

POLAR GEOPHYSICAL INSTITUTE  
RUSSIAN ACADEMY OF SCIENCES



**PGI**  
**GEOPHYSICAL DATA**

**2023**

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**OCTOBER**

---

**NOVEMBER**

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**DECEMBER**

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MURMANSK, APATITY, RUSSIA

March, 2024

# PGI

## GEOPHYSICAL DATA

V. VOROBJEV, editor

V. Burnaeva and N. Kudriashova make-up editors

This bulletin presents the preliminary ground-based optical, geomagnetic and cosmic ray data obtained by Polar Geophysical Institute in the fourth quarter of 2023. All-sky camera observations are published only for the quarters when observations were carried out. All data are available by request.

Reviewer Orlov K.G.

Published since 1996

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## DATA DESCRIPTION

### ***Magnetic data***

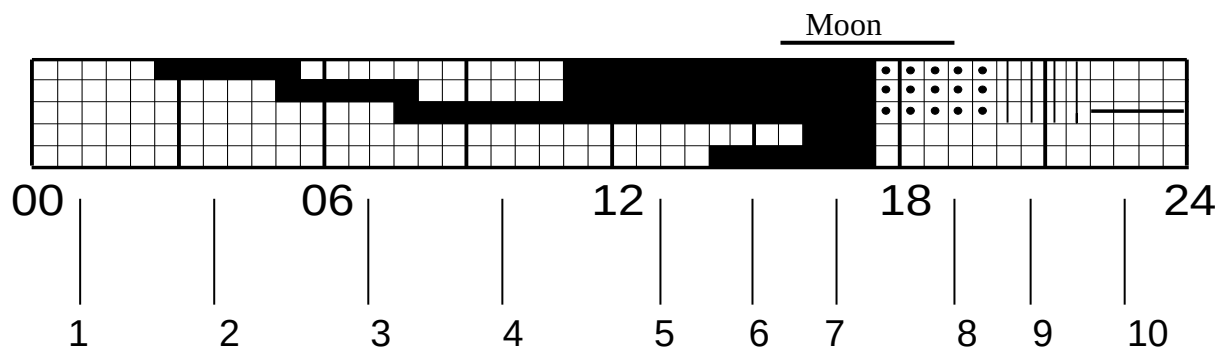
The magnetograms (H, D, and Z) are plotted as magnetic variations recorded in Loparskaya and Lovozero stations by the three component Bobrov type magnetometer with a sampling frequency of 10 samples per seconds. The instrument has a range  $\pm 2620$  nT and a resolution of 5 pT. Magnetic observations 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    |



- 1- no aurora
- 2- auroras present in north range
- 3- weak auroras present in zenith range
- 4- auroras 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, Lovozero and Verhnetulomsky 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:***

***All-sky camera in Apatity was not in operation during this period because of some technical problems.***

### ***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>Verhnetulomsky</i></b> | VTL  | 68.59° N   | 31.75° E | 64.92° N          | 113.0° 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(LOPARSKAYA)

October, 2023

Lower limit of K=9 is 1500 nT

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

## GEOMAGNETIC K-INDICES, LOVOZERO(LOPARSKAYA)

November, 2023

Lower limit of K=9 is 1500 nT

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

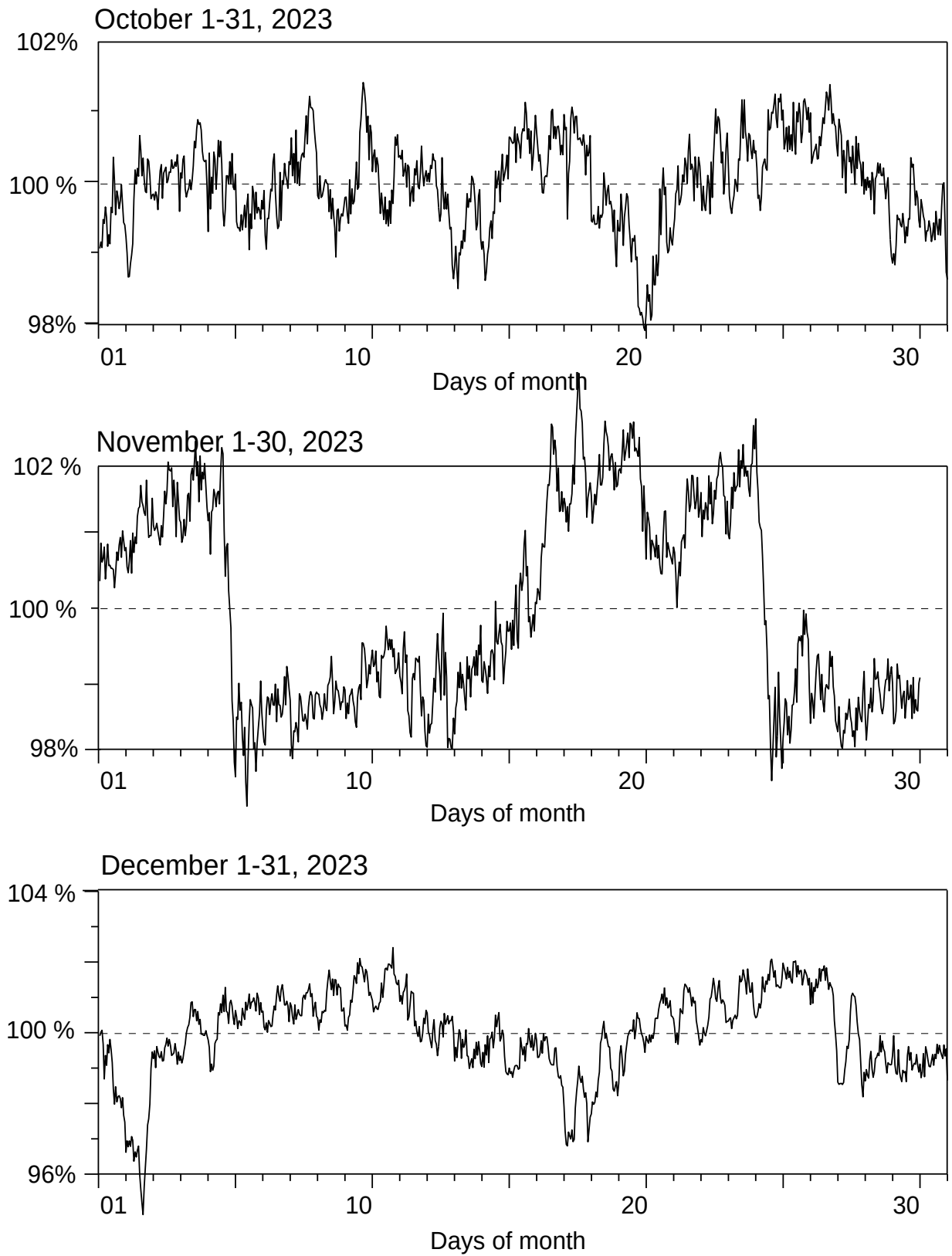
## GEOMAGNETIC K-INDICES, LOVOZERO

December, 2023

Lower limit of K=9 is 1500 nT

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

## Apatity neutron monitor



## **ALL – SKY CAMERA OBSERVATIONS**

**October - December 2023**

























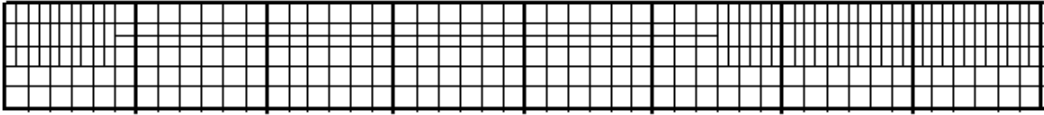




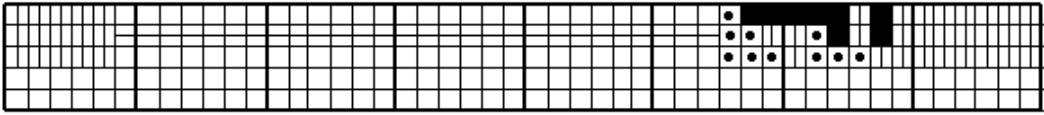


# Lovozero ascaplots

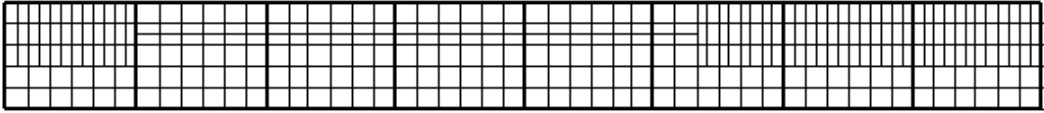
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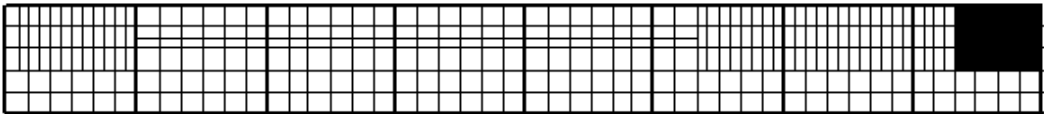
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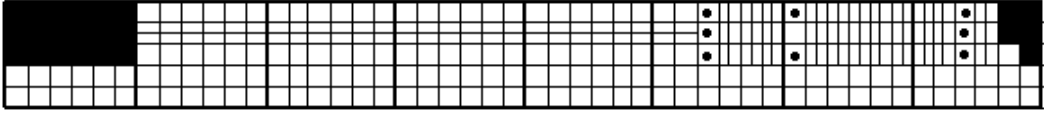
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Oct. 04, 2023



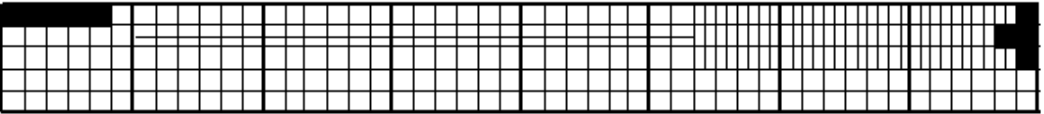
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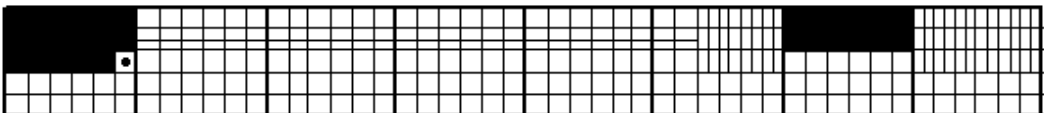
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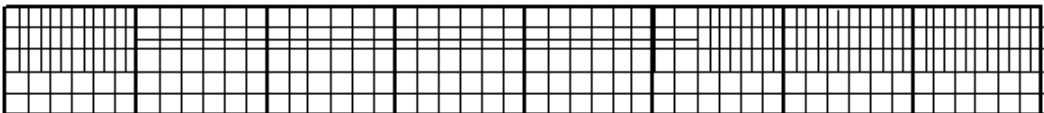
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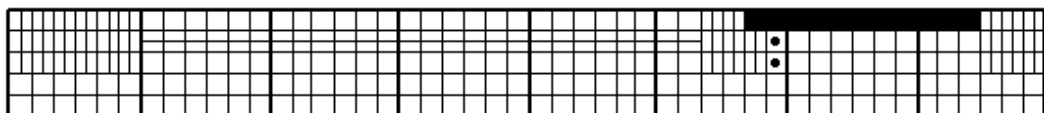
Oct. 08, 2023



Oct. 09, 2023



Oct. 10, 2023



00

06

12

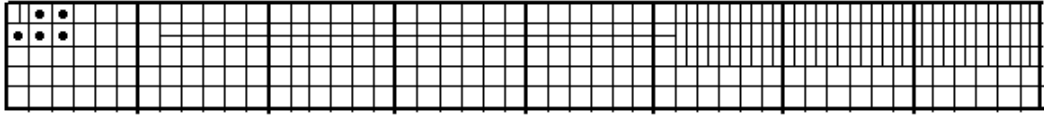
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24

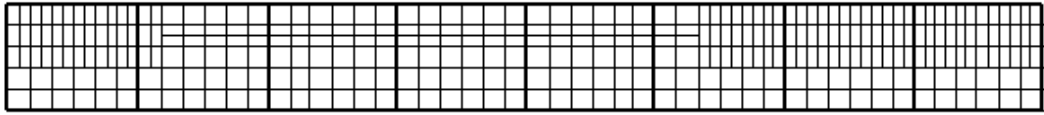
Universal Time

# Lovozero ascaplots

Oct. 11, 2023



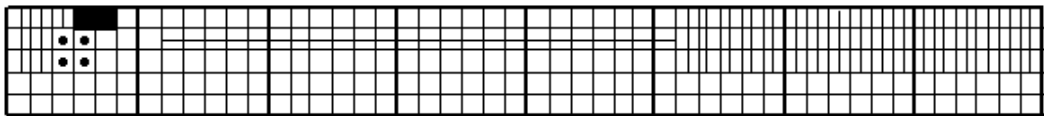
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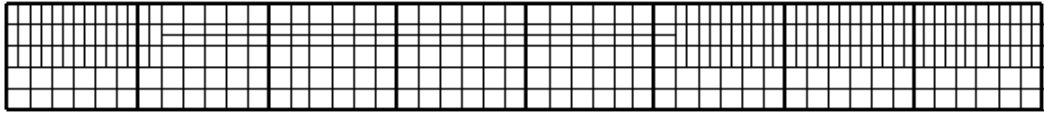
Oct. 13, 2023



Oct. 14, 2023



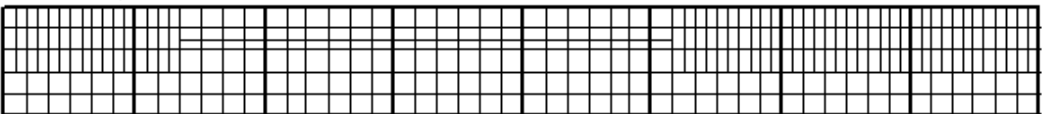
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Oct. 17, 2023



Oct. 18, 2023



Oct. 19, 2023



Oct. 20, 2023

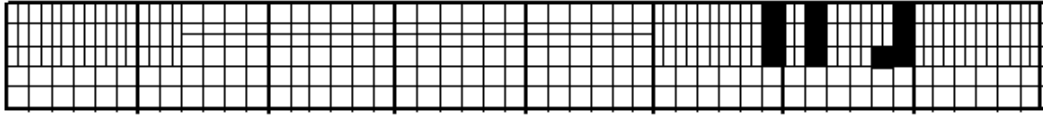


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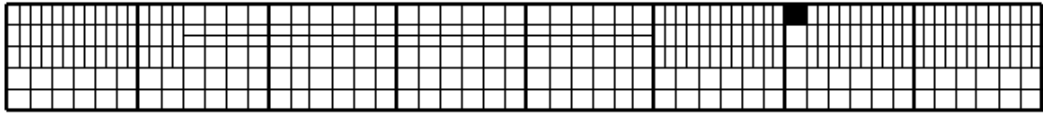
Universal Time

# Lovozero ascaplots

Oct. 21, 2023



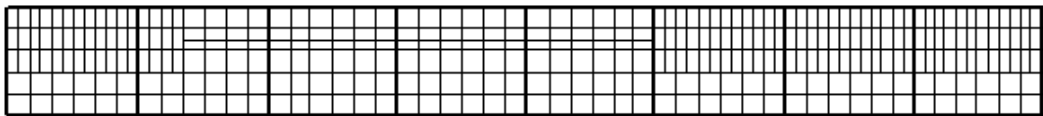
Oct. 22, 2023



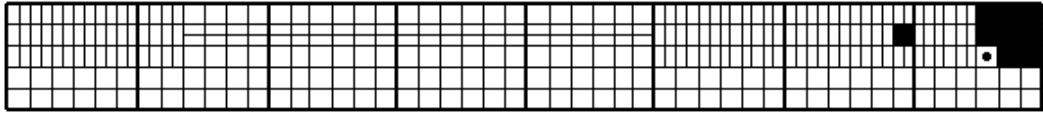
Oct. 23, 2023



Oct. 24, 2023



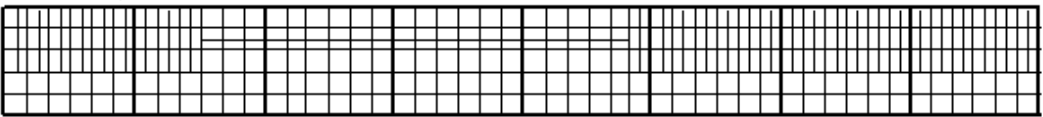
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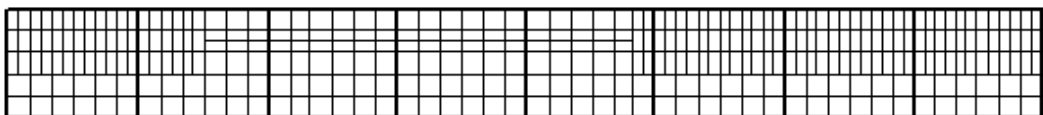
Oct. 26, 2023



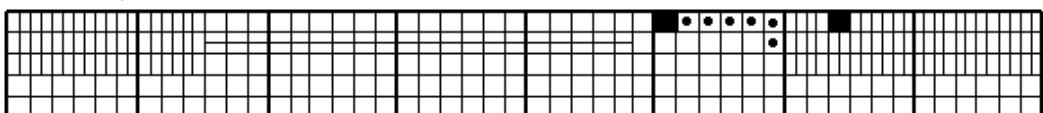
Oct. 27, 2023



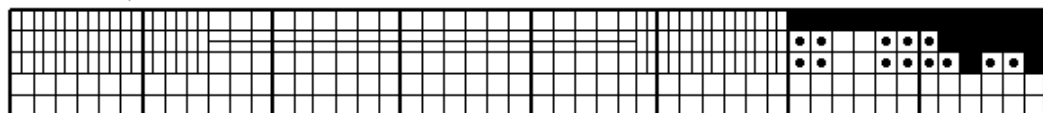
Oct. 28, 2023



Oct. 29, 2023



Oct. 30, 2023



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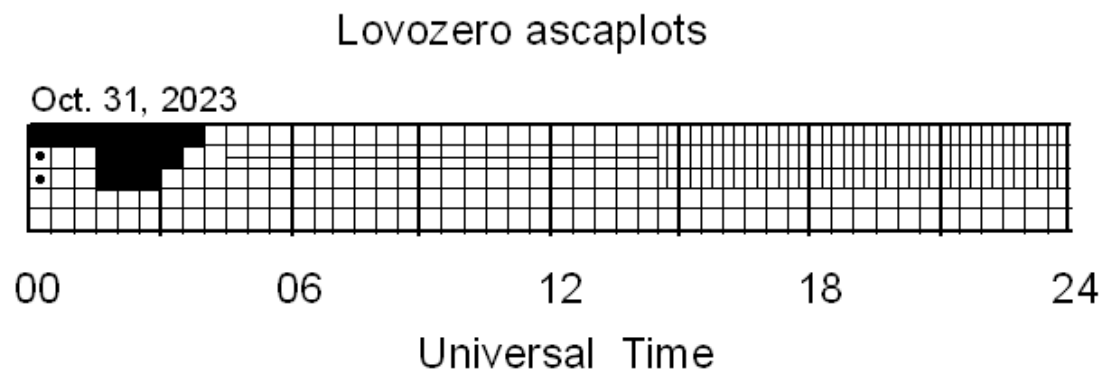
06

12

18

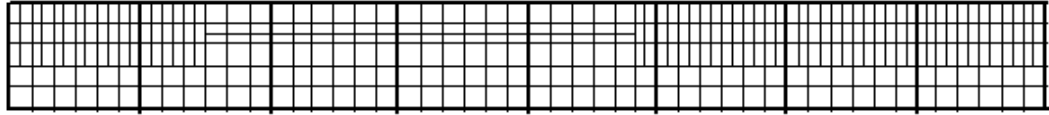
24

Universal Time



# Lovozero ascaplots

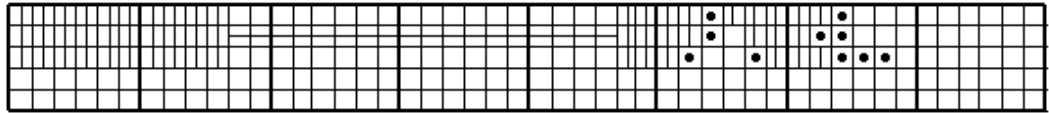
Nov. 01, 2023



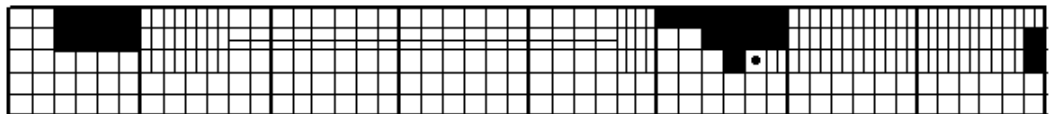
Nov. 02, 2023



Nov. 03, 2023



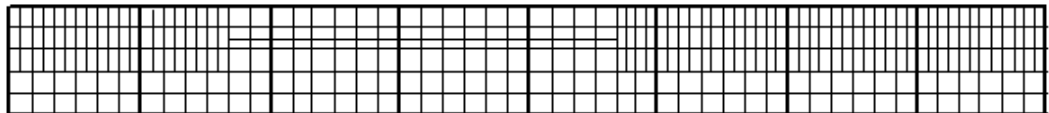
Nov. 04, 2023



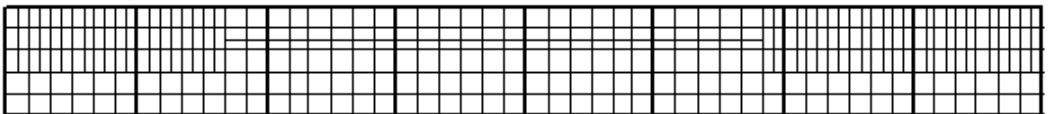
Nov. 05, 2023



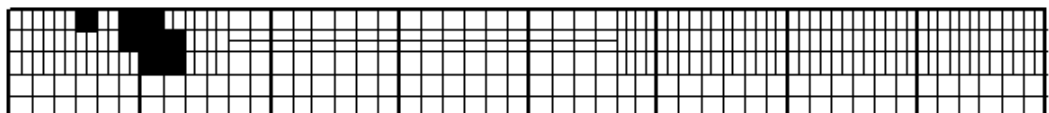
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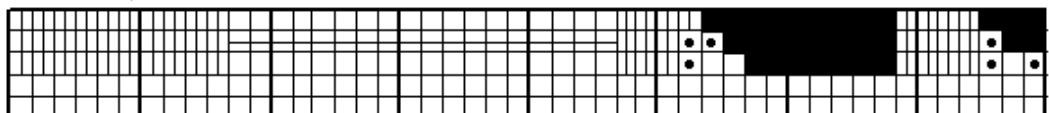
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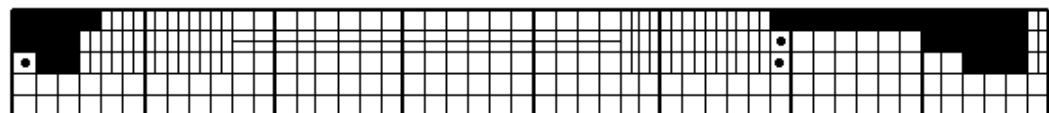
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Nov. 10, 2023

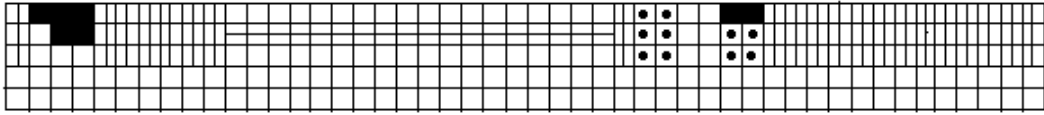


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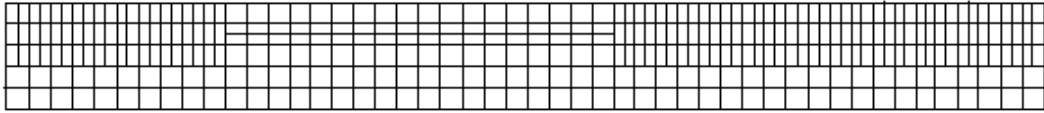
Universal Time

# Lovozero ascaplots

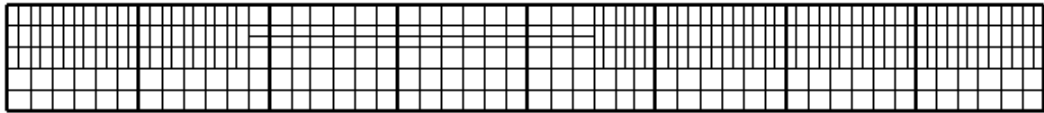
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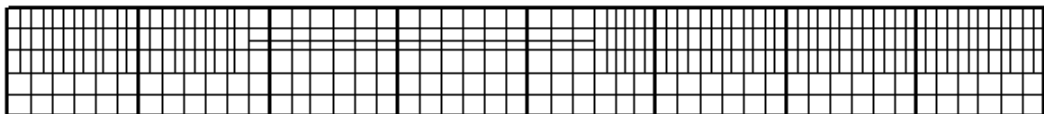
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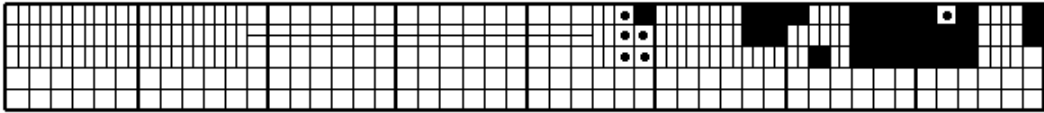
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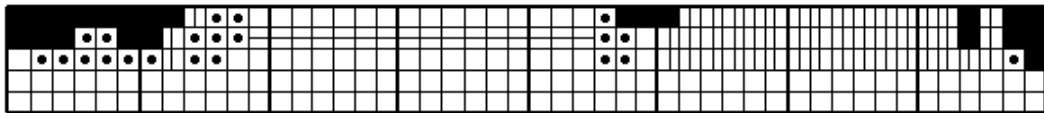
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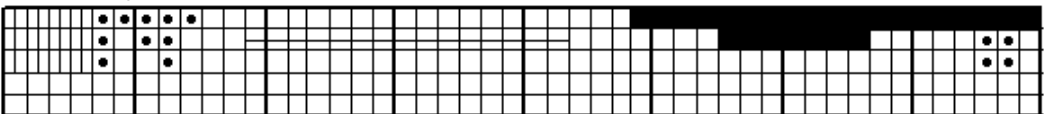
Nov. 15, 2023



Nov. 16, 2023



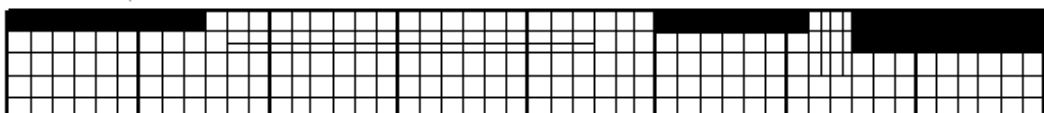
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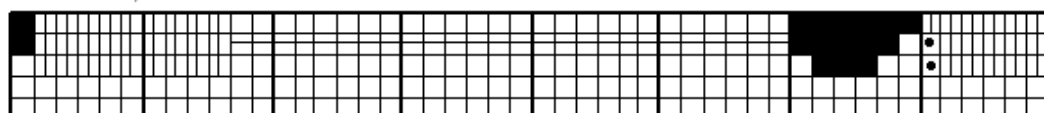
Nov. 18, 2023



Nov. 19, 2023



Nov. 20, 2023

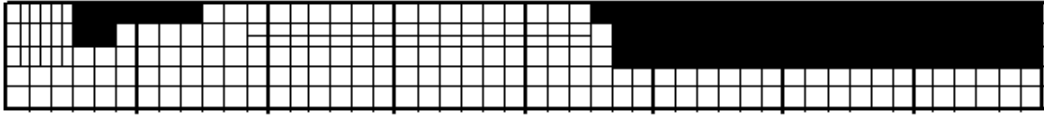


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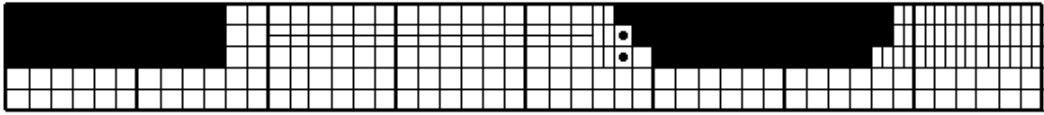
Universal Time

# Lovozero ascaplots

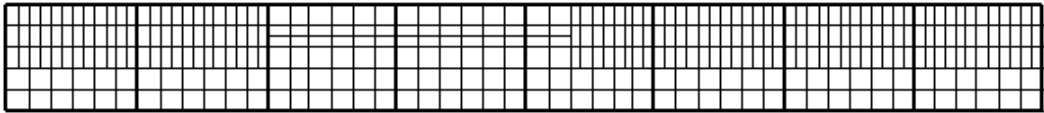
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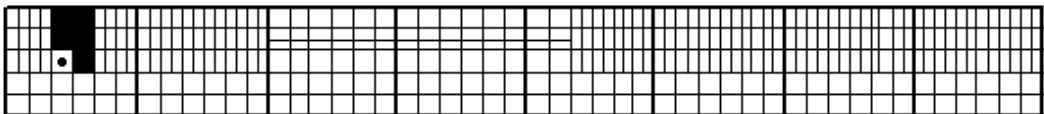
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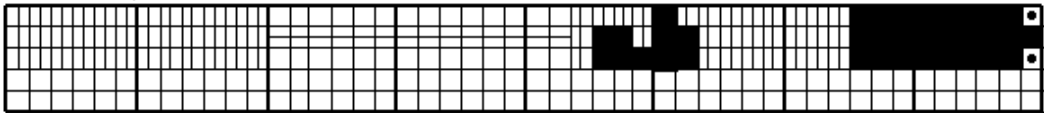
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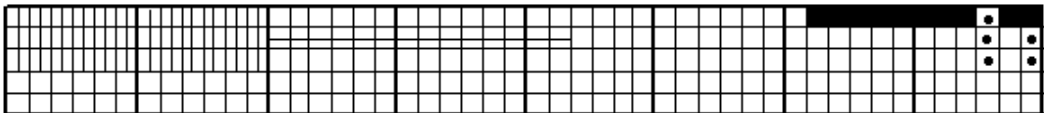
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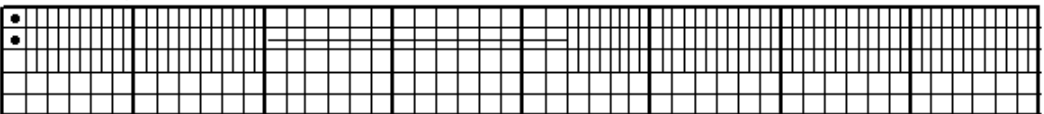
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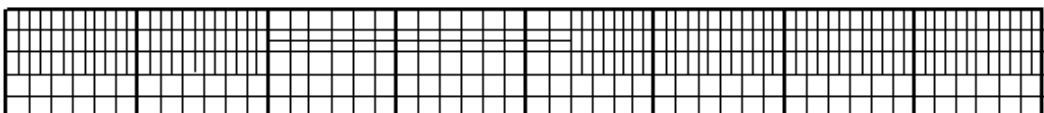
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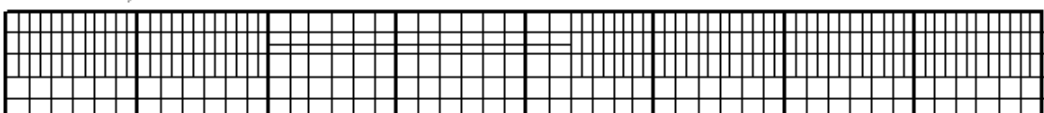
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Nov. 28, 2023



Nov. 29, 2023



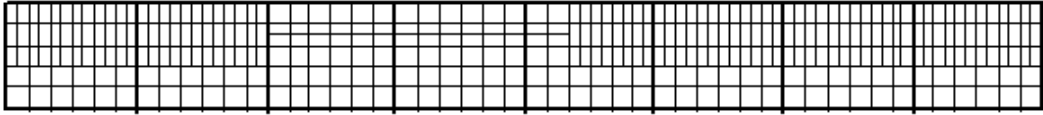
Nov. 30, 2023



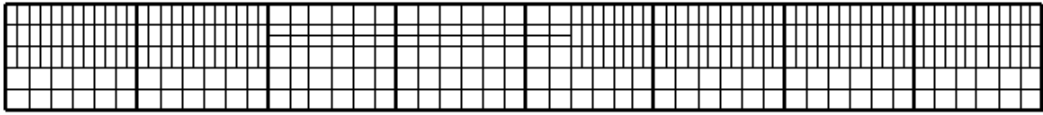
00 06 12 18 24  
Universal Time

# Lovozero ascaplots

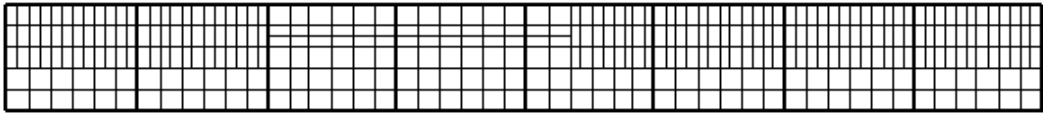
Dec. 01, 2023



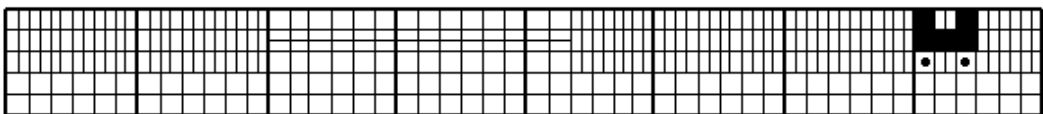
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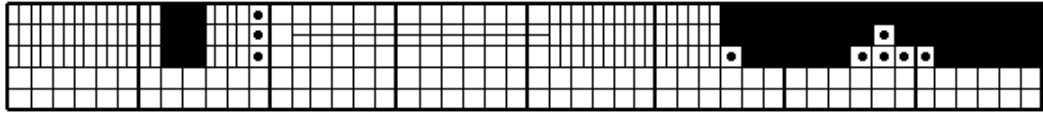
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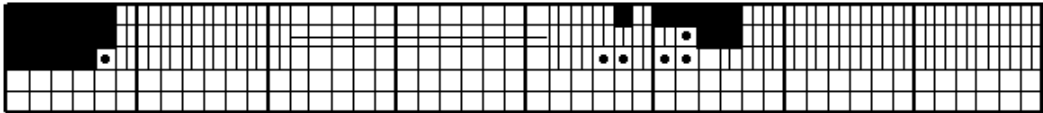
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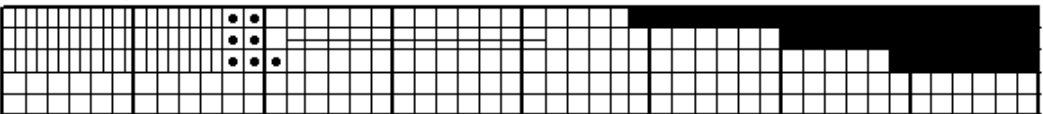
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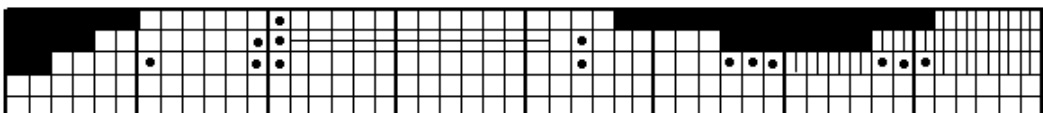
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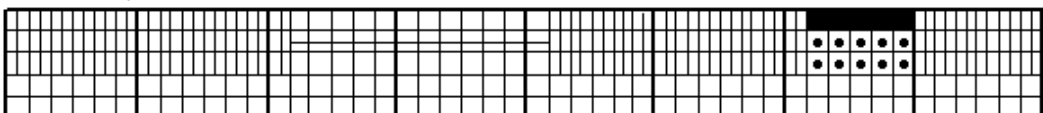
Dec. 07, 2023



