

UPPER ATMOSPHERE PHYSICS DATA,
SYOWA STATION, 1983

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1. Introduction

This data book summarizes upper atmosphere physics data measured by the "Upper Atmosphere Physics" monitoring system at Syowa Station in 1983. The items of data are as follows.

- 1) Geomagnetism: H, D and Z components of magnetic variation
Total force of geomagnetic field
K-index
H, D and Z components of magnetic pulsation
- 2) ELF-VLF wave: Intensities at 0.35, 0.75, 1.2, 2, 4, 8,
30, 60 and 95 kHz
Wide-band spectrum in the frequency range
less than 15 kHz
- 3) Ionosphere: Cosmic noise absorption at 30 MHz
- 4) Optical aurora: Auroral intensity of N_2^+ 4278 Å at
three zenith angles (72° poleward, zenith
and 45° equatorward)
Meridian scanning record of OI 5577 Å and
H β 4861 Å

The UAP (Upper Atmosphere Physics) monitoring system was installed at Syowa Station in January 1981. An outline of the system is given in Section 2. Section 3 presents specifications of the data acquisition system. Some examples of computer plots were already reported by Sato et al. (1984) and Fujii et al. (1985). The recording periods are also listed in Section 3 for each of digital and analogue tapes. The format of the compiled digital data is given in Section 4. Magnetograms in the period of January 1 - December 31, 1983 are given in the appendix.

Digital tapes of the magnetograms are available to users on request. The request should be addressed to:

World Data Center C2 for Aurora
National Institute of Polar Research
9-10, Kaga 1-chome,
Itabashi-ku, Tokyo 173, Japan

Digital and analogue data of other items are available to scientists who want joint study with us. The request should be addressed to:

Upper Atmosphere Research Division
National Institute of Polar Research
9-10, Kaga 1-chome,
Itabashi-ku, Tokyo 173, Japan

2. UAP Monitoring System

For the last fifteen years upper atmosphere phenomena such as geomagnetic variations, ELF-VLF emissions, cosmic noise

absorption, and optical auroras were observed by individual equipment and they were recorded on films, chart papers and analogue magnetic tapes. Therefore, when we use these data for computer analysis, we have to convert them into digital data through complicated procedures. The best way to save these procedures is a systematic measurement of upper atmosphere phenomena and a digital recording on computer compatible tape in real time. Thus we developed a new system which comprises various kinds of sensors and data acquisition facilities. This system is called the Upper Atmosphere Physics (UAP) monitoring system. The system was constructed at Syowa Station in January 1981.

As shown in Fig. 1, this system comprises sensors and data acquisition facilities. The sensors for measuring weak natural electromagnetic waves such as ELF-VLF emissions, ULF magnetic pulsations and cosmic radio noise are set up at a remote station located about 5 km apart from Syowa Station in order to avoid interferences due to man-made electromagnetic noise. The sensors of fluxgate and proton magnetometers are set up about 150 m apart from the data processing building. The sensors of meridian scanning photometer and three-direction photometer are set up on the roof of the data processing building.

The data acquisition facilities are installed in the data processing building. The remote station and the data processing building are linked by VHF and UHF telemeters. All the outputs of the observation instruments are relayed by a switching matrix board and then they are delivered into MELCOM

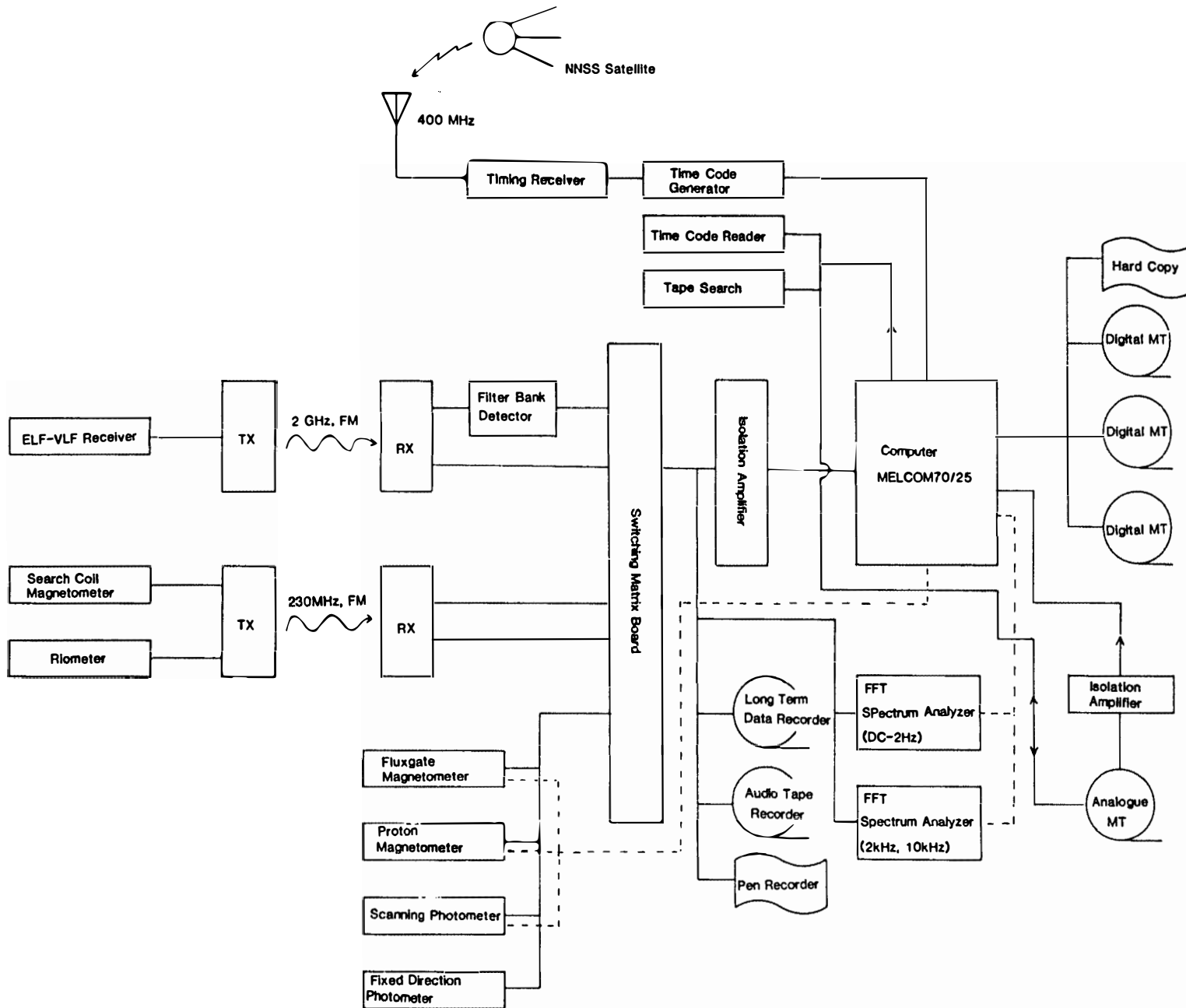


Fig. 1. Block diagram of the "Upper Atmosphere Physics" monitoring system.

70/25 computer system. The data acquisition system has both digital and analogue data recorders since analogue magnetic tapes are quite useful for recording wave phenomena in the high frequency range. For example, one roll of standard 3600 ft audio tape can record VLF emissions up to 15 kHz over 6 hours, while recording time of standard 2400 ft digital tape is only 15 minutes. The data access to the analogue data recorders is controlled by a tape search unit being linked to the computer. The dynamic spectra of ULF magnetic pulsations and ELF-VLF emissions are obtained by two sets of FFT spectral analyzers. The output digital signals from the FFT spectral analyzers are supplied to the computer. All the data are recorded with universal time supplied from a clock/frequency standard unit. This unit consists of NNSS satellite timing receiver, rubidium frequency standard and time code generator. The time code generator supplies IRIG A, B, E and slow codes(S) for the analogue data recorders and 36-bit time code to the computer. The absolute accuracy of these time codes is about 10 μ s. The computer is driven by 1 MHz clock signal from the rubidium standard.

3. Instrumentation and Data Format

3.1. Geomagnetic variation

3.1.1. Magnetogram

Magnetic variations are measured by a three axis fluxgate magnetometer. The range is \pm 1000 nT, and the frequency response is DC-2 Hz. The noise level is less than 0.5 nT.

Both the analogue and digital output signals are recorded on magnetic tapes. Sampling frequency of the digital data is 1 Hz.

Continuous computer plots of magnetogram in the period of January 1 to December 31, 1983 are given in the Appendix 1. In these plots positive sign of the H, D and Z components indicates northward, eastward and upward, respectively. One division of the vertical axis corresponds to 100 nT for the H, D and Z components. For strong magnetic disturbances outside the range of ± 1000 nT, the output level is saturated. The baseline of each component was measured during quiet time. The values of the baseline are listed in Table 1.

3.1.2. Total force of geomagnetic field

The total force of geomagnetic field (F) is continuously measured by a proton magnetometer. The range is 0 - 65000 nT, and the frequency response is 0.2 Hz. The noise level is less than 0.2 nT. The digital output signals are recorded on digital magnetic tapes with sampling frequency of 0.1 Hz.

3.1.3. K-index

As a measure of polar magnetic disturbances K-index was calculated from the standard magnetogram at Syowa. The standard magnetogram is recorded on chart paper with a recording speed of 5 cm per hour. The sensitivities of the H, D and Z components on chart paper are 118 nT/cm, 100 nT/cm, and 111 nT/cm, respectively. From the maximum deviation of the H

Table 1. The values of the geomagnetic baseline.

Date		Time {UT}	Total Int. {nT}	Horizontal Int. {nT}	Vertical Int. {nT}	Declination Angle	Dip Angle
Jan. 6	1	11h58m	44567	18972	40327	-46° 35.8'	-64° 48.3'
Feb. 26	1	10h55m	44564	18971	40325	-46° 32.4'	-64° 48.3'
	2	11h14m	44564	18969	40326	-46° 32.8'	-64° 48.5'
Mar. 27	1	10h36m	44559	18969	40319	-46° 39.2'	-64° 48.3'
May 10	1	10h28m	44550	18977	40306	-46° 38.3'	-64° 47.3'
	2	10h45m	44552	19021	40288	-46° 36.7'	-64° 43.6'
May 26	1	10h50m	44555	18987	40307	-46° 38.4'	-64° 46.6'
	2	11h04m	44557	18988	40309	-46° 39.4'	-64° 46.6'
June 25	1	11h56m	44545	19001	40289	-46° 35.8'	-64° 45.0'
	2	12h06m	44545	18998	40291	-46° 35.7'	-64° 45.3'
Aug. 5	1	11h53m	44530	18997	40274	-46° 39.2'	-64° 44.8'
	2	12h07m	44530	18997	40274	-46° 38.4'	-64° 44.8'
Sep. 4	1	12h08m	44521	19015	40256	-46° 39.3'	-64° 43.0'
	2	12h18m	44520	19011	40257	-46° 38.9'	-64° 43.3'
Oct. 28	1	11h12m	44493	19017	40225	-46° 42.3'	-64° 41.8'
	2	11h24m	44494	19012	40227	-46° 42.5'	-64° 42.2'
Dec. 21	1	11h12m	44483	19017	40213	-46° 36.2'	-64° 41.4'

component from the baseline during each 3-hour interval, K-indices were calculated by using the following scale.

K-indices	Deviation in nT
0	0 - 25
1	25 - 50
2	50 - 100
3	100 - 200
4	200 - 350
5	350 - 600
6	600 - 1000
7	1000 - 1660
8	1660 - 2500
9	2500 and more

Table 2 lists K-indices at Syowa in the period of January 1 - December 31, 1983.

3.1.4 ULF magnetic pulsations

The H, D and Z components of ULF magnetic pulsations are detected by a search coil magnetometer. The three search coil sensors use permalloy cores wound by copper wire (0.4 mm ϕ , 40000 turns). The dimensions of the permalloy core are 1 cm in diameter and 100 cm in length. The intensity range of the magnetometer is 0.001 - 5 nT/s, and the frequency range is 0.001 - 3 Hz. The search coil magnetometer is set at the remote station. The output signals from the telemetry receiver are supplied to both the analogue data recorder and the computer. The data period recorded on analogue long term data

Table 2. K-indices at Syowa Station in the period of January
1 - December 31, 1983.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
1	2331 1221	2332 3332	4421 1345	4442 2345	4534 3264	2532 2223	3311 1003	1221 0013	6722 1233	4211 1326	5522 2245	5432 2333
2	2121 1111	3211 1223	5654 4656	6542 3344	3421 1443	2122 2212	2111 1123	5463 4555	4511 0123	6542 3344	3643 3335	3421 3213
3	1122 2212	2221 1033	5443 3346	4421 1104	2121 1013	3212 1122	3212 1123	4222 4545	4321 0100	4463 3345	5321 3445	3210 1112
4	2111 2212	3432 1805	5342 3266	4422 2433	3543 3435	3110 0002	2310 0132	3210 0232	1000 0004	3344 4544	4212 2212	1111 1311
5	2111 2110	5776 6556	5553 3244	6432 2321	4322 3234	1011 1212	3102 0011	0000 0011	4000 0033	2121 2002	1211 0001	4432 2465
6	1110 1101	6563 4621	4321 1212	3434 4444	4443 2223	2221 1114	4402 3234	1100 0032	4421 0023	5332 2335	1111 0010	4444 5445
7	2011 1101	5655 5526	4422 1004	4543 4456	2323 2123	3320 0021	2403 3226	3221 0046	3311 1454	3522 2115	1111 2444	3534 4454
8	3211 2224	5542 2104	5310 1324	4552 3333	5121 1224	1011 2324	5432 2314	6743 3221	4423 2124	5321 2444	6544 3345	4322 2223
9	3222 1523	3432 4465	5311 1122	4332 2335	3321 0000	2123 1245	4512 1125	6422 1100	4421 1135	5211 1211	5533 4475	2210 1110
10	5673 2213	5552 2222	2121 0044	6543 2236	0110 1111	6533 4431	4322 1000	1421 1101	5421 1244	0111 1242	5331 4454	0233 5543
11	1110 1212	3312 2366	3212 2345	4421 0112	2355 3657	5431 1033	2001 1101	3101 1123	4311 2234	3221 1000	4233 3366	4423 6545
12	3322 2223	4333 4333	5232 2767	4423 2234	7564 3367	5522 2211	2000 3244	4643 3345	4532 3114	0212 1123	5574 4457	4533 4443
13	3320 1213	5443 4343	3333 2232	5534 3435	6554 4446	8854 3445	5554 2102	5544 3336	5311 1115	6634 2344	3553 4454	5543 3446
14	1111 2123	5443 2224	3543 3243	6654 3464	6642 3334	4432 2214	2332 2222	6222 1233	3210 1112	3332 2365	2434 4643	4443 4476
15	3221 3334	2553 3435	4433 3334	7554 4466	6433 3225	5553 2242	3311 0034	5422 2314	4432 1344	3433 2245	4222 3455	5432 2324
16	3432 3332	5632 3335	3321 2124	6544 3456	4221 2244	4221 2114	5421 2245	4000 0125	3543 2345	3431 2233	5542 3555	4521 1123
17	3322 3334	4422 2344	4432 1015	4443 2466	5322 4577	3231 2245	6653 3345	5411 1003	5543 2335	3444 4467	6544 3456	4211 1222
18	4333 3355	5651 1243	4231 1347	4321 2332	2232 2122	5654 2435	6653 2224	2100 0000	5421 1254	6554 3365	5733 3554	2210 3444
19	3222 3213	1122 2114	6653 3334	2432 3324	2221 0011	5443 3223	5322 2224	0001 1324	6633 4366	5321 1110	6432 3346	5422 2234
20	3212 1131	5552 3366	6642 3453	5522 2334	0110 0126	5533 2214	4431 1114	2511 2255	6432 3343	1421 0133	5533 4346	4321 1123
21	2321 1122	5653 3347	6322 1134	5542 1145	2331 2332	5442 2235	4422 1223	6644 2345	5431 1234	2121 2336	4321 1234	3310 2223
22	2111 1122	4423 2235	4421 0134	6545 2103	2563 4676	3332 4646	5320 0025	3221 1253	5322 2114	6532 2113	4321 1121	4322 3443
23	1110 1113	5510 1336	4431 0134	4532 1116	5554 3365	5543 2345	3234 1245	4753 3364	2211 1112	3222 3456	1110 0111	4232 3342
24	2321 2344	4321 2343	4421 0144	4554 4566	5532 5676	4421 2100	6652 3244	5544 3235	3211 3223	6322 2245	2222 2342	2211 4444
25	4332 2233	2321 1332	4565 4344	5543 3477	5411 1100	0000 0014	5433 2222	6544 3344	6432 2446	4100 1114	3422 2236	5321 3233
26	2311 1221	4310 0125	3421 2121	6553 3326	1111 2254	3441 2213	4322 1103	4542 2343	6654 3224	2110 0001	5542 2443	3522 2356
27	2331 1231	3211 1123	1011 0022	5431 2124	5422 1223	3231 1114	3222 1224	4000 1222	6331 2225	1100 0012	2222 3221	5422 2244
28	1010 2225	2221 1133	2533 2545	6632 2113	4400 1000	4001 2233	3332 2244	4322 2132	6521 1145	4111 0125	1111 3446	4332 2125
29	2211 2332		6552 4446	5454 3656	2200 1100	3332 2101	3633 3223	4511 2344	6412 1112	4554 3465	4433 3345	5232 3223
30	1223 2213		4632 2346	6543 3354	1110 0232	3011 1112	6533 2156	5542 2235	1011 1004	5532 3343	5423 3364	4534 5544
31	3321 2232		5623 3244		4341 1113		4212 1111	6563 2456		4322 2223		4432 4466

recorder(R-950L) is listed in Table 3. The sampling frequencies of the digital data are 1 and 2 Hz for H component and 1 Hz for D and Z components, respectively.

Frequency-time (f-t) spectra of magnetic pulsations are easily reproduced from analogue magnetic tapes by using FFT (Fast Fourier Transformer) spectrum analyzer. Some examples of f-t spectra of the H component in the frequency range of DC - 1 Hz were presented by Sato et al. (1984) and Fujii et al. (1985).

3.2. ELF-VLF emissions

The receiving site of natural ELF-VLF electromagnetic waves should be located far away from power line sources. Therefore, a telemeter link between the remote station and the receiving site is used in this new system. The remote station is located at West Ongul Island about 5 km apart from Syowa Station.

The ELF-VLF receiving system at the remote station comprises triangle-shaped tree turn loop antenna (10 m in height, 20 m at the base), pre-amplifier and main amplifier. The gains of the pre- and main-amplifiers are 60 dB and 40 dB, respectively. The ELF-VLF signals selected from the telemetry signals are amplified. Then wave intensities at 0.35, 0.75, 1.2, 2, 4, 8, 30, 60 and 95 kHz are measured by 9-channel filter units. The sensitivity range of this system is 10^{-17} - 10^{-13} watts/m².Hz, and the frequency range is 100 Hz - 100 kHz.

The wide-band signals up to 15 kHz are recorded on audio tape recorders. The recording period of each audio tape is

Table 3. The recording period of ULF magnetic pulsation signals recorded on long term FM data recorder(R-950L). The frequency response of this recorder is DC-10Hz.

Tape Number	Start Time			Stop Time		
	Month	Day	Time(UT)	Month	Day	Time(UT)
R 950L						
83 - 1	2	2		2	18	2047
2		18	2144	3	11	1442
3	3	11	1449		27	1437
4	3	27	1449	4	13	1655
5	4	13	1716	5	1	1929
6	5	10	2003		22	1121
7		22	1610	6	7	1428
8	6	7	1500		23	1100
9		23	1135	7	9	1631
10	7	9	1705		26	0810
11		26	0845	8	12	1020
12	8	12	1050		28	1325
13		28	1355	9	15	0702
14	9	15	0735	10	4	1405
15	10	4	1610		20	0600
16		20	0645	11	4	1700
17	11	4	1700		20	1725
18		20	1751	12	7	0410
19	12	7	0443		23	1618
20		23	1646	1	9	1738
84 - 1	1	9	1748		25	2033
R 950A						
83 - 1	4	1		5	9	
2	5	10		6	19	
3	6	20		7	30	
4	7	31		9	5	
5	9	10		10	9	

listed in Table 4. The wide-band signals are also supplied to FFT spectral analyzer and dynamic spectra in the frequency ranges 0.1 - 2 kHz and 0.1 - 10 kHz are calculated every 10 minutes. These dynamic spectral data are recorded on digital magnetic tapes. Output signals from the 9-channel filter units are recorded on digital magnetic tapes with sampling frequency of 0.5 Hz.

Some examples of computer plots of ELF-VLF wave intensities and frequency-time spectra reproduced from audio magnetic tapes were shown by Sato et al. (1984). It is evident that there is no interference from power line radiation.

3.3. Cosmic noise absorption (CNA)

Cosmic noise absorption at 30 MHz is measured by La Jolla Science riometer. The riometer uses a pair of dipole antennas. The bandwidth and time constant of the receiver are 150 kHz and 0.25 sec, respectively. The riometer is installed at the remote station. The riometer data are recorded on digital magnetic tapes with sampling frequency of 0.5 Hz. Note that the routine observation of CNA at 30 MHz is performed at Syowa independently by another instrument. These data are recorded on chart paper and summarized by Kuratani et al. (1985).

3.4. Auroral photometer

3.4.1. Meridian scanning photometer

The interference filters select OI 5577 Å and H β 4861 Å emissions which are typical emission lines in electron and proton auroras, respectively. The interference filter for H β tilts with 1 sec period for measurement of doppler-shifted H β emission. The field of view is 3° for 5577 Å and 5° for H β . The scanning period from the poleward horizon to the equatorward horizon is 30 s. The sensitivity range is 20 R - 200 kR for 5577 Å and 1 - 1000 R for H β . The meridian scanning photometer has digital interfaces to the computer. The meridian scanning data are recorded on digital magnetic tapes with sampling frequency of 1 Hz.

3.4.2. Three-direction photometer

This photometer detects 4278 Å emission at three angles (zenith, 72° poleward and 45° equatorward). The field of view is 5°. The measurable intensity range is 100 R-200 kR. The output signals are recorded on digital magnetic tapes with sampling frequency of 1 Hz.

3.5. Telemetry system from remote station to mother station

ELF-VLF radio wave receiver, riometer and search coil magnetometer are located at the remote station. The output signals from these instruments are transmitted to recording site at Syowa. The VHF telemeter is used for CNA and the three components of ULF waves. Specifications of telemeters which link between a receiving site and a recording site are listed in Table 5.

Electric powers at the remote station are supplied by car batteries and dry air zinc batteries. The car batteries are charged up once a month by a diesel engine power generator with output power of 16 kVA.

3.6. Clock / frequency standard unit

The clock system comprises a timing receiver, a rubidium frequency standard and a time code generator. The timing receiver detects universal time signals transmitted at 400 MHz from the NNSS satellite. The absolute accuracy is about 10 μ s. The frequency standard with a rubidium oscillator is synchronized with the time pulse of the timing receiver. The stability of the frequency standard is higher than 1×10^{-11} s/day. The time code generator has both analogue code output (IRIG A, B, E and slow code) and BCD digital code.

4. Compiled Digital Tape Format

This defines data tape formats for compiled tapes (Edit tapes) from the original digital magnetic tapes on which upper

atmospheric data are recorded. Edit tapes are generated on FACOM/HITAC M-180 which is compatible to IBM computer. The DCB for this 9-track, 6250 BPI is RECFM=F(or FB), LRECL = 34, BLKSIZE = 20434, DEN = 4 (see Table 6).

On Edit tape 17 kinds of upper atmospheric data are recorded for every one second as shown in Table 7. Every observation data is recorded in the form of 2 bytes (A2) and a set of data for one second make a logical record (2 bytes x 17 = 34 bytes). An observation time which is expressed by 34 bytes and 10-minute data (600 one-second data sets) make a block the length of which is 20434 bytes. On the head of every block, the observation time is recorded in the form as shown in Table 8, which shows the start time of the block data. It is noted that every block starts on the 10th minute. One-day data sets (144 blocks) make one file and a tape mark is written at the end of each file. One-month data files make one volume. The structure of Edit tape mentioned above is shown in Fig. 2.

An example how to read Edit tape is shown in the following:

```
INTEGER*2  TIME(4), DATA (17,600)
READ (10,100) TIME, DATA
100 FORMAT (4A2, 26X, 10(60(17A2)))
```

For co-researchers of NIPR it is permitted to use our M-180 computer system. NIPR has various kinds of softwares such as tape-to-tape copy, 6250 BPI to 1600 BPI conversion and copy, various kinds of display and spectrum analysis programs.

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References

- Fujii,R., Sato,N. and Fukunishi,H. (1985): Upper atmosphere physics data, Syowa Station, 1982, JARE DATA Rep., 105 (Upper Atmosphere Physics 2),226 p.
- Kuratani,Y. Yamazaki,I. and Tanaka,T.(1985): Riometer records of 30 MHz cosmic noise at Syowa Station, Antarctica in 1983. JARE Data Rep., 99 (Ionosphere 31),94 p.
- Sato,N., Fujii,R., Fukunishi,H. and Nakajima, D.(1984): Upper atmosphere physics data, Syowa Station, 1981, JARE Data Rep., 93 (Upper Atmosphere Physics 1),206 p.

Table 4. The recording period of ELF-VLF wide-band signals recorded on audio tapes.

Tape Number	Start Time			Stop Time		
	Month	Day	Time (UT)	Month	Day	Time (UT)
83 - 001	2	2	0715	2	2	1230
002			1224			1810
003		3	0660		3	1200
004			1330			1800
005		4	0600		4	1200
006			1200			1800
007			1800			2400
008		5	0000		5	0600
009			0600			1200
010			1200			1800
011			1800			2400
012		7	1800		7	2400
013		8	1200		8	1800
014			1800			2400
015		9	0600		9	1200
016			1200			1800
017			1800			2400
018		10	0600		10	1200
019			1200			1800
020			1800			2400
021		11	0000		11	0600
022			0600			1200
023			1200			1800
024			1800			2400
025		12	0000		12	0600
026			0600			1200
027			1200			1800
028			1800			2400
029		13	0600		13	1200
030			1800			2400
031		14	0600		14	1200
032		15	0600		15	1200
033		16	1800		16	2400
034		17	0600		17	1200
035			1800			2400
036		18	0000		18	0600
037			1800			2400
038		19	1200		19	1800
039			1800			2400
040		20	0000		20	0600
041			0600			1200
042			1800			2400
043		21	1800		21	2400
044		22	0600		22	1200
045			1200			1800
046			1800			2400
047		23	1800		23	2400
048		25	1200		25	1800
049			1800			2400
050		26	0600		26	1200
051			1200			1800

Tape Number	Start Time			Stop Time		
	Month	Day	Time (UT)	Month	Day	Time (UT)
052	2	26	1800	2	26	2400
053		27	1200		27	1800
054		28	1200		28	1800
055	3	1	0600	3	1	1200
056			1800			2400
057		2	1200		2	1800
058			1800			2400
059		3	1800		3	2400
060		4	1800		4	2400
061		5	1200		5	1800
062		6	0600		6	1200
063			1800			2400
064		7	1800		7	2400
065		8	0600		8	1200
066			1200			1800
067			1800			2400
068		9	1200		9	1800
069		10	0600		10	1200
070			1200			1800
071		11	1800		11	2400
072		12	0000		12	0600
073			1800			2400
074		14	1800		14	2400
075		15	0600		15	1200
076		17	1800		17	2400
077		18	0600		18	1200
078			1200			1800
079			1800			2400
080		19	1800		19	2400
081		20	0600		20	1200
082			1800			2400
083		21	0600		21	1200
084		22	1800		22	2400
085		23	1800		23	2400
086		24	1200		24	1800
087			1800			2400
088		28	0600		28	1200
089			1800			2400
090		29	1800		29	2400
091		30	1200		30	1800
092	4	1	1800	4	1	2400
093		2	1800		2	2400
094		3	0600		3	1200
095			1800			2400
096		4	0600		4	1200
097			1200			1800
098		5	0000		5	0600
099		5	0600		5	1200
100			1200			1800
101			1800			2400
102		7	0600		7	1200

Tape Number	Start Time			Stop Time		
	Month	Day	Time (UT)	Month	Day	Time (UT)
103	4	7	1800	4	7	2400
104		8	0600		8	1200
105		9	1800		9	2400
106		10	1800		10	2400
107		11	1800		11	2400
108		12	1800		12	2400
109		13	0000		13	0600
110			1800			2400
111		14	1900		14	2400
112		15	1800		15	2400
113		16	0000		16	0600
114			1800			2400
115		17	0000		17	0600
116			1200			1800
117			1800			2400
118		19	1800		19	2400
119		20	0600		20	1200
120			1800			2400
121		21	1200		21	1800
122			1800			2400
123		22	1800		22	2400
124		23	0000		23	0600
125			1800			2400
126		24	0600		24	1200
127			1800			2400
128		25	1200		25	1800
129			1800			2400
130		26	0600		26	1200
131			1200			1800
132		26	1800			2400
133		27	1200		27	1800
134			1800			2400
135		28	0000		28	0600
136			0600			1200
137			1200			1800
138			1800			2400
139		29	1200		29	1800
140			1800			2400
141		30	1800		30	2400
142	5	1	1200	5	1	1800
143			1800			2400
144		2	0000		2	0600
145			1200			1800
146			1800			2400
147		3	0000		3	0600
148			0600			1200
149			1200			1800
150			1800			2400
151		4	0000		4	0600
152			0600			1200
153			1800			2400

Tape Number	Start Time			Stop Time		
	Month	Day	Time (UT)	Month	Day	Time (UT)
154	5	4	0000	5	4	0600
155		5	1200		5	1800
156		6	1800		6	2400
157			0600			1200
158			1800			2400
159		7	0600		7	1200
160			1800			2400
161		8	0000		8	0600
162			1800			2400
163		9	1800		9	2400
164		10	0000		10	0600
165		11	0600		11	1200
166			1200			1800
167			1800			1800
168		12	0600		12	1200
169			1800			2400
170		13	1800		13	2400
171		14	1200		14	1800
172			1800			2400
173		15	1800		15	2400
174		16	0000		16	0600
175			1800			2400
176		17	0000		17	0600
177			0600			1200
178			1200			1800
179			1800		18	2400
180		18	1800		19	2400
181		19	0600			1200
182			1200			1800
183			1800			2400
184		20	0000		20	0600
185			1800			2400
186		22	1200		22	1800
187			1800			2400
188		23	1315		23	1800
189			1800			2400
190		25	1200		25	1800
191			1800			2400
192		26	0000		26	0600
193			1800			2400
194		27	1800		27	2400
195		31	1800		31	2400
196	6	3	0000	6	3	0600
197			1200			1800
198		4	1200		4	1800
199			1800			2400
200		6	1800		6	2400
201		7	1800		7	2400
202		9	0000		9	0600
203		11	1800		11	2400

Tape Number	Start Time			Stop Time		
	Month	Day	Time (UT)	Month	Day	Time (UT)
204	6	13	1800	6	13	2400
205		14	0000		14	0600
206			1800			2400
207		15	0000		15	0600
208			1800			2400
209		17	1800		17	2400
210		18	0000		18	0600
211	7	1	1800	7	1	2400
212		5	0000		5	0600
213		6	1800		6	2400
214		7	1800		7	2400
215		8	1800		8	2400
216		9	1800		9	2400
217		13	1800			2400
218		14	1800			2400
219		16	0700			1230
220			1200			1800
221			1800			2400
222		17	0700			1300
223			1200			1800
224			1800			2400
225		18	1800			2400
226		19	1800			2400
227		22	1800			2400
228		23	1300			1820
229		24	0645			1200
230			1200			1800
231			1800			2400
232		25	1800	7	25	2400
233		29	0000			0600
234		30	1800			2400
235		31	0000			0600
236	8	1	1800	8	1	2400
237		2	0000			0600
238			1800			2400
239		3	0000			0600
240			1800			2400
241		4	1800			2400
242		6	1900			2400
243		7	1800			2400
244		9	0000			0600
245			1000			1600
246			1800			2400
247		10	0000			0600
248		12	1800			2400
249		13	1800			2400
250		14	1800			2400
251		15	1800			2400
252		16	1800			2400
253		19	1800			2400
254		20	1800			2400

Tape Number	Start Time			Stop Time		
	Month	Day	Time (UT)	Month	Day	Time (UT)
255	8	21	1800	8	8	2400
256		22	1800			2400
257		23	1800			2400
258		24	1800			2400
259		25	1800			2400
260		27	1800			2400
261		28	1800			2400
262		30	1800			2400
263		31	1800			2400
264	10	4	1800			2400
		5	0510			1110

Tape Number	Start Time			Stop Time		
	Month	Day	Time (UT)	Month	Day	Time (UT)
C - 1	8	18	0600	8	18	1200
2		19	0600		19	1200
3		20	0600		20	1200
4		21	0600		21	1200
5		22	0600		22	1200
6		23	0600		23	1200
7		24	0600		24	1200
35	9	6	0000	9	6	0600
36			0600			1200
37			1200			1800
39		7	0000		7	0600
40			0600			1200
41			1200			1800
42			1800			2400
44		8	0600		8	1200
45			1200			1800
46			1800			2400
47		9	0000		9	0600
48			0600			1200
49			1200			1800
50			1800			2400
51		10	0000		10	0600
52			0600			1200
53			1200			1800
54			1800			2400
55		11	0000		11	0600
56			0600			1200
57			1200			1800
58			1800			2400
59		12	0000		12	0600
60			0600			1200
61			1200			1800
62			1800			2400
63		13	0000		13	0600
64			0600			1200
65			1200			1800

Tape Number	Start Time			Stop Time		
	Month	Day	Time (UT)	Month	Day	Time (UT)
66			1800			2400
67		14	0000		14	0600
68			0600			1200
69			1200			1800
70			1800			2400
71		15	0000		15	0600
72			0600			1200
73			1200			1800
74			1800			2400
75		16	0000		16	0600
76			0600			1200
77			1200			1800
78			1800			2400
79		17	0000		17	0600
80			0600			1200
81			1200			1800
82			1800			2400
83		18	0000		18	0600
84			0600			1200
85			1200			1800
86	9	18	1800	9	18	2400
90		19	1800		19	2400
92		20	0600		20	1200
94			1800			2400
96		21	0600		21	1200
98			1800			2400
99		22	0000		22	0600
100			0600			1200
101			1200			1800
102			1800			2400
107		24	0000		24	0600
108			0600			1200
109			1200			1800
110			1800			2400
111		25	0000		25	0600
112			0600			1200
113			1200			1800
114			1800			2400
115		26	0000		26	0600
116			0600			1200
117			1200			1800
118			1800			2400
119		27	0000		27	0600
120			0600			1200

Tape Number	Start Time			Stop Time		
	Month	Day	Time (UT)	Month	Day	Time (UT)
121			1200			1800
122			1800			2400
123		28	0000		28	0600
124			0600			1200
125			1200			1800
126			1800			2400
127		29	0000		29	0600
128			0600			1200
129			1200			1800
130			1800			2400
132		30	0600		30	1200
134			1800			2400
136	10	1	0600	10	1	1200
138			1800			2400
140		2	0600		2	1200
142	10	2	1800	10	2	2400
143		28	2000		28	2300
		29	2000		29	2300
144		30	2000		30	2300
		31	2000		31	2300
145	11	1	2000	11	1	2300
		2	2000		2	2300
146		3	2000		3	2300
		4	2000		4	2300
147		5	2000		5	2300
		6	2000		6	2300
148	1	10	0300	1	10	0900
149			0900			1500
150		11	0300		11	0900
151			0900			1500
152		12	0300		12	0900
153			0900			1500
154		13	0300		13	0900
155			0900			1500
156		14	0300		14	0900
157			0900			1500
158		15	0300		15	0900
159			0900			1500
160		16	0300		16	0900
161			0900			1500
162		17	0300		17	0900
163			0900			1500
164		18	0300		18	0900
165			0900			1500
166		19	0300		19	0900
167			0900			1500

Table 5. Specifications of telemeters which link the remote station and the mother station.

	UHF telemeter	VHF telemeter
Modulation	PCM	FM
Carrier frequency	1859 MHz	240 MHz
Transmitter power	0.4 W	0.4 W
Antenna	Parabola(1 m ϕ)	Yagi(7 elements)
Max frequency deviation	200 kHz	125 kHz
VCO stability	better than 1%	better than 1%
VCO lineality	better than 1%	better than 1%
Carrier spurious	less than -30 dB	less than -30 dB

Table 6. The tape format of the compiled digital tape.

Item	Specification
Track	9 tracks
Record density	6250 BPI
Record format	F (FB)
Block length	20,434 bytes (1byte=8 bits)
Record length (Logical record length)	34 bytes
Label	Non-label
Filing	Single volume/multi-file

Table 7. The data sequence in each logical record on the compiled digital tape.

Sequence	Observation items
1	VLF 750 Hz
2	VLF 2 Hz
3	VLF 4 kHz
4	VLF 30 kHz
5	VLF 350 kHz
6	VLF 1.2 KHz
7	VLF 8 kHz
8	VLF 60 kHz
9	VLF 90 kHz
10	CNA
11	Total magnetic fiel intensity
12	H-component of magnetic field
13	D-component of magnetic field
14	Z-component of magnetic field
15	H-component of ULF wave
16	D-component of ULF wave
17	Space

Table 8. The format of the observation time on the compiled digital tape.

Sequence	Items
1	Year (2 Bytes)
2	Total day (Jan. 1=1) (2 Bytes)
3	Hour (2 Bytes)
4	Minute (2 Bytes)
5	Space (26 Bytes)

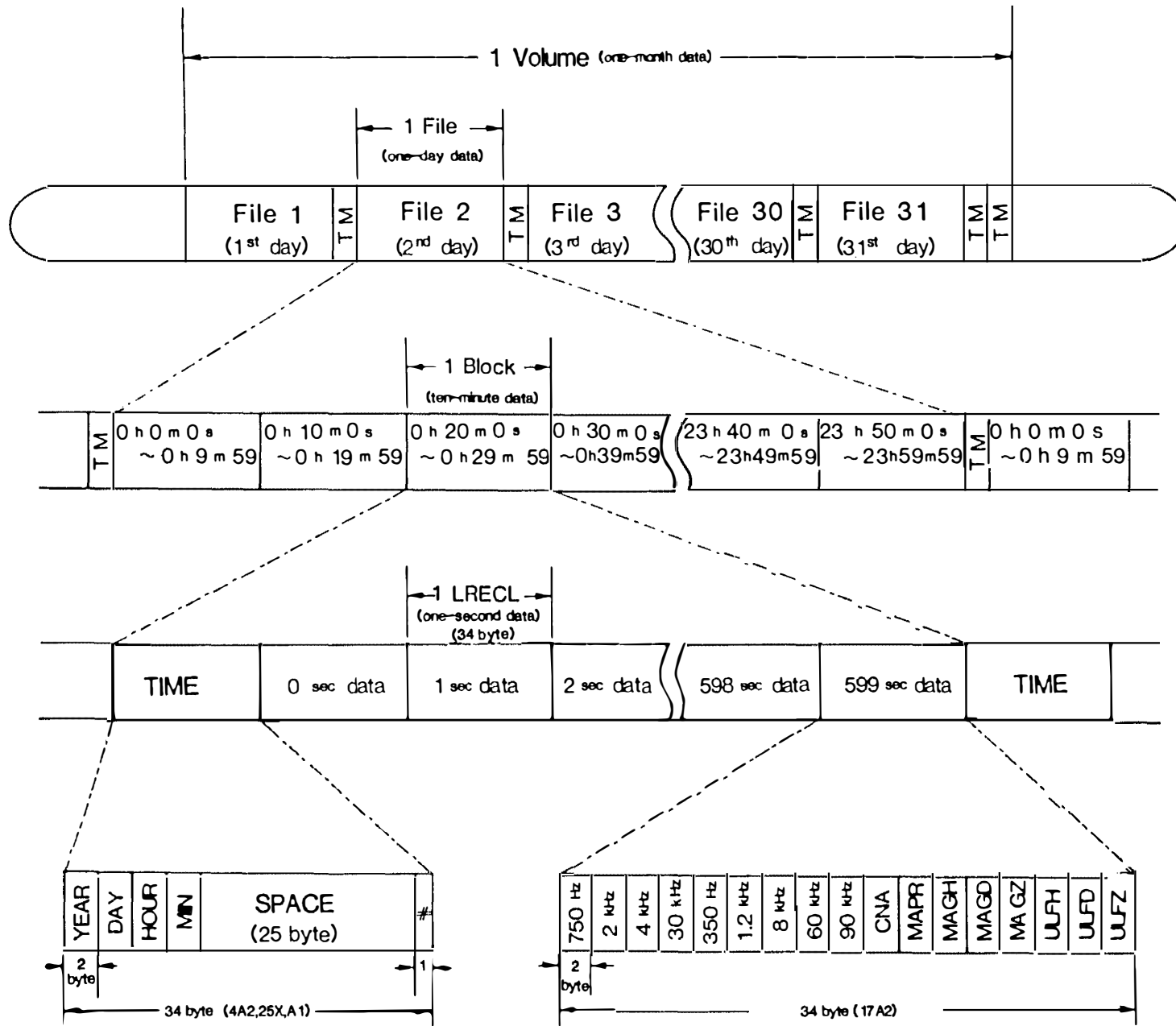


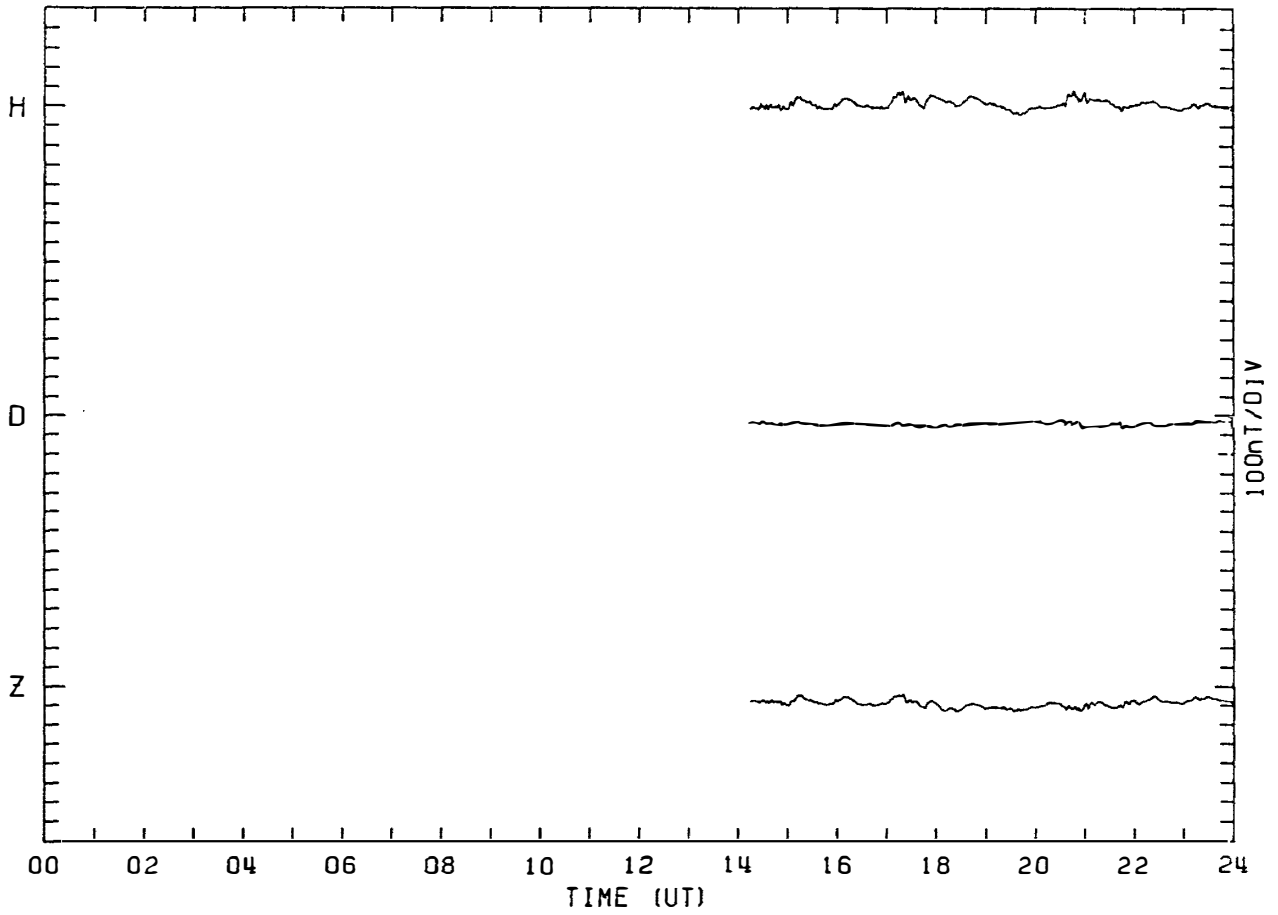
Fig. 2. The structure of the compiled digital tape format.

Appendix 1

Continuous computer plots of magnetogram in the
period of January 1 to December 31, 1983

