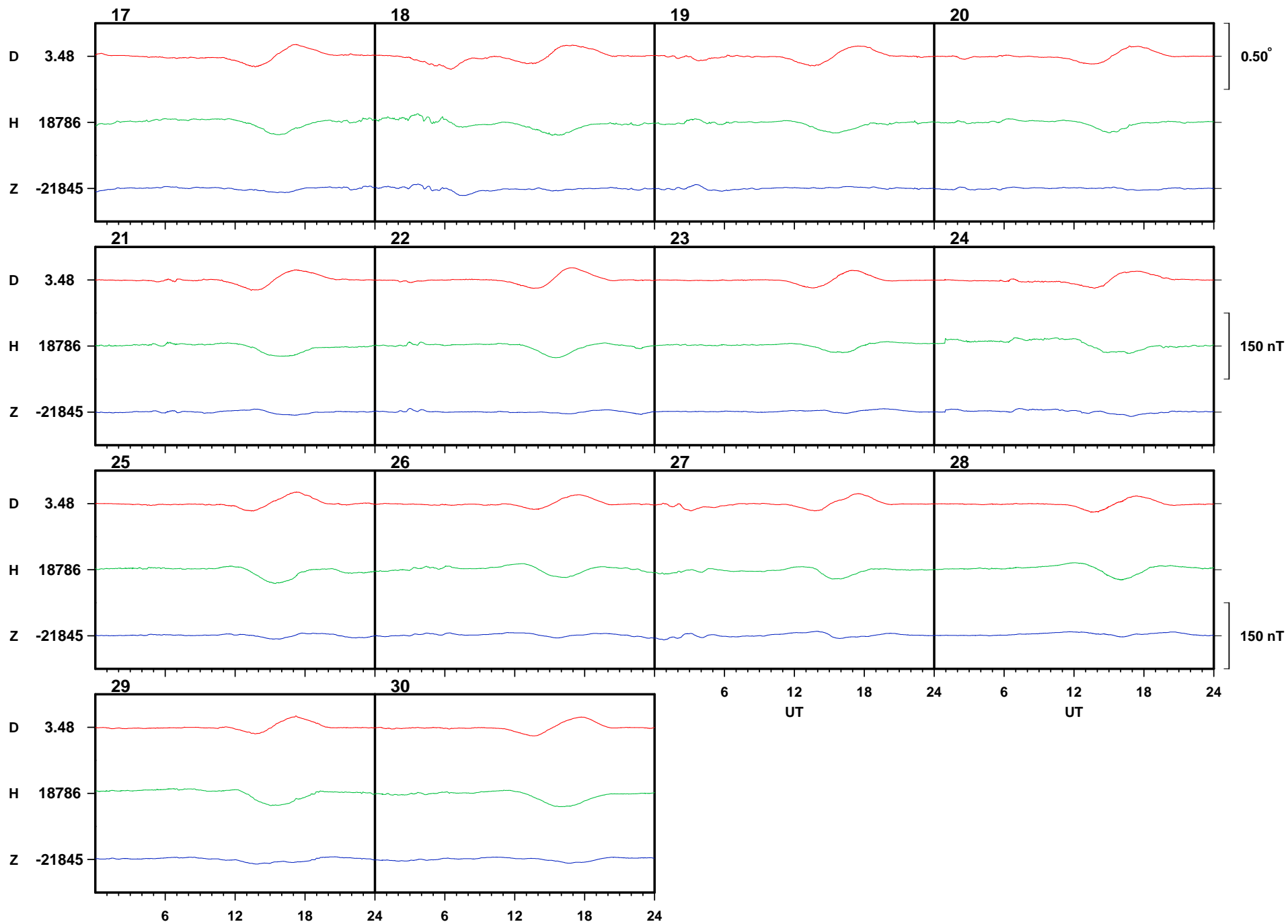


# Falkland Islands

# April

# 2009





Falkland Islands

April

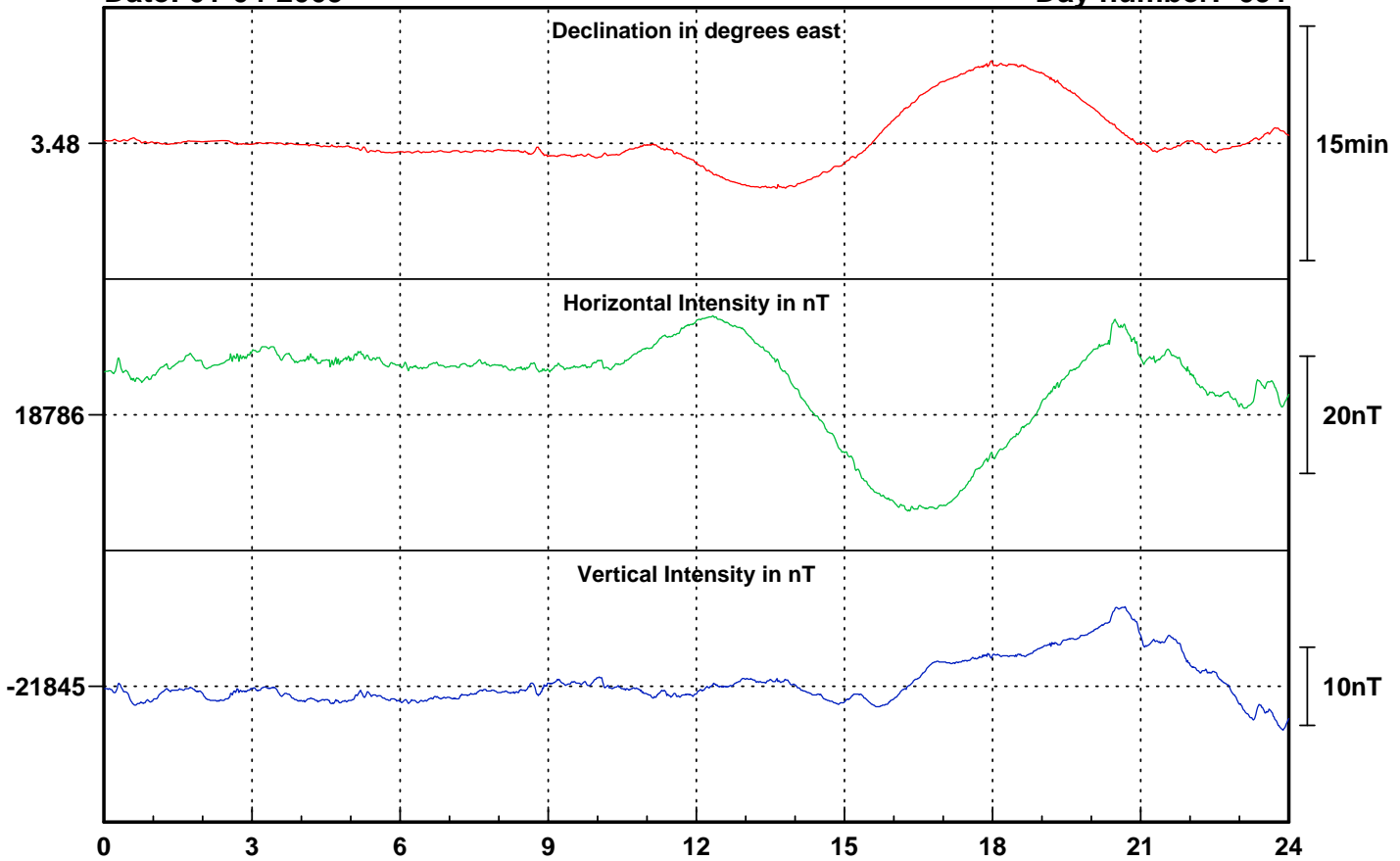
2009



# Falkland Islands

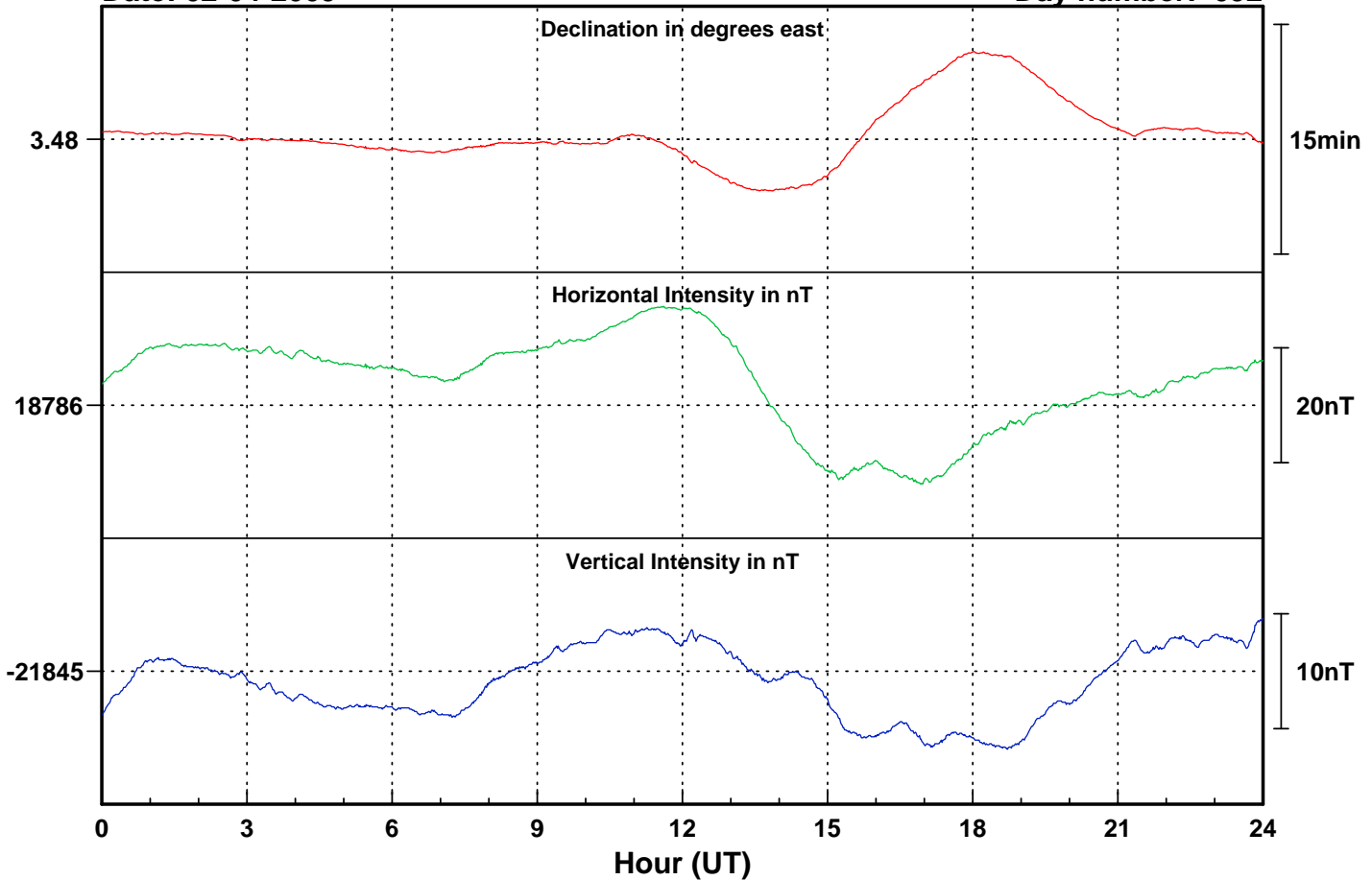
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Day number: 091



Date: 02-04-2009

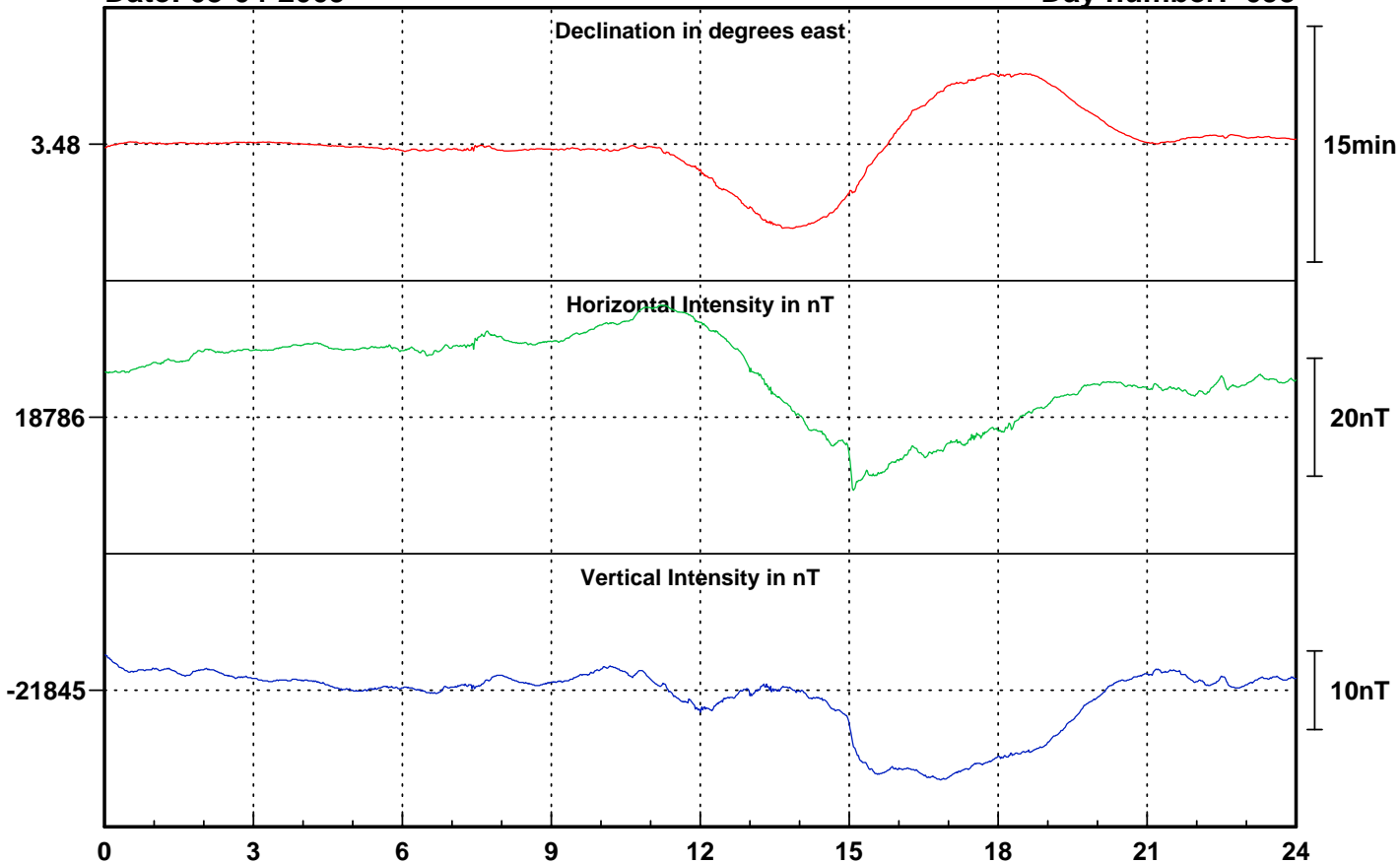
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Date: 03-04-2009

