

POLAR GEOPHYSICAL INSTITUTE
RUSSIAN ACADEMY OF SCIENCES



PGI
GEOPHYSICAL DATA

2017

OCTOBER

NOVEMBER

DECEMBER

MURMANSK, APATITY, RUSSIA

May, 2018

PGI

GEOPHYSICAL DATA

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This bulletin presents the preliminary ground-based optical, geomagnetic and cosmic ray data obtained by Polar Geophysical Institute in the fourth quarter of 2017. All-sky camera observations are published only for the quarters when observations were carried out. All data are available by request.

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DATA DESCRIPTION

Magnetic data

The magnetograms (H, D, and Z) are plotted as magnetic variations recorded in Loparskaya and Lovozero stations by the three component Bobrov type magnetometer with a sampling frequency of 10 samples per seconds. The instrument has a range ± 2620 nT and a resolution of 5 pT. Magnetic observations are gathered every second and registered in the digital form as the 10-sec averaged data. Digits in the plots at the left hand side denote the scale of the records in nT/div. Timing is provided by the GPS.

Magnetic quiet values for H, D and Z components are shown by dotted line as a daily averaged magnetic activity level for three magnetically quiet days of each month. Quiet days are brand by the symbol Q in tables of geomagnetic K-indices.

Geomagnetic K-indices

The hourly K-indices indicate the level of geomagnetic field disturbance. The maximum deflection of two components H and D from the magnetic quiet value during one hour interval have been recalculated to the value of the local hourly K-index. The following scale has been used:

K-indices	Deflection in nT
0	0-15
1	15-30
2	30-60
3	60-120
4	120-210
5	210-360
6	360-600
7	600-990
8	990-1500
9	1500 and more

Cosmic ray data

The 18-NM-64-neutron monitor has been operating in Apatity since 1969. A plot of pressure corrected hourly data (count accumulated during one hour interval) is presented in units of percent with respect to the monthly mean intensity. Mean values are:

October

November

December

The hourly data are sent to WDC-B2 (Moscow) and WDC-C (Japan).

Please visit <http://pgia.ru/data/>

All-sky camera observations

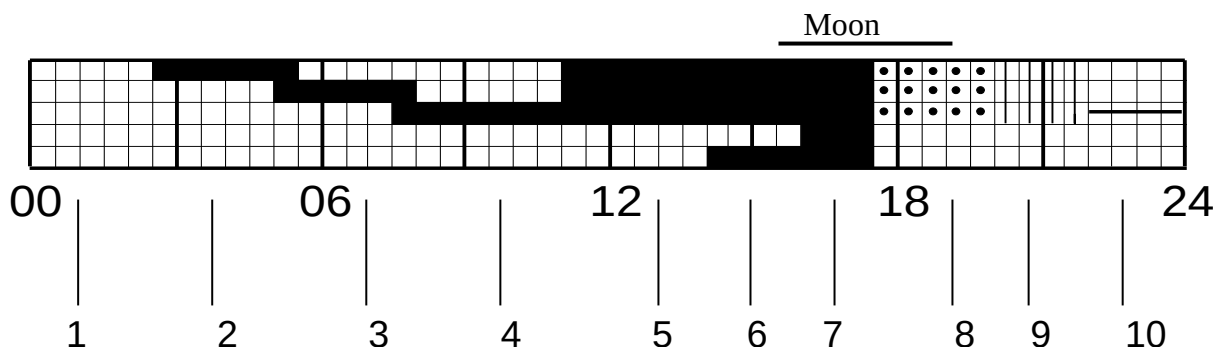
Calendar

Calendar shows the intervals of digital all-sky camera observations in Apatity and Lovozero, which are available during dark periods from 14:00 UT through midnight to 05:00 UT.

Ascaplots

All-sky camera observations are presented in this bulletin in the form of the standard five lines ascaplot. A detailed description of askaplots interpretation was published in: Annals of International Geophysical Year. V. XX. Part 1. P. 1-5. 1962.

Example of an ascaplot and the legend are given below. Top three lines give information on the existence of aurorae in north, zenith and south ranges of the sky, respectively. The fourth and fifth lines in the standard five lines ascaplot give the zenith range auroral intensity. We do not use all-sky camera observations to form a correct estimate of the auroral intensity.



- 1- no aurora
- 2- aurora present in north range
- 3- weak aurora present in zenith range
- 4- aurora present in south range
- 5- aurorae present in north, zenith and south ranges
- 6- medium aurora in zenith, aurorae present in north and south ranges
- 7- strong aurora in zenith, aurorae present in north and south ranges
- 8- partial cloudiness
- 9- total cloudiness
- 10- no operation

Keograms

Black white keograms show the auroral display along the geomagnetic meridian of station. Here we present a few selected auroral events observed at Apatity and Lovozero in night-time interval from 17:00 UT to 01:00 UT. Zenith angles are given along the vertical axis. Magnetic north is at the top of the figure.

PLEASE NOTE:

Magnetometer in Loparskaya was not in operation during December 2017 because of some technical problems.

Coordinates of stations

Stations	Code	Geographic		Corr. Geomagnetic	
		Lat	Long	Lat	Long
<i>Loparskaya</i>	LOP	68.63° N	33.25° E	64.94° N	113.6° E
<i>Lovozero</i>	LOZ	67.97° N	35.02° E	64.17° N	115.3° E
<i>Apatity</i>	APT	67.58° N	33.31° E	63.86° N	113.6° E

Please visit

<http://pgia.ru/data/>

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GEOMAGNETIC K-INDICES, LOVOZERO

October, 2017

Lower limit of K=9 is 1500 nT

Time, UT									
	03	06	09	12	15	18	21	24	
Day									
1	6 5 2	1 0 0	0 2 2	1 1 1	1 1 3	3 5 5	1 2 3	4 5 4	Q
2	0 0 0	2 2 2	1 0 1	2 1 1	2 2 2	2 1 1	1 1 1	0 0 0	
3	0 1 2	3 3 2	1 1 1	2 1 1	0 0 0	0 0 2	1 2 2	3 3 4	
4	2 2 0	1 1 1	0 0 0	1 0 0	0 0 0	0 0 1	2 2 2	4 5 4	
5	3 4 3	2 0 0	0 0 0	0 0 0	0 0 0	0 1 1	1 2 2	5 5 4	
6	3 2 2	2 2 2	1 0 1	1 1 1	1 1 1	2 3 2	1 2 3	4 5 3	
7	0 0 0	0 0 0	0 0 0	1 1 1	0 0 0	1 1 1	1 2 2	1 1 1	
8	0 1 0	0 0 0	0 0 1	1 1 1	0 0 0	0 0 0	0 0 1	1 0 0	
9	0 1 2	1 0 0	0 0 1	1 1 0	0 0 0	0 0 0	0 0 0	0 1 1	
10	0 0 0	0 0 0	0 0 0	1 1 1	0 0 0	0 0 0	0 0 0	3 4 5	
11	5 3 2	1 2 2	2 2 2	3 1 2	3 1 4	4 4 7	5 5 6	5 5 5	
12	7 5 3	3 3 2	- 1 3	3 3 2	3 5 4	4 4 4	3 3 5	4 6 7	
13	5 2 1	3 3 2	1 0 1	1 3 3	5 5 6	5 4 5	8 8 6	6 7 7	
14	7 5 2	4 4 4	3 3 2	2 4 4	3 4 3	4 2 5	5 6 5	4 3 5	
15	6 7 6	4 4 3	2 2 2	2 2 4	4 5 4	4 5 5	4 4 4	1 0 1	
16	1 1 1	1 1 2	1 0 1	1 1 2	2 1 2	2 1 0	0 3 5	5 4 3	
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19	4 4 1	0 1 1	1 0 0	1 0 1	1 2 4	3 5 4	4 3 5	5 4 4	
20	3 3 1	0 0 1	1 1 1	1 1 2	3 3 2	1 0 1	1 1 3	4 3 2	
21	1 1 1	1 0 0	1 0 0	0 0 1	0 1 1	1 1 3	3 1 3	2 4 6	
22	5 4 2	1 0 0	0 0 0	1 1 1	0 0 0	0 0 0	0 0 3	3 2 1	
23	2 3 2	1 0 0	0 0 1	1 2 1	0 0 0	0 0 0	0 0 1	3 3 3	
24	2 2 1	0 0 0	0 0 1	1 1 1	2 5 5	5 6 5	4 4 4	6 7 5	
25	4 4 4	4 2 3	3 2 3	2 3 2	2 2 2	2 2 3	3 1 5	6 5 4	
26	4 1 2	2 1 0	0 1 3	2 2 3	5 4 5	5 4 4	4 4 3	0 1 2	
27	1 2 2	0 0 0	0 0 1	1 1 1	0 0 0	0 0 0	1 1 0	1 1 2	
28	2 1 0	0 0 0	0 0 1	1 1 1	1 1 1	1 1 2	2 1 0	0 0 0	
29	0 0 0	0 0 1	1 1 1	1 1 1	1 1 2	2 1 2	1 1 1	0 1 1	
30	1 1 1	0 1 0	0 1 1	1 1 1	1 1 1	1 1 2	1 1 0	0 1 1	
31	2 1 1	1 1 0	1 1 1	1 1 1	1 1 1	0 0 0	0 0 0	0 0 0	
									Q

GEOMAGNETIC K-INDICES, LOVOZERO(LOPARSKAYA)

November, 2017

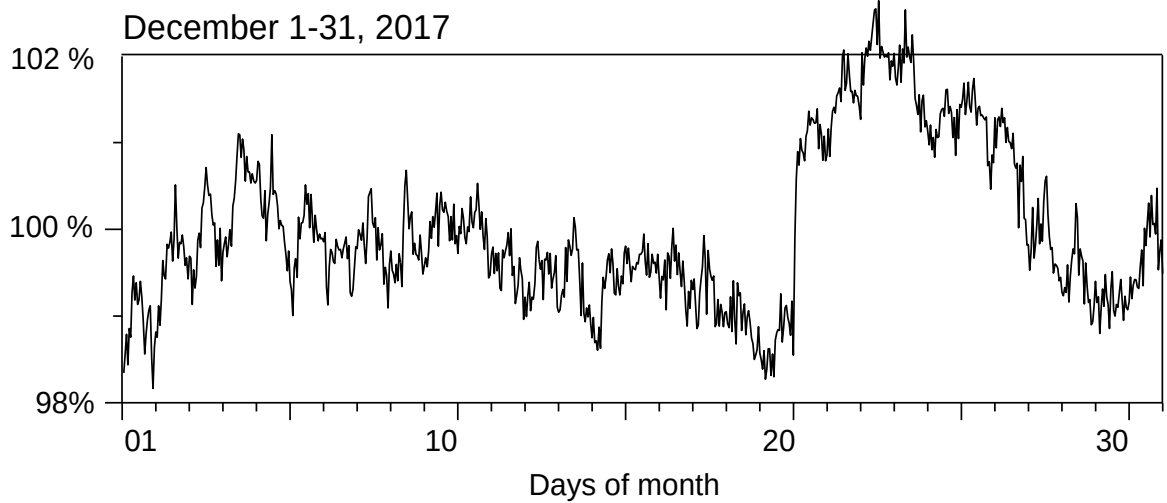
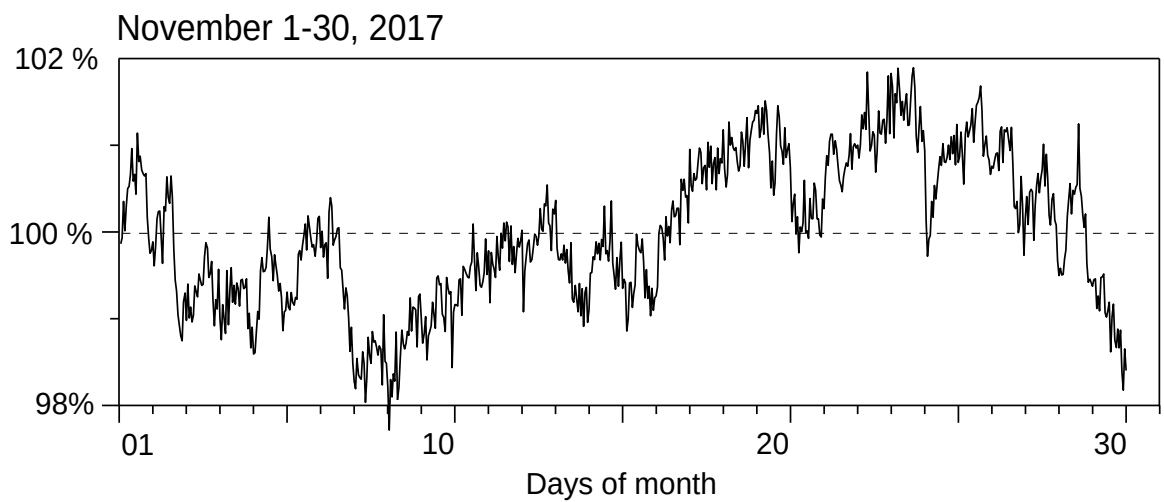
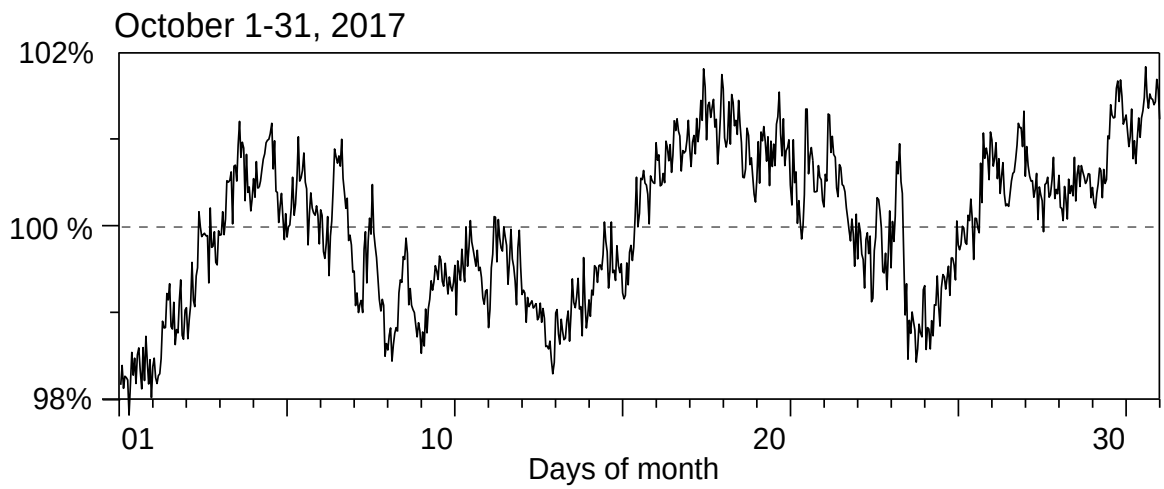
Lower limit of K=9 is 1500 nT

Day	Time, UT								
	03	06	09	12	15	18	21	24	
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2	3 3 2	2 1 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 1	3 4 5	
3	5 4 2	0 0 0	0 0 0	0 0 2	3 3 0	0 0 1	2 0 0	0 0 2	
4	2 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 1 0	0 0 0	3 3 1	
5	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	Q
6	1 1 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	Q
7	0 0 1	1 1 1	0 0 0	0 3 4	4 3 3	3 4 4	7 6 4	5 7 6	
8	7 6 4	4 3 2	2 2 2	3 3 3	5 6 5	5 5 2	2 3 5	7 4 3	
9	3 2 1	2 1 0	2 2 2	2 3 3	3 3 3	3 3 3	5 2 3	4 5 4	
10	3 3 2	1 1 1	2 3 3	3 3 2	3 3 3	3 2 3	4 1 4	3 3 4	
11	3 2 1	1 1 1	1 2 1	2 2 1	2 2 2	2 2 2	1 0 1	3 3 3	
12	2 1 0	0 0 0	0 0 0	1 1 1	1 1 1	2 2 0	0 0 3	4 2 0	
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14	3 3 4	3 1 1	0 0 1	1 1 1	1 0 0	2 4 3	3 2 2	3 3 3	
15	3 0 0	0 0 1	0 2 1	2 3 2	1 2 3	3 5 3	3 2 2	3 2 0	
16	1 1 3	3 3 1	1 1 2	2 2 0	0 1 1	1 2 2	3 5 4	4 6 3	
17	1 0 0	0 1 1	1 1 0	1 1 2	2 0 0	0 0 0	0 0 0	0 1 1	
18	1 2 2	1 1 1	1 0 0	0 0 0	0 0 0	1 2 1	1 1 3	4 4 4	
19	2 0 0	0 1 1	1 1 1	1 0 0	0 0 0	0 0 0	0 2 2	1 1 0	
20	1 1 0	0 0 1	1 1 1	1 1 0	0 0 0	0 0 1	3 3 1	1 2 5	
21	5 5 2	2 2 3	2 2 3	3 2 2	0 1 2	2 4 5	4 4 4	4 5 5	
22	3 2 0	1 2 1	1 0 0	0 0 0	2 3 3	3 2 2	5 4 4	2 1 0	
23	1 2 2	2 0 0	0 0 0	1 1 0	2 2 1	1 2 2	2 2 2	5 5 3	
24	3 3 2	2 2 1	0 0 0	0 0 0	0 0 0	0 0 0	4 3 6	4 3 3	
25	1 1 0	0 0 0	0 1 0	1 1 1	1 1 1	1 1 1	0 0 0	0 0 0	Q
26	0 0 0	0 0 0	0 0 0	0 0 0	1 1 1	2 1 1	2 2 1	0 1 0	
27	0 0 0	0 0 0	0 0 0	0 0 0	0 0 1	0 0 1	2 1 1	0 0 0	
28	2 3 2	2 1 2	1 1 1	1 2 2	2 2 2	2 1 1	2 2 2	2 1 1	
29	1 1 0	0 0 1	0 0 1	1 1 1	1 1 1	1 1 1	3 2 2	1 1 1	
30	2 1 1	3 3 2	0 0 0	0 0 1	1 1 3	3 2 1	1 1 1	2 2 1	

GEOMAGNETIC K-INDICES, LOVOZERO
December, 2017
Lower limit of K=9 is 1500 nT

	Time, UT								
	03	06	09	12	15	18	21	24	
Day									
1	0 0 0	1 1 0	0 0 0	0 0 0	0 0 0	2 3 2	5 4 1	0 0 1	Q
2	1 1 0	0 0 0	0 0 0	0 0 0	0 0 0	3 3 1	1 0 0	0 0 0	
3	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	2 2 0	
4	0 0 0	0 0 1	1 1 1	1 0 0	0 3 3	2 3 4	6 4 4	5 5 1	
5	4 3 3	3 3 2	1 1 2	2 3 3	3 3 5	3 5 3	4 4 2	4 5 3	
6	3 2 2	2 2 2	2 1 0	0 0 1	1 0 2	2 2 1	2 4 2	2 3 3	
7	3 1 1	1 1 1	1 1 1	1 1 1	0 2 2	3 0 0	2 3 4	4 4 3	
8	2 1 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 2 2	
9	2 2 1	0 0 0	0 0 0	0 0 0	0 0 0	1 1 1	1 0 1	0 0 0	
10	0 0 0	0 0 0	0 0 0	0 0 0	0 0 1	1 2 2	2 1 0	0 3 3	
11	2 1 0	0 0 0	0 0 0	0 1 2	4 3 2	3 3 2	2 4 3	1 - -	Q
12	2 3 2	2 2 1	1 0 2	2 2 2	2 1 1	1 2 2	6 5 5	4 2 1	
13	2 1 1	1 1 1	1 1 1	1 1 2	2 2 2	3 2 2	2 2 0	1 1 4	
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18	5 3 2	2 2 2	2 2 3	3 2 1	3 3 1	0 2 1	2 2 1	1 0 0	
19	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 0 1	2 3 3	4 4 4	
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21	0 0 0	0 0 0	0 0 0	0 0 1	1 1 1	0 0 0	0 0 0	0 0 0	
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23	2 2 2	1 1 1	1 1 1	1 1 0	0 0 0	0 0 0	0 1 1	0 1 1	
24	0 1 1	1 2 1	1 1 1	1 1 1	2 2 3	2 2 2	2 4 3	3 2 4	
25	4 2 1	1 0 1	1 1 1	0 0 0	0 1 0	1 2 4	4 4 4	2 3 4	
26	4 3 2	1 1 1	0 0 0	0 0 0	0 0 0	0 0 2	1 6 5	3 4 5	
27	3 2 1	1 2 2	1 1 1	1 1 1	0 0 1	2 1 0	2 2 2	3 0 1	
28	1 1 0	1 1 1	1 1 1	1 1 0	1 1 1	1 1 0	0 1 1	3 2 1	
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30	1 1 1	0 1 0	0 0 0	0 0 0	0 0 0	2 2 2	3 3 2	2 2 0	
31	0 1 1	0 0 0	0 0 0	0 0 0	0 0 1	1 2 2	2 2 2	4 3 3	

Apatity neutron monitor



ALL – SKY CAMERA OBSERVATIONS

October - December 2017

CALENDAR OF TV OBSERVATIONS

October 25 - 26

UT	14	15	16	17	18	19	20	21	22	23	24	01	02	03	04	05
LOZ																
APT																

October 26 -27

[illegible]

October 27 - 28

[illegible]

October 28 - 29

[illegible]

October 29 - 30

[illegible]

October 30 - 31

[illegible]

October 31

[illegible]

CALENDAR OF TV OBSERVATIONS

November 01 - 02

[illegible]

November 02 - 03

[illegible]

November 03 - 04

[illegible]

November 04 - 05

[illegible]

November 05- 06

[illegible]

November 06 - 07

[illegible]

November 07 - 08

[illegible]

November 08 - 09

[illegible]

CALENDAR OF TV OBSERVATIONS

November 17 - 18

[illegible]

November 18 - 19

[illegible]

November 19 - 20

[illegible]

November 20 - 21

[illegible]

November 21 - 22

[illegible]

November 22- 23

[illegible]

November 23 - 24

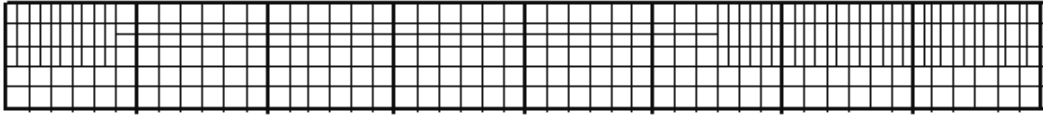
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November 24 - 25

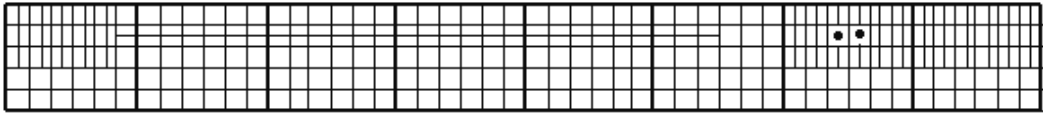
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Apatity ascaplots

Oct. 01, 2017



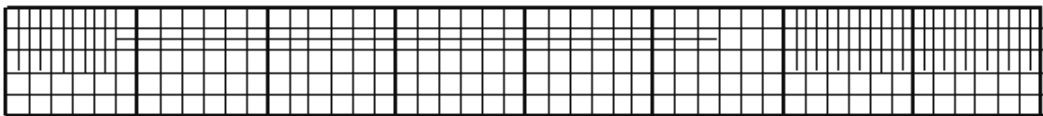
Oct. 02, 2017



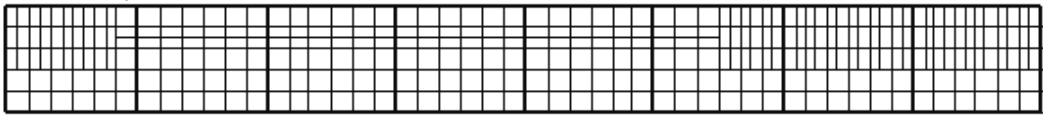
Oct. 03, 2017



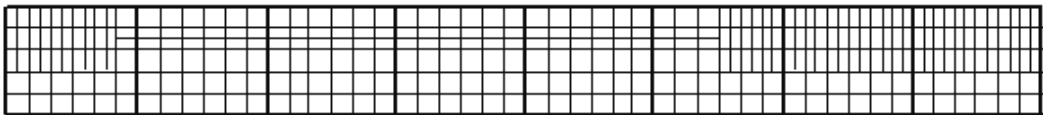
Oct. 04, 2017



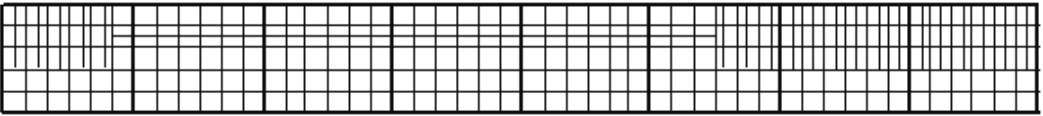
Oct. 05, 2017



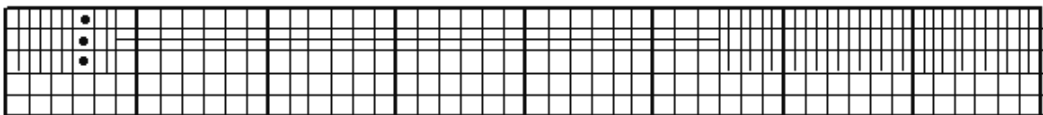
Oct. 06, 2017



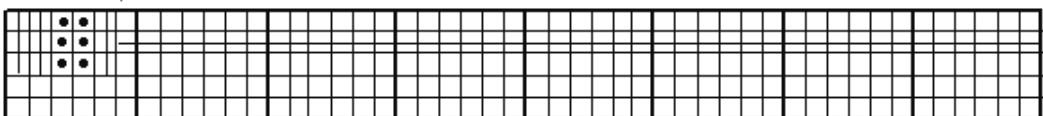
Oct. 07, 2017



Oct. 08, 2017



Oct. 09, 2017



Oct. 10, 2017

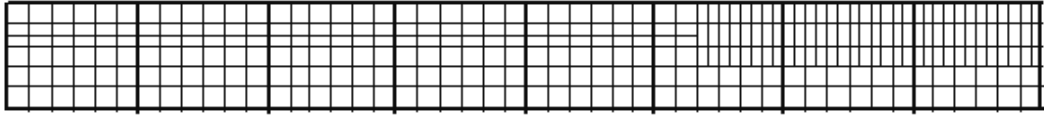


00 06 12 18 24

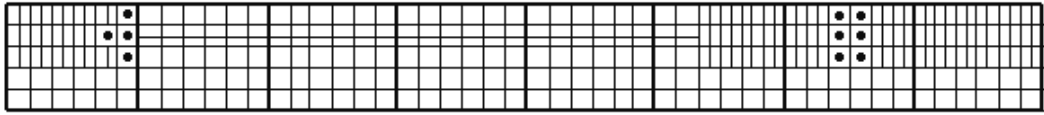
Universal Time

Apatity ascaplots

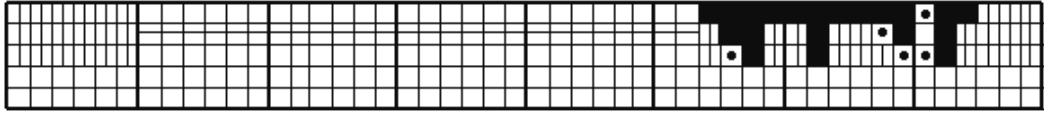
Oct. 11, 2017



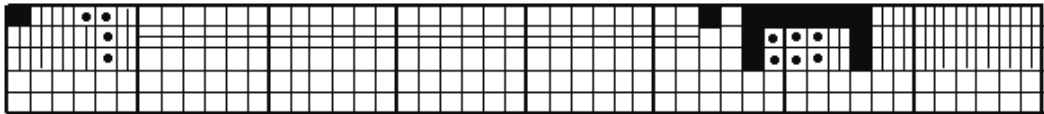
Oct. 12, 2017



Oct. 13, 2017



Oct. 14, 2017



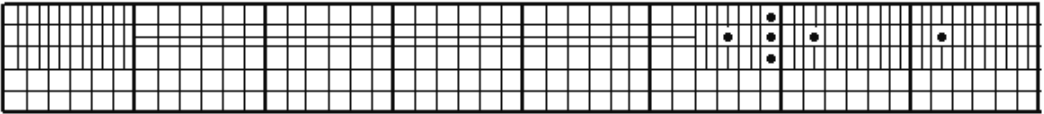
Oct. 15, 2017



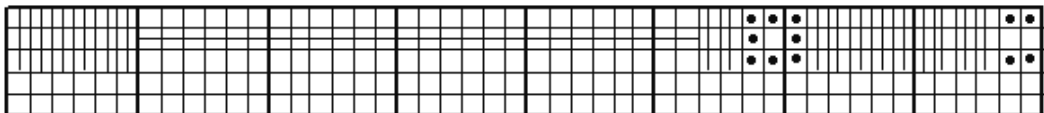
Oct. 16, 2017



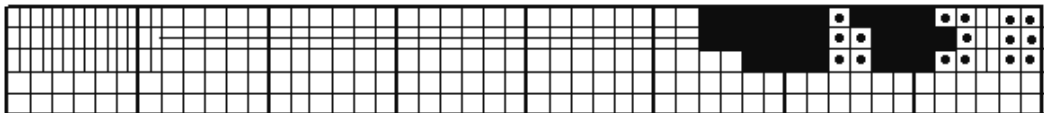
Oct. 17, 2017



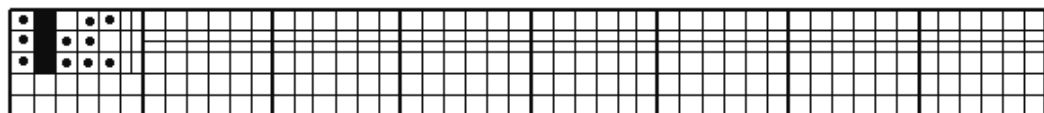
Oct. 18, 2017



Oct. 19, 2017



Oct. 20, 2017

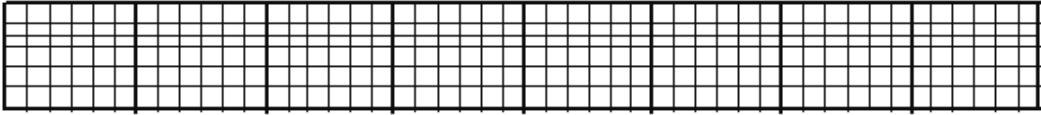


00 06 12 18 24

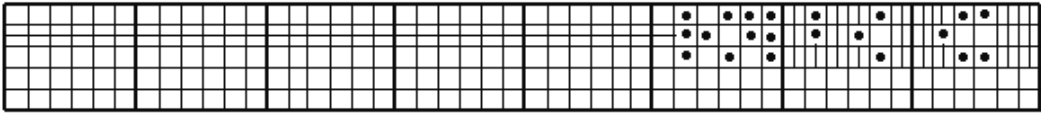
Universal Time

Apatity ascaplots

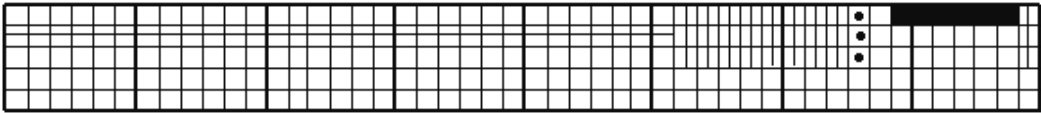
Oct. 21, 2017



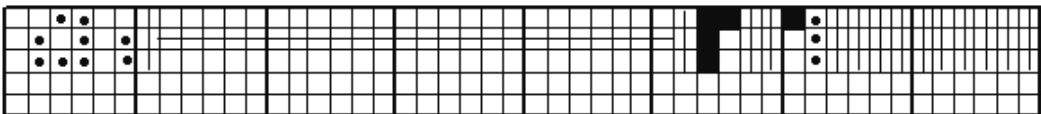
Oct. 22, 2017



Oct. 23, 2017



Oct. 24, 2017



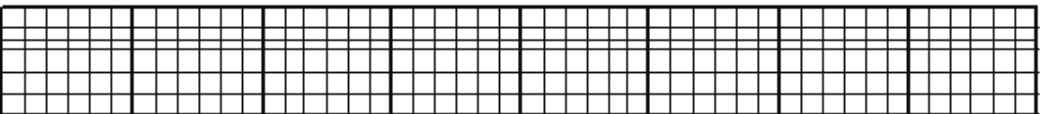
Oct. 25, 2017



Oct. 26, 2017



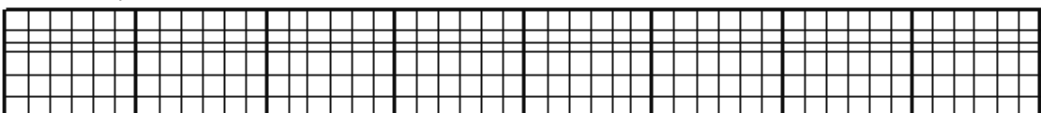
Oct. 27, 2017



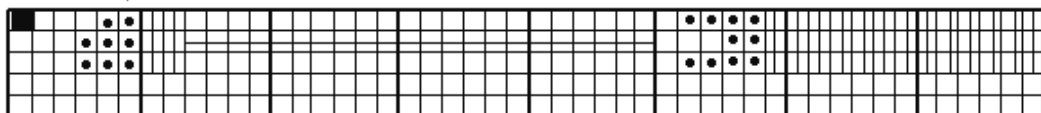
Oct. 28, 2017



Oct. 29, 2017



Oct. 30, 2017



00

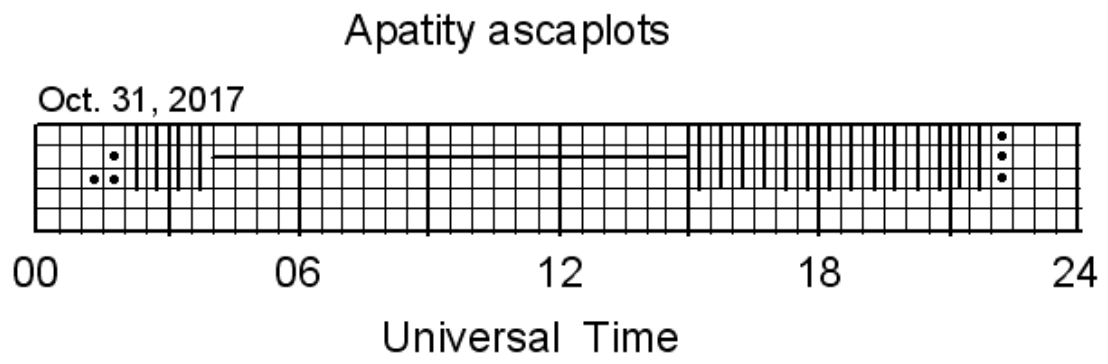
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12