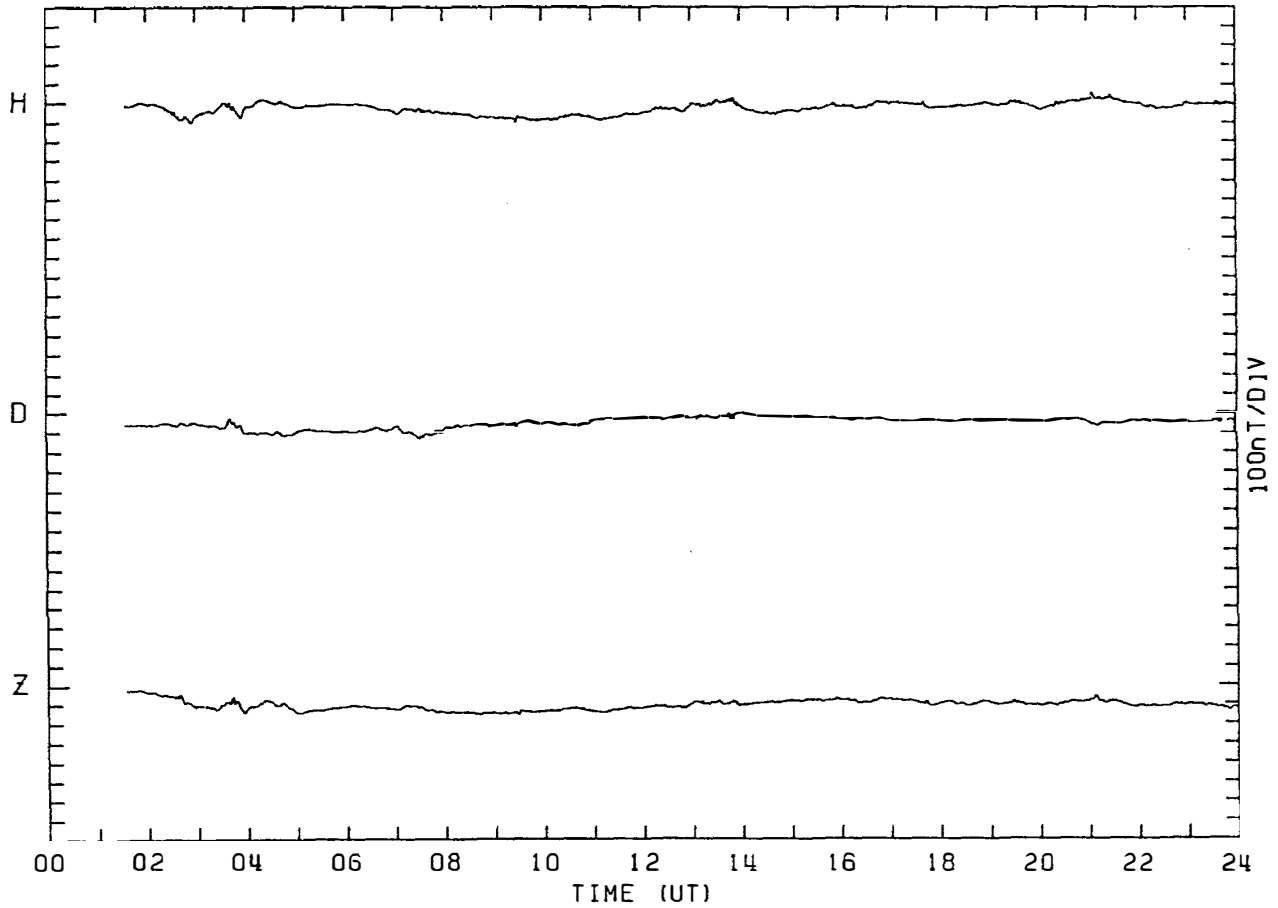
MAGNETOGRAM SYOWA STATION

DAY: 1 JANUARY 1. 1983



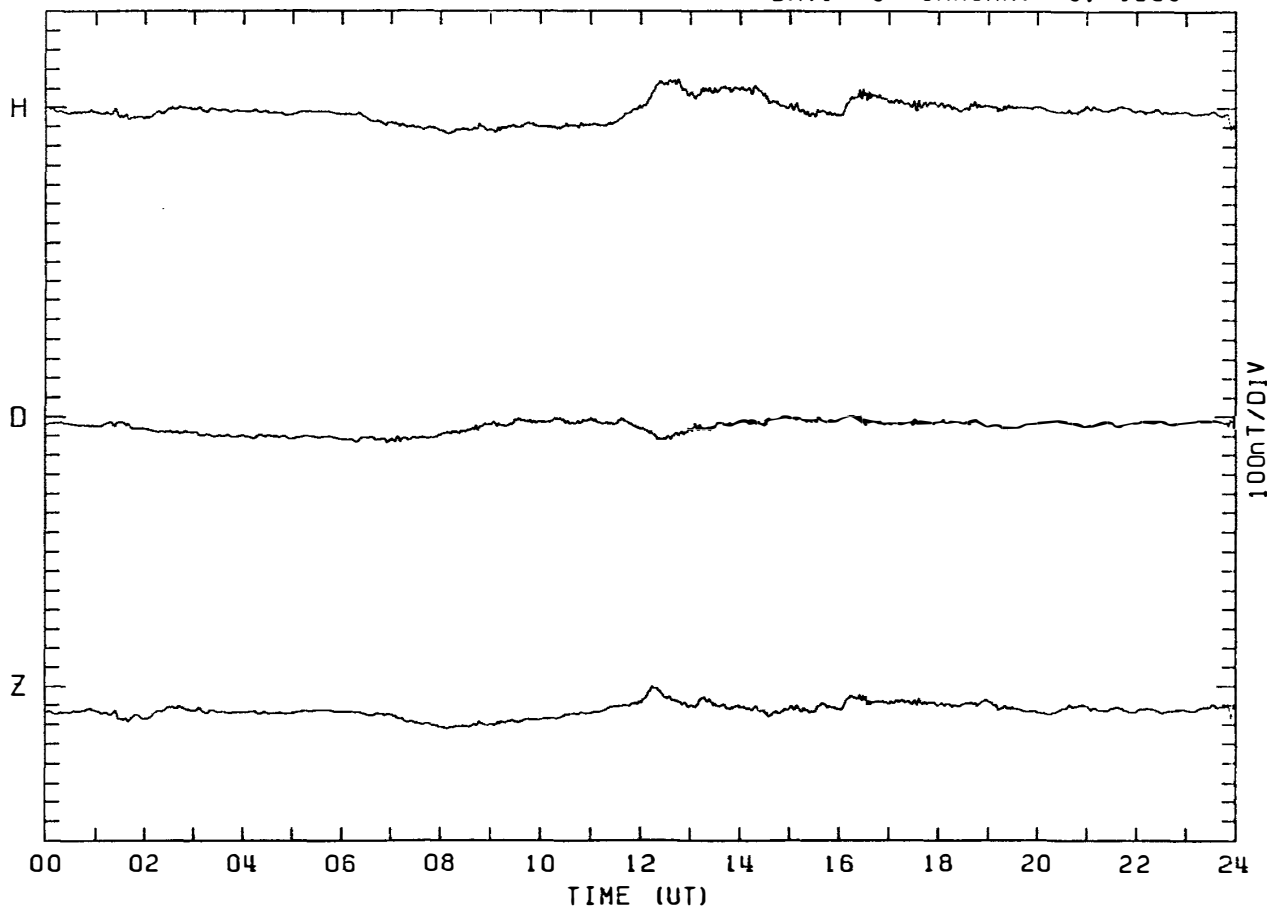
MAGNETOGRAM SYOWA STATION

DAY: 2 JANUARY 2. 1983



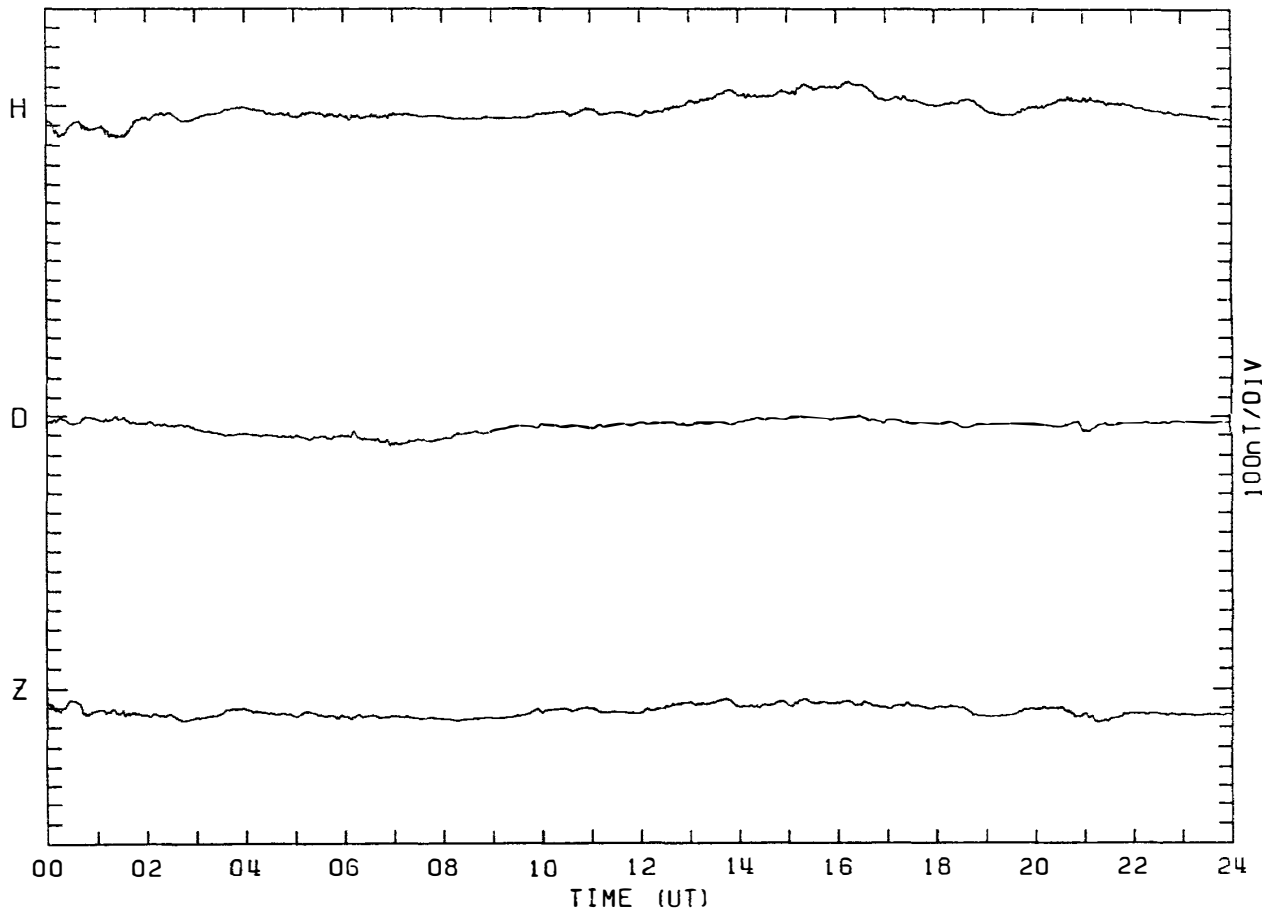
MAGNETOGRAM SYOWA STATION

DAY: 3 JANUARY 3, 1983



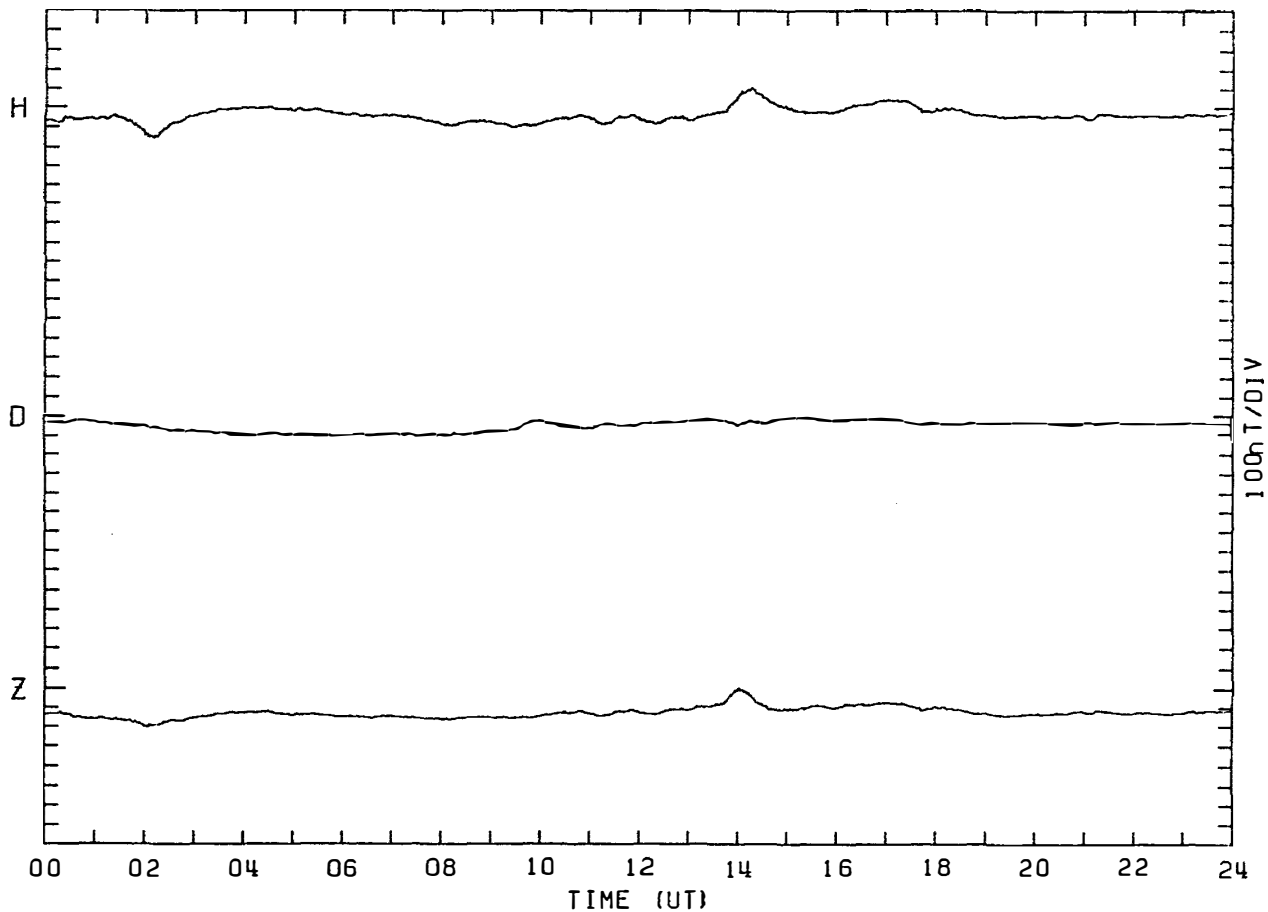
MAGNETOGRAM SYOWA STATION

DAY: 4 JANUARY 4, 1983



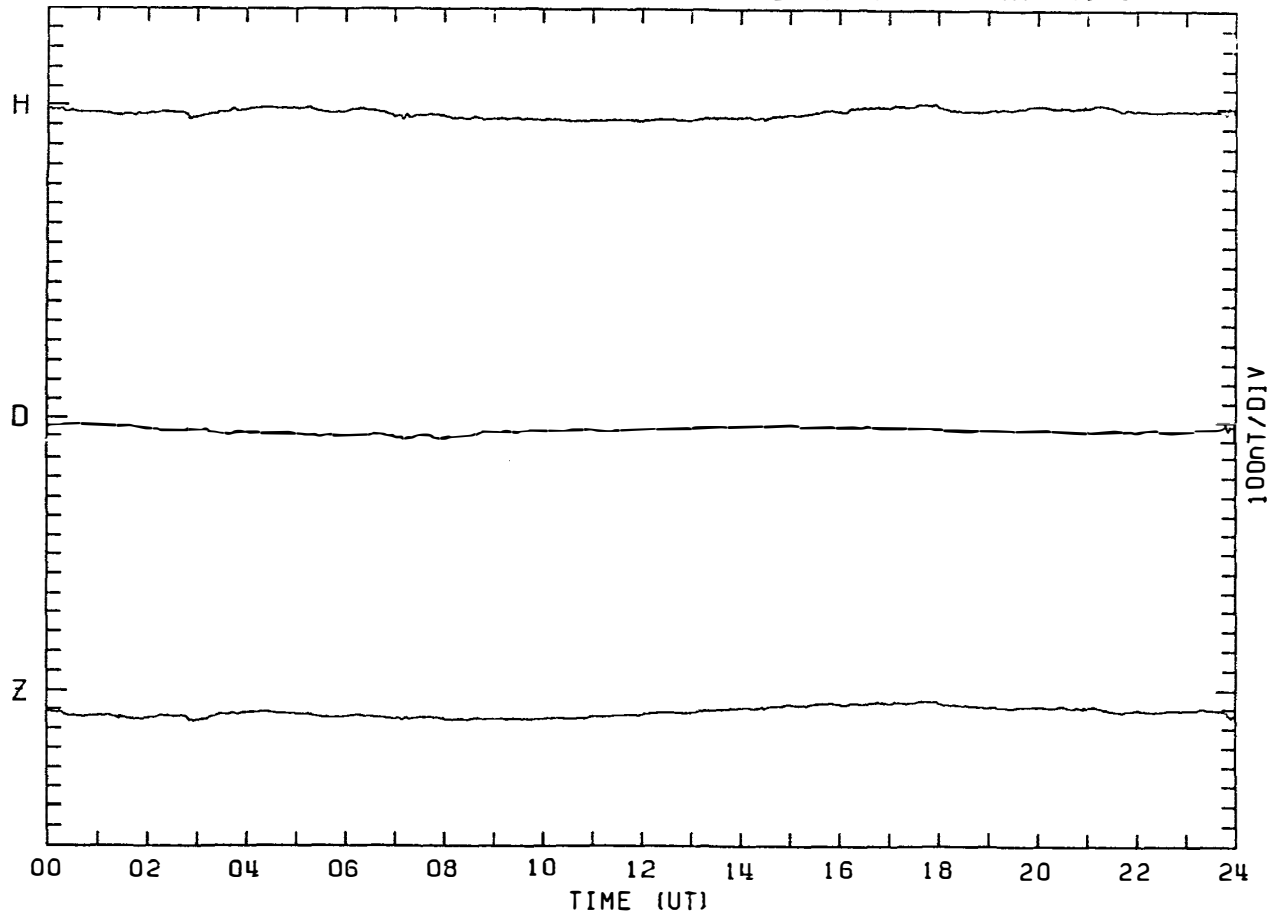
MAGNETOGRAM SYOWA STATION

DAY: 5 JANUARY 5. 1983



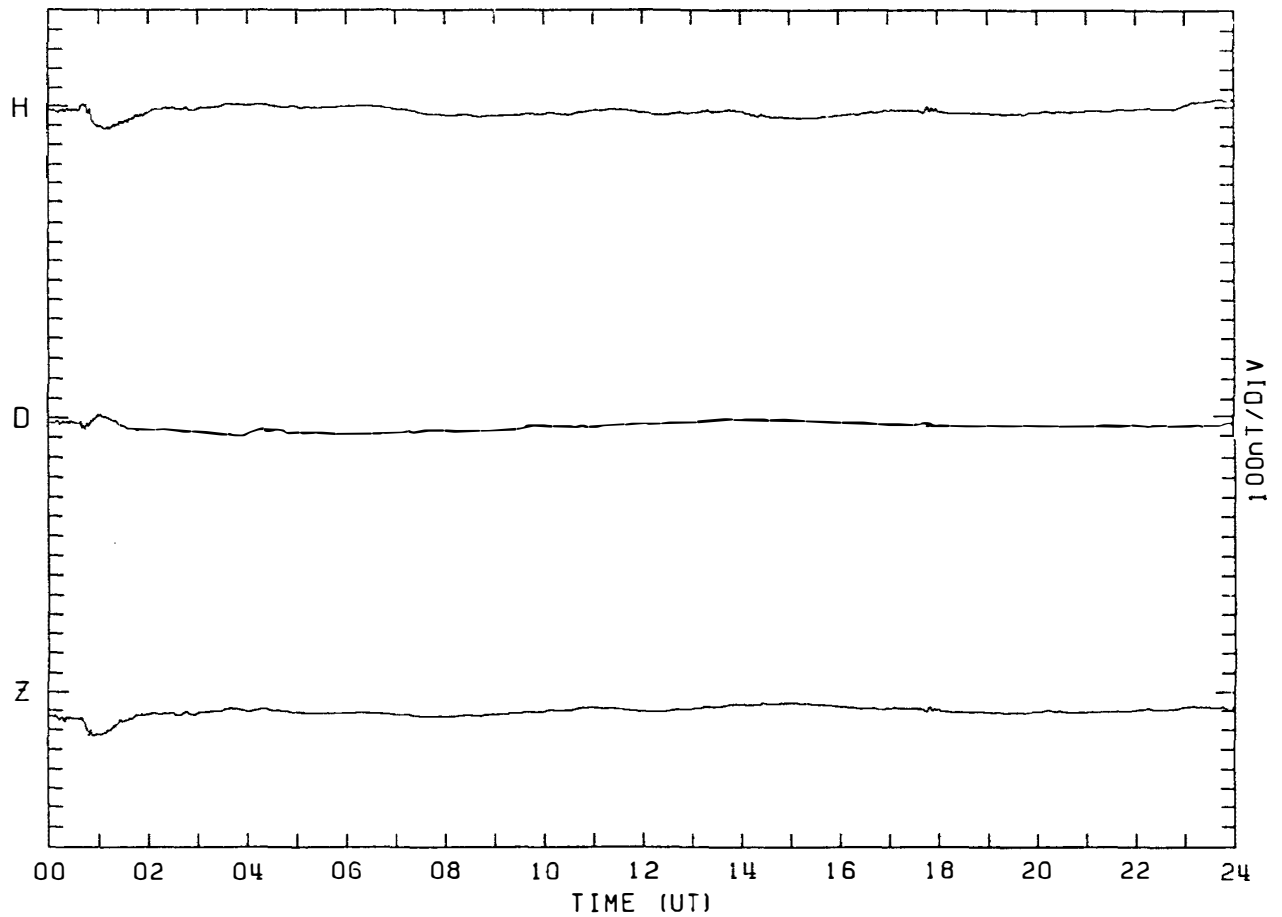
MAGNETOGRAM SYOWA STATION

DAY: 6 JANUARY 6. 1983



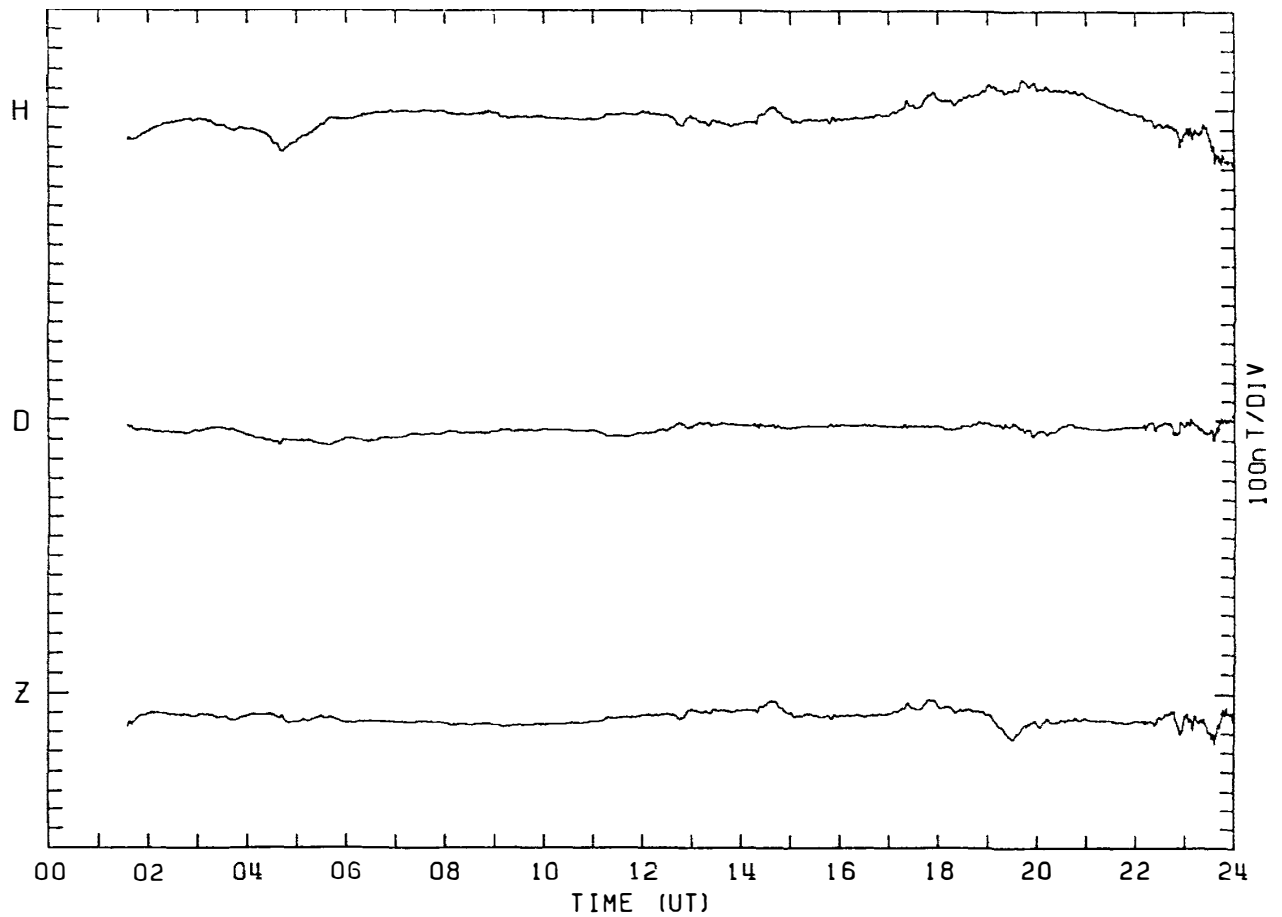
MAGNETOGRAM SYOWA STATION

DAY: 7 JANUARY 7. 1983



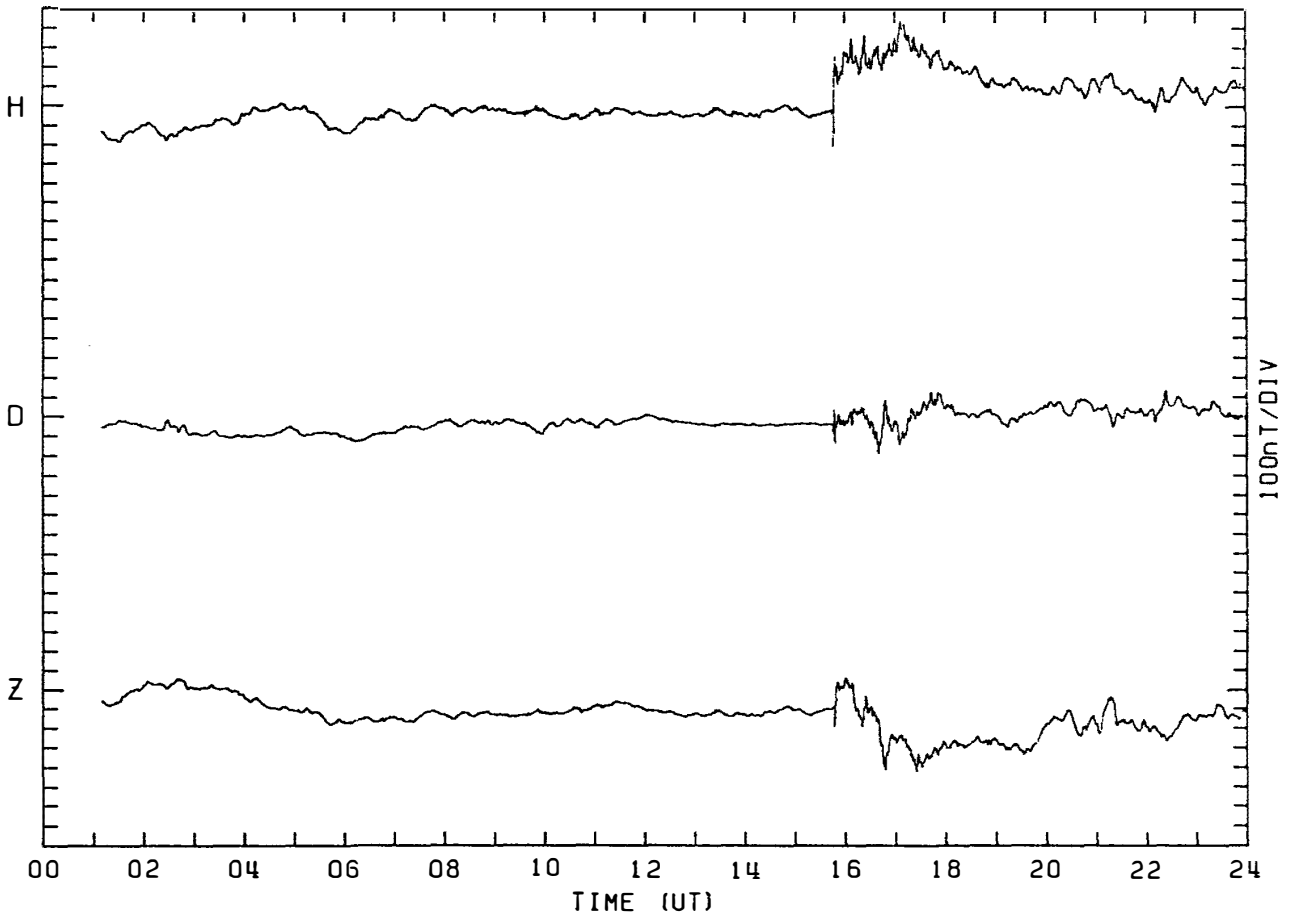
MAGNETOGRAM SYOWA STATION

DAY: 8 JANUARY 8. 1983



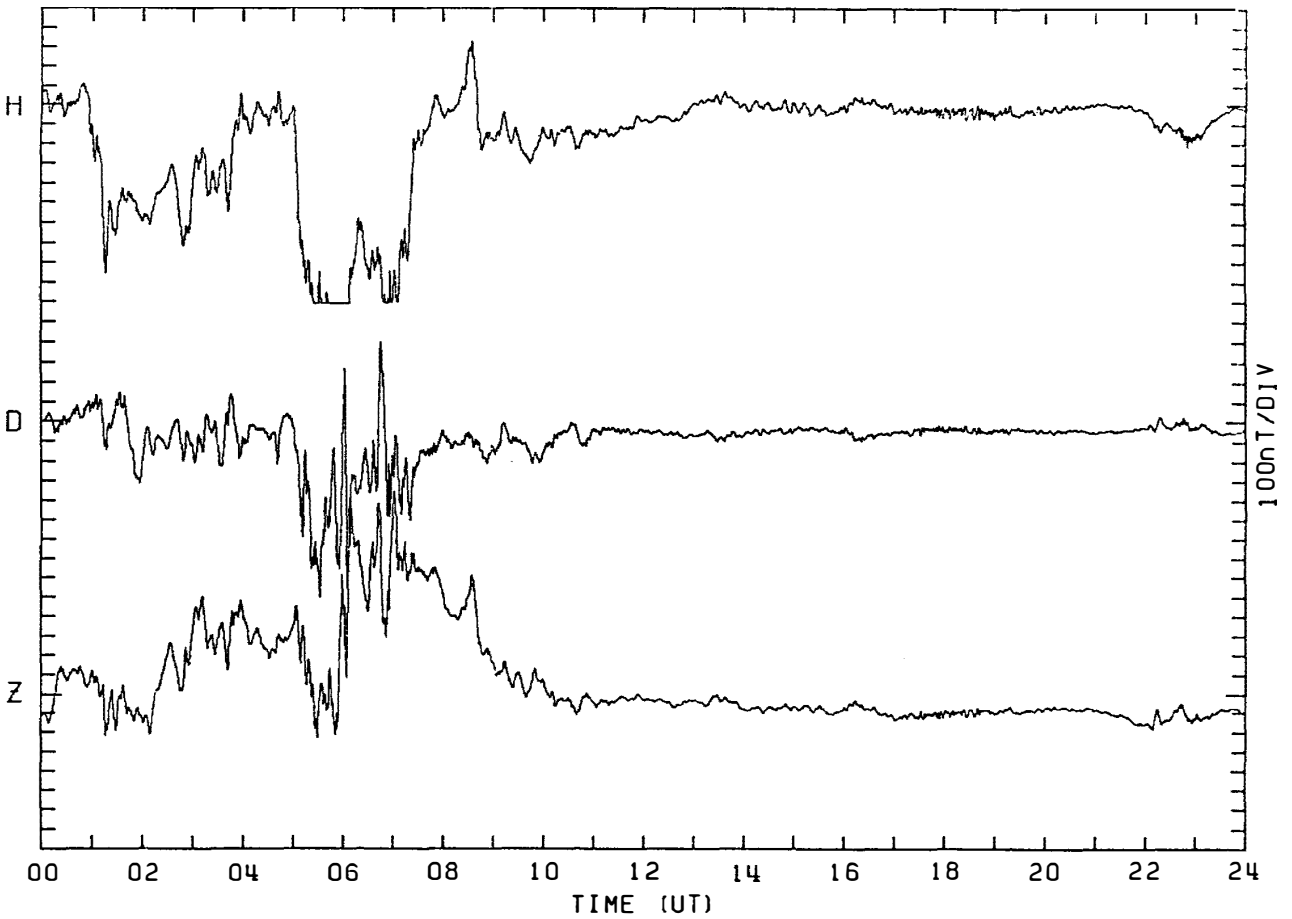
MAGNETOGRAM SYOWA STATION

DAY: 9 JANUARY 9, 1983



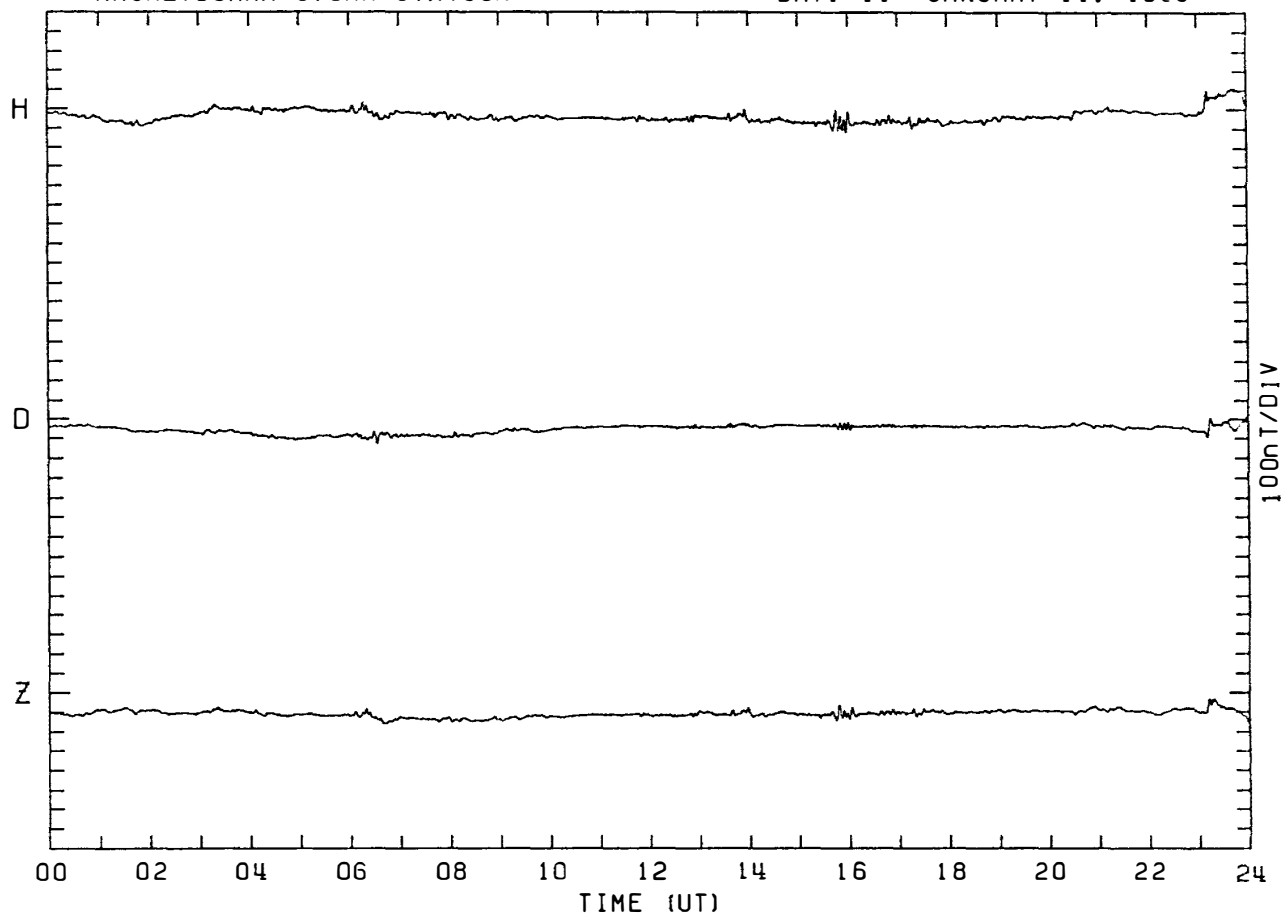
MAGNETOGRAM SYOWA STATION

DAY: 10 JANUARY 10, 1983



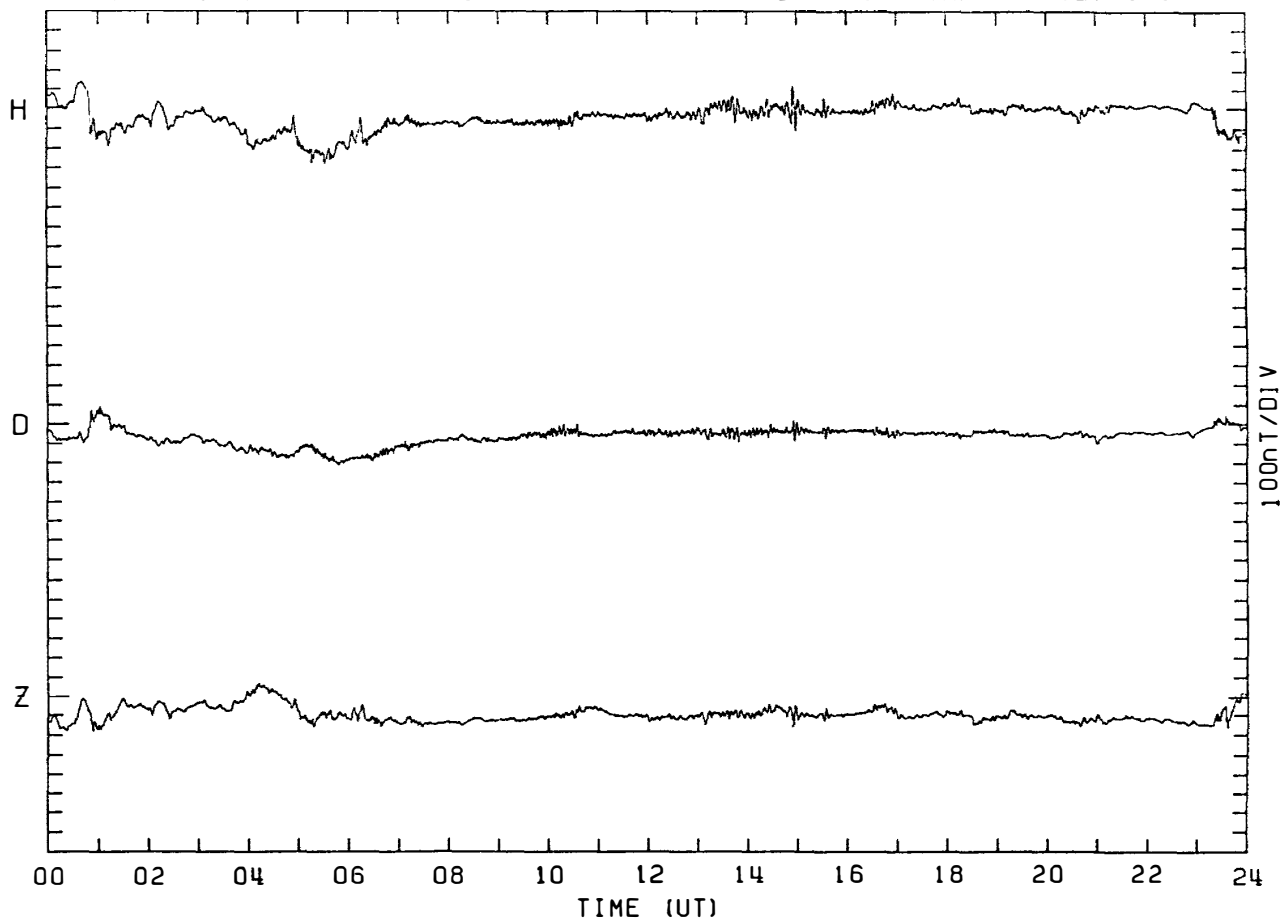
MAGNETOGRAM SYOWA STATION

DAY: 11 JANUARY 11. 1983



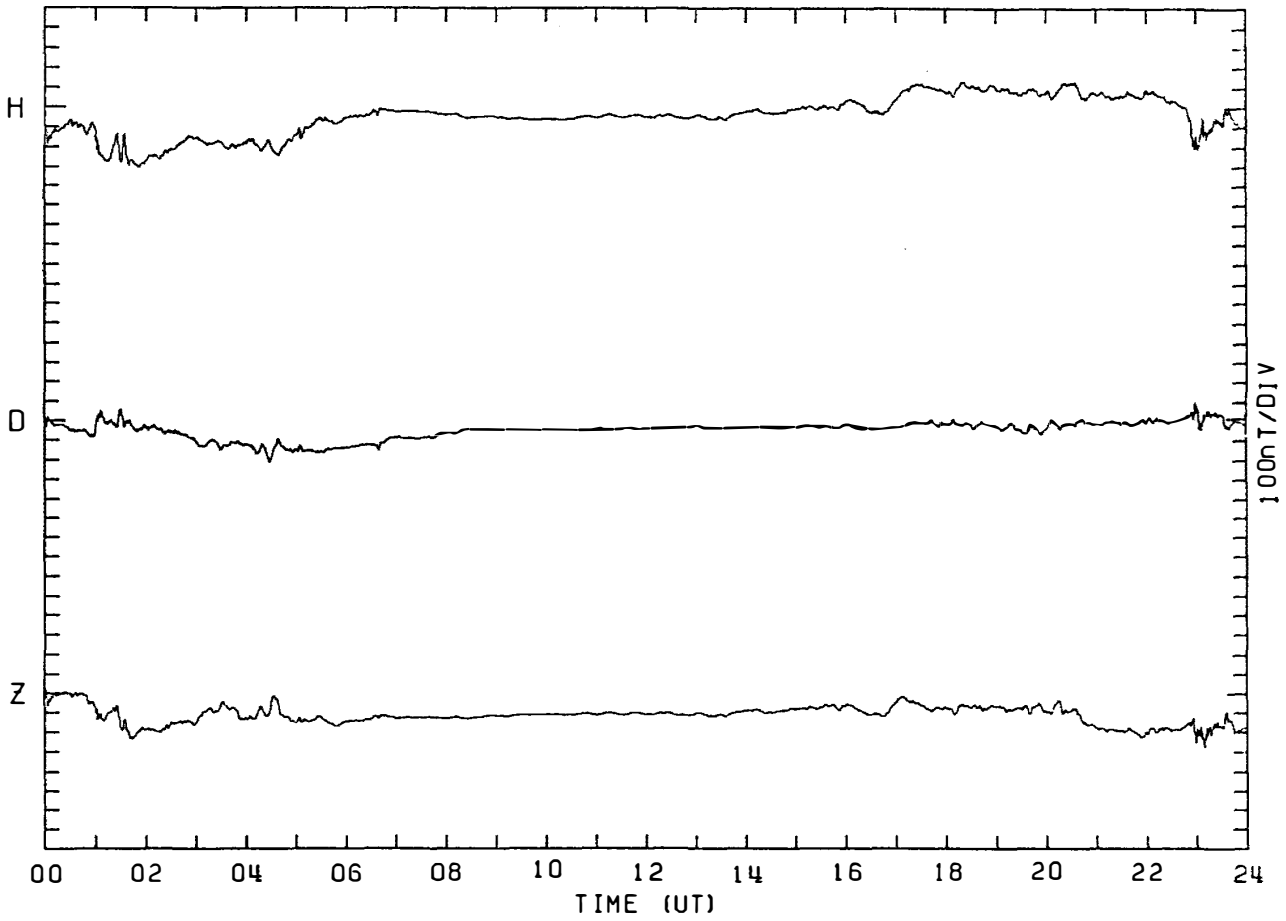
MAGNETOGRAM SYOWA STATION

DAY: 12 JANUARY 12. 1983



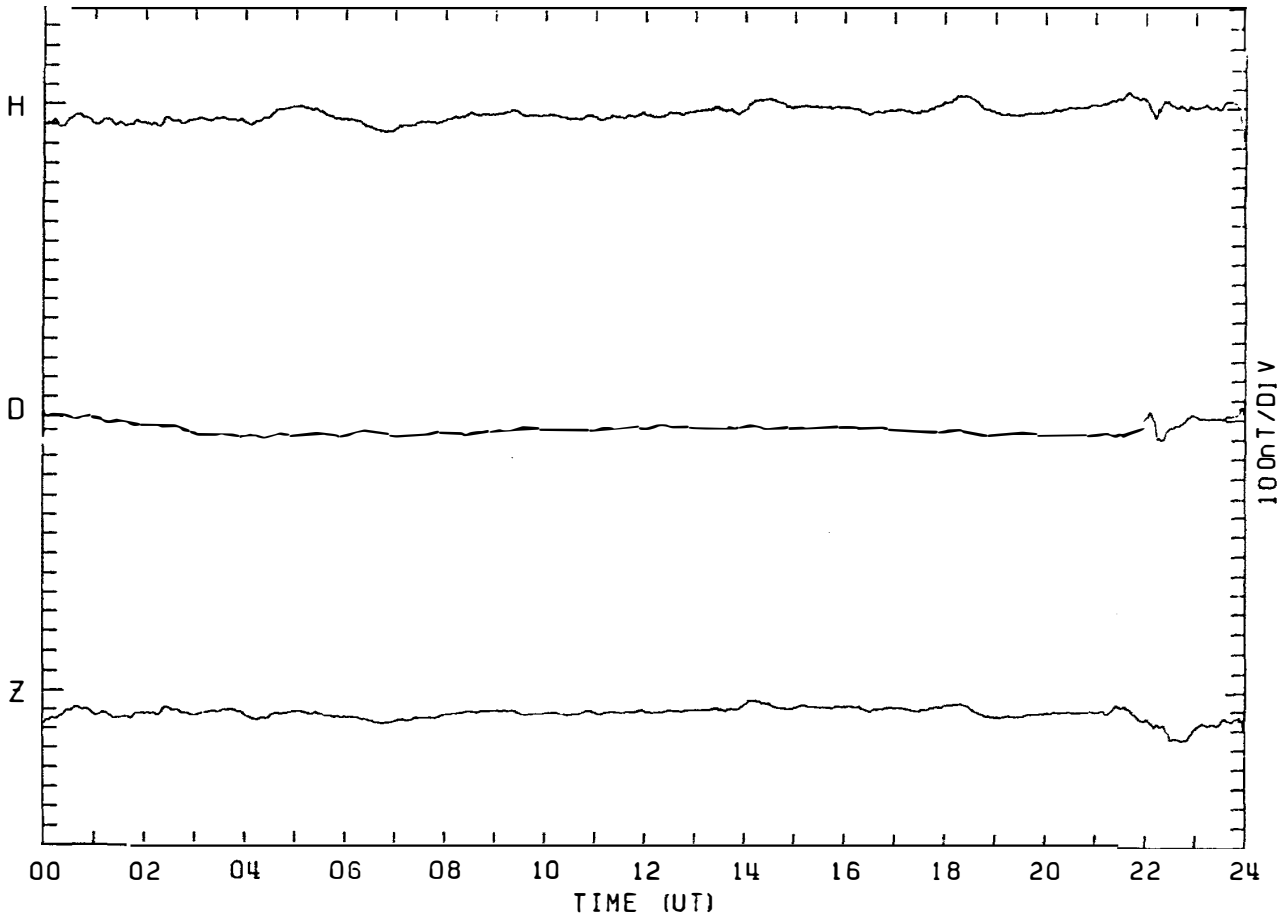
MAGNETOGRAM SYOWA STATION

DAY: 13 JANUARY 13, 1983



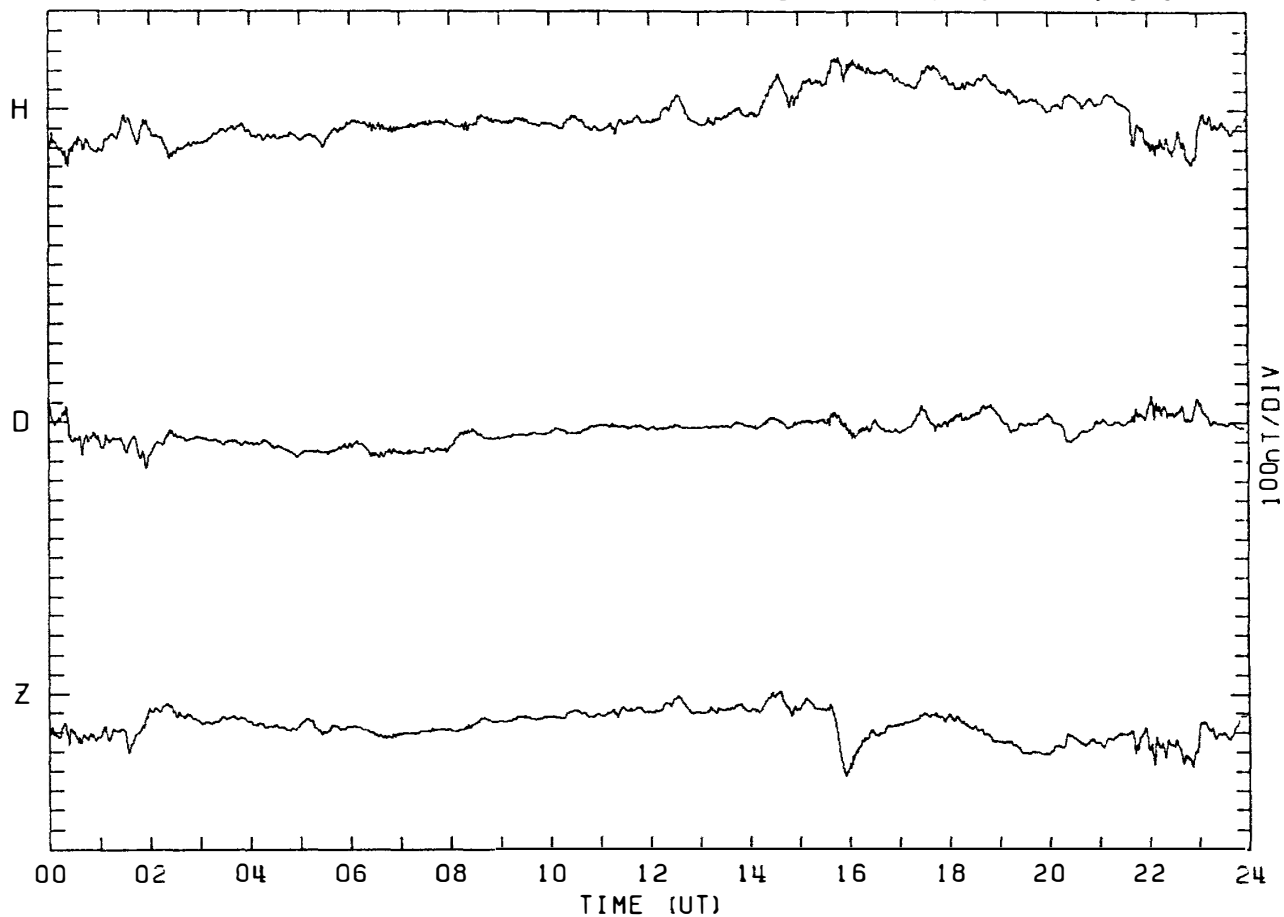
MAGNETOGRAM SYOWA STATION

DAY: 14 JANUARY 14, 1983



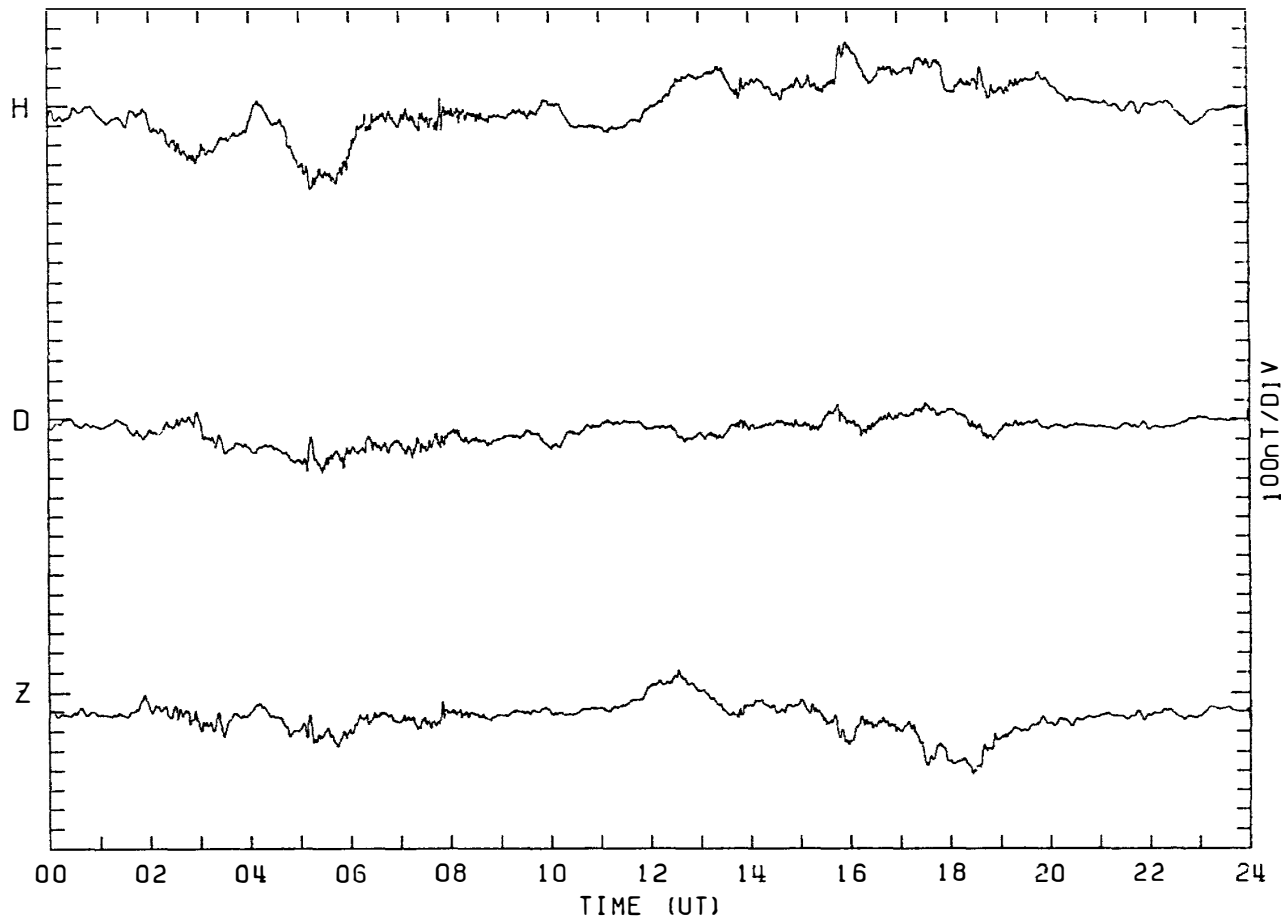
MAGNETOGRAM SYOWA STATION

DAY: 15 JANUARY 15, 1983



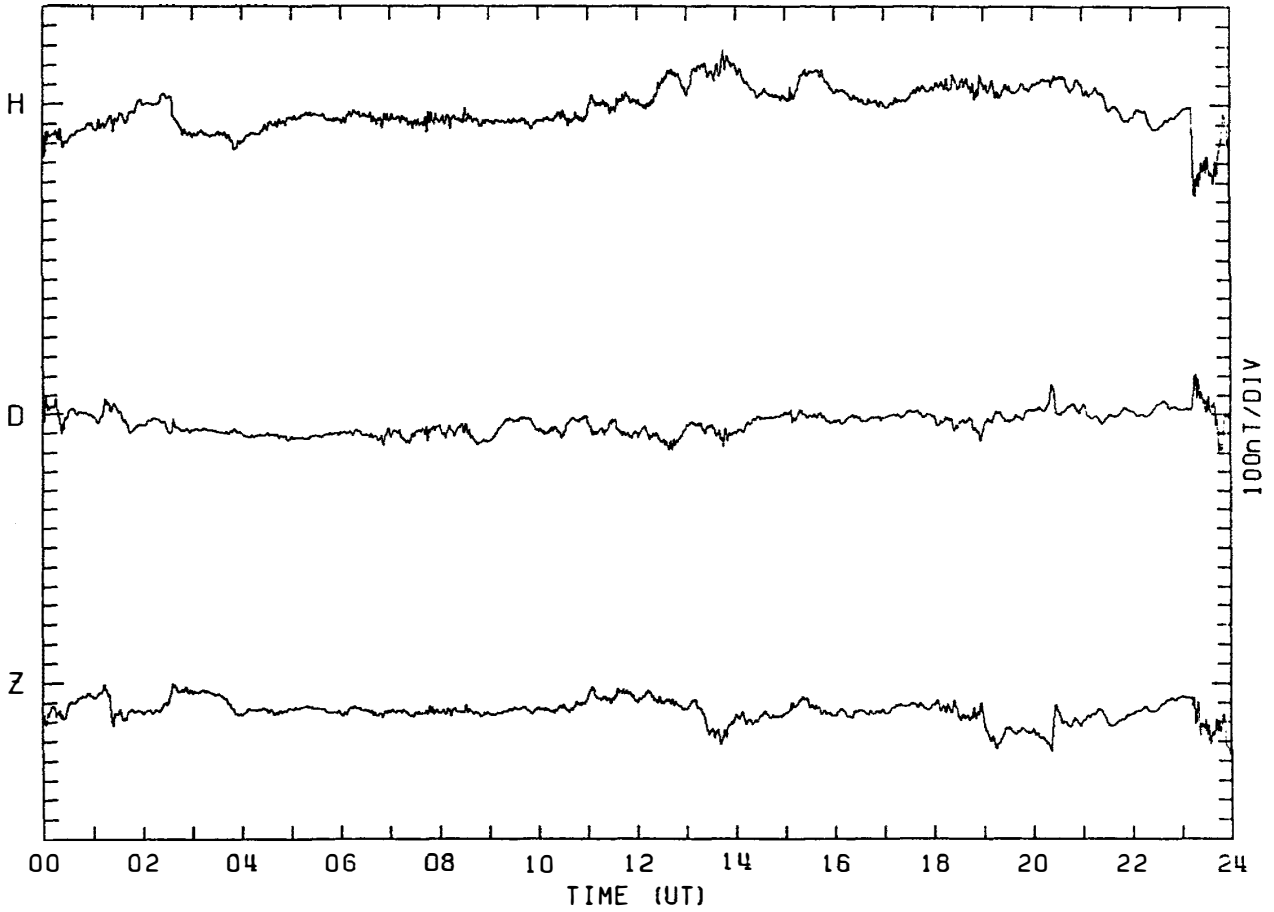
MAGNETOGRAM SYOWA STATION

DAY: 16 JANUARY 16, 1983



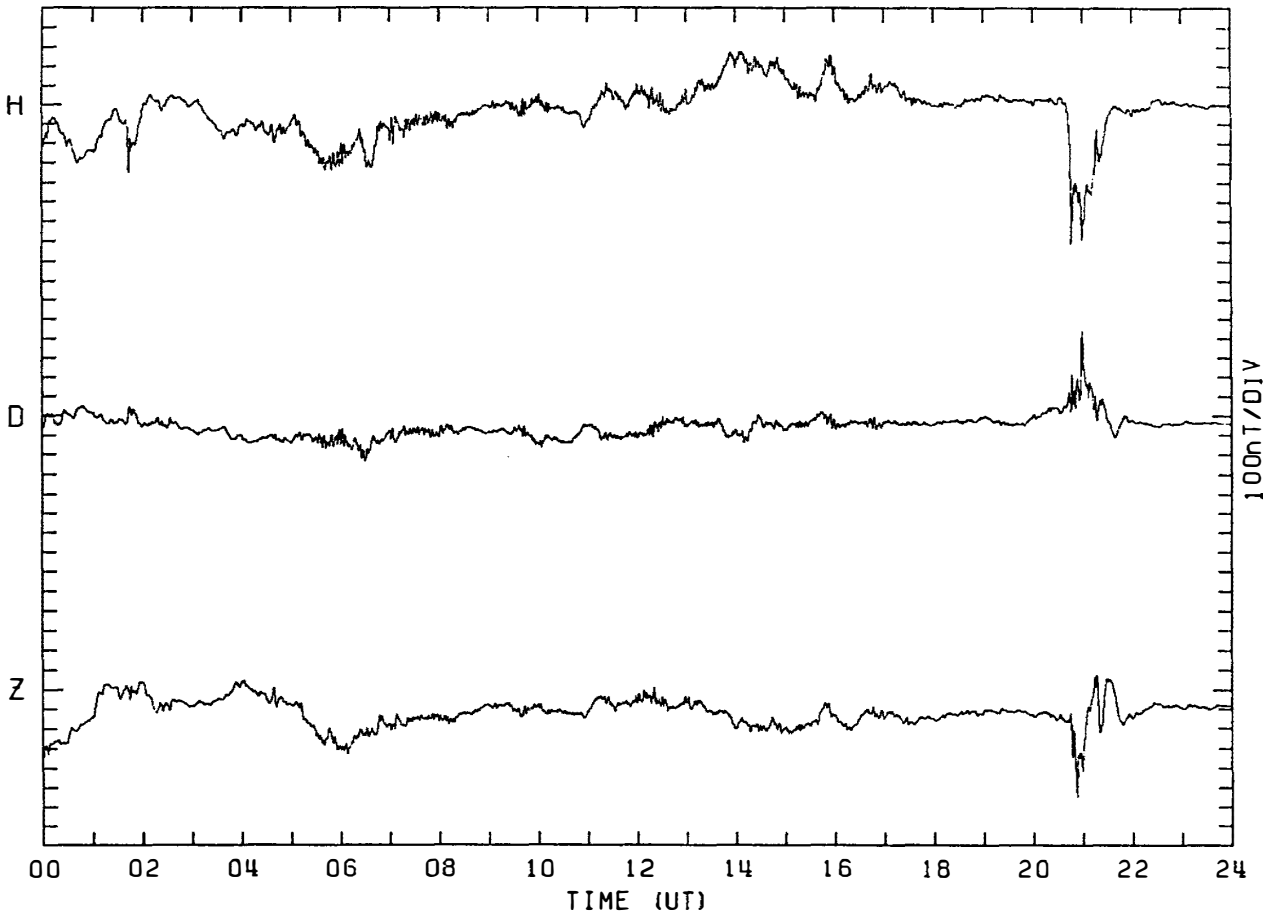
MAGNETOGRAM SYOWA STATION

DAY: 17 JANUARY 17. 1983



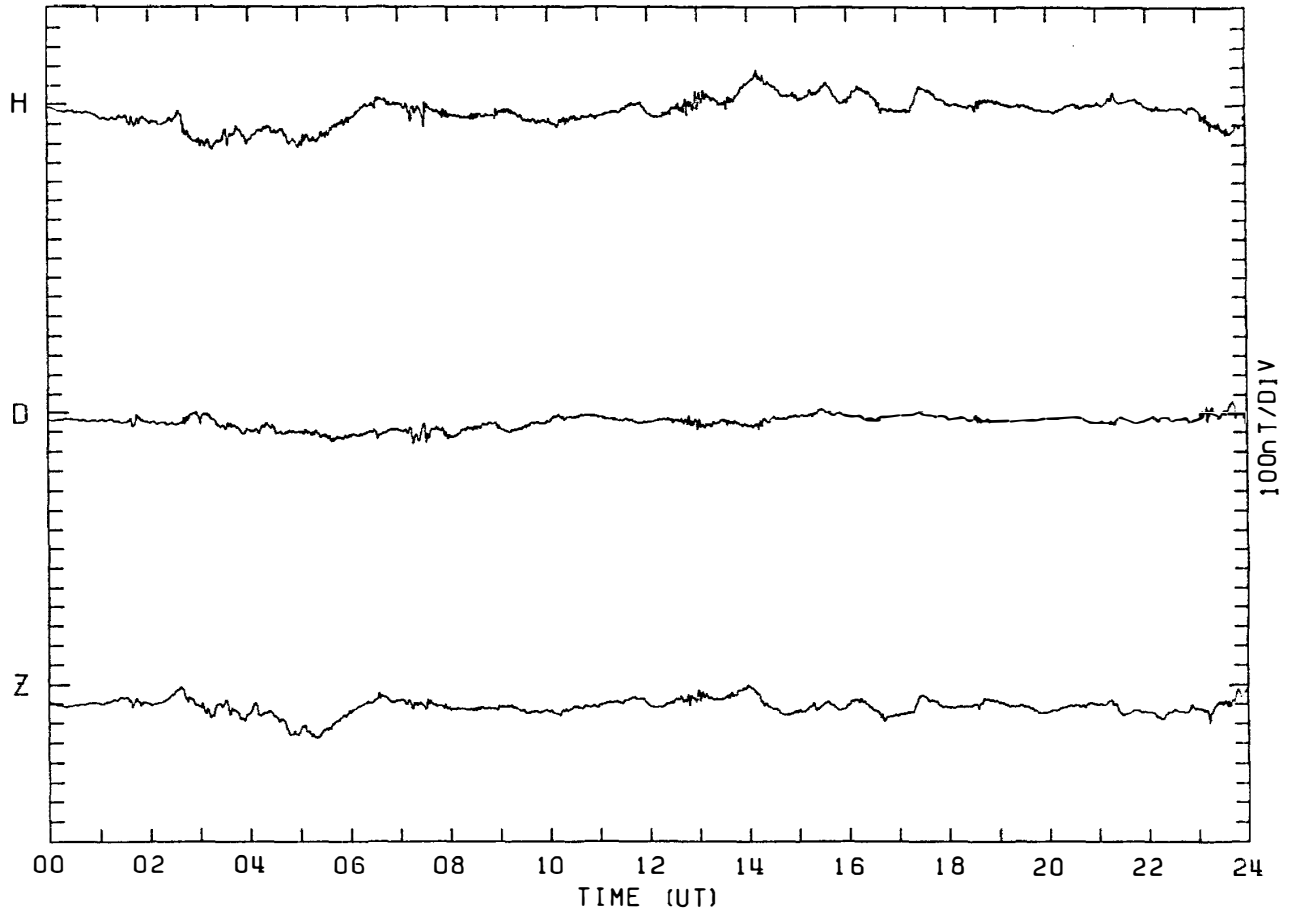
MAGNETOGRAM SYOWA STATION

DAY: 18 JANUARY 18. 1983



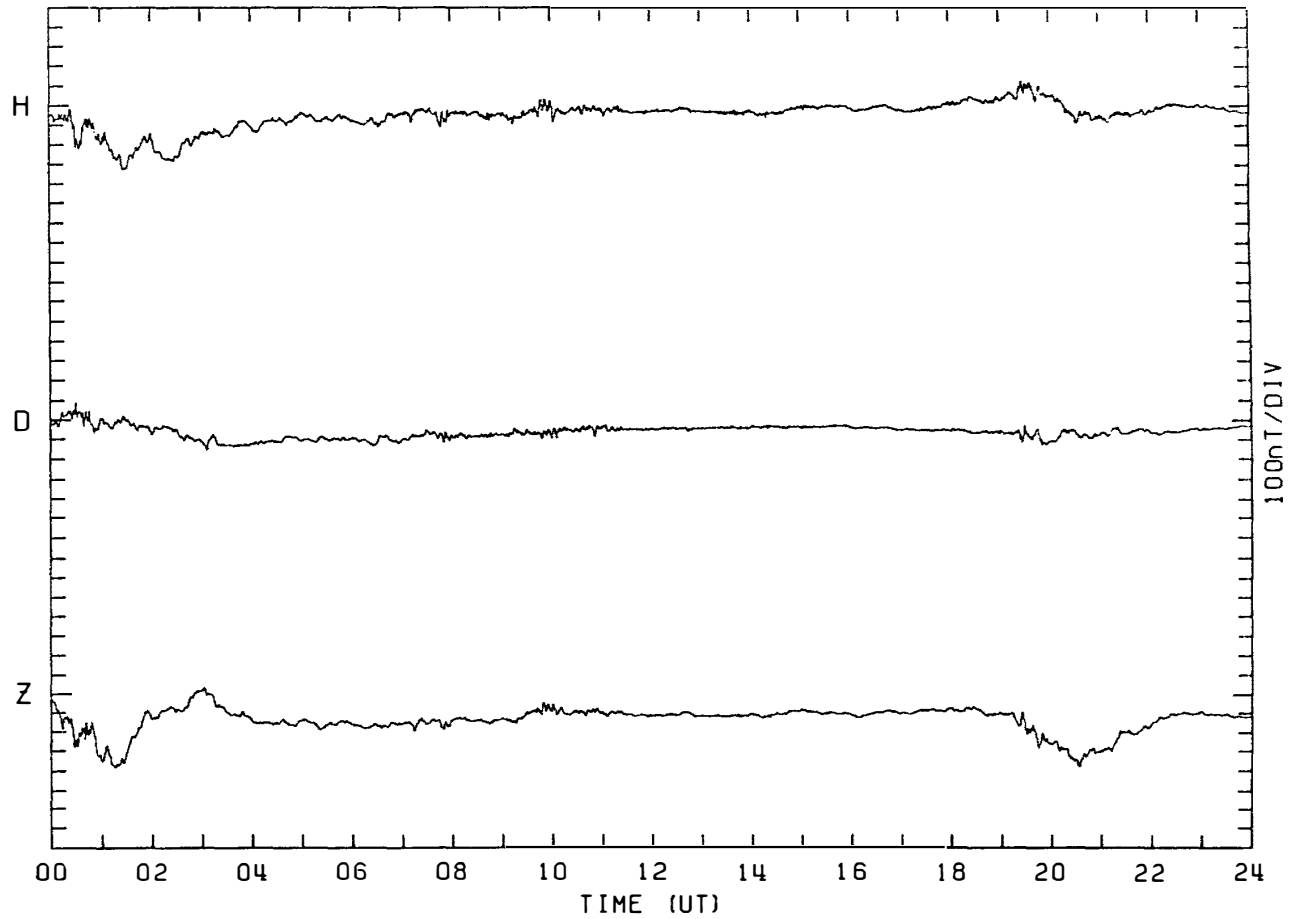
MAGNETOGRAM SYOWA STATION

DAY: 19 JANUARY 19, 1983



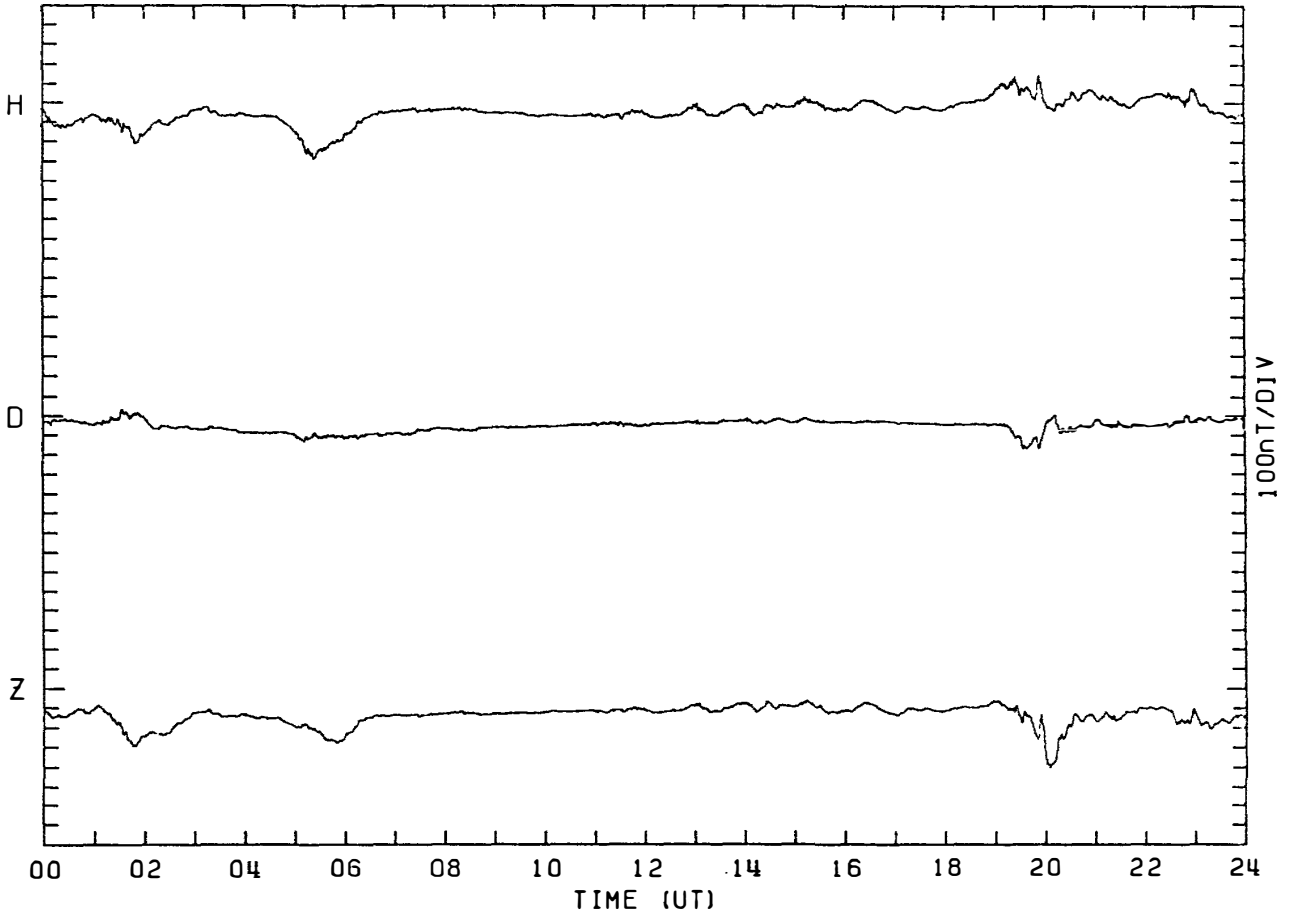
MAGNETOGRAM SYOWA STATION

DAY: 20 JANUARY 20, 1983



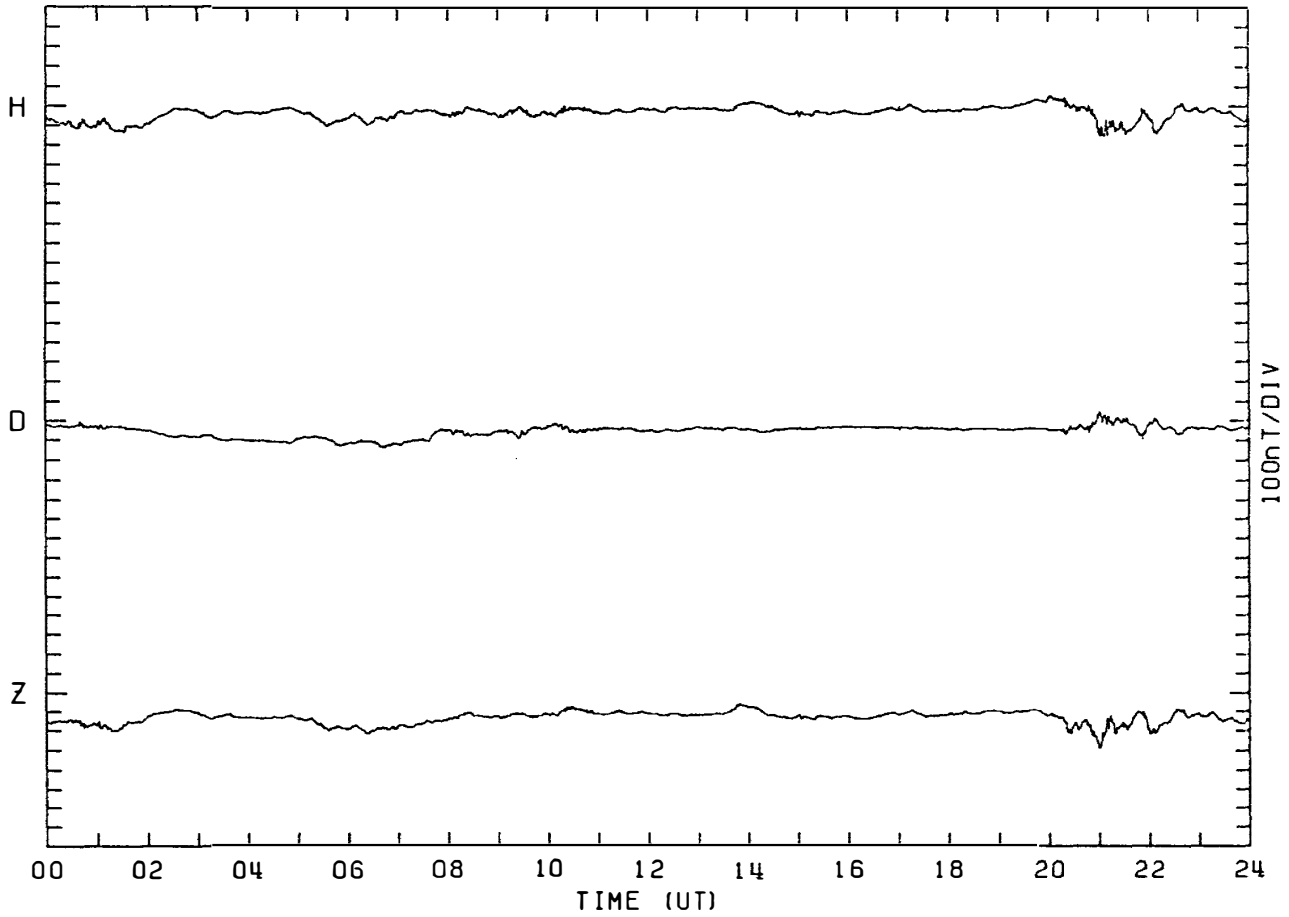
MAGNETOGRAM SYOWA STATION

DAY: 21 JANUARY 21, 1983



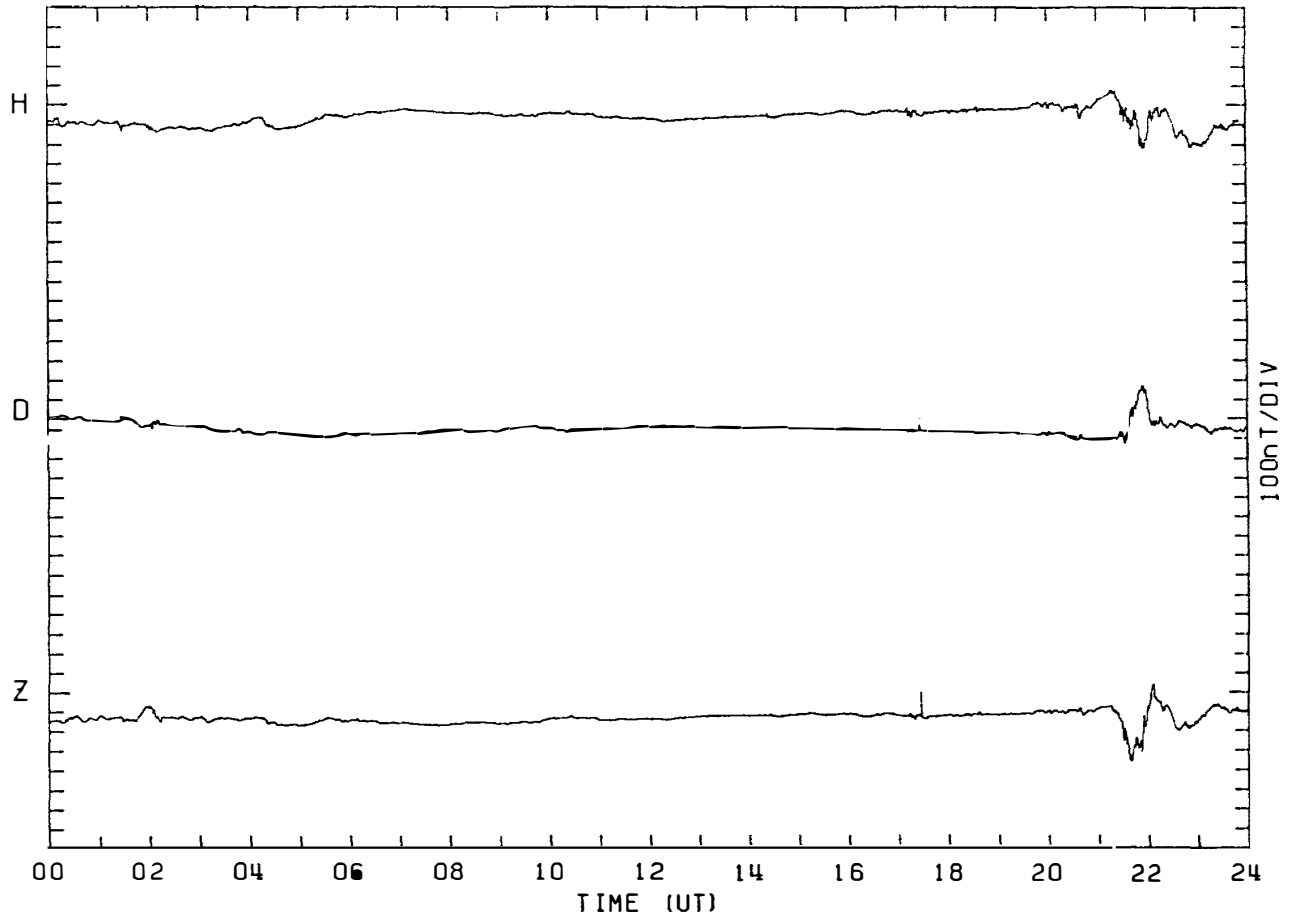
MAGNETOGRAM SYOWA STATION

DAY: 22 JANUARY 22, 1983



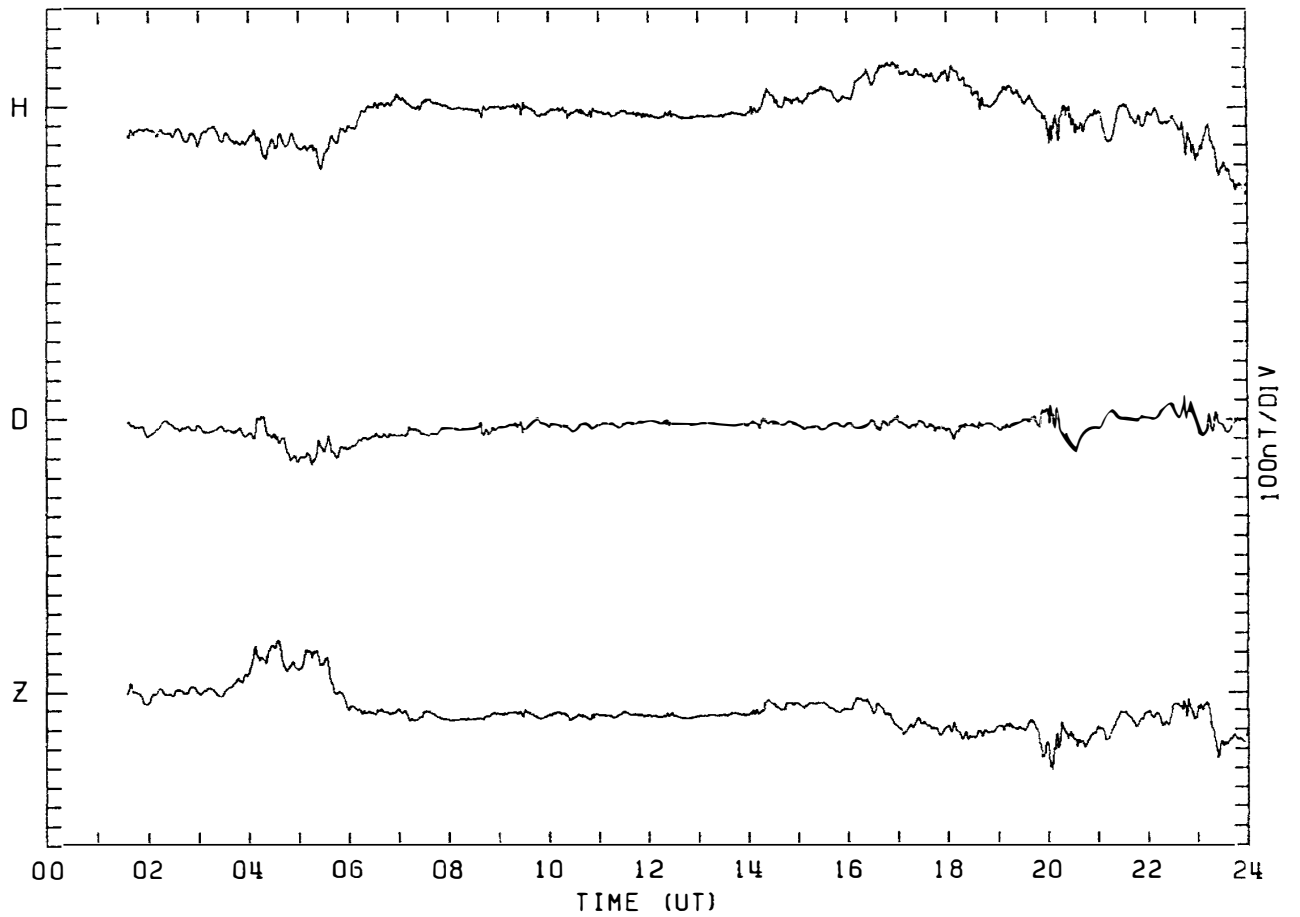
MAGNETOGRAM SYOWA STATION

DAY: 23 JANUARY 23, 1983



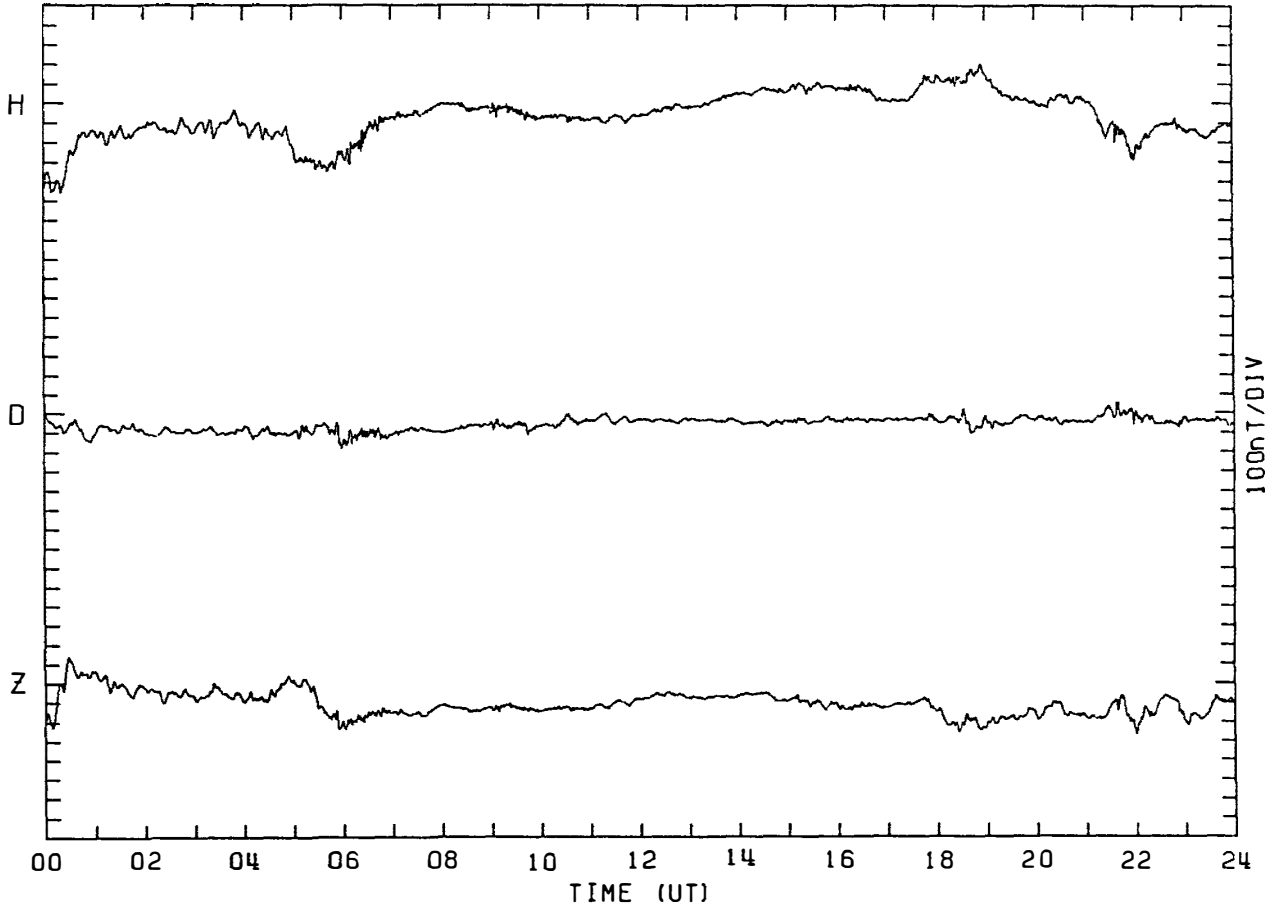
MAGNETOGRAM SYOWA STATION

DAY: 24 JANUARY 24, 1983



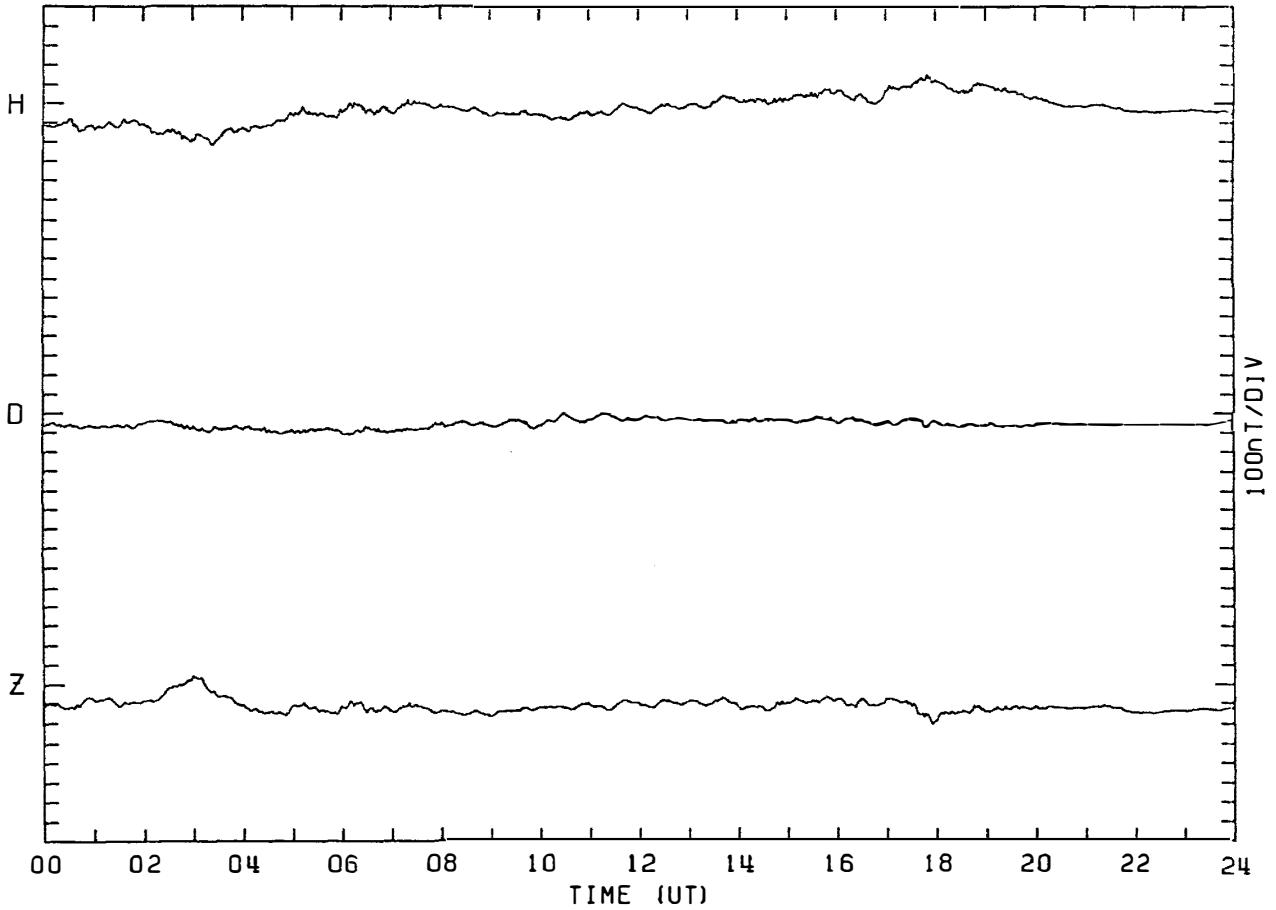
MAGNETOGRAM SYOWA STATION

DAY: 25 JANUARY 25, 1983



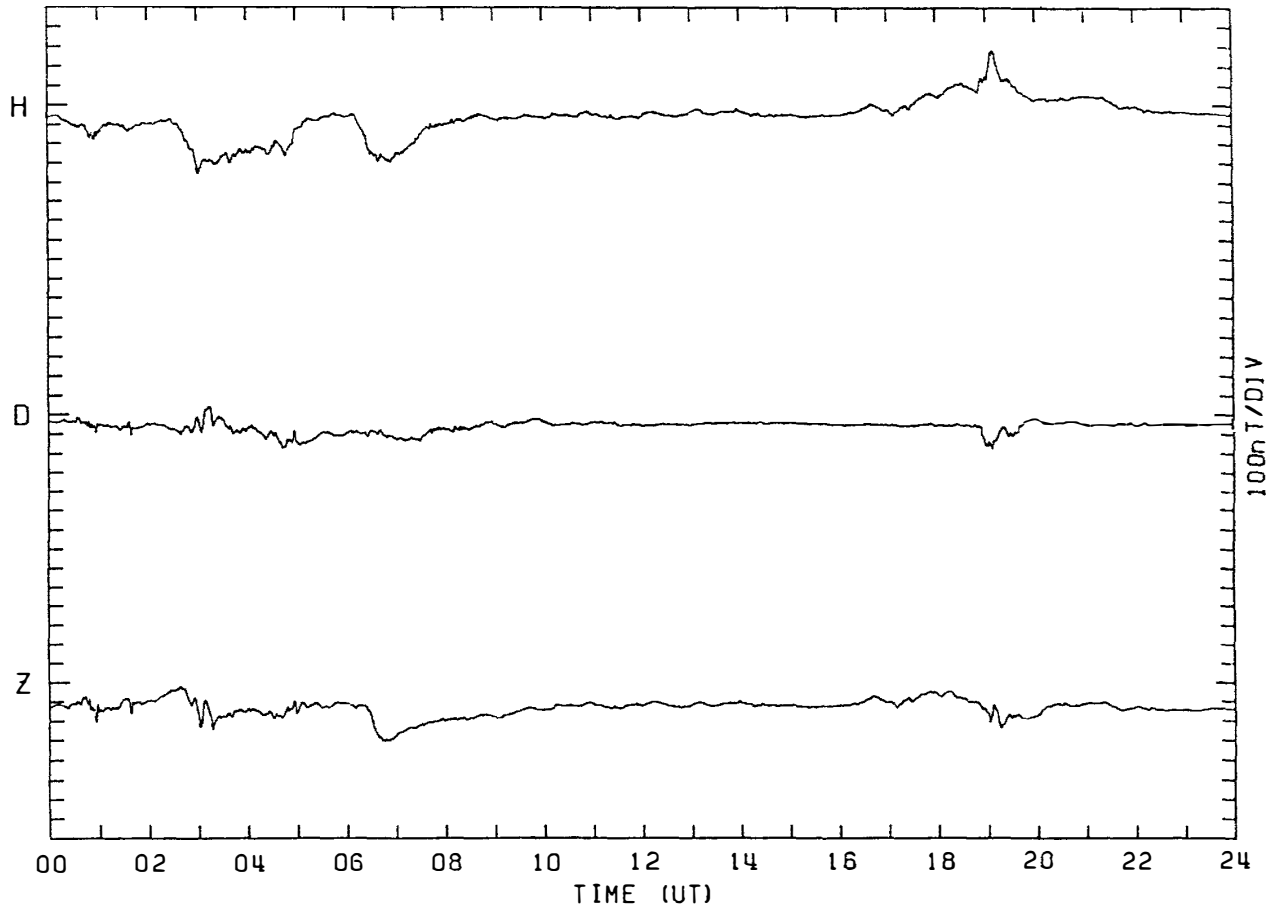
MAGNETOGRAM SYOWA STATION

DAY: 26 JANUARY 26, 1983



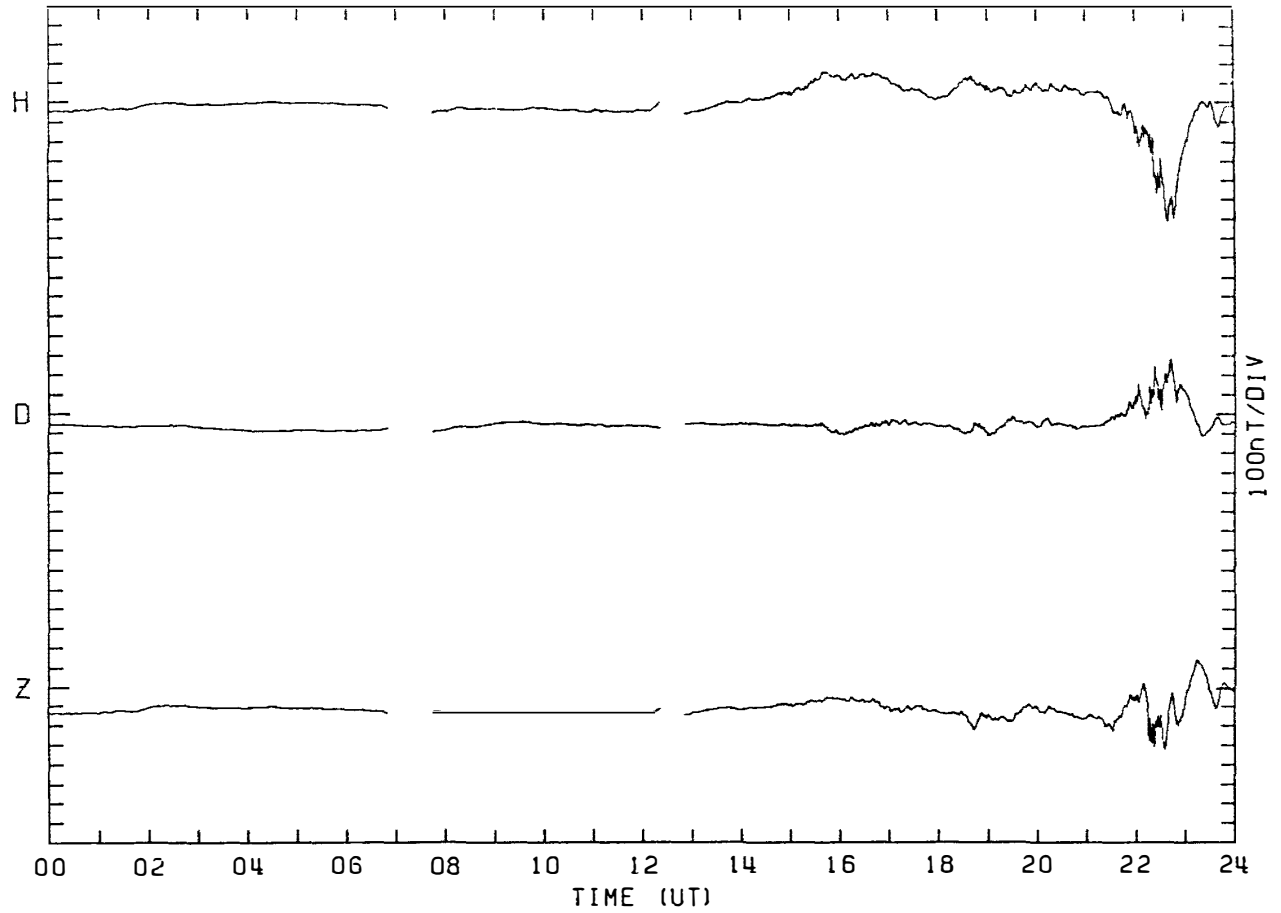
MAGNETOGRAM SYOWA STATION

DAY: 27 JANUARY 27. 1983



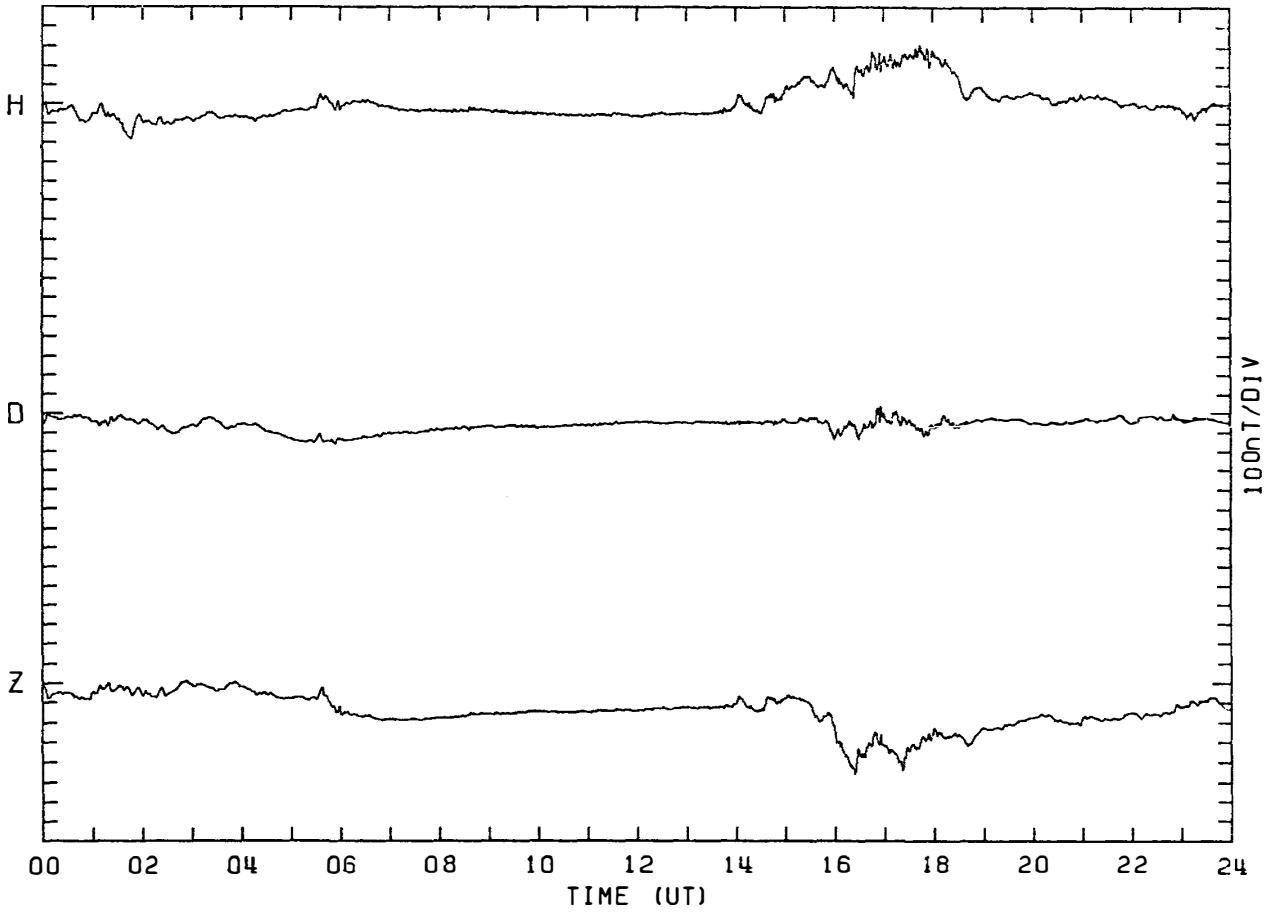
MAGNETOGRAM SYOWA STATION

DAY: 28 JANUARY 28. 1983



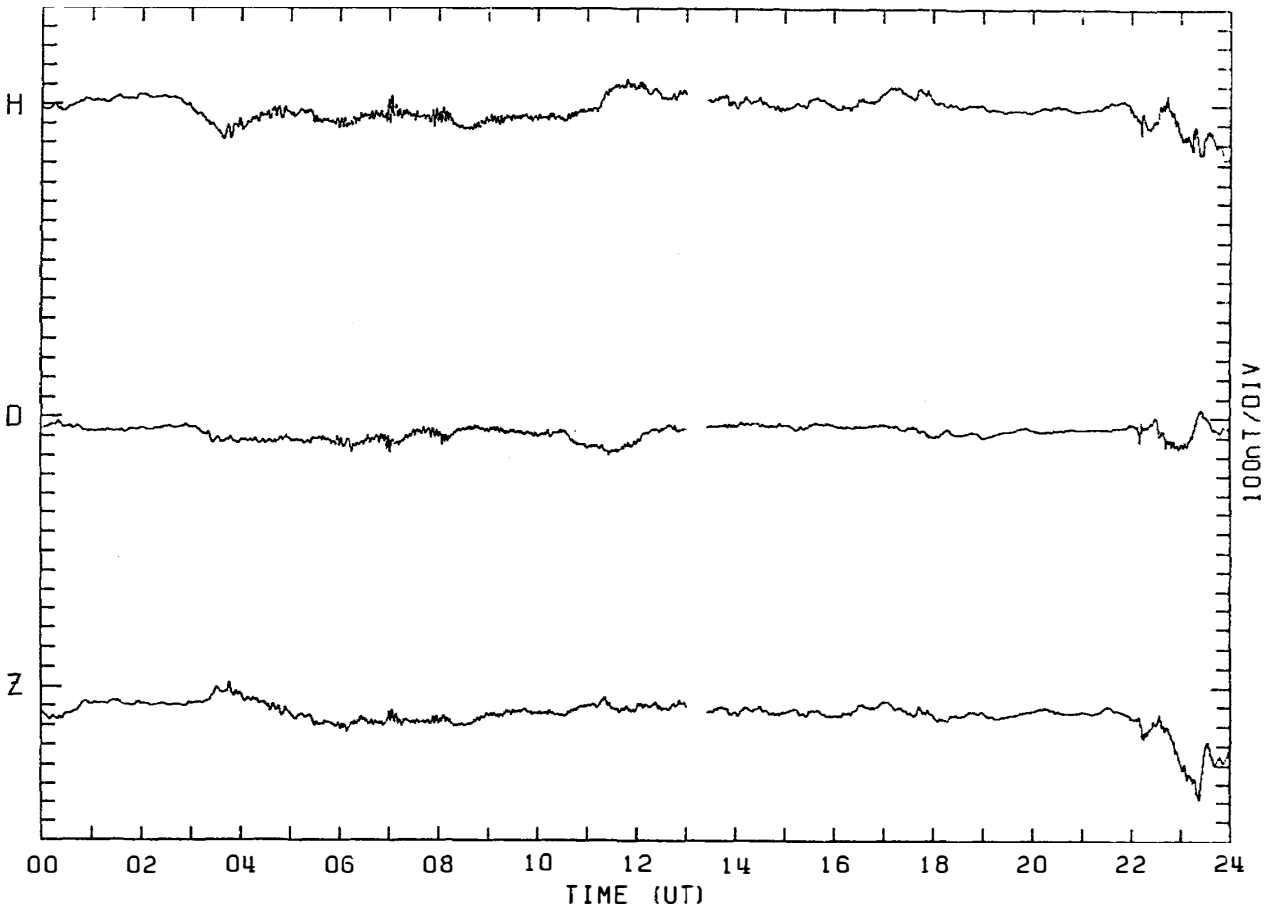
MAGNETOGRAM SYOWA STATION

DAY: 29 JANUARY 29, 1983



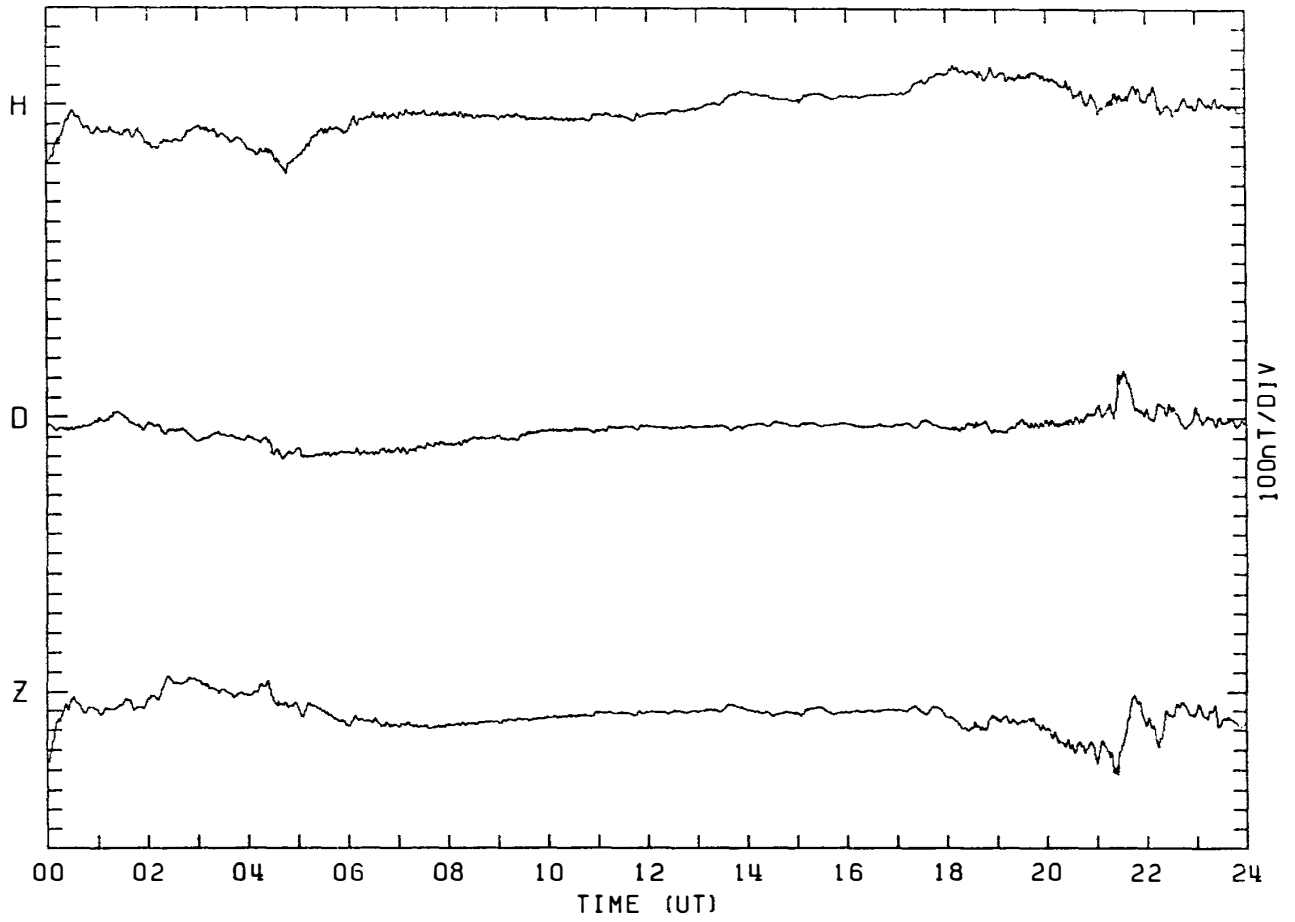
MAGNETOGRAM SYOWA STATION

DAY: 30 JANUARY 30, 1983



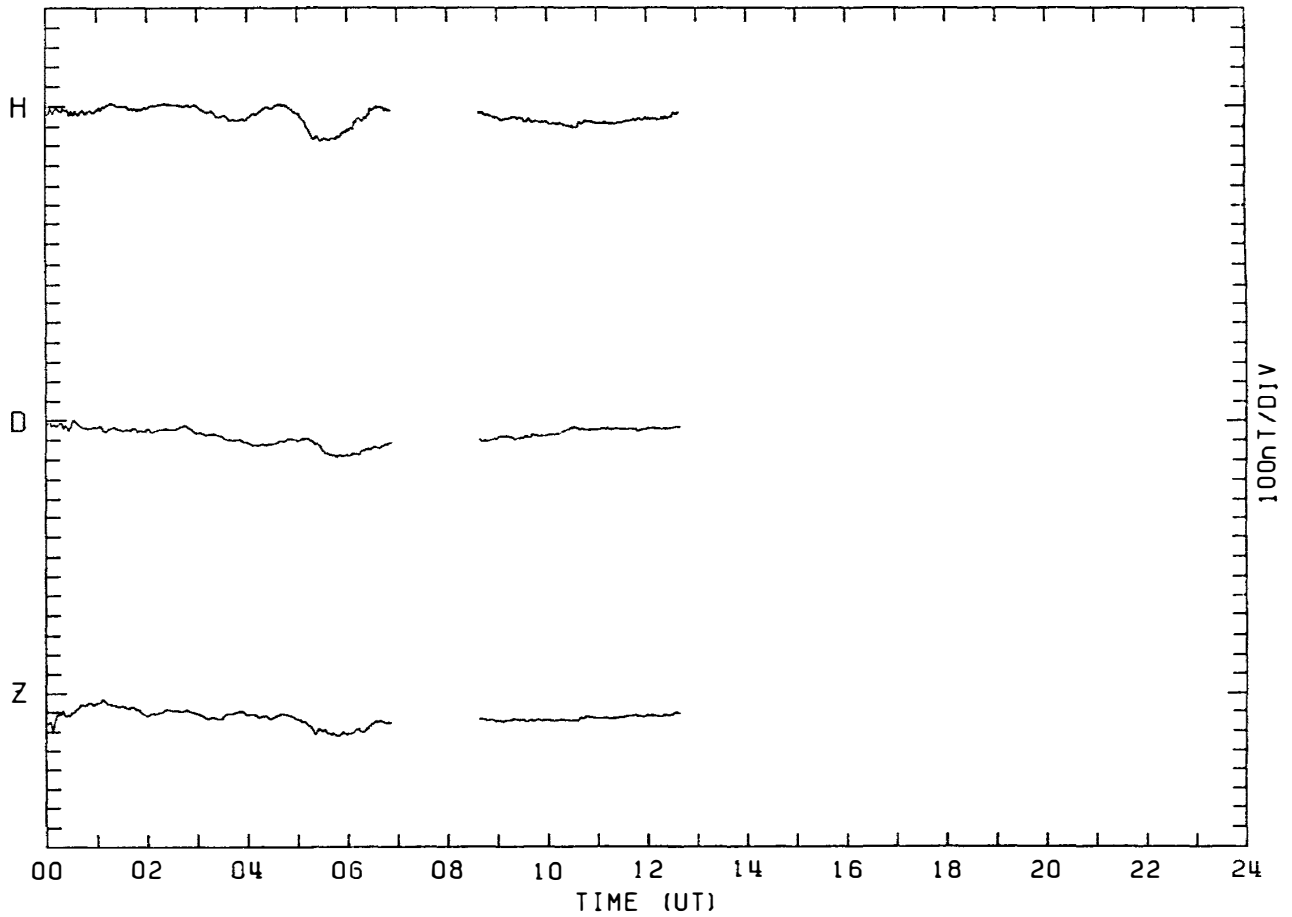
MAGNETOGRAM SYOWA STATION

DAY: 31 JANUARY 31. 1983



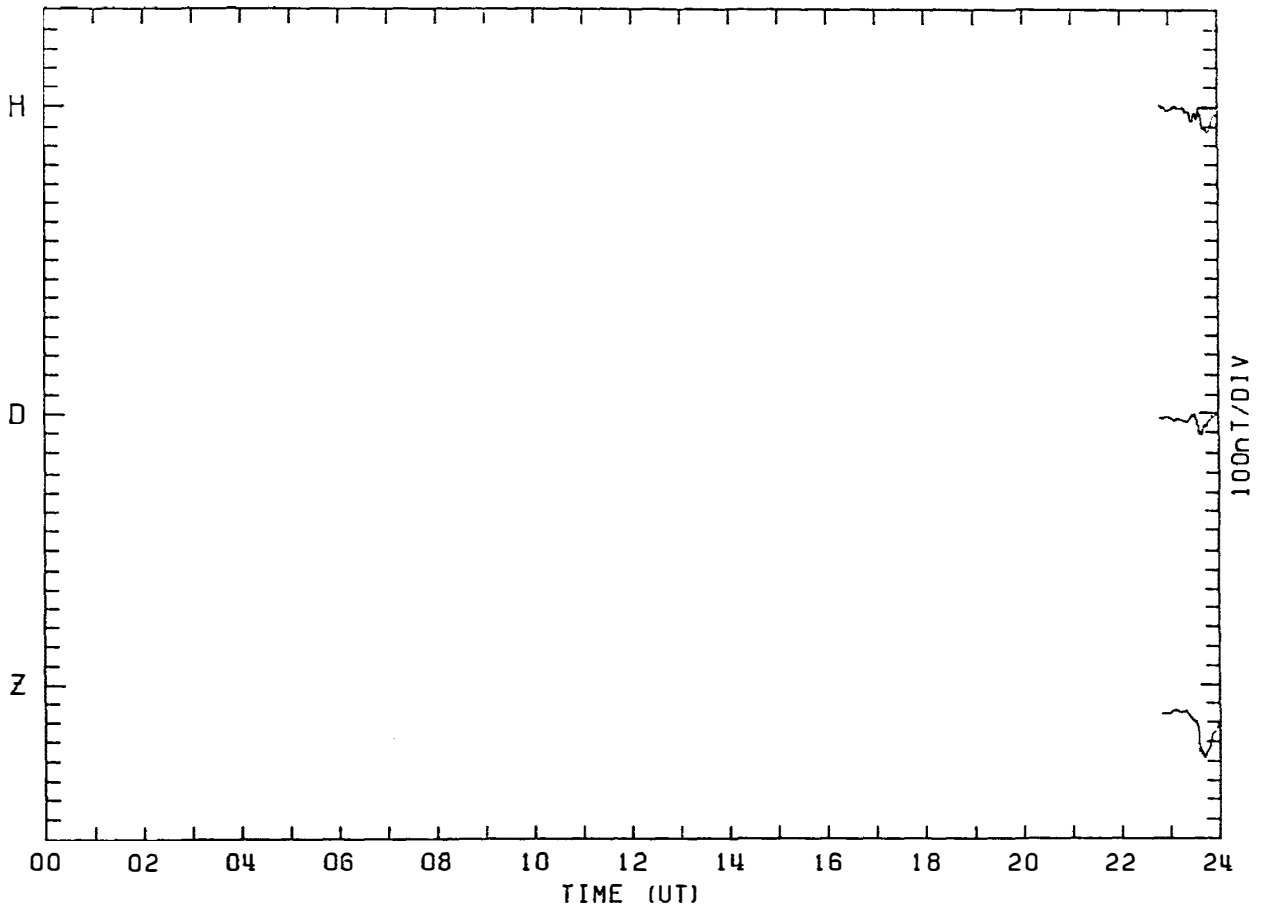
MAGNETOGRAM SYOWA STATION

DAY: 32 FEBRUARY 1. 1983