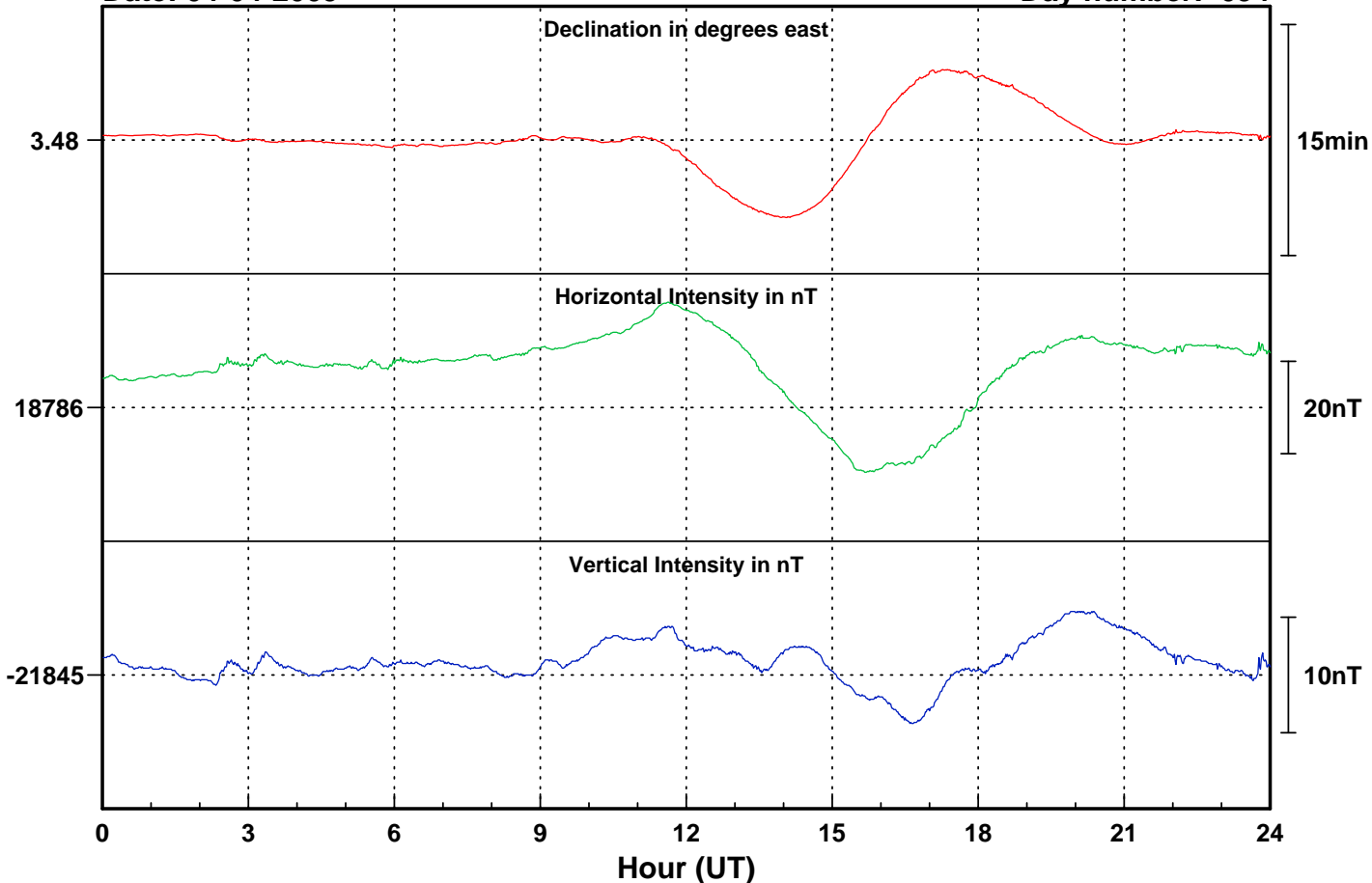
# Falkland Islands

Day number: 093



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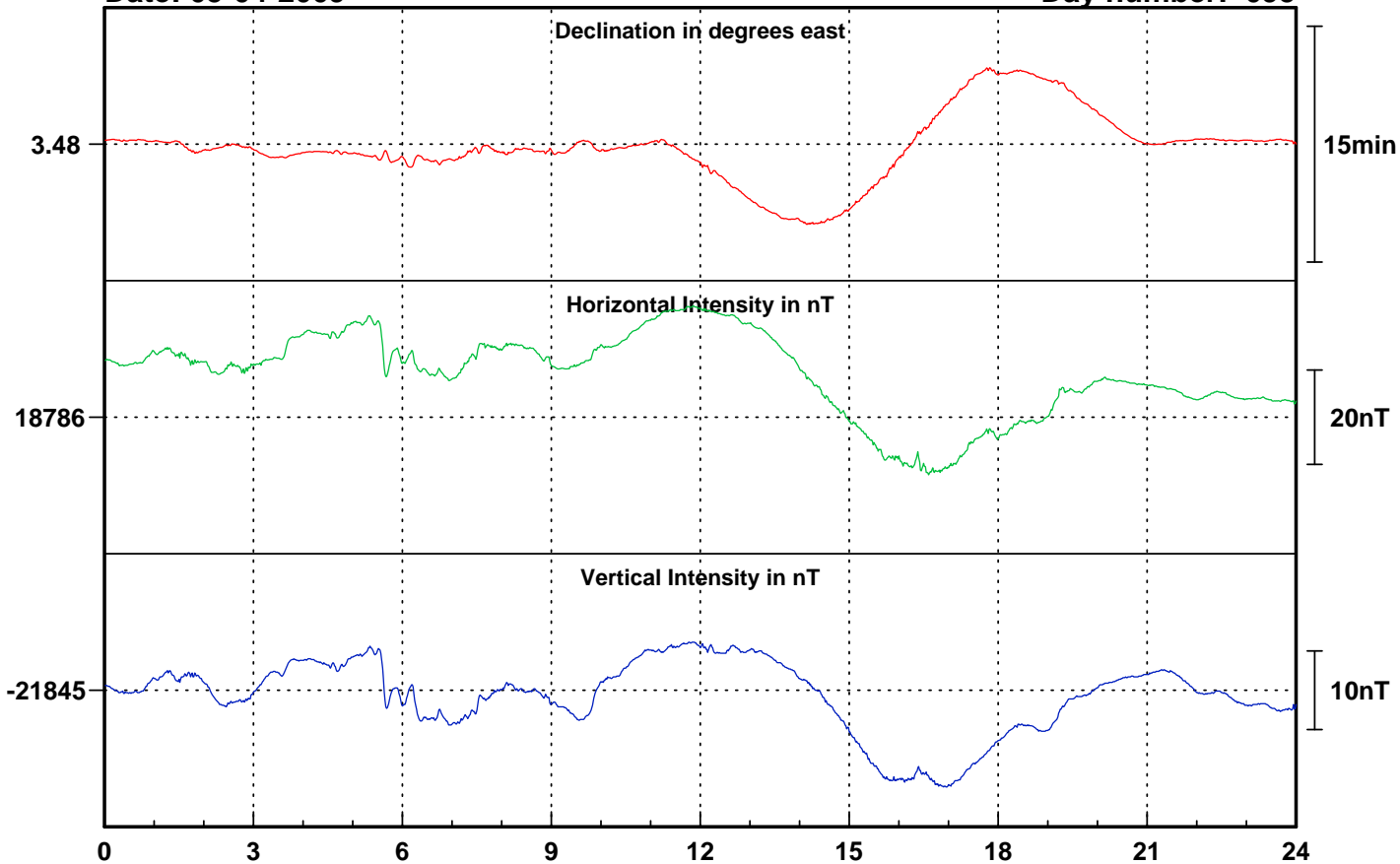
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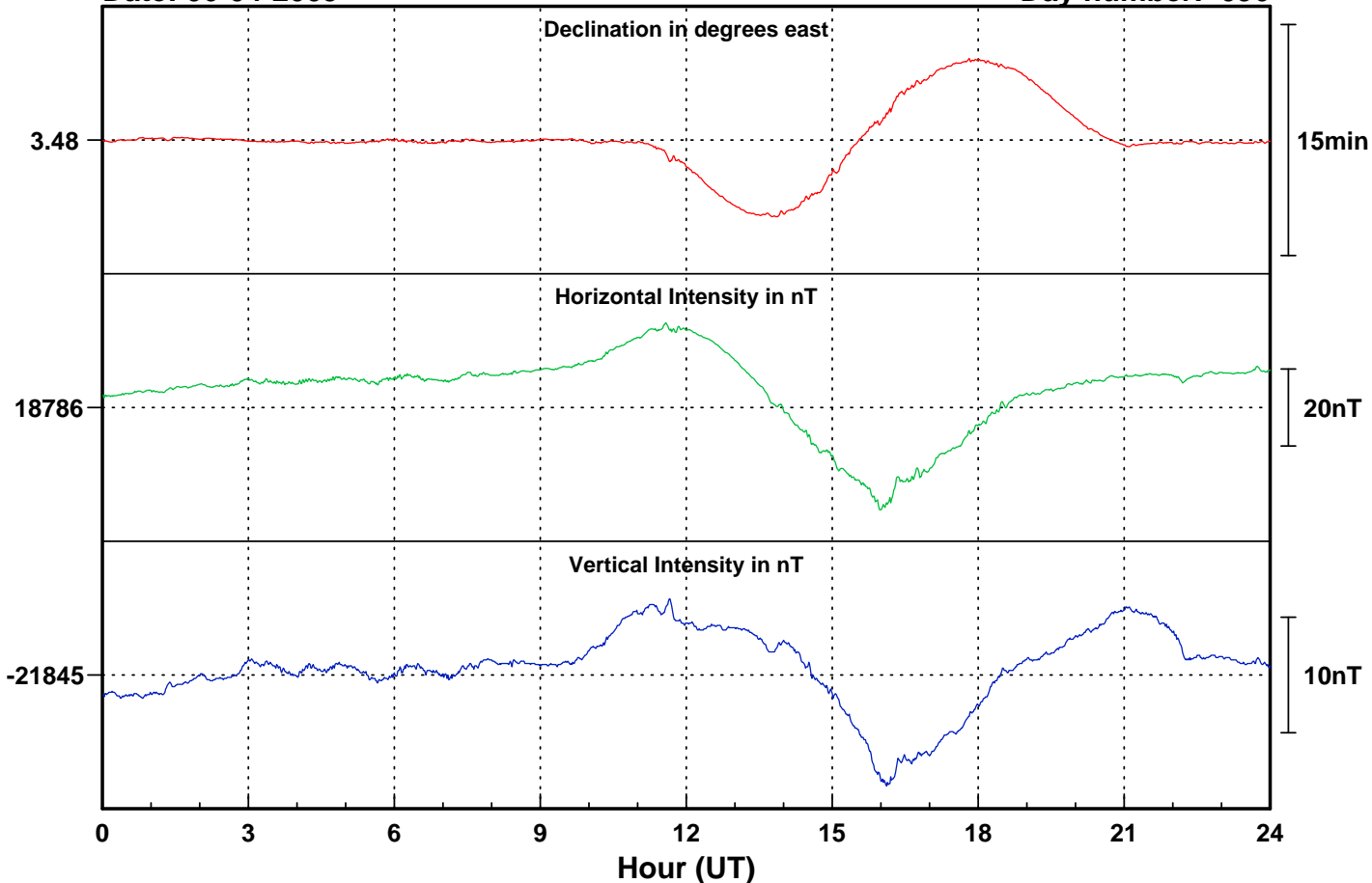
# Falkland Islands

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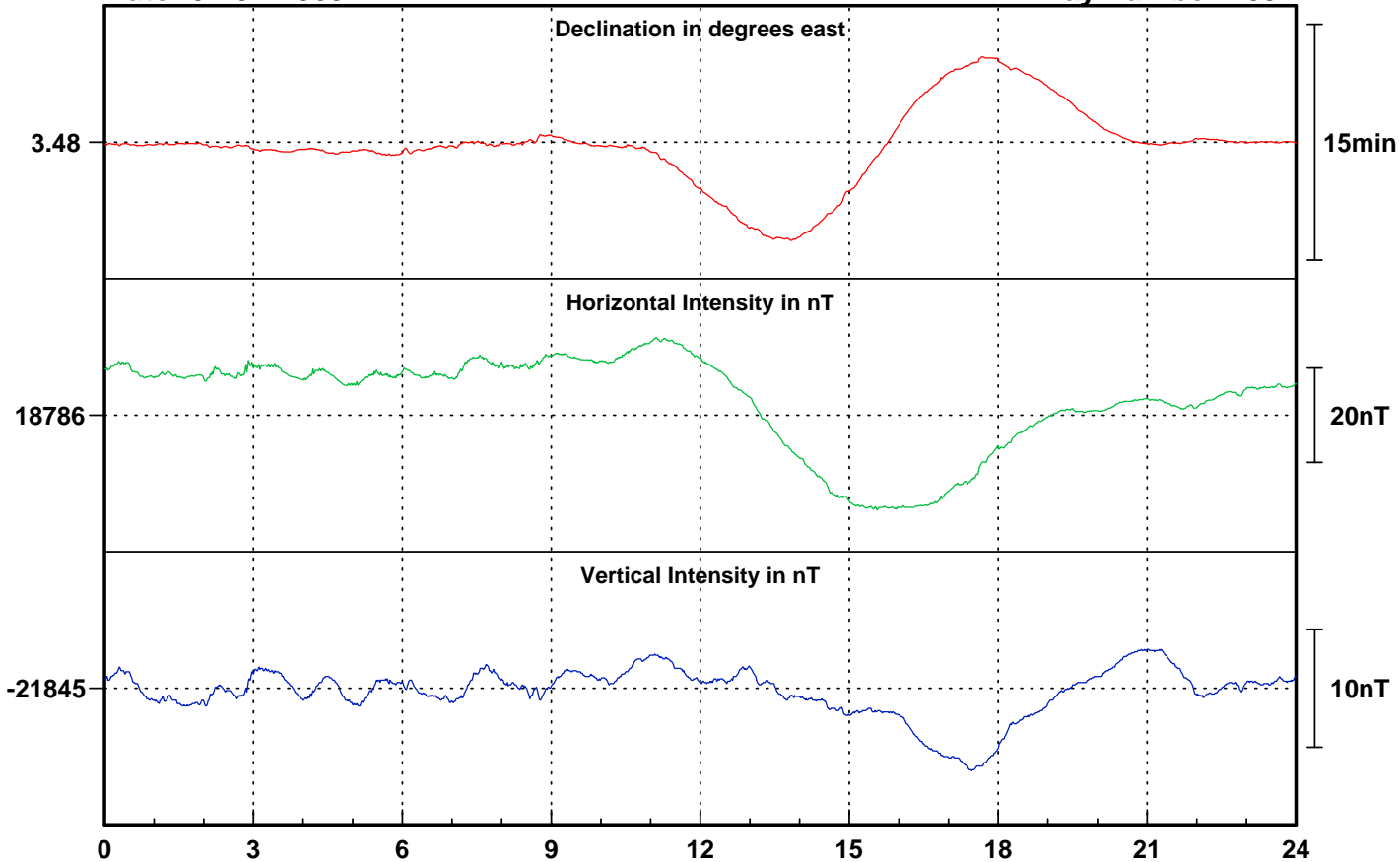
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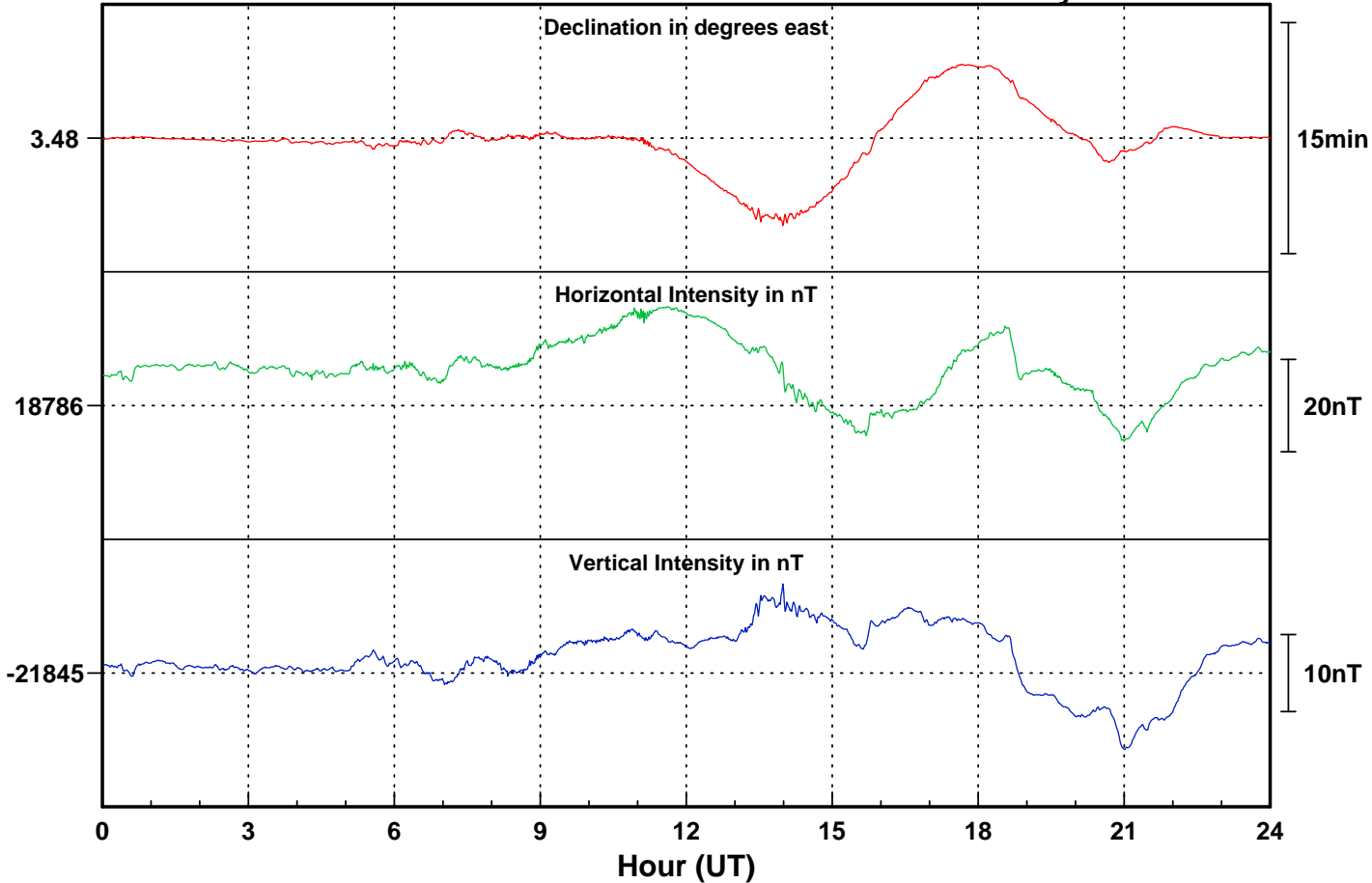
# Falkland Islands

