

BRITISH GEOLOGICAL SURVEY

**Sable Island
Observatory
Monthly
Magnetic
Bulletin**

December 2005

05/12/SB



**British
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

SABLE ISLAND OBSERVATORY MAGNETIC DATA

1.1 Introduction

Sable Island is the third overseas geomagnetic observatory to be established by BGS. The installation, funded by a joint venture between BGS, Sperry Drilling Services and Sable Offshore Energy, was completed in May 1999 and the observatory became operational from 8th May 1999.

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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Fax: +44 (0) 131 668 4368
E-mail: orba@bgs.ac.uk
Internet: www.geomag.bgs.ac.uk

1.2 Position

The Island is a sandbank formed by the meeting of currents from the St. Lawrence Delta and the Gulf Stream and is located approximately 290km southeast of Halifax, Nova Scotia.

The observatory co-ordinates are:-

Geographic: $43^{\circ} 55.9'N$ $299^{\circ}0.4'E$
Geomagnetic: $52^{\circ} 07.6'N$ $11^{\circ}54.4'E$
Height above mean sea level: $5m$ (approx)

The geomagnetic co-ordinates are calculated using the 10th generation International Geomagnetic Reference Field (IGRF) at epoch 2005.5

1.3 The Observatory Operation

1.3.1 GDAS

The observatory operates under the control of the Geomagnetic Data Acquisition System (GDAS), which was developed by BGS staff, installed in April 2004 and became fully operational from 13th May 2004. 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.

1.4 Data Presentation

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

1.4.1 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.

1.4.2 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.

1.4.3 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.

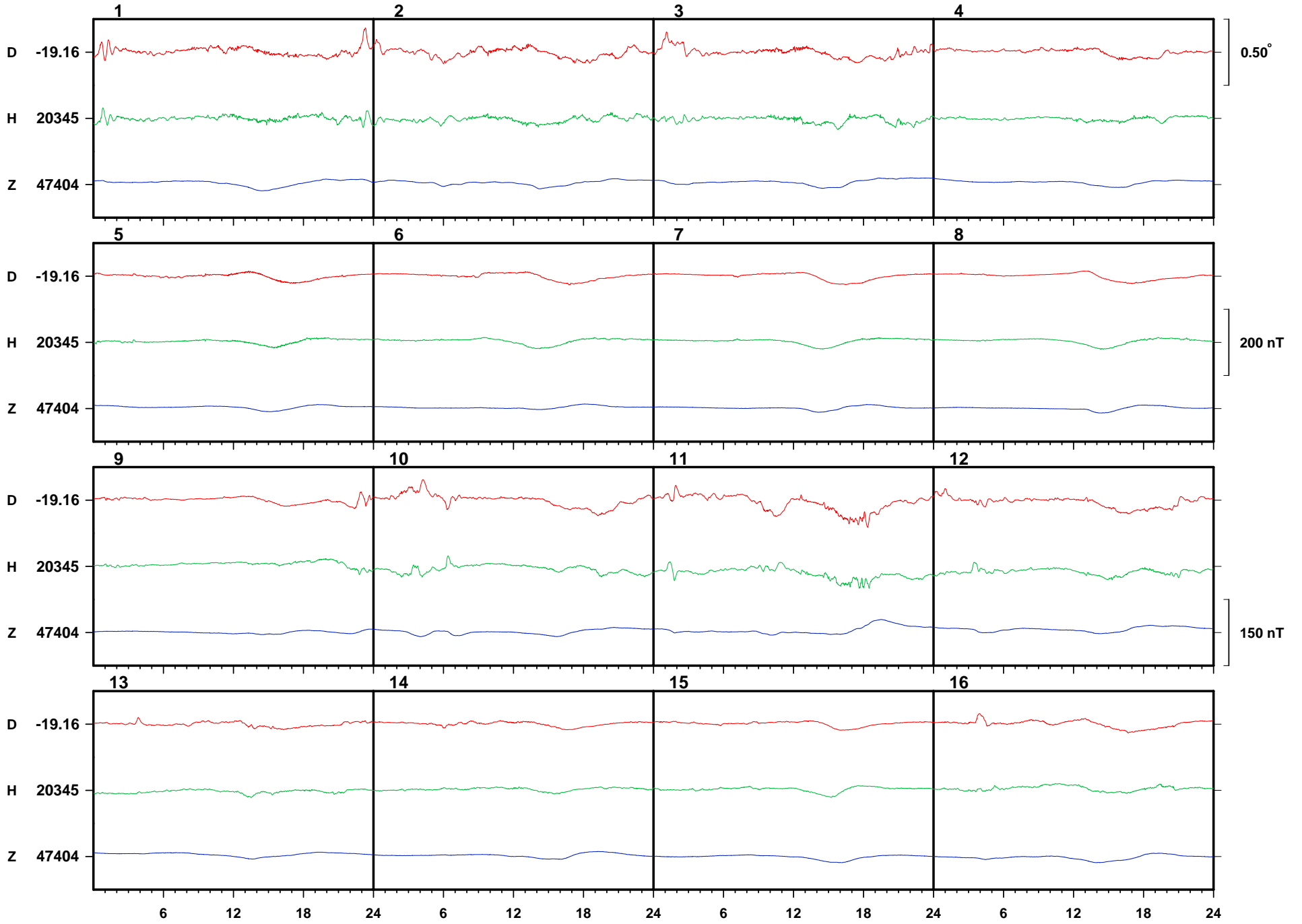
1.4.4 Daily and Monthly Mean Values

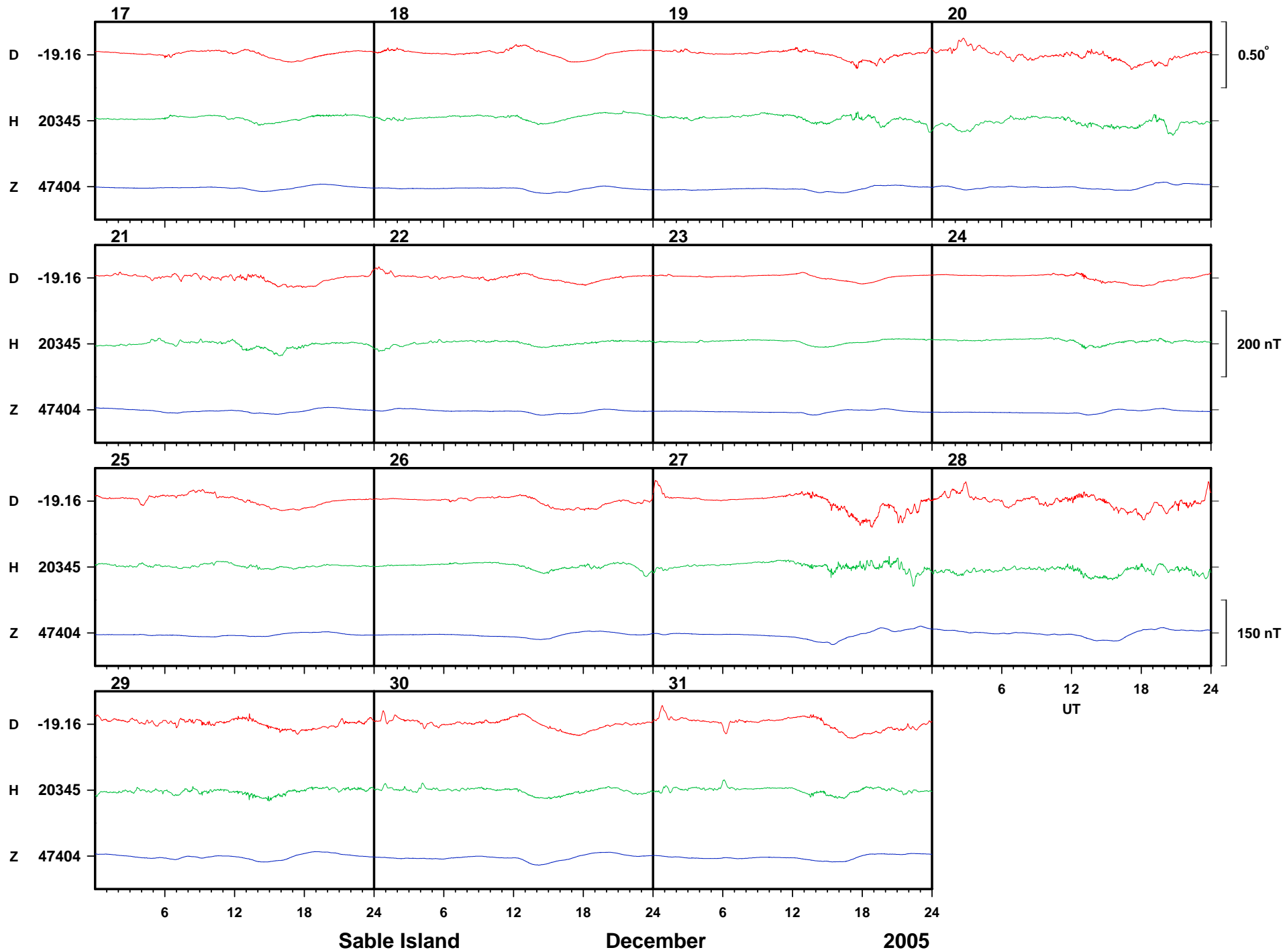
Daily mean values of D , H , Z and F are plotted throughout the year. In addition, a table of monthly mean values of all the geomagnetic elements is provided. These values depend on accurate specification of the fluxgate sensor baselines. It is anticipated that provisional values will not be altered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

