BRITISH GEOLOGICAL SURVEY

Ascension Island Observatory

Monthly Magnetic Bulletin

August 2009

09/08/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.

Enquiries about the data should be addressed to:

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British Geological Survey
Murchison House, West Mains Road
Edinburgh EH9 3LA
Scotland, UK

Tel: +44 (0) 131 667 1000
Fax: +4 (0) 131 650 0265
E-mail: orba@bgs.ac.uk
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, Ascension Island.
The observatory co-ordinates are:

Geographic:	*7°56.94' S*	*345°37.44' E*
Geomagnetic:	*2°20.34' S*	*56°33.66' E*
Height above mean sea level:		*177 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 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.

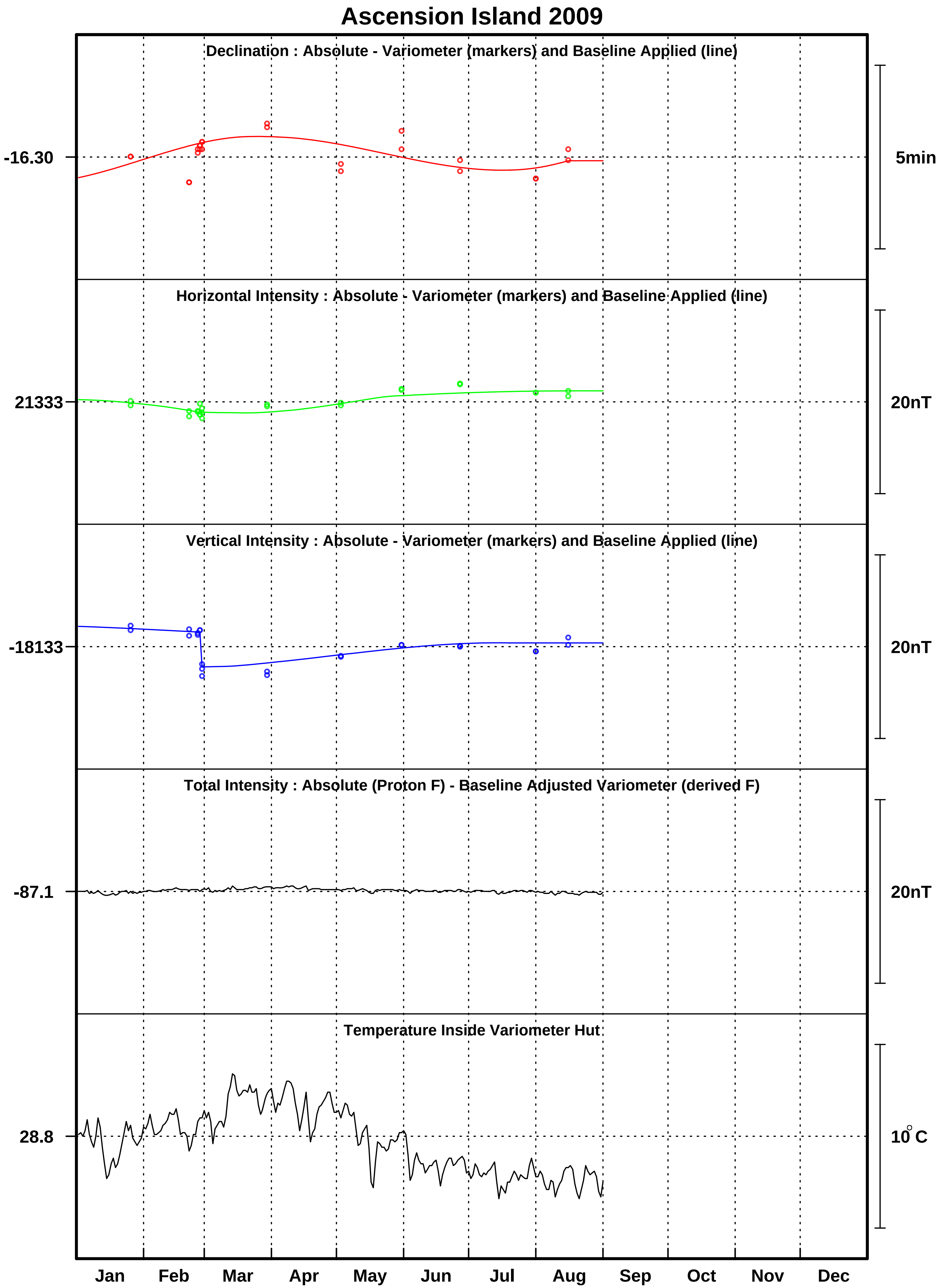
4.5 Daily and Monthly Mean Values

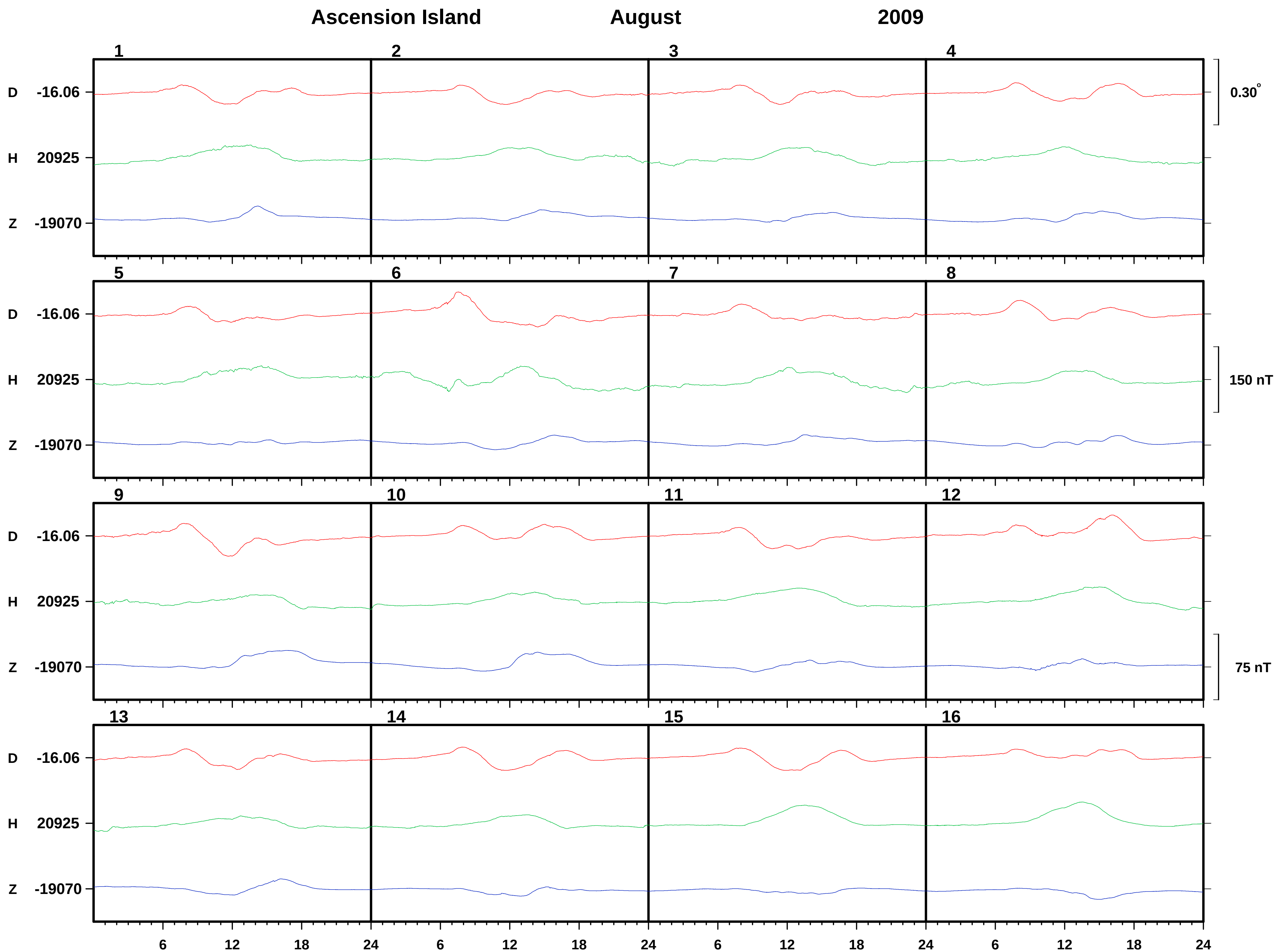
Daily mean values of *D*, *H*, *Z* and *F* are plotted throughout the year. In addition, a table of monthly mean values of all the geomagnetic elements is provided. These values depend on accurate specification of the fluxgate sensor baselines. This data is provisional. It is anticipated that provisional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

ASCENSION ISLAND OBSERVATORY

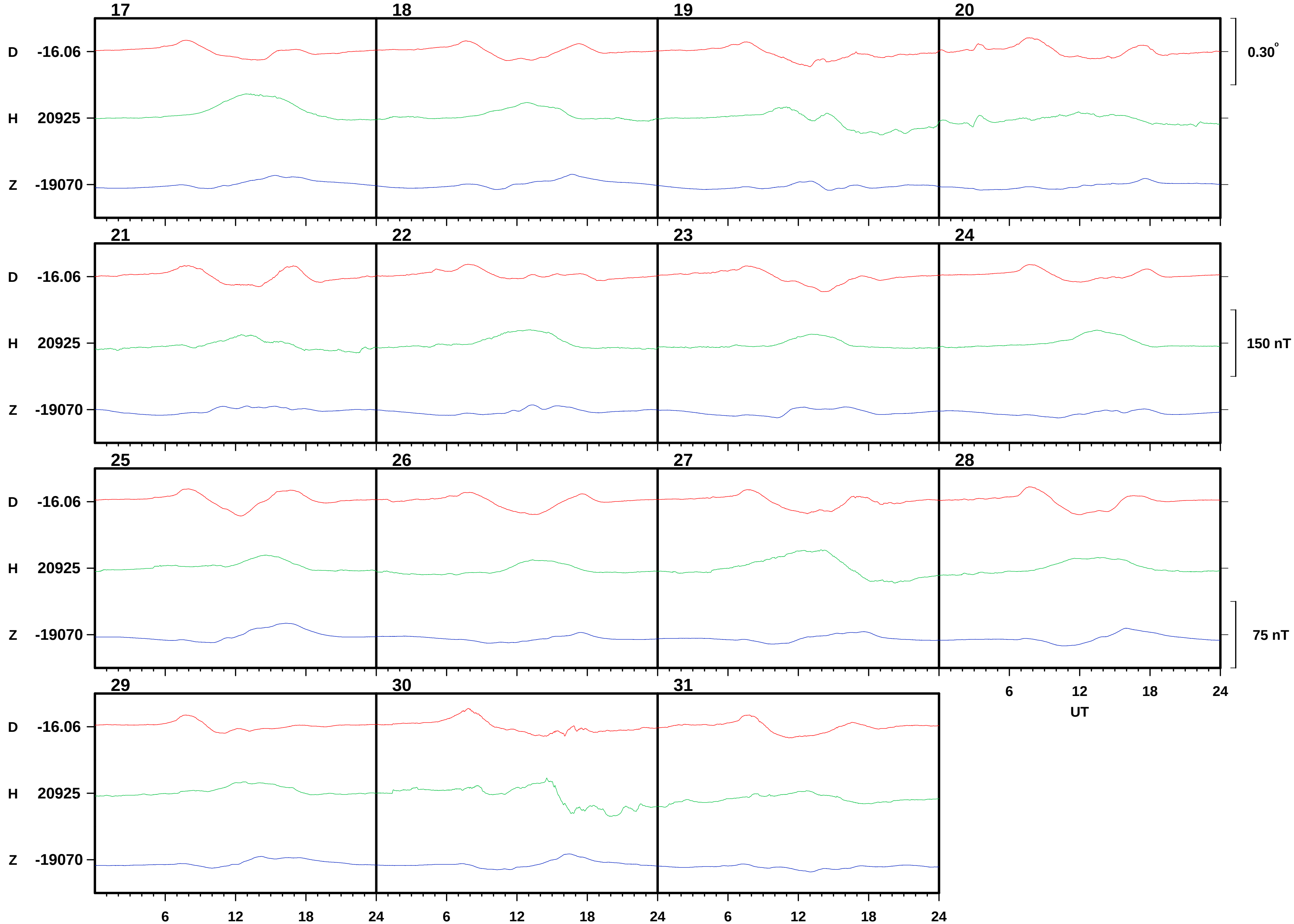
ABSOLUTE OBSERVATIONS

		DECLINATION			INCLINATION							
Date	**Day Number**	**Time (UT)**	**Absolute (º)**	**Baseline (º)**	**Time (UT)**	**Inclination (º)**	**Total Field Intensity (nT)**	**H Absolute (nT)**	**H Baseline (nT)**	**Z Absolute (nT)**	**Z Baseline (nT)**	**Observer**
15-Aug-09	227	07:59	-16.0138	-16.3050	08:12	-42.3497	28307.8	20920.8	21334.1	-19069.6	-19038.5	GA
15-Aug-09	227	08:24	-16.0112	-16.3000	08:38	-42.3466	28311.2	20924.4	21333.5	-19070.8	-19039.3	GA


Ascension Island 2009
Declination : Absolute - Variometer (markers) and Baseline Applied (line)
-16.30
5min
Horizontal Intensity : Absolute - Variometer (markers) and Baseline Applied (line)
21333
20nT
Vertical Intensity : Absolute - Variometer (markers) and Baseline Applied (line)
-18133
20nT
Total Intensity : Absolute (Proton F) - Baseline Adjusted Variometer (derived F)
-87.1
20nT
Temperature Inside Variometer Hut
28.8
10°C
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

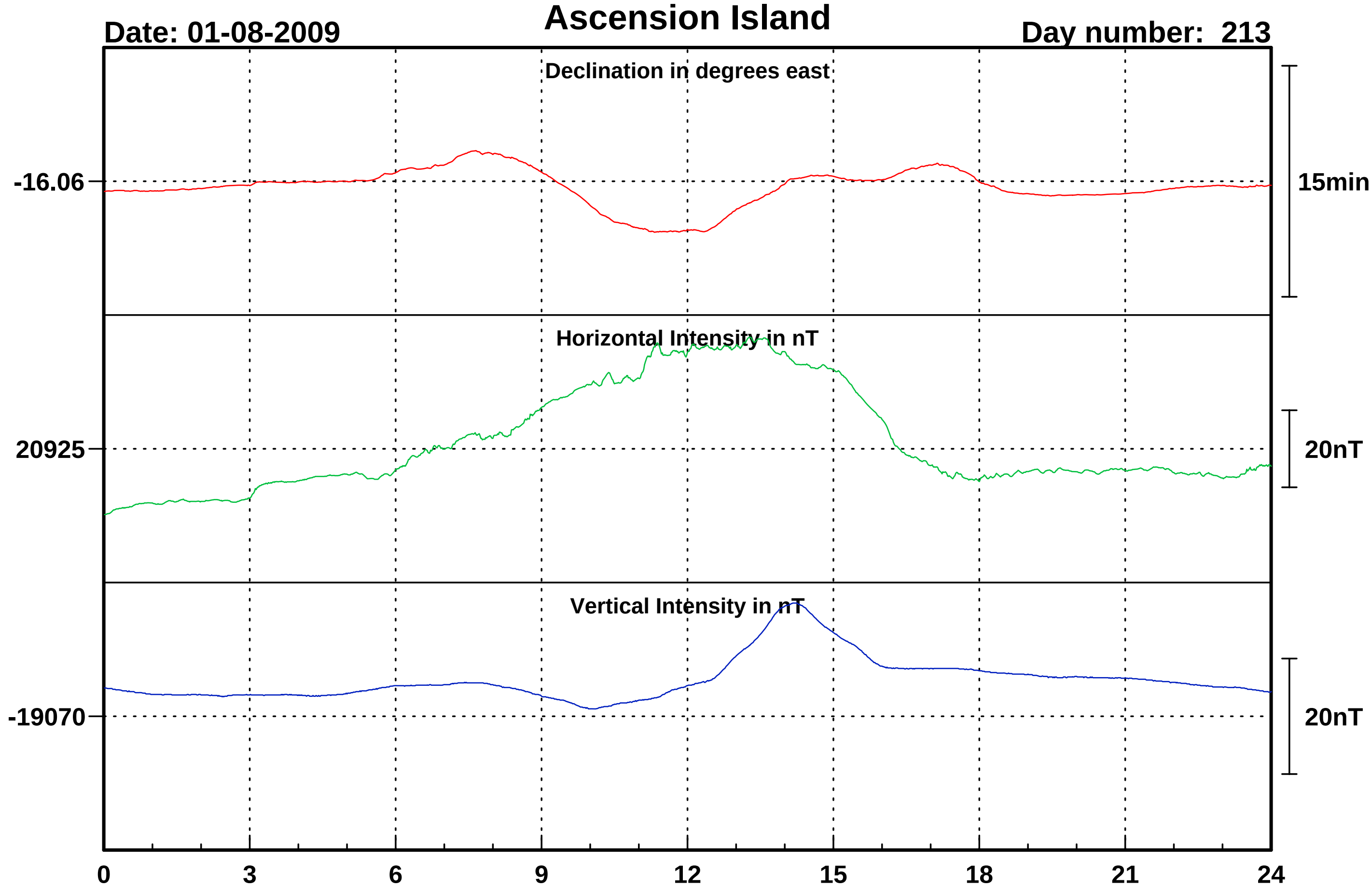


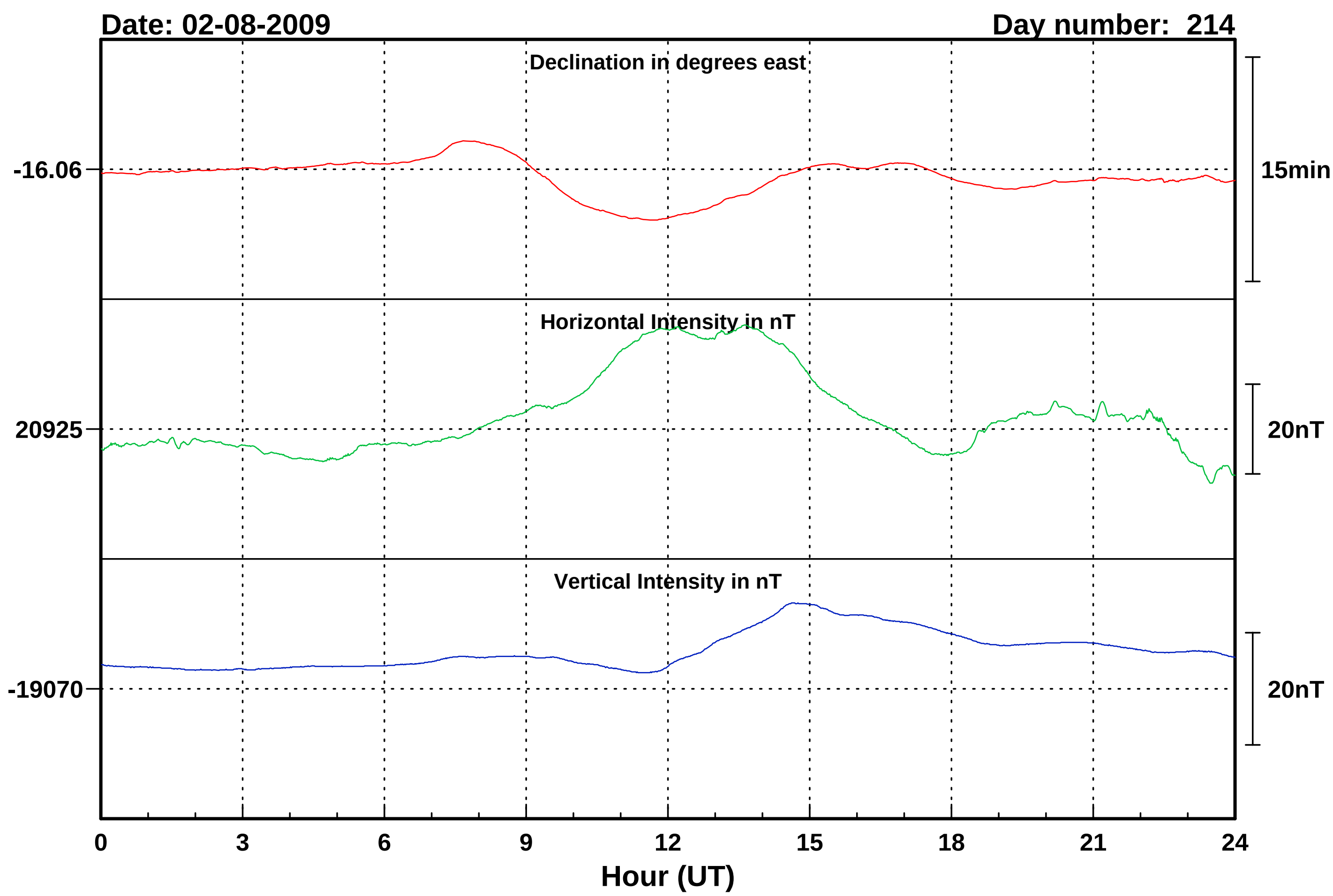
Ascension Island
August
2009
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
D -16.06
H 20925
Z -19070
0.30°
150 nT
75 nT
6
12
18
24