18

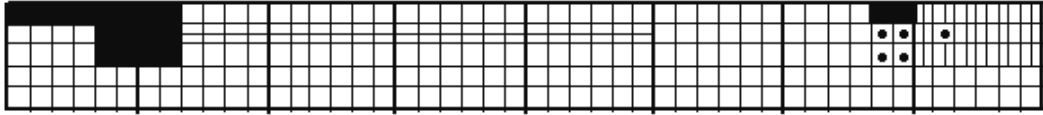
24

Universal Time

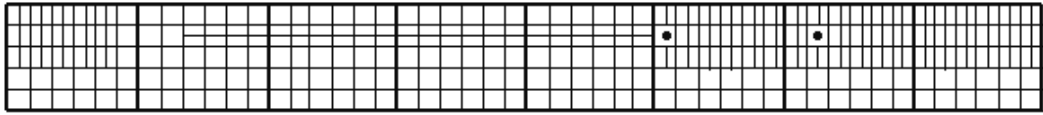


Apatity ascaplots

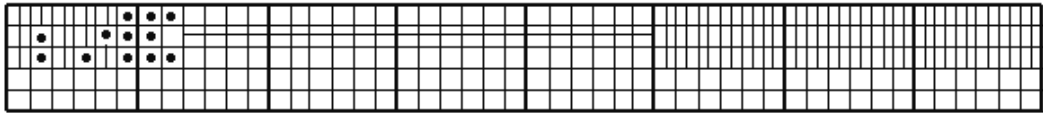
Nov. 01, 2017



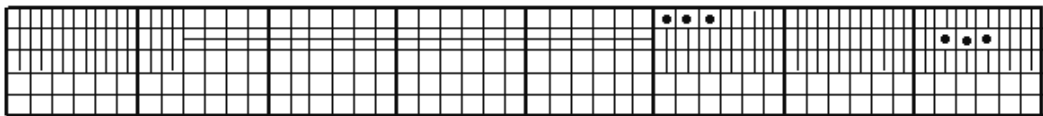
Nov. 02, 2017



Nov. 03, 2017



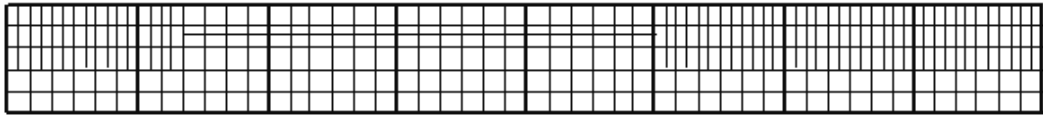
Nov. 04, 2017



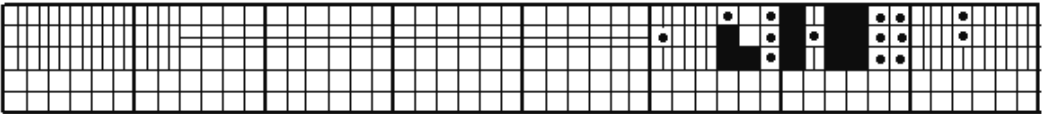
Nov. 05, 2017



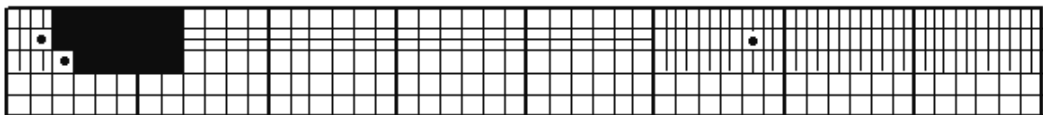
Nov. 06, 2017



Nov. 07, 2017



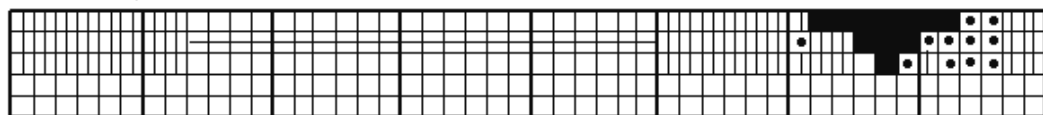
Nov. 08, 2017



Nov. 09, 2017



Nov. 10, 2017

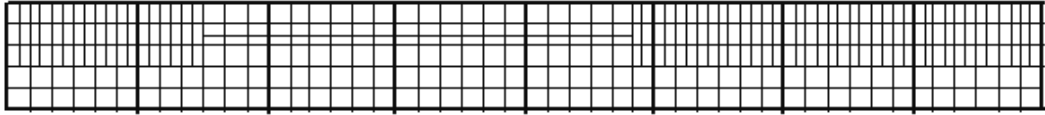


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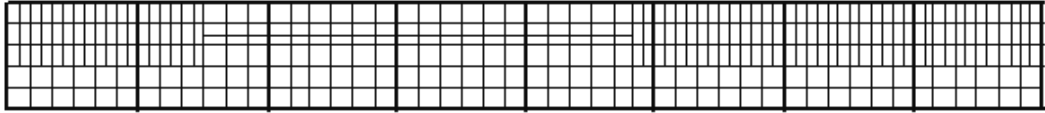
Universal Time

Apatity ascaplots

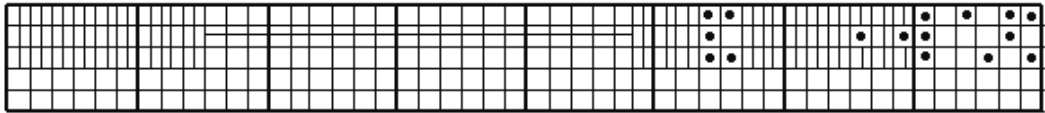
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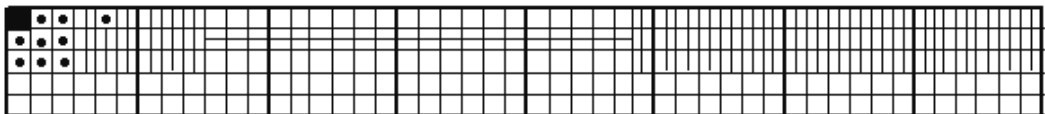
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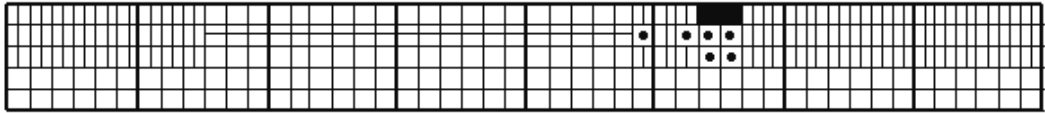
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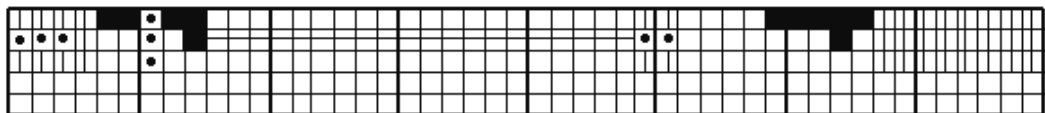
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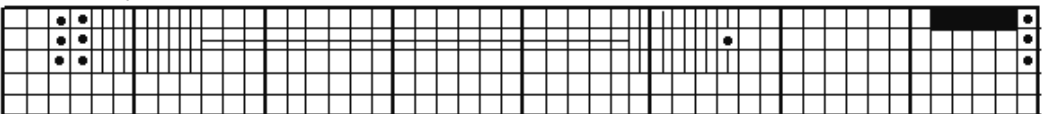
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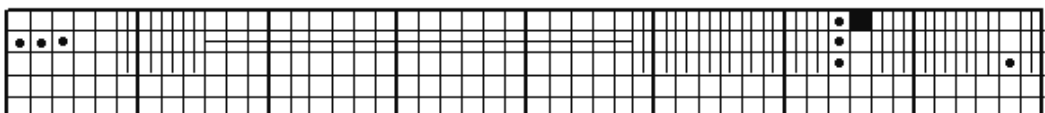
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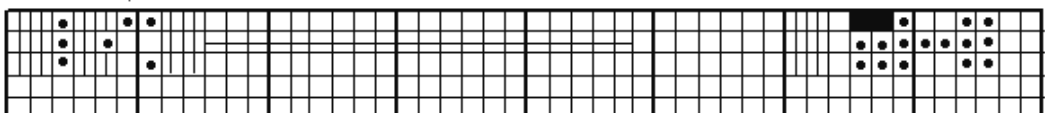
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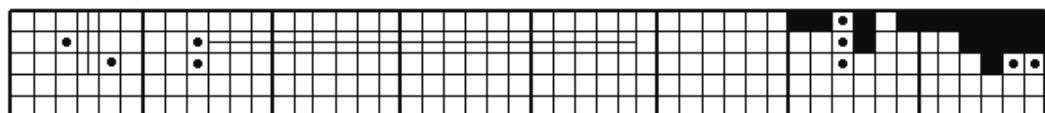
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Nov. 19, 2017



Nov. 20, 2017

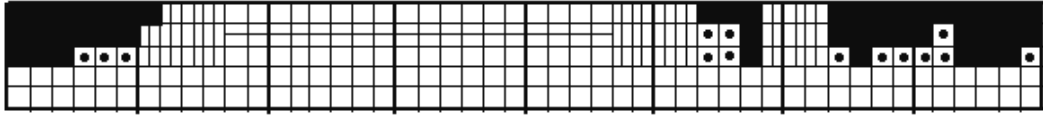


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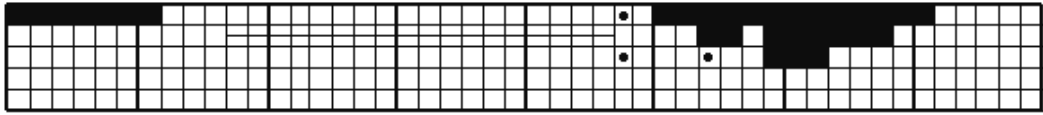
Universal Time

Apatity ascaplots

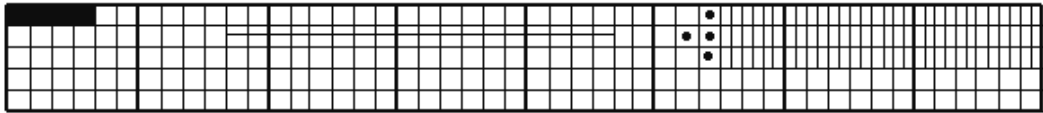
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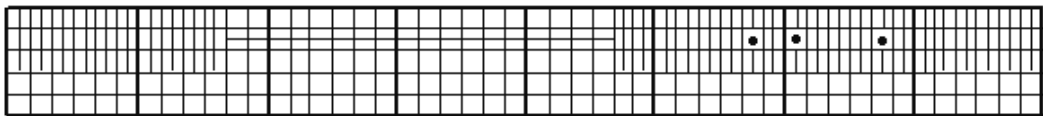
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Nov. 23, 2017



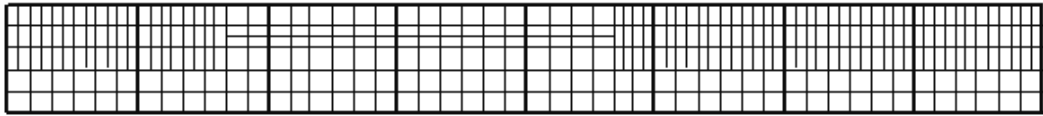
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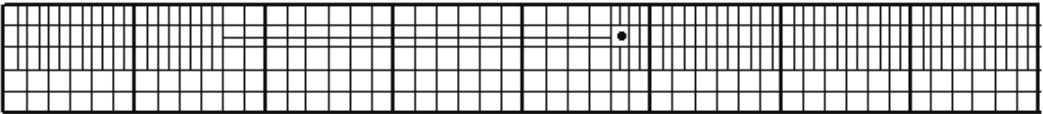
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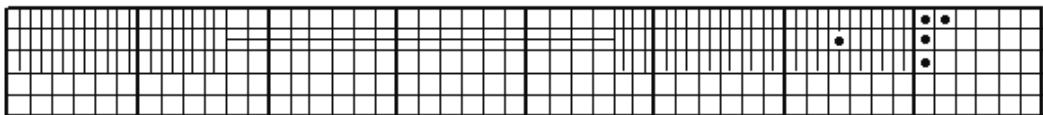
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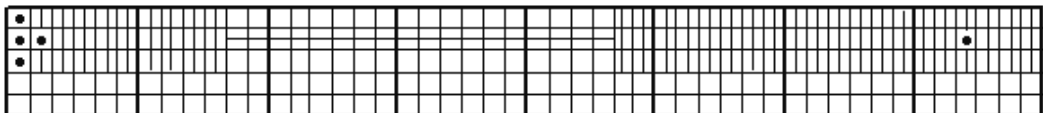
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Nov. 29, 2017



Nov. 30, 2017

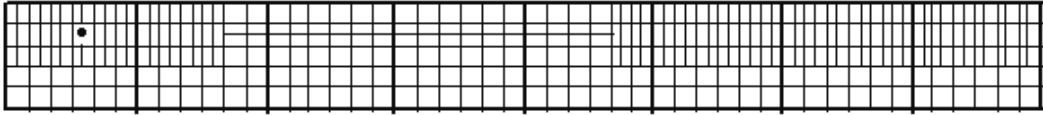


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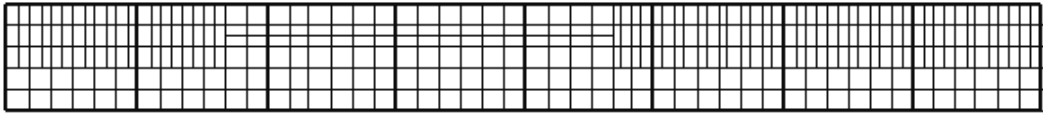
Universal Time

Apatity ascaplots

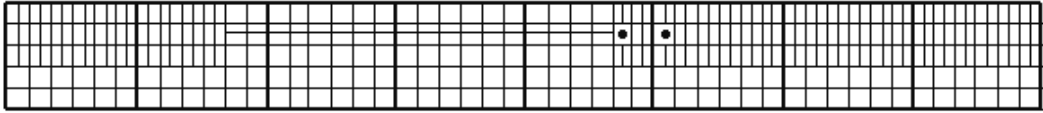
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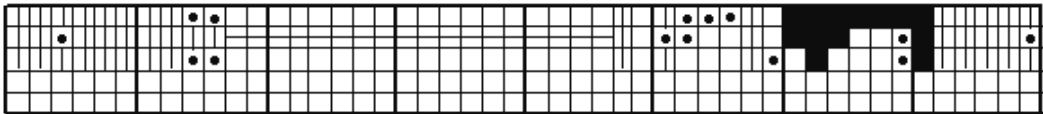
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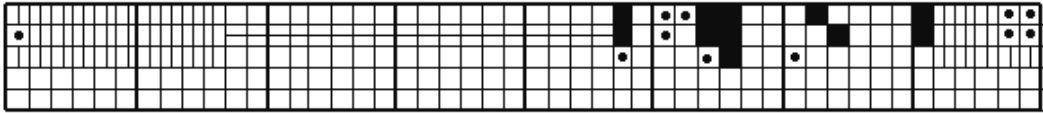
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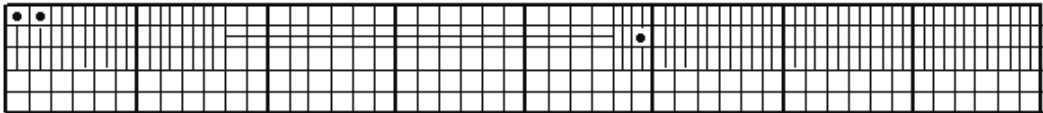
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Dec. 05, 2017



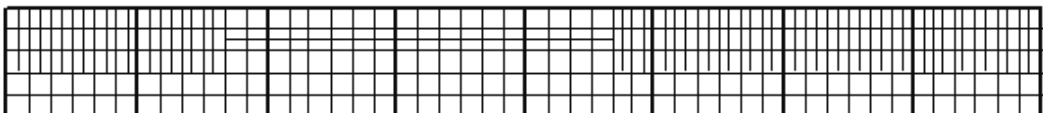
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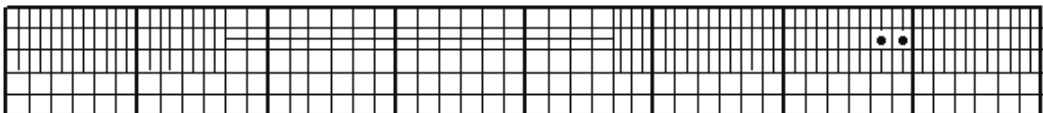
Dec. 07, 2017



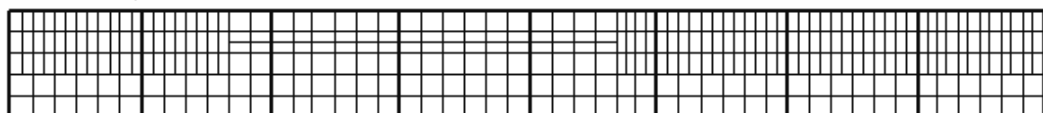
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Dec. 09, 2017



Dec. 10, 2017

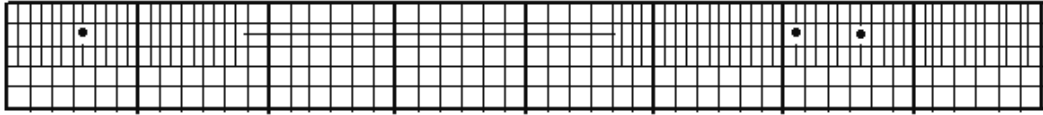


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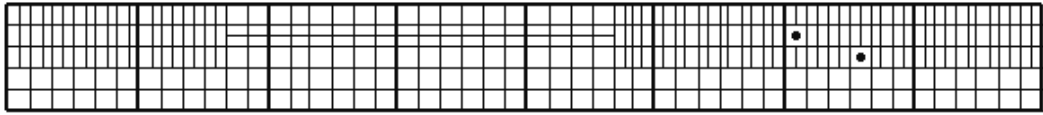
Universal Time

Apatity ascaplots

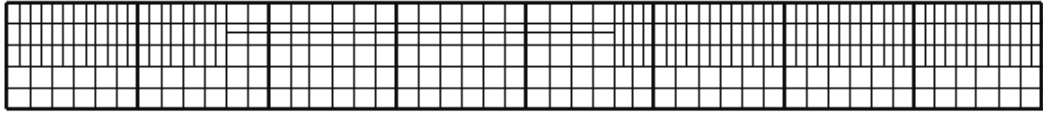
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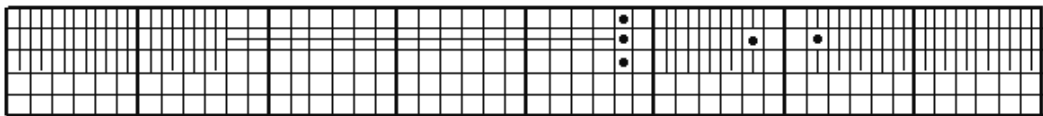
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Dec. 13, 2017



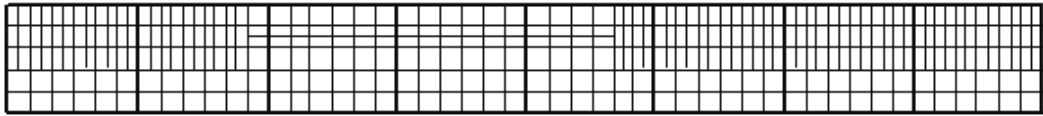
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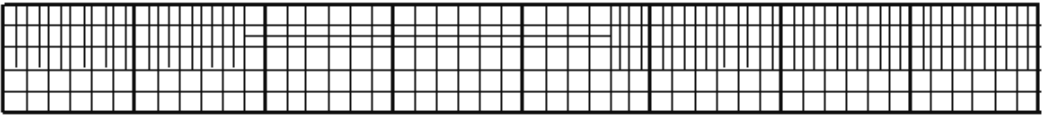
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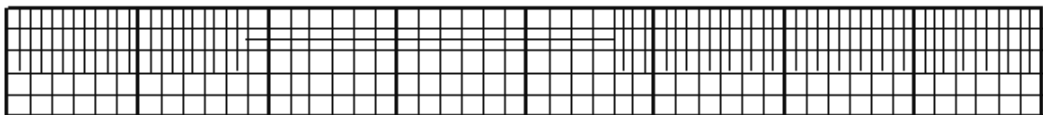
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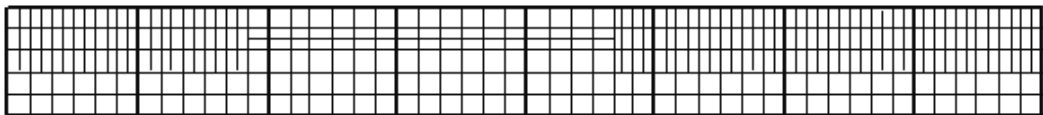
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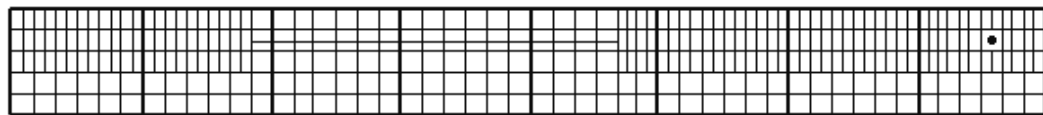
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Dec. 19, 2017



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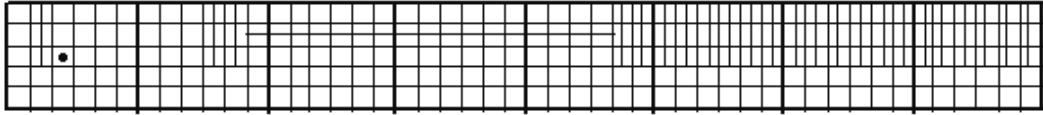


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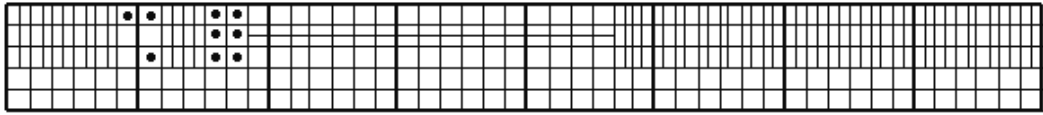
Universal Time

Apatity ascaplots

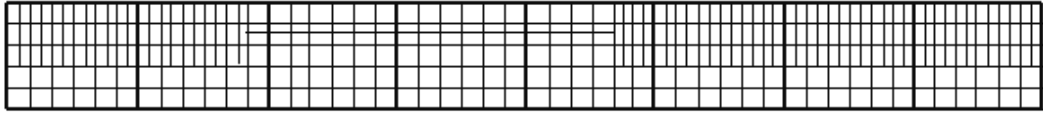
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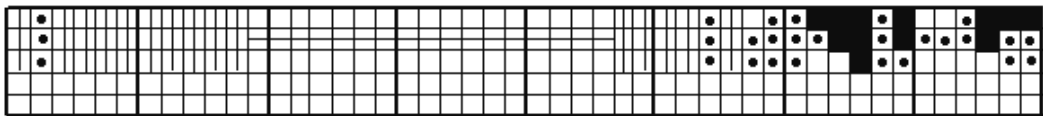
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Dec. 23, 2017



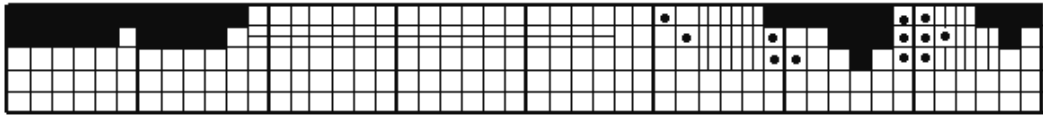
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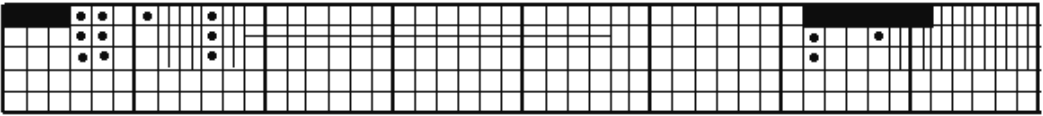
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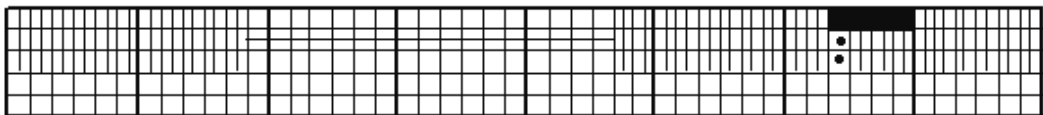
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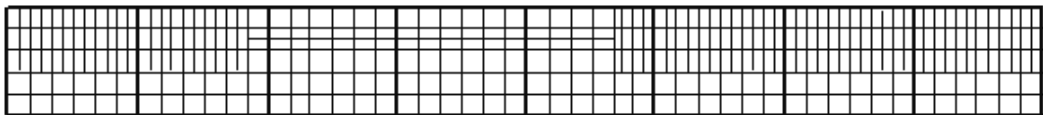
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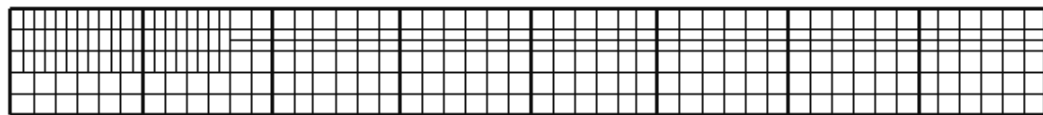
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Dec. 29, 2017



Dec. 30, 2017

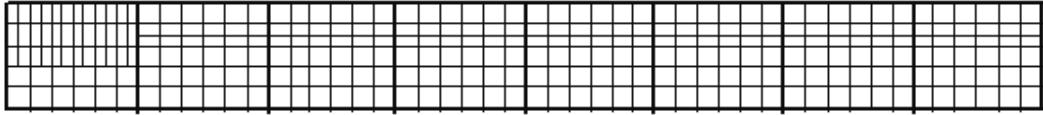


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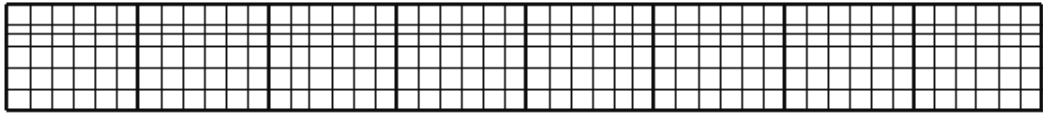
Universal Time

Lovozero ascaplots

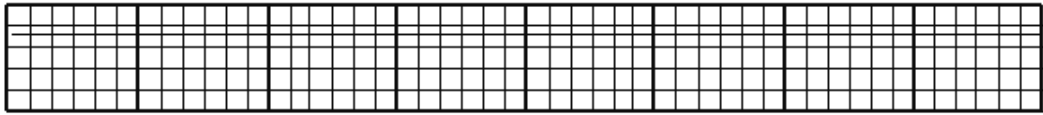
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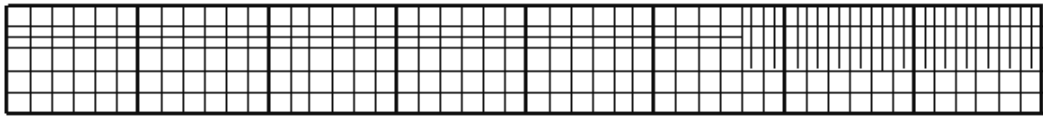
Oct. 02, 2017



Oct. 03, 2017



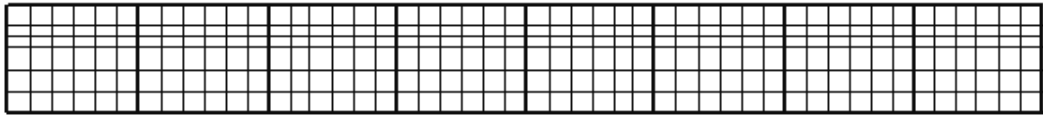
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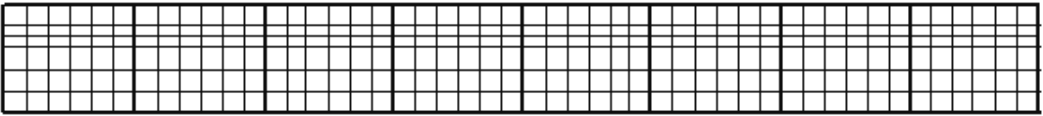
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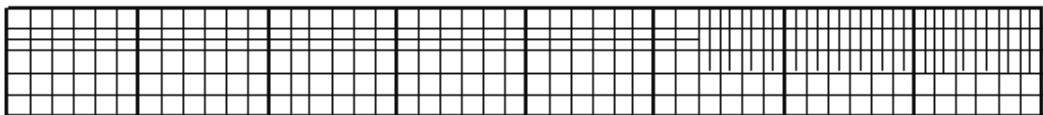
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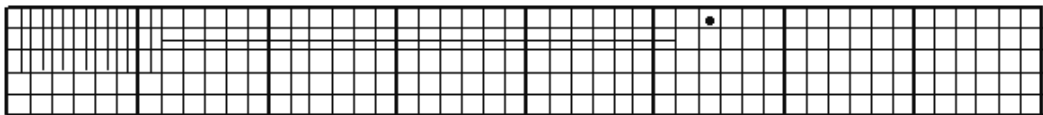
Oct. 07, 2017



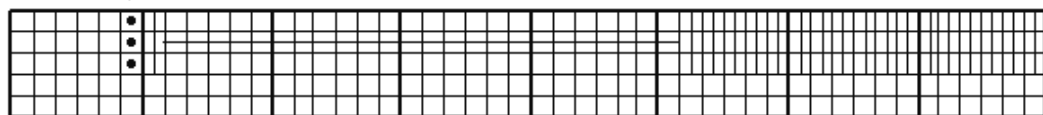
Oct. 08, 2017



Oct. 09, 2017



Oct. 10, 2017

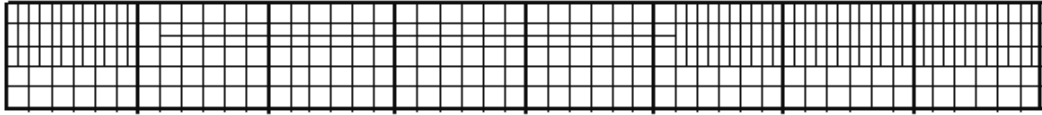


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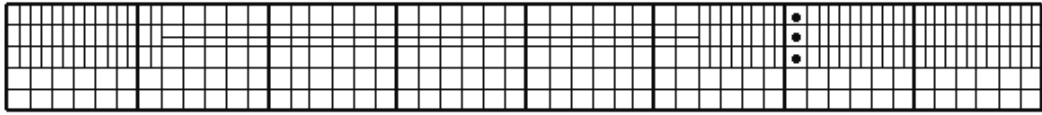
Universal Time

