BRITISH GEOLOGICAL SURVEY

King Edward Point Observatory

Monthly Magnetic Bulletin

March 2012

12/03/KE

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

KING EDWARD POINT OBSERVATORY MAGNETIC DATA

1. Introduction

King Edward Point observatory was installed by the British Geological Survey (BGS), with the permission of the Government of South Georgia and the South Sandwich Islands (GSGSSI), in collaboration with British Antarctic Survey (BAS), and became operational in February 2011.

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.

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: enquiries@bgs.ac.uk
Internet: www.geomag.bgs.ac.uk

2. Position

King Edward Point Observatory, one of the geomagnetic observatories maintained and operated by the British Geological Survey (BGS), is situated on a site adjacent to the Government of South Georgia and the South Sandwich Islands (GSGSSI) research station at King Edward Point, Cumberland East Bay, South Georgia. The observatory co-ordinates are:

Geographic:	*54° 16' 56"S*	*323° 30' 26"E*
Geomagnetic:	*45° 59' 02"S*	*029° 32' 06"E*
Height above mean sea level:	*7 m*	

The geomagnetic co-ordinates are approximations, calculated using the 11th generation International Geomagnetic Reference Field (IGRF) at epoch 2012.5. On-line access to models (including IGRF), charts and navigational data are available at http://www.geomag.bgs.ac.uk/data_service/models_compass/home

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 February 2011. 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, available on-line at www.geomag.bgs.ac.uk/data_service/home

3.2 Absolute Observations

The GDAS fluxgate magnetometers accurately measure variations in the components of the geomagnetic field, but not the absolute magnitudes. One set 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

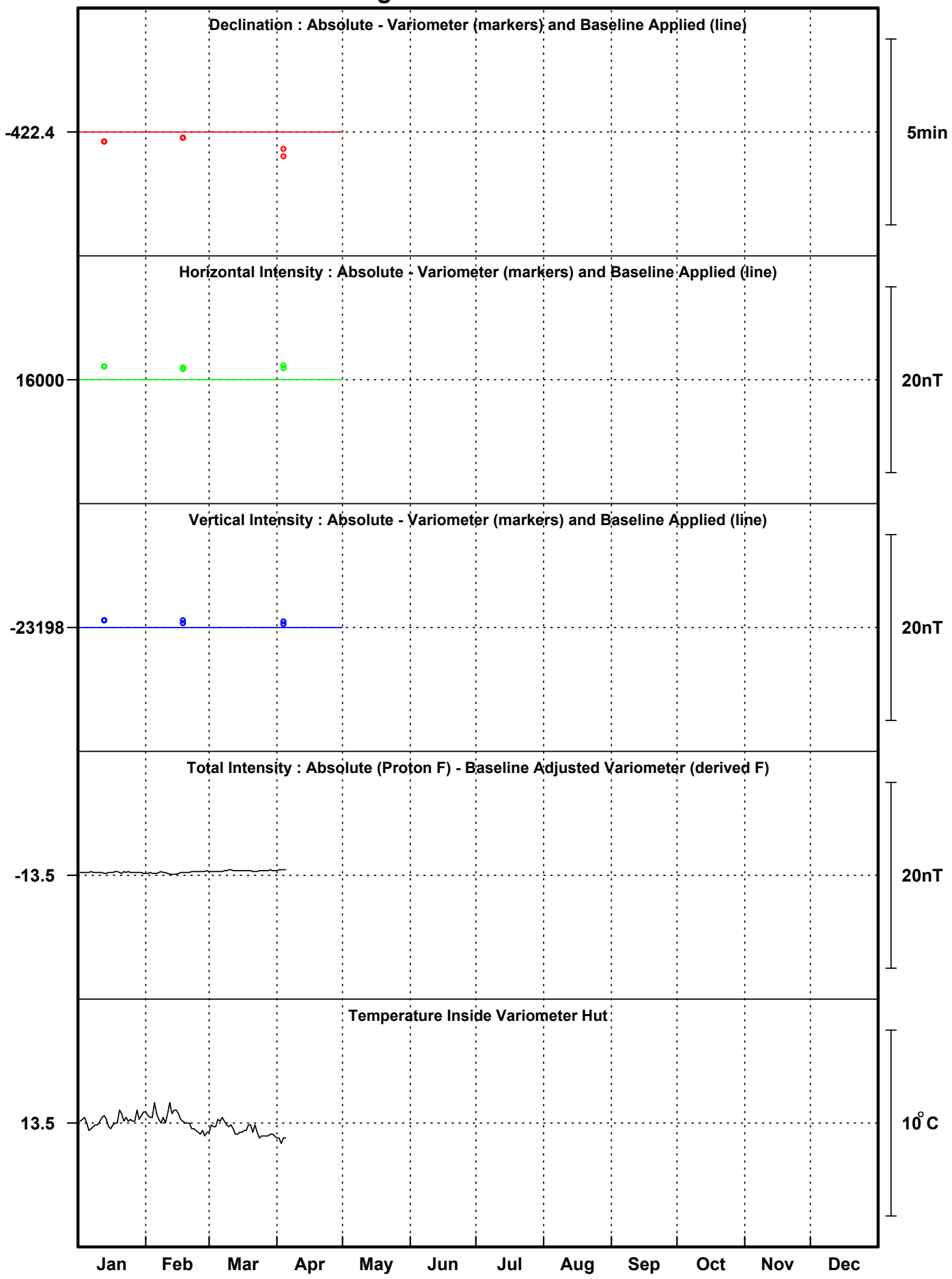
Commercial users can contact the geomagnetism team for information on the range of applications and services offered. Full contact details are available at www.geomag.bgs.ac.uk/contactus/staff

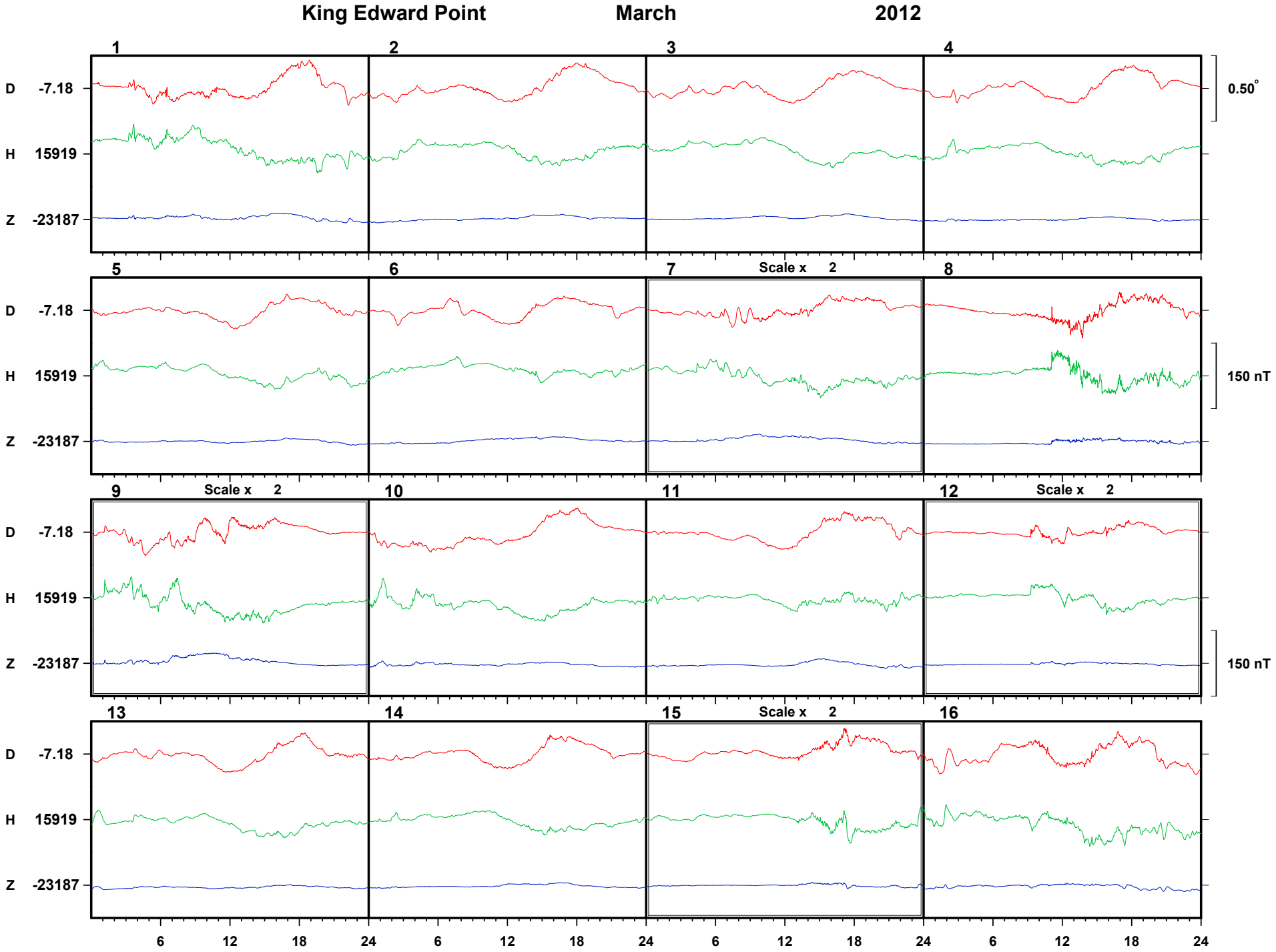
KING EDWARD POINT OBSERVATORY

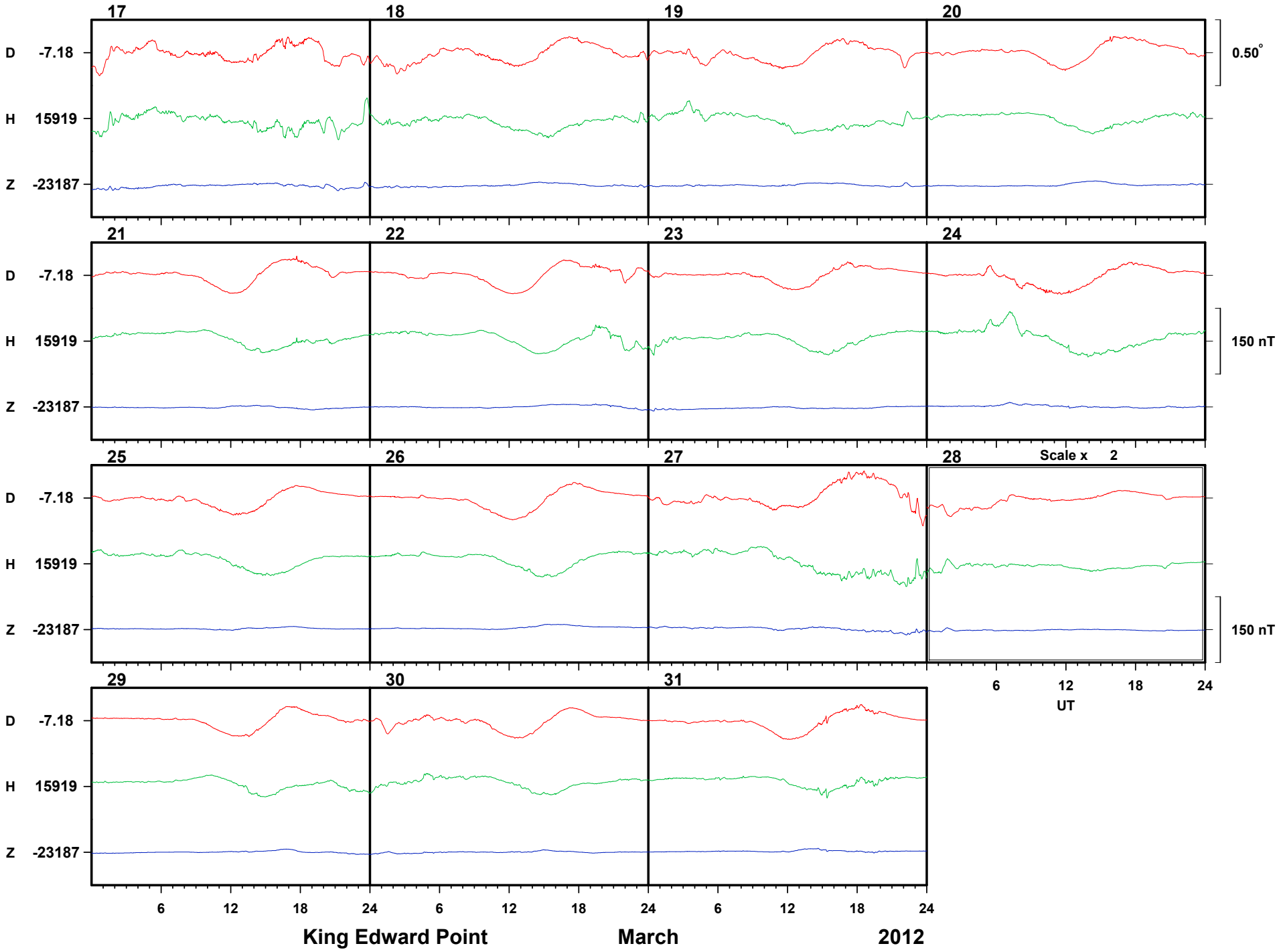
ABSOLUTE OBSERVATIONS

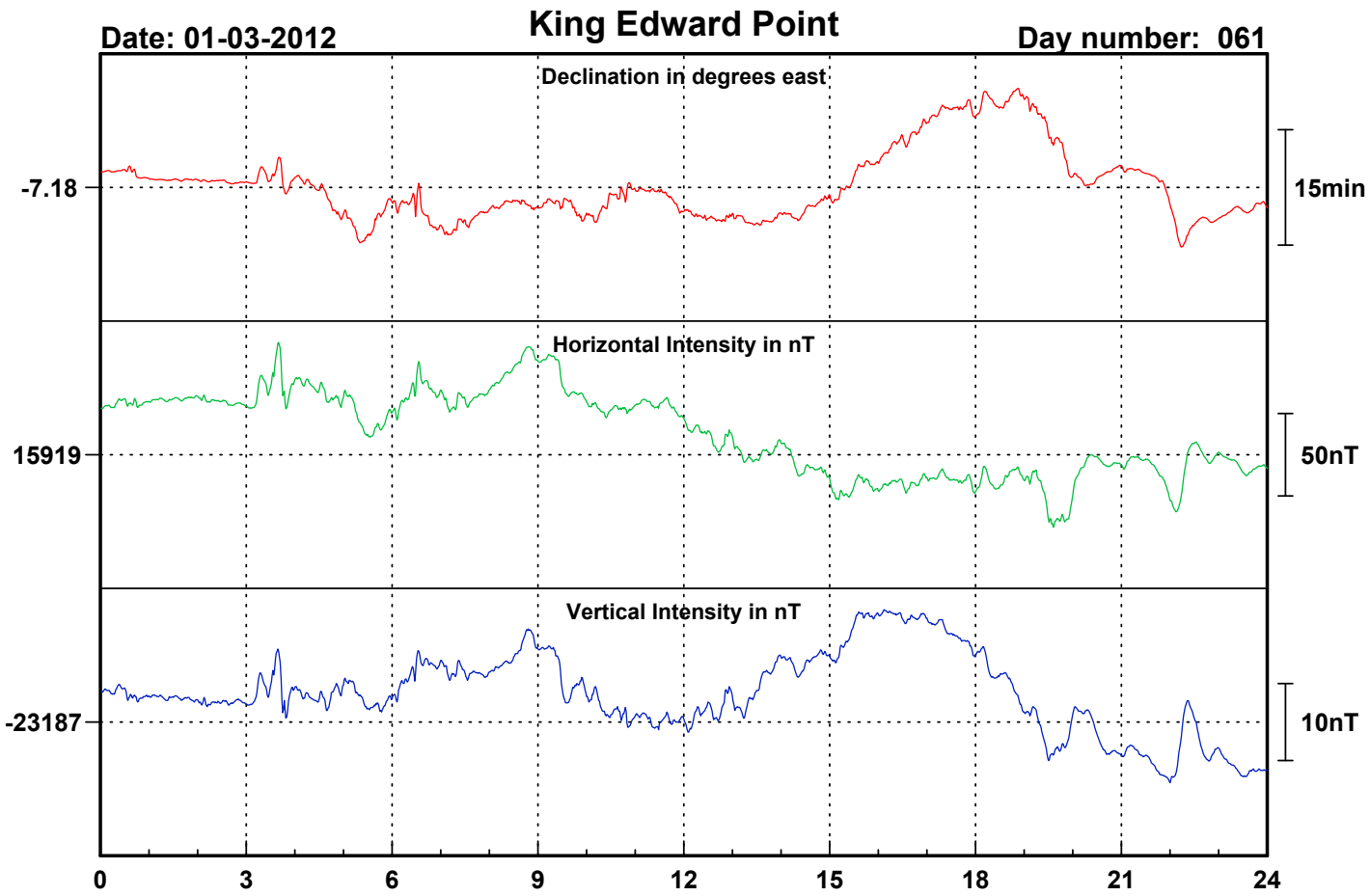
		Declination			Inclination		Total Field		Horizontal Intensity		Vertical Intensity		
Date	**Day Number**	**Time (UT)**	**Absolute (º)**	**Baseline (º)**	**Time (UT)**	**Absolute (º)**	**Site difference (nT)**	**Absolute corrected (nT)**	**Absolute (nT)**	**Baseline (nT)**	**Absolute (nT)**	**Baseline (nT)**	**Observer**
NONE													

King Edward Point 2012




King Edward Point
March
2012
1
2
3
4
D -7.18
H 15919
Z -23187
0.50°
5
6
7
Scale x 2
8
150 nT
9
Scale x 2
10
11
12
Scale x 2
13
14
15
Scale x 2
16
6
12
18
24


