

**BRITISH GEOLOGICAL SURVEY**

# Ascension Island

# Observatory

# Monthly

# Magnetic

# Bulletin

**November 2008**

**08/11/AS**



**British Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

# ASCENSION ISLAND OBSERVATORY MAGNETIC DATA

## 1. Introduction

Ascension Island Observatory was installed by the British Geological Survey (BGS) with financial support from a consortium of oil companies and became operational in September 1992.

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.

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

## 2. Position

Ascension Island Observatory, one of the geomagnetic observatories maintained and operated by BGS, is situated on a site adjacent to the Cable and Wireless Earth Station on Donkey Plain, Ascension Island.

The observatory co-ordinates are:

*Geographic:*         $7^{\circ} 57.0^{\circ} S$          $345^{\circ} 37.4^{\circ} E$   
*Geomagnetic:*  $2^{\circ} 20.7^{\circ} S$          $56^{\circ} 34.8^{\circ} E$   
*Height above mean sea level:*         $177 m$

The geomagnetic co-ordinates are calculated using the 10th generation International Geomagnetic Reference Field at epoch 2008.5.

## 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 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. 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.

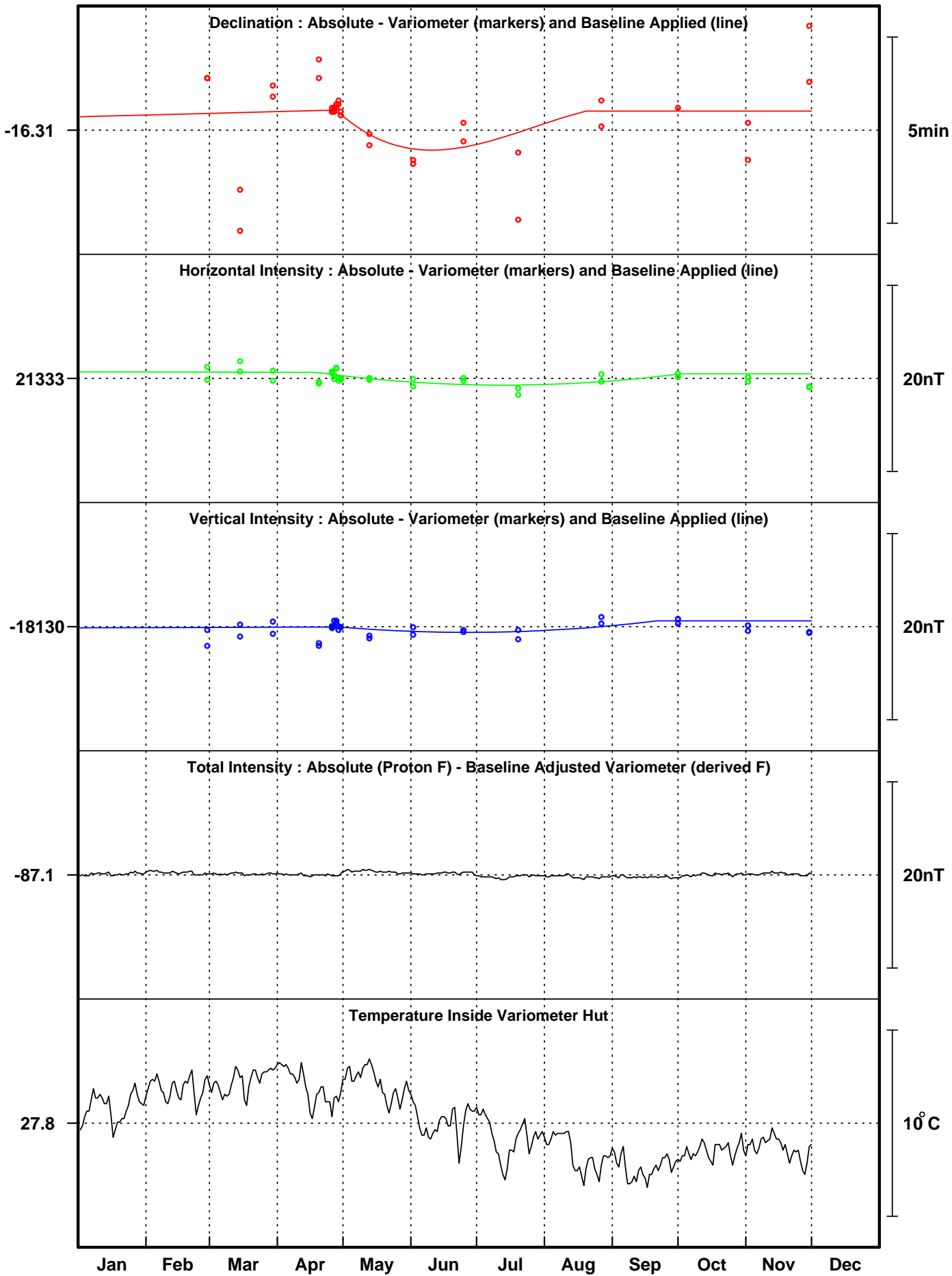
### **4.5 Daily and Monthly Mean Values**

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.





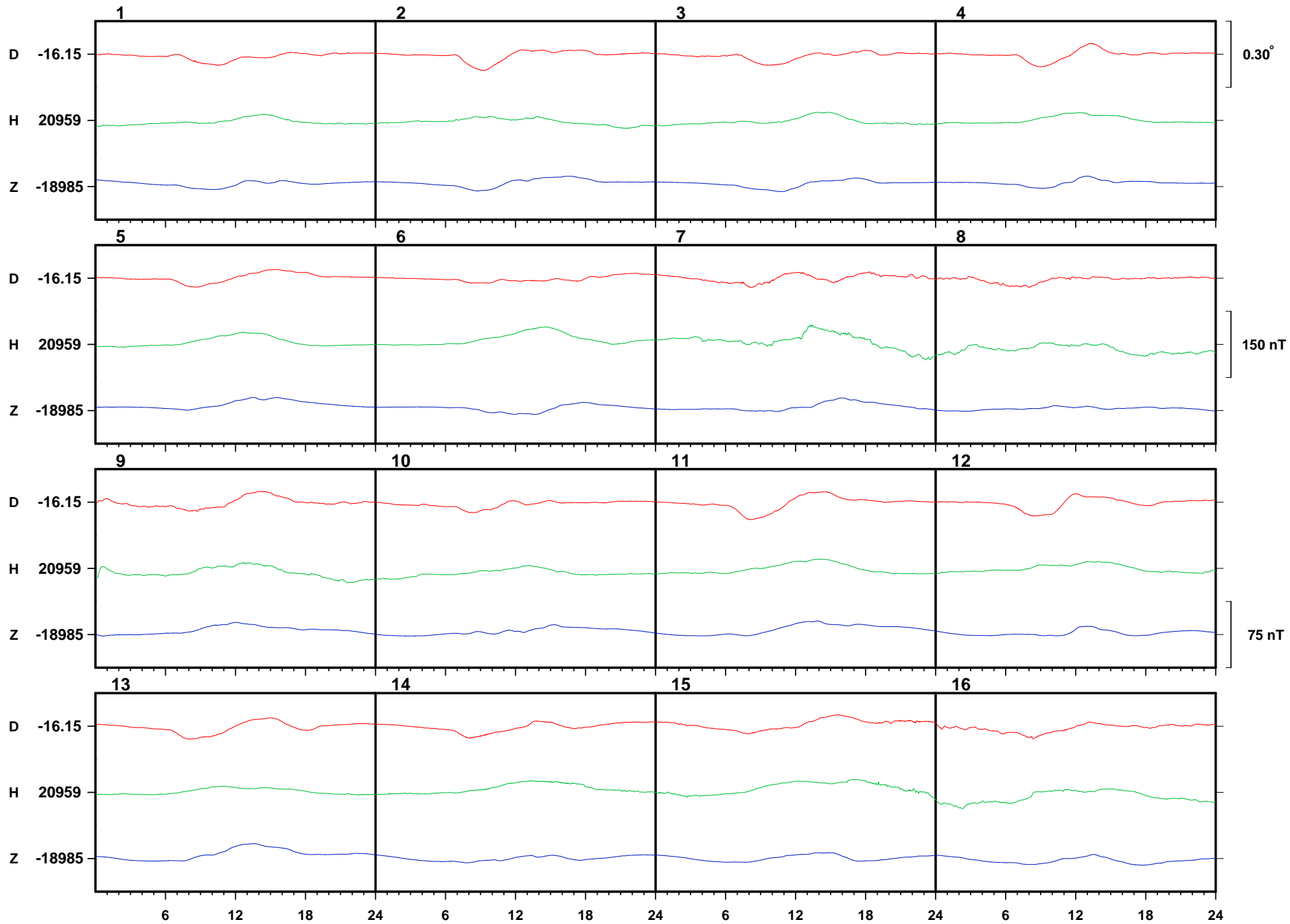
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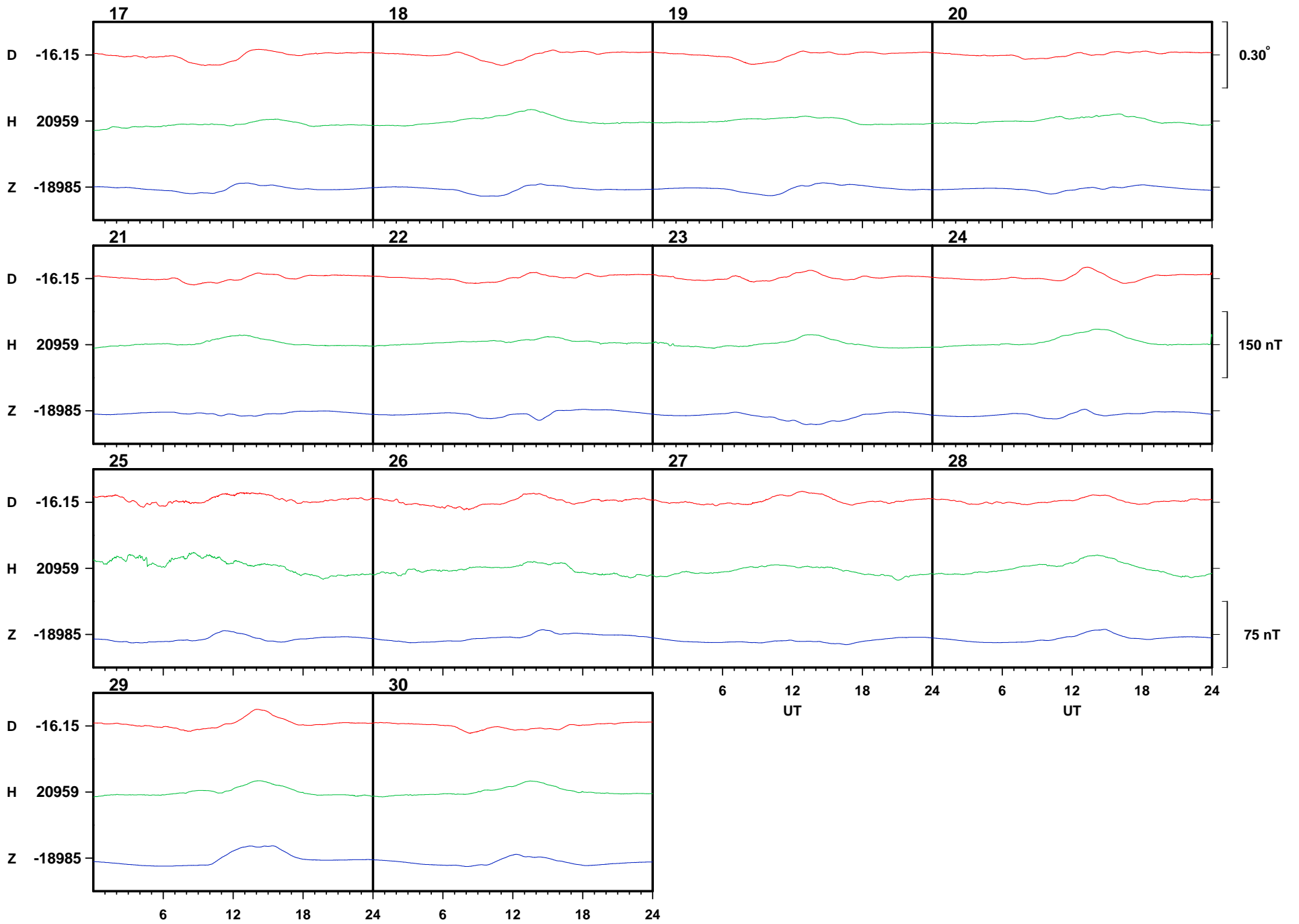


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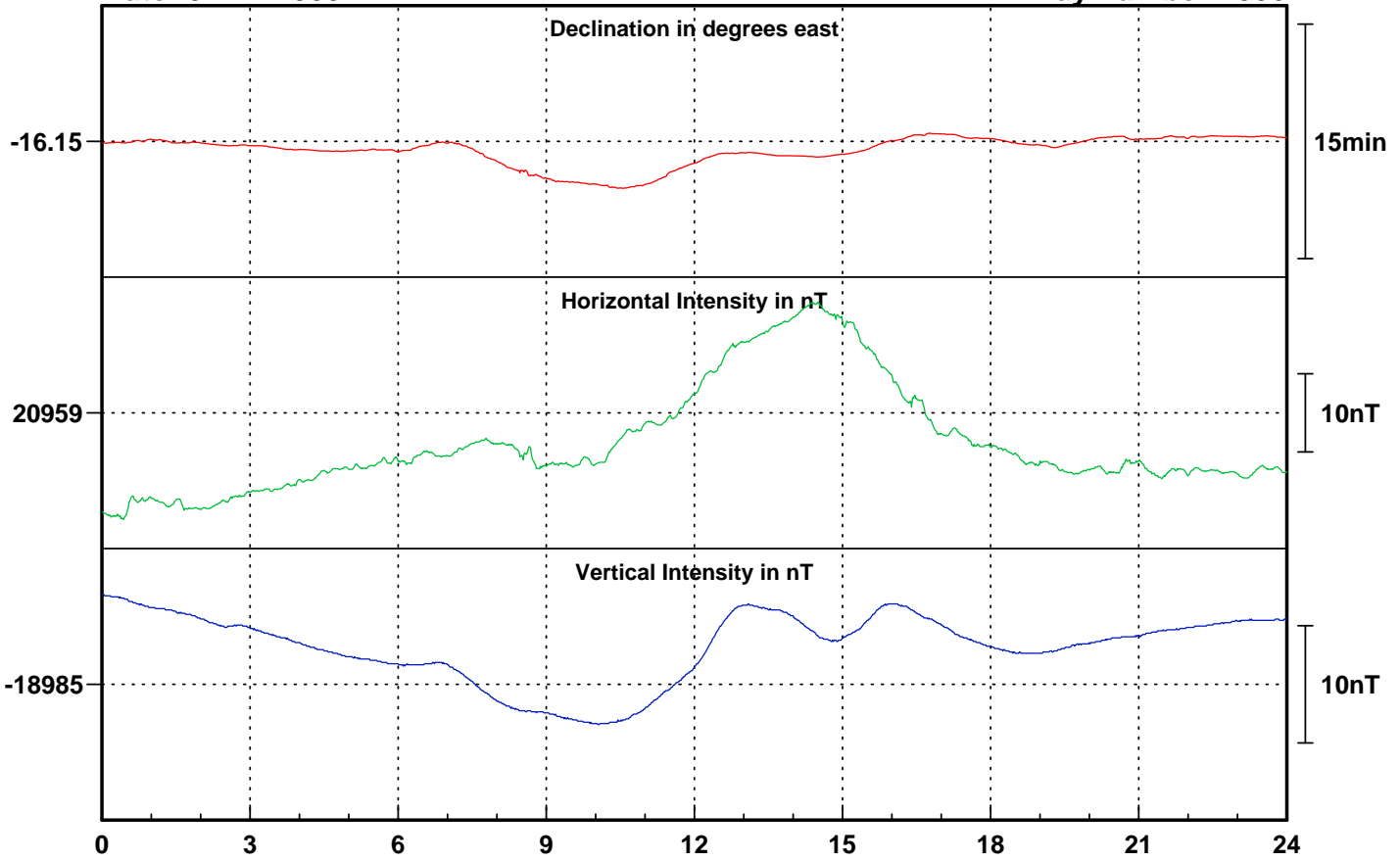
2008



