POLAR GEOPHYSICAL INSTITUTE
**RUSSIAN ACADEMY OF SCIENCES**

# PGI
# GEOPHYSICAL DATA

## 2024
## *JANUARY*
## *FEBRUARY*
## *MARCH*

MURMANSK, APATITY, **RUSSIA**
May 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 first quarter of 2024. 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

CONTENTS:

DATA DESCRIPTION

### *Magnetic data*

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

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

### *Geomagnetic K-indices*

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

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

***Cosmic ray data***

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

| | |
|---|---|
| January | 5737.03 |
| February | 5777.14 |
| March | 5795.61 |

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

Please visit **http://pgia.ru/data/**

***All-sky camera observations***

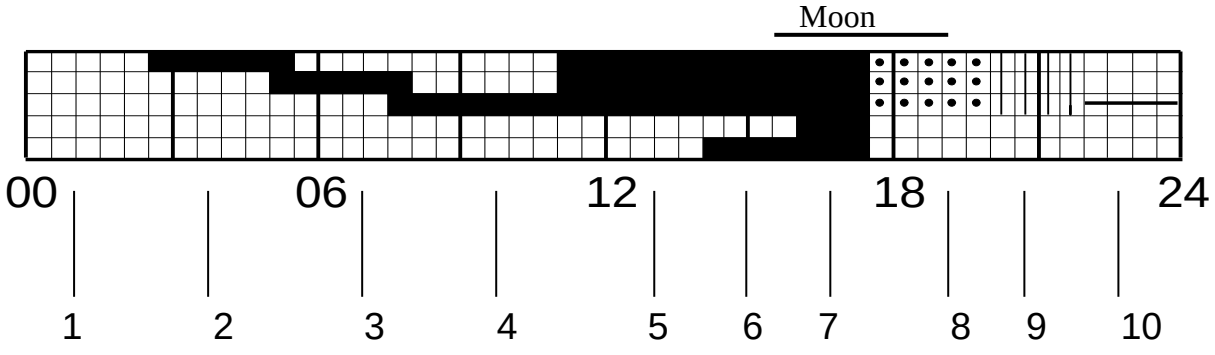
*Calendar*

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- aurorae present in north range
3- weak aurorae present in zenith range
4- aurorae 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 |
| ***Loparskaya*** | LOP | 68.63° N | 33.25° E | 64.94° N | 113.6° E |
| ***Verhnetulomsky*** | VTL | 68.59° N | 31.75° E | 64.92° N | 113.0° E |
| ***Lovozero*** | LOZ | 67.97° N | 35.02° E | 64.17° N | 115.3° E |
| ***Apatity*** | APT | 67.58° N | 33.31° E | 63.86° N | 113.6° E |

**Please visit**

***http://pgia.ru/data/***

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184209, RUSSIA

# GEOMAGNETIC K-INDICES, LOVOZERO
January, 2024
Lower limit of K=9 is 1500 nT

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

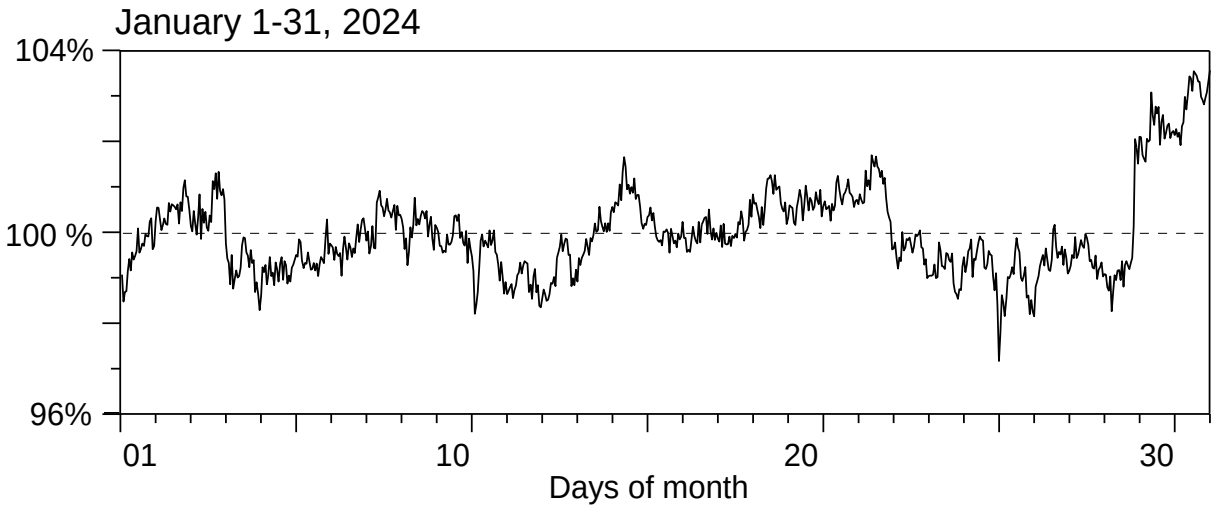
# GEOMAGNETIC K-INDICES, LOVOZERO
February, 2024
Lower limit of K=9 is 1500 nT

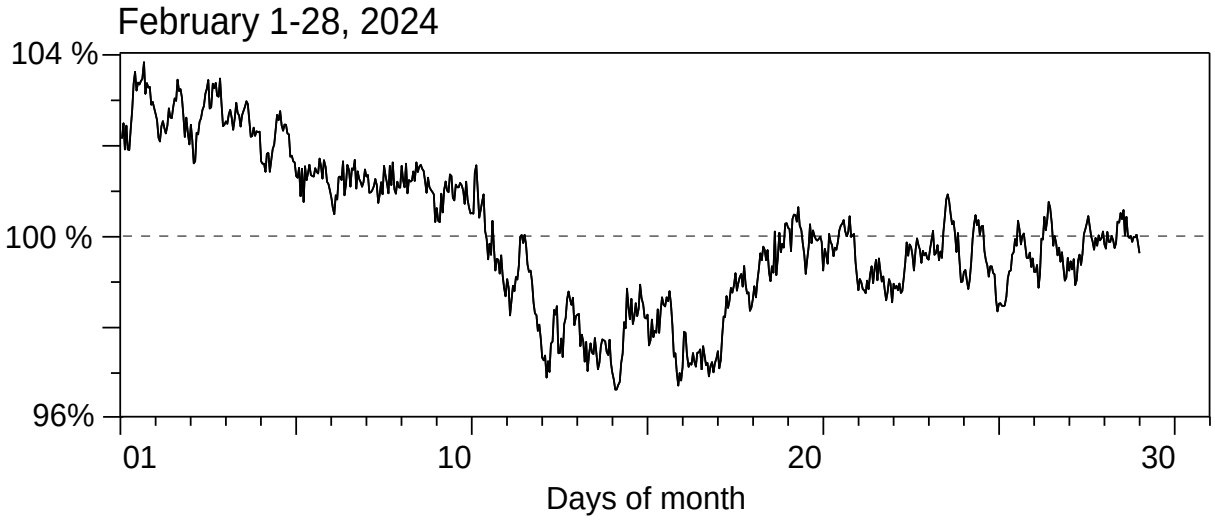
| Day | Time, UT 03 | 06 | 09 | 12 | 15 | 18 | 21 | 24 | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 1 1 | 0 0 0 | 0 0 0 | 1 1 1 | 1 1 1 | 0 1 2 | 3 2 1 | 1 1 0 | |
| 2 | 0 0 0 | 0 0 0 | 0 0 0 | 0 1 1 | 1 0 0 | 0 0 0 | 0 0 0 | 0 0 0 | Q |
| 3 | 0 0 0 | 0 0 0 | 0 0 0 | 0 1 1 | 1 1 1 | 1 0 0 |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

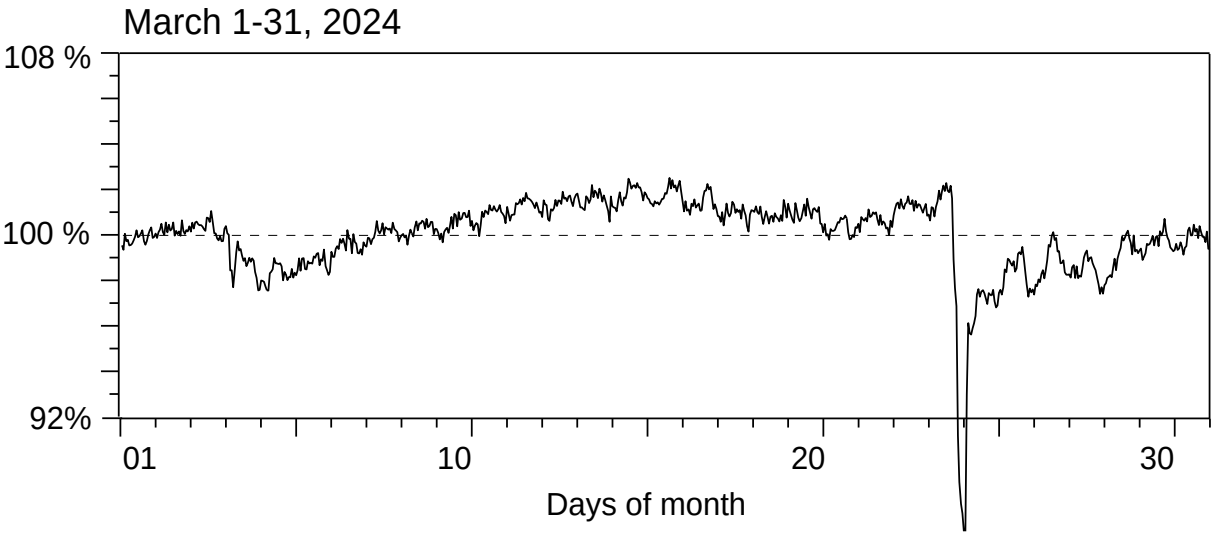
# GEOMAGNETIC K-INDICES, LOVOZERO
March, 2024
Lower limit of K=9 is 1500 nT

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

# Apatity neutron monitor



# ALL – SKY CAMERA OBSERVATIONS

## January - March 2024

# CALENDAR OF **TV** OBSERVATIONS

January 01 - 02

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

January 02 - 03

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

January 03 - 04

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

January 04 - 05

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

January 05- 06

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

January 06 - 07

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

January 07 - 08

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

# CALENDAR OF **TV** OBSERVATIONS

January 08 - 09

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

January 09 -10

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

January 10 -11

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

January 11 - 12

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

January 12 - 13

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

January 13 - 14

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

January 14- 15

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

# CALENDAR OF **TV** OBSERVATIONS

January 15 - 16

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

January 16 - 17

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

January17 - 18

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

January18 - 19

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

January19 - 20

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

January20 - 21

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

January21 - 22

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

# CALENDAR OF **TV** OBSERVATIONS

January22- 23

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

January23 - 24

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

January24 - 25

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

January25 - 26

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

January26 -27

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

January27 - 28

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

January28 - 29

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

# CALENDAR OF **TV** OBSERVATIONS

January29 - 30

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

January30 - 31

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

January31

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

# CALENDAR OF **TV** OBSERVATIONS

February 01 - 02

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

February 02 - 03

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

February 03 - 04

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

February 04 - 05

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

February 05- 06

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

February 06 - 07

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

February 07 - 08

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

# CALENDAR OF **TV** OBSERVATIONS

February 08 - 09

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

February 09 - 10

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

February10 -11

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

February11 - 12

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

February12 - 13

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

February13 - 14

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

February14 - 15

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

# CALENDAR OF **TV** OBSERVATIONS

February15 - 16

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

February16 - 17

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

February17 - 18

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

February18 - 19

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

February19 - 20

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

February20 - 21

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

February21 - 22

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

# CALENDAR OF **TV** OBSERVATIONS

February22- 23

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

February23 - 24

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

February24 - 25

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

February25 - 26

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

February26 -27

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

February27 - 28

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

February28 - 29

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

# CALENDAR OF **TV** OBSERVATIONS

February29

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

# CALENDAR OF **TV** OBSERVATIONS

March 01 - 02

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

March 02 - 03

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

March 03 - 04

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

March 04 - 05

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

March 05- 06

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

March 06 - 07

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

March 07 - 08

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

# CALENDAR OF **TV** OBSERVATIONS

March 08 - 09

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

March 09 - 10

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

March 10 -11

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

March 11 - 12

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

March 12 - 13

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

March 13 - 14

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

March 14- 15

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

# CALENDAR OF **TV** OBSERVATIONS

March 15 - 16

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

March 16 - 17

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

March 17 - 18

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

March 18 - 19

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

March 19 - 20

| UT | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
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| **LOZ** | | | | — | — | — | — | — | — | — | — | — | — | | | |
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| **VTL** | | | | — | — | — | — | — | — | — | — | — | — | | | |

March 20 - 21

| UT | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
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| **LOZ** | | | | — | — | — | — | — | — | — | — | — | — | | | |
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| **VTL** | | | | — | — | — | — | — | — | — | — | — | — | | | |

March 21 - 22

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

# CALENDAR OF **TV** OBSERVATIONS

March 22- 23

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

| UT | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
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| **APT** | | | | | | | | | | | | | | | | |
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March 24 - 25

| UT | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
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| **LOZ** | | | | — | — | — | — | — | — | — | — | — | | | | |
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| **VTL** | | | | — | — | — | — | — | — | — | — | — | — | | | |

March 25 - 26

| UT | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
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| **APT** | | | | | | | | | | | | | | | | |
| **VTL** | | | | — | — | — | — | — | — | — | — | — | — | | | |

March 26 -27

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

March 27 - 28

| UT | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
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| **LOZ** | | | | — | — | — | — | — | — | — | — | — | | | | |
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March 28 - 29

| UT | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
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| **VTL** | | | | | — | — | — | — | — | — | — | — | | | | |

# CALENDAR OF **TV** OBSERVATIONS

March 29 - 30

| UT | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 01 | 02 | 03 | 04 | 05 |
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March 30 - 31

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| **VTL** | | | | | — | — | — | — | — | — | — | — | | | | |

March 31

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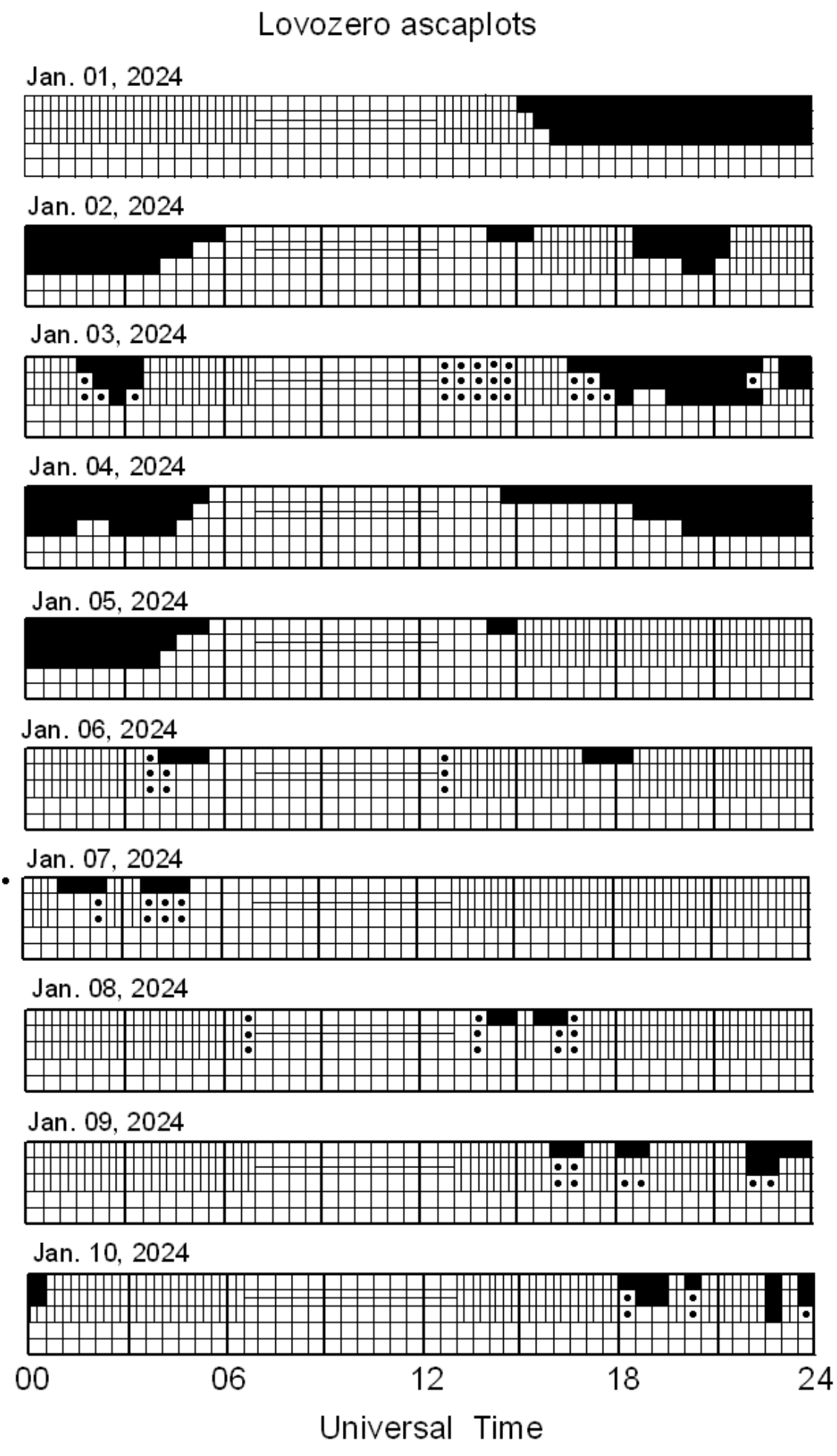
| **VTL** | | | | | — | — | — | — | — | — | — | — | | | | |