Lovozero ascaplots

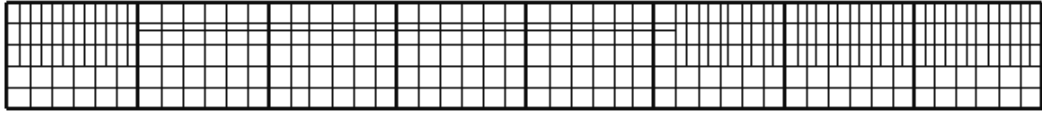
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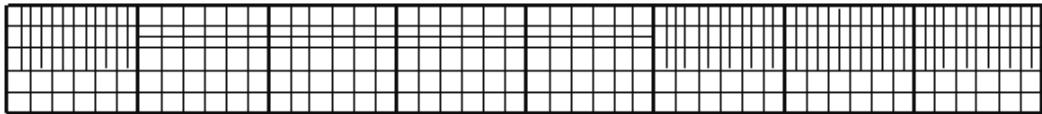
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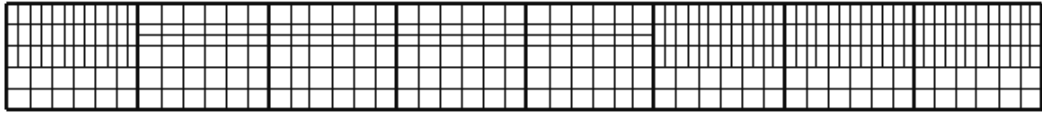
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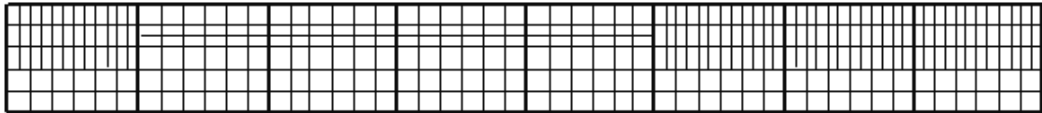
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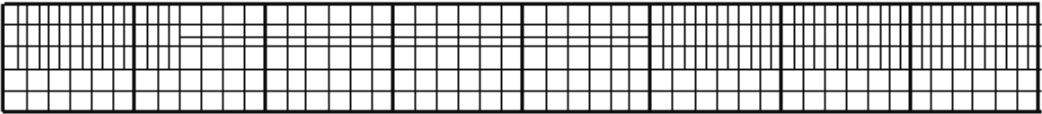
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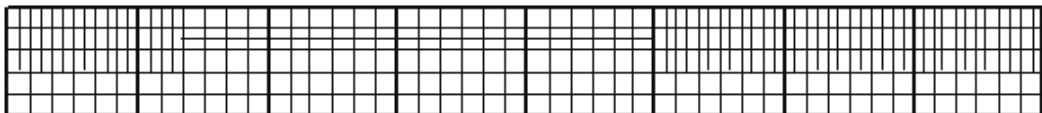
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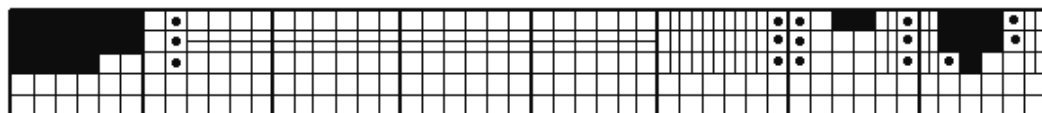
Oct. 18, 2017



Oct. 19, 2017



Oct. 20, 2017



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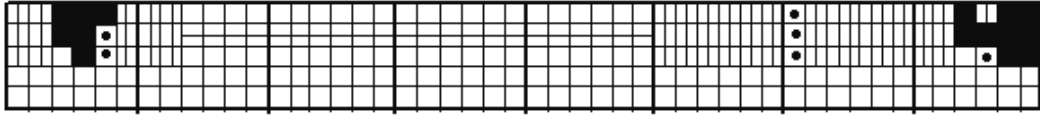
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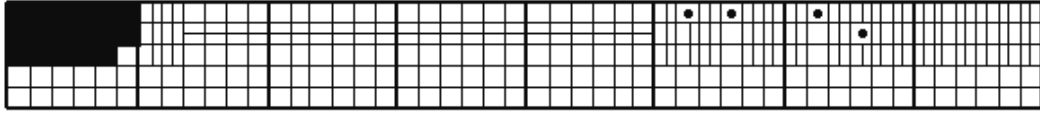
Universal Time

Lovozero ascaplots

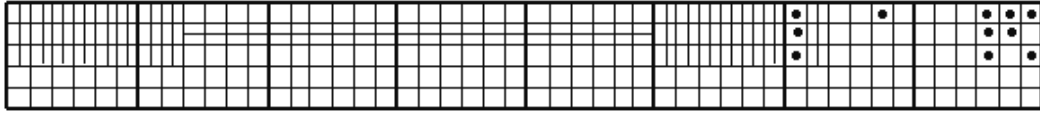
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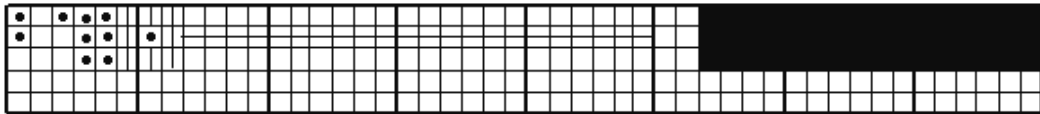
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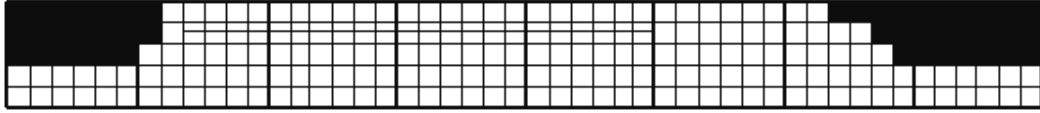
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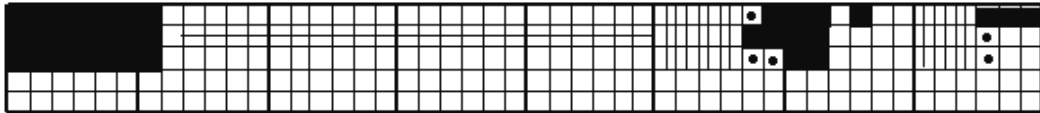
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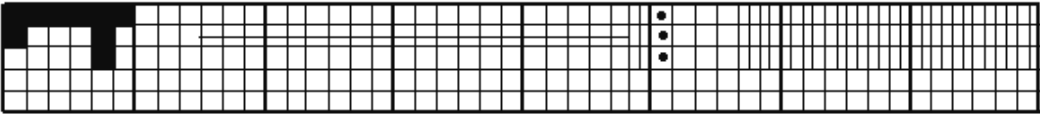
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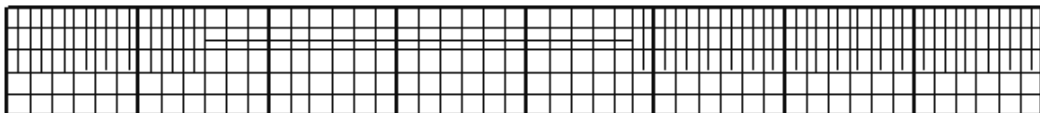
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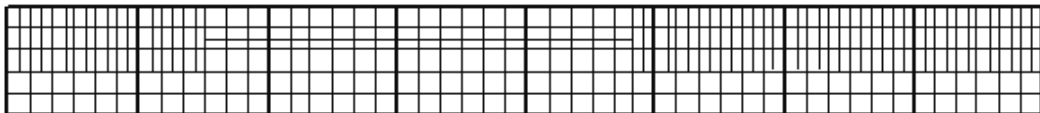
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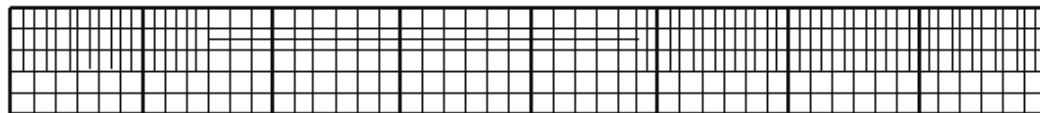
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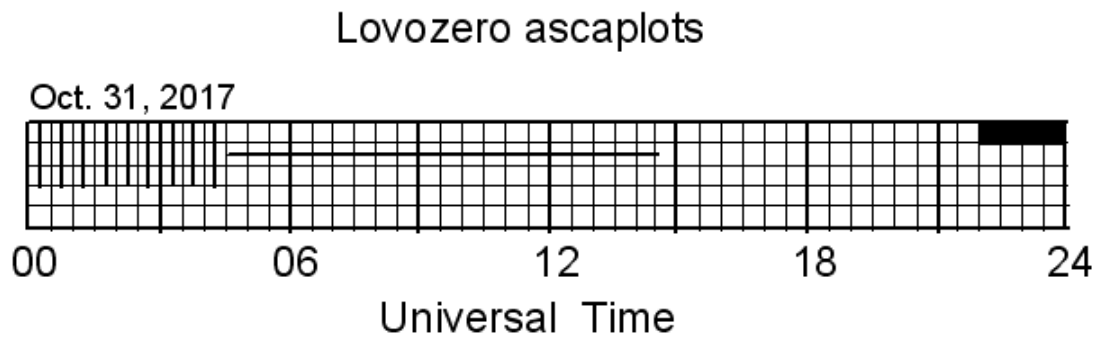
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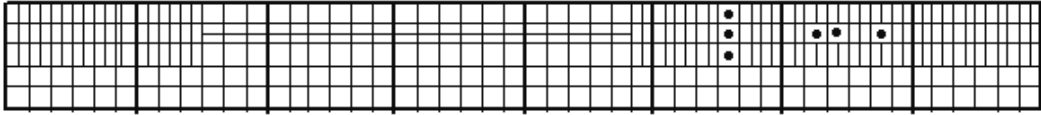


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Universal Time

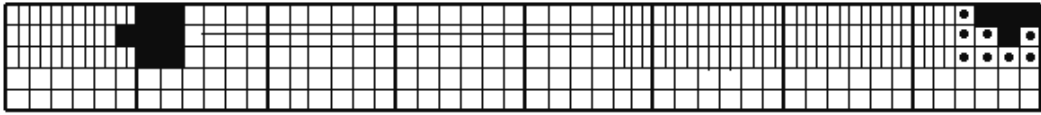


Lovozero ascaplots

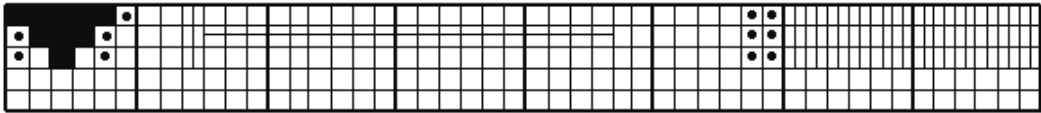
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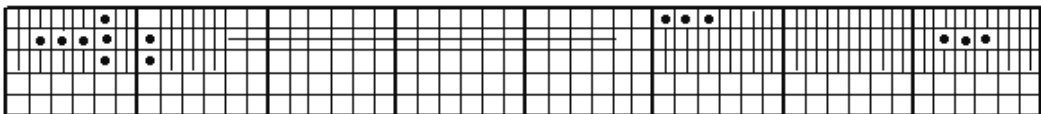
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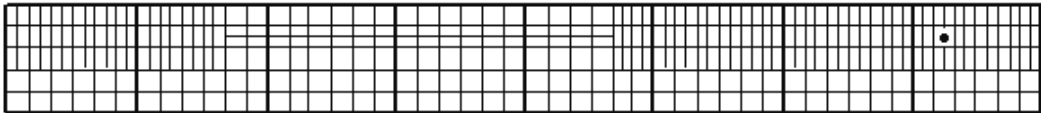
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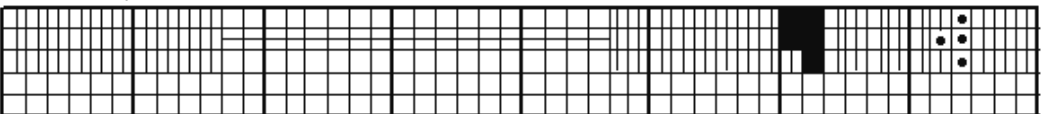
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Nov. 06, 2017



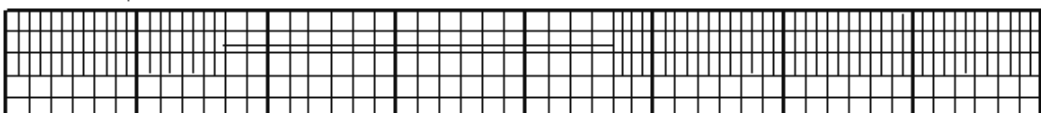
Nov. 07, 2017



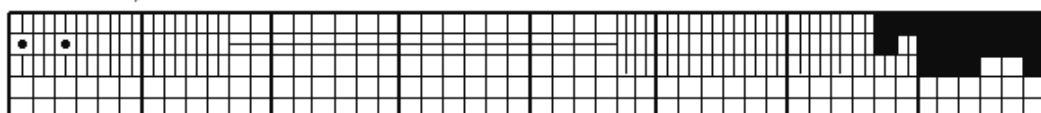
Nov. 08, 2017



Nov. 09, 2017



Nov. 10, 2017

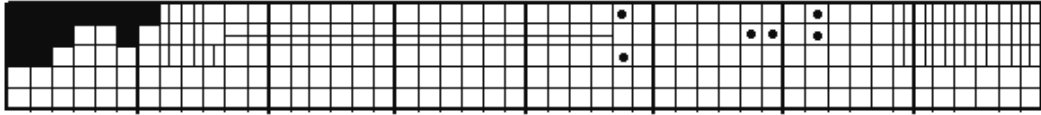


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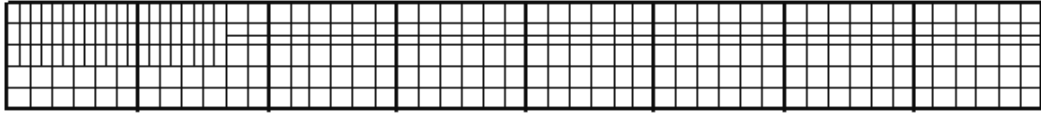
Universal Time

Lovozero ascaplots

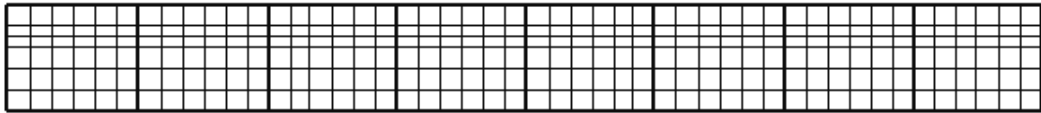
Nov. 11, 2017



Nov. 12, 2017



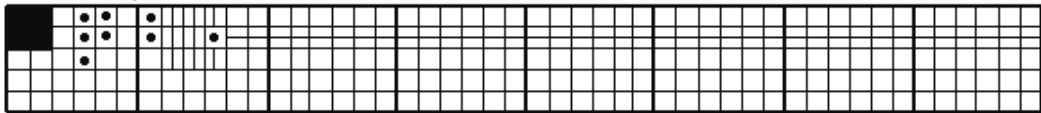
Nov. 13, 2017



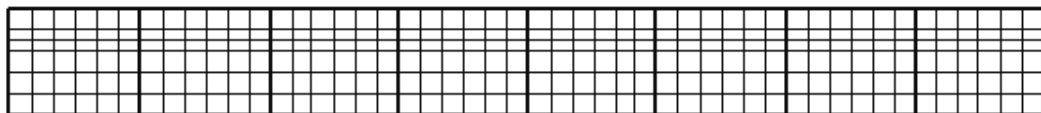
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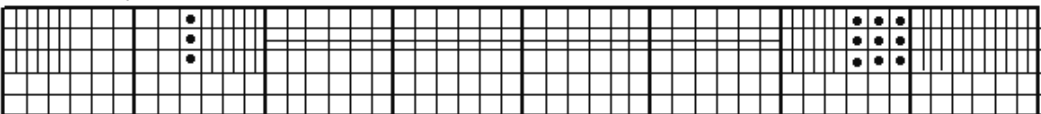
Nov. 15, 2017



Nov. 16, 2017



Nov. 17, 2017



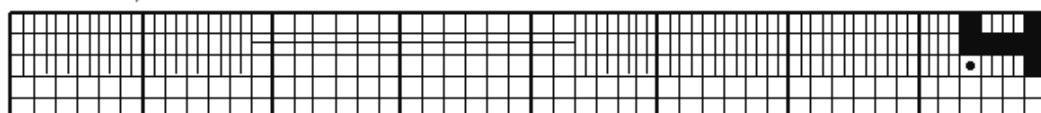
Nov. 18, 2017



Nov. 19, 2017



Nov. 20, 2017

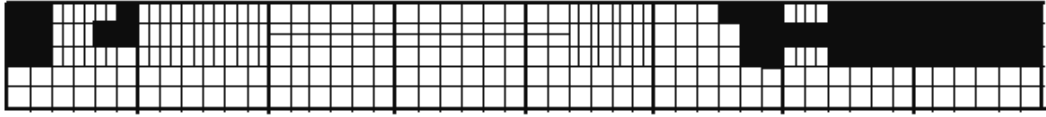


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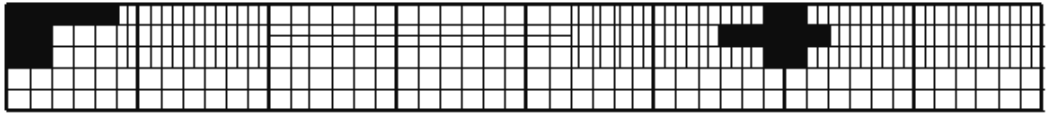
Universal Time

Lovozero ascaplots

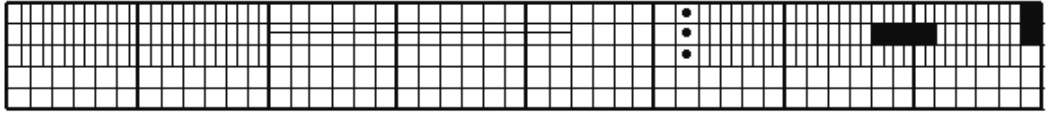
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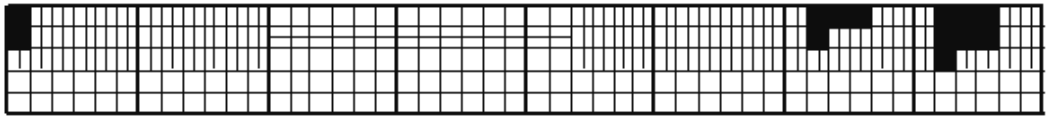
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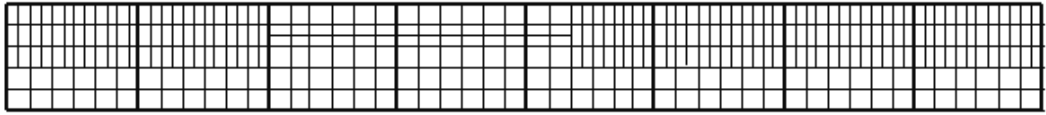
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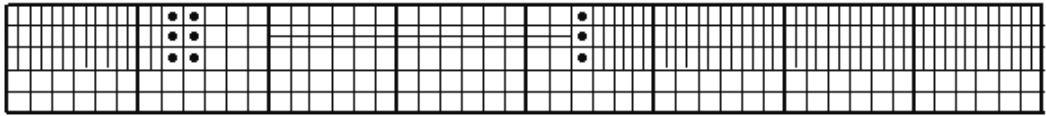
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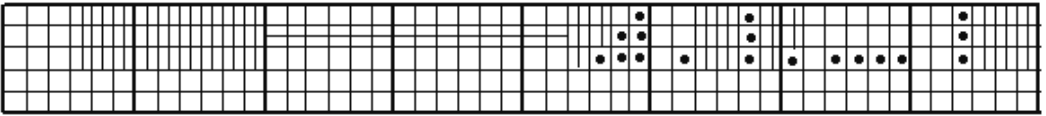
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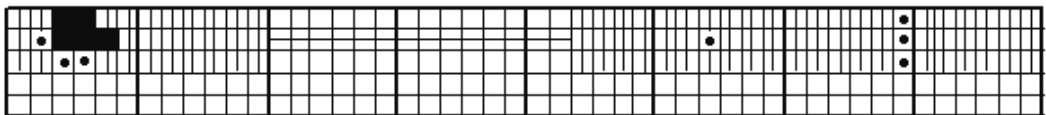
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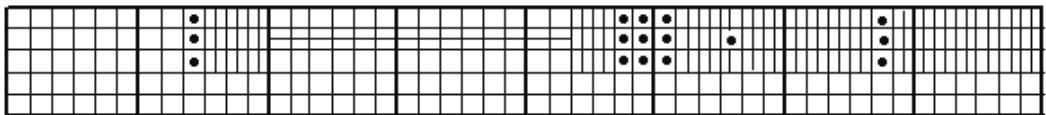
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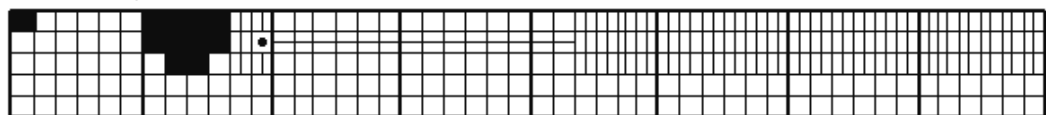
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Nov. 29, 2017



Nov. 30, 2017

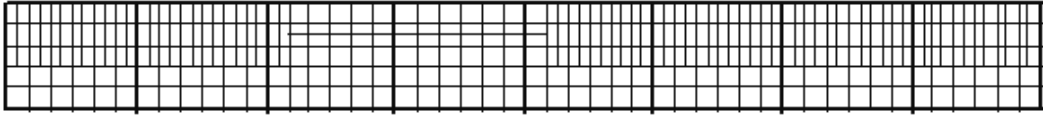


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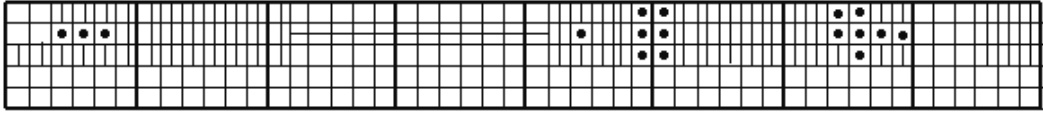
Universal Time

Lovozero ascaplots

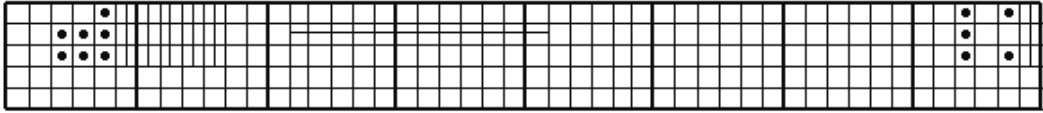
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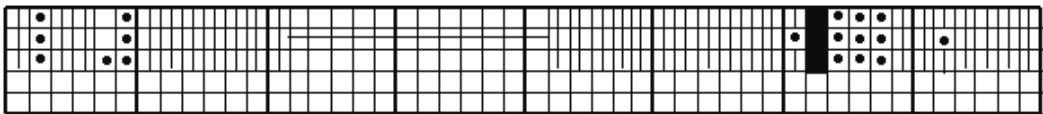
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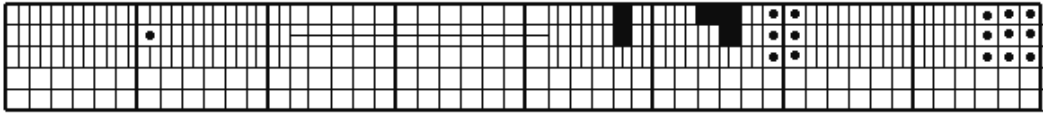
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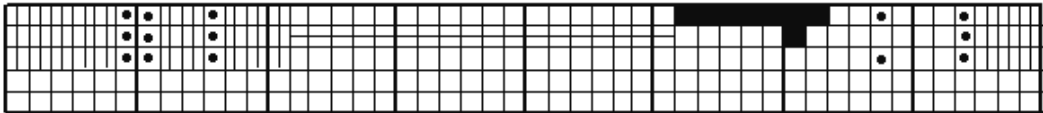
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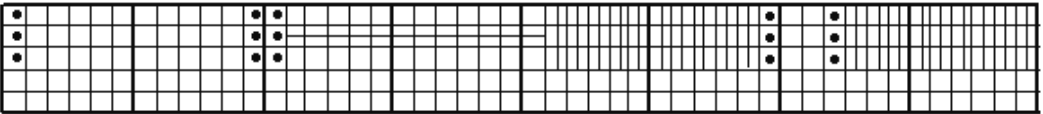
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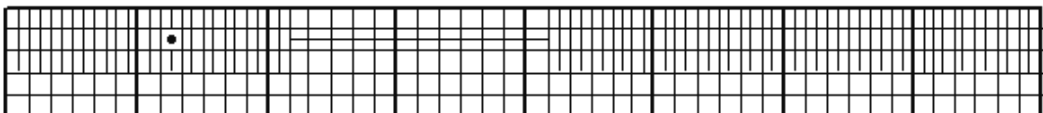
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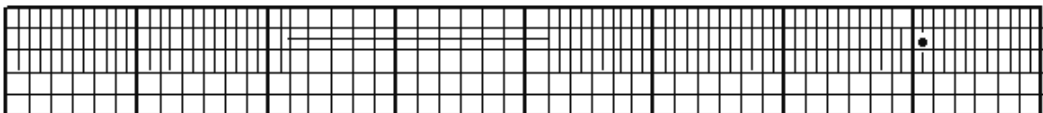
Dec. 07, 2017



Dec. 08, 2017



Dec. 09, 2017



Dec. 10, 2017



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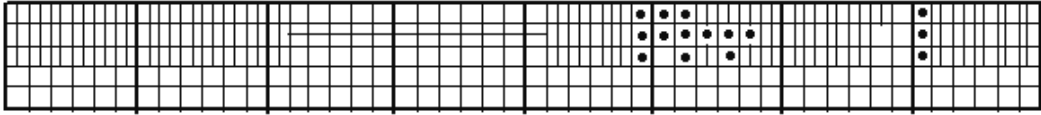
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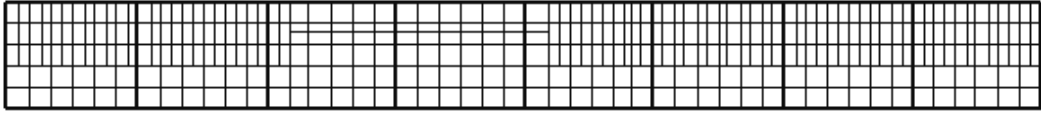
Universal Time

Lovozero ascaplots

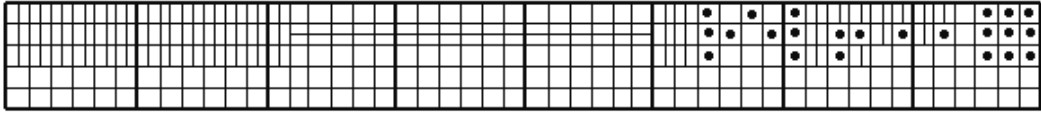
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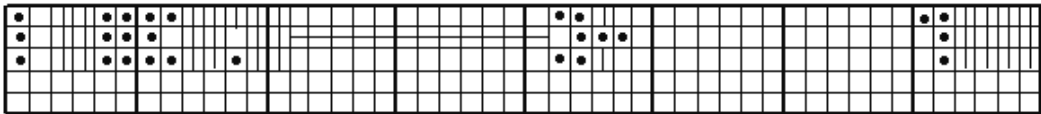
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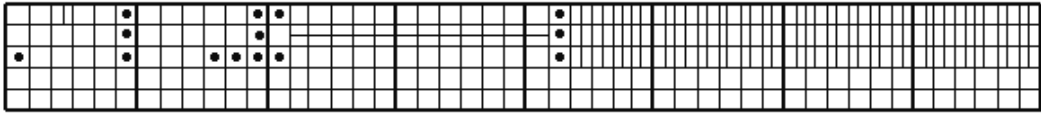
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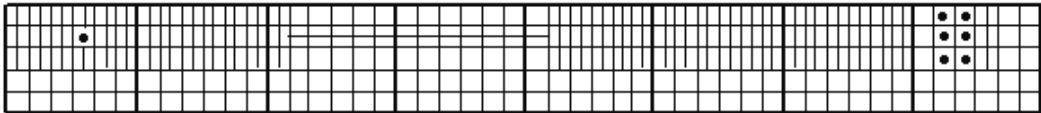
Dec. 14, 2017



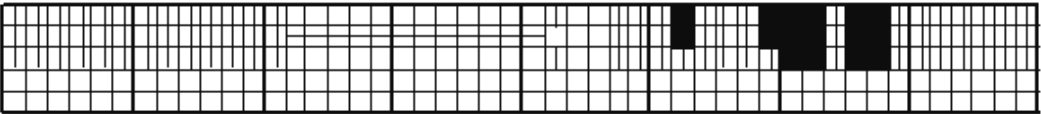
Dec. 15, 2017



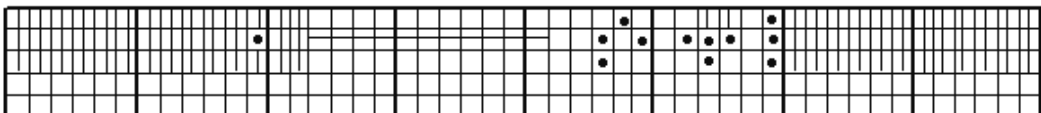
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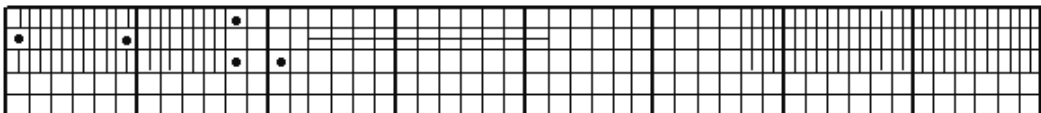
Dec. 17, 2017



Dec. 18, 2017



Dec. 19, 2017



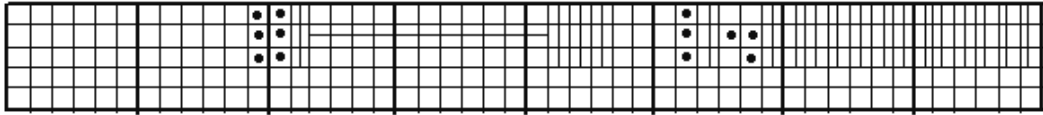
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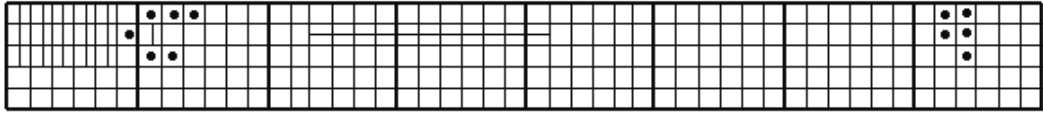
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Universal Time

Lovozero ascaplots

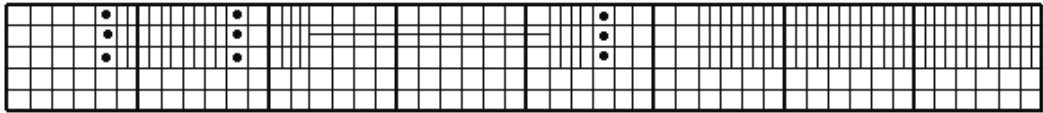
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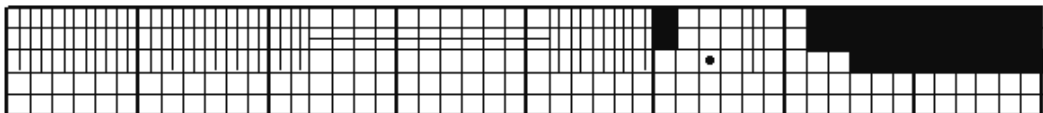
Dec. 22, 2017



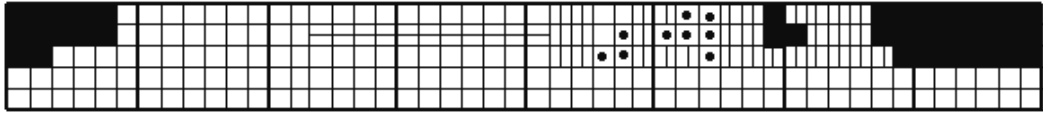
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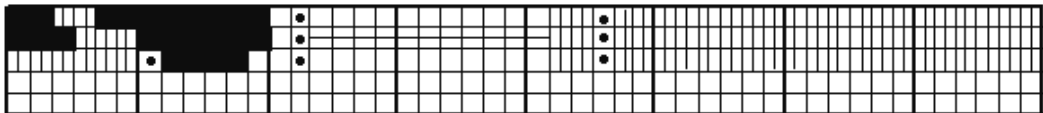
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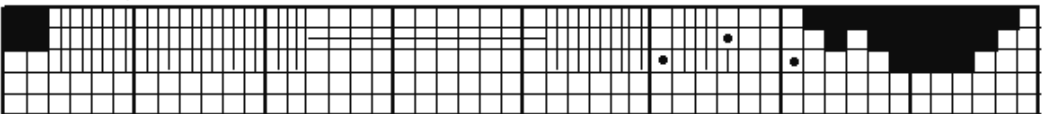
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Dec. 26, 2017



