

POLAR GEOPHYSICAL INSTITUTE  
RUSSIAN ACADEMY OF SCIENCES



**PGI**  
**GEOPHYSICAL DATA**

**2019**

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**JANUARY**

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**FEBRUARY**

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**MARCH**

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MURMANSK, APATITY, RUSSIA

August 2019

# 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 2019. 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  | 417 208 |
| February | 424 806 |
| March    | 413 240 |

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

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

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

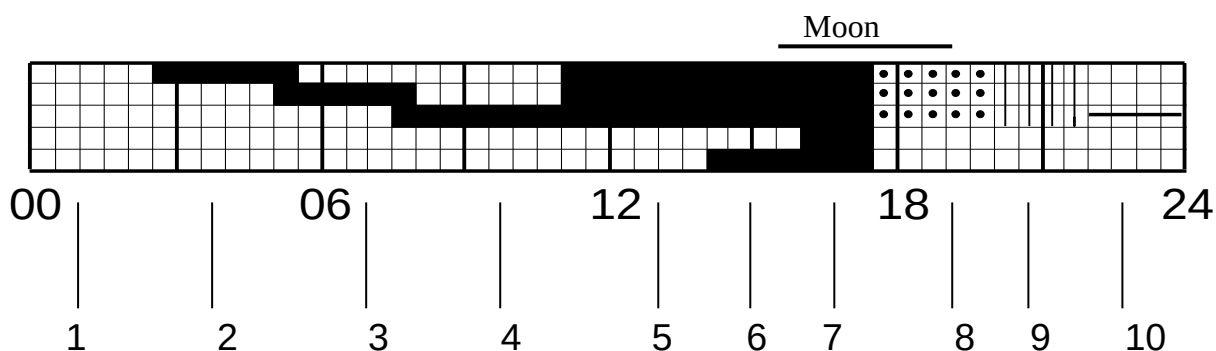
### *Calendar*

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

### *Ascaplots*

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

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





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

### ***Keograms***

Black white keograms show the auroral display along the geomagnetic meridian of station. Here we present a few selected auroral events observed at Apatity, 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, 2019

Lower limit of K=9 is 1500 nT

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

GEOMAGNETIC K-INDICES, LOVOZERO  
February, 2019  
Lower limit of K=9 is 1500 nT

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

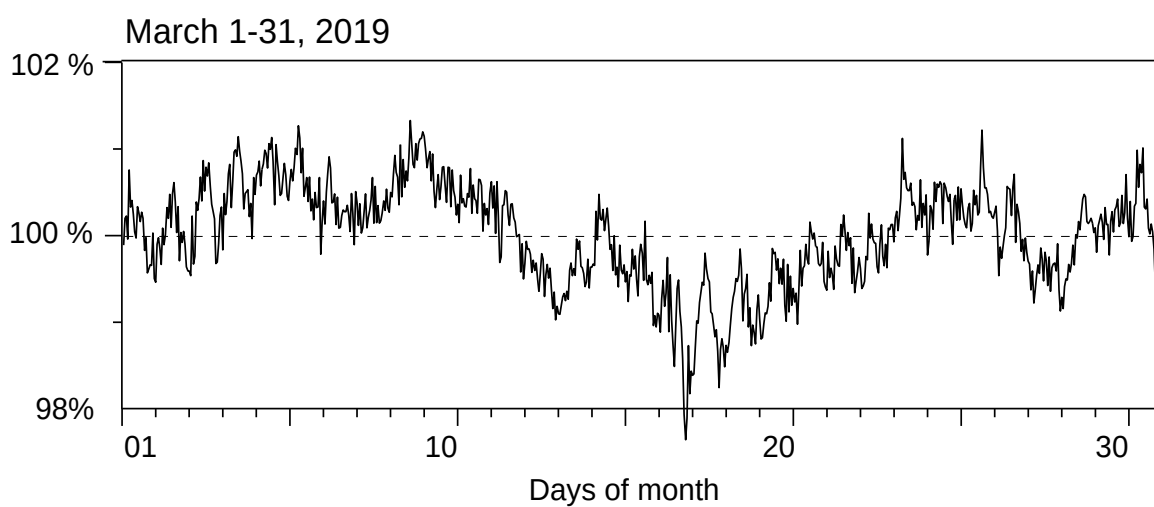
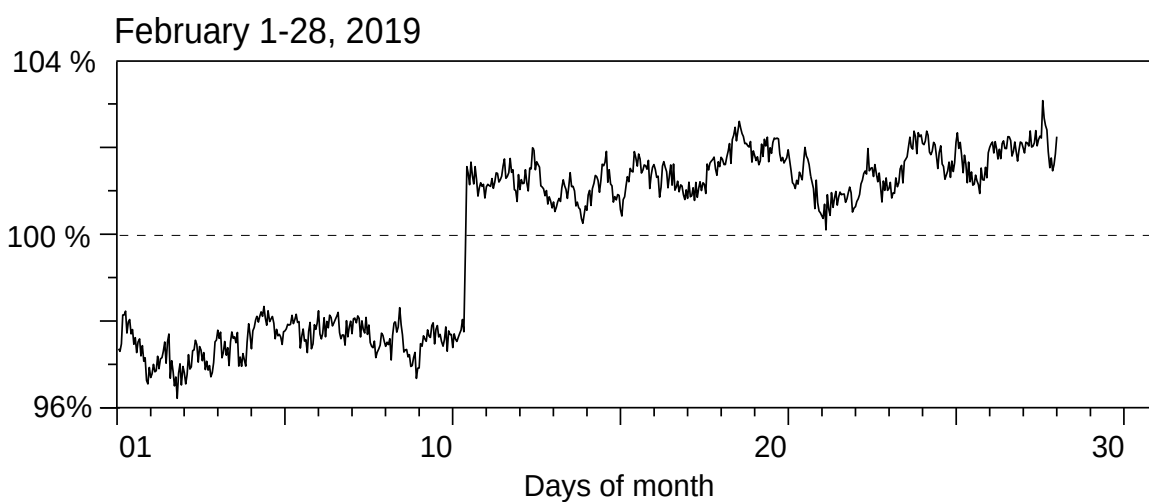
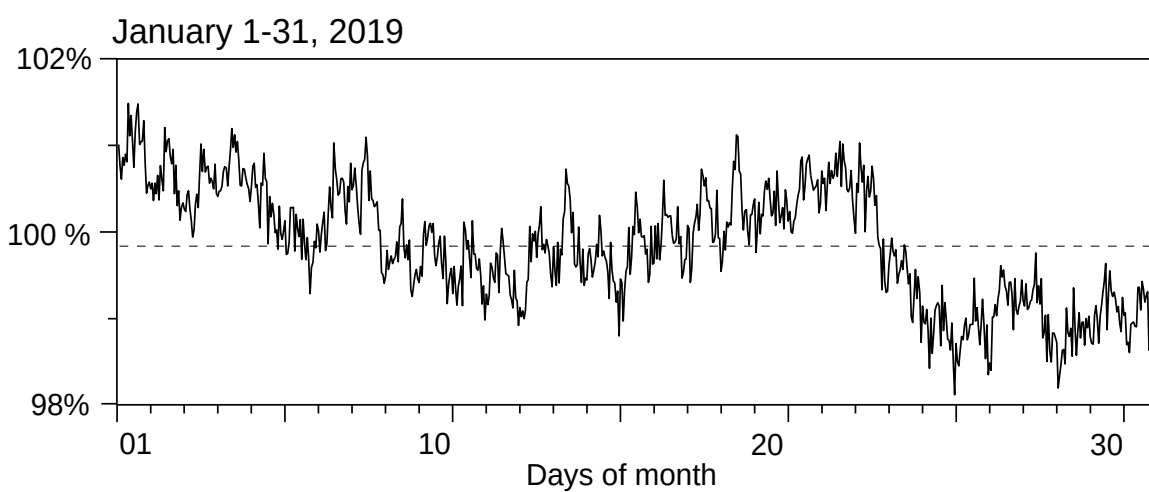
## GEOMAGNETIC K-INDICES, LOVOZERO

March, 2019

Lower limit of K=9 is 1500 nT

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

## Apatity neutron monitor



## **ALL – SKY CAMERA OBSERVATIONS**

**January - March 2019**

January 02 - 03

January 03 - 04

January 04 - 05January 05- 06

January 06 - 07

January 07 - 08[illegible]



## CALENDAR OF TV OBSERVATIONS

January 08 - 09

[illegible]

January 09 -10

[illegible]

January10 -11

[illegible]

January11 - 12

[illegible]

January12 - 13

[illegible]

January 13 - 14

[illegible]

January14- 15

[illegible]

January 16 - 17

January 17 - 18

January 18 - 19

January 19 - 20

January 20 - 21

January 21 - 22

[illegible]



January 30 - 31

January31[illegible]



## February 09 - 10

February 10 -11February11 - 12February 12 - 13February 13 - 14February 14- 15[illegible]

February16 - 17February 17 - 18February 18 - 19February 19 - 20February 20 - 21February21 - 22[illegible]

February 23 - 24

February 24 - 25February 25 - 26February 26 -27February 27 - 28February28[illegible]



March 02 - 03

March 03 - 04

March 04 - 05

March 05- 06

March 06 - 07

March 07 - 08

[illegible]

March 09 - 10

March 10 -11

March 11 - 12

March 12 - 13

March 13 - 14

March 14- 15

[illegible]



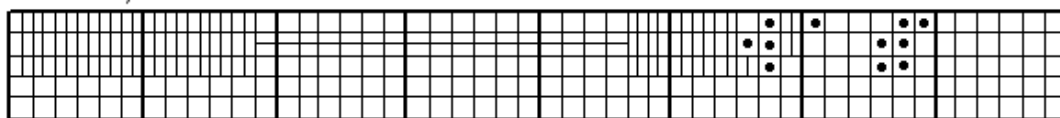


March 30 - 31

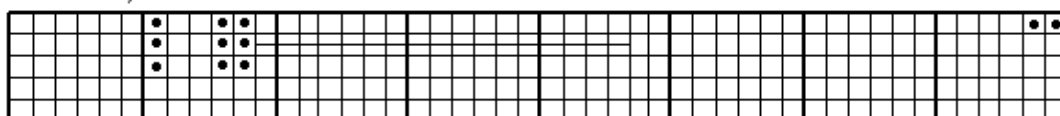
March 31[illegible]

# Apatity ascaplots

Jan. 01, 2019



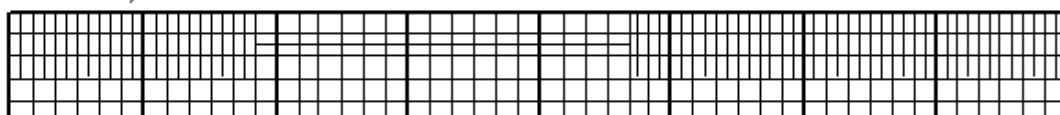
Jan. 02, 2019



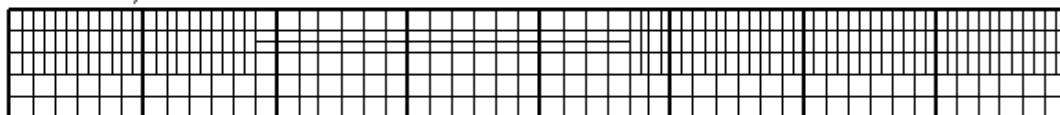
Jan. 03, 2019



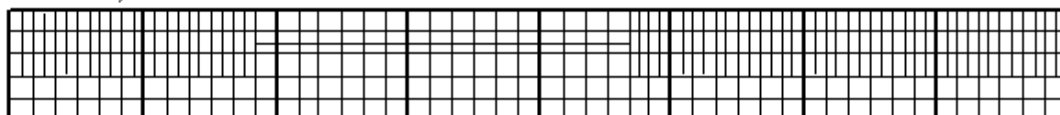
Jan. 04, 2019



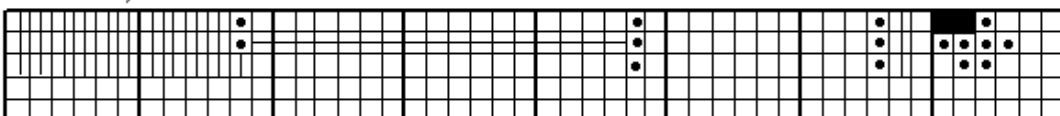
Jan. 05, 2019



Jan. 06, 2019



Jan. 07, 2019



Jan. 08, 2019



Jan. 09, 2019



Jan. 10, 2019

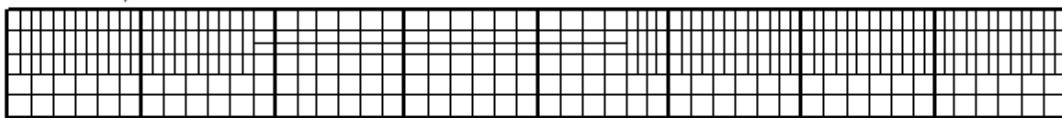


00                      06                      12                      18                      24

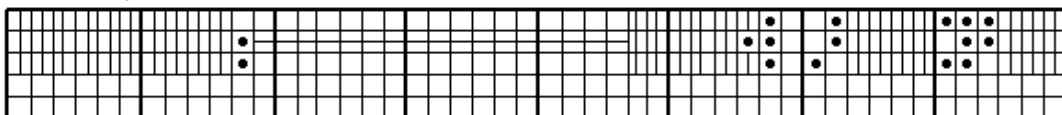
Universal Time

# Apatity ascaplots

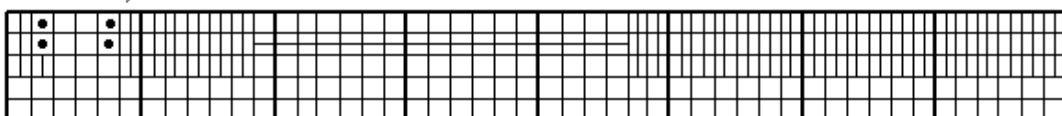
Jan. 11, 2019



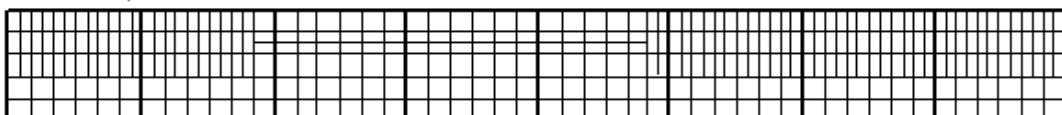
Jan. 12, 2019



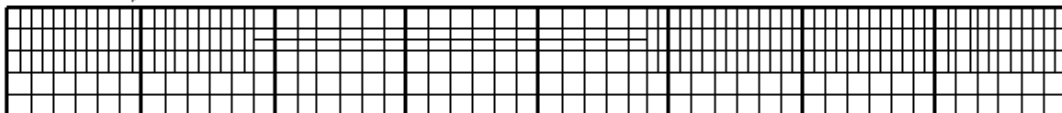
Jan. 13, 2019



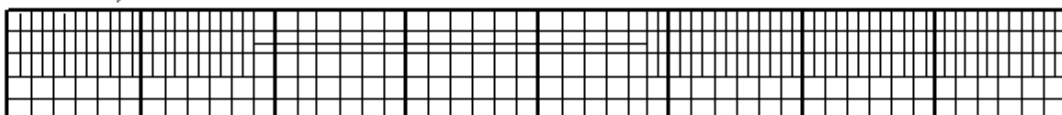
Jan. 14, 2019



Jan. 15, 2019



Jan. 16, 2019



Jan. 17, 2019



Jan. 18, 2019



Jan. 19, 2019



Jan. 20, 2019



00

06

12

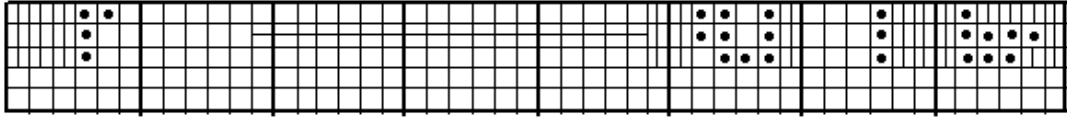
18

24

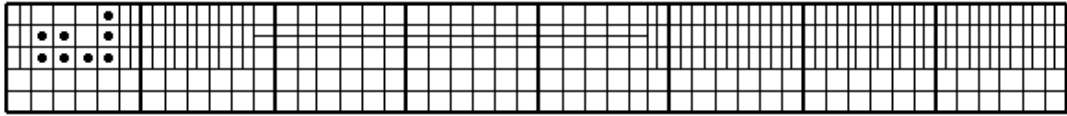
Universal Time

# Apatity ascaplots

Jan. 21, 2019



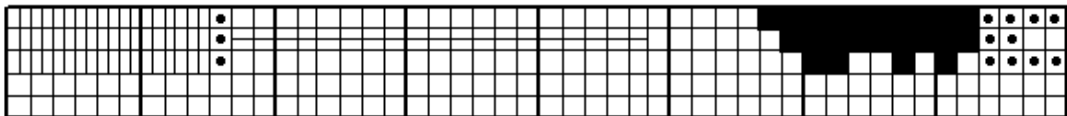
Jan. 22, 2019



Jan. 23, 2019



Jan. 24, 2019



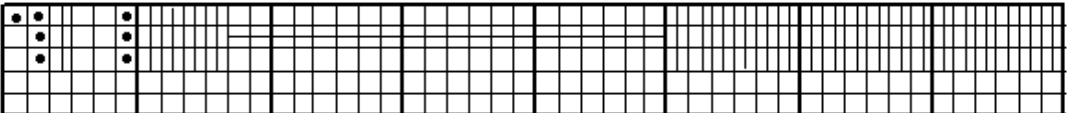
Jan. 25, 2019



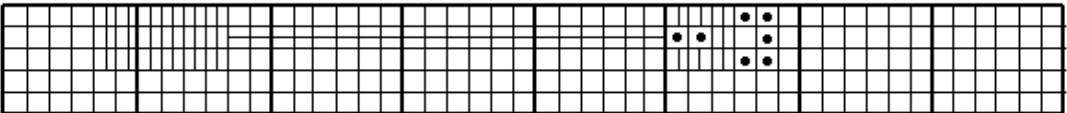
Jan. 26, 2019



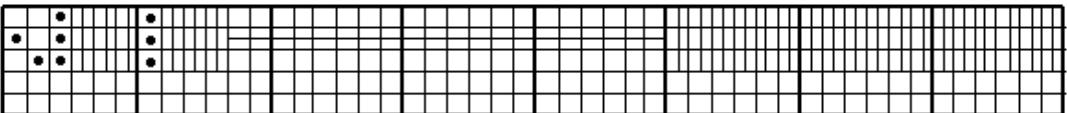
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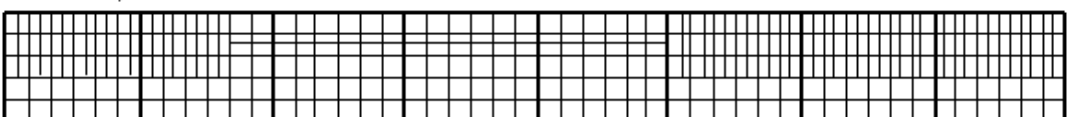
Jan. 28, 2019



Jan. 29, 2019



Jan. 30, 2019



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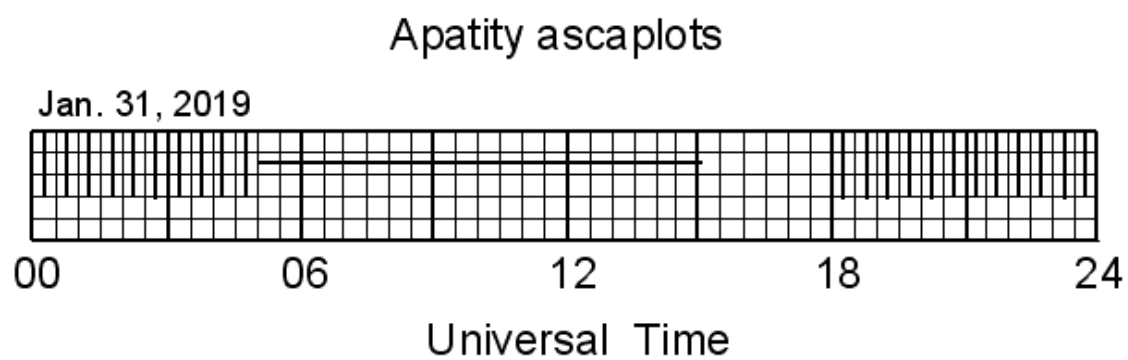
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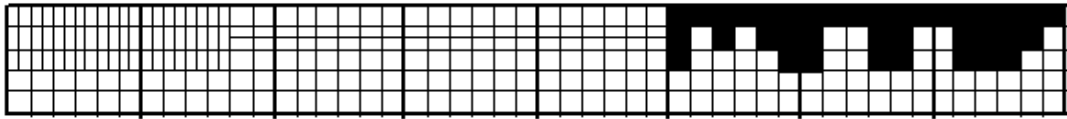
Universal Time



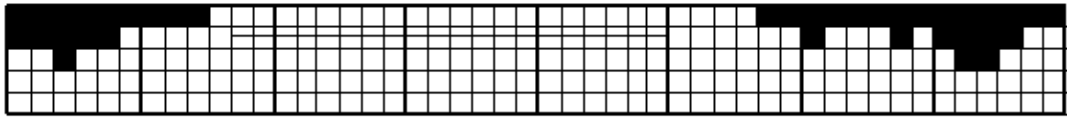


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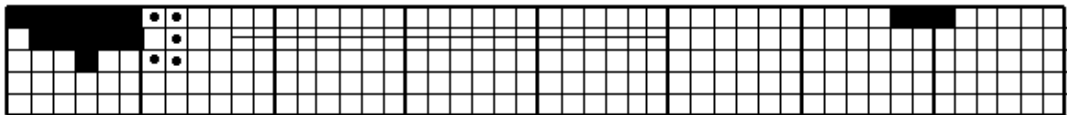
Feb. 01, 2019



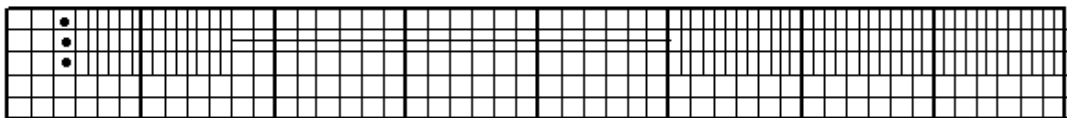
Feb. 02, 2019



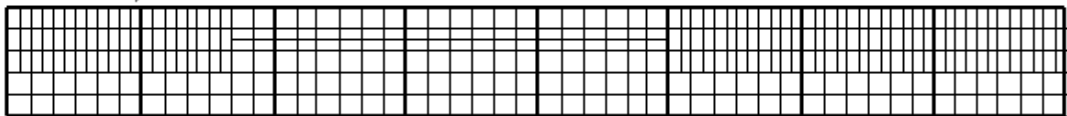
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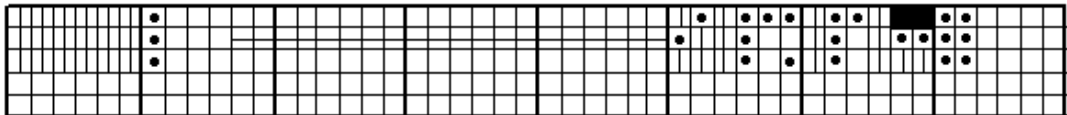
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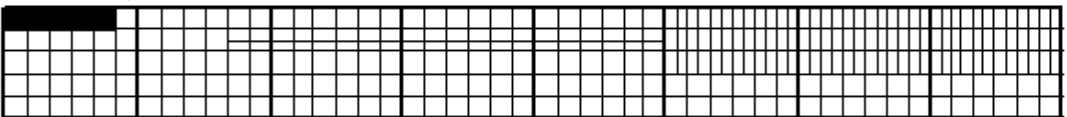
Feb. 05, 2019



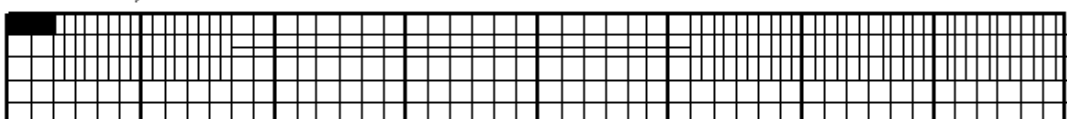
Feb. 06, 2019



Feb. 07, 2019



Feb. 08, 2019



Feb. 09, 2019



Feb. 10, 2019



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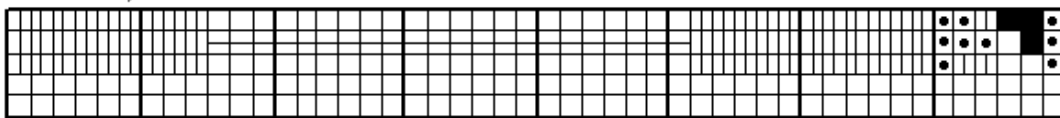
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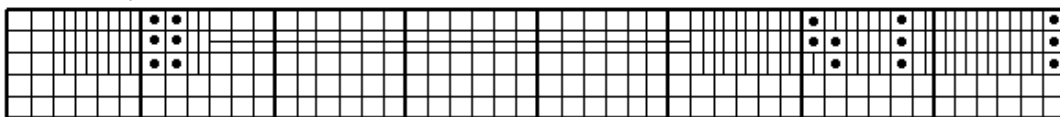
Universal Time

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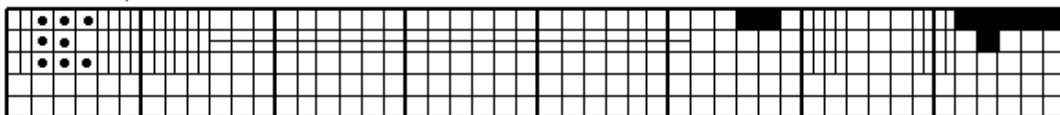
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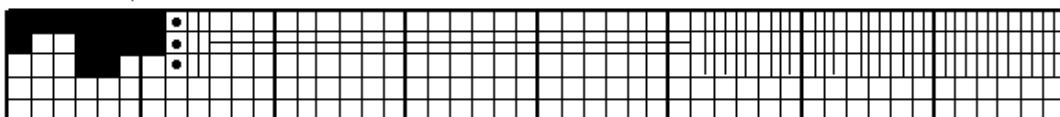
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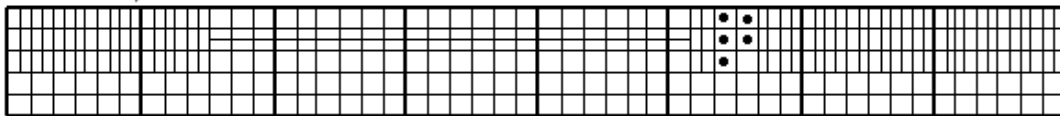
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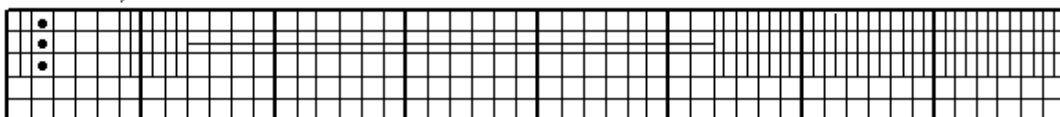
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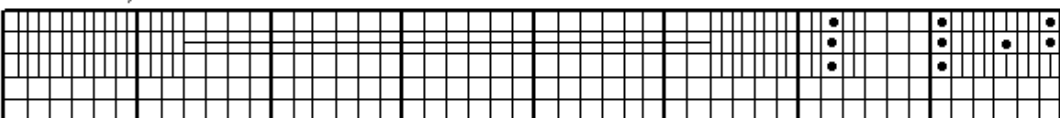
Feb. 15, 2019



Feb. 16, 2019



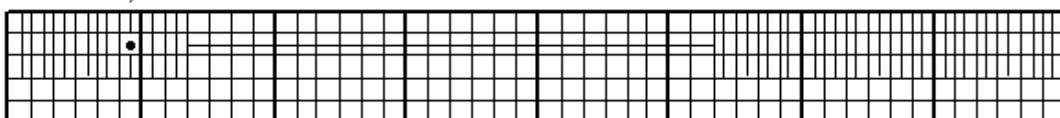
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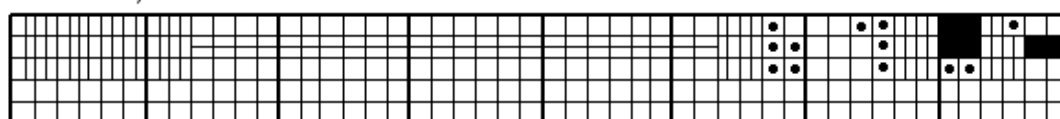
Feb. 18, 2019



Feb. 19, 2019



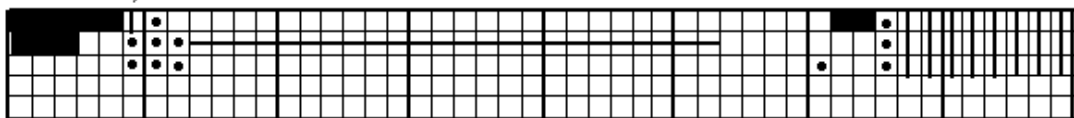
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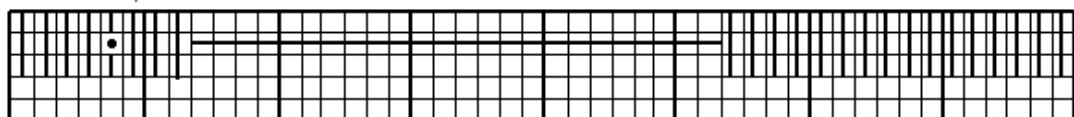
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Universal Time

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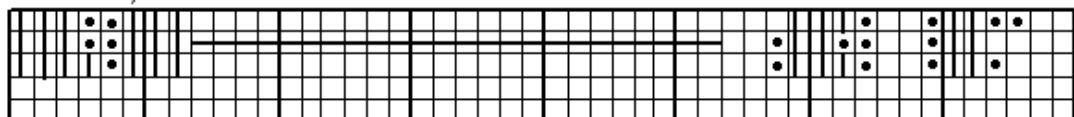
Feb. 21, 2019



Feb. 22, 2019



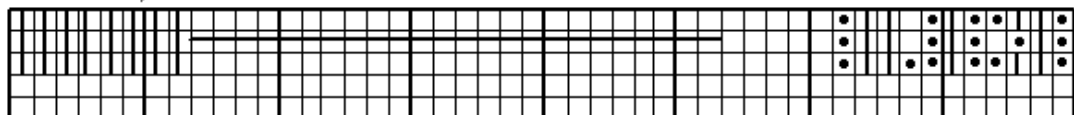
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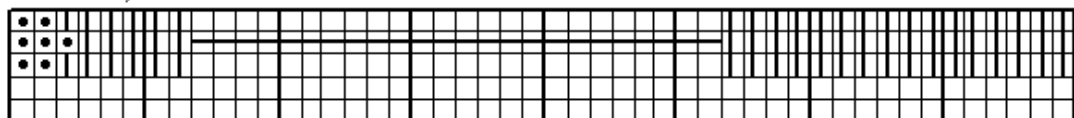
Feb. 24, 2019



Feb. 25, 2019



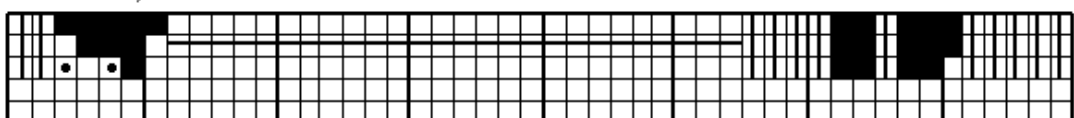
Feb. 26, 2019



Feb. 27, 2019



Feb. 28, 2019

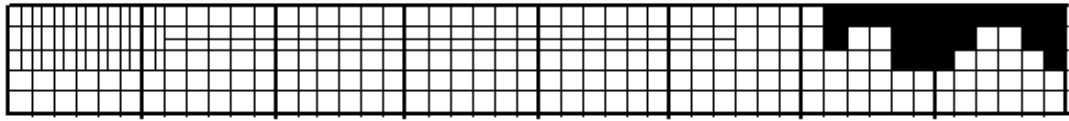


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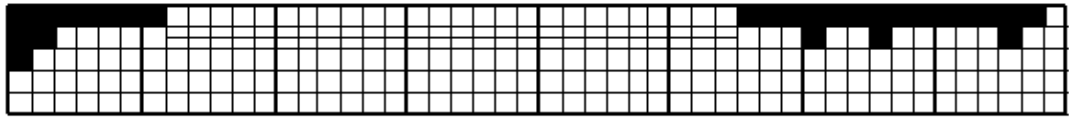
Universal Time

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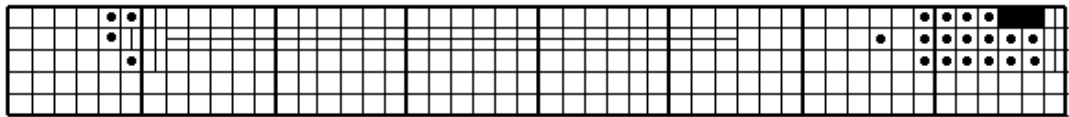
Mar. 01, 2019



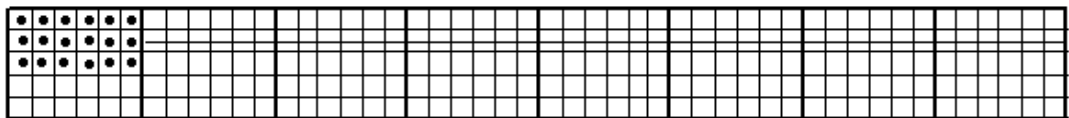
Mar. 02, 2019



Mar. 03, 2019



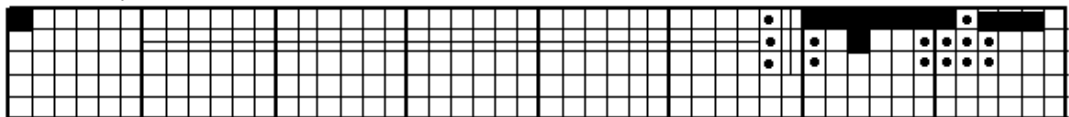
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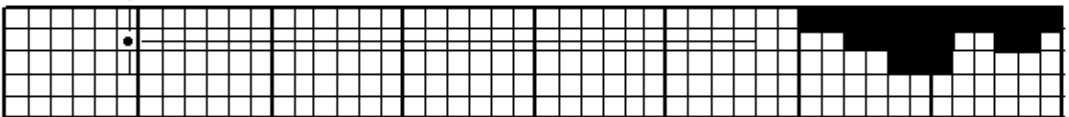
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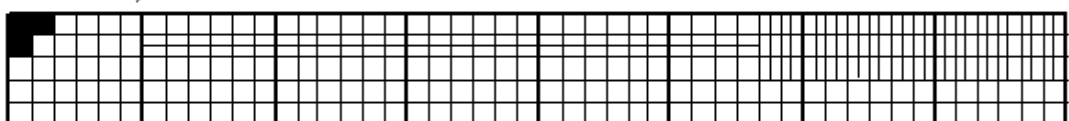
Mar. 06, 2019



Mar. 07, 2019



Mar. 08, 2019



Mar. 09, 2019



Mar. 10, 2019



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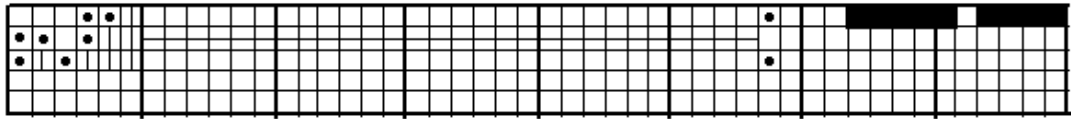
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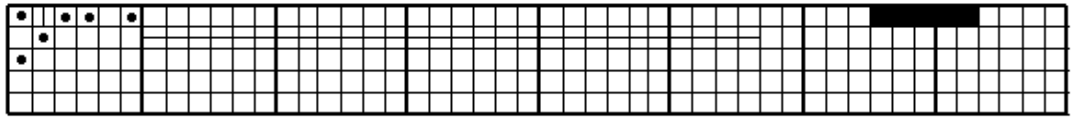
Universal Time

# Apatity ascaplots

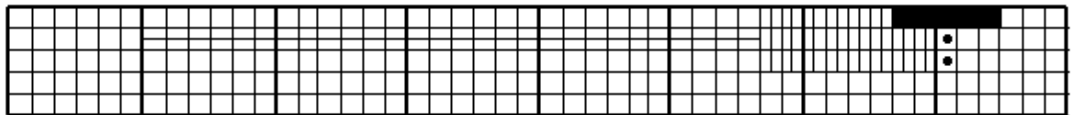
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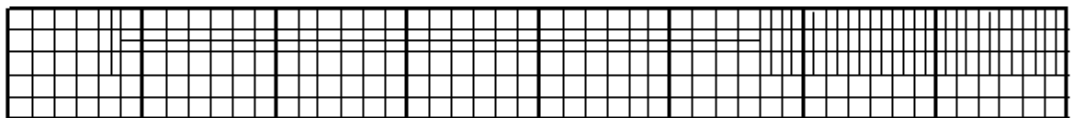
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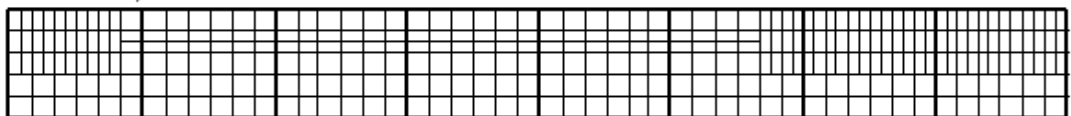
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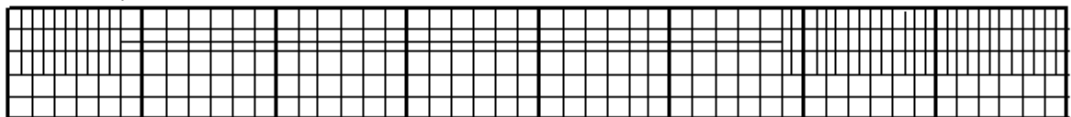
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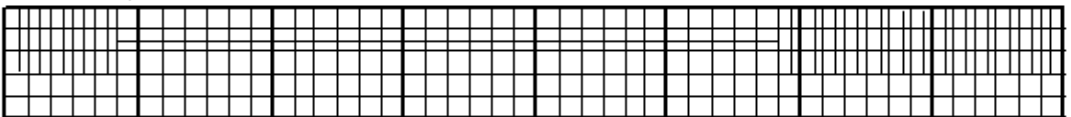
Mar. 15, 2019