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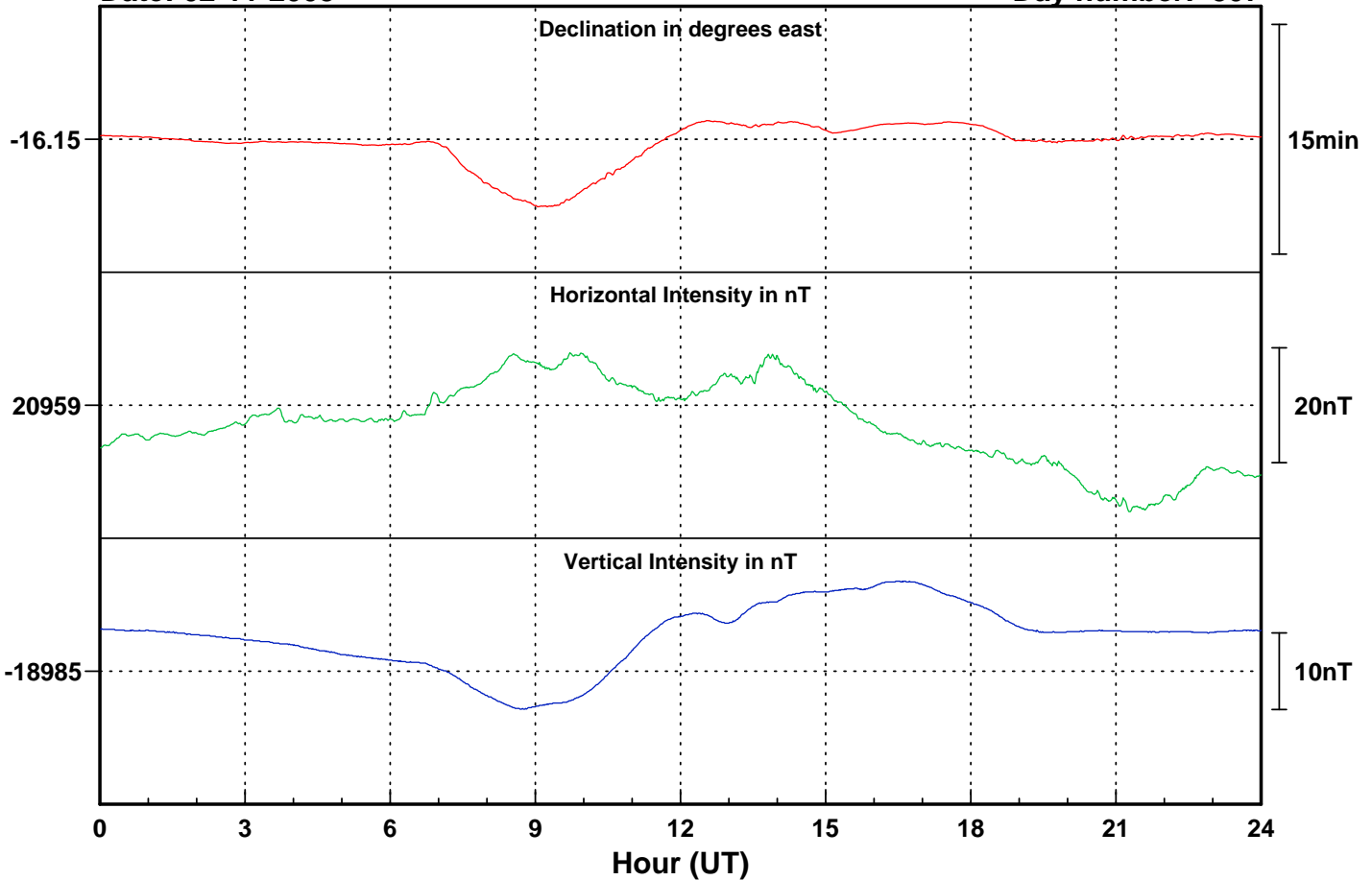
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Day number: 306



Date: 02-11-2008

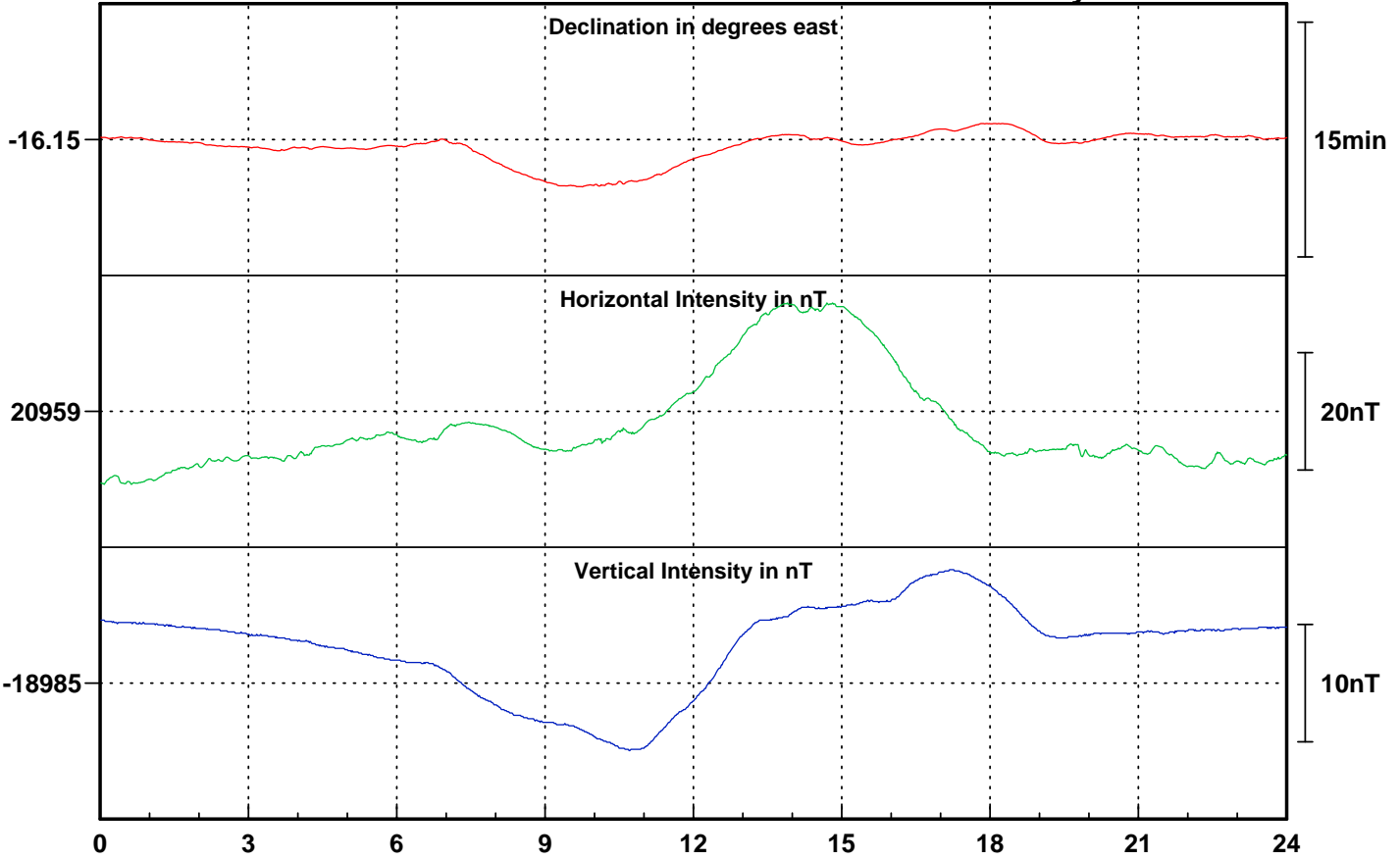
Day number: 307



Date: 03-11-2008

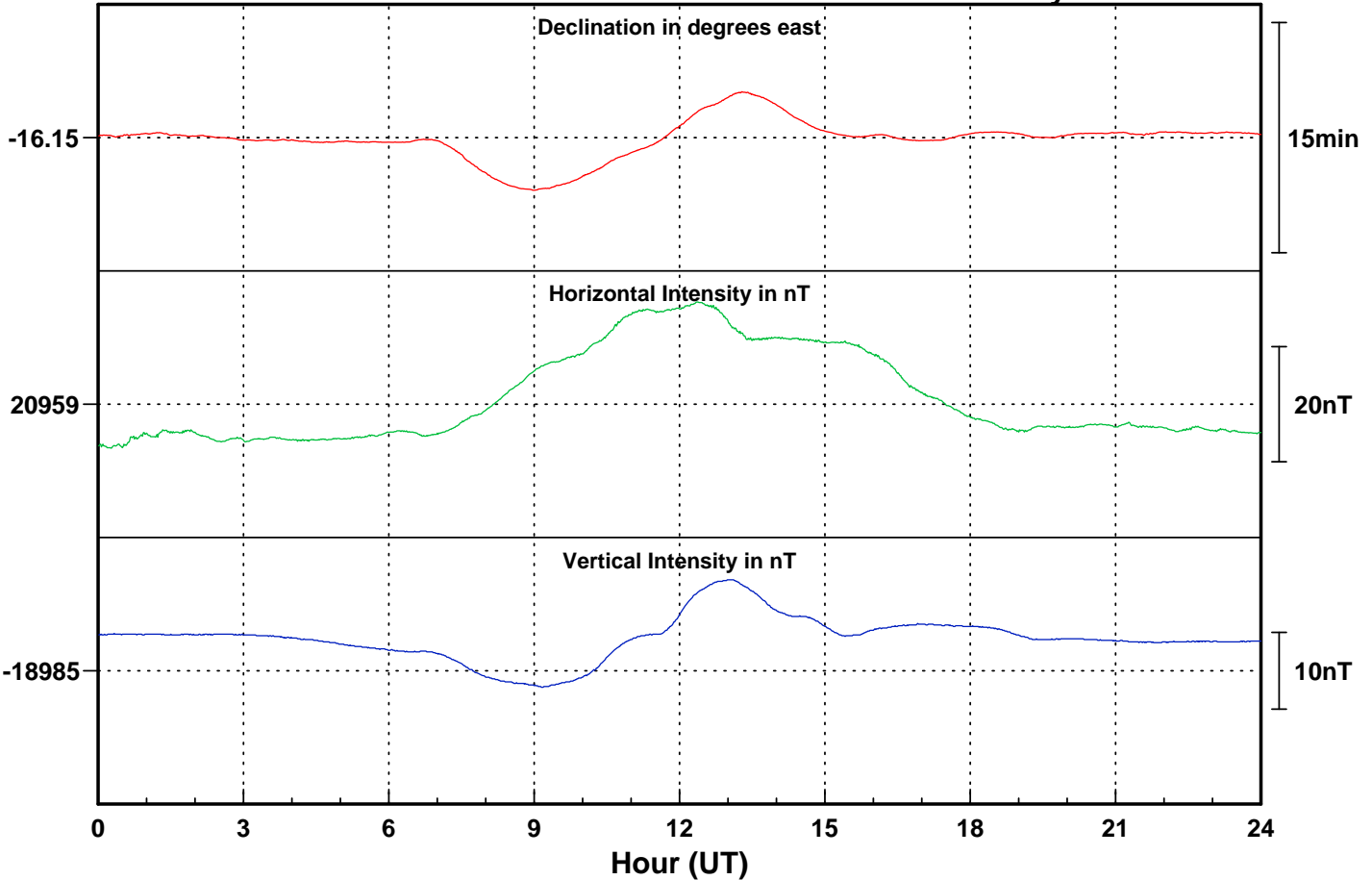
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Day number: 308



Date: 04-11-2008

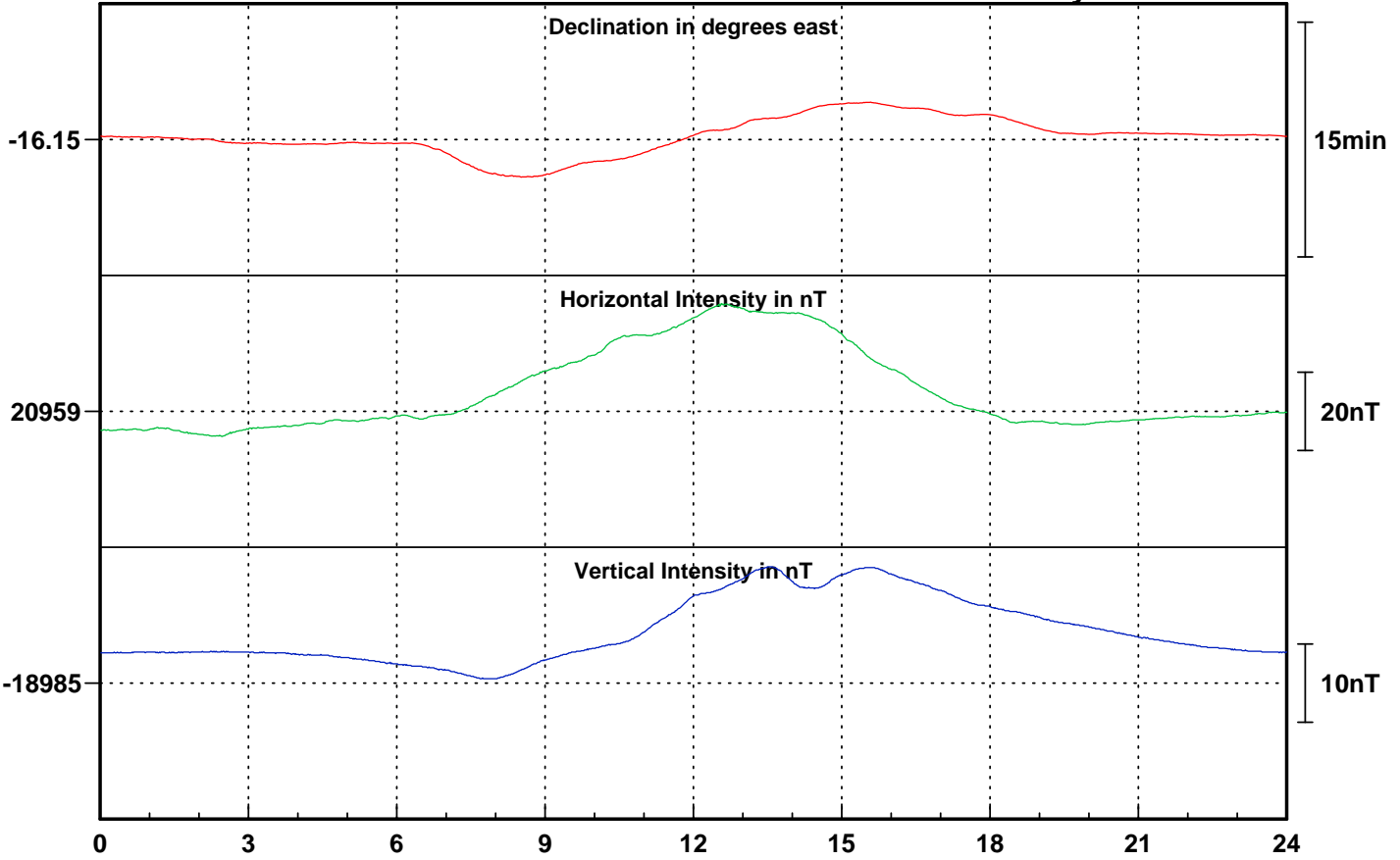
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Date: 05-11-2008

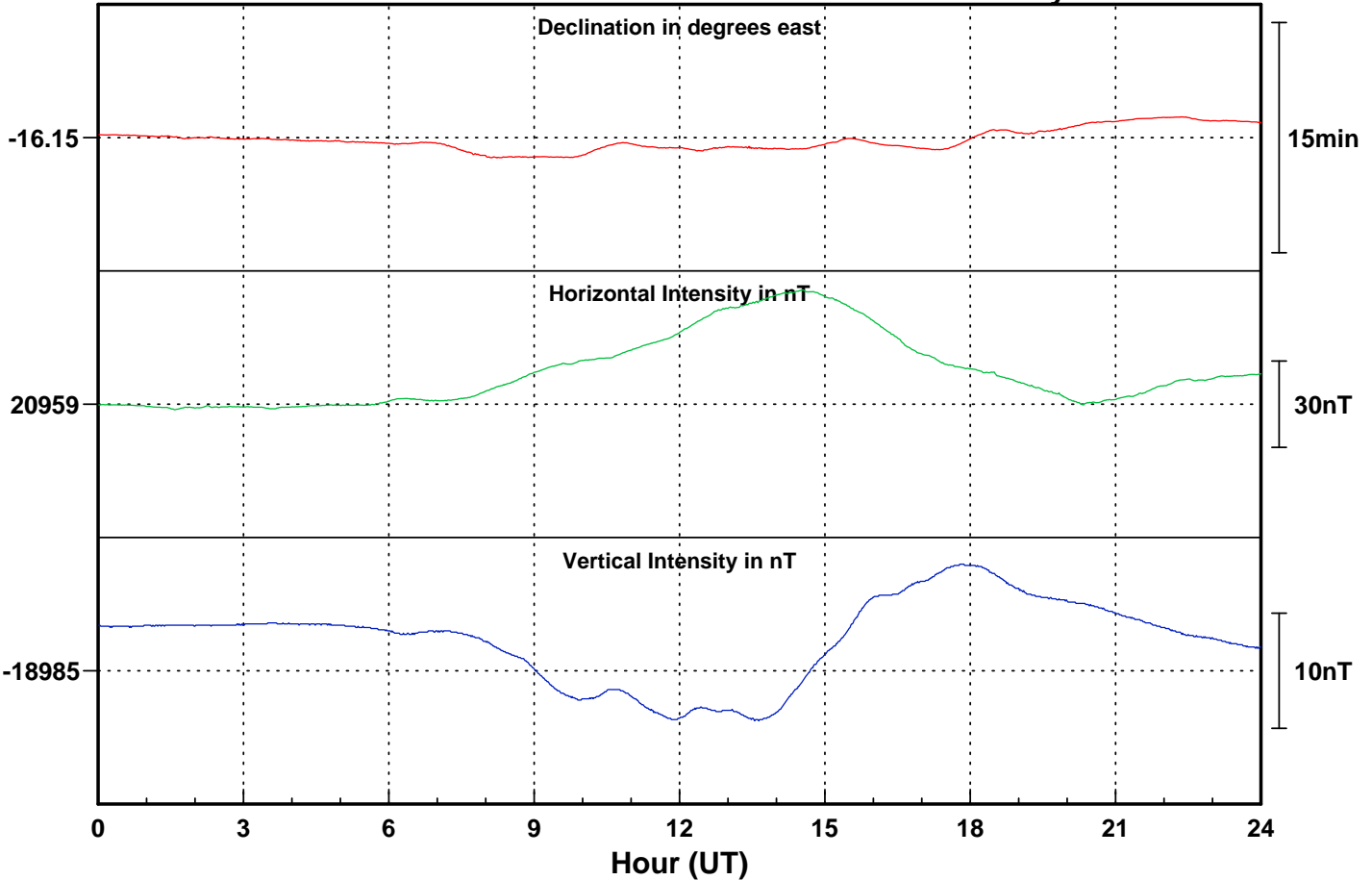
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Day number: 310