Dec. 08, 2023



Dec. 09, 2023



Dec. 10, 2023

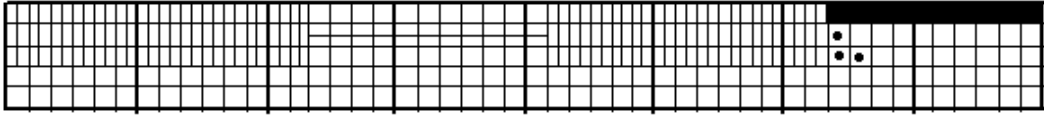


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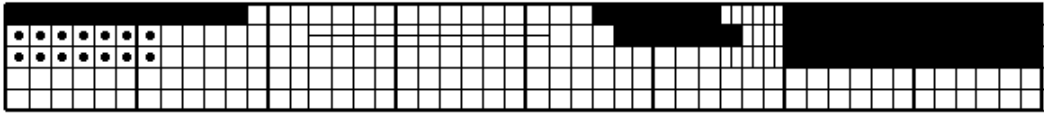
Universal Time

# Lovozero ascaplots

Dec. 11, 2023



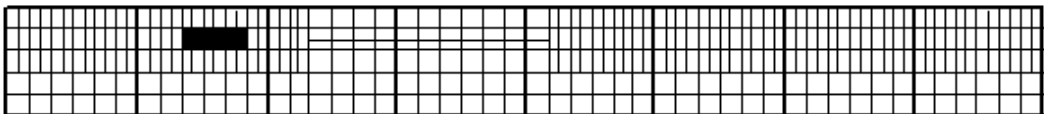
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Dec. 13, 2023



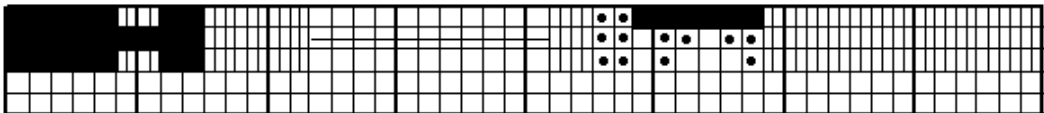
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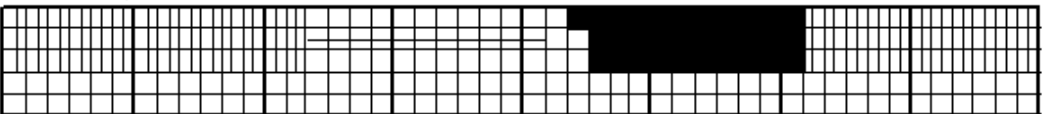
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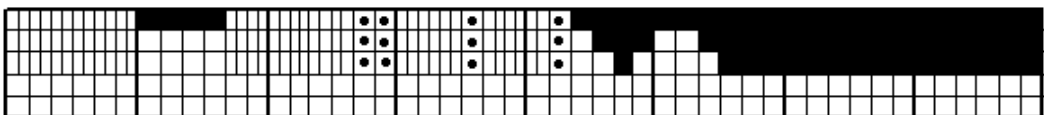
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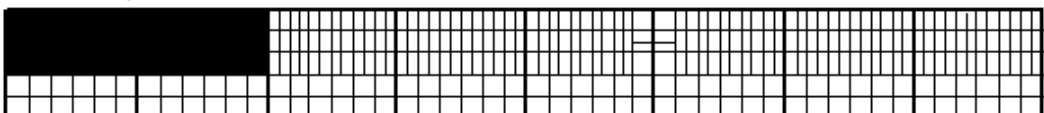
Dec. 17, 2023



Dec. 18, 2023



Dec. 19, 2023



Dec. 20, 2023

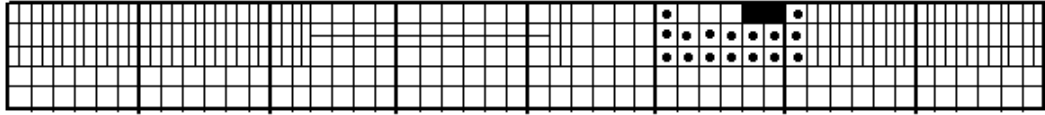


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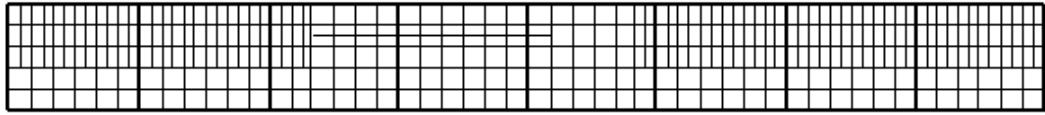
Universal Time

# Lovozero ascaplots

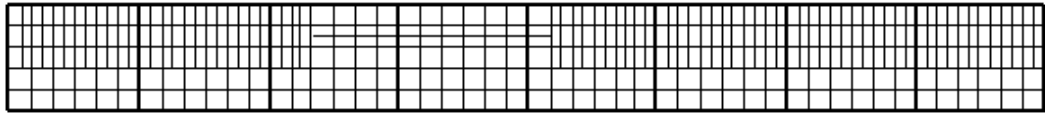
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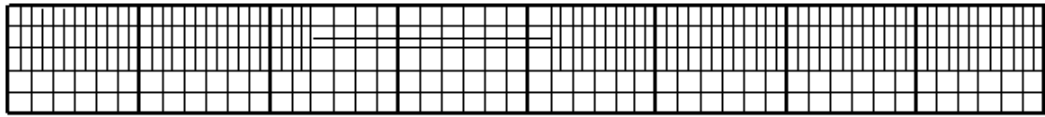
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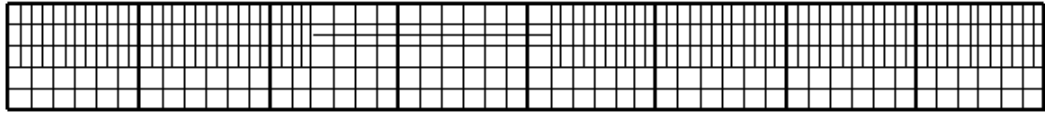
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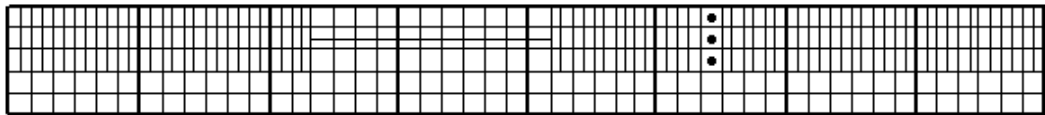
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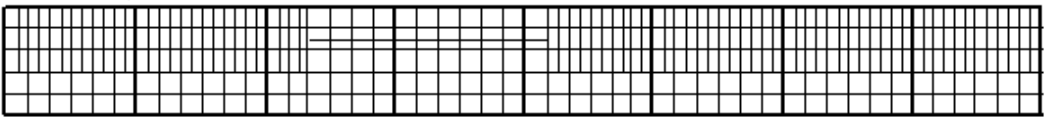
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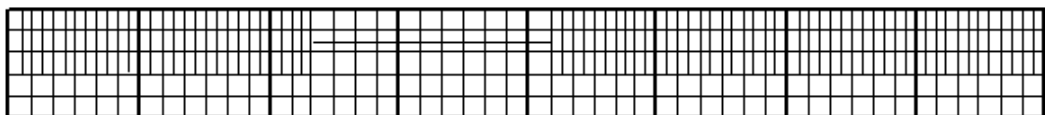
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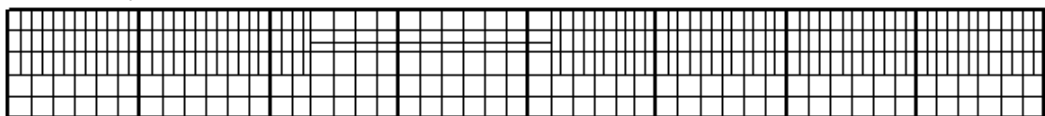
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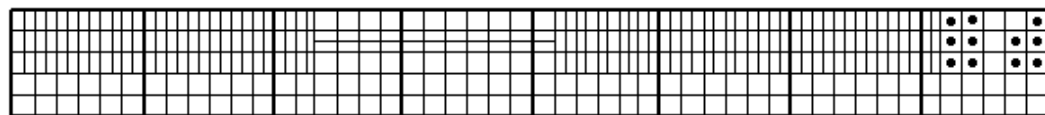
Dec. 28, 2023



Dec. 29, 2023



Dec. 30, 2023



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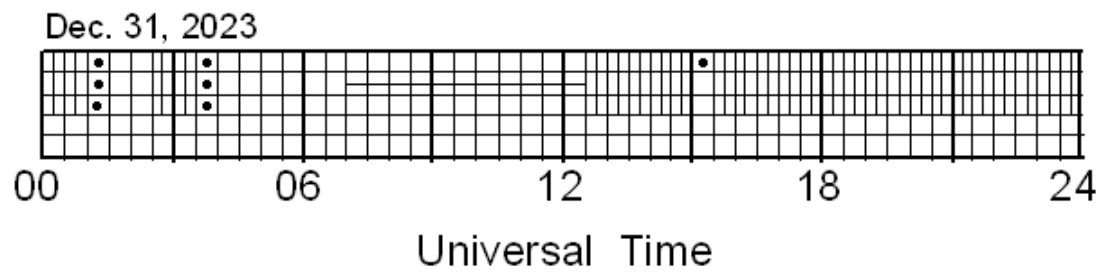
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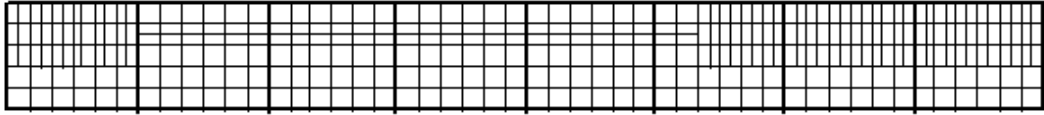
Universal Time

## Lovozero ascaplots

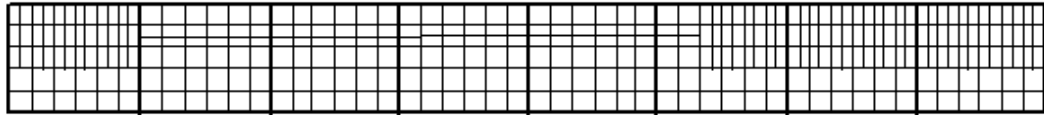


# Verhnetulomsky ascaplots

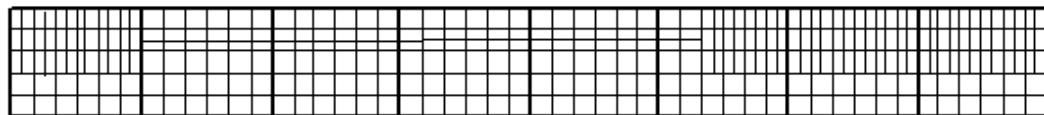
Oct. 10, 2023



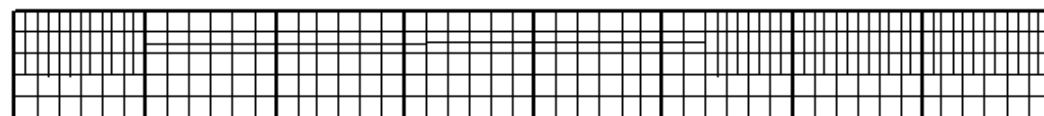
Oct. 11, 2023



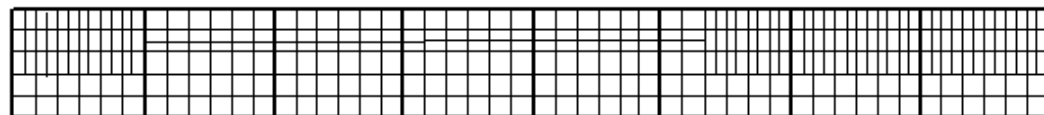
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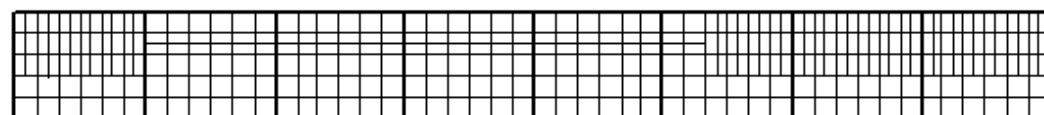
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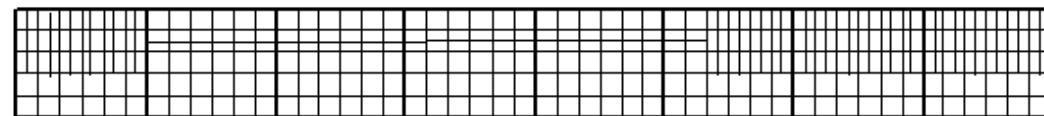
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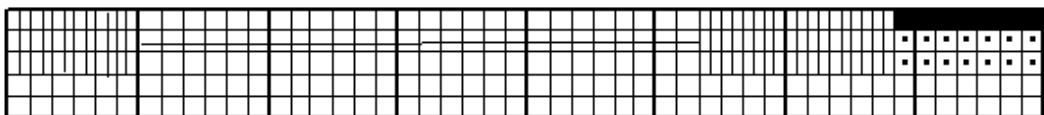
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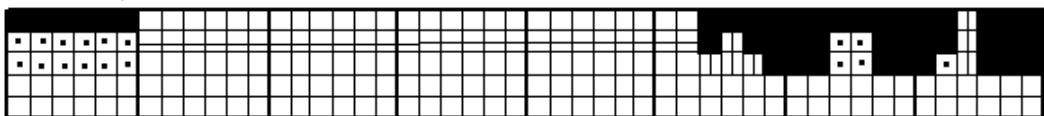
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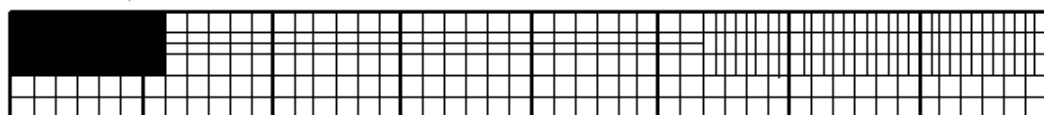
Oct. 17, 2023



Oct. 18, 2023



Oct. 19, 2023

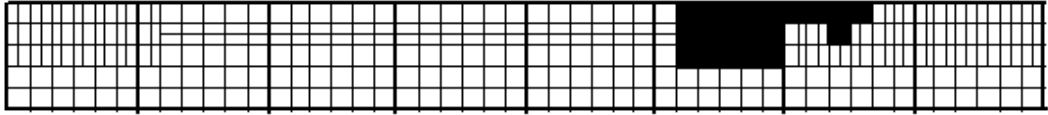


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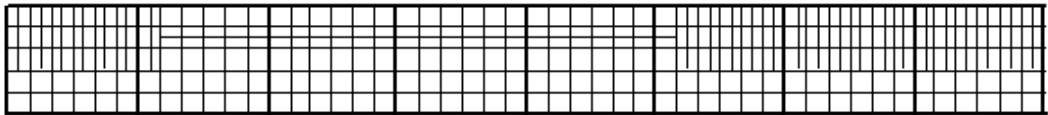
Universal Time

## Verhnetulomsky ascaplots

Oct. 20, 2023



Oct. 21, 2023



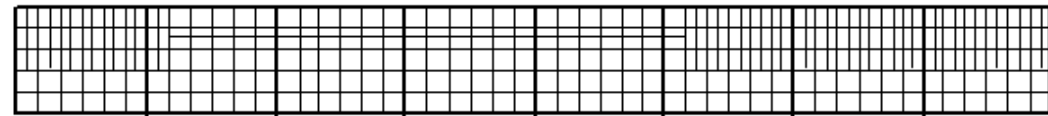
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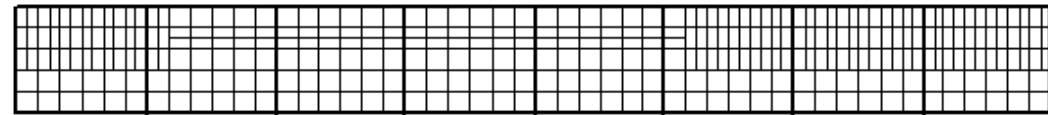
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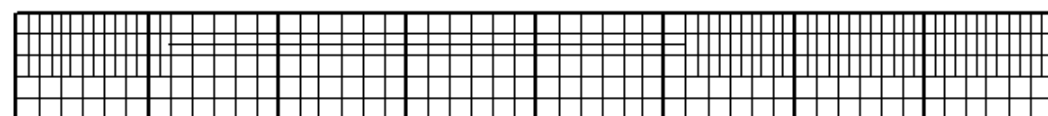
Oct. 24, 2023



Oct. 25, 2023



Oct. 26, 2023



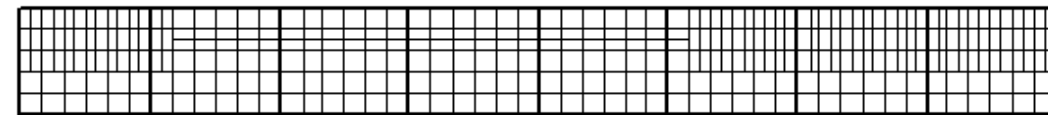
Oct. 27, 2023



Oct. 28, 2023



Oct. 29, 2023

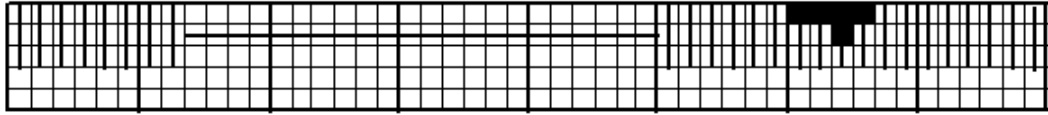


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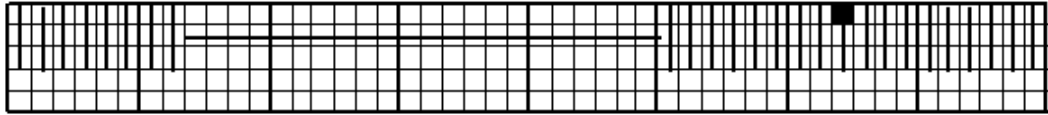
Universal Time

## Verhnetulomsky ascaplots

Oct. 30, 2023



Oct. 31, 2023



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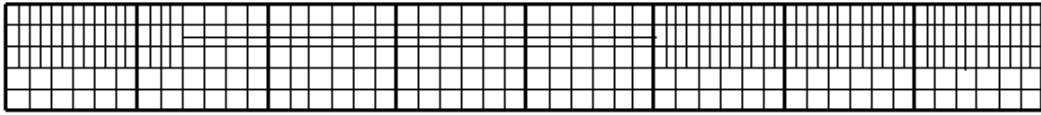
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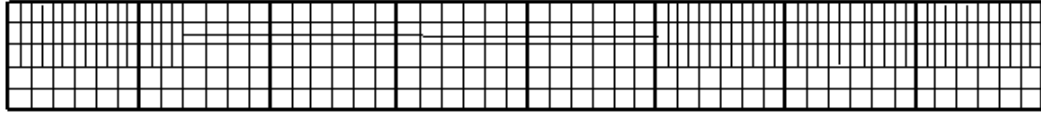
Universal Time

# Verhnetulomsky ascaplots

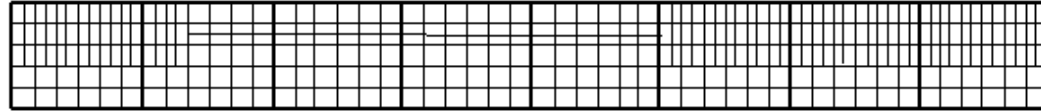
Nov. 01, 2023



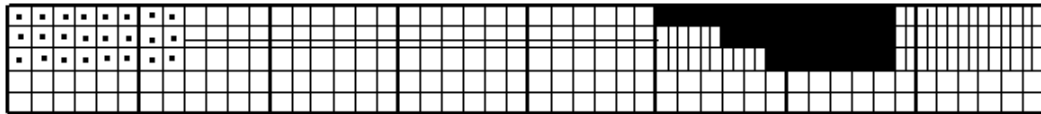
Nov. 02, 2023



Nov. 03, 2023



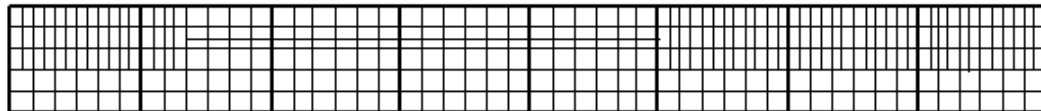
Nov. 04, 2023



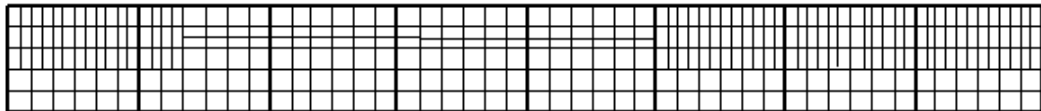
Nov. 05, 2023



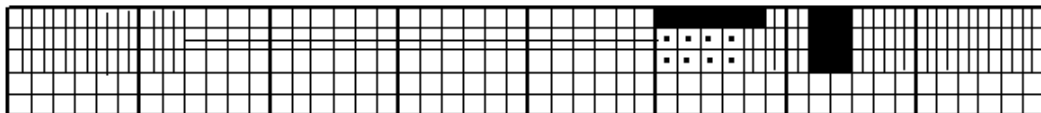
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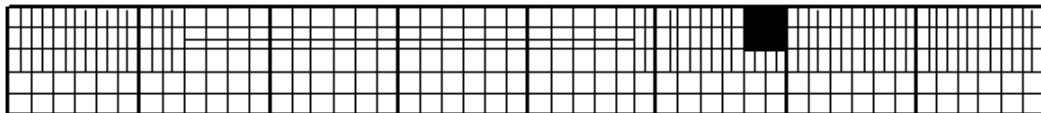
Nov. 07, 2023



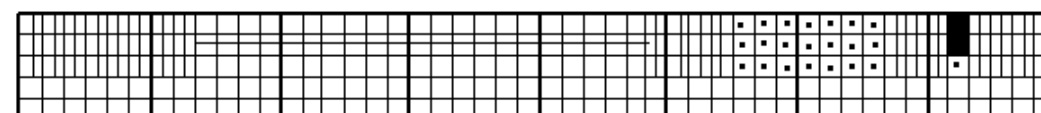
Nov. 08, 2023



Nov. 09, 2023



Nov. 10, 2023

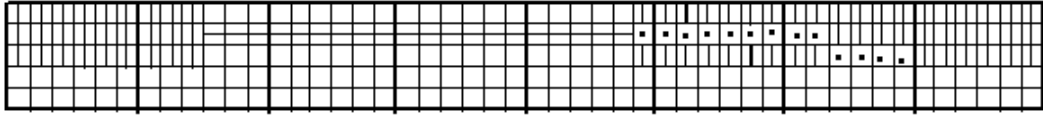


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Universal Time

# Verhnetulomsky ascaplots

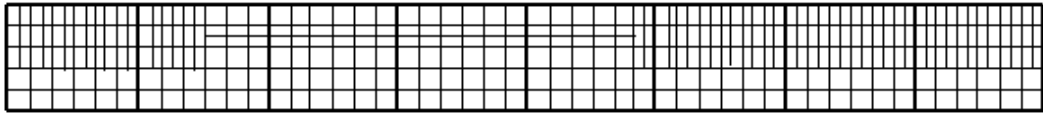
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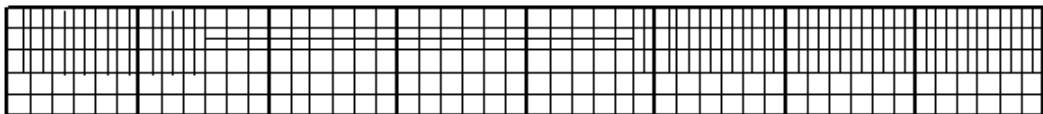
Nov. 12, 2023



Nov. 13, 2023



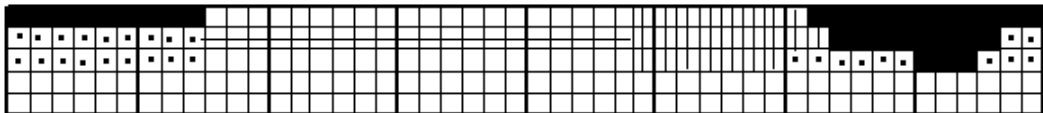
Nov. 14, 2023



Nov. 15, 2023



Nov. 16, 2023



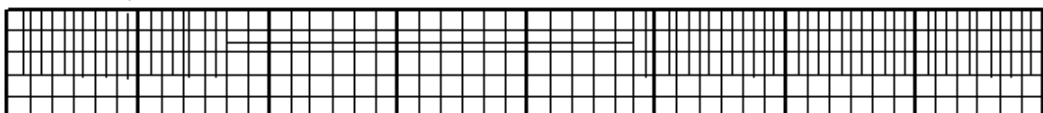
Nov. 17, 2023



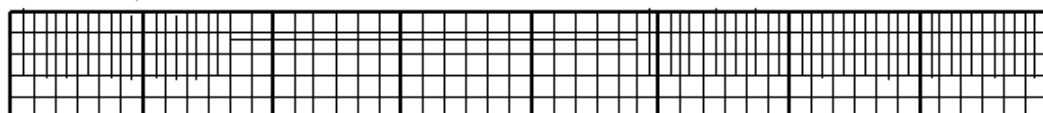
Nov. 18, 2023



Nov. 19, 2023



Nov. 20, 2023

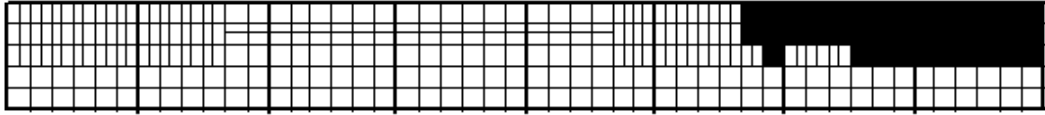


00 06 12 18 24

Universal Time

# Verhnetulomsky ascaplots

Nov. 21, 2023



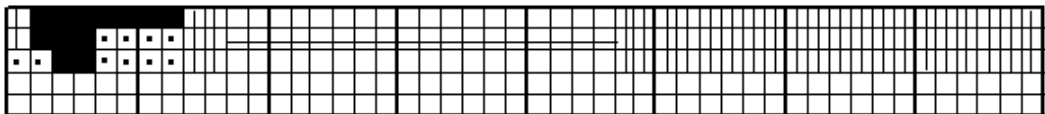
Nov. 22, 2023



Nov. 23, 2023



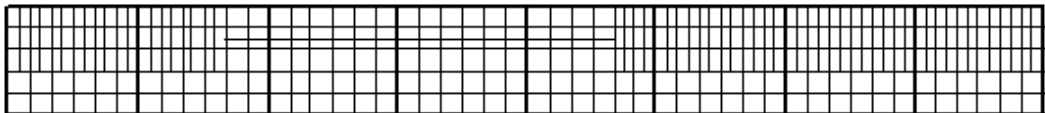
Nov. 24, 2023



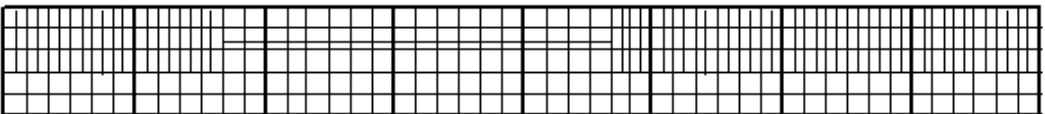
Nov. 25, 2023



Nov. 26, 2023



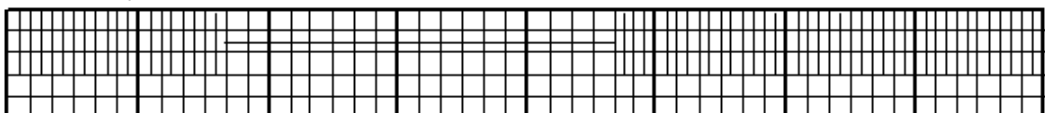
Nov. 27, 2023



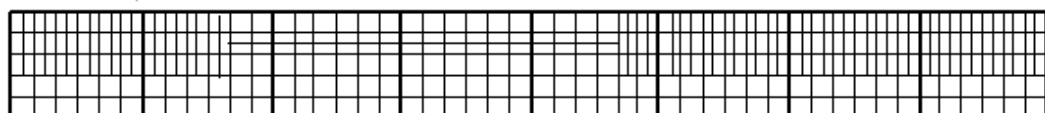
Nov. 28, 2023



Nov. 29, 2023



Nov. 30, 2023

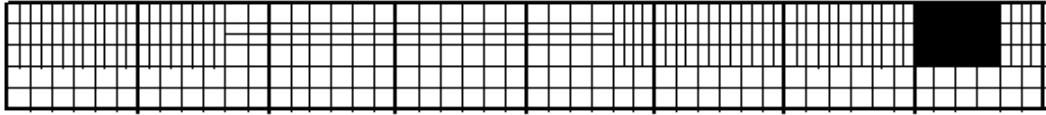


00                      06                      12                      18                      24

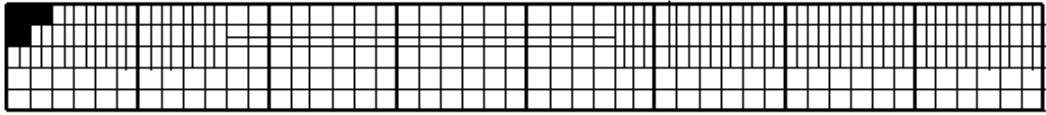
Universal Time

## Verhnetulomsky ascaplots

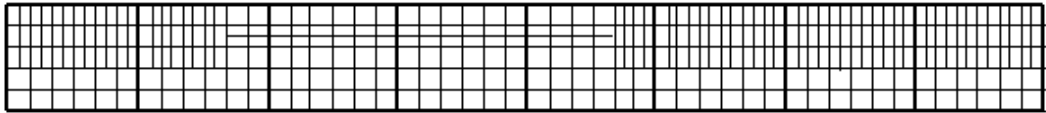
Dec. 01, 2023



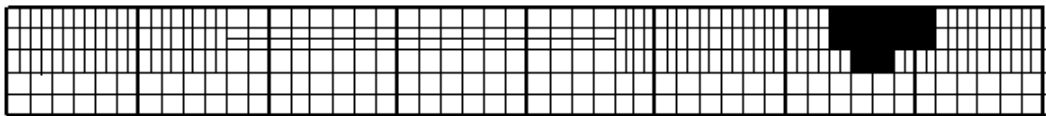
Dec. 02, 2023



Dec. 03, 2023



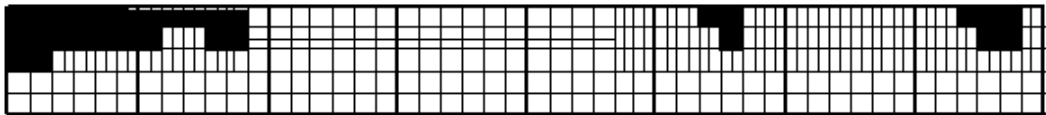
Dec. 04, 2023



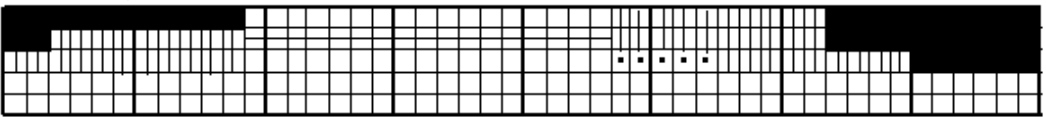
Dec. 05, 2023



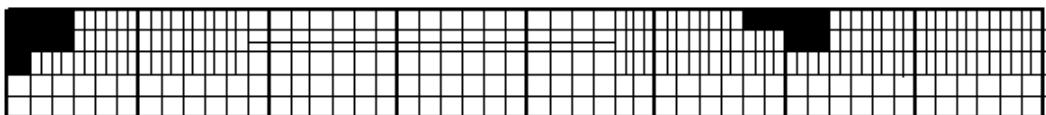
Dec. 06, 2023



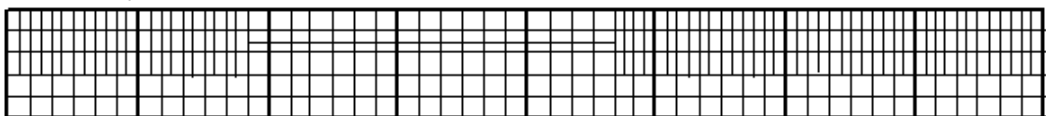
Dec. 07, 2023



Dec. 08, 2023



Dec. 09, 2023



Dec. 10, 2023

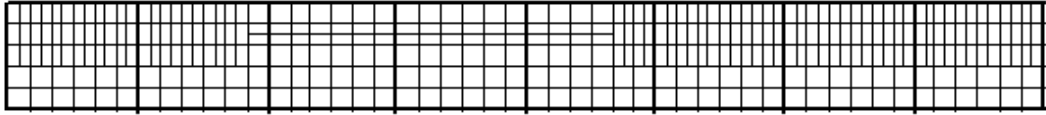


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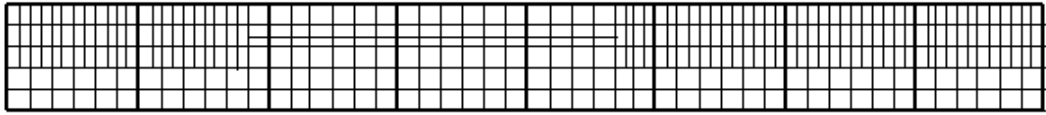
Universal Time