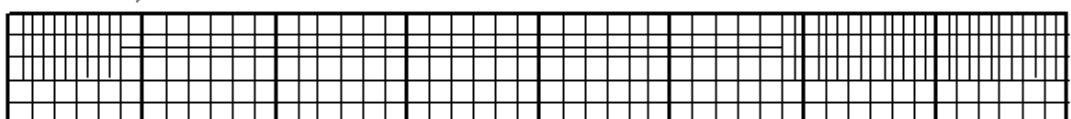
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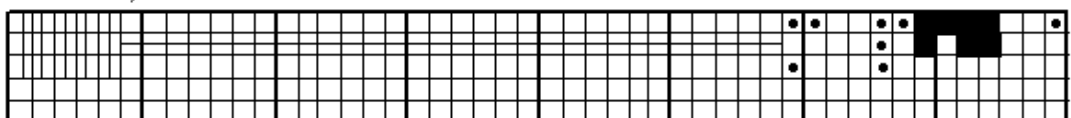
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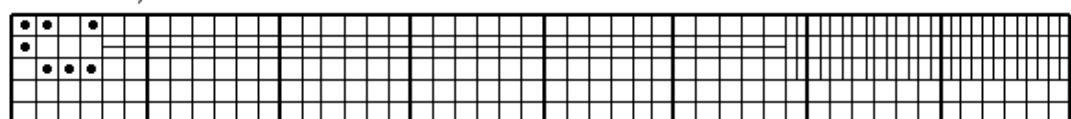
Mar. 18, 2019



Mar. 19, 2019



Mar. 20, 2019

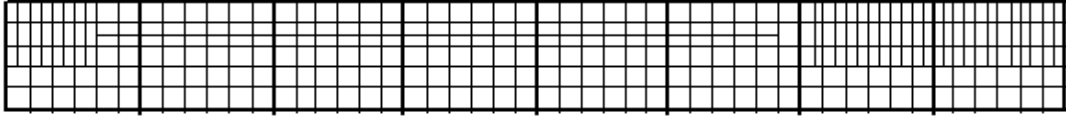


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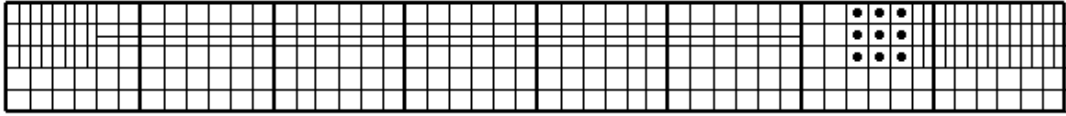
Universal Time

# Apatity ascaplots

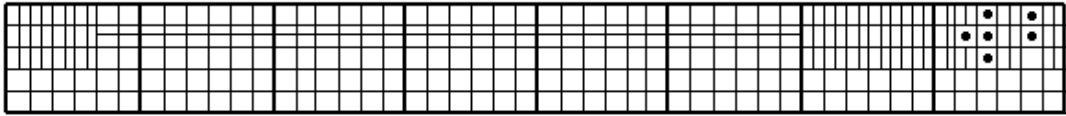
Mar. 21, 2019



Mar. 22, 2019



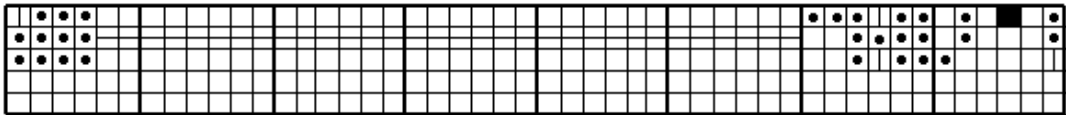
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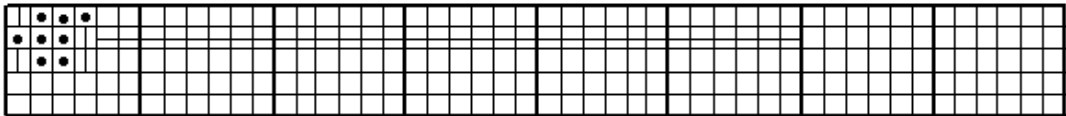
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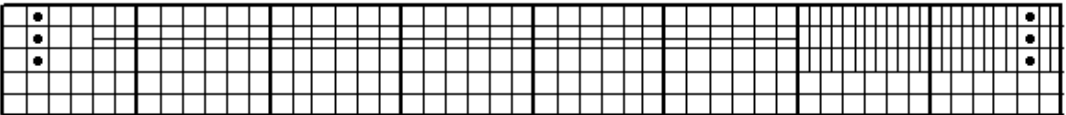
Mar. 25, 2019



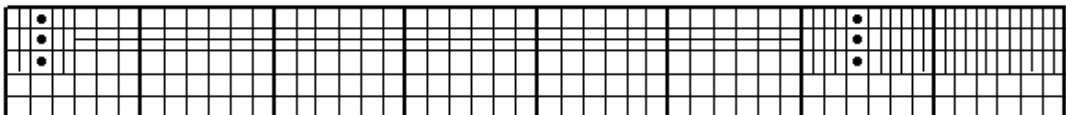
Mar. 26, 2019



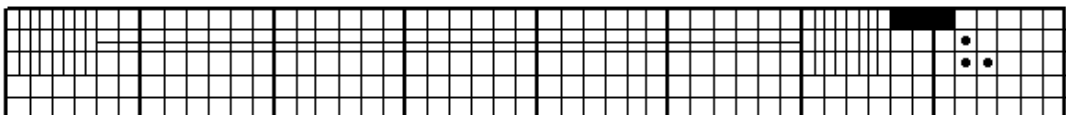
Mar. 27, 2019



Mar. 28, 2019



Mar. 29, 2019



Mar. 30, 2019



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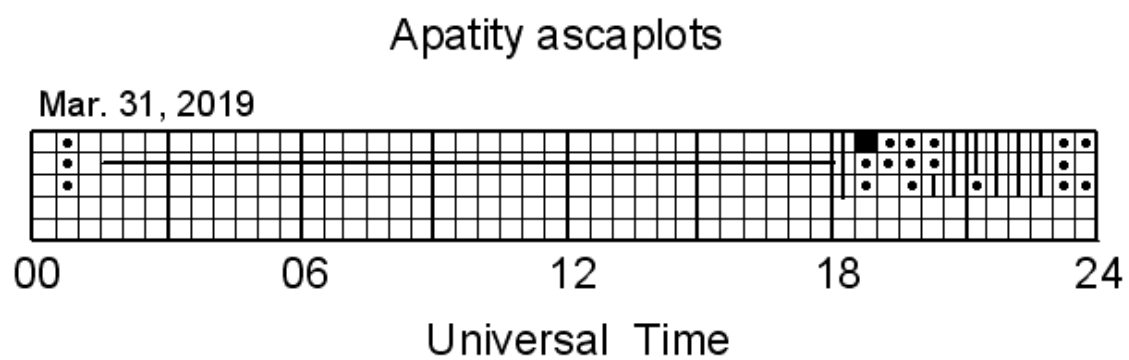
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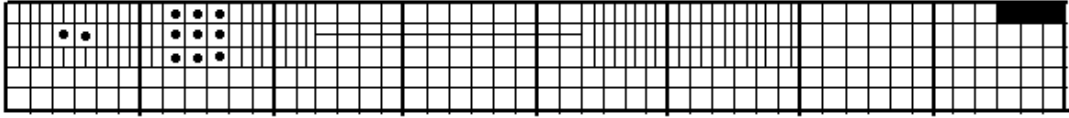
Universal Time



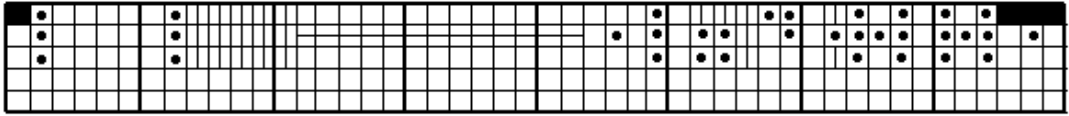


# Lovozero ascaplots

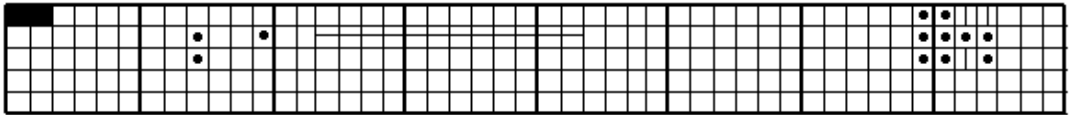
Jan. 01, 2019



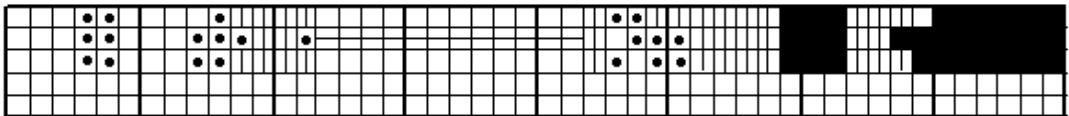
Jan. 02, 2019



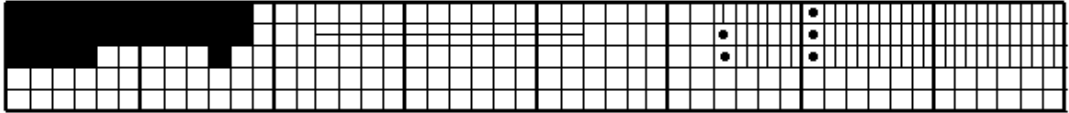
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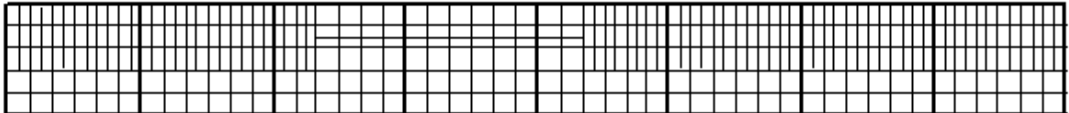
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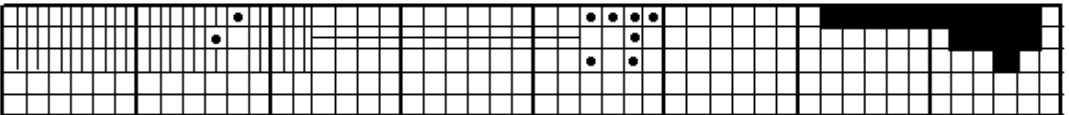
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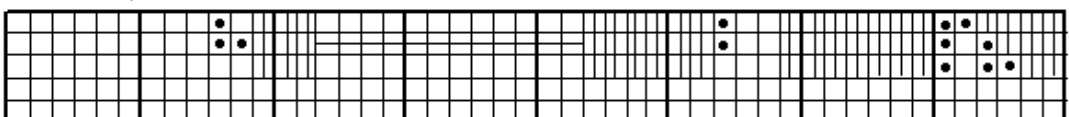
Jan. 06, 2019



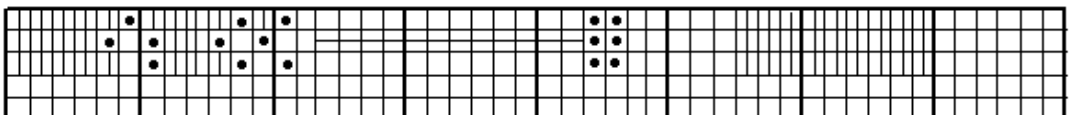
Jan. 07, 2019



Jan. 08, 2019



Jan. 09, 2019



Jan. 10, 2019



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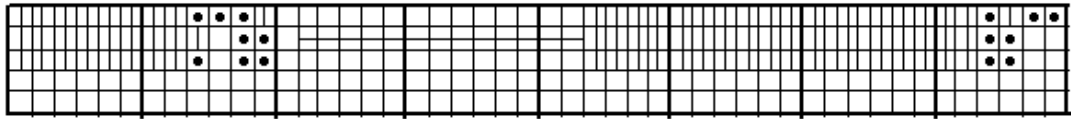
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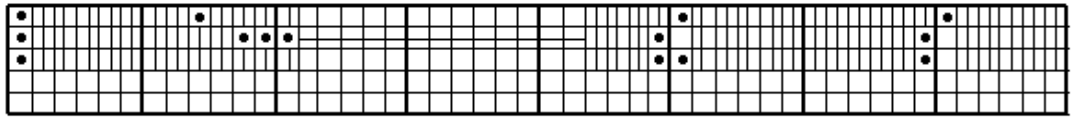
Universal Time

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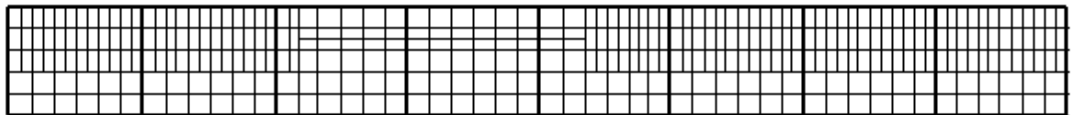
Jan. 11, 2019



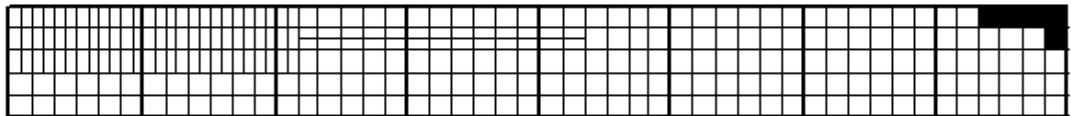
Jan. 12, 2019



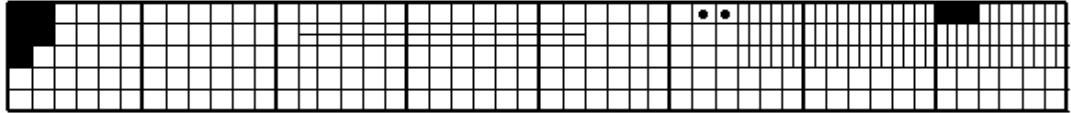
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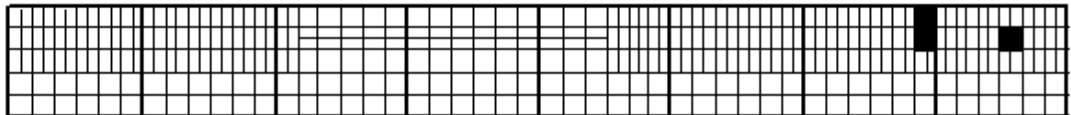
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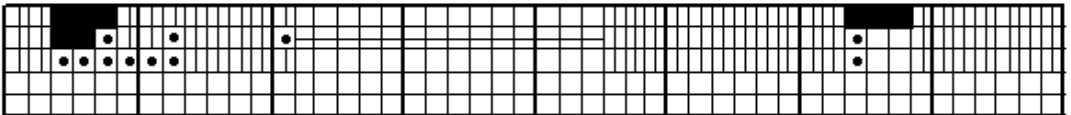
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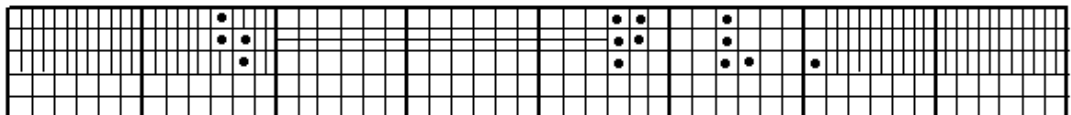
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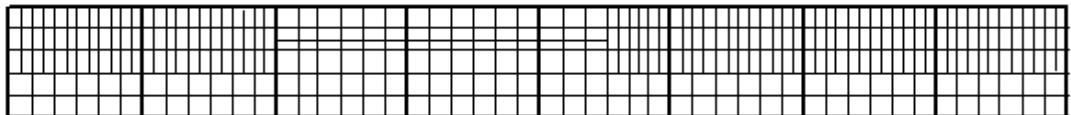
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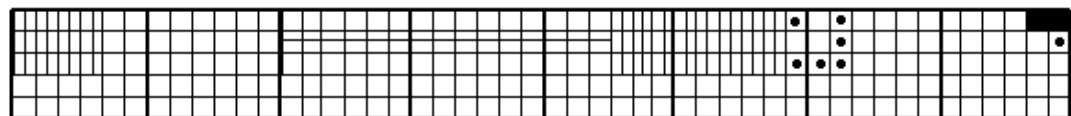
Jan. 18, 2019



Jan. 19, 2019



Jan. 20, 2019



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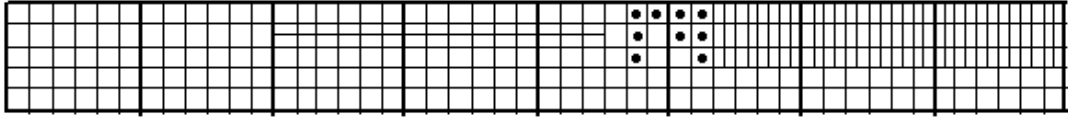
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Universal Time

# Lovozero ascaplots

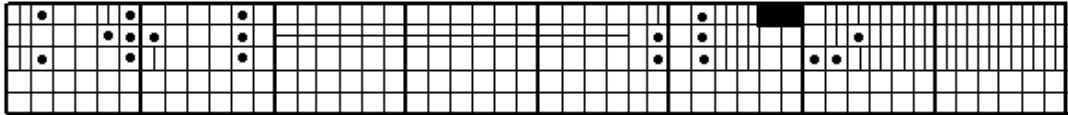
Jan. 21, 2019



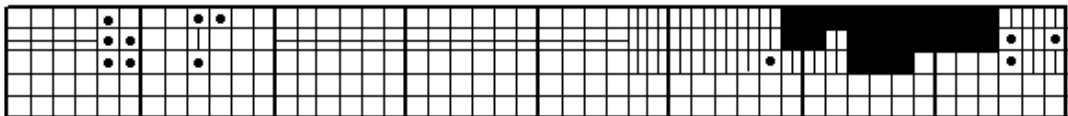
Jan. 22, 2019



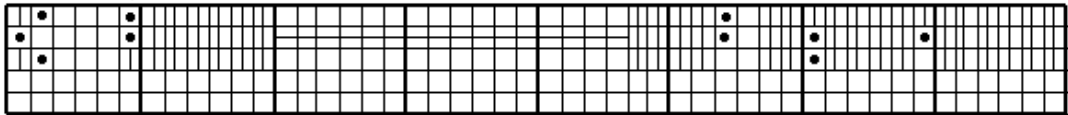
Jan. 23, 2019



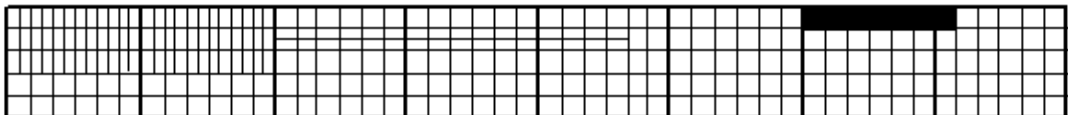
Jan. 24, 2019



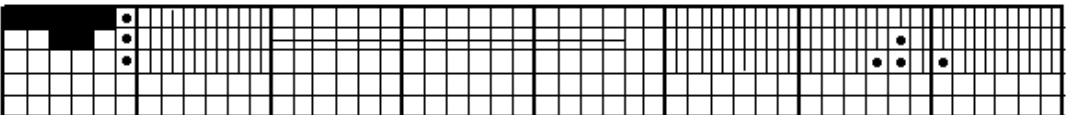
Jan. 25, 2019



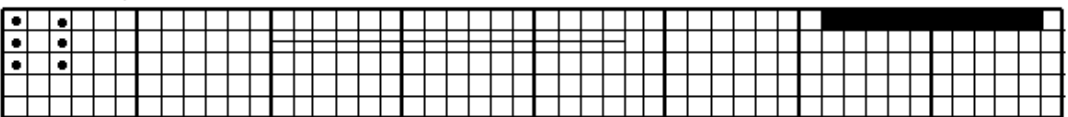
Jan. 26, 2019



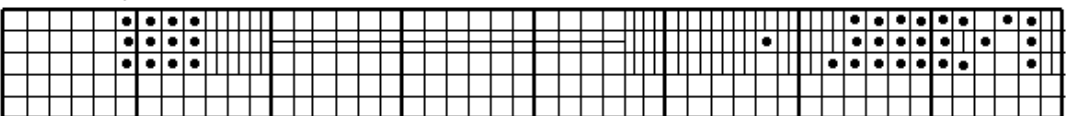
Jan. 27, 2019



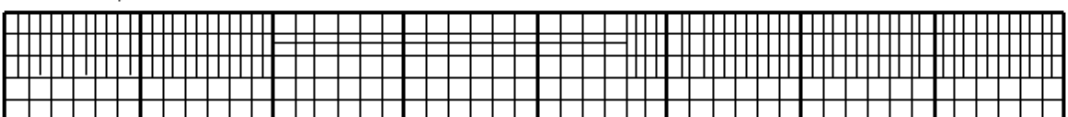
Jan. 28, 2019



Jan. 29, 2019



Jan. 30, 2019



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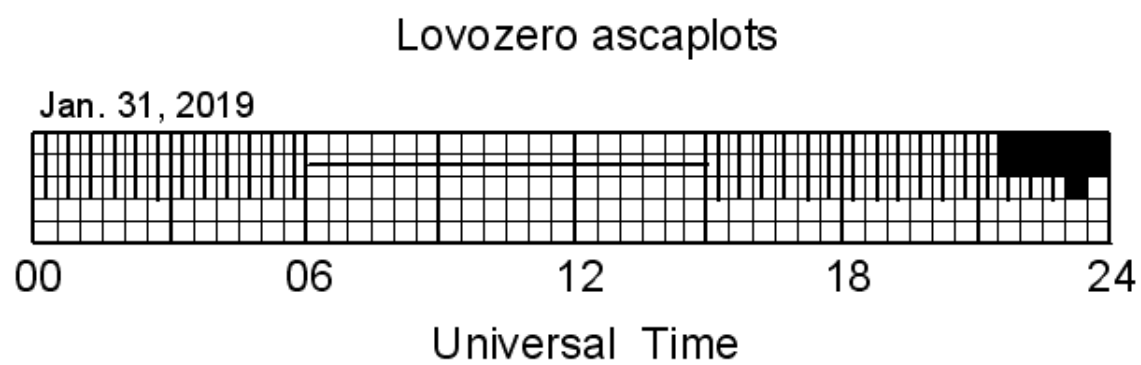
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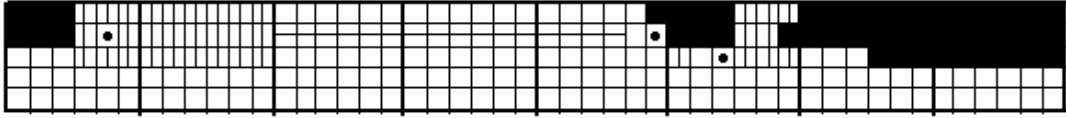
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Universal Time

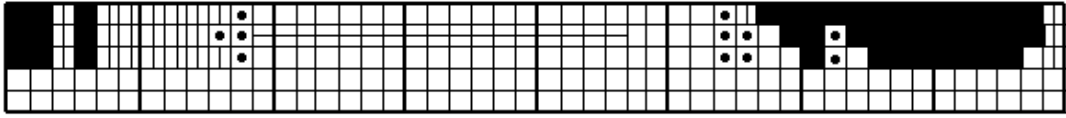


# Lovozero ascaplots

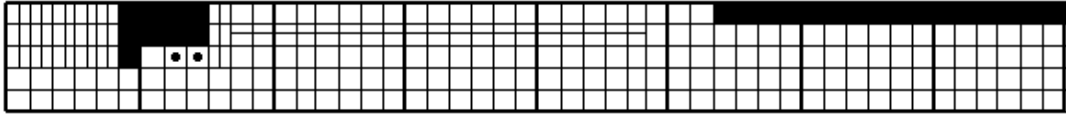
Feb. 01, 2019



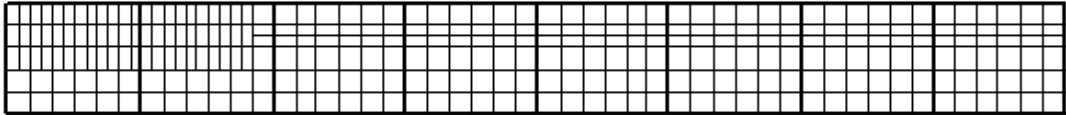
Feb. 02, 2019



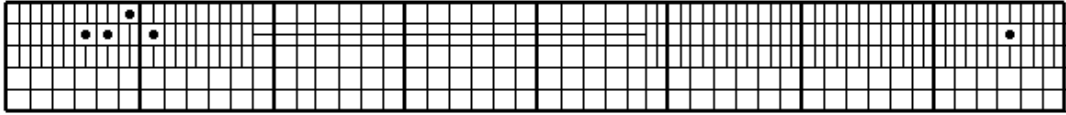
Feb. 03, 2019



Feb. 04, 2019



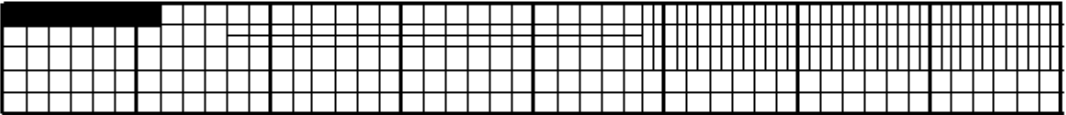
Feb. 05, 2019



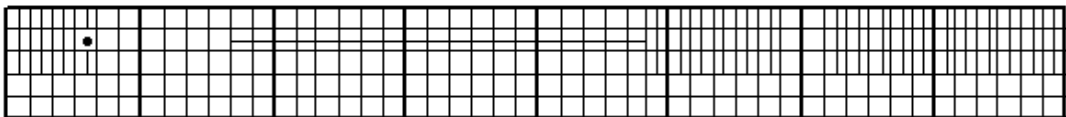
Feb. 06, 2019



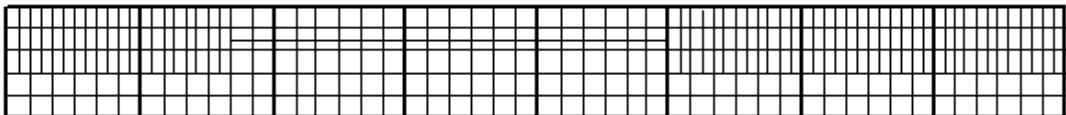
Feb. 07, 2019



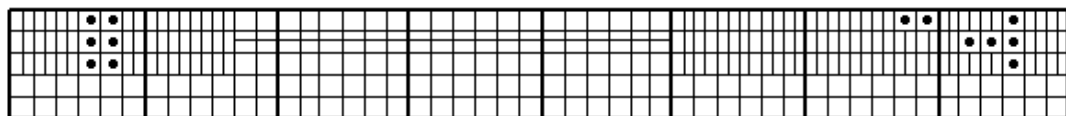
Feb. 08, 2019



Feb. 09, 2019



Feb. 10, 2019



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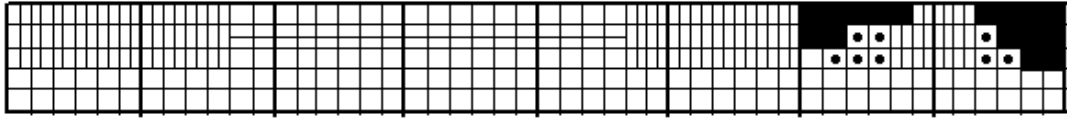
18

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Universal Time

# Lovozero ascaplots

Feb. 11, 2019



Feb. 12, 2019



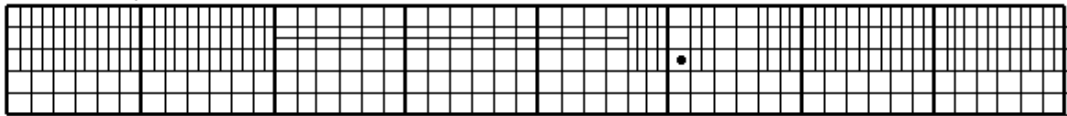
Feb. 13, 2019



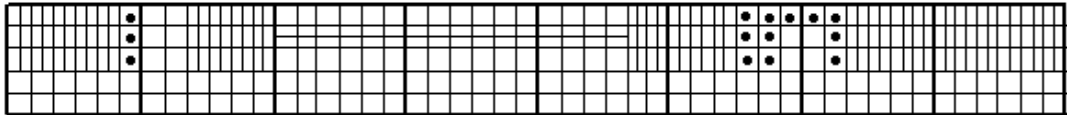
Feb. 14, 2019



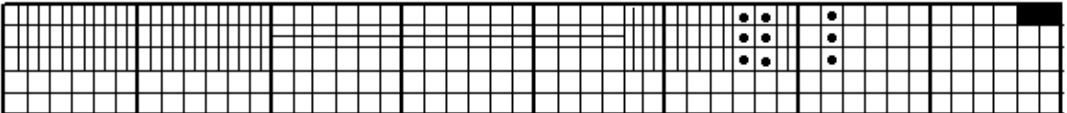
Feb. 15, 2019



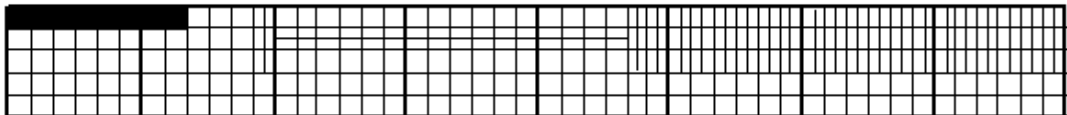
Feb. 16, 2019



Feb. 17, 2019



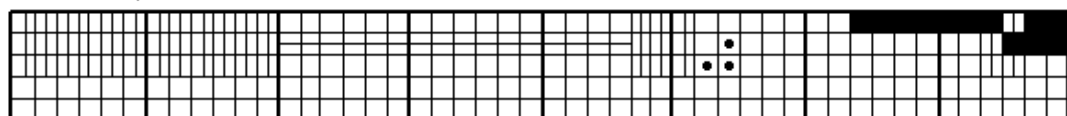
Feb. 18, 2019



Feb. 19, 2019



Feb. 20, 2019



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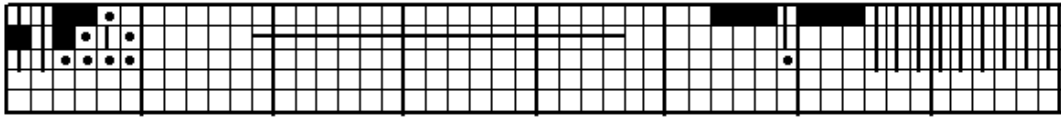
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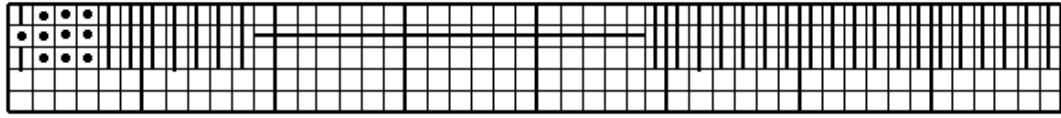
Universal Time

# Lovozero ascaplots

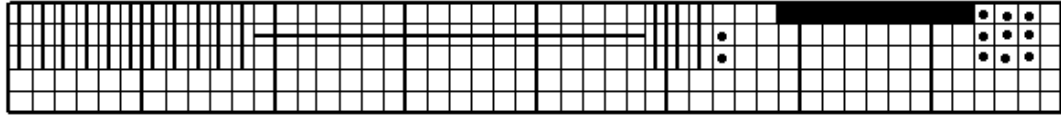
Feb. 21, 2019



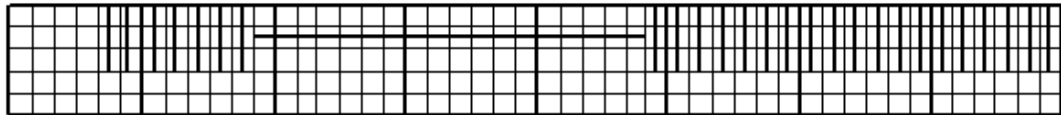
Feb. 22, 2019



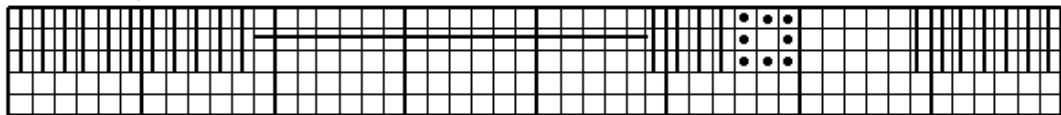
Feb. 23, 2019



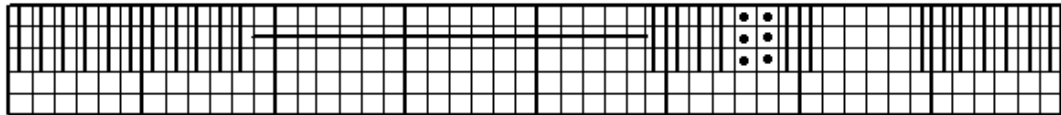
Feb. 24, 2019



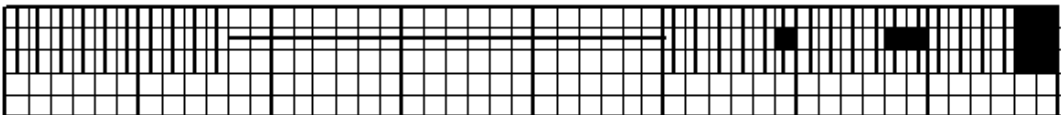
Feb. 25, 2019



Feb. 26, 2019



Feb. 27, 2019



Feb. 28, 2019

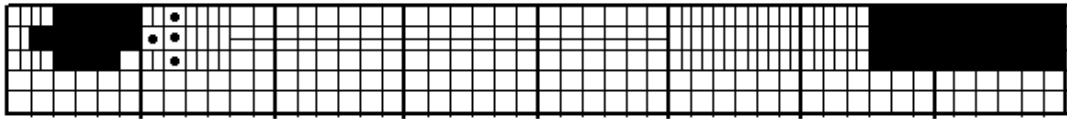


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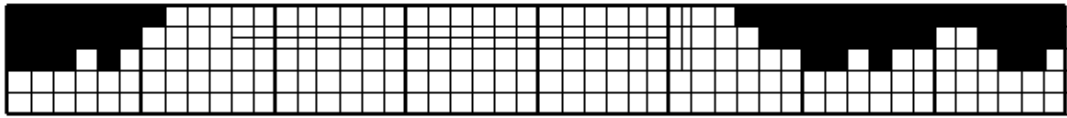
Universal Time

# Lovozero ascaplots

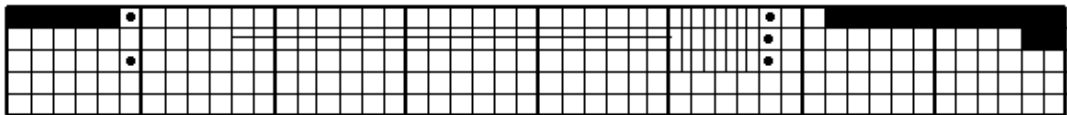
Mar. 01, 2019



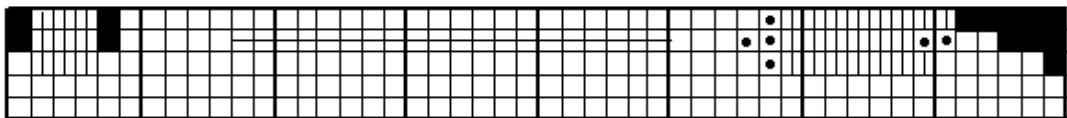
Mar. 02, 2019



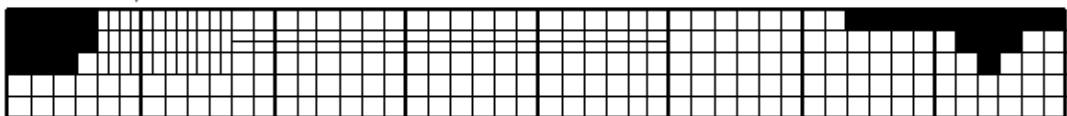
Mar. 03, 2019



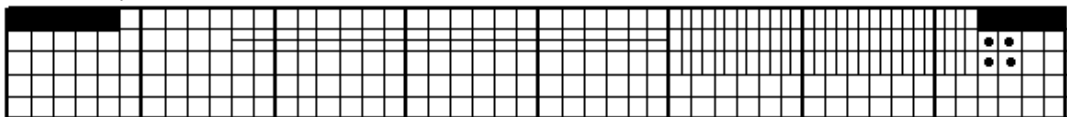
Mar. 04, 2019



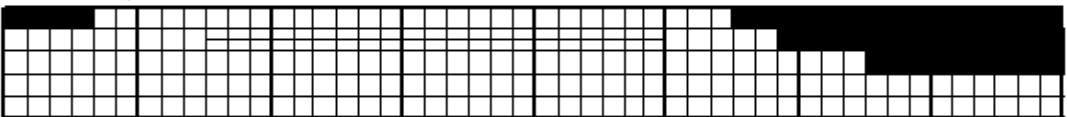
Mar. 05, 2019



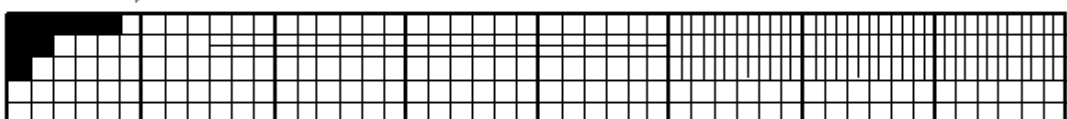
Mar. 06, 2019



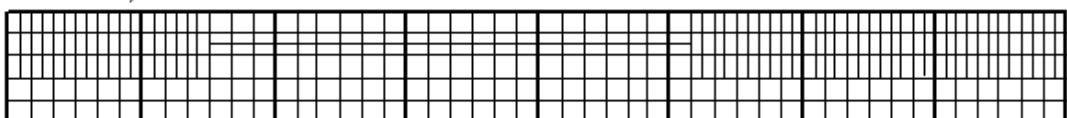
Mar. 07, 2019



Mar. 08, 2019



Mar. 09, 2019



Mar. 10, 2019



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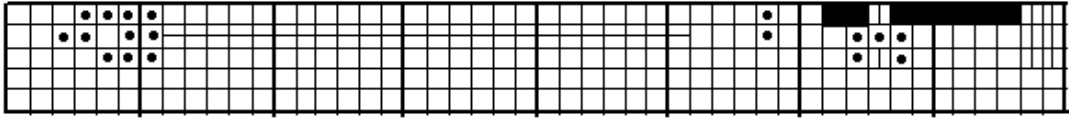
24