Date: 06-11-2008

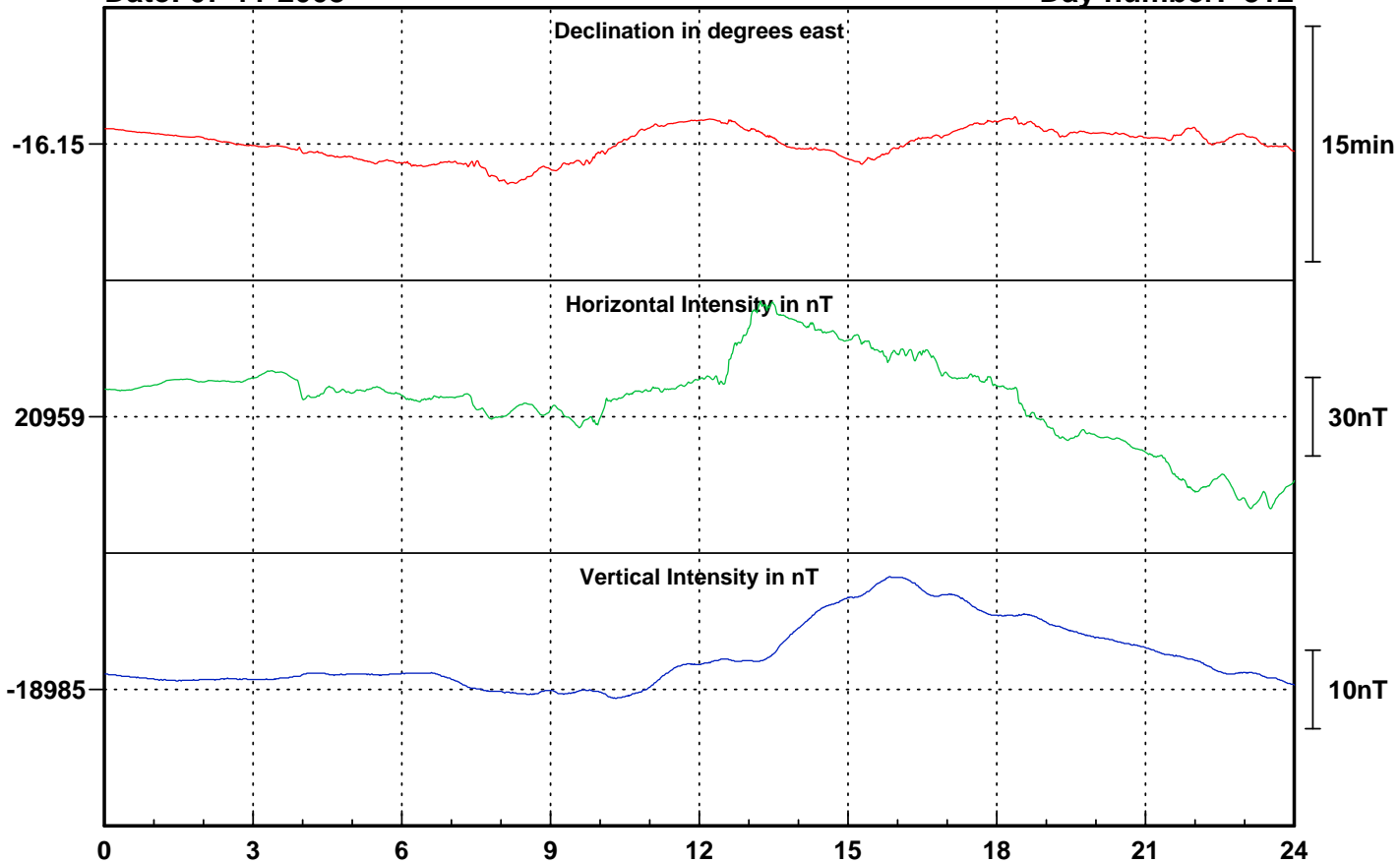
Day number: 311



Date: 07-11-2008

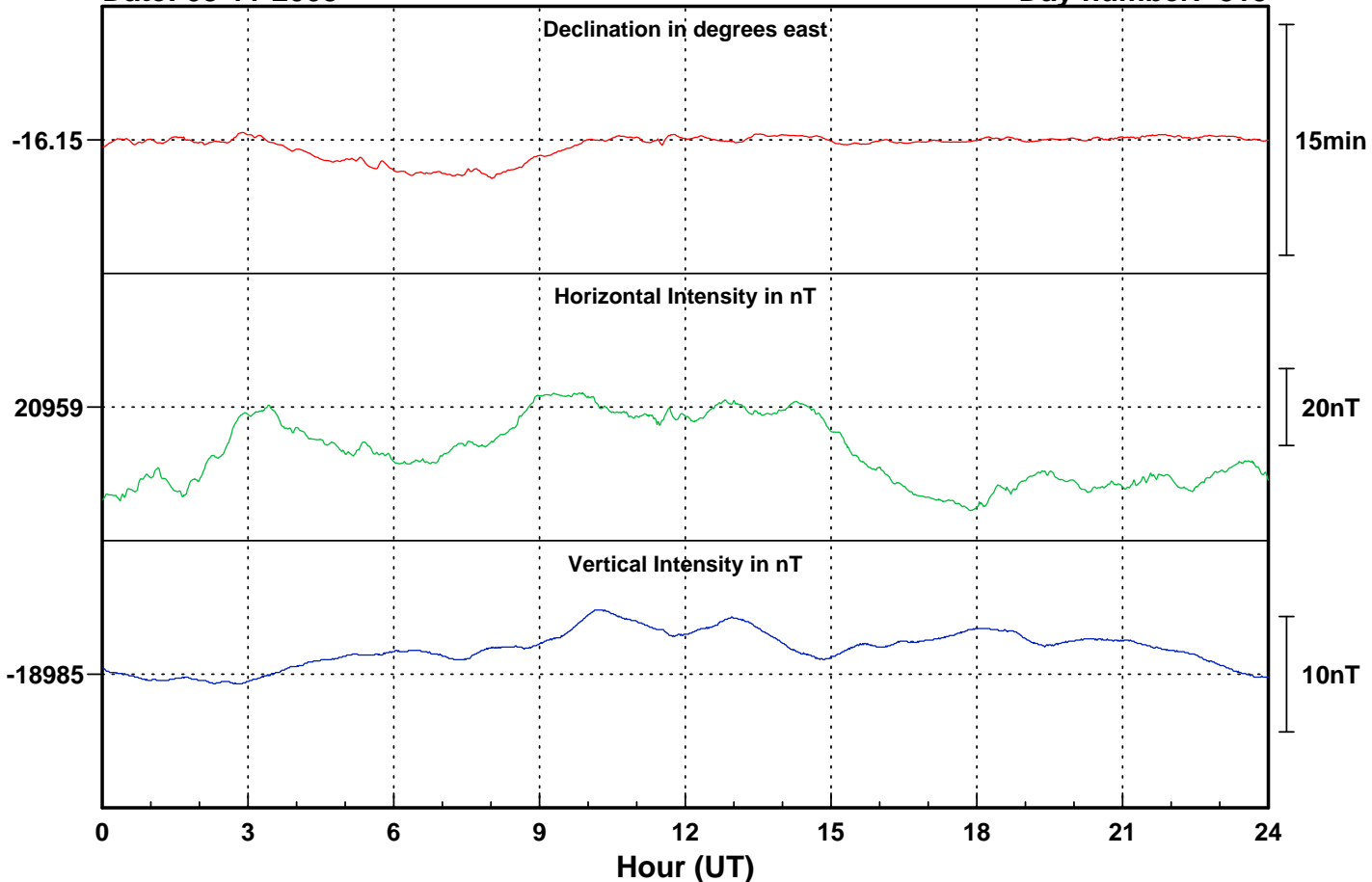
# Ascension Island

Day number: 312



Date: 08-11-2008

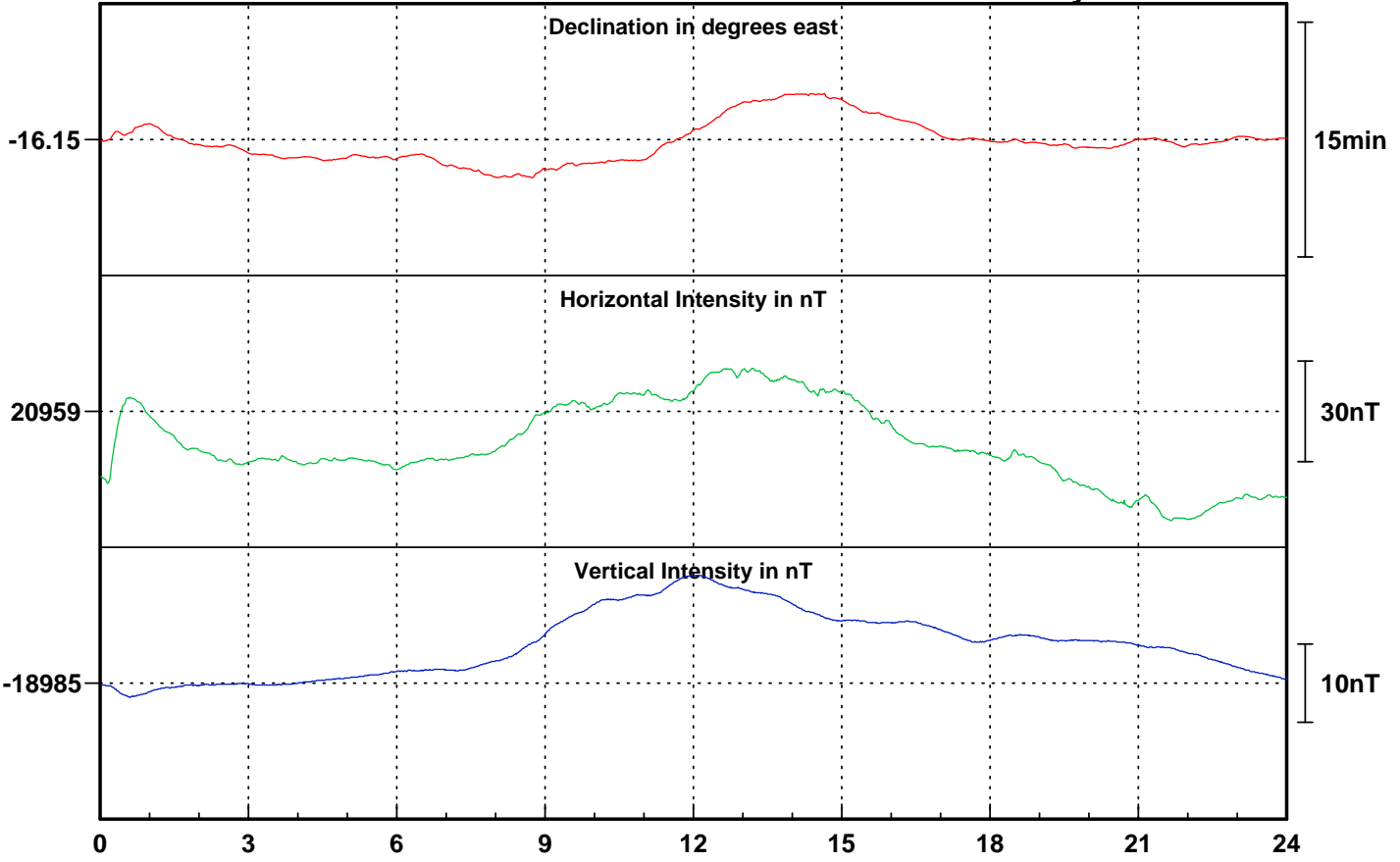
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Date: 09-11-2008

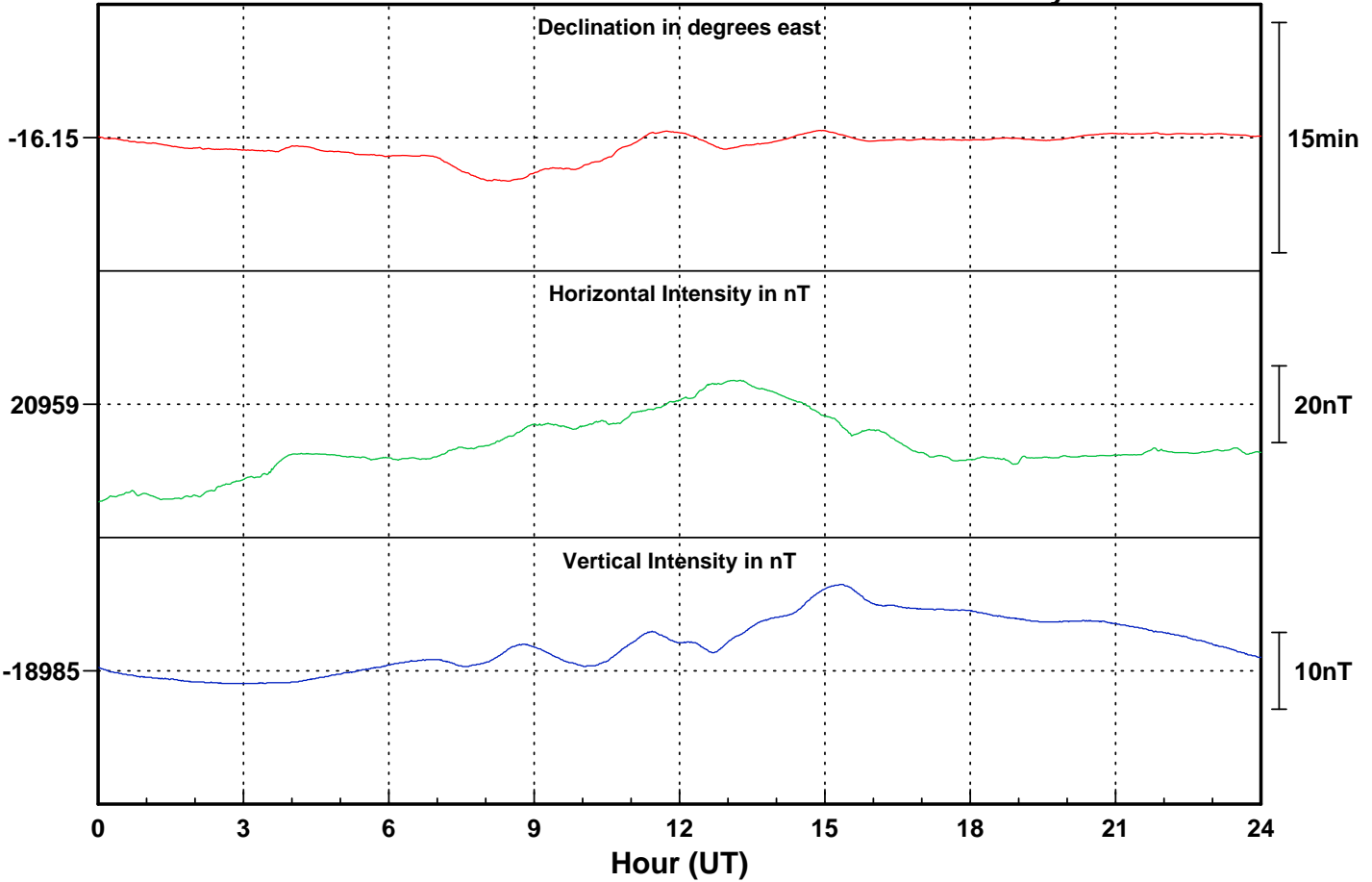
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Day number: 314



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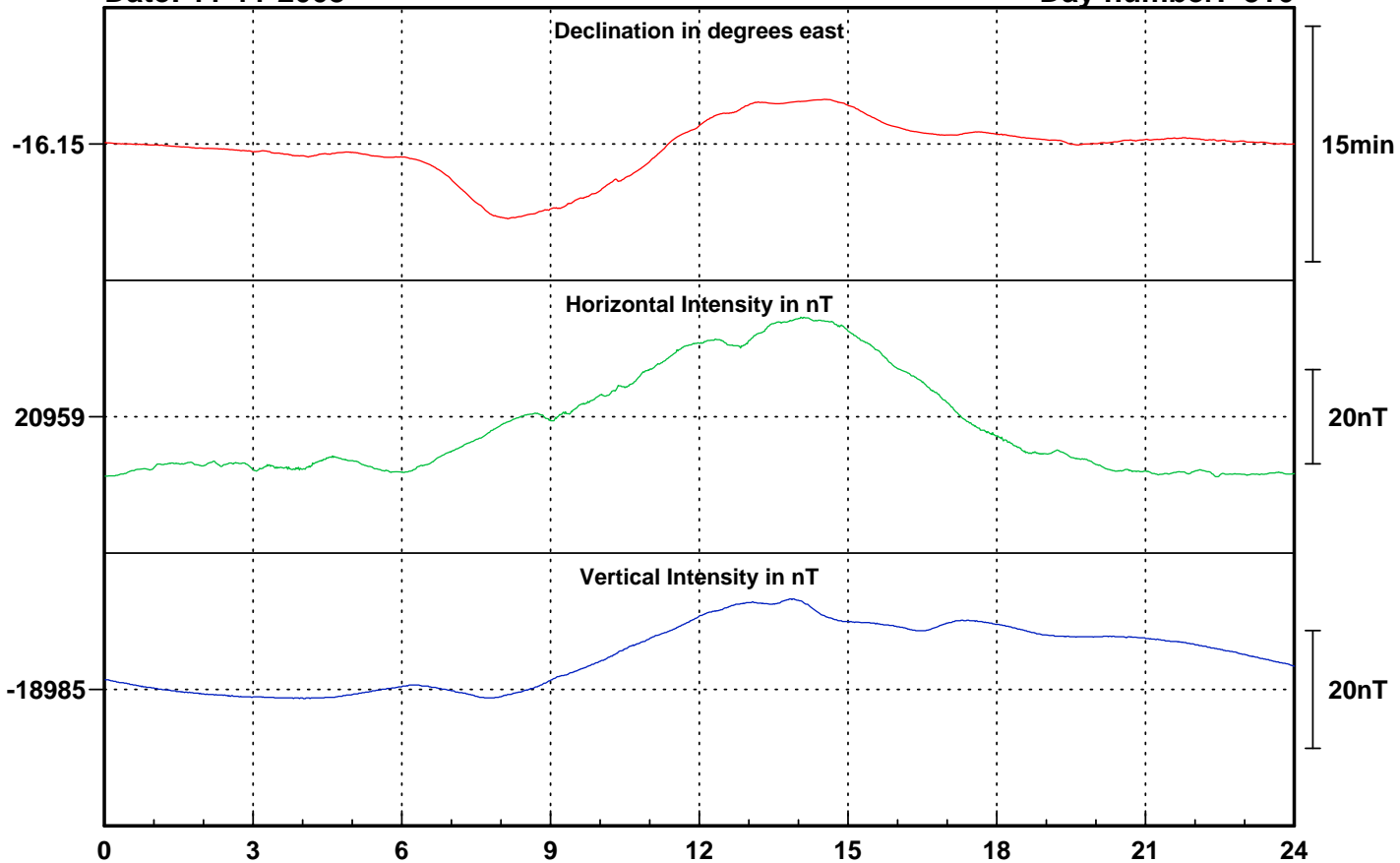
Day number: 315



