

POLAR GEOPHYSICAL INSTITUTE  
RUSSIAN ACADEMY OF SCIENCES



**PGI**  
**GEOPHYSICAL DATA**

**2016**

---

**JULY**

---

**AUGUST**

---

**SEPTEMBER**

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MURMANSK, APATITY, RUSSIA

# PGI

## GEOPHYSICAL DATA

V. VOROBJEV, editor

V. Burnaeva and N. Golubtsova, make-up editors

This bulletin presents the preliminary ground-based optical, geomagnetic and cosmic ray data obtained by Polar Geophysical Institute in the third quarter of 2016. All-sky camera observations are published only for the quarter 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  $\pm 2620$  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:

|           |         |
|-----------|---------|
| July      | 402 648 |
| August    | 404 955 |
| September | 405 930 |

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

Please visit also our Internet pages: <http://pgia.ru/data/>

## ***All-sky camera observations***

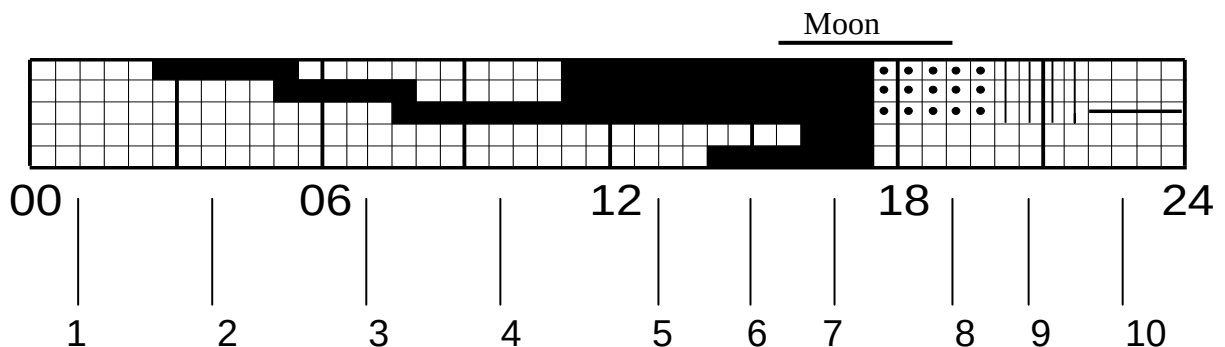
### *Calendar*

Calendar shows the intervals of digital all-sky camera observations in Apatity and Lovozero, which are available during dark periods from 1400 to 0600 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 Lovozero and/or Loparskaya 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.

### ***Coordinates of stations***

| Stations                 | Code | Geographic |          | Corr. Geomagnetic |          |
|--------------------------|------|------------|----------|-------------------|----------|
|                          |      | Lat        | Long     | Lat               | Long     |
| <b><i>Loparskaya</i></b> | LOP  | 68.63° N   | 33.25° E | 64.94° N          | 113.6° E |
| <b><i>Lovozero</i></b>   | LOZ  | 67.97° N   | 35.02° E | 64.17° N          | 115.3° E |
| <b><i>Apatity</i></b>    | 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  
 July, 2016  
 Lower limit of K=9 is 1500 nT

| Day | Time, UT |       |       |       |       |       |       |       |   |
|-----|----------|-------|-------|-------|-------|-------|-------|-------|---|
|     | 03       | 06    | 09    | 12    | 15    | 18    | 21    | 24    |   |
| 1   | 4 4 1    | 1 1 1 | 0 1 1 | 2 1 1 | 2 1 2 | 2 1 1 | 1 1 1 | 0 0 0 | Q |
| 2   | 0 0 1    | 1 1 0 | 1 0 1 | 1 1 1 | 2 2 3 | 3 2 2 | 2 2 2 | 3 3 3 |   |
| 3   | 4 1 2    | 2 2 2 | 0 1 1 | 2 2 2 | 2 2 2 | 2 3 3 | 2 2 2 | 3 5 5 |   |
| 4   | 2 1 2    | 1 2 2 | 2 2 1 | 1 2 1 | 1 2 2 | 1 0 1 | 1 1 2 | 1 1 1 |   |
| 5   | 1 1 2    | 2 1 2 | 1 1 1 | 2 2 1 | 1 1 1 | 1 1 1 | 1 1 1 | 1 1 1 |   |
| 6   | 1 1 1    | 1 1 1 | 1 1 1 | 1 2 2 | 2 2 2 | 2 2 2 | 2 2 2 | 3 3 1 |   |
| 7   | 2 3 2    | 2 2 2 | 2 2 1 | 2 2 3 | 4 4 4 | 4 5 5 | 4 3 5 | 6 5 6 |   |
| 8   | 6 5 4    | 2 2 2 | 2 2 2 | 3 3 3 | 4 4 5 | 5 4 4 | 4 5 5 | 1 1 2 |   |
| 9   | 2 5 5    | 3 3 2 | 2 2 2 | 2 2 2 | 3 5 4 | 4 3 3 | 3 2 1 | 3 3 2 |   |
| 10  | 1 1 2    | 1 1 2 | 1 1 2 | 1 2 2 | 3 2 2 | 1 2 1 | 2 2 1 | 1 2 4 |   |
| 11  | 4 3 2    | 2 2 1 | 1 2 1 | 1 1 2 | 1 2 2 | 2 3 3 | 3 2 4 | 5 4 2 |   |
| 12  | 5 5 4    | 4 5 4 | 3 2 1 | 2 3 3 | 3 2 3 | 2 2 2 | 2 2 3 | 4 5 6 |   |
| 13  | 6 5 3    | 2 2 2 | 2 1 1 | 2 1 1 | 1 2 2 | 2 1 1 | 2 1 1 | 1 3 4 |   |
| 14  | 3 2 1    | 1 2 2 | 2 2 2 | 2 3 2 | 2 2 2 | 3 3 2 | 2 2 2 | 0 3 4 |   |
| 15  | 5 4 3    | 3 3 2 | 2 2 3 | 2 2 2 | 2 2 2 | 2 3 3 | 3 1 0 | 2 5 4 |   |
| 16  | 2 5 5    | 1 1 2 | 1 1 1 | 1 2 2 | 3 3 2 | 1 1 1 | 1 2 1 | 1 0 0 |   |
| 17  | 1 1 1    | 2 1 1 | 1 1 1 | 1 1 1 | 2 3 3 | 3 3 2 | 2 1 1 | 1 0 0 |   |
| 18  | 1 1 1    | 1 1 1 | 1 1 2 | 2 1 1 | 1 1 1 | 0 0 0 | 1 1 1 | 0 0 2 |   |
| 19  | 1 1 1    | 1 1 1 | 1 1 1 | 1 1 1 | 2 2 2 | 2 2 1 | 1 1 1 | 1 1 3 |   |
| 20  | 5 6 3    | 4 4 2 | 2 3 2 | 2 2 2 | 3 3 2 | 2 2 1 | 1 0 0 | 0 0 0 |   |
| 21  | 0 1 1    | 1 1 1 | 1 1 2 | 2 2 2 | 2 1 1 | 2 0 0 | 0 0 0 | 0 1 2 |   |
| 22  | 2 1 1    | 2 2 2 | 1 0 1 | 1 2 2 | 3 3 3 | 3 4 4 | 3 2 1 | 0 2 2 |   |
| 23  | 1 2 2    | 2 2 2 | 2 1 1 | 1 1 2 | 2 1 1 | 0 0 0 | 1 1 1 | 1 1 1 |   |
| 24  | 1 2 2    | 2 2 1 | 1 1 1 | 1 1 2 | 2 2 1 | 2 4 5 | 3 3 3 | 4 4 4 |   |
| 25  | 6 5 4    | 3 2 3 | 3 2 1 | 3 3 4 | 5 5 5 | 4 3 3 | 2 1 4 | 4 3 3 |   |
| 26  | 2 1 1    | 1 2 1 | 1 1 1 | 1 1 1 | 1 1 2 | 2 2 1 | 1 0 3 | 3 2 0 |   |
| 27  | 0 1 1    | 1 1 1 | 1 1 1 | 1 1 1 | 1 1 1 | 1 1 1 | 1 1 1 | 1 1 2 |   |
| 28  | 1 2 2    | 2 2 2 | 1 1 2 | 2 2 2 | 2 2 2 | 2 3 4 | 5 5 3 | 3 3 4 |   |
| 29  | 3 3 2    | 2 3 3 | 2 2 1 | 2 2 2 | 2 2 2 | 2 3 3 | 2 3 4 | 4 2 1 |   |
| 30  | 3 4 3    | 1 1 2 | 1 1 1 | 1 1 1 | 1 1 0 | 0 0 1 | 1 0 0 | 0 1 2 |   |
| 31  | 2 2 2    | 1 1 1 | 1 1 1 | 1 1 2 | 1 1 1 | 1 1 1 | 1 1 1 | 0 0 0 | Q |

## GEOMAGNETIC K-INDICES, LOVOZERO(LOPARSCAYA)

August, 2016

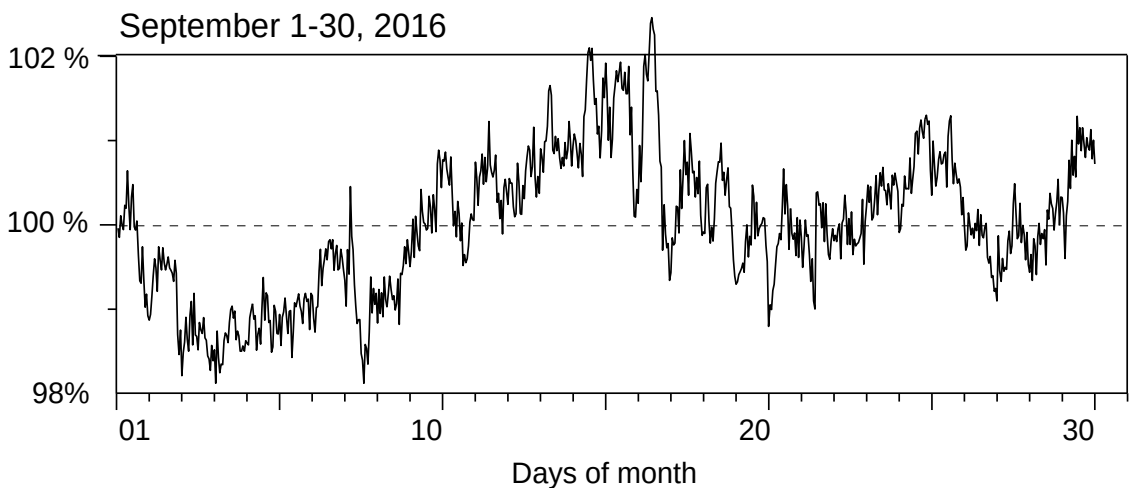
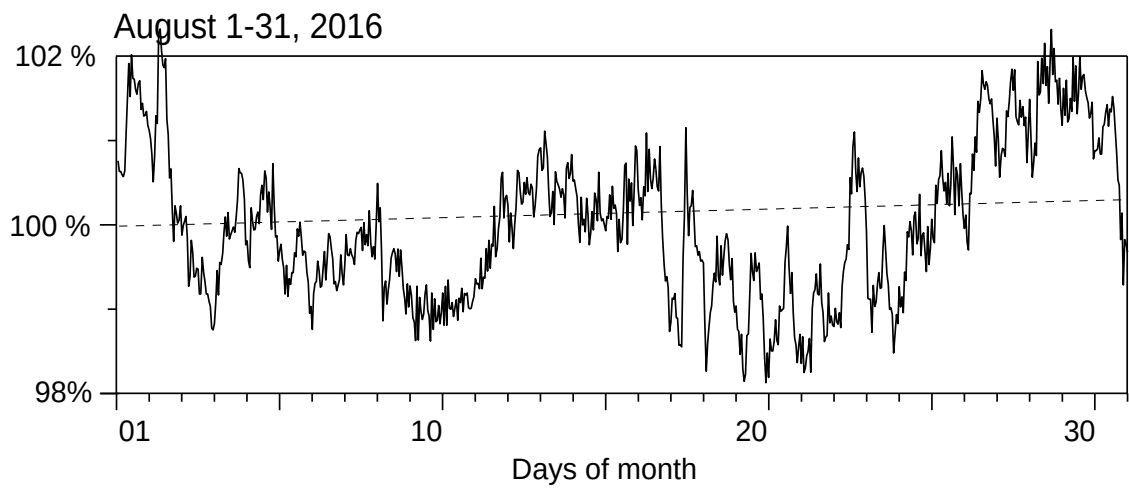
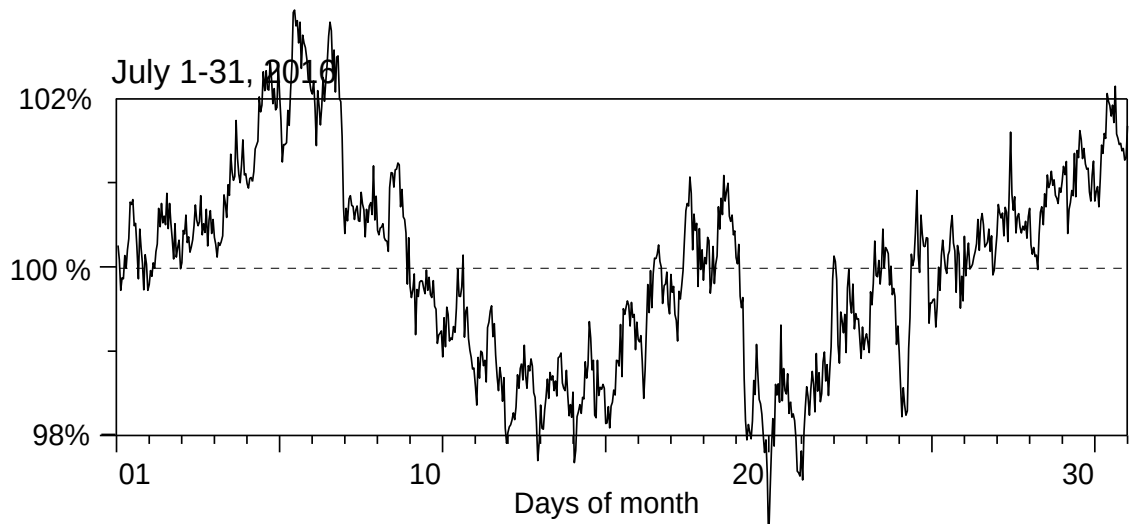
Lower limit of K=9 is 1500 nT

| Day | Time, UT |       |       |       |       |       |       |       |   |
|-----|----------|-------|-------|-------|-------|-------|-------|-------|---|
|     | 03       | 06    | 09    | 12    | 15    | 18    | 21    | 24    |   |
| 1   | 1 1 1    | 1 1 1 | 1 1 1 | 2 2 1 | 1 1 1 | 1 1 1 | 1 1 0 | 1 0 0 | Q |
| 2   | 1 1 1    | 1 1 2 | 1 1 1 | 1 1 2 | 2 2 2 | 3 2 2 | 2 2 2 | 2 6 7 |   |
| 3   | 6 5 4    | 2 2 3 | 4 3 2 | 3 4 4 | 5 5 4 | 5 3 5 | 3 2 1 | 4 4 4 |   |
| 4   | 5 4 3    | 2 3 2 | 1 2 - | 2 2 3 | 3 4 5 | 6 3 3 | 5 5 2 | 1 1 1 |   |
| 5   | 1 2 2    | 2 2 3 | 3 2 2 | 3 3 3 | 4 3 3 | 3 3 3 | 2 2 4 | 6 6 6 |   |
| 6   | 3 4 2    | 2 2 2 | 2 2 2 | 3 4 4 | 4 2 3 | 3 3 3 | 1 1 3 | 5 6 4 |   |
| 7   | 6 6 3    | 2 2 2 | 2 2 2 | 1 1 1 | 3 2 4 | 4 4 3 | 2 1 0 | 3 5 6 |   |
| 8   | 6 5 4    | 2 2 1 | 2 2 2 | 2 1 1 | 1 3 3 | 5 5 3 | 3 1 1 | 1 0 1 |   |
| 9   | 1 2 2    | 2 3 2 | 2 2 2 | 2 2 3 | 4 4 4 | 5 4 2 | 1 0 1 | 5 4 5 |   |
| 10  | 5 3 2    | 2 2 2 | 2 2 1 | 2 4 1 | 3 2 2 | 4 3 2 | 2 5 6 | 5 5 4 | Q |
| 11  | 2 2 2    | 2 2 2 | 2 1 1 | 2 2 1 | 1 1 1 | 2 3 5 | 3 3 3 | 5 5 4 |   |
| 12  | 2 5 5    | 5 2 1 | 2 1 2 | 2 1 1 | 2 3 3 | 2 2 2 | 2 1 1 | 1 1 1 |   |
| 13  | 1 2 2    | 2 1 1 | 1 1 1 | 2 1 1 | 3 3 3 | 3 3 3 | 3 2 1 | 1 2 2 |   |
| 14  | 1 1 1    | 1 1 1 | 1 1 1 | 1 2 2 | 2 0 1 | 1 0 0 | 1 0 0 | 0 0 0 |   |
| 15  | 1 1 1    | 1 1 1 | 1 1 1 | 1 1 1 | 1 1 1 | 2 1 1 | 1 1 0 | 2 1 0 |   |
| 16  | 0 1 1    | 1 1 1 | 0 0 1 | 1 1 1 | 2 2 2 | 2 3 2 | 1 1 3 | 4 5 5 |   |
| 17  | 5 2 2    | 2 2 2 | 0 0 1 | 1 1 2 | 2 1 1 | 0 0 0 | 1 1 3 | 4 3 3 |   |
| 18  | 2 2 3    | 3 2 2 | 1 1 1 | 2 1 1 | 1 2 2 | 1 1 1 | 1 0 1 | 2 1 1 |   |
| 19  | 0 1 1    | 1 1 1 | 1 1 2 | 2 2 1 | 1 2 2 | 2 3 2 | 2 1 0 | 0 0 1 | Q |
| 20  | 3 2 2    | 2 2 2 | 2 1 1 | 1 1 1 | 0 0 0 | 0 1 0 | 0 1 0 | 1 1 1 |   |
| 21  | 1 1 1    | 1 1 2 | 2 2 1 | 1 2 2 | 2 1 3 | 3 2 2 | 2 1 1 | 4 4 2 |   |
| 22  | 1 1 -    | - - 2 | 2 1 1 | 1 1 1 | 1 0 1 | 1 2 2 | 2 2 1 | 2 3 3 |   |
| 23  | 2 2 2    | 2 1 1 | 1 1 1 | 1 1 3 | 3 5 5 | 5 5 4 | 5 5 5 | 5 6 3 |   |
| 24  | 5 5 5    | 4 2 3 | 2 2 2 | 1 2 4 | 4 2 1 | 1 2 1 | 0 2 3 | 5 4 1 |   |
| 25  | 2 2 3    | 1 2 2 | 2 2 2 | 3 2 2 | 1 2 2 | 2 3 3 | 2 1 2 | 4 4 4 |   |
| 26  | 5 3 3    | 2 1 1 | 1 1 1 | 1 1 1 | 1 1 1 | 2 2 2 | 2 1 2 | 1 3 2 |   |
| 27  | 1 1 1    | 2 2 1 | 1 1 1 | 1 1 1 | 1 0 2 | 0 0 0 | 0 0 0 | 0 0 0 |   |
| 28  | 0 0 1    | 1 1 1 | 1 1 1 | 1 1 1 | 1 0 0 | 0 0 0 | 0 0 0 | 0 0 0 | Q |
| 29  | 0 0 1    | 1 1 1 | 0 1 1 | 2 2 2 | 2 2 2 | 1 1 2 | 2 1 5 | 5 1 0 |   |
| 30  | 0 3 4    | 2 1 1 | 1 2 2 | 2 3 2 | 2 4 5 | 5 5 4 | 5 5 5 | 5 5 5 |   |
| 31  | 2 2 2    | 1 1 1 | 1 1 1 | 2 2 1 | 1 1 0 | 1 1 1 | 1 3 4 | 6 6 6 |   |

GEOMAGNETIC K-INDICES, LOVOZERO  
 September, 2016  
 Lower limit of K=9 is 1500 nT

| Day | Time, UT |       |       |       |       |       |       |       |   |
|-----|----------|-------|-------|-------|-------|-------|-------|-------|---|
|     | 03       | 06    | 09    | 12    | 15    | 18    | 21    | 24    |   |
| 1   | 5 6 5    | 3 2 3 | 3 2 2 | 3 3 2 | 3 4 5 | 3 1 1 | 2 6 6 | 7 6 6 |   |
| 2   | 6 8 7    | 5 5 5 | 3 3 2 | 2 3 3 | 4 5 5 | 4 4 4 | 2 1 5 | 7 7 5 |   |
| 3   | 5 6 5    | 5 6 3 | 2 2 3 | 3 3 3 | 5 5 4 | 5 5 4 | 4 7 7 | 6 6 6 |   |
| 4   | 7 6 2    | 2 2 2 | 2 3 2 | 2 3 4 | 4 5 3 | 2 3 4 | 3 5 5 | 5 5 5 |   |
| 5   | 4 3 3    | 2 1 3 | 2 2 2 | 1 2 1 | 1 2 1 | 2 4 4 | 3 6 6 | 5 5 3 |   |
| 6   | 2 1 2    | 3 1 2 | 2 2 2 | 2 1 1 | 2 2 0 | 1 2 2 | 1 6 6 | 3 1 5 |   |
| 7   | 4 3 2    | 2 1 1 | 2 1 1 | 1 1 1 | 3 3 3 | 4 4 3 | 2 2 0 | 1 1 3 |   |
| 8   | 4 4 3    | 2 1 2 | 2 1 2 | 1 3 3 | 2 3 4 | 4 4 3 | 4 4 2 | 3 3 1 |   |
| 9   | 1 1 0    | 0 1 0 | 1 1 1 | 1 1 1 | 1 1 1 | 0 1 1 | 1 0 0 | 0 0 2 | Q |
| 10  | 2 1 0    | 0 0 0 | 0 0 1 | 1 2 1 | 1 0 0 | 0 0 0 | 0 0 1 | 2 4 5 |   |
| 11  | 1 0 0    | 0 0 1 | 1 0 0 | 0 1 1 | 1 1 2 | 2 2 1 | 1 2 3 | 3 3 2 |   |
| 12  | 3 3 1    | 1 1 1 | 1 0 1 | 1 1 1 | 1 1 2 | 0 0 0 | 0 1 0 | 1 3 3 |   |
| 13  | 1 2 2    | 1 0 0 | 0 1 2 | 2 2 2 | 2 2 1 | 0 0 0 | 0 0 0 | 2 3 3 |   |
| 14  | 2 2 2    | 1 1 1 | 1 1 1 | 1 1 2 | 2 2 3 | 3 3 3 | 4 5 5 | 5 5 5 |   |
| 15  | 5 5 4    | 2 1 1 | 1 1 1 | 1 2 2 | 1 1 0 | 1 1 1 | 0 0 0 | 1 0 0 |   |
| 16  | 0 0 0    | 0 0 0 | 0 0 1 | 1 1 1 | 1 1 0 | 1 1 1 | 1 1 1 | 0 0 1 | Q |
| 17  | 1 1 1    | 0 0 1 | 1 0 1 | 1 1 1 | 1 1 0 | 0 0 0 | 0 0 0 | 0 1 0 | Q |
| 18  | 1 0 0    | 1 1 1 | 1 1 1 | 1 1 2 | 1 2 3 | 4 2 2 | 3 0 1 | 2 2 1 |   |
| 19  | 1 0 0    | 0 0 0 | 0 0 1 | 2 2 3 | 3 4 4 | 4 3 3 | 2 1 0 | 2 2 1 |   |
| 20  | 3 6 6    | 3 3 3 | 2 2 3 | 2 3 2 | 1 1 1 | 1 2 2 | 1 1 5 | 4 1 2 |   |
| 21  | 6 5 3    | 1 1 1 | 1 1 1 | 1 1 0 | 1 1 1 | 0 0 0 | 0 0 0 | 0 2 2 |   |
| 22  | 2 2 0    | 0 0 1 | 1 1 1 | 1 1 - | - 0 0 | 0 0 0 | 0 0 0 | 0 0 0 |   |
| 23  | 0 0 0    | 0 0 - | - 1 1 | 1 1 1 | 1 1 0 | 0 0 0 | 0 0 0 | 0 0 0 |   |
| 24  | 0 0 0    | 0 0 0 | 0 0 1 | 1 1 1 | 1 1 1 | 1 1 1 | 1 2 3 | 4 4 4 |   |
| 25  | 4 5 4    | 3 2 2 | 1 0 1 | 2 2 3 | 1 1 1 | 0 0 3 | 3 3 6 | 5 4 7 |   |
| 26  | 6 5 3    | 2 2 2 | 1 1 1 | 1 1 2 | 4 4 4 | 4 4 3 | 5 5 6 | 5 4 6 |   |
| 27  | 6 7 6    | 4 3 2 | 2 1 2 | 4 4 3 | 3 4 5 | 5 3 2 | 5 5 4 | 5 5 6 |   |
| 28  | 6 5 6    | 6 3 1 | 2 2 2 | 2 3 3 | 3 4 4 | 4 4 6 | 7 6 8 | 7 5 4 |   |
| 29  | 3 3 5    | 5 4 3 | 3 3 3 | 4 5 3 | 4 5 5 | 5 3 4 | 5 4 3 | 5 5 5 |   |
| 30  | 5 5 2    | 2 1 3 | 2 2 2 | 1 2 2 | 1 2 2 | 3 3 5 | 6 4 5 | 5 5 5 |   |

## Apatity neutron monitor



## **ALL – SKY CAMERA OBSERVATIONS**

**July - September 2016**







## CALENDAR OF TV OBSERVATIONS

August 17 - 18

[illegible]

## August 18 - 19

[illegible]

August 19 - 20

[illegible]

August 20 - 21

[illegible]

August 21 - 22

[illegible]

August 22 - 23

[illegible]

August 23 - 24

[illegible]

August 24 - 25

[illegible]



## CALENDAR OF TV OBSERVATIONS

September 02 - 03

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| UT         | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
| <b>LOZ</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <b>APT</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

September 03 - 04

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| UT         | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
| <b>LOZ</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <b>APT</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

September 04 - 05

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| UT         | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
| <b>LOZ</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <b>APT</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

September 05 - 06

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| UT         | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
| <b>LOZ</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <b>APT</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

September 06 - 07

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| UT         | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
| <b>LOZ</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <b>APT</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

September 07 - 08

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| UT         | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
| <b>LOZ</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <b>APT</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

September 08 - 09

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| UT         | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
| <b>LOZ</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <b>APT</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

September 09 - 10

|            |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| UT         | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
| <b>LOZ</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| <b>APT</b> |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |



## CALENDAR OF TV OBSERVATIONS

September 18 - 19

[illegible]

September 19 - 20

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

September 20 - 21

[illegible]

September 21 - 22

[illegible]

September 22 - 23

[illegible]

September 23 - 24

[illegible]

September 24 - 25

[illegible]

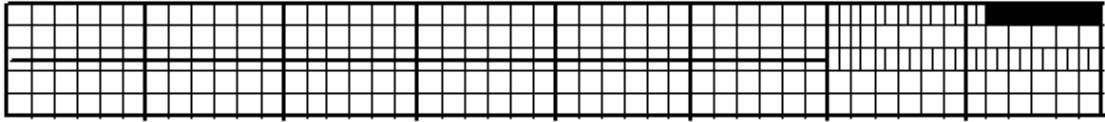
September 25 - 26

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



## Apatity ascaplots

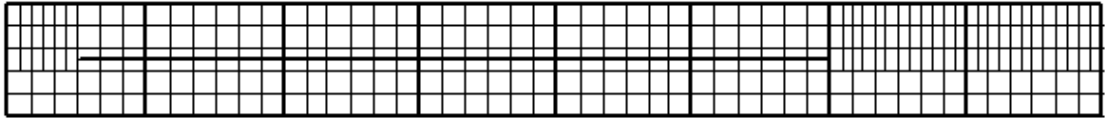
Sep. 09, 2016



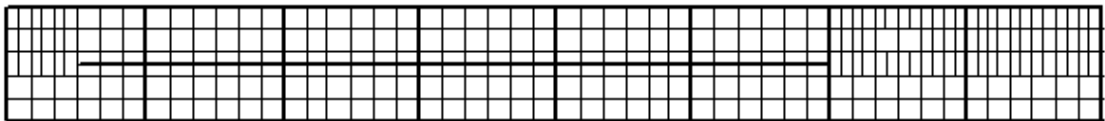
Sep. 10, 2016



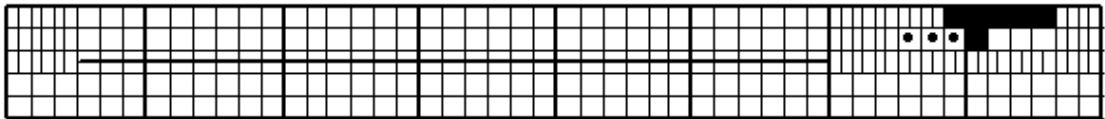
Sep. 11, 2016



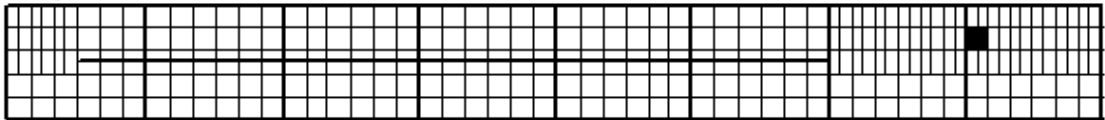
Sep. 12, 2016



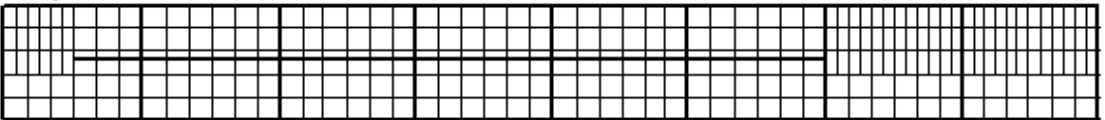
Sep. 13, 2016



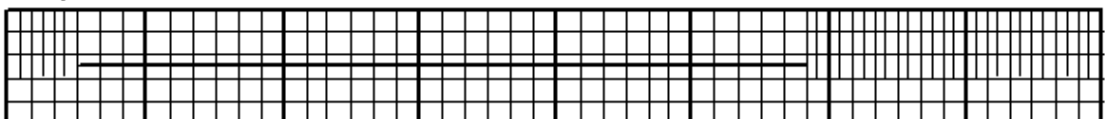
Sep. 14, 2016



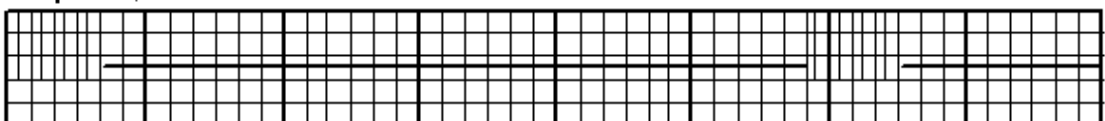
Sep. 15, 2016



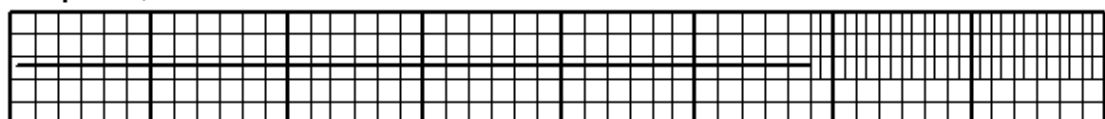
Sep. 16, 2016



Sep. 17, 2016



Sep. 18, 2016



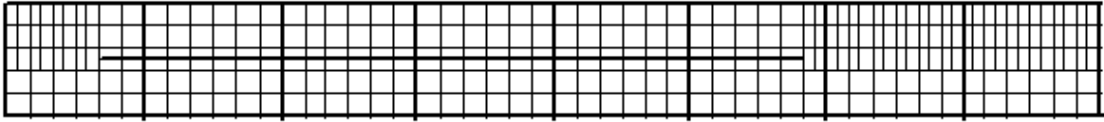
00                      06                      12                      18                      24