17
18
19
20
D -7.18
H 15919
Z -23187
0.50°
21
22
23
24
150 nT
25
26
27
28
Scale x 2
29
30
31
6
12
18
24
UT
King Edward Point
March
2012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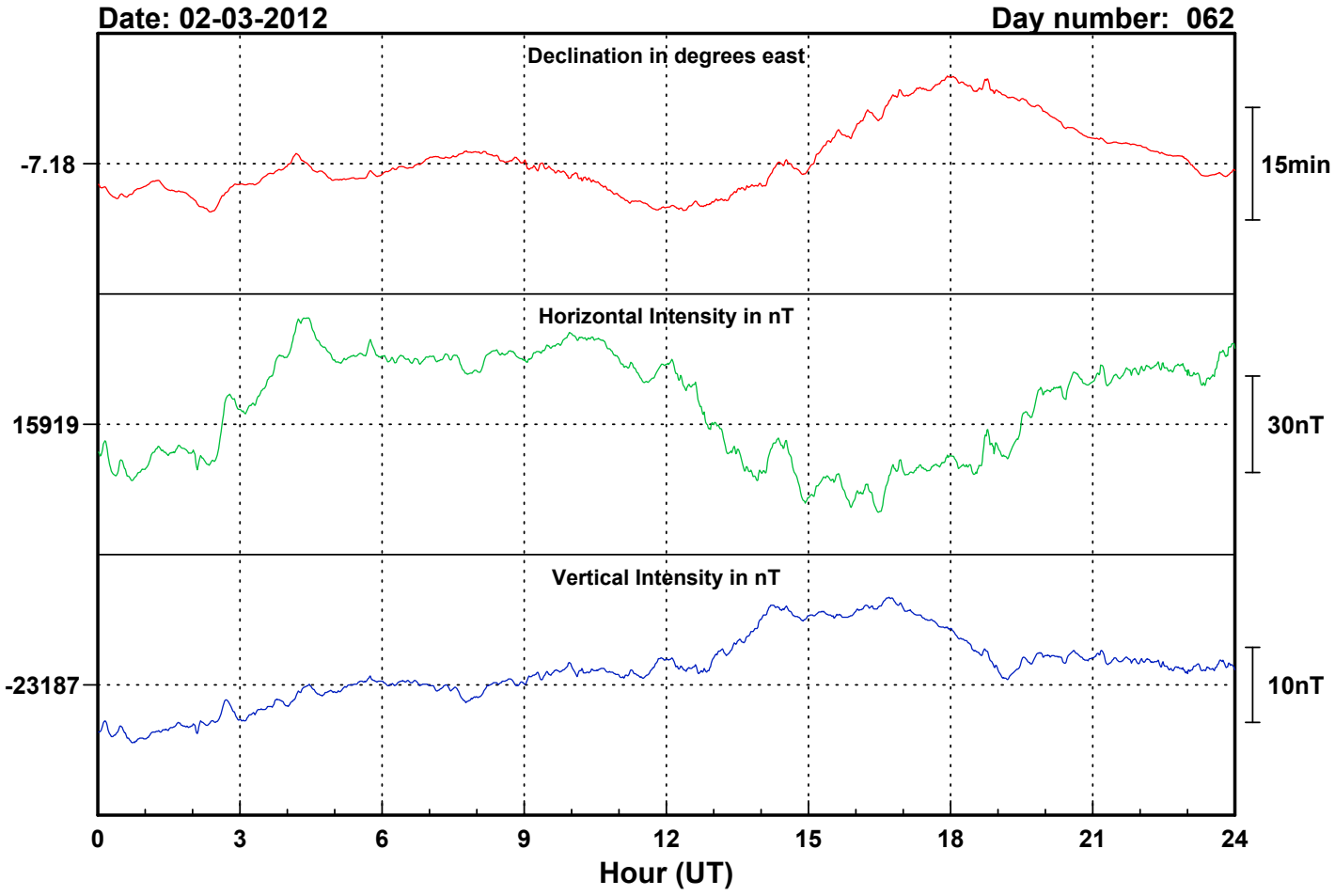
Day number: 061
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
50nT
Vertical Intensity in nT
-23187
10nT
0
3
6
9
12
15
18
21
24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Day number: 062
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
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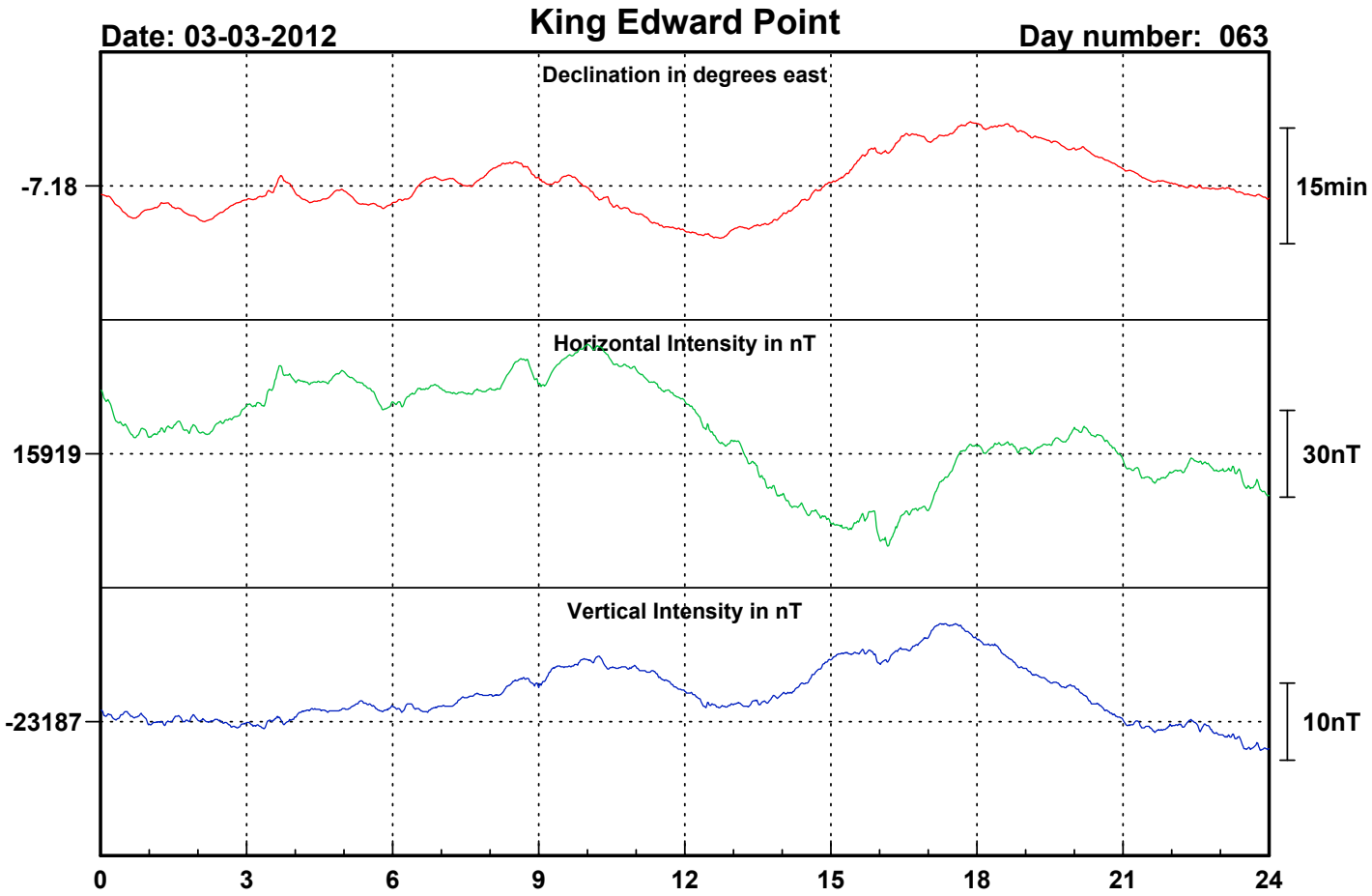
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)