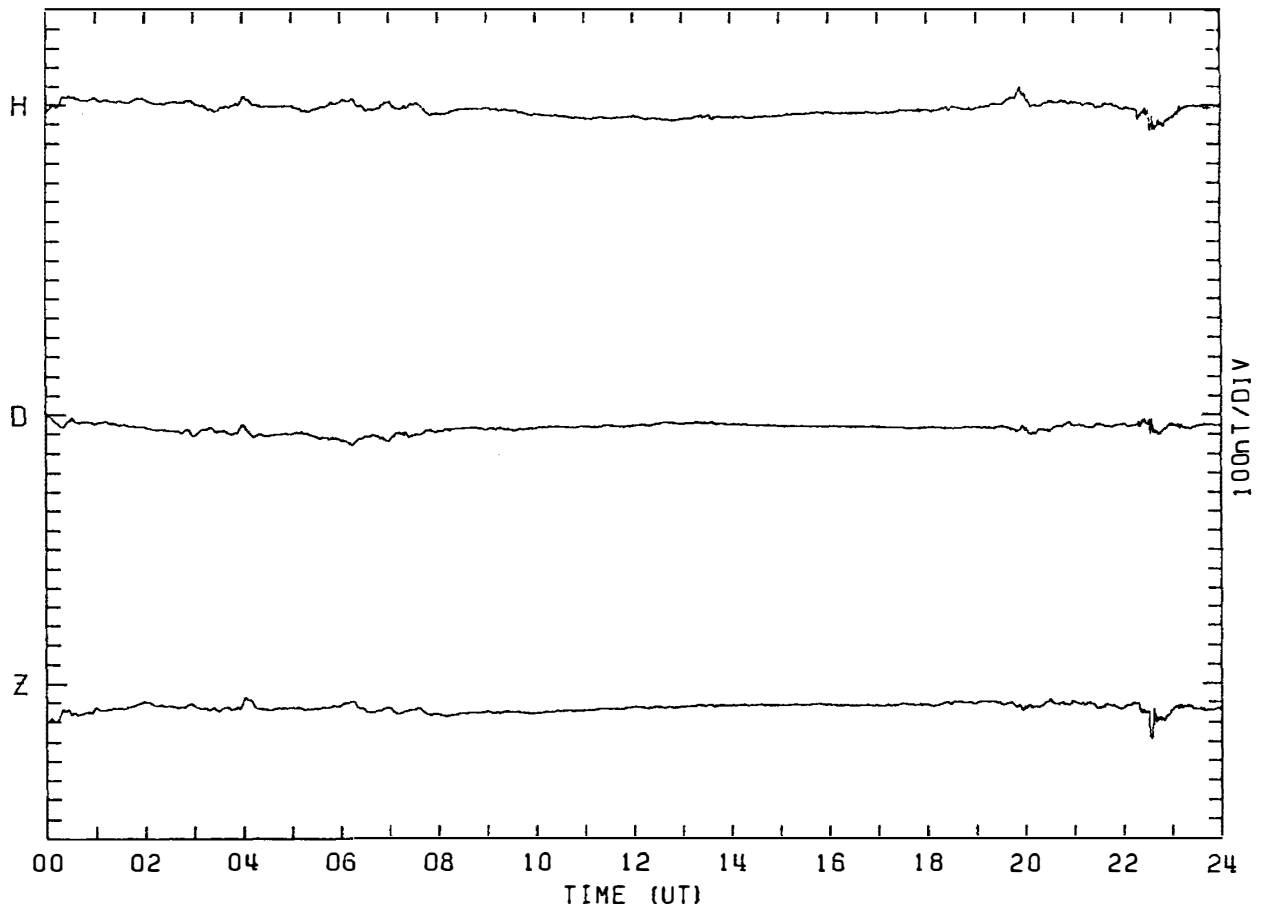
MAGNETOGRAM SYOWA STATION

DAY: 33 FEBRUARY 2. 1983



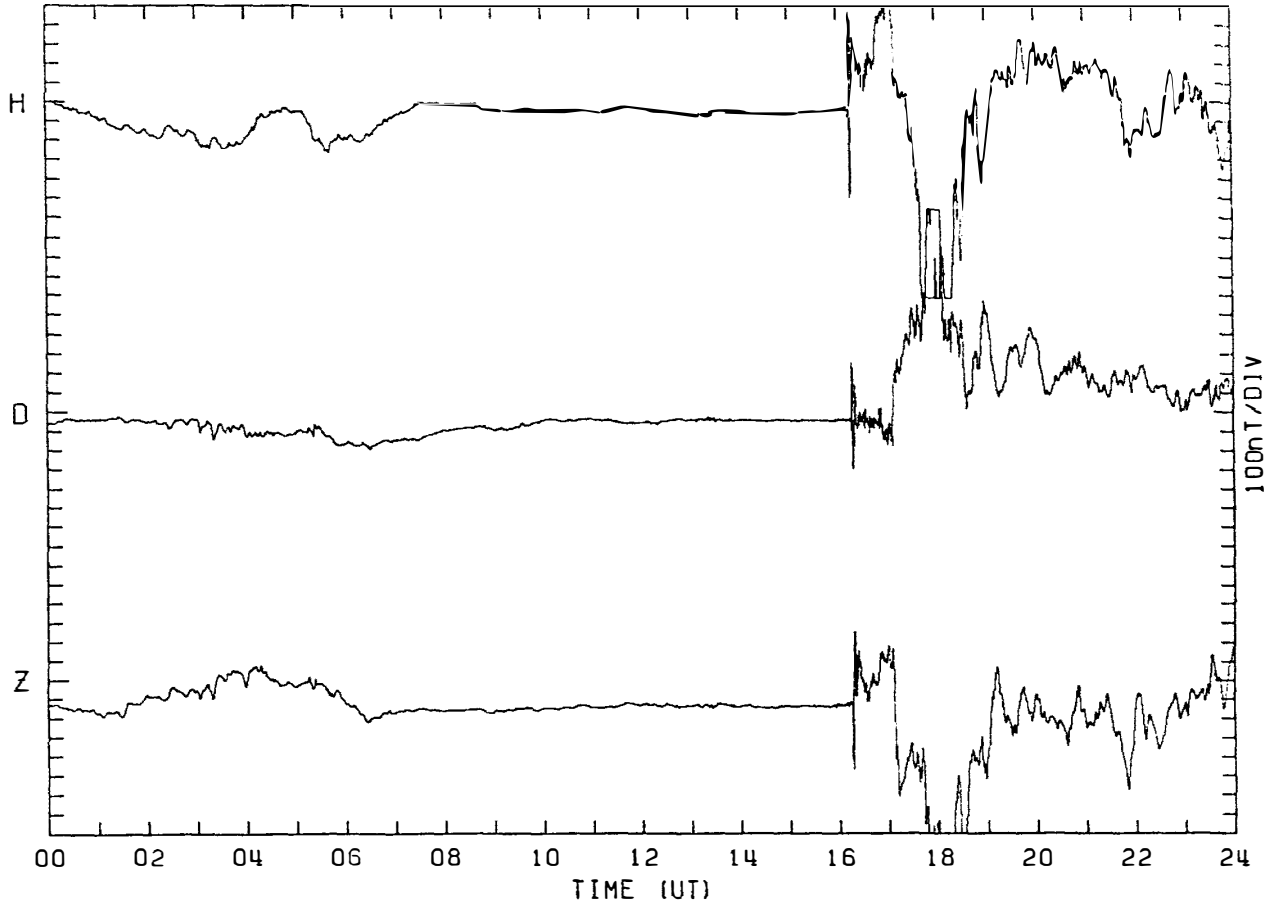
MAGNETOGRAM SYOWA STATION

DAY: 34 FEBRUARY 3. 1983



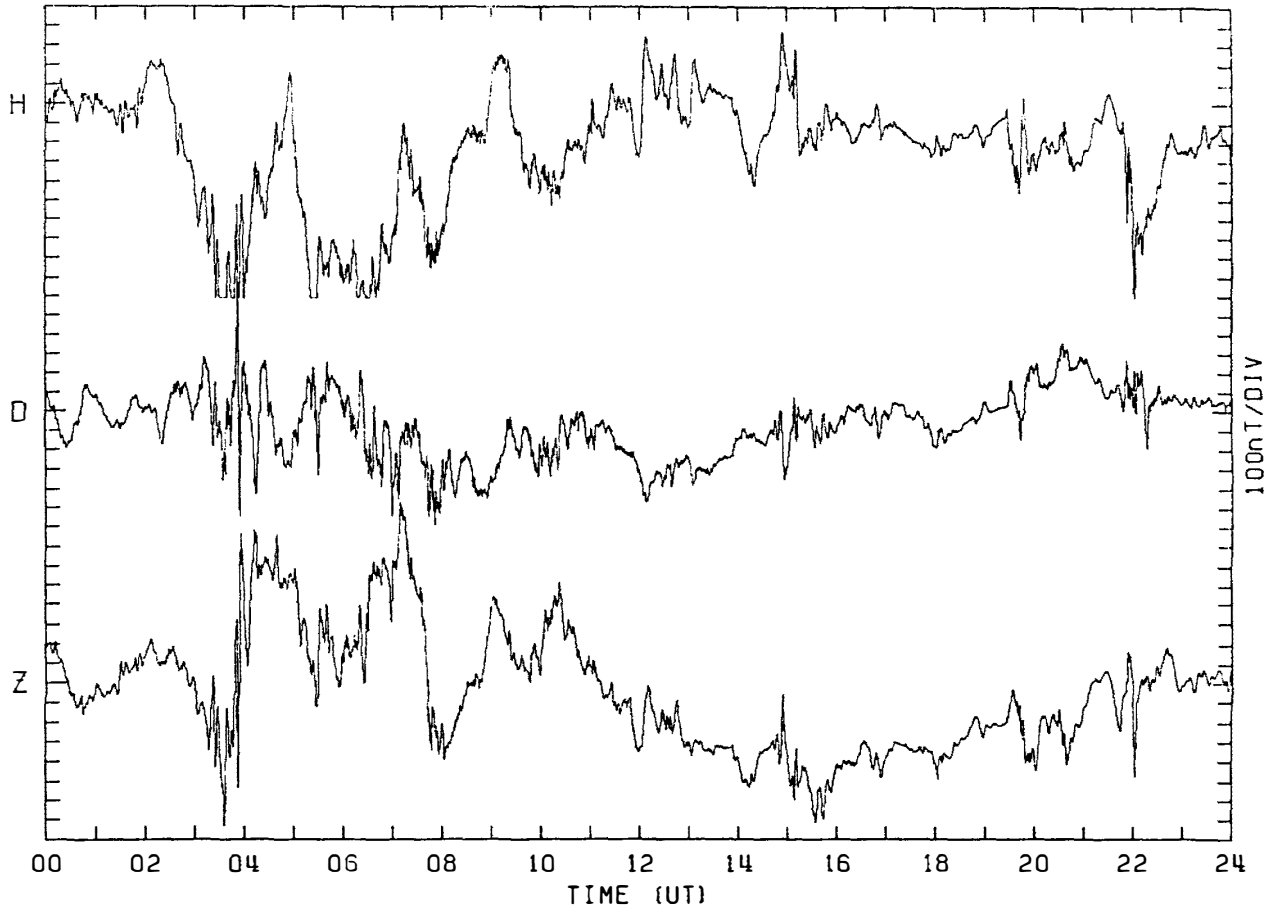
MAGNETOGRAM SYOWA STATION

DAY: 35 FEBRUARY 4, 1983



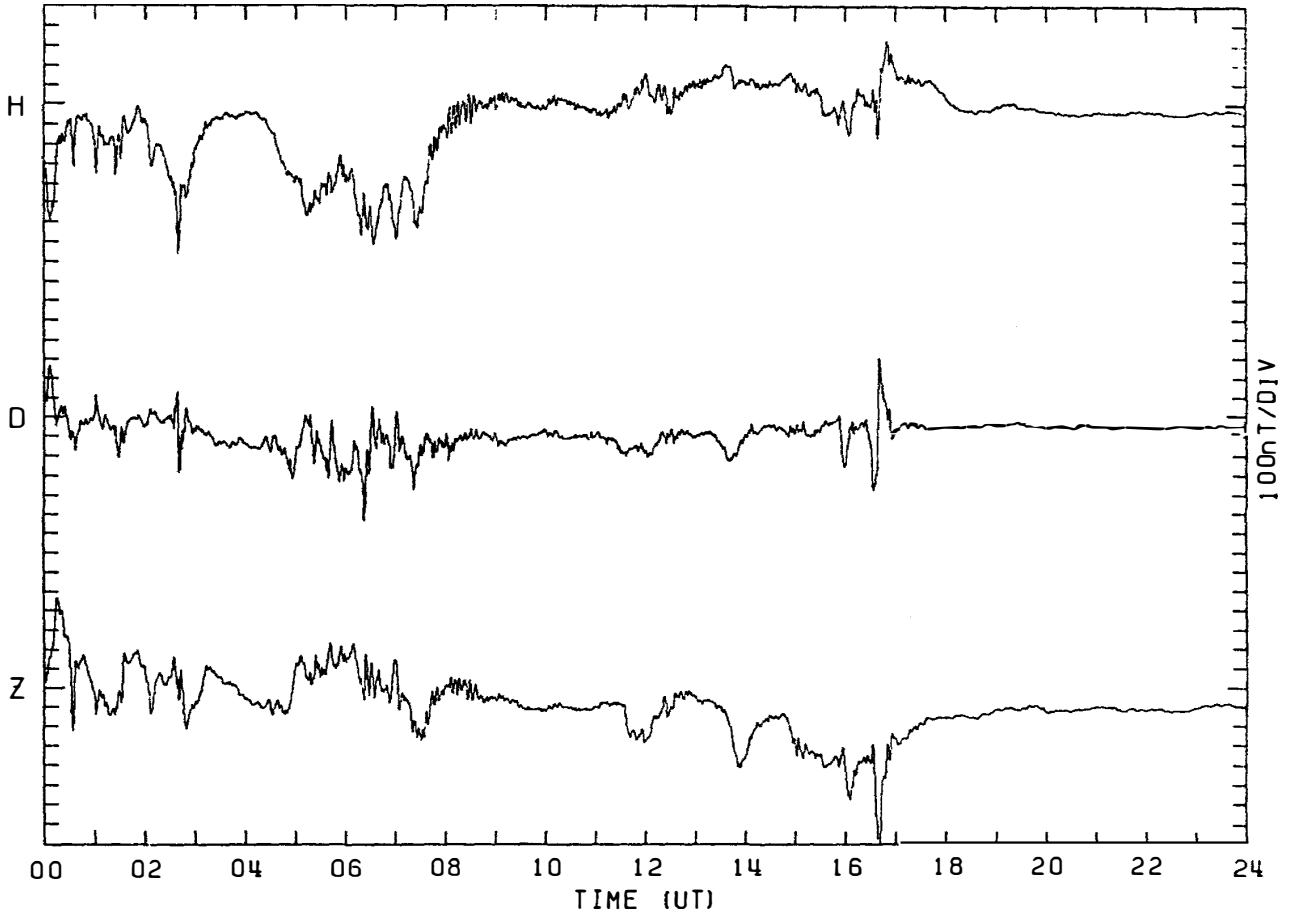
MAGNETOGRAM SYOWA STATION

DAY: 36 FEBRUARY 5, 1983



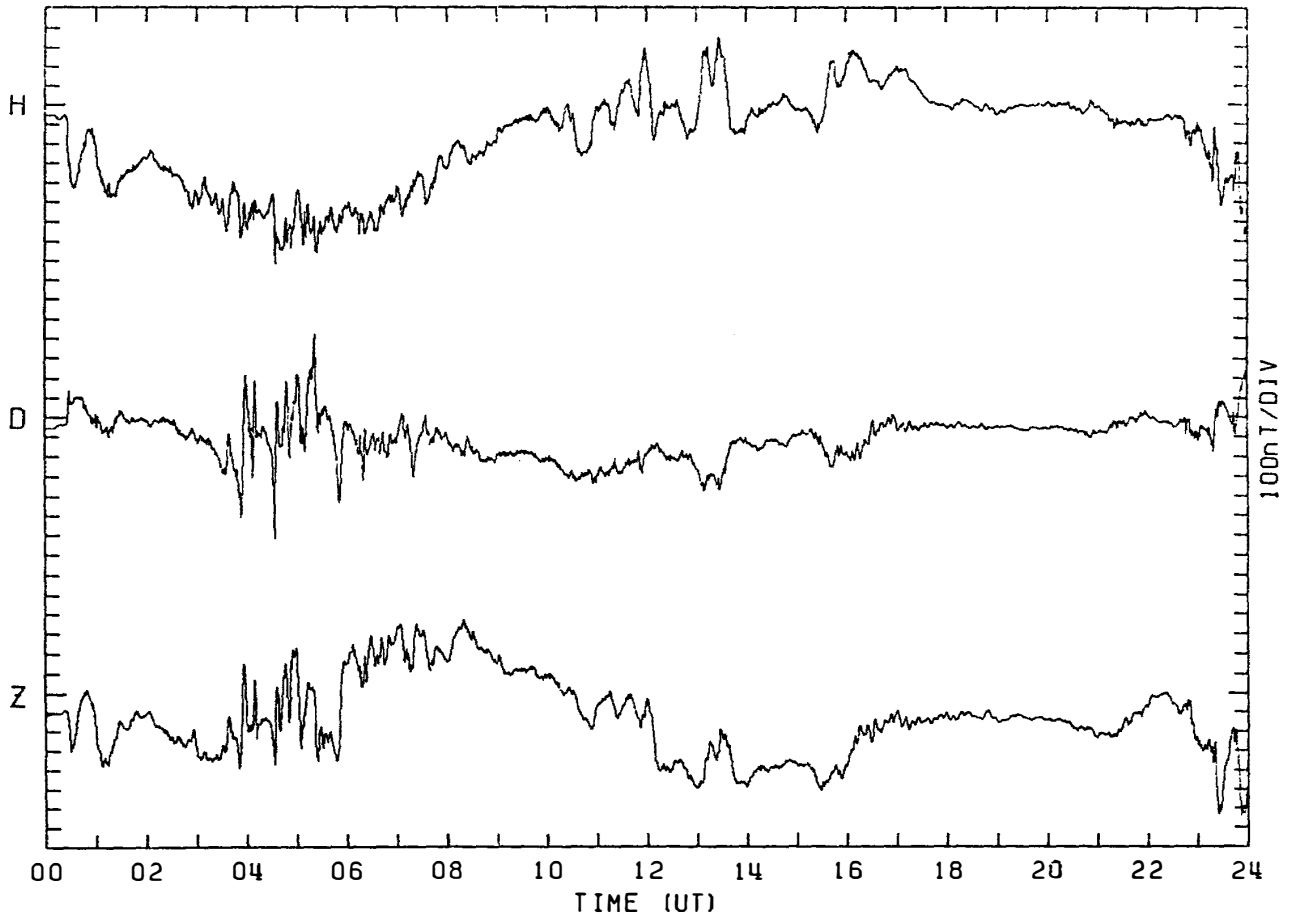
MAGNETOGRAM SYOWA STATION

DAY: 37 FEBRUARY 6. 1983



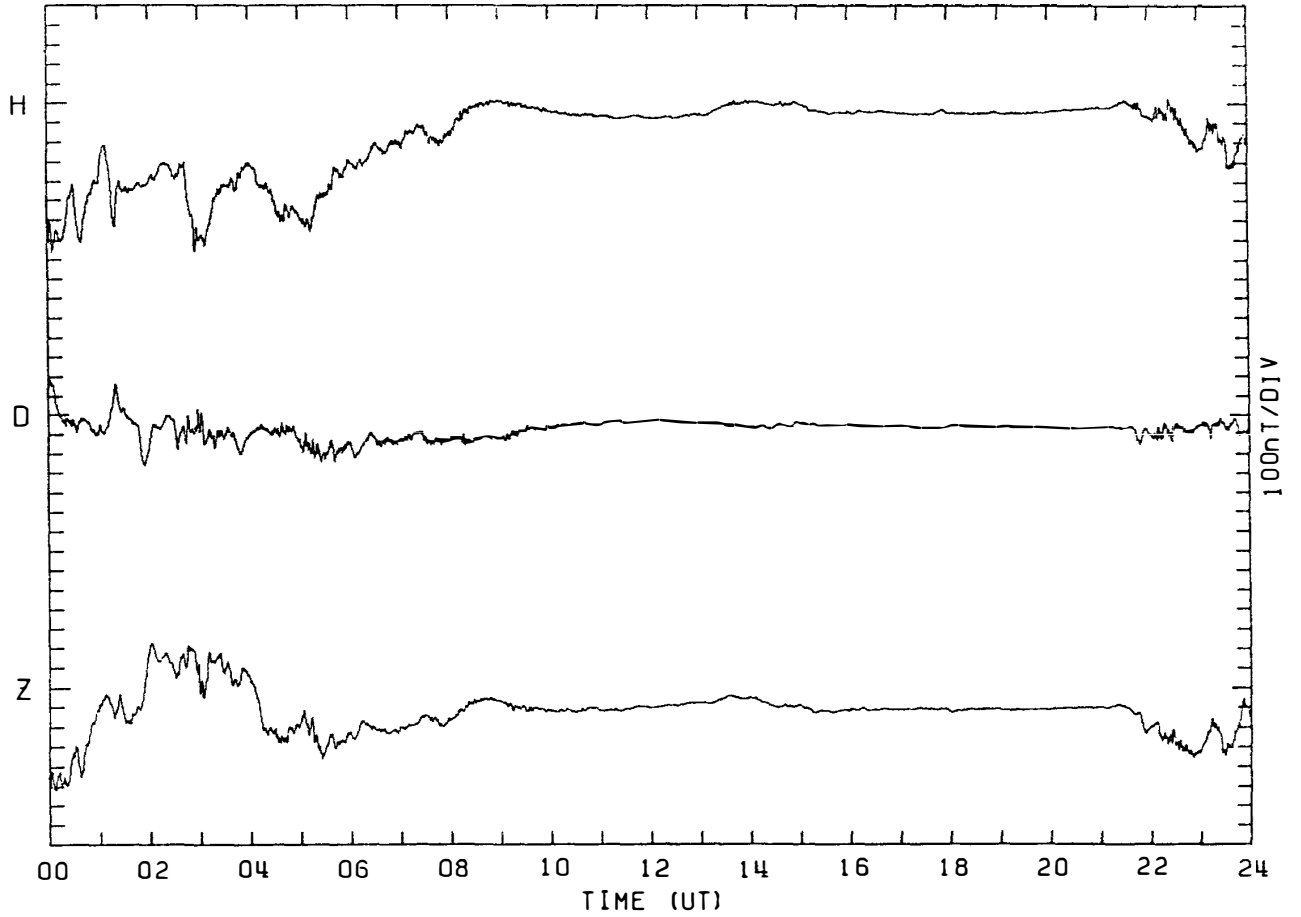
MAGNETOGRAM SYOWA STATION

DAY: 38 FEBRUARY 7. 1983



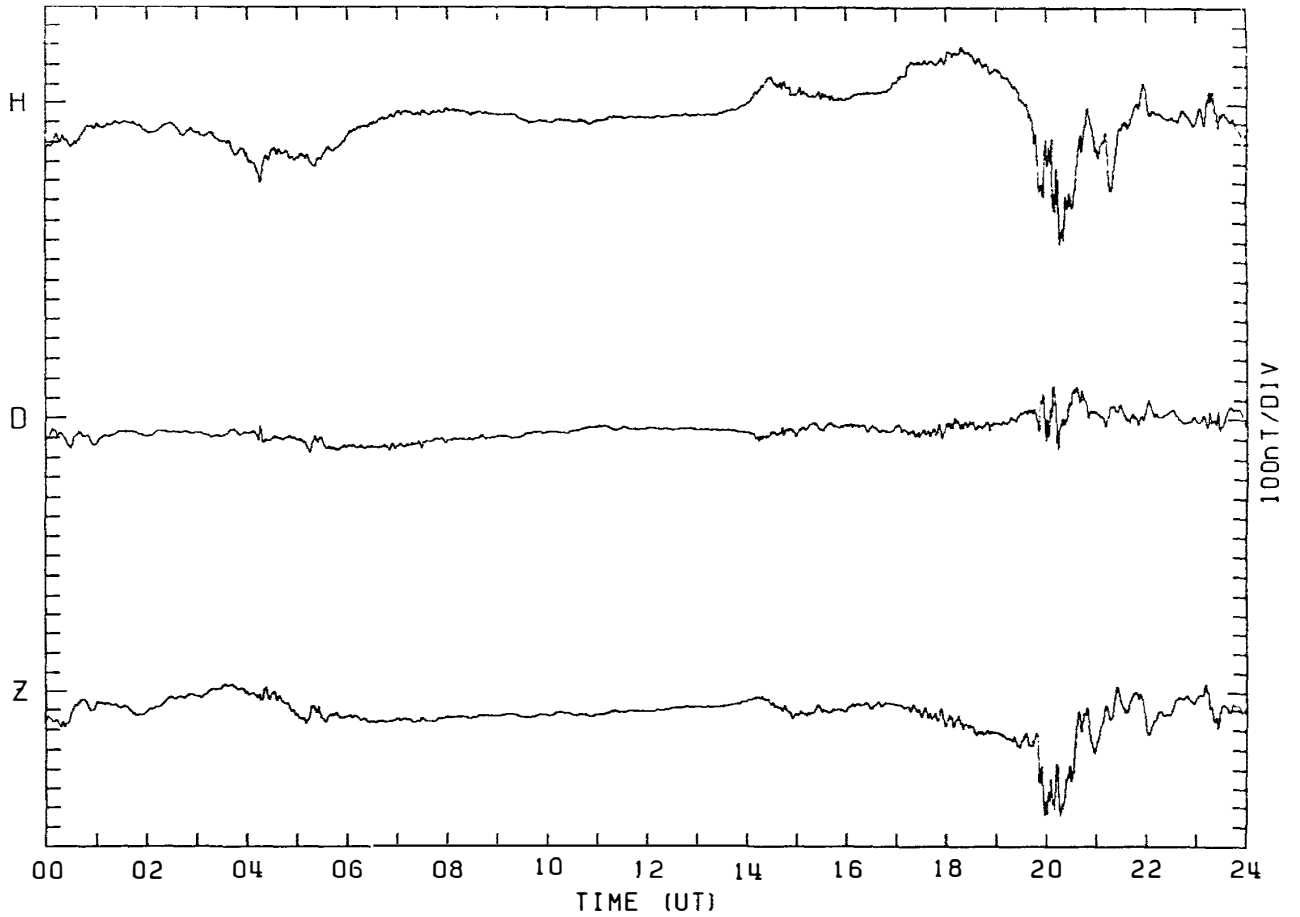
MAGNETOGRAM SYOWA STATION

DAY: 39 FEBRUARY 8. 1983



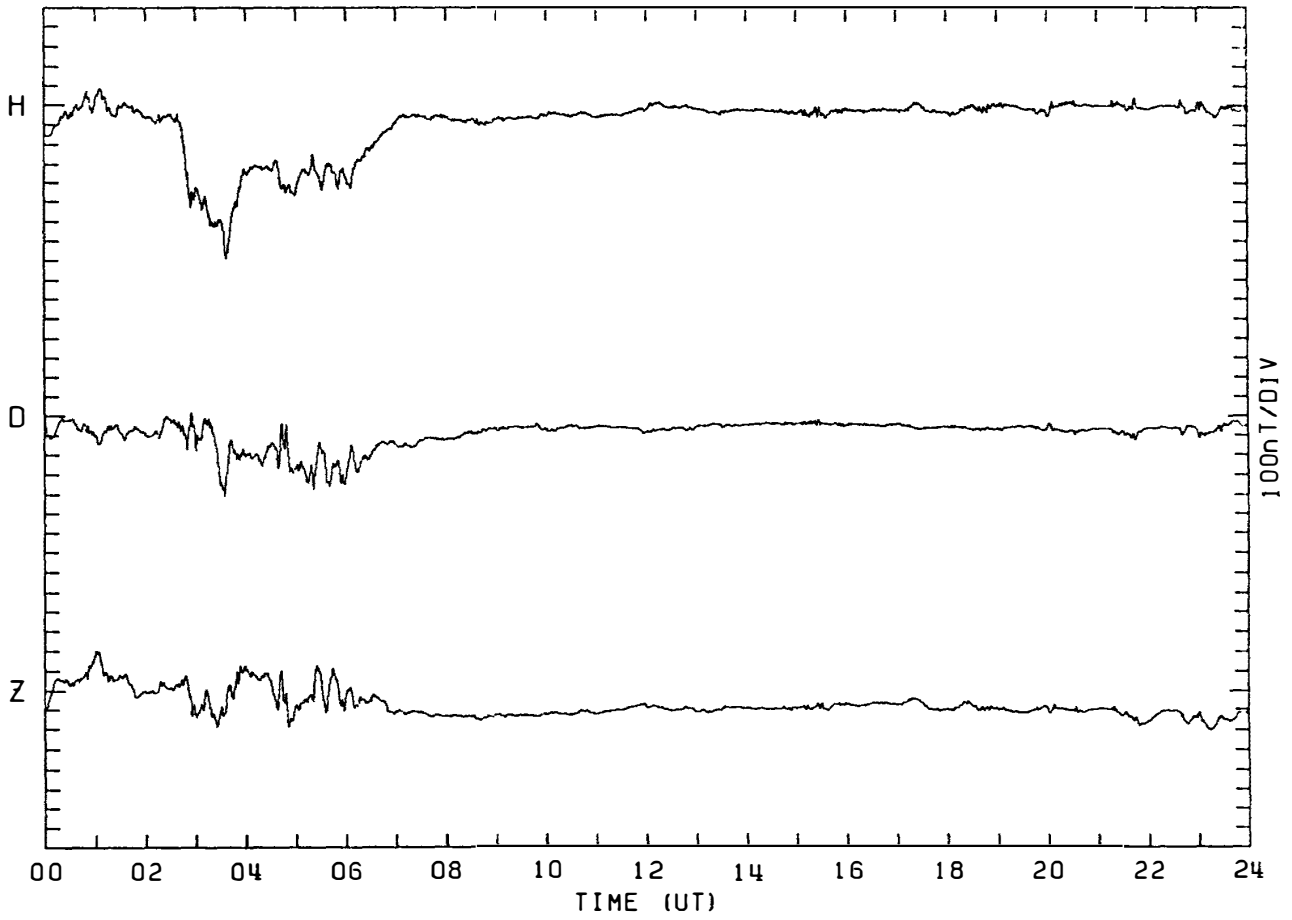
MAGNETOGRAM SYOWA STATION

DAY: 40 FEBRUARY 9. 1983



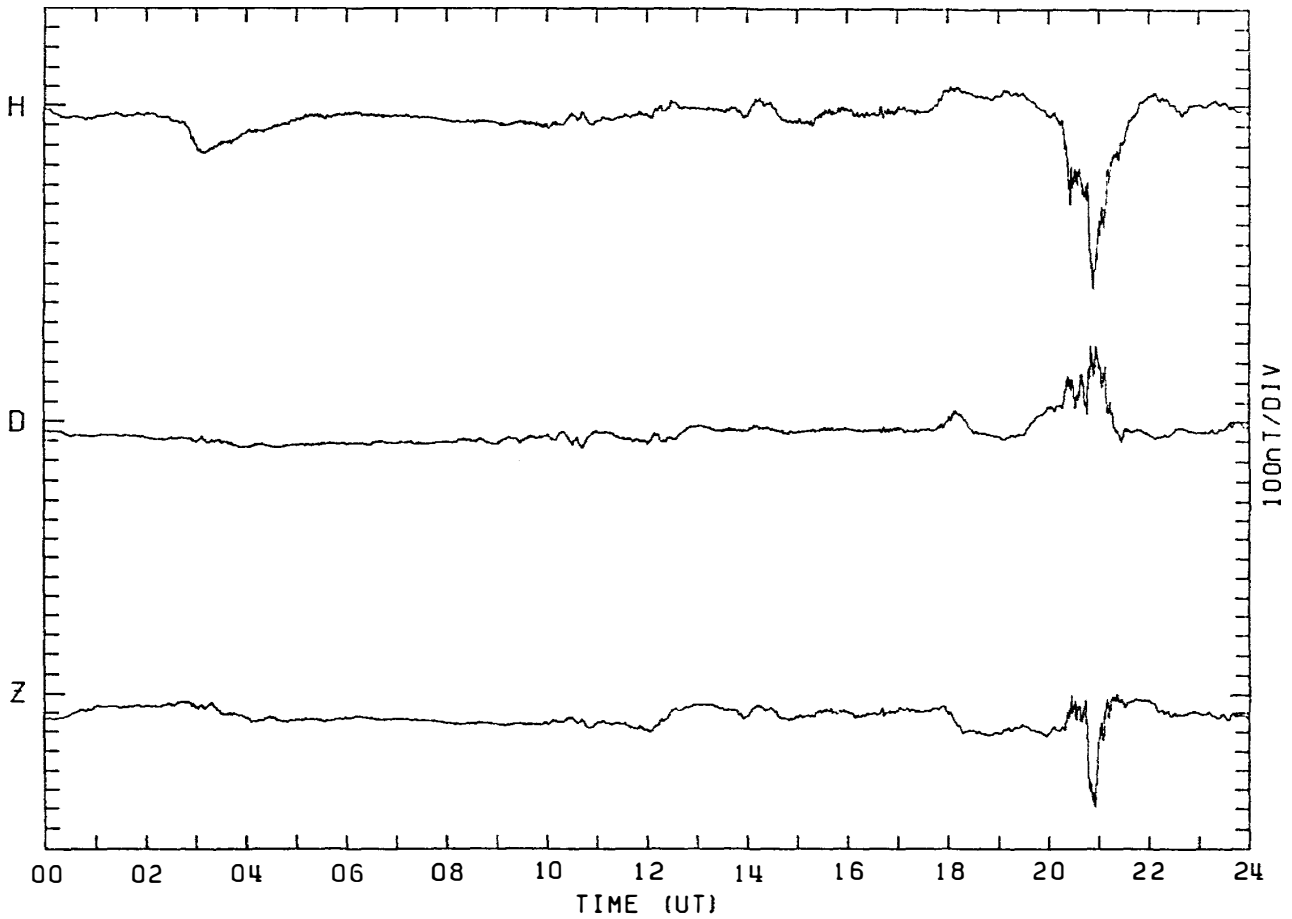
MAGNETOGRAM SYOWA STATION

DAY: 41 FEBRUARY 10. 1983



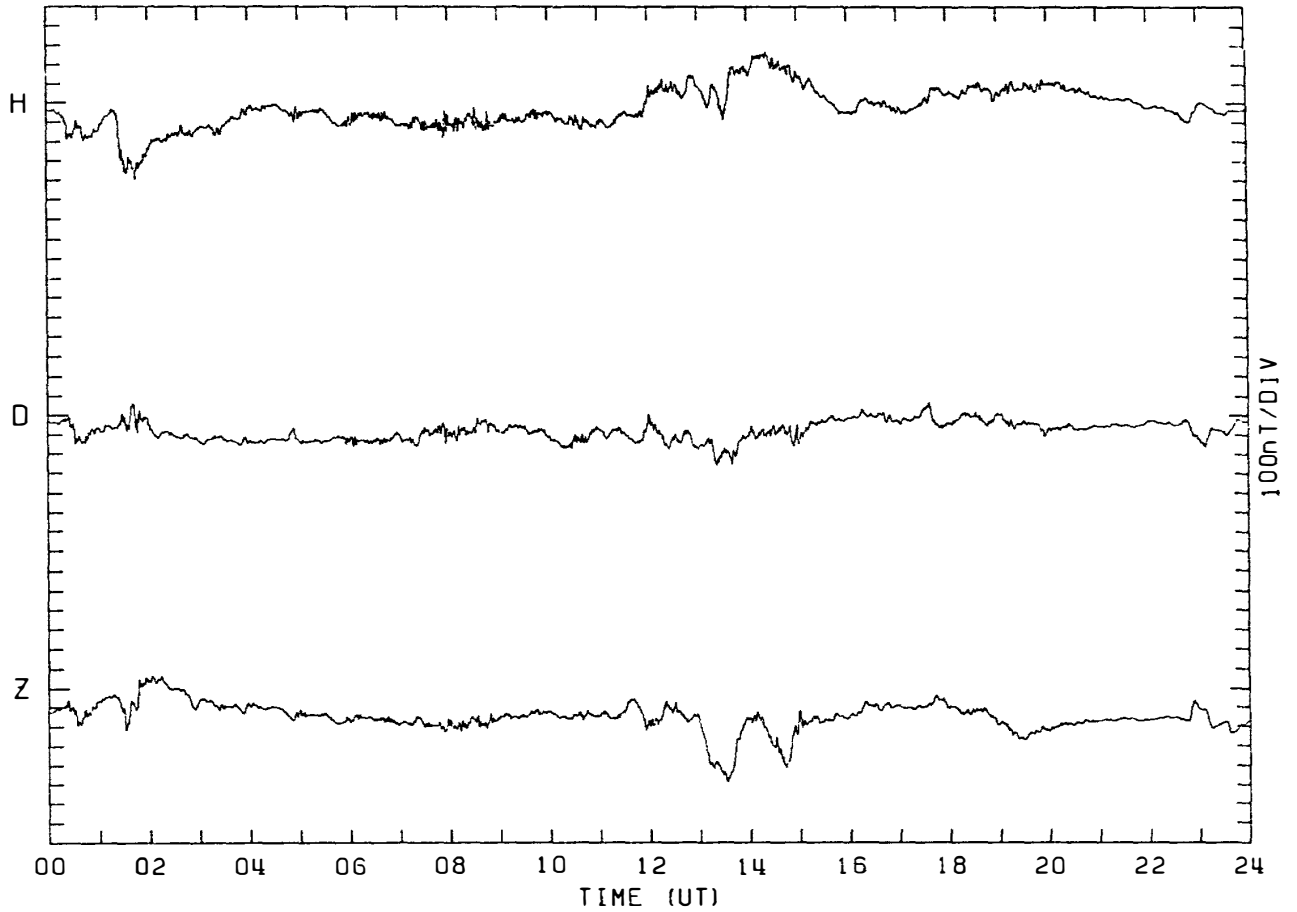
MAGNETOGRAM SYOWA STATION

DAY: 42 FEBRUARY 11. 1983



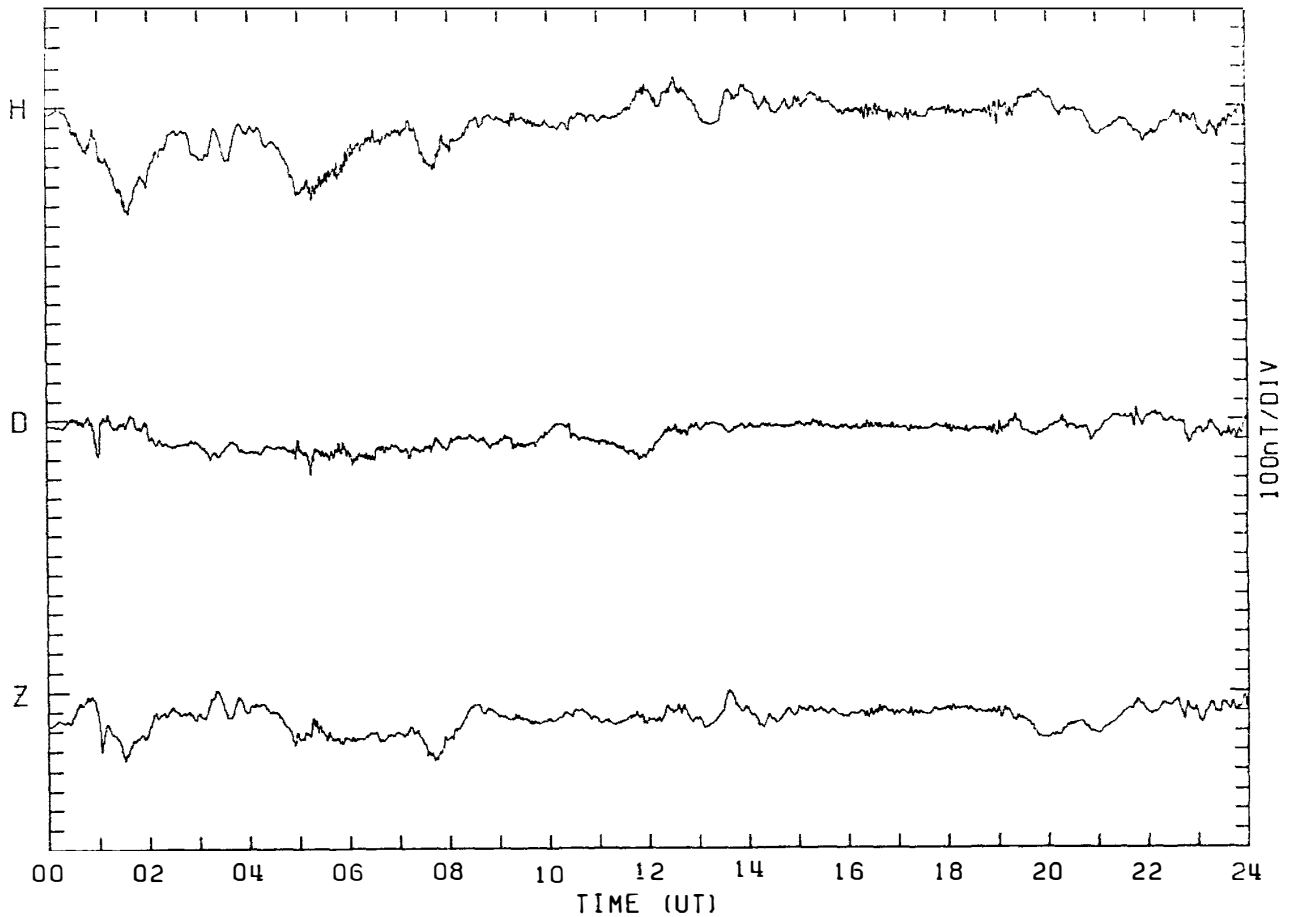
MAGNETOGRAM SYOWA STATION

DAY: 43 FEBRUARY 12. 1983



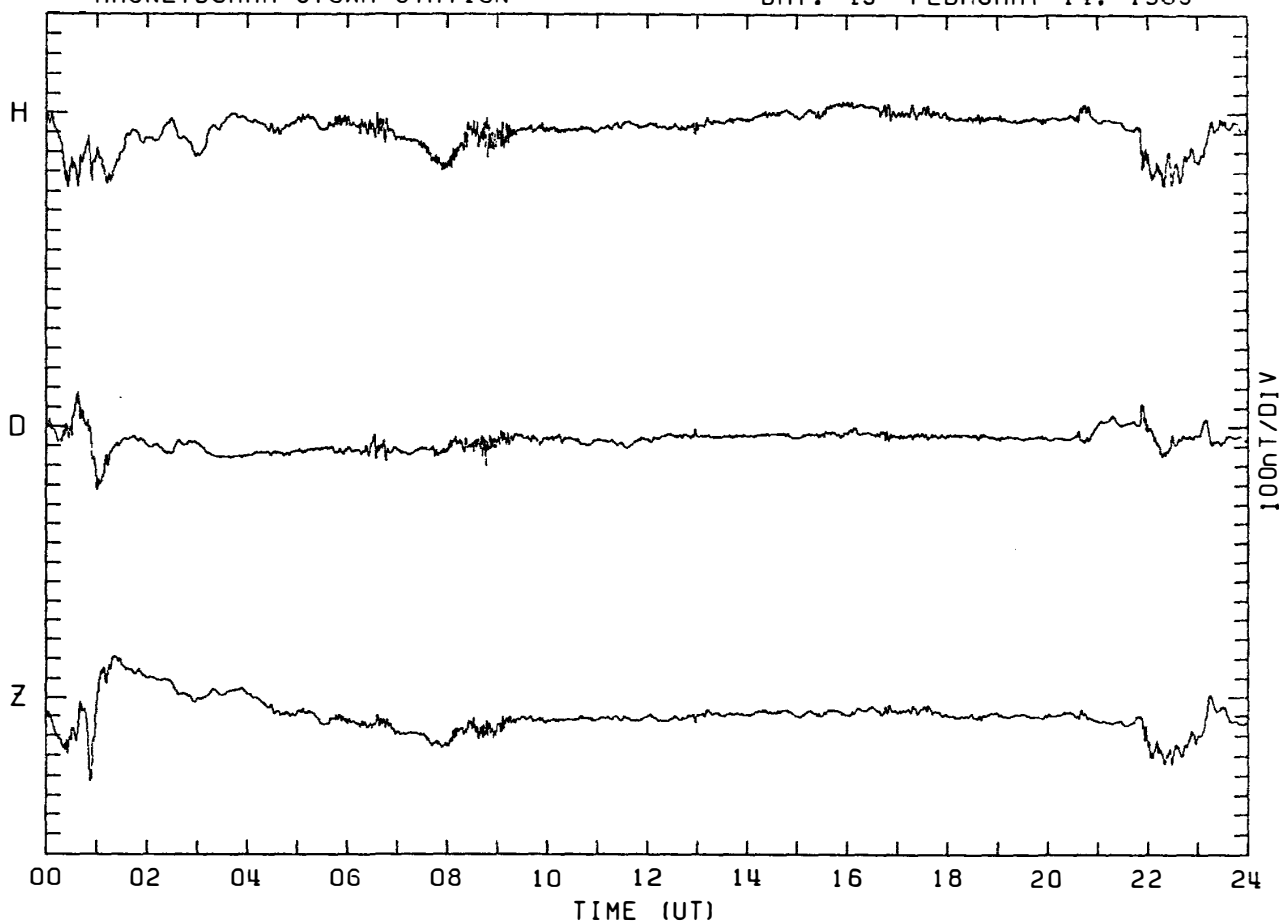
MAGNETOGRAM SYOWA STATION

DAY: 44 FEBRUARY 13. 1983



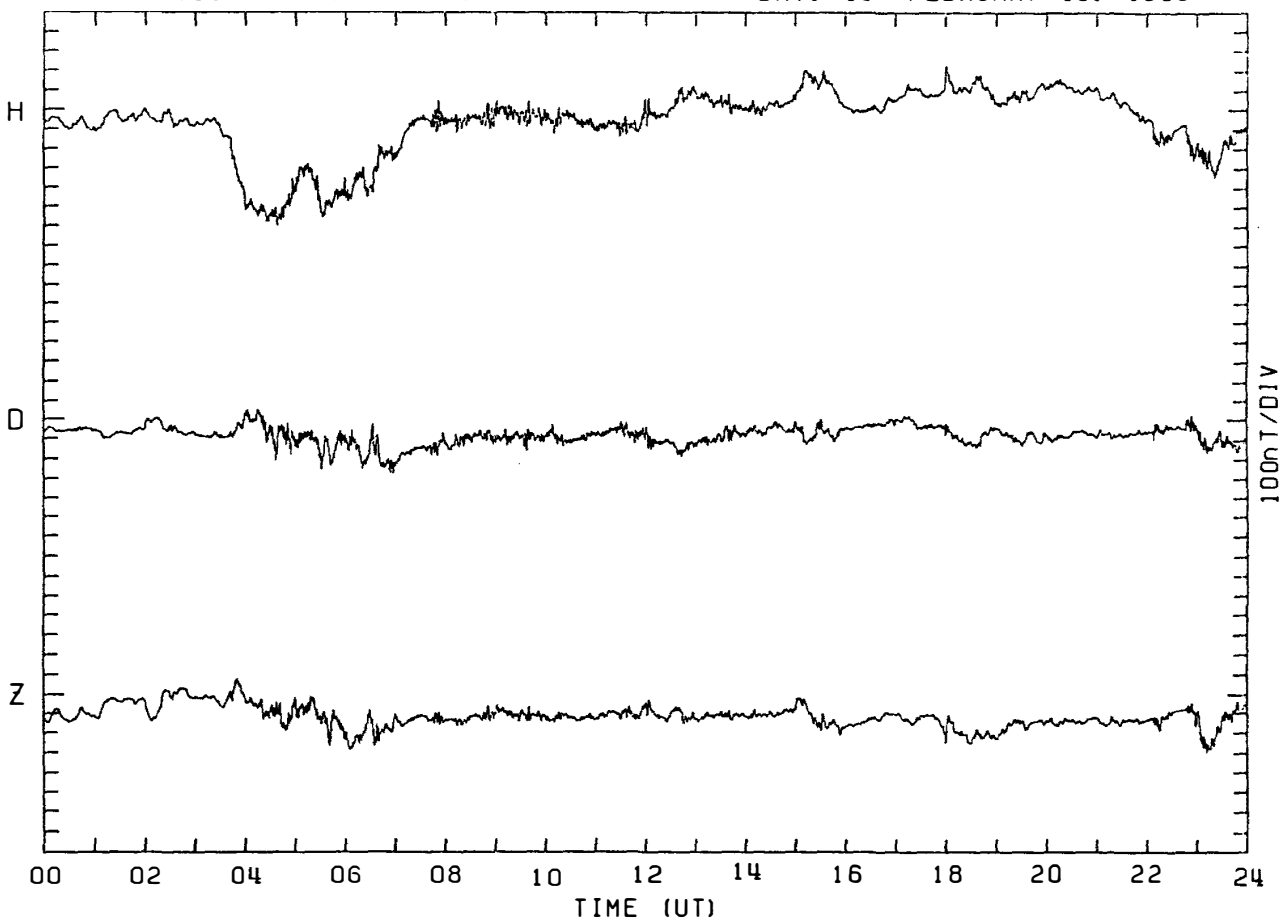
MAGNETOGRAM SYOWA STATION

DAY: 45 FEBRUARY 14. 1983



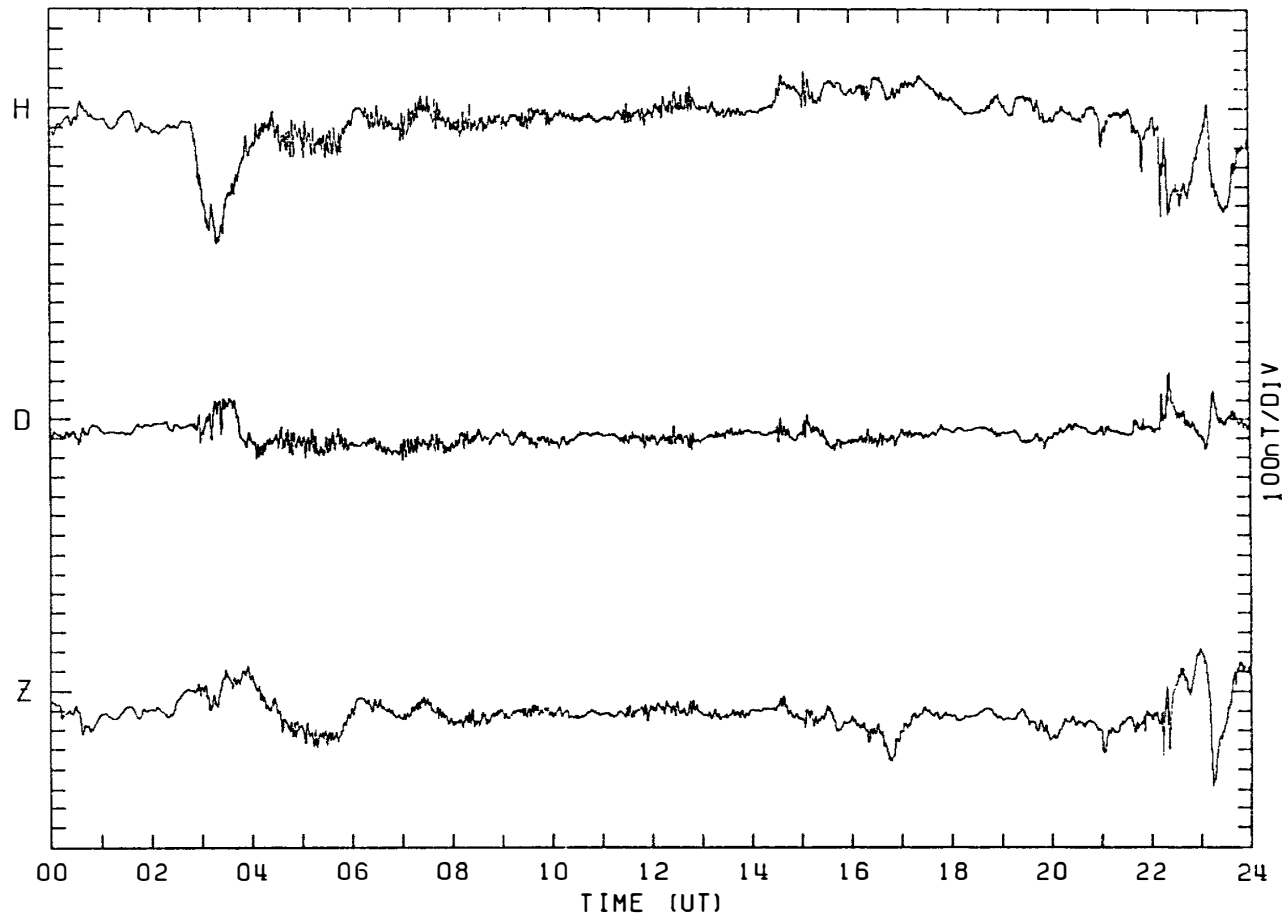
MAGNETOGRAM SYOWA STATION

DAY: 46 FEBRUARY 15. 1983



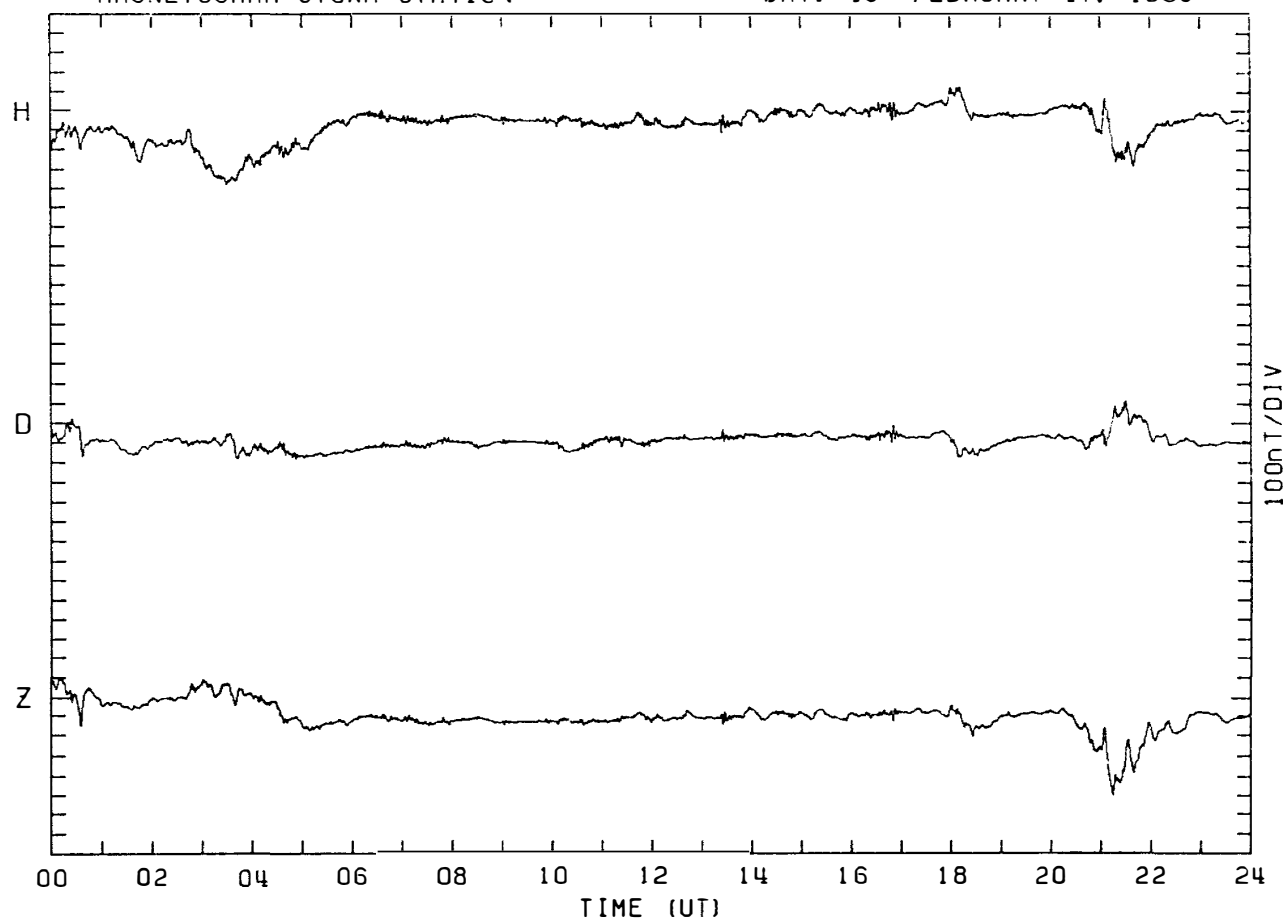
MAGNETOGRAM SYOWA STATION

DAY: 47 FEBRUARY 16. 1983



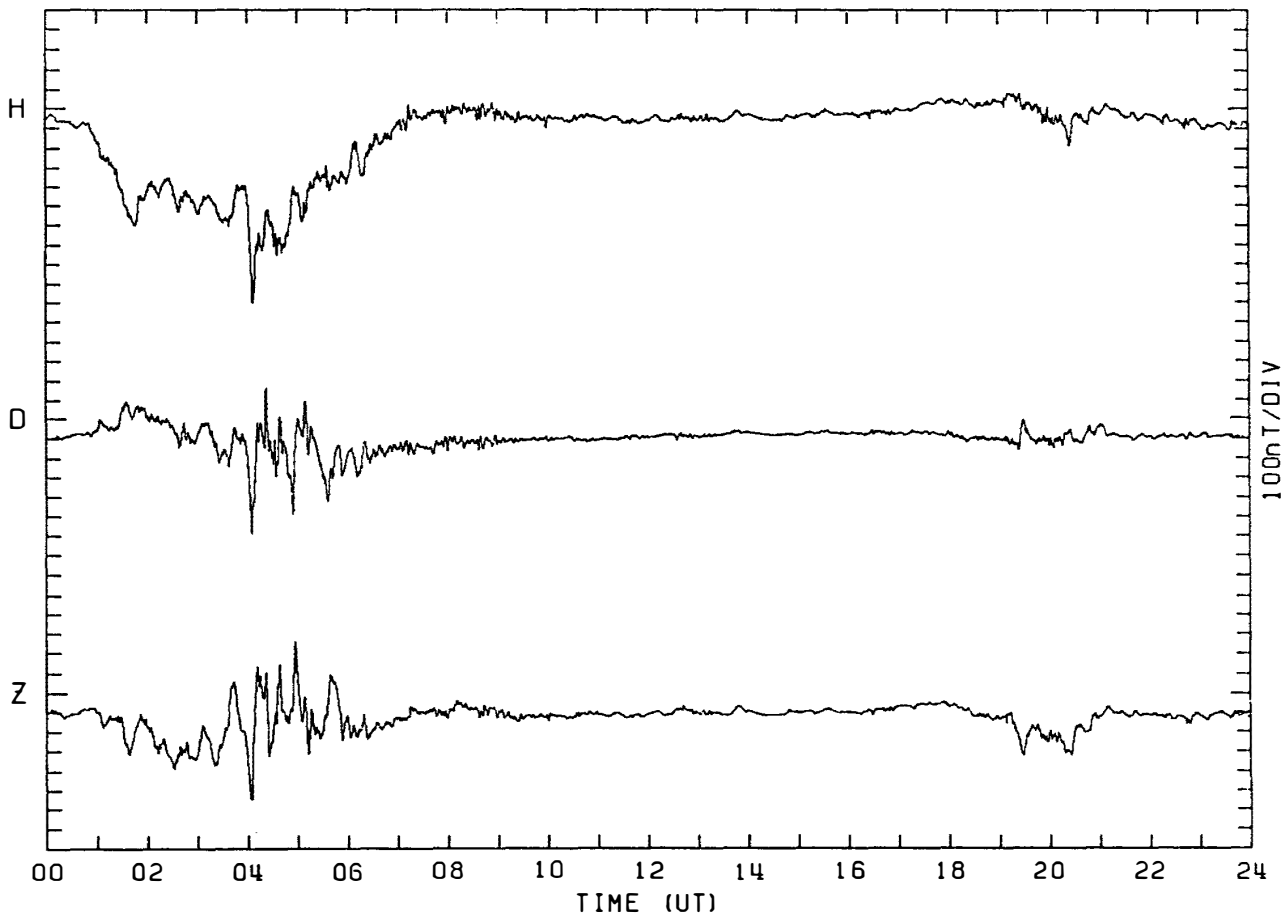
MAGNETOGRAM SYOWA STATION

DAY: 48 FEBRUARY 17. 1983



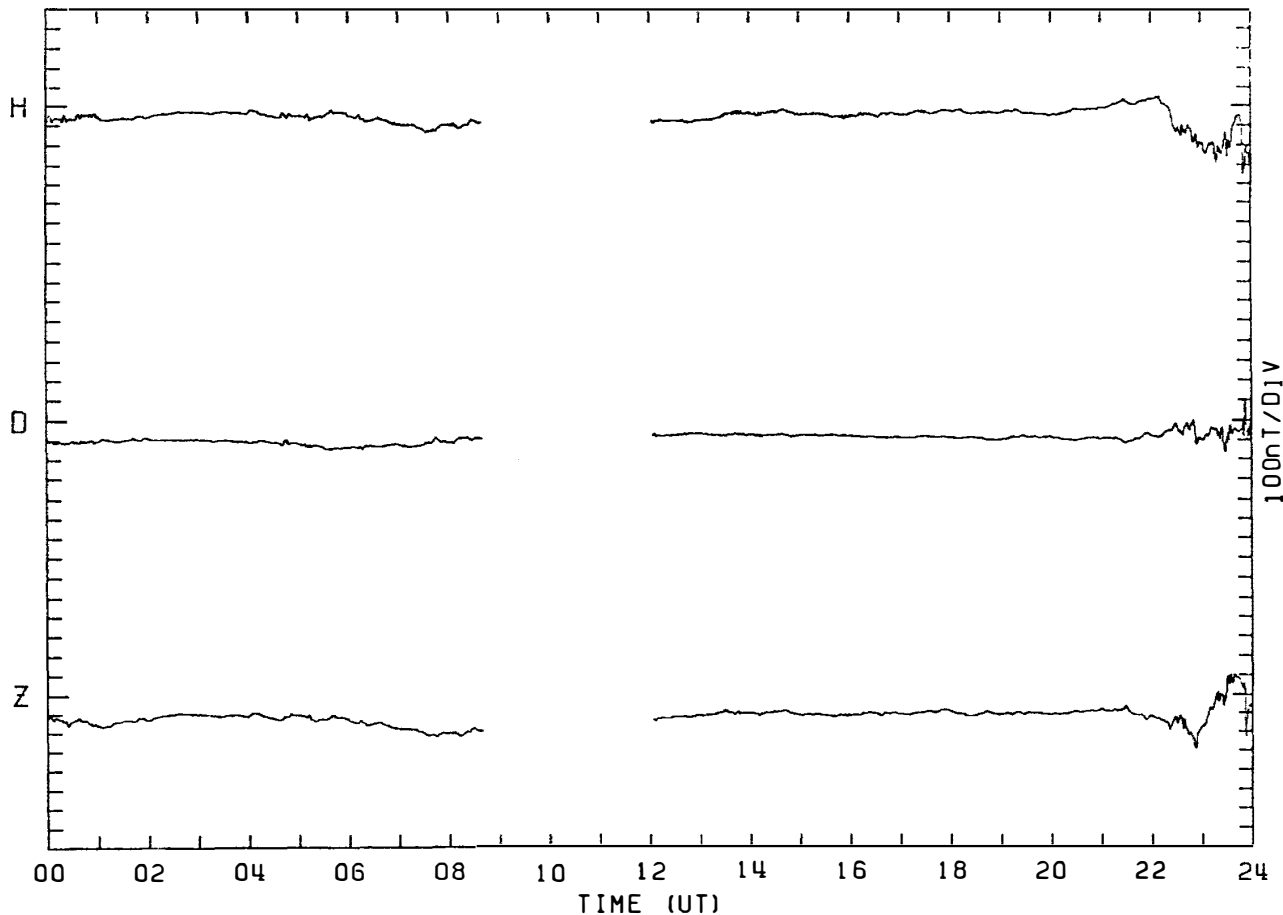
MAGNETOGRAM SYOWA STATION

DAY: 49 FEBRUARY 18, 1983



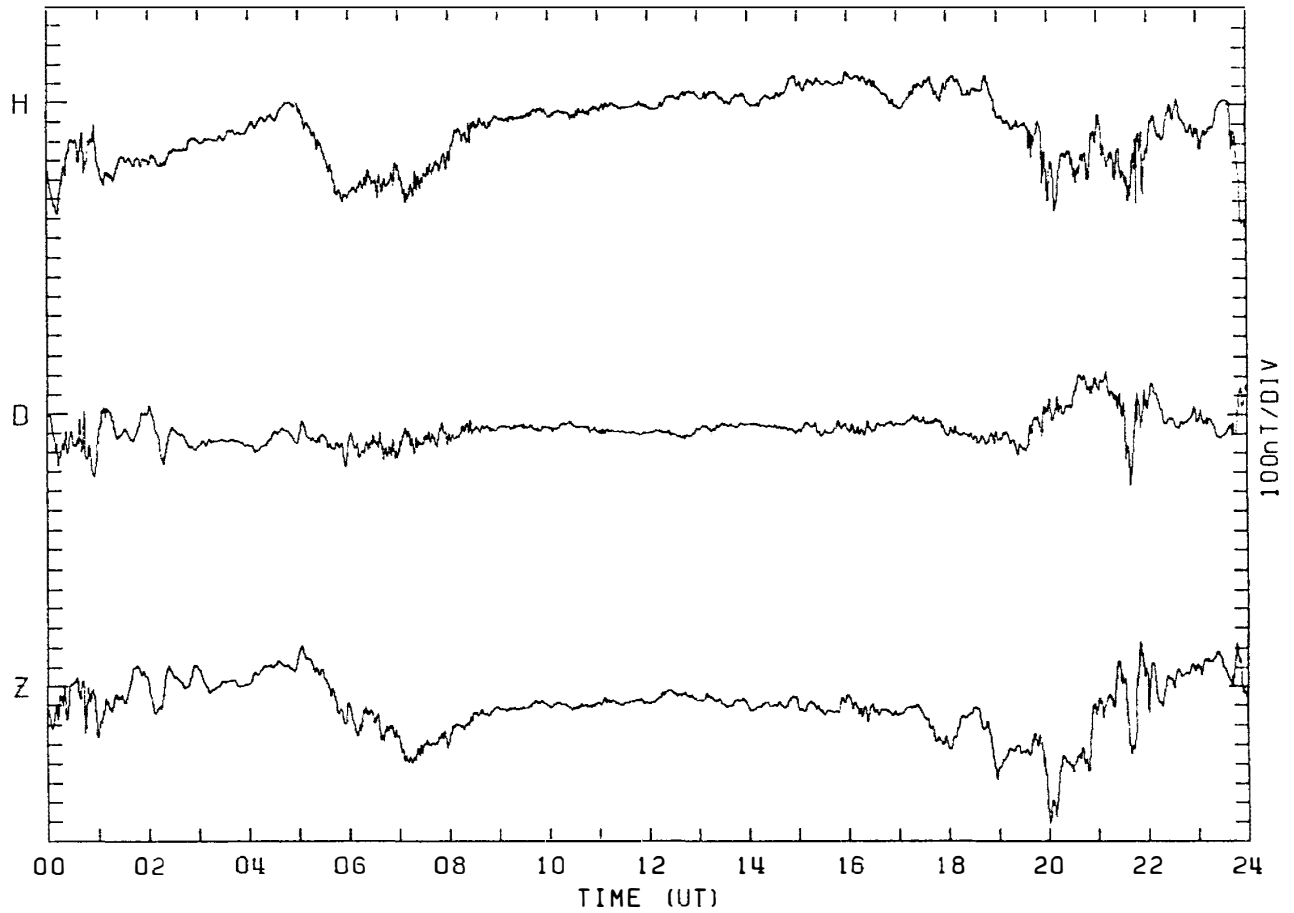
MAGNETOGRAM SYOWA STATION

DAY: 50 FEBRUARY 19, 1983



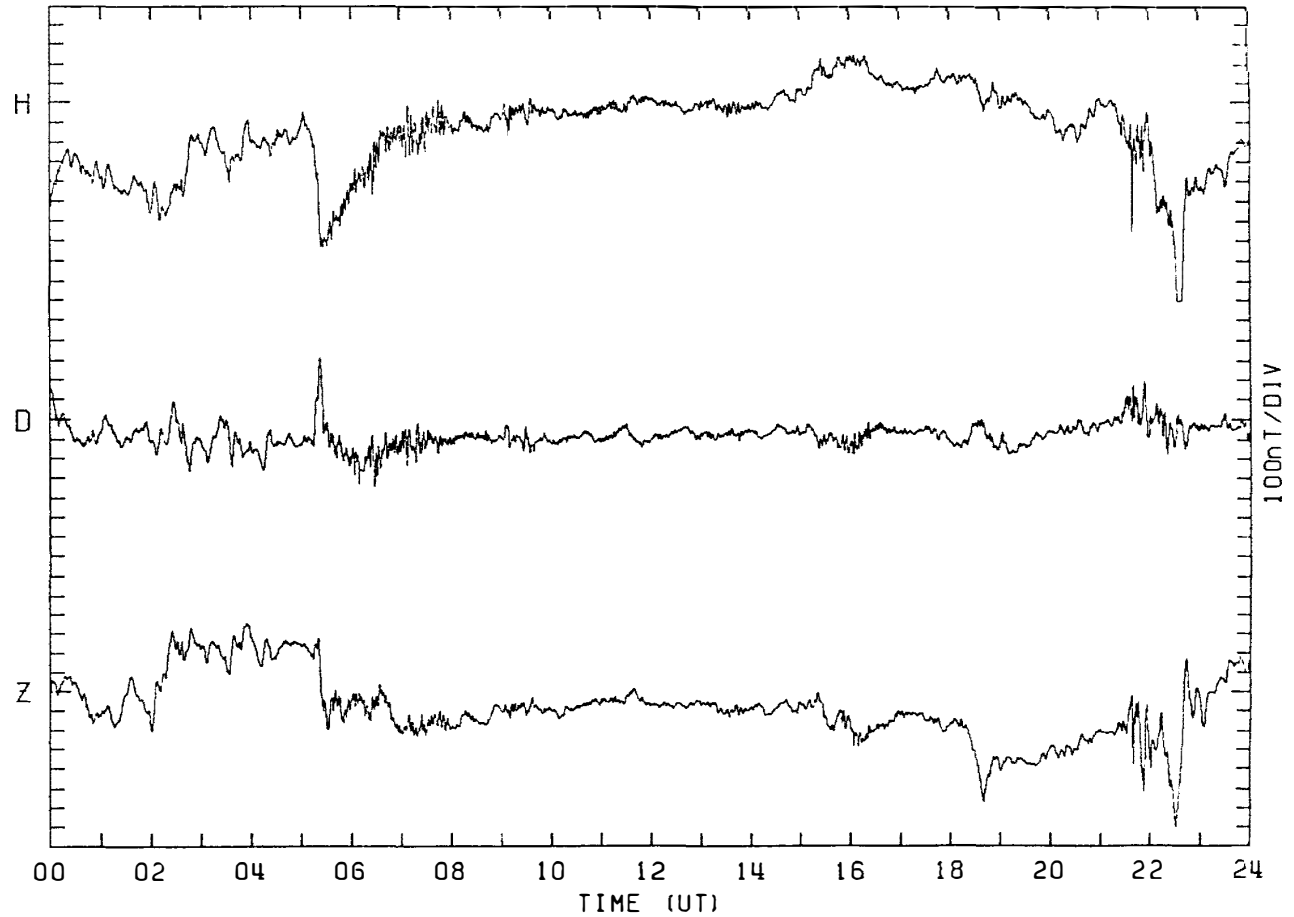
MAGNETOGRAM SYOWA STATION

DAY: 51 FEBRUARY 20, 1983



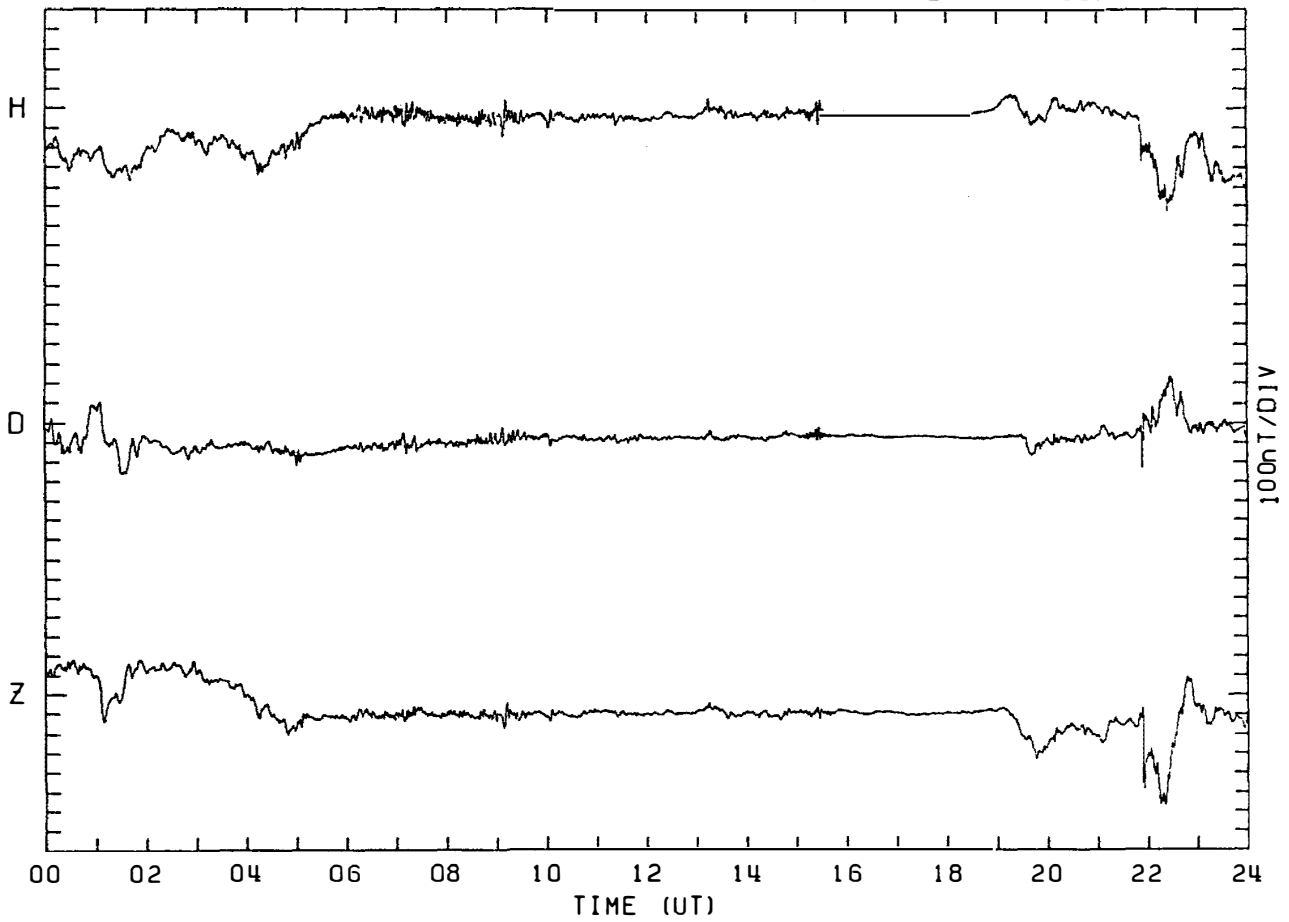
MAGNETOGRAM SYOWA STATION

DAY: 52 FEBRUARY 21, 1983



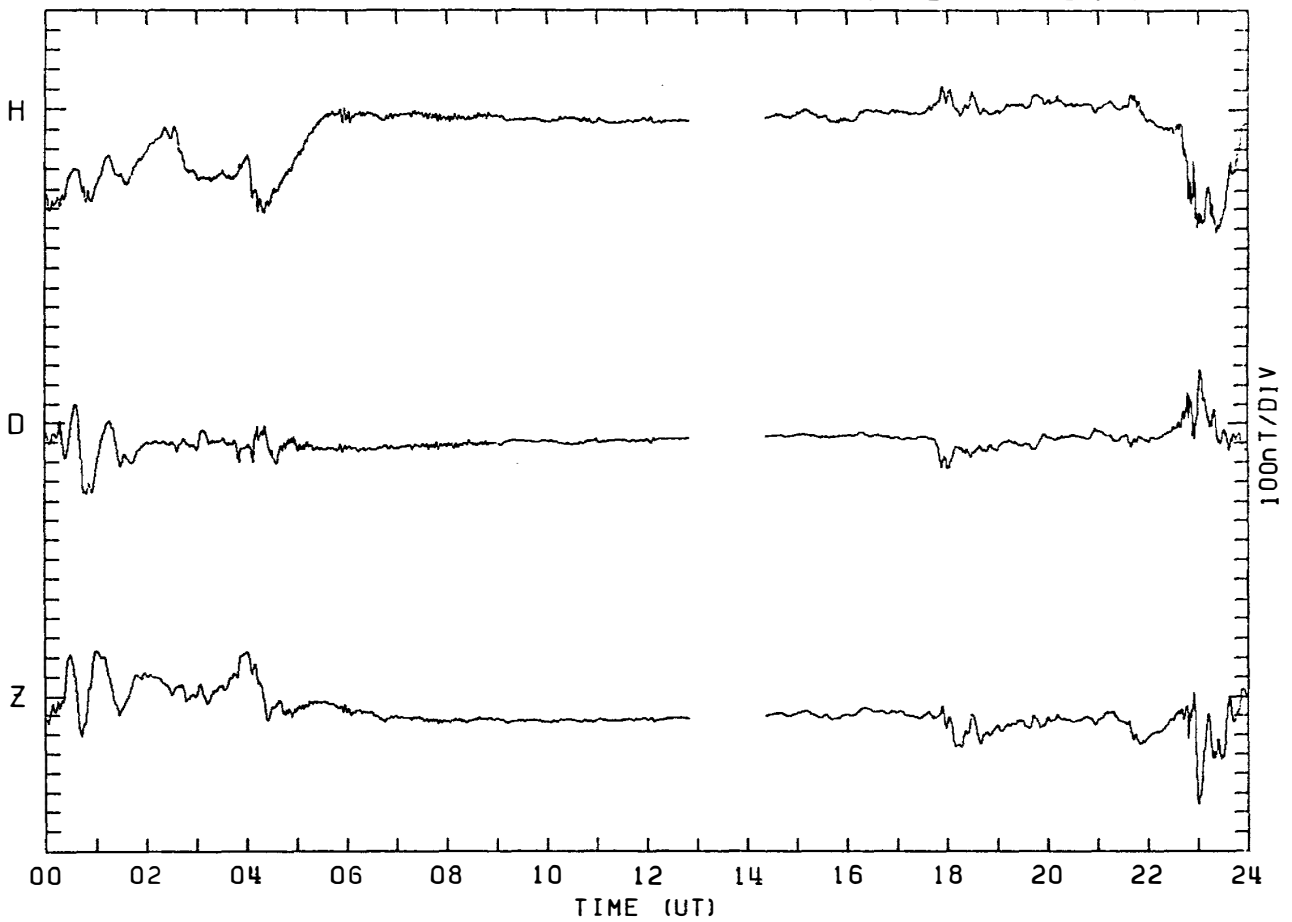
MAGNETOGRAM SYOWA STATION

DAY: 53 FEBRUARY 22. 1983



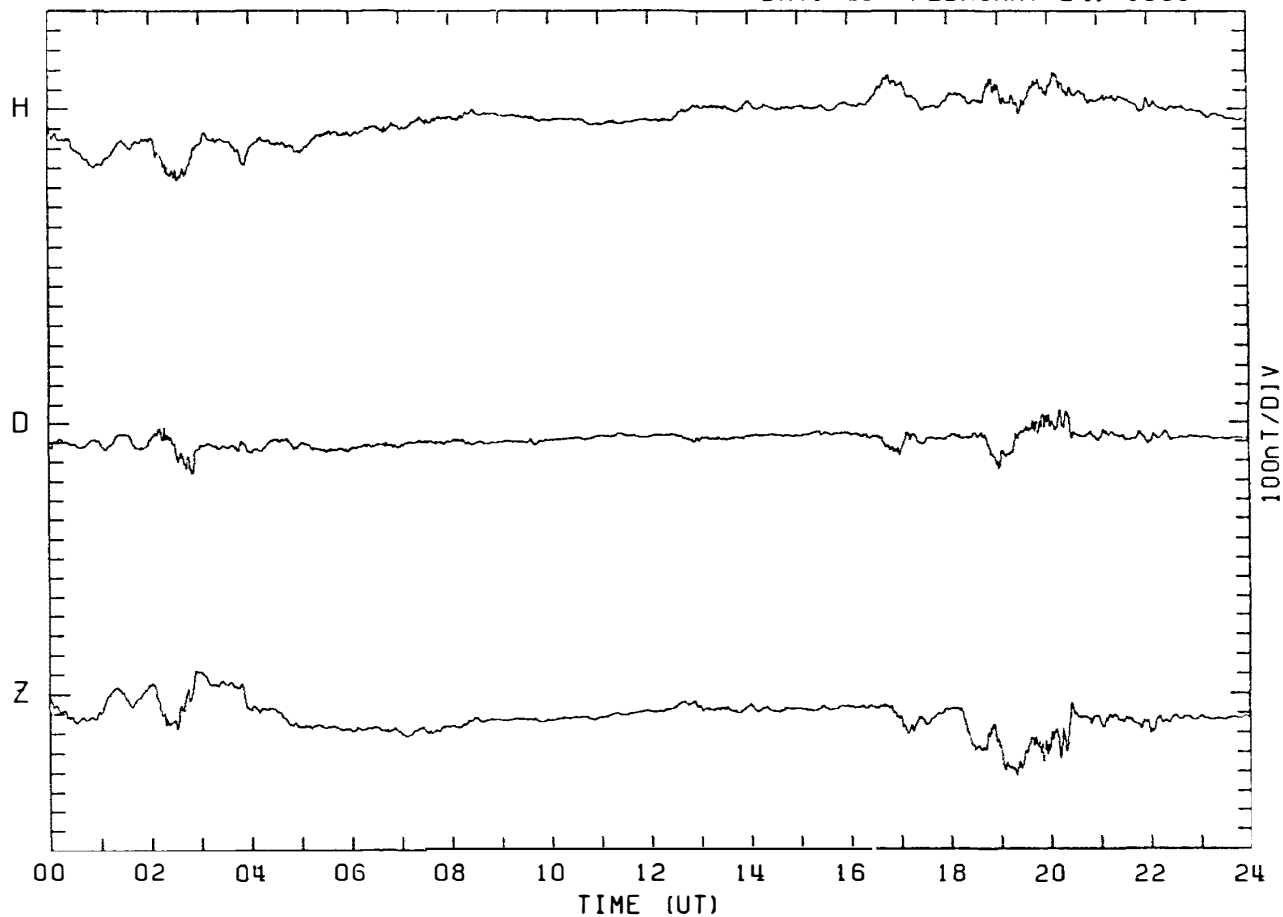
MAGNETOGRAM SYOWA STATION

DAY: 54 FEBRUARY 23. 1983



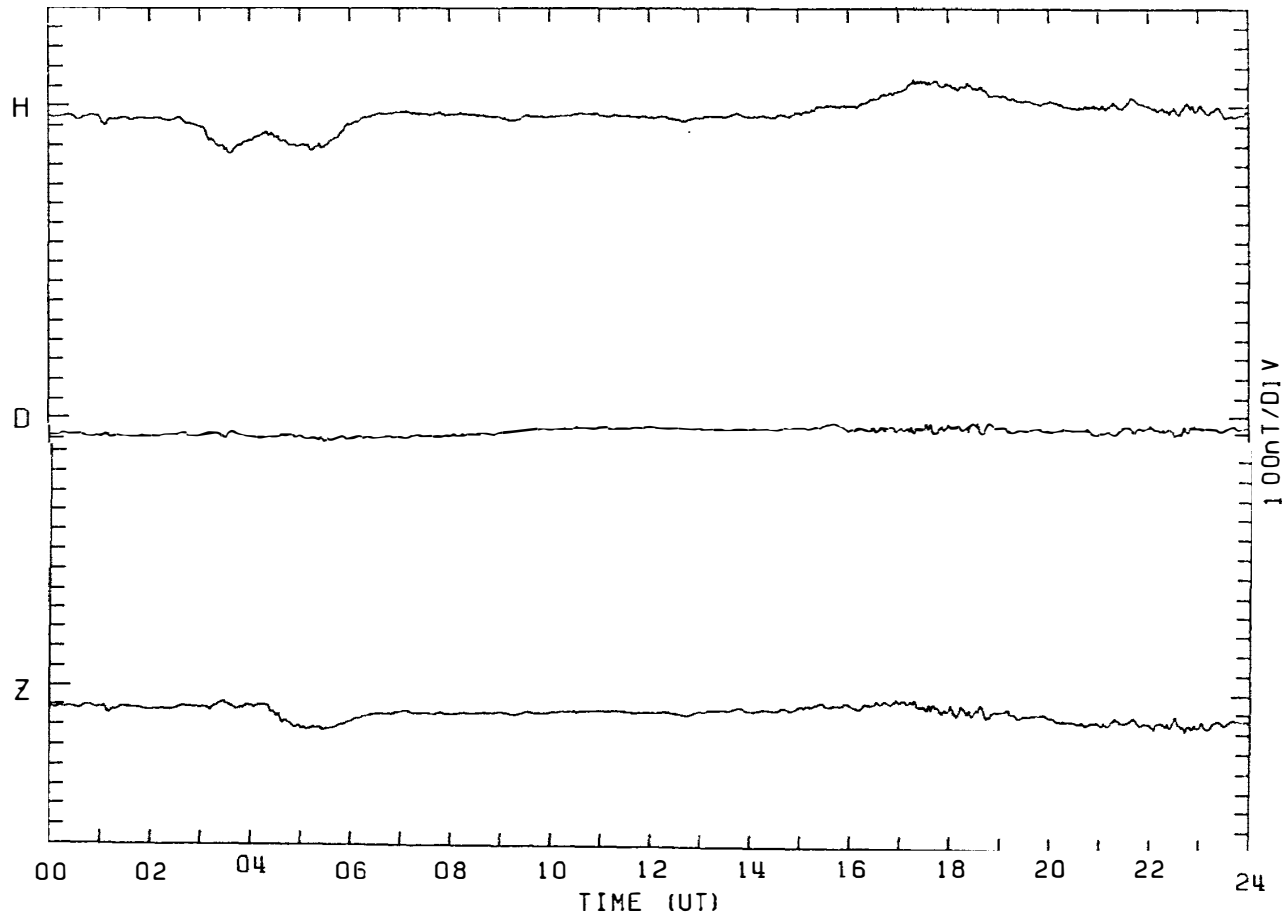
MAGNETOGRAM SYOWA STATION

DAY: 55 FEBRUARY 24. 1983



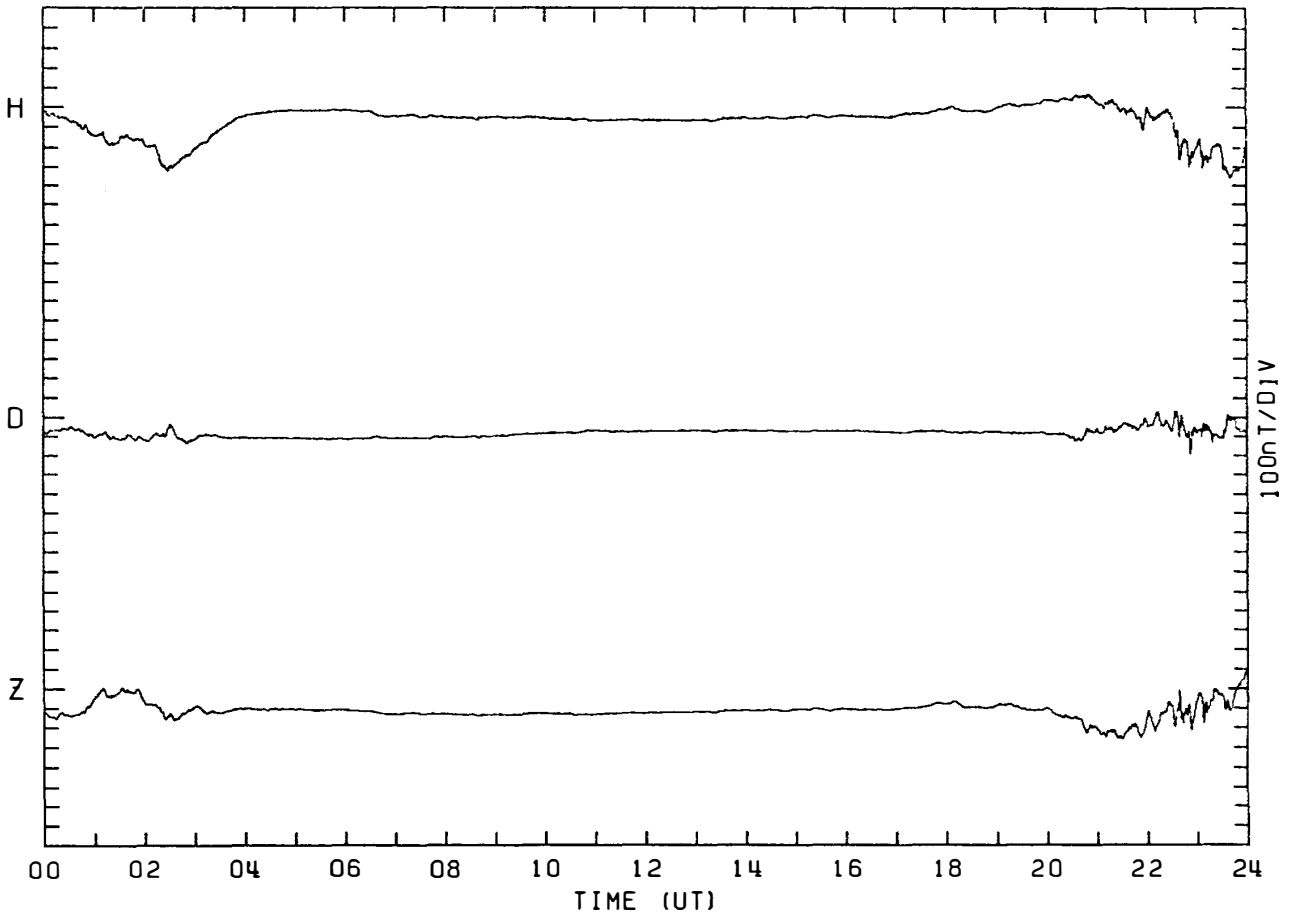
MAGNETOGRAM SYOWA STATION

DAY: 56 FEBRUARY 25. 1983



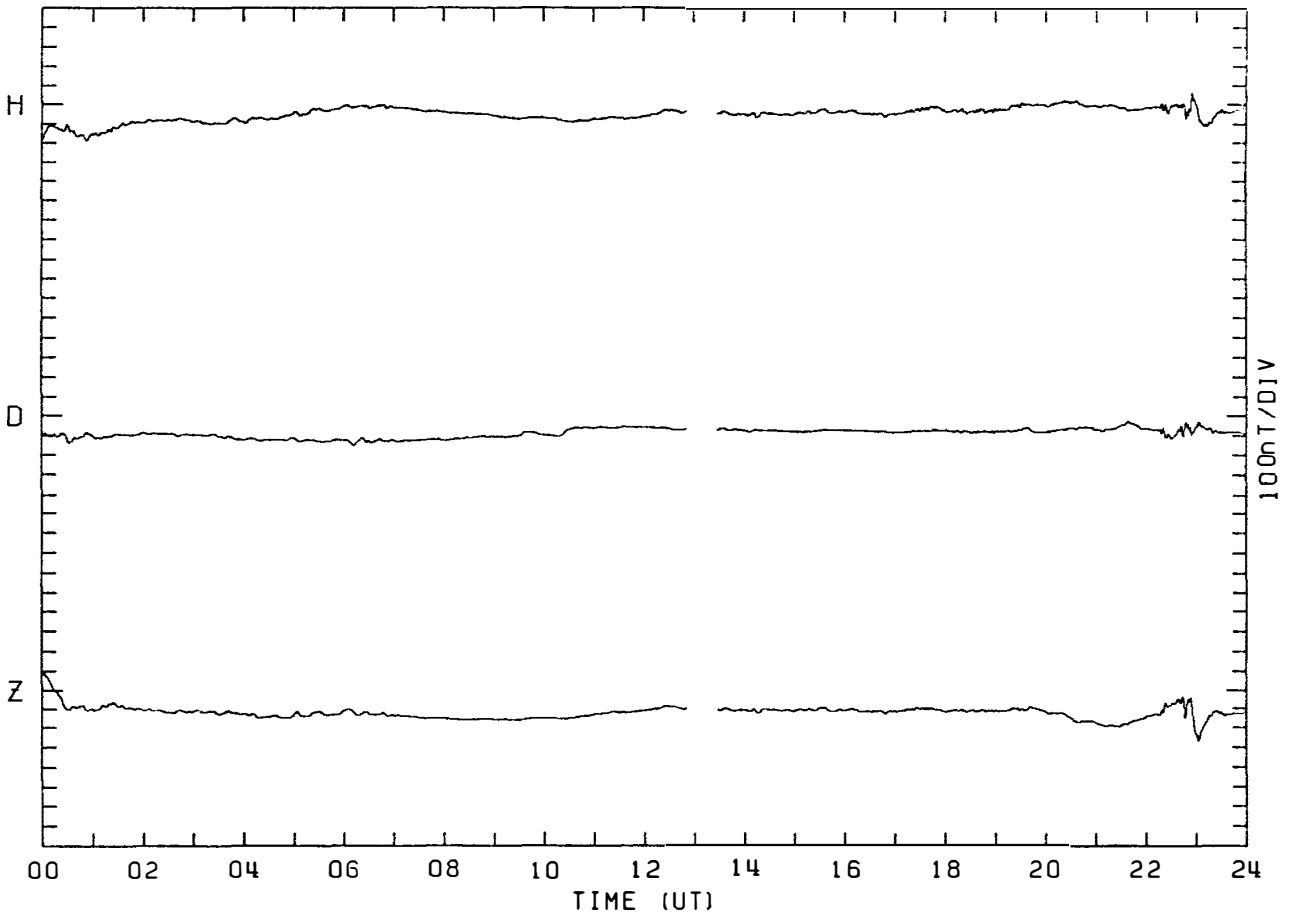
MAGNETOGRAM SYOWA STATION

DAY: 57 FEBRUARY 26. 1983



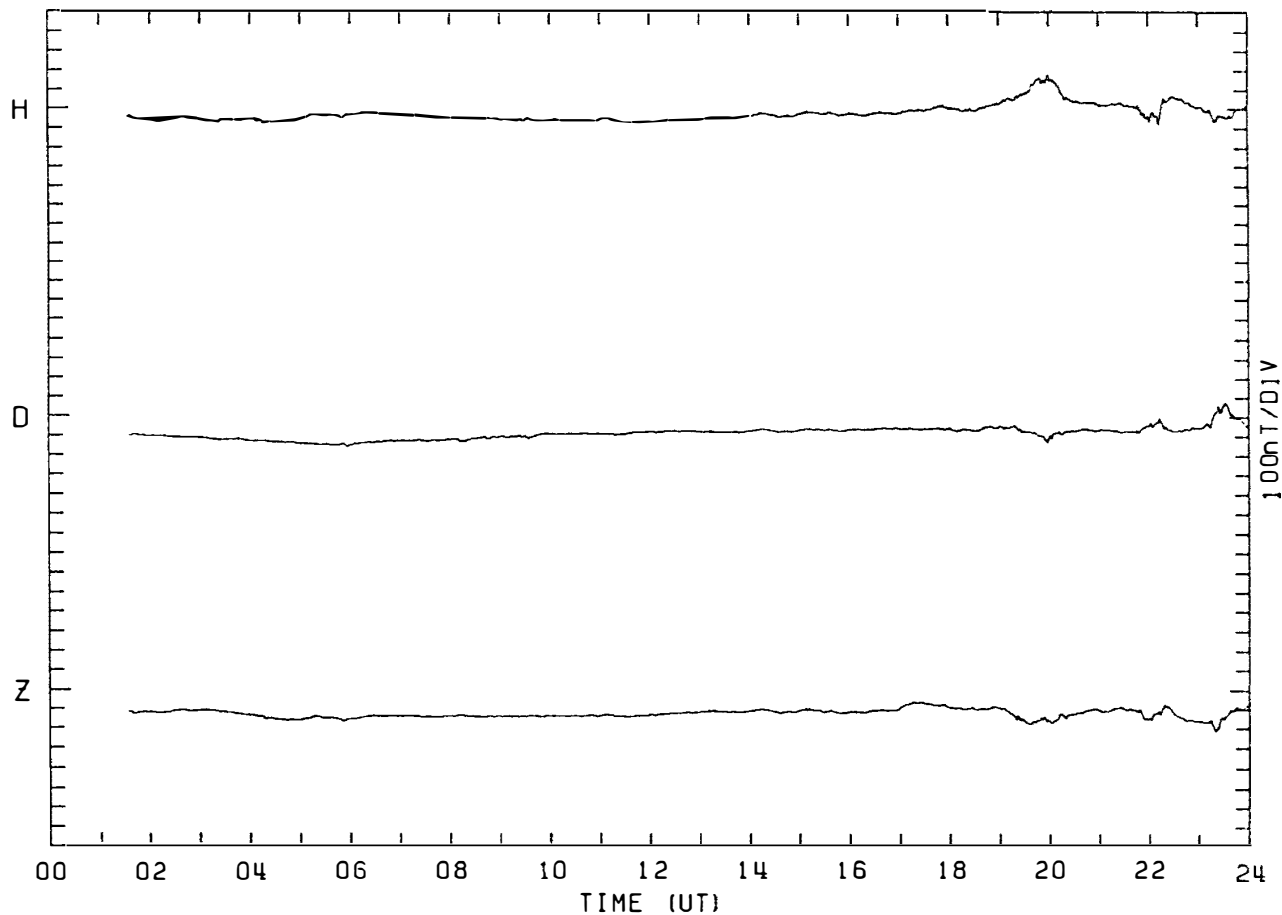
MAGNETOGRAM SYOWA STATION

DAY: 58 FEBRUARY 27. 1983



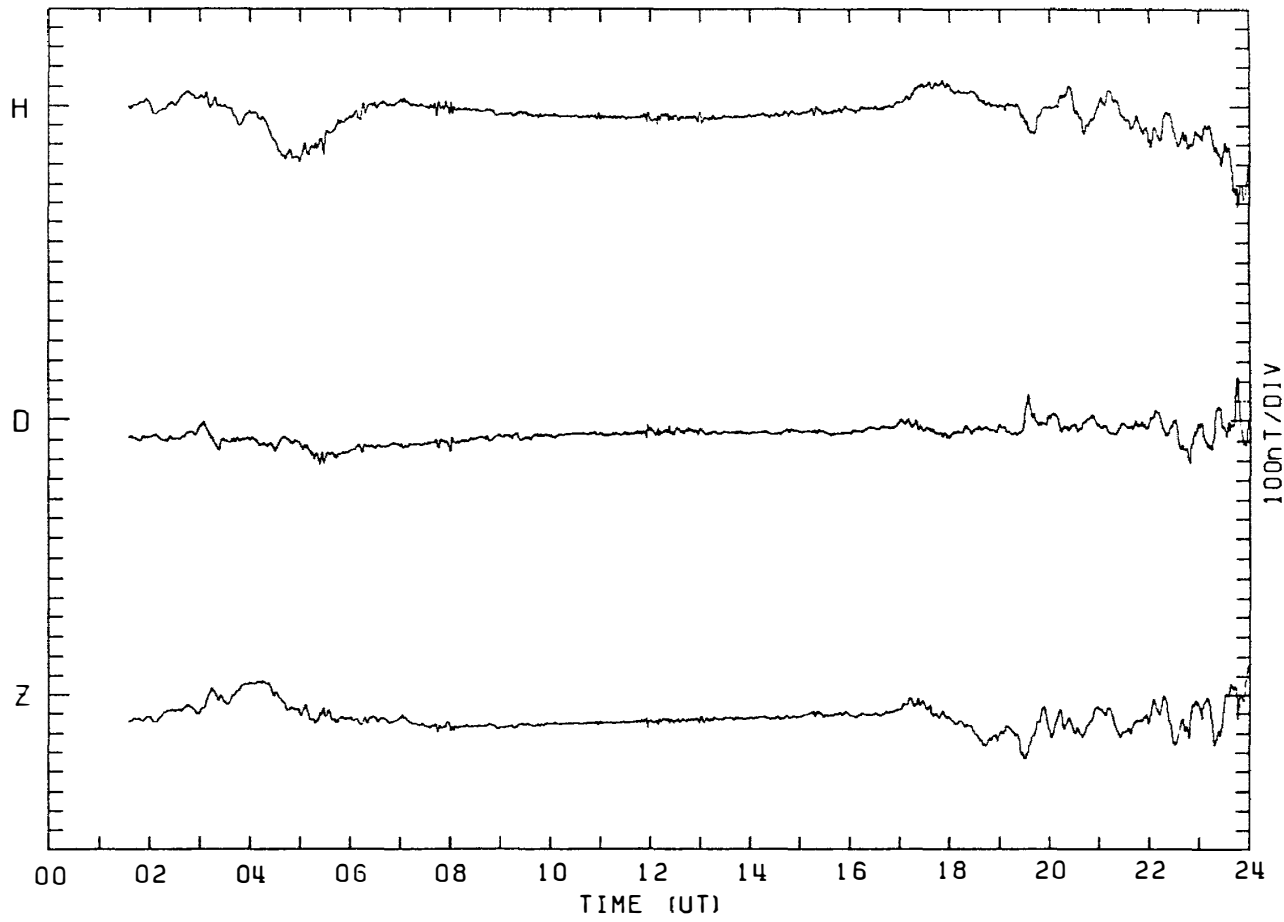
MAGNETOGRAM SYOWA STATION

DAY: 59 FEBRUARY 28. 1983



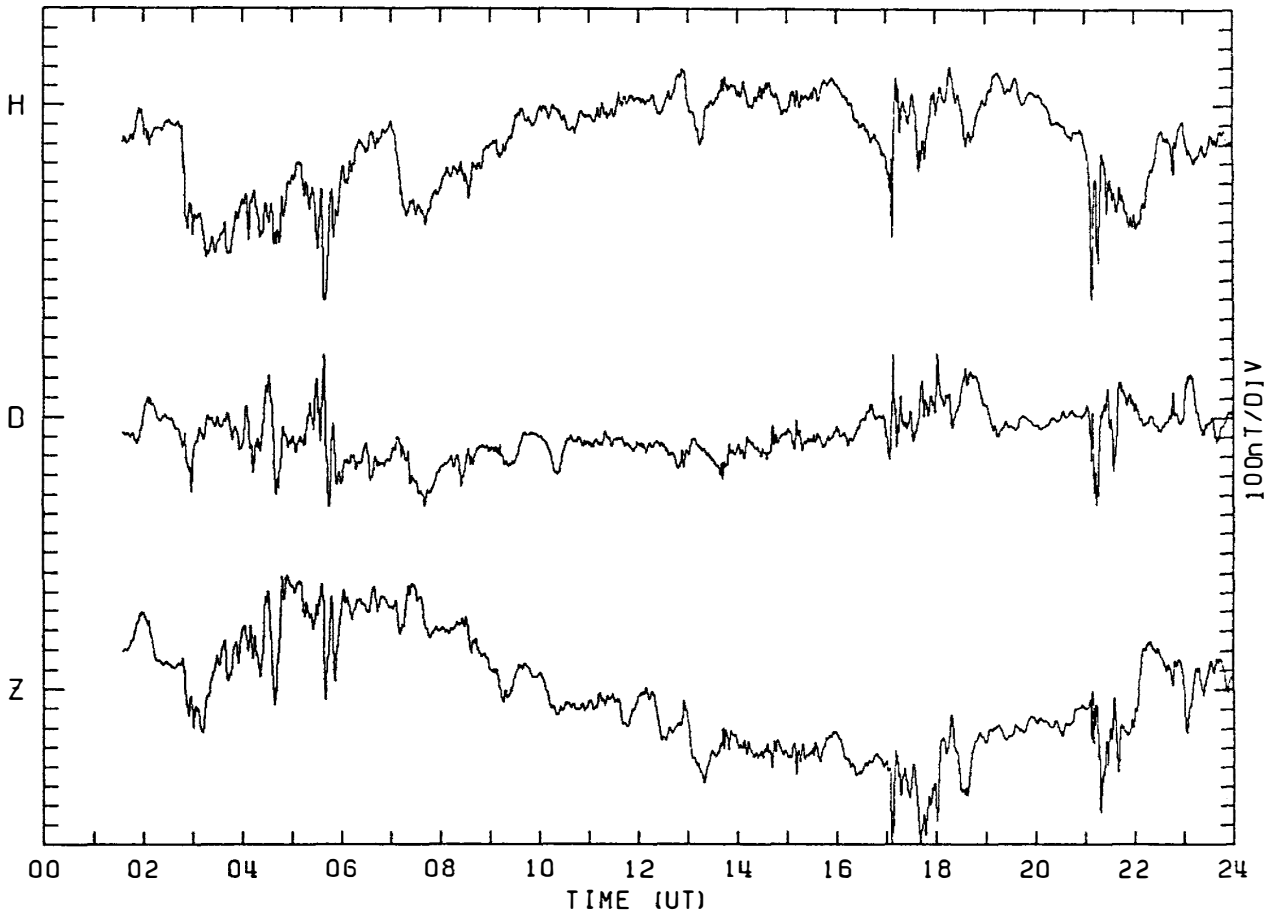
MAGNETOGRAM SYOWA STATION

DAY: 60 MARCH 1. 1983



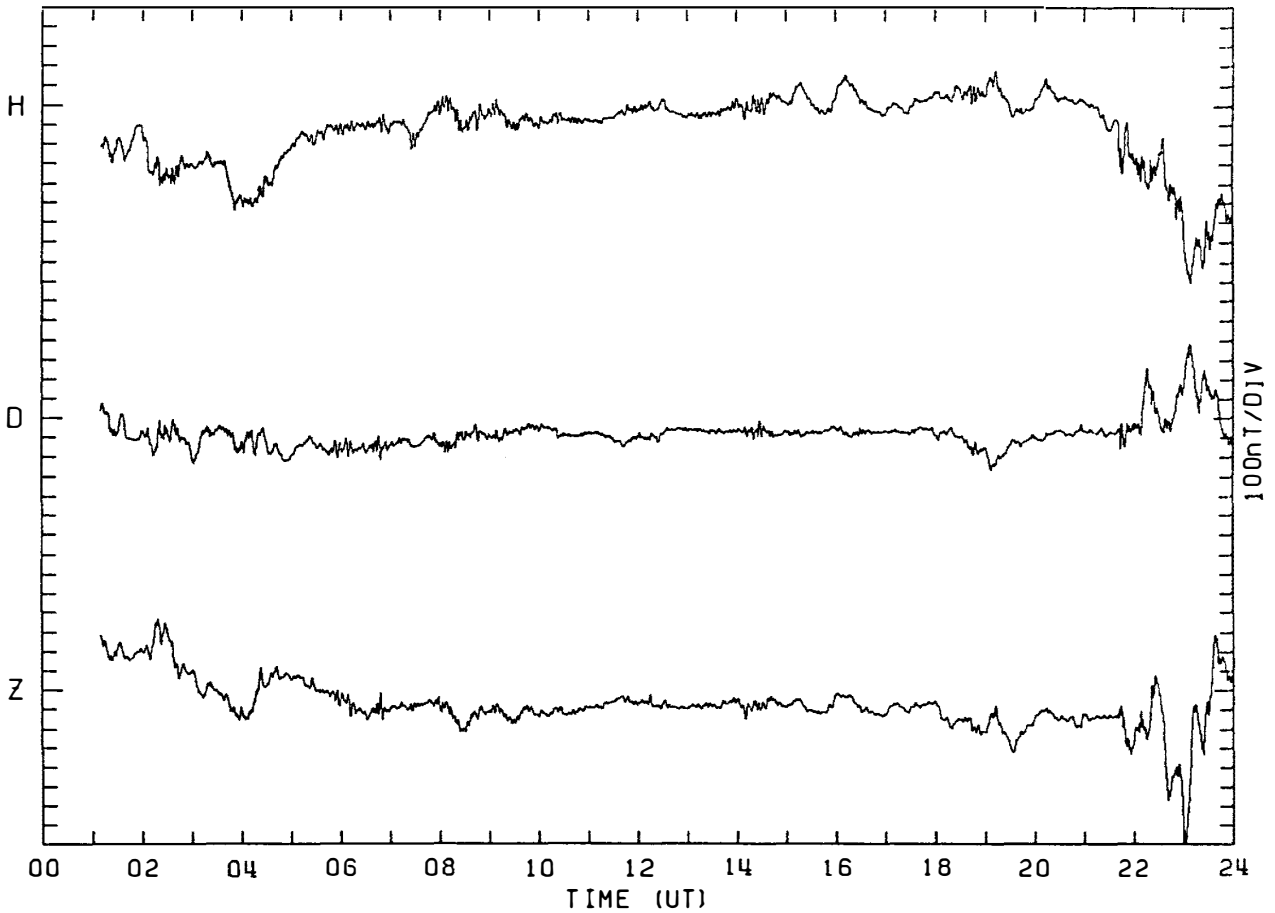
MAGNETOGRAM SYOWA STATION

DAY: 61 MARCH 2. 1983



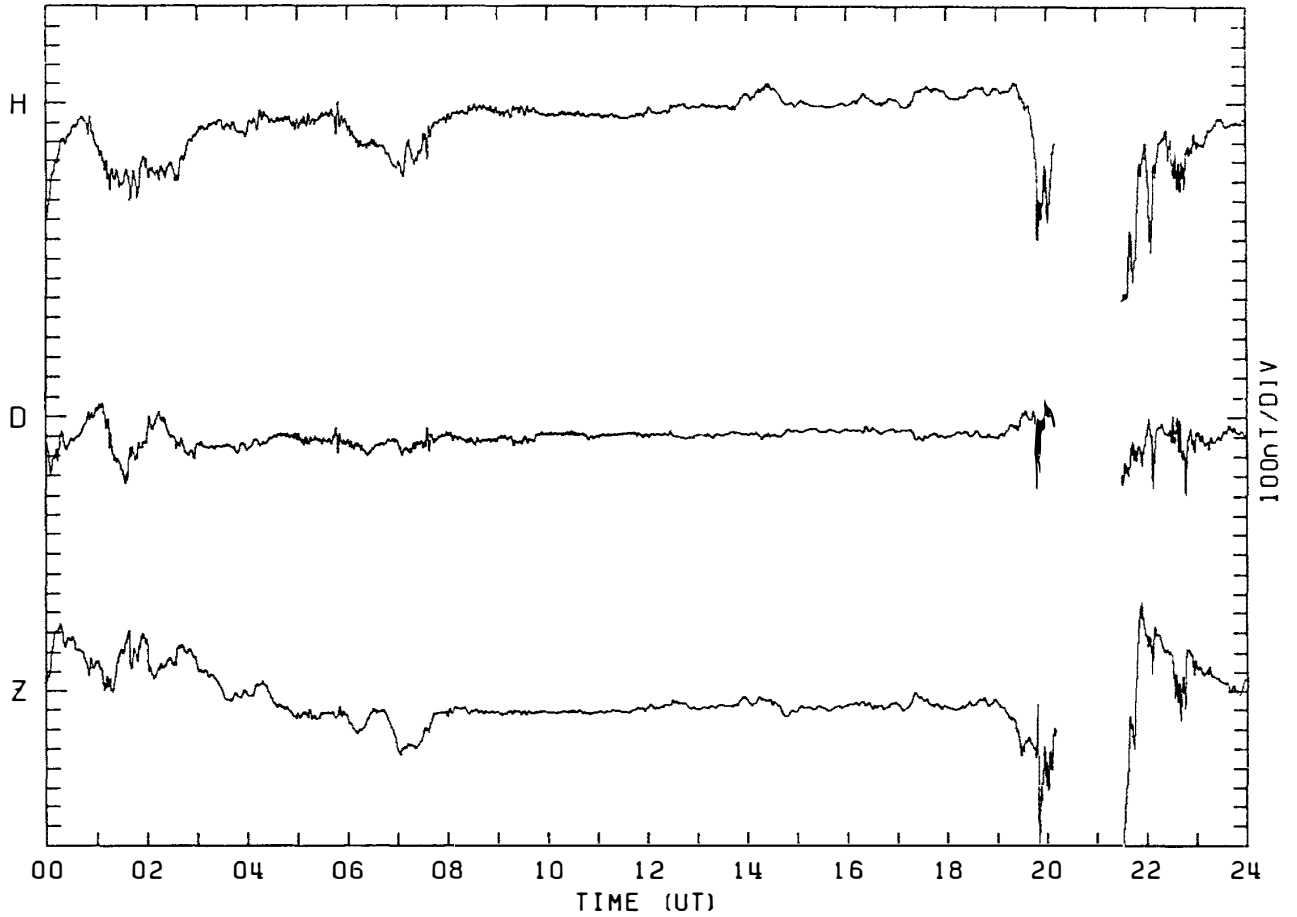
MAGNETOGRAM SYOWA STATION

DAY: 62 MARCH 3. 1983



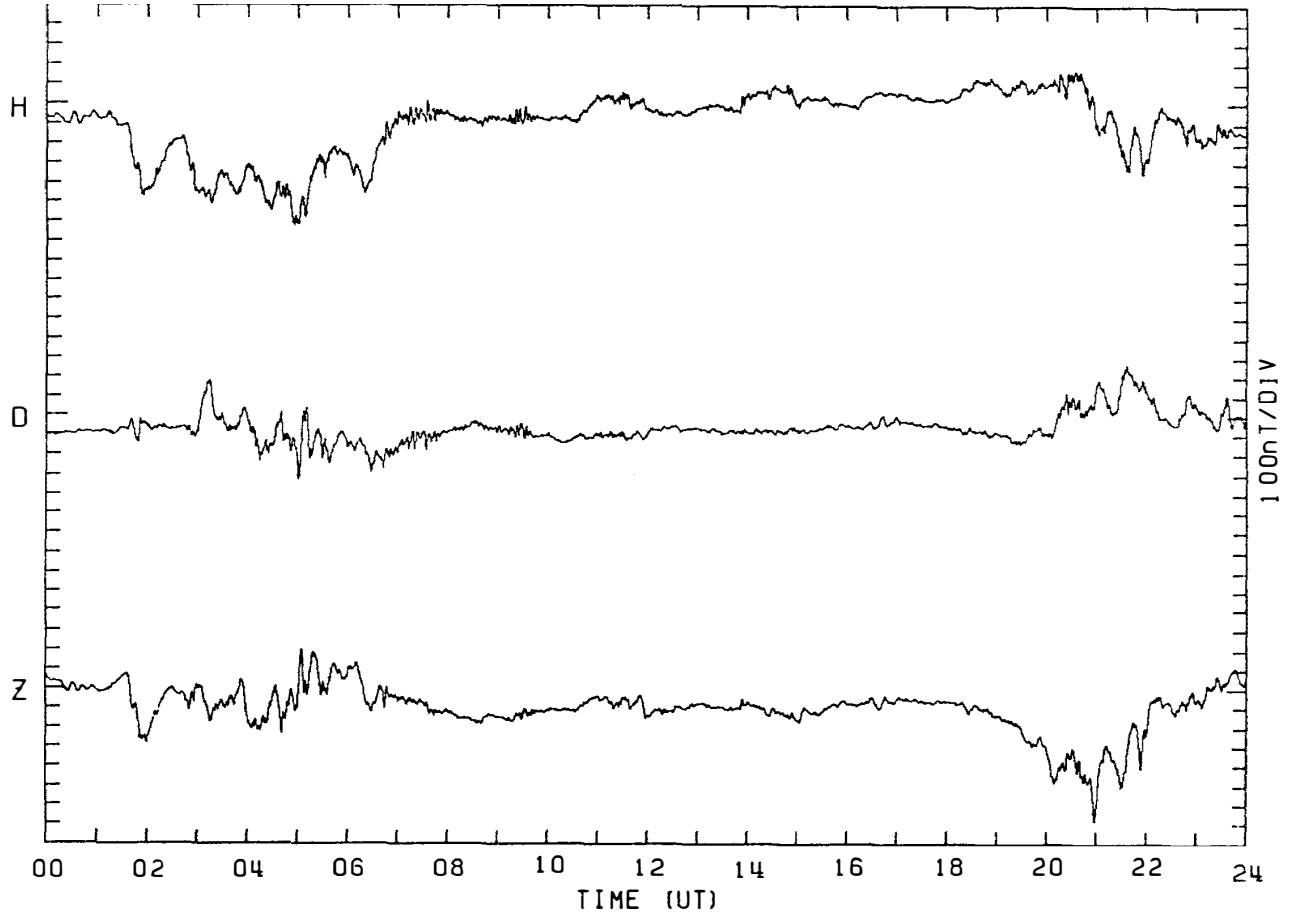
MAGNETOGRAM SYOWA STATION

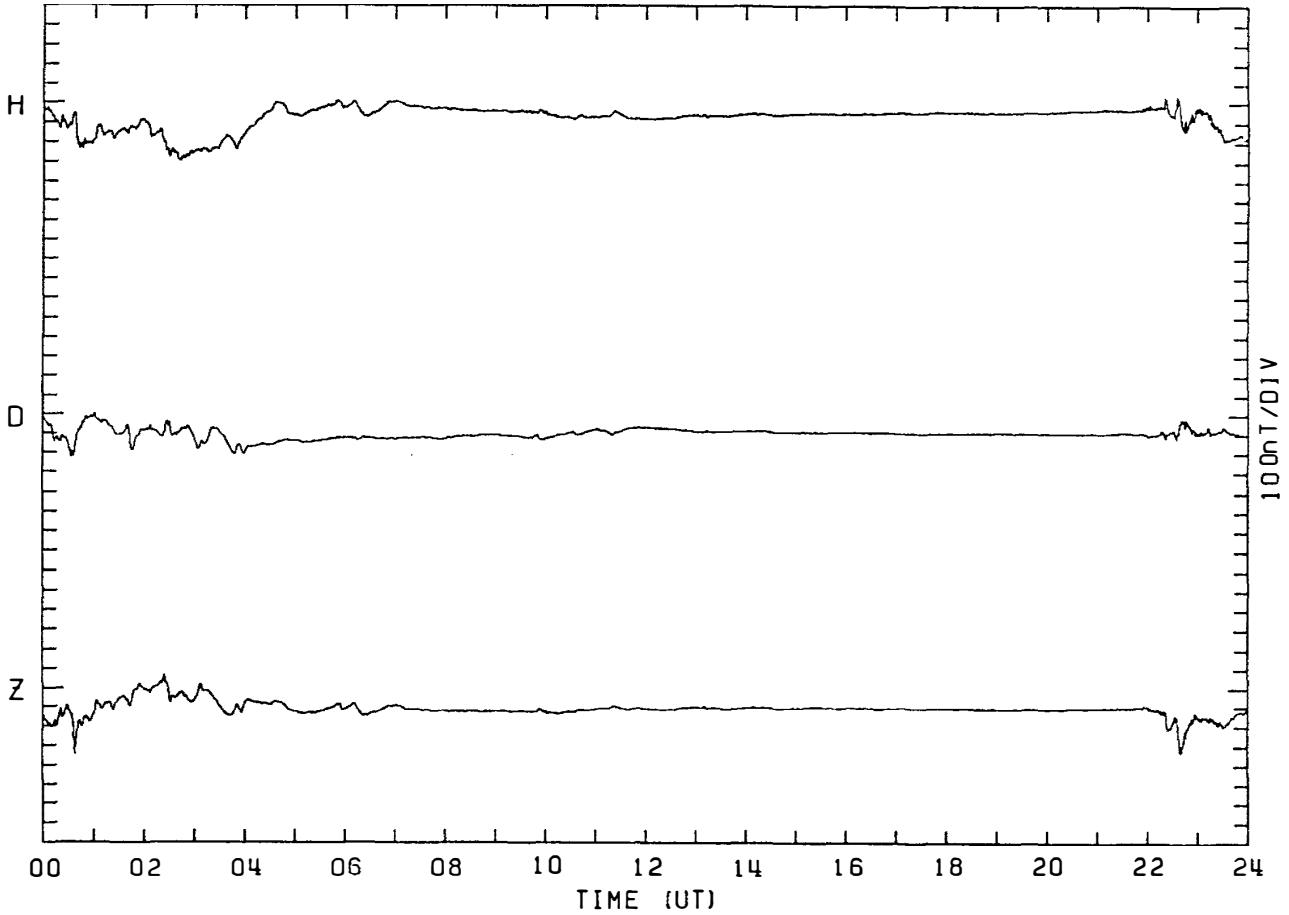
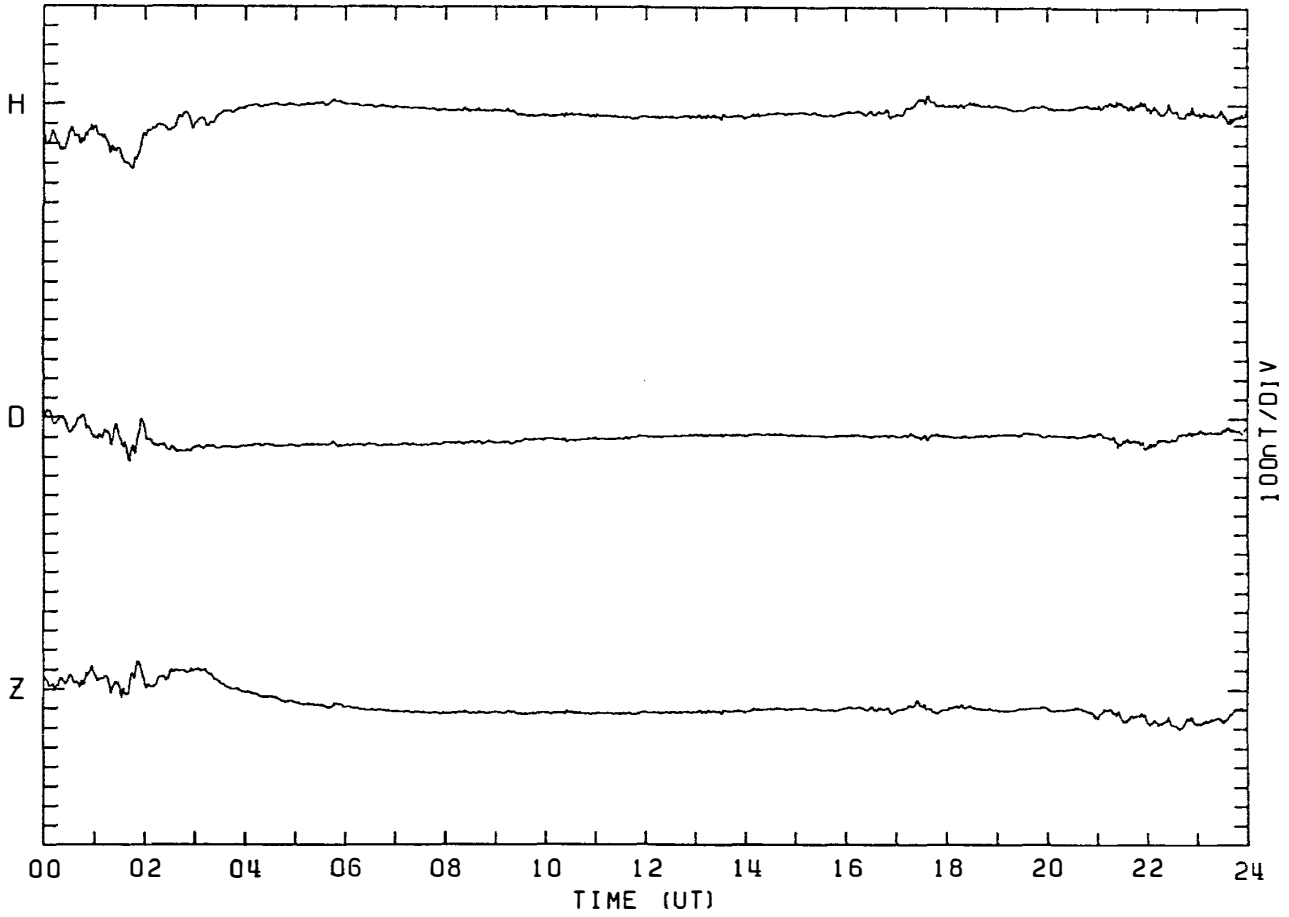
DAY: 63 MARCH 4. 1983



