

POLAR GEOPHYSICAL INSTITUTE  
RUSSIAN ACADEMY OF SCIENCES



**PGI**  
**GEOPHYSICAL DATA**

**2023**  

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**JANUARY**  

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**FEBRUARY**  

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**MARCH**  

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MURMANSK, APATITY, RUSSIA

May 2023

# **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 first quarter of 2023. All-sky camera observations are published only for the quarters when observations were carried out. All data are available by request.

Published since 1996

Reviewer K.G. Orlov

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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:

|          |         |
|----------|---------|
| January  | 383 949 |
| February | 380 647 |
| March    | 382 185 |

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

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

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

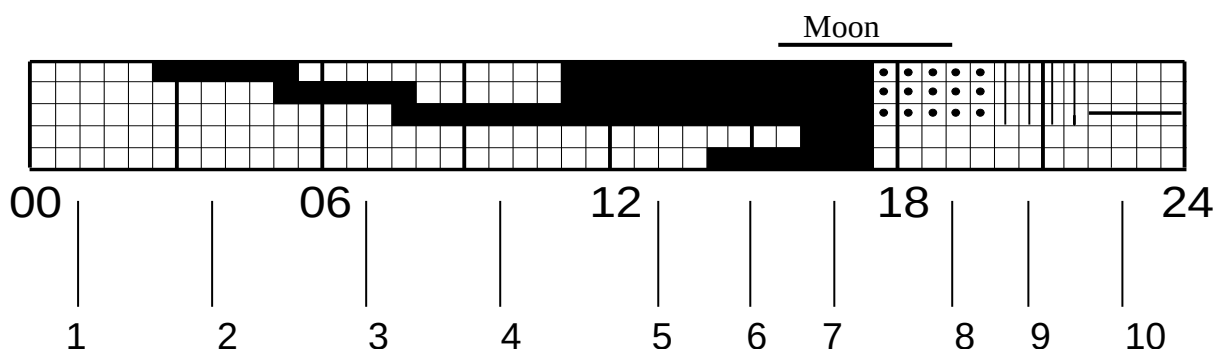
#### *Calendar*

Calendar shows the intervals of digital all-sky camera observations in Apatity and Lovozero, which are available during dark periods from 14:00 U to 06:00 UT.

#### *Ascaplots*

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

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





- 1- no aurora
- 2- 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.

### ***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  
January, 2023  
Lower limit of K=9 is 1500 nT

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

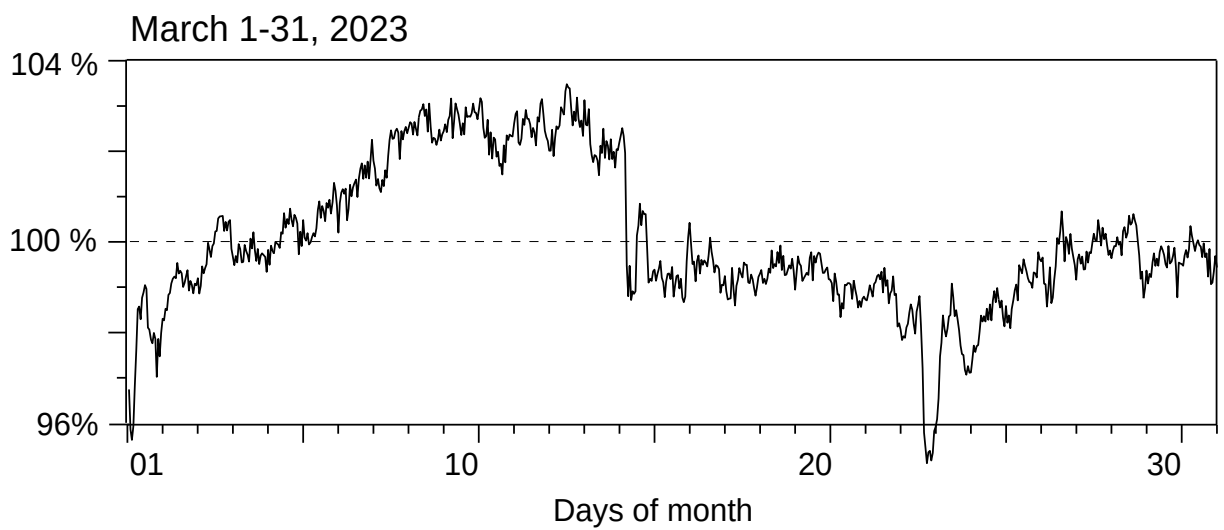
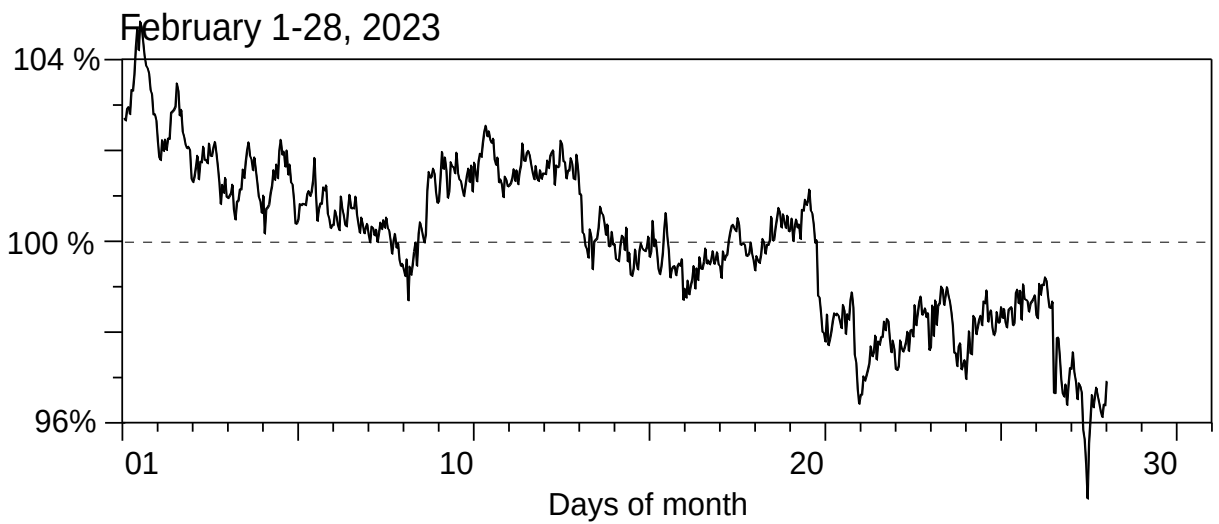
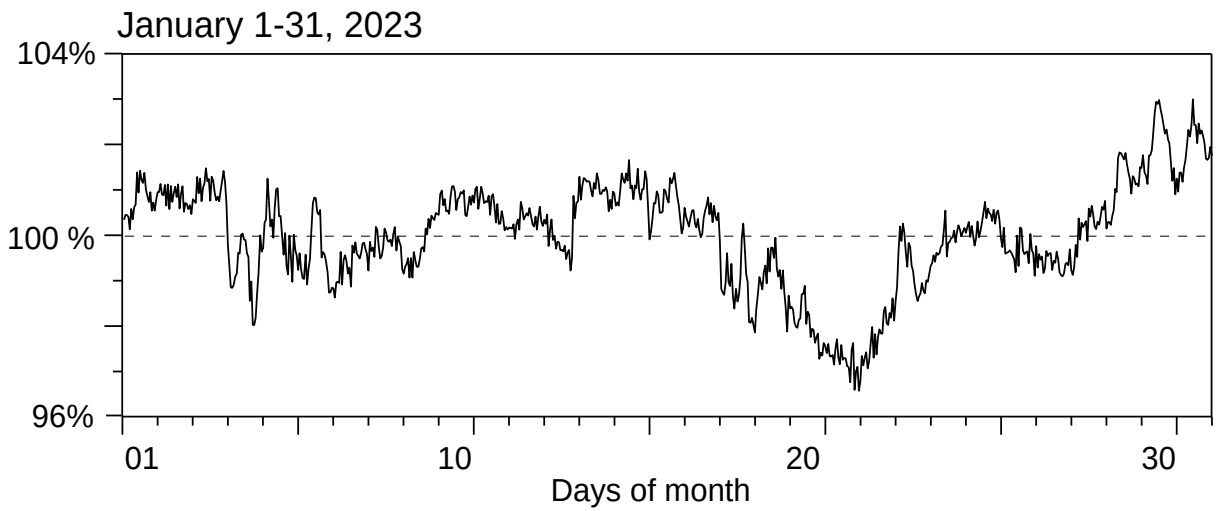
GEOMAGNETIC K-INDICES, LOVOZERO  
 February, 2023  
 Lower limit of K=9 is 1500 nT

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

GEOMAGNETIC K-INDICES, LOVOZERO  
 March, 2023  
 Lower limit of K=9 is 1500 nT

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

# Apatity neutron monitor



## **ALL – SKY CAMERA OBSERVATIONS**

**January - March 2023**





## CALENDAR OF TV OBSERVATIONS

## January 08 - 09

[illegible]

## January 09 -10

[illegible]

## January 10 -11

[illegible]

## January 11 - 12

[illegible]

## January 12 - 13

[illegible]

## January 13 - 14

[illegible]

## January 14- 15

[illegible]

## CALENDAR OF TV OBSERVATIONS

## January 15 - 16

[illegible]

## January 16 - 17

[illegible]

## January 17 - 18

[illegible]

## January 18 - 19

[illegible]

## January 19 - 20

[illegible]

## January 20 - 21

[illegible]

## January 21 - 22

[illegible]



**January30 - 31**

# January31

[illegible]

## CALENDAR OF TV OBSERVATIONS

## February 01 - 02

[illegible]

## February 02 - 03

[illegible]

## February 03 - 04

[illegible]

## February 04 - 05

[illegible]

## February 05- 06

[illegible]

## February 06 - 07

[illegible]

## February 07 - 08

[illegible]

















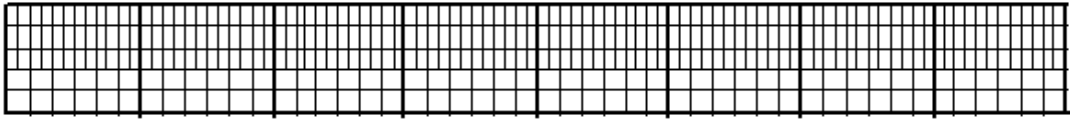
## March 30 - 31

## March 31

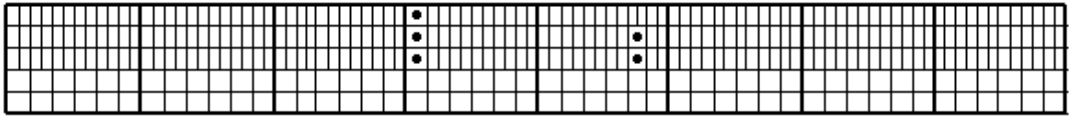
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## Apatity ascaplots

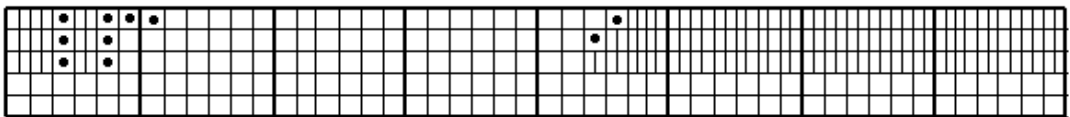
Jan. 01, 2023



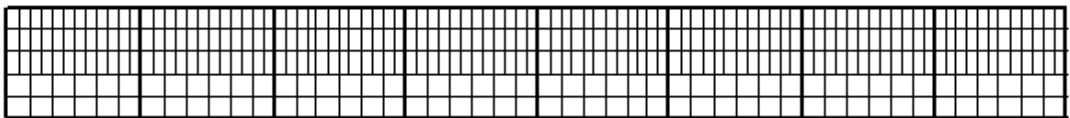
Jan. 02, 2023



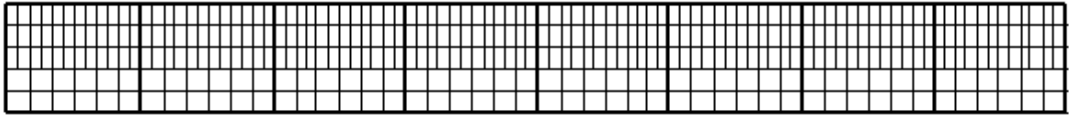
Jan. 03, 2023



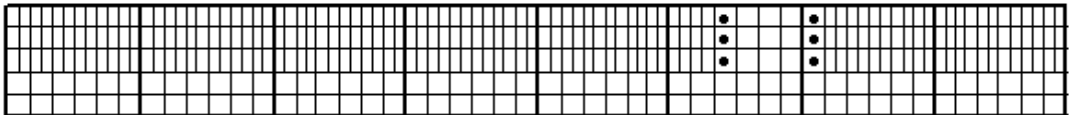
Jan. 04, 2023



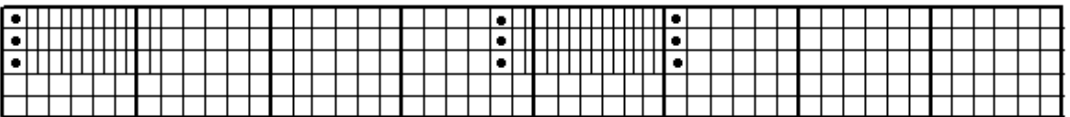
Jan. 05, 2023



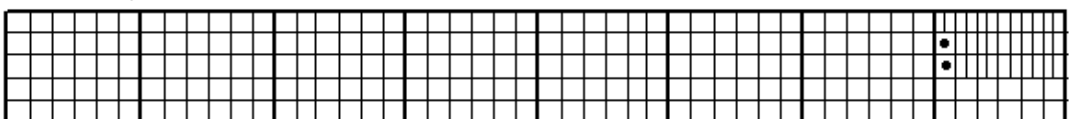
Jan. 06, 2023



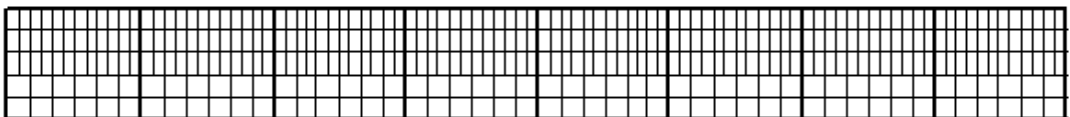
Jan. 07, 2023



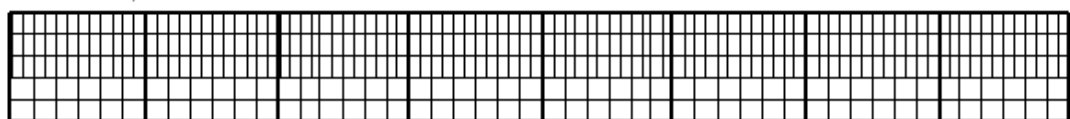
Jan. 08, 2023



Jan. 09, 2023



Jan. 10, 2023



00

06

12

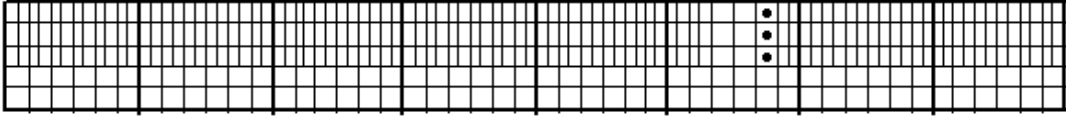
18

24

Universal Time

## Apatity ascaplots

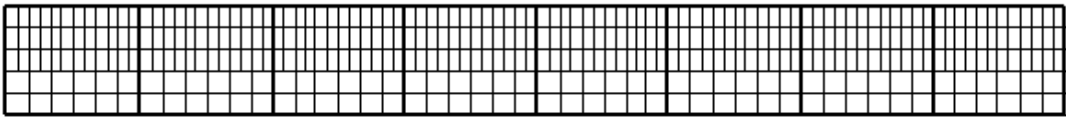
Jan. 11, 2023



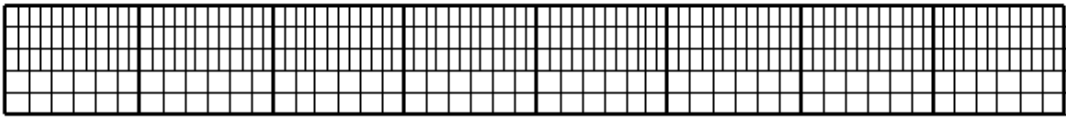
Jan. 12, 2023



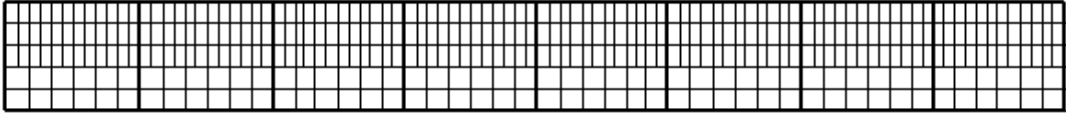
Jan. 13, 2023



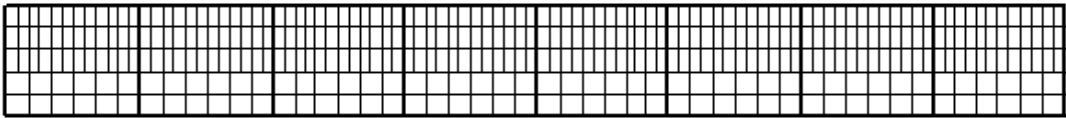
Jan. 14, 2023



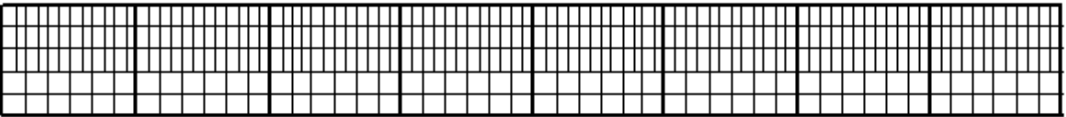
Jan. 15, 2023



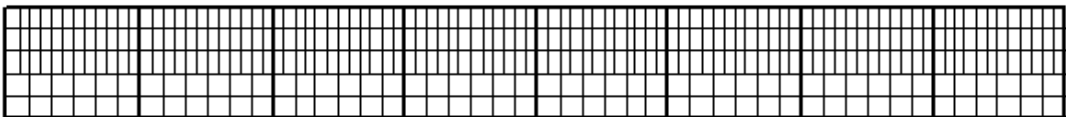
Jan. 16, 2023



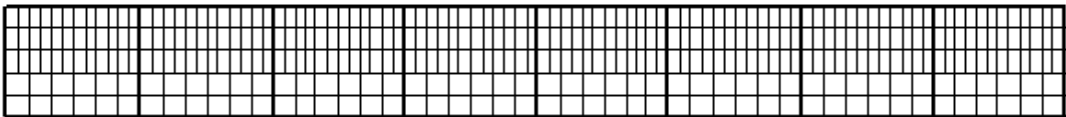
Jan. 17, 2023



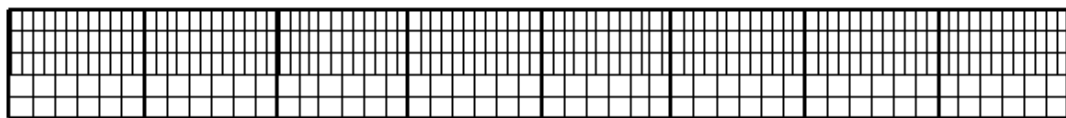
Jan. 18, 2023



Jan. 19, 2023



Jan. 20, 2023



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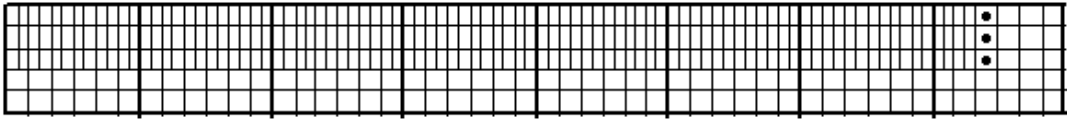
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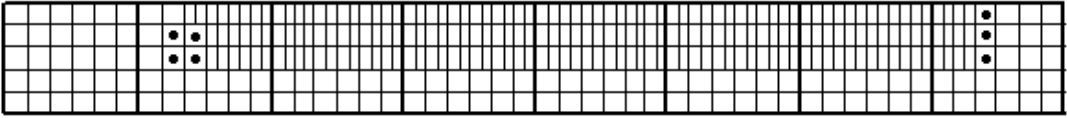
Universal Time

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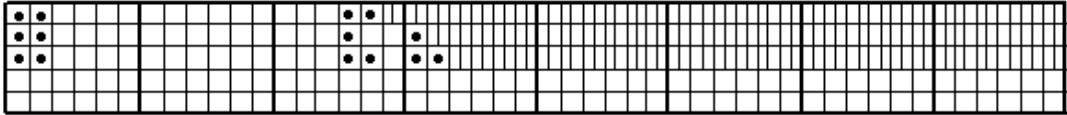
Jan. 21, 2023



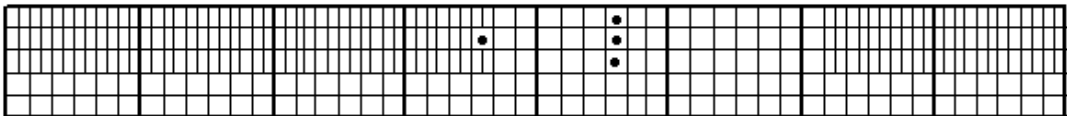
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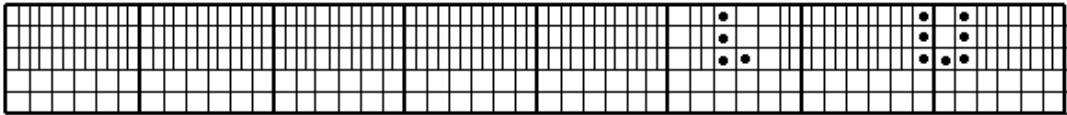
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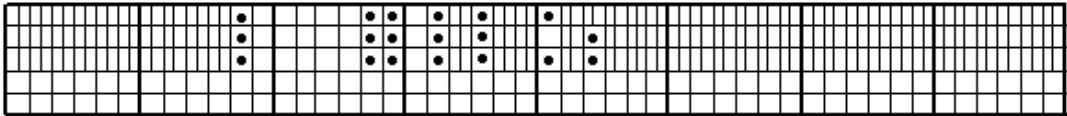
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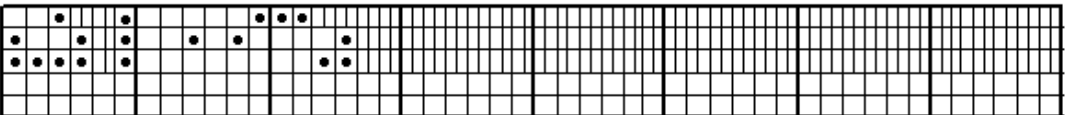
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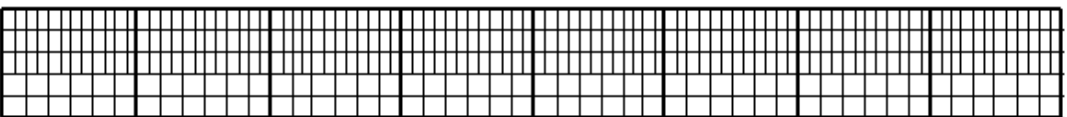
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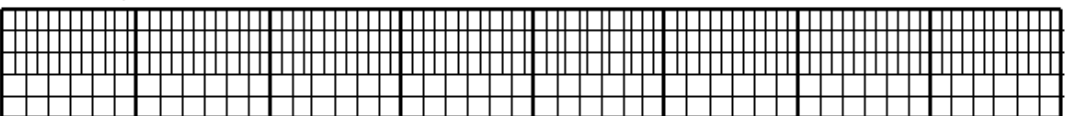
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Jan. 28, 2023



Jan. 29, 2023



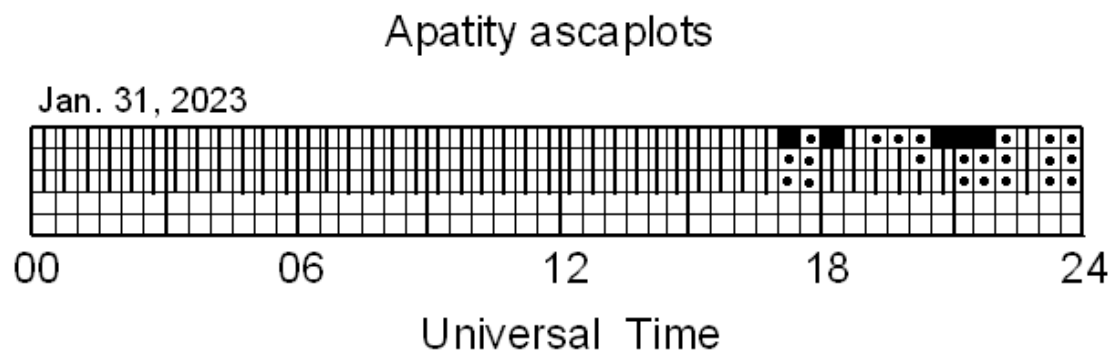
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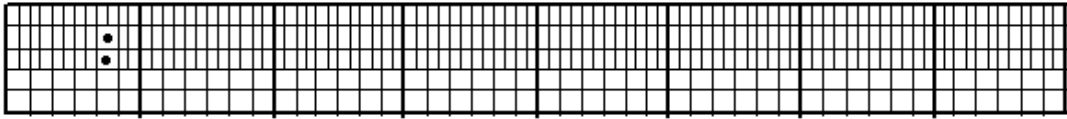
Universal Time



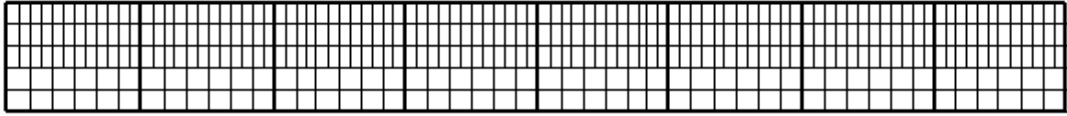


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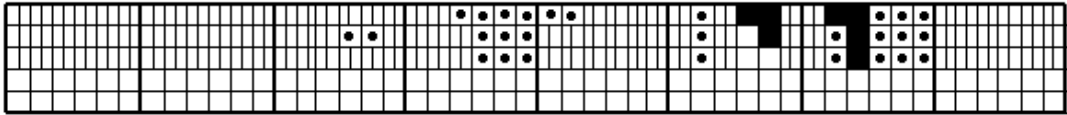
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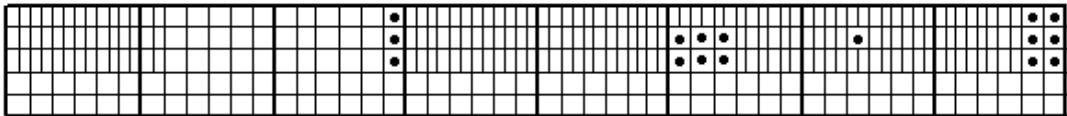
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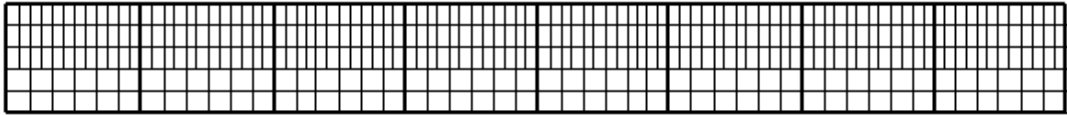
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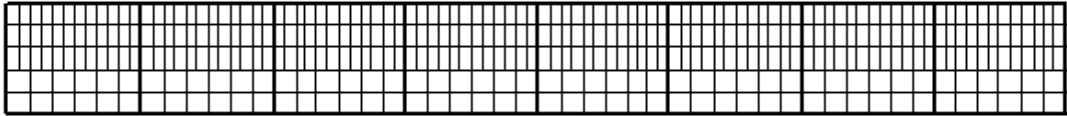
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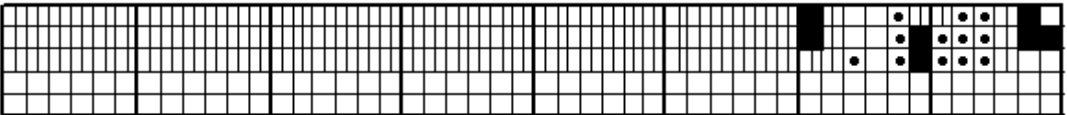
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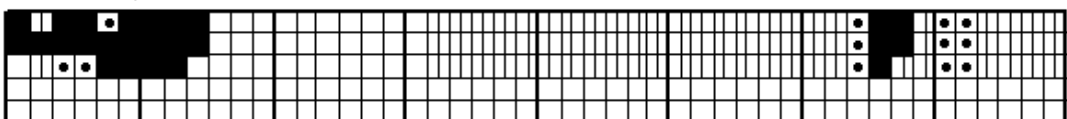
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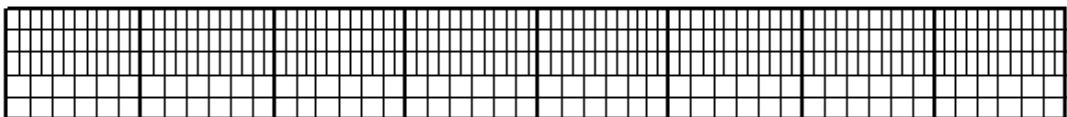
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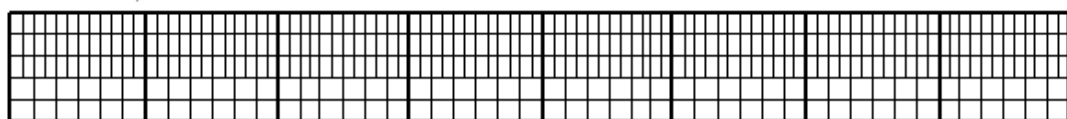
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Feb. 10, 2023



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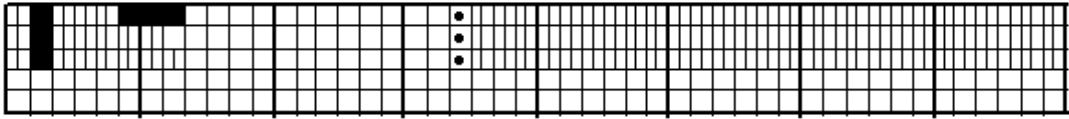
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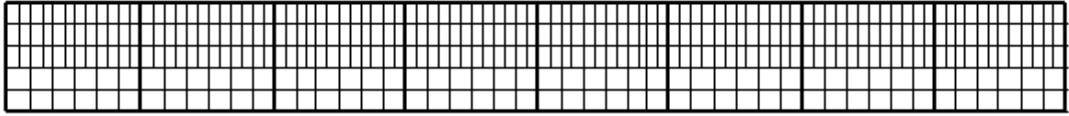
Universal Time

## Apatity ascaplots

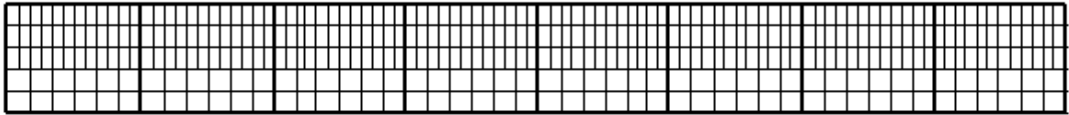
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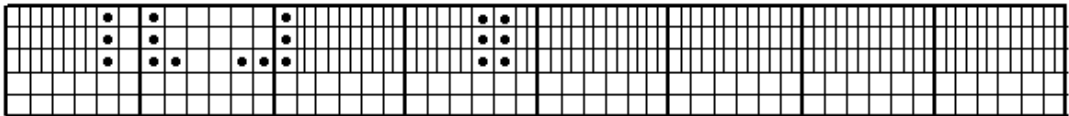
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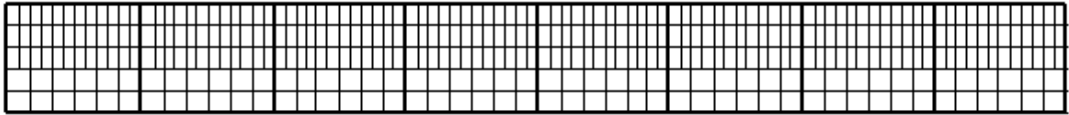
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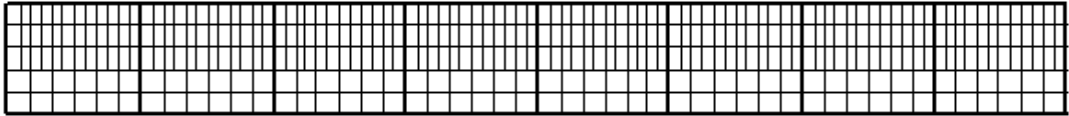
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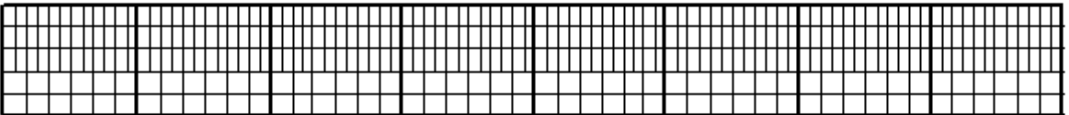
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Feb. 16, 2023



Feb. 17, 2023



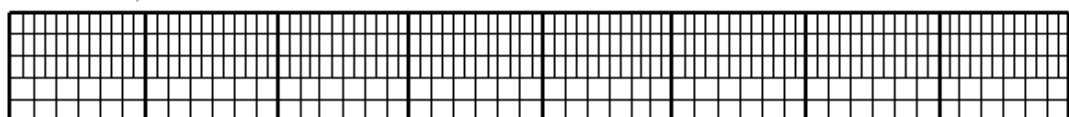
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Feb. 19, 2023



Feb. 20, 2023

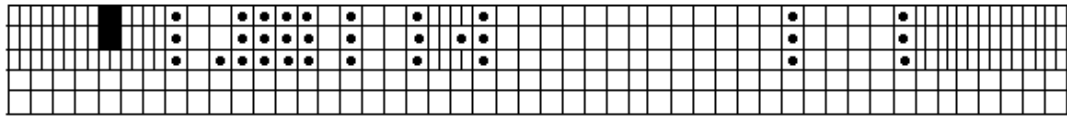


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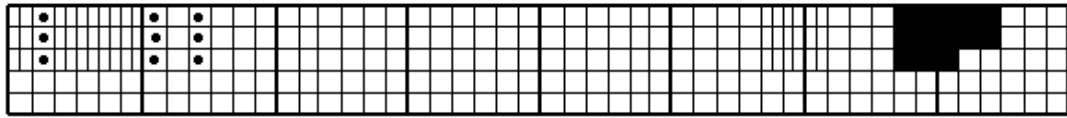
Universal Time

# Apatity ascaplots

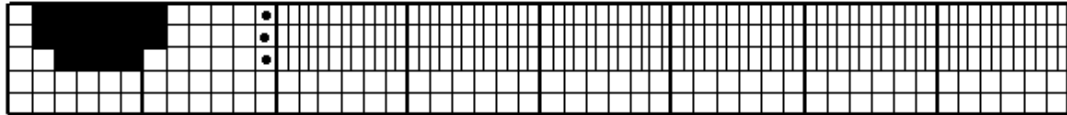
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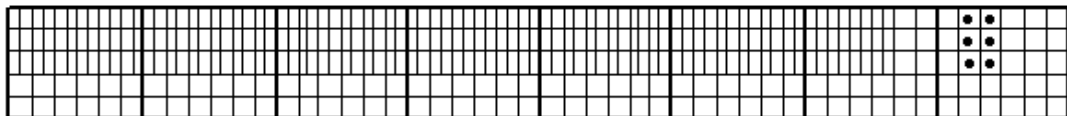
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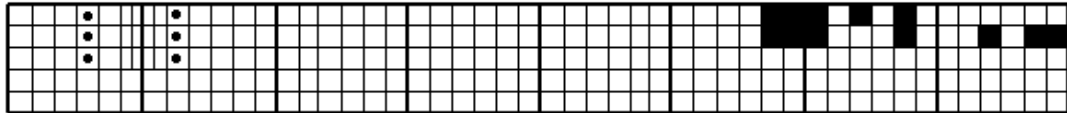
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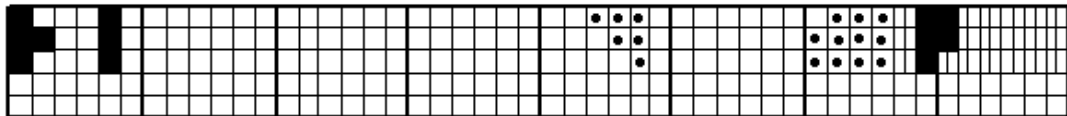
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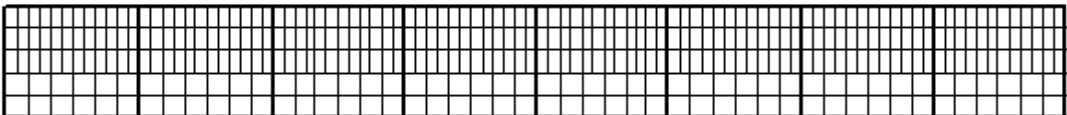
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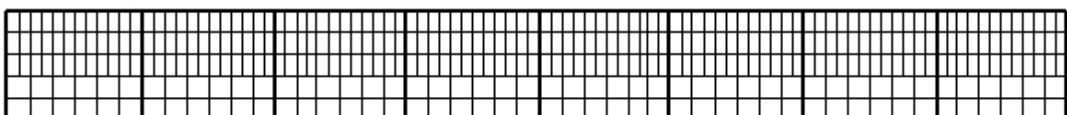
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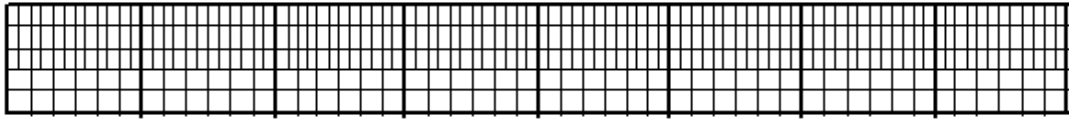


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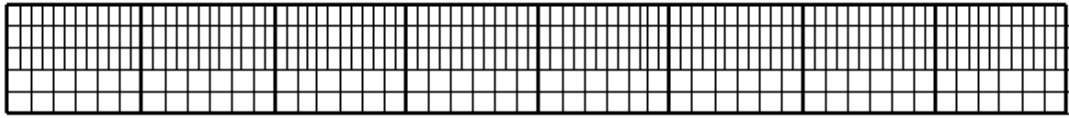
Universal Time

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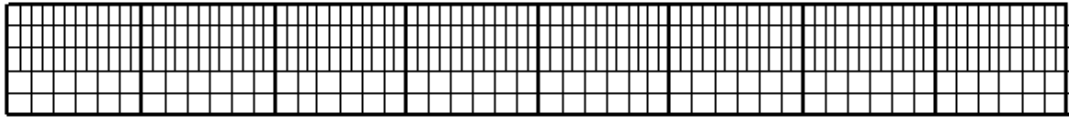
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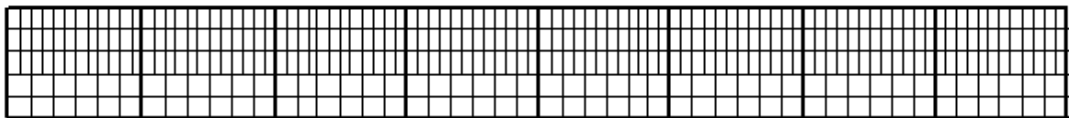
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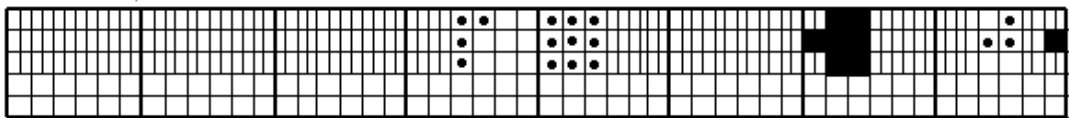
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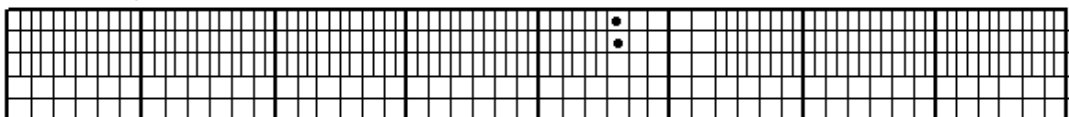
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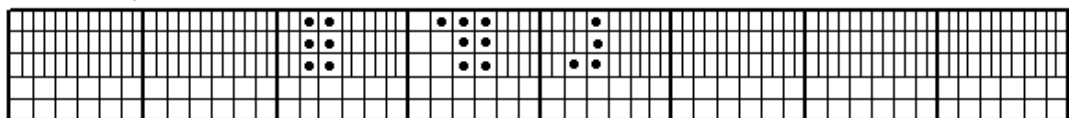
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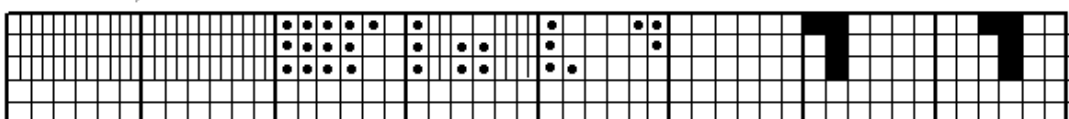
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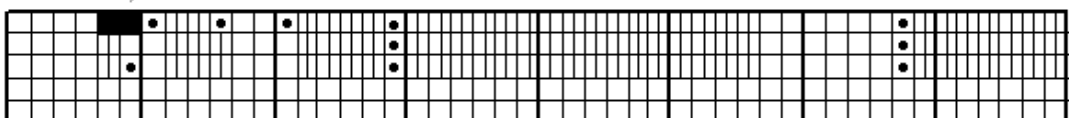
Mar. 07, 2023



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Mar. 09, 2023



Mar. 10, 2023

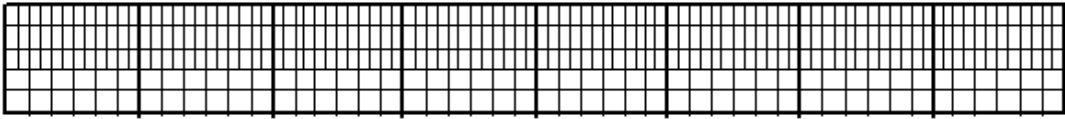


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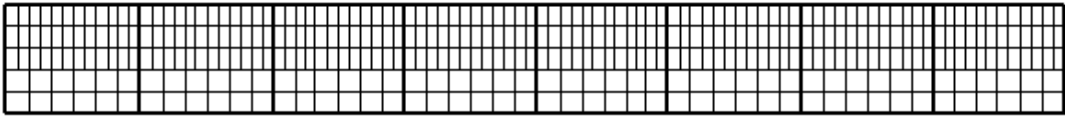
Universal Time