Date: 11-11-2008

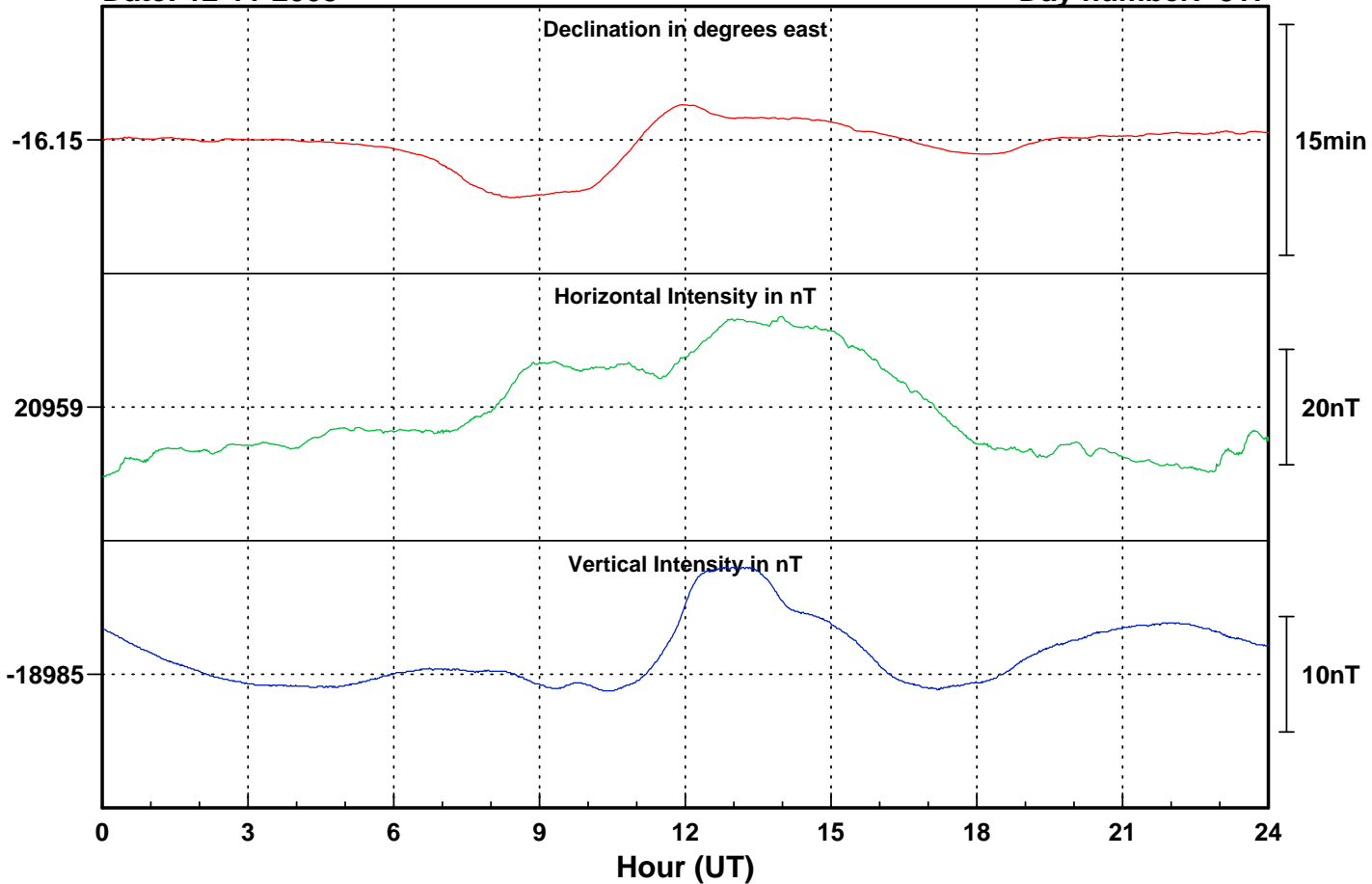
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Day number: 316



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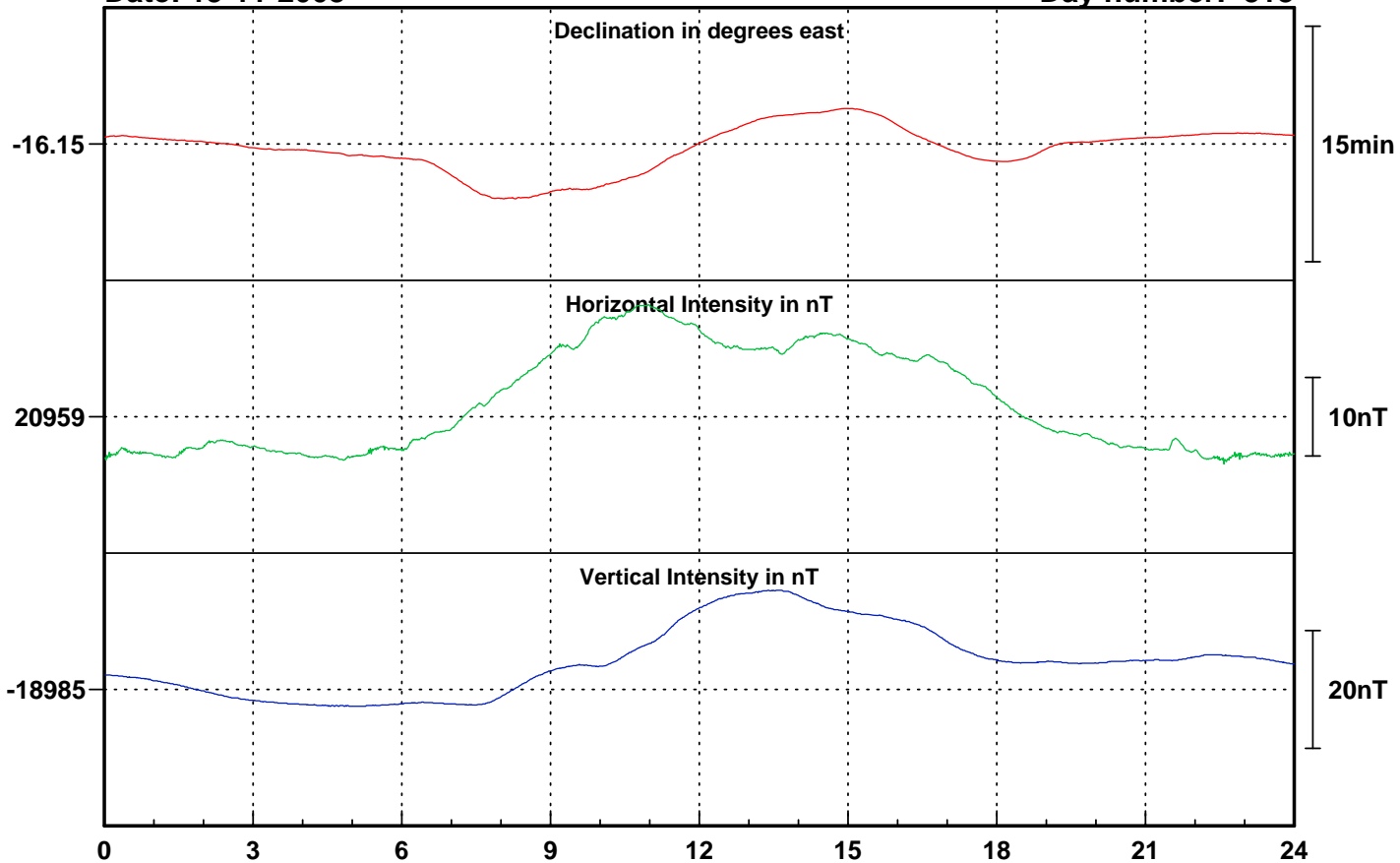
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Date: 13-11-2008

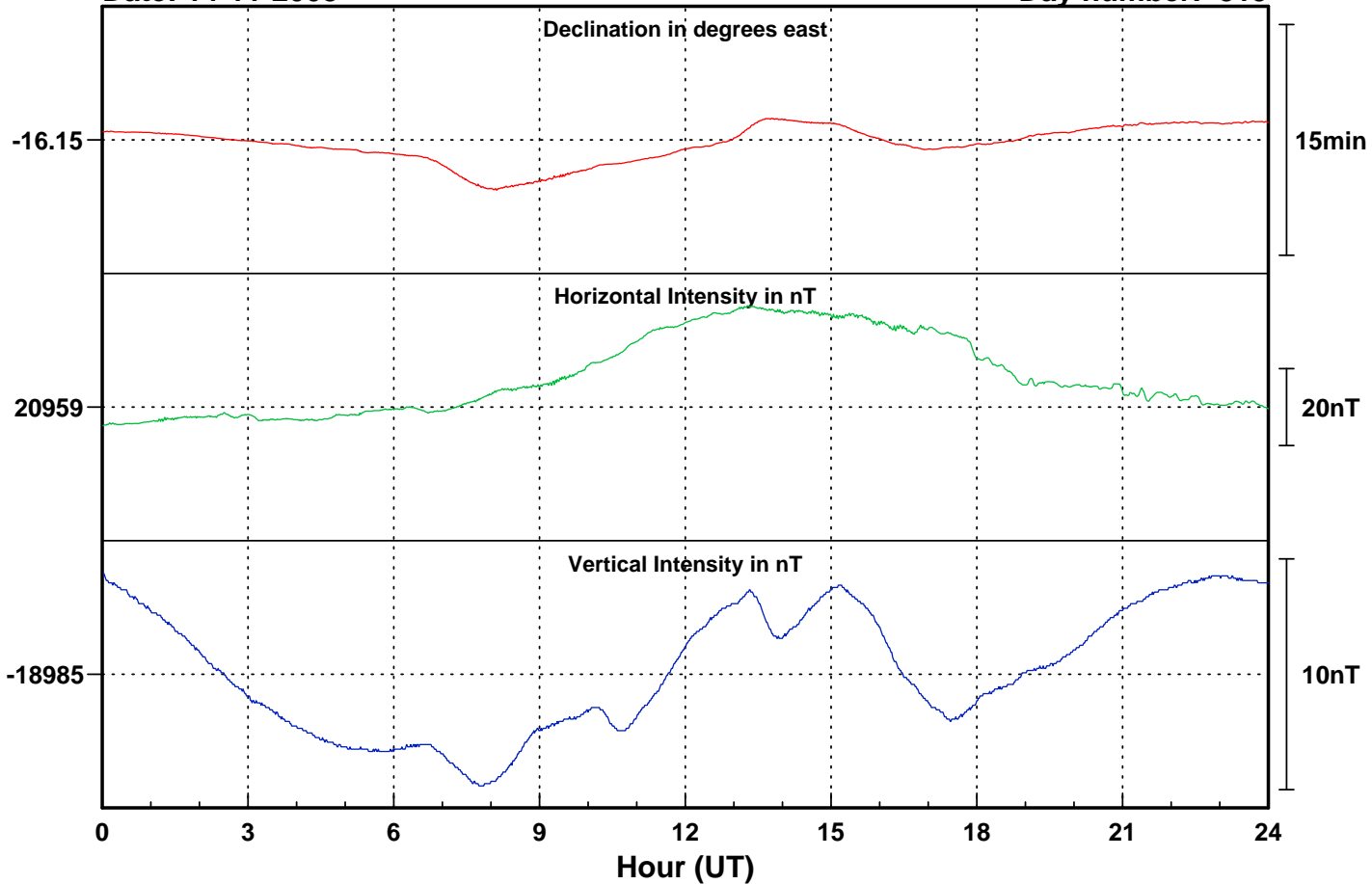
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Day number: 318



Date: 14-11-2008

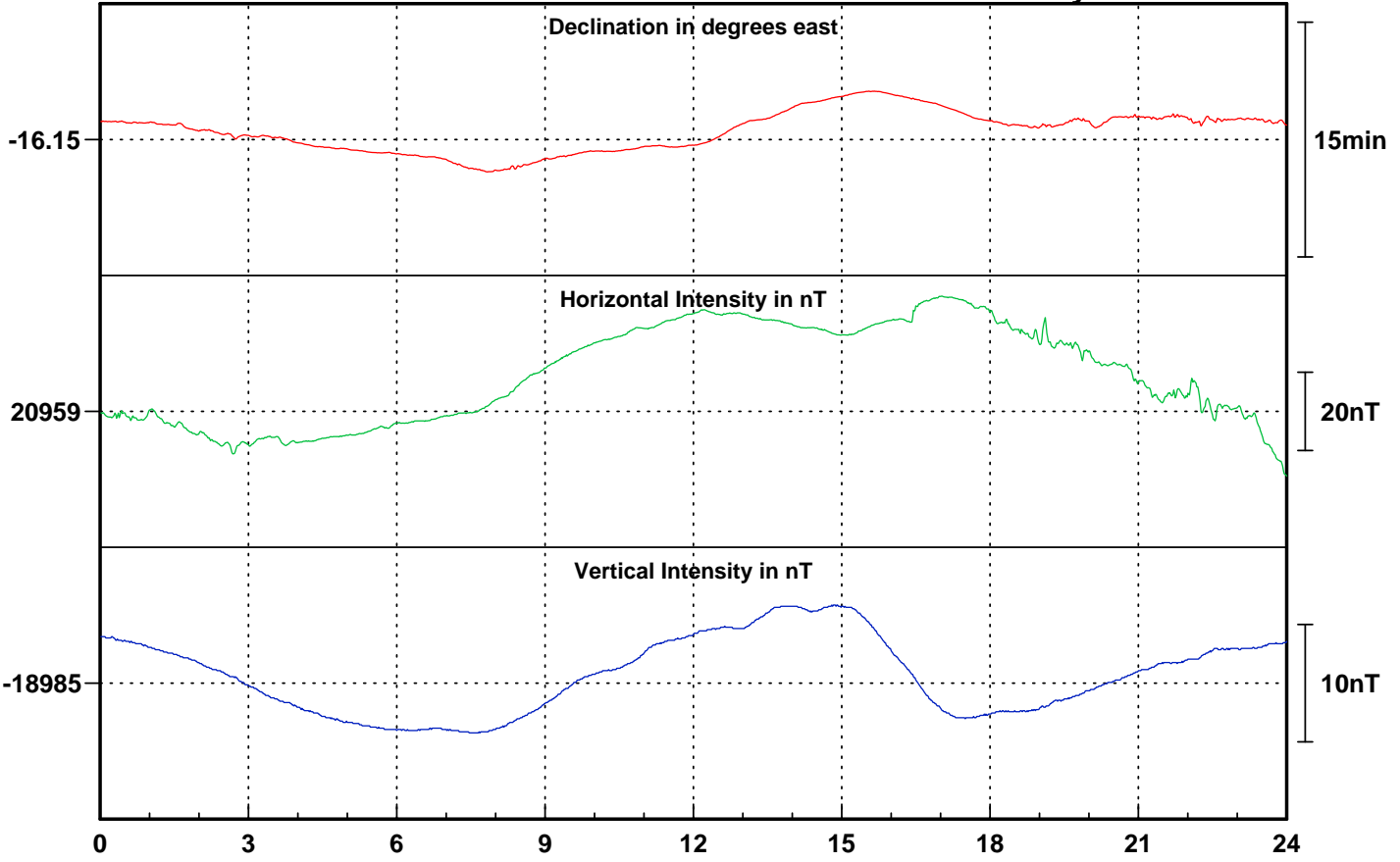
Day number: 319



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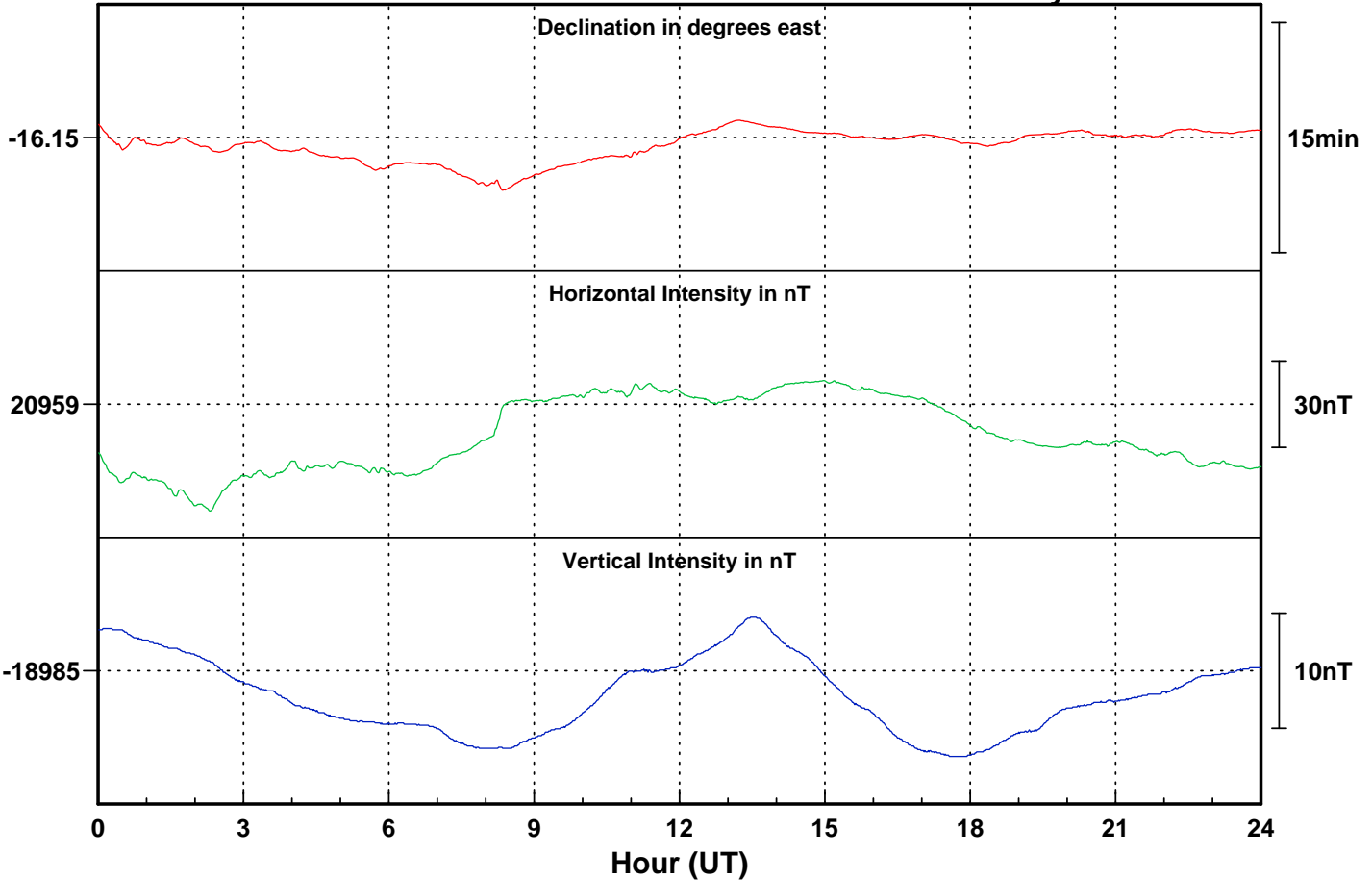
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Day number: 320