Sable Island

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Sable Island

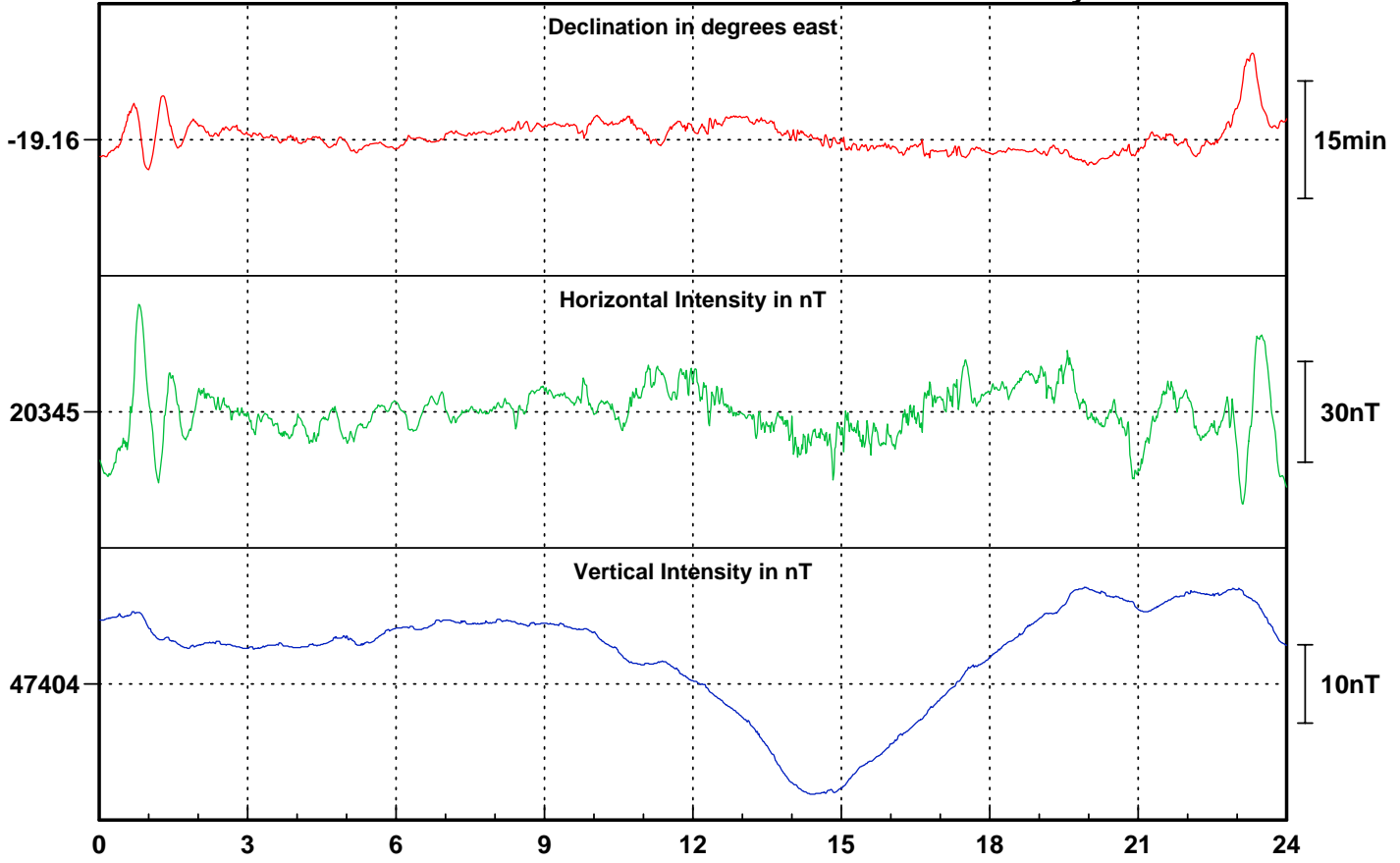
December

2005

Date: 01-12-2005

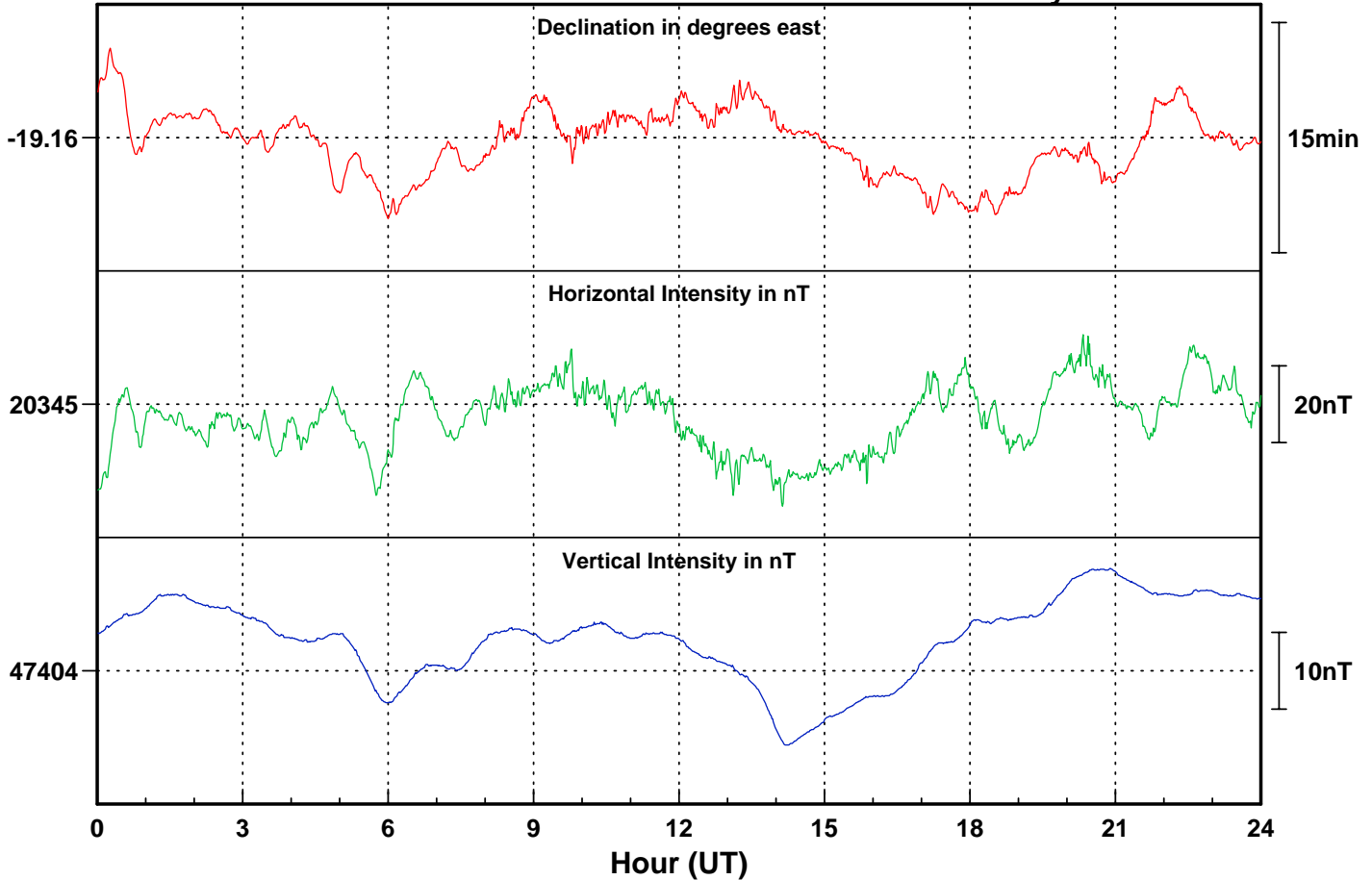
Sable Island

Day number: 335



Date: 02-12-2005

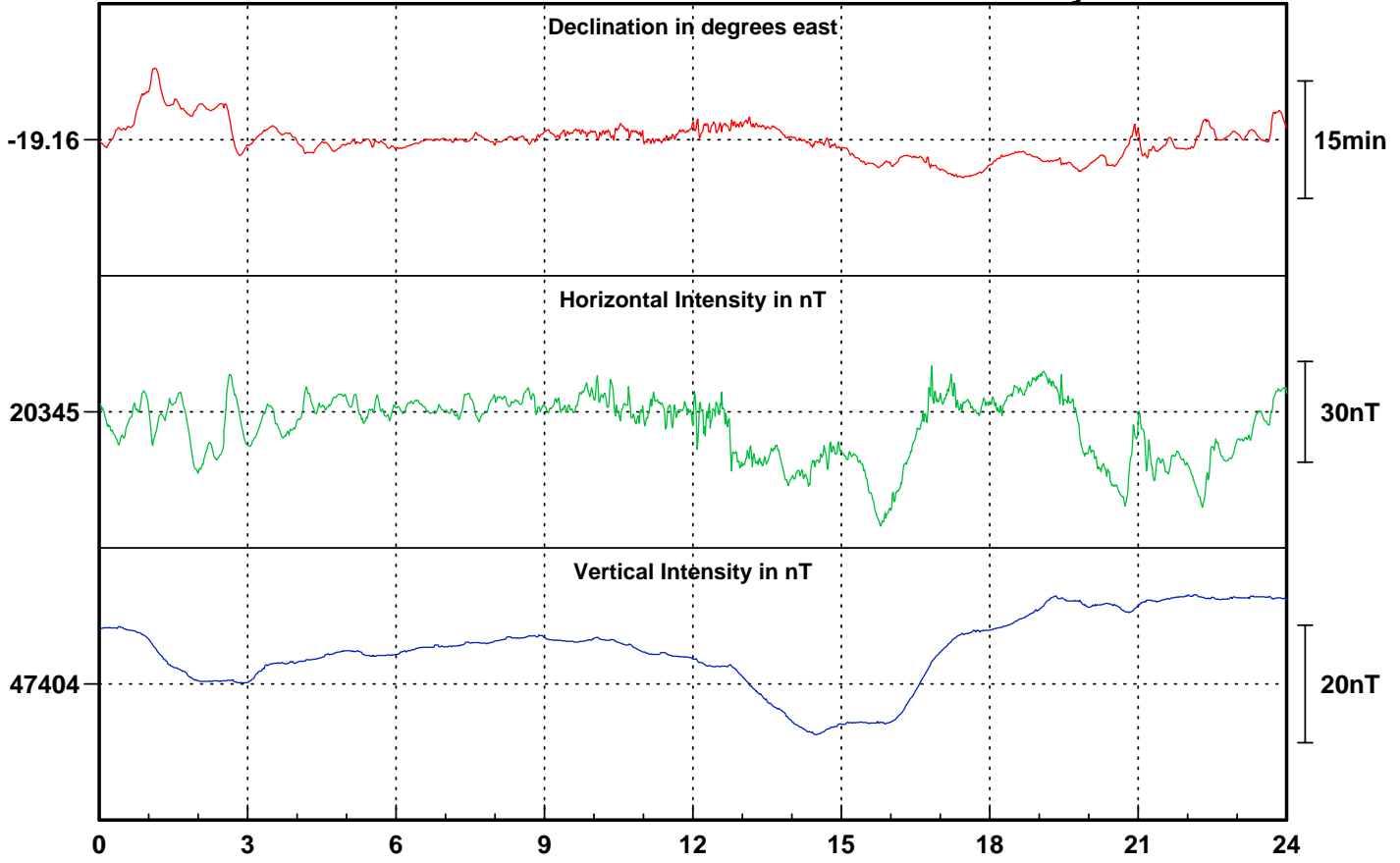
Day number: 336



Date: 03-12-2005

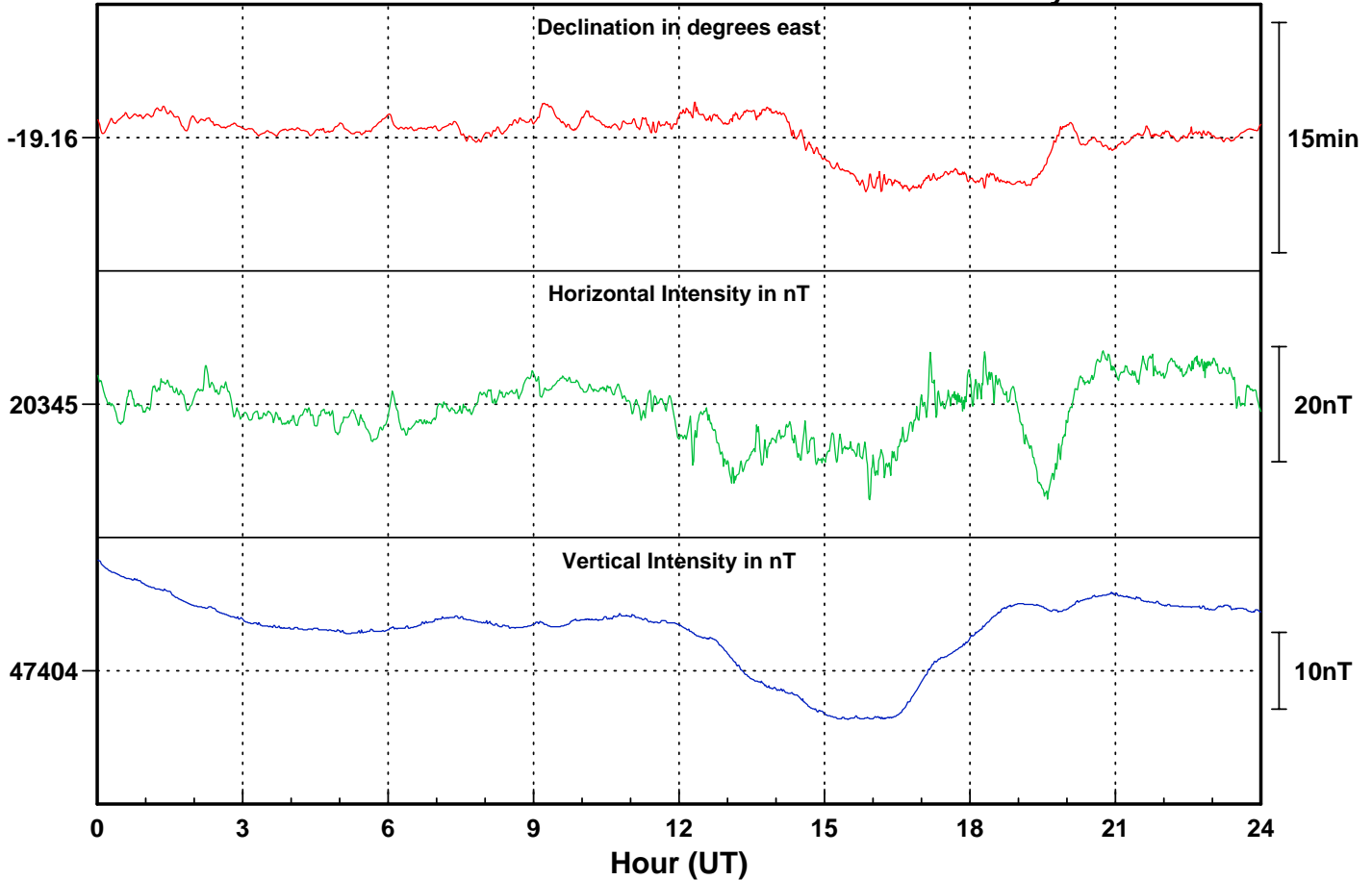
Sable Island

Day number: 337



Date: 04-12-2005

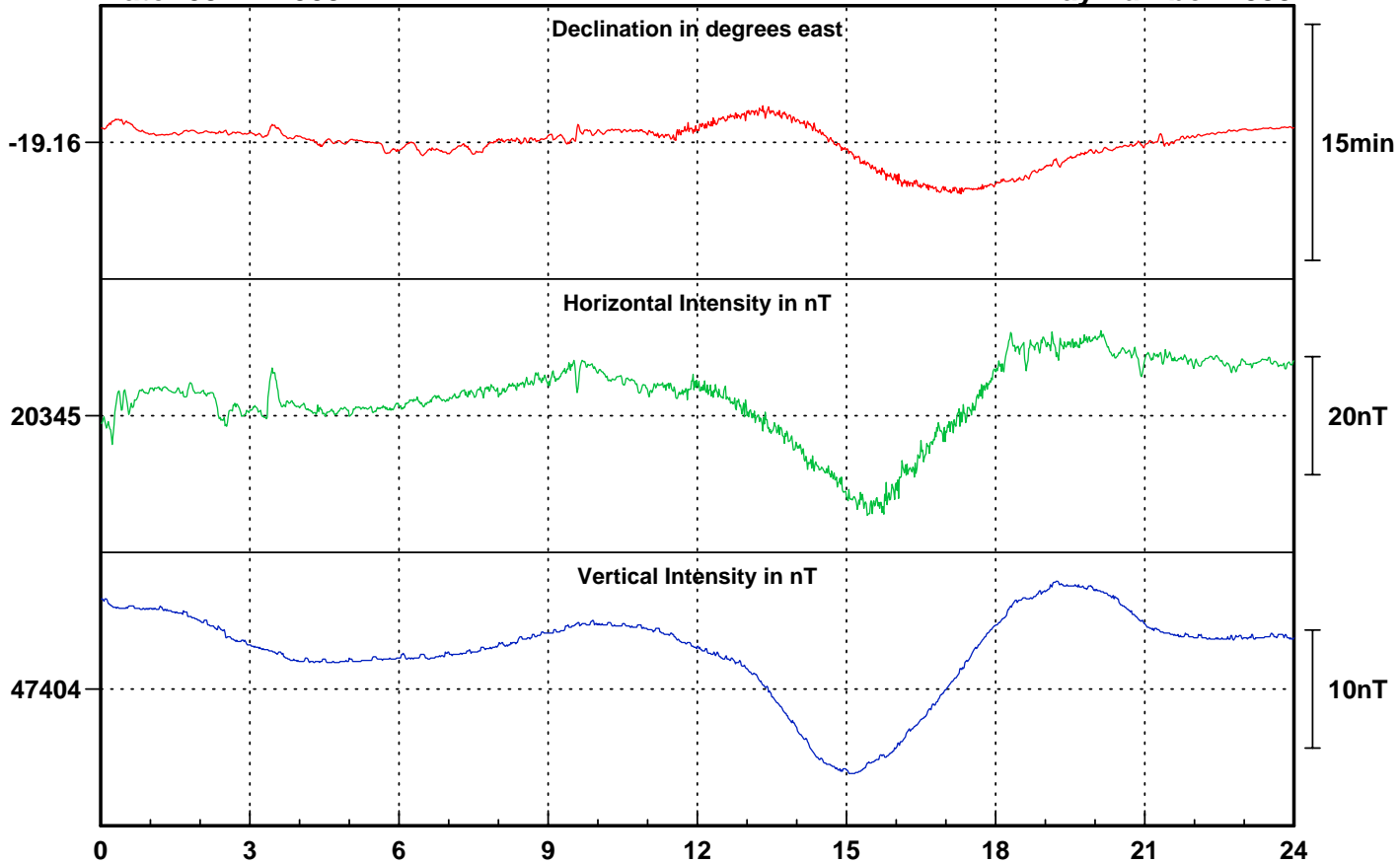
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Date: 05-12-2005

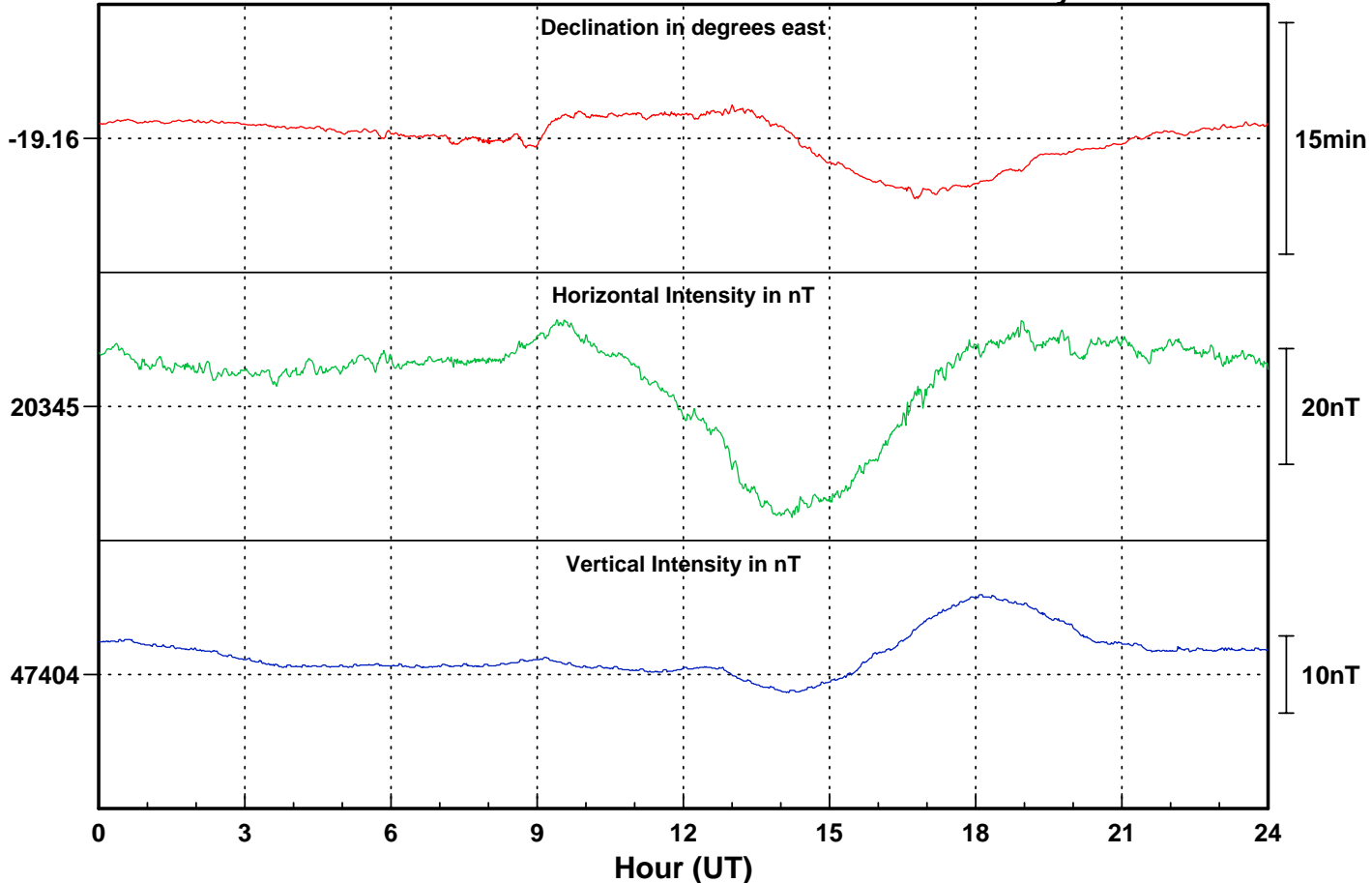
Sable Island

Day number: 339



Date: 06-12-2005

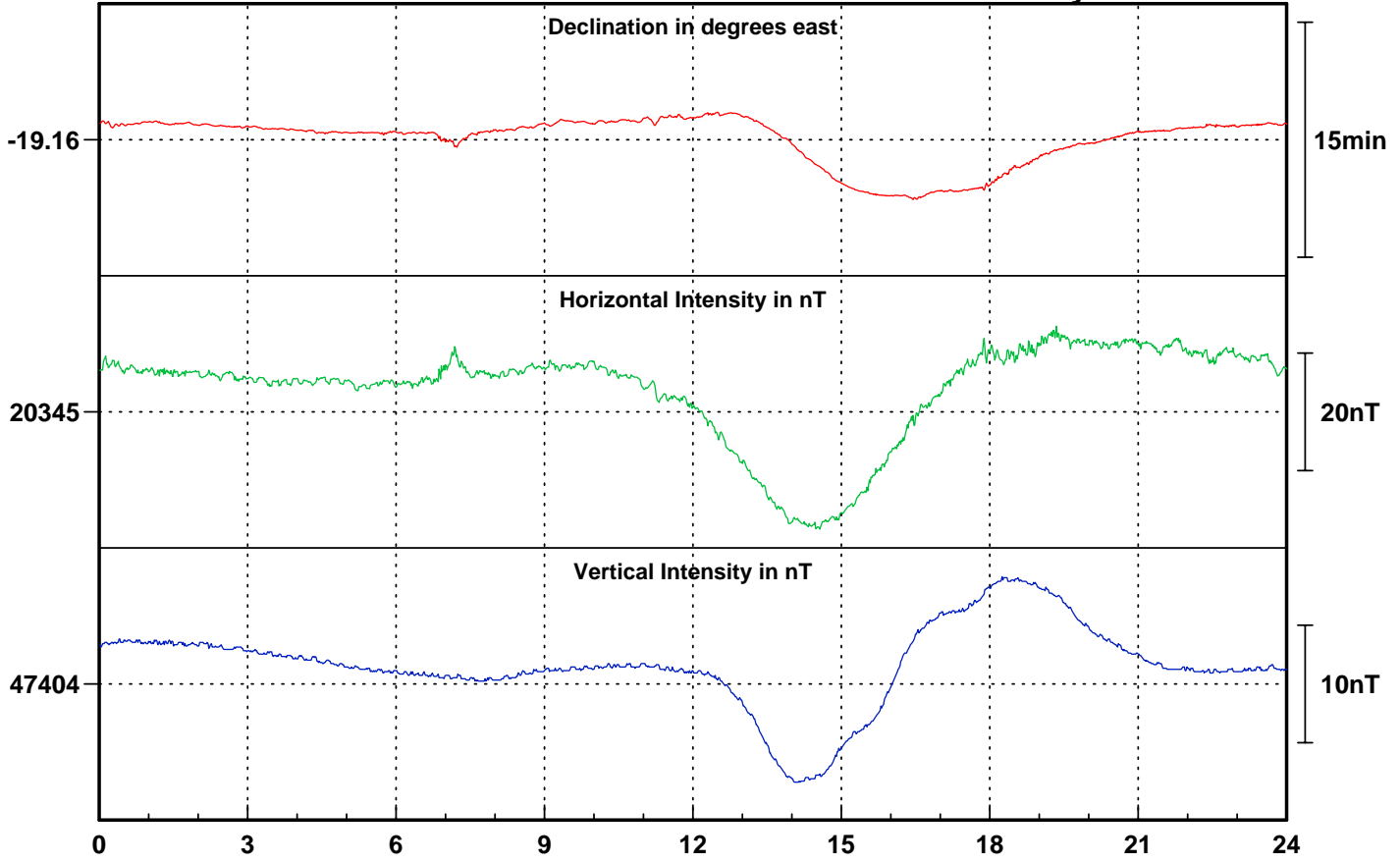
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Date: 07-12-2005