Universal Time

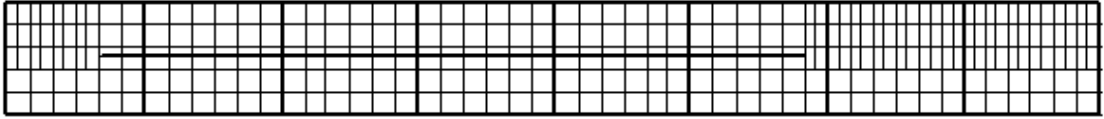


## Apatity ascaplots

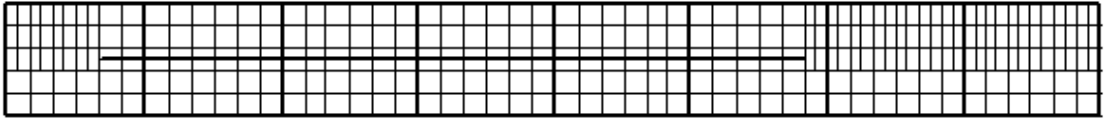
Sep. 19, 2016



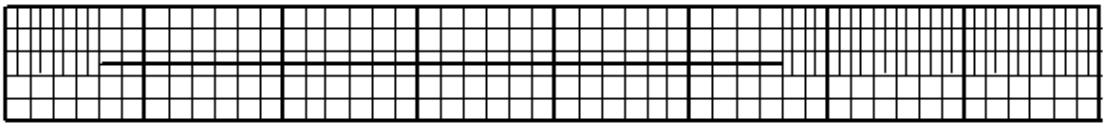
Sep. 20, 2016



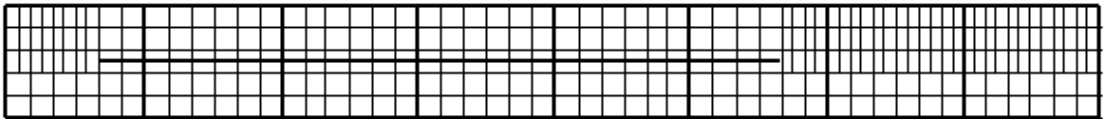
Sep. 21, 2016



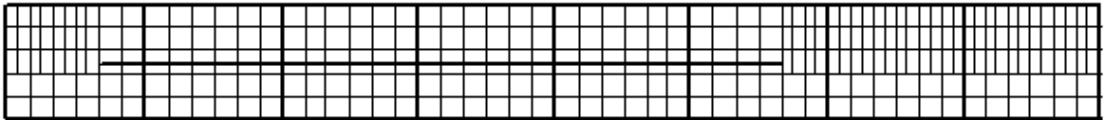
Sep. 22, 2016



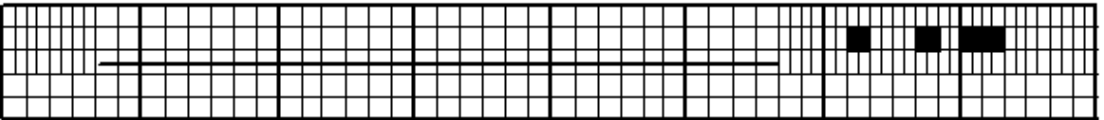
Sep. 23, 2016



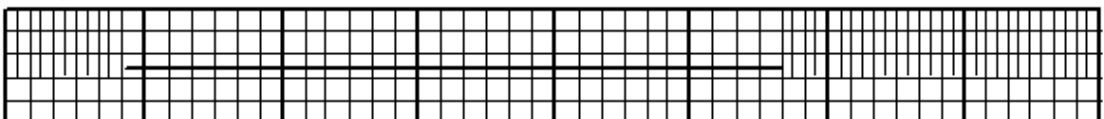
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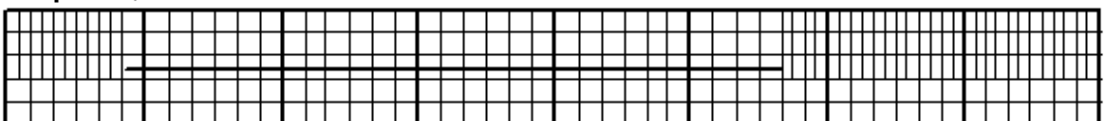
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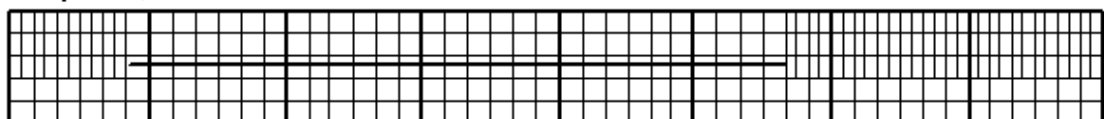
Sep. 26, 2016



Sep. 27, 2016



Sep. 28, 2016

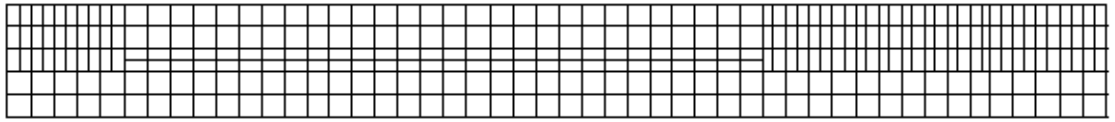


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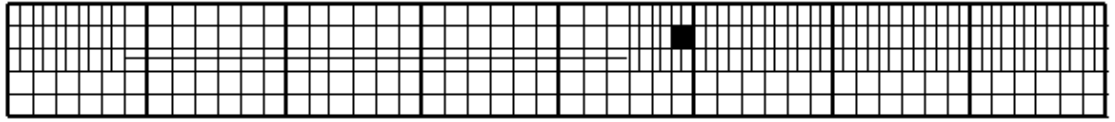
Universal Time

## Apatity ascaplots

Sep. 29, 2016



Sep. 30, 2016

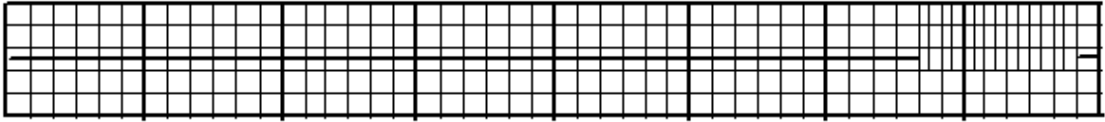


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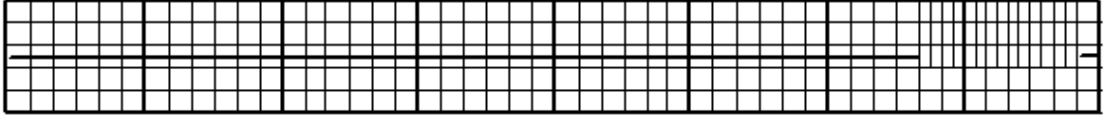
Universal Time

## Lovozero ascaplots

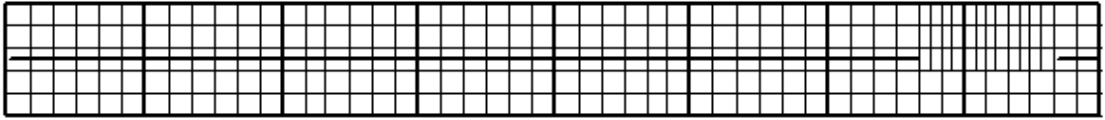
Aug. 01, 2016



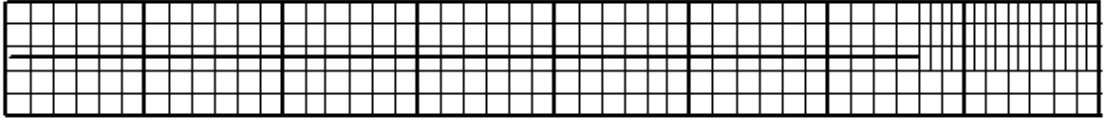
Aug. 02, 2016



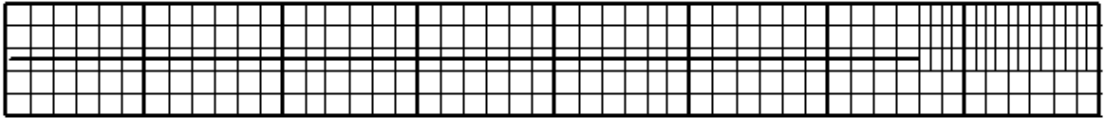
Aug. 03, 2016



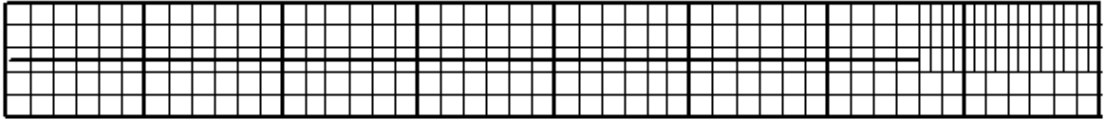
Aug. 04, 2016



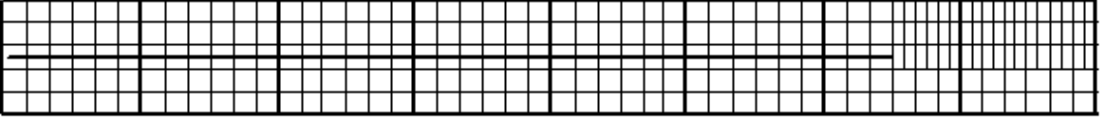
Aug. 05, 2016



Aug. 06, 2016



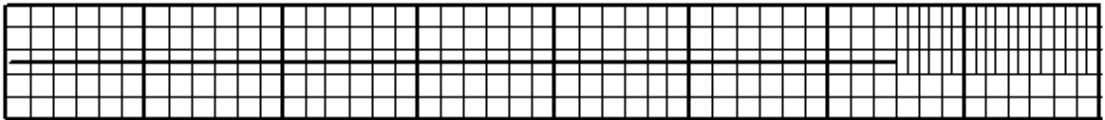
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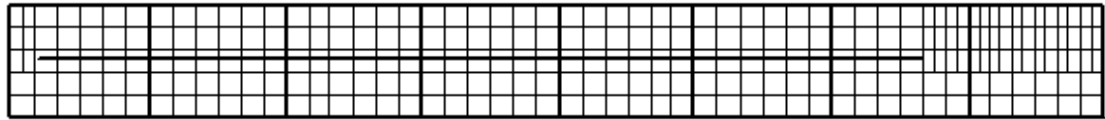
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Aug. 09, 2016



Aug. 10, 2016

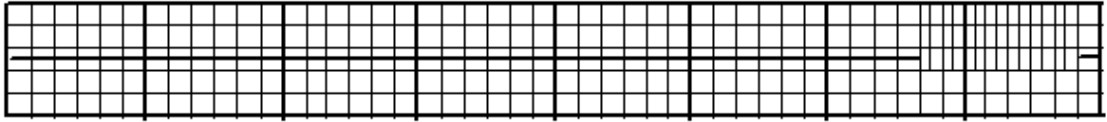


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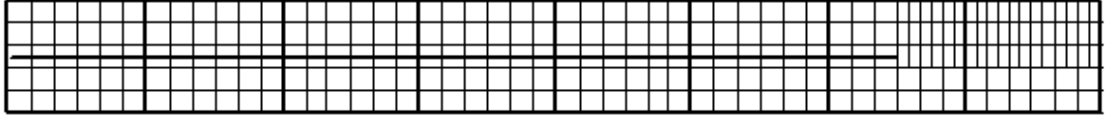
Universal Time

## Lovozero ascaplots

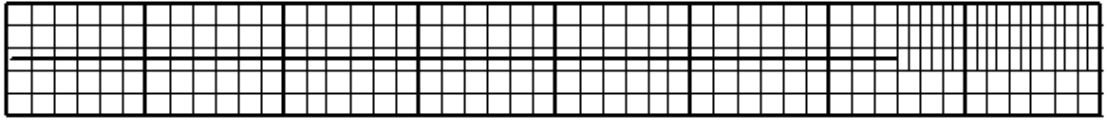
Aug. 11, 2016



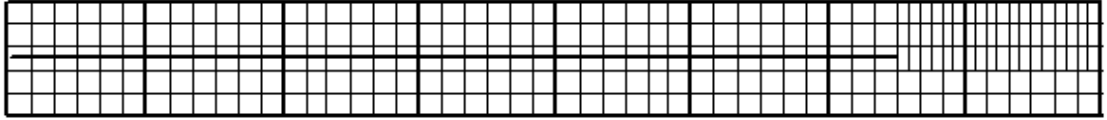
Aug. 12, 2016



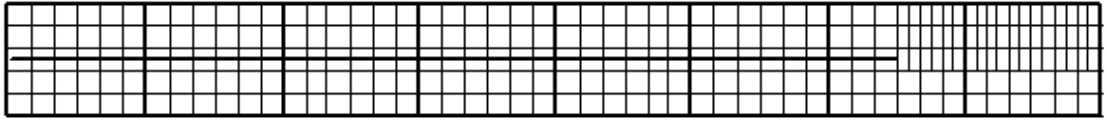
Aug. 13, 2016



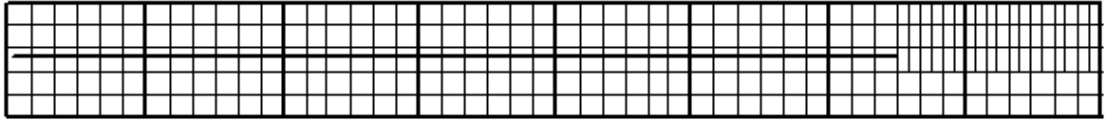
Aug. 14, 2016



Aug. 15, 2016



Aug. 16, 2016



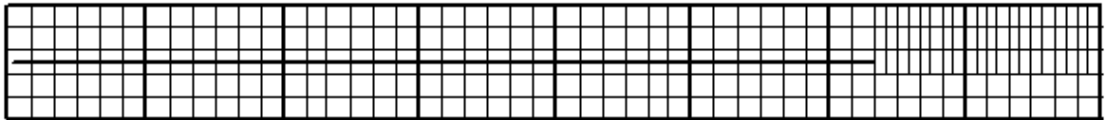
Aug. 17, 2016



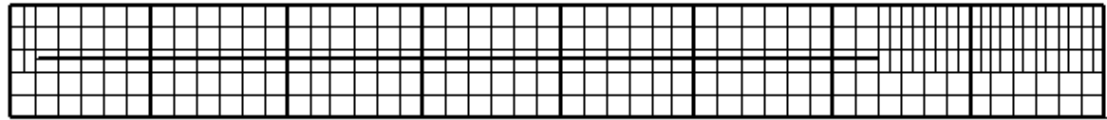
Aug. 18, 2016



Aug. 19, 2016



Aug. 20, 2016

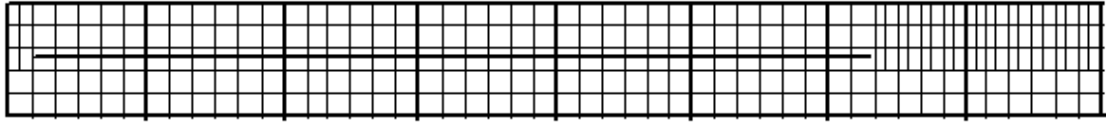


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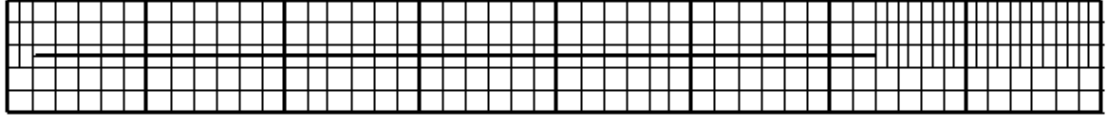
Universal Time

# Lovozero ascaplots

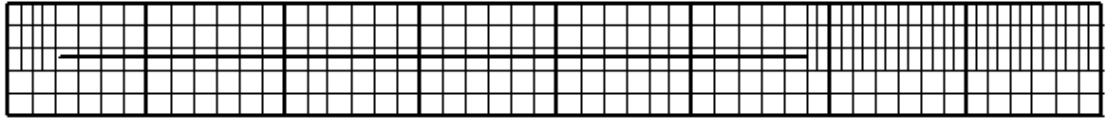
Aug. 21, 2016



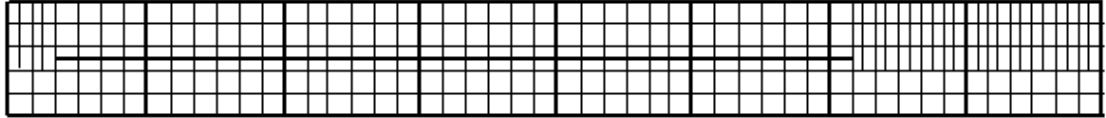
Aug. 22, 2016



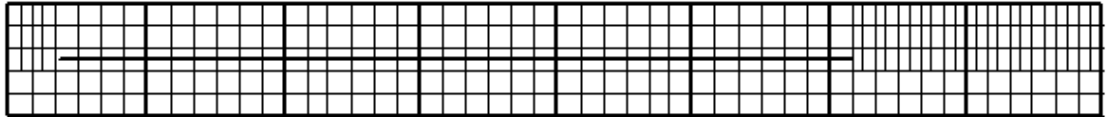
Aug. 23, 2016



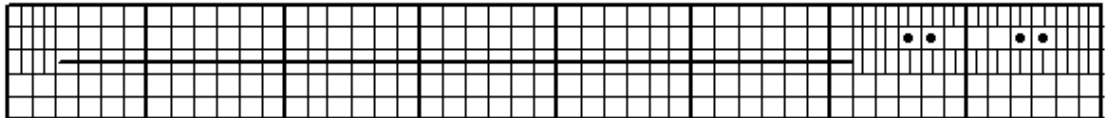
Aug. 24, 2016



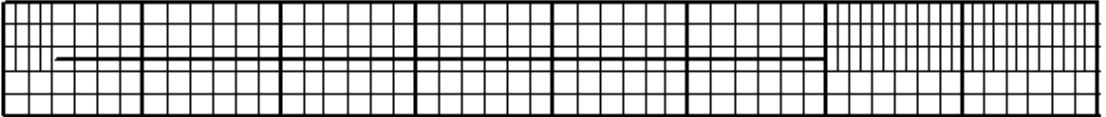
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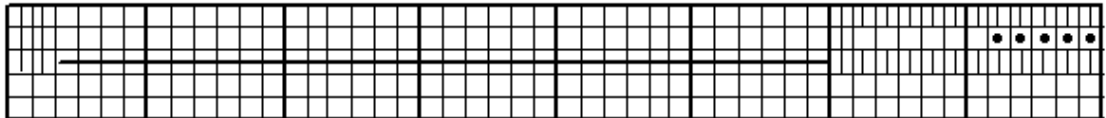
Aug. 26, 2016



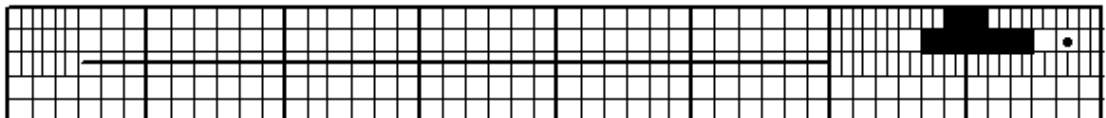
Aug. 27, 2016



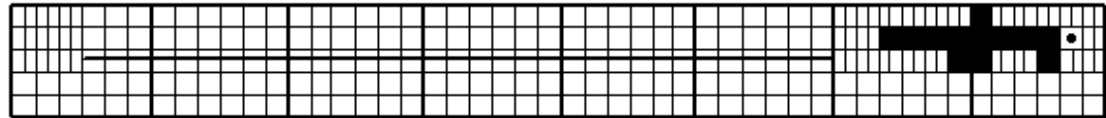
Aug. 28, 2016



Aug. 29, 2016



Aug. 30, 2016

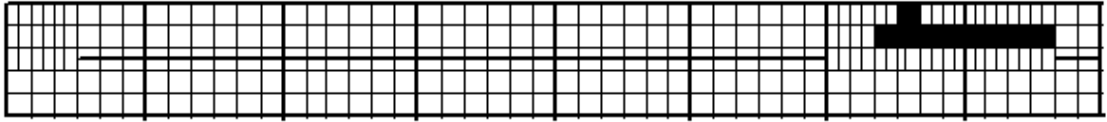


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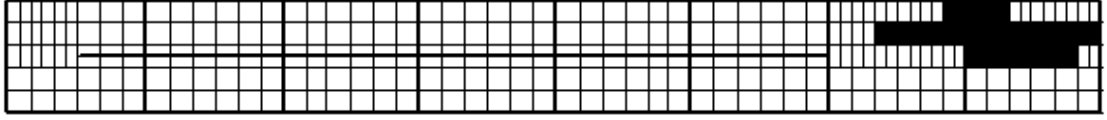
Universal Time

# Lovozero ascaplots

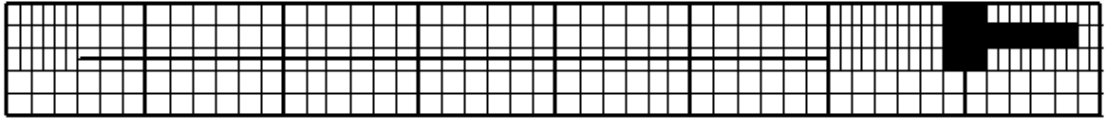
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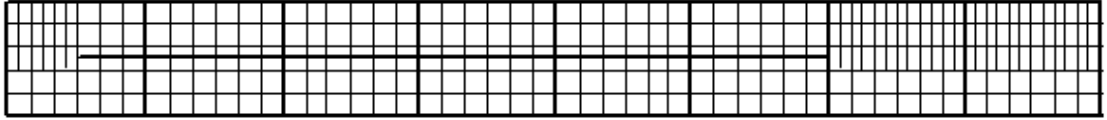
Sep. 01, 2016



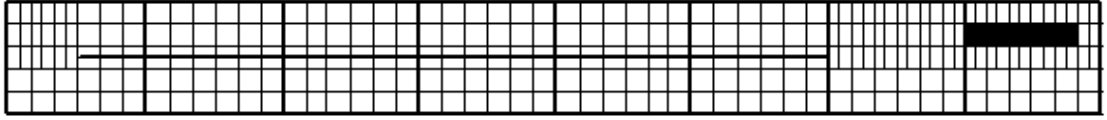
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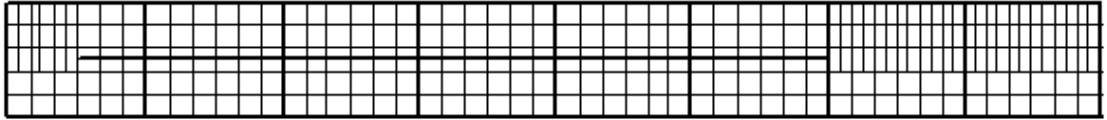
Sep. 03, 2016



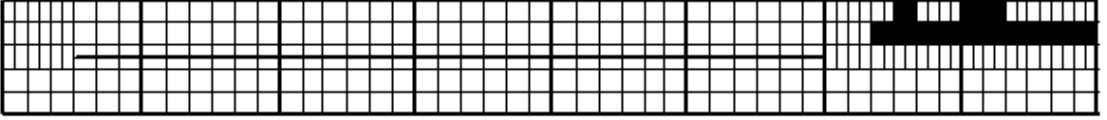
Sep. 04, 2016



Sep. 05, 2016



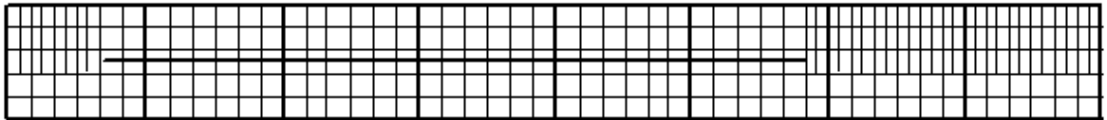
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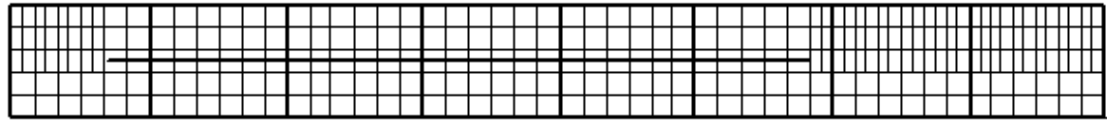
Sep. 07, 2016



Sep. 08, 2016



Sep. 09, 2016

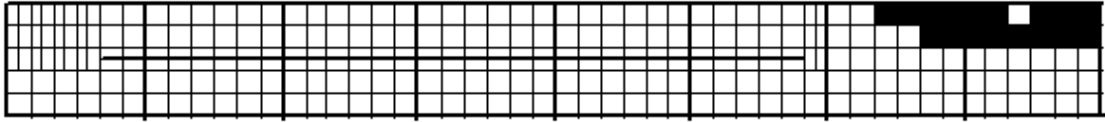


00 06 12 18 24

Universal Time

## Lovozero ascaplots

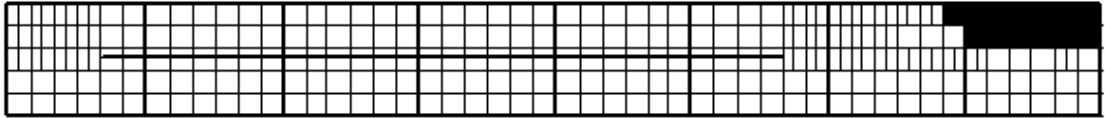
Sep. 10, 2016



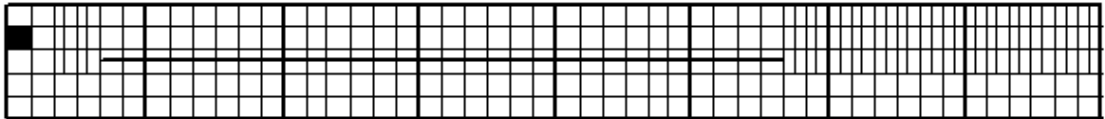
Sep. 11, 2016



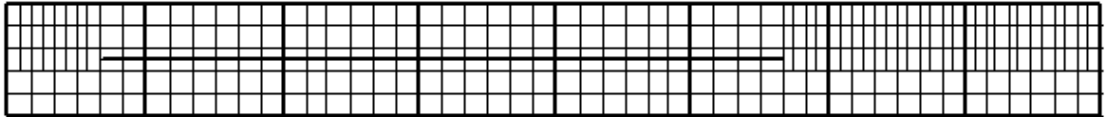
Sep. 12, 2016



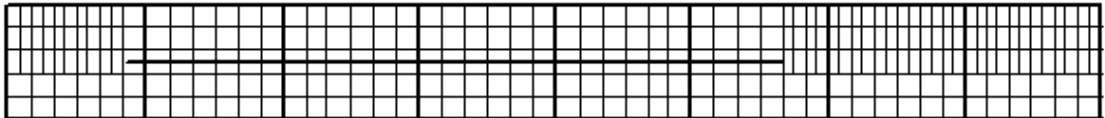
Sep. 13, 2016



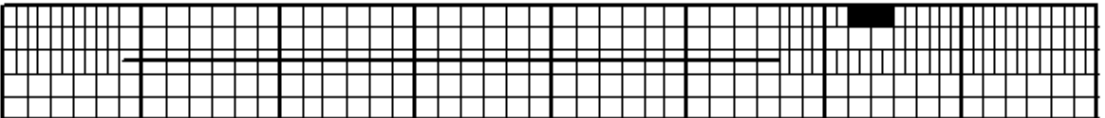
Sep. 14, 2016



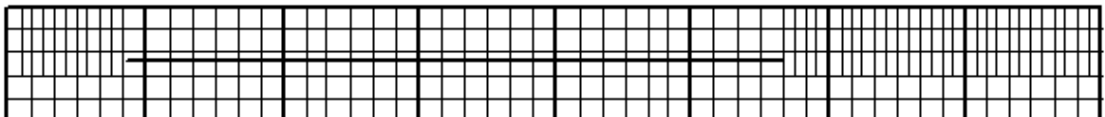
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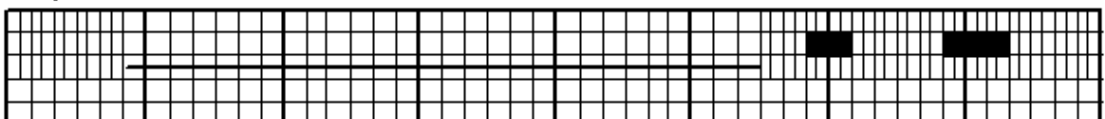
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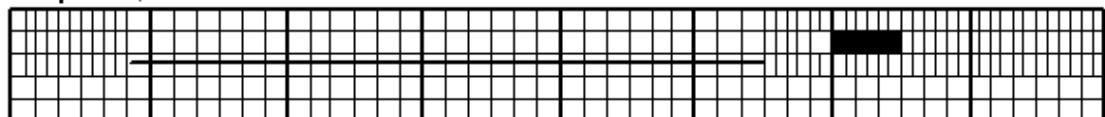
Sep. 17, 2016



Sep. 18, 2016



Sep. 19, 2016

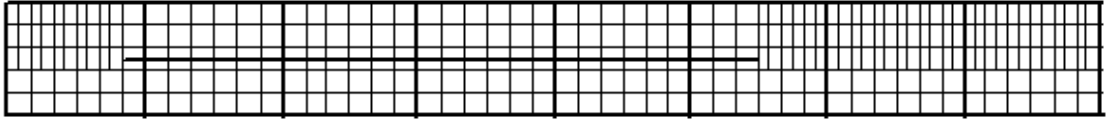


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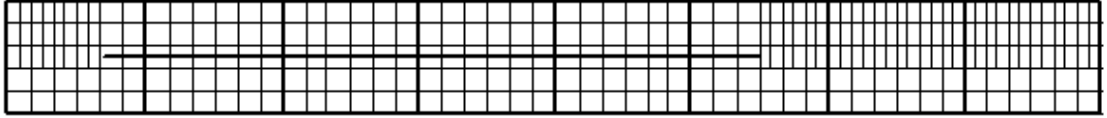
Universal Time