Day number: 097



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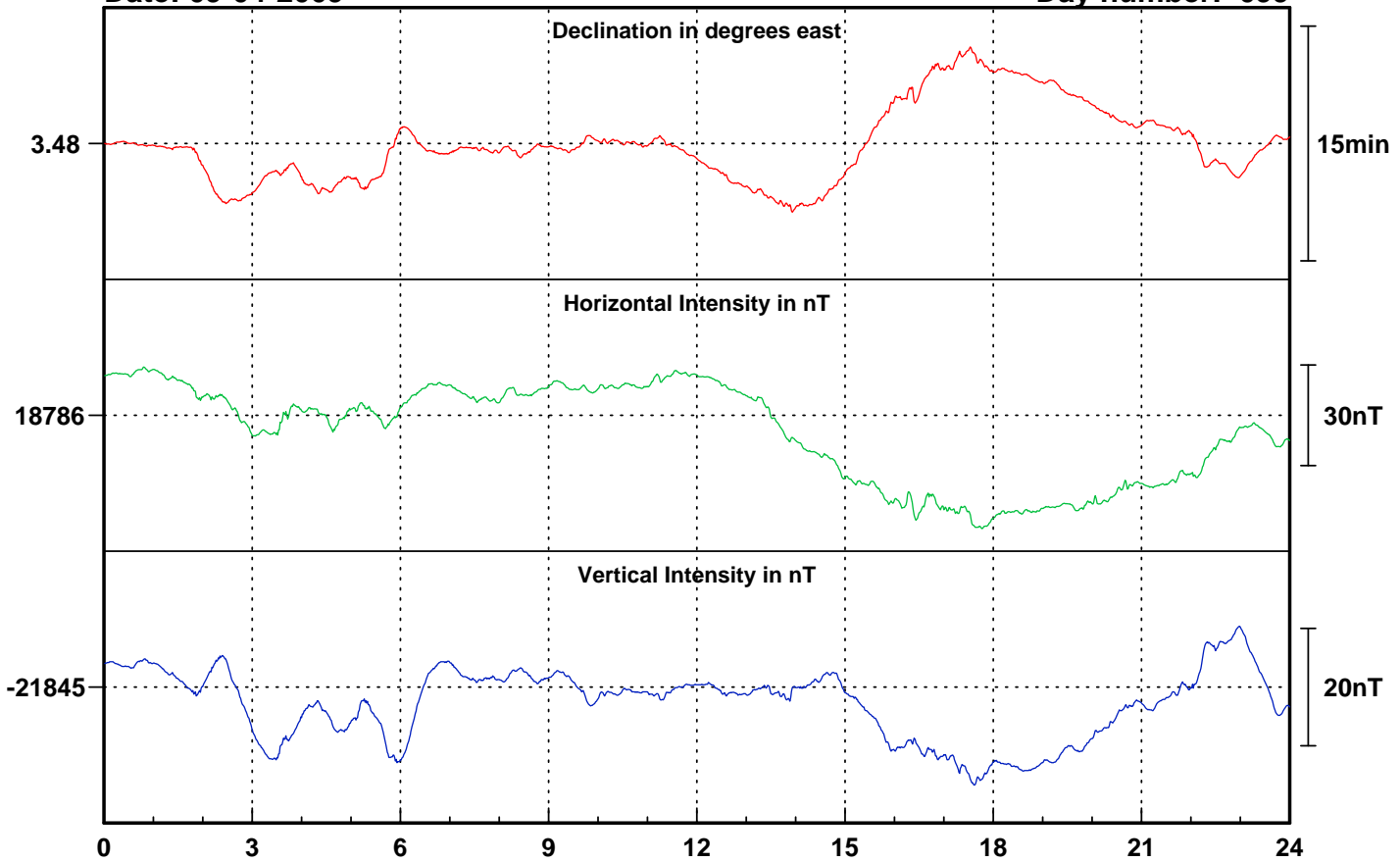
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# Falkland Islands

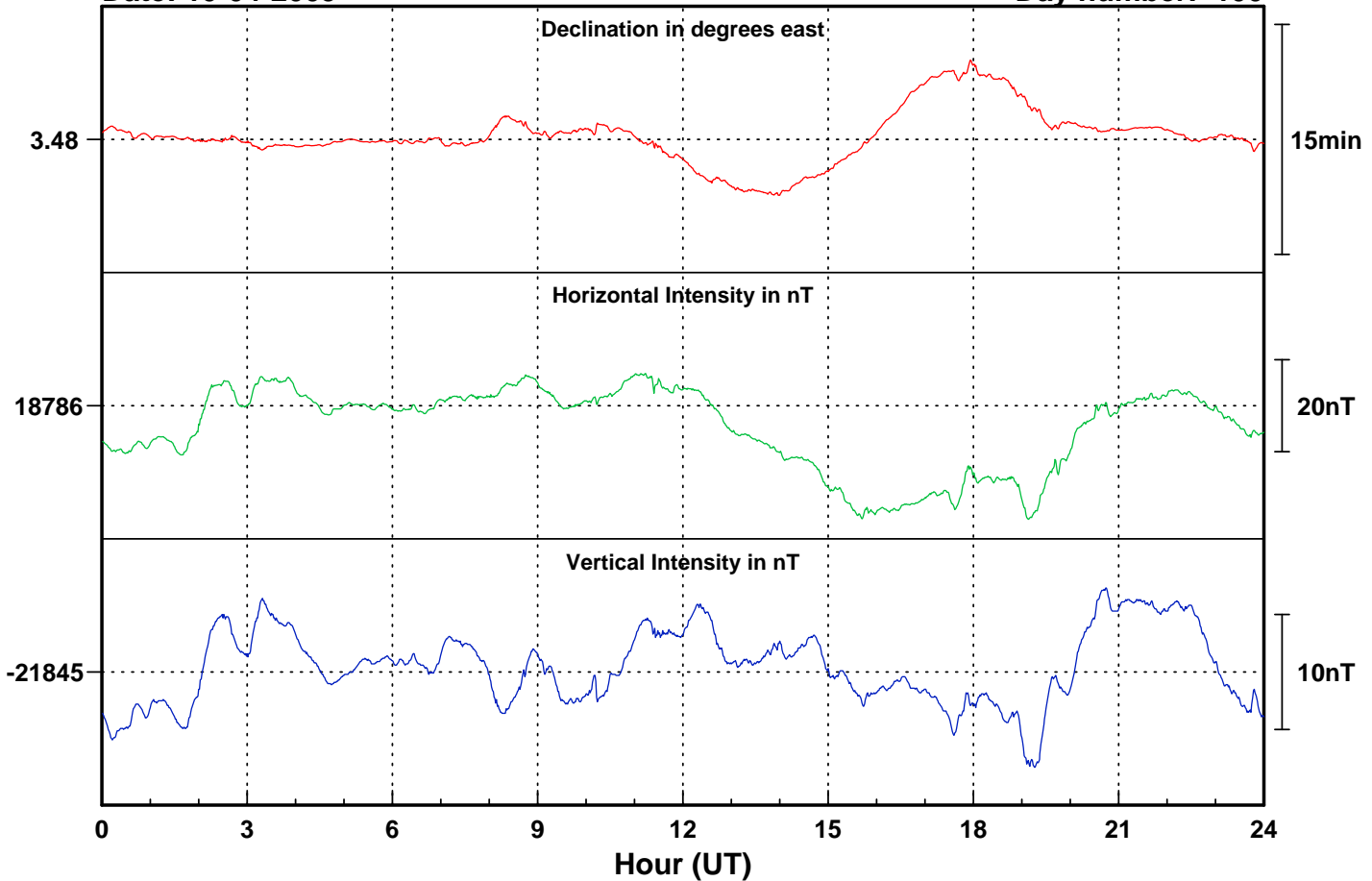
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Date: 10-04-2009

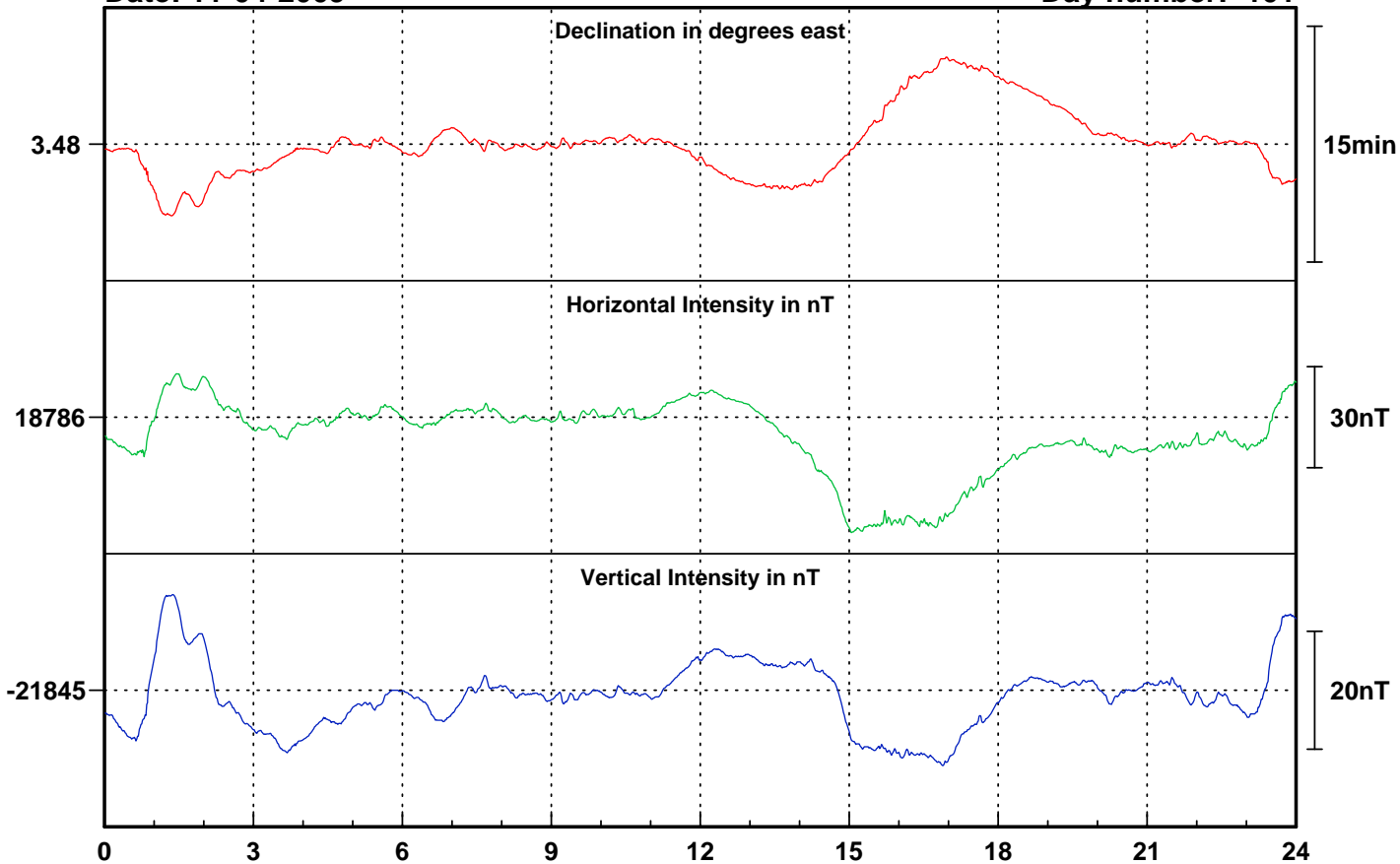
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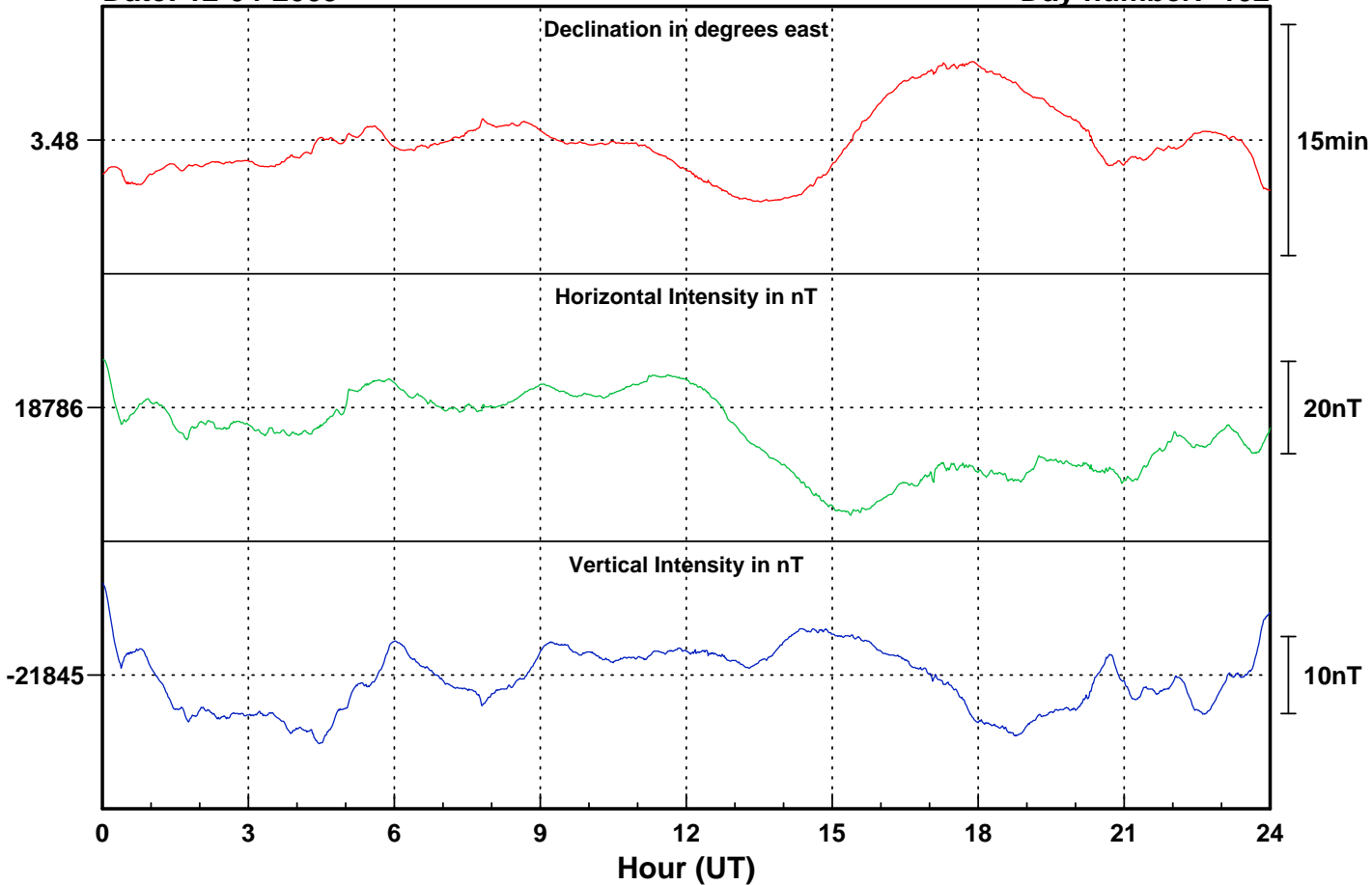
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Day number: 101