Universal Time

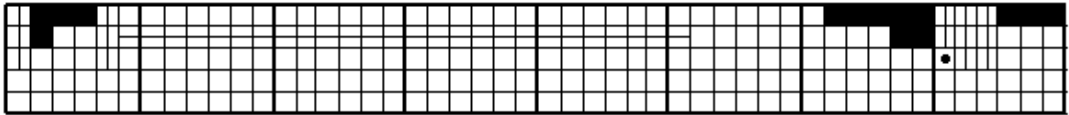


# Lovozero ascaplots

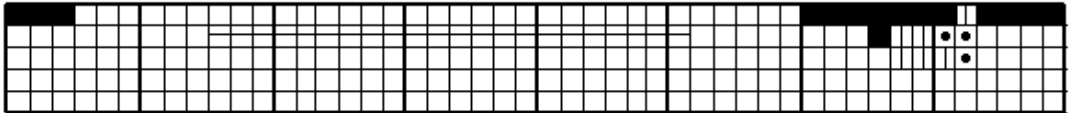
Mar. 11, 2019



Mar. 12, 2019



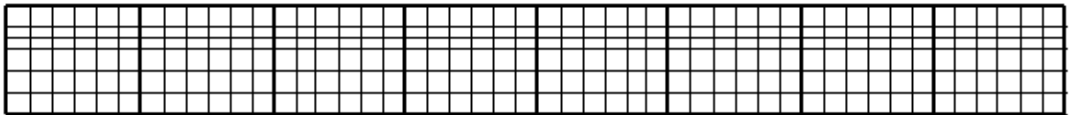
Mar. 13, 2019



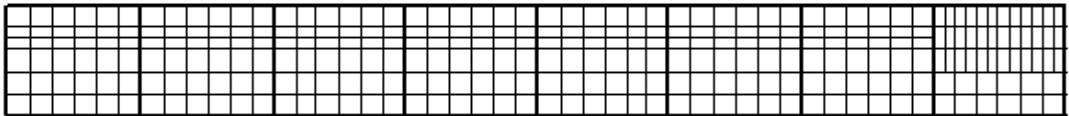
Mar. 14, 2019



Mar. 15, 2019



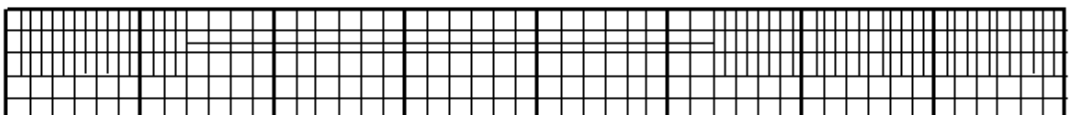
Mar. 16, 2019



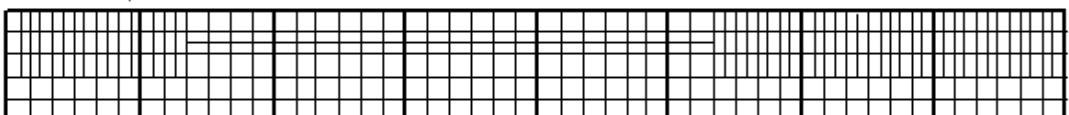
Mar. 17, 2019



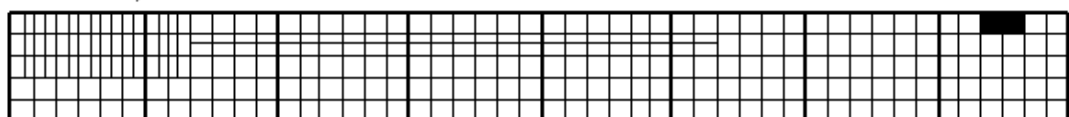
Mar. 18, 2019



Mar. 19, 2019



Mar. 20, 2019

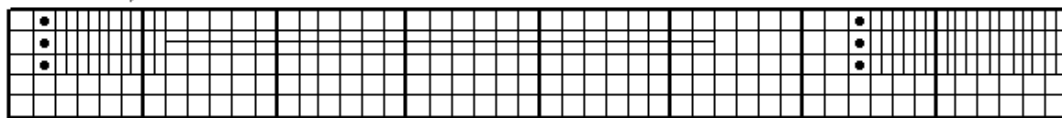


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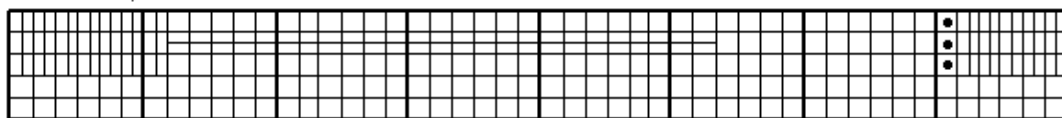
Universal Time

# Lovozero ascaplots

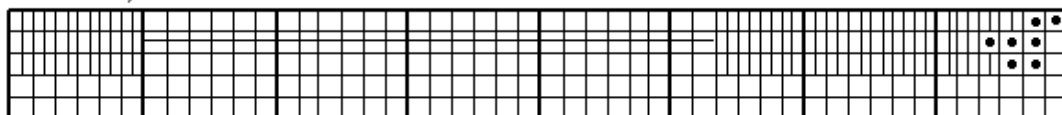
Mar. 21, 2019



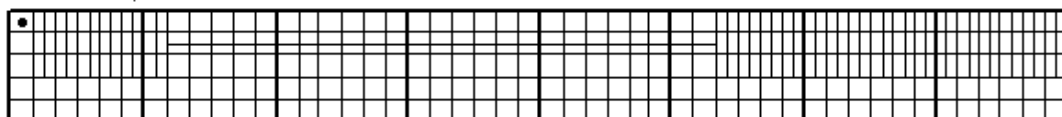
Mar. 22, 2019



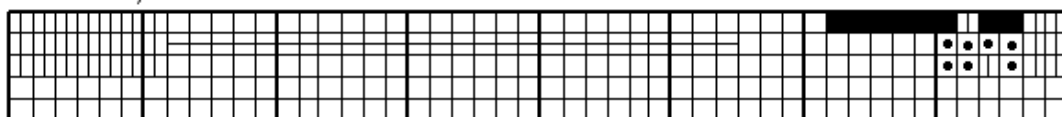
Mar. 23, 2019



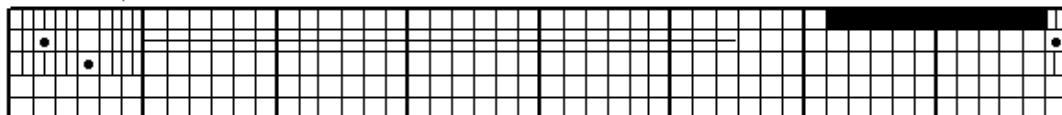
Mar. 24, 2019



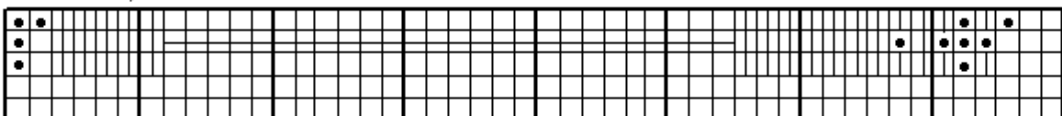
Mar. 25, 2019



Mar. 26, 2019



Mar. 27, 2019



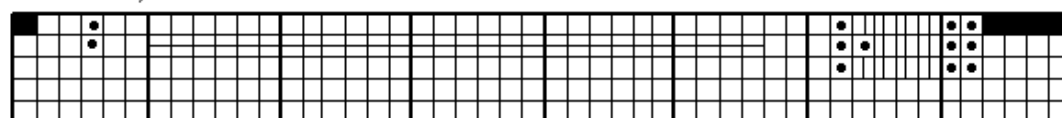
Mar. 28, 2019



Mar. 29, 2019

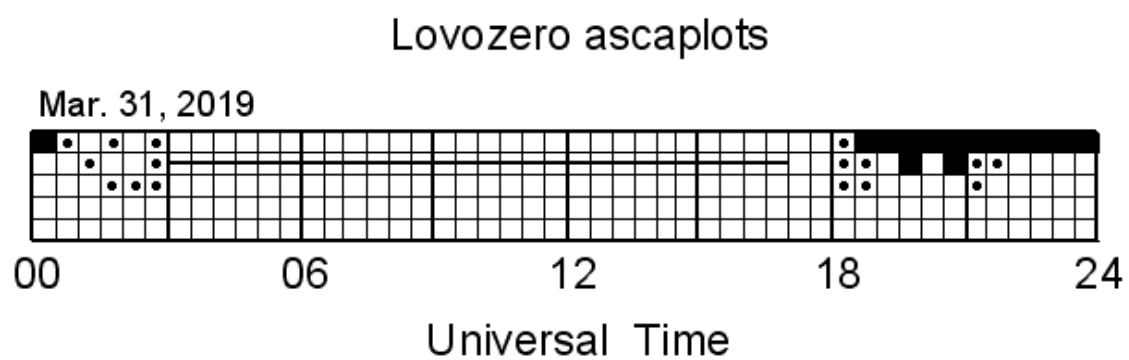


Mar. 30, 2019



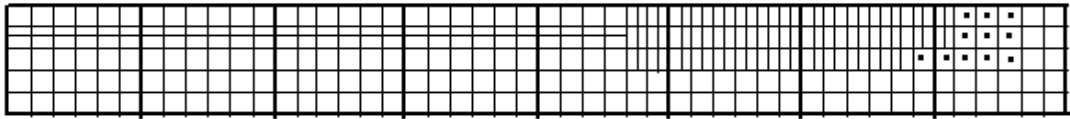
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Universal Time



# Verhnetulomsky ascaplots

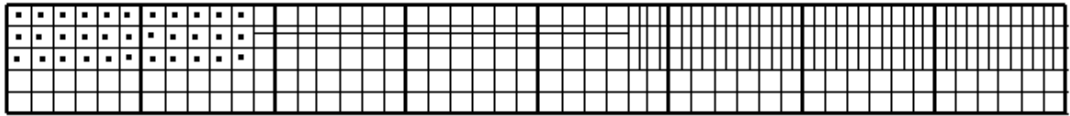
Jan. 09, 2019



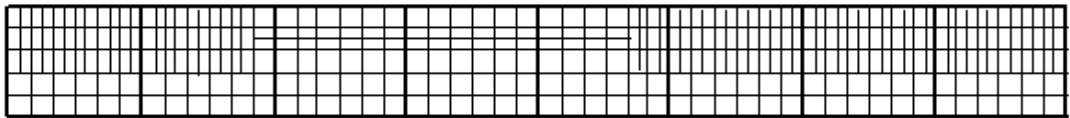
Jan. 10, 2019



Jan. 11, 2019



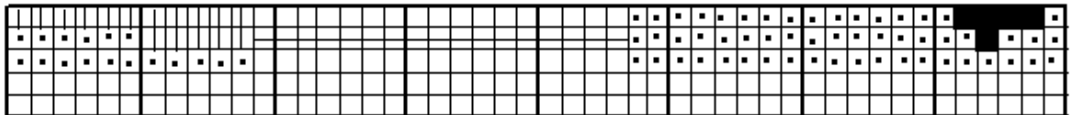
Jan. 12, 2019



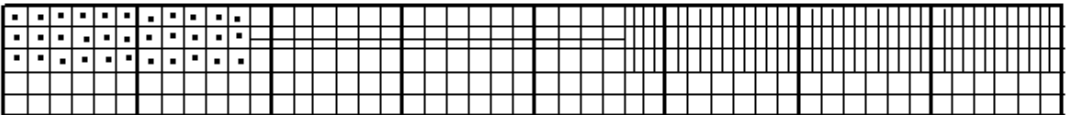
Jan. 13, 2019



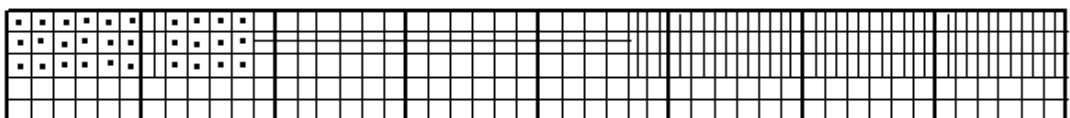
Jan. 14, 2019



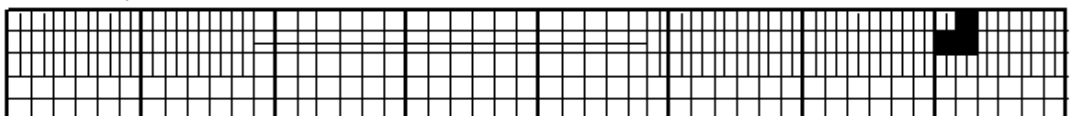
Jan. 15, 2019



Jan. 16, 2019



Jan. 17, 2019



Jan. 18, 2019



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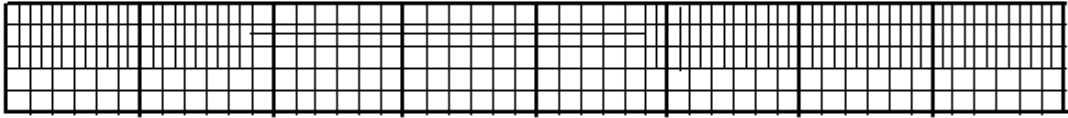
18

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Universal Time

# Verhnetulomsky ascaplots

Jan. 19, 2019



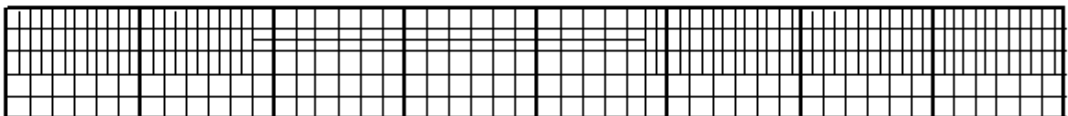
Jan. 20, 2019



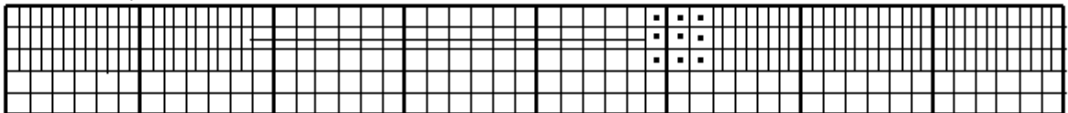
Jan. 21, 2019



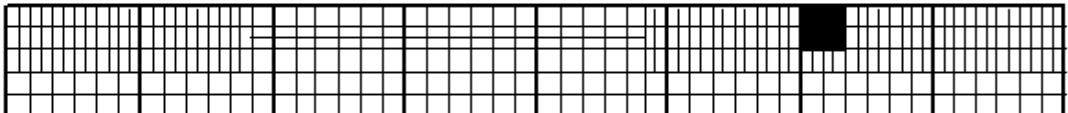
Jan. 22, 2019



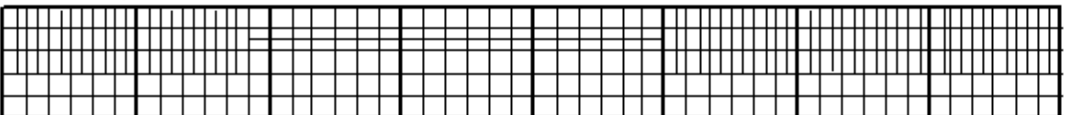
Jan. 23, 2019



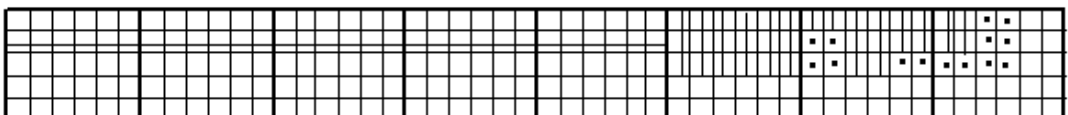
Jan. 24, 2019



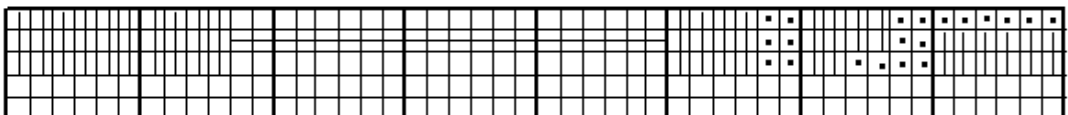
Jan. 25, 2019



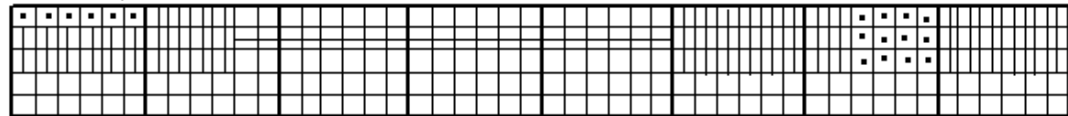
Jan. 27, 2019



Jan. 28, 2019



Jan. 29, 2019



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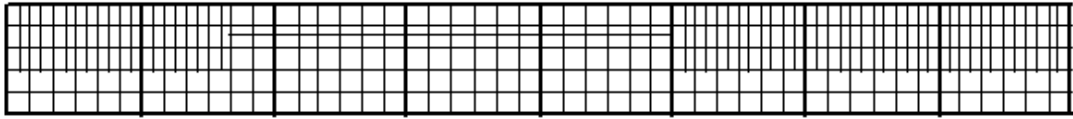
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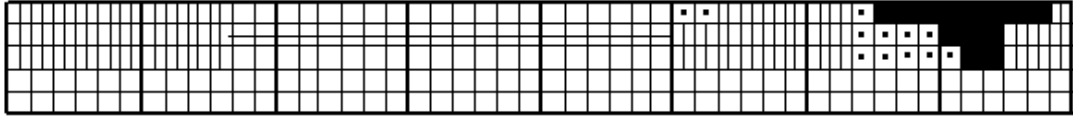
Universal Time

## Verhnetulomsky ascaplots

Jan. 30, 2019



Jan. 31, 2019



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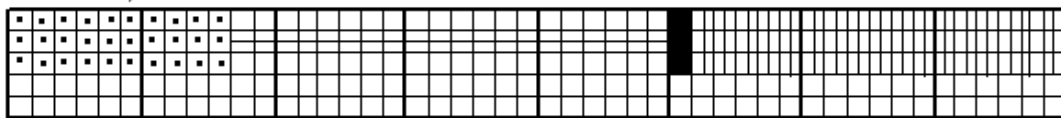
18

24

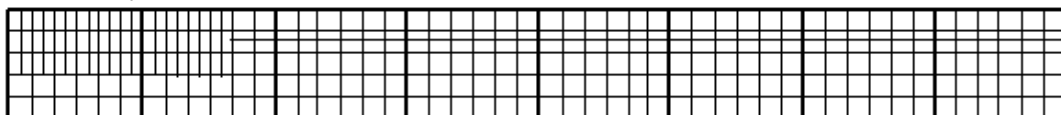
Universal Time

## Verhnetulomsky ascaplots

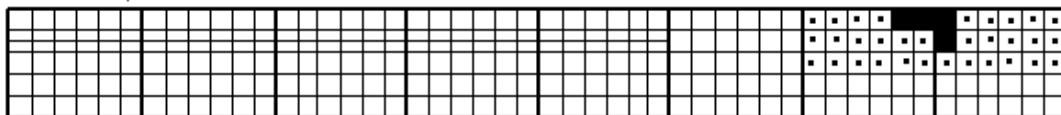
Feb. 01, 2019



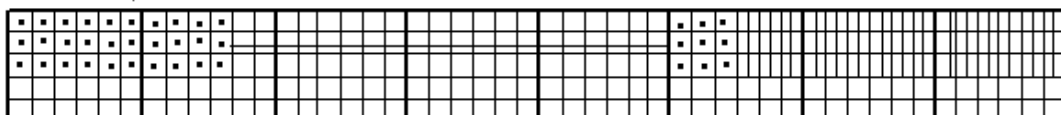
Feb. 02, 2019



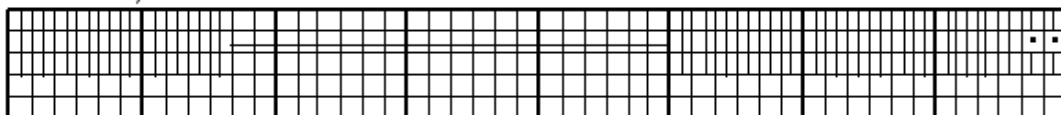
Feb. 03, 2019



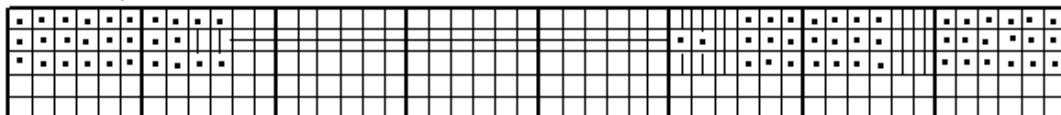
Feb. 04, 2019



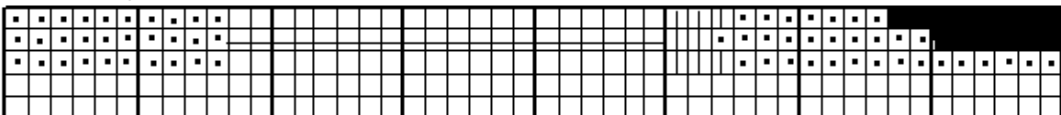
Feb. 05, 2019



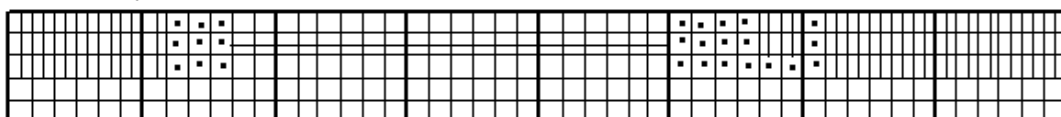
Feb. 06, 2019



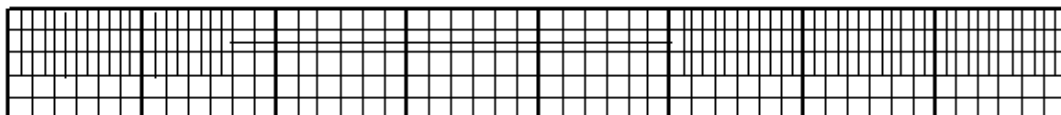
Feb. 07, 2019



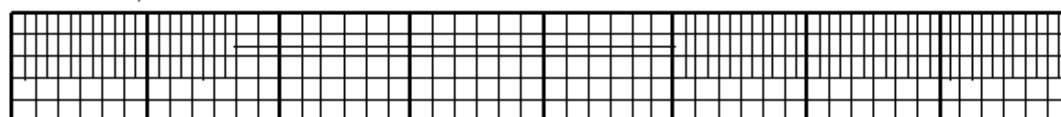
Feb. 08, 2019



Feb. 09, 2019



Feb. 10, 2019



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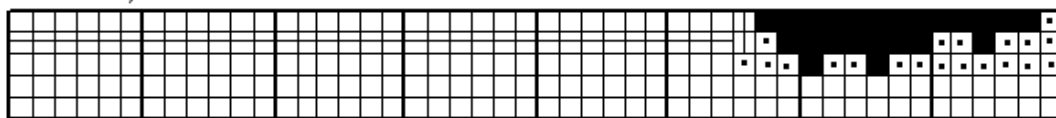
18

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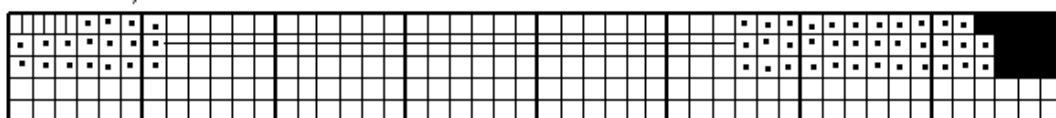
Universal Time