Lovozero ascaplots
Jan. 01, 2024
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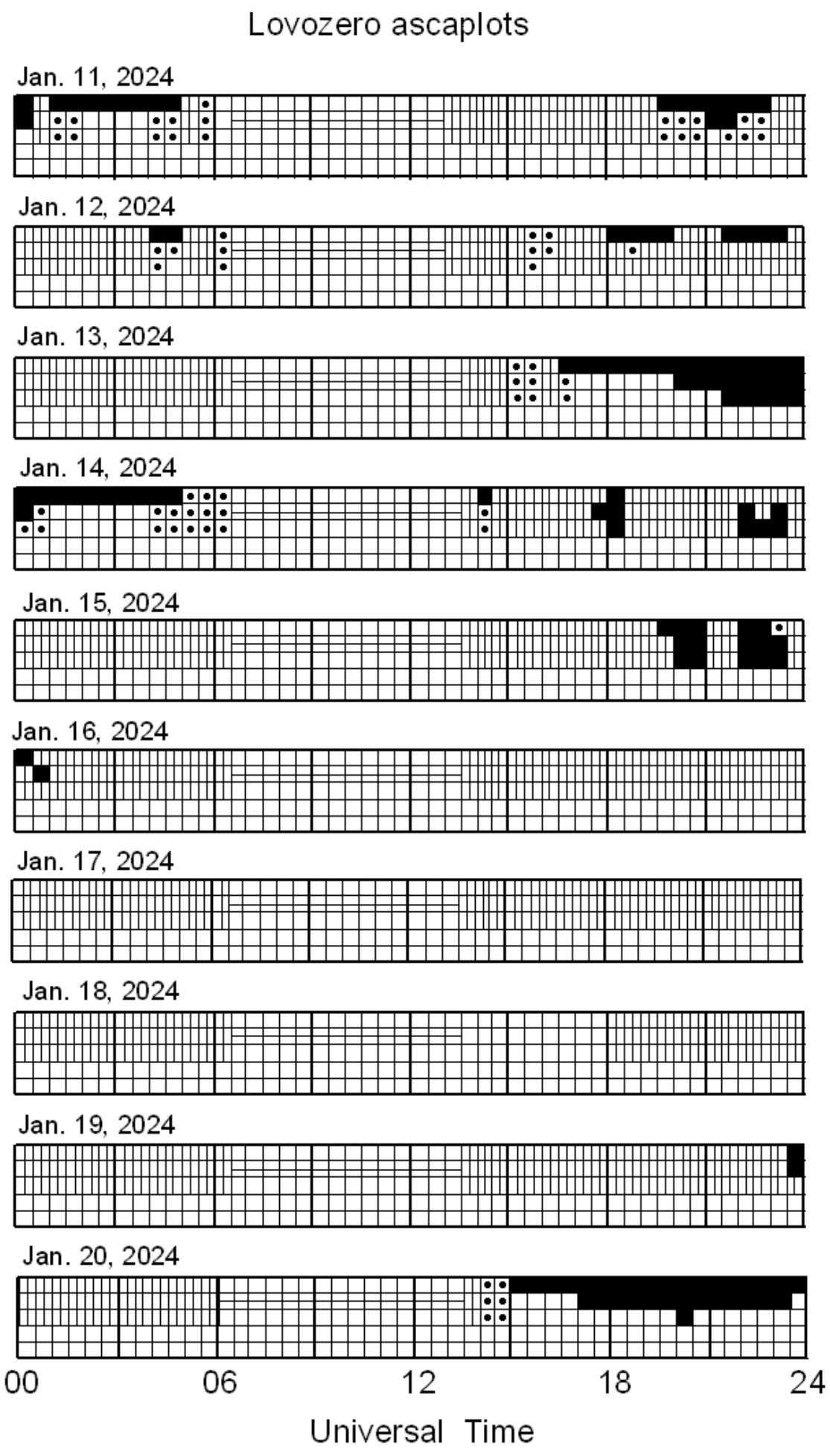
Lovozero ascaplots
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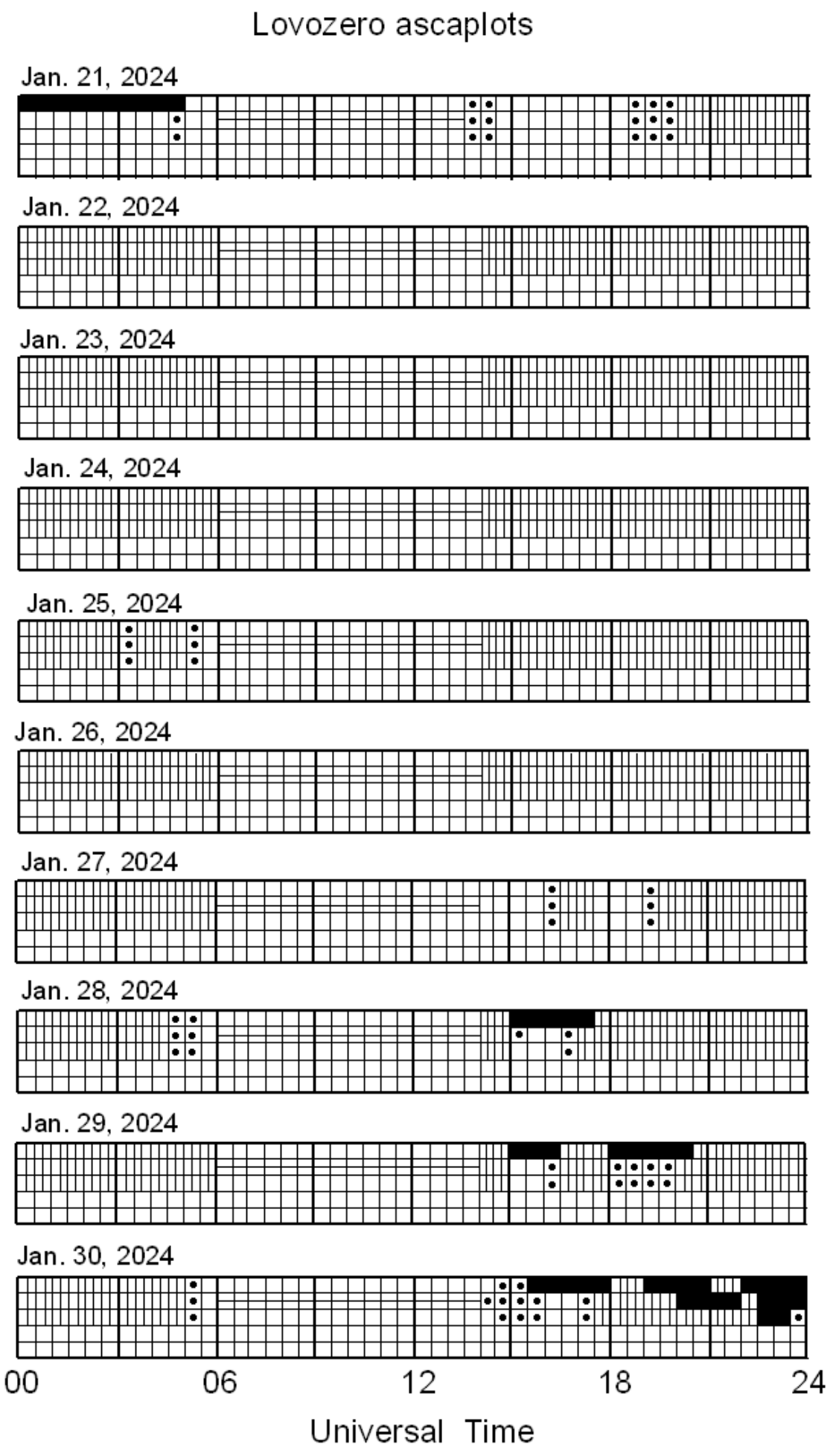
Lovozero ascaplots
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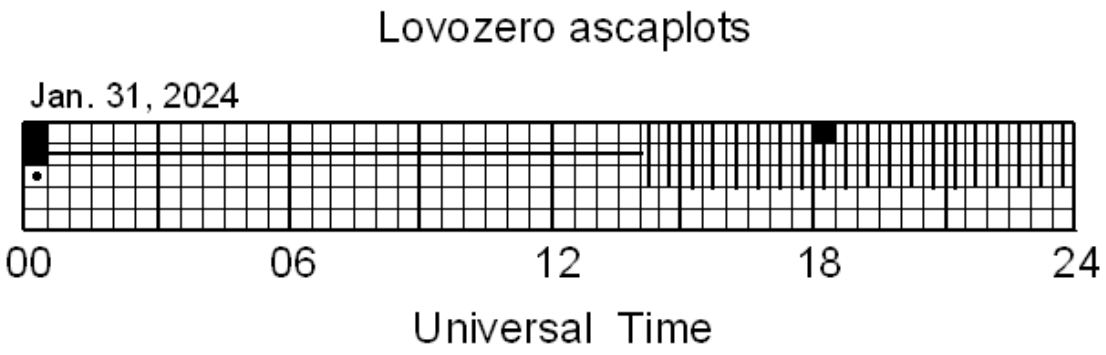
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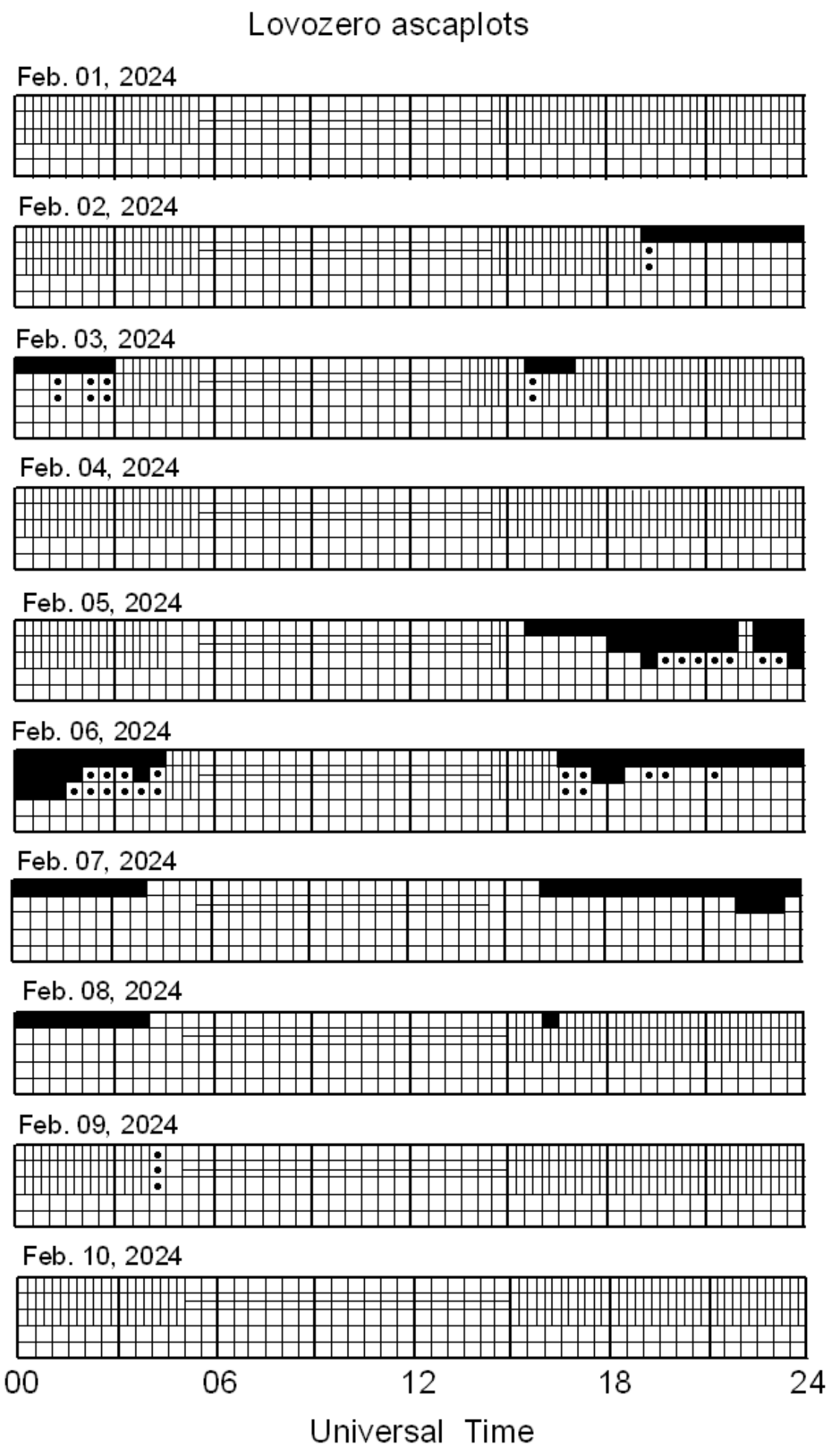
Lovozero ascaplots
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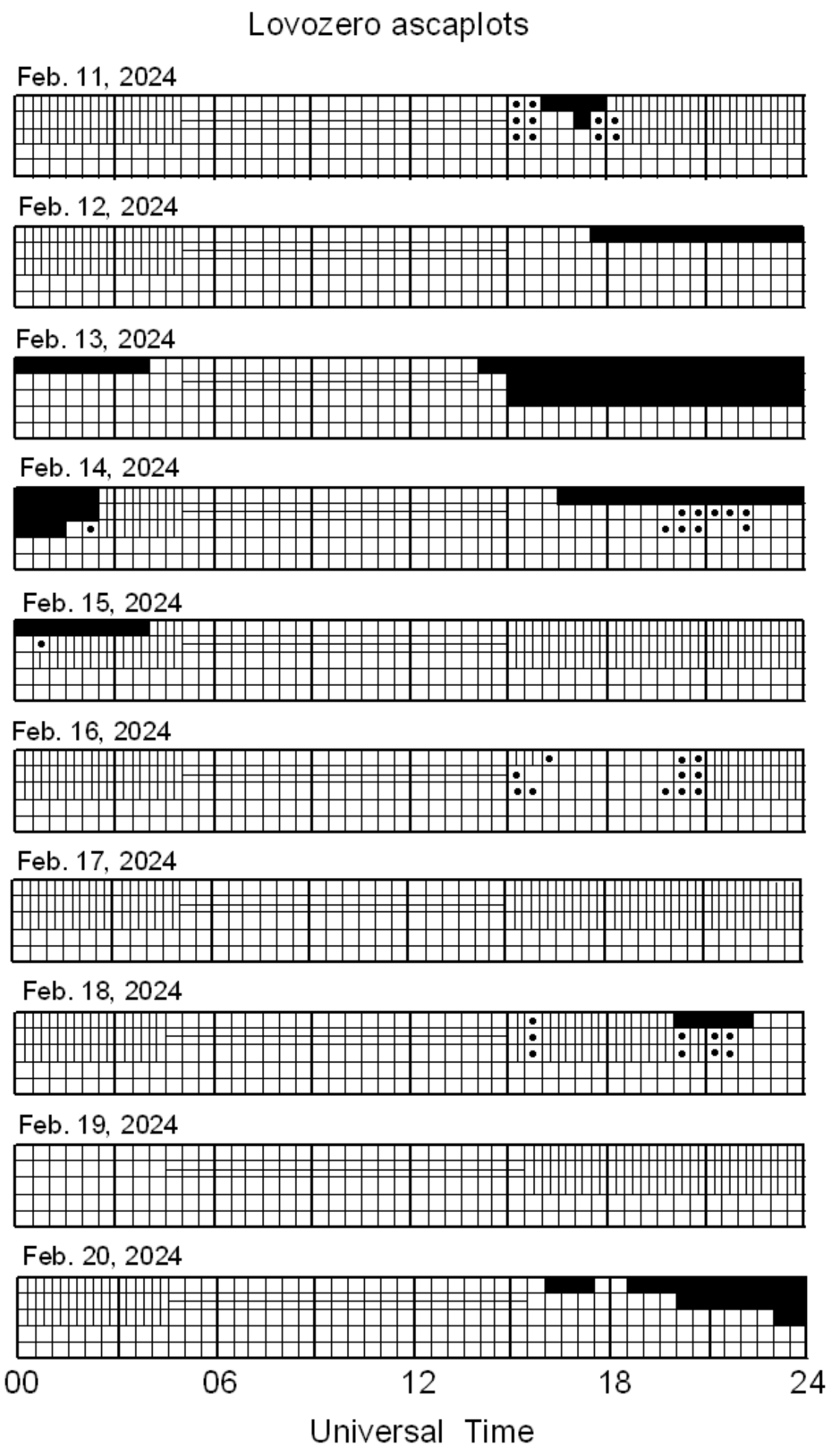
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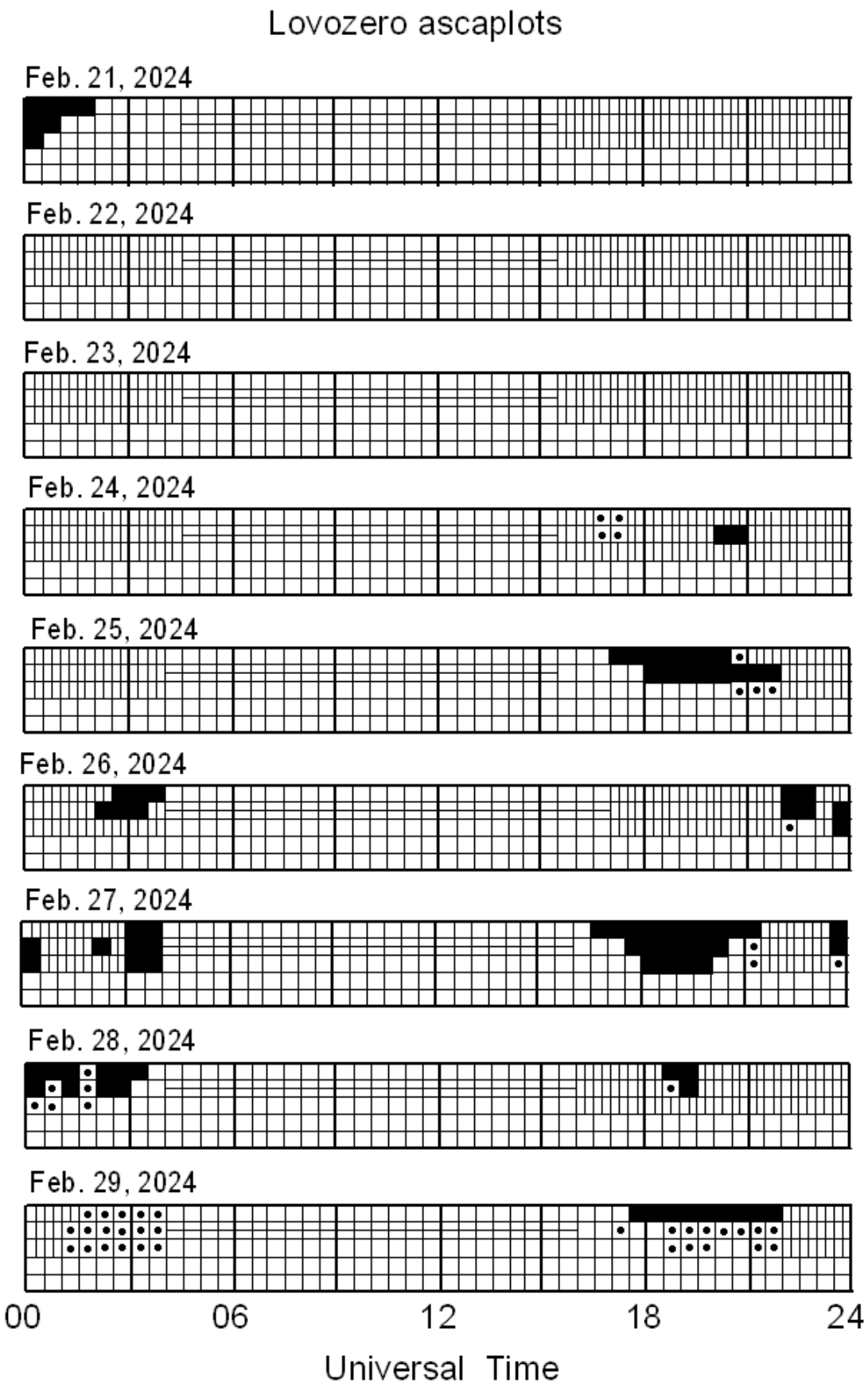
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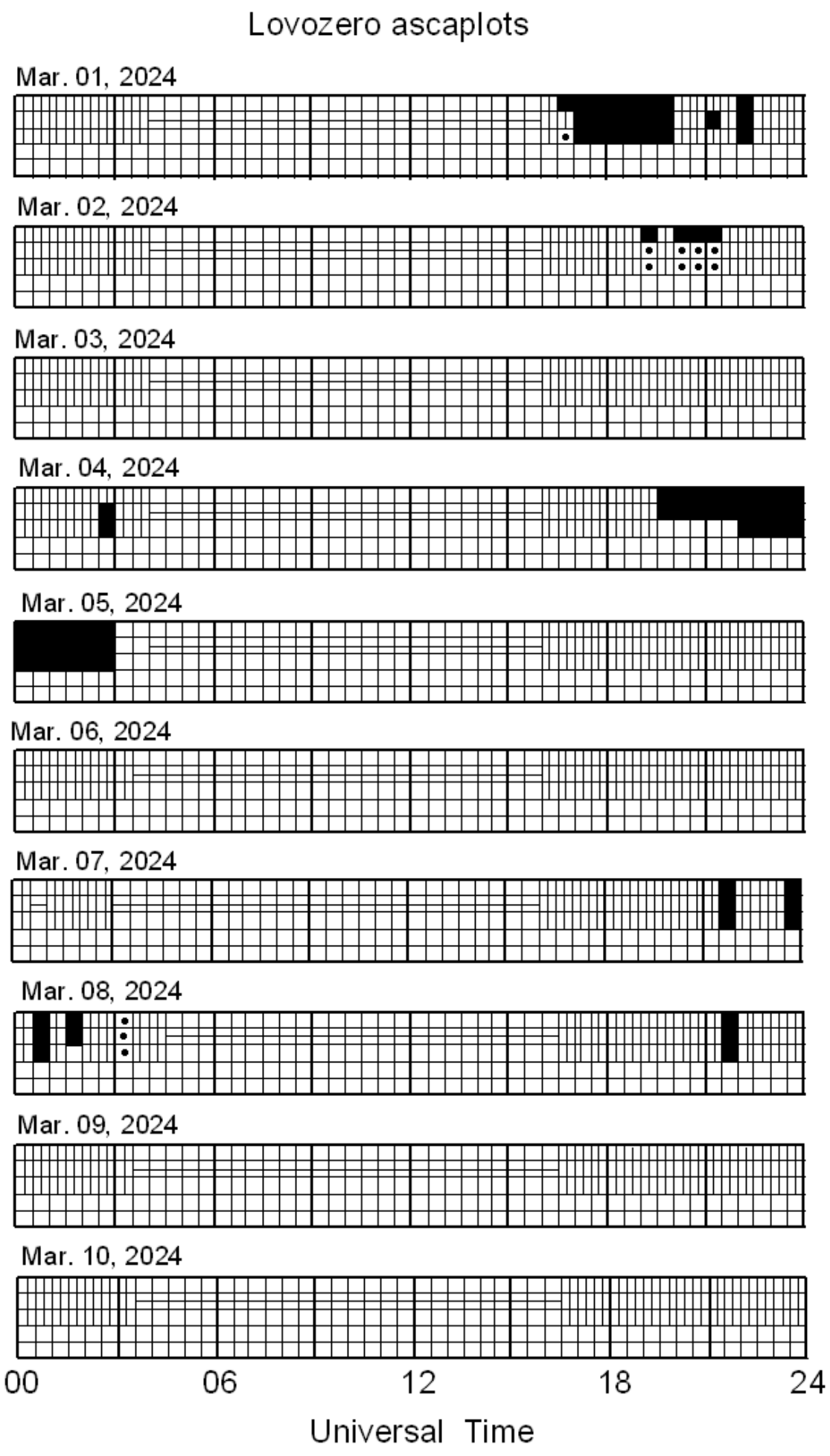
Lovozero ascaplots
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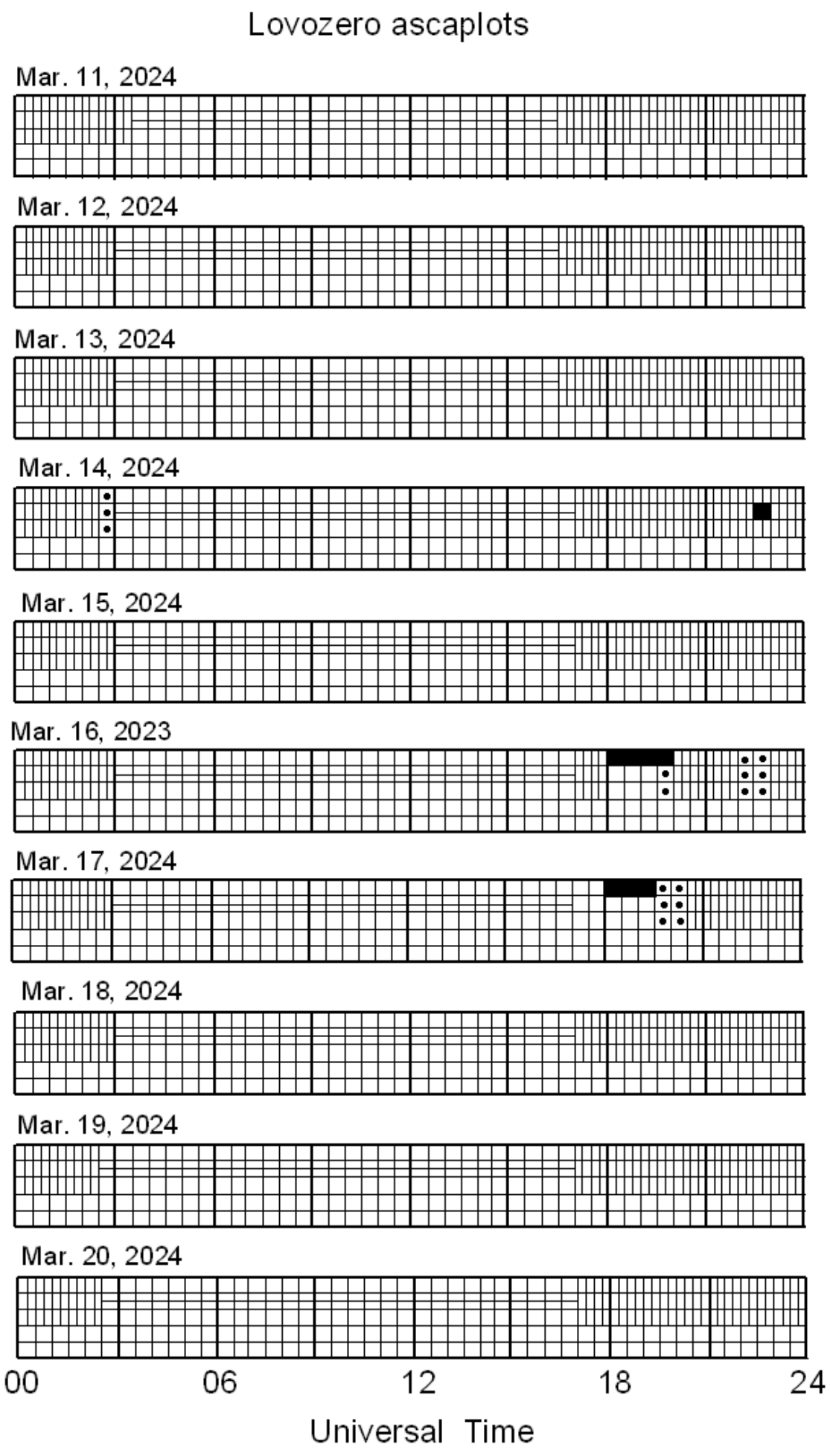
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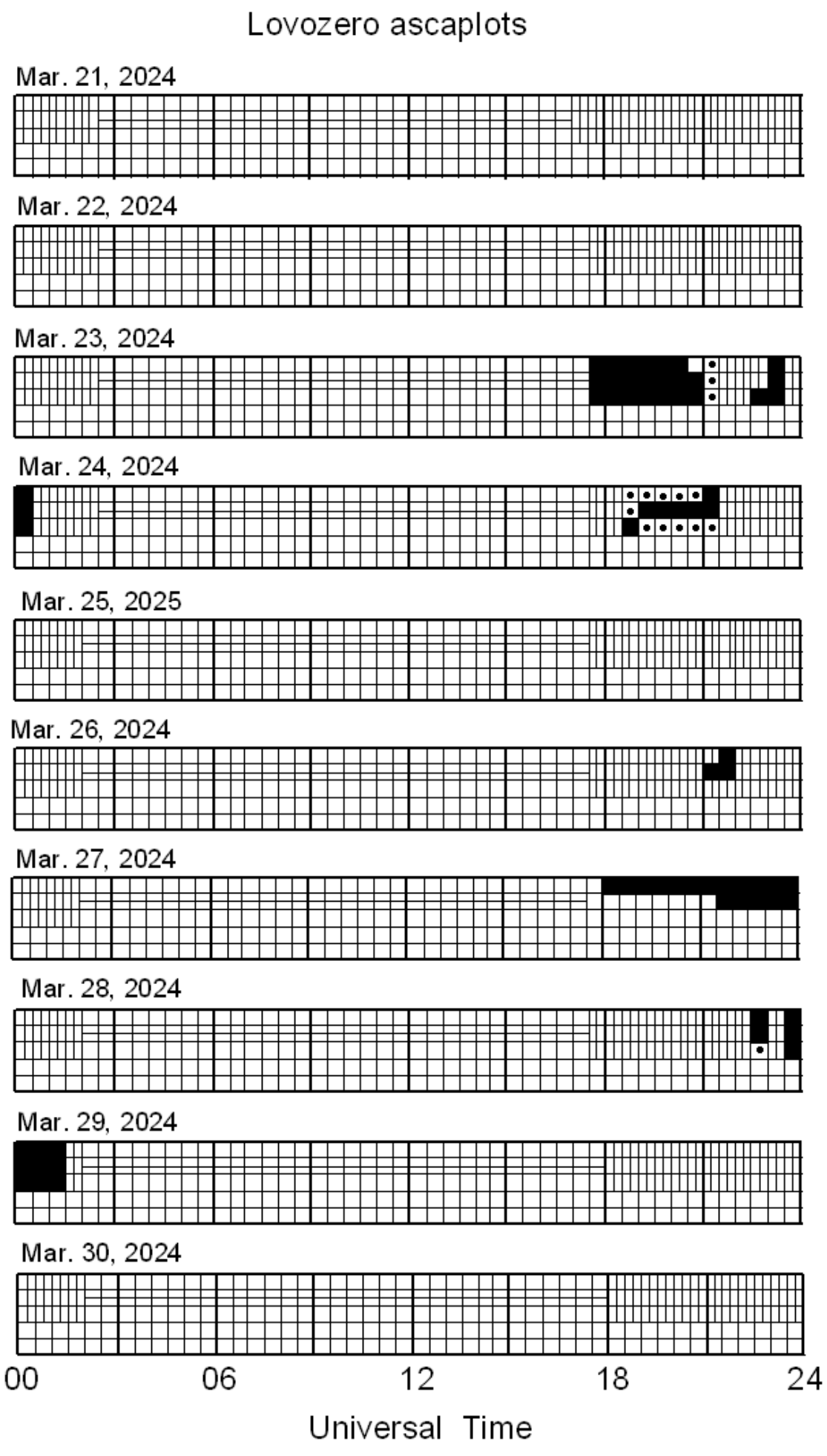
Lovozero ascaplots
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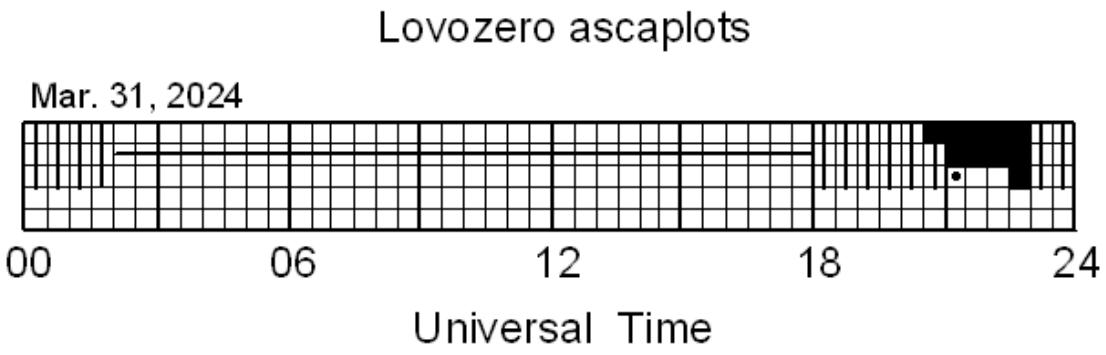
Lovozero ascaplots
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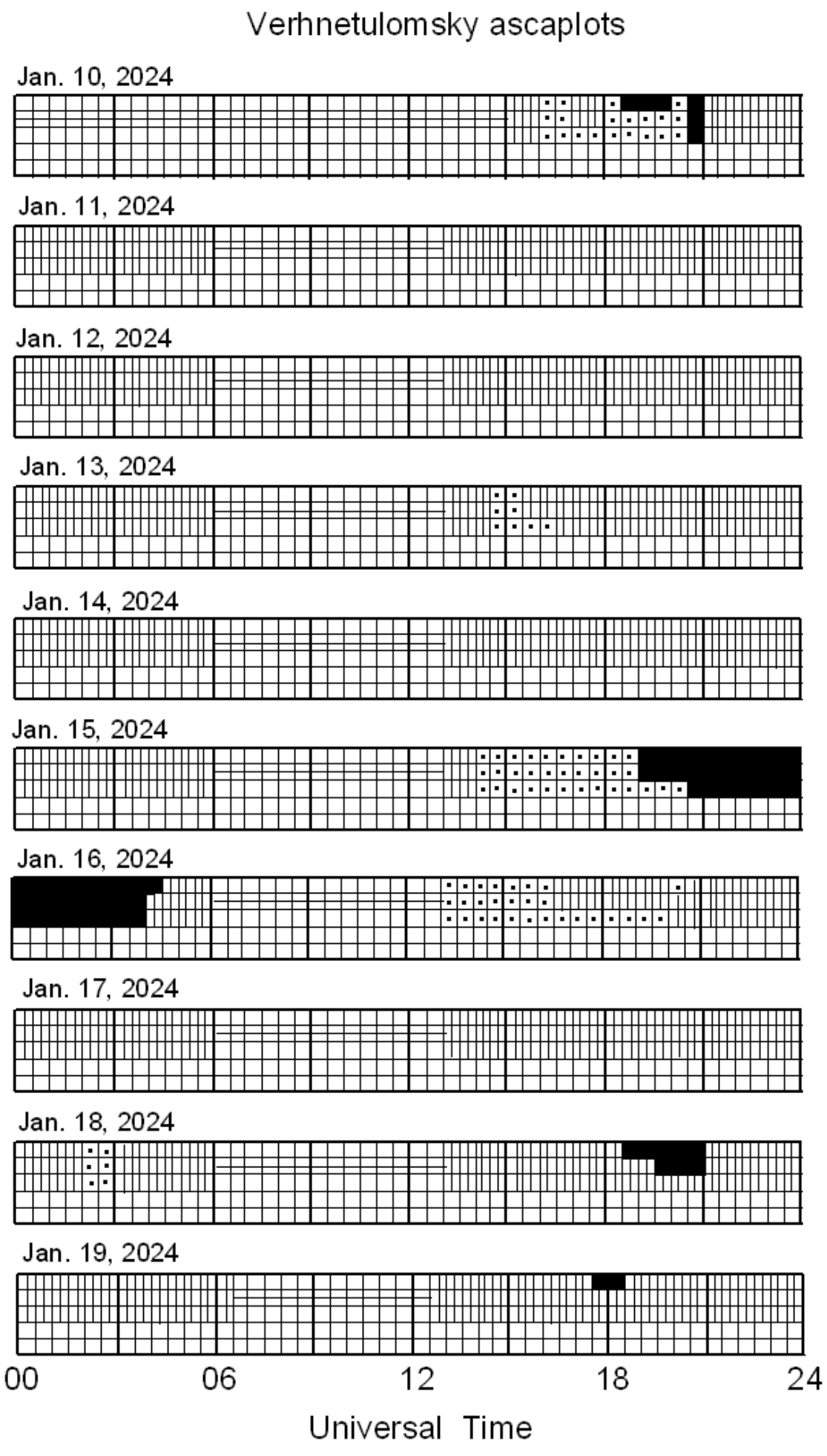
Verhnetulomsky ascaplots
Jan. 10, 2024
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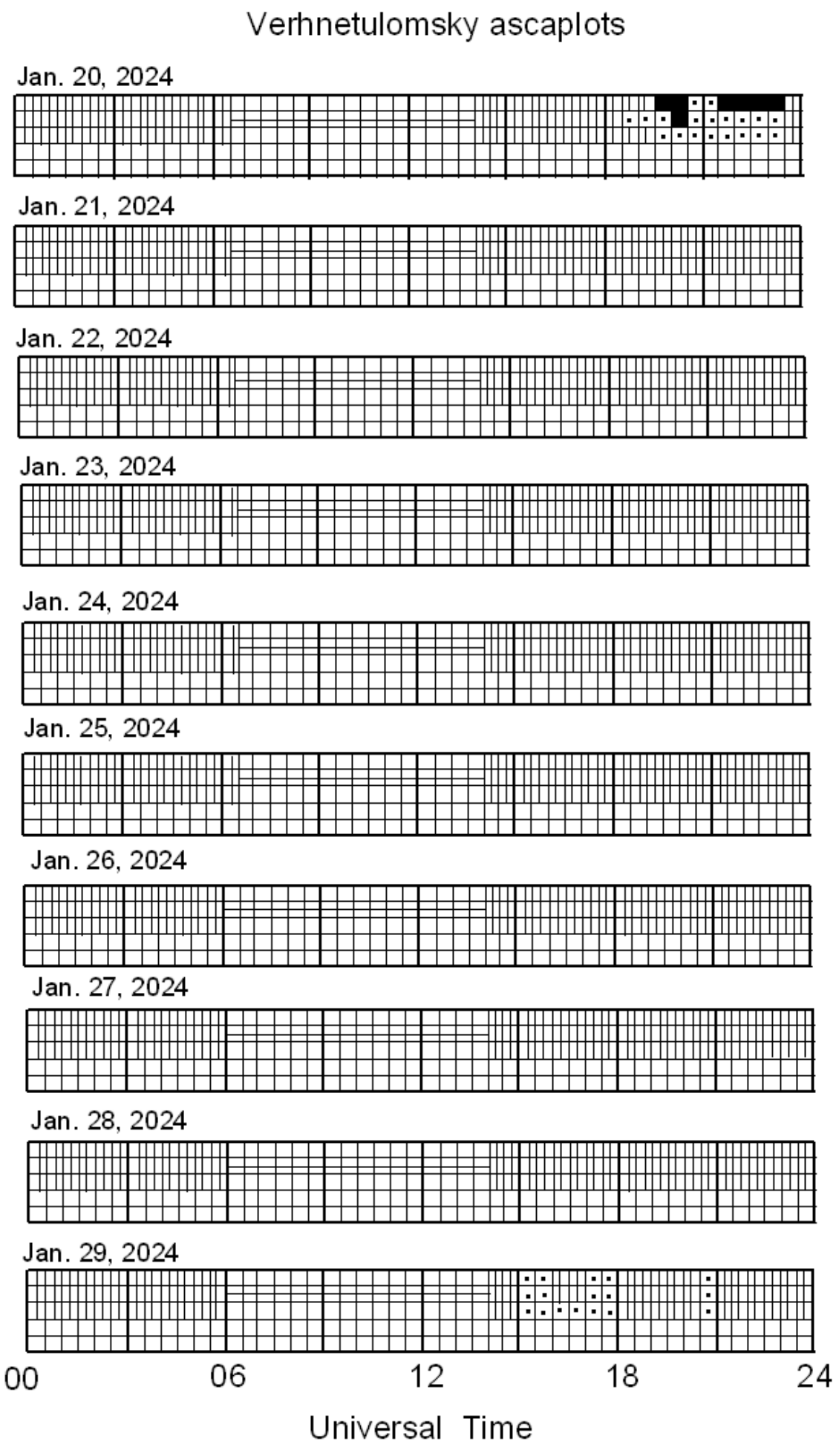
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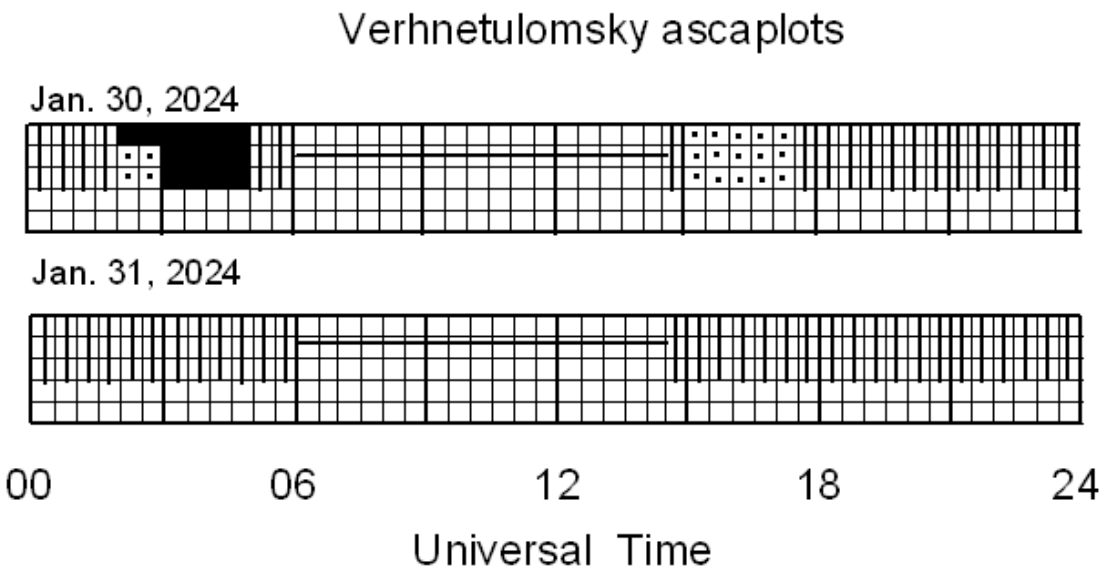
Verhnetulomsky ascaplots
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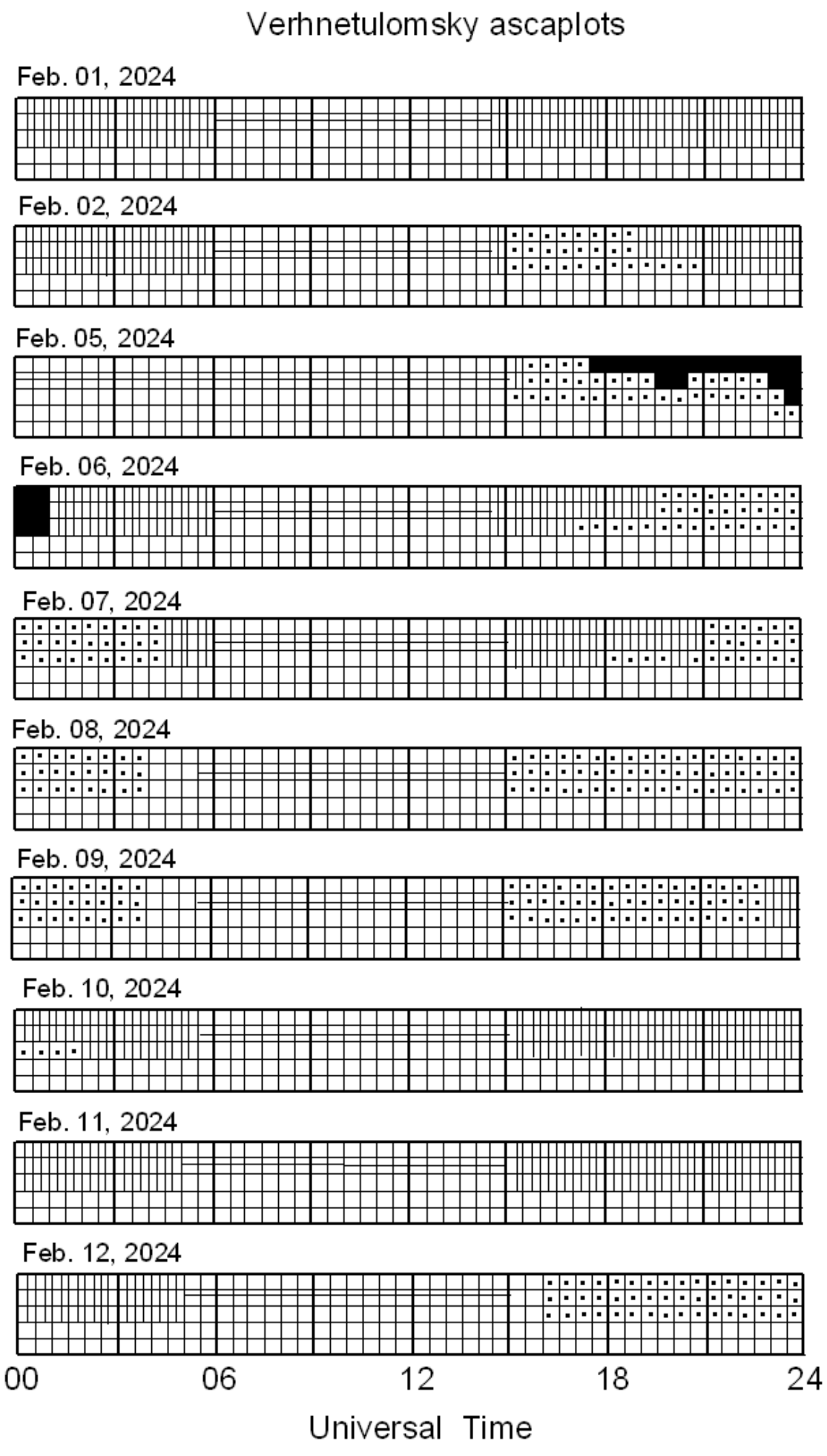
Verhnetulomsky ascaplots
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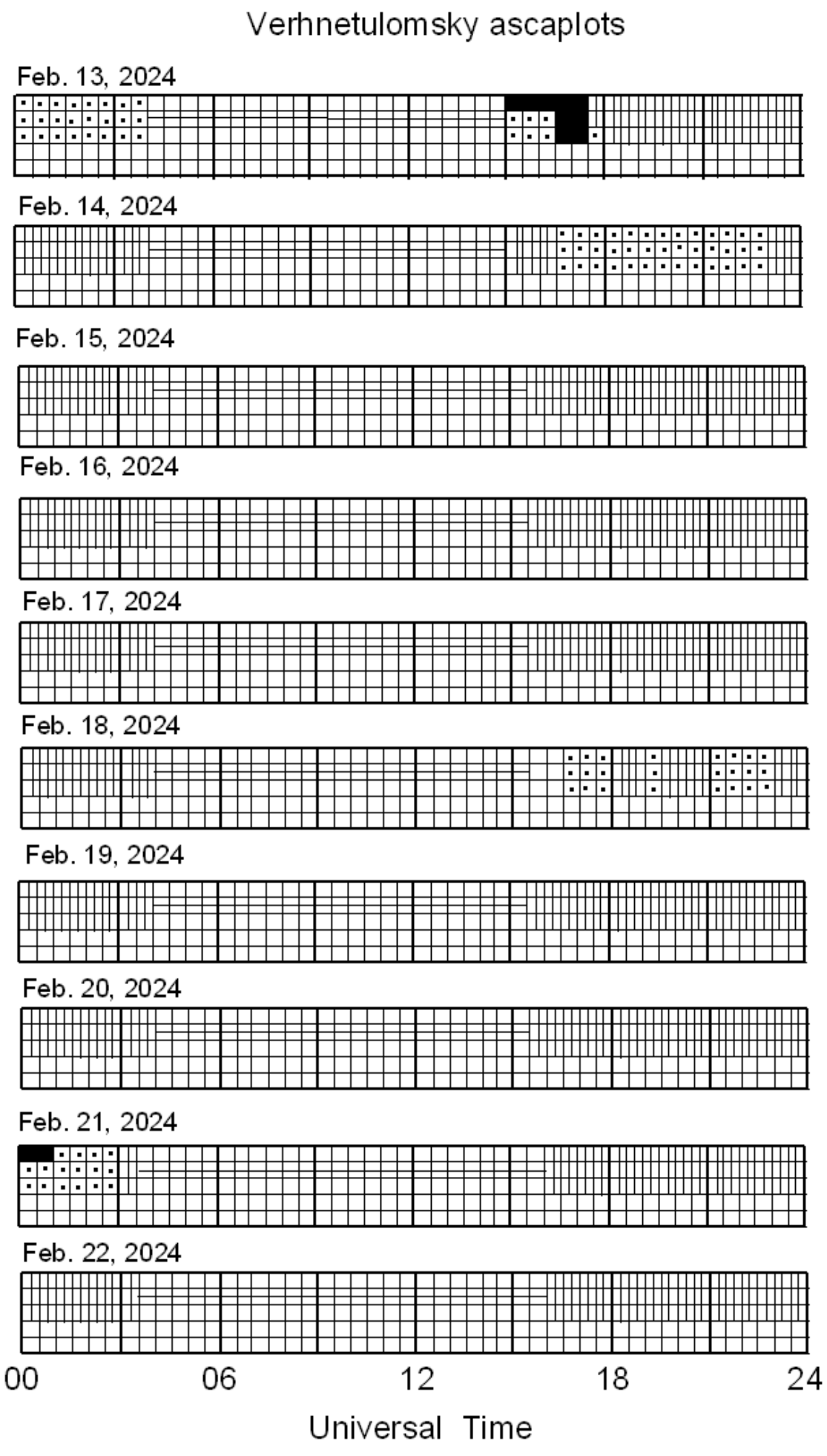
Verhnetulomsky ascaplots
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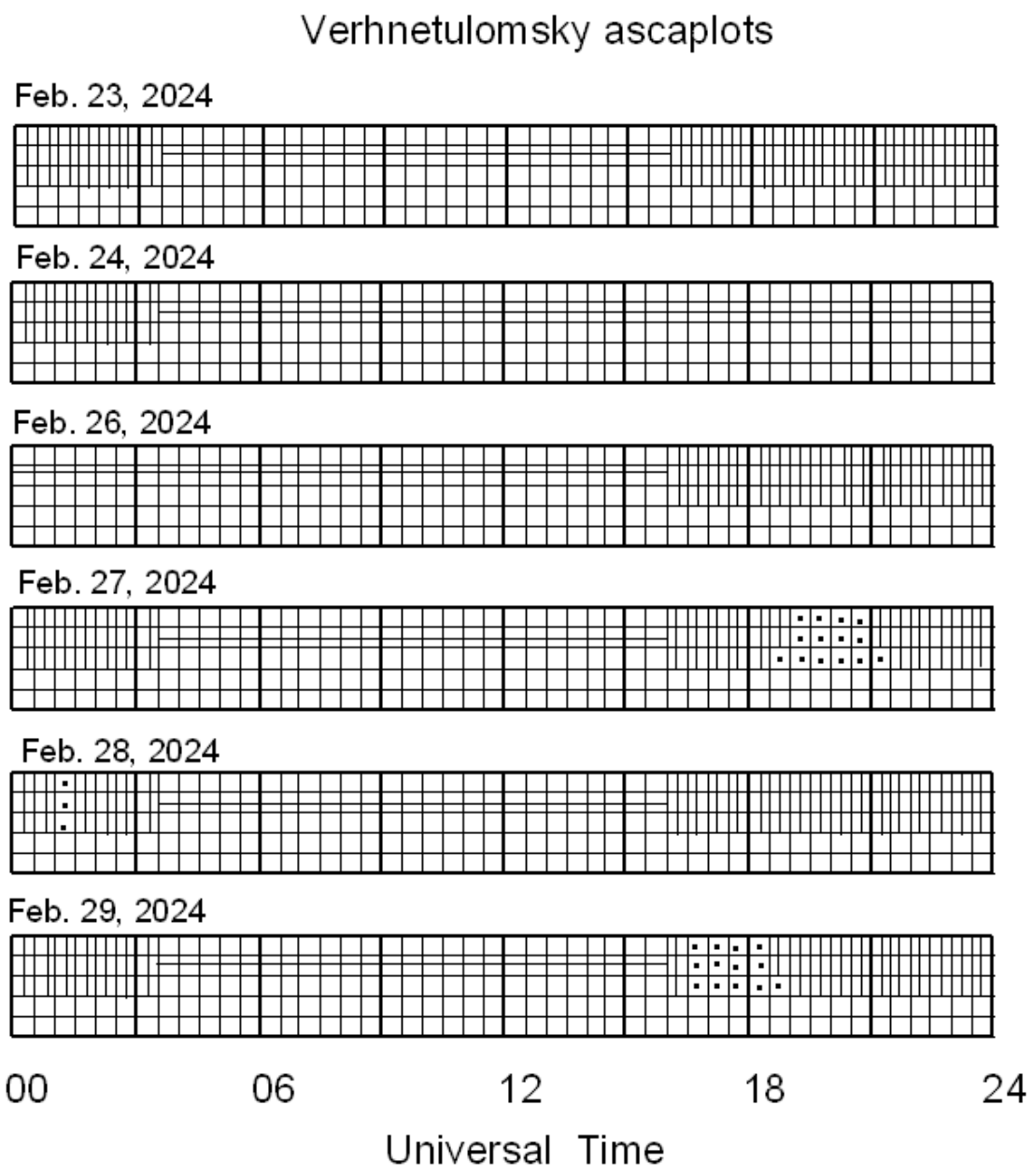
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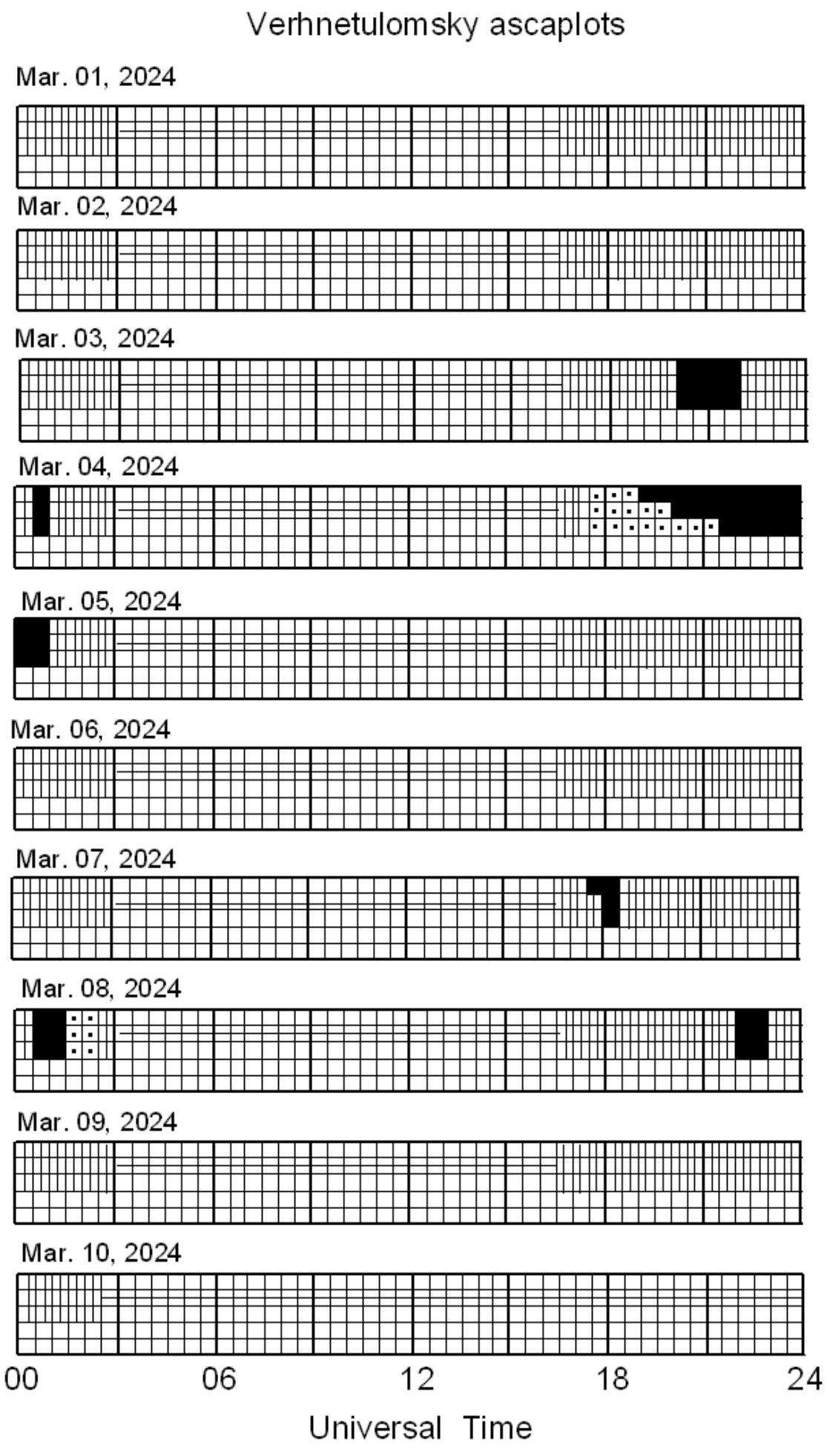
Verhnetulomsky ascaplots
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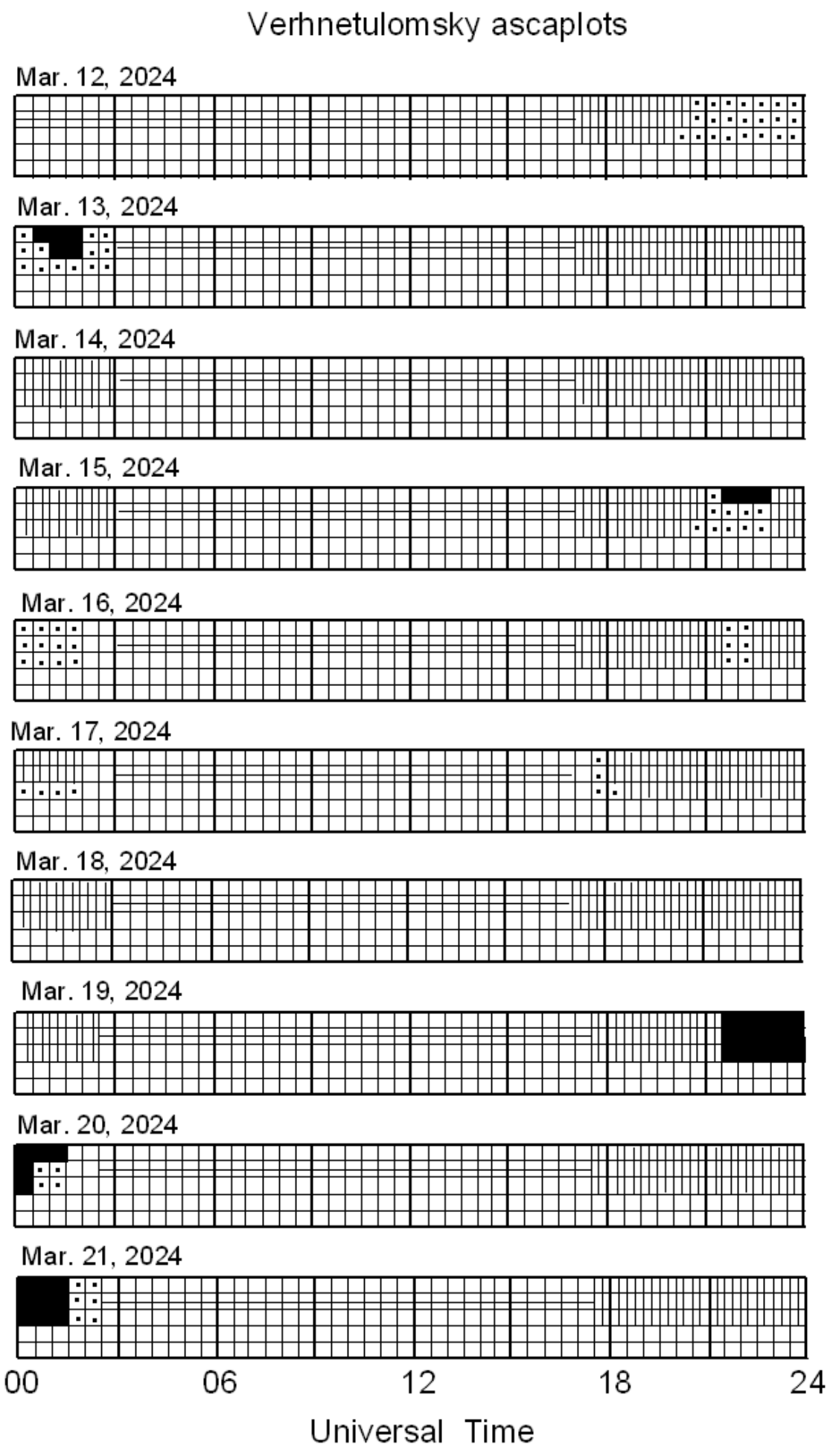
Verhnetulomsky ascaplots
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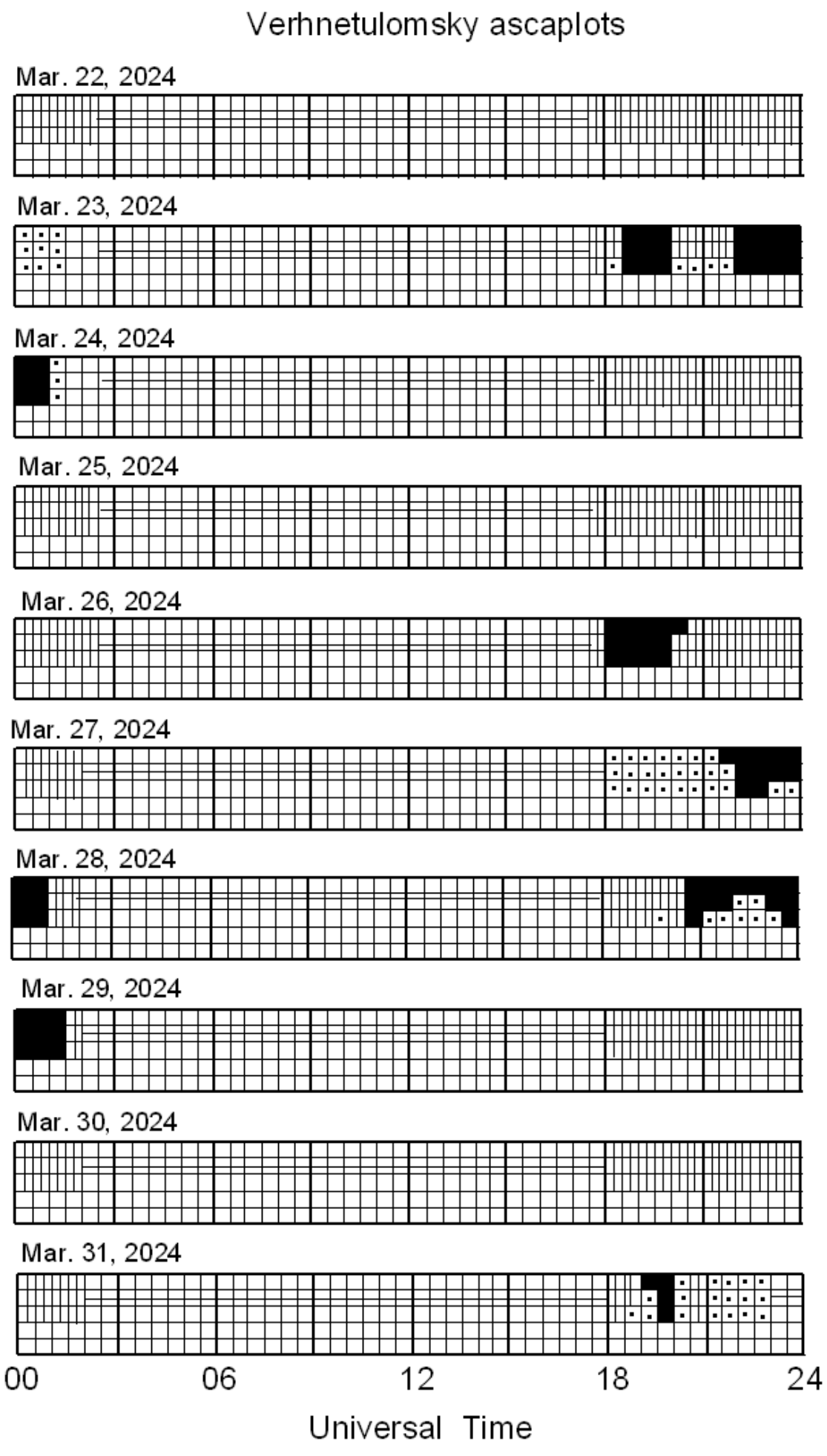
Verhnetulomsky ascaplots
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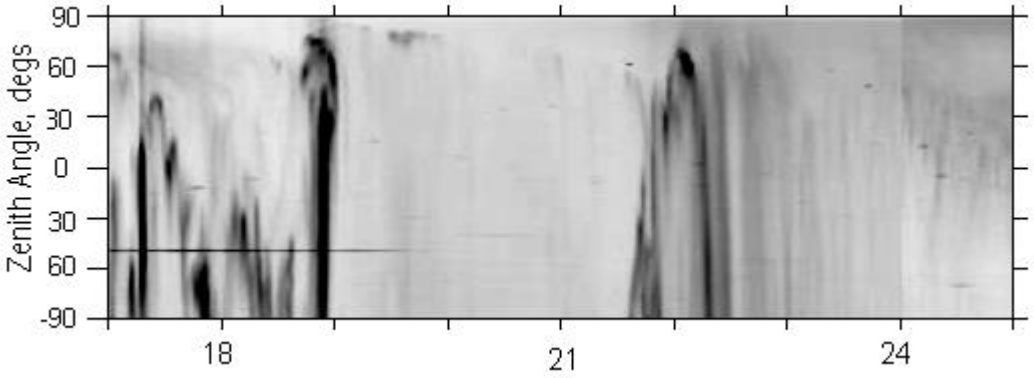
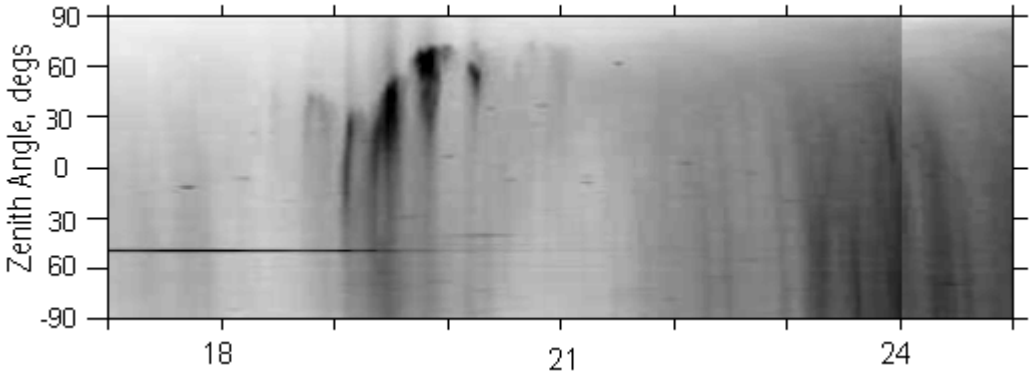
# Lovozero TV keograms