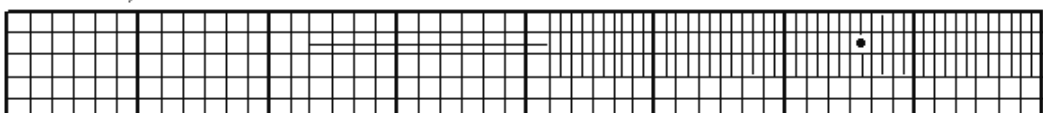
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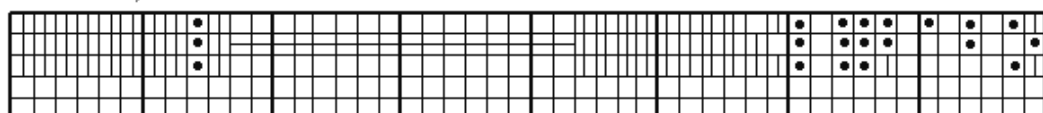
Dec. 28, 2017



Dec. 29, 2017



Dec. 30, 2017



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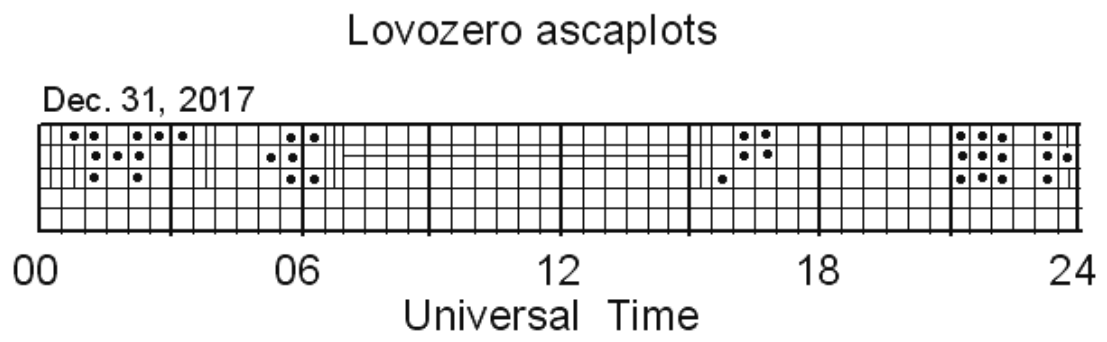
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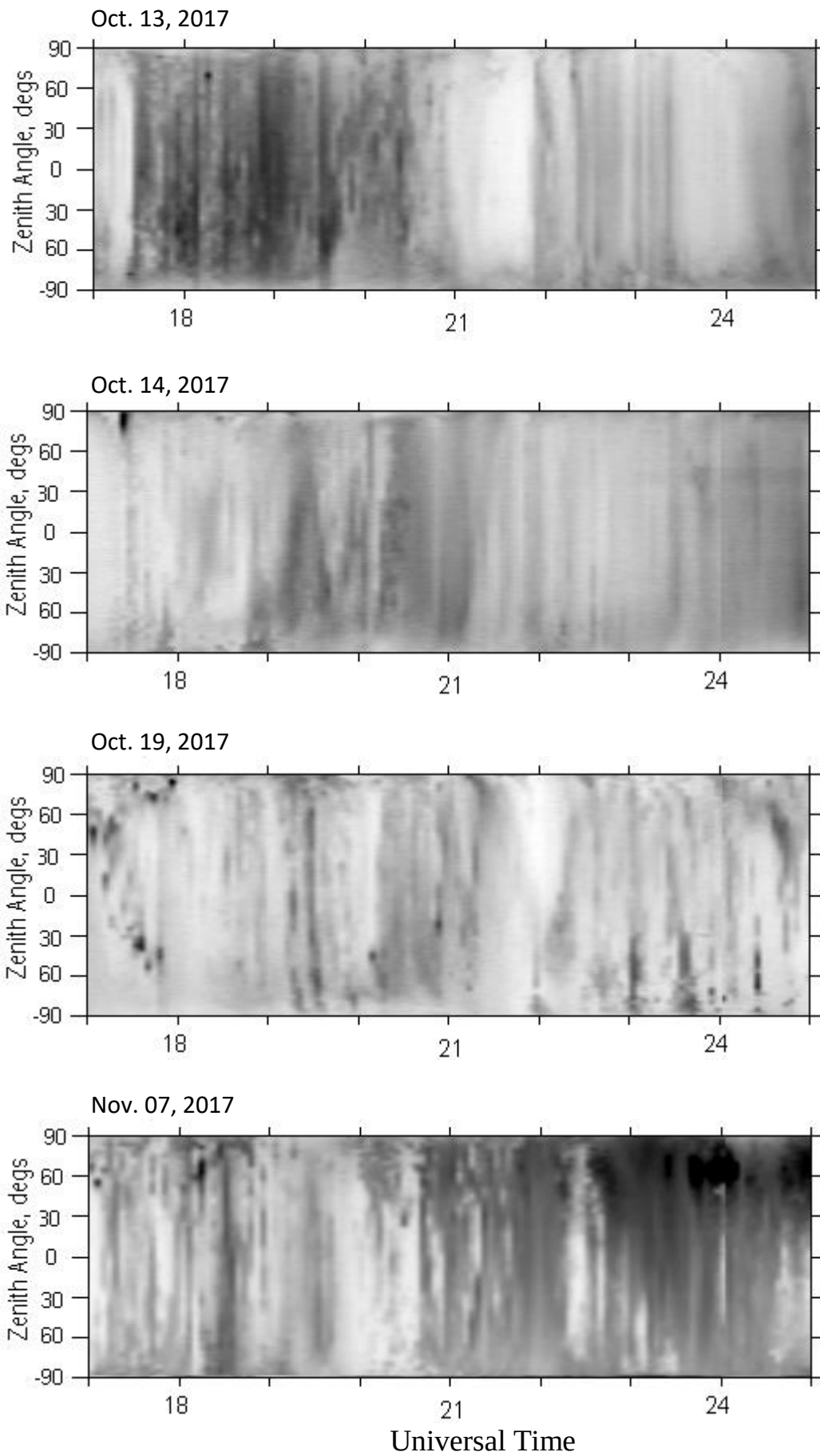
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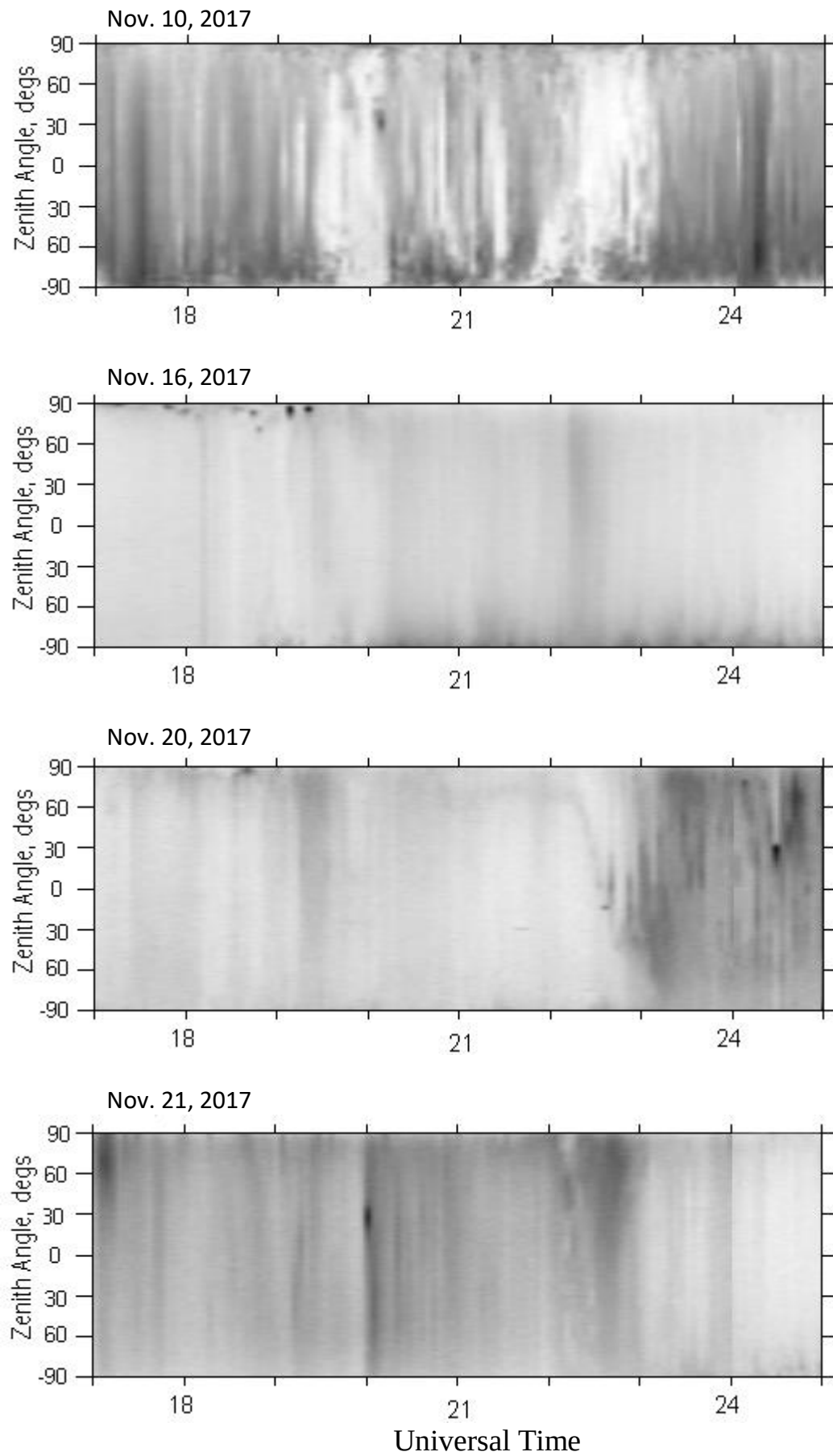
Universal Time



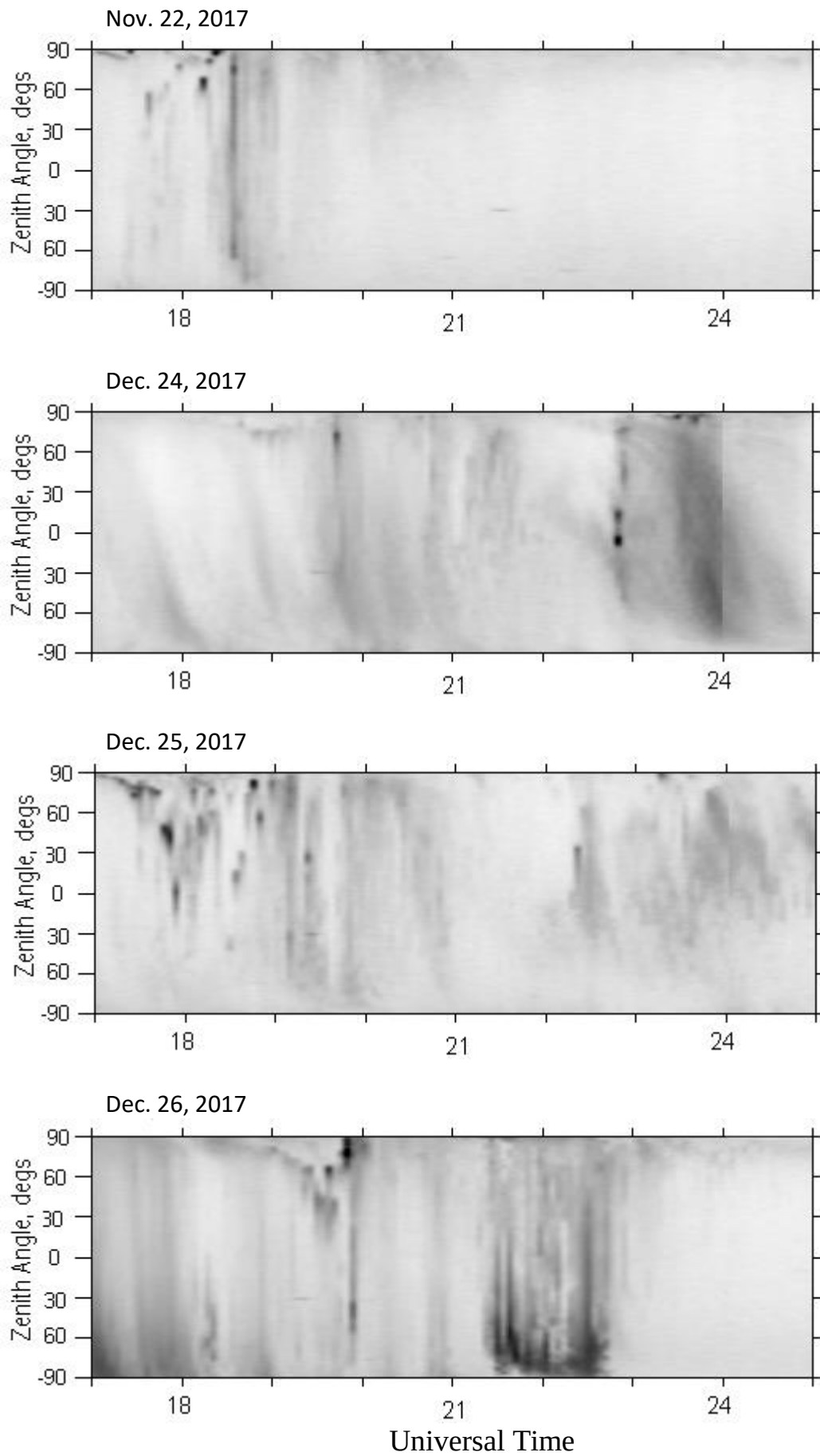
Apatity TV keograms



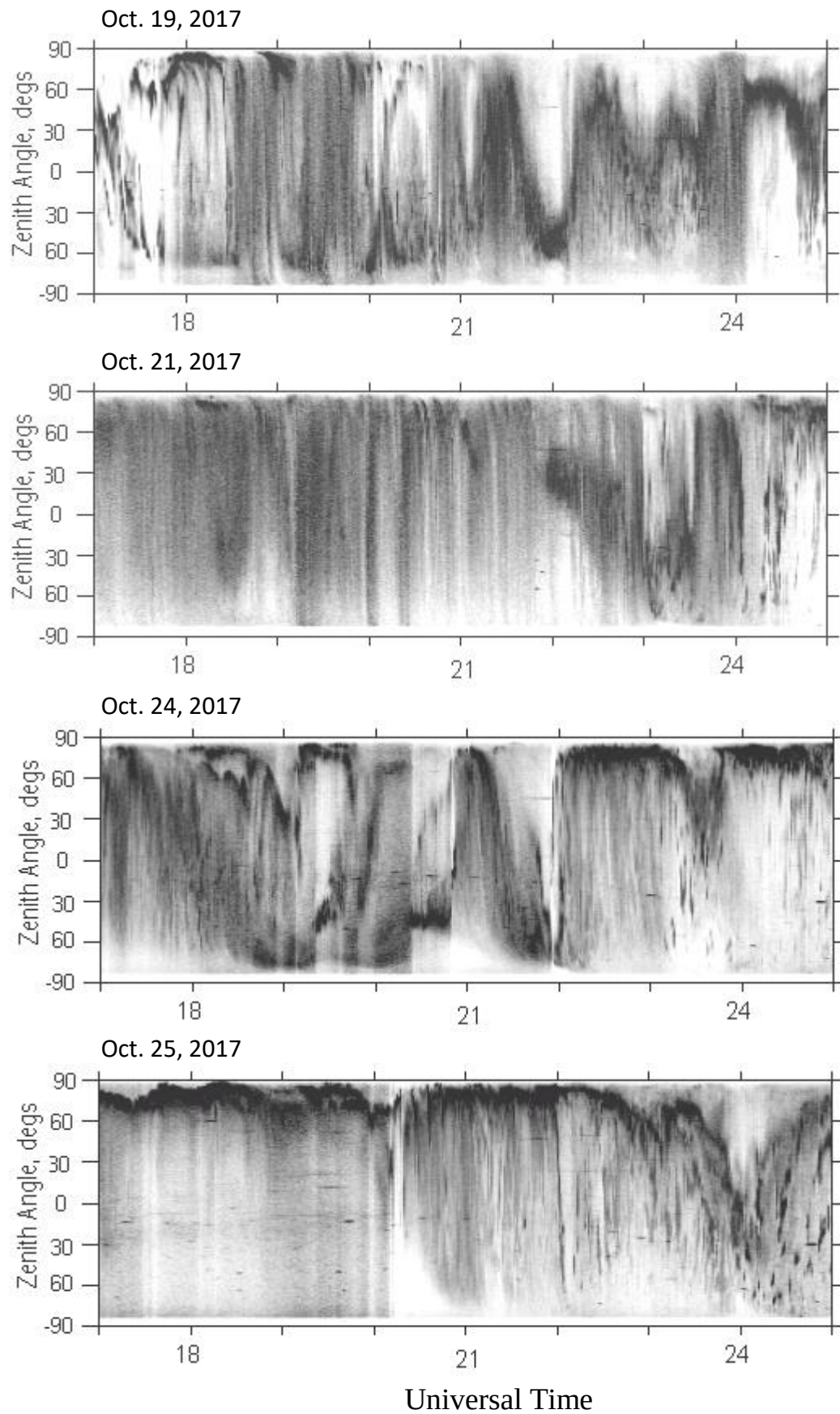
Apatity TV keograms



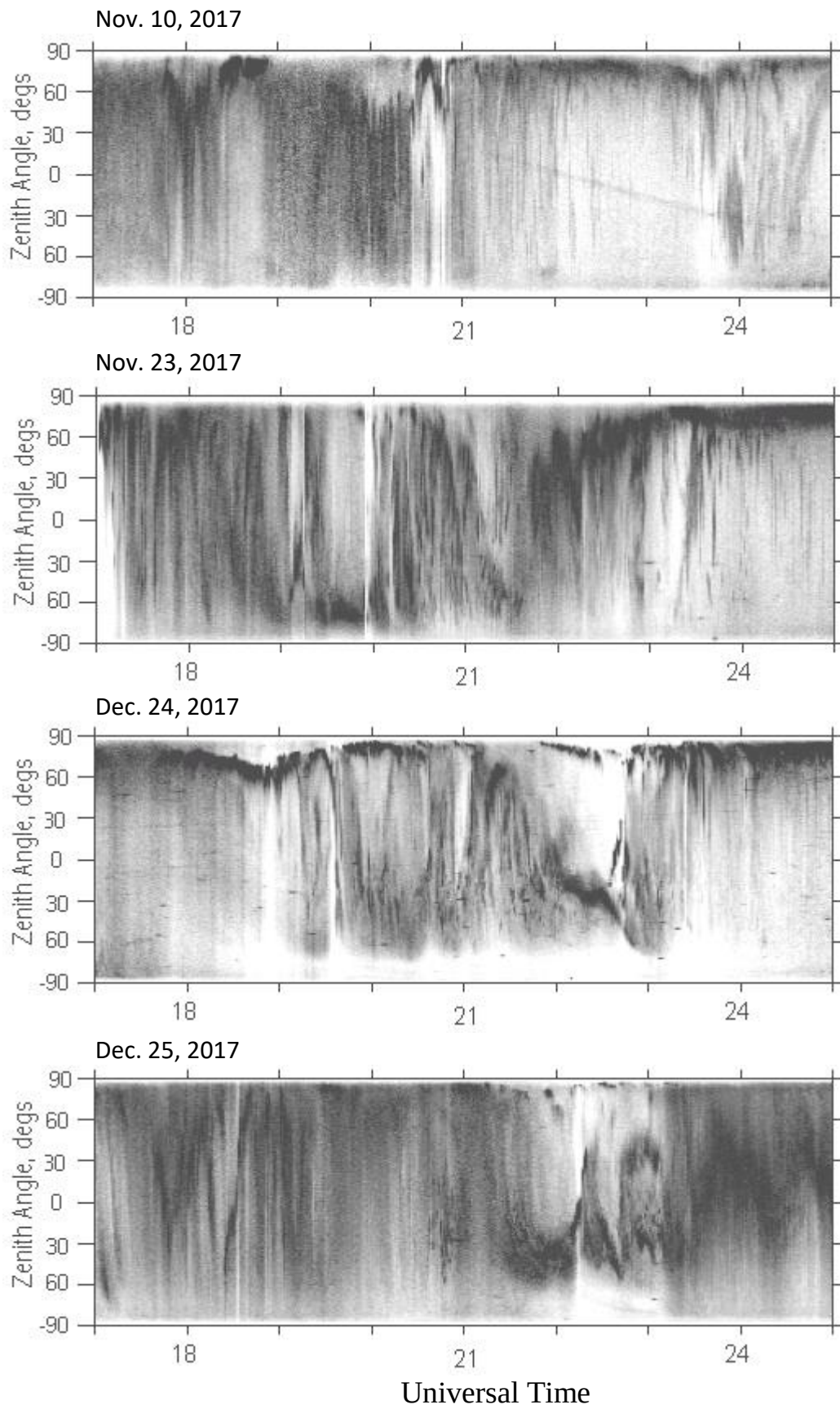
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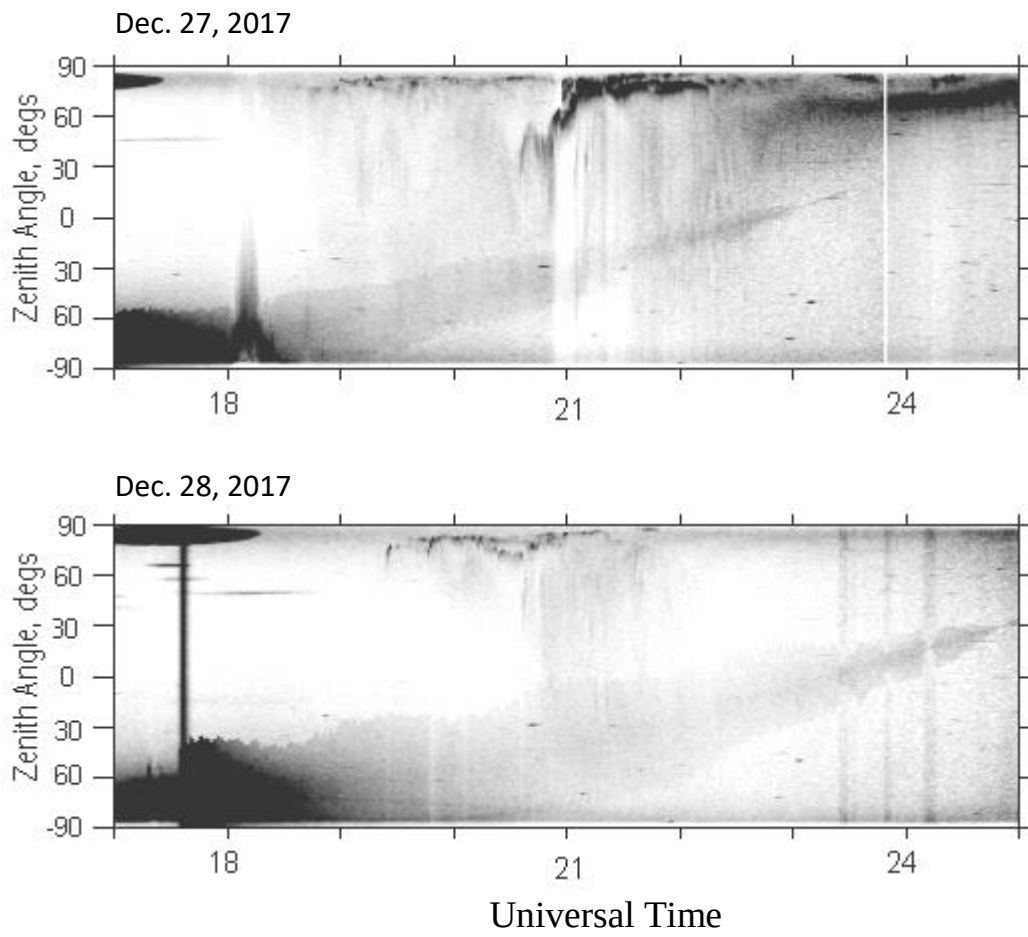
Lovozero TV keograms