Date: 12-04-2009

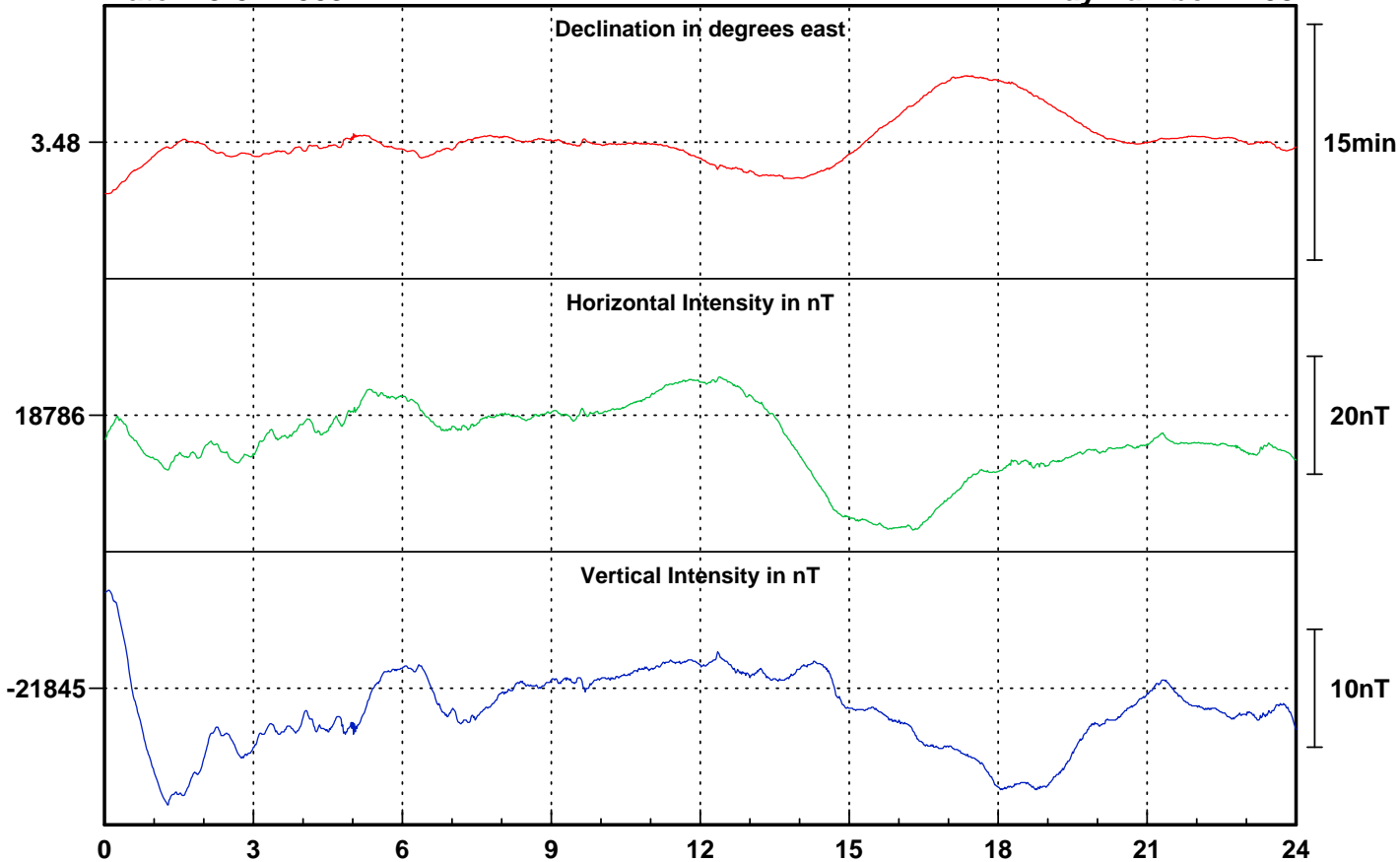
Day number: 102



Date: 13-04-2009

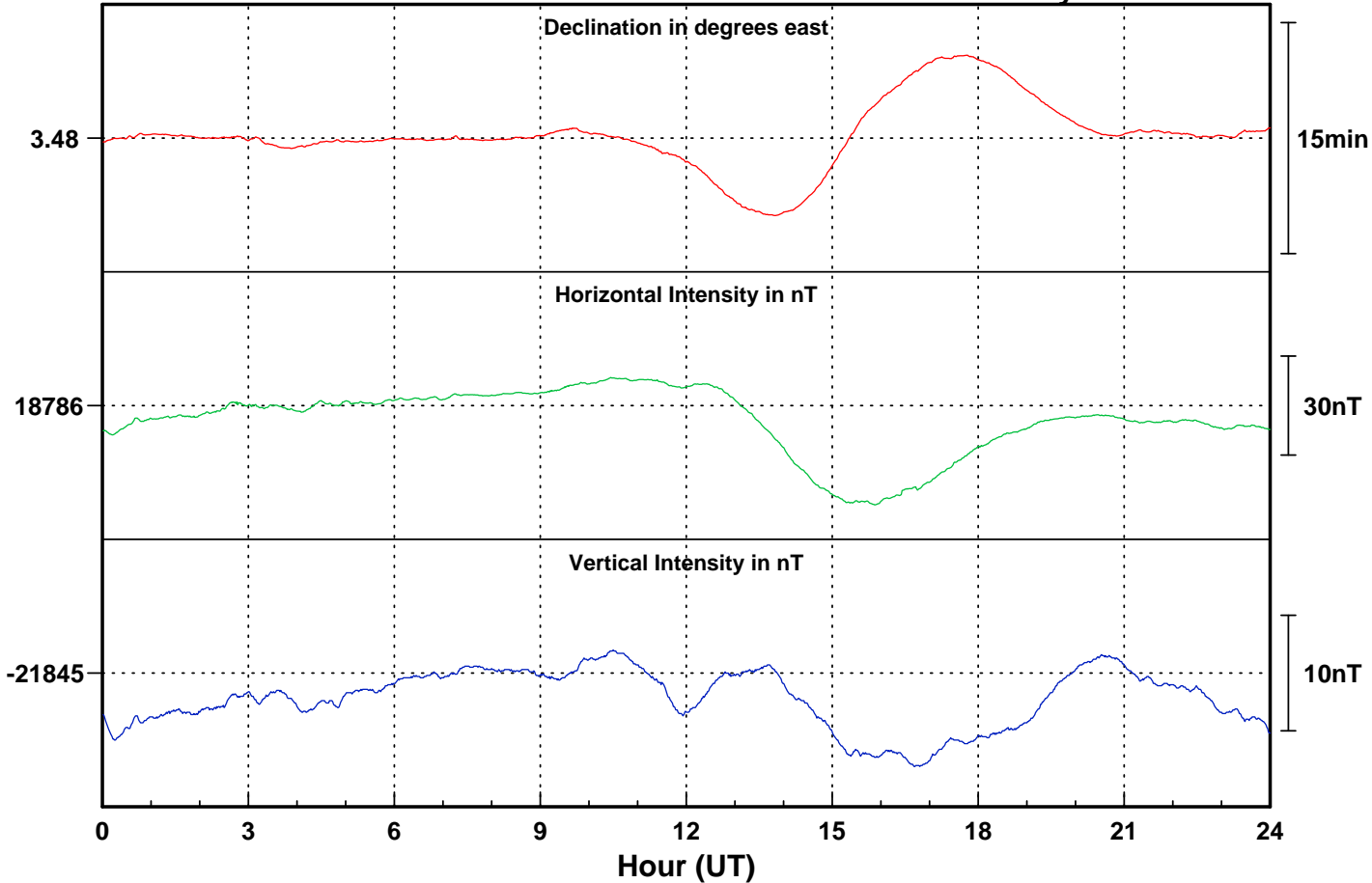
# Falkland Islands

Day number: 103



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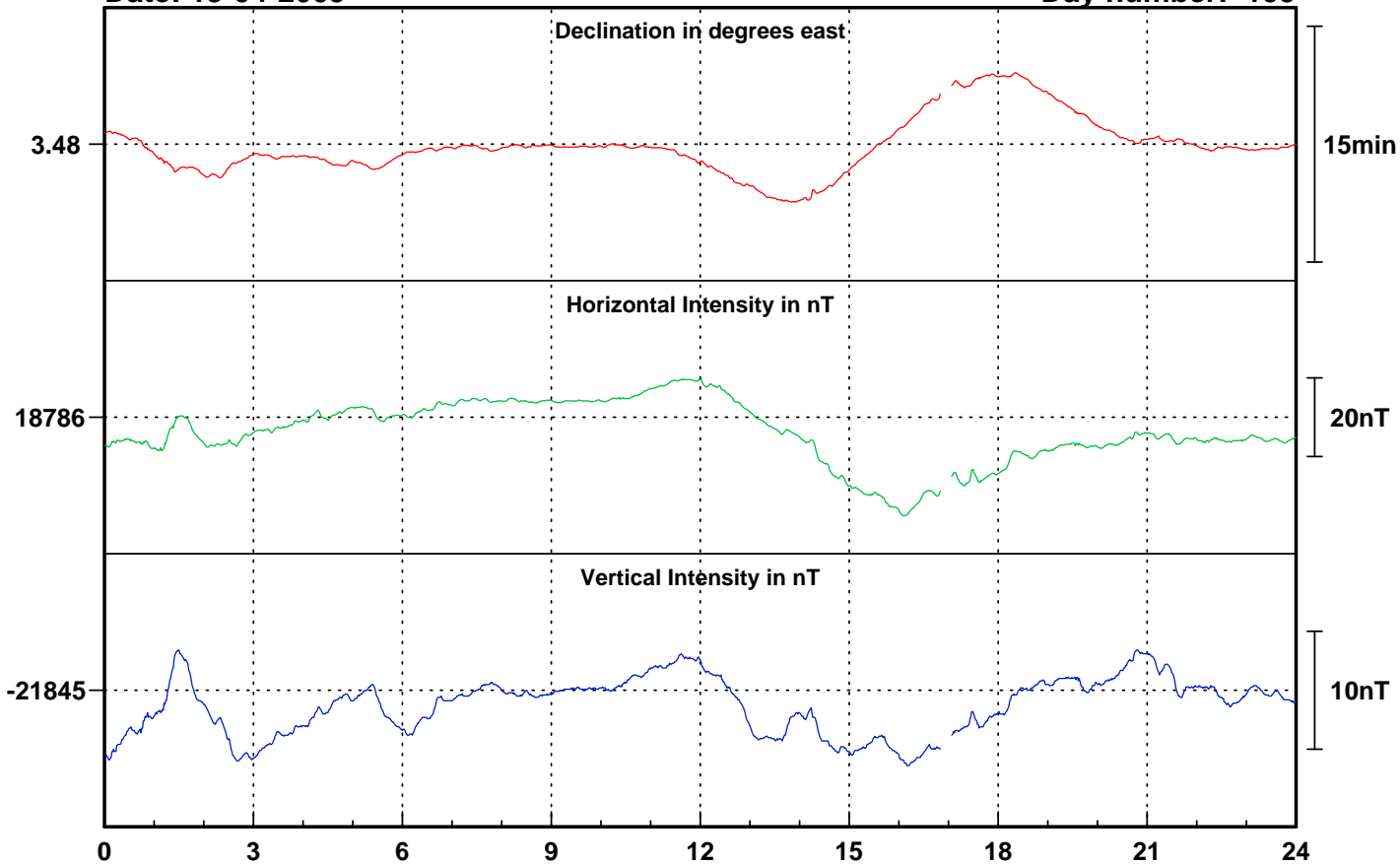
Day number: 104



# Falkland Islands

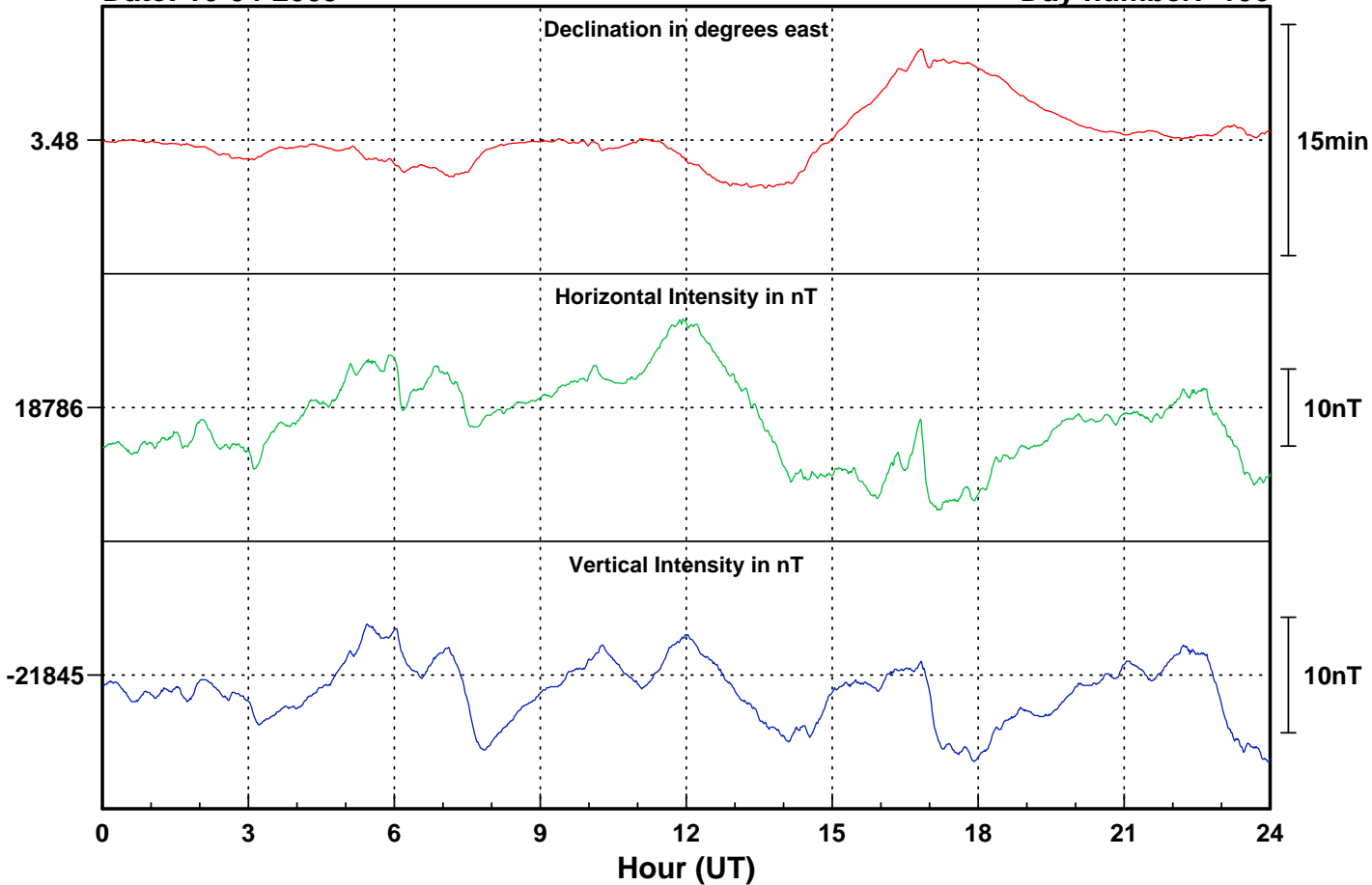
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Day number: 105