## Verhnetulomsky ascaplots

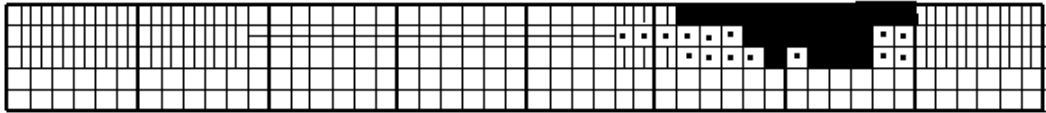
Dec. 11, 2023



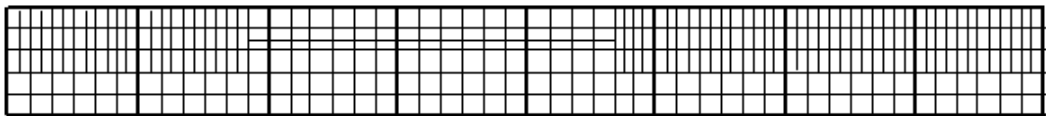
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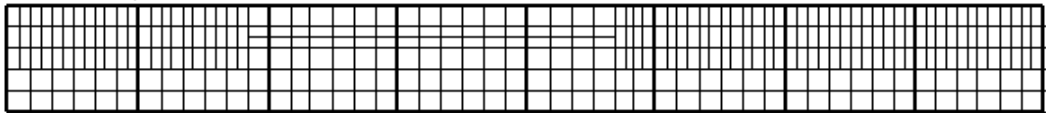
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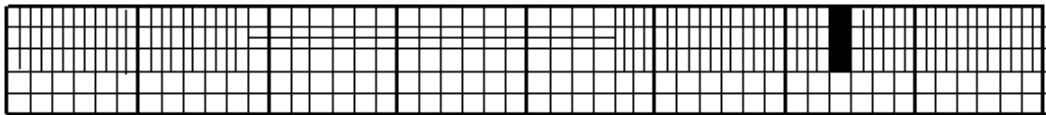
Dec. 14, 2023



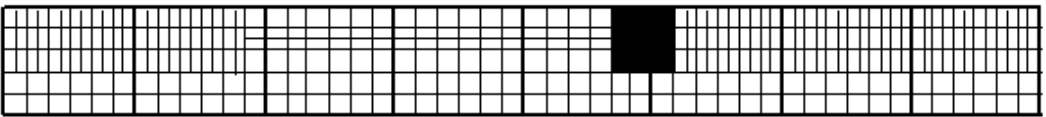
Dec. 15, 2023



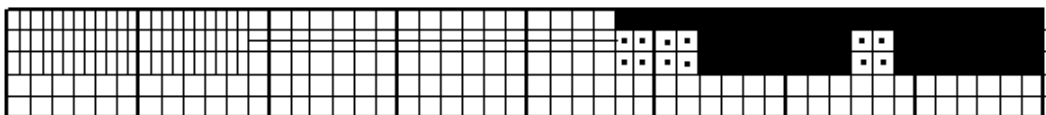
Dec. 16, 2023



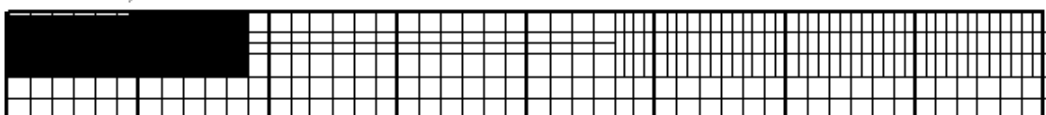
Dec. 17, 2023



Dec. 18, 2023



Dec. 19, 2023



Dec. 20, 2023

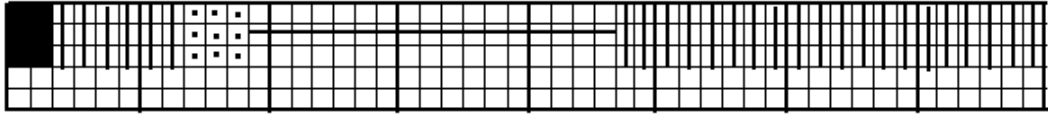


00                      06                      12                      18                      24

