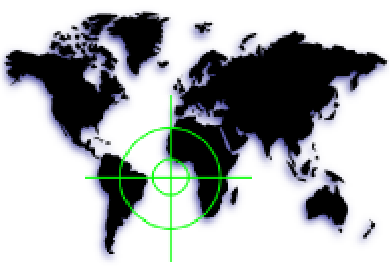
BRITISH GEOLOGICAL SURVEY

Ascension Island Observatory *Monthly Magnetic Bulletin*

October 2018

18/10/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.

Enquiries about the data should be addressed to:

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Scotland, UK

Tel: +44 (0) 131 667 1000
E-mail: enquiries@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. The observatory co-ordinates are:

Geographic: *7° 56′56.4″S* *345° 37′26.4″E*
Geomagnetic: *-2° 55′24″S* *057° 52′12″E*
Height above mean sea level: *177 m*

The geographical coordinates are measured by a handheld GPS device, which uses WGS84 as the reference coordinate system. The height above MSL is determined from the best available contour maps. The geomagnetic co-ordinates are approximations, calculated using the 12th generation International Geomagnetic Reference Field (IGRF) at epoch 2018.5. 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 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, 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. 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.'

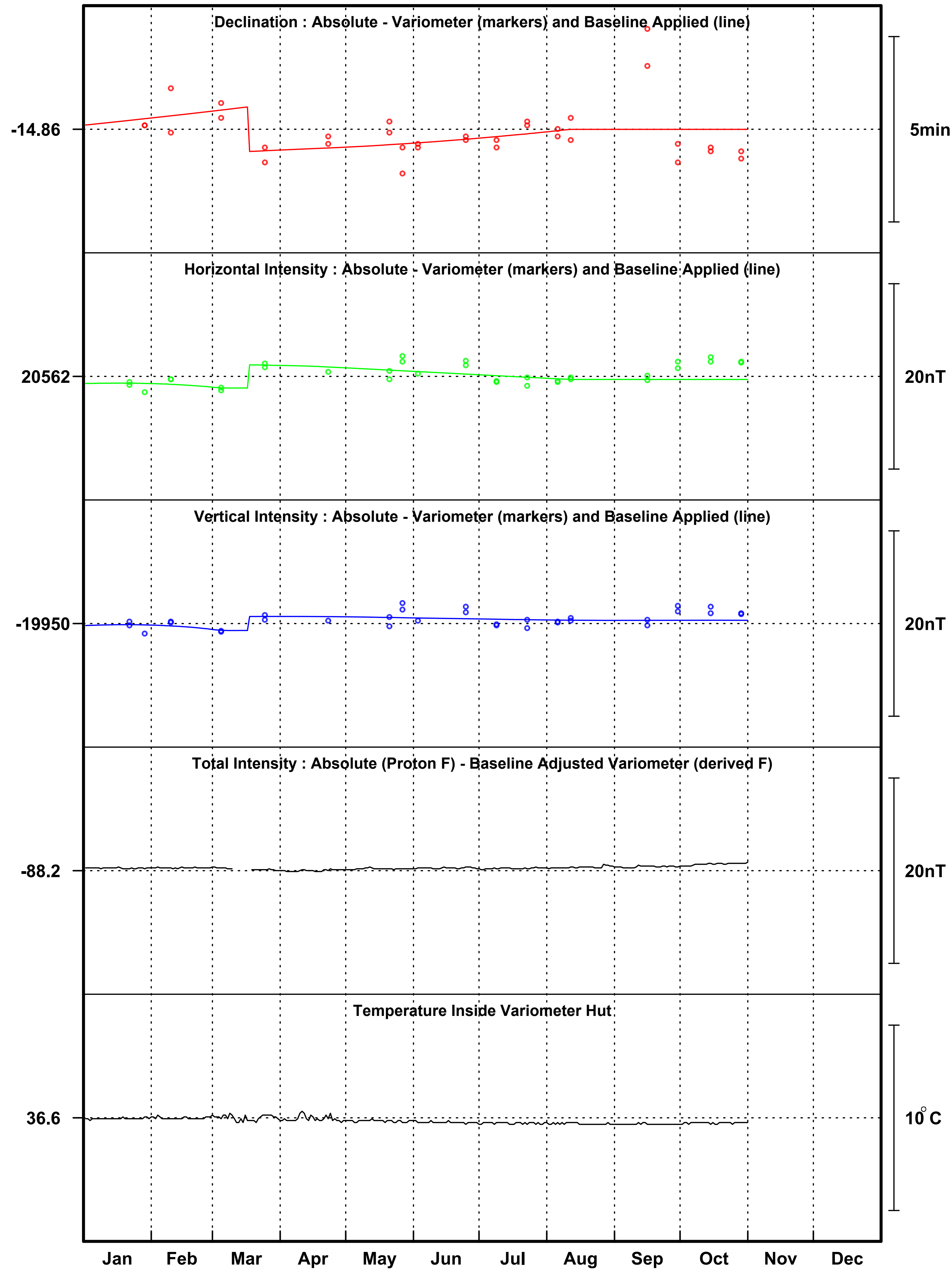
Commercial users can contact the geomagnetism team for information on the range of applications and services offered. Full contact details are available at www.geomag.bgs.ac.uk/contactus/staff

ASCENSION ISLAND OBSERVATORY

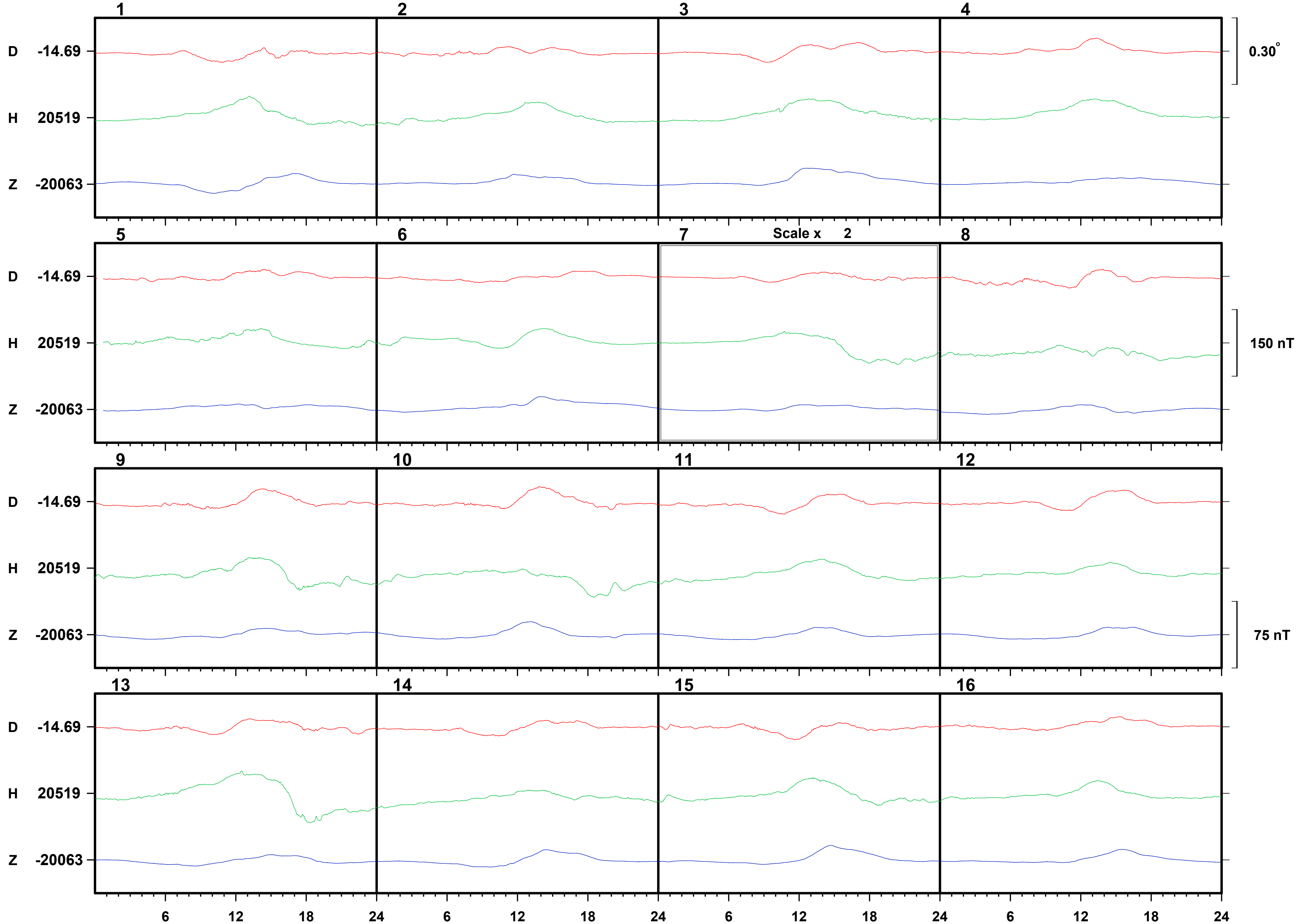
ABSOLUTE OBSERVATIONS

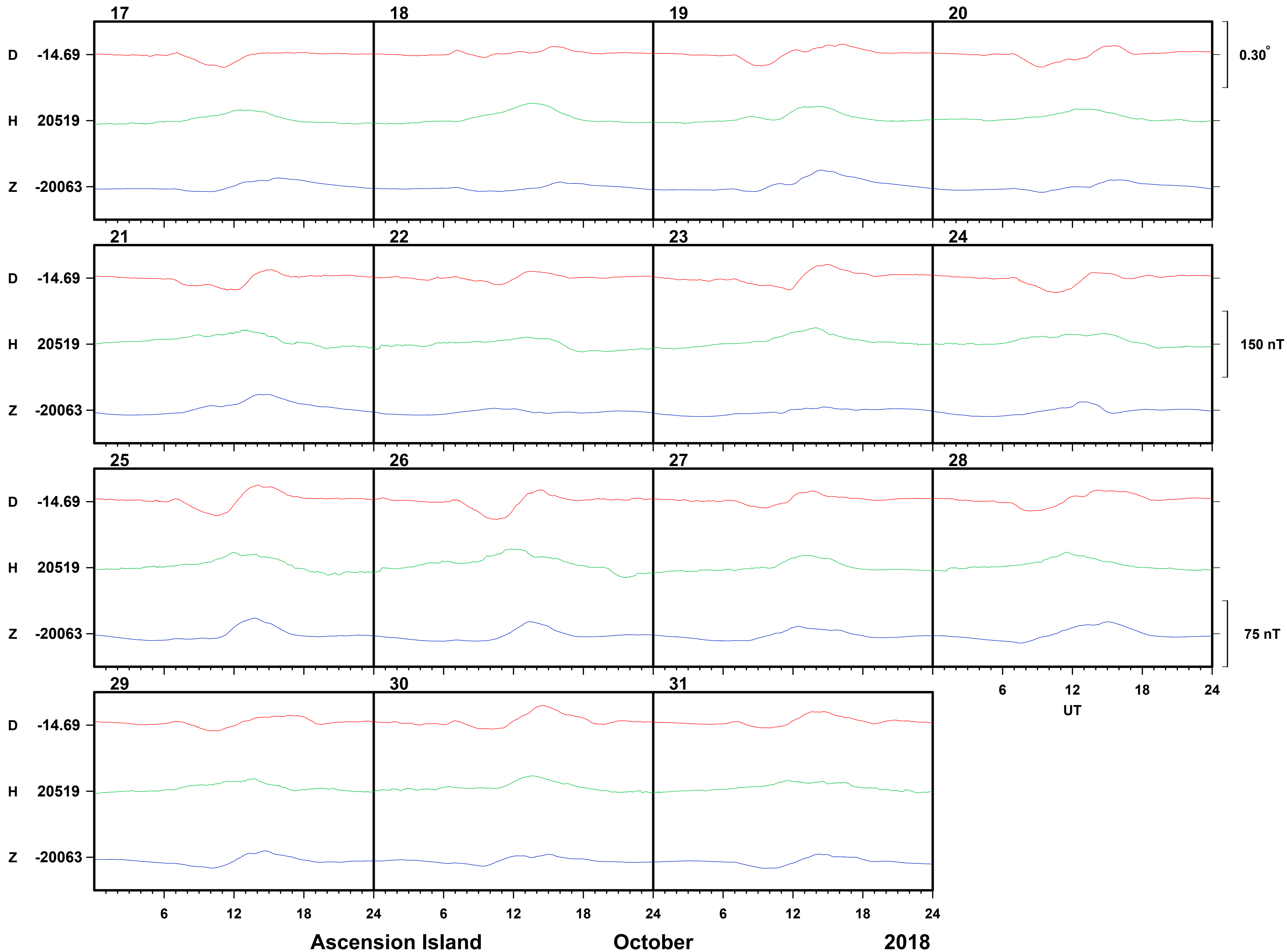
		Declination			Inclination		Total Field		Horizontal Intensity		Vertical Intensity		
Date	**Day Number**	**Time (UT)**	**Absolute (º)**	**Baseline (º)**	**Time (UT)**	**Absolute (º)**	**Site difference (nT)**	**Absolute corrected (nT)**	**Absolute (nT)**	**Baseline (nT)**	**Absolute (nT)**	**Baseline (nT)**	**Observer**
14-Oct-18	287	10:58	-14.7351	-14.8650	11:10	-44.3653	88.0	28698.8	20516.7	20563.2	-20067.1	-19949.0	GA
14-Oct-18	287	11:20	-14.7187	-14.8633	11:31	-44.3603	88.0	28698.5	20518.2	20563.7	-20065.1	-19948.3	GA
28-Oct-18	301	15:56	-14.6539	-14.8650	16:06	-44.3279	88.0	28696.1	20527.8	20563.1	-20051.8	-19949.1	GA
28-Oct-18	301	16:13	-14.6567	-14.8683	16:22	-44.3315	88.0	28696.0	20526.5	20563.2	-20053.0	-19949.0	GA