## Lovozero ascaplots

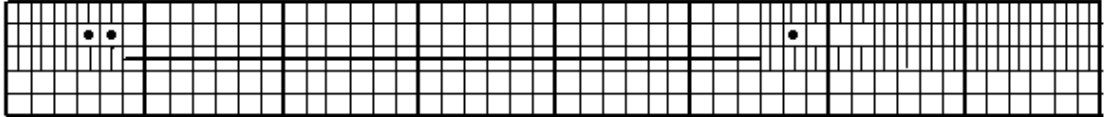
Sep. 20, 2016



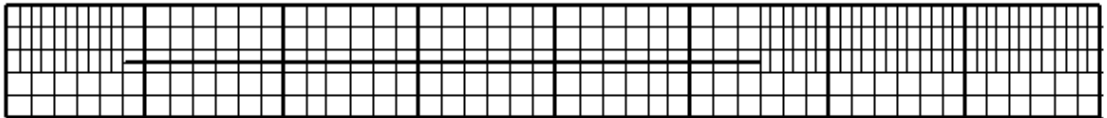
Sep. 21, 2016



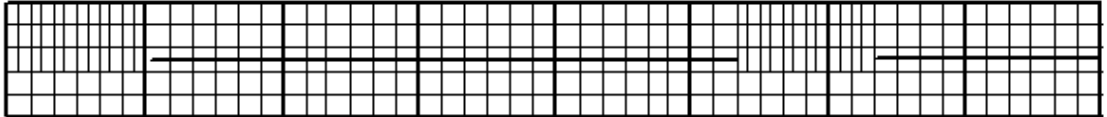
Sep. 22, 2016



Sep. 23, 2016



Sep. 24, 2016



00

06

12

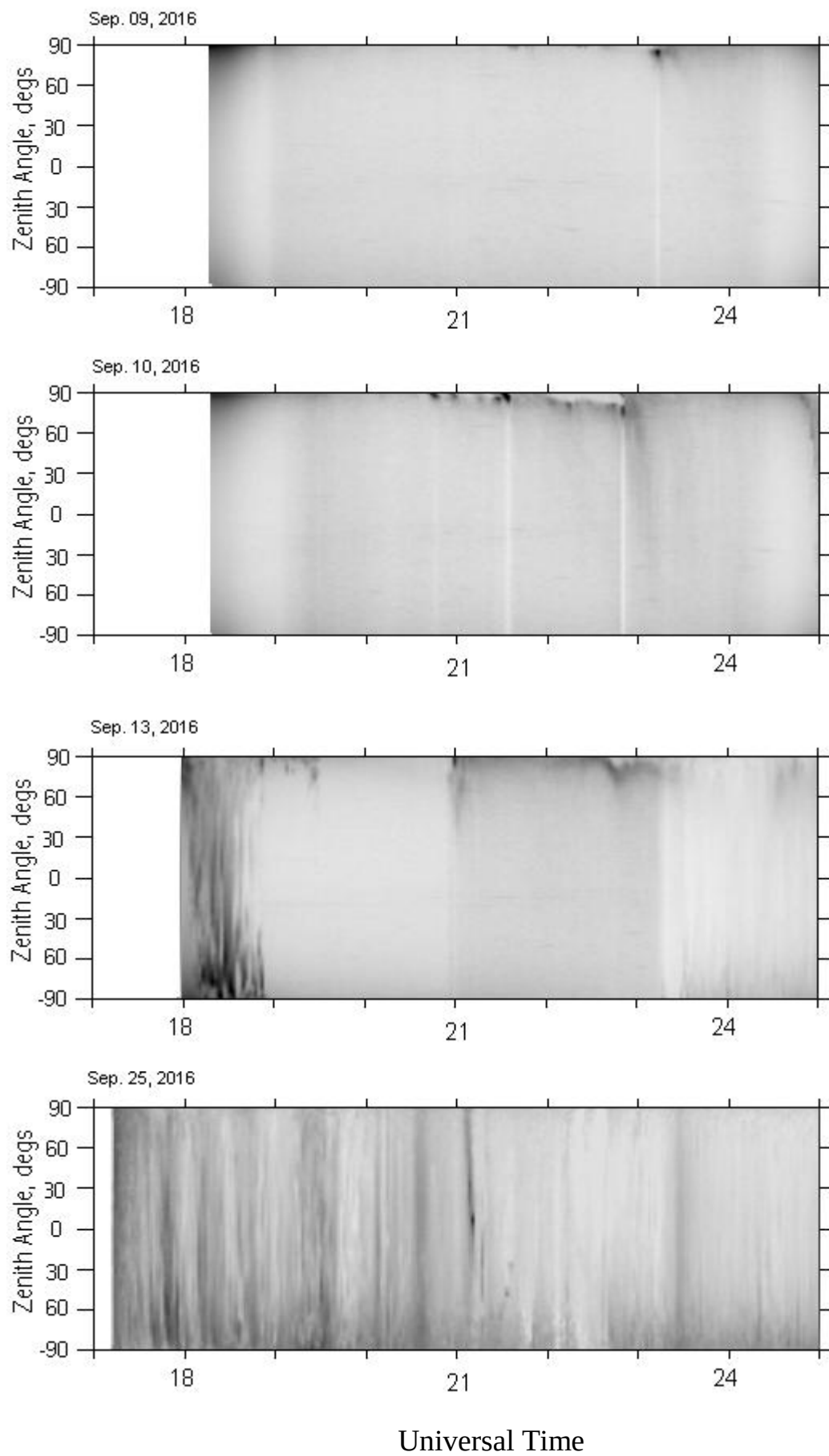
18

24

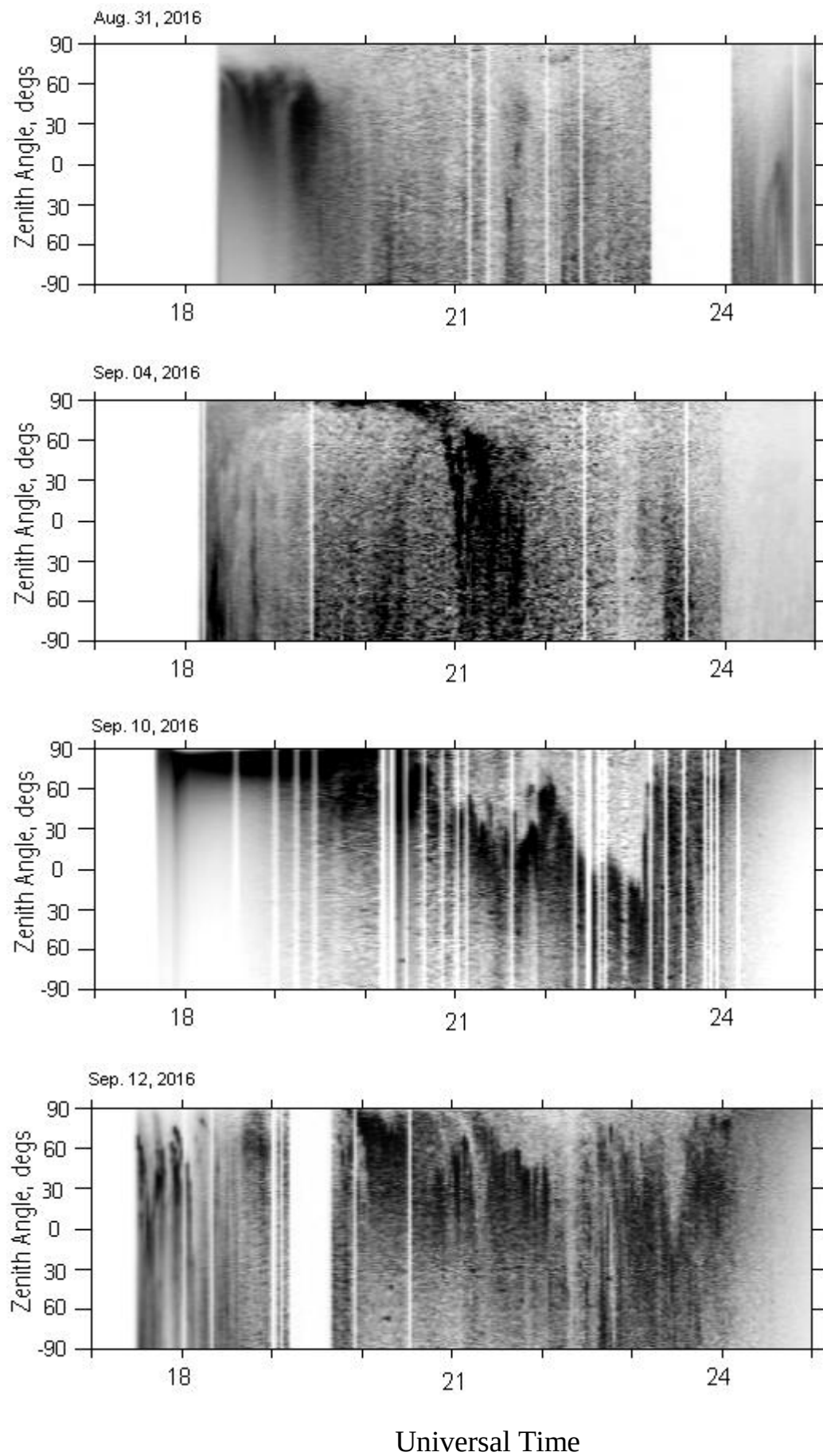
Universal Time



## Apatity TV keograms



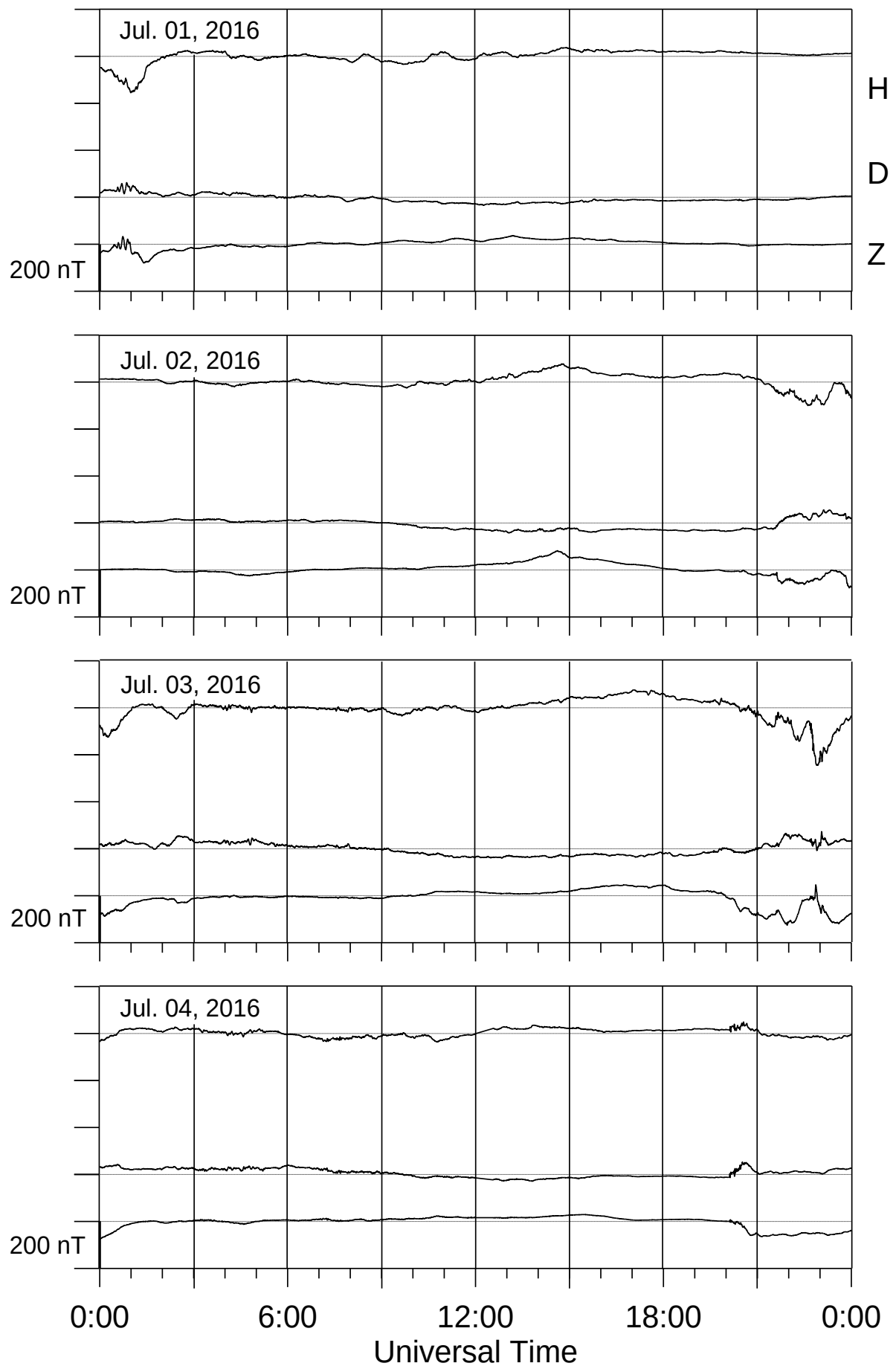
## Lovozero TV keograms



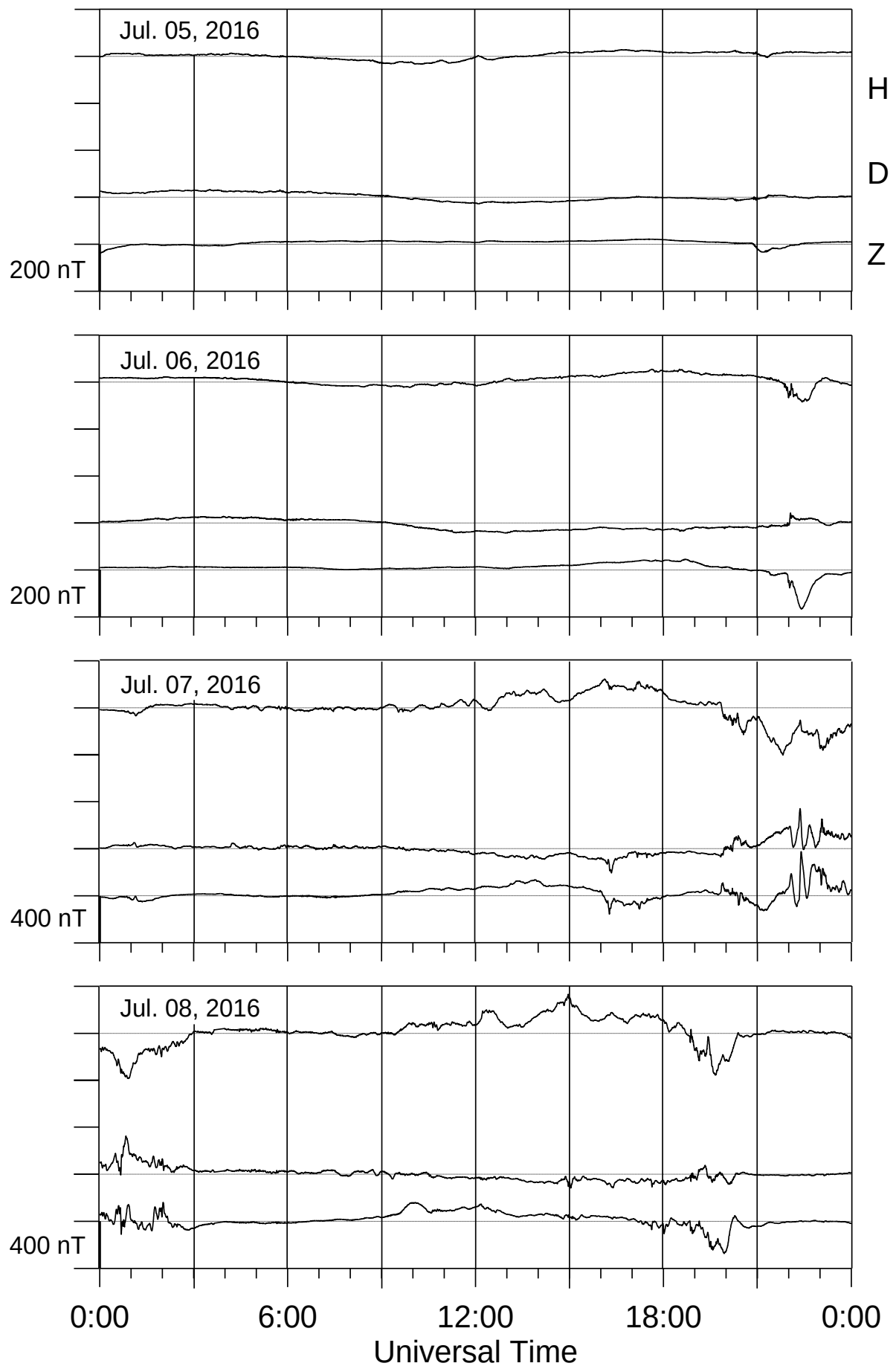
## **LOVOZERO MAGNETOGRAMS**

**July - September 2016**

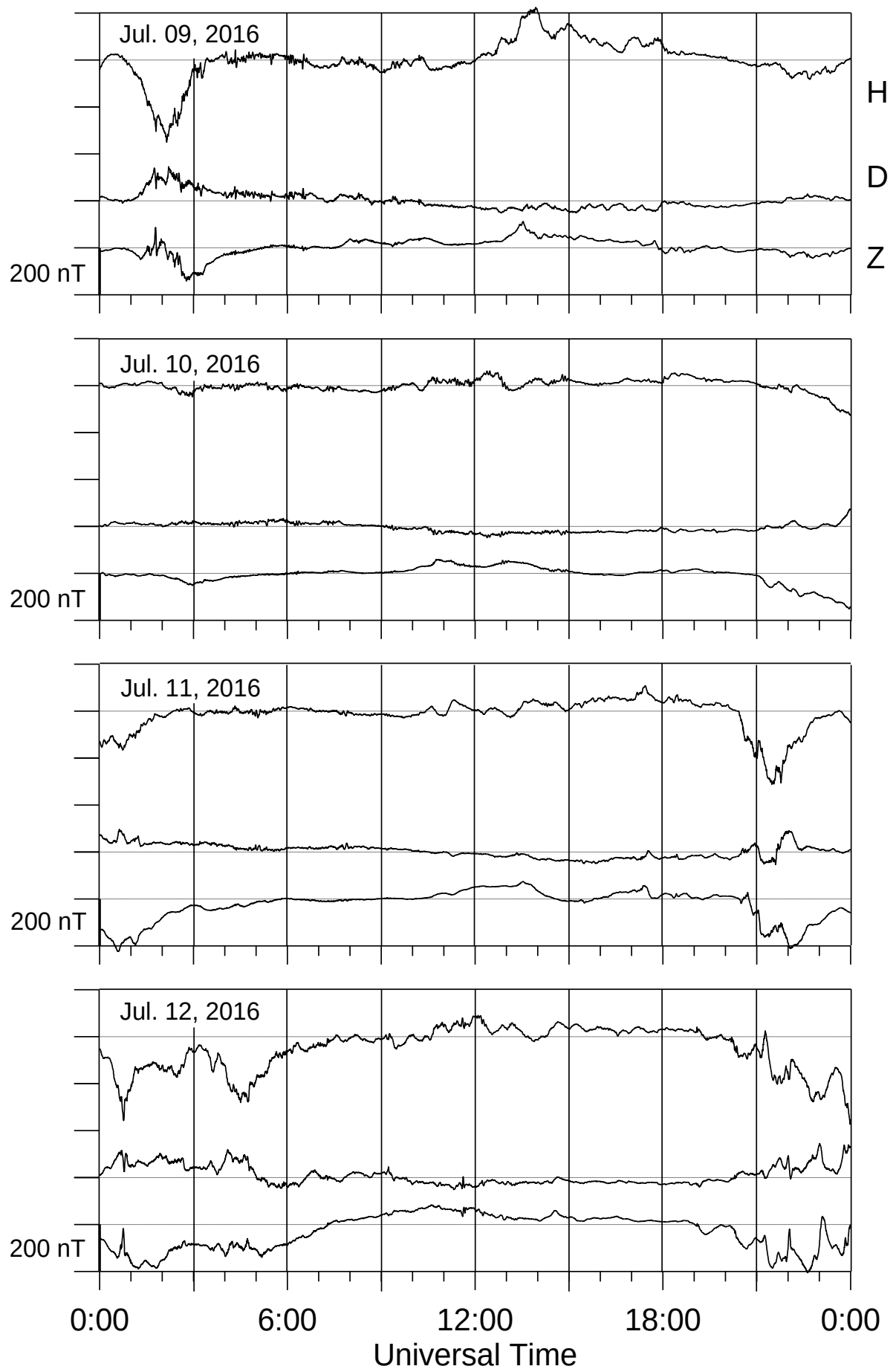
## Lovozero magnetometer



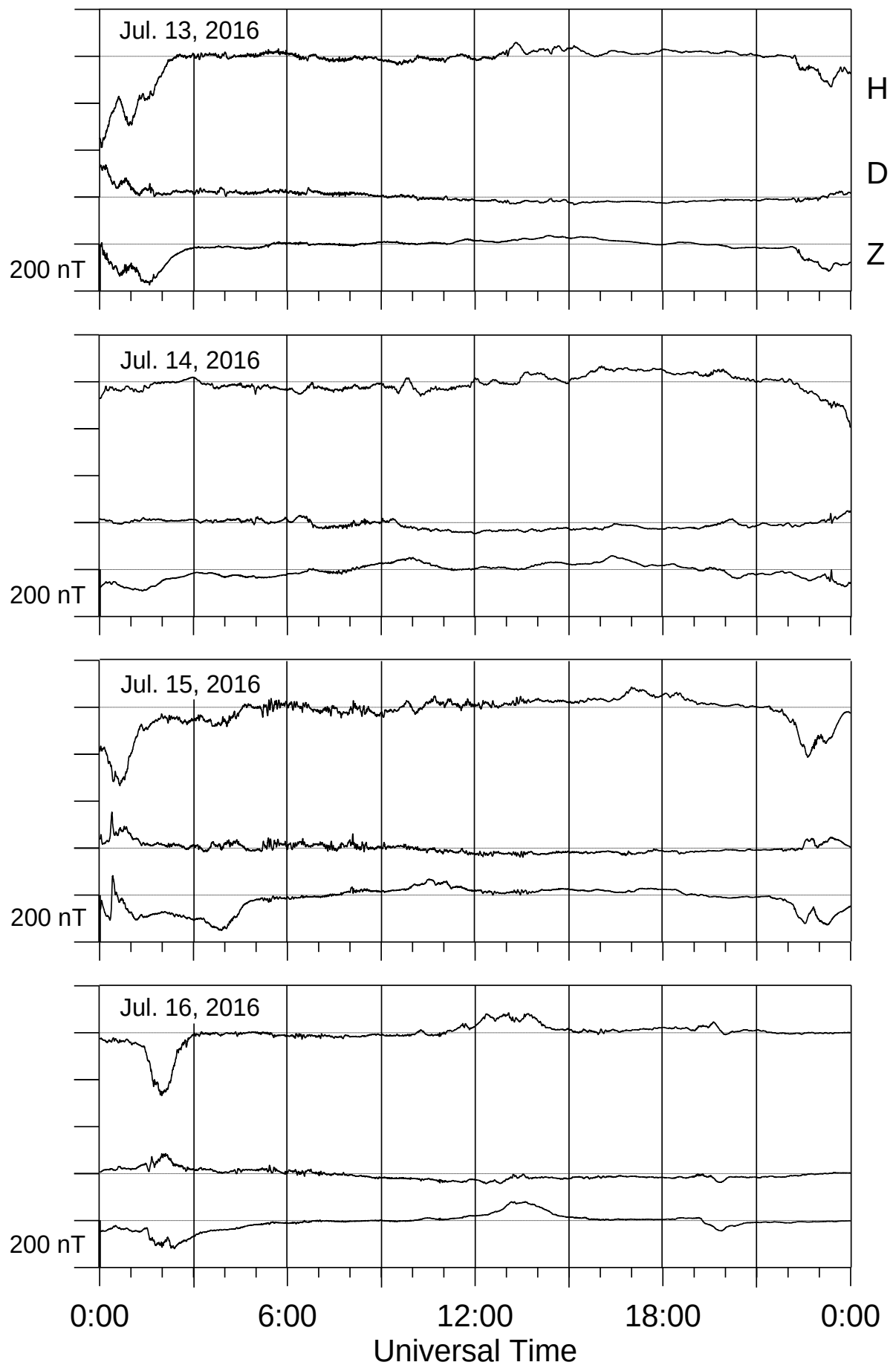