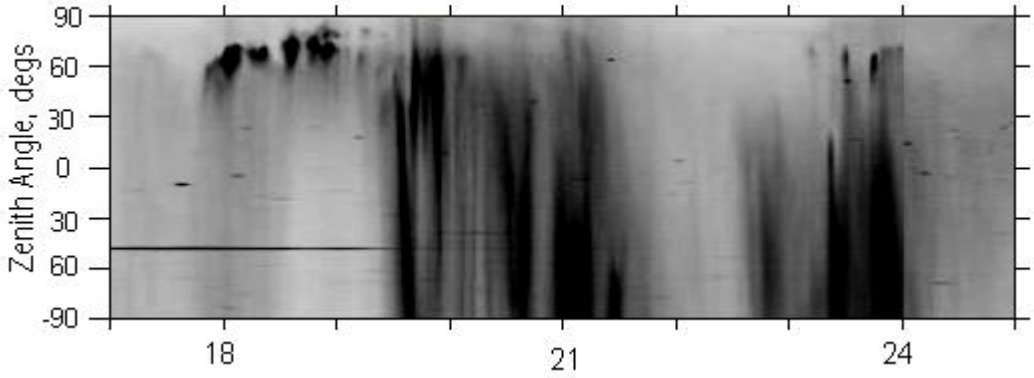
Jan. 01, 2024



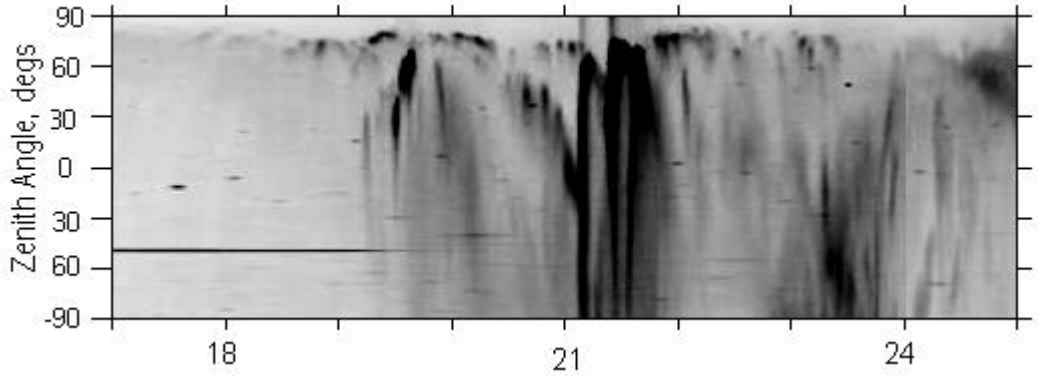

Jan. 02, 2024




Jan. 03, 2024



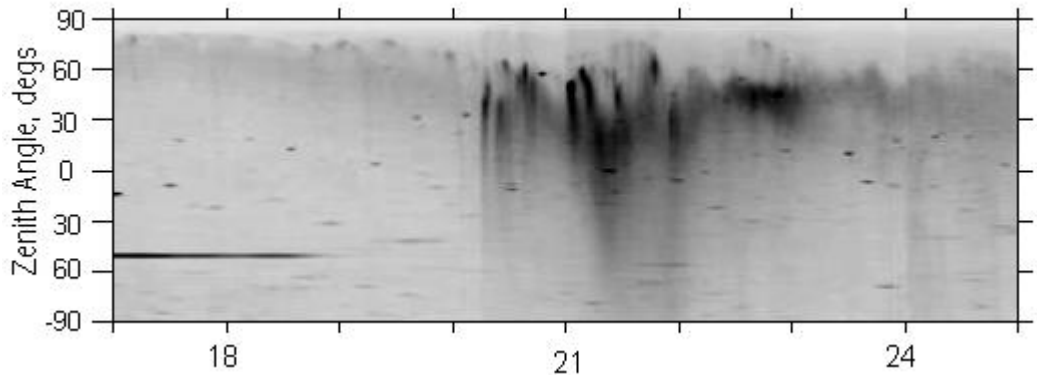

Jan.04, 2024



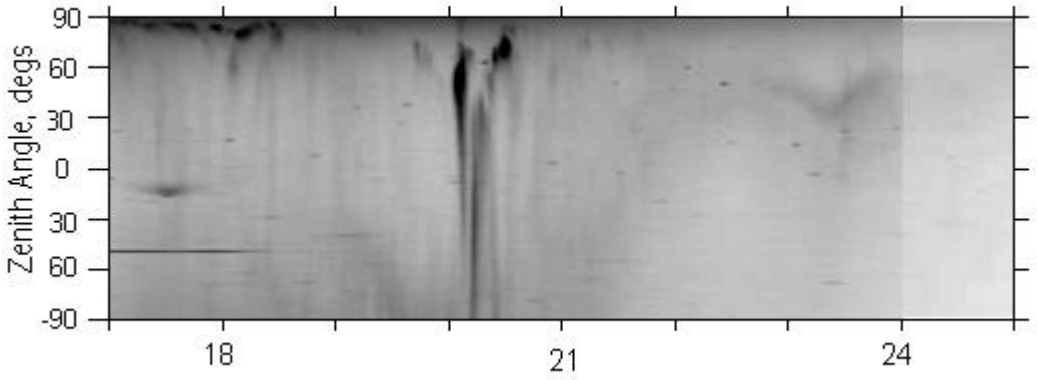

Universal Time

# Lovozero TV keograms

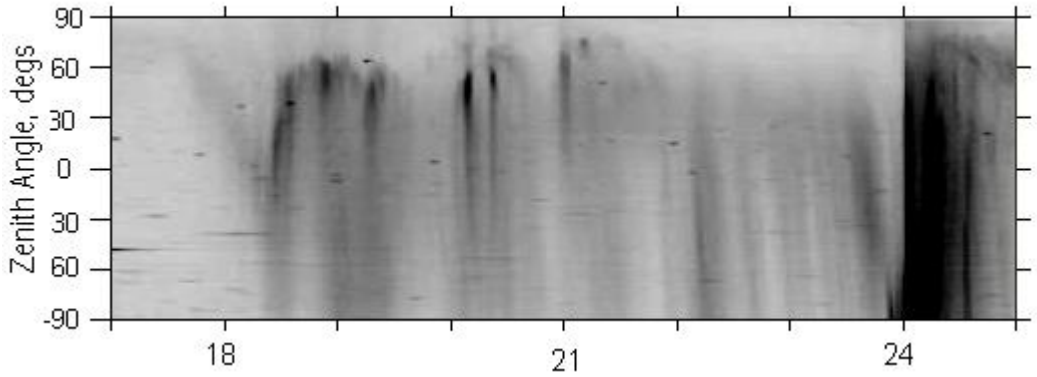
Jan. 13, 2024




Jan. 20, 2024




Feb. 05, 2024

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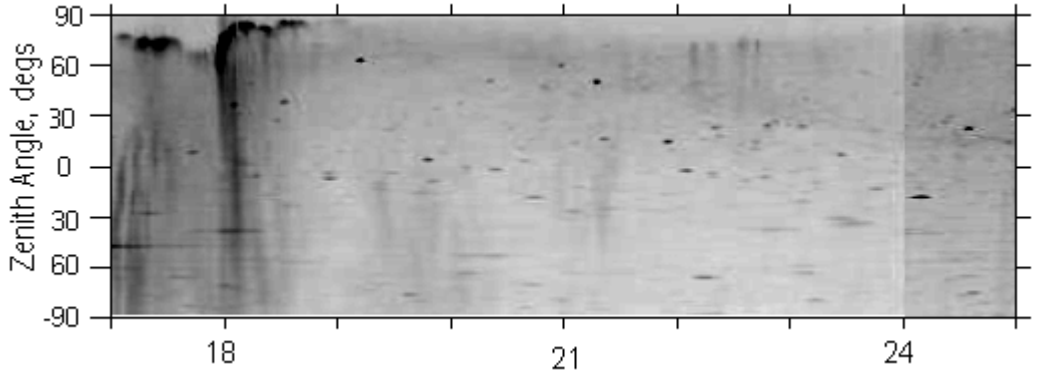
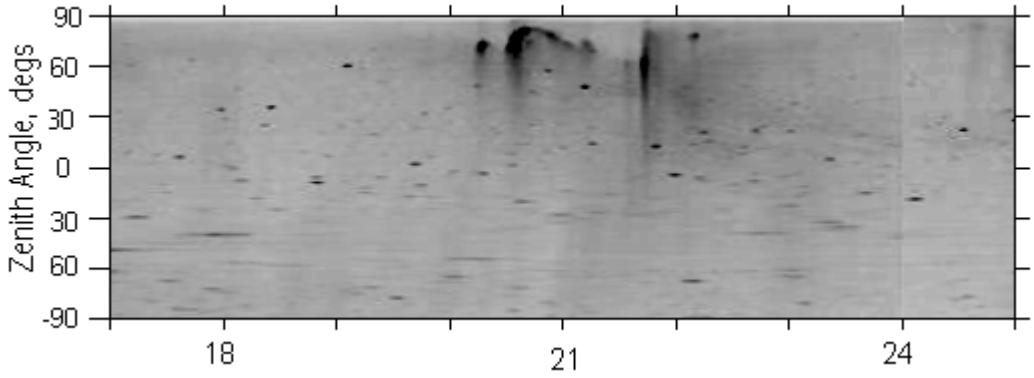



Universal Time

# Lovozero TV keograms

Feb. 07, 2024

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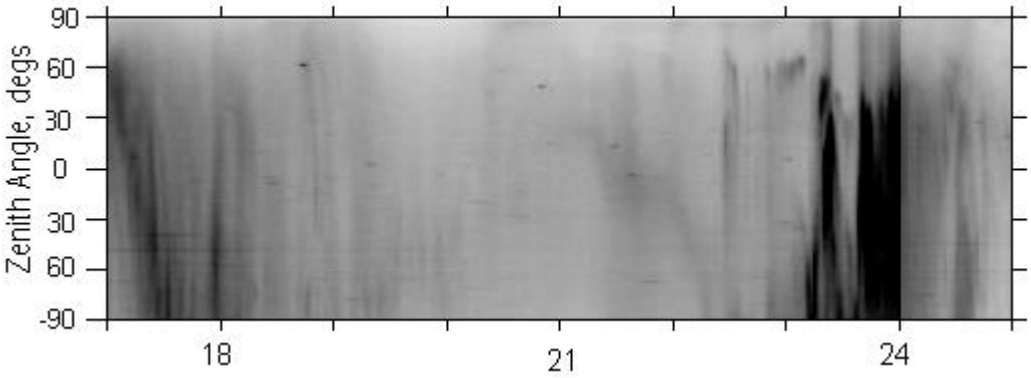


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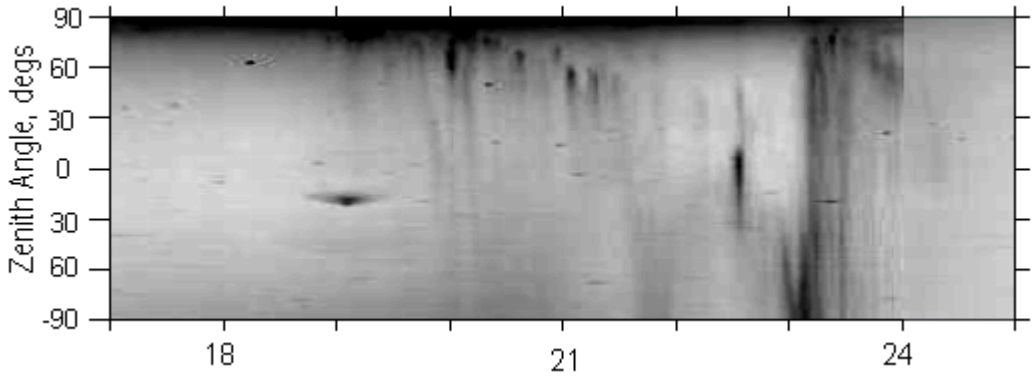


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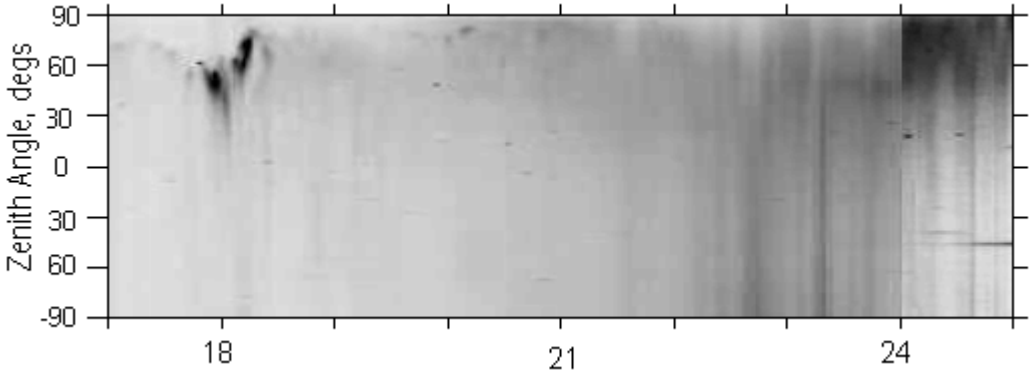
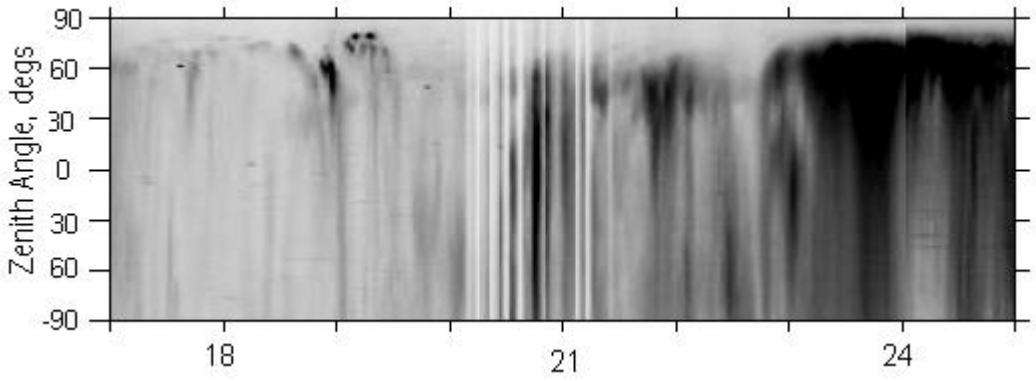



Universal Time

# Lovozero TV keograms

Mar. 01, 2024

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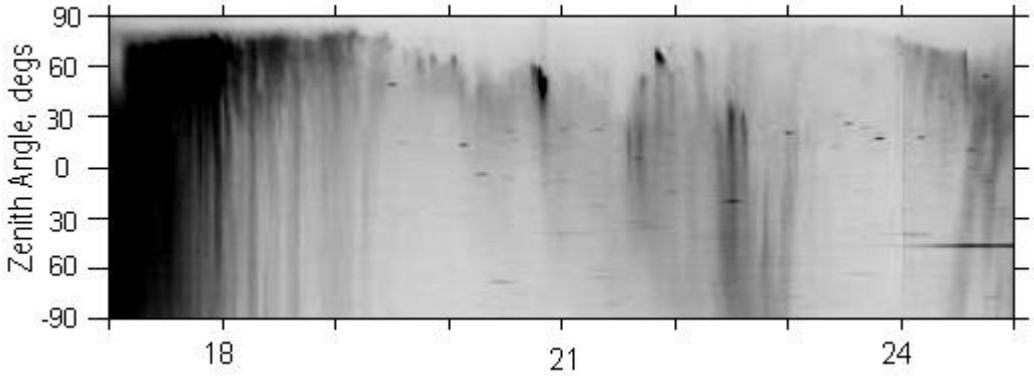


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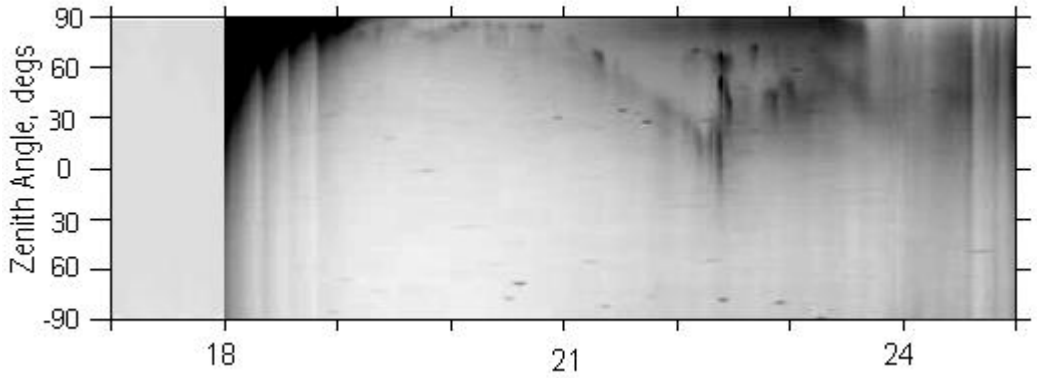
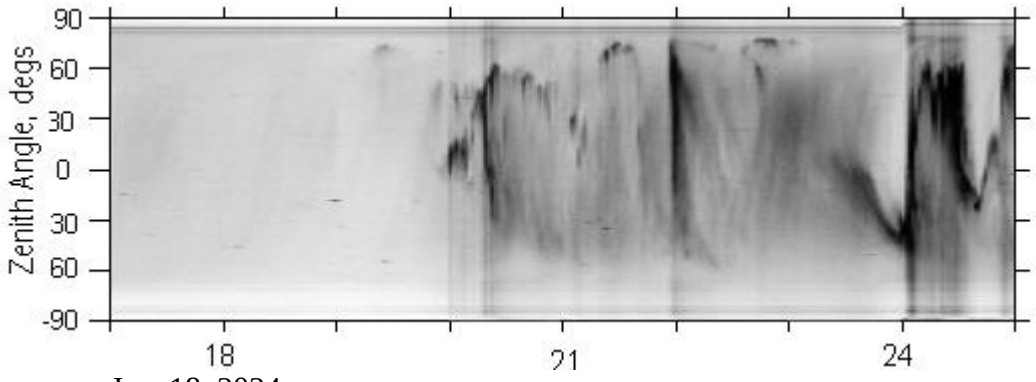



Universal Time

# Verhnetulomsky TV keograms

Jan. 15, 2024

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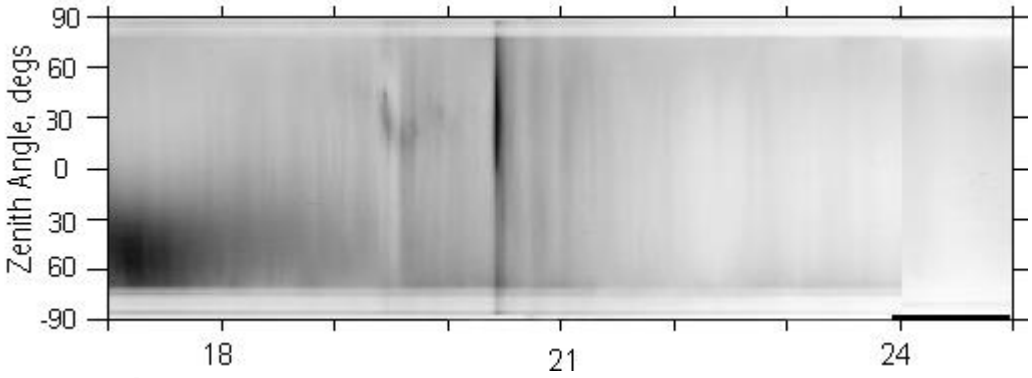


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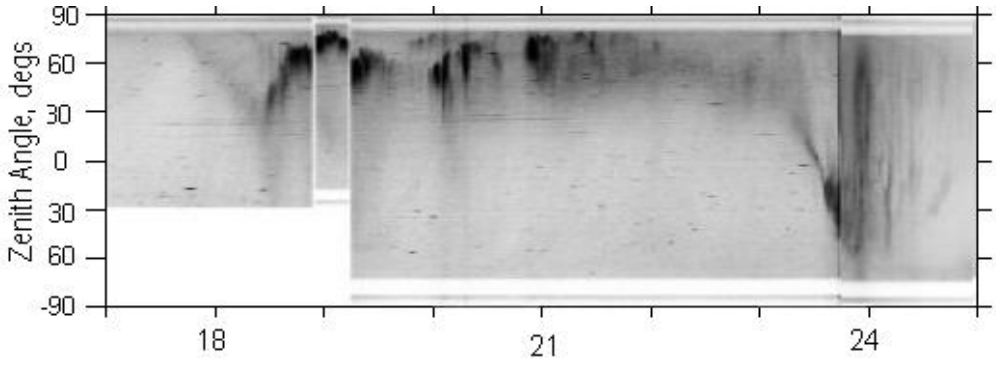


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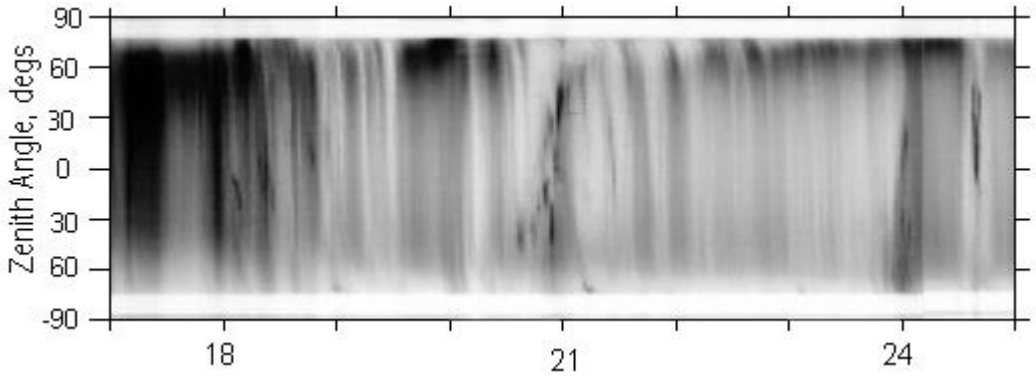


Universal Time

# Verhnetulomsky TV keograms

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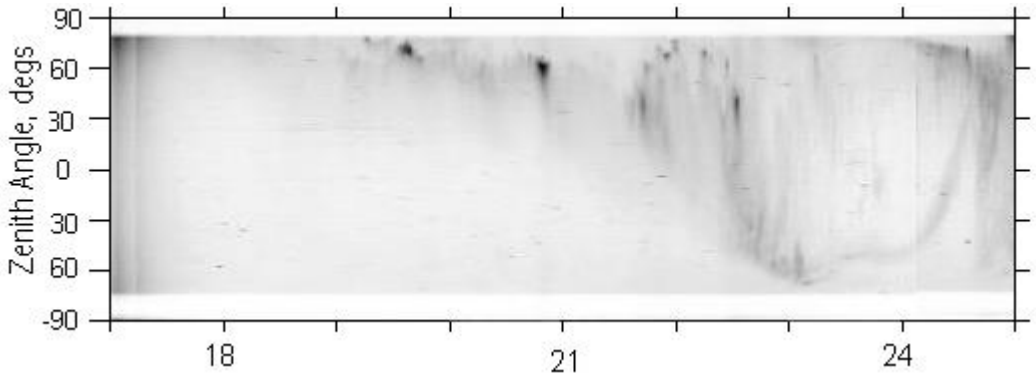