Date: 16-11-2008

Day number: 321

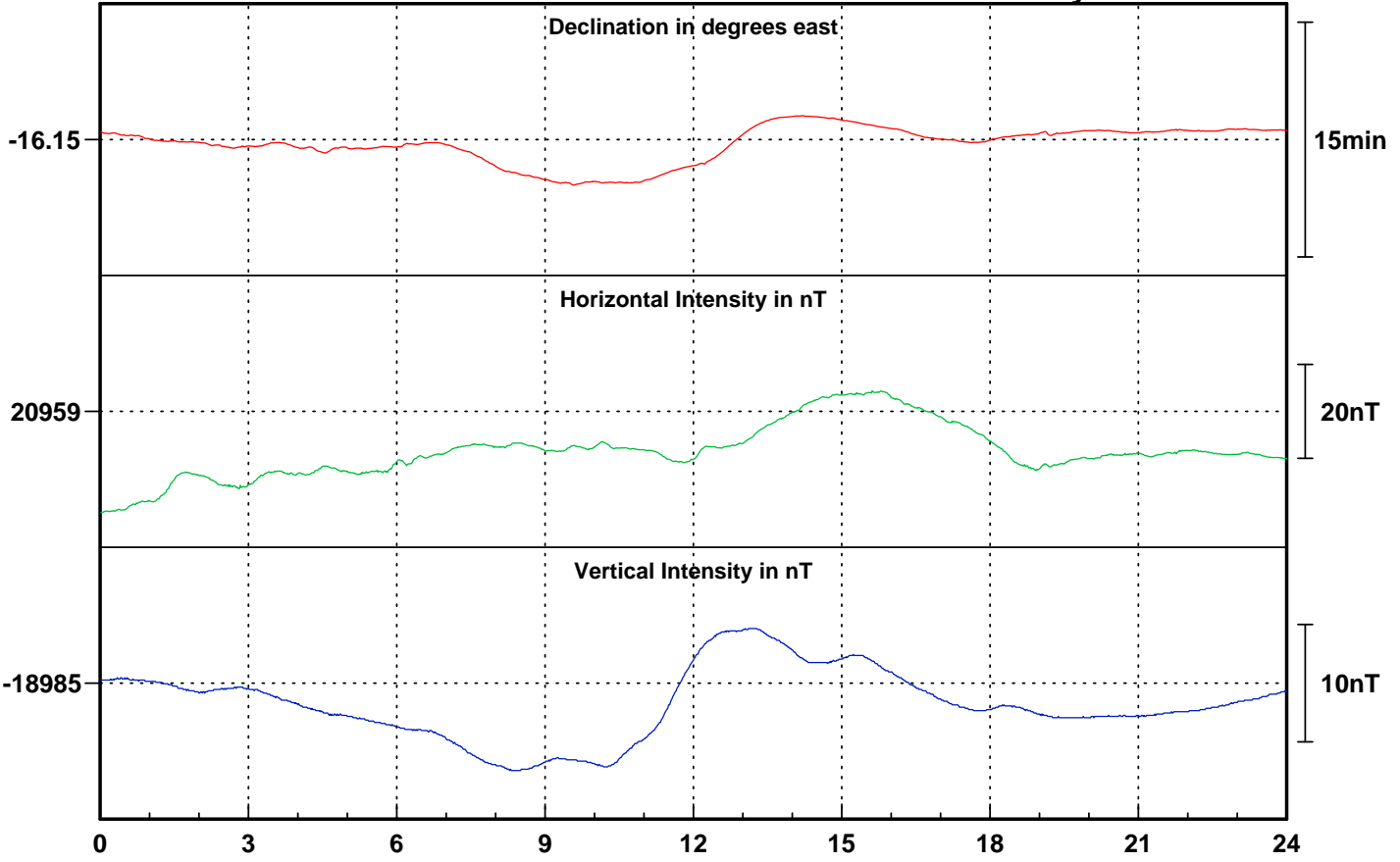




Date: 17-11-2008

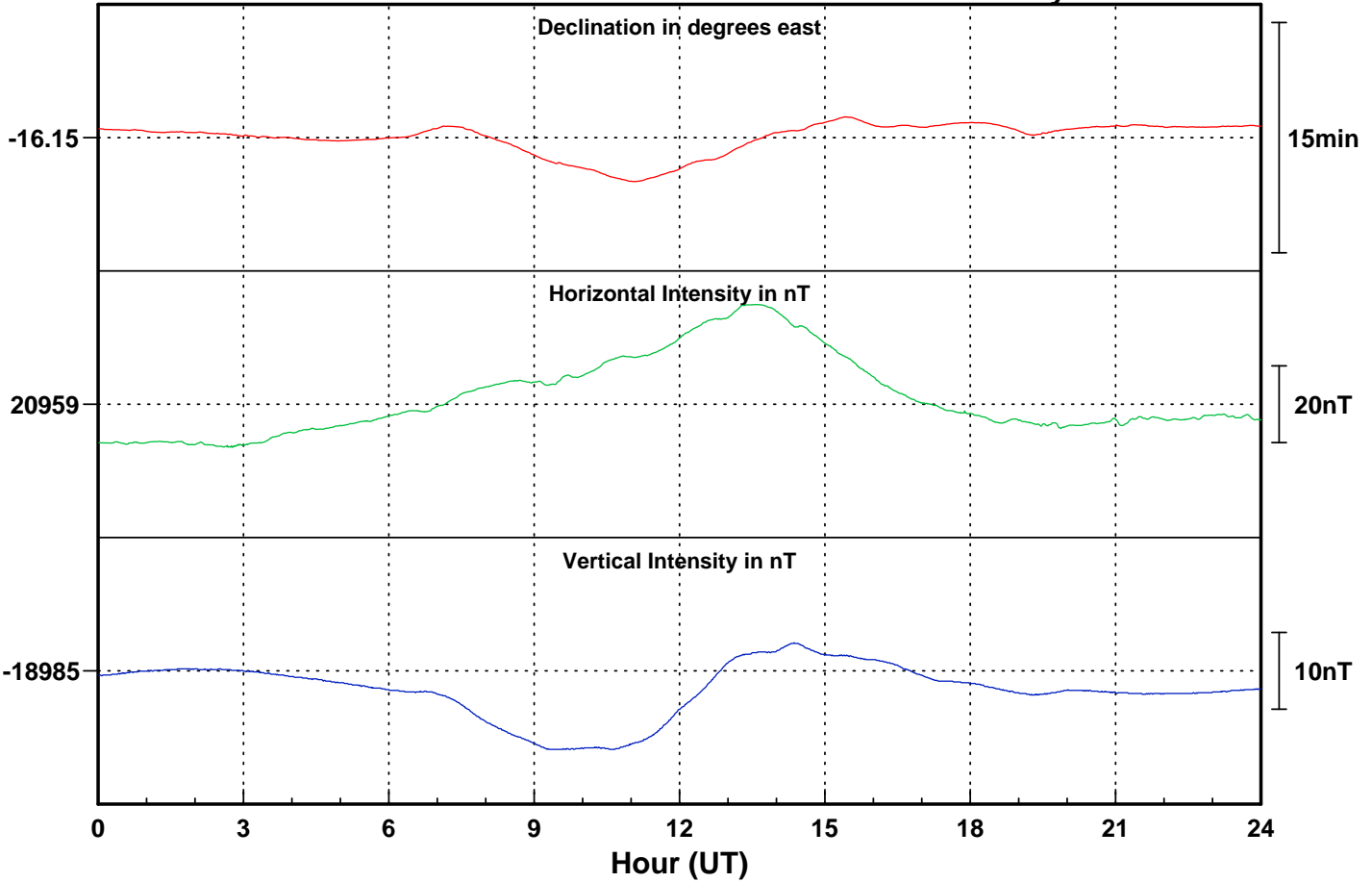
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Day number: 322



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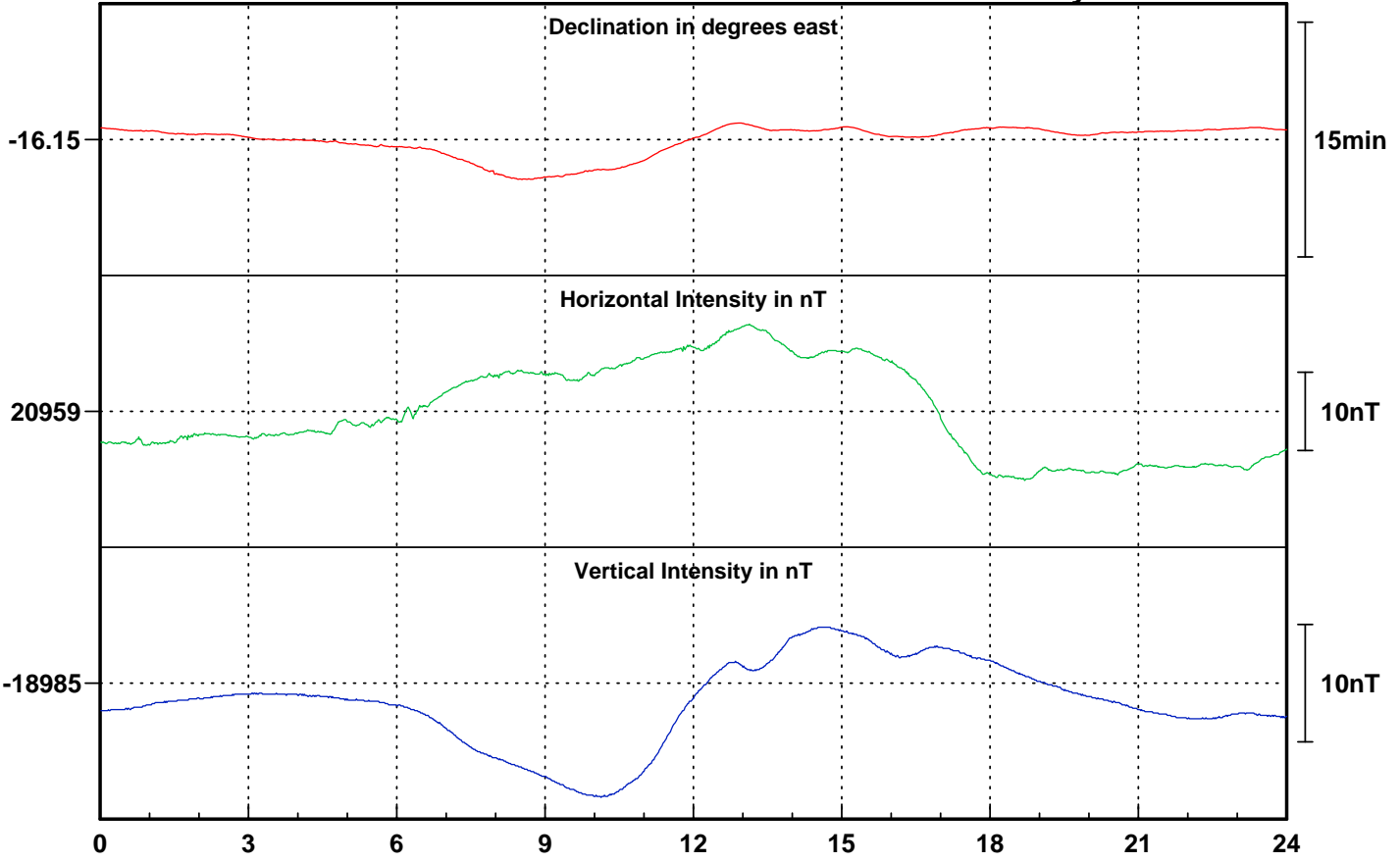
Day number: 323



Date: 19-11-2008

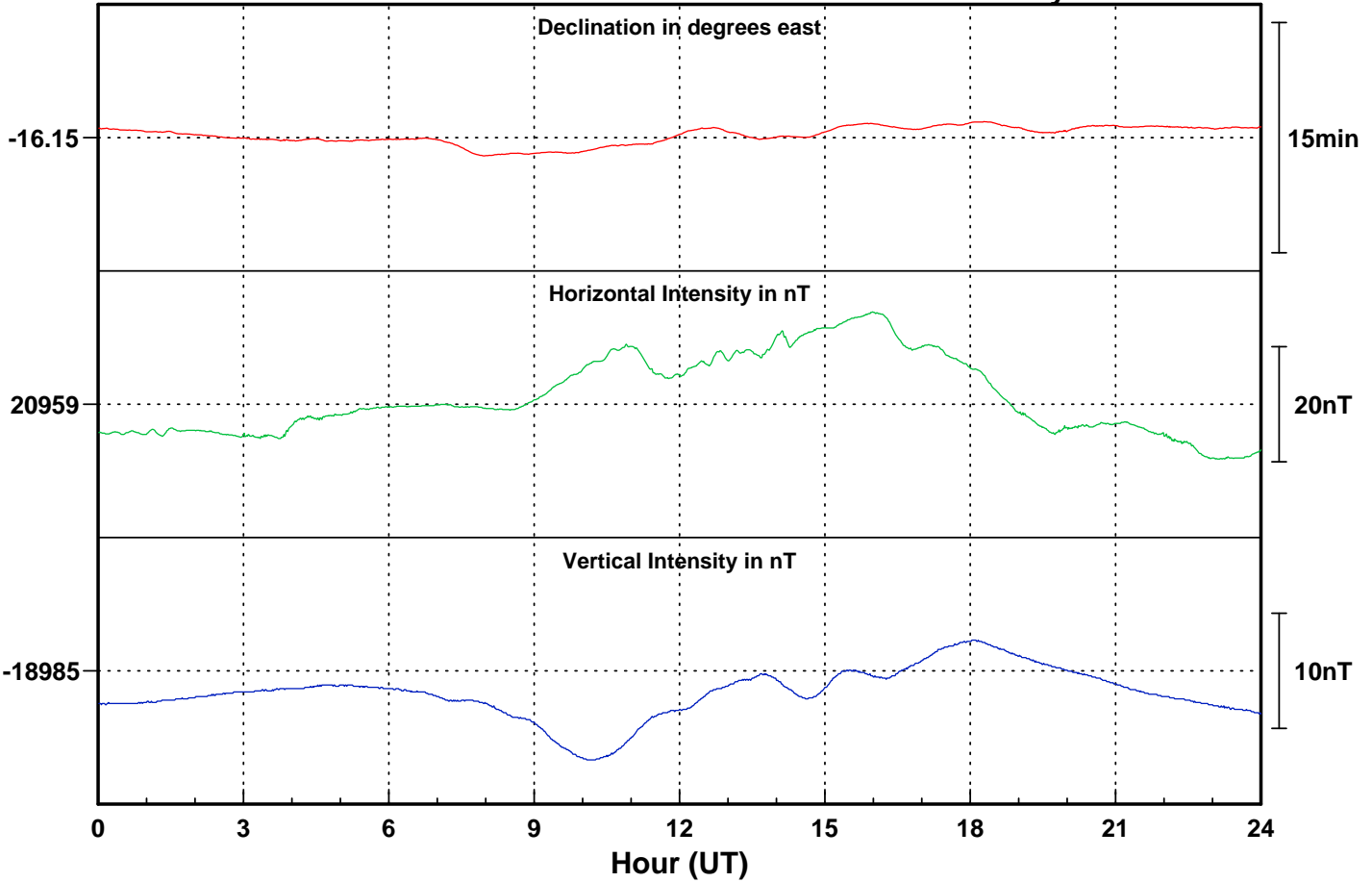
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Day number: 324