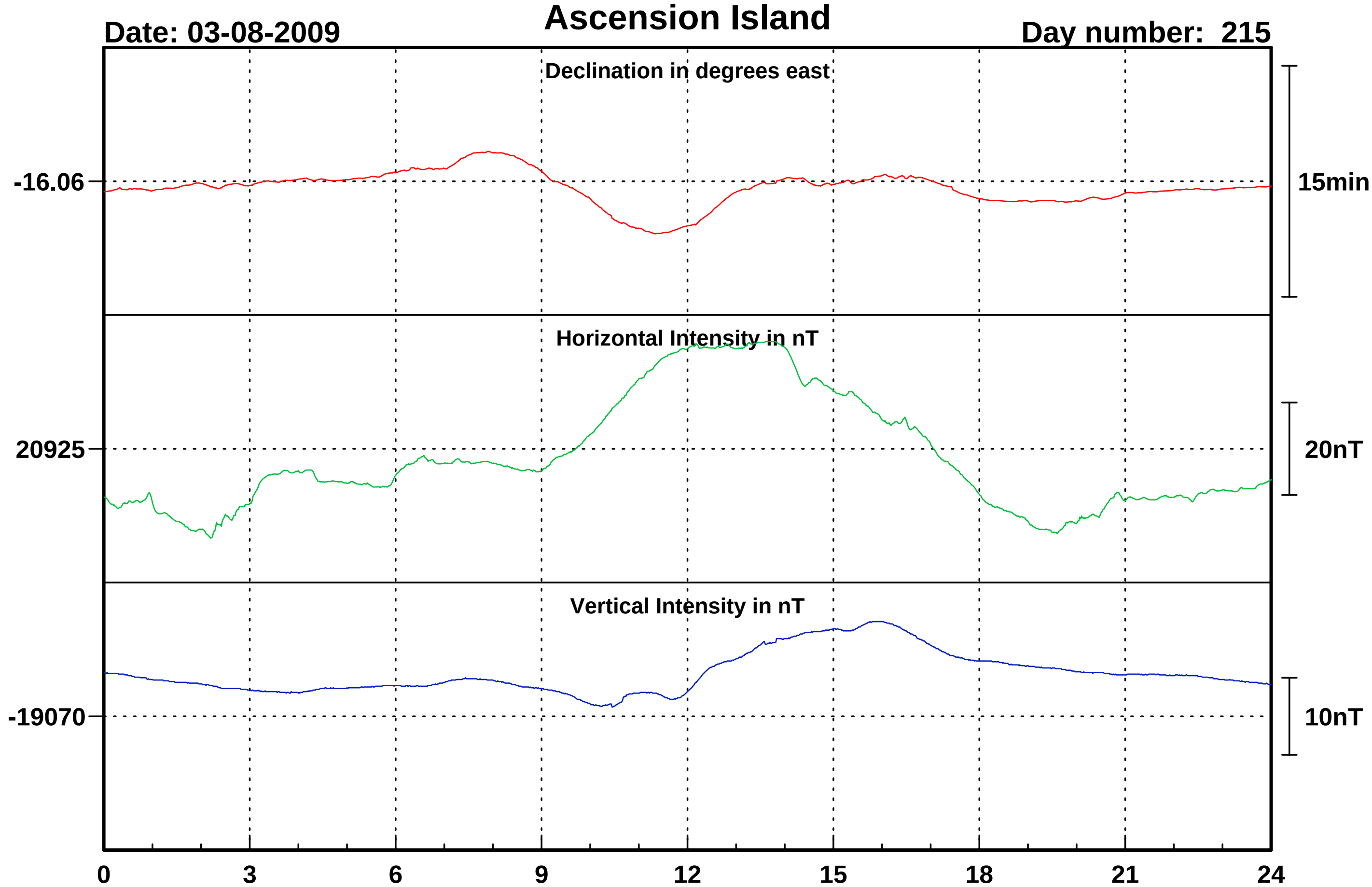
Ascension Island August 2009

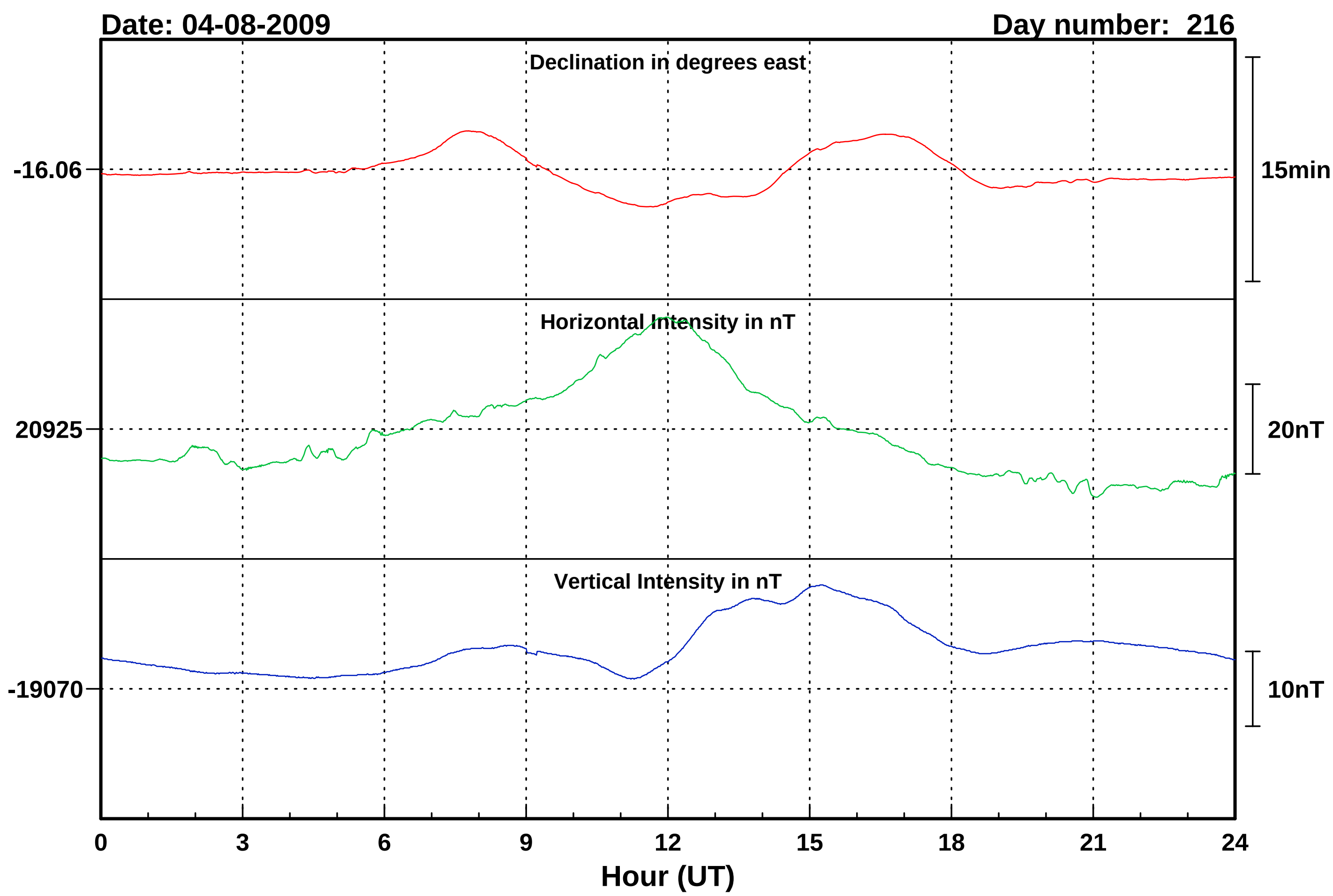
Ascension Island





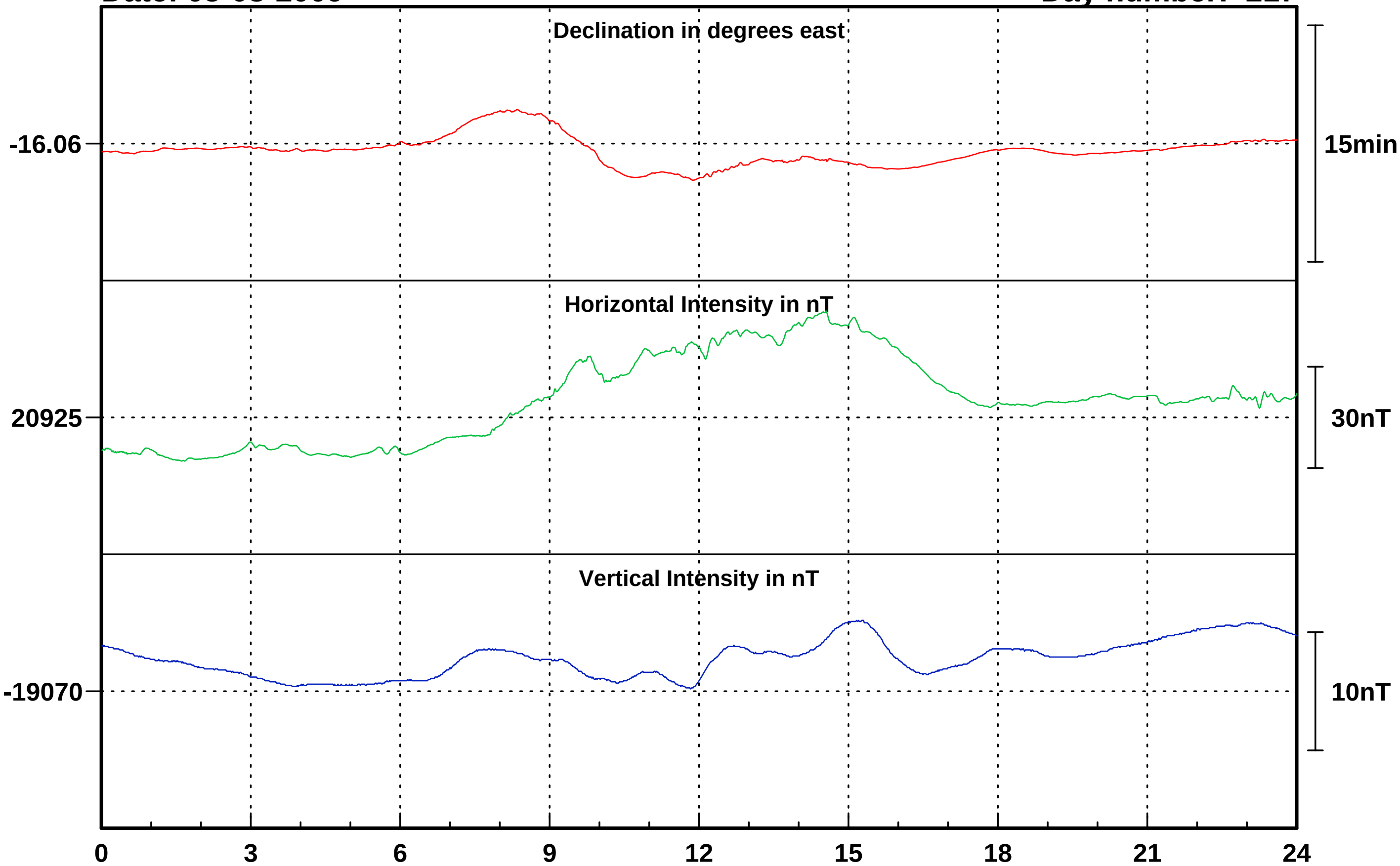
Ascension Island



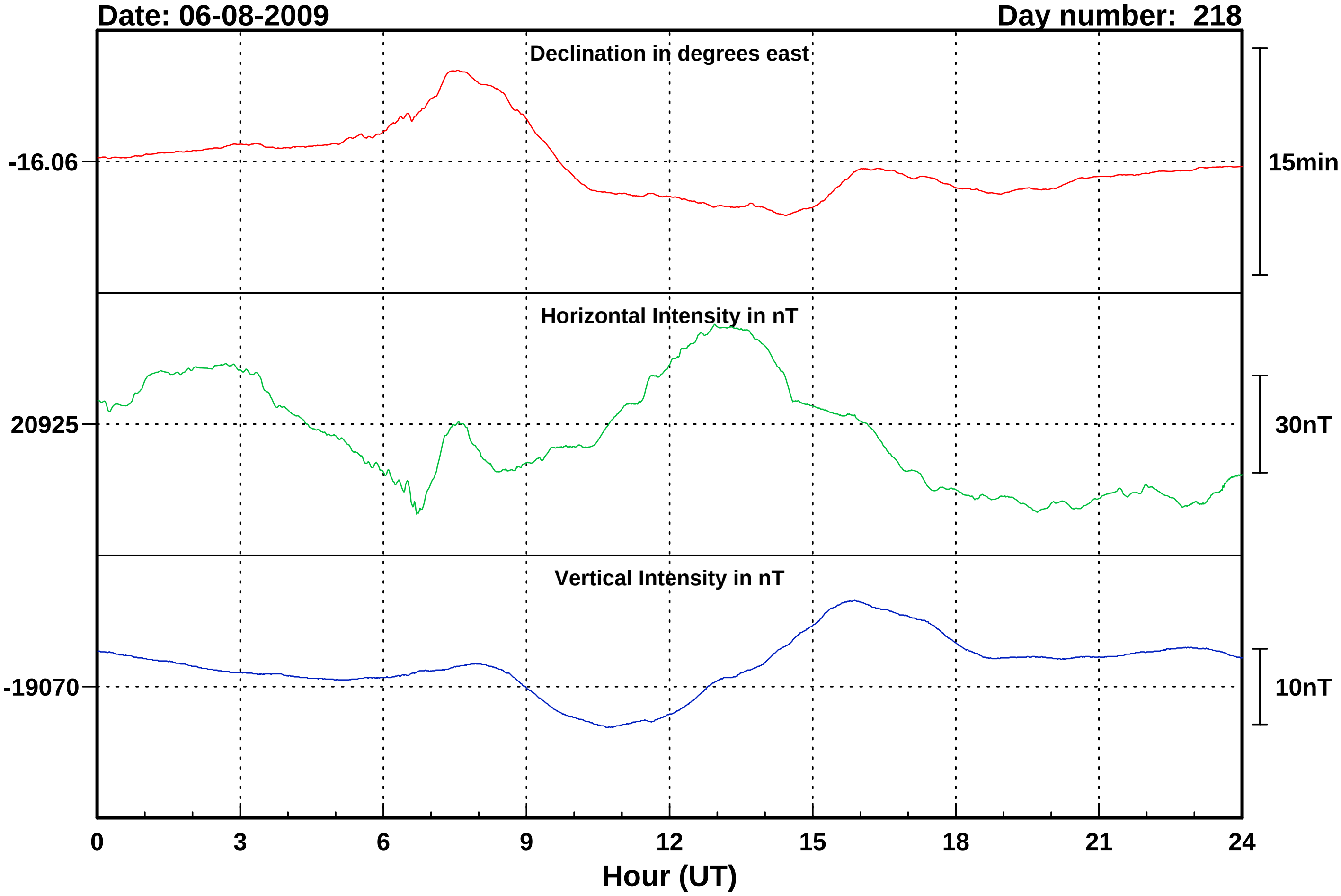


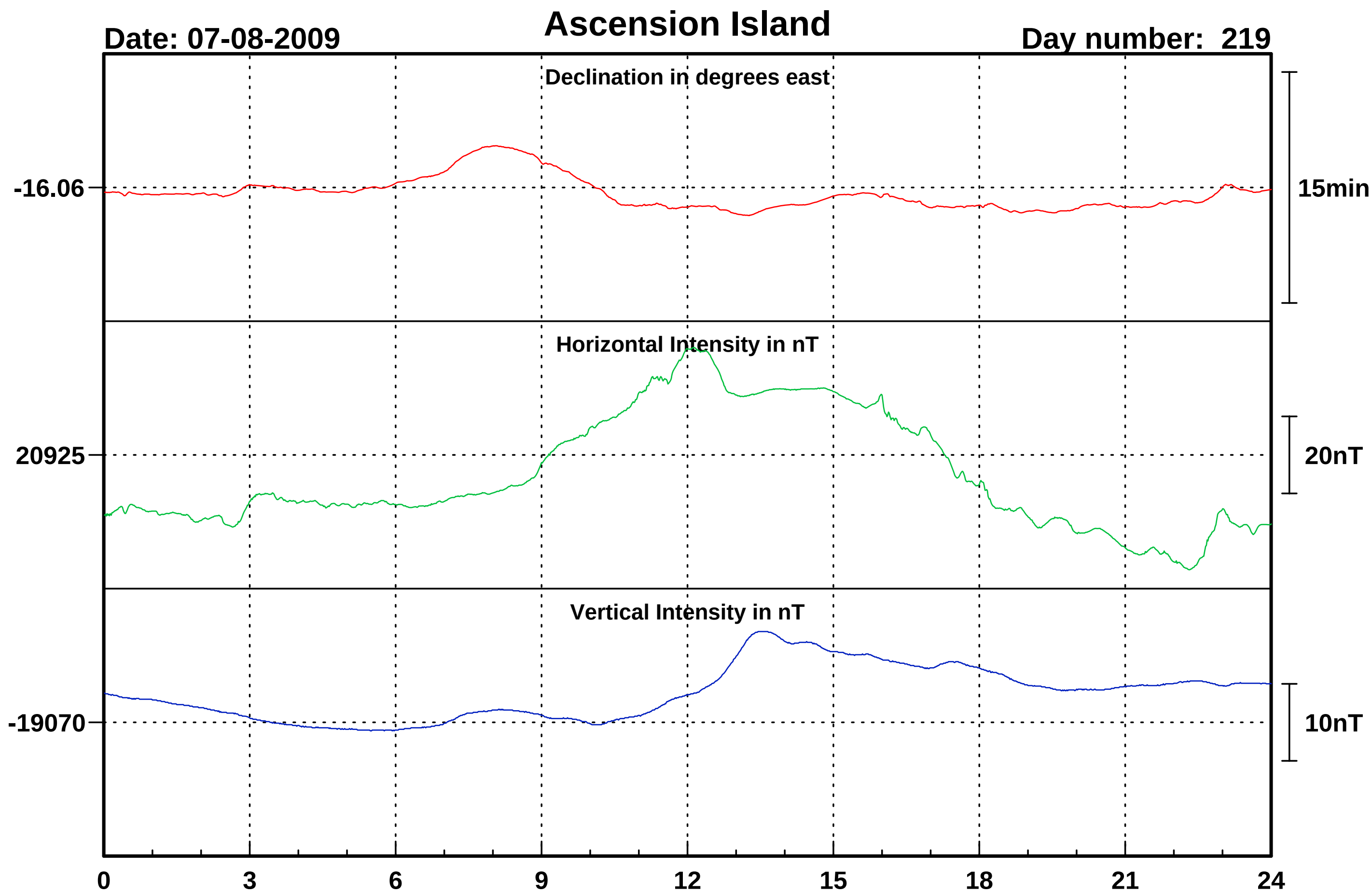
Ascension Island

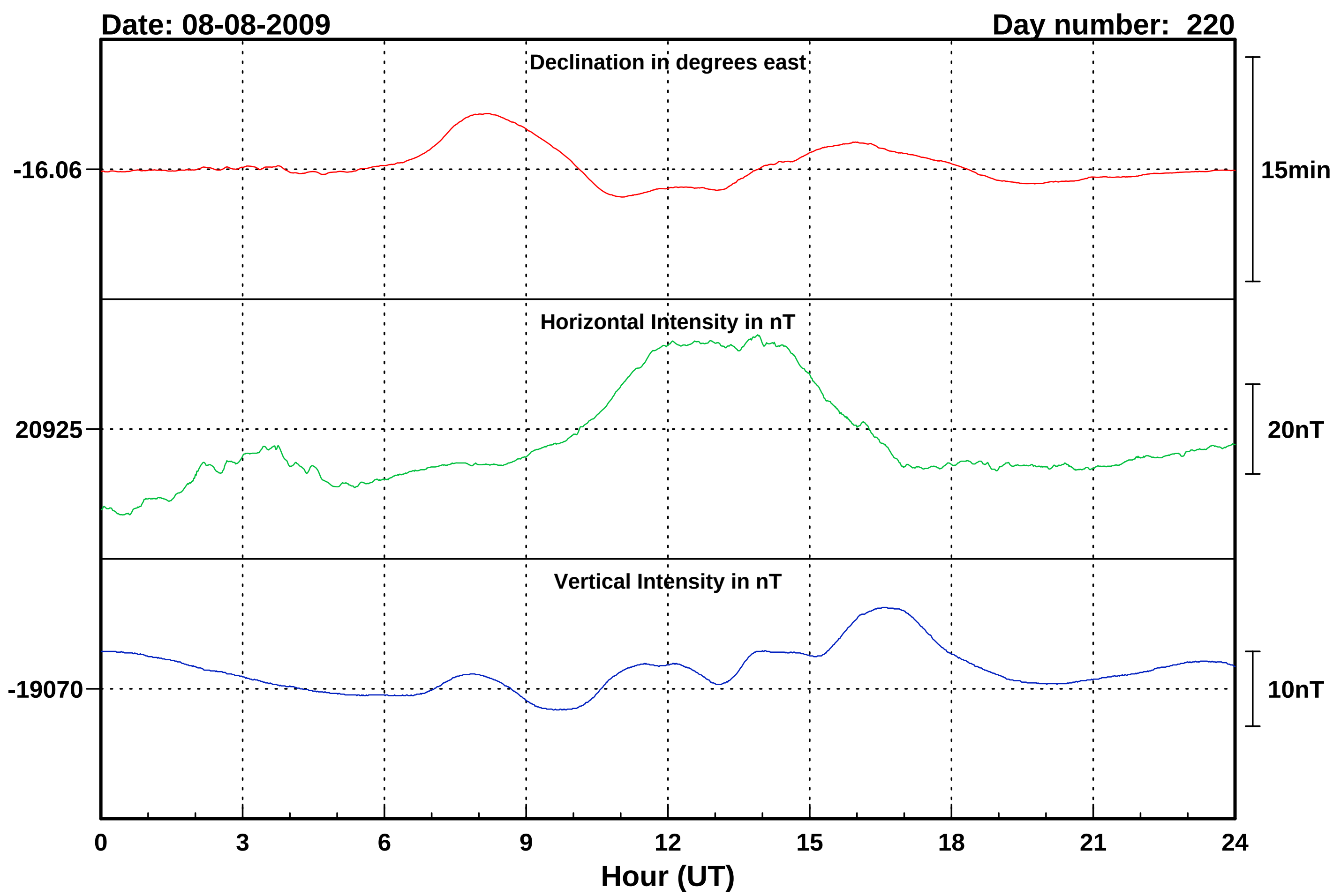
Date: 05-08-2009 Day number: 217



Date: 06-08-2009 Day number: 218

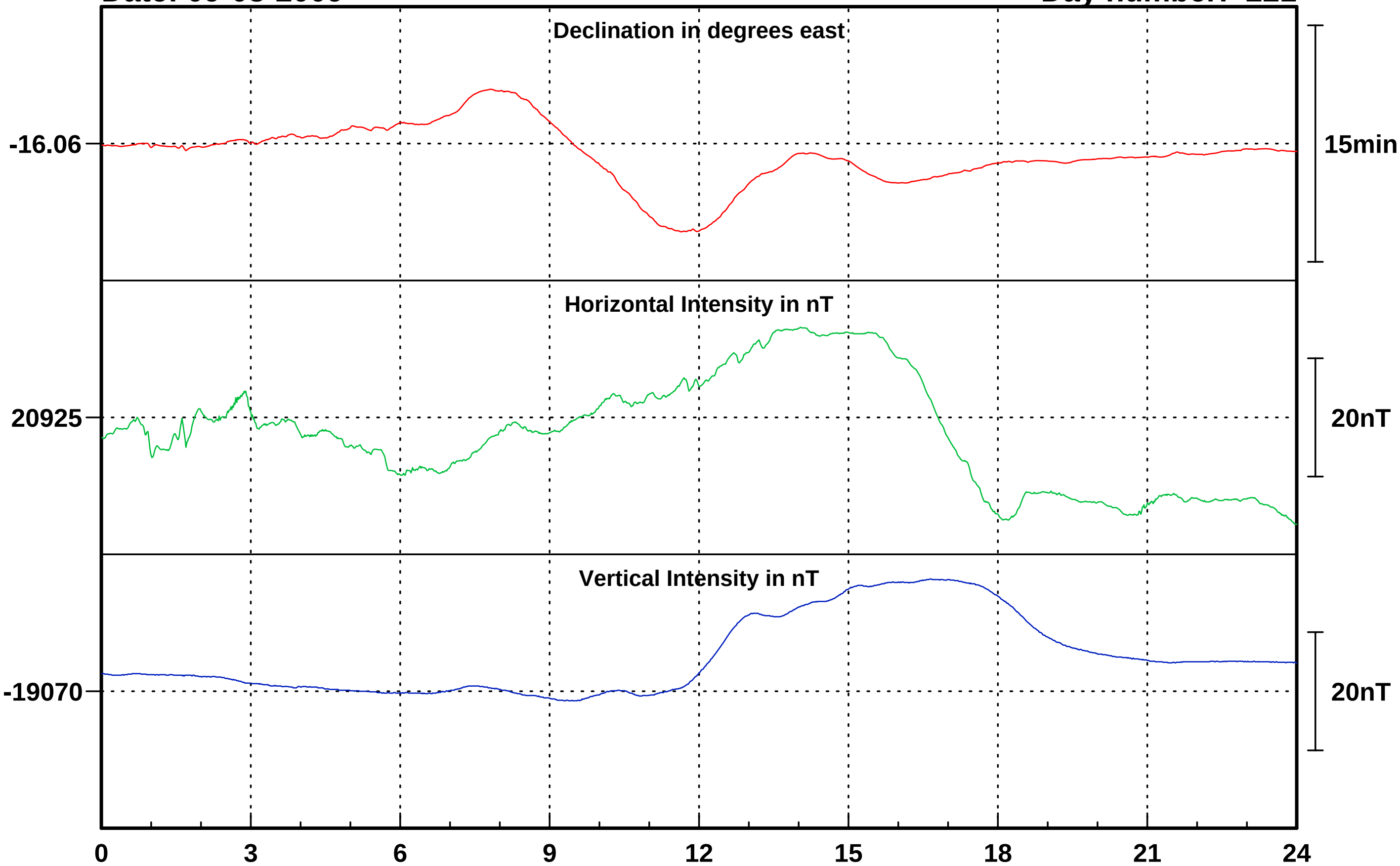