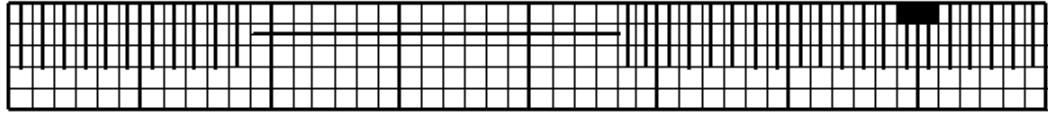
Universal Time

## Verhnetulomsky ascaplots

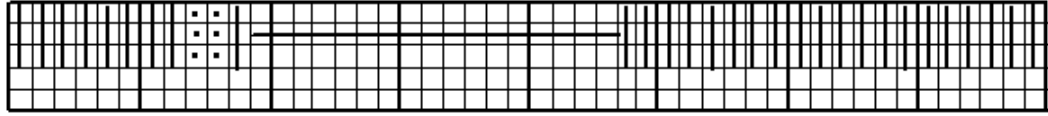
Dec. 21, 2023



Dec. 22, 2023



Dec. 23, 2023



00

06

12

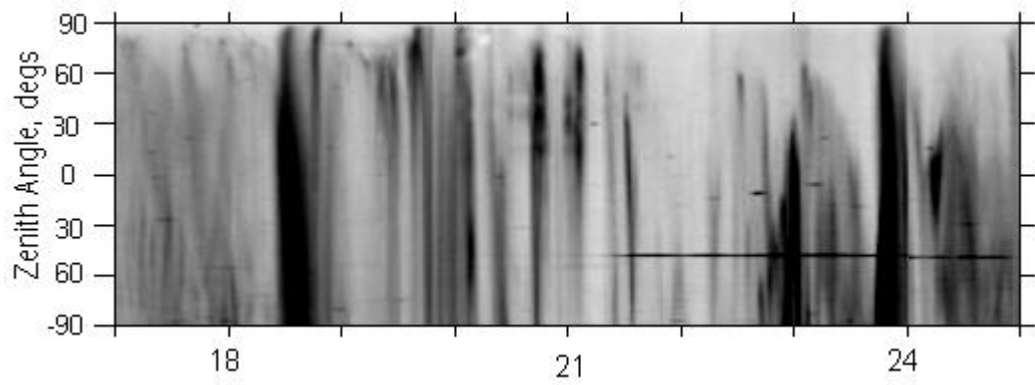
18

24

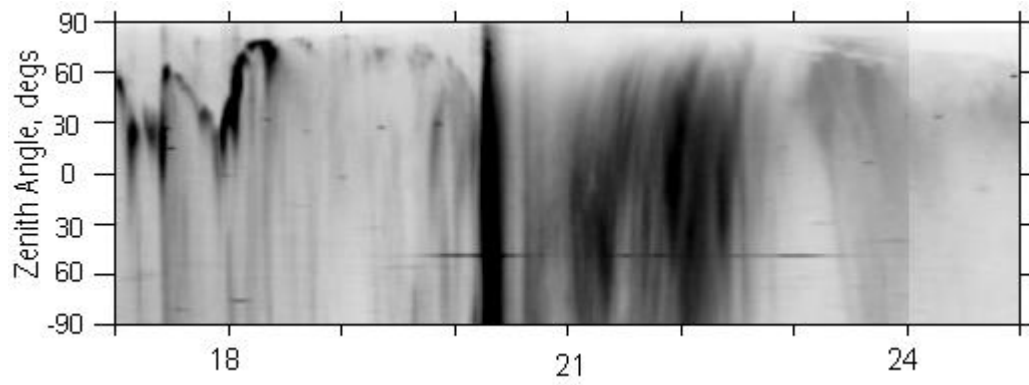
Universal Time

## Lovozero TV keograms

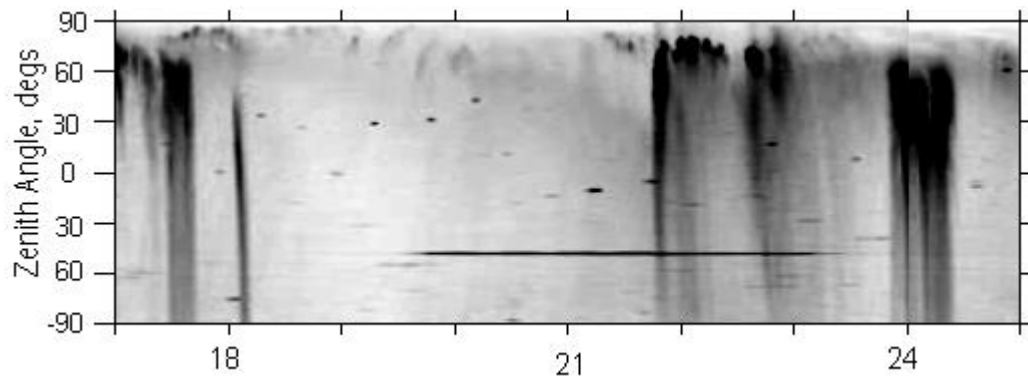
Oct. 18, 2023



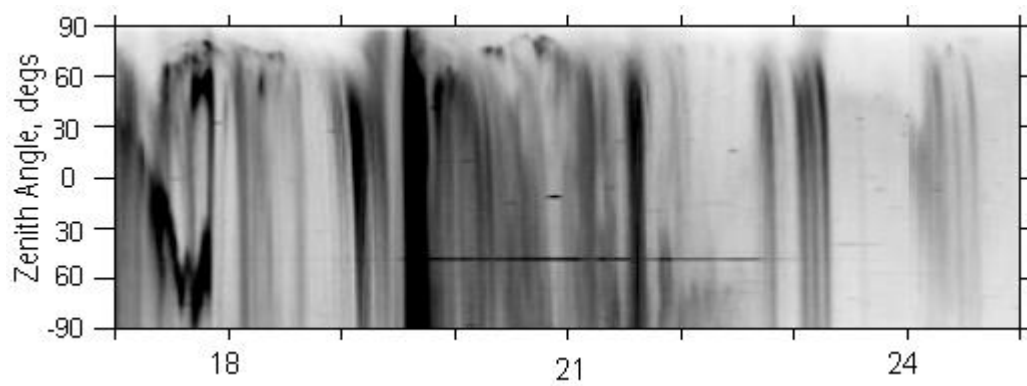
Nov.09, 2023



Nov. 10, 2023

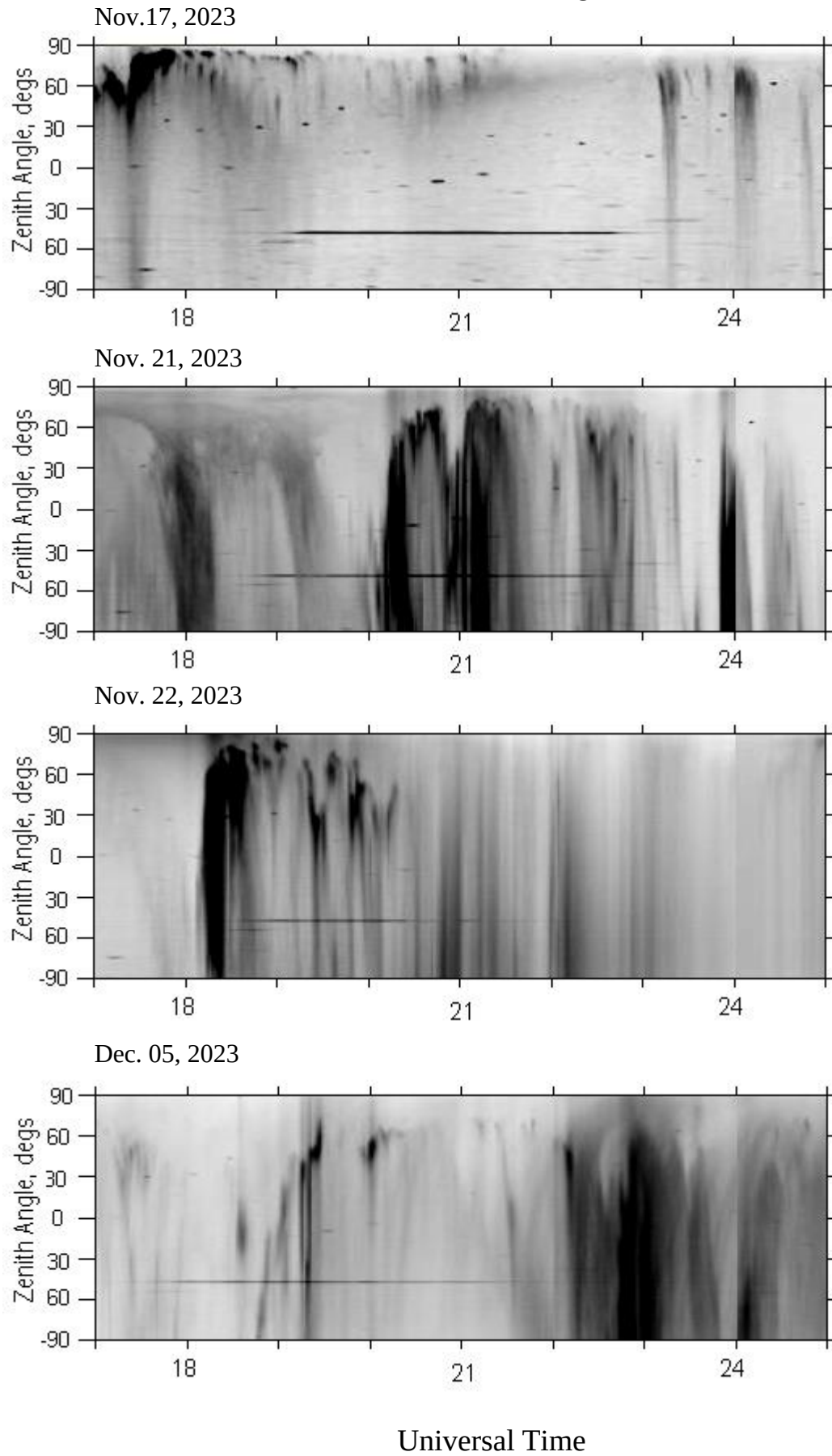


Nov. 15, 2023

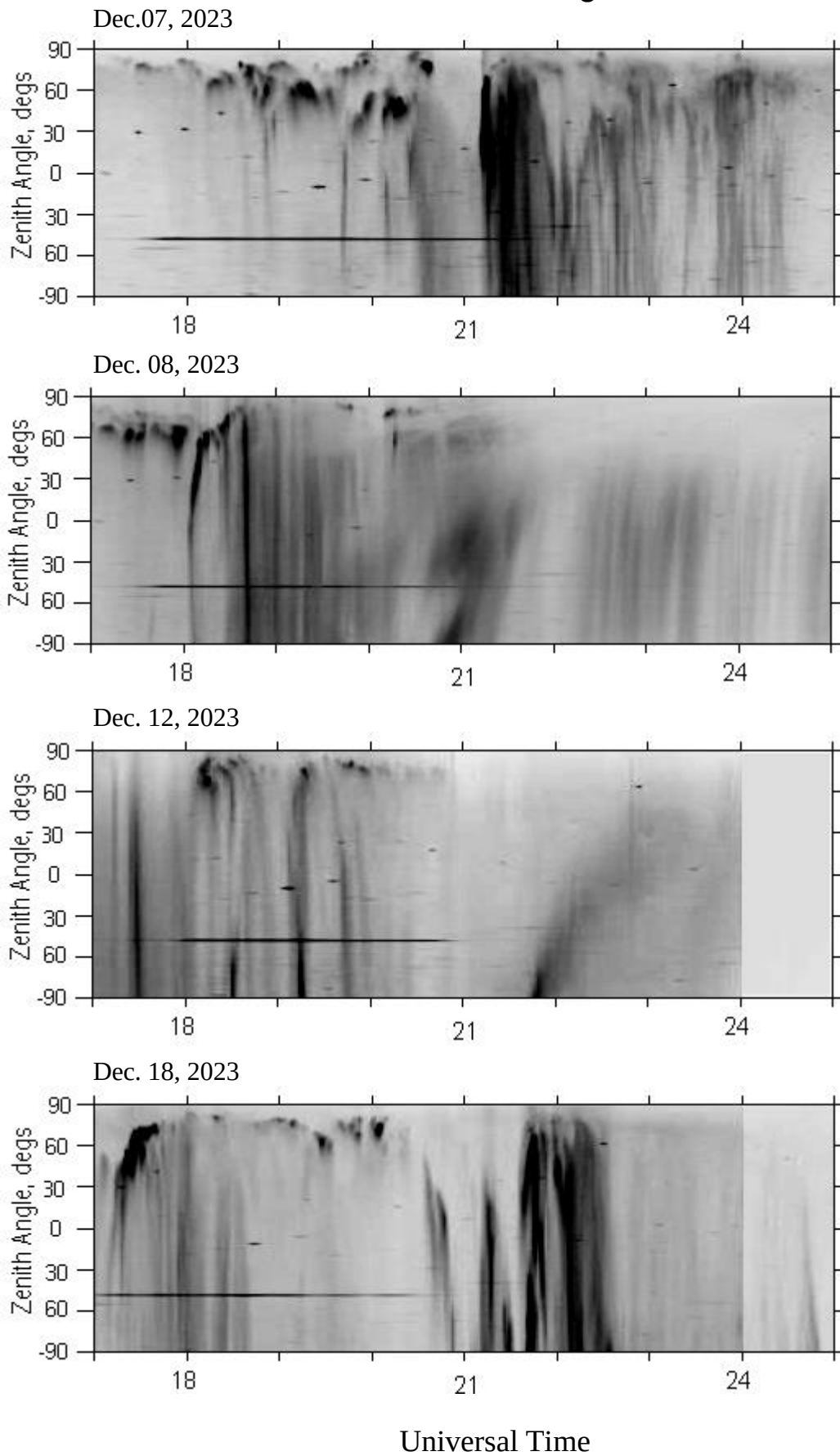


Universal Time

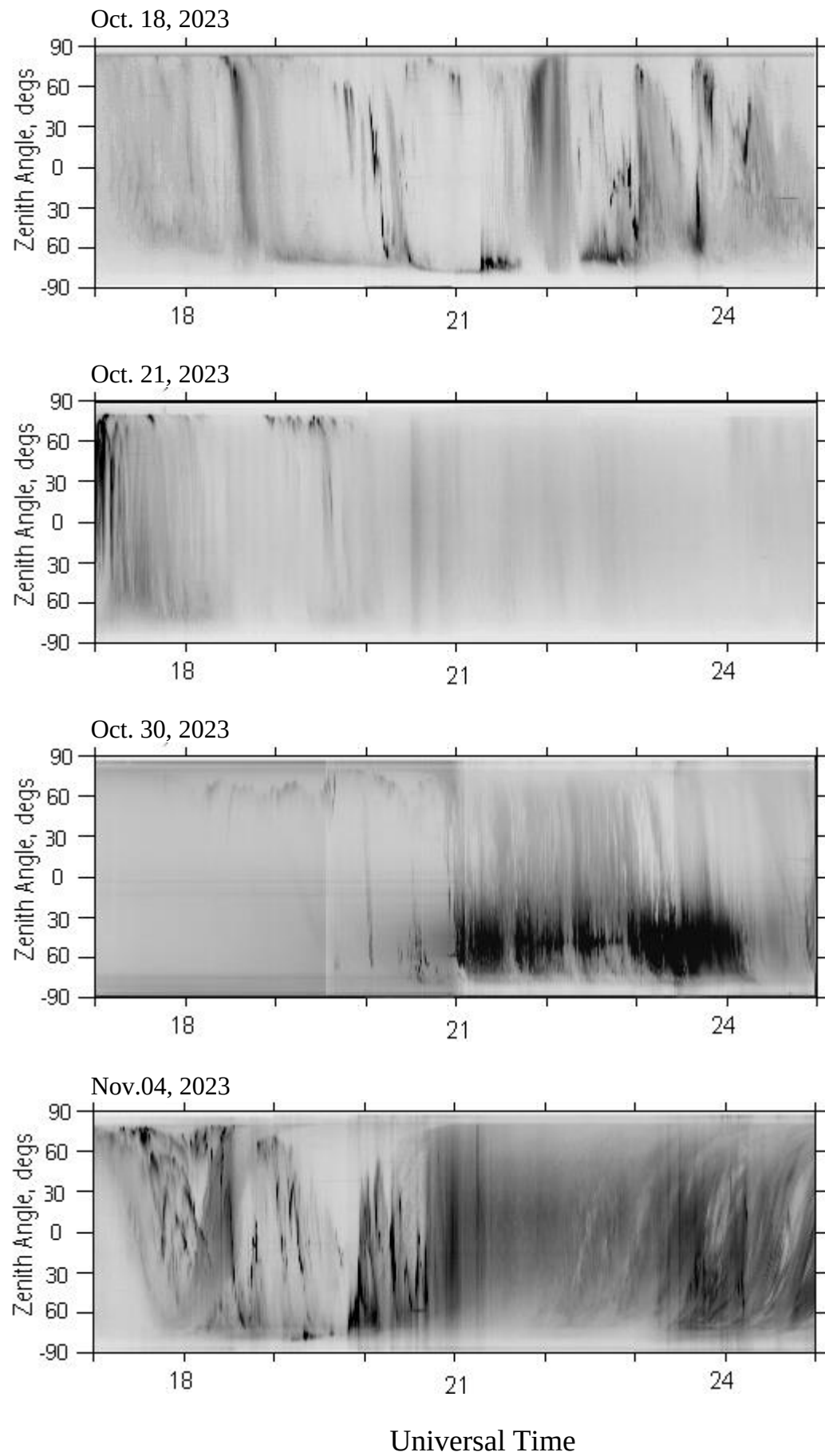
## Lovozero TV keograms



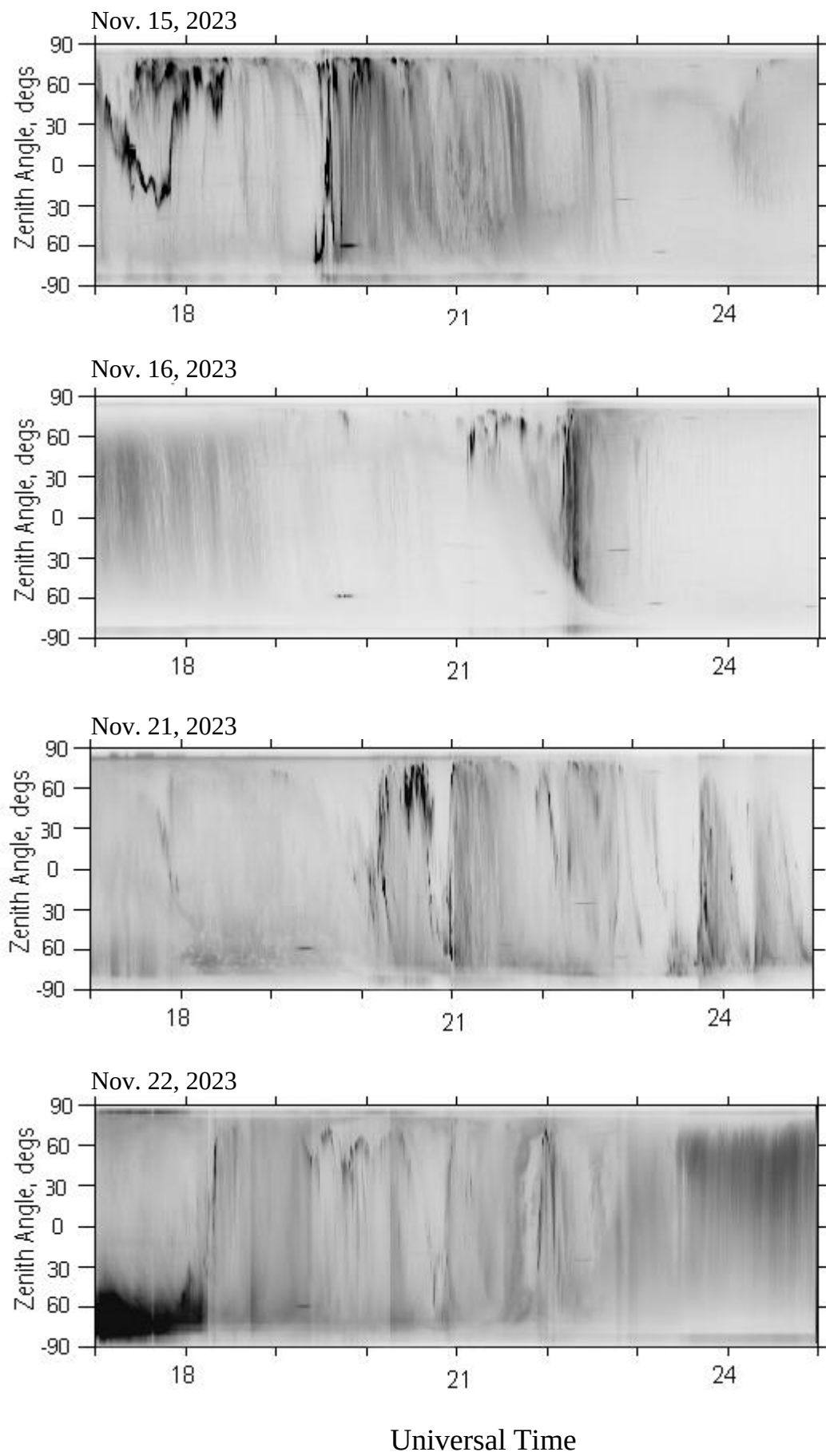
## Lovozero TV keograms



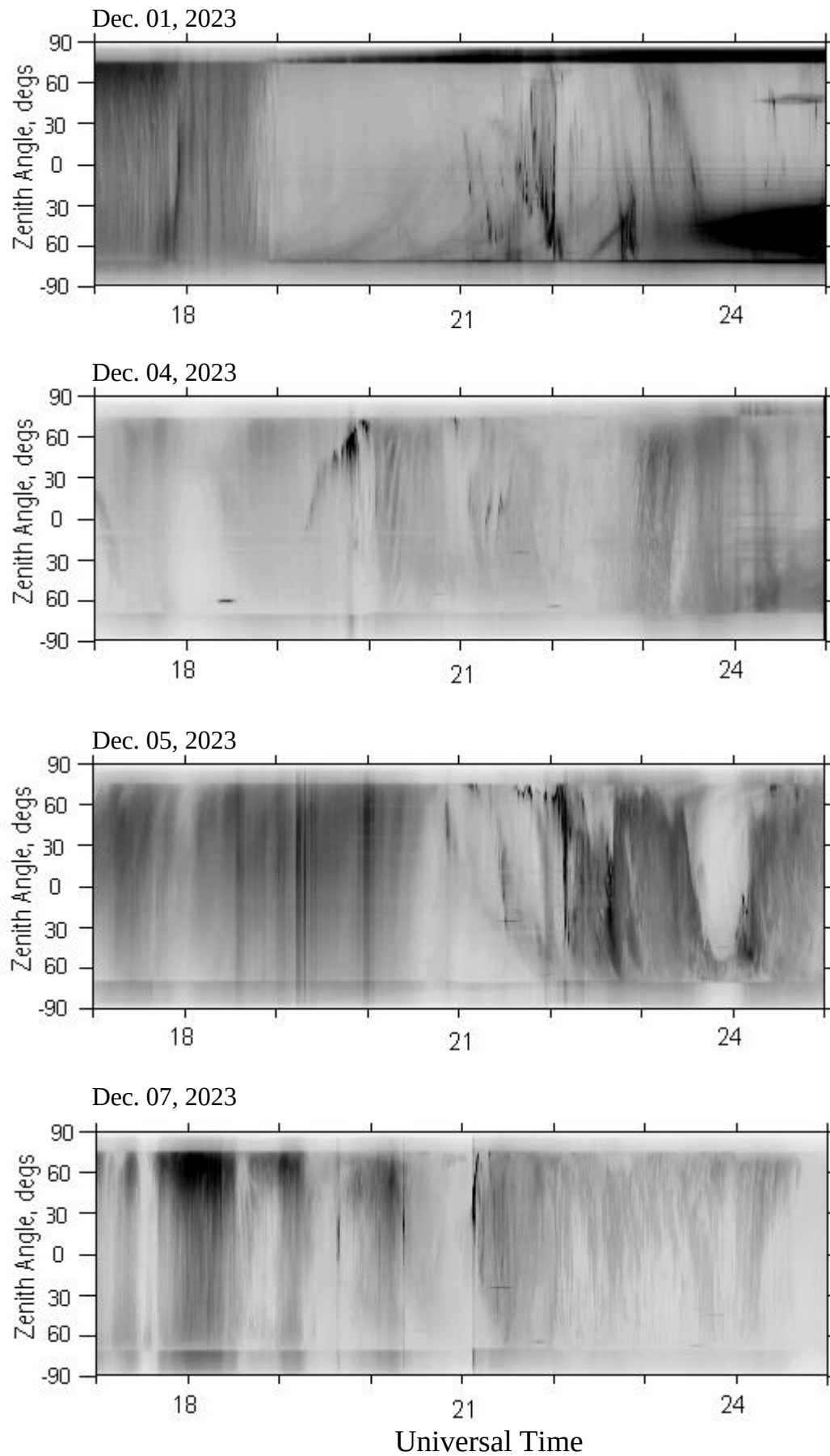
## Verhnetulomsky TV keograms



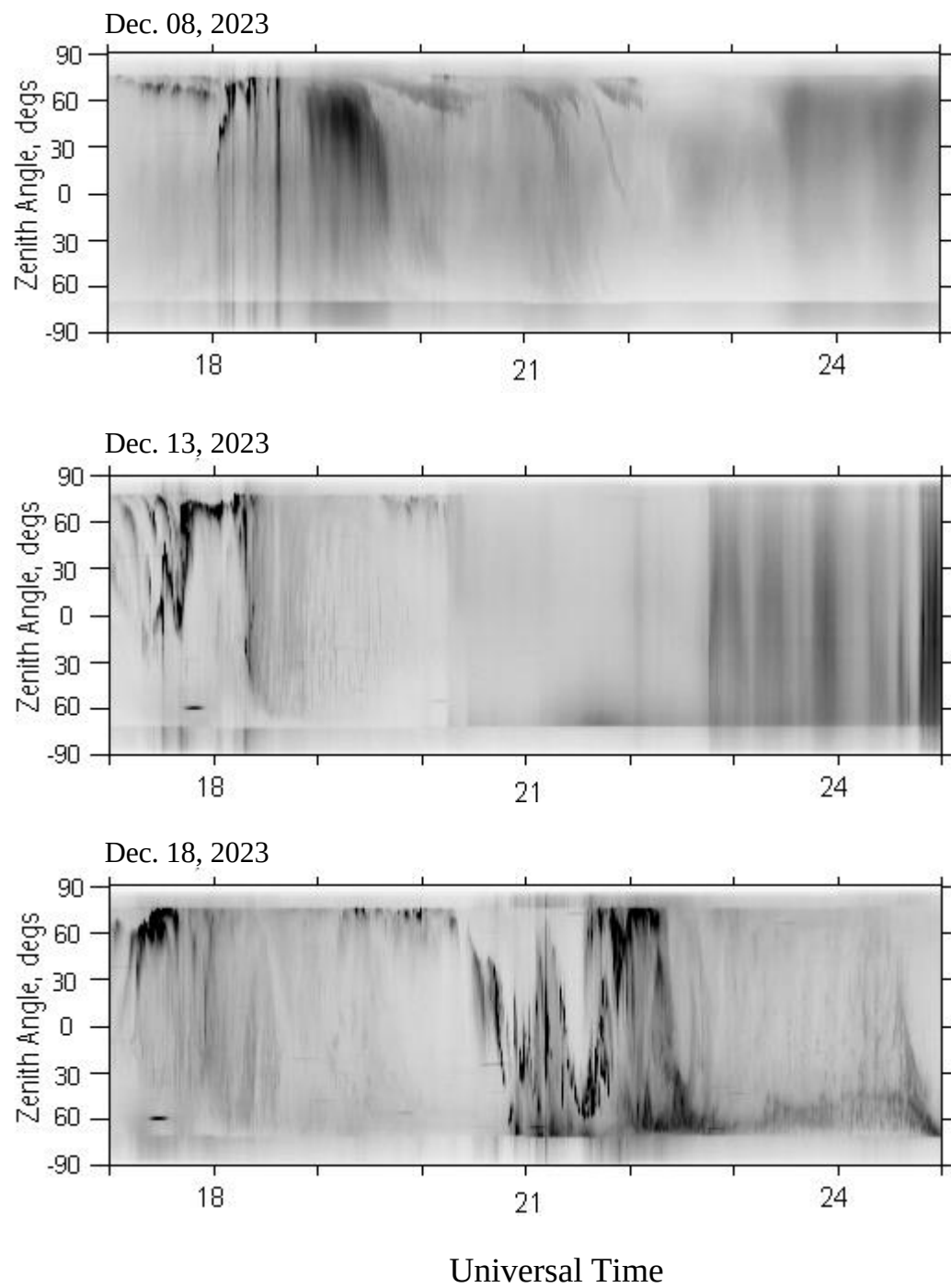
## Verhnetulomsky TV keograms



## Verhnetulomsky TV keograms



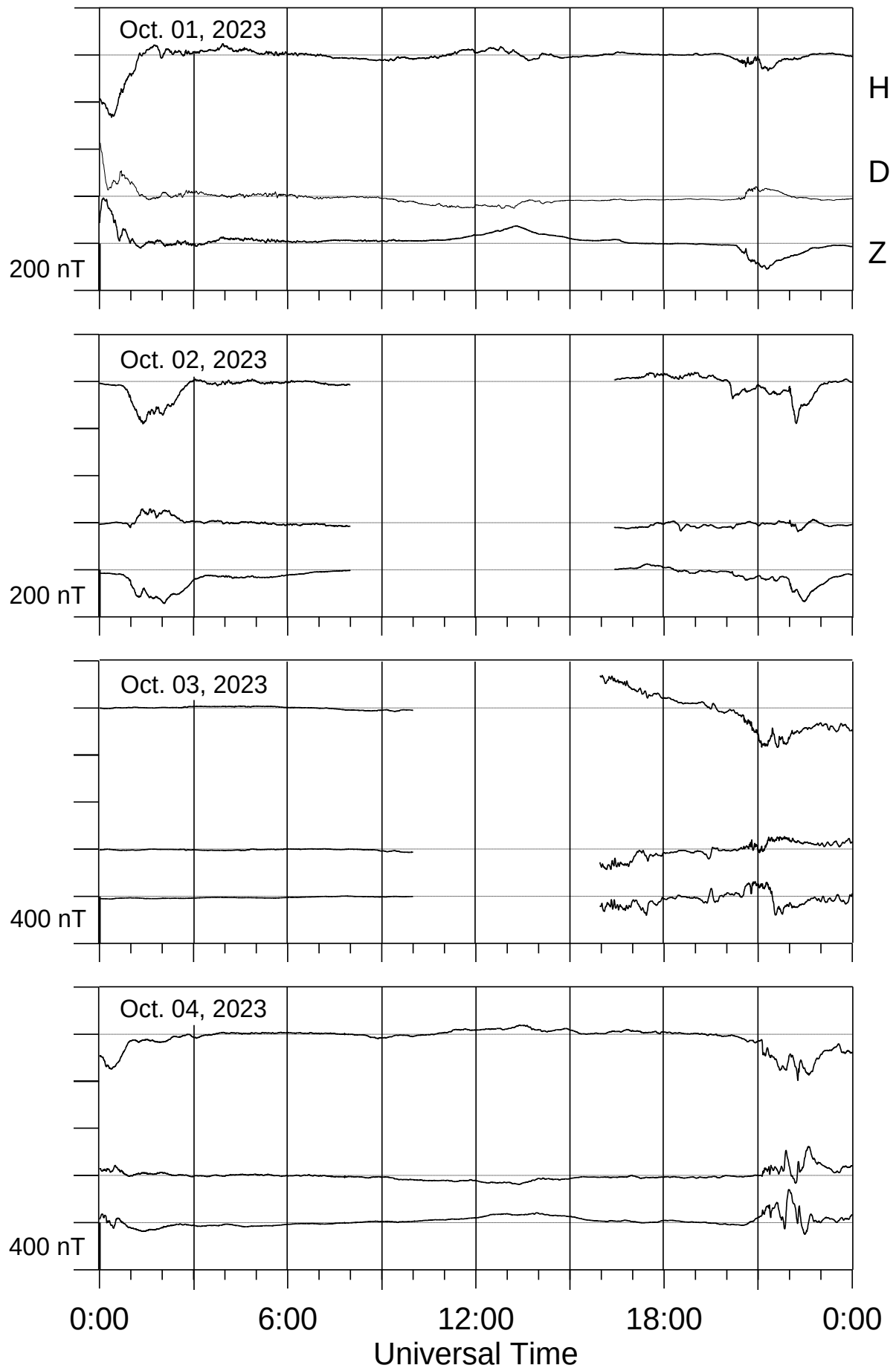
## Verhnetulomsky TV keograms



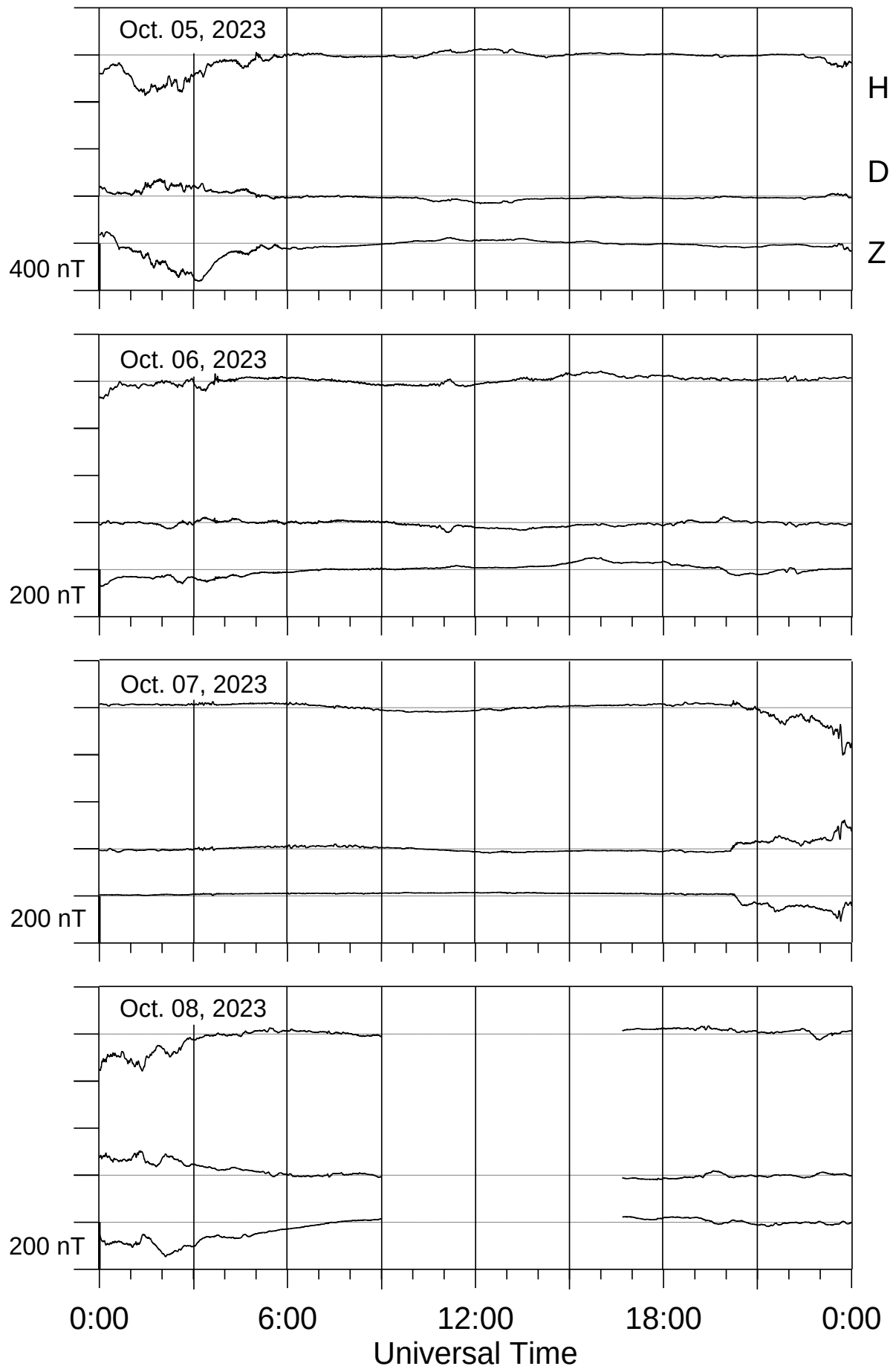
## **LOVOZERO MAGNETOGRAMS**

**October - December 2023**

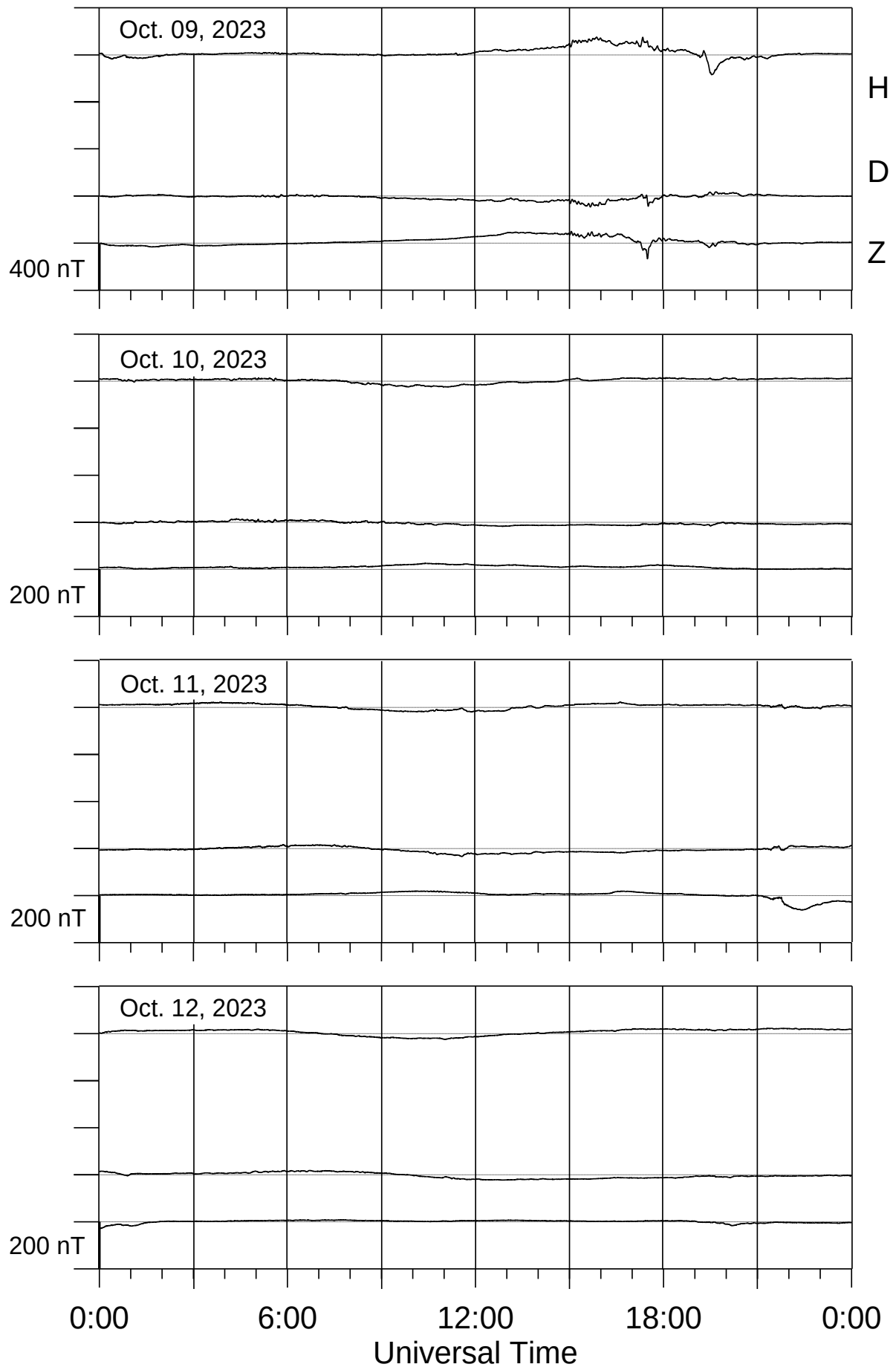
## Lovozero magnetometer



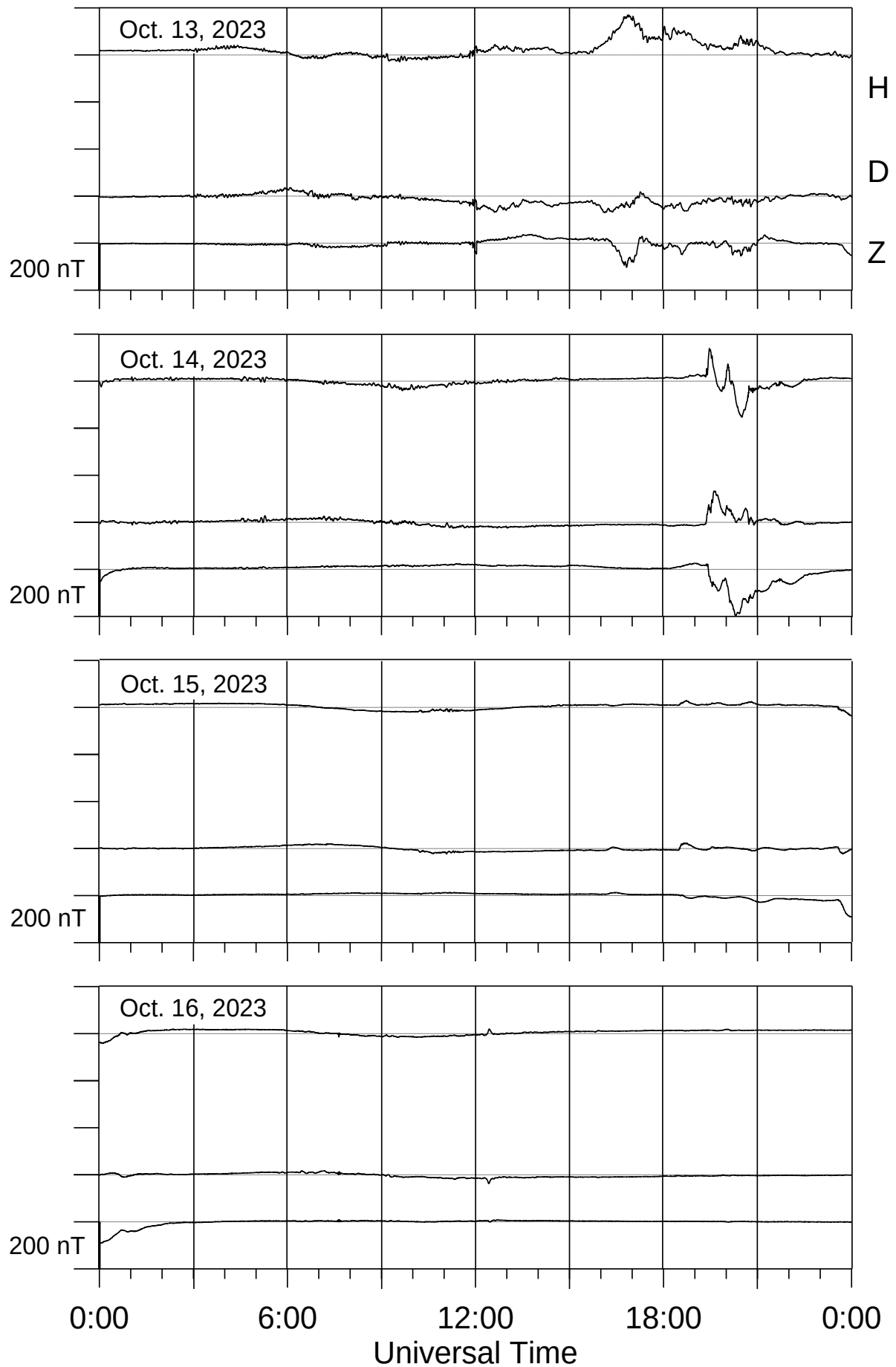
## Lovozero magnetometer



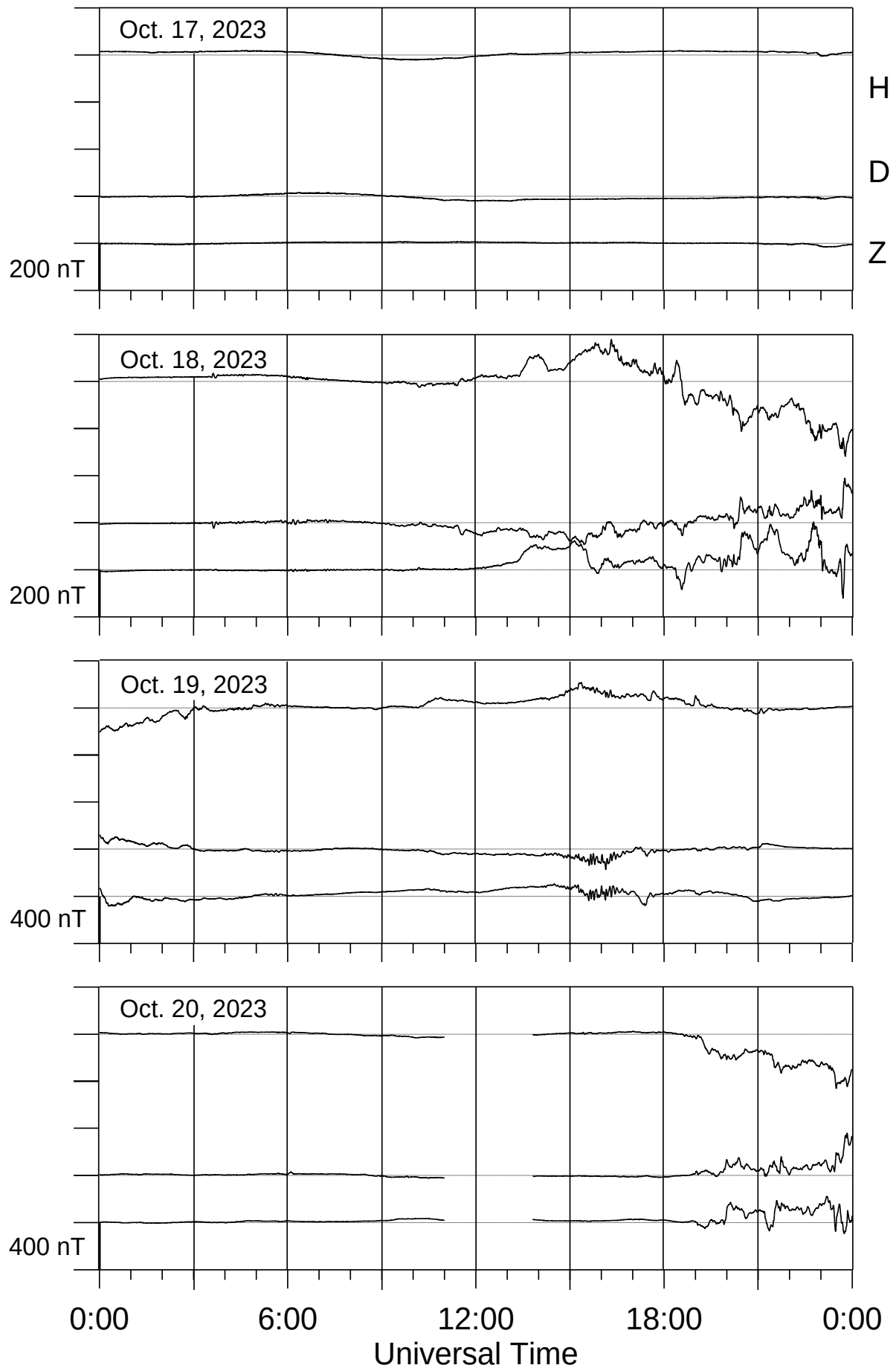
## Lovozero magnetometer



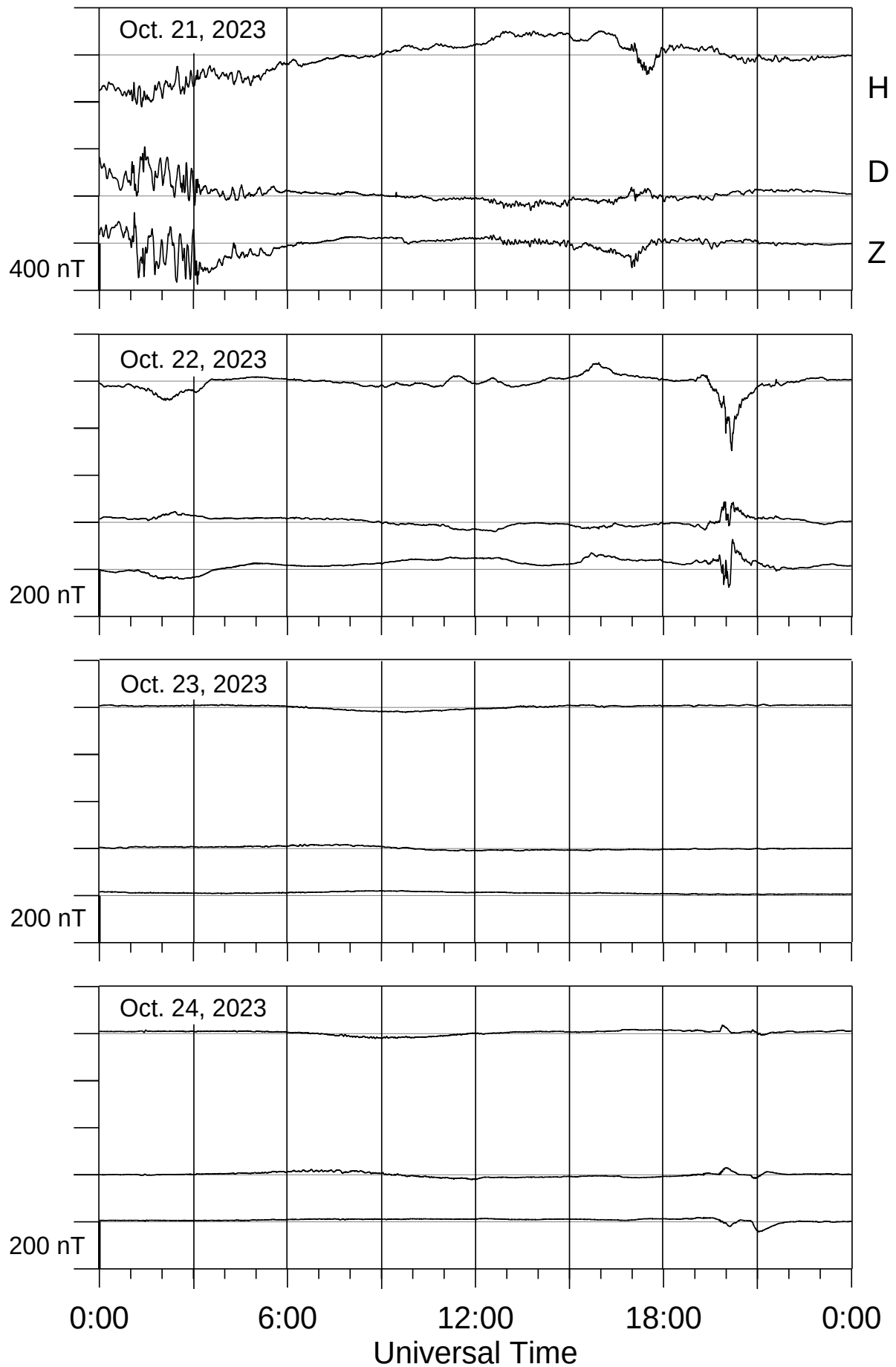
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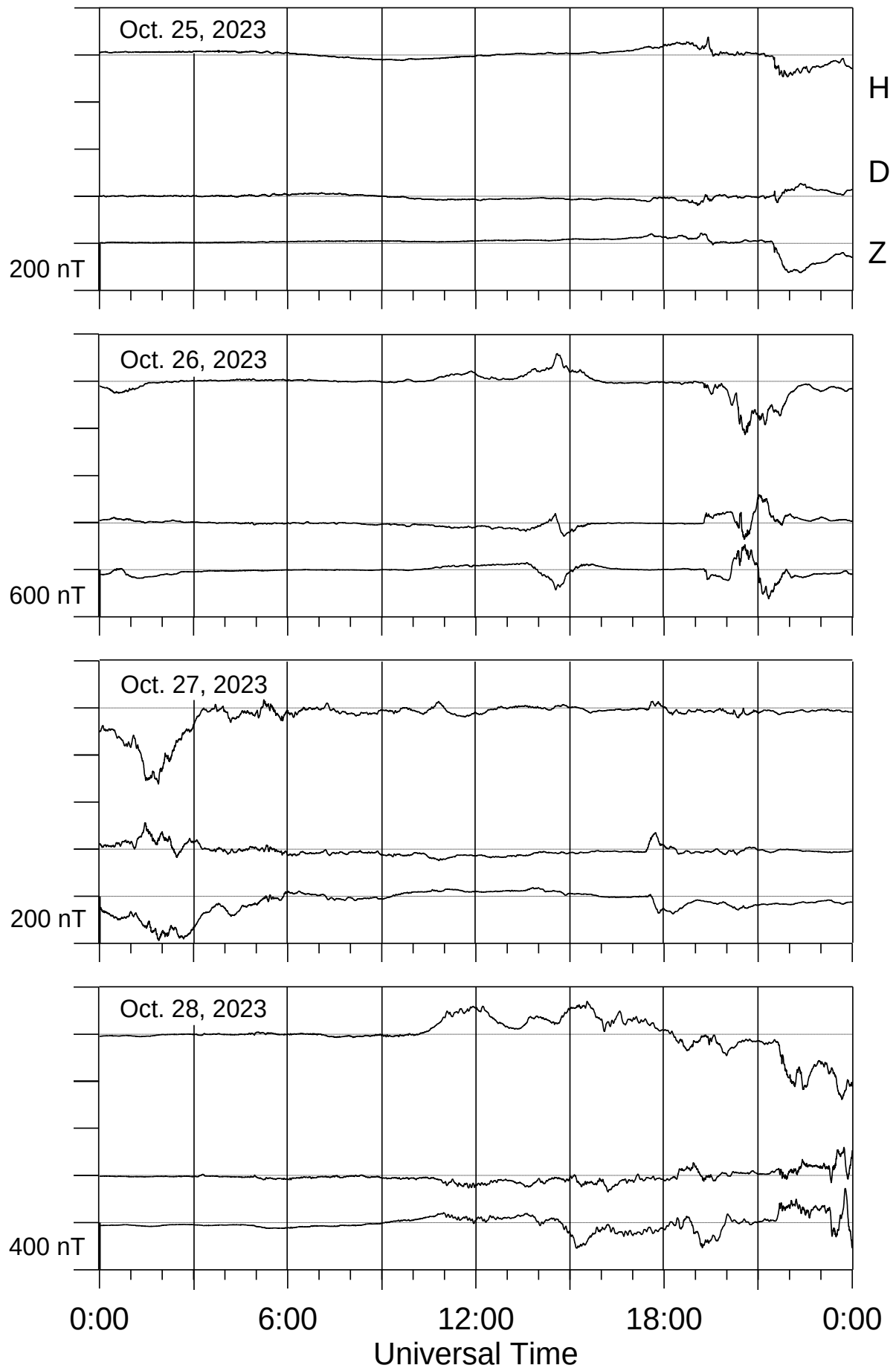
## Lovozero magnetometer