Lovozero TV keograms



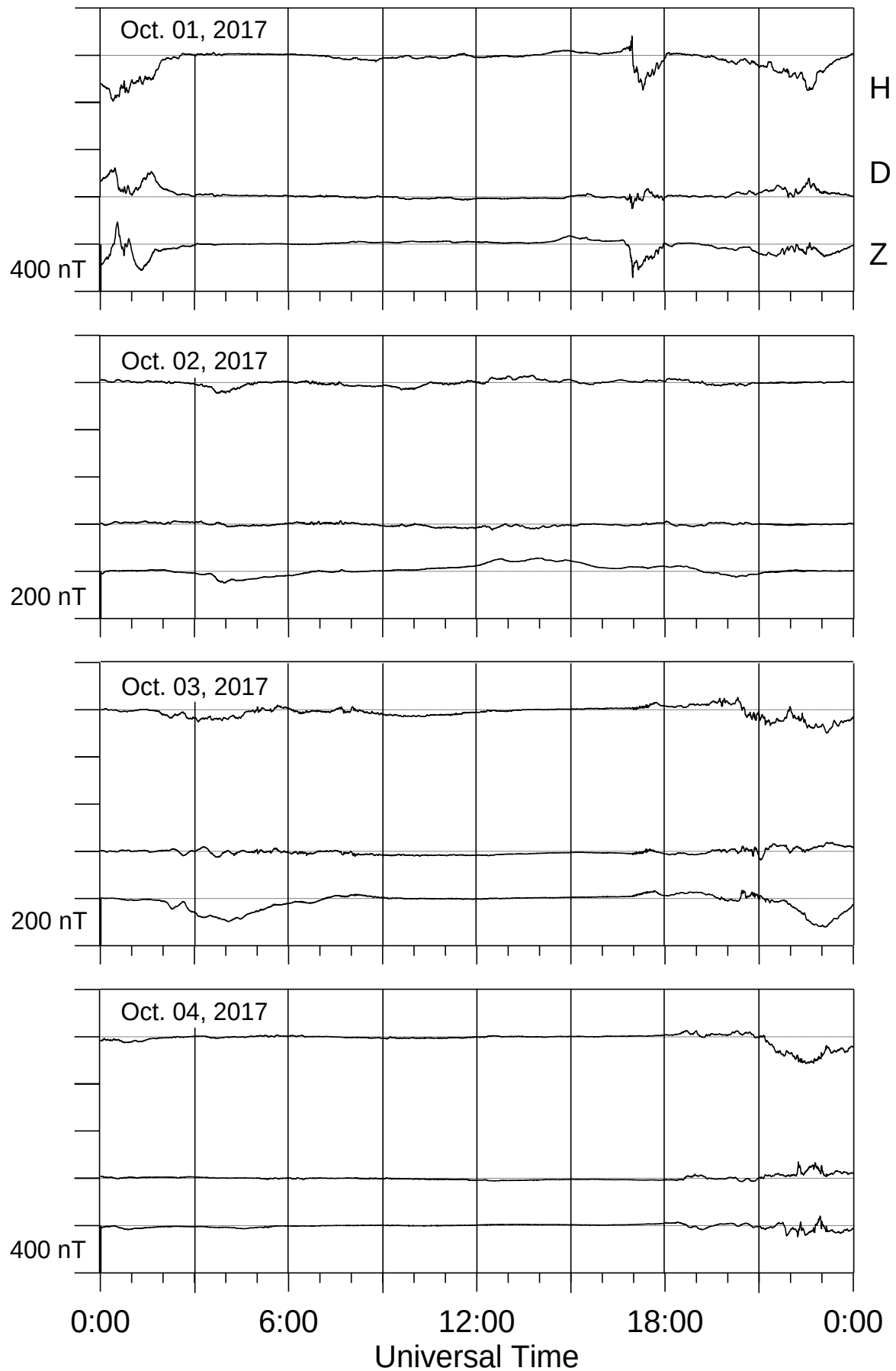
Lovozero TV keograms



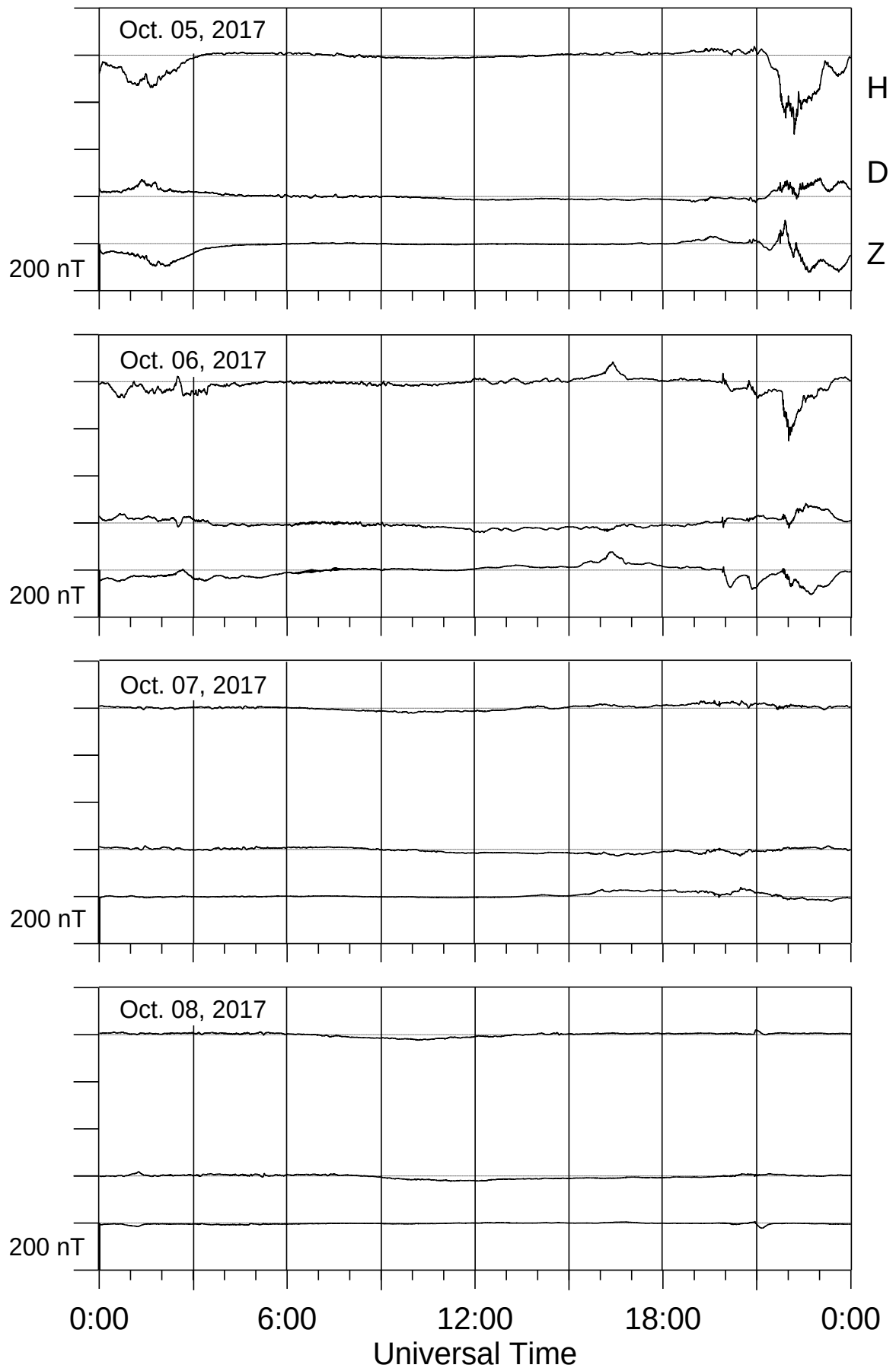
LOVOZERO MAGNETOGRAMS

October - December 2017

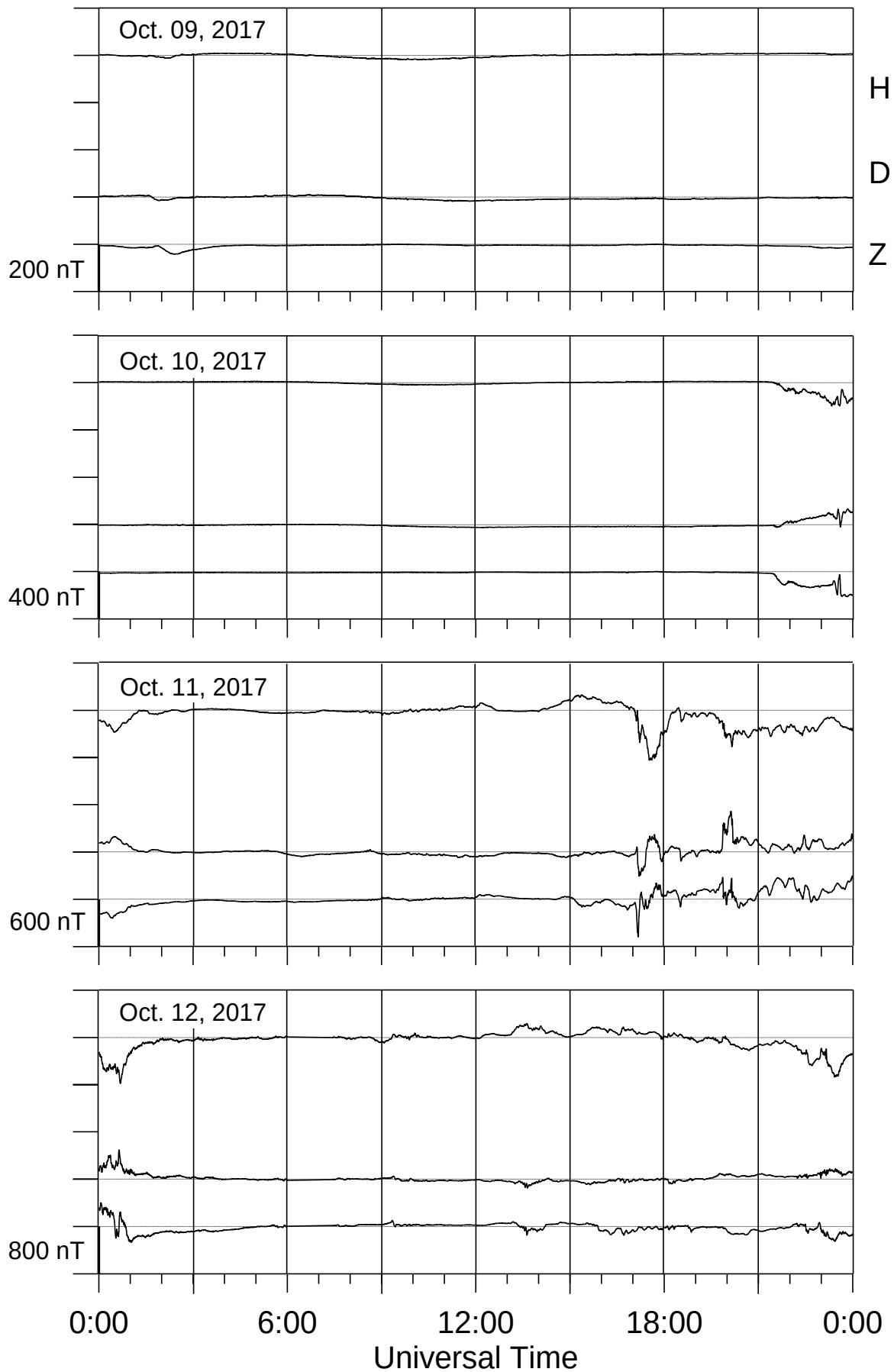
Lovozero magnetometer



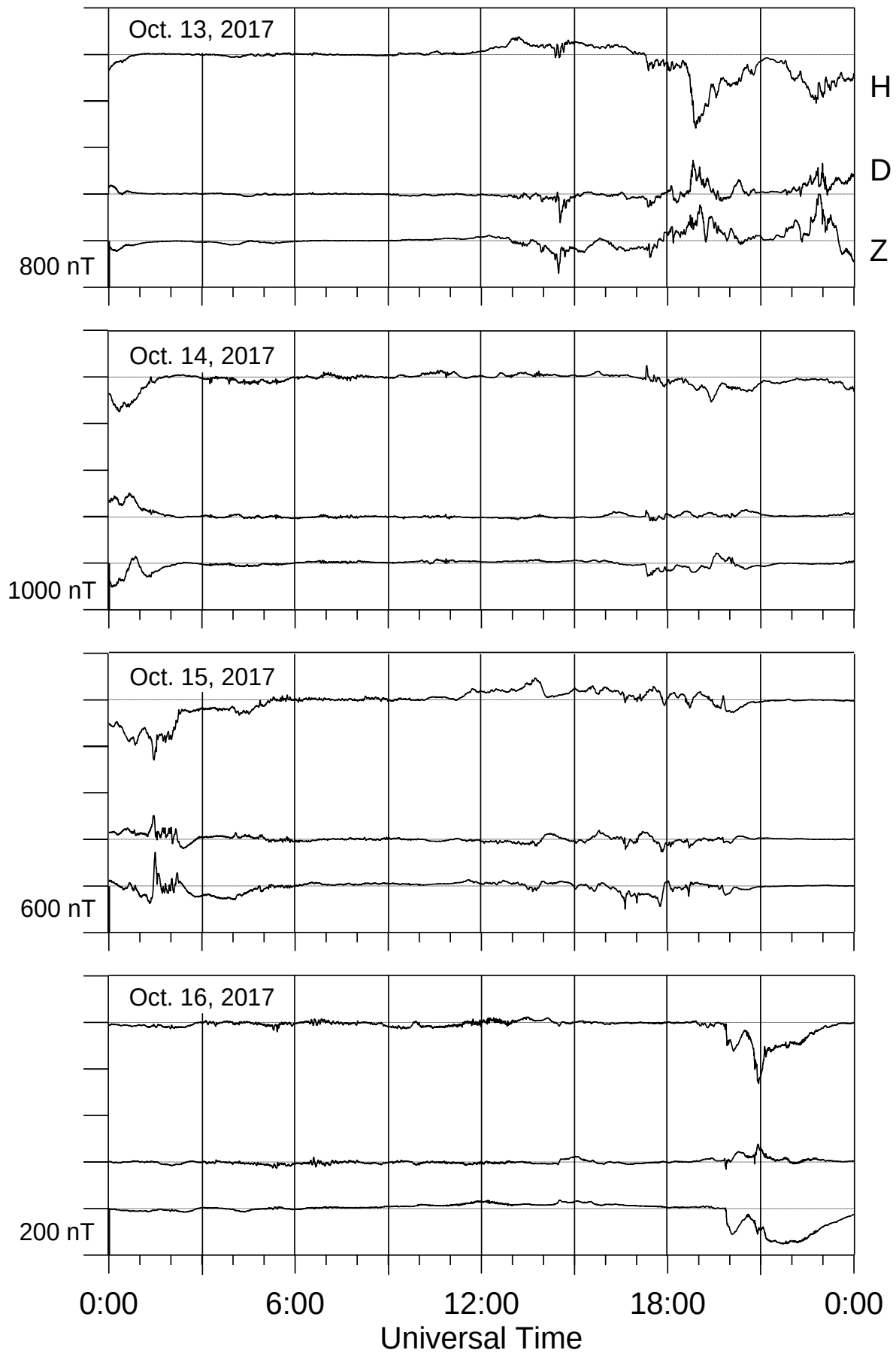
Lovozero magnetometer



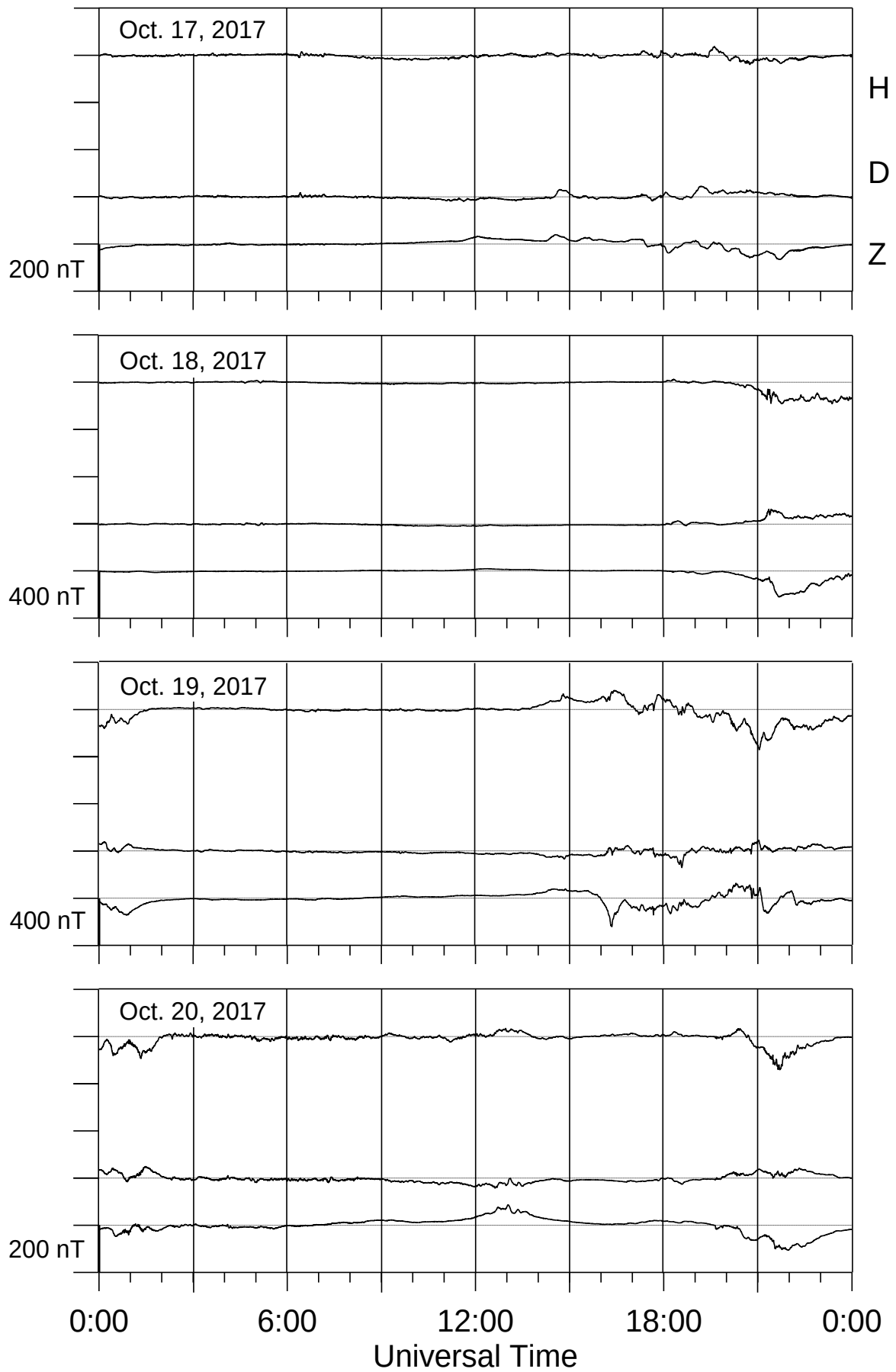
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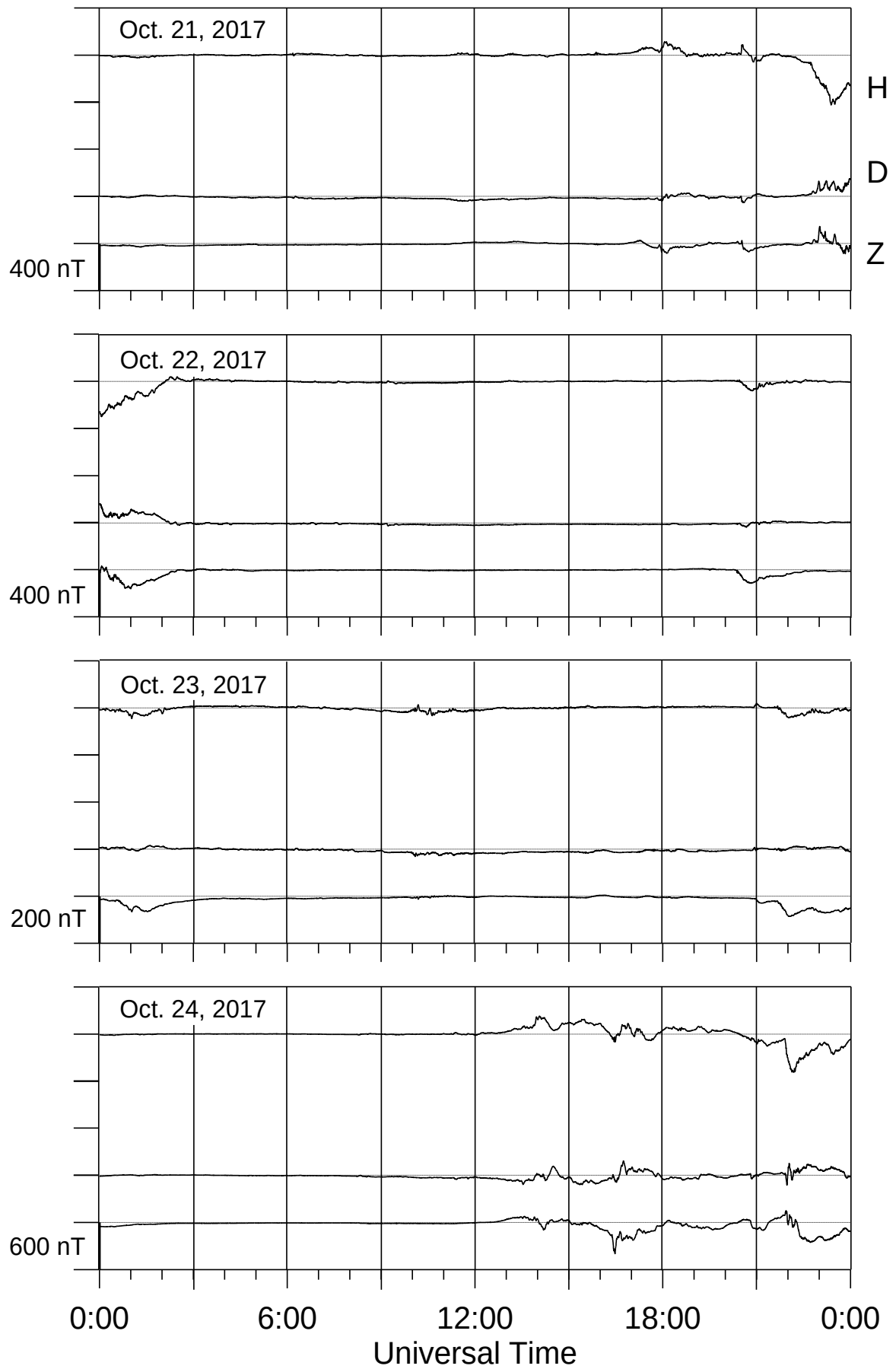
Lovozero magnetometer