King Edward Point
Date: 03-03-2012
Day number: 063
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
-23187
10nT
0
3
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15
18
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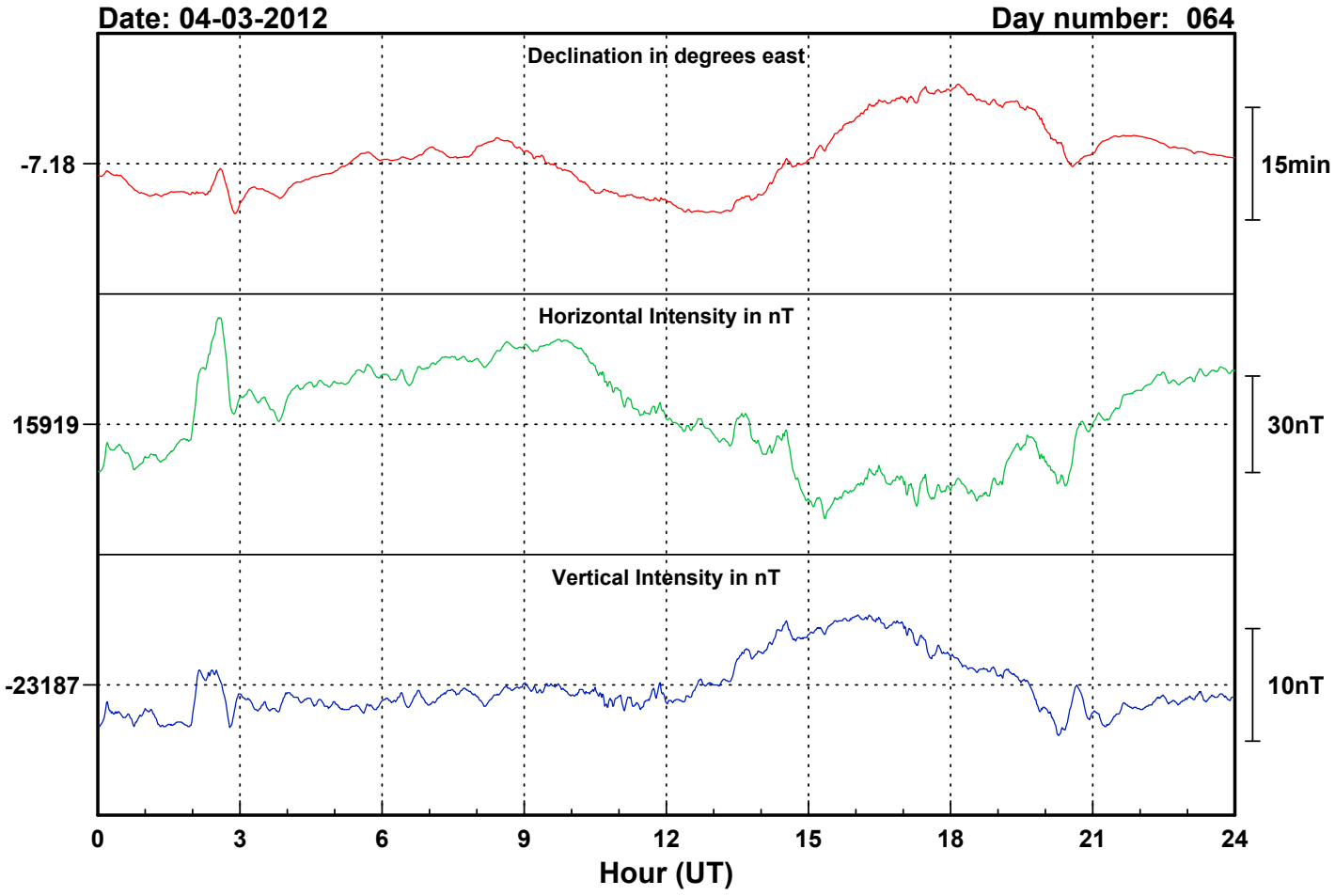
24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Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
-23187
10nT
0
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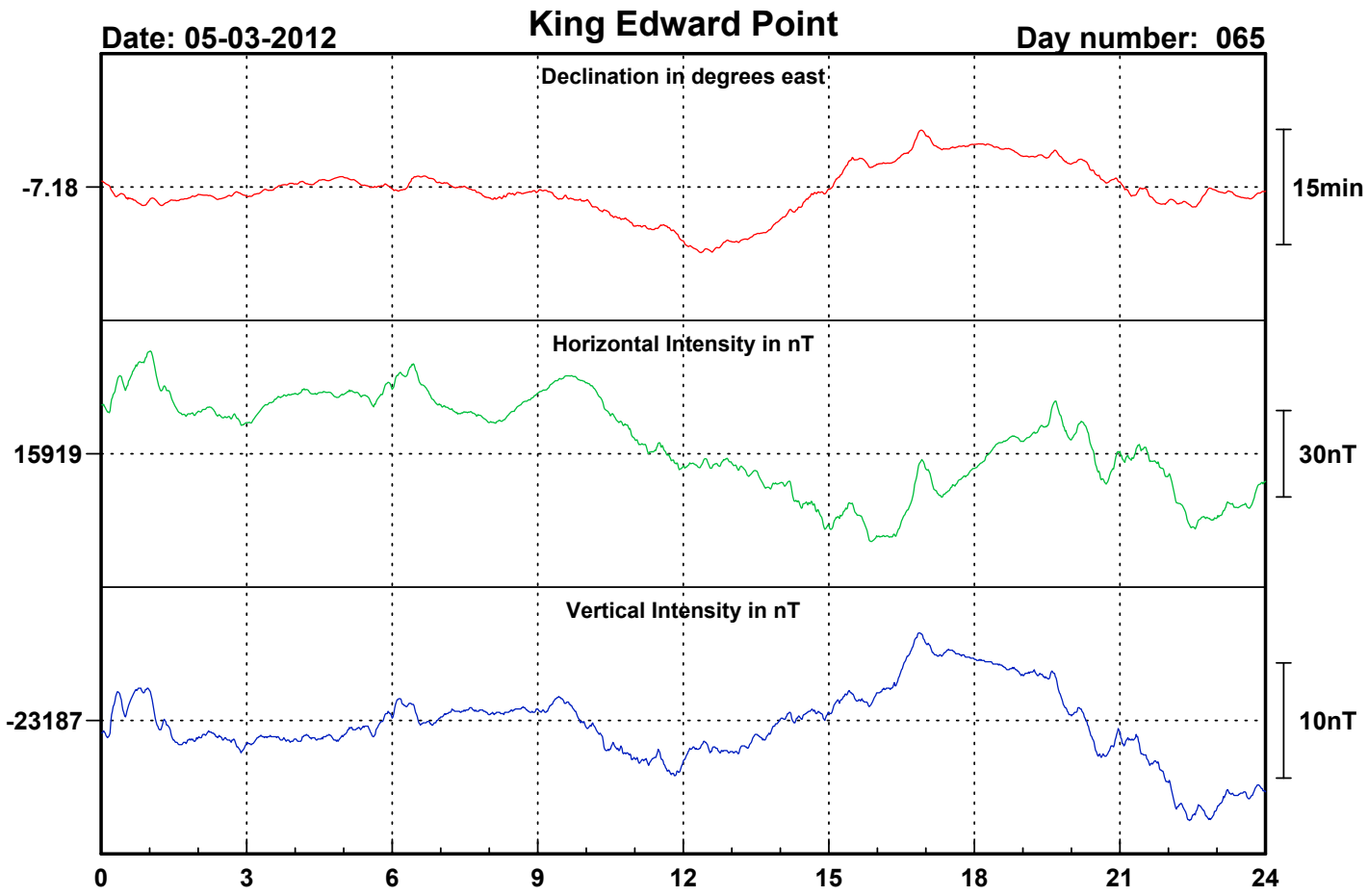
24
Hour (UT)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Date: 05-03-2012
Day number: 065
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
-23187
10nT
0
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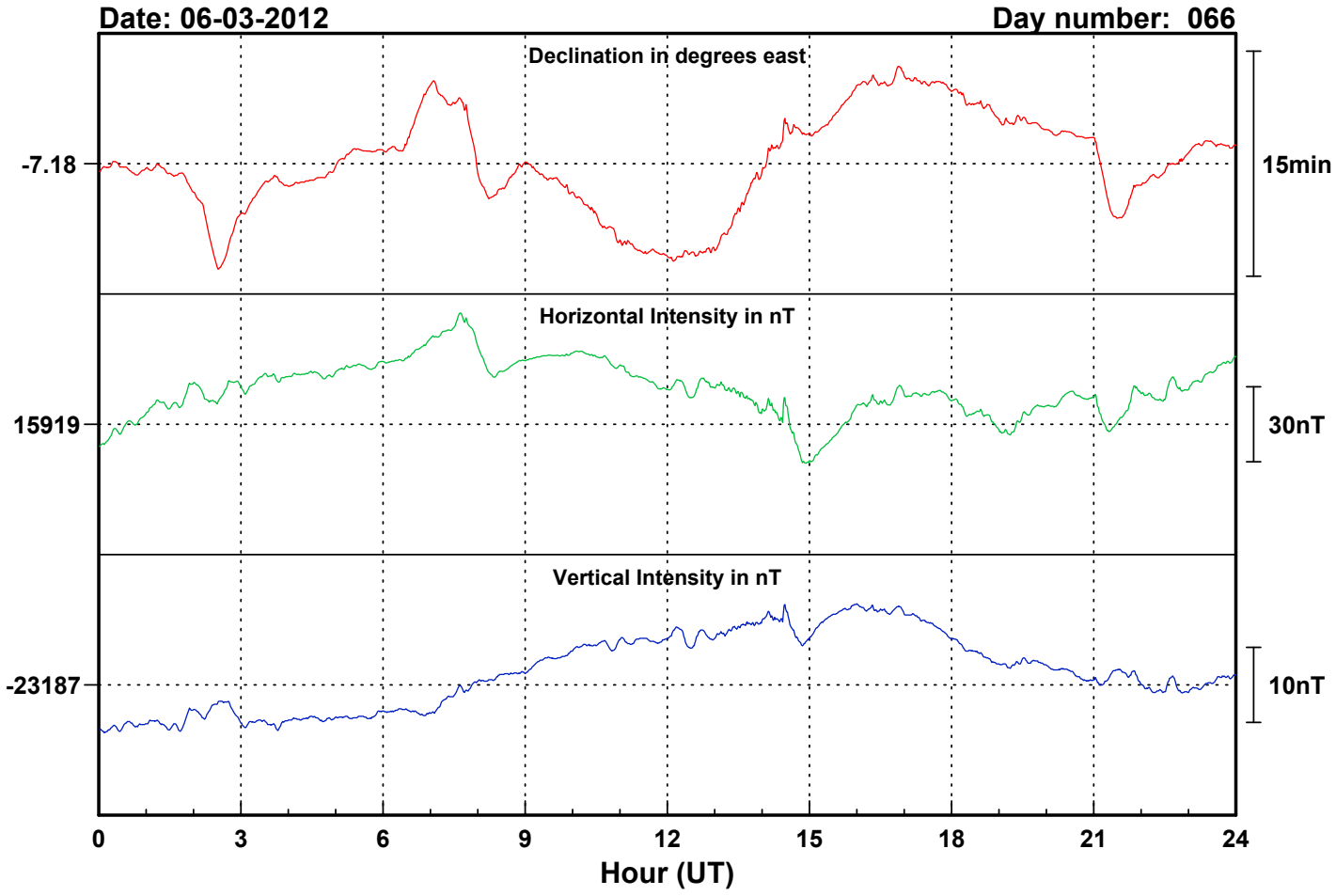
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-7.18
15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
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10nT
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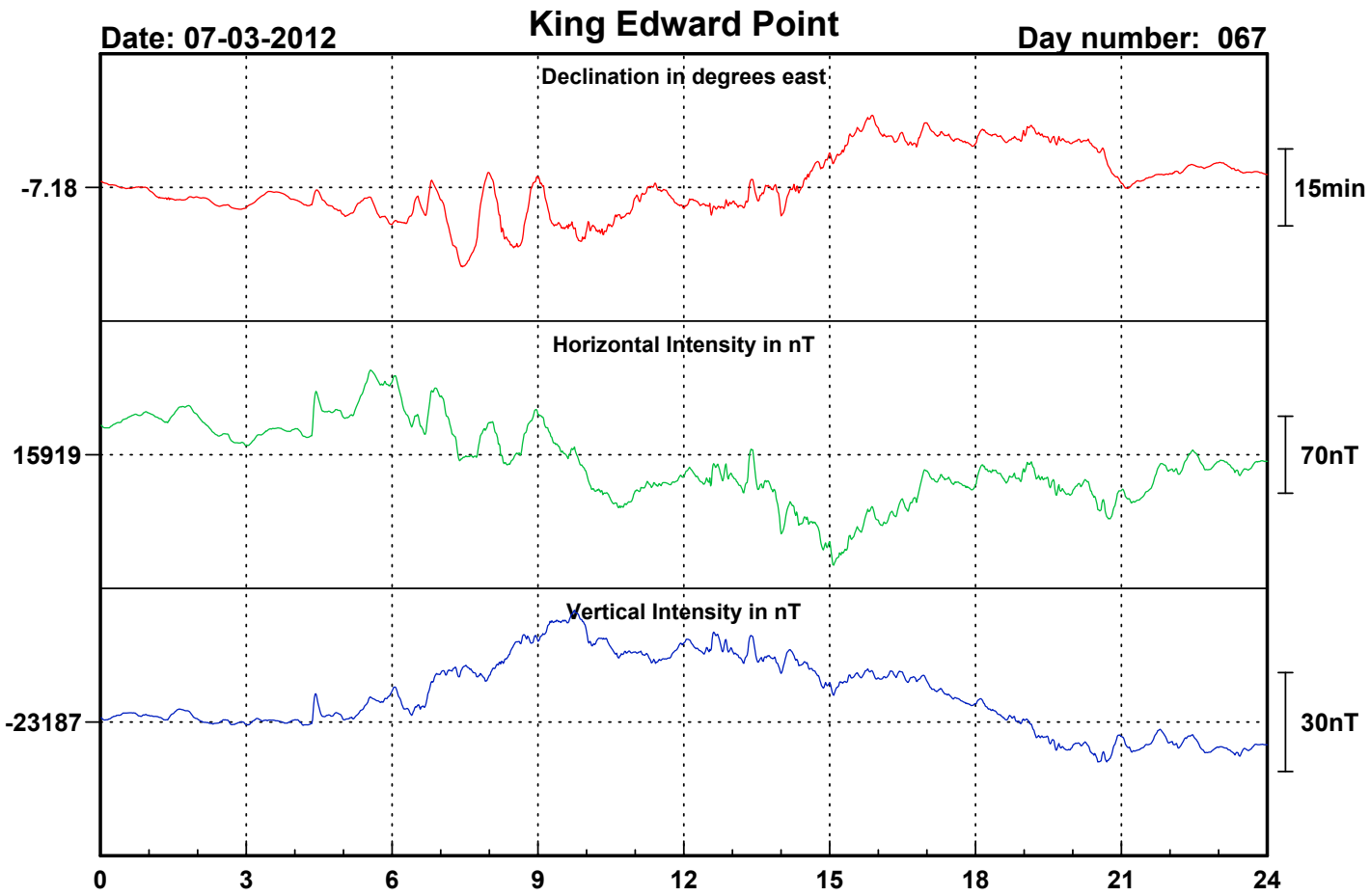
Hour (UT)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Date: 07-03-2012
Day number: 067
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
70nT
Vertical Intensity in nT
-23187
30nT
0
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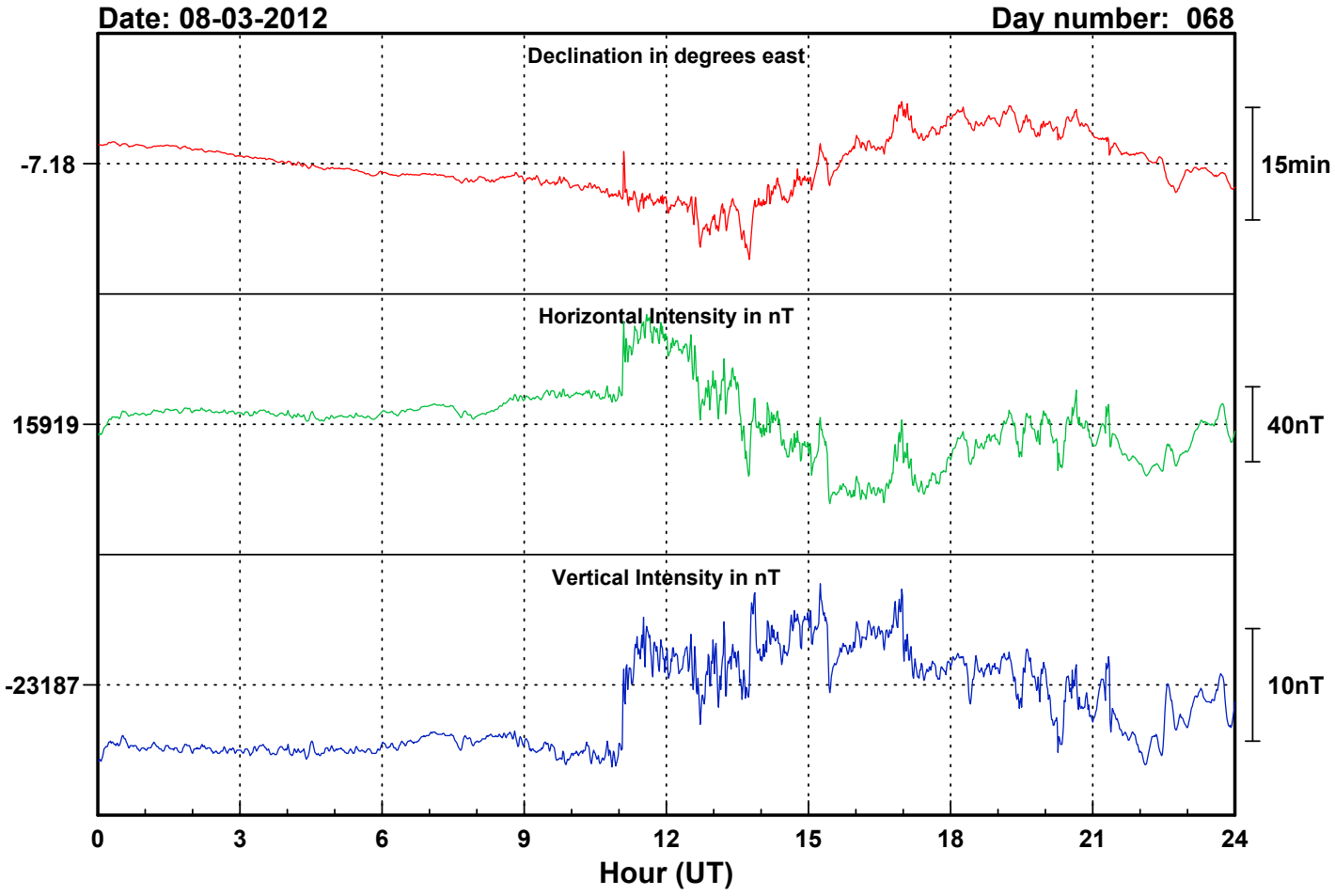
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Day number: 068
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
40nT
Vertical Intensity in nT
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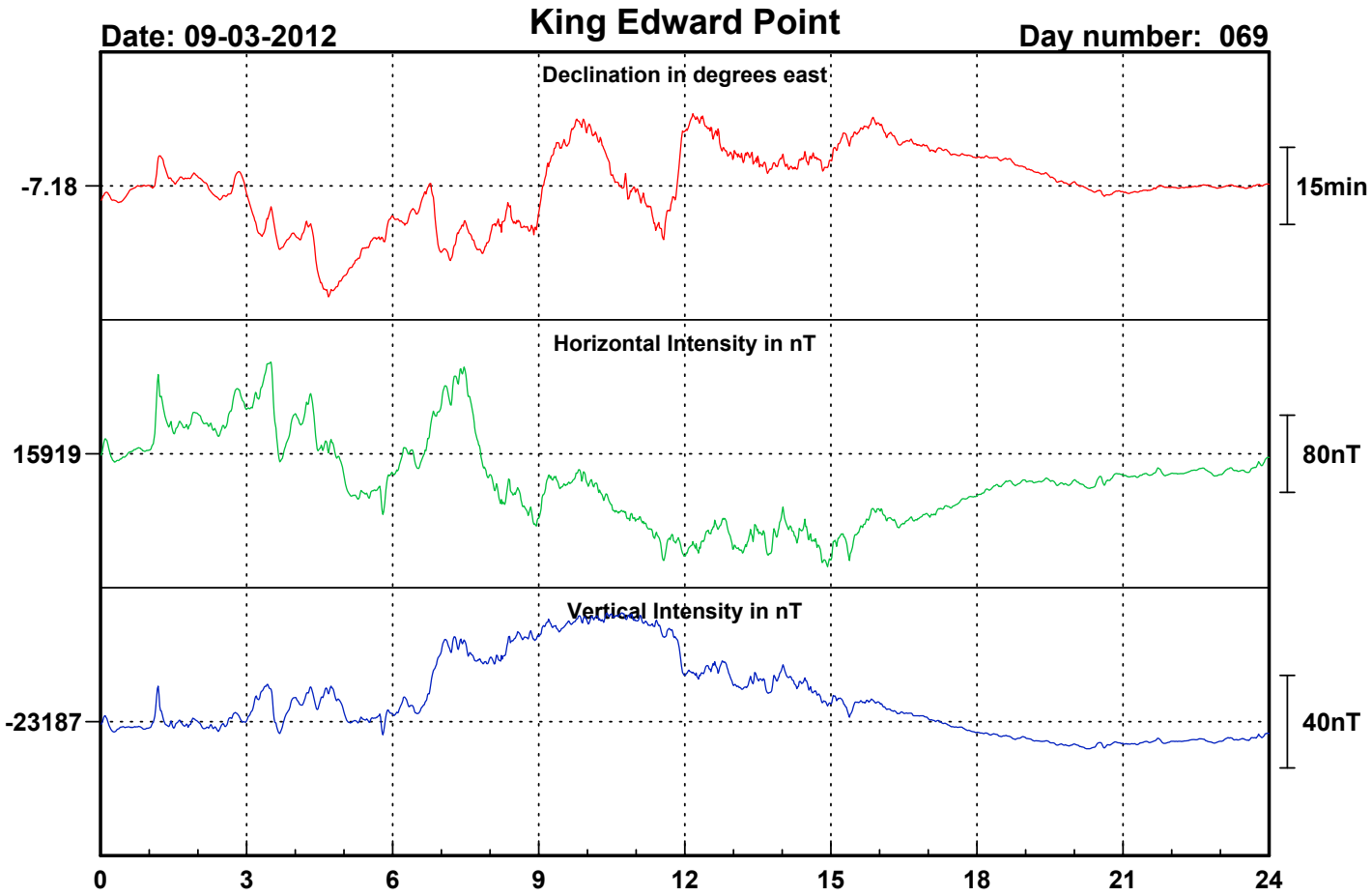
Hour (UT)


