BRITISH GEOLOGICAL SURVEY

Ascension Island Observatory *Monthly Magnetic Bulletin*

November 2010

10/11/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 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.

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Internet: 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. The observatory co-ordinates are:

Geographic:	*7.949 °S*	*345.624 °E*
Geomagnetic:	*2.589 °S*	*57.106 °E*
Height above mean sea level:	*177 m*	

The geomagnetic co-ordinates are approximations, calculated using the 11th generation International Geomagnetic Reference Field (IGRF) at epoch 2010.5. On-line access to models (including IGRF), charts and navigational data are available at www.geomag.bgs.ac.uk/navigation.html

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 in the Geomagnetism Information and Forecast Service (GIFS), available on-line at www.geomag.bgs.ac.uk/on_line_gifs.html

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. 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 Ascension Island 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/staff.html.

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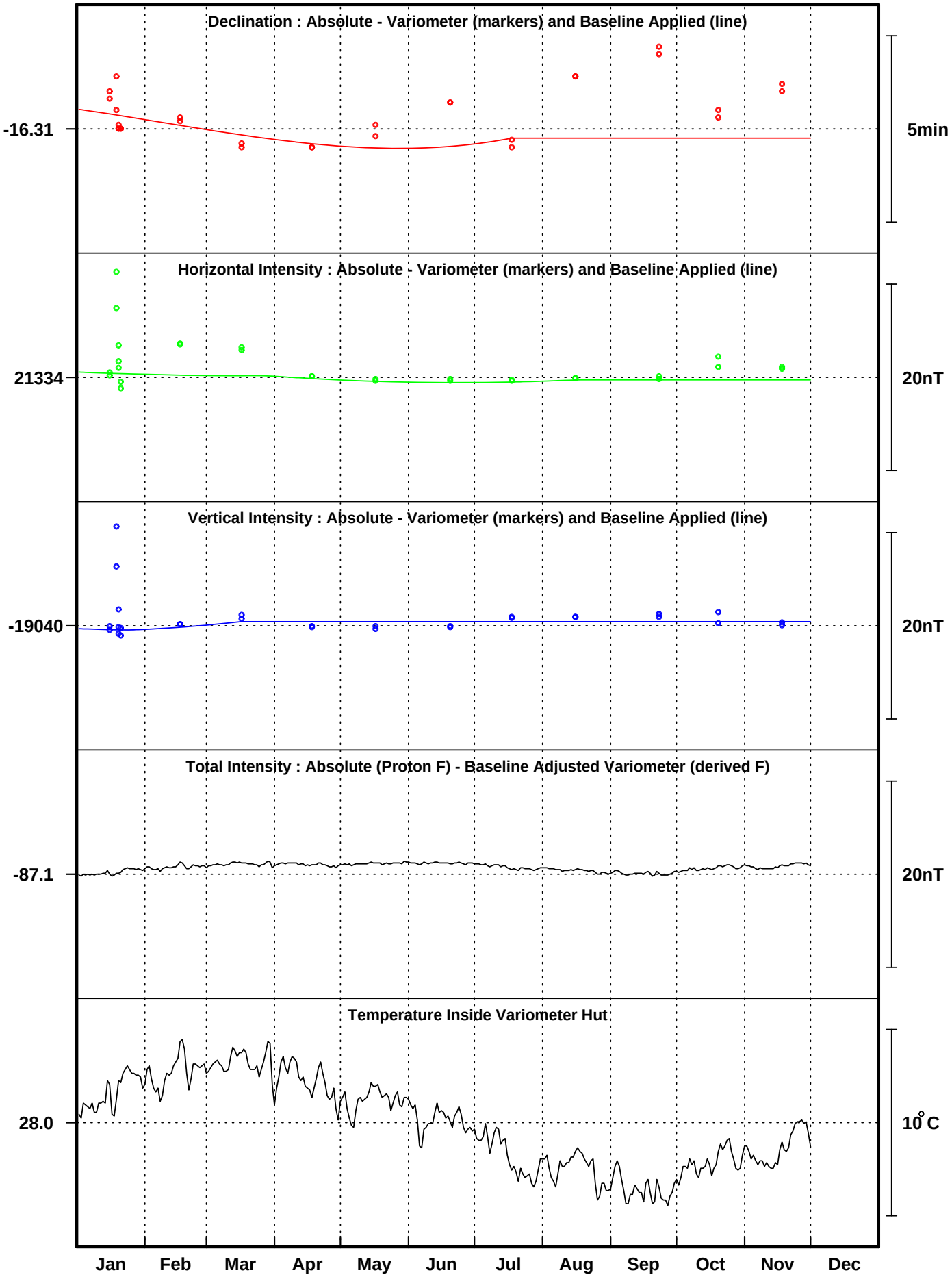
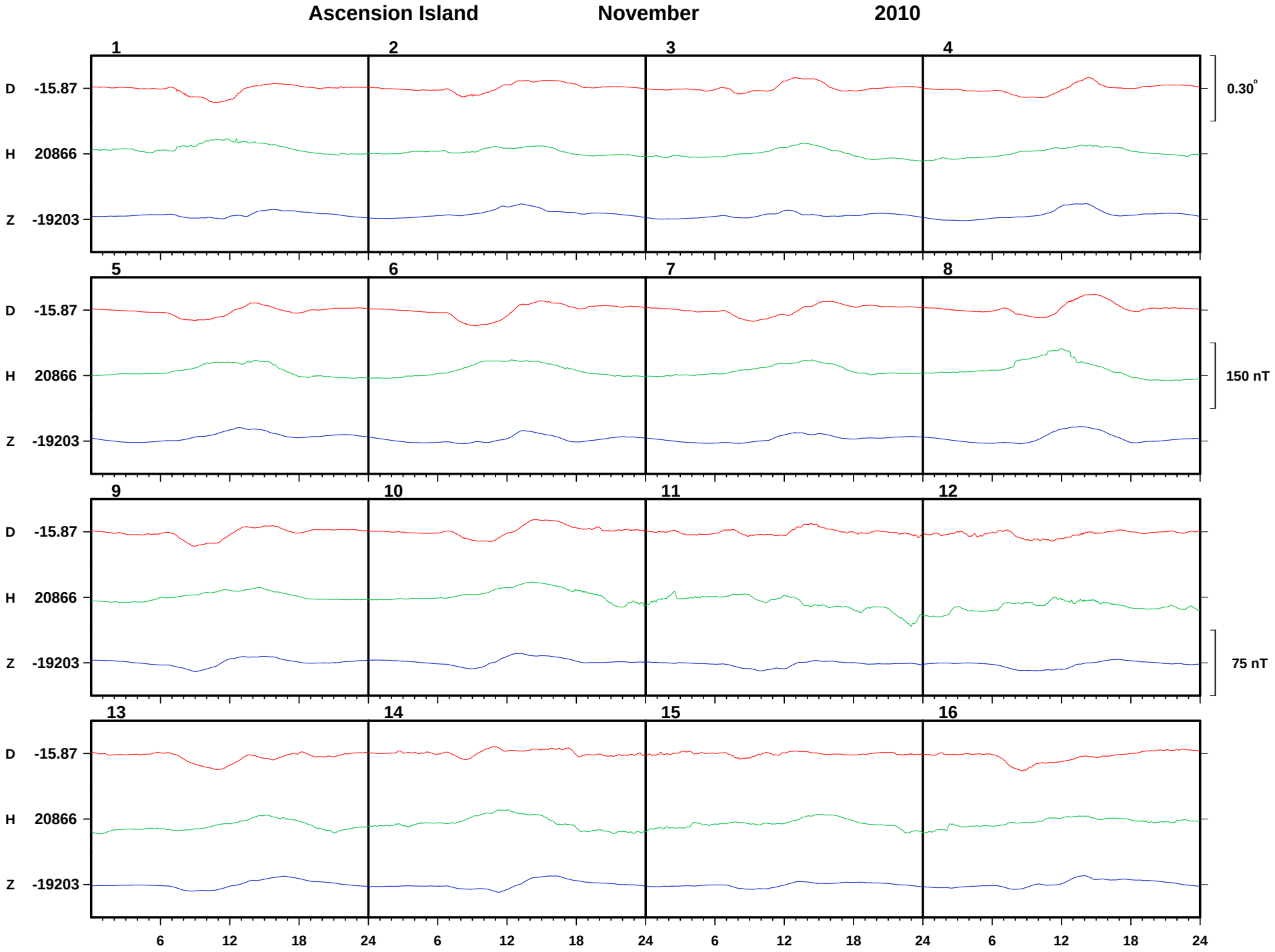
Ascension Island 2010




Ascension Island
November
2010
1
2
3
4
D -15.87
H 20866
Z -19203
0.30°
5
6
7
8
D -15.87
H 20866
Z -19203
150 nT
9
10
11
12
D -15.87
H 20866
Z -19203
75 nT
13
14
15
16
D -15.87
H 20866
Z -19203
6
12
18
24
6
12
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6
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24
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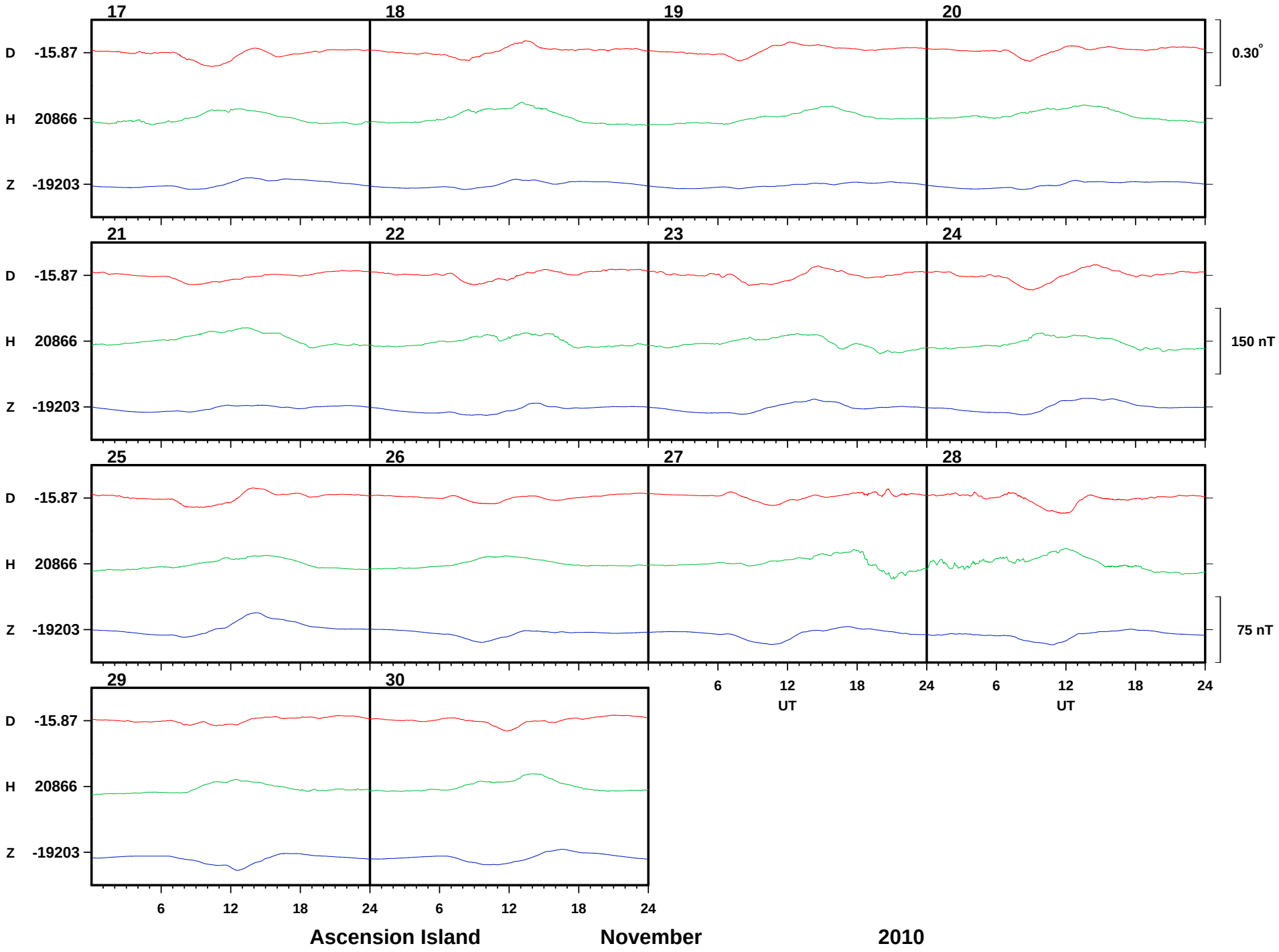
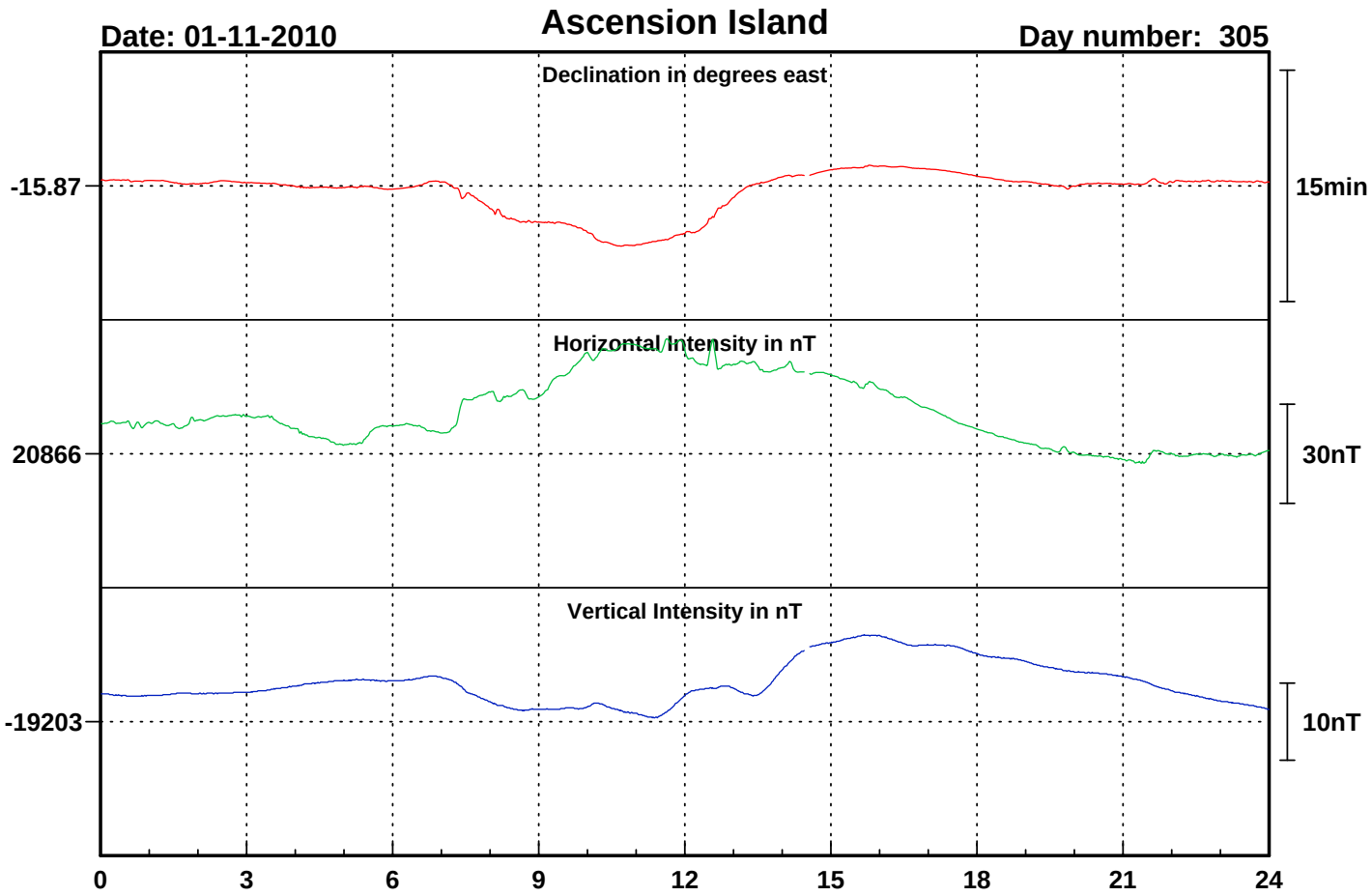
18
24


17
18
19
20
D -15.87
H 20866
Z -19203
0.30°
21
22
23
24
150 nT
25
26
27
28
75 nT
29
30
6
12
18
24
UT
Ascension Island
November
2010