# Verhnetulomsky ascaplots

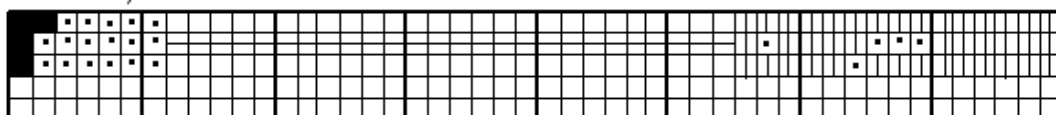
Mar. 02, 2019



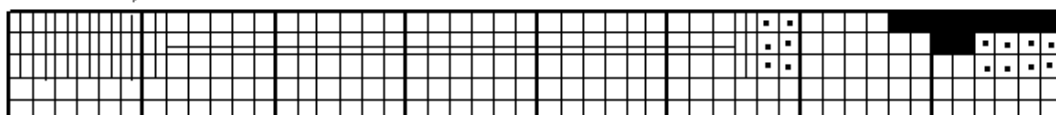
Mar. 03, 2019



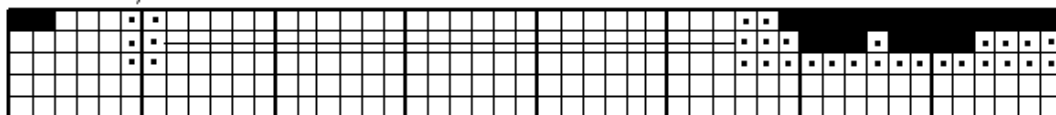
Mar. 04, 2019



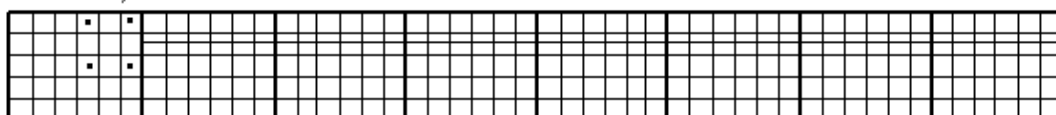
Mar. 05, 2019



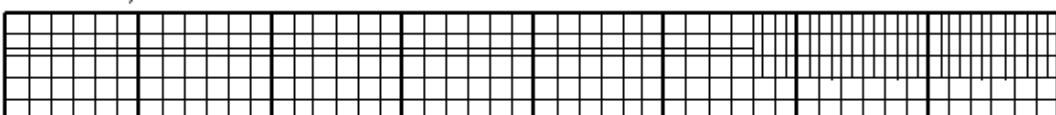
Mar. 06, 2019



Mar. 07, 2019



Mar. 08, 2019



Mar. 09, 2019

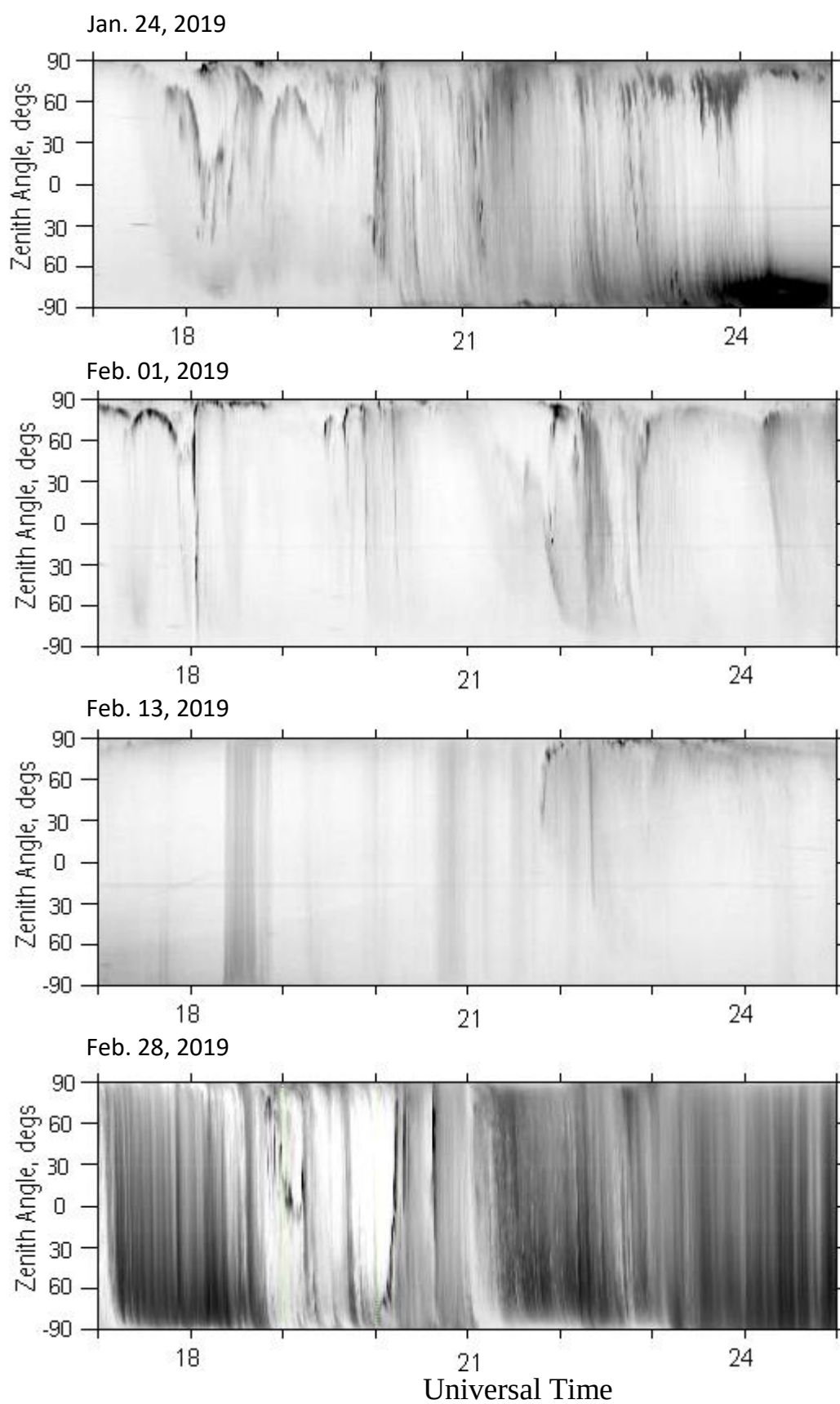


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Universal Time

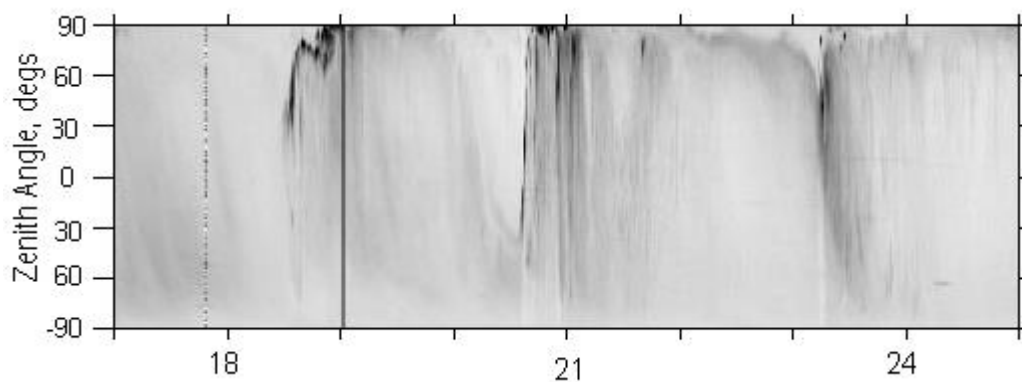


## Apatity TV keograms

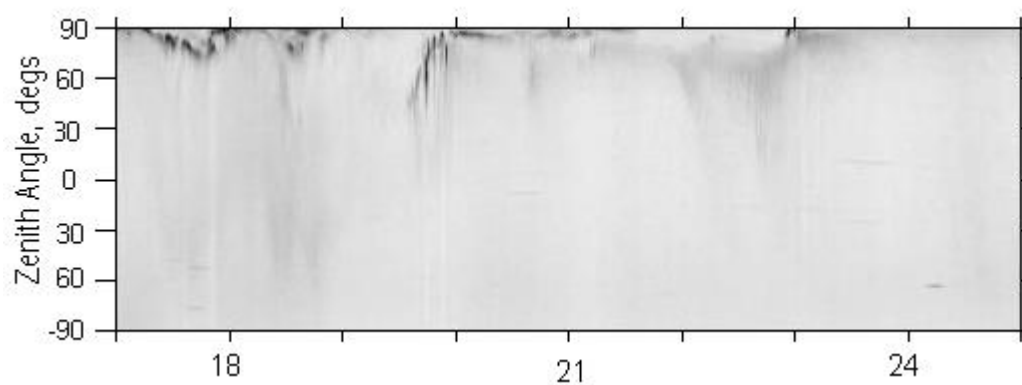


## Apatity TV keograms

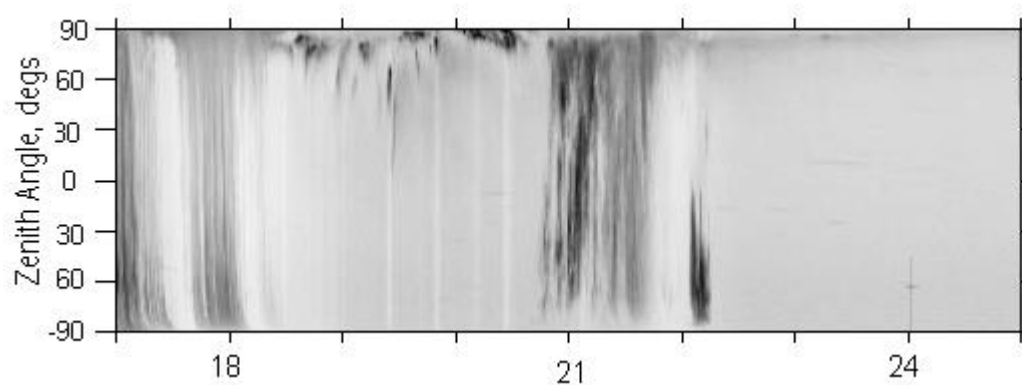
Mar. 01, 2019



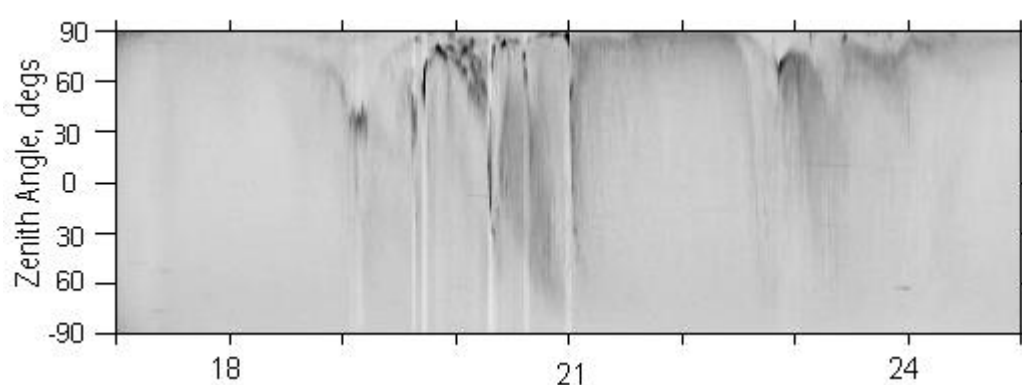
Mar. 02, 2019



Mar. 06, 2019



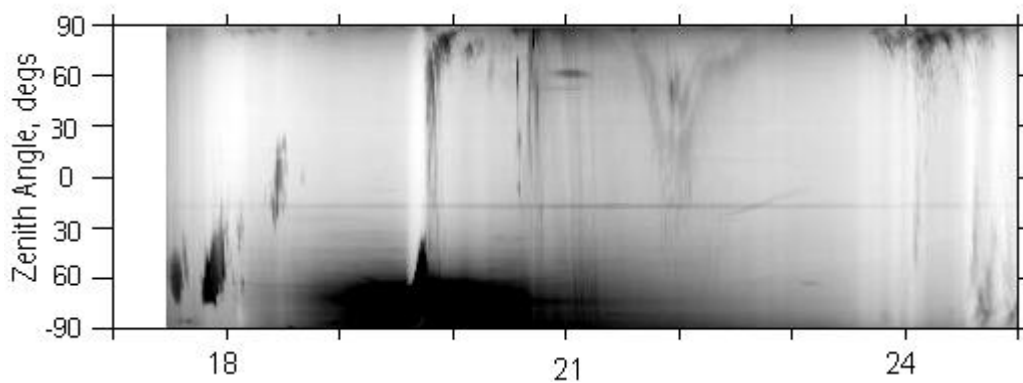
Mar. 07, 2019



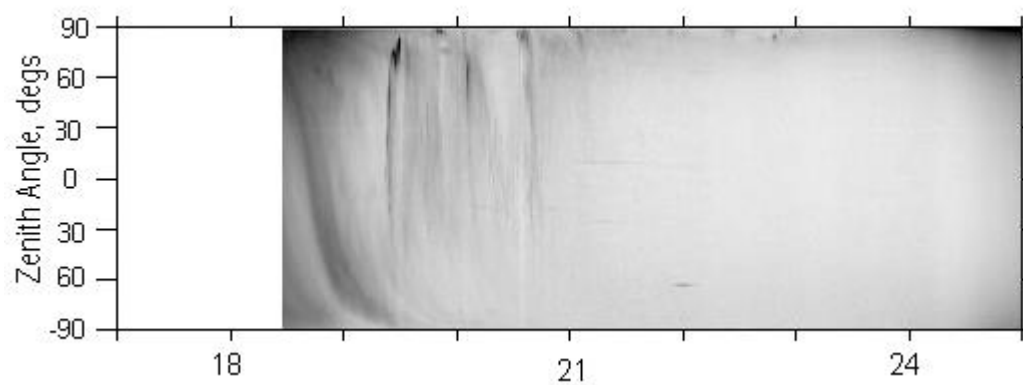
Universal Time

## Apatity TV keograms

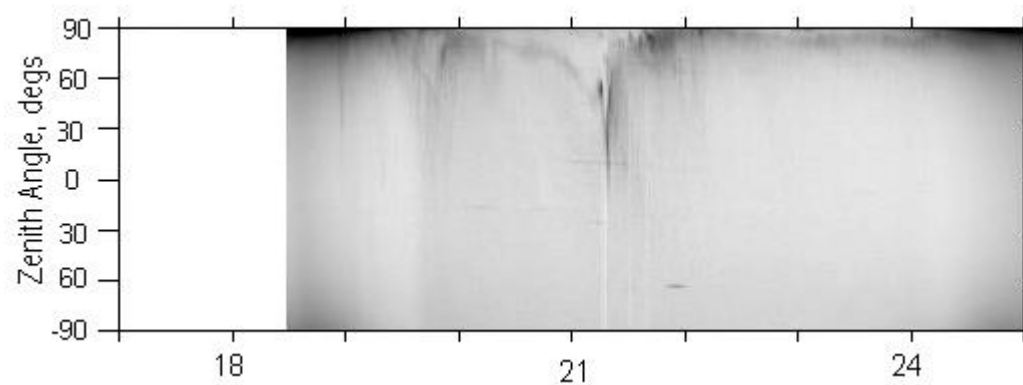
Mar. 19, 2019



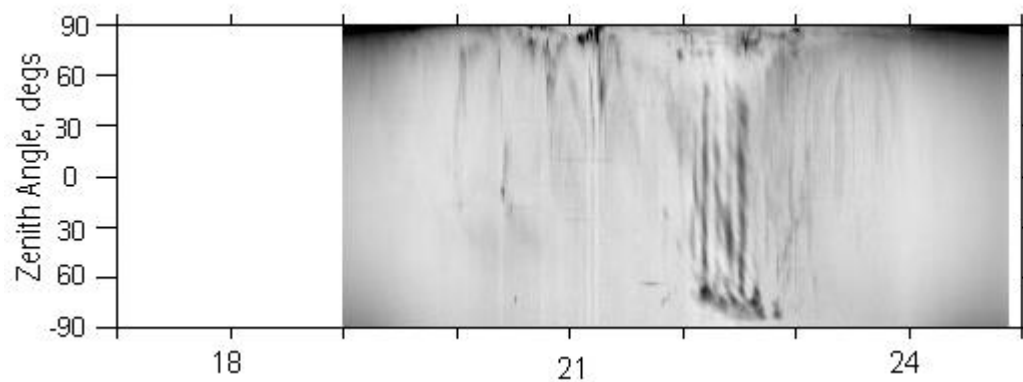
Apr. 04, 2019



Apr. 05, 2019

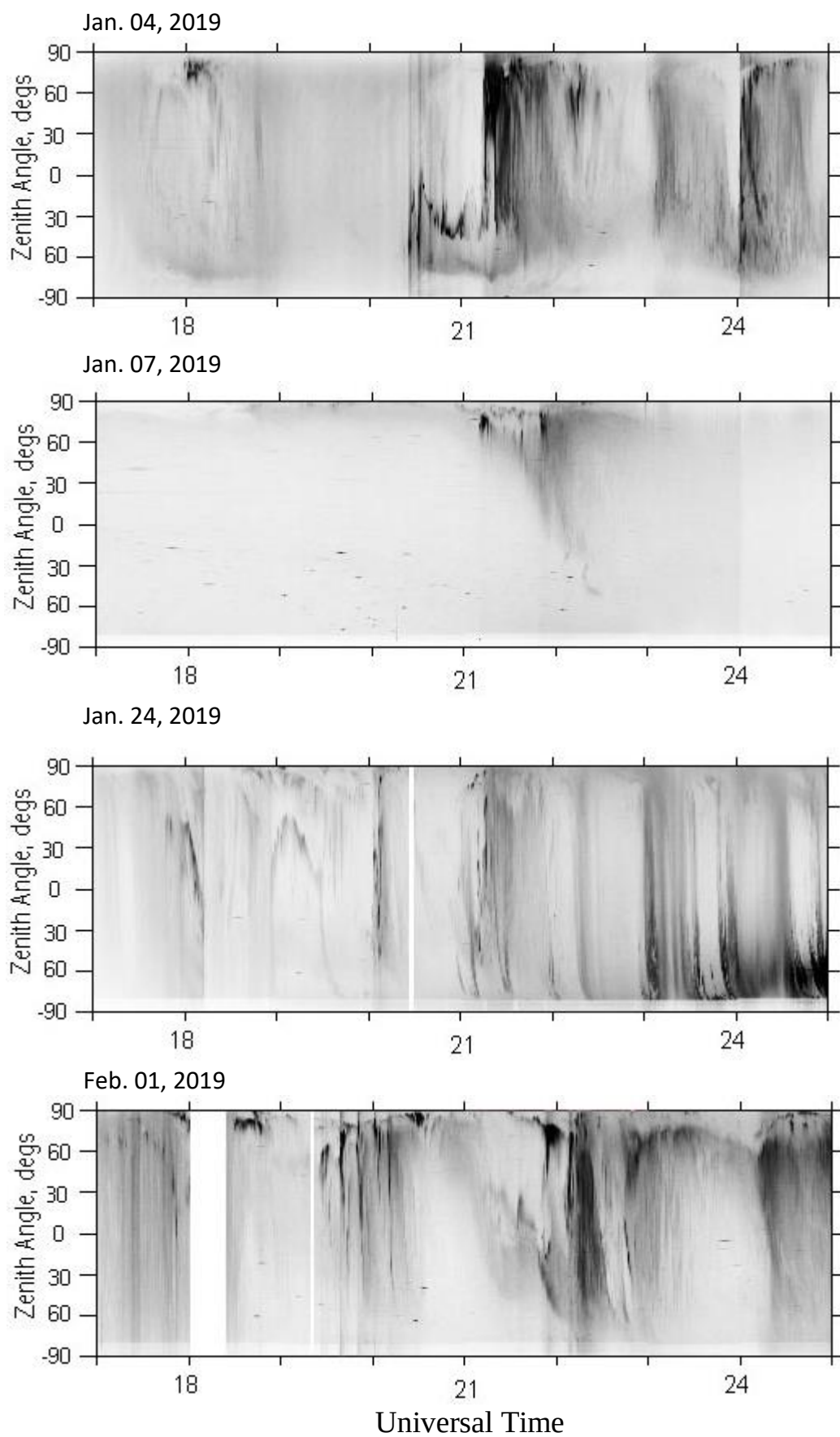


Apr. 08, 2019