King Edward Point
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Day number: 069
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
80nT
Vertical Intensity in nT
-23187
40nT
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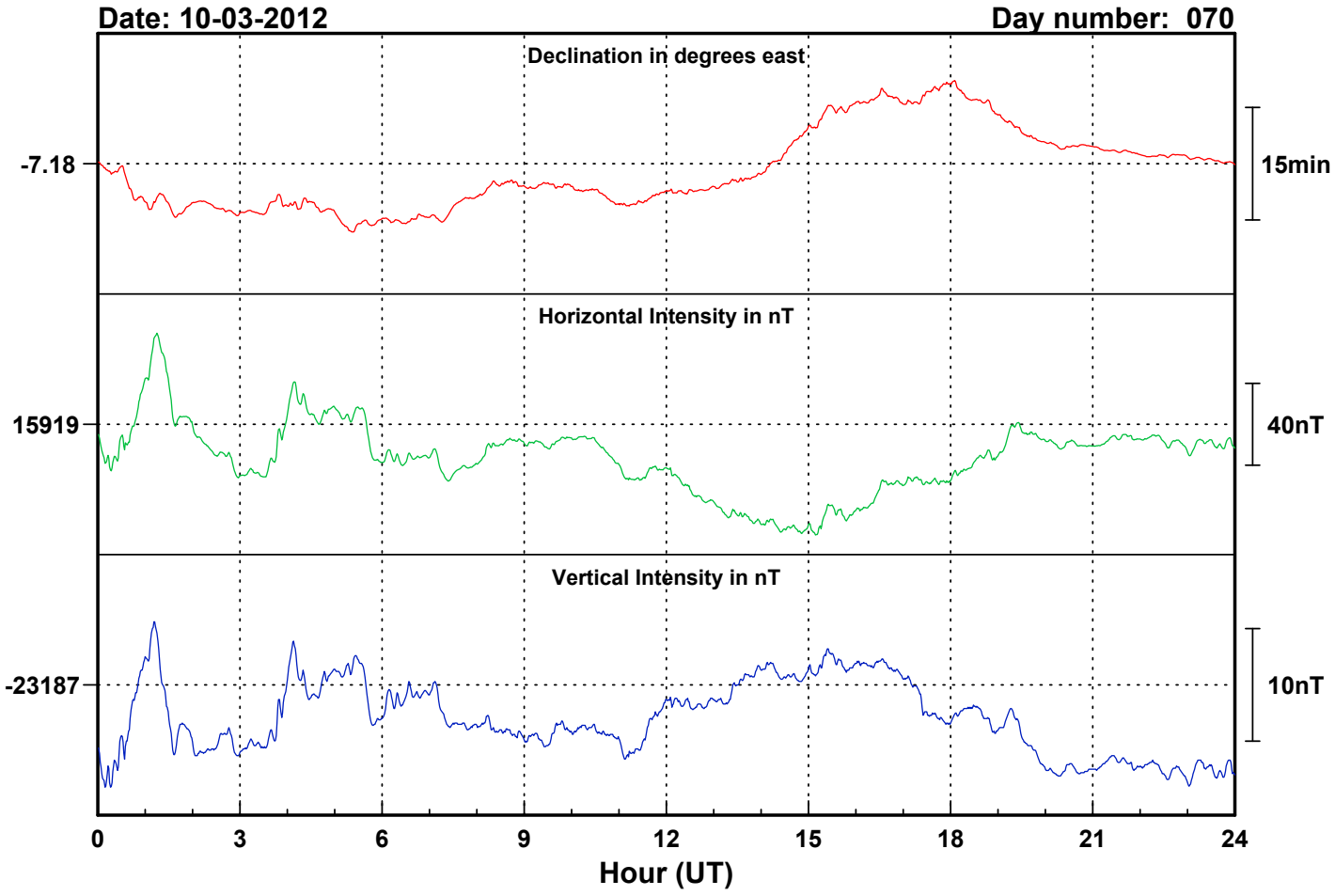
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Day number: 070
Declination in degrees east
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15min
Horizontal Intensity in nT
15919
40nT
Vertical Intensity in nT
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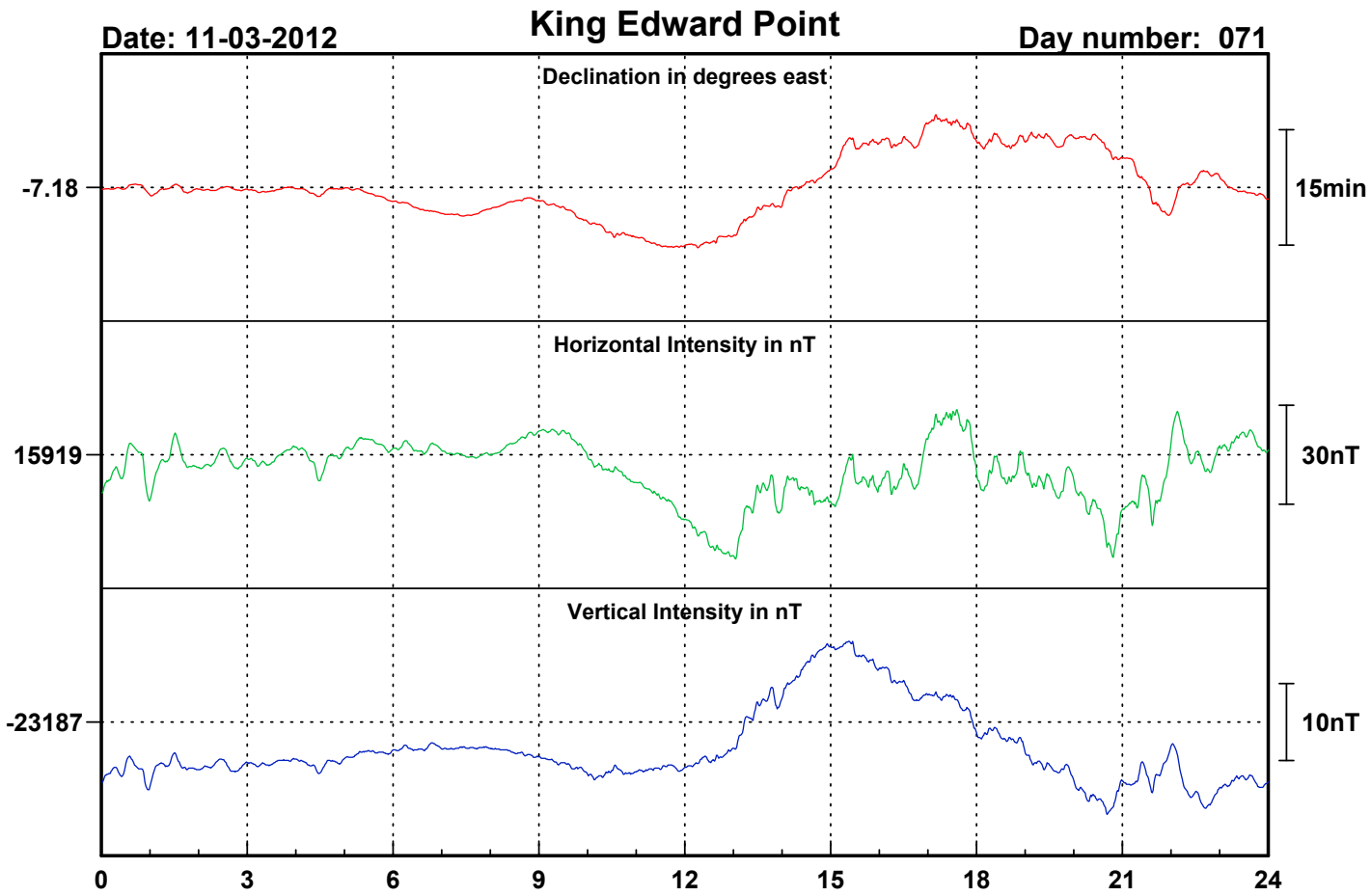
Hour (UT)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15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
-23187
10nT
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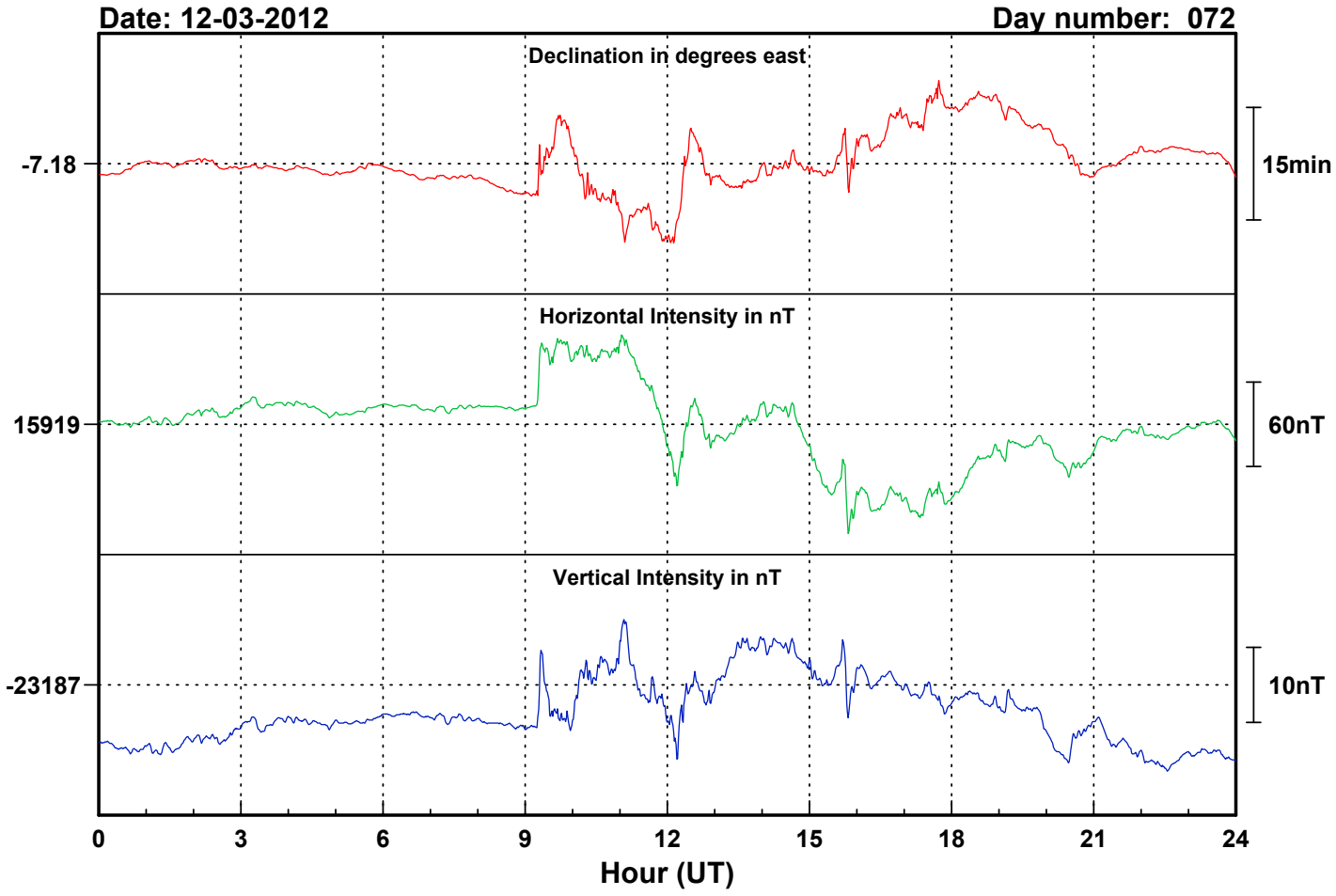
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15min
Horizontal Intensity in nT
15919
60nT
Vertical Intensity in nT
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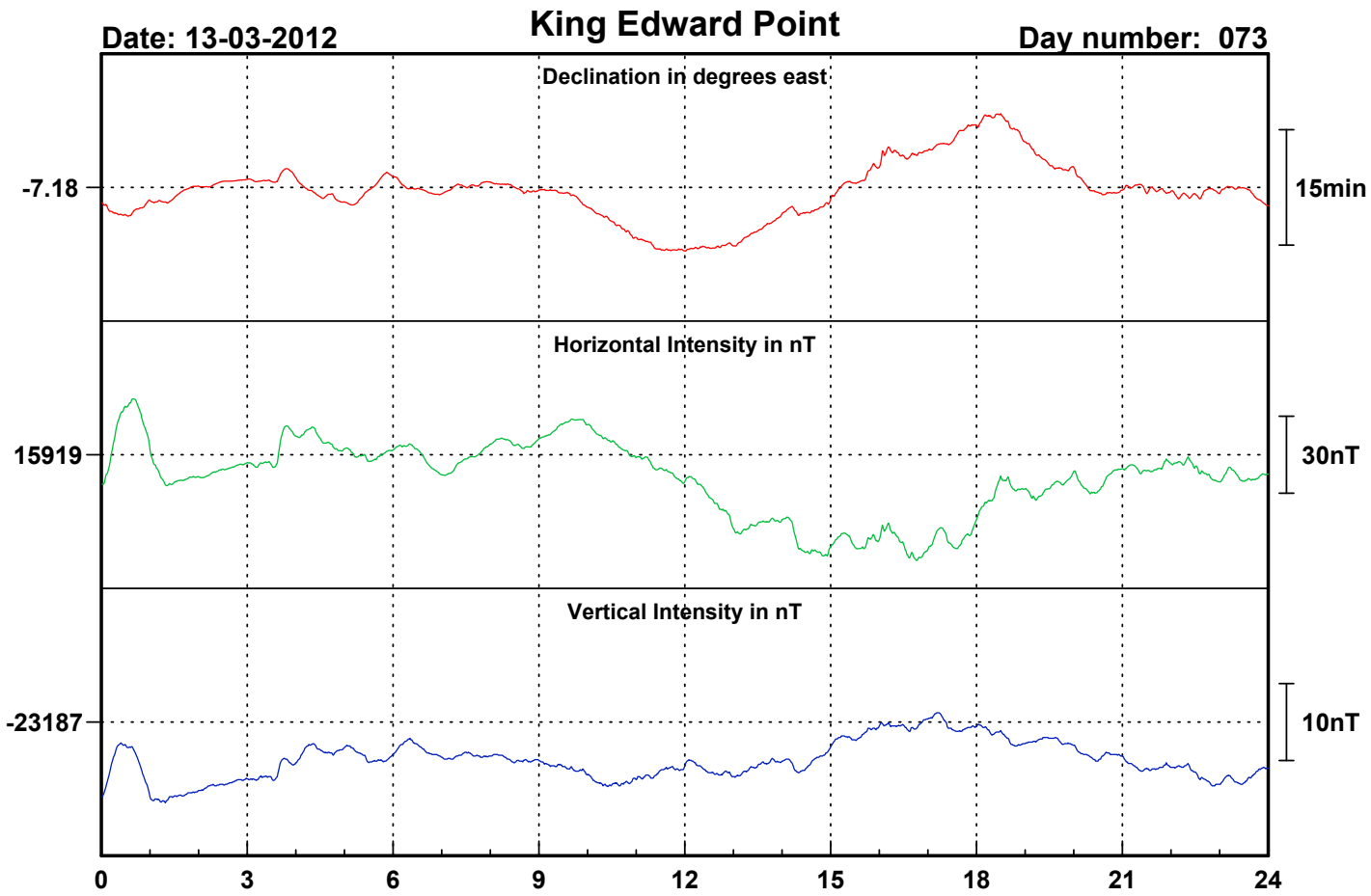
Hour (UT)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15min
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30nT
Vertical Intensity in nT
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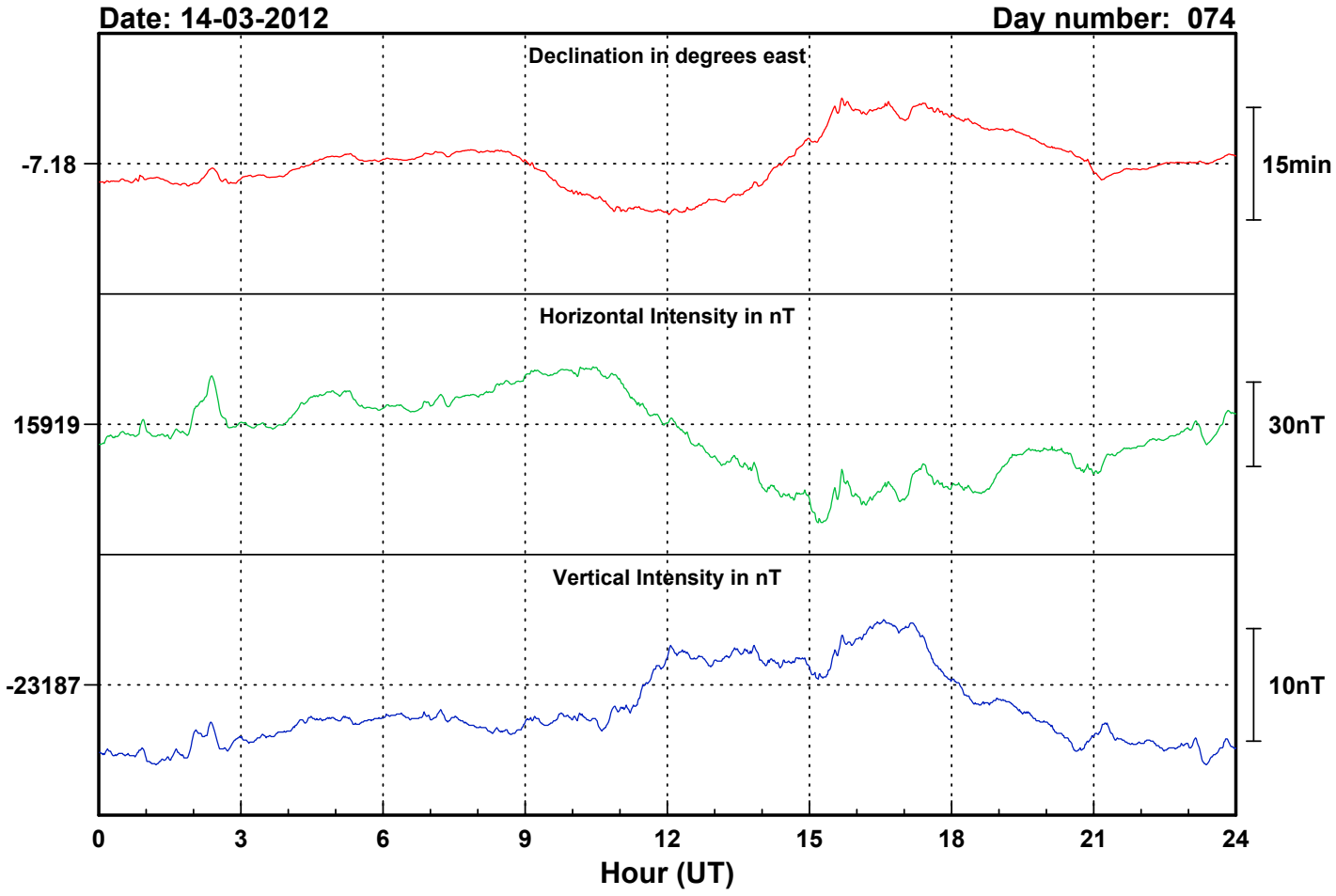
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15min
Horizontal Intensity in nT
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30nT
Vertical Intensity in nT
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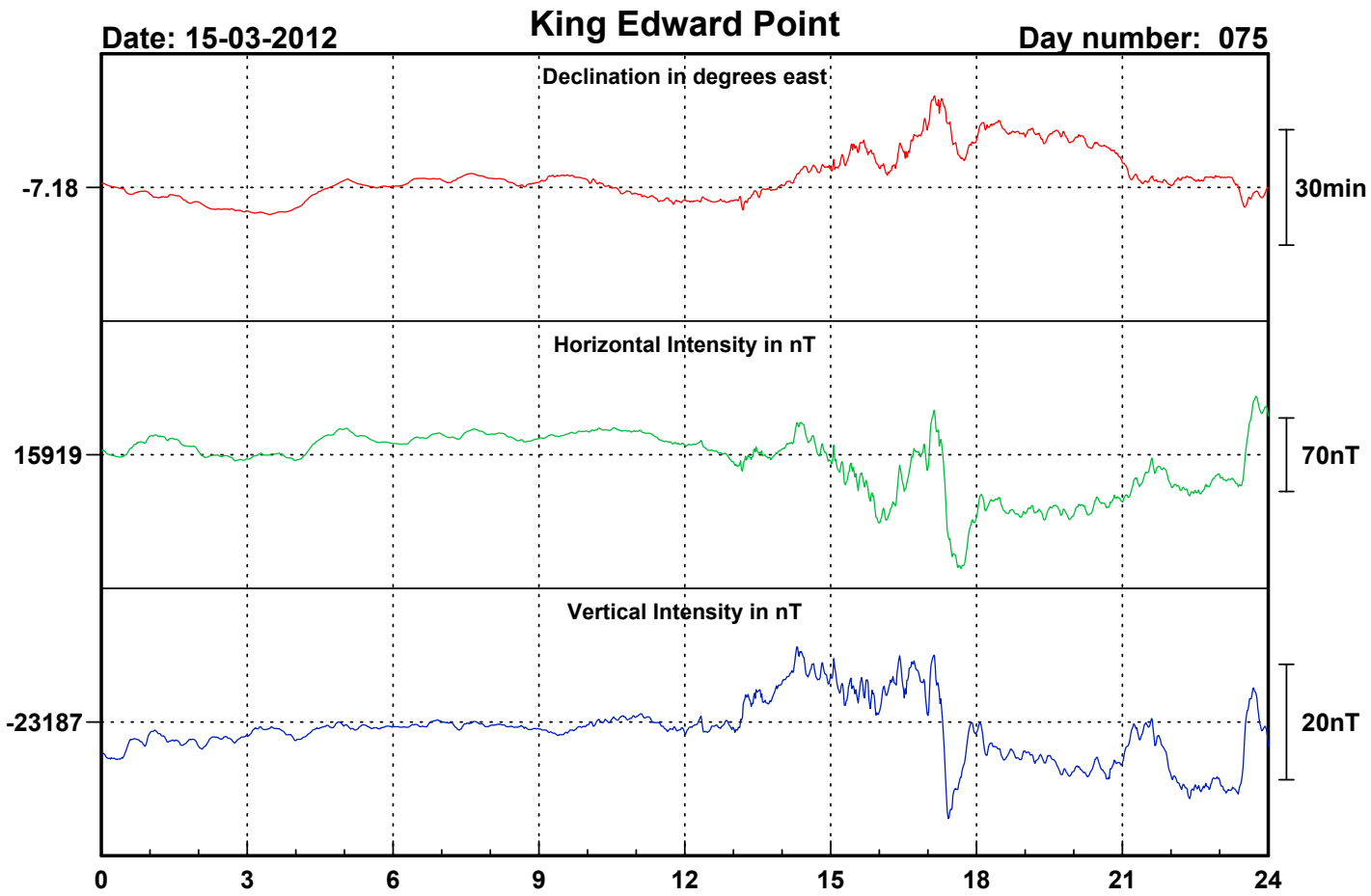
Hour (UT)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Day number: 075
Declination in degrees east
-7.18
30min
Horizontal Intensity in nT
15919
70nT
Vertical Intensity in nT
-23187
20nT
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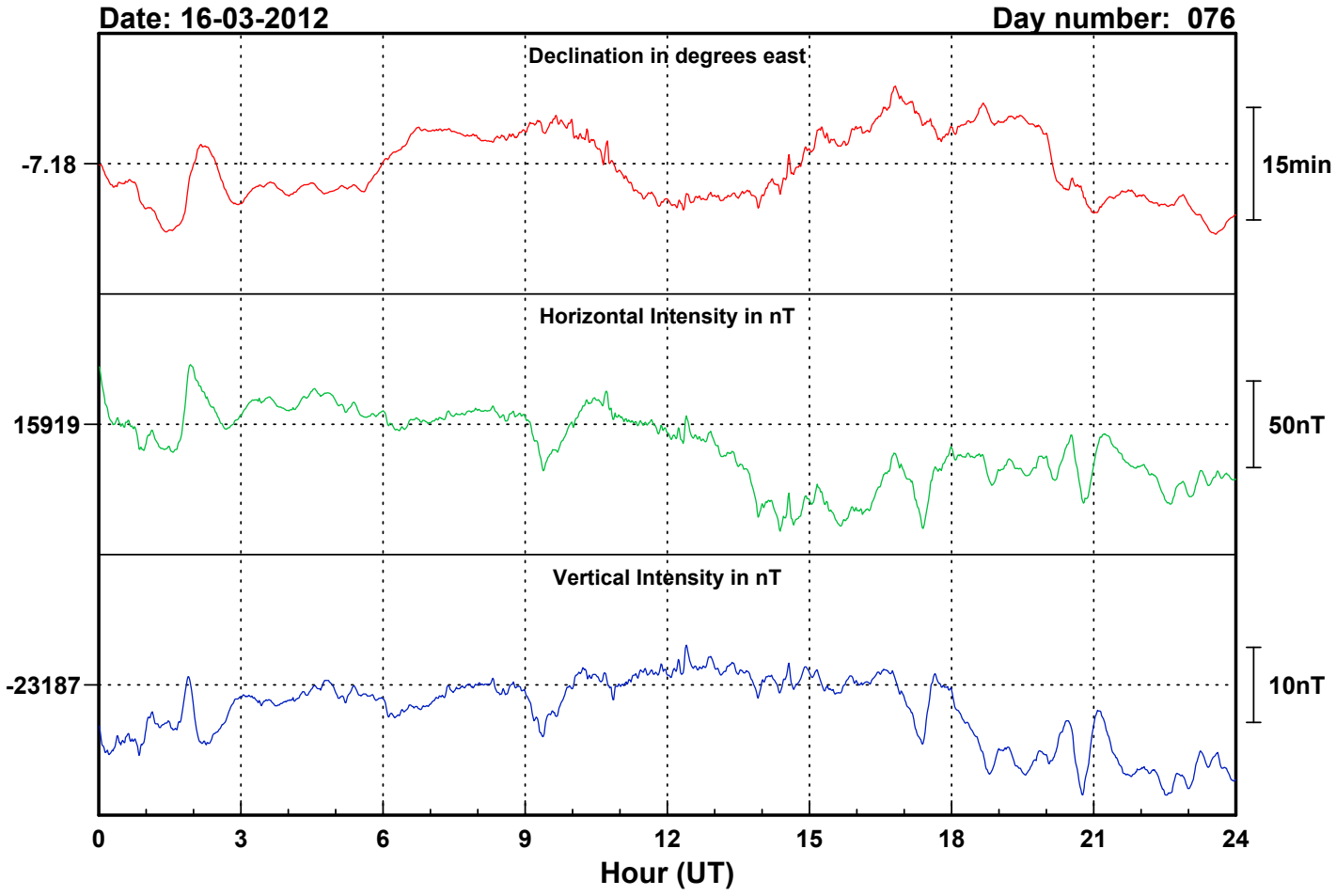
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15min
Horizontal Intensity in nT
15919
50nT
Vertical Intensity in nT
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10nT
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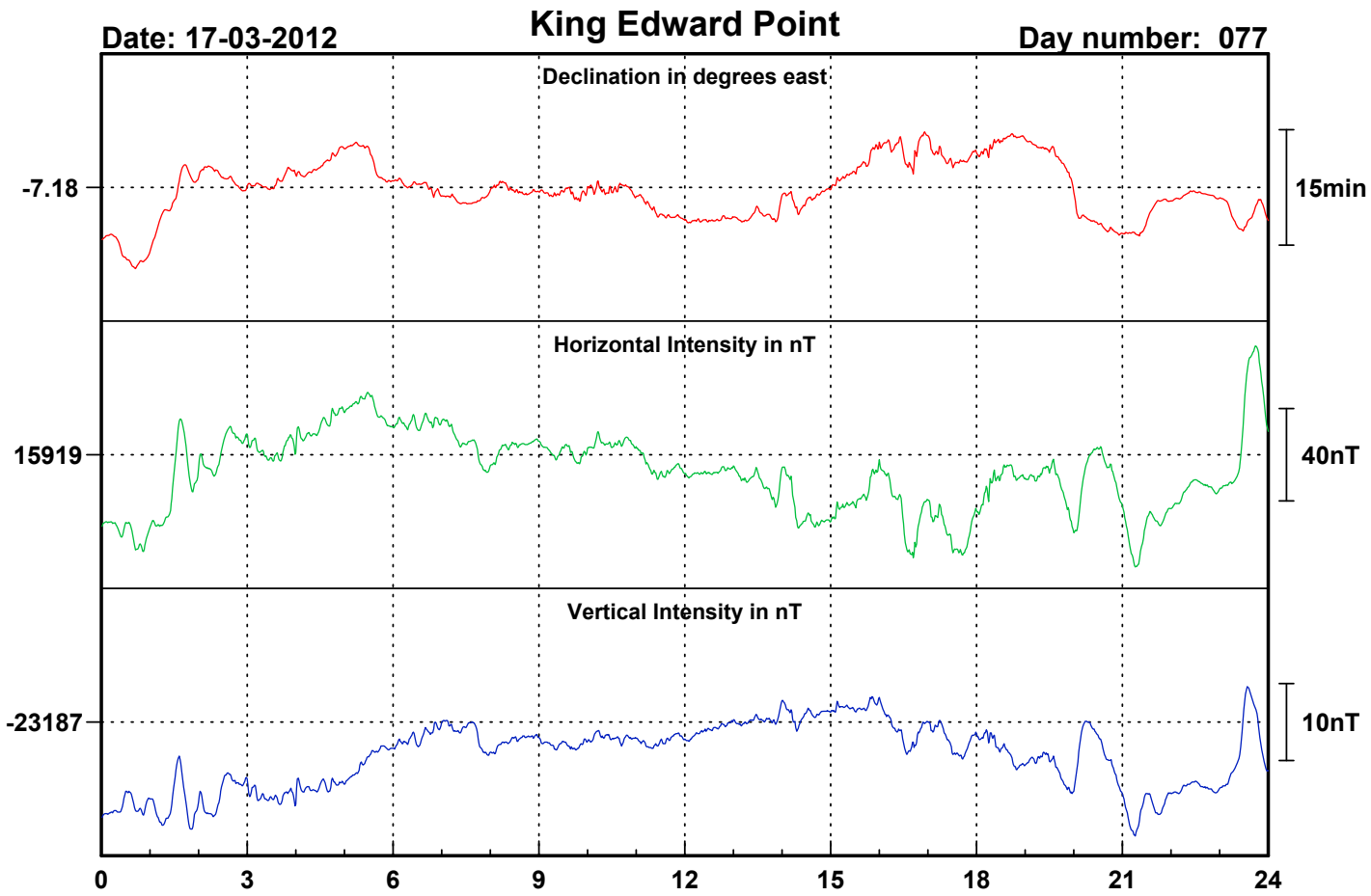
Hour (UT)