ASCENSION ISLAND OBSERVATORY

ABSOLUTE OBSERVATIONS

		Declination			Inclination		Total Field		Horizontal Intensity		Vertical Intensity		
Date	**Day Number**	**Time (UT)**	**Absolute (º)**	**Baseline (º)**	**Time (UT)**	**Absolute (º)**	**Site difference (nT)**	**Absolute corrected (nT)**	**Absolute (nT)**	**Baseline (nT)**	**Absolute (nT)**	**Baseline (nT)**	**Observer**
17-Nov-10	321	16:55	-15.8651	-16.2883	17:07	-42.6099	87.1	28356.3	20869.7	21334.5	-19197.3	-19039.7	GA
17-Nov-10	321	17:16	-15.8573	-16.2850	17:26	-42.6123	87.1	28355.1	20868.0	21334.7	-19197.4	-19039.4	GA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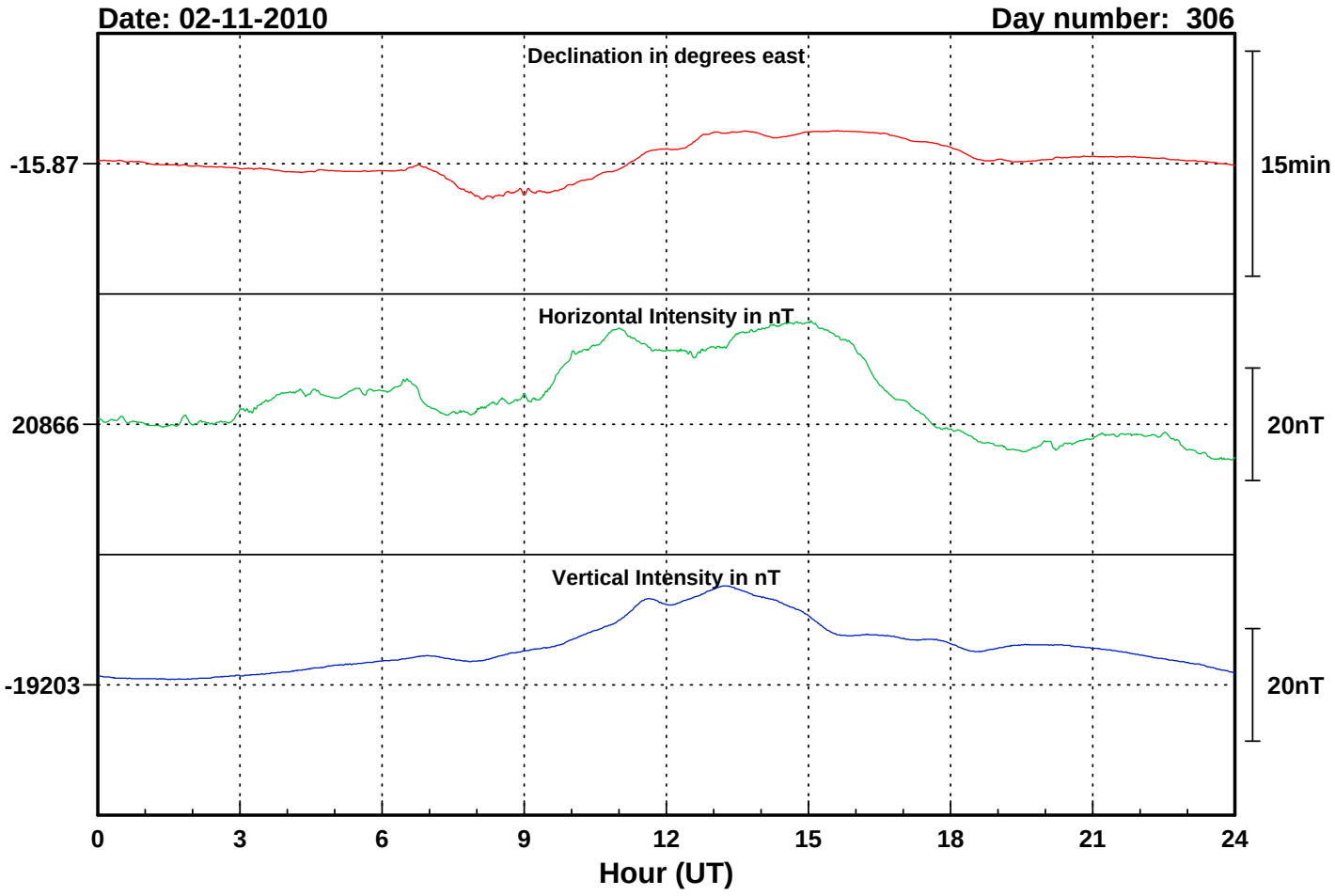
Date: 01-11-2010
Day number: 305
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
-19203
10nT
0
3
6
9
12
15
18
21
24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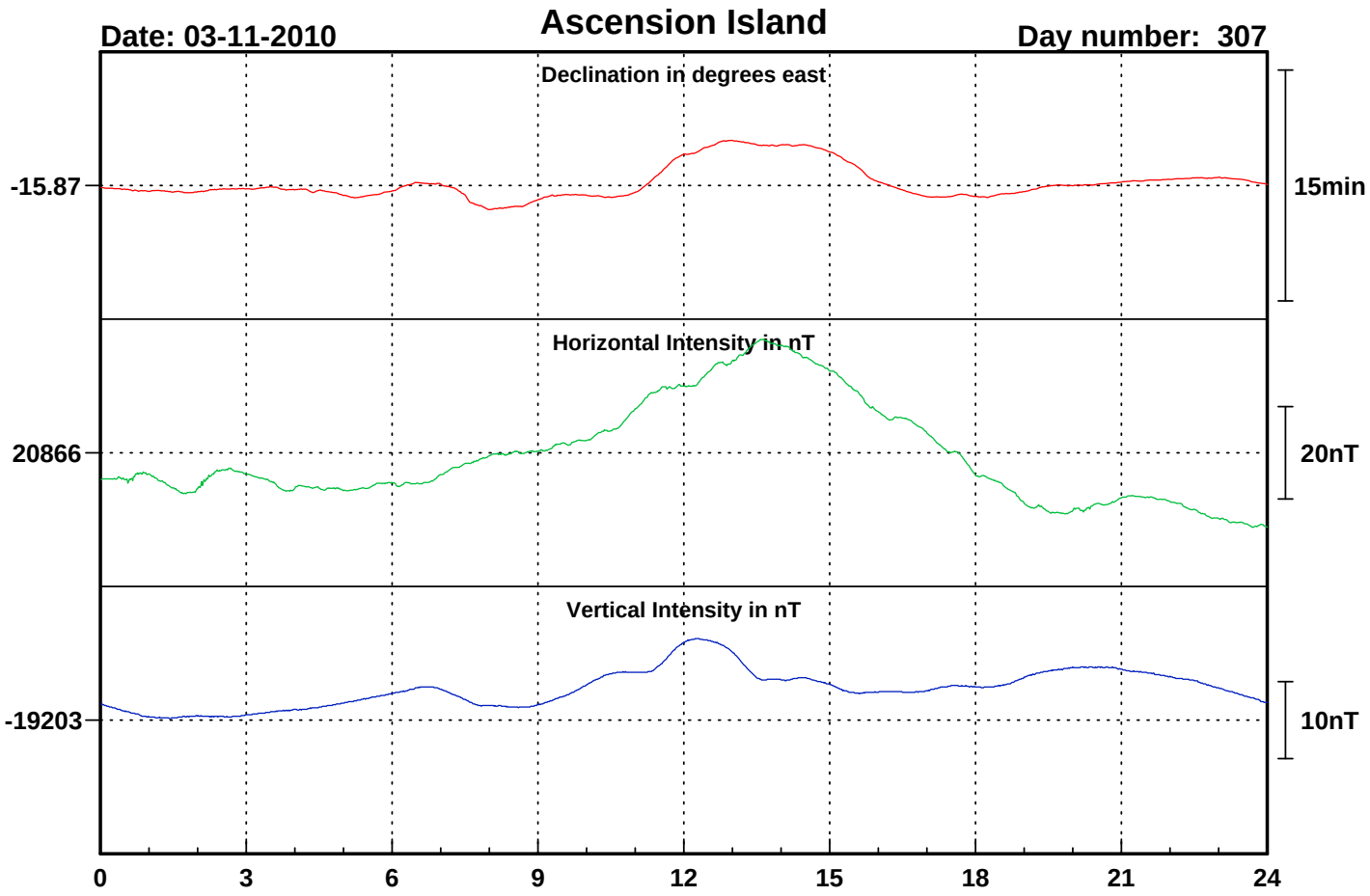
Day number: 306
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
20nT
0
3
6
9
12
15
18
21
24
Hour (UT)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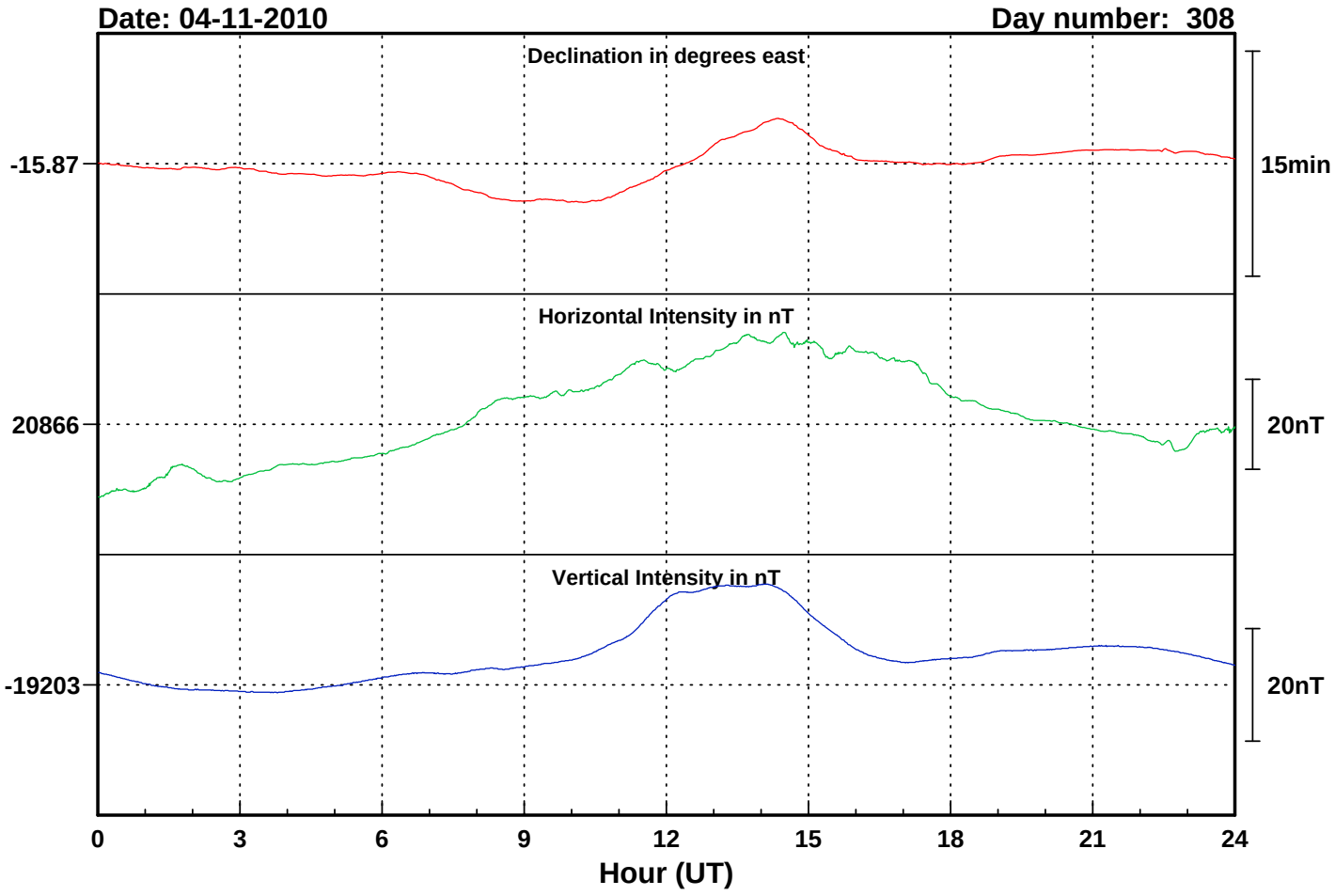
Day number: 307
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
10nT
0
3
6
9
12
15
18
21
24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Day number: 308
Declination in degrees east
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15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
20nT
0
3
6
9
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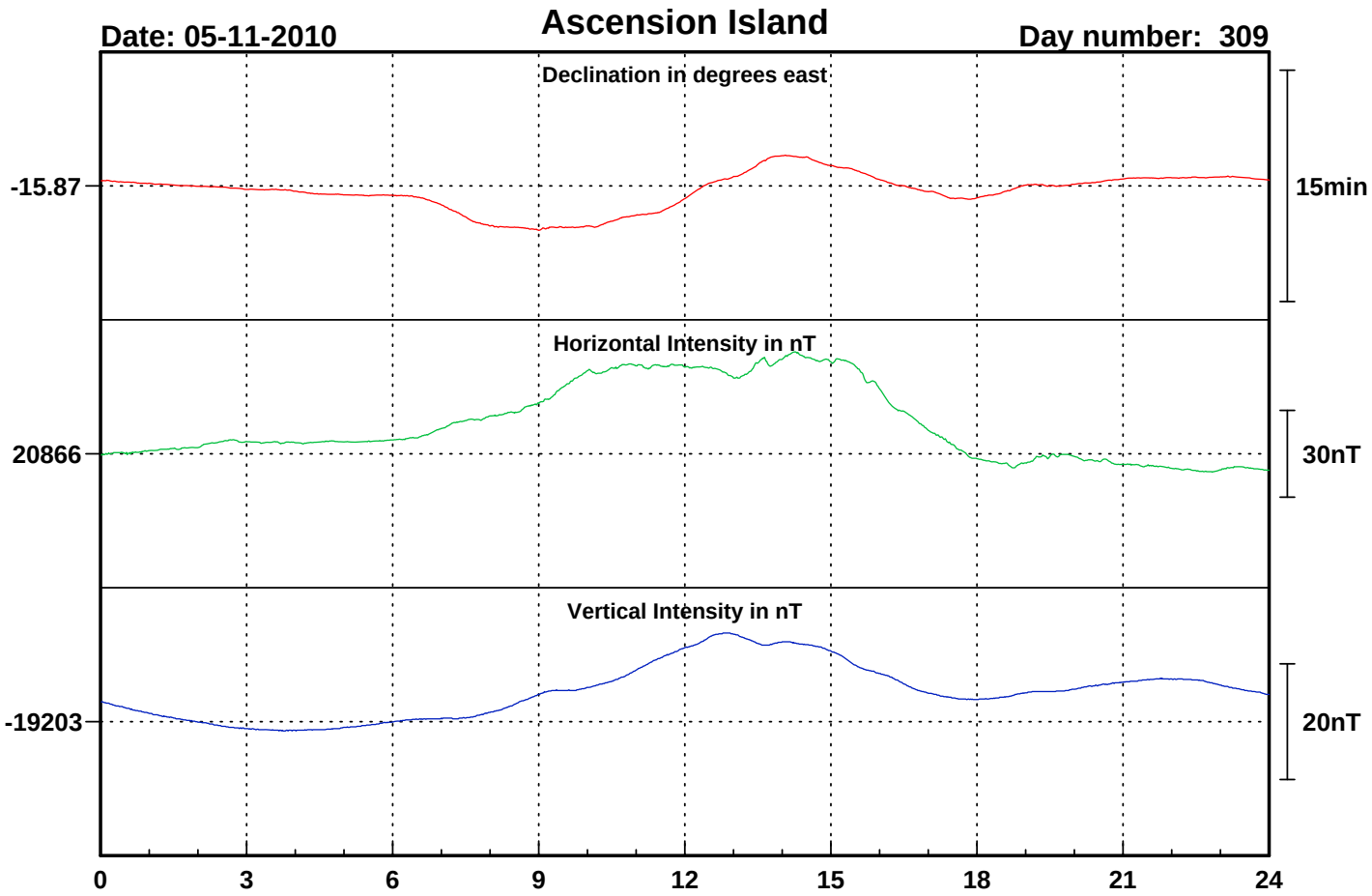
18
21
24
Hour (UT)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Date: 05-11-2010