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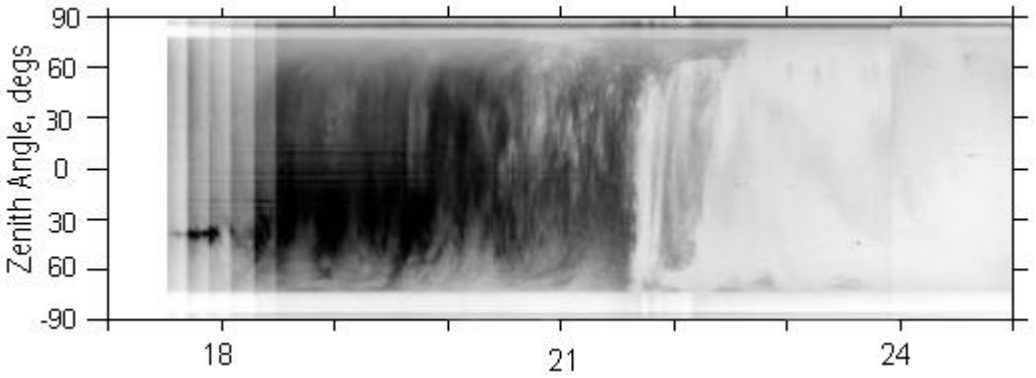


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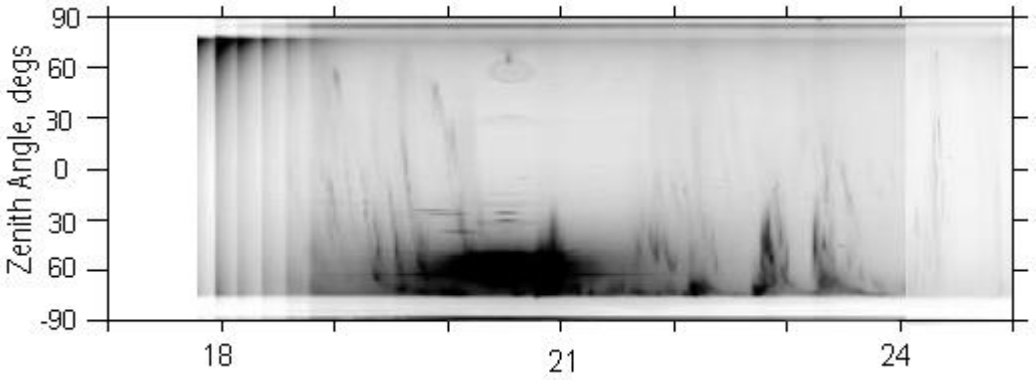


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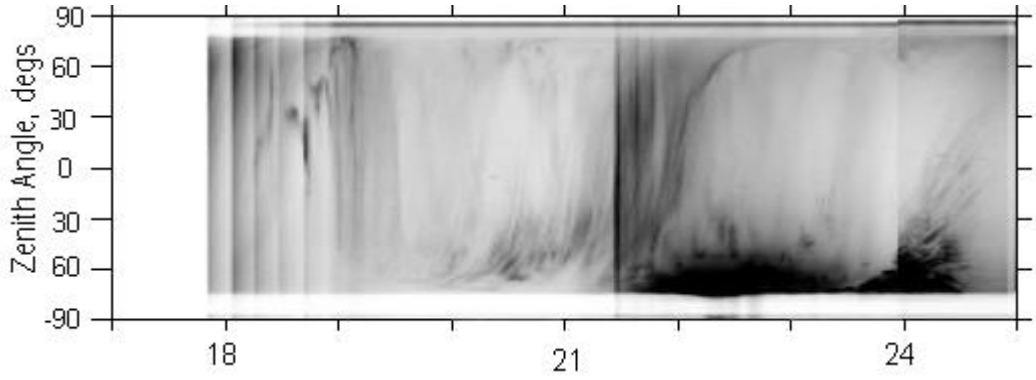
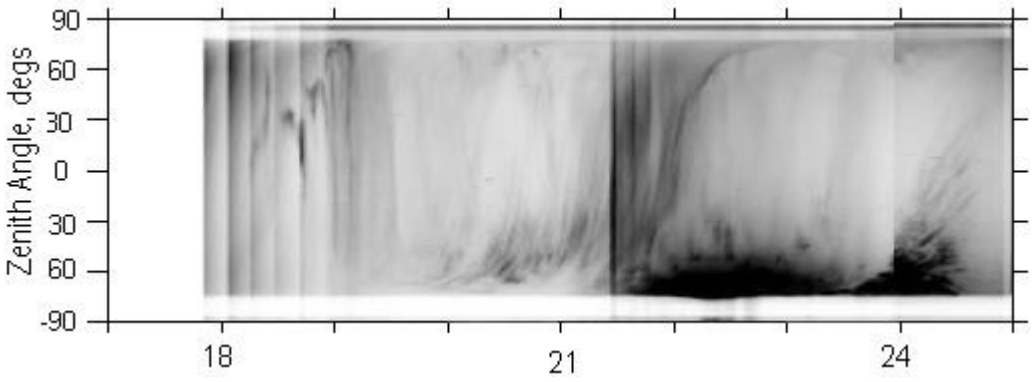



Universal Time

# Verhnetulomsky TV keograms

Mar. 26, 2024

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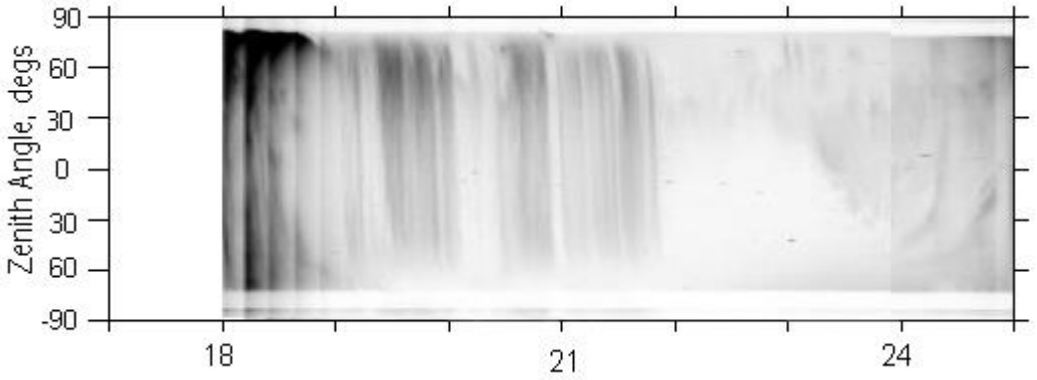
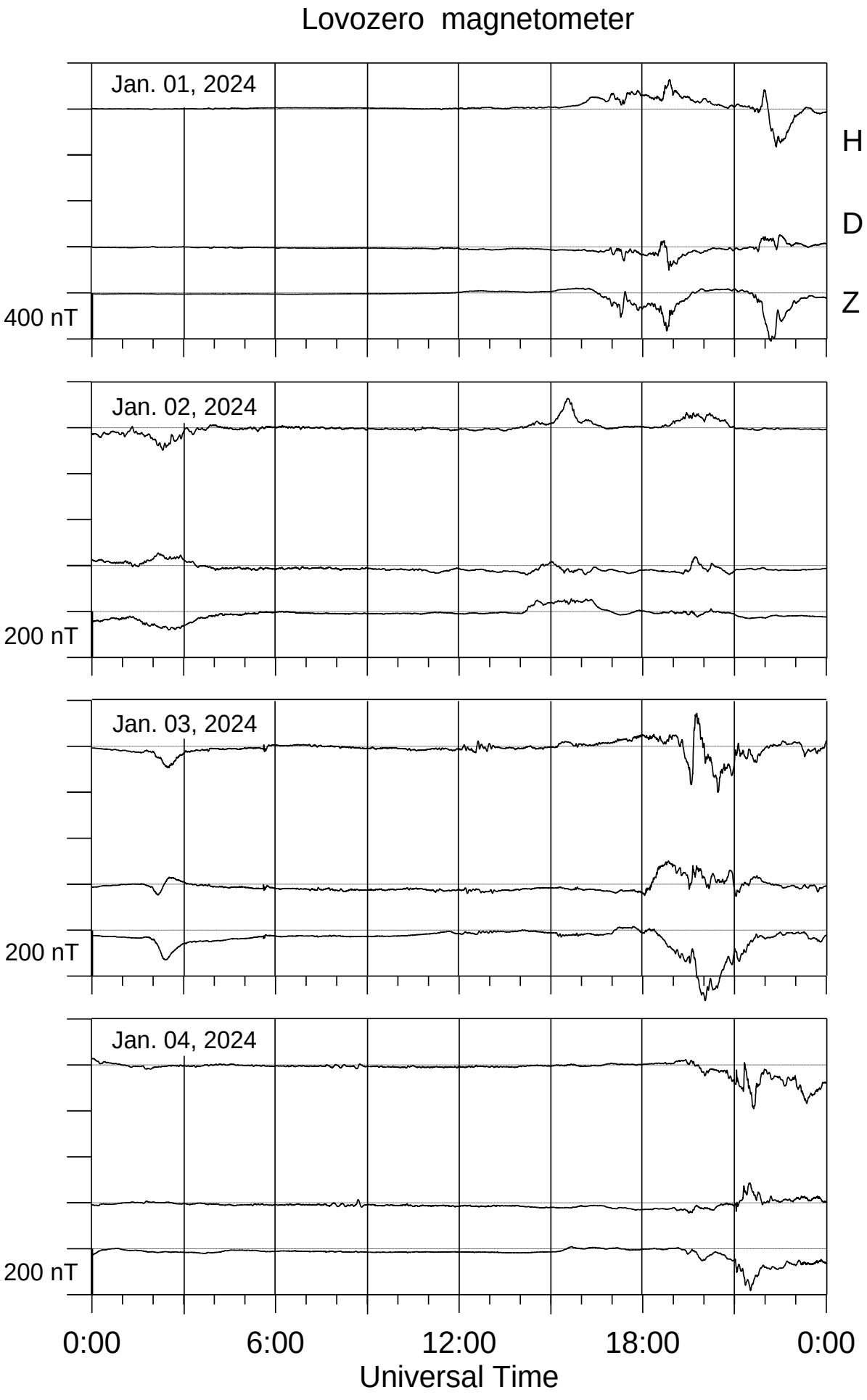