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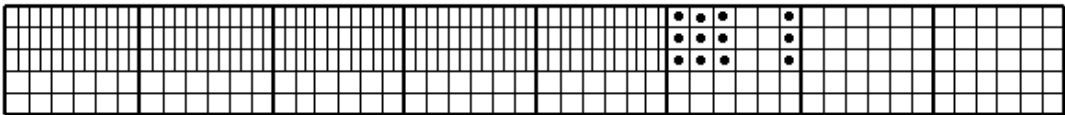
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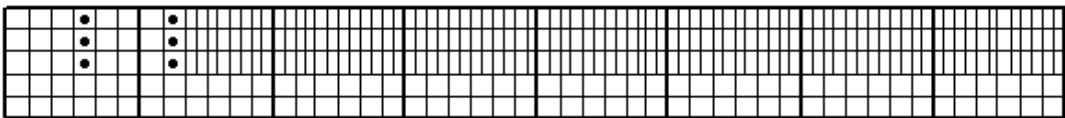
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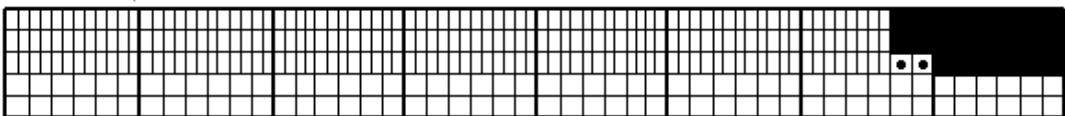
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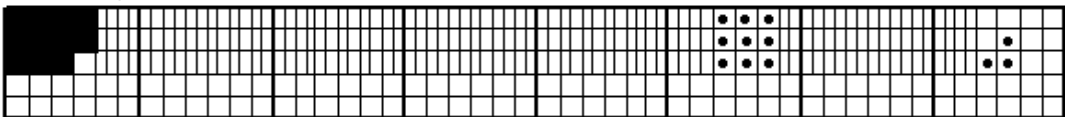
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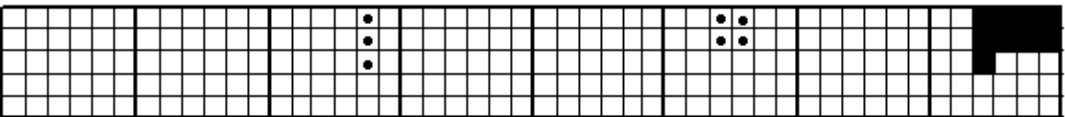
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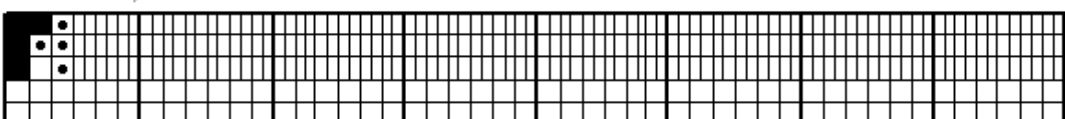
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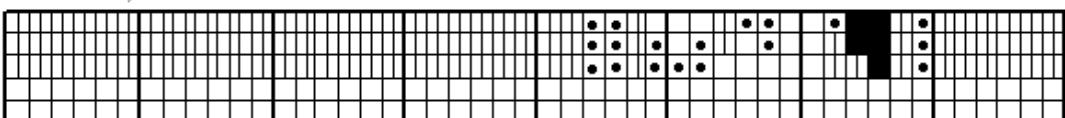
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Mar. 19, 2023



Mar. 20, 2023

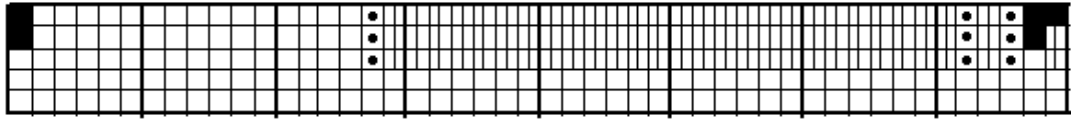


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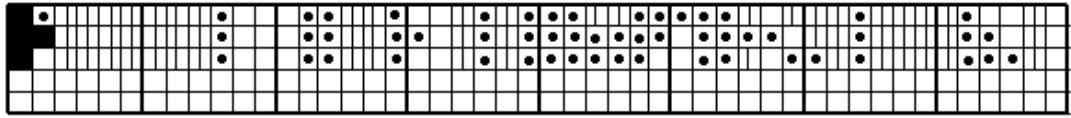
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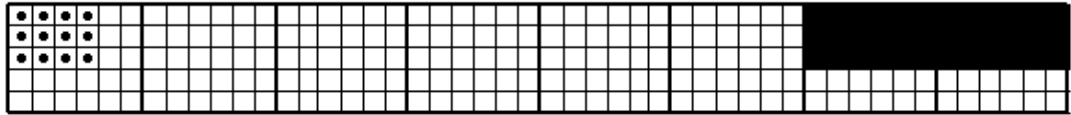
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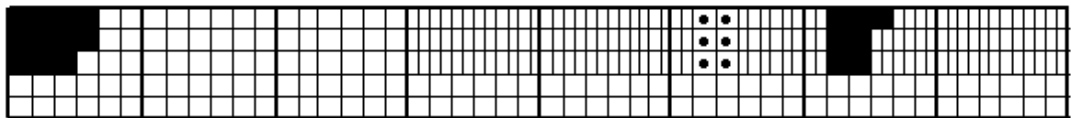
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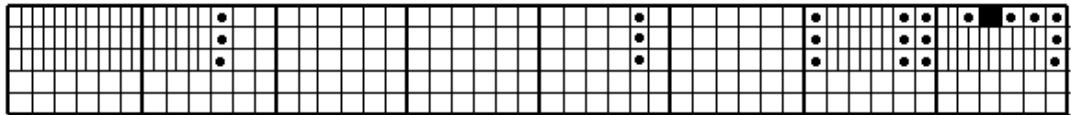
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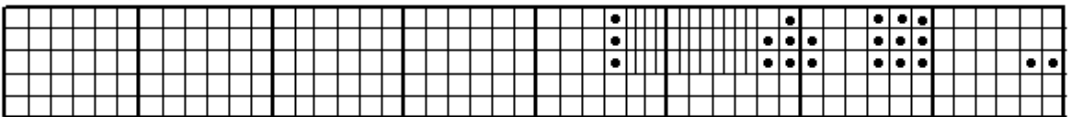
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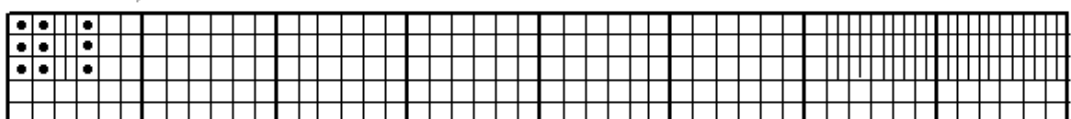
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Mar. 27, 2023



Mar. 28, 2023



Mar. 29, 2023



Mar. 30, 2023



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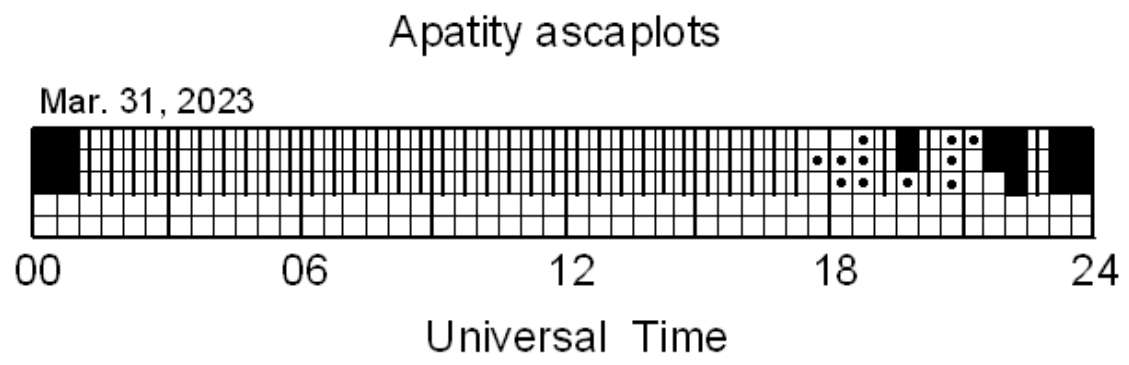
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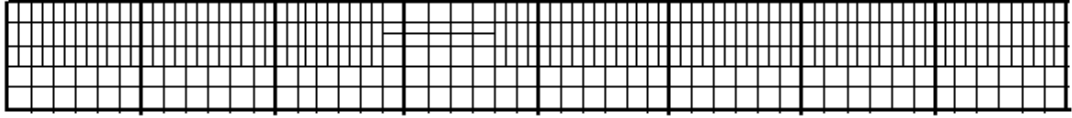
Universal Time



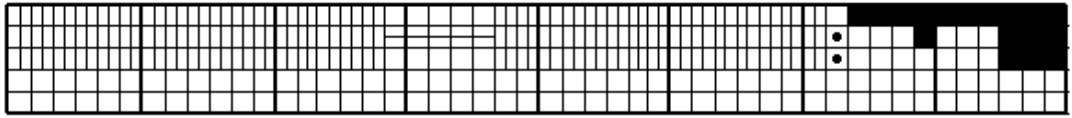


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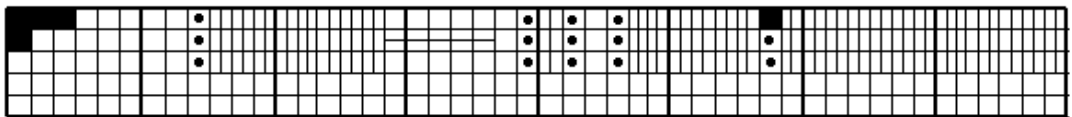
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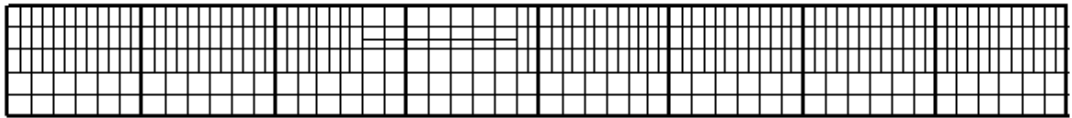
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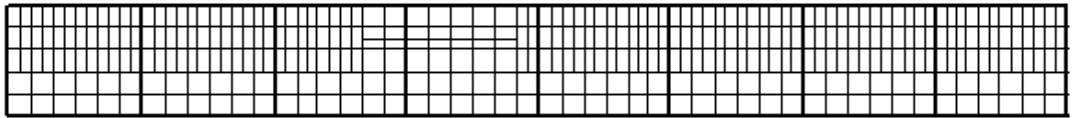
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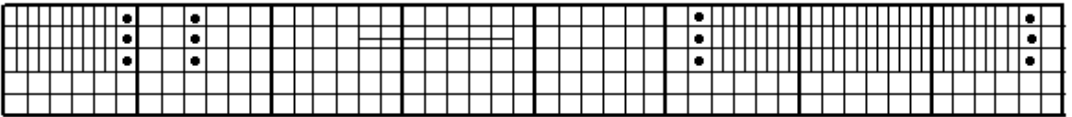
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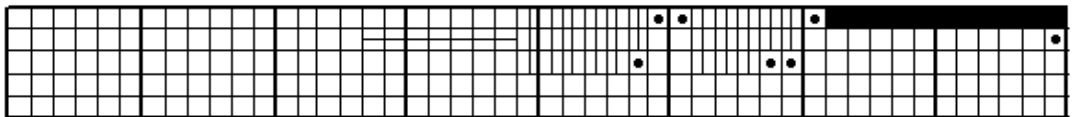
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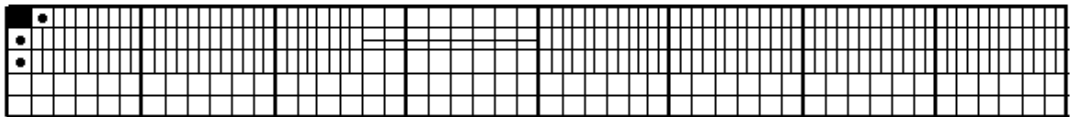
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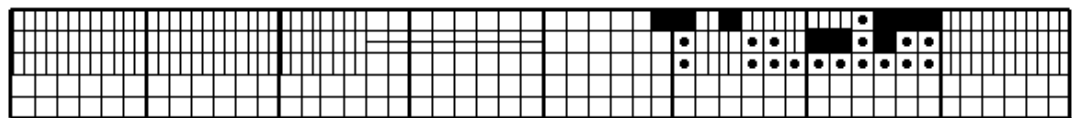
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Jan. 10, 2023



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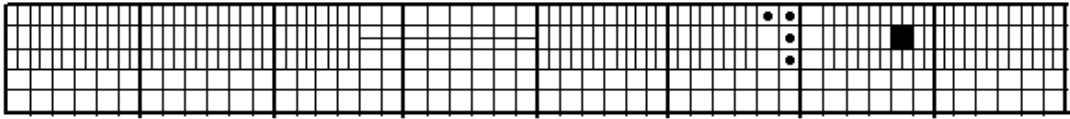
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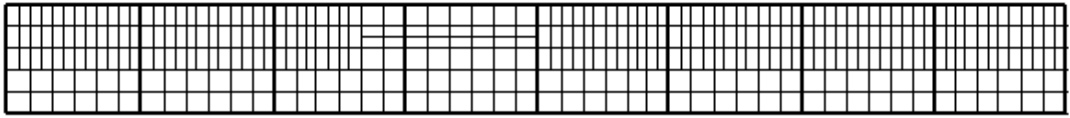
Universal Time

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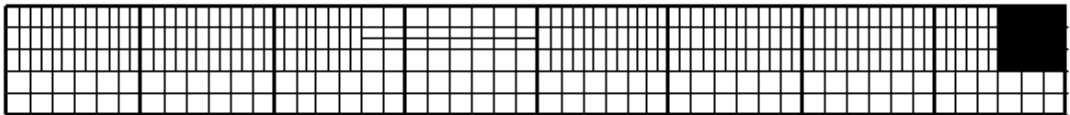
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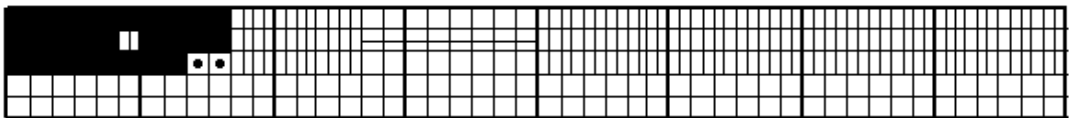
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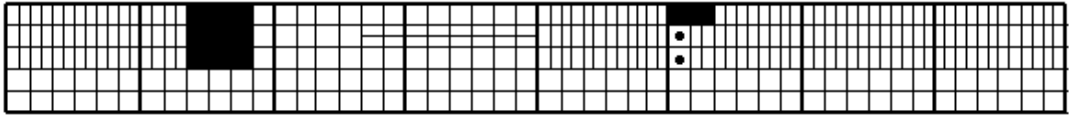
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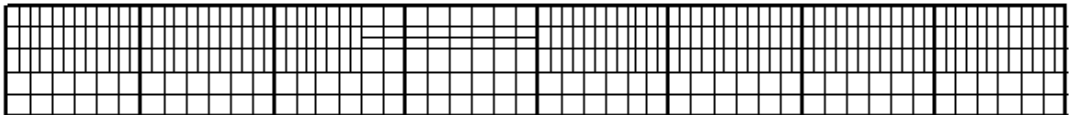
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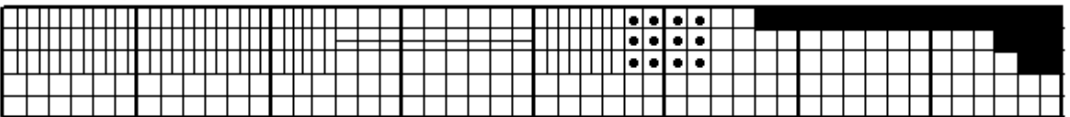
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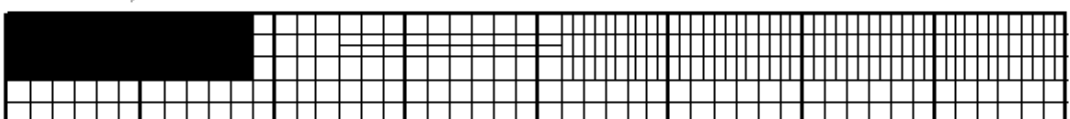
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Jan. 17, 2023



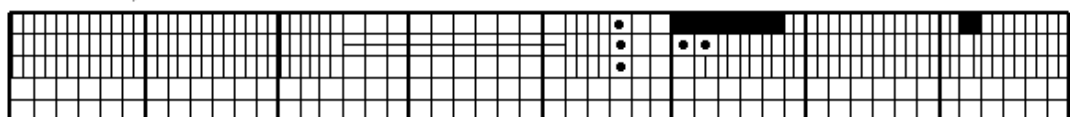
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Jan. 20, 2023



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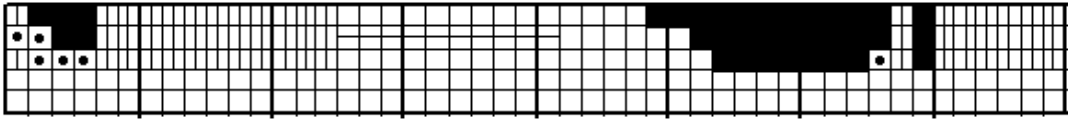
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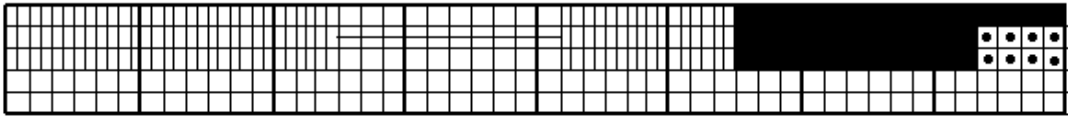
Universal Time

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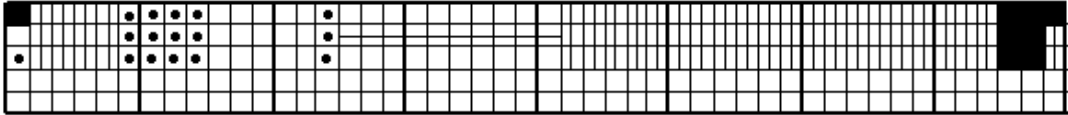
Jan. 21, 2023



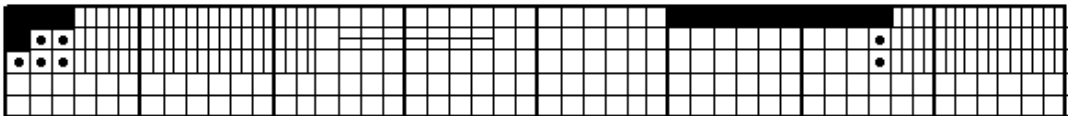
Jan. 22, 2023



Jan. 23, 2023



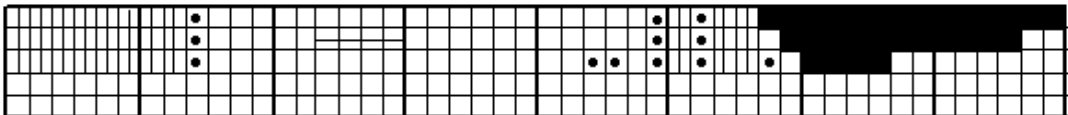
Jan. 24, 2023



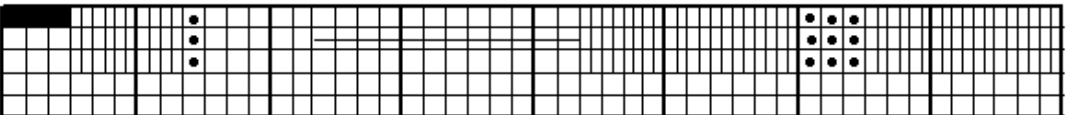
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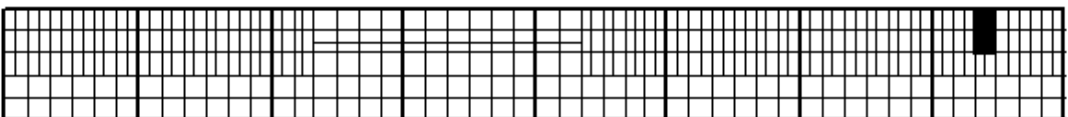
Jan. 26, 2023



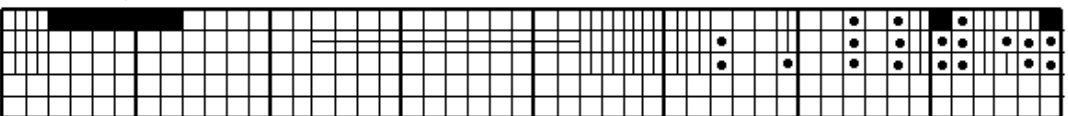
Jan. 27, 2023



Jan. 28, 2023



Jan. 29, 2023



Jan. 30, 2023



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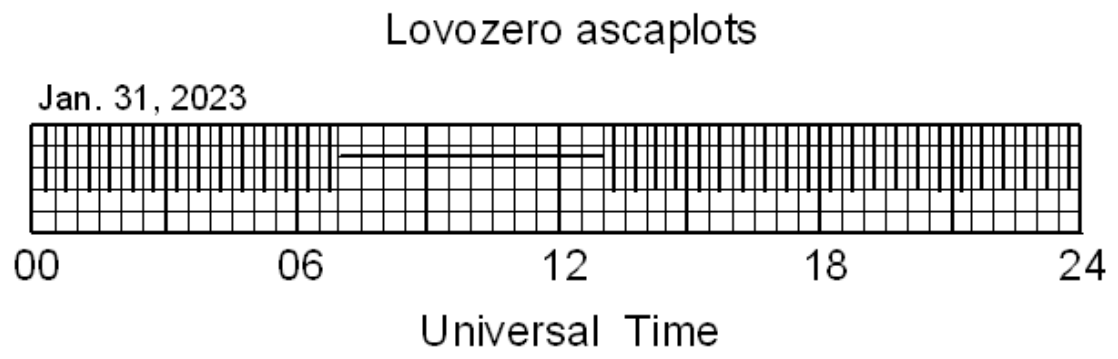
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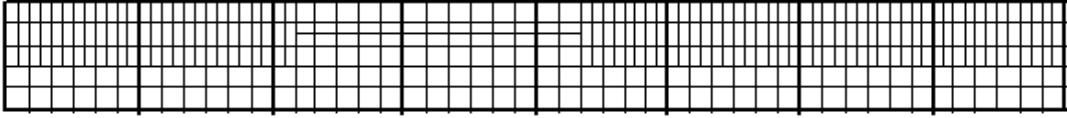
24

Universal Time



# Lovozero ascaplots

Feb. 01, 2023



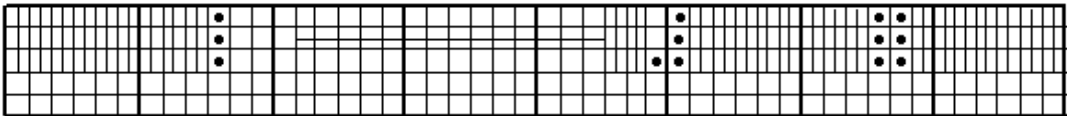
Feb. 02, 2023



Feb. 03, 2023



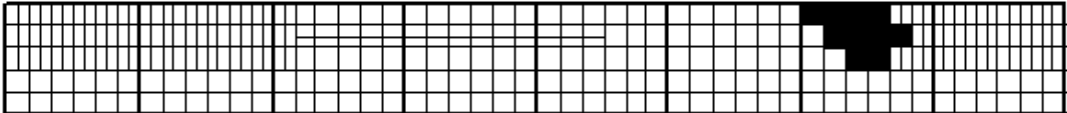
Feb. 04, 2023



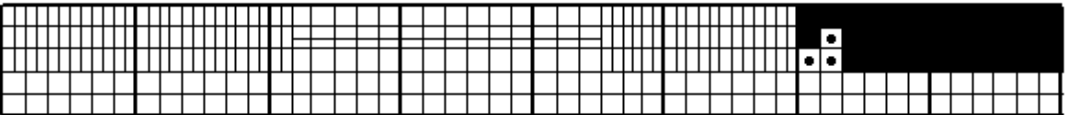
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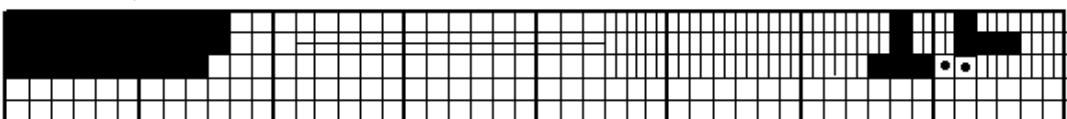
Feb. 06, 2023



Feb. 07, 2023



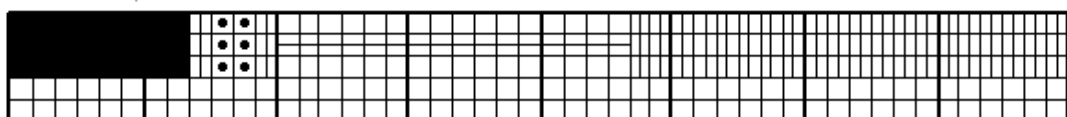
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Feb. 09, 2023



Feb. 10, 2023

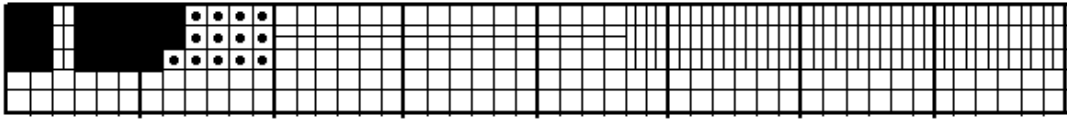


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Universal Time

# Lovozero ascaplots

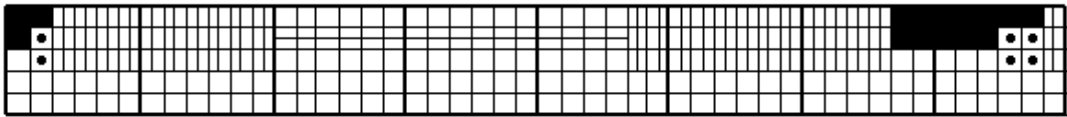
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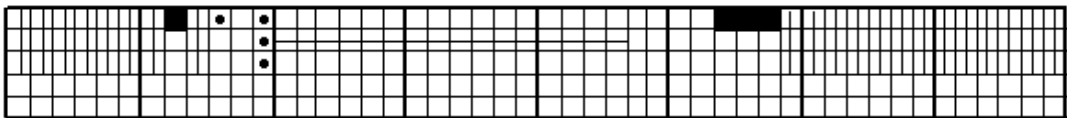
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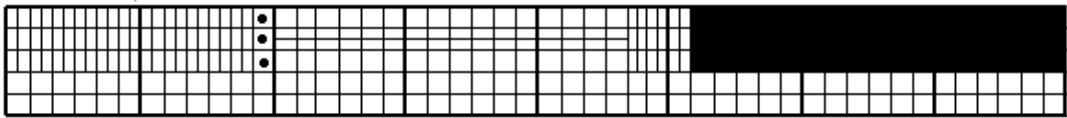
Feb. 13, 2023



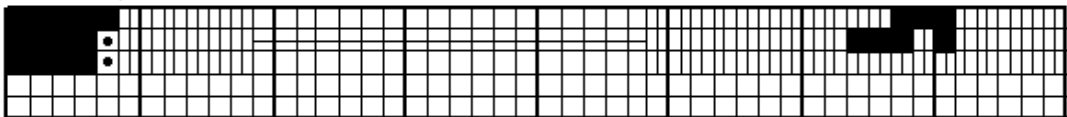
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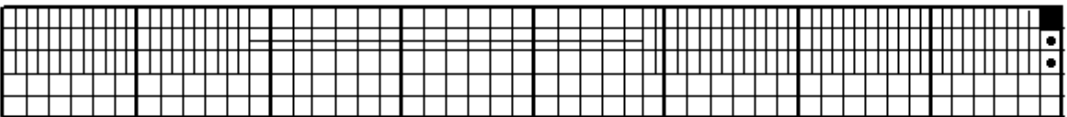
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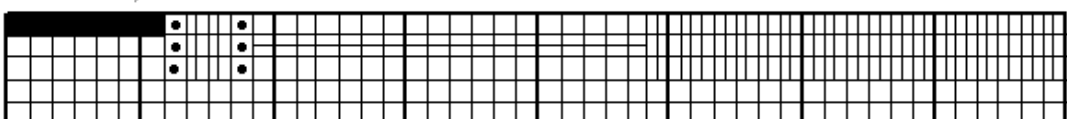
Feb. 16, 2023



Feb. 17, 2023



Feb. 18, 2023



Feb. 19, 2023



Feb. 20, 2023



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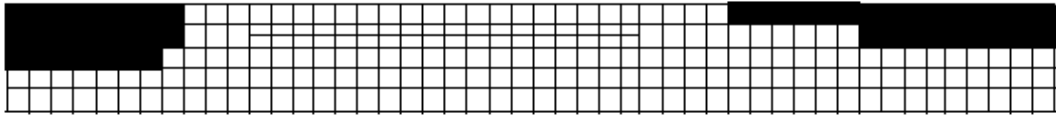
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Universal Time

# Lovozero ascaplots

Feb. 21, 2023



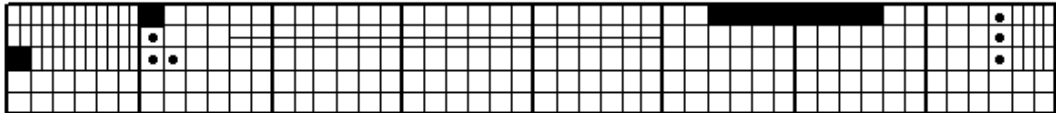
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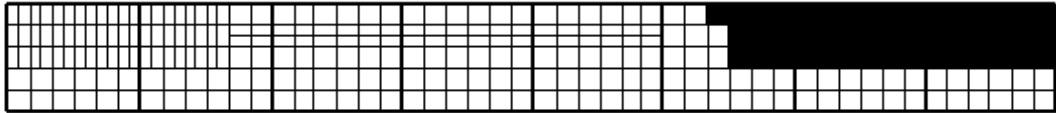
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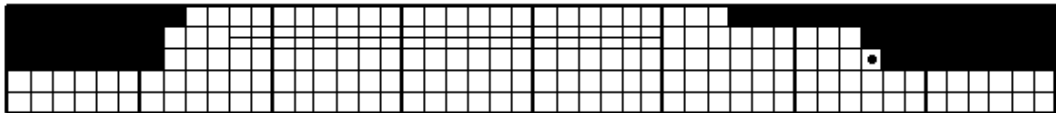
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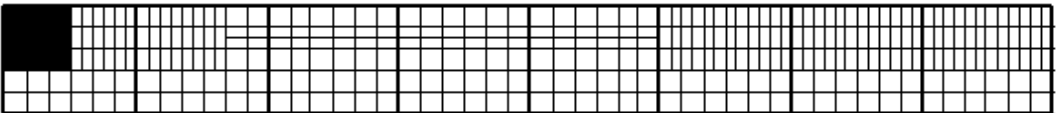
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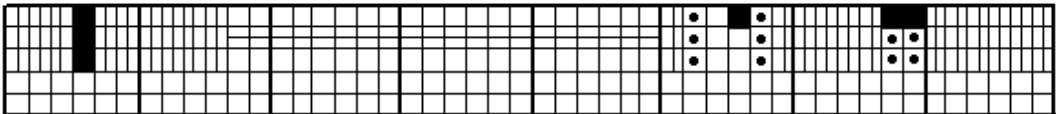
Feb. 26, 2023



Feb. 27, 2023



Feb. 28, 2023

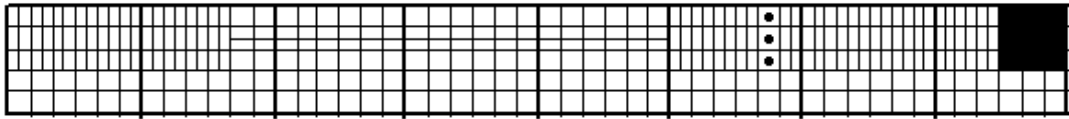


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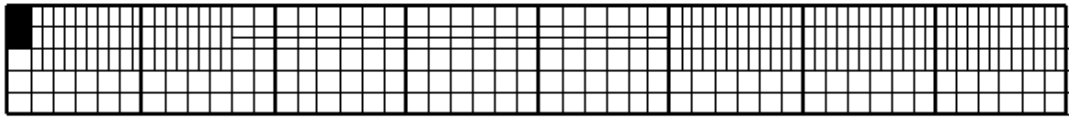
Universal Time

# Lovozero ascaplots

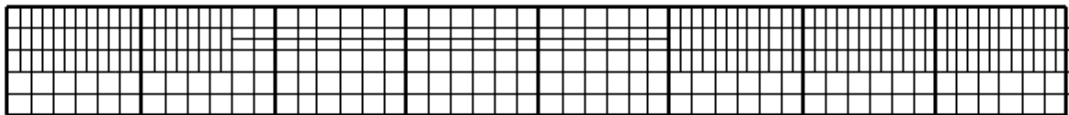
Mar. 01, 2023



Mar. 02, 2023



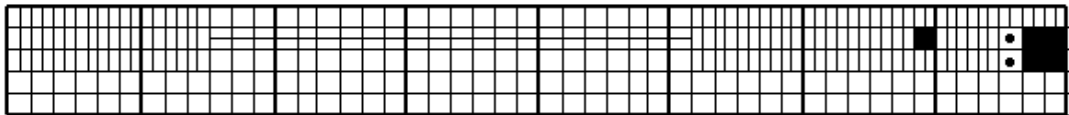
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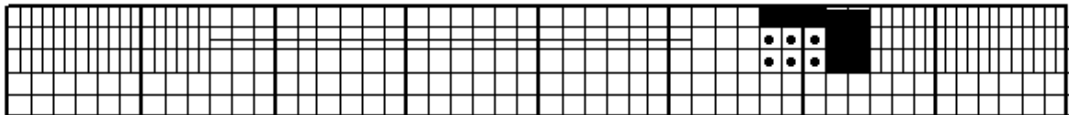
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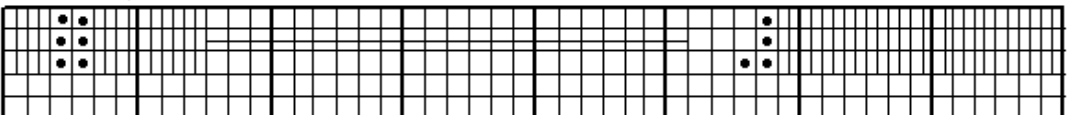
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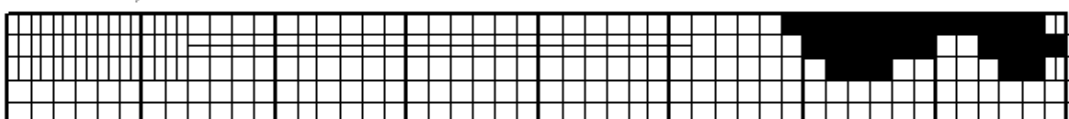
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Mar. 07, 2023



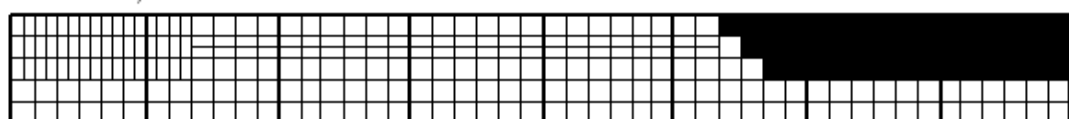
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Mar. 09, 2023



Mar. 10, 2023



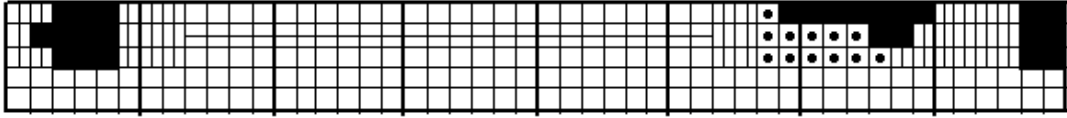
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Universal Time



## Lovozero ascaplots

Mar. 11, 2023



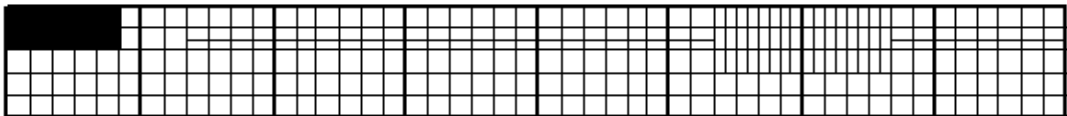
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Mar. 13, 2023



Mar. 14, 2023



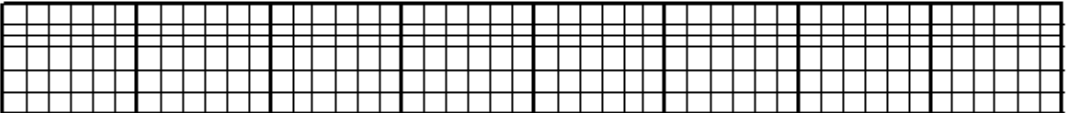
Mar. 15, 2023



Mar. 16, 2023



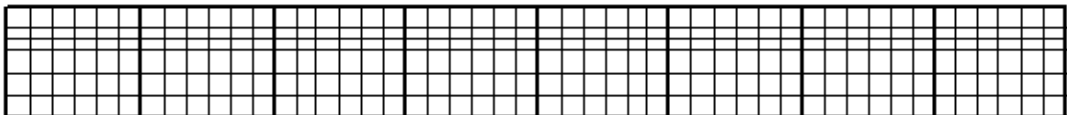
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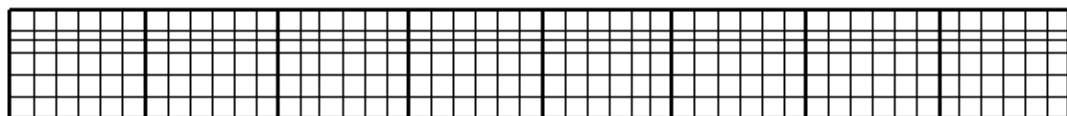
Mar. 18, 2023



Mar. 19, 2023



Mar. 20, 2023



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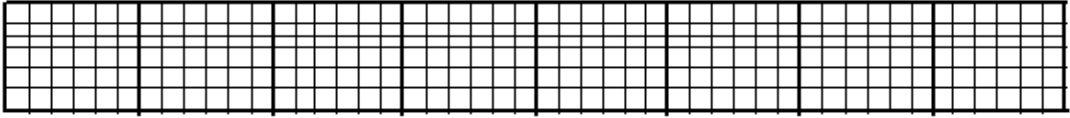
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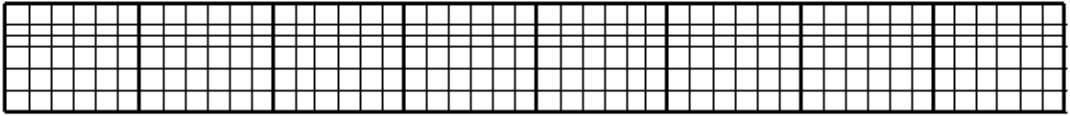
Universal Time

# Lovozero ascaplots

Mar. 21, 2023



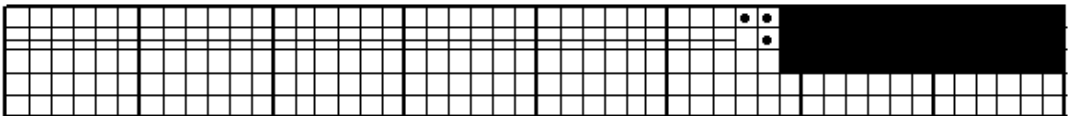
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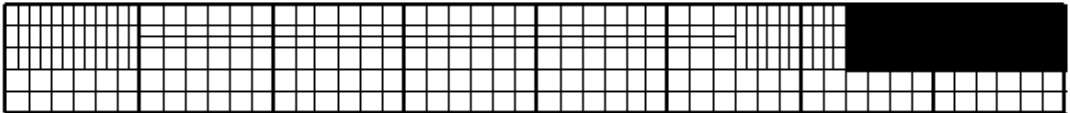
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Mar. 24, 2023



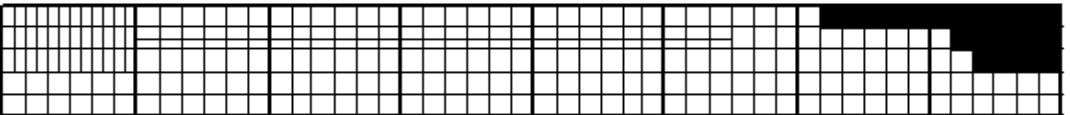
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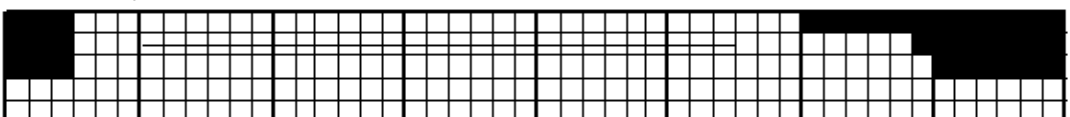
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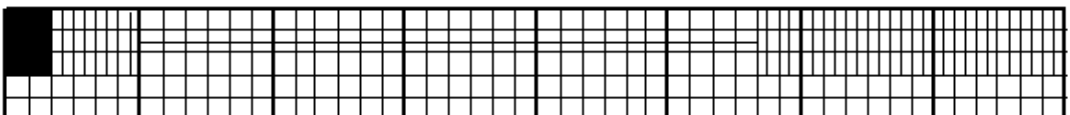
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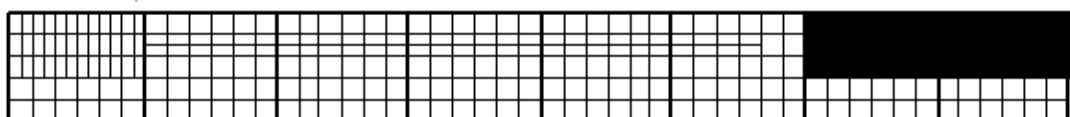
Mar. 28, 2023



Mar. 29, 2023

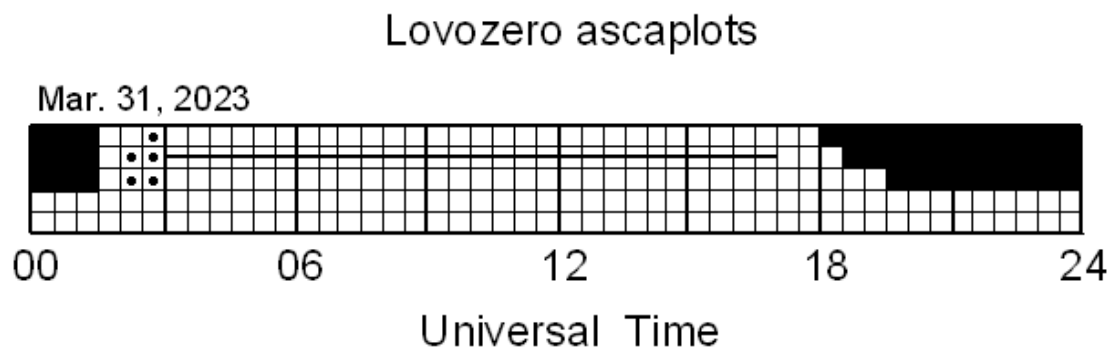


Mar. 30, 2023



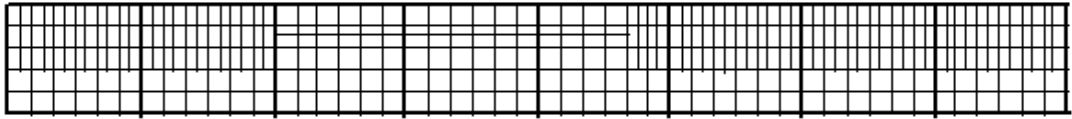
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Universal Time