Ascension Island 2018

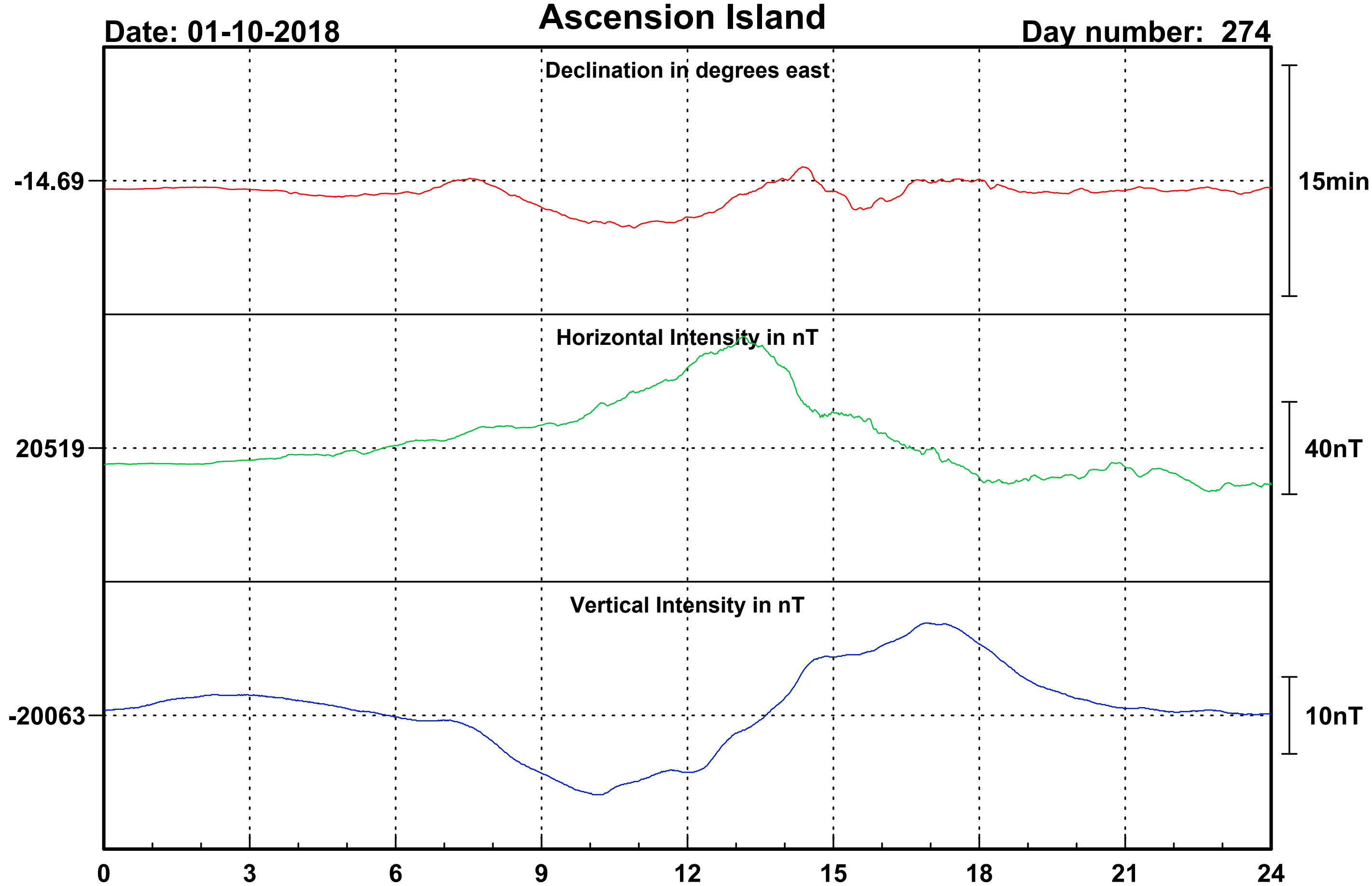


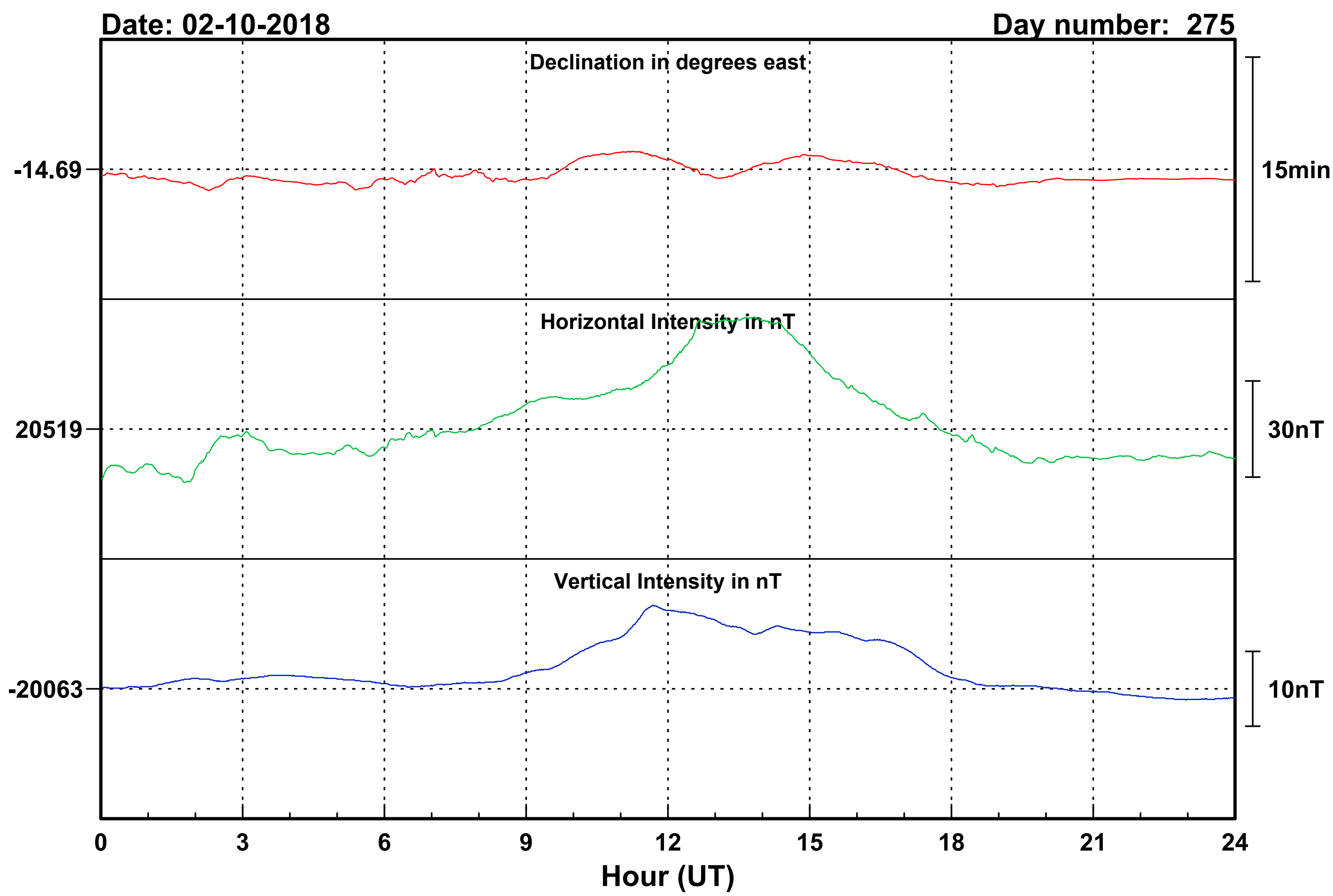
Ascension Island October 2018




17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
D -14.69
H 20519
Z -20063
0.30°
150 nT
75 nT
6
12
18
24
UT
Ascension Island
October
2018

Ascension Island





Ascension Island

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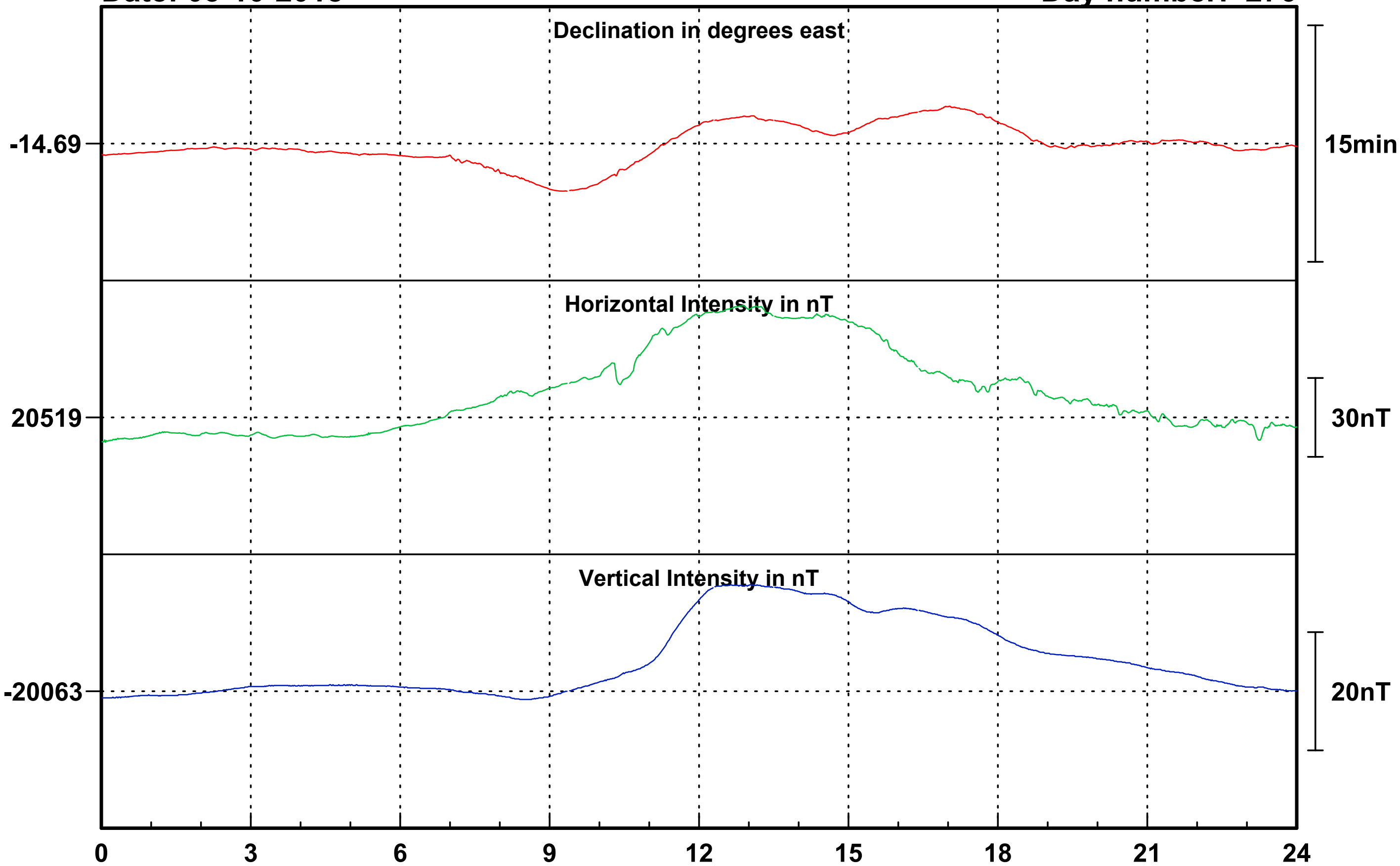

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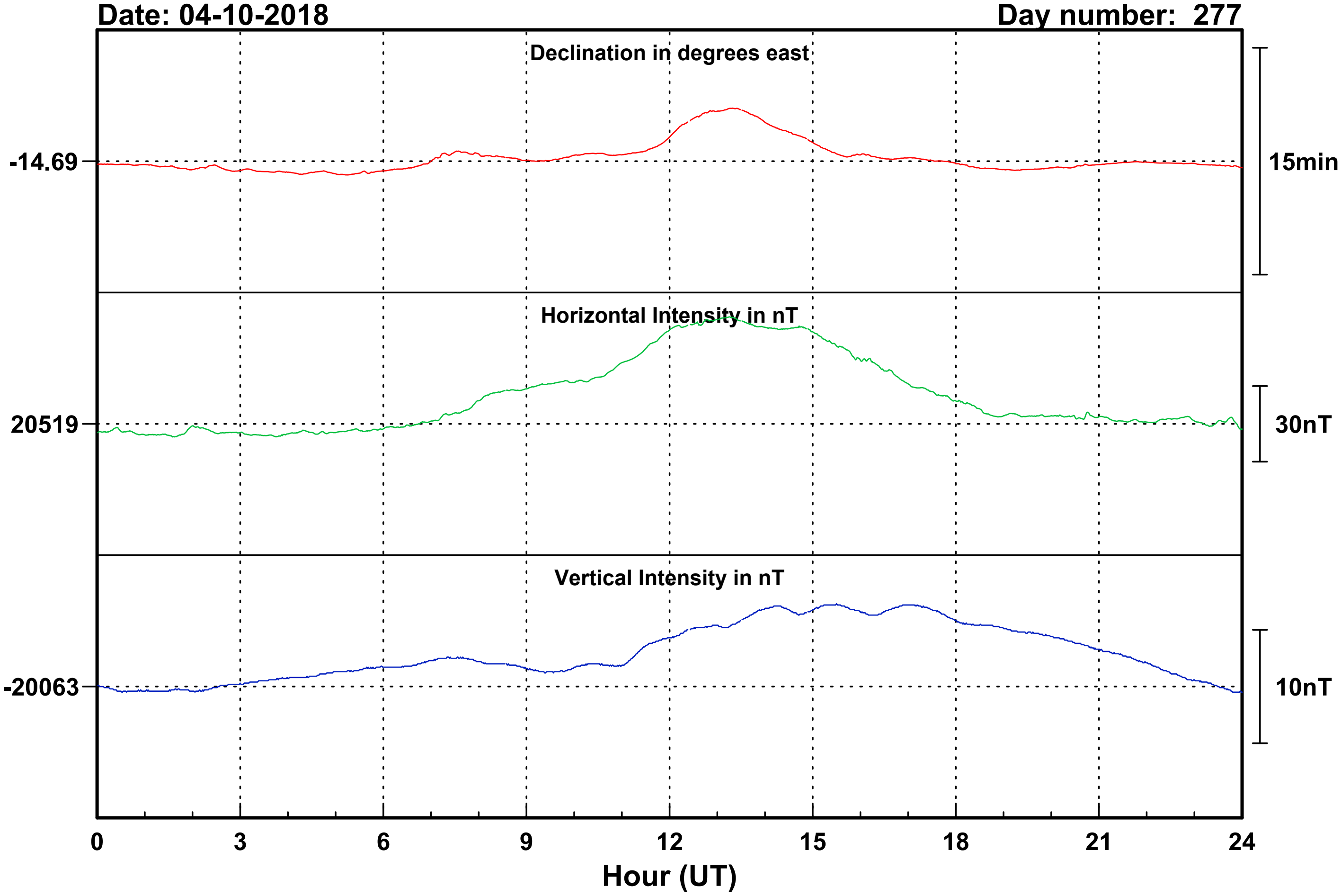
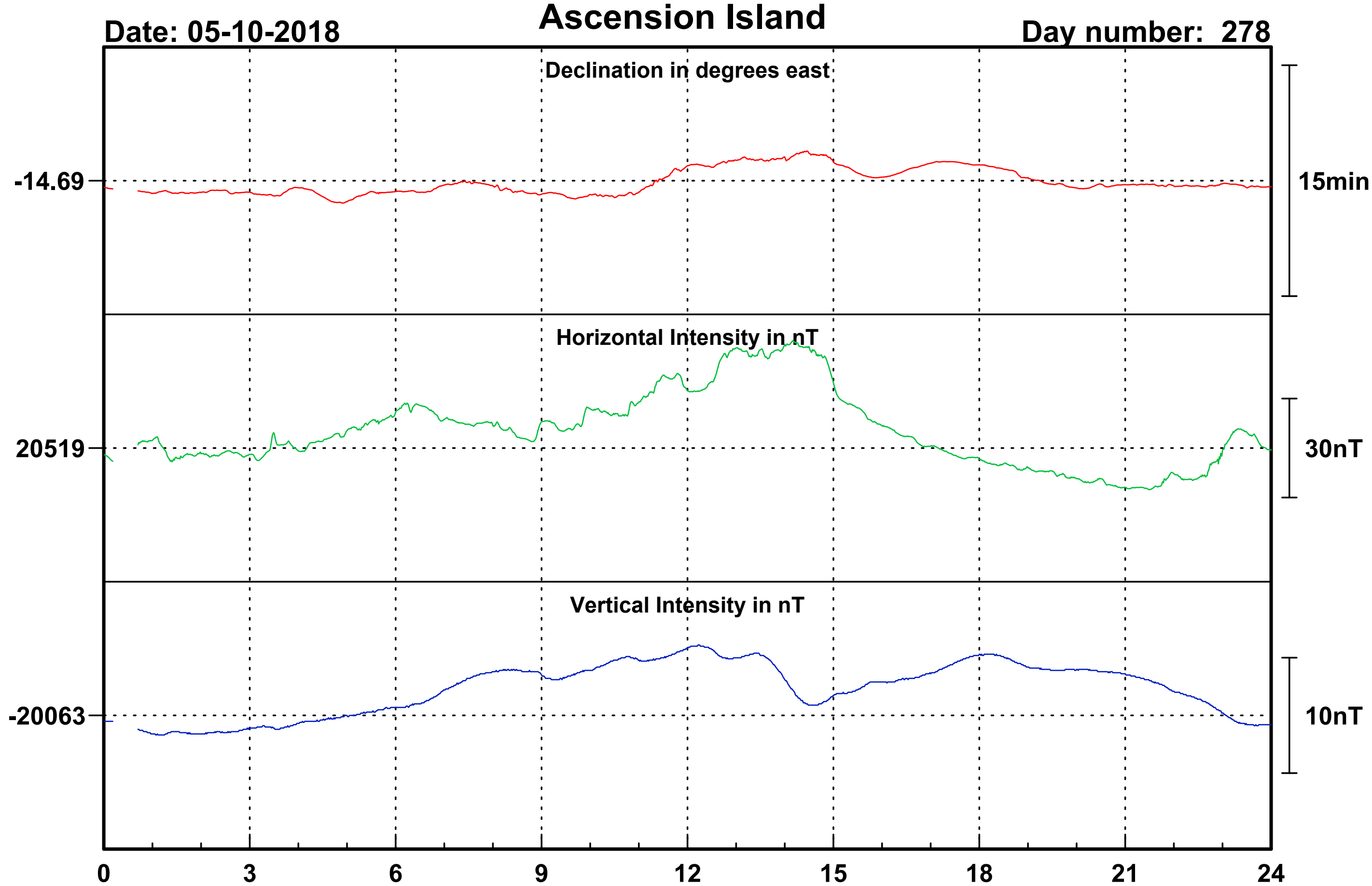
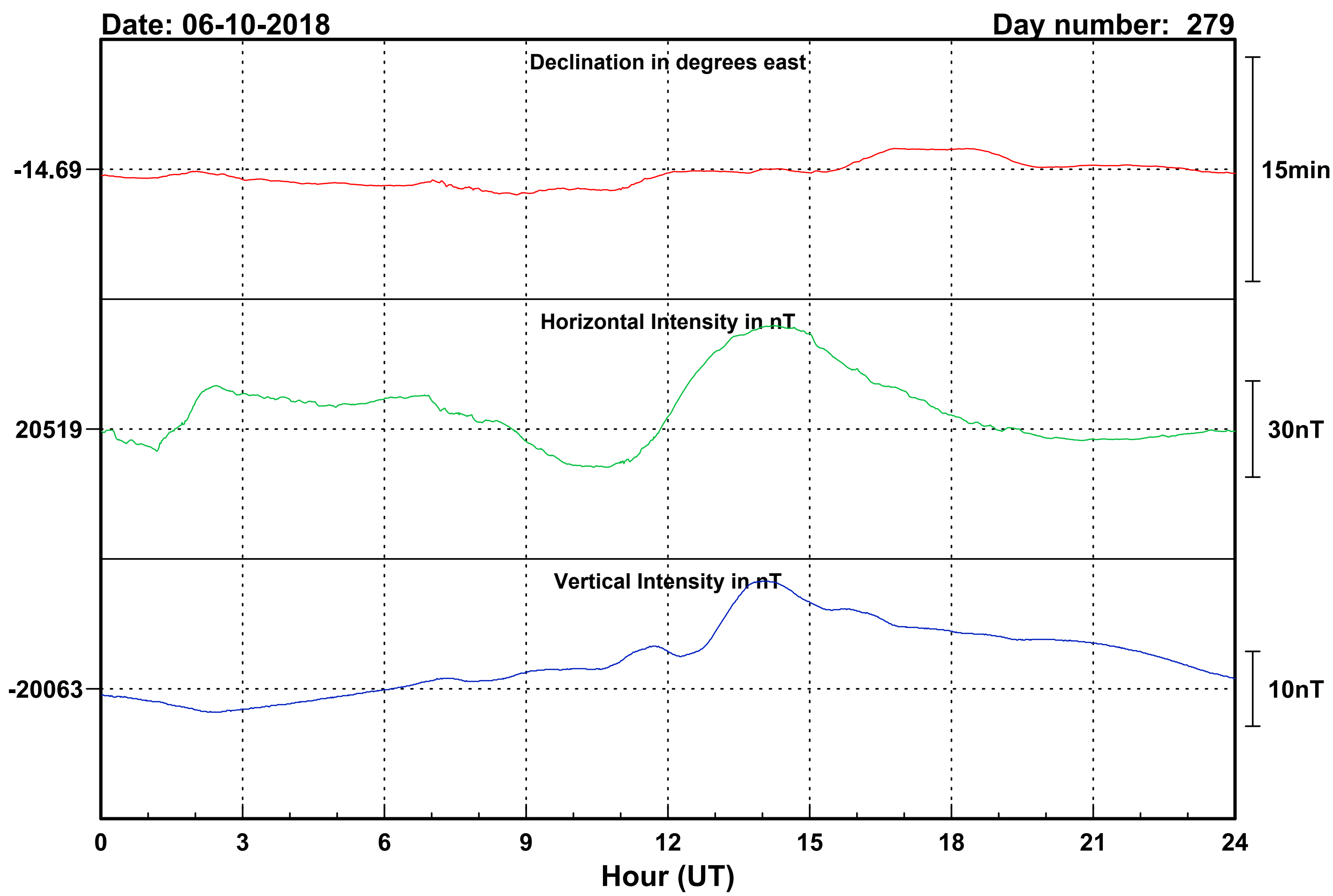
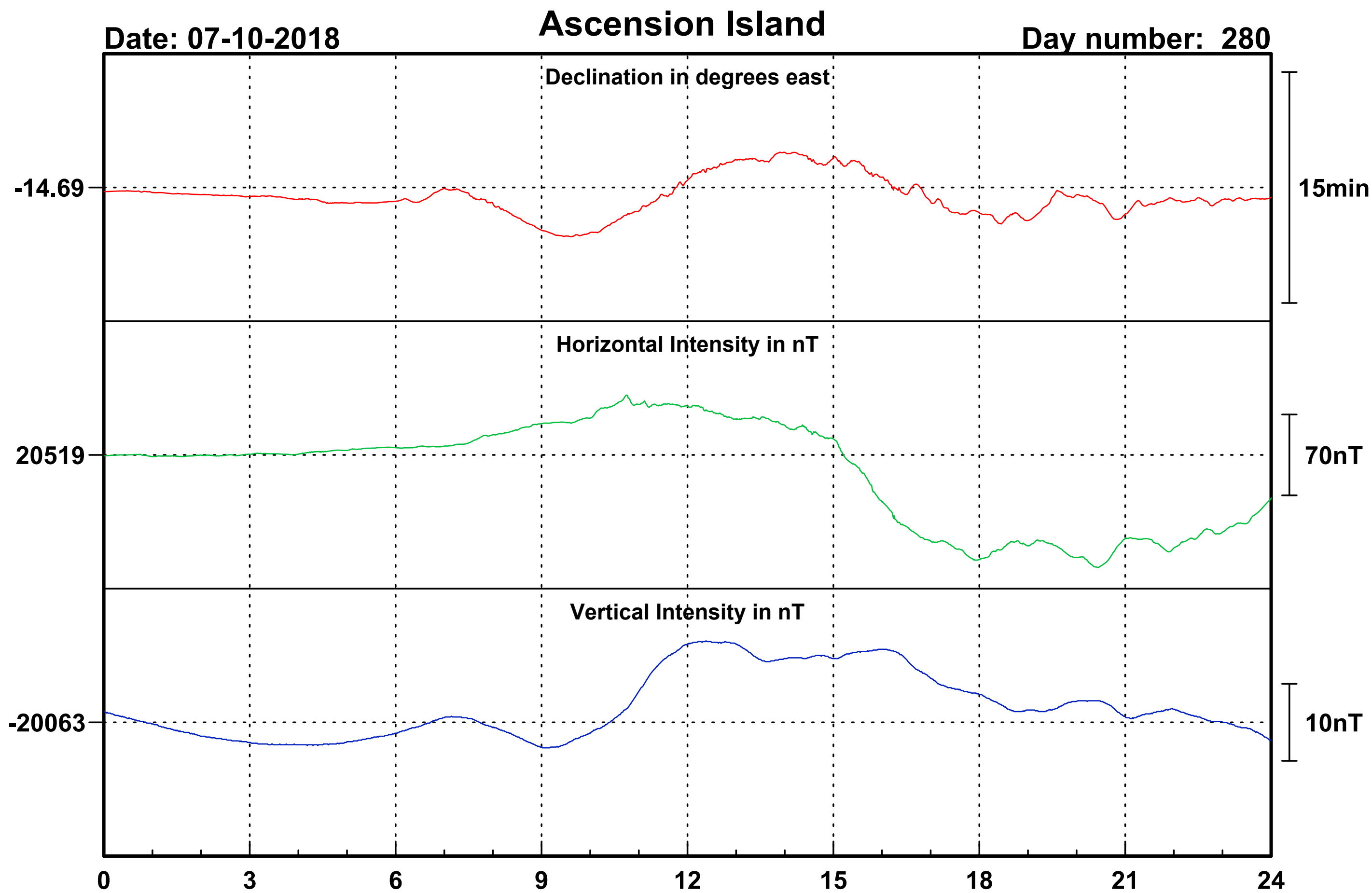
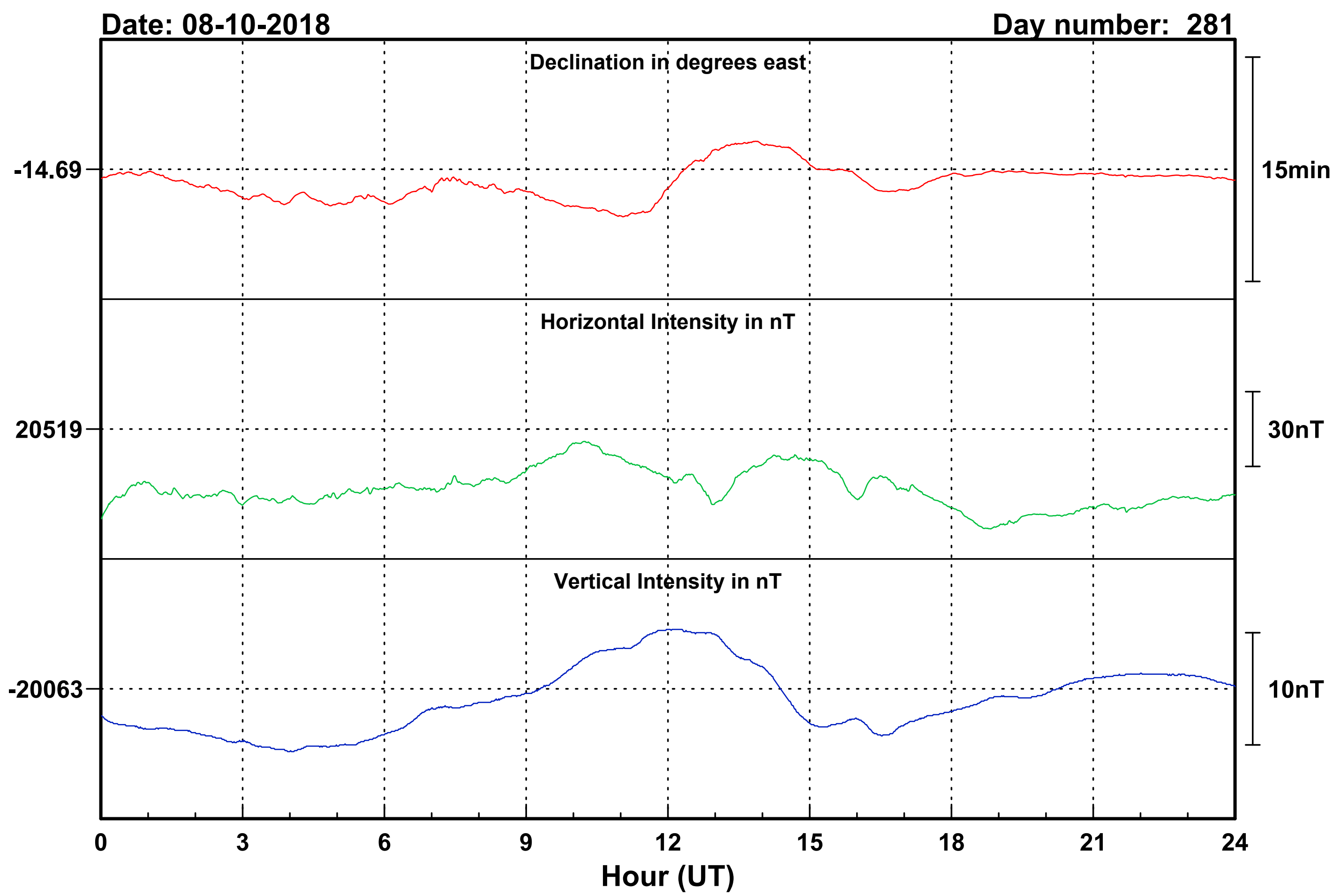