Date: 20-11-2008

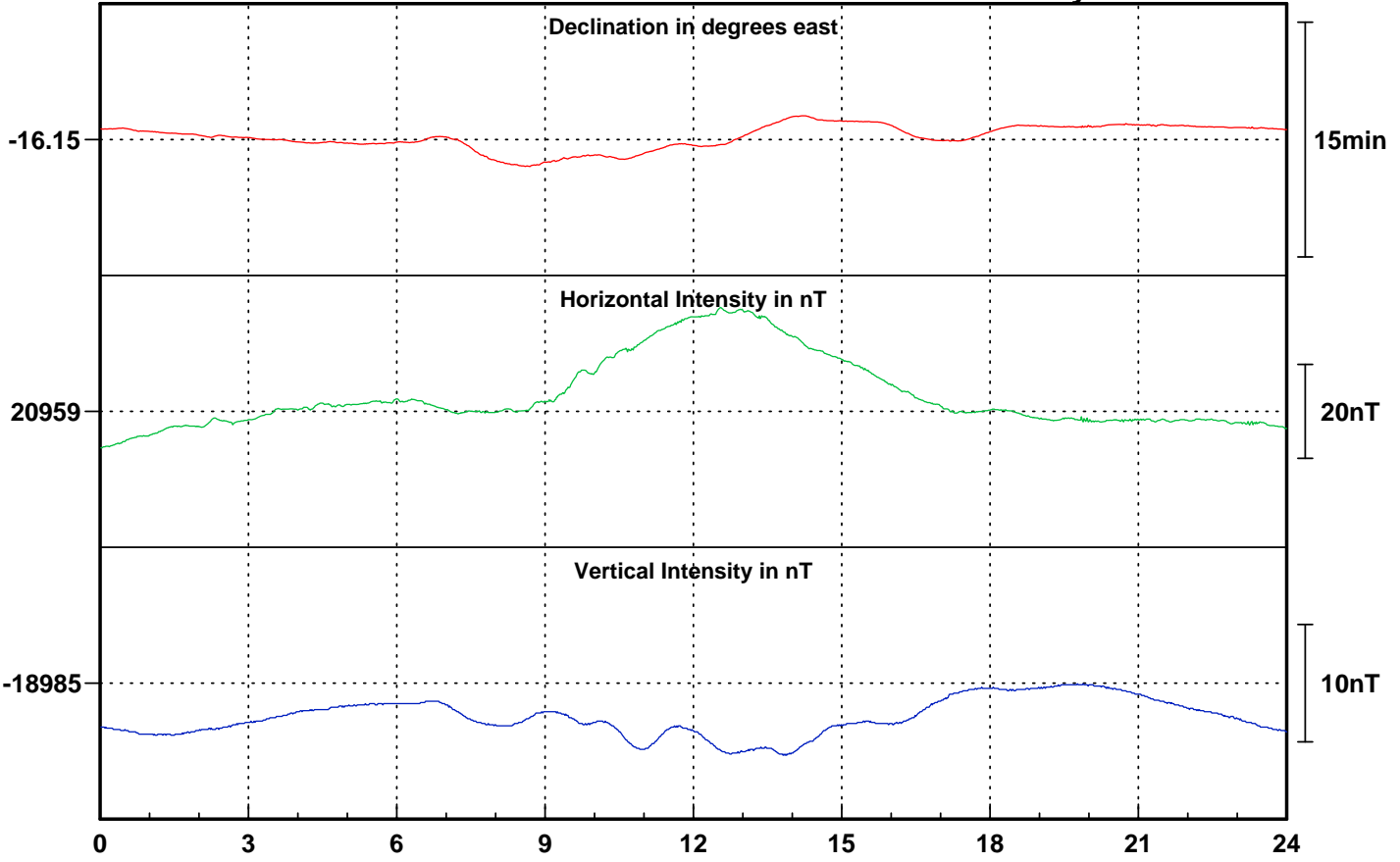
Day number: 325



Date: 21-11-2008

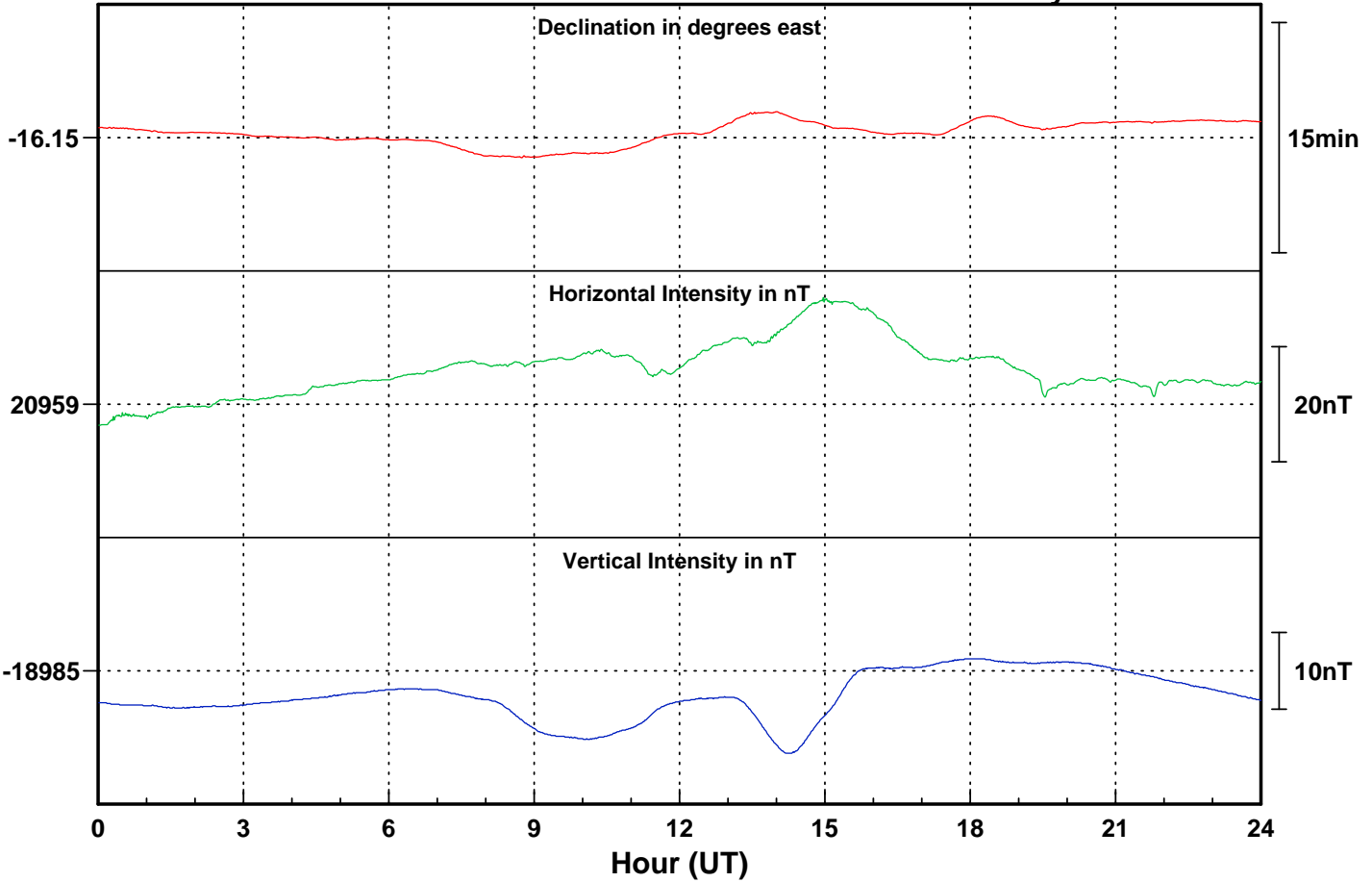
# Ascension Island

Day number: 326



Date: 22-11-2008

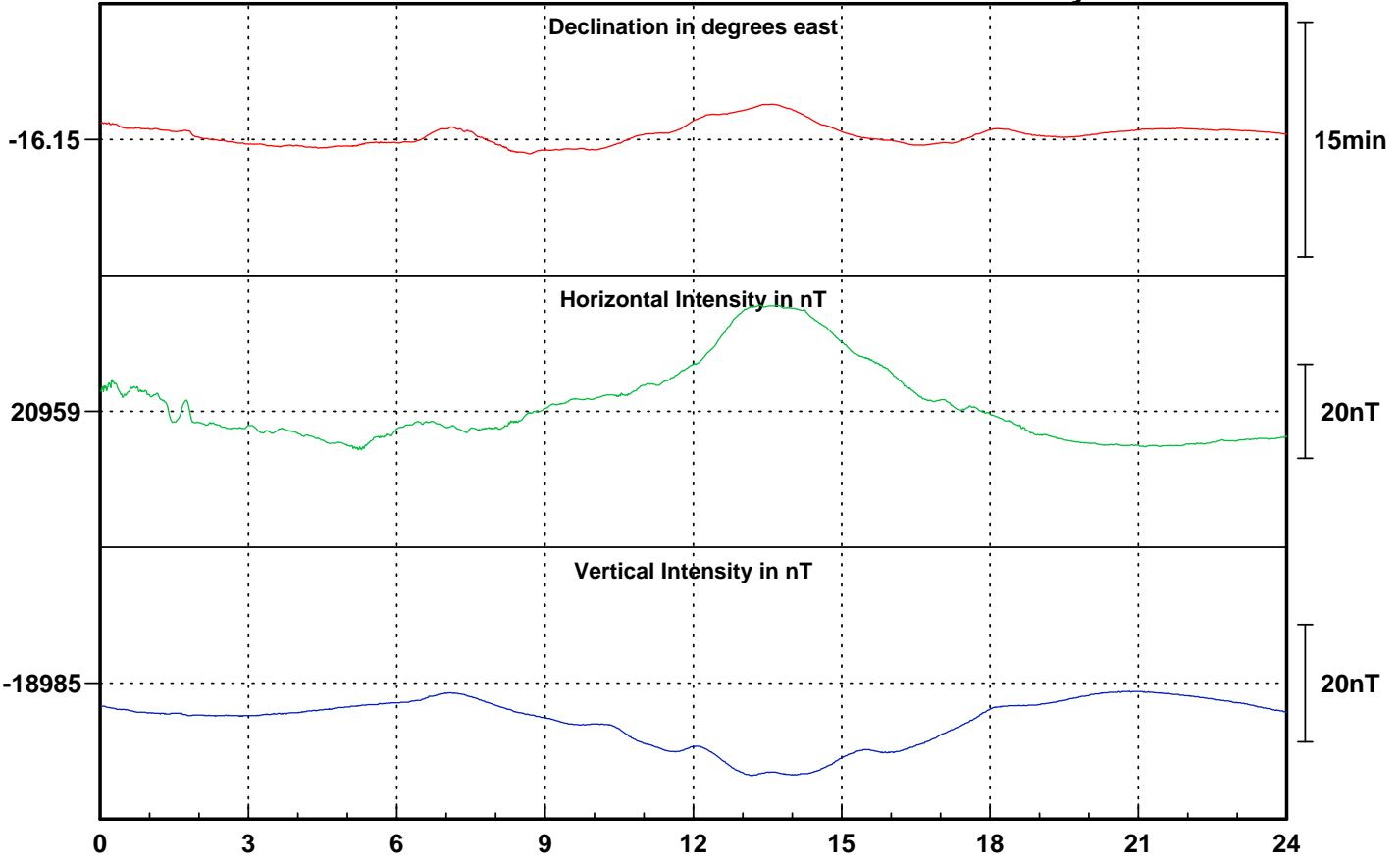
Day number: 327



Date: 23-11-2008

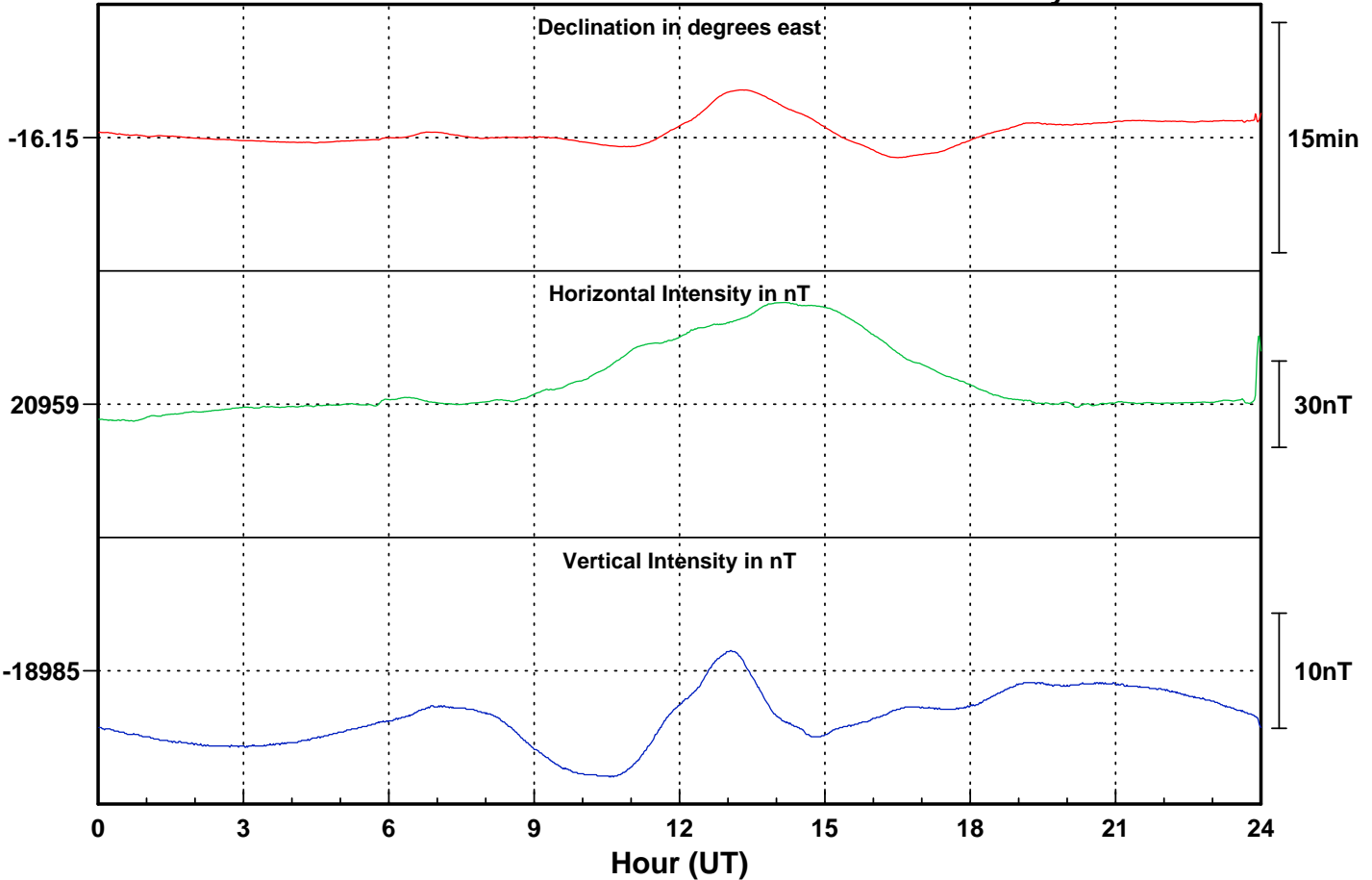
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Day number: 328



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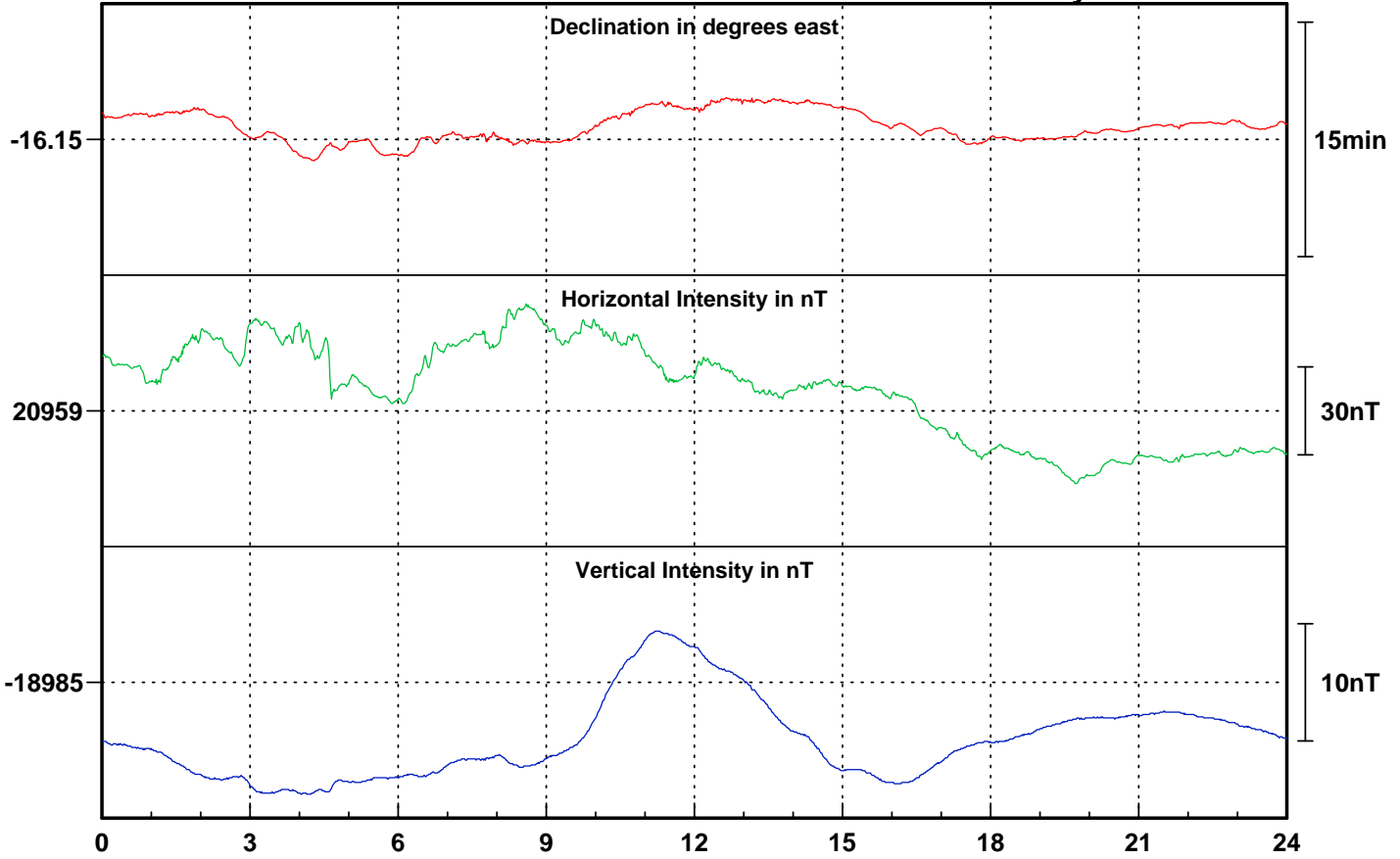
Day number: 329