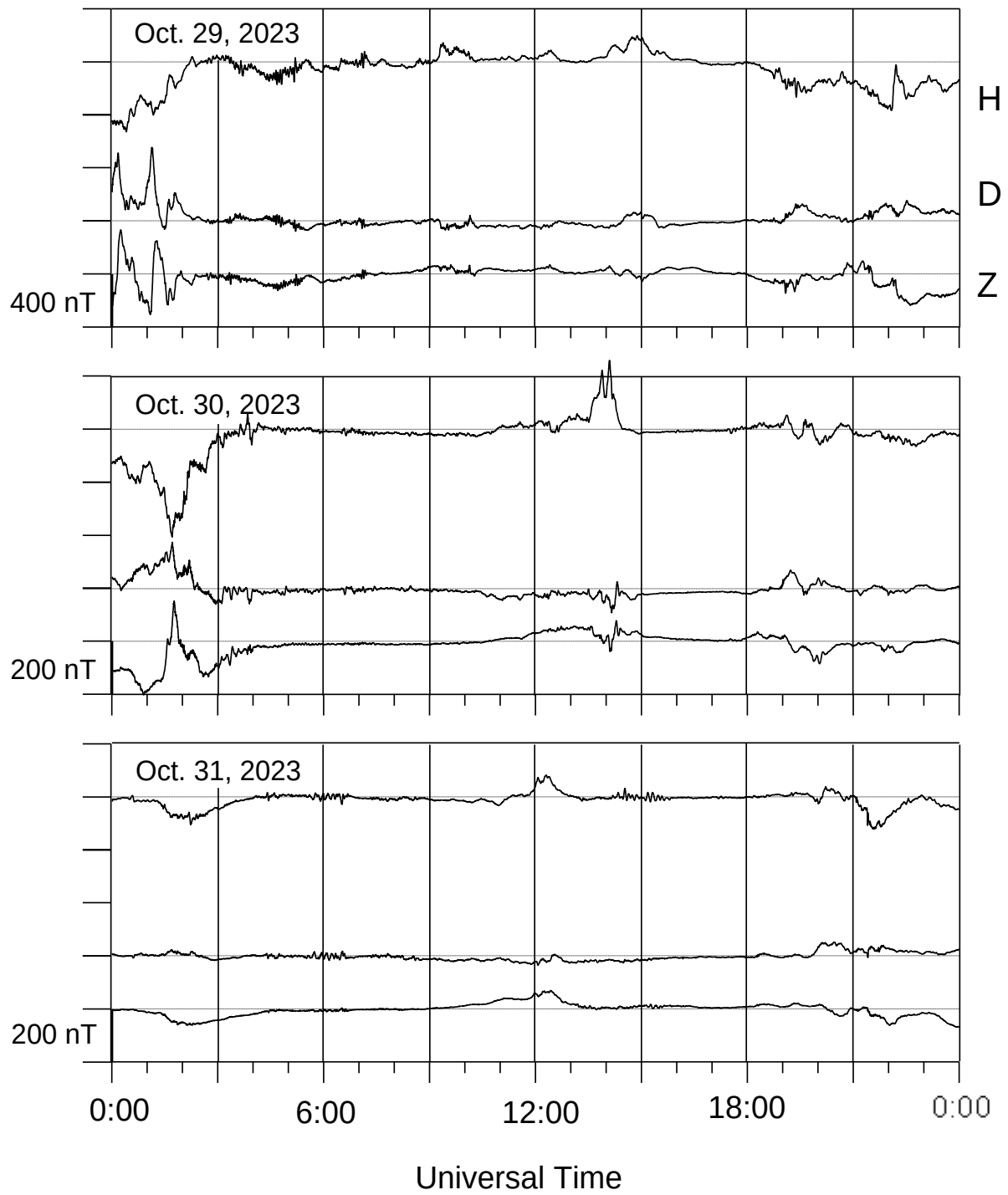
## Lovozero magnetometer



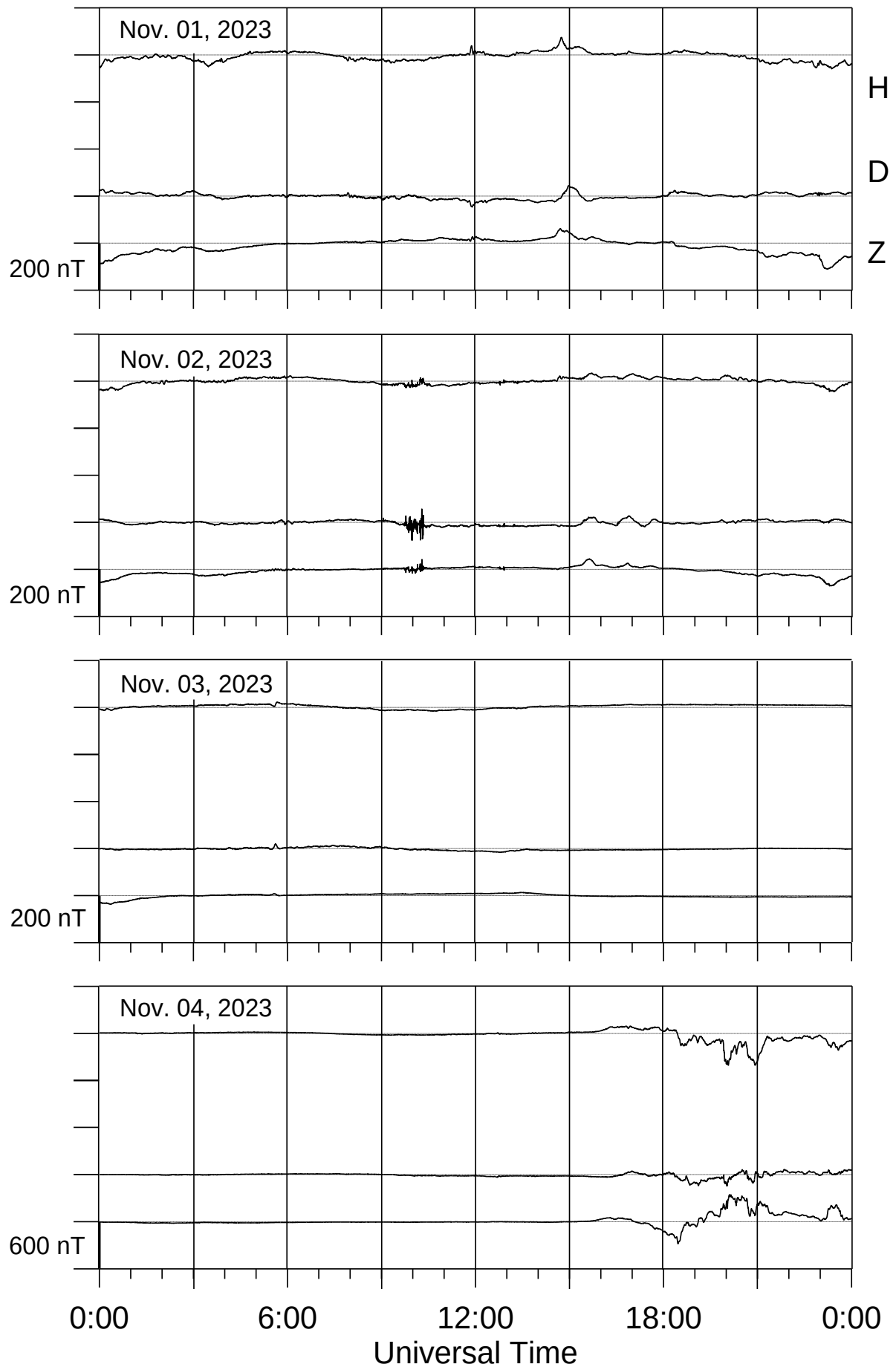
## Lovozero magnetometer



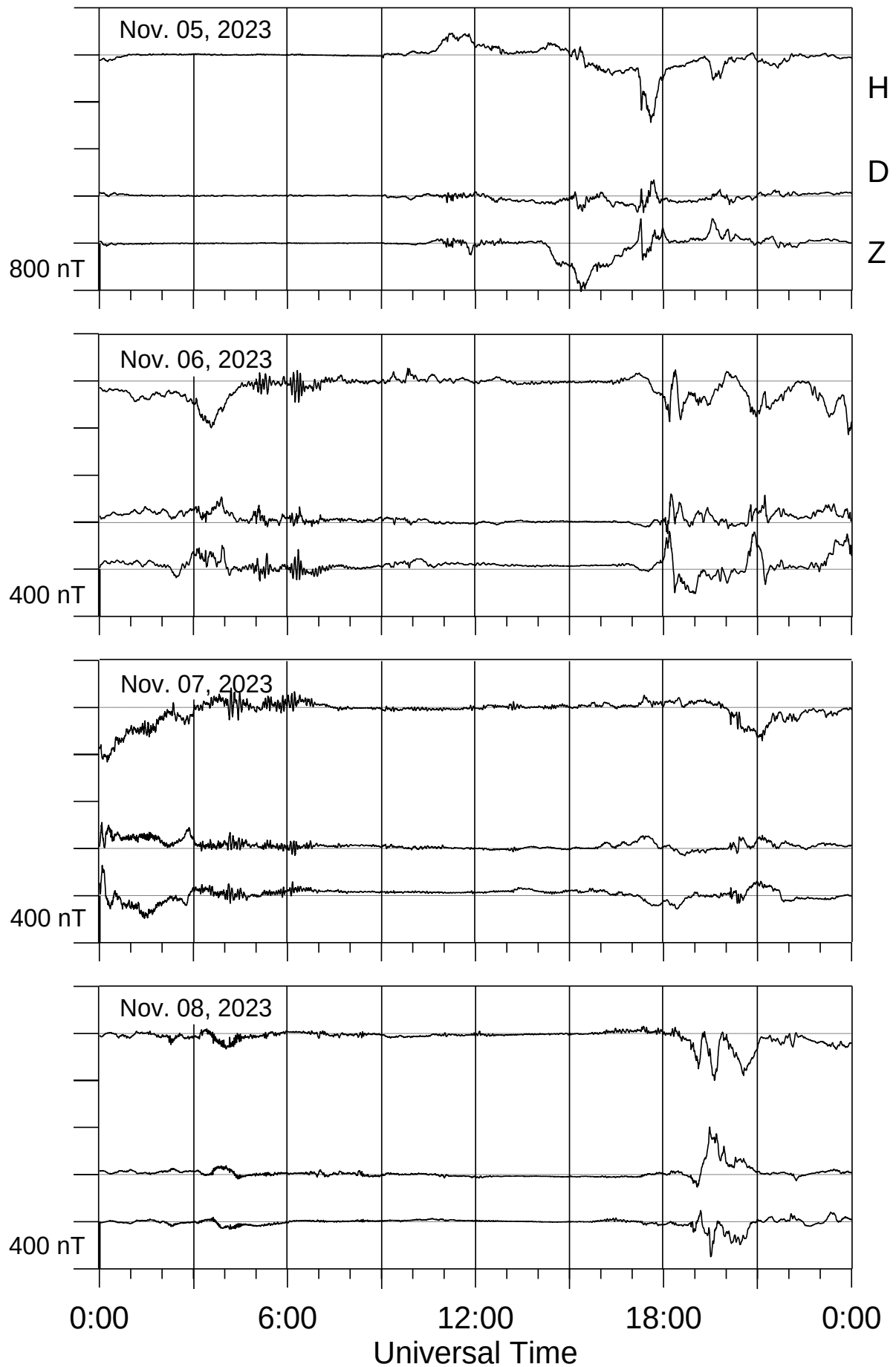
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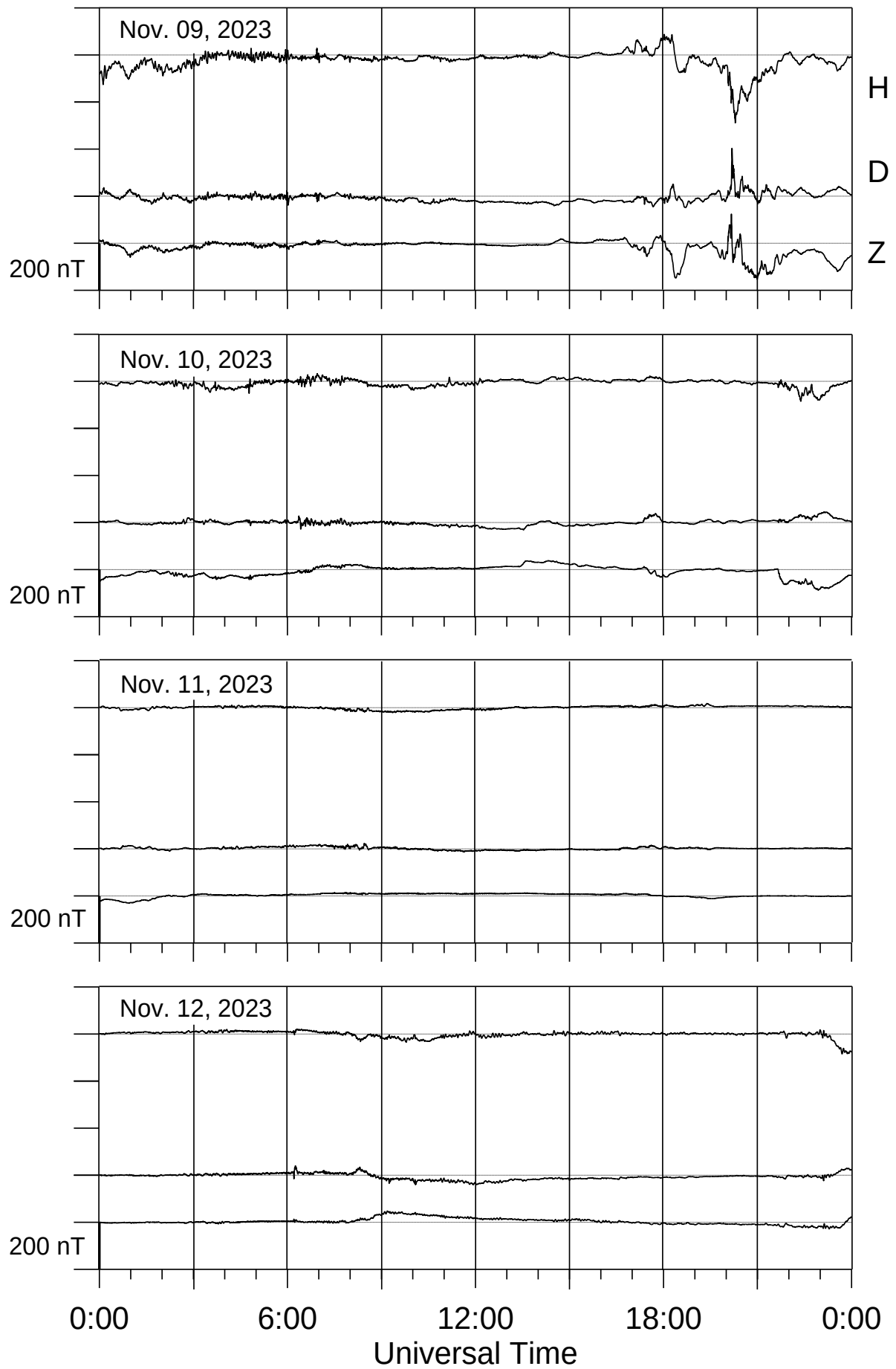
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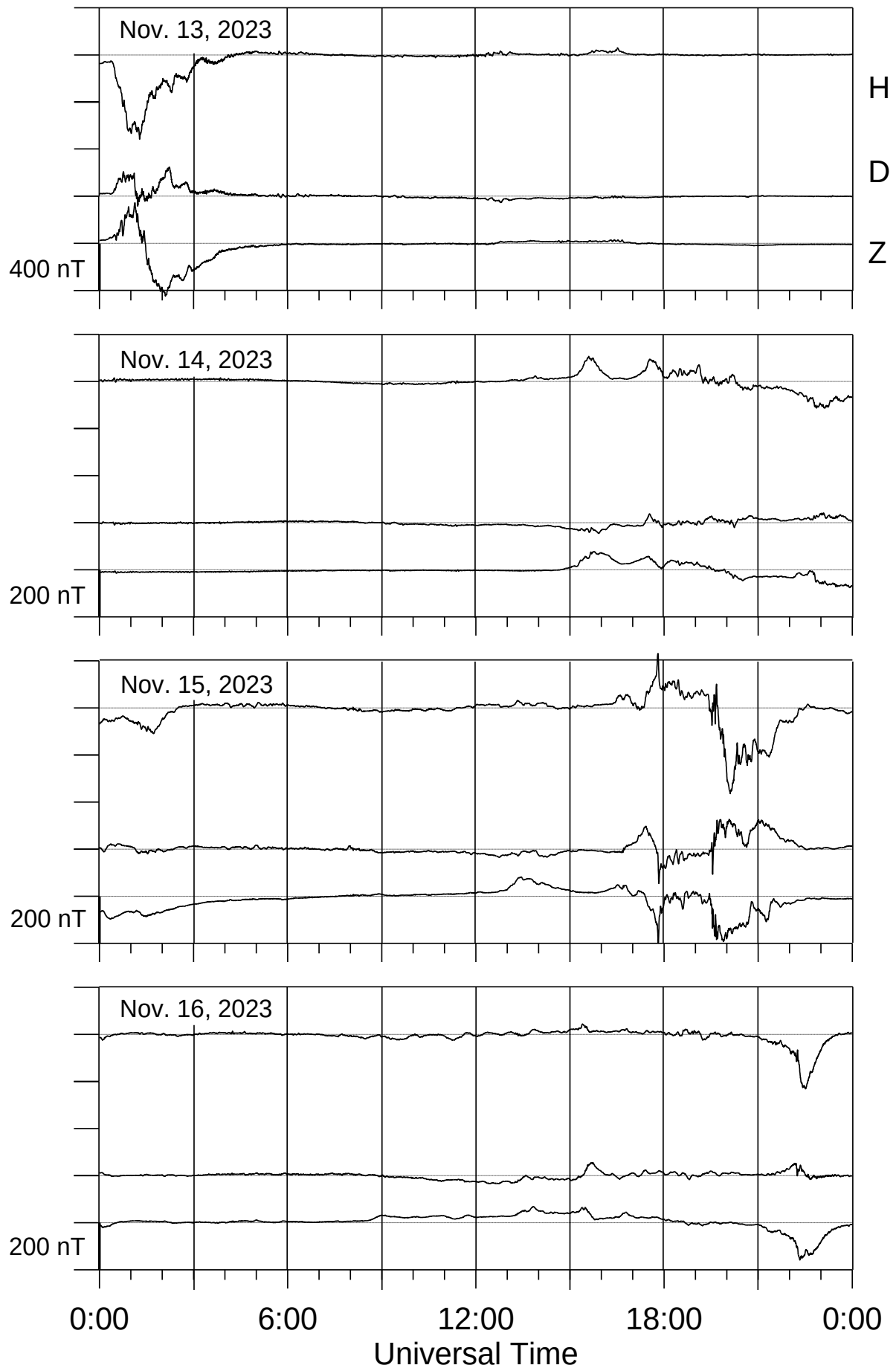
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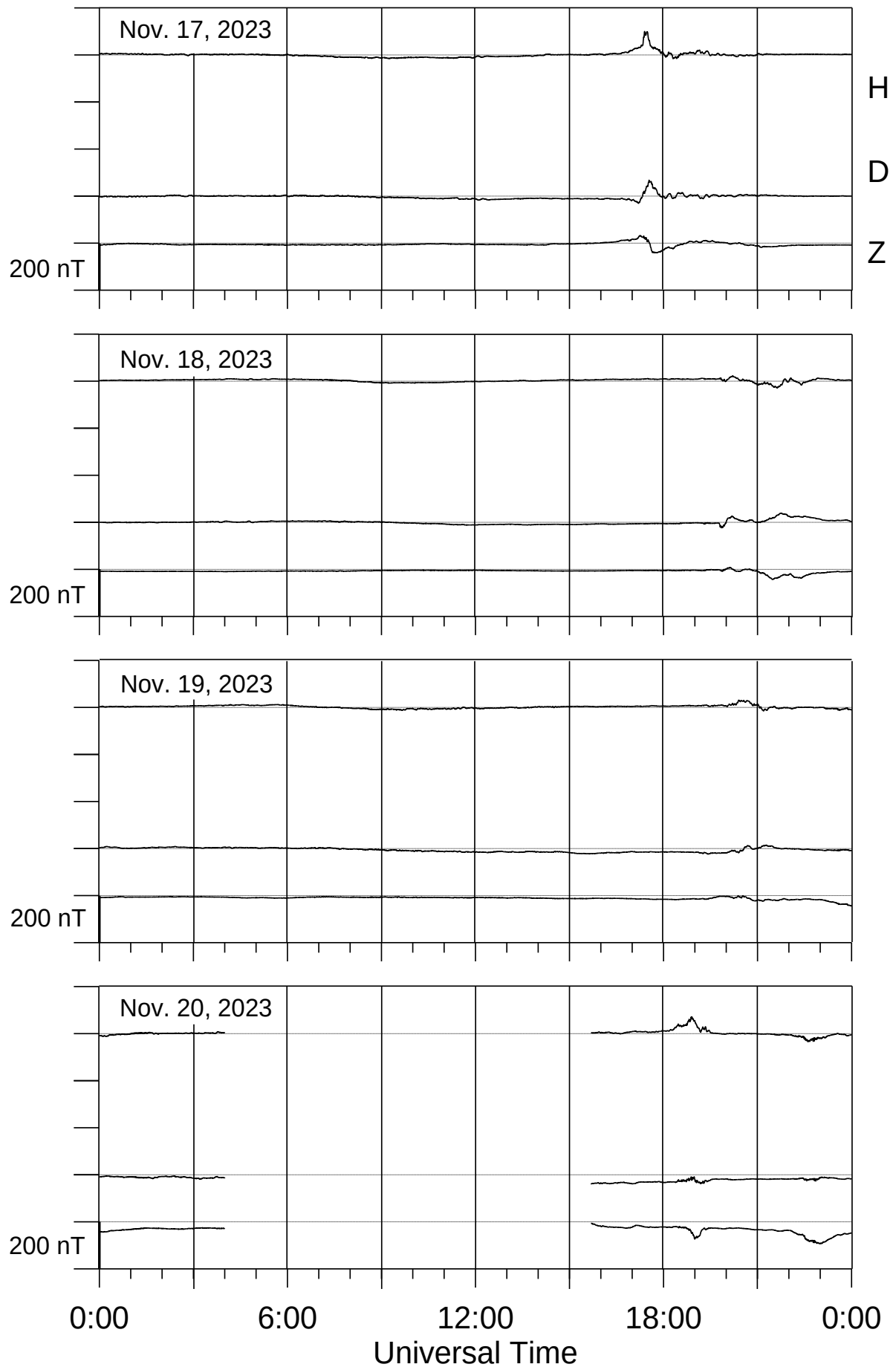
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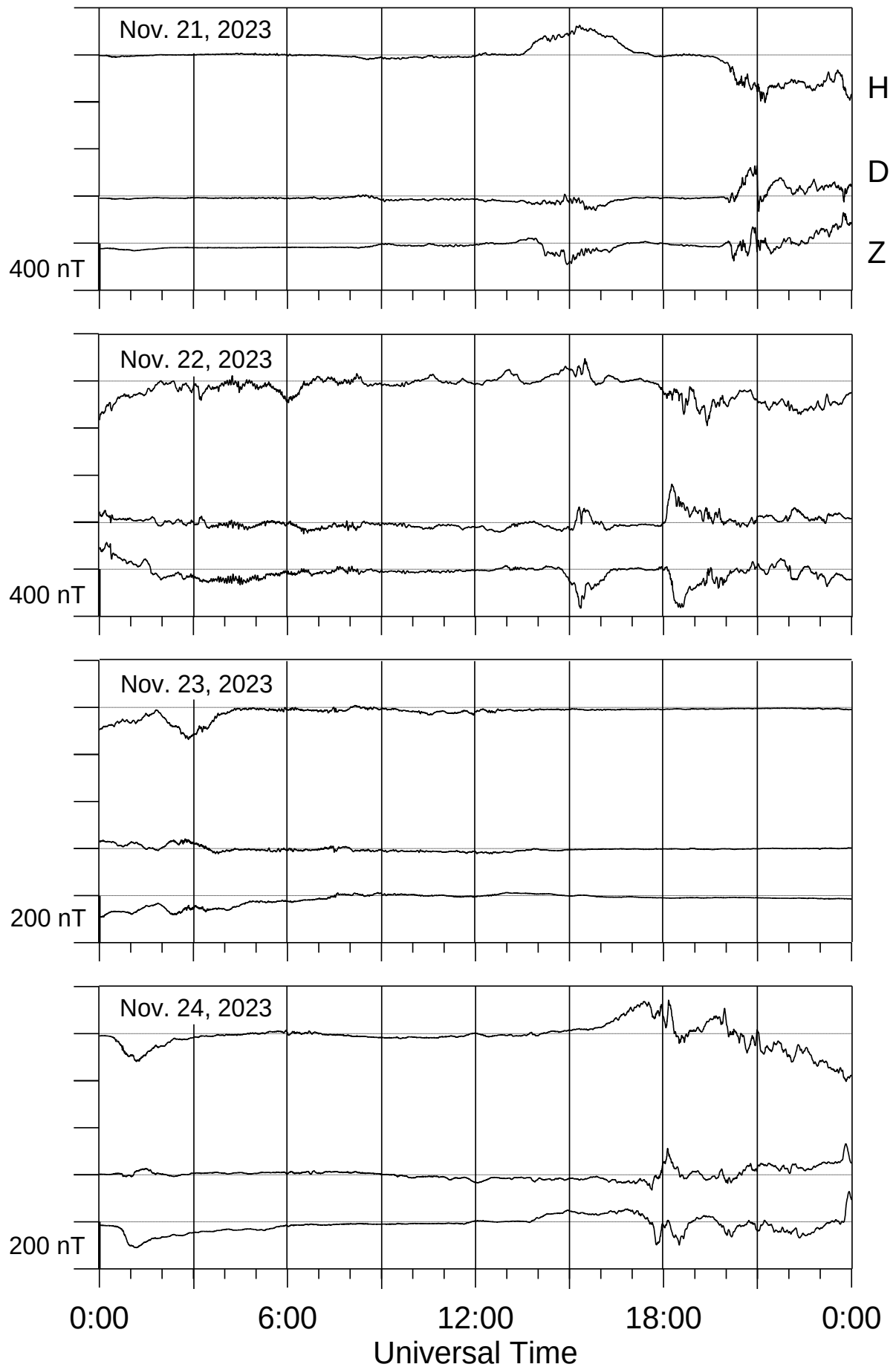
## Lovozero magnetometer



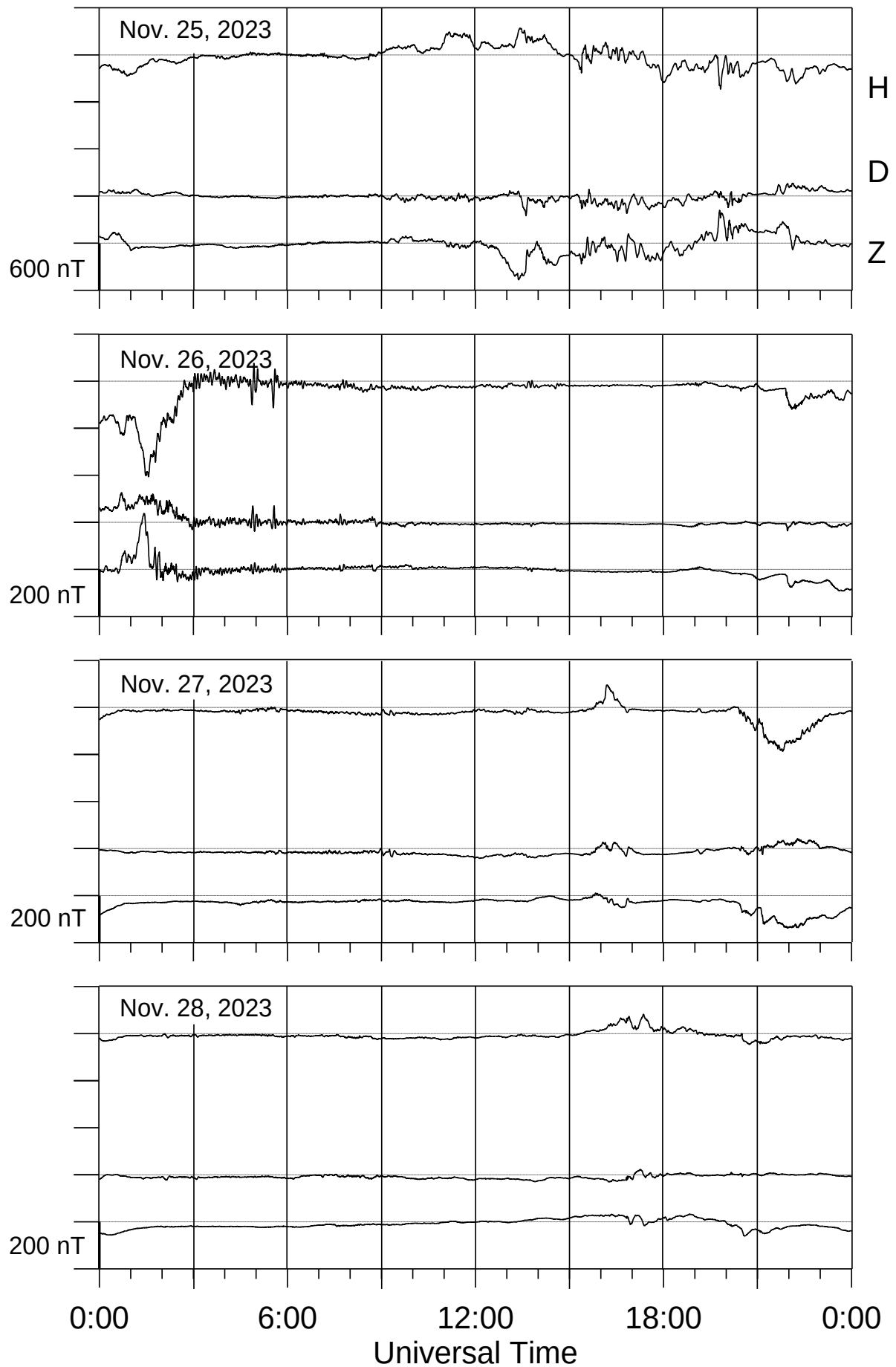
## Lovozero magnetometer



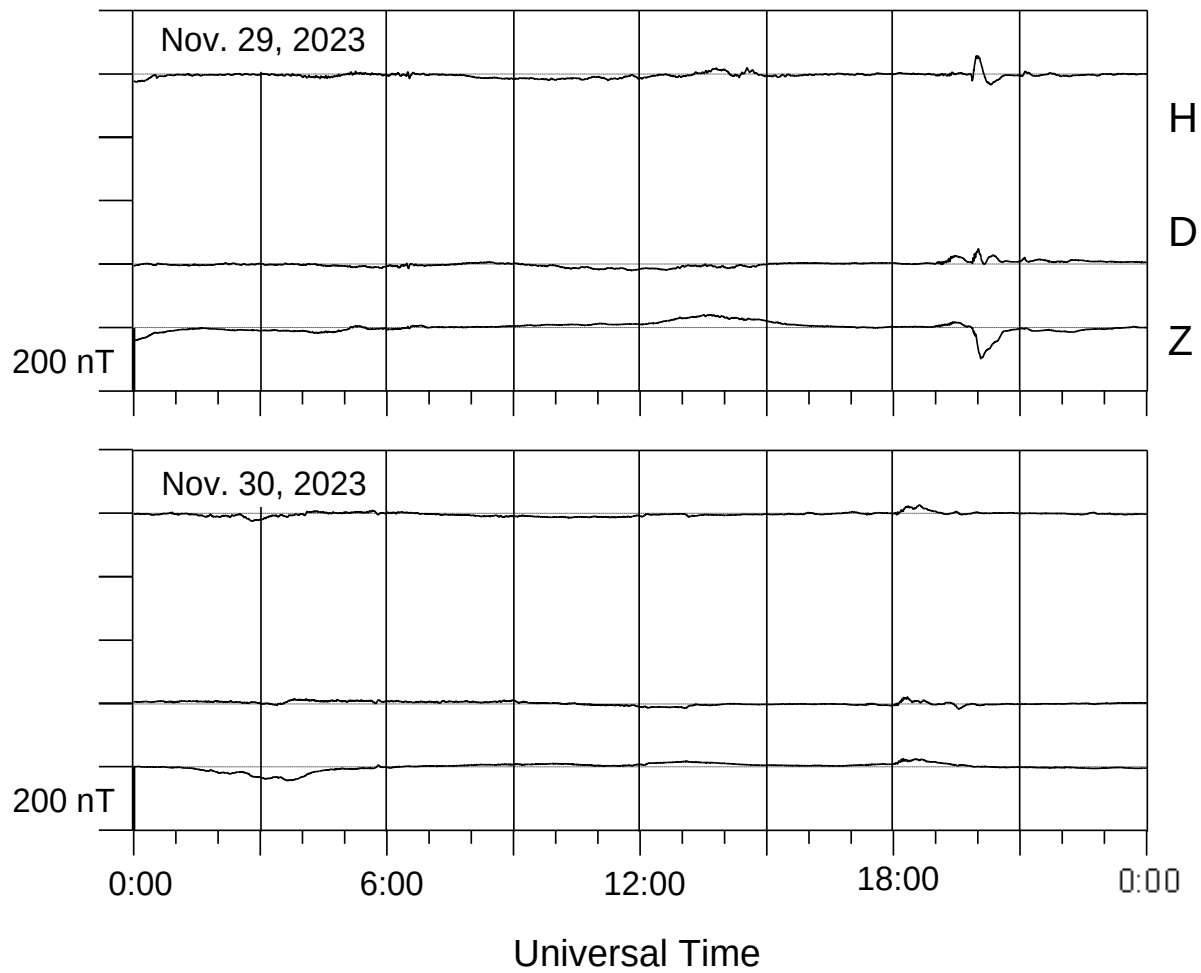
## Lovozero magnetometer



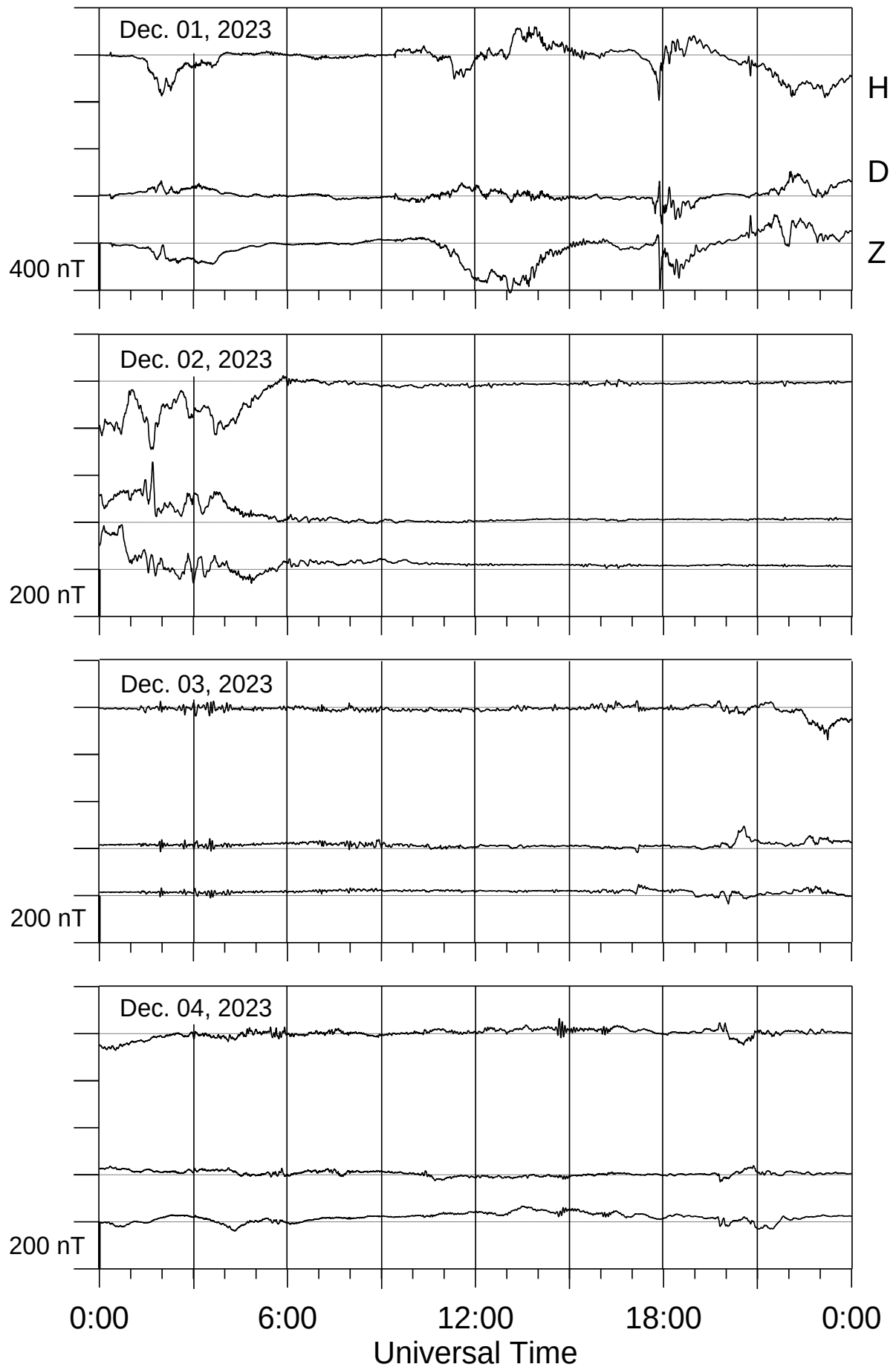
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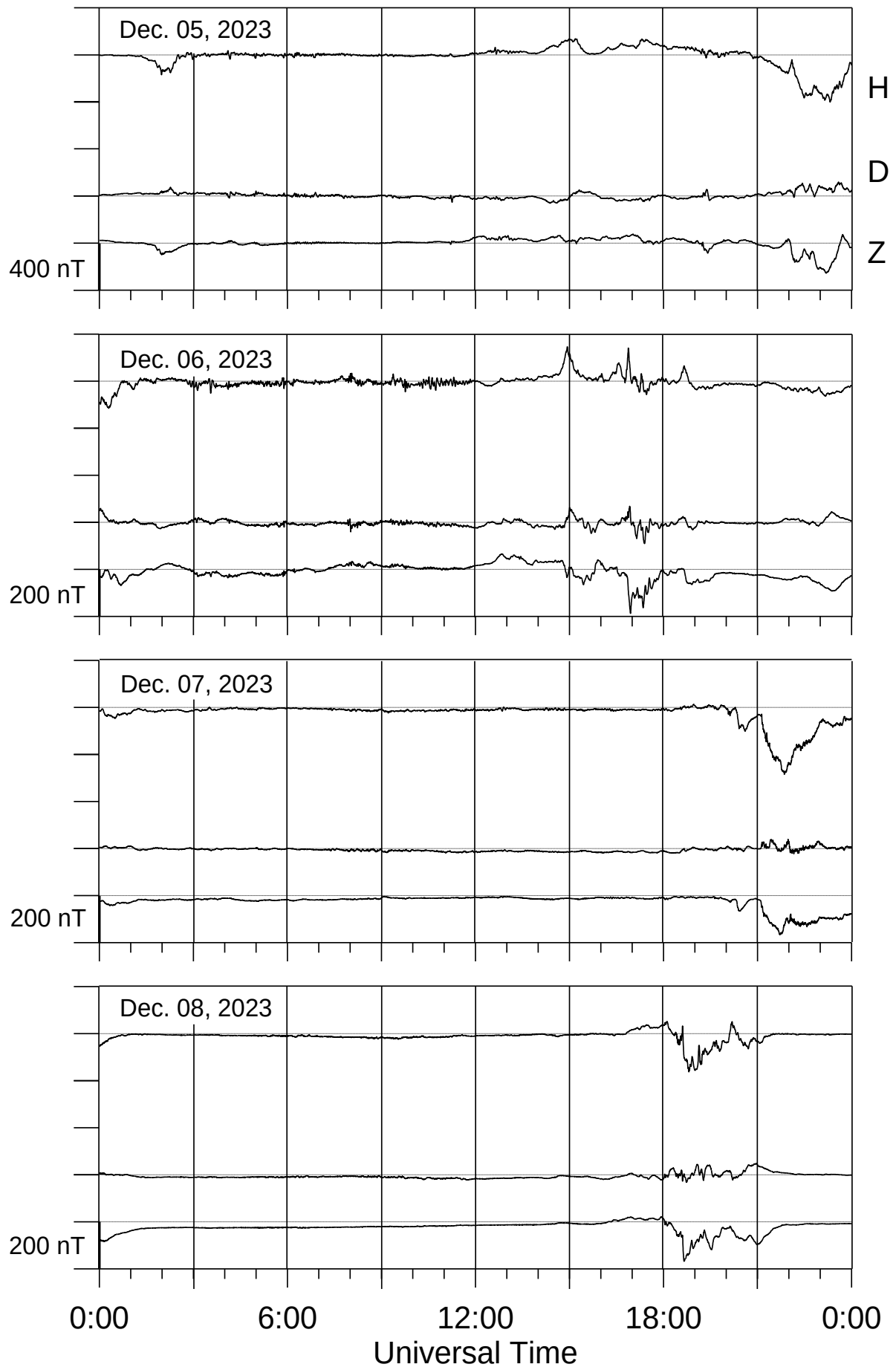
## Lovozero magnetometer