Ascension Island

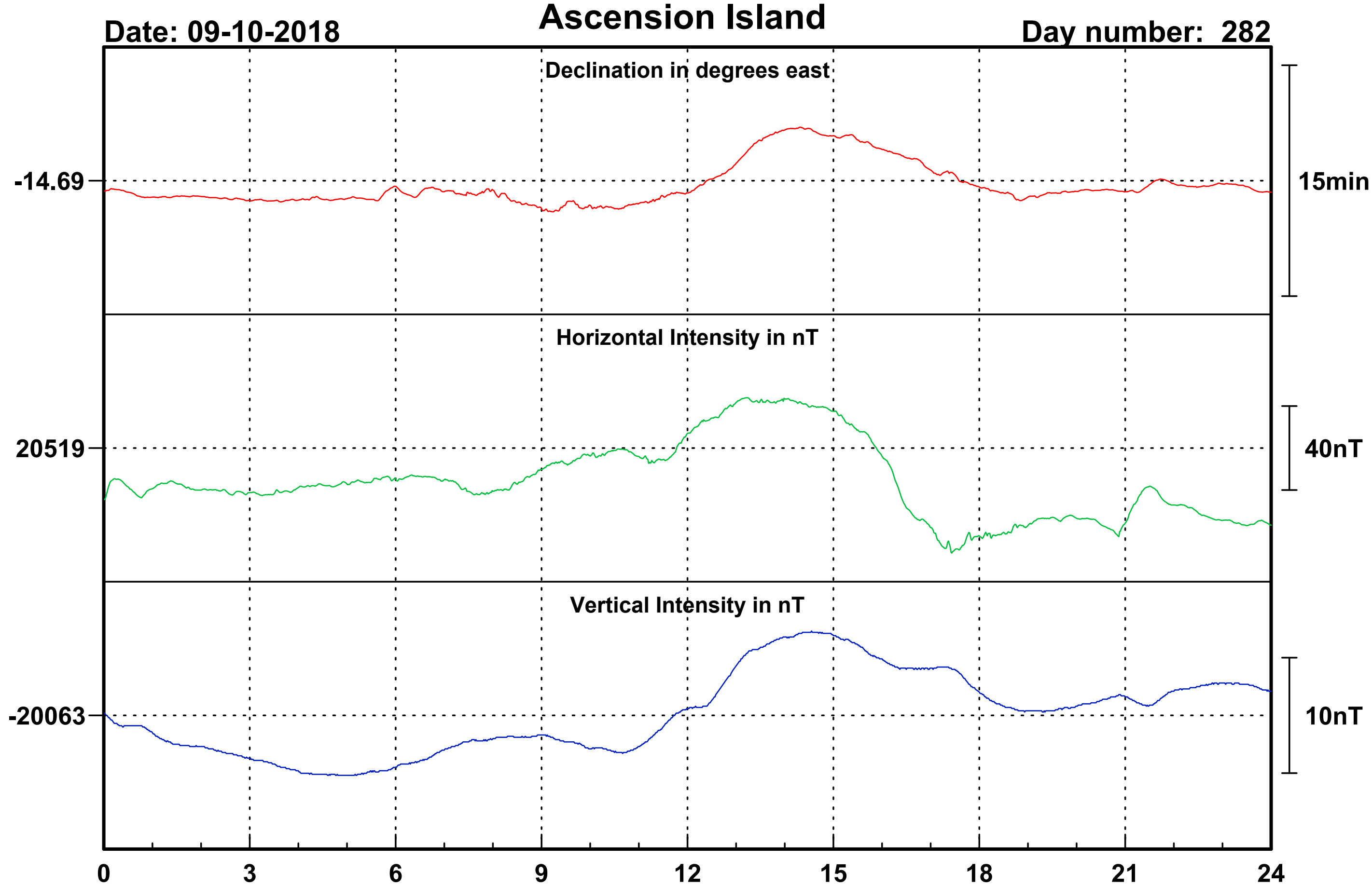


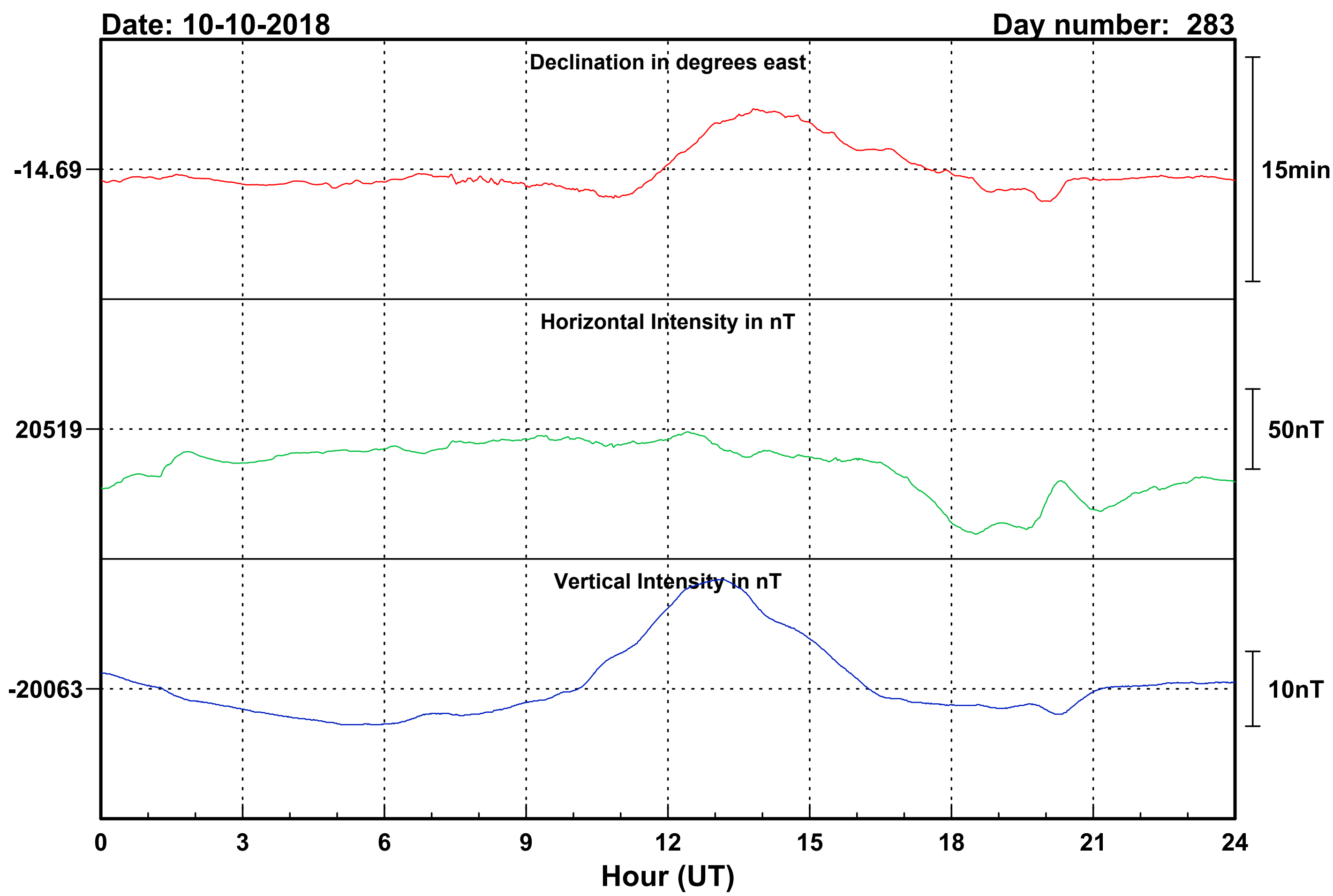



Ascension Island
Date: 07-10-2018
Day number: 280
Declination in degrees east
-14.69
15min
Horizontal Intensity in nT
20519
70nT
Vertical Intensity in nT
-20063
10nT
0
3
6
9
12
15
18
21
24


Date: 08-10-2018
Day number: 281
Declination in degrees east
-14.69
15min
Horizontal Intensity in nT
20519
30nT
Vertical Intensity in nT
-20063
10nT
0
3
6
9
12
15
18
21
24
Hour (UT)