Universal Time

# LOVOZERO MAGNETOGRAMS

## January - March 2024


Lovozero magnetometer
Jan. 01, 2024
H
D
Z
400 nT
Jan. 02, 2024
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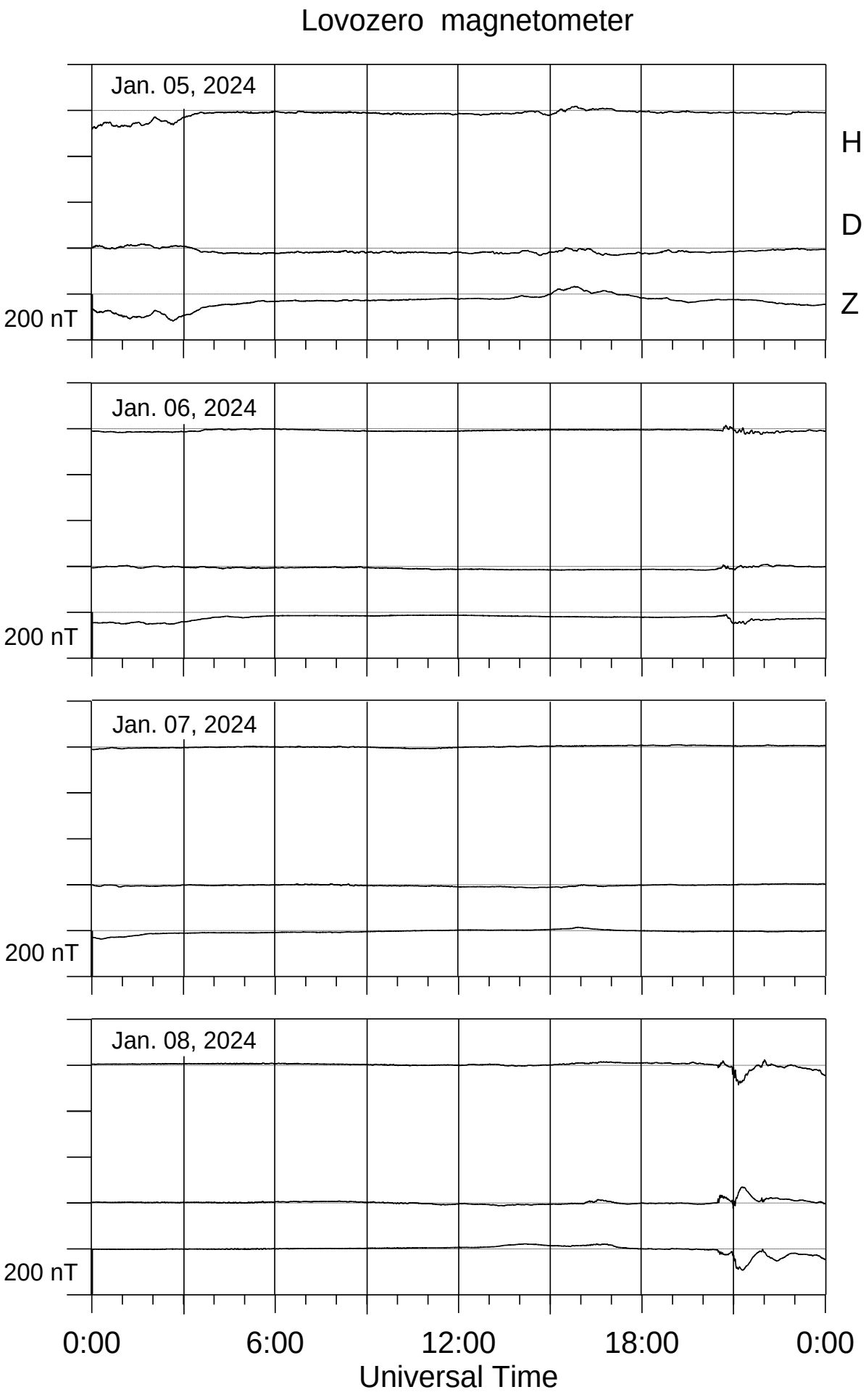
Jan. 03, 2024
200 nT
Jan. 04, 2024
200 nT
0:00
6:00
12:00
18:00
0:00
Universal Time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H
D
Z
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Jan. 06, 2024
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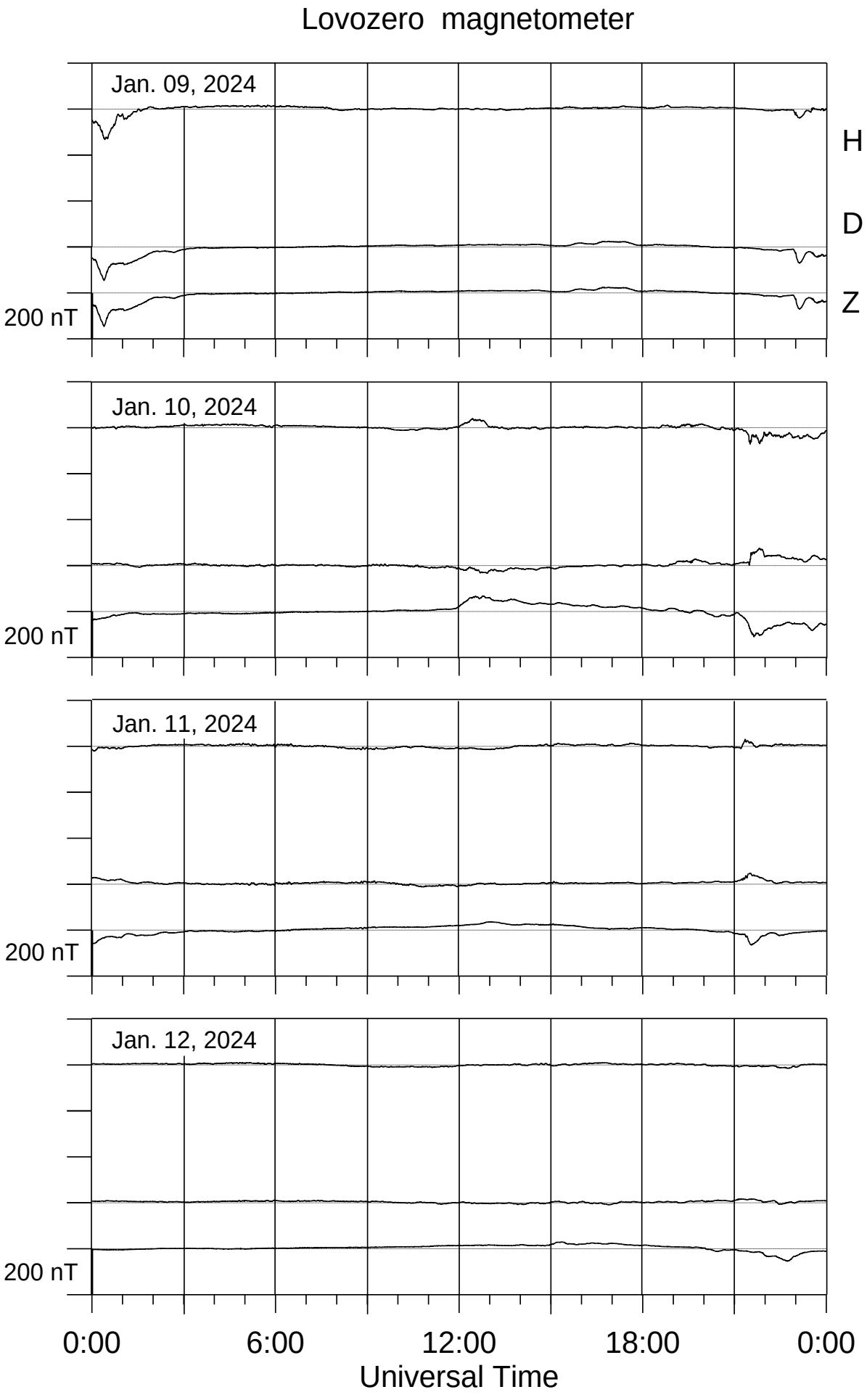
Universal Time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H
D
Z
200 nT
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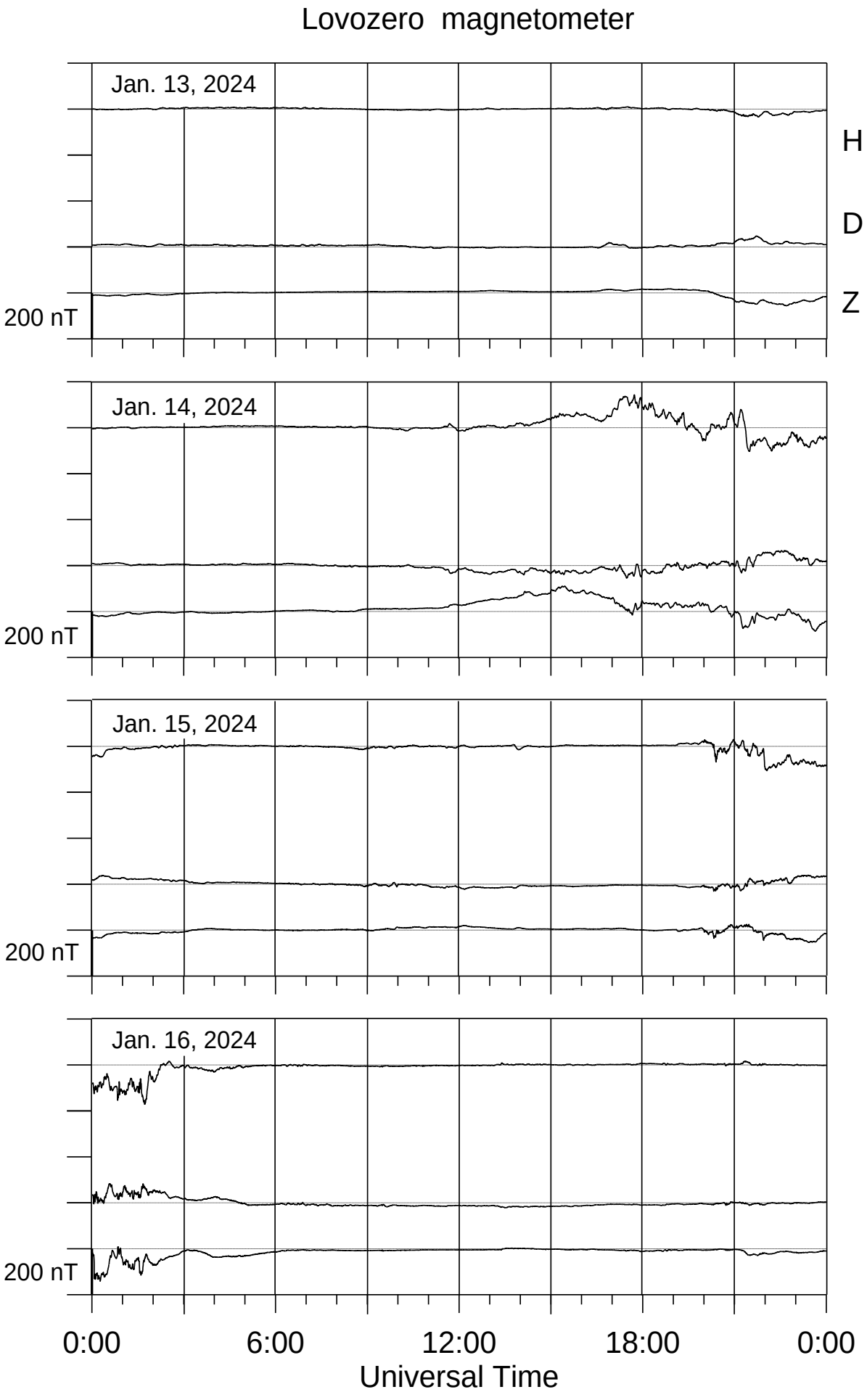
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D
Z
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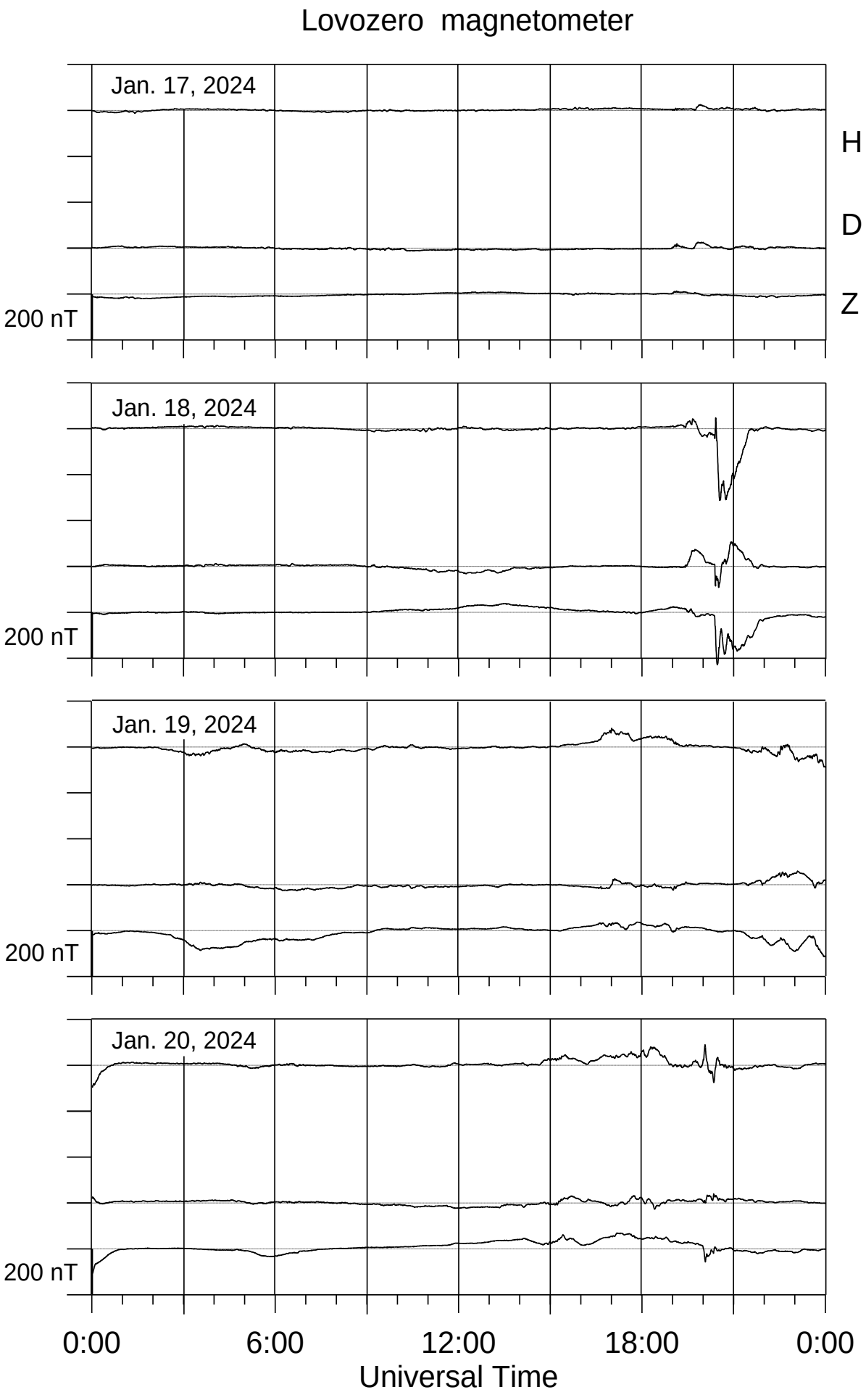
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D
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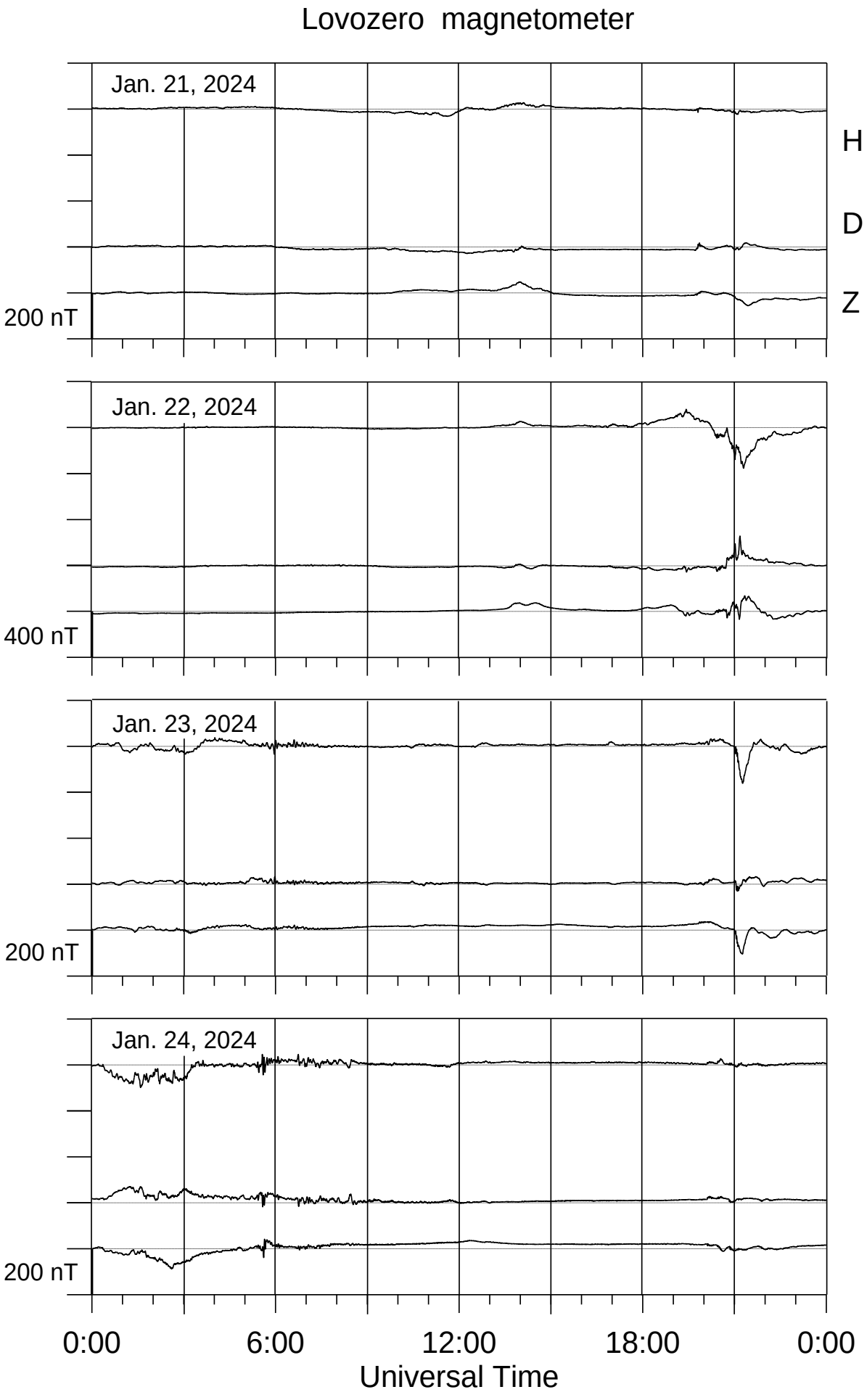
Universal Time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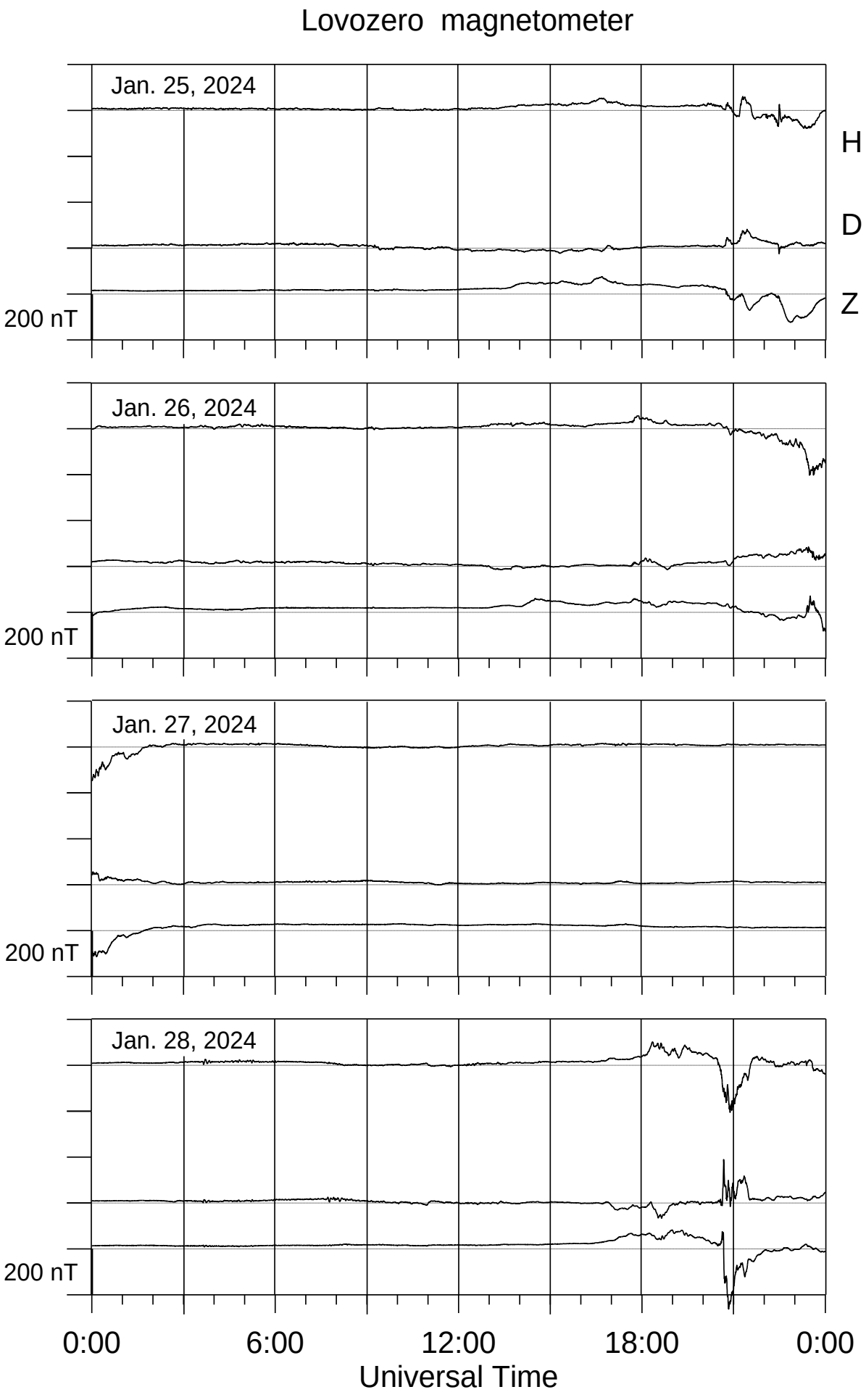
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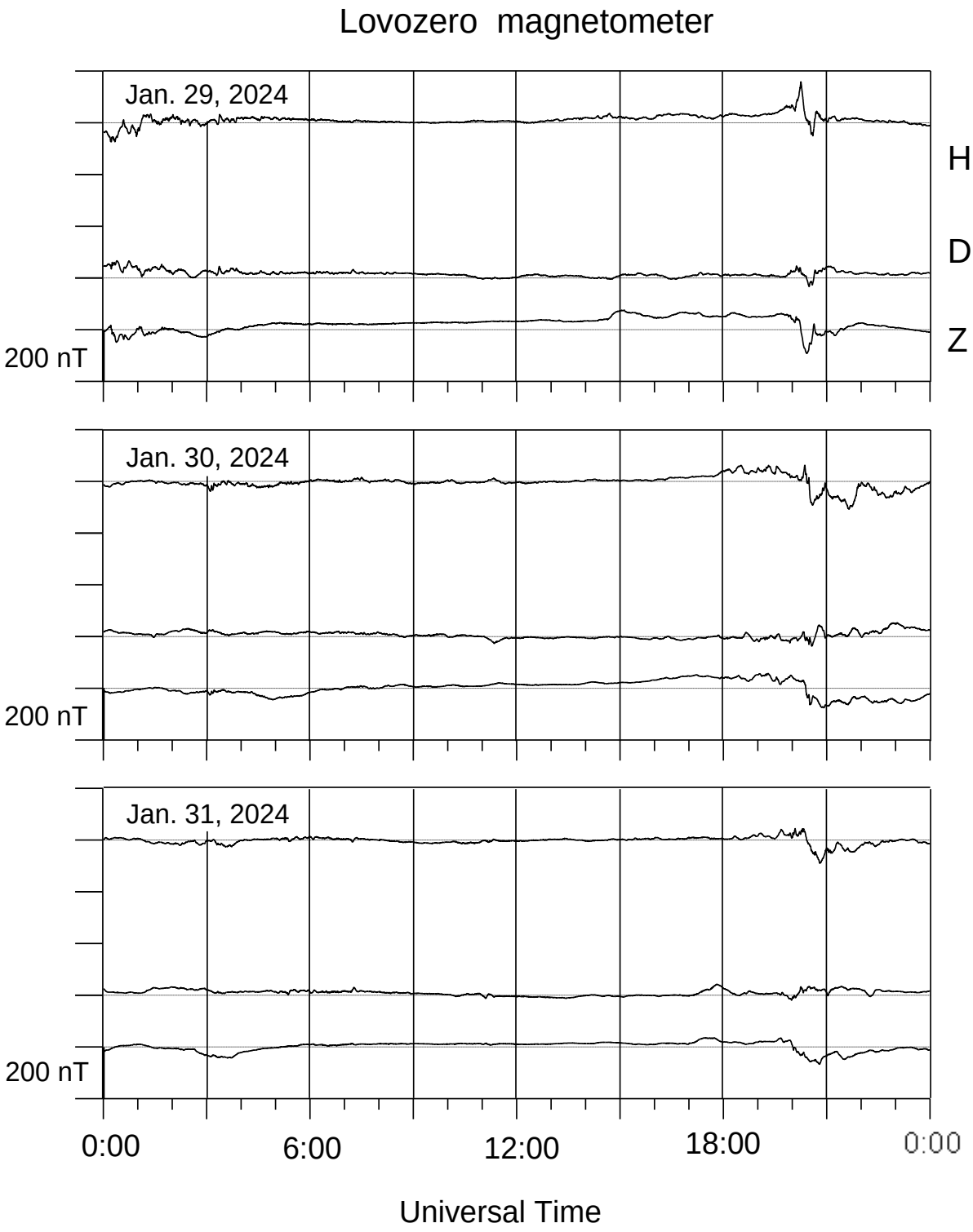
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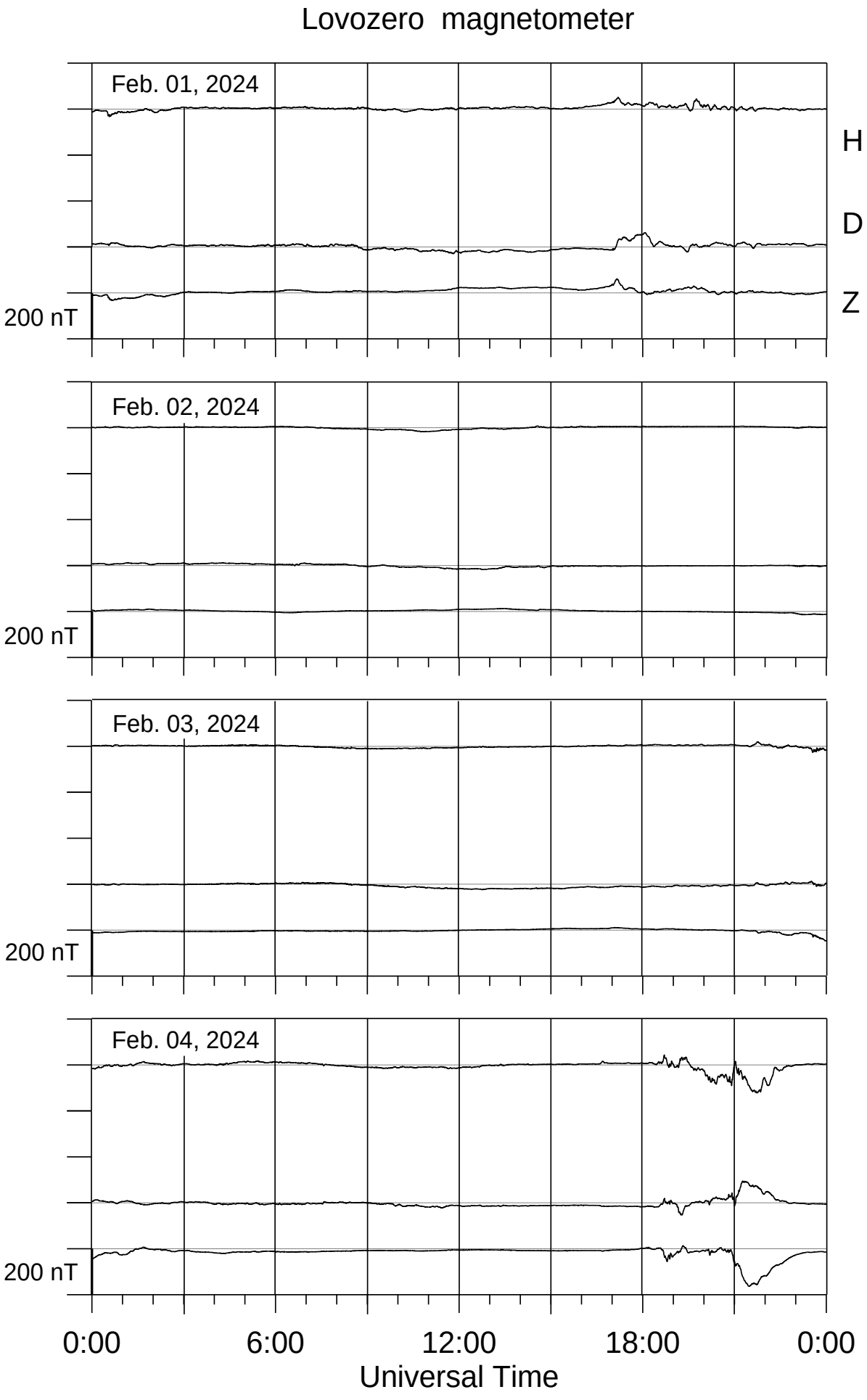
Universal Time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Feb. 02, 2024
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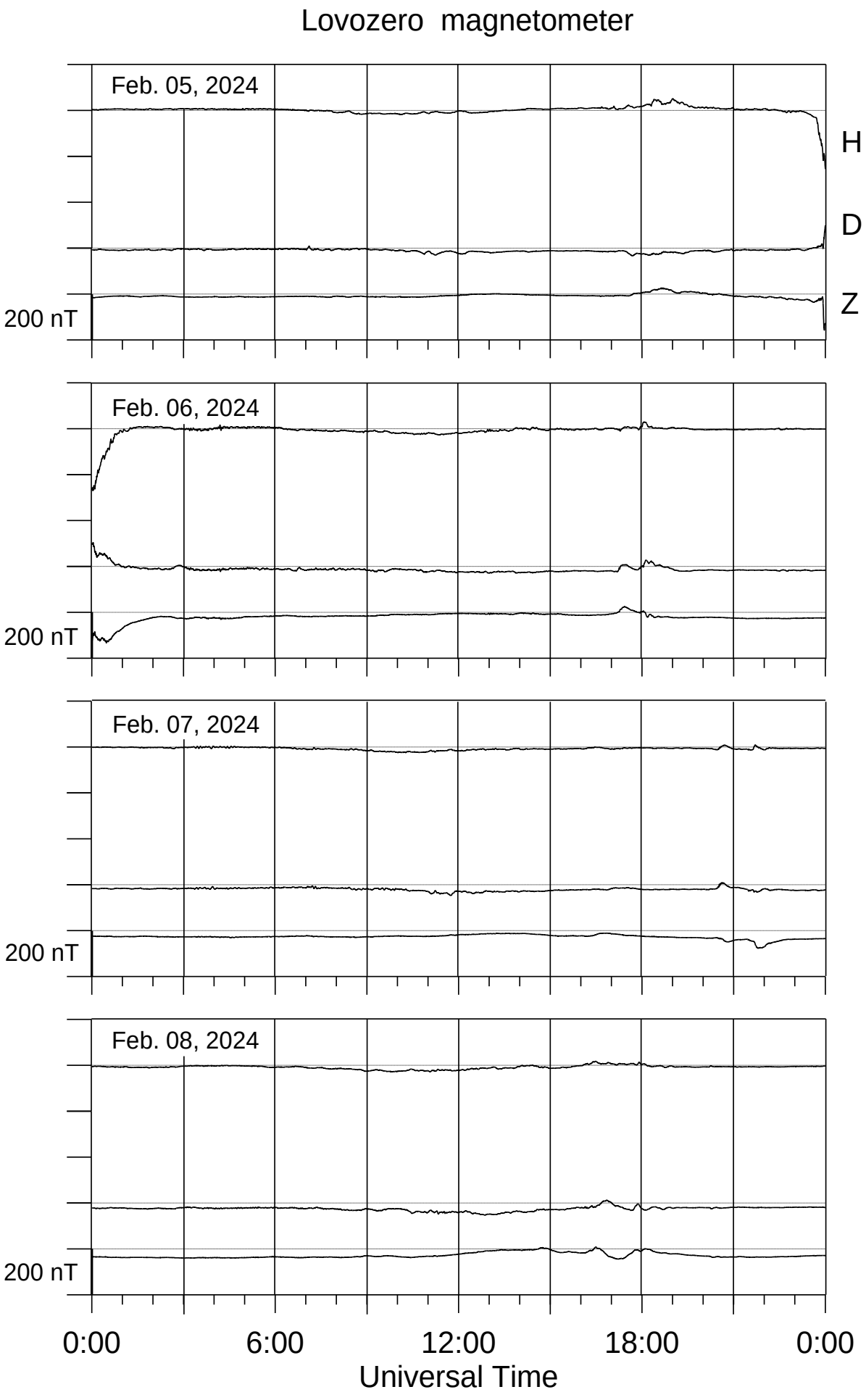