Date: 16-04-2009

Day number: 106

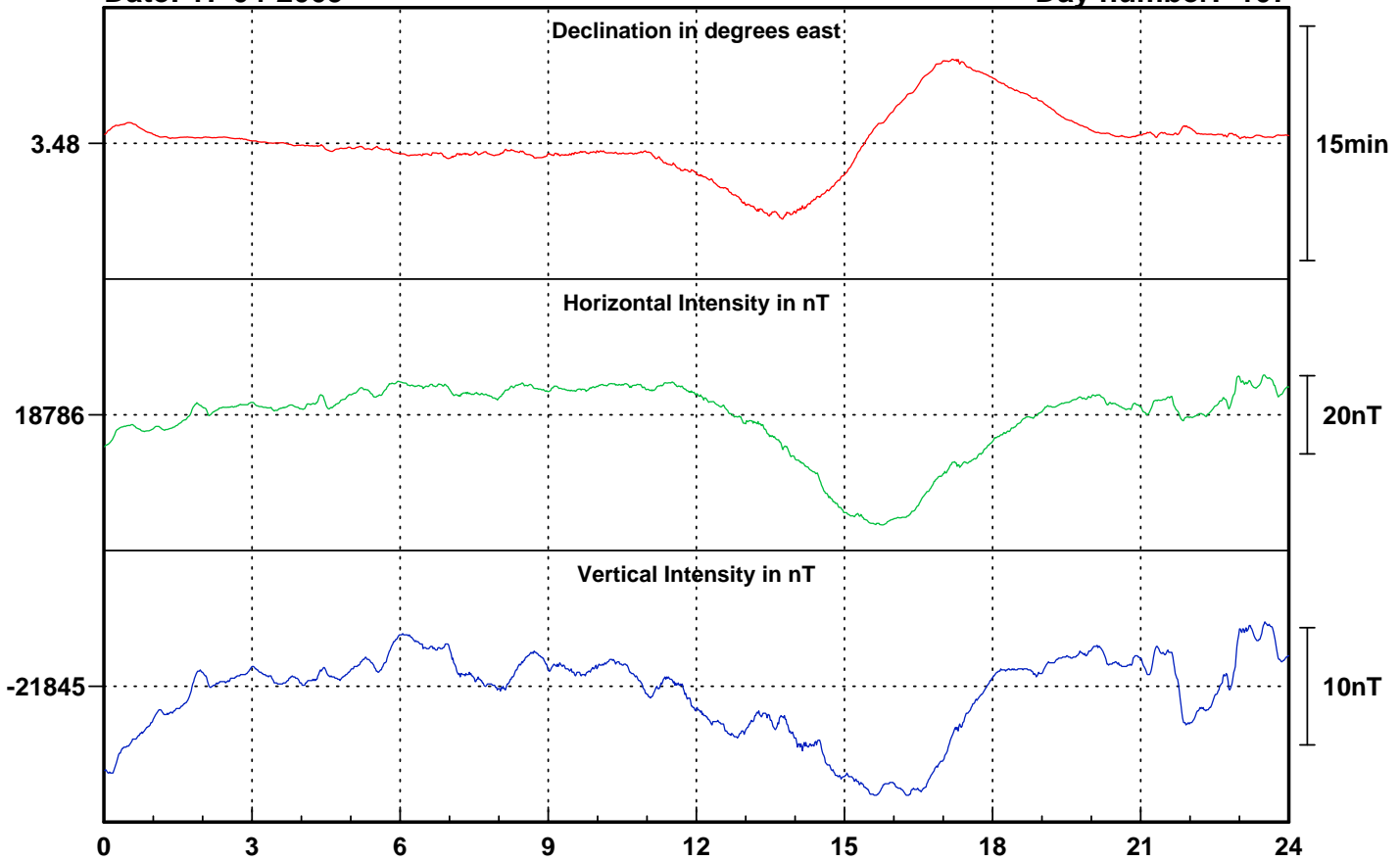




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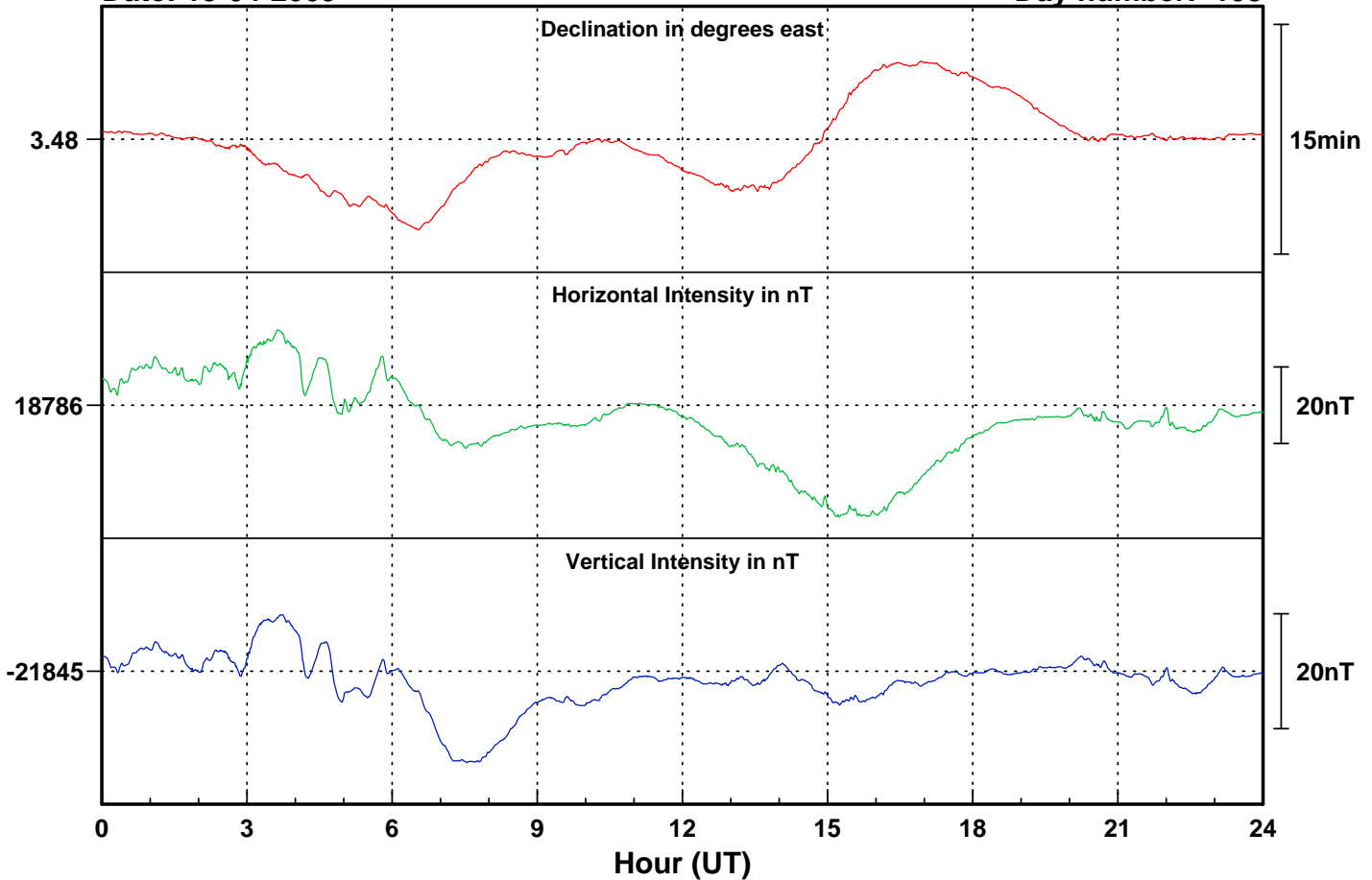
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Day number: 107



Date: 18-04-2009

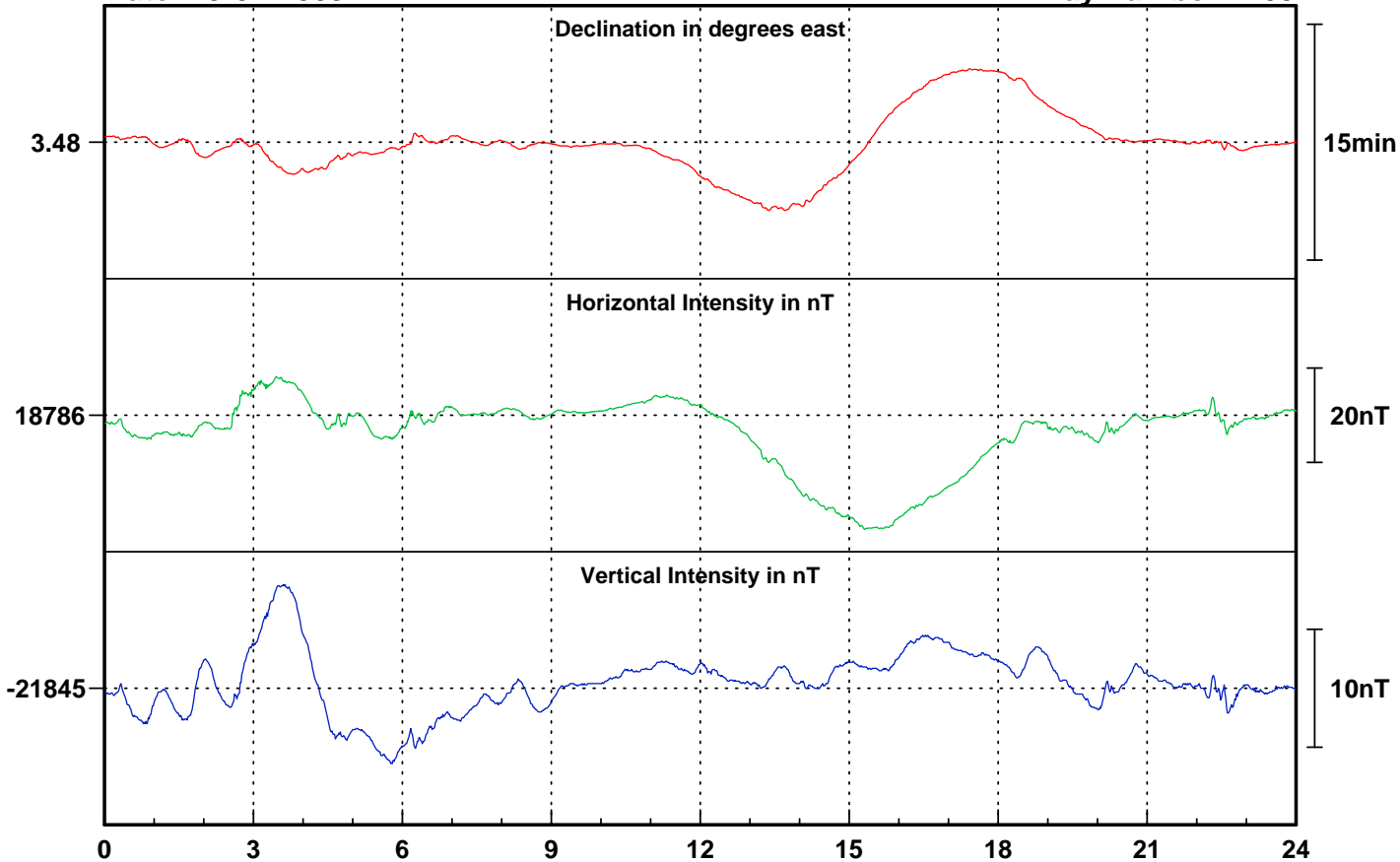
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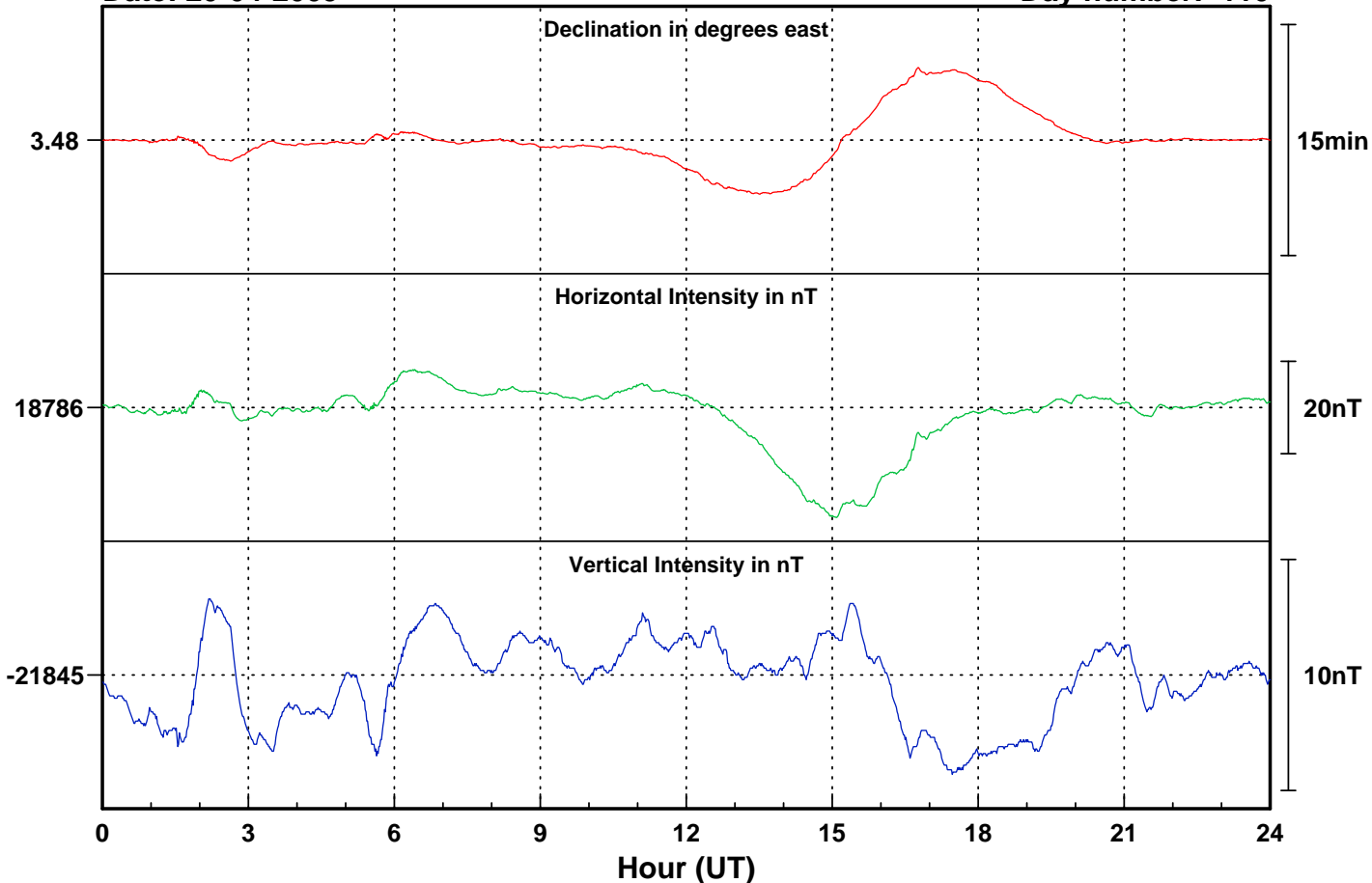
# Falkland Islands