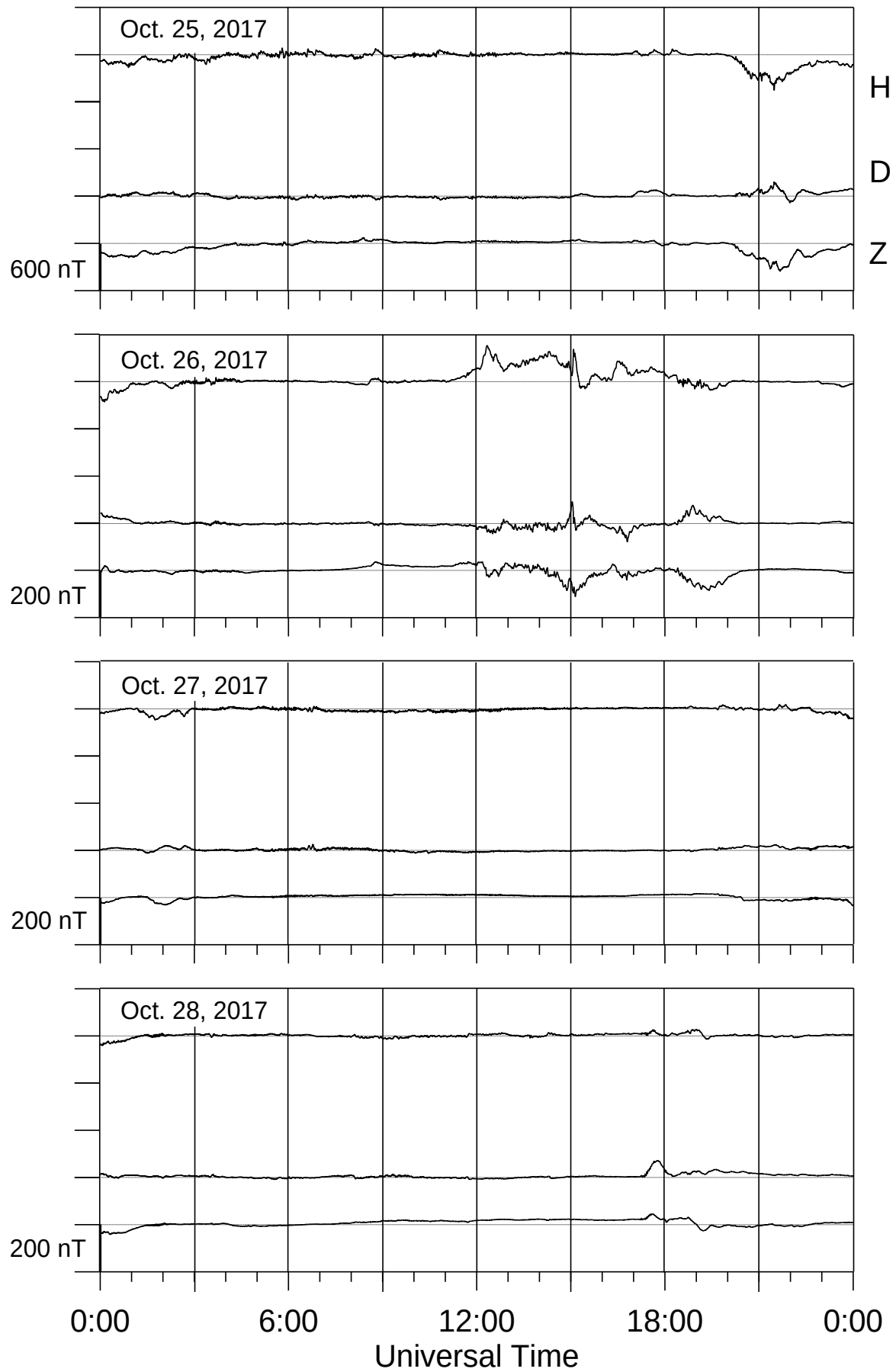
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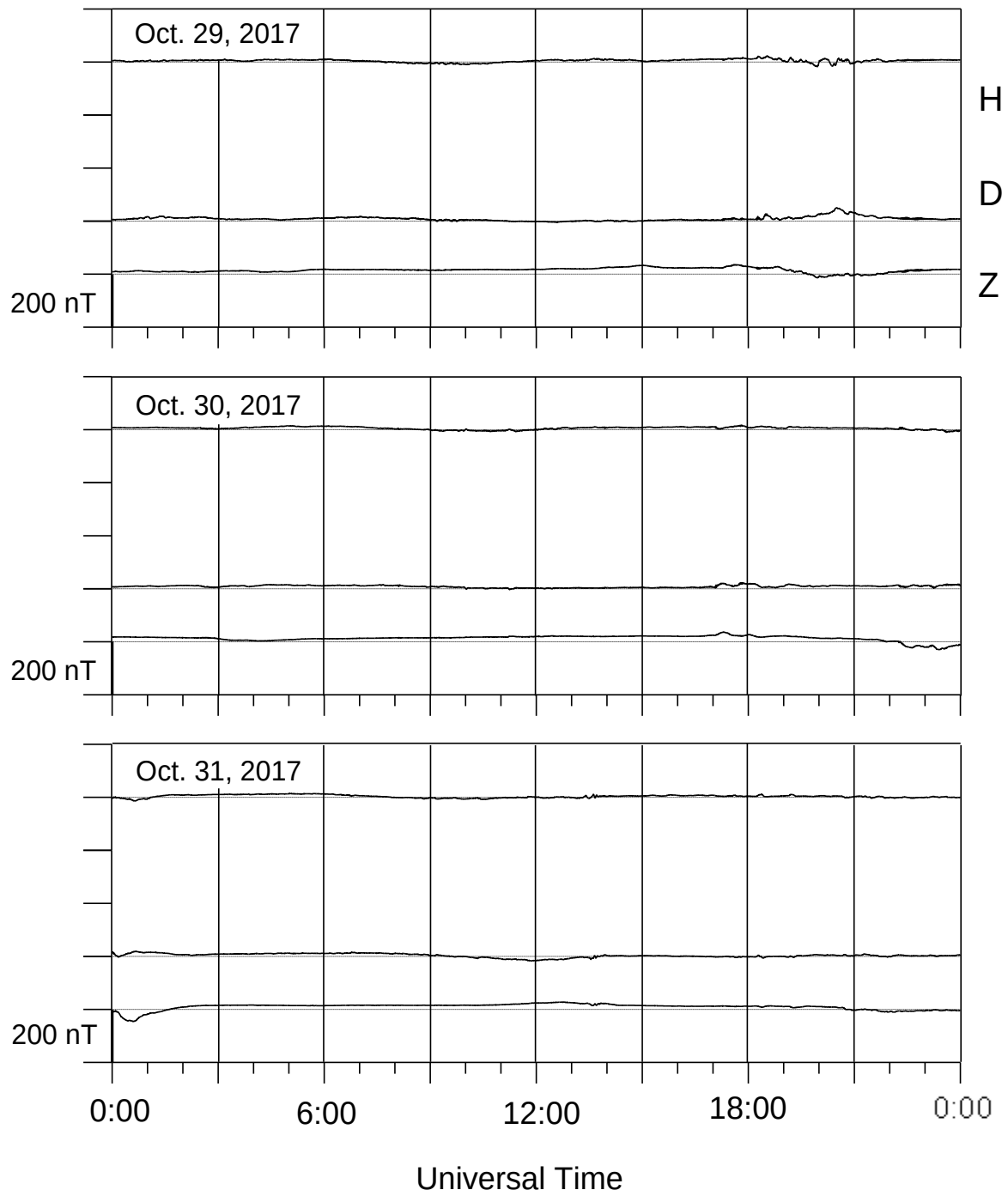
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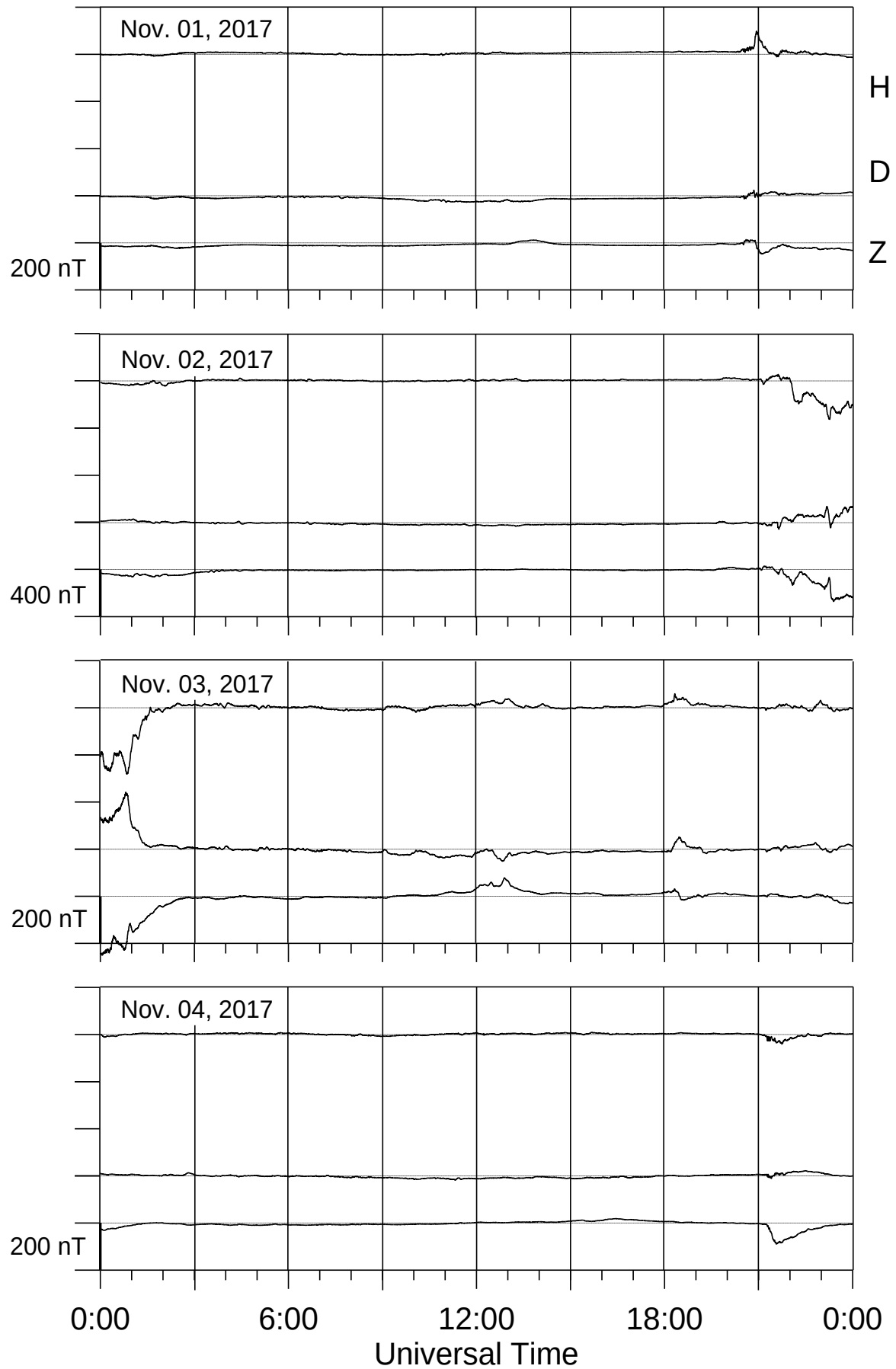
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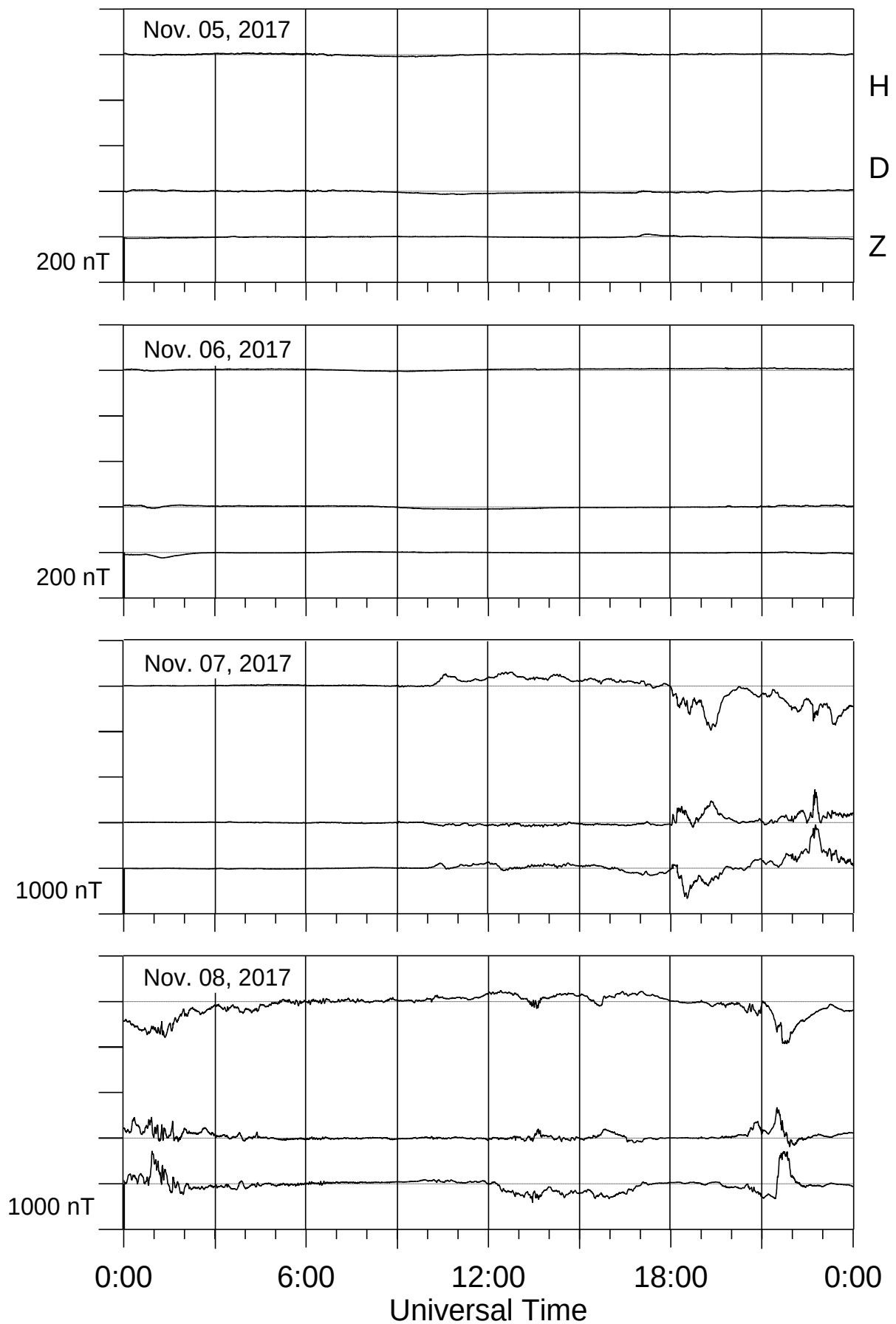
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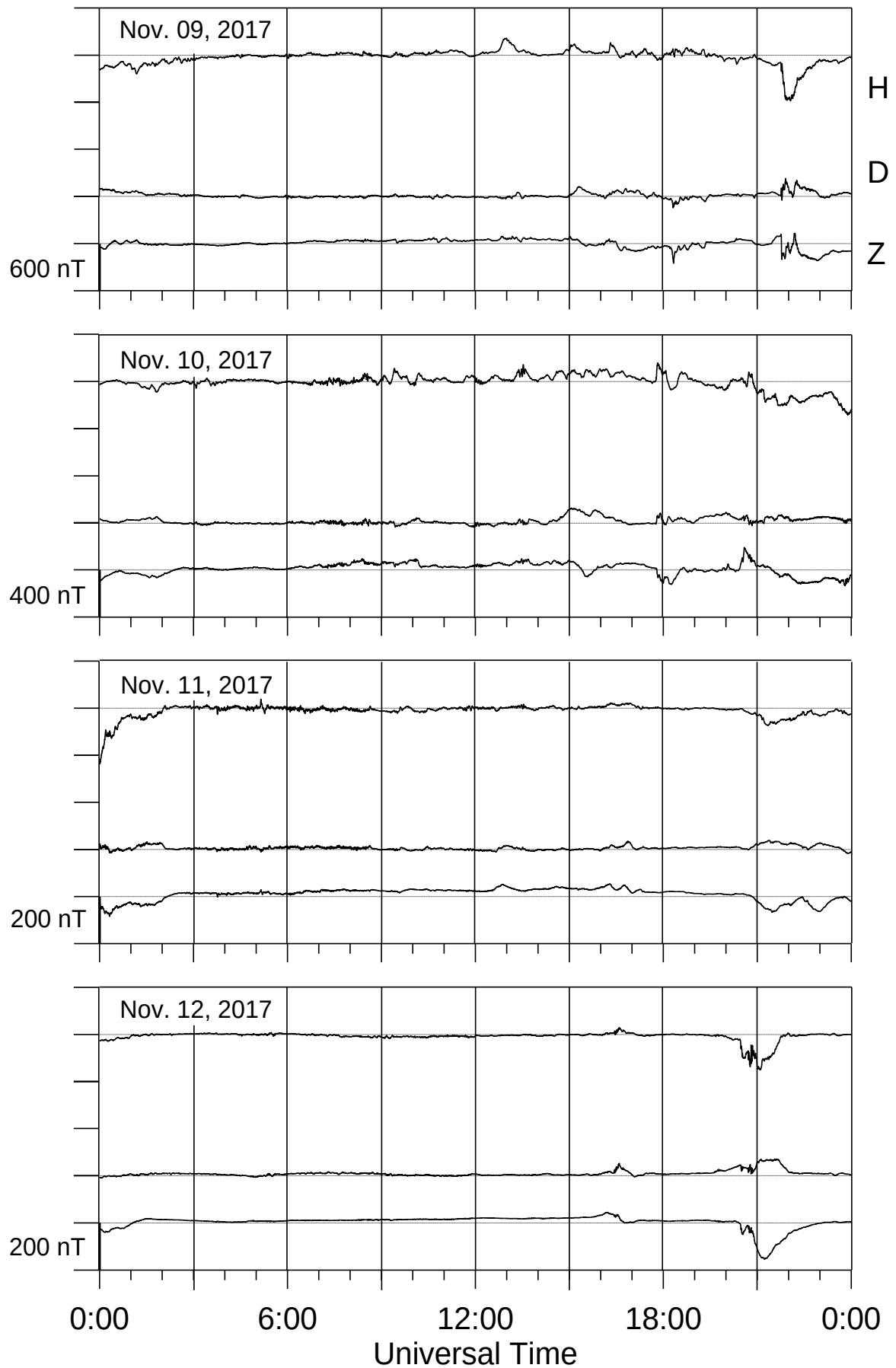
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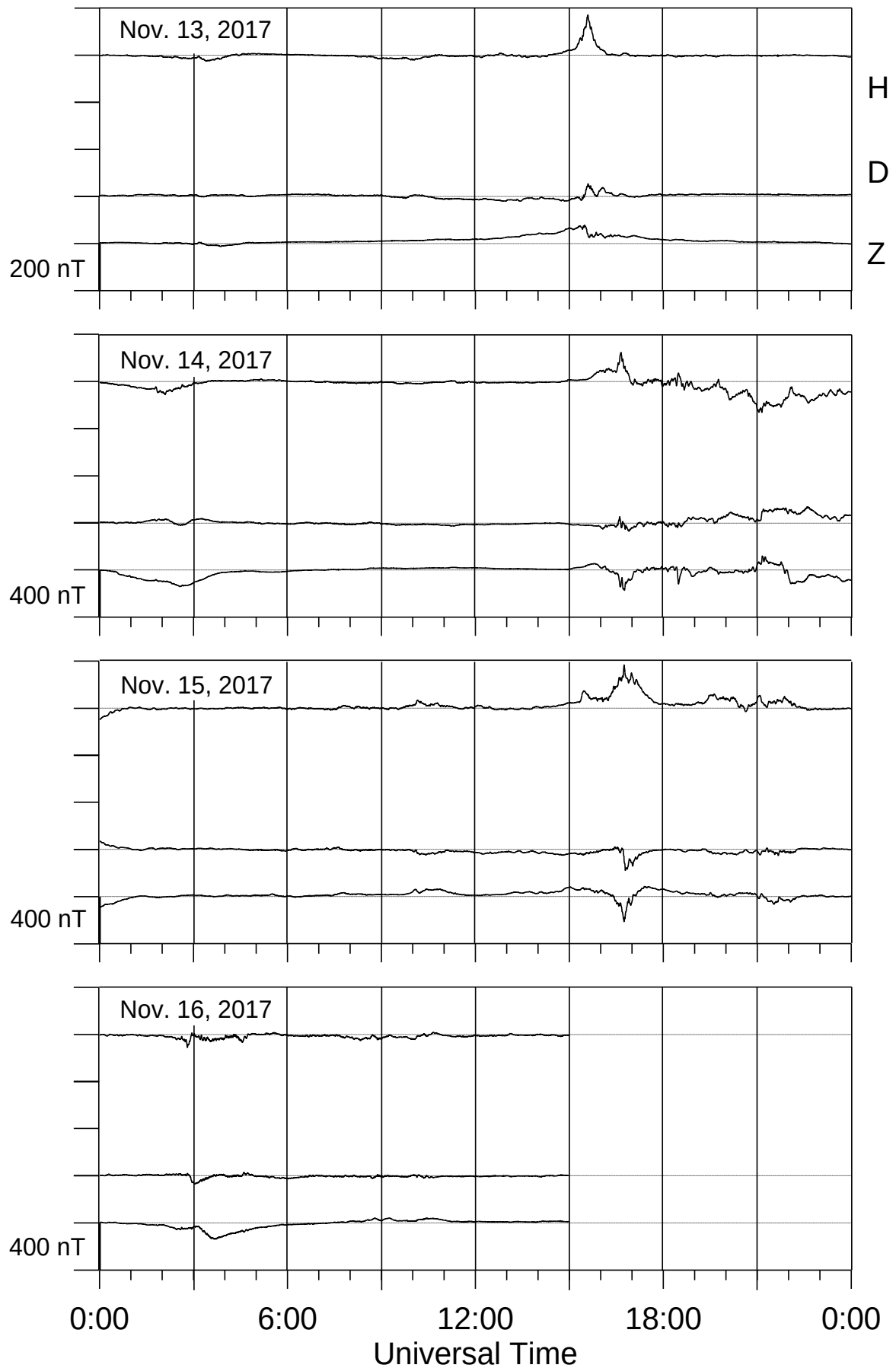
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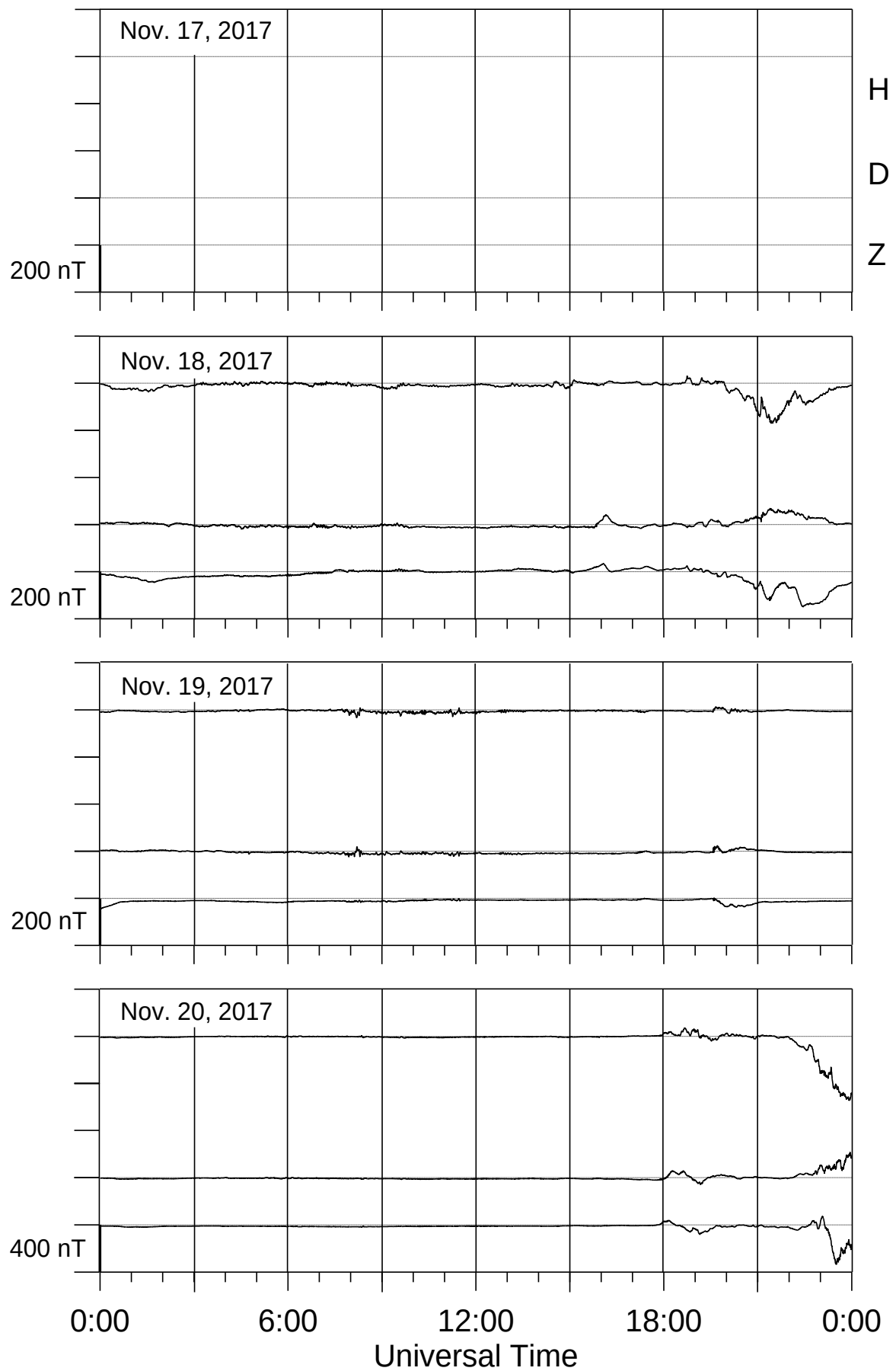
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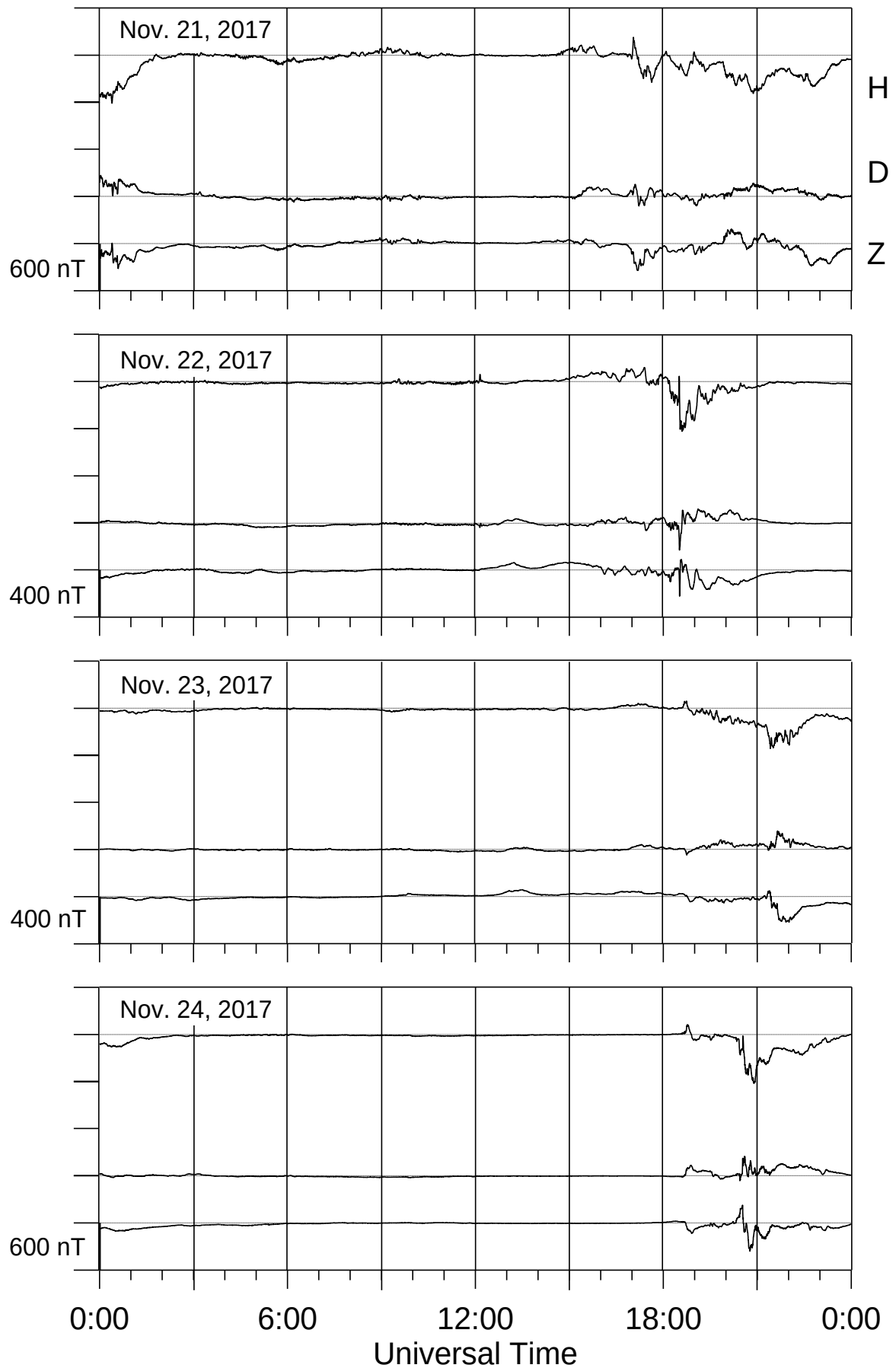
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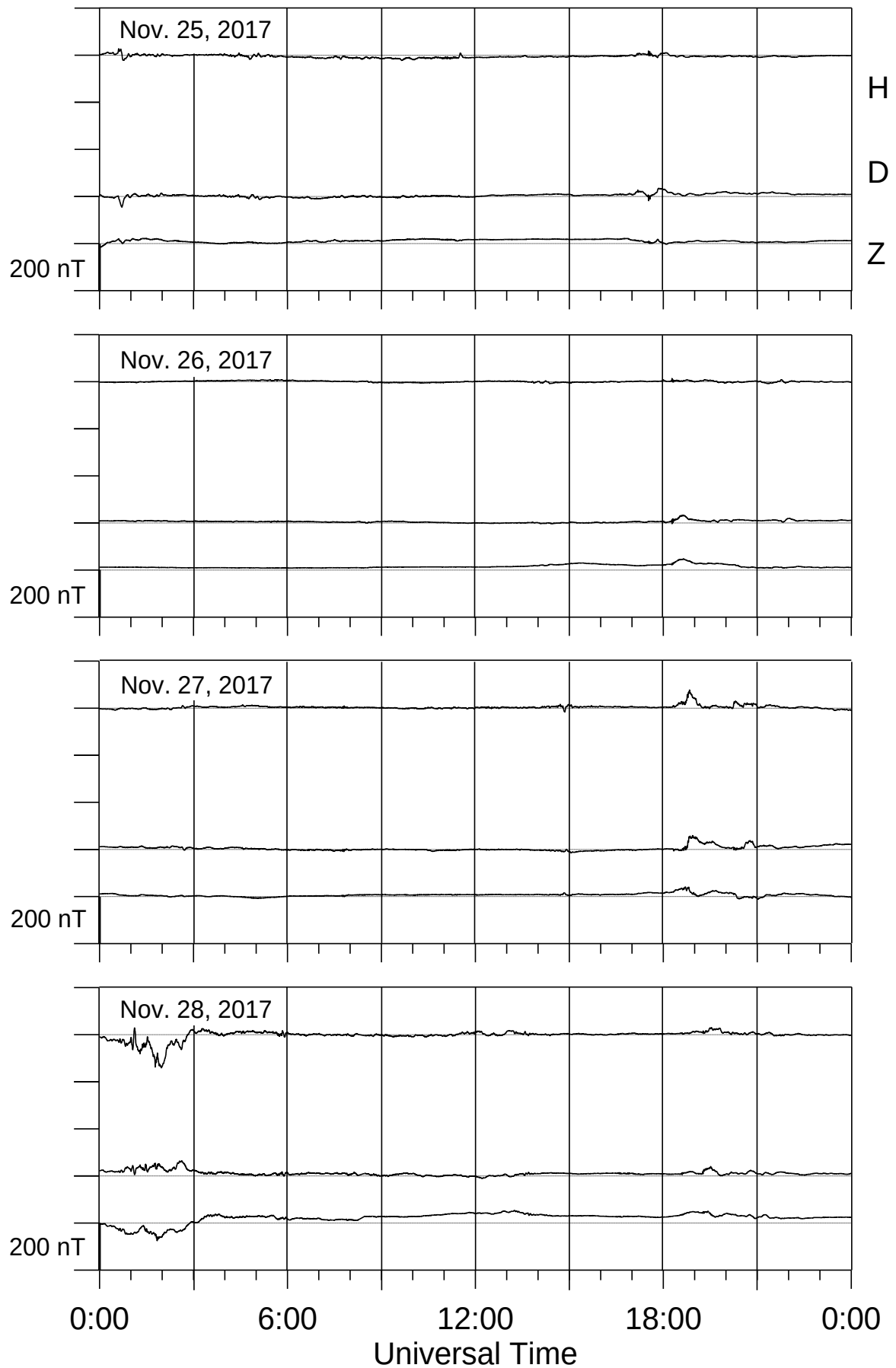
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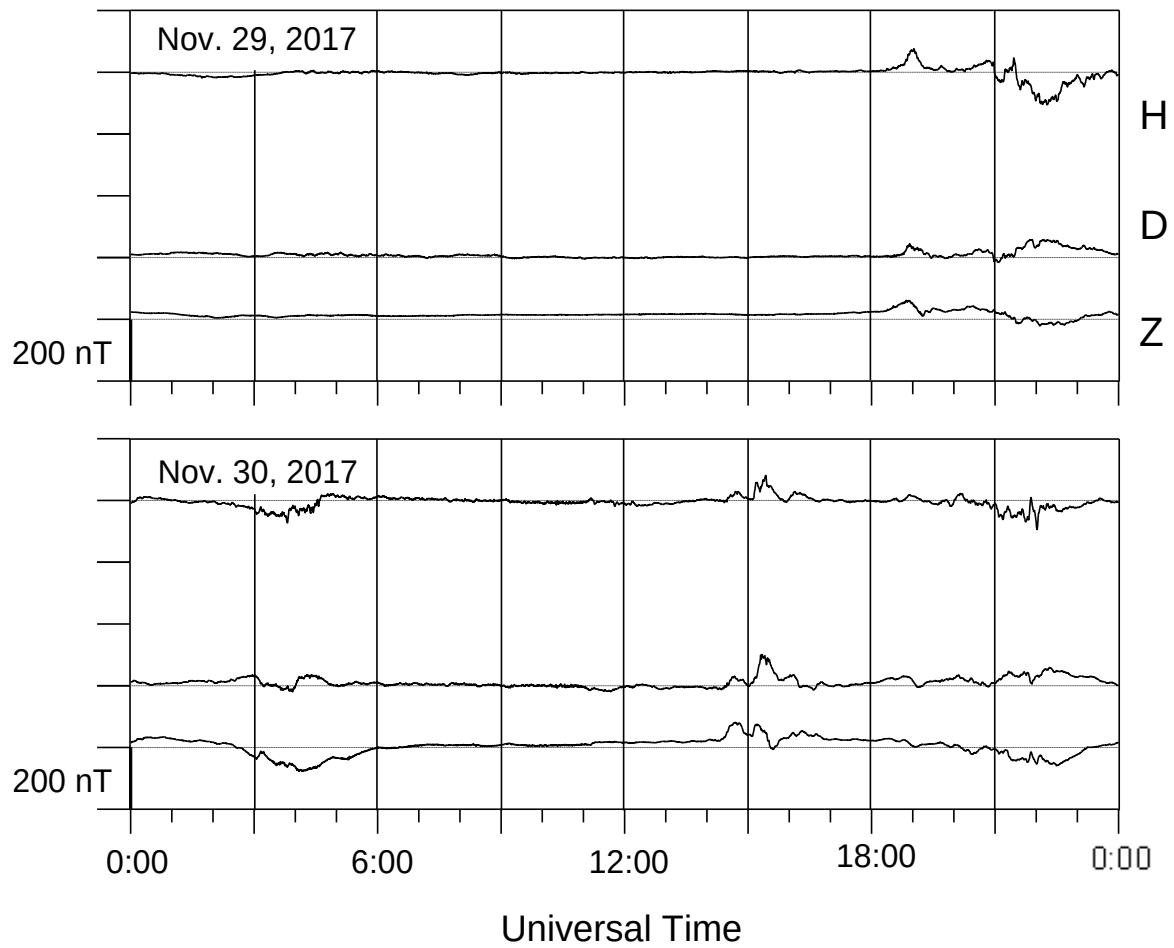
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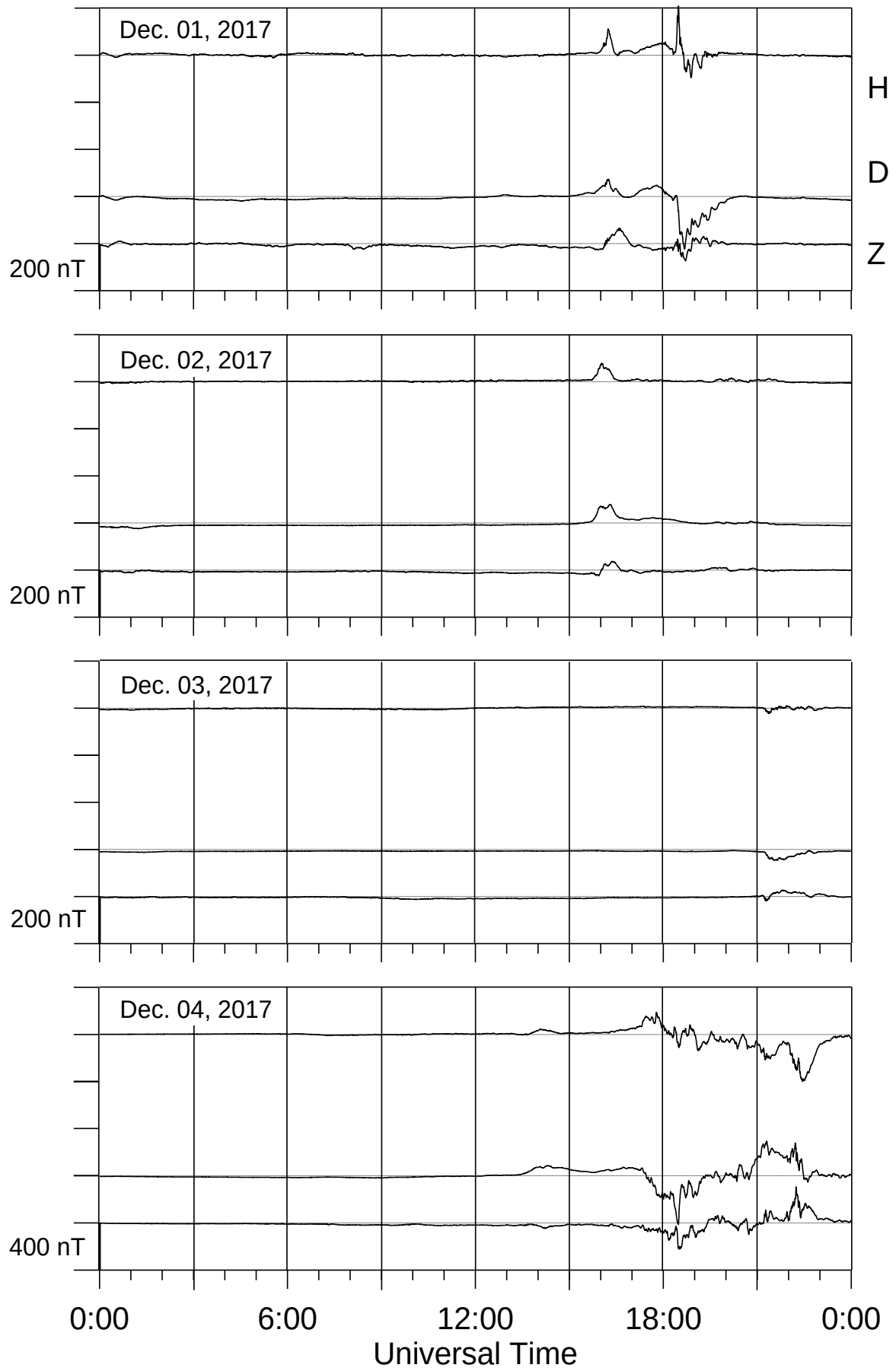
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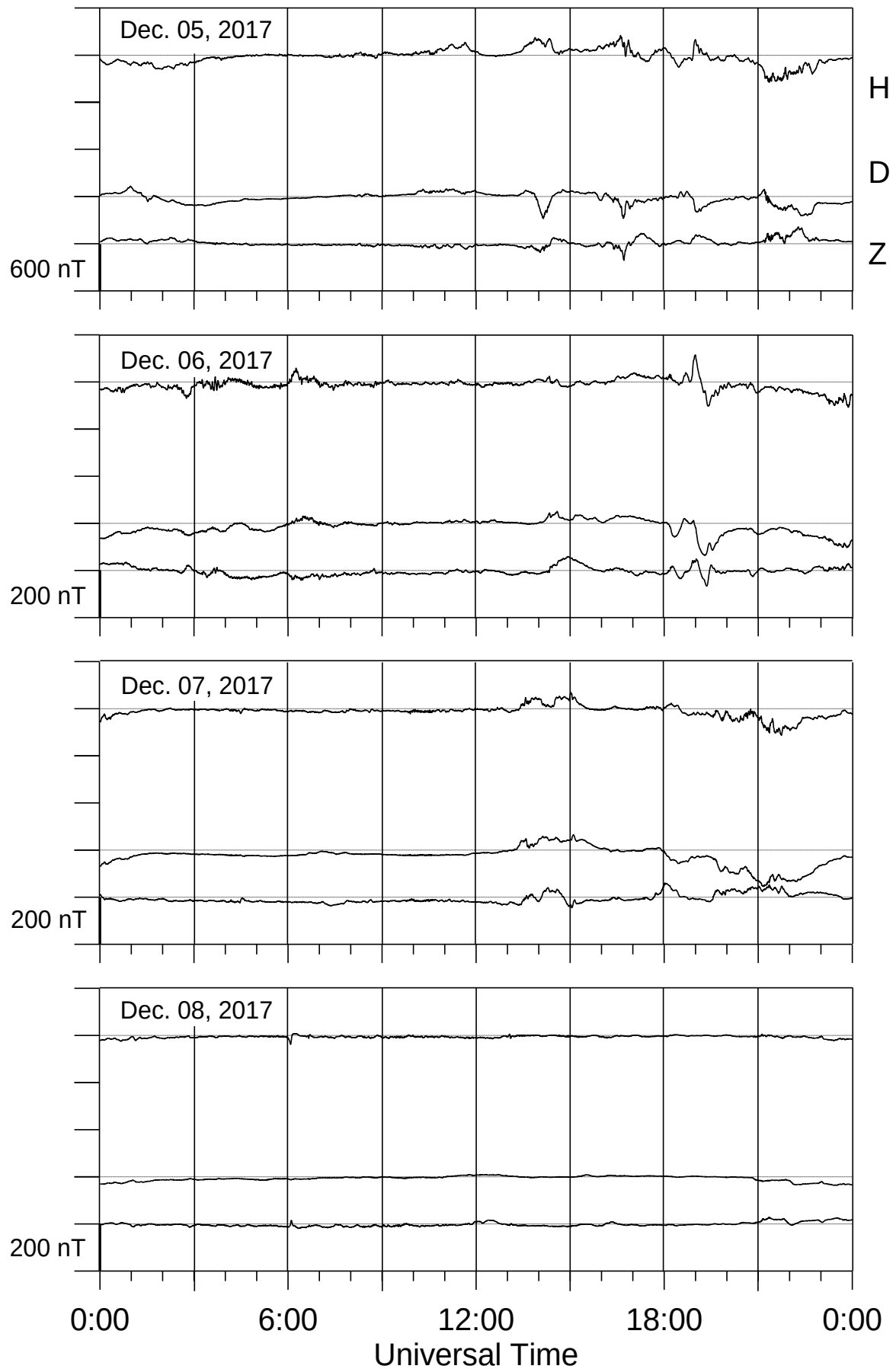
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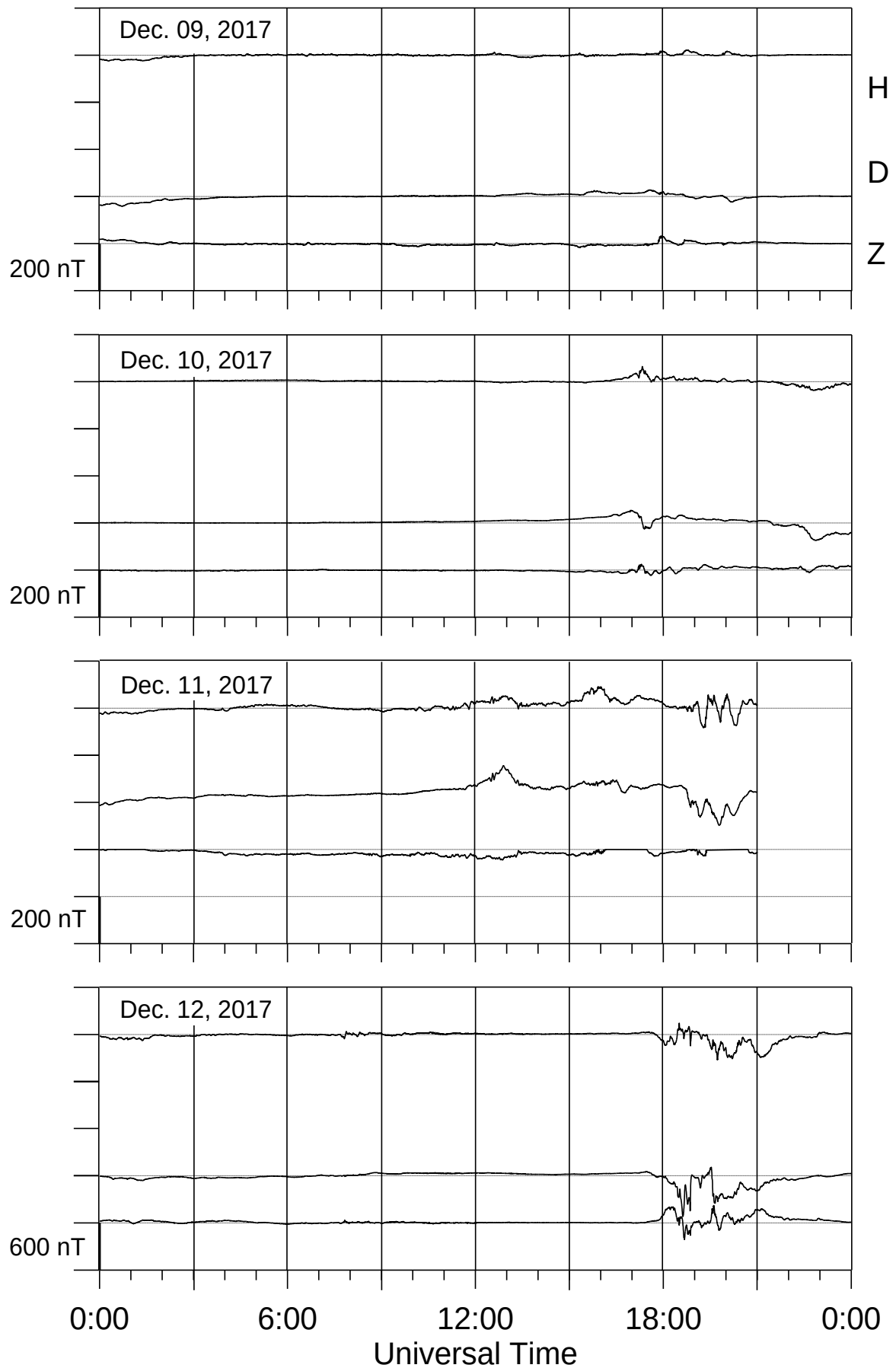
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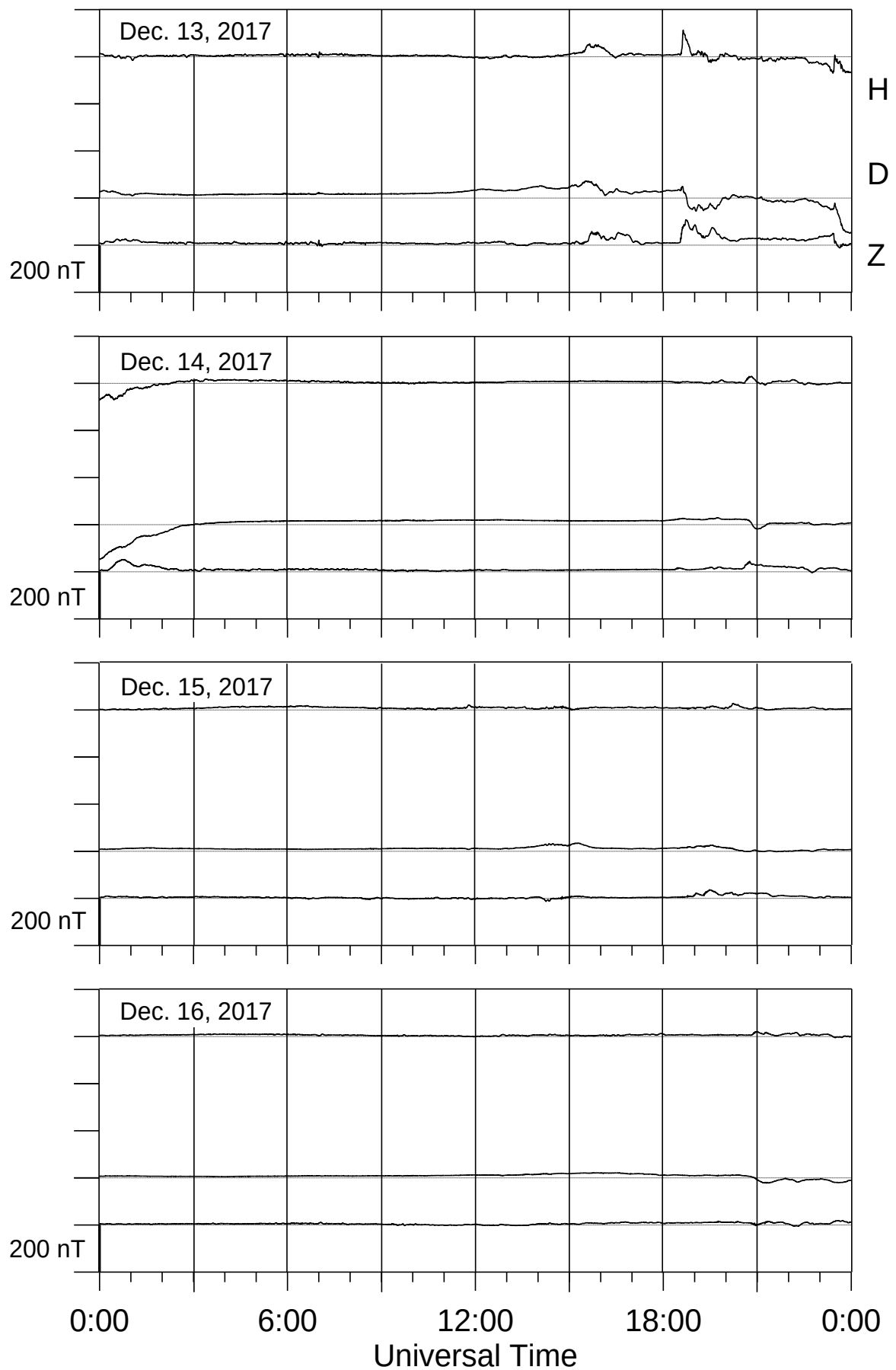
Lovozero magnetometer