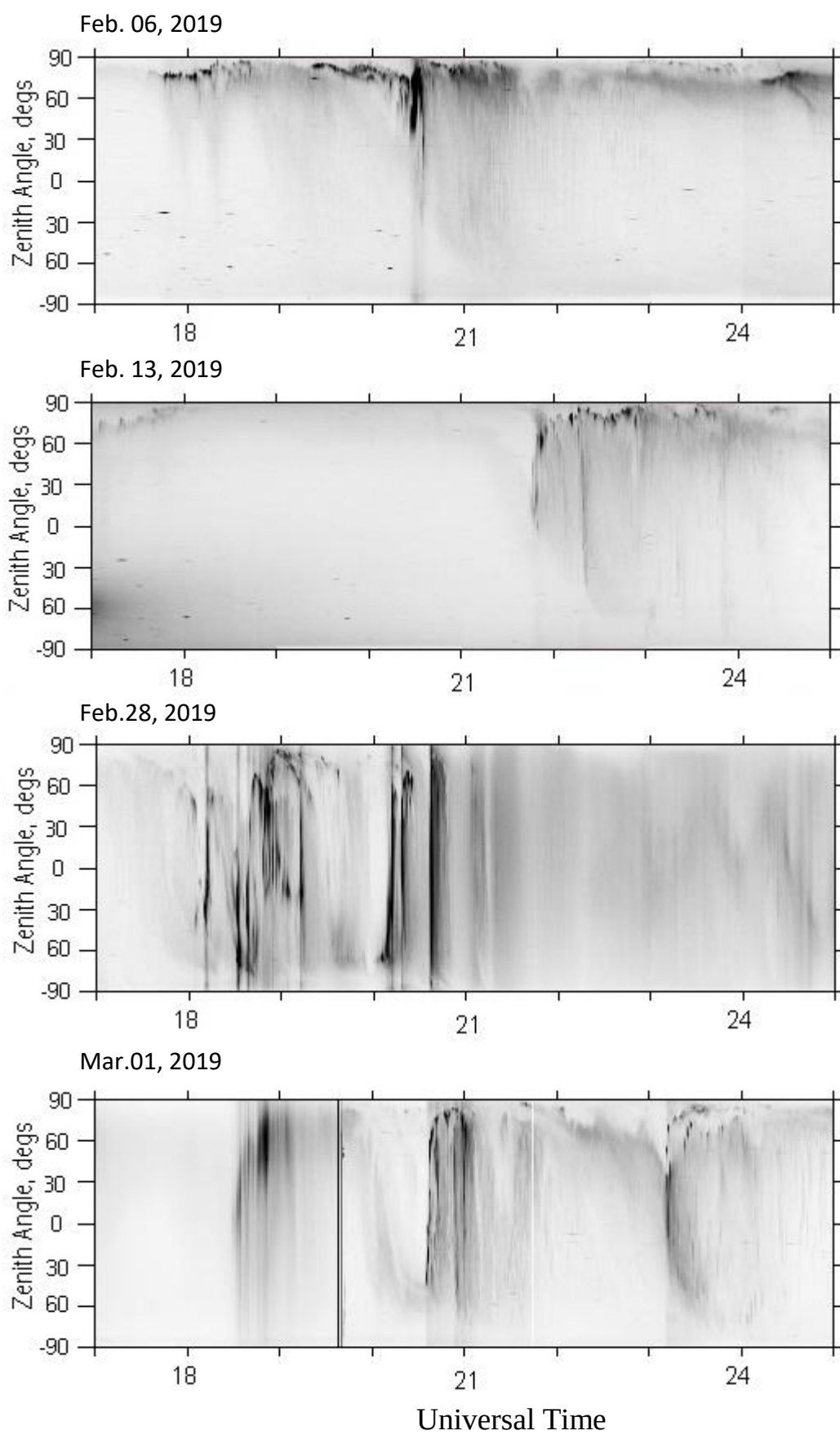


Universal Time

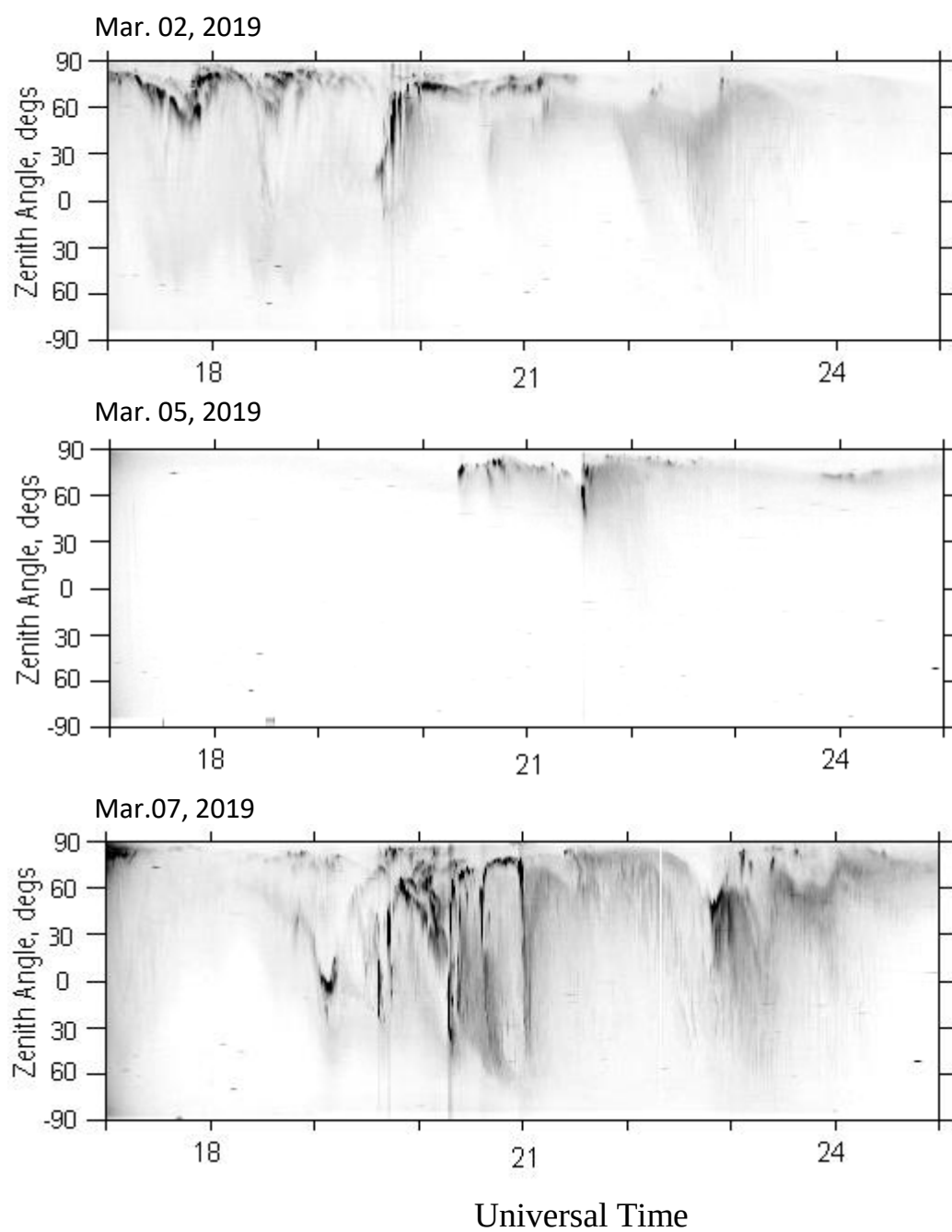
## Lovozero TV keograms



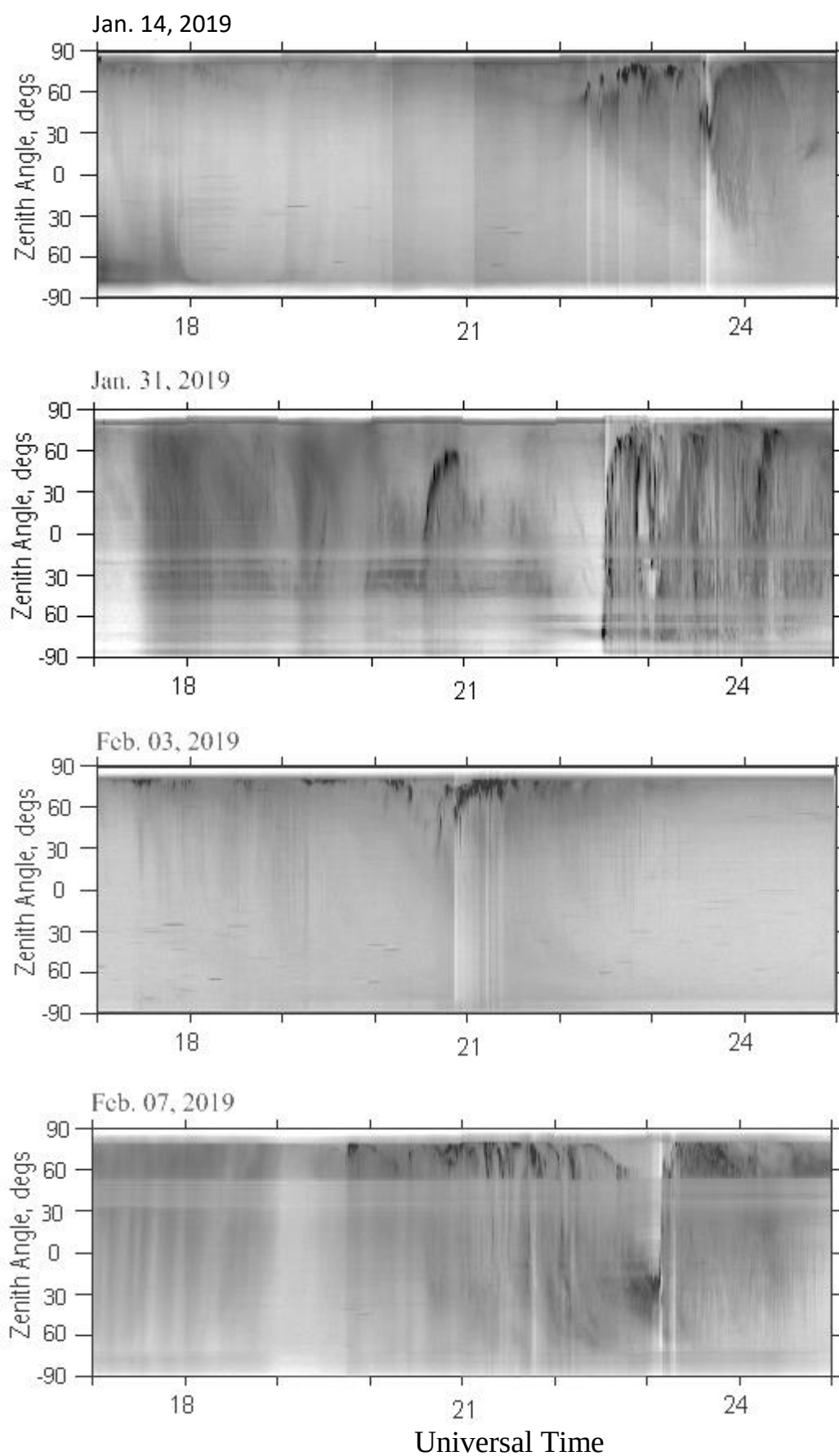
## Lovozero TV keograms



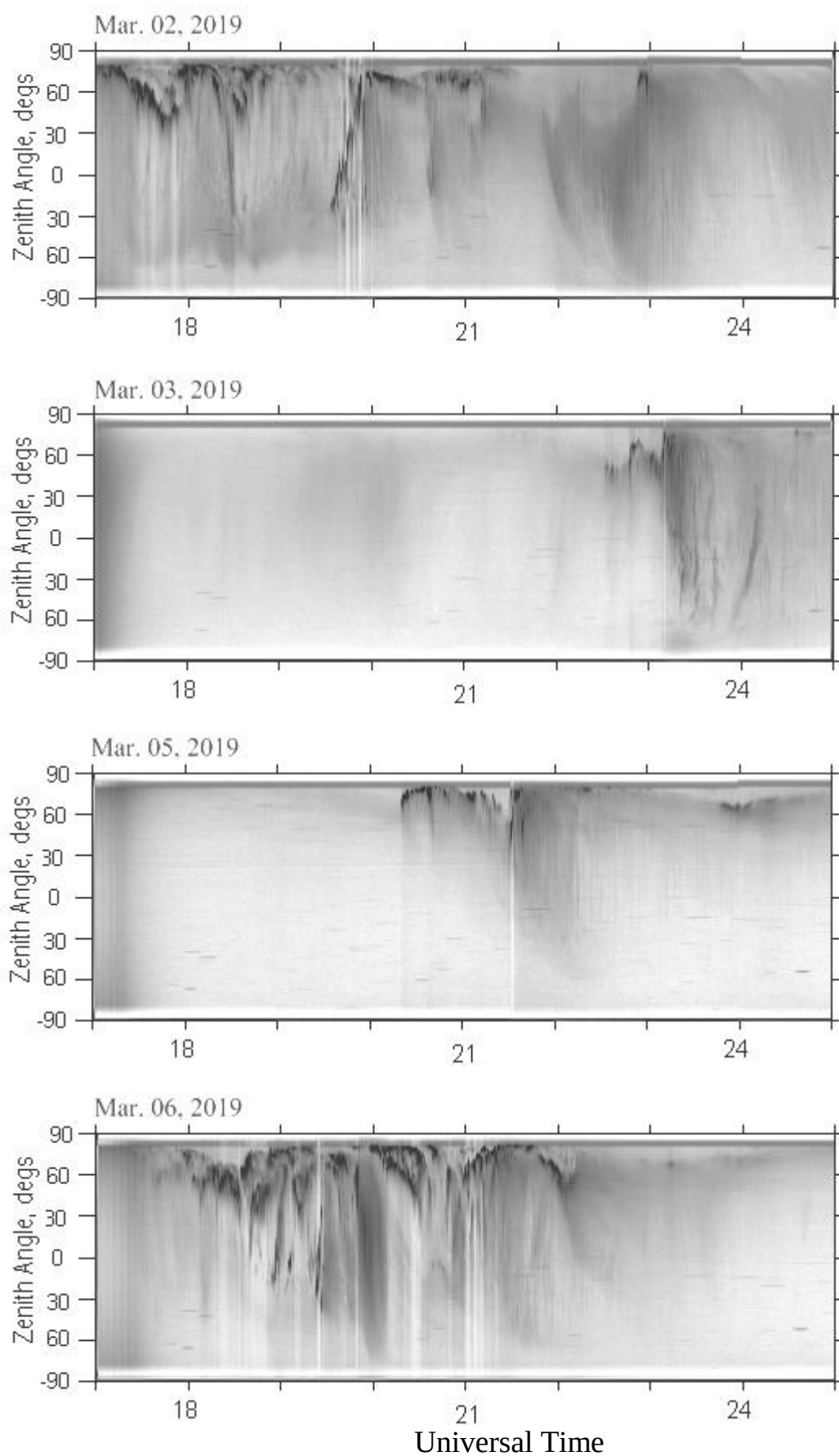
## Lovozero TV keograms



## Verhnetulomsky TV keograms



## Verhnetulomsky TV keograms

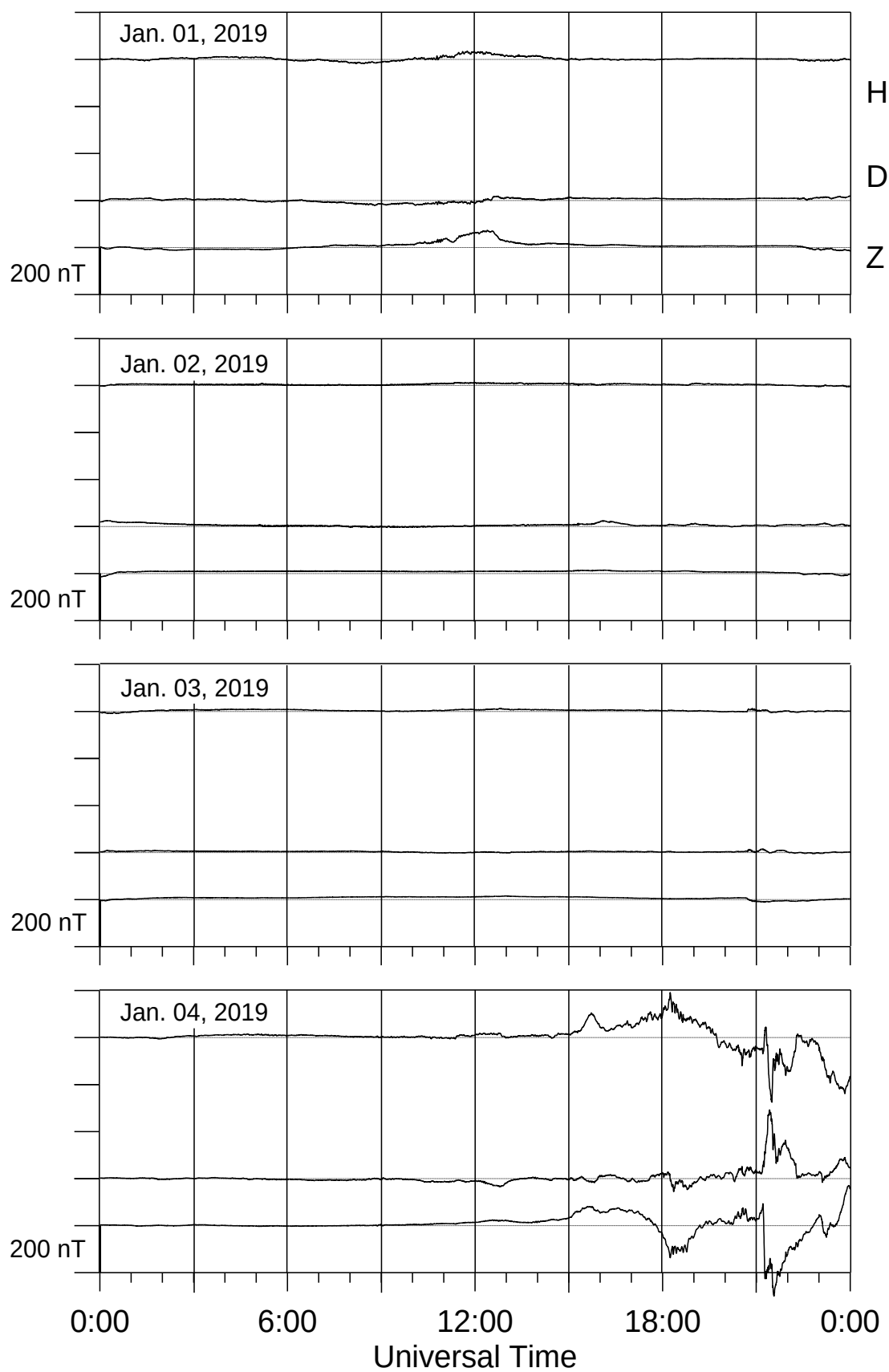




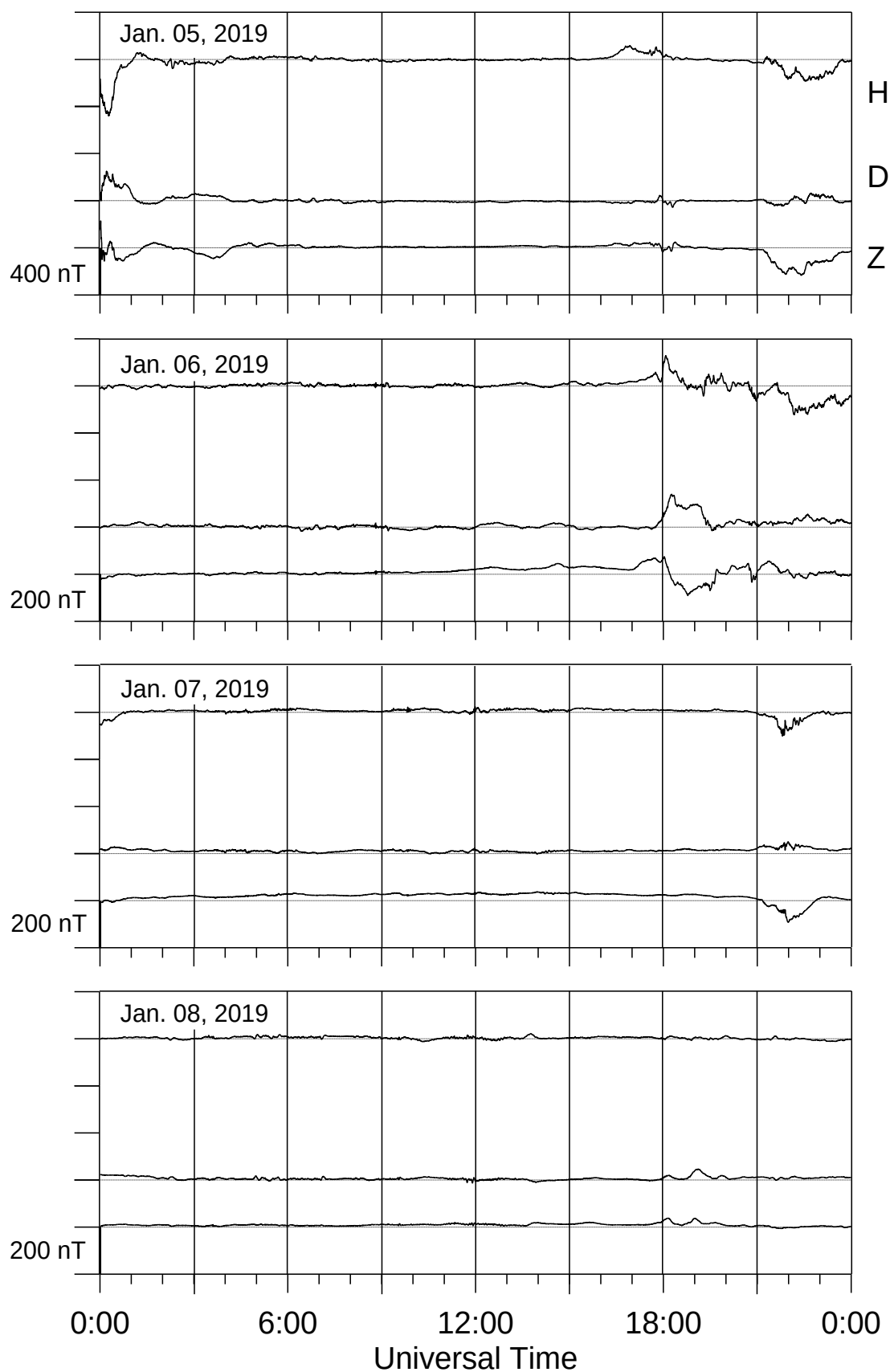
## **LOVOZERO MAGNETOGRAMS**

**January - March 2019**

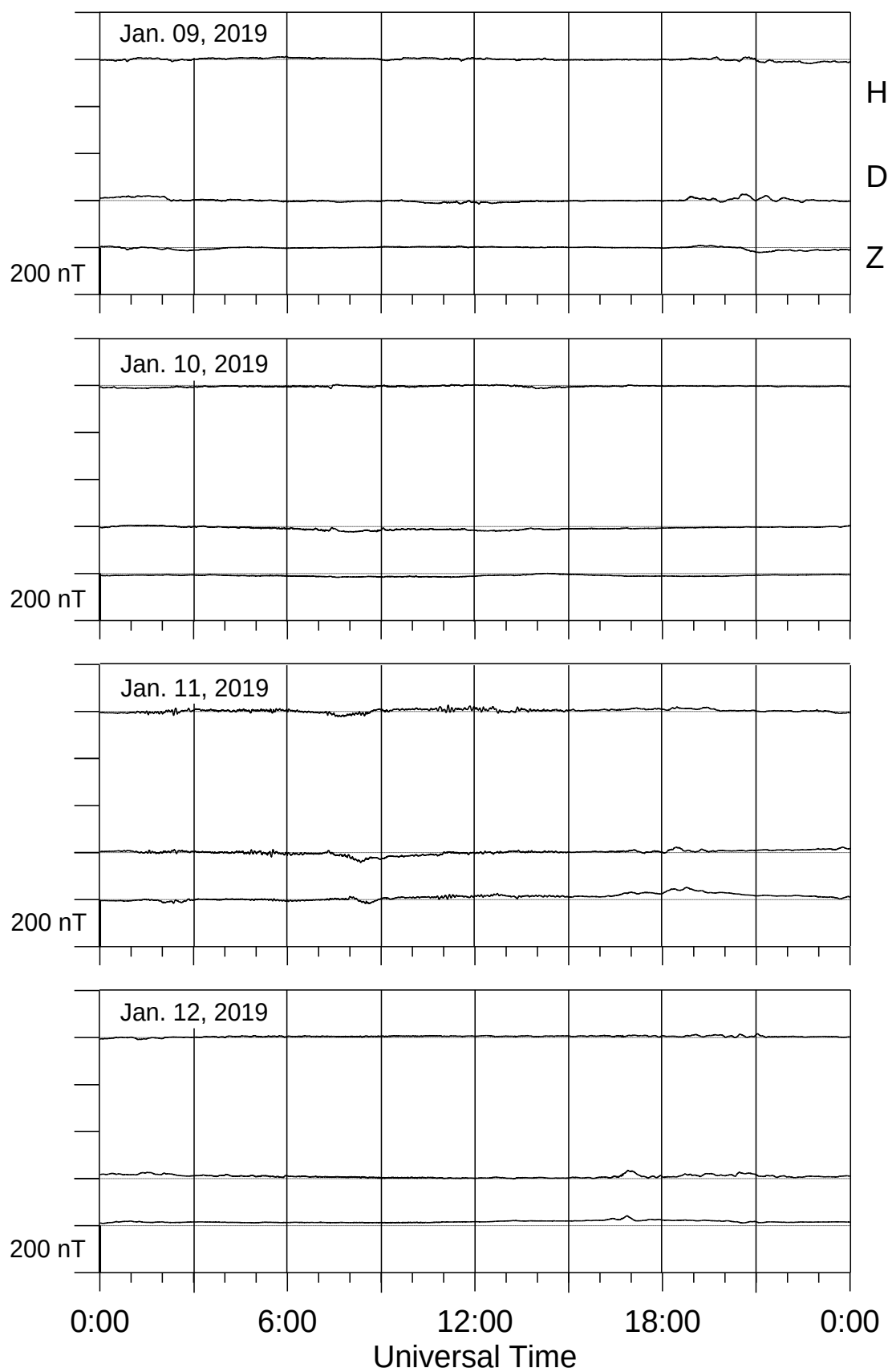
## Lovozero magnetometer



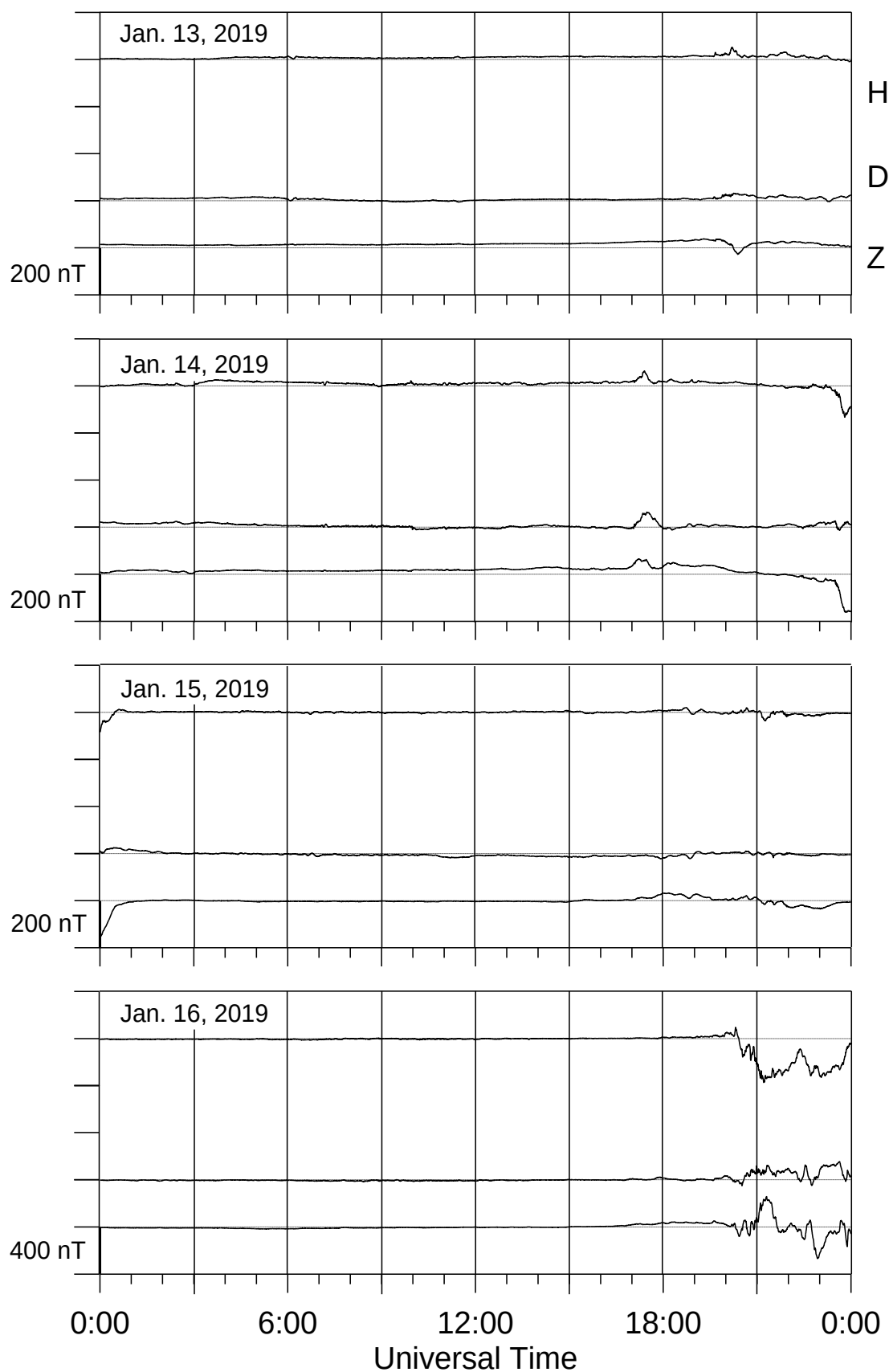
## Lovozero magnetometer



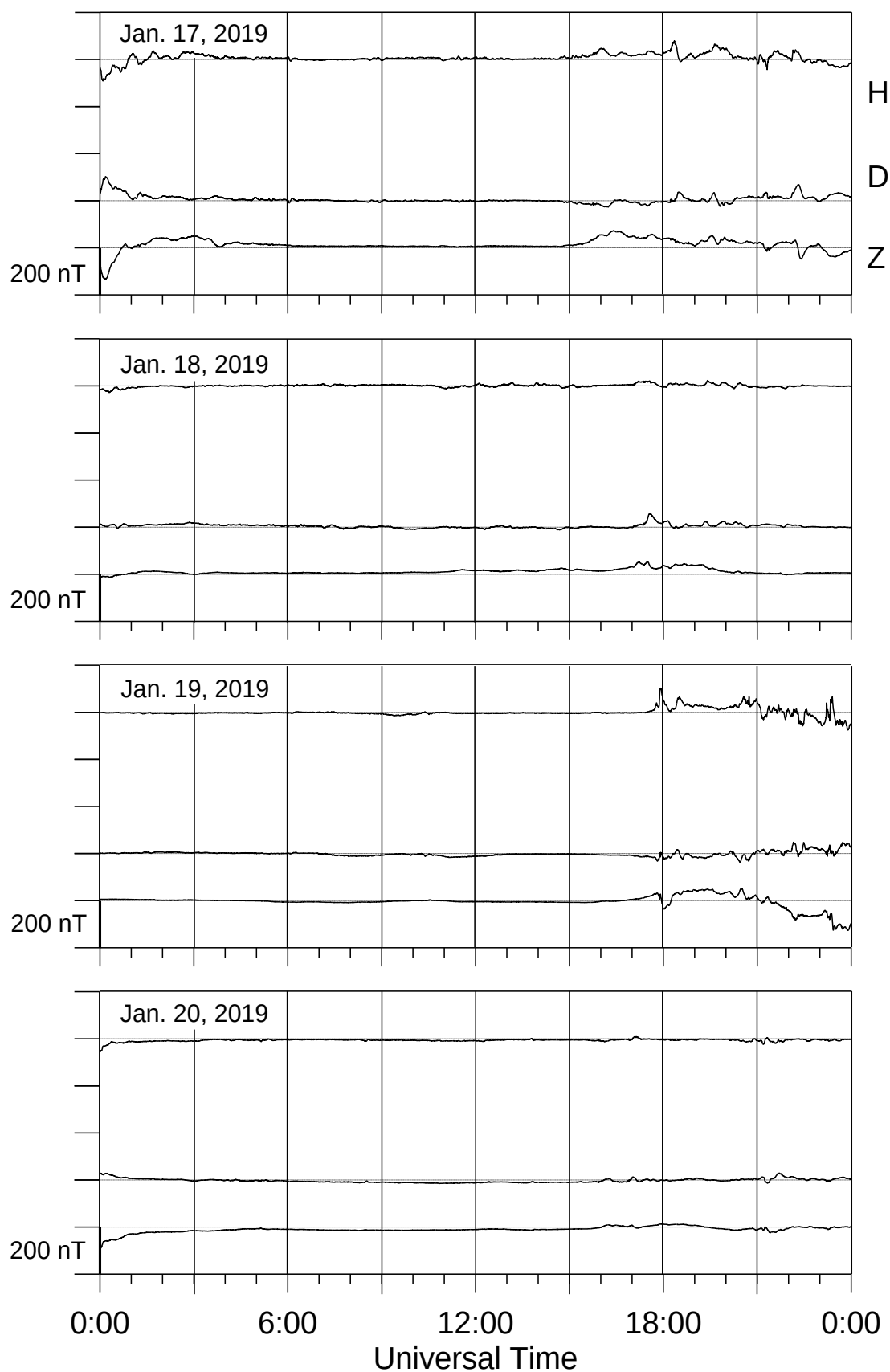
## Lovozero magnetometer



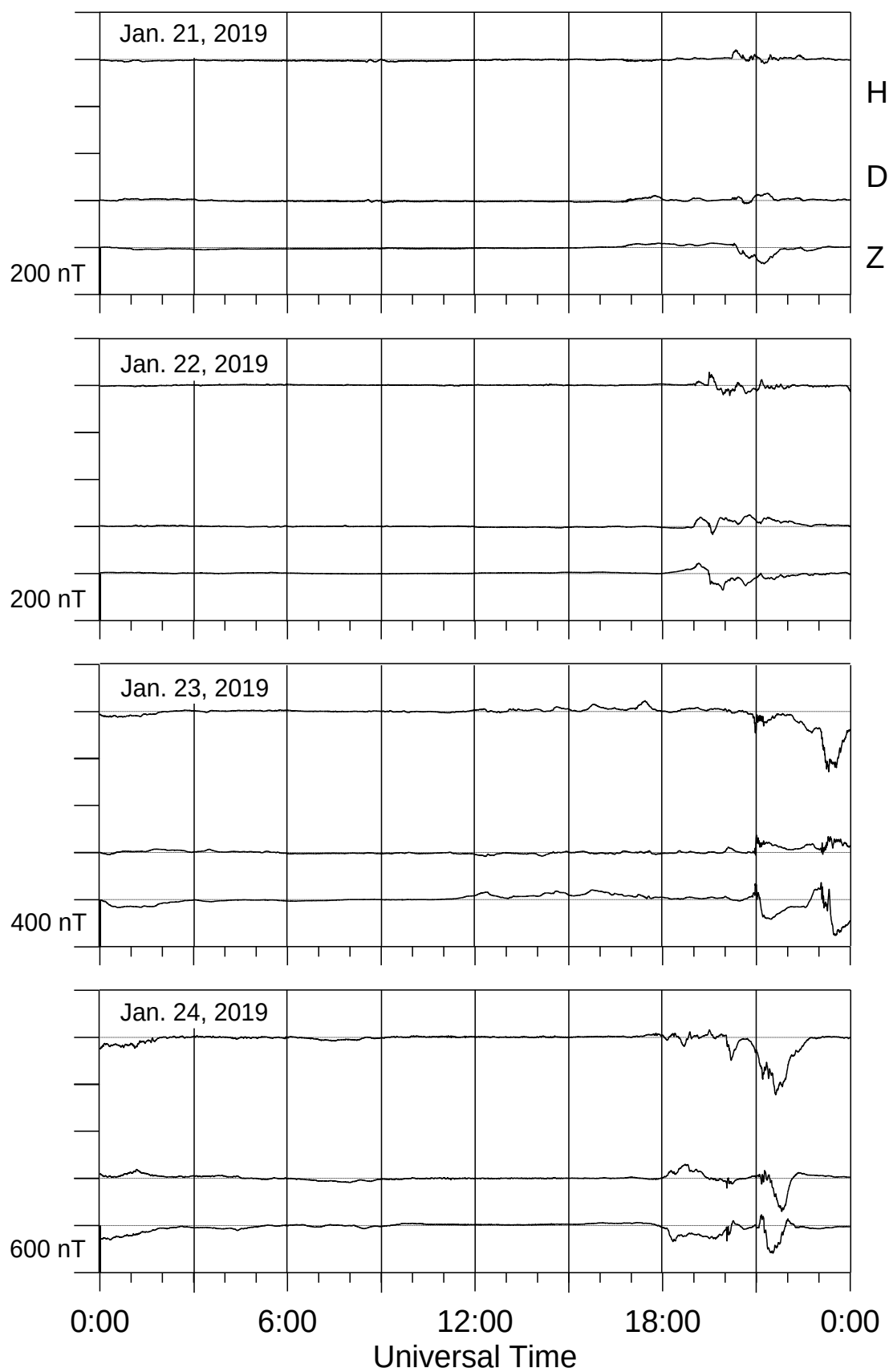
## Lovozero magnetometer



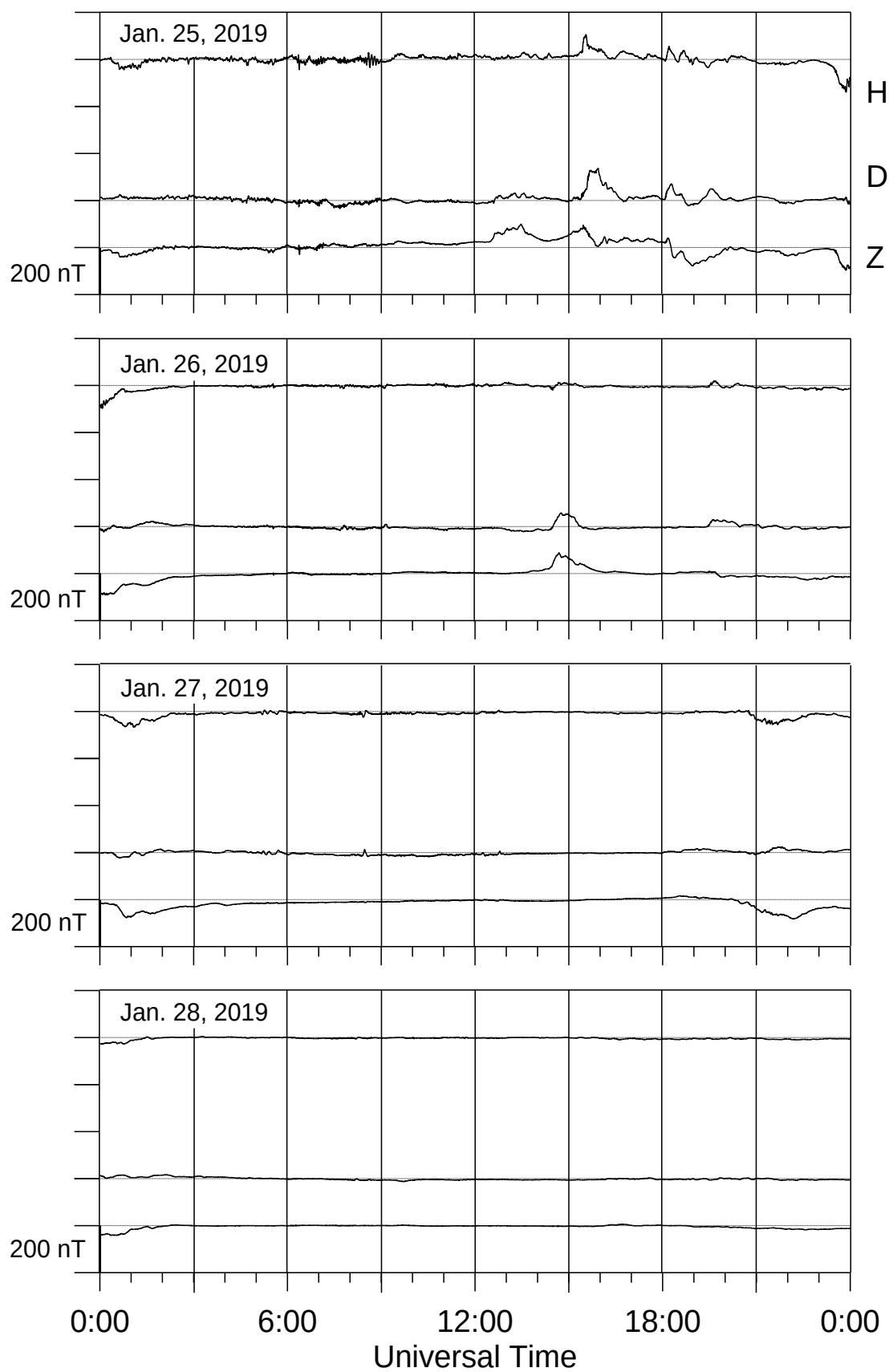
## Lovozero magnetometer



## Lovozero magnetometer

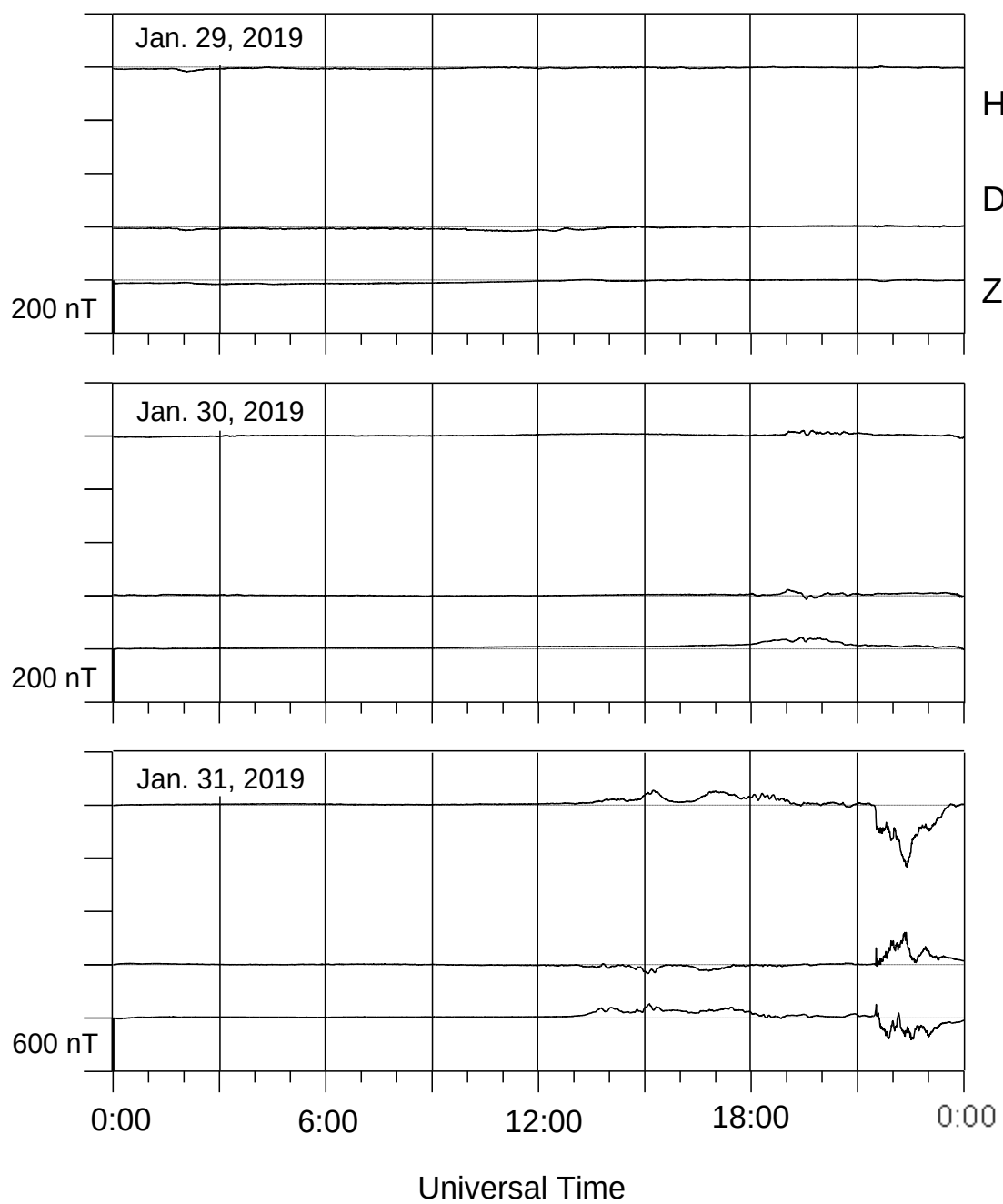


## Lovozero magnetometer

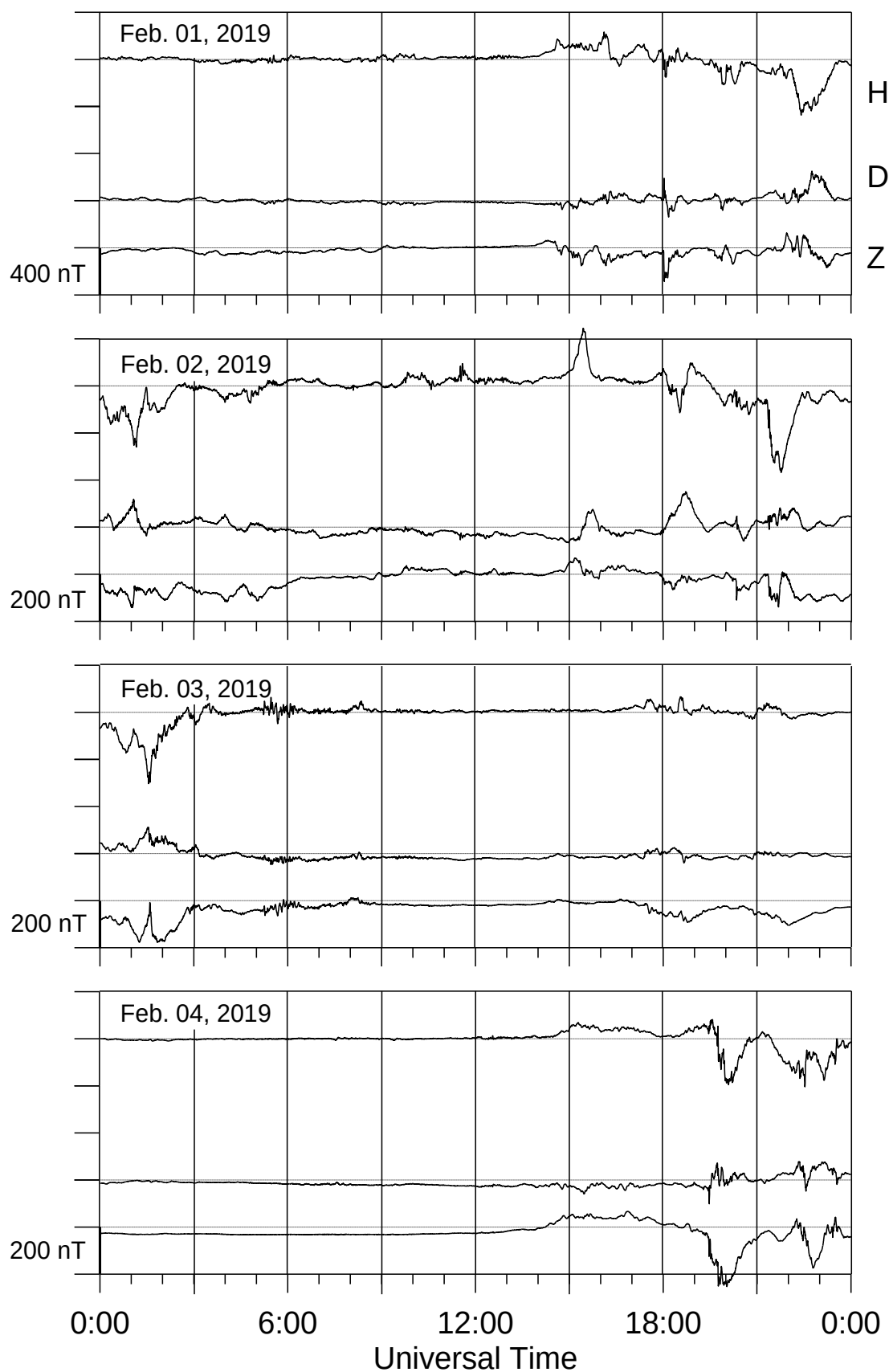




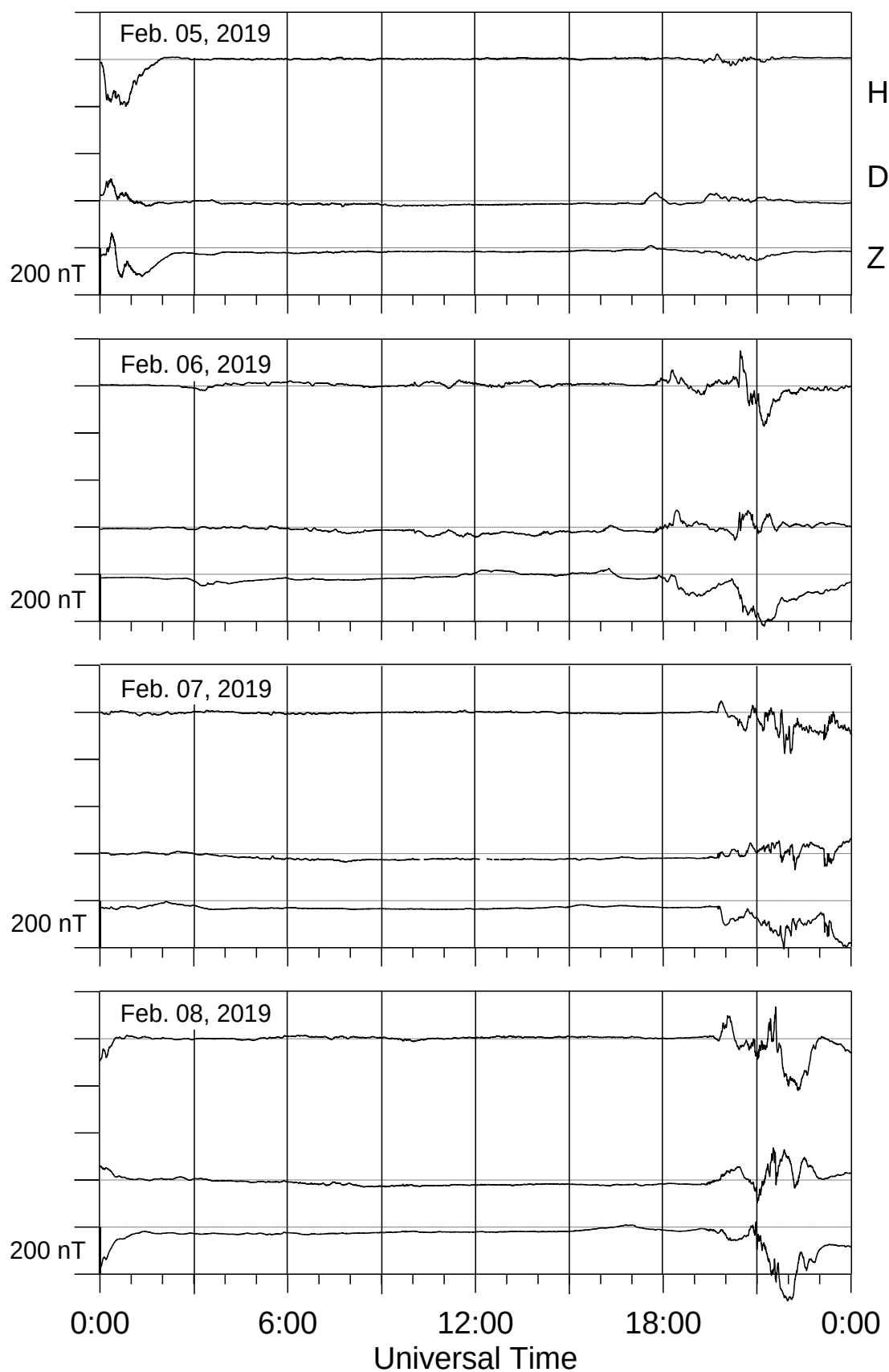
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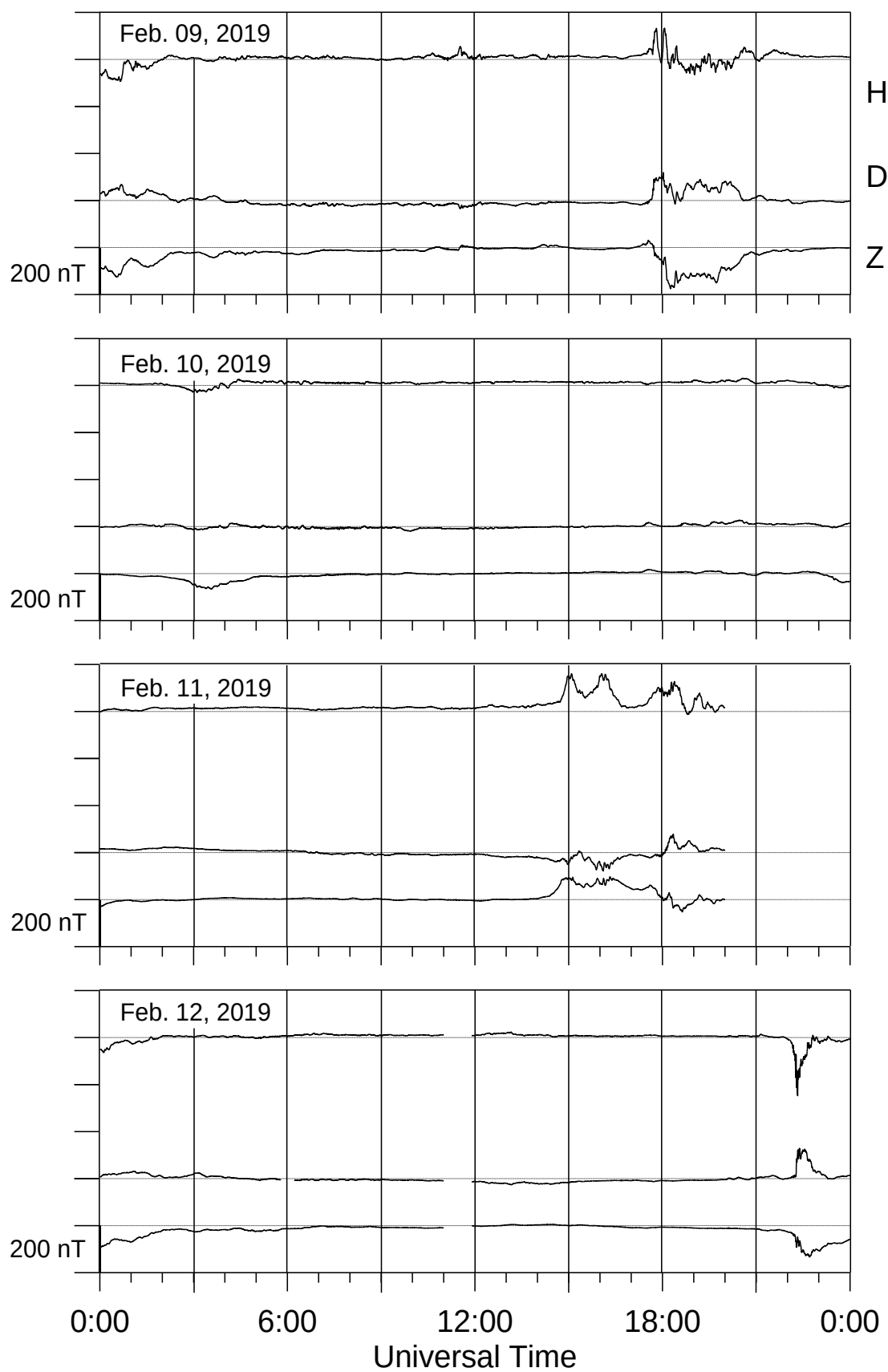
## Lovozero magnetometer