Day number: 109



Date: 20-04-2009

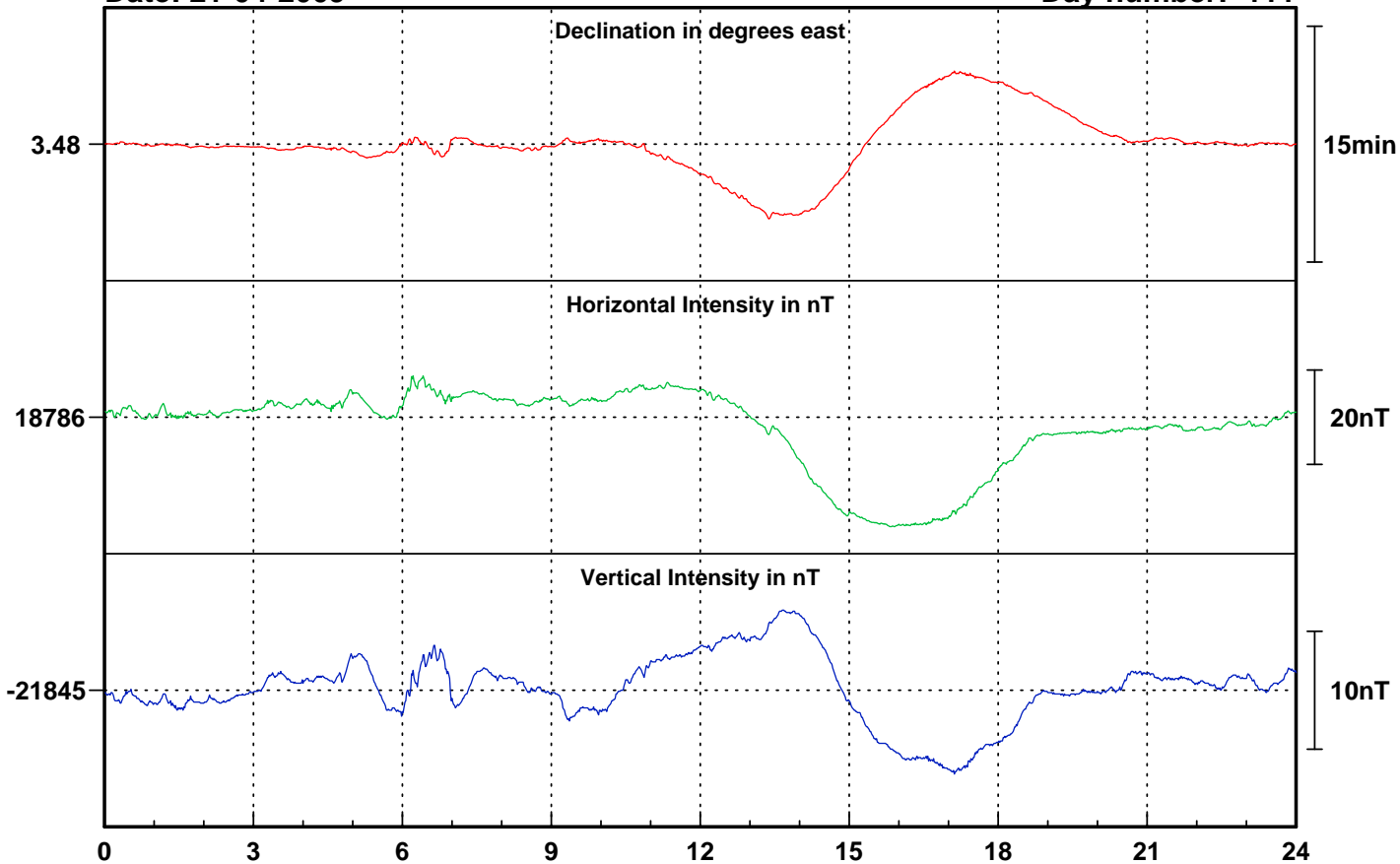
Day number: 110



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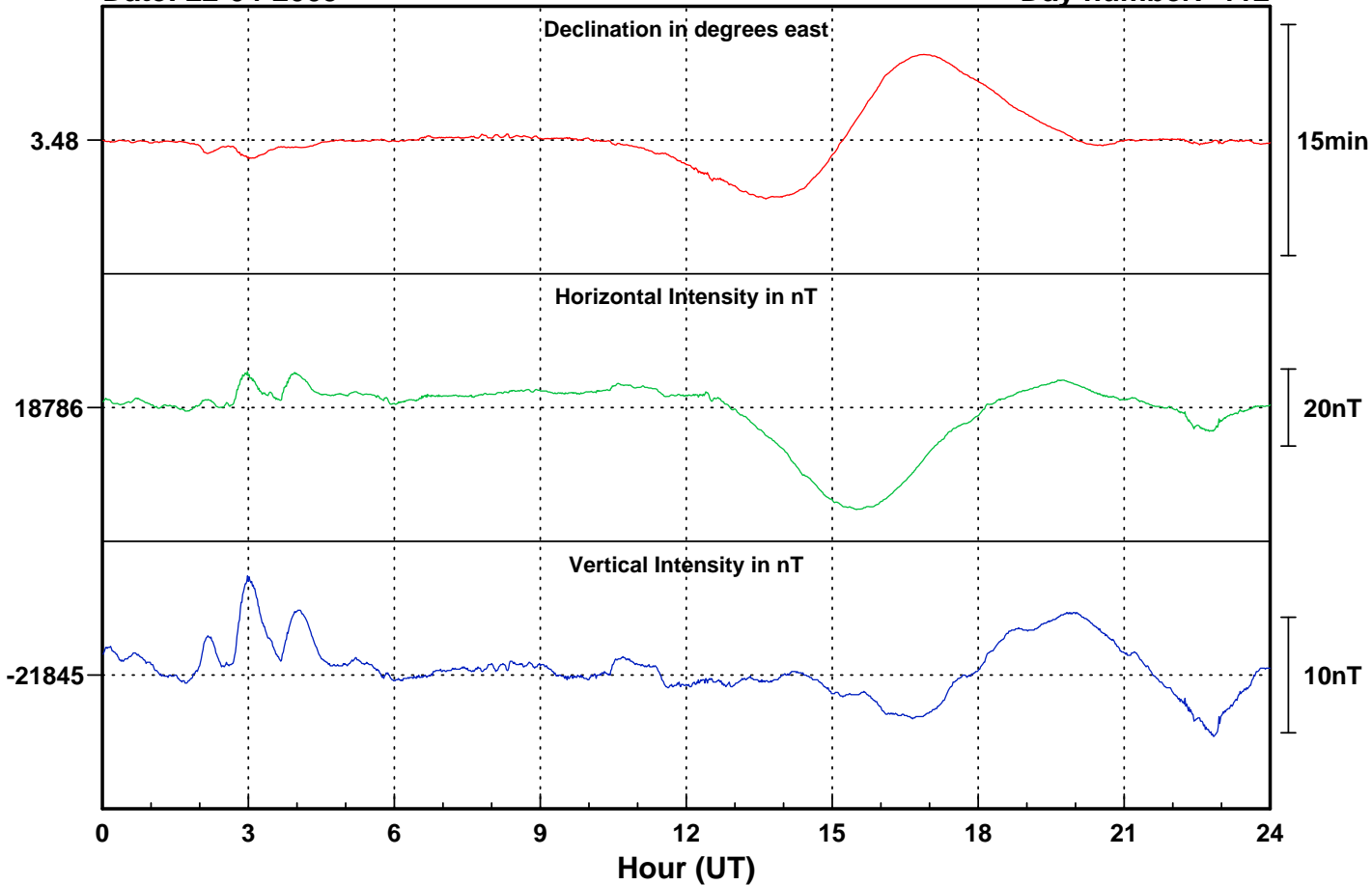
# Falkland Islands

Day number: 111



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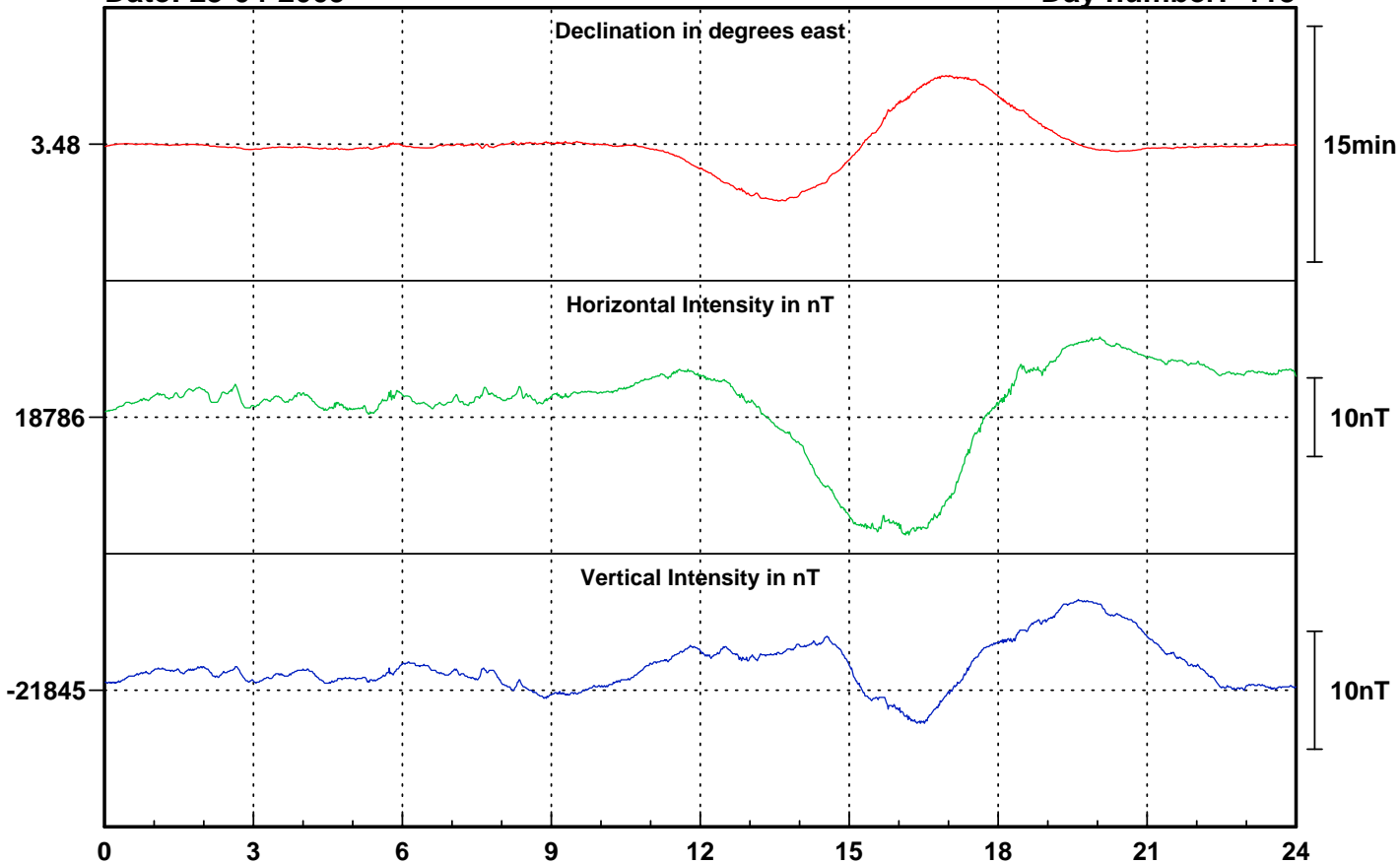
Day number: 112