Day number: 309
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
-19203
20nT
0
3
6
9
12
15
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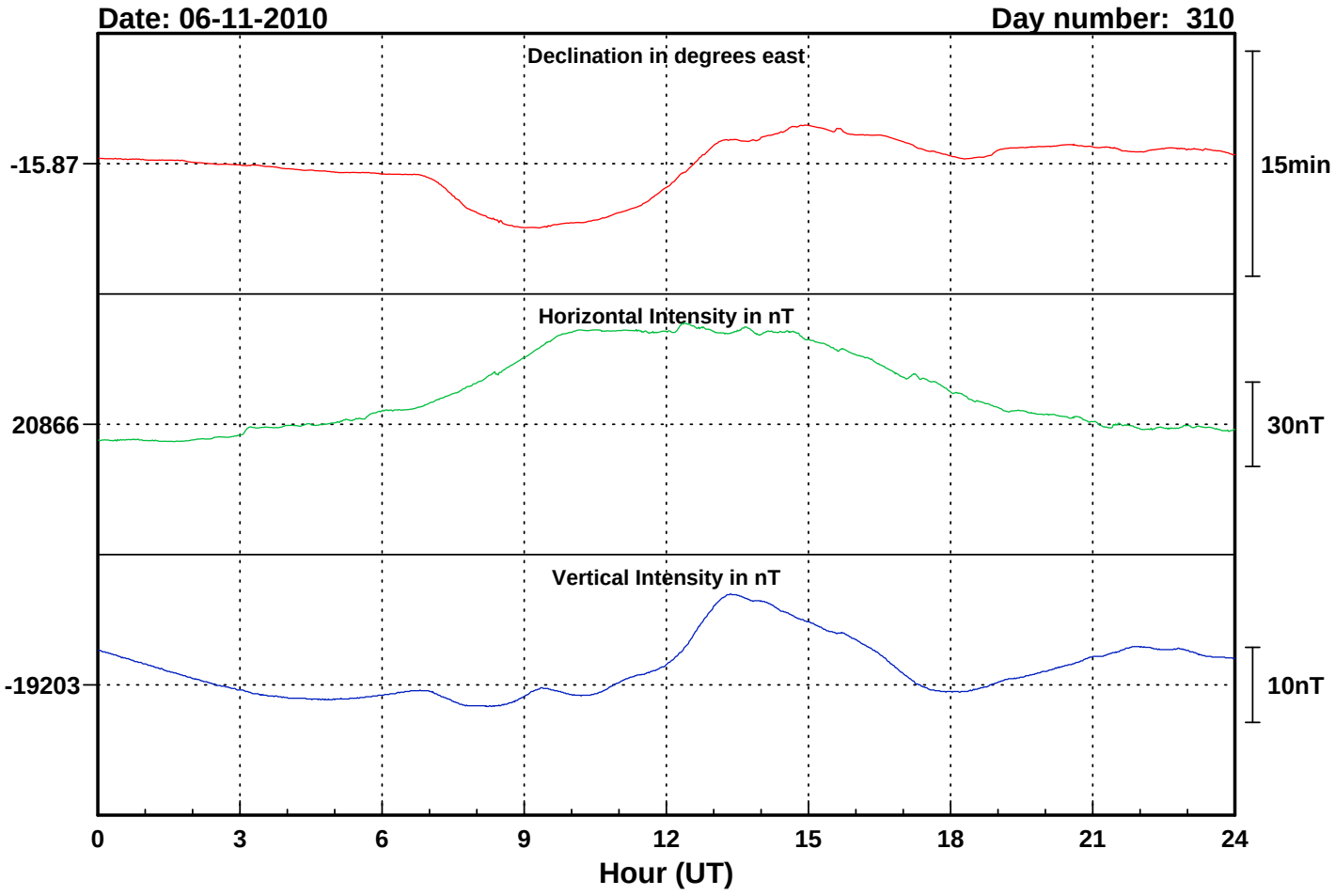
21
24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Day number: 310
Declination in degrees east
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15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
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3
6
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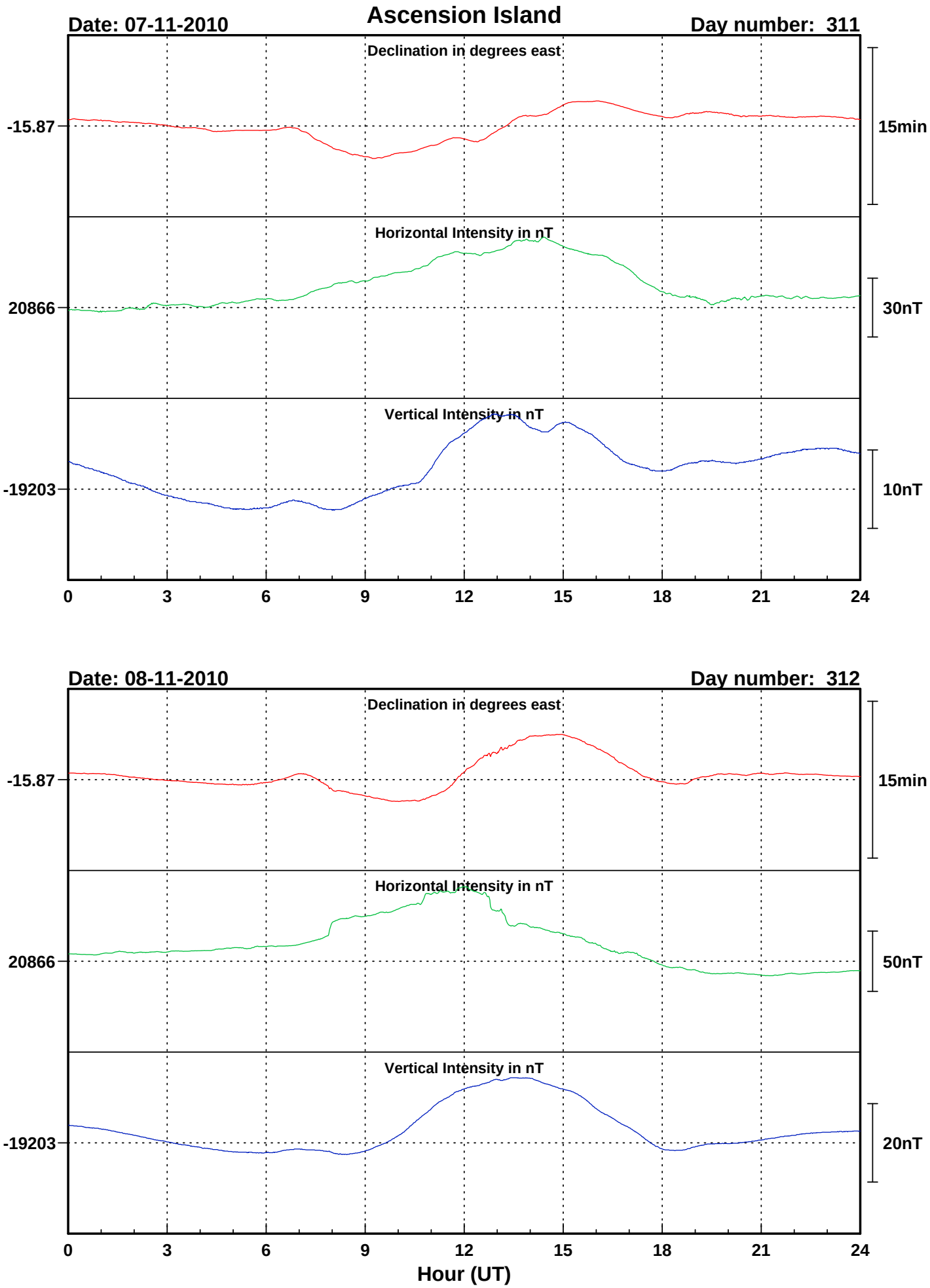
15
18
21
24
Hour (UT)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Date: 07-11-2010
Day number: 311
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
-19203
10nT
0
3
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9
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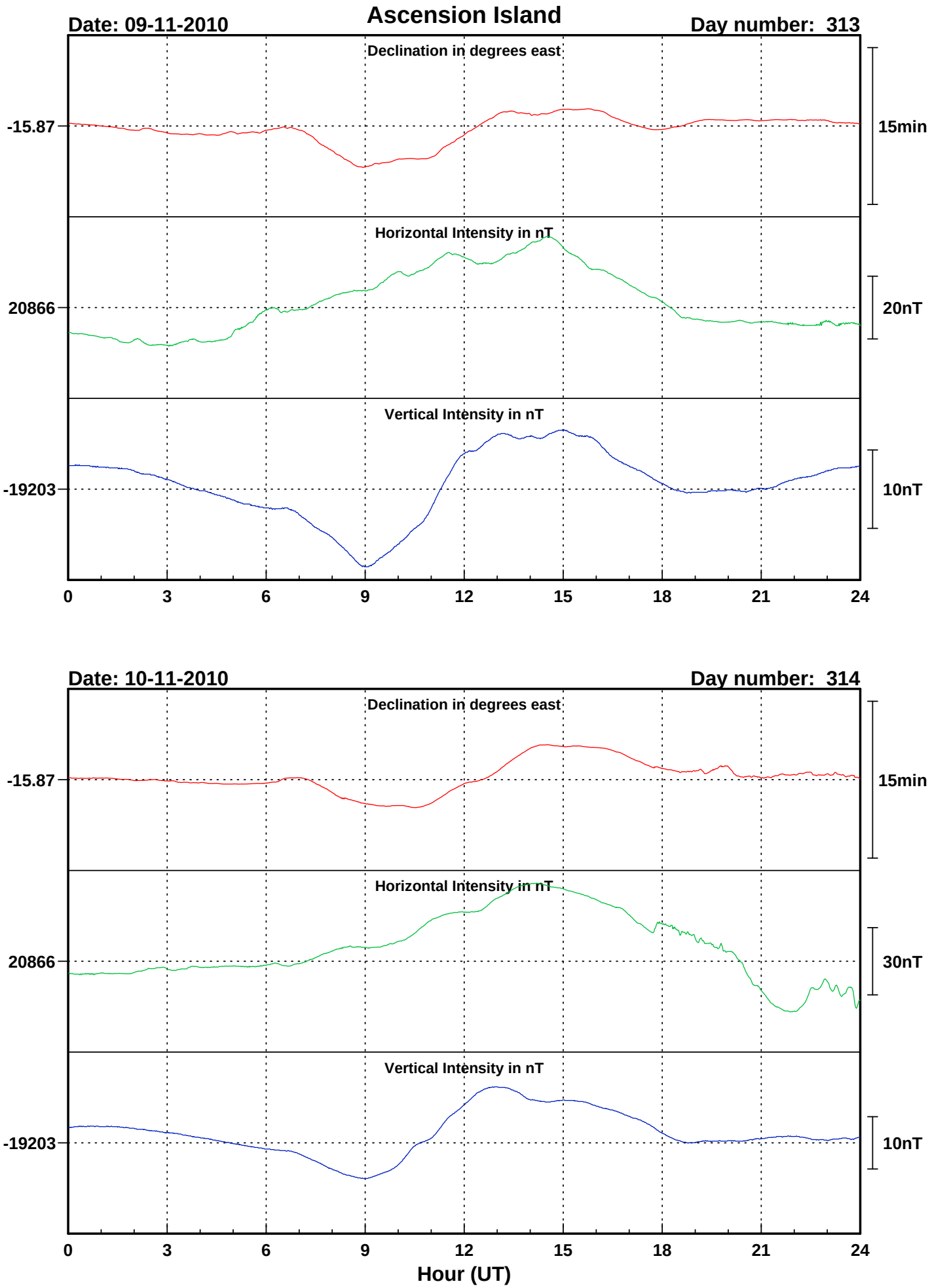
15
18
21
24
Date: 08-11-2010
Day number: 312
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
50nT
Vertical Intensity in nT
-19203
20nT
0
3
6
9
12
15
18
21
24
Hour (UT)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Day number: 313
Declination in degrees east
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15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
10nT
0
3
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24
Date: 10-11-2010
Day number: 314
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
-19203
10nT
0
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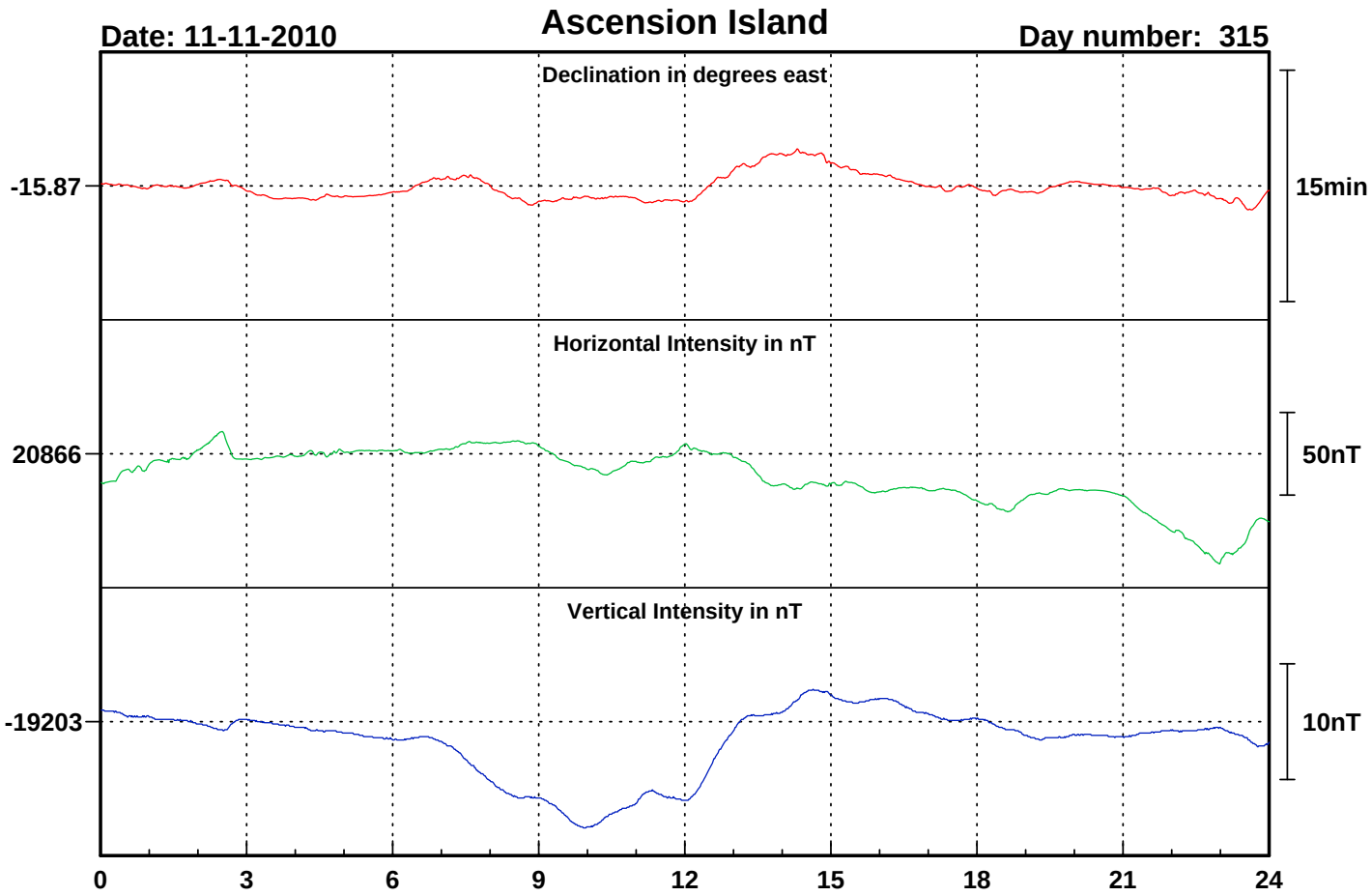