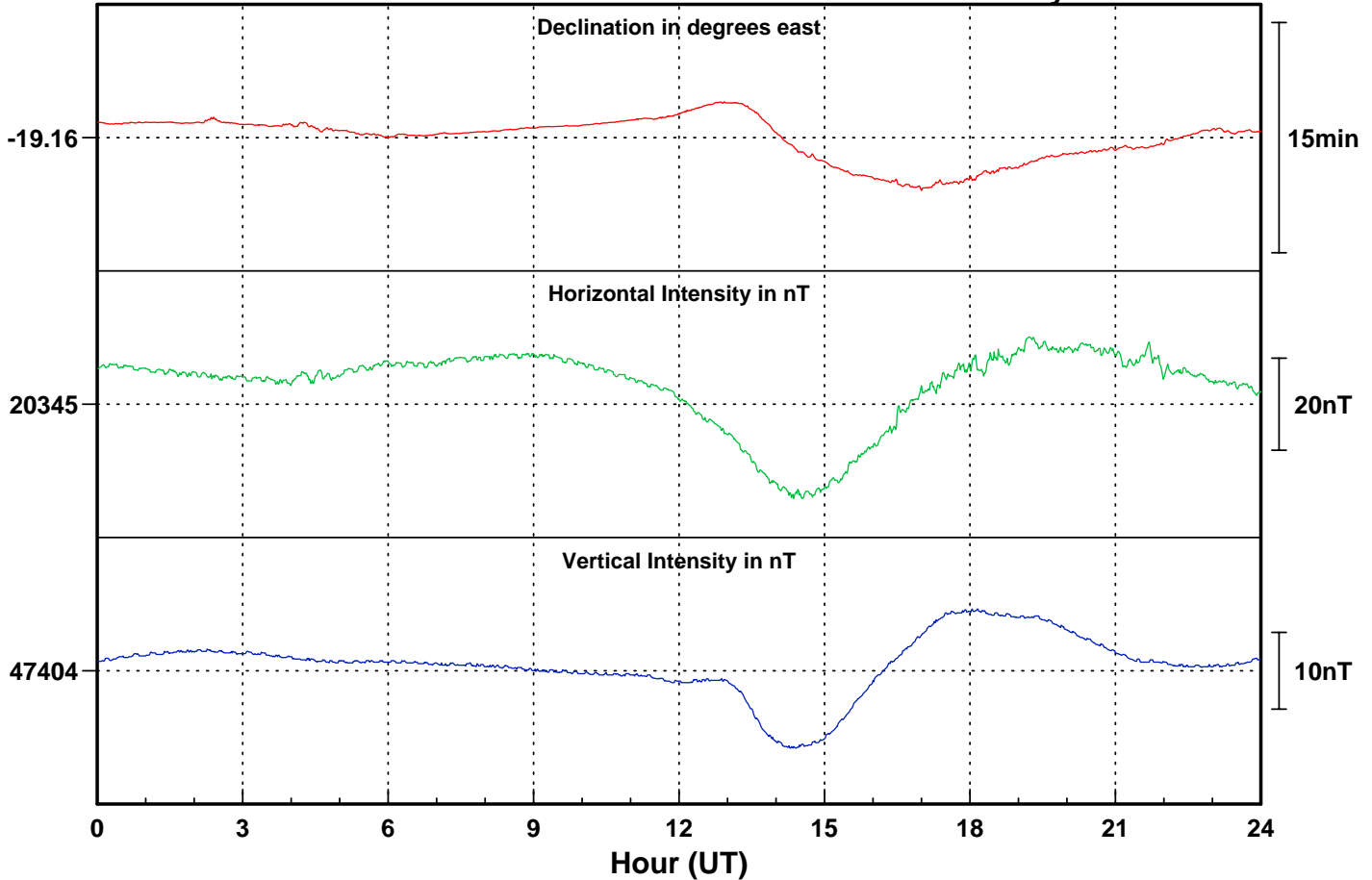
Sable Island

Day number: 341



Date: 08-12-2005

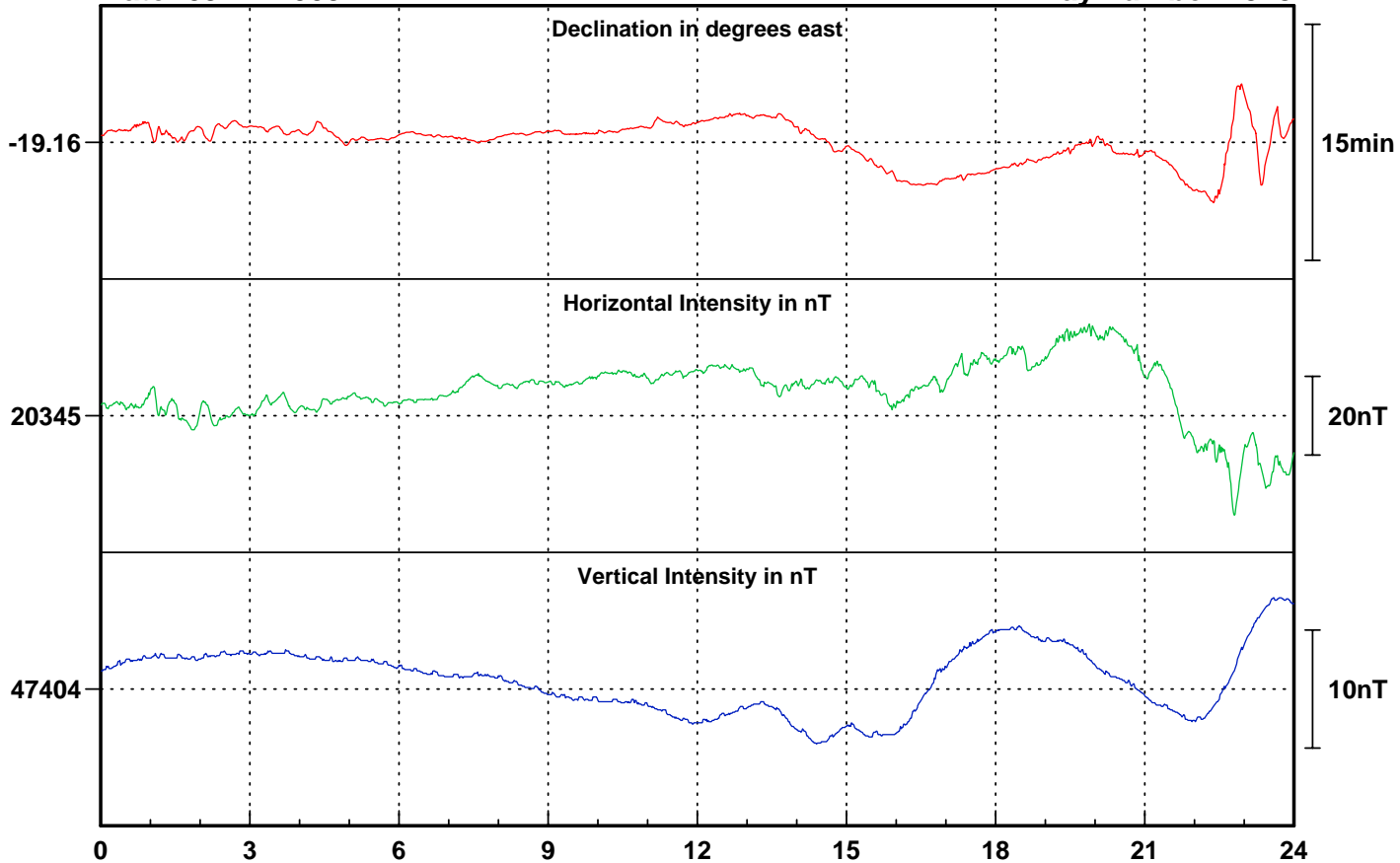
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Date: 09-12-2005