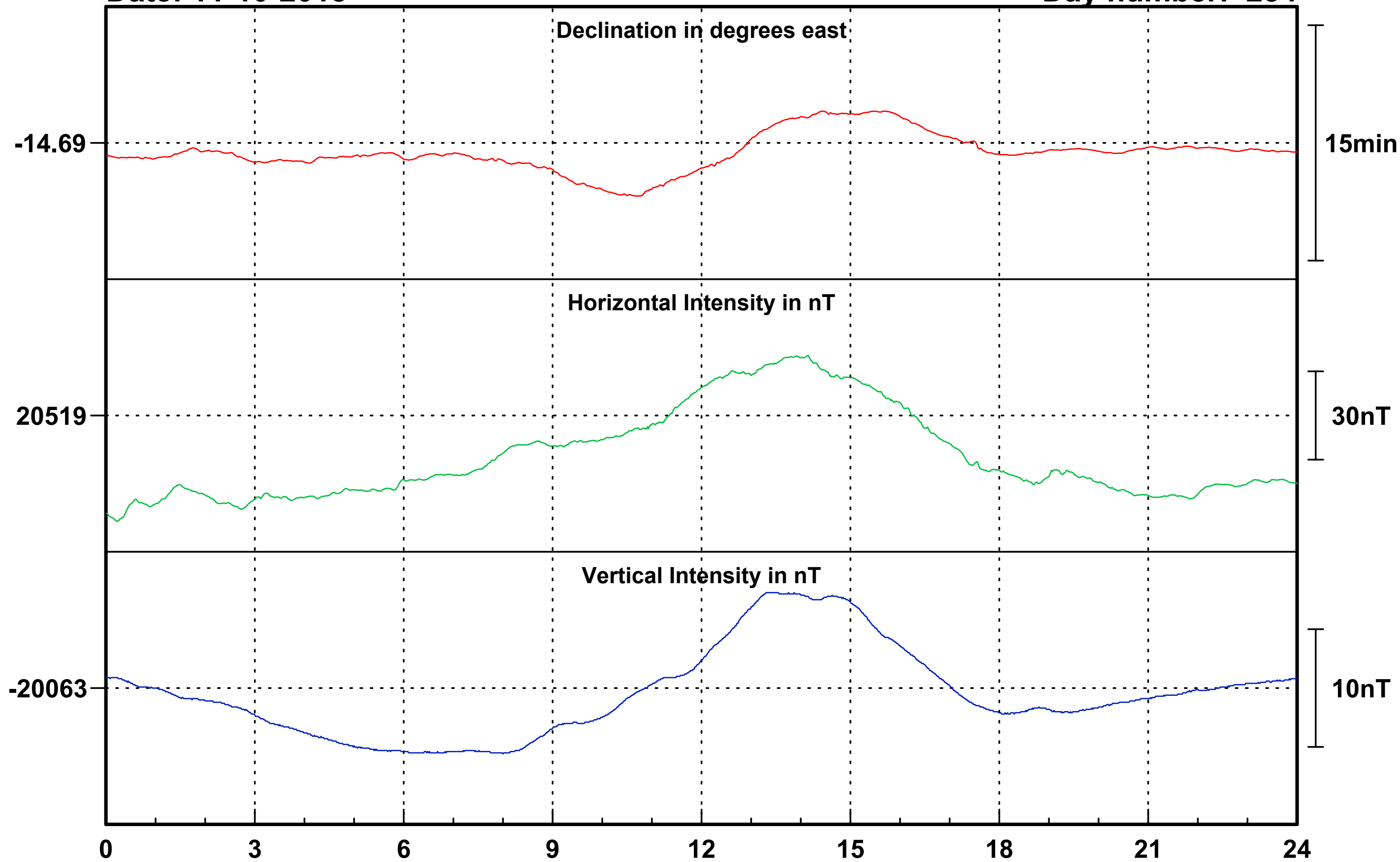
Ascension Island



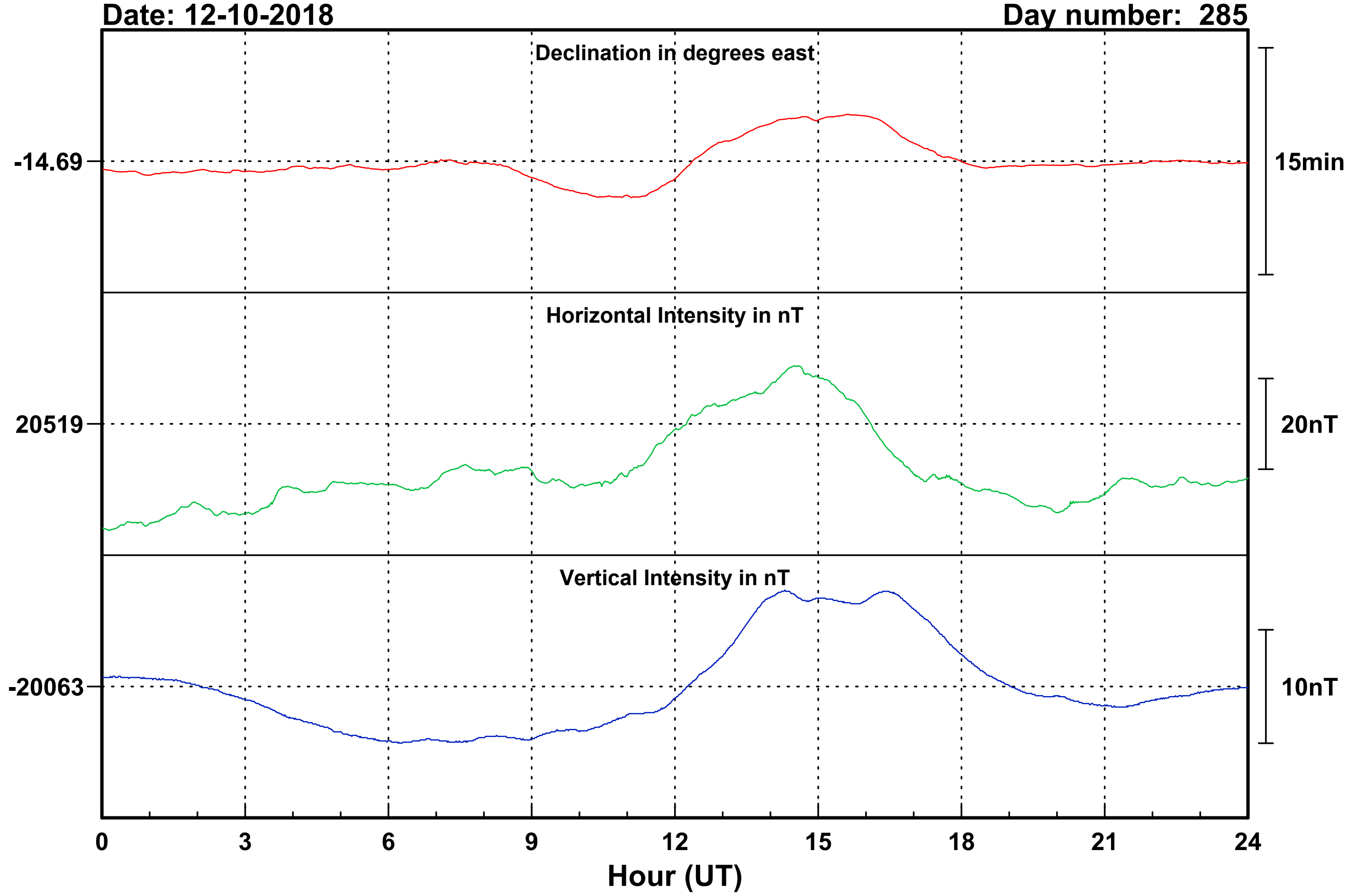


Ascension Island

Date: 11-10-2018 **Day number: 284**

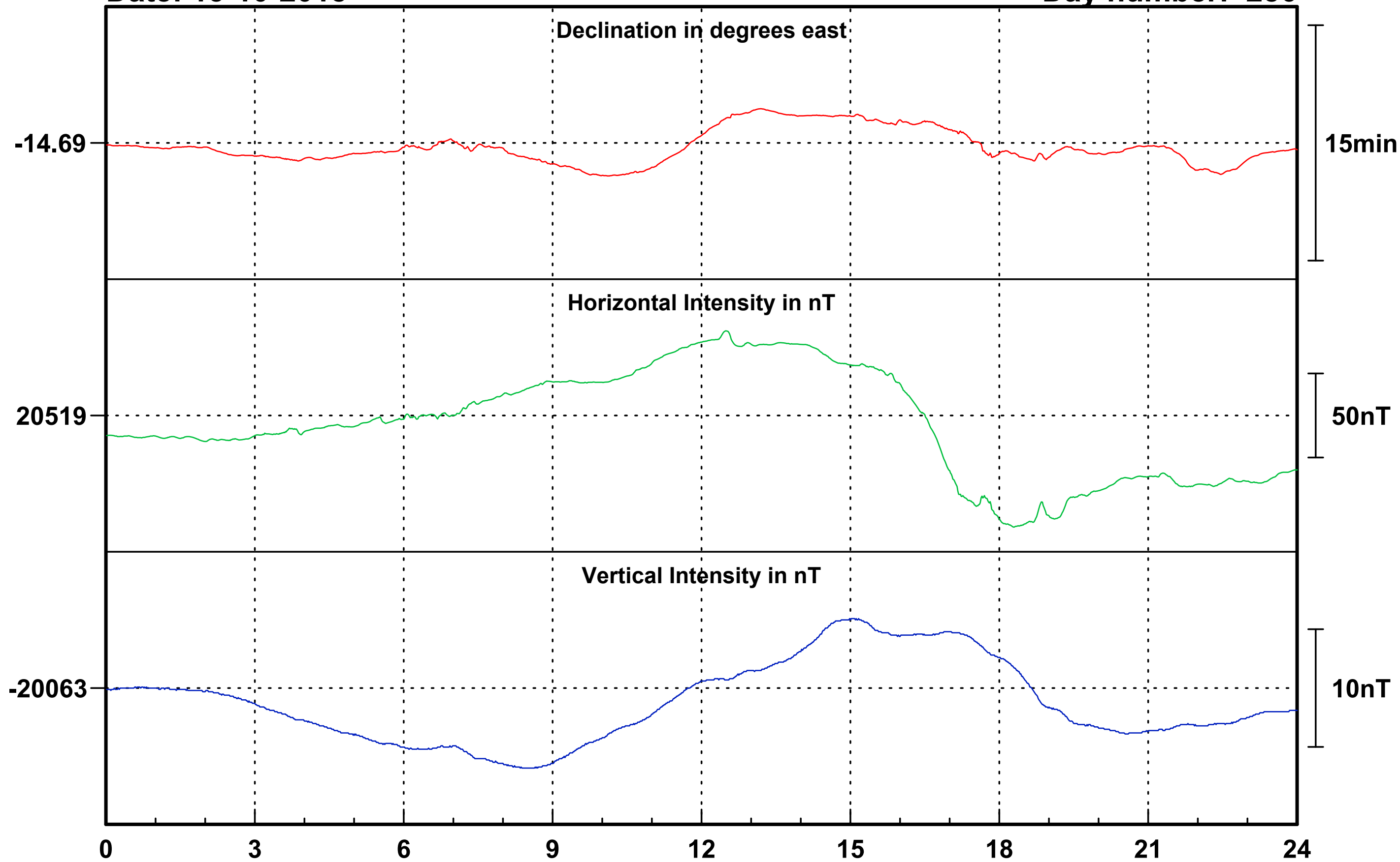


Date: 12-10-2018 **Day number: 285**

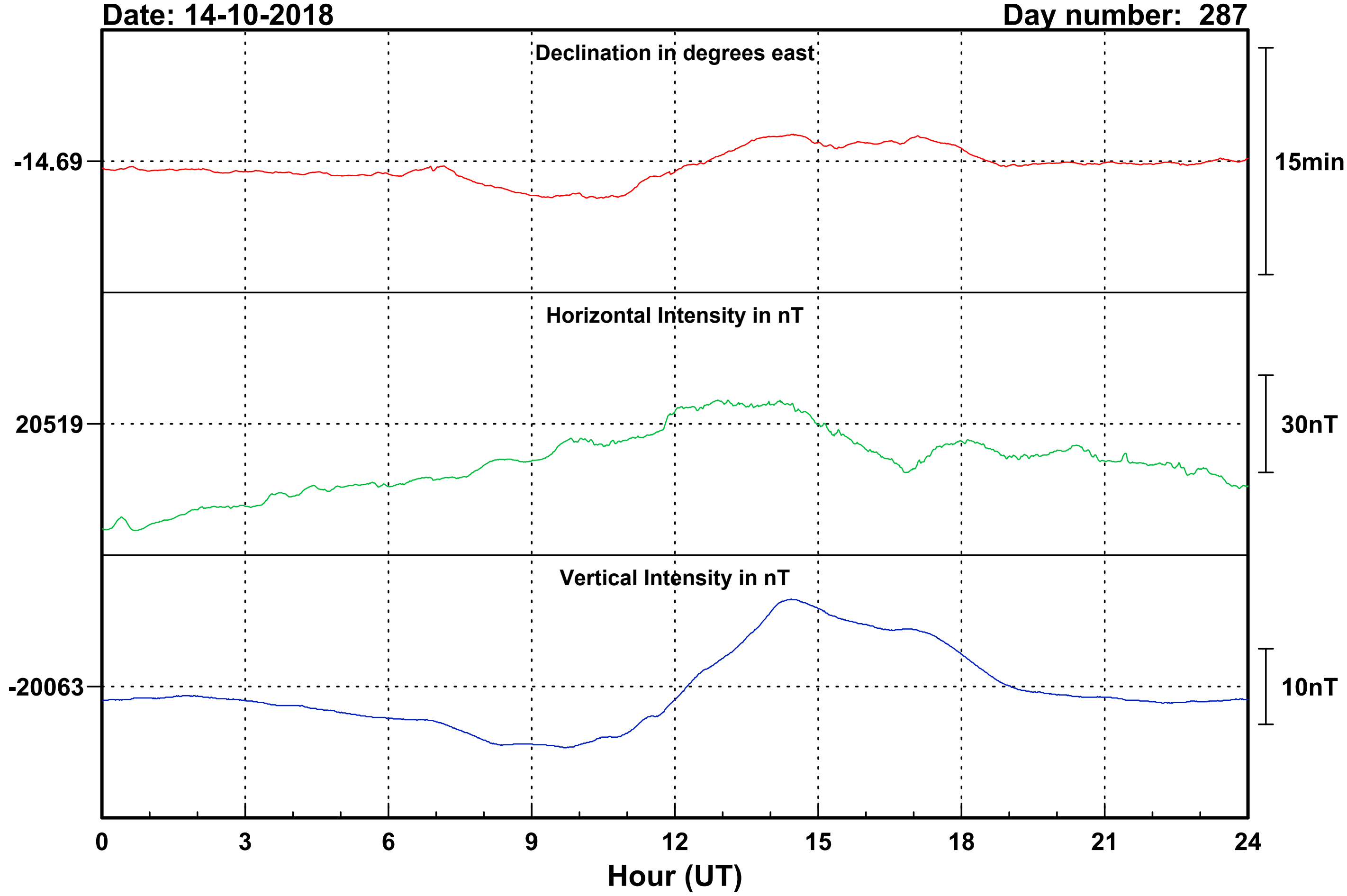


Ascension Island

Date: 13-10-2018 Day number: 286

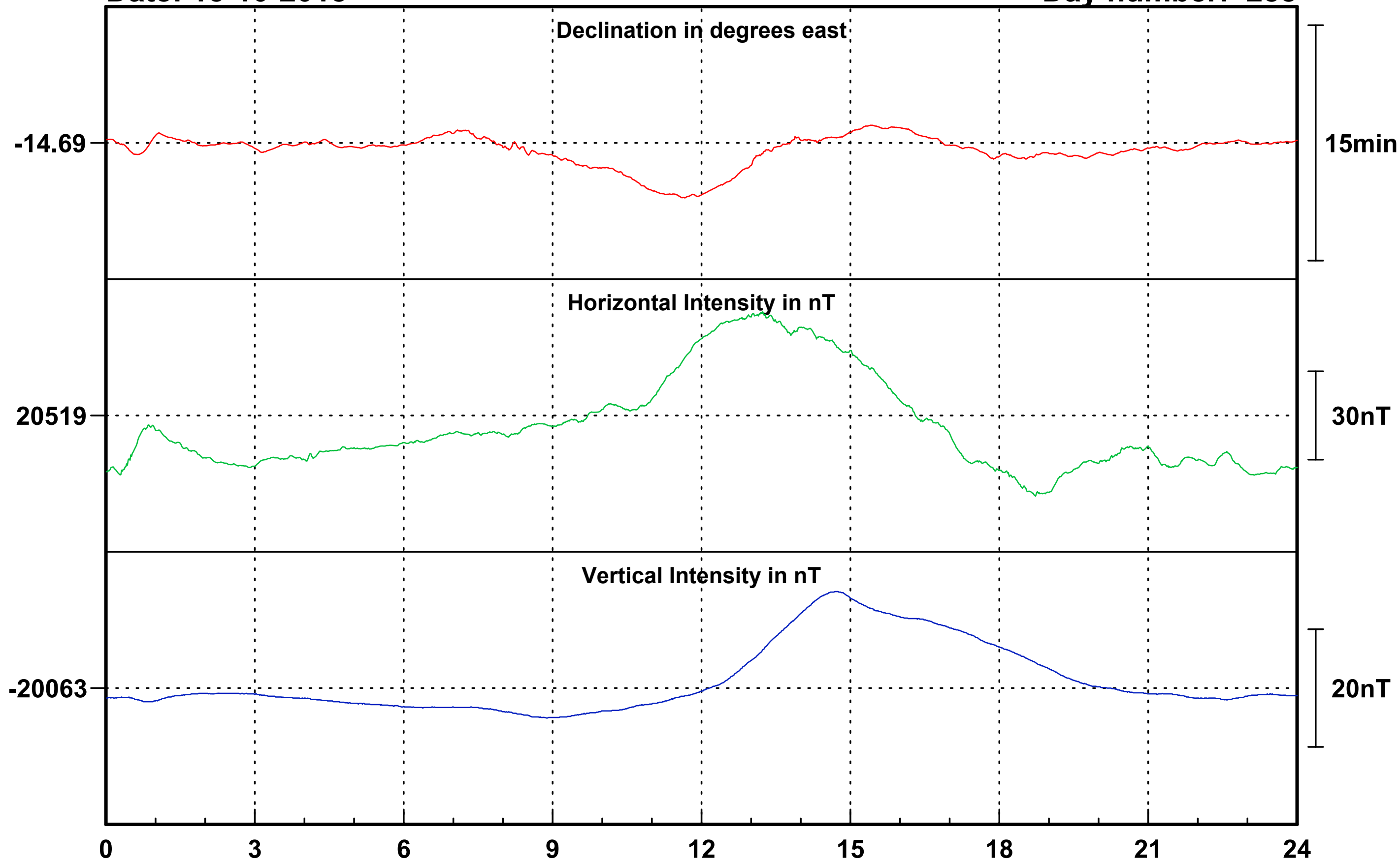


Date: 14-10-2018 Day number: 287

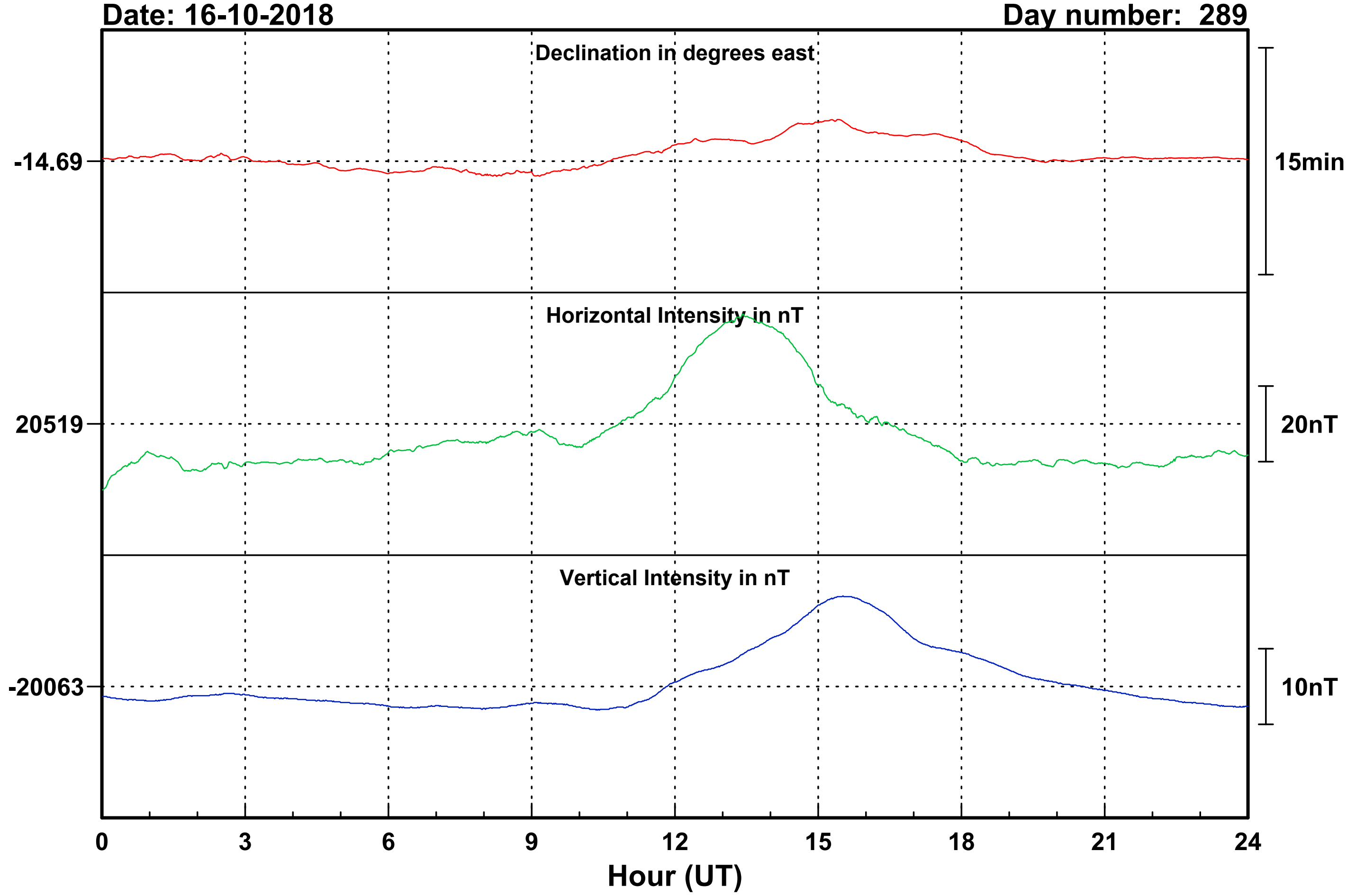