Ascension Island
Date: 07-08-2009
Day number: 219
Declination in degrees east
-16.06
15min
Horizontal Intensity in nT
20925
20nT
Vertical Intensity in nT
-19070
10nT
0
3
6
9
12
15
18
21
24

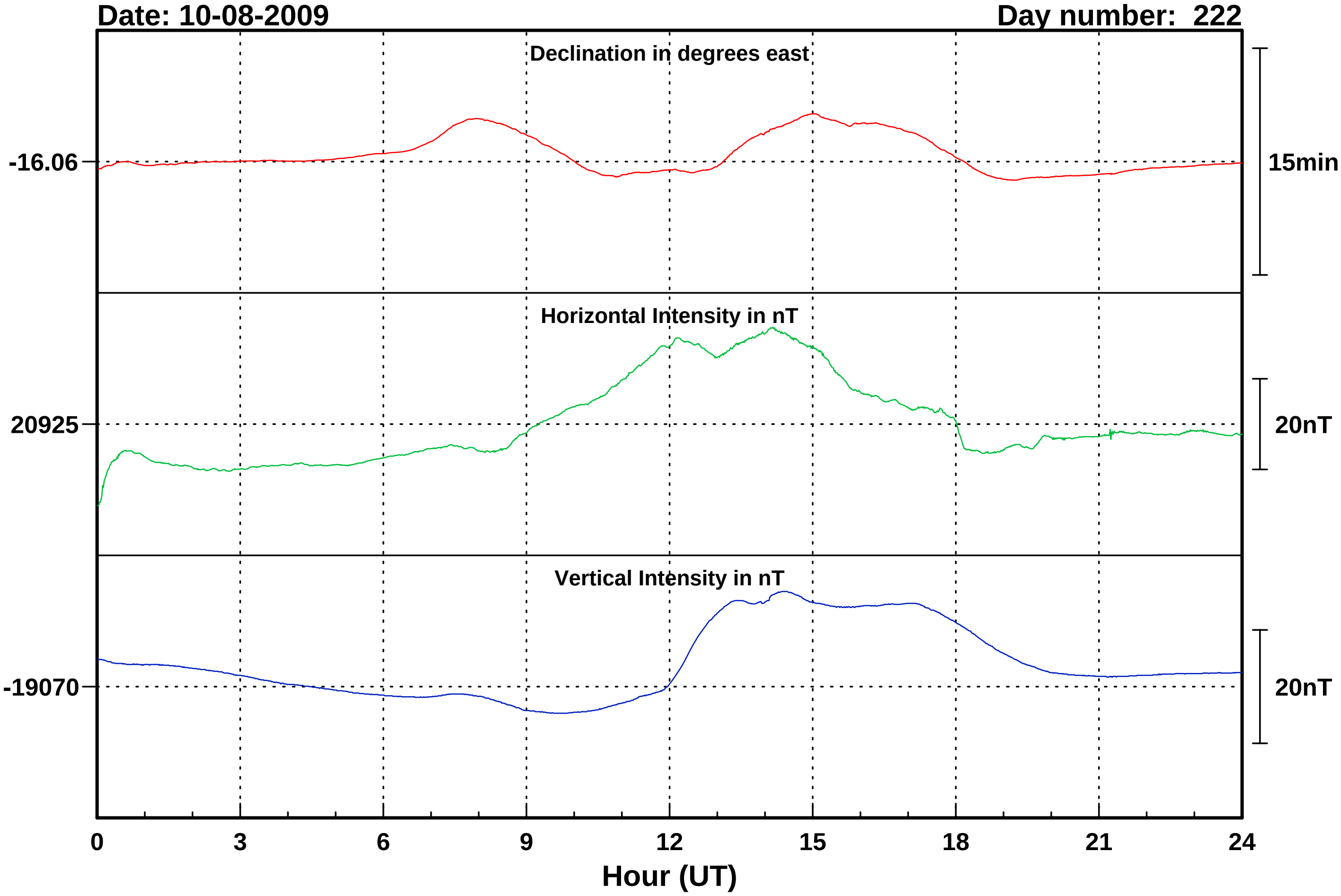

Date: 08-08-2009
Day number: 220
Declination in degrees east
-16.06
15min
Horizontal Intensity in nT
20925
20nT
Vertical Intensity in nT
-19070
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)