MAGNETOGRAM SYOWA STATION

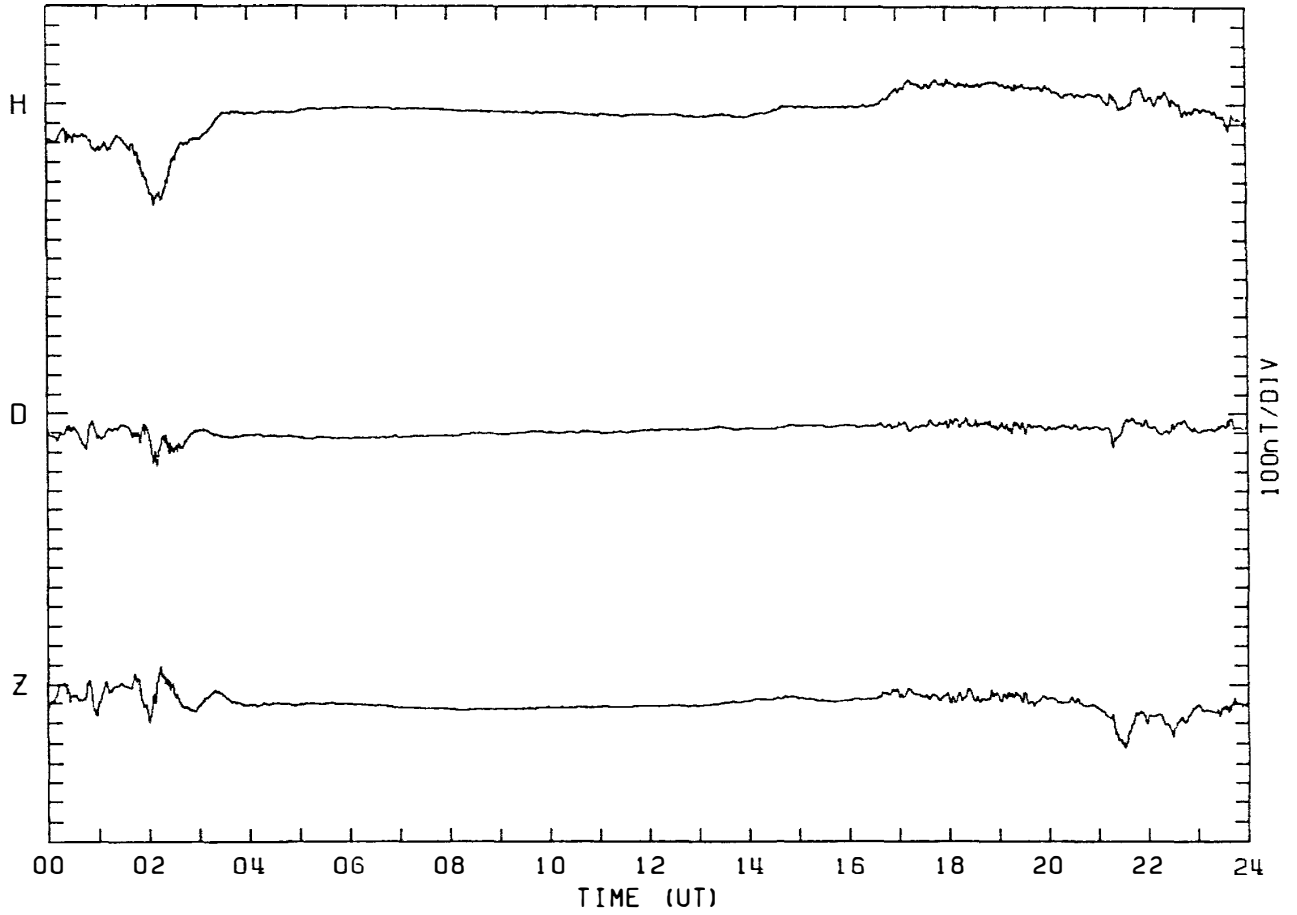
DAY: 64 MARCH 5. 1983





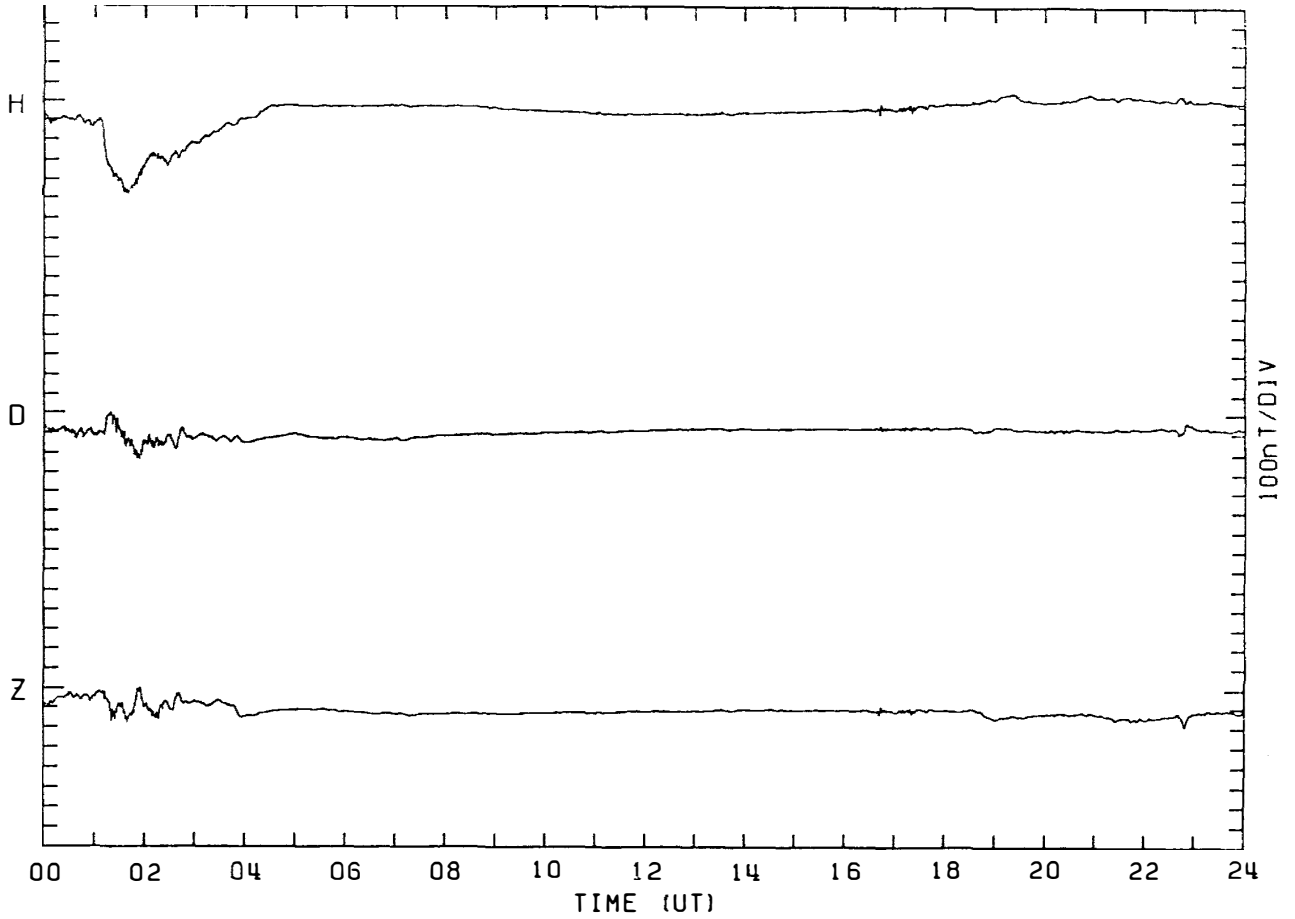
MAGNETOGRAM SYOWA STATION

DAY: 67 MARCH 8. 1983



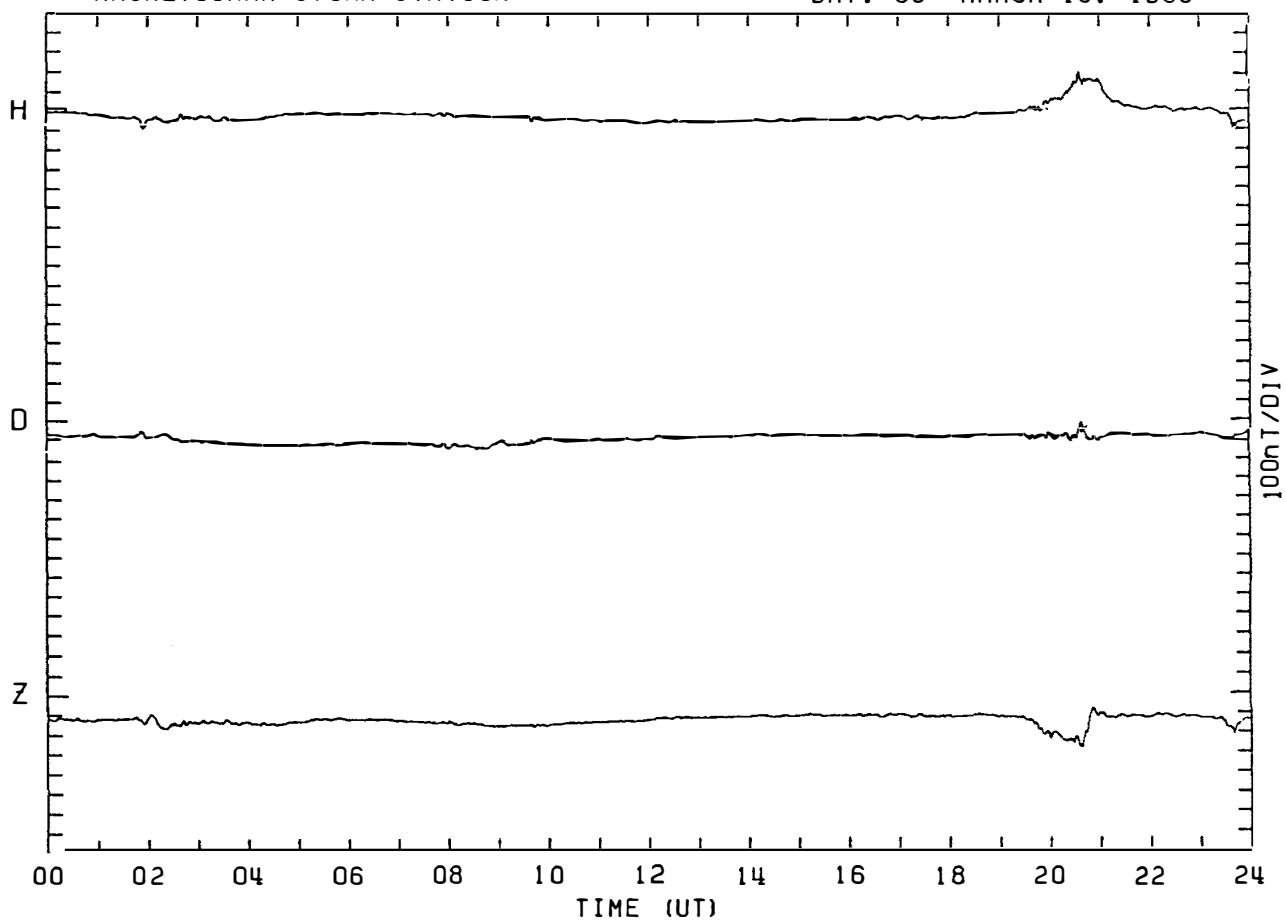
MAGNETOGRAM SYOWA STATION

DAY: 68 MARCH 9. 1983



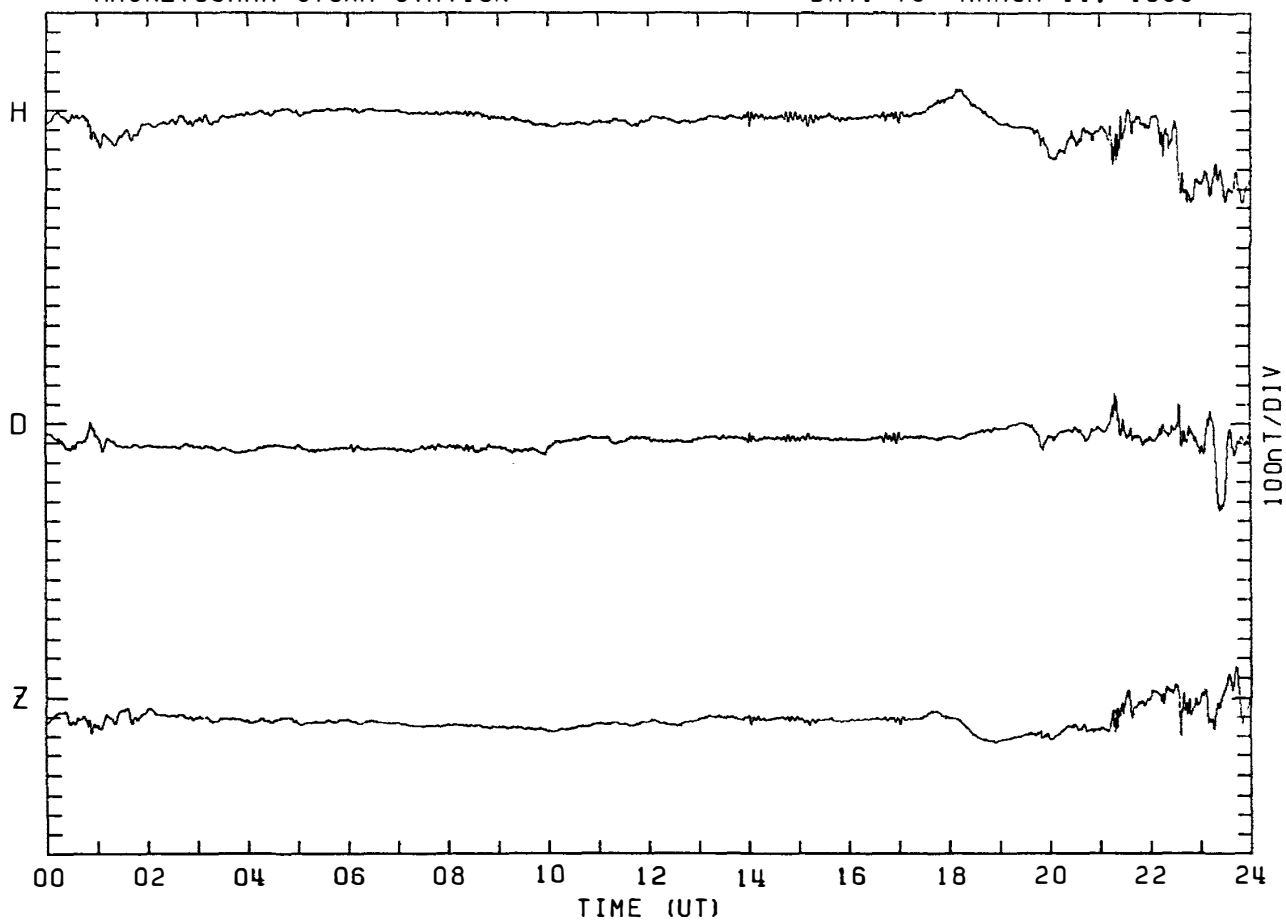
MAGNETOGRAM SYOWA STATION

DAY: 69 MARCH 10. 1983



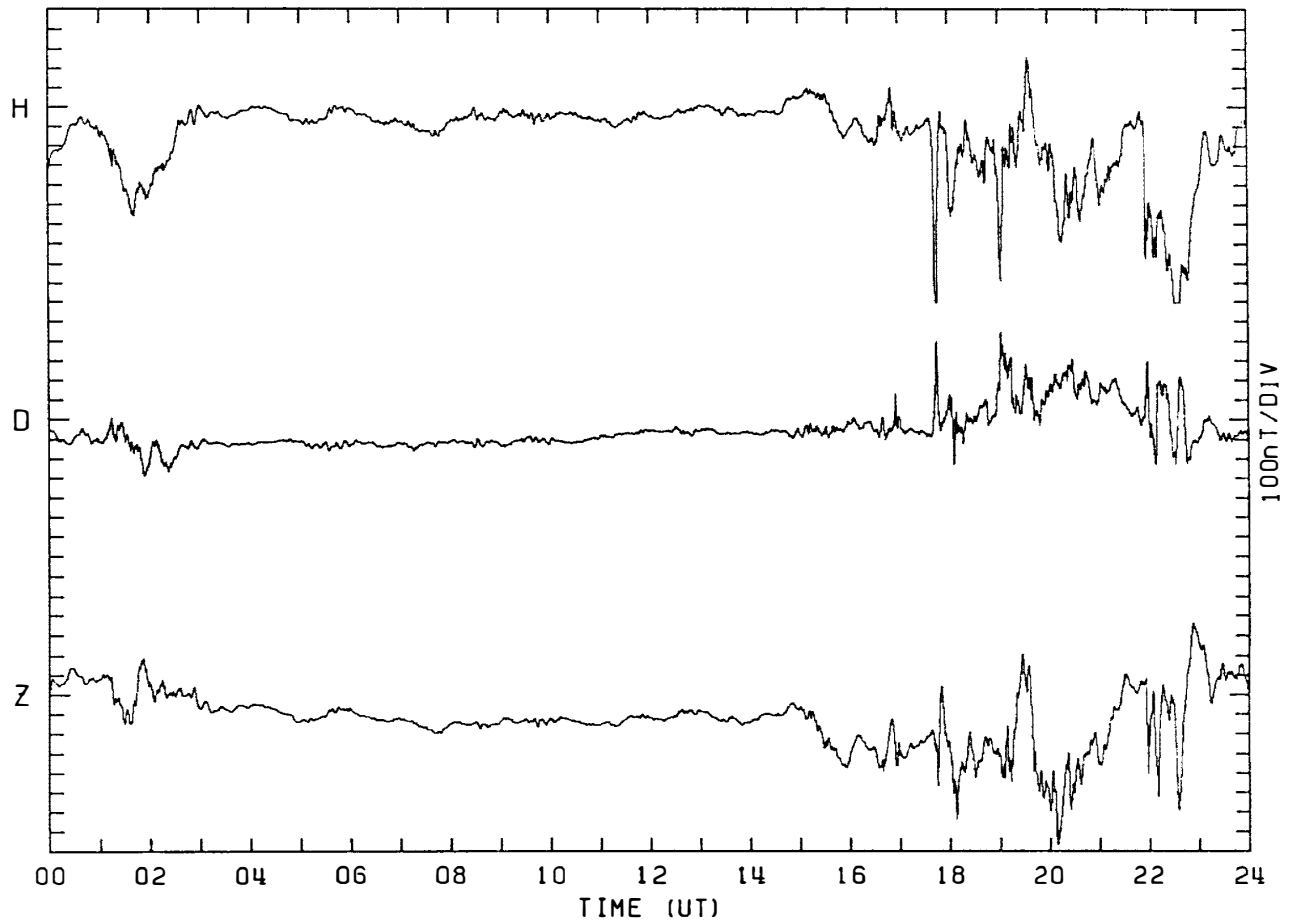
MAGNETOGRAM SYOWA STATION

DAY: 70 MARCH 11. 1983



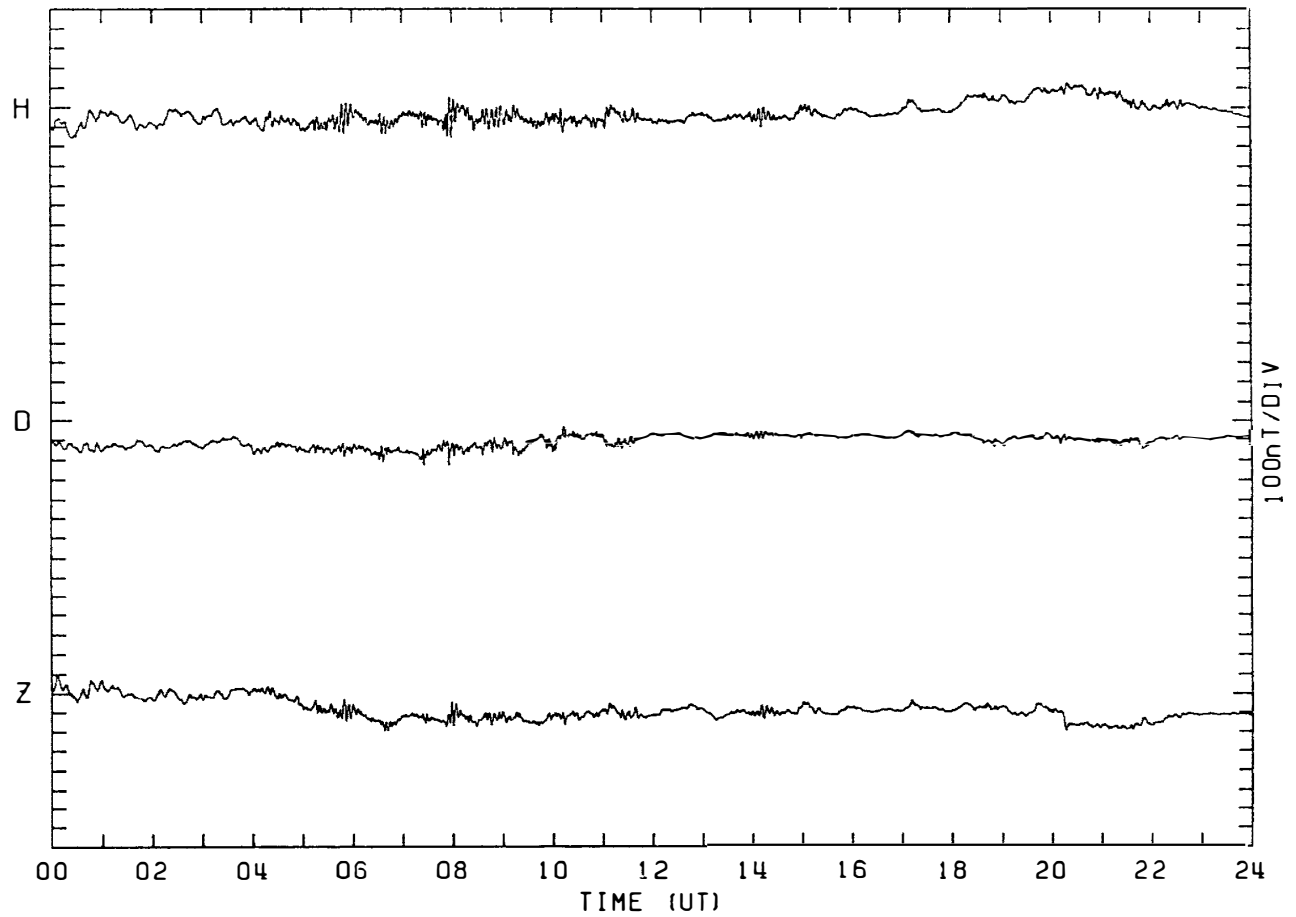
MAGNETOGRAM SYOWA STATION

DAY: 71 MARCH 12. 1983



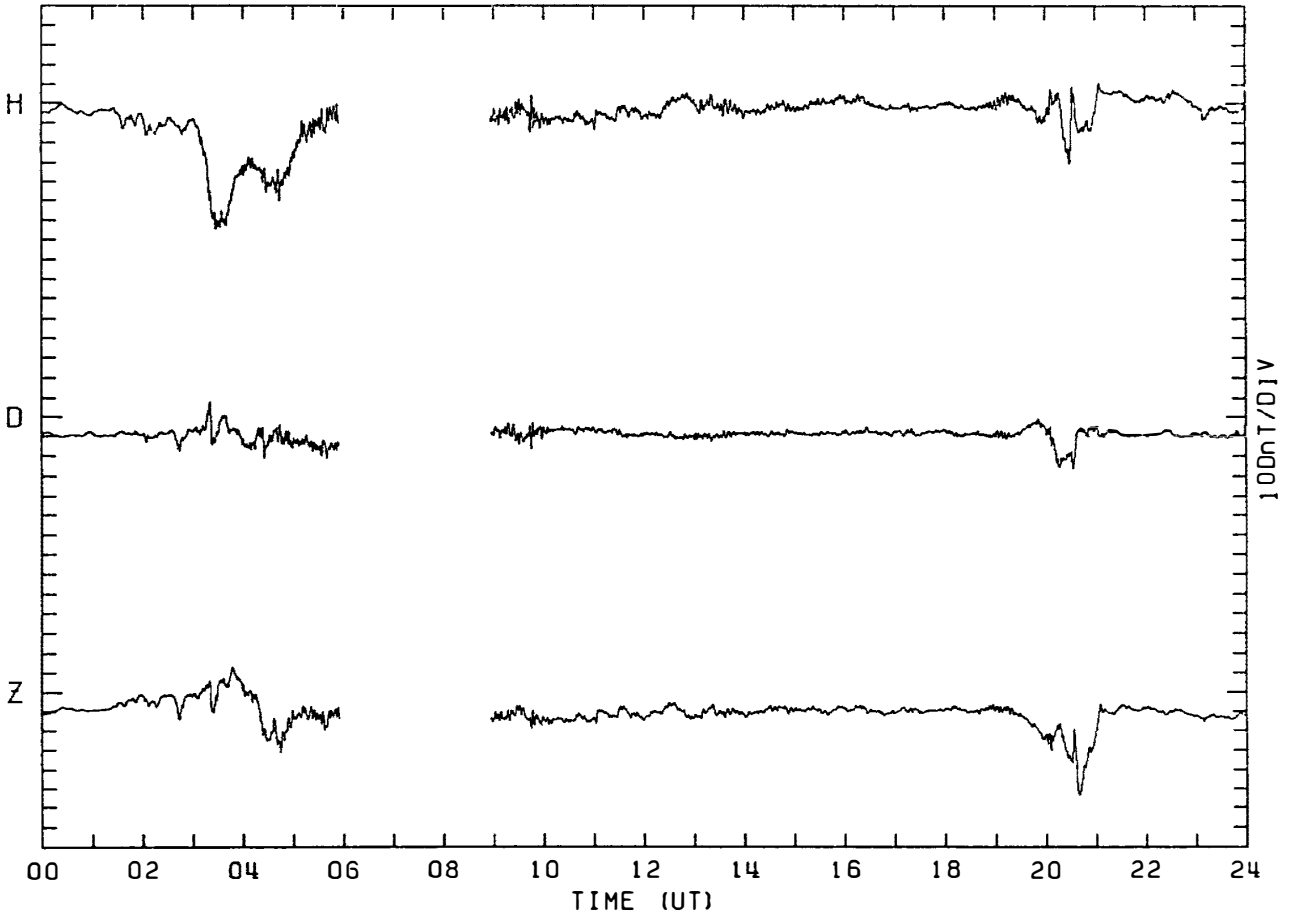
MAGNETOGRAM SYOWA STATION

DAY: 72 MARCH 13. 1983



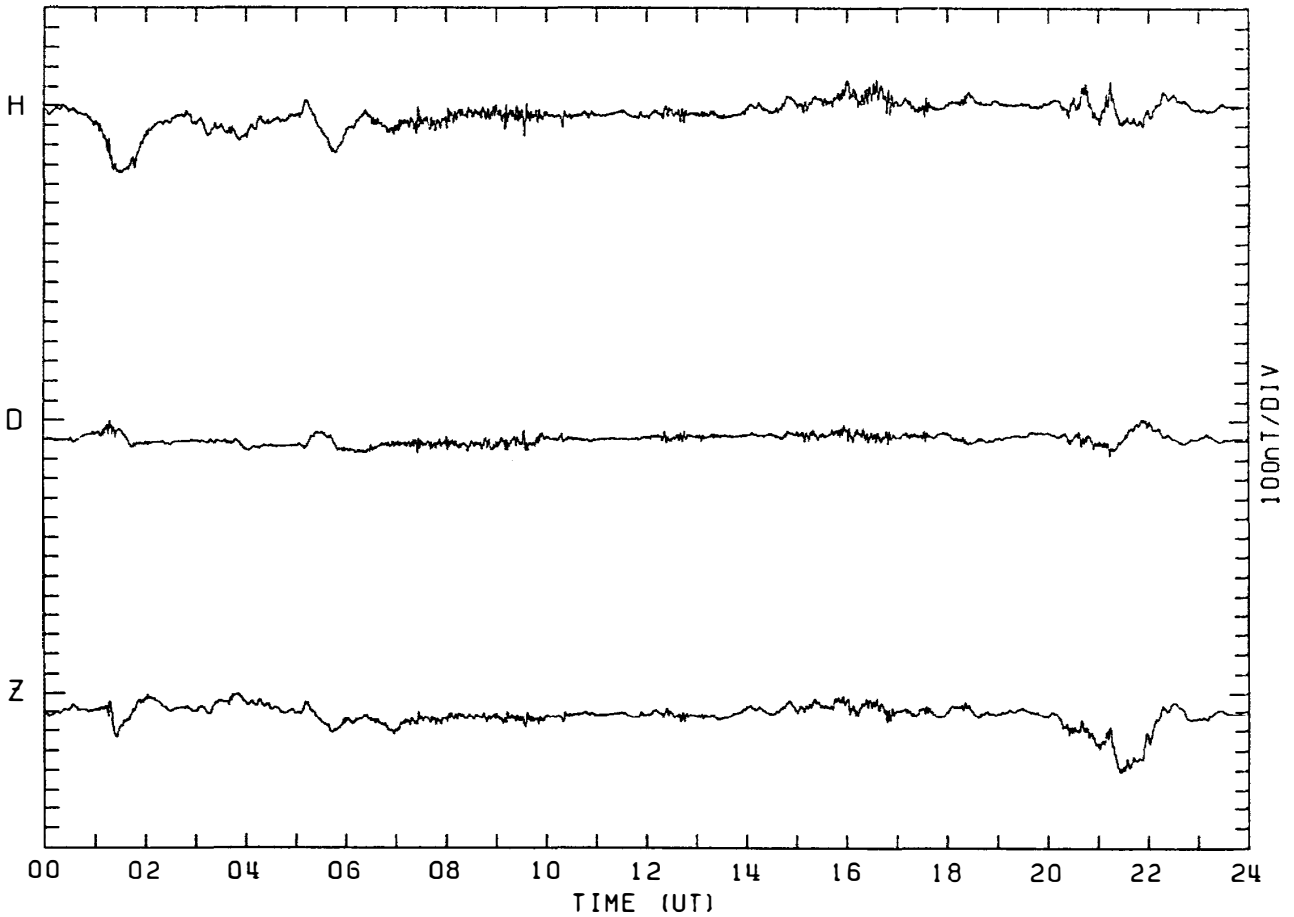
MAGNETOGRAM SYOWA STATION

DAY: 73 MARCH 14. 1983



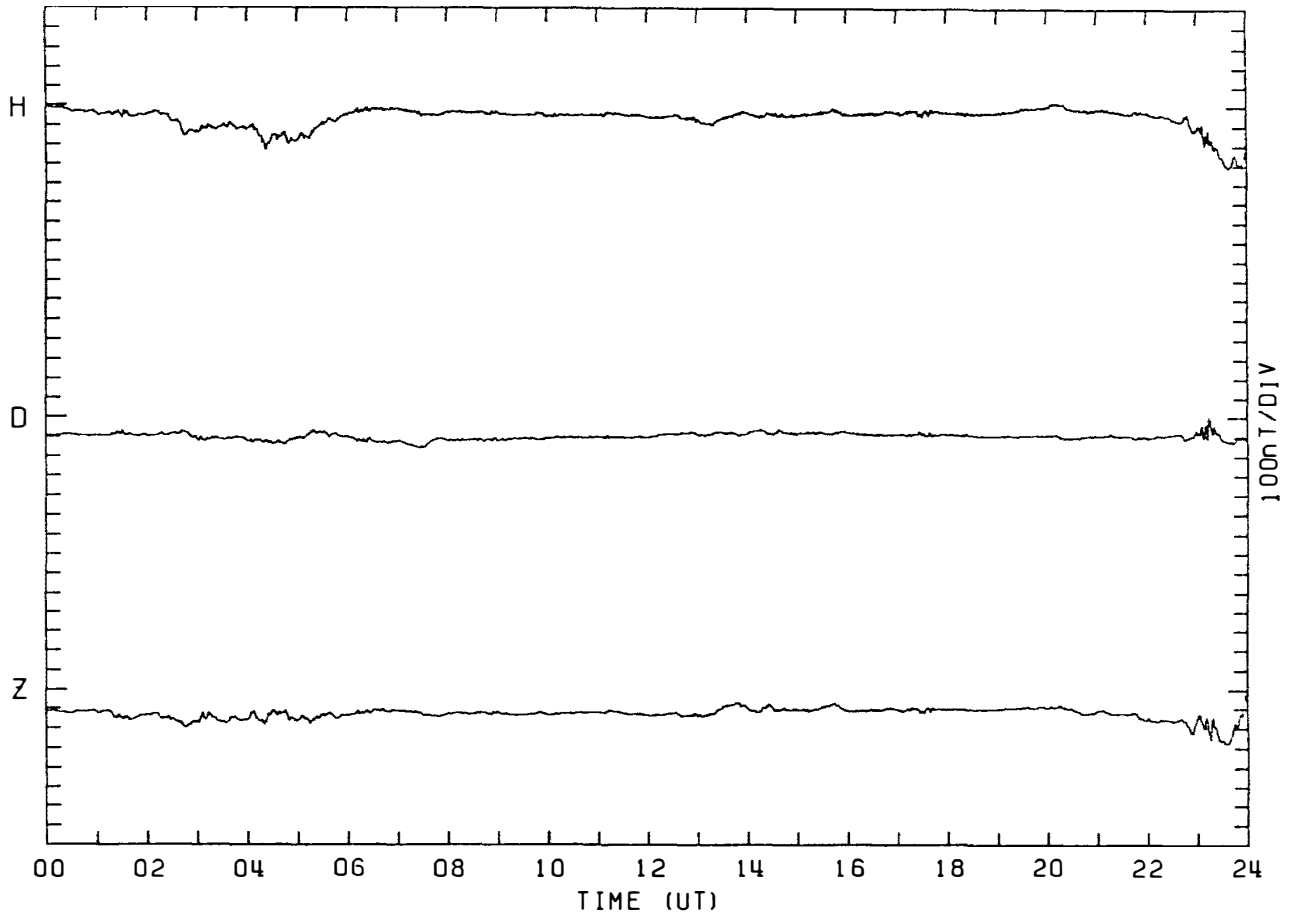
MAGNETOGRAM SYOWA STATION

DAY: 74 MARCH 15. 1983



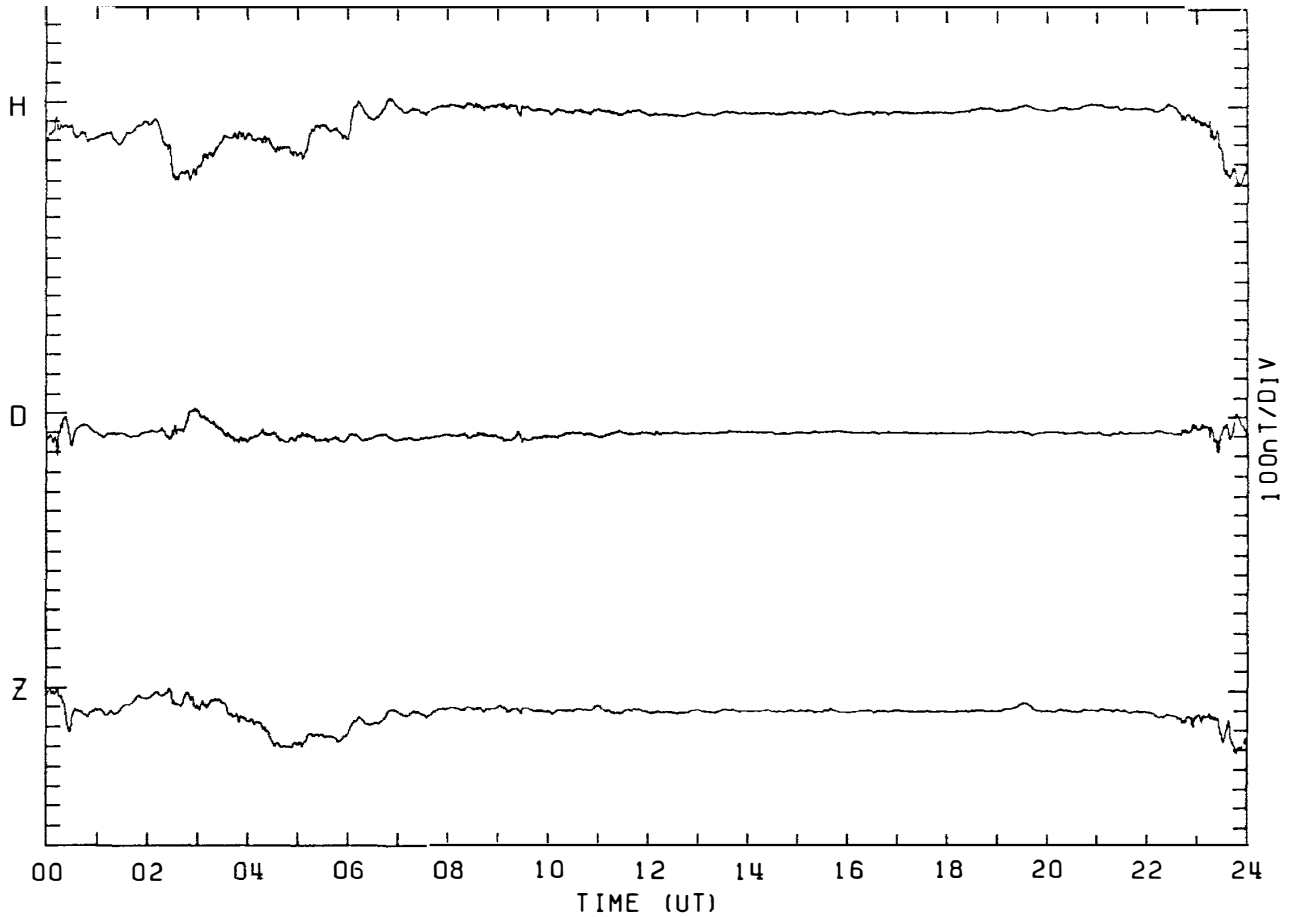
MAGNETOGRAM SYOWA STATION

DAY: 75 MARCH 16. 1983



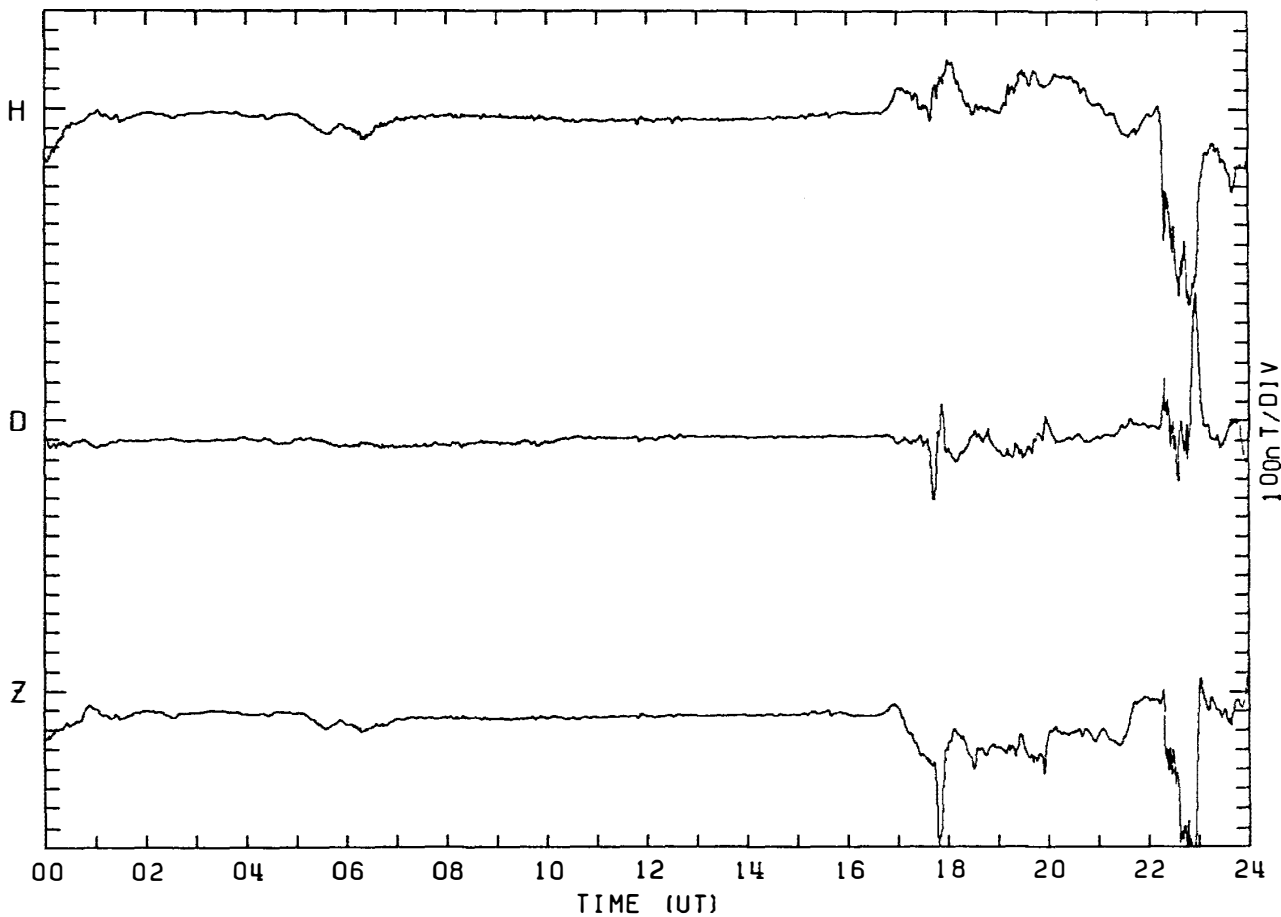
MAGNETOGRAM SYOWA STATION

DAY: 76 MARCH 17. 1983



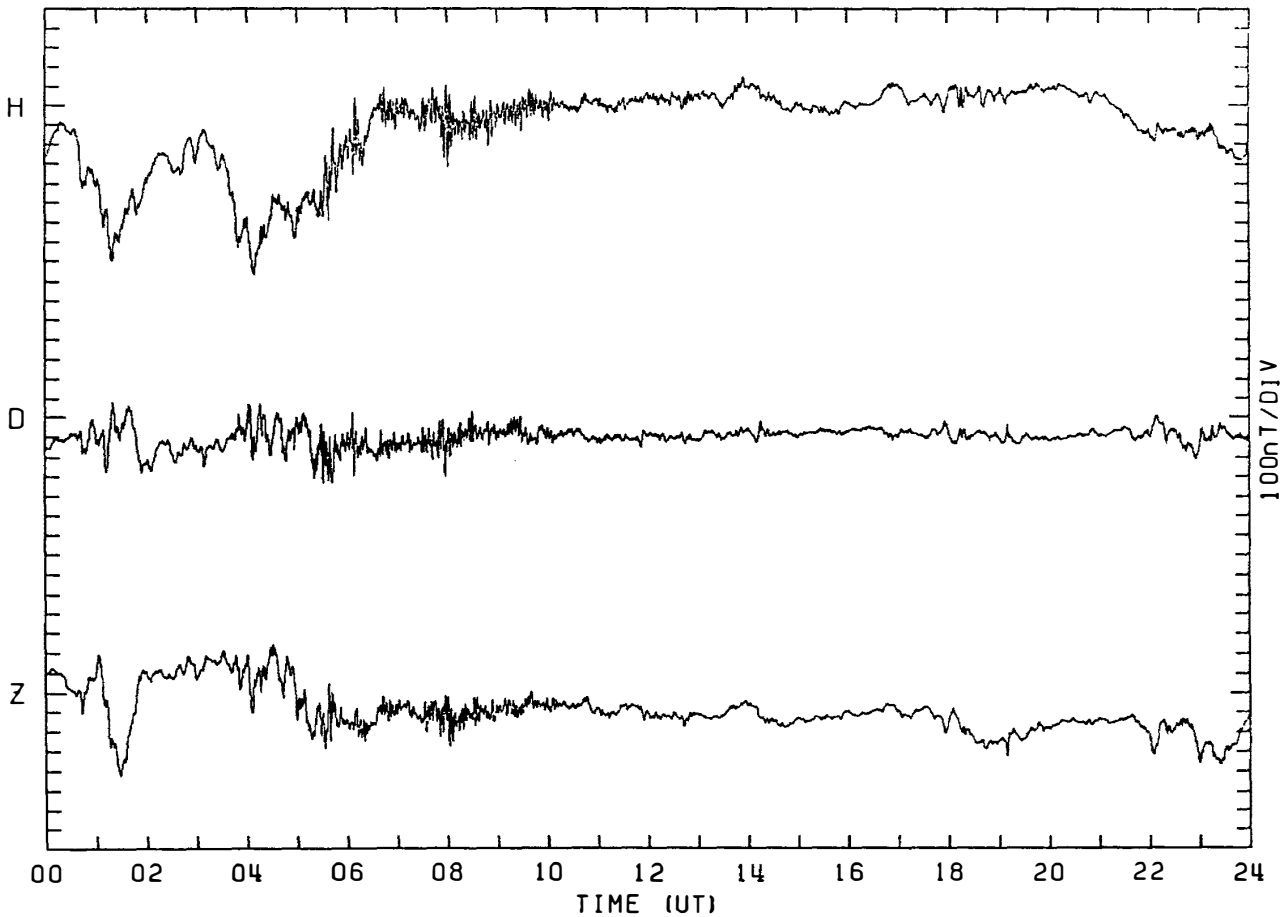
MAGNETOGRAM SYOWA STATION

DAY: 77 MARCH 18, 1983



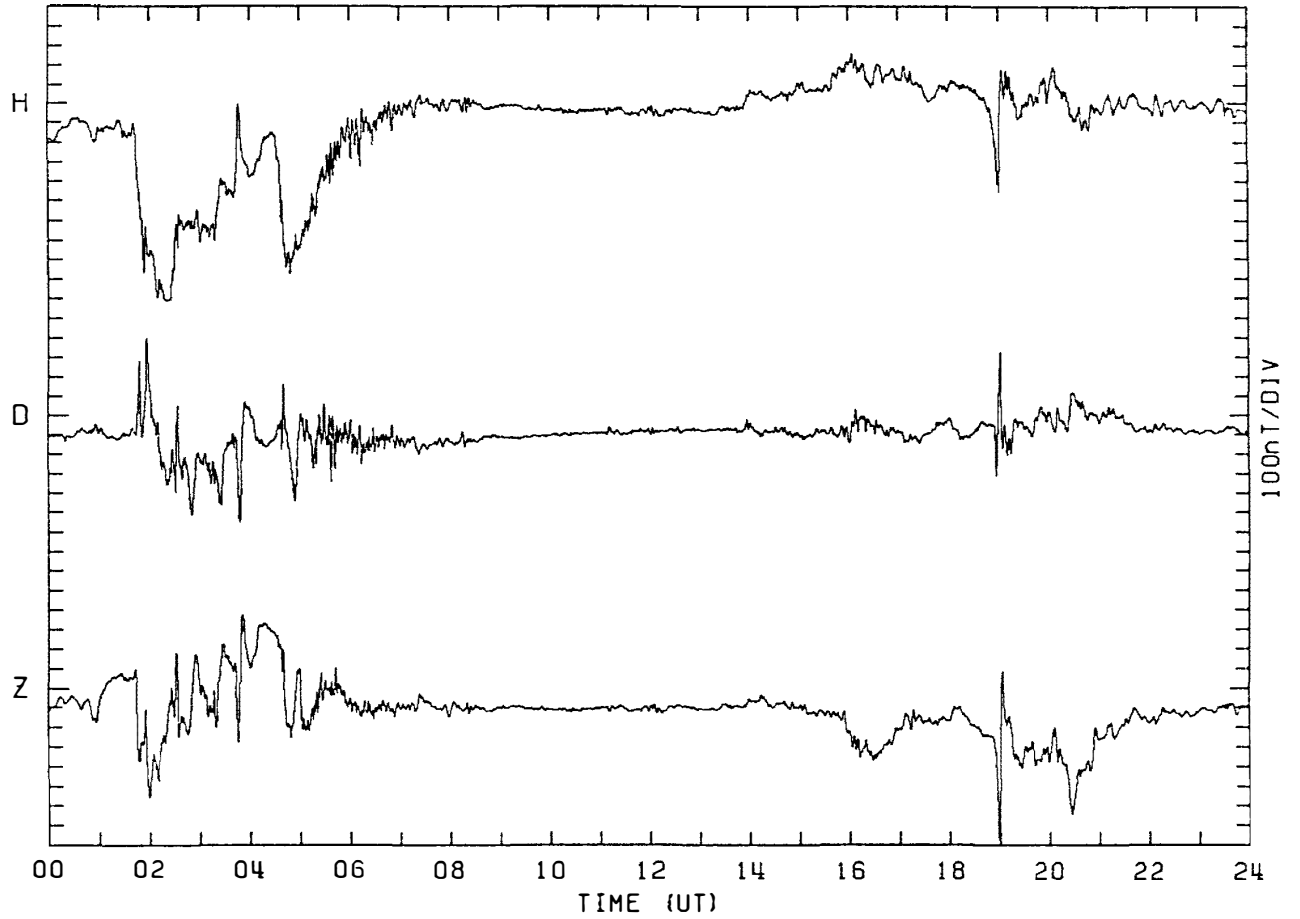
MAGNETOGRAM SYOWA STATION

DAY: 78 MARCH 19, 1983



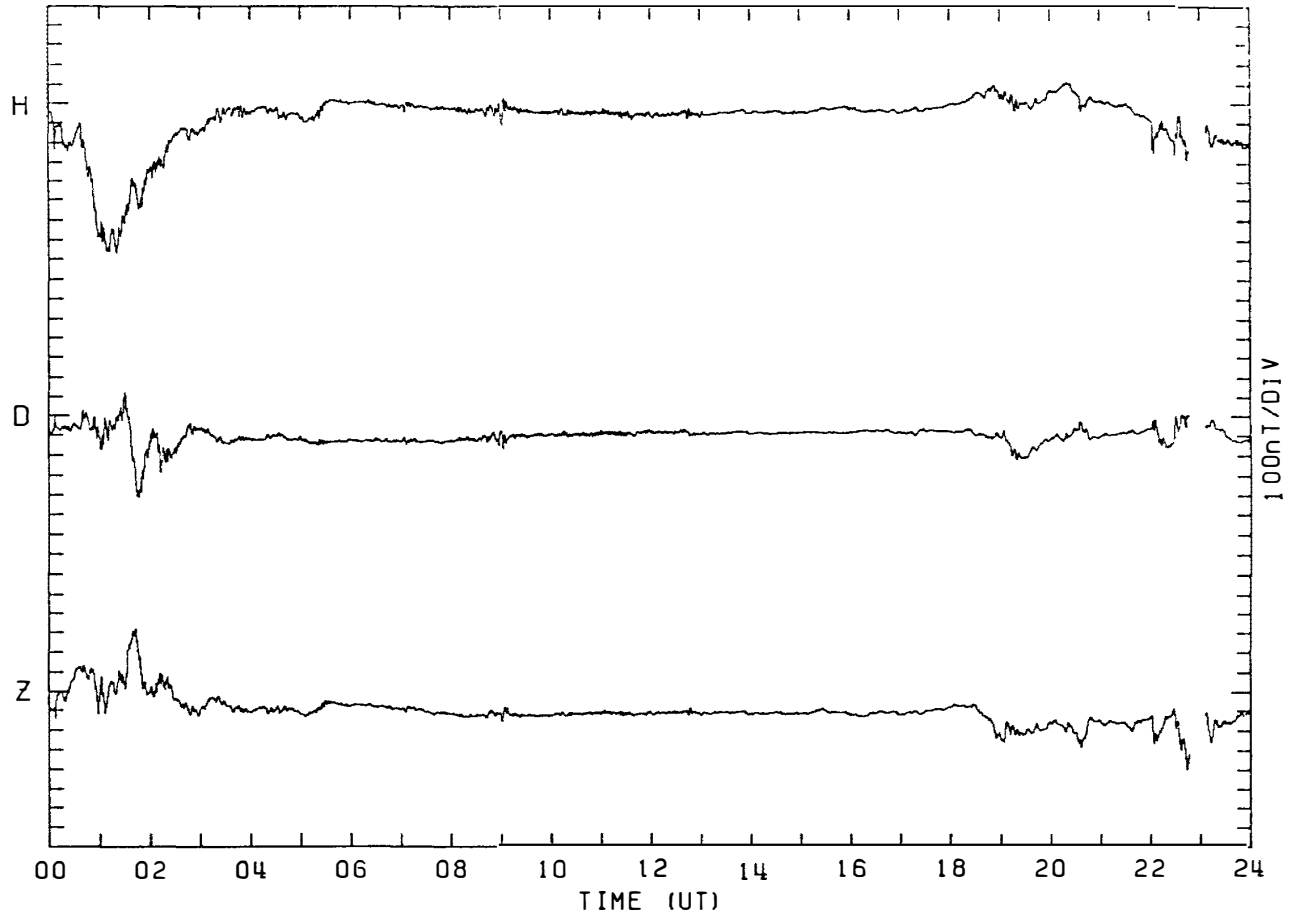
MAGNETOGRAM SYOWA STATION

DAY: 79 MARCH 20, 1983



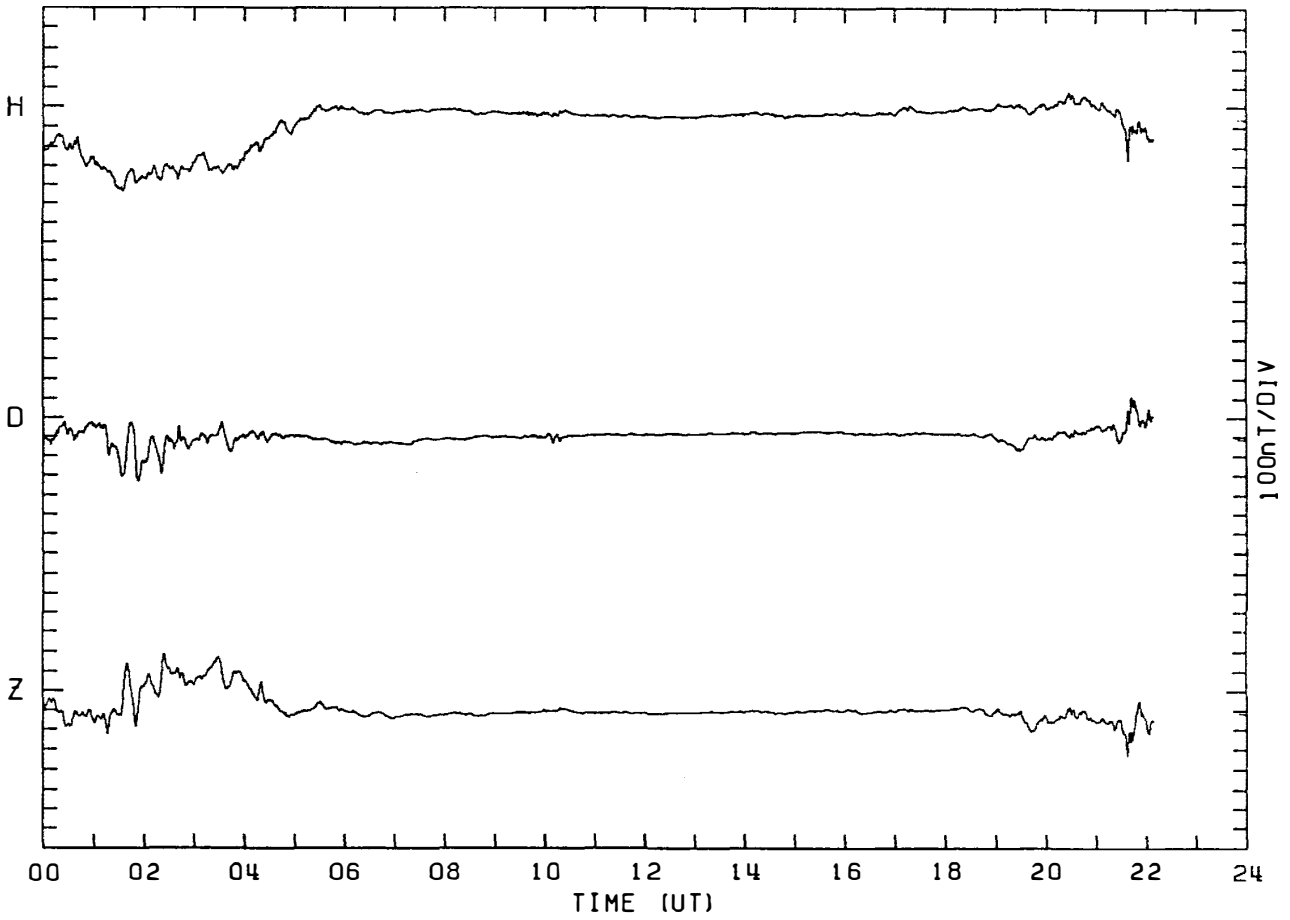
MAGNETOGRAM SYOWA STATION

DAY: 80 MARCH 21, 1983



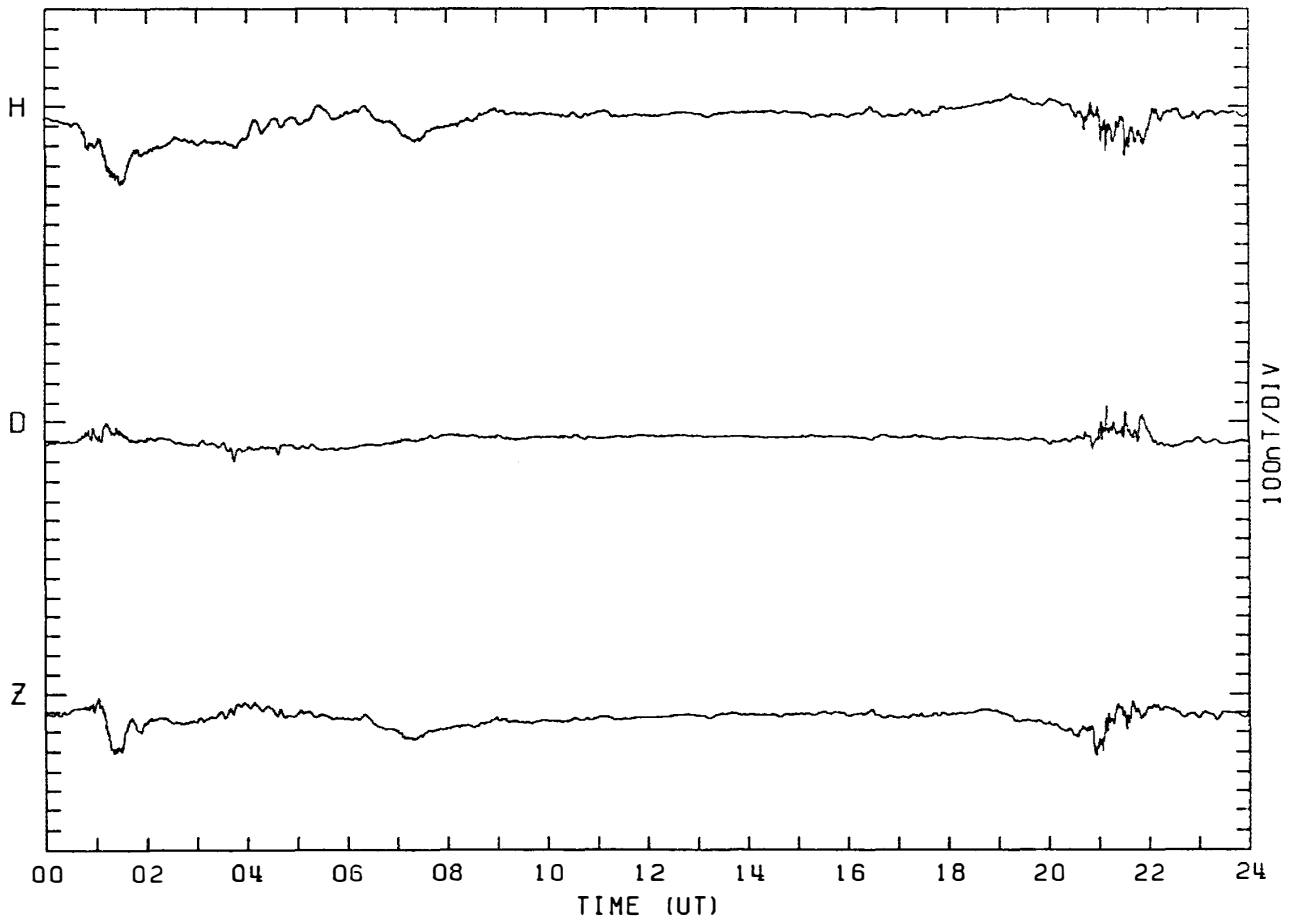
MAGNETOGRAM SYOWA STATION

DAY: 81 MARCH 22, 1983



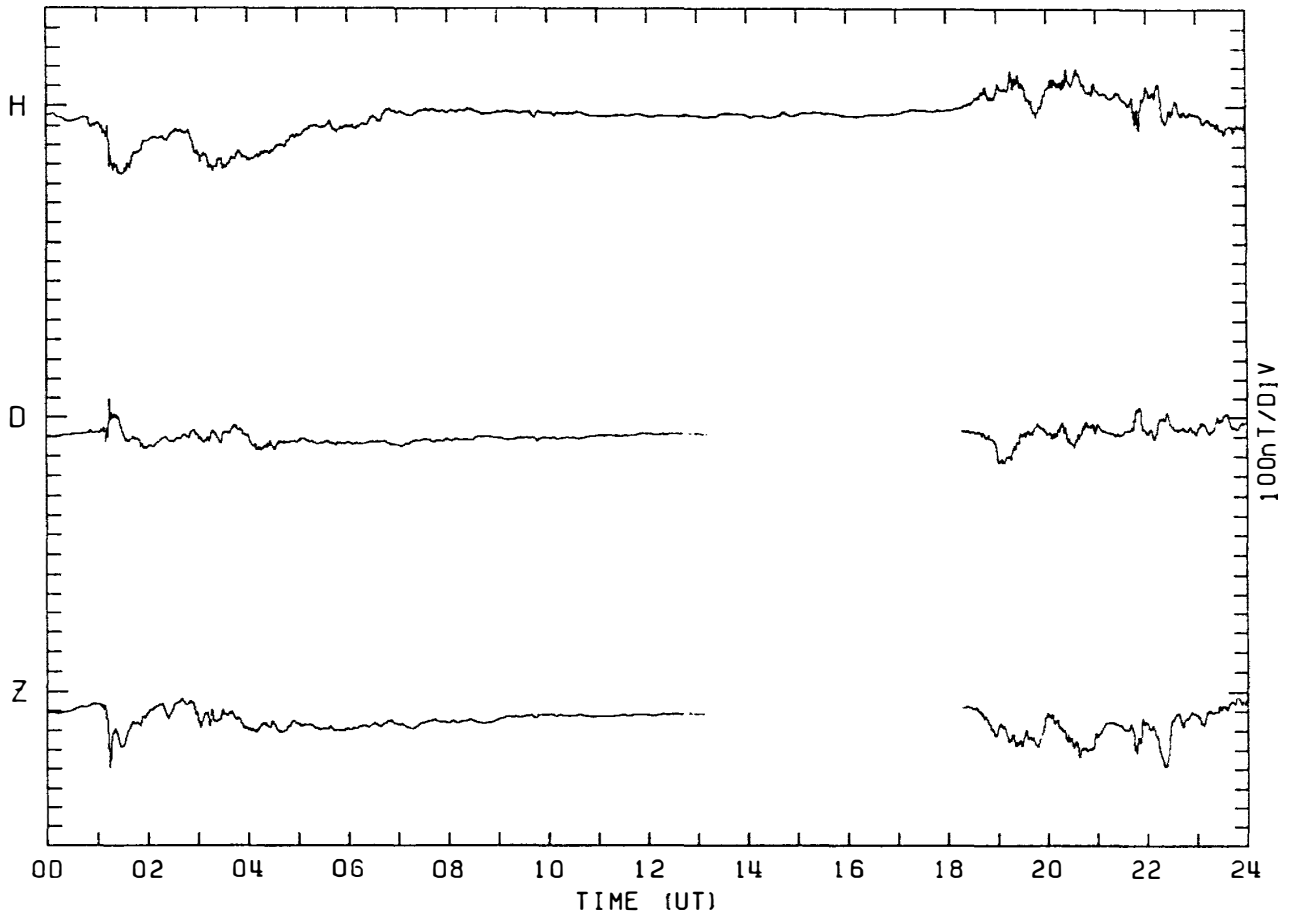
MAGNETOGRAM SYOWA STATION

DAY: 82 MARCH 23, 1983



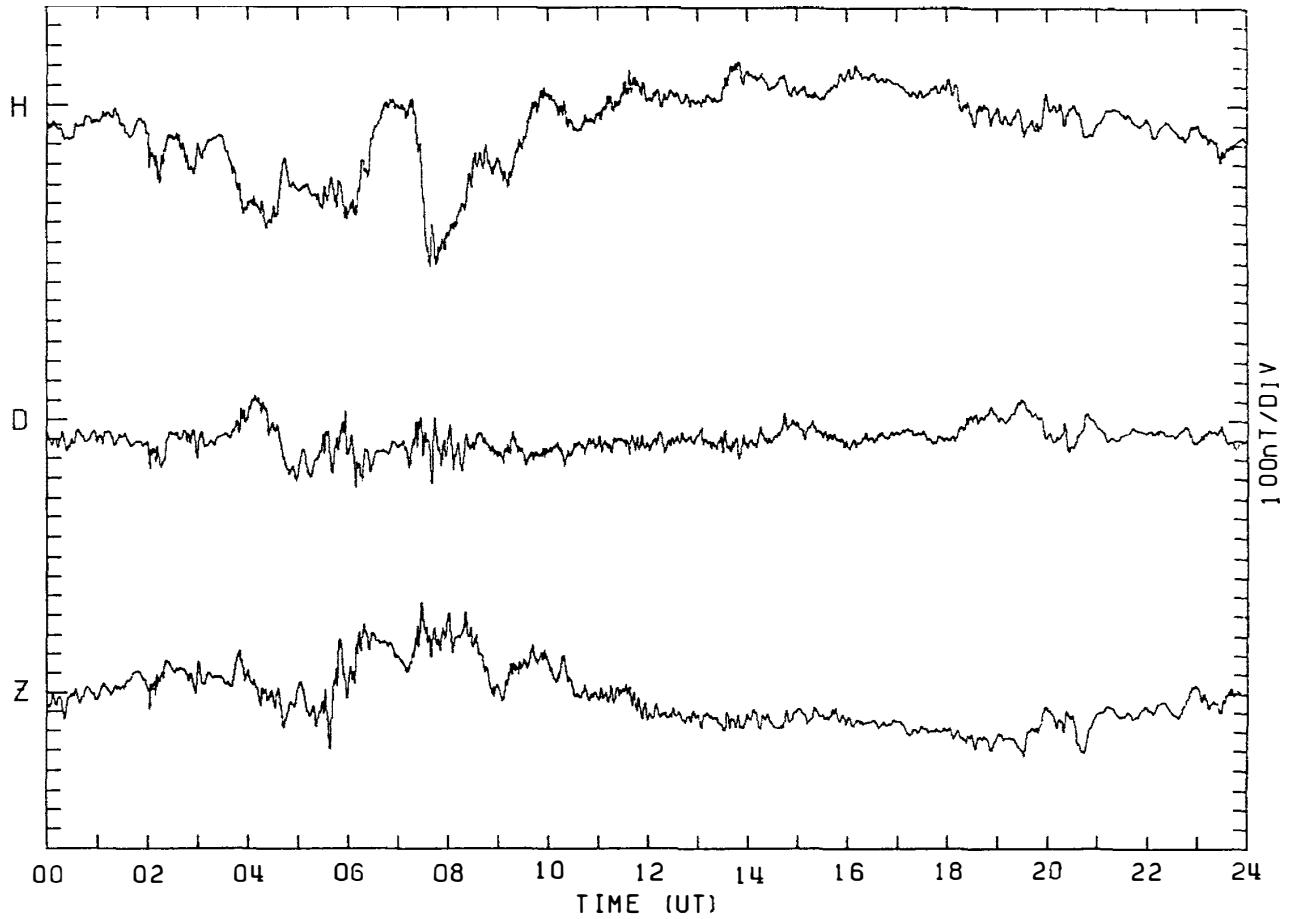
MAGNETOGRAM SYOWA STATION

DAY: 83 MARCH 24. 1983



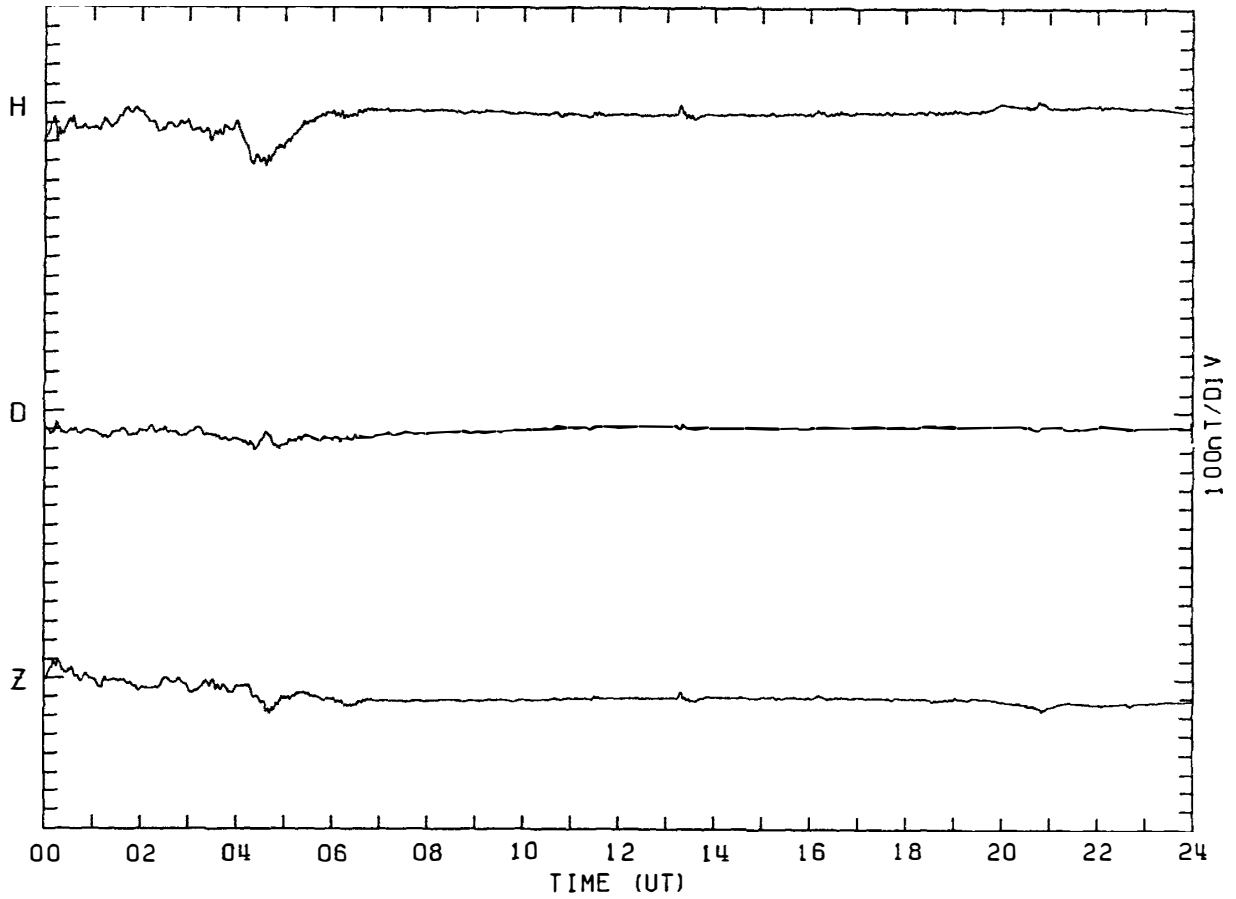
MAGNETOGRAM SYOWA STATION

DAY: 84 MARCH 25. 1983



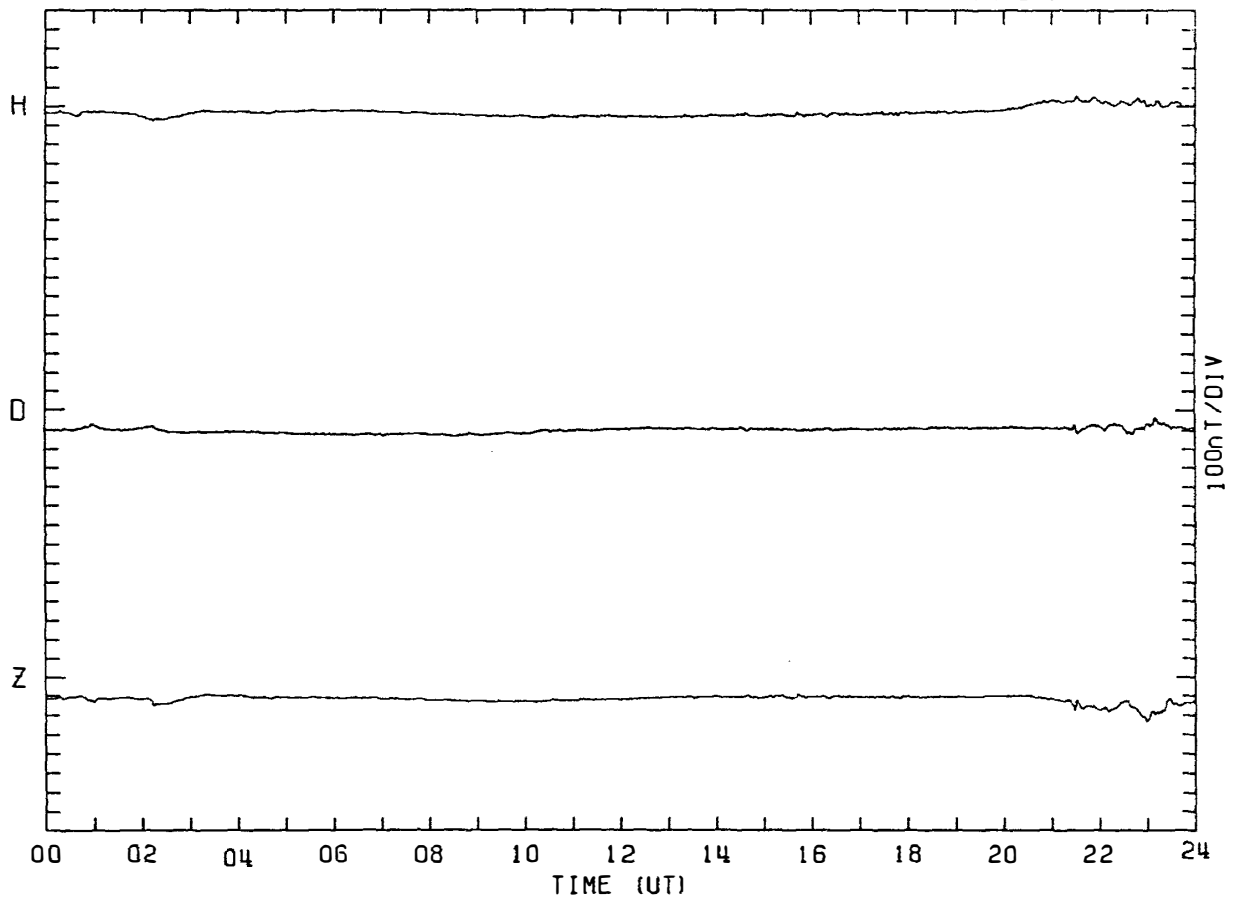
MAGNETOGRAM SYOWA STATION

DAY: 85 MARCH 26, 1983



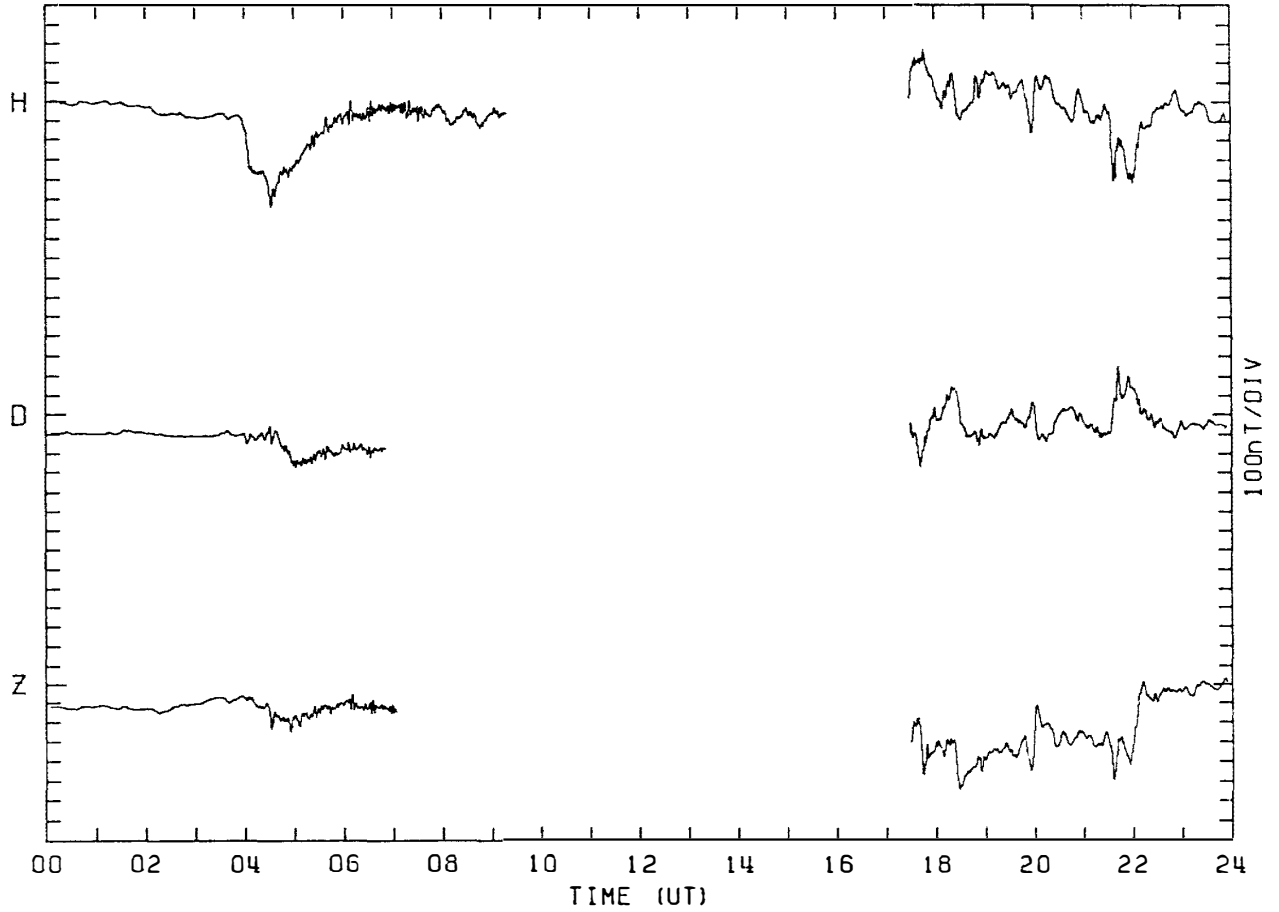
MAGNETOGRAM SYOWA STATION

DAY: 86 MARCH 27, 1983



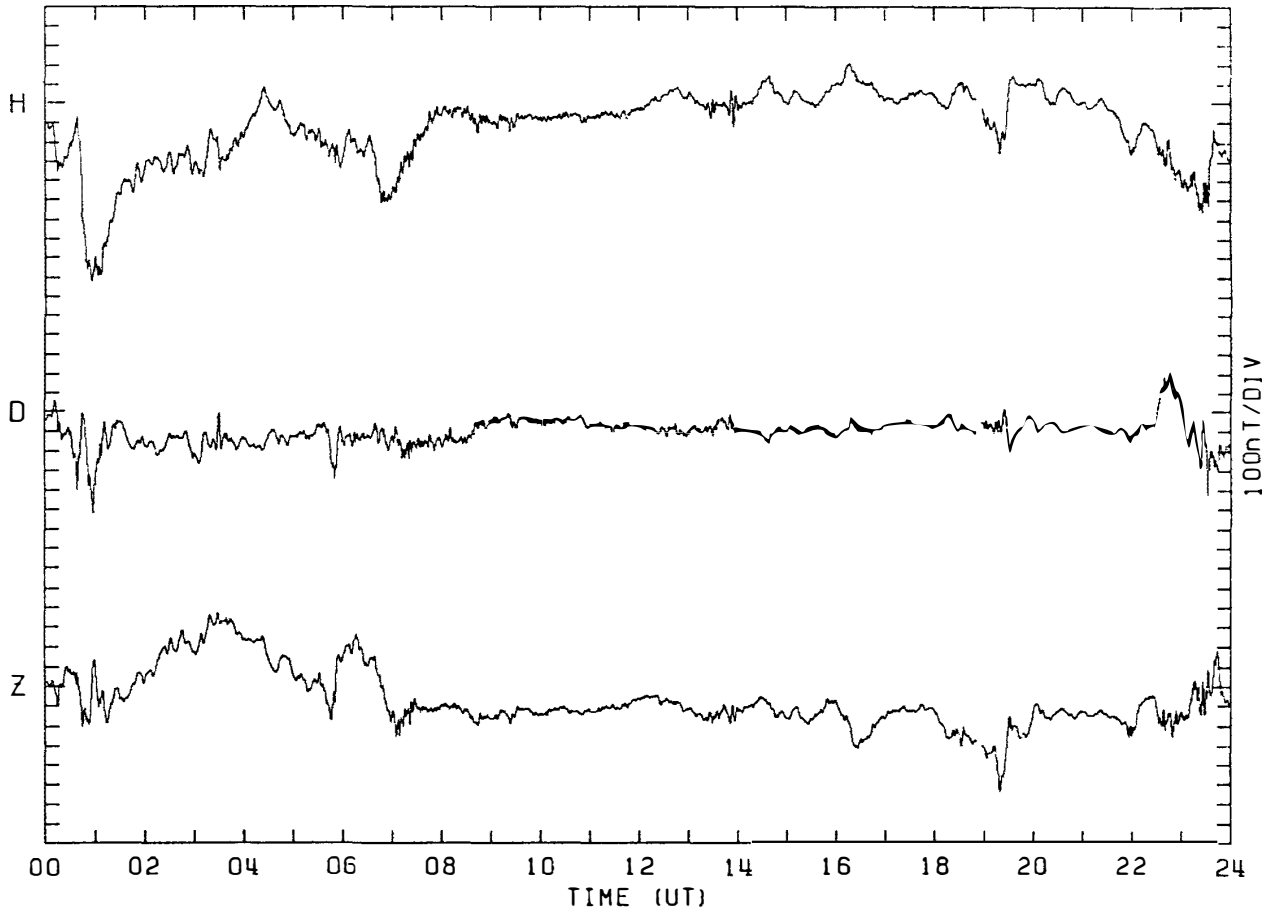
MAGNETOGRAM SYOWA STATION

DAY: 87 MARCH 28. 1983



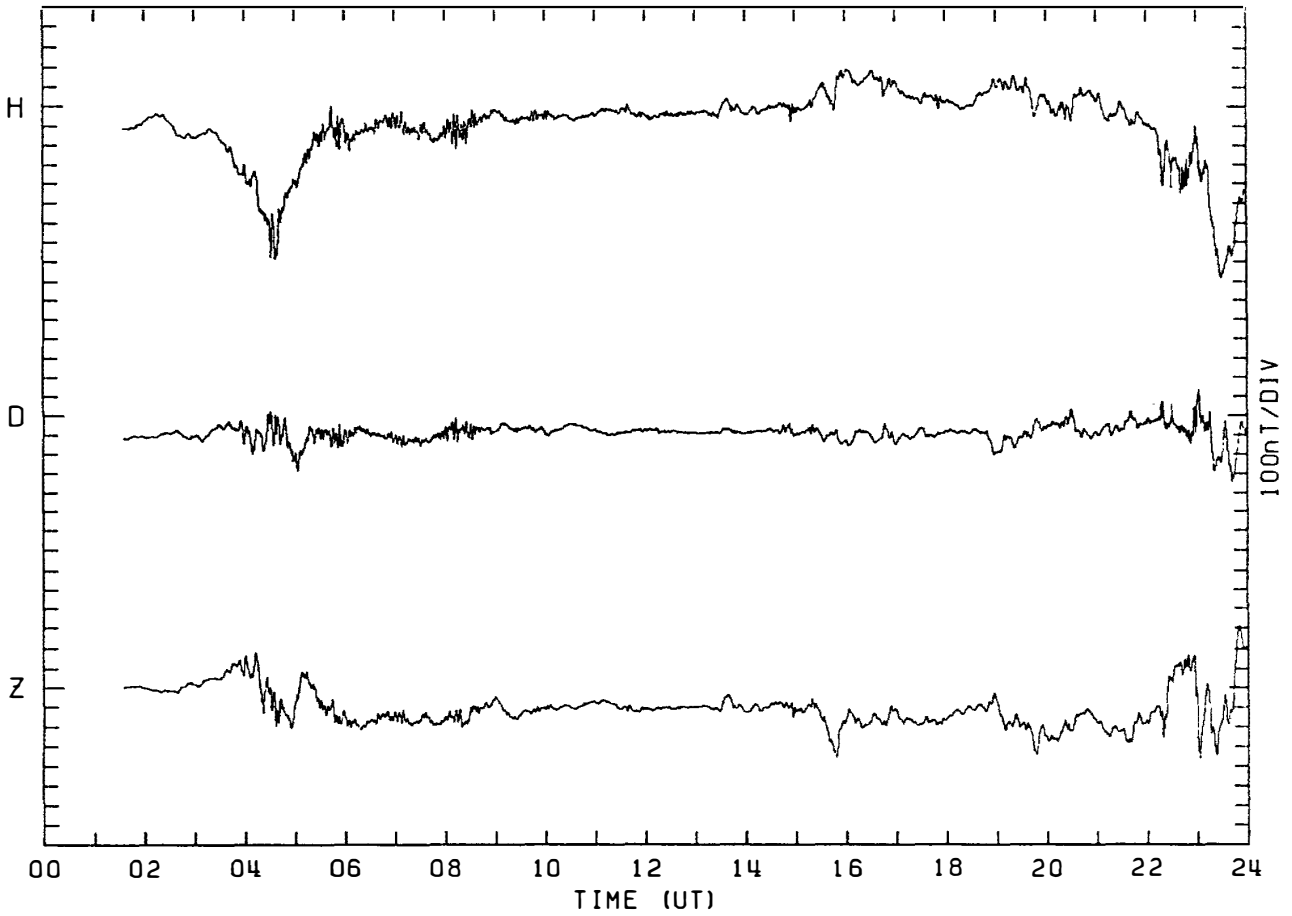
MAGNETOGRAM SYOWA STATION

DAY: 88 MARCH 29. 1983



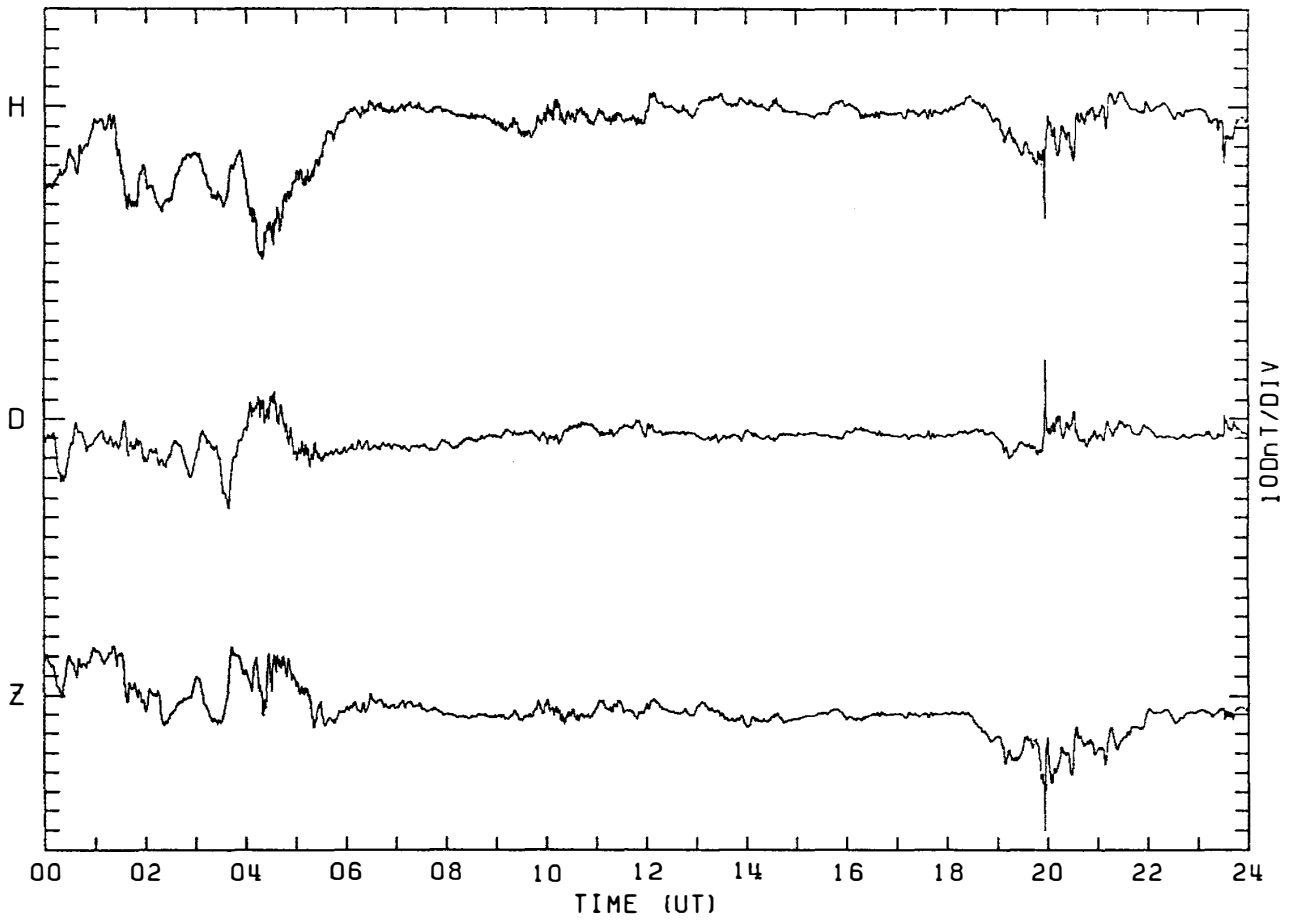
MAGNETOGRAM SYOWA STATION

DAY: 89 MARCH 30. 1983



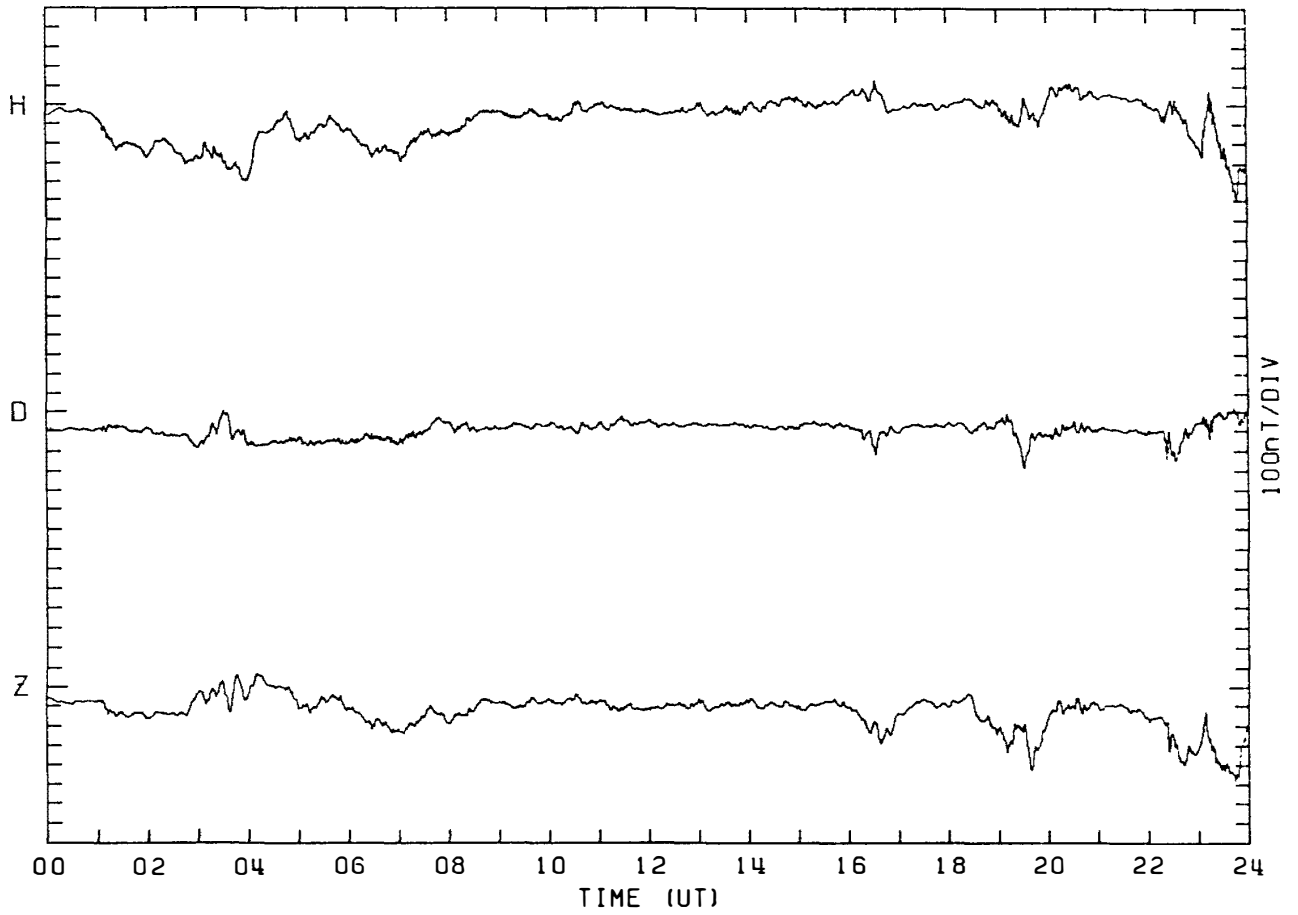
MAGNETOGRAM SYOWA STATION

DAY: 90 MARCH 31. 1983



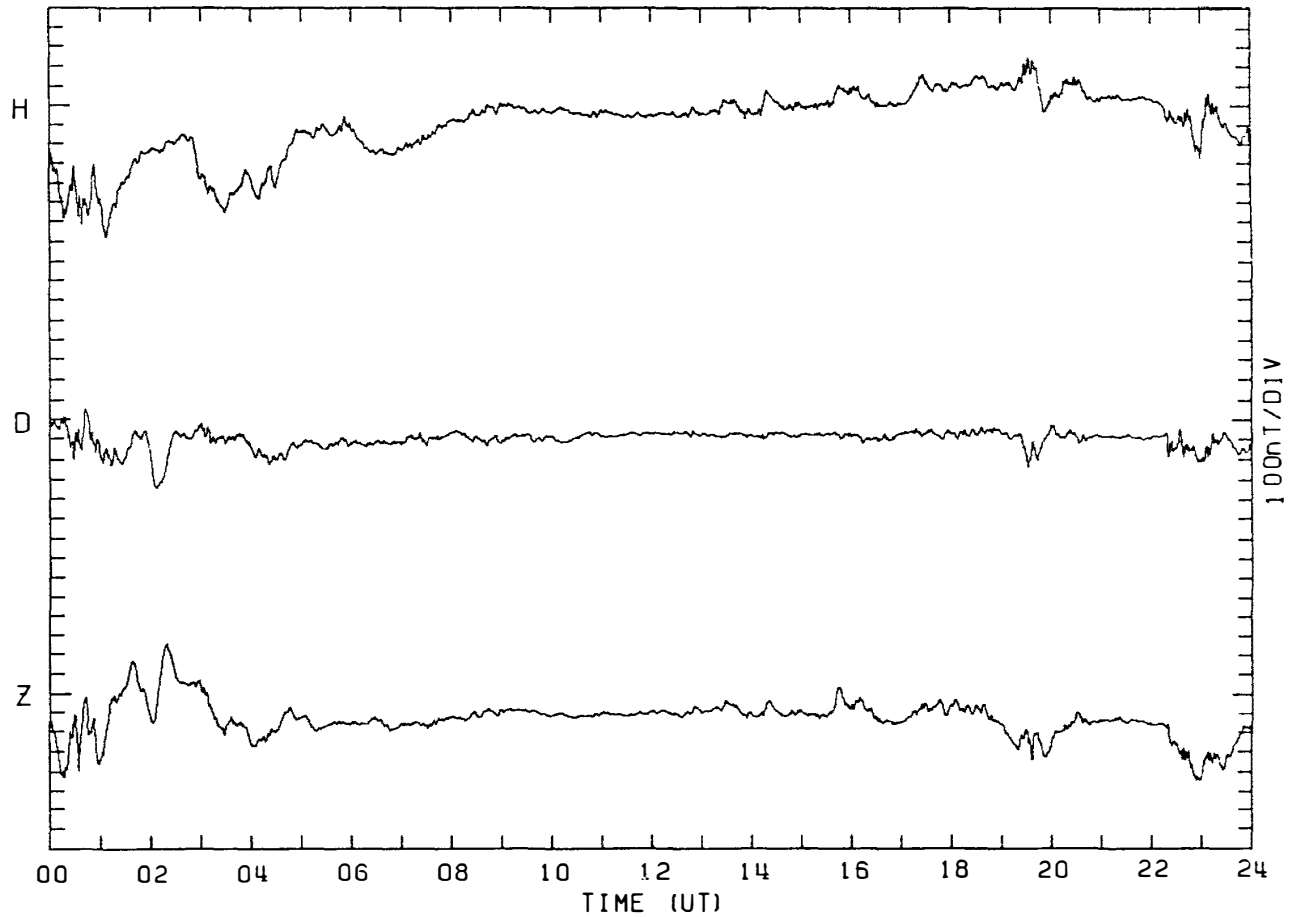
MAGNETOGRAM SYOWA STATION

DAY: 91 APRIL 1. 1983



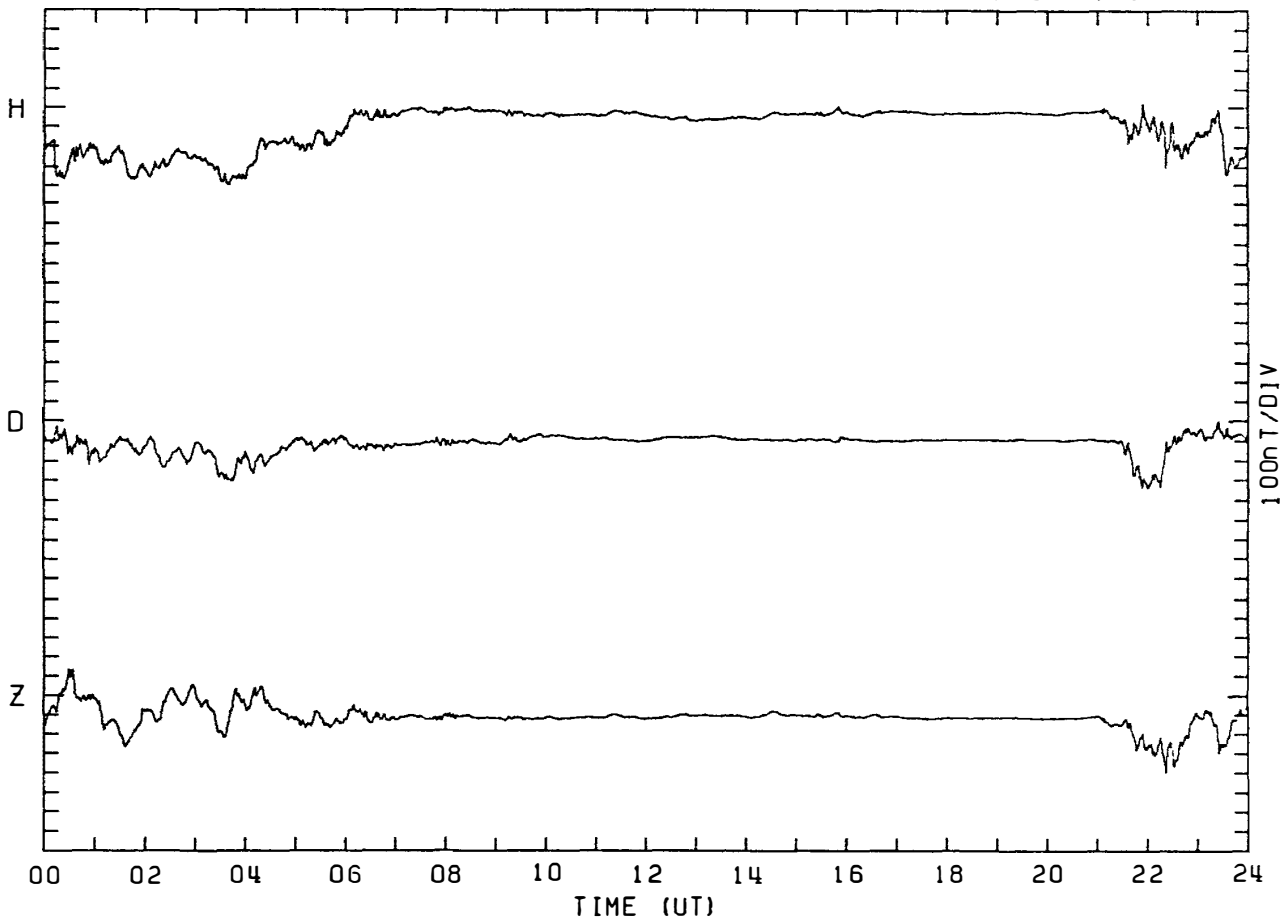
MAGNETOGRAM SYOWA STATION

DAY: 92 APRIL 2. 1983



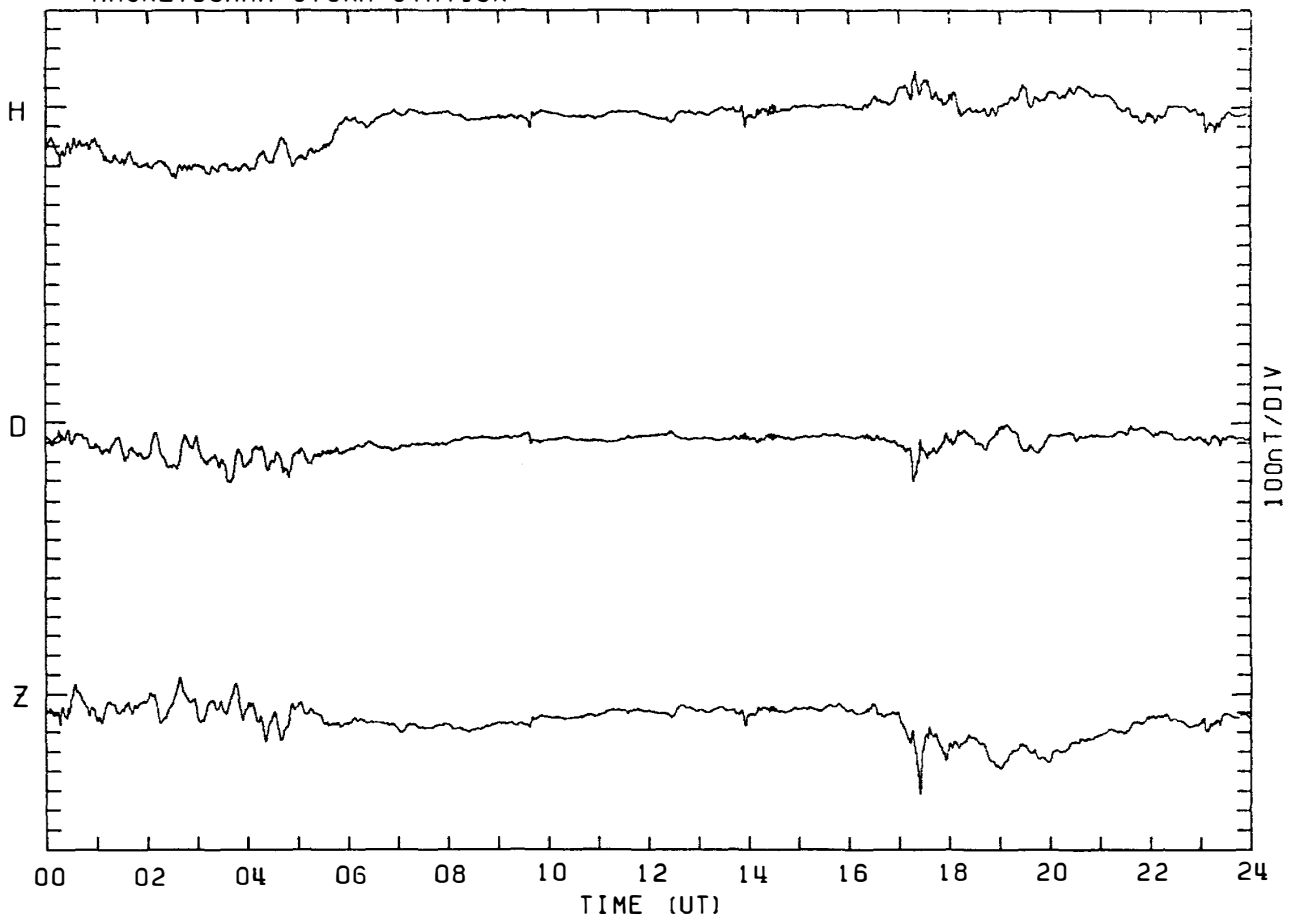
MAGNETOGRAM SYOWA STATION

DAY: 93 APRIL 3, 1983



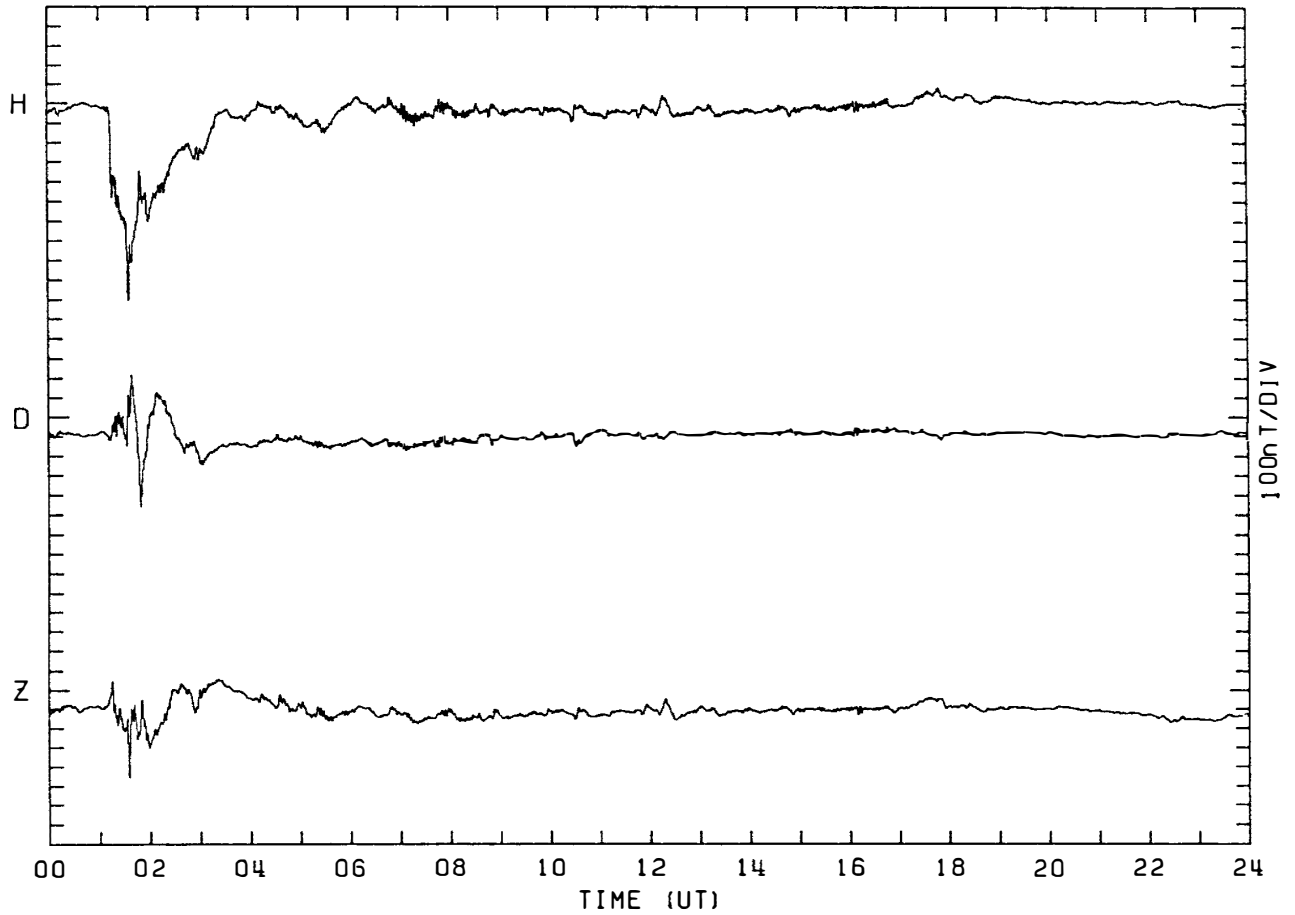
MAGNETOGRAM SYOWA STATION

DAY: 94 APRIL 4, 1983



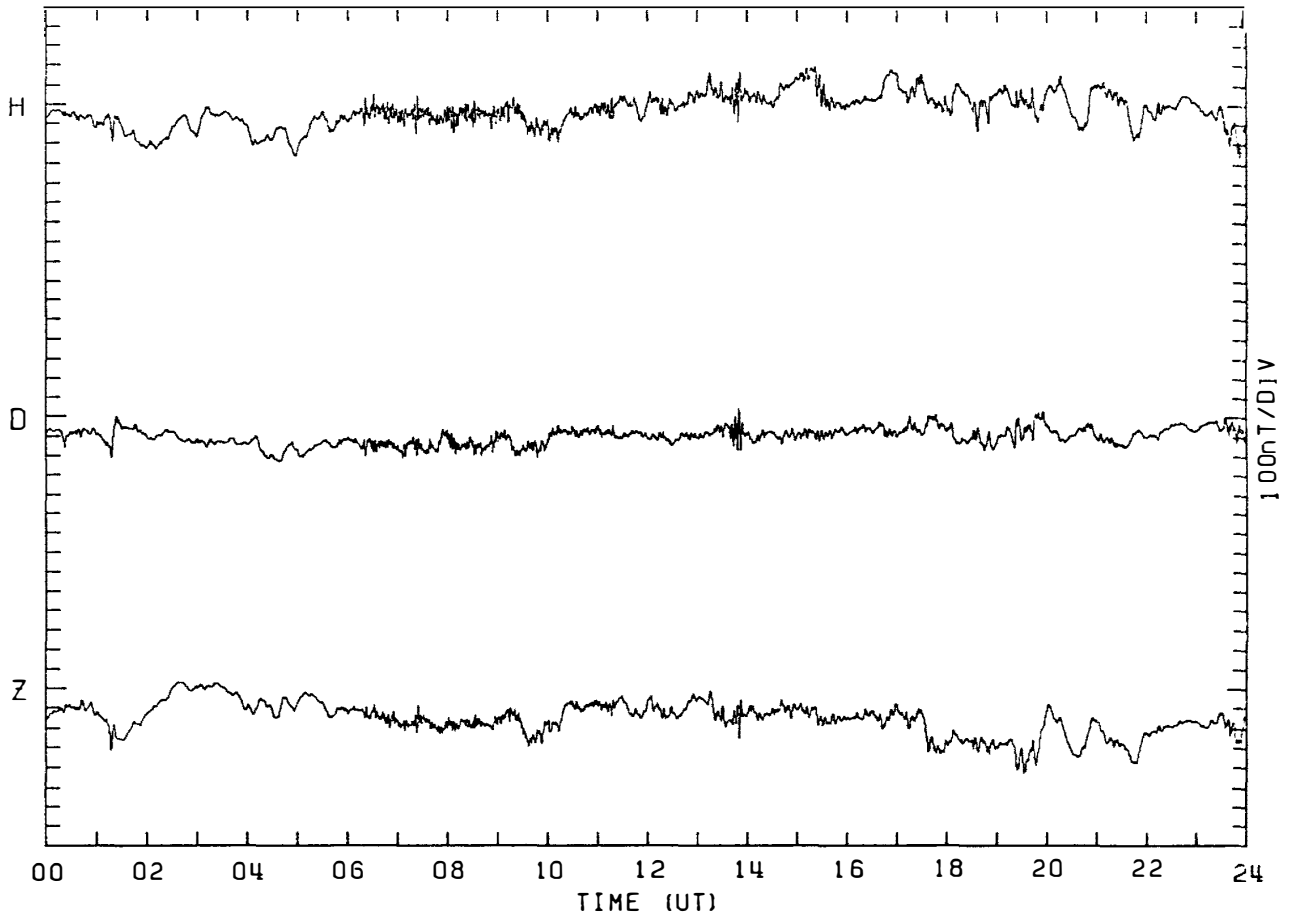
MAGNETOGRAM SYOWA STATION

DAY: 95 APRIL 5. 1983



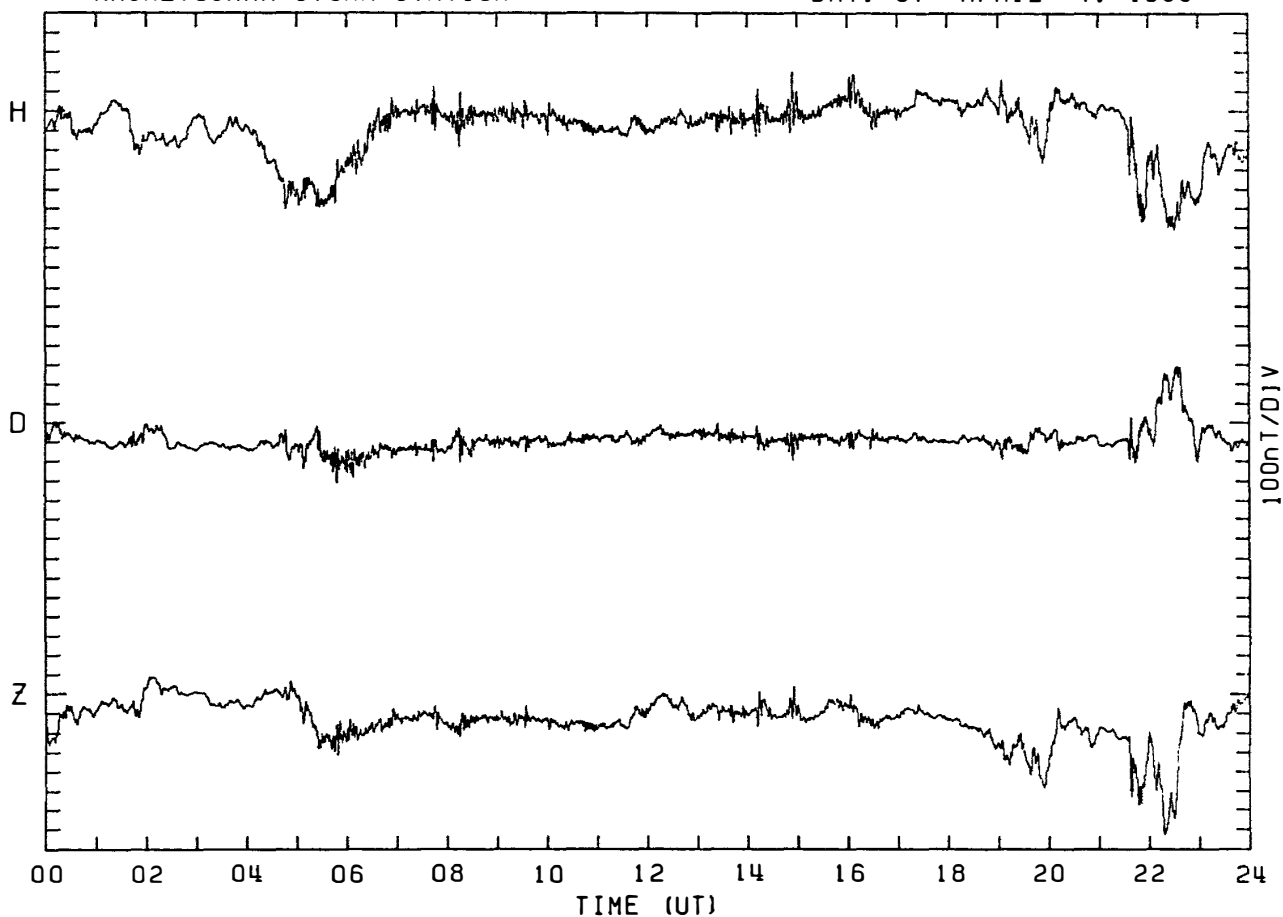
MAGNETOGRAM SYOWA STATION

DAY: 96 APRIL 6. 1983



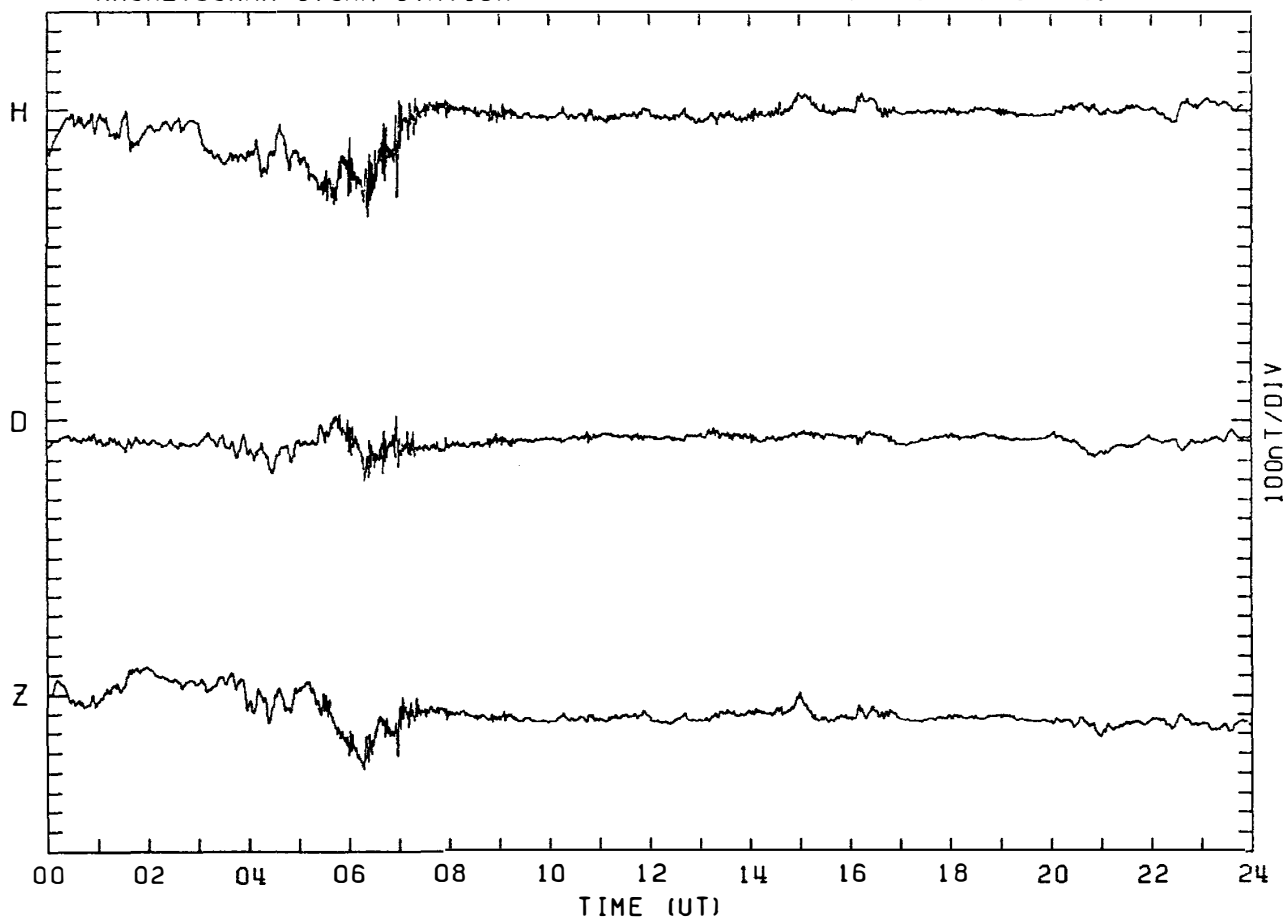
MAGNETOGRAM SYOWA STATION

DAY: 97 APRIL 7. 1983



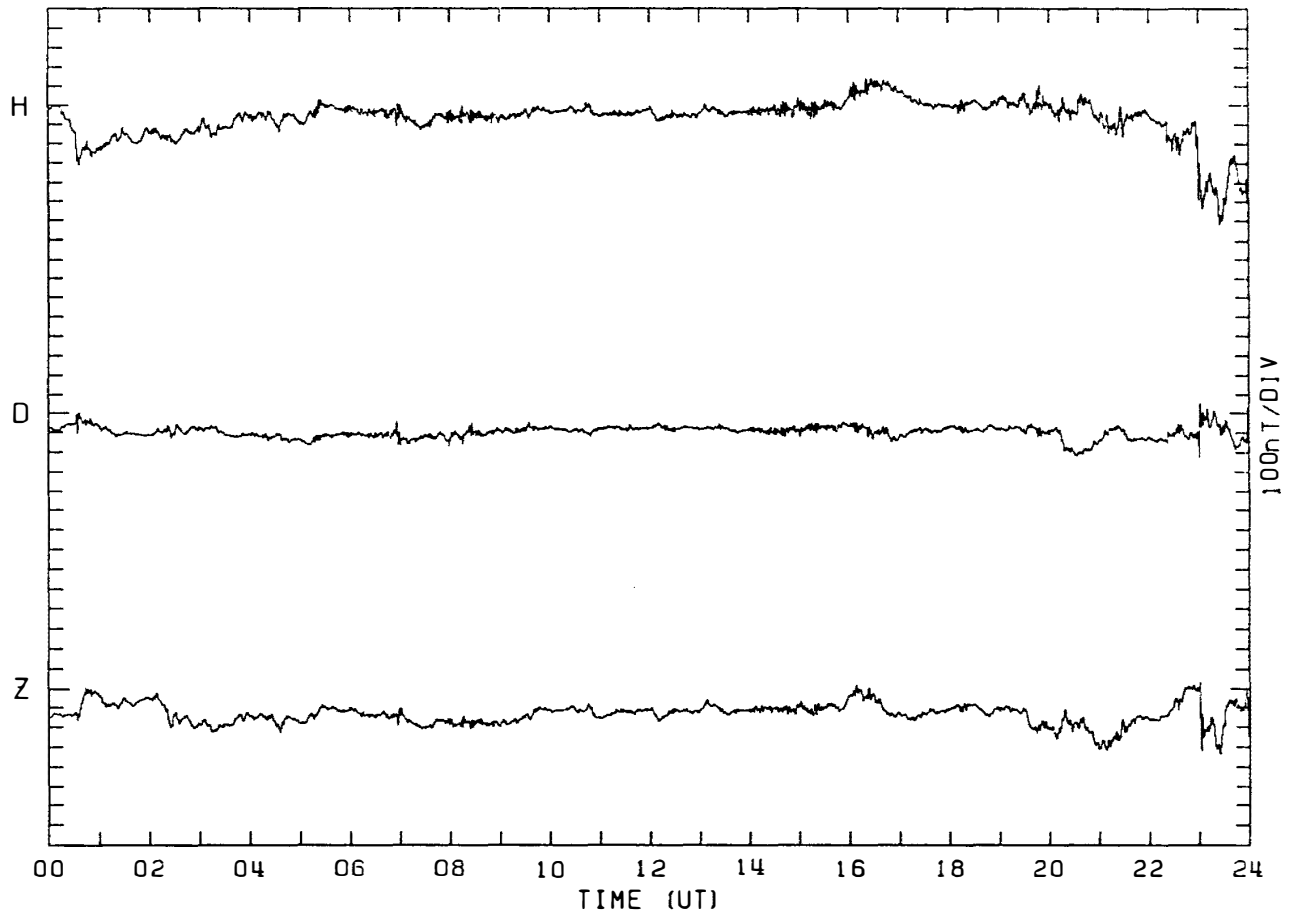
MAGNETOGRAM SYOWA STATION

DAY: 98 APRIL 8. 1983



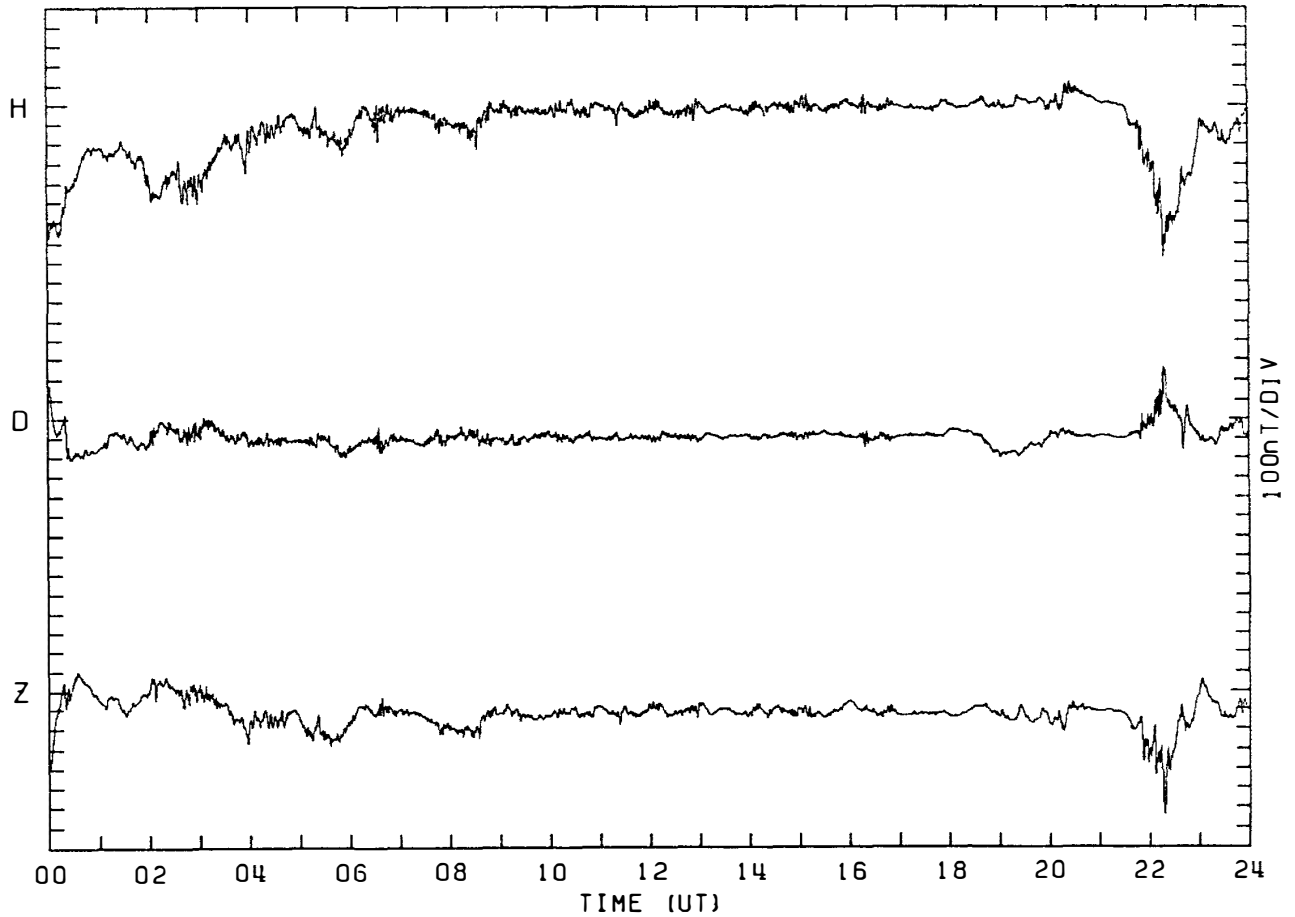