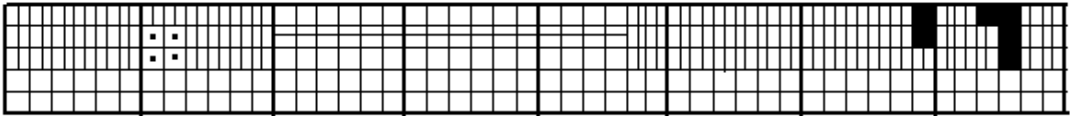


# Verhnetulomsky ascaplots

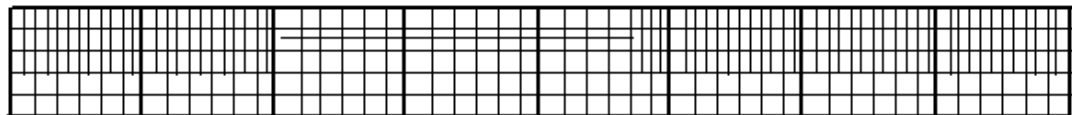
Jan. 01, 2023



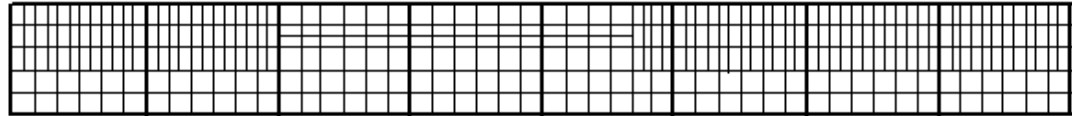
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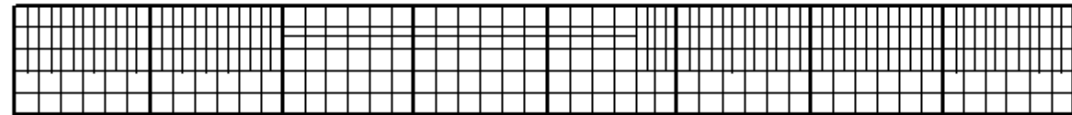
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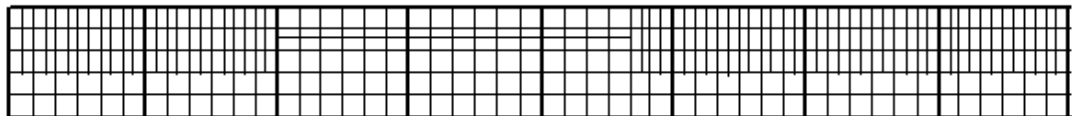
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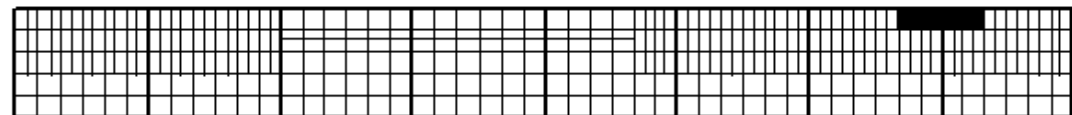
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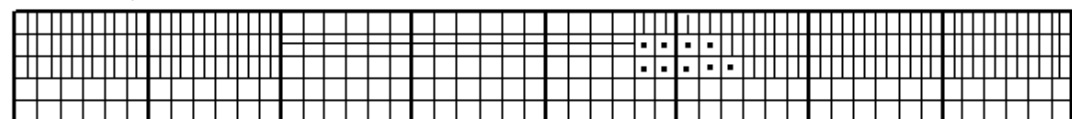
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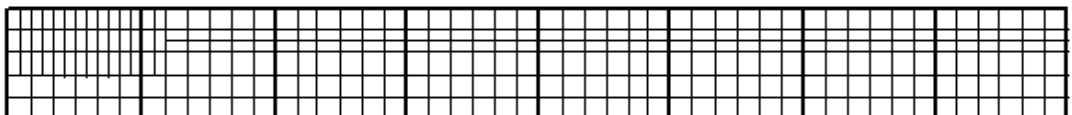
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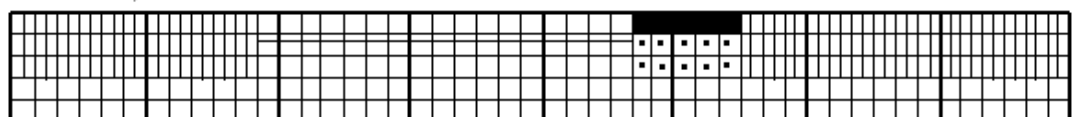
Jan. 08, 2023



Jan. 09, 2023



Jan. 10, 2023



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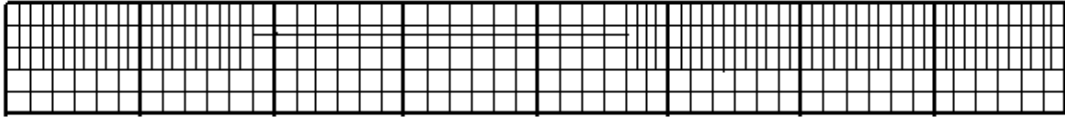
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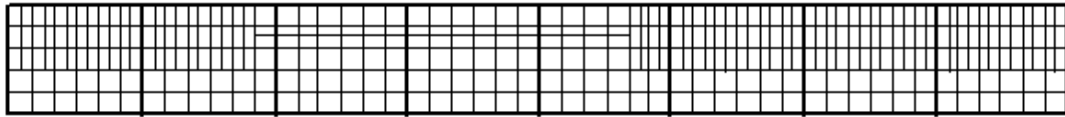
Universal Time

## Verhnetulomsky ascaplots

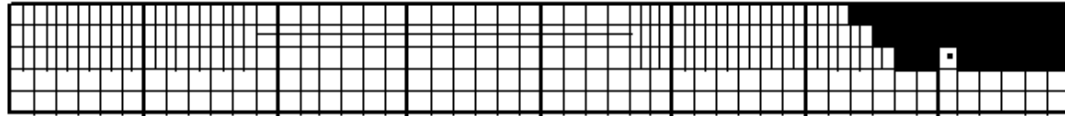
Jan. 11, 2023



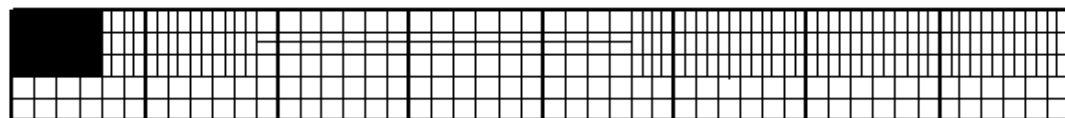
Jan. 12, 2023



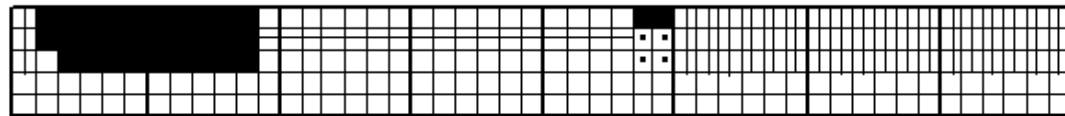
Jan. 13, 2023



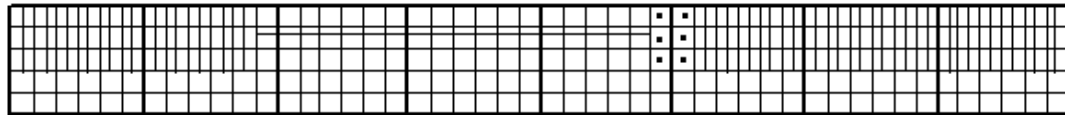
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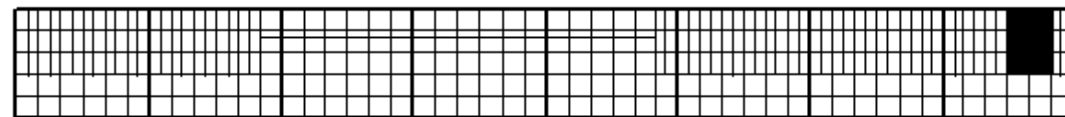
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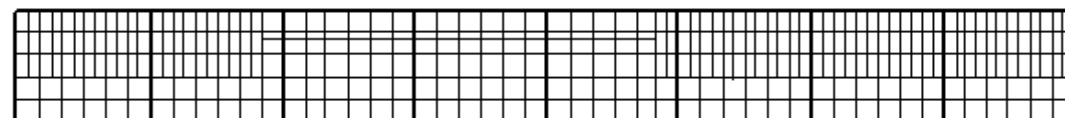
Jan. 16, 2023



Jan. 17, 2023



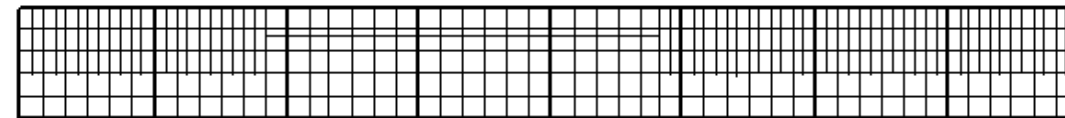
Jan. 18, 2023



Jan. 19, 2023



Jan. 20, 2023

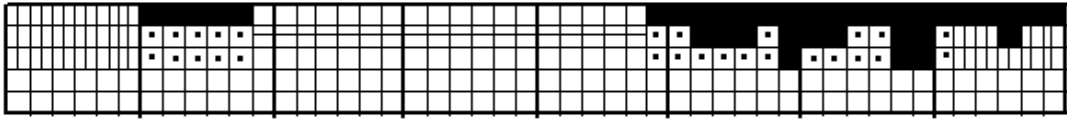


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Universal Time

## Verhnetulomsky ascaplots

Jan. 21, 2023



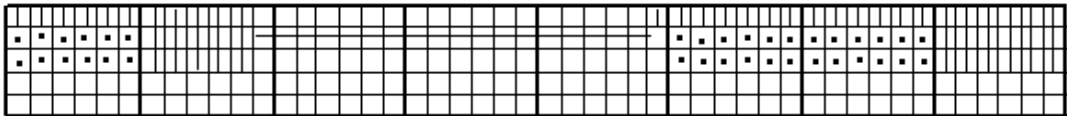
Jan. 22, 2023



Jan. 23, 2023



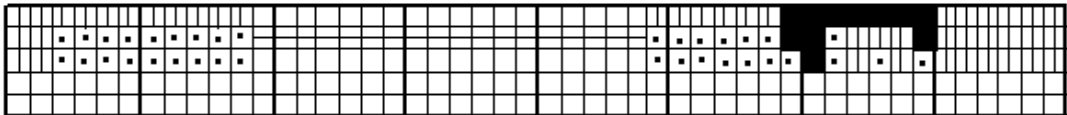
Jan. 24, 2023



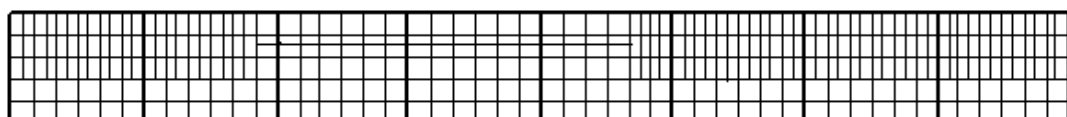
Jan. 25, 2023



Jan. 26, 2023



Jan. 27, 2023



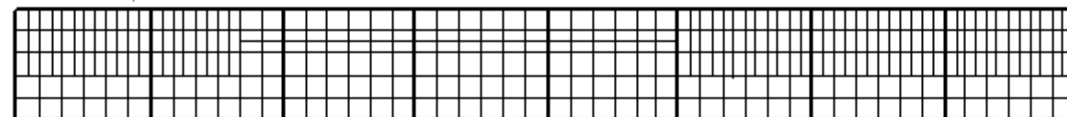
Jan. 28, 2023



Jan. 29, 2023



Jan. 30, 2023



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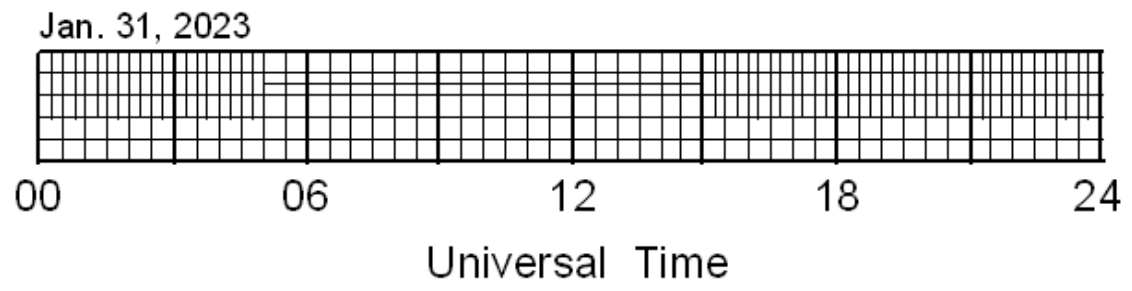
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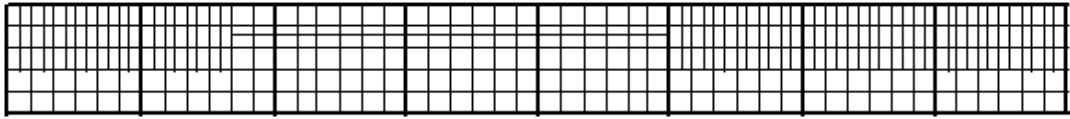
Universal Time

## Verhnetulomsky ascaplots

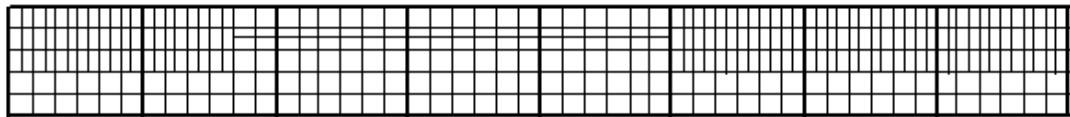


## Verhnetulomsky ascaplots

Feb. 01, 2023



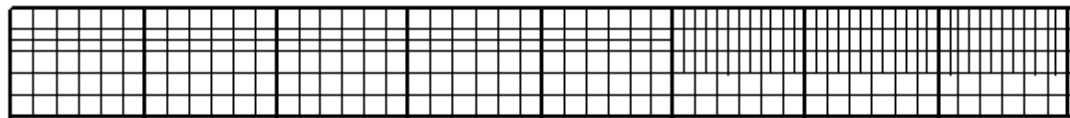
Feb. 02, 2023



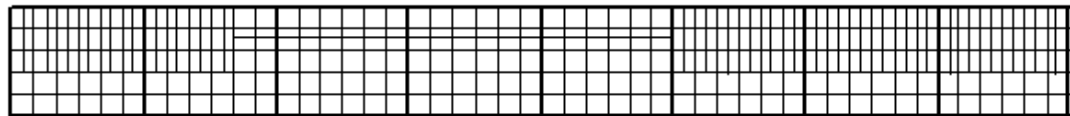
Feb. 03, 2023



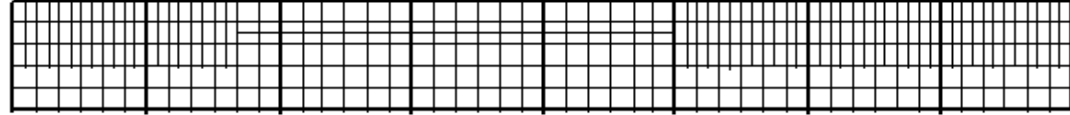
Feb. 04, 2023



Feb. 05, 2023



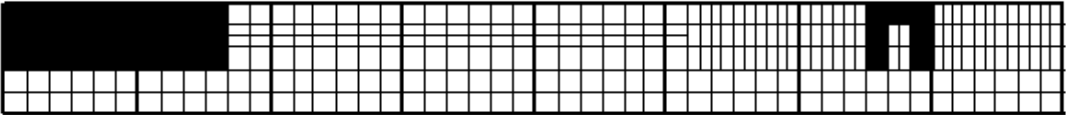
Feb. 06, 2023



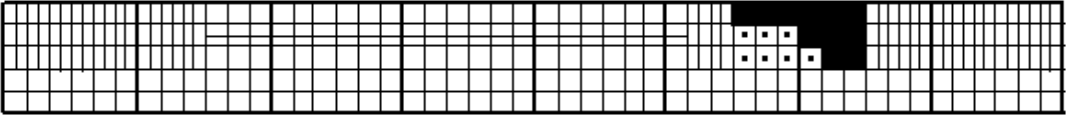
Feb. 07, 2023



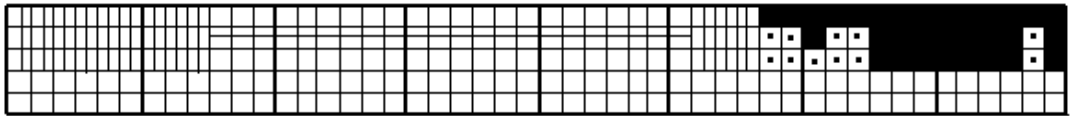
Feb. 08, 2023



Feb. 09, 2023



Feb. 10, 2023



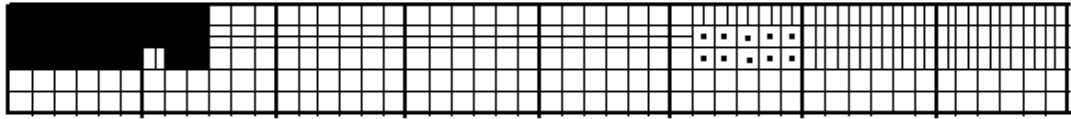
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Universal Time



# Verhnetulomsky ascaplots

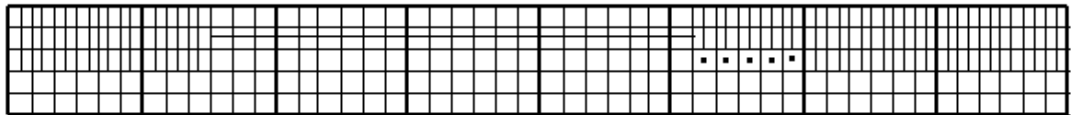
Feb. 11, 2023



Feb. 12, 2023



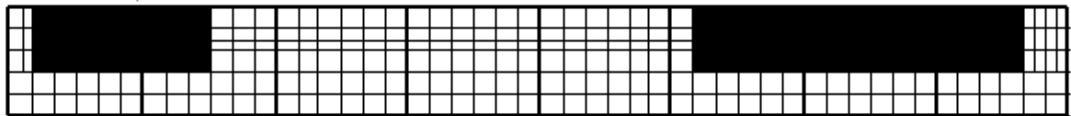
Feb. 13, 2023



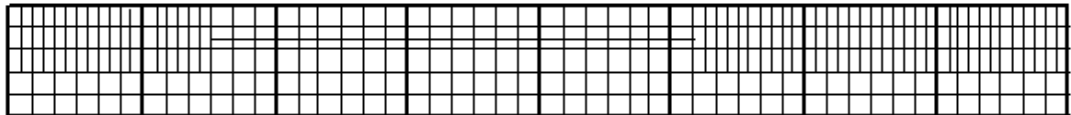
Feb. 14, 2023



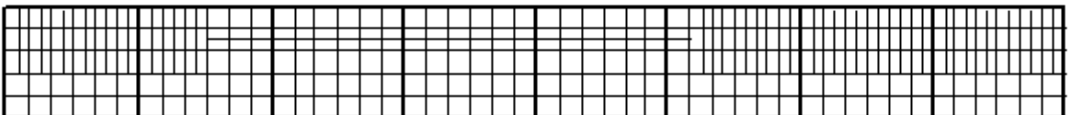
Feb. 15, 2023



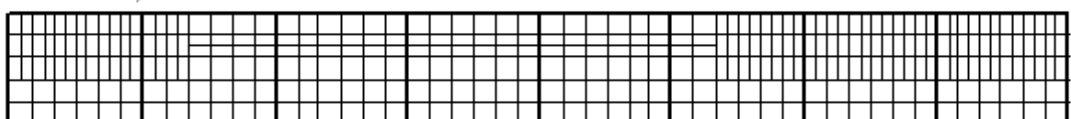
Feb. 16, 2023



Feb. 17, 2023



Feb. 18, 2023



Feb. 19, 2023



Feb. 20, 2023



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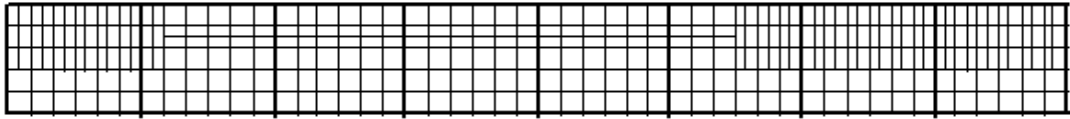
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Universal Time

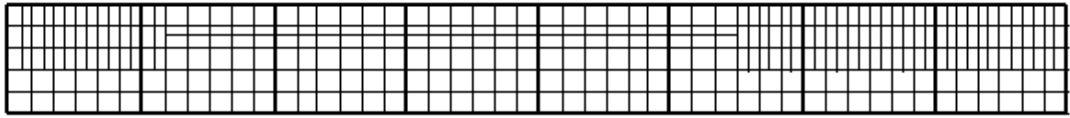


## Verhnetulomsky ascaplots

Mar. 01, 2023



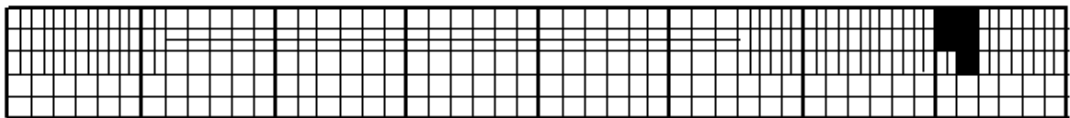
Mar. 02, 2023



Mar. 03, 2023



Mar. 04, 2023



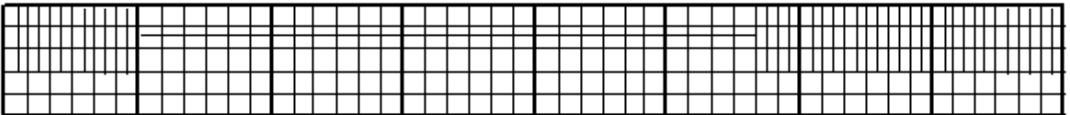
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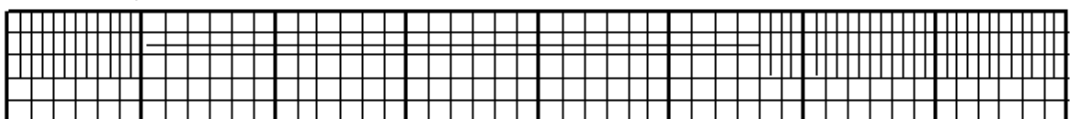
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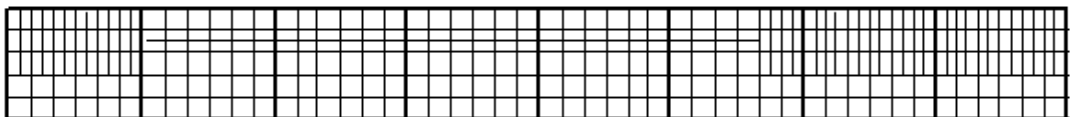
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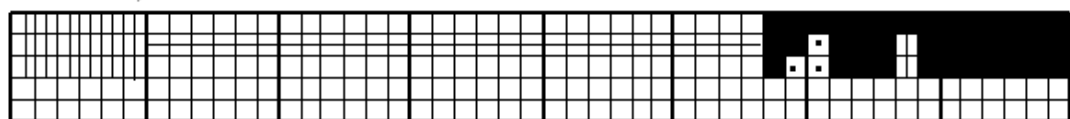
Mar. 08, 2023



Mar. 09, 2023



Mar. 10, 2023

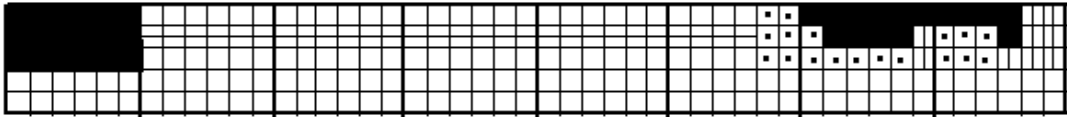


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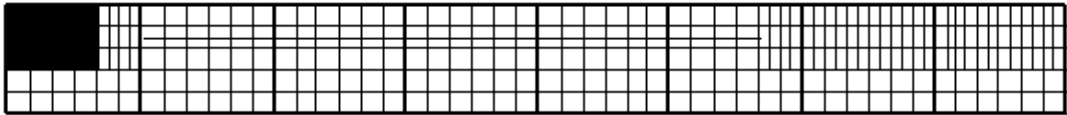
Universal Time

## Verhnetulomsky ascaplots

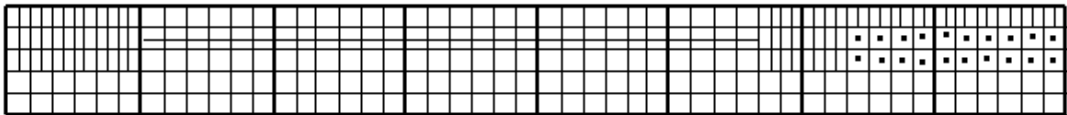
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Mar. 12, 2023



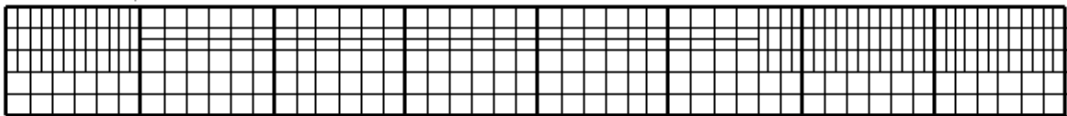
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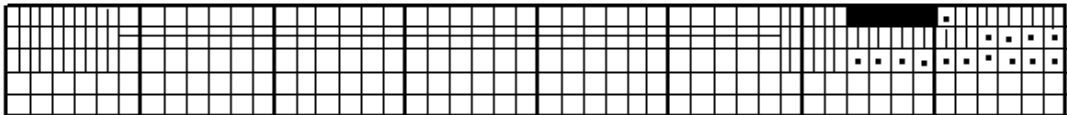
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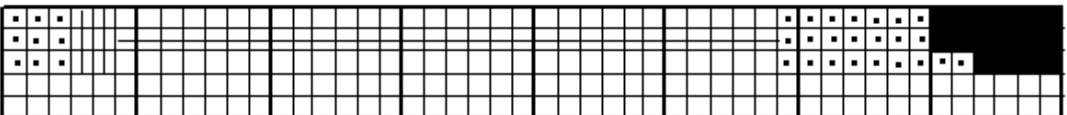
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Mar. 16, 2023



Mar. 17, 2023



Mar. 18, 2023



Mar. 19, 2023



Mar. 20, 2023



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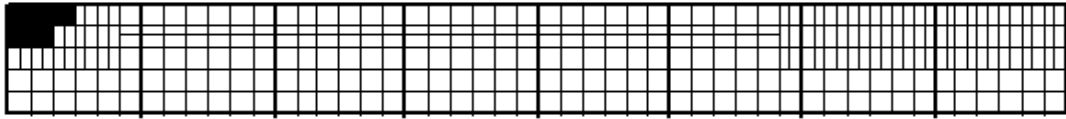
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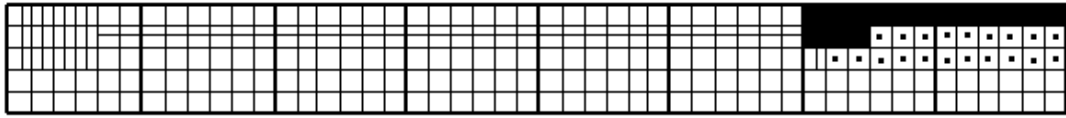
Universal Time

## Verhnetulomsky ascaplots

Mar. 21, 2023



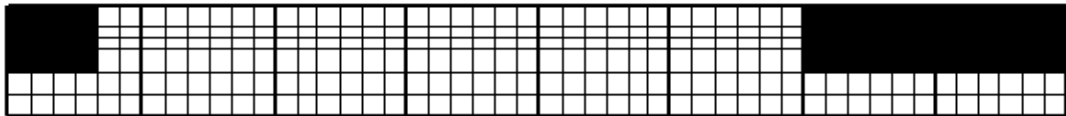
Mar. 22, 2023



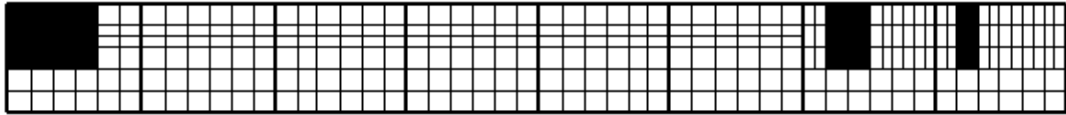
Mar. 23, 2023



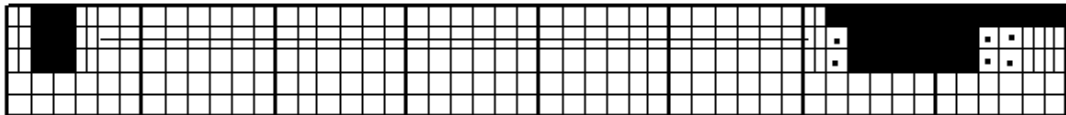
Mar. 24, 2023



Mar. 25, 2023



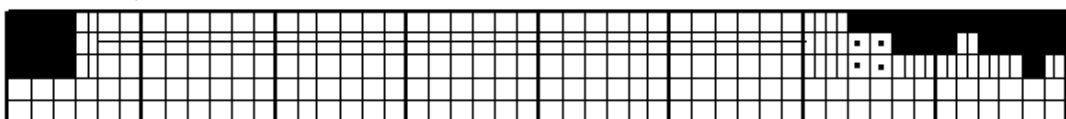
Mar. 26, 2023



Mar. 27, 2023



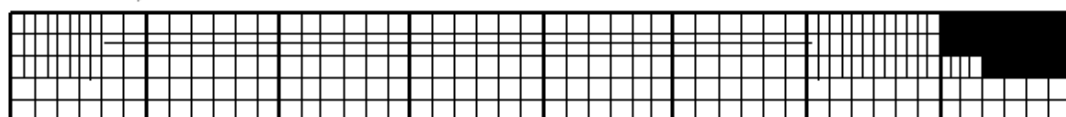
Mar. 28, 2023



Mar. 29, 2023



Mar. 30, 2023



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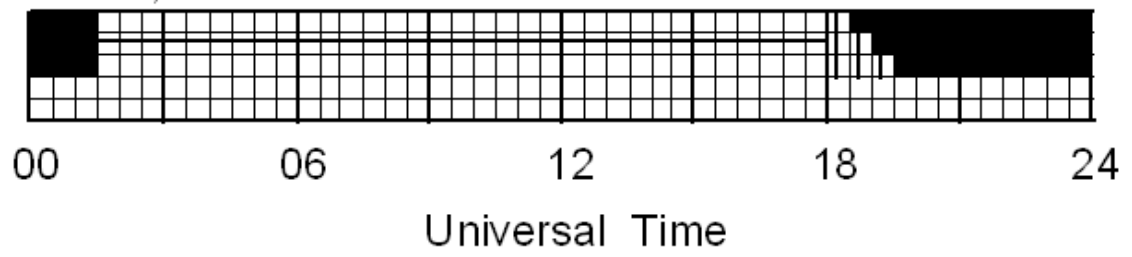
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Universal Time

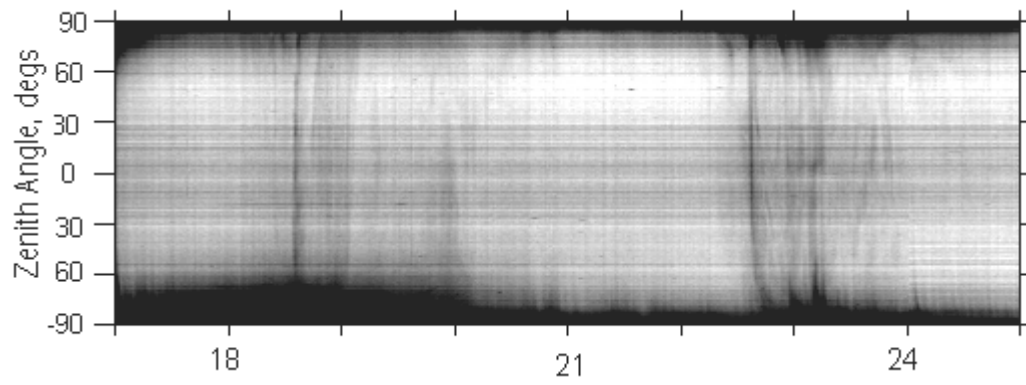
## Verhnetulomsky ascapiplots

Mar. 31, 2023

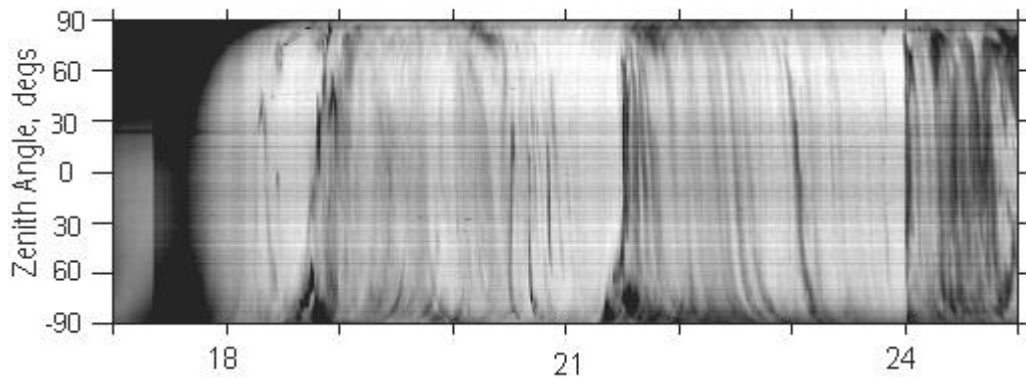


## Apatity TV keograms

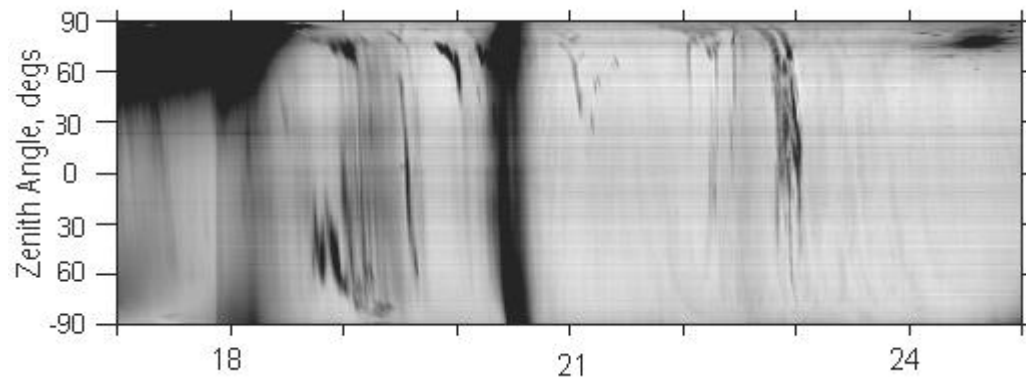
Mar. 08, 2023



Mar. 23, 2023

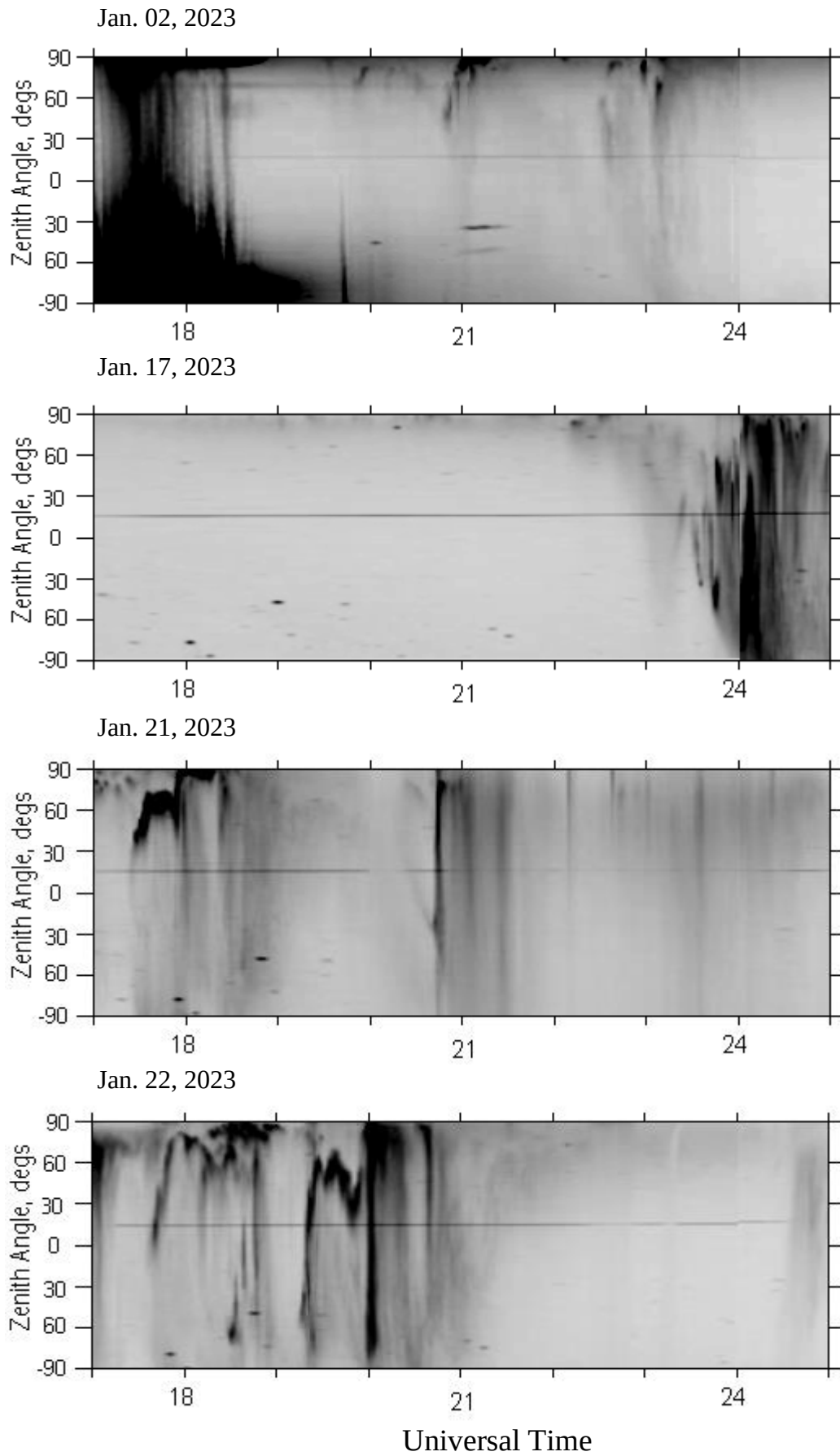


Mar. 31, 2023



Universal Time

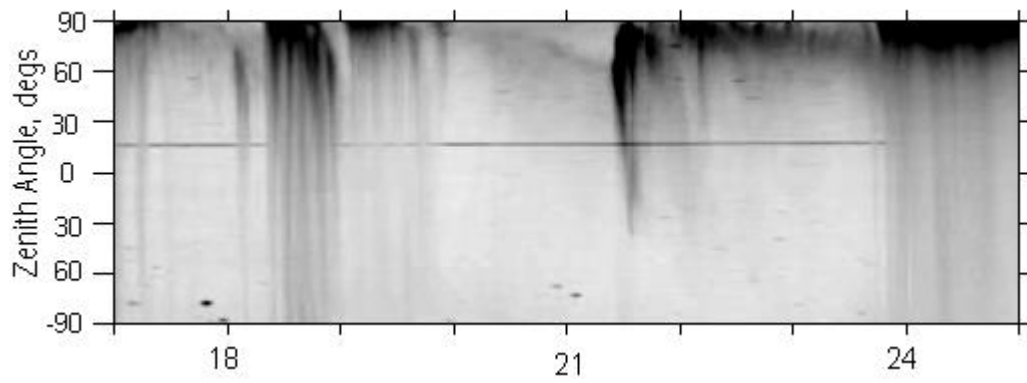
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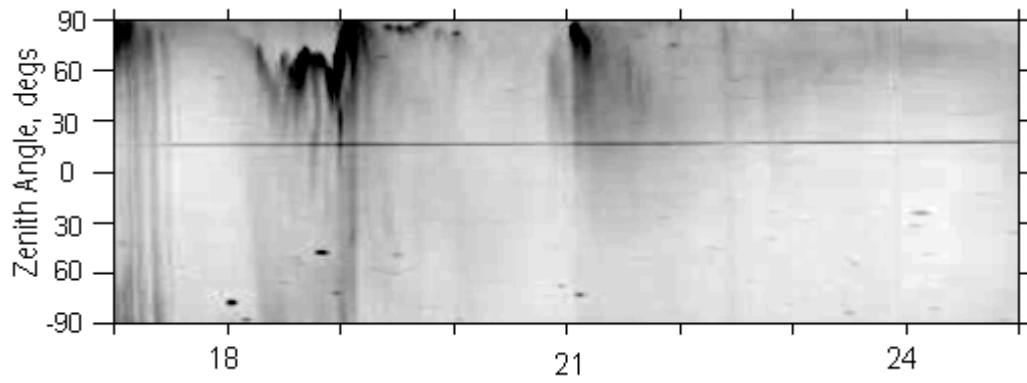