King Edward Point
Date: 17-03-2012
Day number: 077
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
40nT
Vertical Intensity in nT
-23187
10nT
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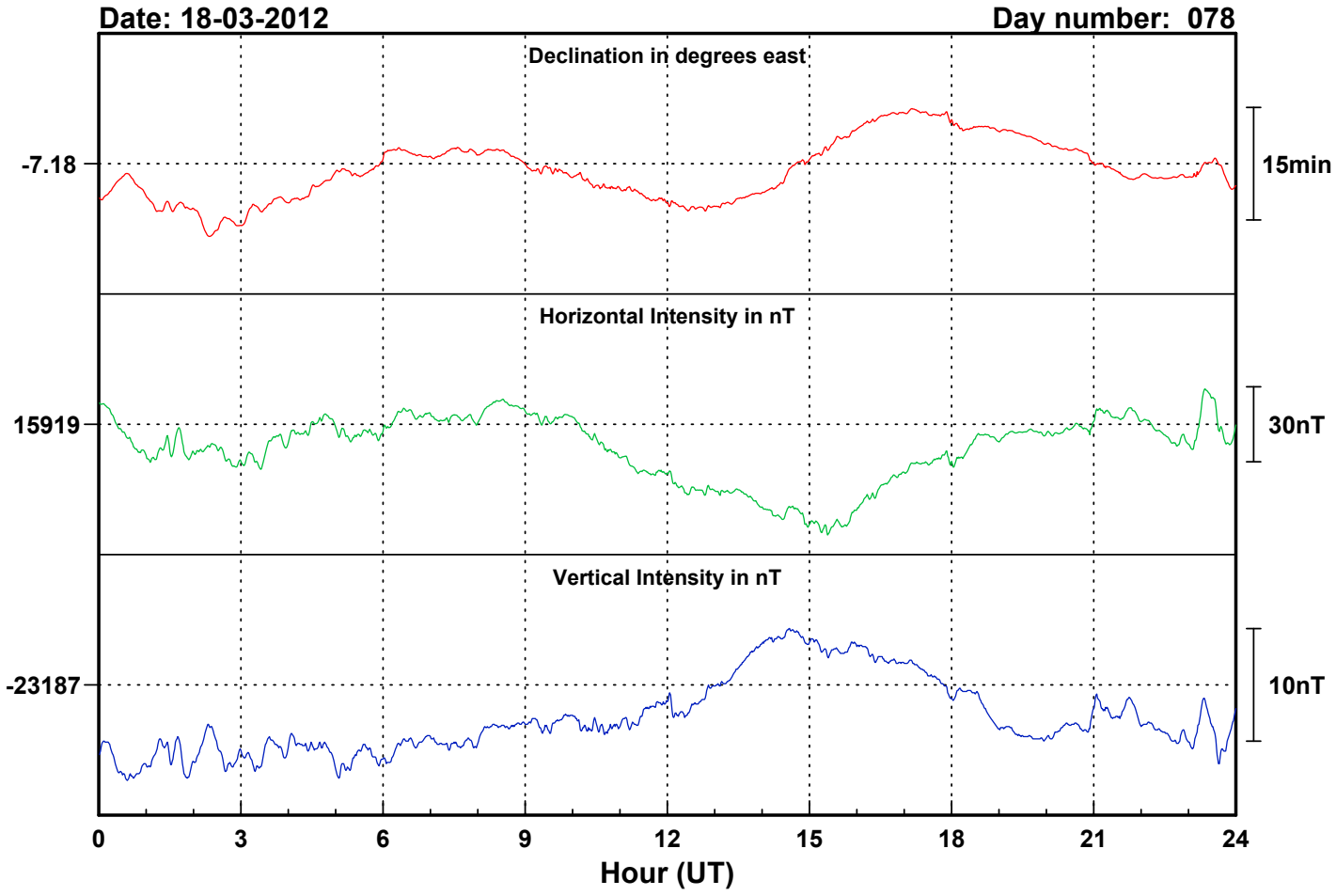
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15min
Horizontal Intensity in nT
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30nT
Vertical Intensity in nT
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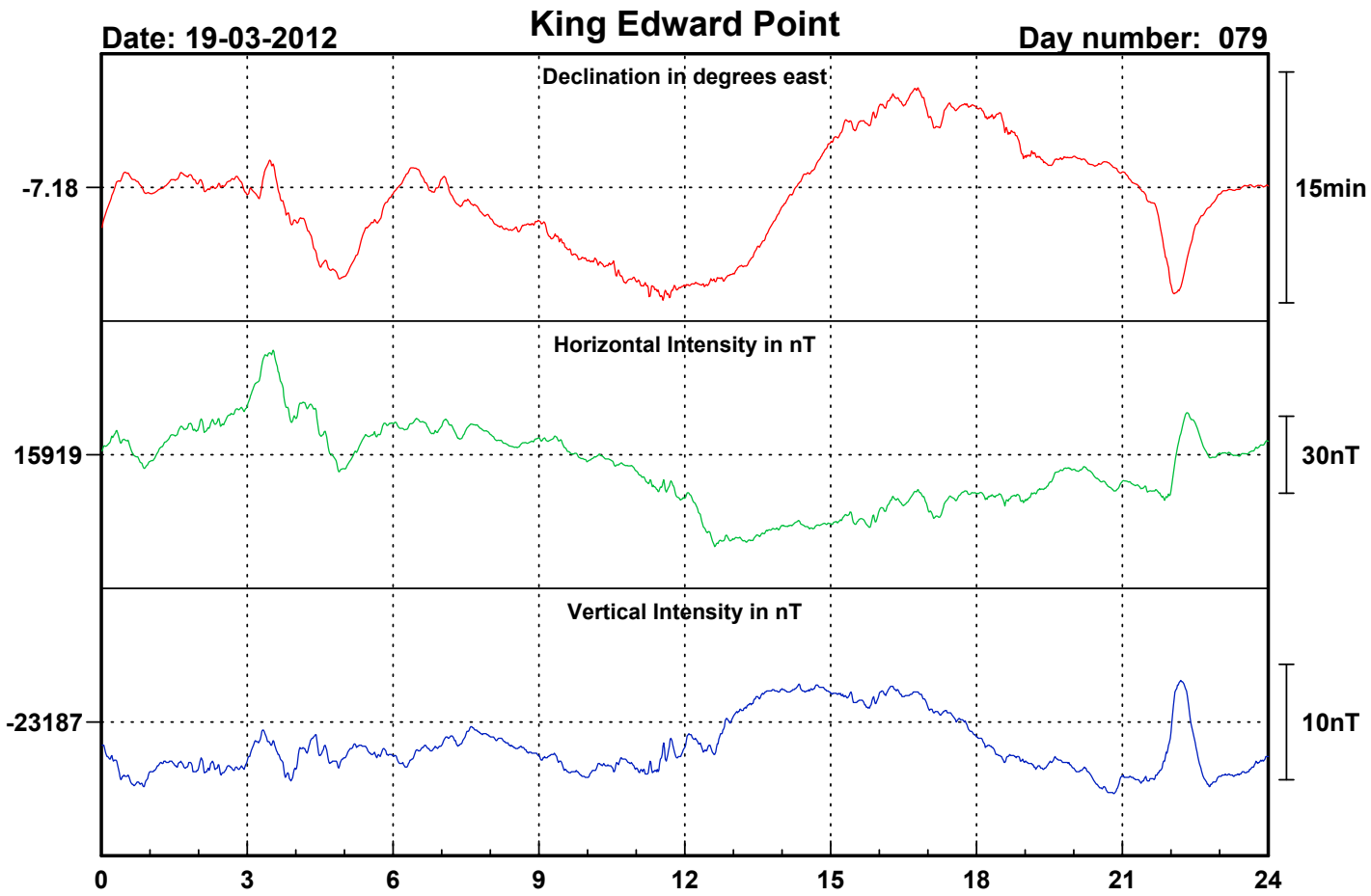
Hour (UT)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Day number: 079
Declination in degrees east
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15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
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0
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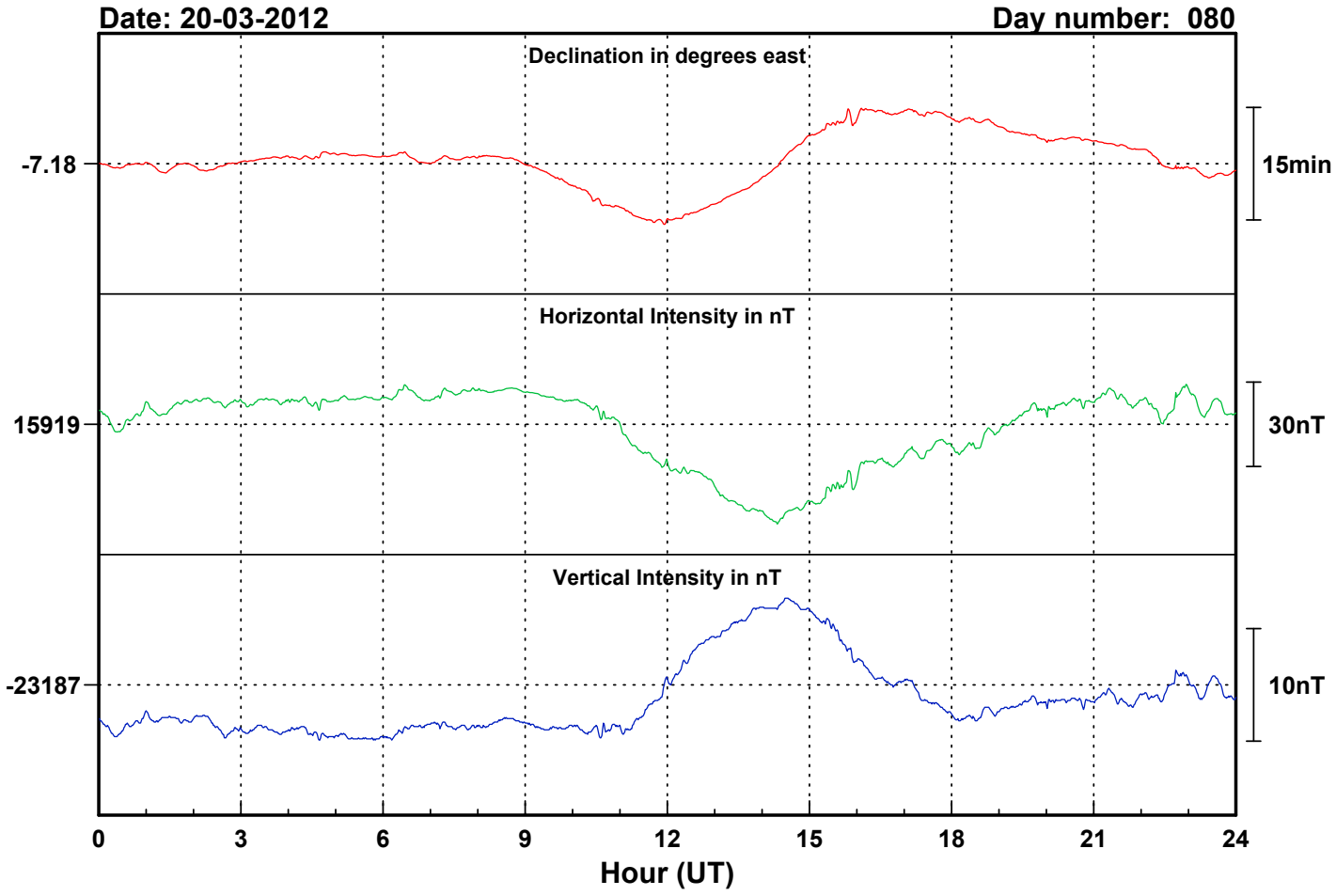
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15min
Horizontal Intensity in nT