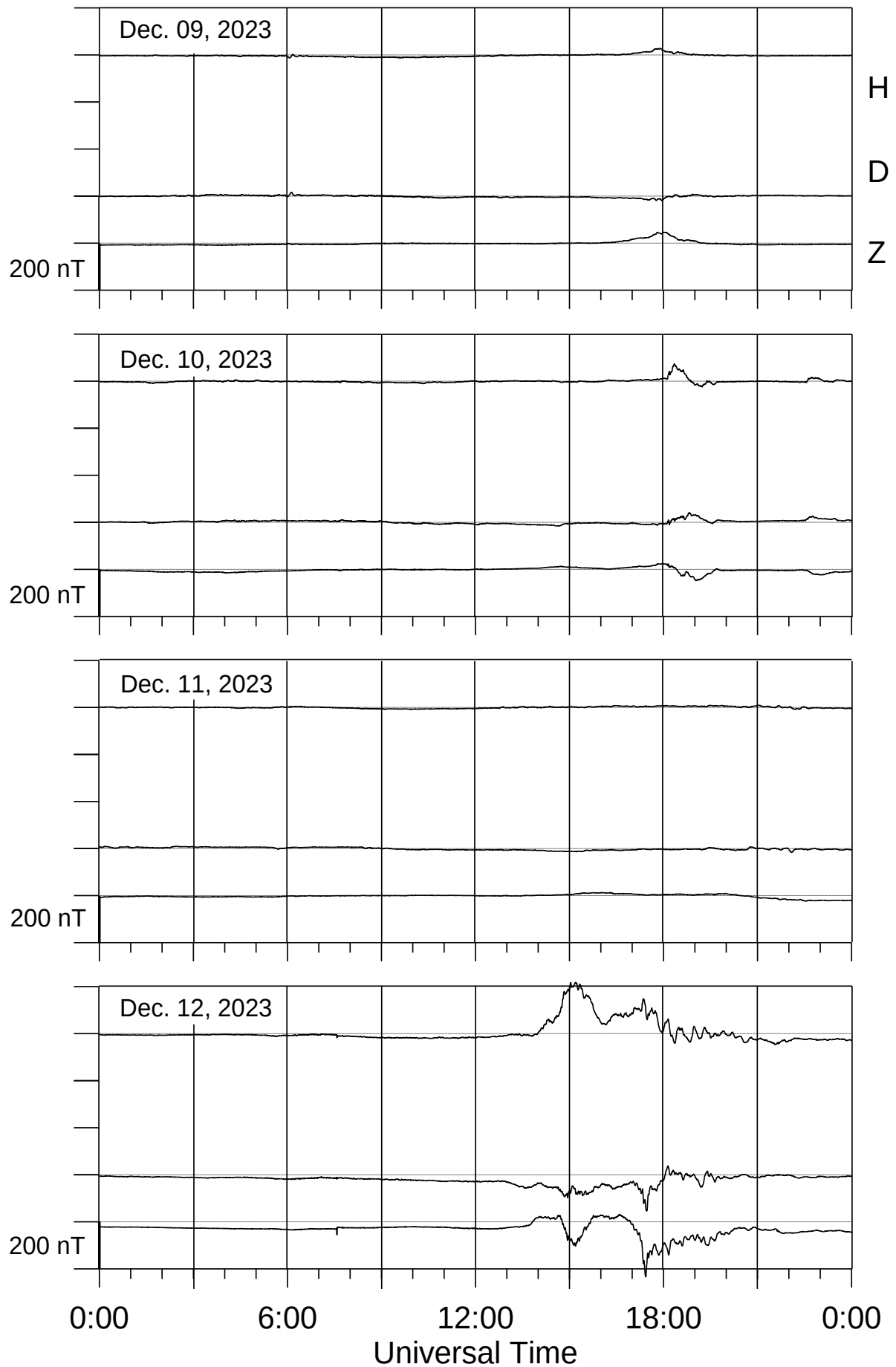
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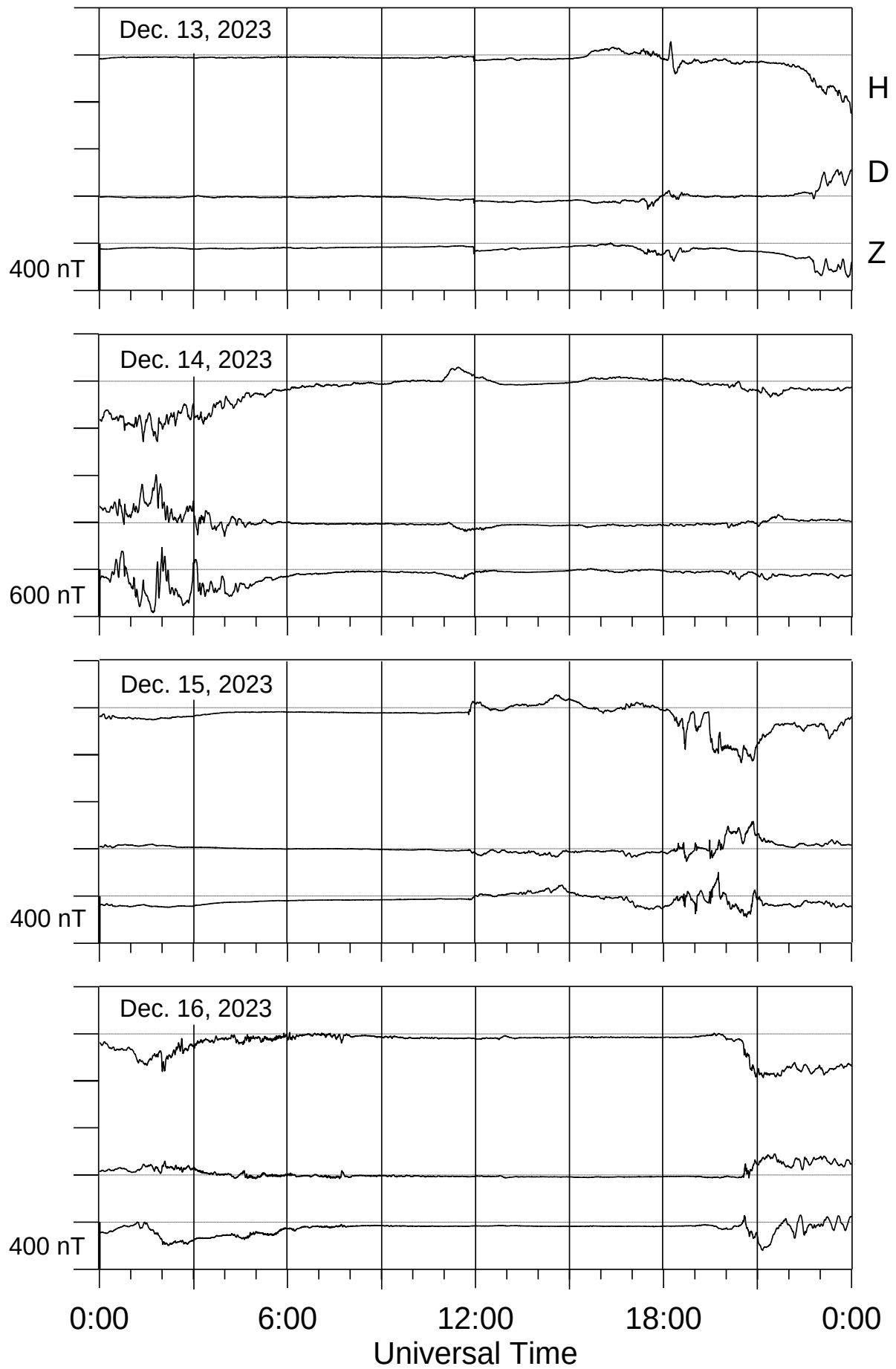
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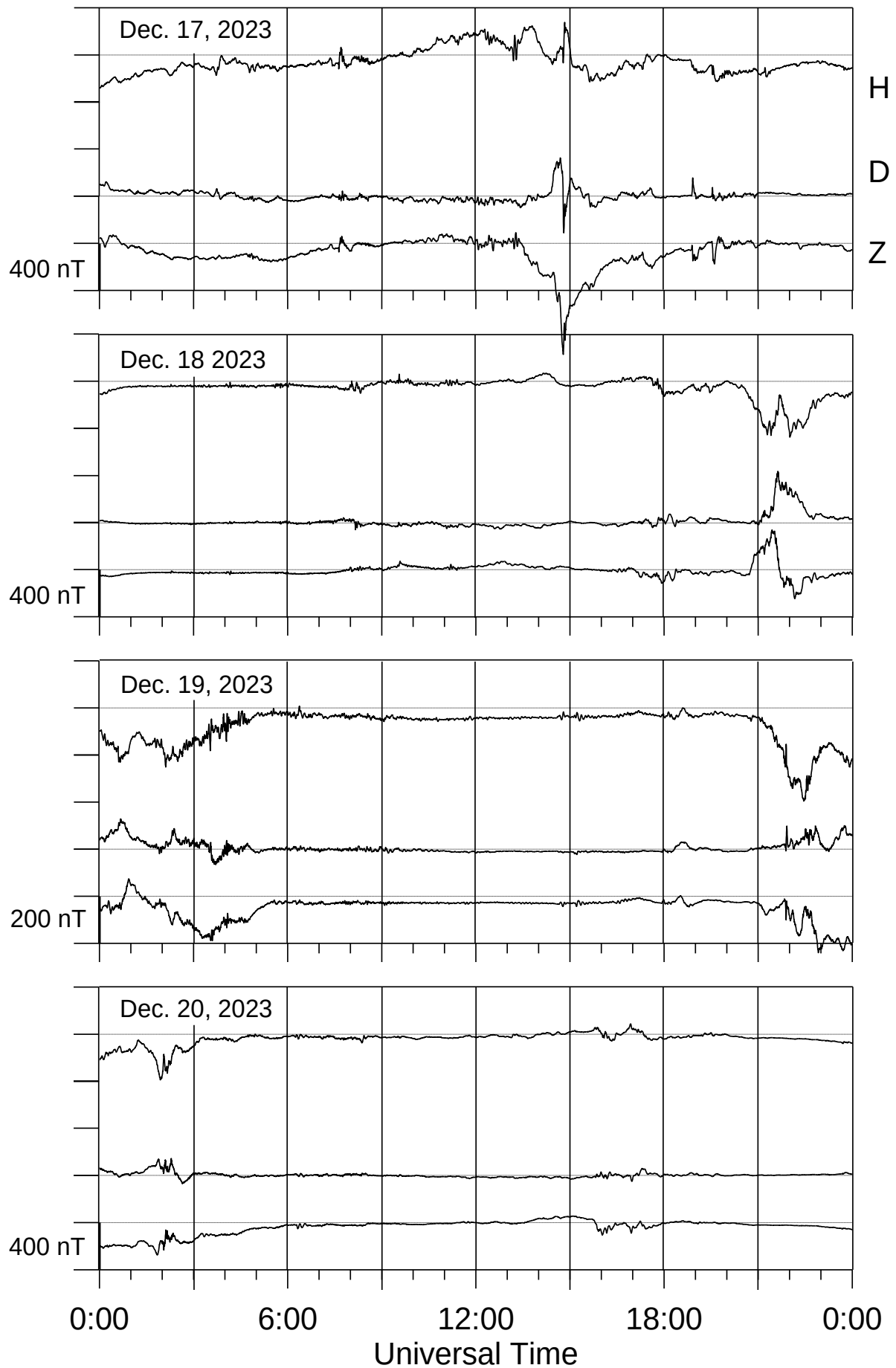
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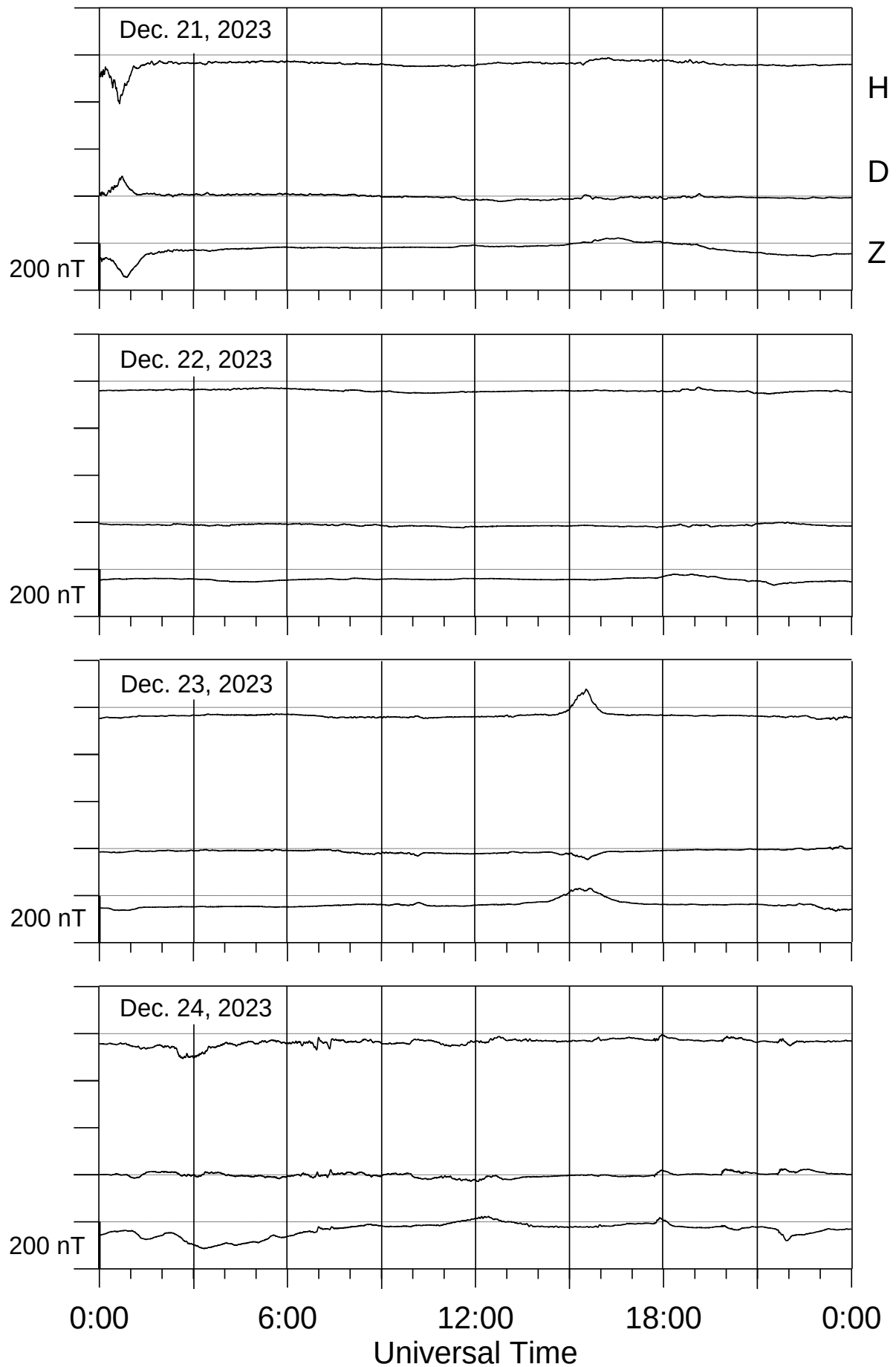
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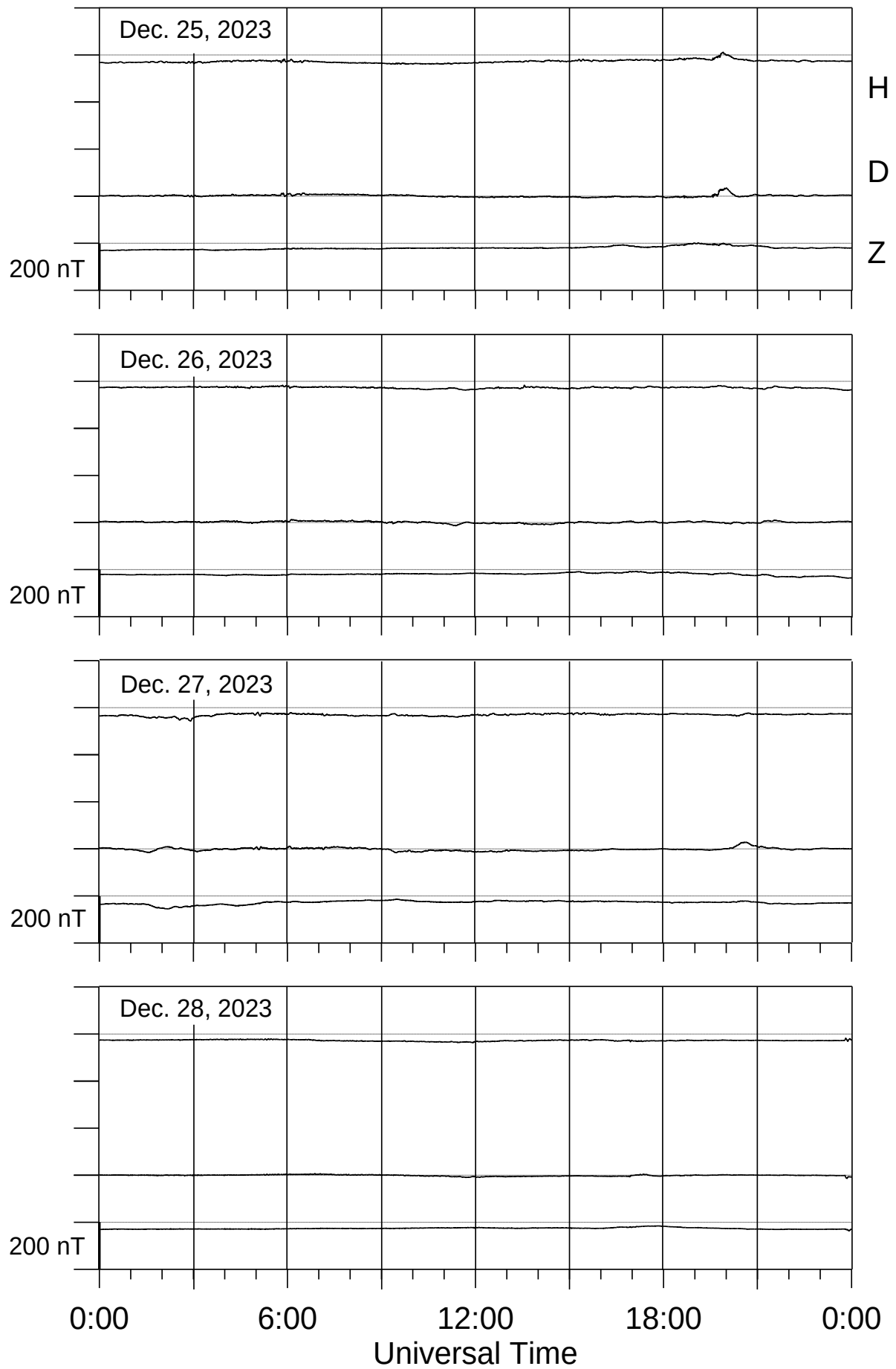
## Lovozero magnetometer



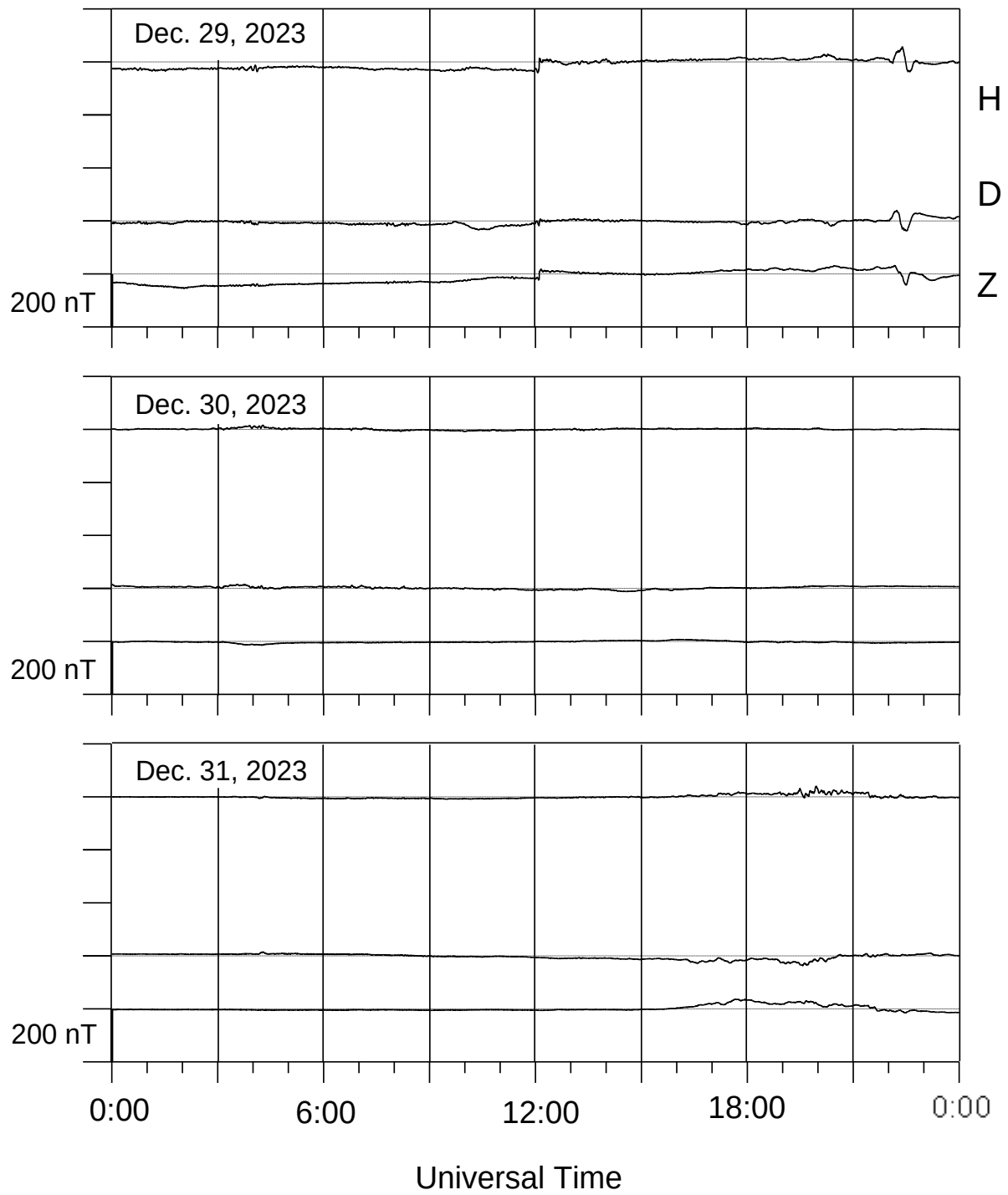
## Lovozero magnetometer



## Lovozero magnetometer



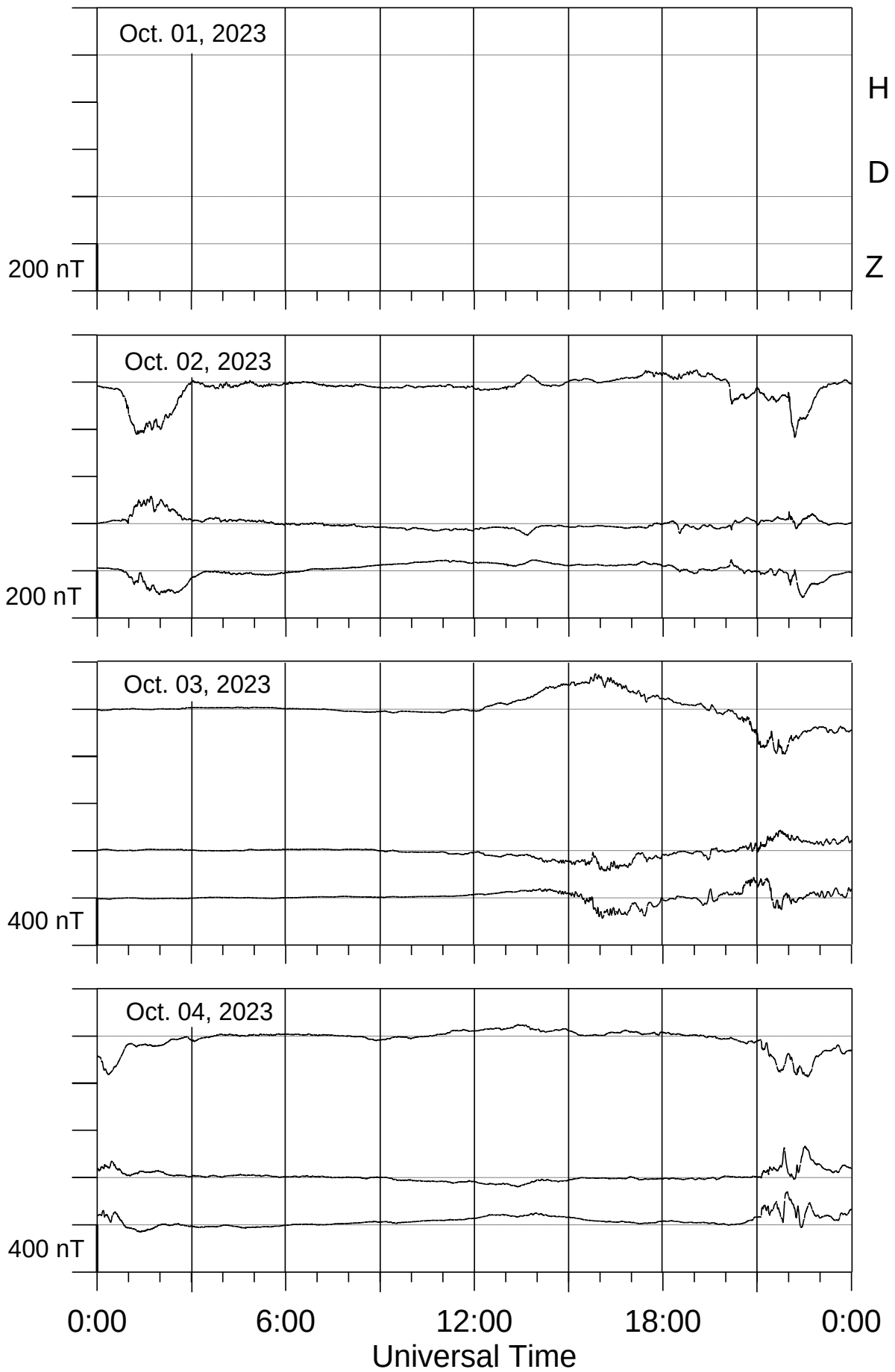
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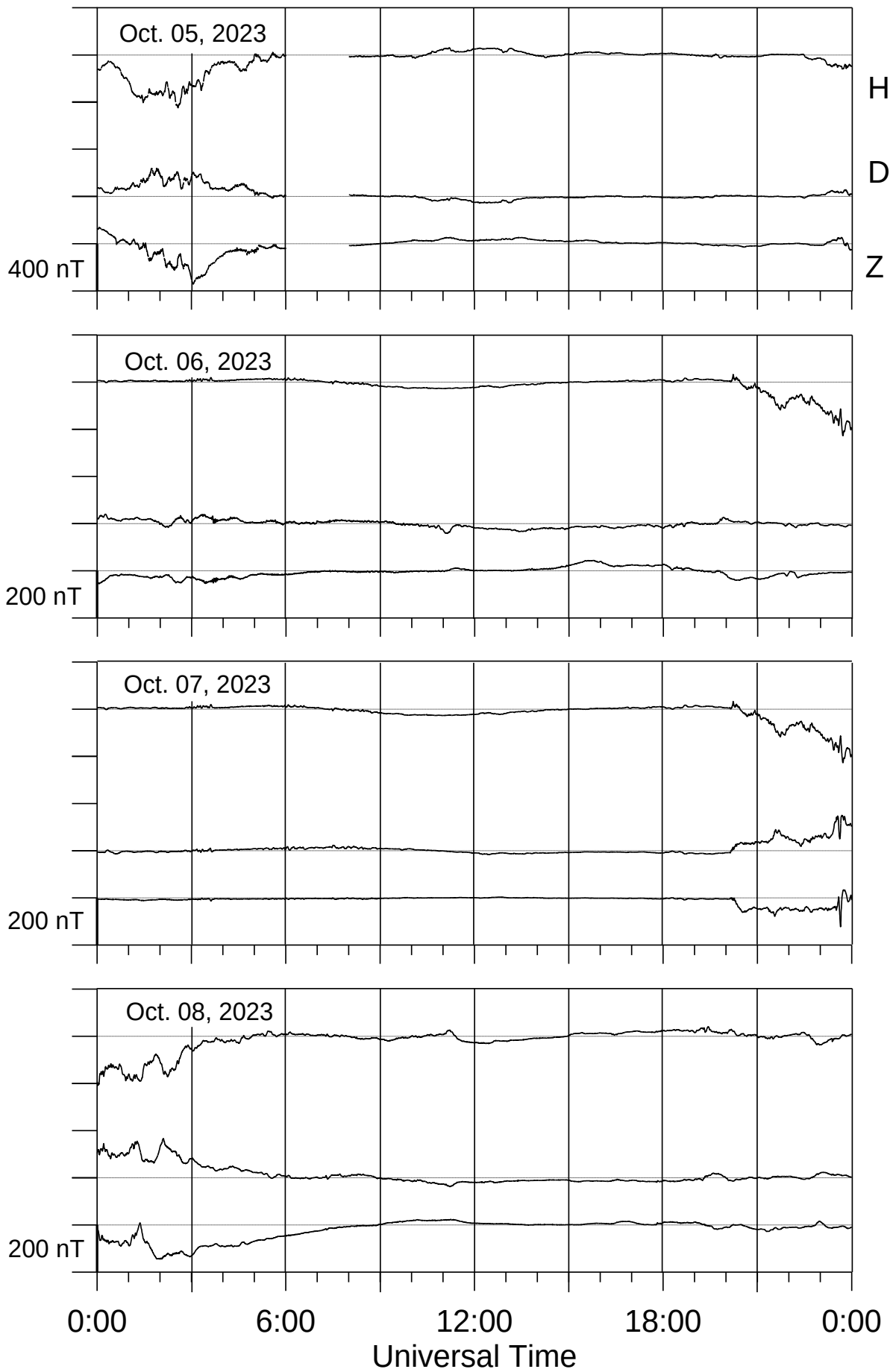
## **LOPARSKAYA MAGNETOGRAMS**