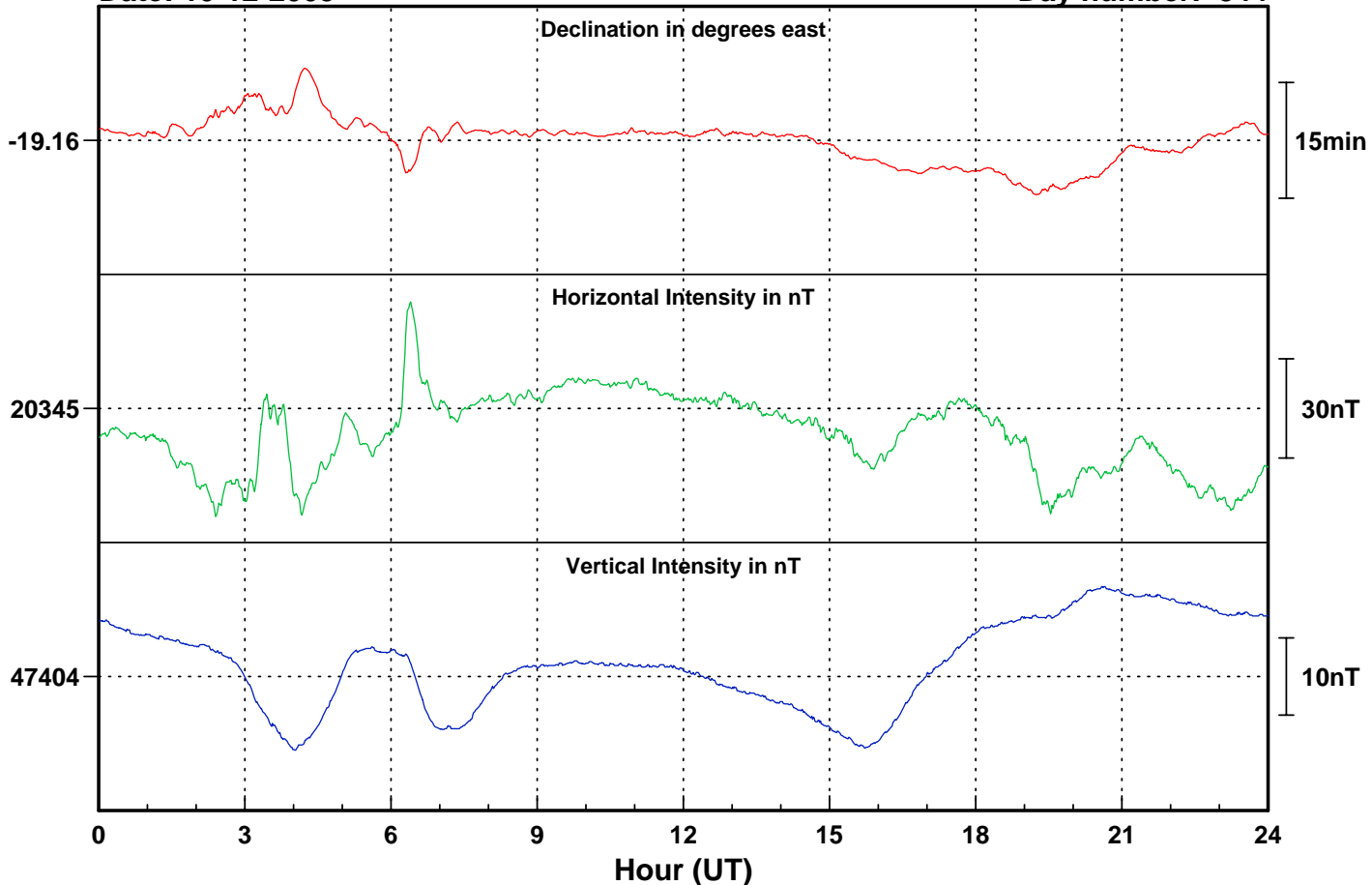
Sable Island

Day number: 343



Date: 10-12-2005

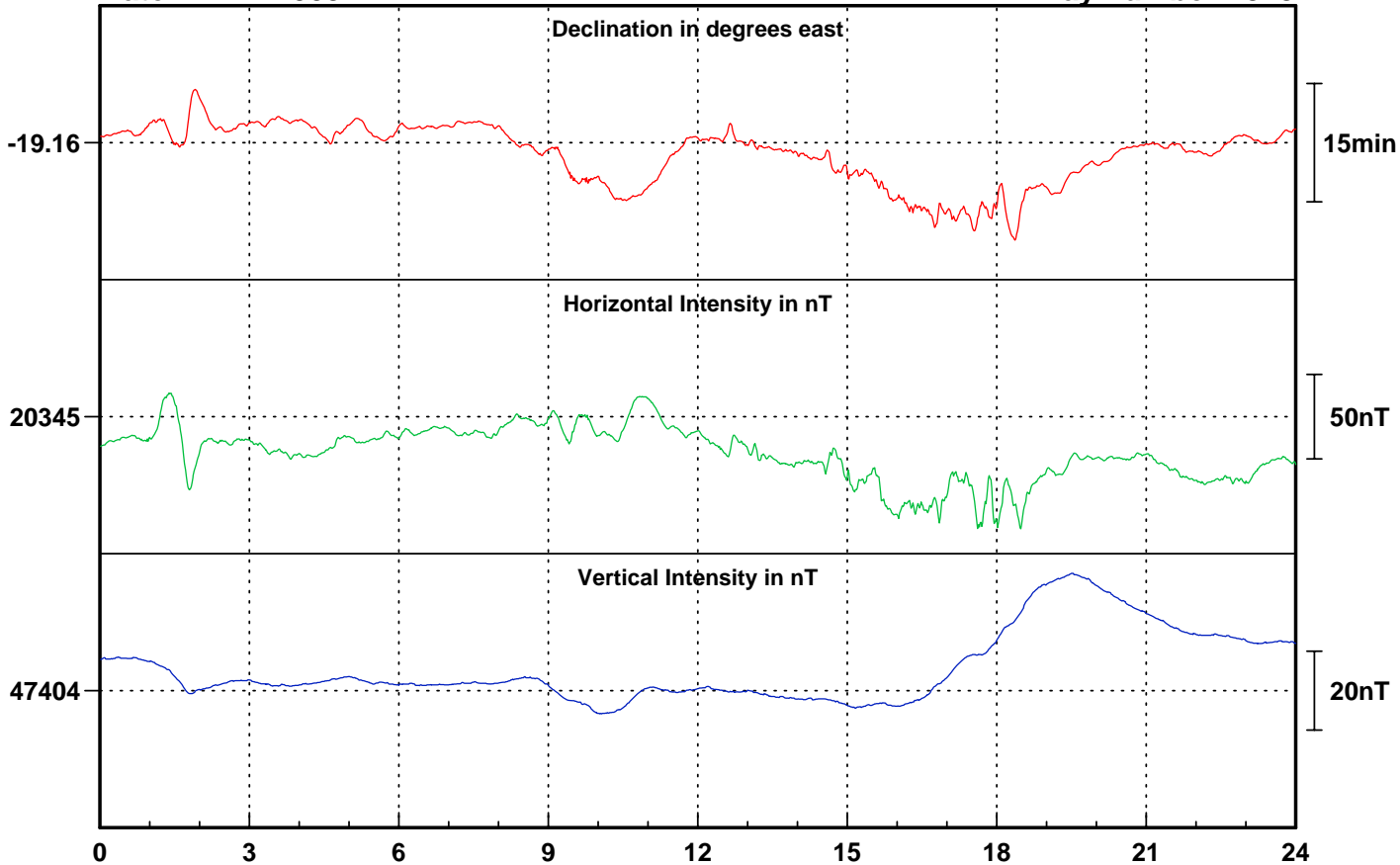
Day number: 344



Date: 11-12-2005

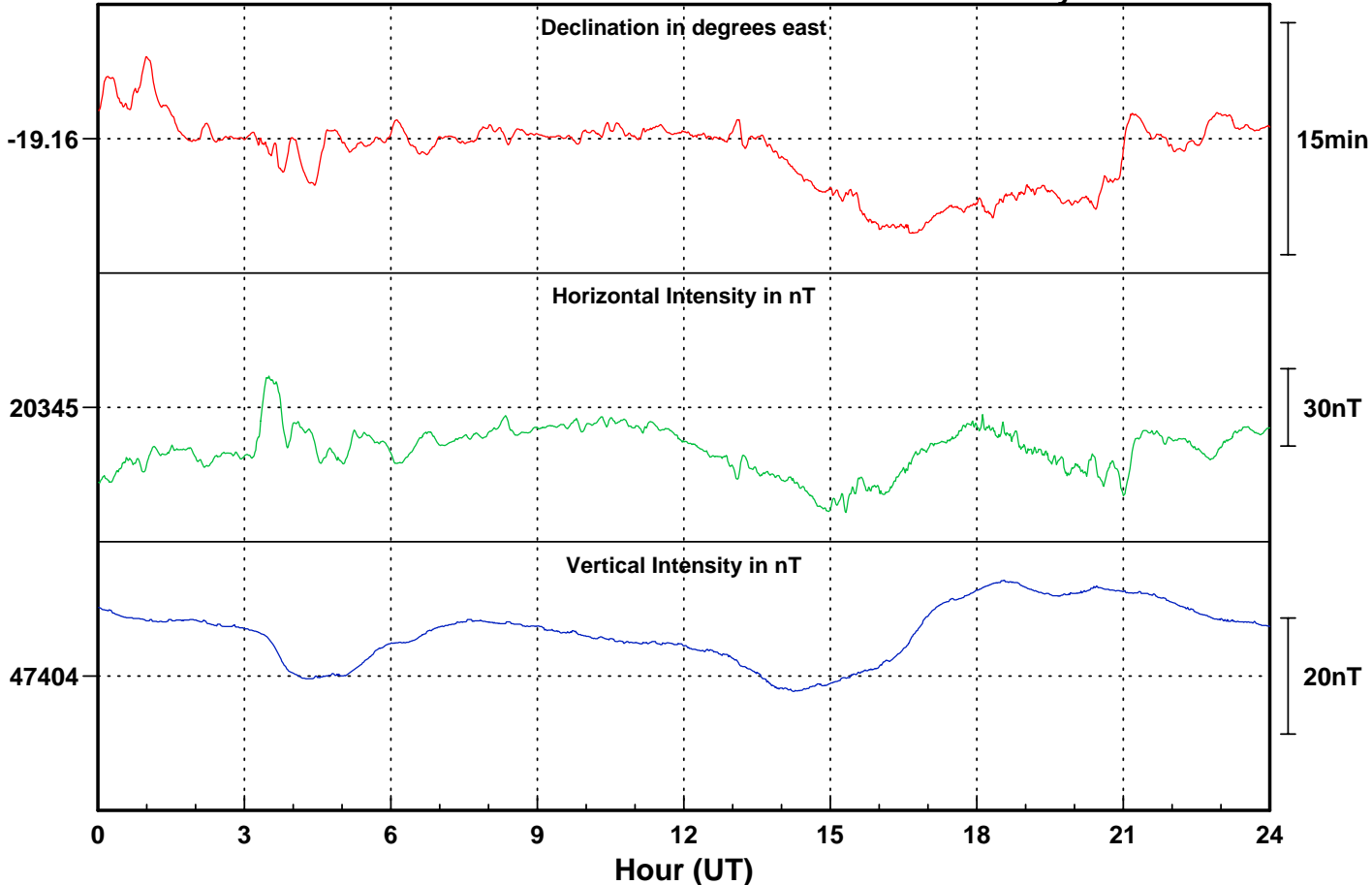
Sable Island

Day number: 345



Date: 12-12-2005

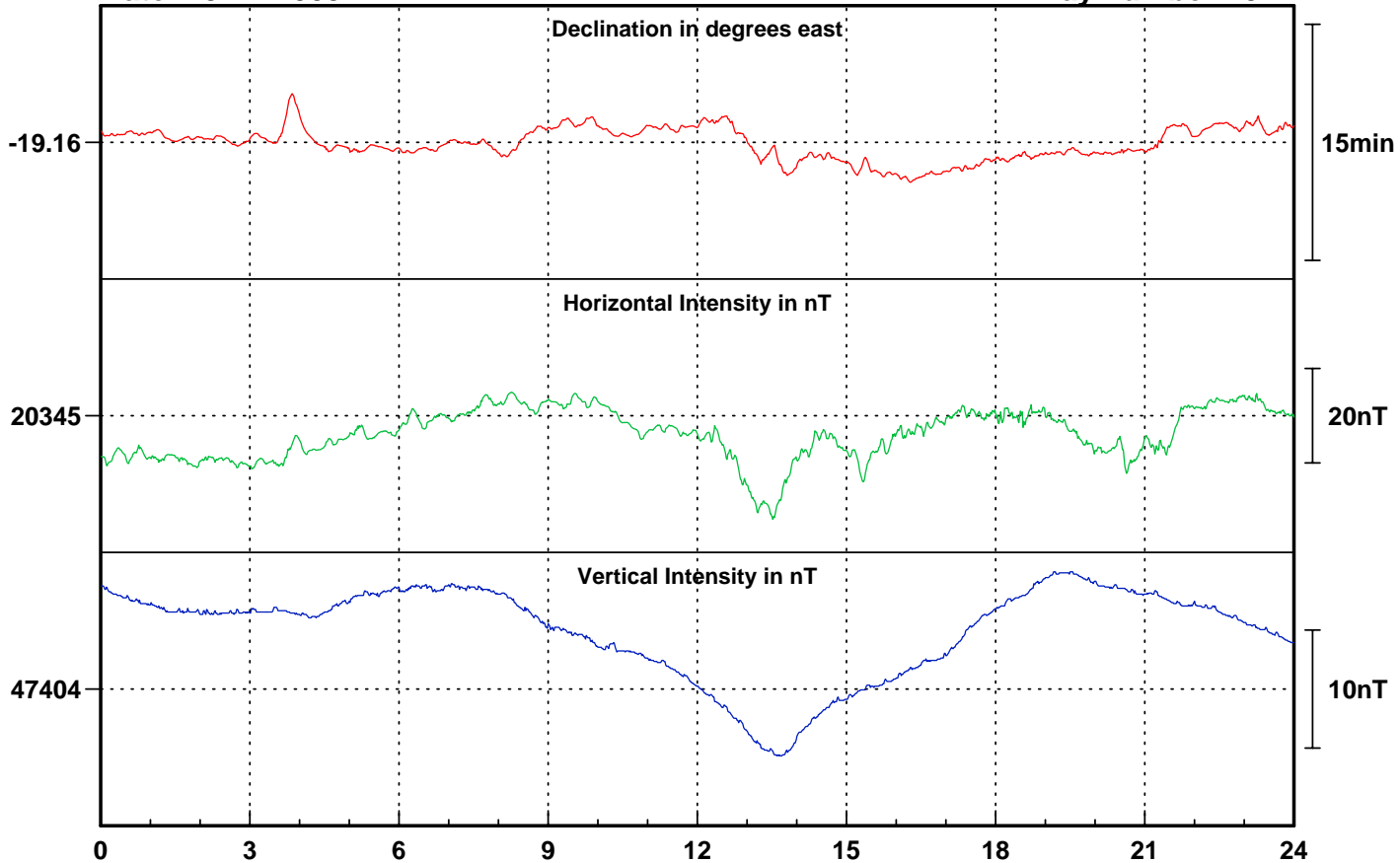
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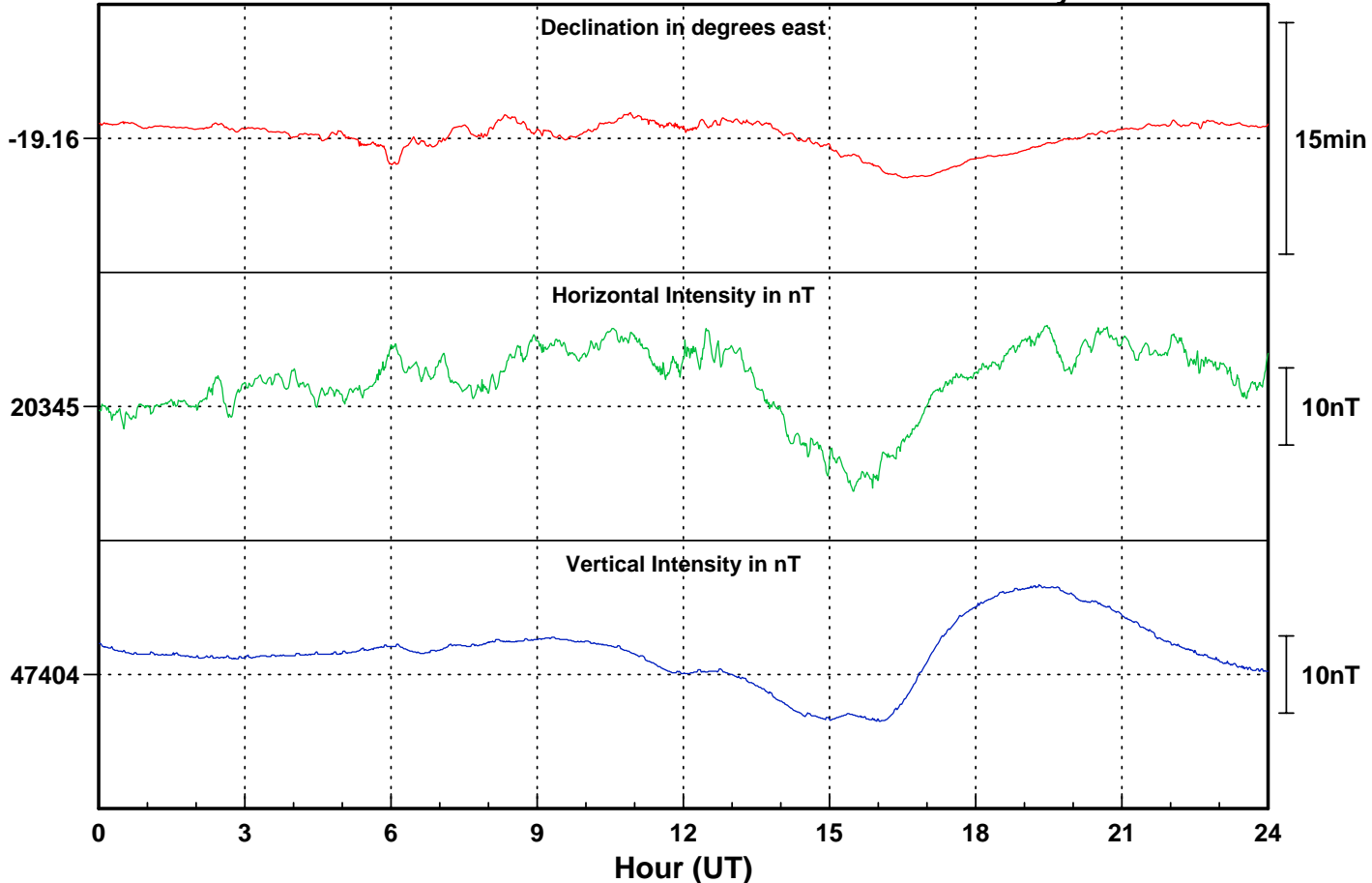
Sable Island

Day number: 347



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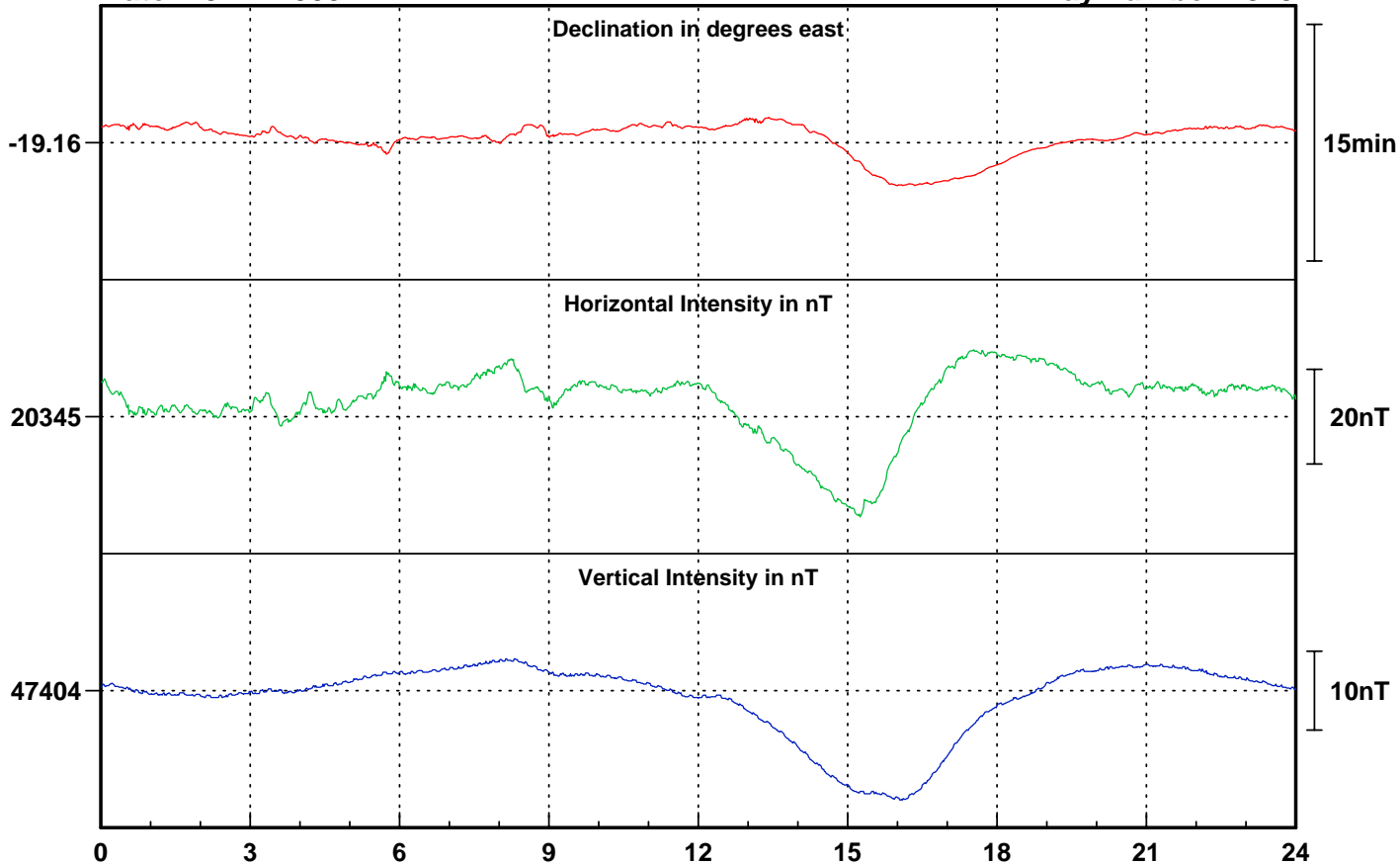
Day number: 348



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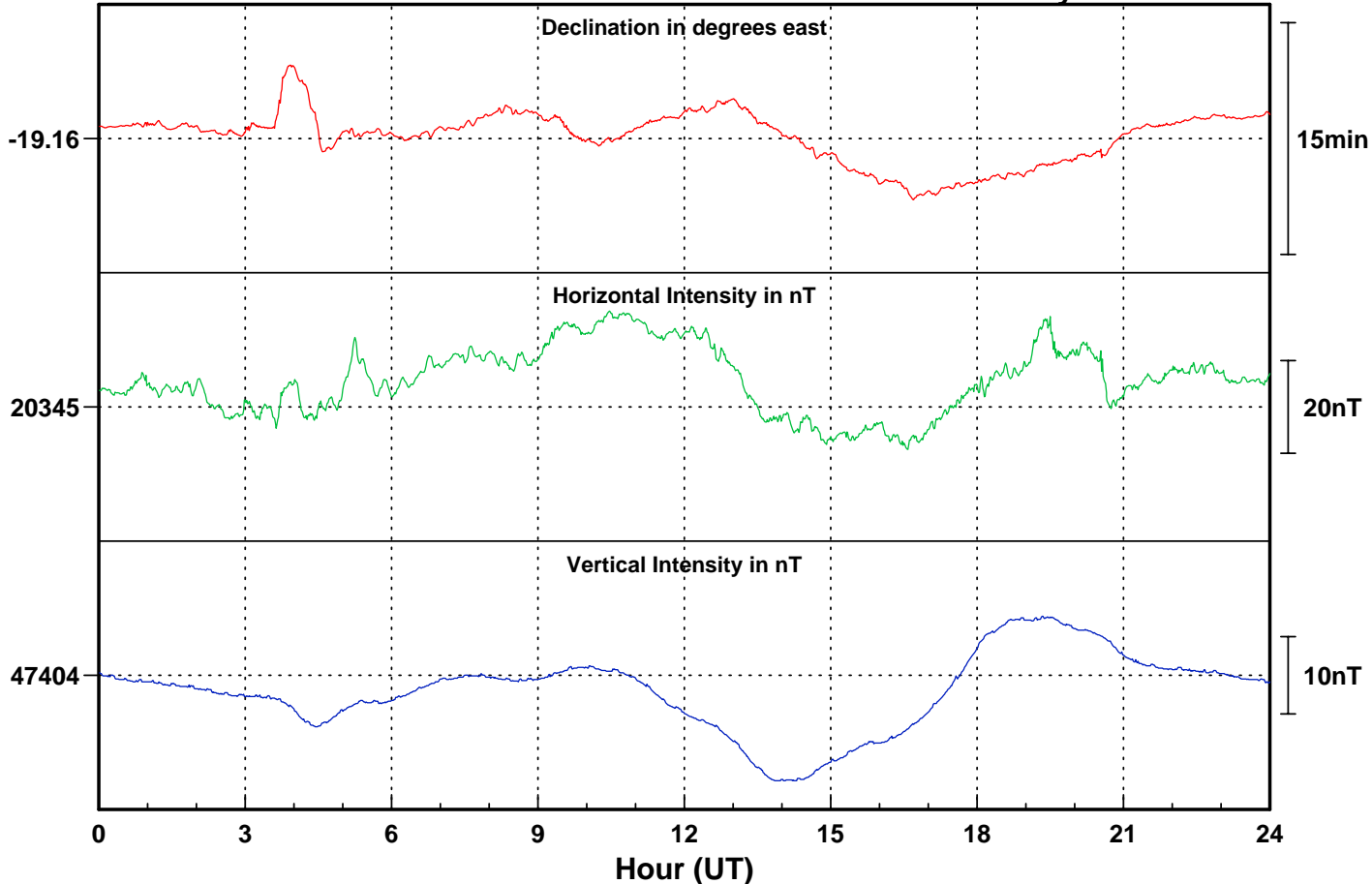
Sable Island