## Lovozero TV keograms

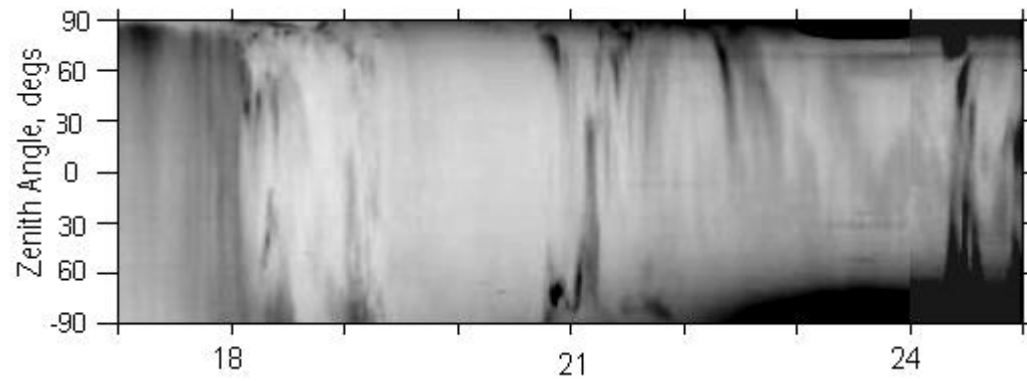
Jan. 25, 2023



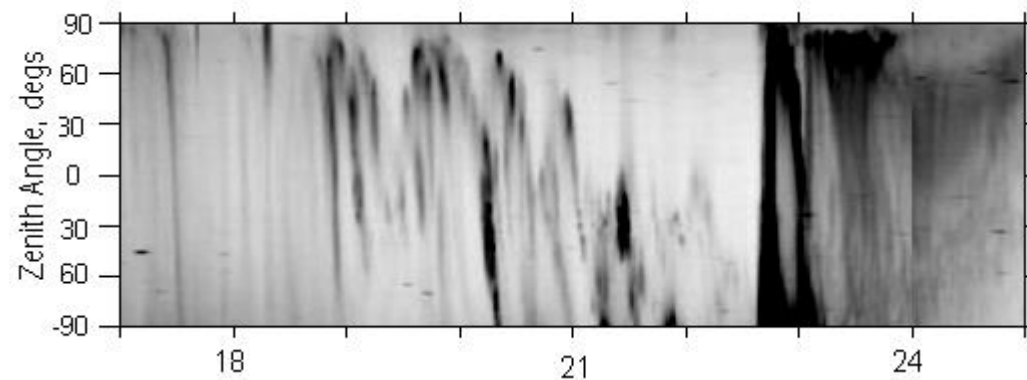
Jan. 26, 2023



Feb. 07, 2023



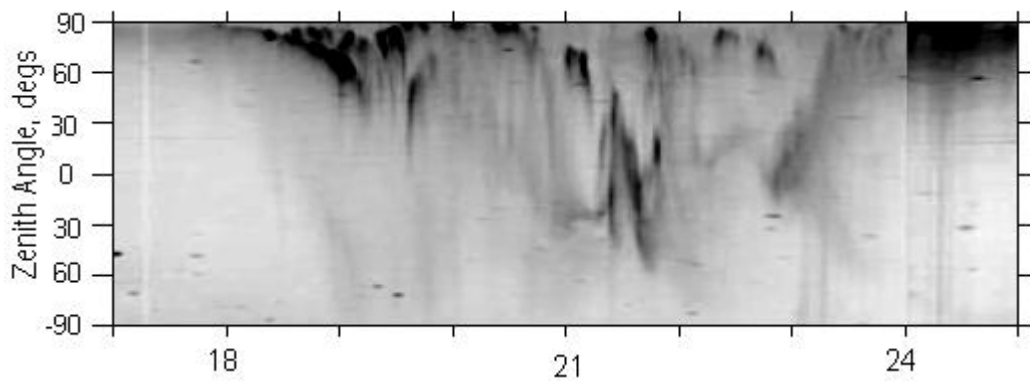
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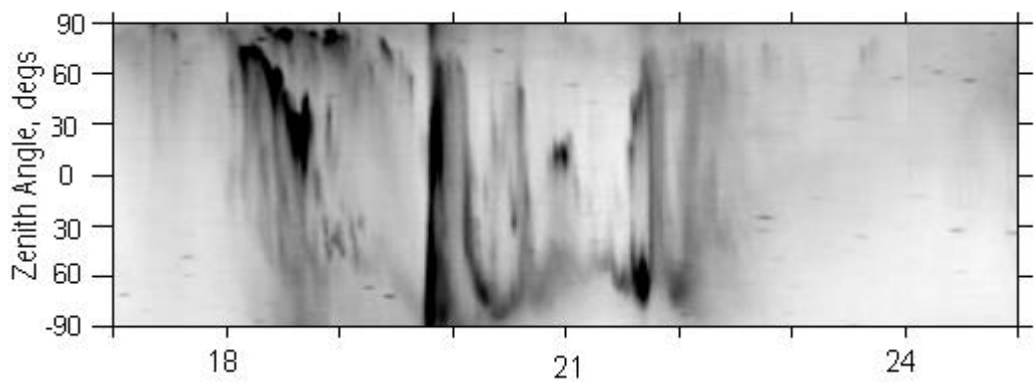
Universal Time

## Lovozero TV keograms

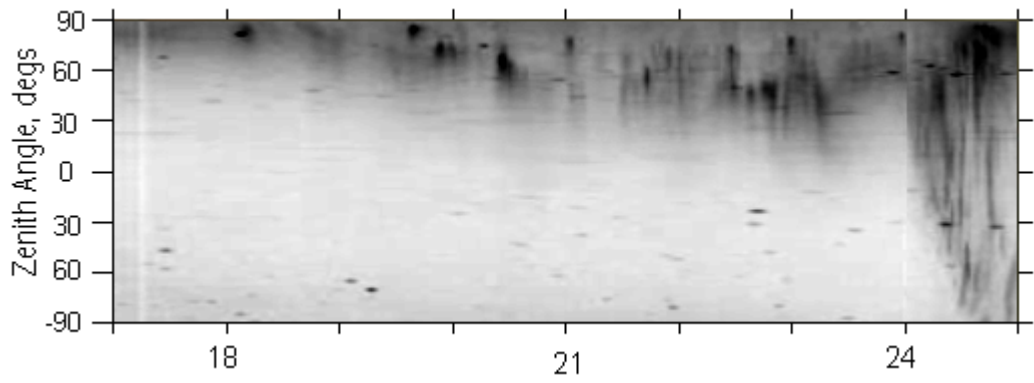
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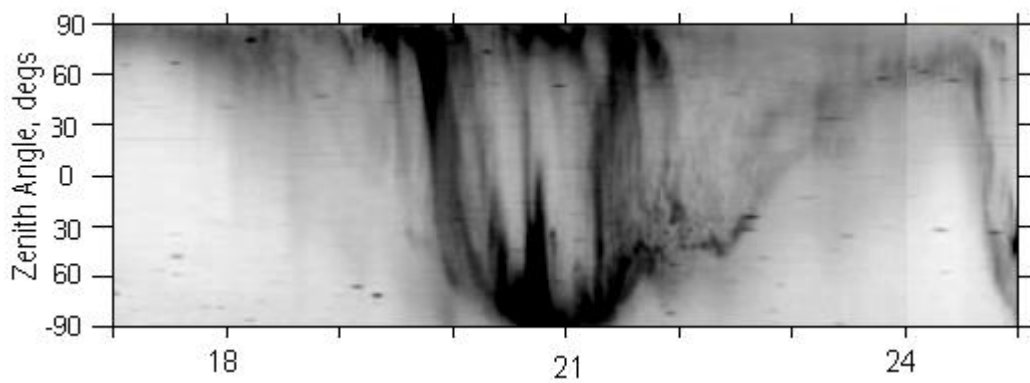
Feb. 20, 2023



Feb. 21, 2023



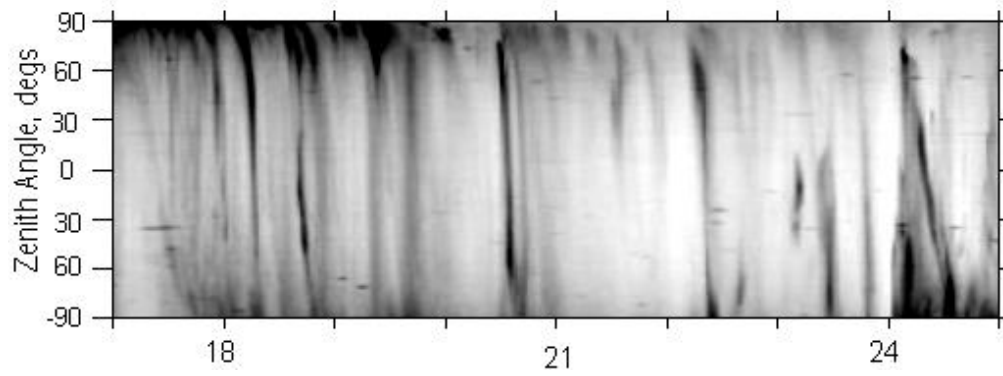
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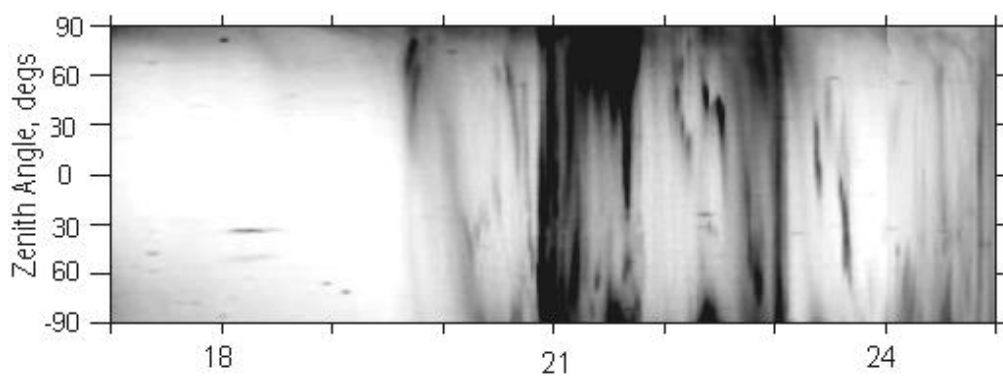
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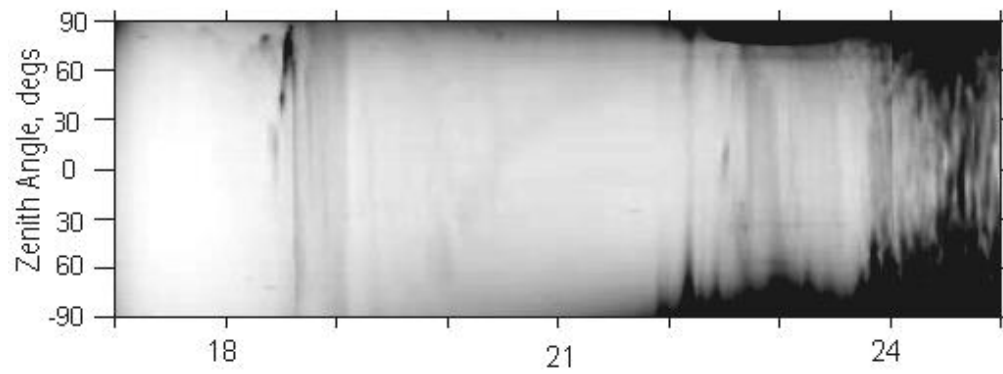
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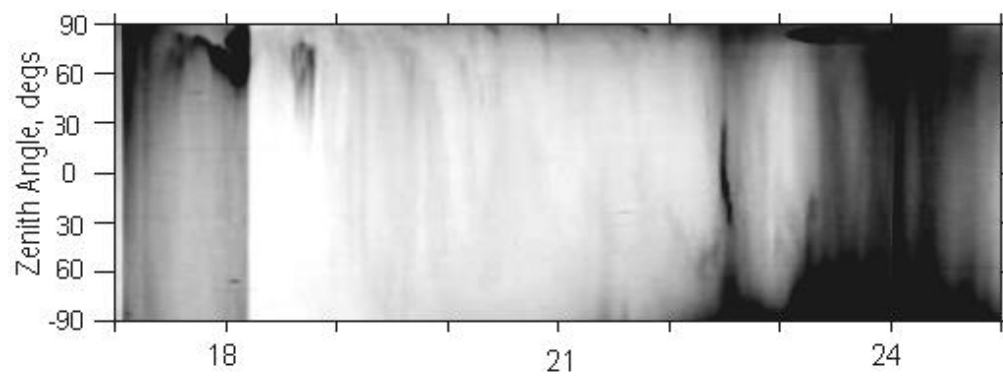
Feb. 26, 2023



Mar. 08, 2023



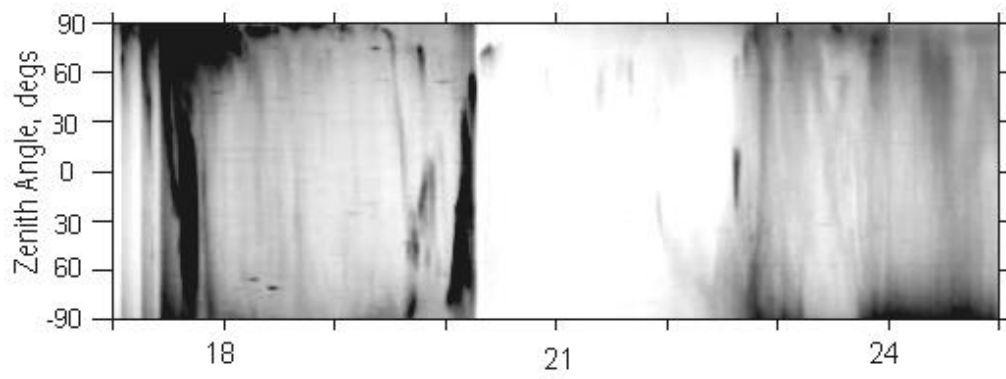
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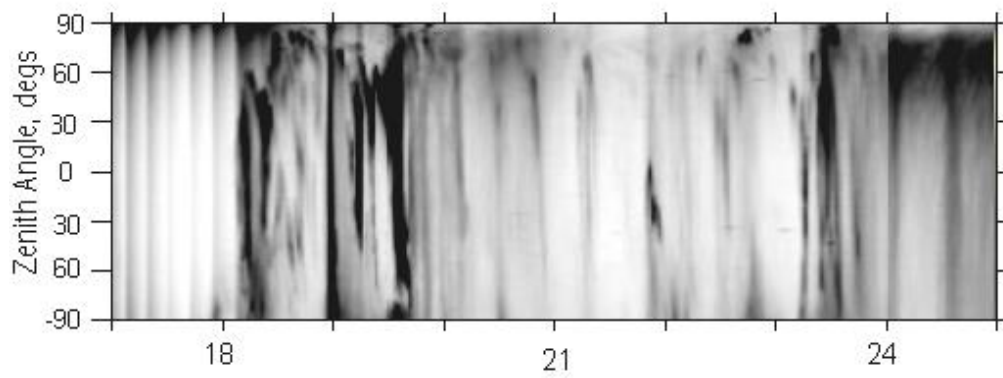
Universal Time

## Lovozero TV keograms

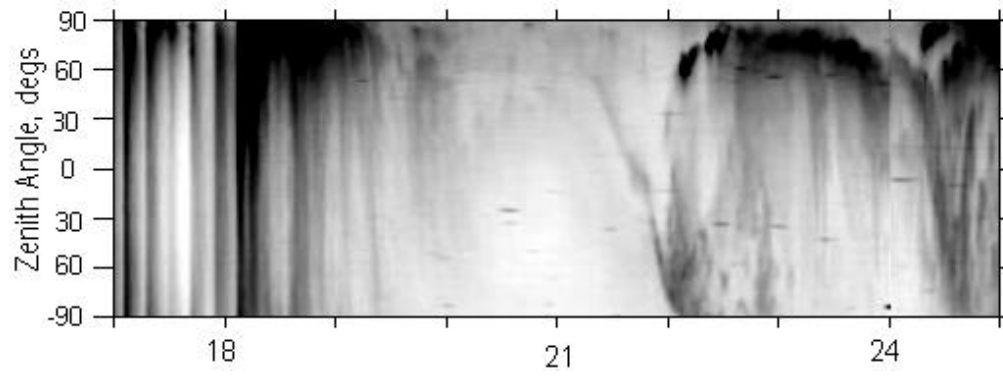
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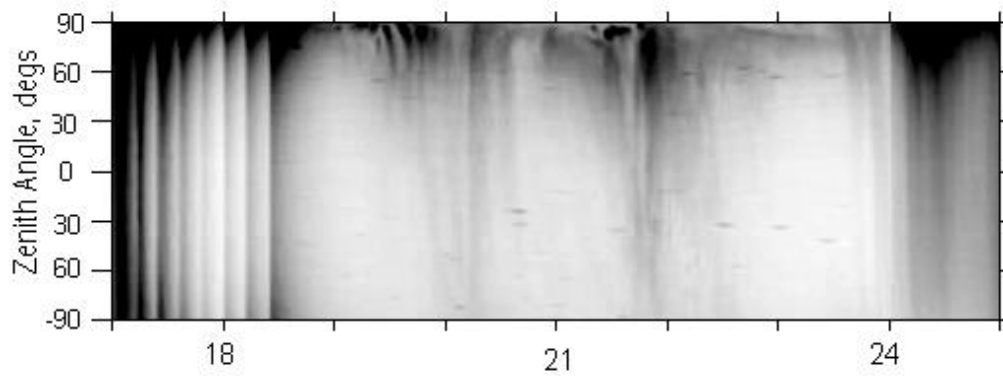
Mar. 24, 2023



Mar. 25, 2023



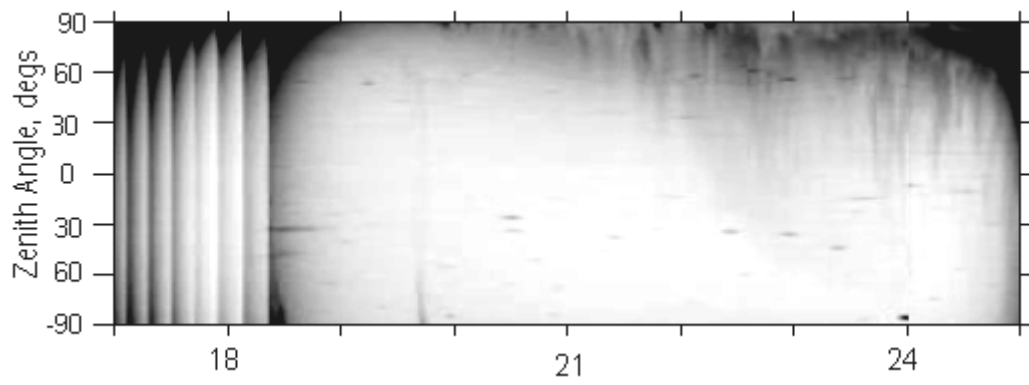
Mar. 26, 2023



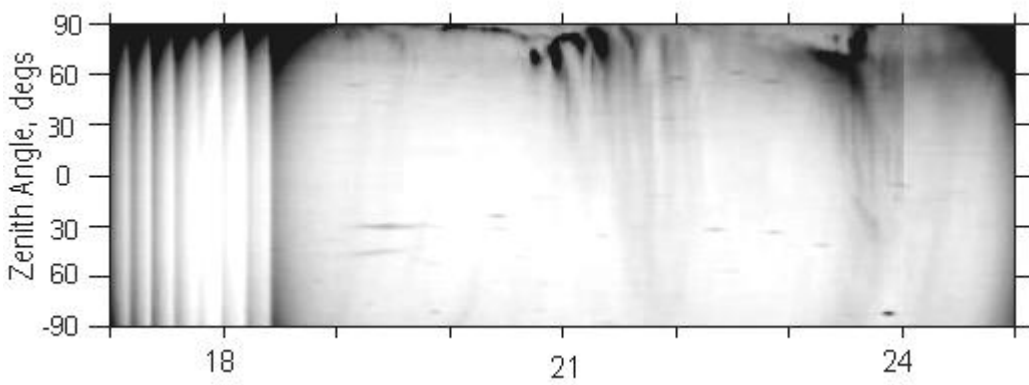
Universal Time

## Lovozero TV keograms

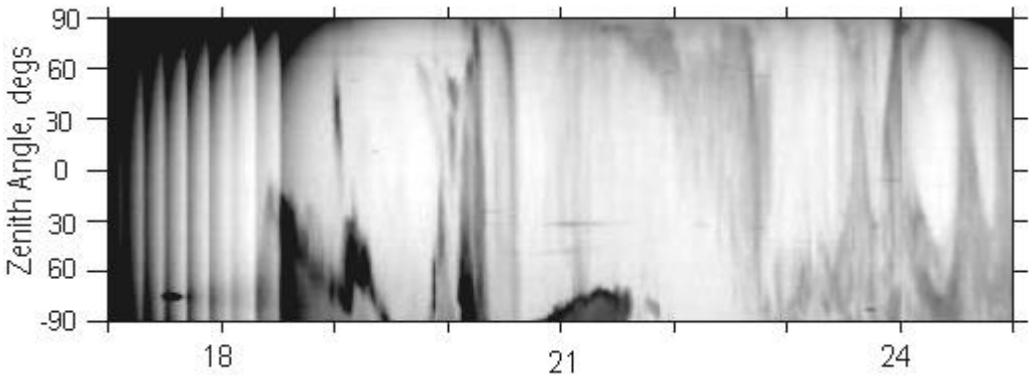
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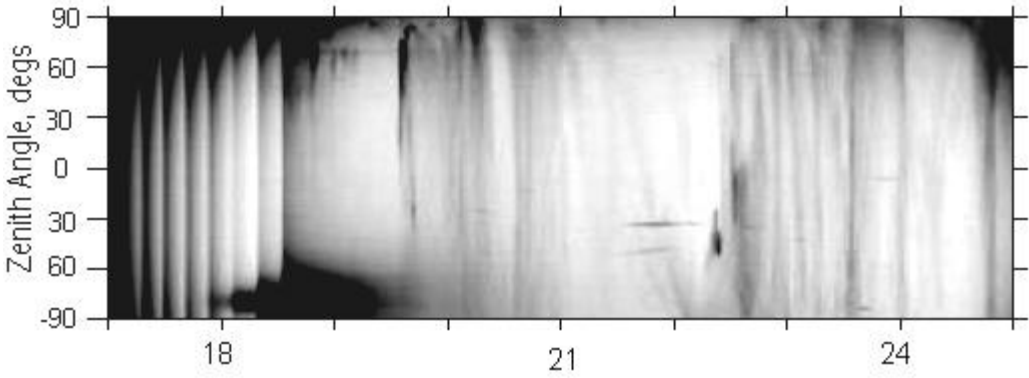
Mar. 28, 2023