MAGNETOGRAM SYOWA STATION

DAY: 99 APRIL 9. 1983



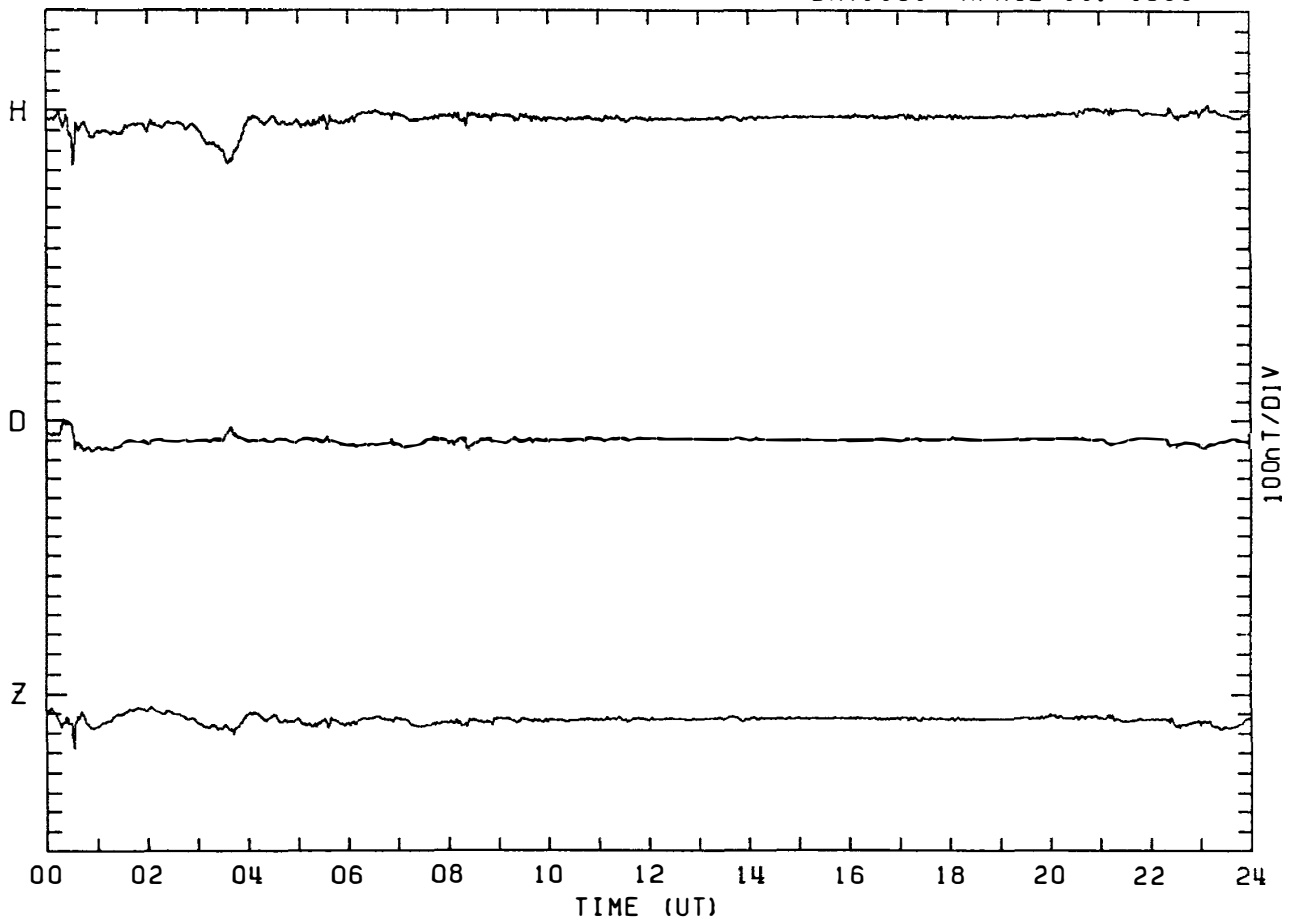
MAGNETOGRAM SYOWA STATION

DAY: 100 APRIL 10. 1983



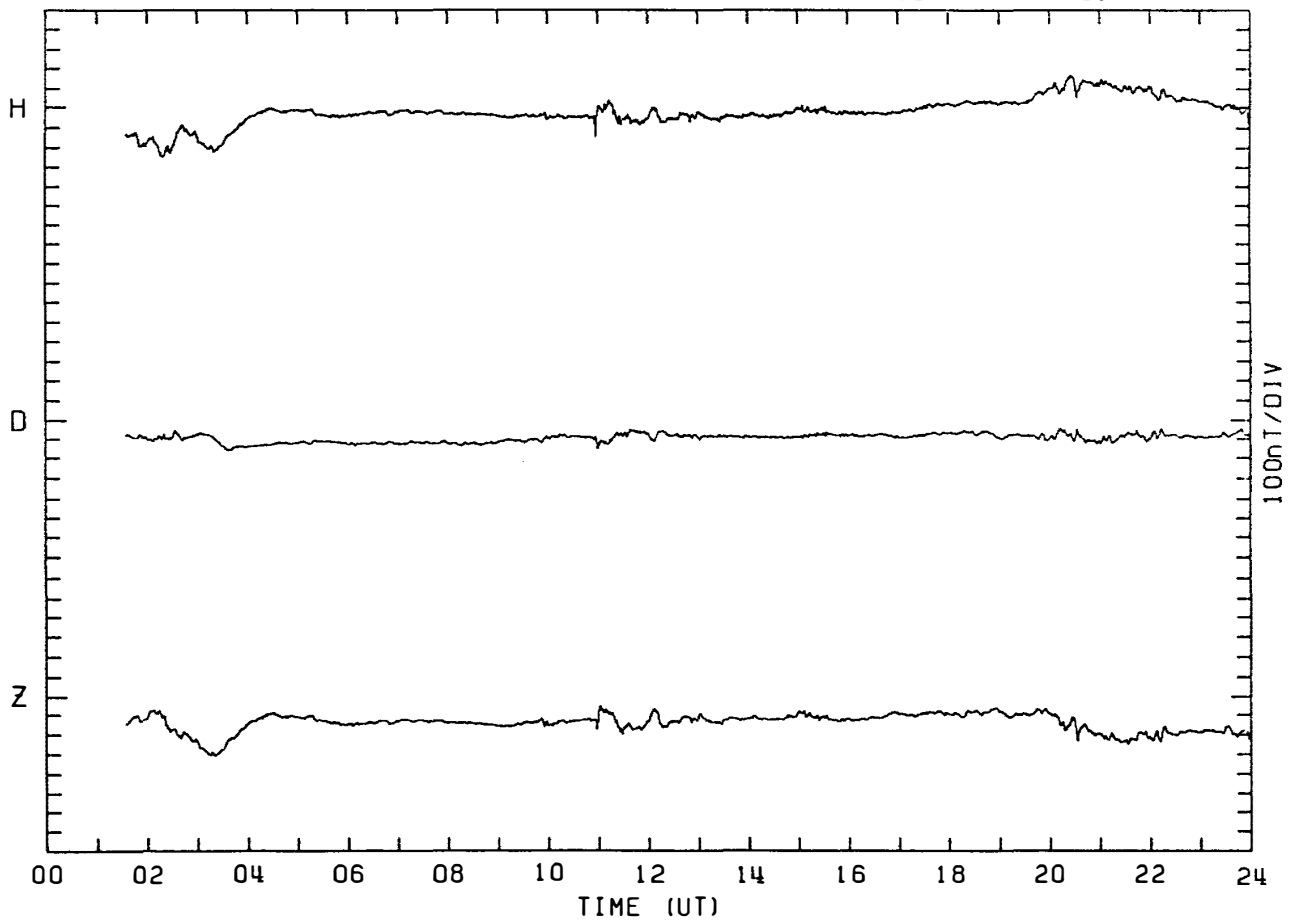
MAGNETOGRAM SYOWA STATION

DAY:101 APRIL 11. 1983



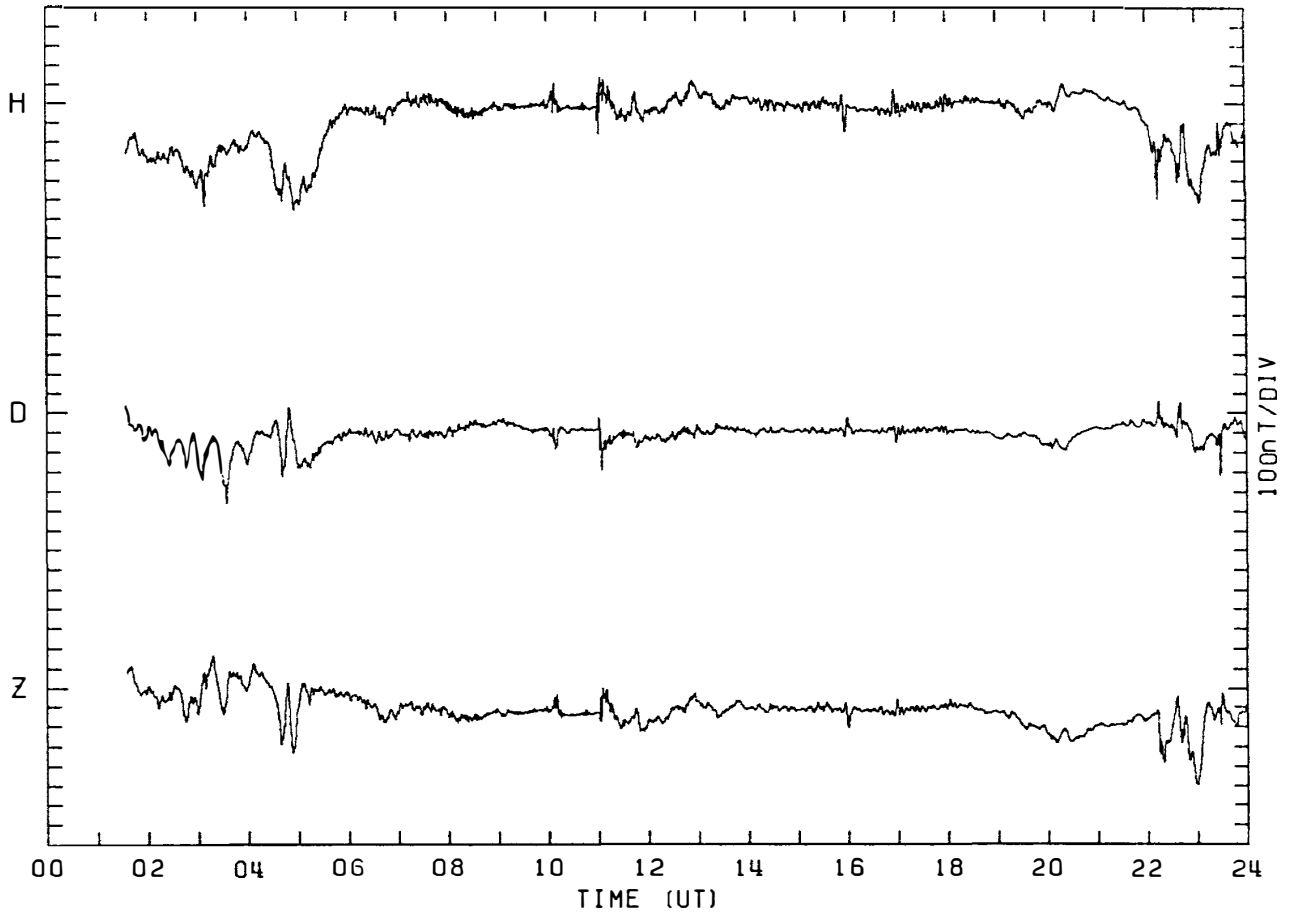
MAGNETOGRAM SYOWA STATION

DAY:102 APRIL 12. 1983



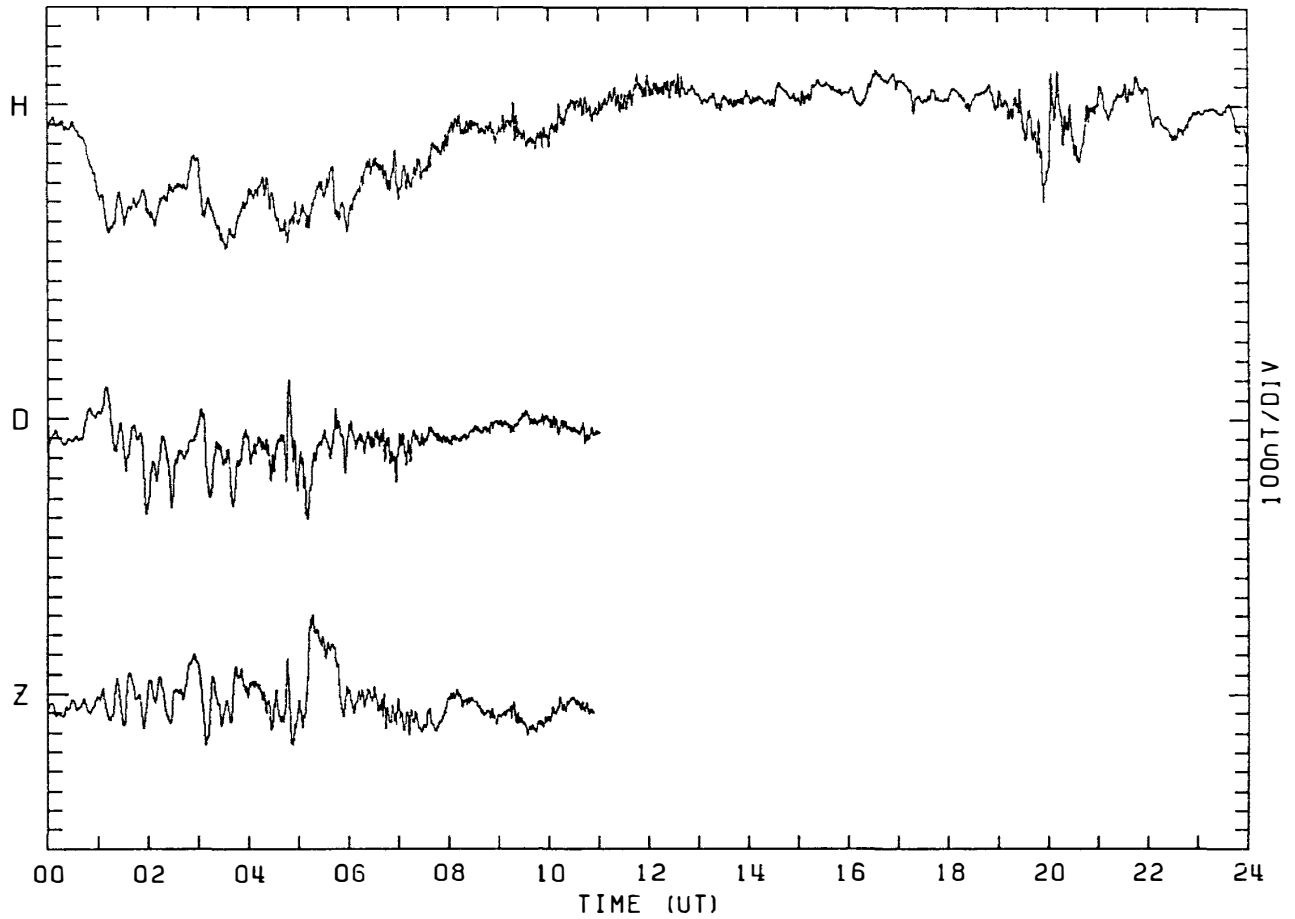
MAGNETOGRAM SYOWA STATION

DAY:103 APRIL 13. 1983



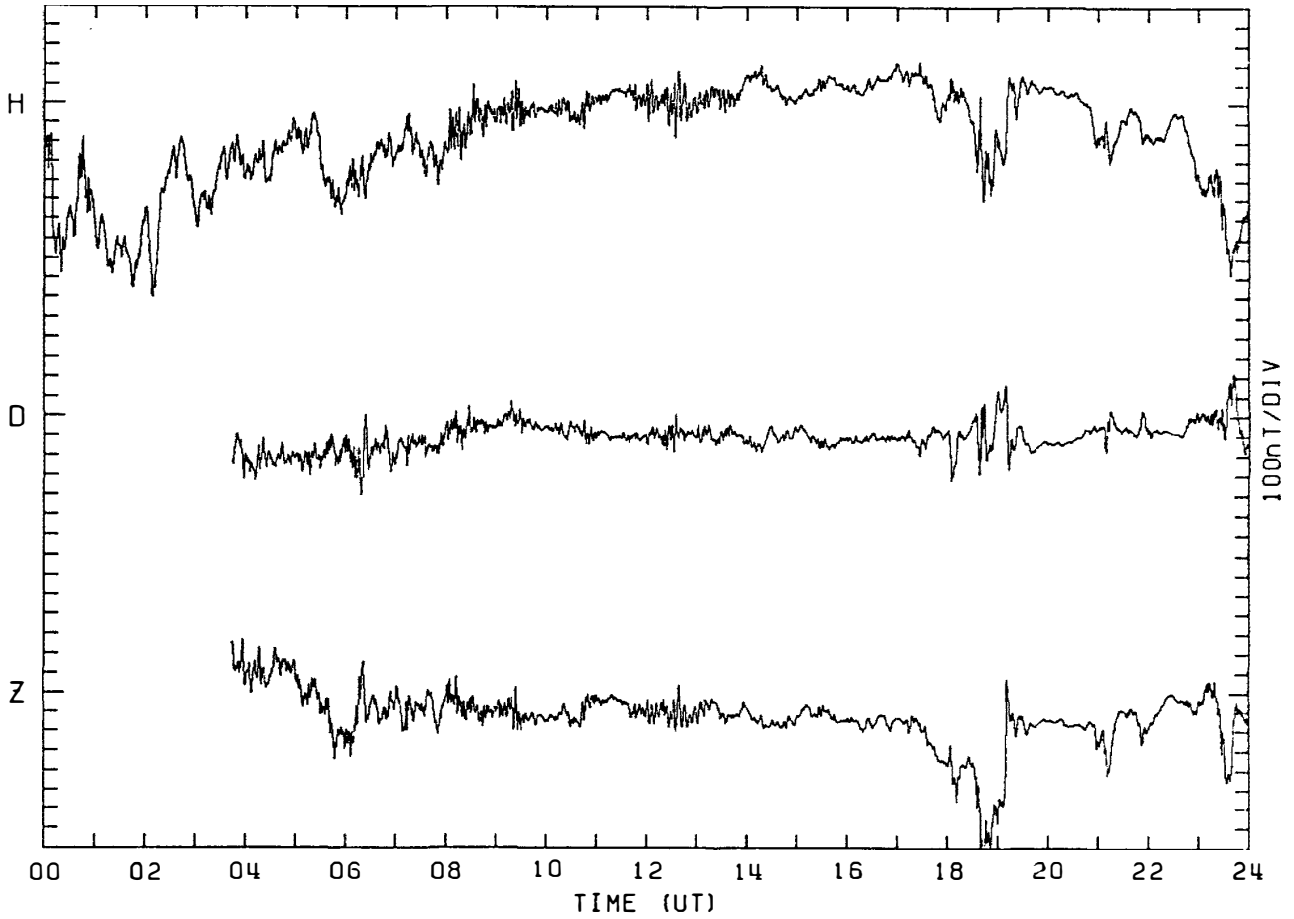
MAGNETOGRAM SYOWA STATION

DAY:104 APRIL 14. 1983



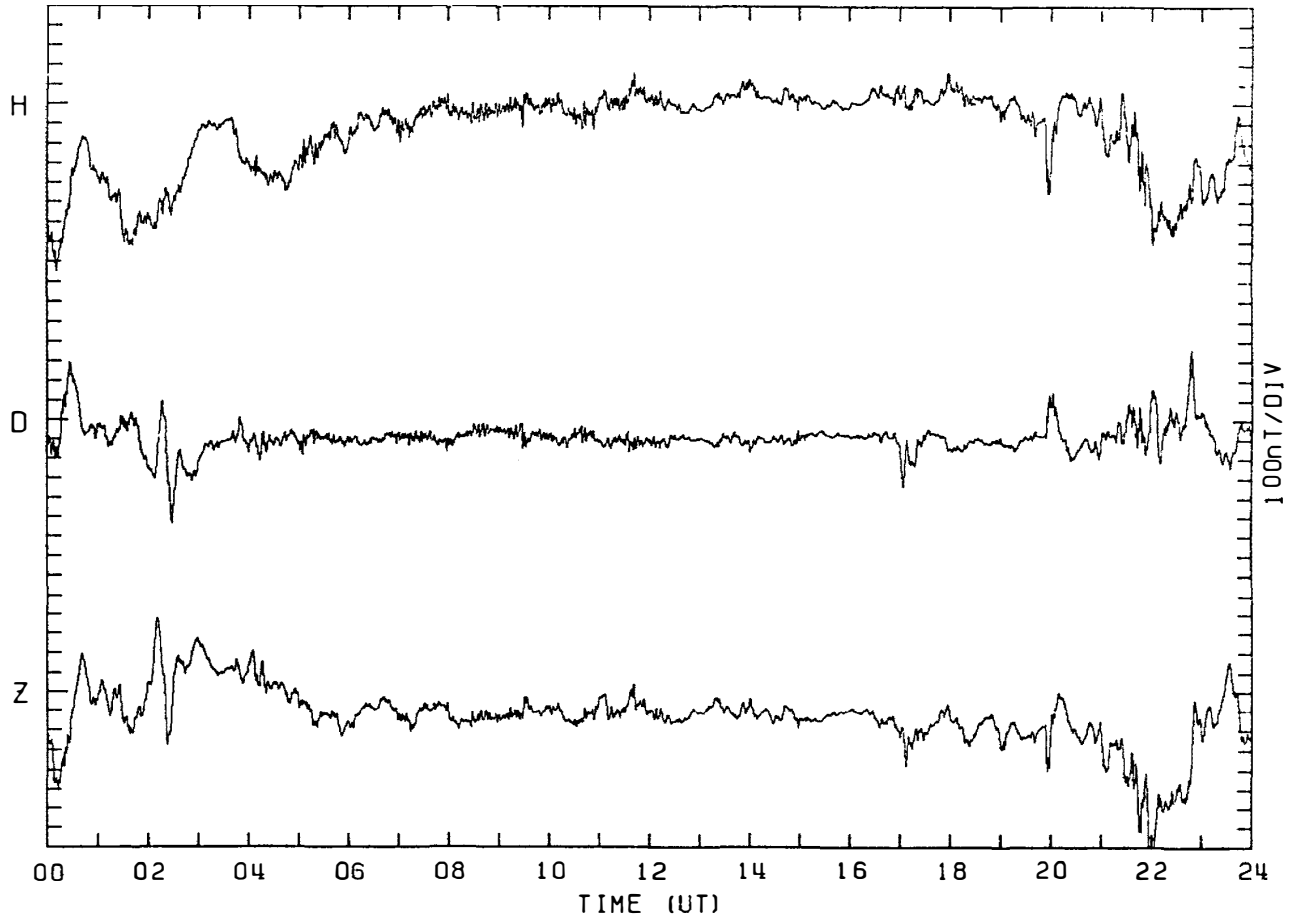
MAGNETOGRAM SYOWA STATION

DAY:105 APRIL 15. 1983



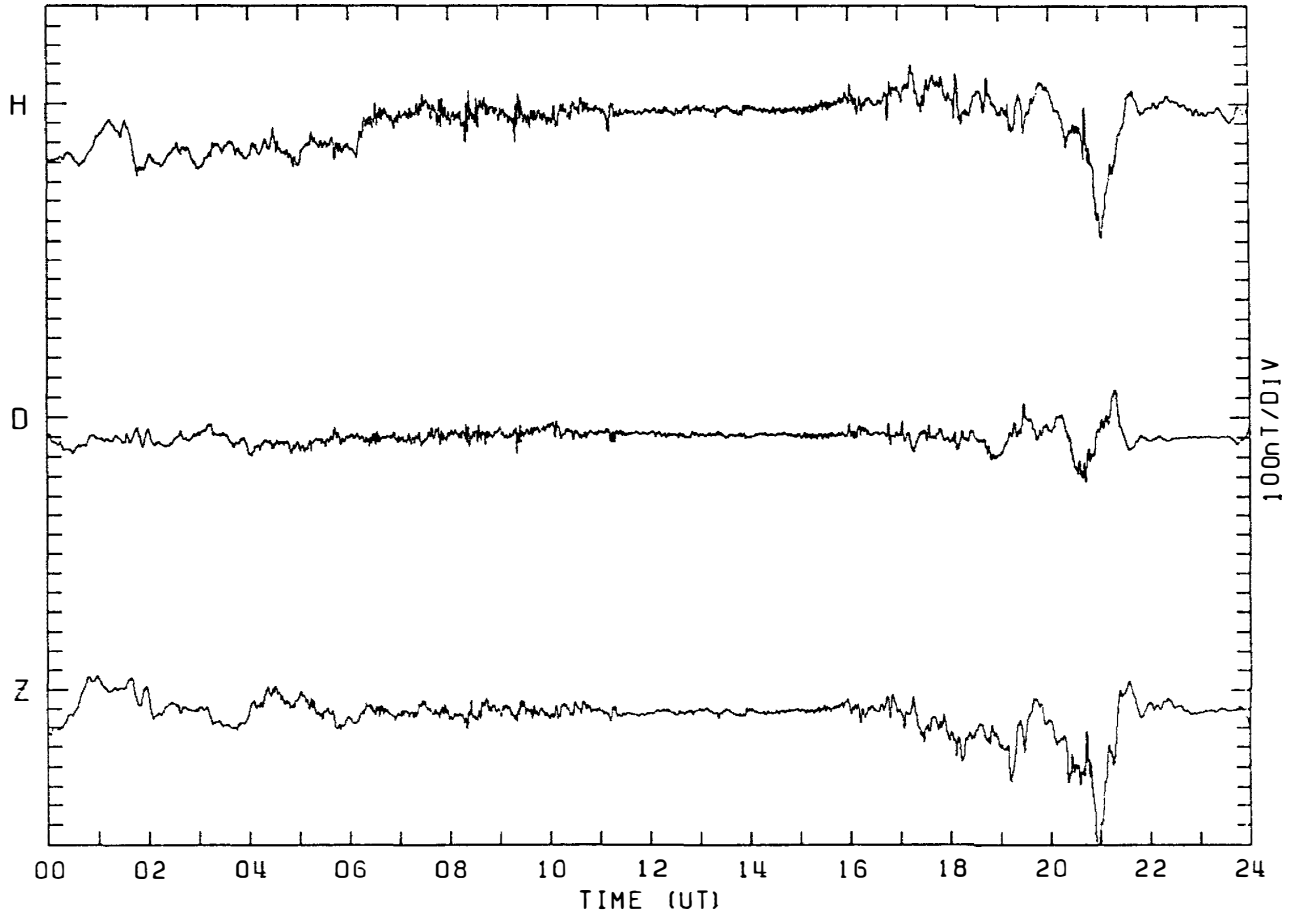
MAGNETOGRAM SYOWA STATION

DAY:106 APRIL 16. 1983



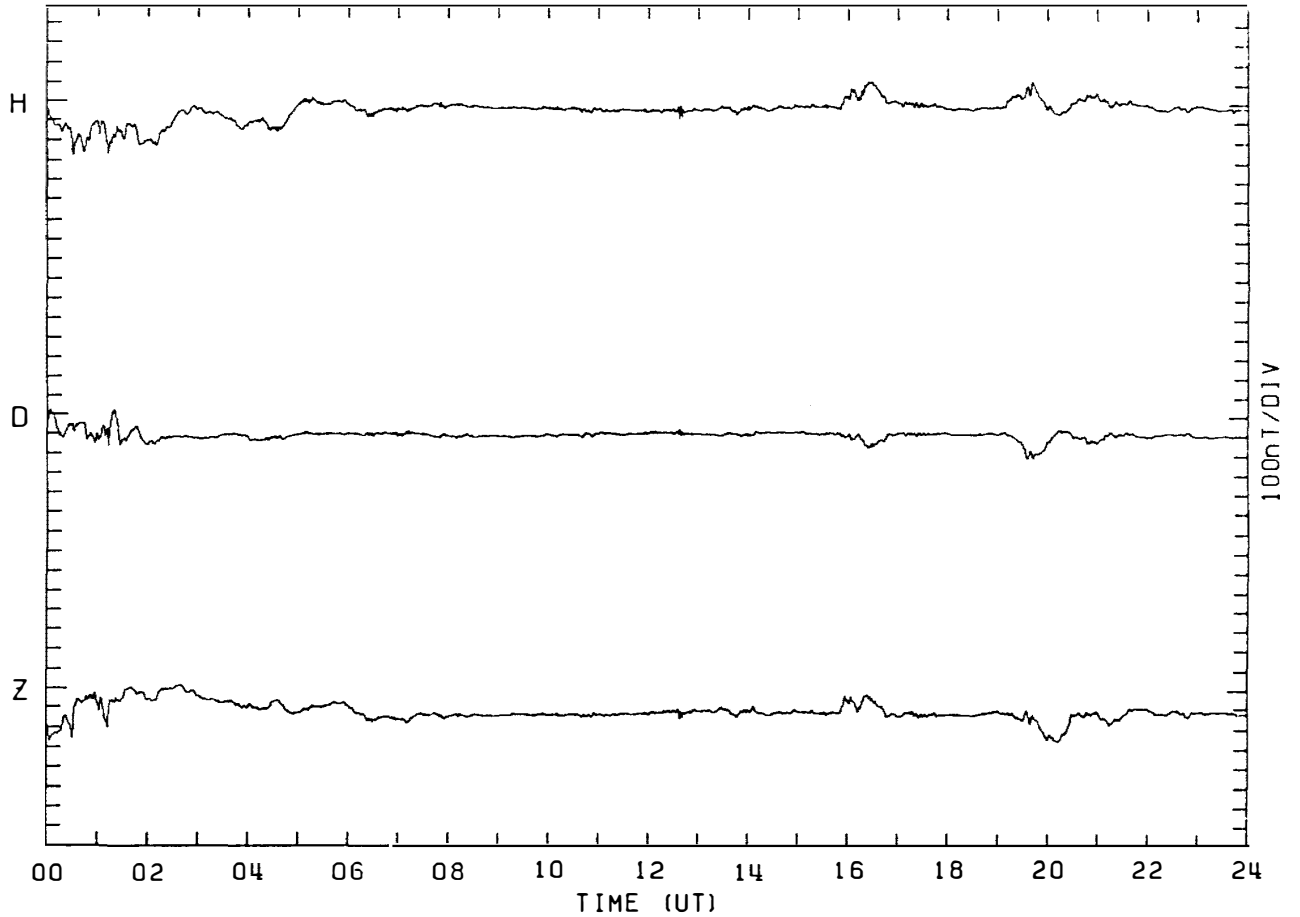
MAGNETOGRAM SYOWA STATION

DAY:107 APRIL 17. 1983



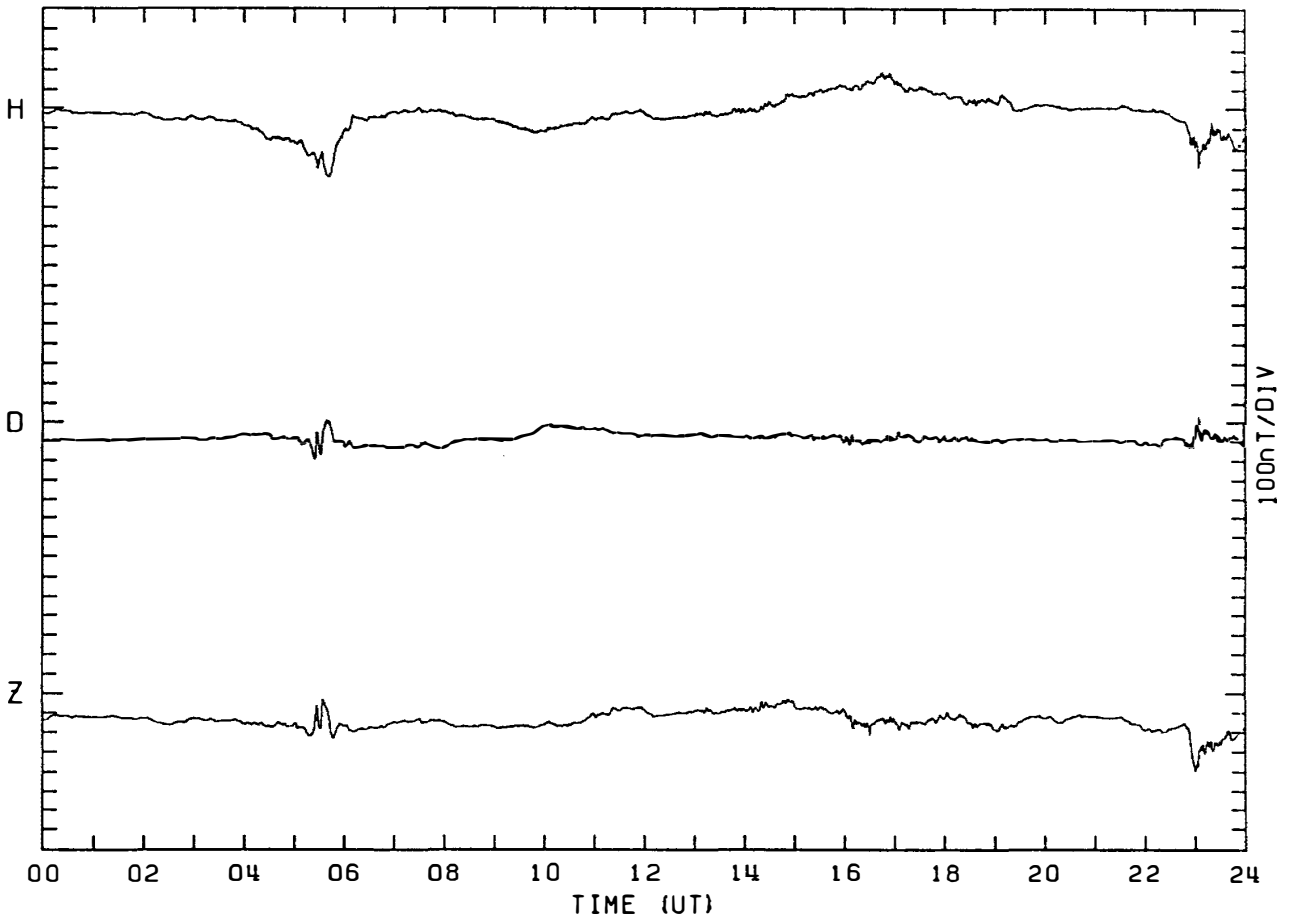
MAGNETOGRAM SYOWA STATION

DAY:108 APRIL 18. 1983



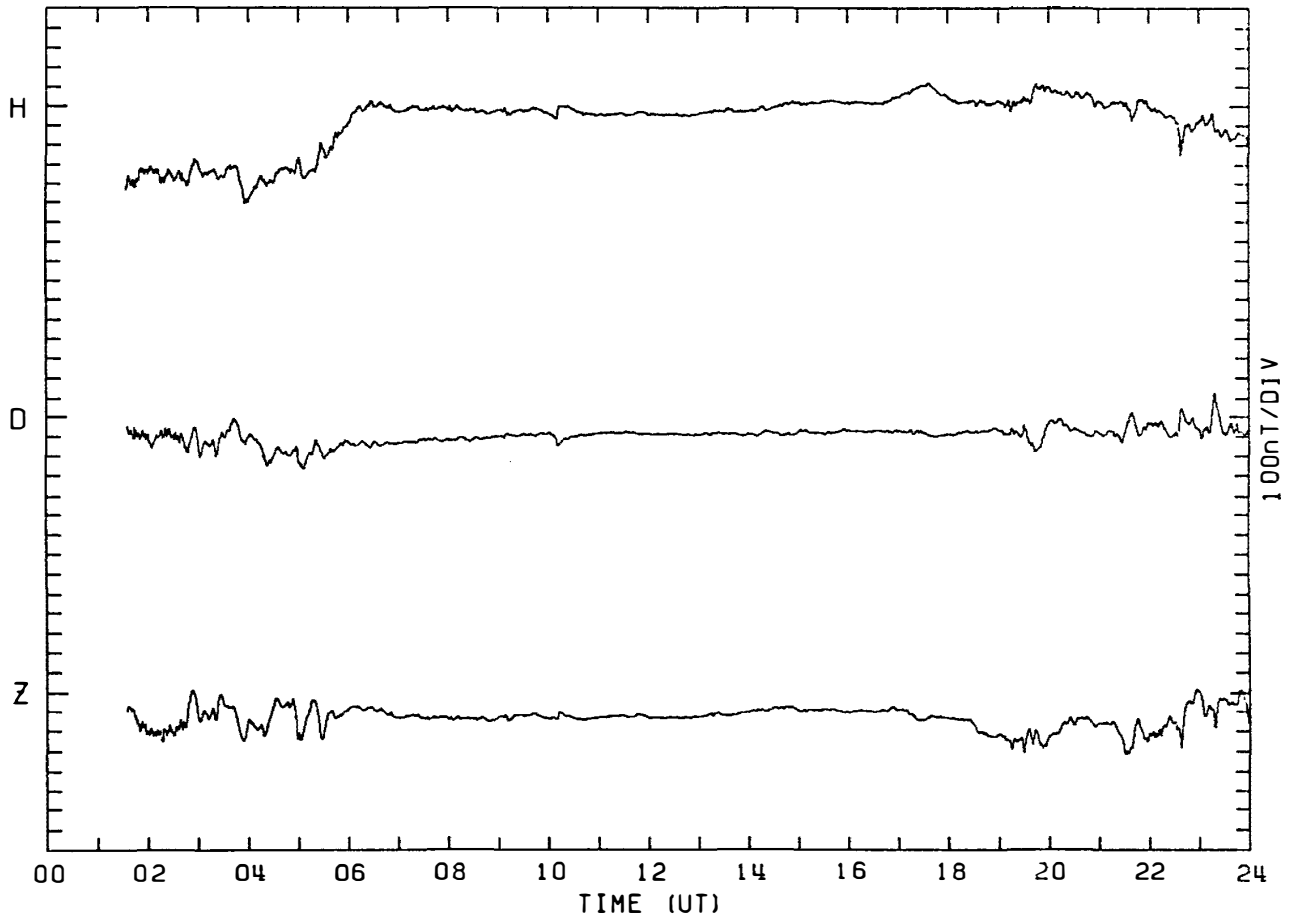
MAGNETOGRAM SYOWA STATION

DAY:109 APRIL 19, 1983



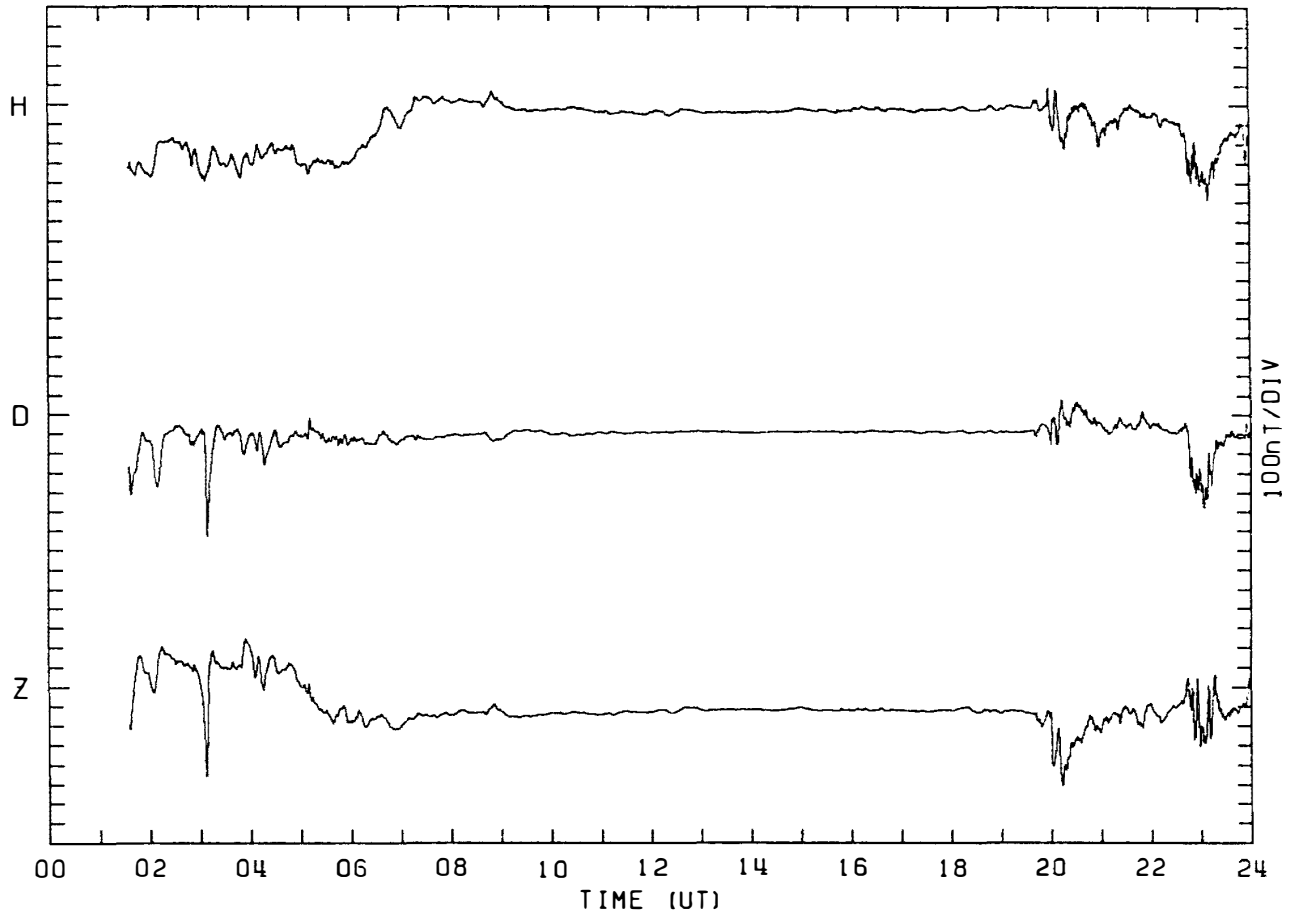
MAGNETOGRAM SYOWA STATION

DAY:110 APRIL 20, 1983



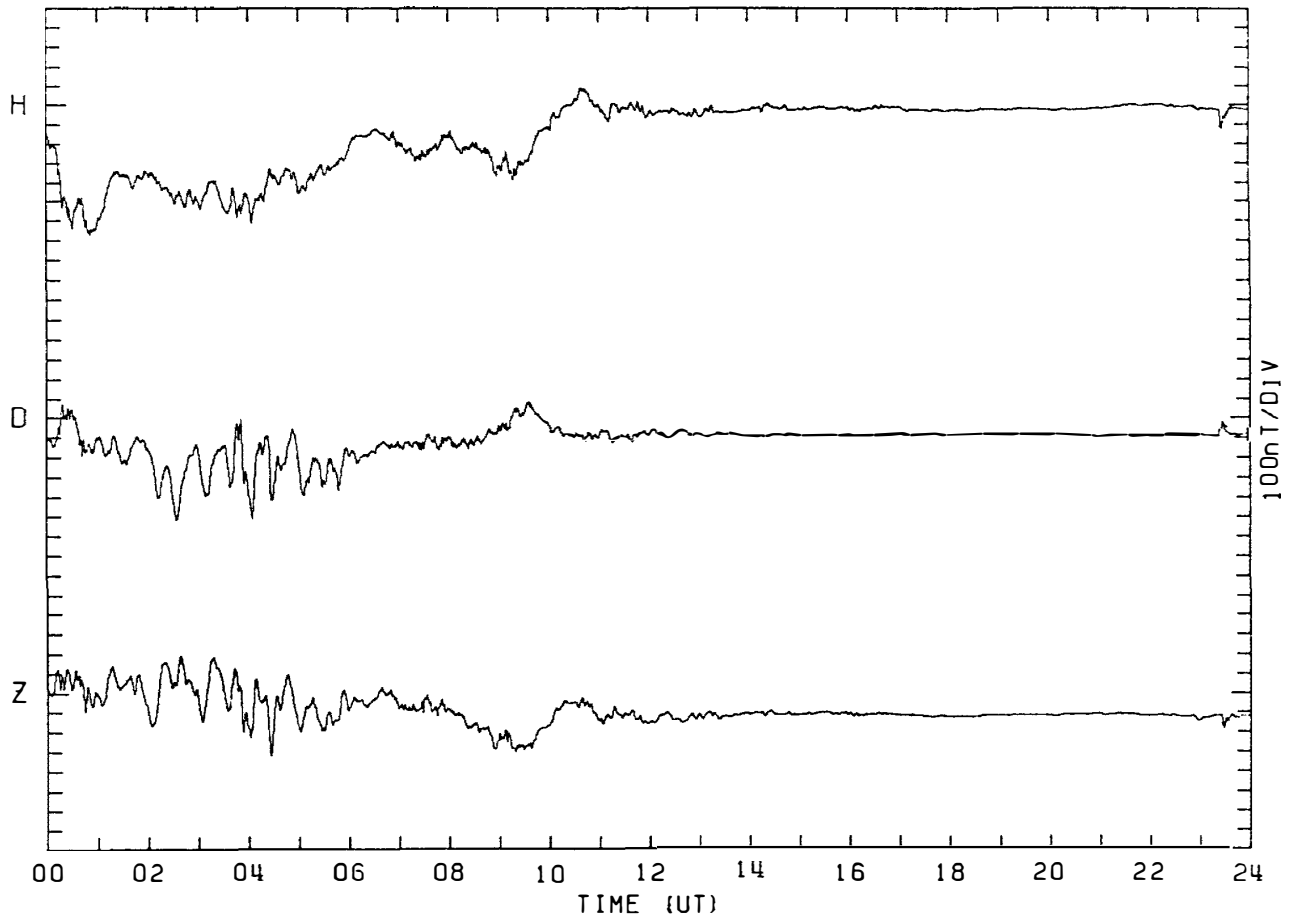
MAGNETOGRAM SYOWA STATION

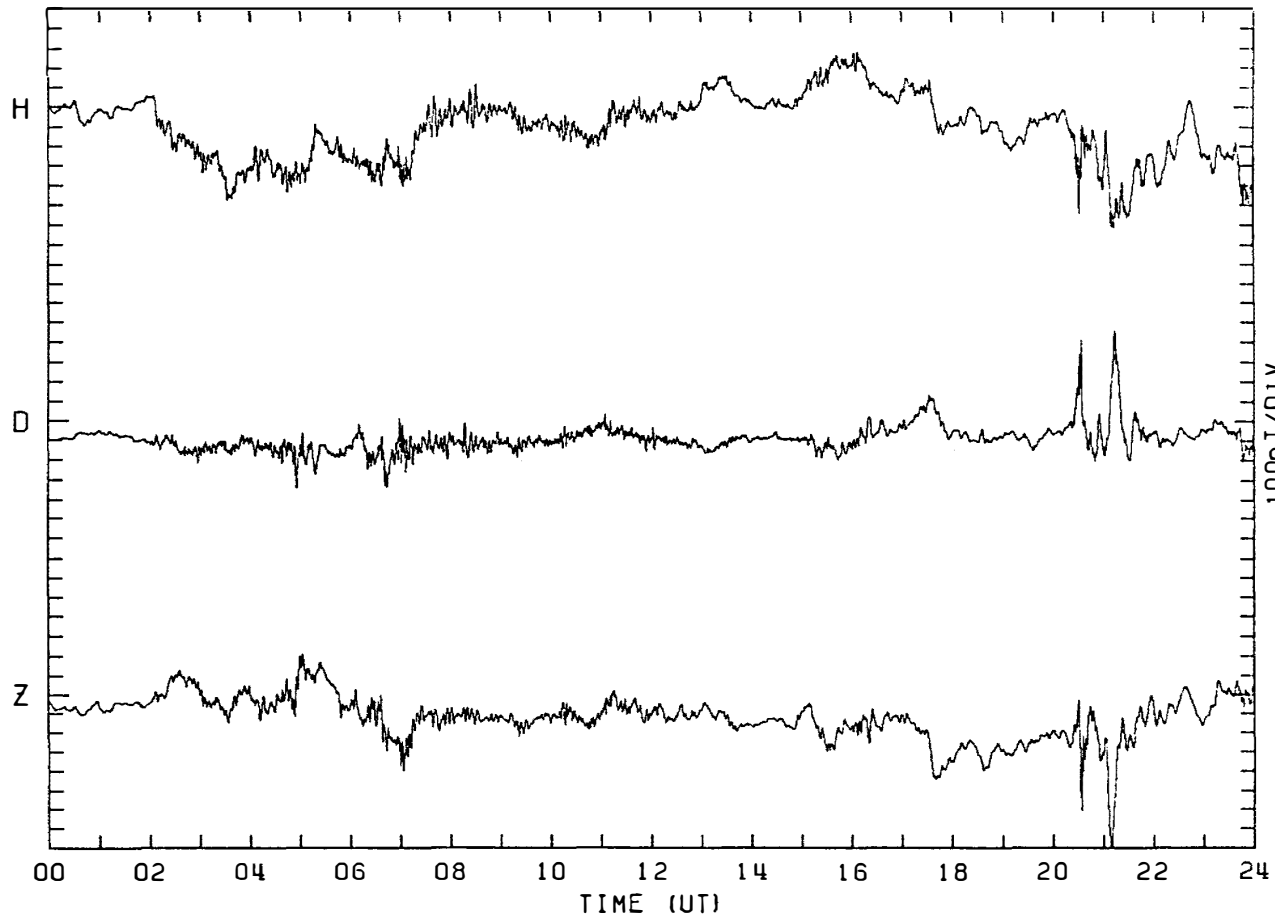
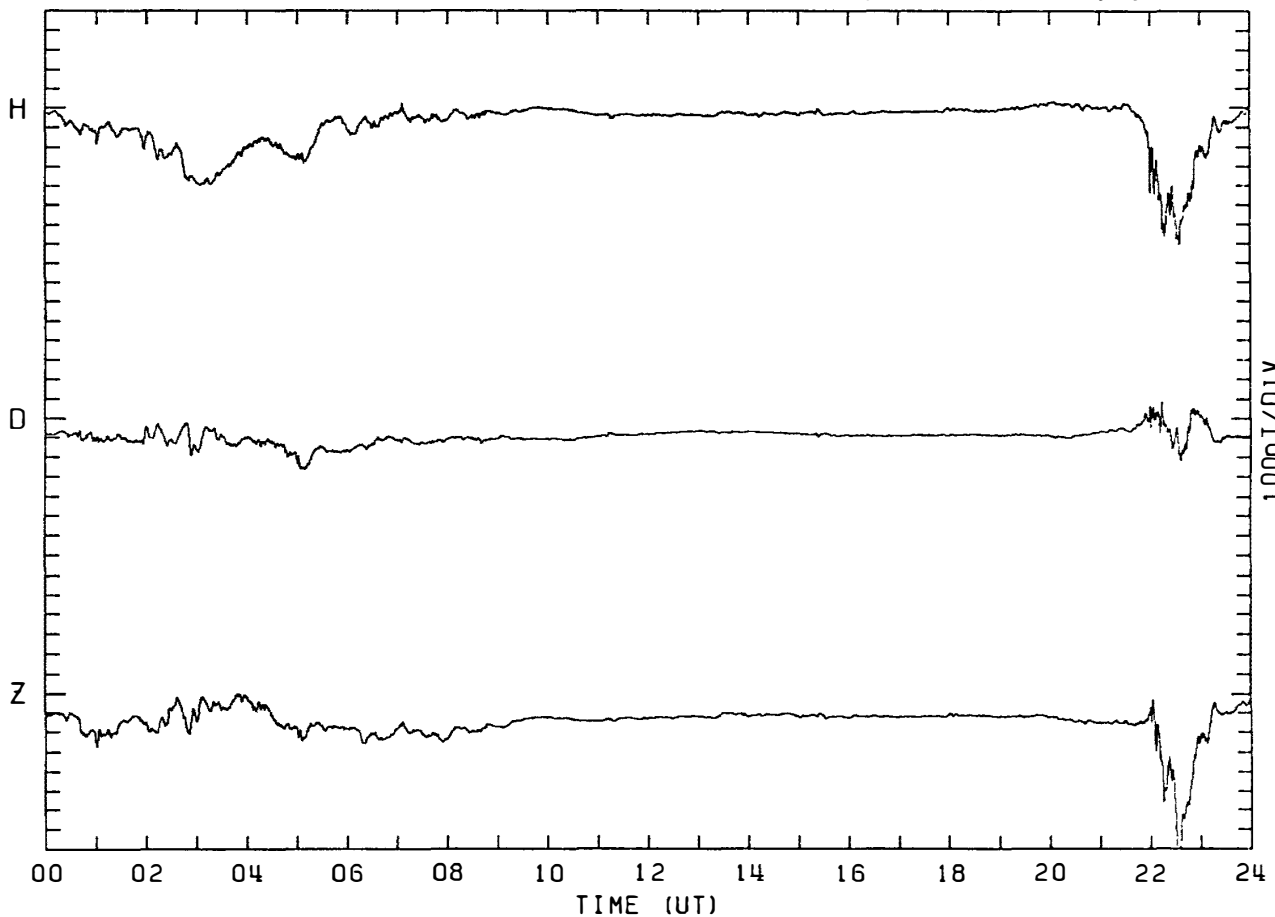
DAY:111 APRIL 21. 1983



MAGNETOGRAM SYOWA STATION

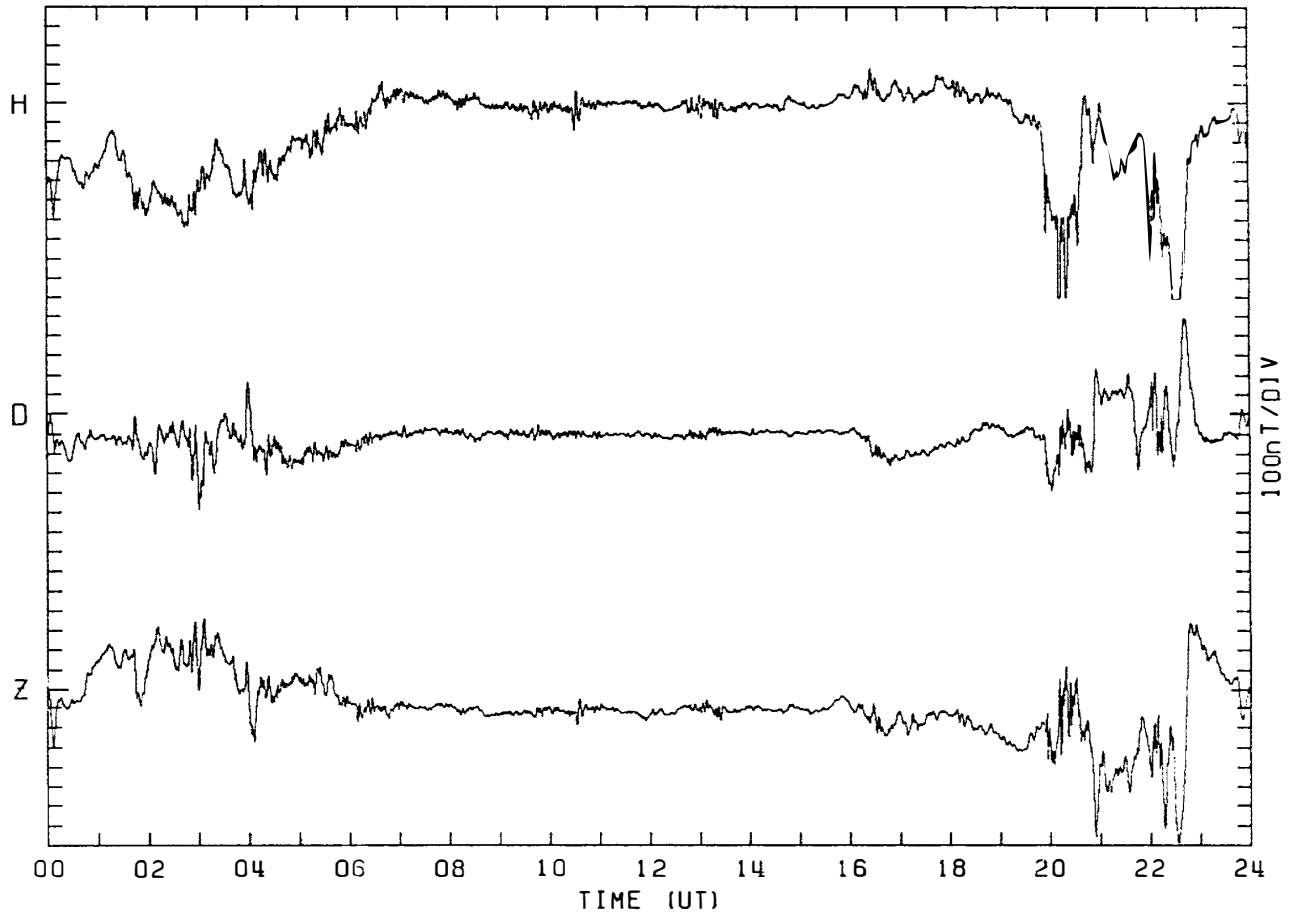
DAY:112 APRIL 22. 1983





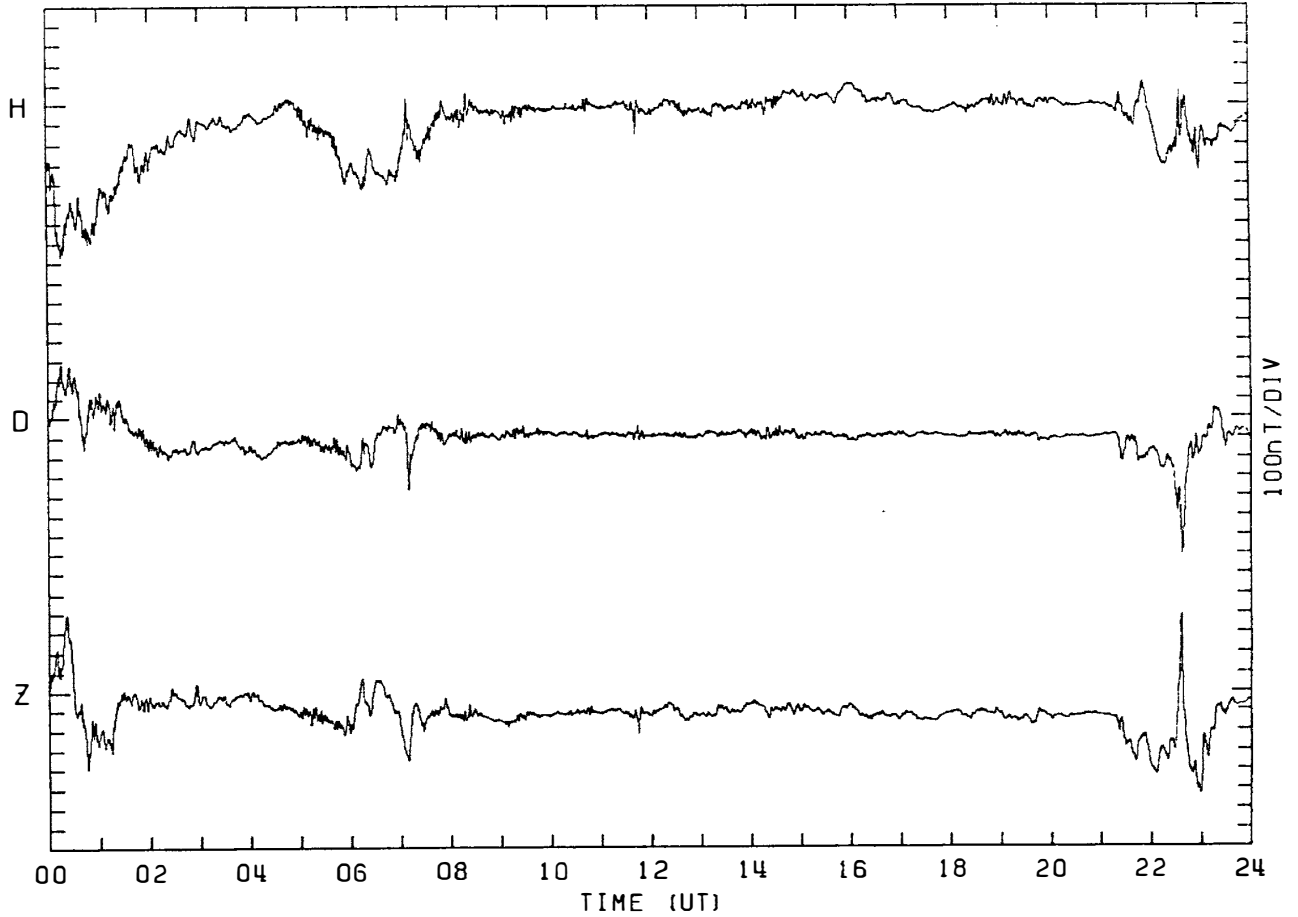
MAGNETOGRAM SYOWA STATION

DAY:115 APRIL 25. 1983



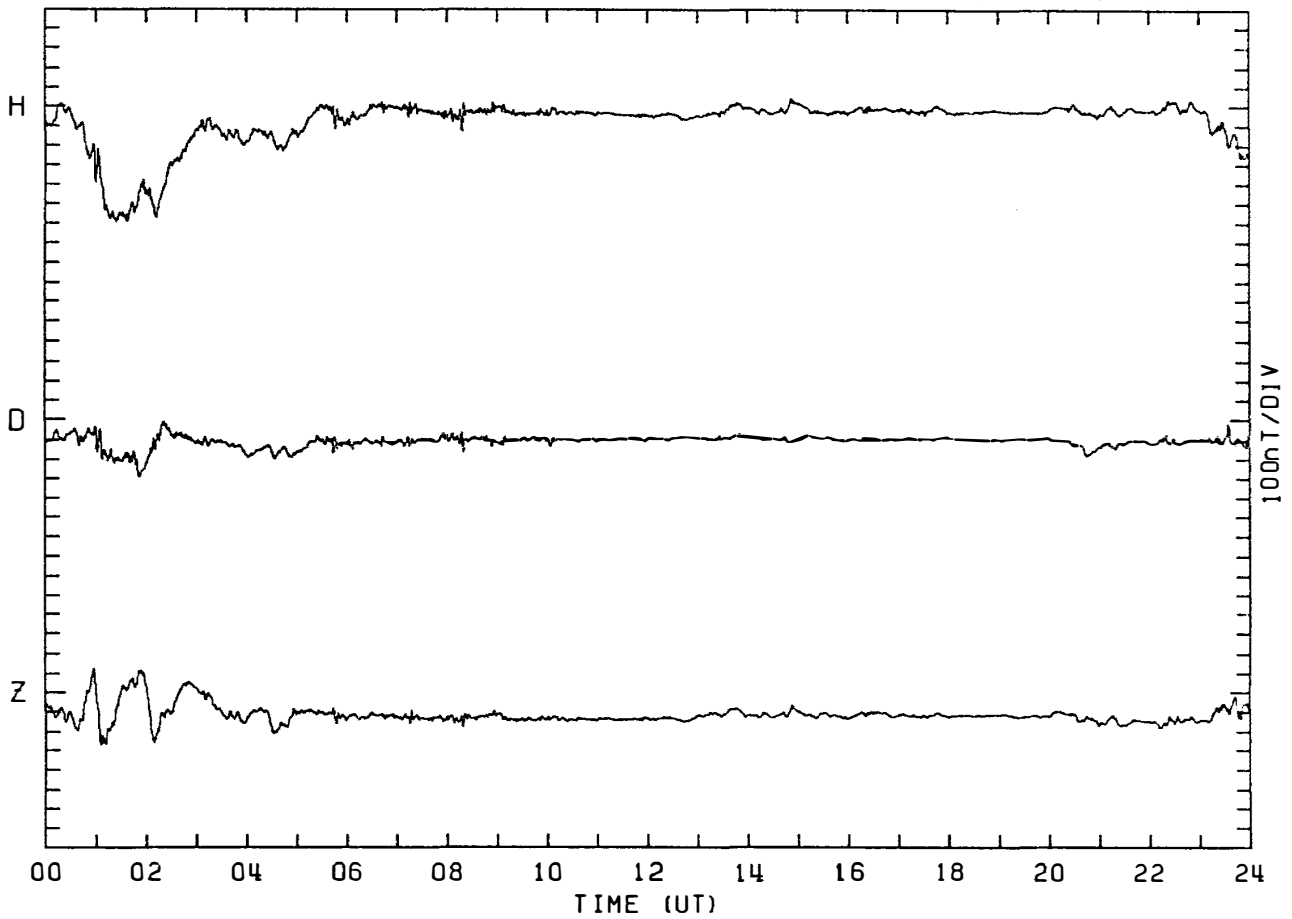
MAGNETOGRAM SYOWA STATION

DAY:116 APRIL 26. 1983



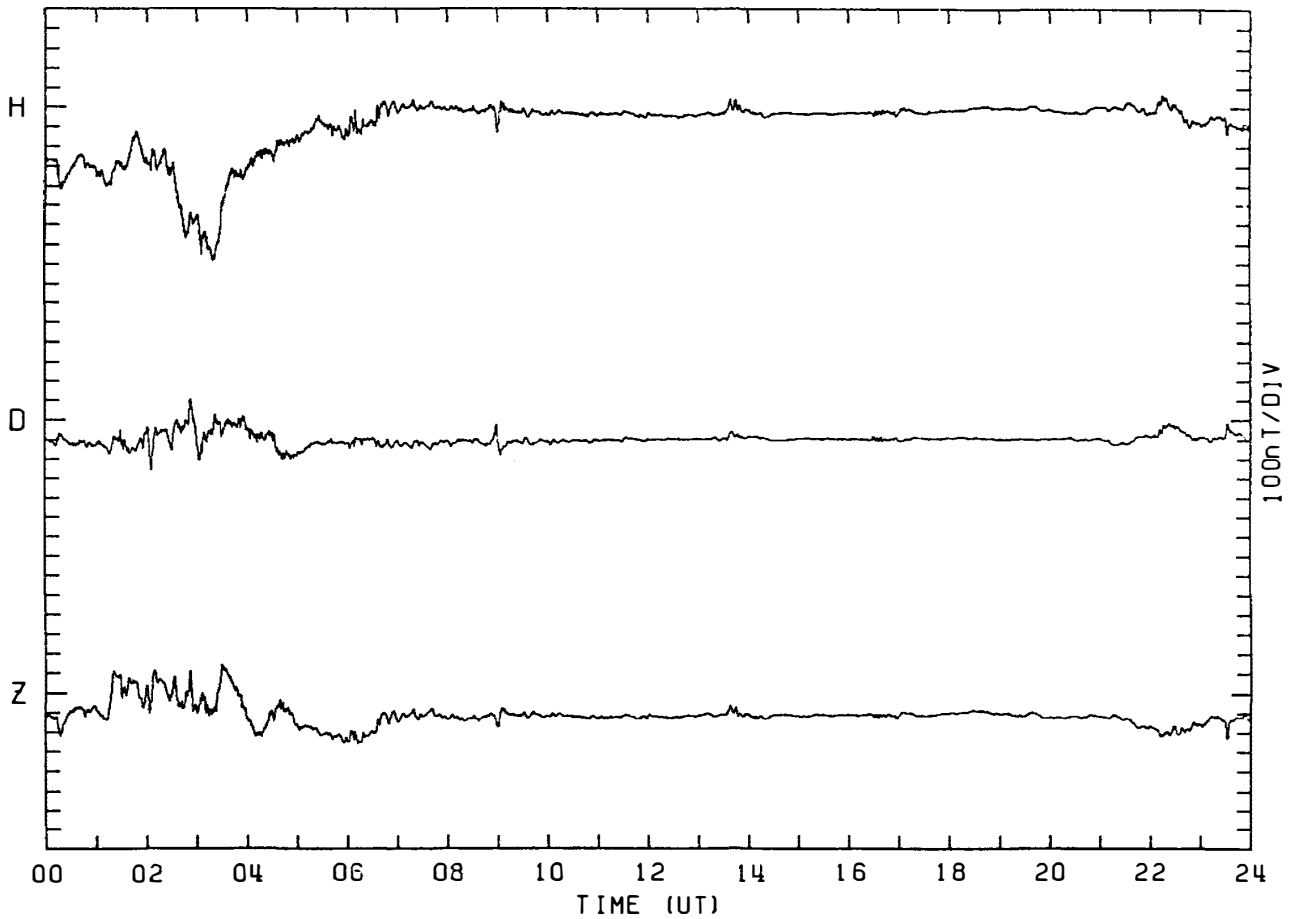
MAGNETOGRAM SYOWA STATION

DAY:117 APRIL 27. 1983



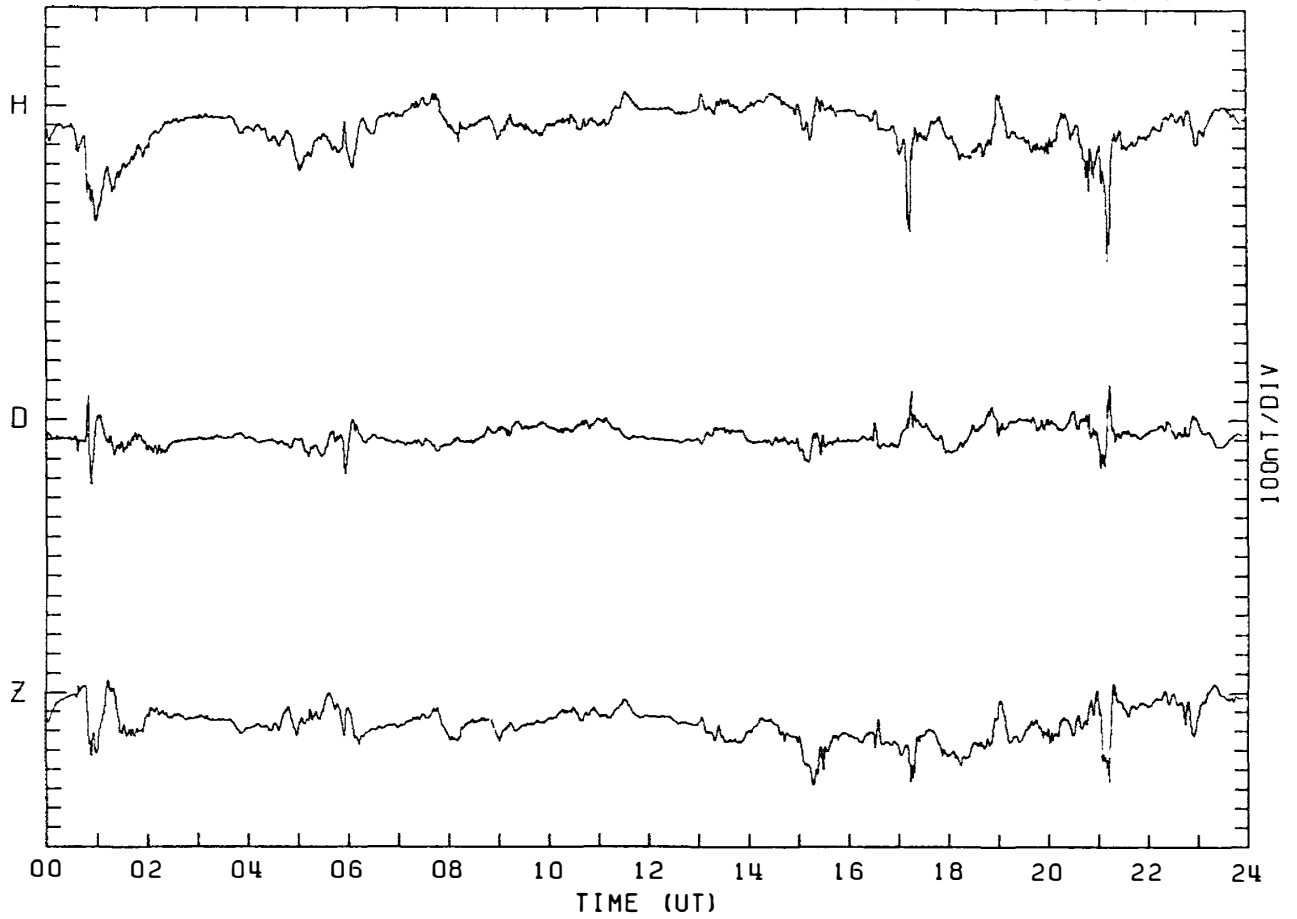
MAGNETOGRAM SYOWA STATION

DAY:118 APRIL 28. 1983



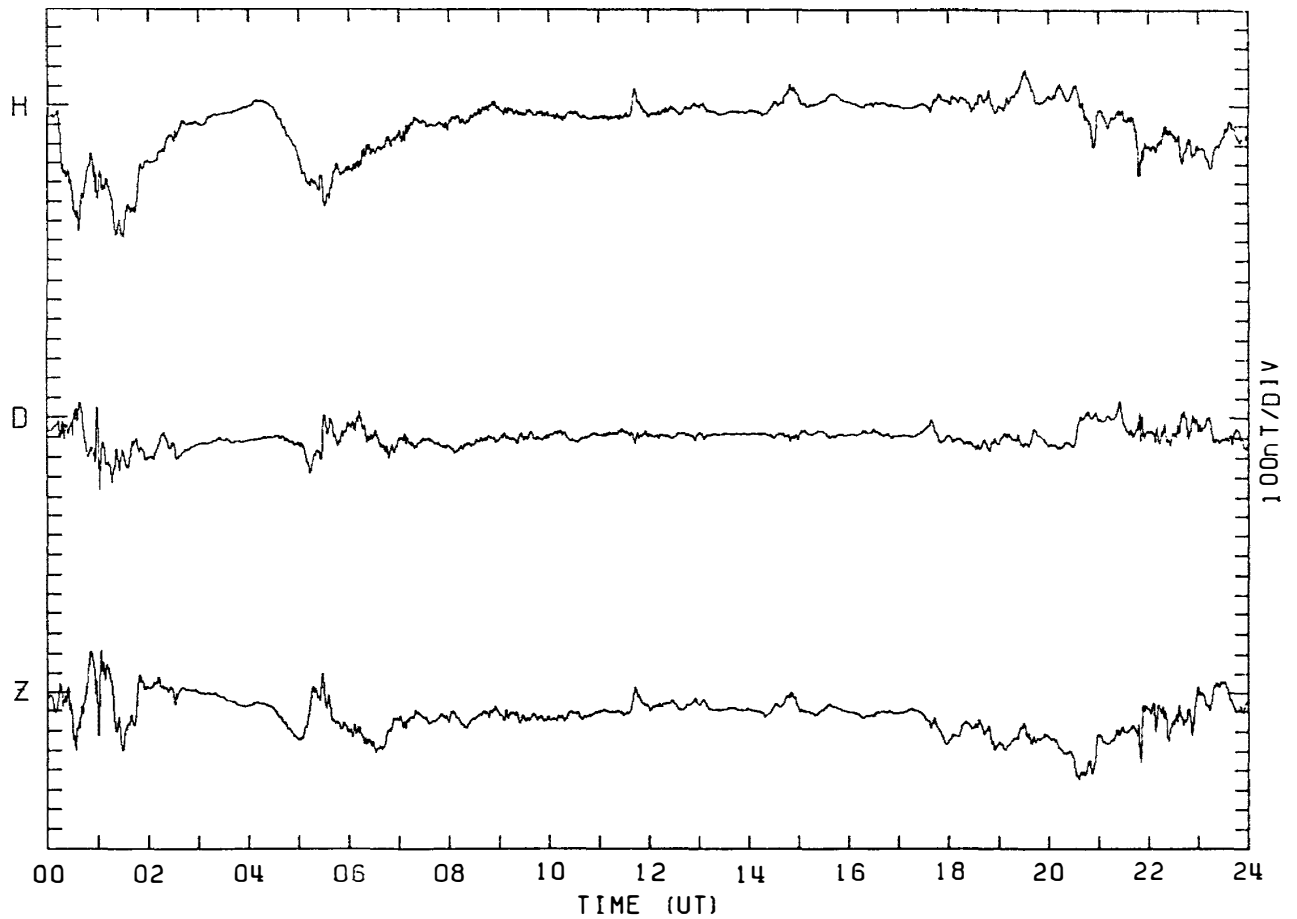
MAGNETOGRAM SYOWA STATION

DAY:119 APRIL 29. 1983



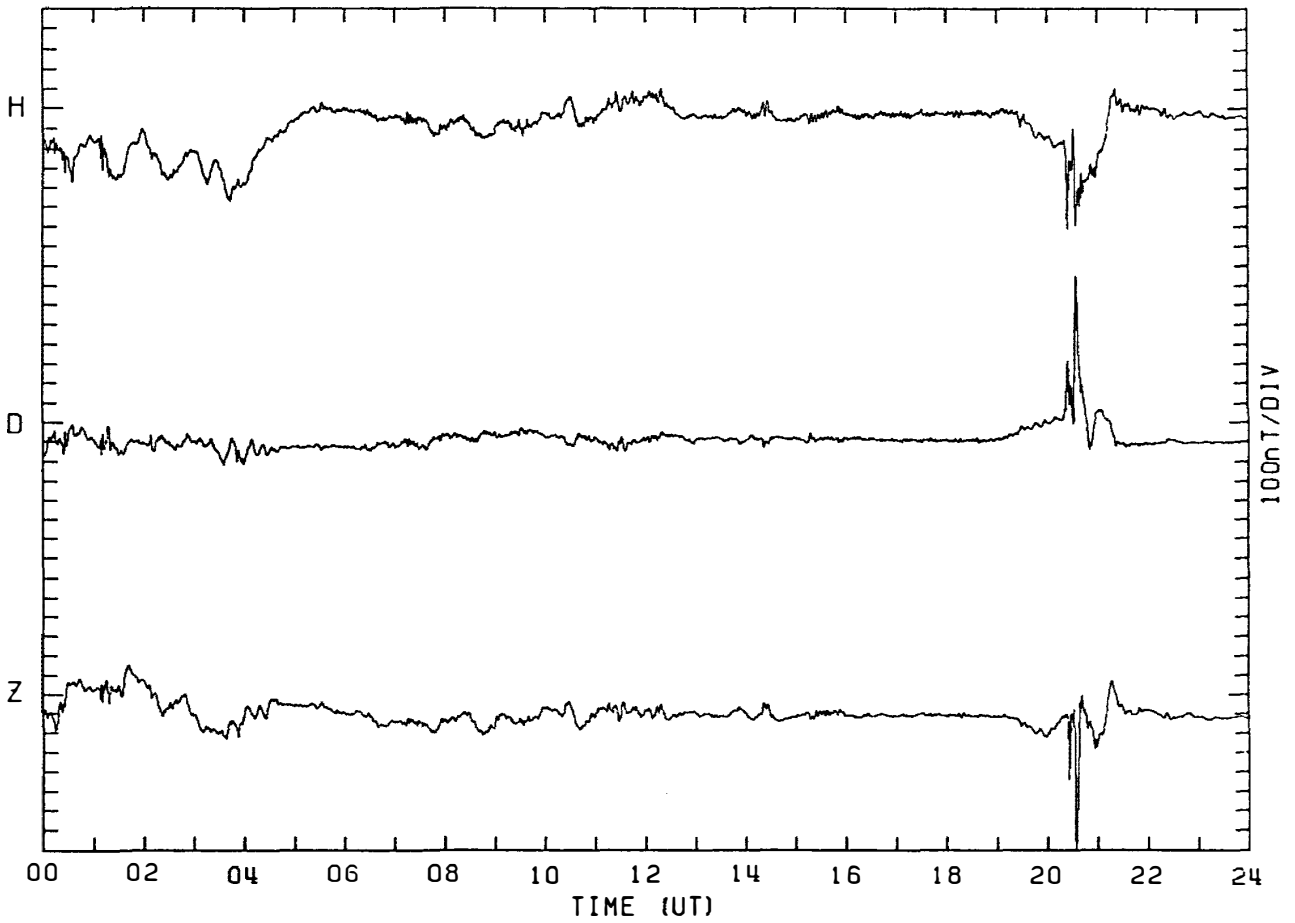
MAGNETOGRAM SYOWA STATION

DAY:120 APRIL 30. 1983



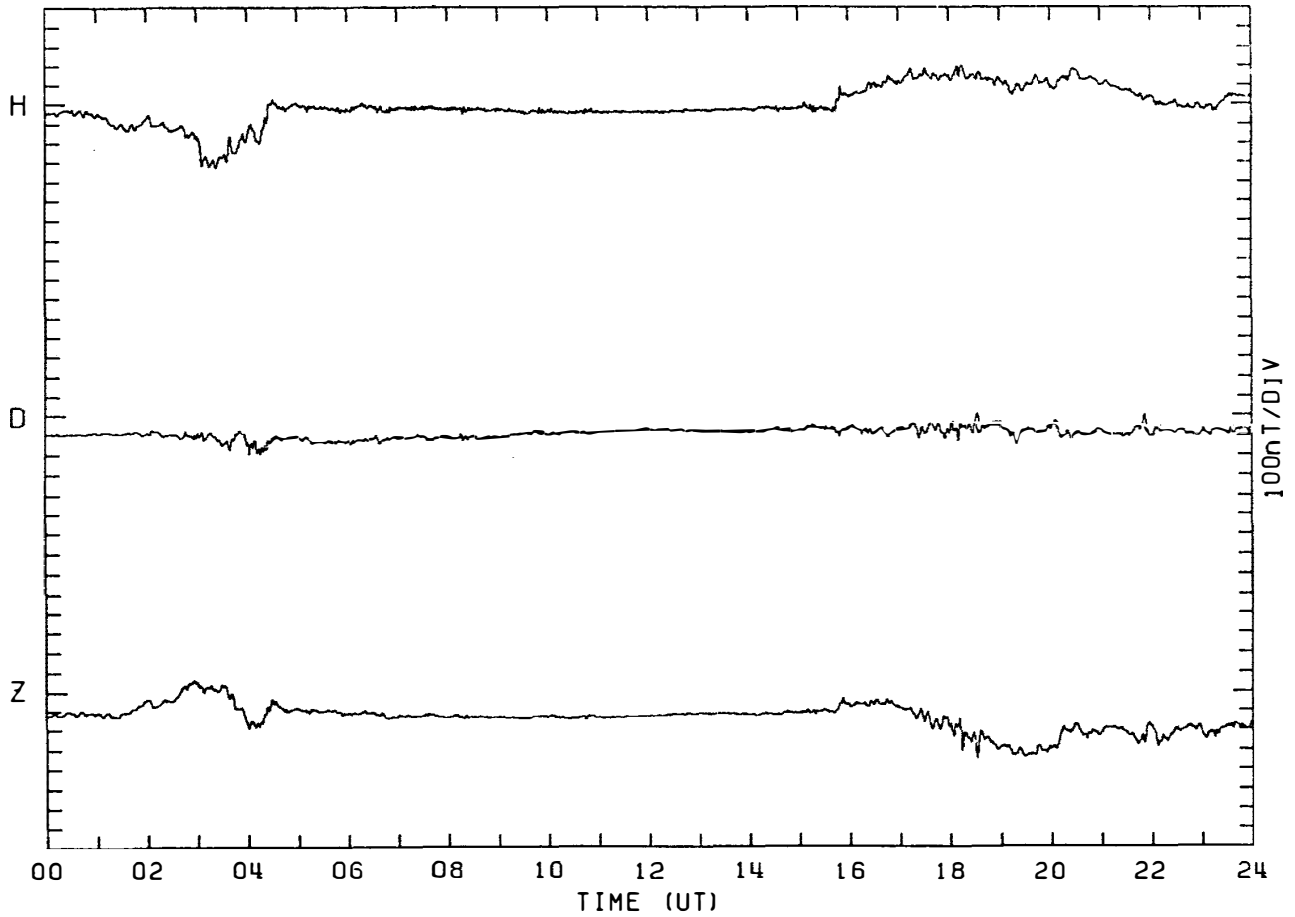
MAGNETOGRAM SYOWA STATION

DAY:121 MAY 1. 1983



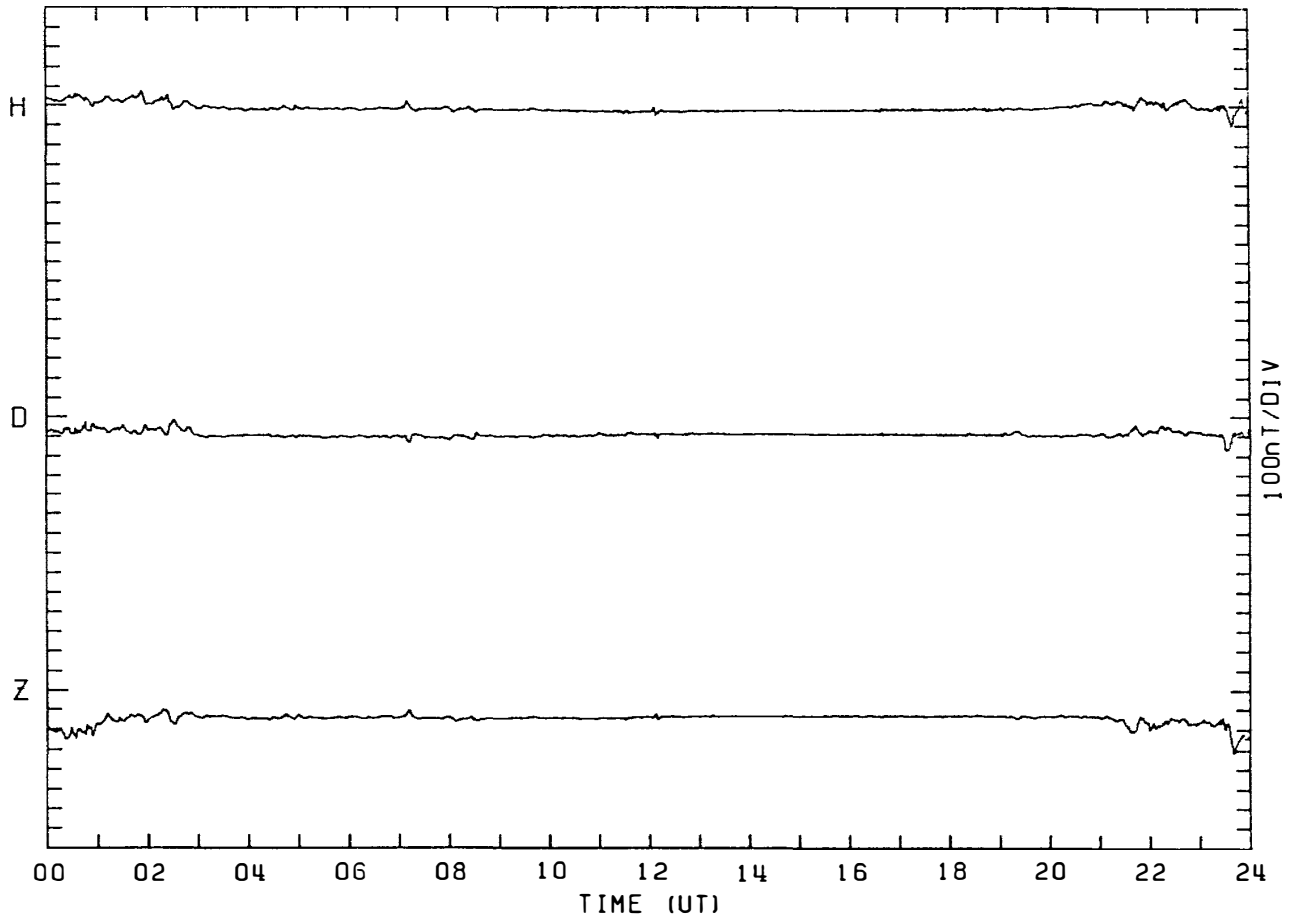
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DAY:122 MAY 2. 1983



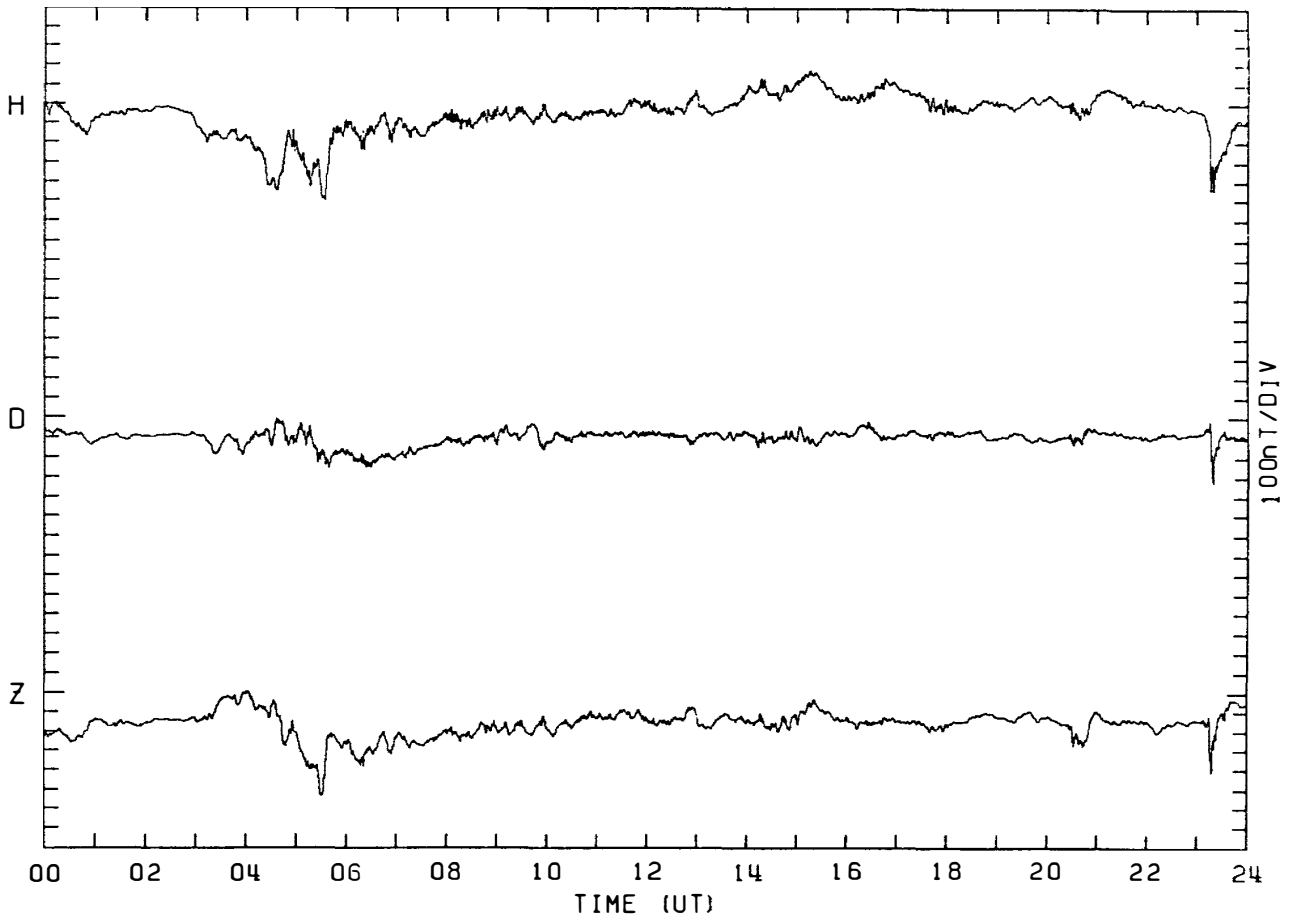
MAGNETOGRAM SYOWA STATION

DAY:123 MAY 3. 1983



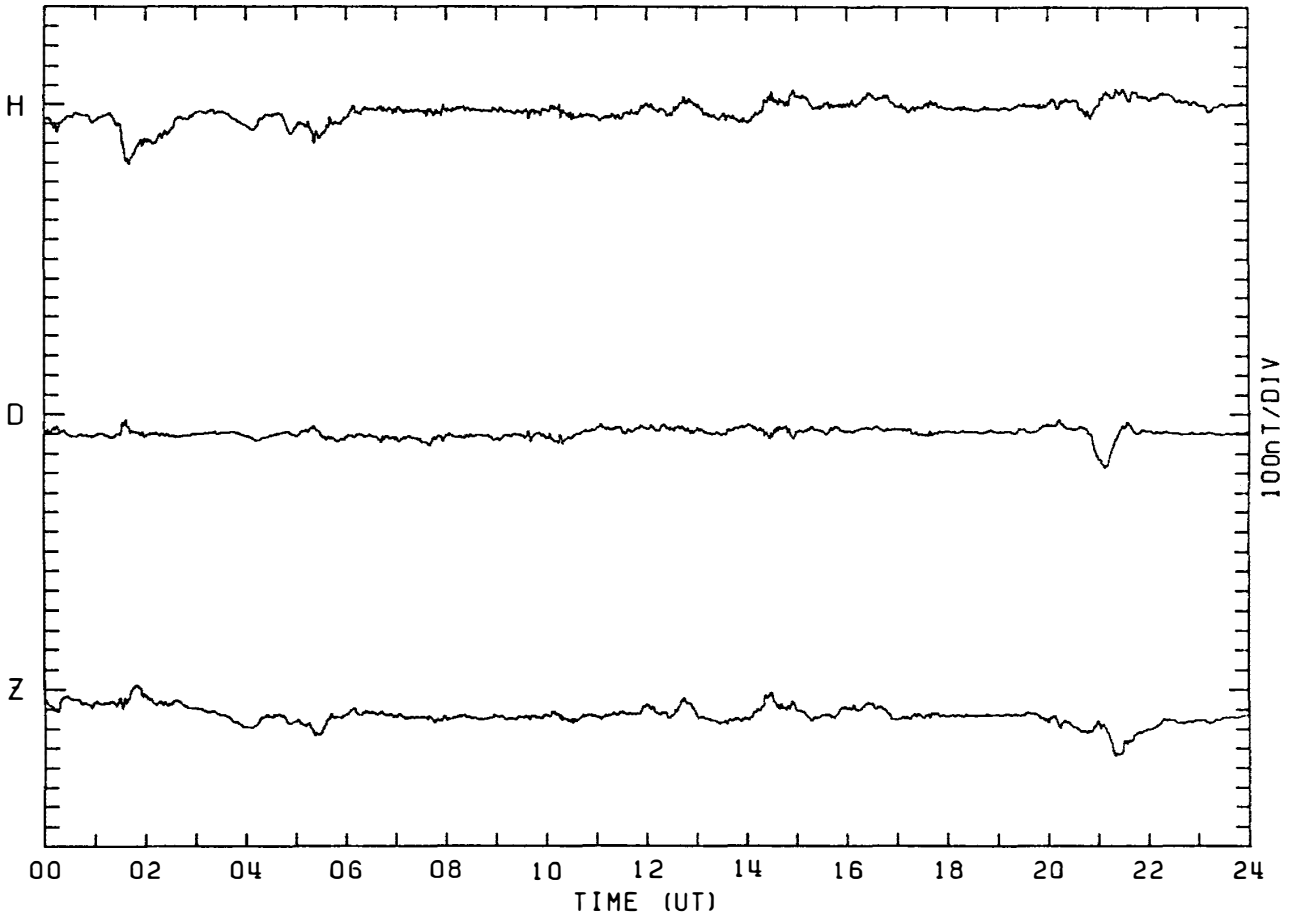
MAGNETOGRAM SYOWA STATION

DAY:124 MAY 4. 1983



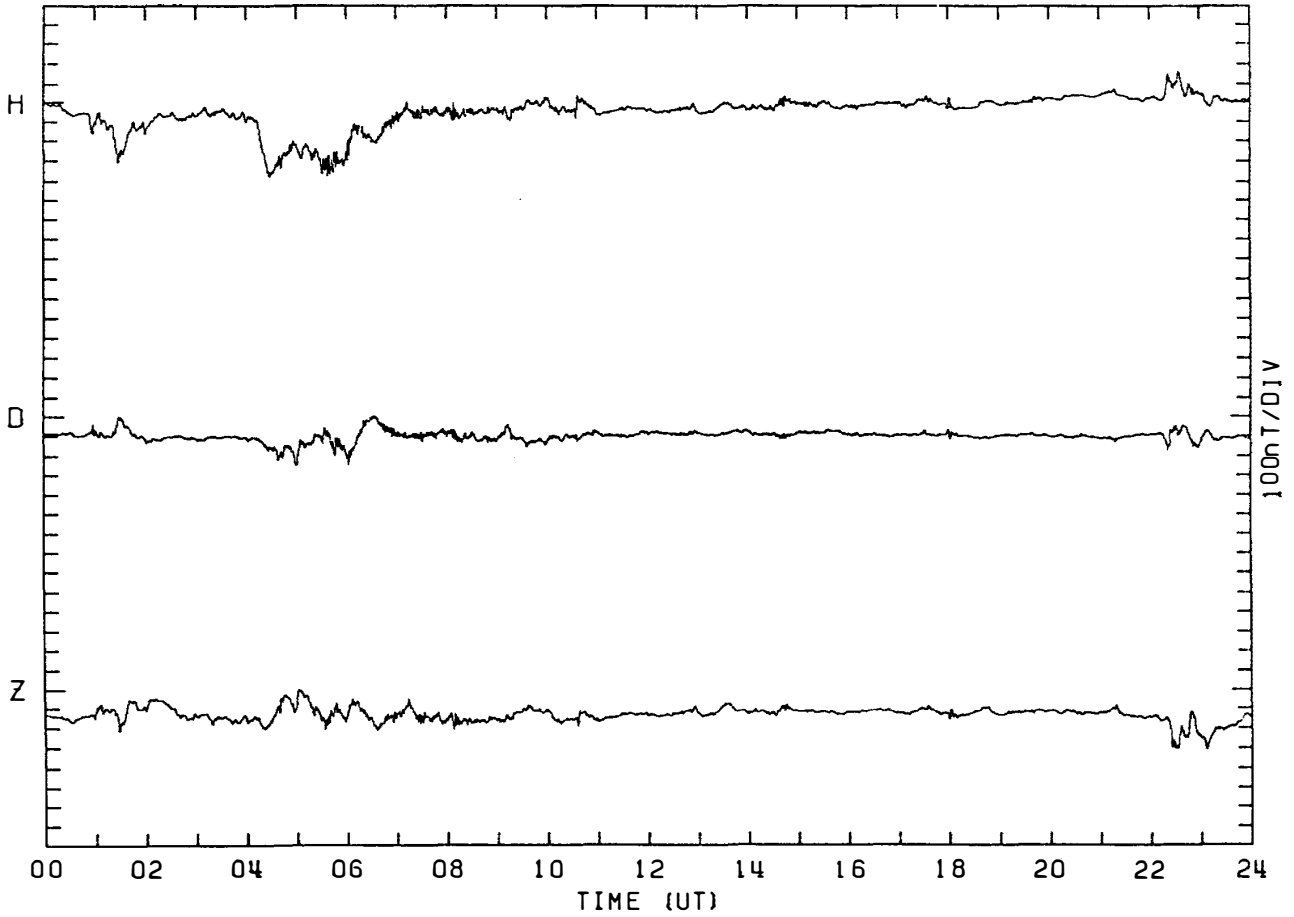
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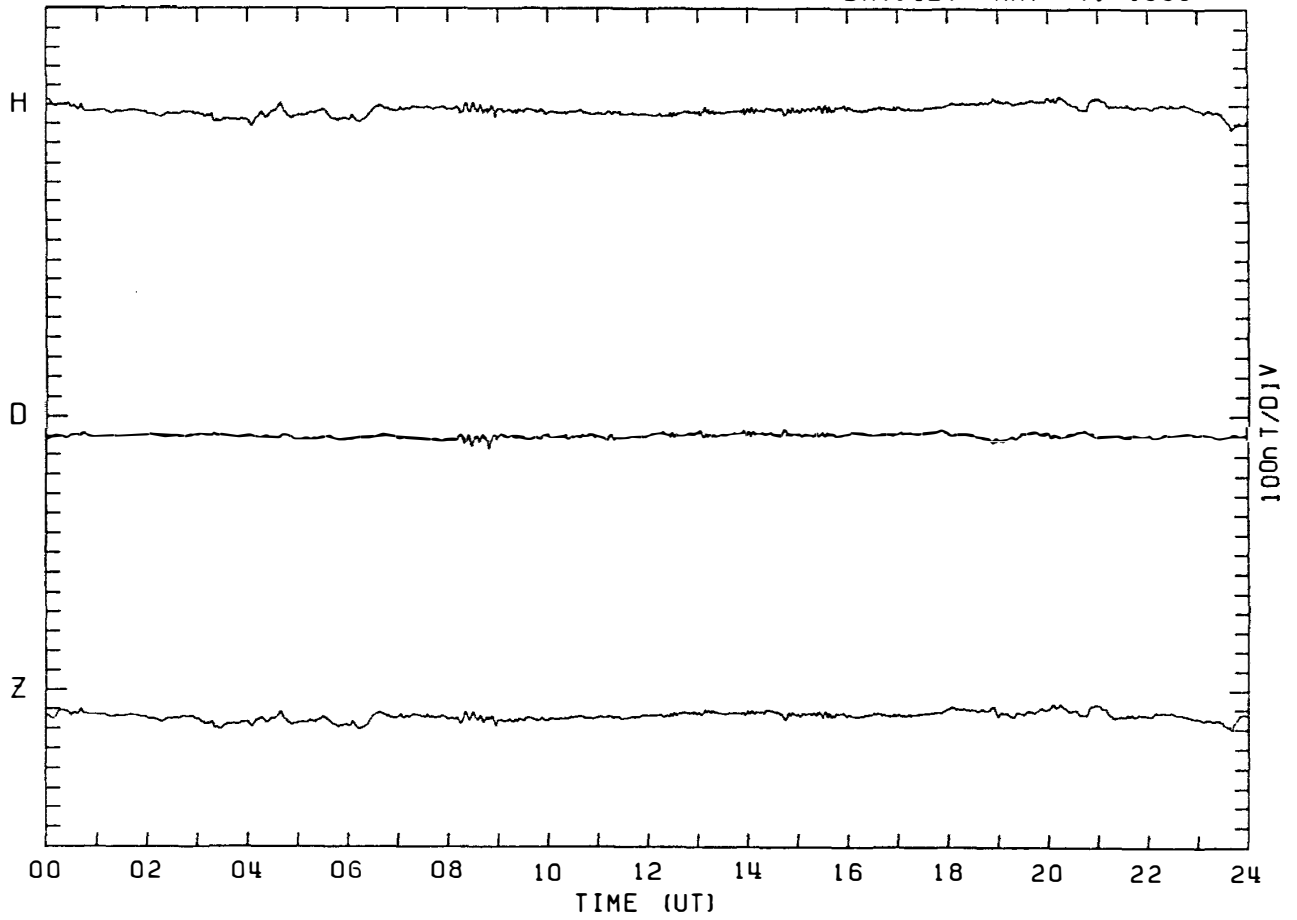
MAGNETOGRAM SYOWA STATION

DAY:126 MAY 6. 1983



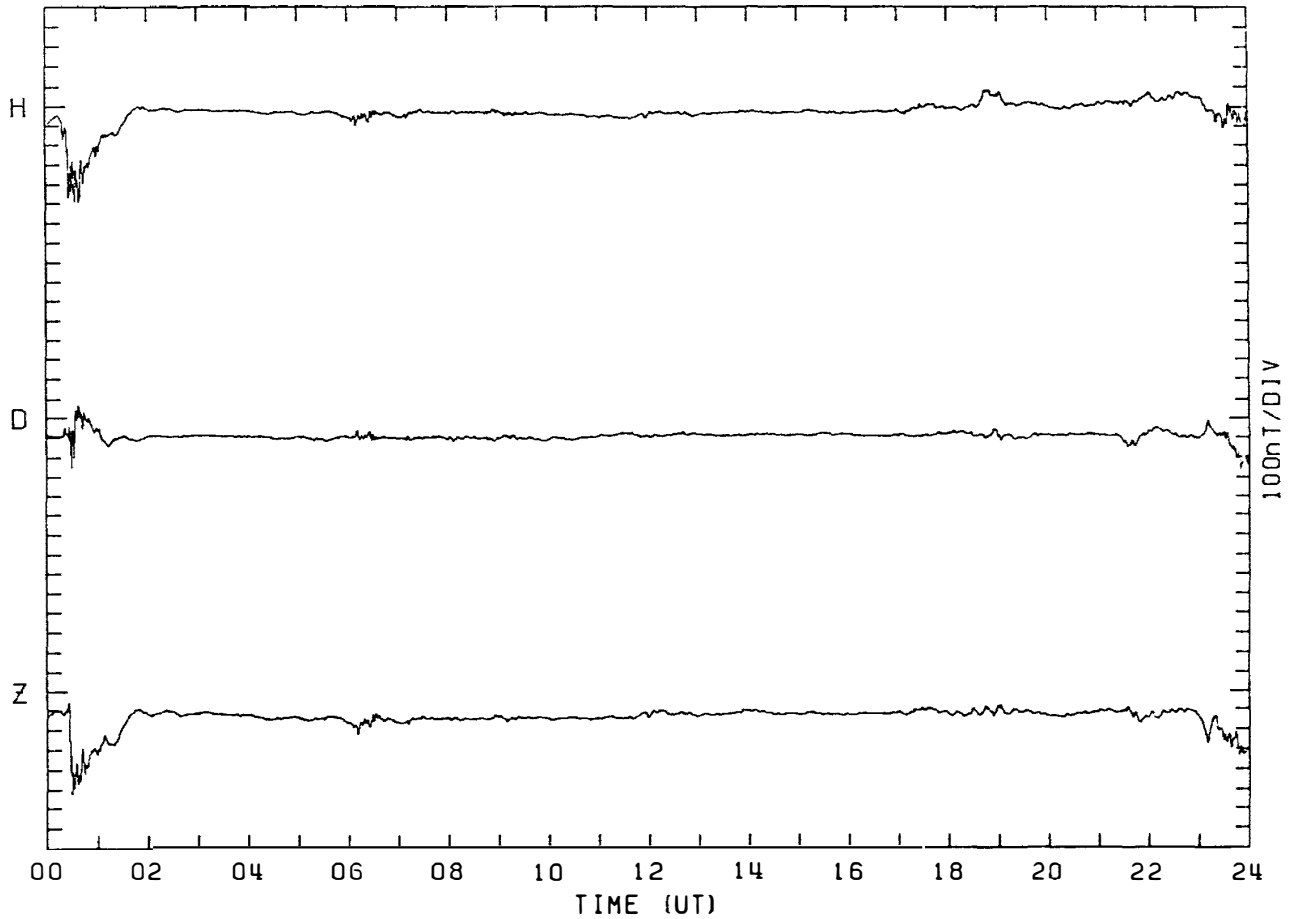
MAGNETOGRAM SYOWA STATION

DAY:127 MAY 7. 1983



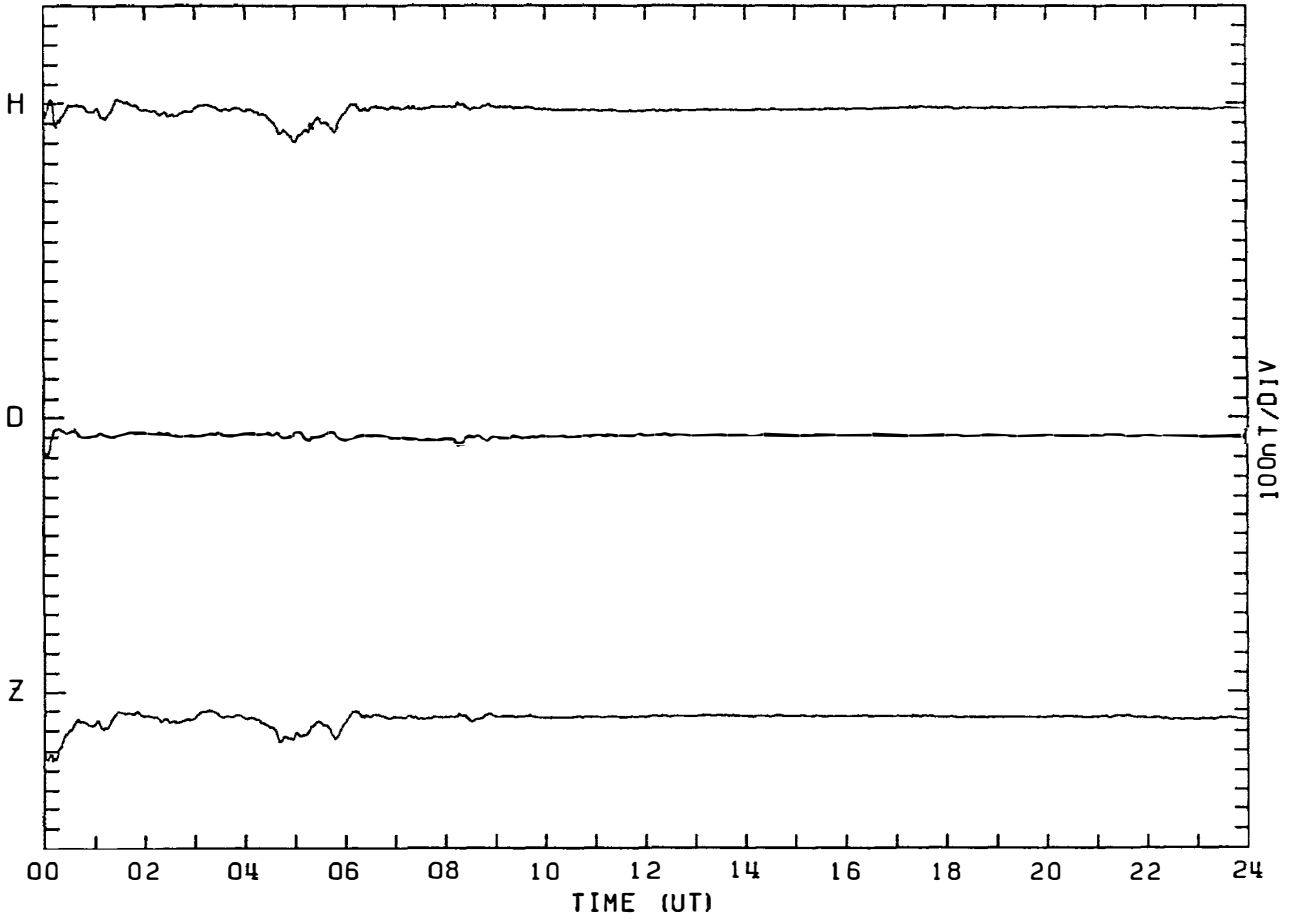
MAGNETOGRAM SYOWA STATION

DAY:128 MAY 8. 1983



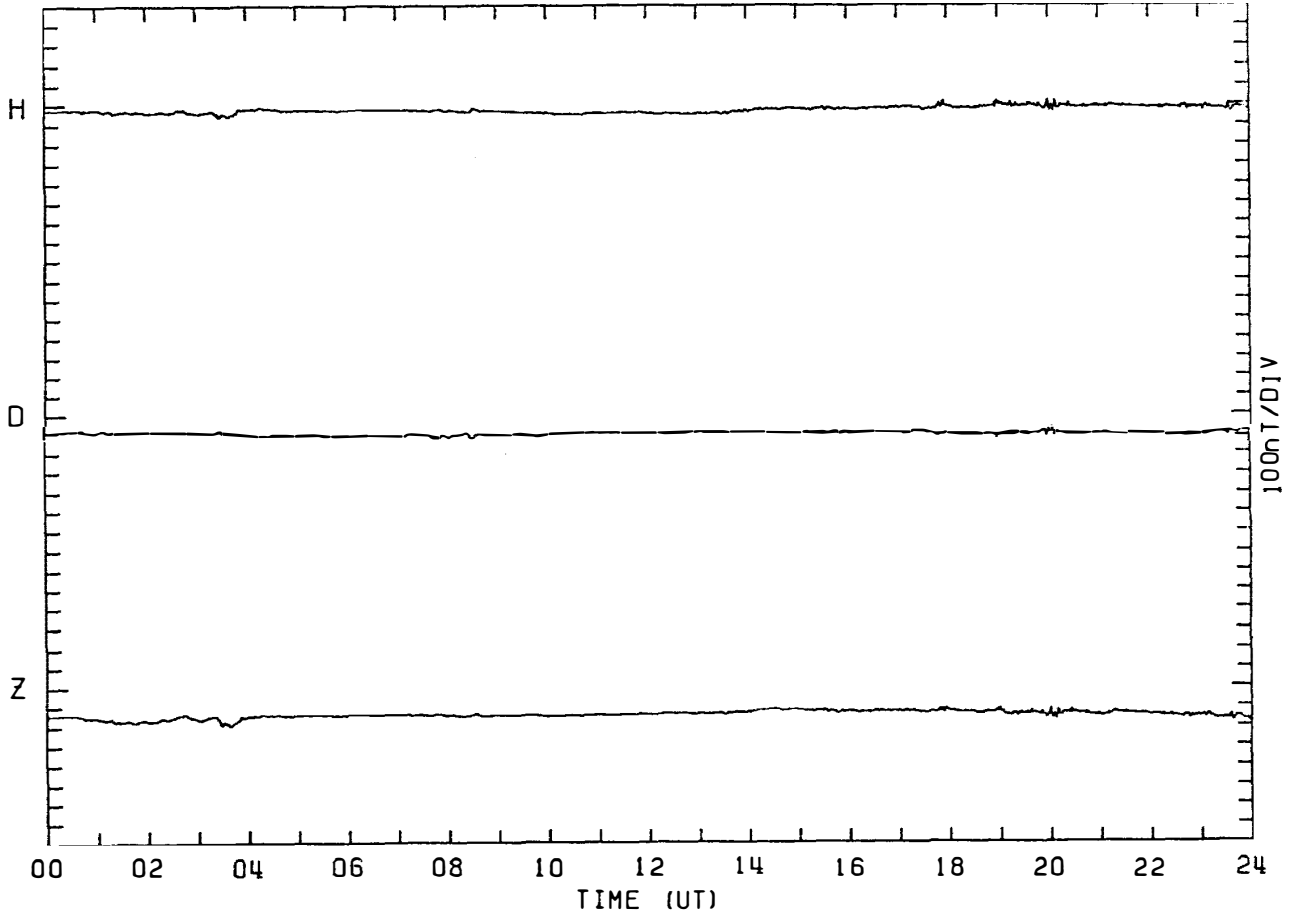
MAGNETOGRAM SYOWA STATION

DAY:129 MAY 9. 1983



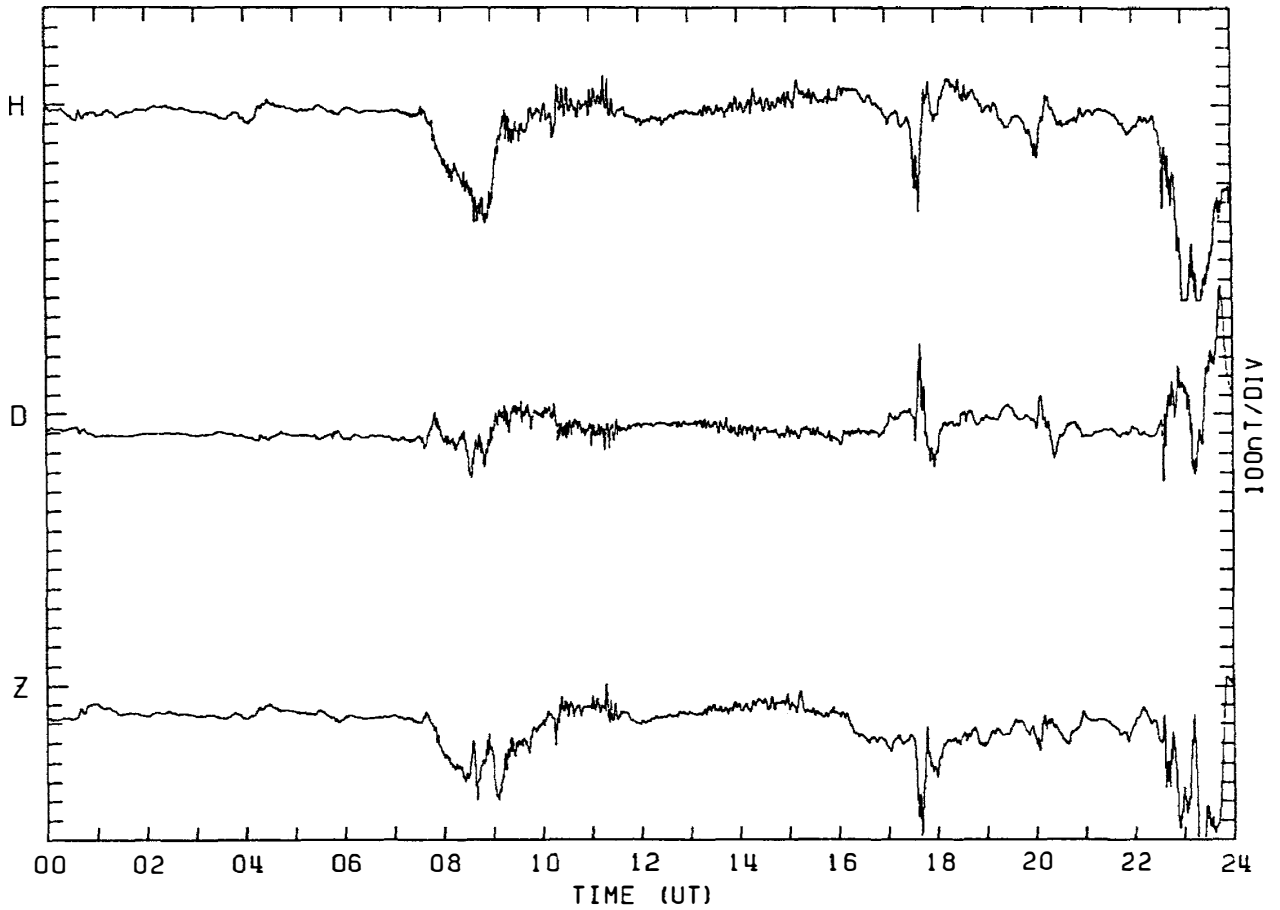
MAGNETOGRAM SYOWA STATION

DAY:130 MAY 10. 1983



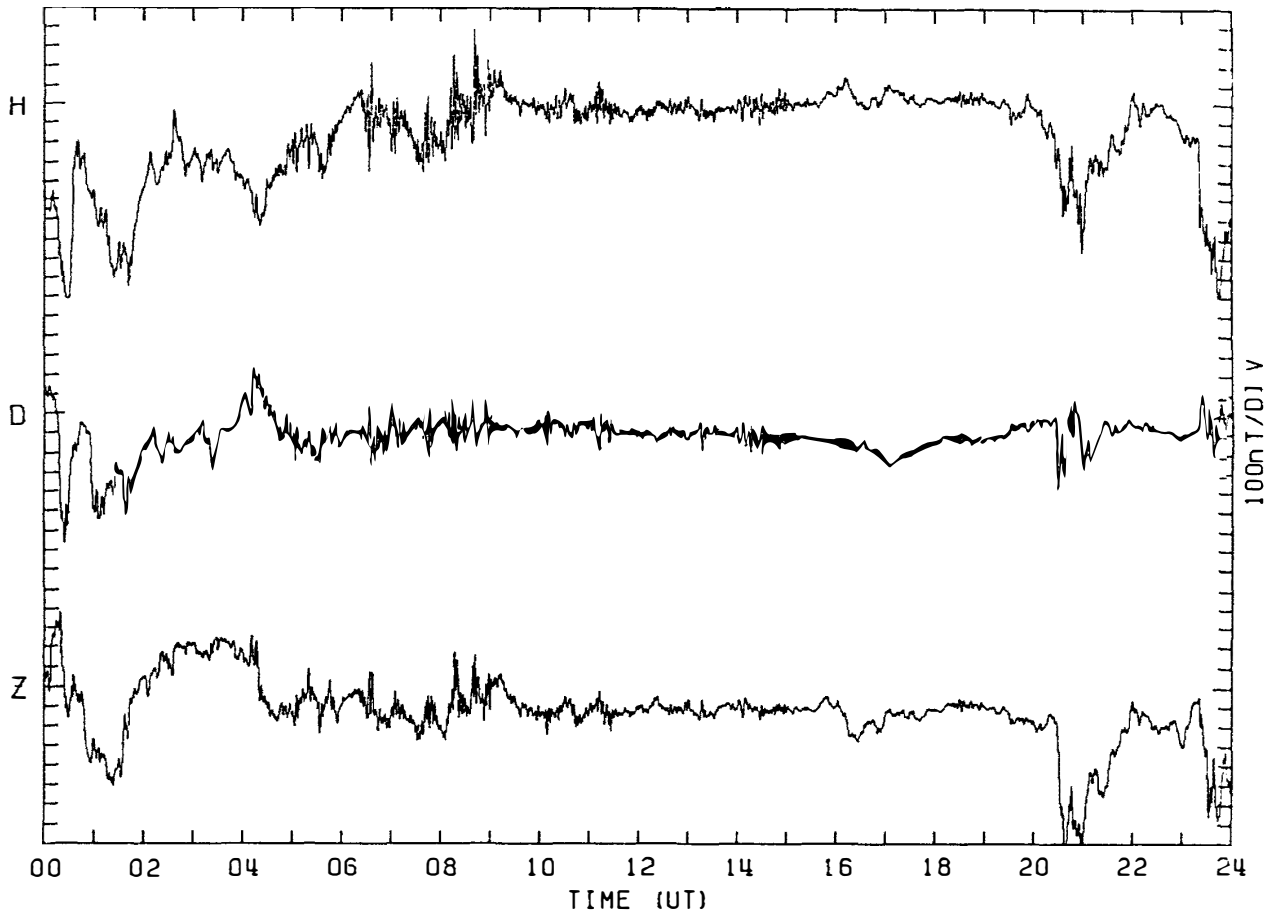
MAGNETOGRAM SYOWA STATION

DAY:131 MAY 11. 1983



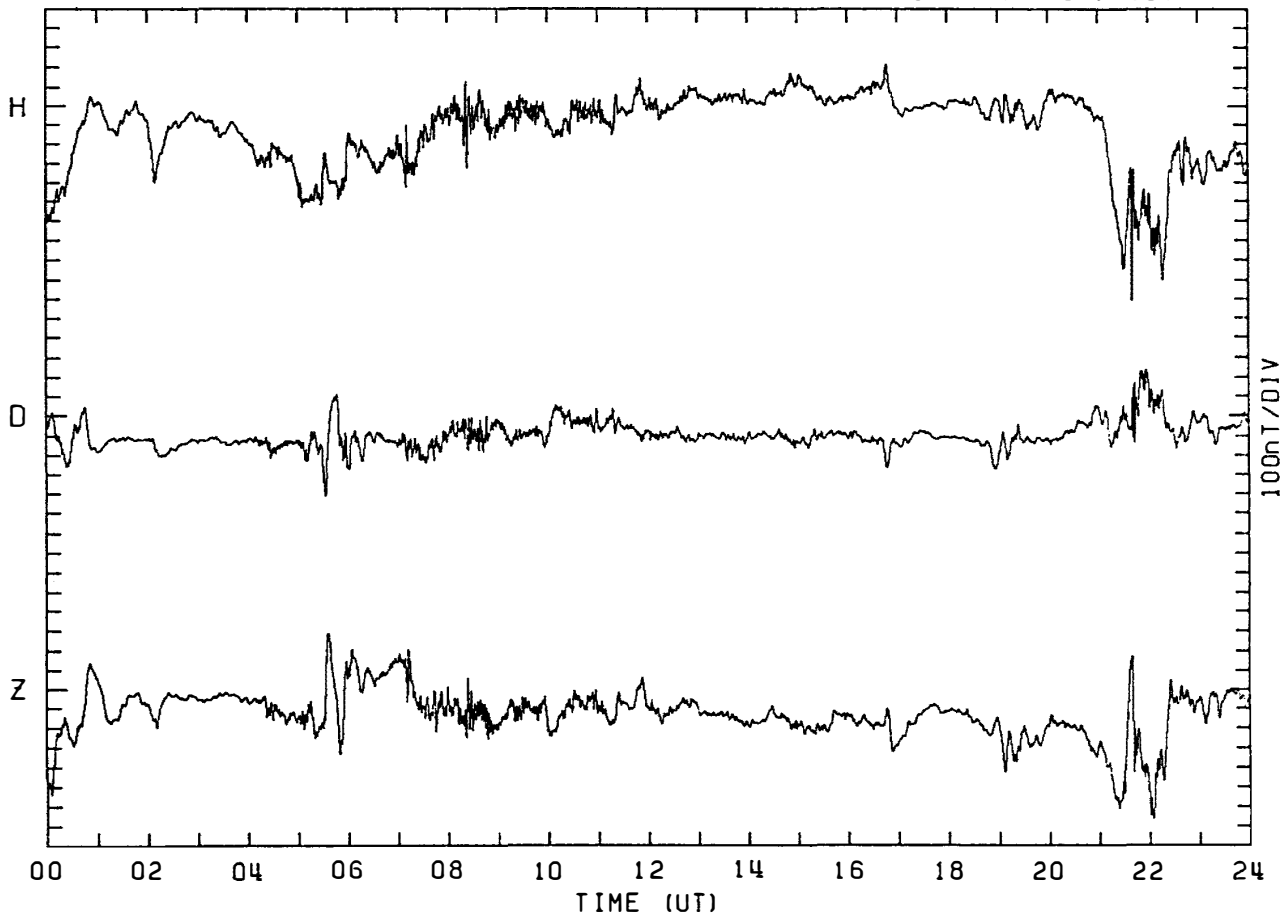
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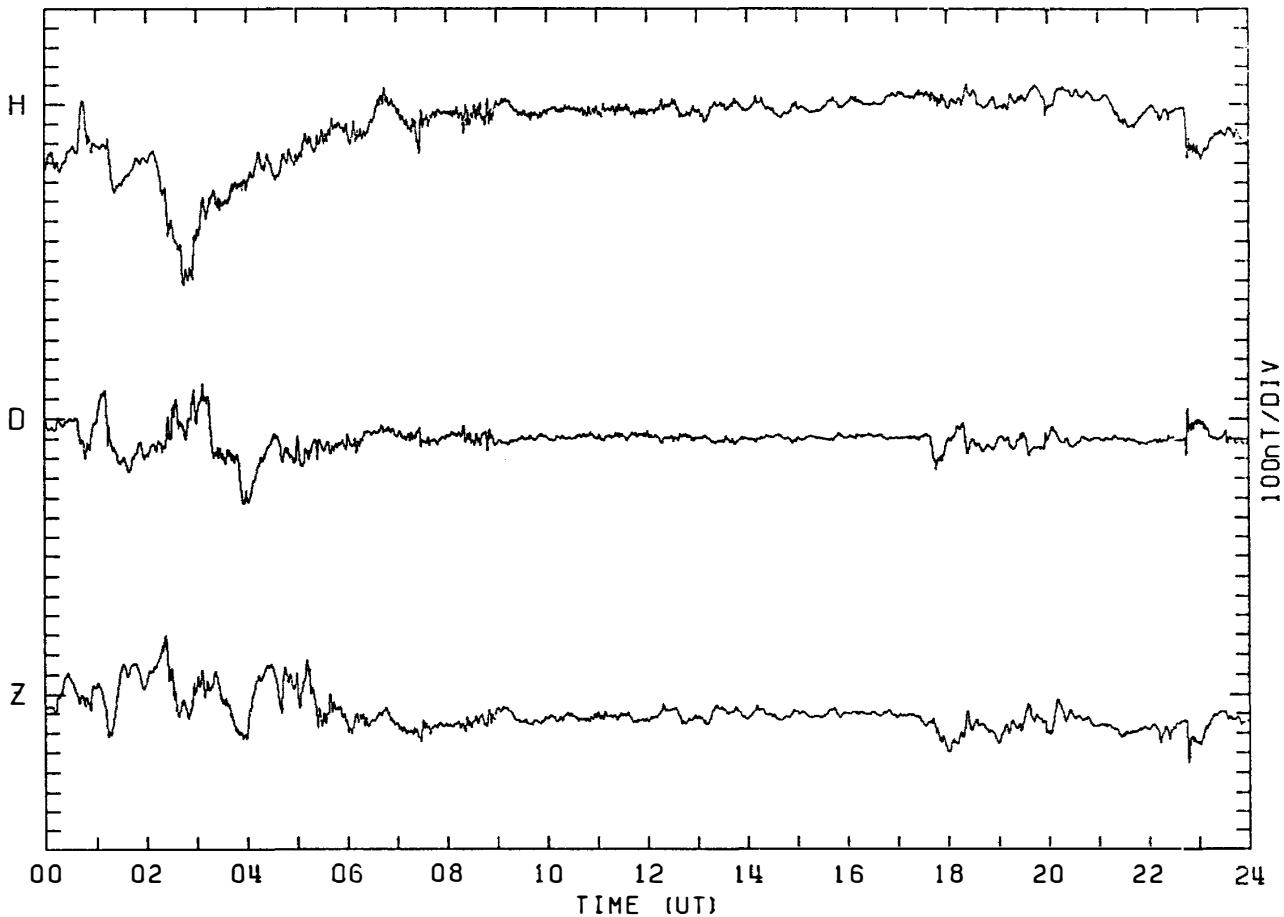
MAGNETOGRAM SYOWA STATION