## Lovozero magnetometer



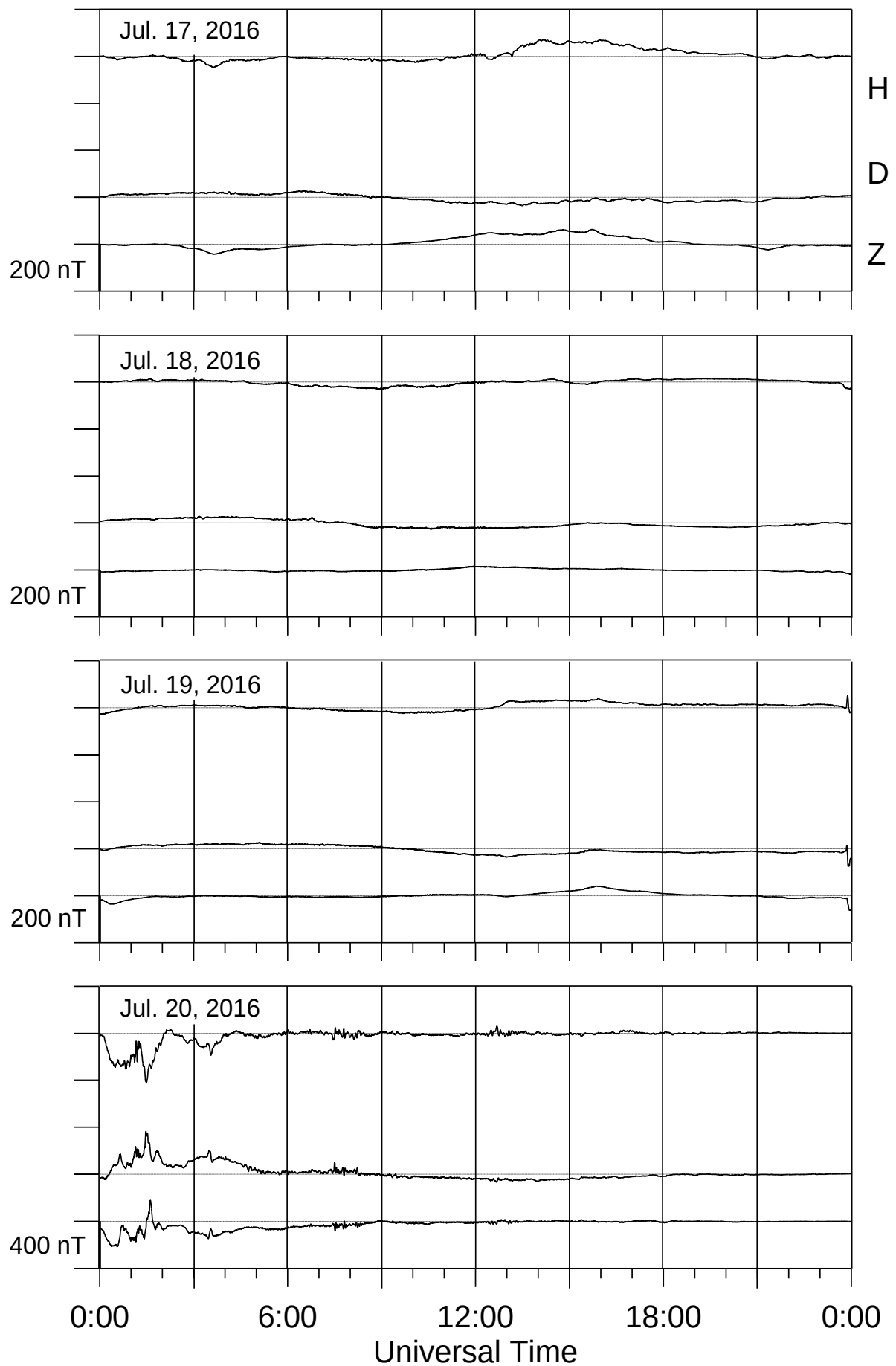
## Lovozero magnetometer



## Lovozero magnetometer

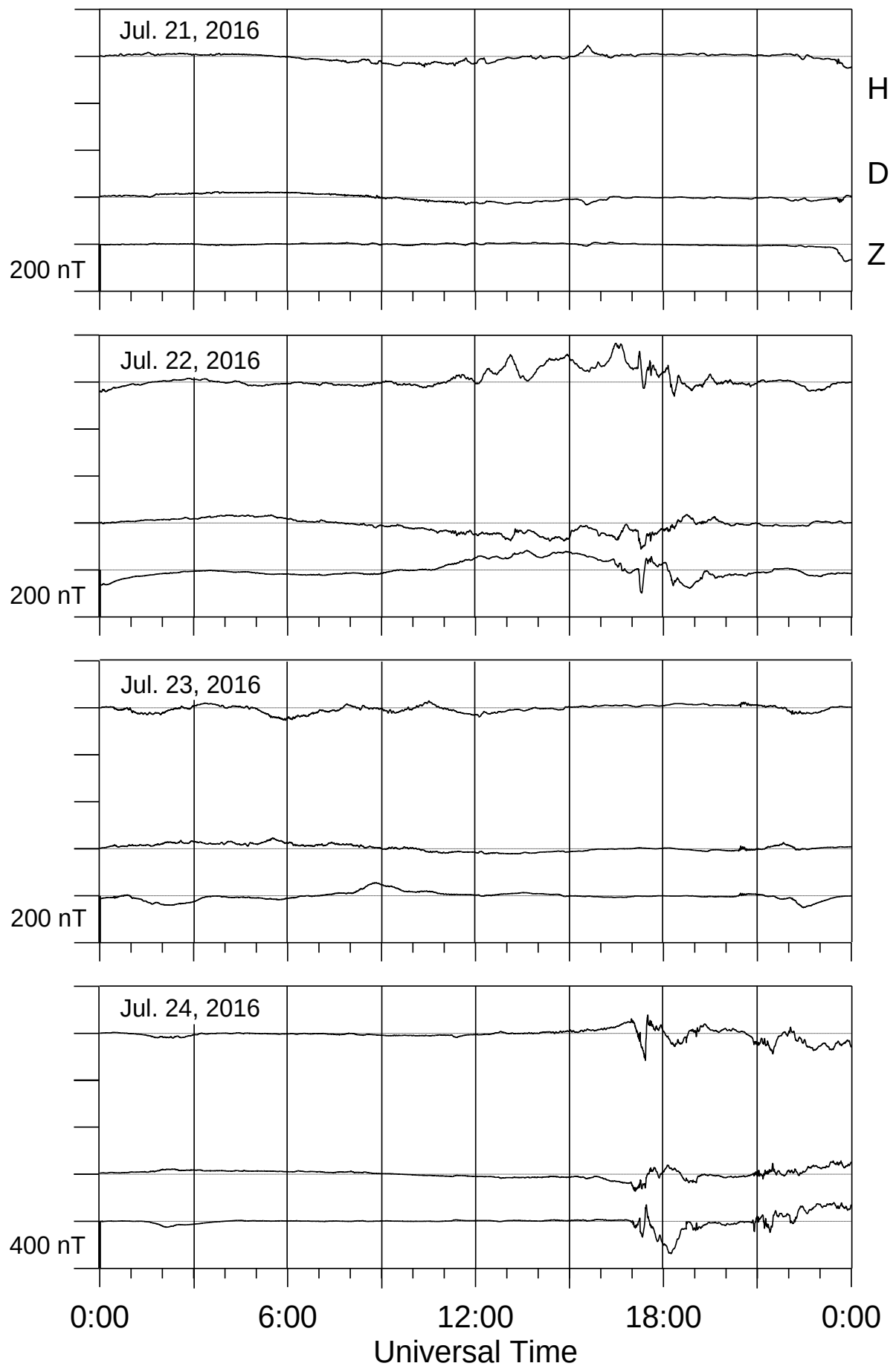


## Lovozero magnetometer

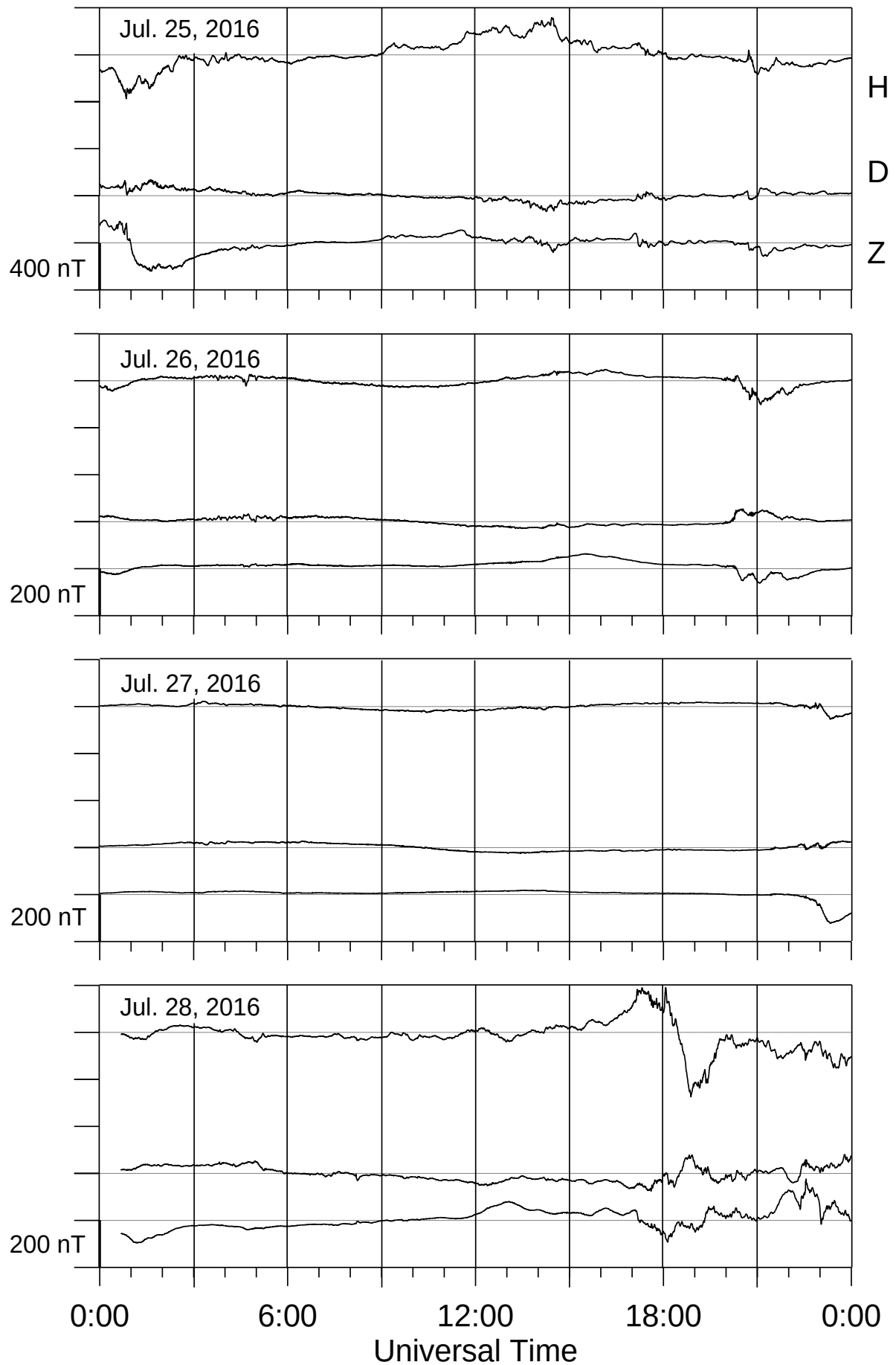




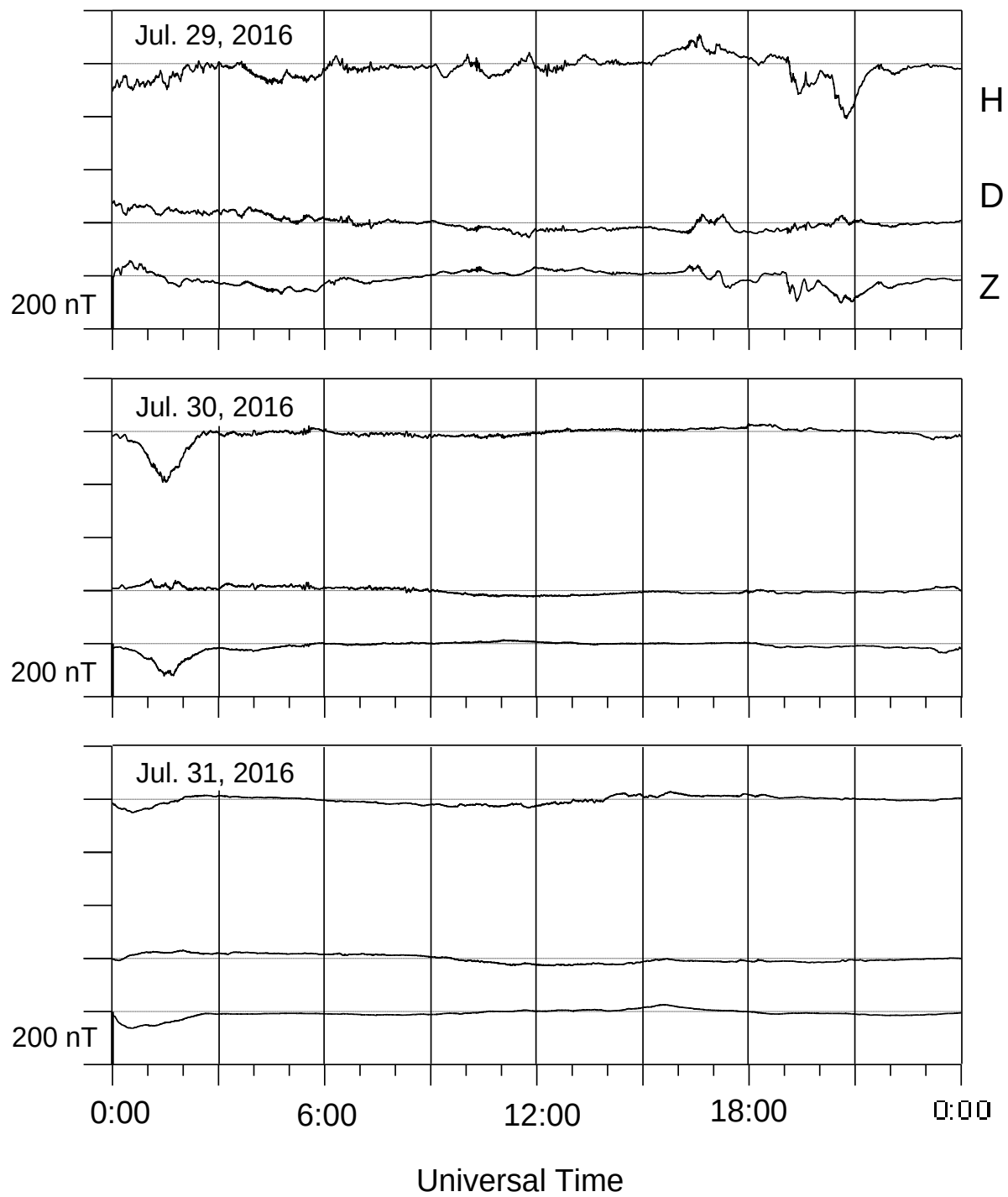
## Lovozero magnetometer



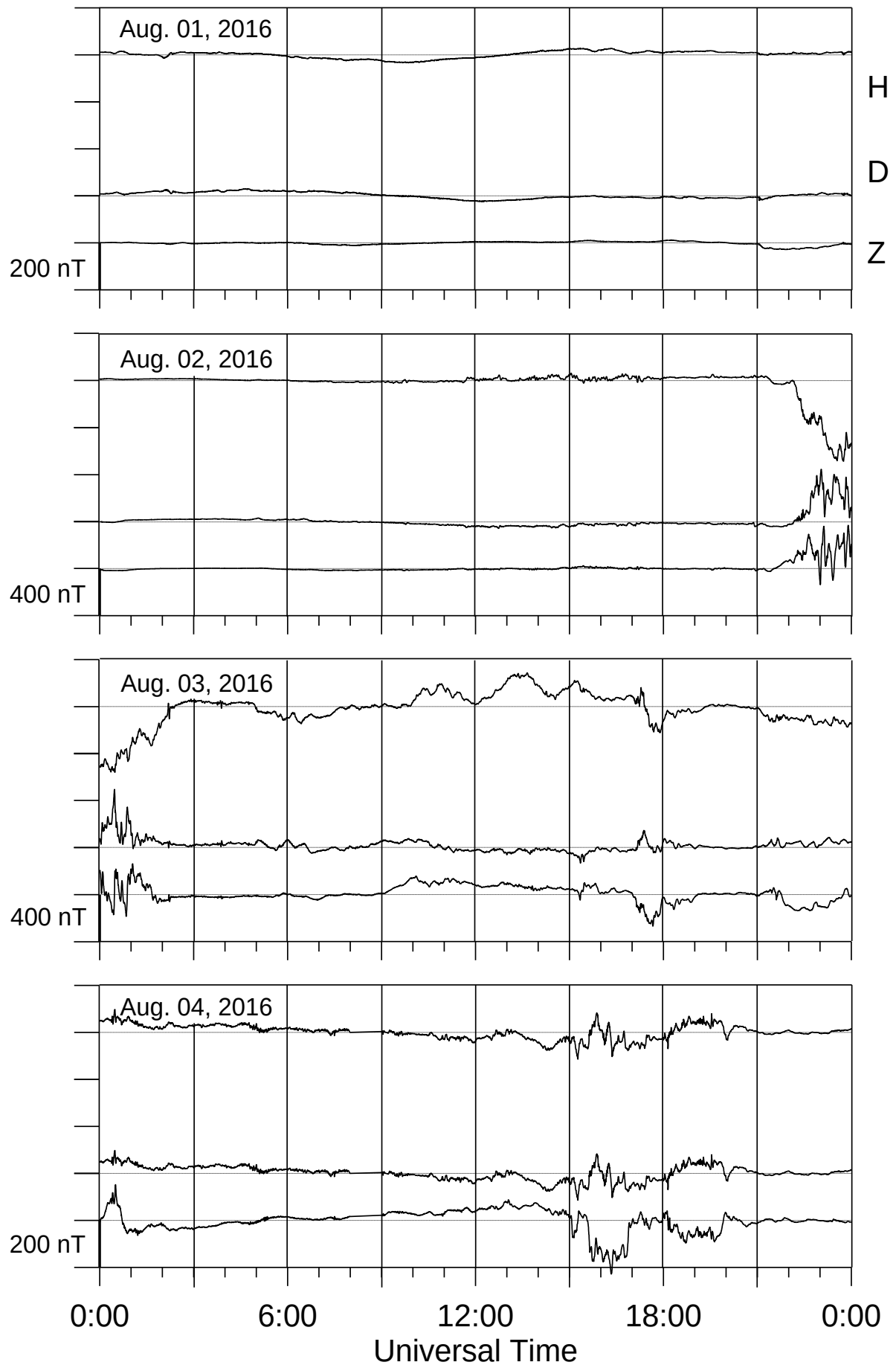
## Lovozero magnetometer



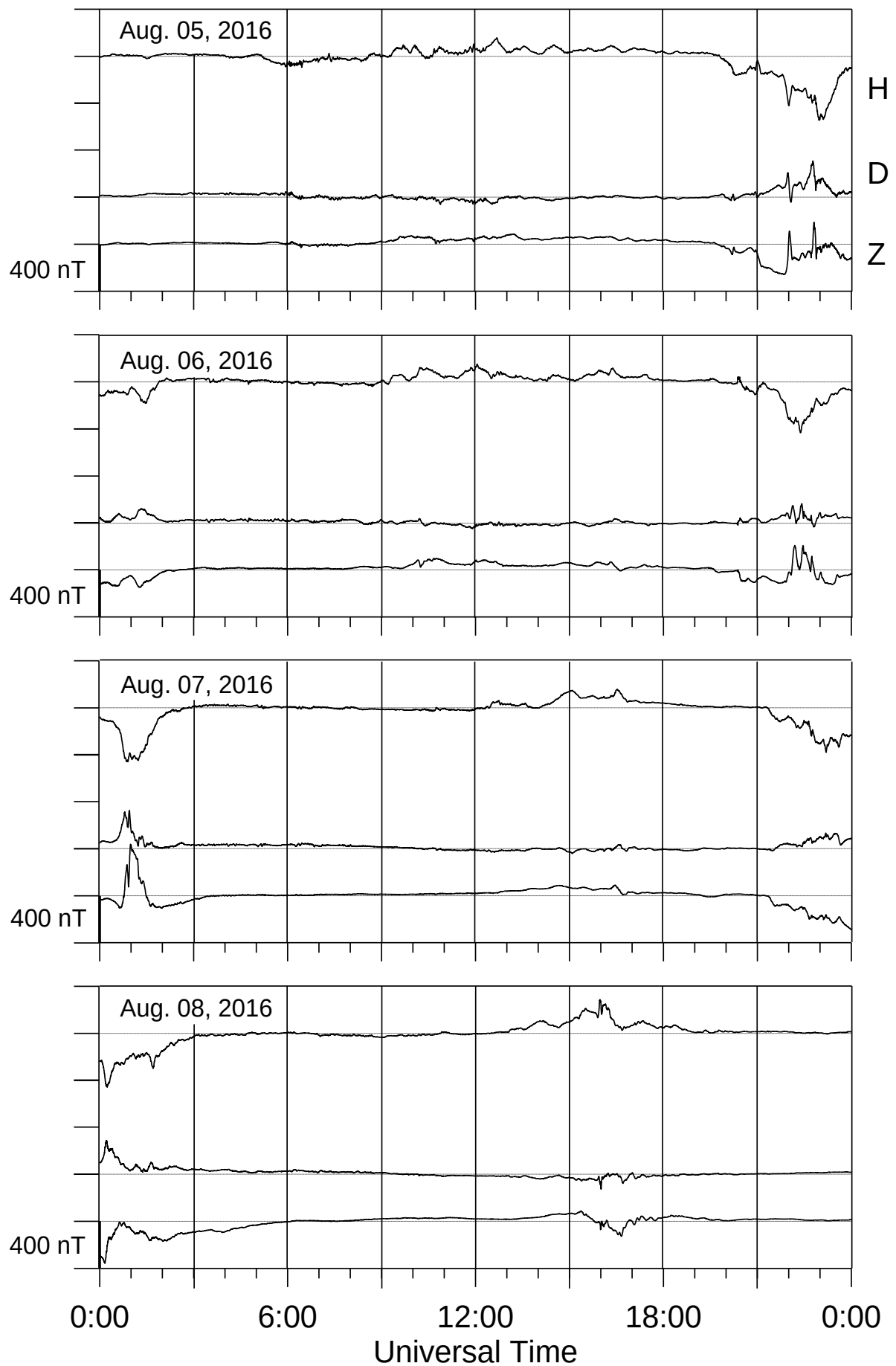
## Lovozero magnetometer



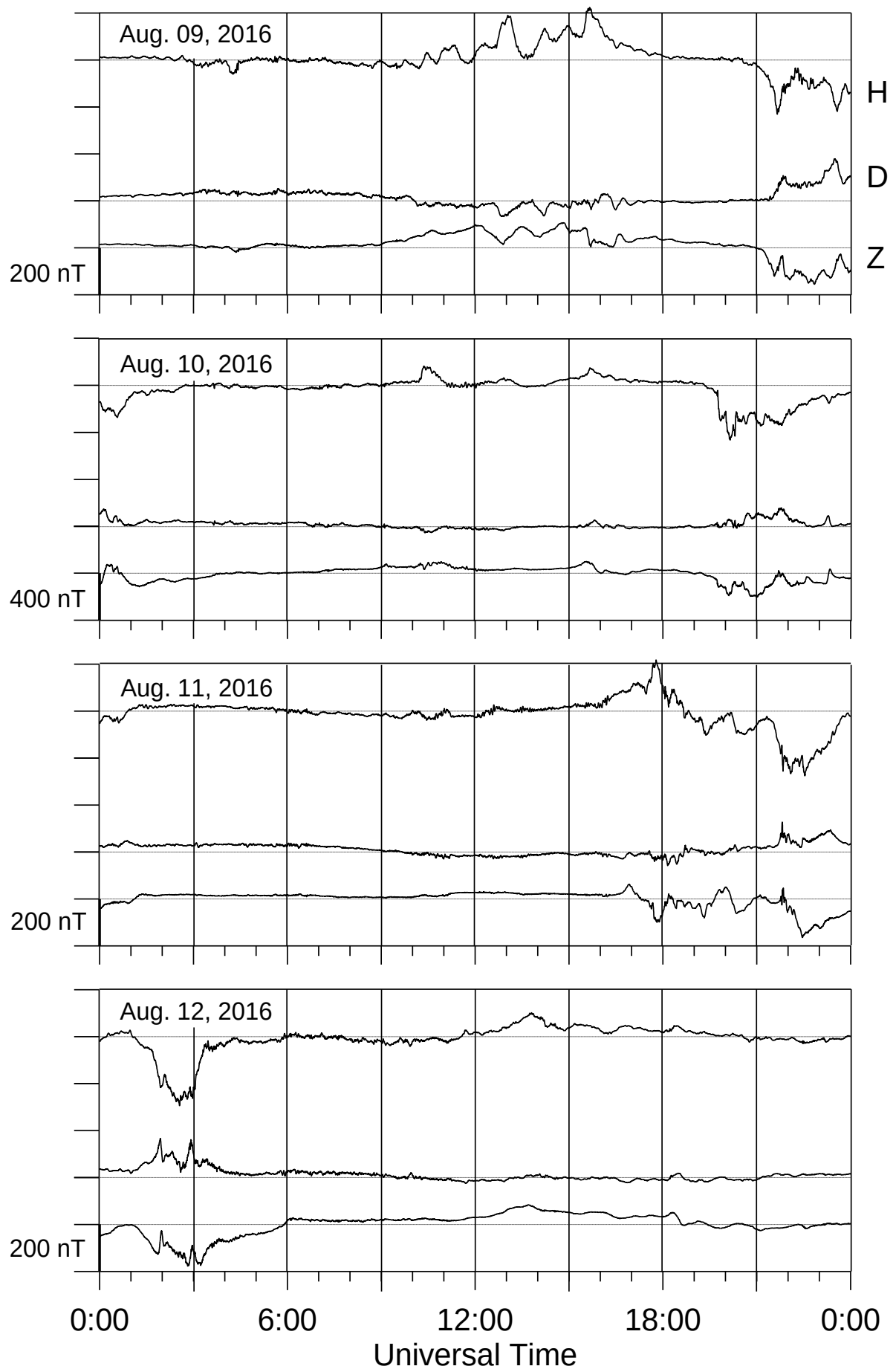
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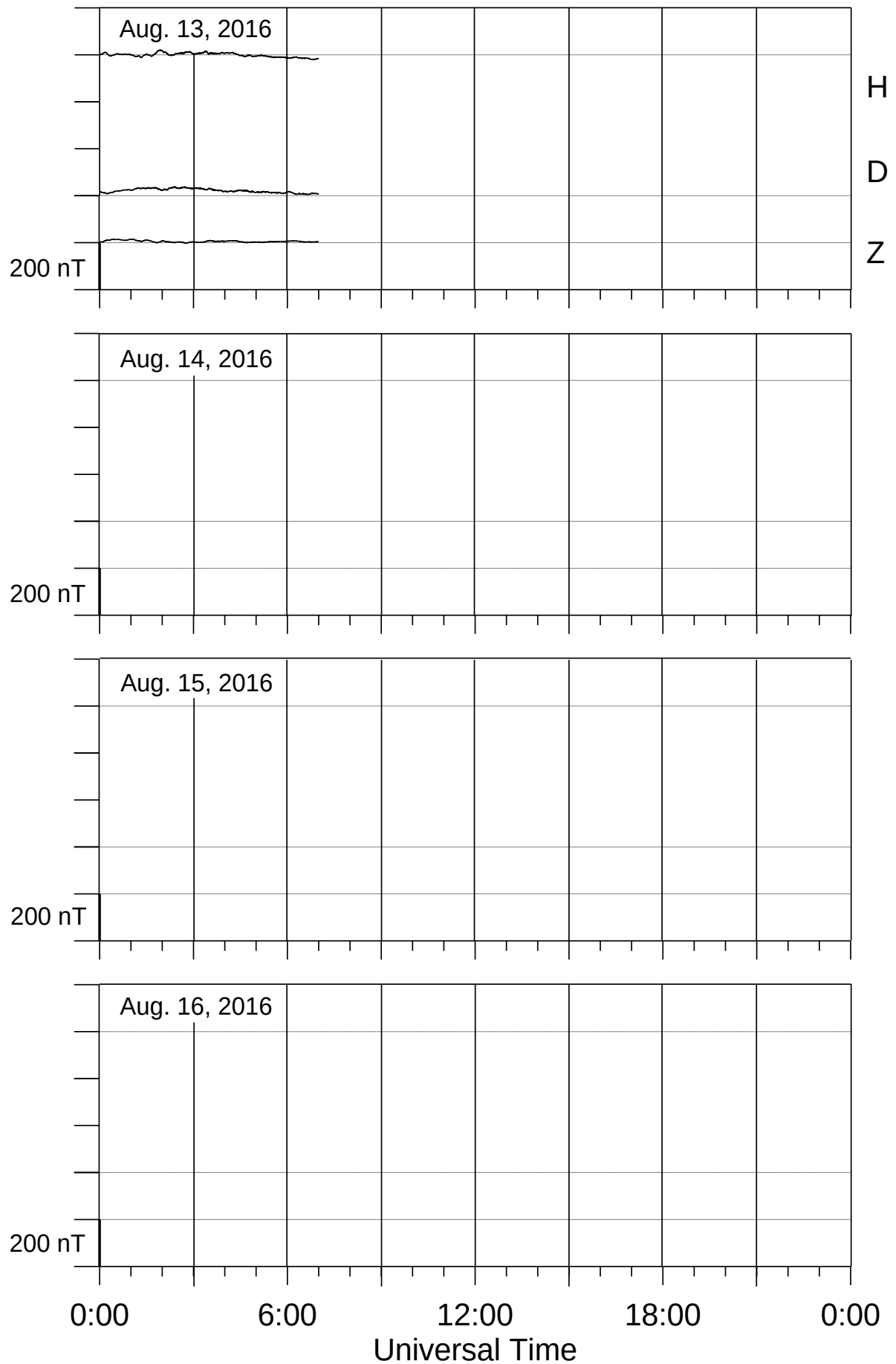
## Lovozero magnetometer