Ascension Island

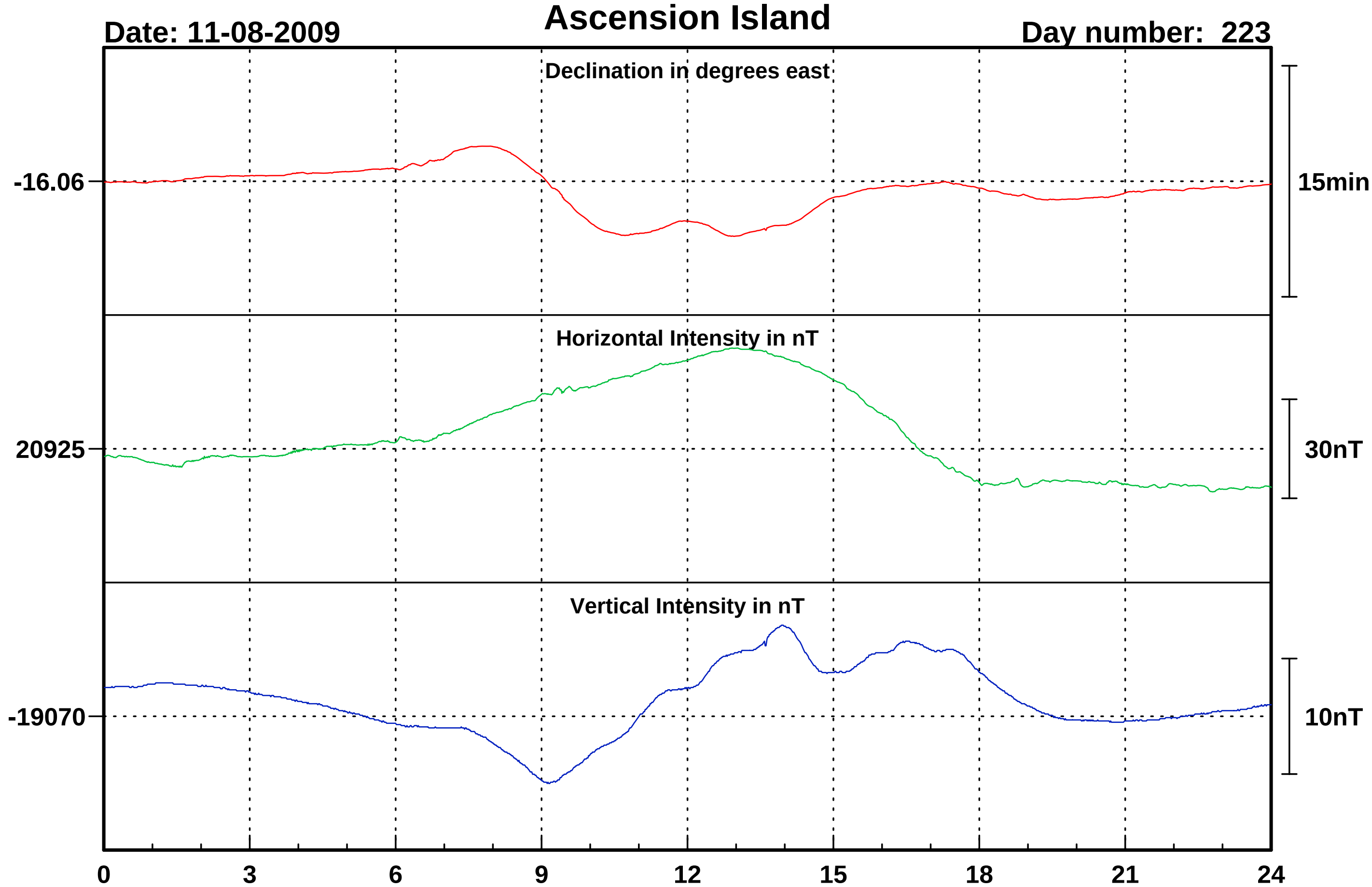
Date: 09-08-2009 Day number: 221

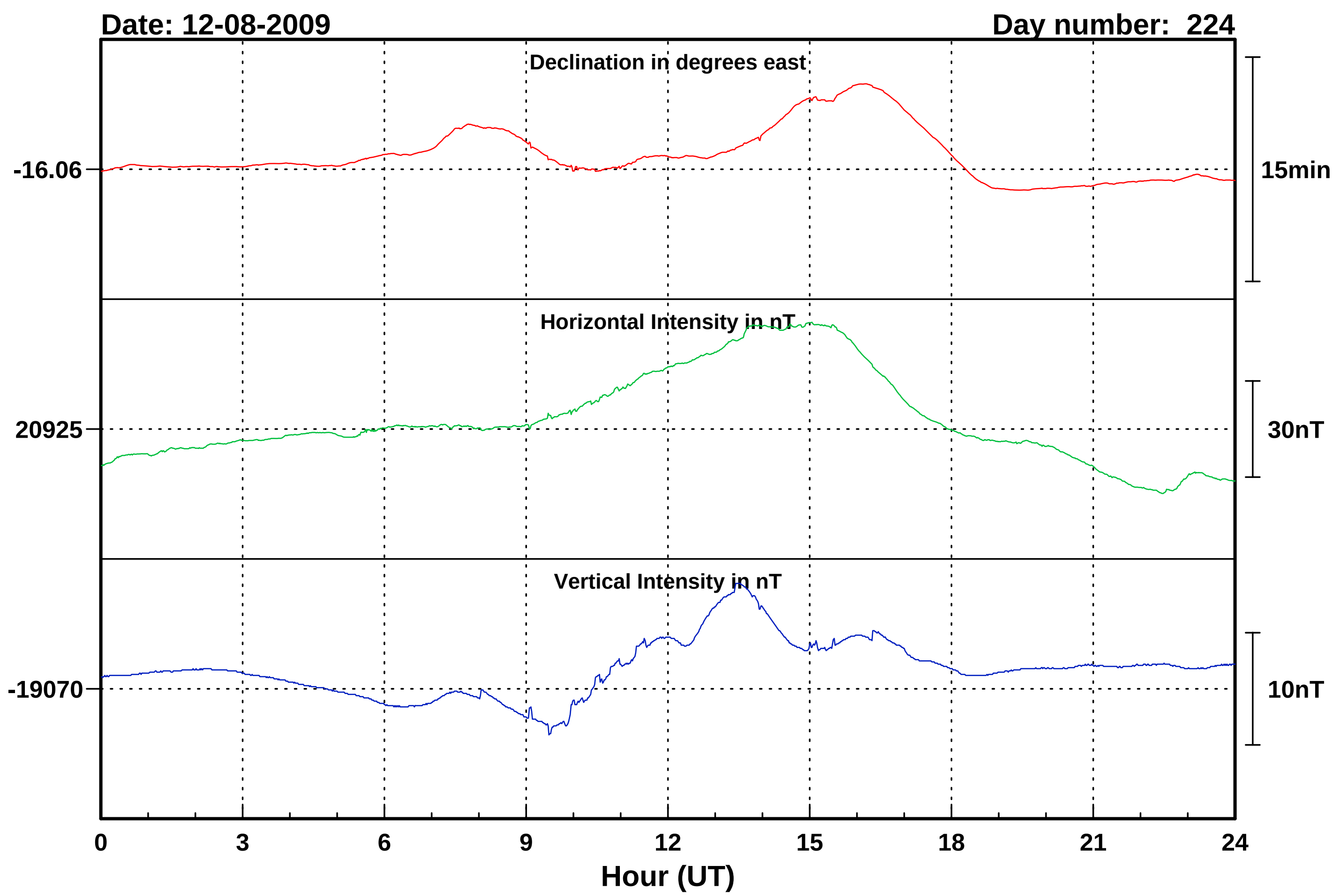


Date: 10-08-2009 Day number: 222



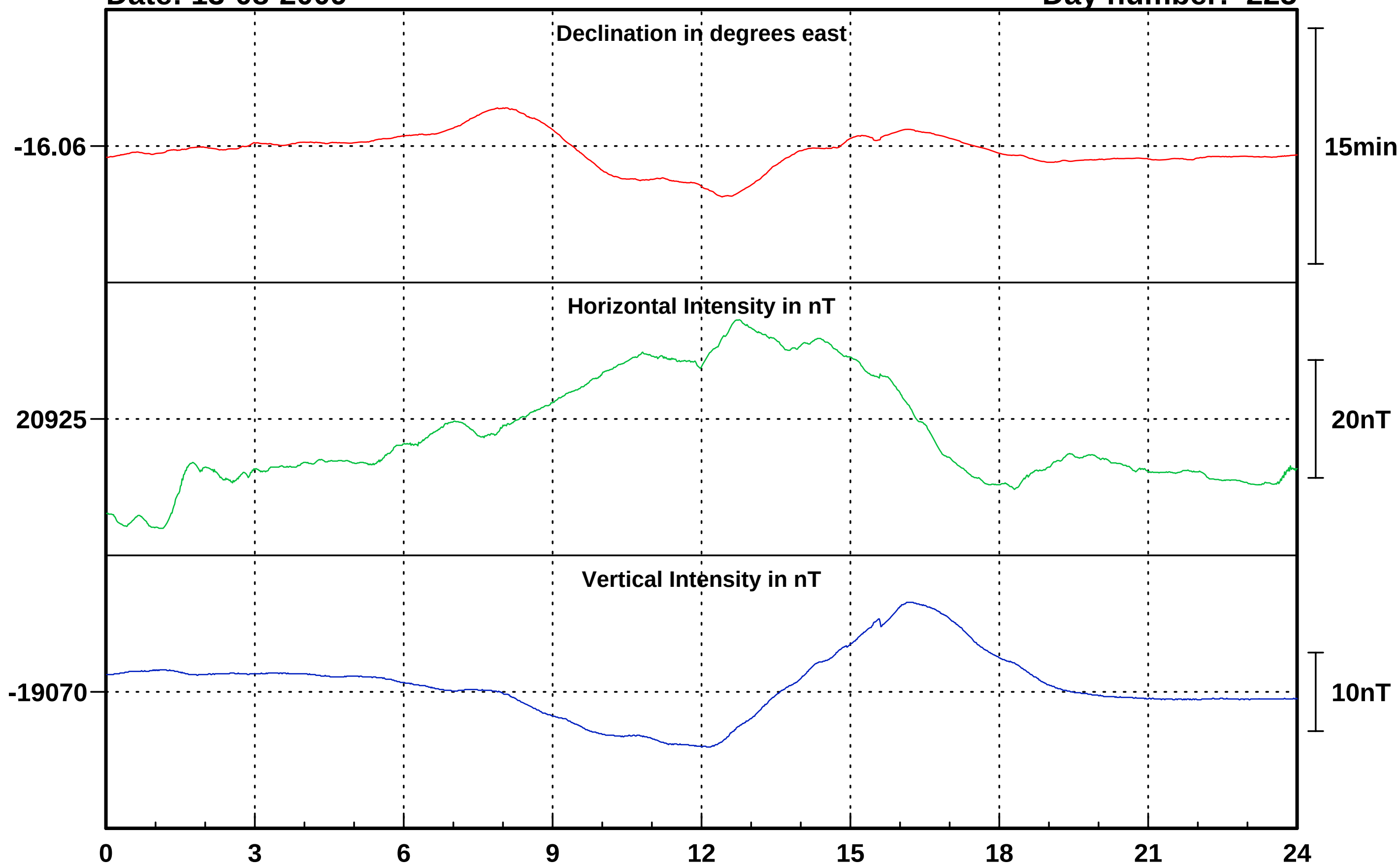
Ascension Island



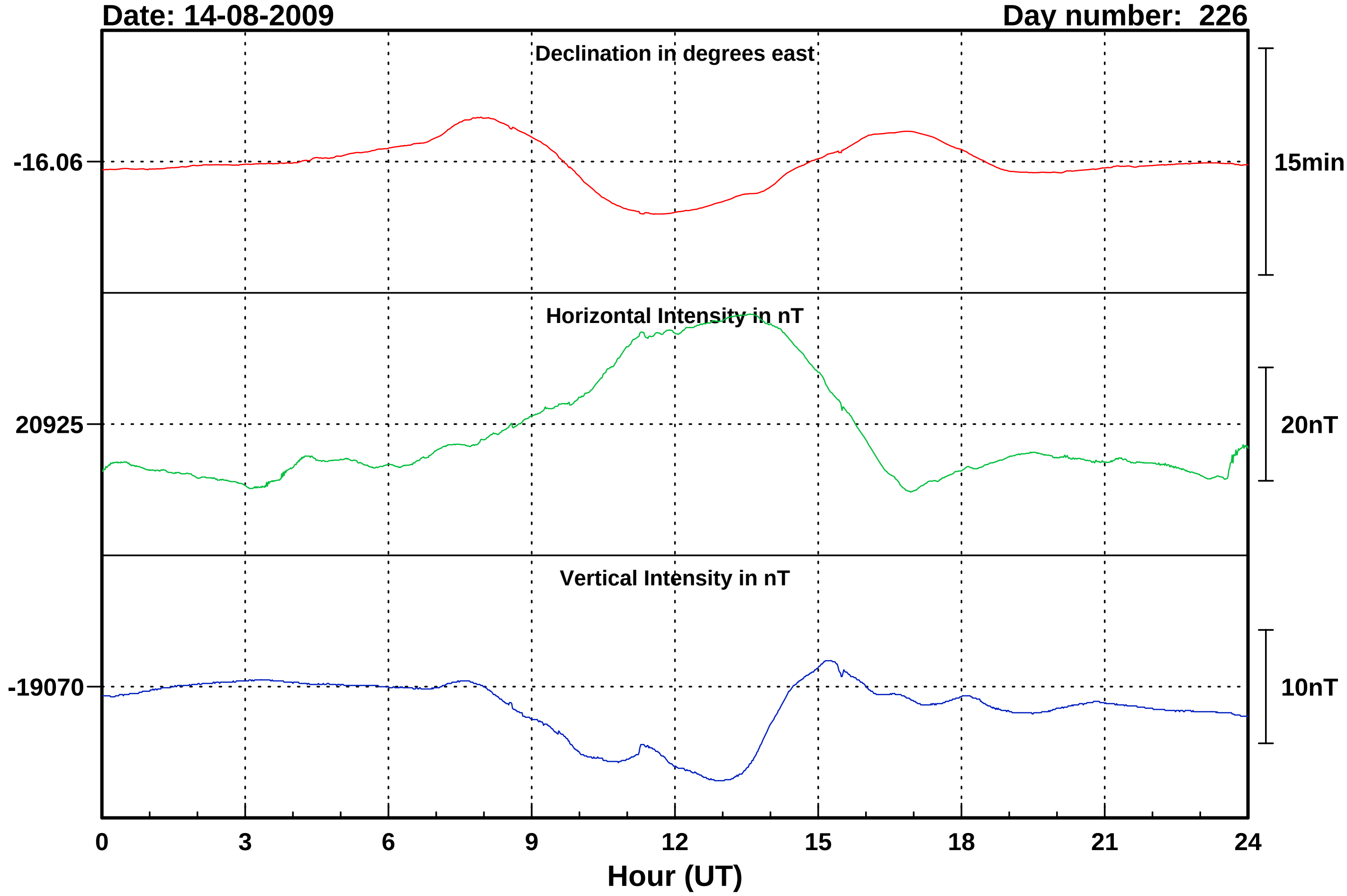


Ascension Island

Date: 13-08-2009 Day number: 225

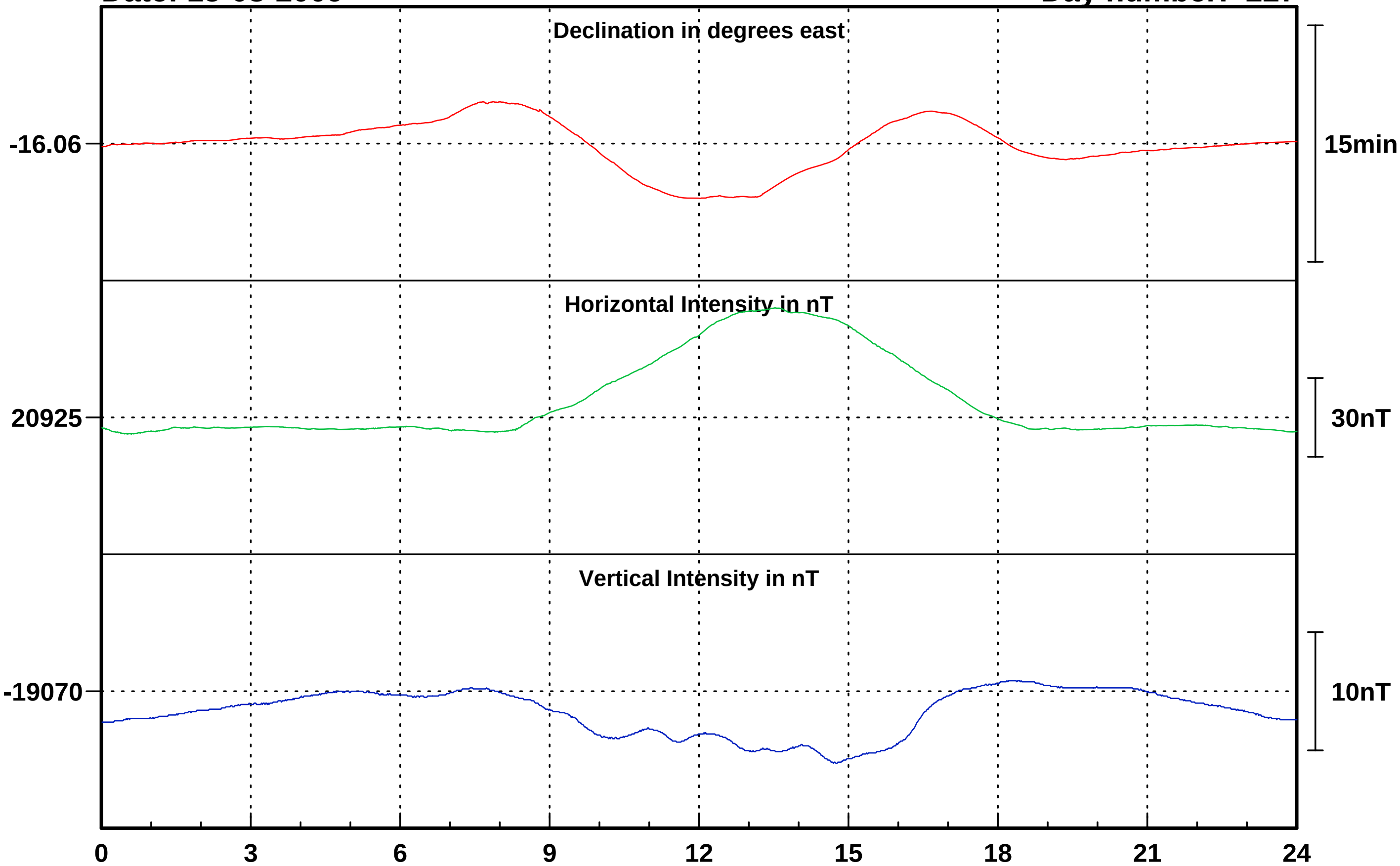