DAY:133 MAY 13. 1983



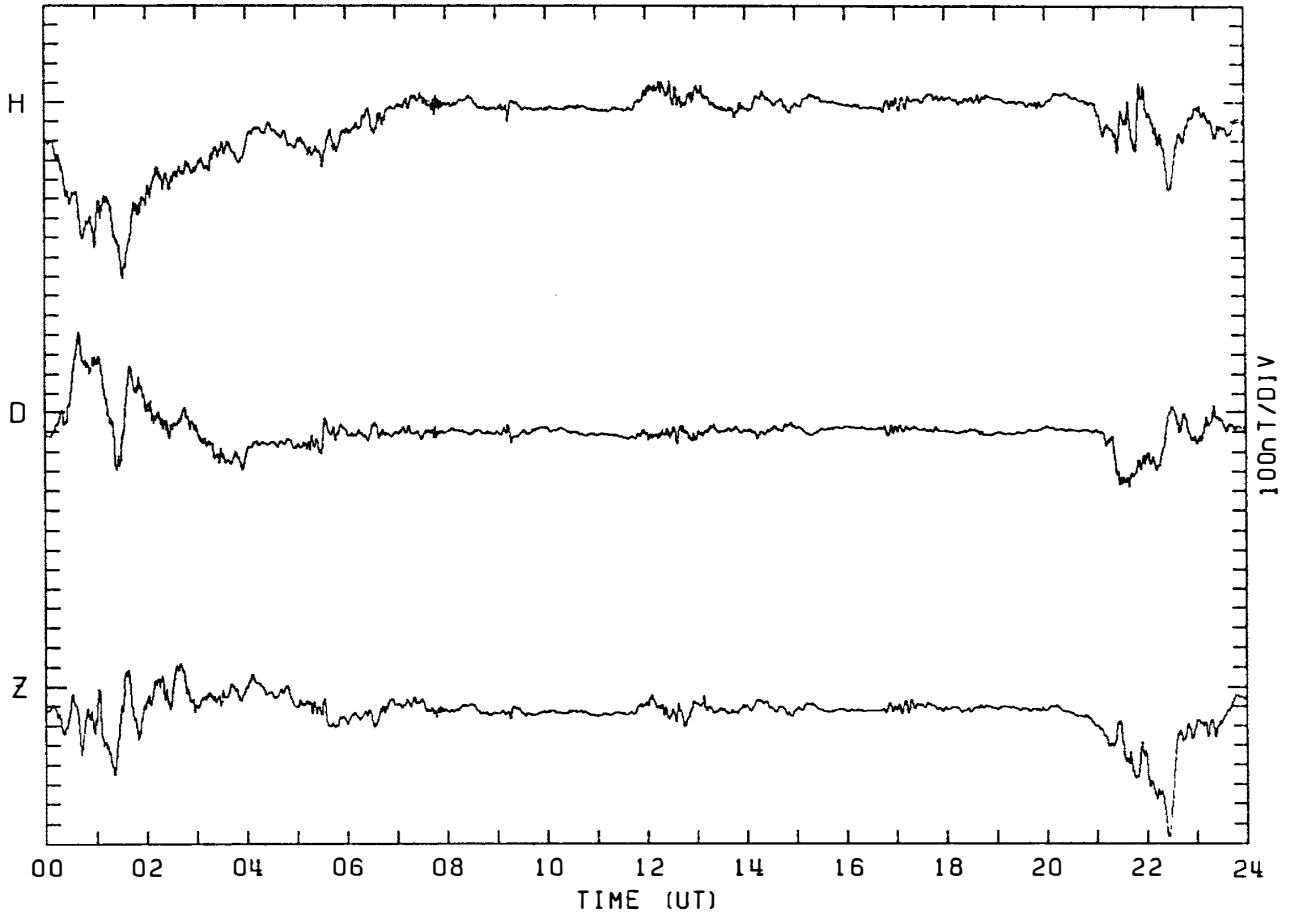
MAGNETOGRAM SYOWA STATION

DAY:134 MAY 14. 1983



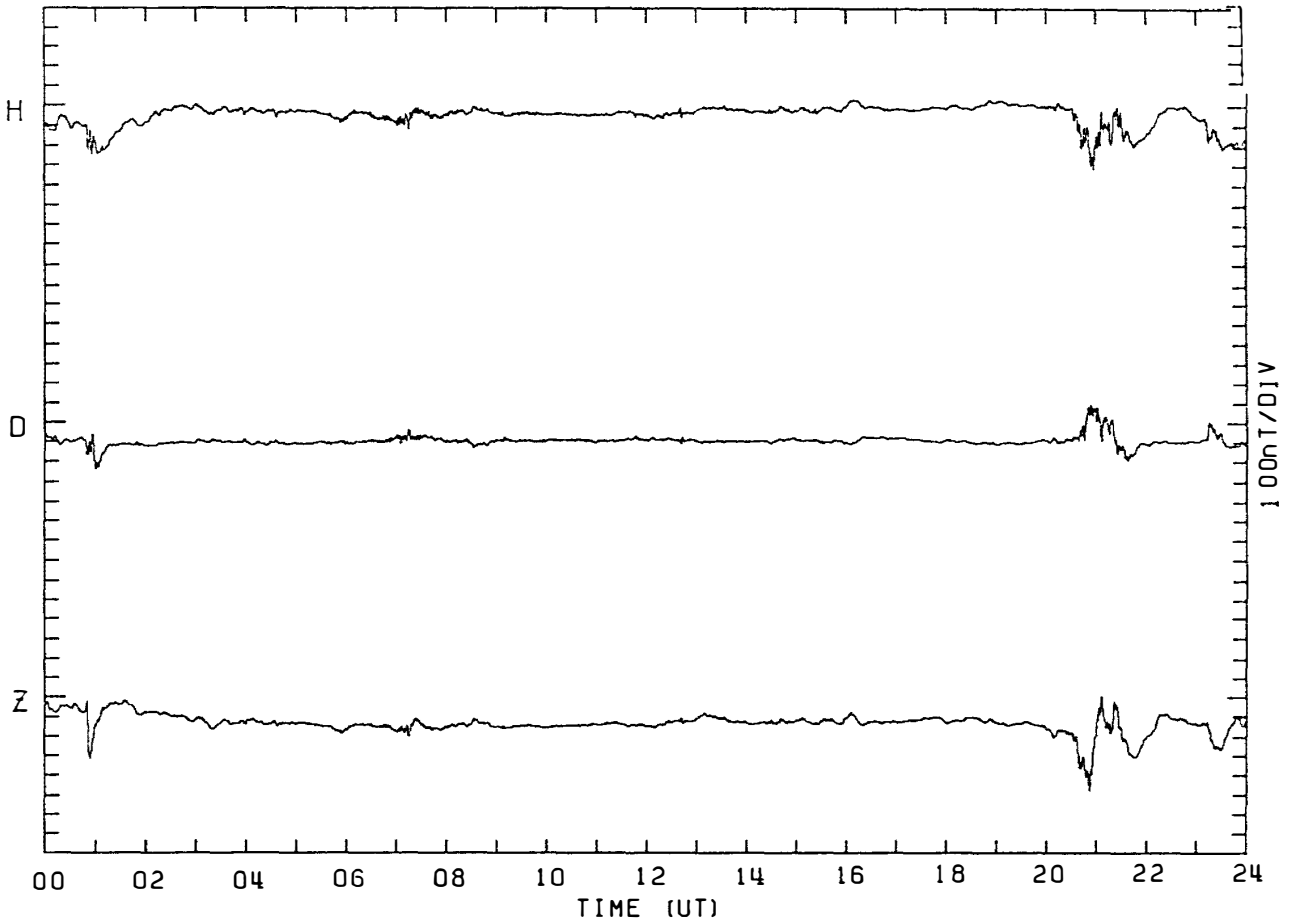
MAGNETOGRAM SYOWA STATION

DAY:135 MAY 15. 1983



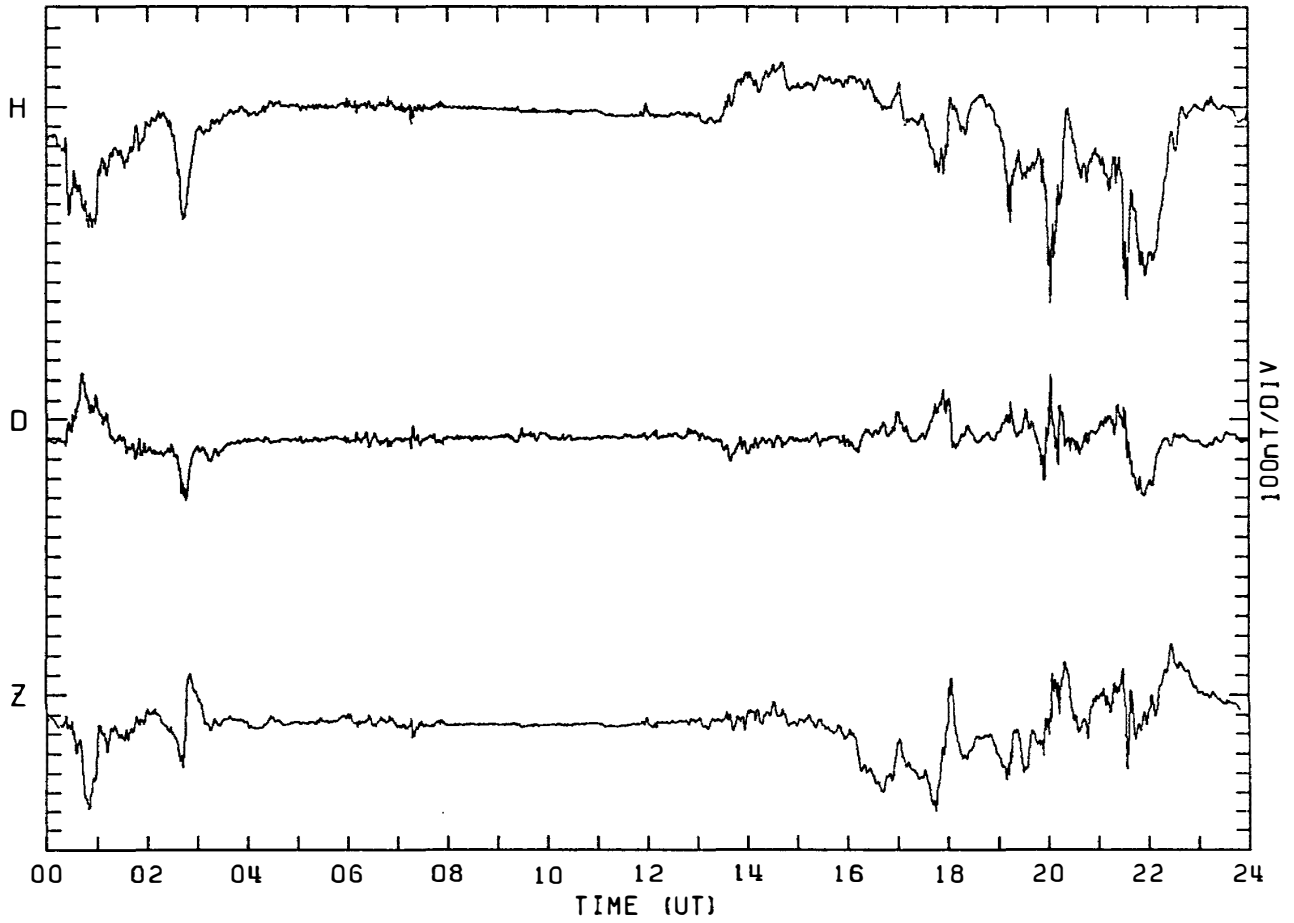
MAGNETOGRAM SYOWA STATION

DAY:136 MAY 16. 1983



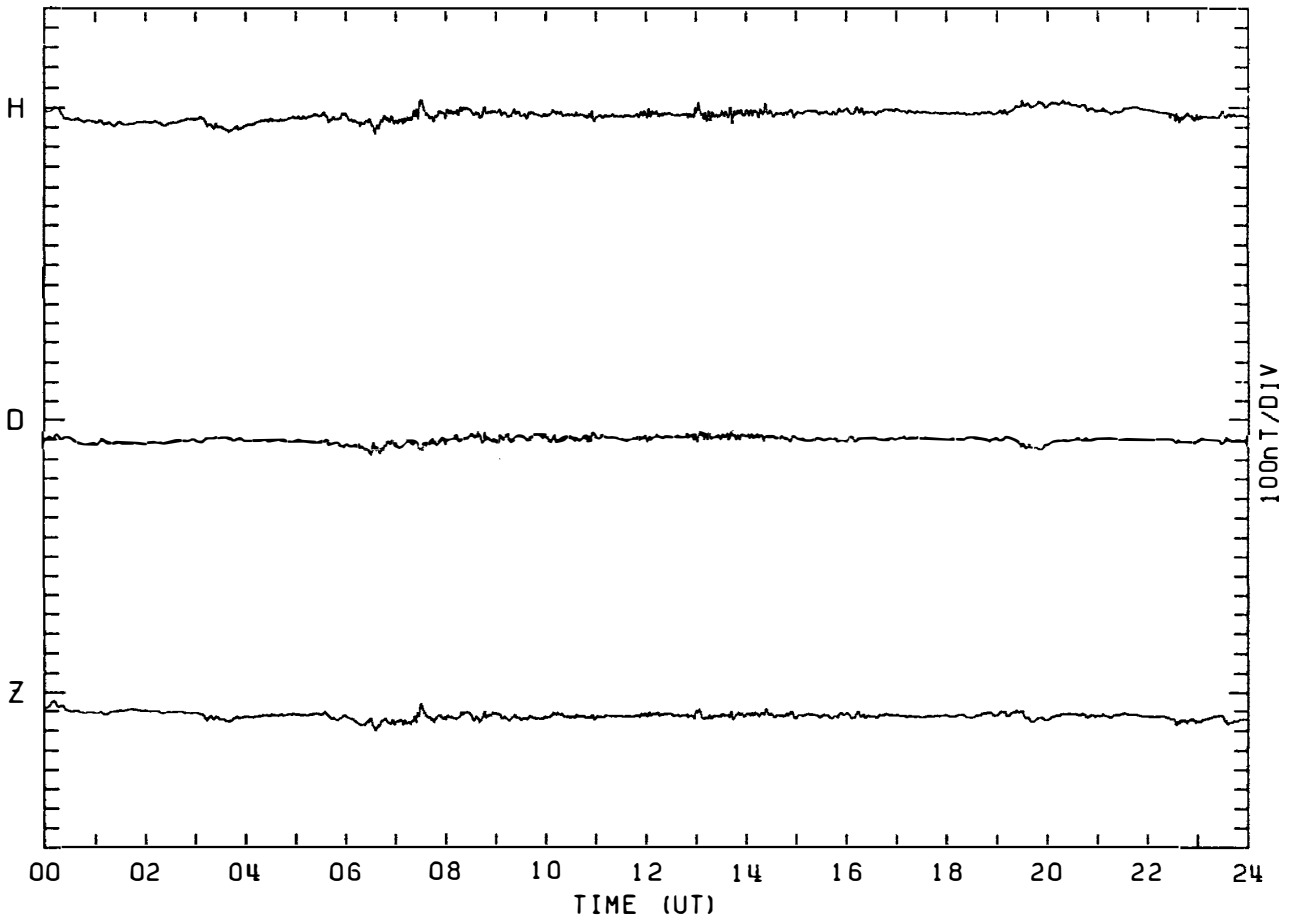
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DAY:137 MAY 17. 1983



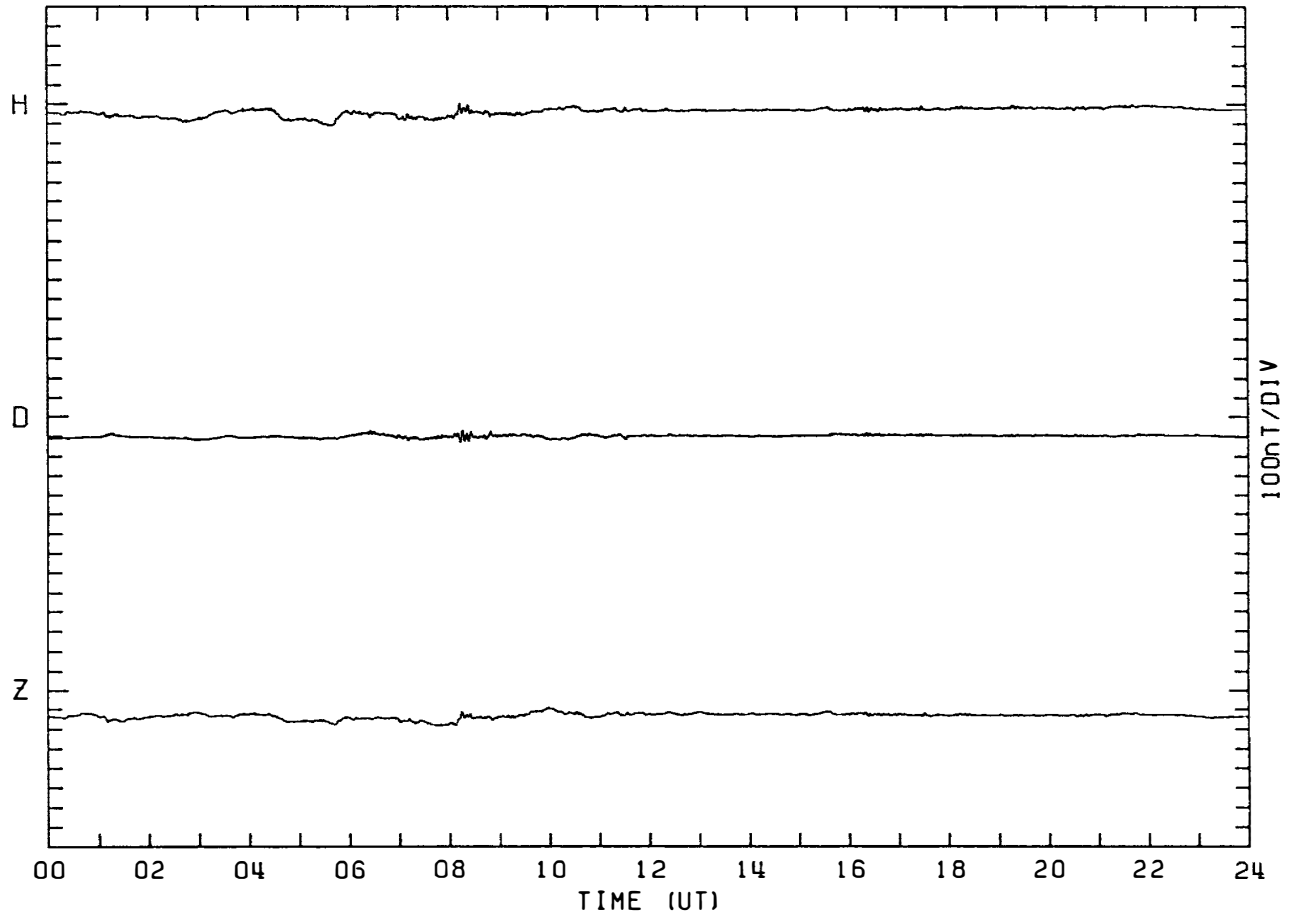
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DAY:138 MAY 18. 1983



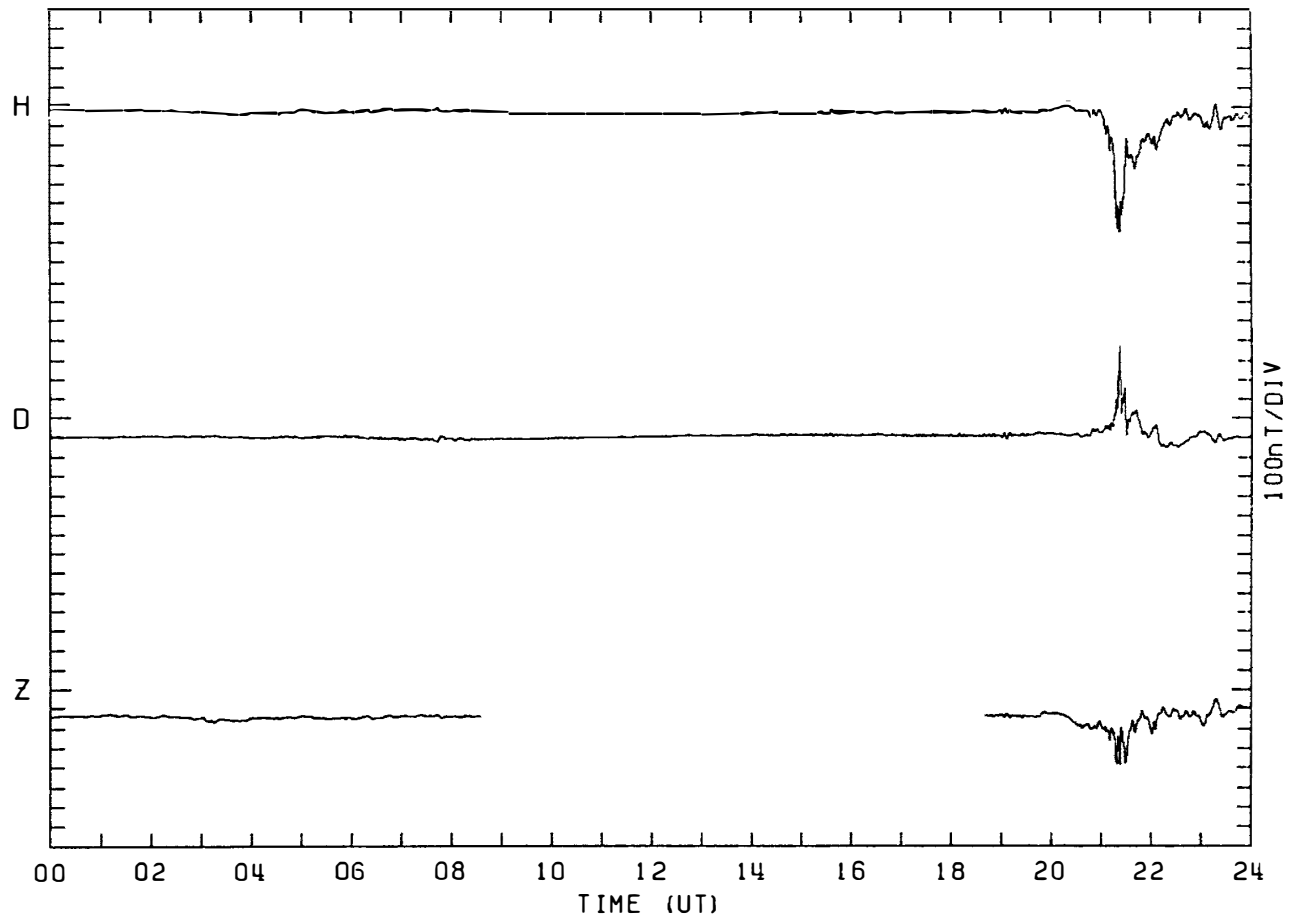
MAGNETOGRAM SYOWA STATION

DAY:139 MAY 19. 1983



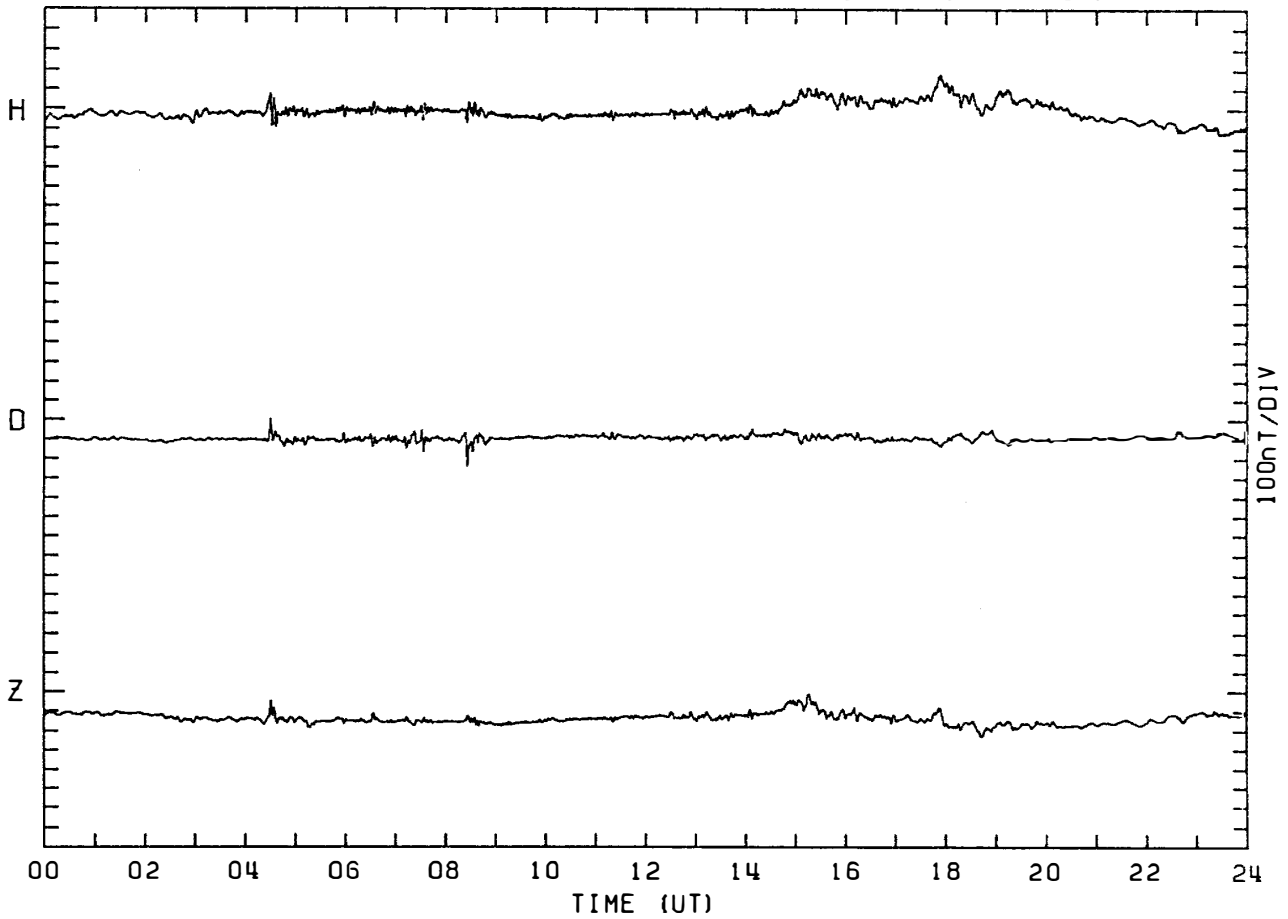
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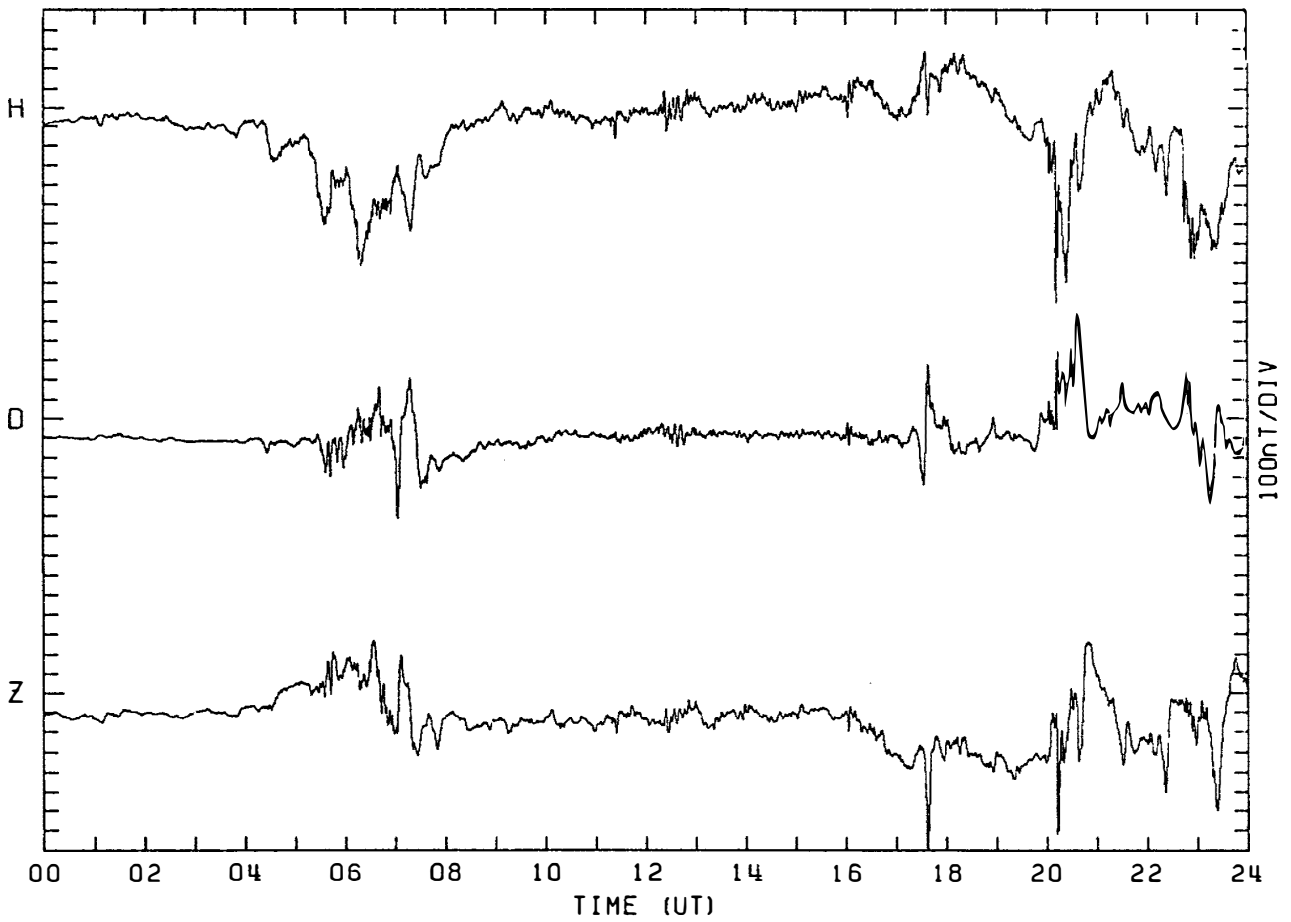
MAGNETOGRAM SYOWA STATION

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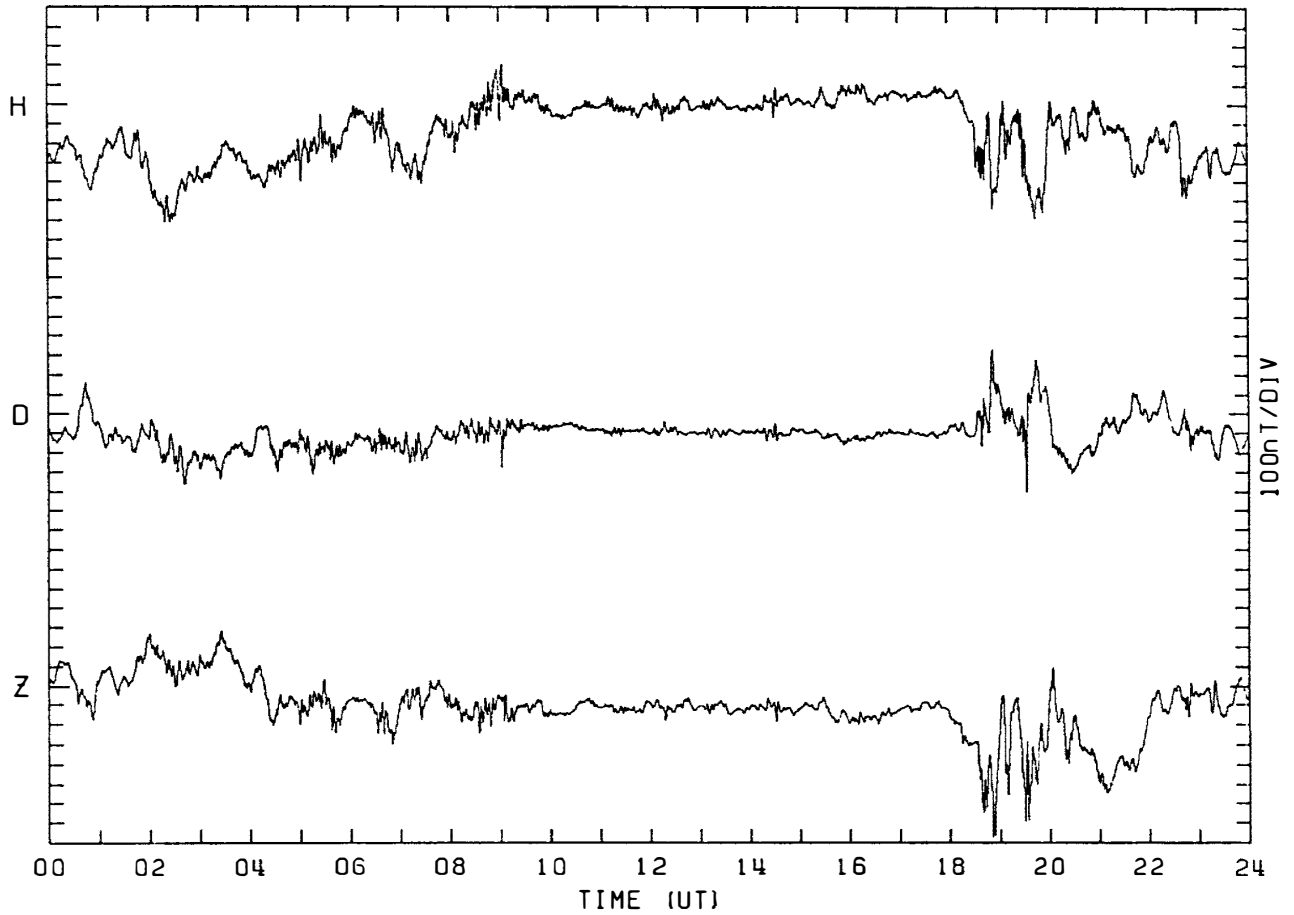
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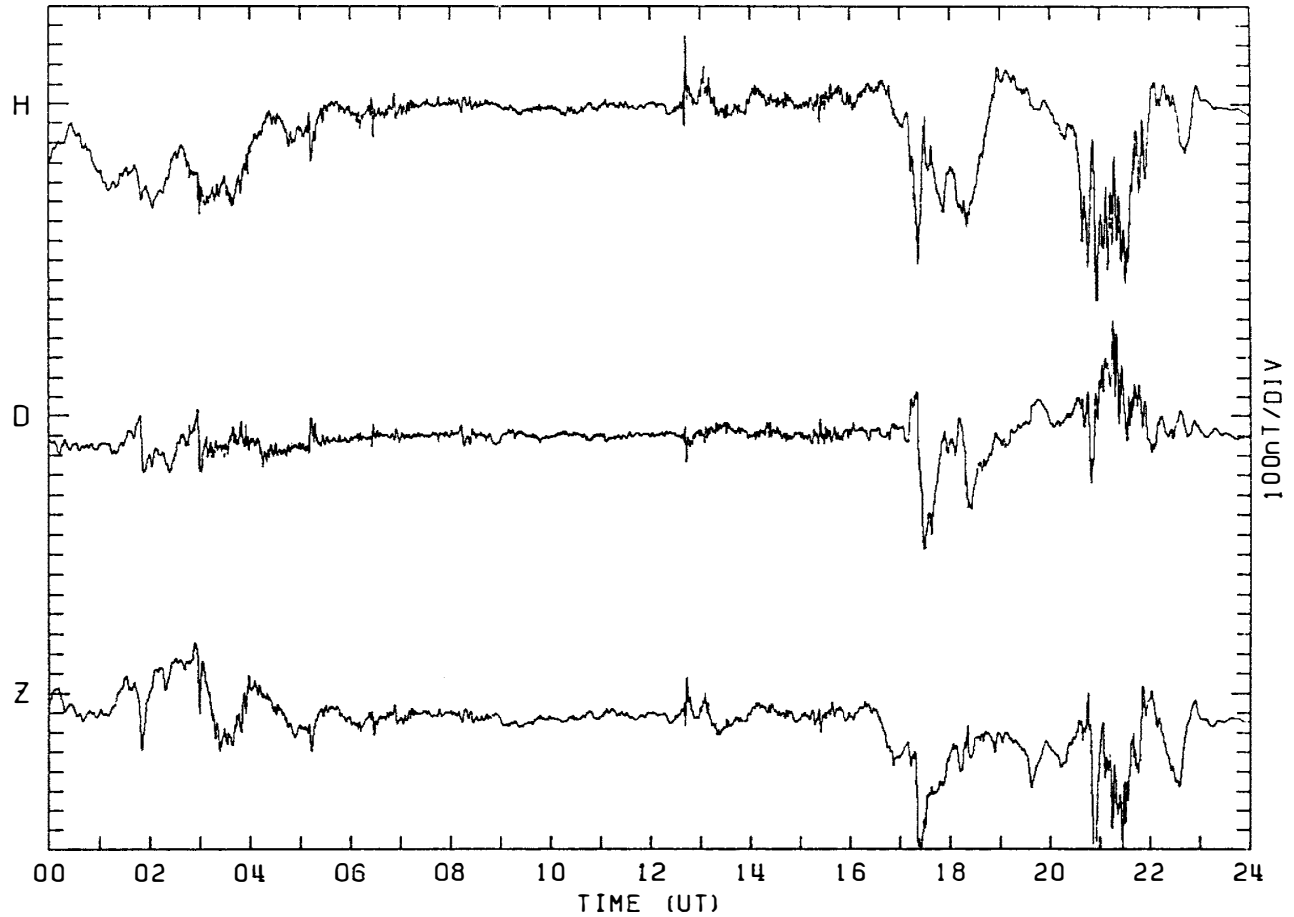
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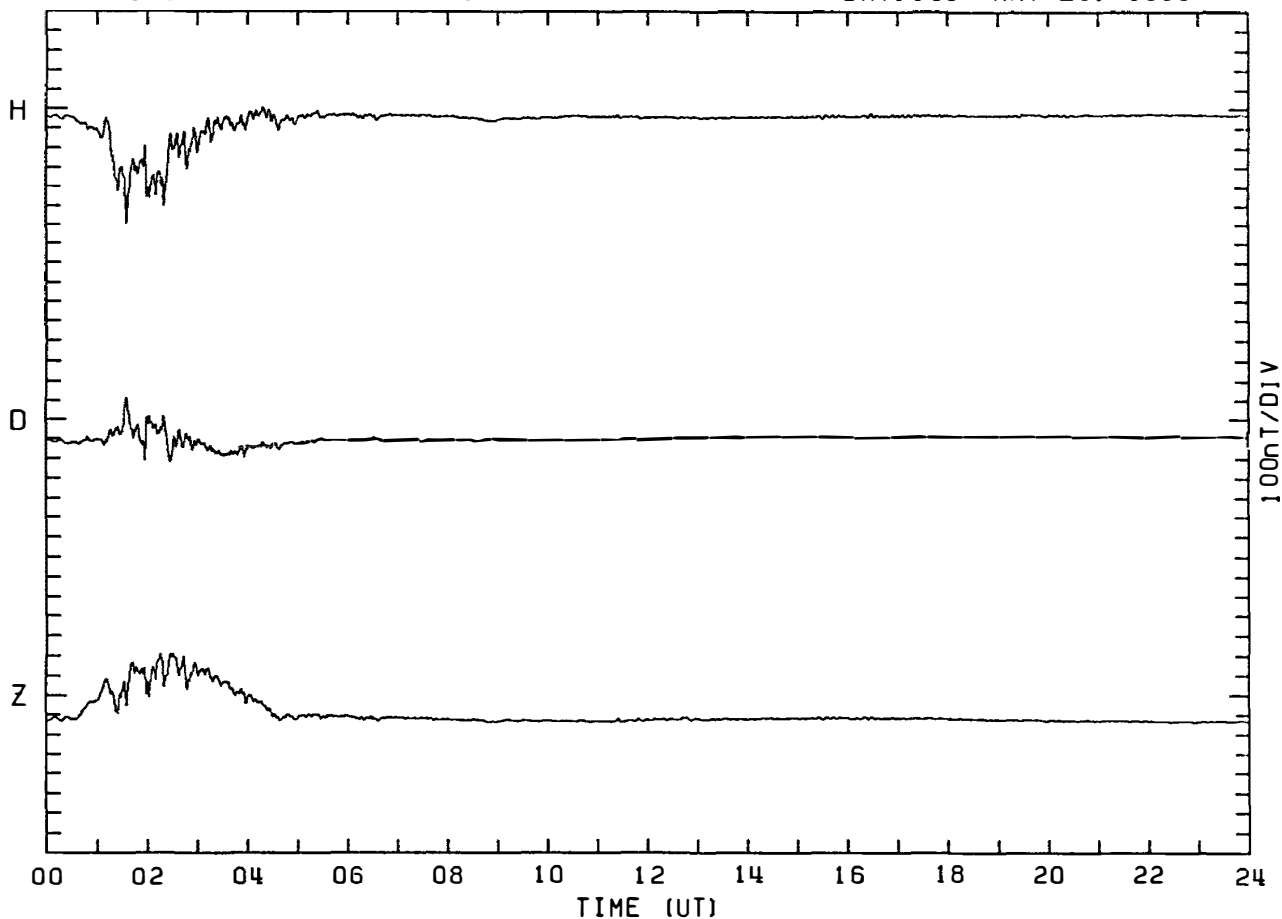
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DAY: 144 MAY 24. 1983



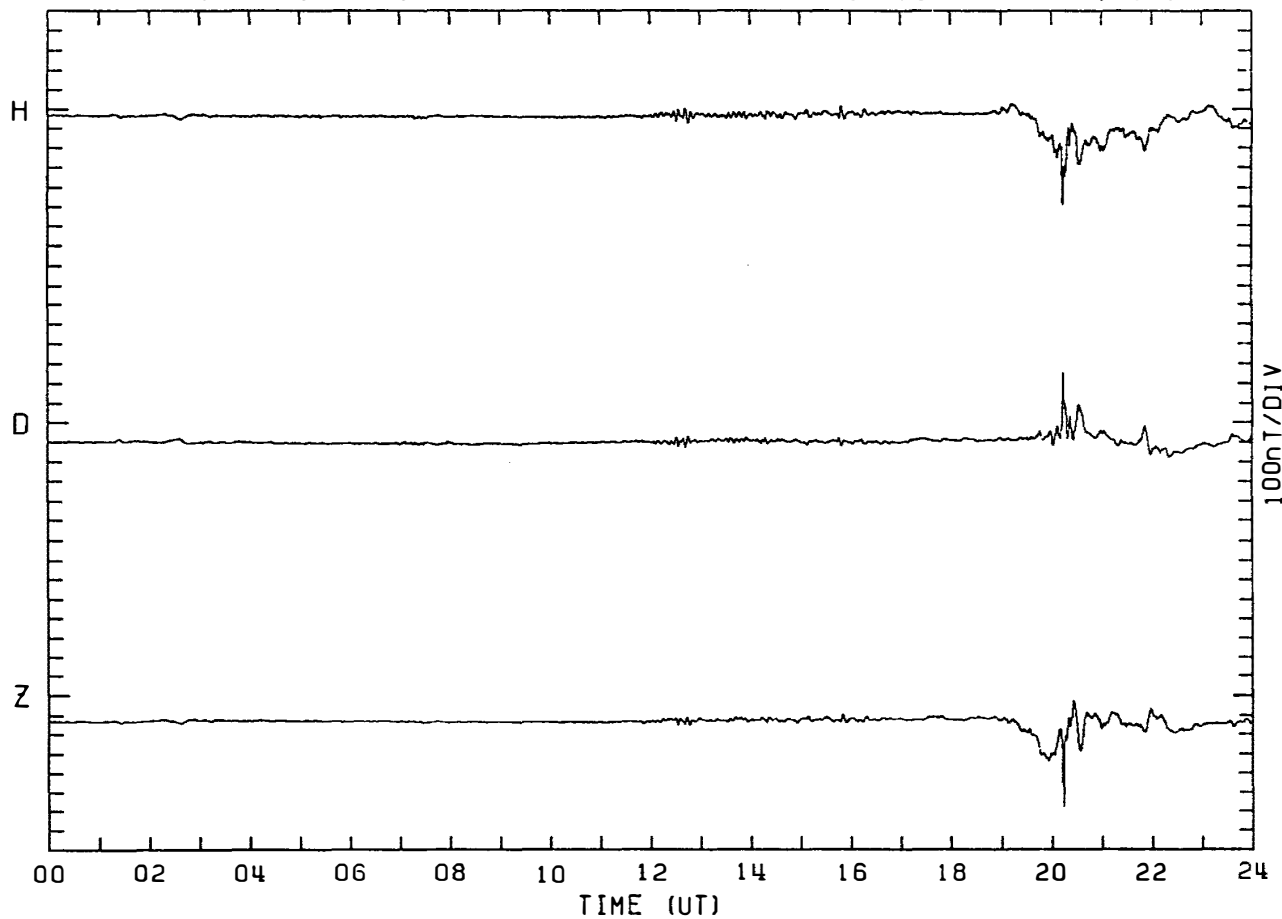
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DAY: 145 MAY 25, 1983



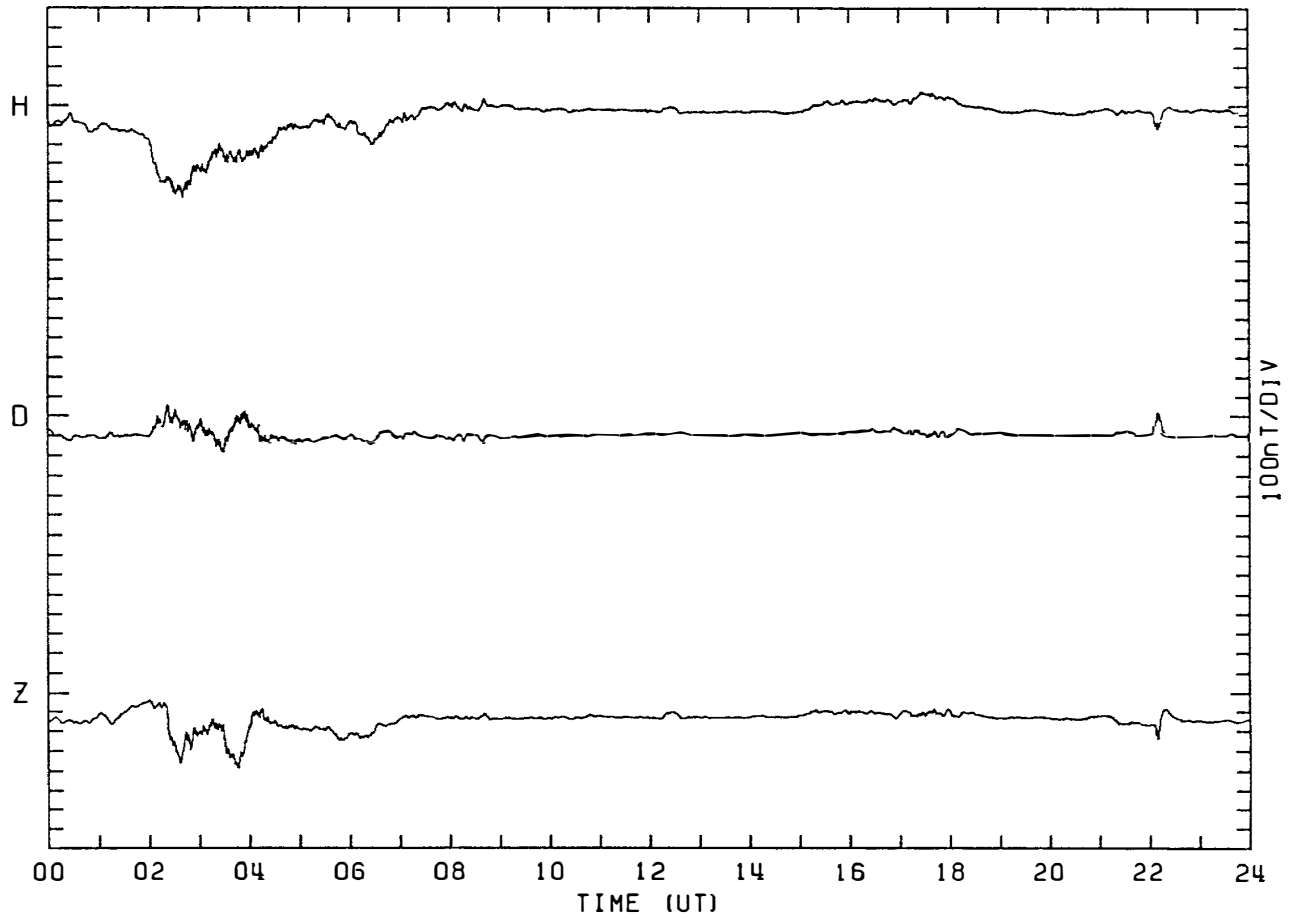
MAGNETOGRAM SYOWA STATION

DAY: 146 MAY 26, 1983



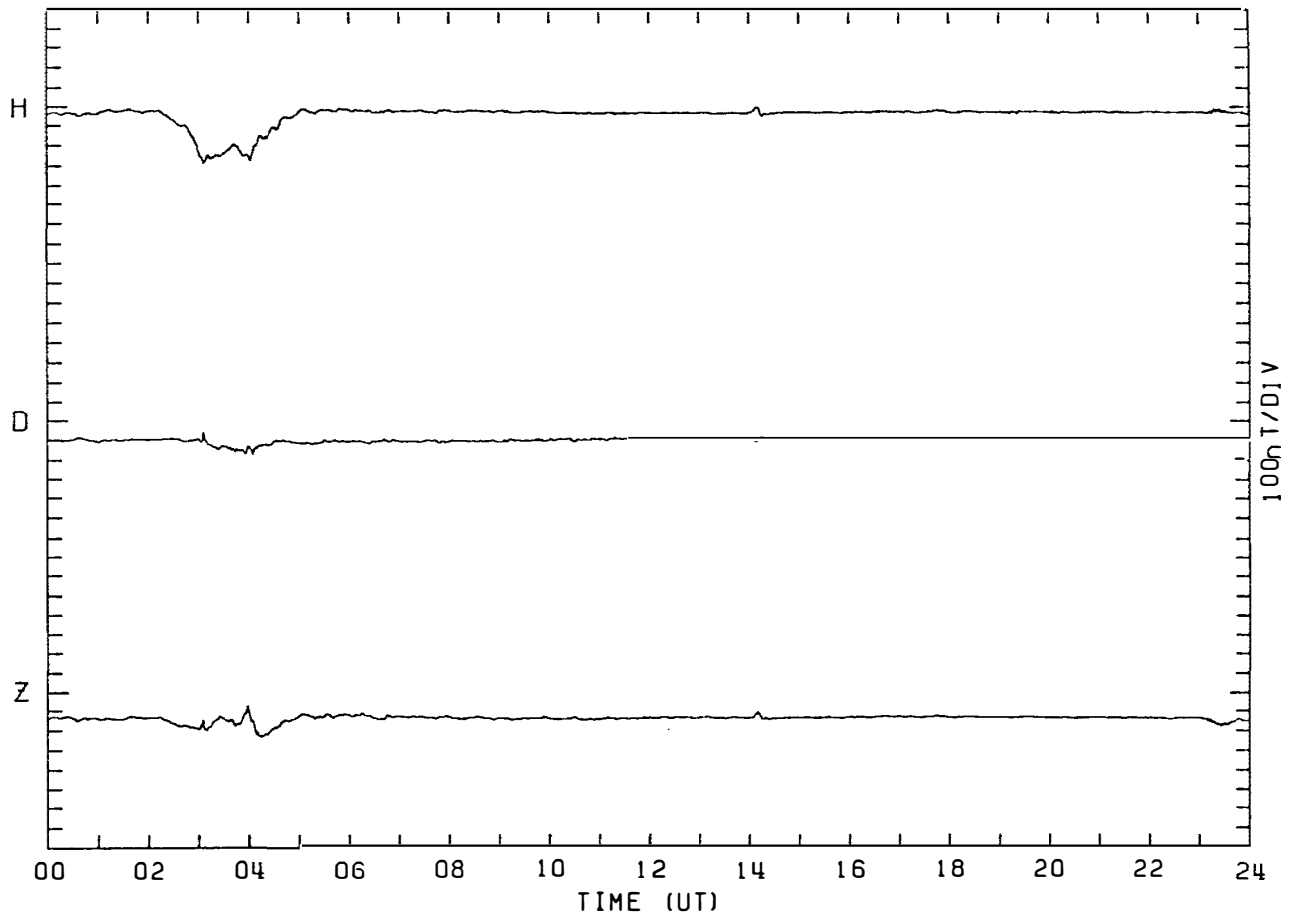
MAGNETOGRAM SYOWA STATION

DAY: 147 MAY 27, 1983



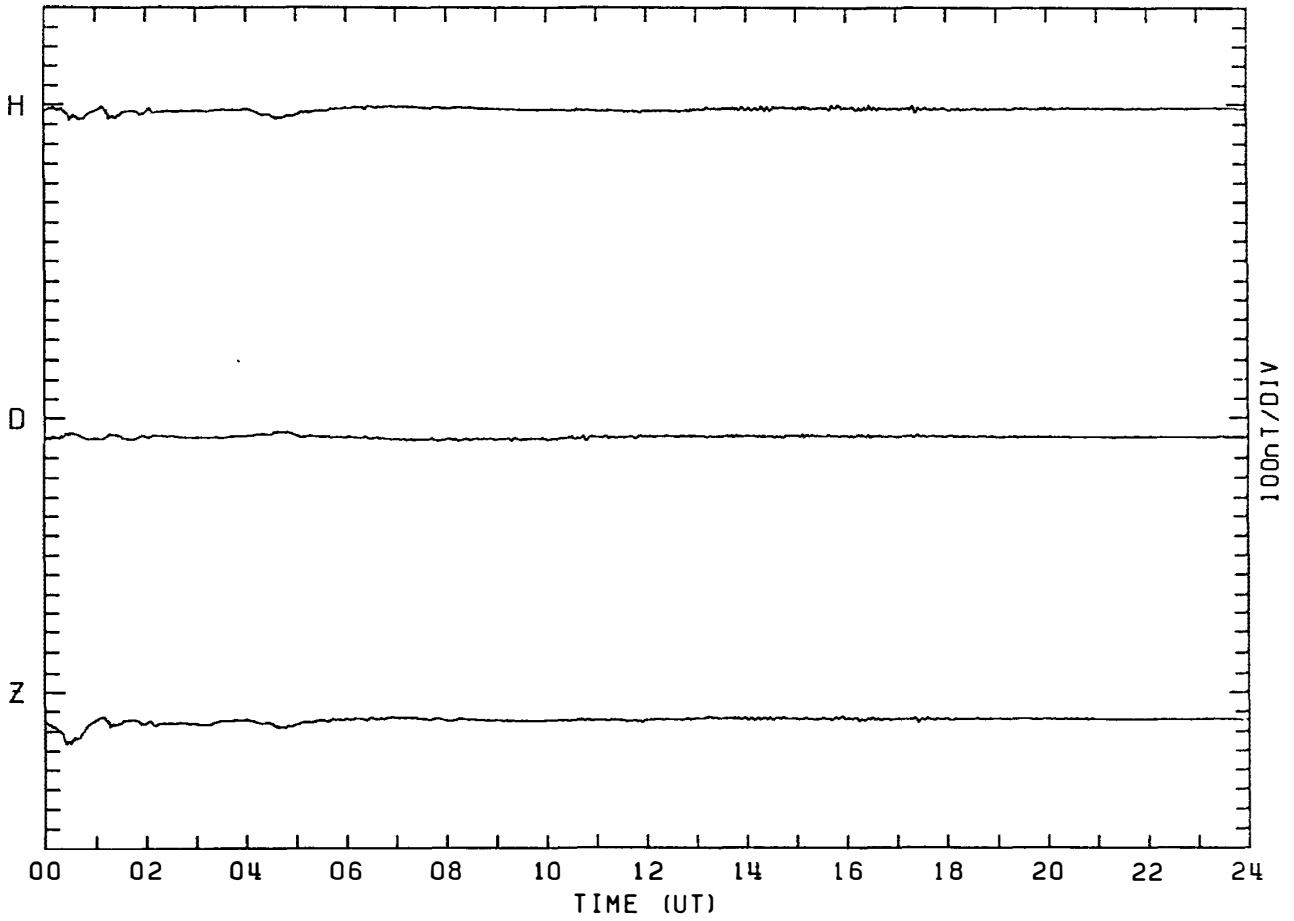
MAGNETOGRAM SYOWA STATION

DAY: 148 MAY 28, 1983



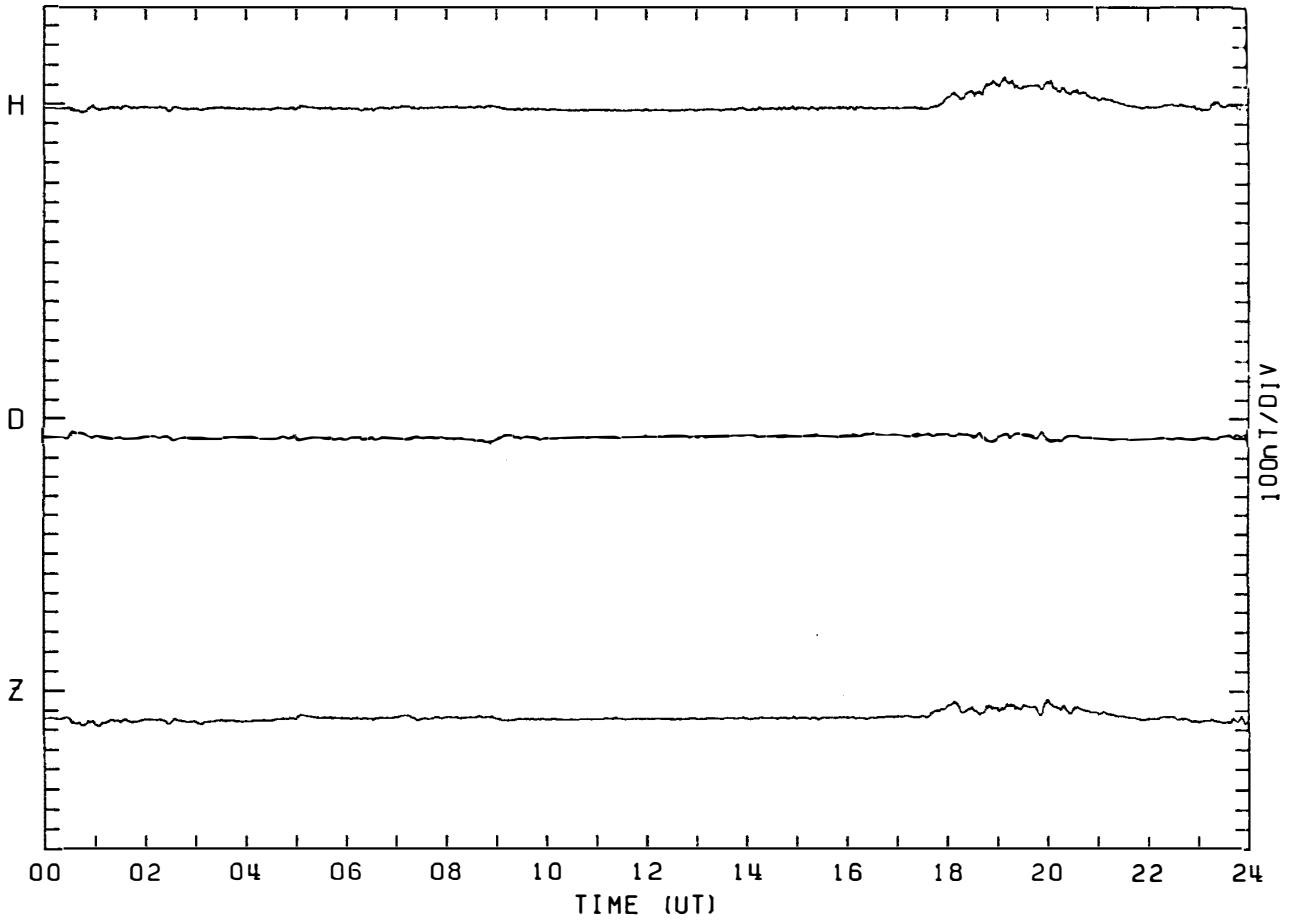
MAGNETOGRAM SYOWA STATION

DAY:149 MAY 29. 1983



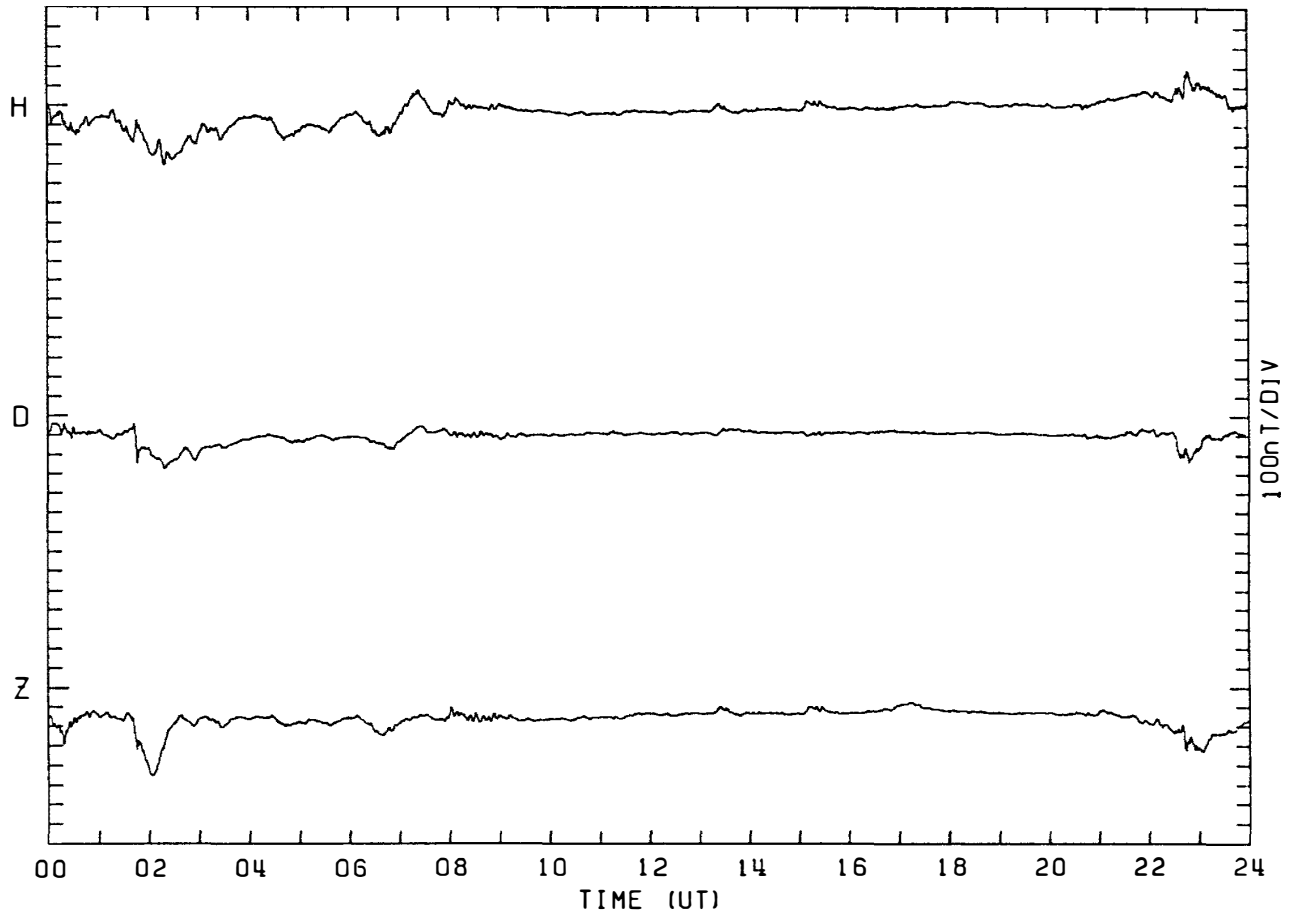
MAGNETOGRAM SYOWA STATION

DAY:150 MAY 30. 1983



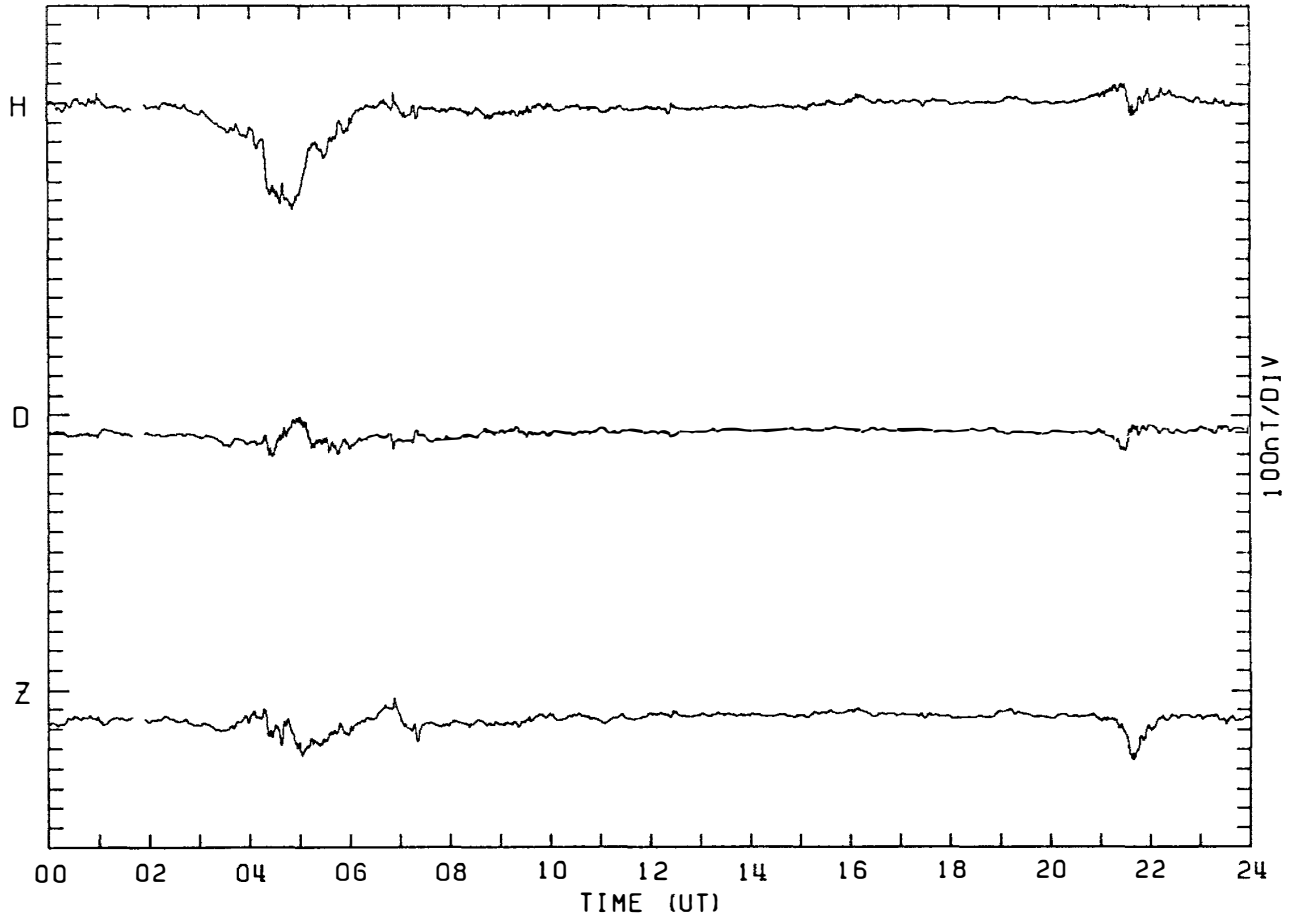
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DAY:151 MAY 31. 1983



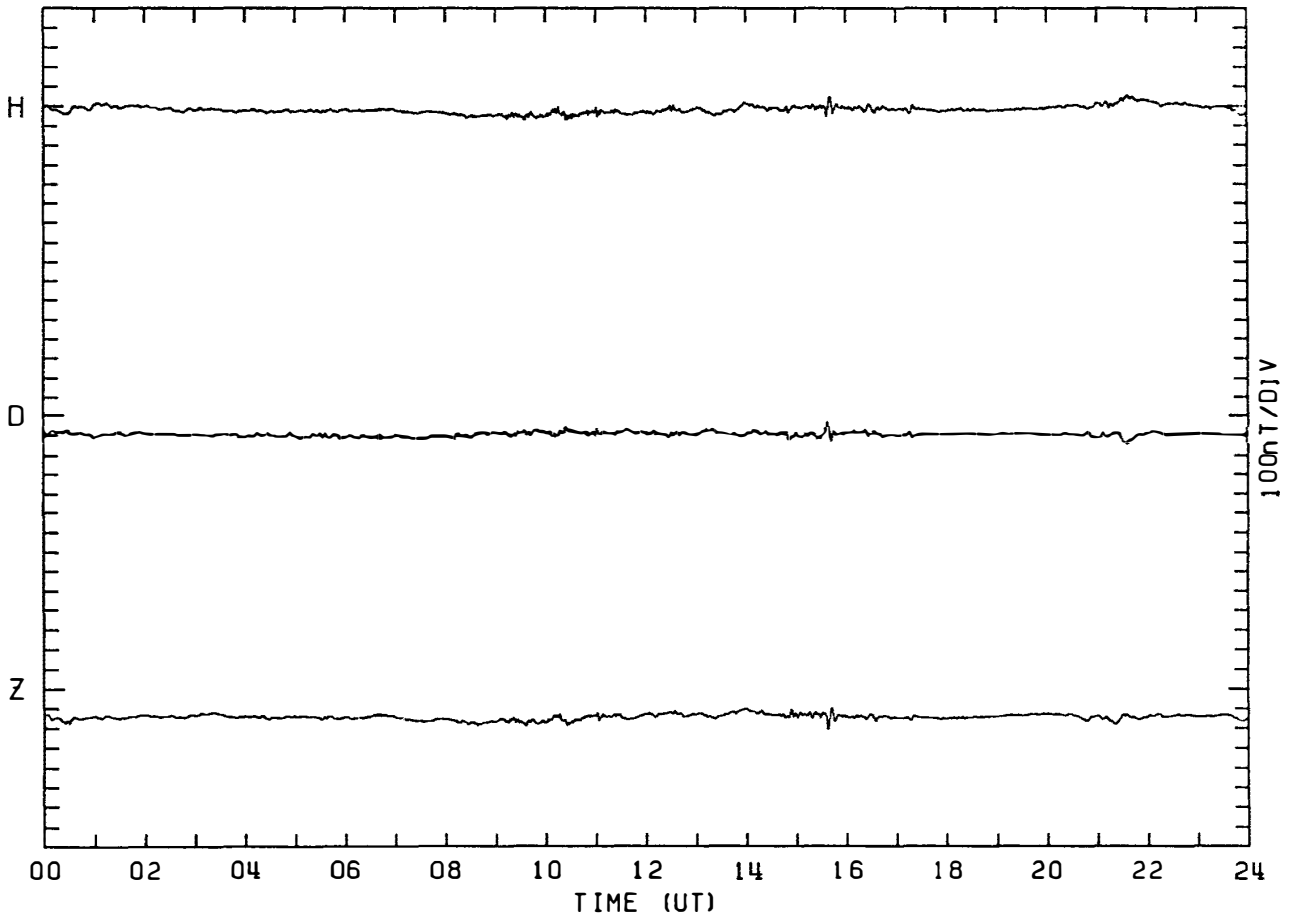
MAGNETOGRAM SYOWA STATION

DAY:152 JUNE 1. 1983



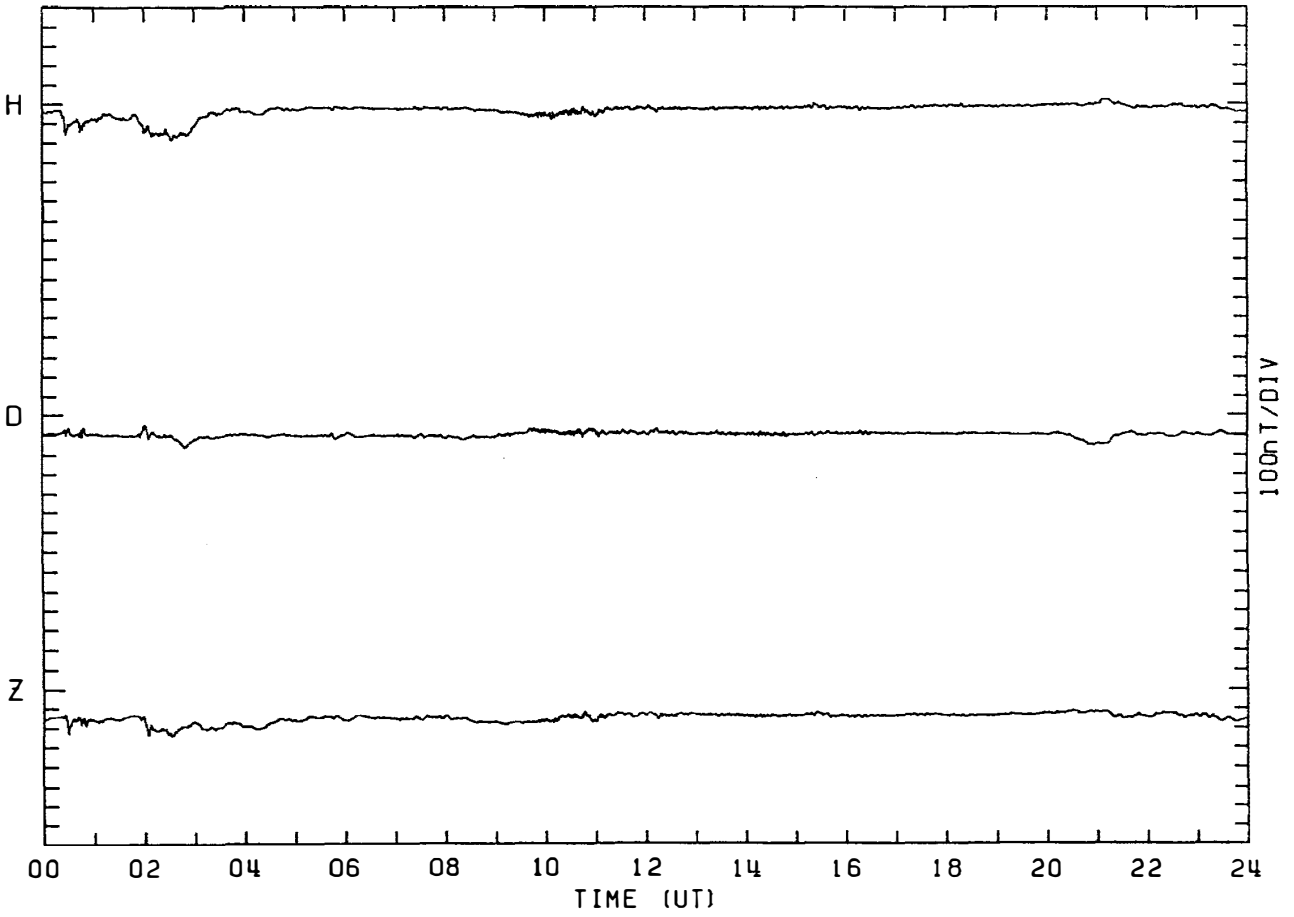
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DAY: 153 JUNE 2, 1983



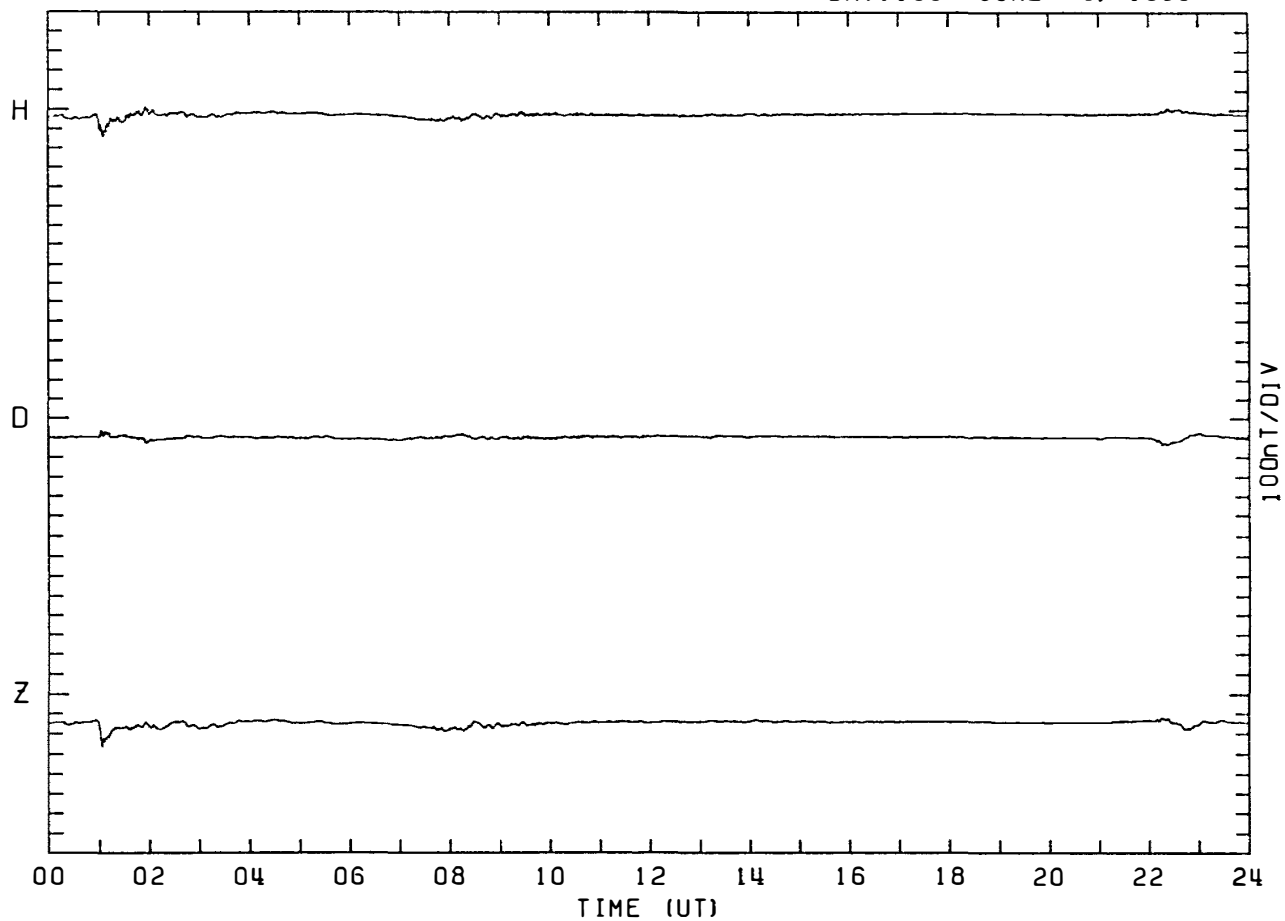
MAGNETOGRAM SYOWA STATION

DAY: 154 JUNE 3, 1983



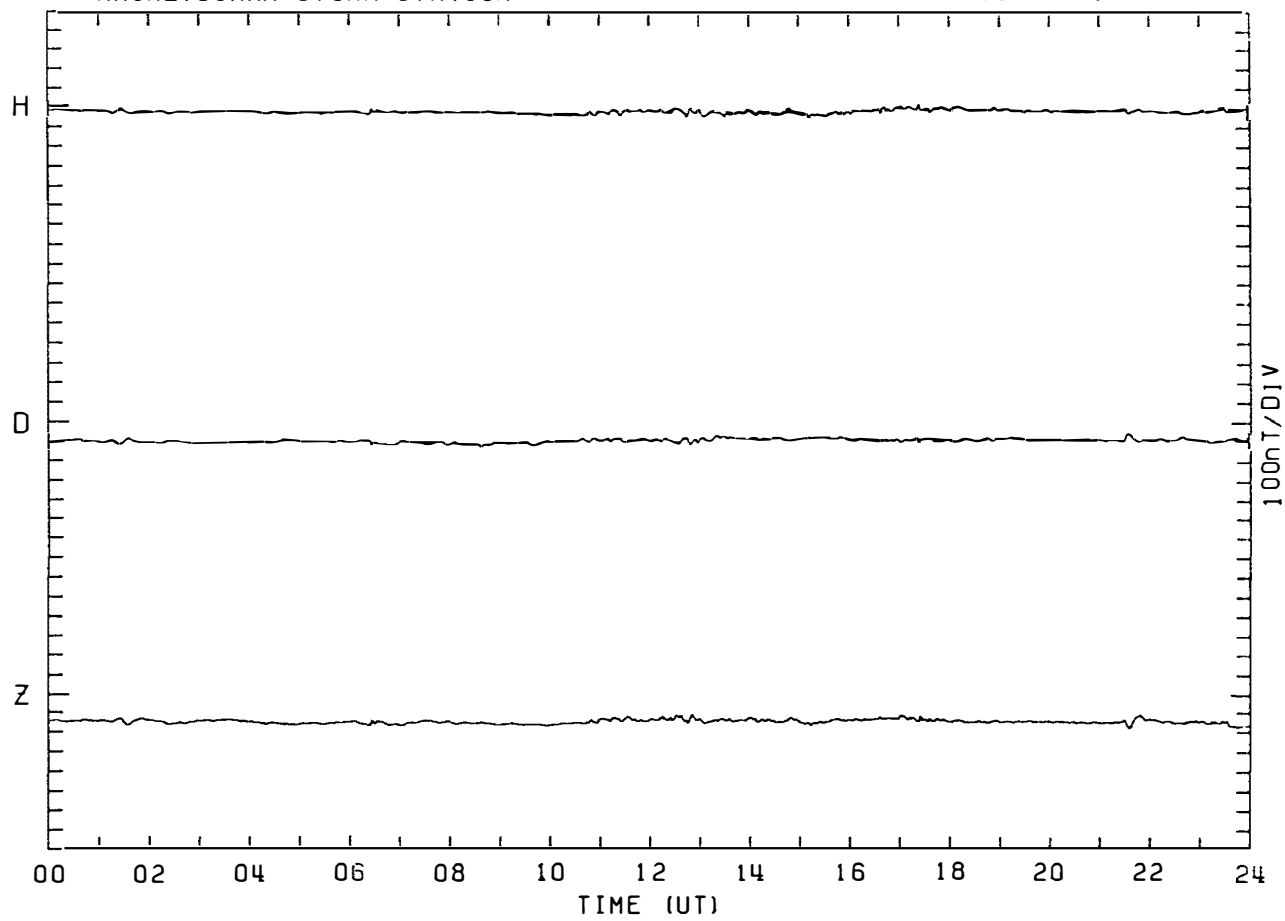
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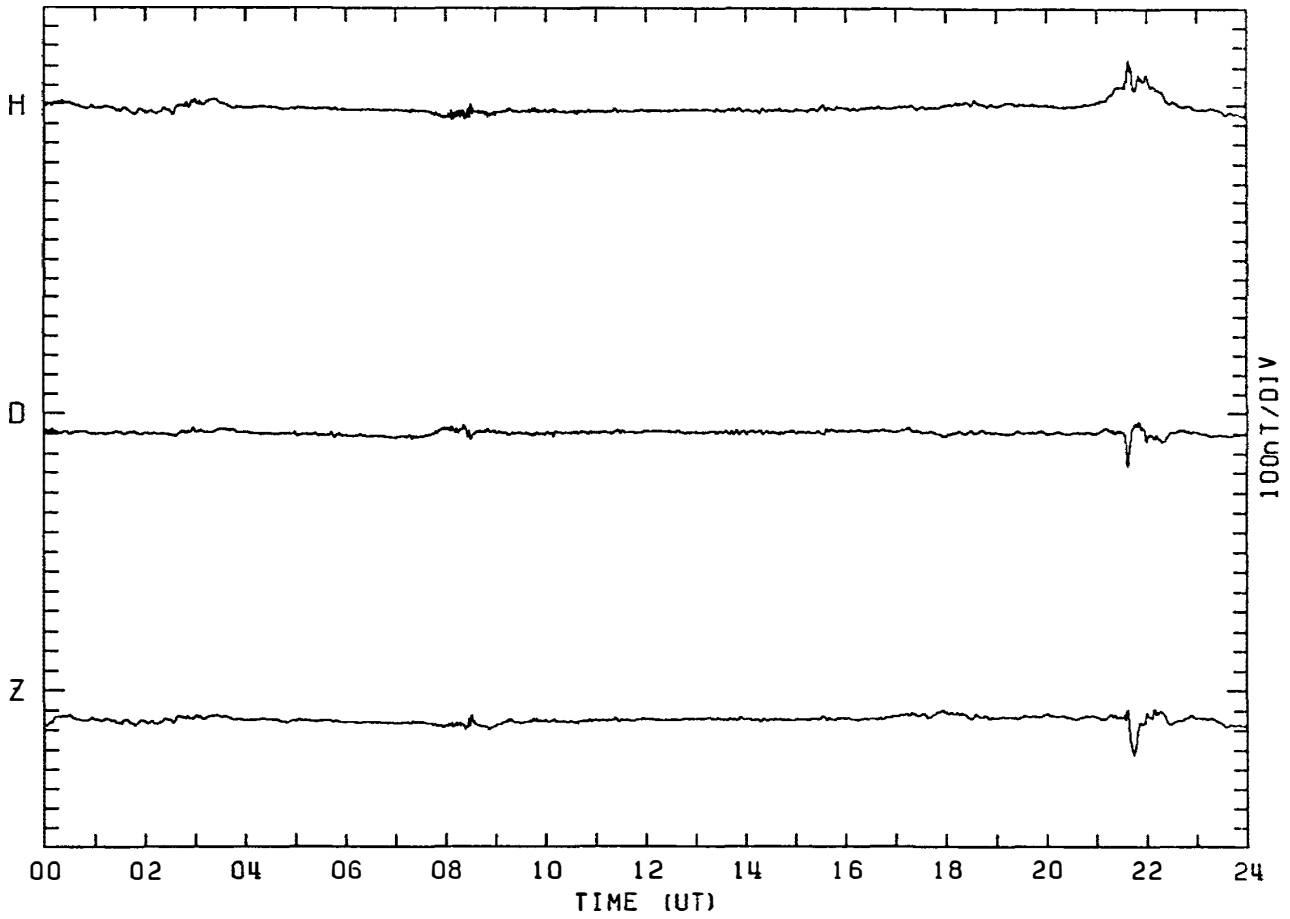
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DAY:156 JUNE 5, 1983