Day number: 349



Date: 16-12-2005

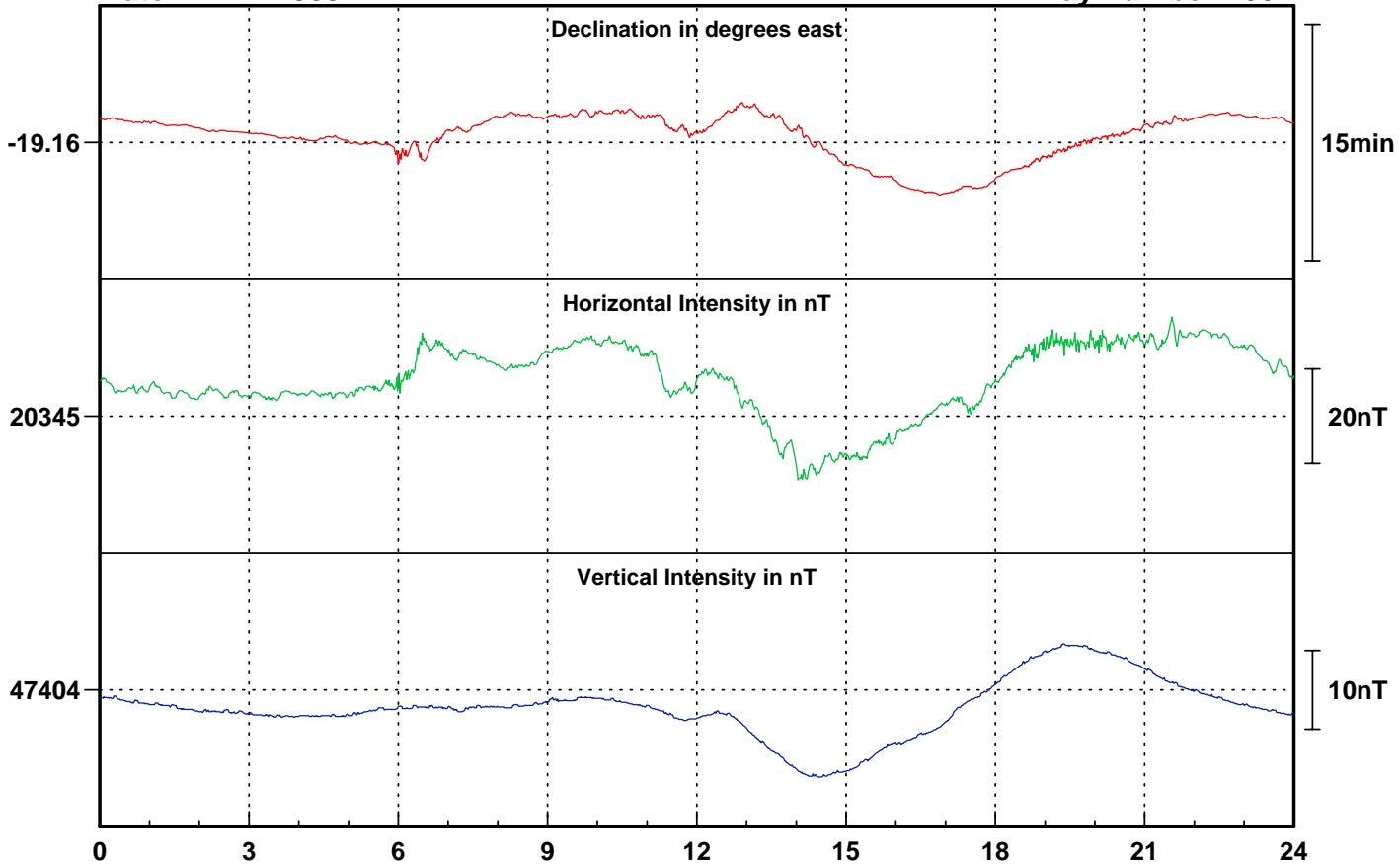
Day number: 350



Date: 17-12-2005

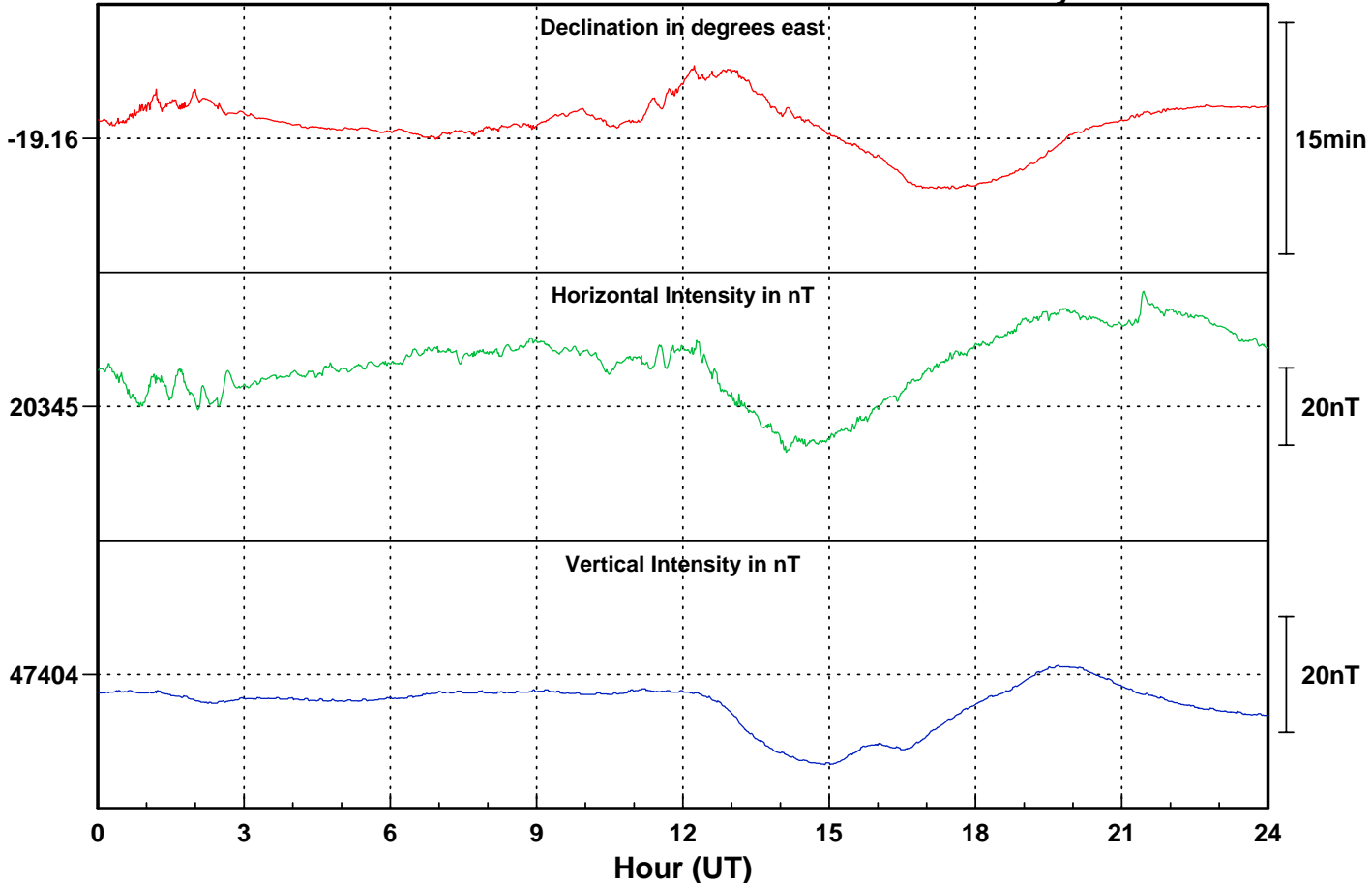
Sable Island

Day number: 351



Date: 18-12-2005

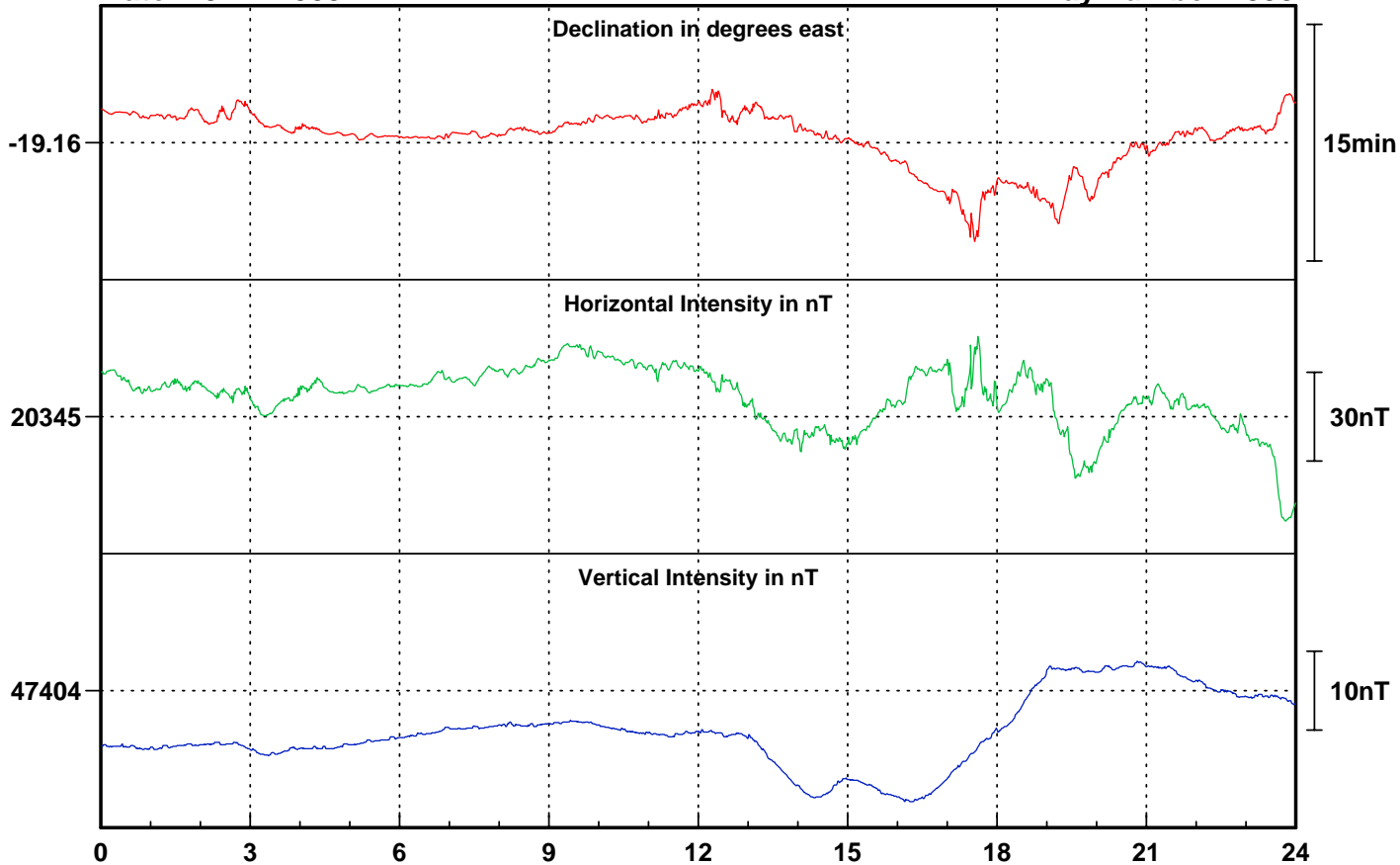
Day number: 352



Date: 19-12-2005

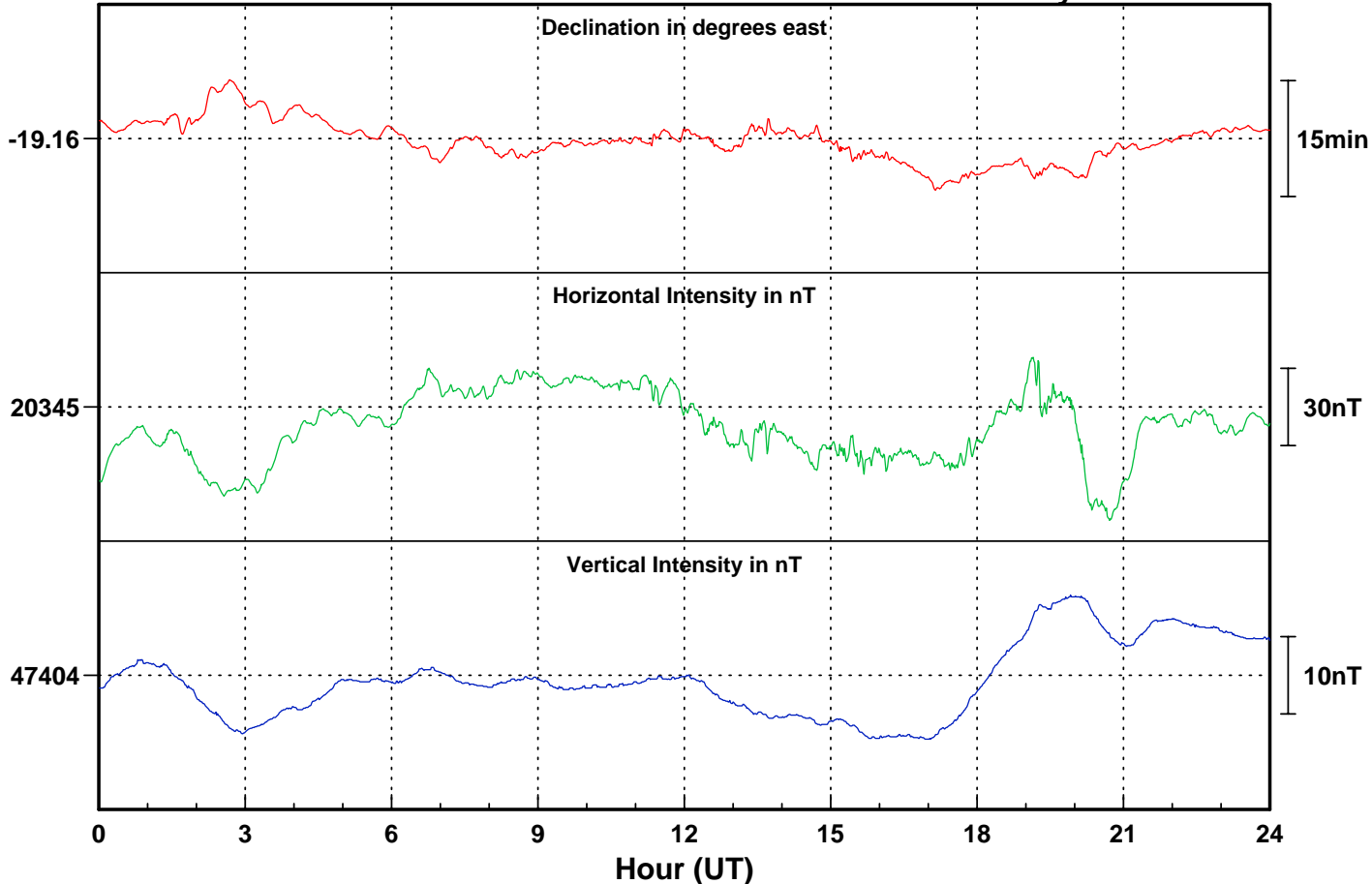
Sable Island

Day number: 353