Date: 14-08-2009 Day number: 226

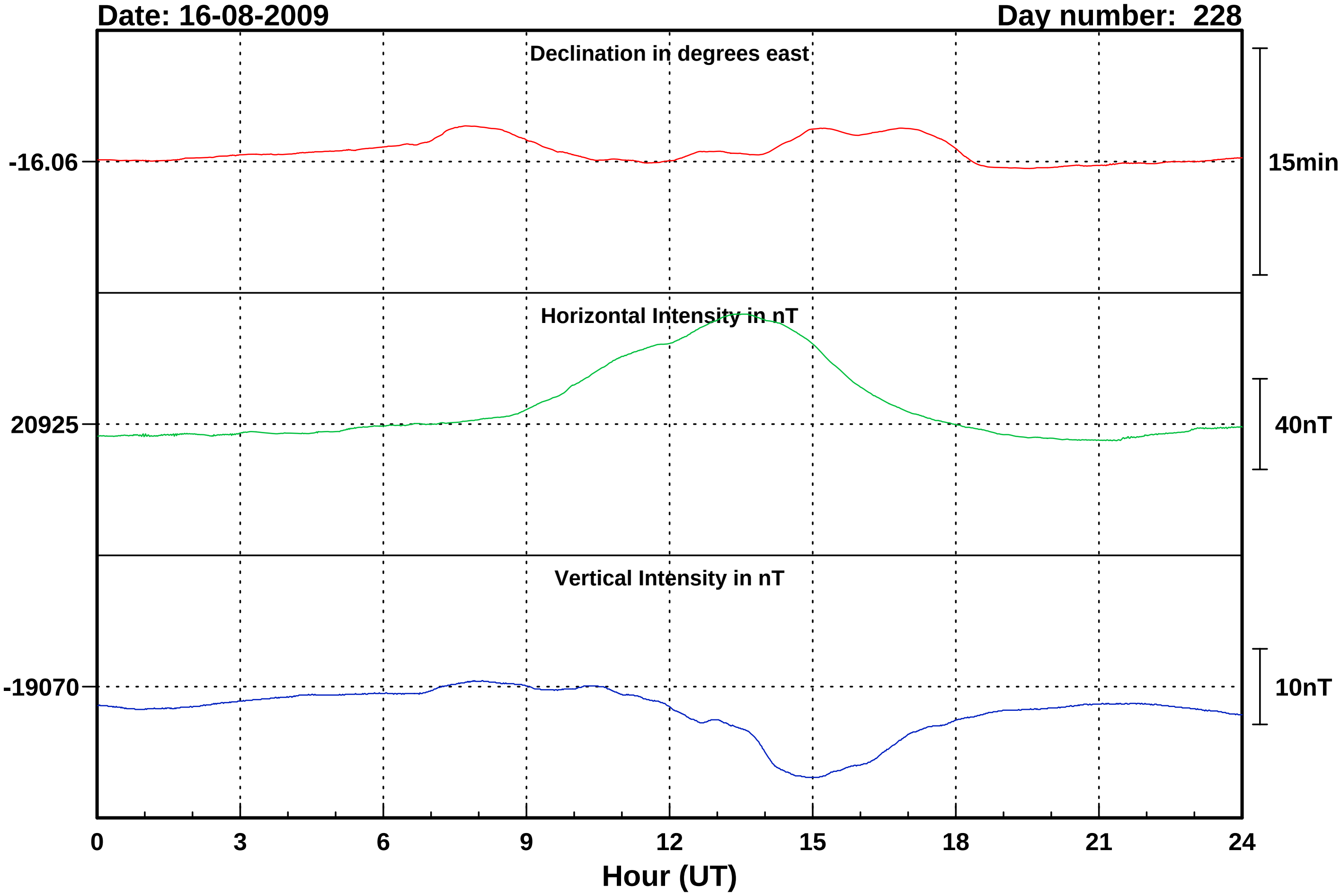


Ascension Island

Date: 15-08-2009 Day number: 227

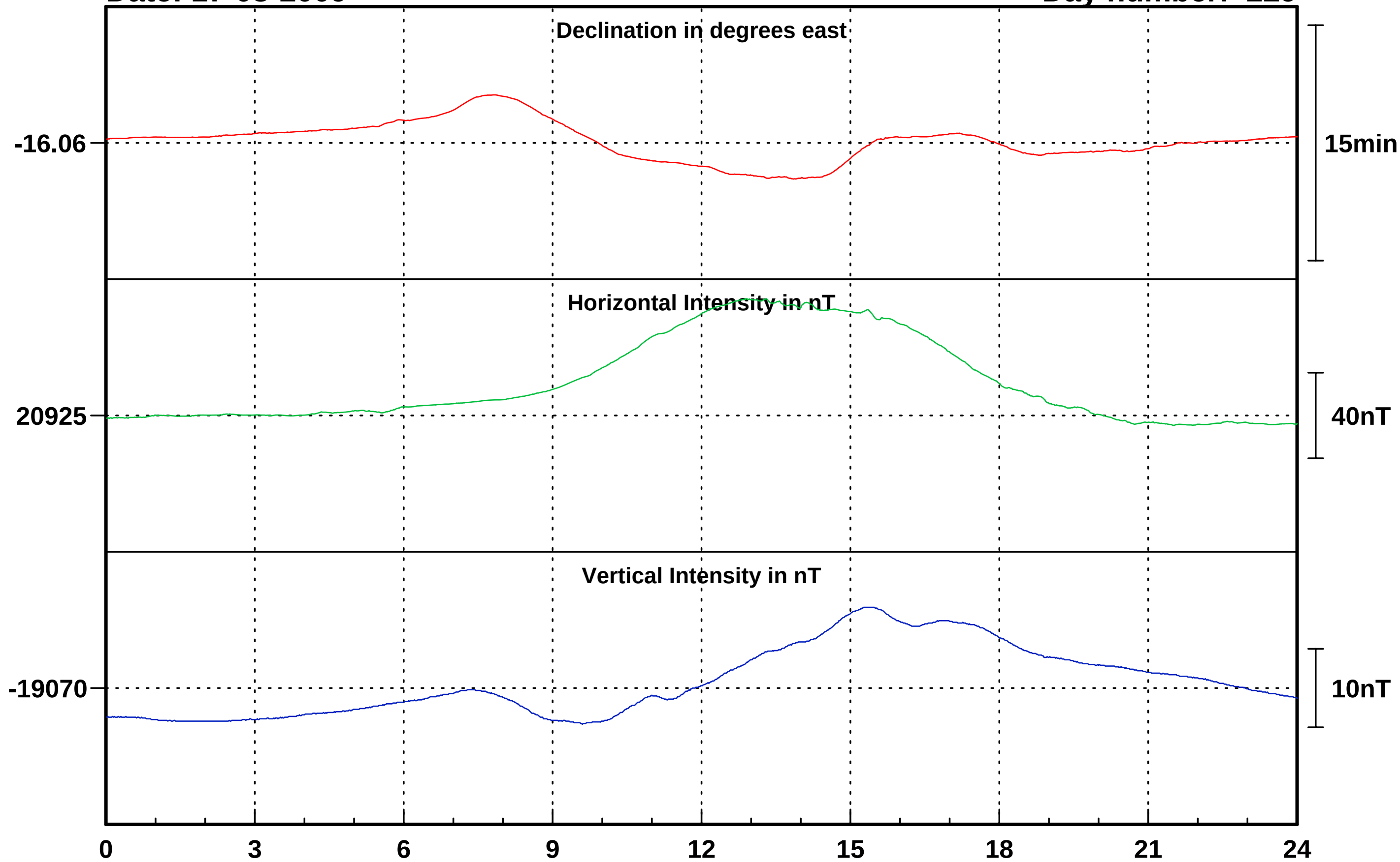


Date: 16-08-2009 Day number: 228

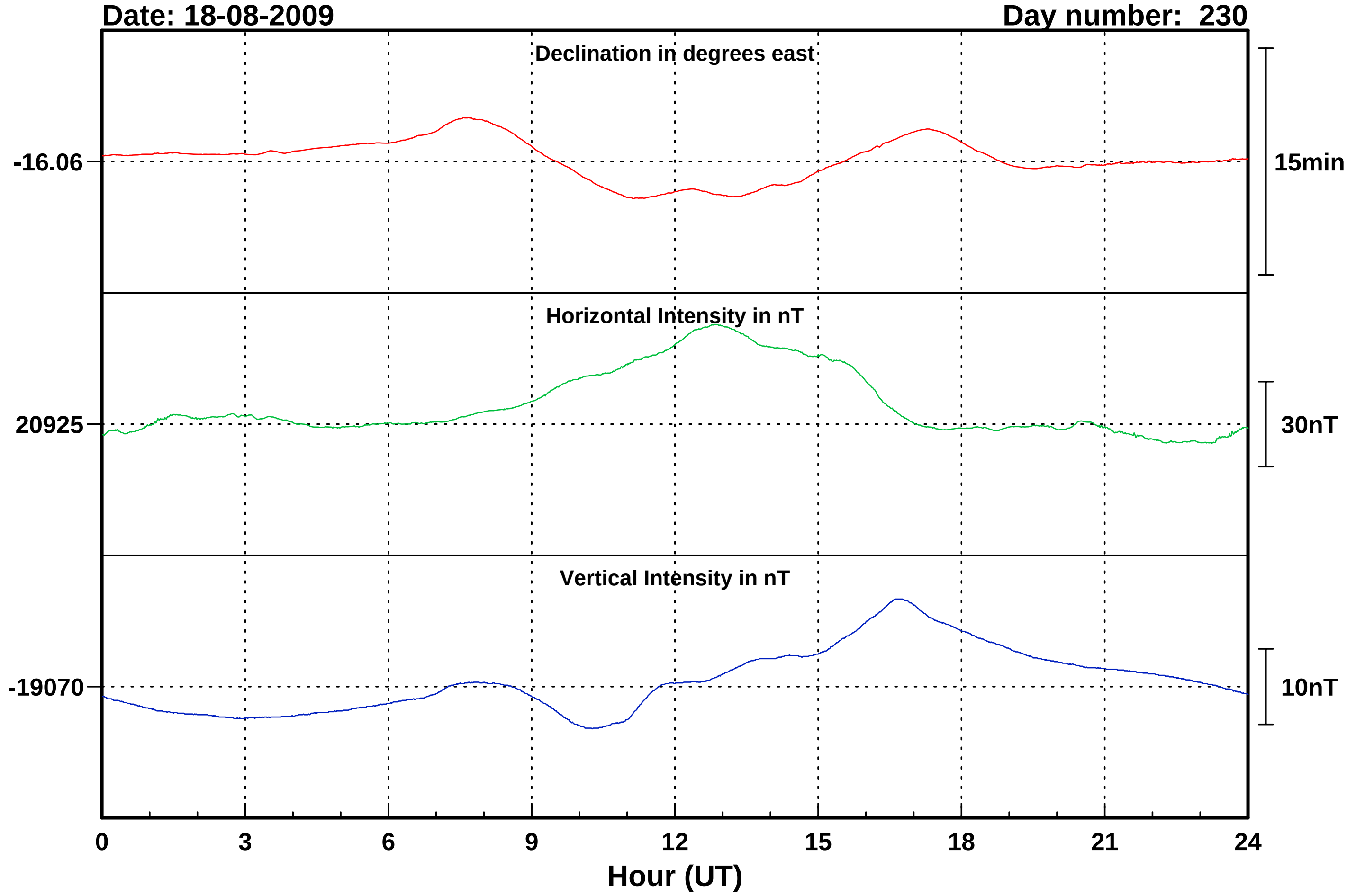


Ascension Island

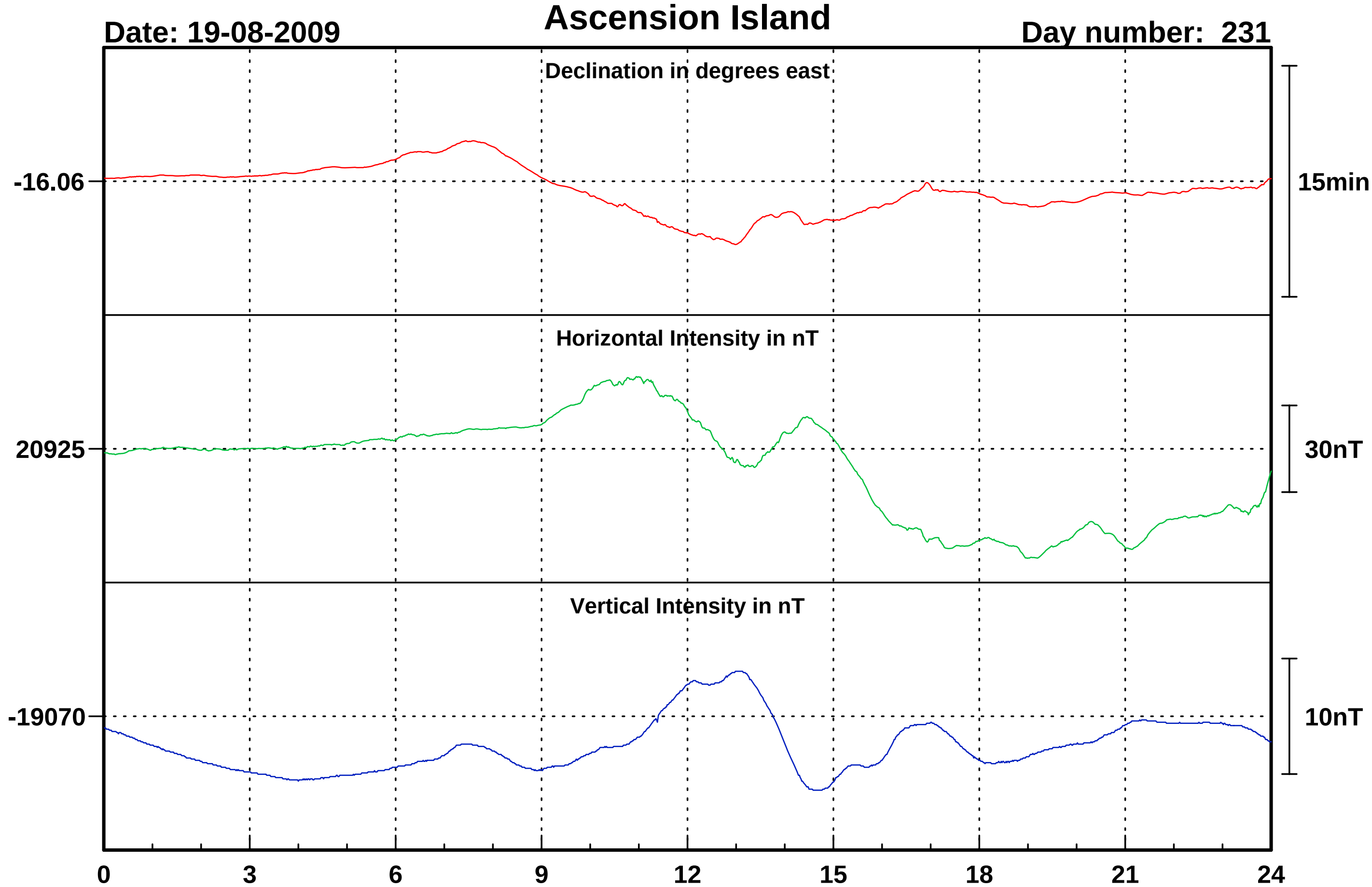
Date: 17-08-2009 Day number: 229