Mar. 30, 2023

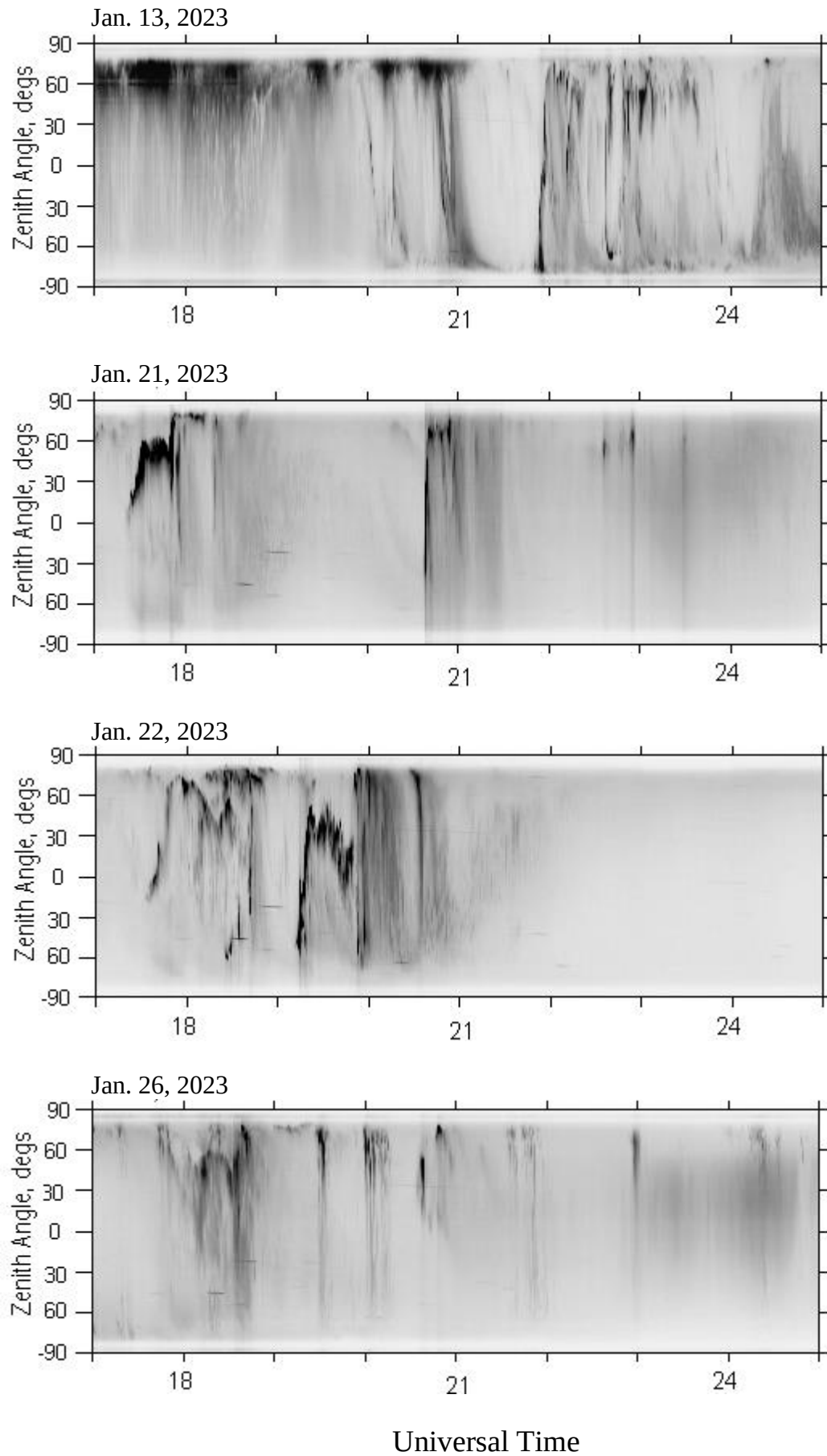


Mar. 31, 2023

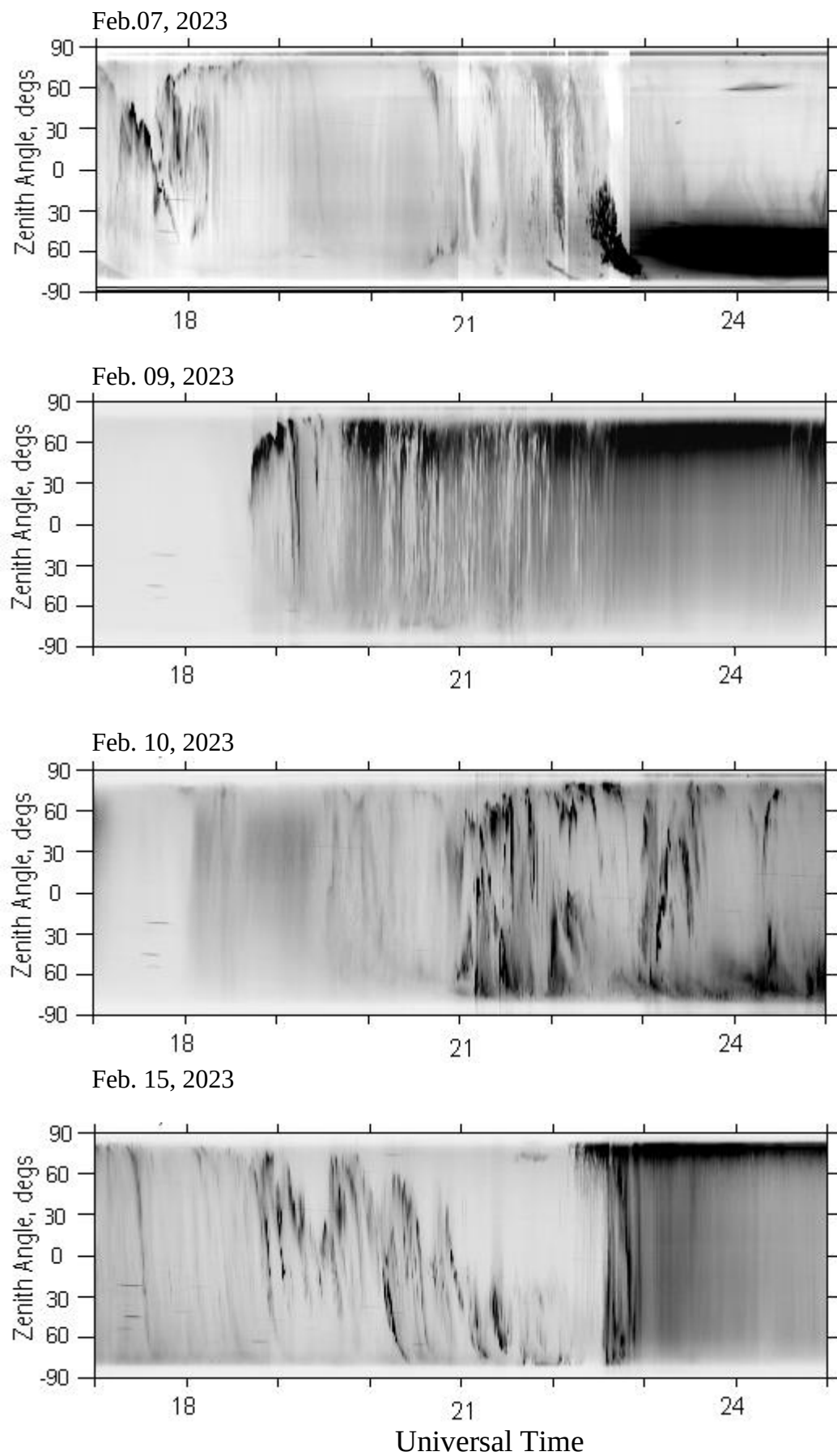


Universal Time

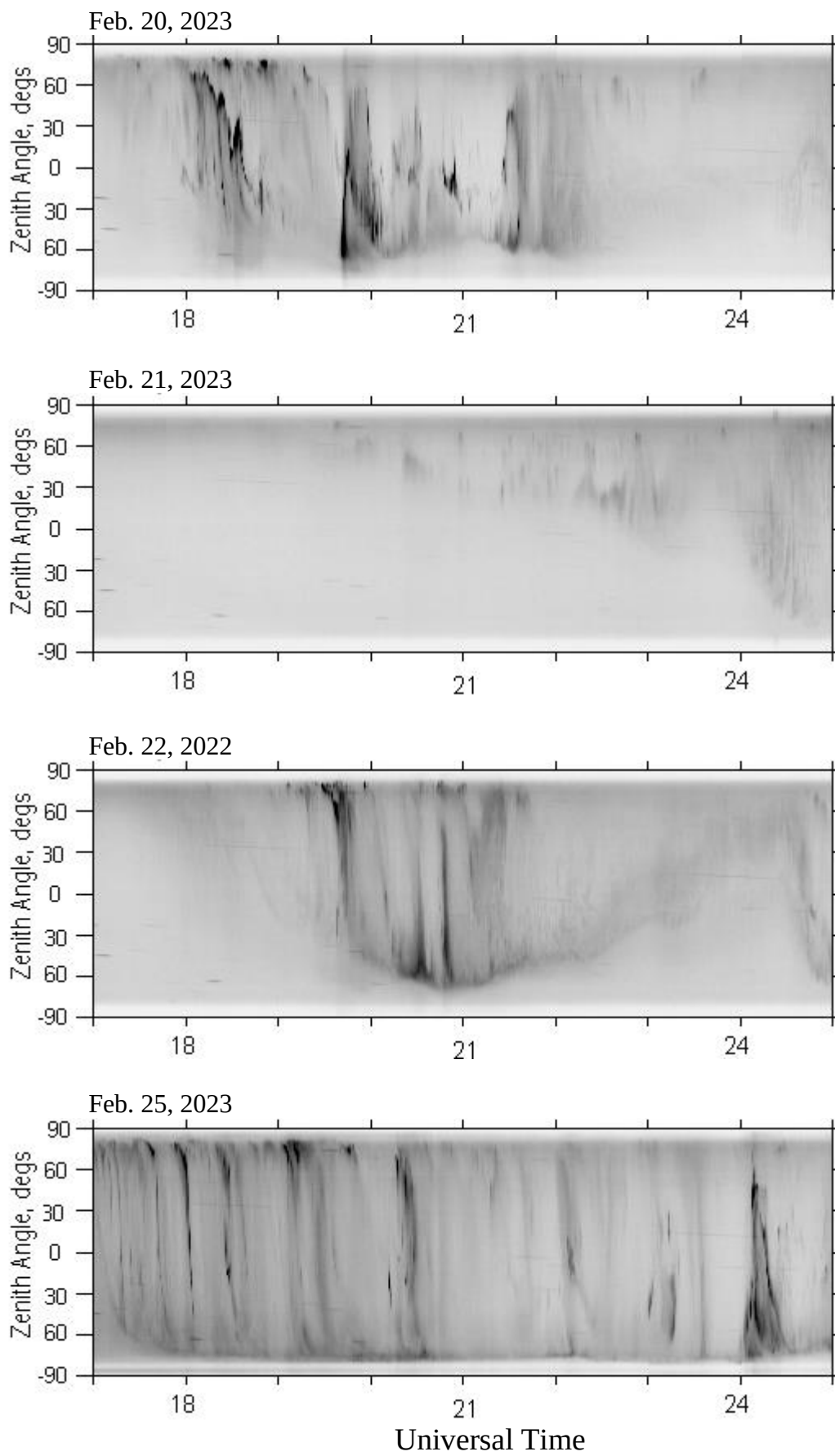
## Verhnetulomsky TV keograms



## Verhnetulomsky TV keograms

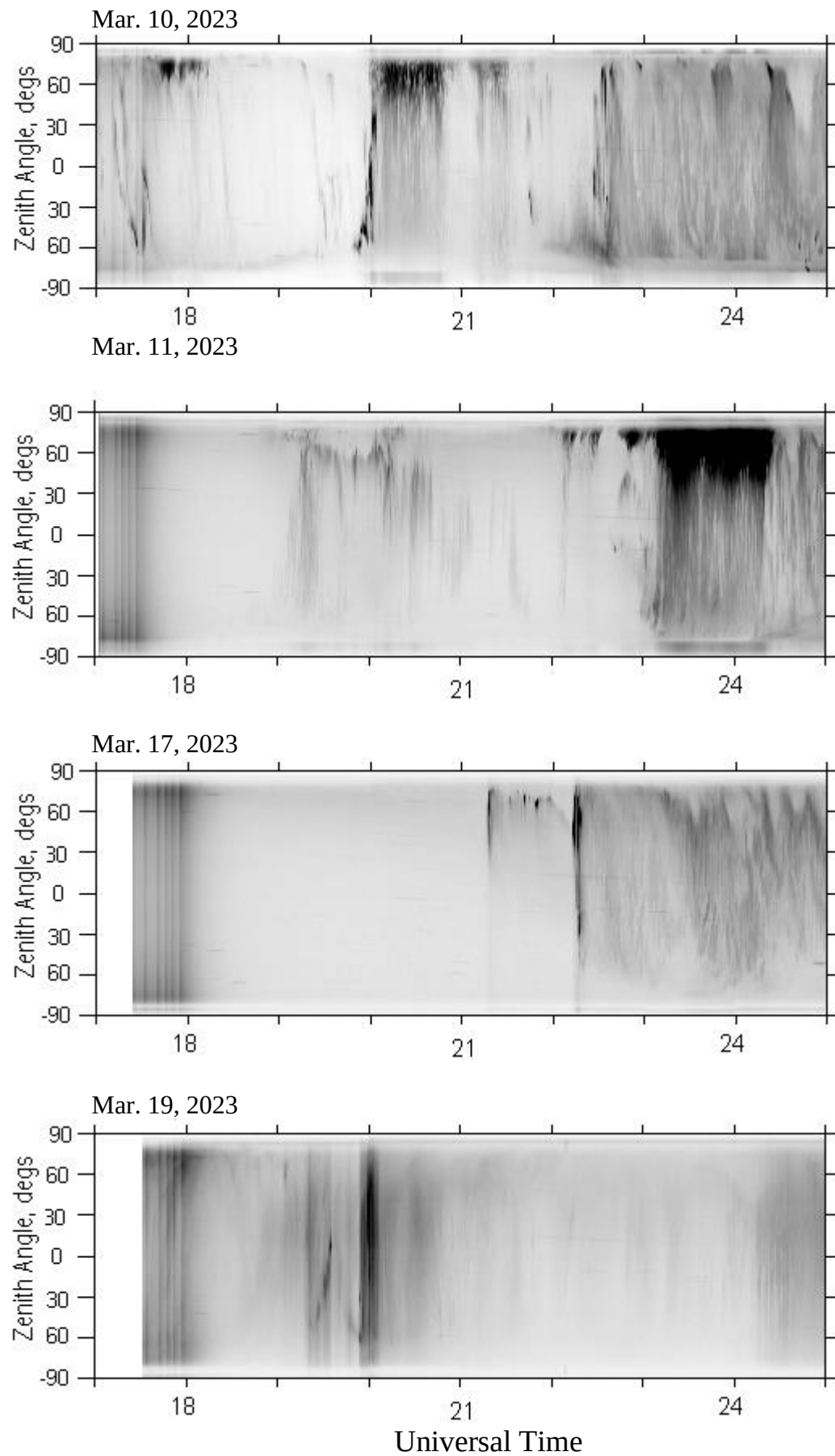


## Verhnetulomsky TV keograms

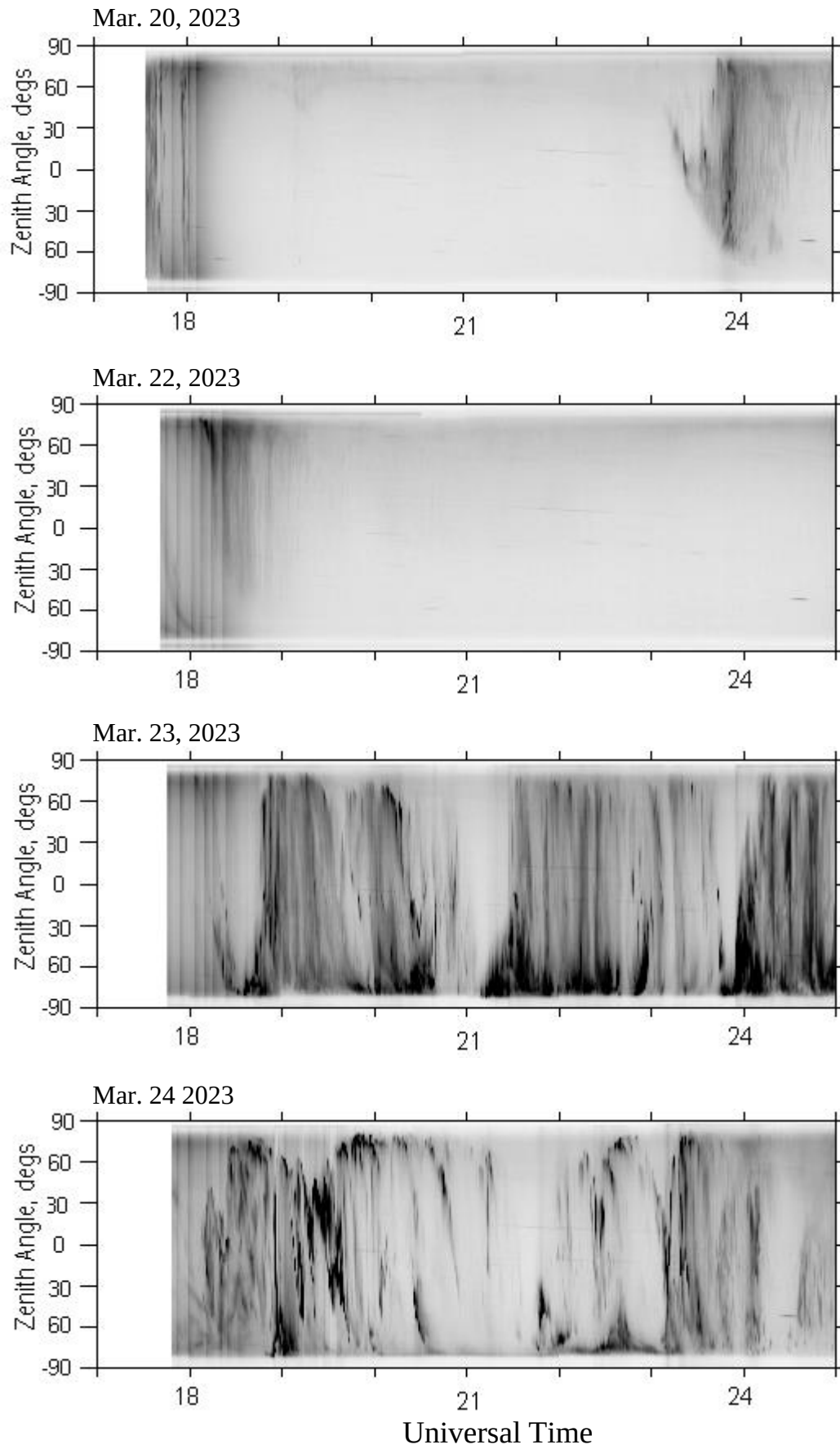




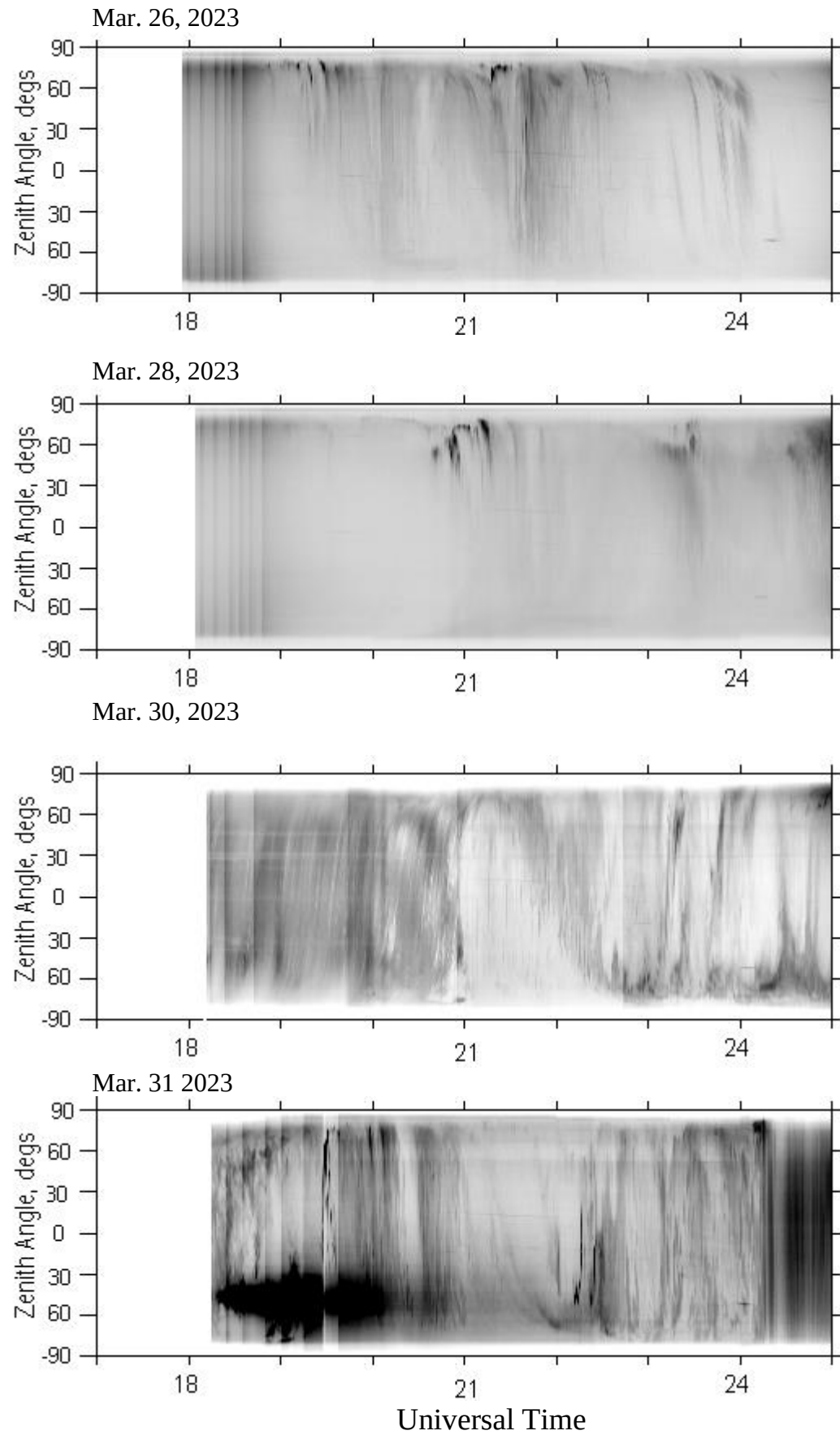
## Verhnetulomsky TV keograms



## Verhnetulomsky TV keograms



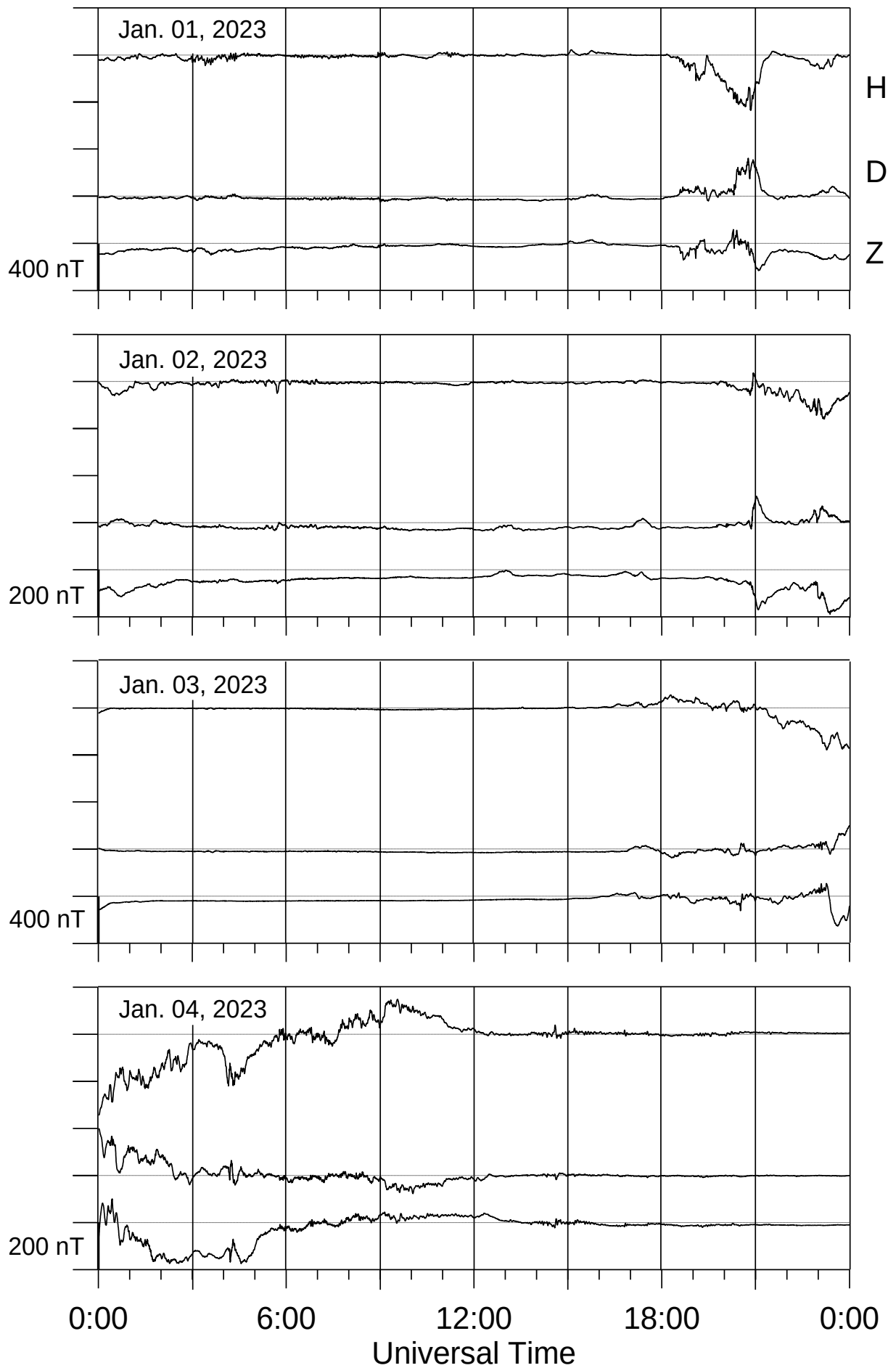
## Verhnetulomsky TV keograms



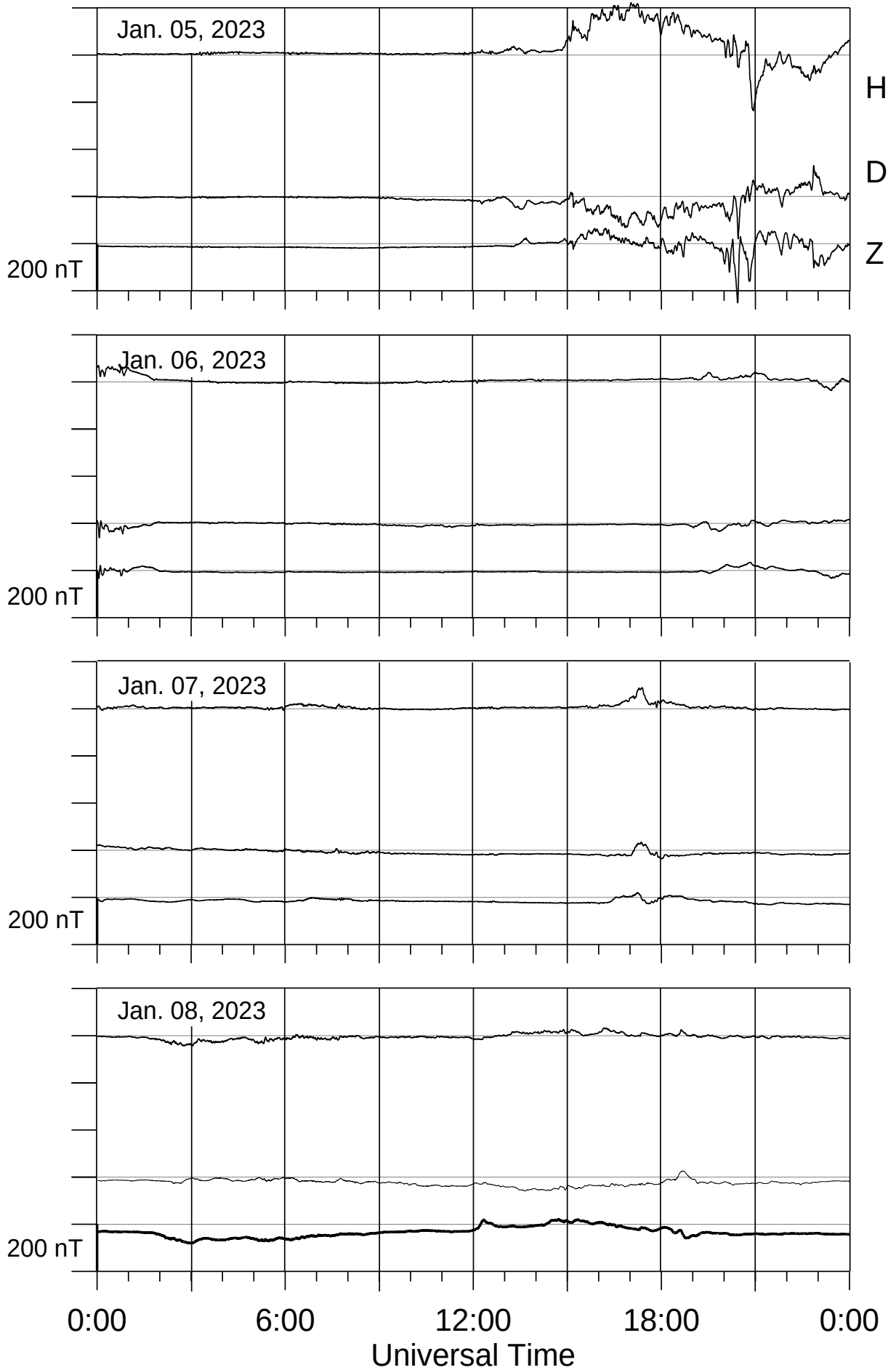
## **LOVOZERO MAGNETOGRAMS**

**January - March 2023**

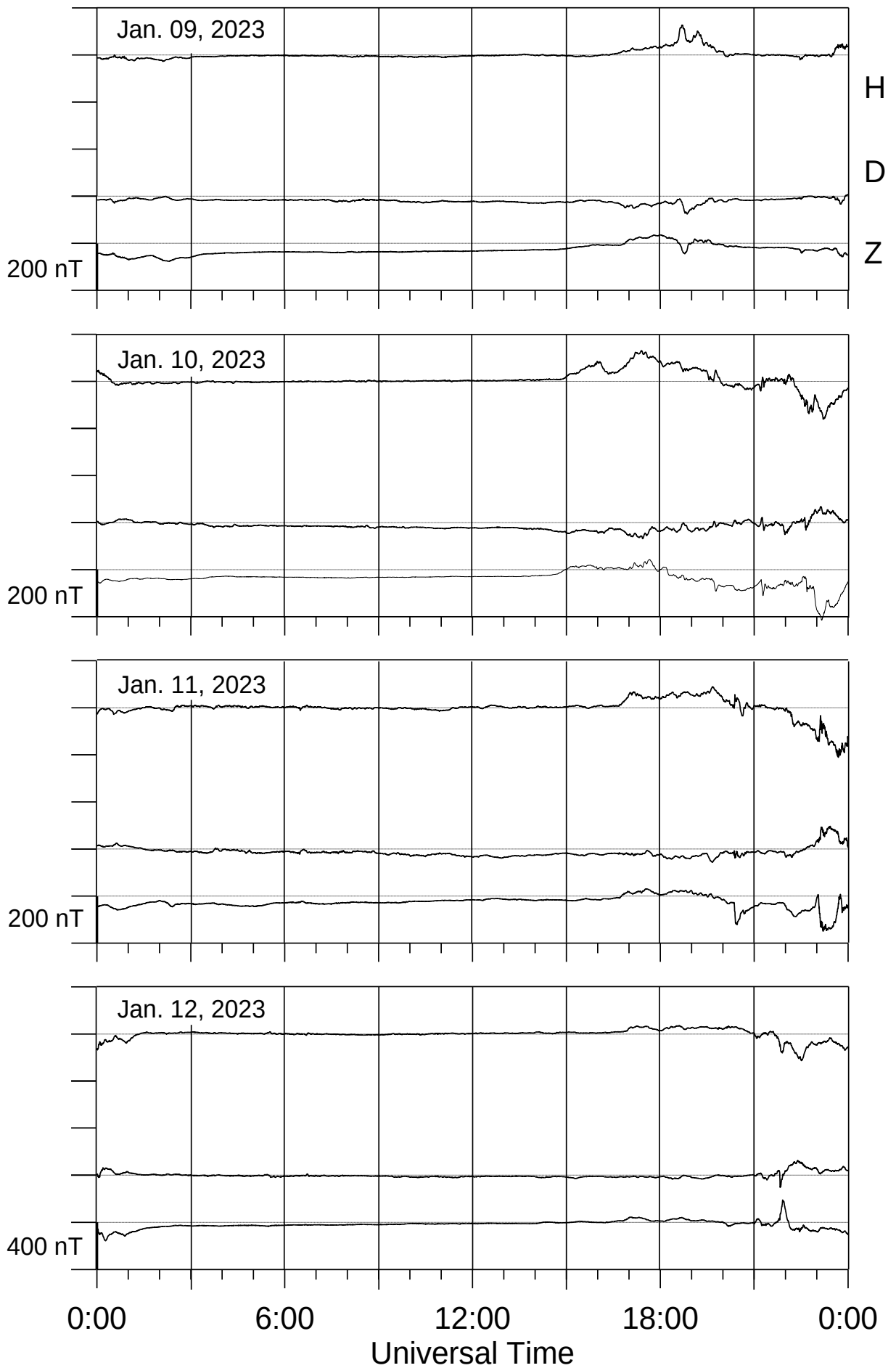
## Lovozero magnetometer



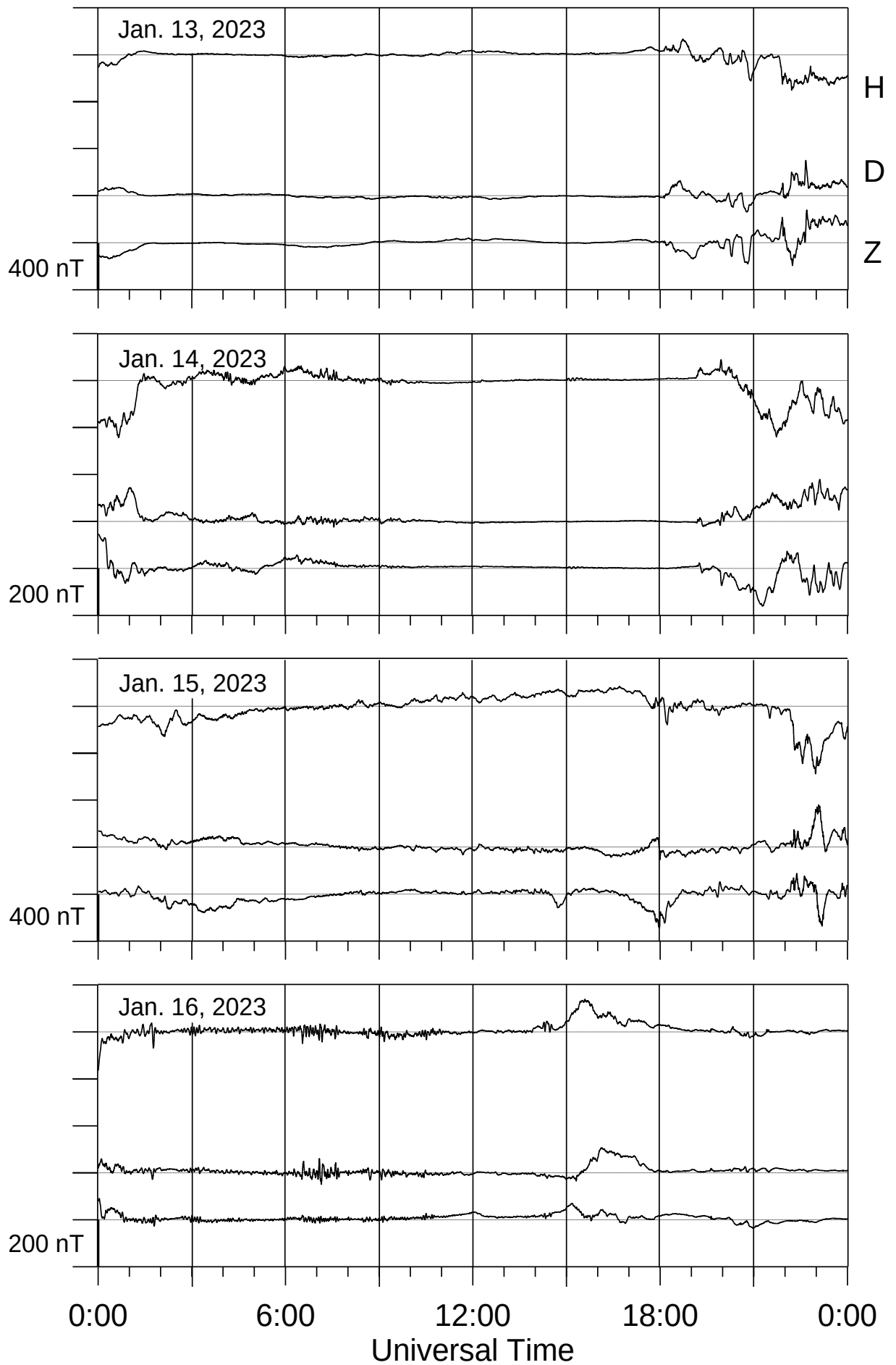
## Lovozero magnetometer



## Lovozero magnetometer

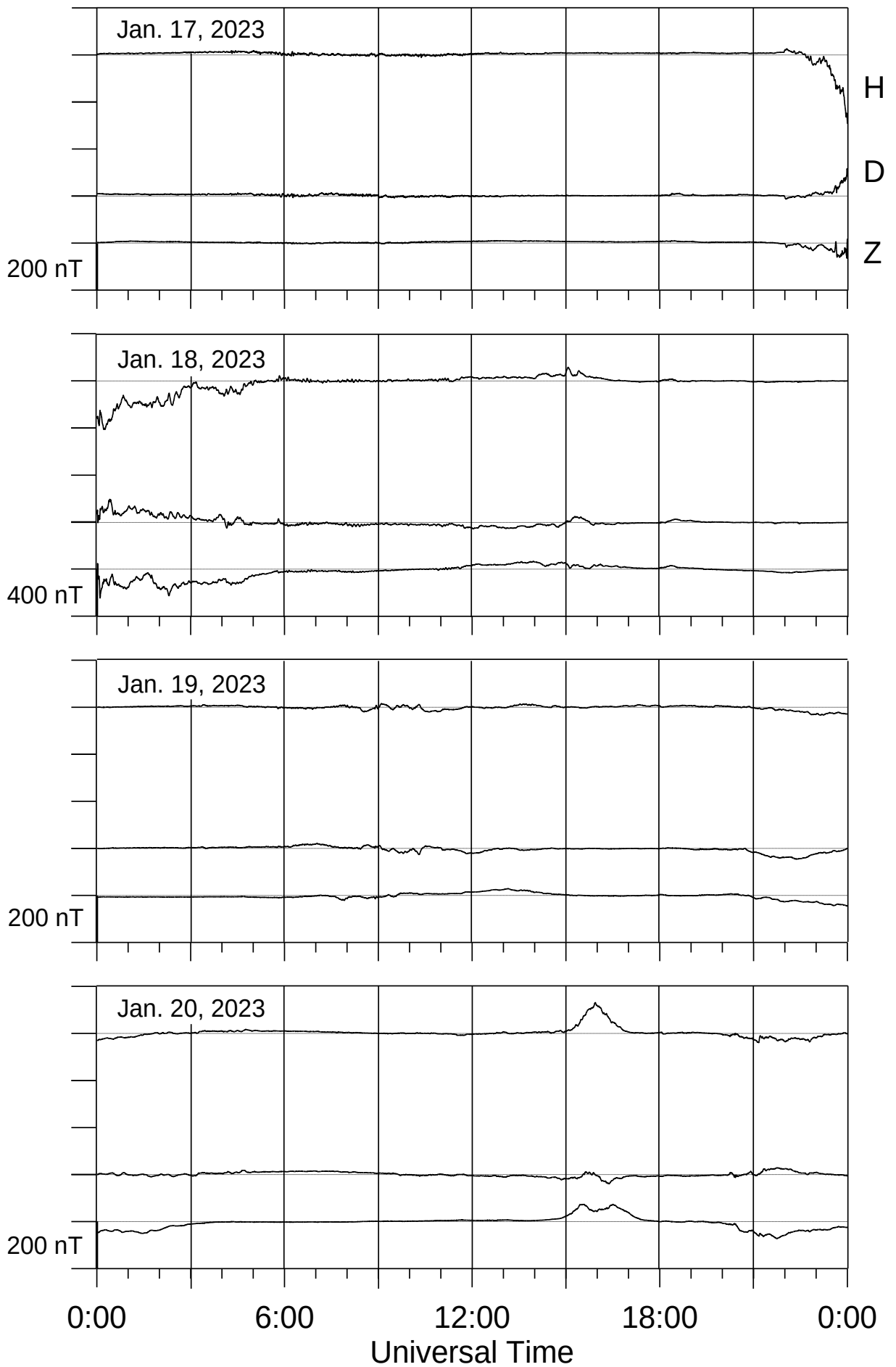


## Lovozero magnetometer

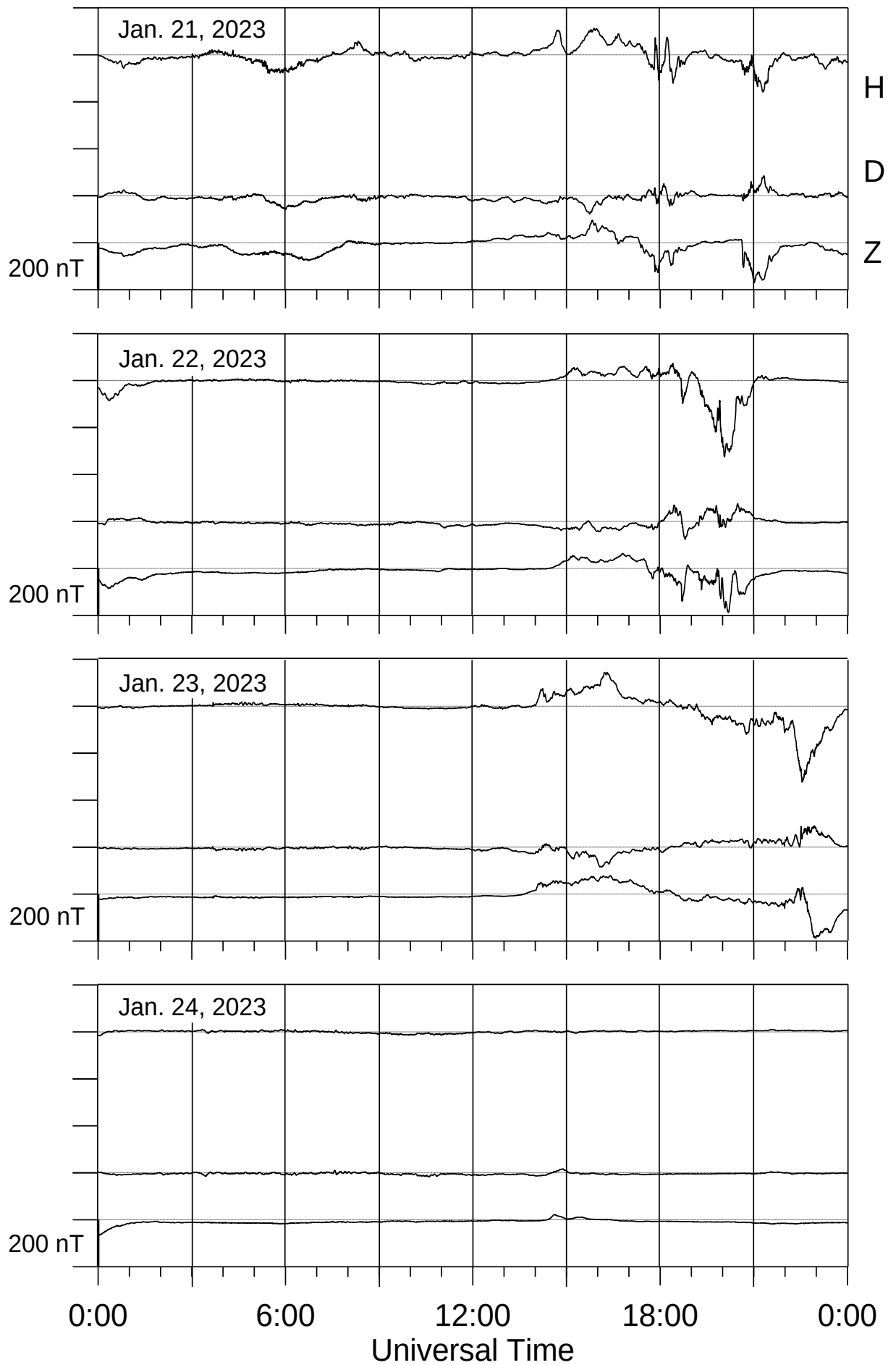




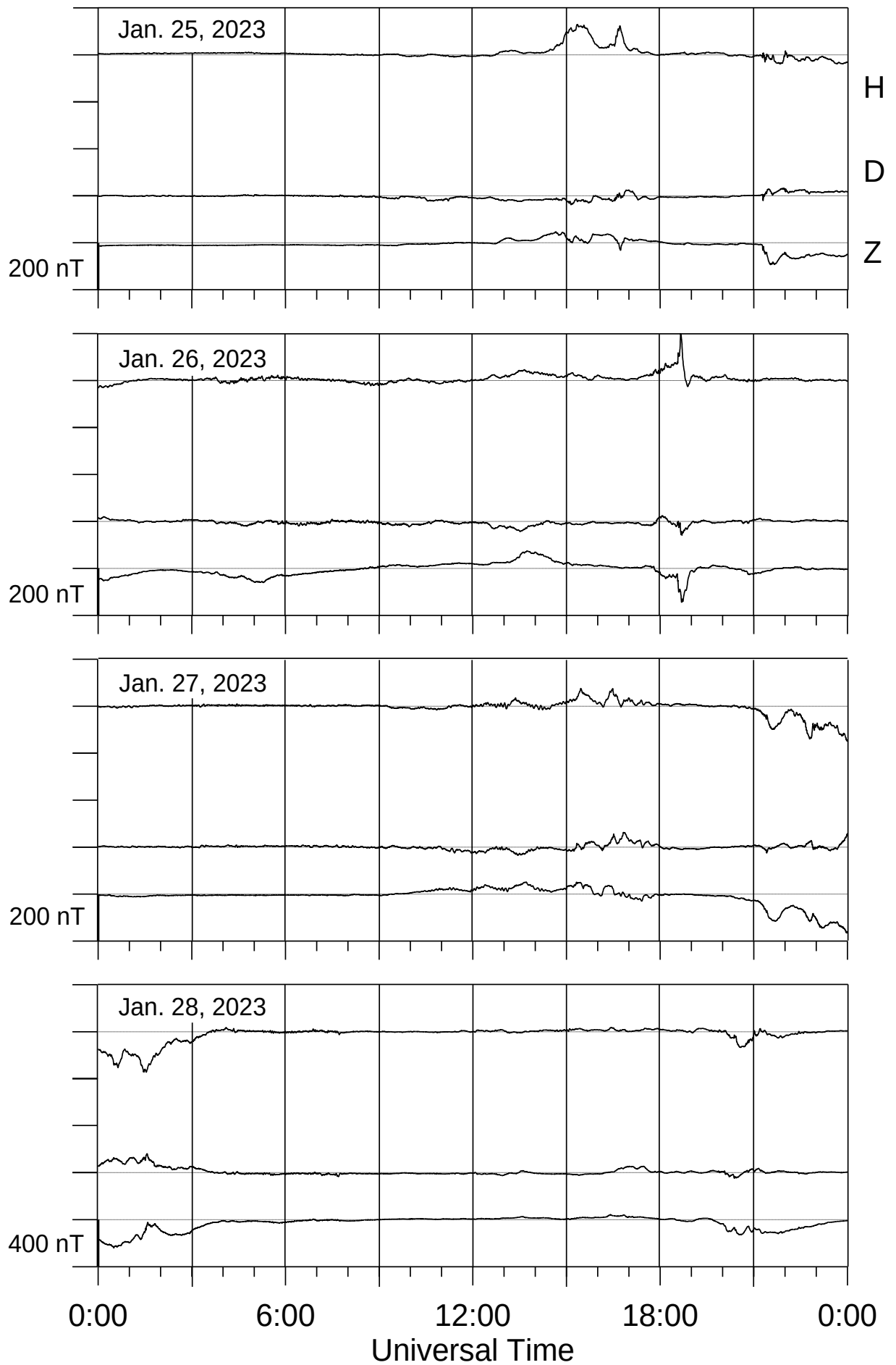
## Lovozero magnetometer



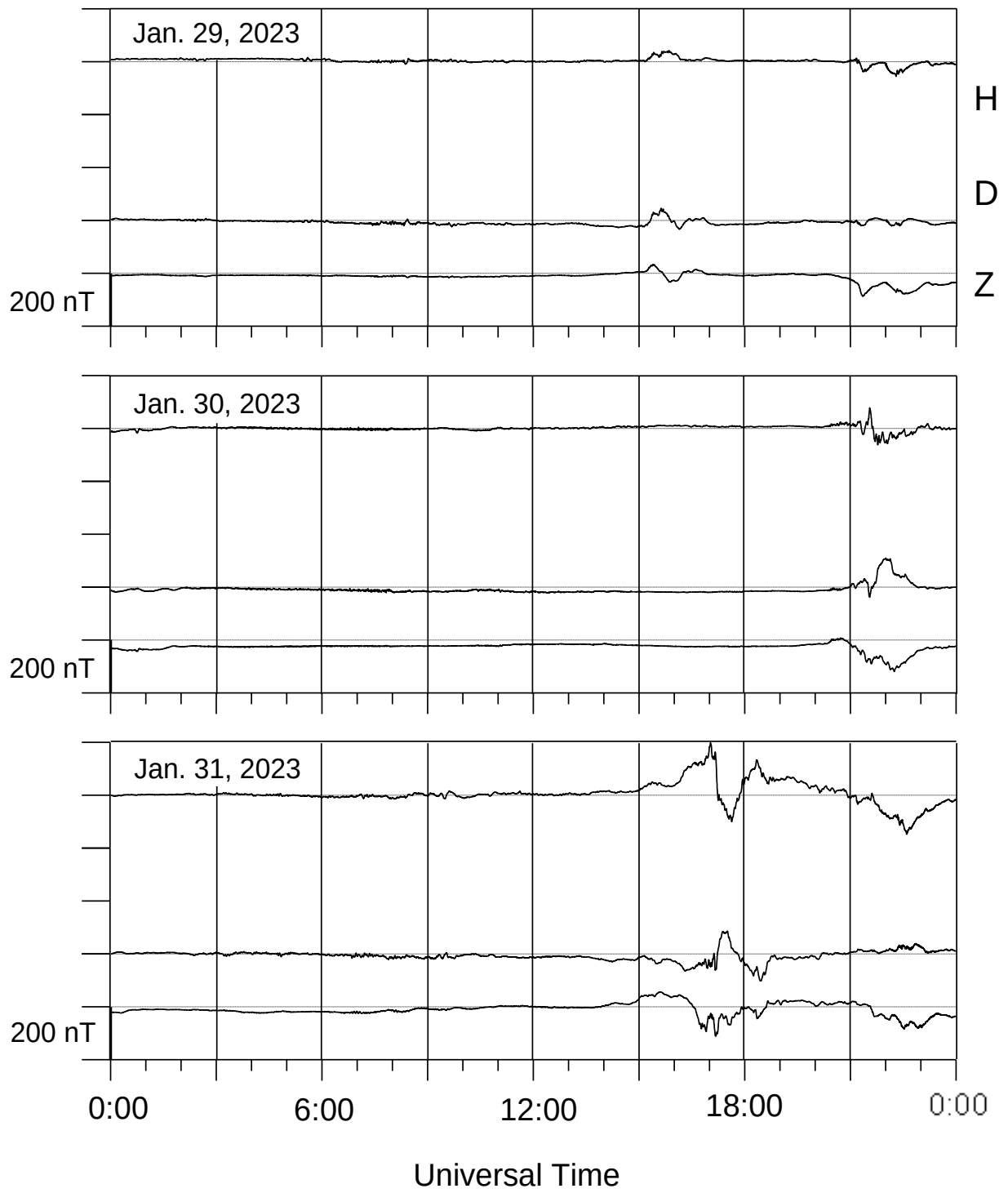
## Lovozero magnetometer



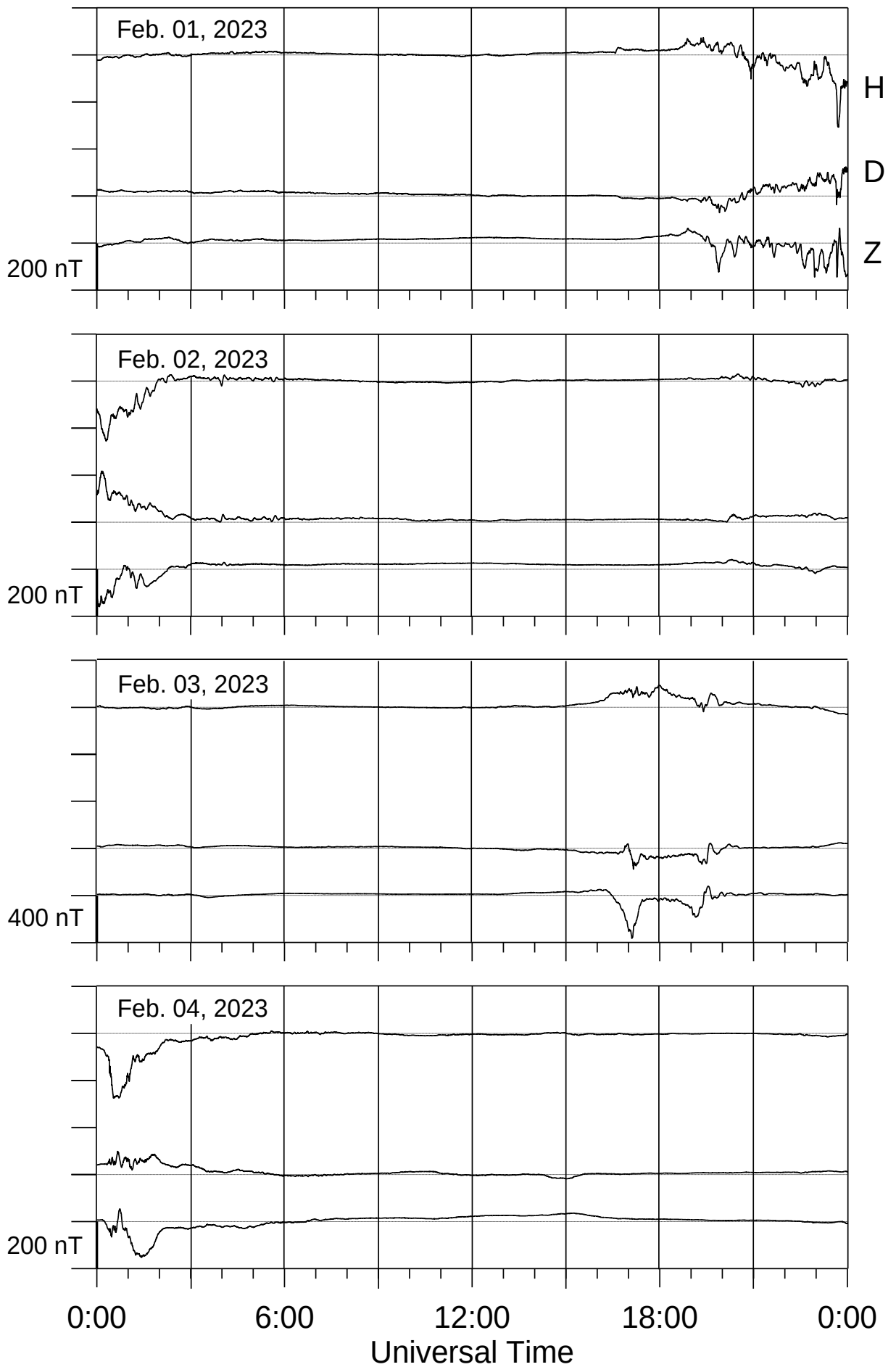
## Lovozero magnetometer



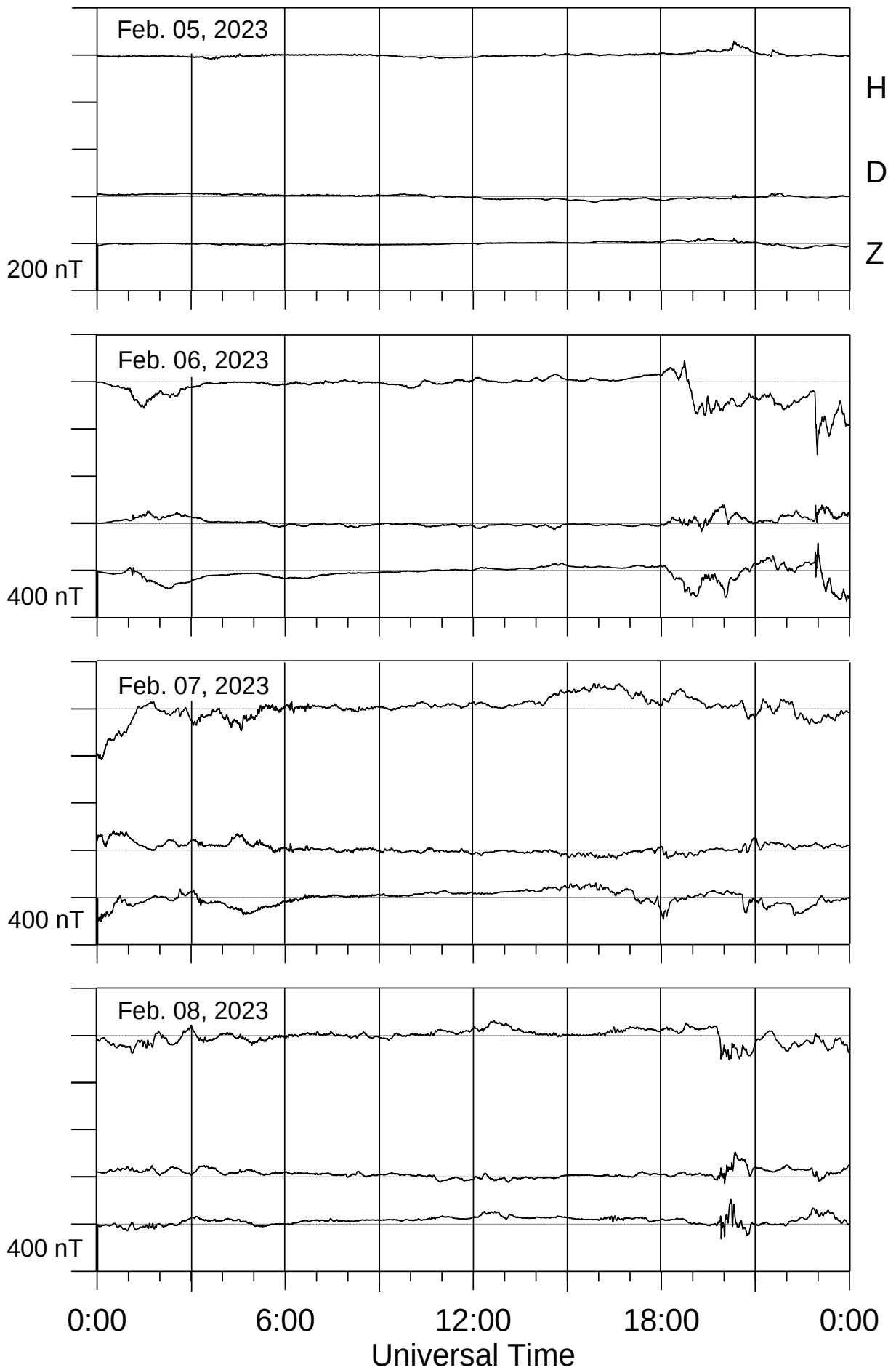
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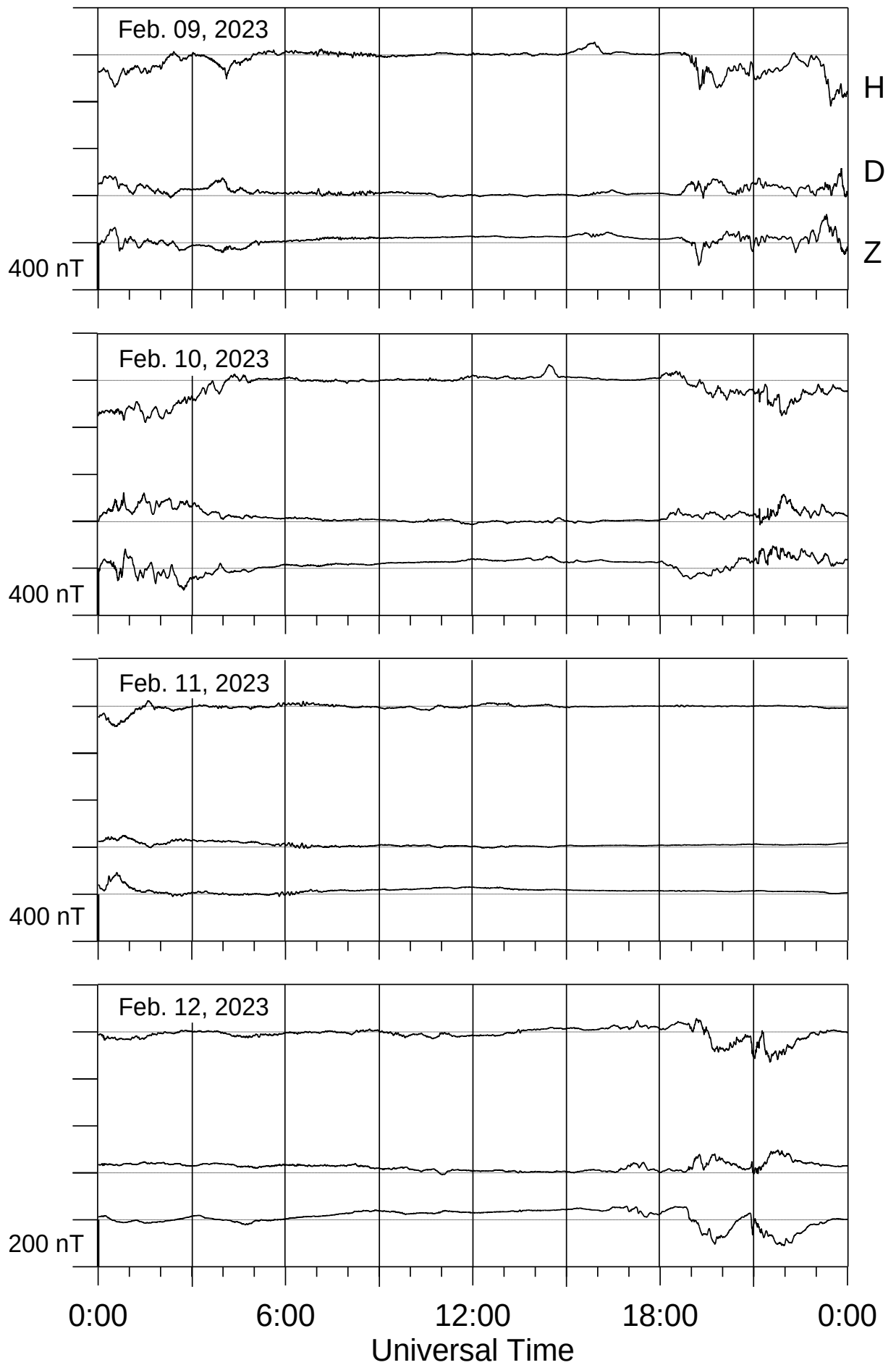
## Lovozero magnetometer