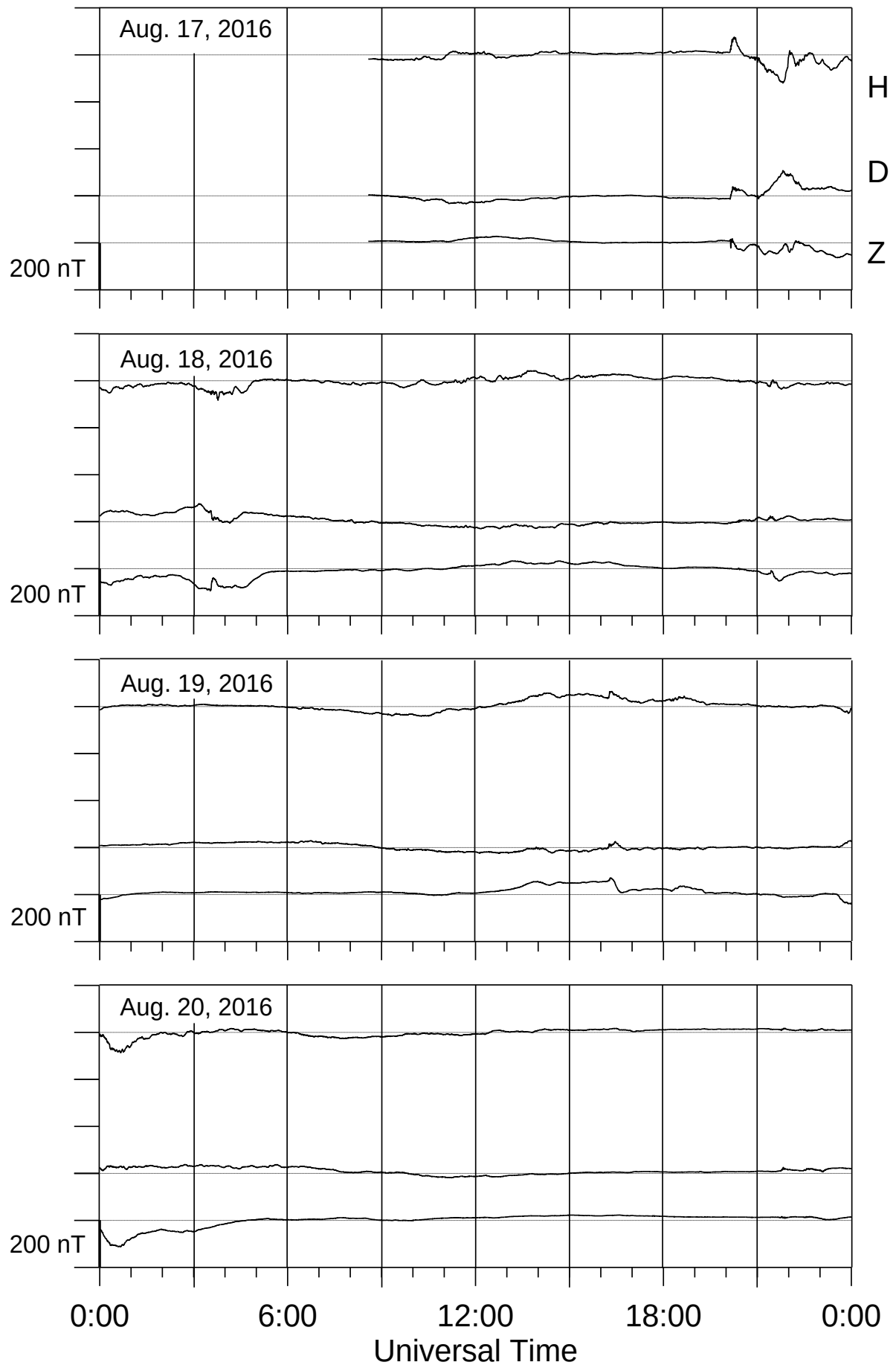
## Lovozero magnetometer



## Lovozero magnetometer

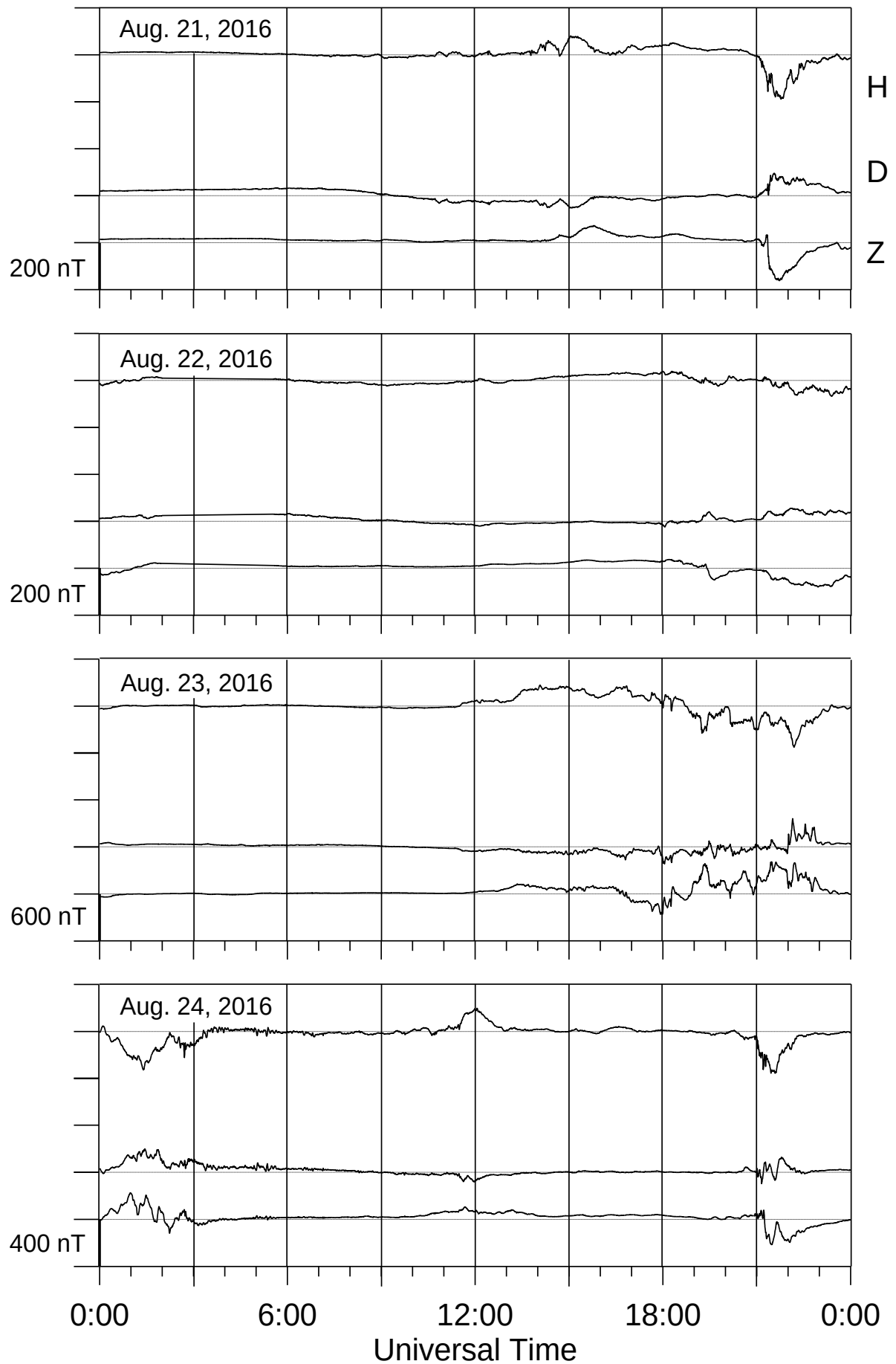


## Lovozero magnetometer

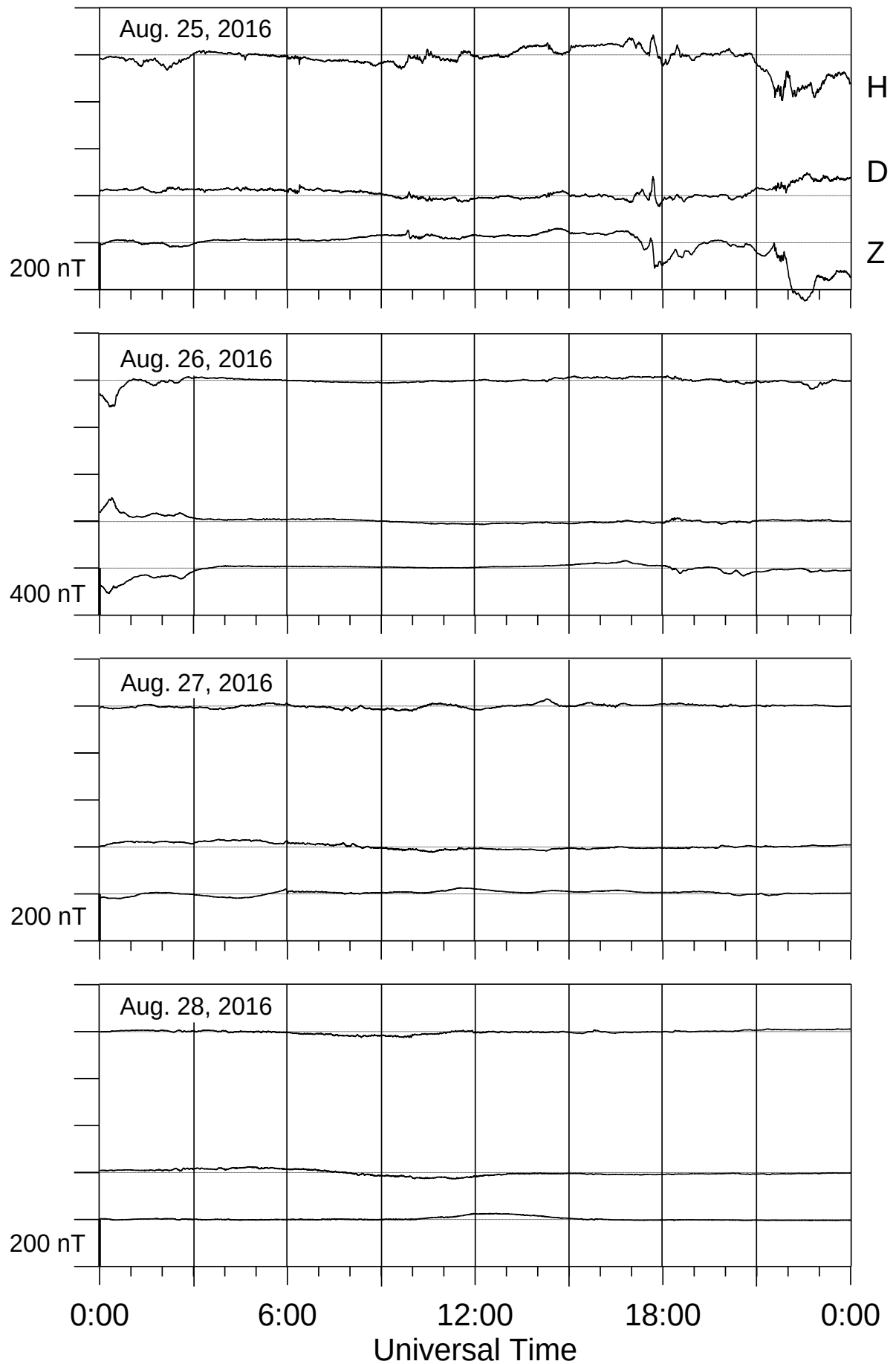




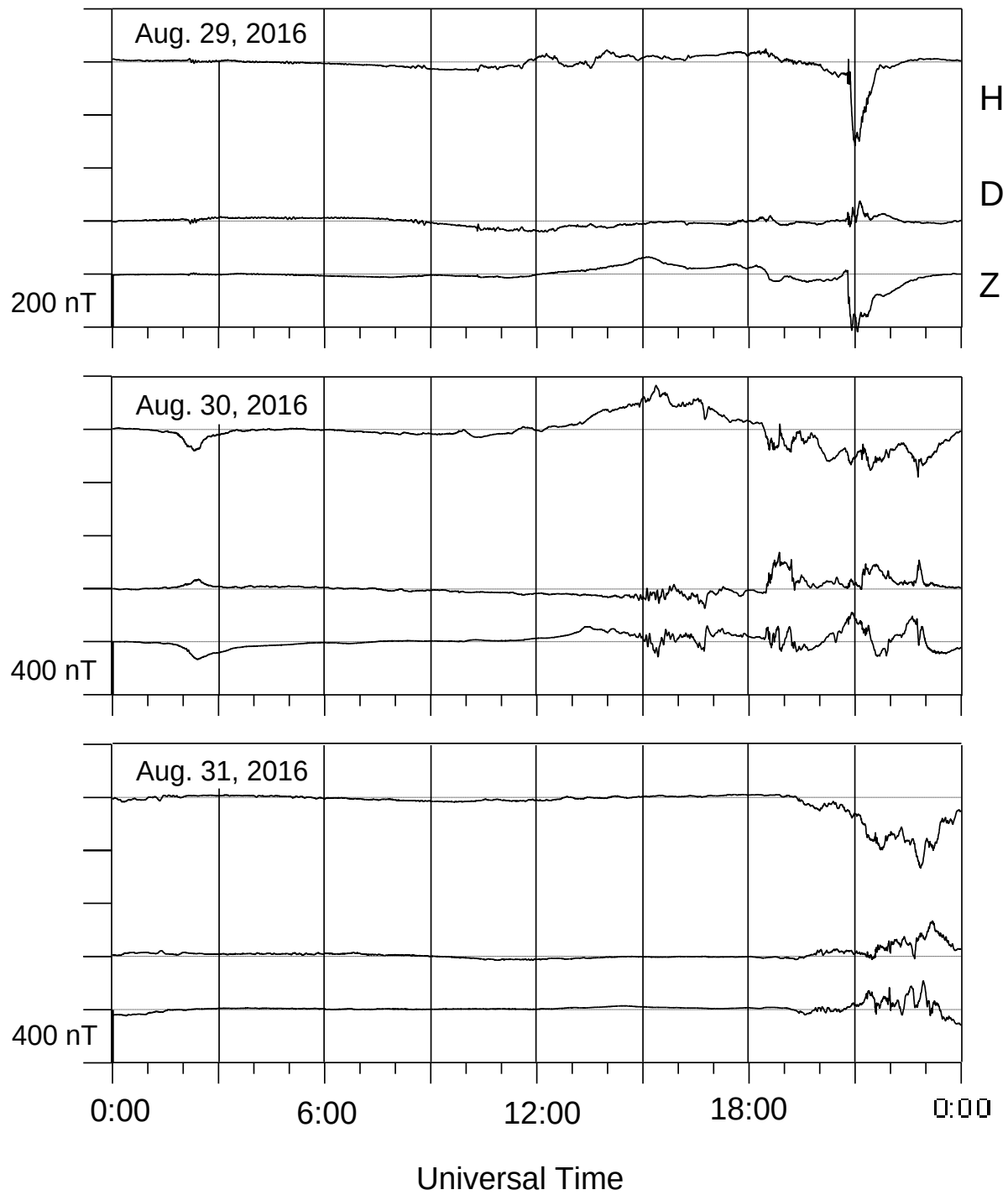
## Lovozero magnetometer



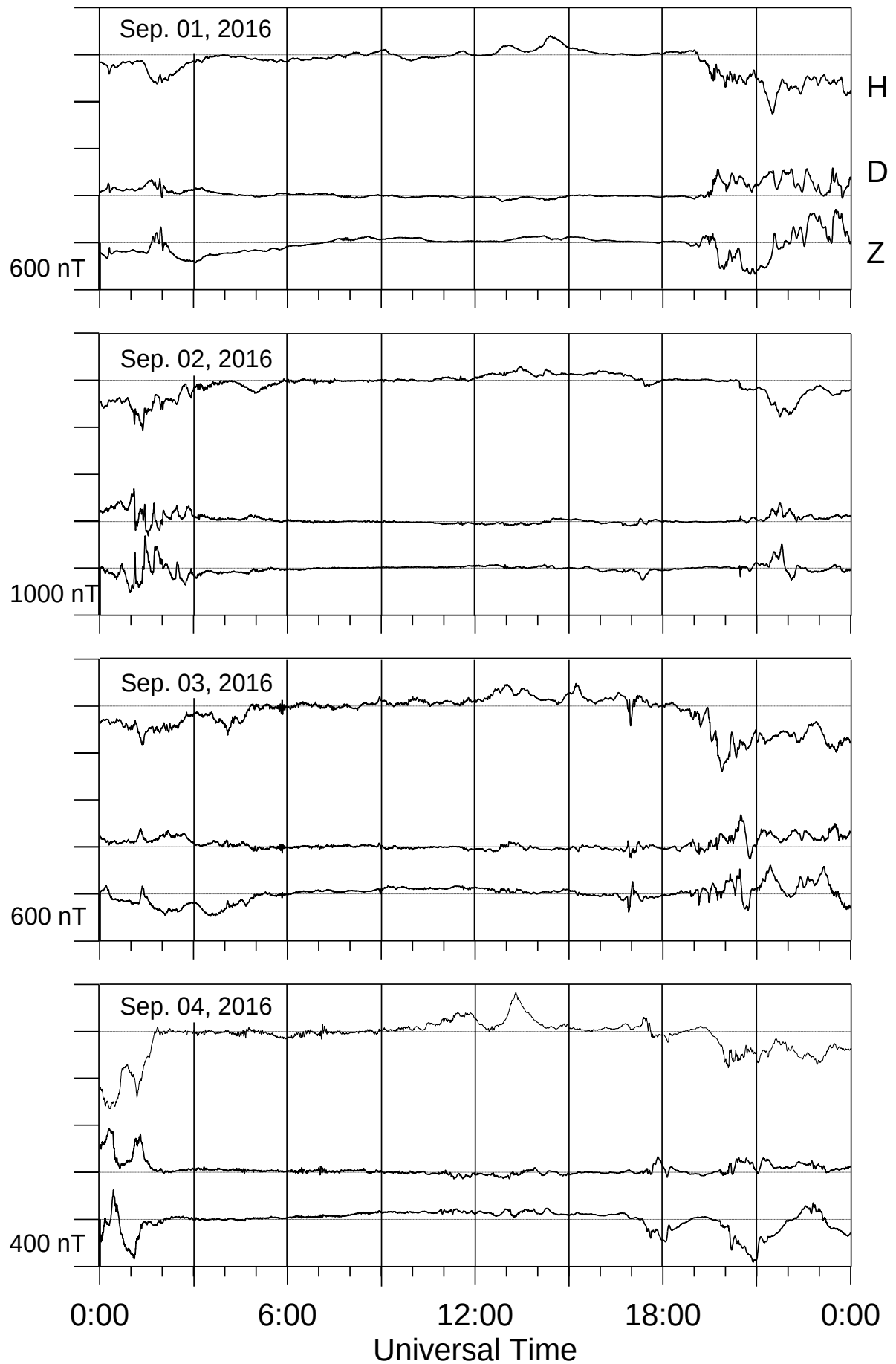
## Lovozero magnetometer



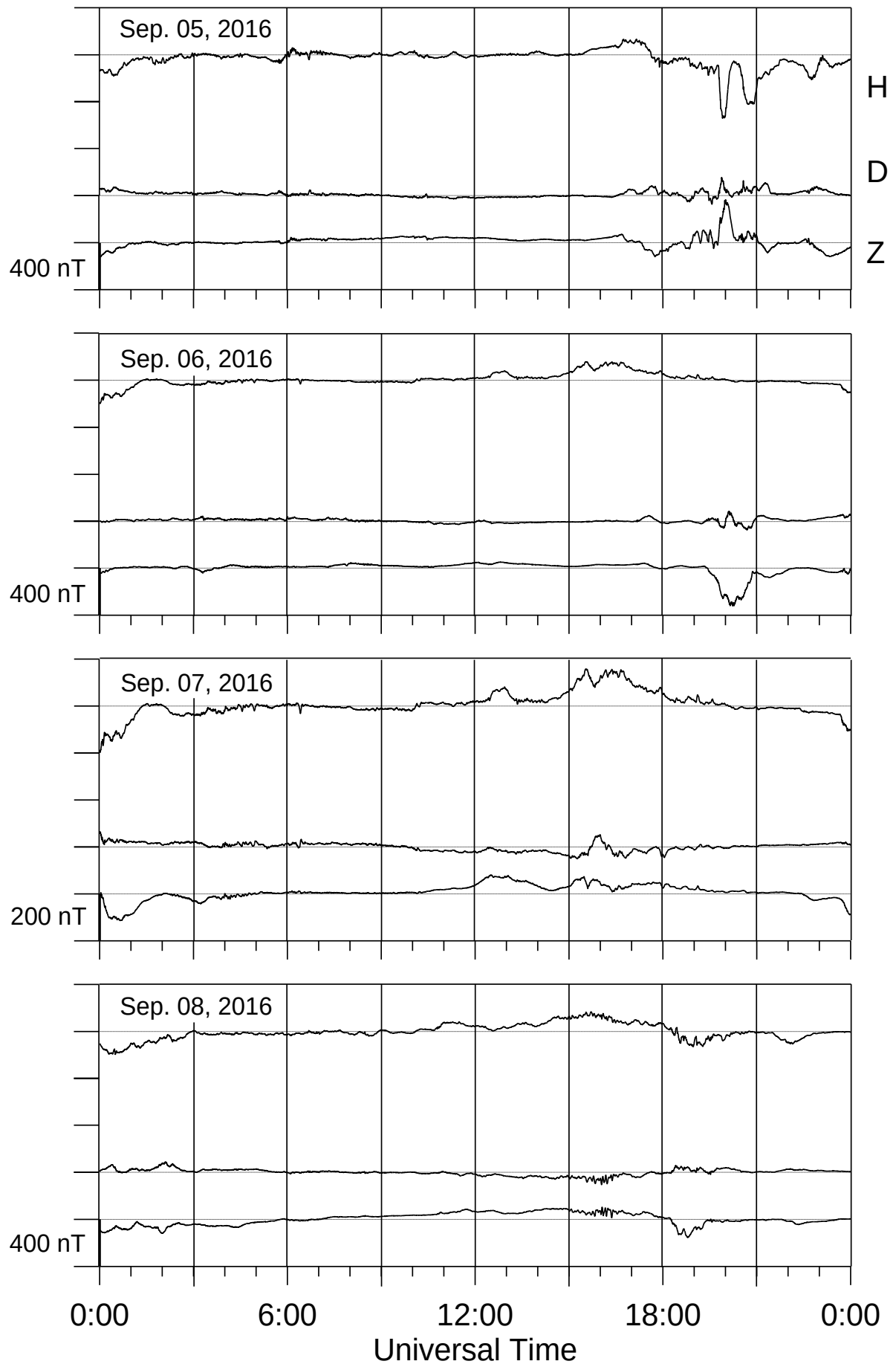
## Lovozero magnetometer



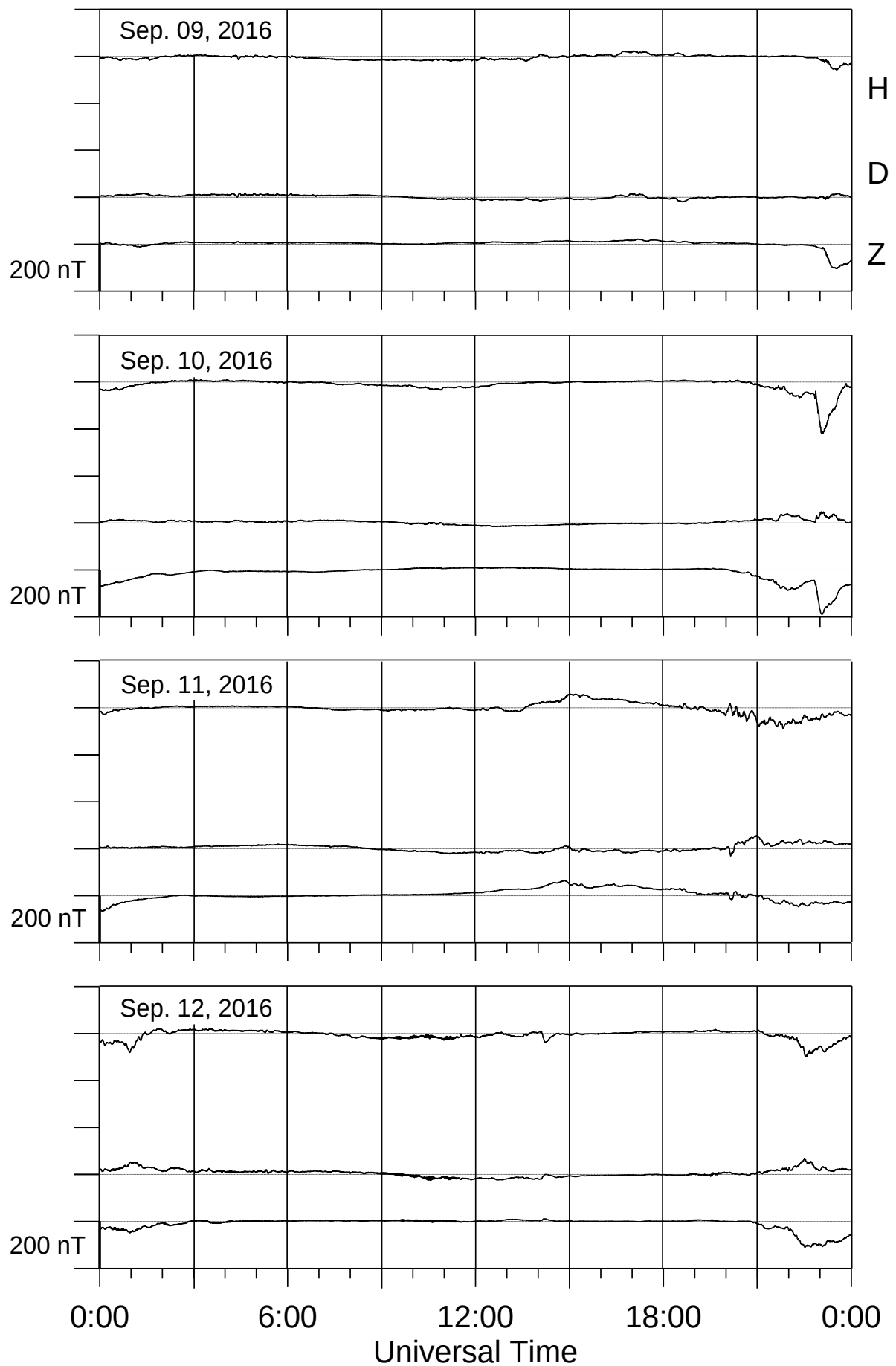
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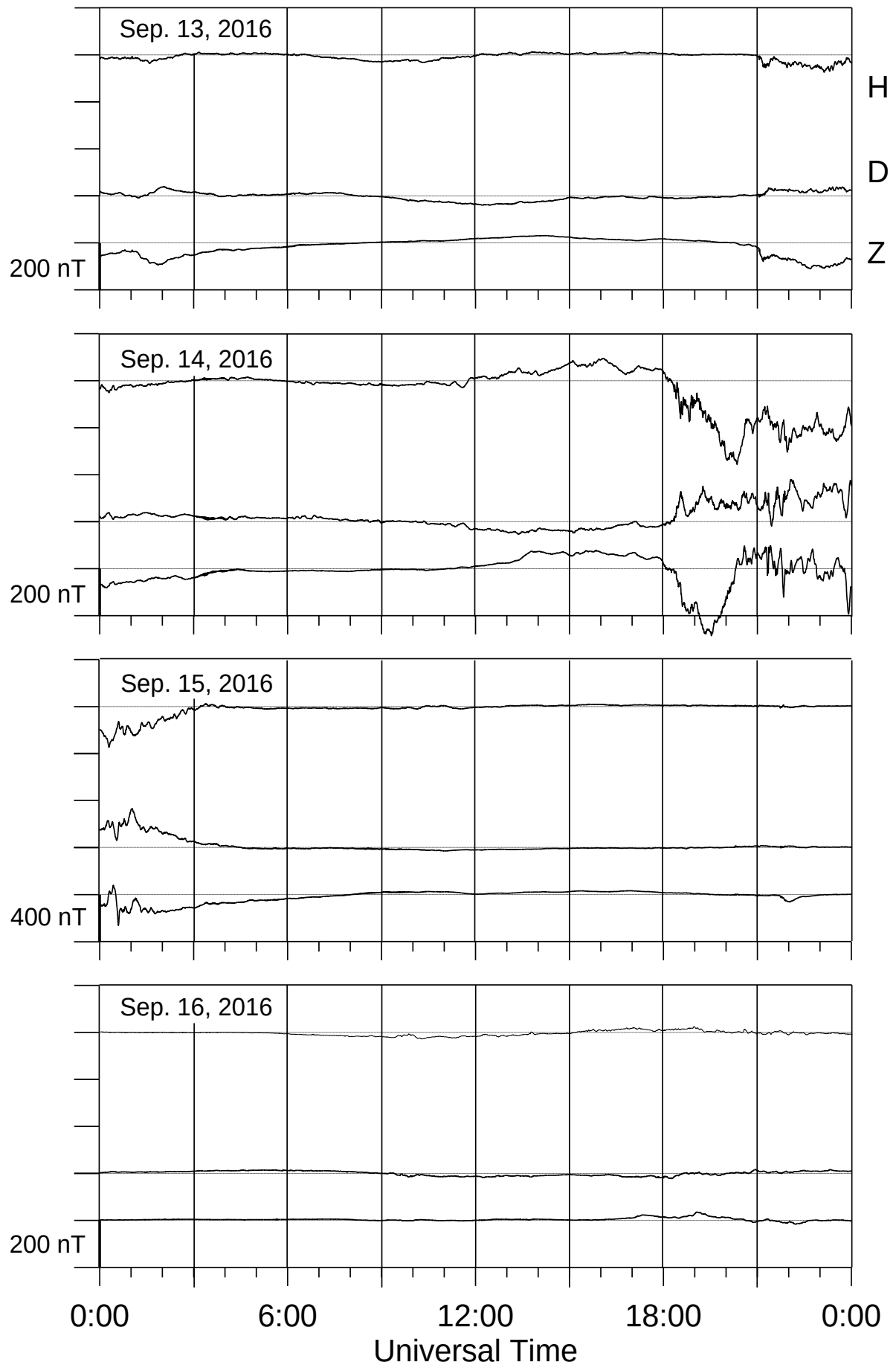
## Lovozero magnetometer



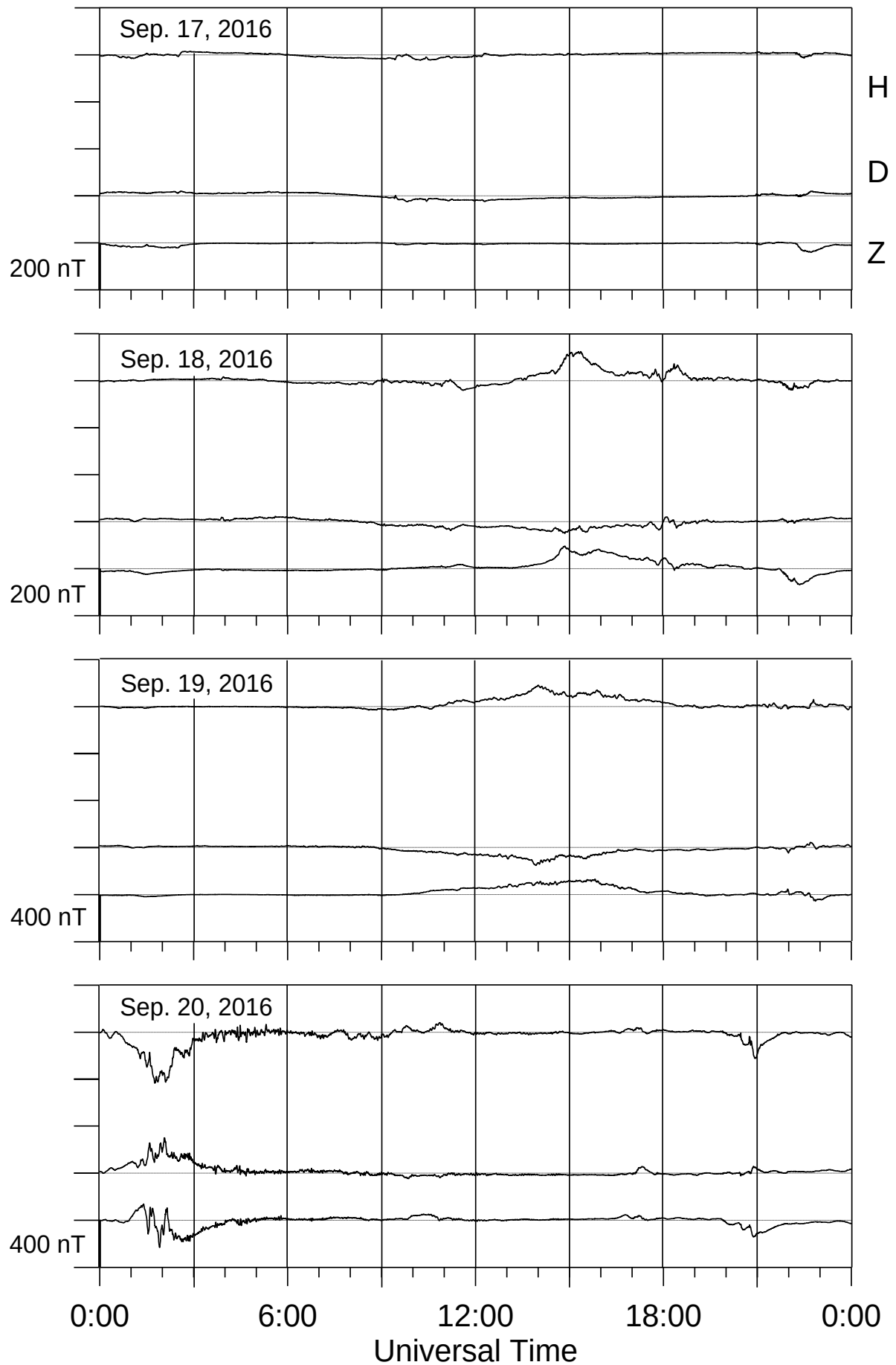
## Lovozero magnetometer



## Lovozero magnetometer

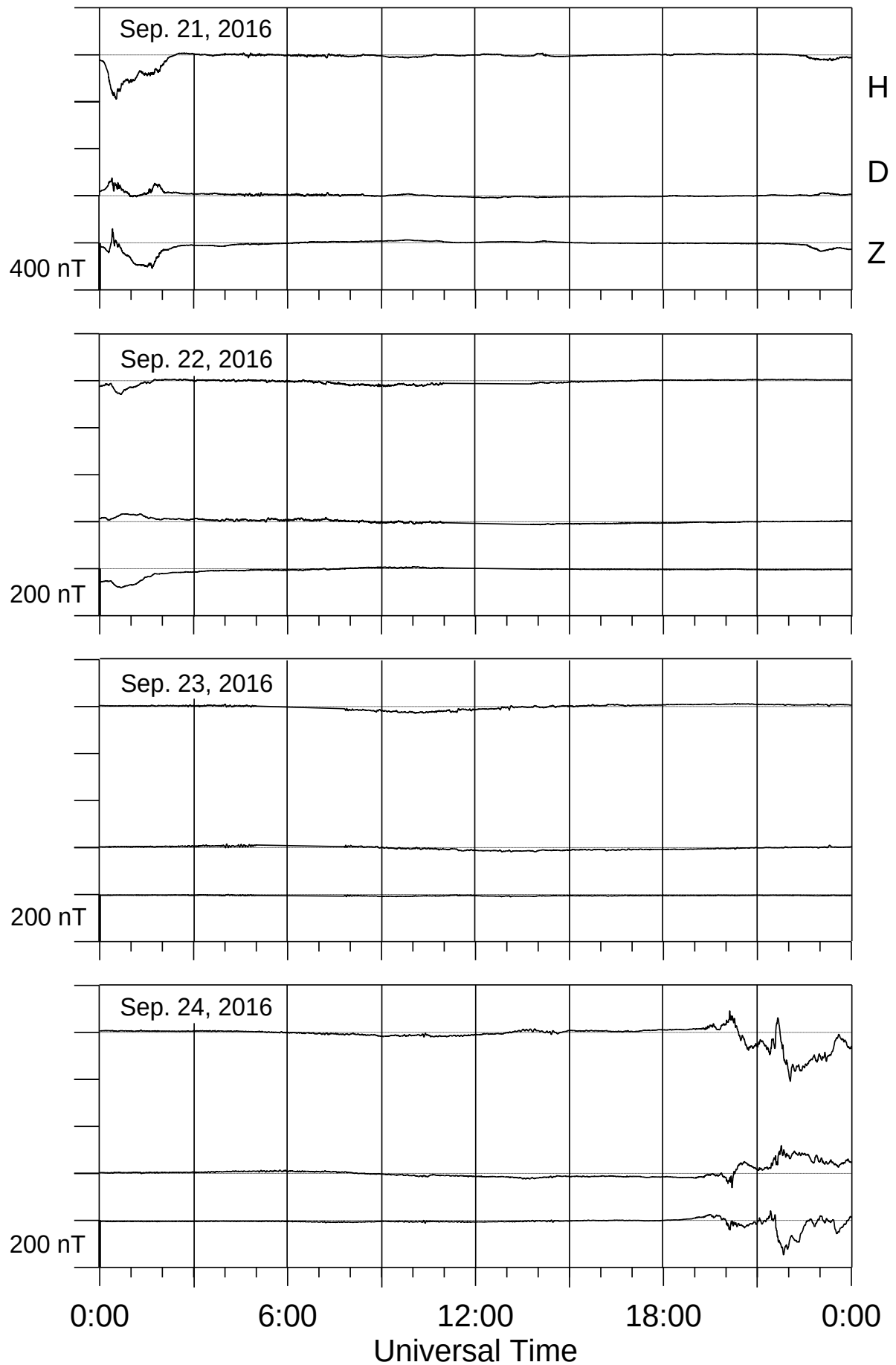


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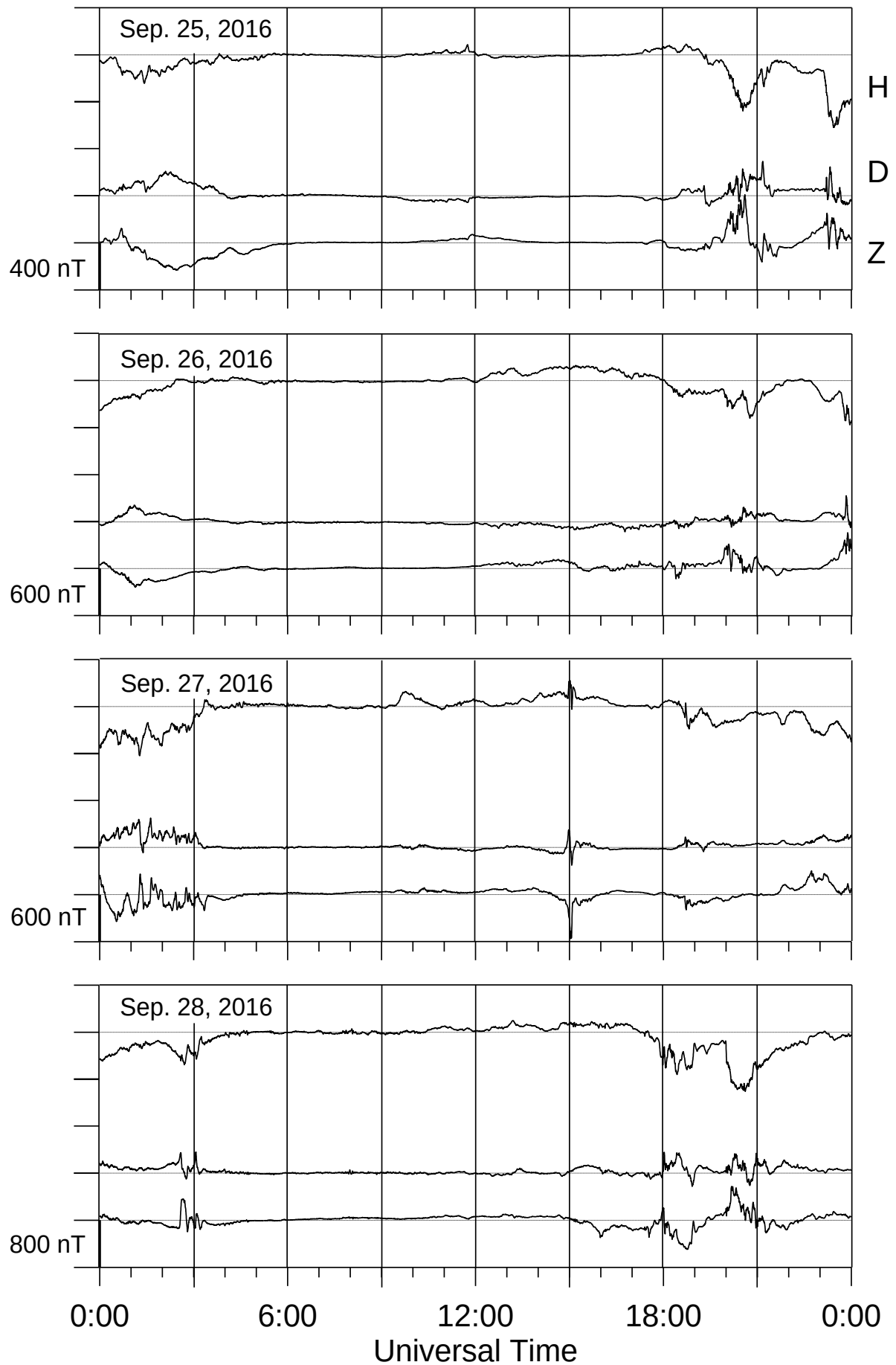