Ascension Island

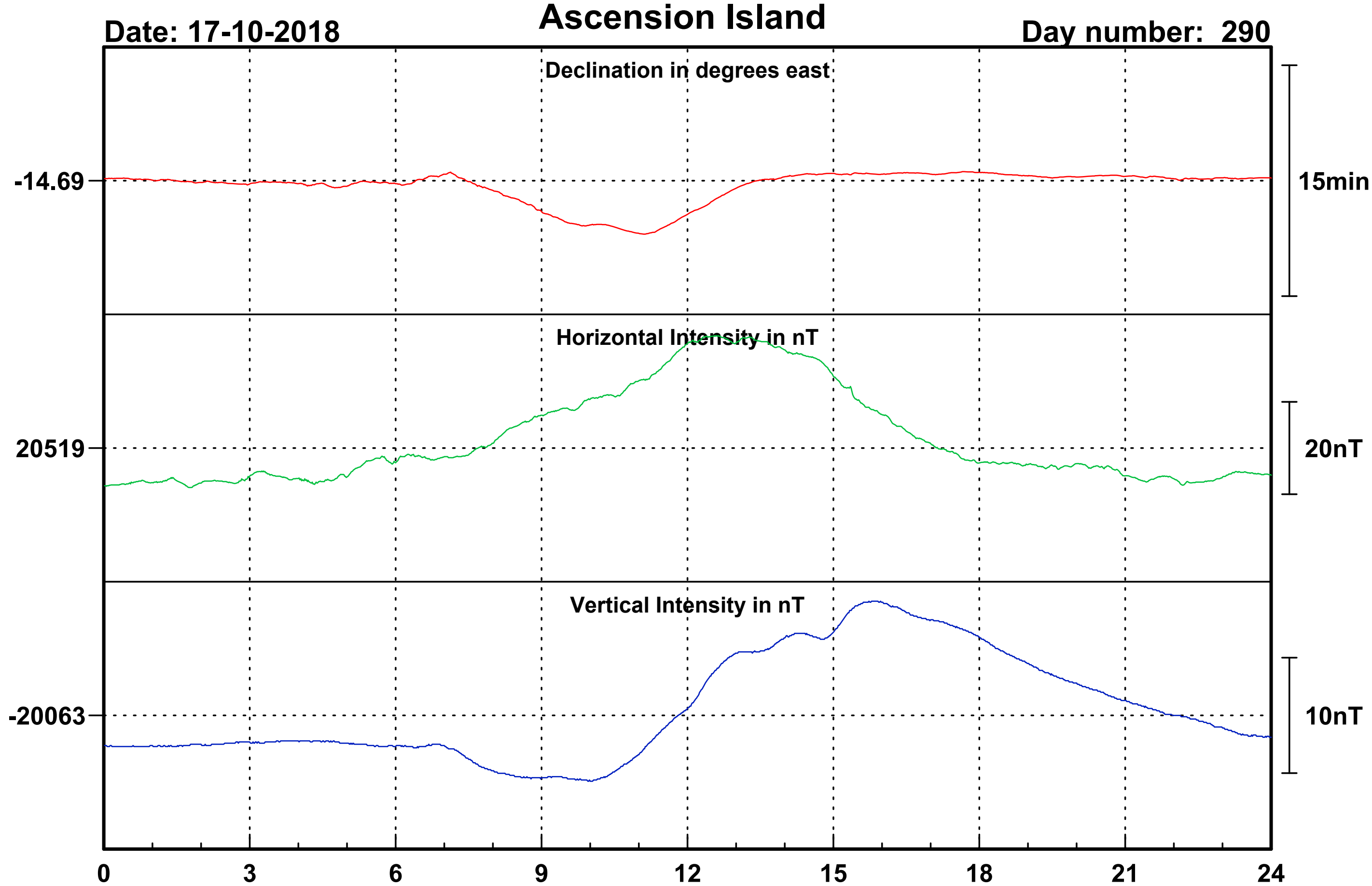
Date: 15-10-2018 Day number: 288

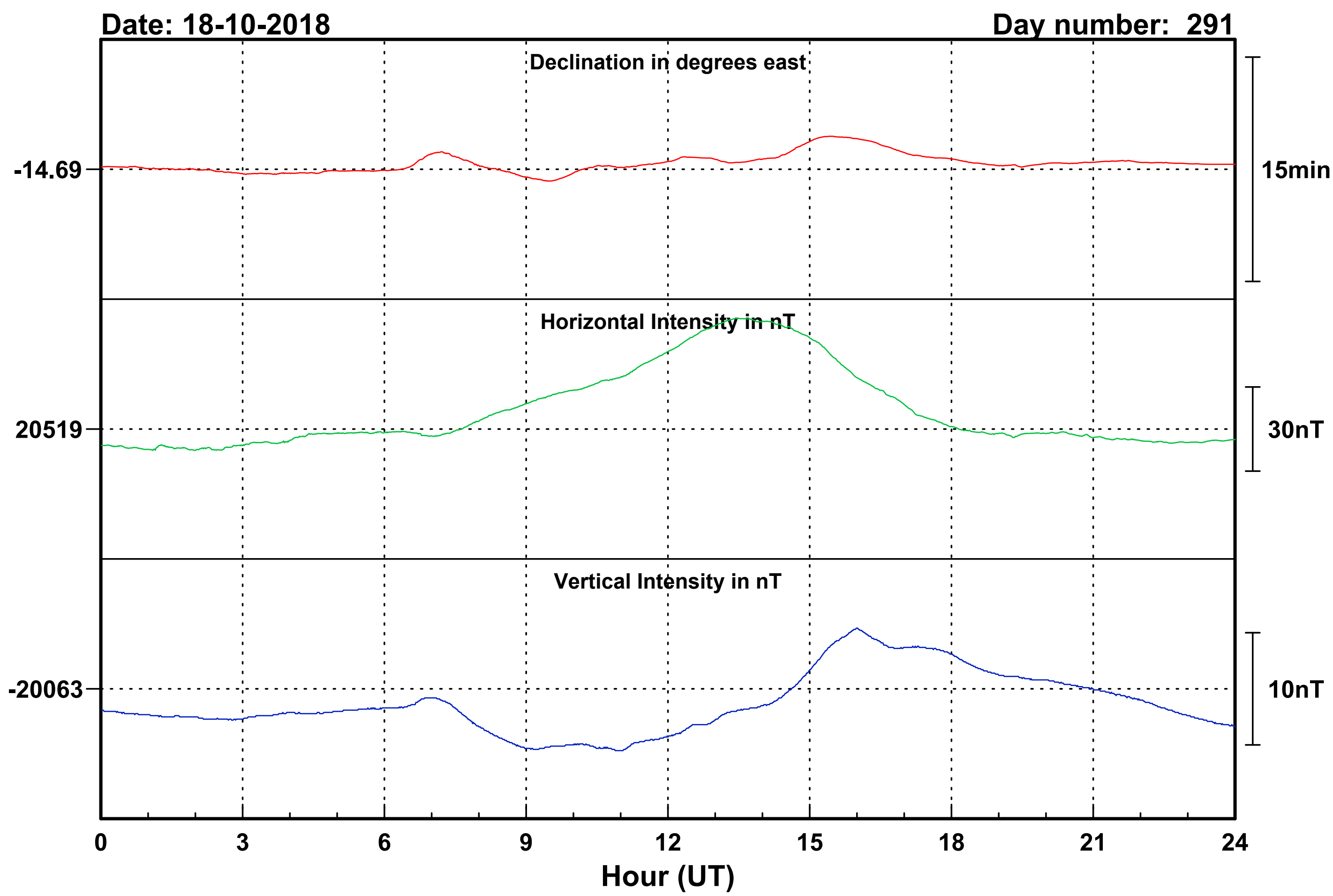


Date: 16-10-2018 Day number: 289



Ascension Island





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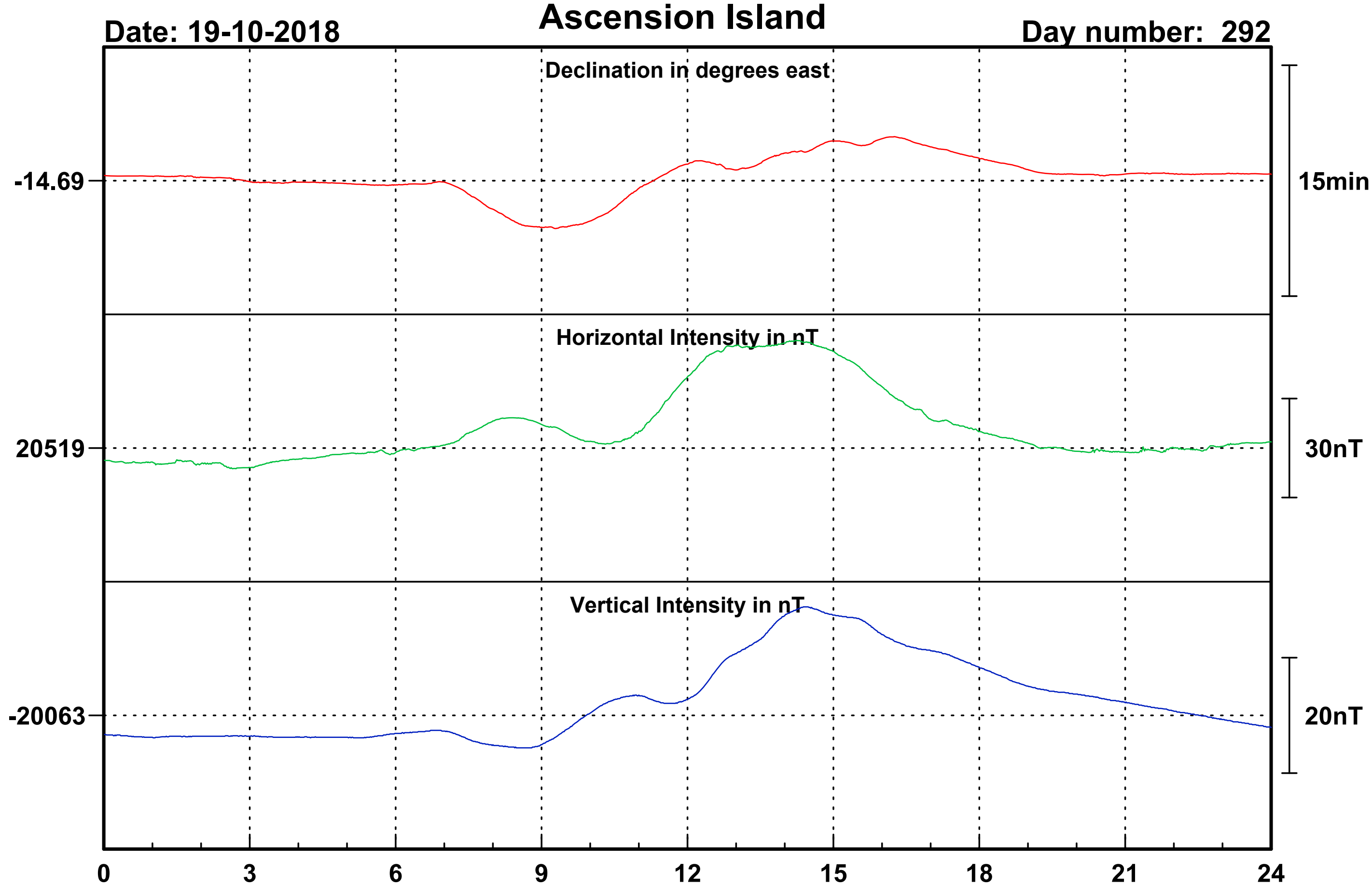

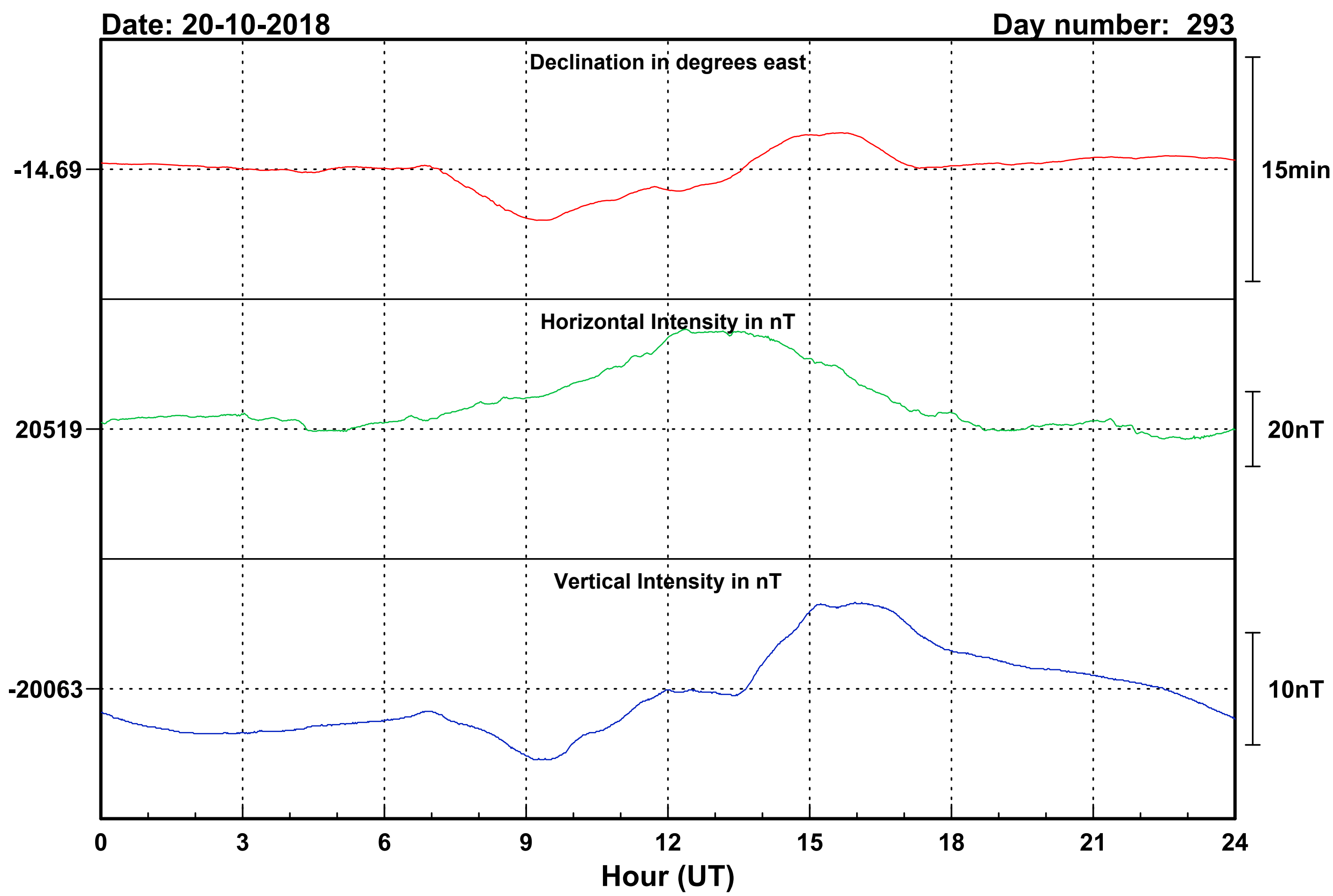

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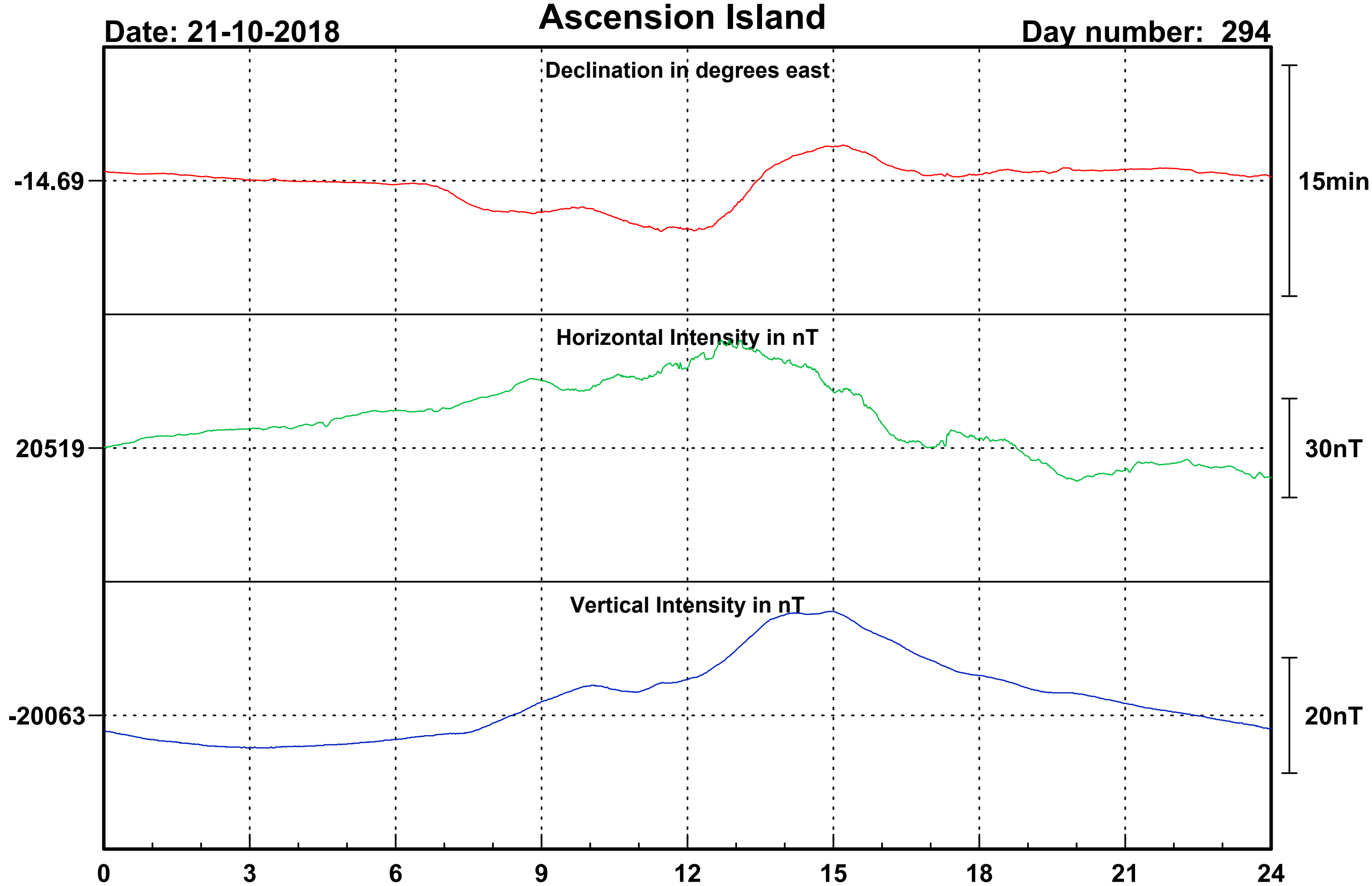