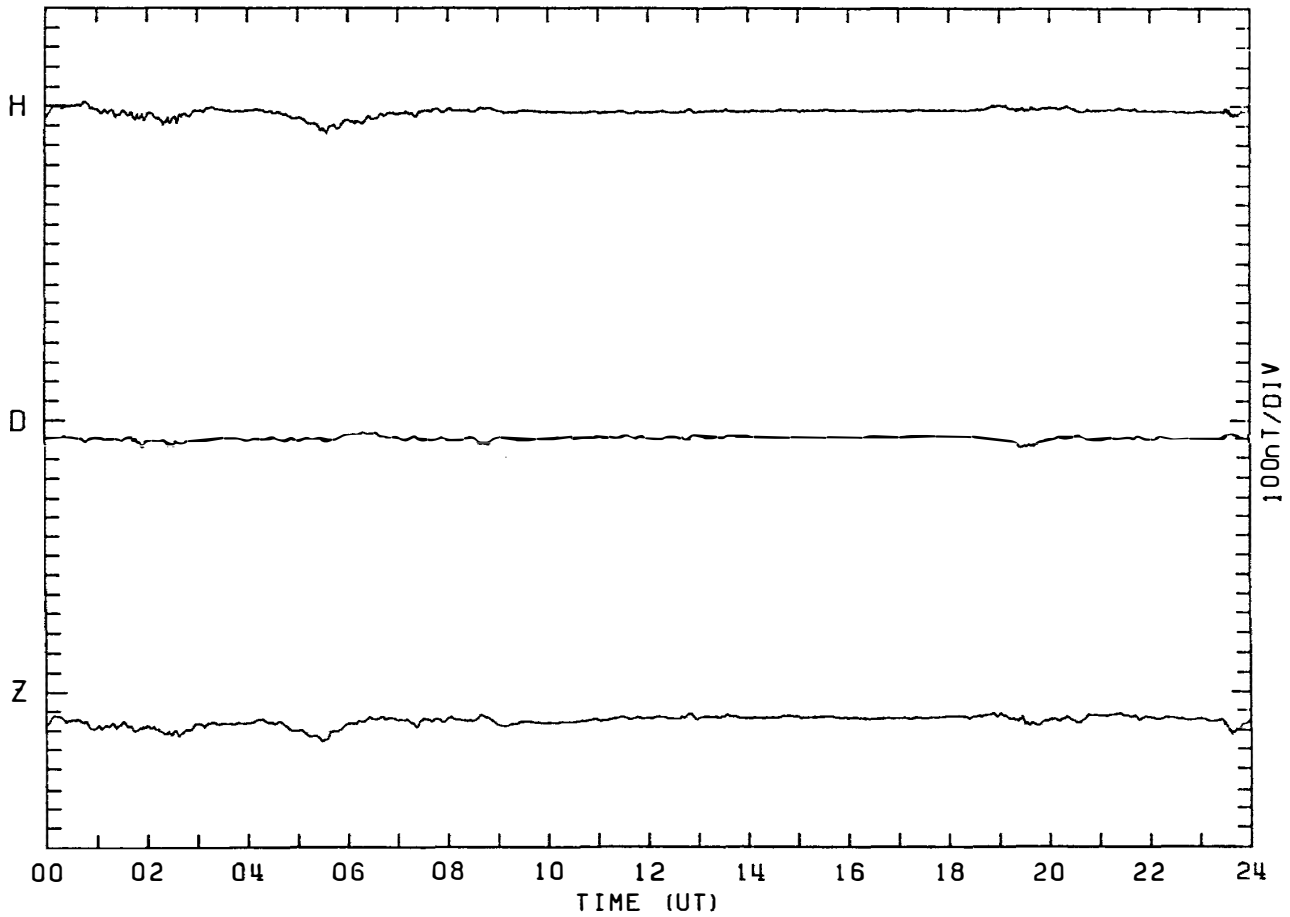
MAGNETOGRAM SYOWA STATION

DAY:157 JUNE 6. 1983



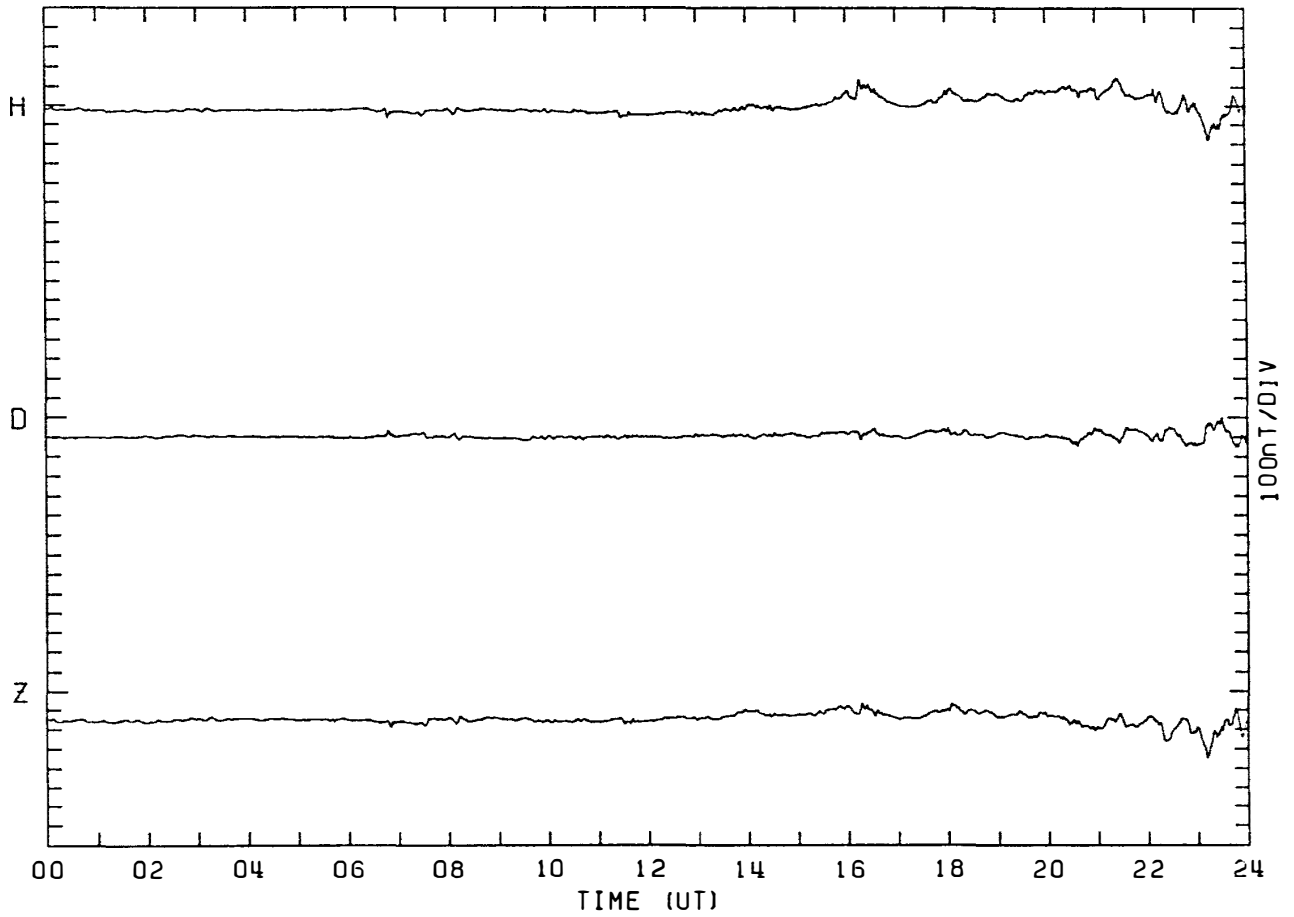
MAGNETOGRAM SYOWA STATION

DAY:158 JUNE 7. 1983



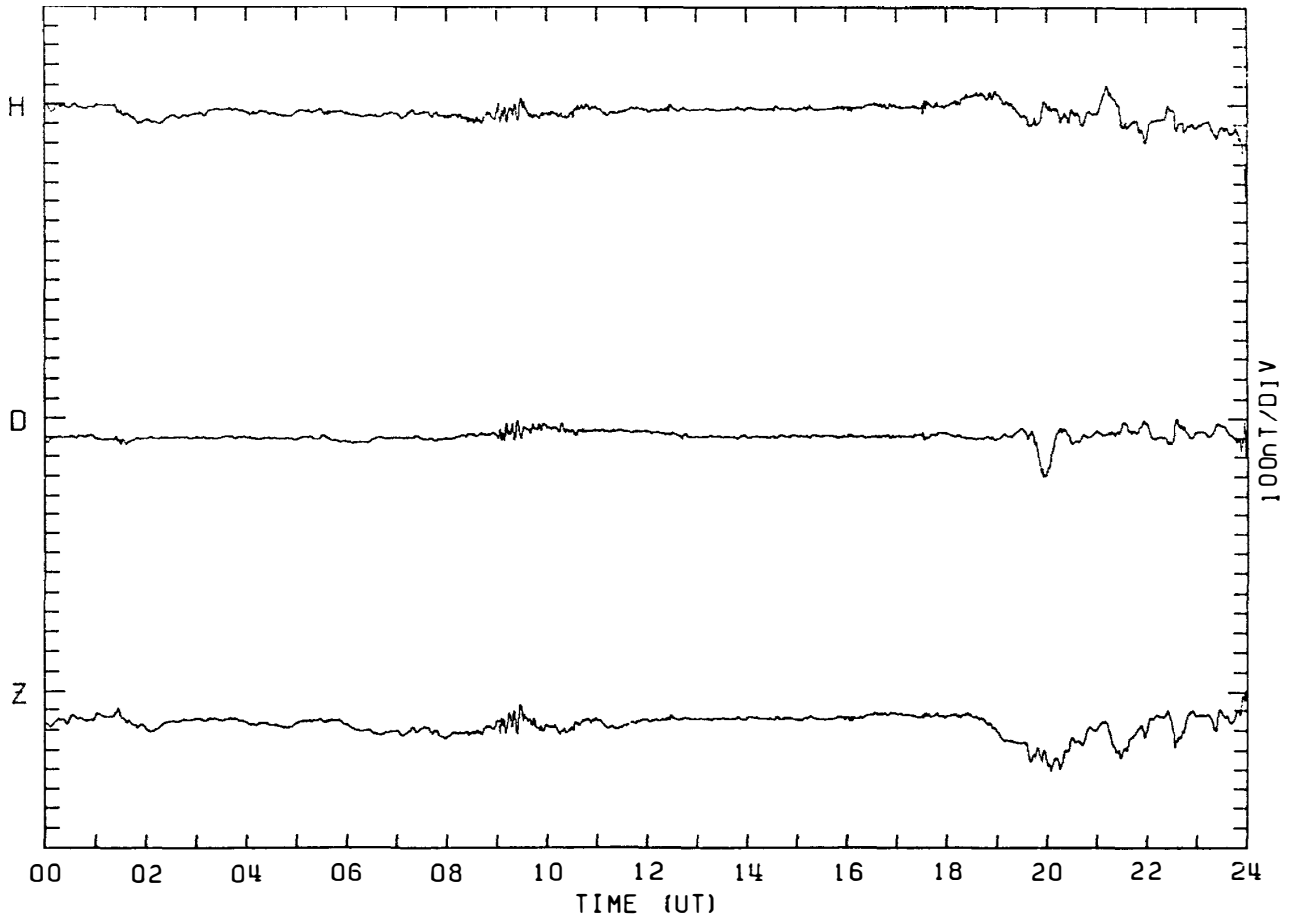
MAGNETOGRAM SYOWA STATION

DAY:159 JUNE 8. 1983



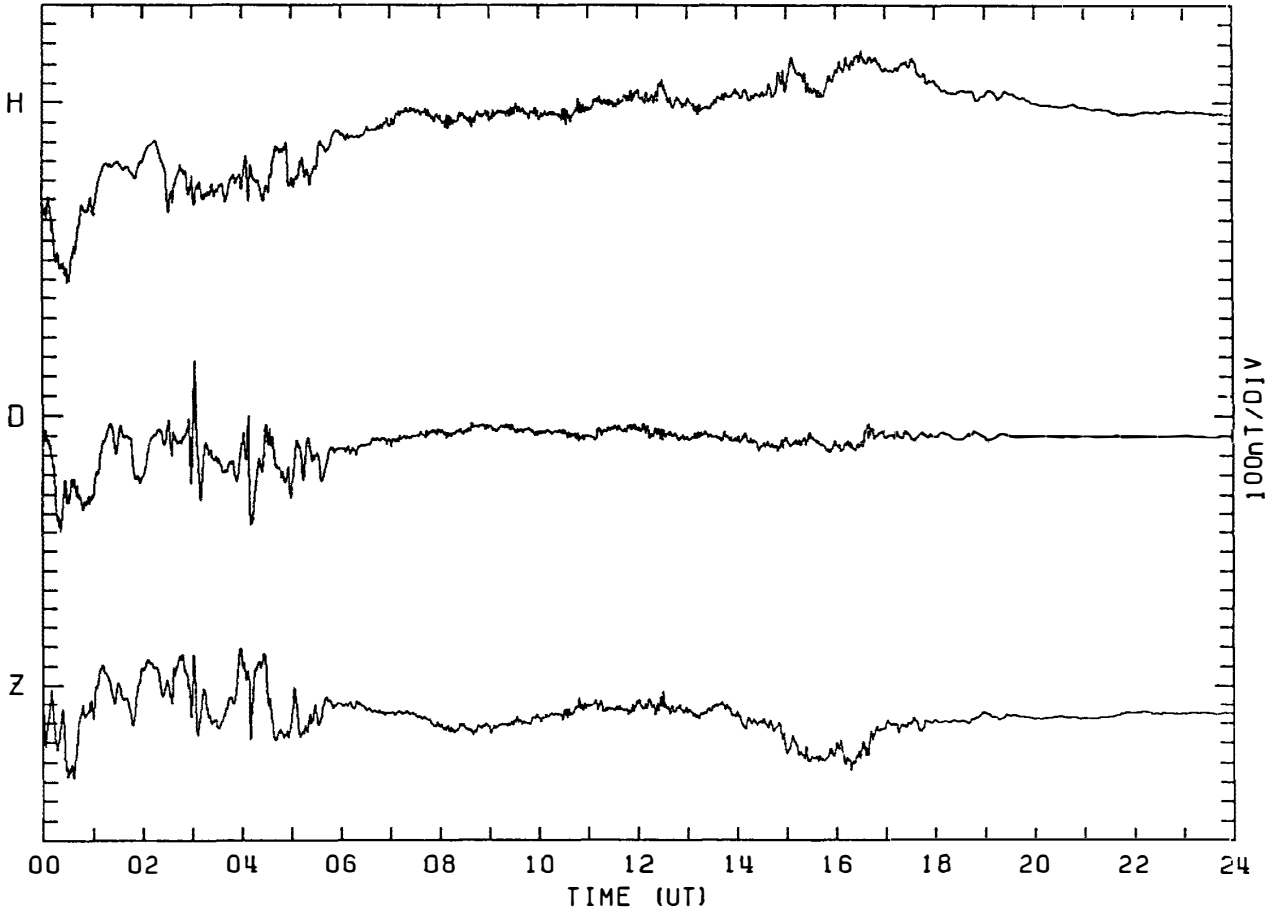
MAGNETOGRAM SYOWA STATION

DAY:160 JUNE 9. 1983



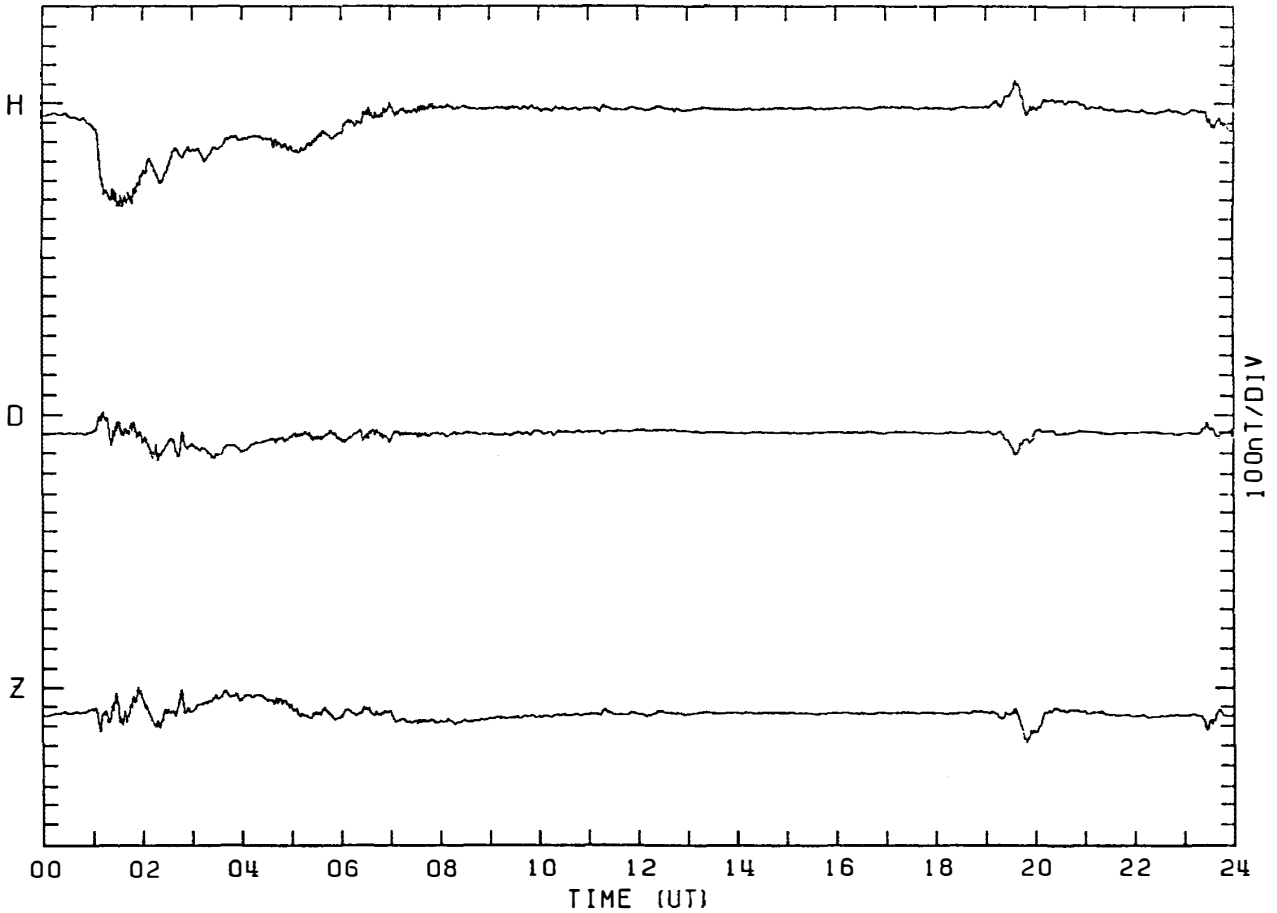
MAGNETOGRAM SYOWA STATION

DAY:161 JUNE 10. 1983



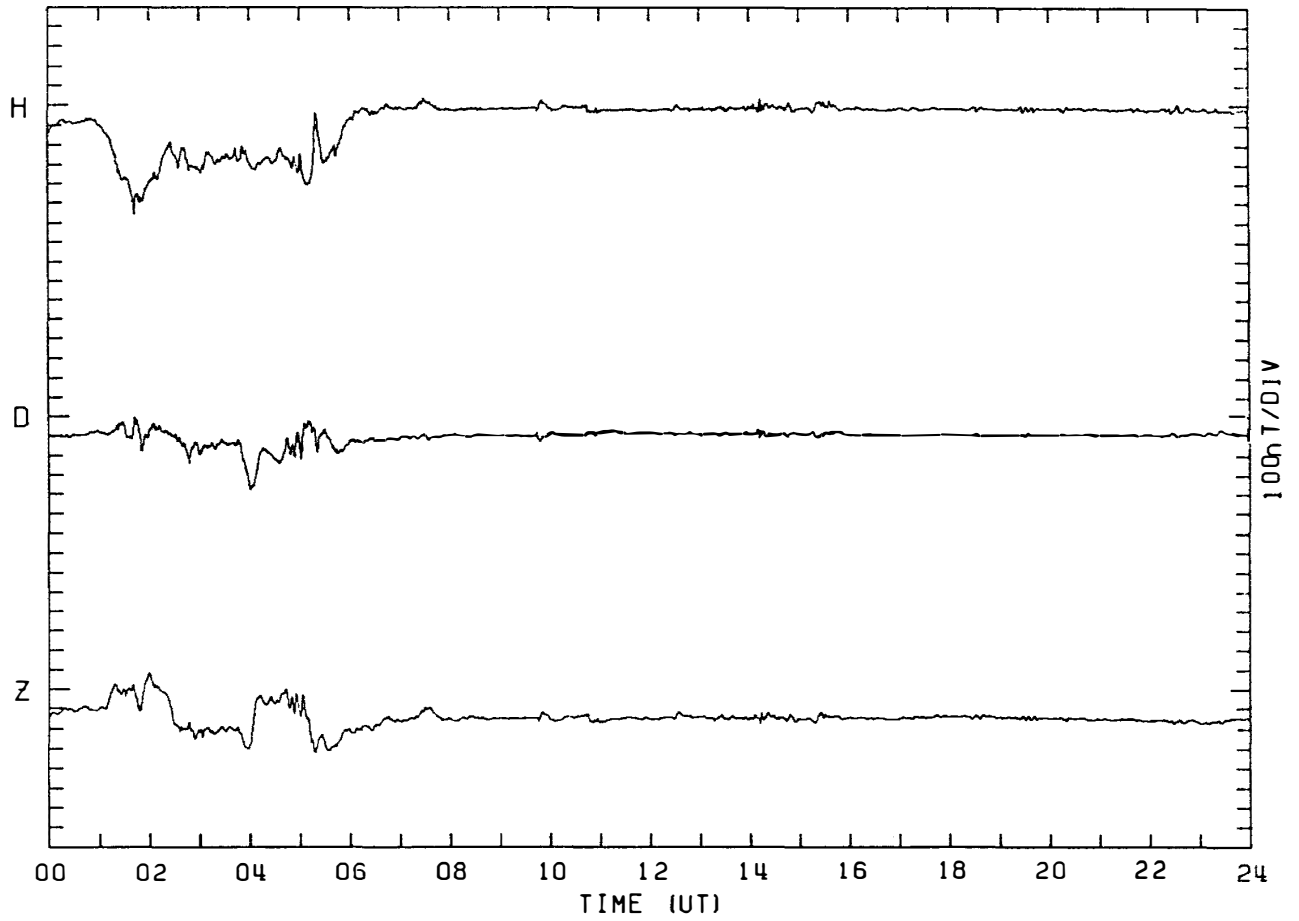
MAGNETOGRAM SYOWA STATION

DAY:162 JUNE 11. 1983



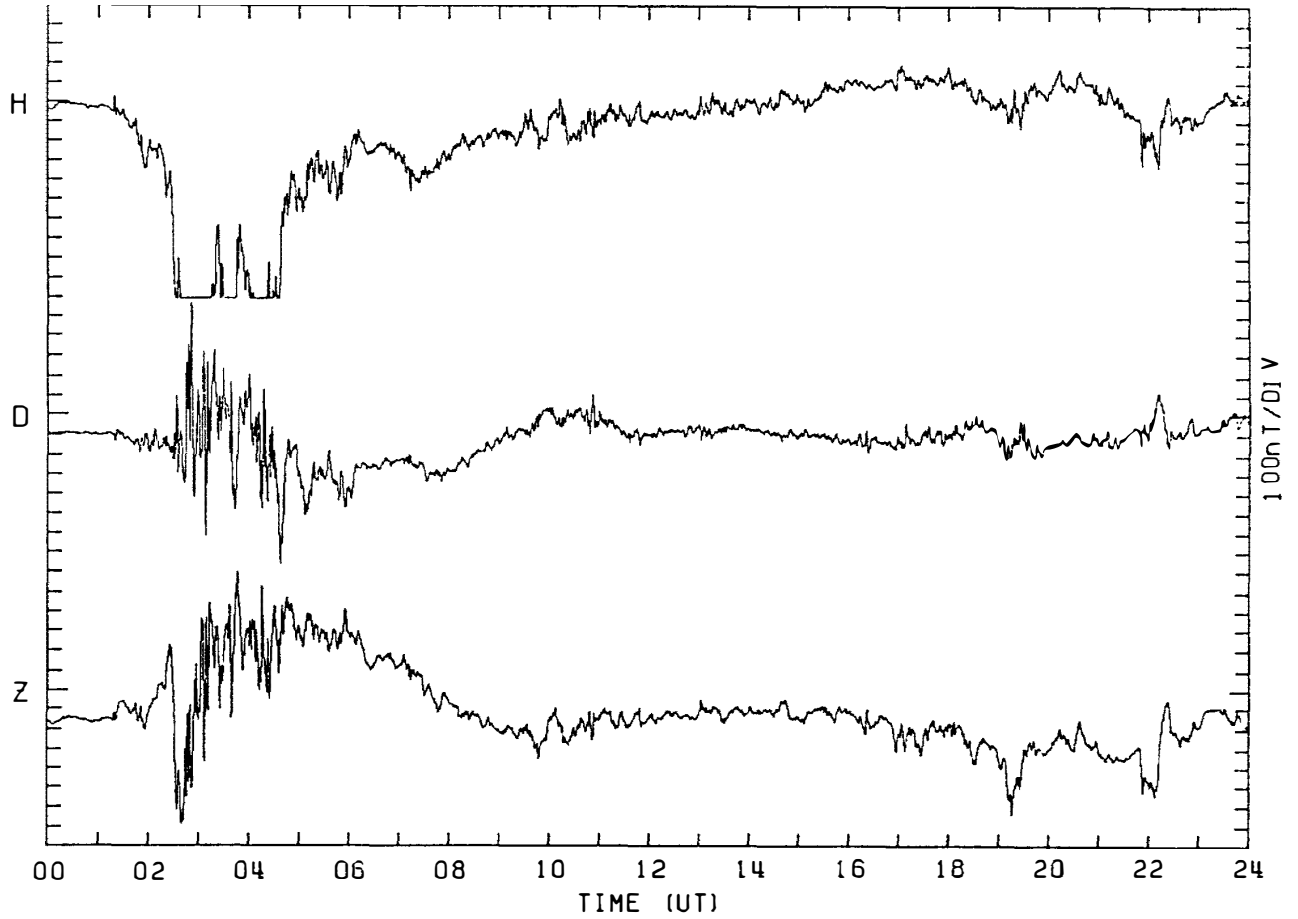
MAGNETOGRAM SYOWA STATION

DAY:163 JUNE 12. 1983



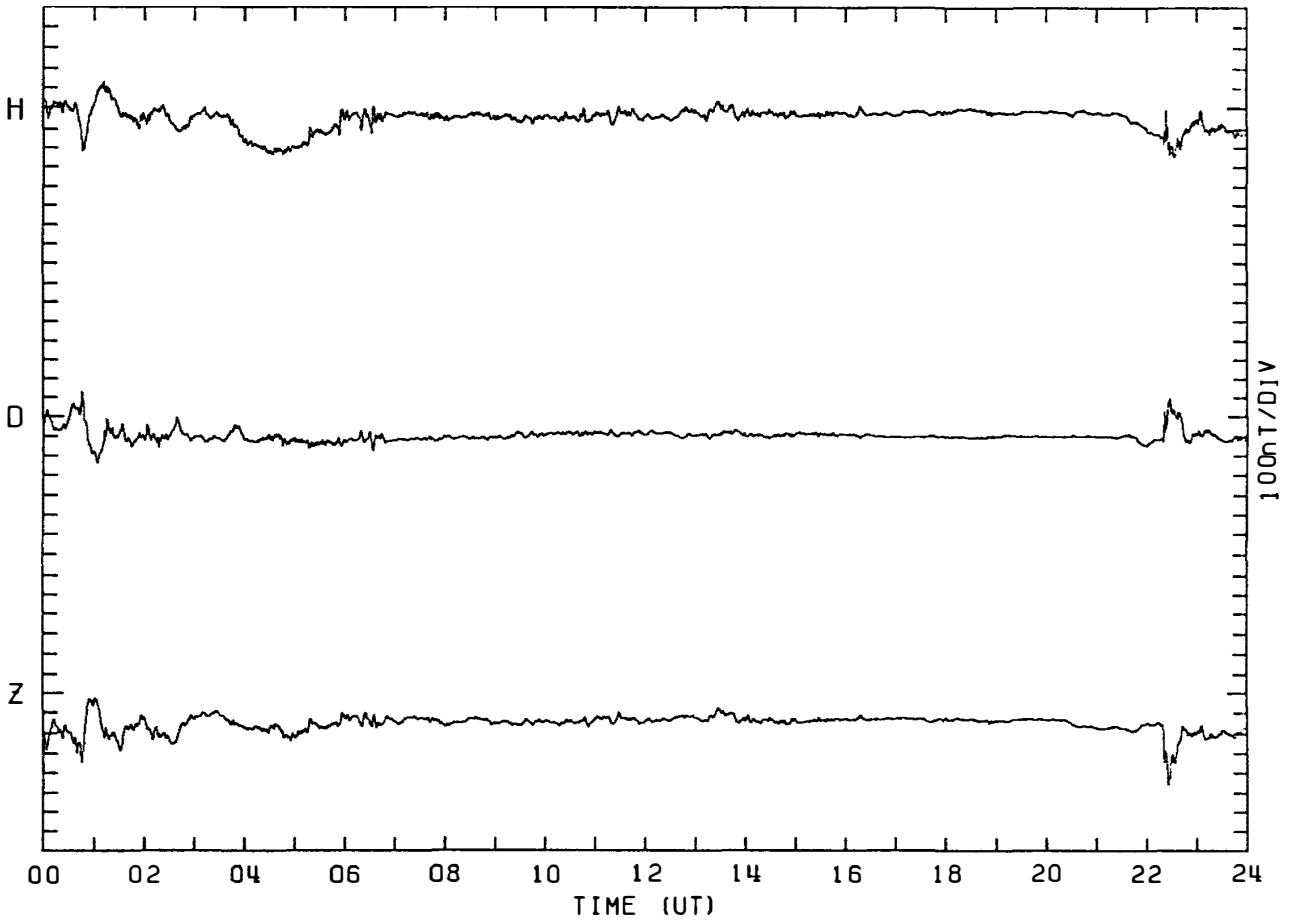
MAGNETOGRAM SYOWA STATION

DAY:164 JUNE 13. 1983



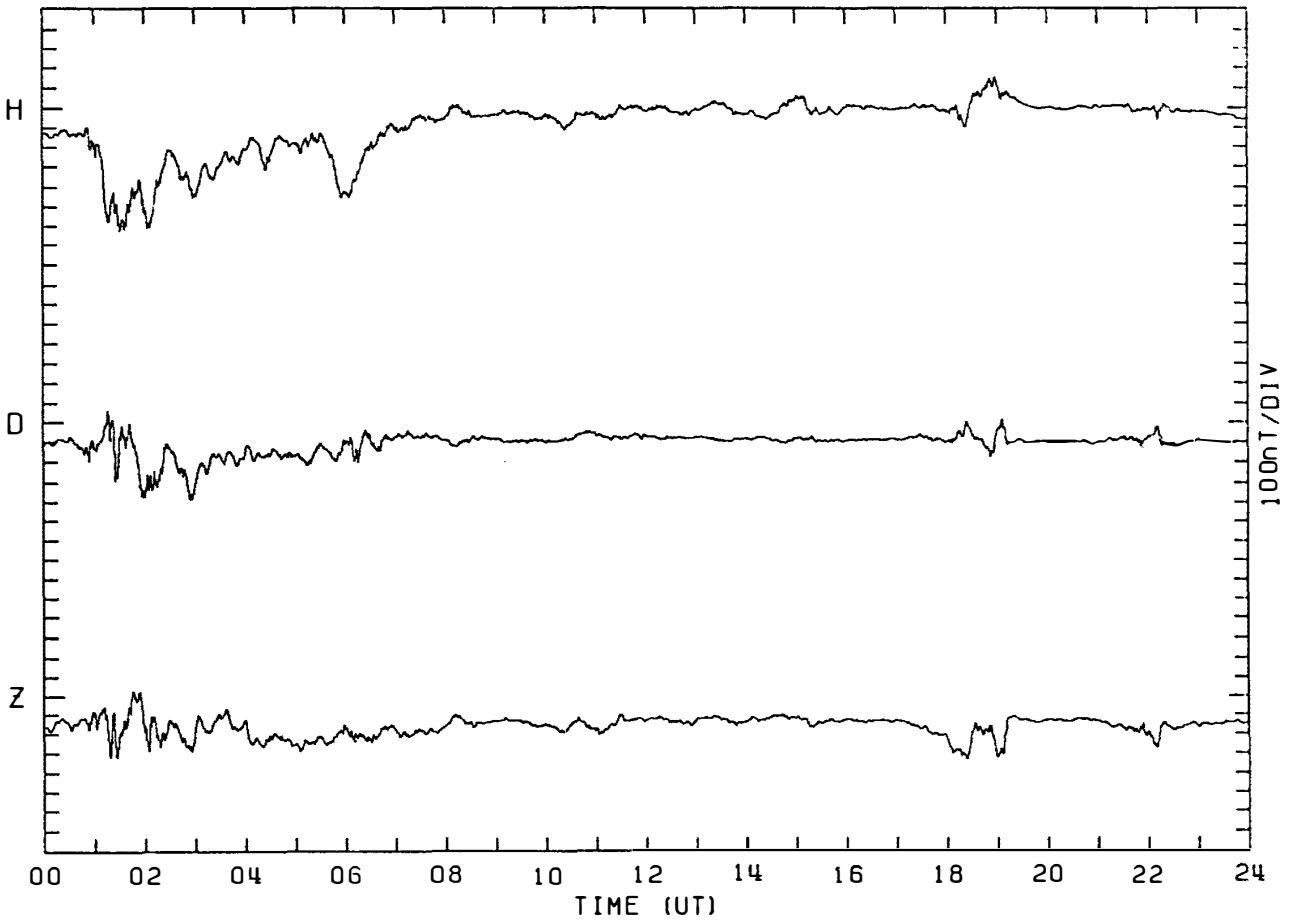
MAGNETOGRAM SYOWA STATION

DAY:165 JUNE 14. 1983



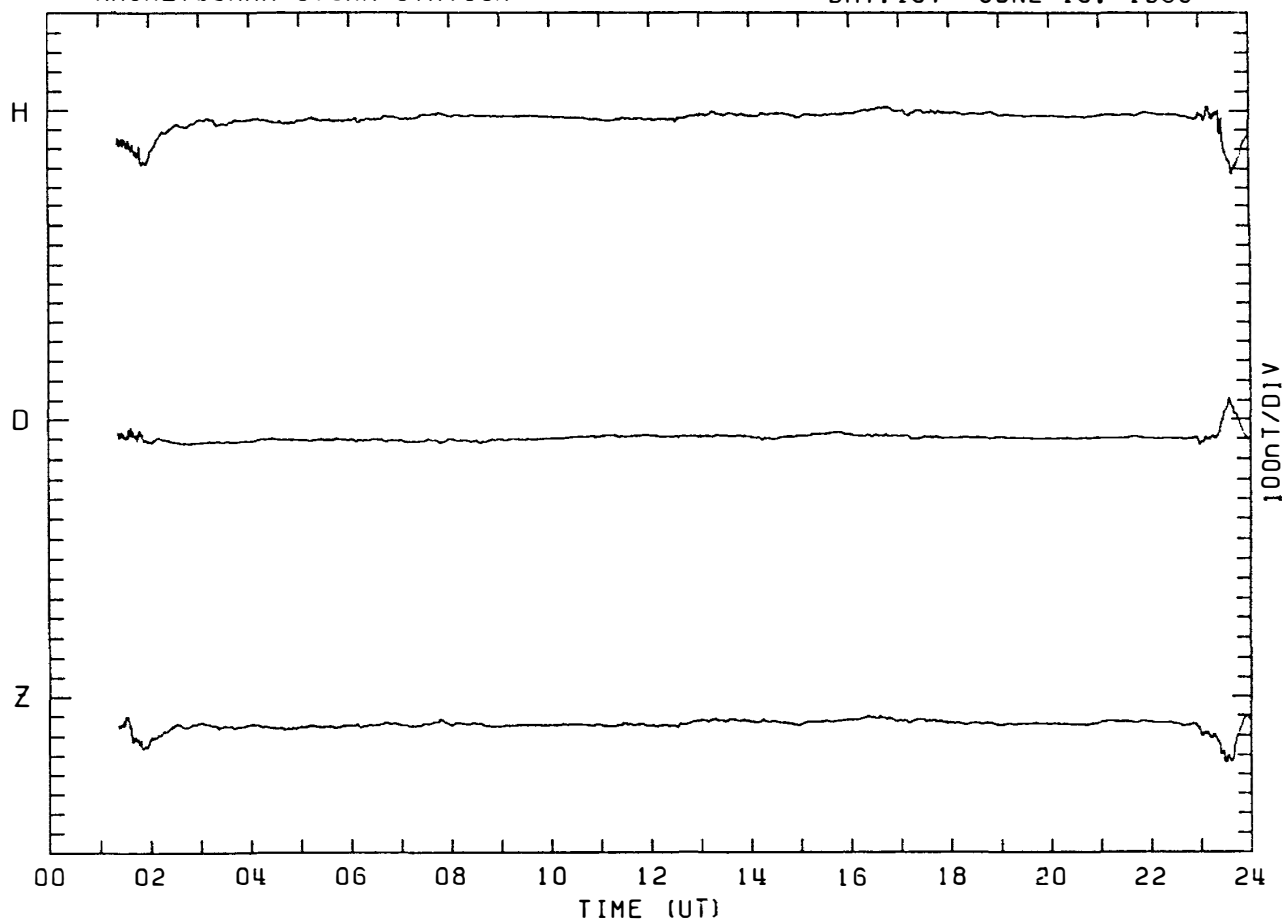
MAGNETOGRAM SYOWA STATION

DAY:166 JUNE 15. 1983



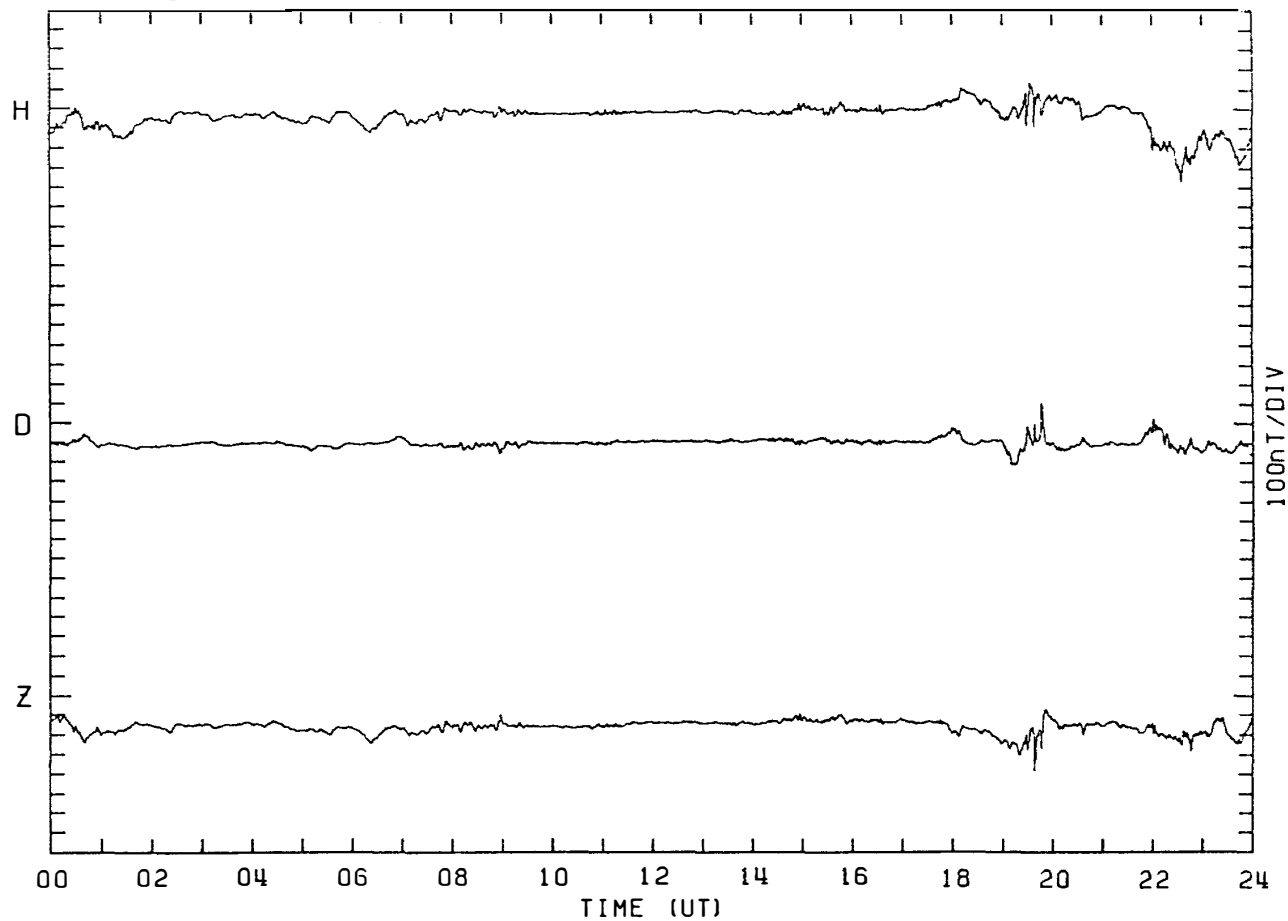
MAGNETOGRAM SYOWA STATION

DAY:167 JUNE 16. 1983



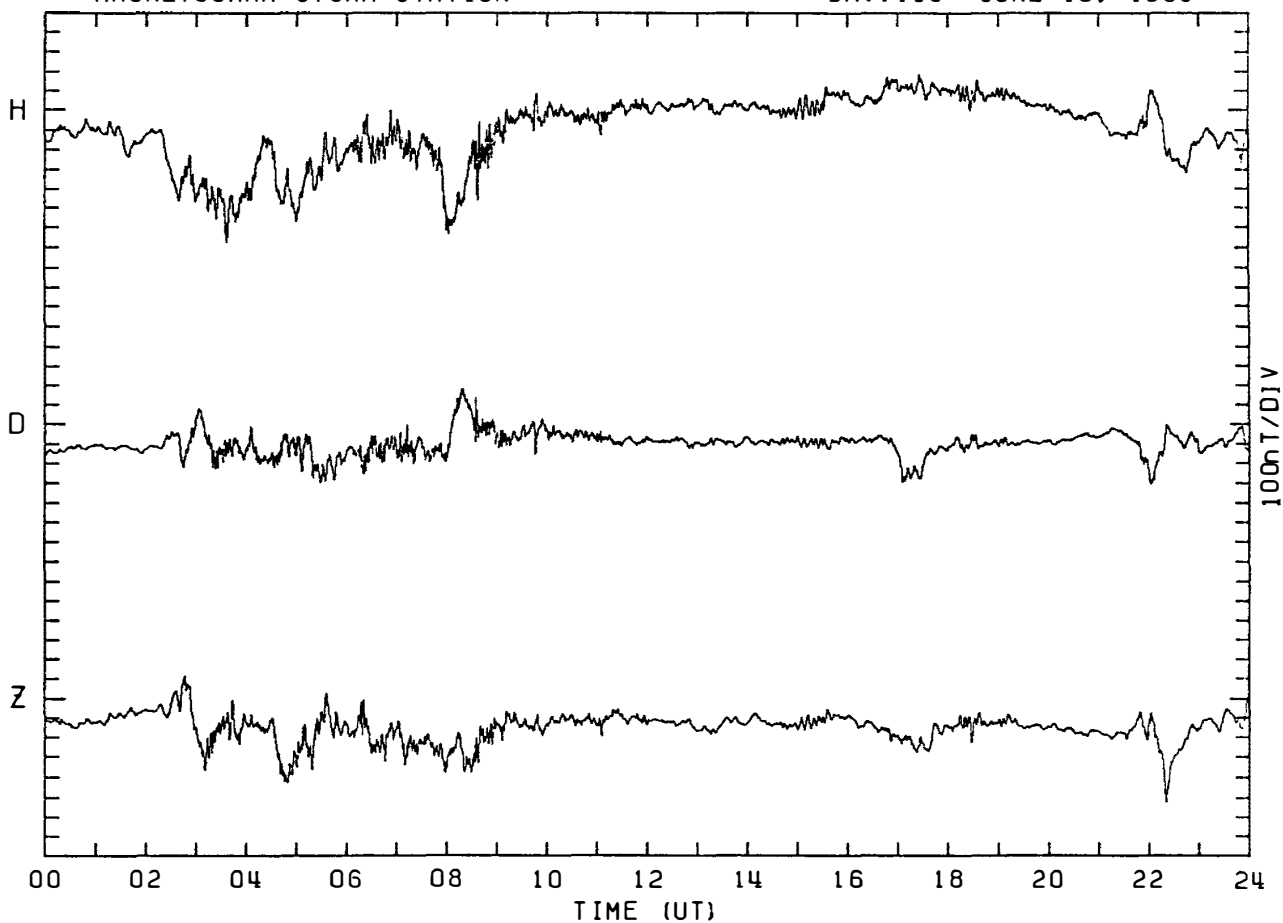
MAGNETOGRAM SYOWA STATION

DAY:168 JUNE 17. 1983



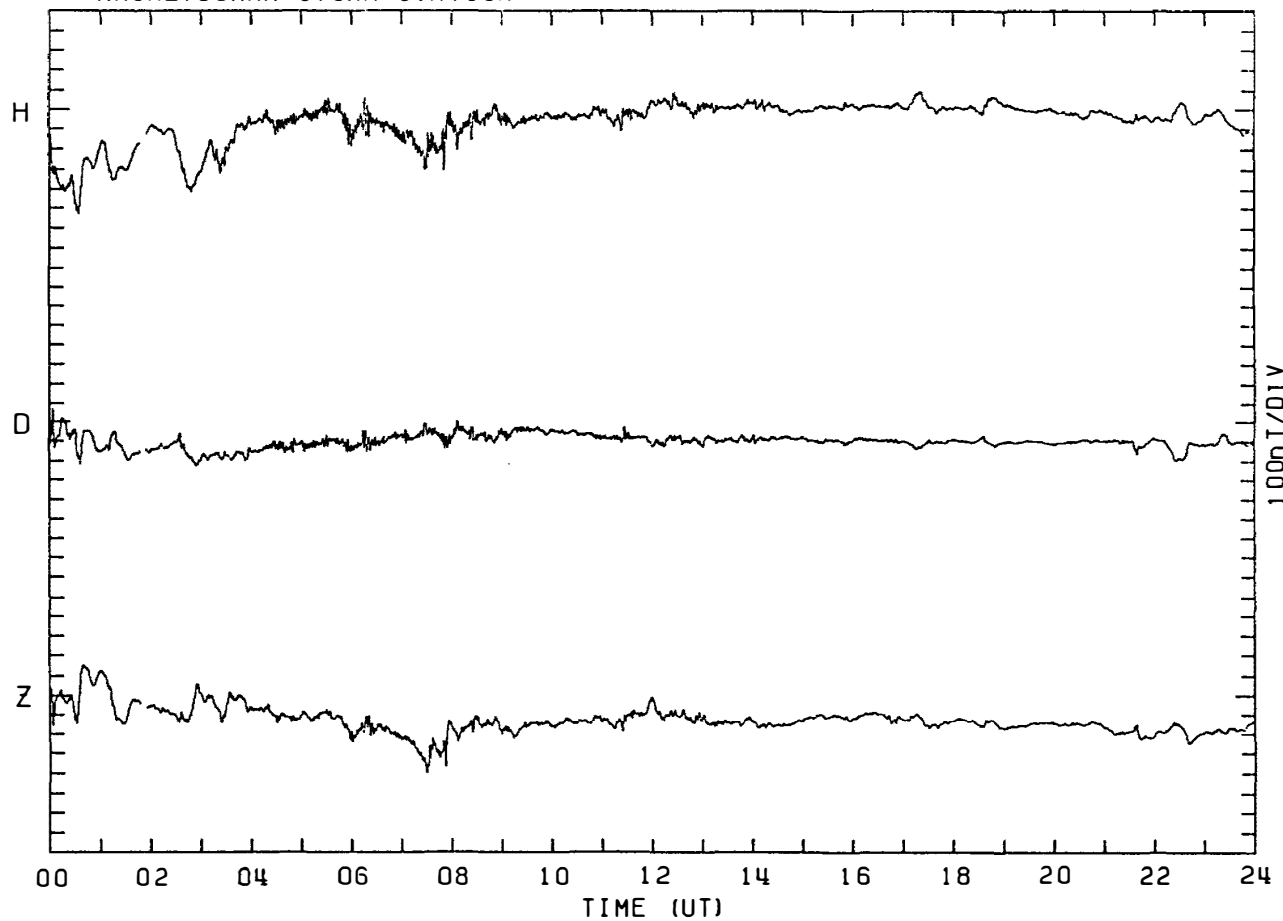
MAGNETOGRAM SYOWA STATION

DAY:169 JUNE 18, 1983



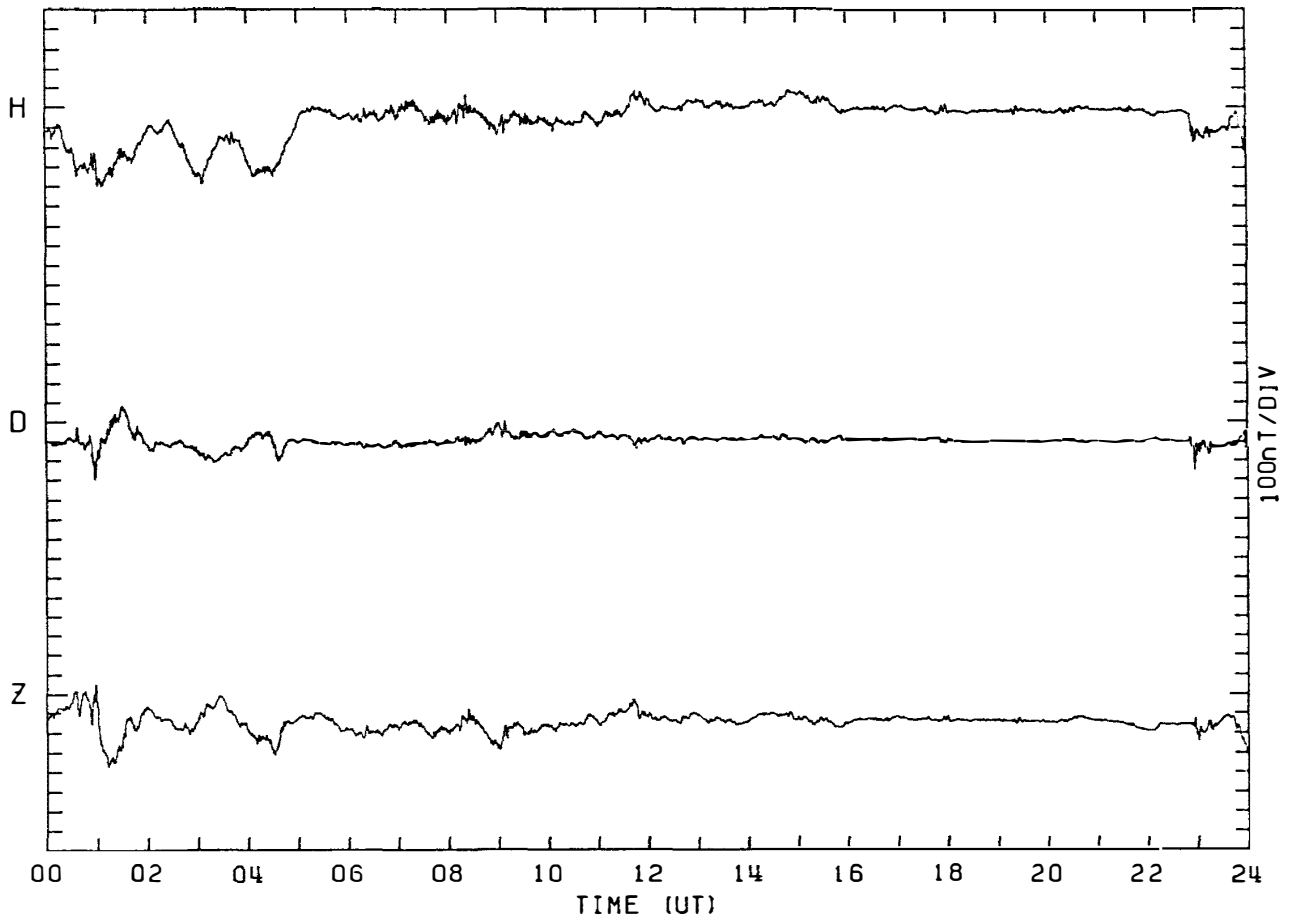
MAGNETOGRAM SYOWA STATION

DAY:170 JUNE 19, 1983



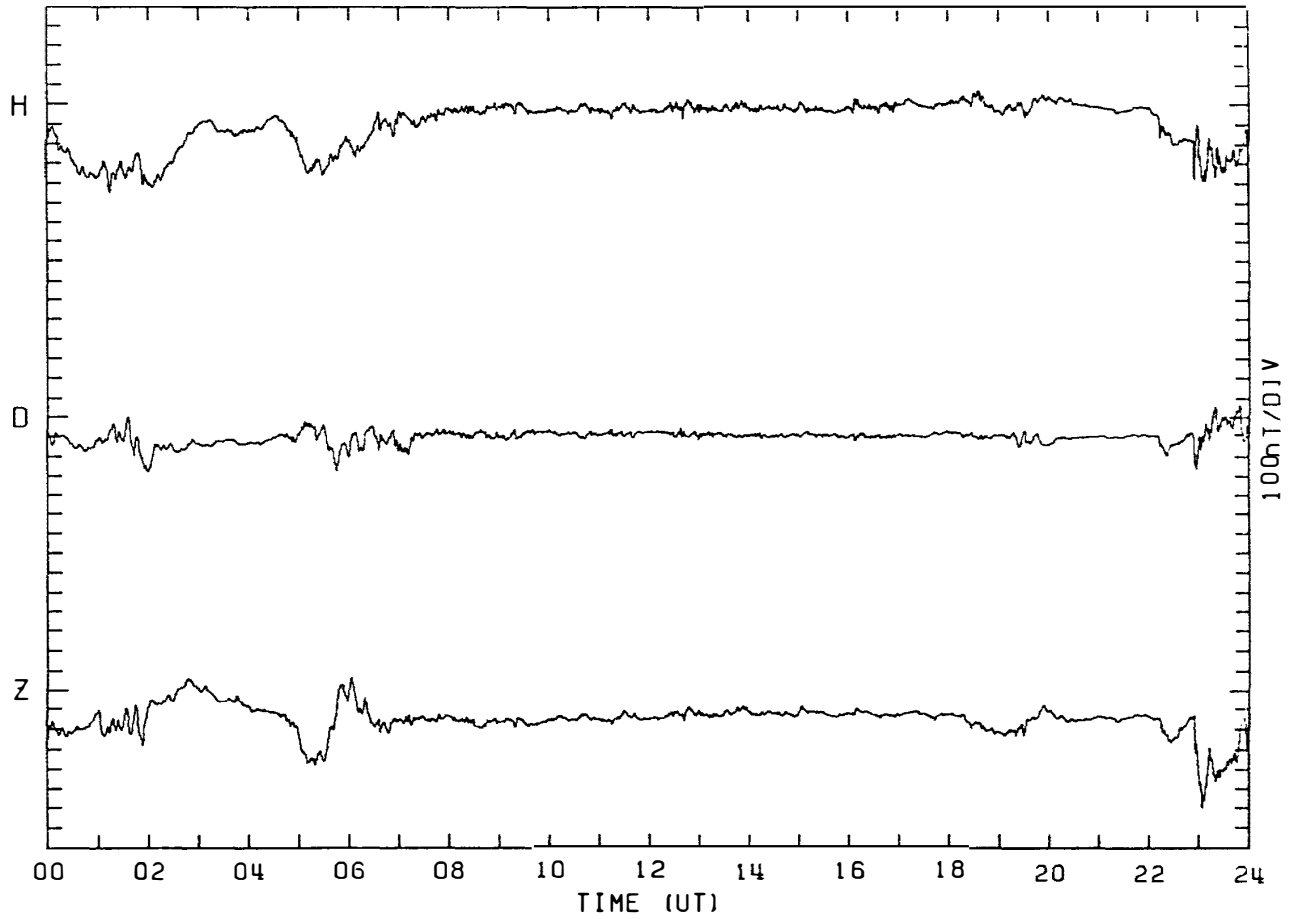
MAGNETOGRAM SYOWA STATION

DAY:171 JUNE 20. 1983



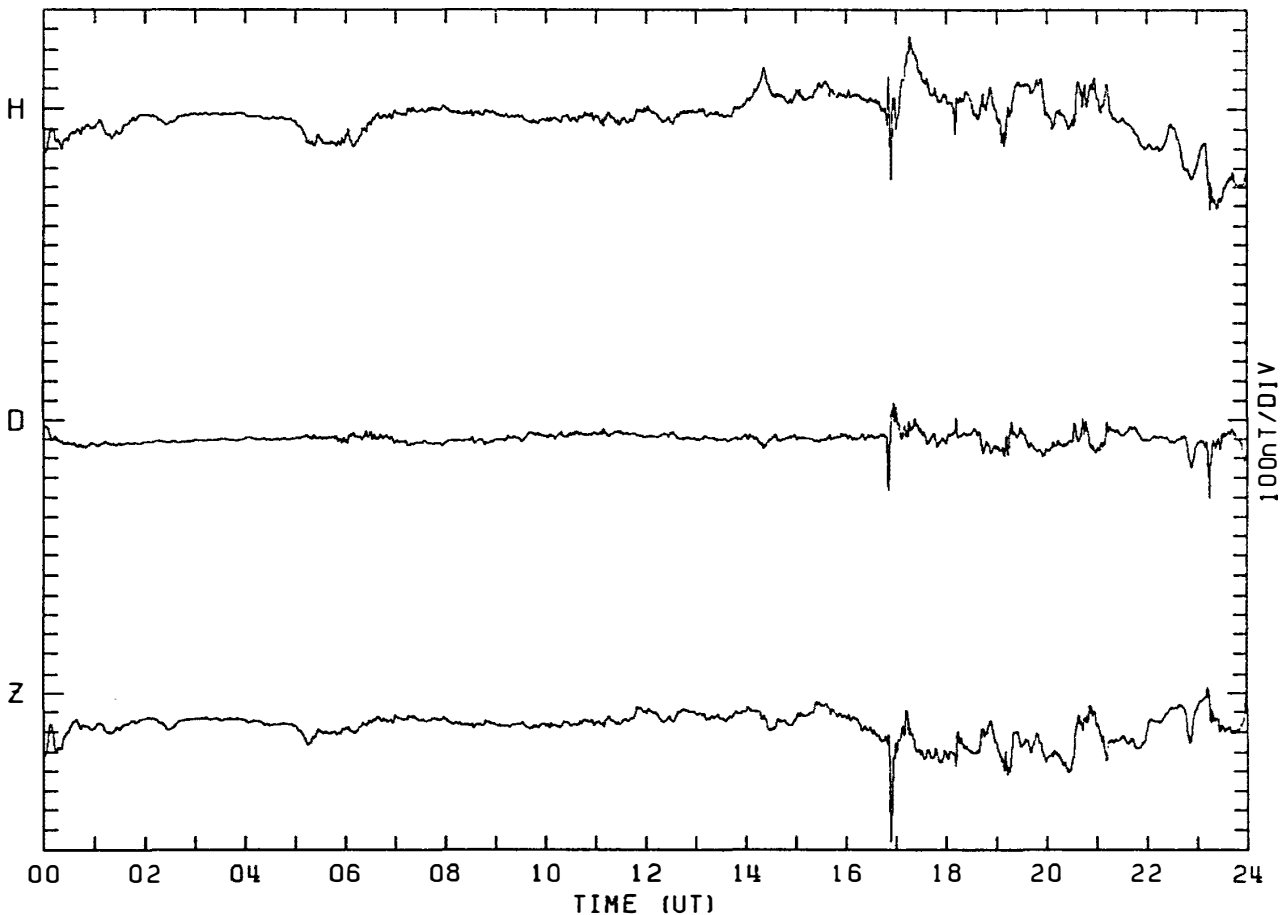
MAGNETOGRAM SYOWA STATION

DAY:172 JUNE 21. 1983



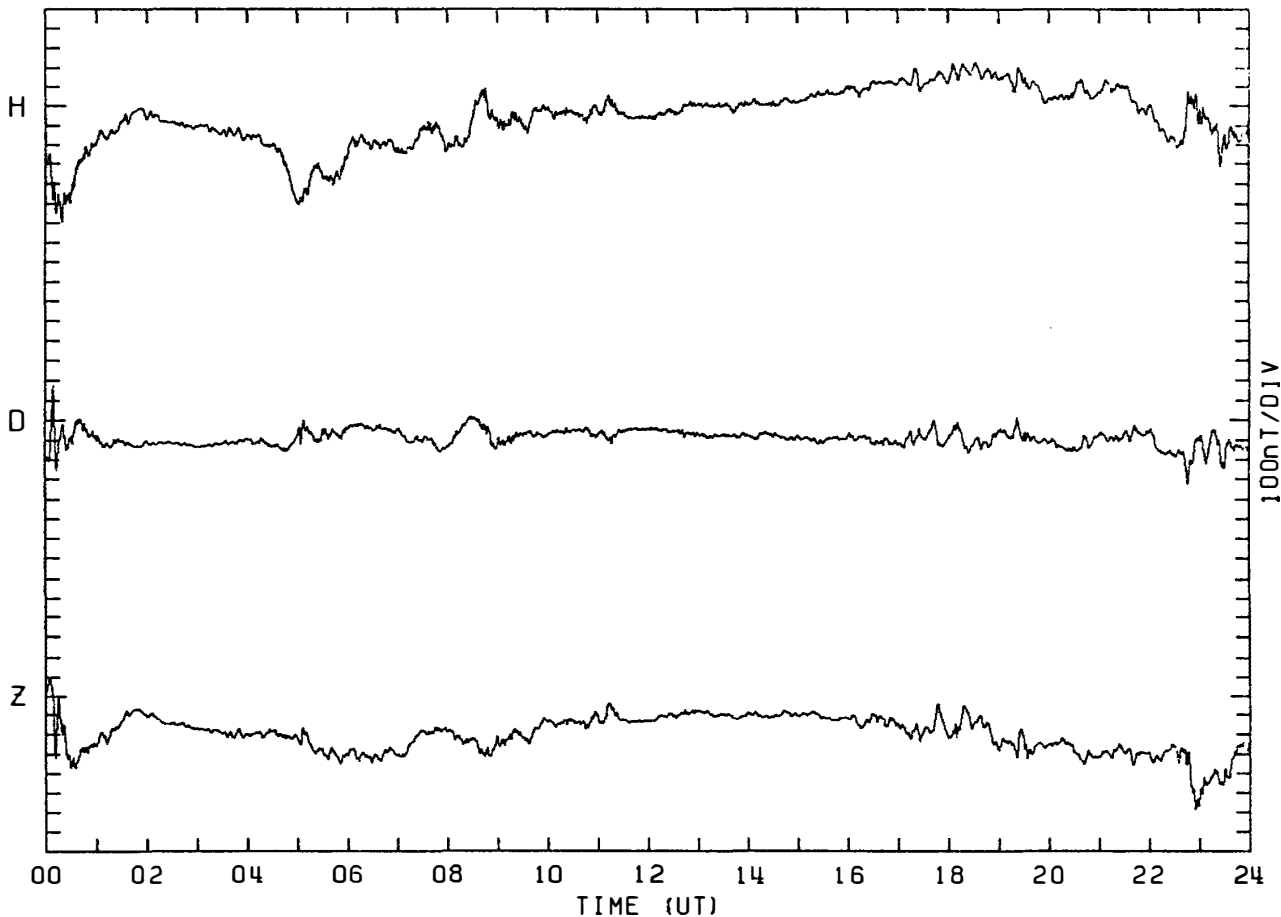
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DAY:173 JUNE 22. 1983



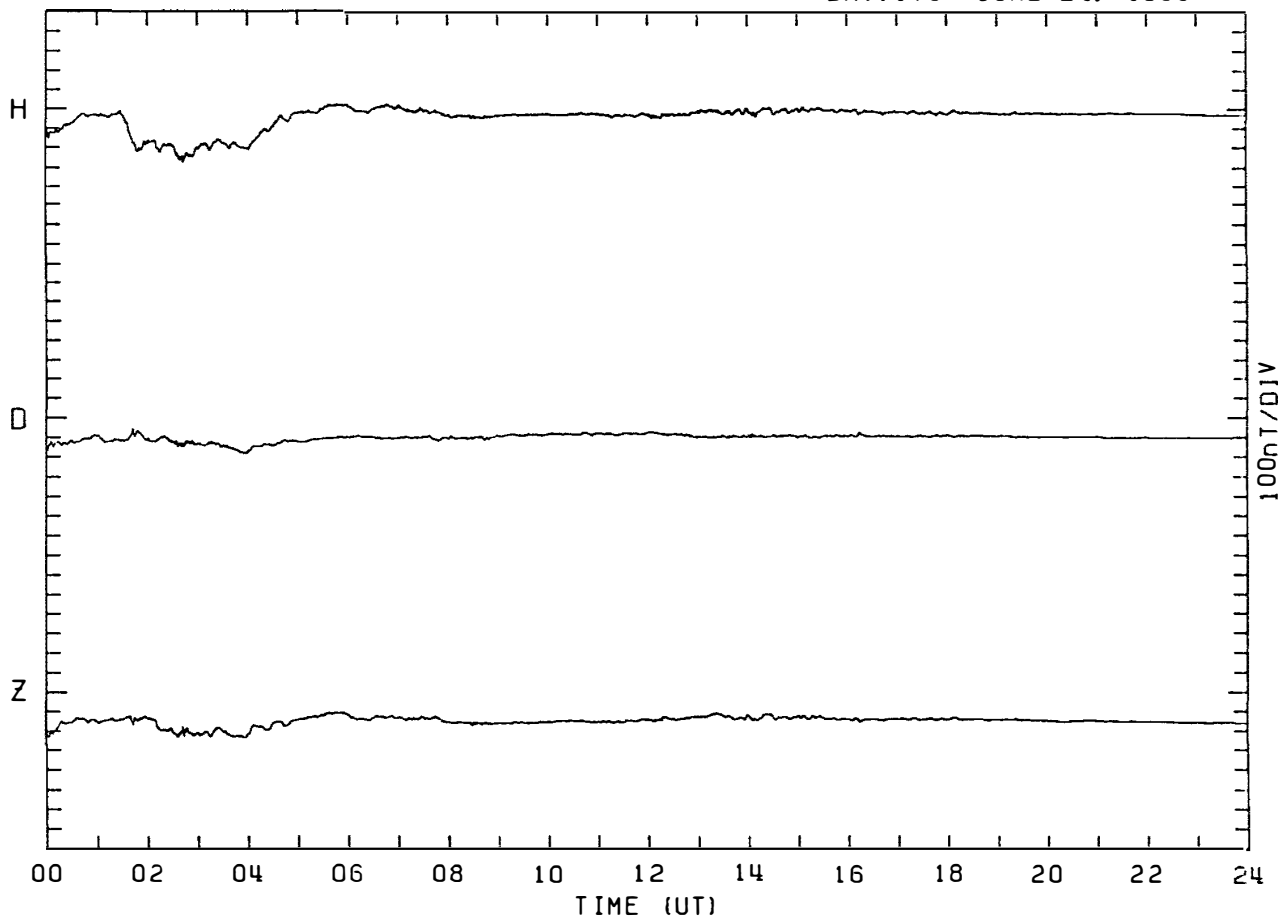
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DAY:174 JUNE 23. 1983



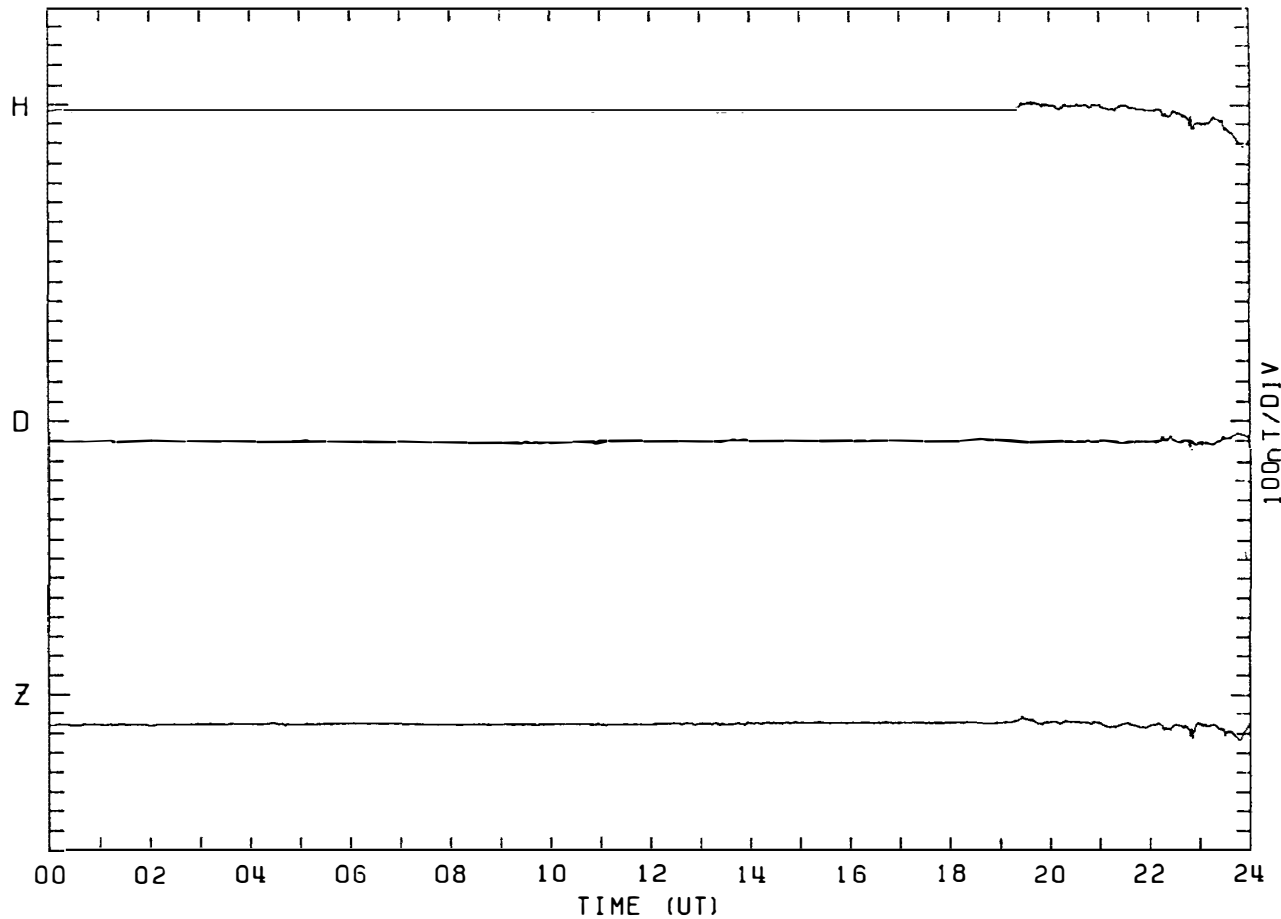
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DAY:175 JUNE 24. 1983