Hour (UT)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Date: 11-11-2010
Day number: 315
Declination in degrees east
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15min
Horizontal Intensity in nT
20866
50nT
Vertical Intensity in nT
-19203
10nT
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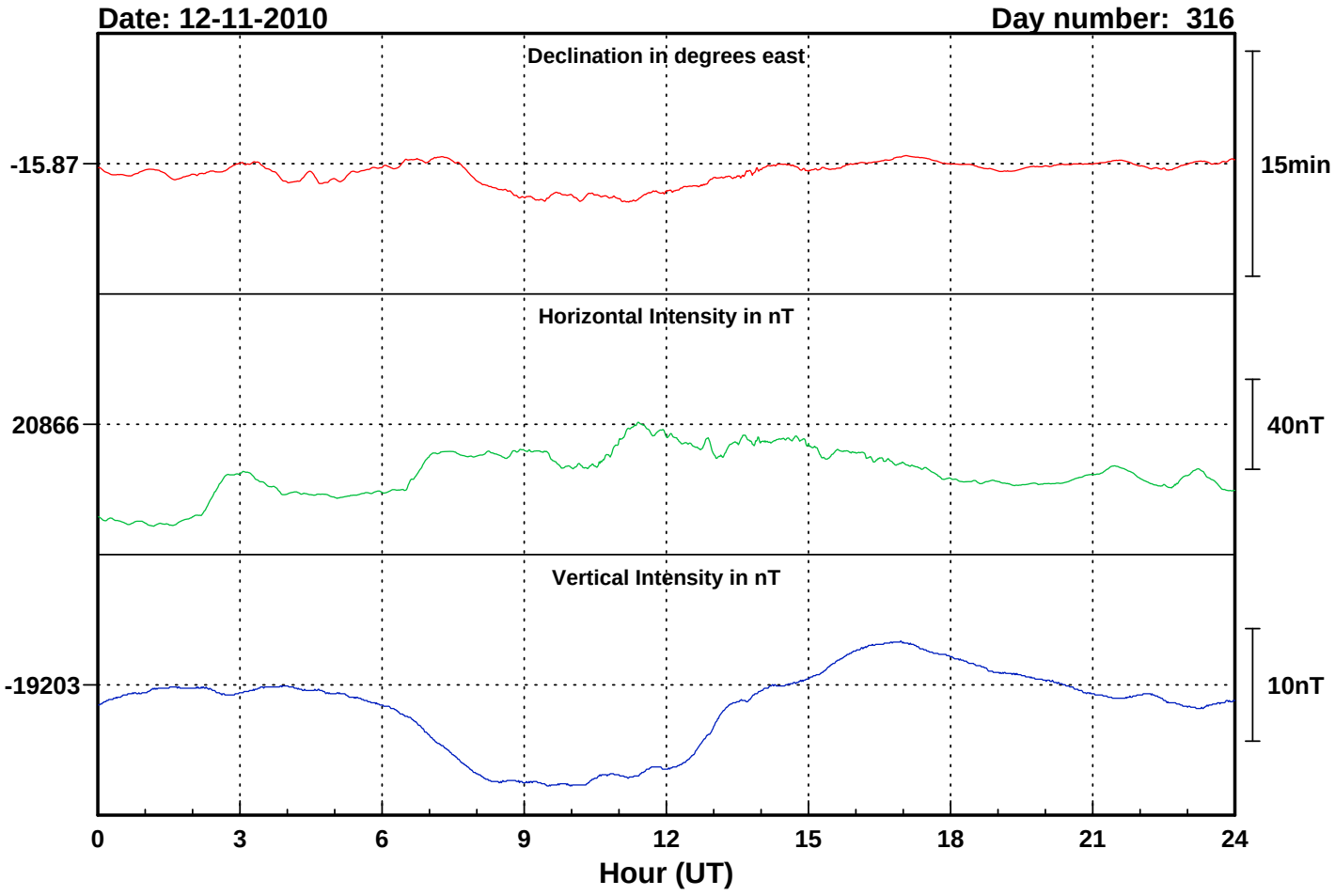
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Day number: 316
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15min
Horizontal Intensity in nT
20866
40nT
Vertical Intensity in nT
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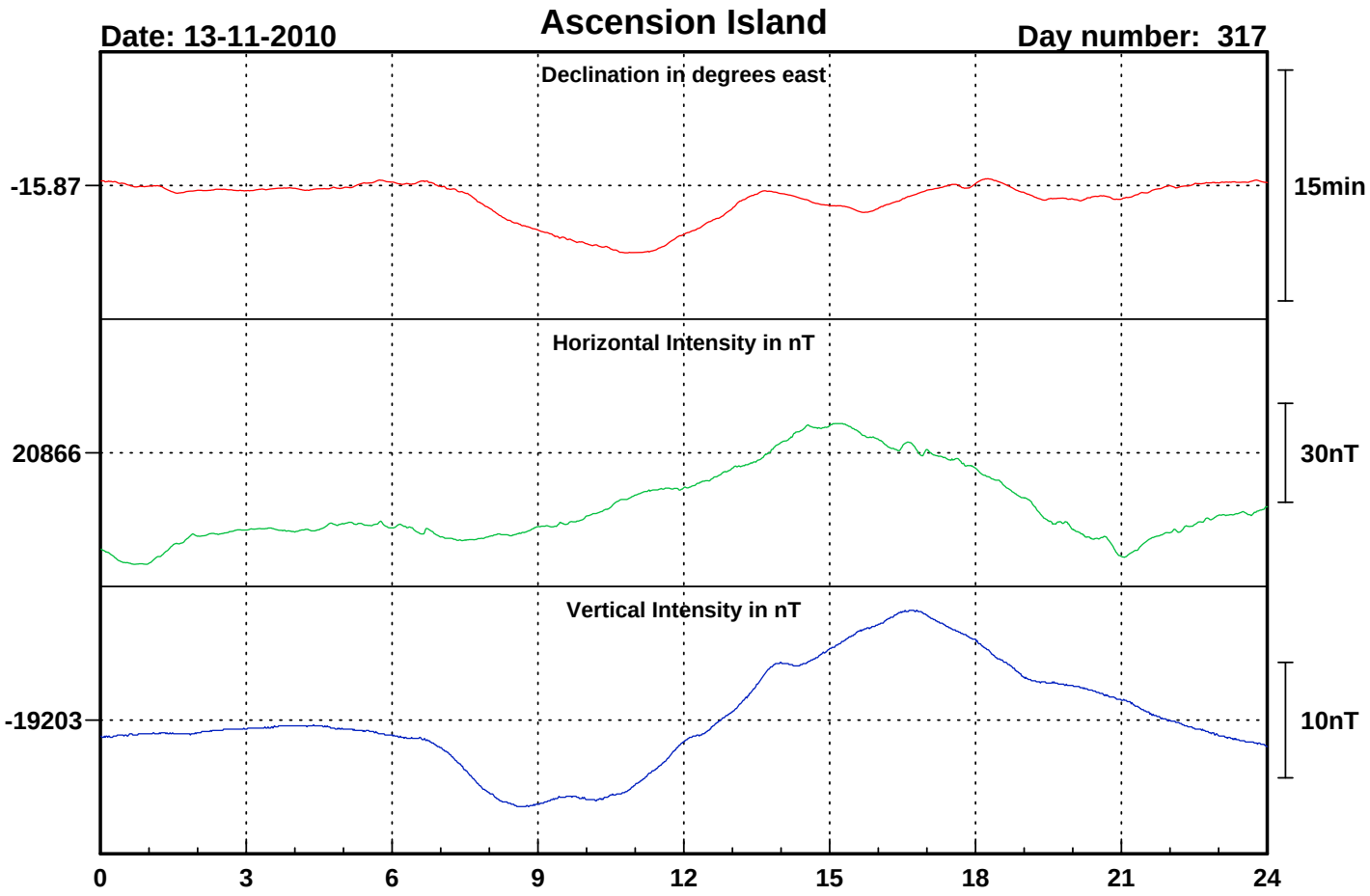
24
Hour (UT)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15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
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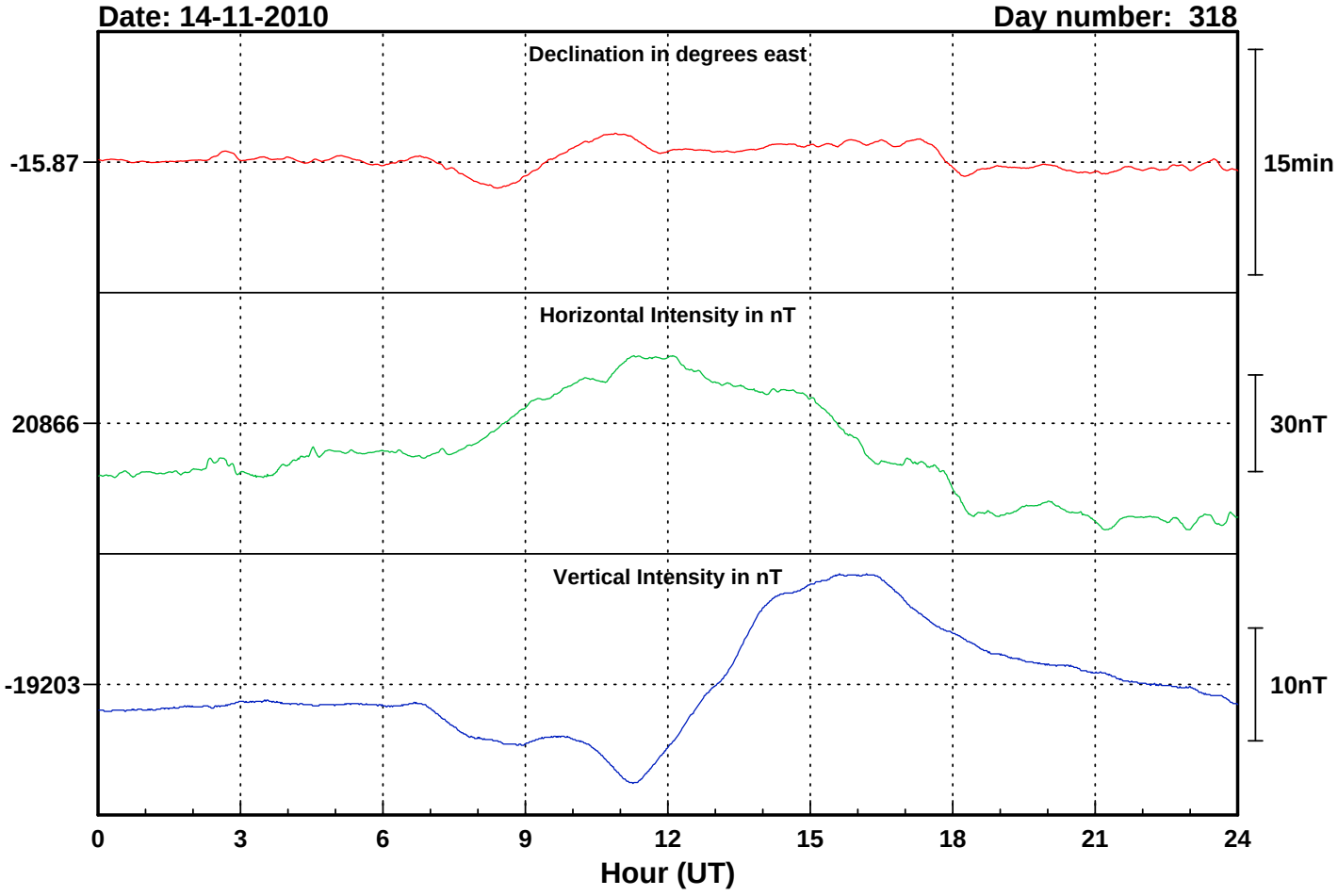
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15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
-19203
10nT
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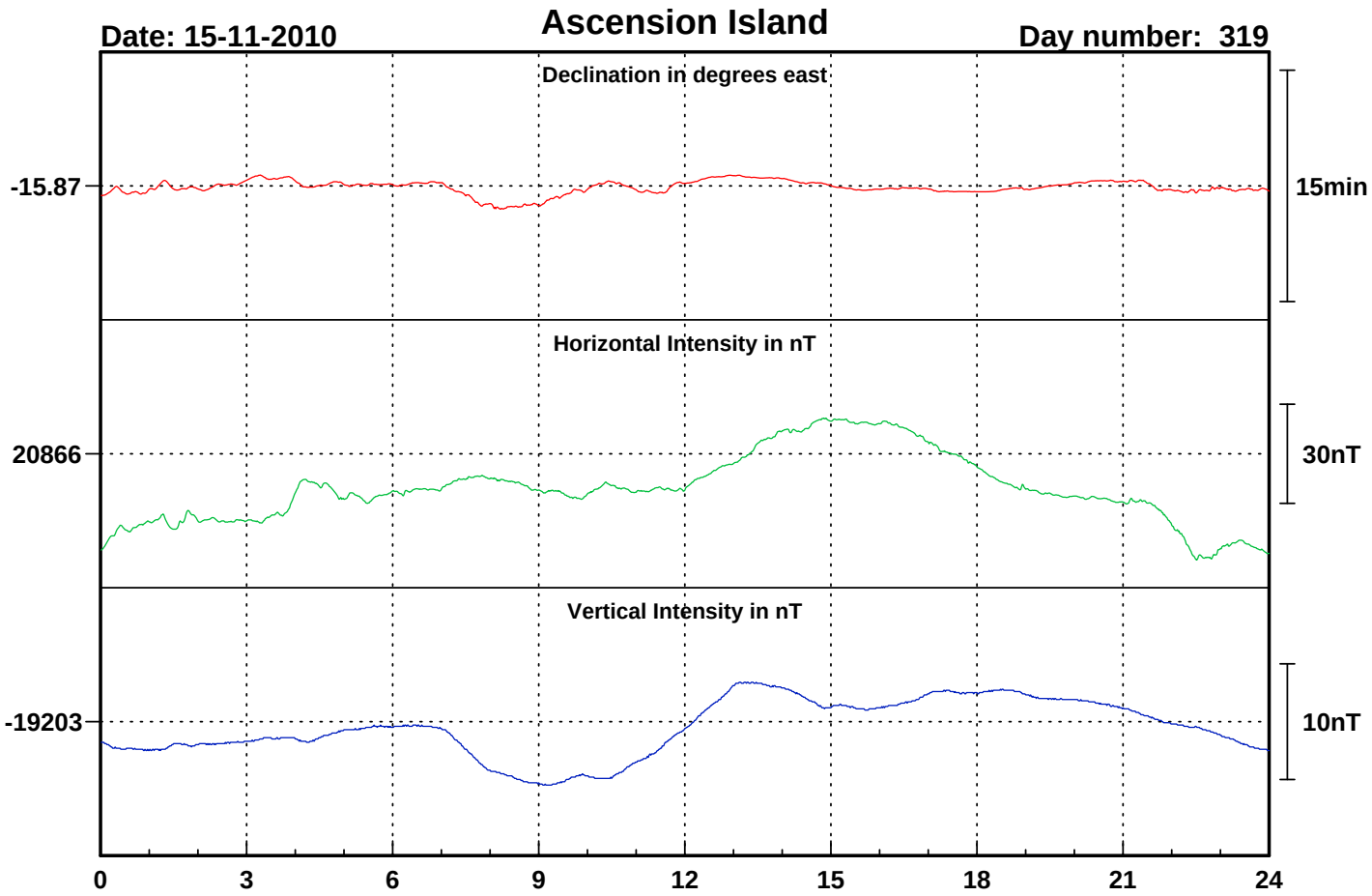
Hour (UT)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15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
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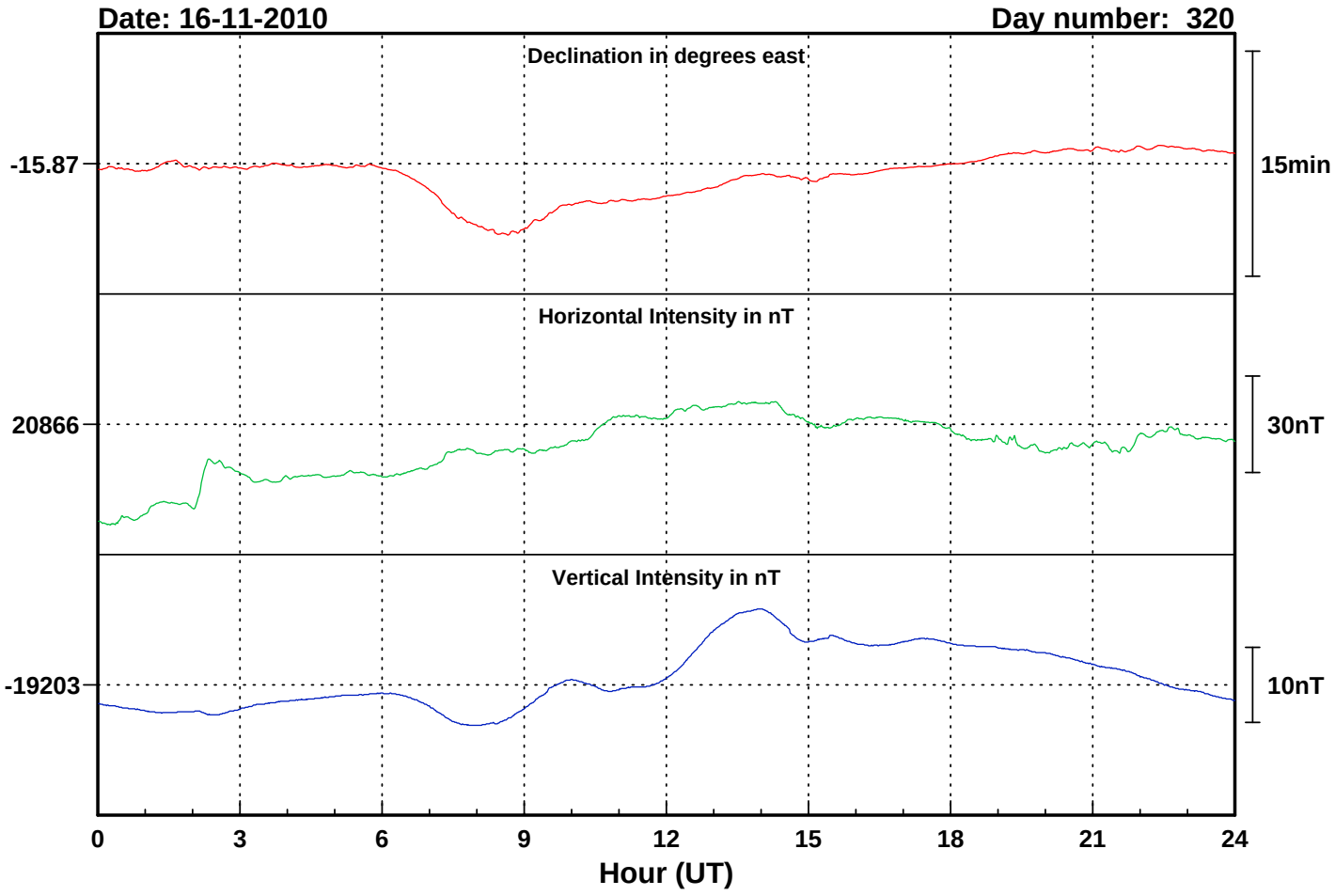
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Day number: 320
Declination in degrees east
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15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
-19203
10nT
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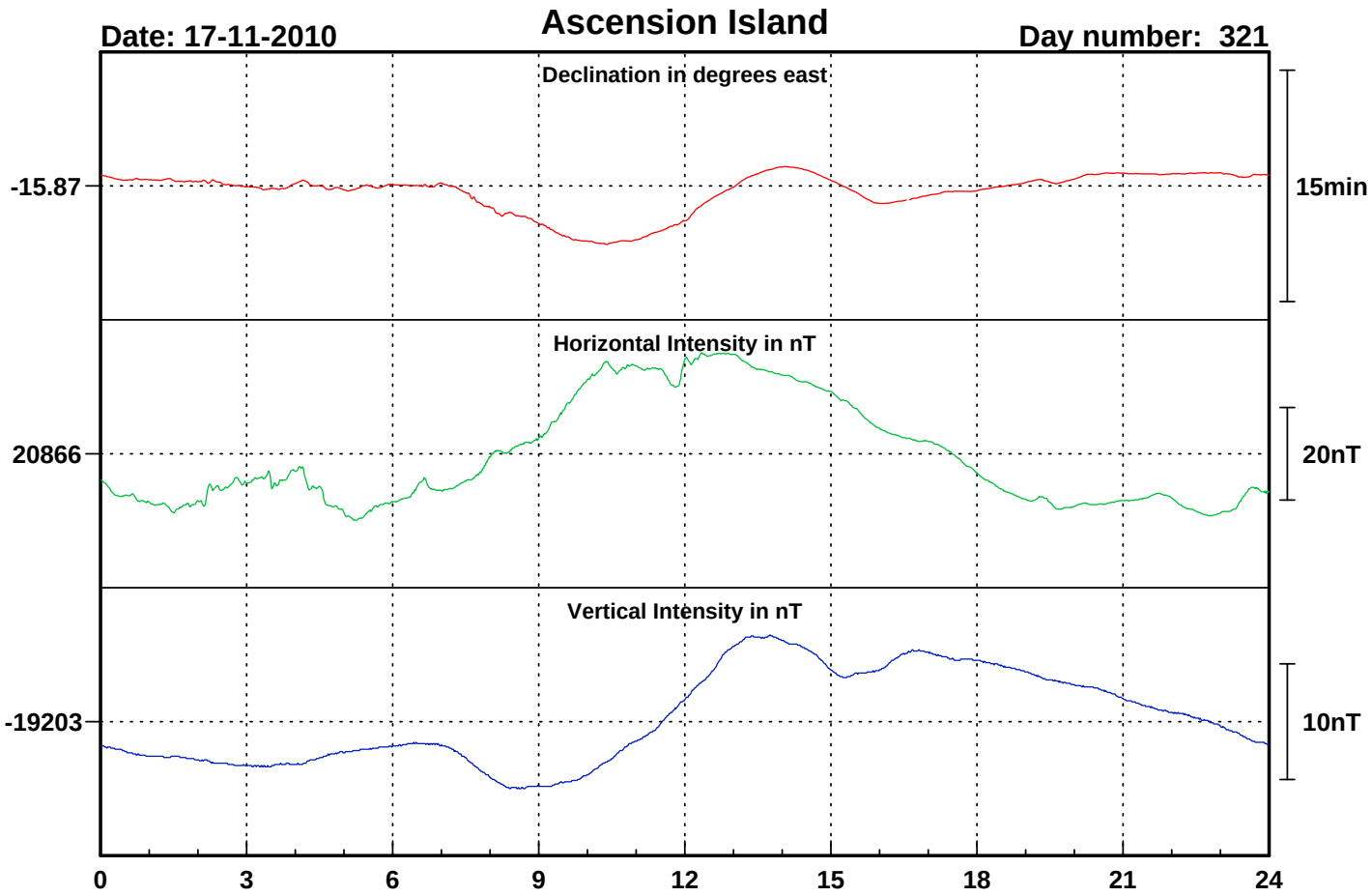