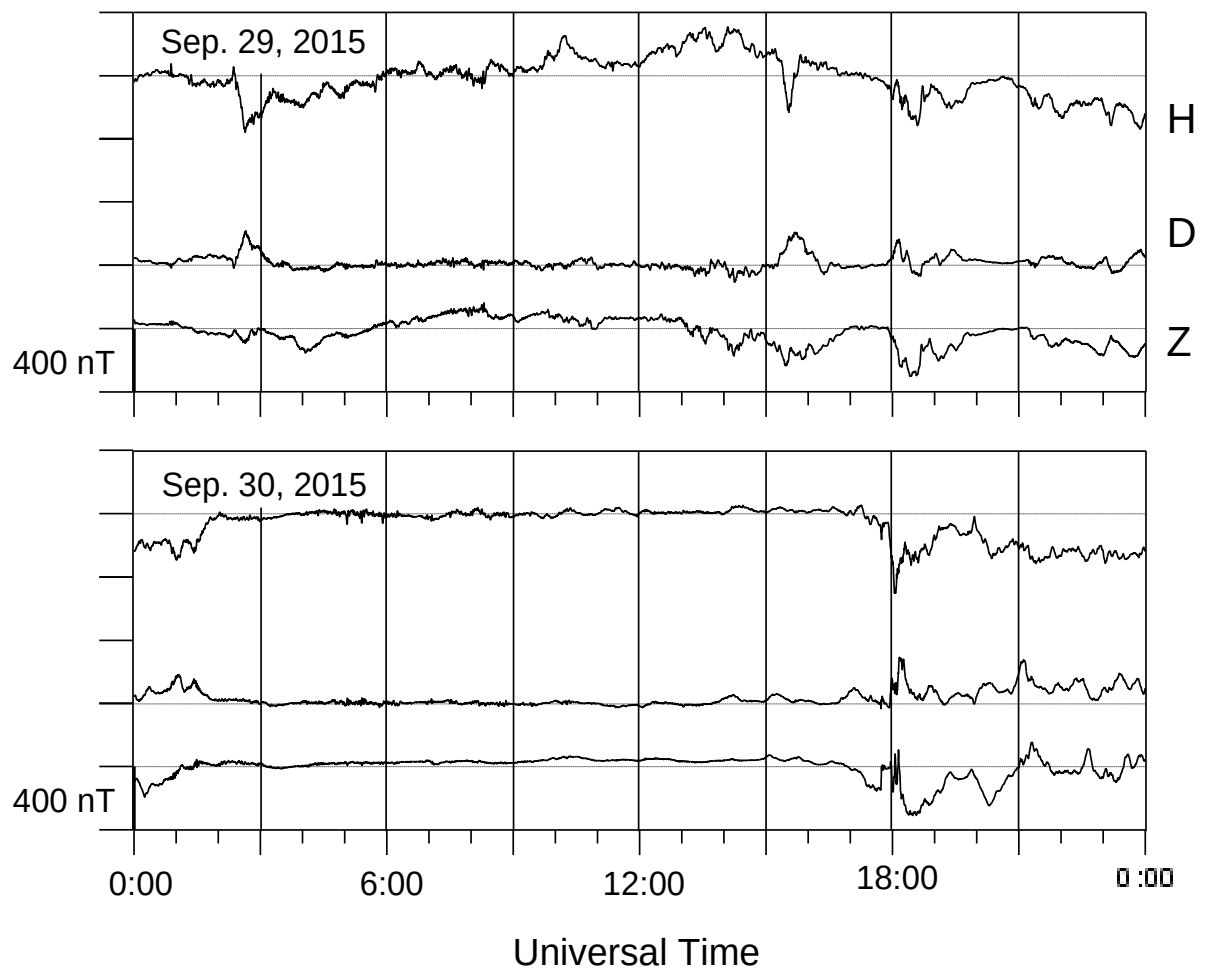
## Lovozero magnetometer



## Lovozero magnetometer



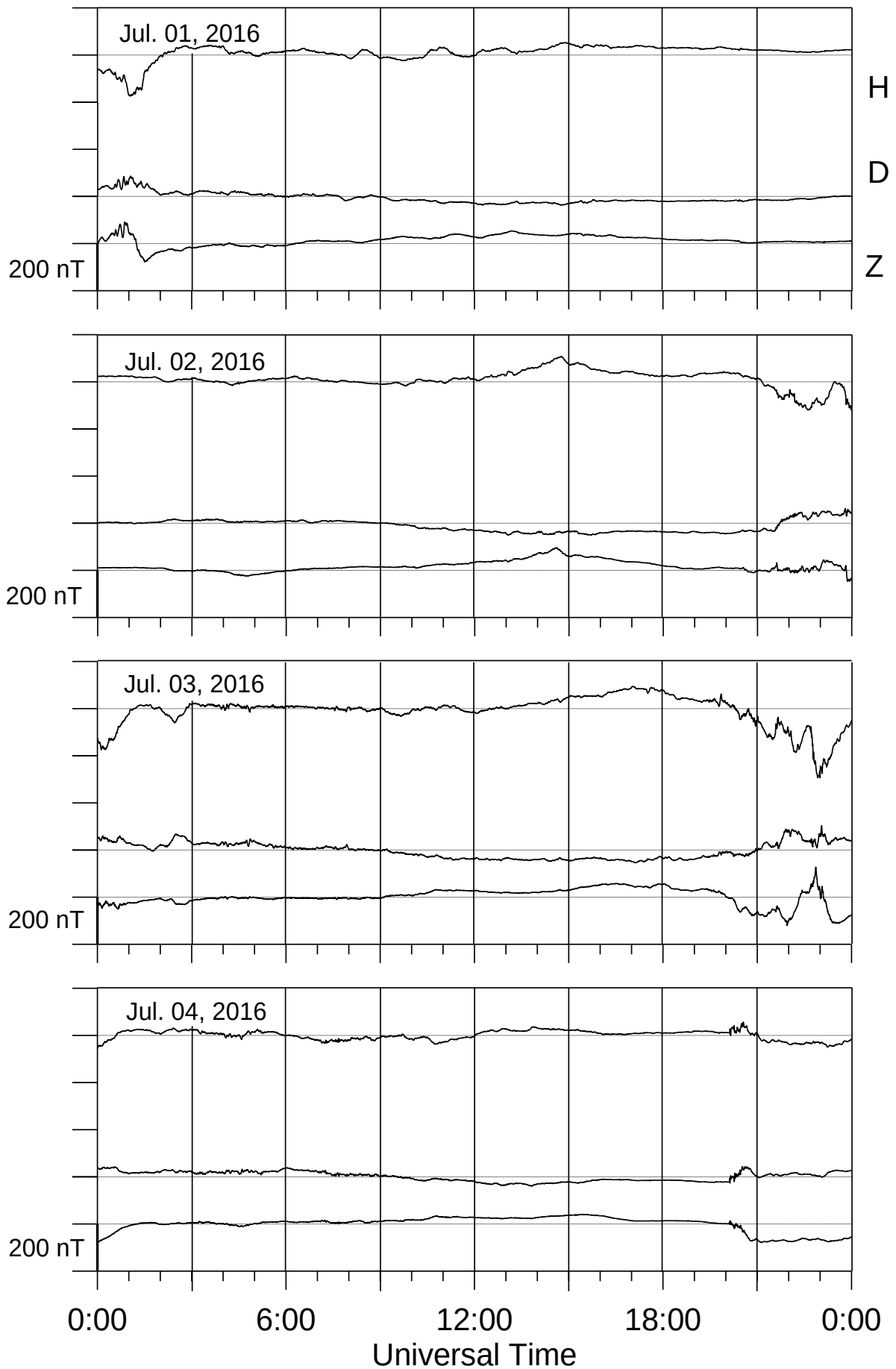
## Lovozero magnetometer



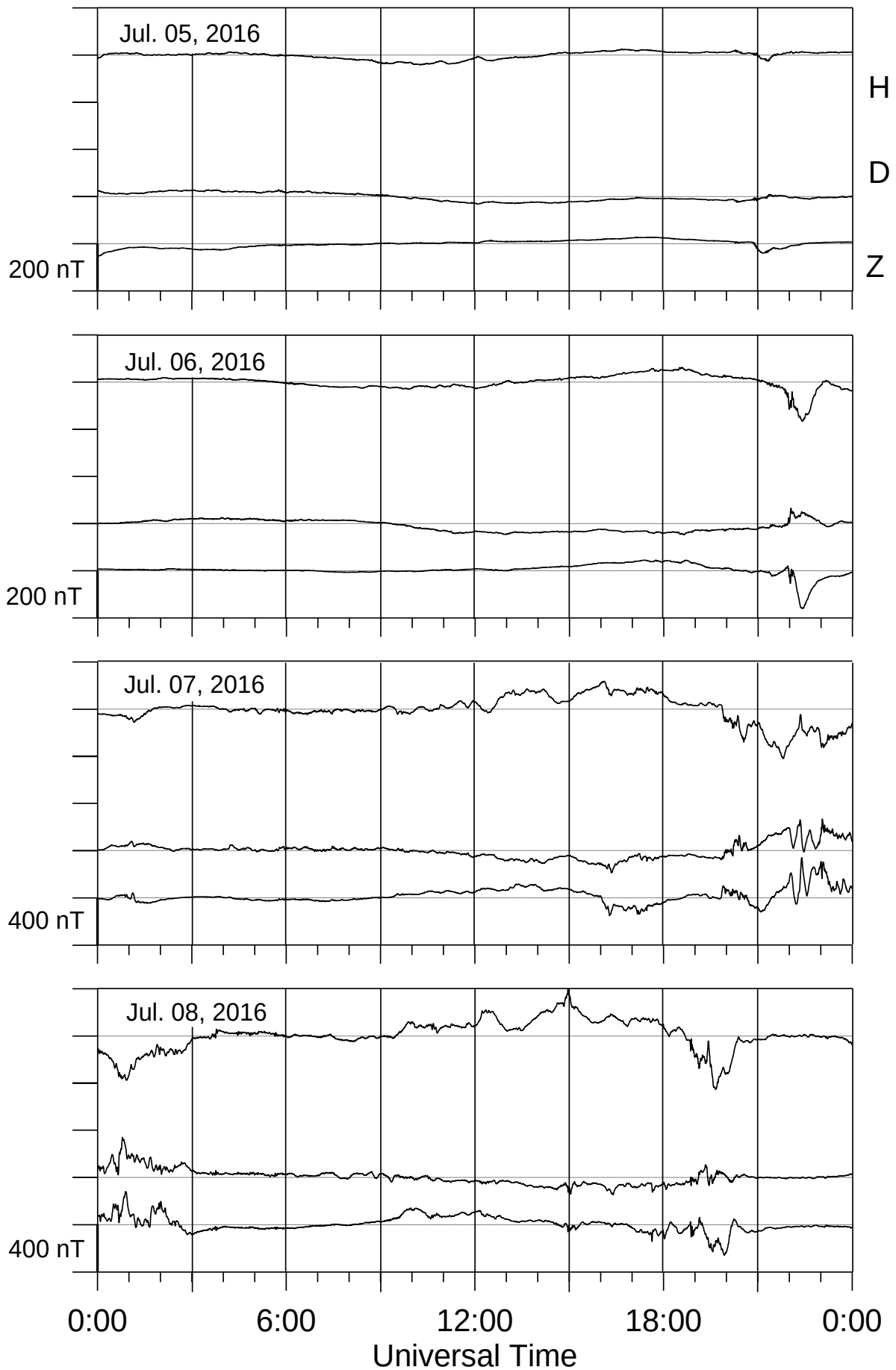
## **LOPARSKAYA MAGNETOGRAMS**

**July - September 2016**

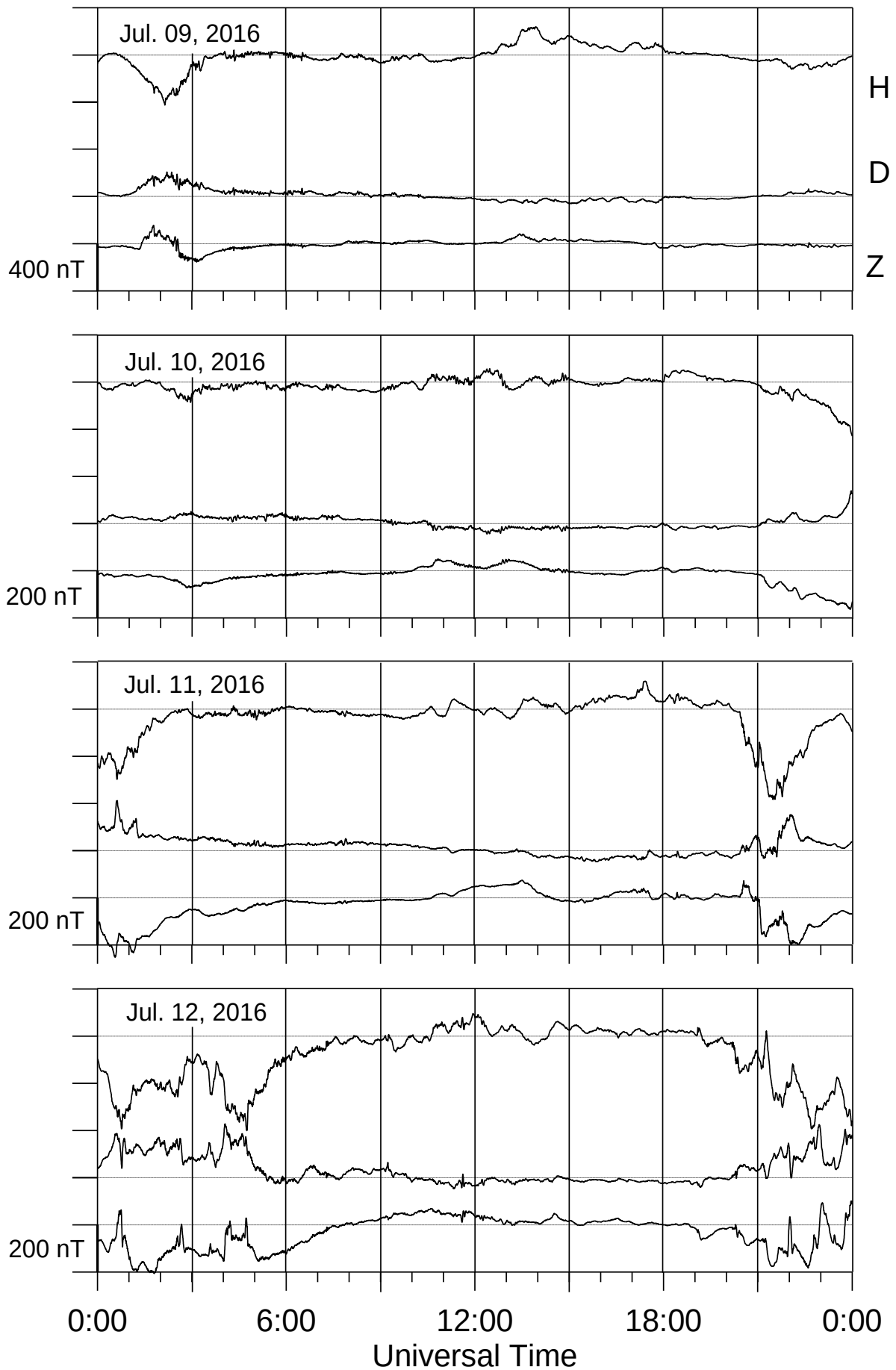
## Loparskaya magnetometer



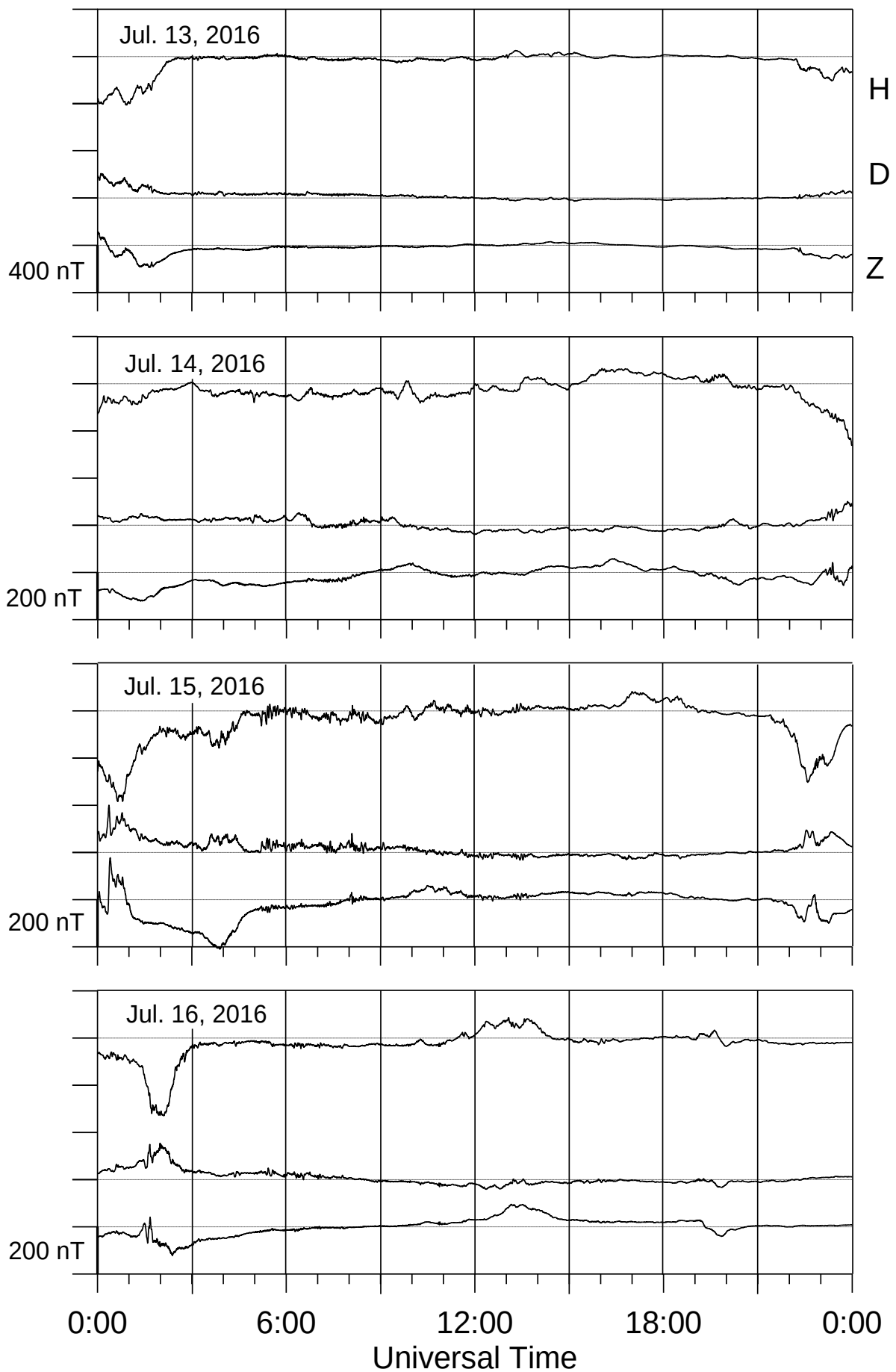
## Loparskaya magnetometer



## Loparskaya magnetometer

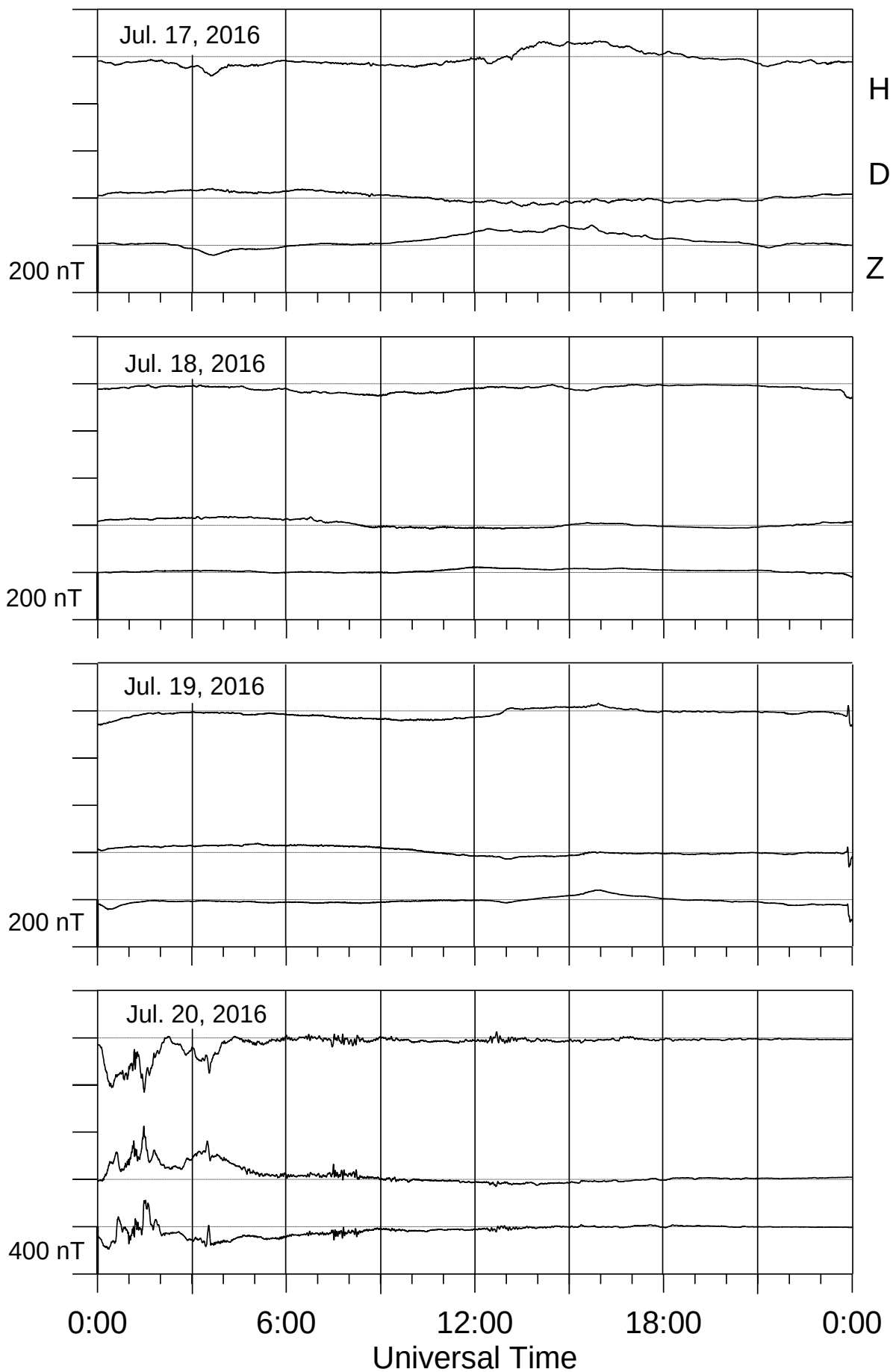


## Loparskaya magnetometer

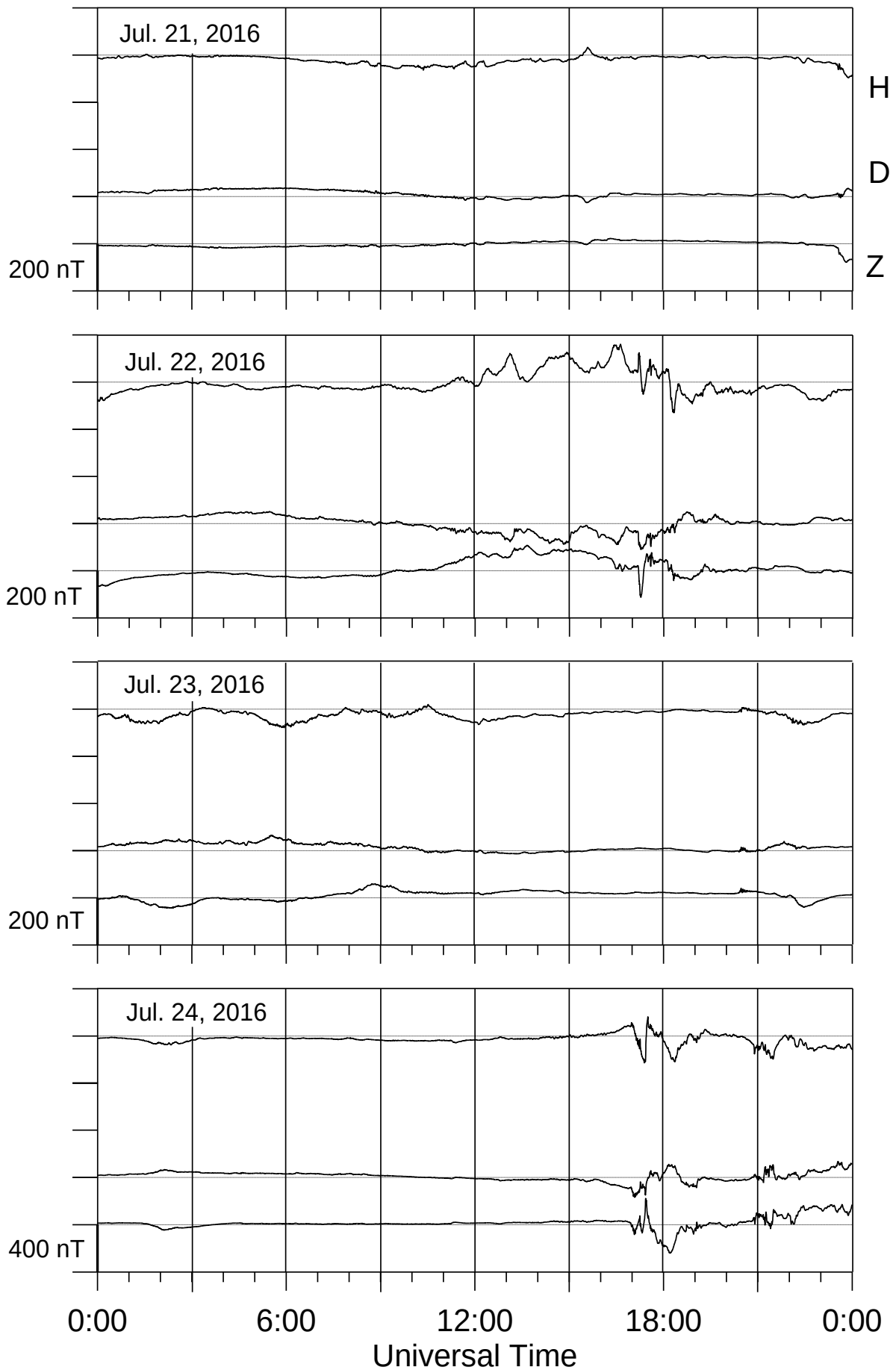




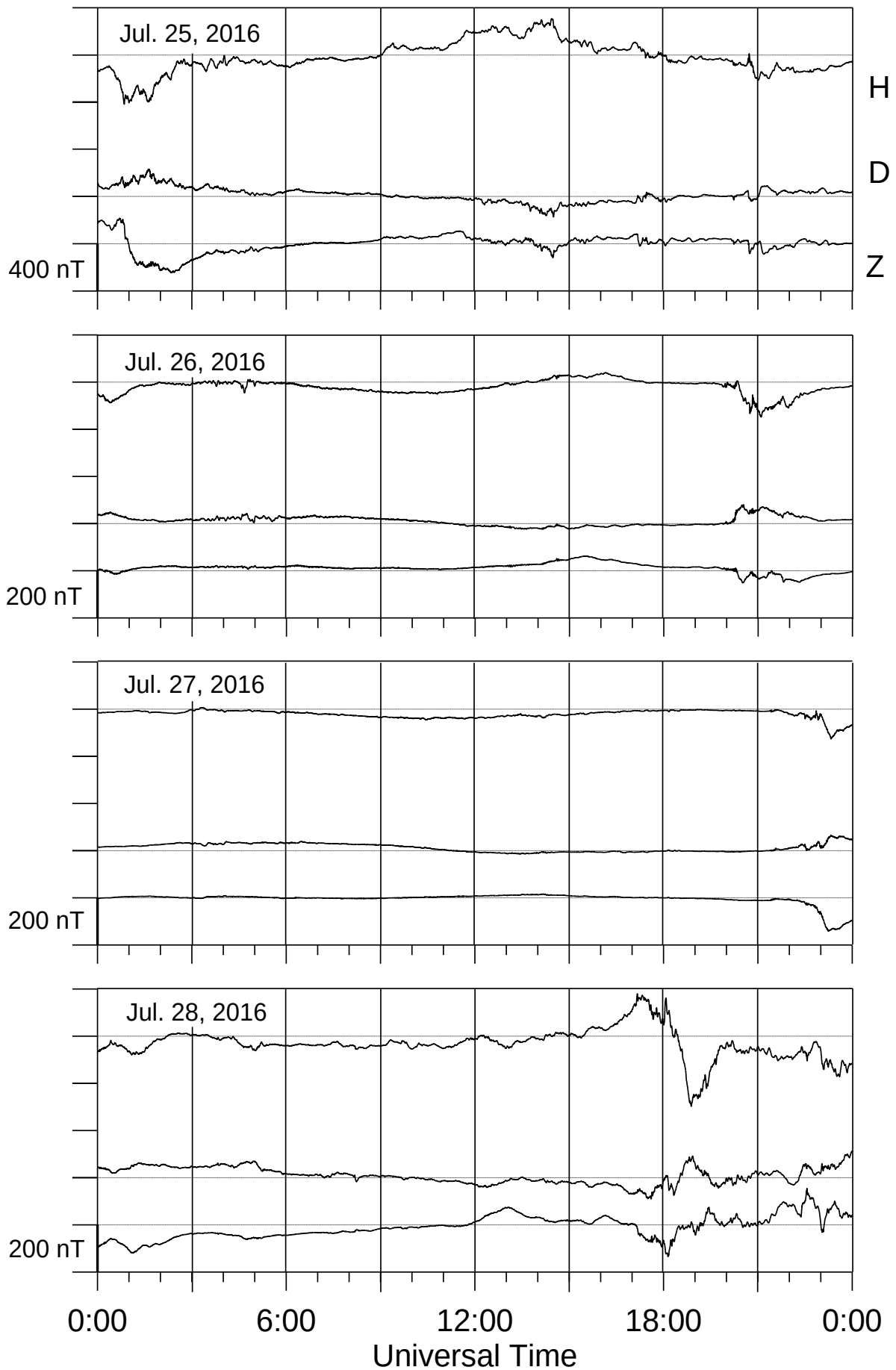