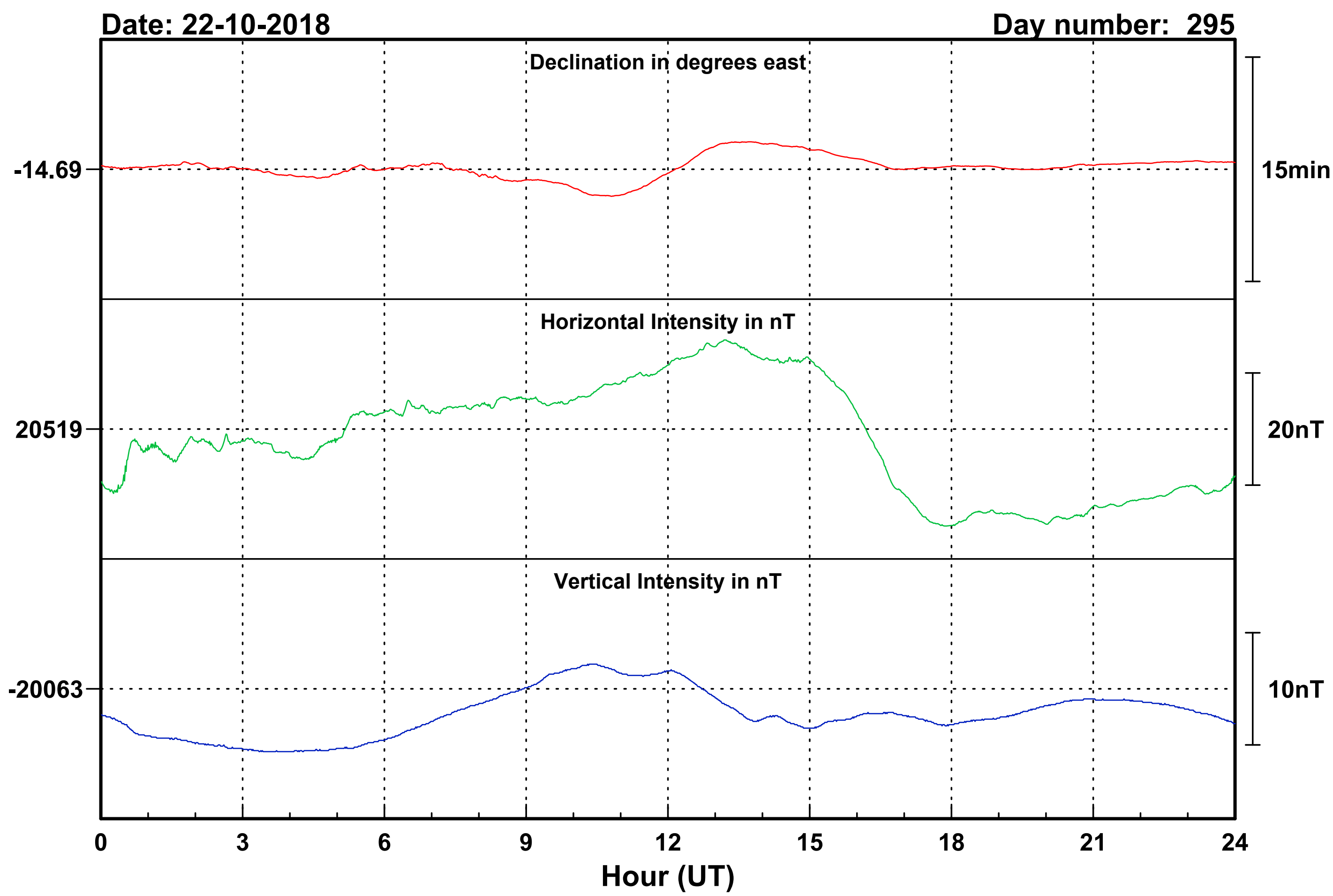

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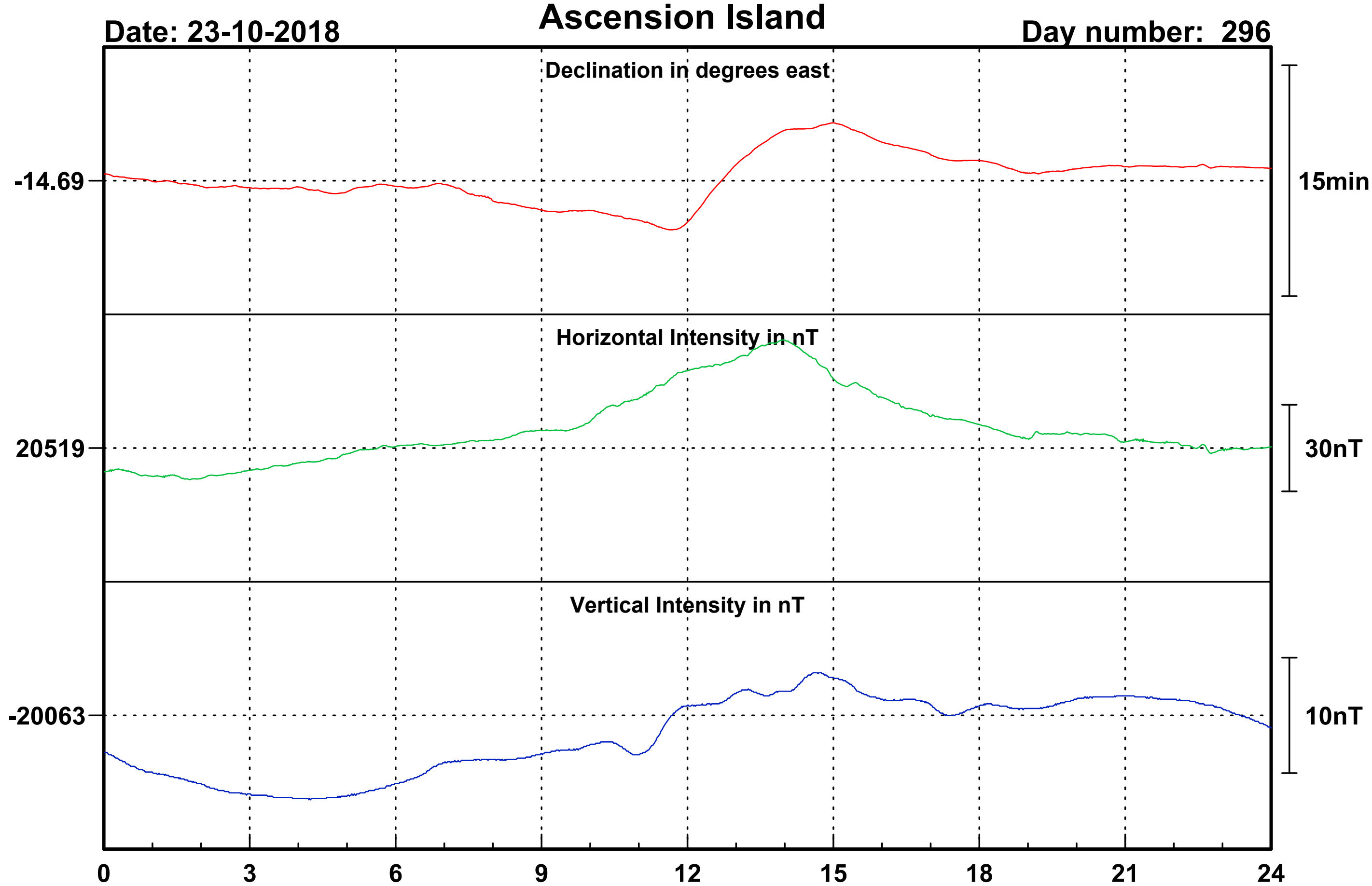

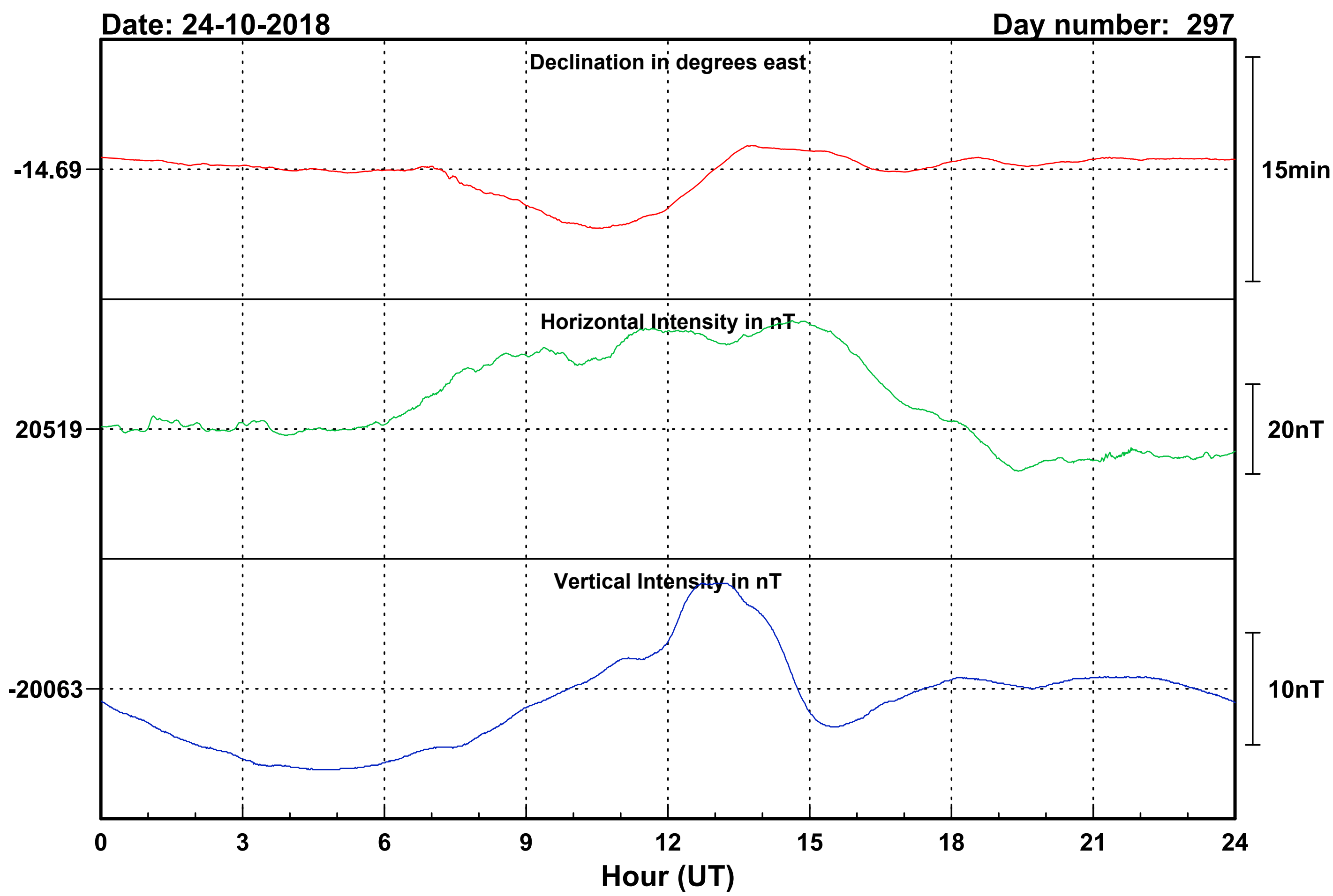

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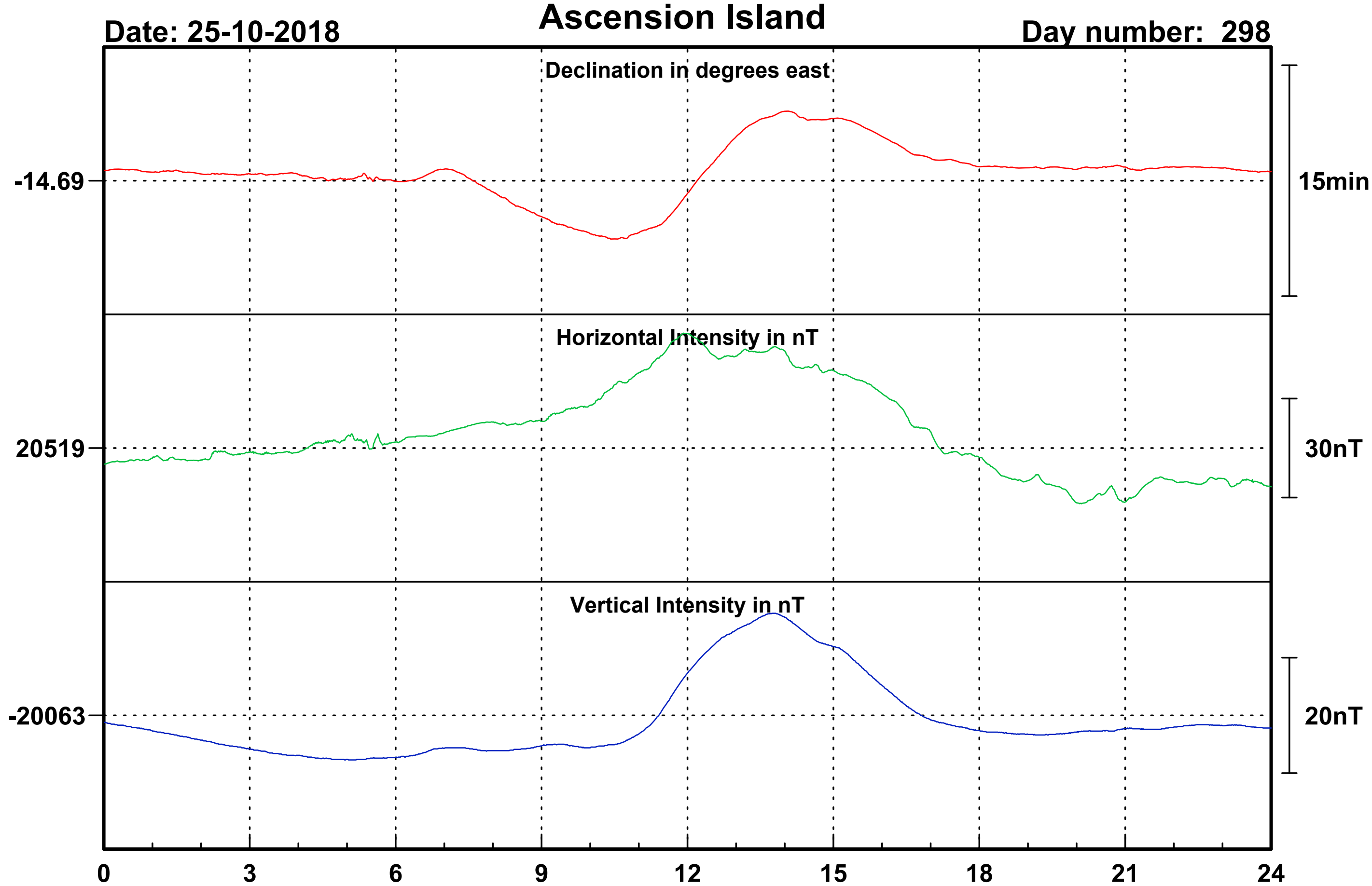