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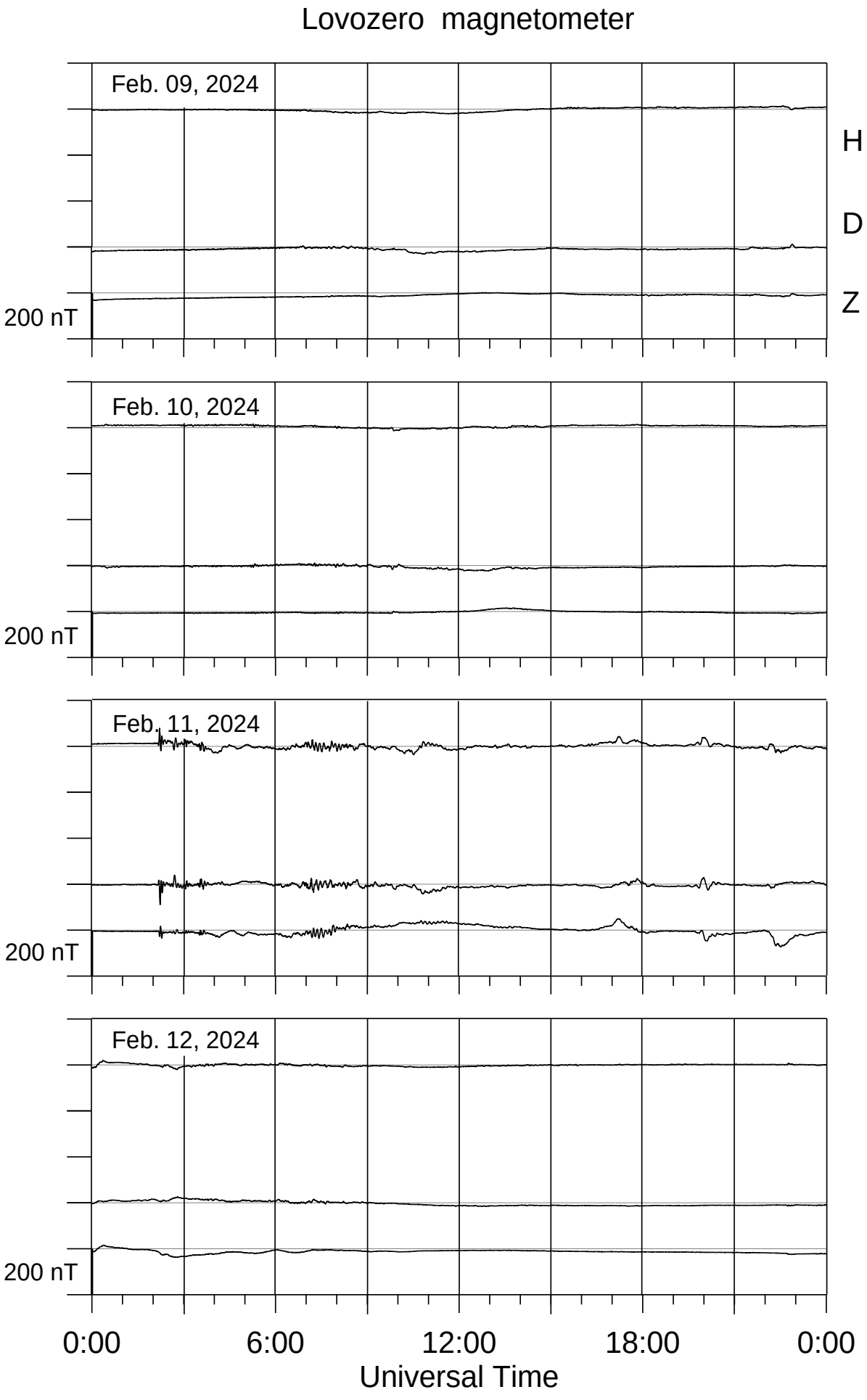
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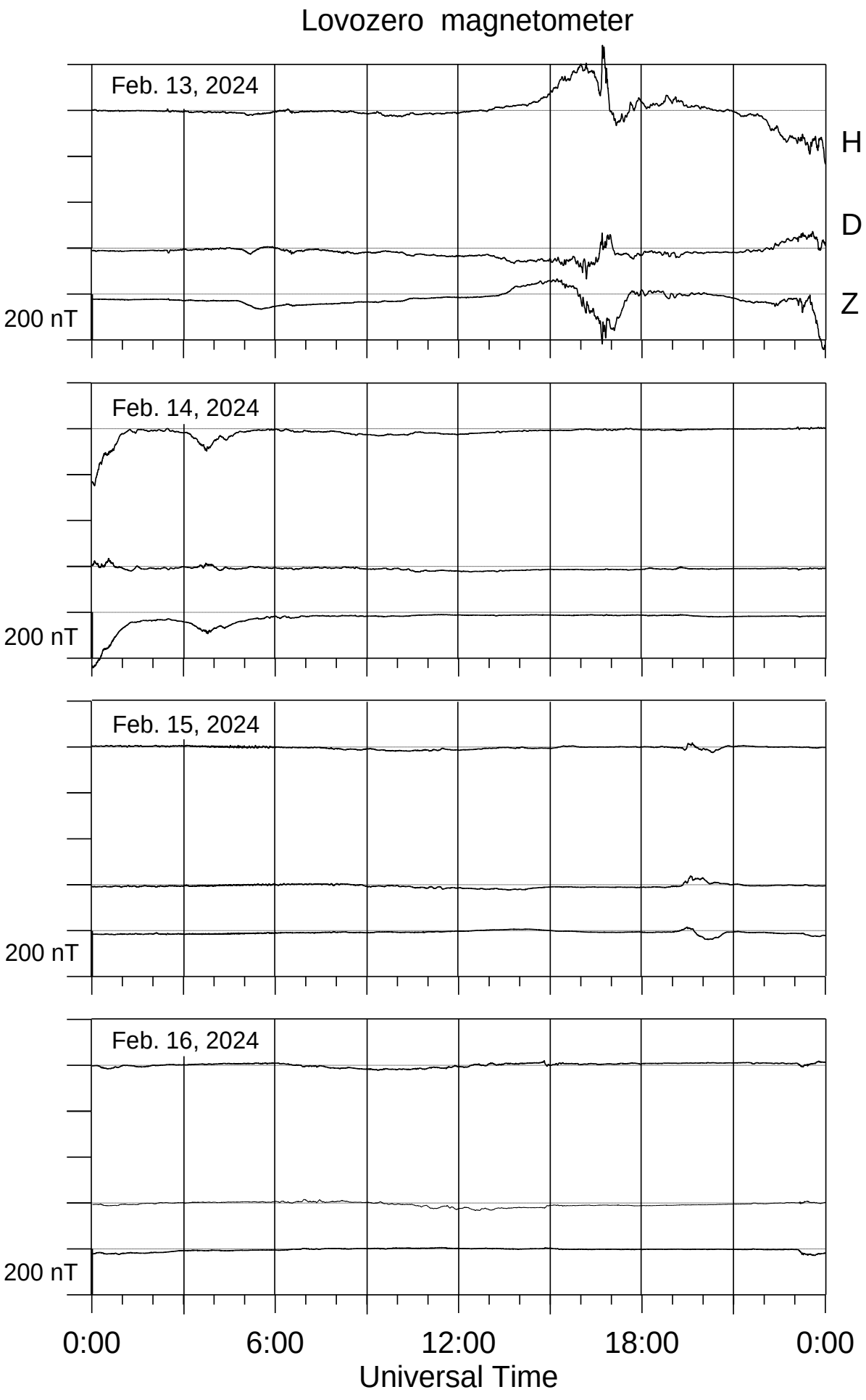
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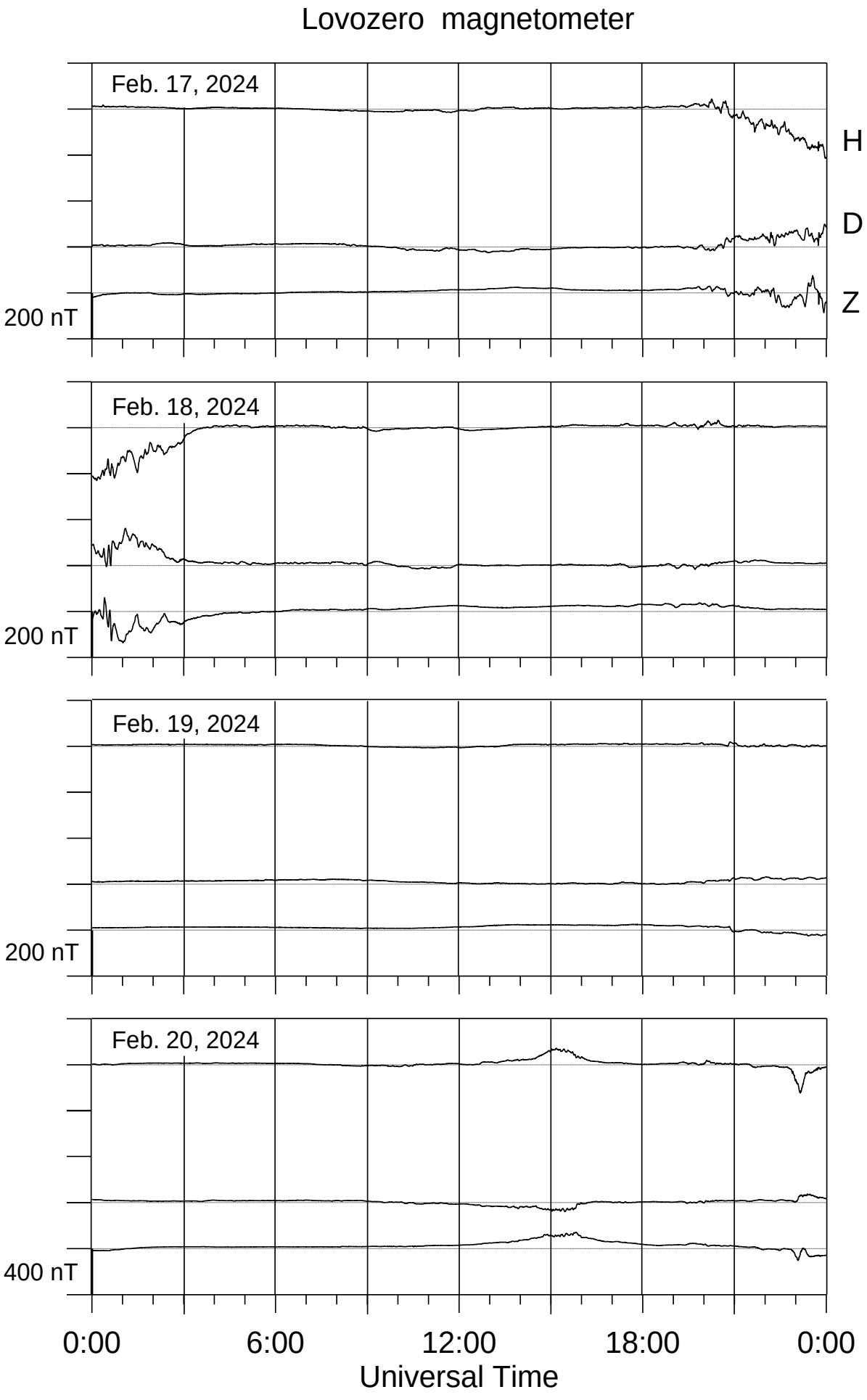
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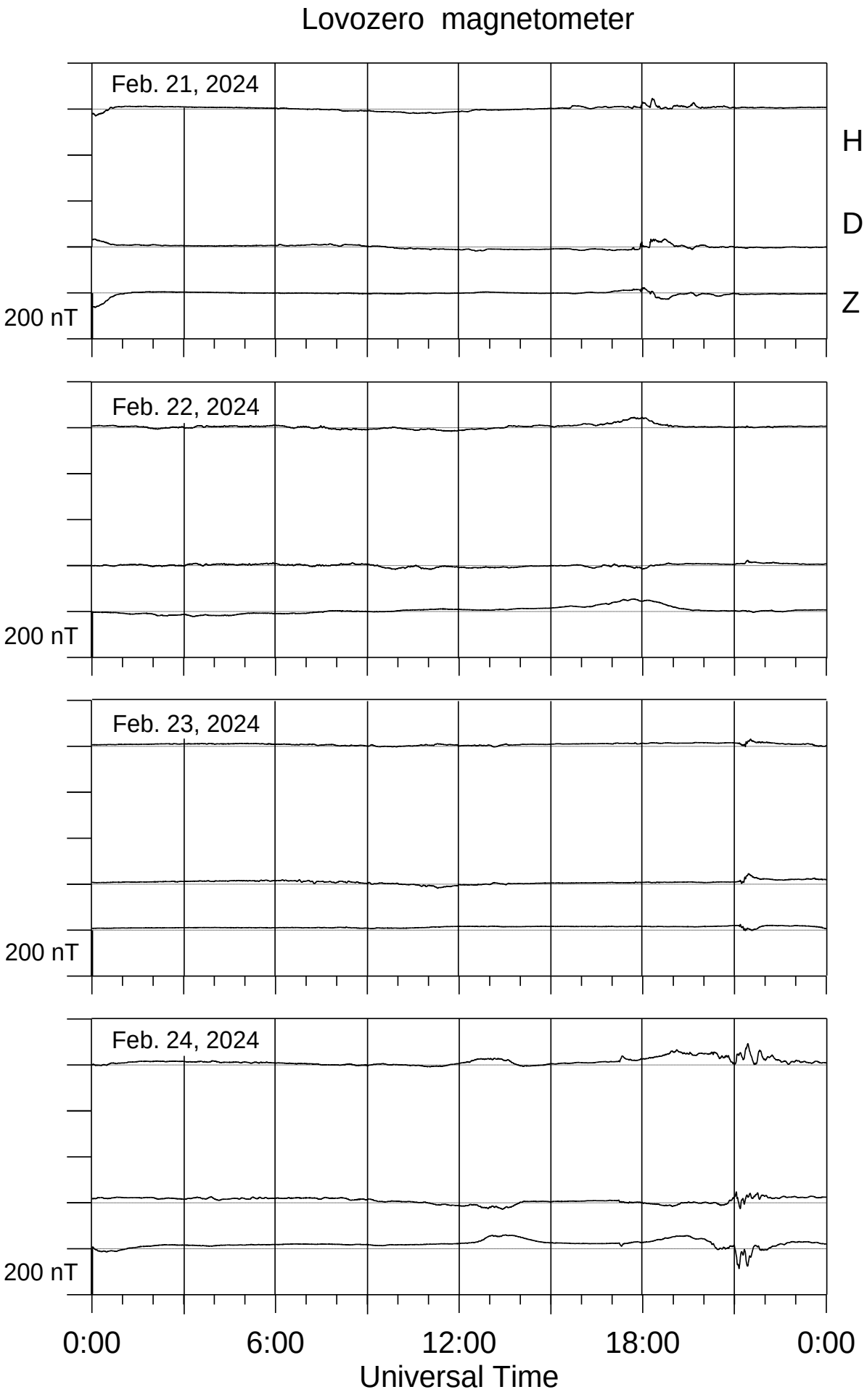
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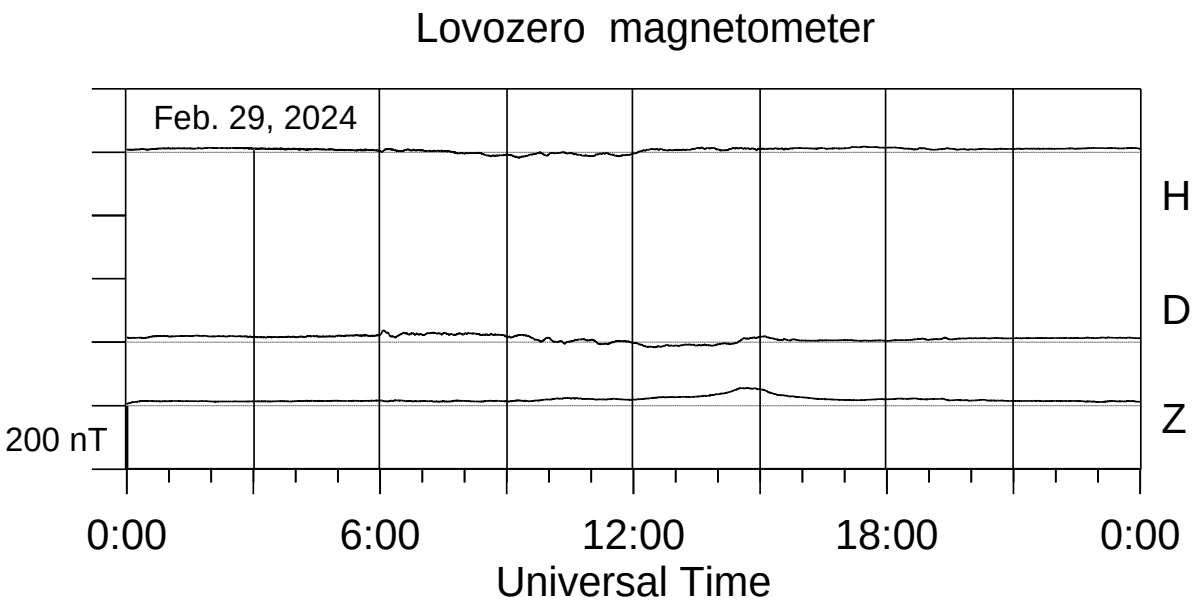
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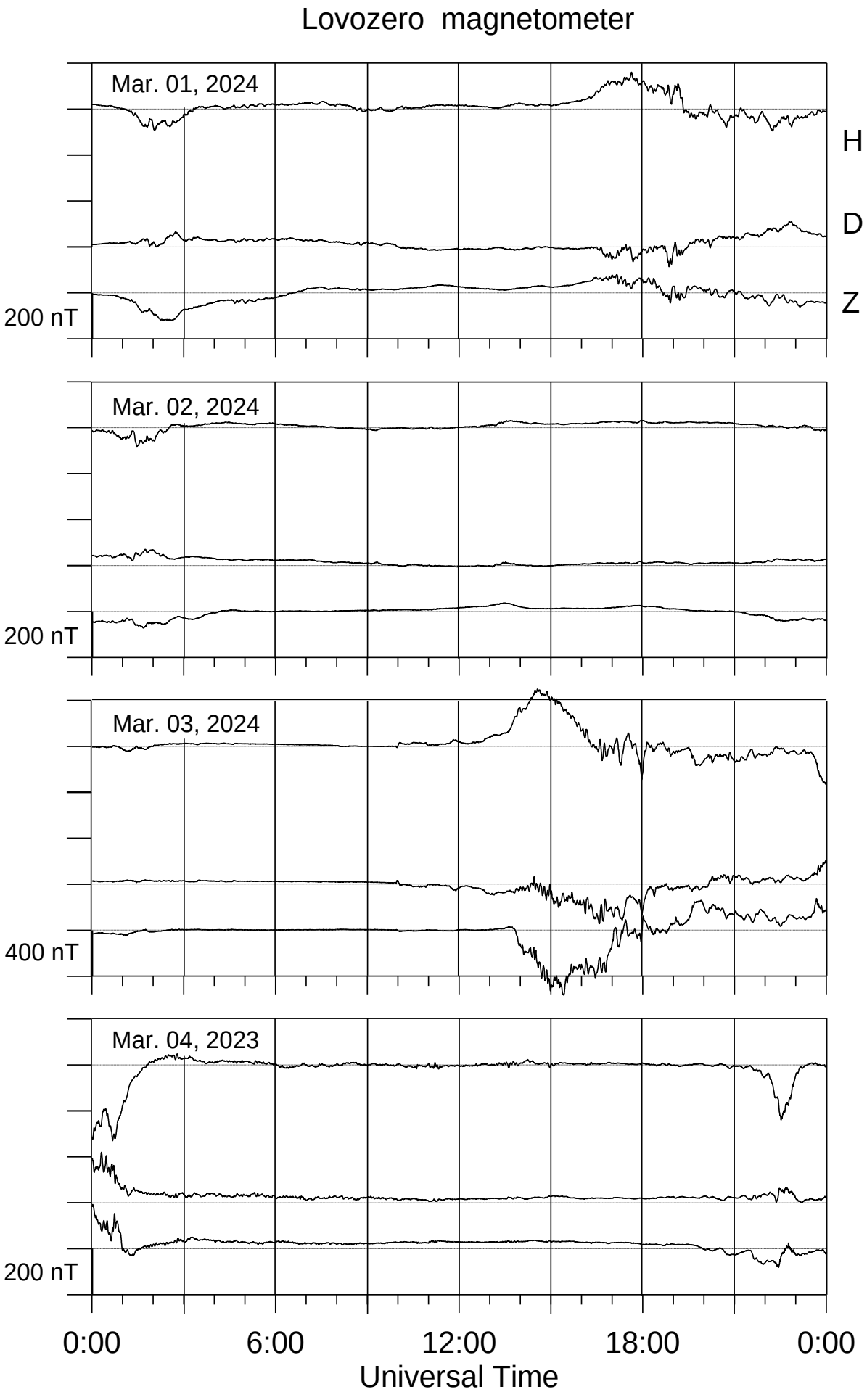
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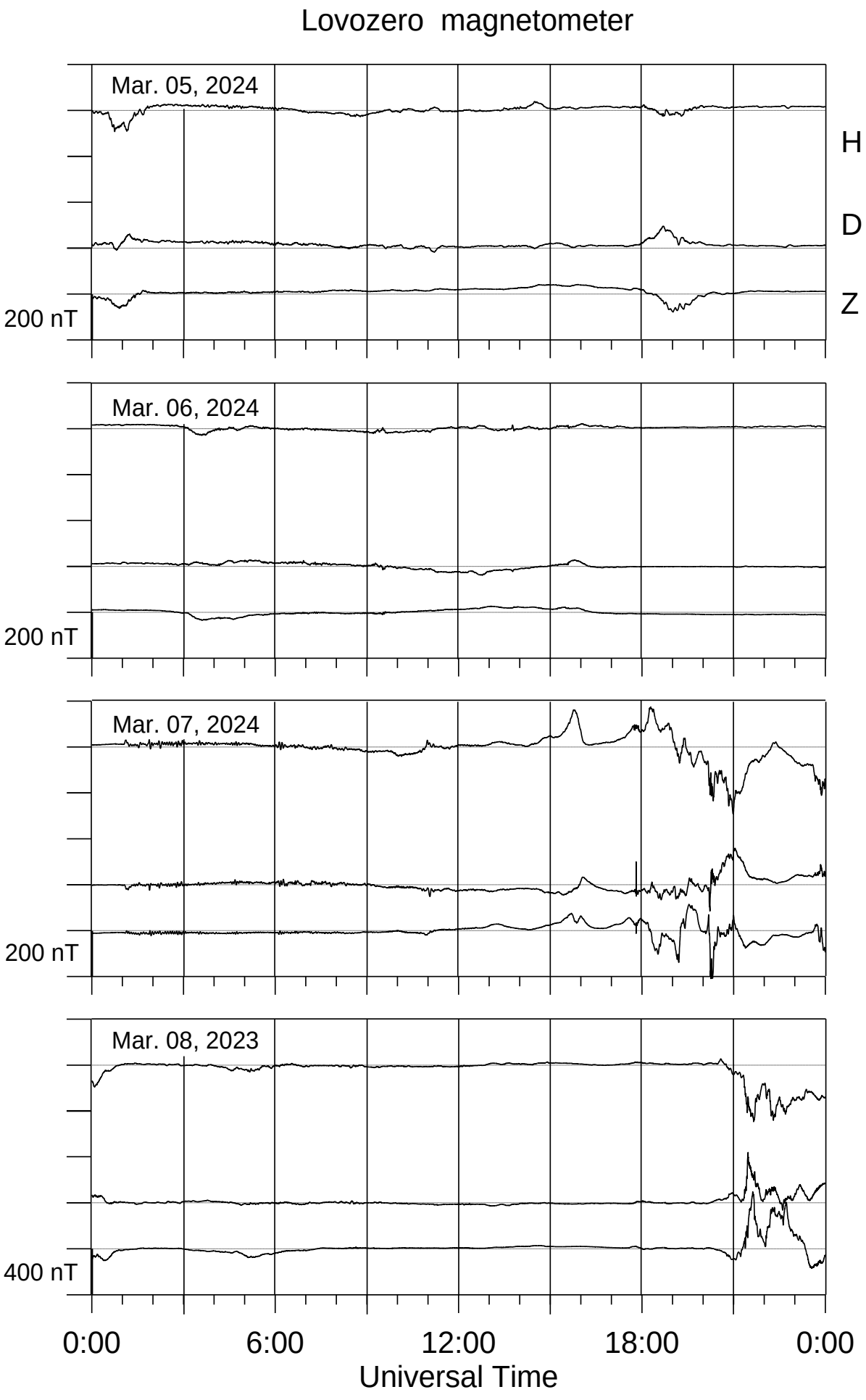
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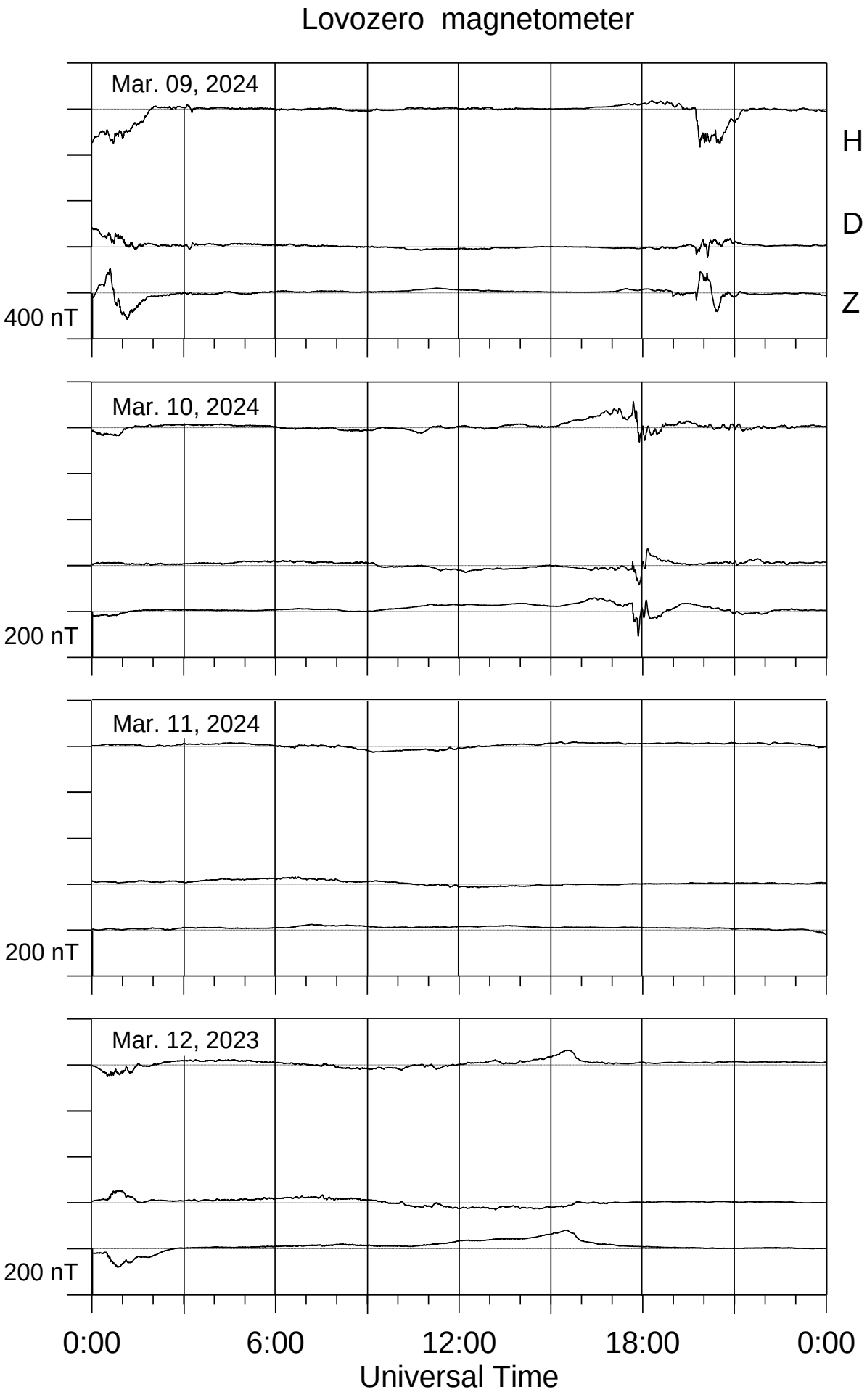
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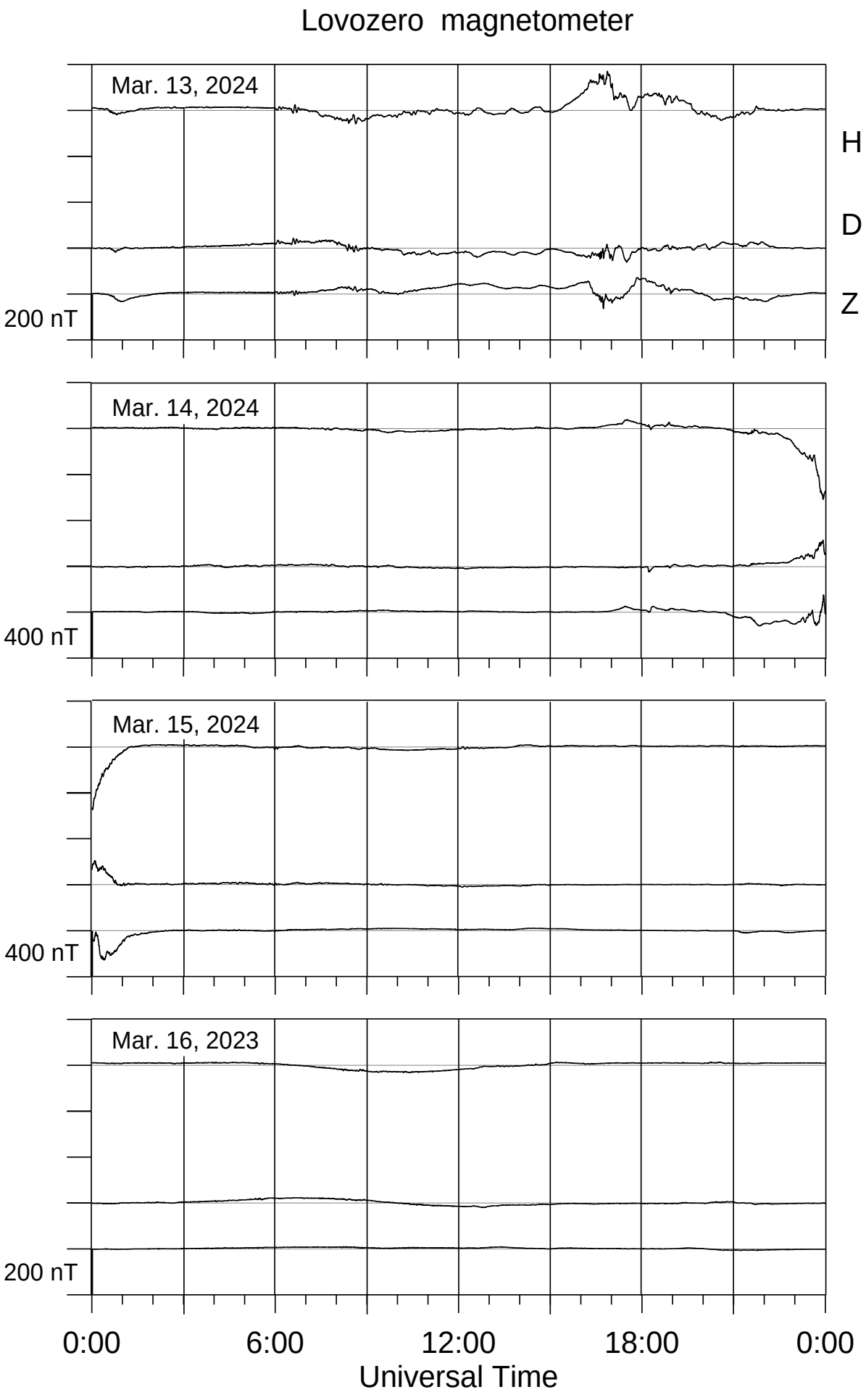
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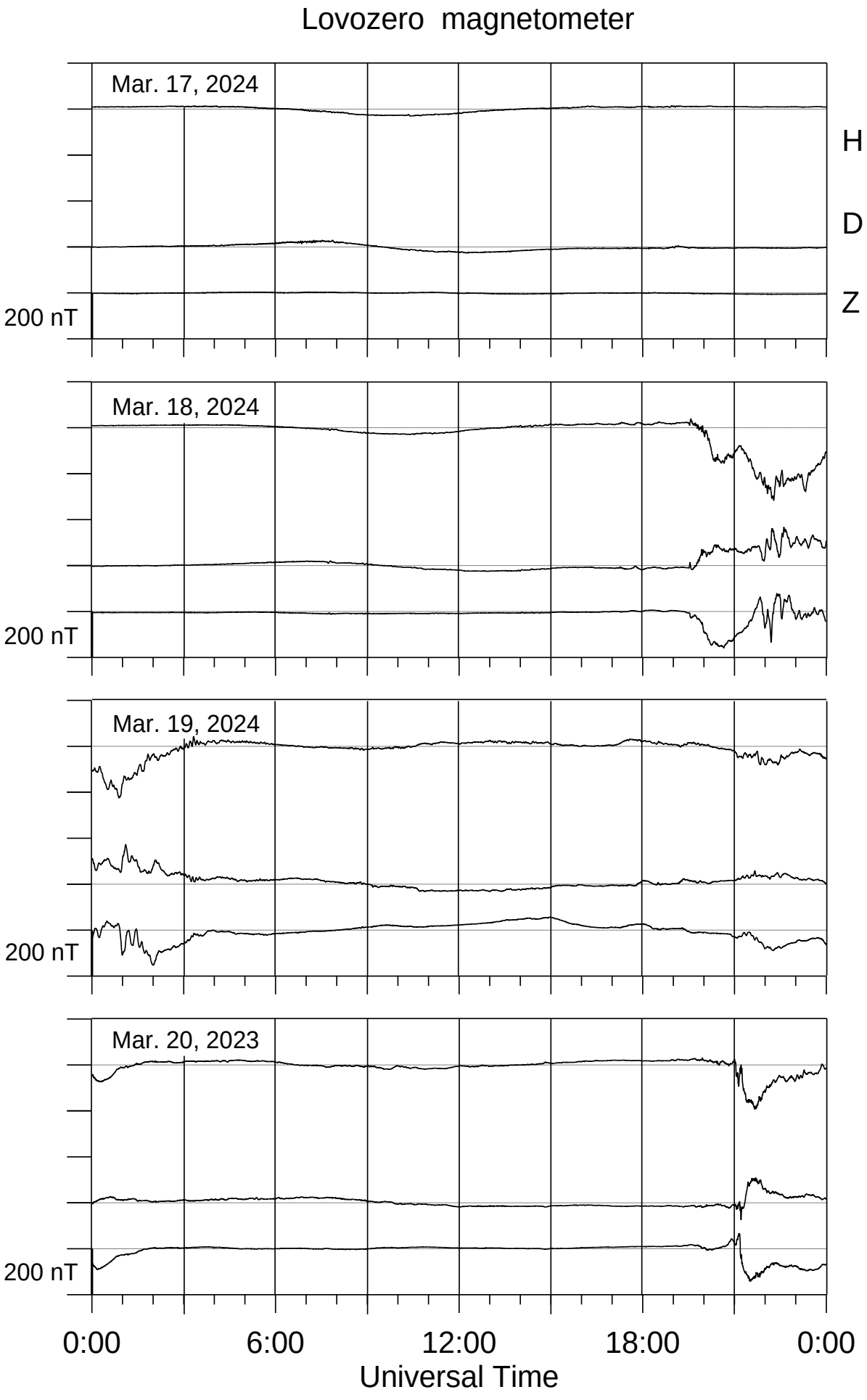
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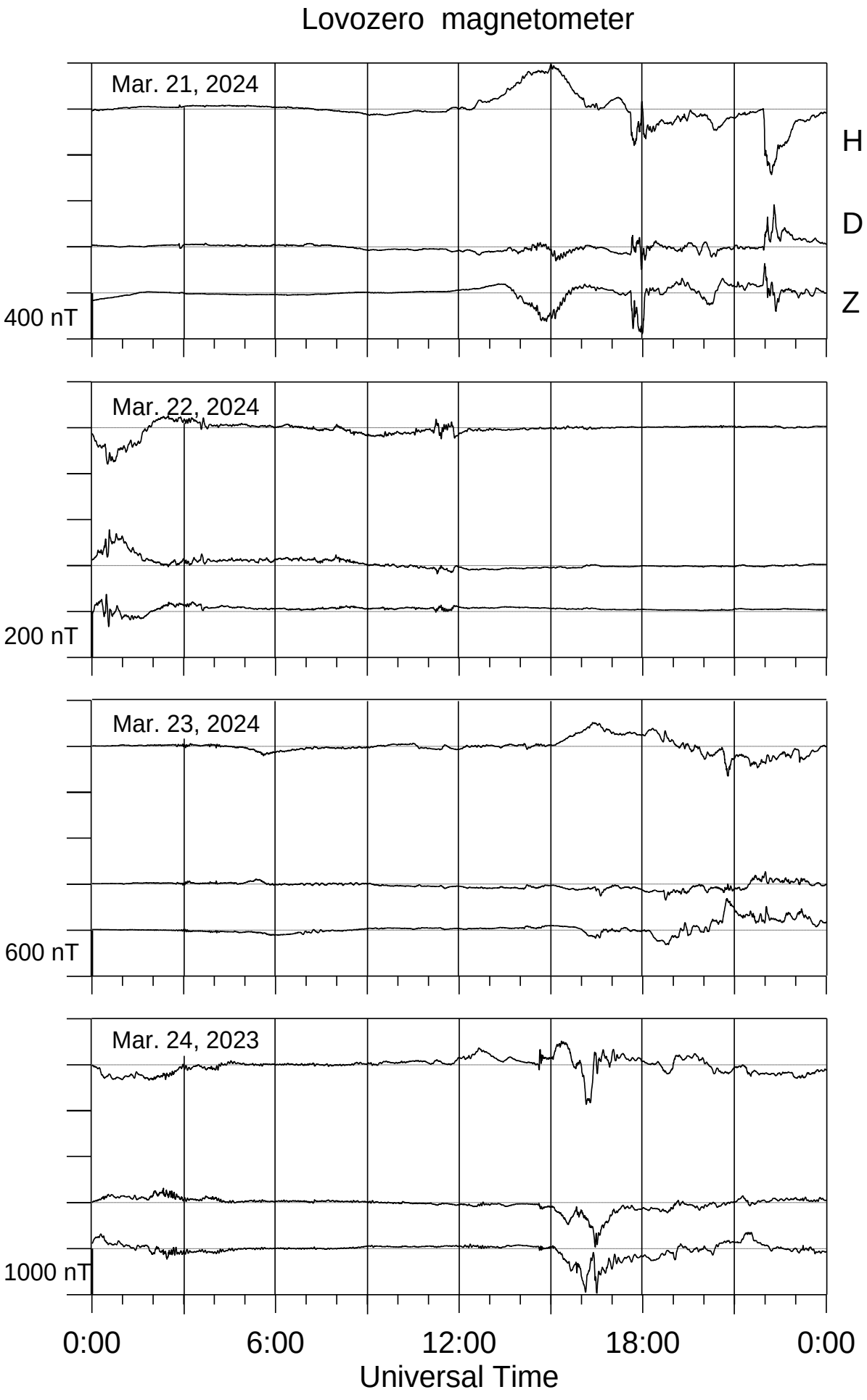
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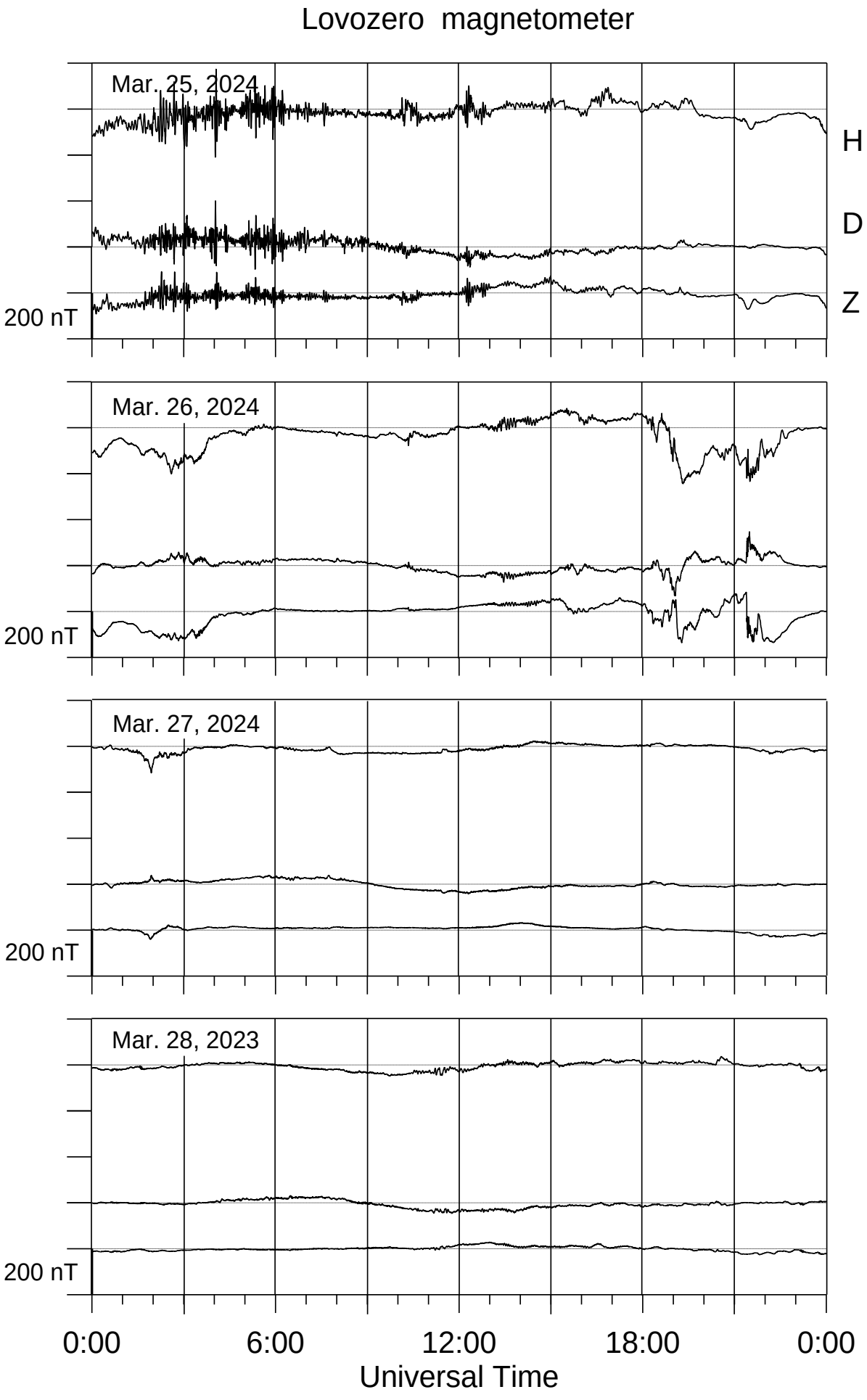
Lovozero magnetometer
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12:00
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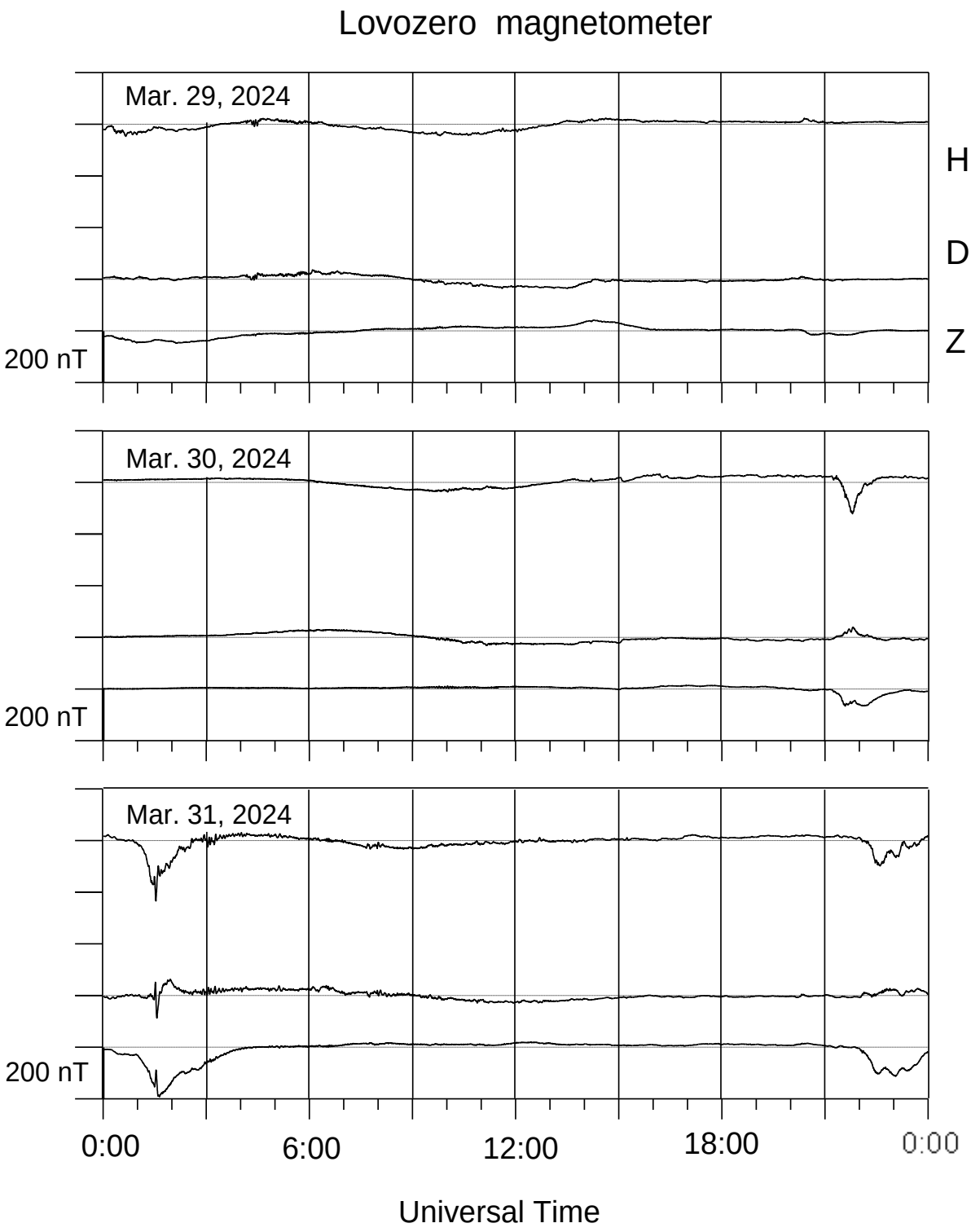
Lovozero magnetometer
Mar. 29, 2024
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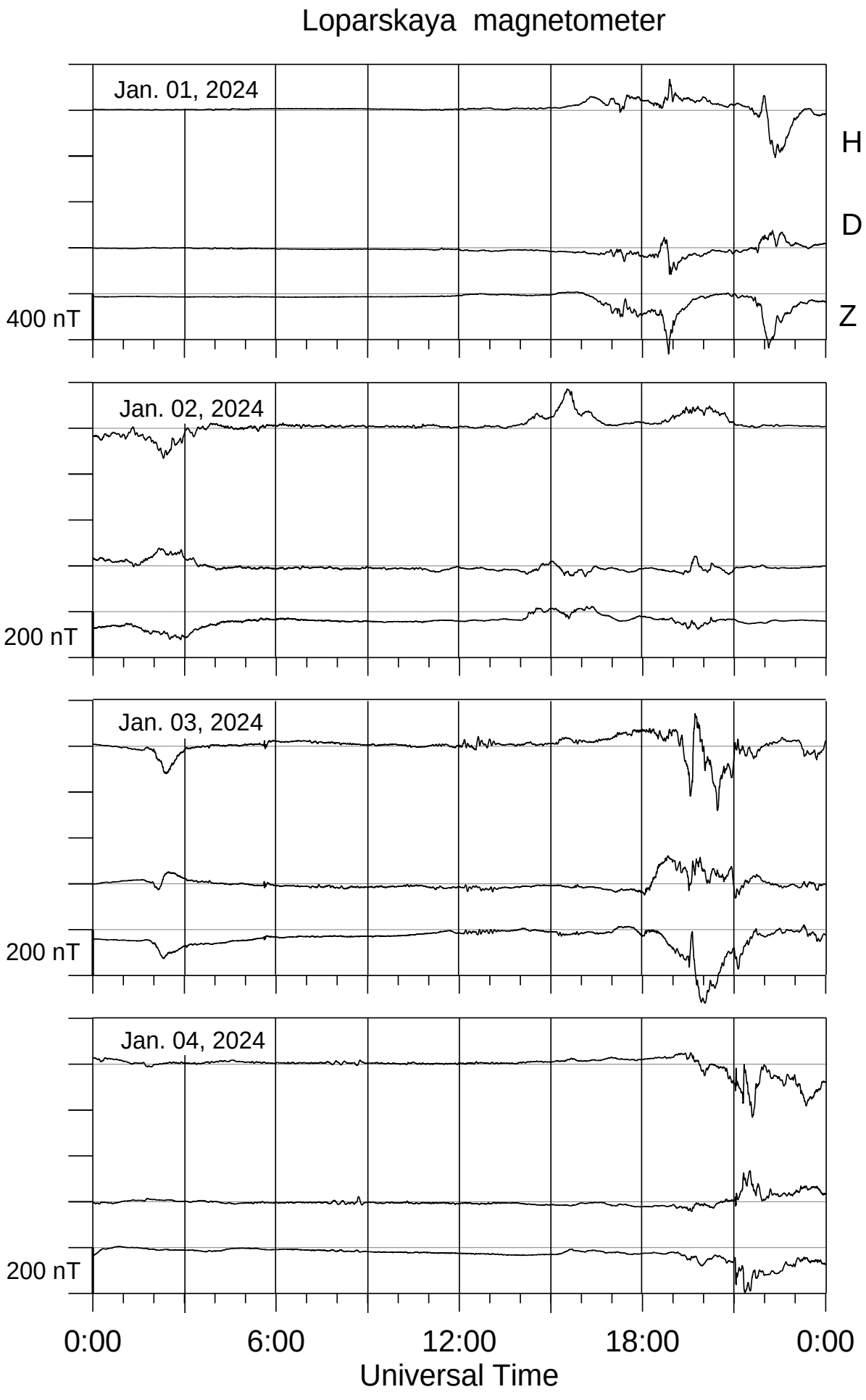
Universal Time