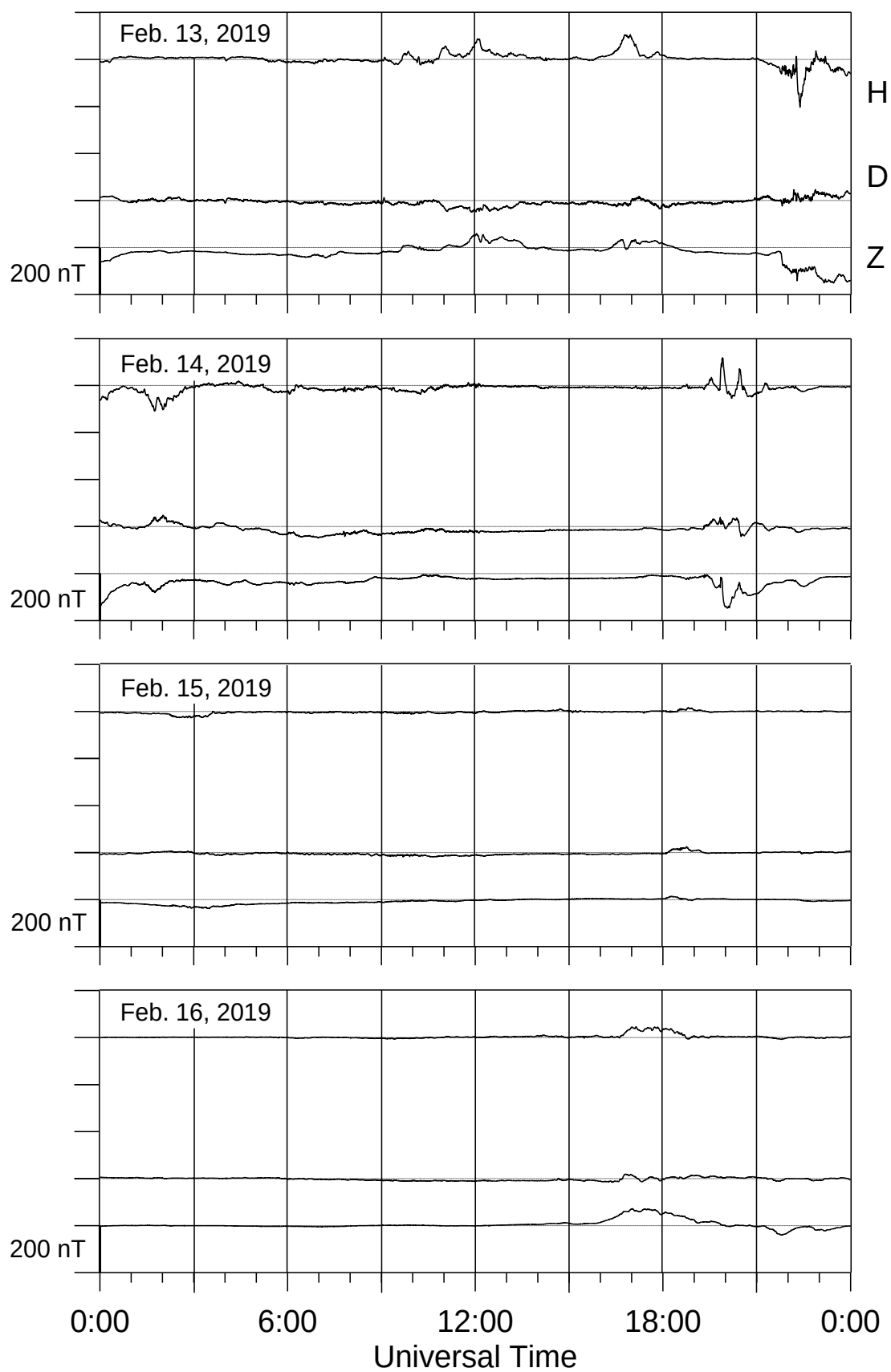
## Lovozero magnetometer



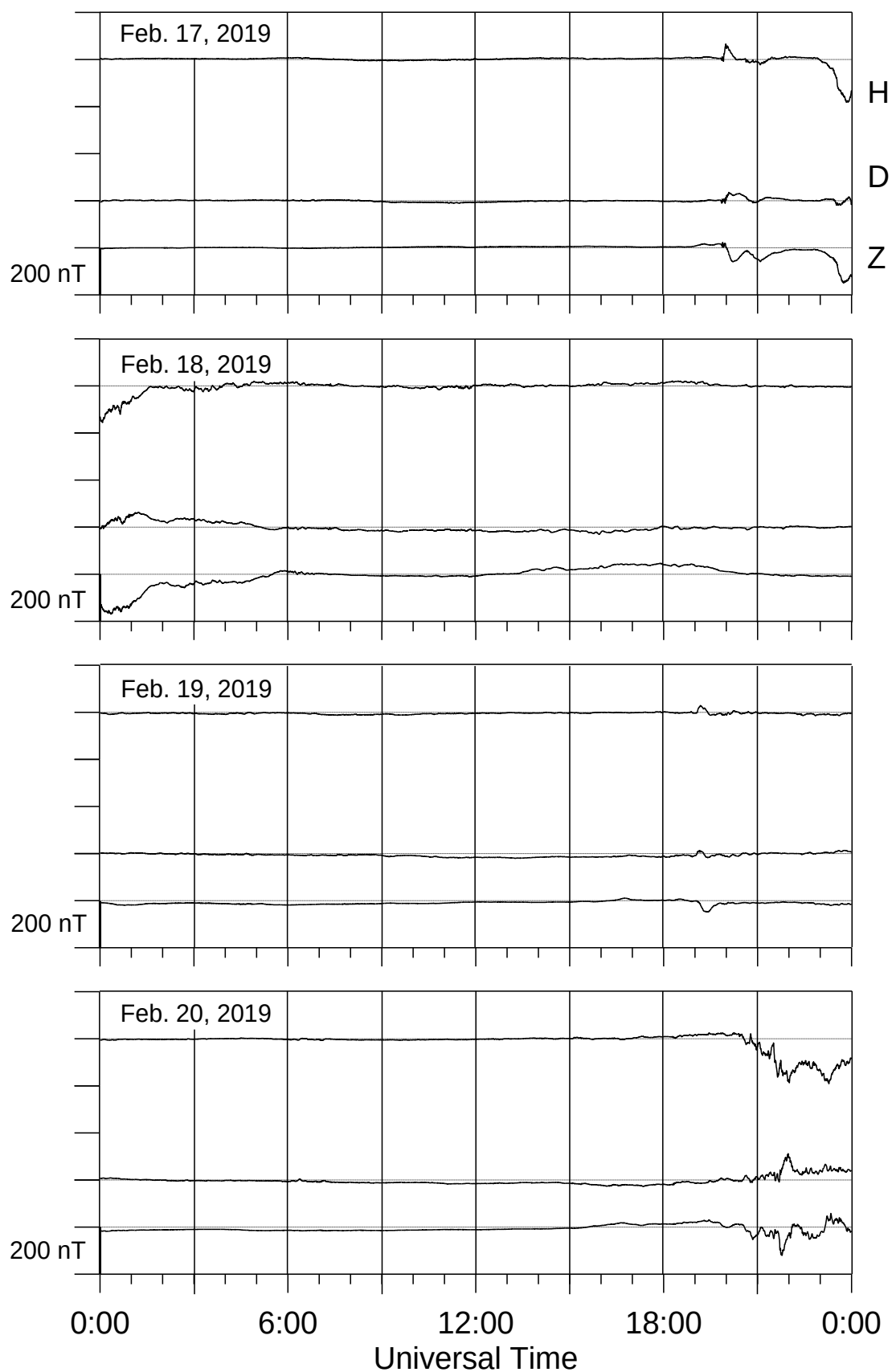
## Lovozero magnetometer



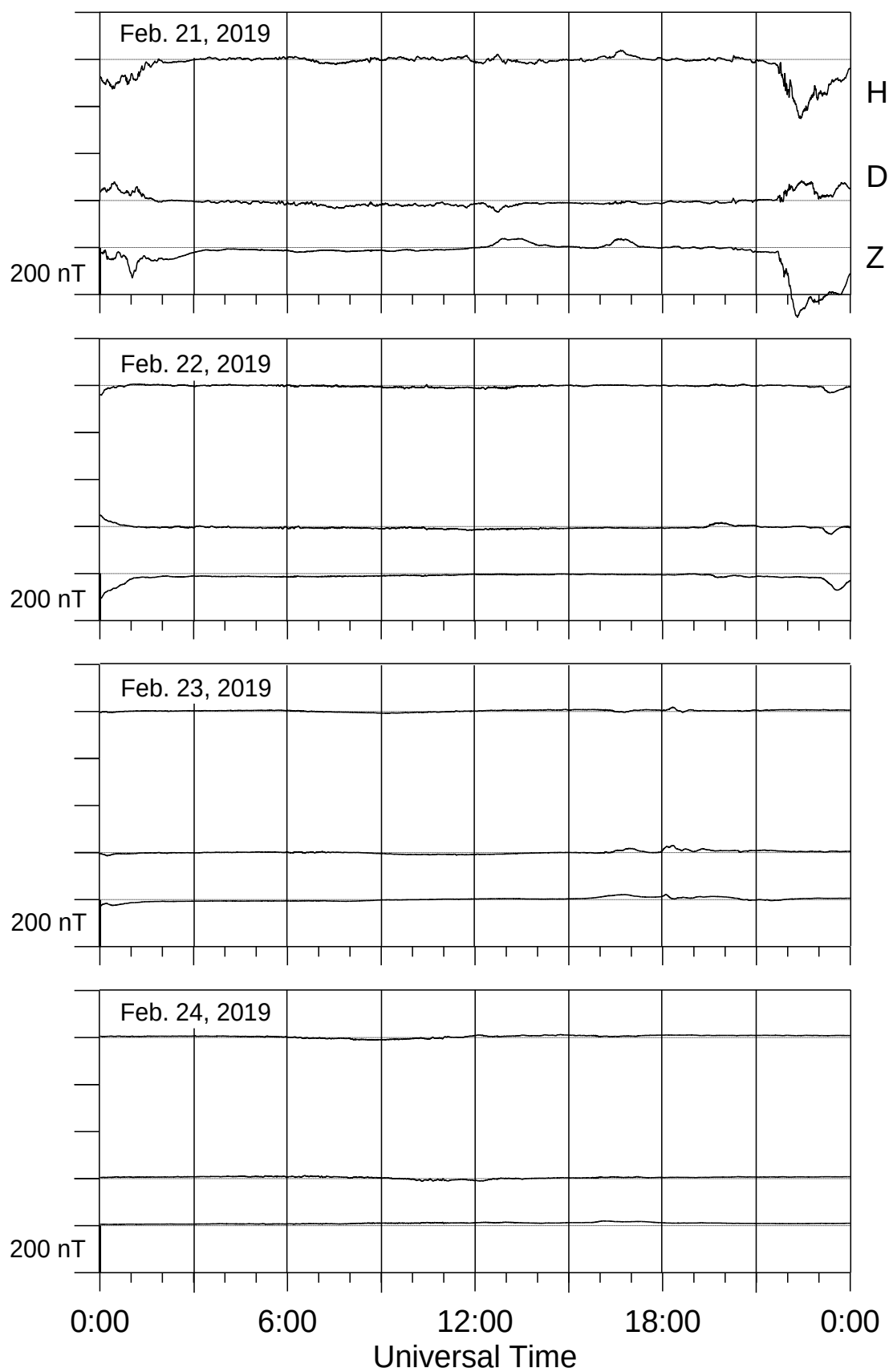
## Lovozero magnetometer



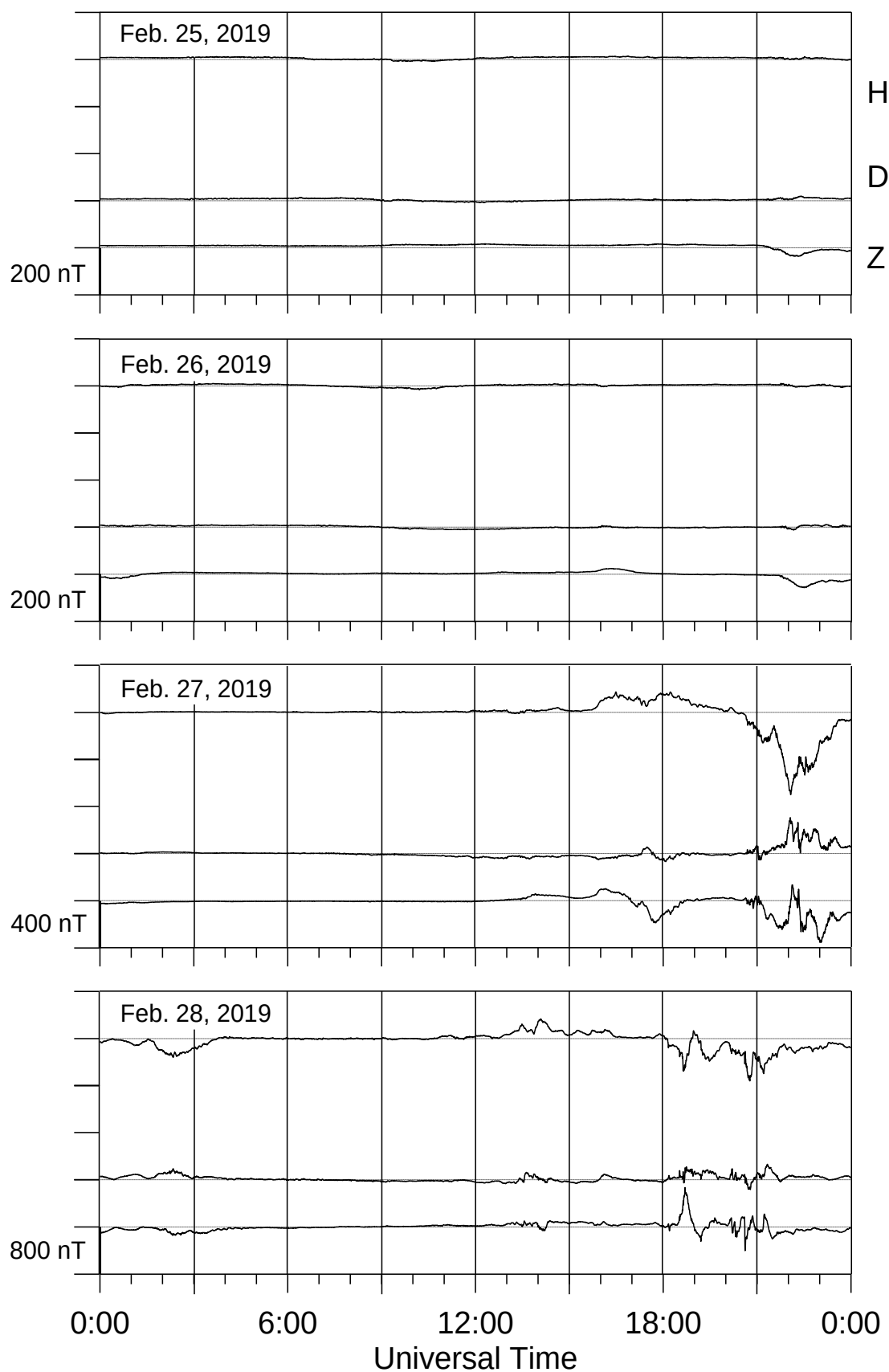
## Lovozero magnetometer



## Lovozero magnetometer

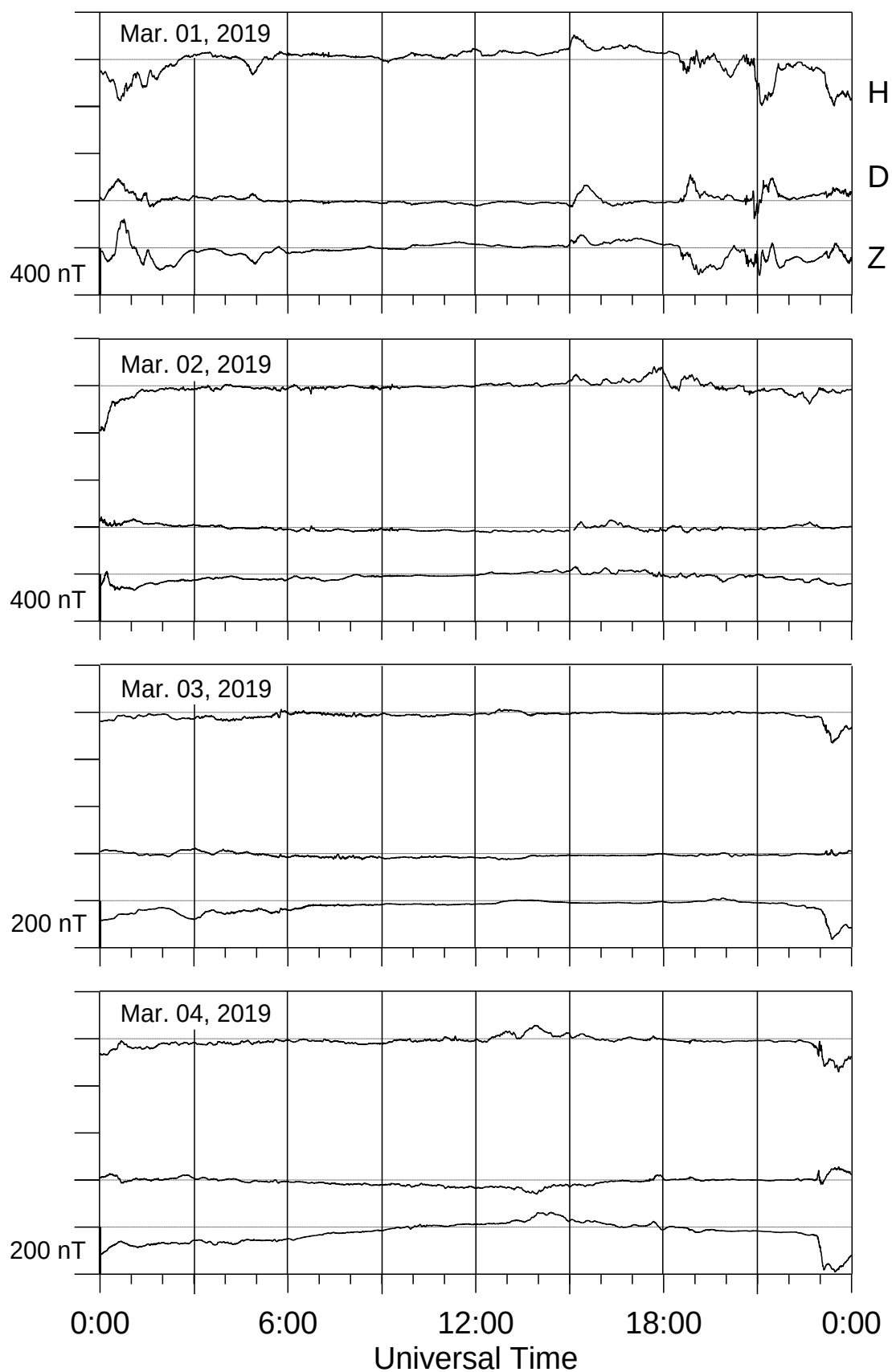


## Lovozero magnetometer

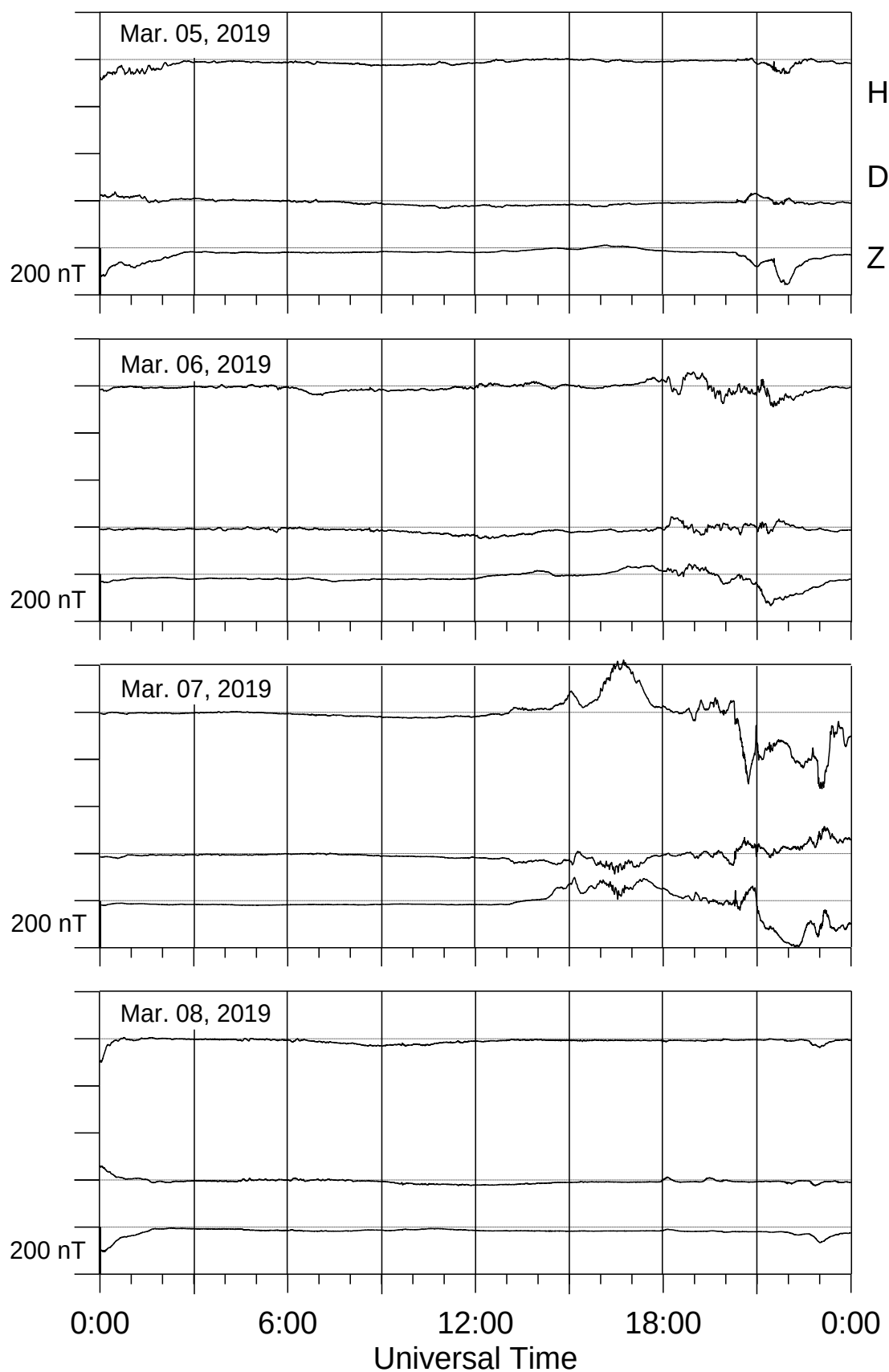




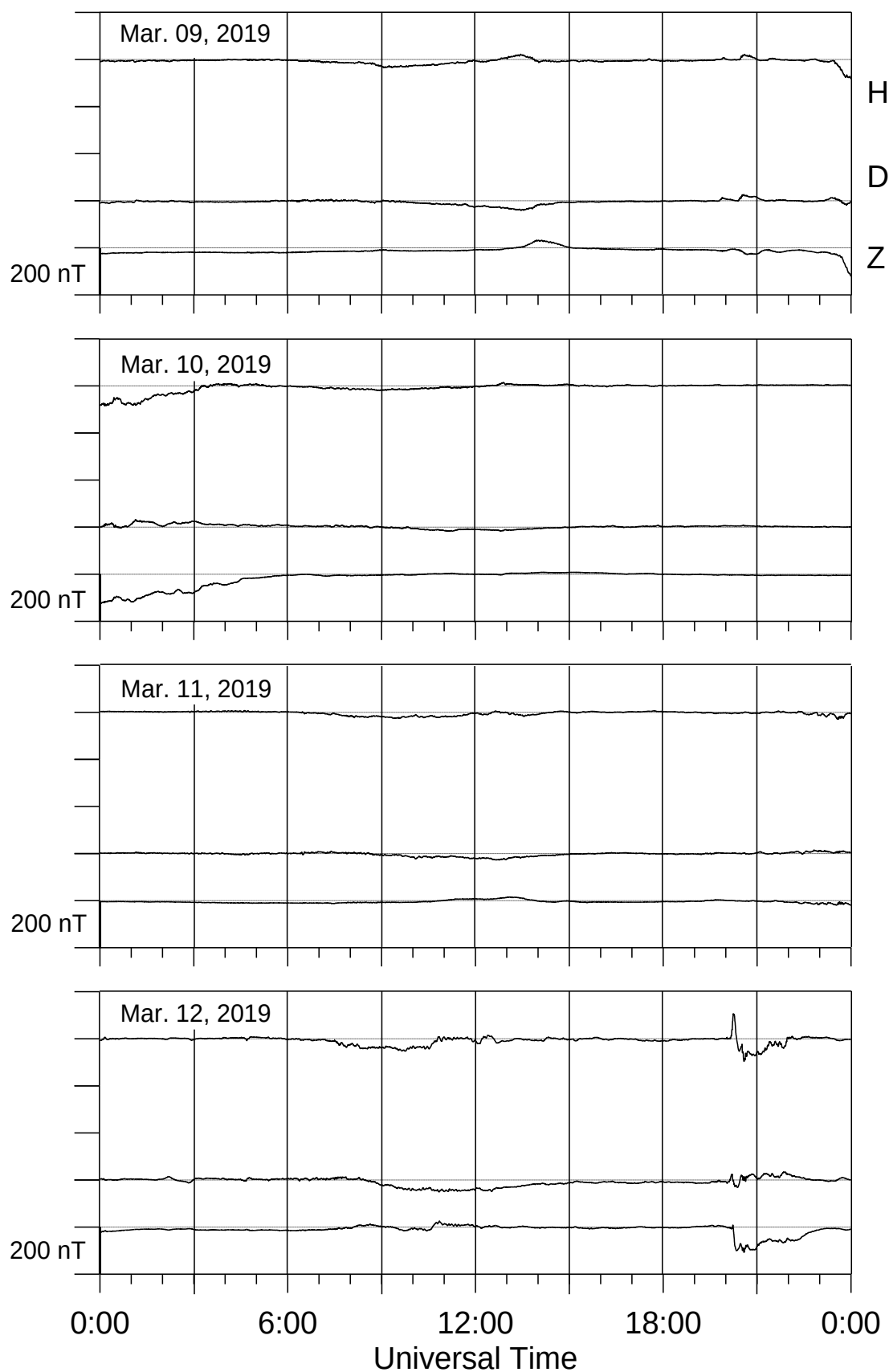
## Lovozero magnetometer



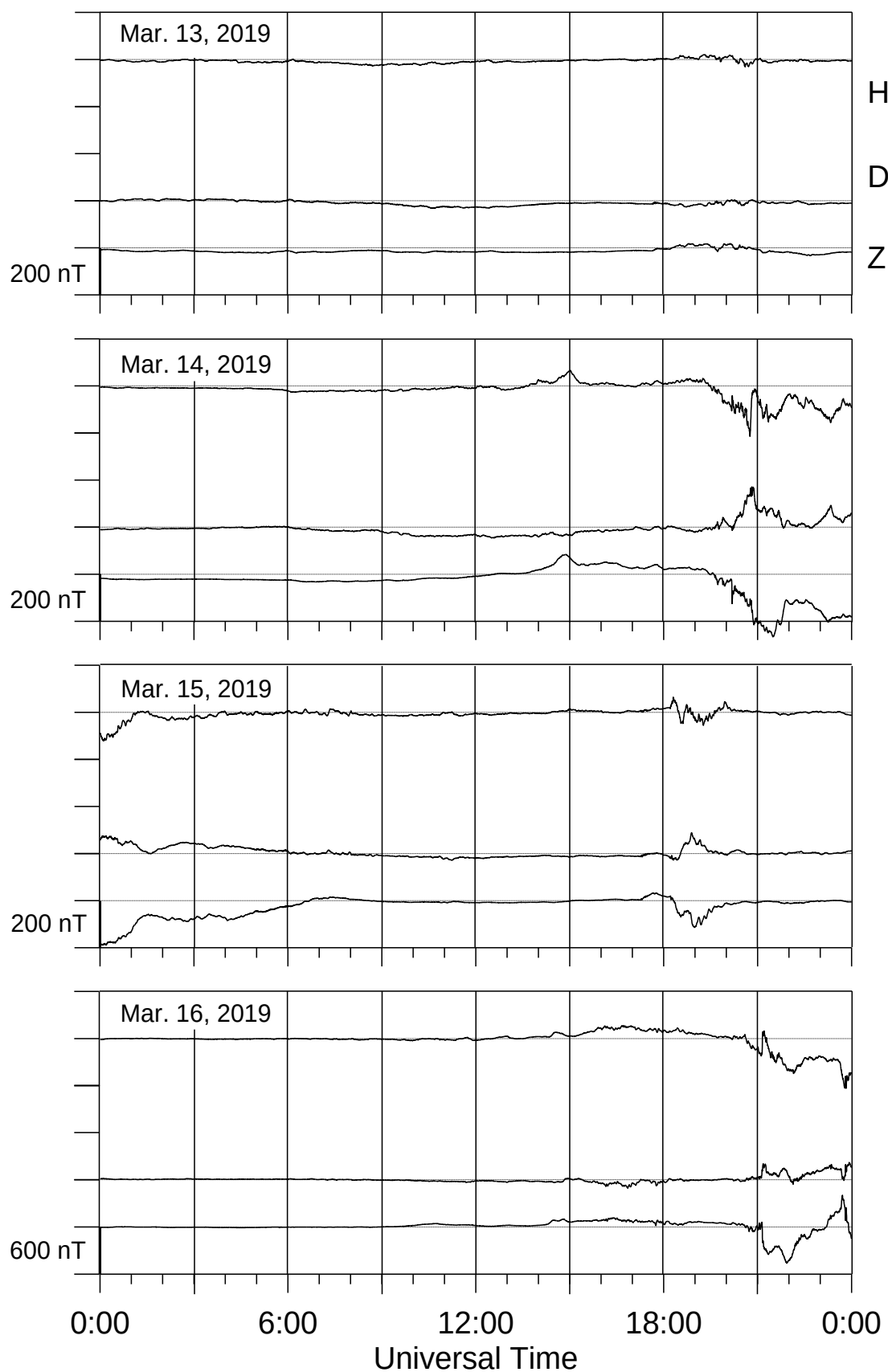
## Lovozero magnetometer



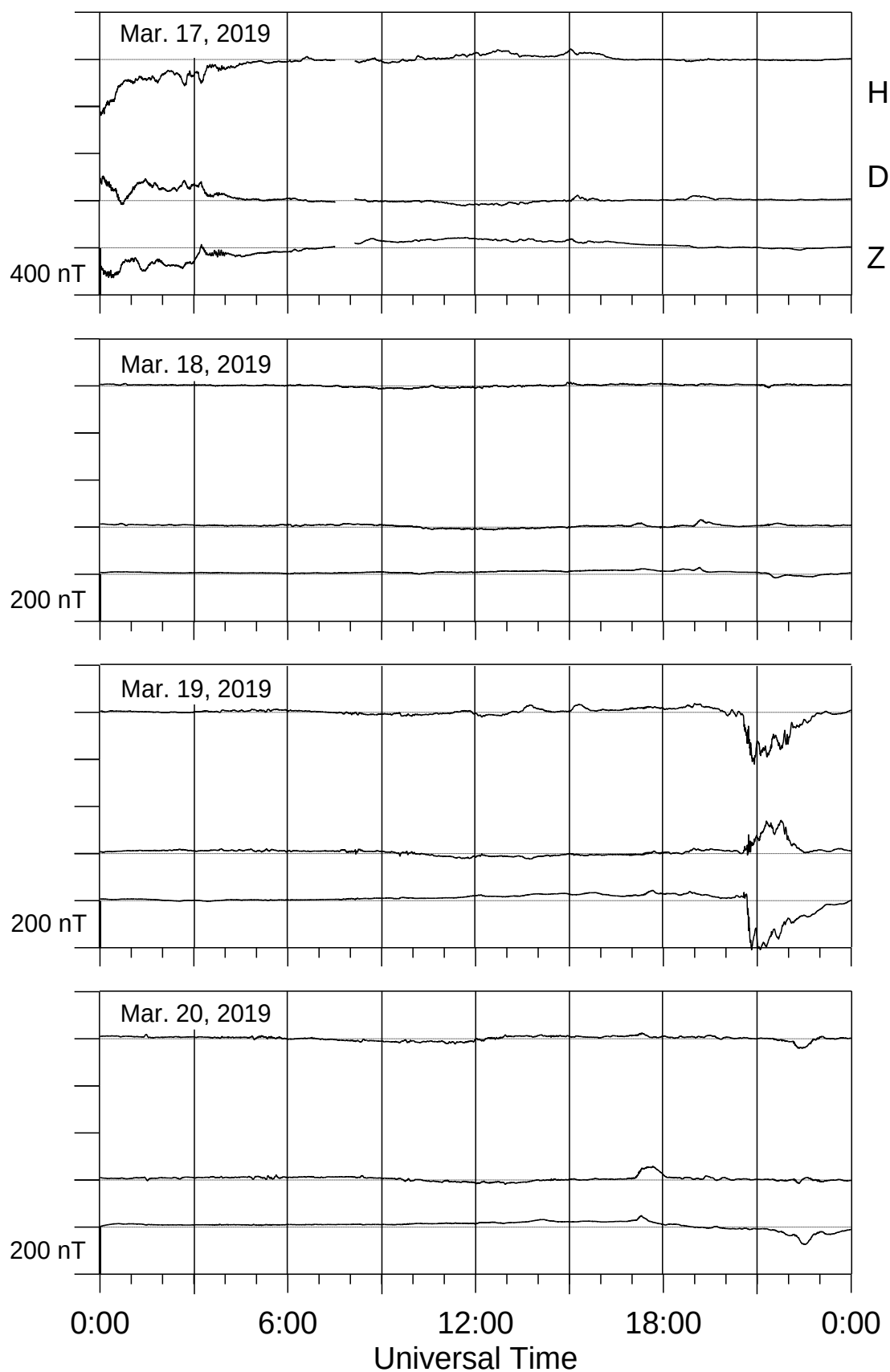
## Lovozero magnetometer



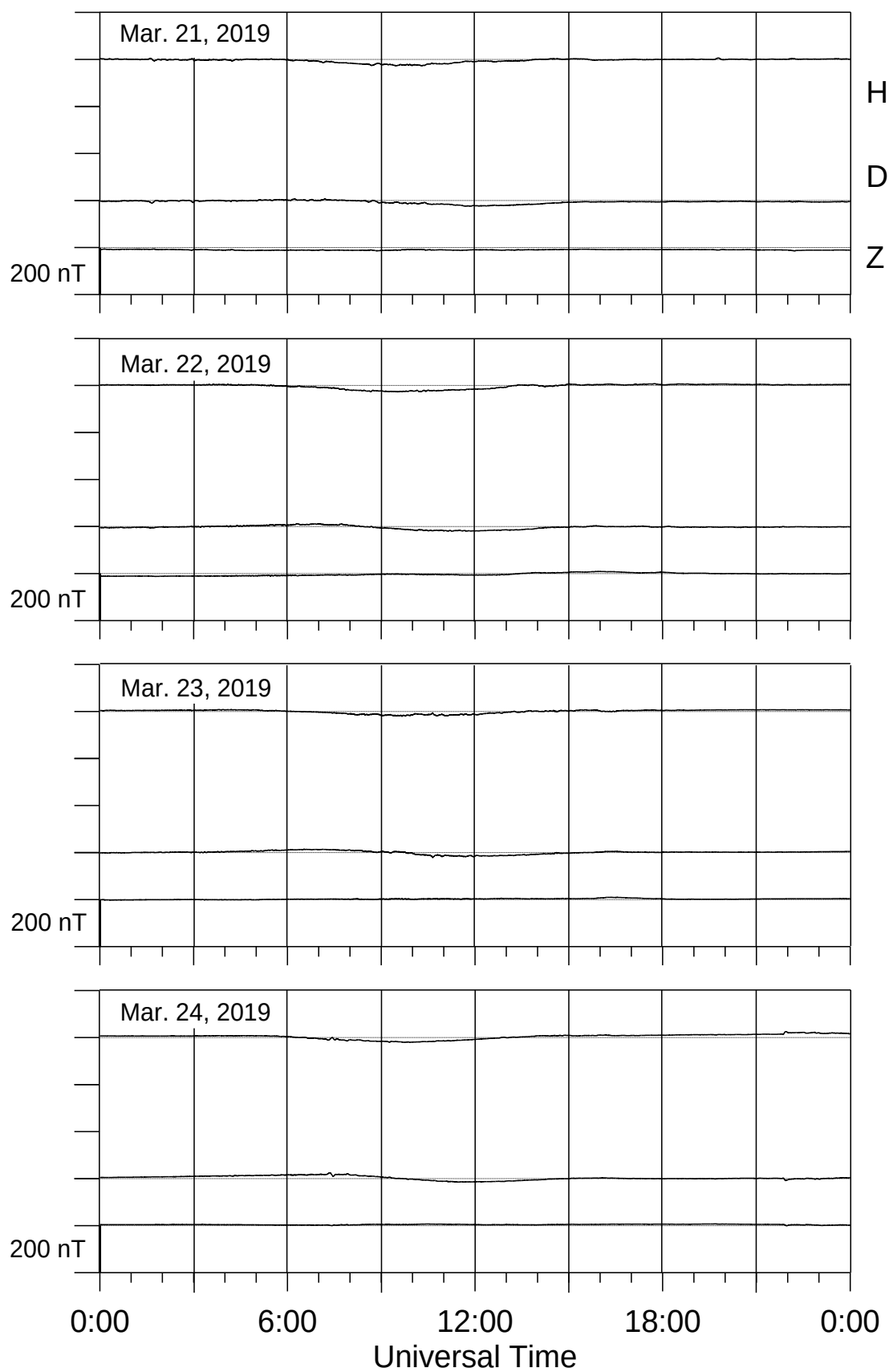
## Lovozero magnetometer



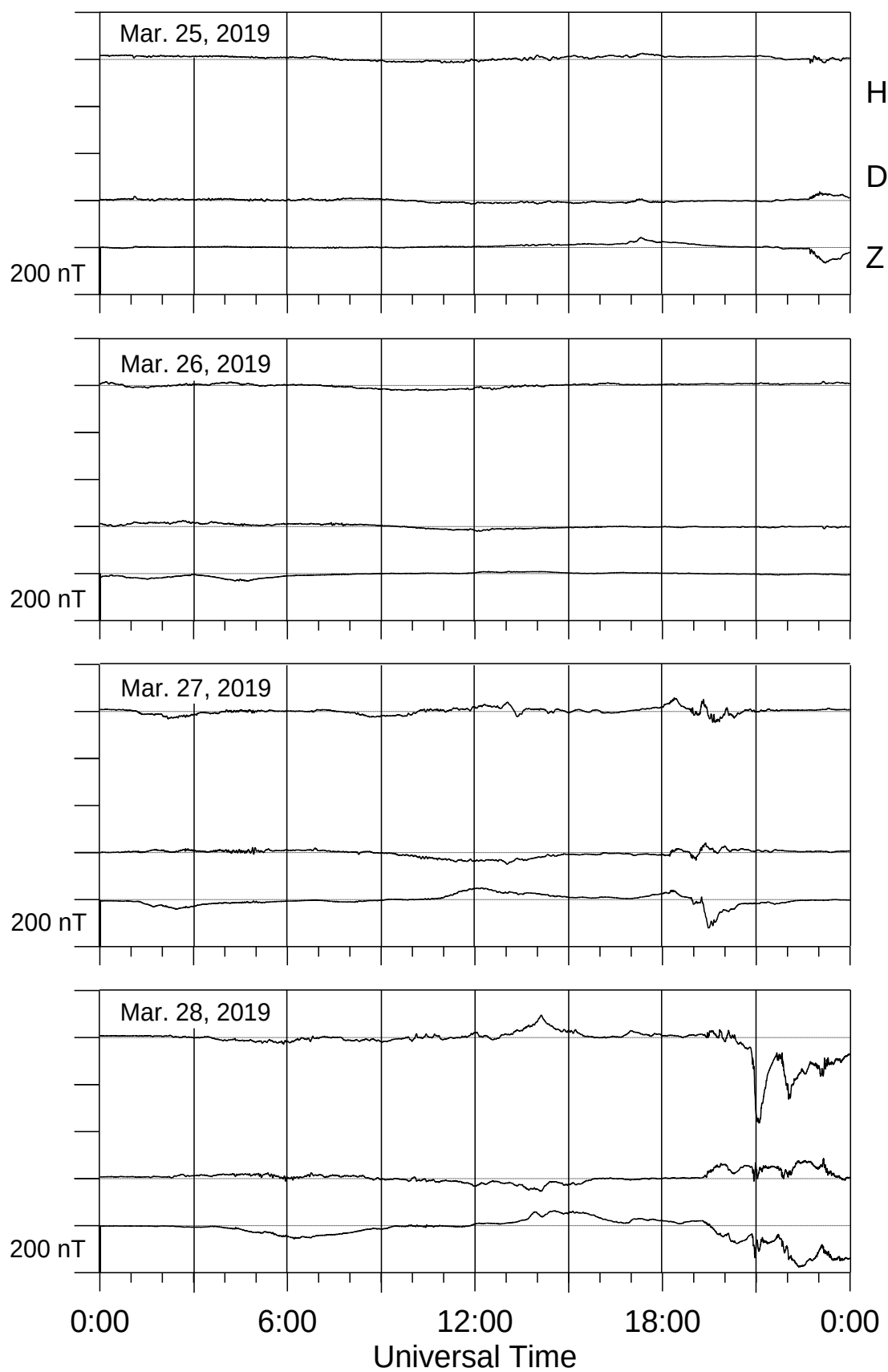
## Lovozero magnetometer



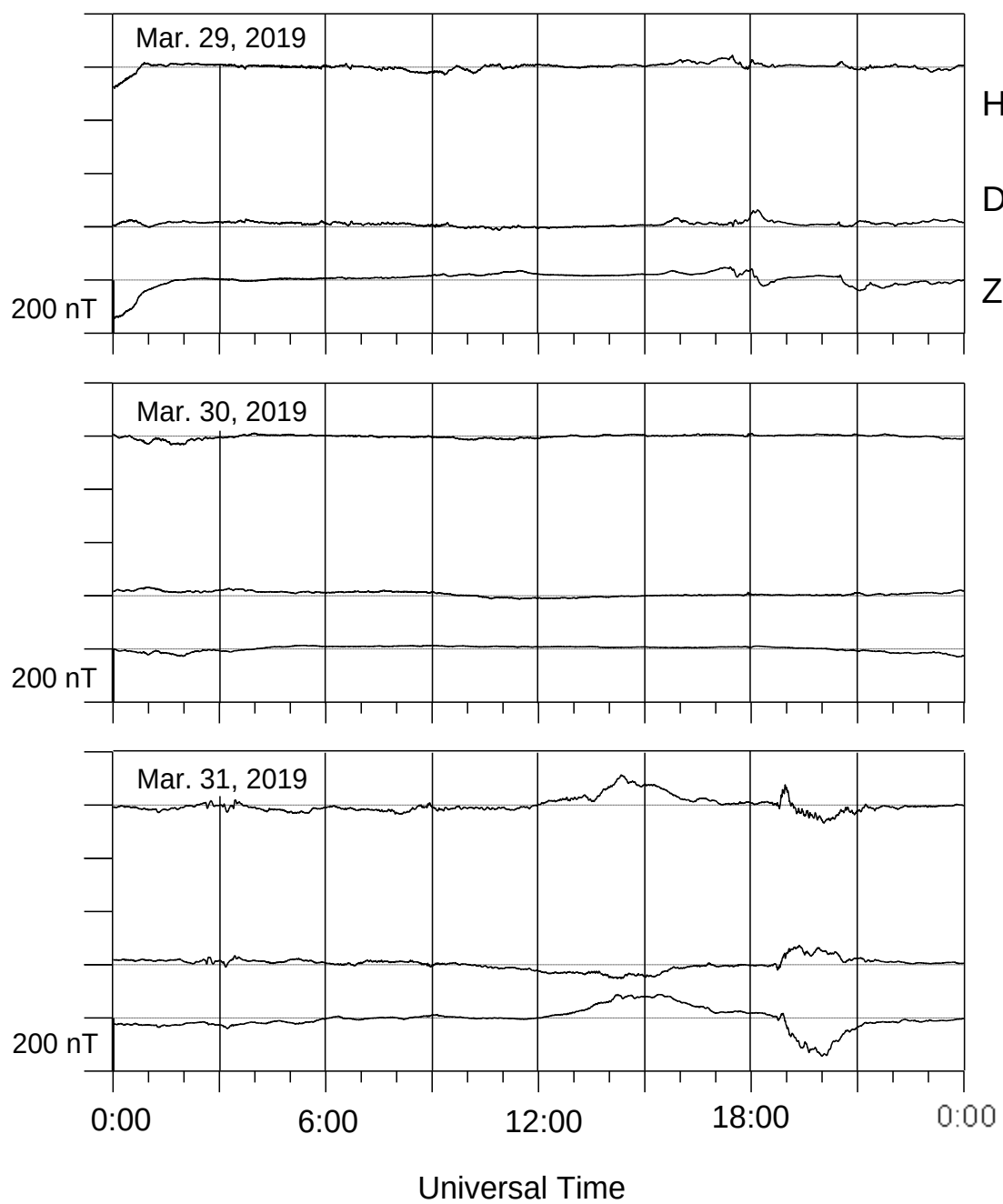
## Lovozero magnetometer



## Lovozero magnetometer



## Lovozero magnetometer

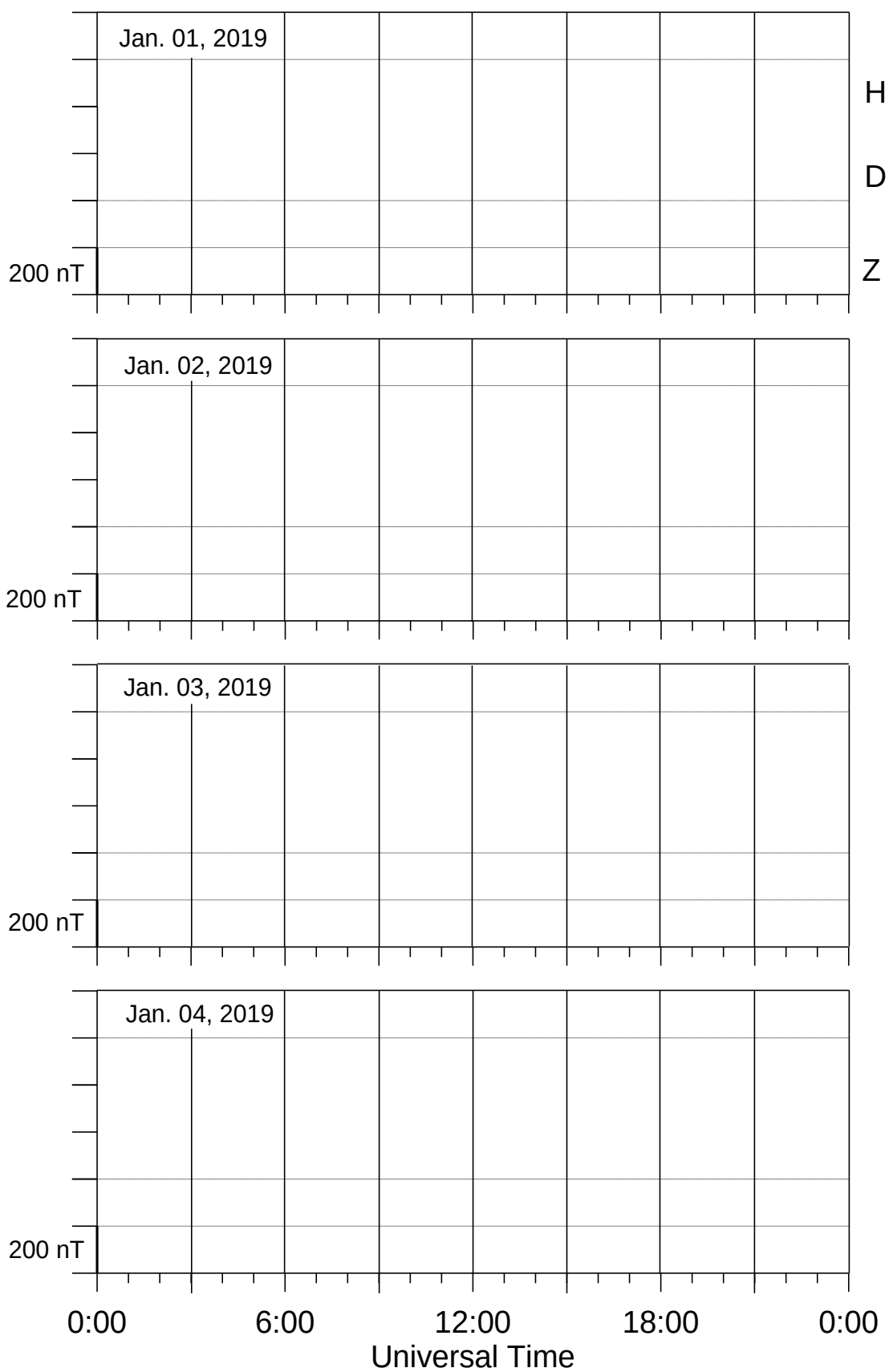