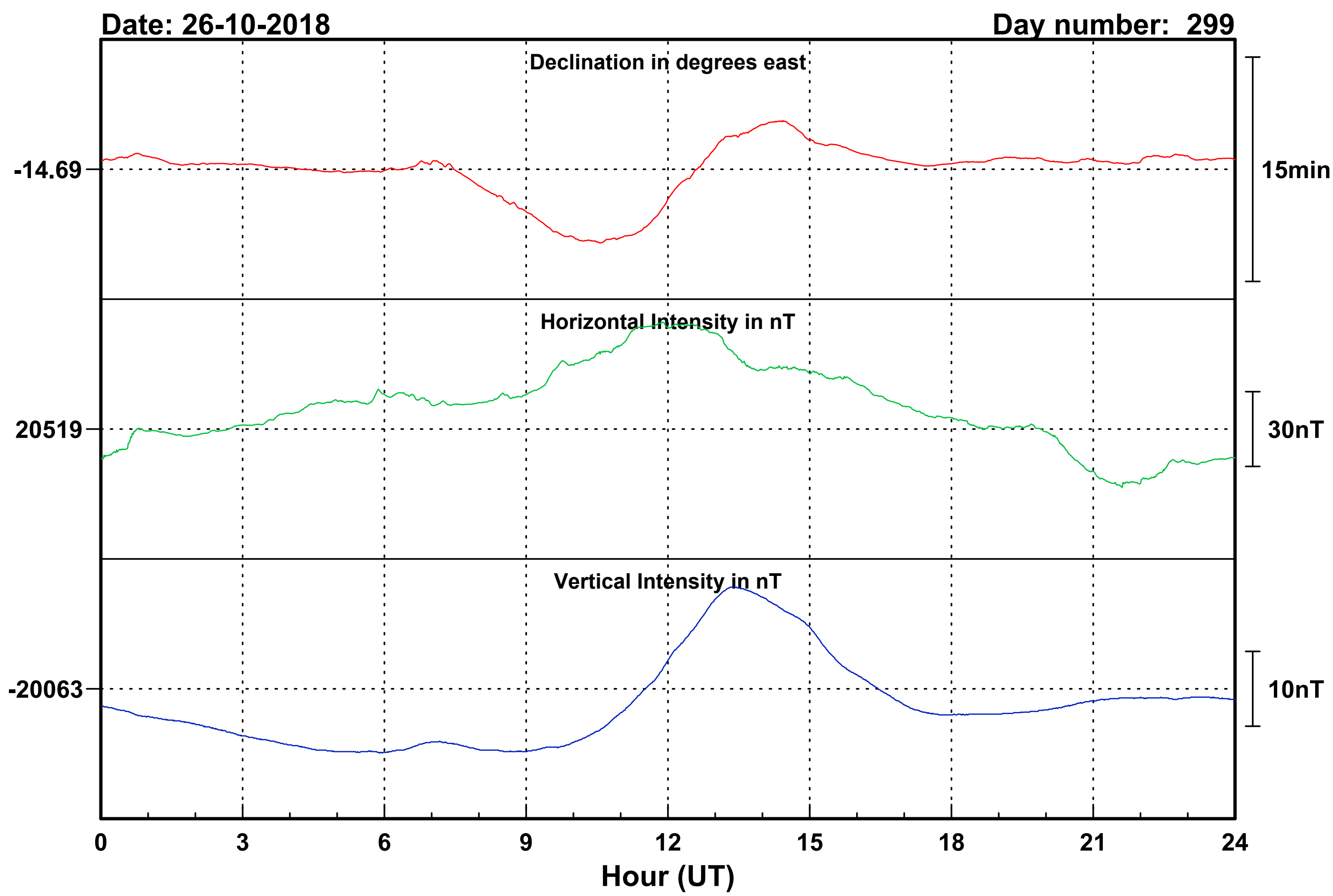

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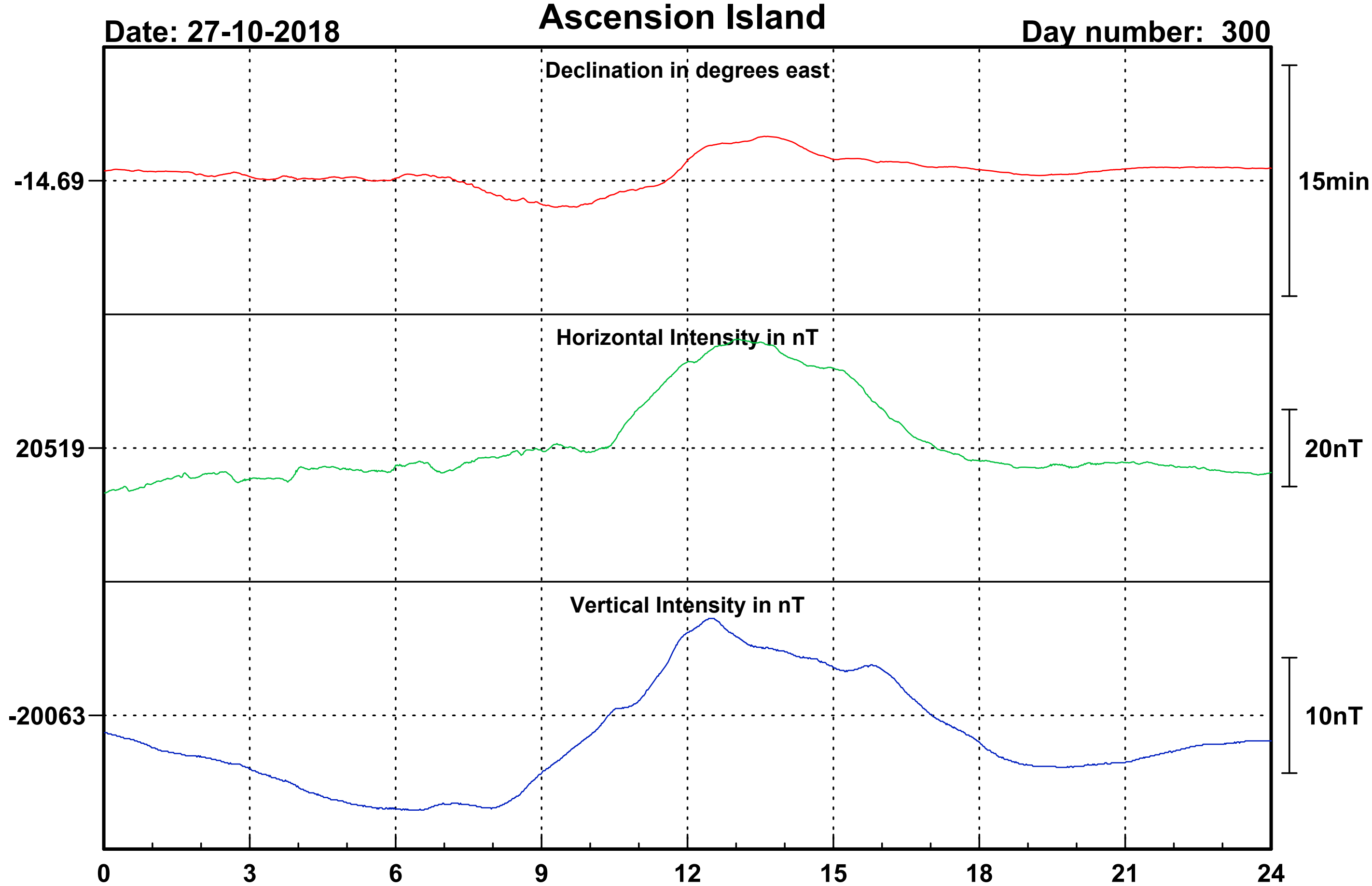
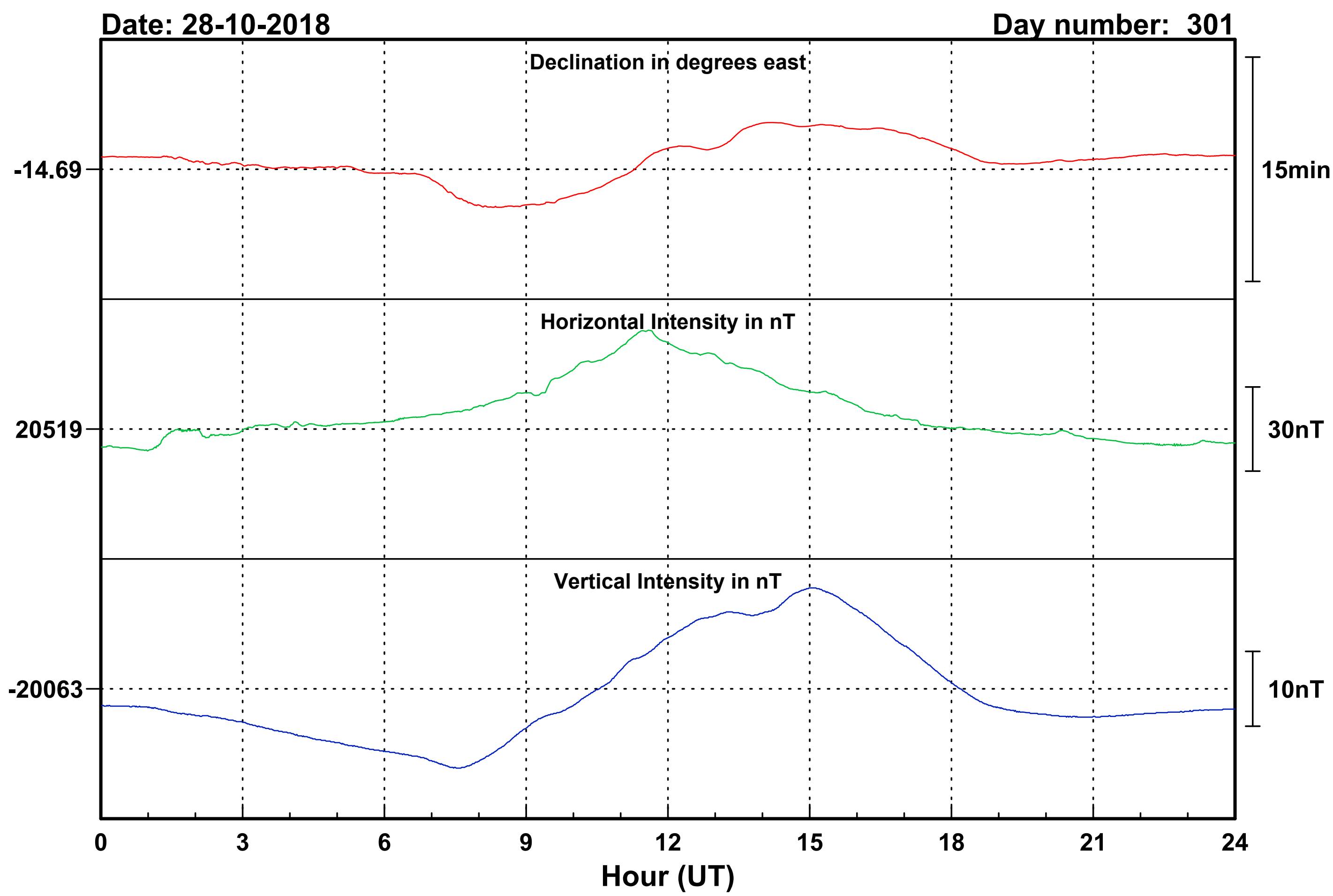
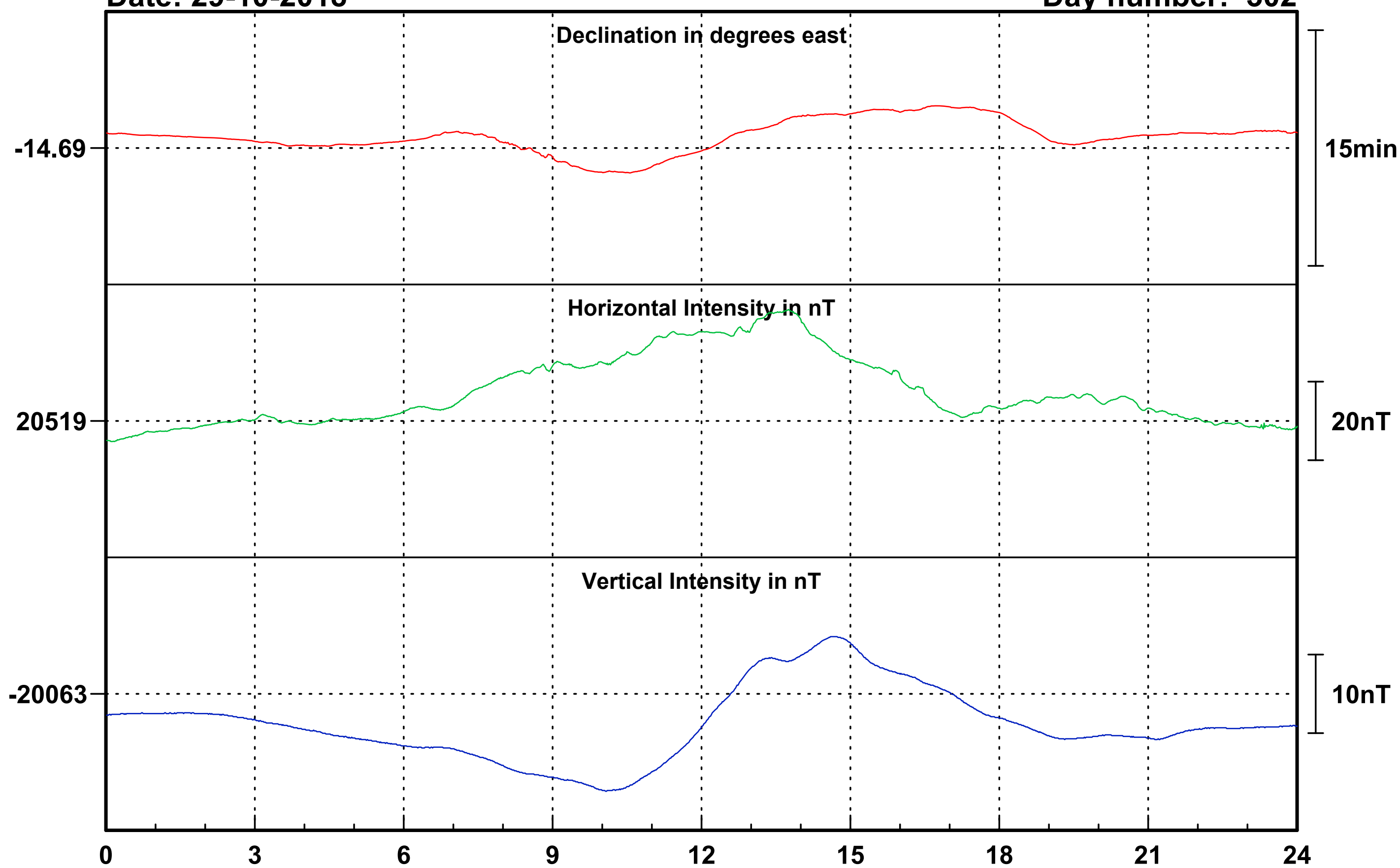