Hour (UT)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Date: 17-11-2010
Day number: 321
Declination in degrees east
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15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
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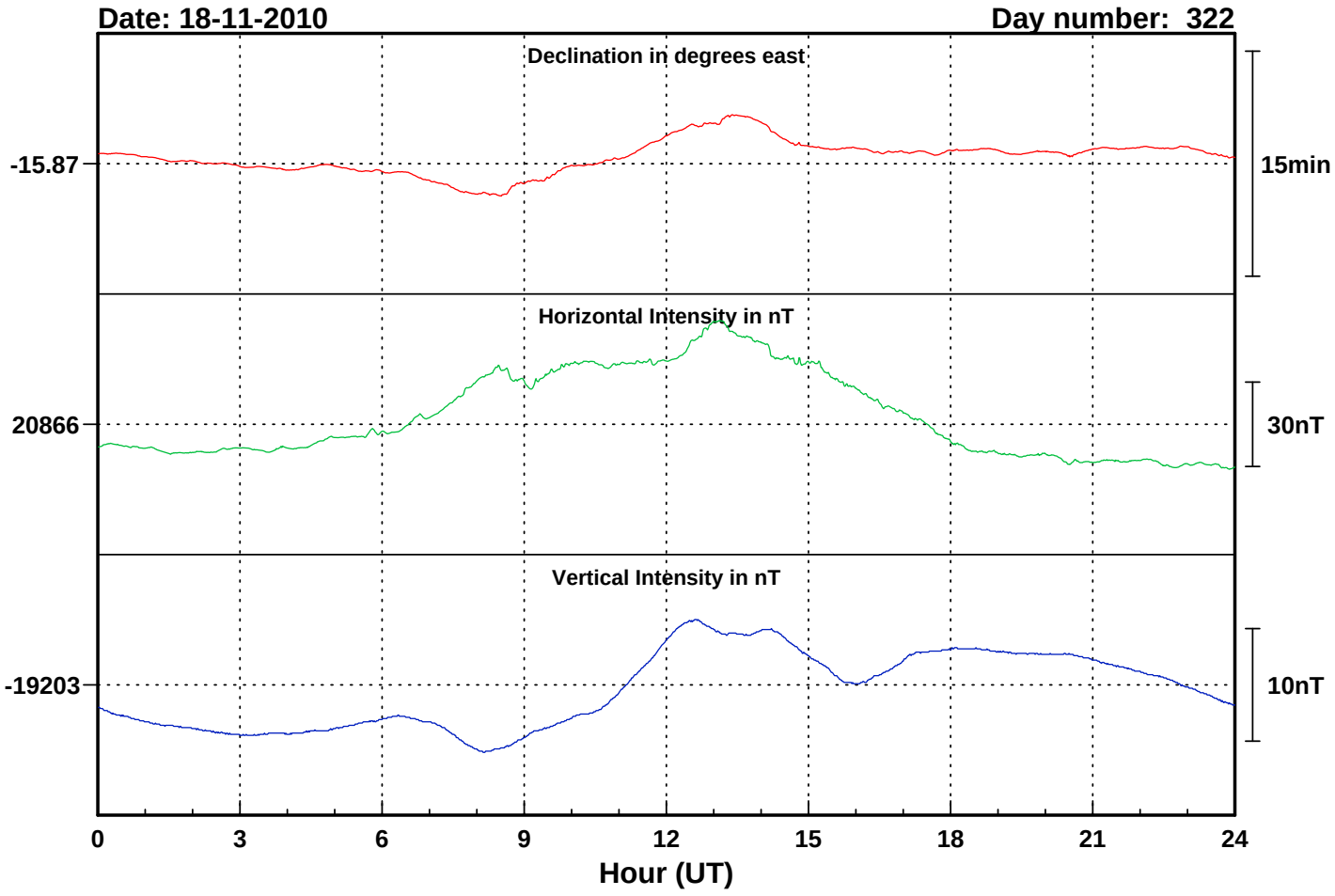
Date: 18-11-2010
Day number: 322
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
-19203
10nT
0
3
6
9
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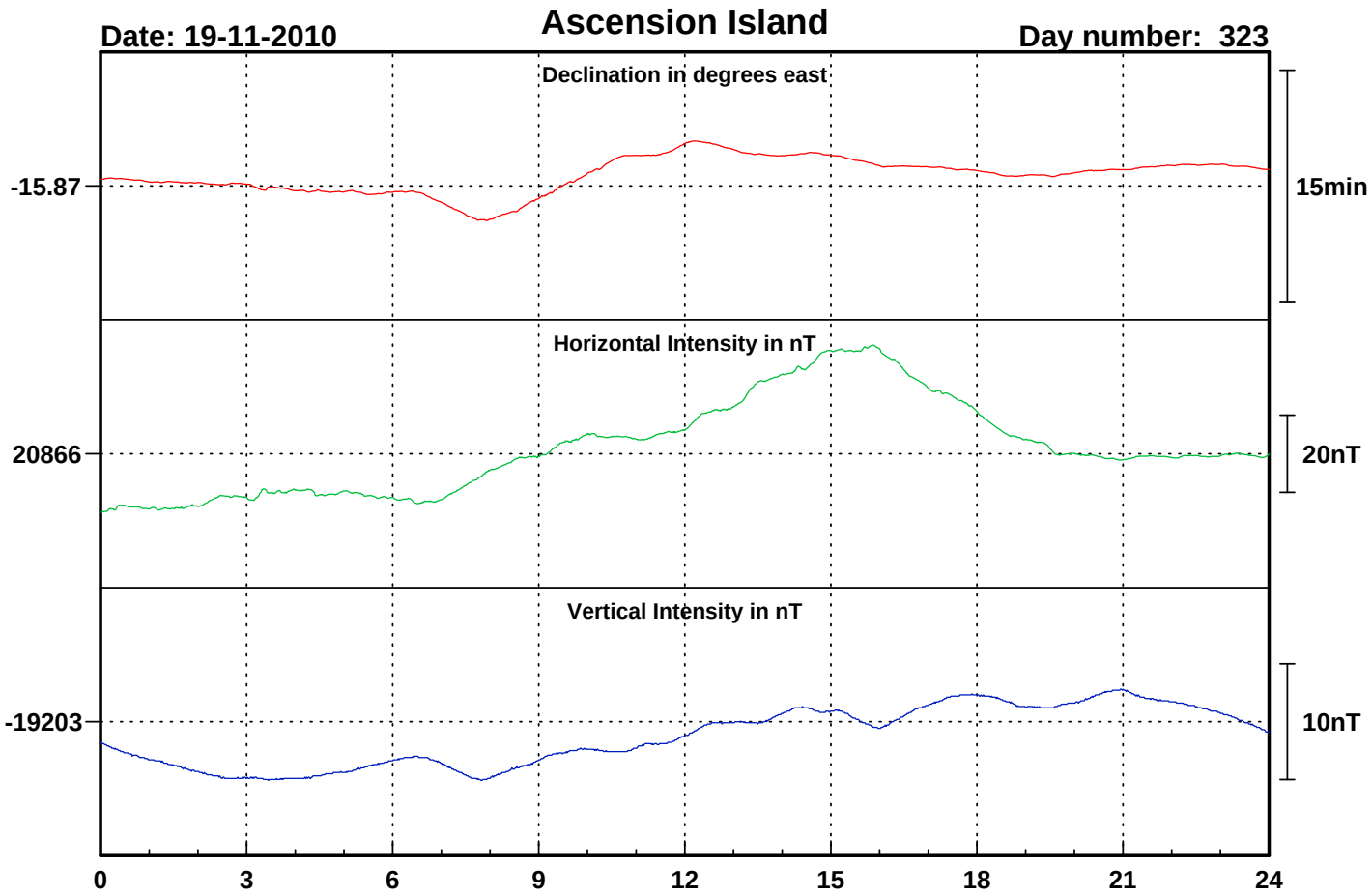
21
24
Hour (UT)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Date: 19-11-2010
Day number: 323
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
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10nT
0
3
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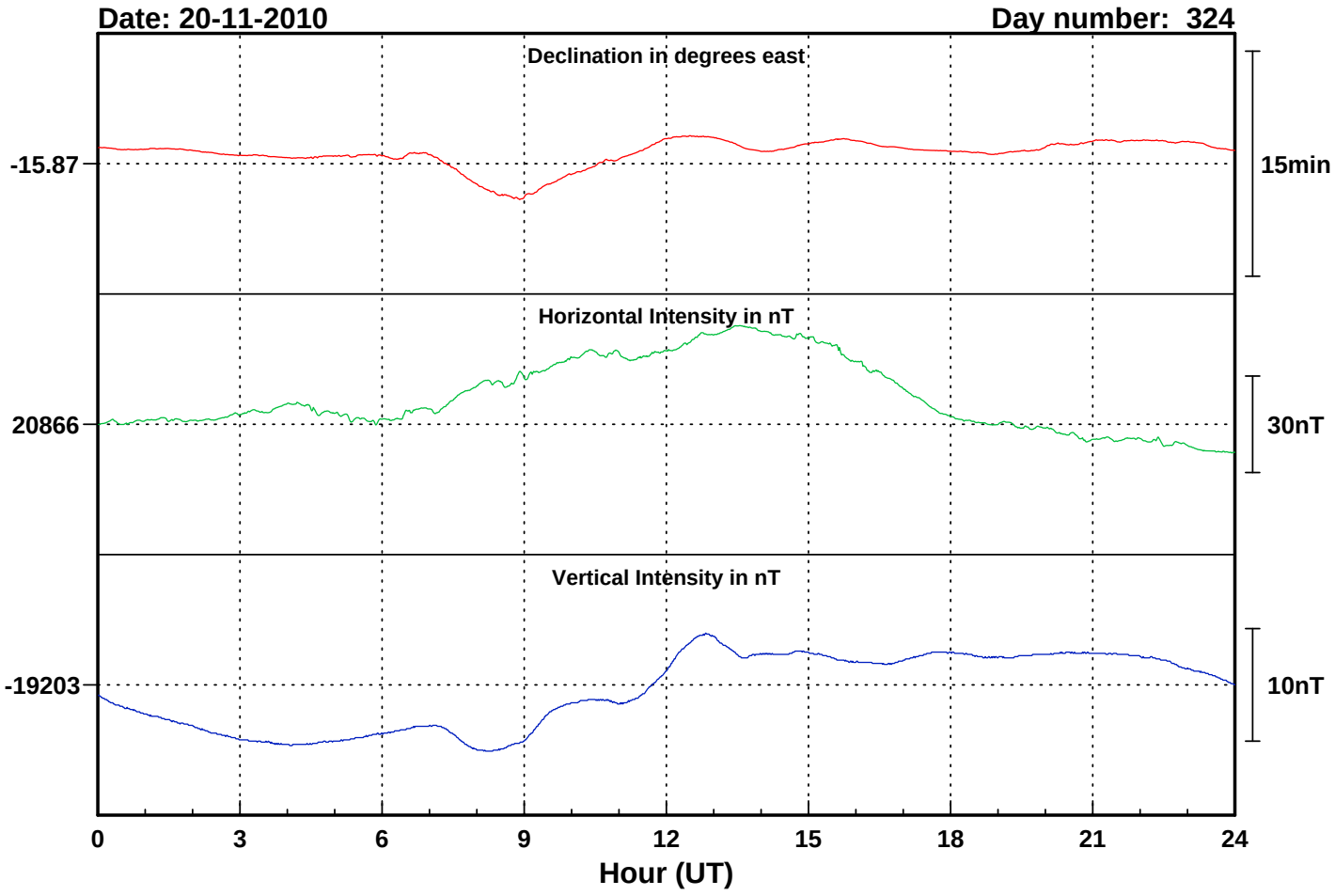
12
15
18
21
24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15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
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3
6
9
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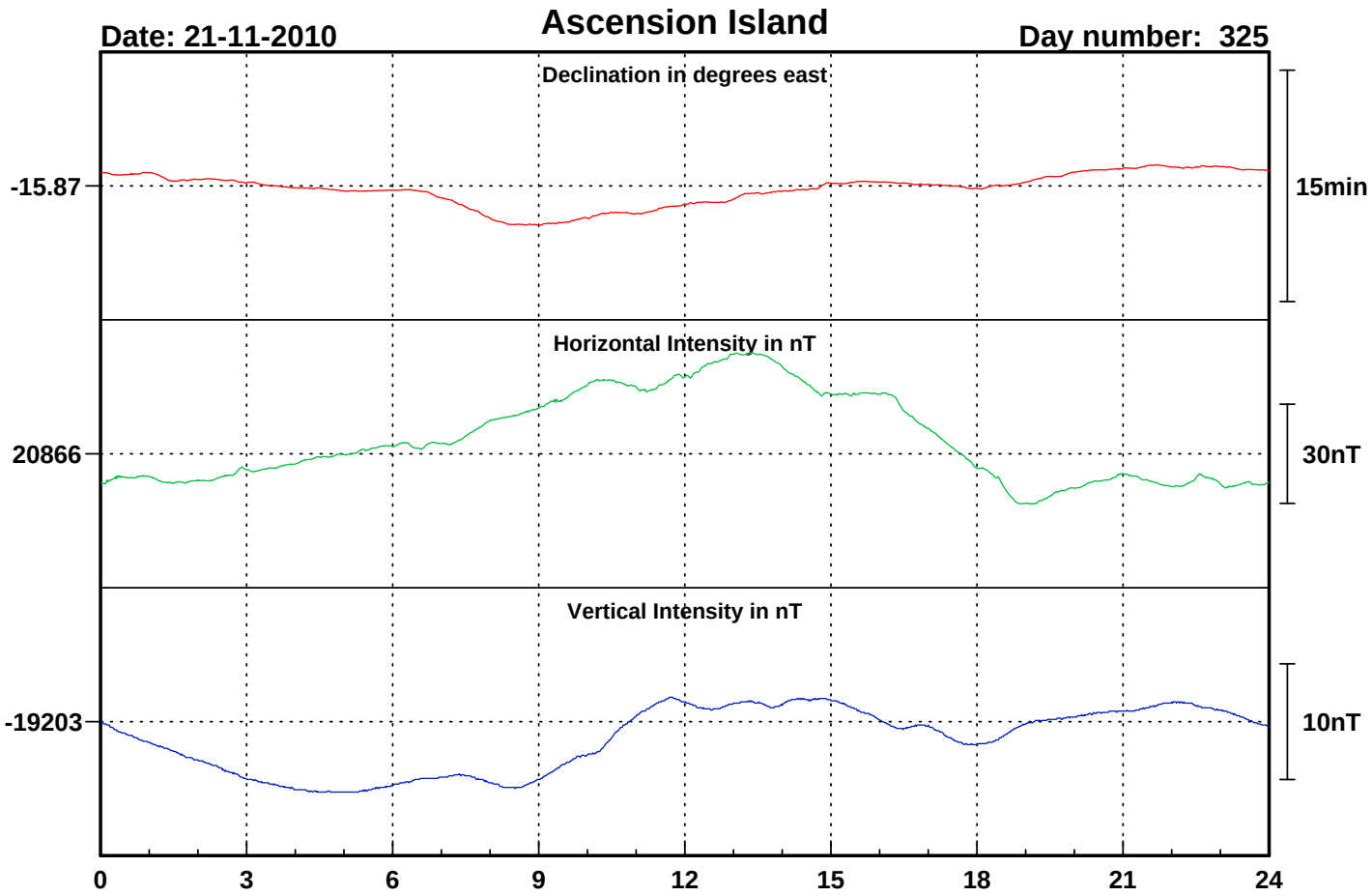
24
Hour (UT)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Date: 21-11-2010
Day number: 325
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
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10nT
0
3
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9
12
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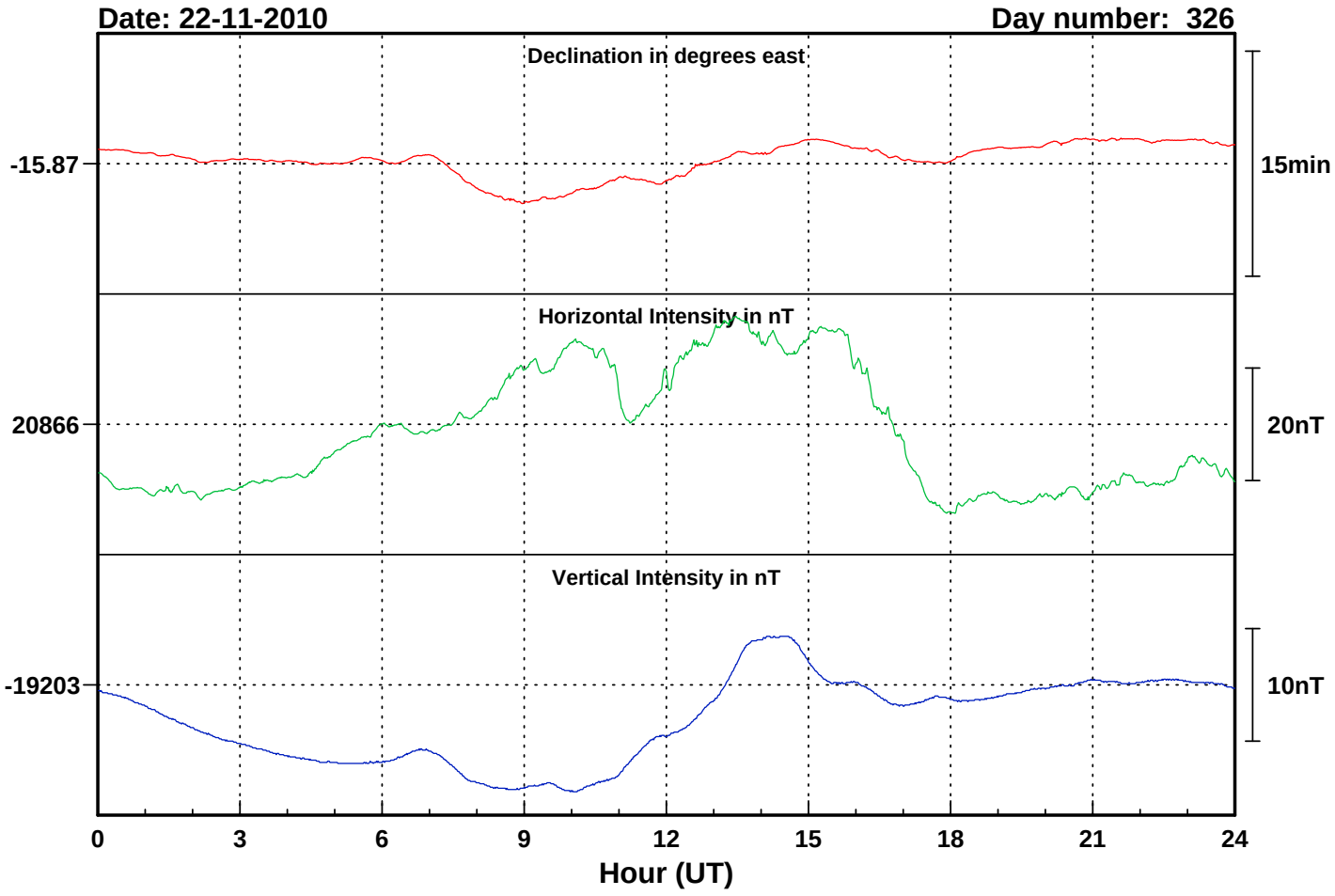
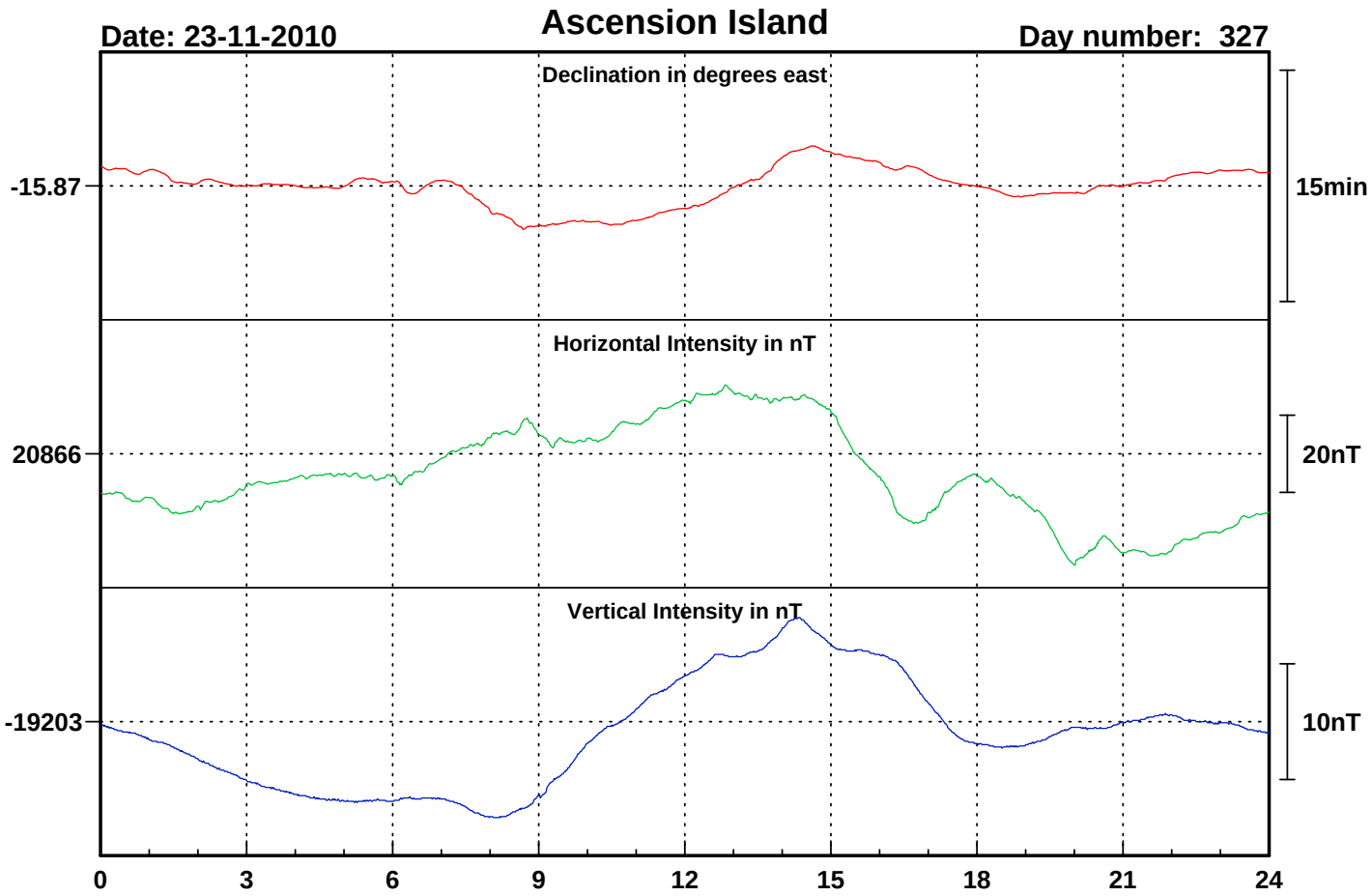
24