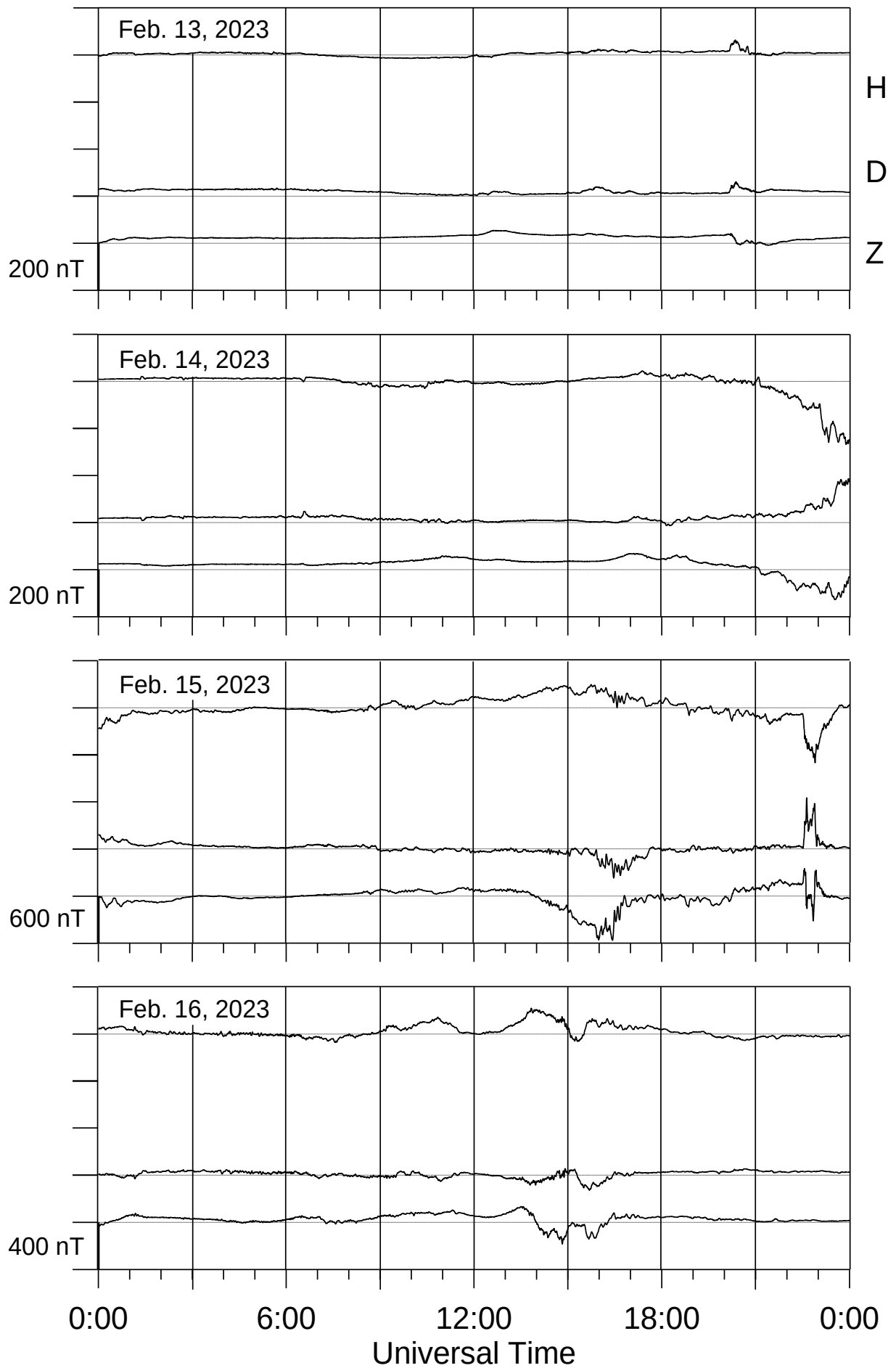
## Lovozero magnetometer



## Lovozero magnetometer

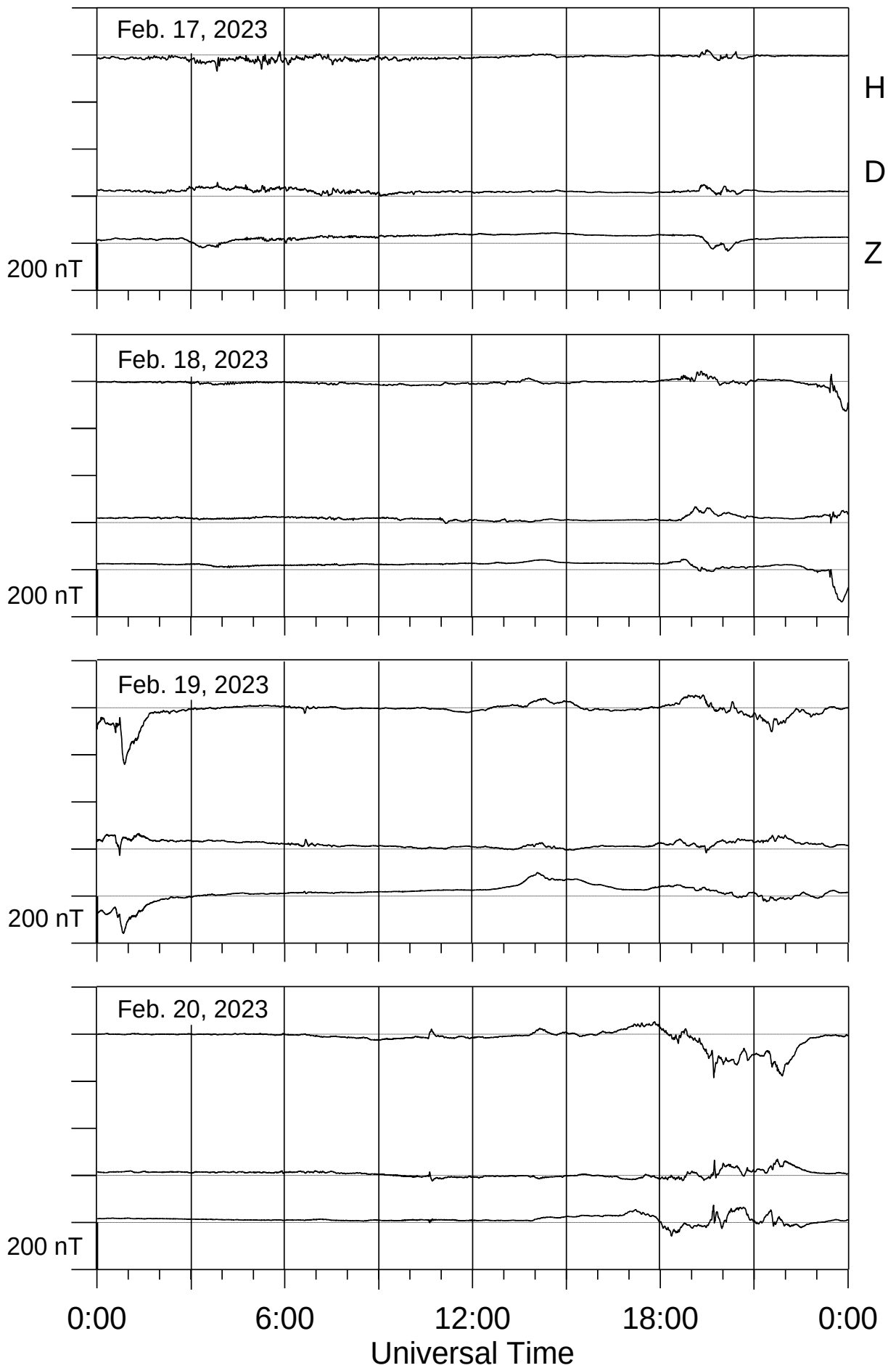


## Lovozero magnetometer

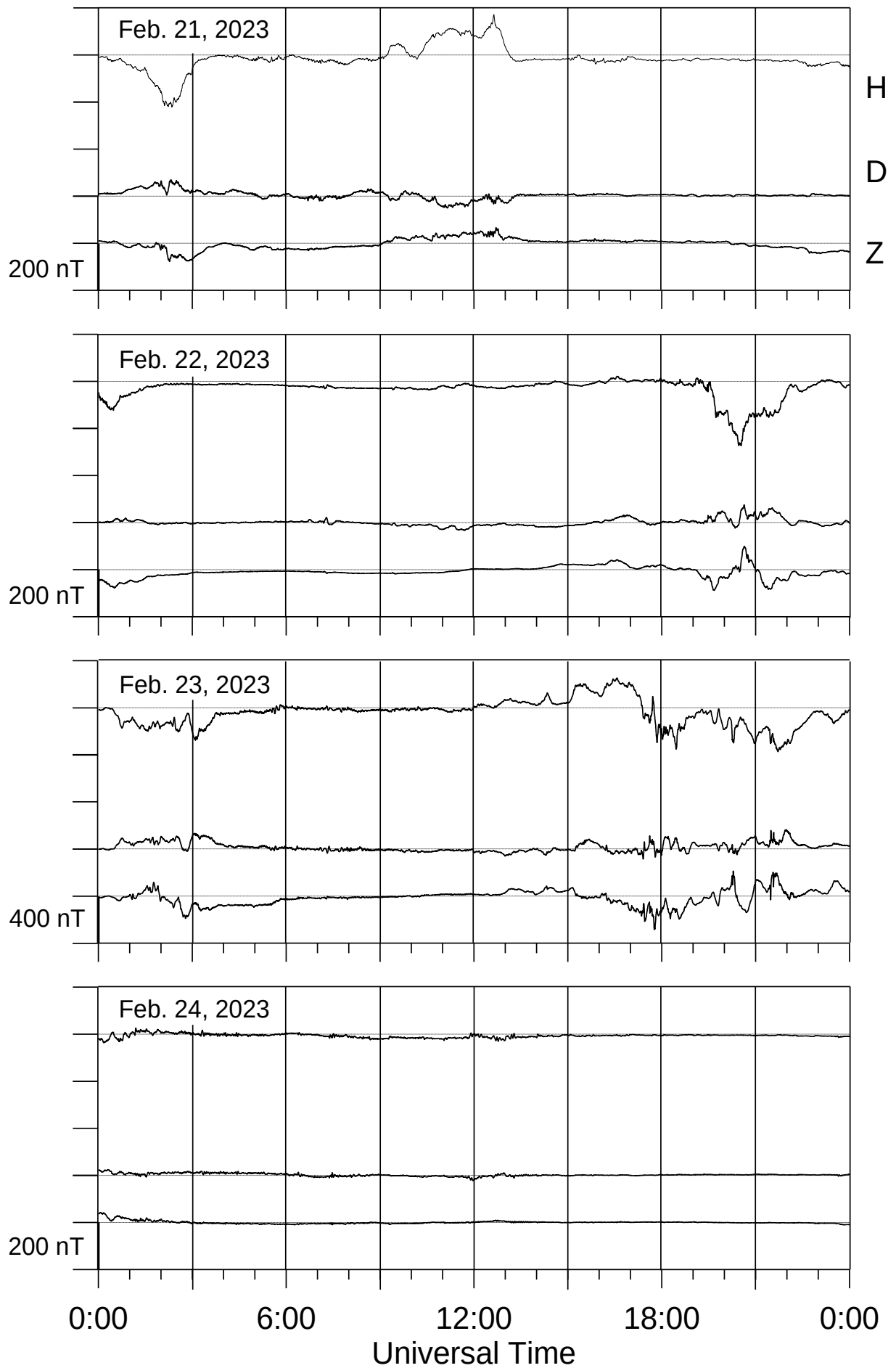




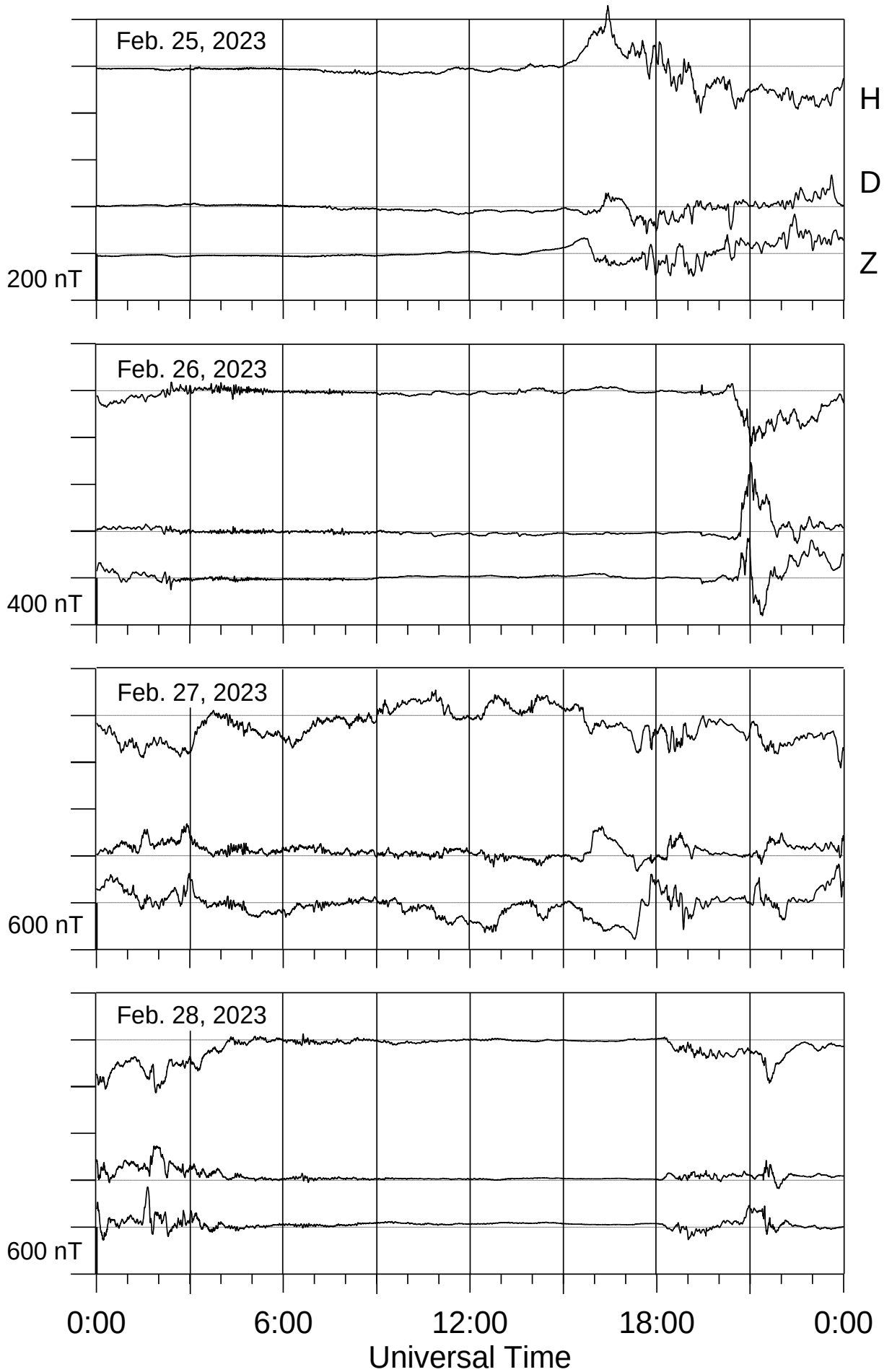
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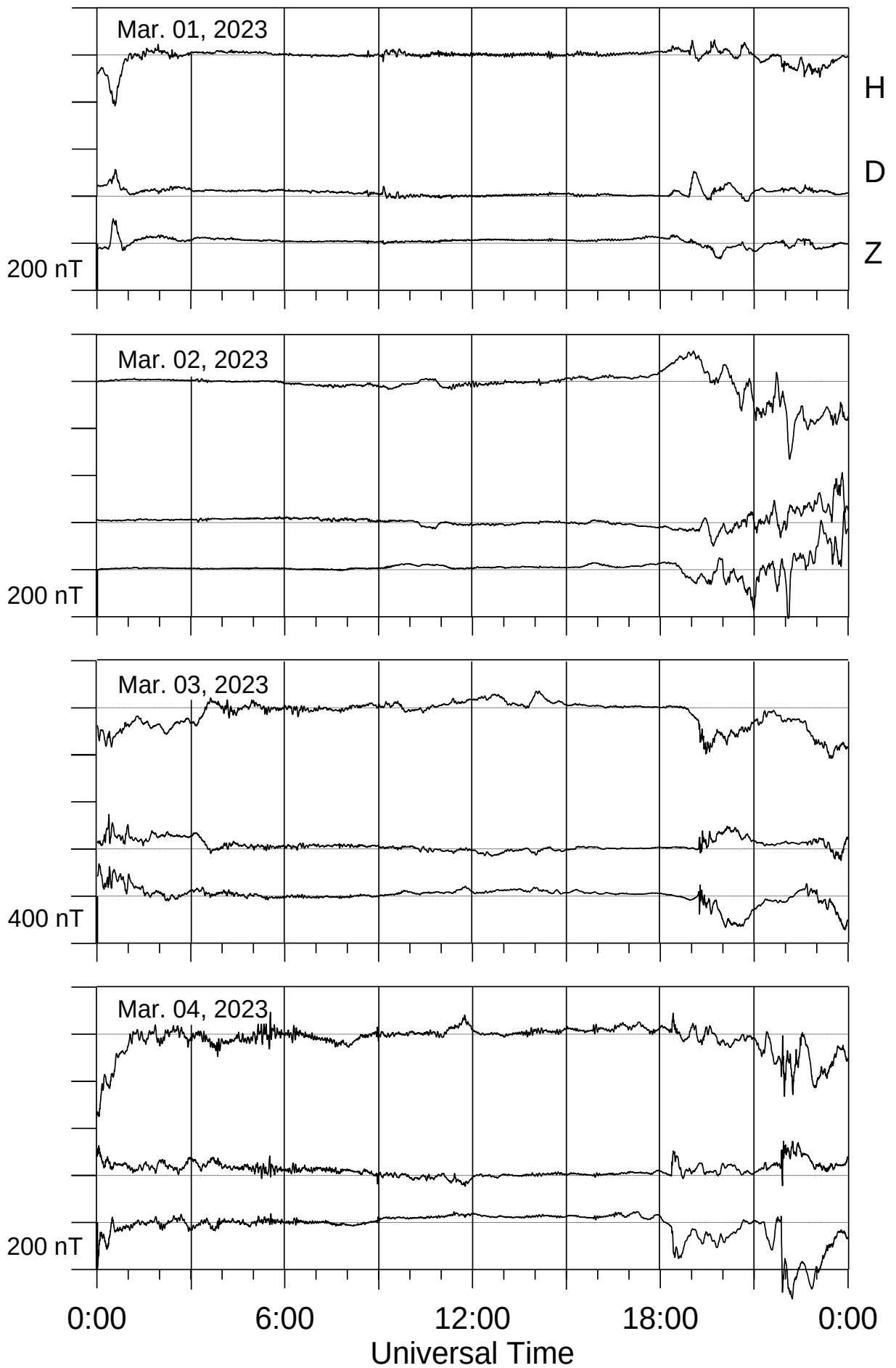
## Lovozero magnetometer



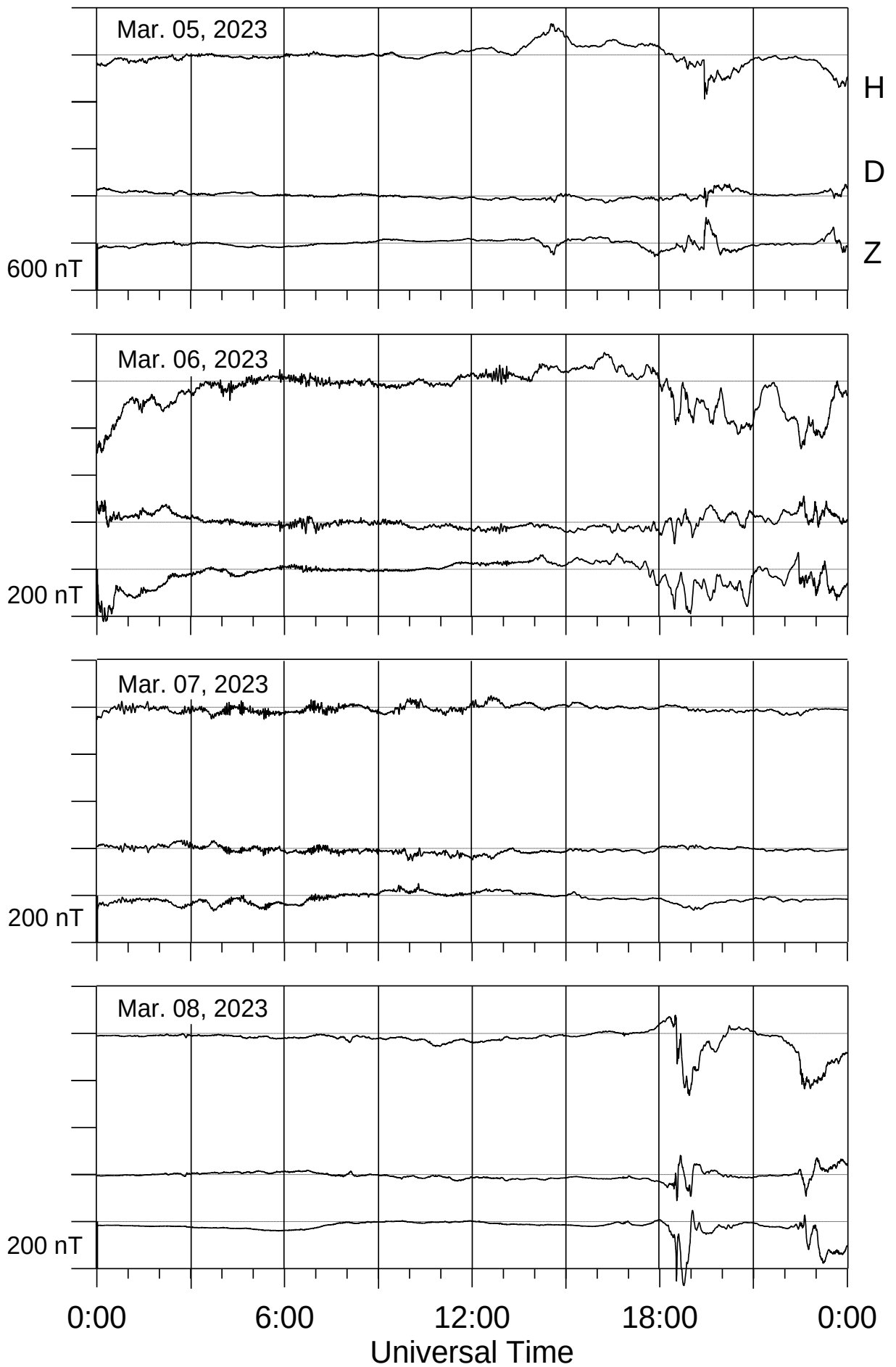
## Lovozero magnetometer



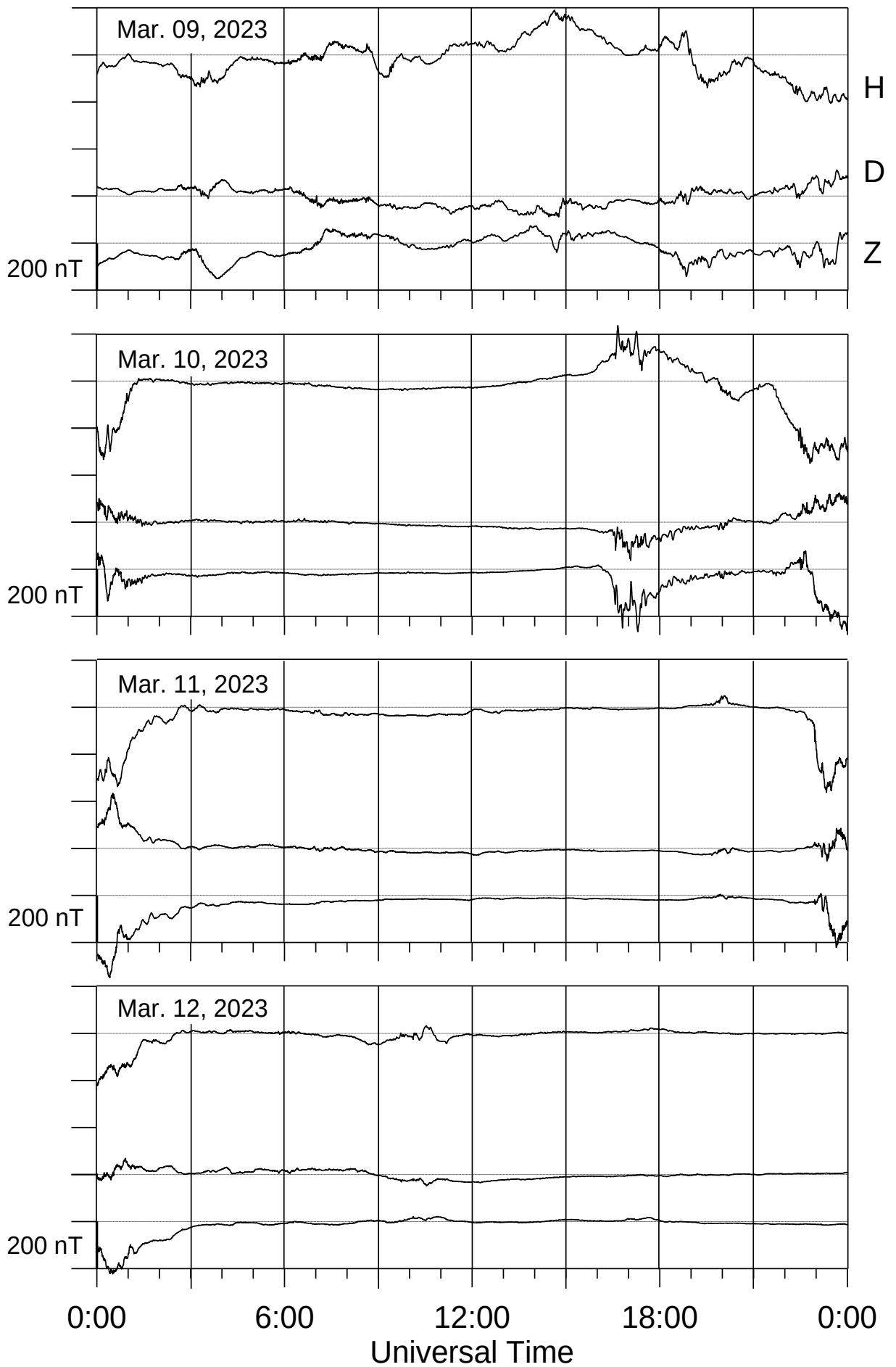
## Lovozero magnetometer



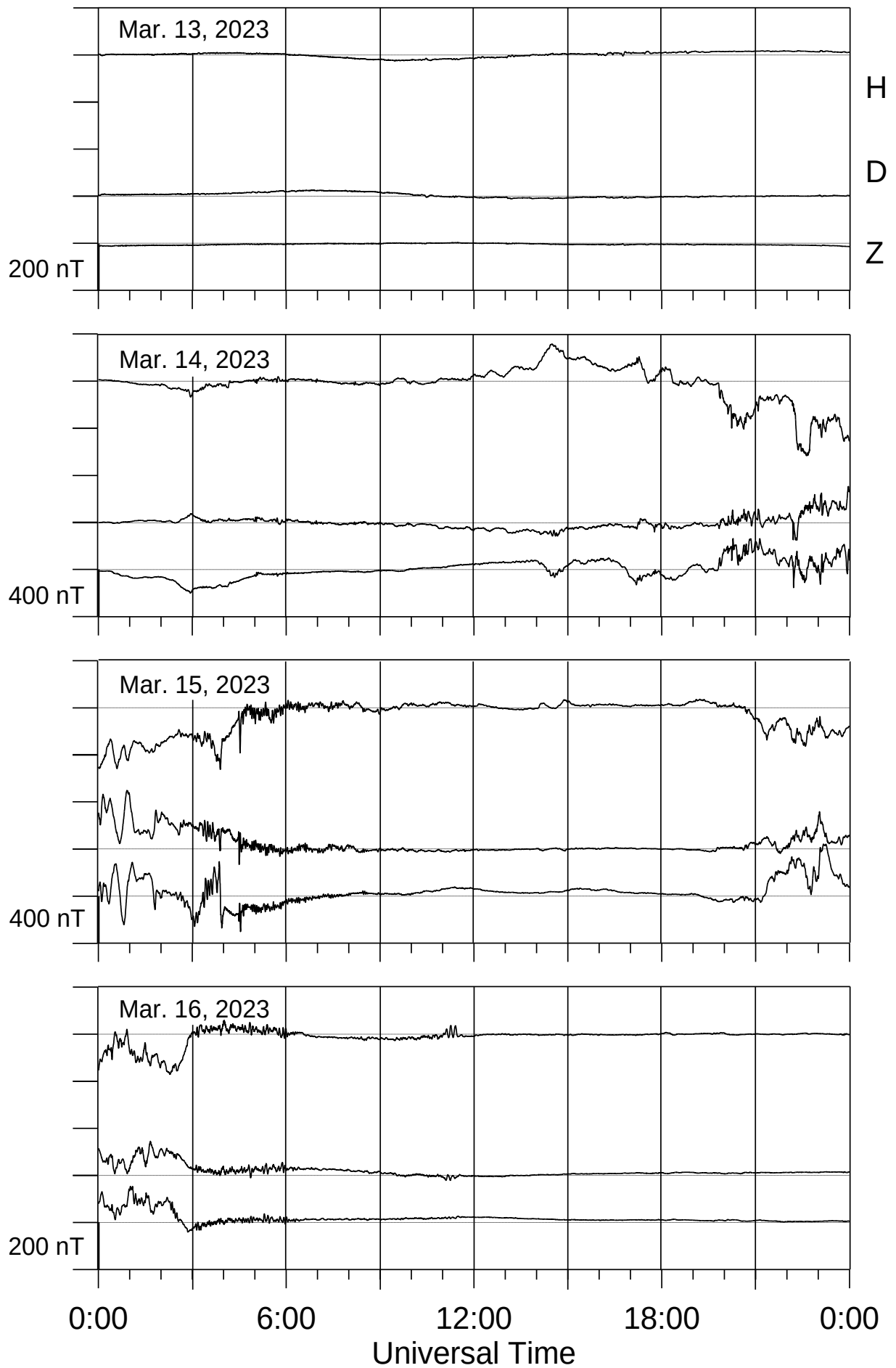
## Lovozero magnetometer



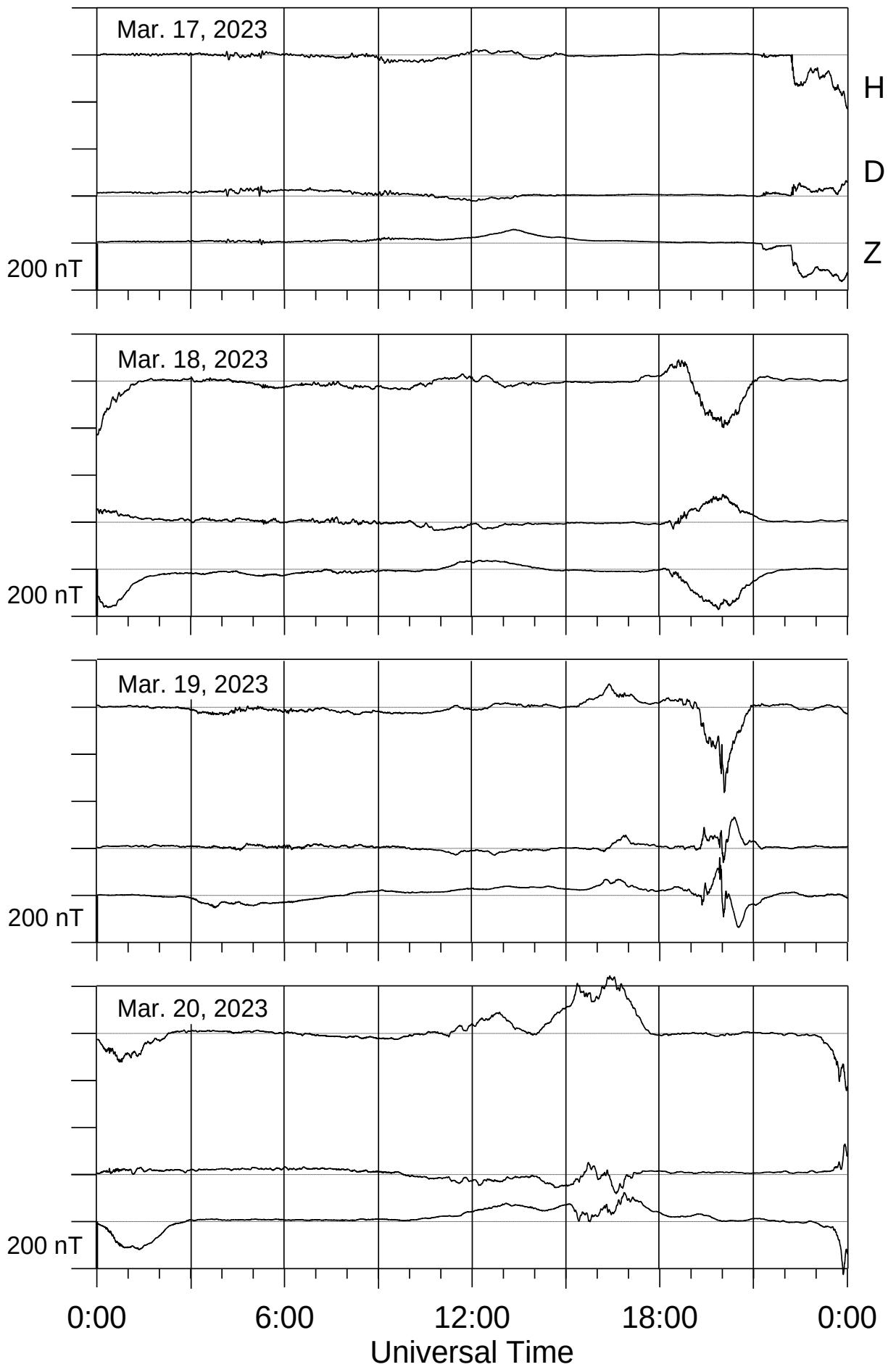
## Lovozero magnetometer



## Lovozero magnetometer

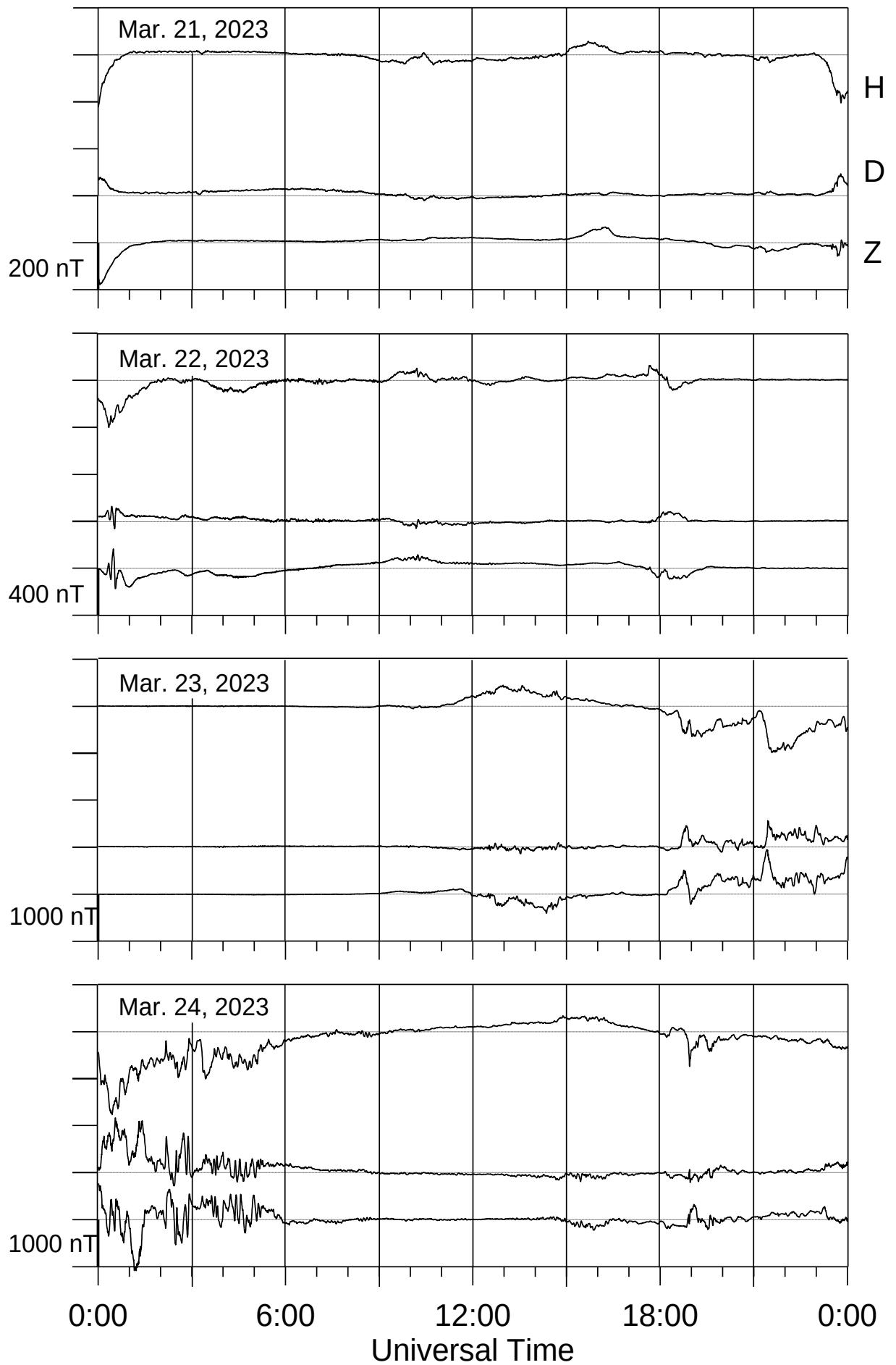


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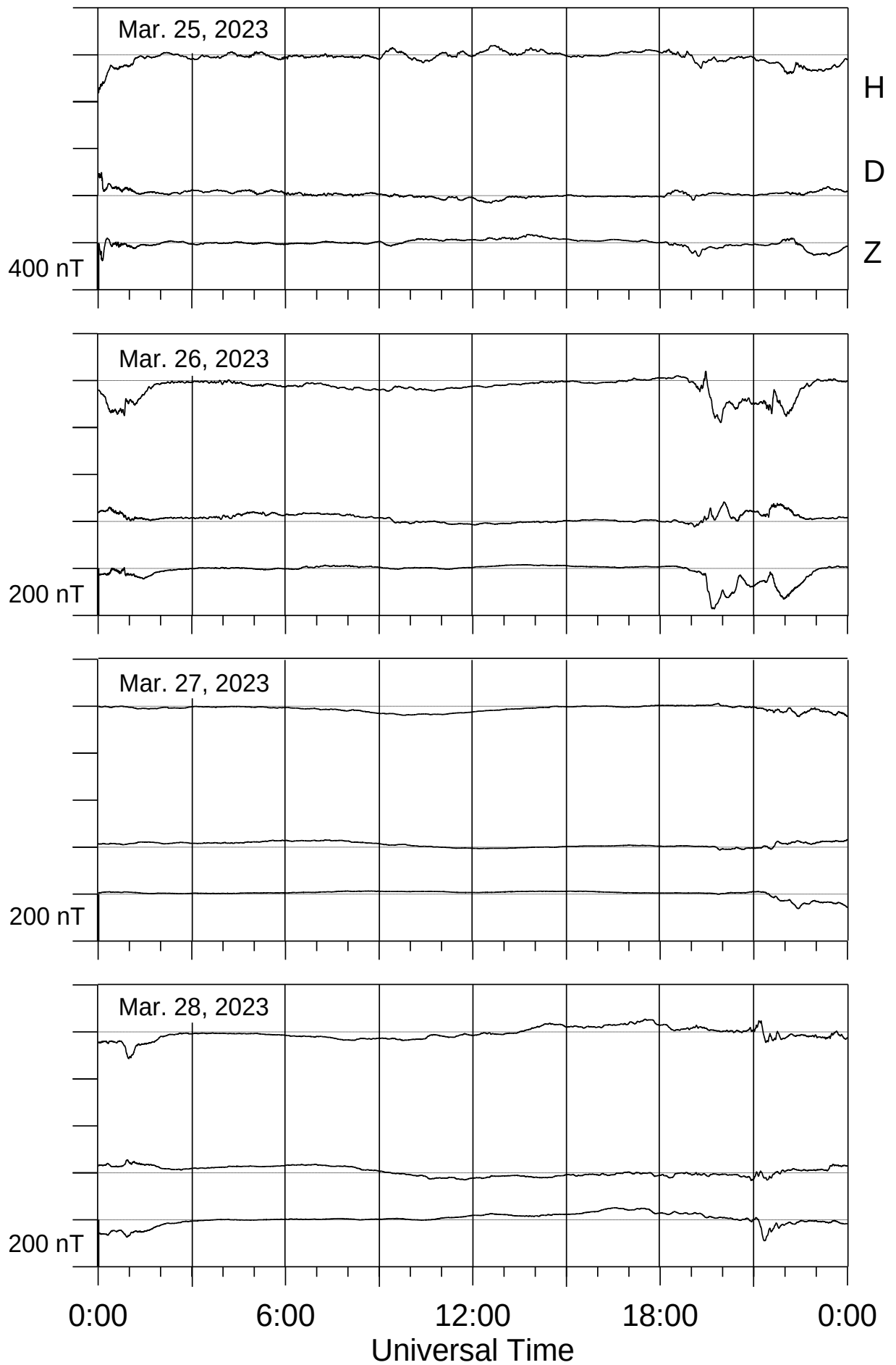