## Loparskaya magnetometer



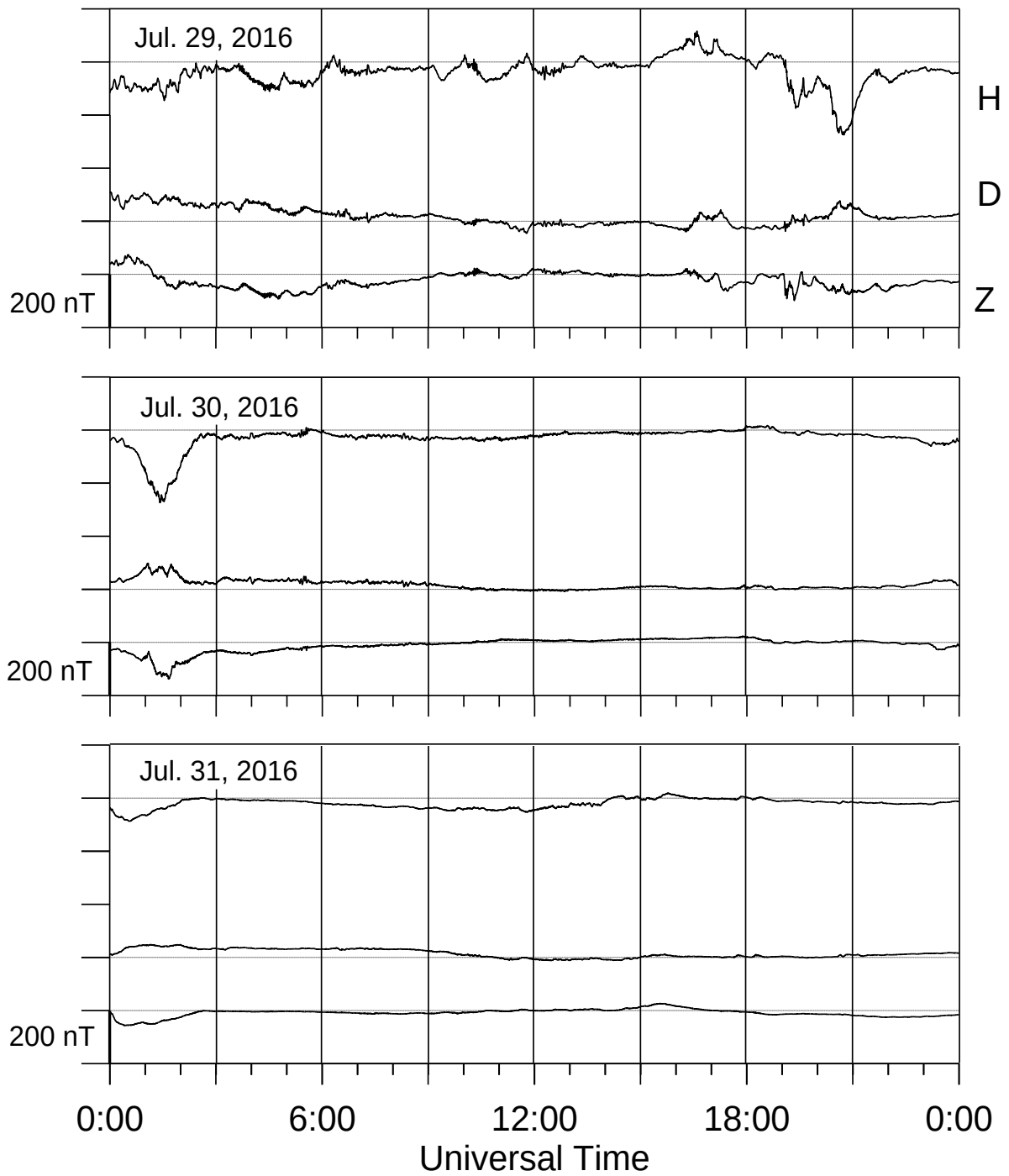
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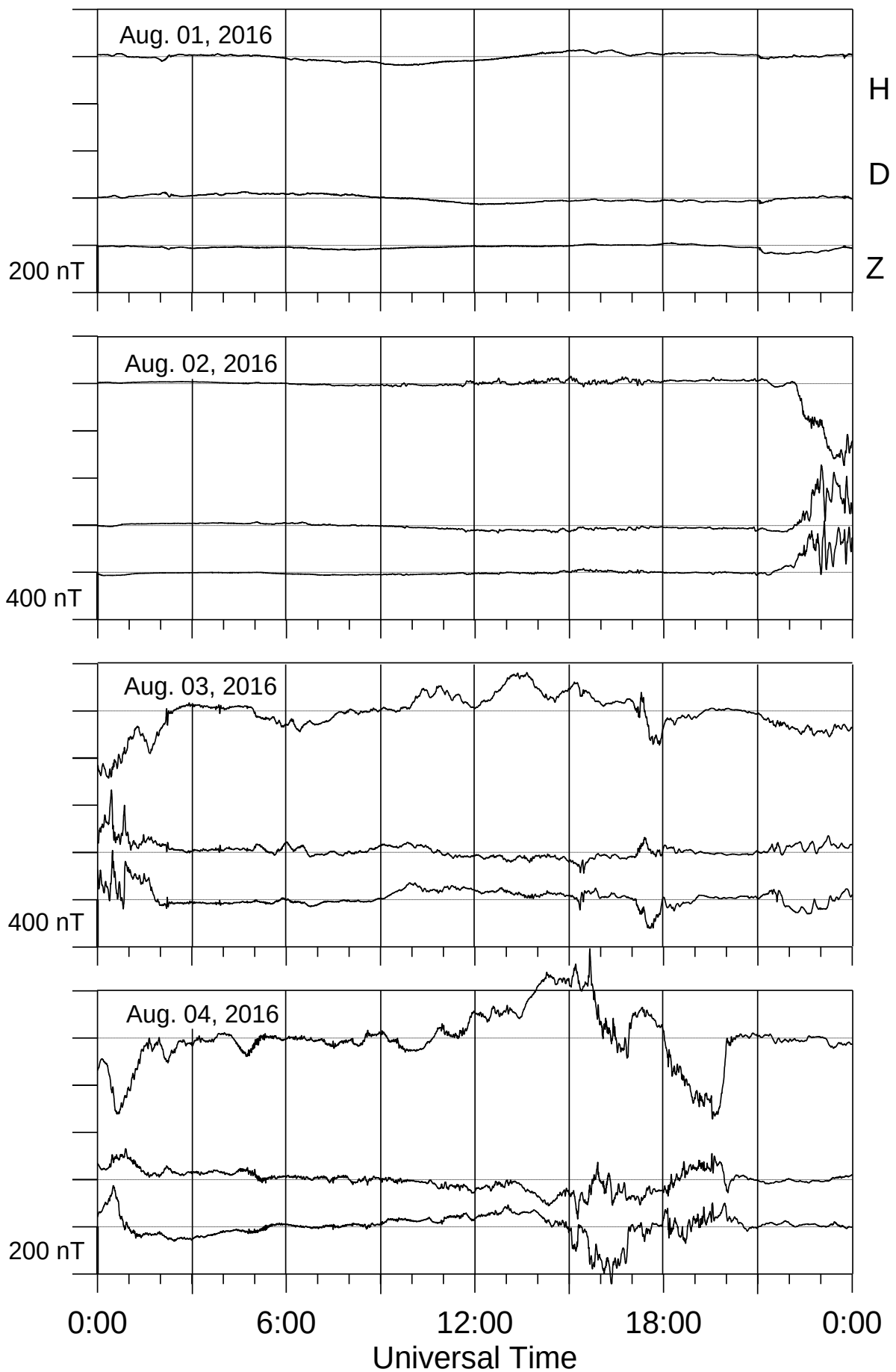
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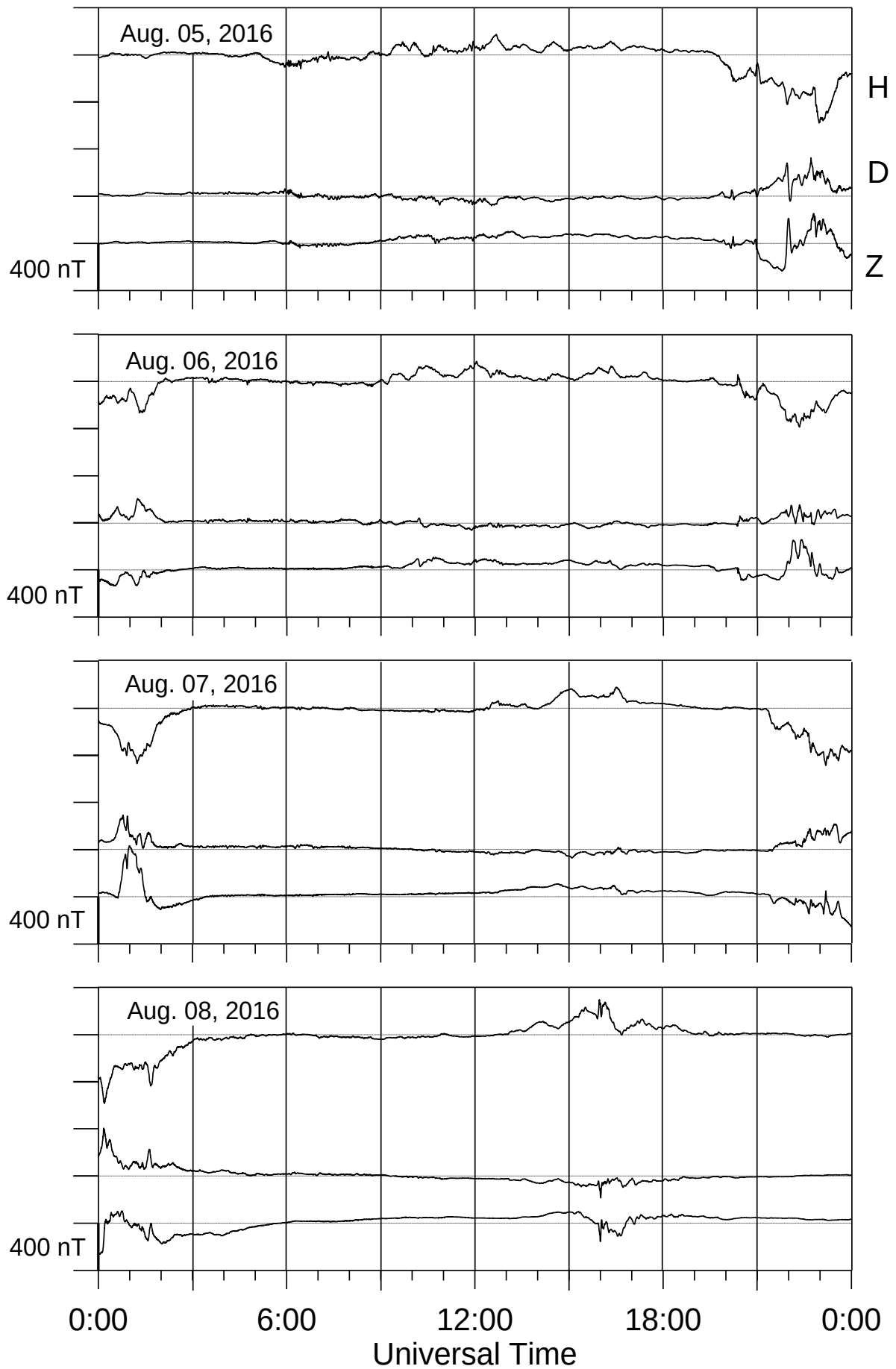
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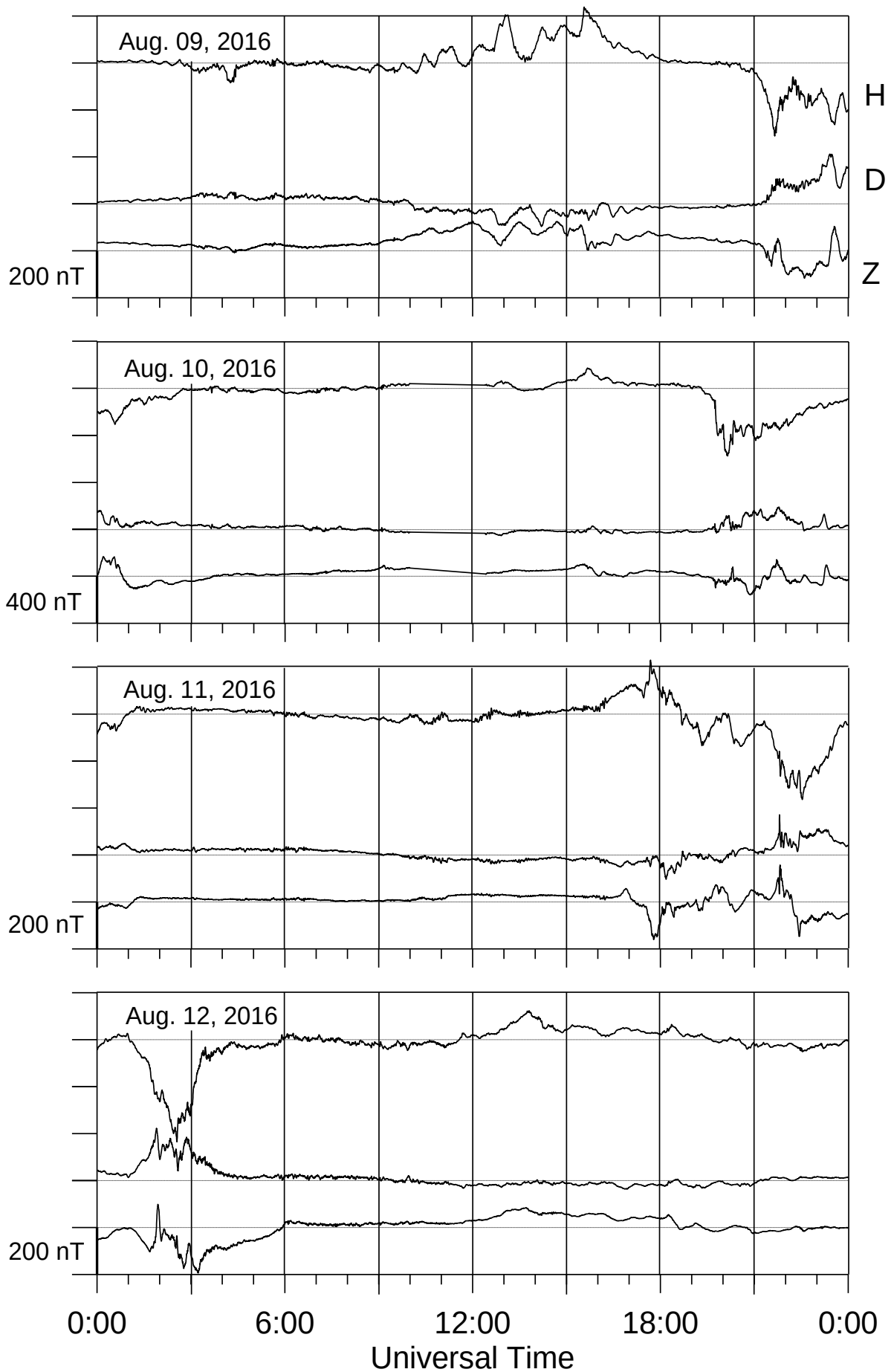
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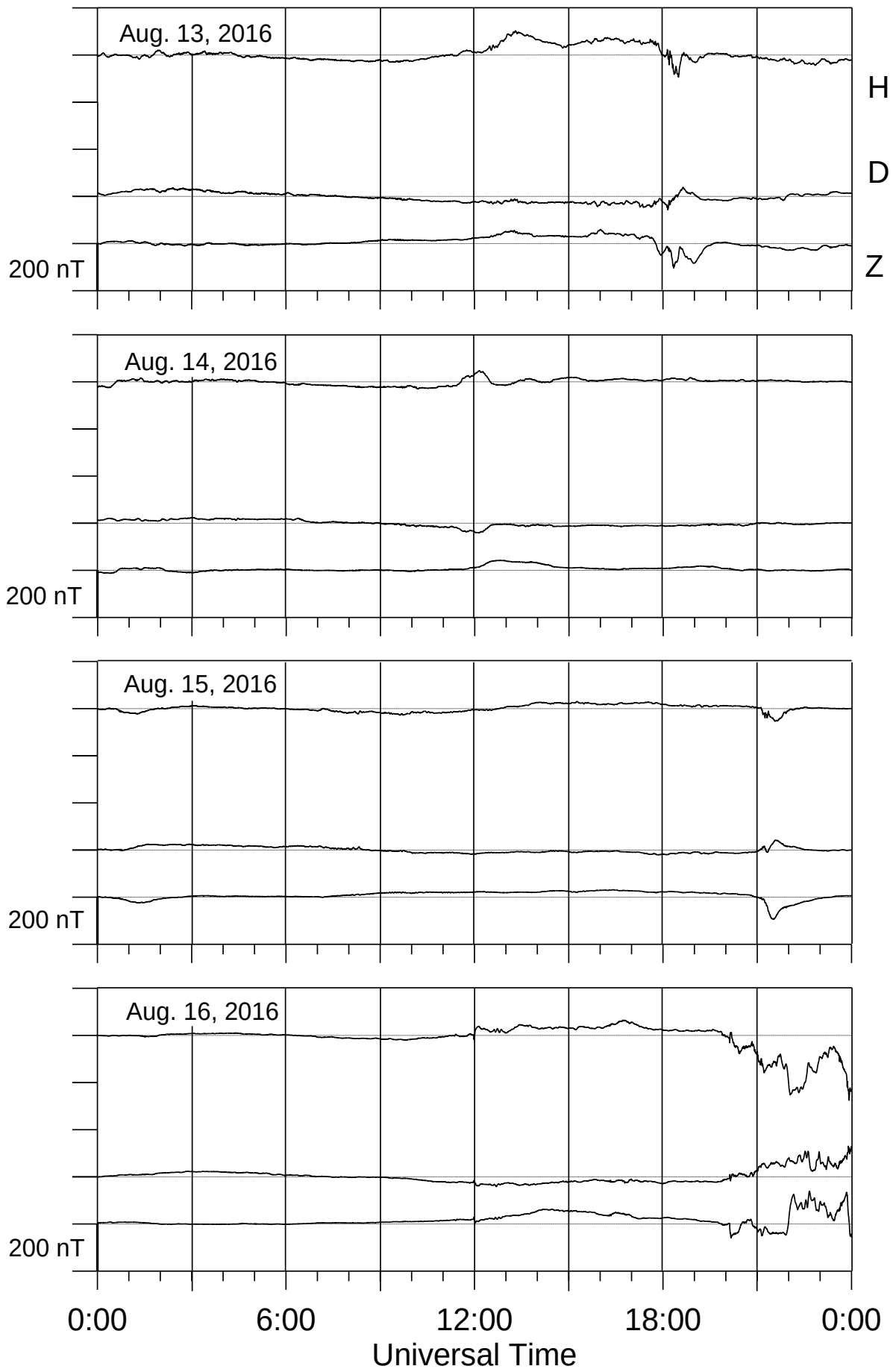
## Loparskaya magnetometer



## Loparskaya magnetometer

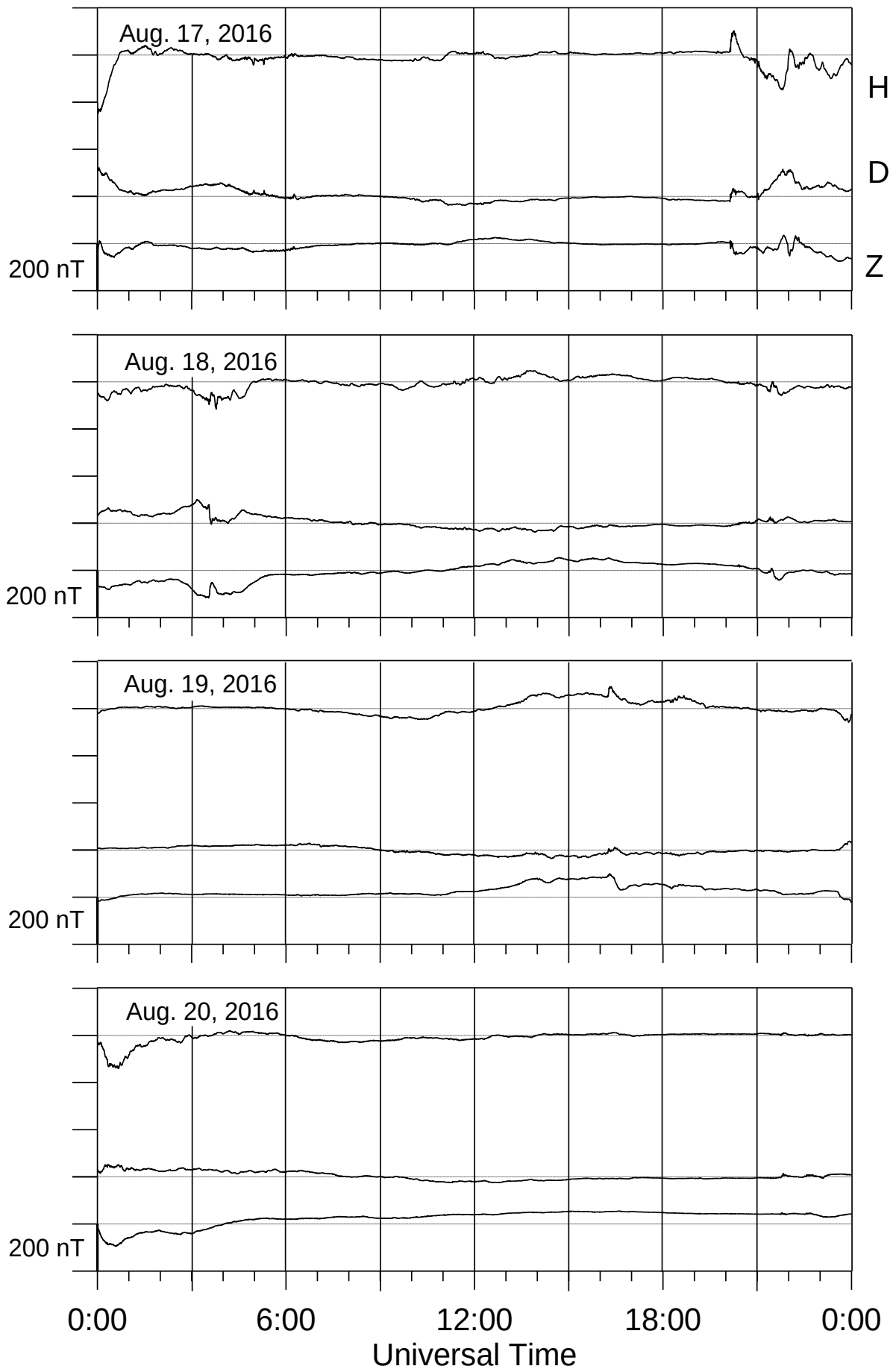


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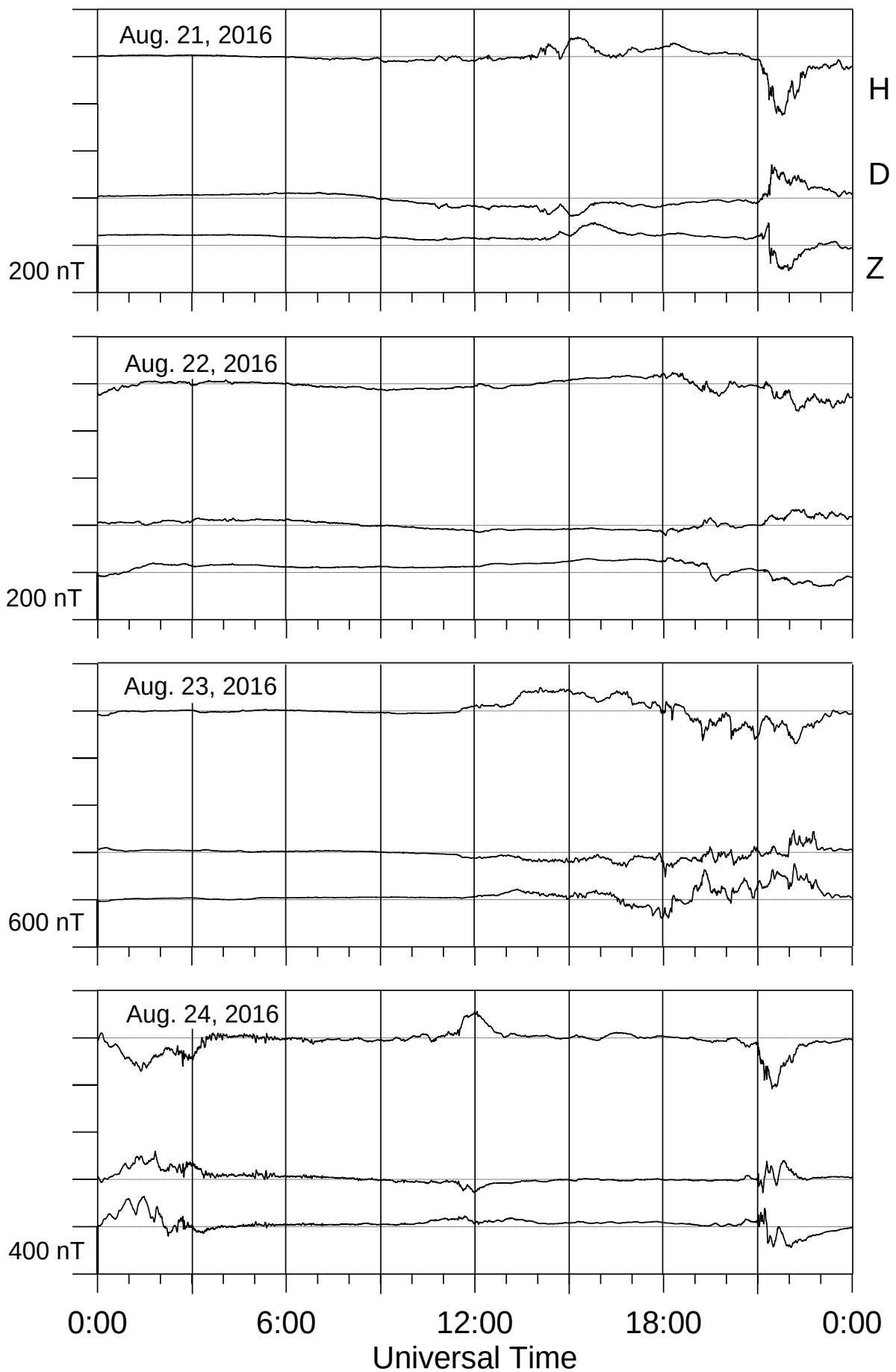