Date: 22-11-2010
Day number: 326
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)


Ascension Island
Date: 23-11-2010
Day number: 327
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
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0
3
6
9
12
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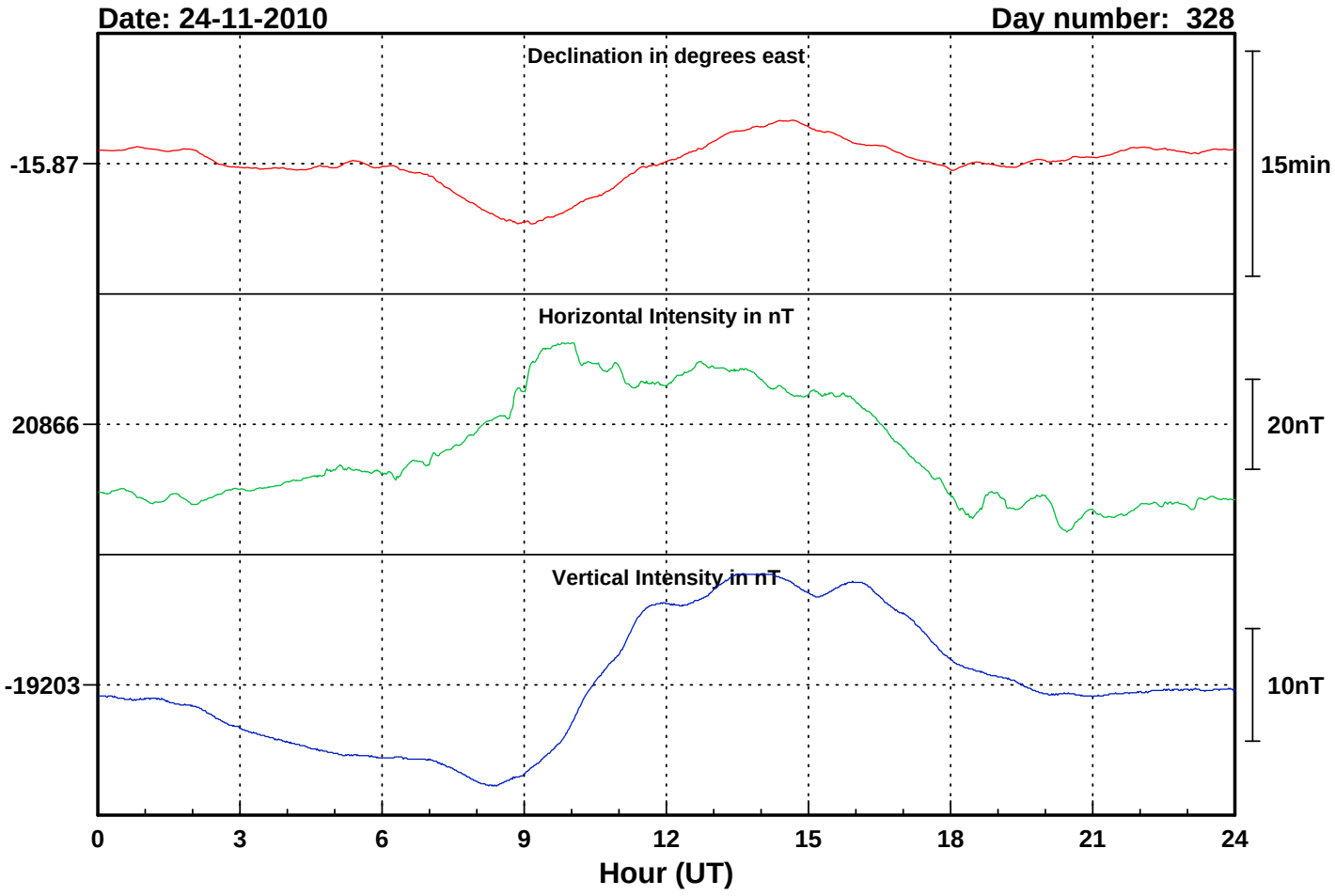
21
24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Day number: 328
Declination in degrees east
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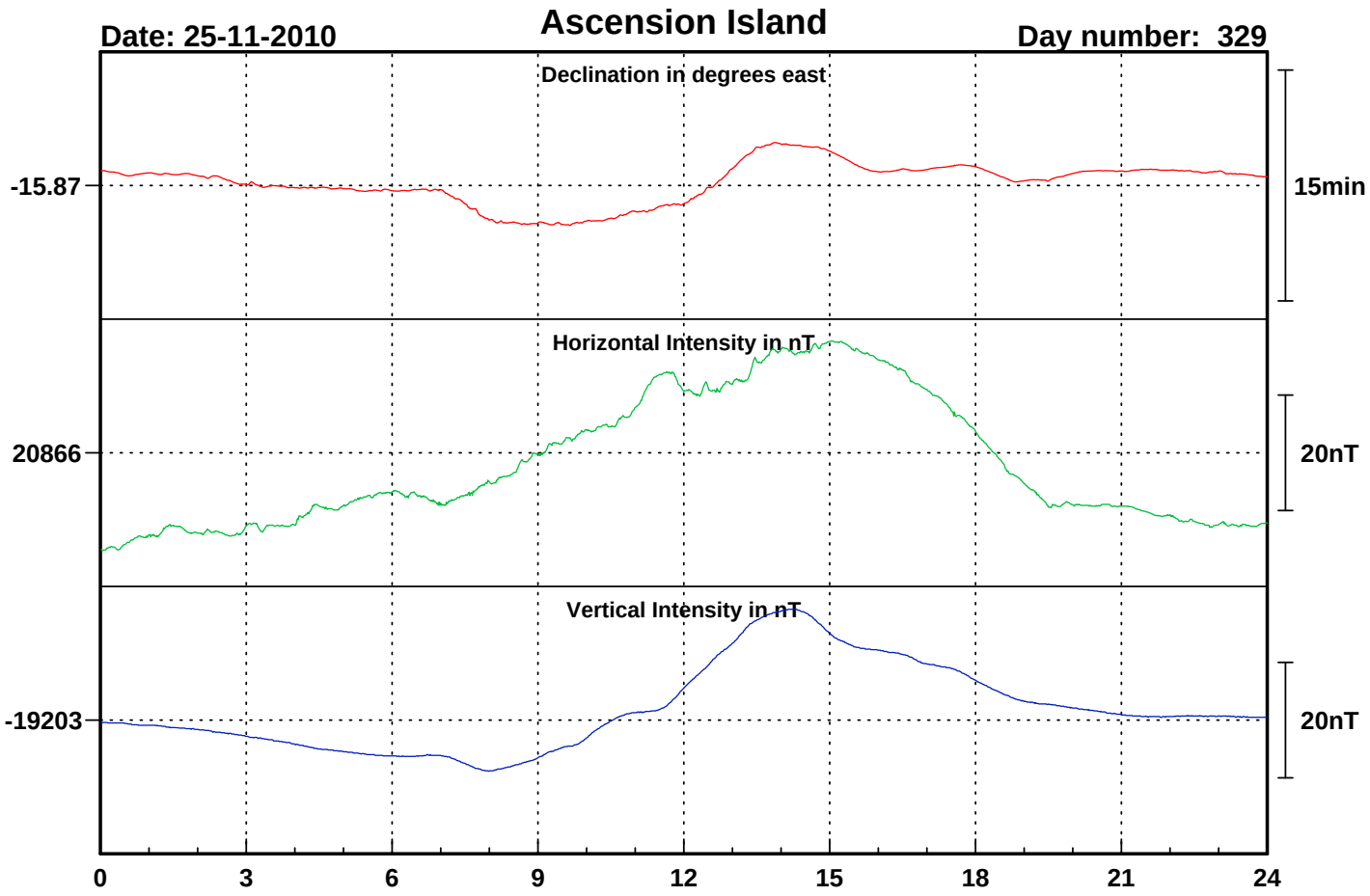
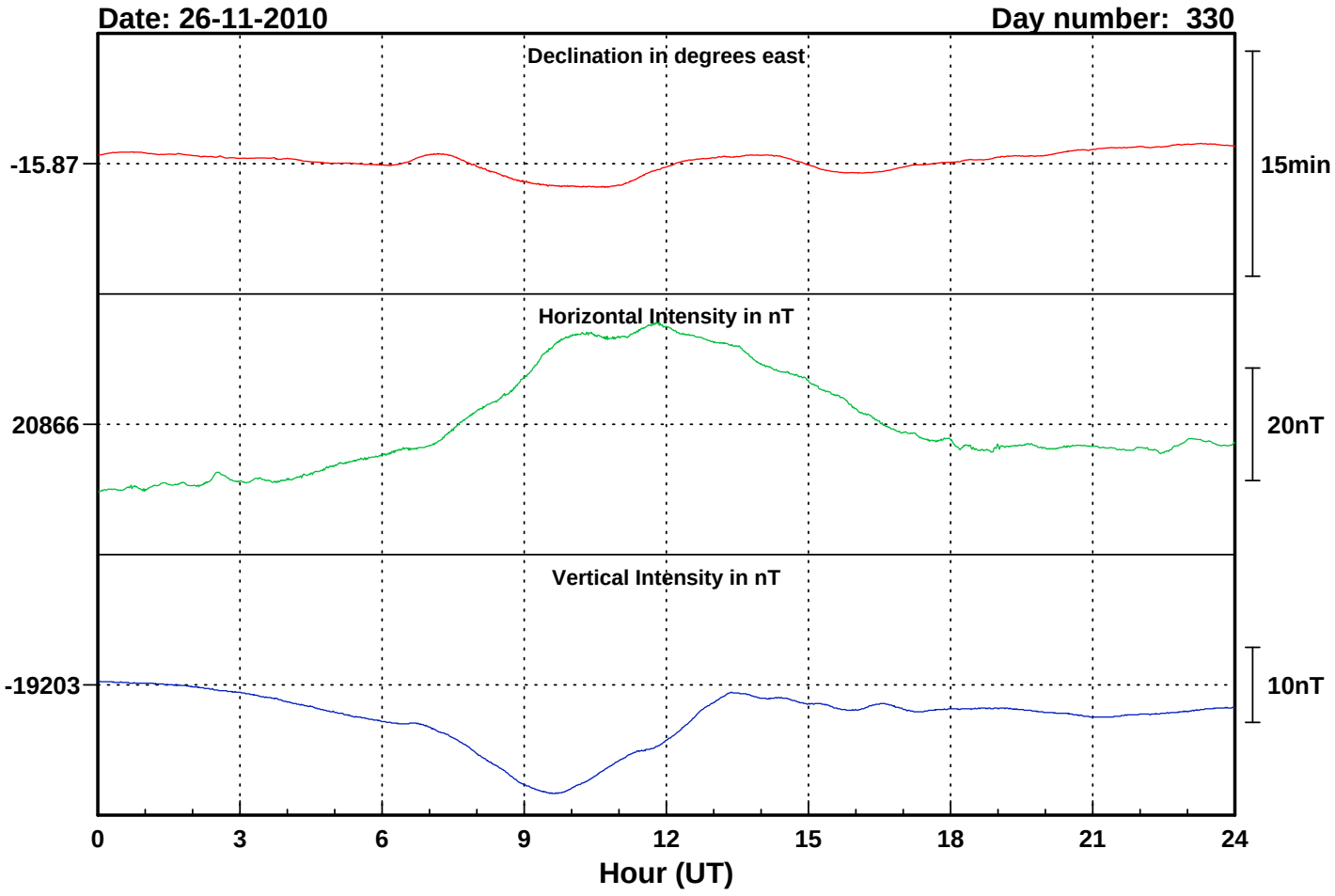
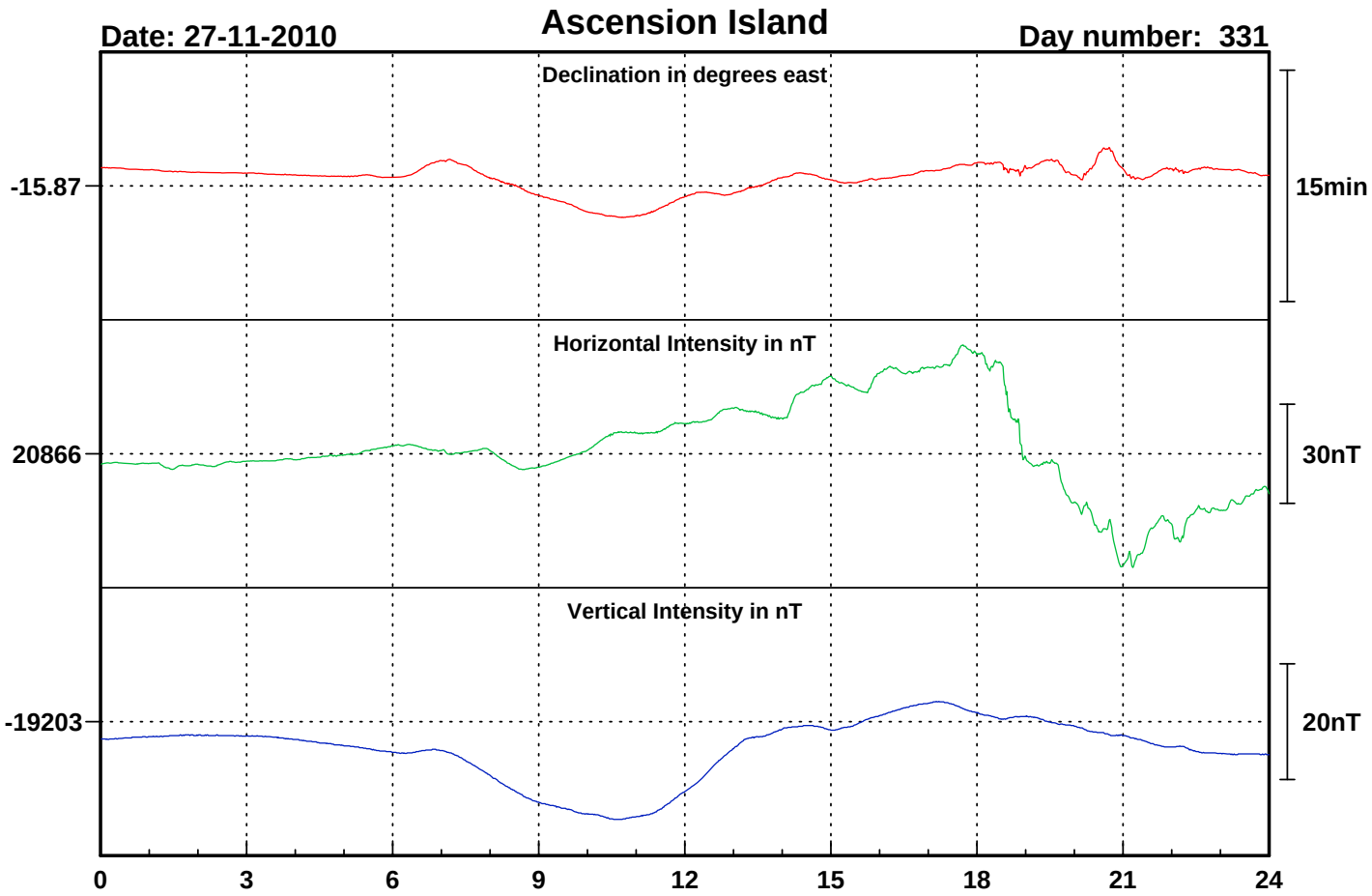
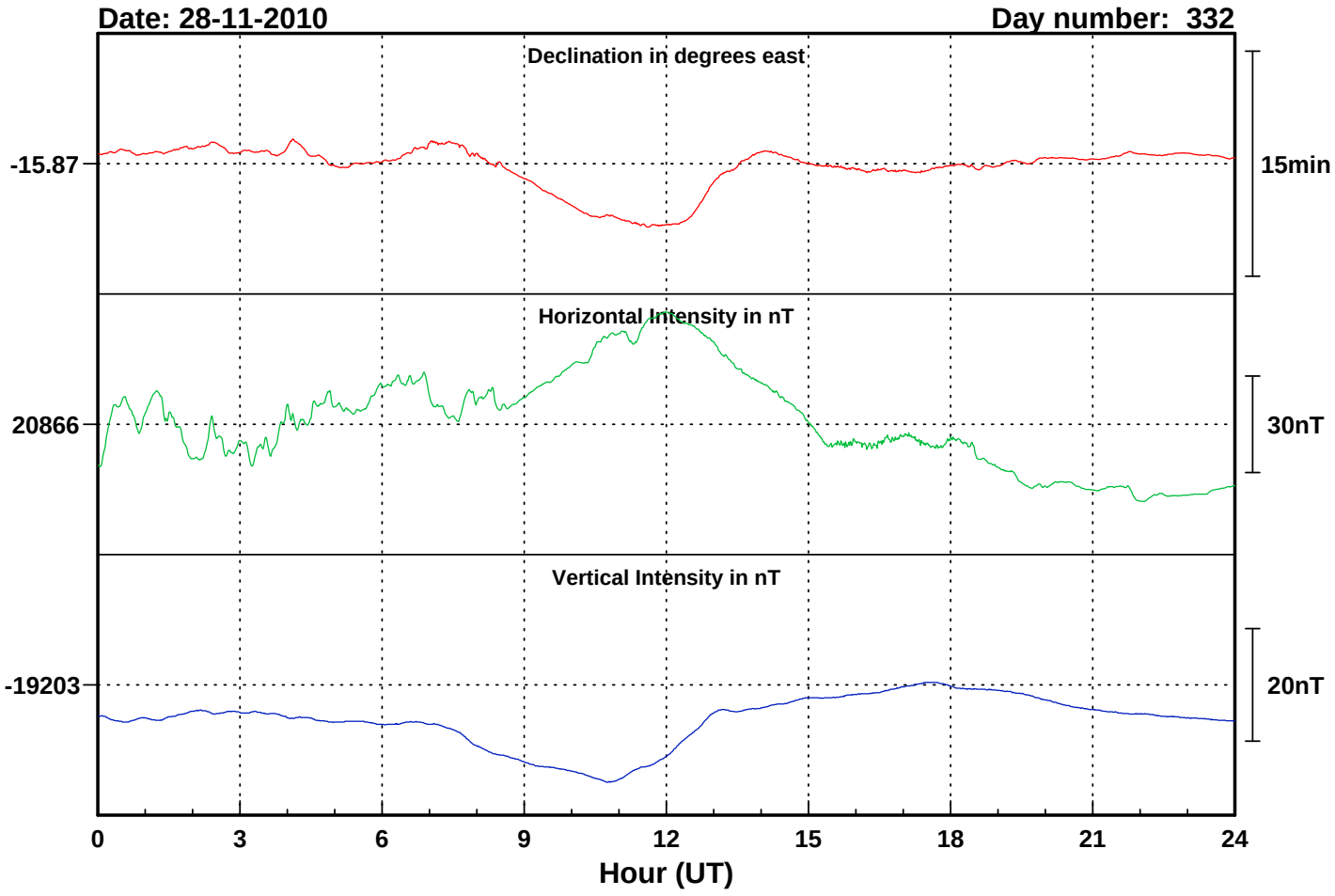
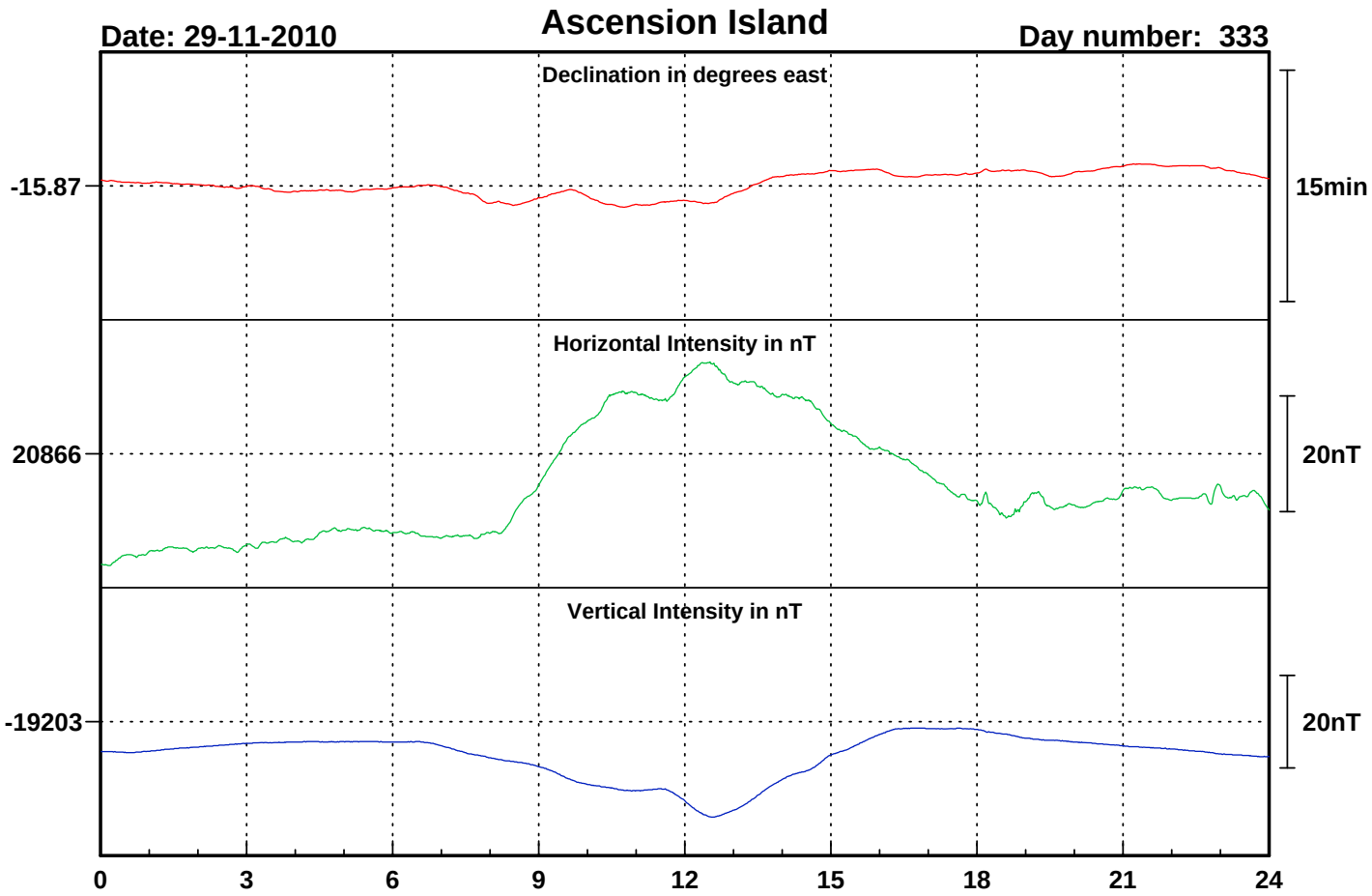
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)