Date: 23-04-2009

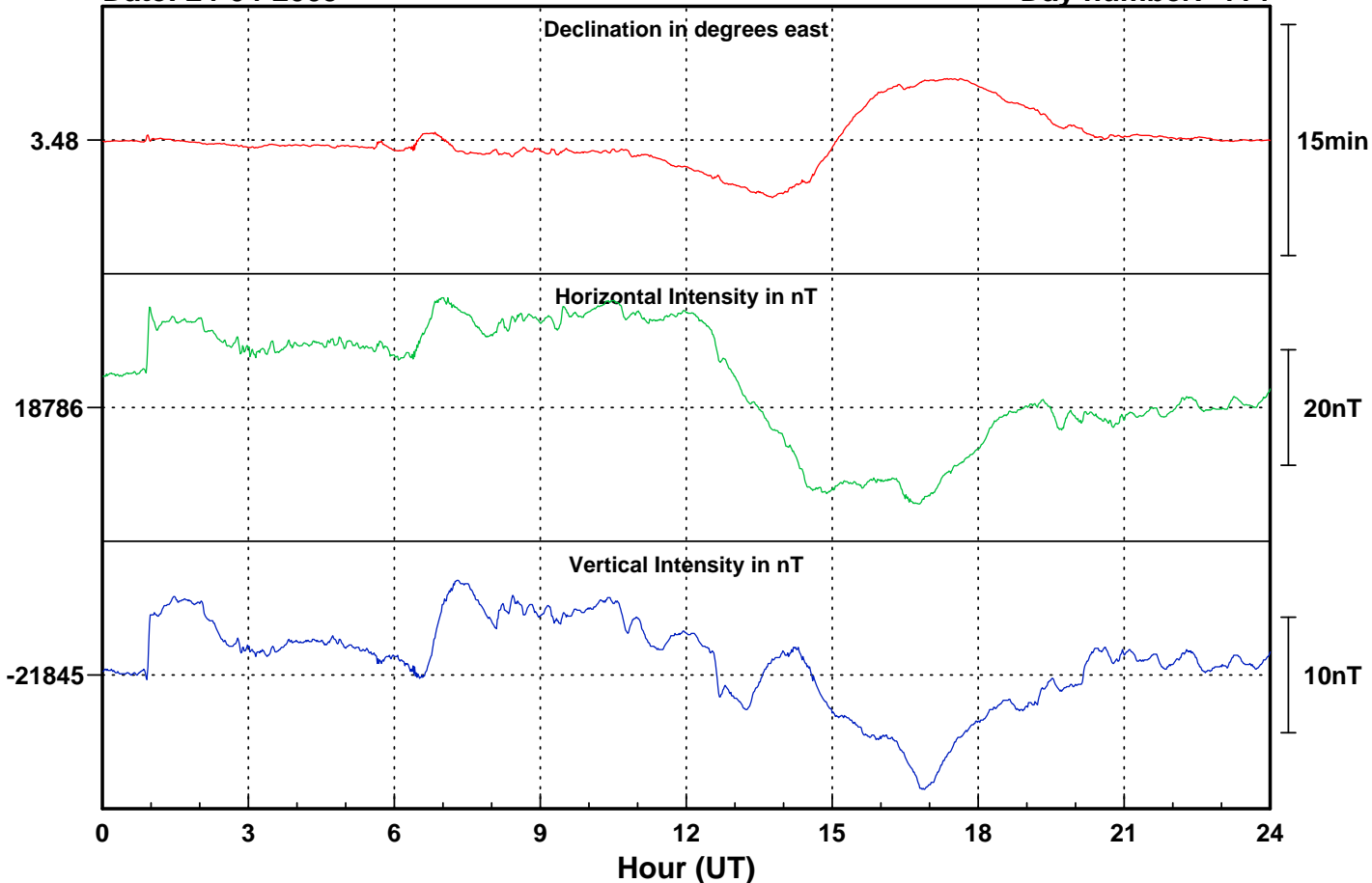
# Falkland Islands

Day number: 113



Date: 24-04-2009

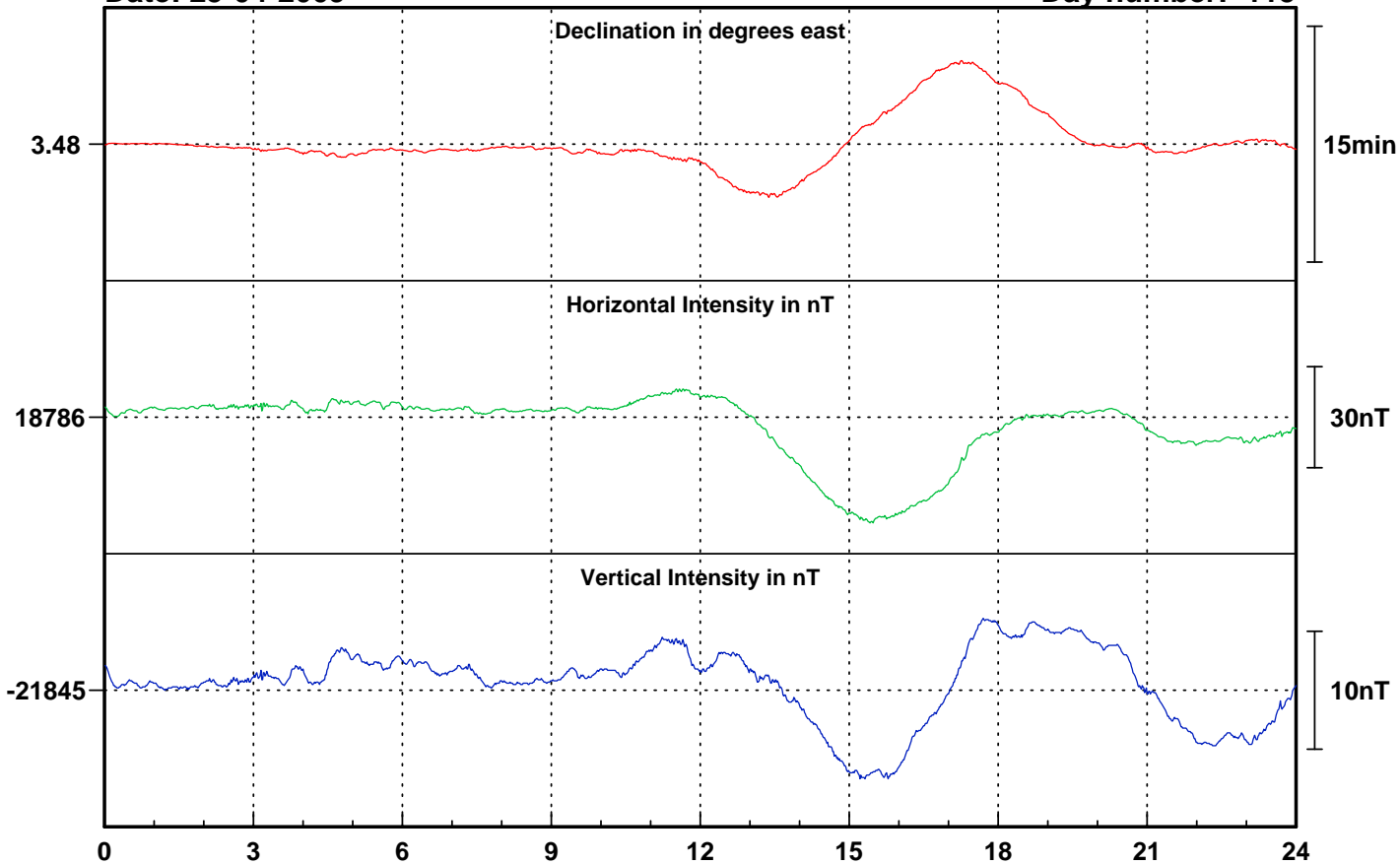
Day number: 114



Date: 25-04-2009

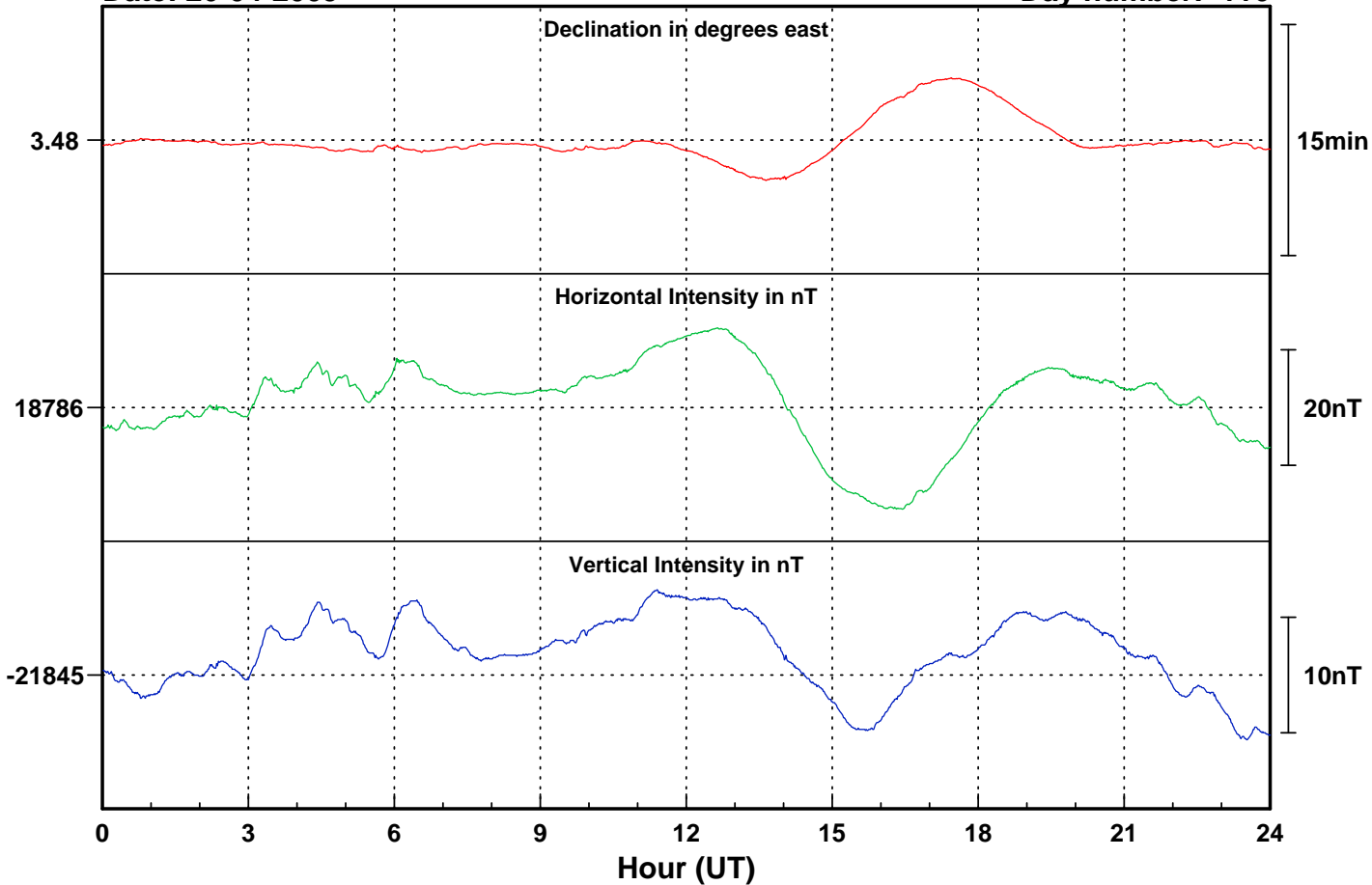
# Falkland Islands

Day number: 115



Date: 26-04-2009

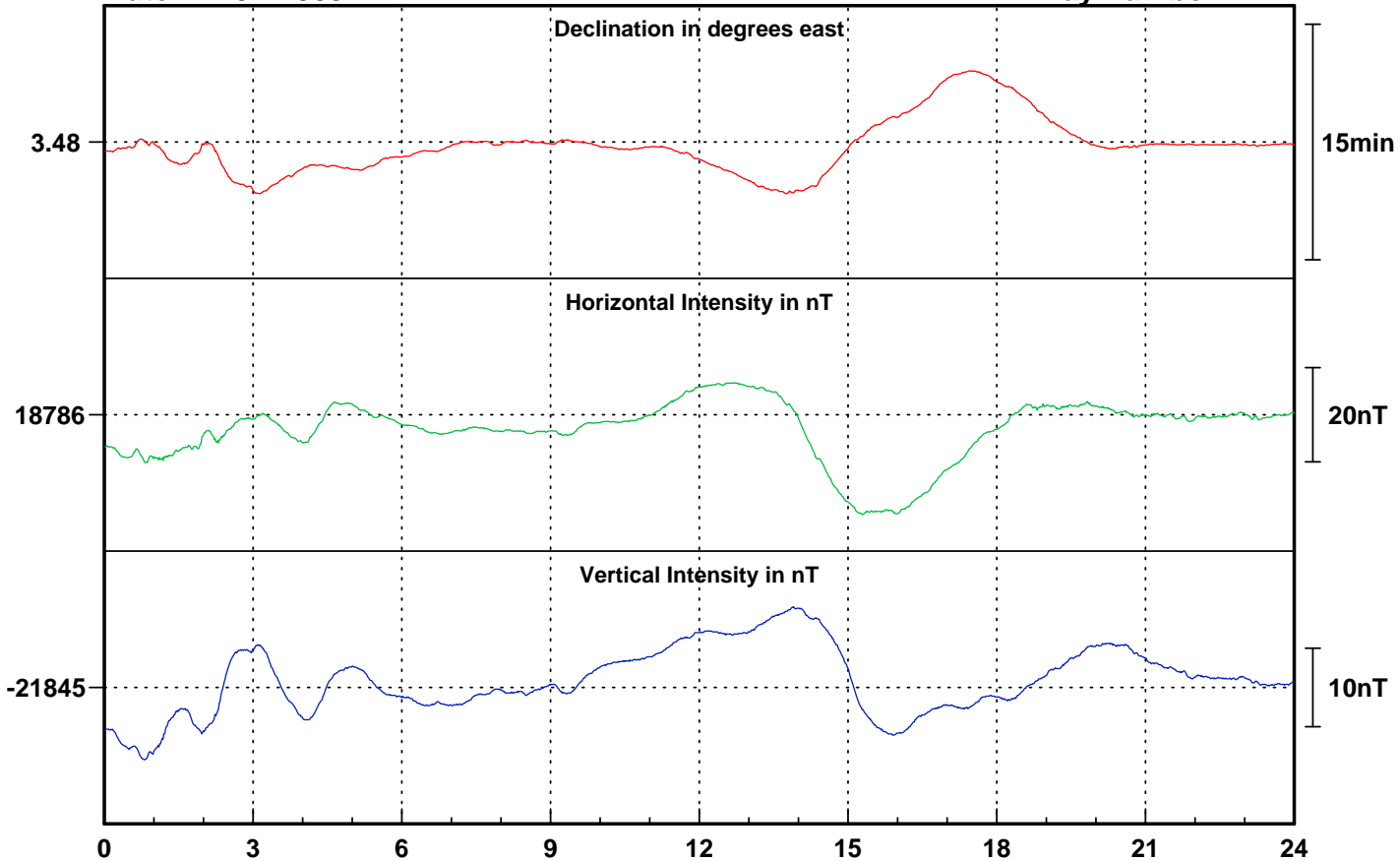
Day number: 116



Date: 27-04-2009

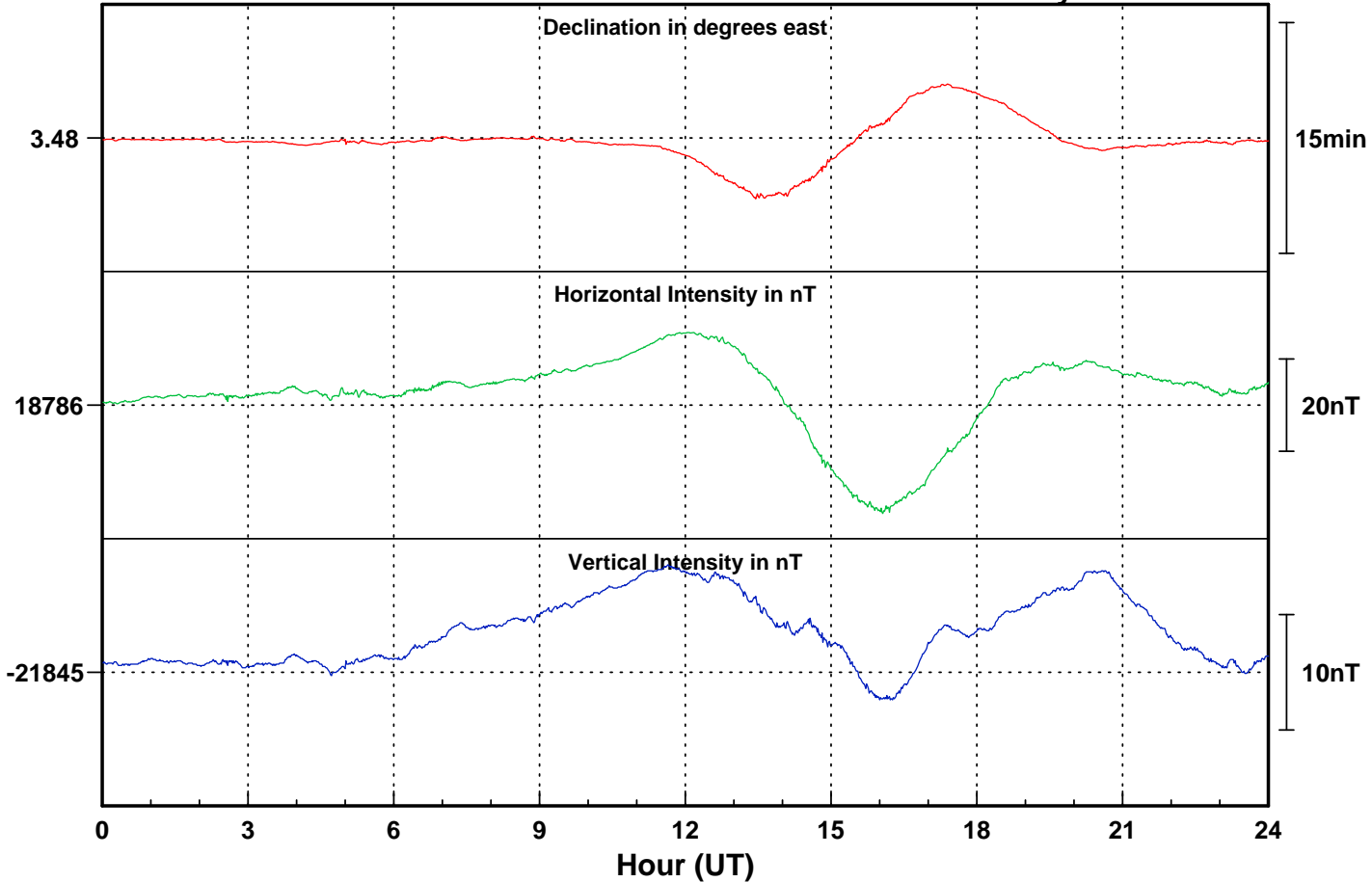
# Falkland Islands

Day number: 117



Date: 28-04-2009

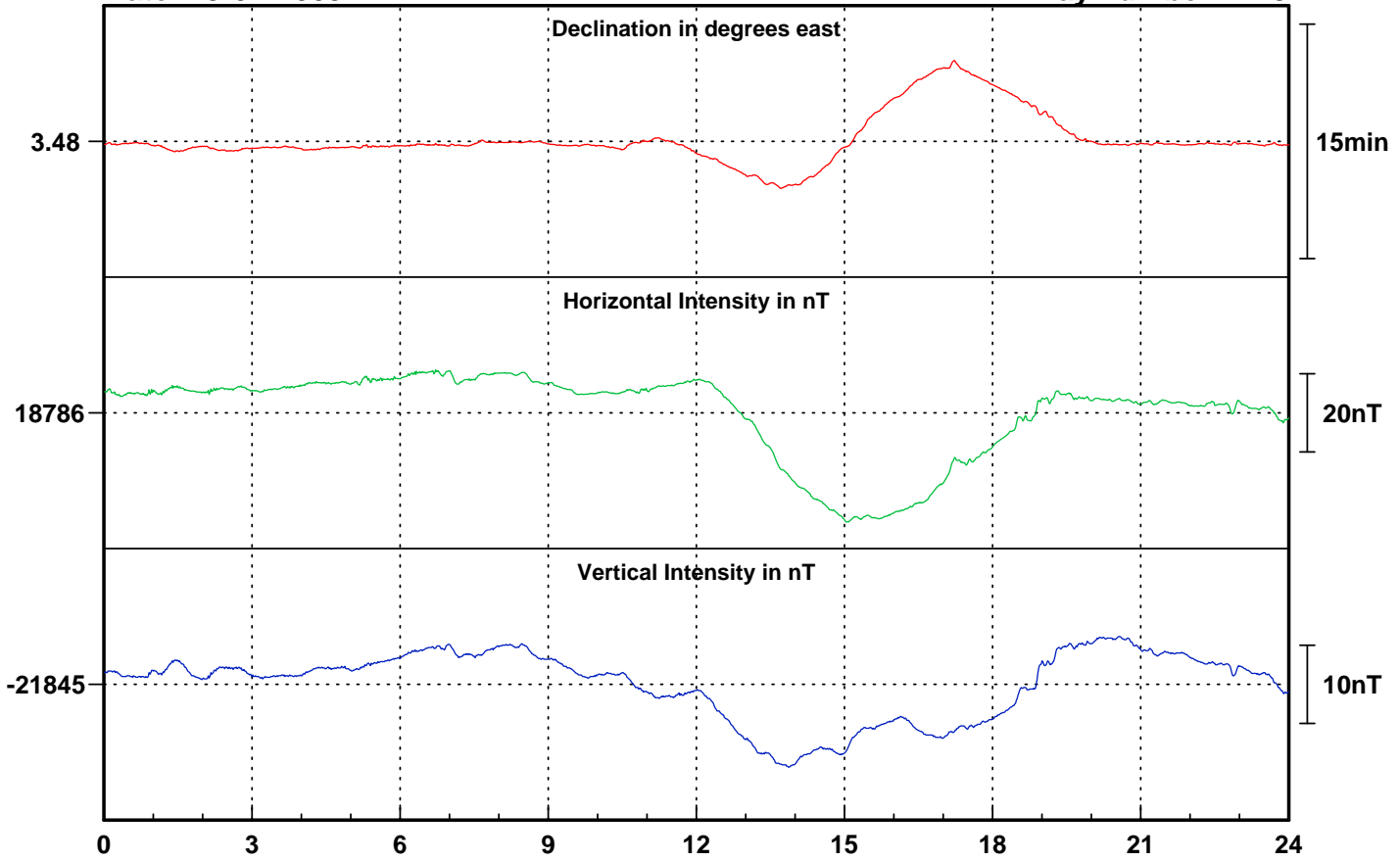
Day number: 118



Date: 29-04-2009

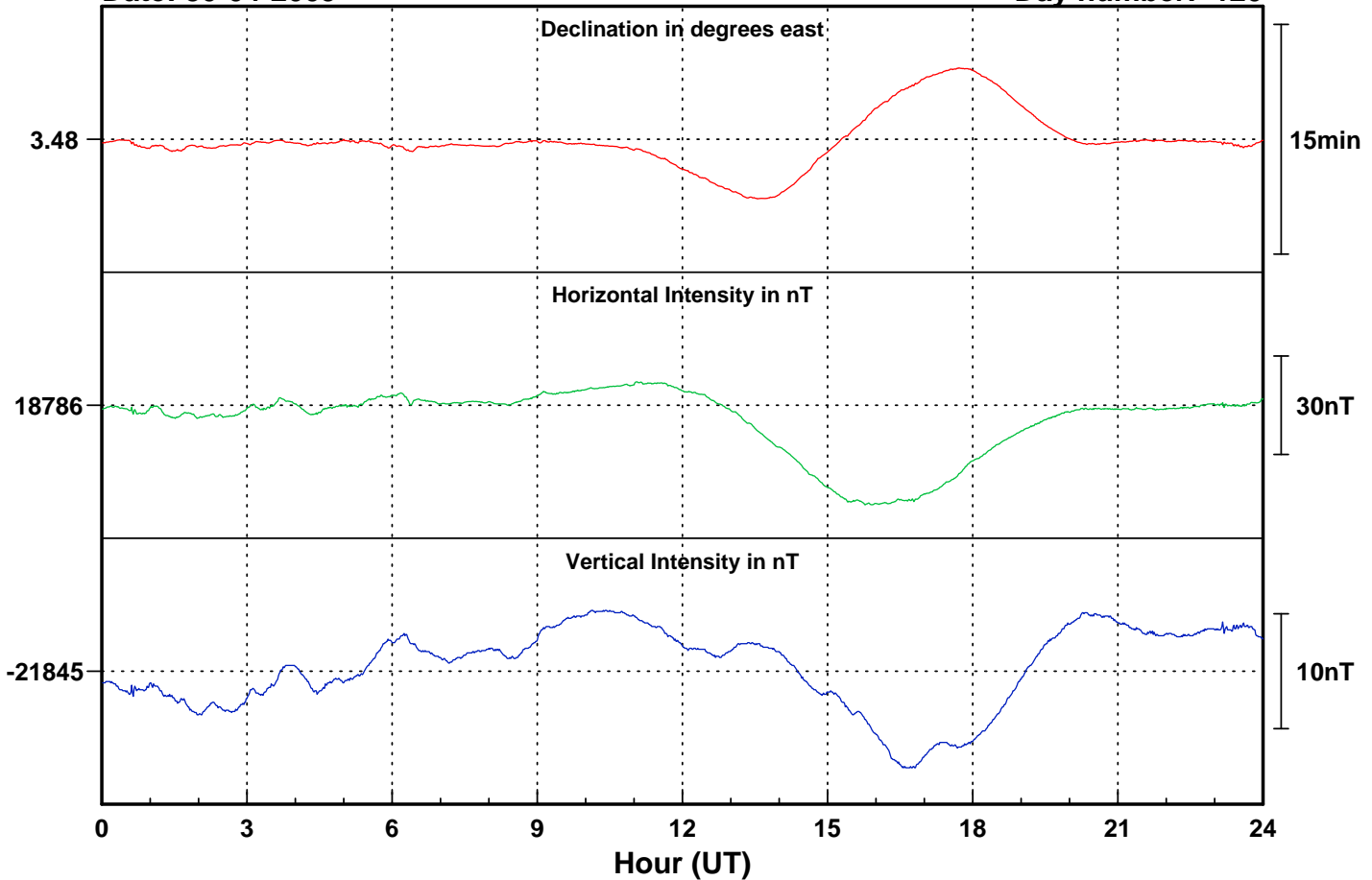
# Falkland Islands

Day number: 119

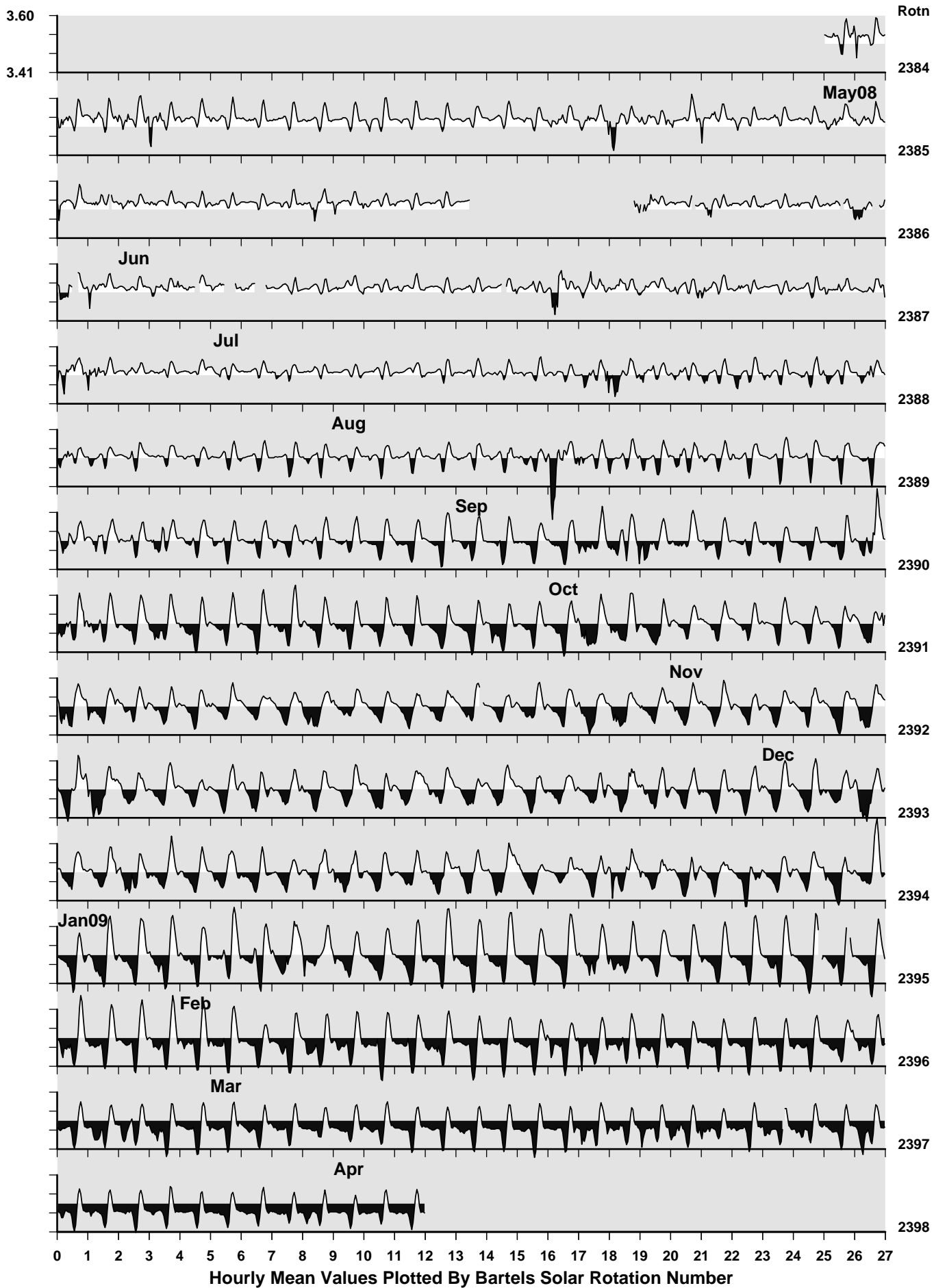


Date: 30-04-2009

Day number: 120

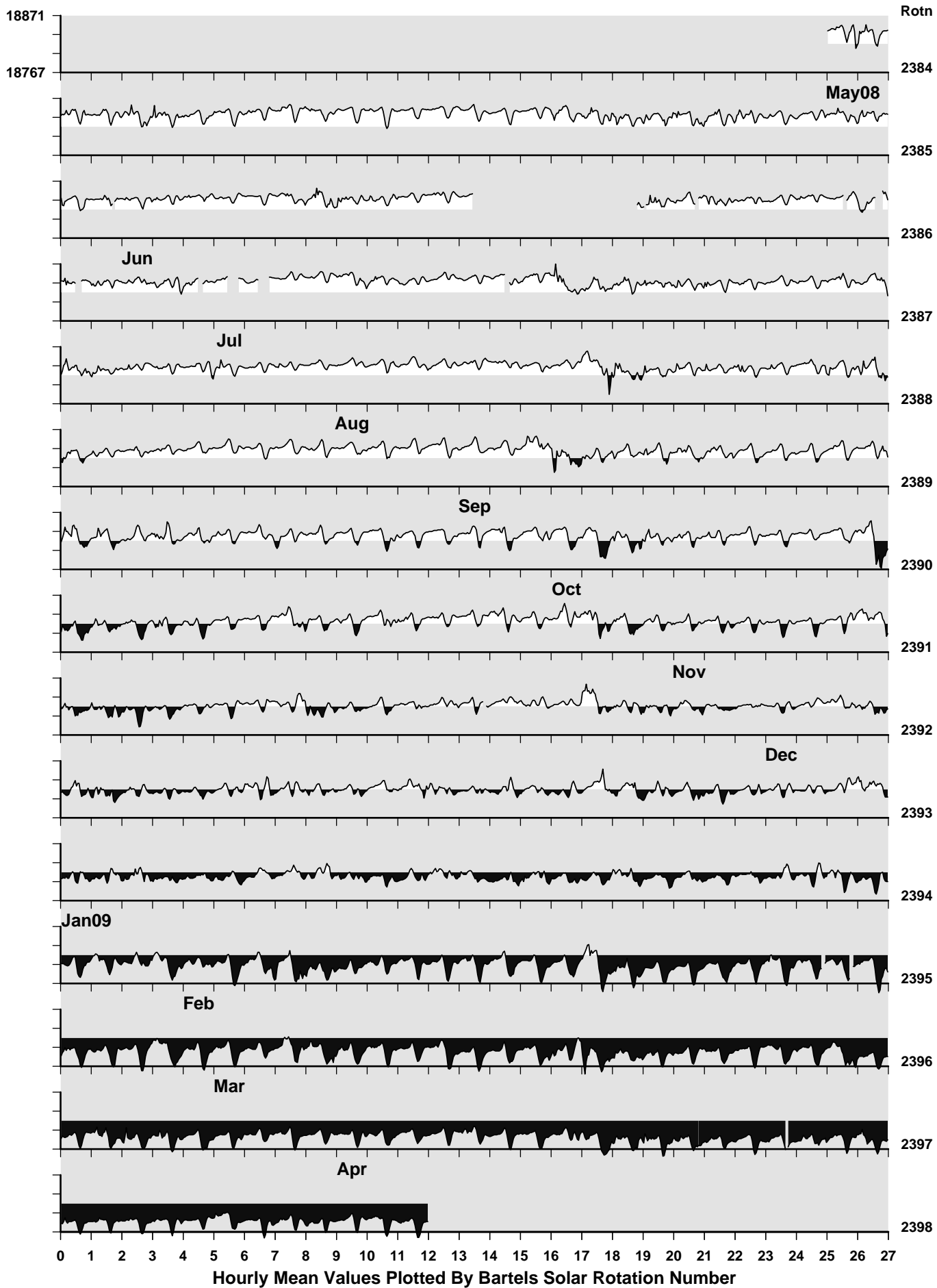


# Falkland Islands Observatory: Declination (degrees)



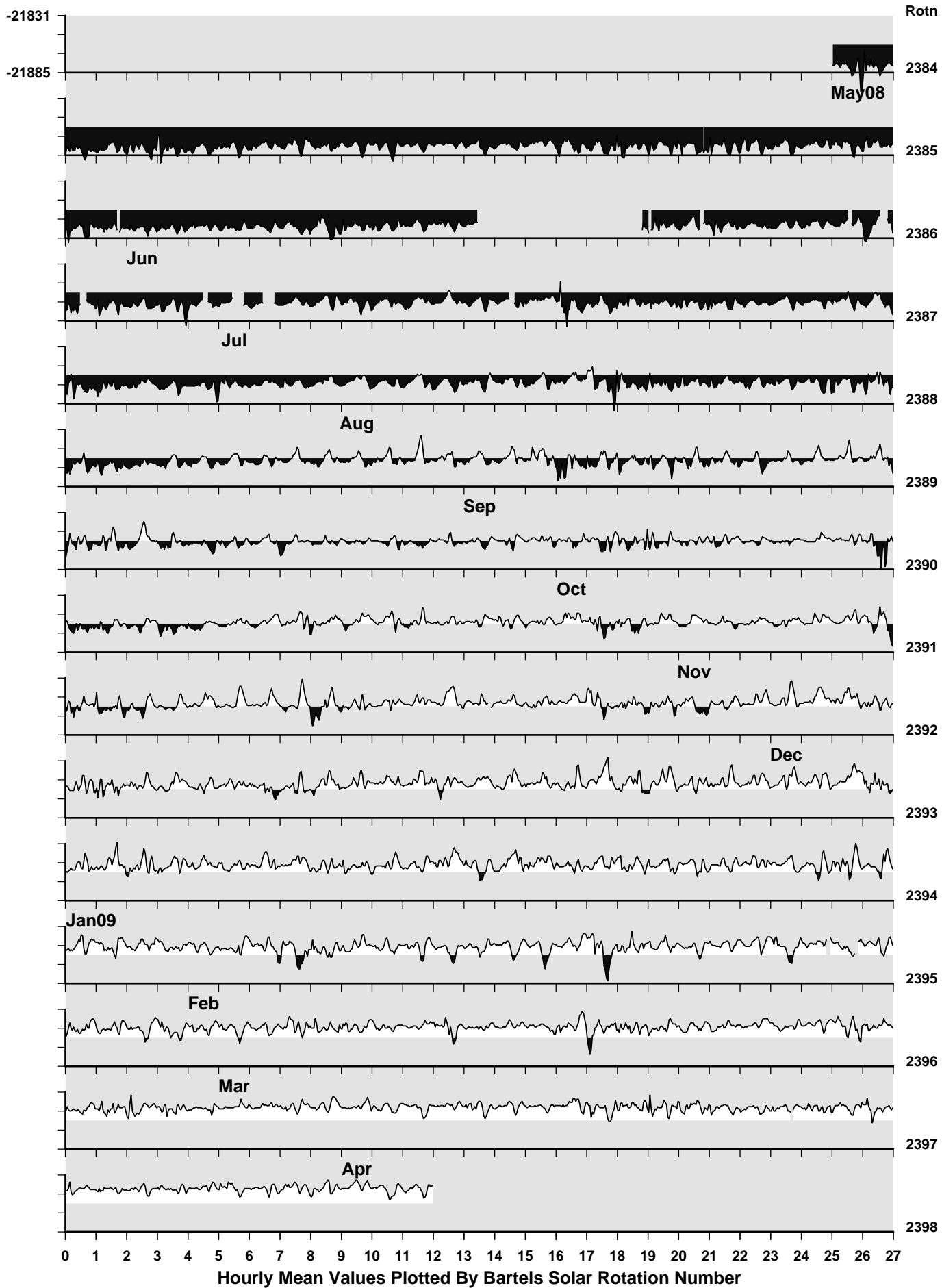