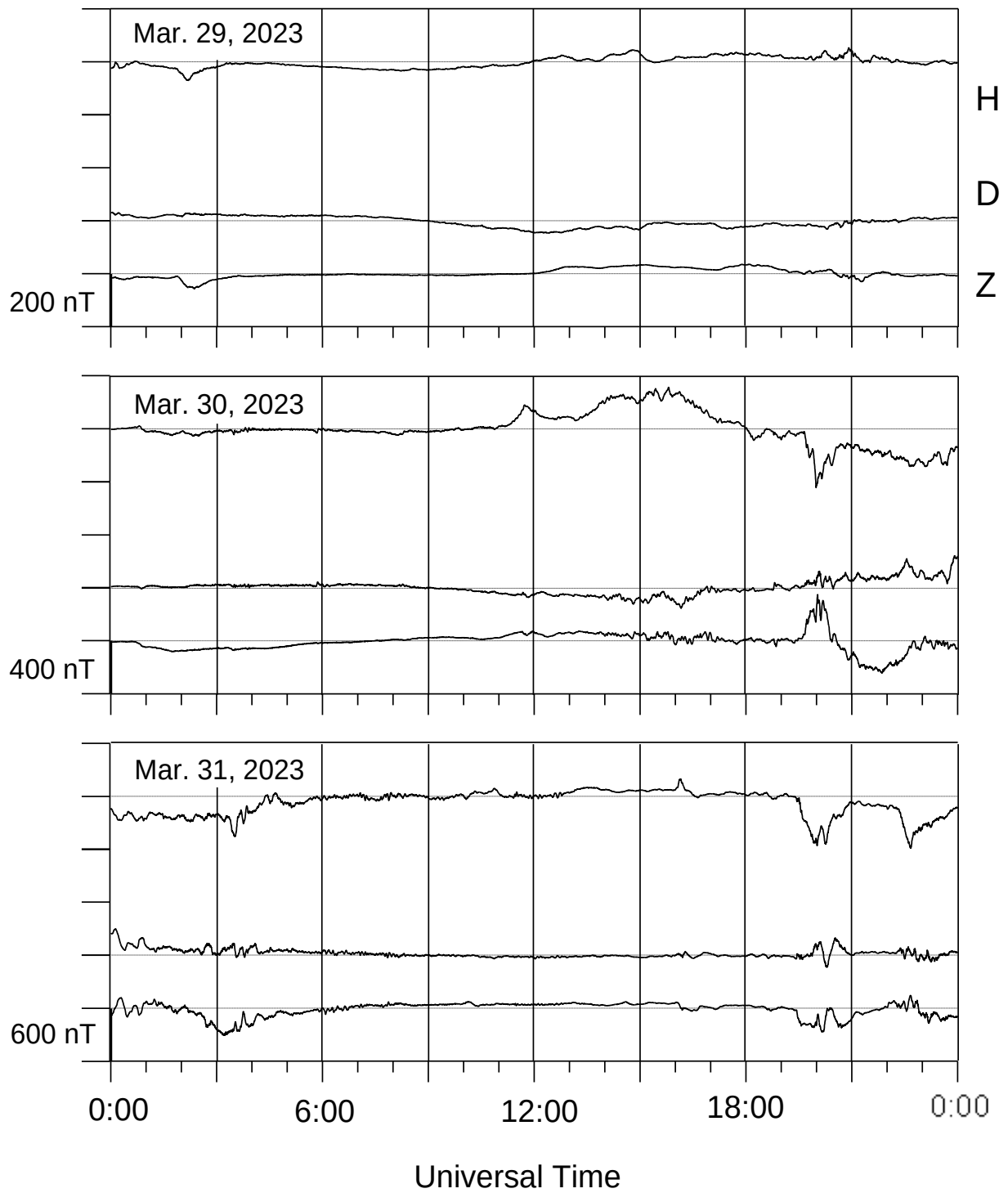
## Lovozero magnetometer



## Lovozero magnetometer



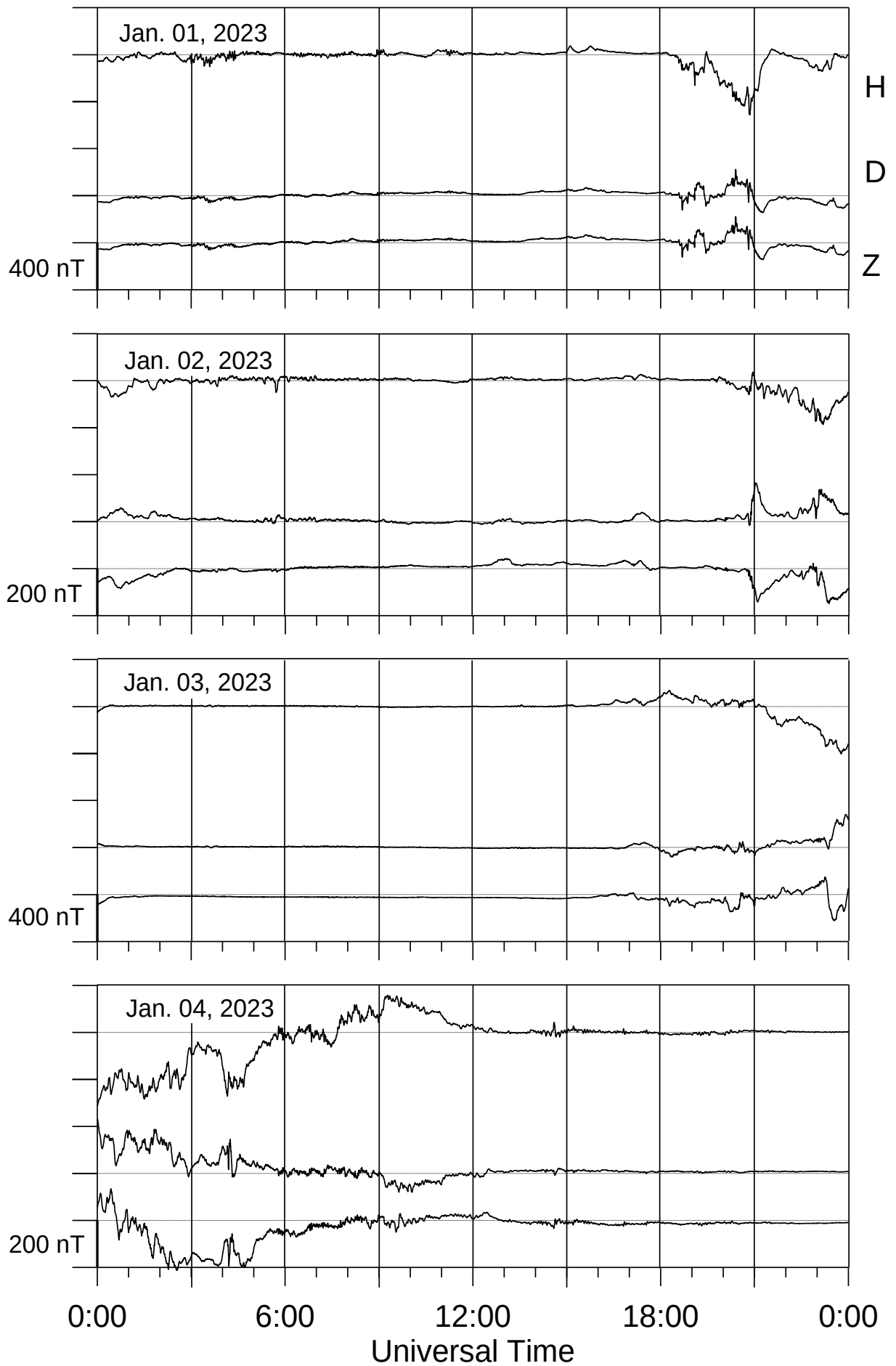
## Lovozero magnetometer



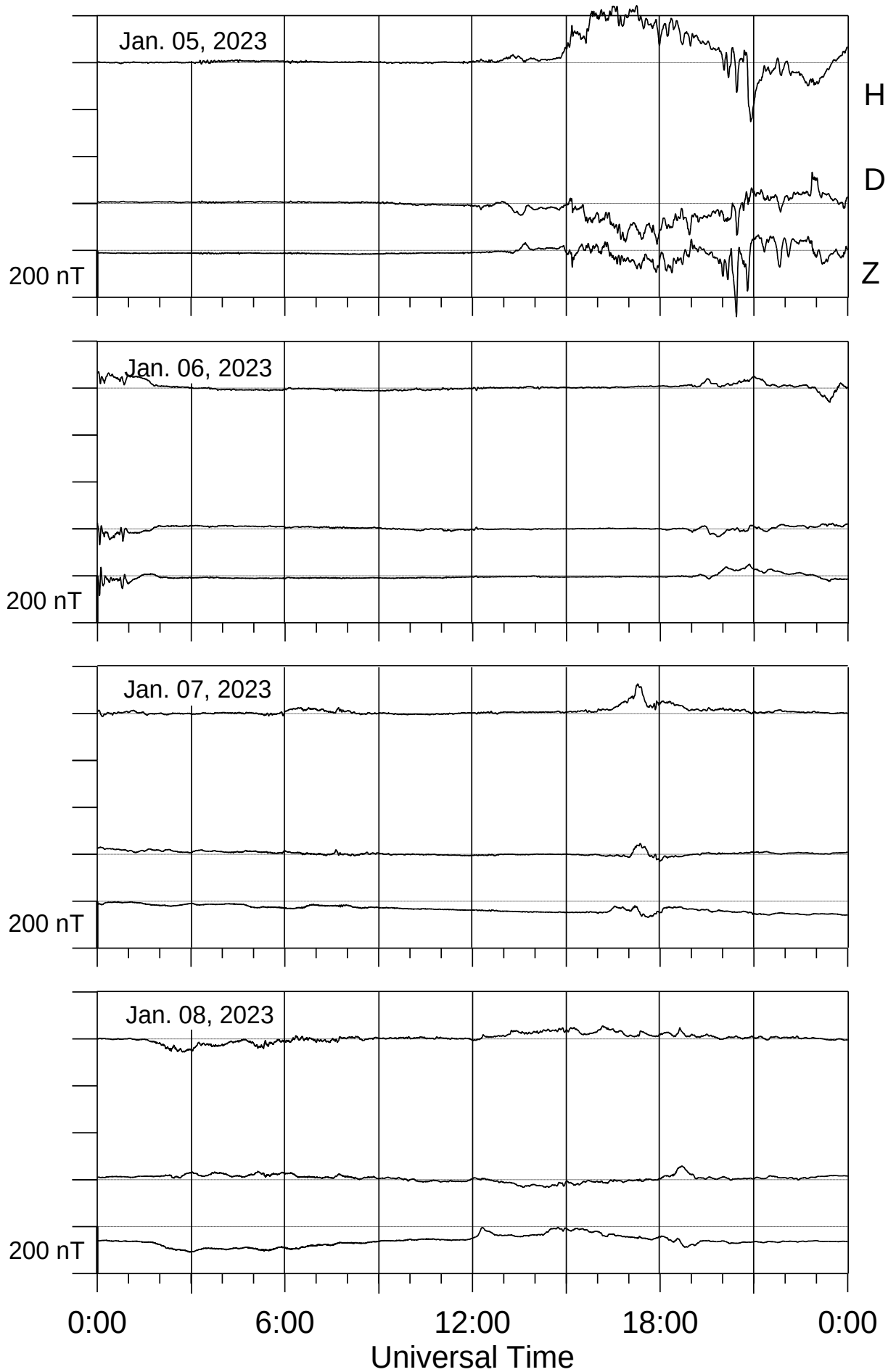
## **LOPARSKAYA MAGNETOGRAMS**

**January - March 2023**

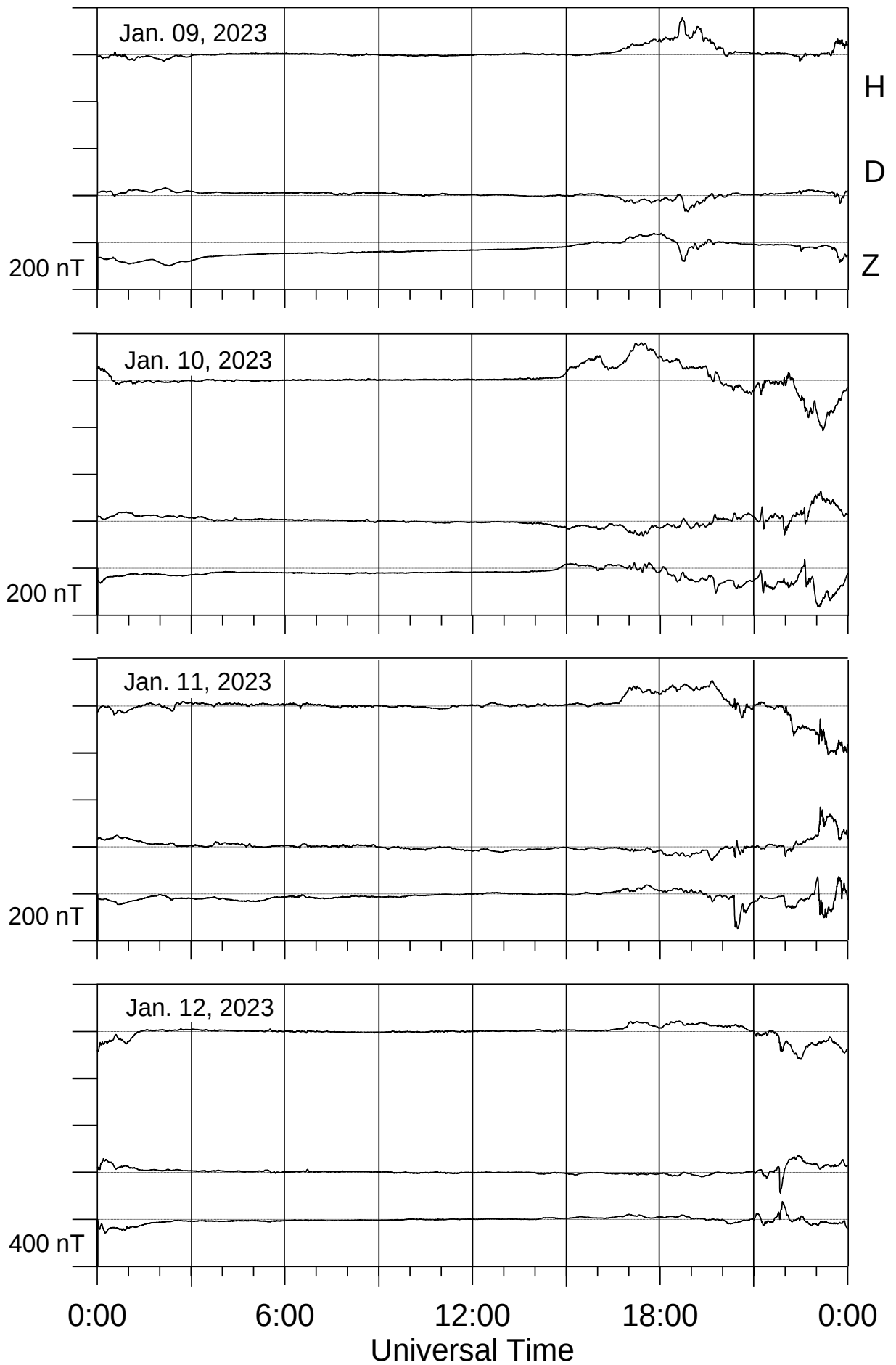
## Loparskaya magnetometer



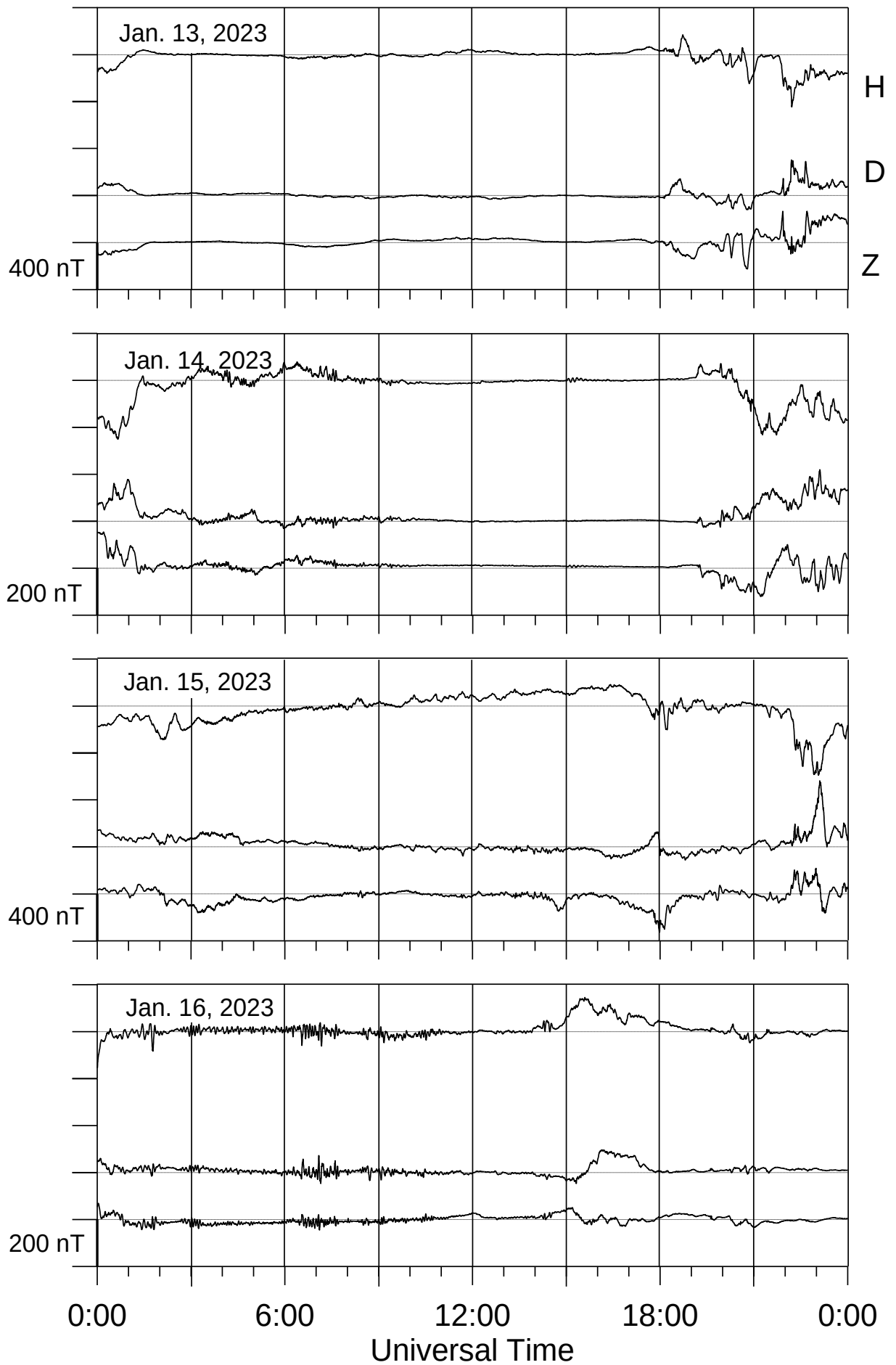
## Loparskaya magnetometer



## Loparskaya magnetometer

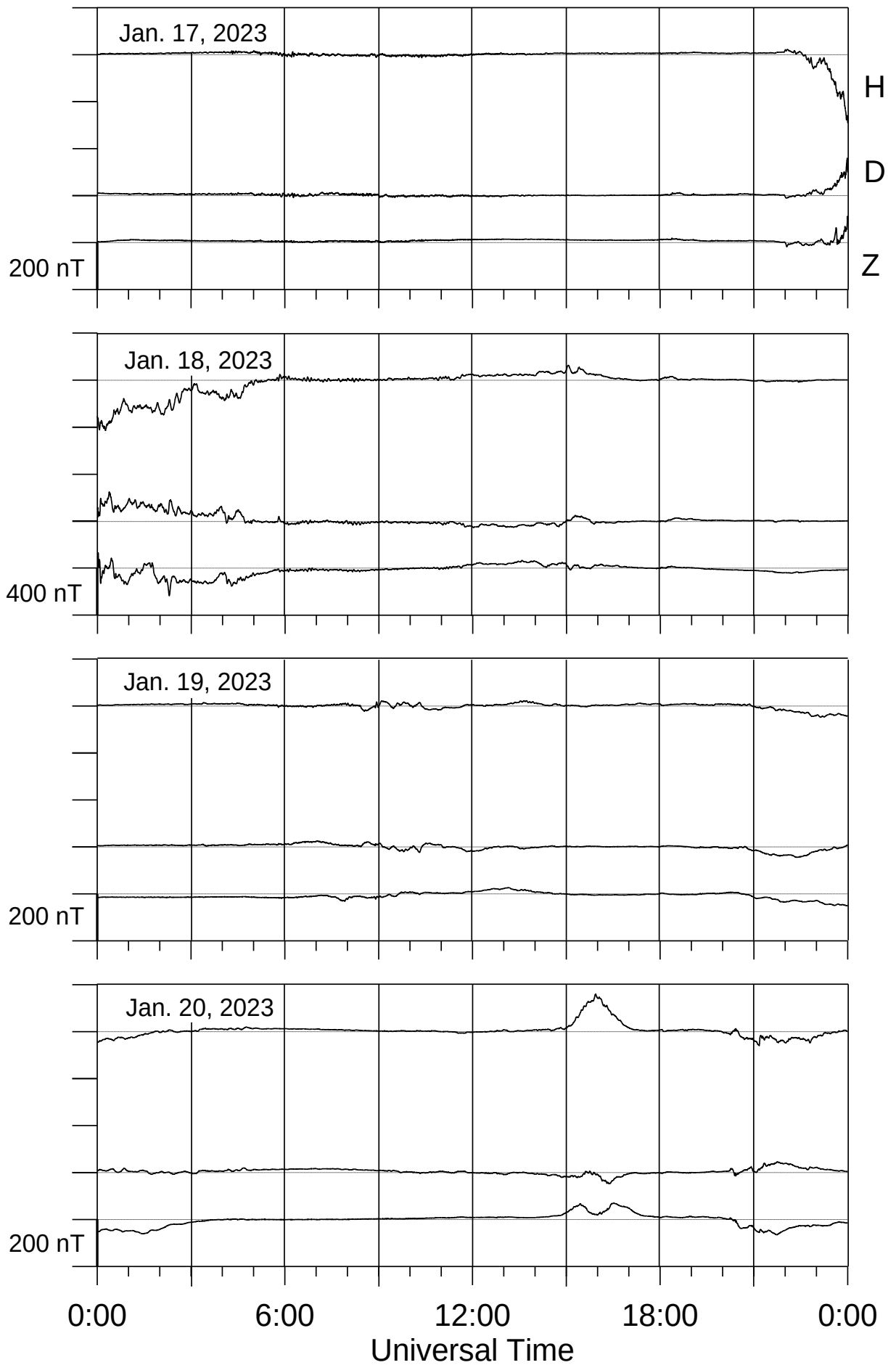


## Loparskaya magnetometer

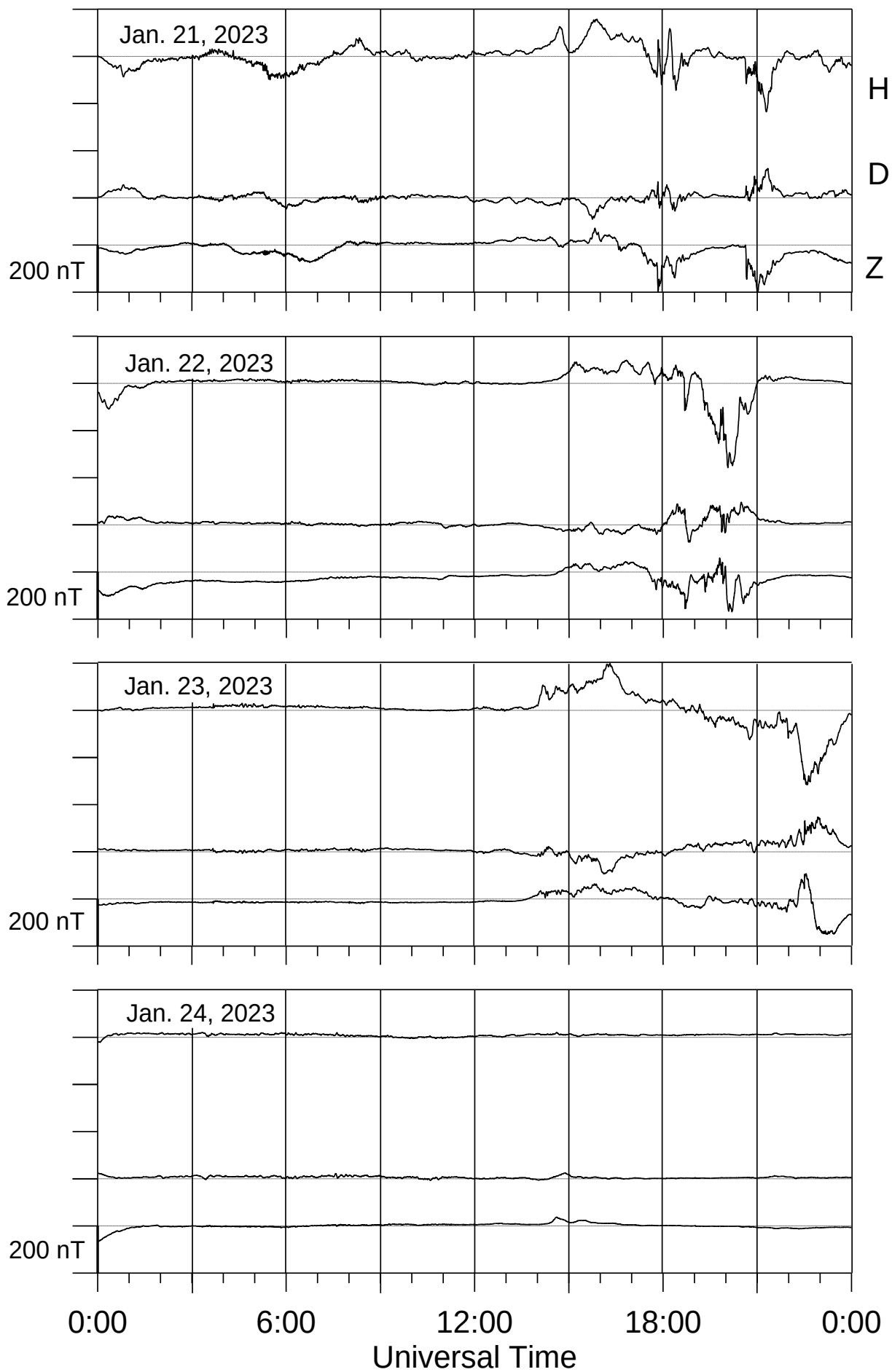




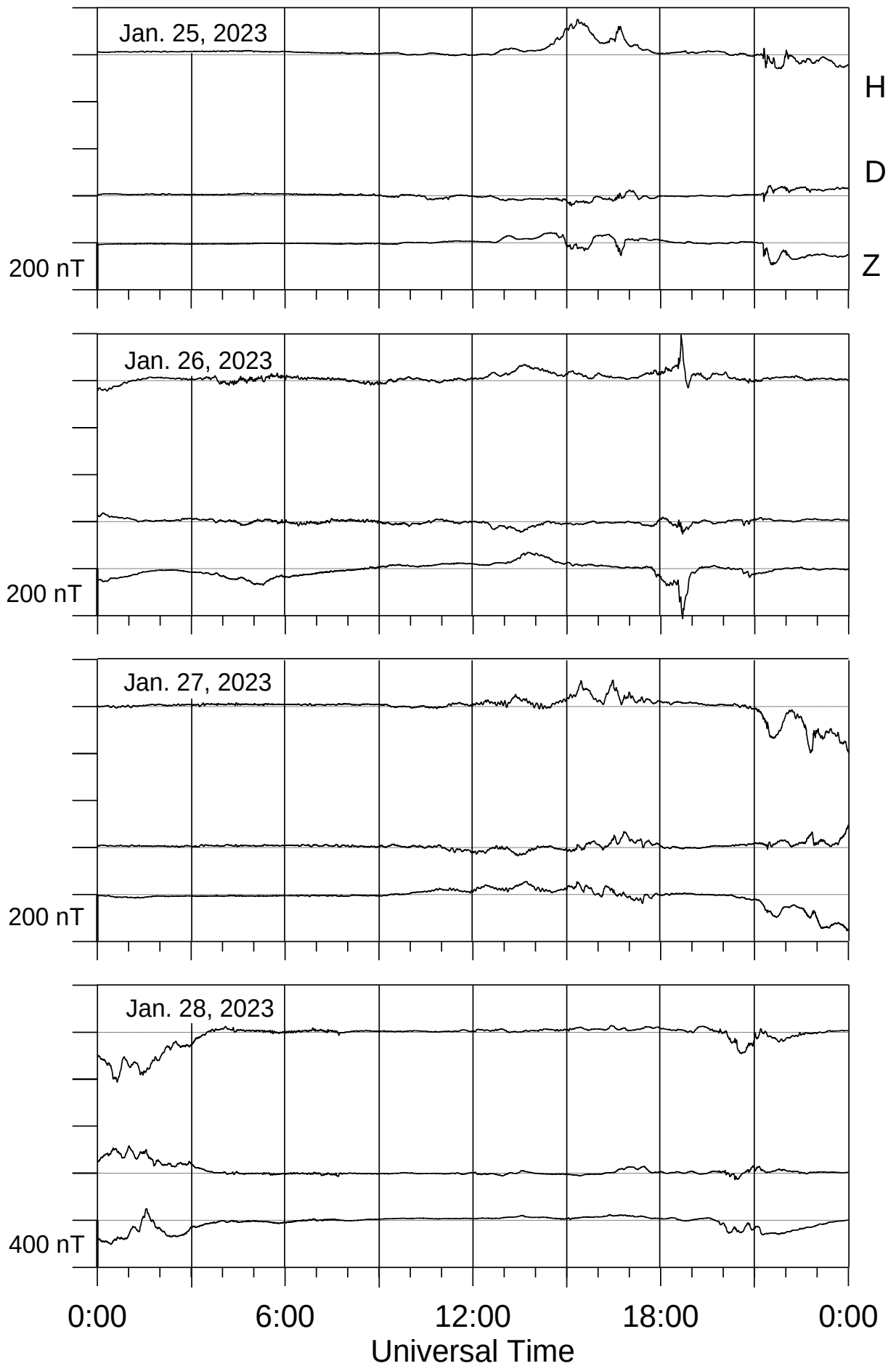
## Loparskaya magnetometer



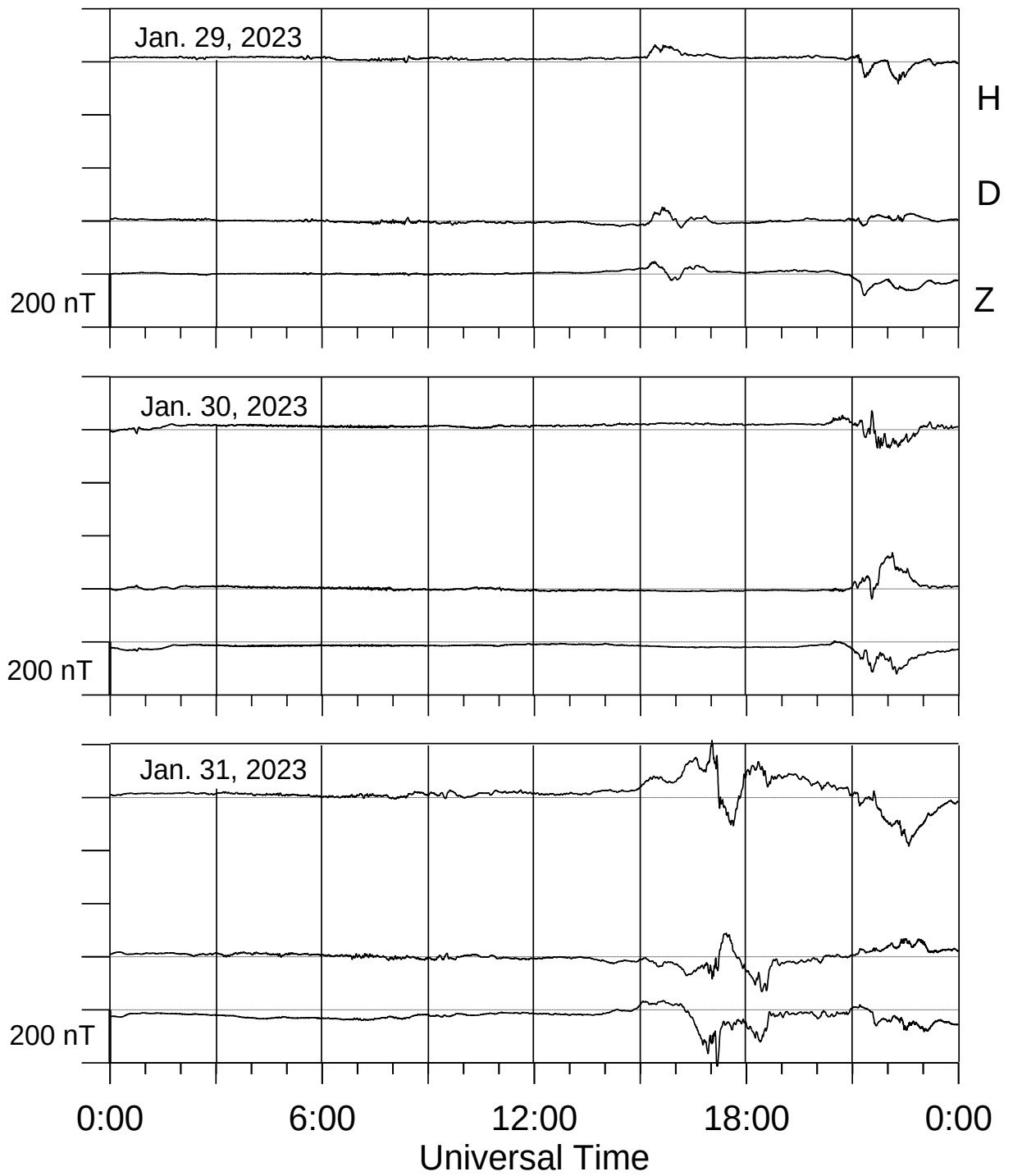
## Loparskaya magnetometer



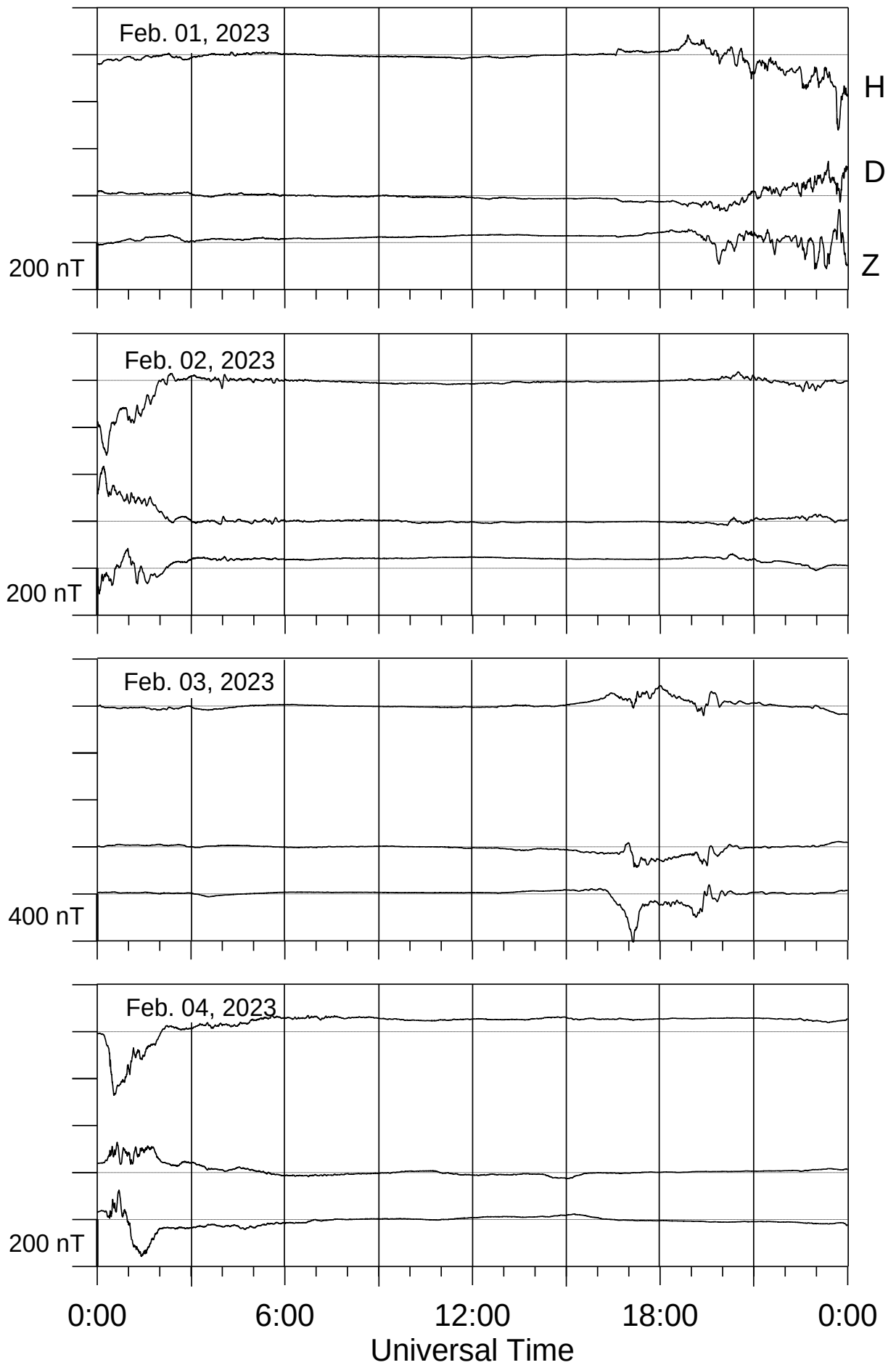
## Loparskaya magnetometer



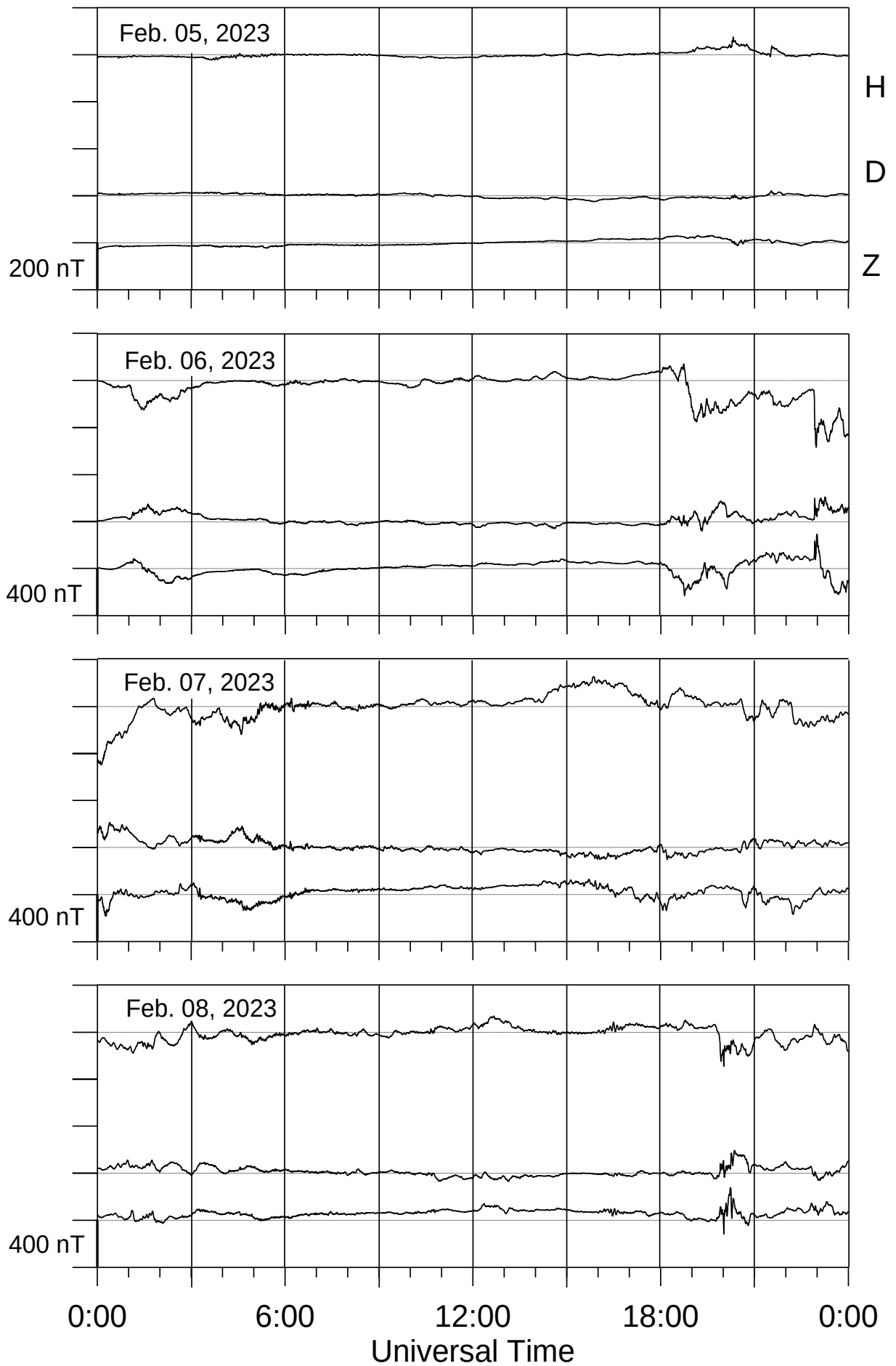
## Loparskaya magnetometer



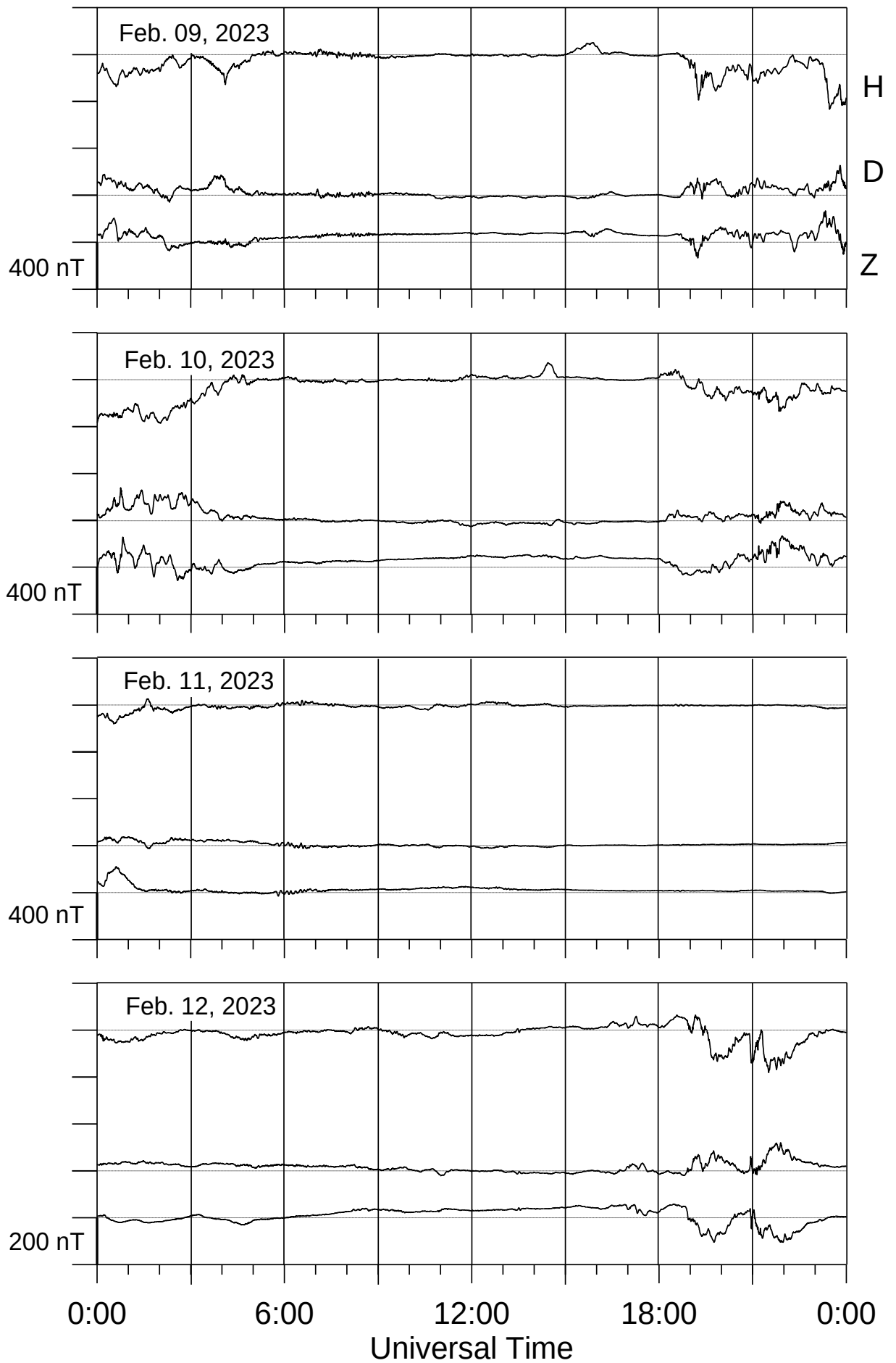