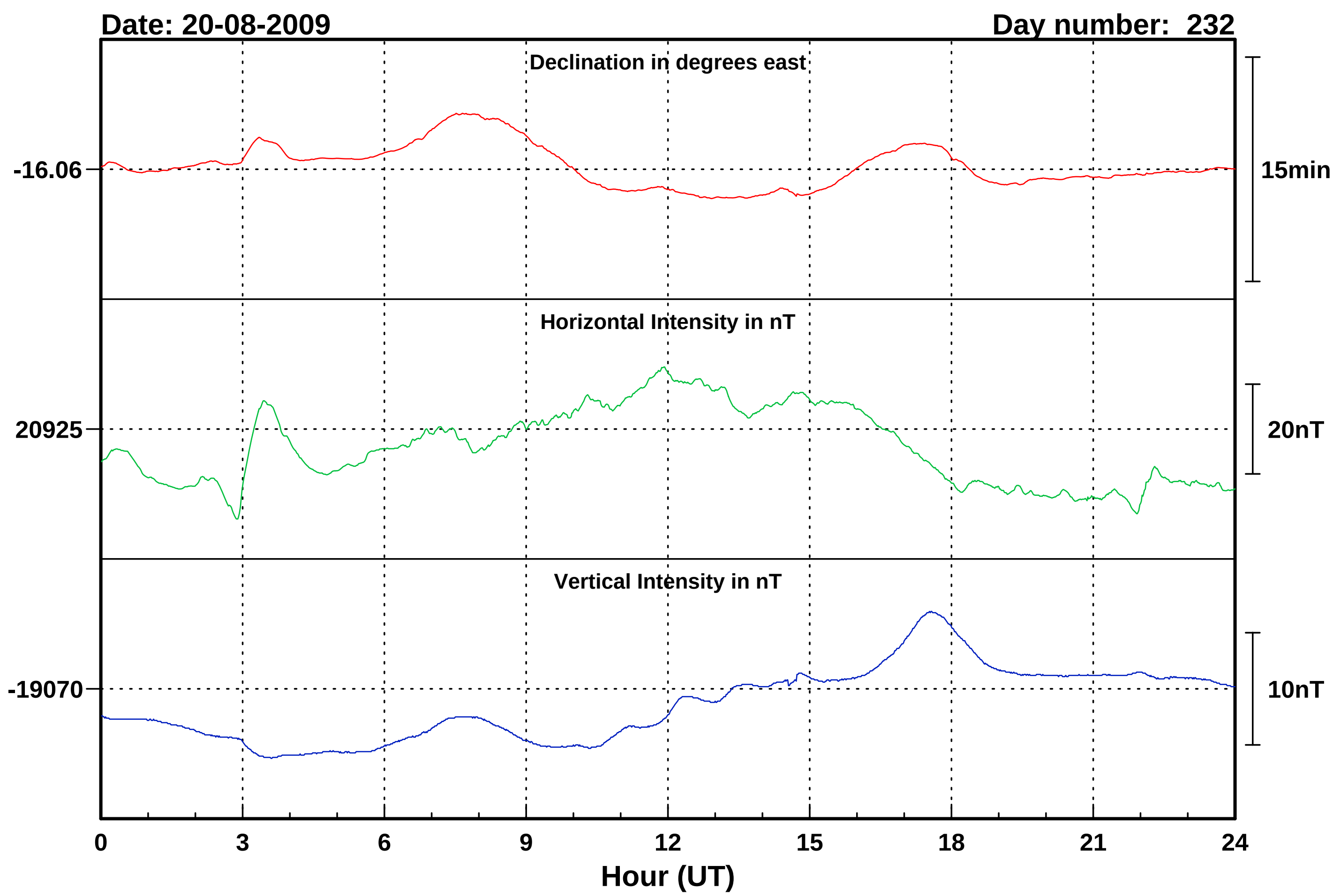


Date: 18-08-2009 Day number: 230



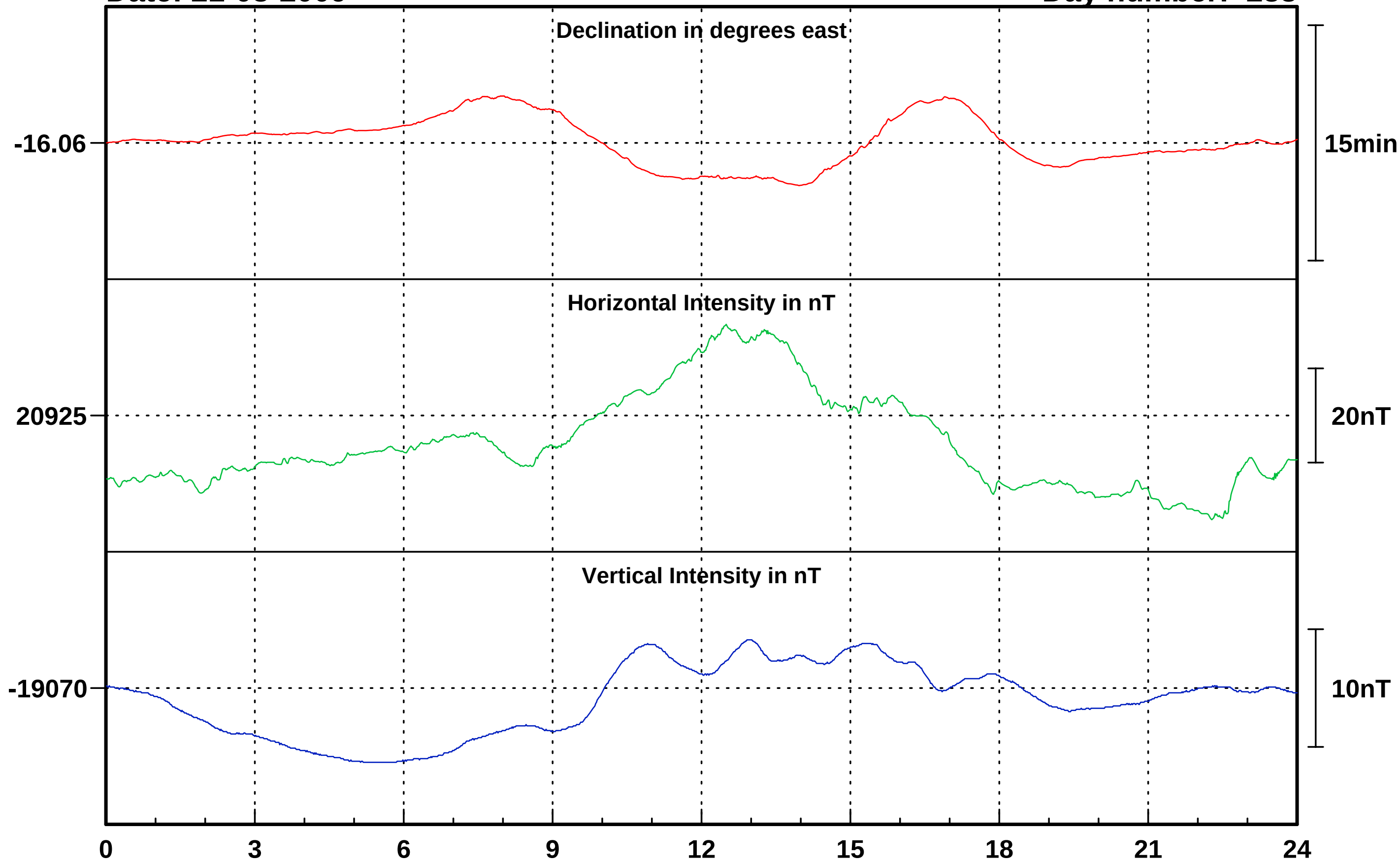
Ascension Island



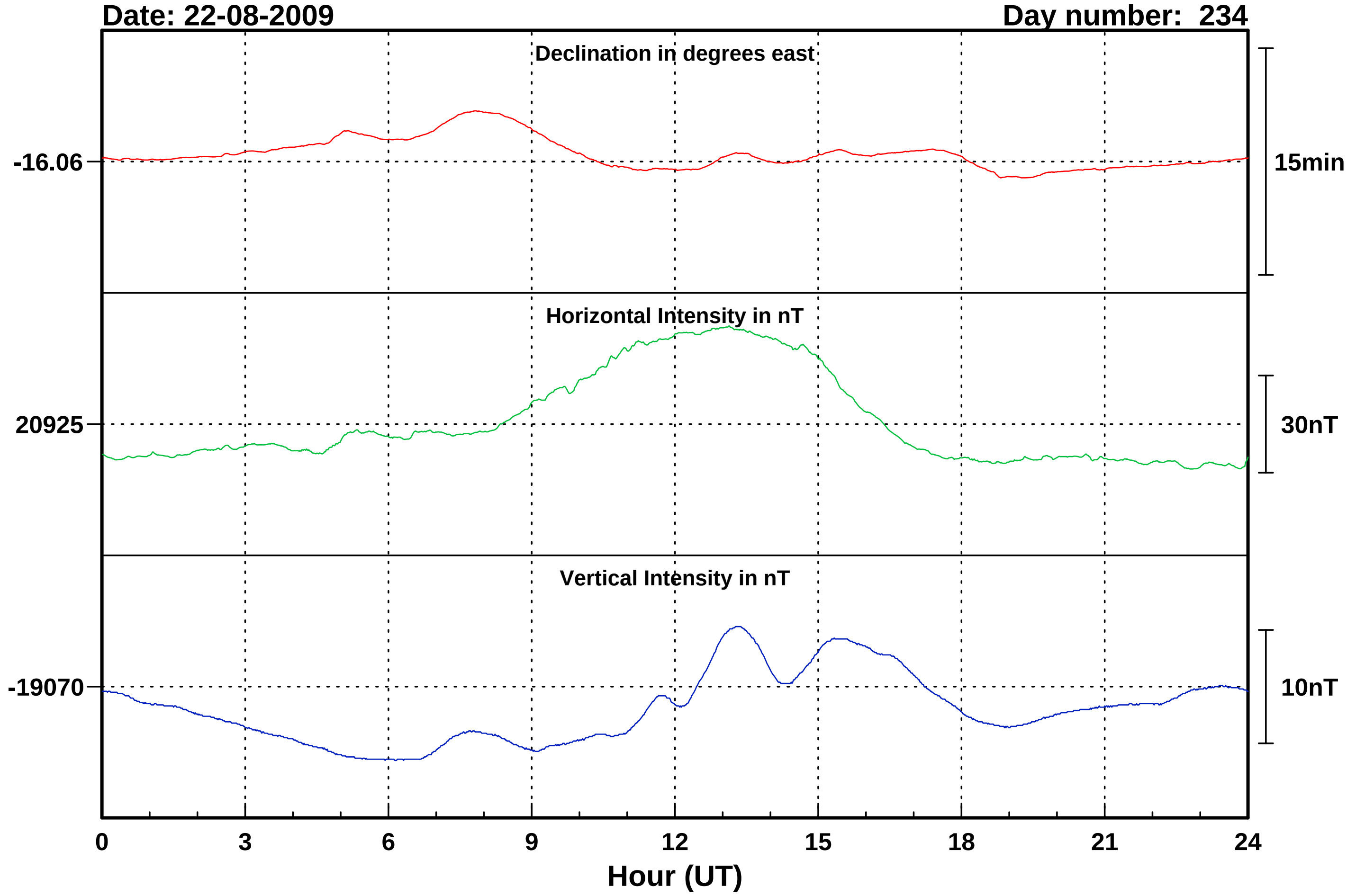


Ascension Island

Date: 21-08-2009 Day number: 233

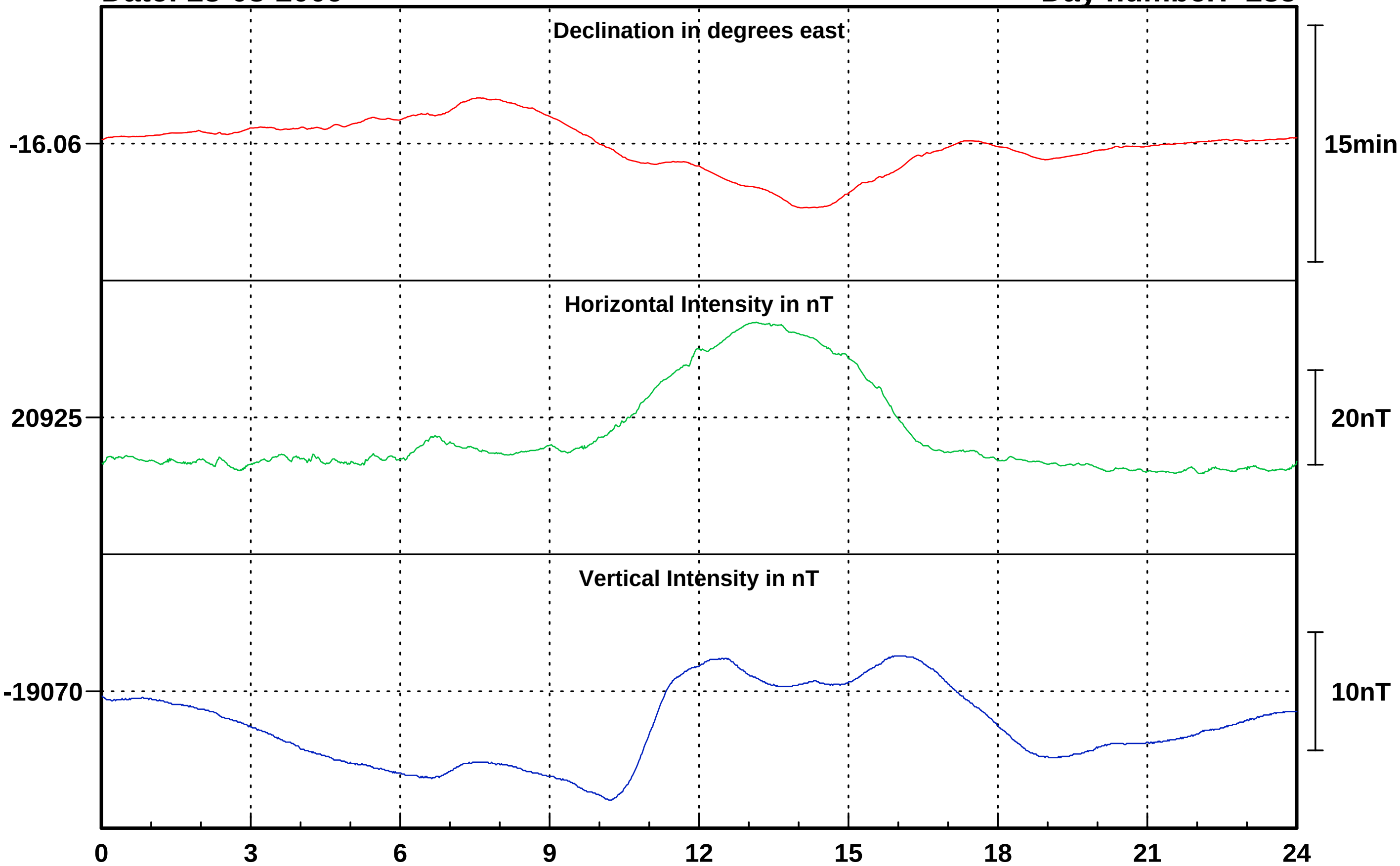


Date: 22-08-2009 Day number: 234

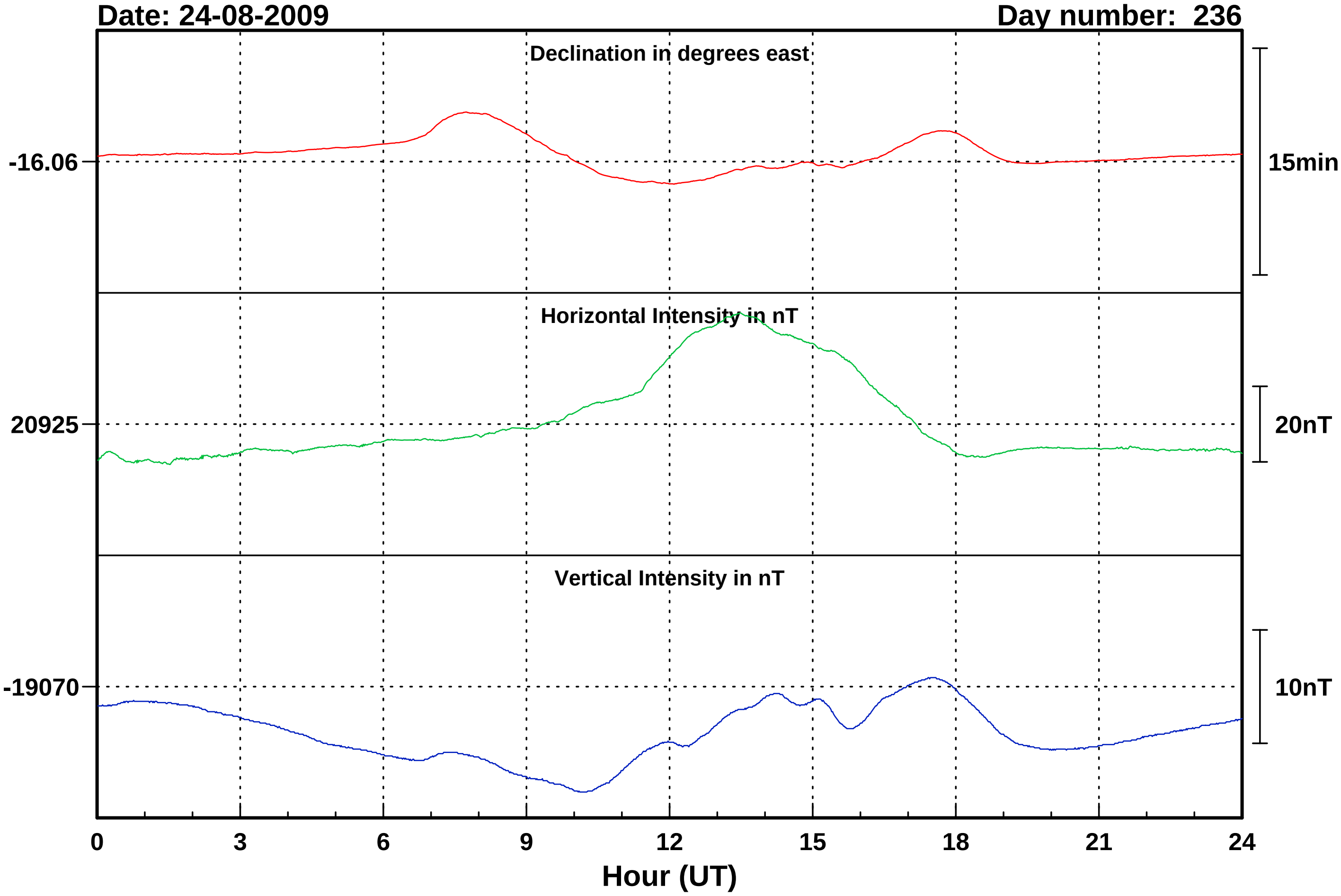


Ascension Island