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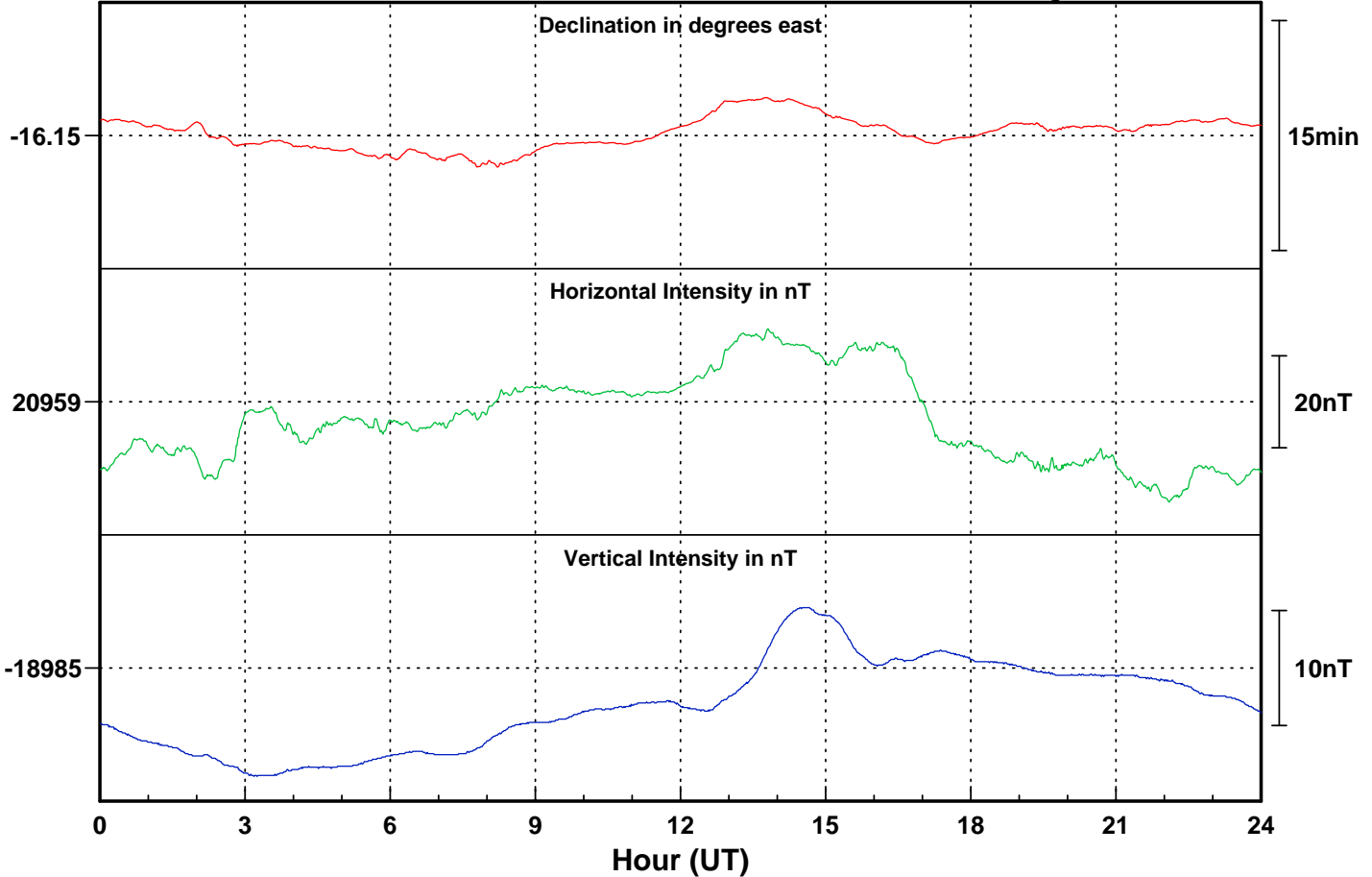
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Day number: 330



Date: 26-11-2008

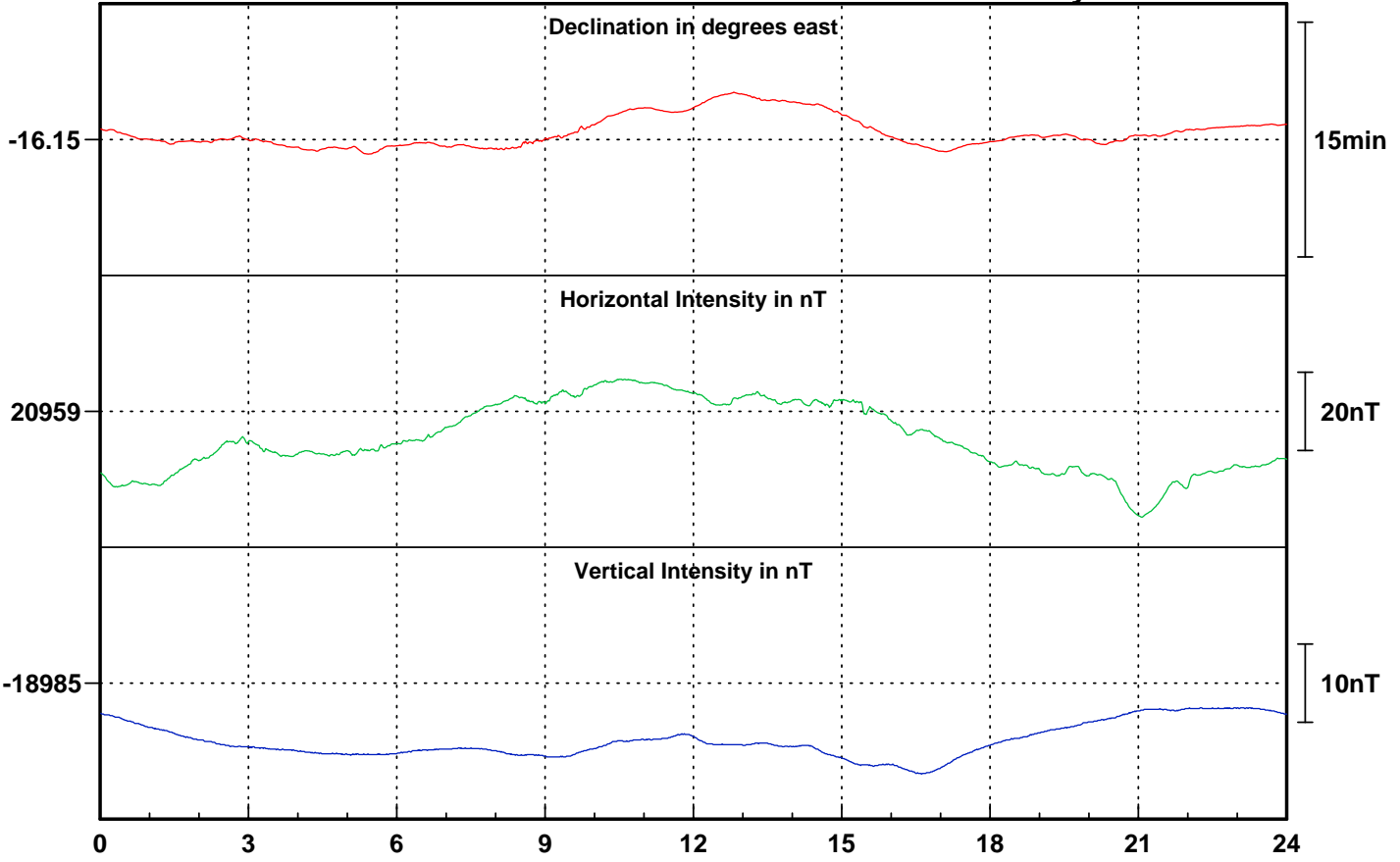
Day number: 331



Date: 27-11-2008

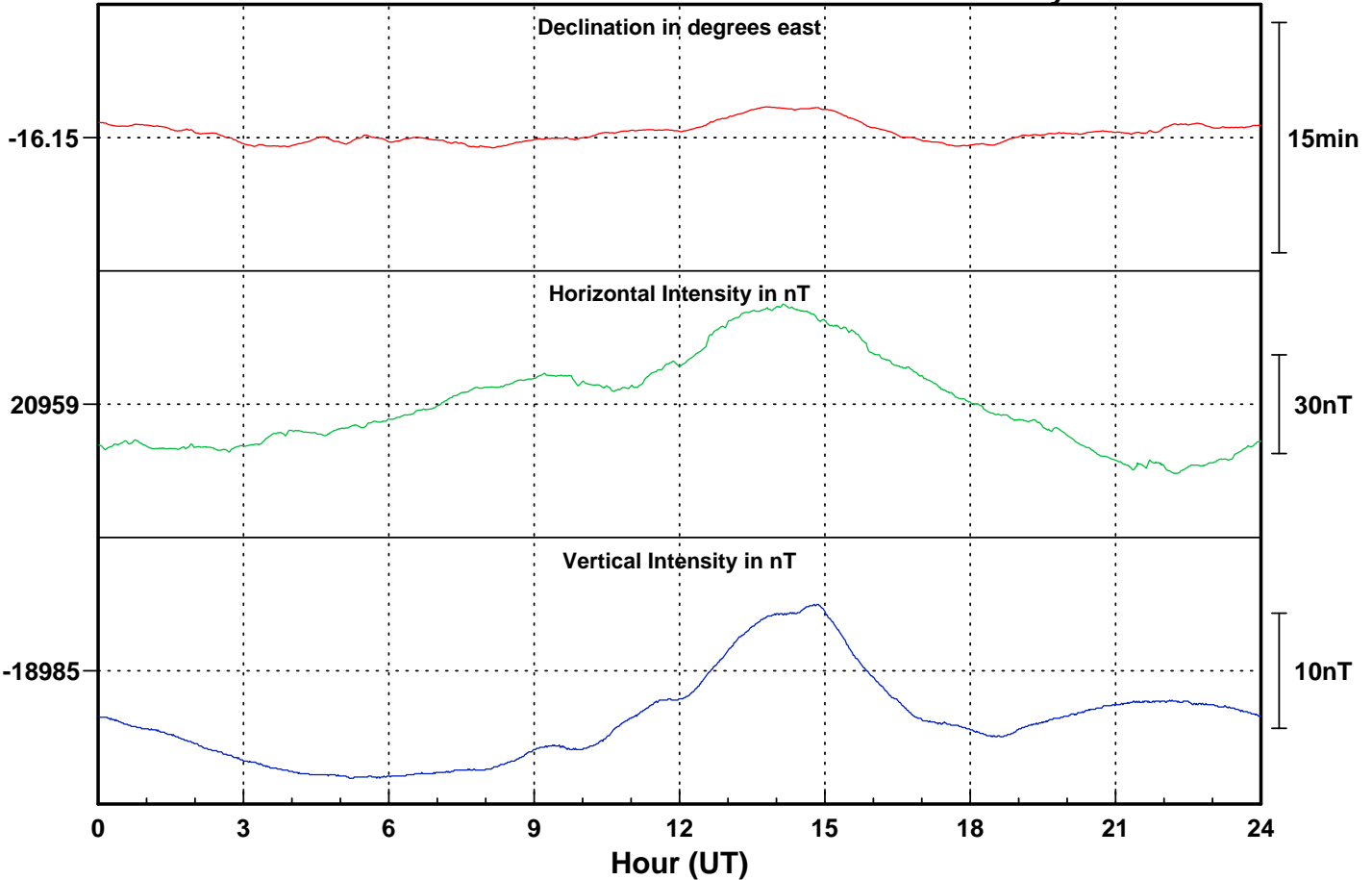
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Day number: 332



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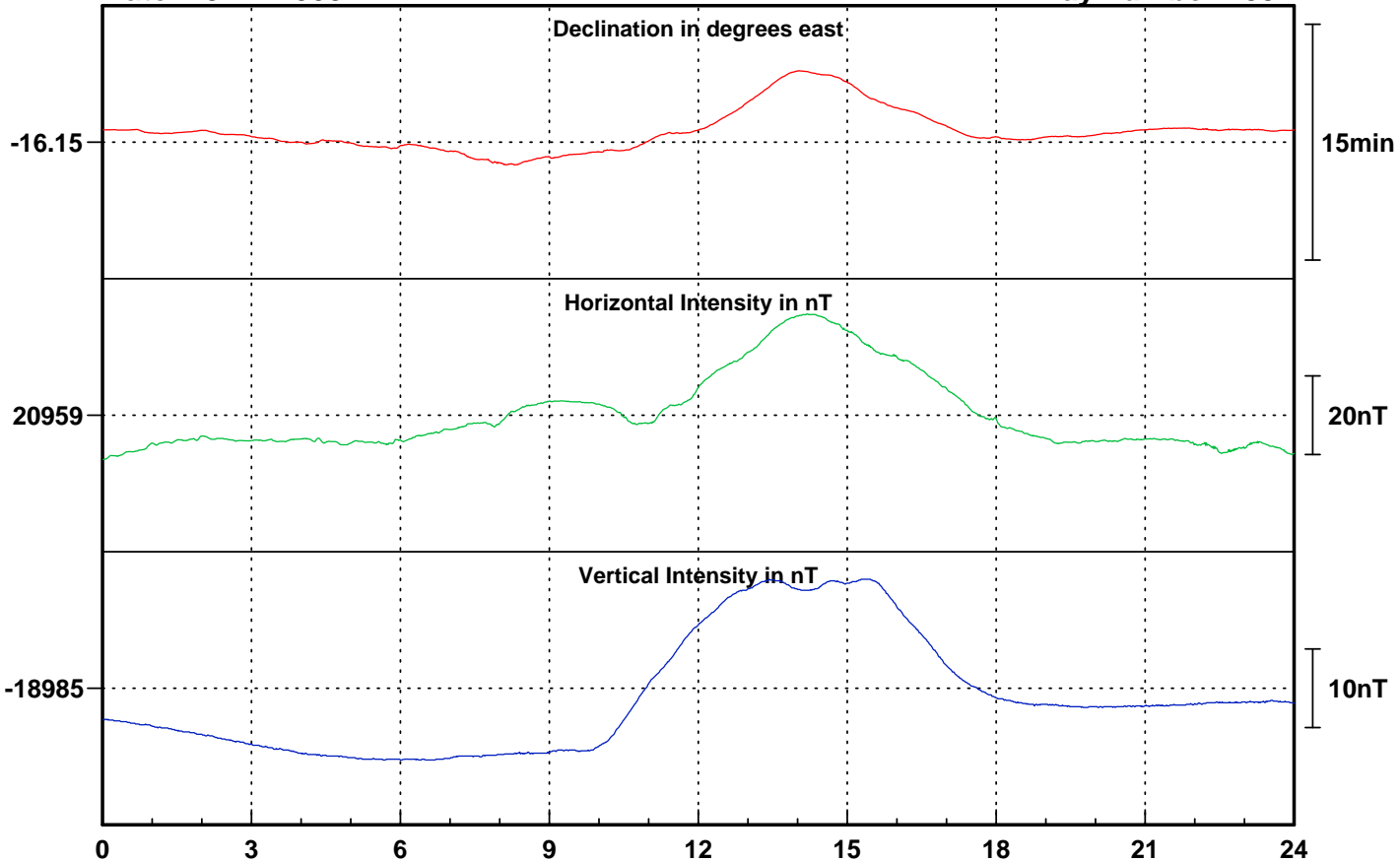
Day number: 333