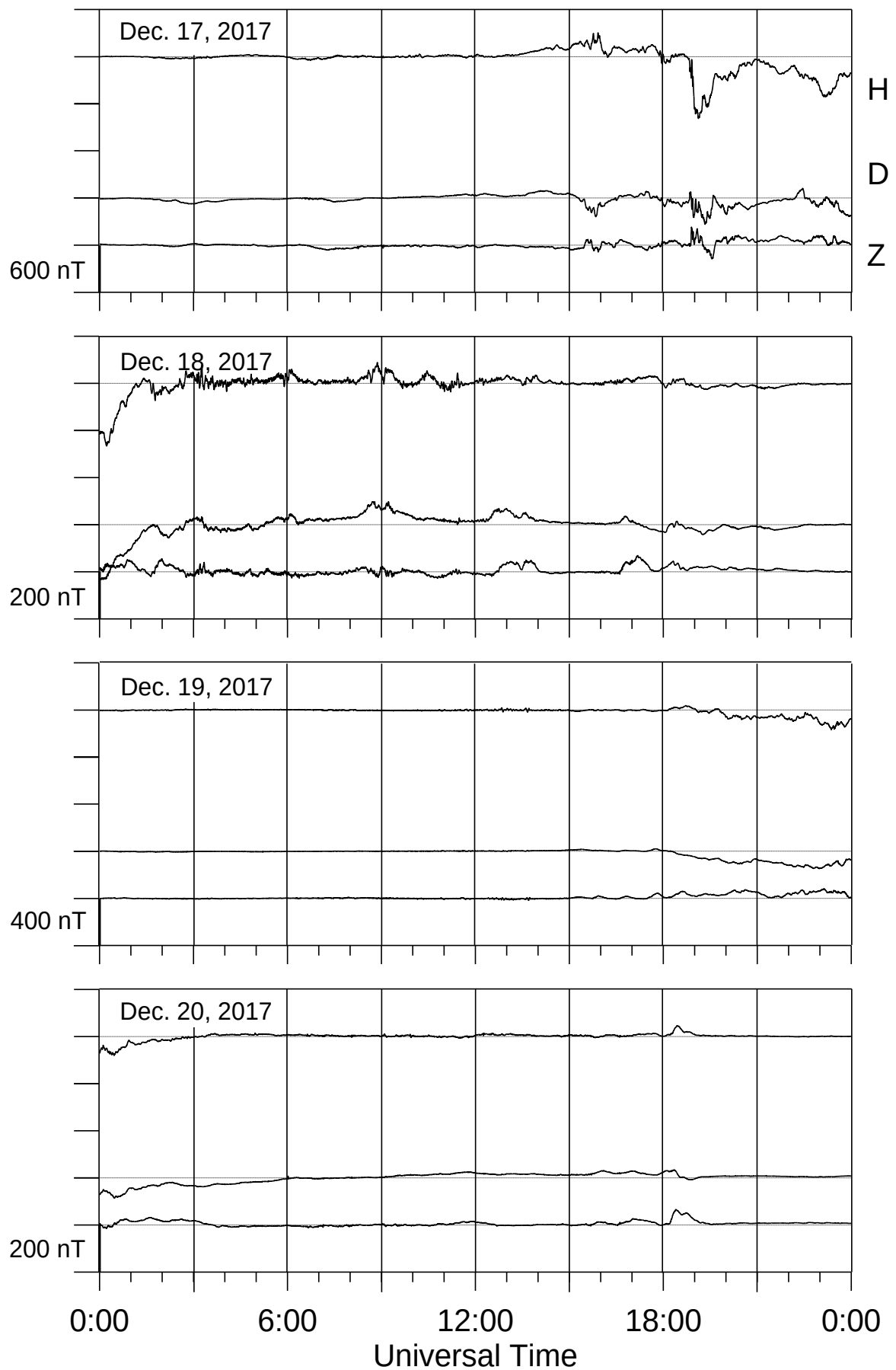
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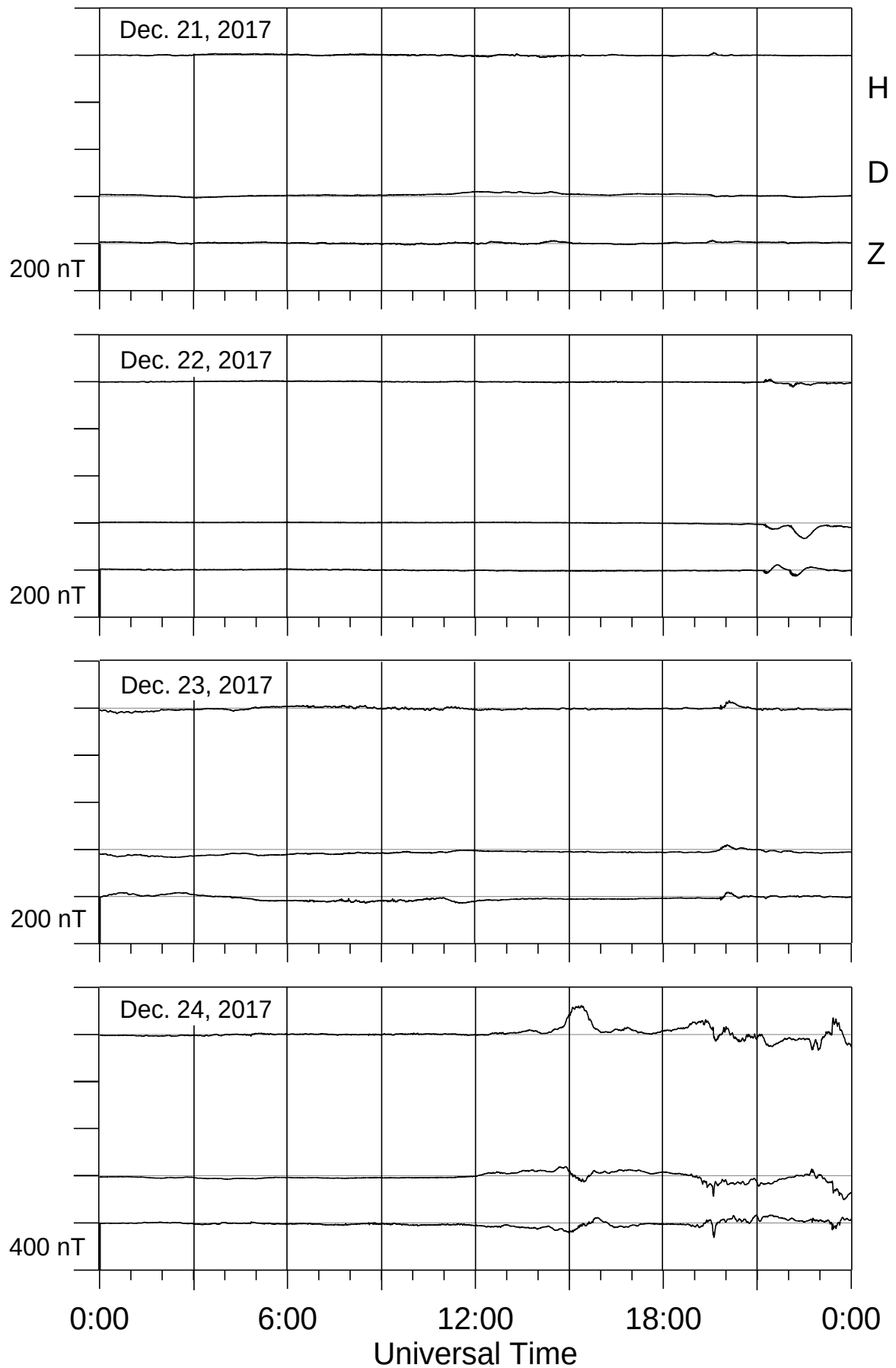
Lovozero magnetometer