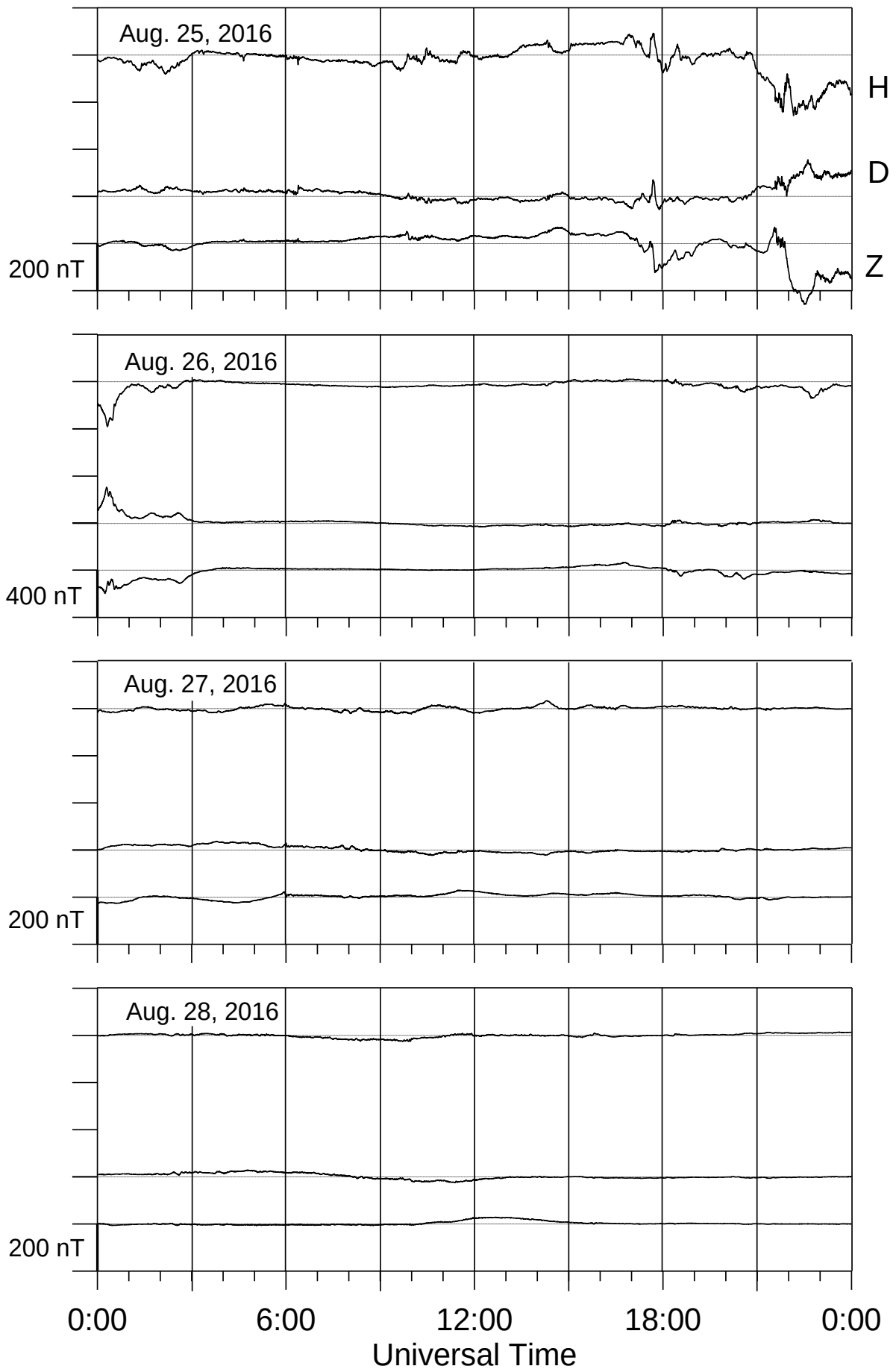
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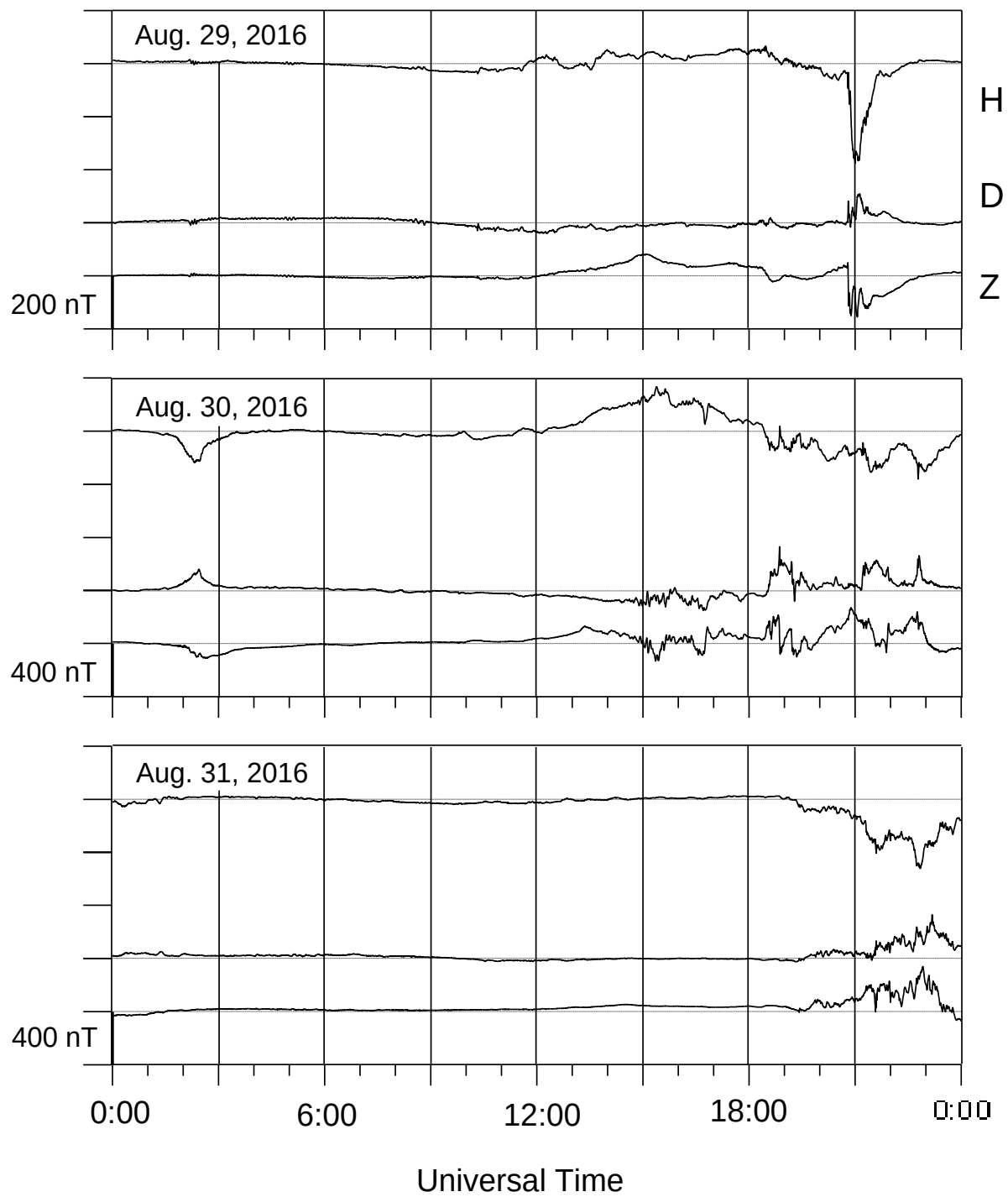
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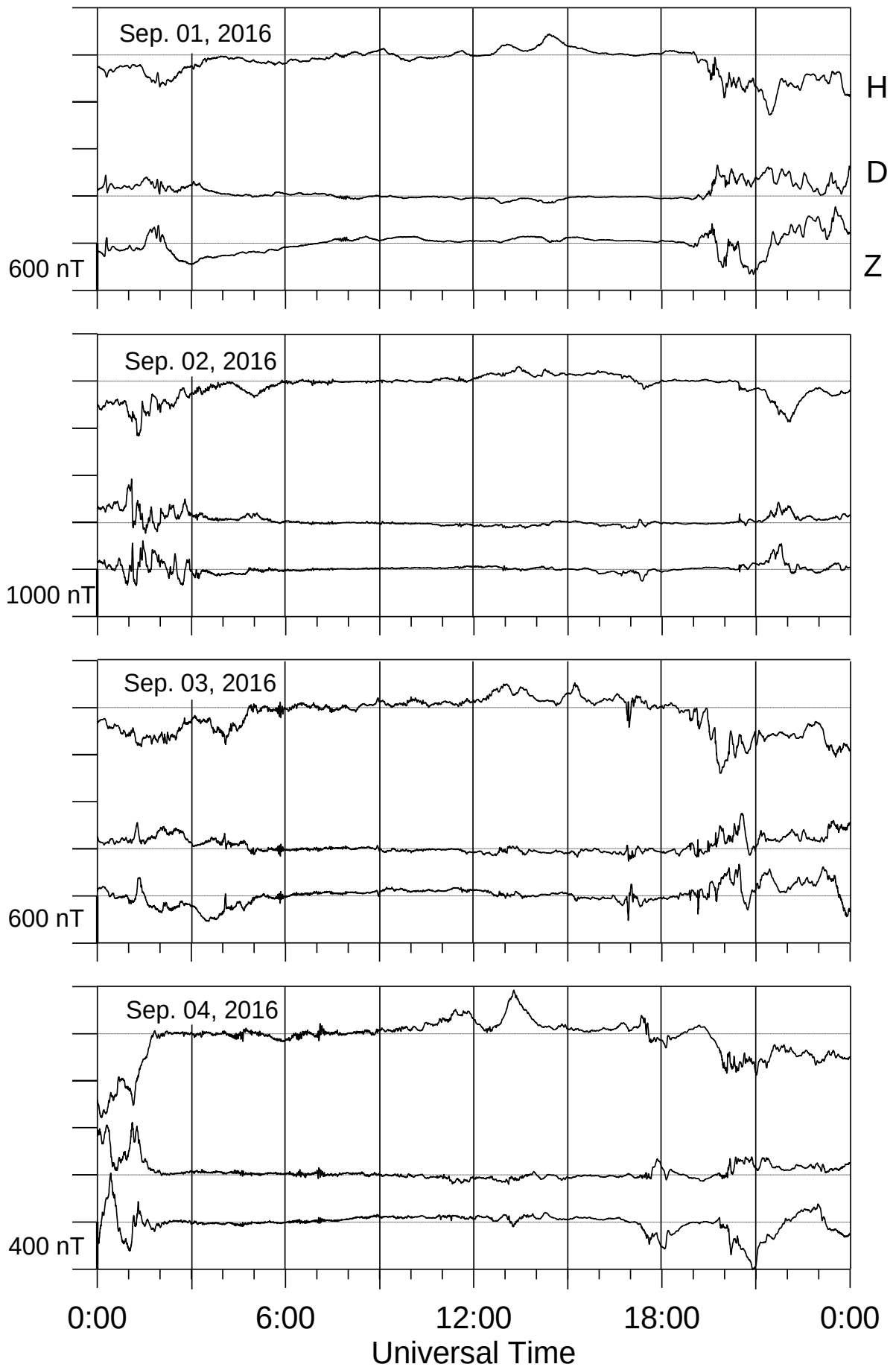
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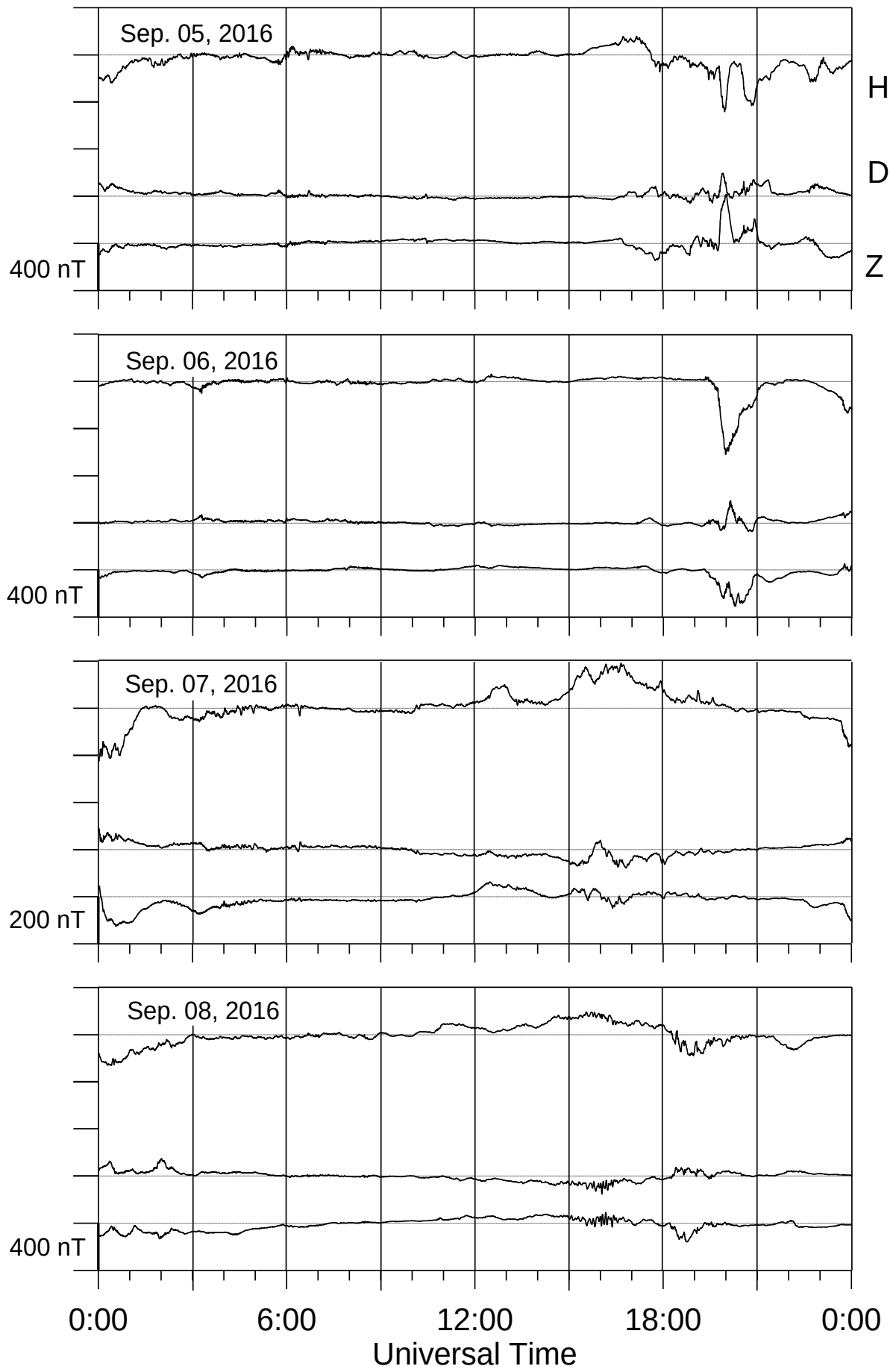
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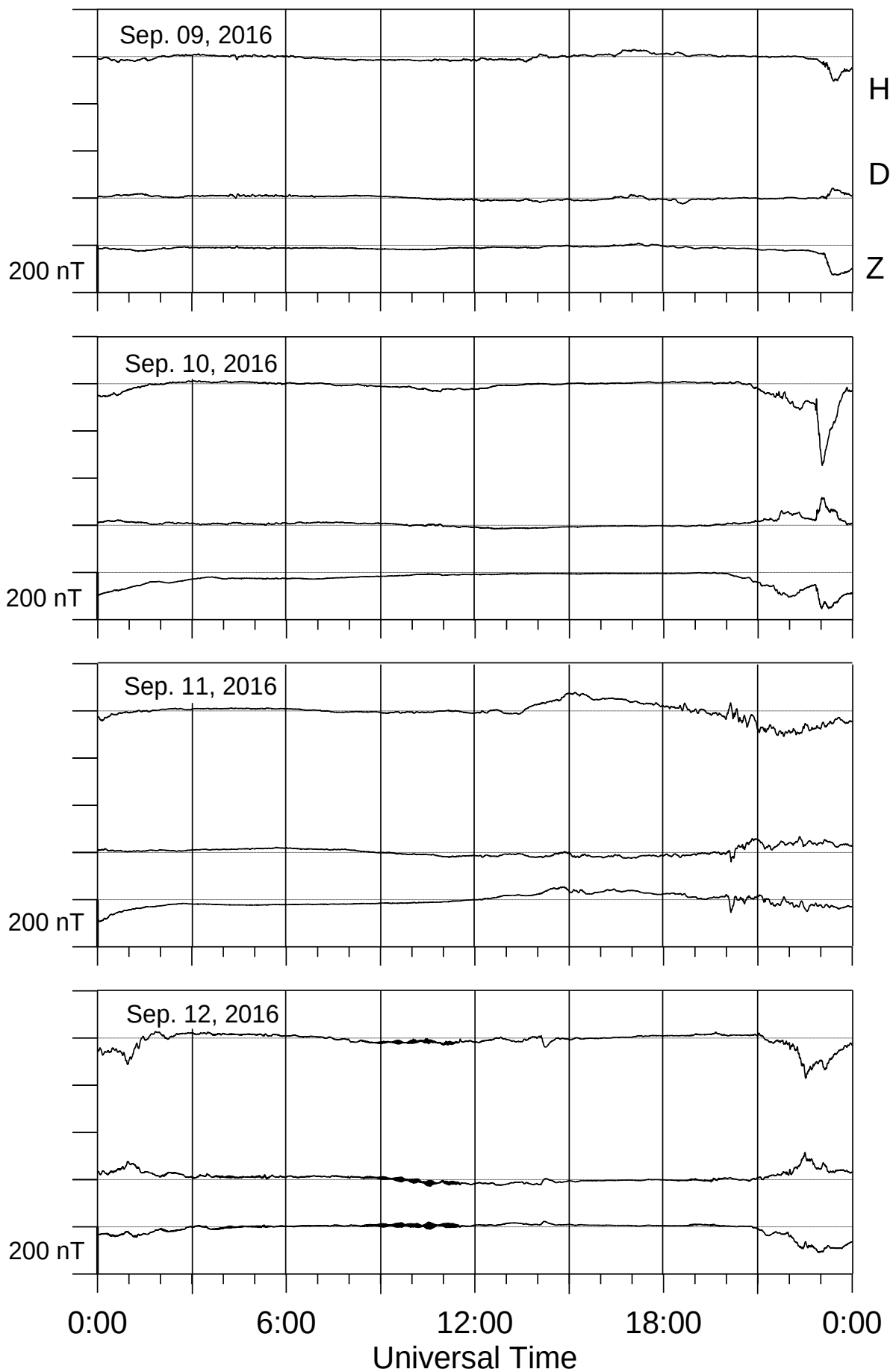
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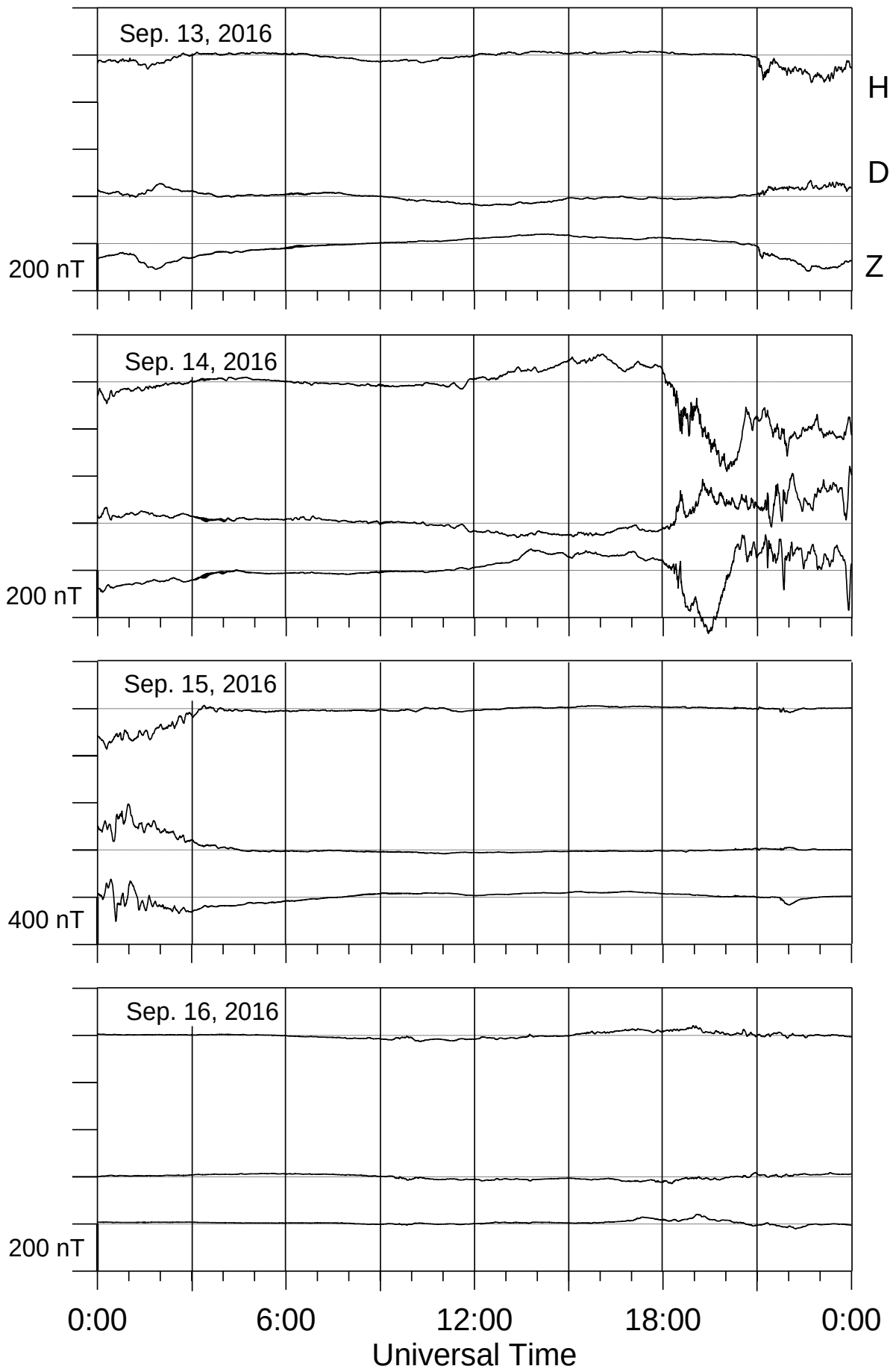
## Loparskaya magnetometer



## Loparskaya magnetometer

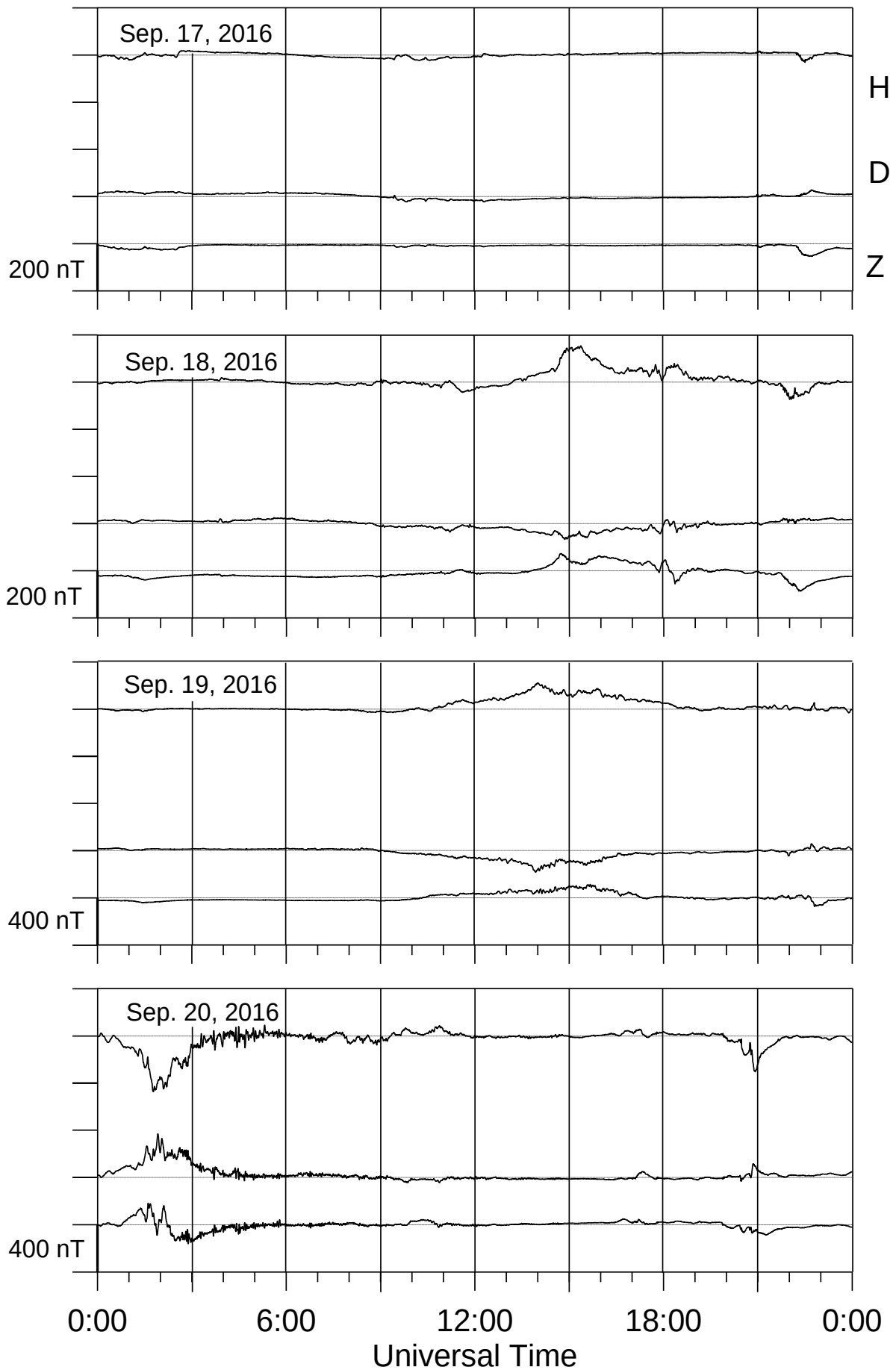


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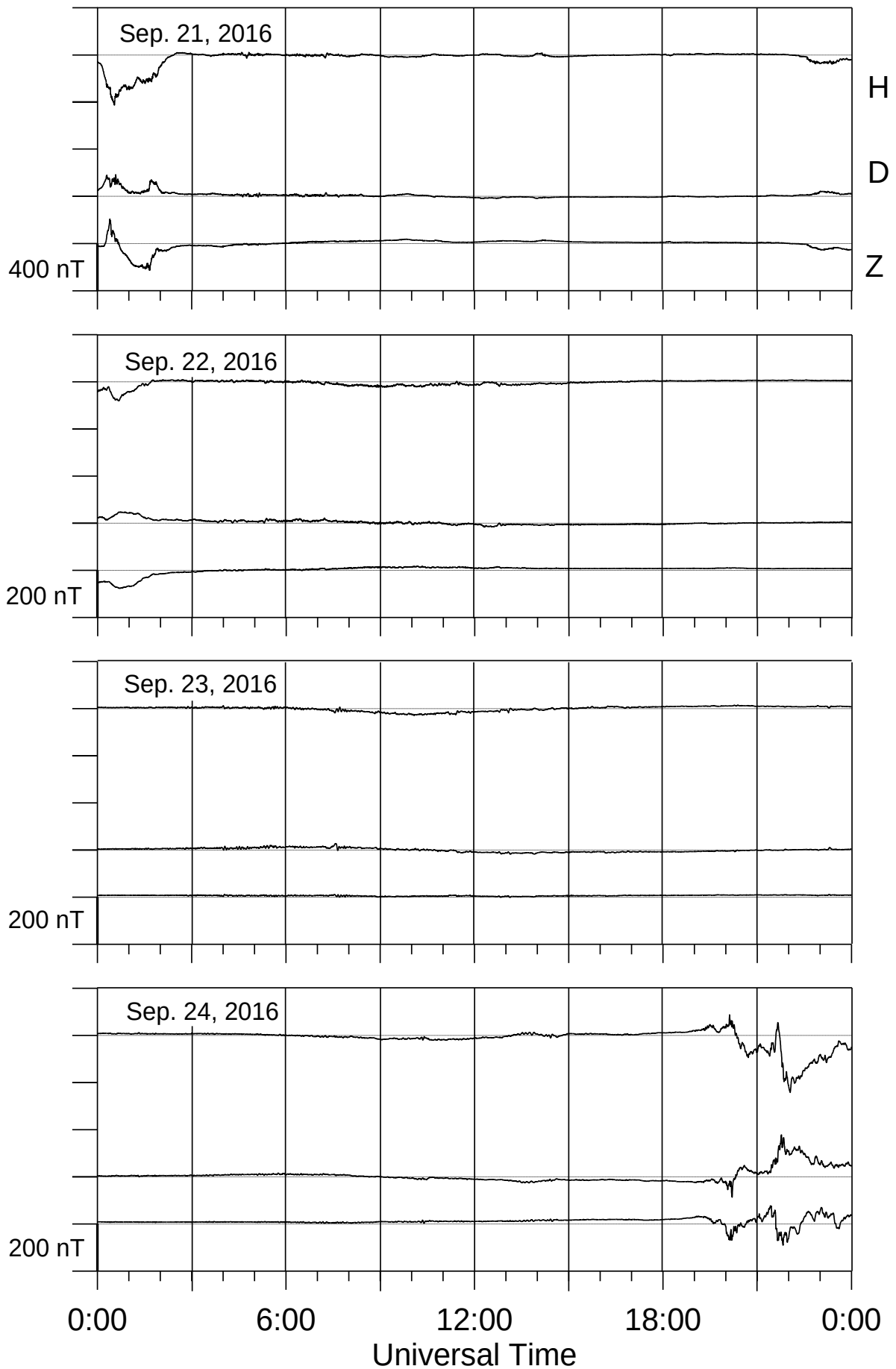




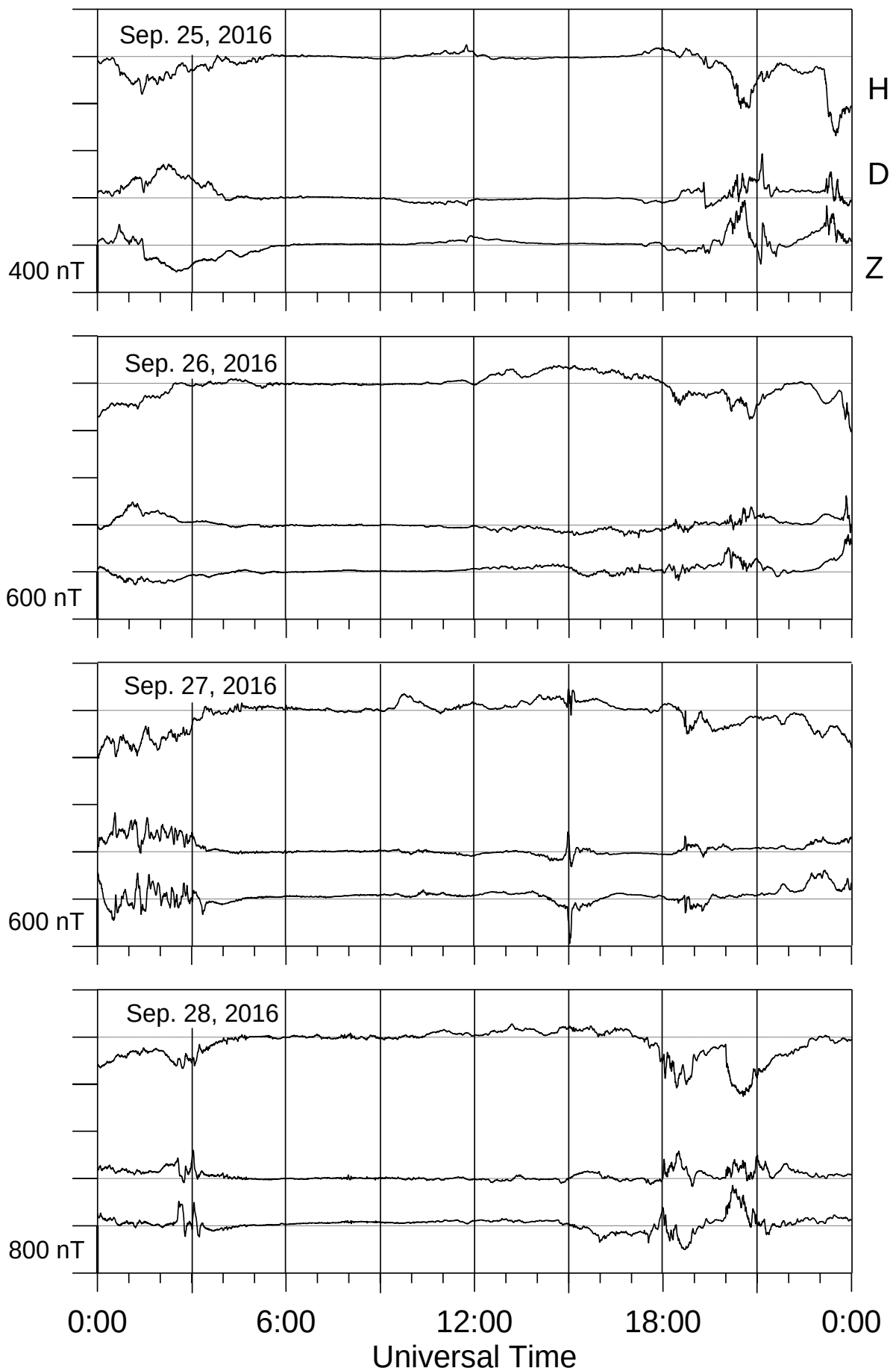
## Loparskaya magnetometer



## Loparskaya magnetometer



## Loparskaya magnetometer



## Loparskay magnetometer