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30nT
Vertical Intensity in nT
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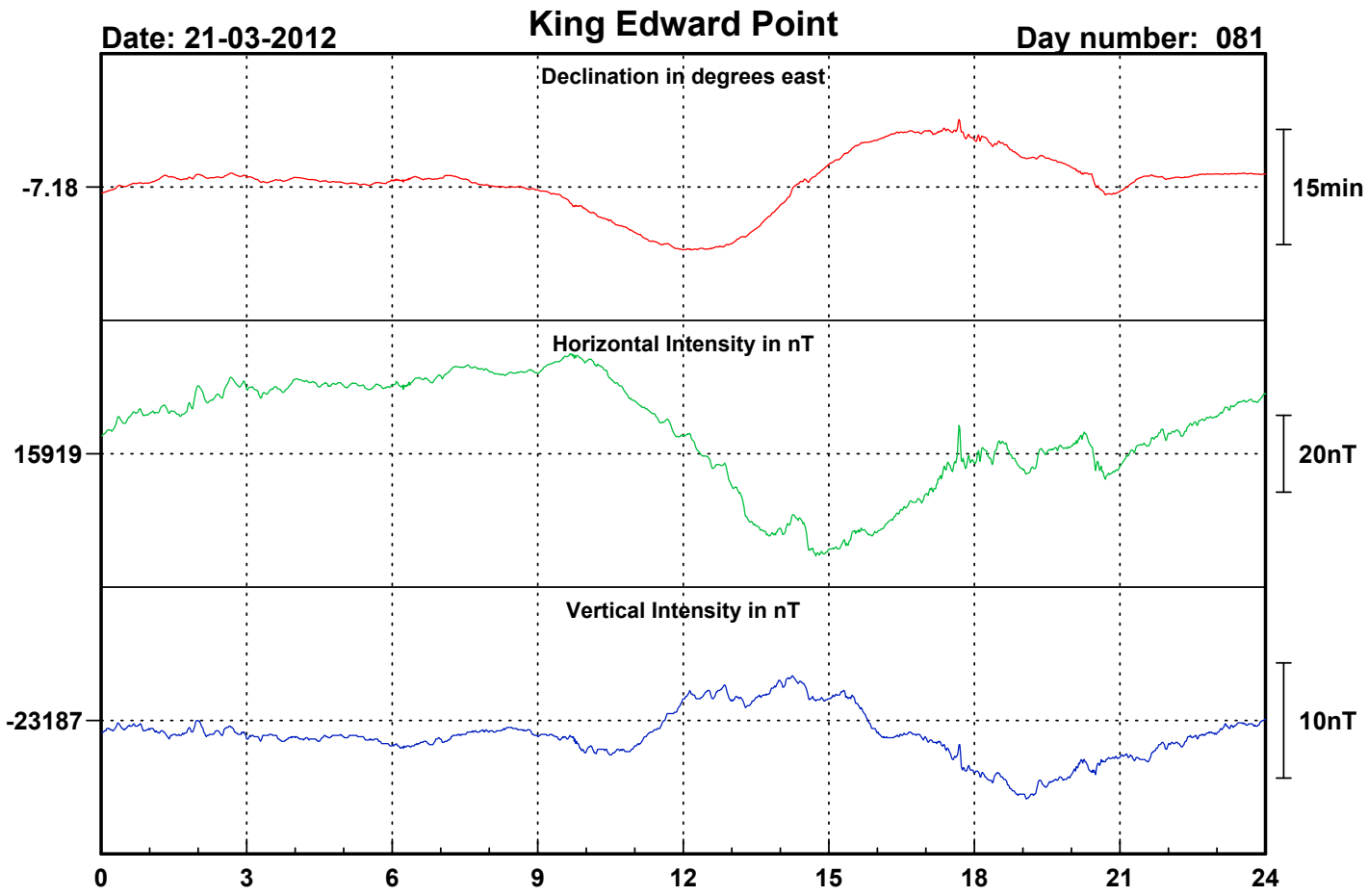
24
Hour (UT)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Date: 21-03-2012
Day number: 081
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15min
Horizontal Intensity in nT
15919
20nT
Vertical Intensity in nT
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0
3
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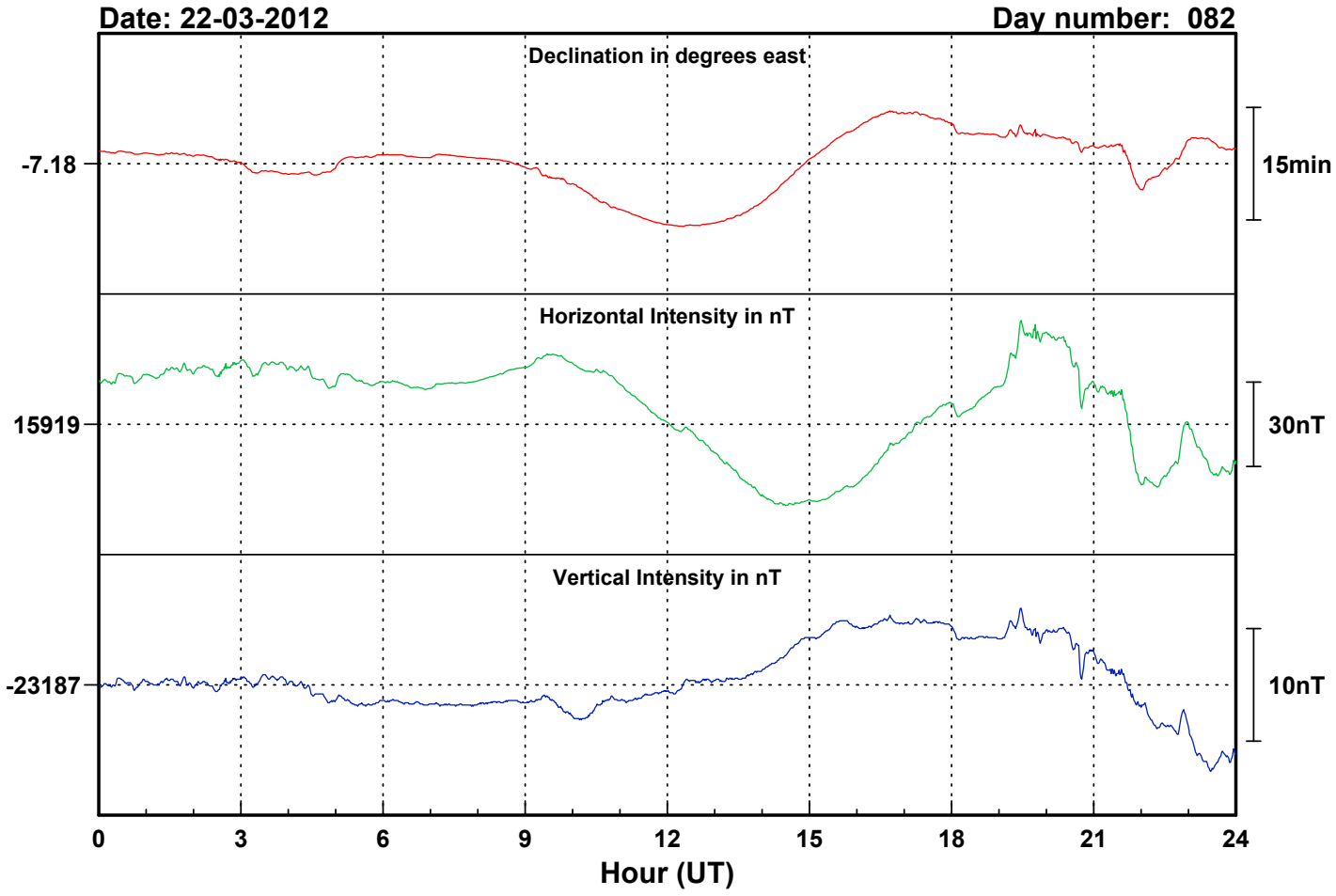
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Declination in degrees east
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15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
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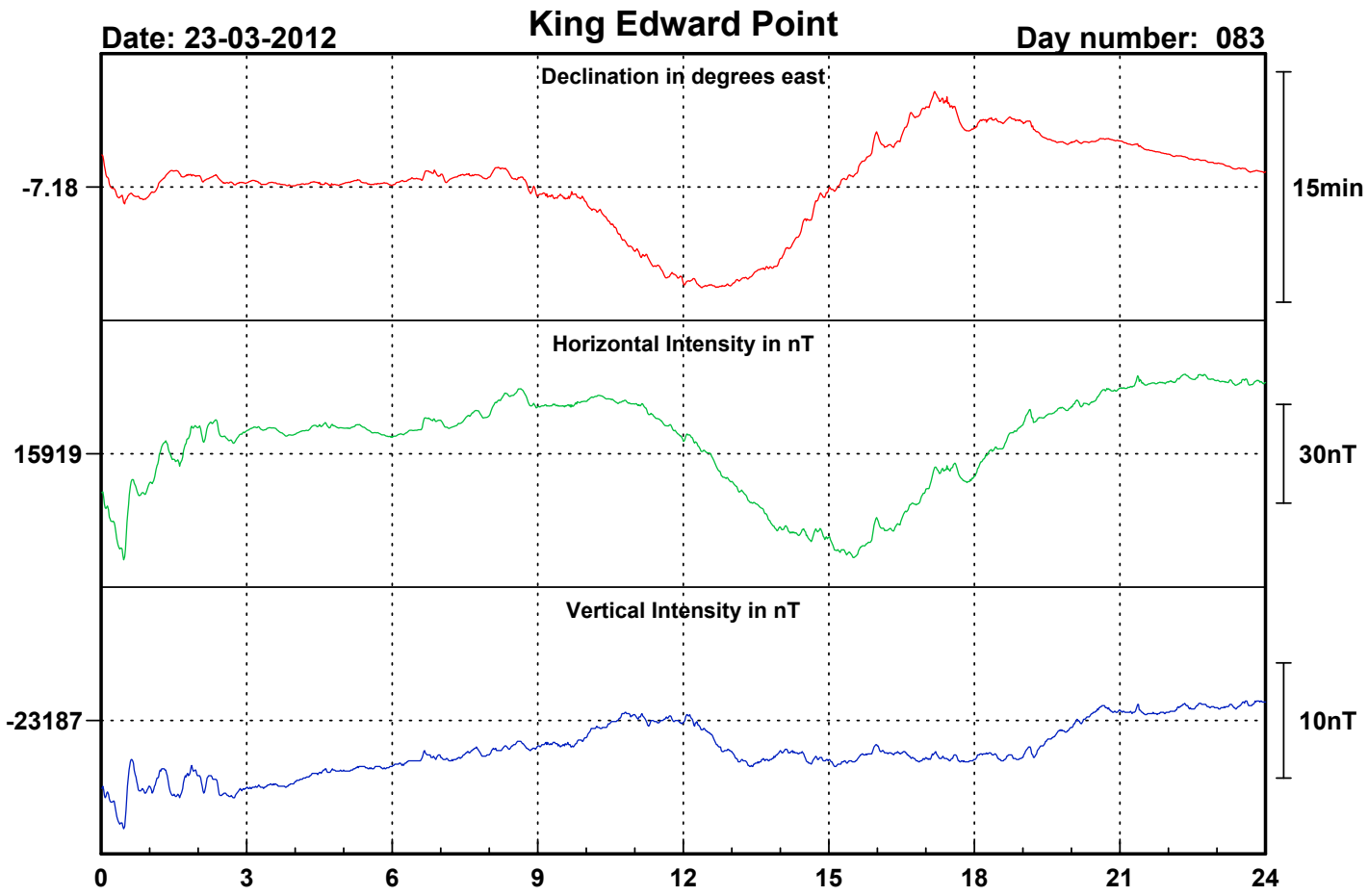
24
Hour (UT)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Date: 23-03-2012
Day number: 083