**October - December 2023**

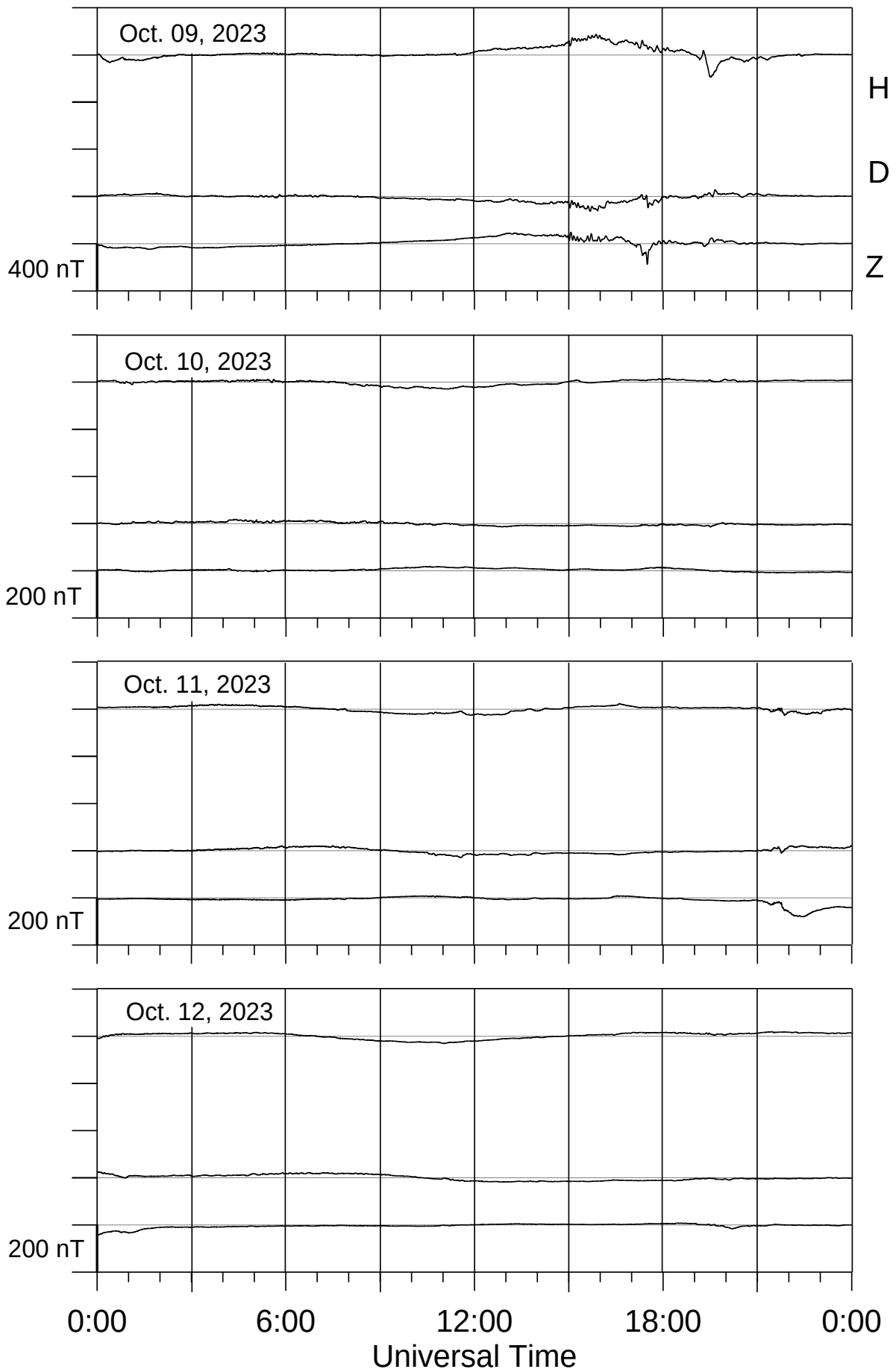
## Loparskaya magnetometer



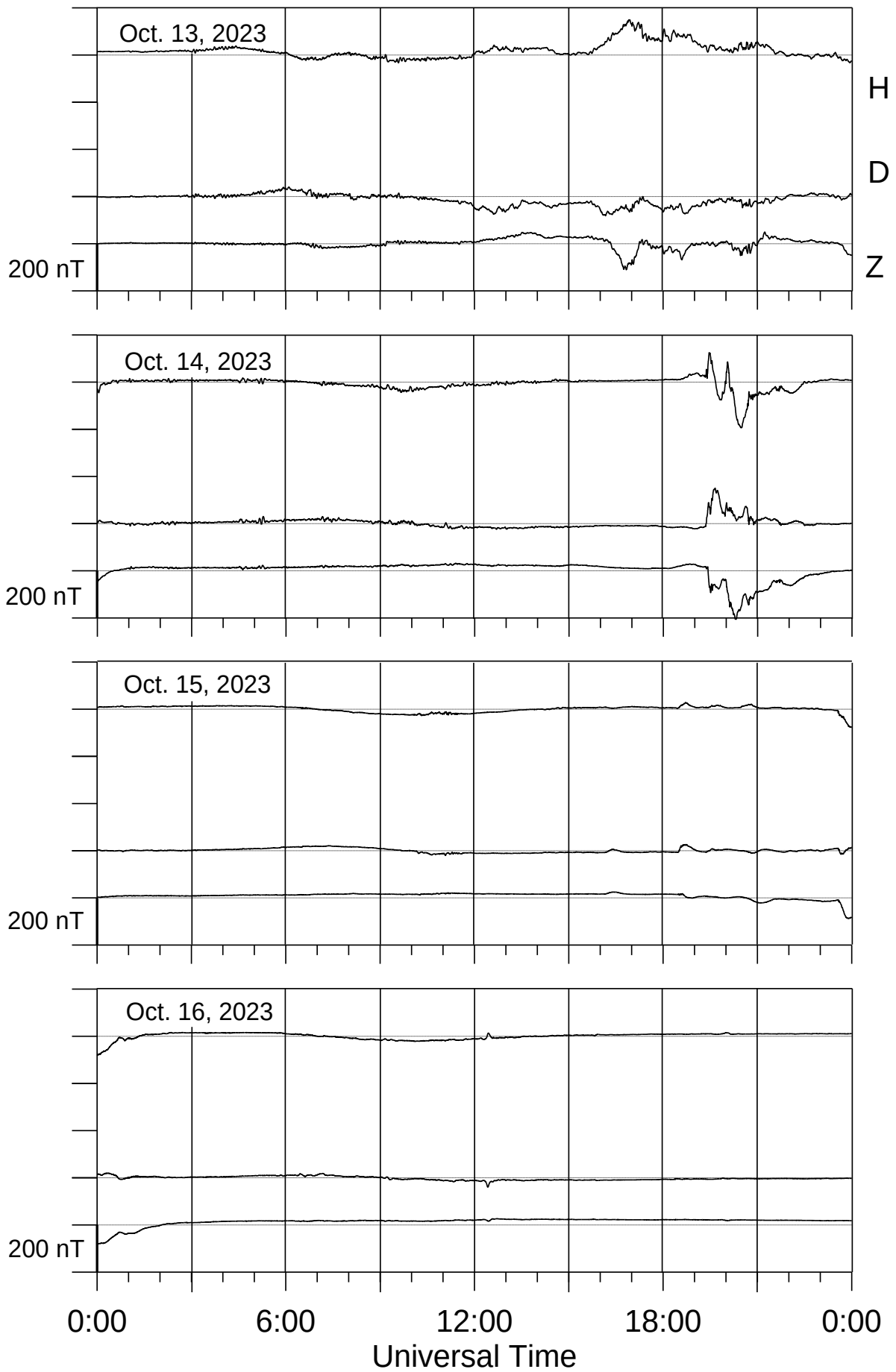
## Loparskaya magnetometer



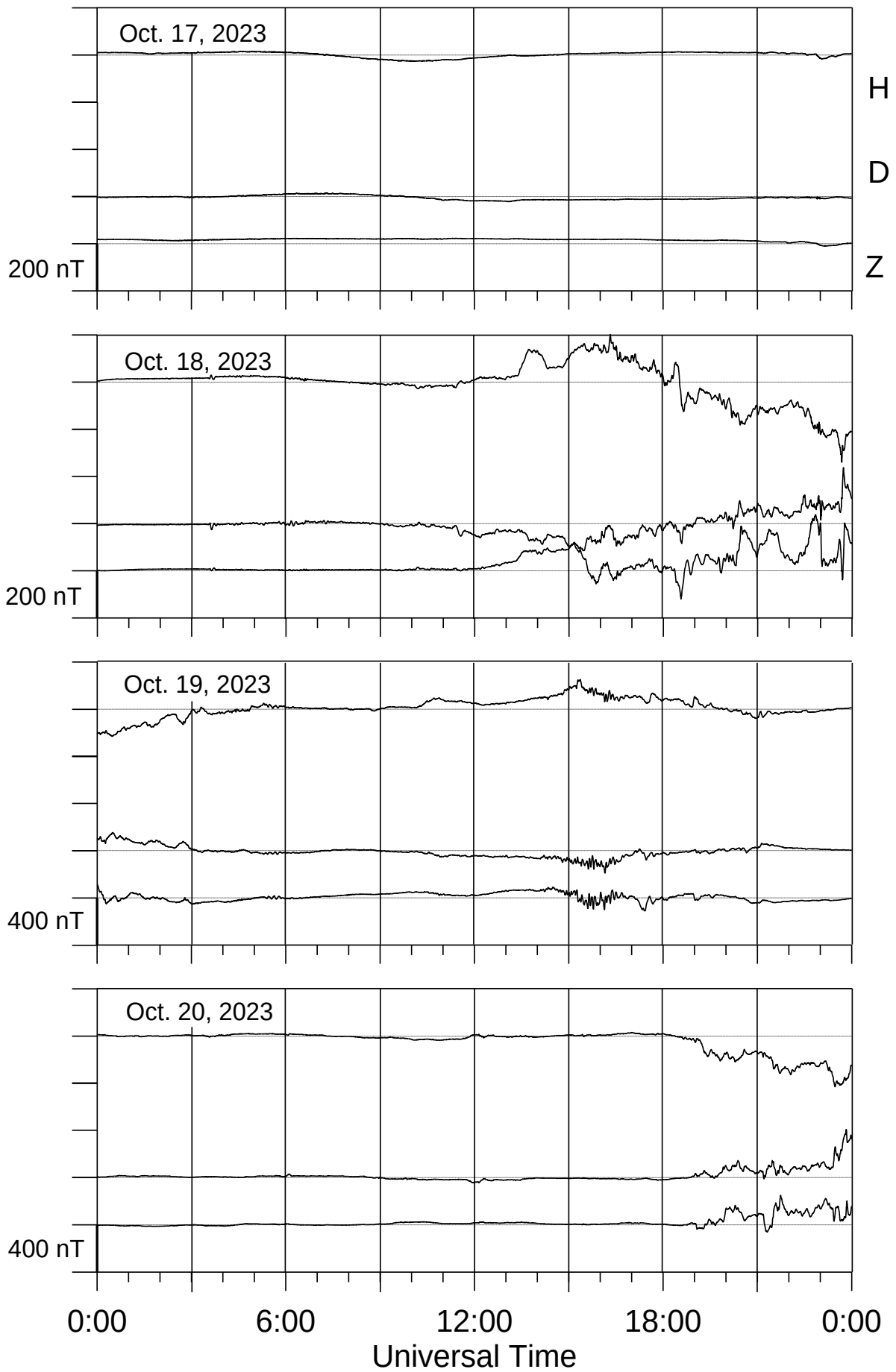
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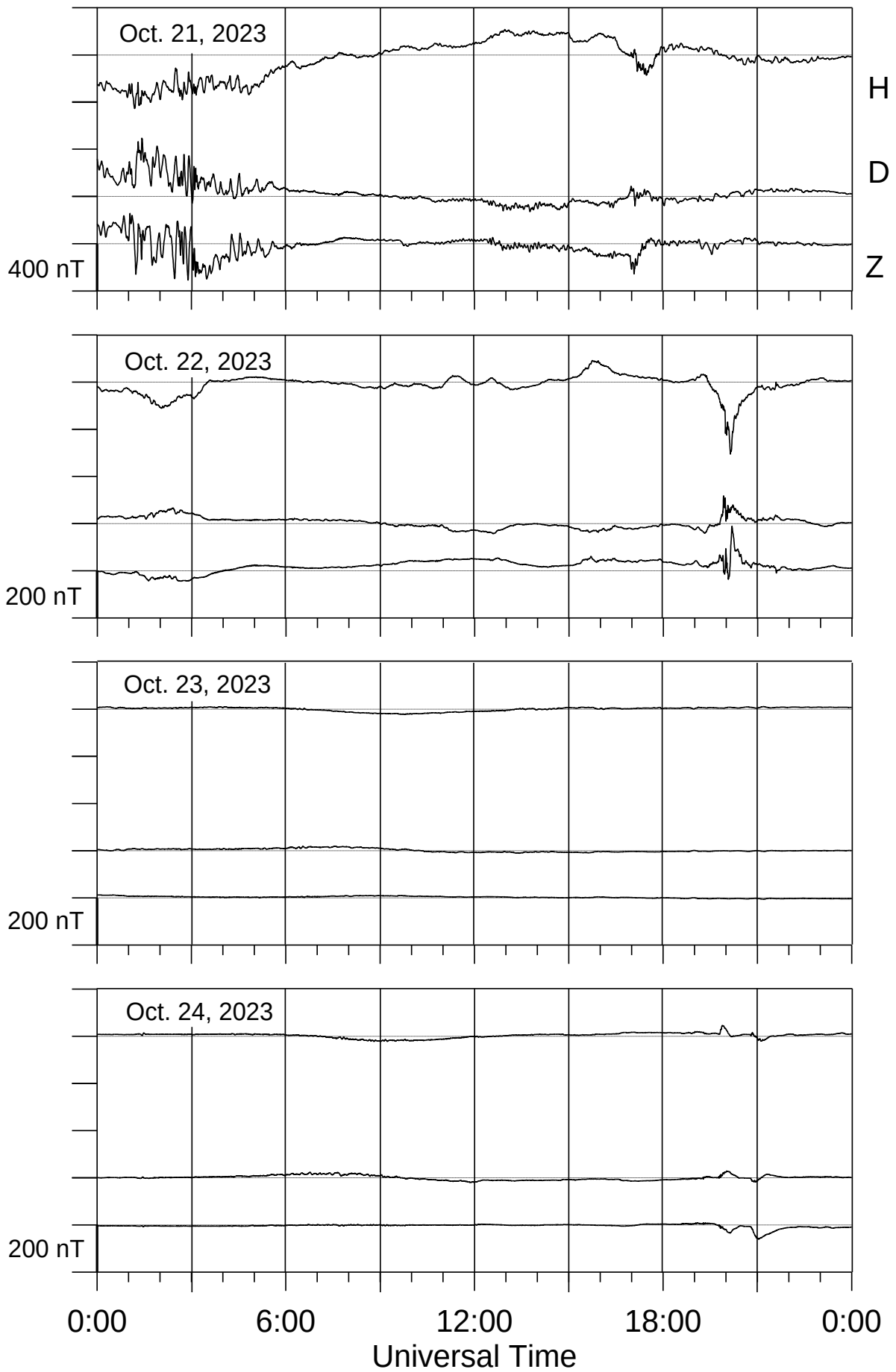
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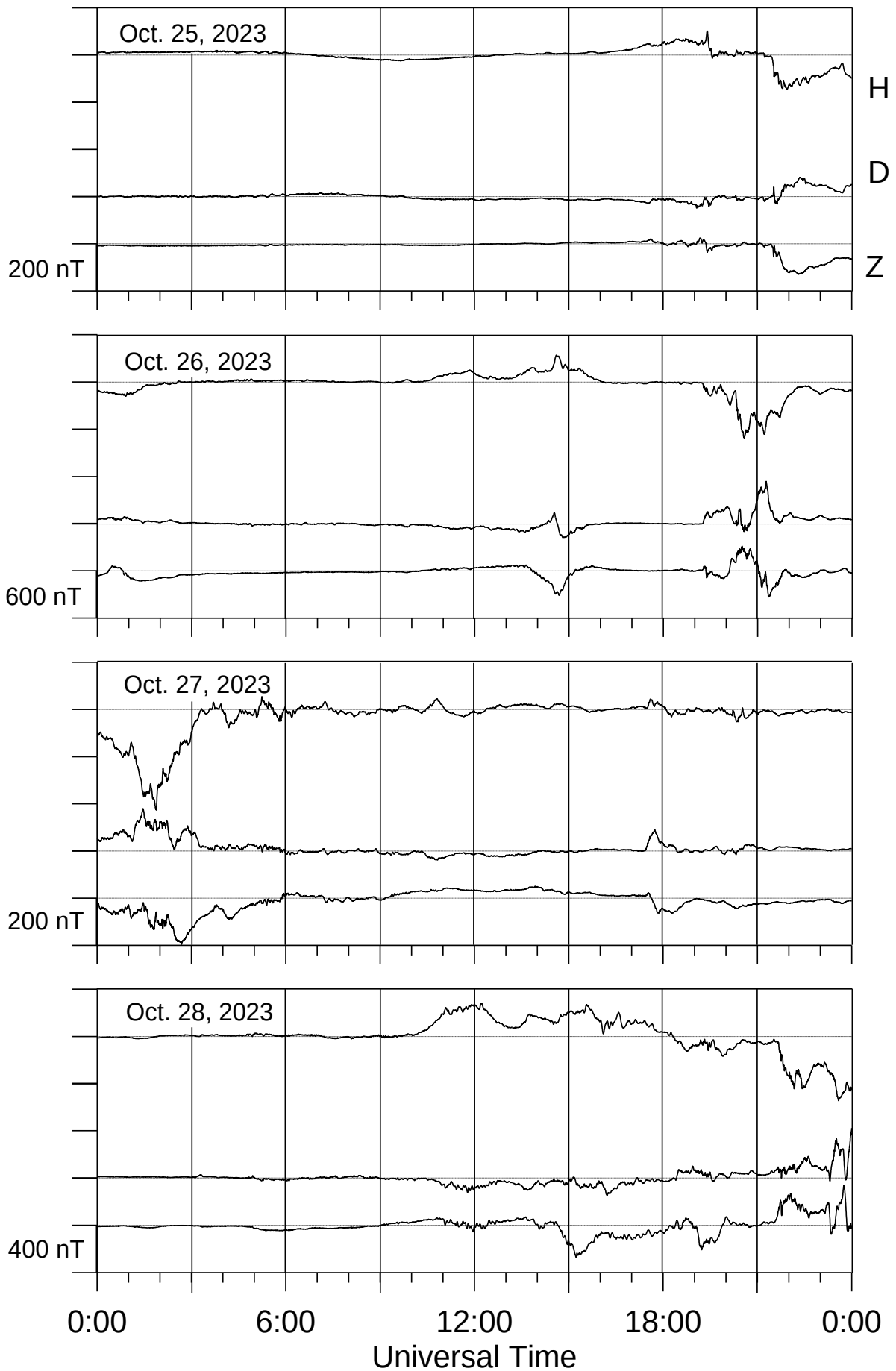
## Loparskaya magnetometer



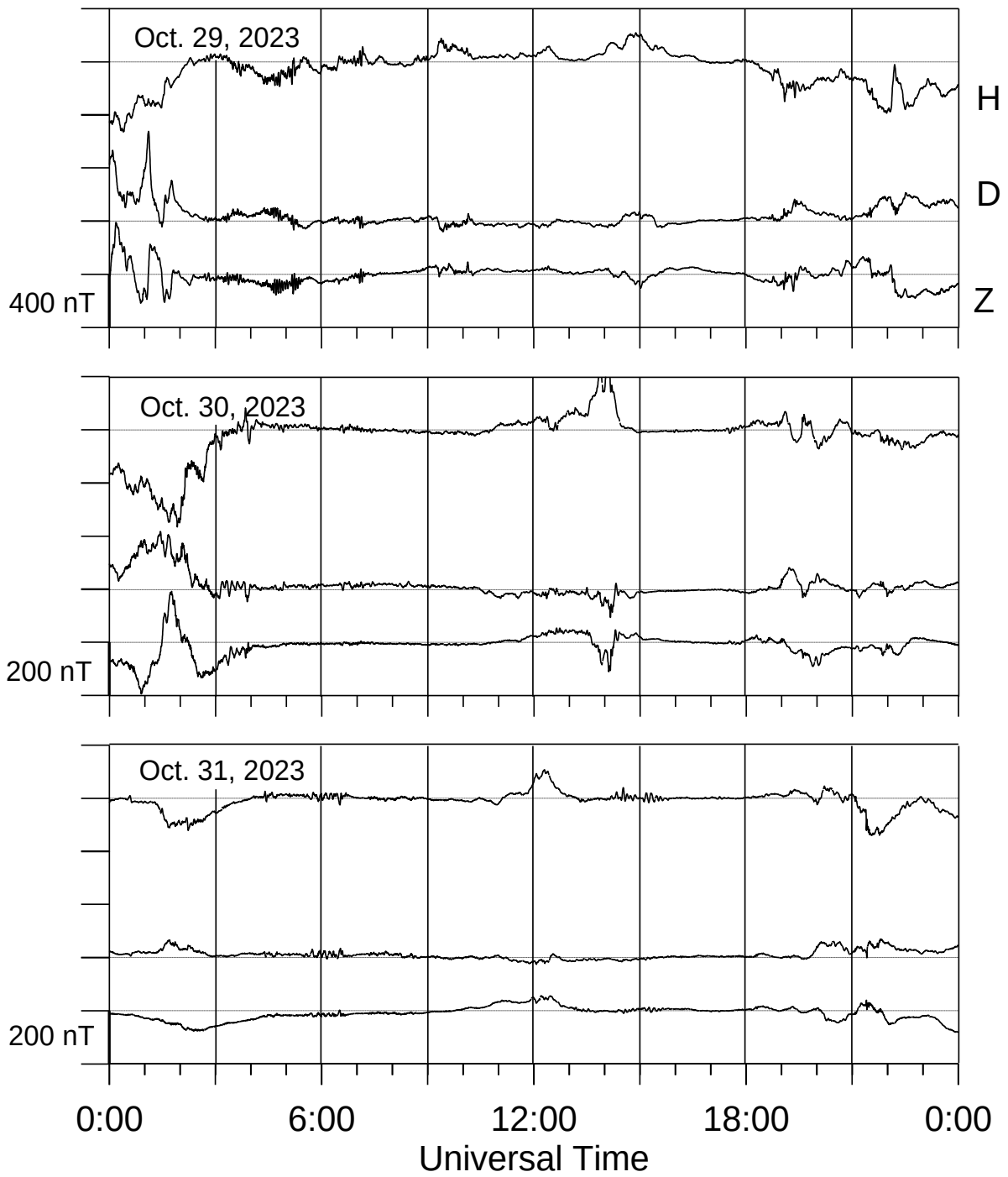
## Loparskaya magnetometer



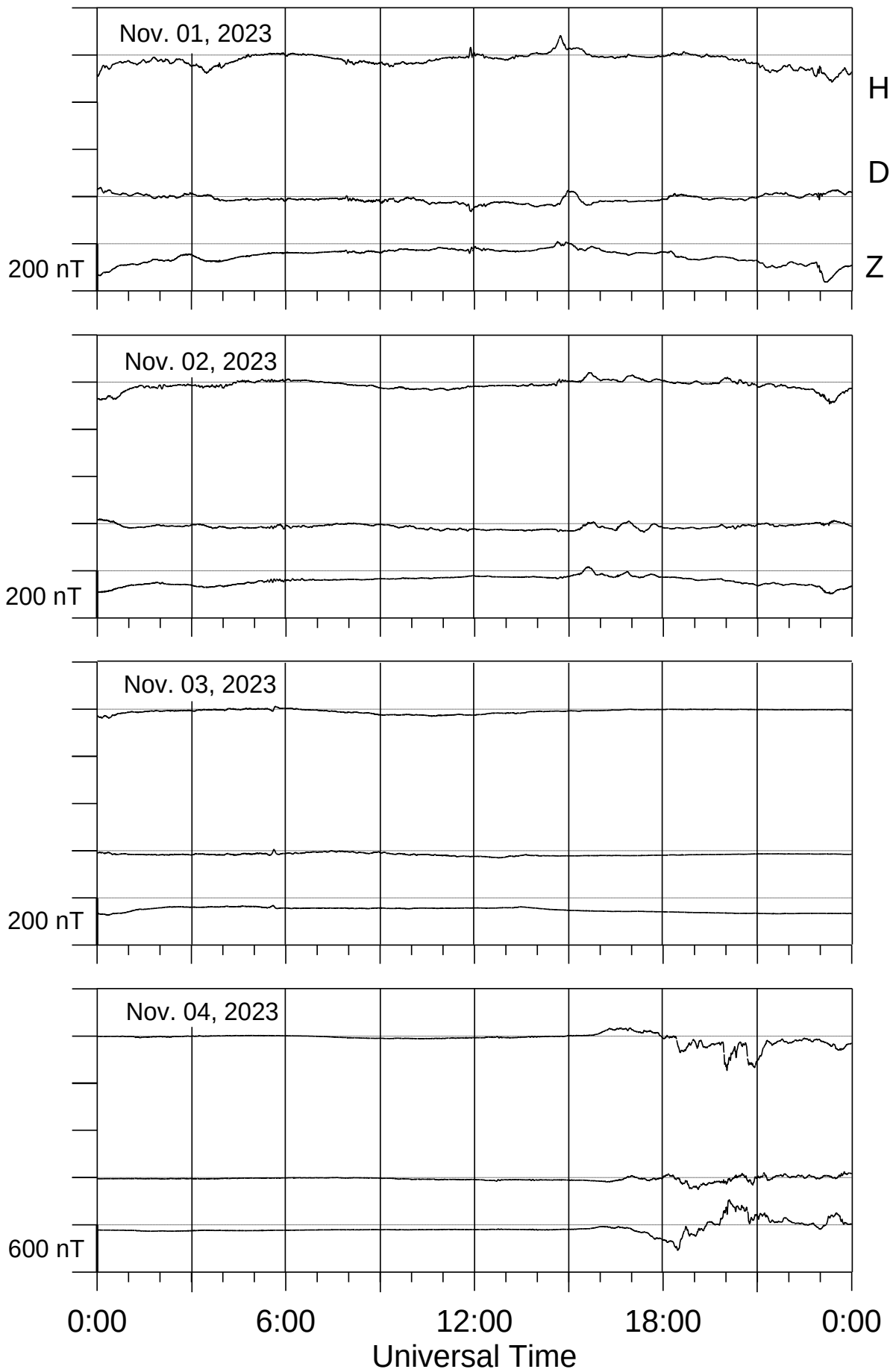
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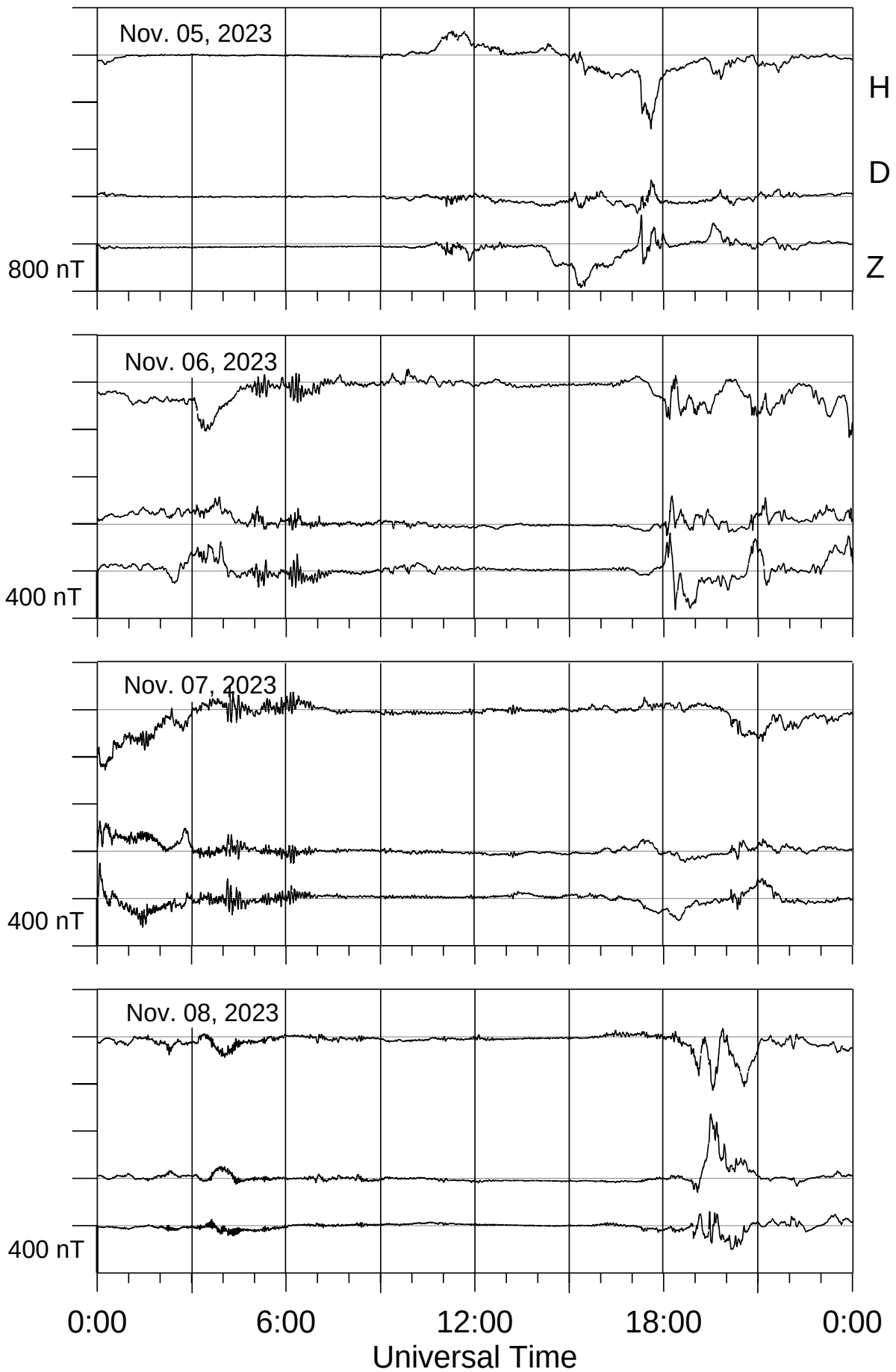
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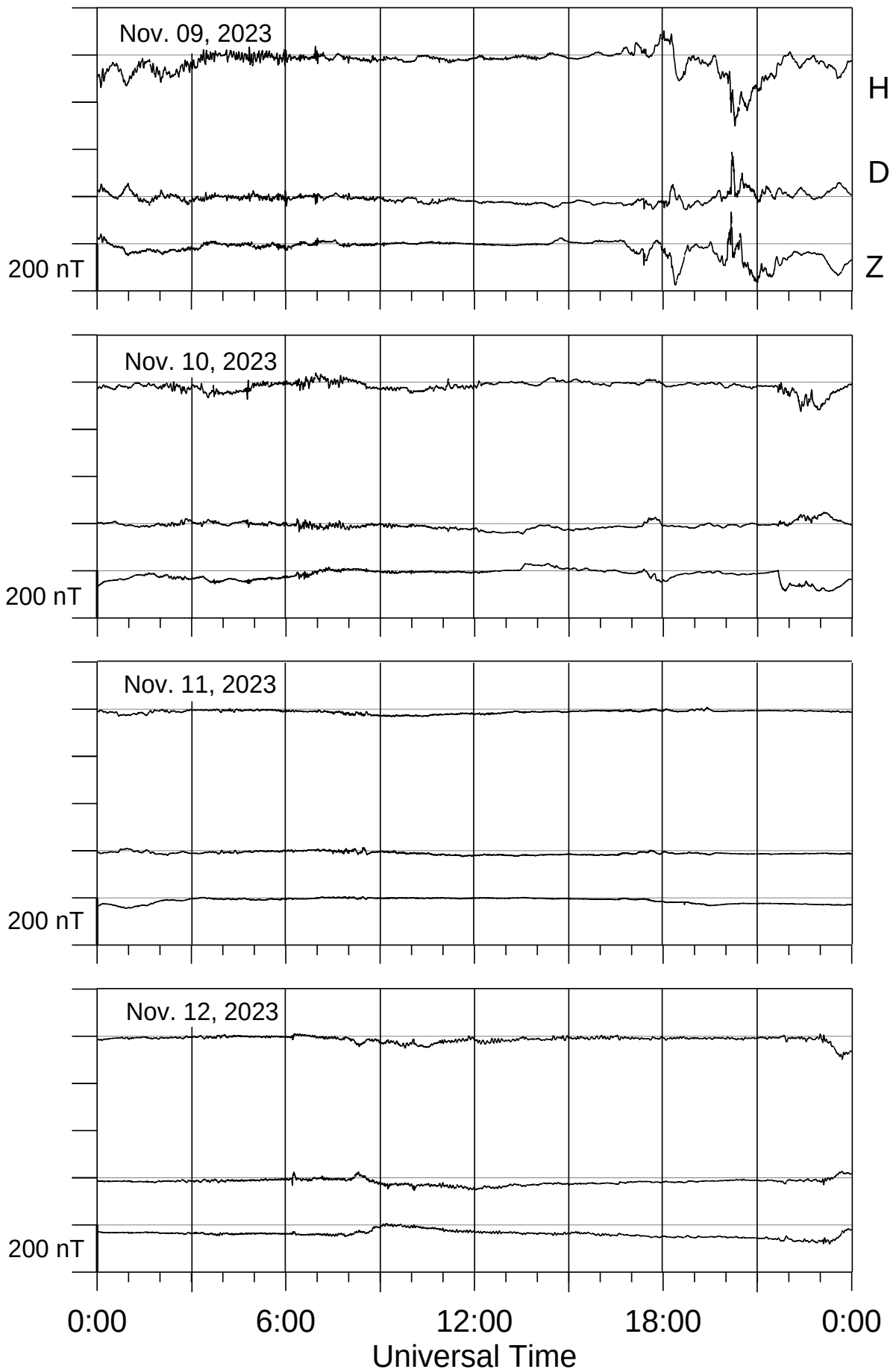
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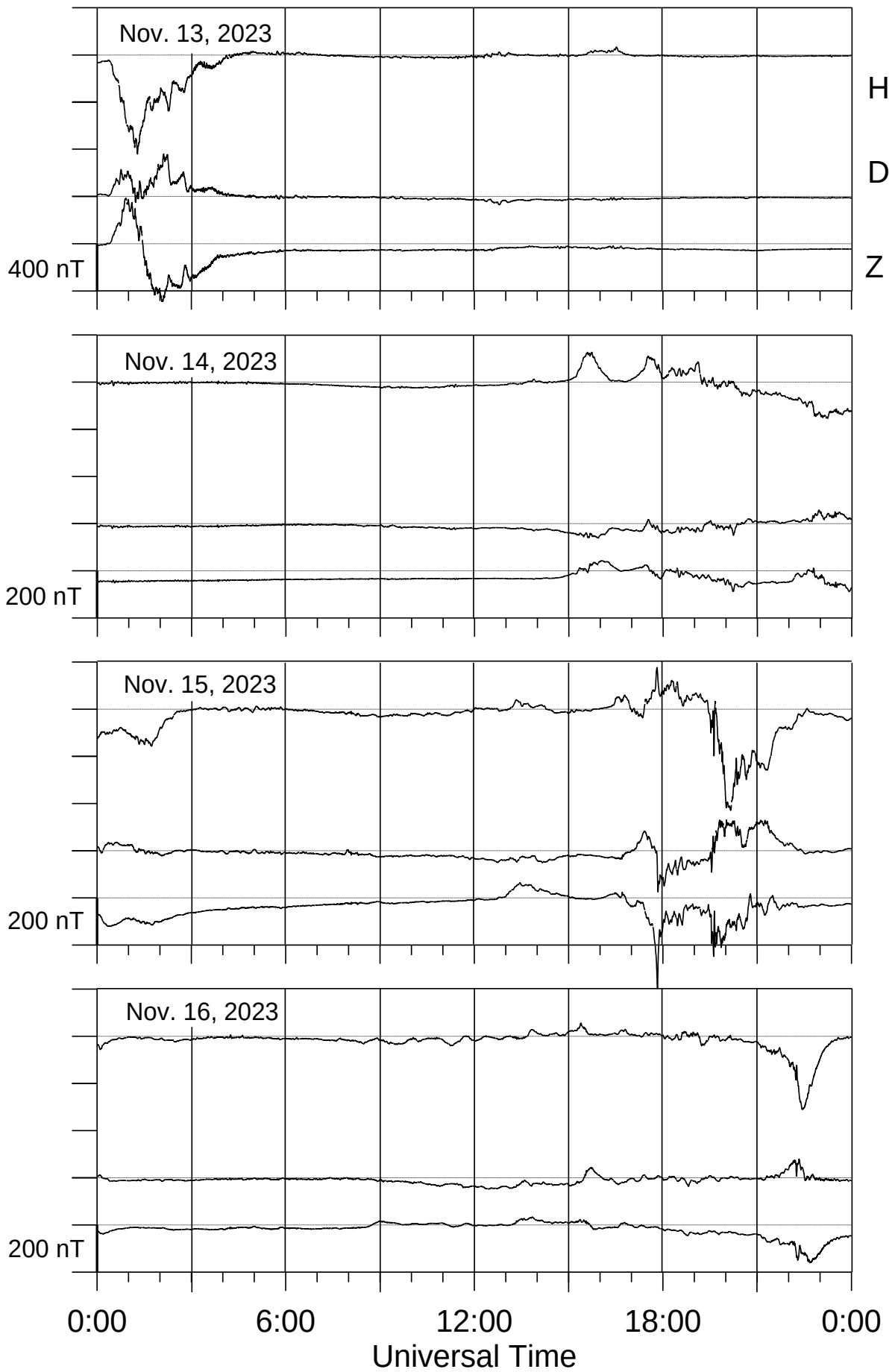
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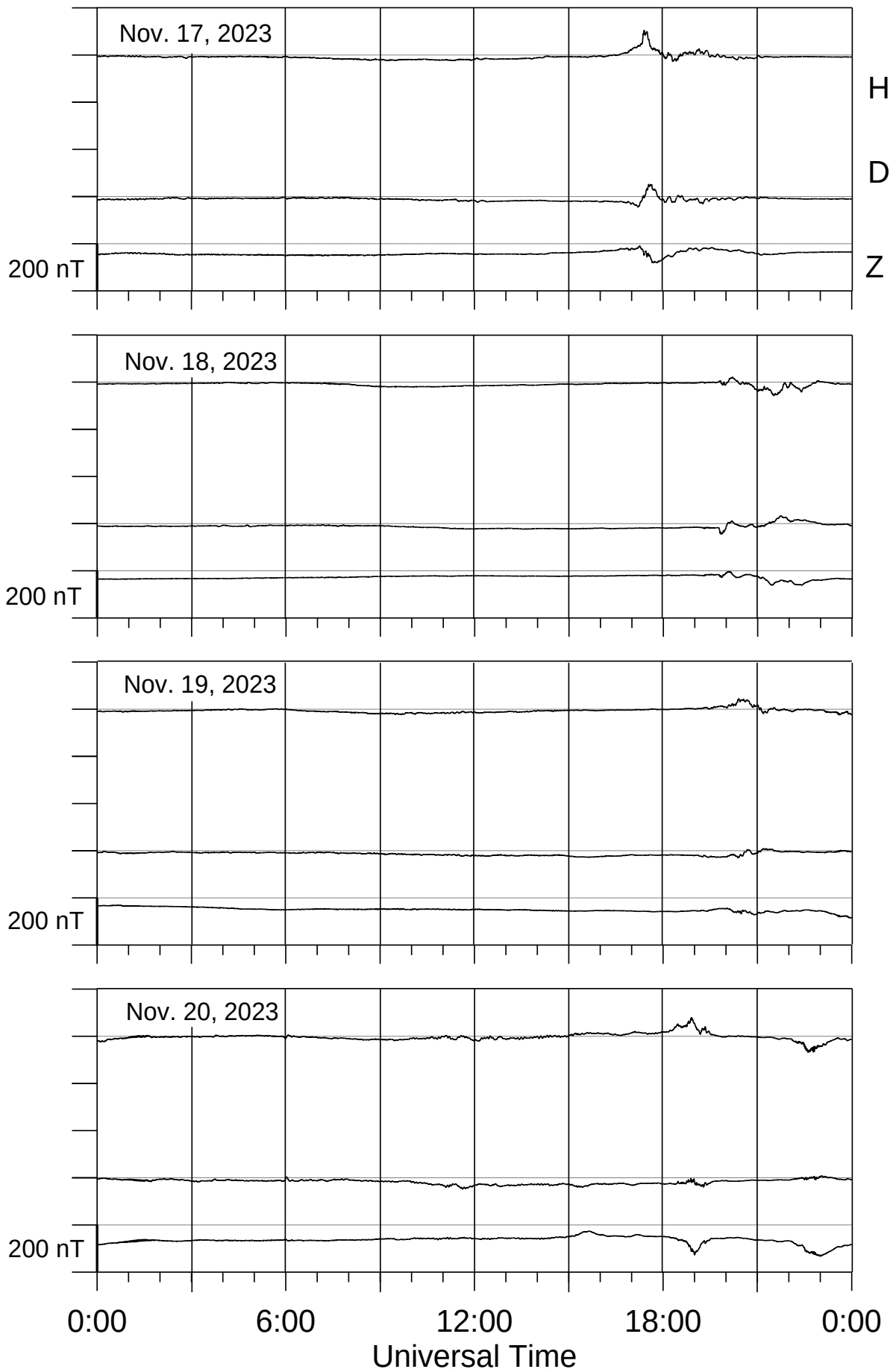
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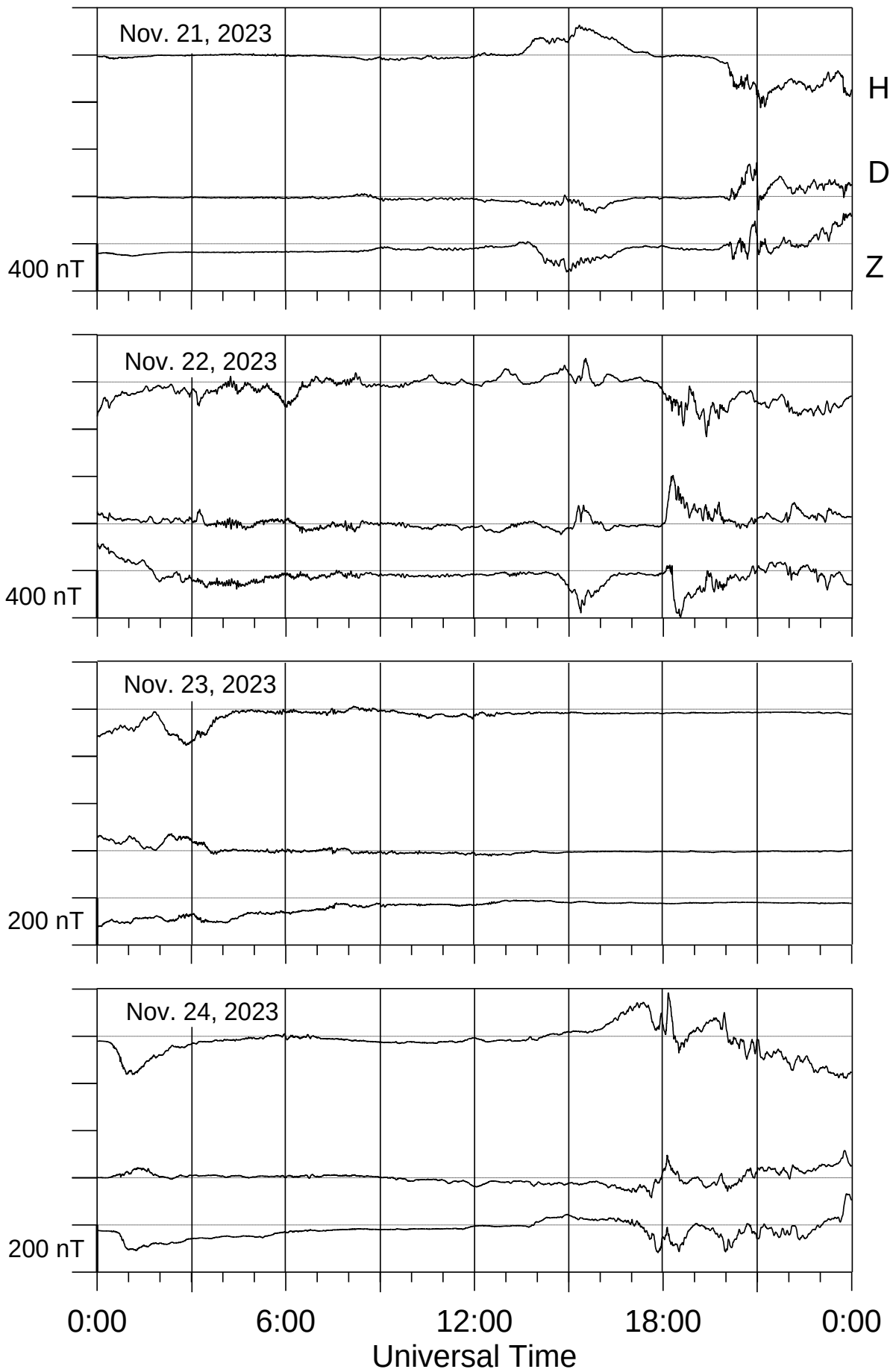
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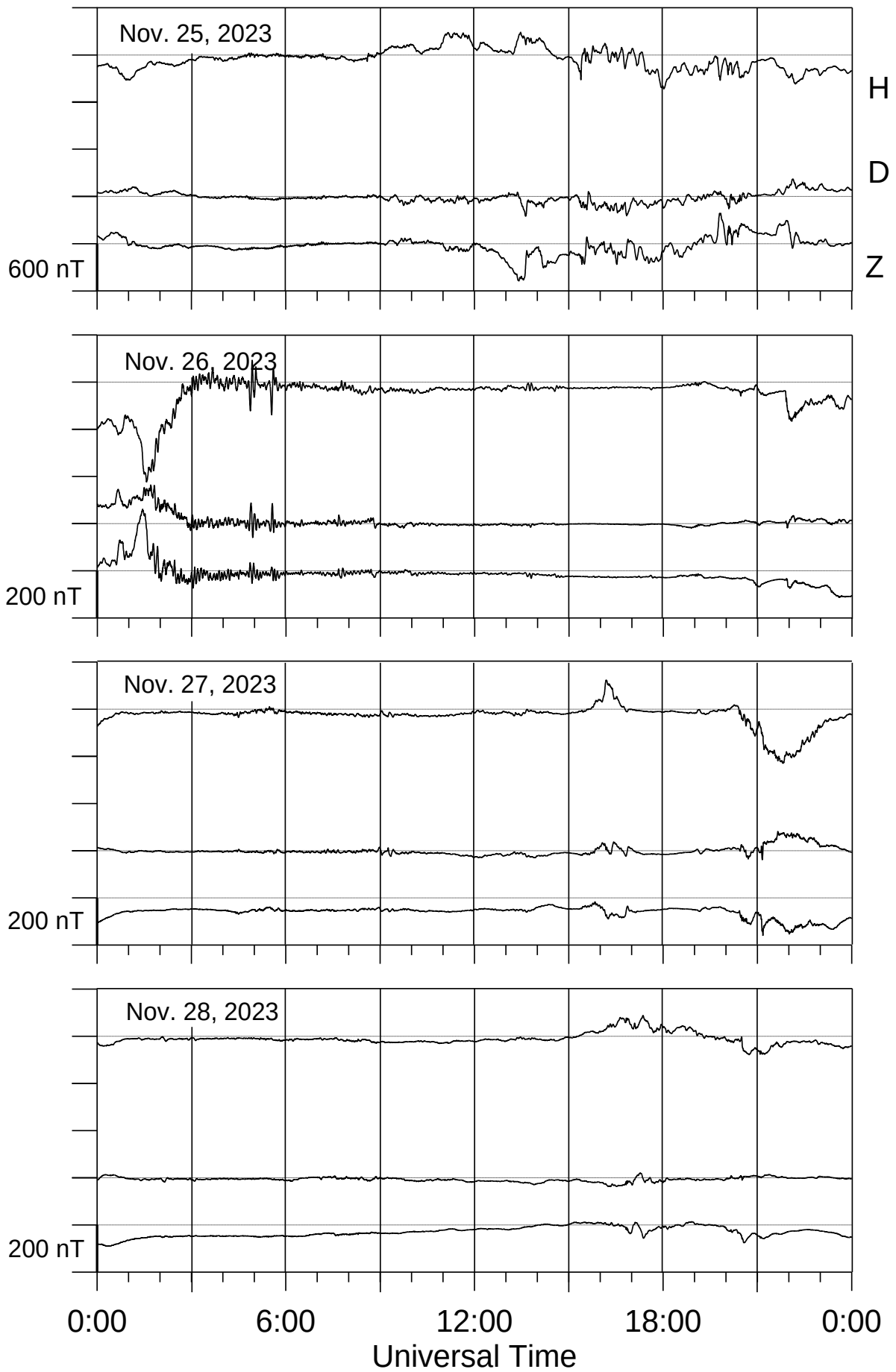
## Loparskaya magnetometer