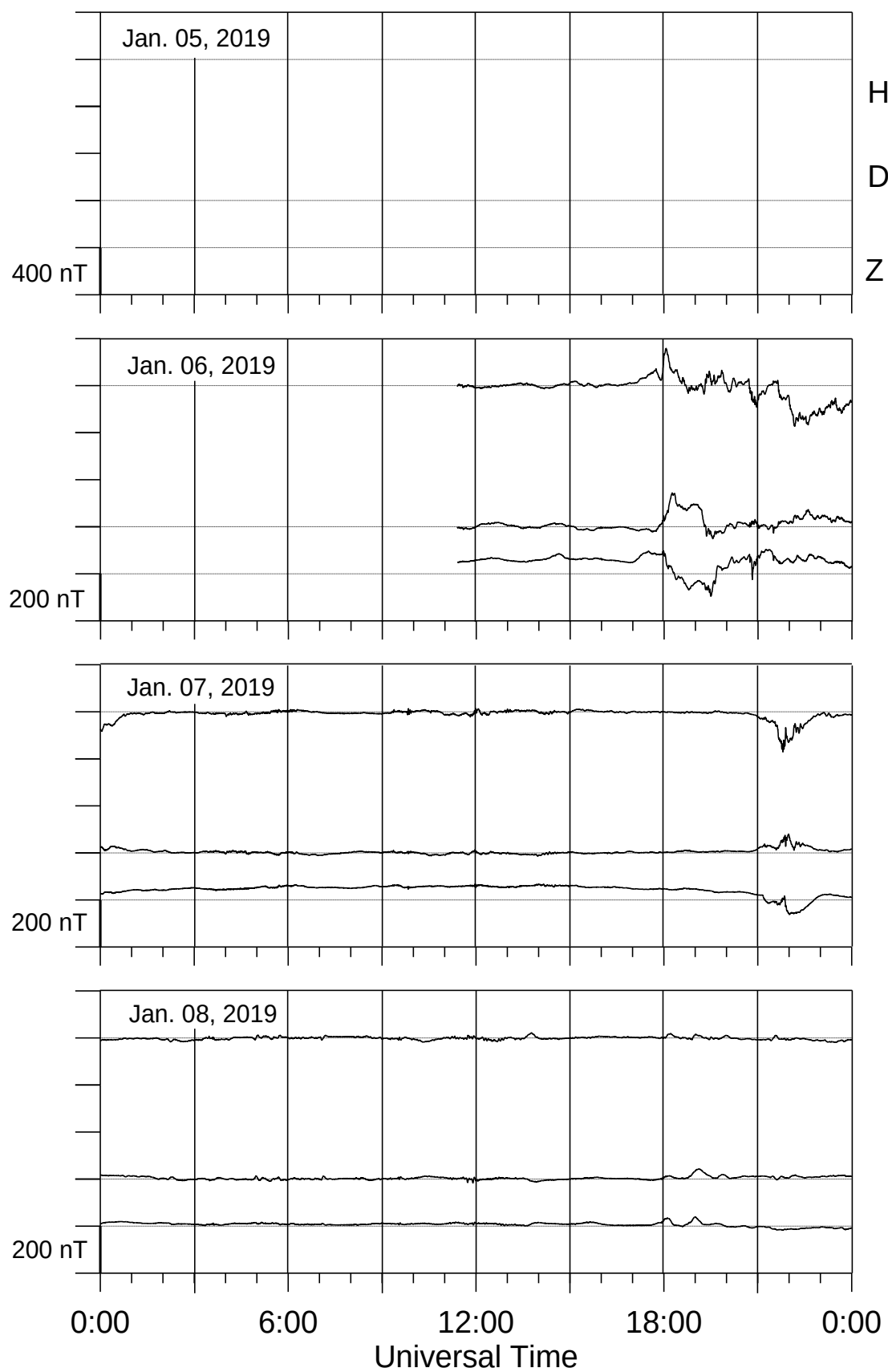
## **LOPARSKAYA MAGNETOGRAMS**

**January - March 2019**

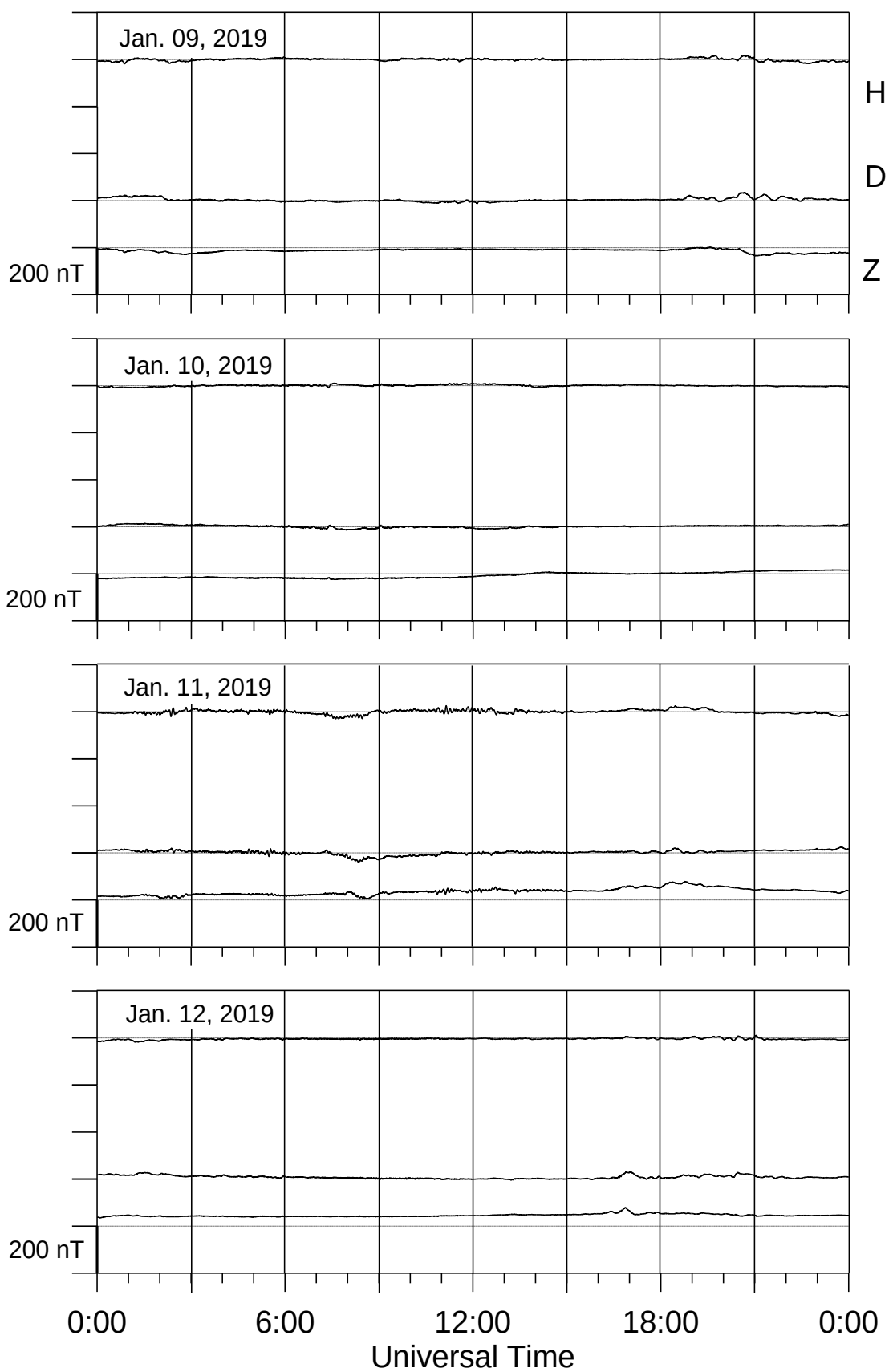
## Loparskaya magnetometer



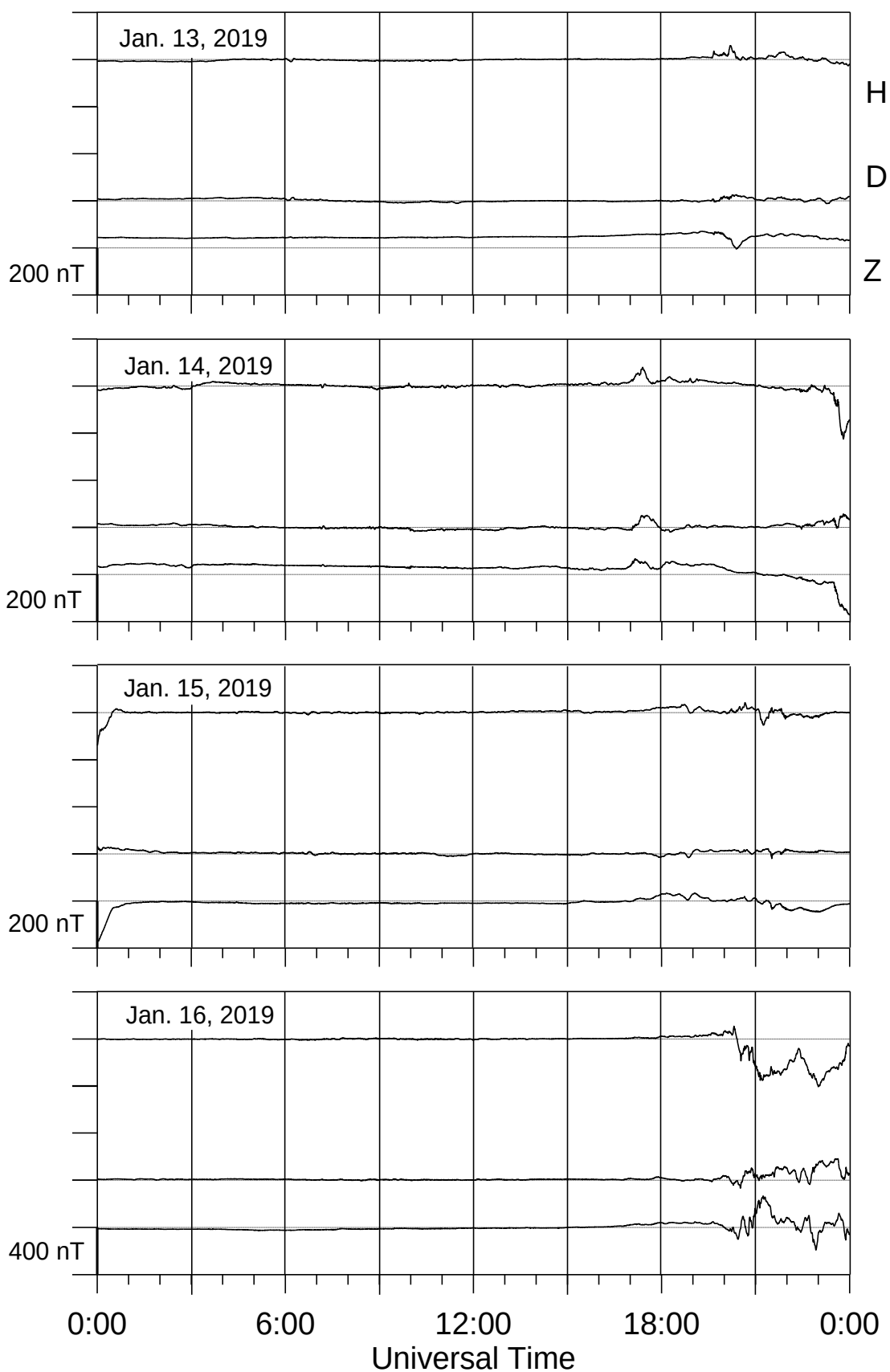
## Loparskaya magnetometer



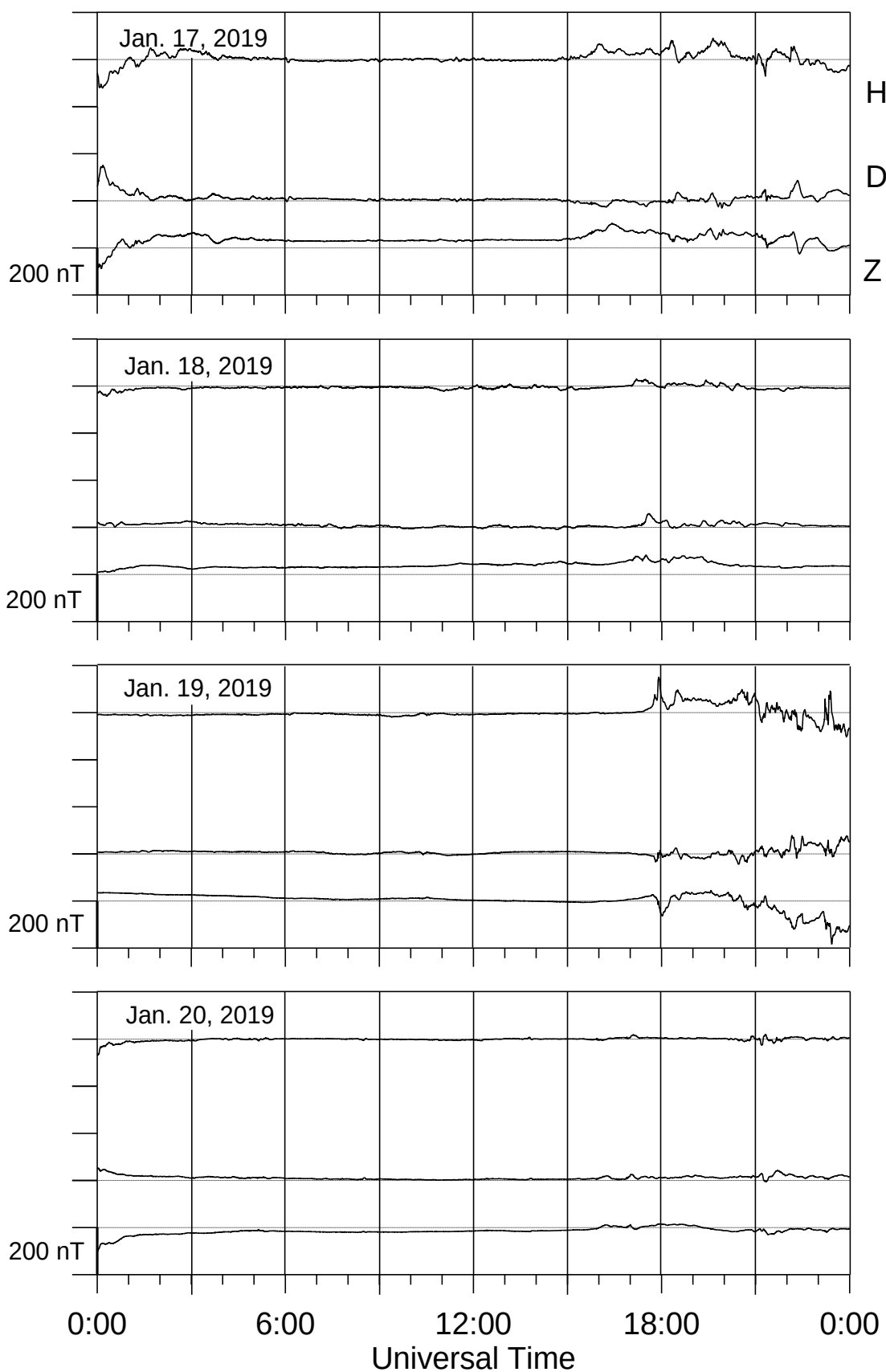
## Loparskaya magnetometer



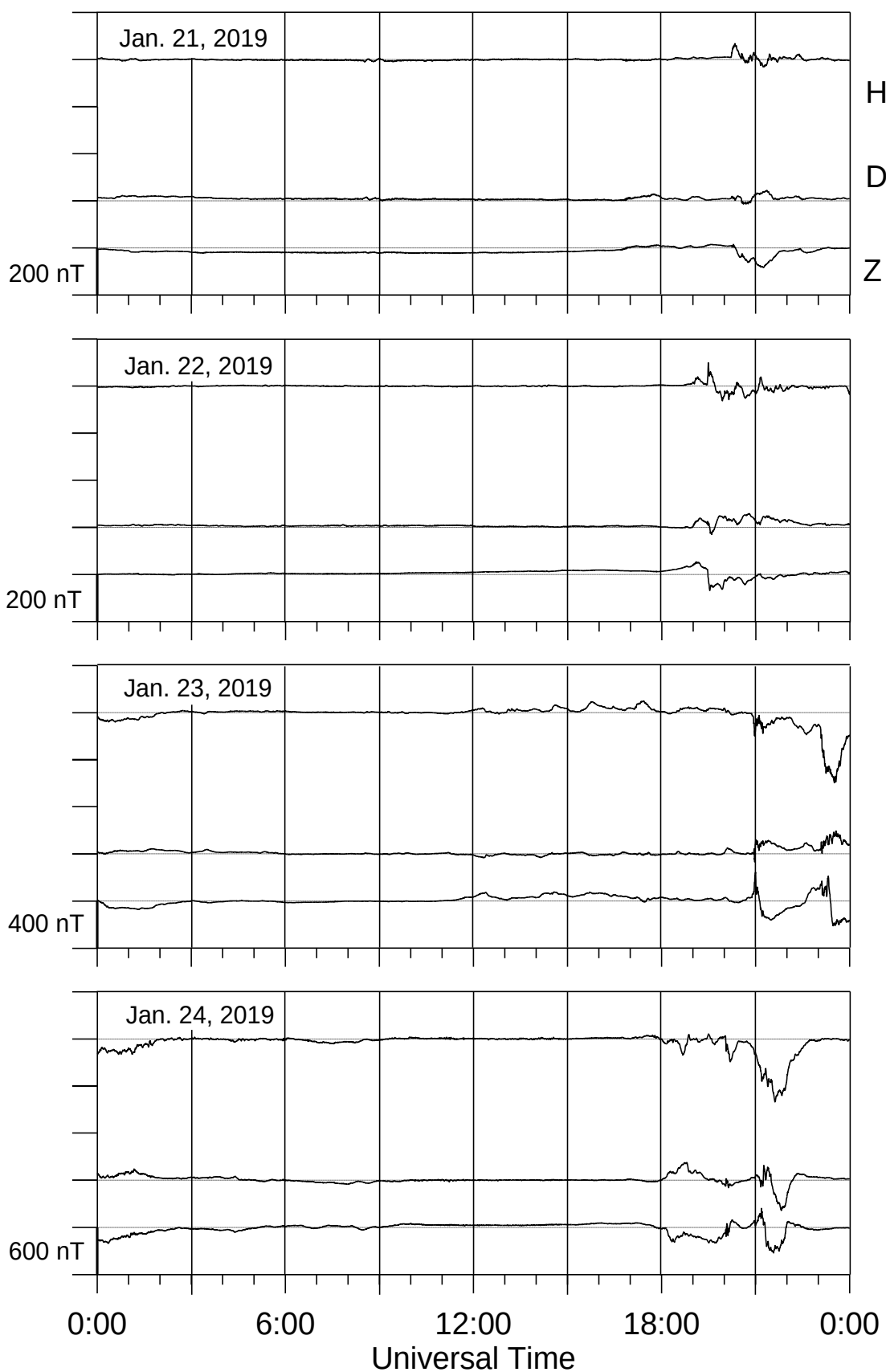
## Loparskaya magnetometer



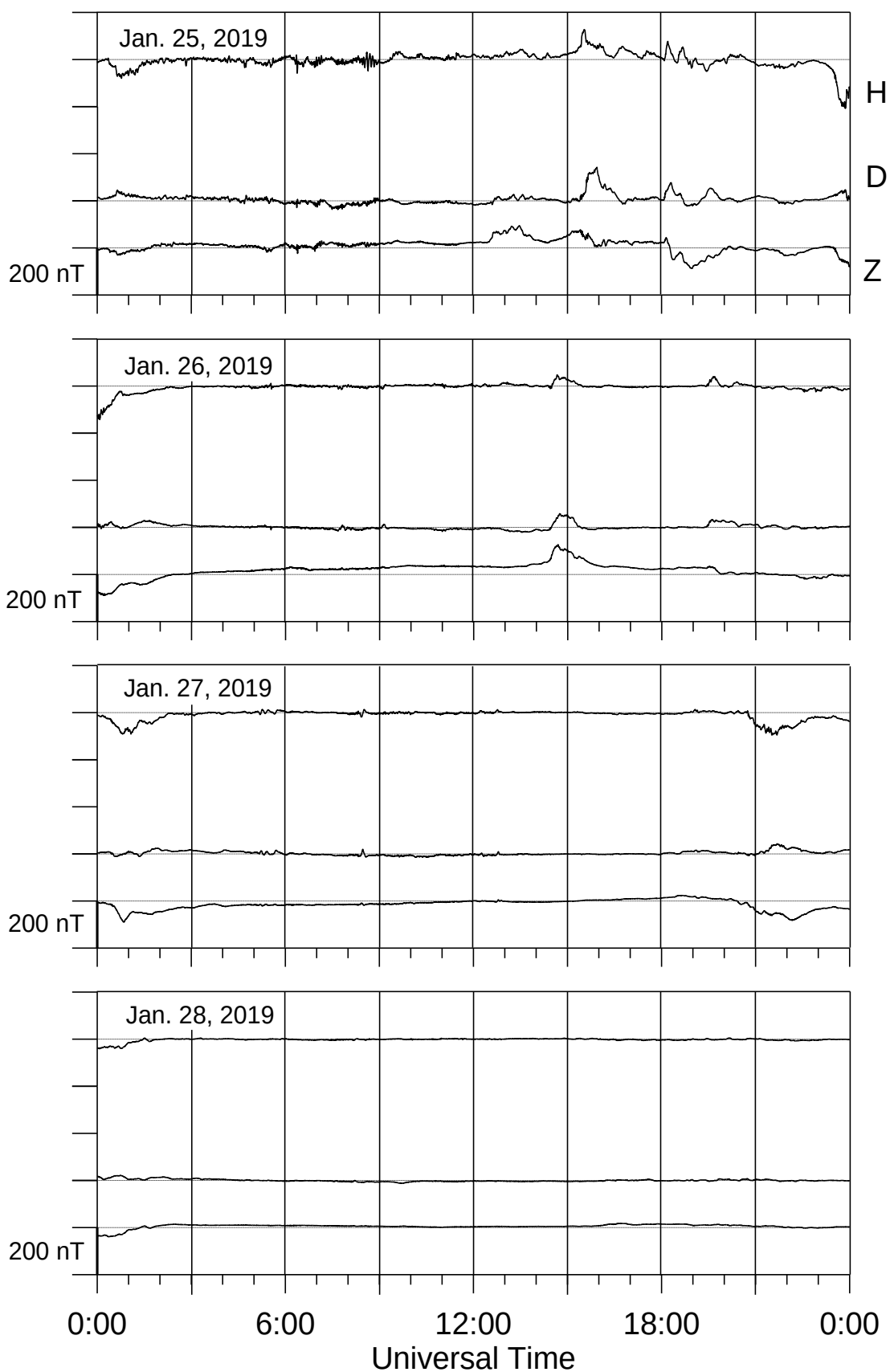
## Loparskaya magnetometer



## Loparskaya magnetometer

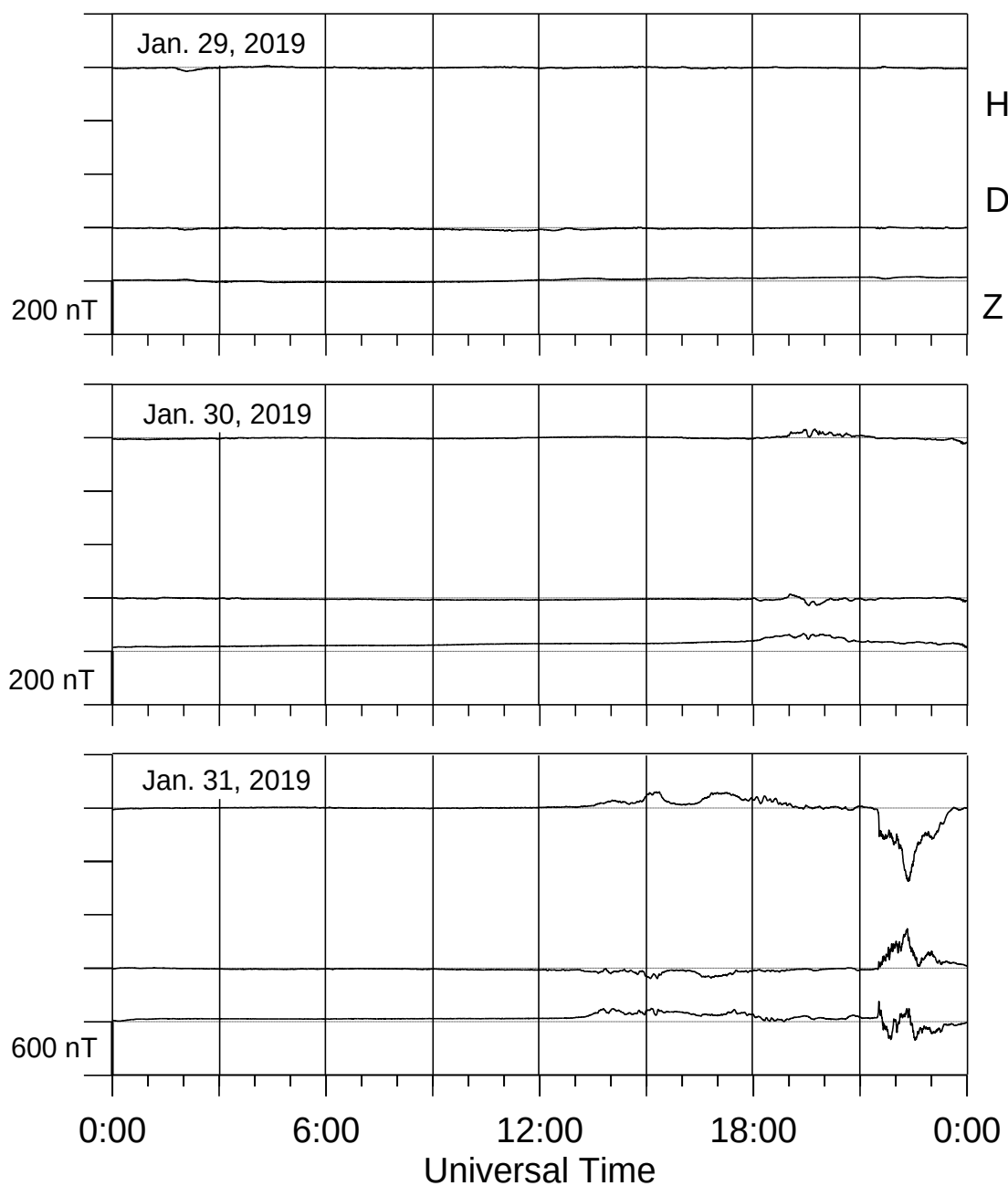


## Loparskaya magnetometer

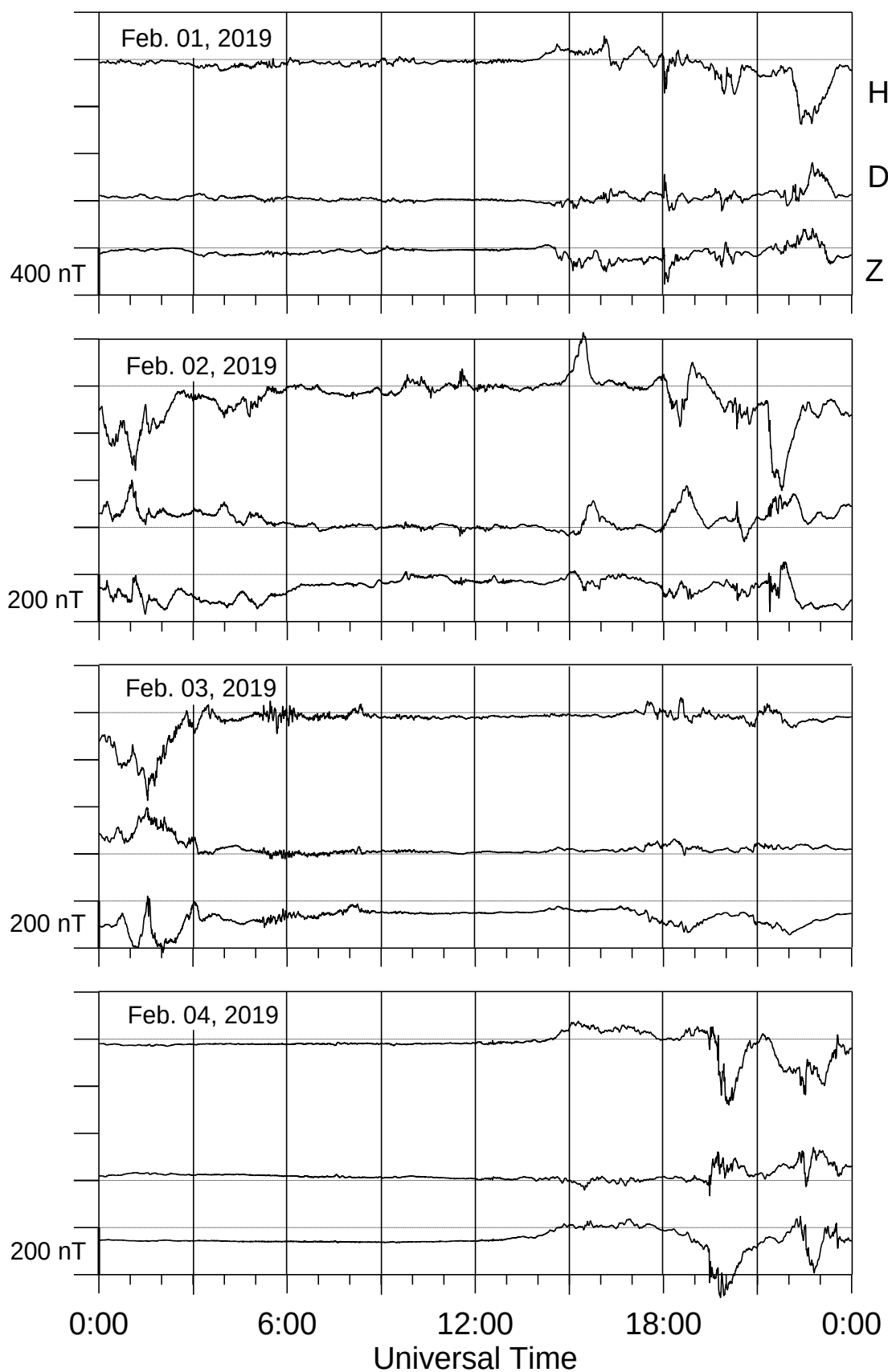




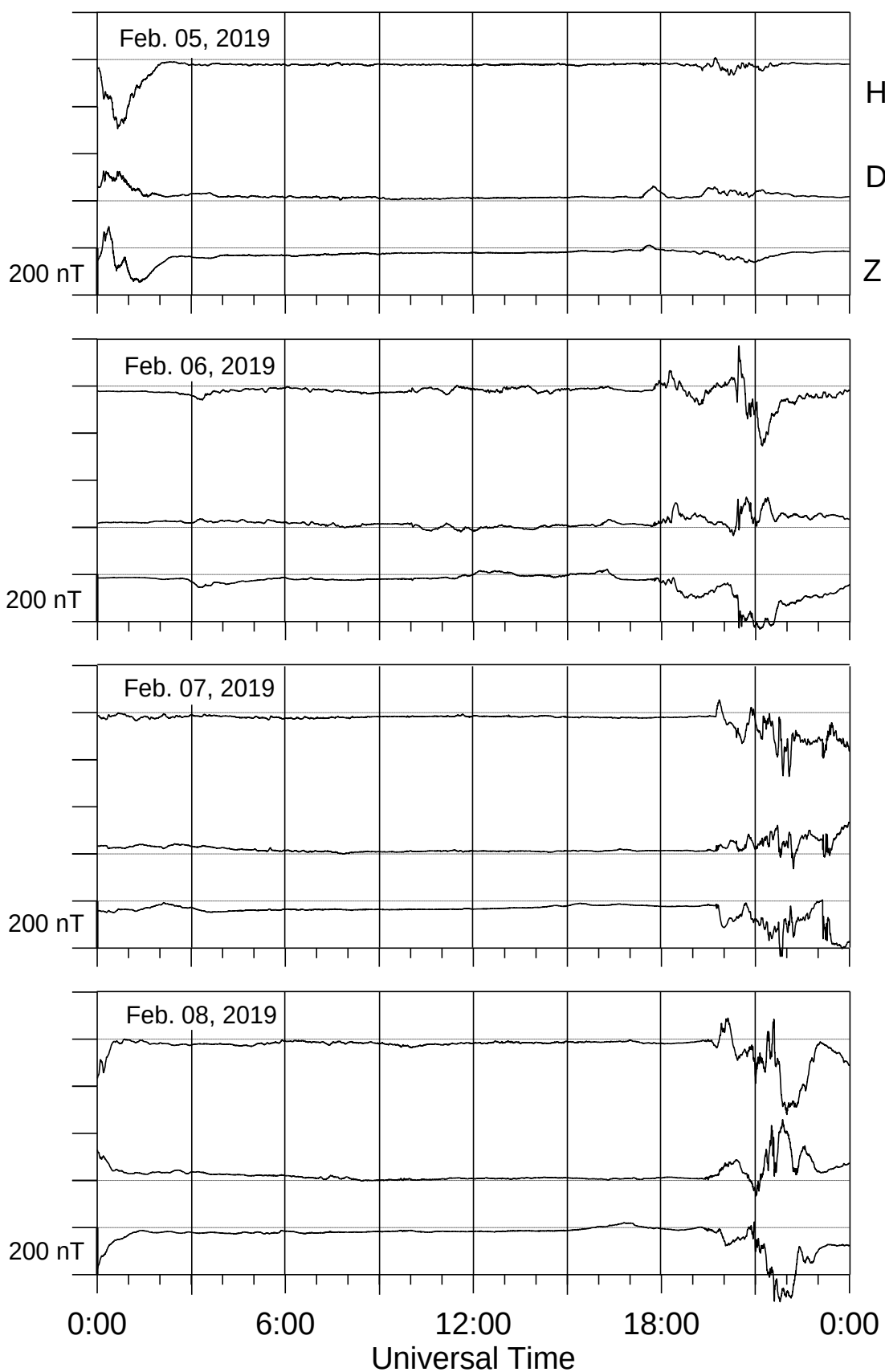
## Loparskaya magnetometer



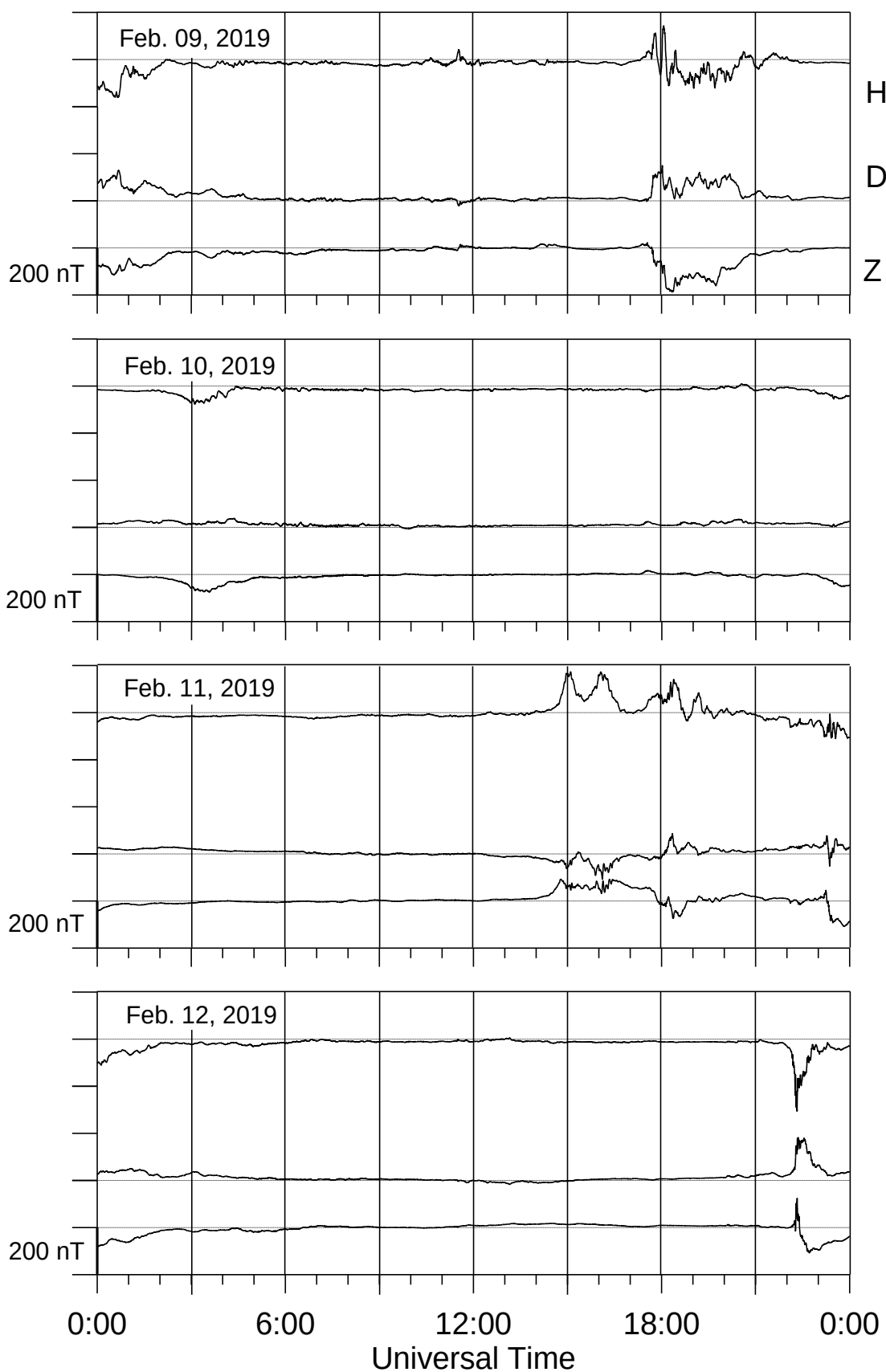
## Loparskaya magnetometer



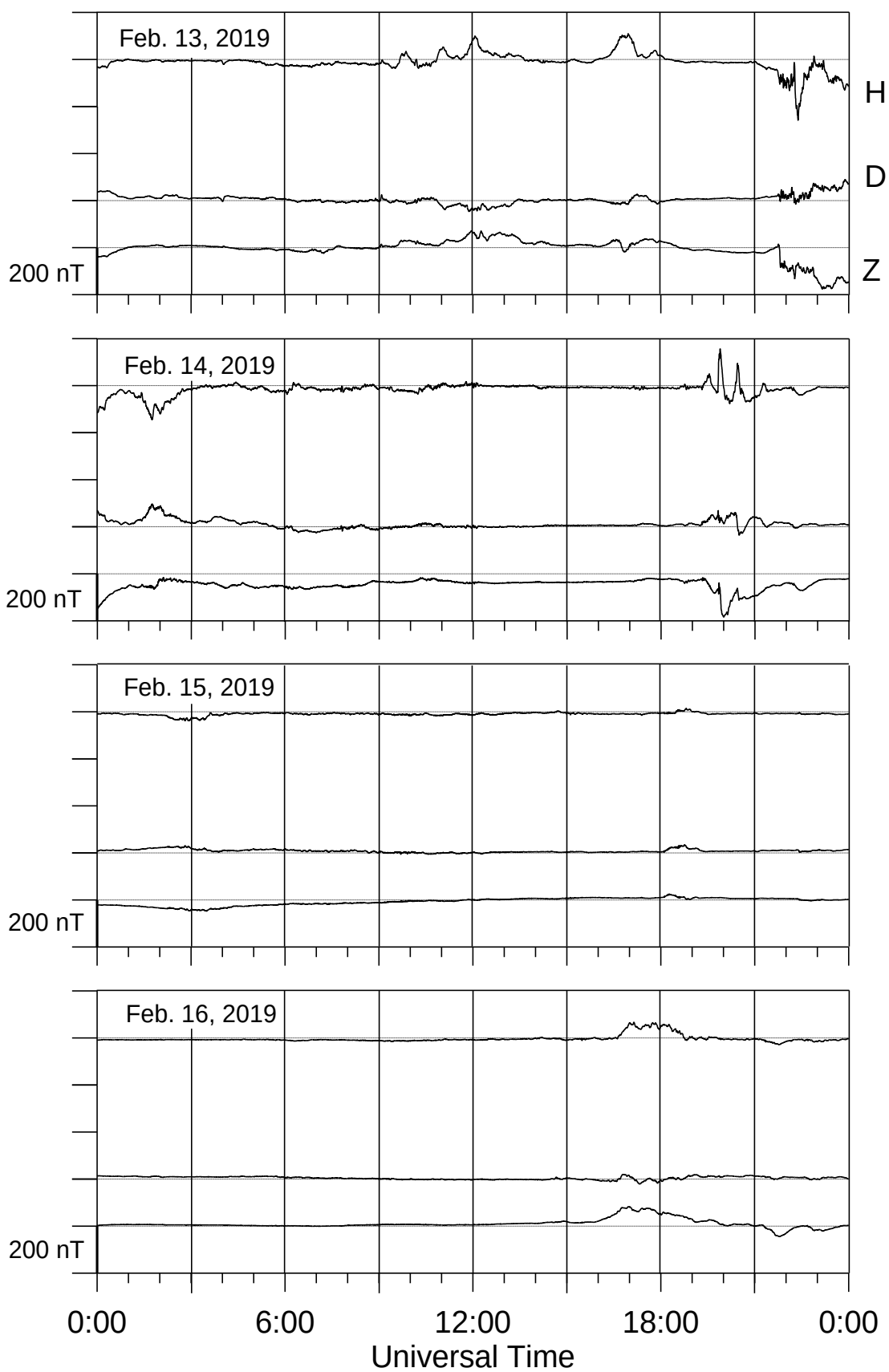
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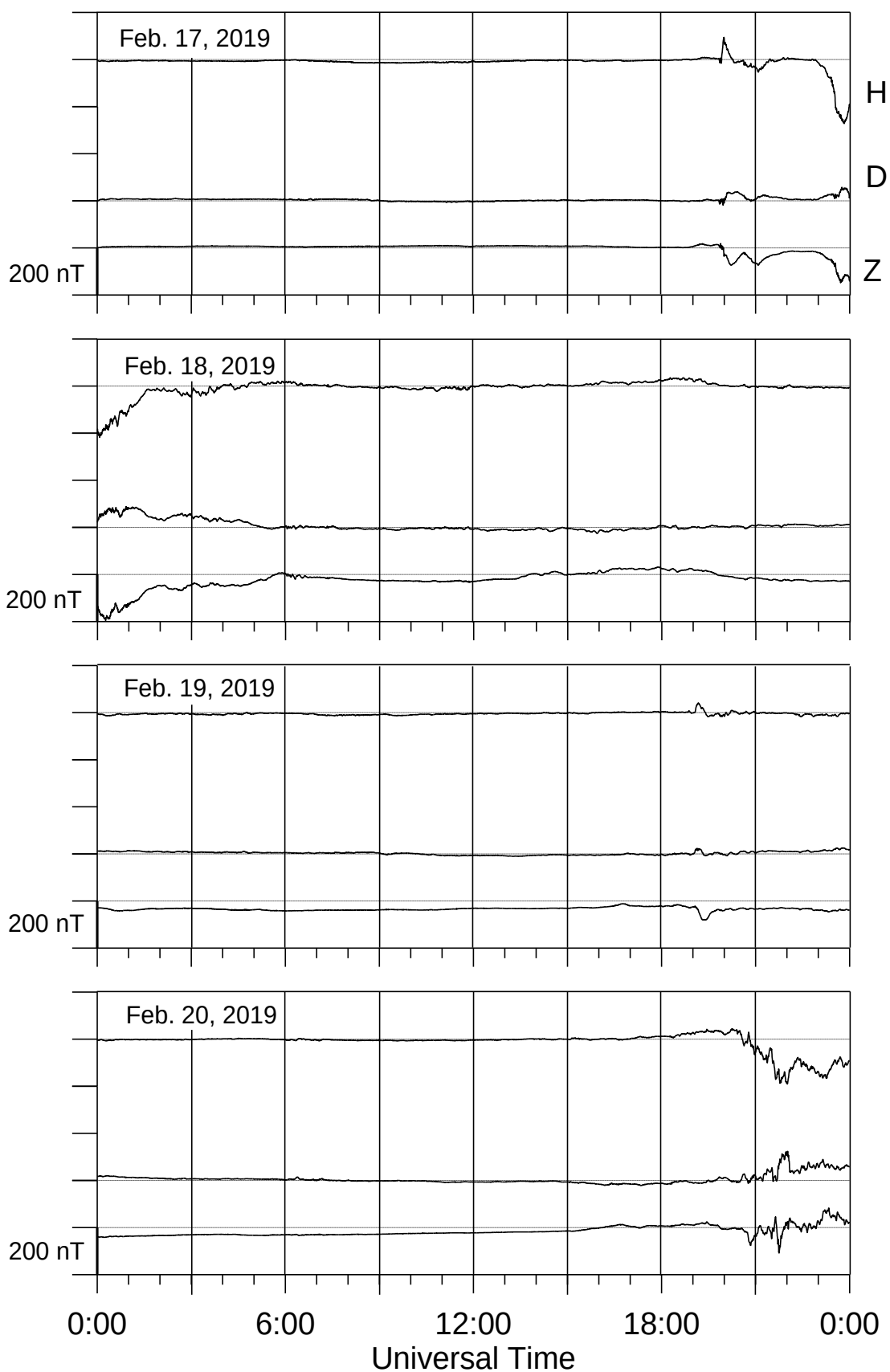
## Loparskaya magnetometer