Date: 20-12-2005

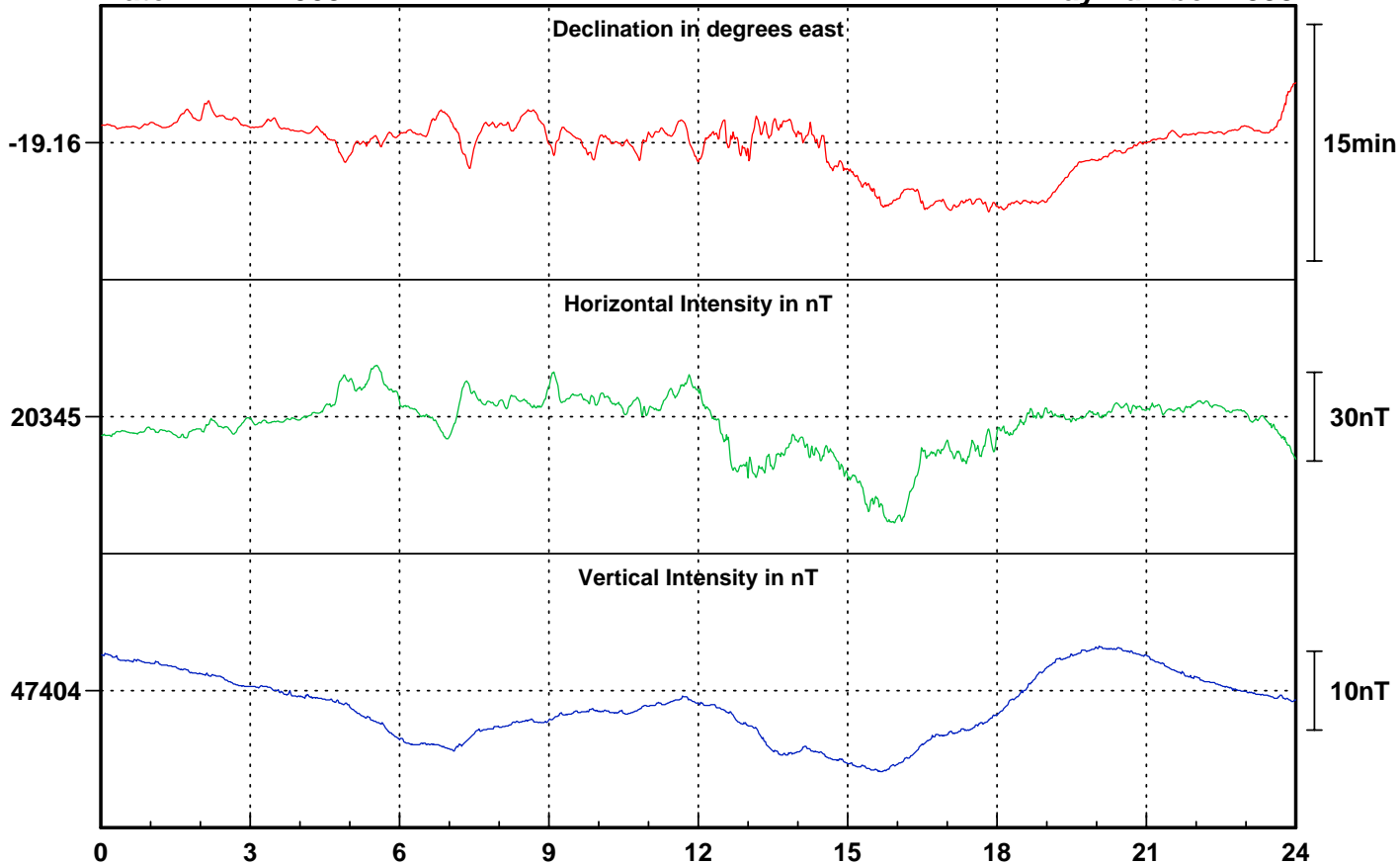
Day number: 354



Date: 21-12-2005

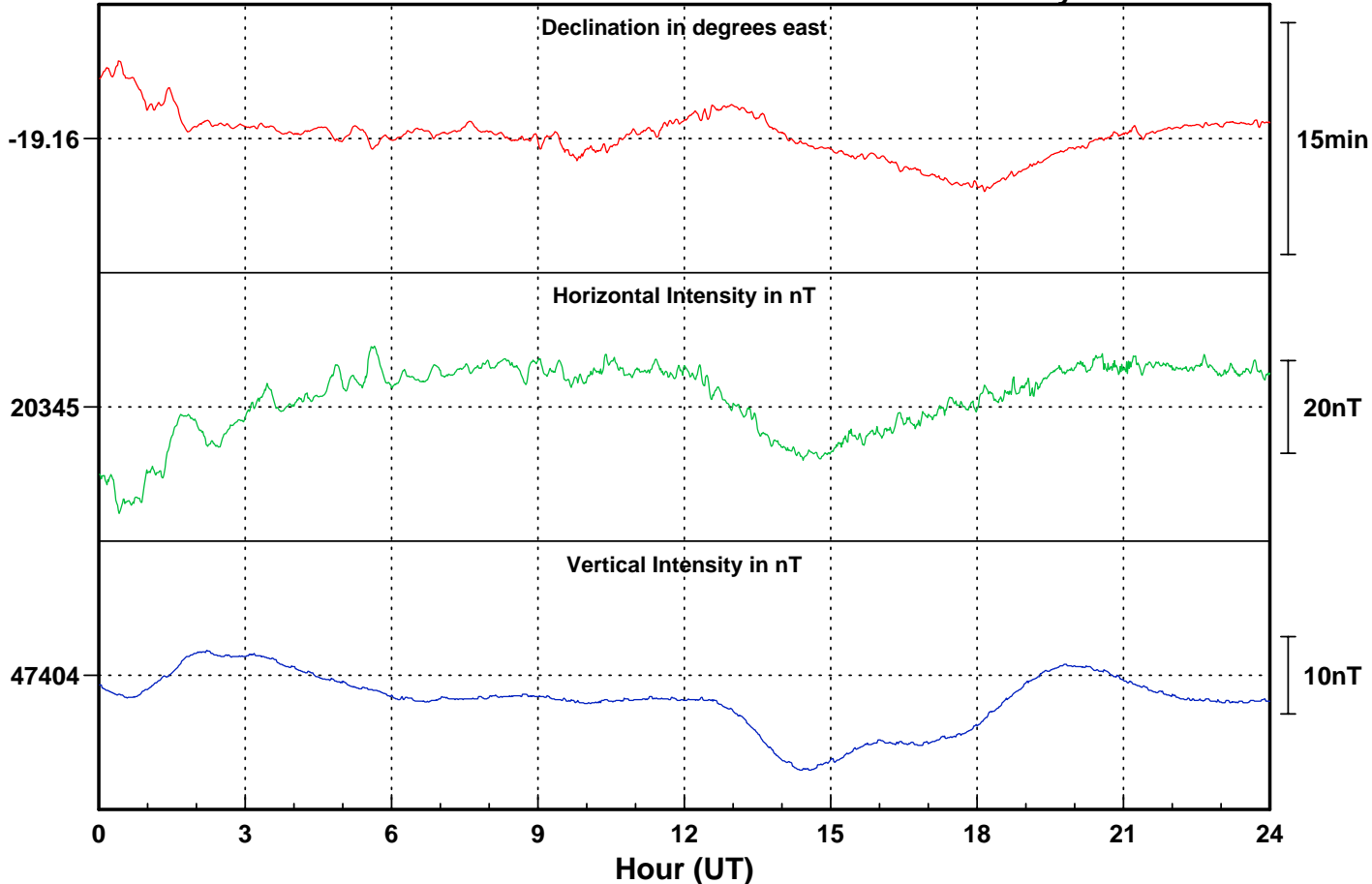
Sable Island

Day number: 355



Date: 22-12-2005

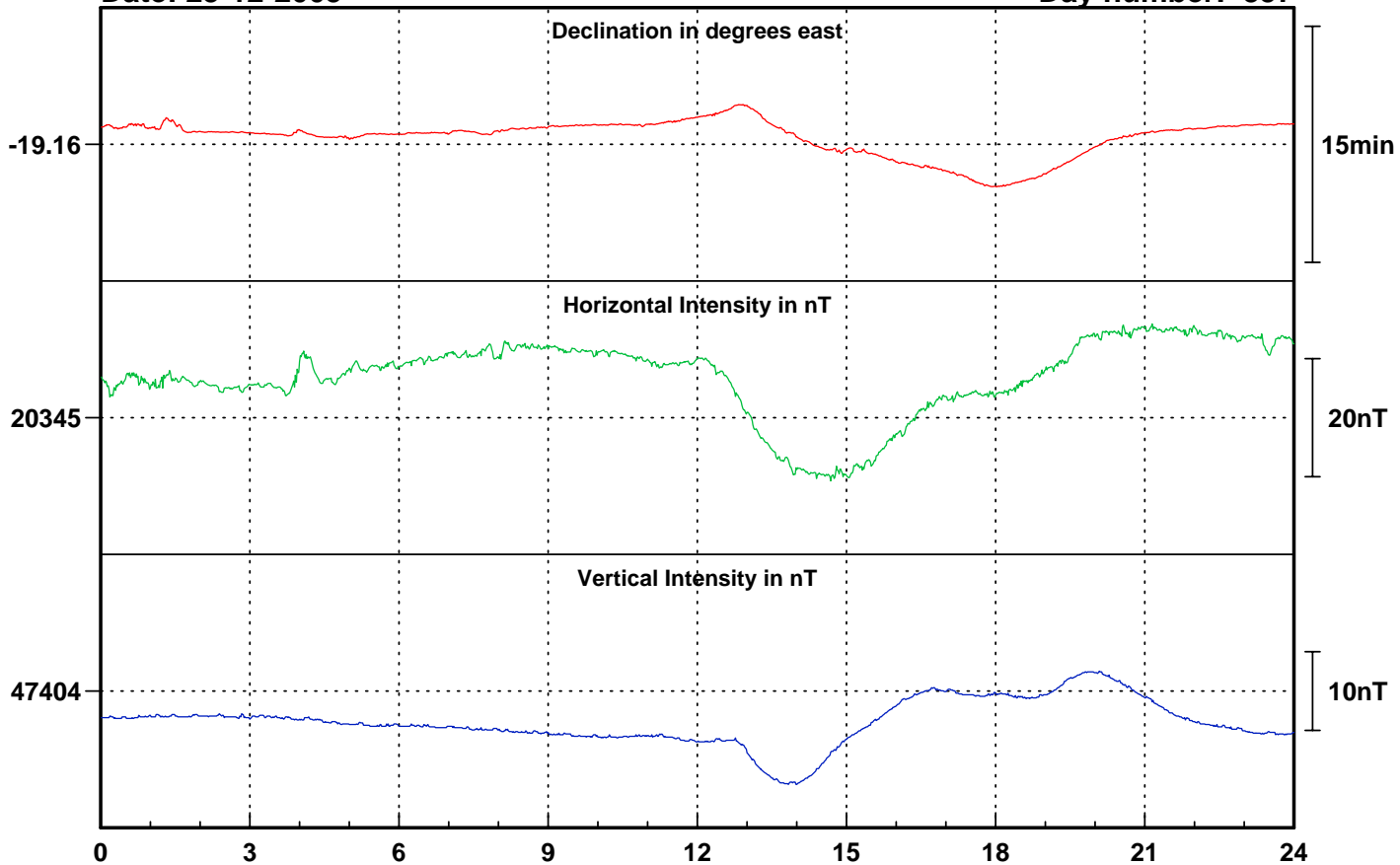
Day number: 356



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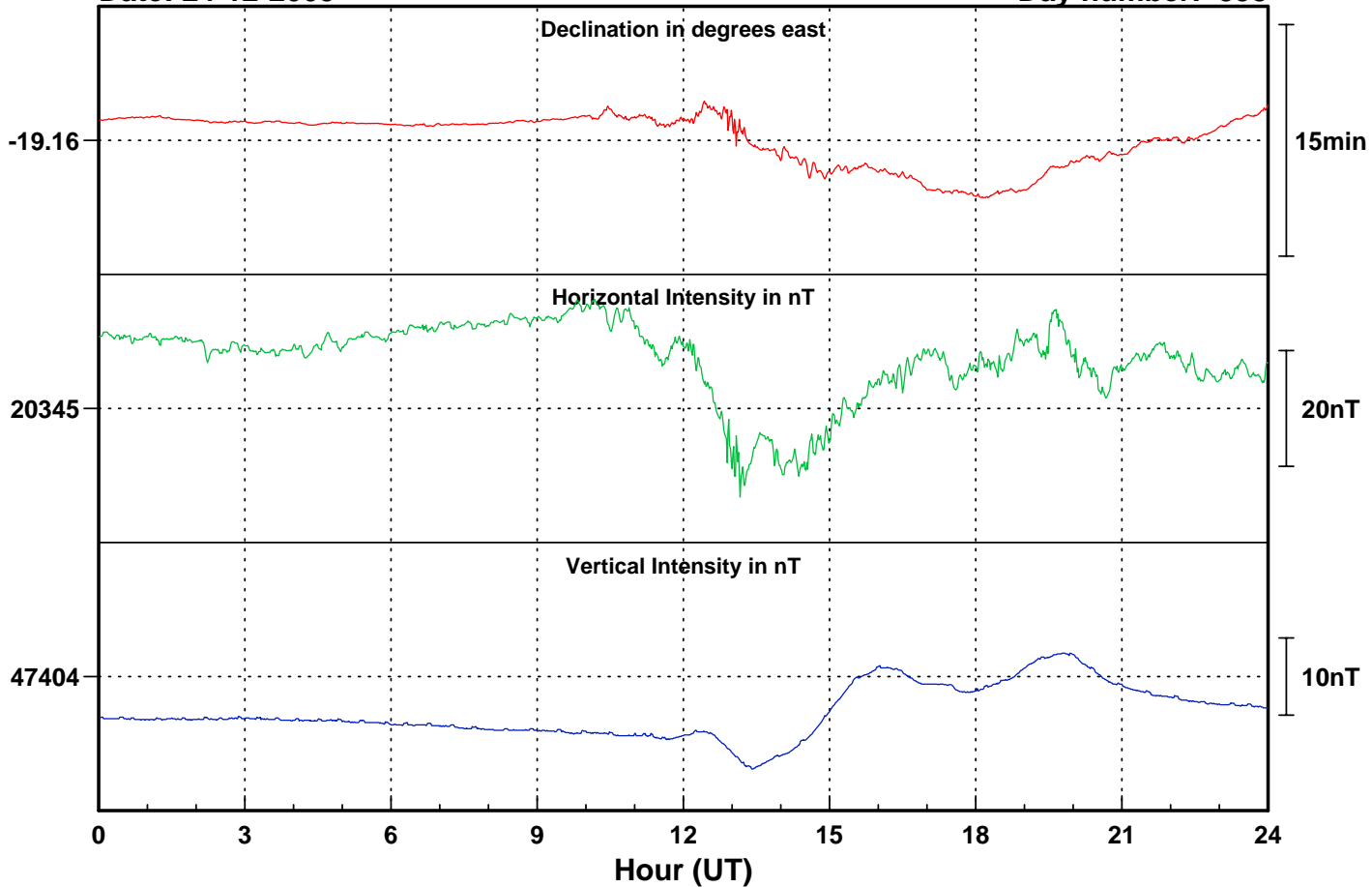
Sable Island