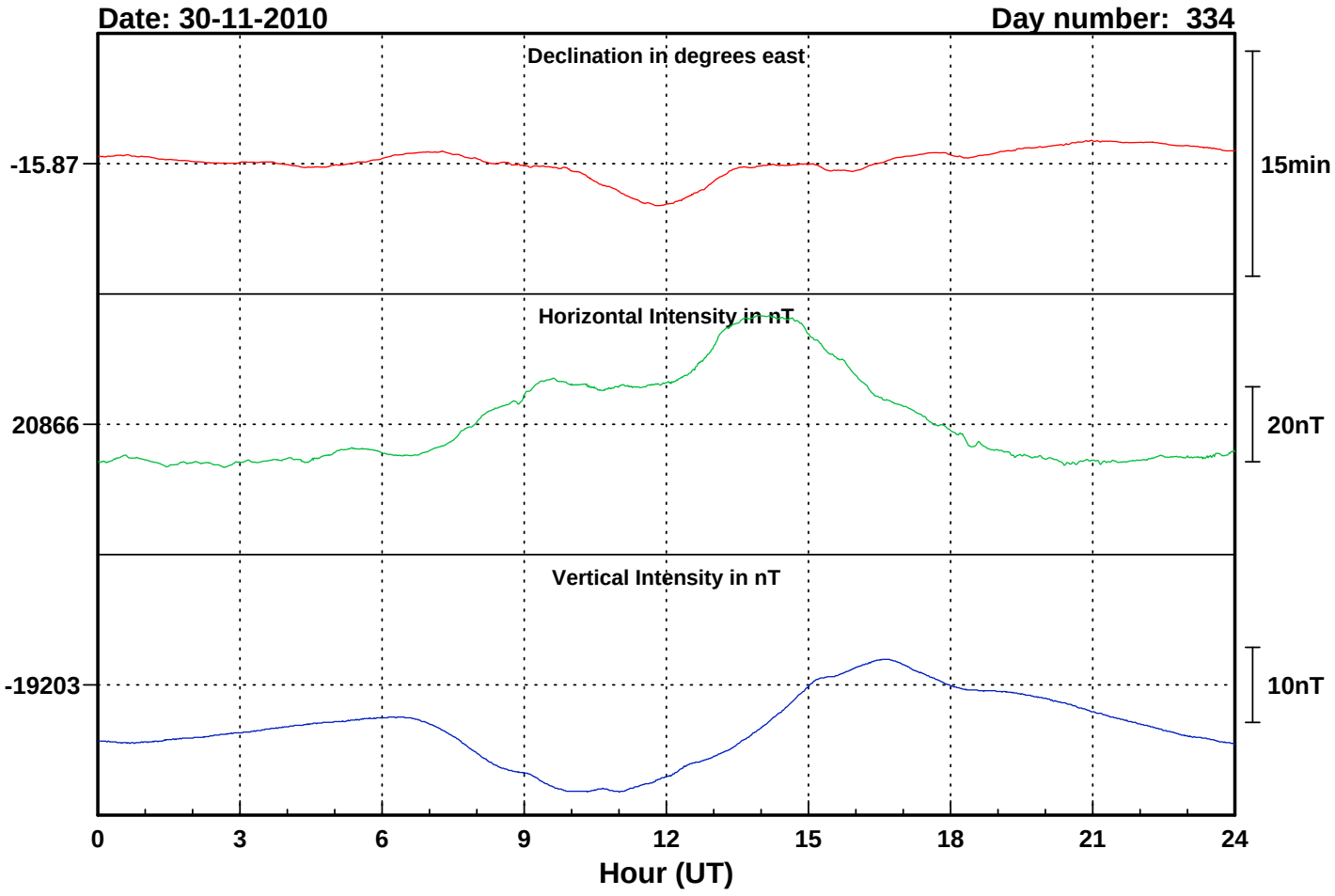

Ascension Island
Date: 25-11-2010
Day number: 329
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
20nT
0
3
6
9
12
15
18
21
24


Date: 26-11-2010
Day number: 330
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)