# LOPARSKAYA MAGNETOGRAMS

## January - March 2024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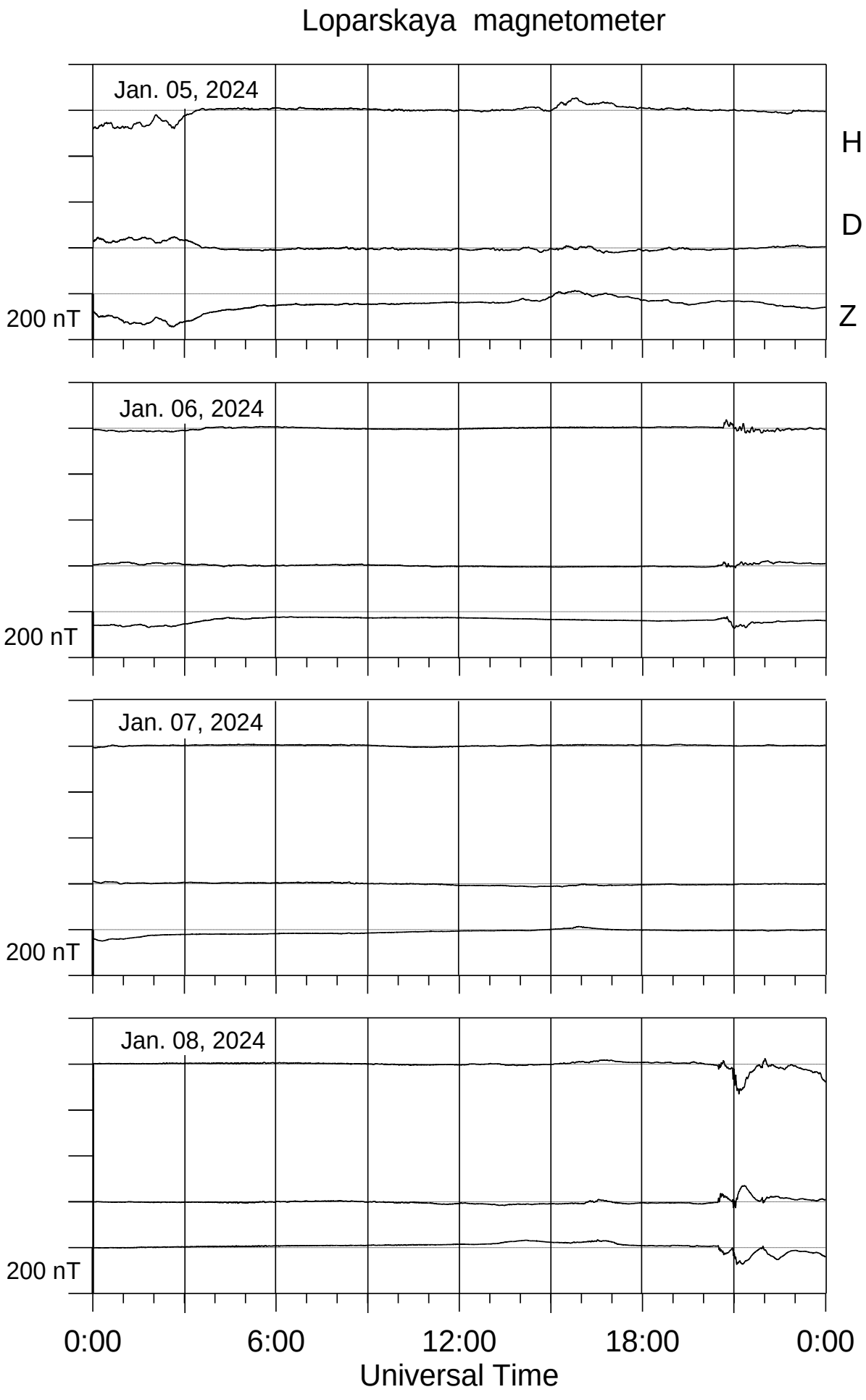
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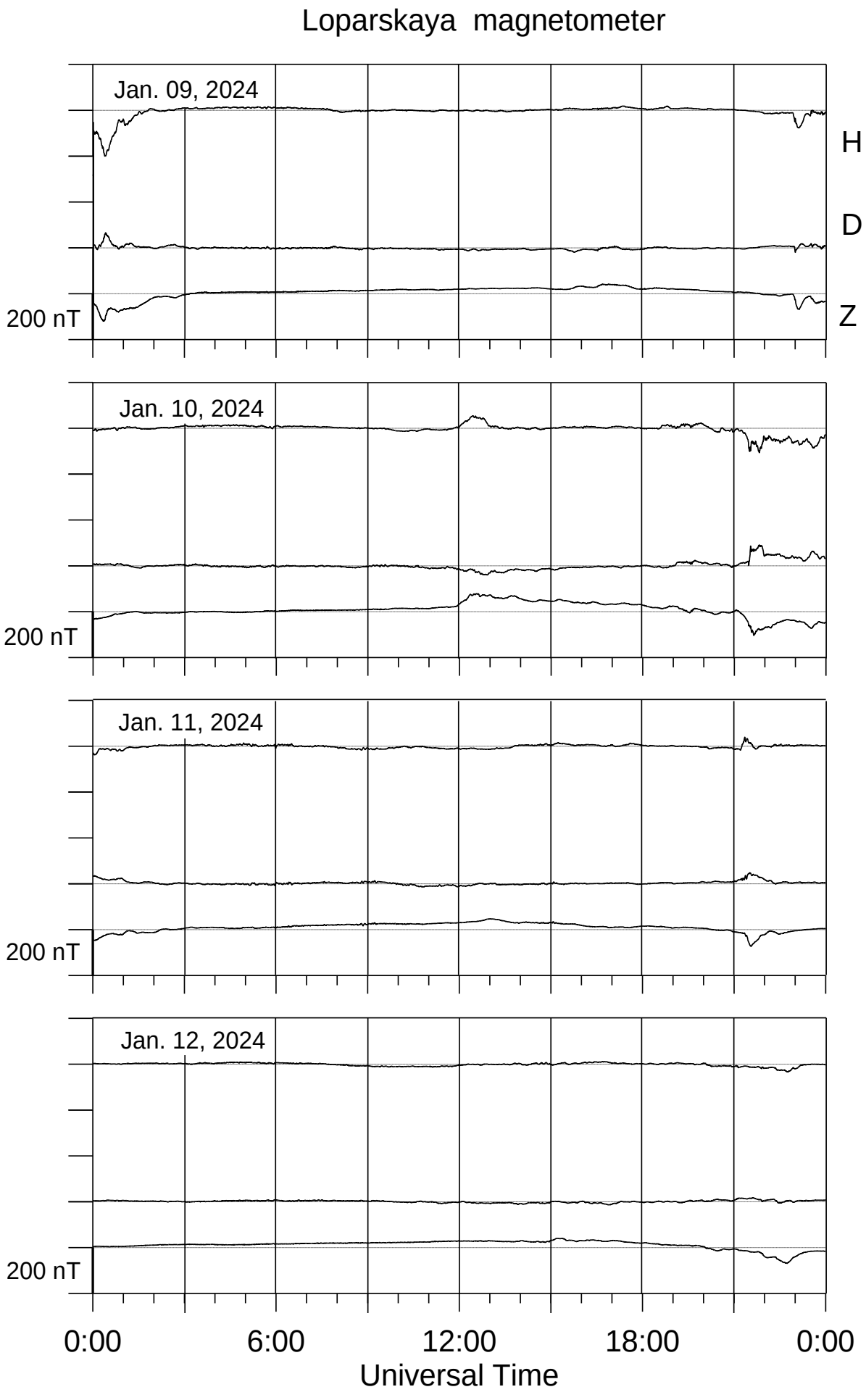
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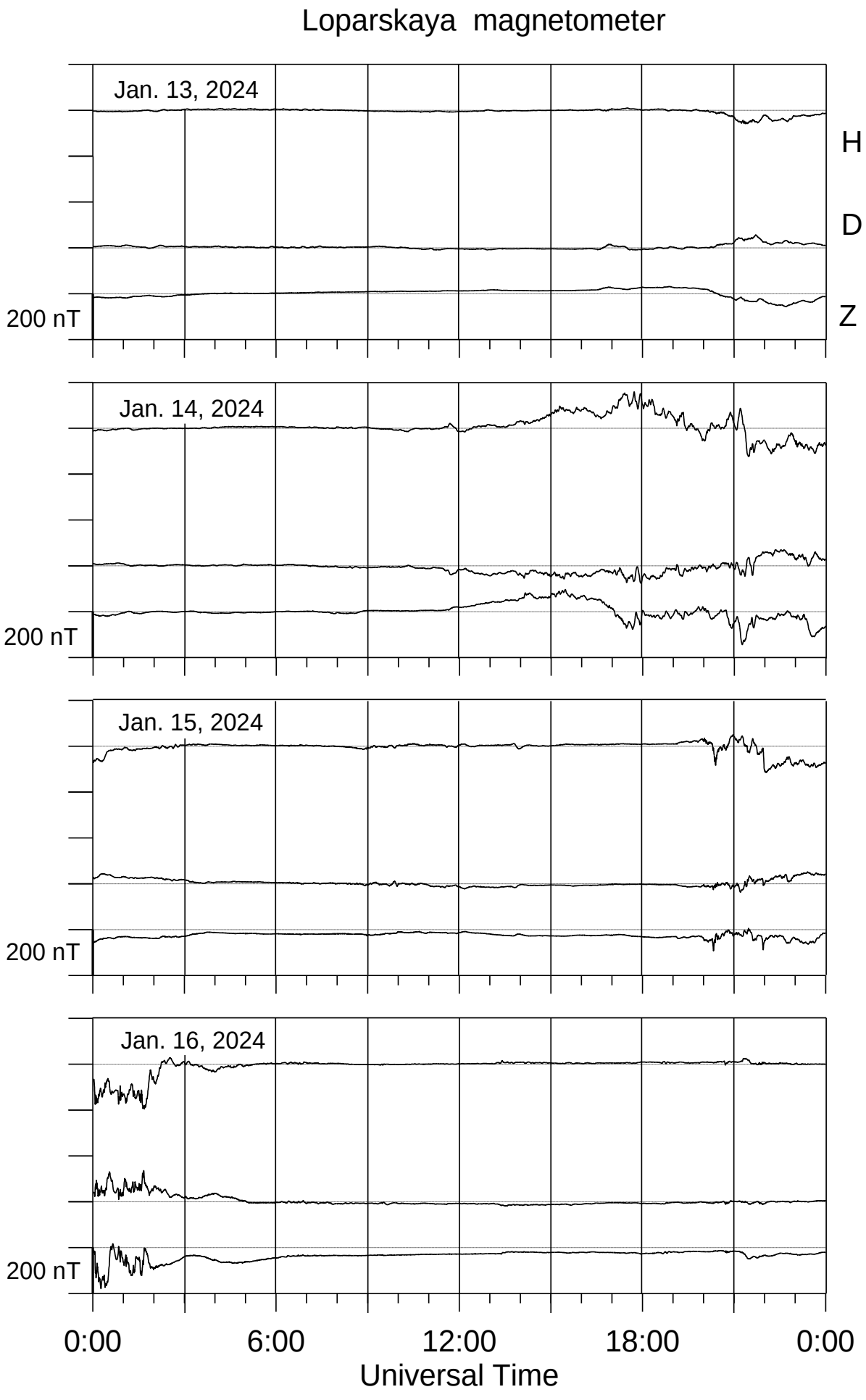
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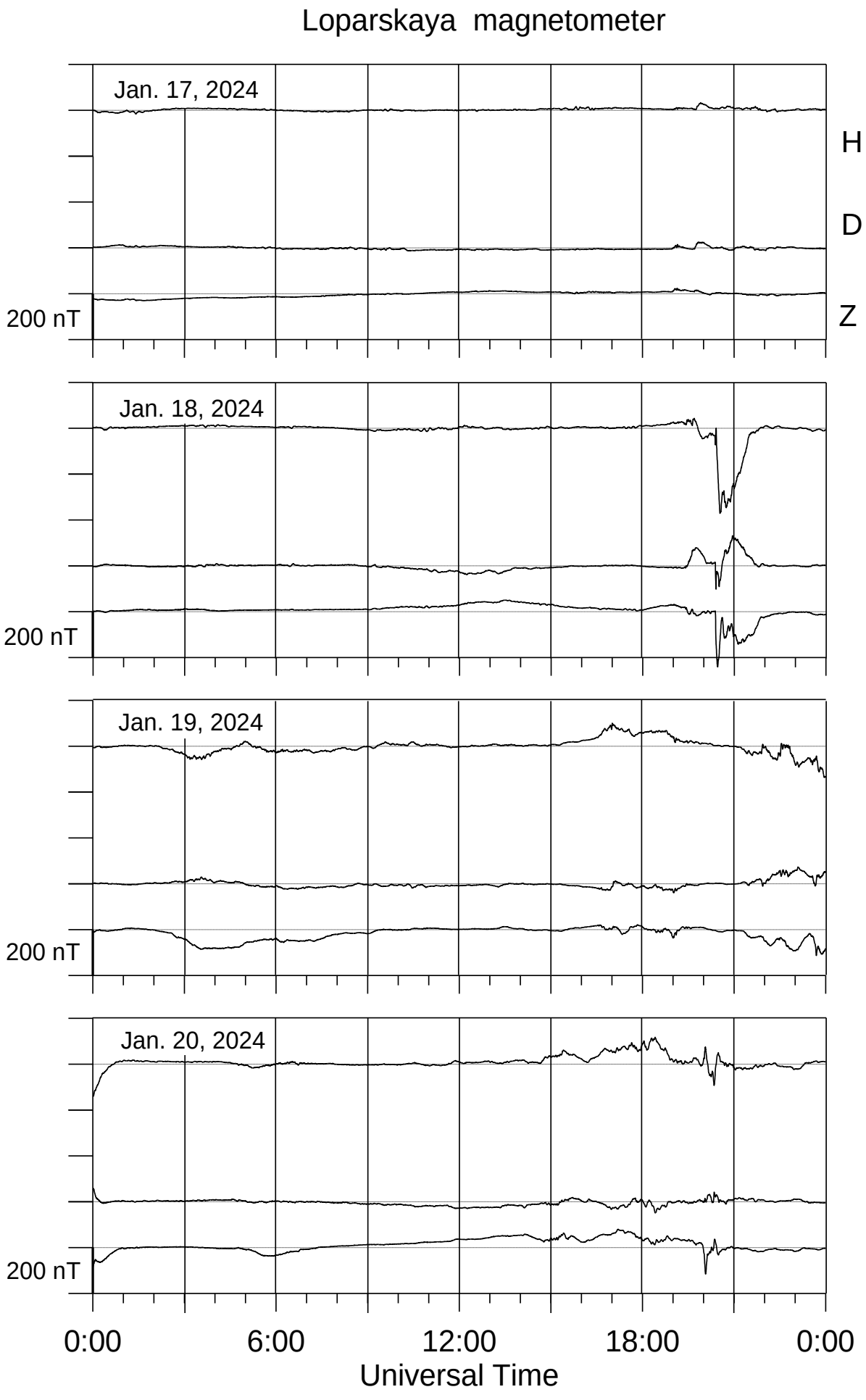
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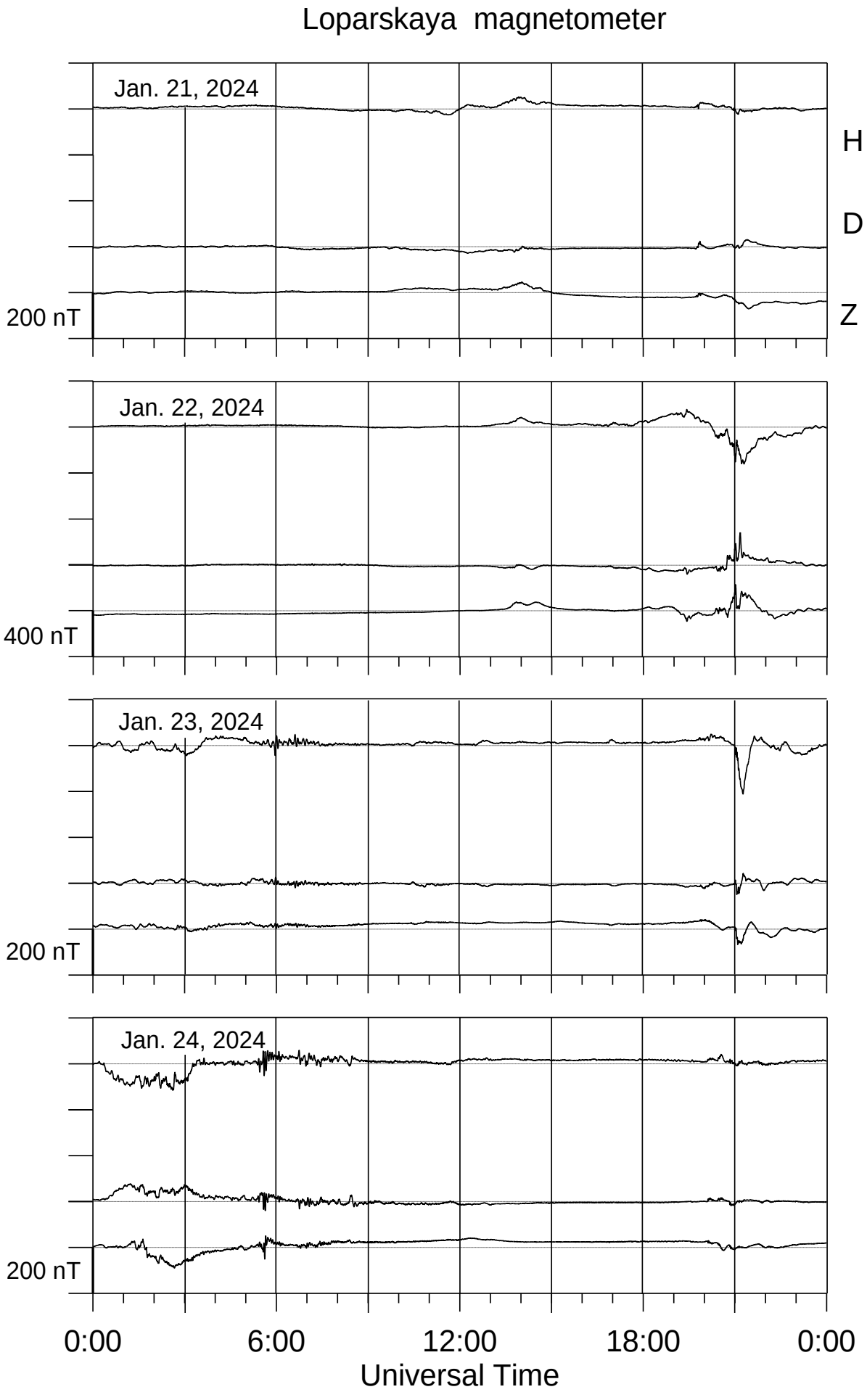
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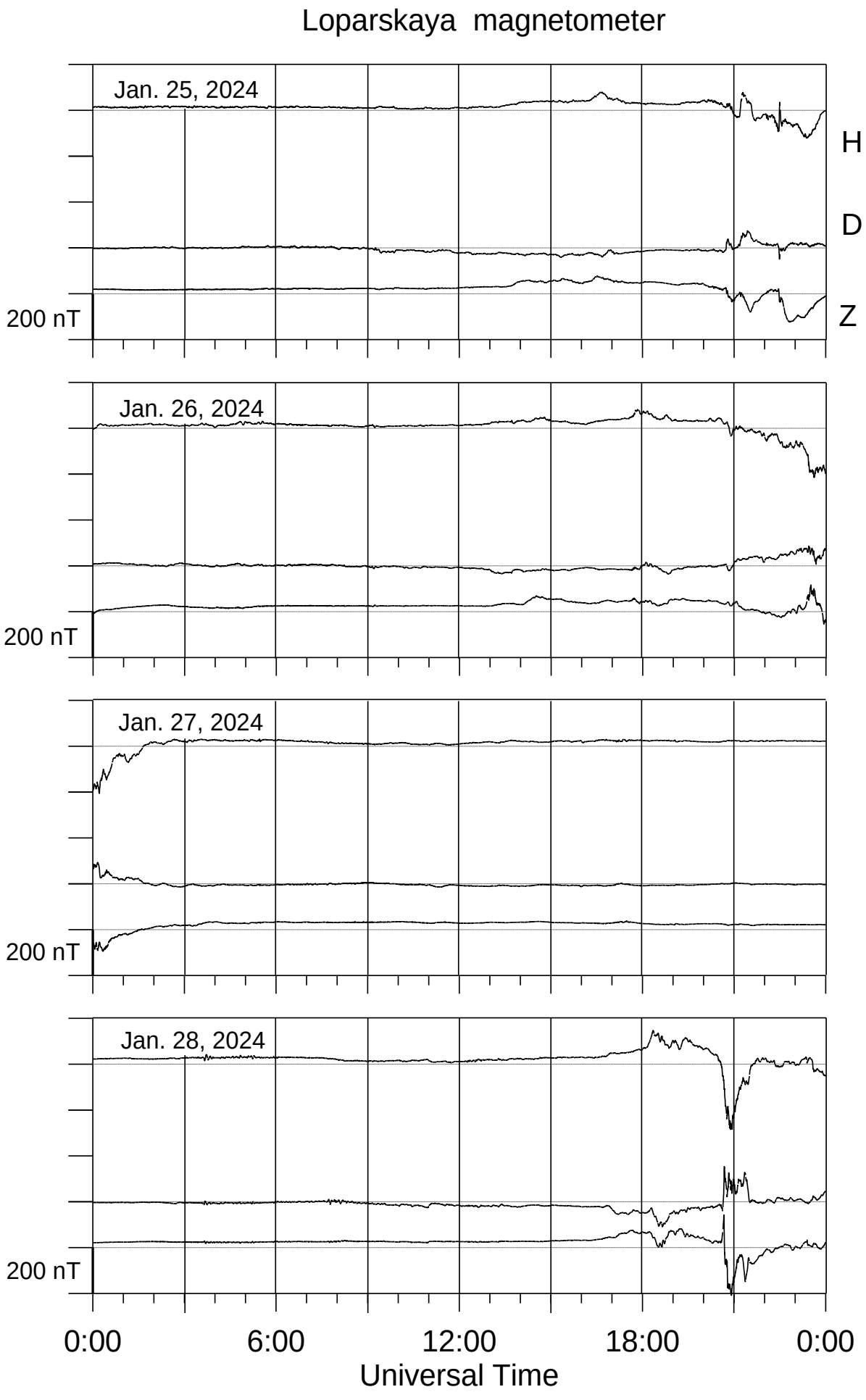
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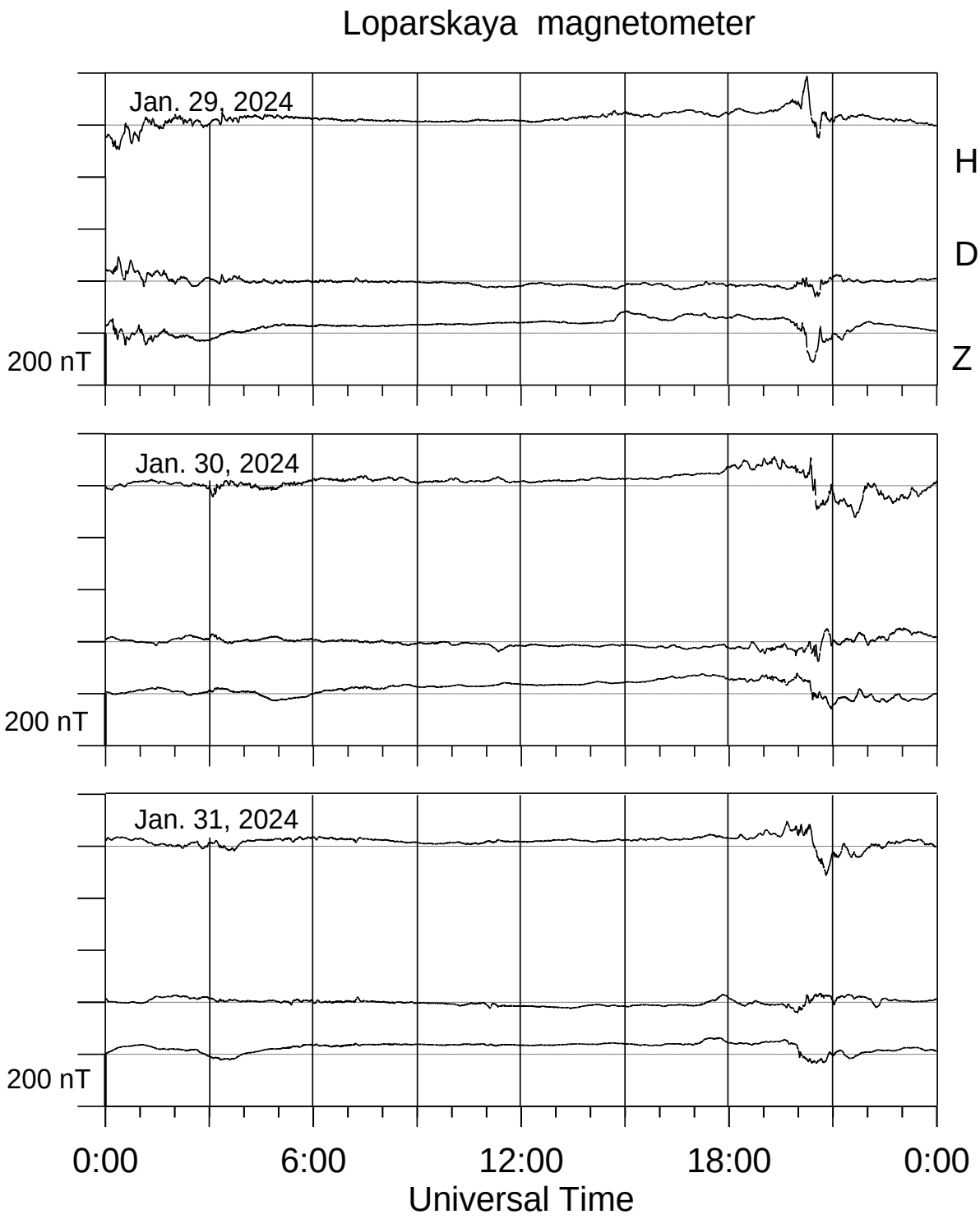
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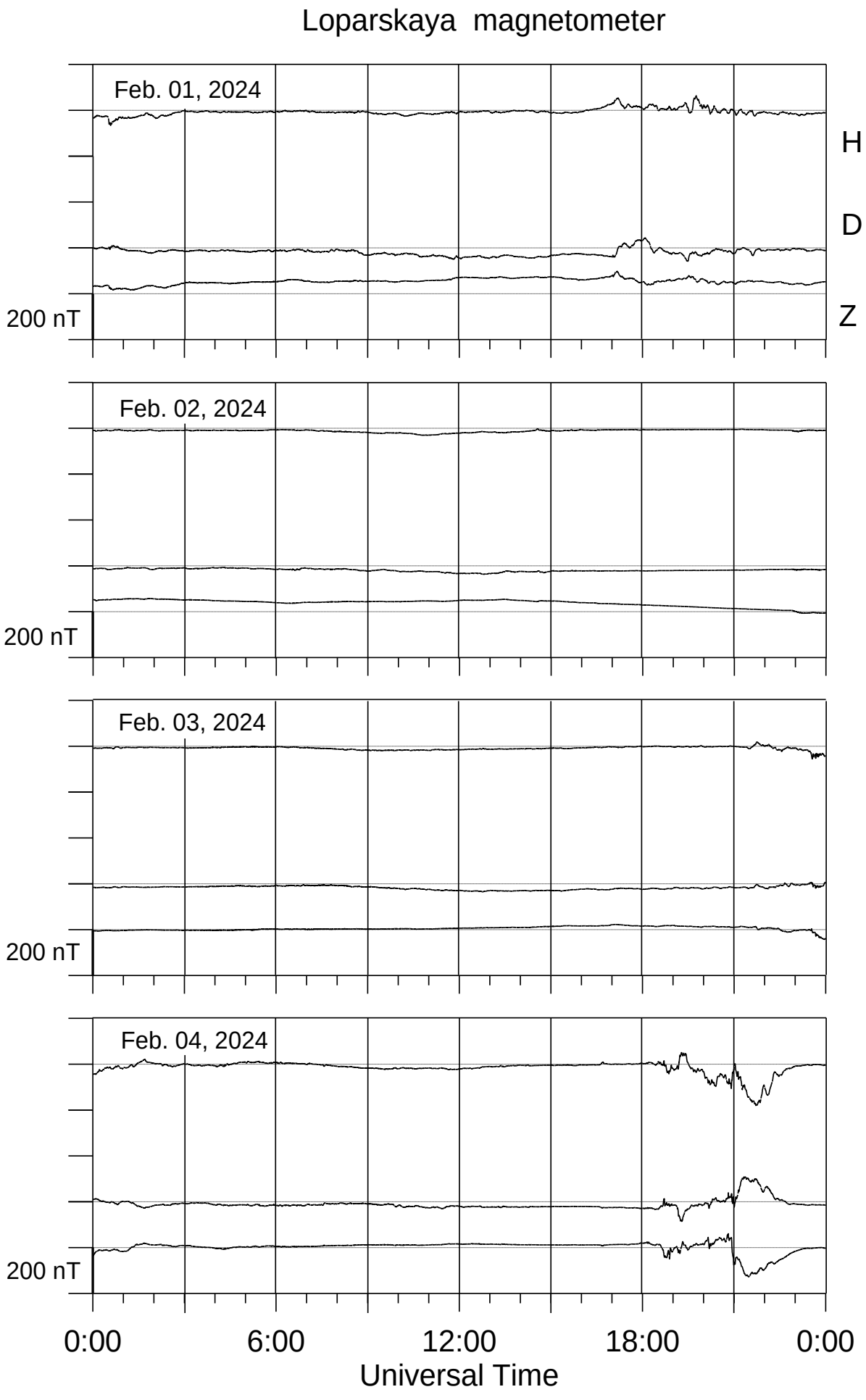
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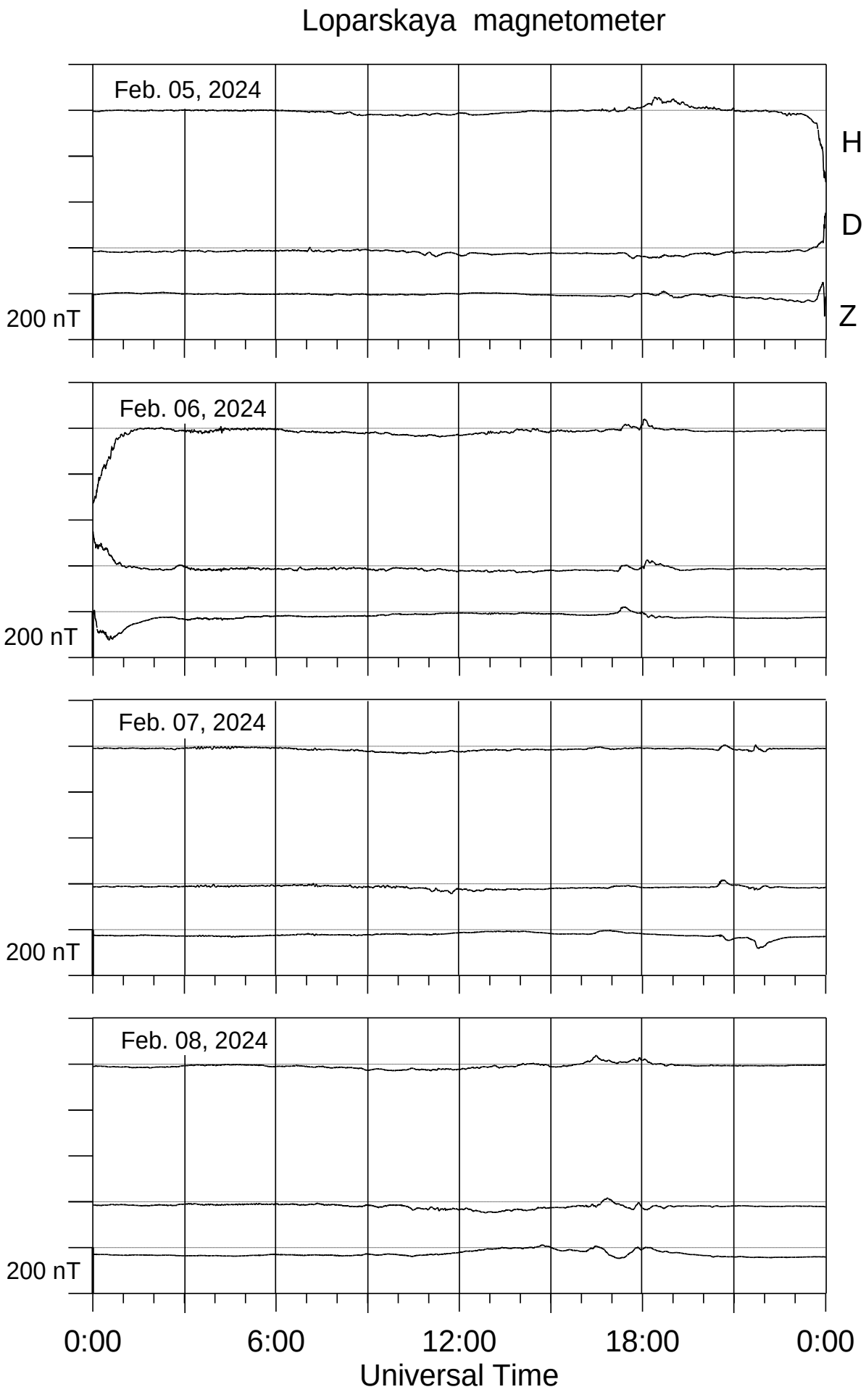
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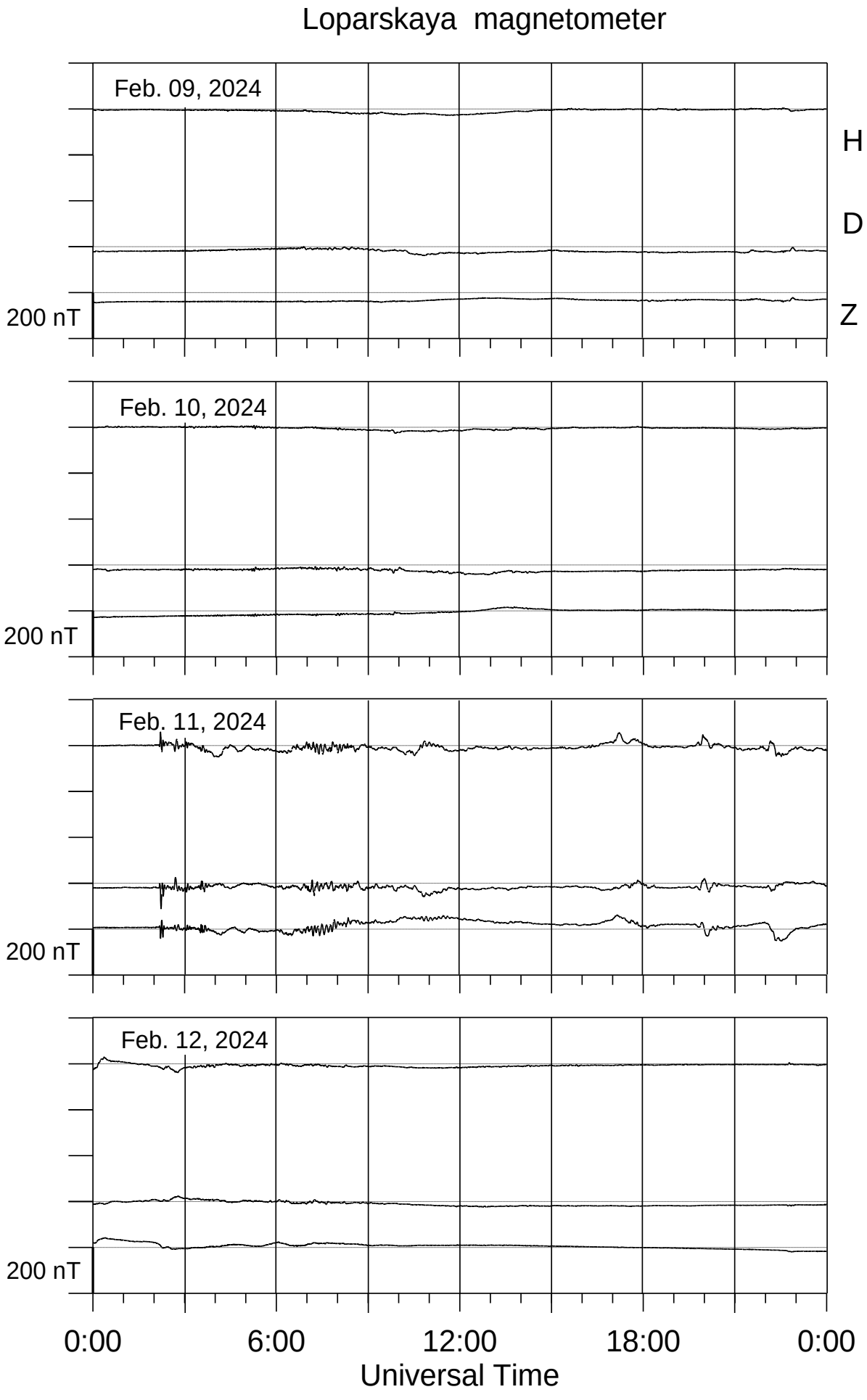
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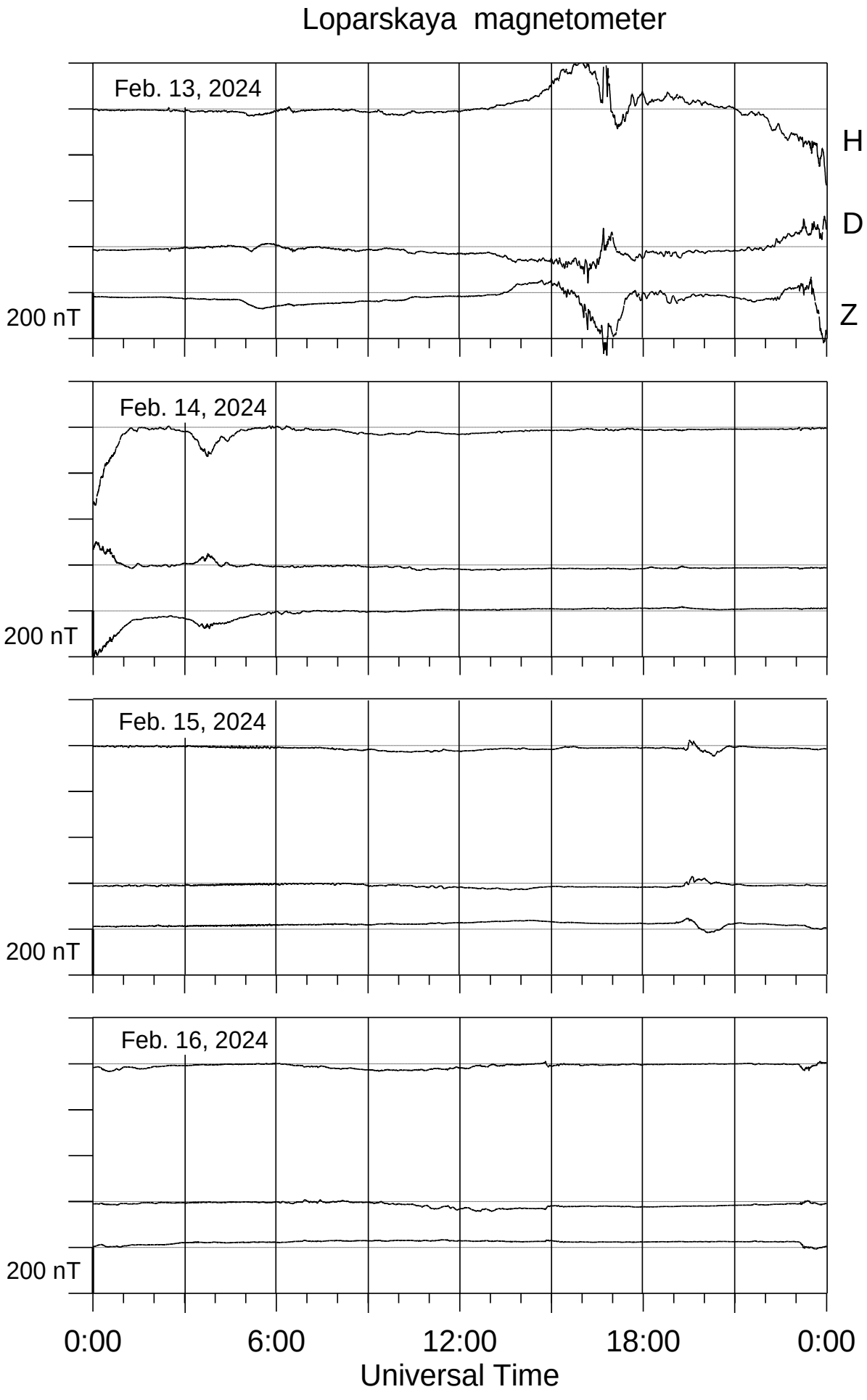
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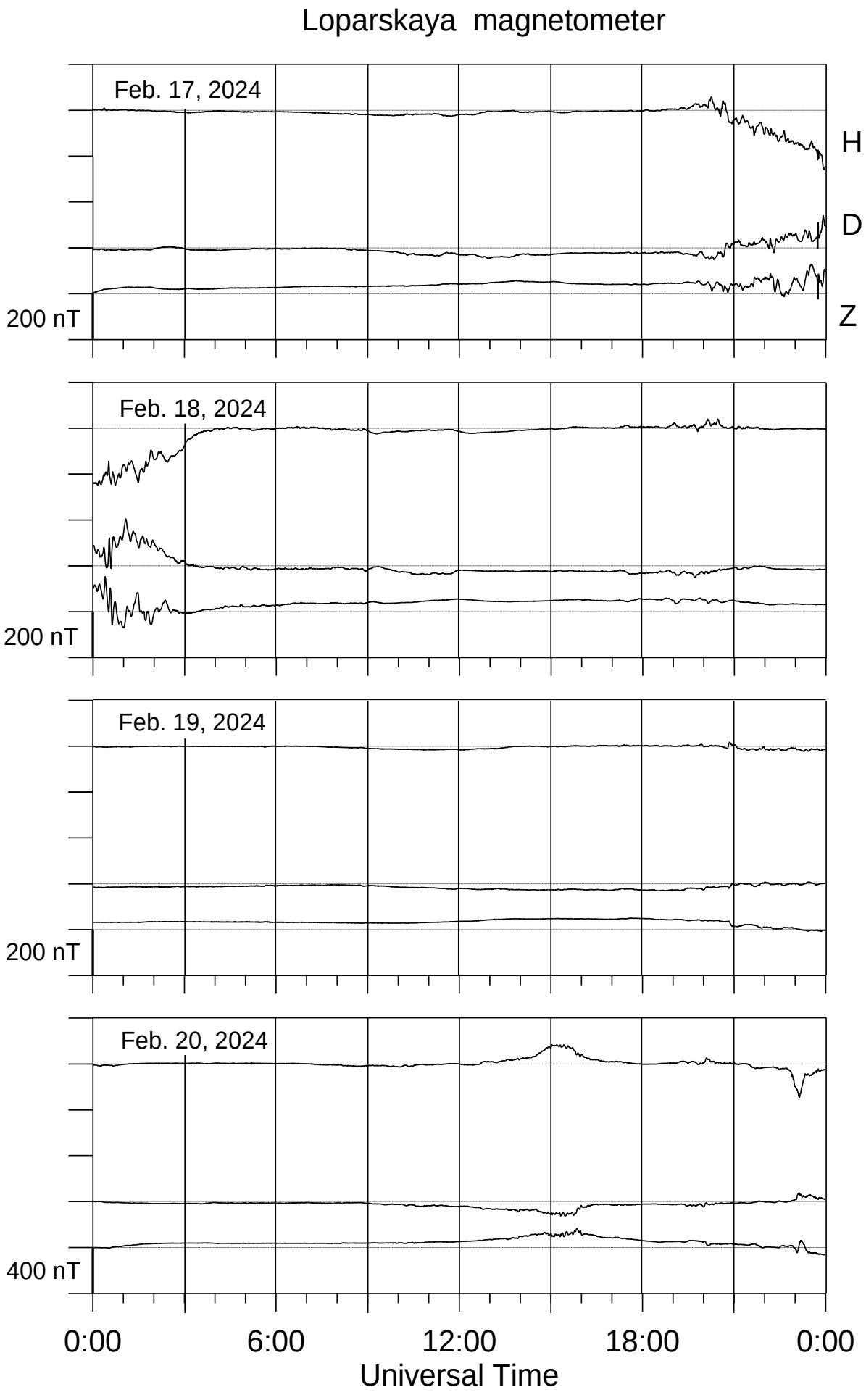