Declination in degrees east
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15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
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0
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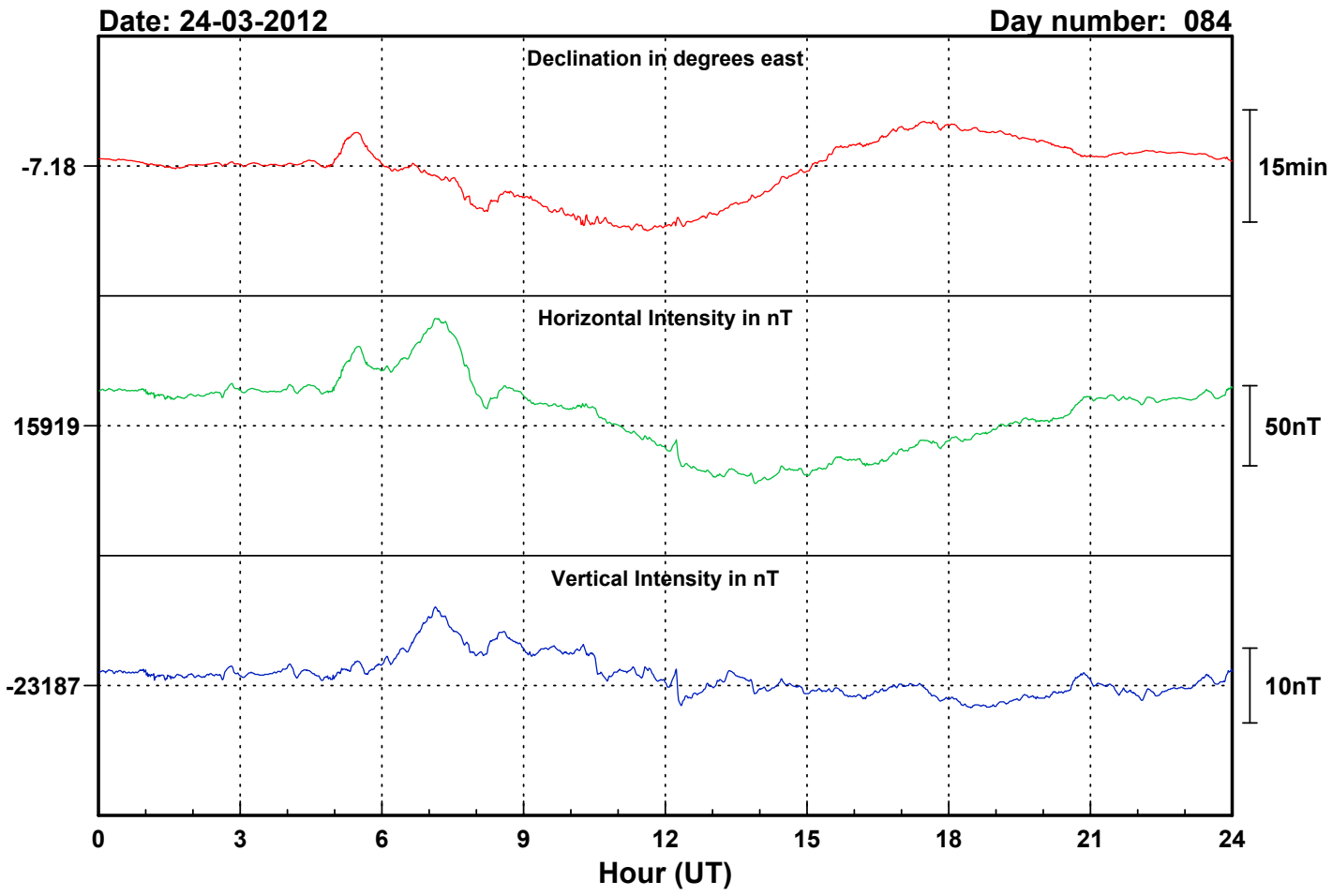
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15min
Horizontal Intensity in nT
15919
50nT
Vertical Intensity in nT
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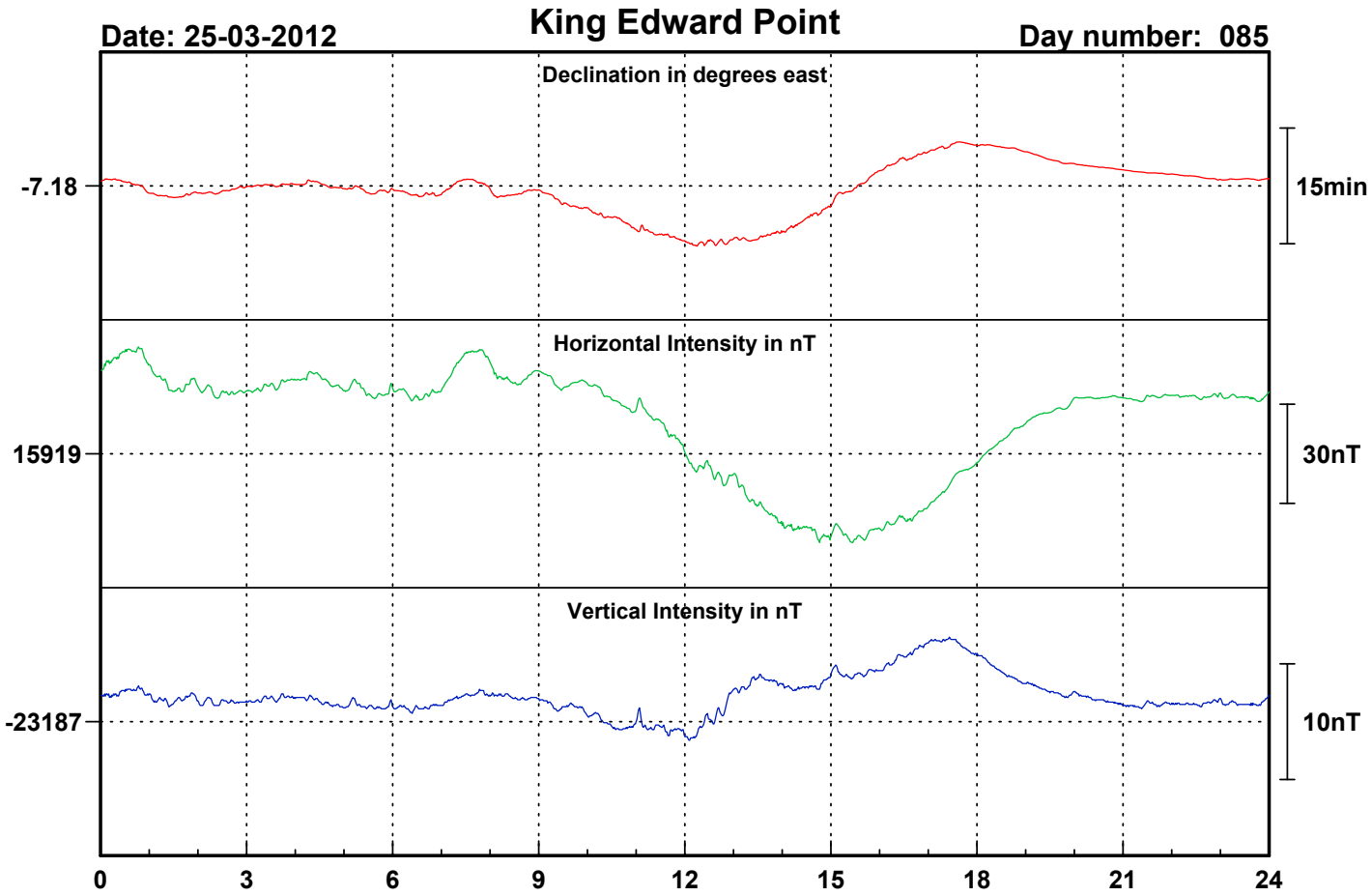
6
9
12
15
18
21
24
Hour (UT)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Day number: 085
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
-23187
10nT
0
3
6
9
12
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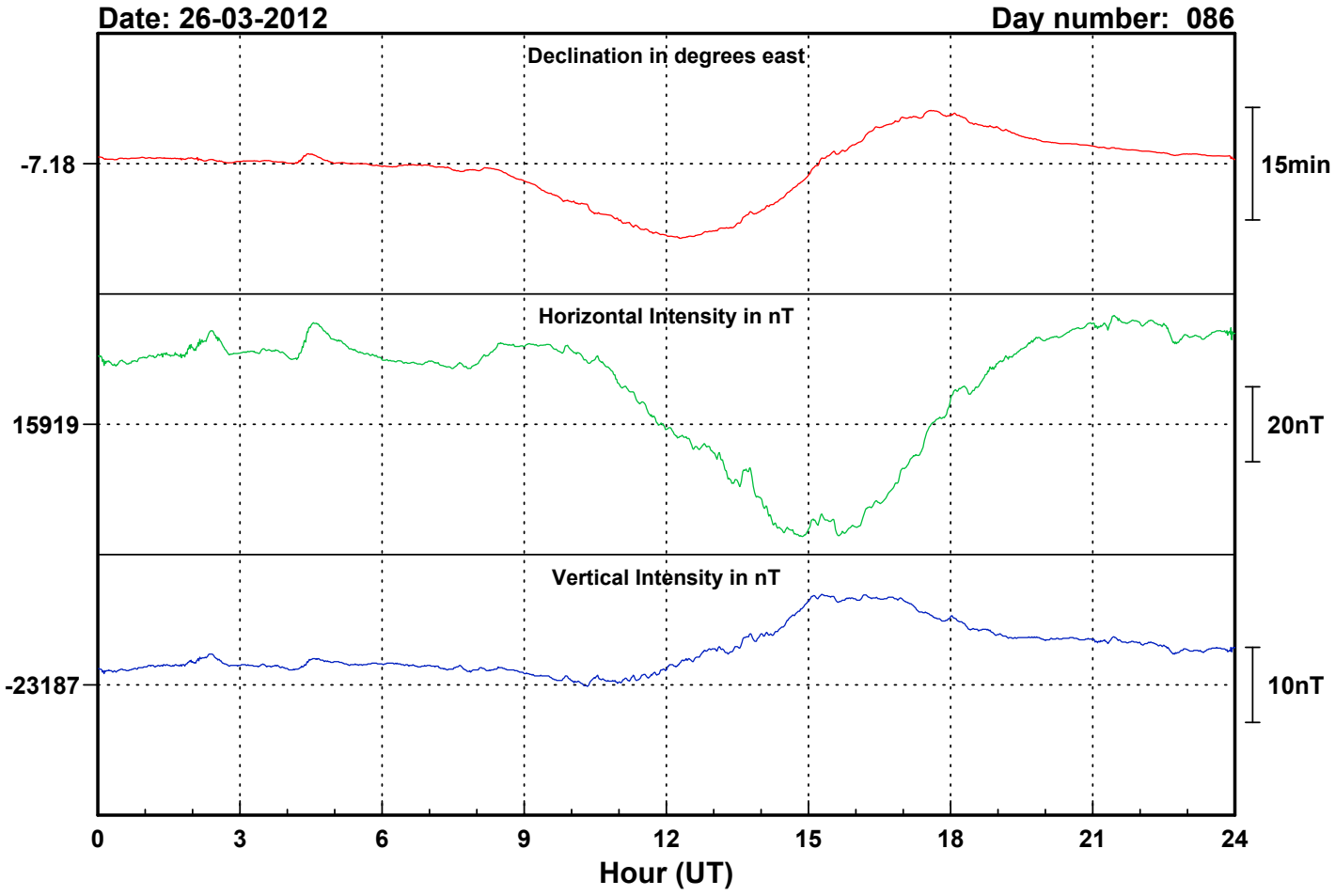
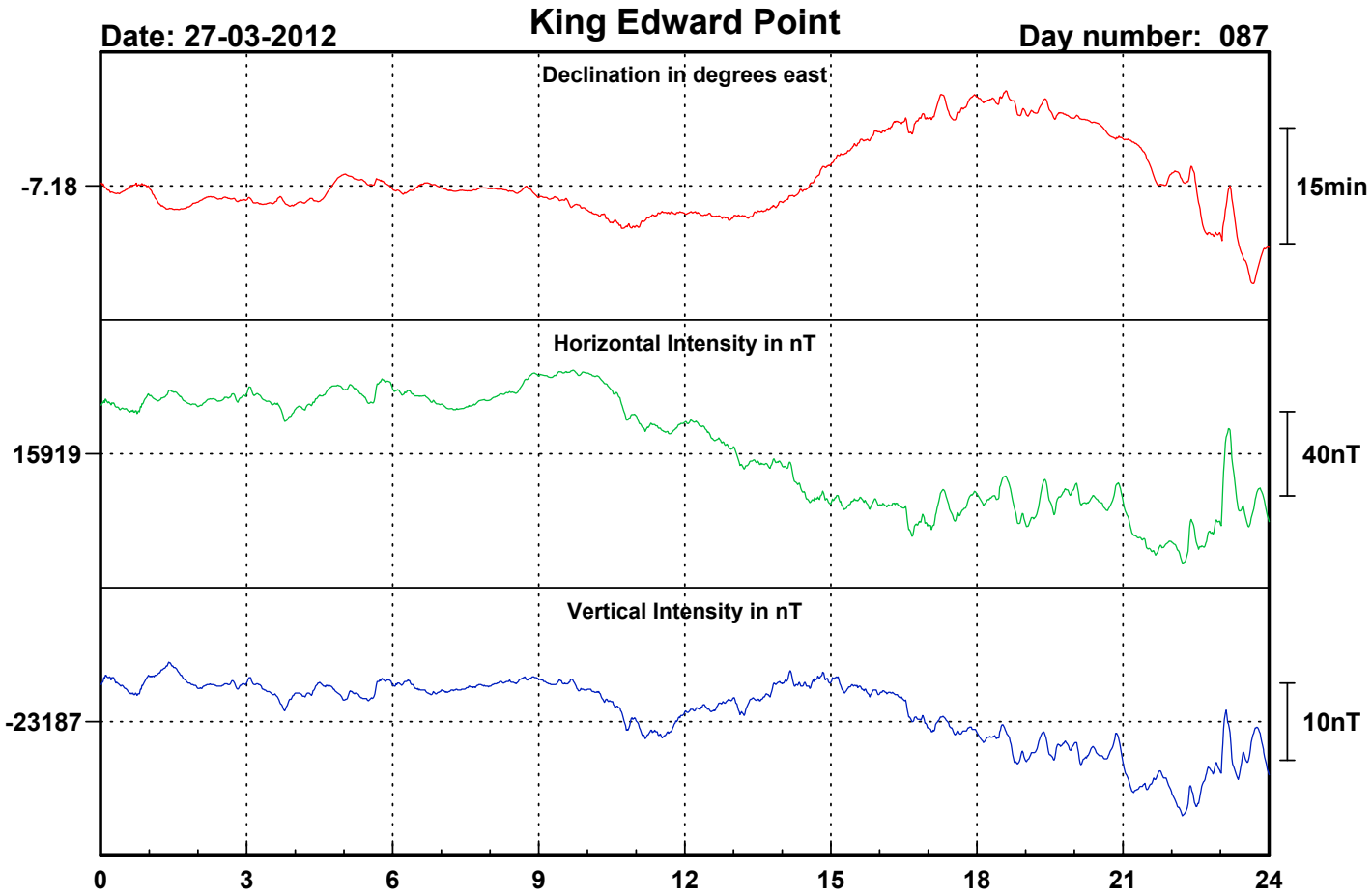
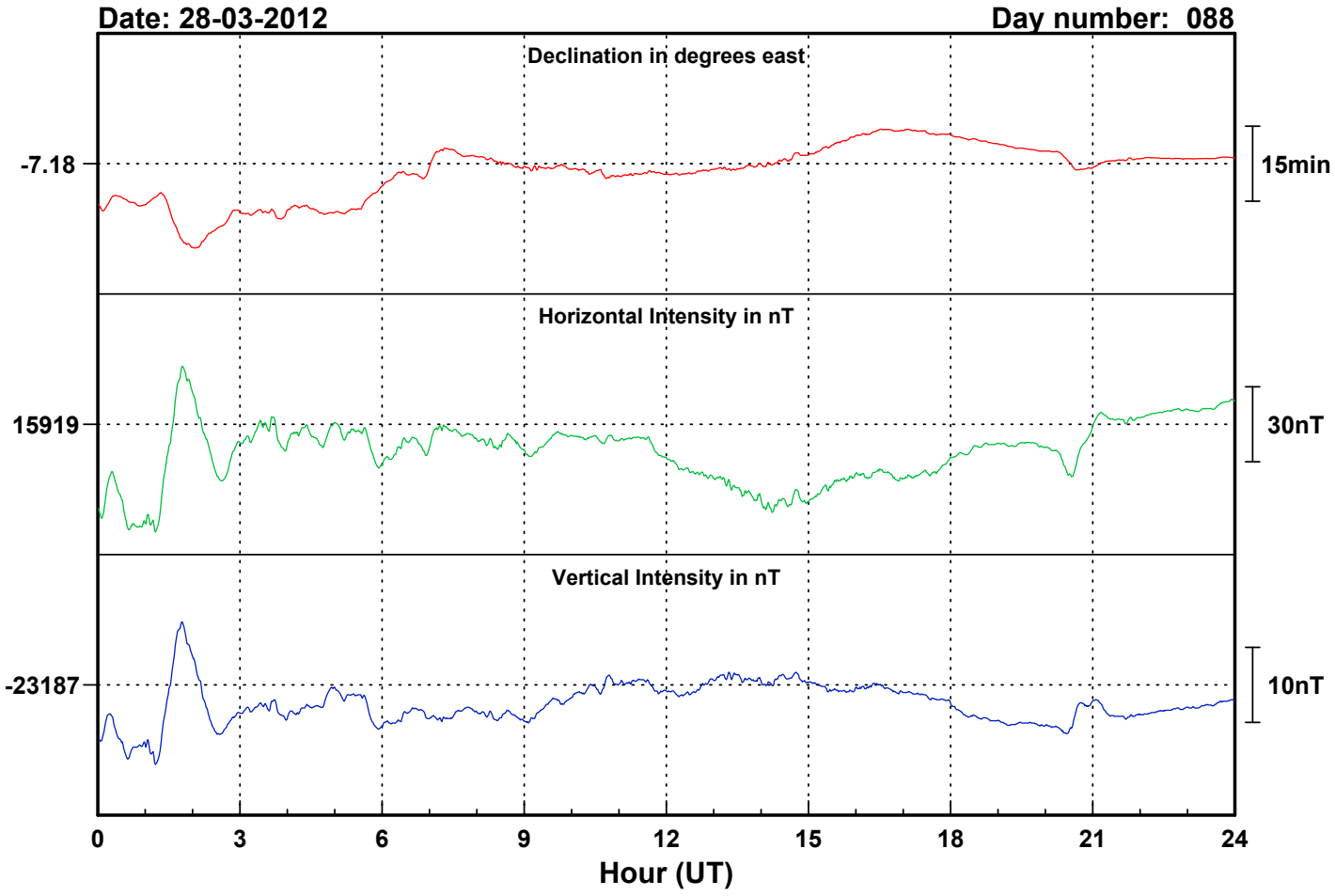
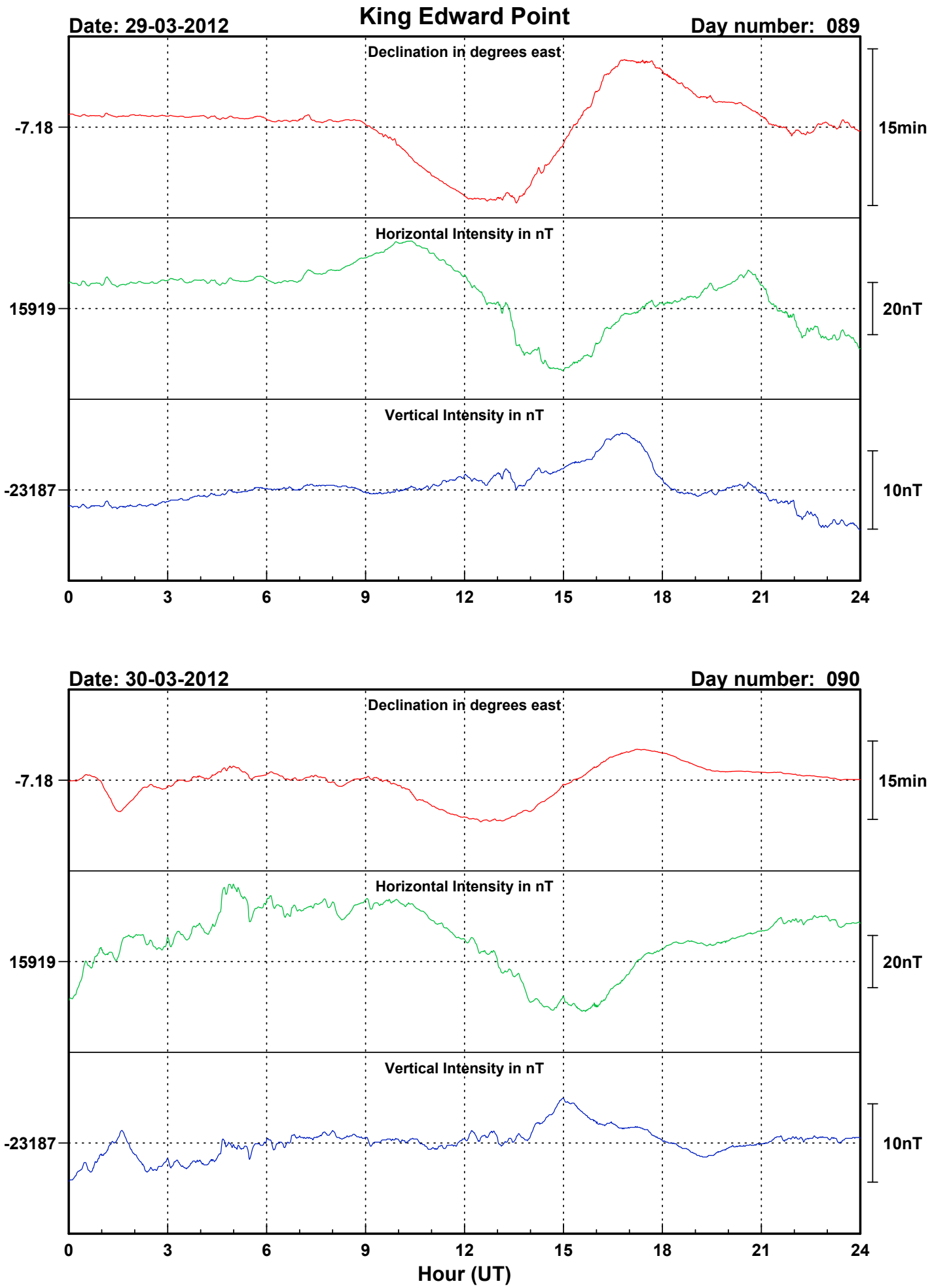
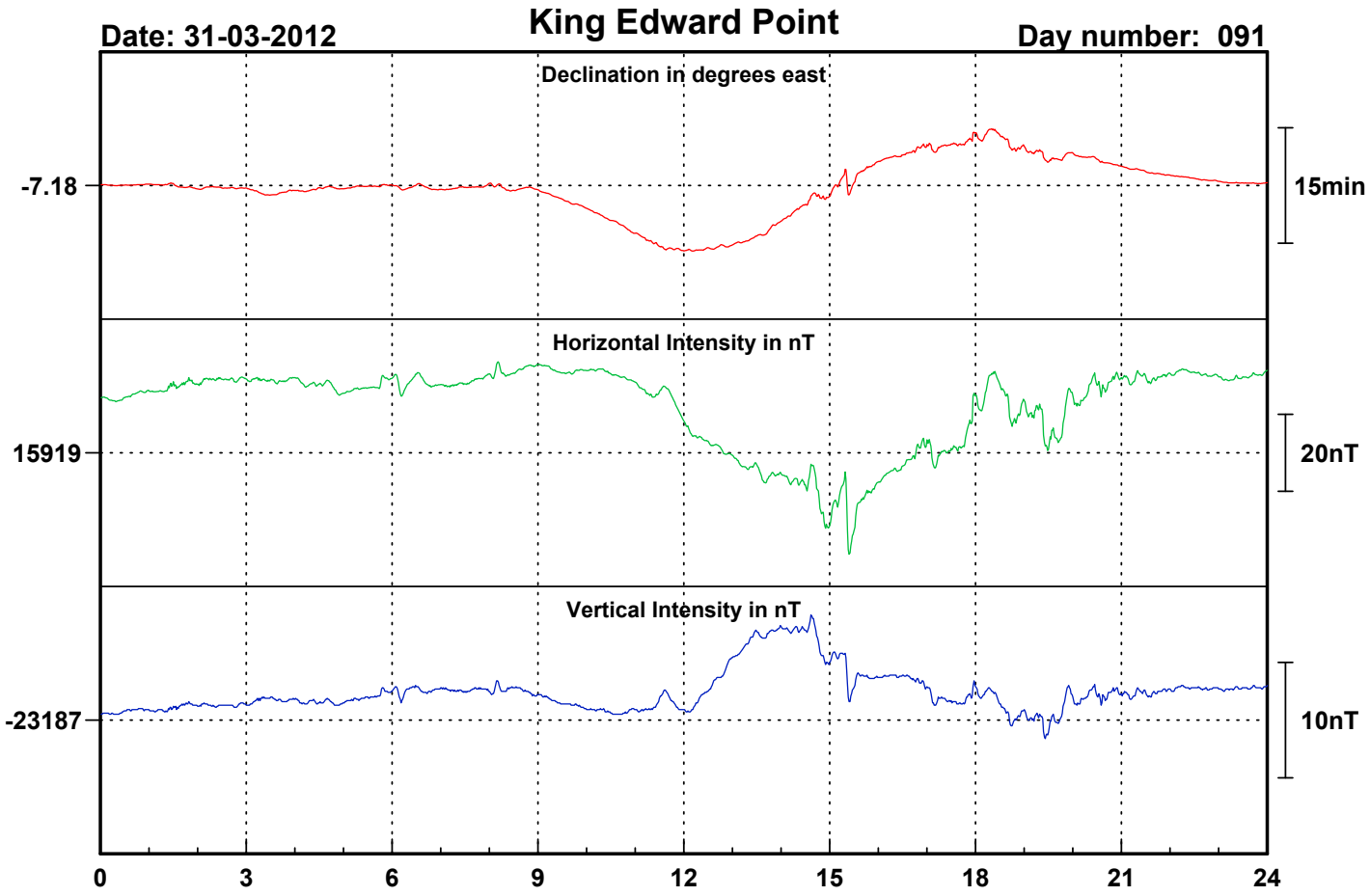
21
24