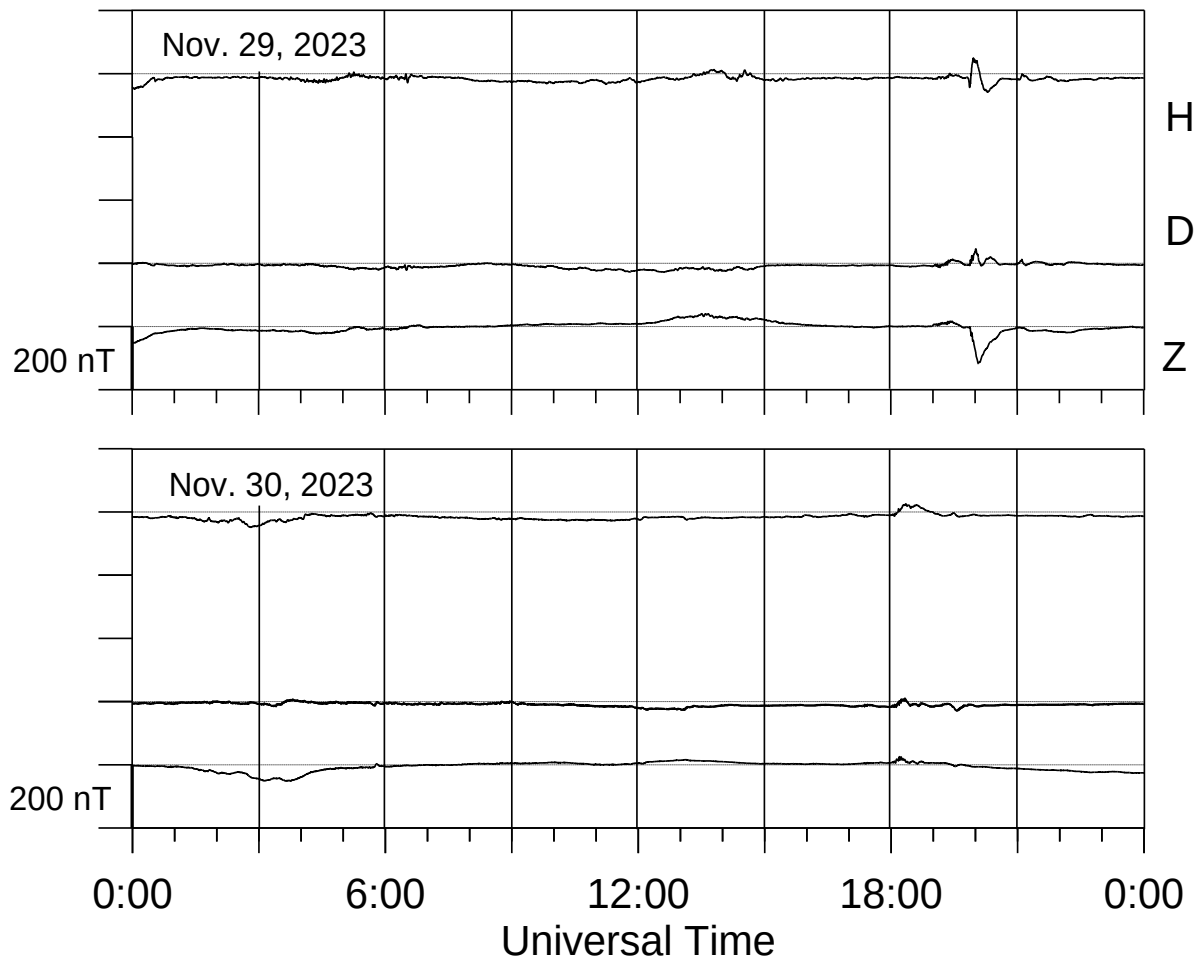
## Loparskaya magnetometer



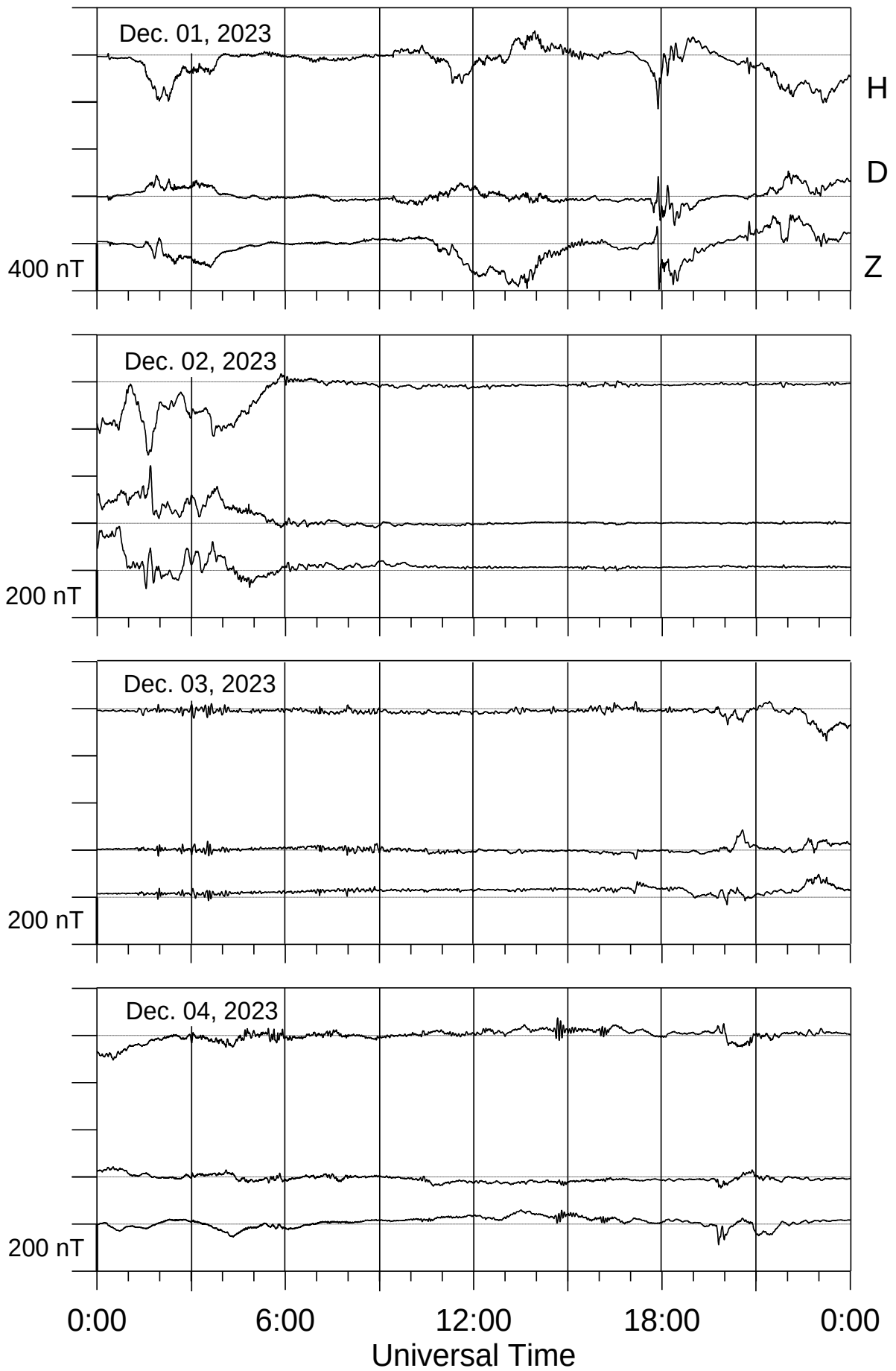
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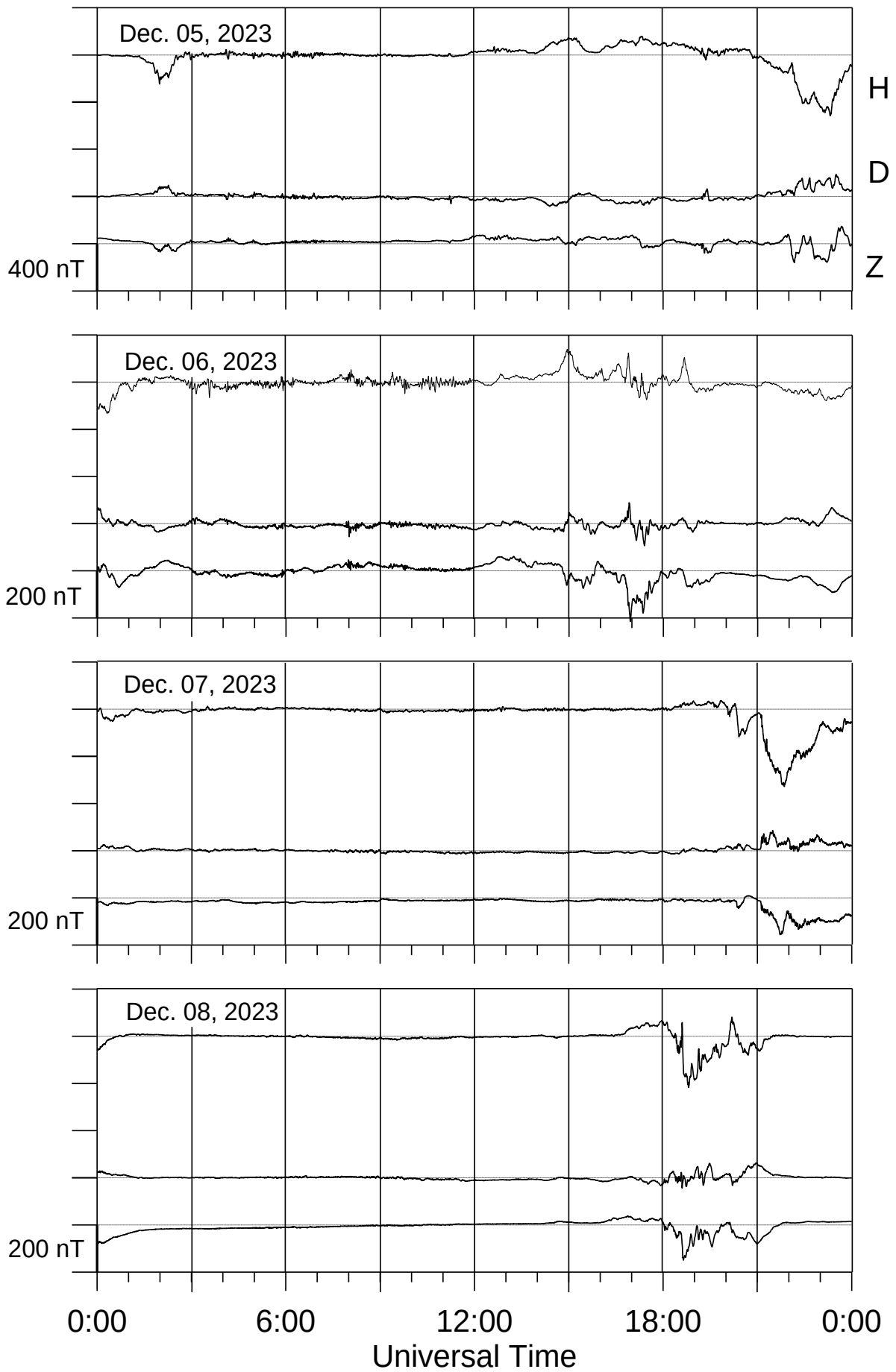
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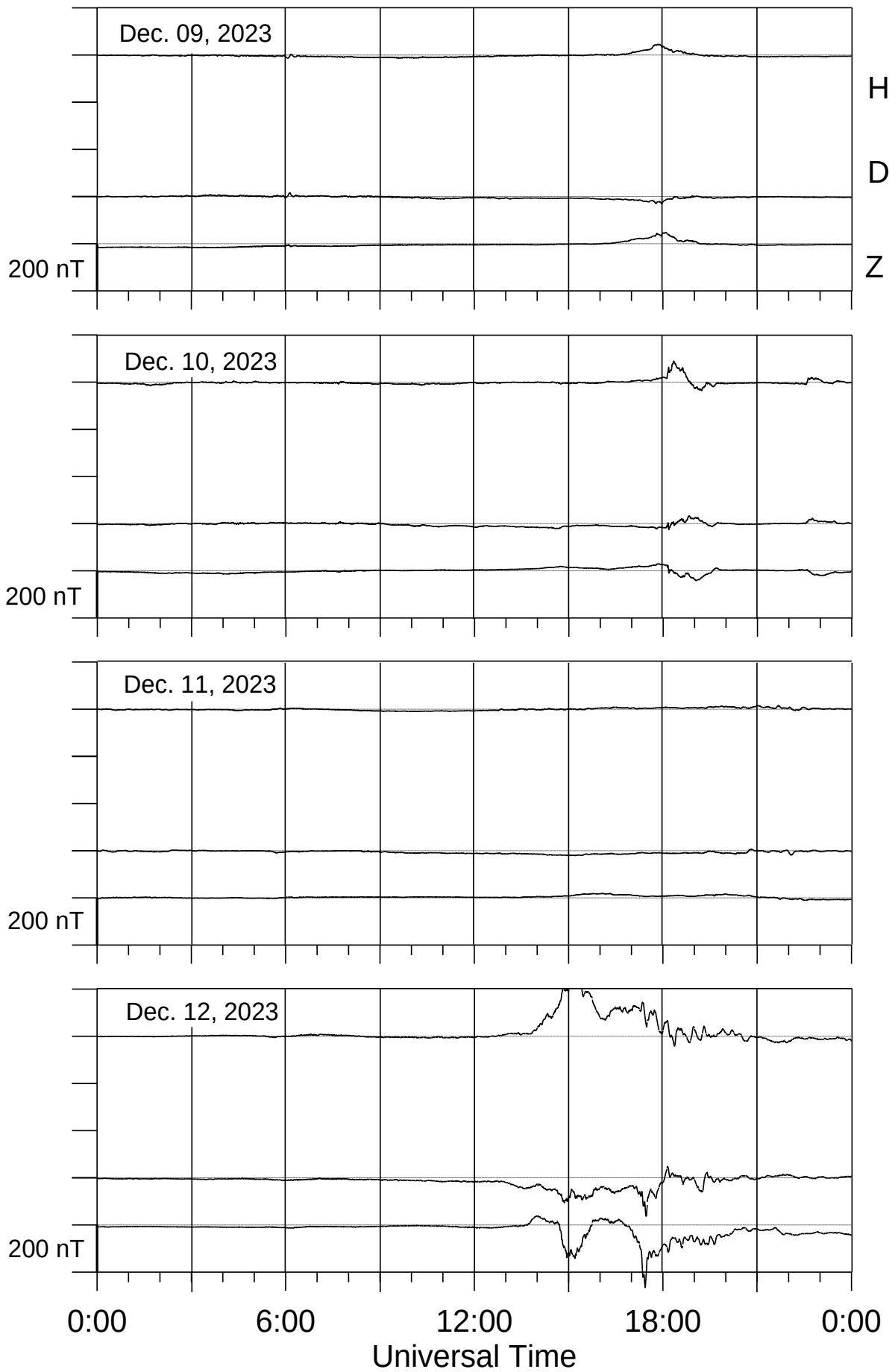
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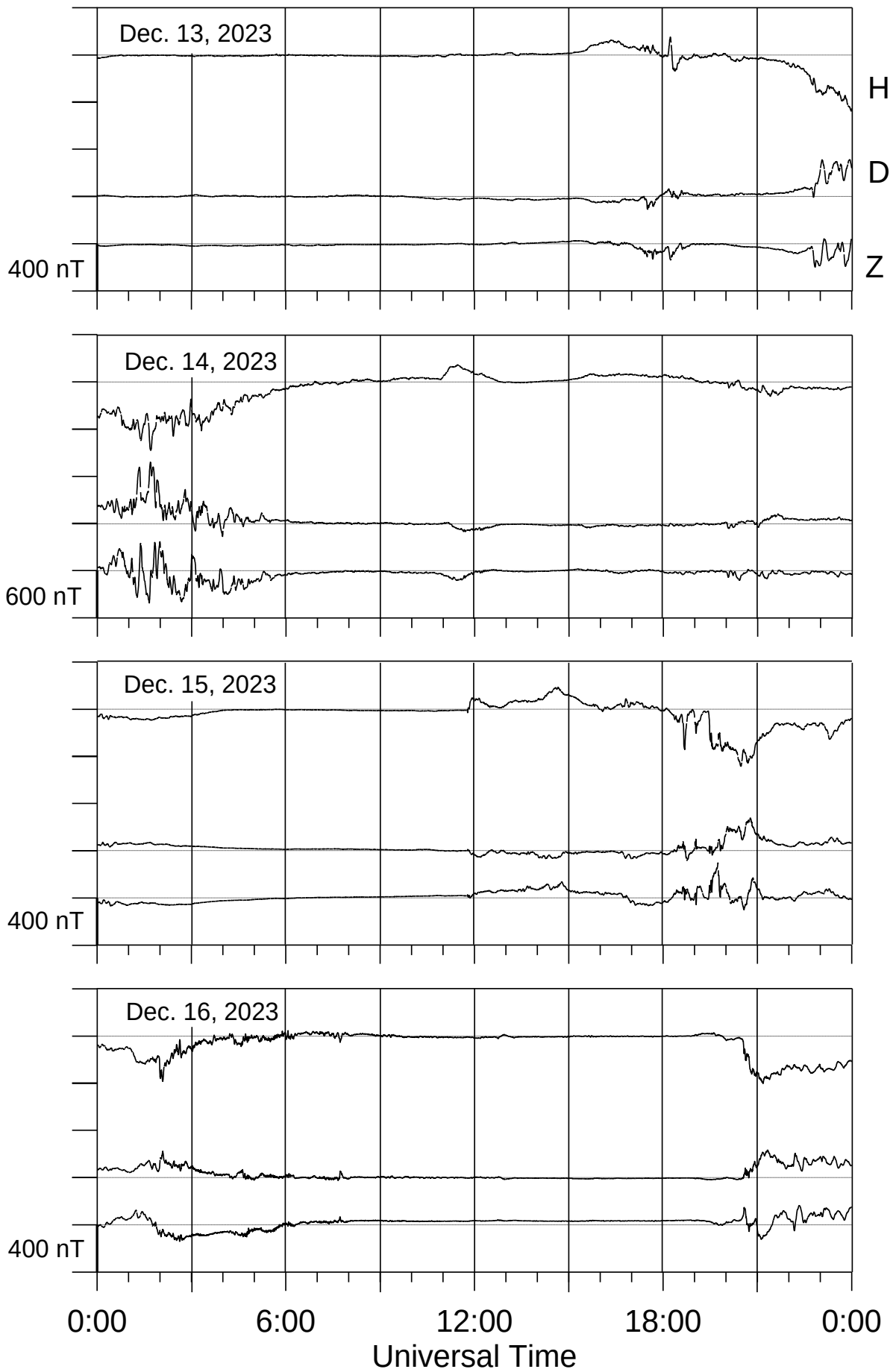
## Loparskaya magnetometer



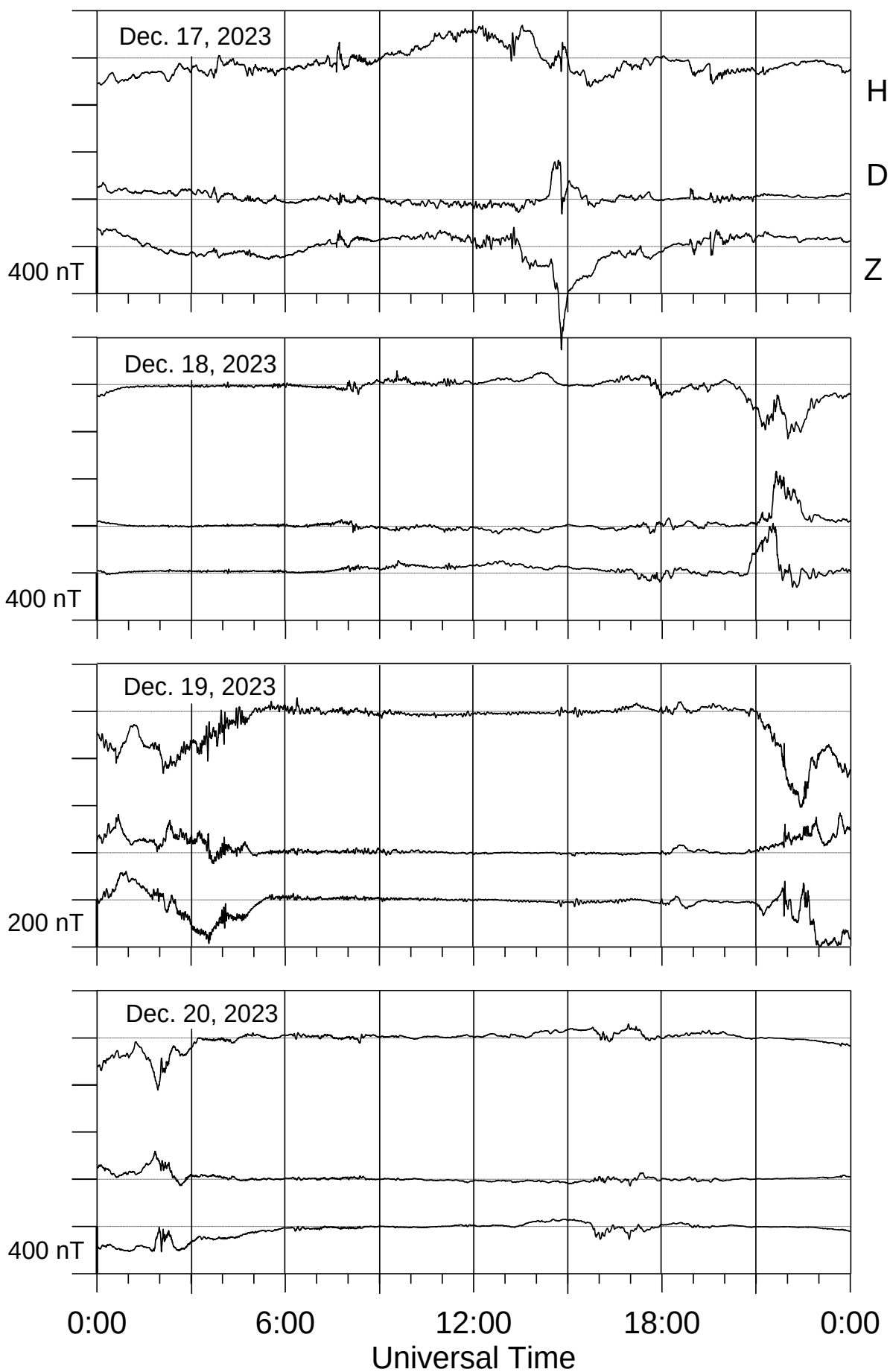
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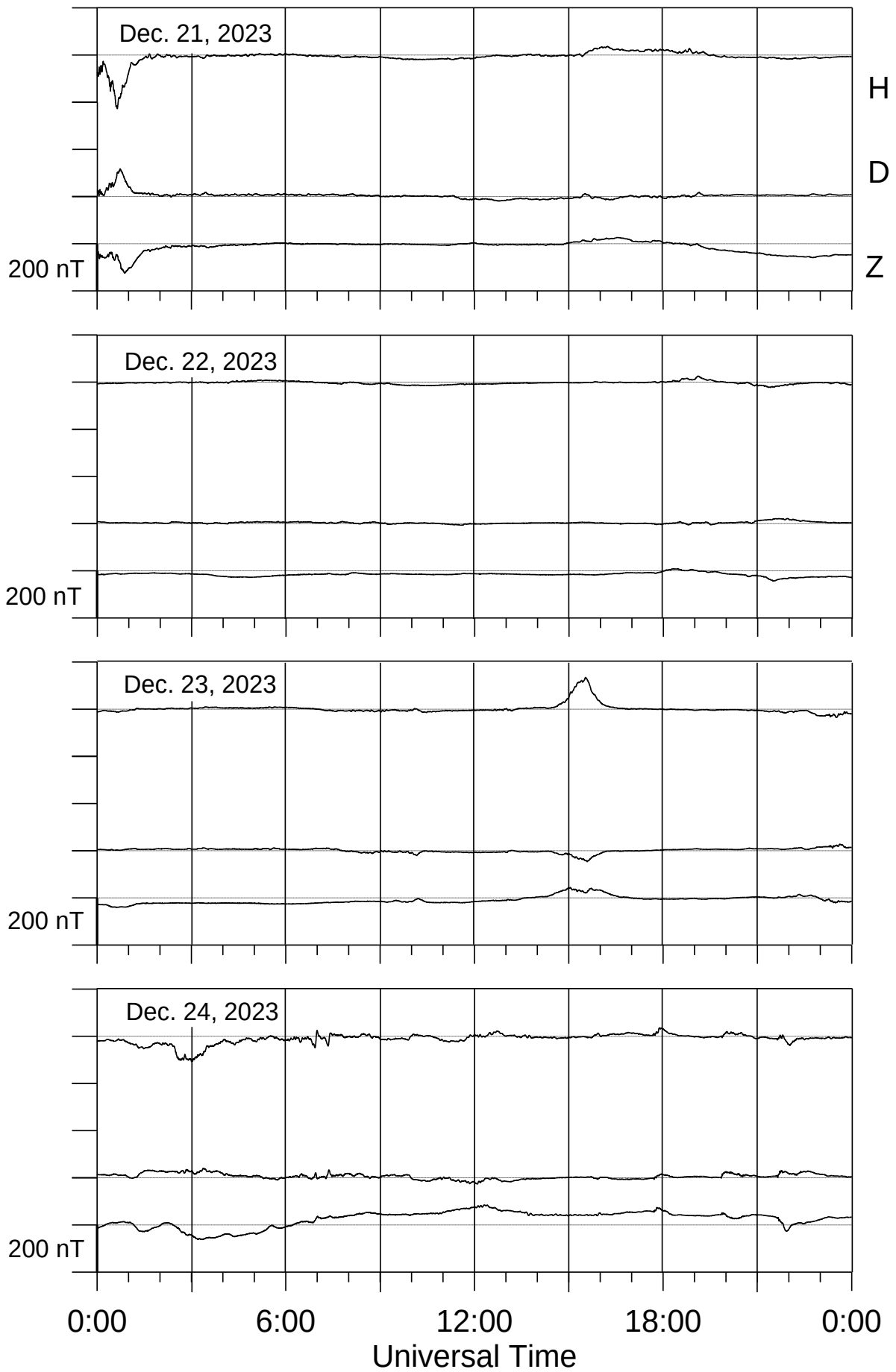
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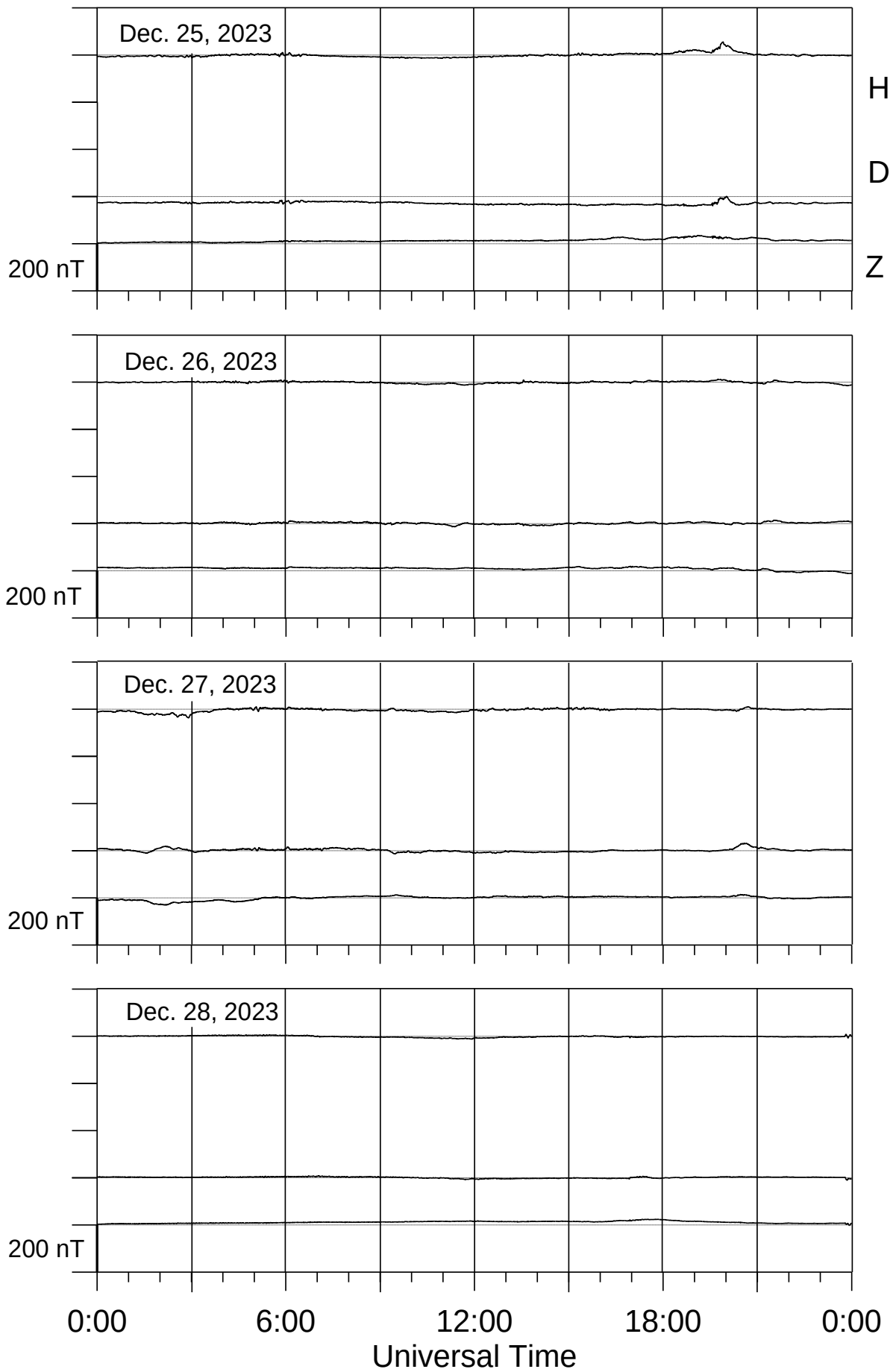
## Loparskaya magnetometer



## Loparskaya magnetometer



## Loparskaya magnetometer



## Loparskaya magnetometer