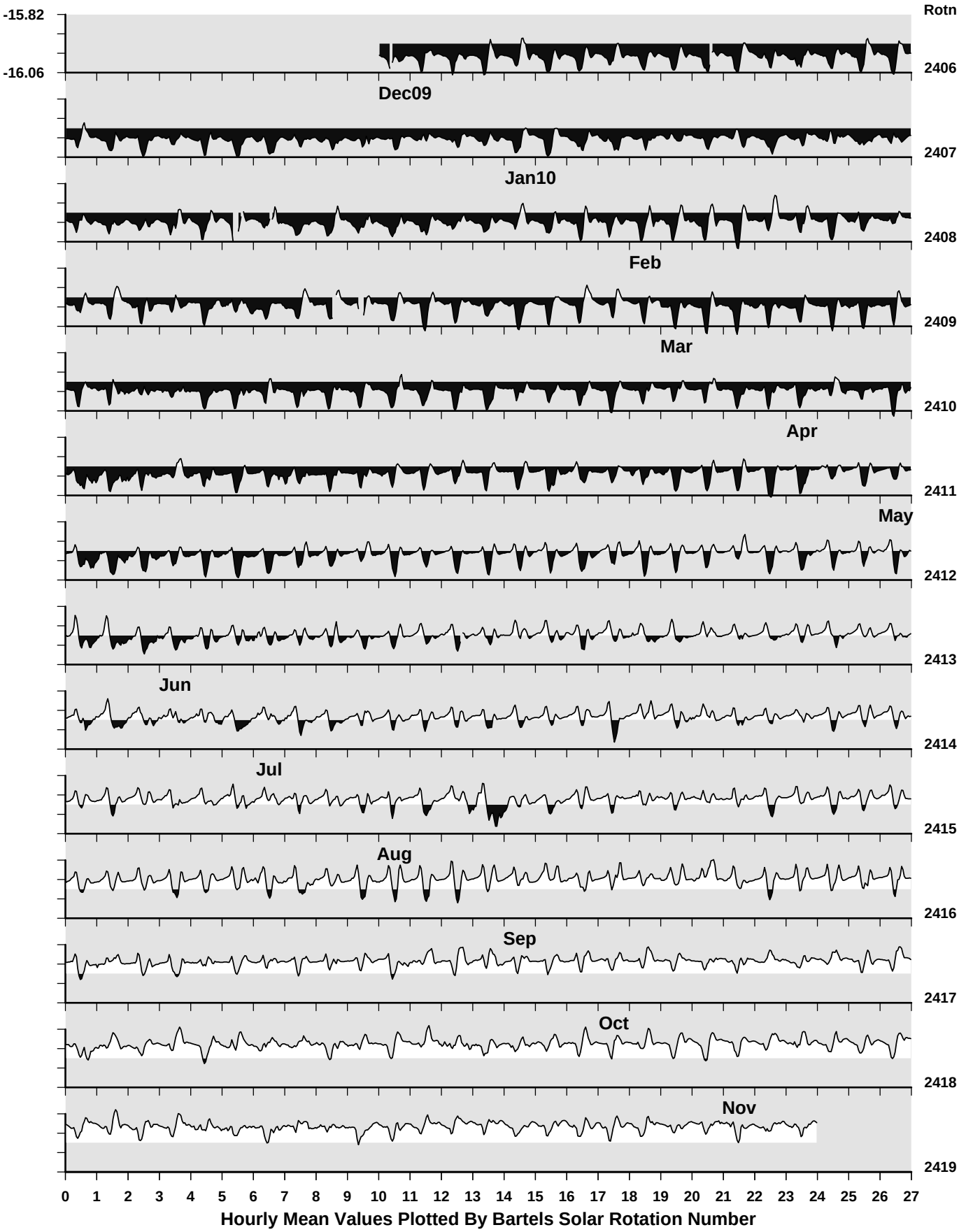

Ascension Island
Date: 27-11-2010
Day number: 331
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
-19203
20nT
0
3
6
9
12
15
18
21
24


Date: 28-11-2010
Day number: 332
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
30nT
Vertical Intensity in nT
-19203
20nT
0
3
6
9
12
15
18
21
24
Hour (UT)


Ascension Island
Date: 29-11-2010
Day number: 333
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
20nT
0
3
6
9
12
15
18
21
24

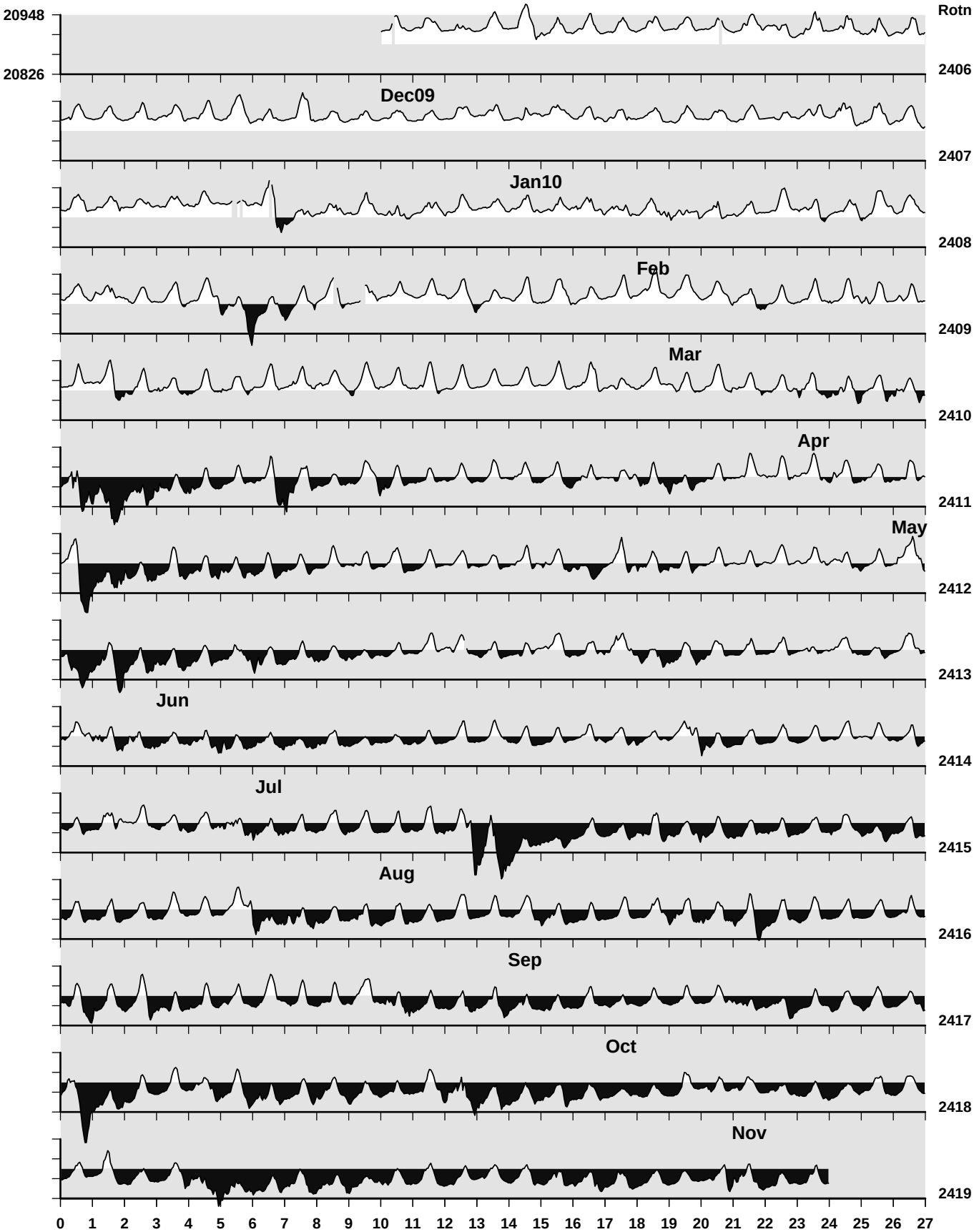

Date: 30-11-2010
Day number: 334
Declination in degrees east
-15.87
15min
Horizontal Intensity in nT
20866
20nT
Vertical Intensity in nT
-19203
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)

Ascension Island Observatory: Declination (degrees)



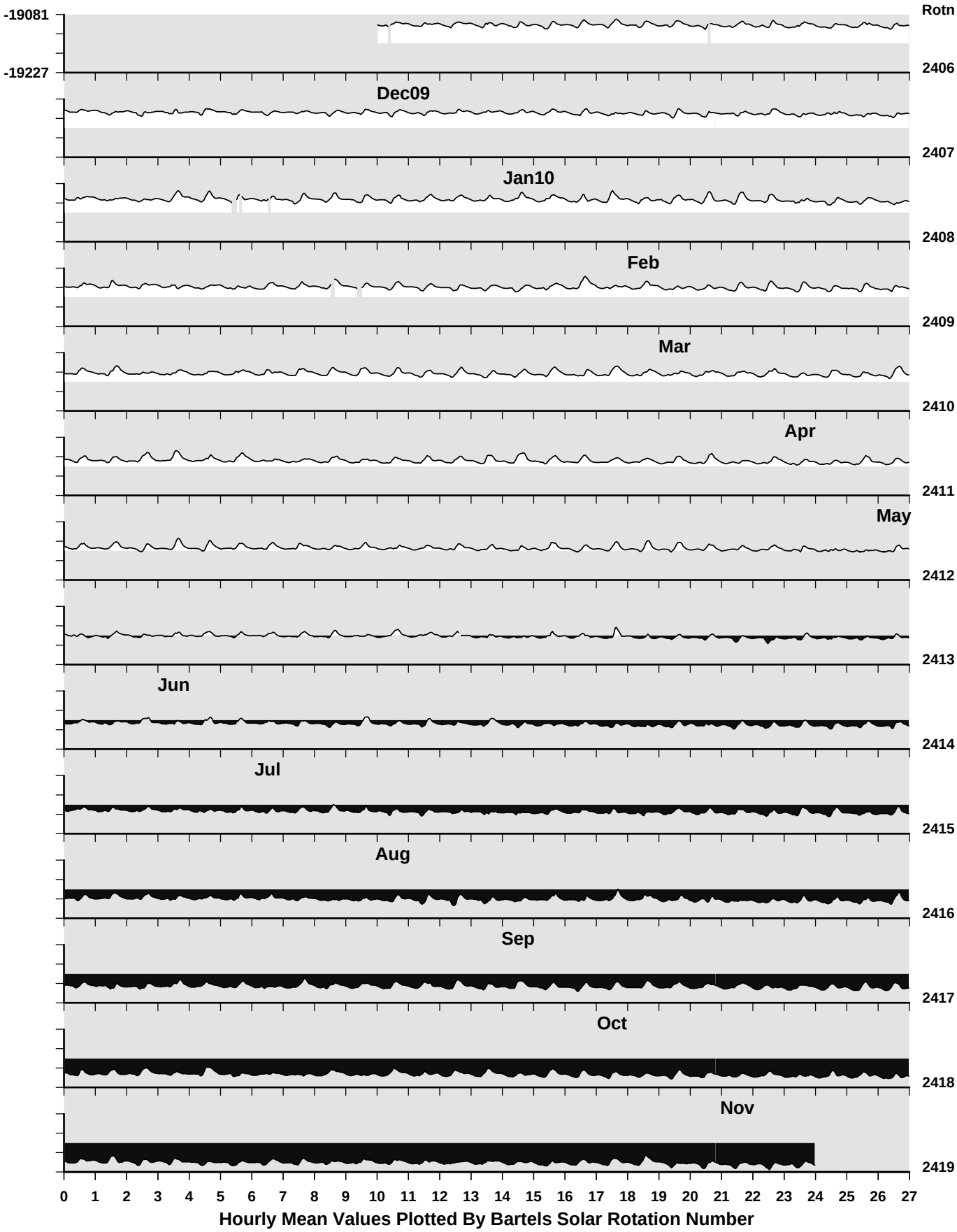
Hourly Mean Values Plotted By Bartels Solar Rotation Number

Ascension Island Observatory: Horizontal Intensity (nT)

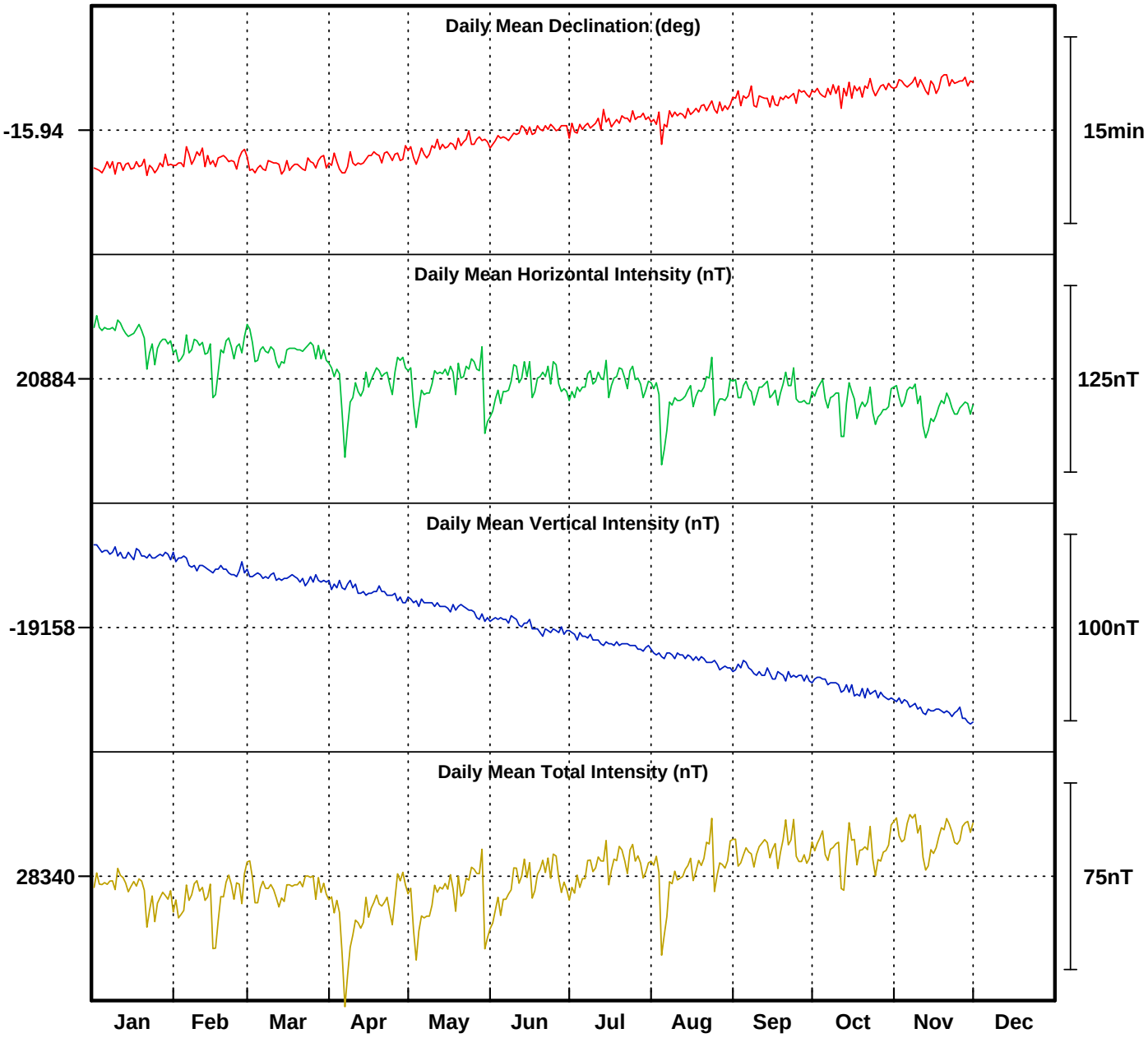


Hourly Mean Values Plotted By Bartels Solar Rotation Number

Ascension Island Observatory: Vertical Intensity (nT)



Ascension Is Observatory 2010



Monthly Mean Values for Ascension Island Observatory 2010

Month	*D*	*H*	*I*	*X*	*Y*	*Z*	*F*
January	-15° 59.2′	20912 nT	-42° 26.1′	20104 nT	-5759 nT	-19119 nT	28335 nT
February	-15° 58.6′	20902 nT	-42° 27.6′	20095 nT	-5753 nT	-19126 nT	28332 nT
March	-15° 59.1′	20902 nT	-42° 28.1′	20093 nT	-5756 nT	-19132 nT	28336 nT
April	-15° 58.6′	20881 nT	-42° 30.5′	20074 nT	-5747 nT	-19139 nT	28325 nT
May	-15° 57.6′	20881 nT	-42° 31.3′	20076 nT	-5741 nT	-19148 nT	28331 nT
June	-15° 56.4′	20881 nT	-42° 32.1′	20078 nT	-5735 nT	-19157 nT	28338 nT
July	-15° 55.6′	20882 nT	-42° 32.8′	20080 nT	-5730 nT	-19166 nT	28344 nT
August	-15° 54.8′	20871 nT	-42° 34.6′	20071 nT	-5723 nT	-19176 nT	28342 nT
September	-15° 53.6′	20875 nT	-42° 34.9′	20077 nT	-5717 nT	-19183 nT	28351 nT
October	-15° 53.0′	20868 nT	-42° 36.2′	20071 nT	-5711 nT	-19192 nT	28351 nT
November	-15° 52.5′	20866 nT	-42° 37.4′	20070 nT	-5707 nT	-19203 nT	28357 nT

Note

i. The values shown here are provisional.