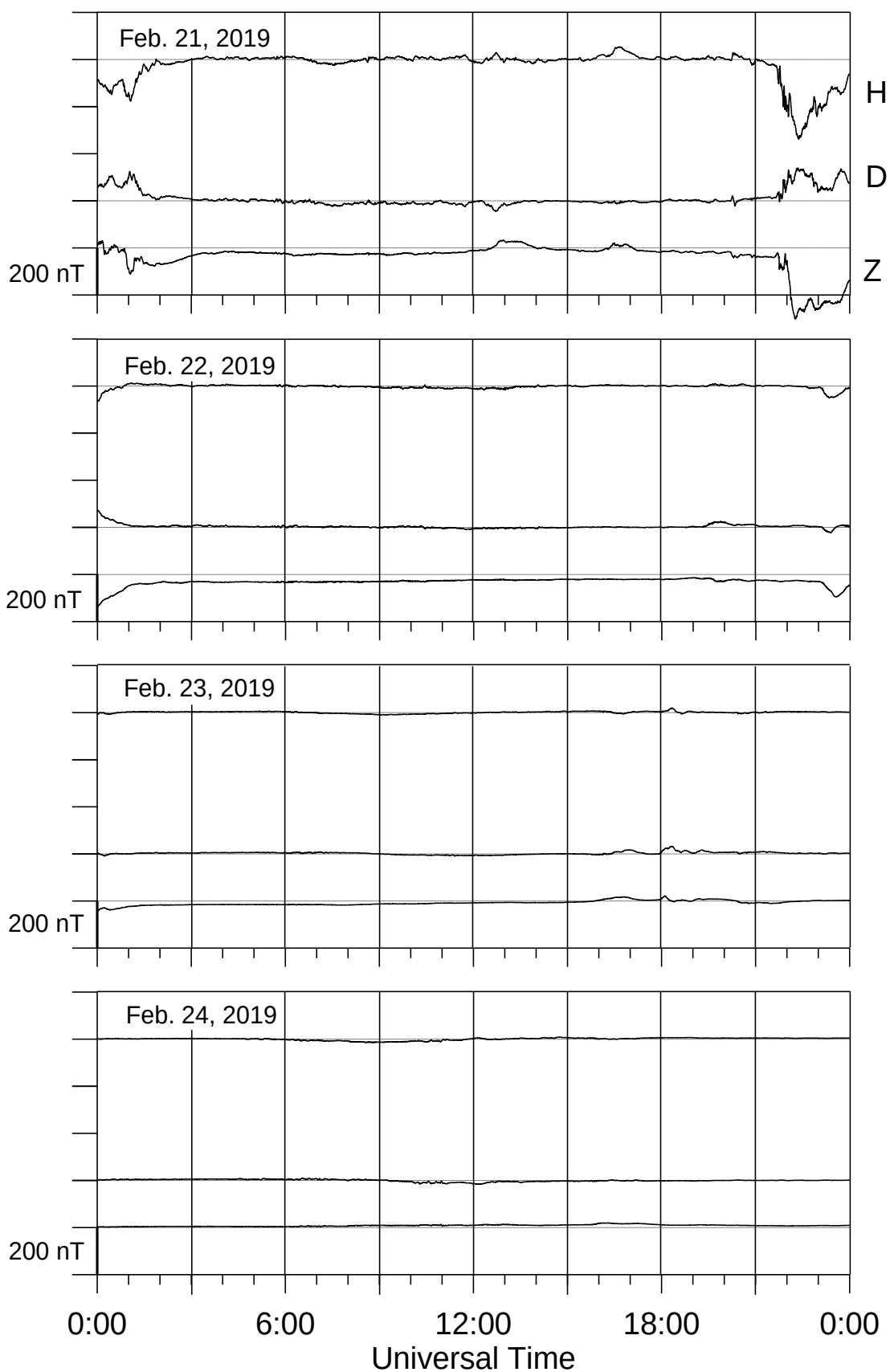
## Loparskaya magnetometer



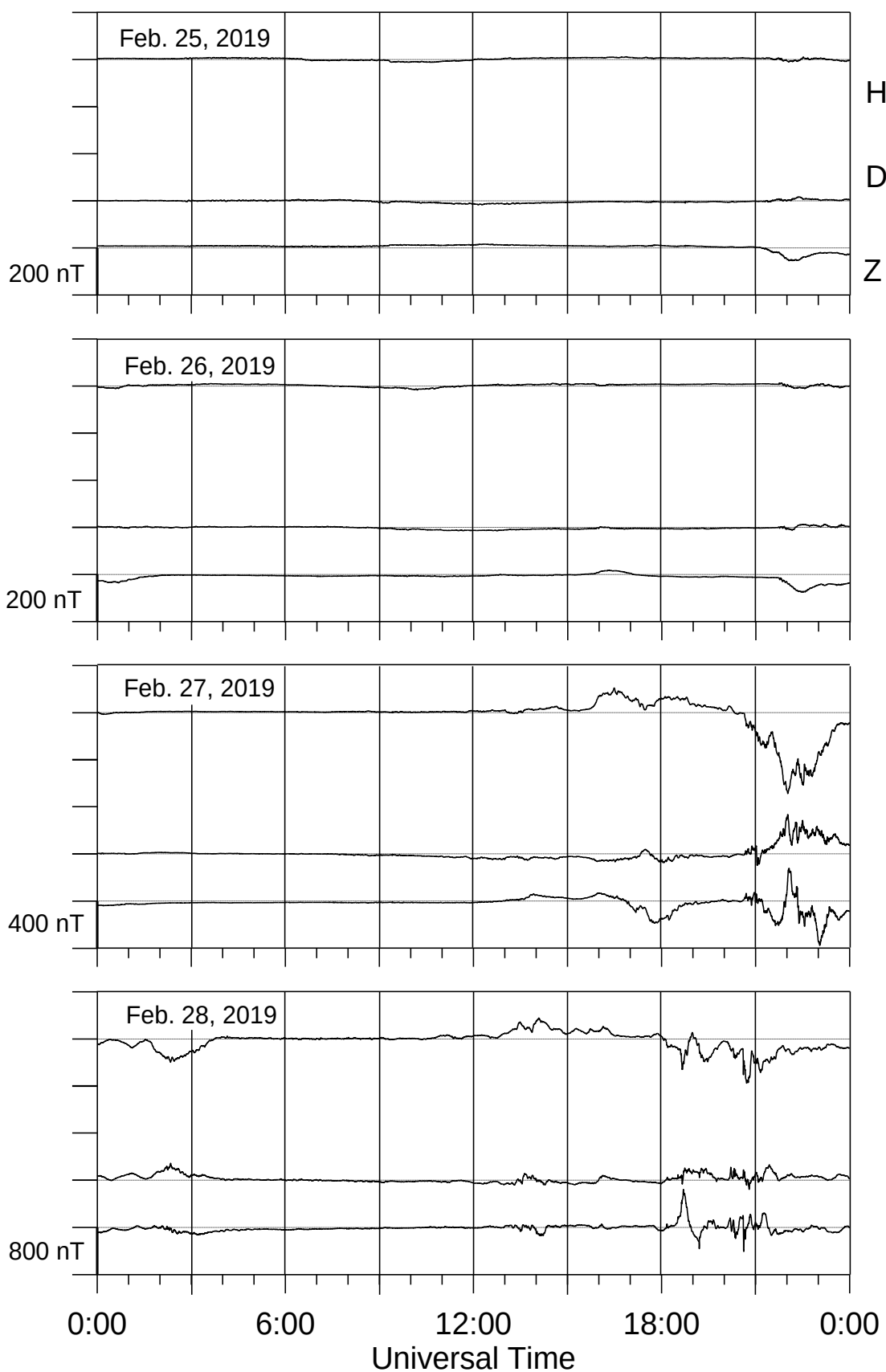
## Loparskaya magnetometer



## Loparskaya magnetometer

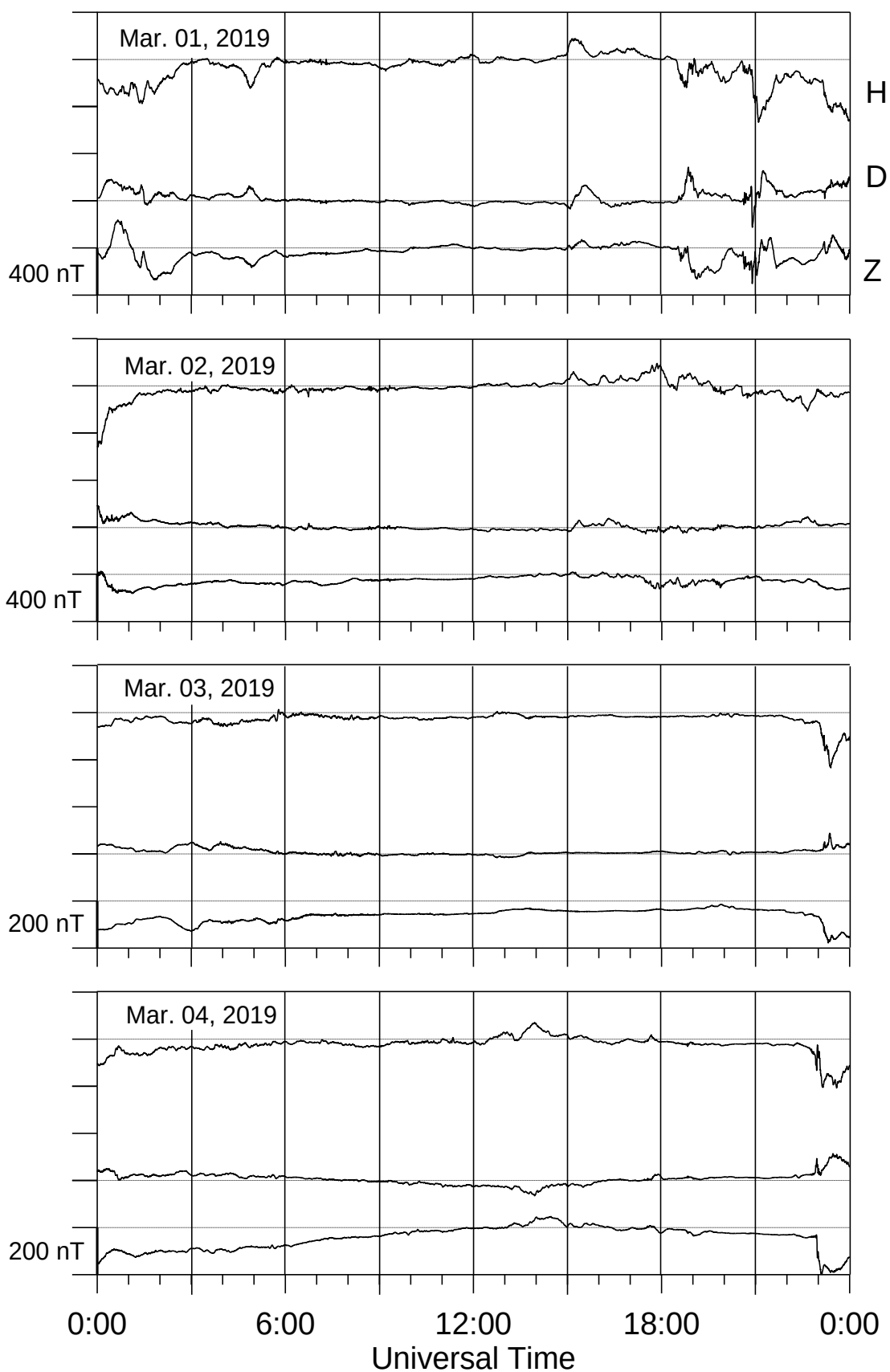


## Loparskaya magnetometer

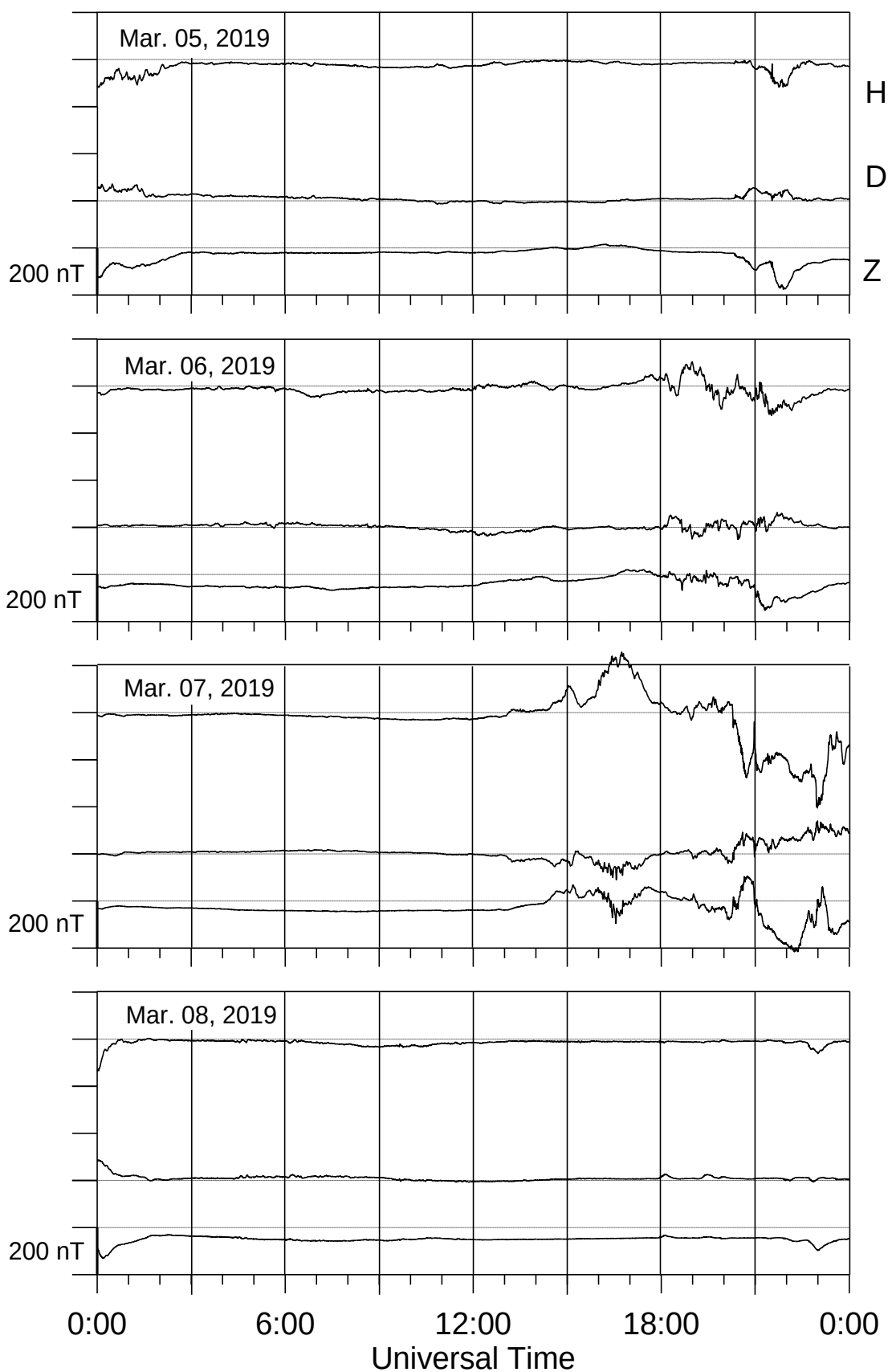




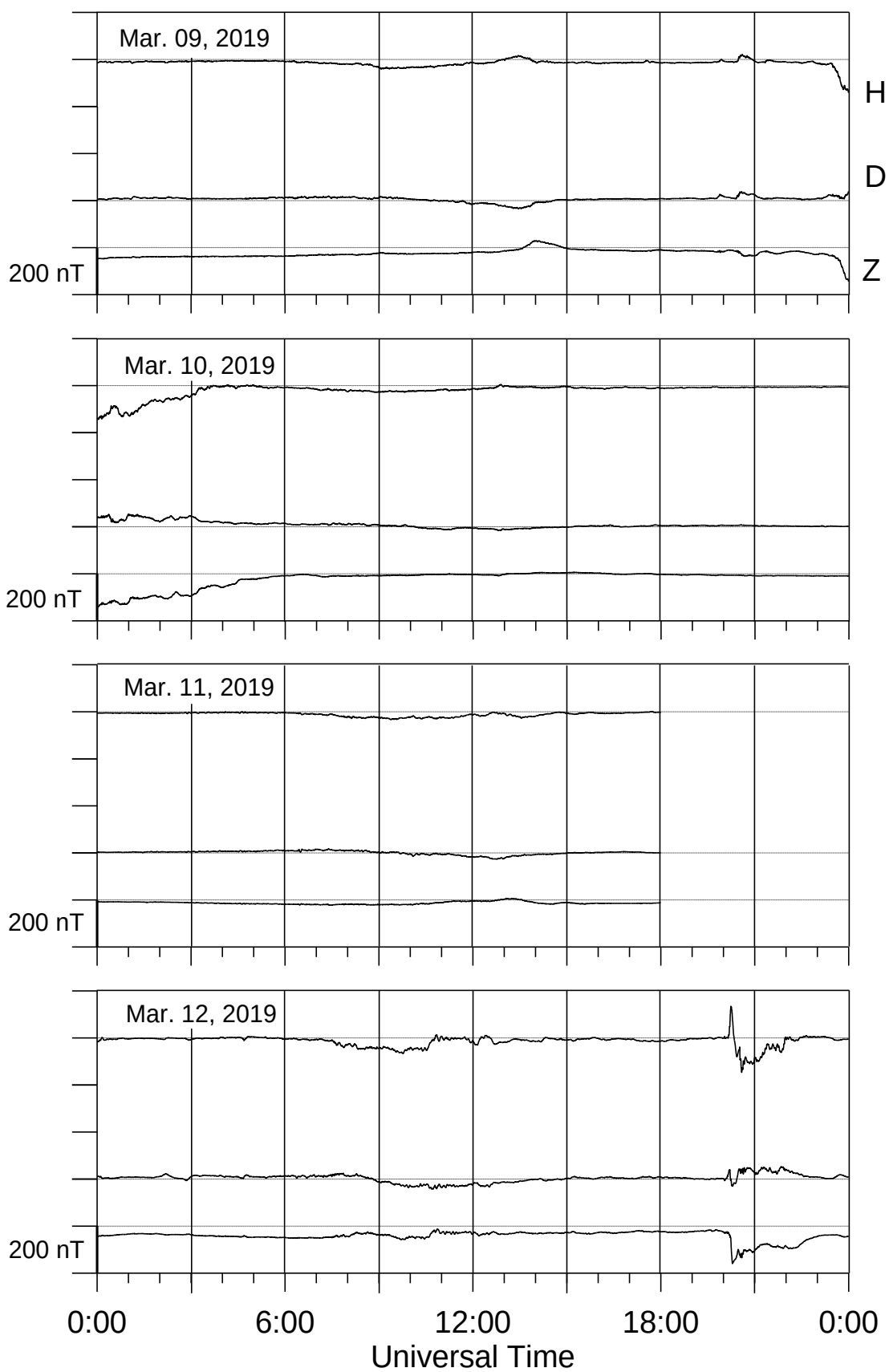
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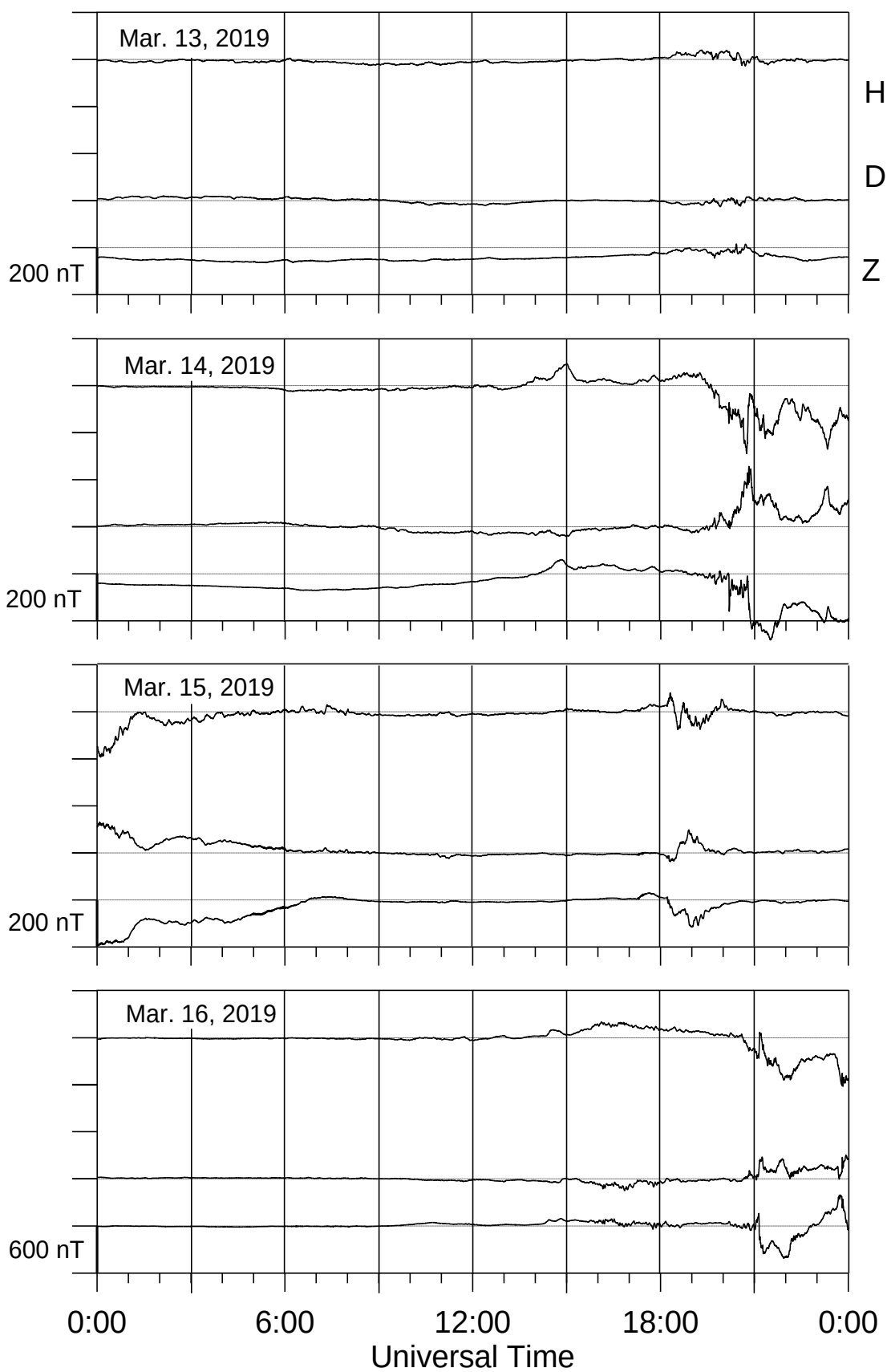
## Loparskaya magnetometer



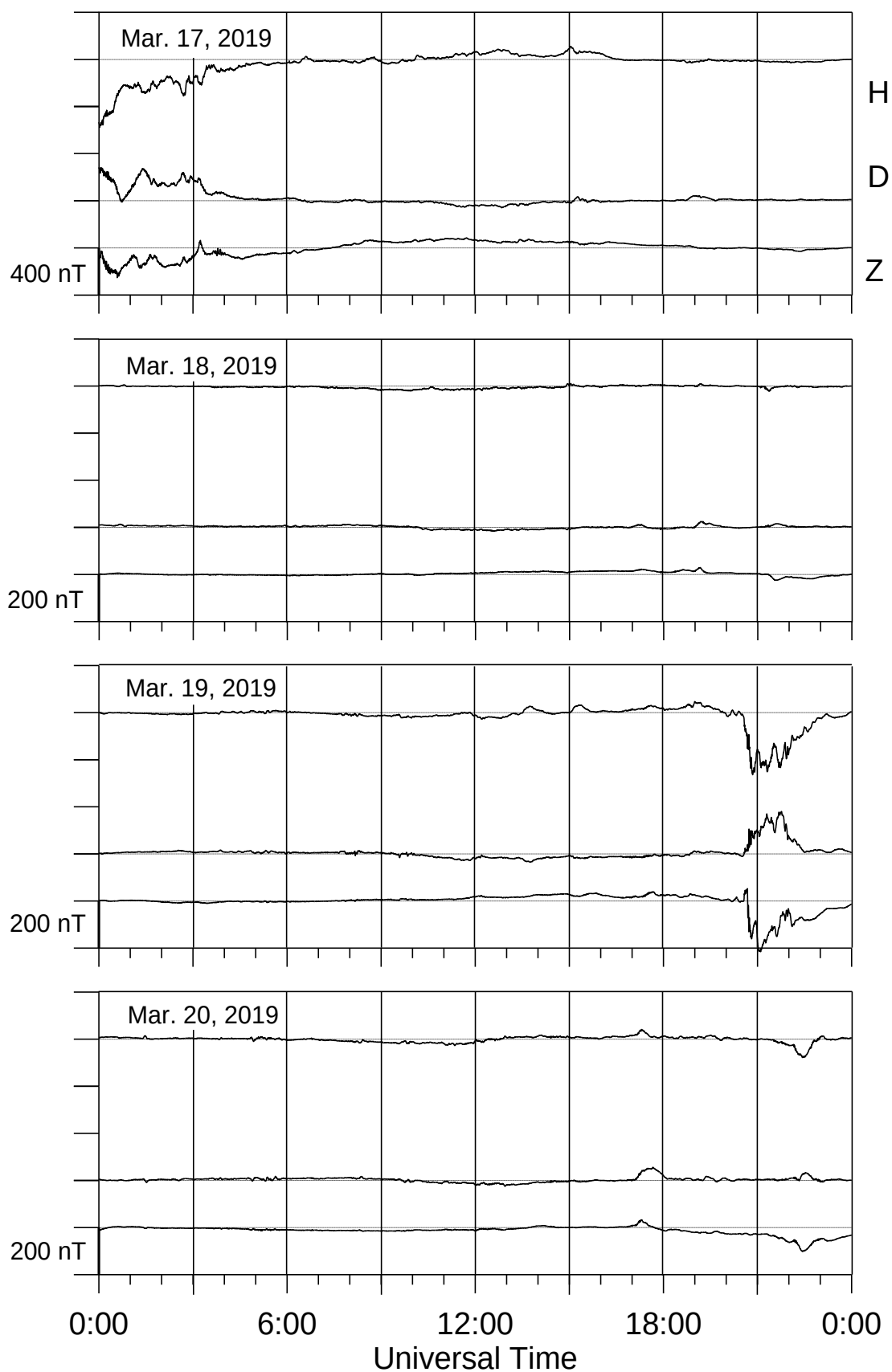
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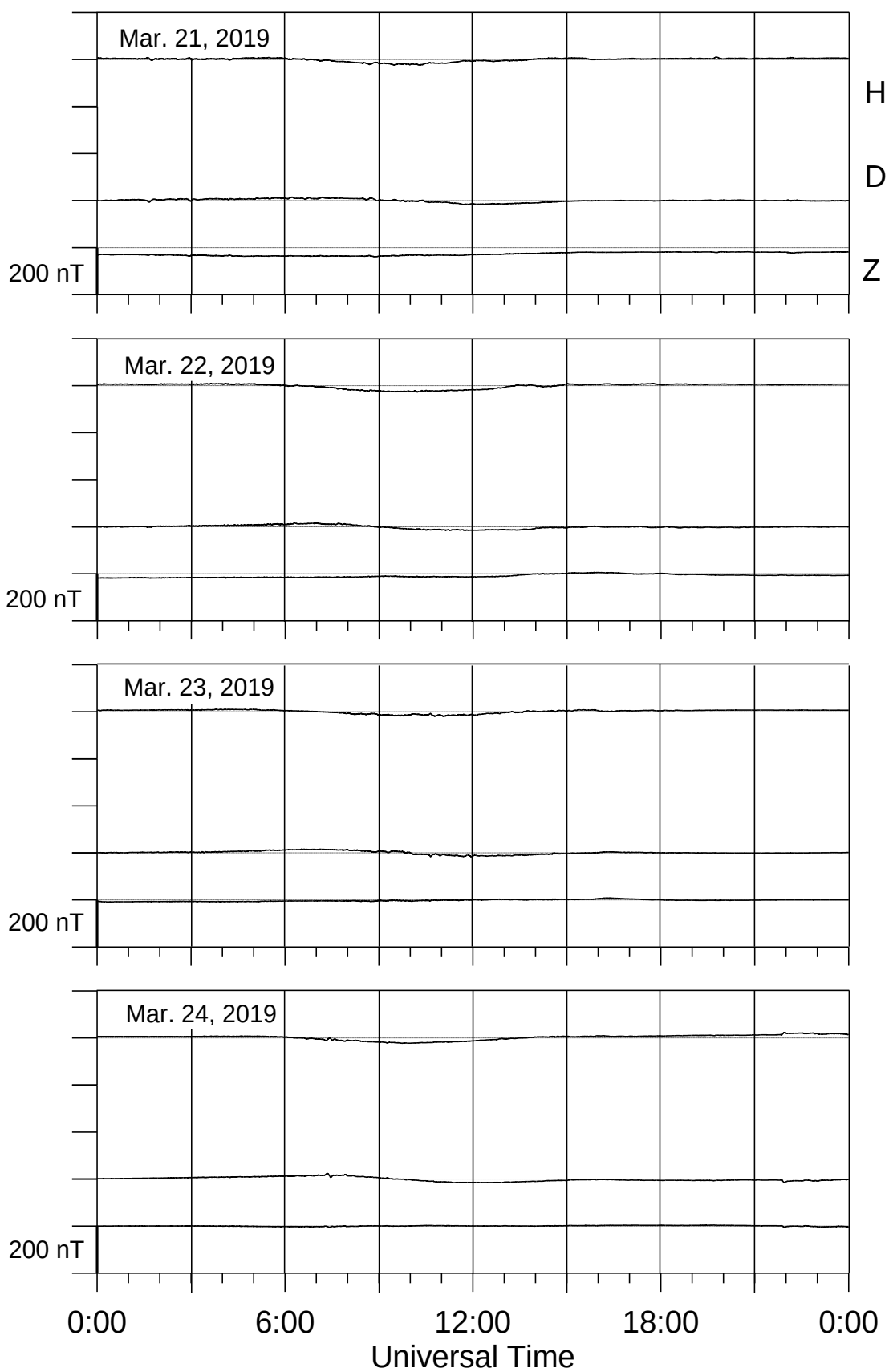
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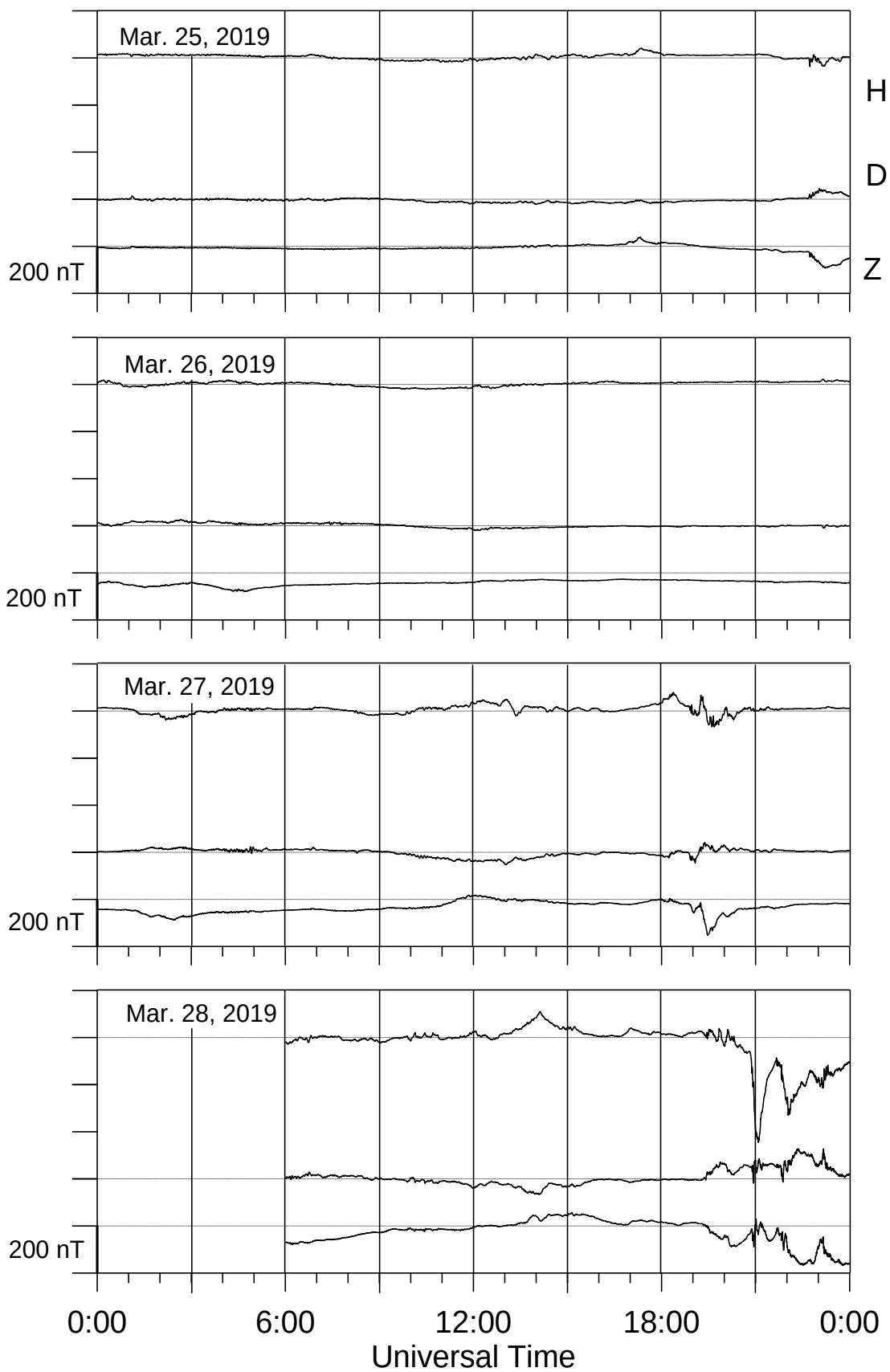
## Loparskaya magnetometer



## Loparskaya magnetometer



## Loparskaya magnetometer



## Loparskaya magnetometer