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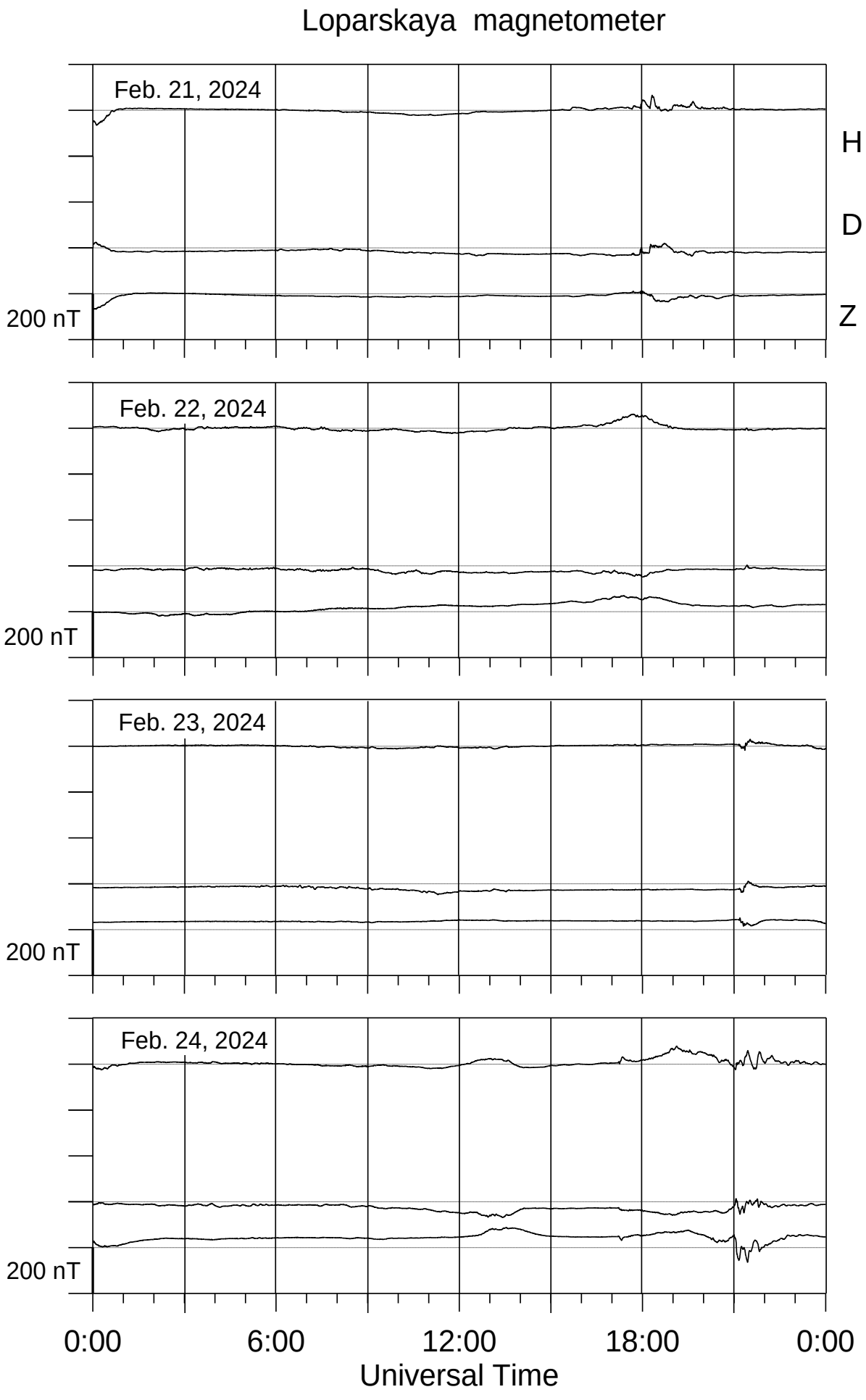
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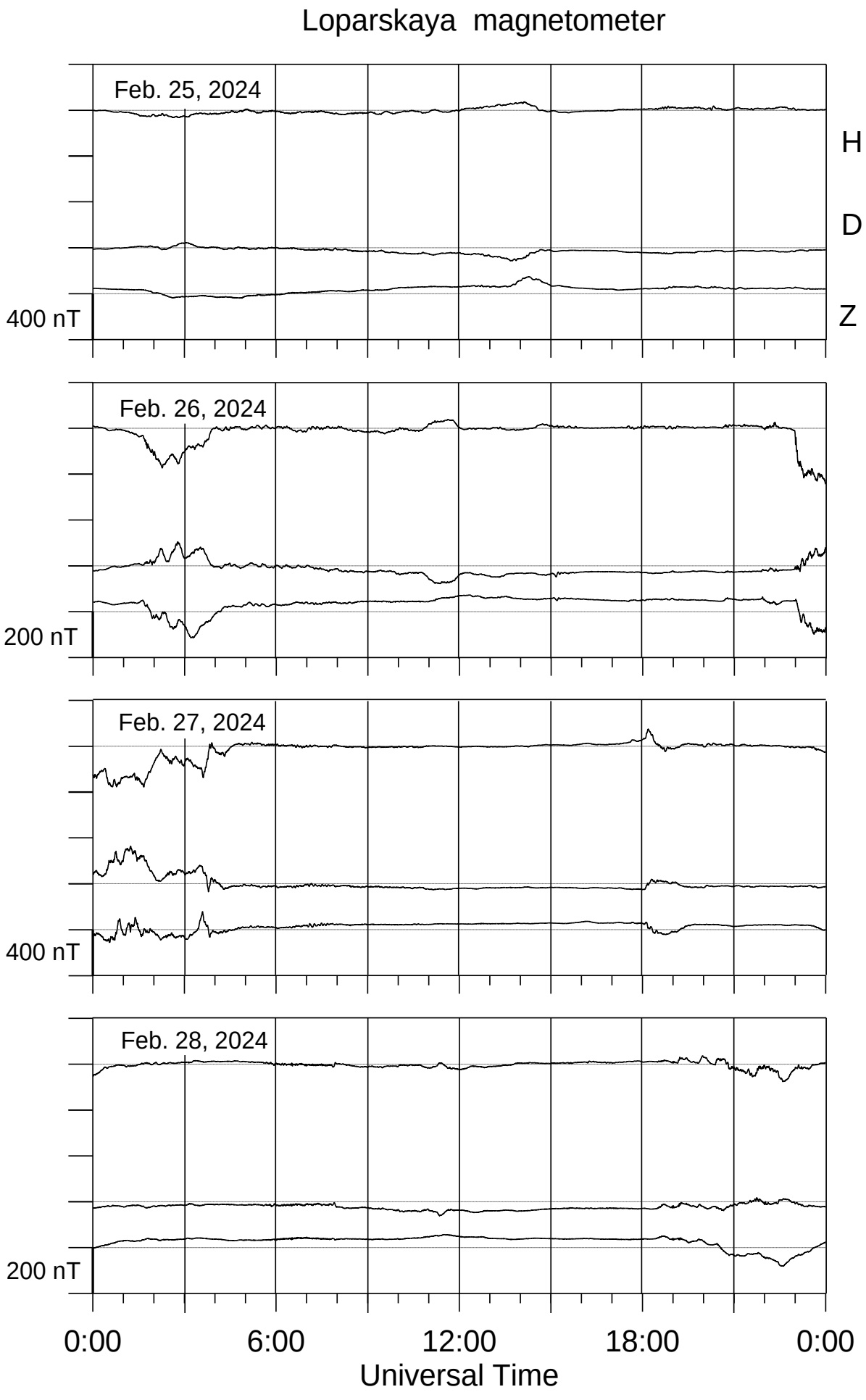
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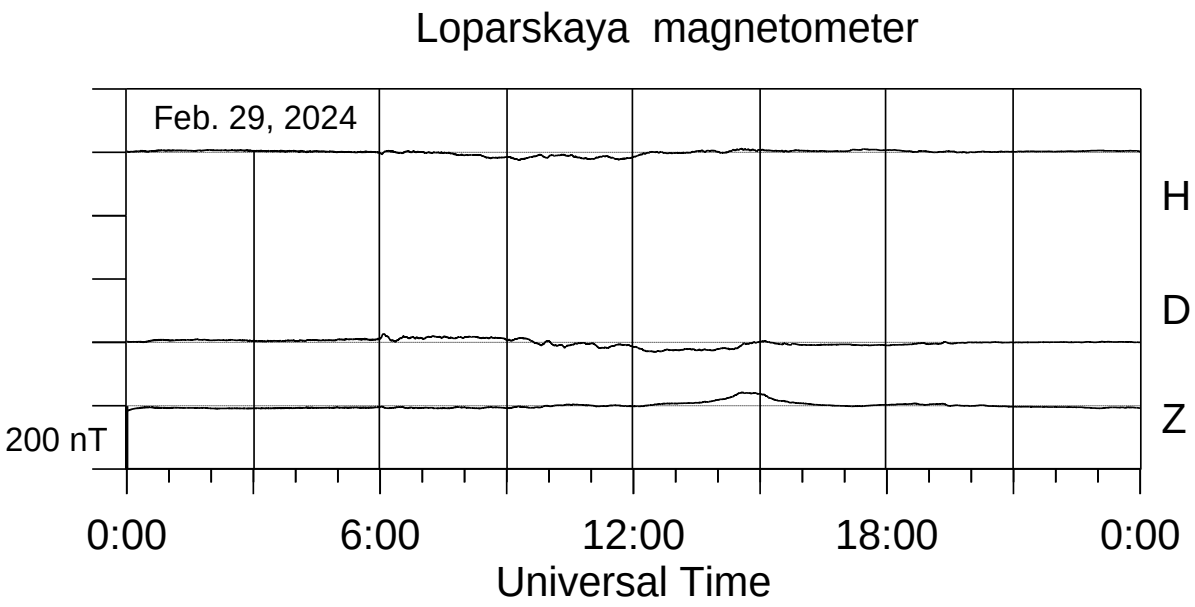
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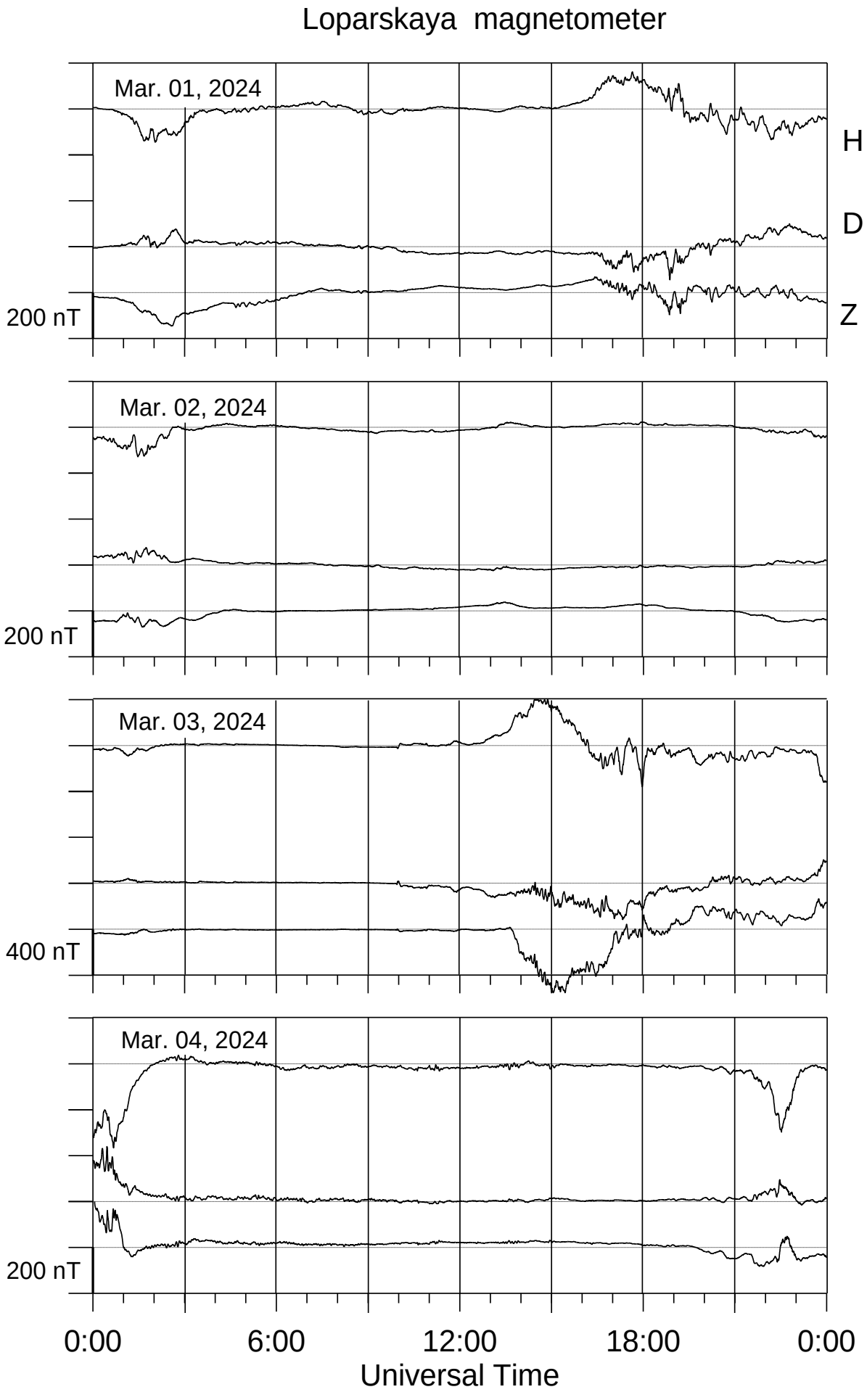
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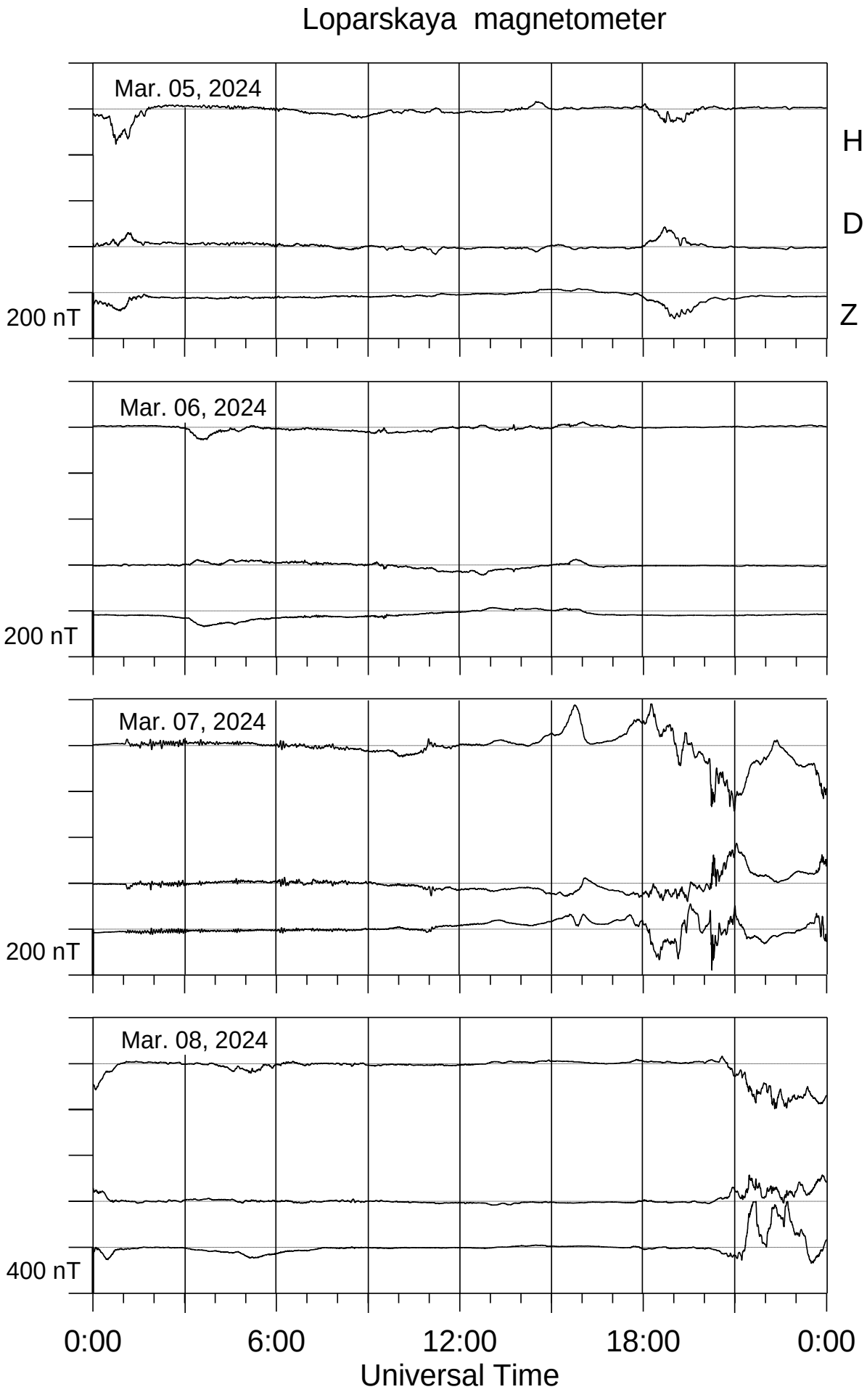
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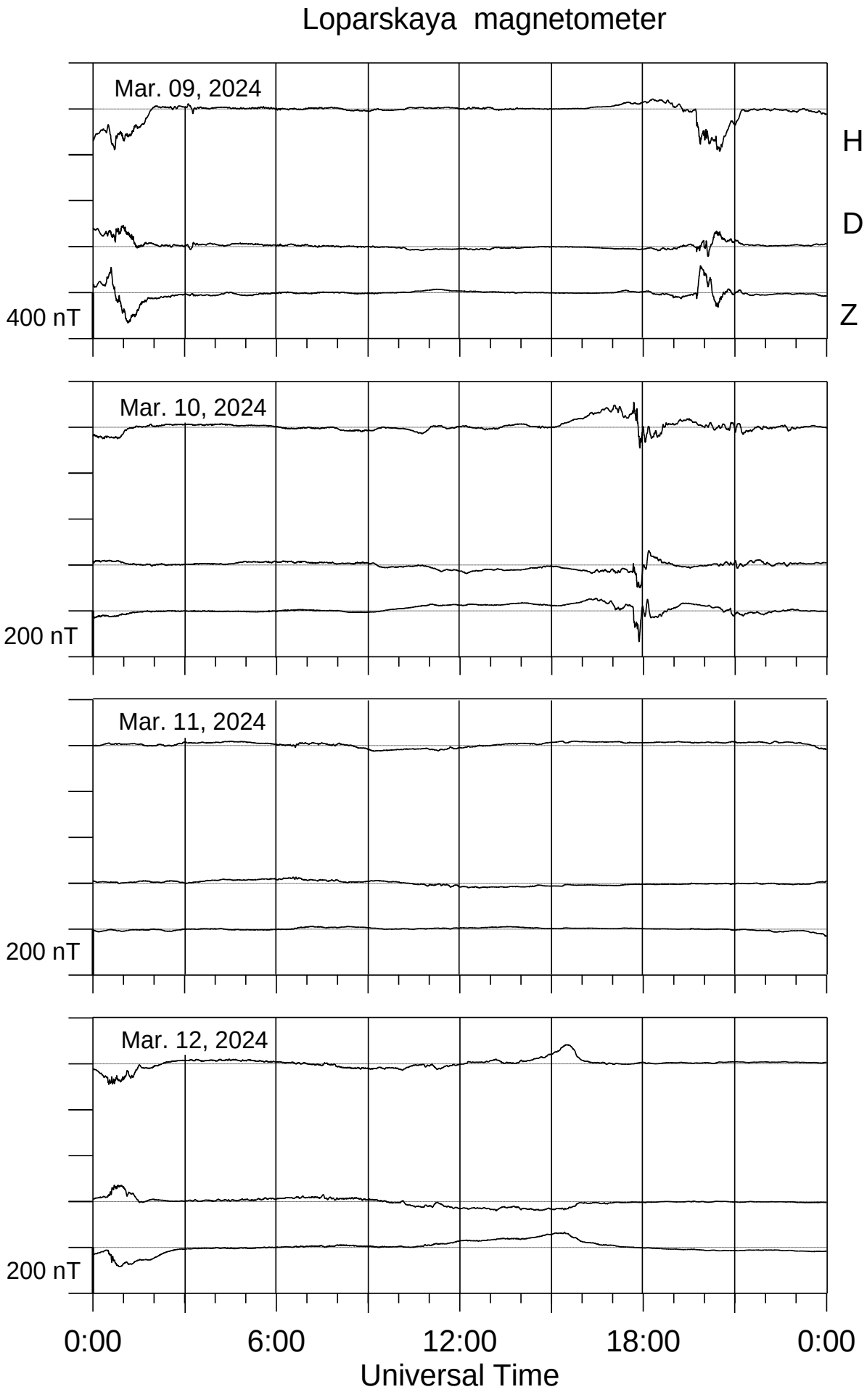
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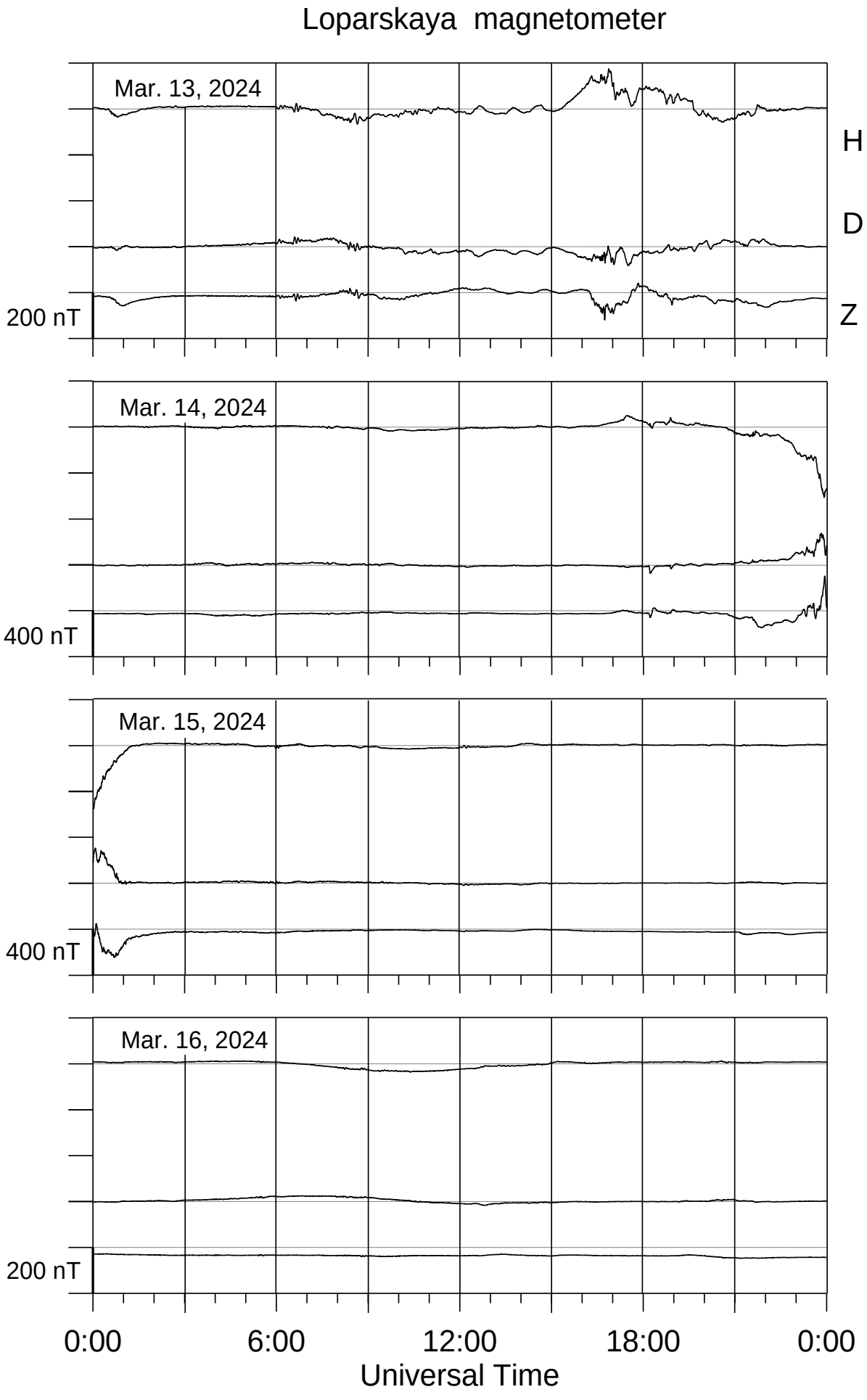
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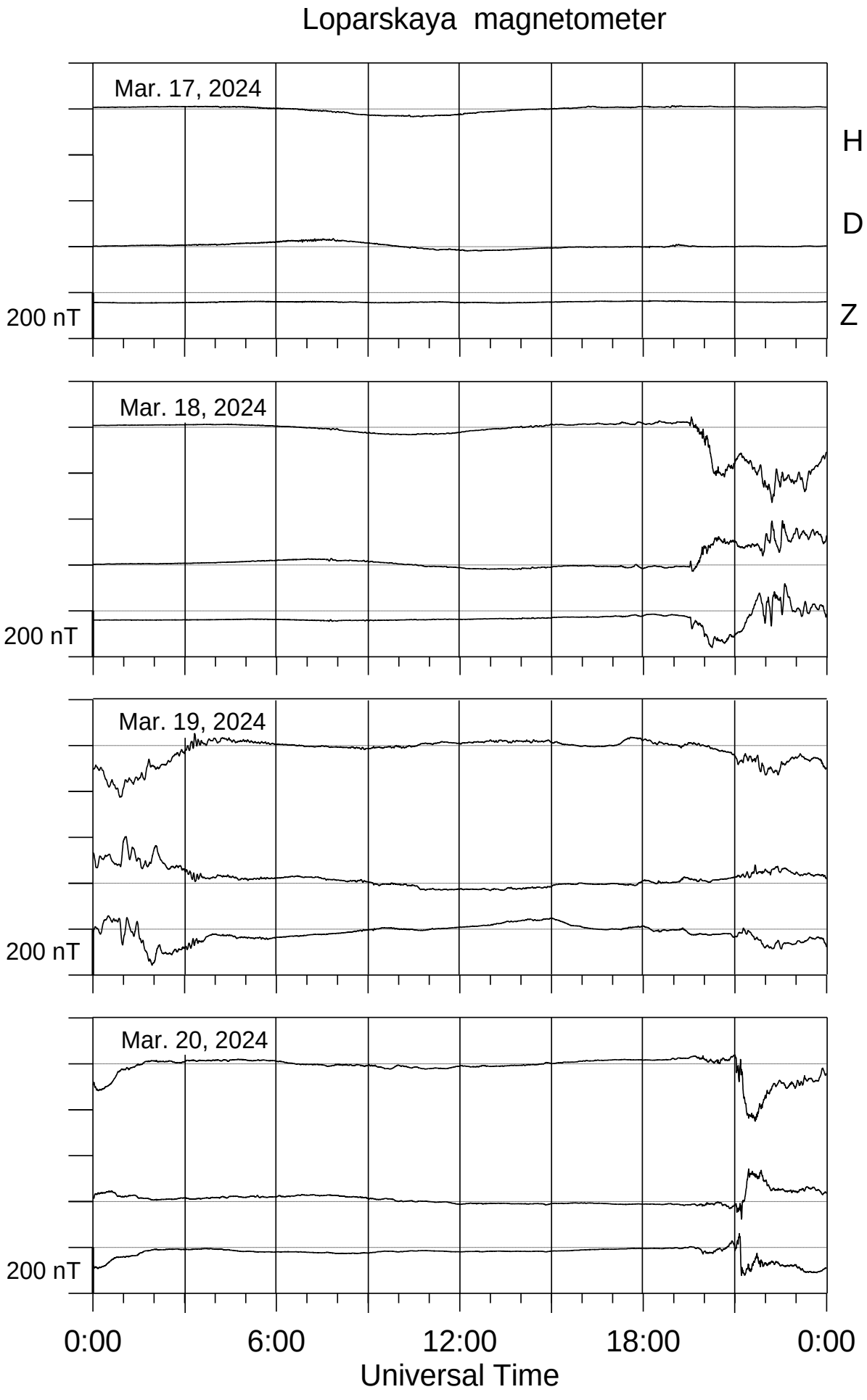
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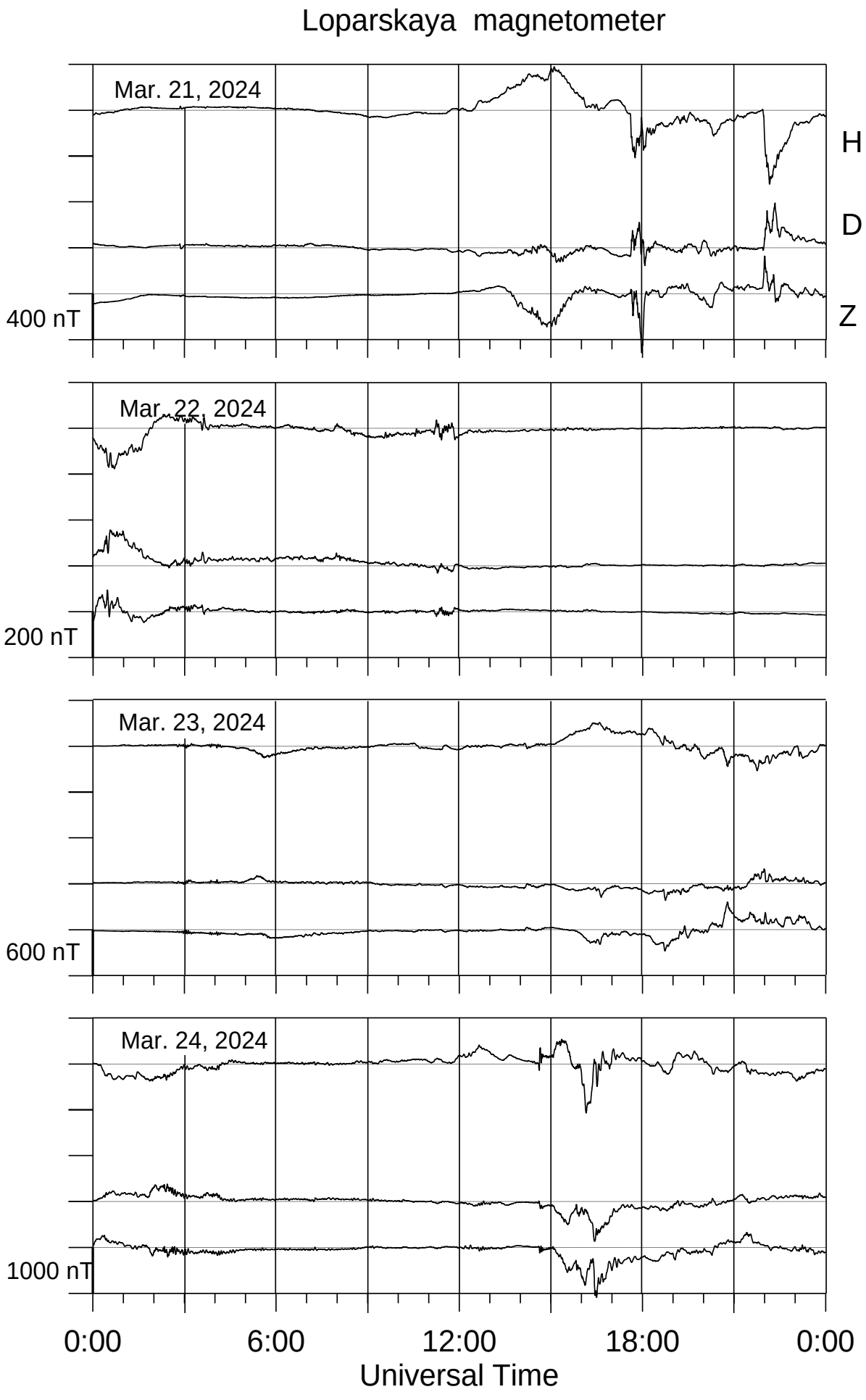
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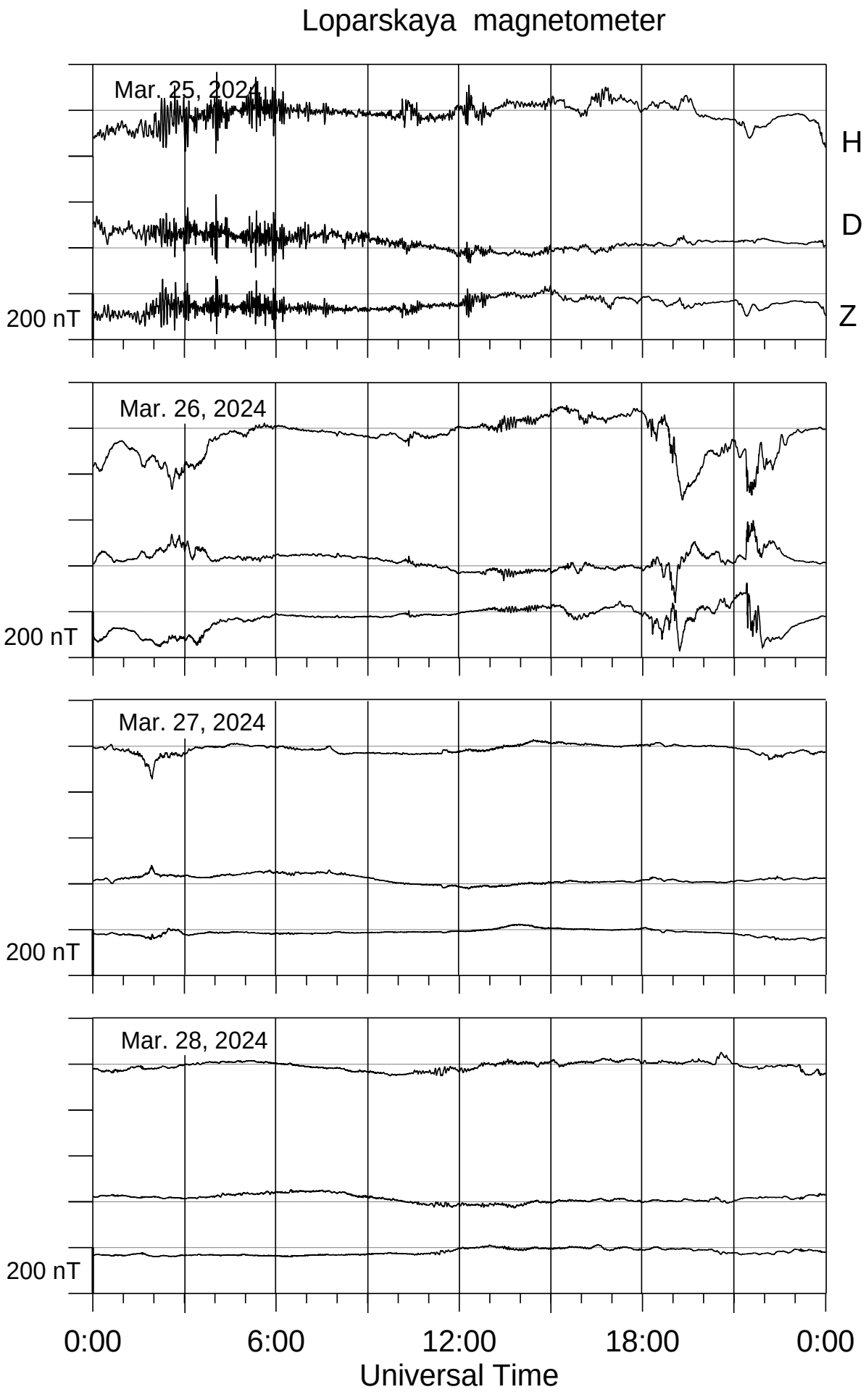
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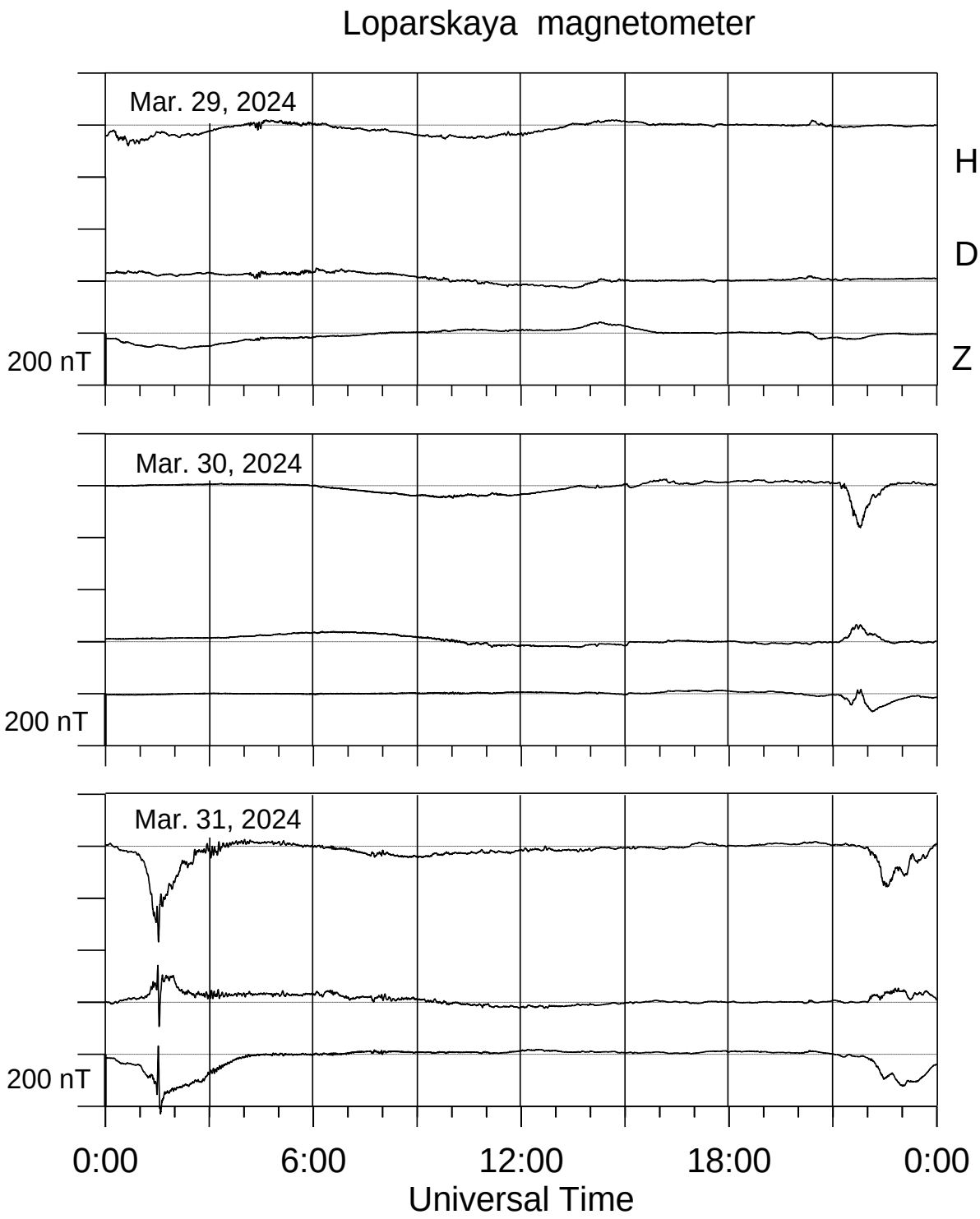
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Universal Time