# Falkland Islands Observatory: Horizontal Intensity (nT)



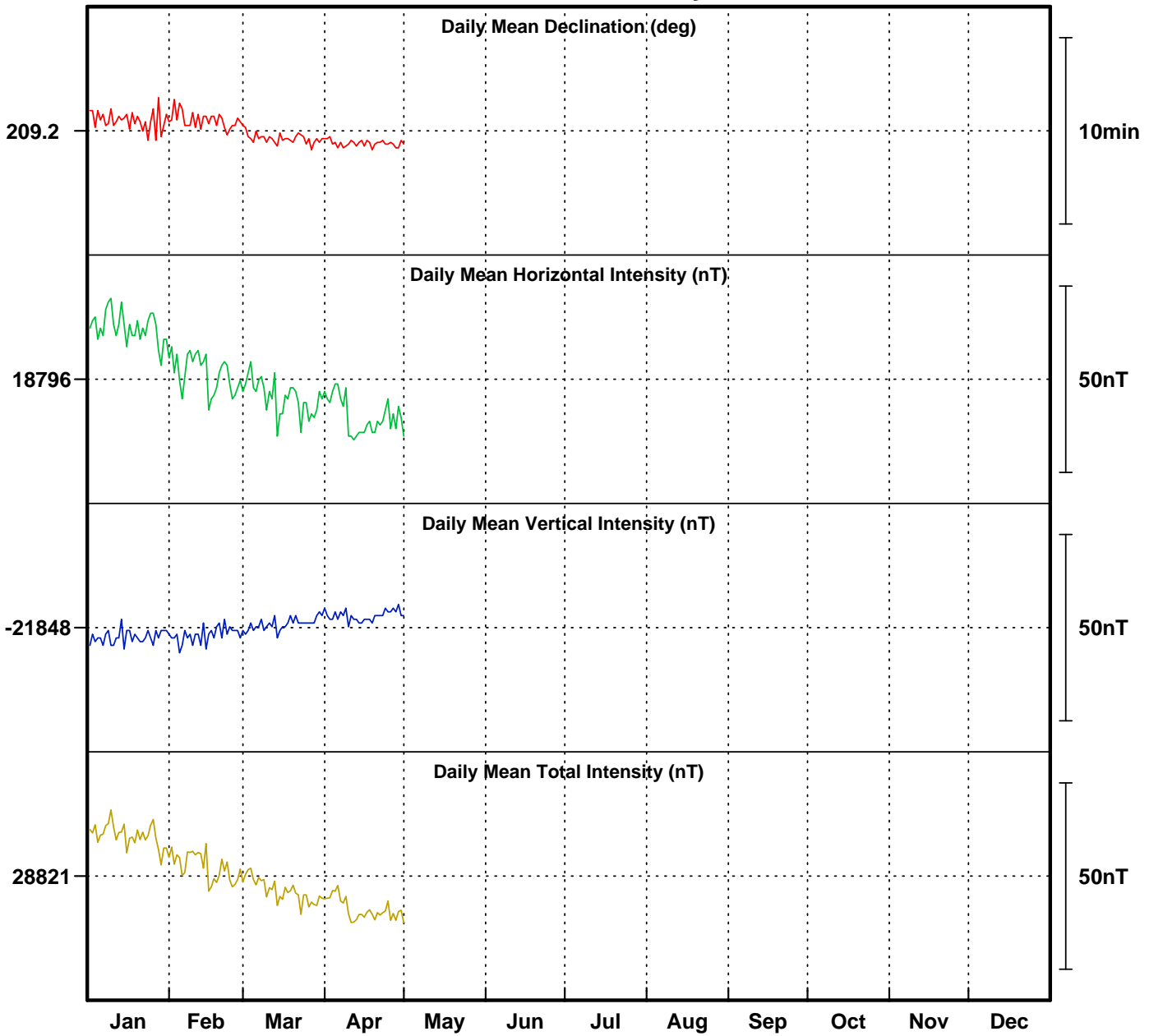
Hourly Mean Values Plotted By Bartels Solar Rotation Number

# Falkland Islands Observatory: Vertical Intensity (nT)



Hourly Mean Values Plotted By Bartels Solar Rotation Number

# Falklands Is Observatory 2009



### Monthly Mean Values for Port Stanley Observatory 2009

Month	<i>D</i>	<i>H</i>	<i>I</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>F</i>
January	3° 29.8′	18810 nT	-49° 16.6′	18775 nT	1147 nT	-21851 nT	28832 nT
February	3° 29.8′	18798 nT	-49° 17.7′	18763 nT	1146 nT	-21850 nT	28823 nT
March	3° 28.8′	18791 nT	-49° 18.0′	18757 nT	1141 nT	-21847 nT	28817 nT
April	3° 28.5′	18786 nT	-49° 18.3′	18752 nT	1139 nT	-21845 nT	28812 nT

Note

- i. The values shown here are provisional.