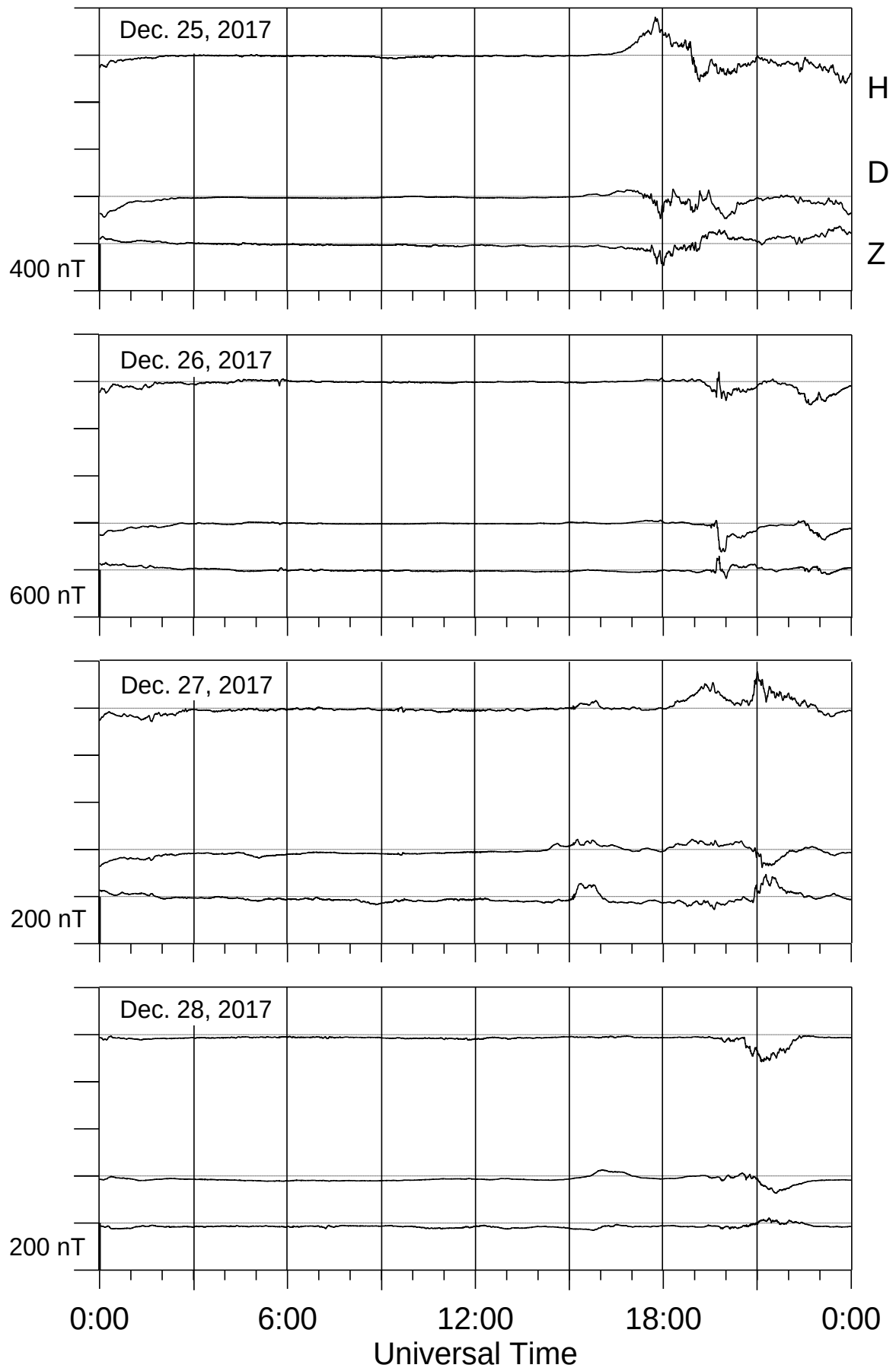
Lovozero magnetometer



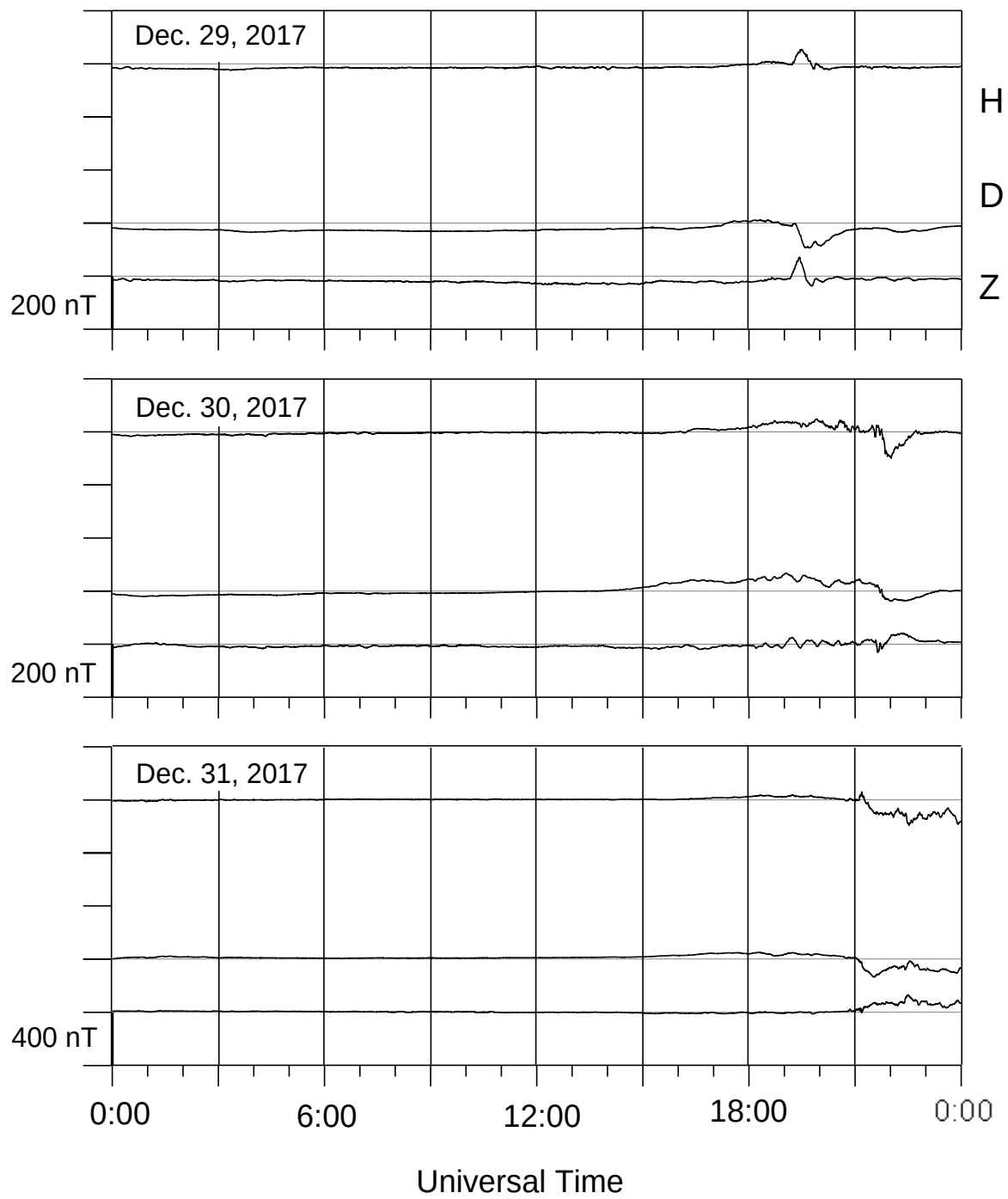
Lovozero magnetometer



Lovozero magnetometer



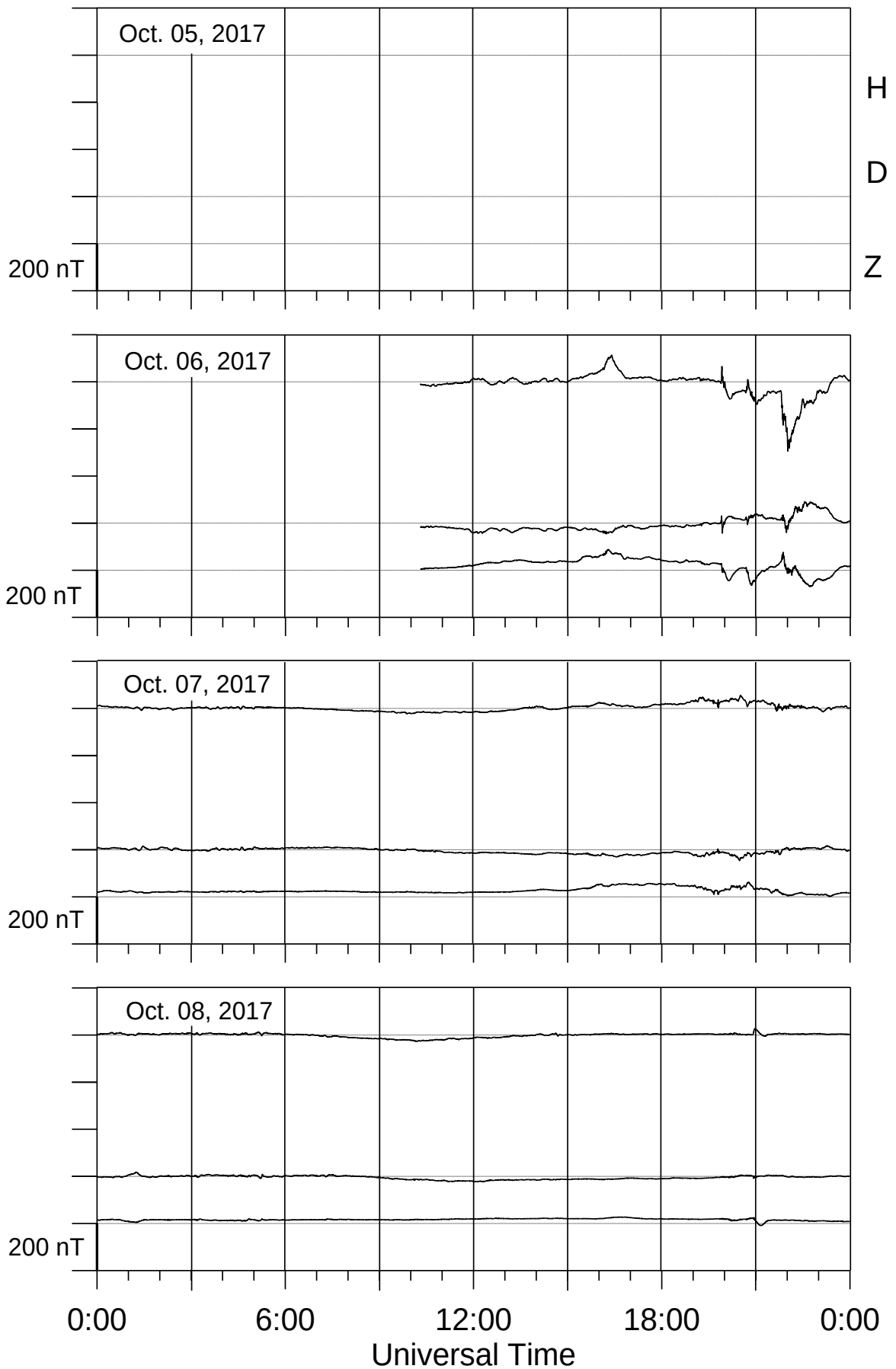
Lovozero magnetometer



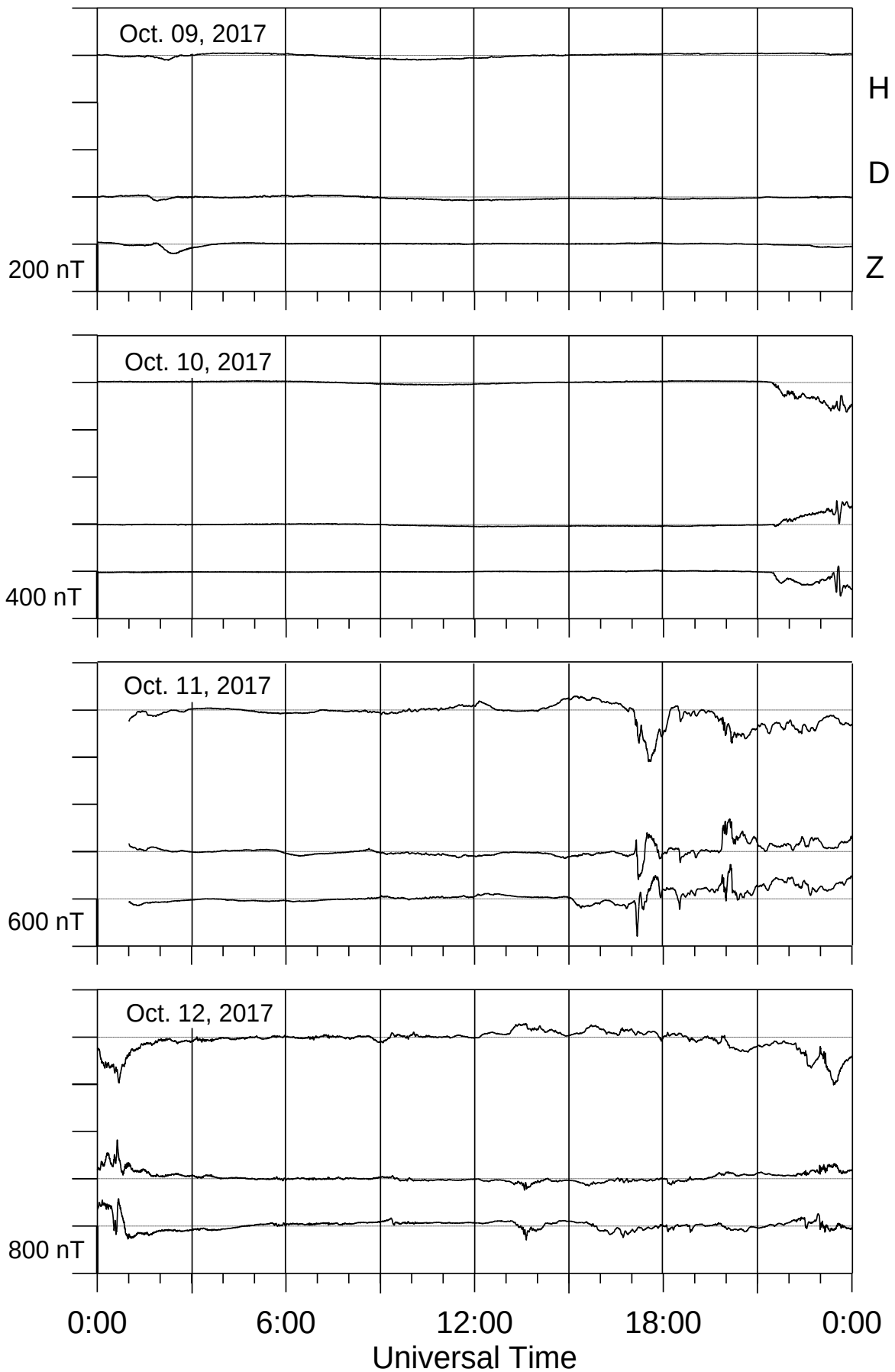
LOPARSKAYA MAGNETOGRAMS

October - December 2017

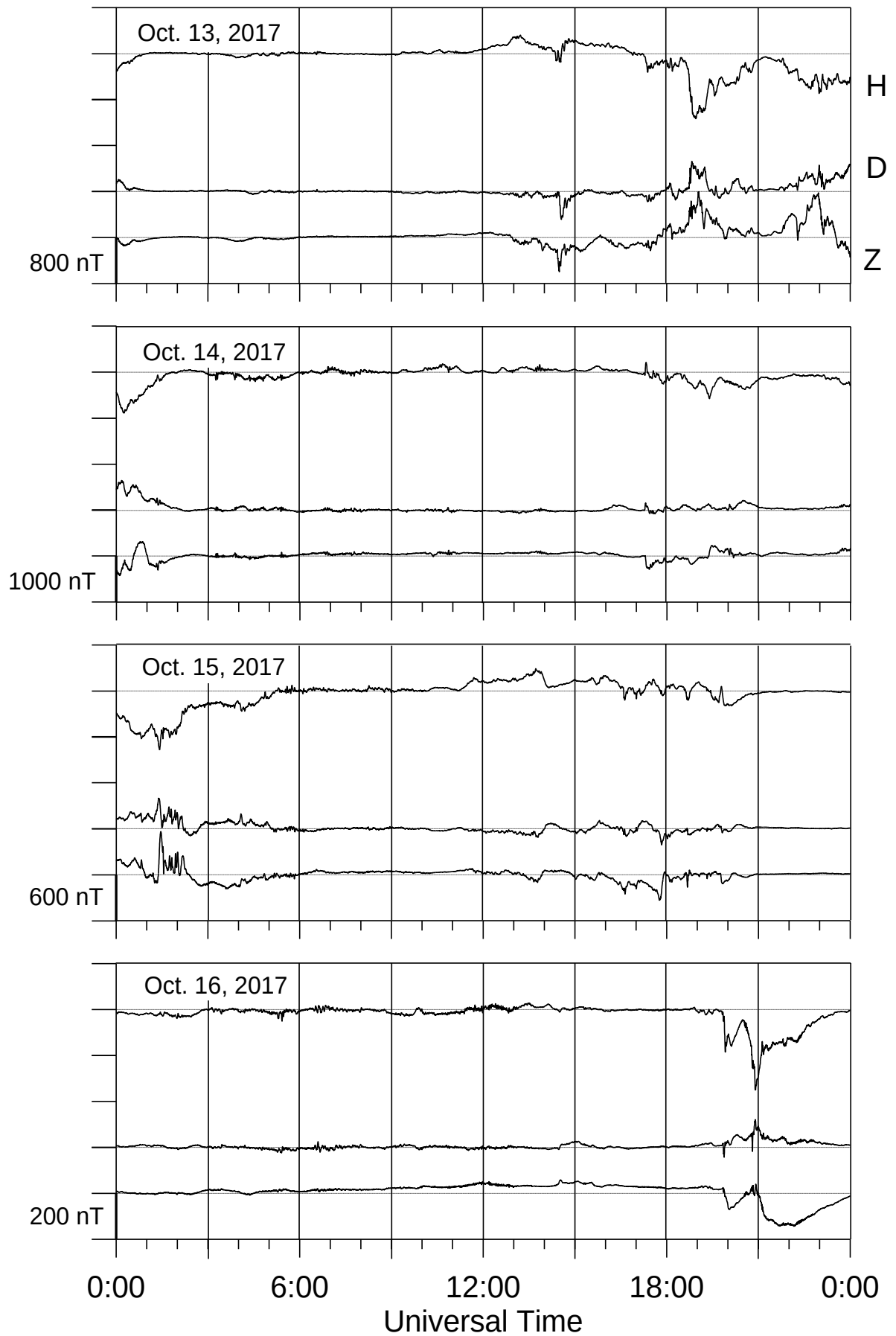
Loparskaya magnetometer



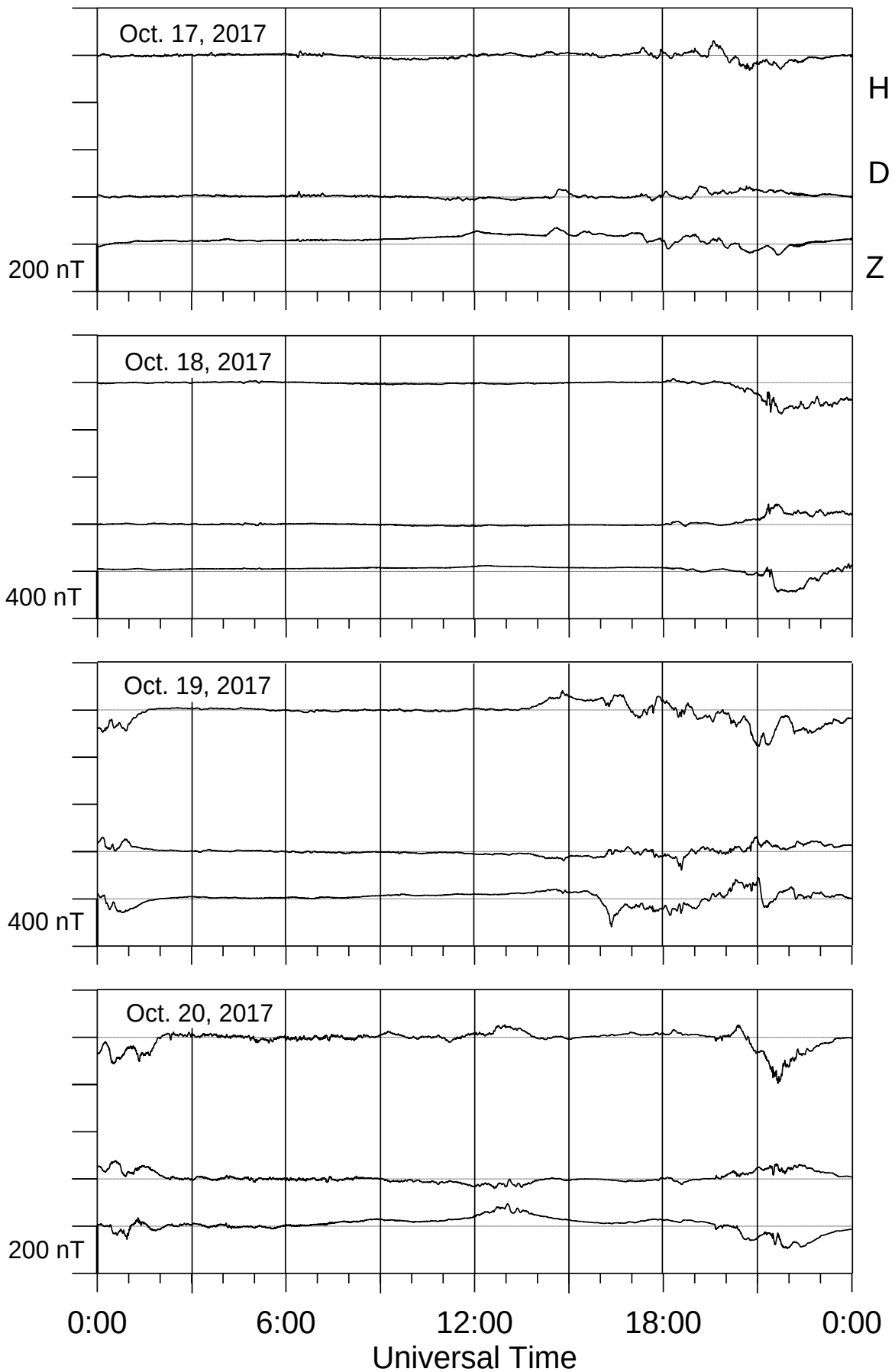
Loparskaya magnetometer



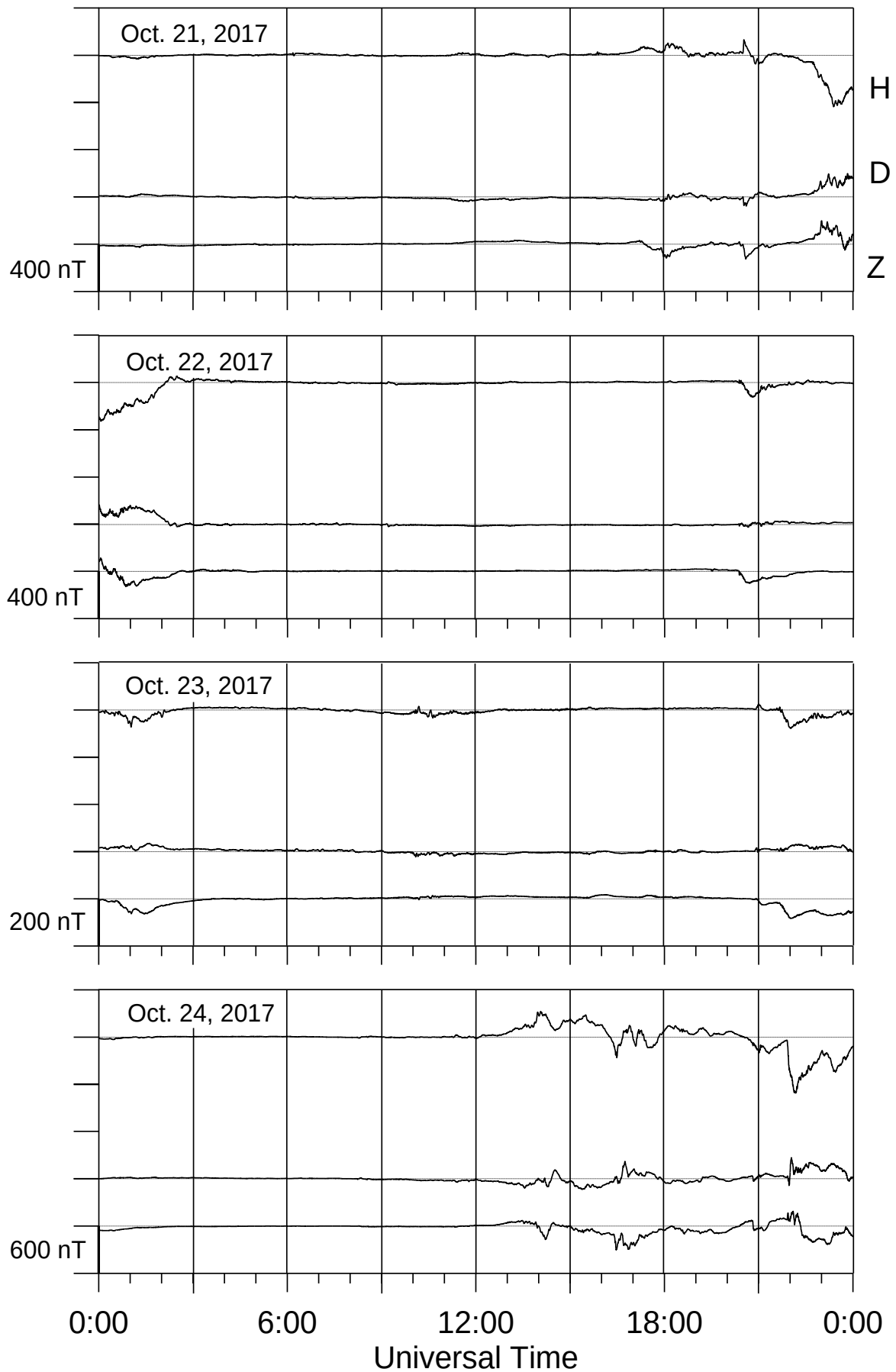
Loparskaya magnetometer



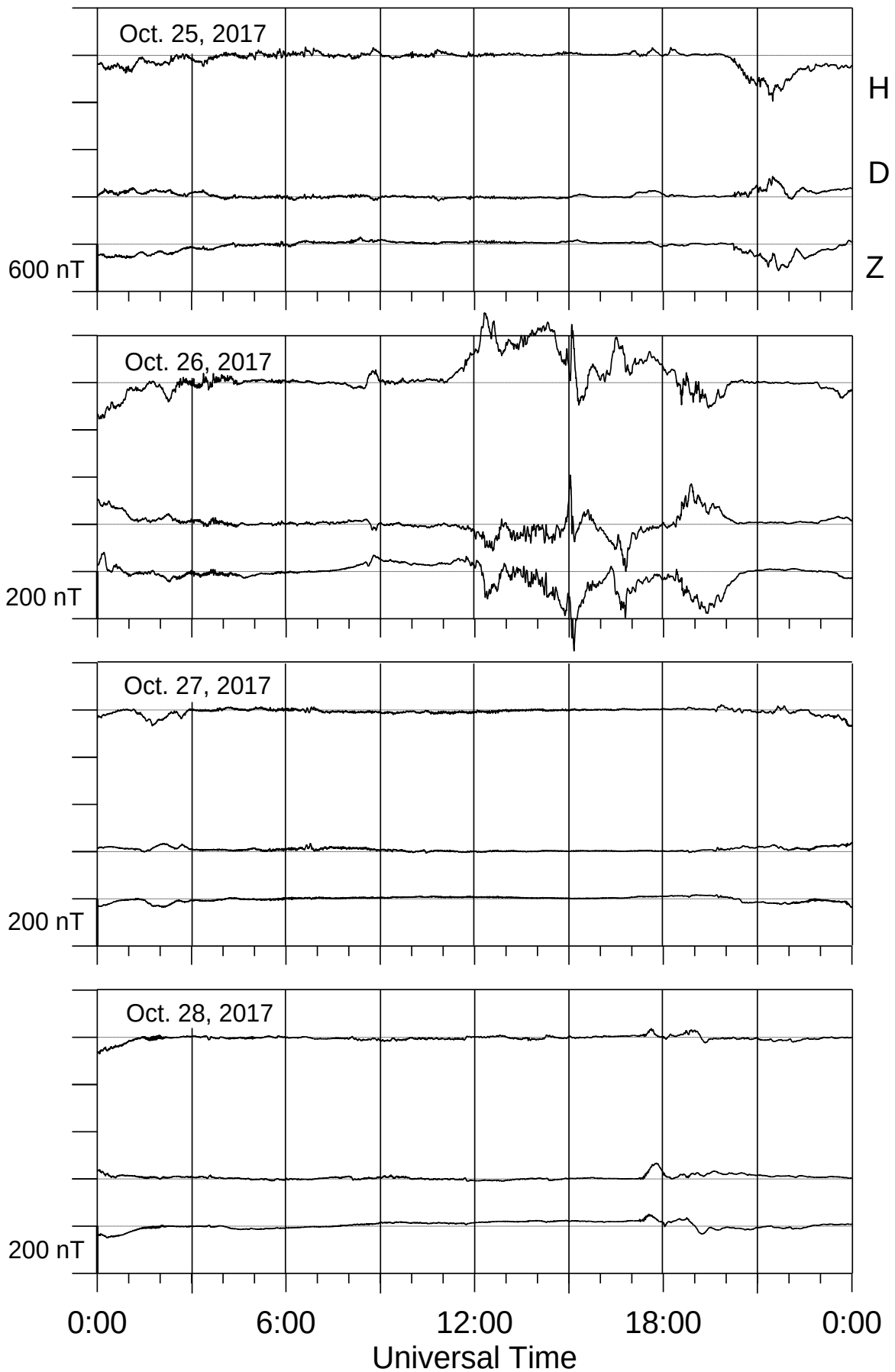
Loparskaya magnetometer



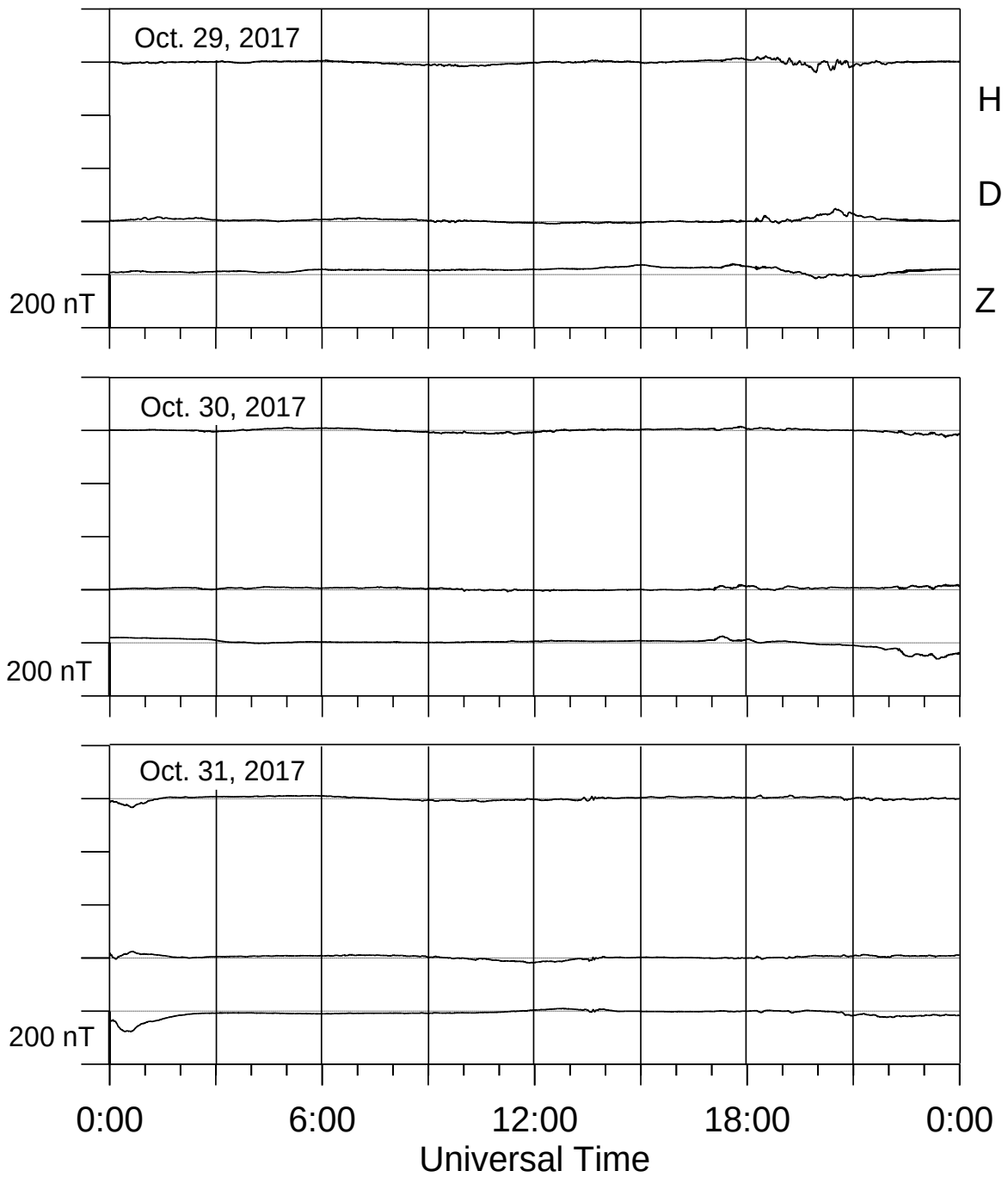
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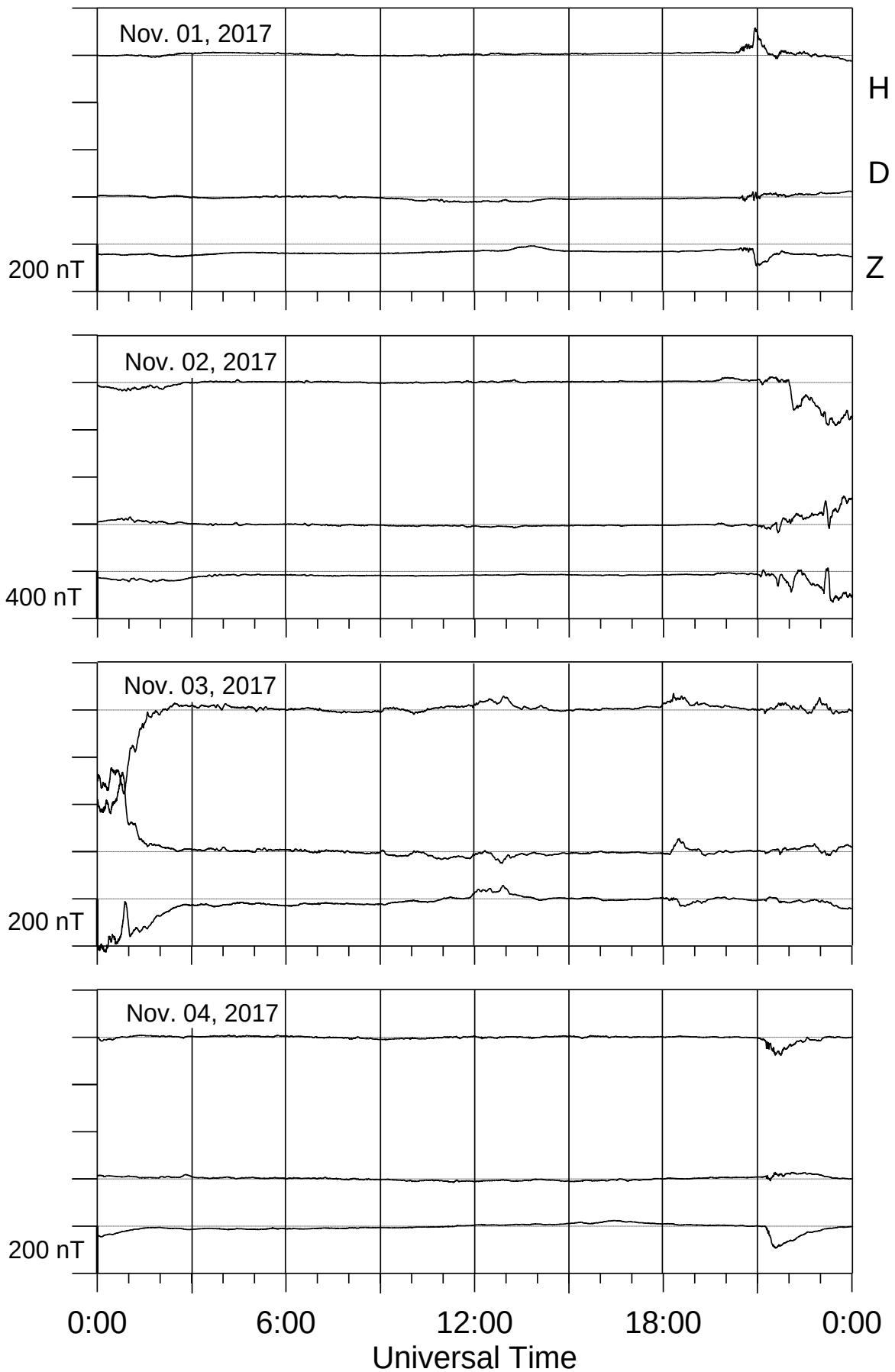
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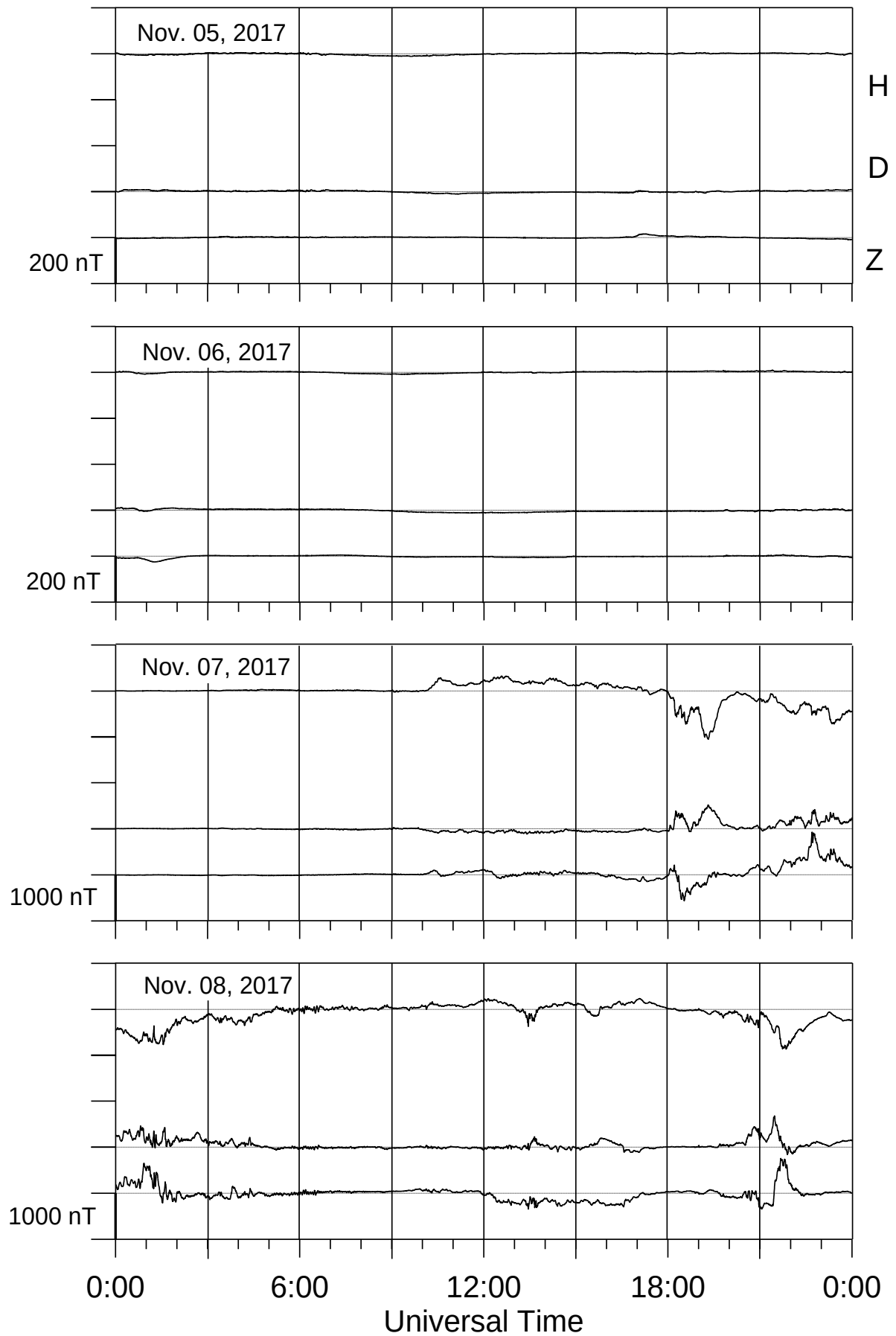
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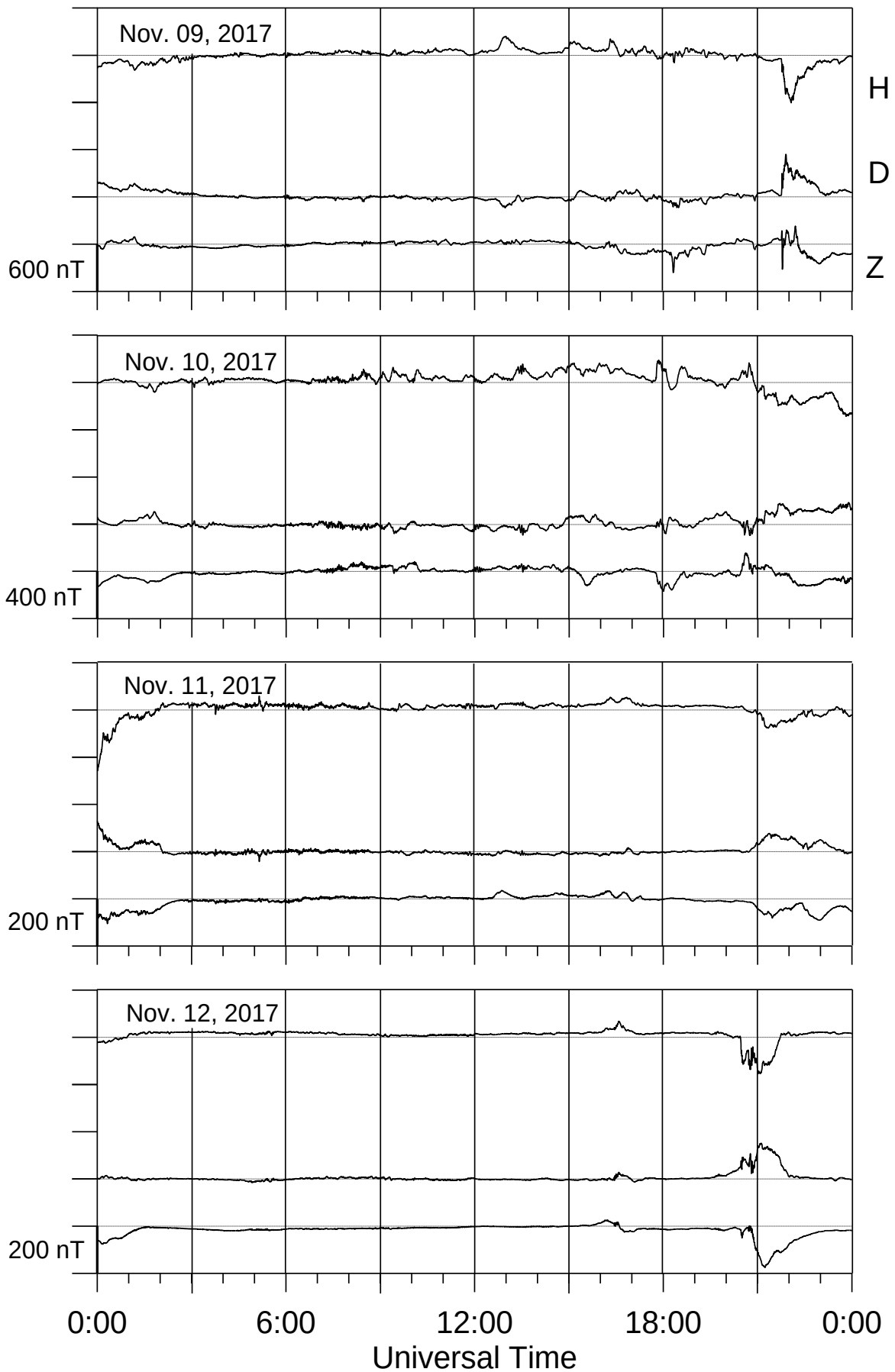
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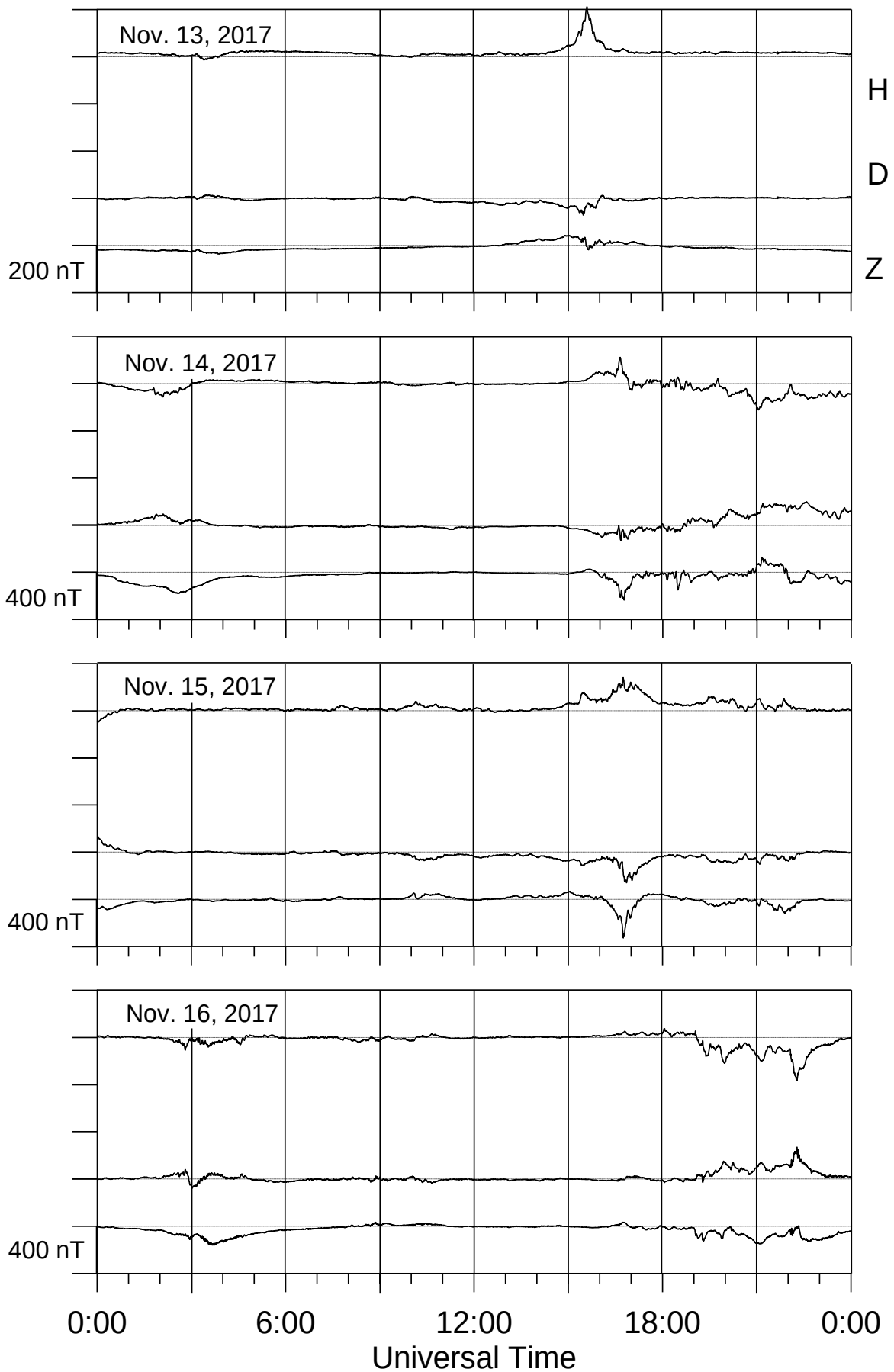
Loparskaya magnetometer



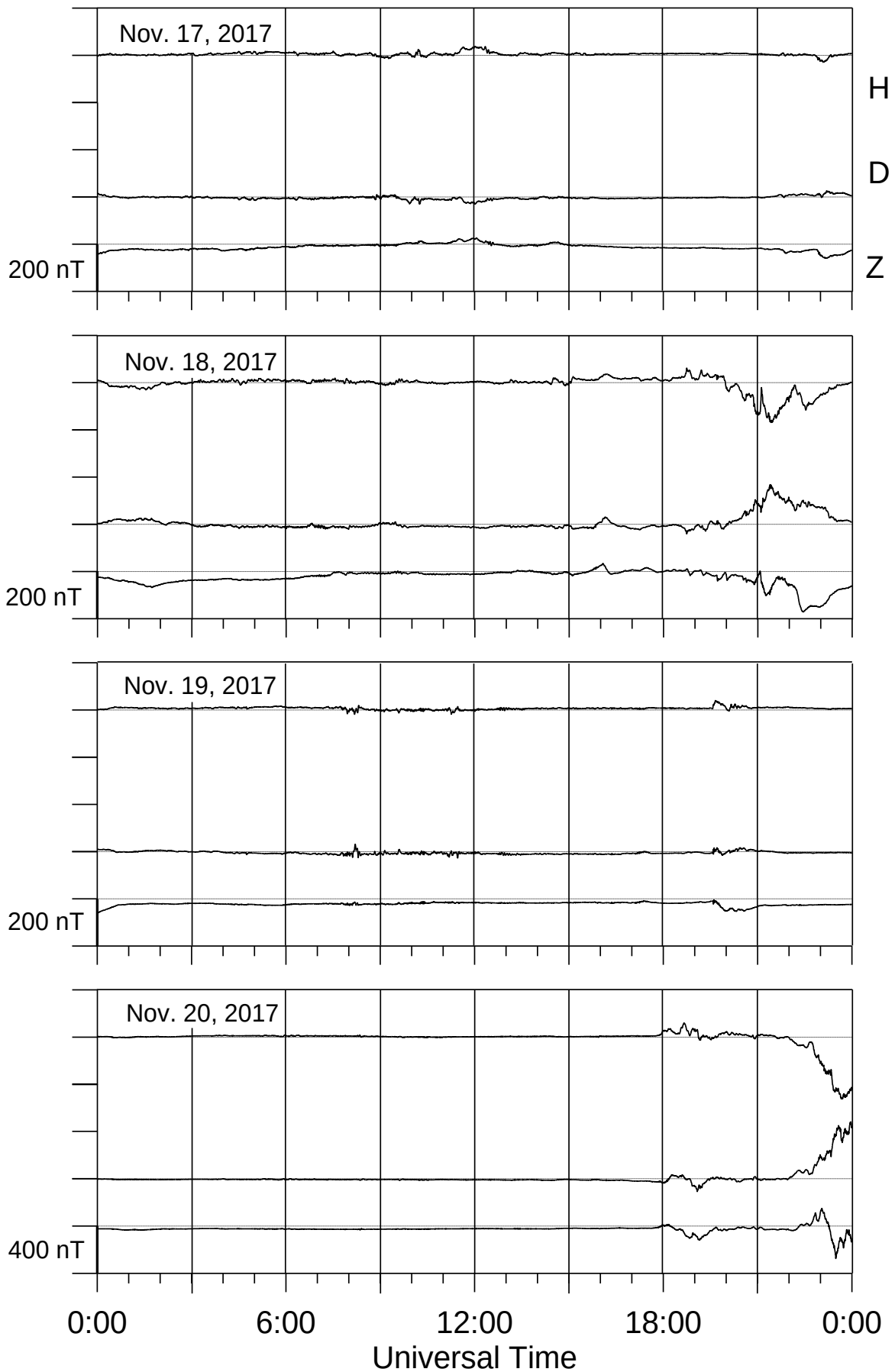
Loparskaya magnetometer



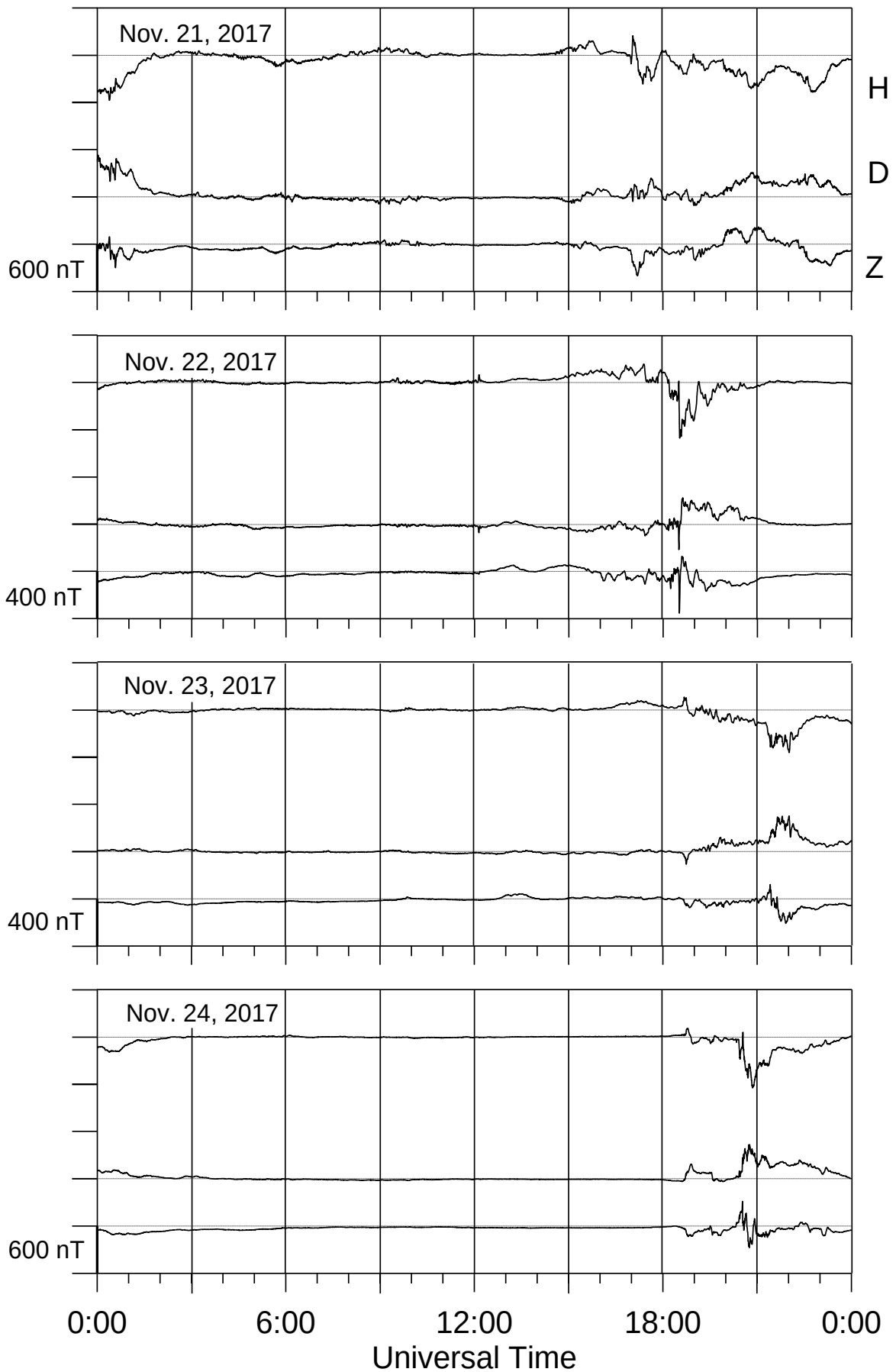
Loparskaya magnetometer



Loparskaya magnetometer



Loparskaya magnetometer



Loparskaya magnetometer