## Loparskaya magnetometer



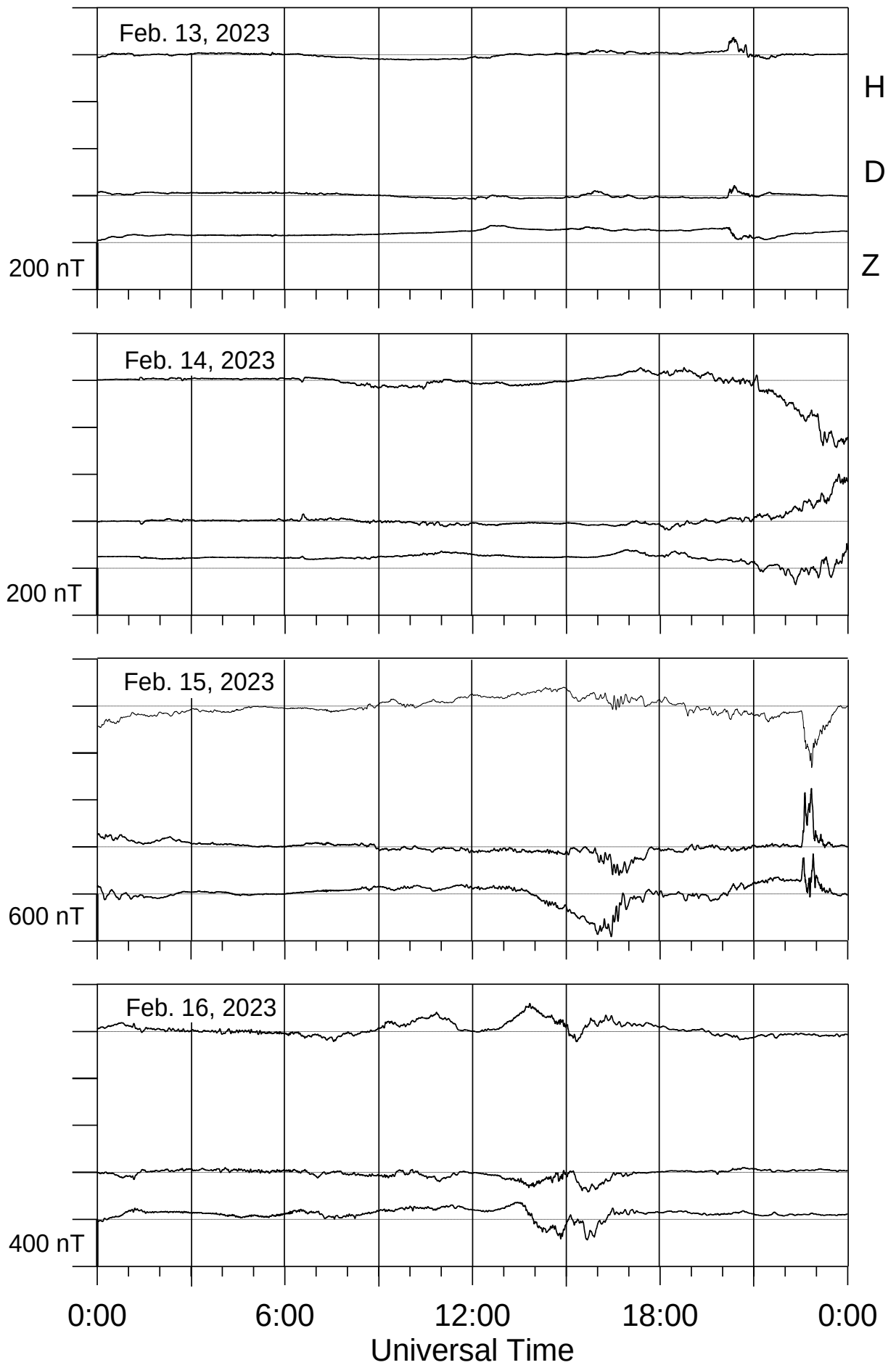
## Loparskaya magnetometer



## Loparskaya magnetometer

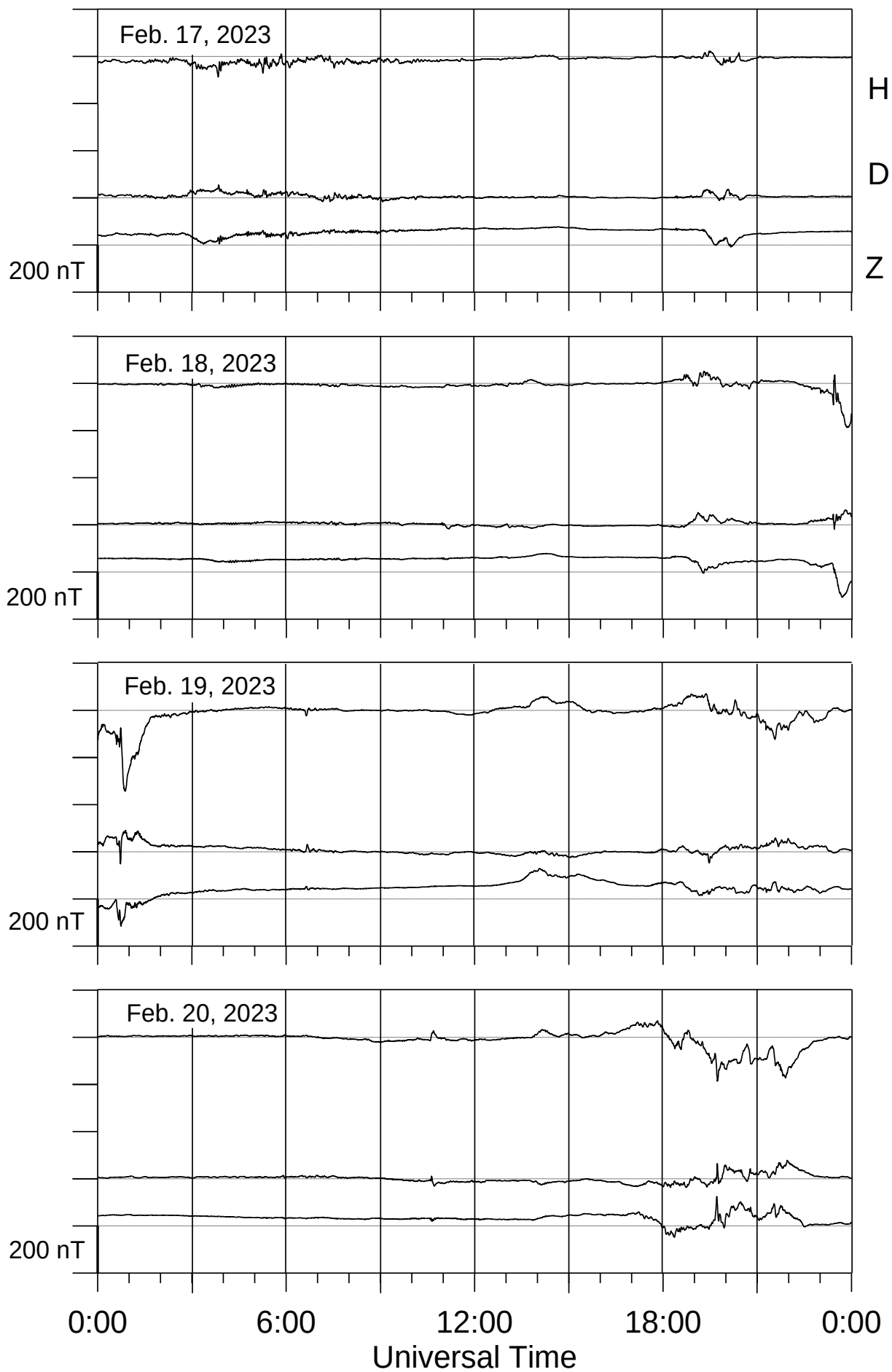


## Loparskaya magnetometer

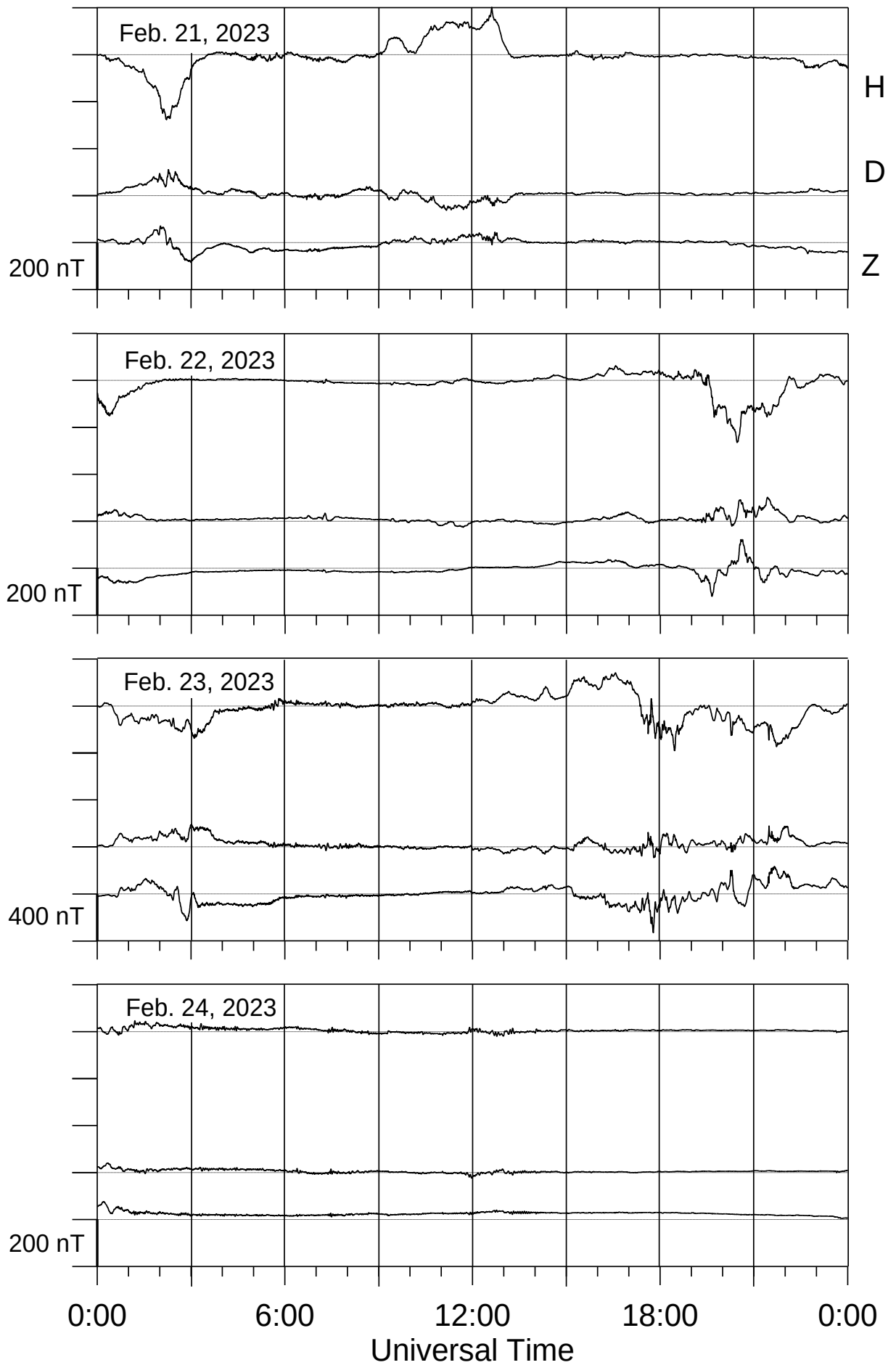




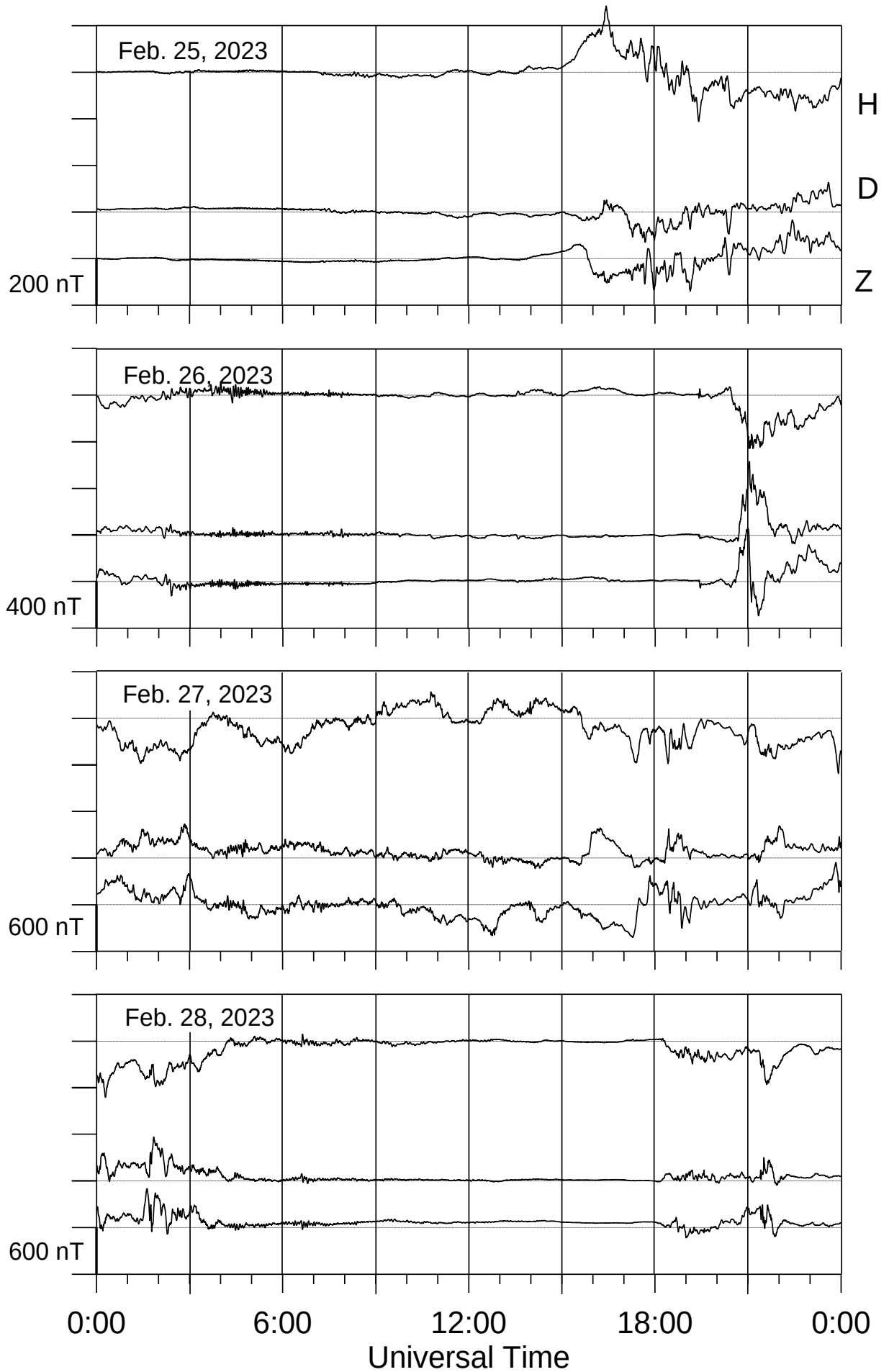
## Loparskaya magnetometer



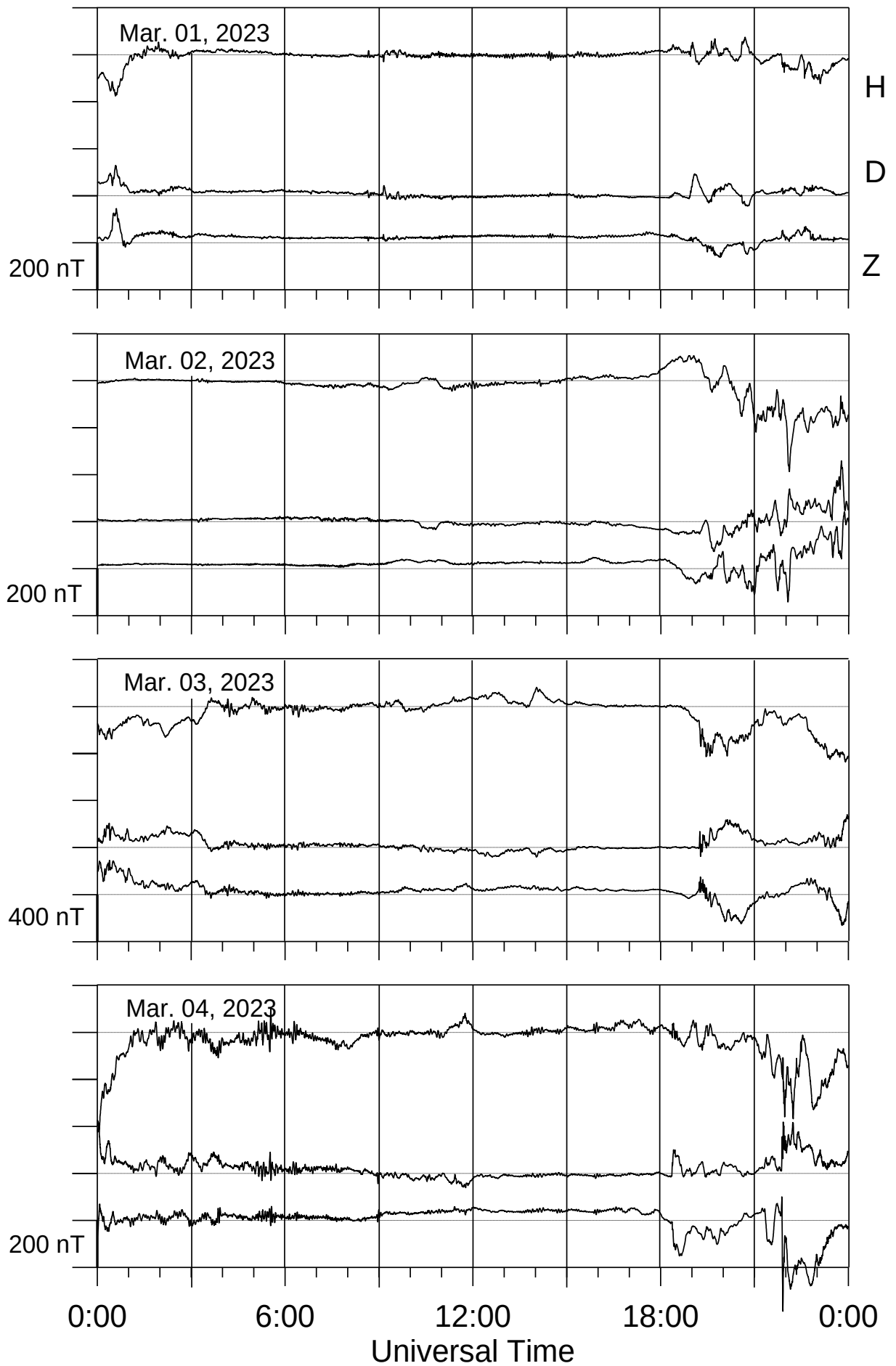
## Loparskaya magnetometer



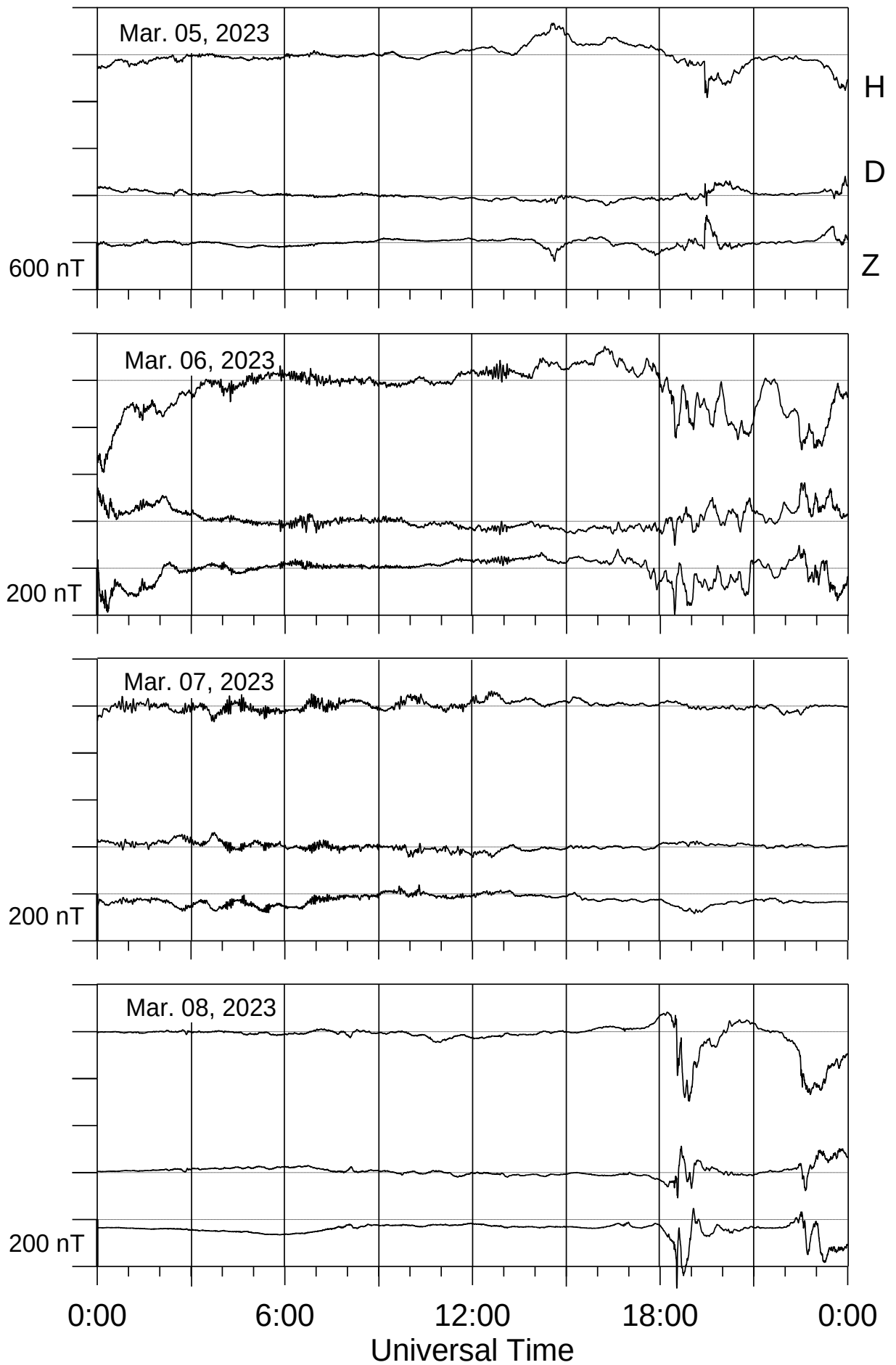
## Loparskaya magnetometer



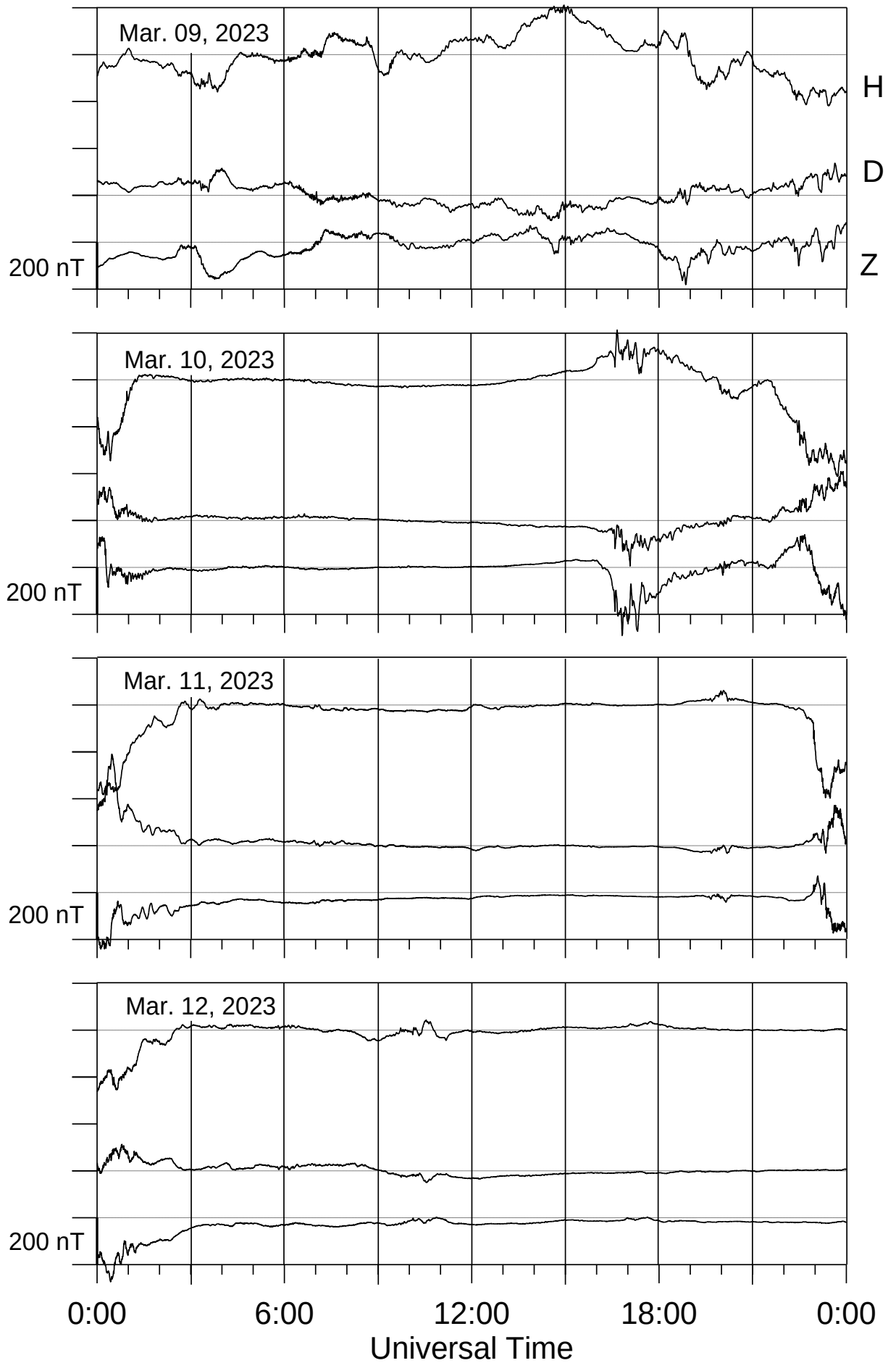
## Loparskaya magnetometer



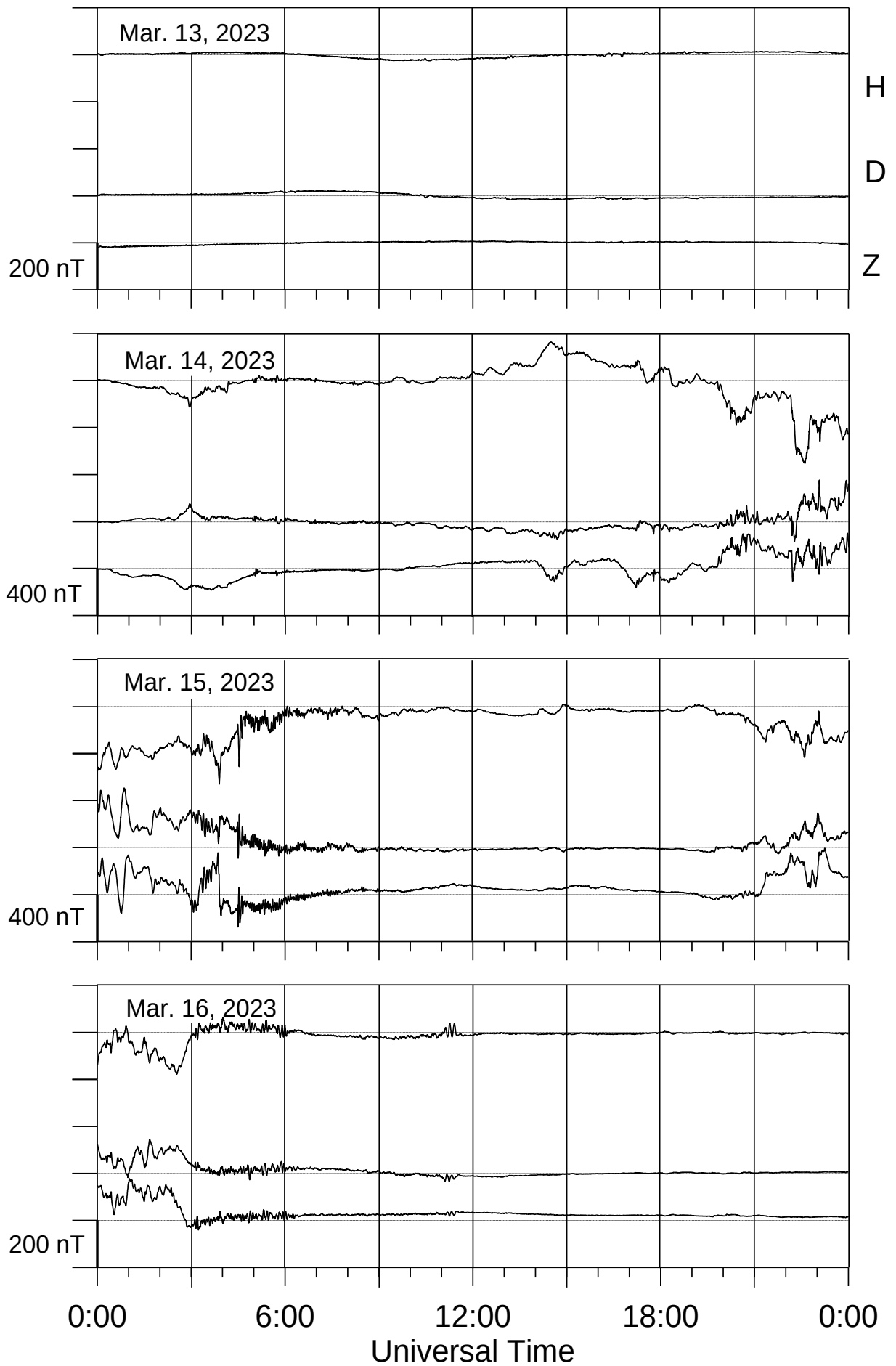
## Loparskaya magnetometer



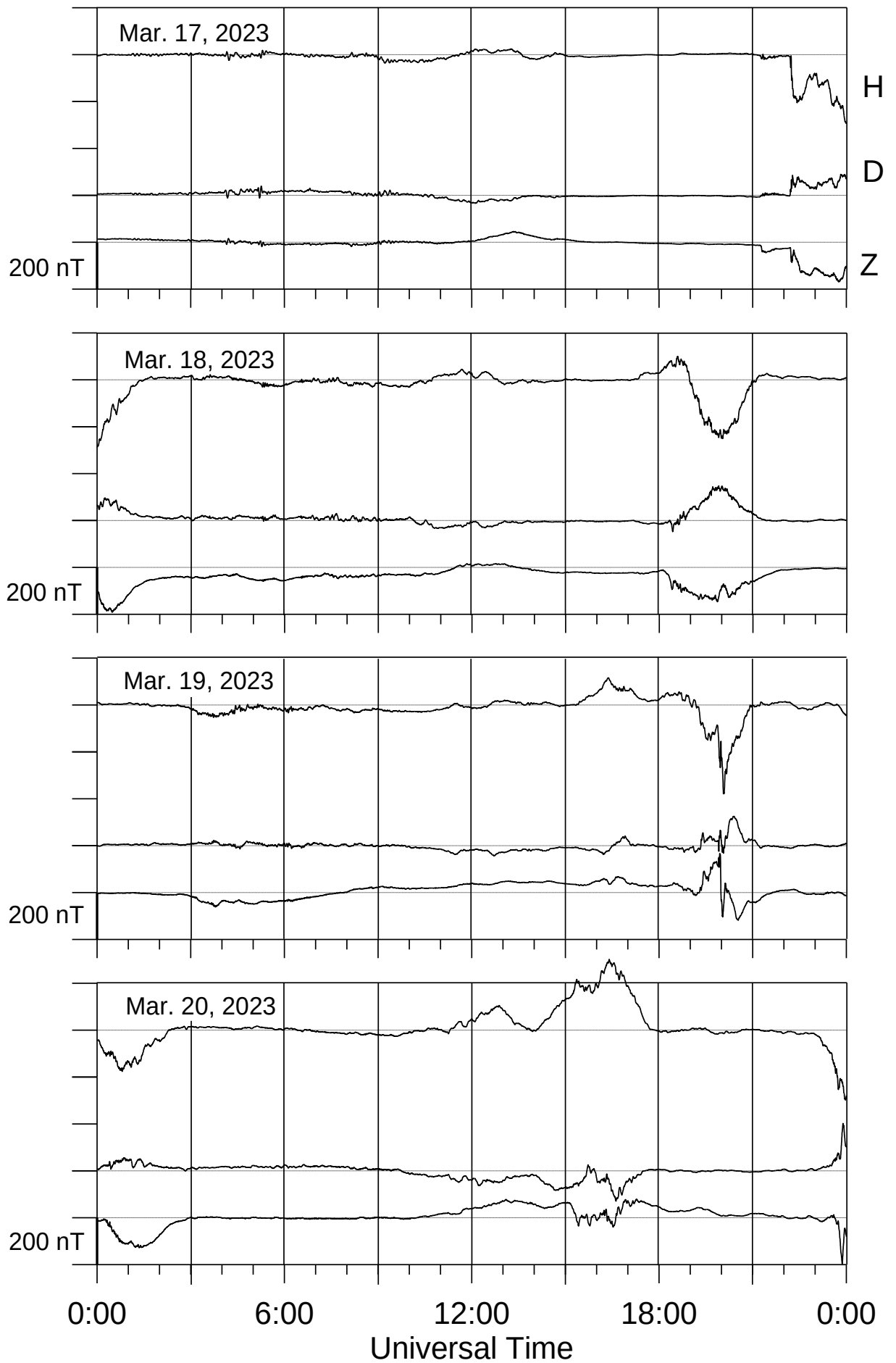
## Loparskaya magnetometer



## Loparskaya magnetometer

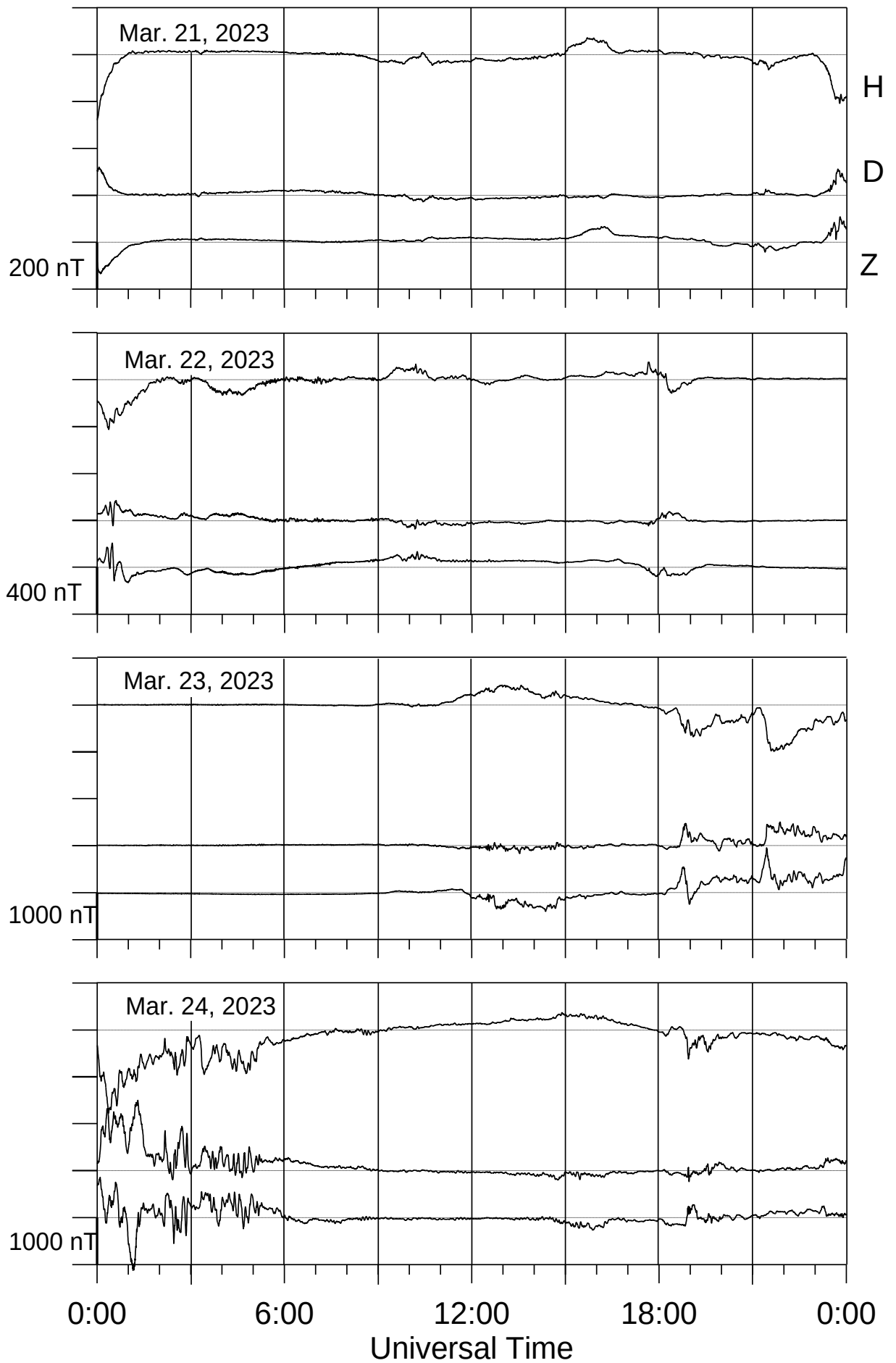


## Loparskaya magnetometer

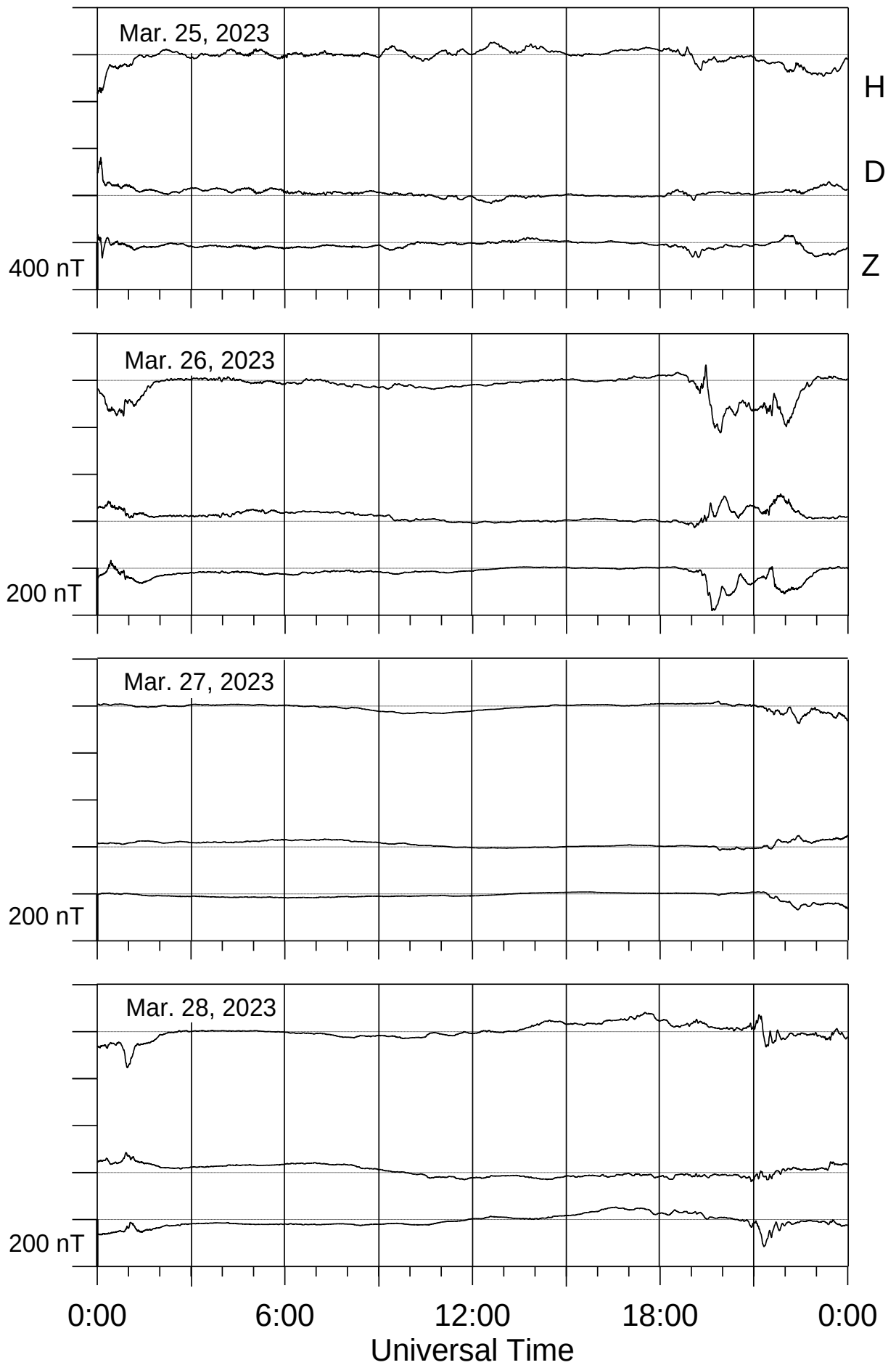




## Loparskaya magnetometer



## Loparskaya magnetometer



## Loparskaya magnetometer