Day number: 357



Date: 24-12-2005

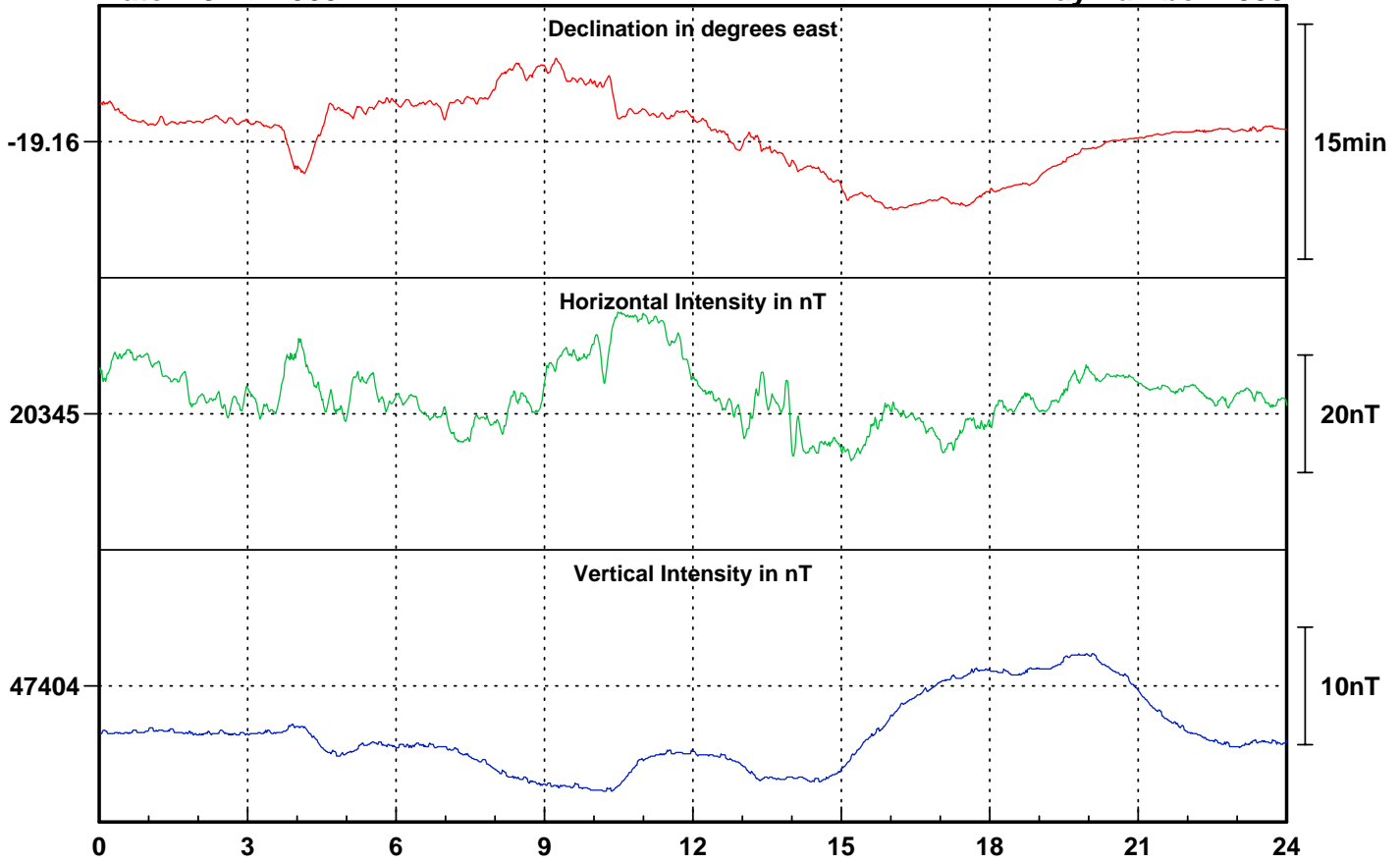
Day number: 358



Date: 25-12-2005

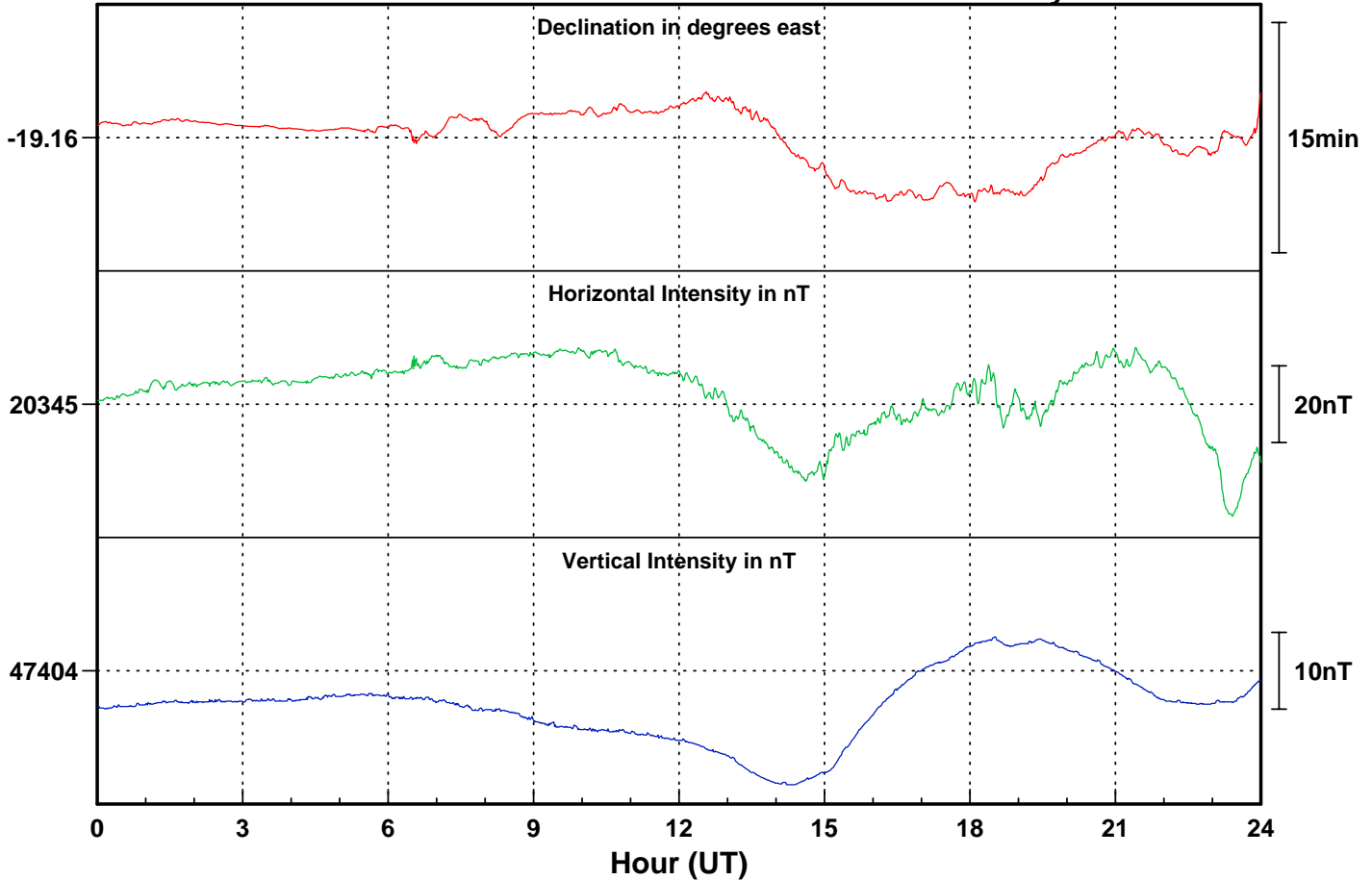
Sable Island

Day number: 359



Date: 26-12-2005

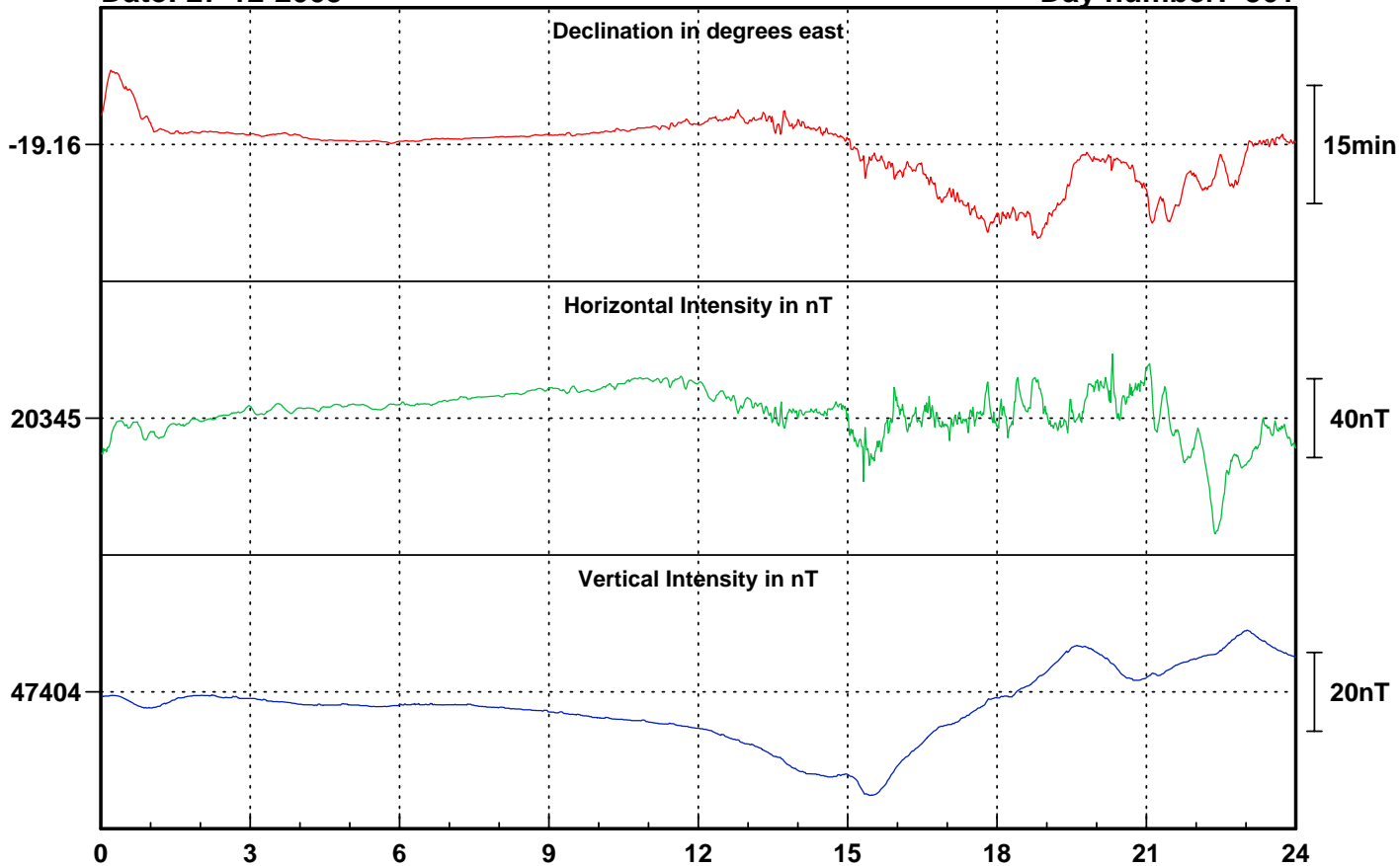
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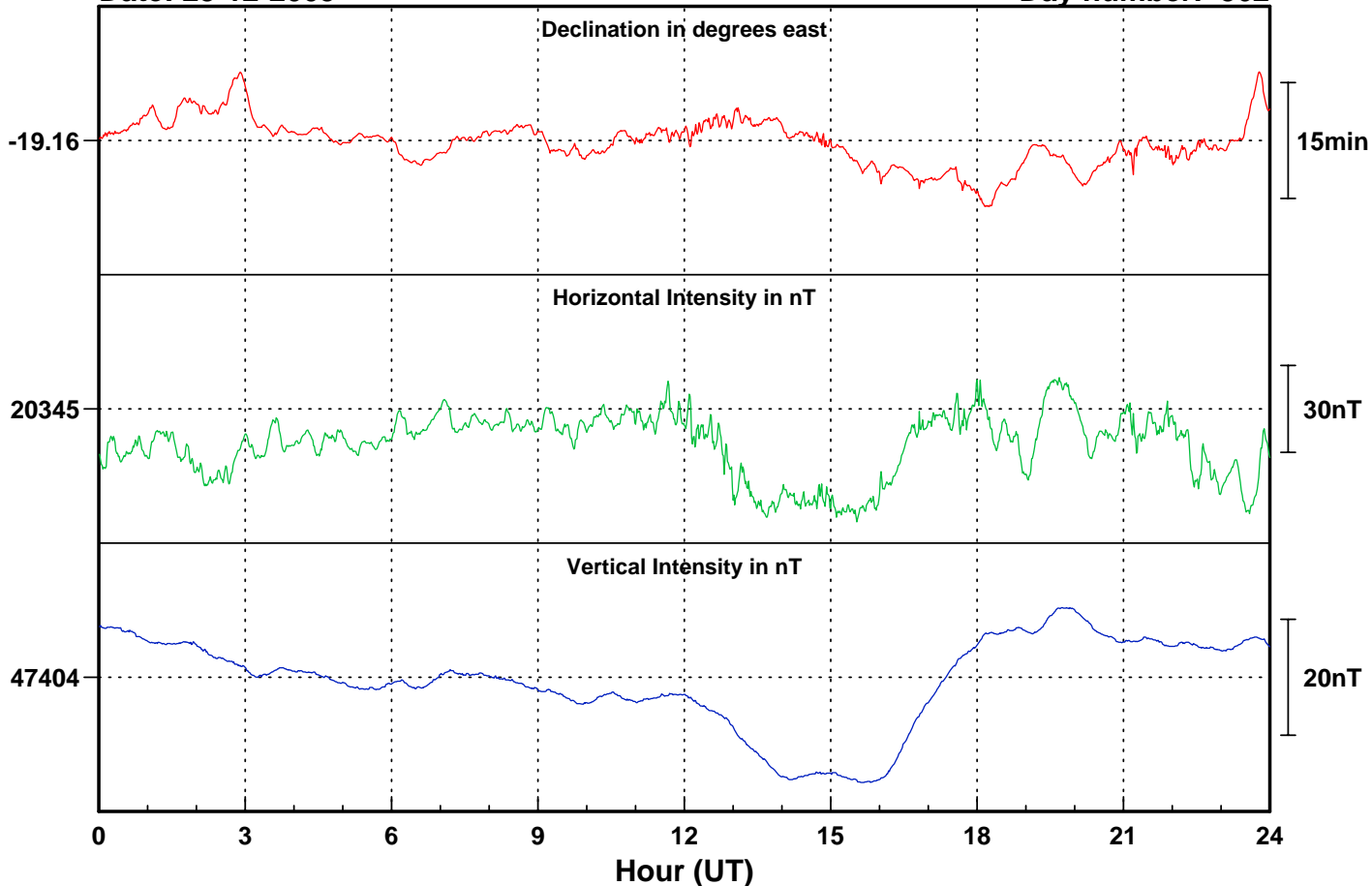
Sable Island

Day number: 361



Date: 28-12-2005

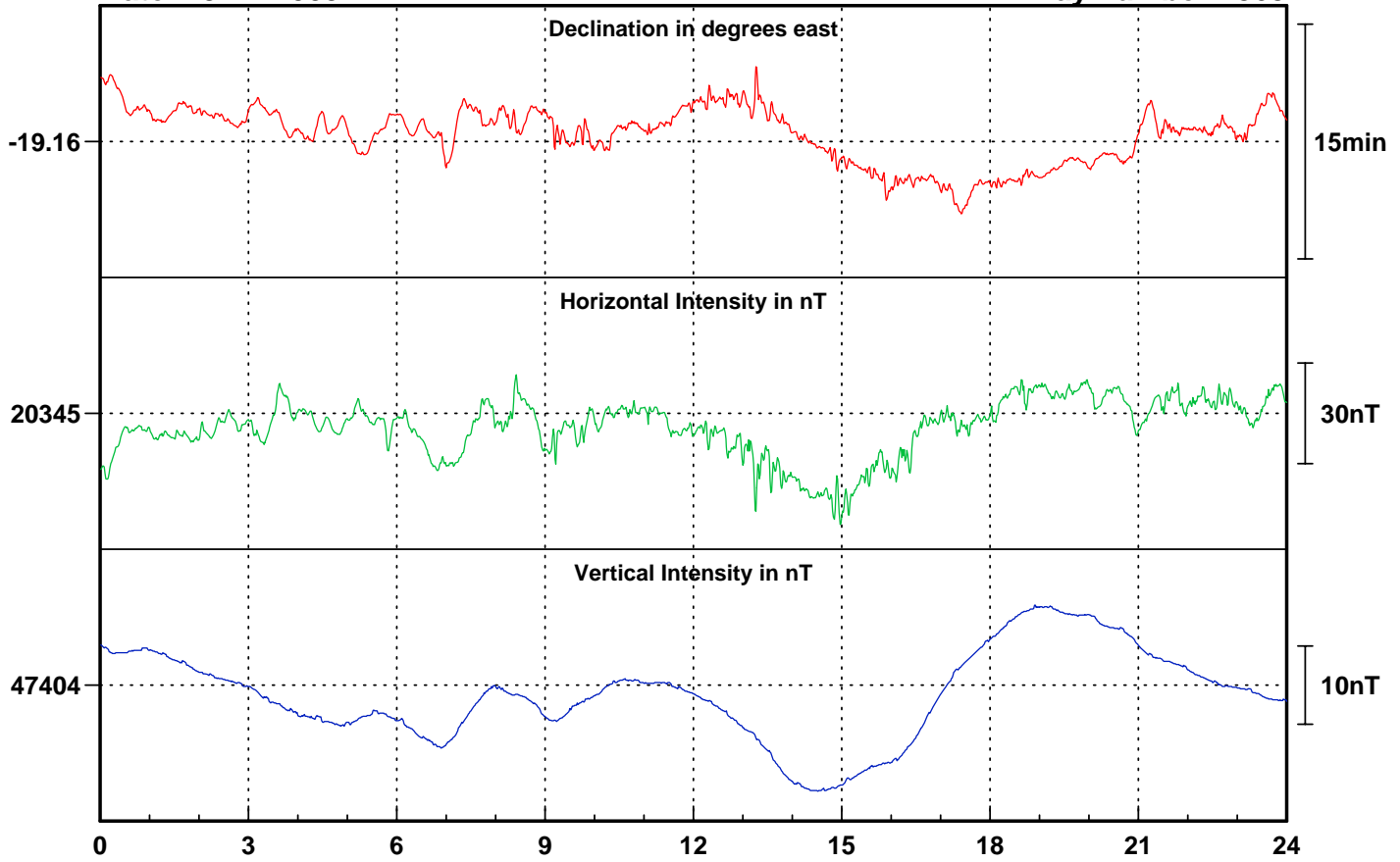
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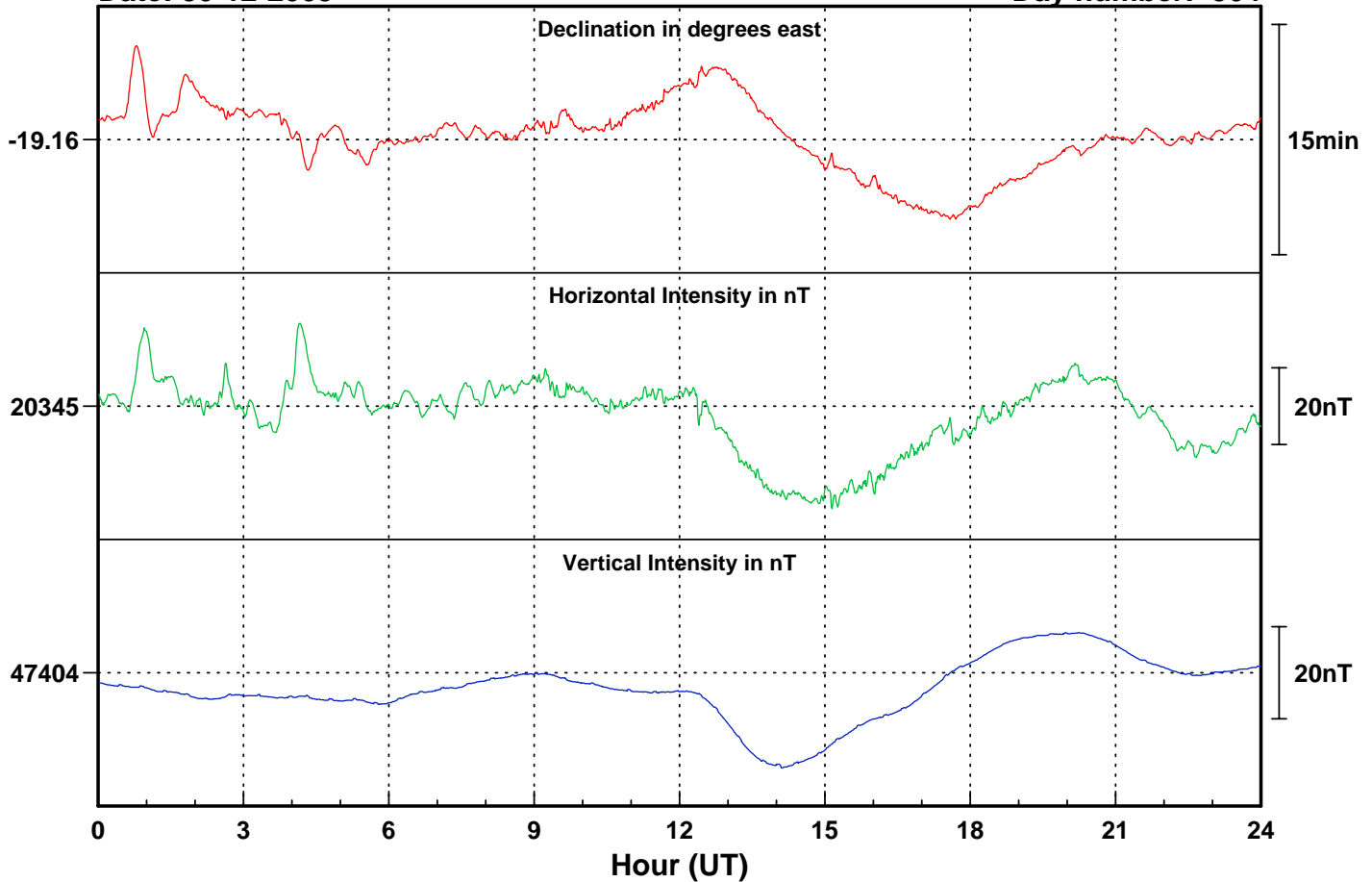
Sable Island