Date: 26-03-2012
Day number: 086
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
20nT
Vertical Intensity in nT
-23187
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)

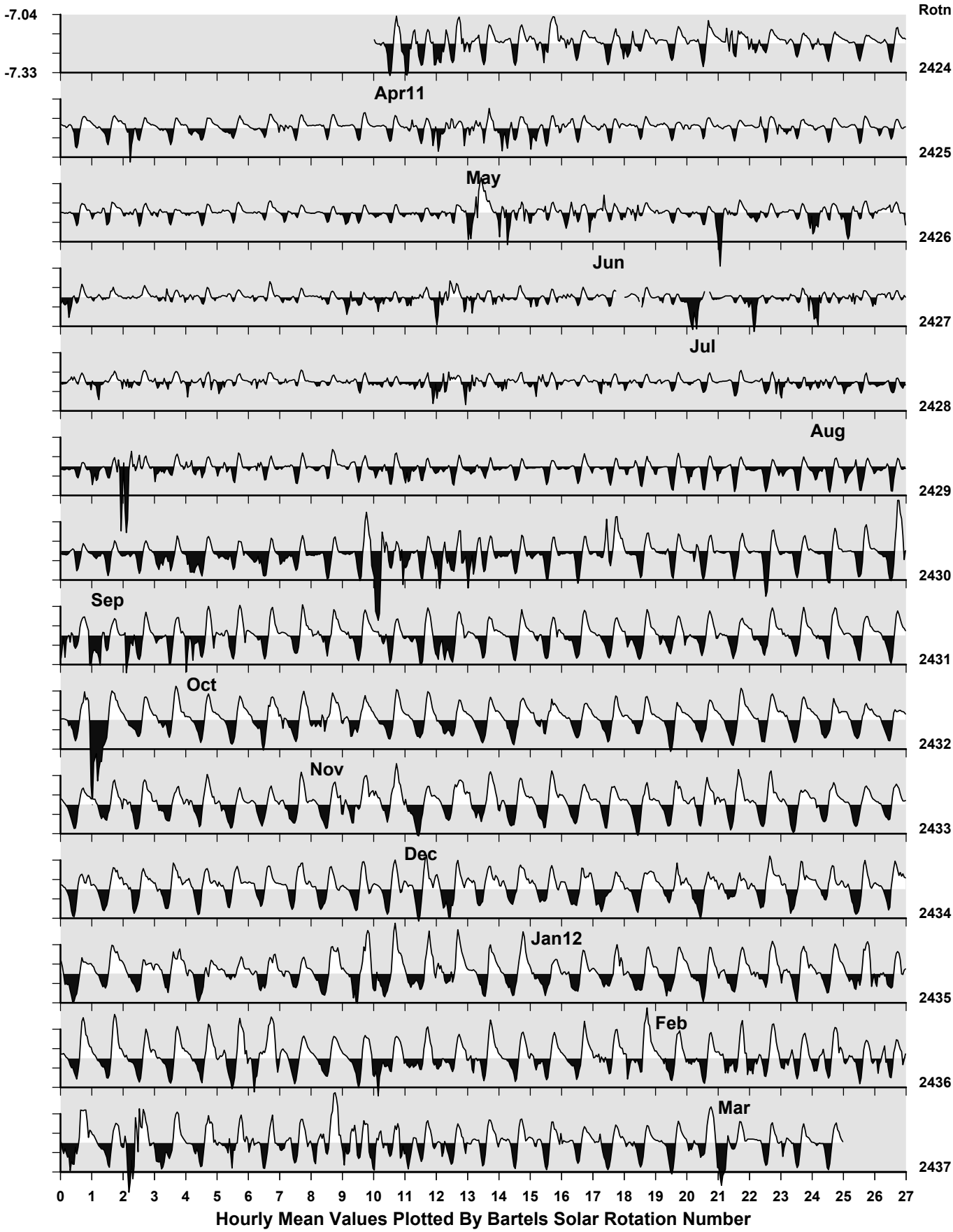

King Edward Point
Date: 27-03-2012
Day number: 087
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
40nT
Vertical Intensity in nT
-23187
10nT
0
3
6
9
12
15
18
21
24


Date: 28-03-2012
Day number: 088
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
30nT
Vertical Intensity in nT
-23187
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)

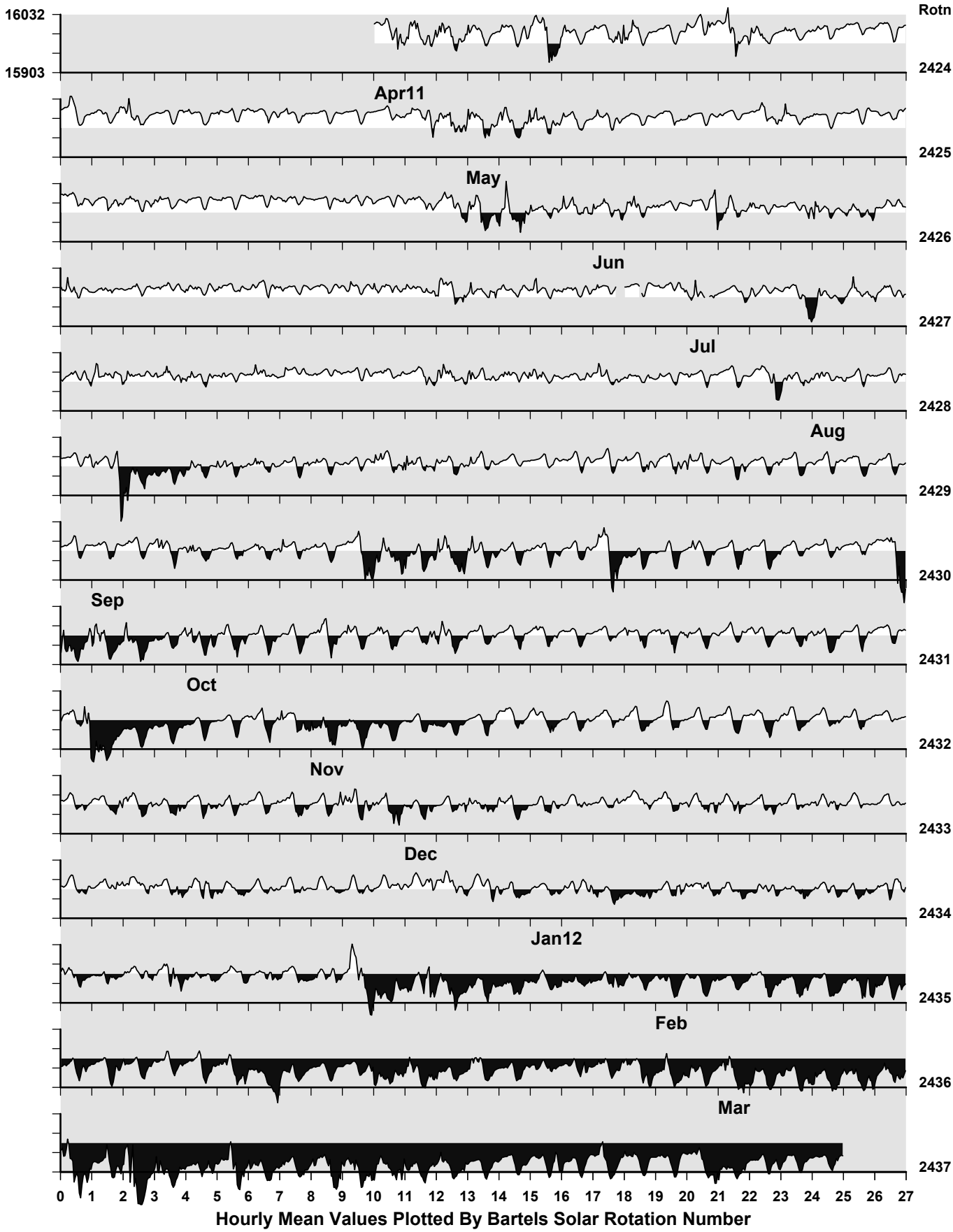

King Edward Point
Date: 29-03-2012
Day number: 089
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
20nT
Vertical Intensity in nT
-23187
10nT
0
3
6
9
12
15
18
21
24
Date: 30-03-2012
Day number: 090
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
20nT
Vertical Intensity in nT
-23187
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)


King Edward Point
Date: 31-03-2012
Day number: 091
Declination in degrees east
-7.18
15min
Horizontal Intensity in nT
15919
20nT
Vertical Intensity in nT
-23187
10nT
0
3
6
9
12
15
18
21
24

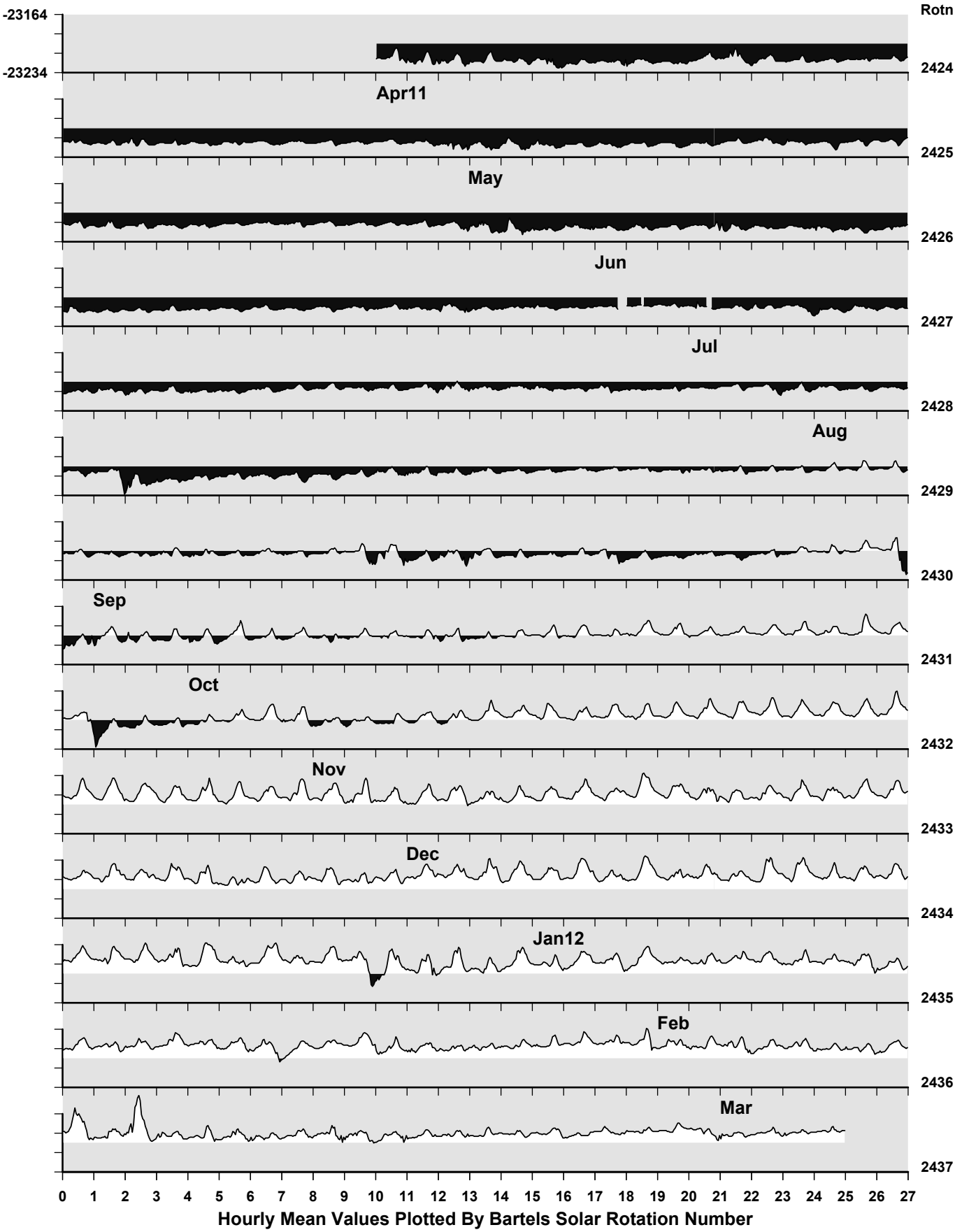
King Edward Point Observatory: Declination (degrees)



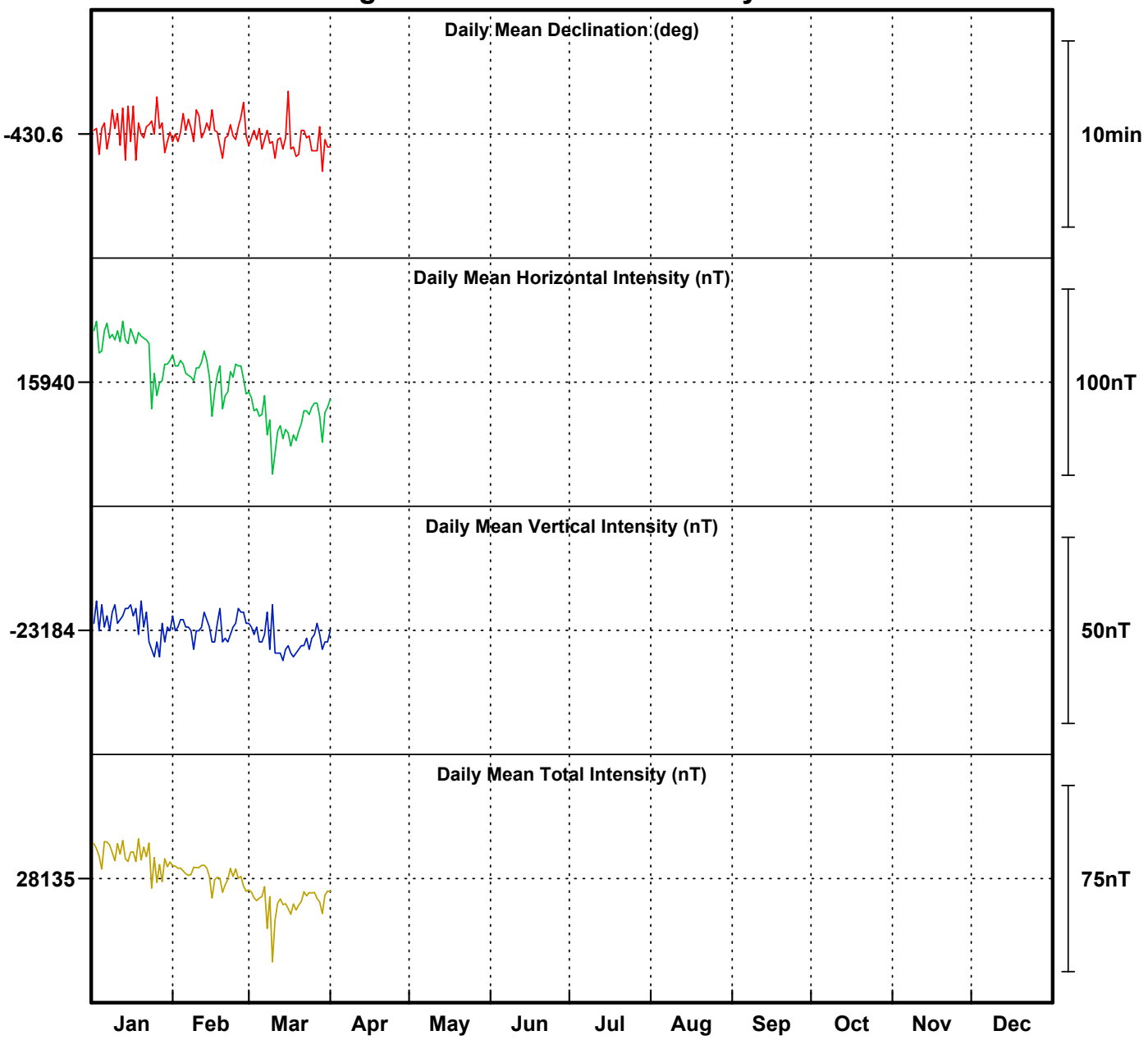
King Edward Point Observatory: Horizontal Intensity (nT)



King Edward Point Observatory: Vertical Intensity (nT)



King Edward Point Observatory 2012



Monthly Mean Values for King Edward Point Observatory 2012

Month	*D*	*H*	*I*	*X*	*Y*	*Z*	*F*
January	-7° 10.4´	15959 nT	-55° 27.4´	15834 nT	-1993 nT	-23182 nT	28144 nT
February	-7° 10.4´	15944 nT	-55° 29.0´	15819 nT	-1991 nT	-23183 nT	28136 nT
March	-7° 11.0´	15919 nT	-55° 31.7´	15794 nT	-1991 nT	-23187 nT	28125 nT

Note

i. The values shown here are provisional.