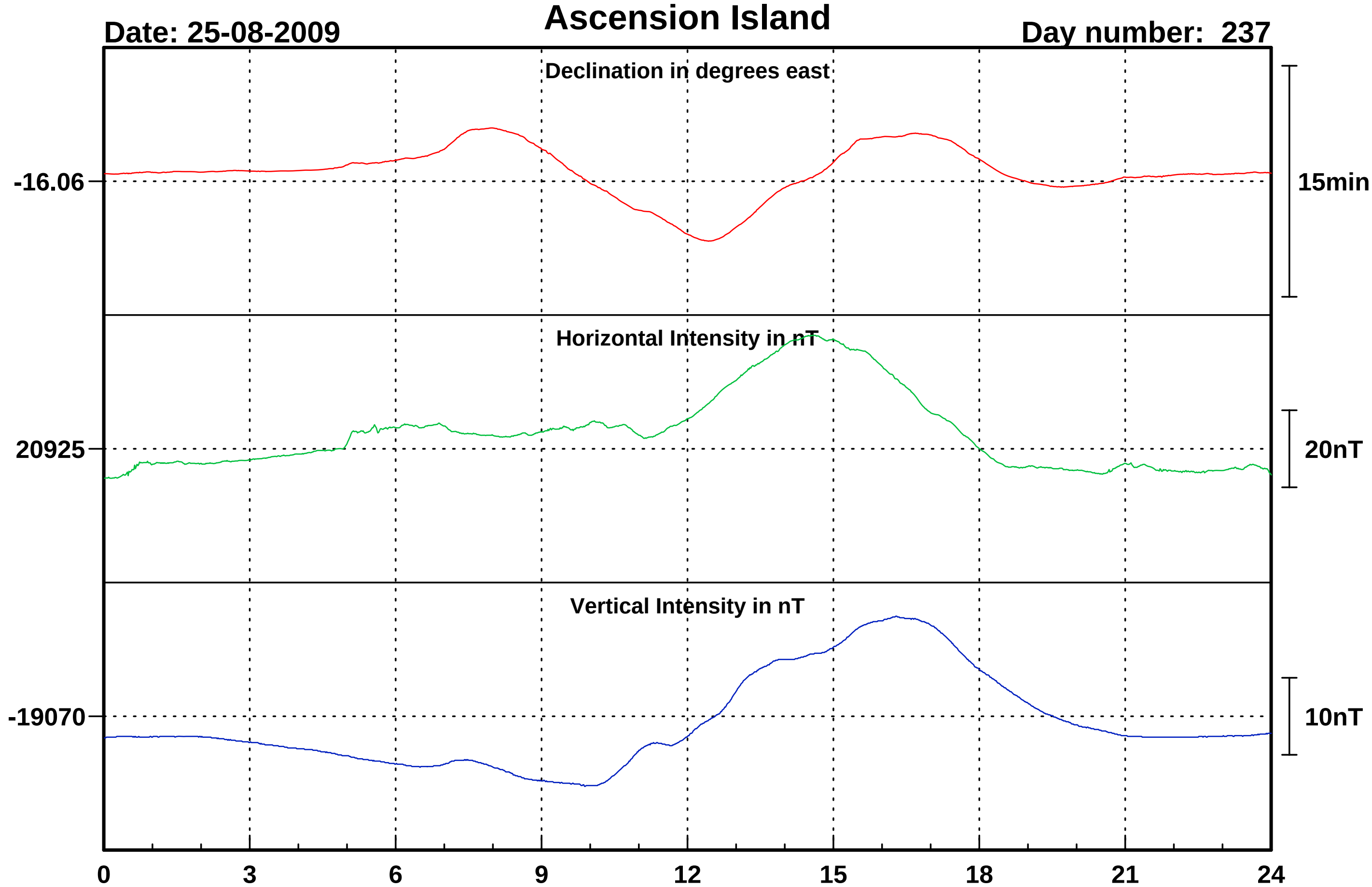
Date: 23-08-2009 Day number: 235

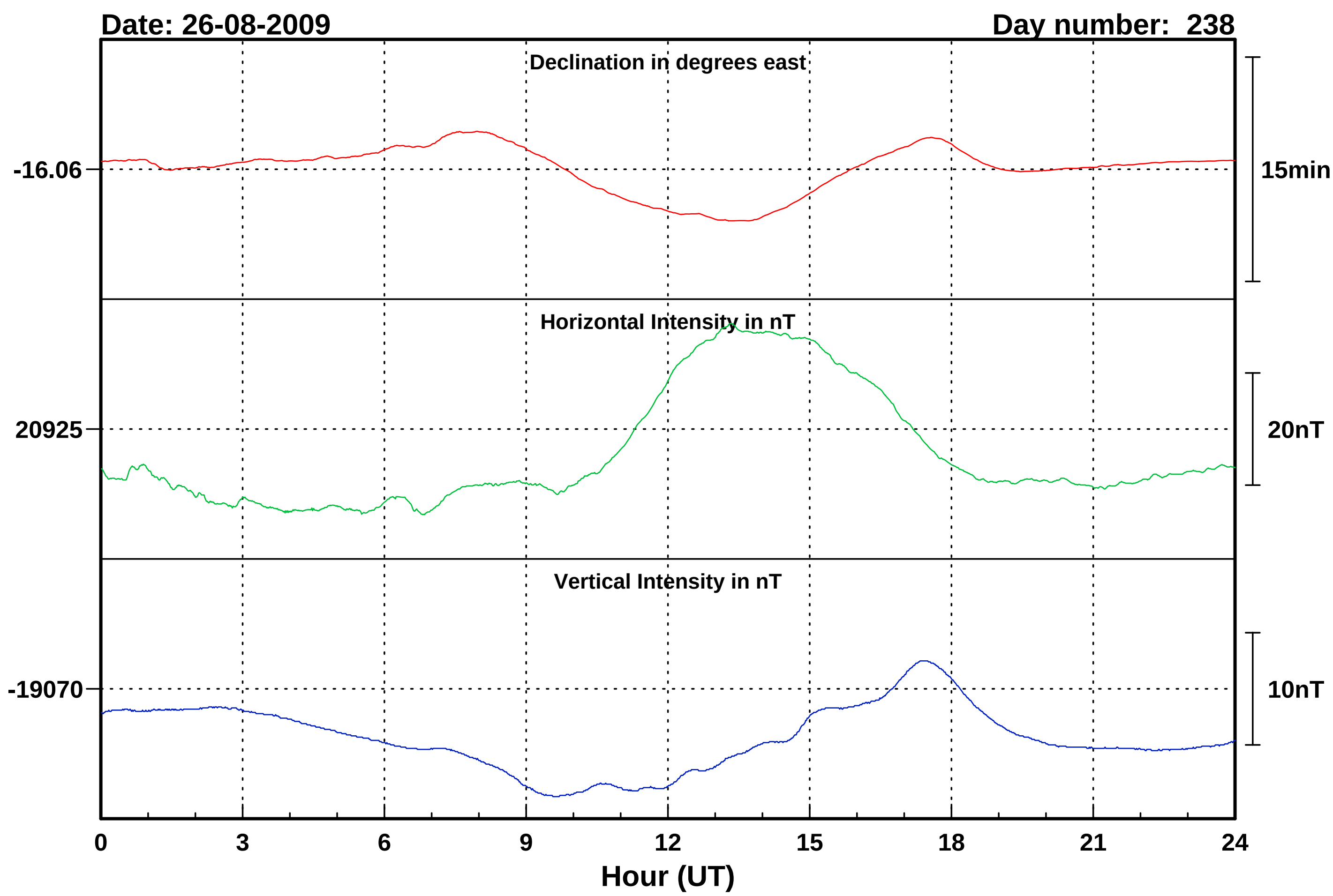


Date: 24-08-2009 Day number: 236



Ascension Island





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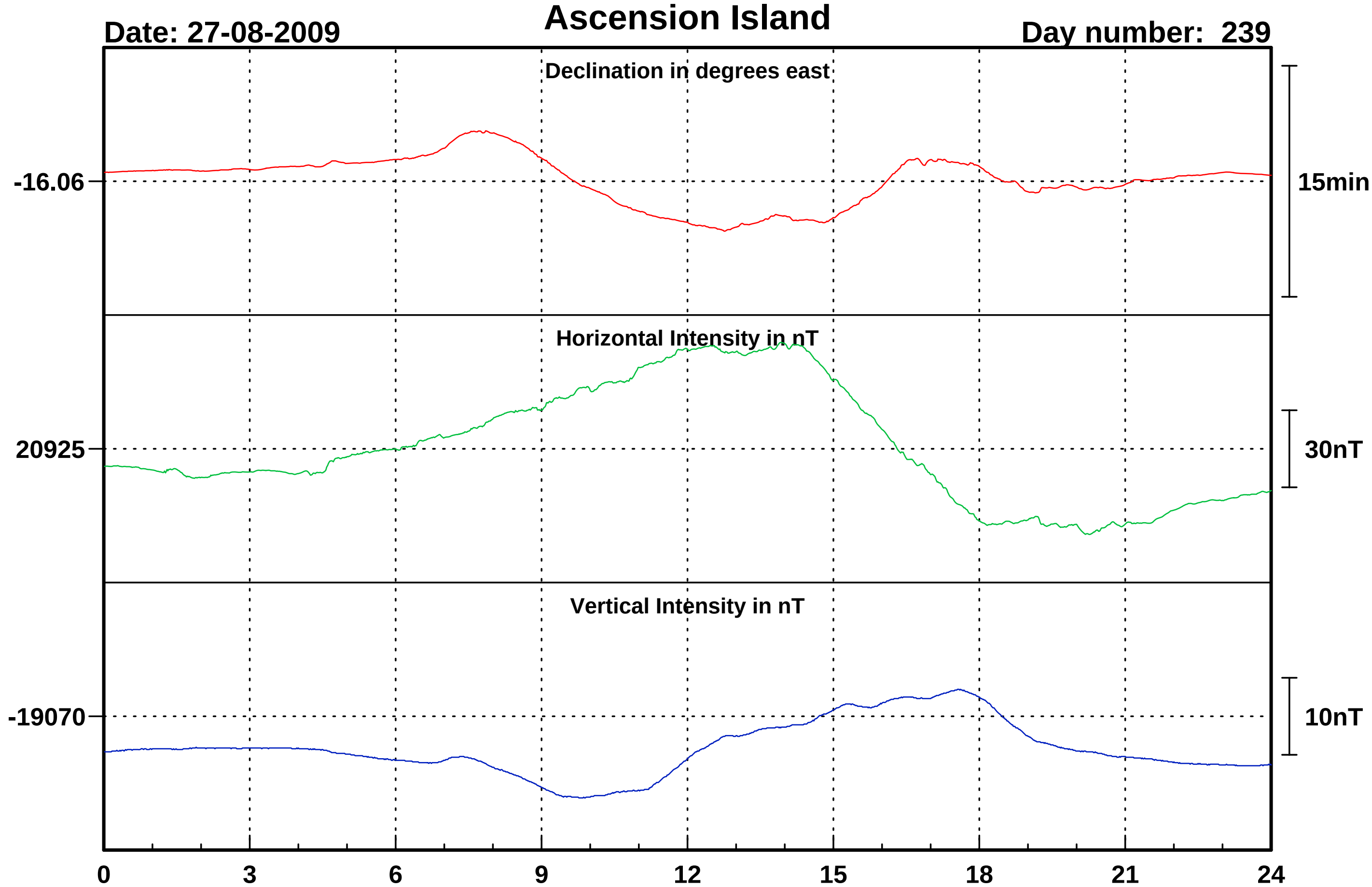
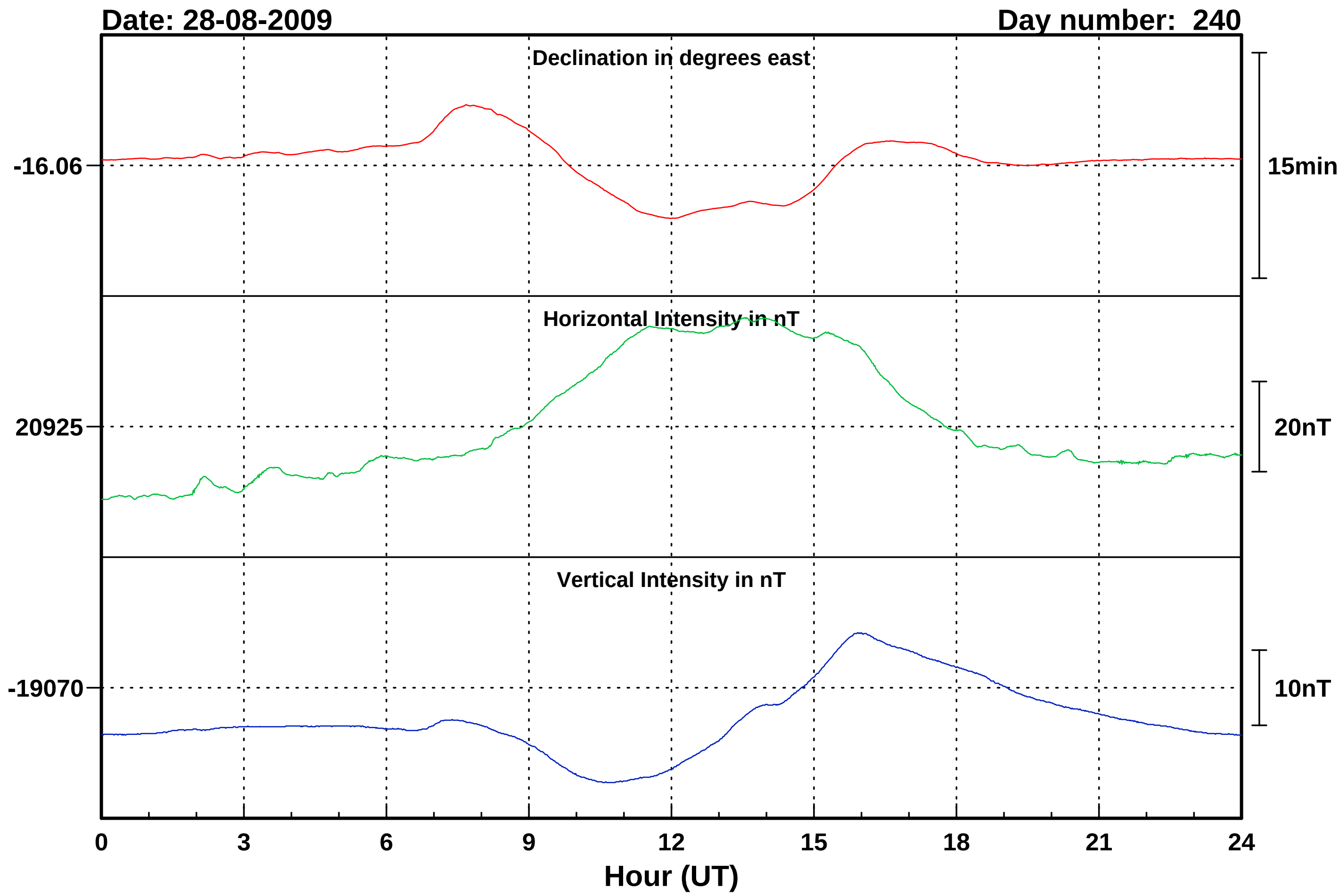
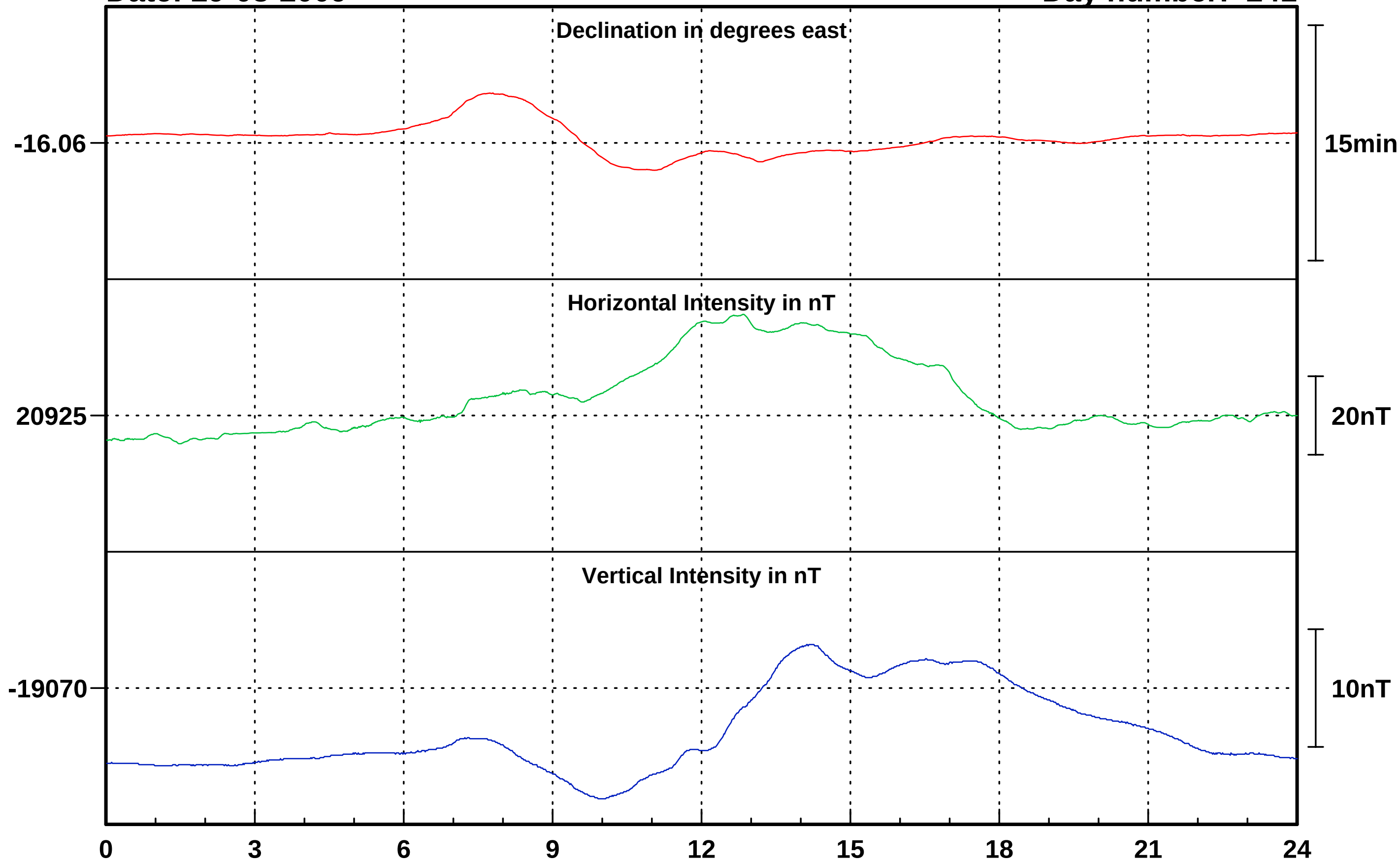