Day number: 363



Date: 30-12-2005

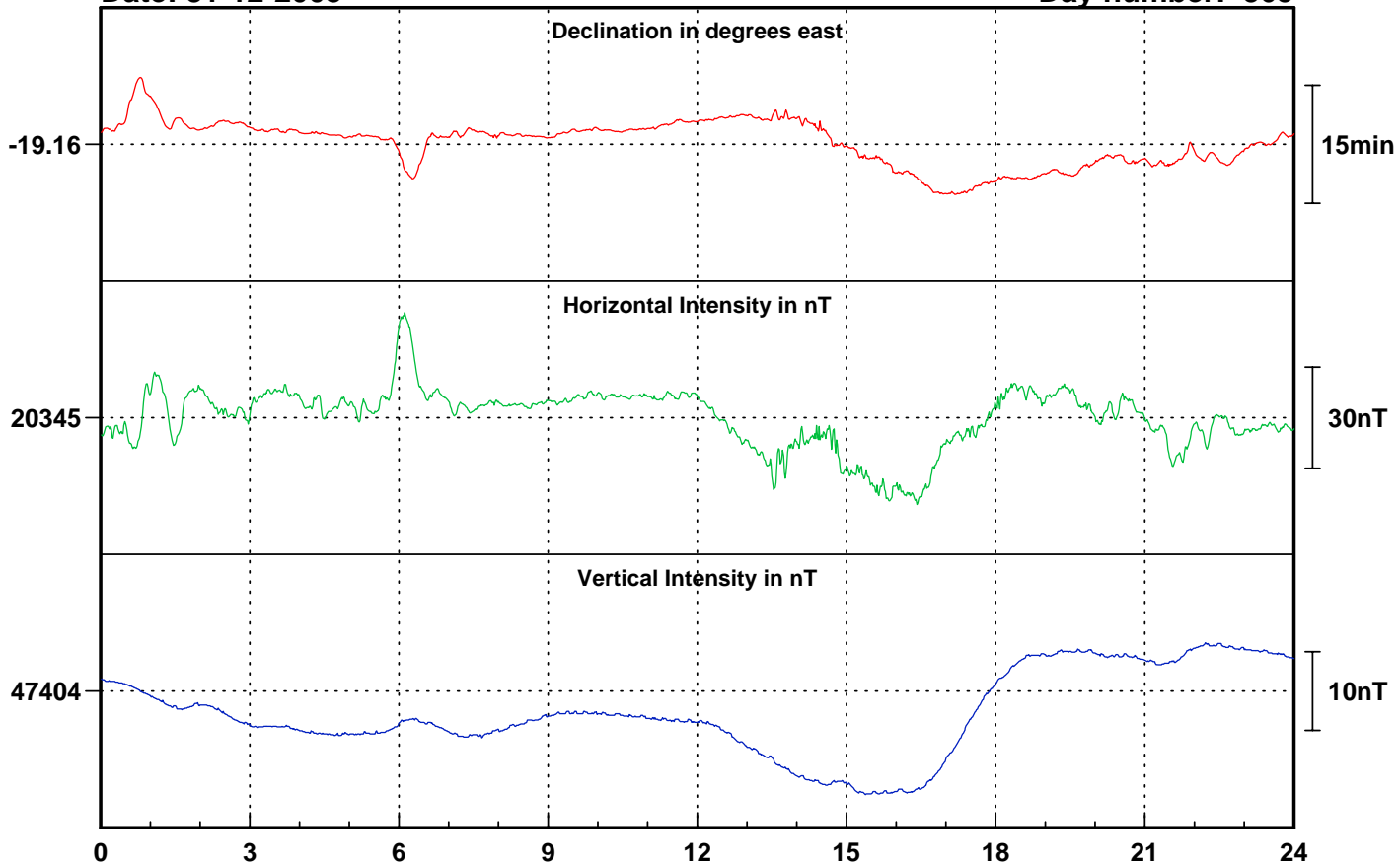
Day number: 364



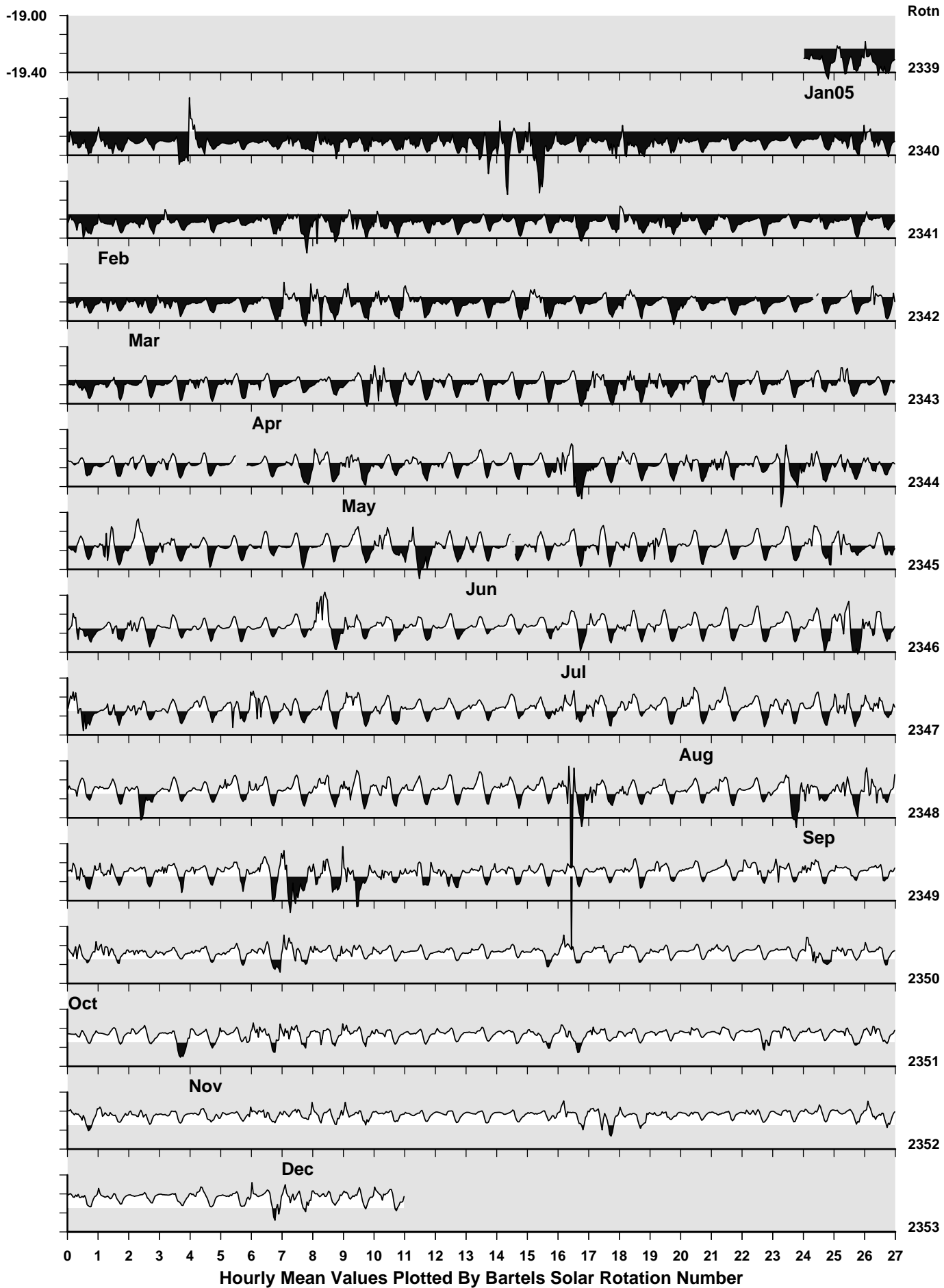
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Sable Island

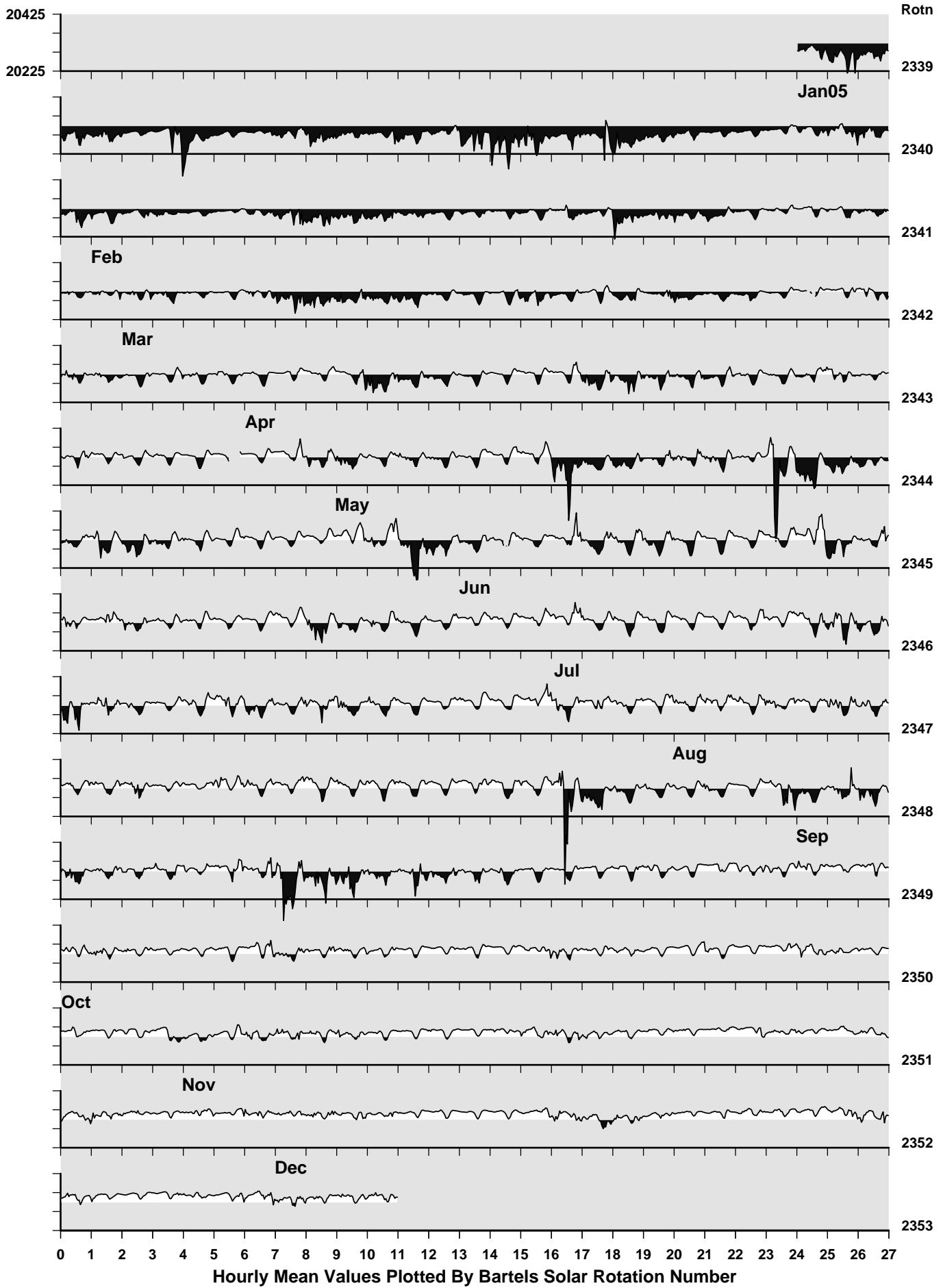
Day number: 365



Sable Island Observatory: Declination (degrees)

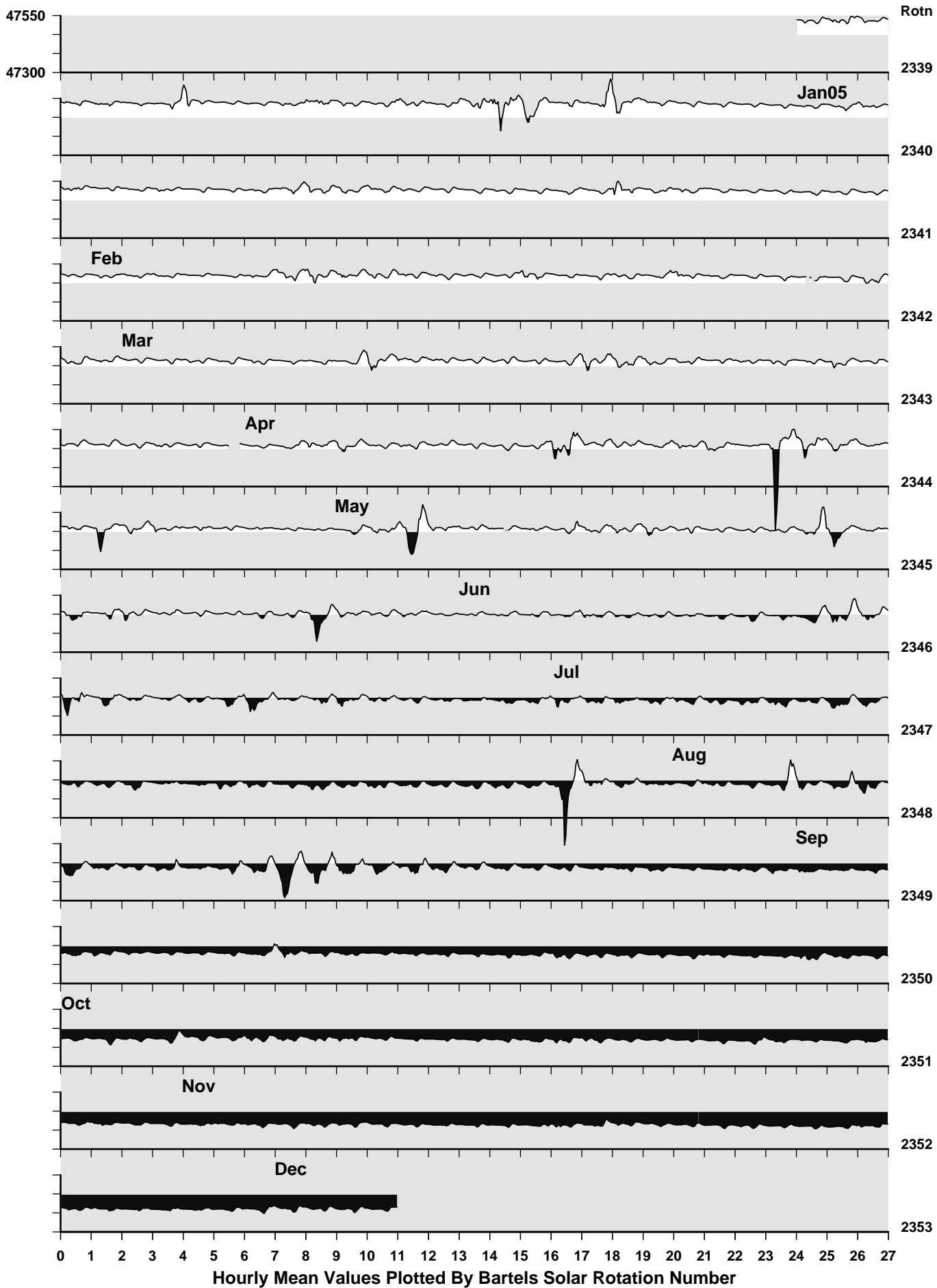


Sable Island Observatory: Horizontal Intensity (nT)



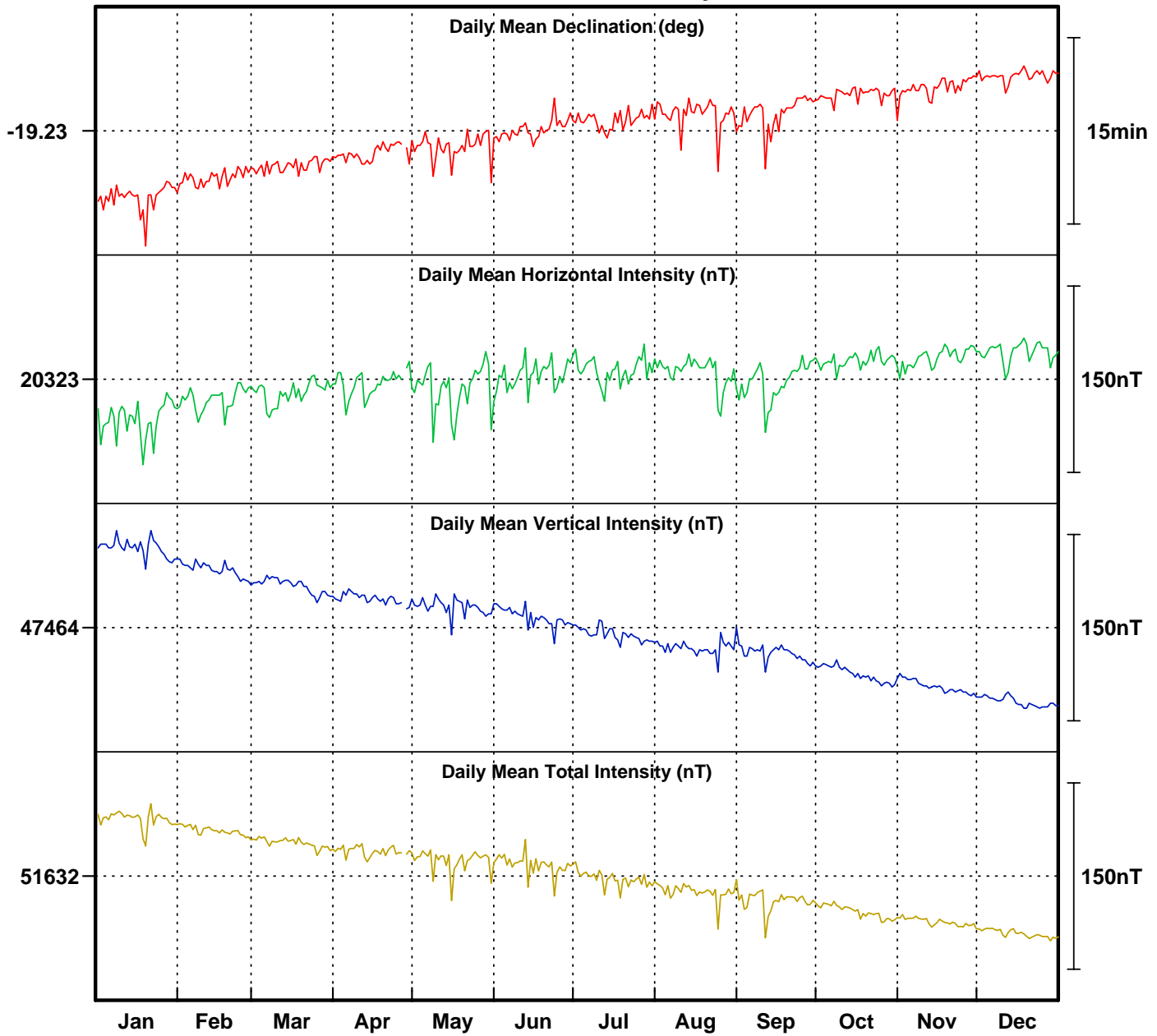
Hourly Mean Values Plotted By Bartels Solar Rotation Number

Sable Island Observatory: Vertical Intensity (nT)



Hourly Mean Values Plotted By Bartels Solar Rotation Number

Sable Island Observatory 2005



Monthly Mean Values for Sable Island Observatory 2005

Month	<i>D</i>	<i>H</i>	<i>I</i>	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>F</i>
January	-19° 19.3′	20290 nT	66° 52.9′	19148 nT	-6713 nT	47528 nT	51678 nT
February	-19° 17.7′	20307 nT	66° 51.4′	19166 nT	-6710 nT	47510 nT	51668 nT
March	-19° 16.7′	20312 nT	66° 50.8′	19173 nT	-6706 nT	47497 nT	51658 nT
April	-19° 15.7′	20319 nT	66° 50.1′	19182 nT	-6703 nT	47487 nT	51652 nT
May	-19° 15.2′	20315 nT	66° 50.2′	19178 nT	-6699 nT	47481 nT	51644 nT
June	-19° 13.8′	20327 nT	66° 49.2′	19193 nT	-6695 nT	47472 nT	51641 nT
July	-19° 13.1′	20330 nT	66° 48.6′	19197 nT	-6692 nT	47458 nT	51629 nT
August	-19° 12.6′	20328 nT	66° 48.5′	19196 nT	-6689 nT	47448 nT	51619 nT
September	-19° 12.5′	20321 nT	66° 48.8′	19190 nT	-6686 nT	47443 nT	51612 nT
October	-19° 11.0′	20337 nT	66° 47.4′	19208 nT	-6683 nT	47426 nT	51603 nT
November	-19° 10.4′	20340 nT	66° 46.9′	19212 nT	-6680 nT	47416 nT	51595 nT
December	-19° 9.5′	20345 nT	66° 46.3′	19218 nT	-6677 nT	47404 nT	51585 nT

Note

i. The values shown here are provisional.