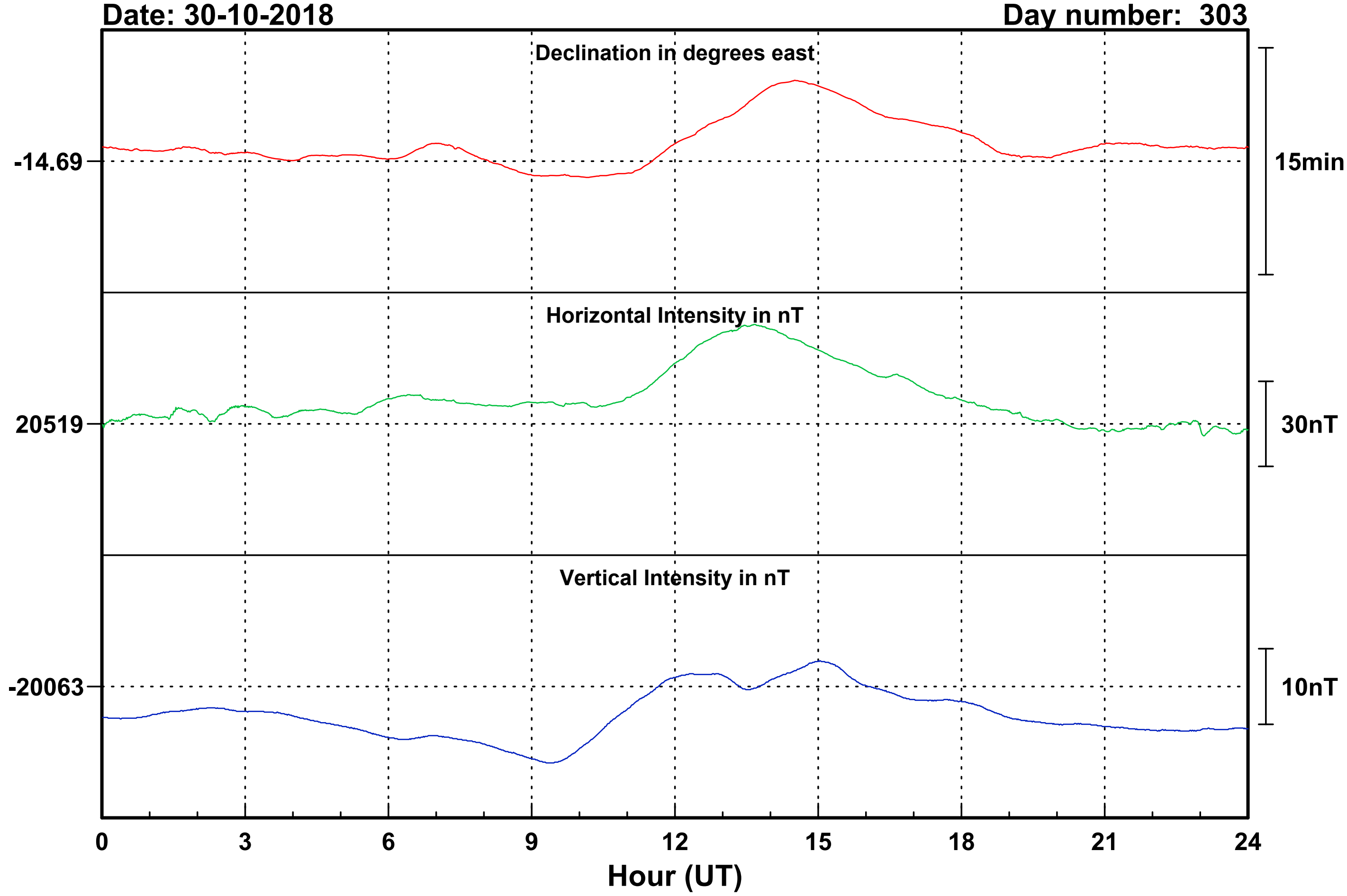


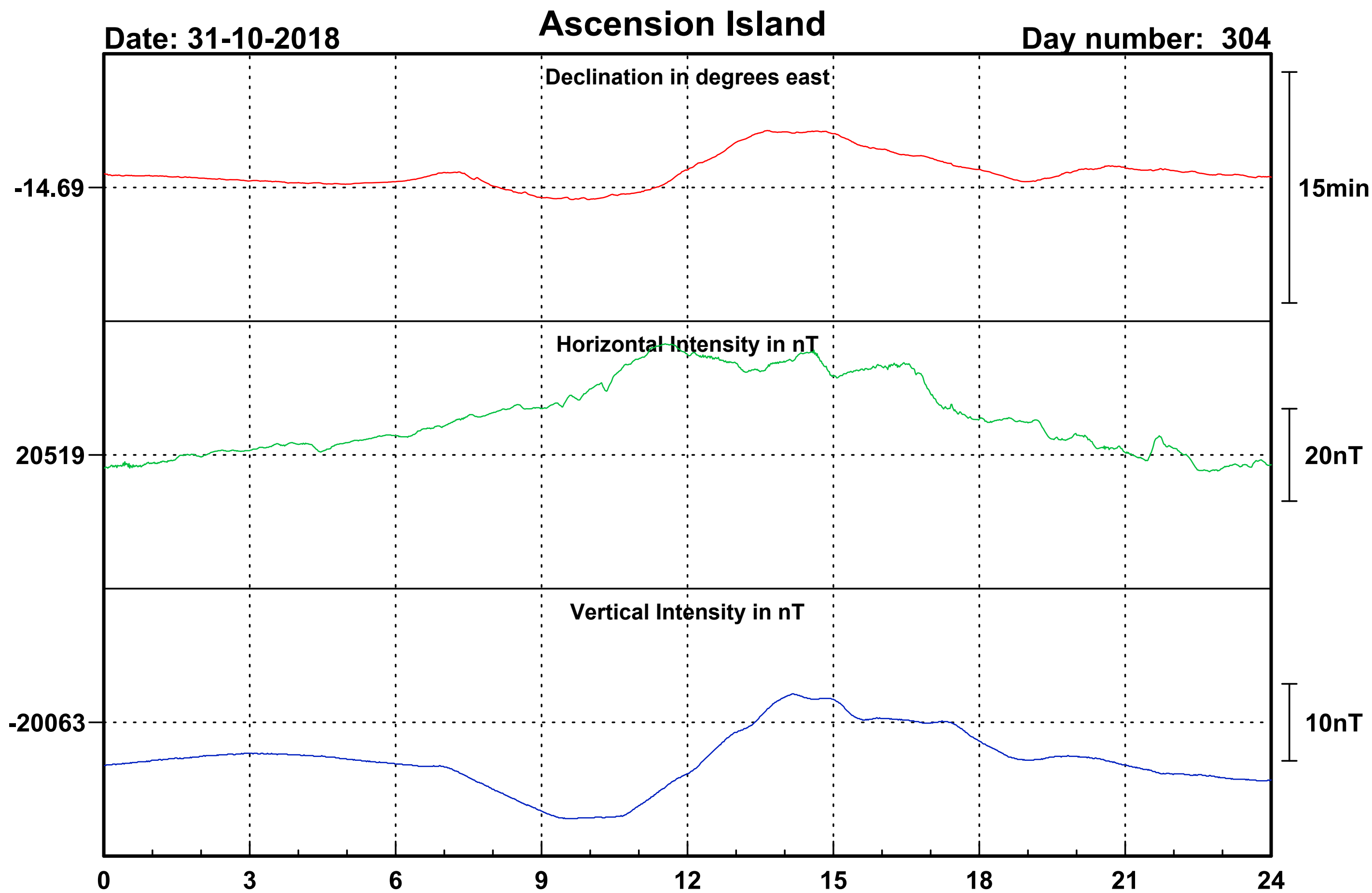
Ascension Island

Date: 29-10-2018 Day number: 302

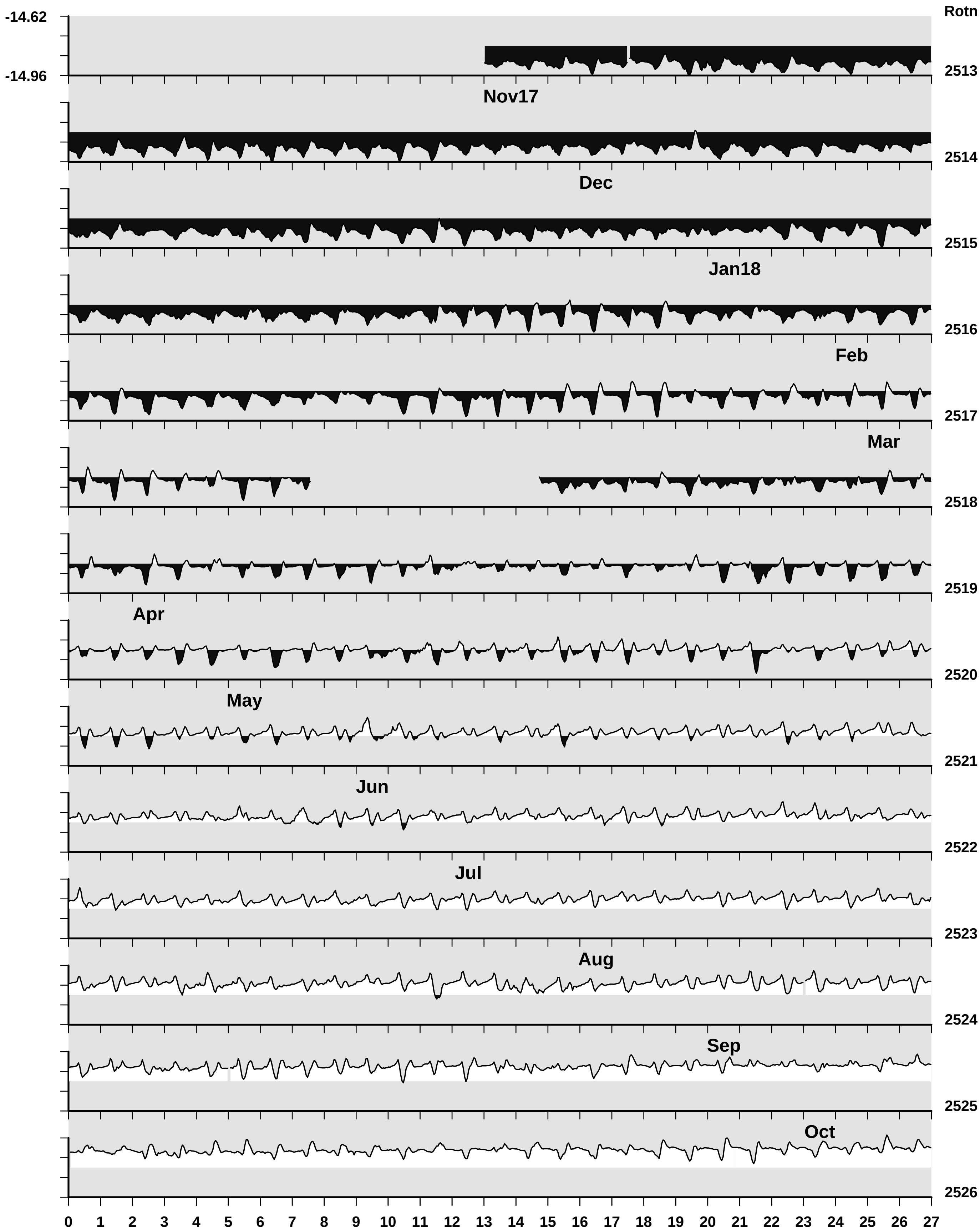


Date: 30-10-2018 Day number: 303



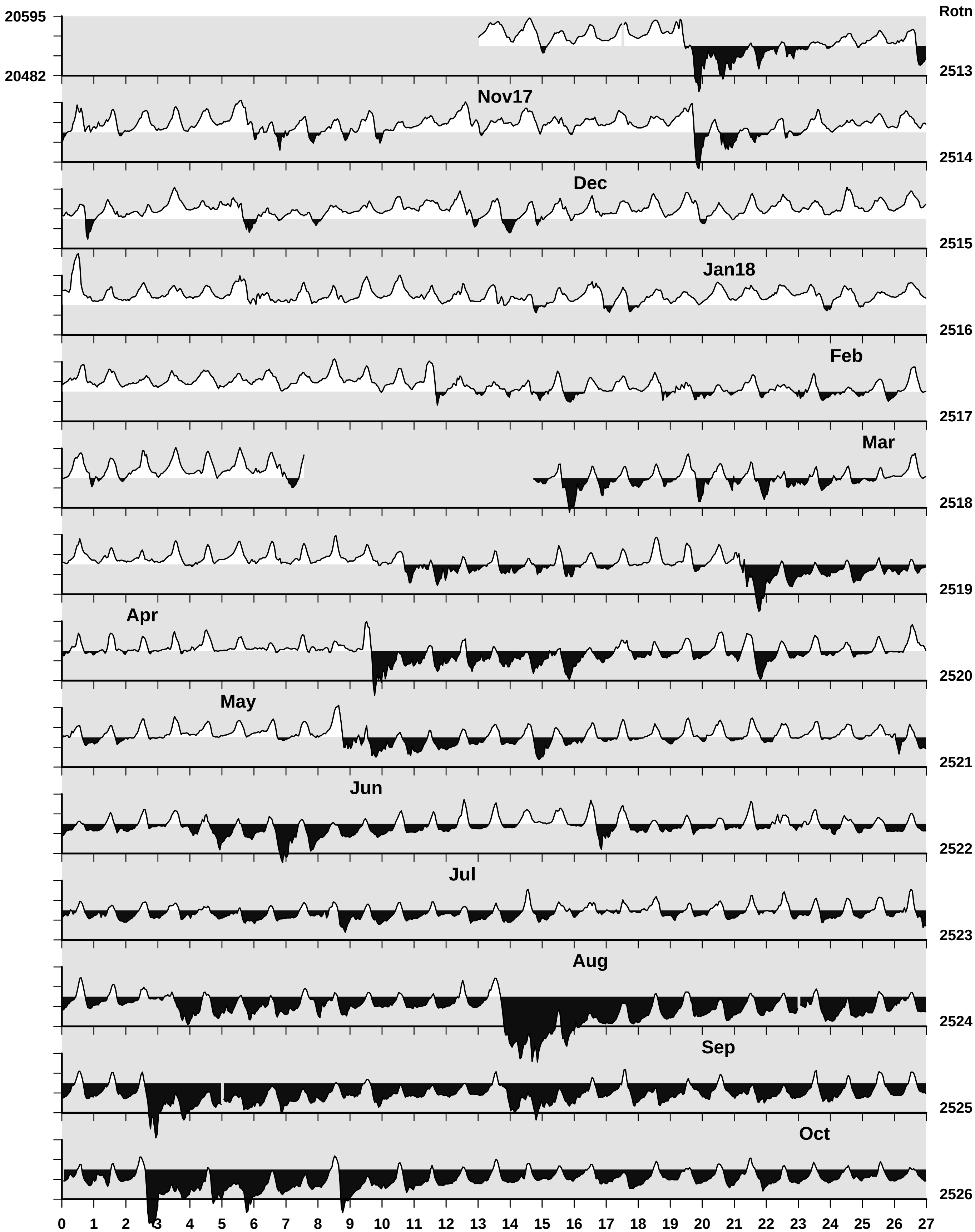

Ascension Island
Date: 31-10-2018
Day number: 304
Declination in degrees east
-14.69
15min
Horizontal Intensity in nT
20519
20nT
Vertical Intensity in nT
-20063
10nT
0
3
6
9
12
15
18
21
24

Ascension Island Observatory: Declination (degrees)



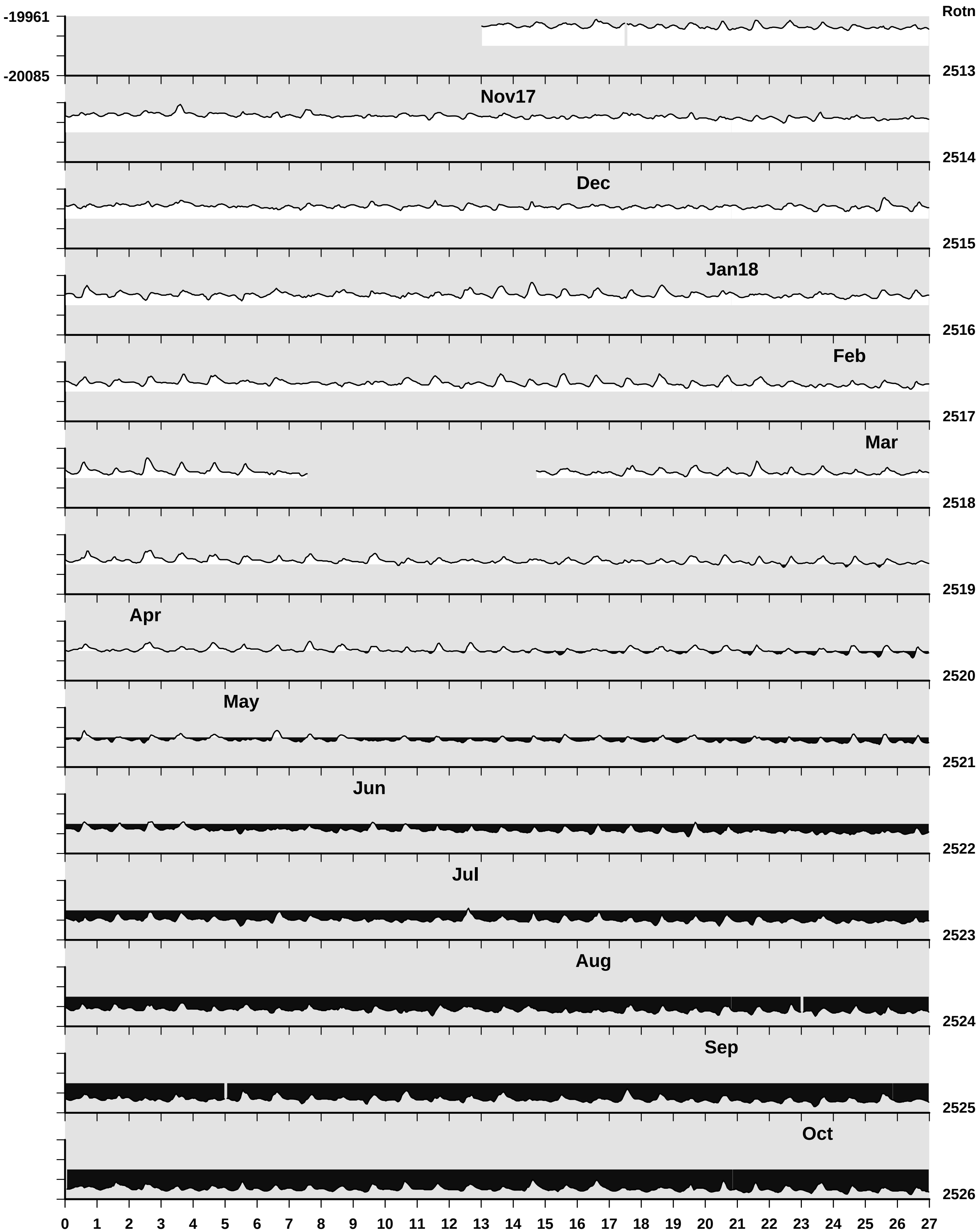
Hourly Mean Values Plotted By Bartels Solar Rotation Number

Ascension Island Observatory: Horizontal Intensity (nT)

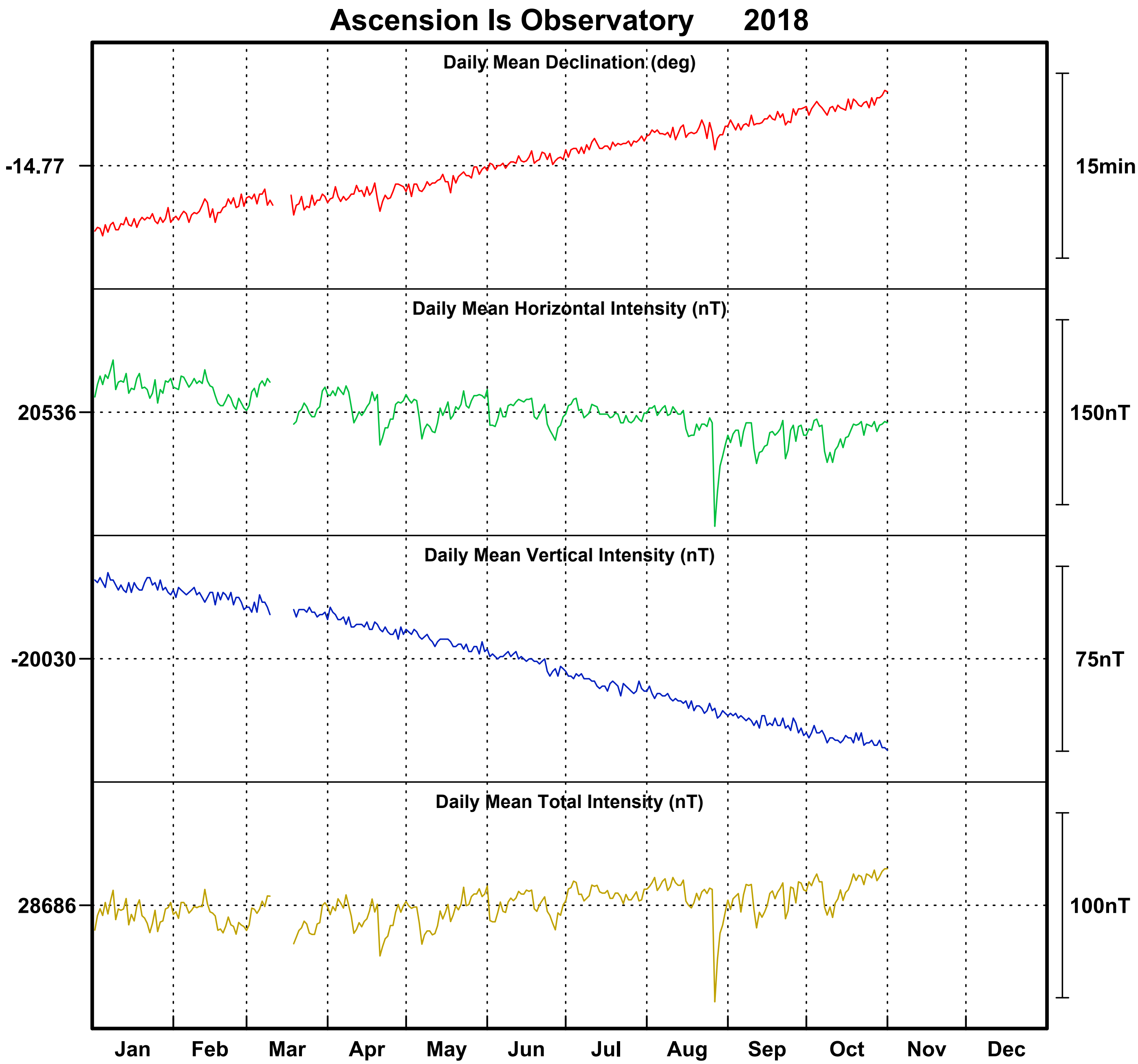


Hourly Mean Values Plotted By Bartels Solar Rotation Number

Ascension Island Observatory: Vertical Intensity (nT)



Hourly Mean Values Plotted By Bartels Solar Rotation Number



Ascension Is Observatory 2018
Daily Mean Declination (deg)
-14.77
15min
Daily Mean Horizontal Intensity (nT)
20536
150nT
Daily Mean Vertical Intensity (nT)
-20030
75nT
Daily Mean Total Intensity (nT)
28686
100nT
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

Monthly Mean Values for Ascension Island Observatory 2018

Month	*D*	*H*	*I*	*X*	*Y*	*Z*	*F*
January	-14° 50.9´	20558 nT	-44° 12.7´	19872 nT	-5269 nT	-20000 nT	28682 nT
February	-14° 49.8´	20552 nT	-44° 13.6´	19868 nT	-5261 nT	-20005 nT	28681 nT
March	999 999.9	99999	999 999.9	99999	99999	99999	99999
April	-14° 48.6´	20540 nT	-44° 15.6´	19858 nT	-5250 nT	-20016 nT	28680 nT
May	-14° 47.4´	20538 nT	-44° 16.4´	19857 nT	-5243 nT	-20023 nT	28683 nT
June	-14° 45.9´	20534 nT	-44° 17.4´	19856 nT	-5233 nT	-20031 nT	28686 nT
July	-14° 44.6´	20535 nT	-44° 18.1´	19858 nT	-5226 nT	-20040 nT	28693 nT
August	-14° 43.6´	20523 nT	-44° 19.8´	19849 nT	-5217 nT	-20048 nT	28690 nT
September	-14° 42.5´	20516 nT	-44° 21.0´	19843 nT	-5209 nT	-20056 nT	28690 nT
October	-14° 41.3´	20519 nT	-44° 21.3´	19848 nT	-5203 nT	-20063 nT	28697 nT

Note

i. The values shown here are provisional.
ii. 999 999.9 and 99999 indicate values that have been flagged due to >10% of data missing during that month