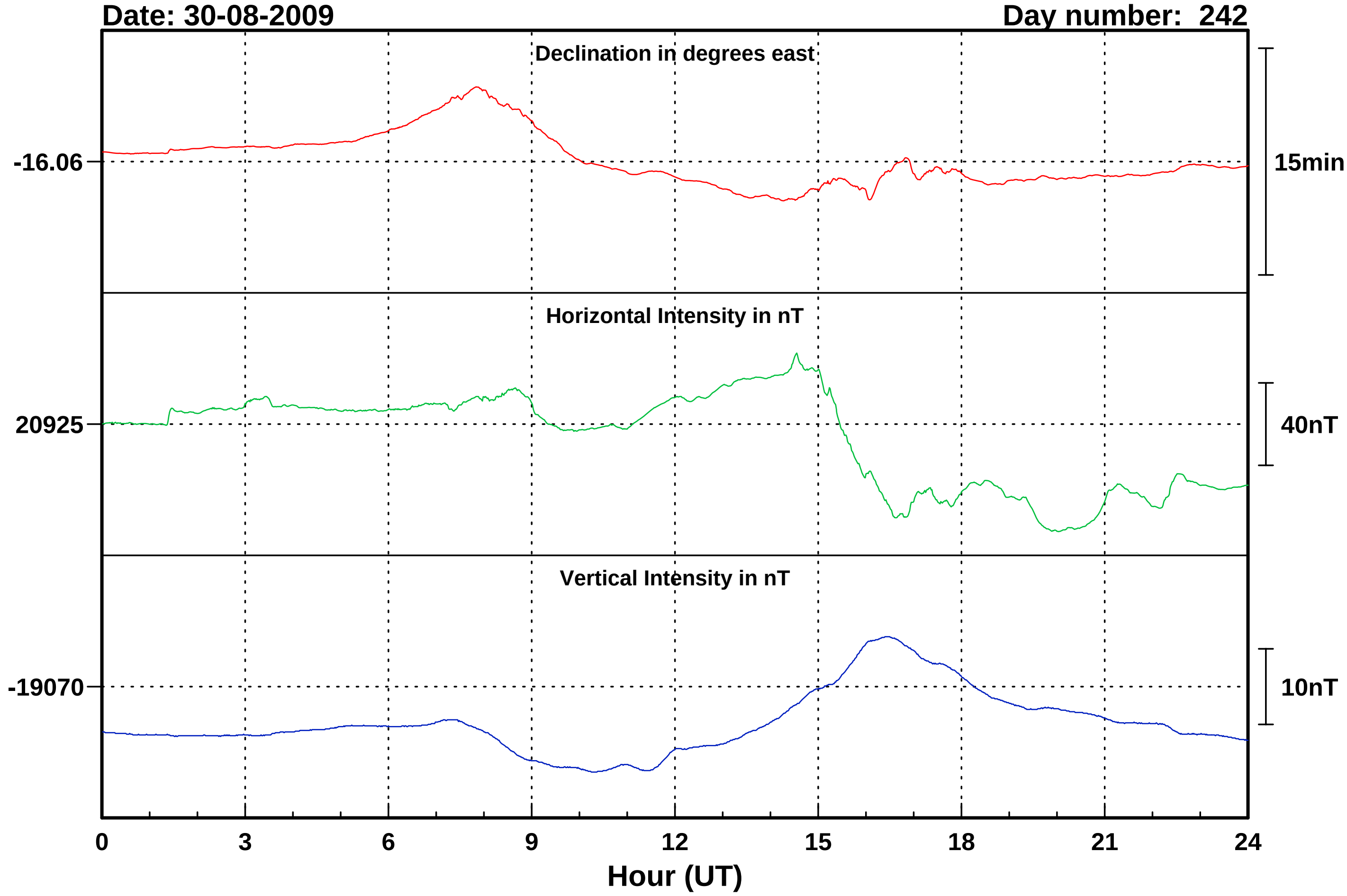


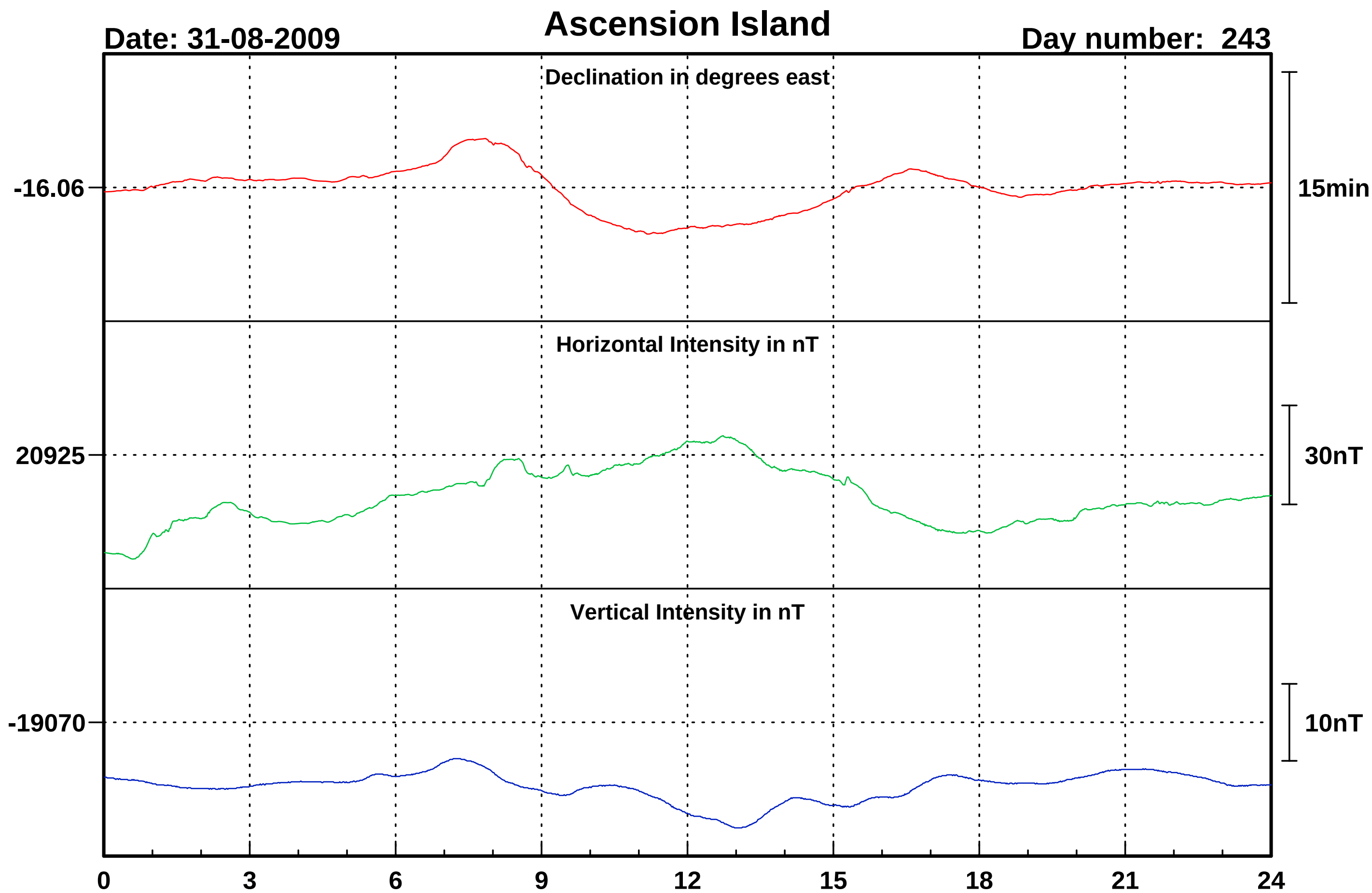
Ascension Island

Date: 29-08-2009 Day number: 241

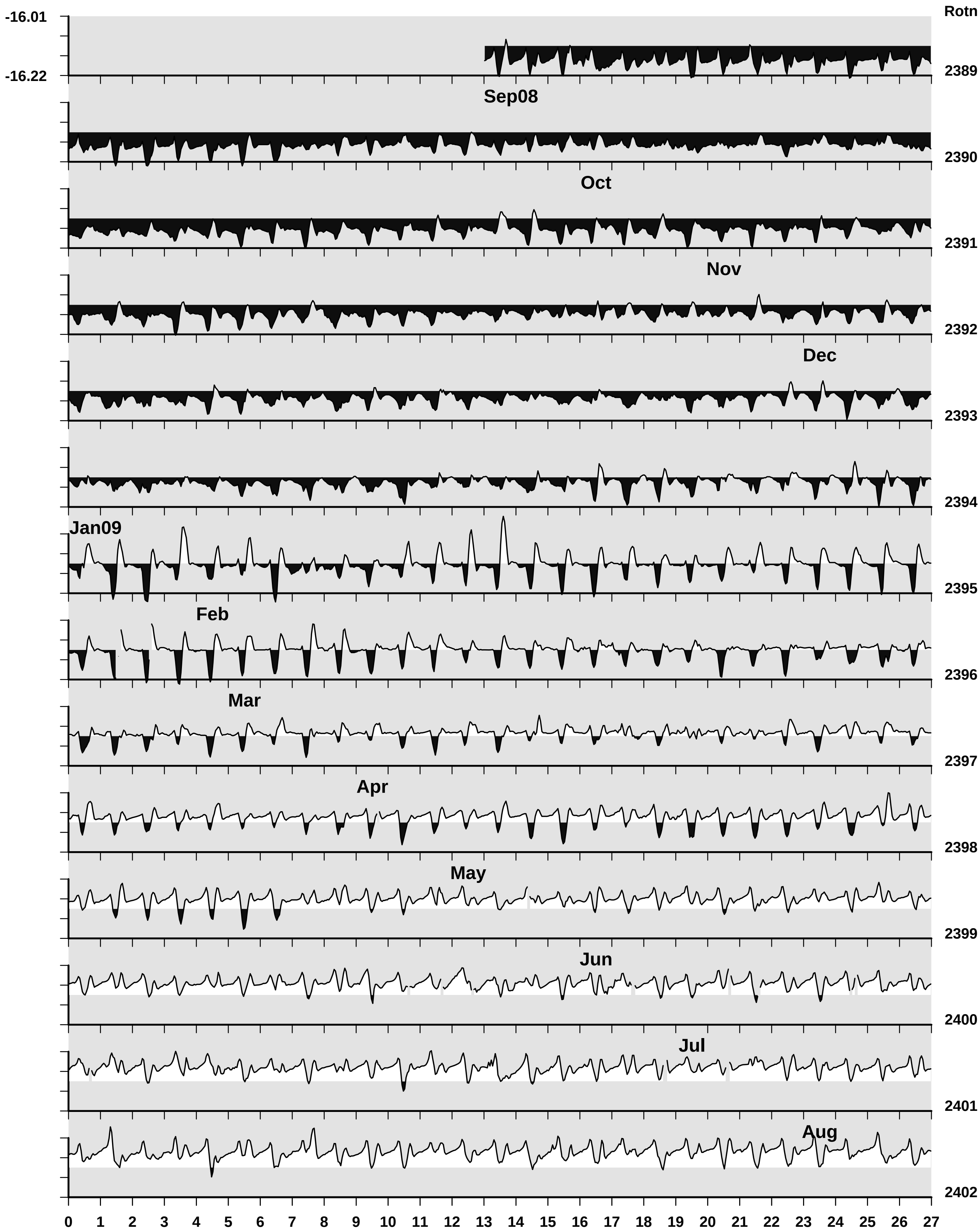


Date: 30-08-2009 Day number: 242



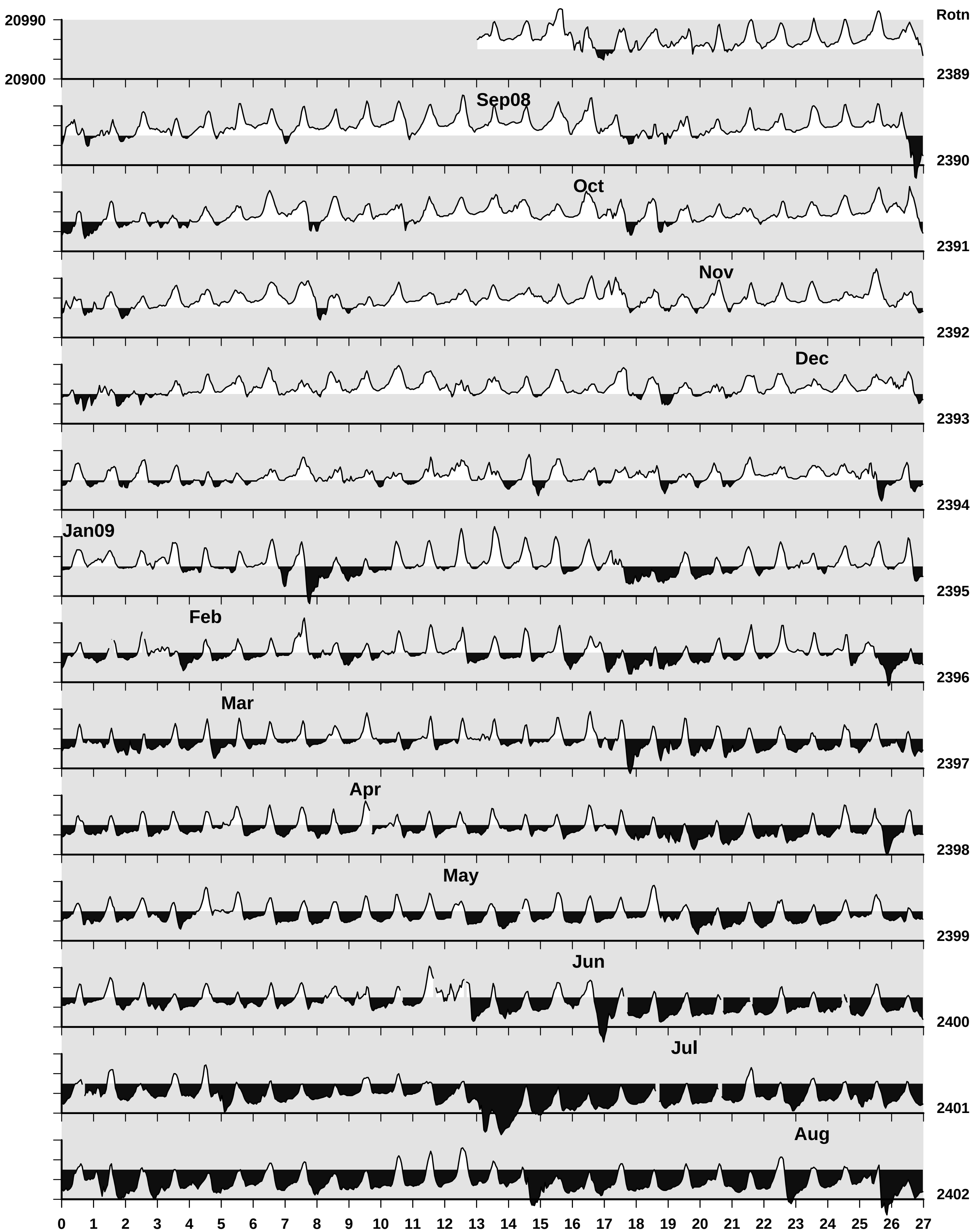

Ascension Island
Date: 31-08-2009
Day number: 243
Declination in degrees east
-16.06
15min
Horizontal Intensity in nT
20925
30nT
Vertical Intensity in nT
-19070
10nT
0
3
6
9
12
15
18
21
24

Ascension Island Observatory: Declination (degrees)

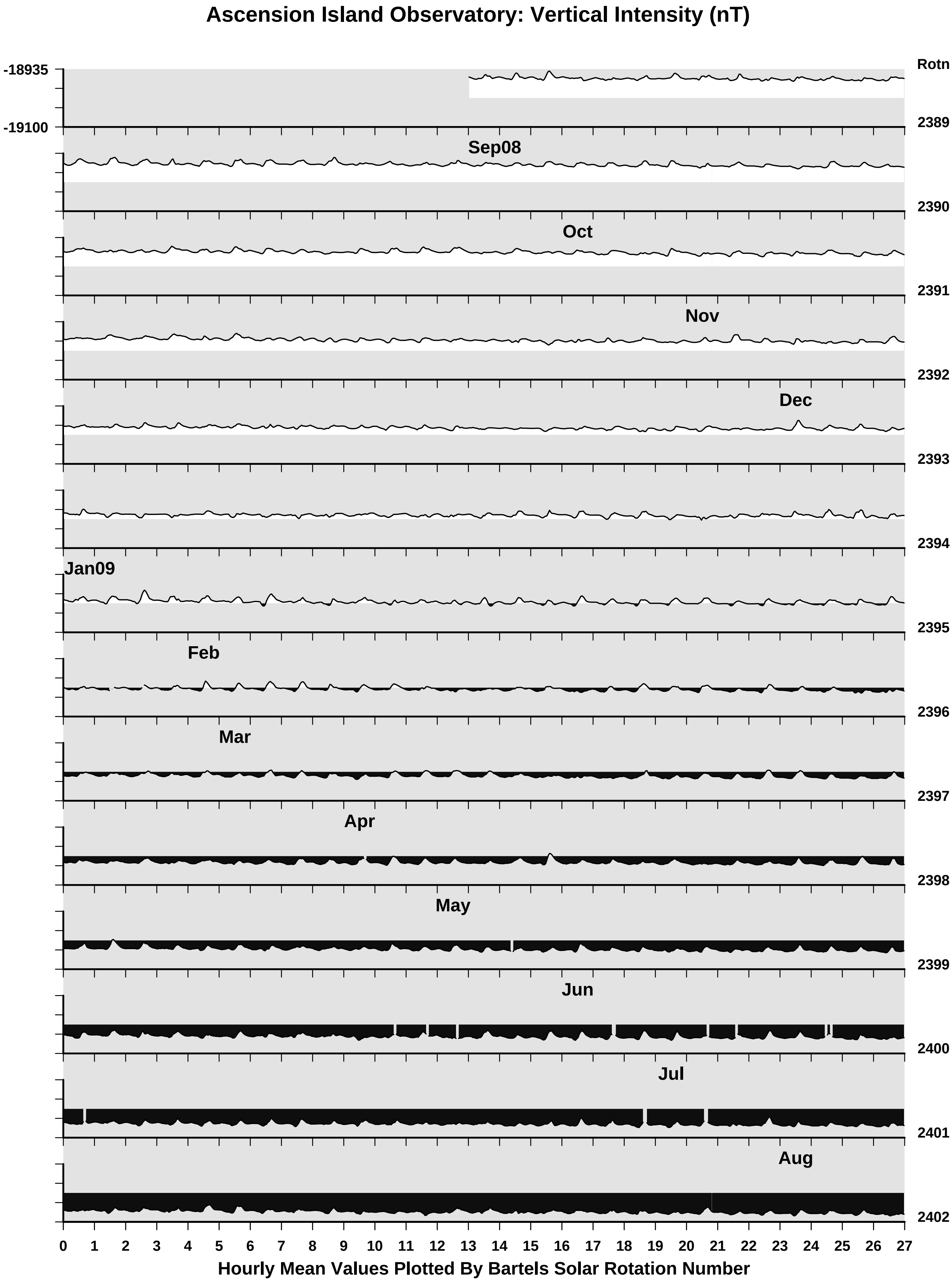


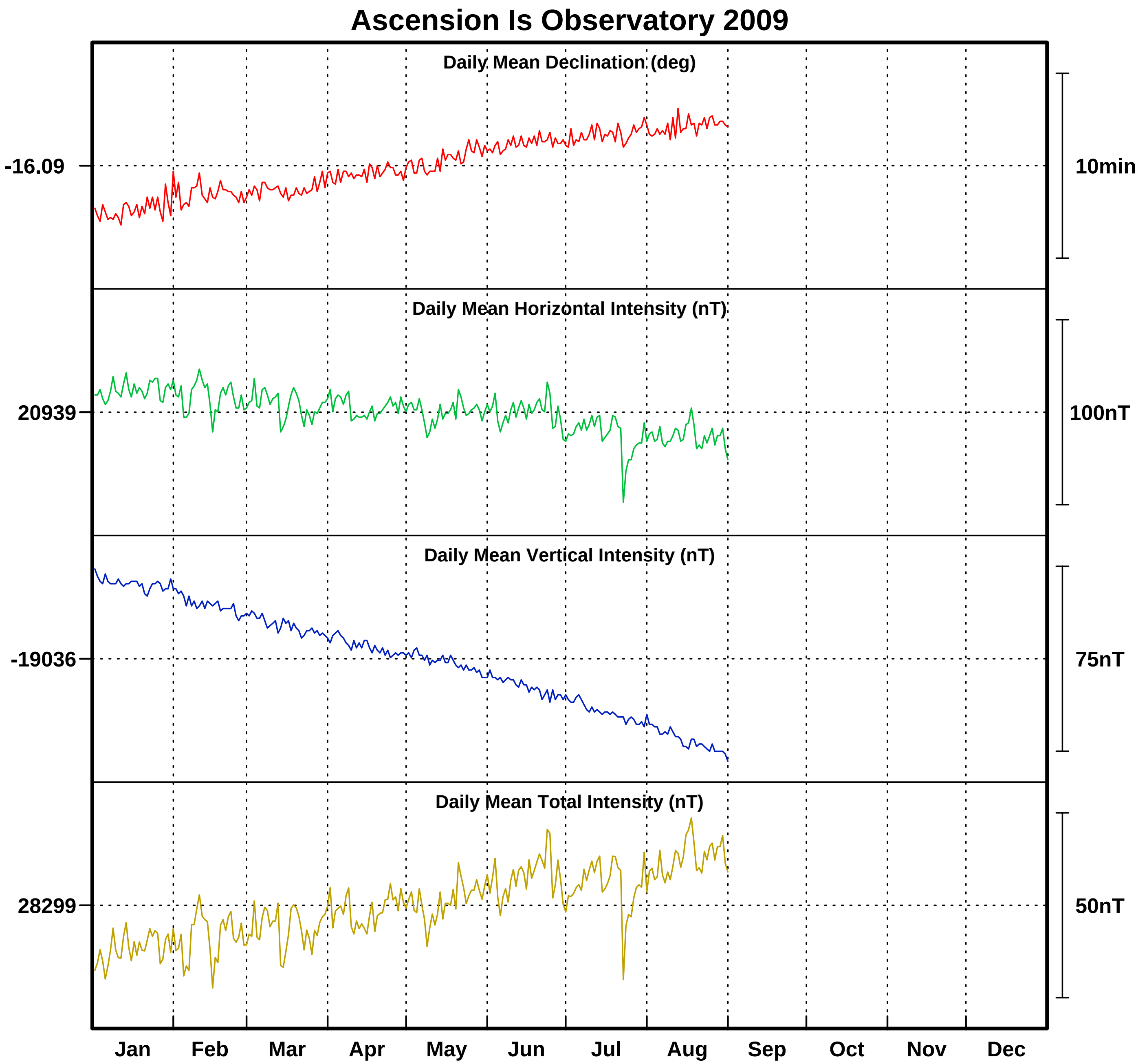
Hourly Mean Values Plotted By Bartels Solar Rotation Number

Ascension Island Observatory: Horizontal Intensity (nT)



Hourly Mean Values Plotted By Bartels Solar Rotation Number


Ascension Island Observatory: Vertical Intensity (nT)
-18935
-19100
Rotn
2389
2390
2391
2392
2393
2394
2395
2396
2397
2398
2399
2400
2401
2402
Sep08
Oct
Nov
Dec
Jan09
Feb
Mar
Apr
May
Jun
Jul
Aug
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
Hourly Mean Values Plotted By Bartels Solar Rotation Number


Ascension Is Observatory 2009
Daily Mean Declination (deg)
-16.09
10min
Daily Mean Horizontal Intensity (nT)
20939
100nT
Daily Mean Vertical Intensity (nT)
-19036
75nT
Daily Mean Total Intensity (nT)
28299
50nT
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Monthly Mean Values for Ascension Island Observatory 2009

Month	*D*	*H*	*I*	*X*	*Y*	*Z*	*F*
January	-16° 7.9´	20951 nT	-42° 12.8´	20126 nT	-5821 nT	-19006 nT	28287 nT
February	-16° 7.1´	20947 nT	-42° 14.0´	20123 nT	-5815 nT	-19015 nT	28290 nT
March	-16° 6.9´	20943 nT	-42° 15.0´	20120 nT	-5813 nT	-19023 nT	28293 nT
April	-16° 6.0´	20941 nT	-42° 15.9´	20120 nT	-5807 nT	-19032 nT	28297 nT
May	-16° 5.2´	20939 nT	-42° 16.7´	20119 nT	-5802 nT	-19038 nT	28300 nT
June	-16° 4.4´	20938 nT	-42° 17.6´	20120 nT	-5797 nT	-19048 nT	28306 nT
July	-16° 3.9´	20926 nT	-42° 19.5´	20109 nT	-5791 nT	-19058 nT	28304 nT
August	-16° 3.5´	20925 nT	-42° 20.6´	20109 nT	-5788 nT	-19070 nT	28311 nT

Note

i. The values shown here are provisional.