Date: 29-11-2008

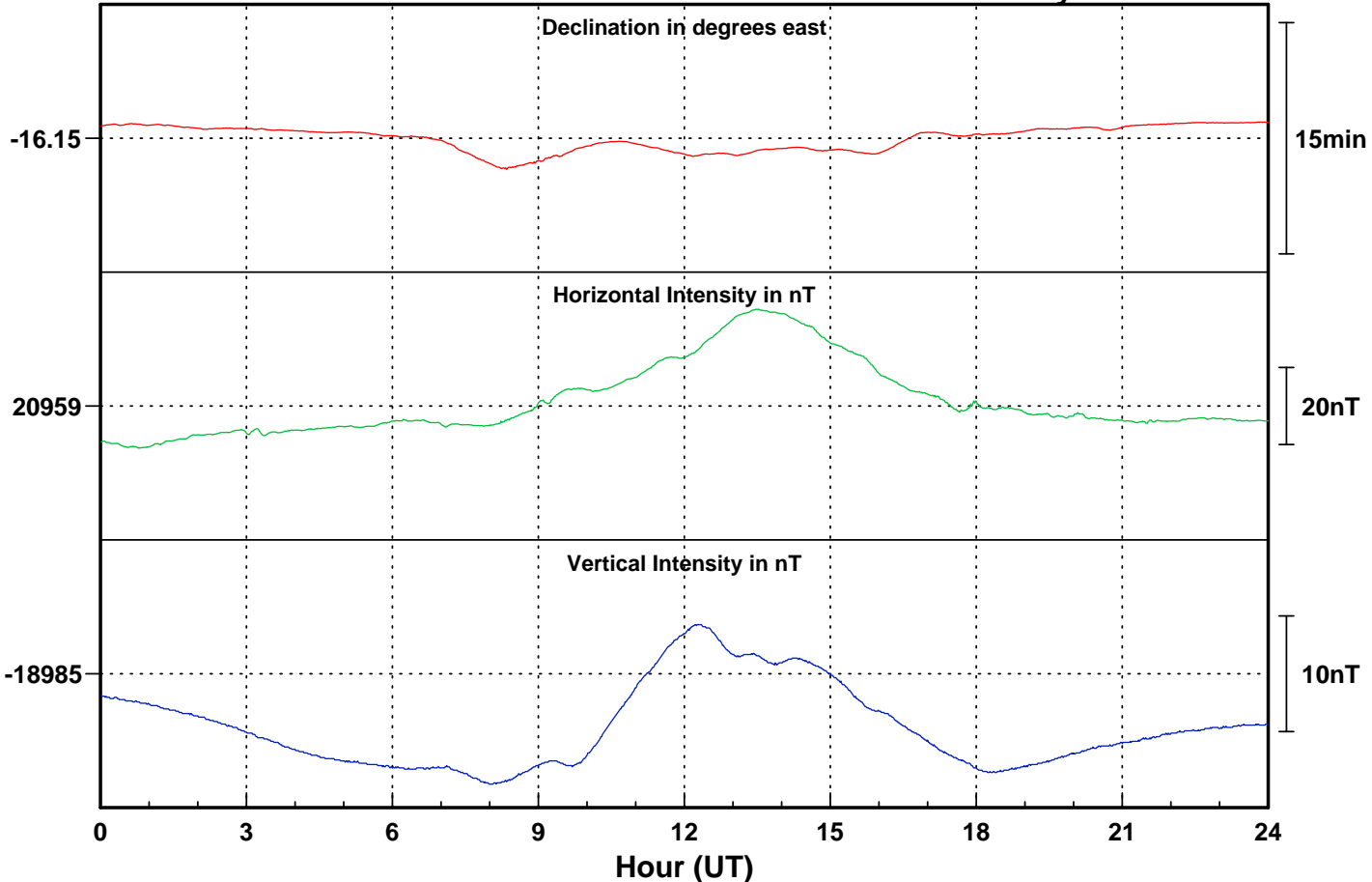
# Ascension Island

Day number: 334

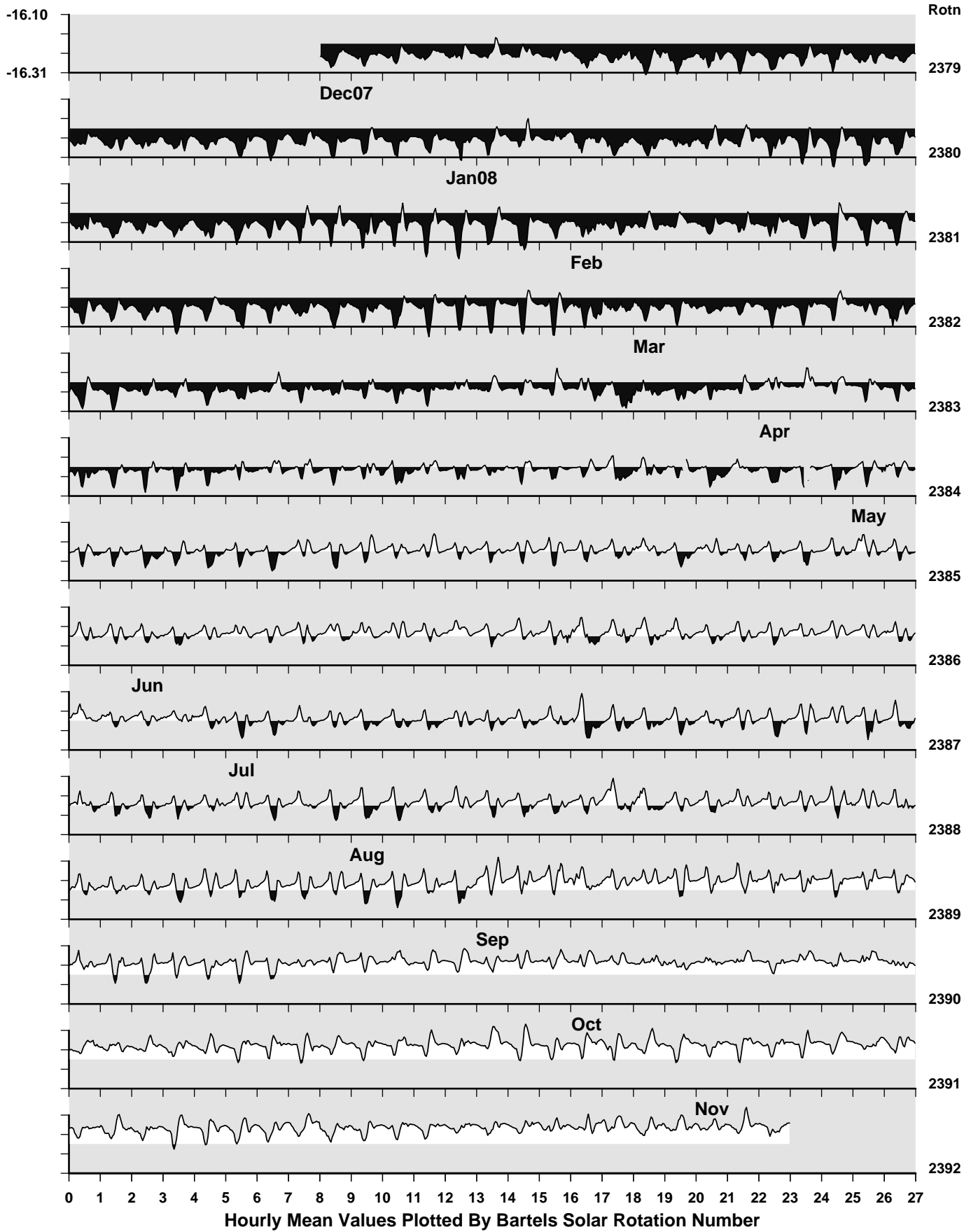


Date: 30-11-2008

Day number: 335



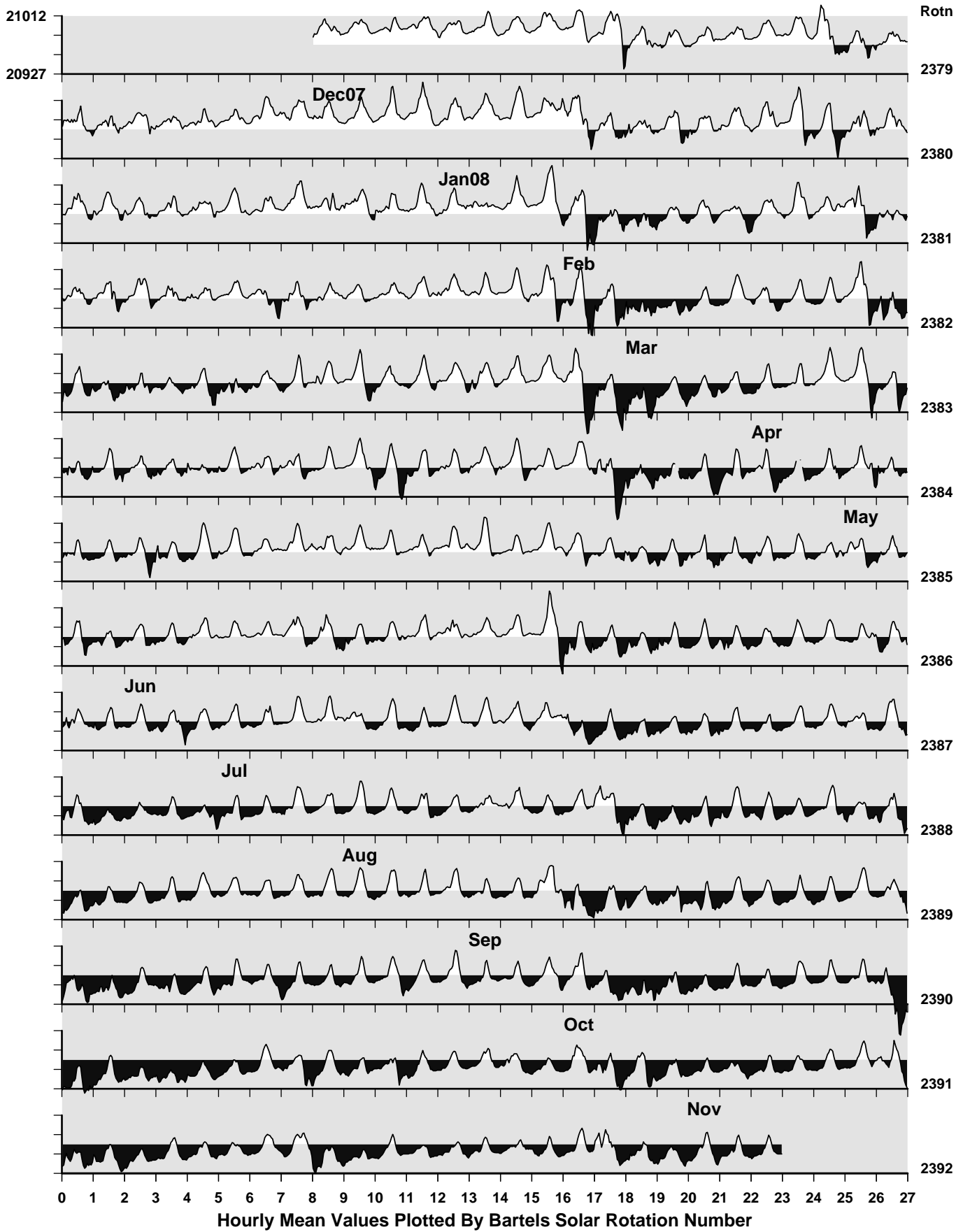
# Ascension Island Observatory: Declination (degrees)



Hourly Mean Values Plotted By Bartels Solar Rotation Number

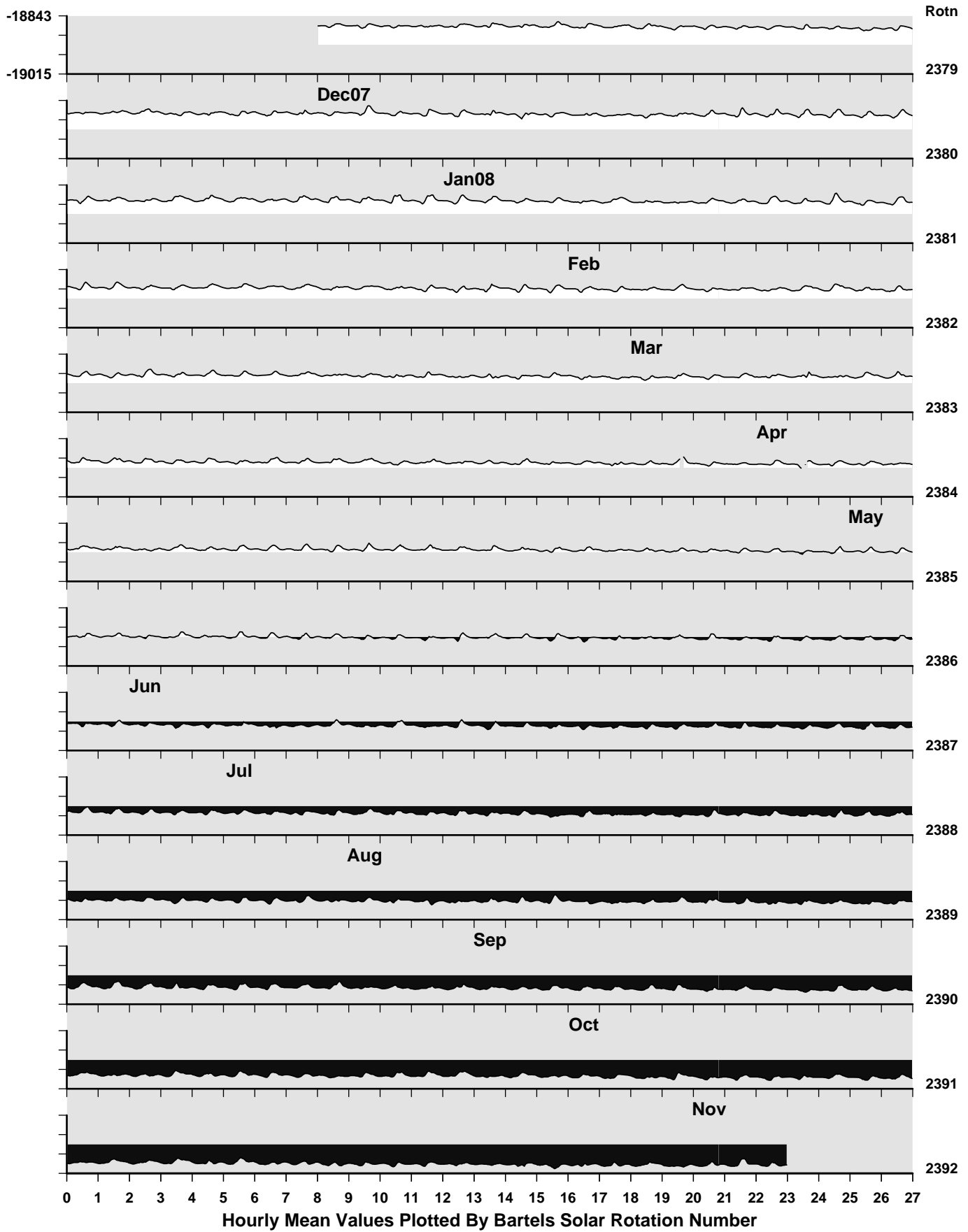


# Ascension Island Observatory: Horizontal Intensity (nT)



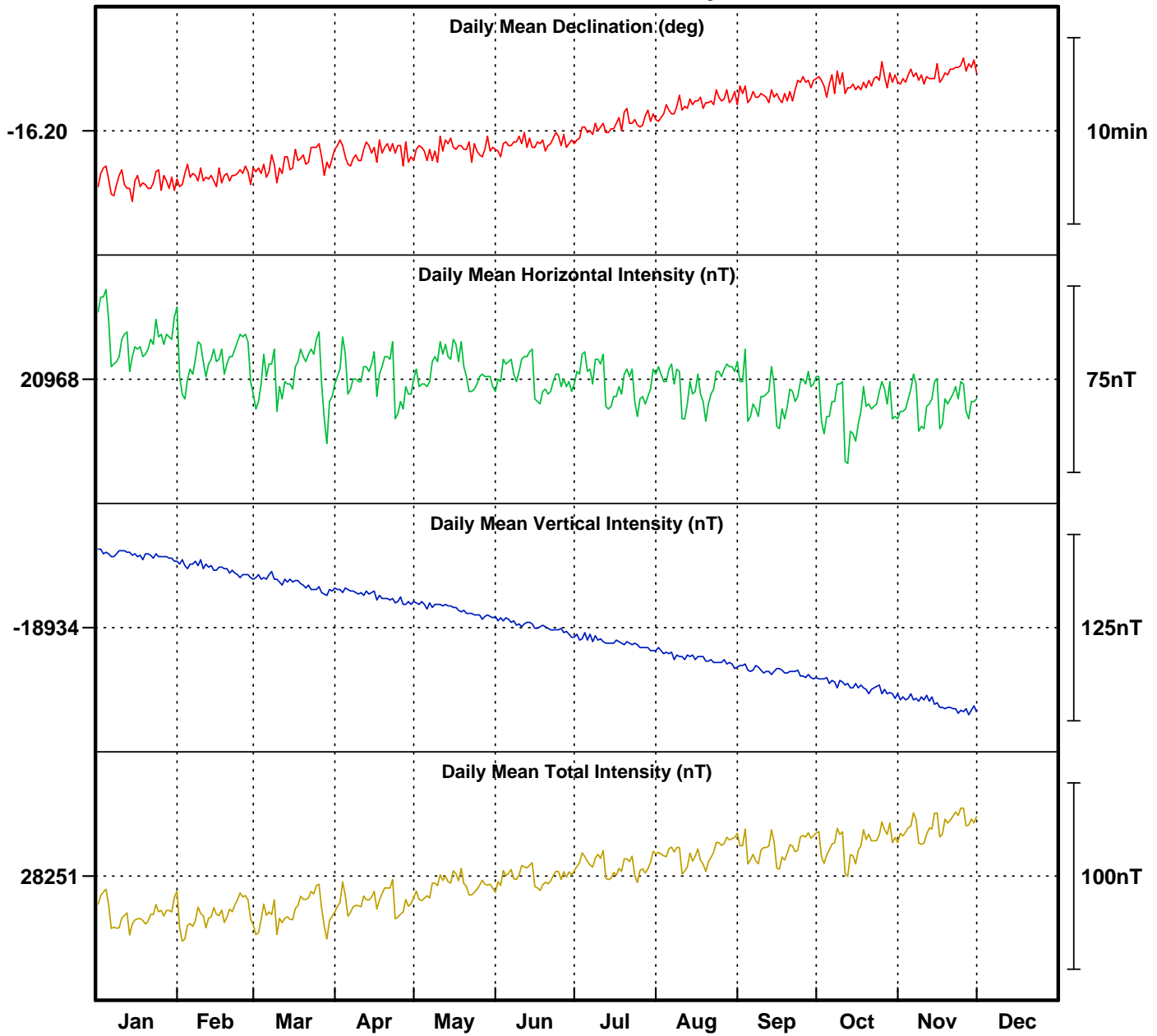
Hourly Mean Values Plotted By Bartels Solar Rotation Number

# Ascension Island Observatory: Vertical Intensity (nT)



Hourly Mean Values Plotted By Bartels Solar Rotation Number

# Ascension Is Observatory 2008



### Monthly Mean Values for Ascension Island Observatory 2008

| Month     | <i>D</i>   | <i>H</i> | <i>I</i>   | <i>X</i> | <i>Y</i> | <i>Z</i>  | <i>F</i> |
|-----------|------------|----------|------------|----------|----------|-----------|----------|
| January   | -16° 15.1′ | 20983 nT | -41° 59.3′ | 20145 nT | -5872 nT | -18886 nT | 28231 nT |
| February  | -16° 14.8′ | 20973 nT | -42° 0.9′  | 20136 nT | -5868 nT | -18895 nT | 28230 nT |
| March     | -16° 14.1′ | 20967 nT | -42° 2.3′  | 20131 nT | -5862 nT | -18905 nT | 28232 nT |
| April     | -16° 13.1′ | 20969 nT | -42° 2.9′  | 20134 nT | -5857 nT | -18912 nT | 28238 nT |
| May       | -16° 12.3′ | 20972 nT | -42° 3.4′  | 20139 nT | -5853 nT | -18921 nT | 28246 nT |
| June      | -16° 11.6′ | 20970 nT | -42° 4.6′  | 20138 nT | -5848 nT | -18932 nT | 28252 nT |
| July      | -16° 12.2′ | 20966 nT | -42° 5.9′  | 20134 nT | -5850 nT | -18944 nT | 28257 nT |
| August    | -16° 11.6′ | 20966 nT | -42° 7.0′  | 20134 nT | -5847 nT | -18955 nT | 28264 nT |
| September | -16° 9.9′  | 20962 nT | -42° 8.0′  | 20133 nT | -5836 nT | -18963 nT | 28266 nT |
| October   | -16° 9.4′  | 20956 nT | -42° 9.4′  | 20128 nT | -5831 nT | -18973 nT | 28269 nT |
| November  | -16° 8.9′  | 20959 nT | -42° 10.3′ | 20132 nT | -5829 nT | -18985 nT | 28279 nT |

Note

i. The values shown here are provisional.