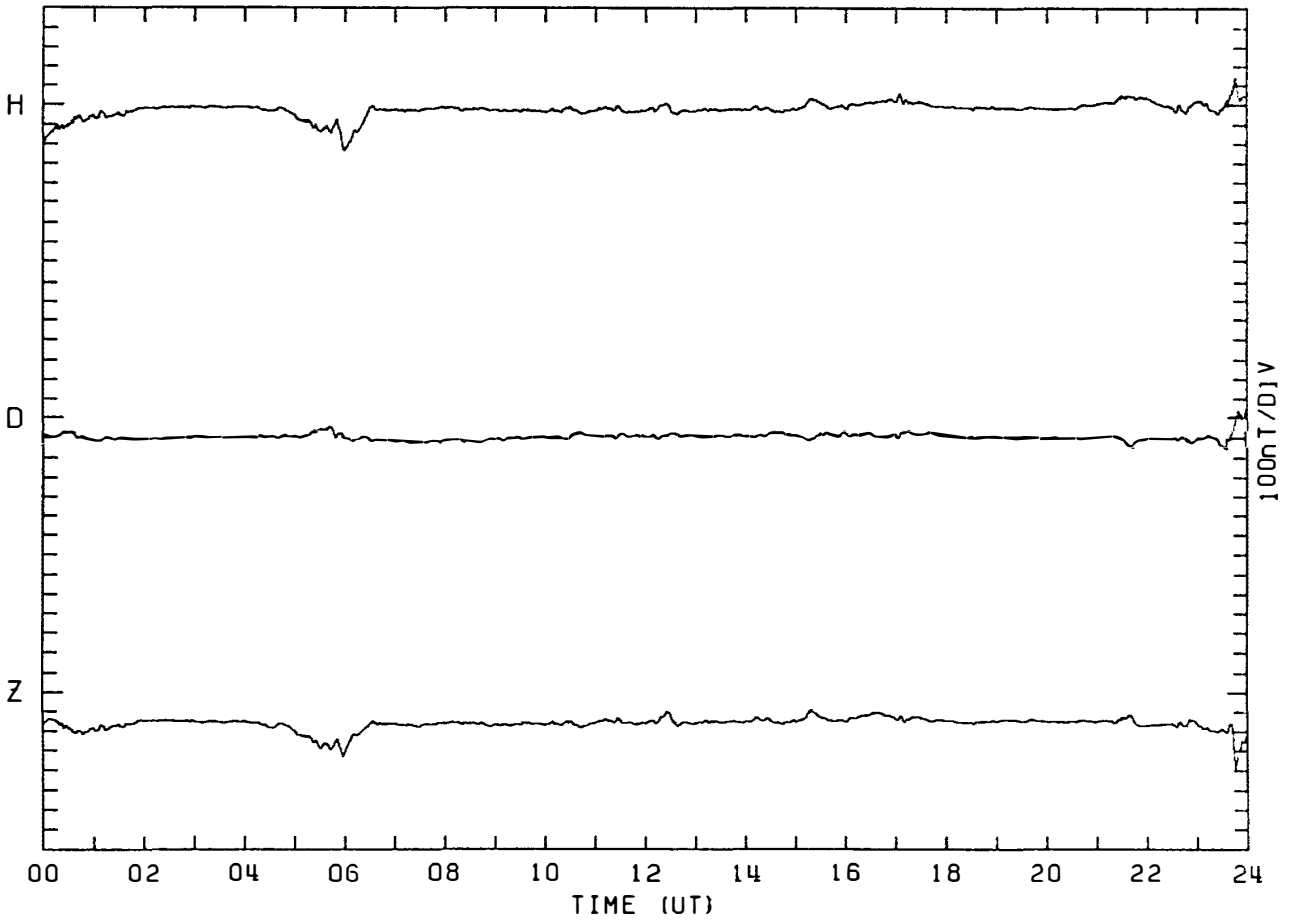
MAGNETOGRAM SYOWA STATION

DAY:176 JUNE 25. 1983



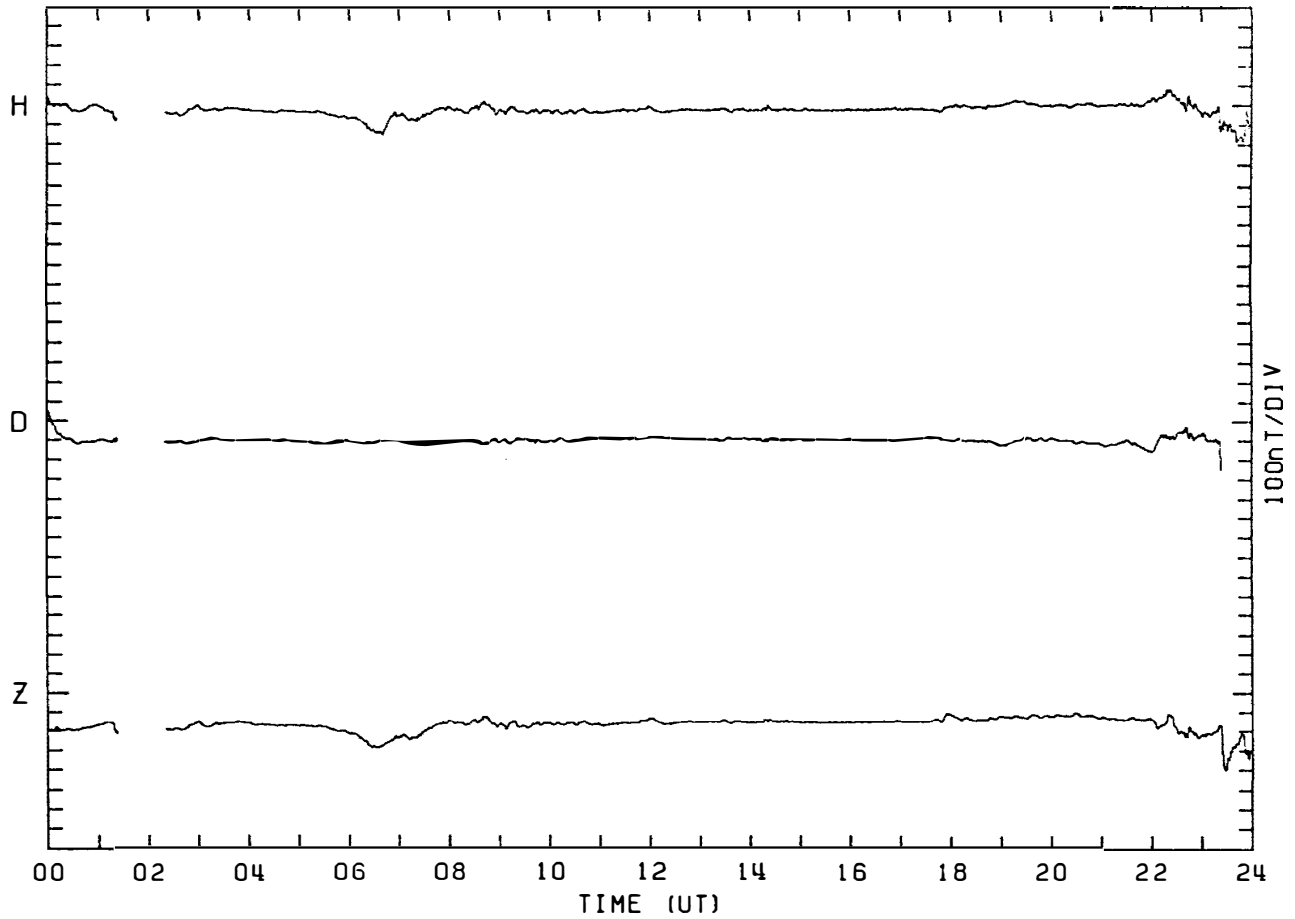
MAGNETOGRAM SYOWA STATION

DAY:177 JUNE 26, 1983



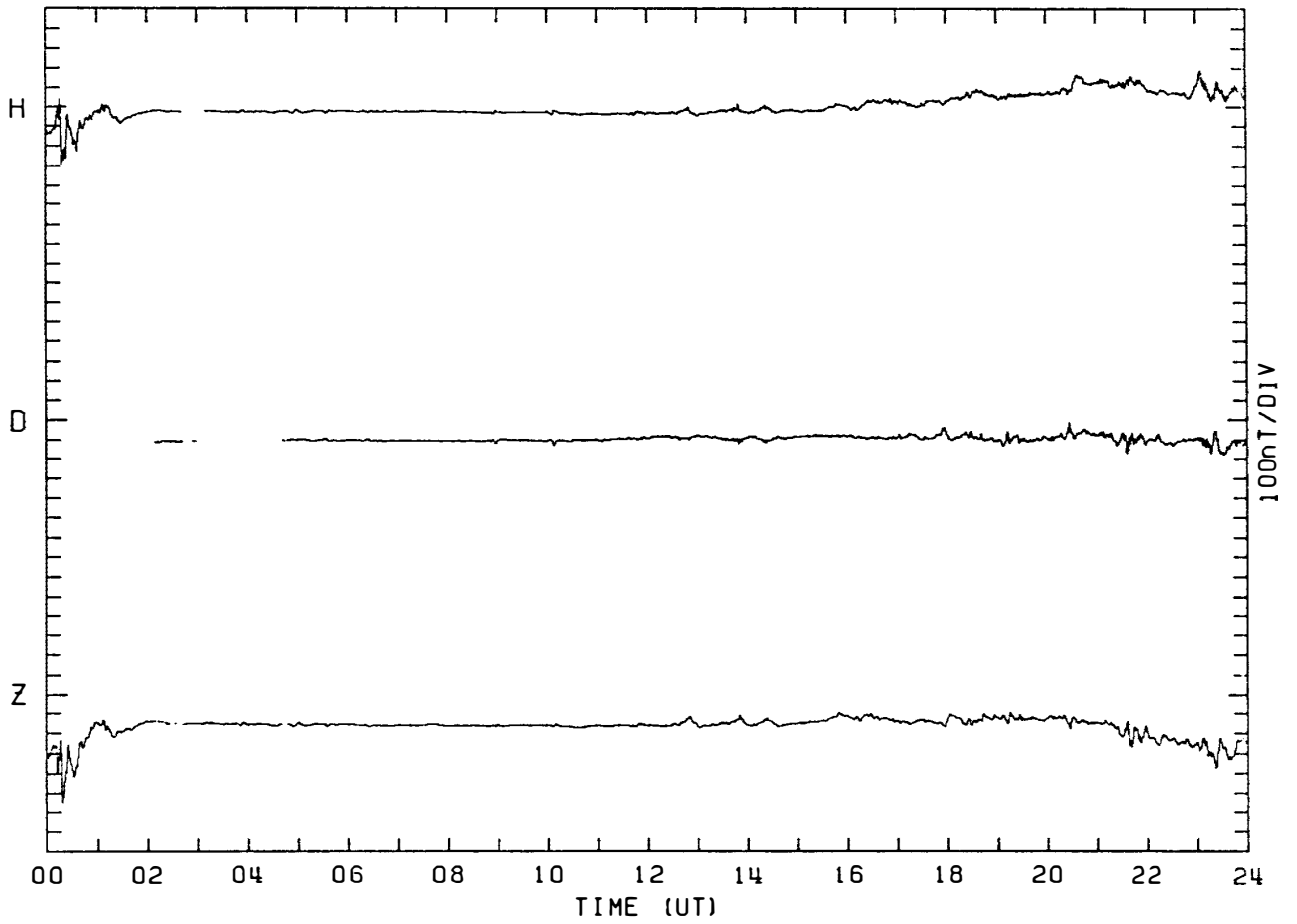
MAGNETOGRAM SYOWA STATION

DAY:178 JUNE 27, 1983



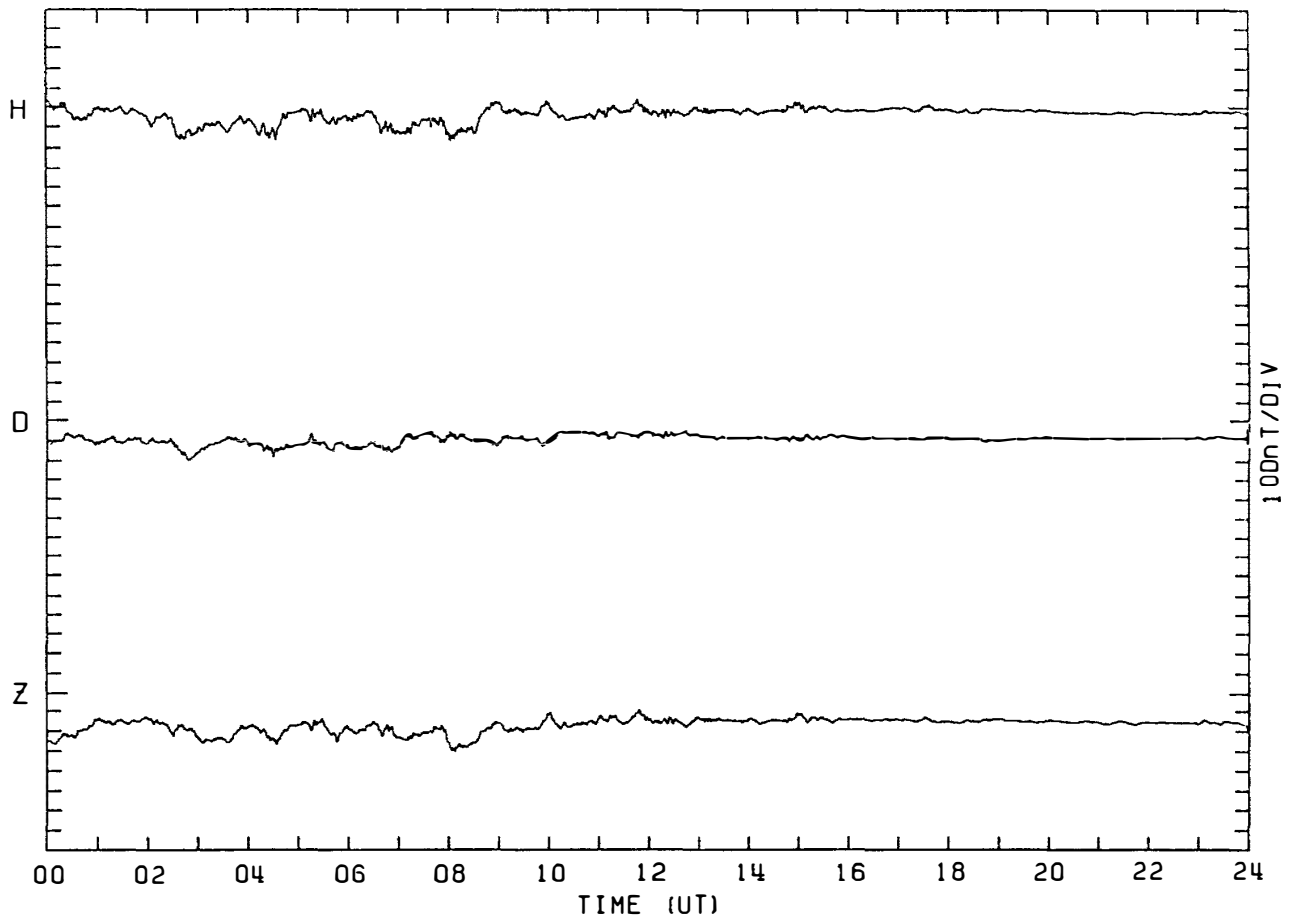
MAGNETOGRAM SYOWA STATION

DAY:179 JUNE 28. 1983



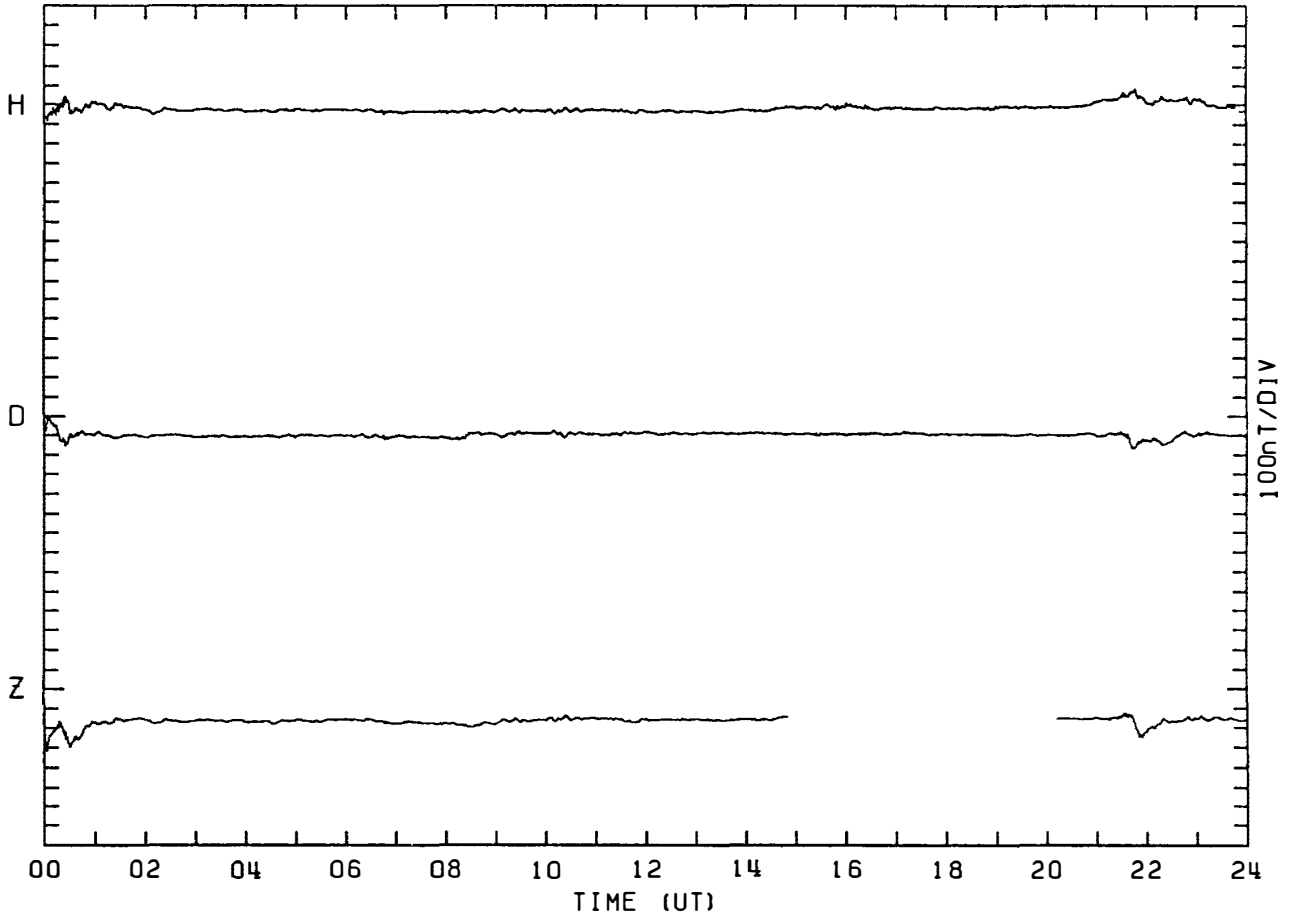
MAGNETOGRAM SYOWA STATION

DAY:180 JUNE 29. 1983



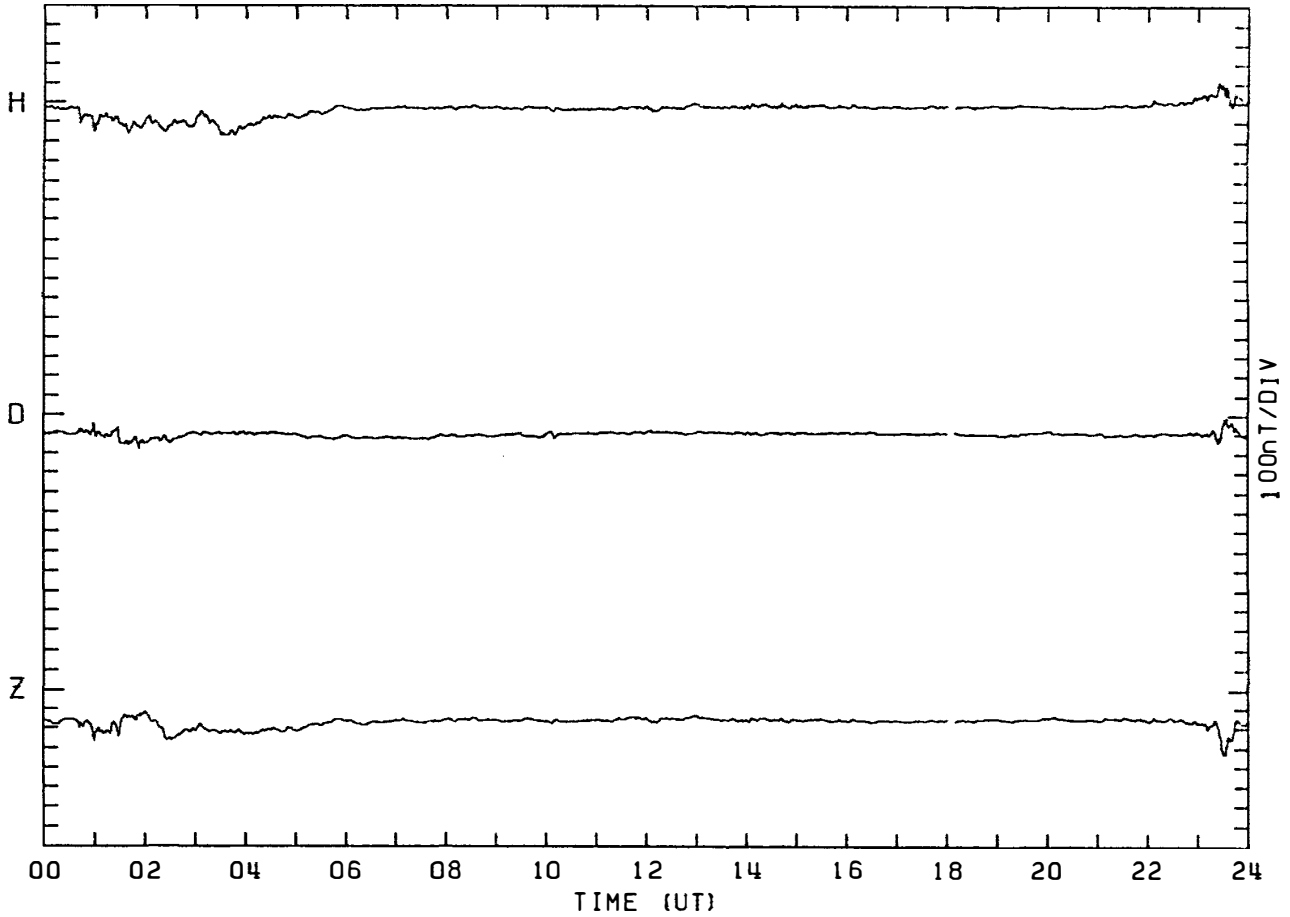
MAGNETOGRAM SYOWA STATION

DAY:181 JUNE 30, 1983



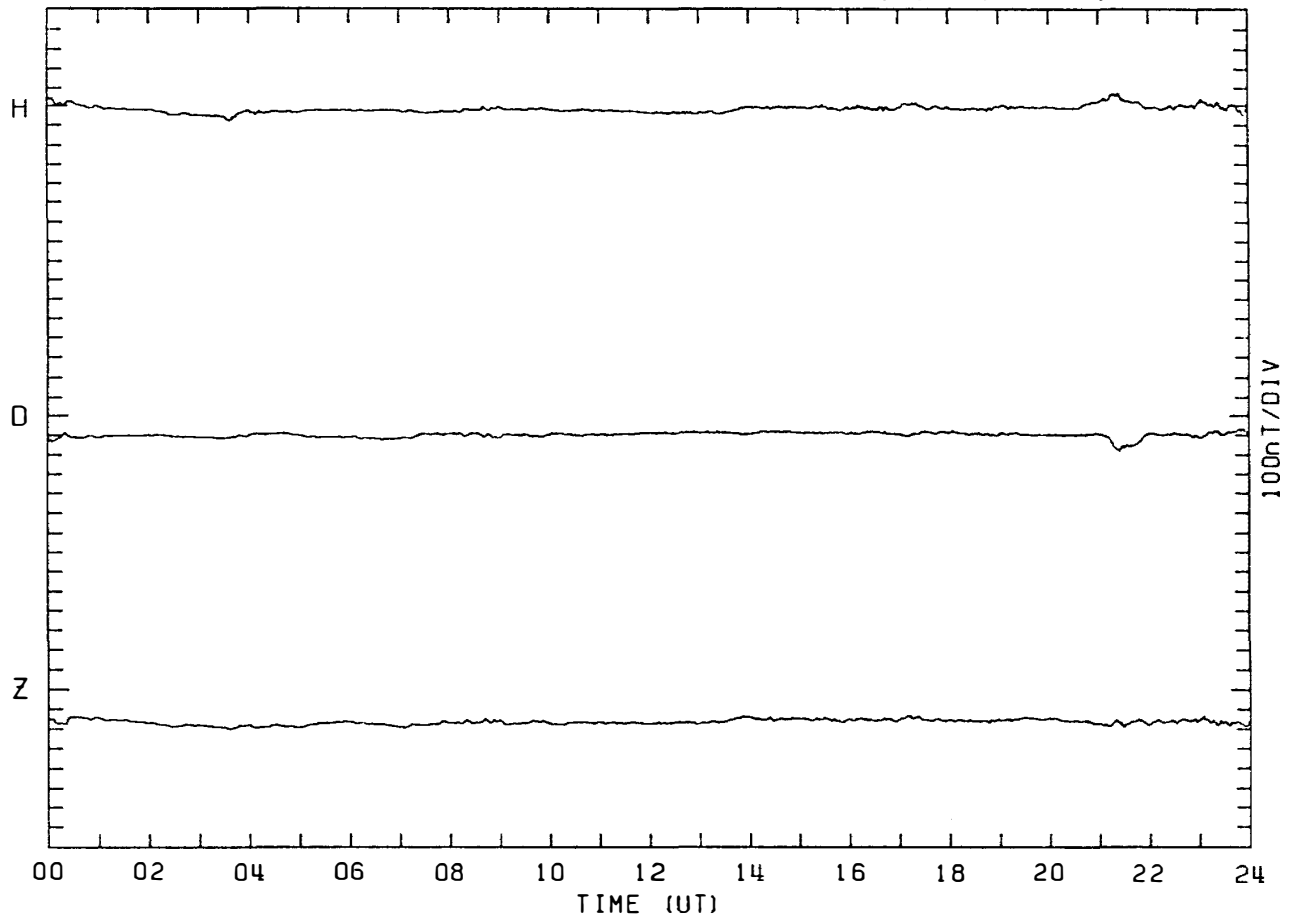
MAGNETOGRAM SYOWA STATION

DAY:182 JULY 1, 1983



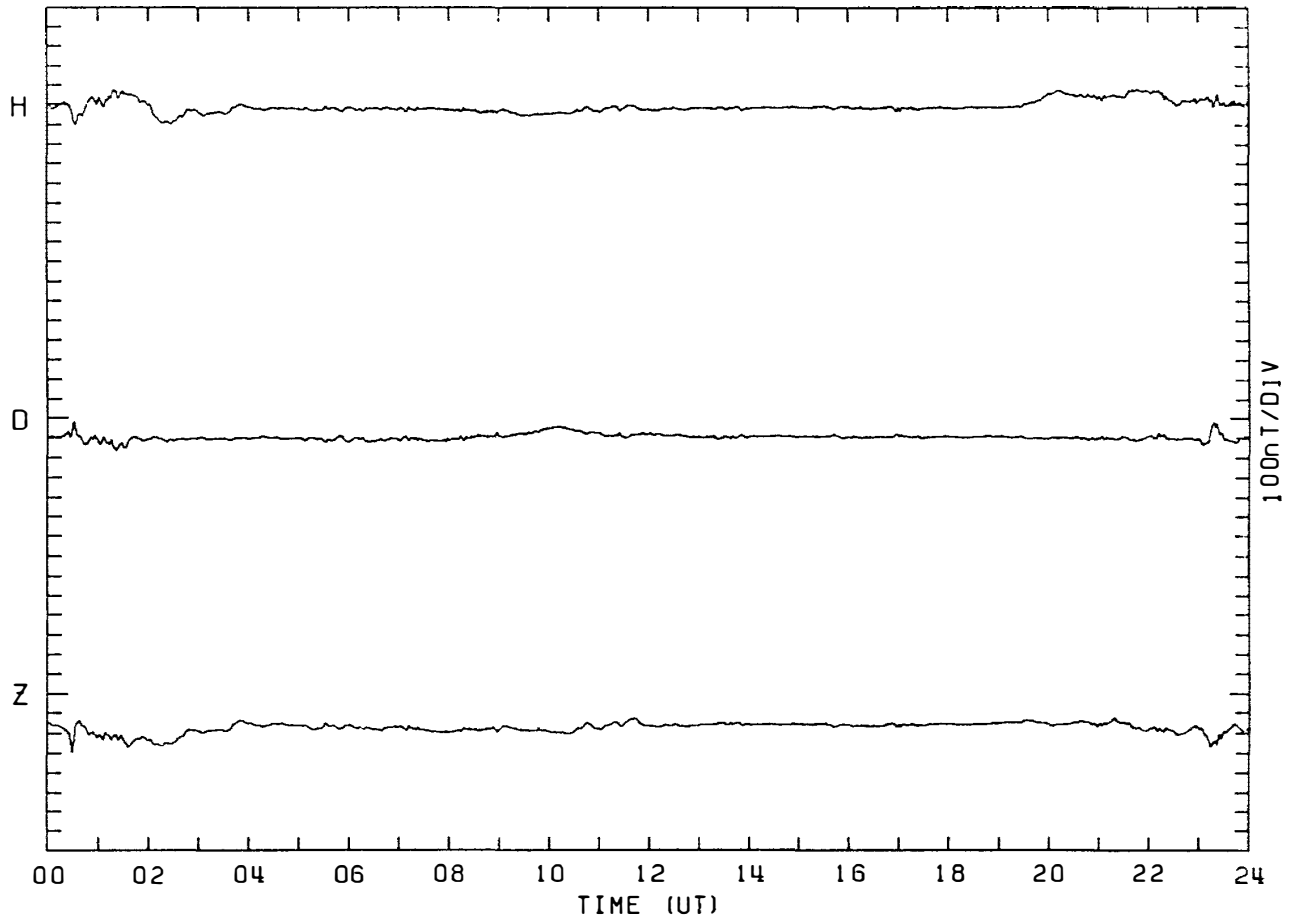
MAGNETOGRAM SYOWA STATION

DAY:183 JULY 2. 1983



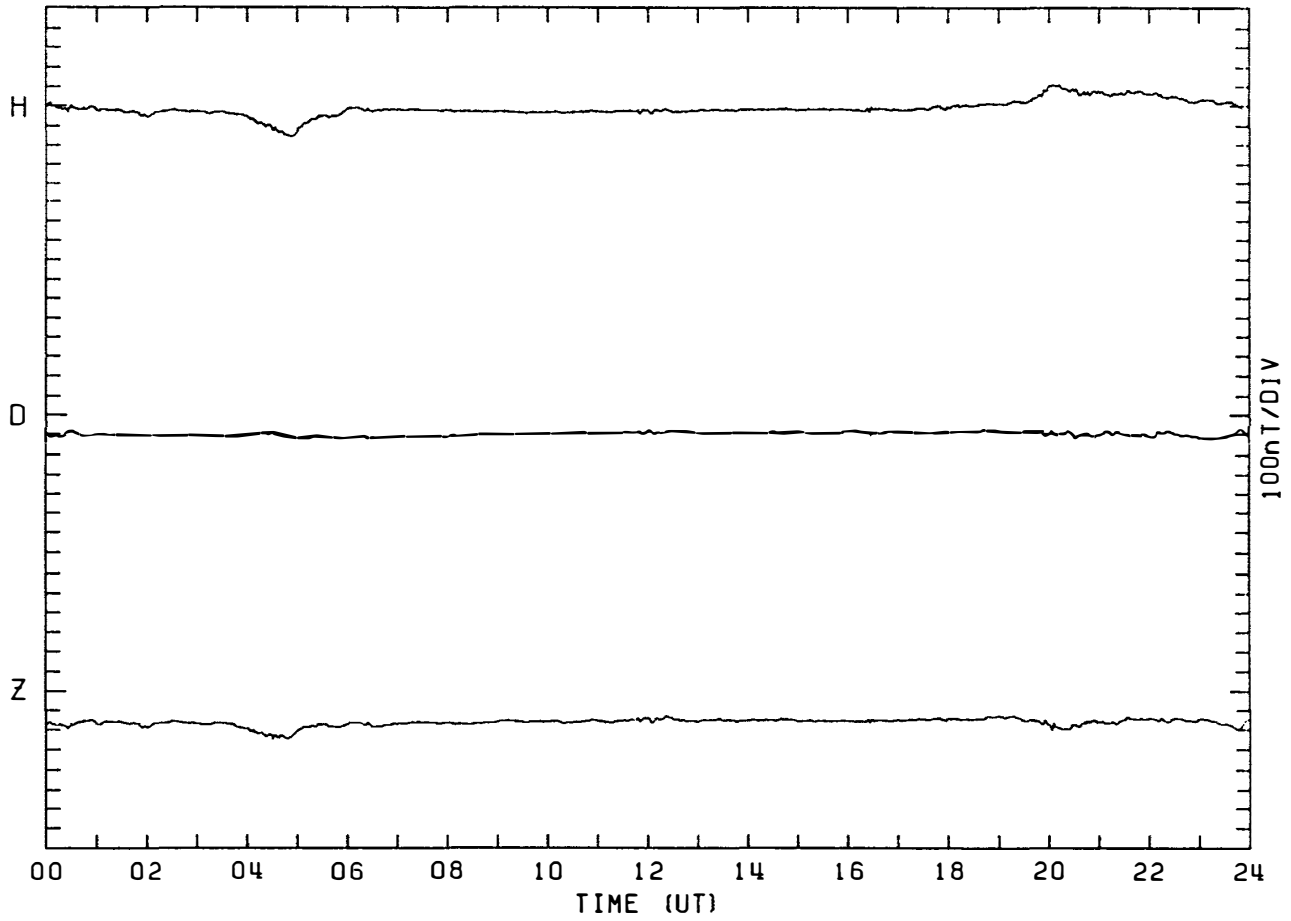
MAGNETOGRAM SYOWA STATION

DAY:184 JULY 3. 1983



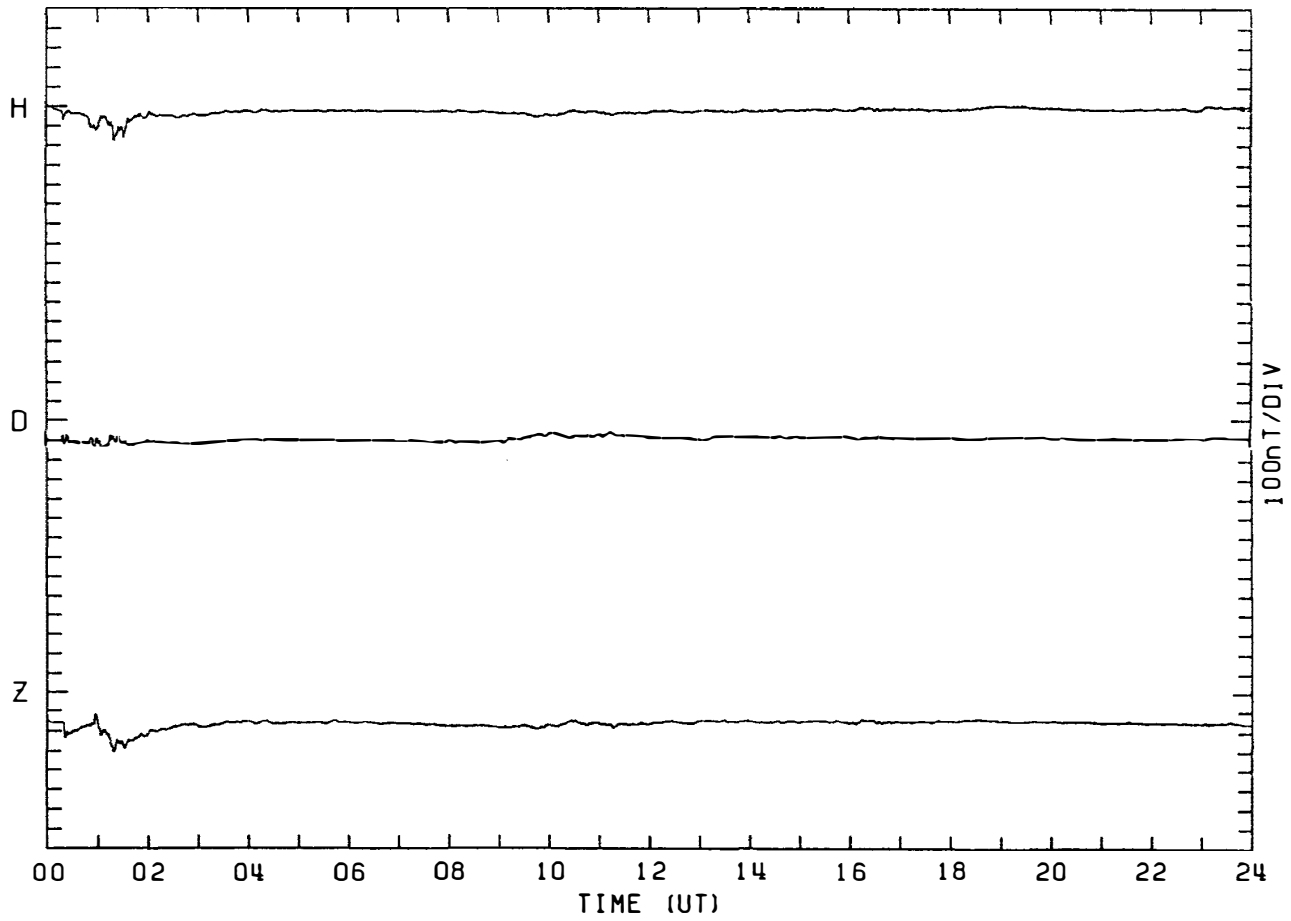
MAGNETOGRAM SYOWA STATION

DAY:185 JULY 4. 1983



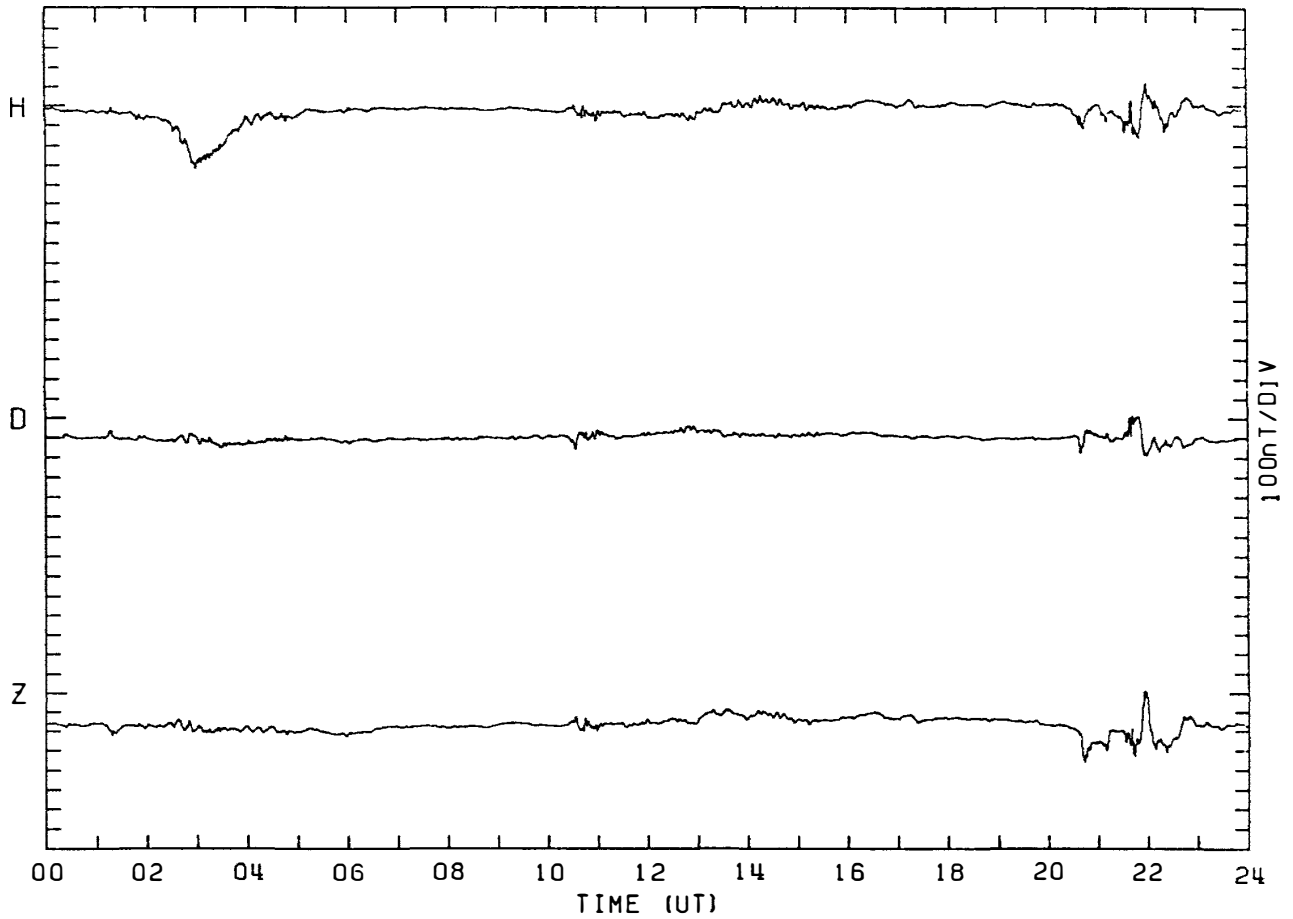
MAGNETOGRAM SYOWA STATION

DAY:186 JULY 5. 1983



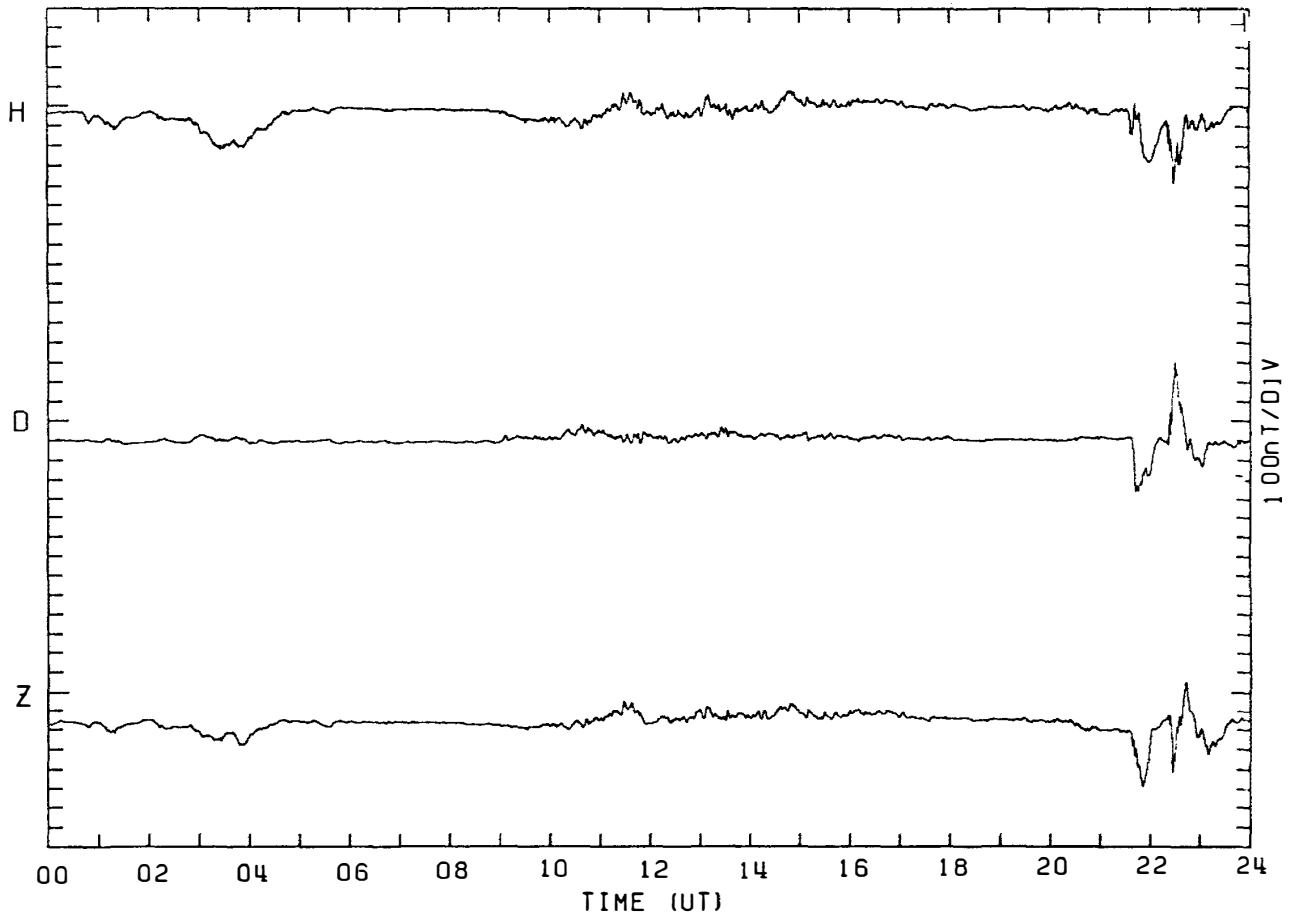
MAGNETOGRAM SYOWA STATION

DAY:187 JULY 6. 1983



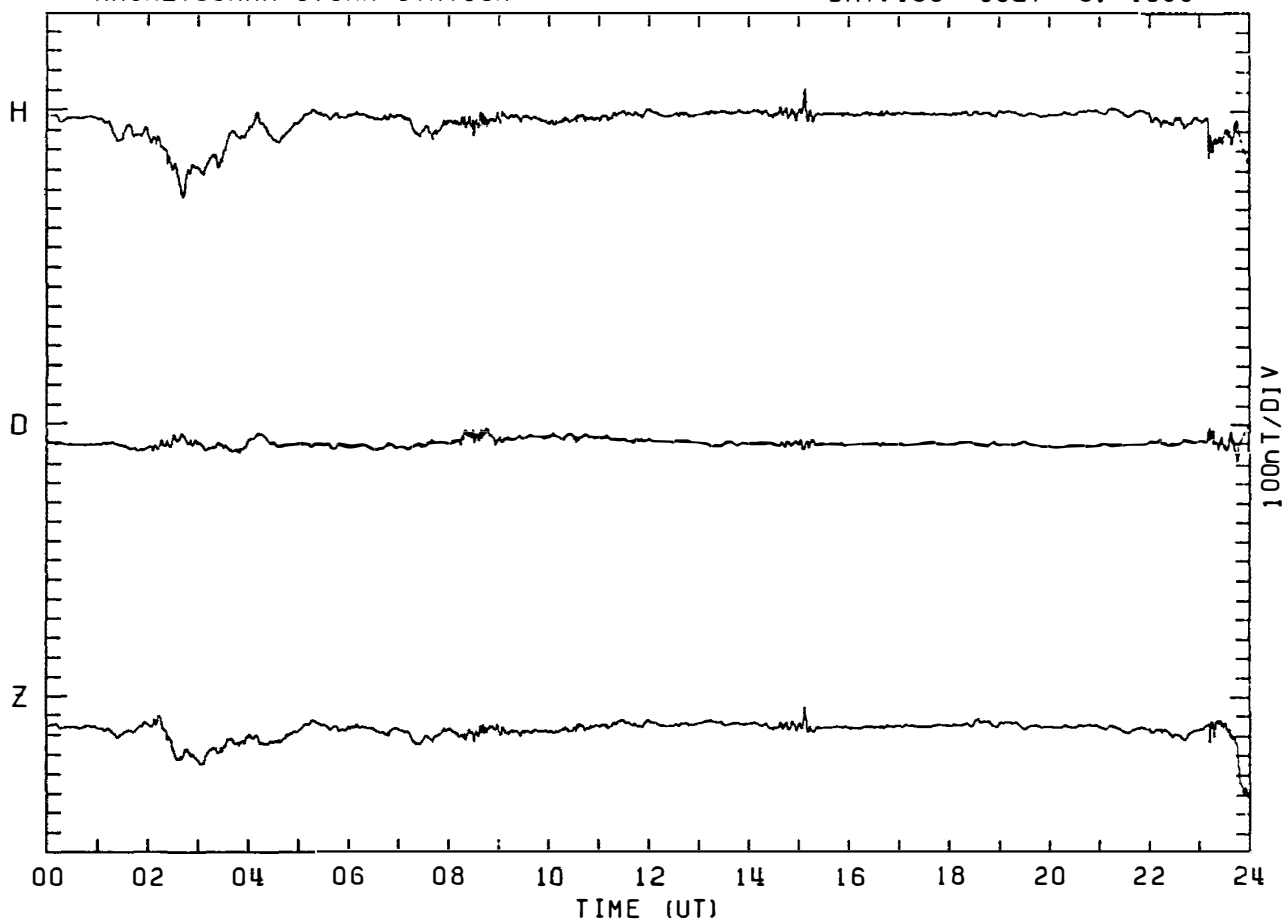
MAGNETOGRAM SYOWA STATION

DAY:188 JULY 7. 1983



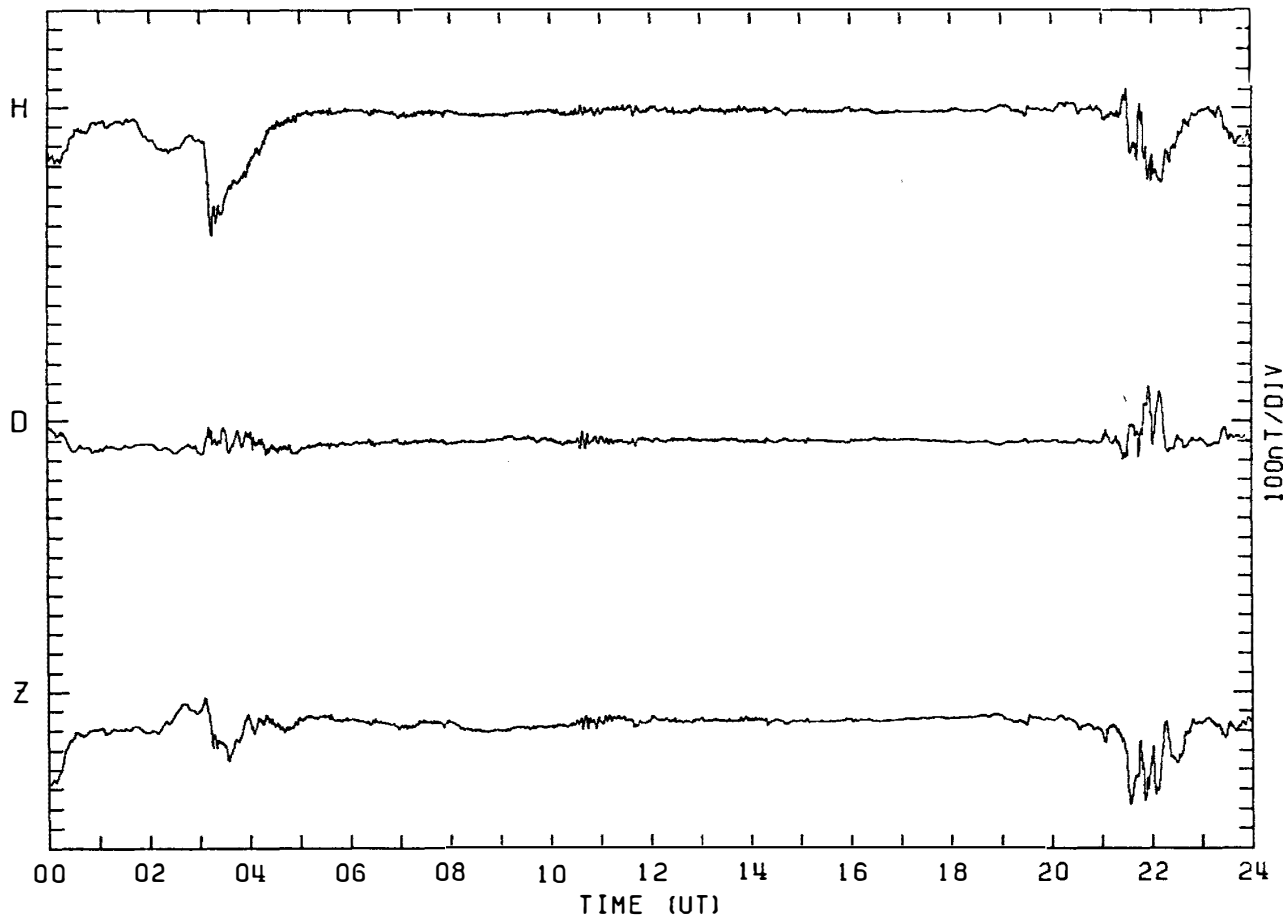
MAGNETOGRAM SYOWA STATION

DAY:189 JULY 8. 1983



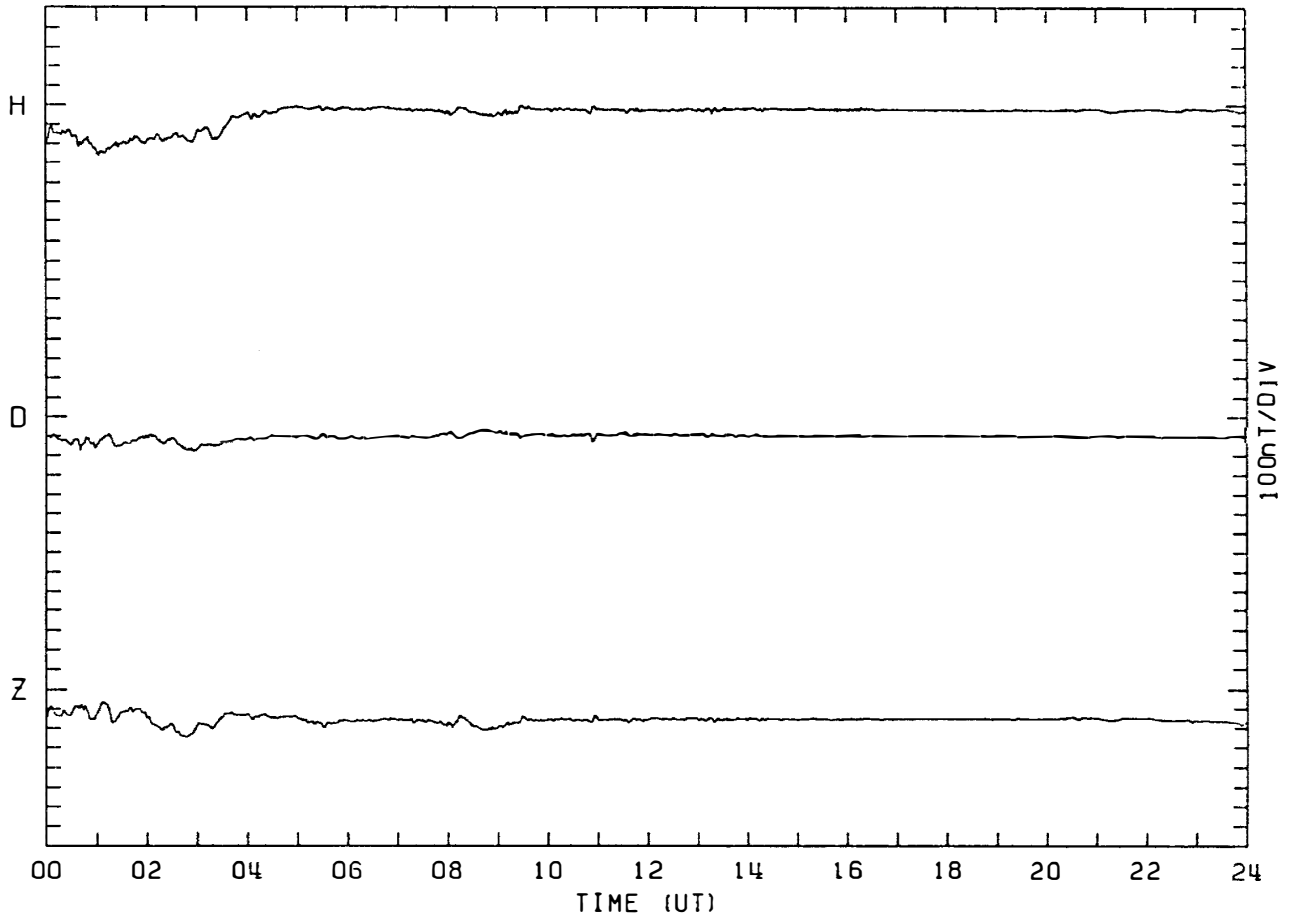
MAGNETOGRAM SYOWA STATION

DAY:190 JULY 9. 1983



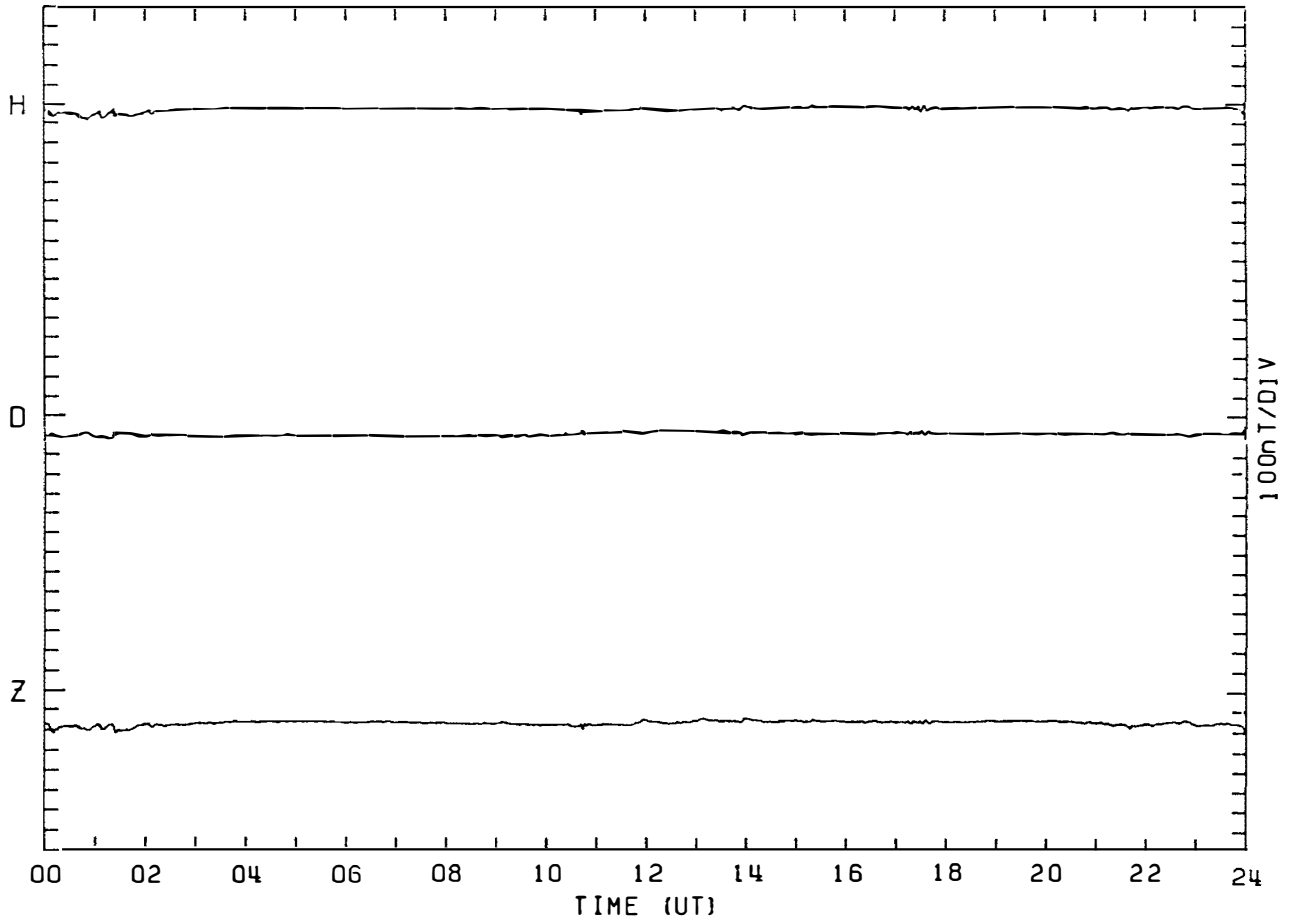
MAGNETOGRAM SYOWA STATION

DAY:191 JULY 10, 1983



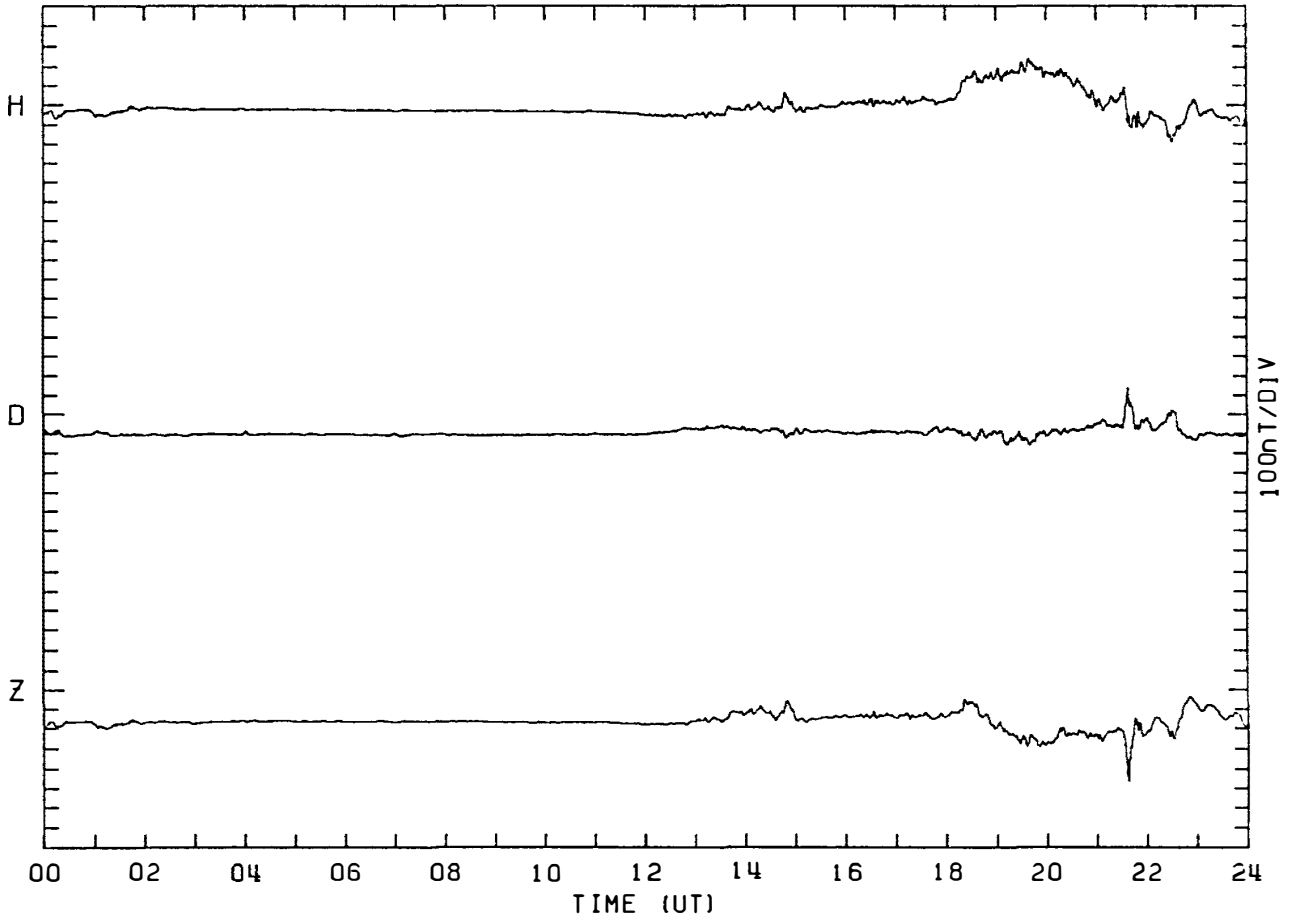
MAGNETOGRAM SYOWA STATION

DAY:192 JULY 11, 1983



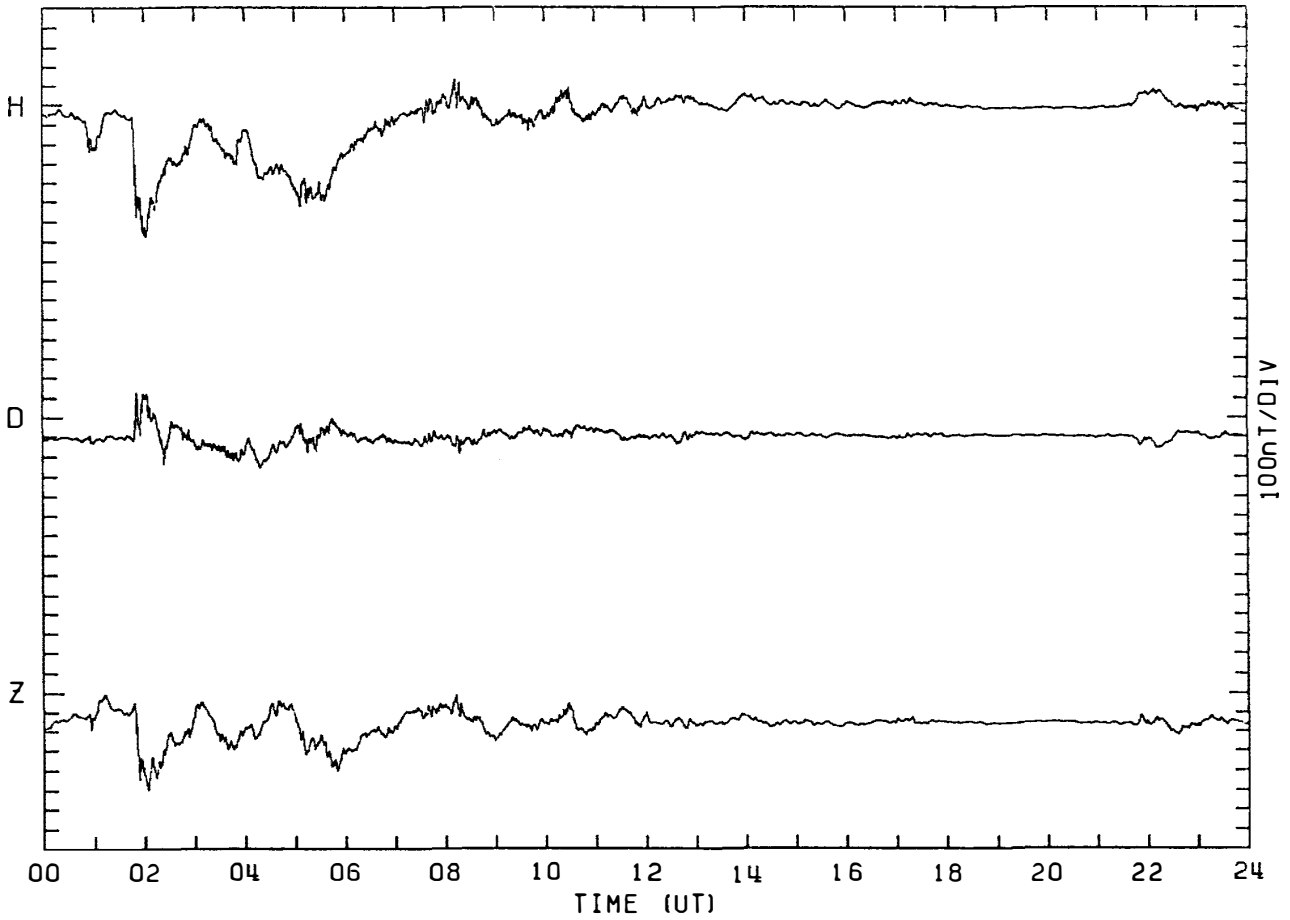
MAGNETOGRAM SYOWA STATION

DAY:193 JULY 12. 1983



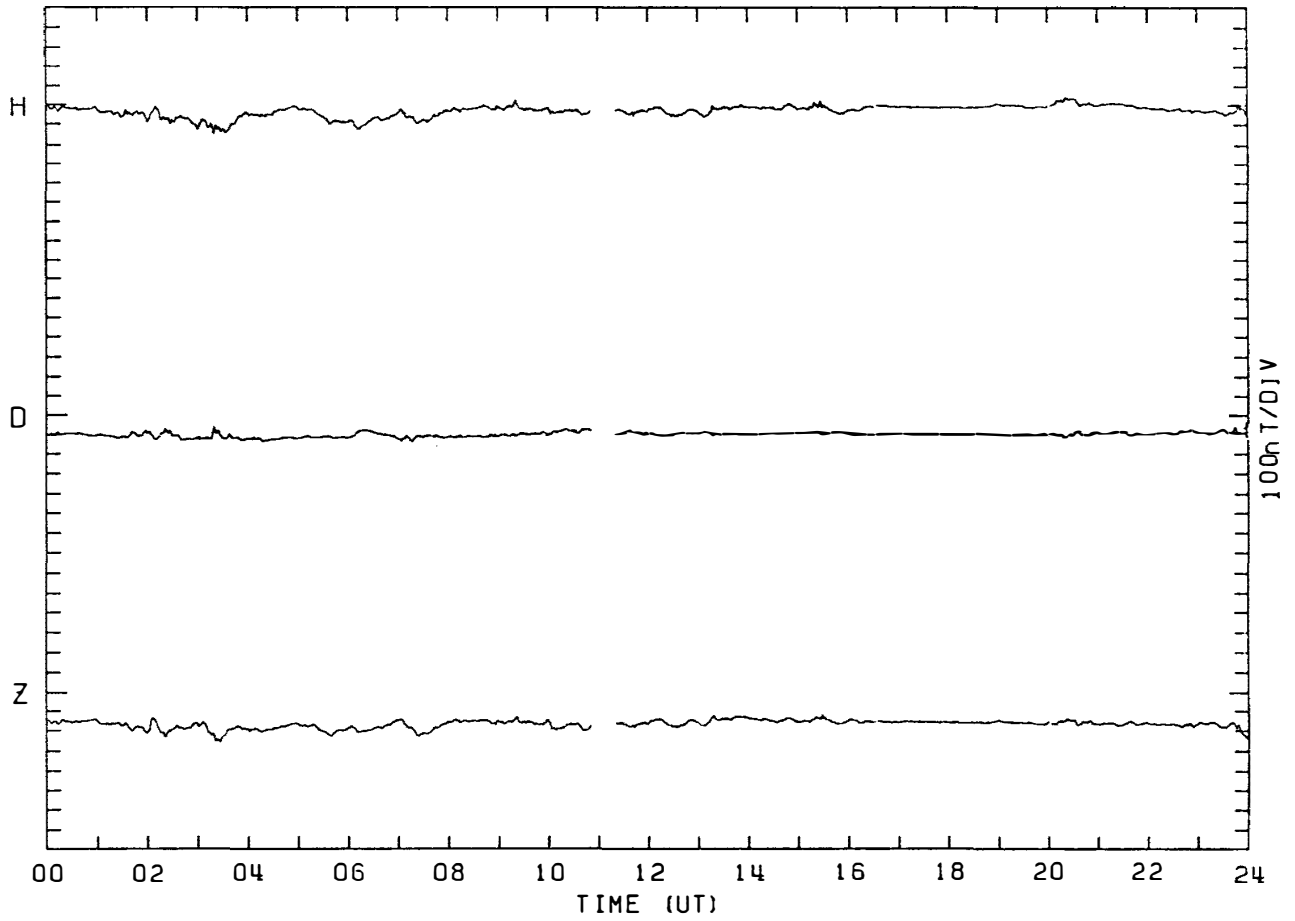
MAGNETOGRAM SYOWA STATION

DAY:194 JULY 13. 1983



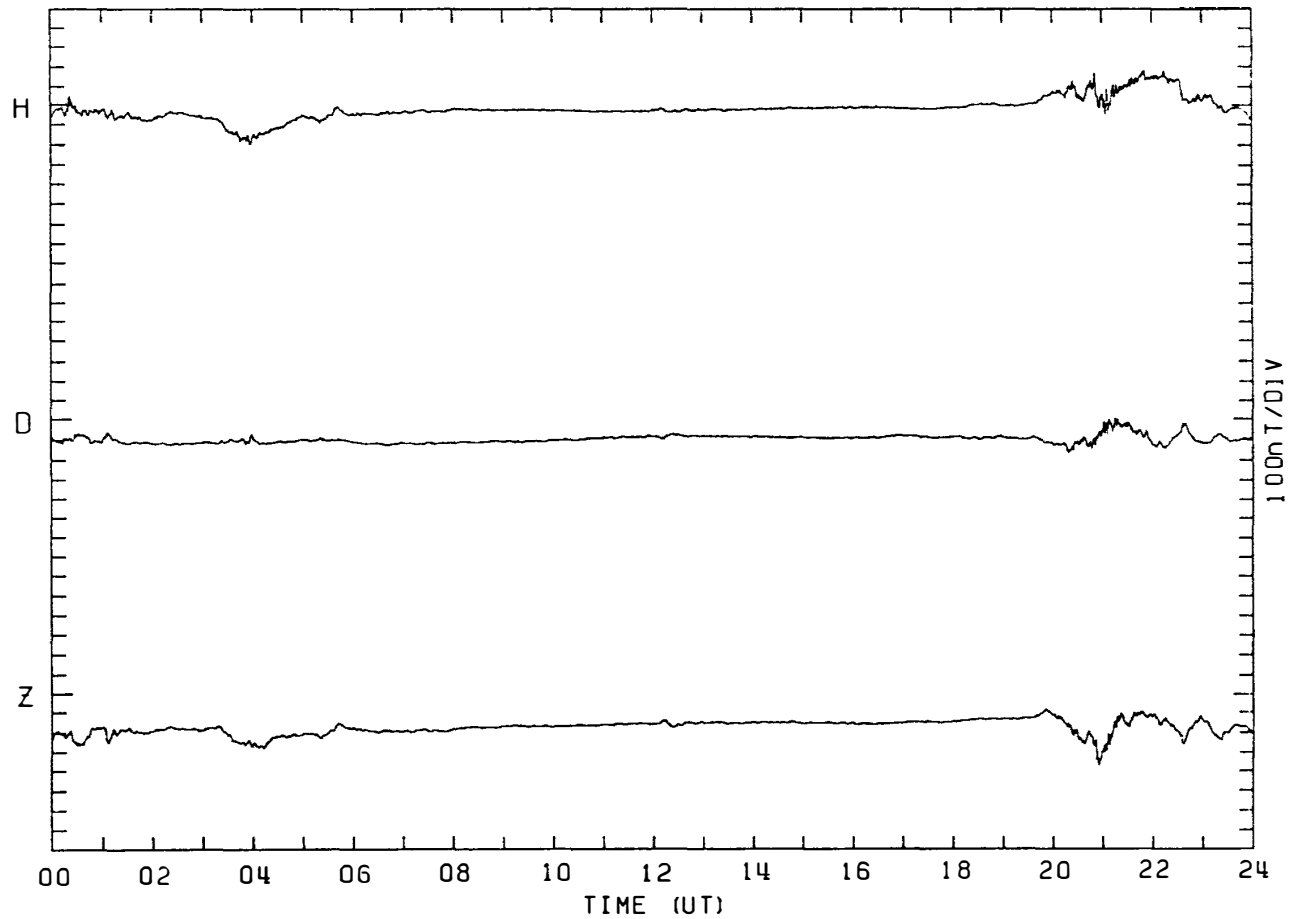
MAGNETOGRAM SYOWA STATION

DAY:195 JULY 14. 1983



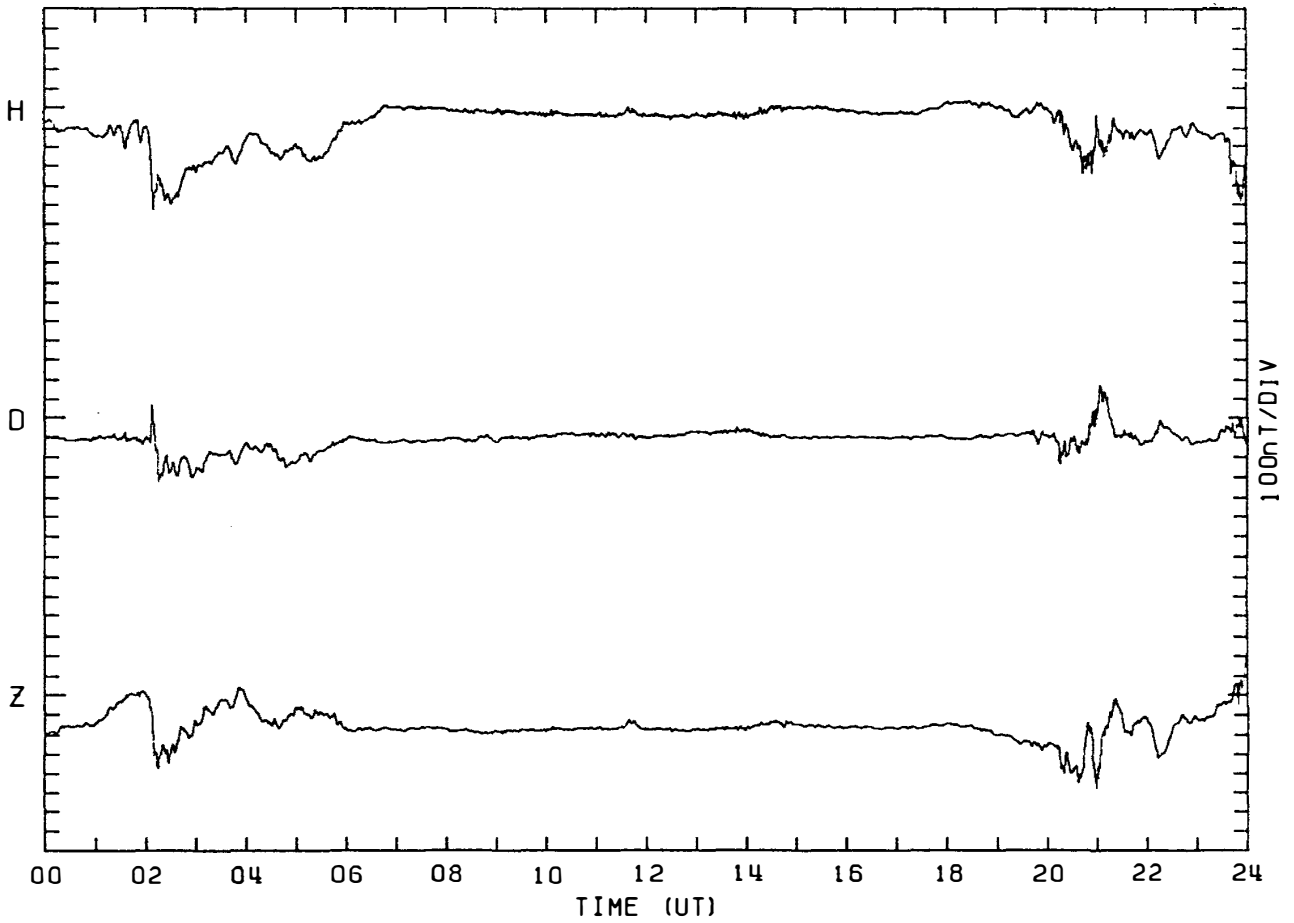
MAGNETOGRAM SYOWA STATION

DAY:196 JULY 15. 1983



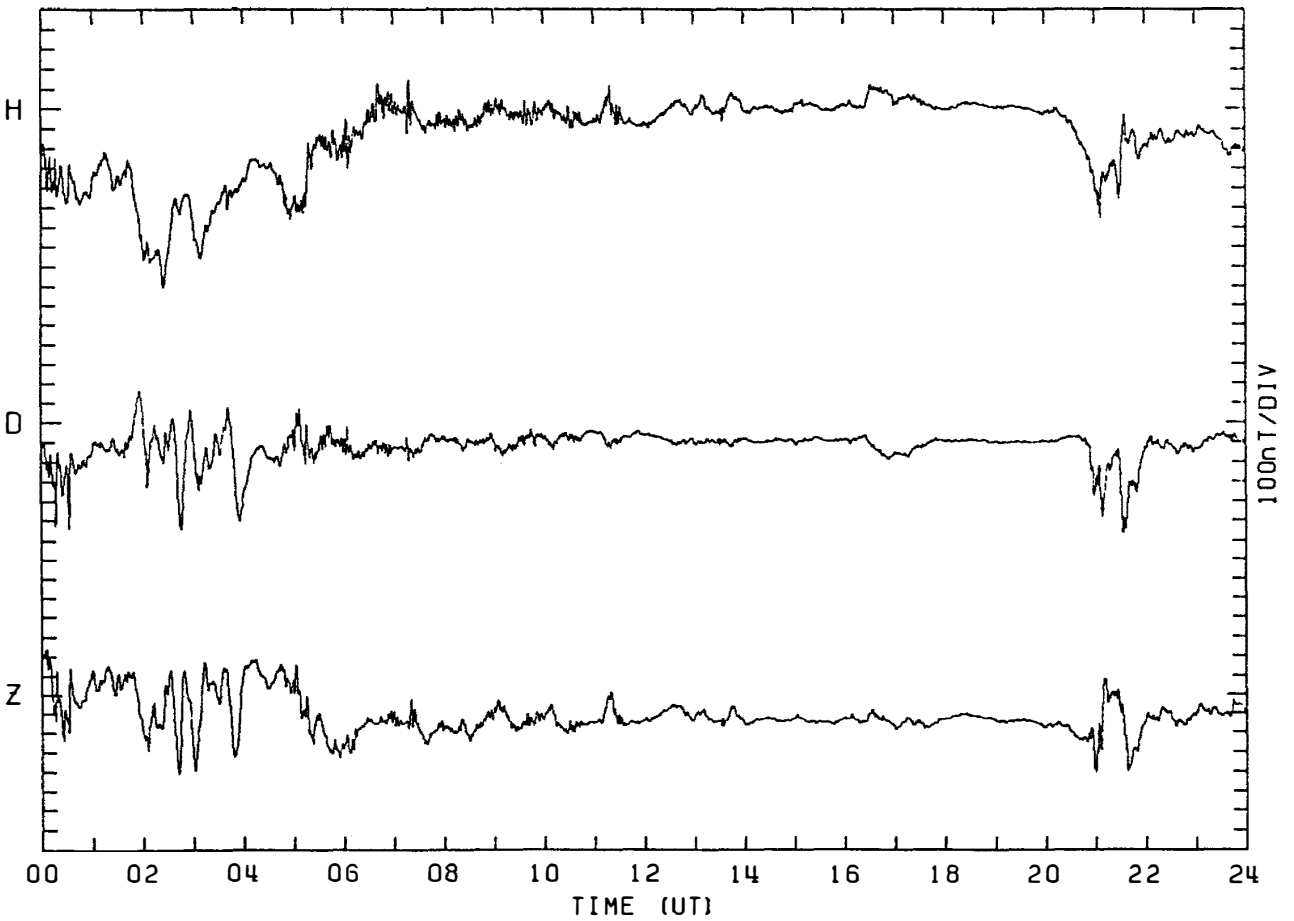
MAGNETOGRAM SYOWA STATION

DAY:197 JULY 16. 1983



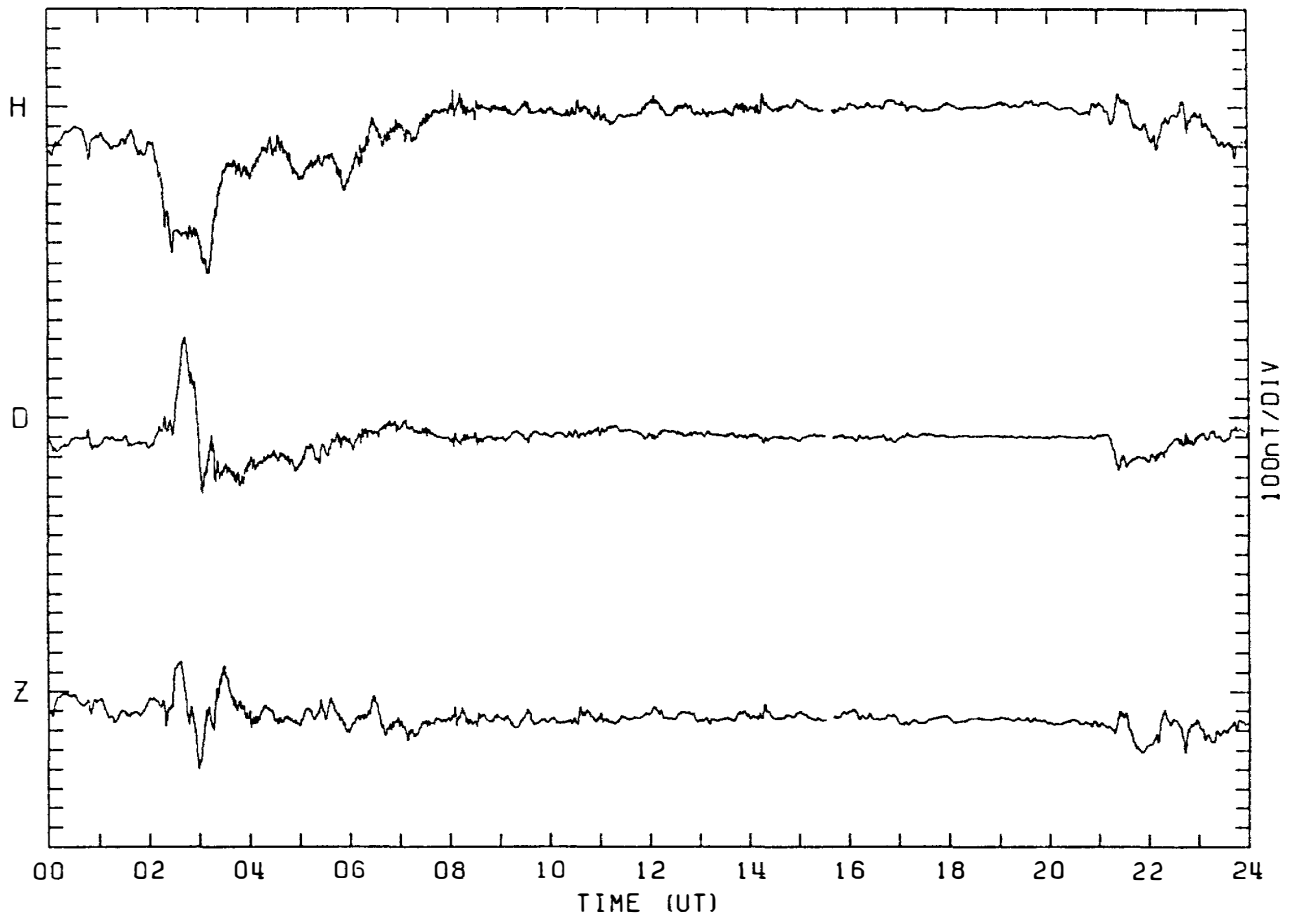
MAGNETOGRAM SYOWA STATION

DAY:198 JULY 17. 1983



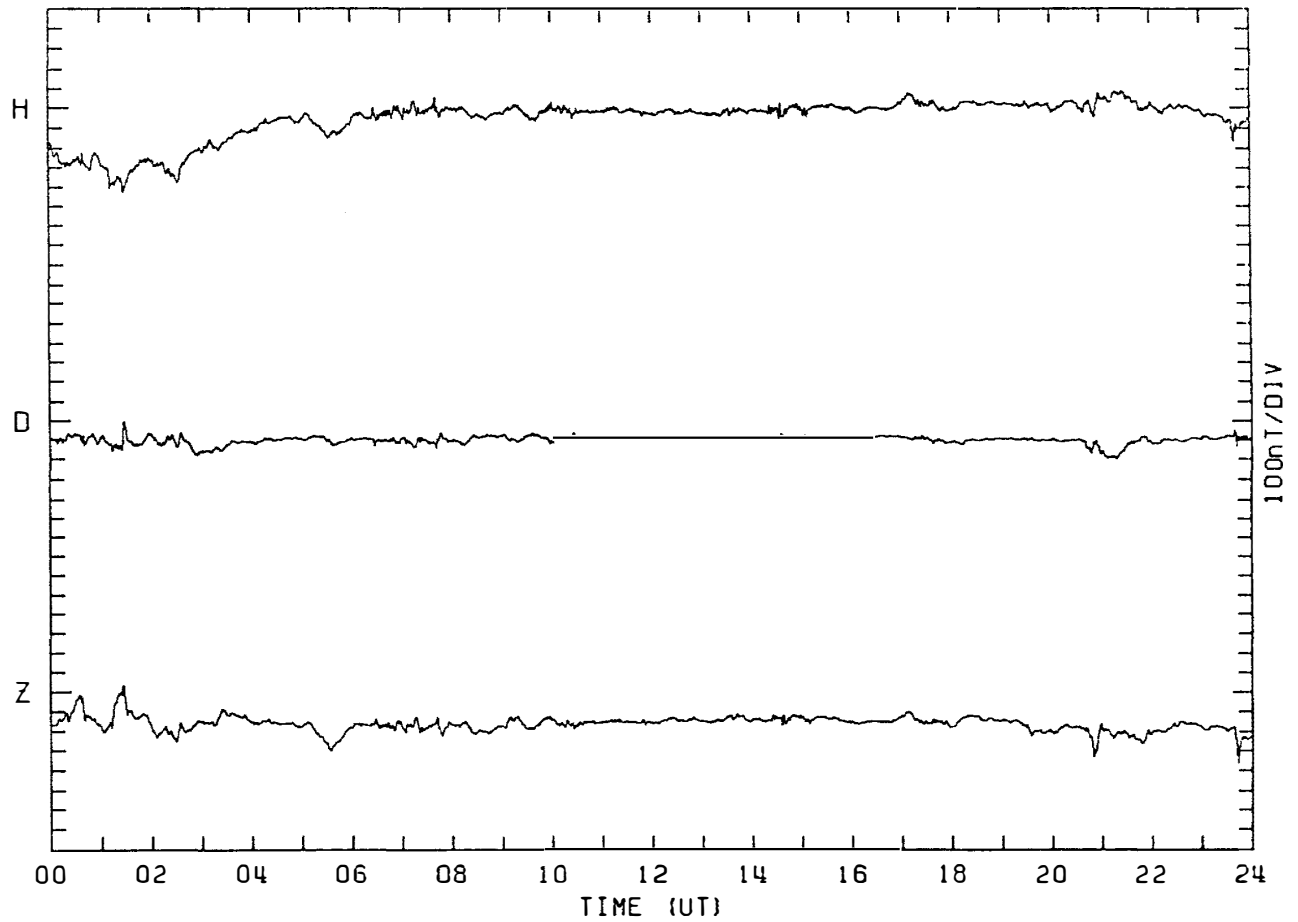
MAGNETOGRAM SYOWA STATION

DAY:199 JULY 18. 1983



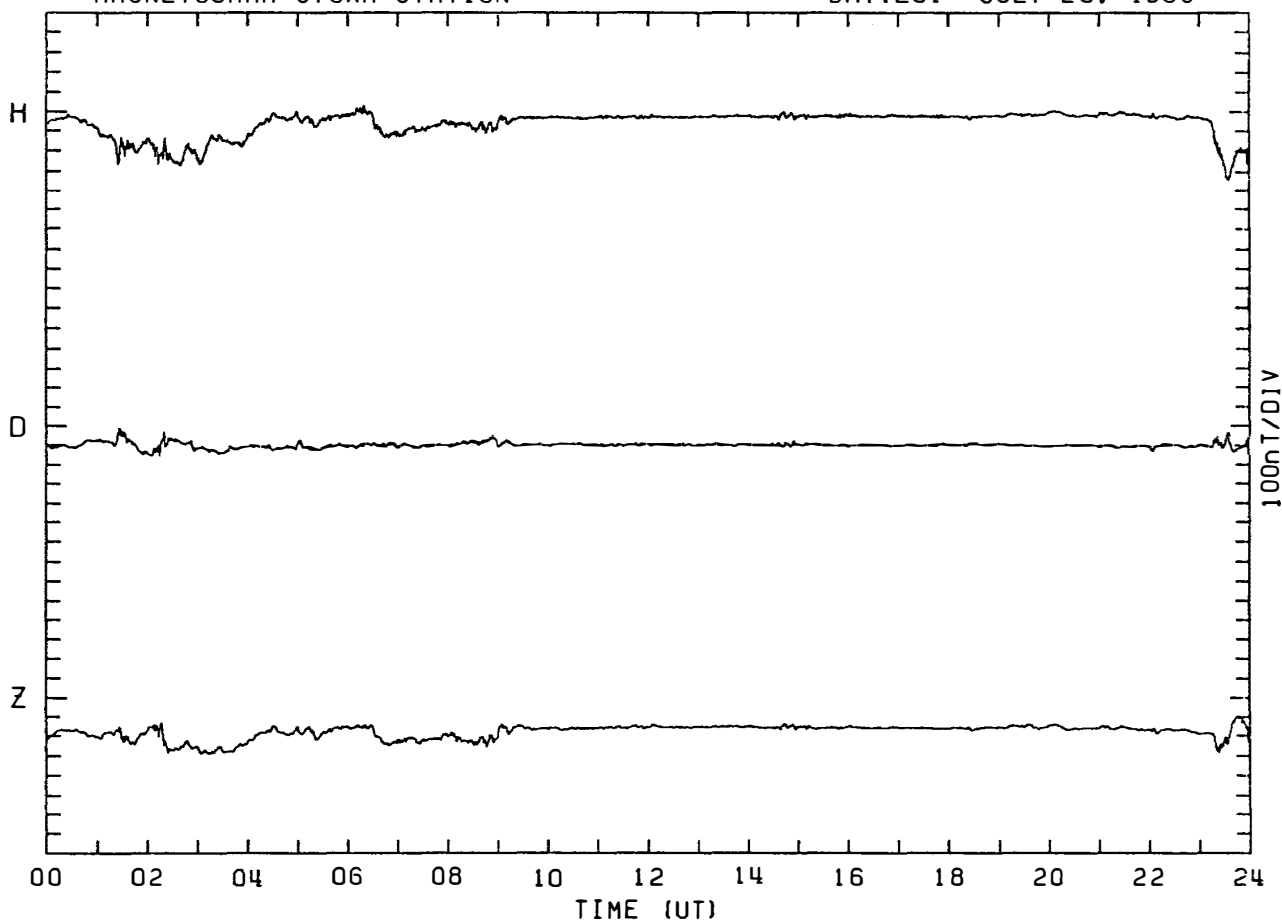
MAGNETOGRAM SYOWA STATION

DAY:200 JULY 19. 1983



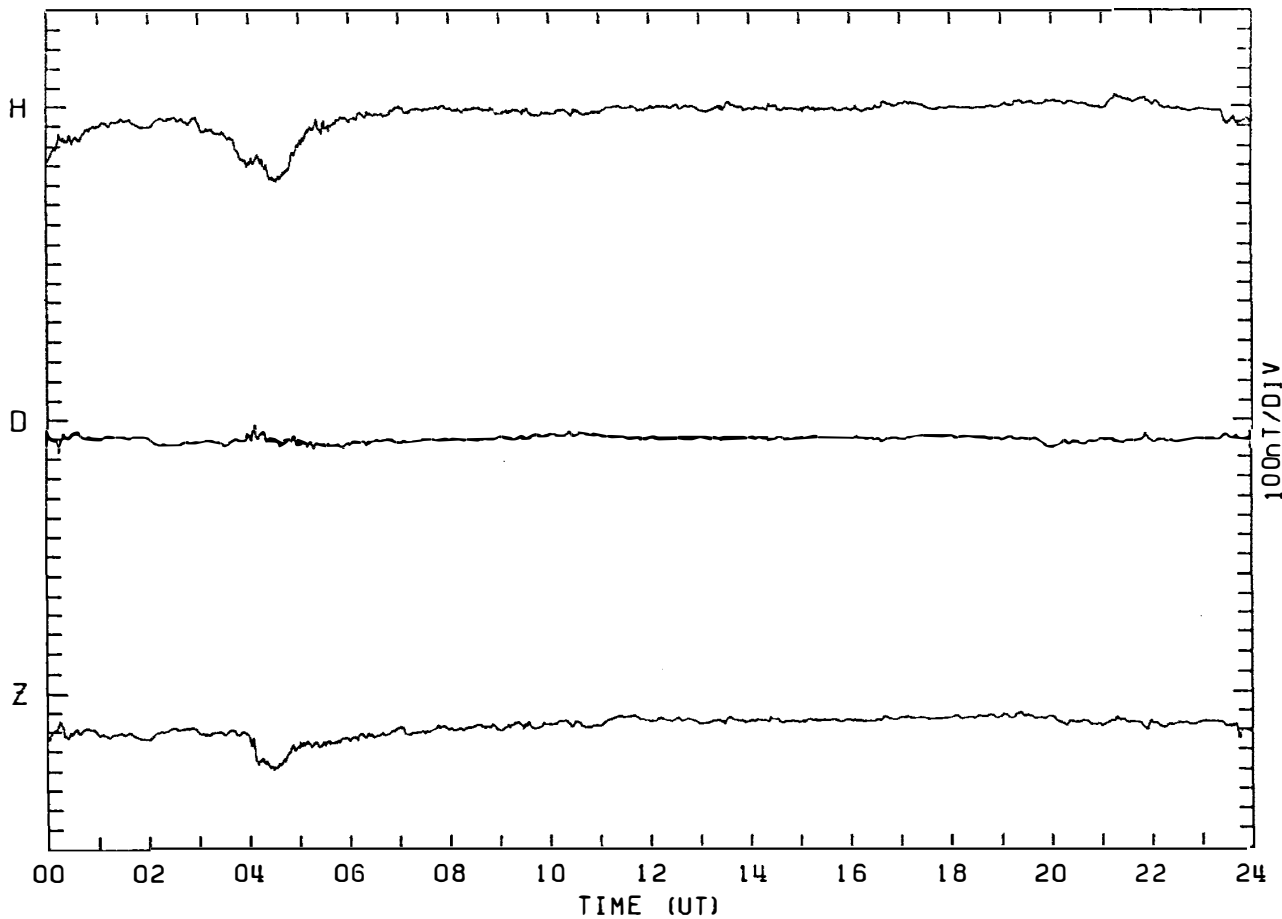
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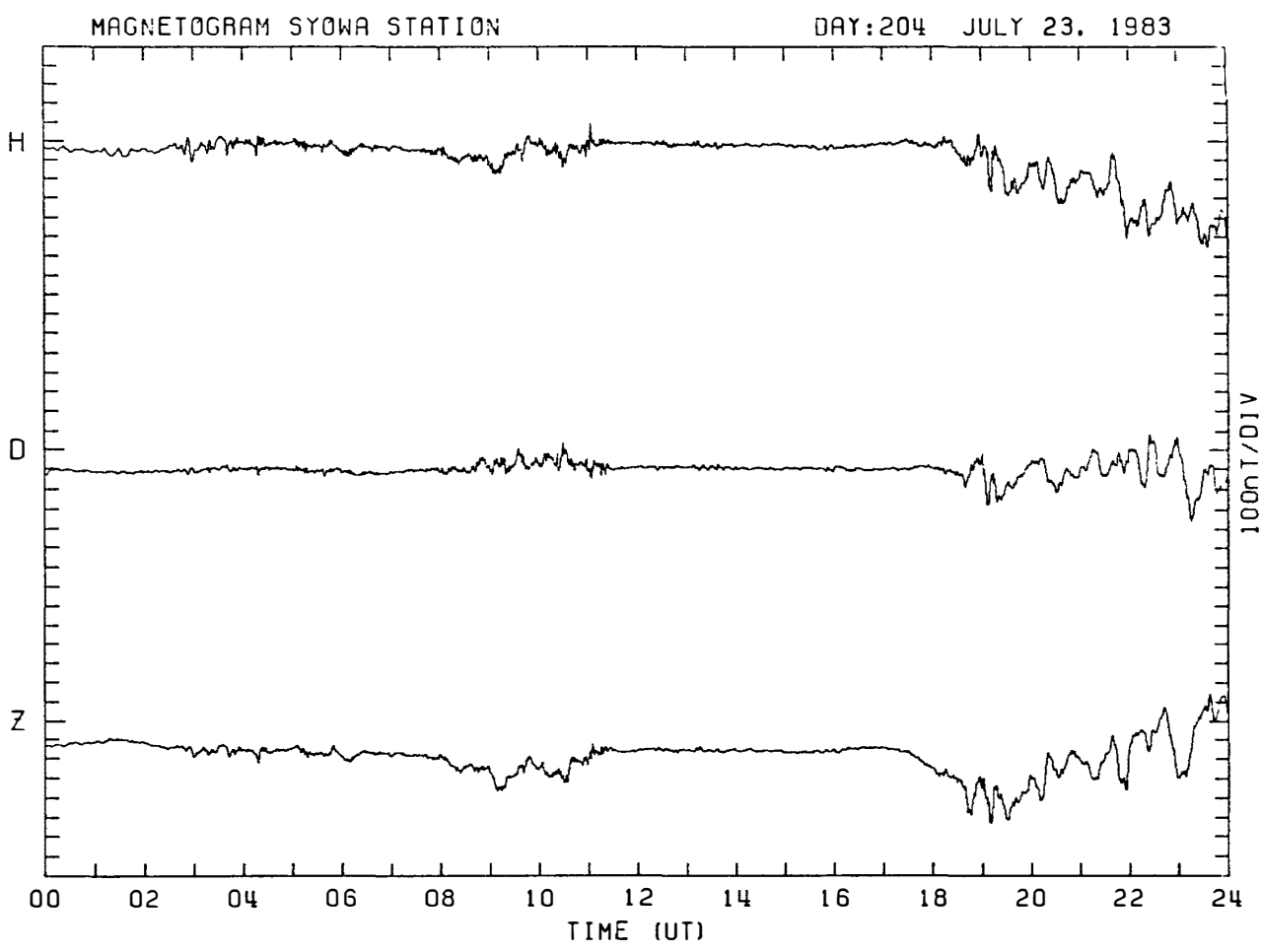
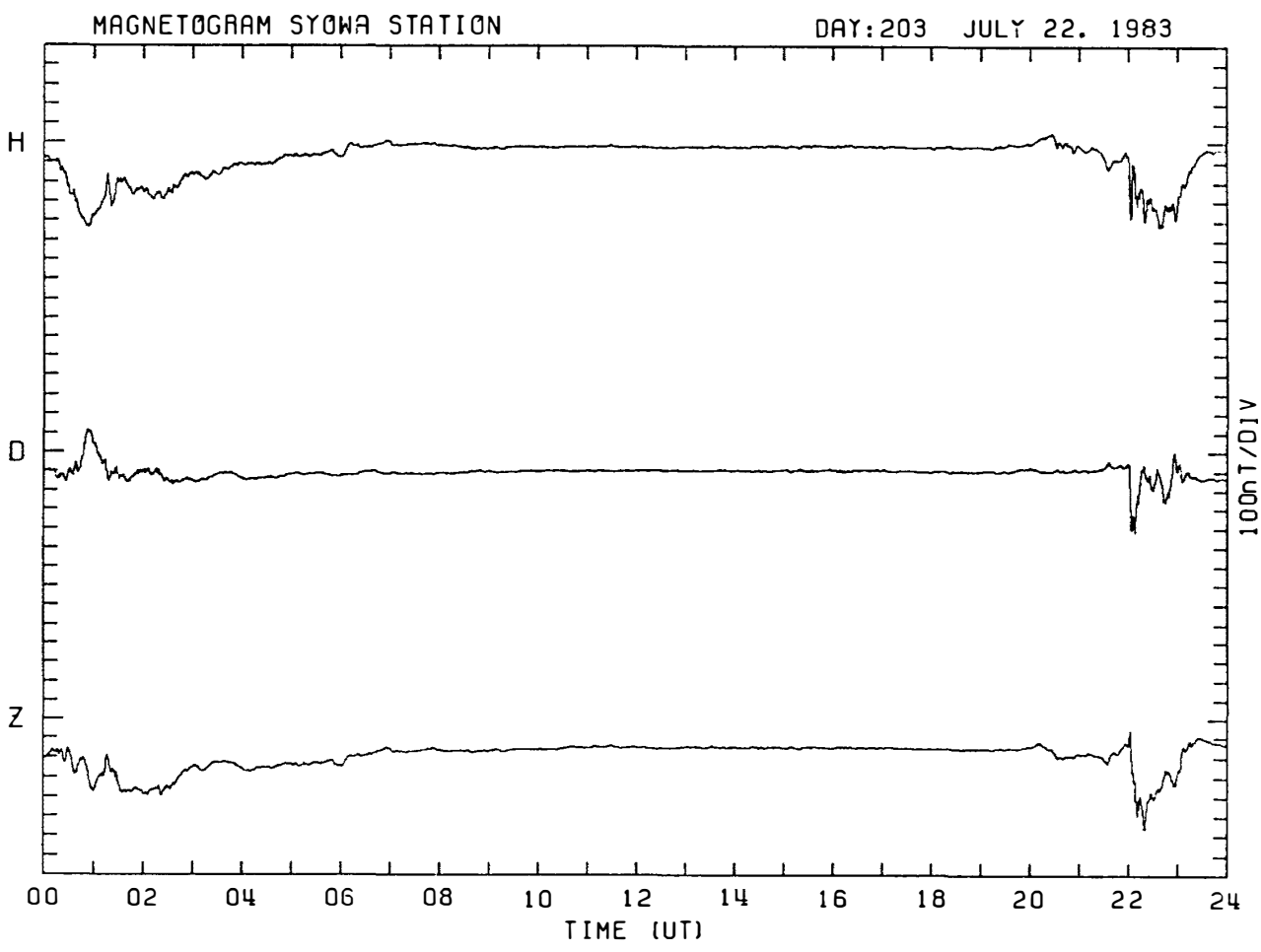
DAY:201 JULY 20. 1983



MAGNETOGRAM SYOWA STATION

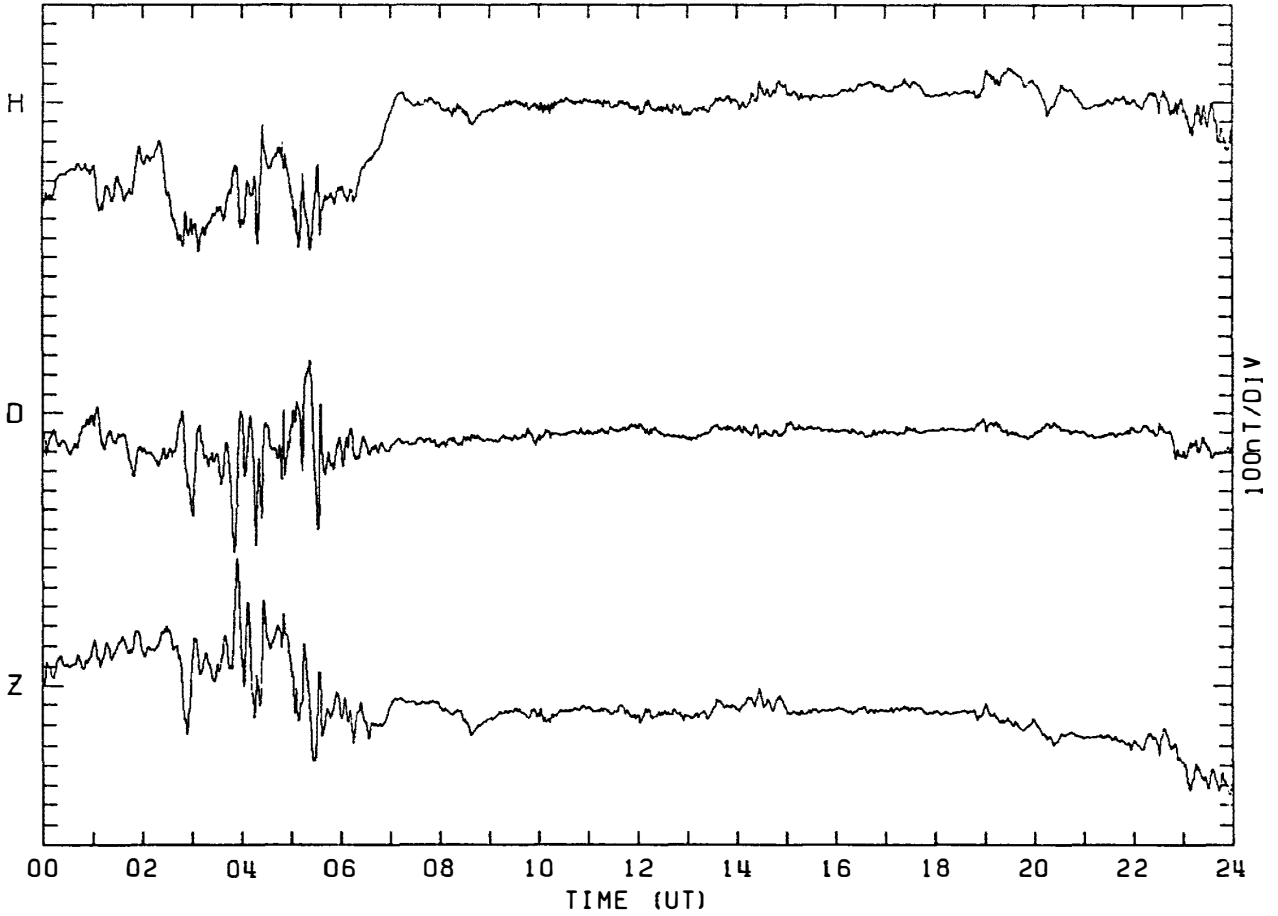
DAY:202 JULY 21. 1983





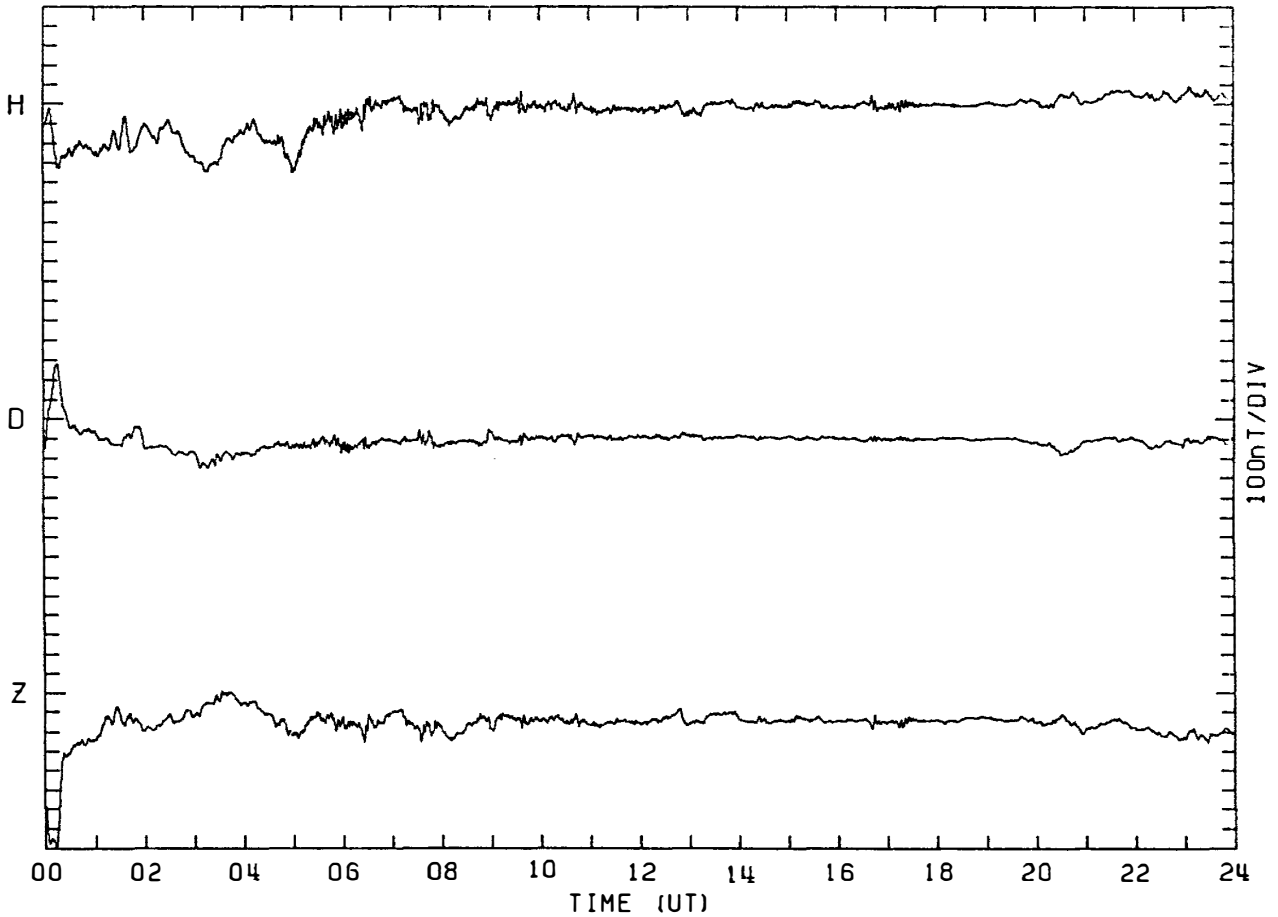
MAGNETOGRAM SYOWA STATION

DAY:205 JULY 24. 1983



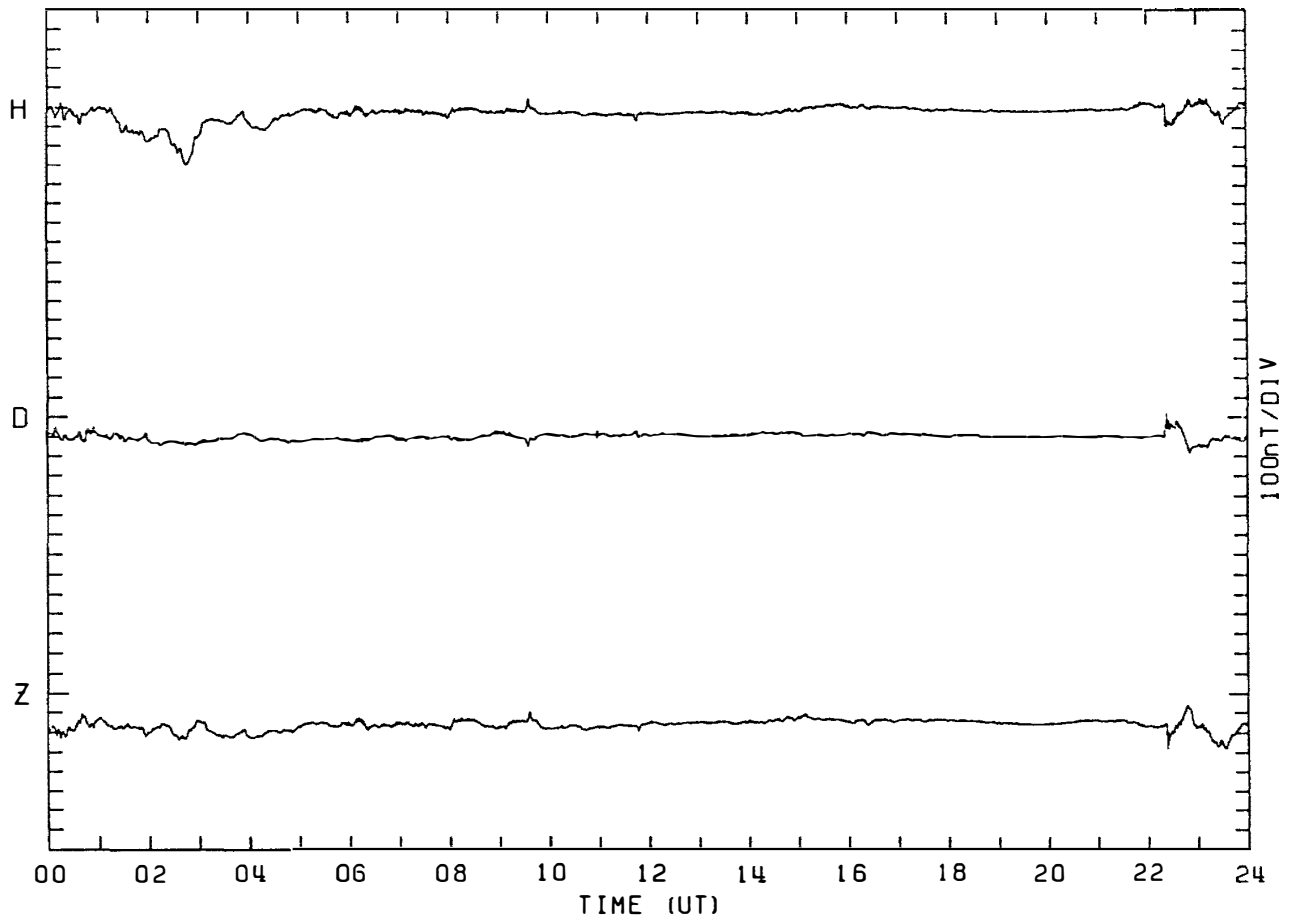
MAGNETOGRAM SYOWA STATION

DAY:206 JULY 25. 1983



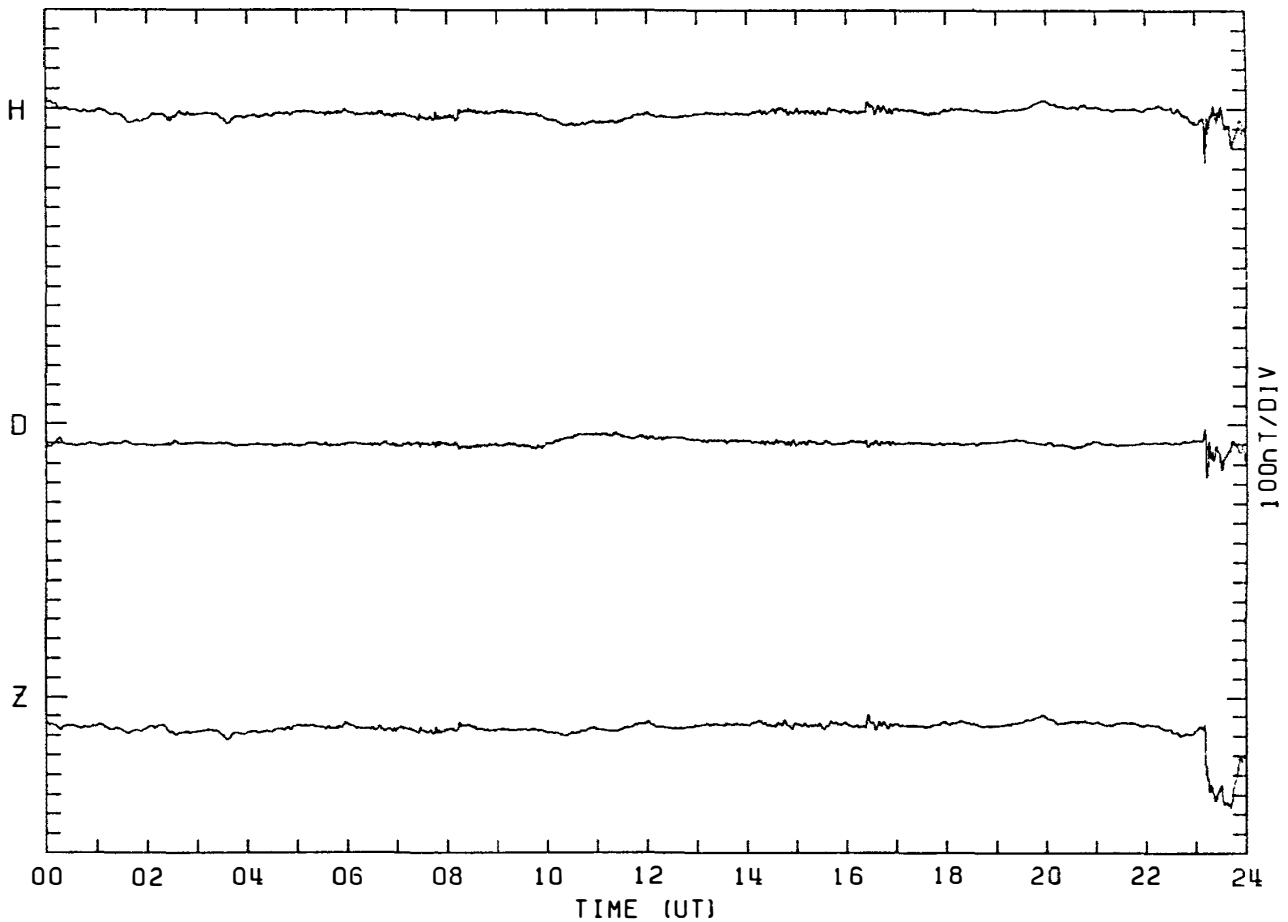
MAGNETOGRAM SYOWA STATION

DAY:207 JULY 26. 1983



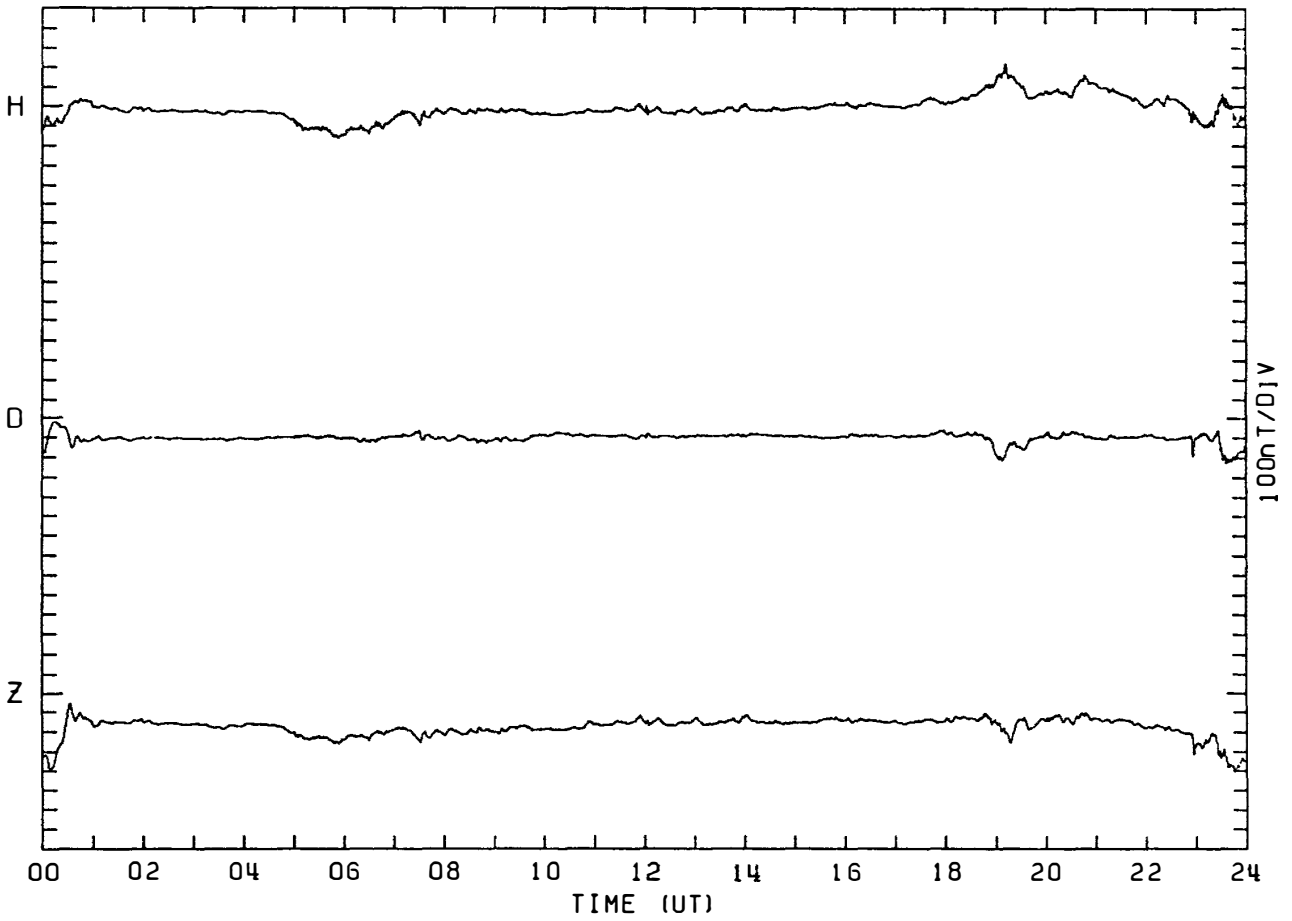
MAGNETOGRAM SYOWA STATION

DAY:208 JULY 27. 1983



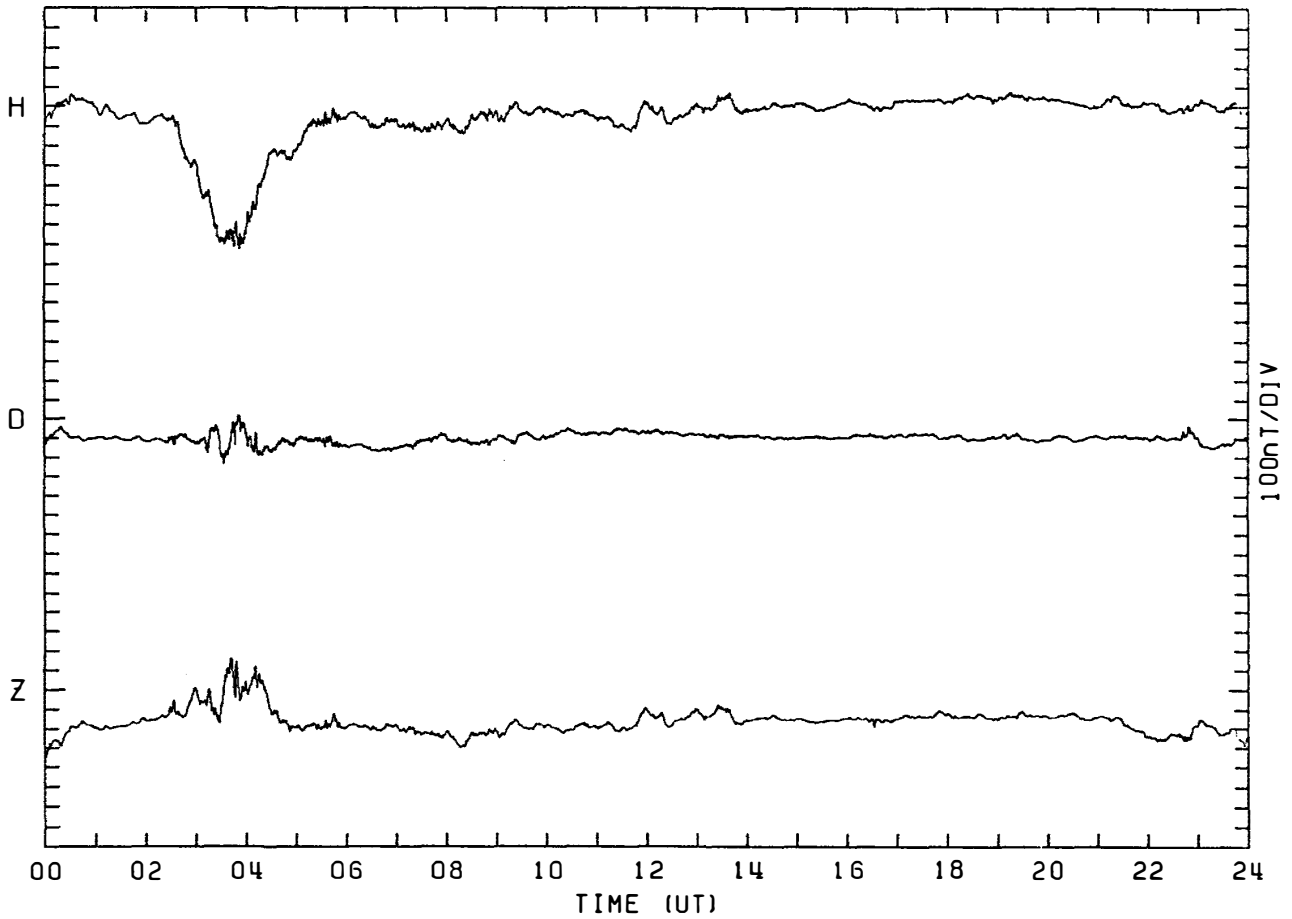
MAGNETOGRAM SYOWA STATION

DAY:209 JULY 28. 1983



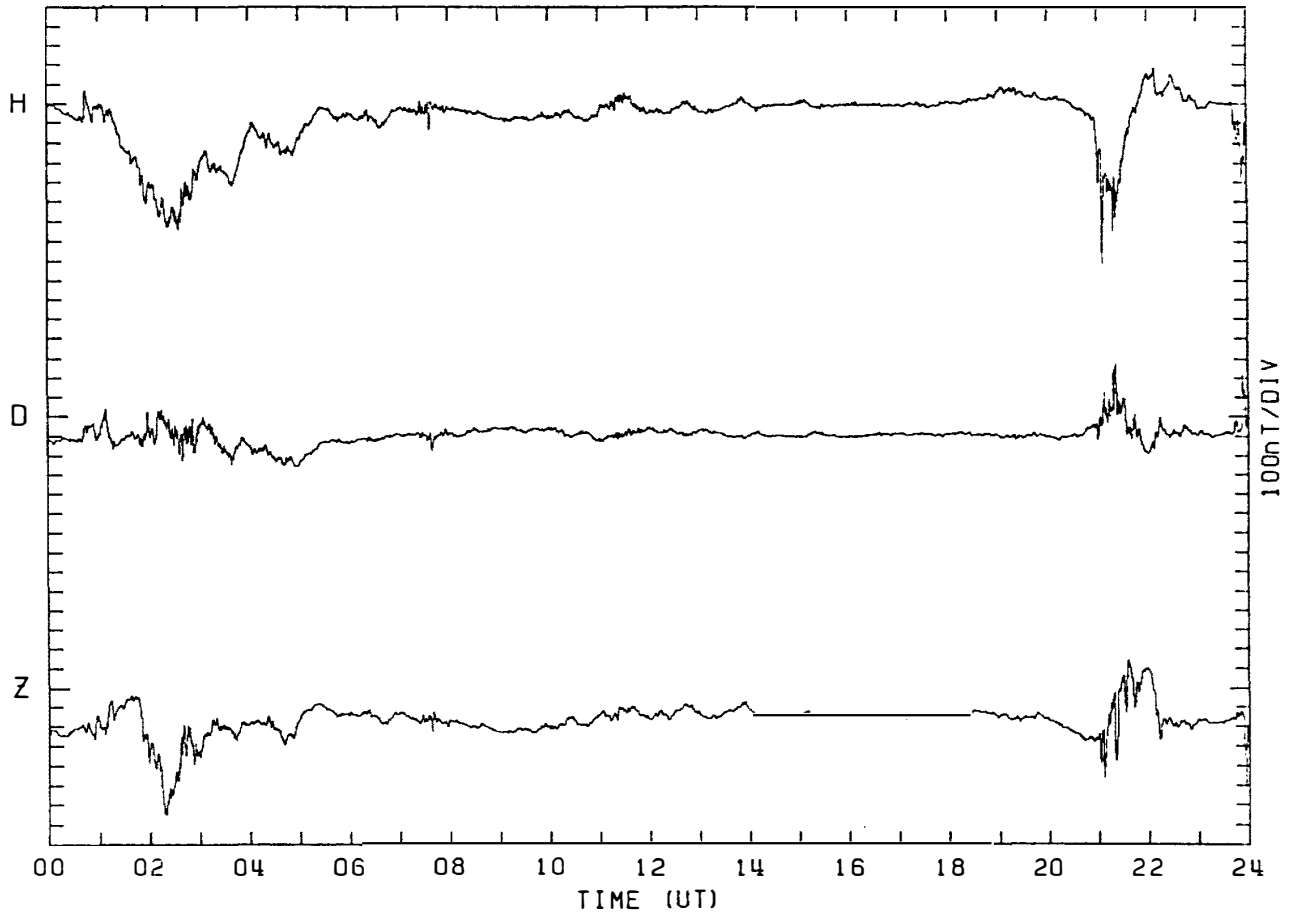
MAGNETOGRAM SYOWA STATION

DAY:210 JULY 29. 1983



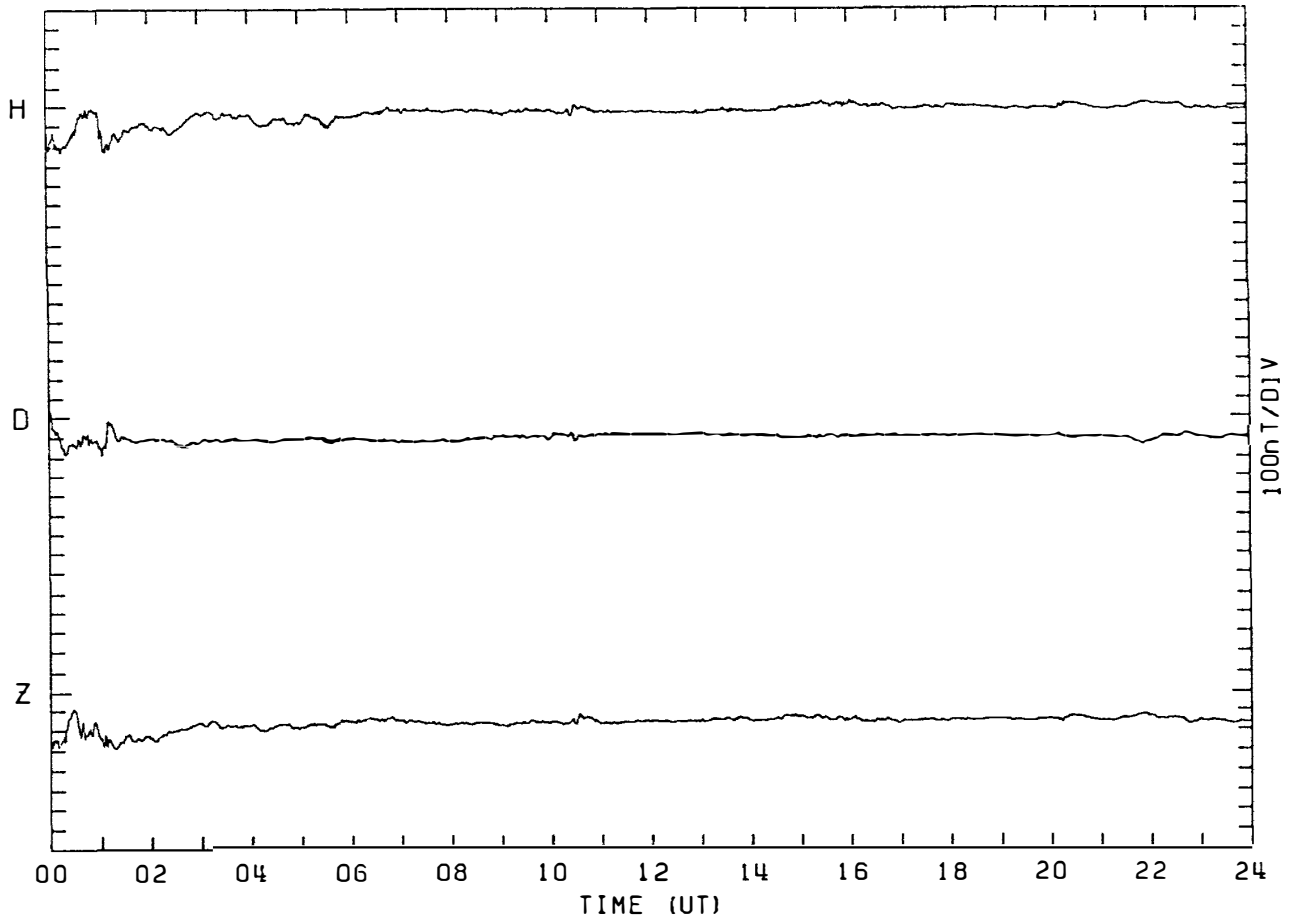
MAGNETOGRAM SYOWA STATION

DAY:211 JULY 30. 1983



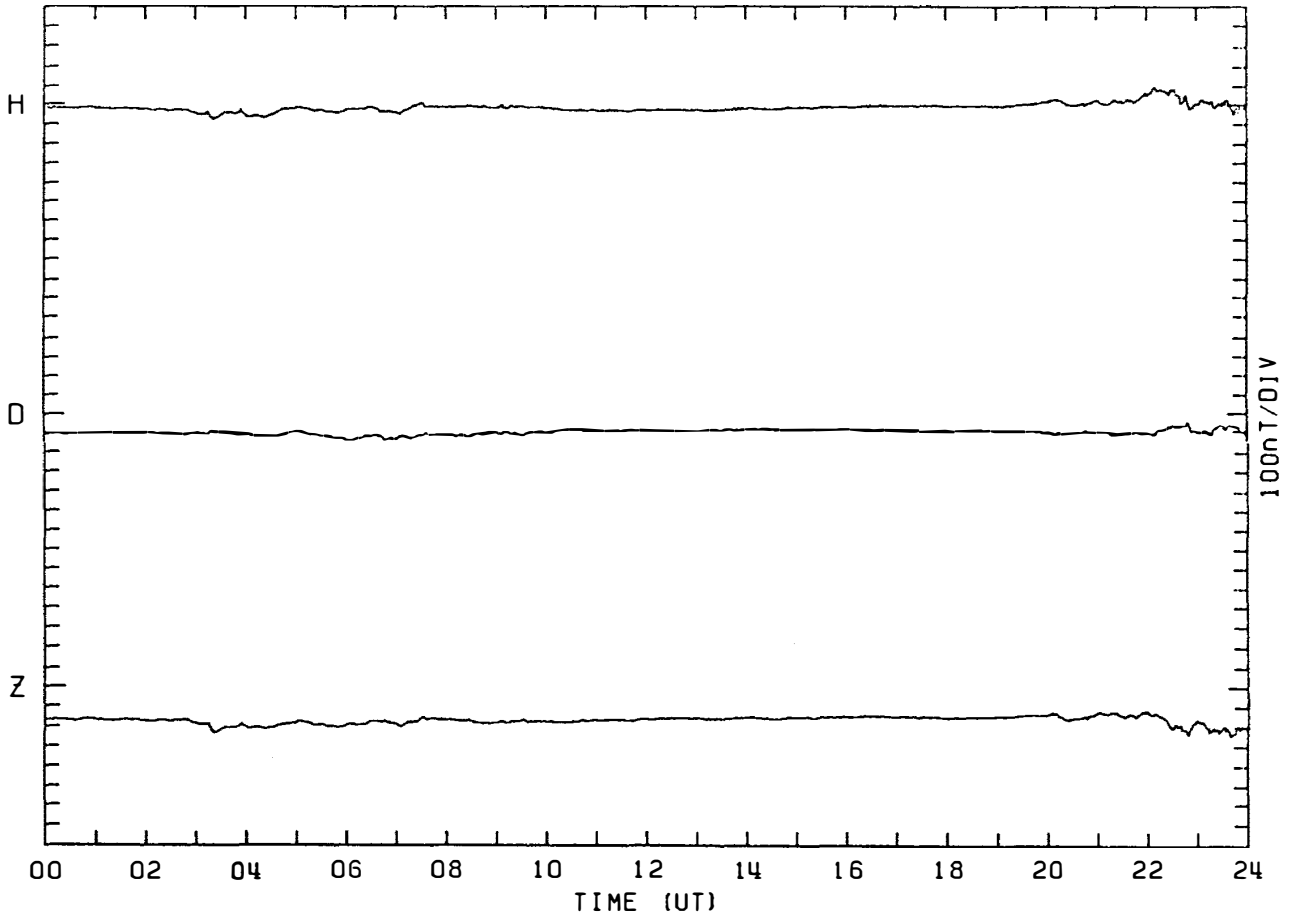
MAGNETOGRAM SYOWA STATION

DAY:212 JULY 31. 1983



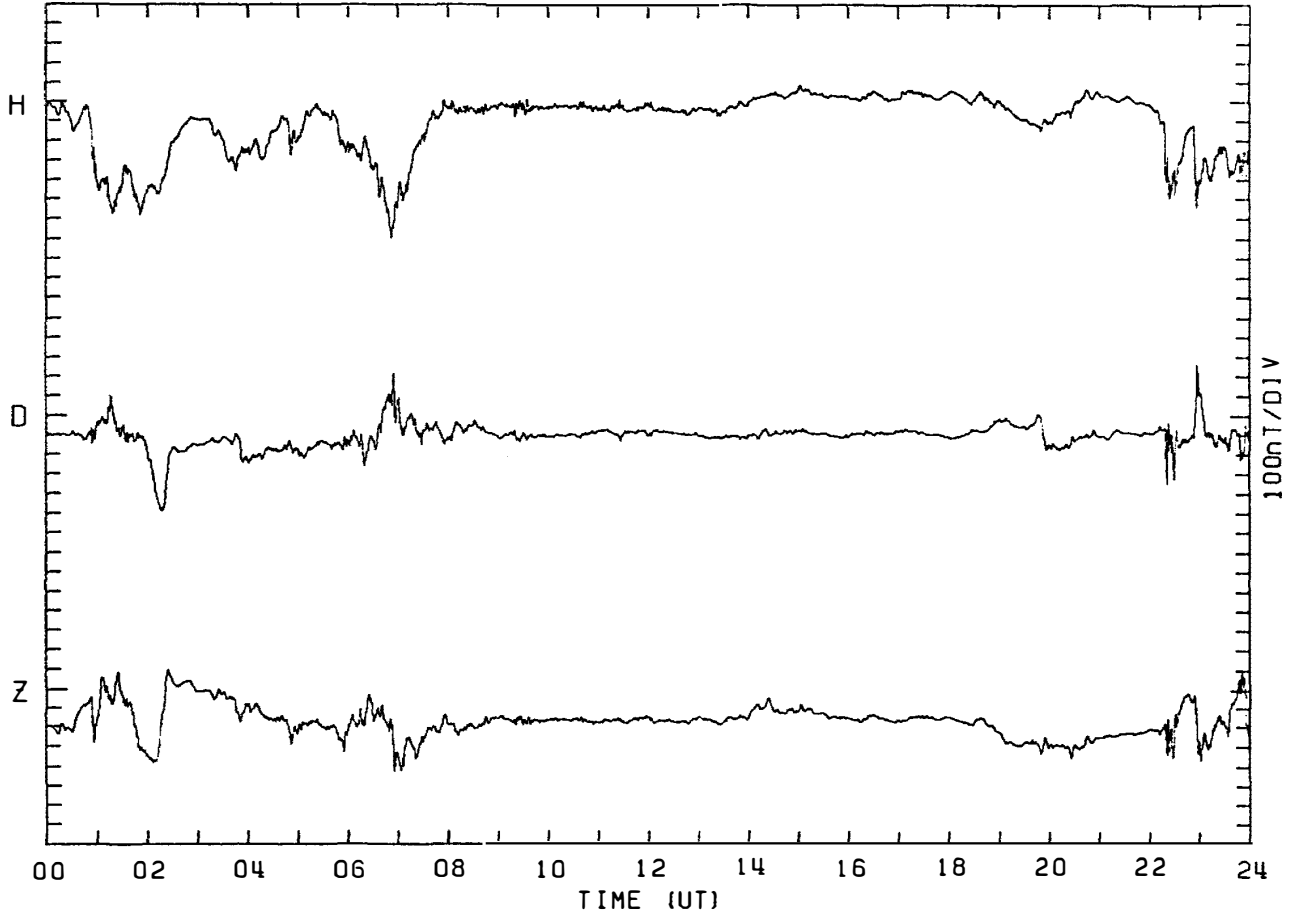
MAGNETOGRAM SYOWA STATION

DAY:213 AUGUST 1. 1983



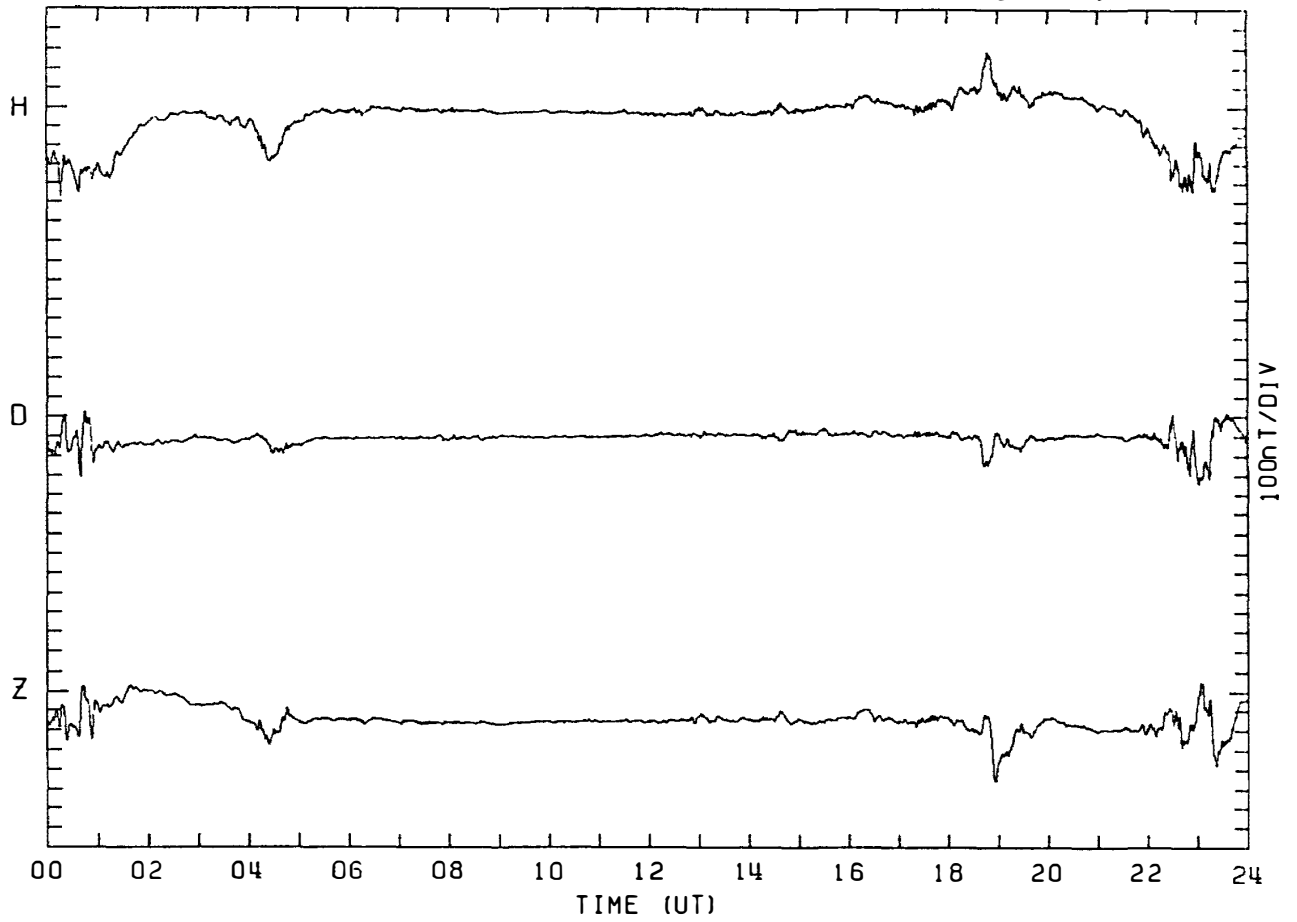
MAGNETOGRAM SYOWA STATION

DAY:214 AUGUST 2. 1983



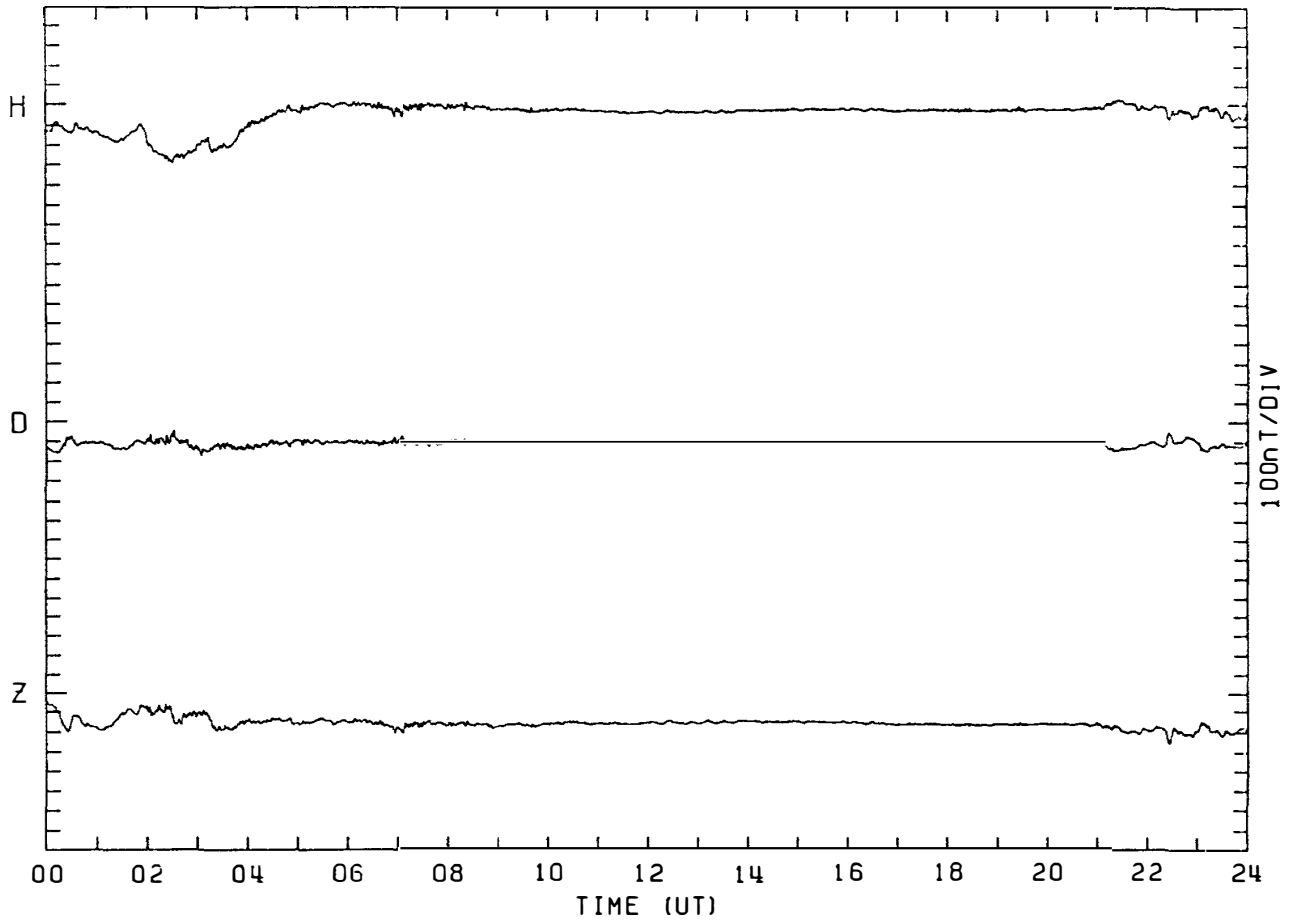
MAGNETOGRAM SYOWA STATION

DAY:215 AUGUST 3. 1983



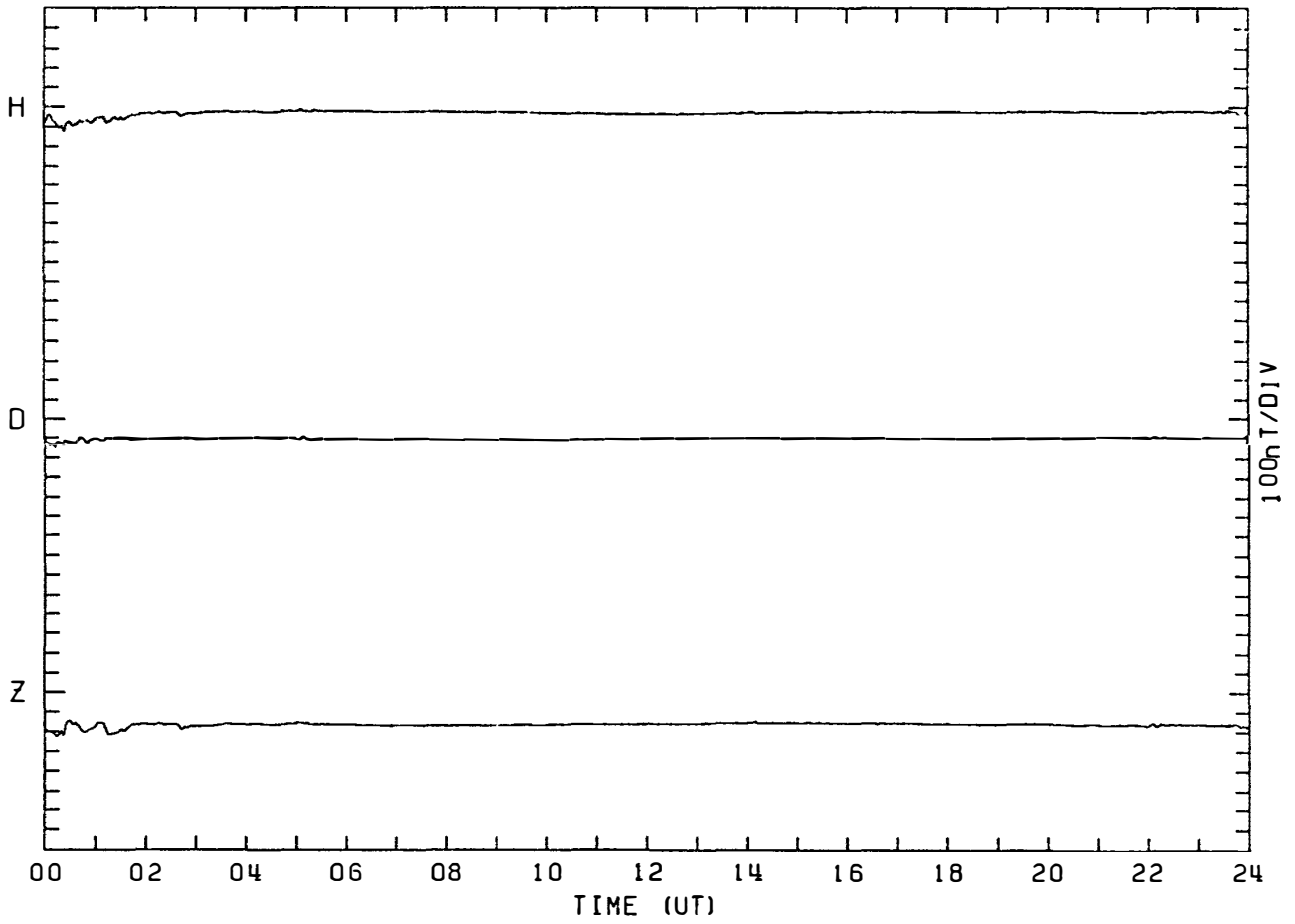
MAGNETOGRAM SYOWA STATION

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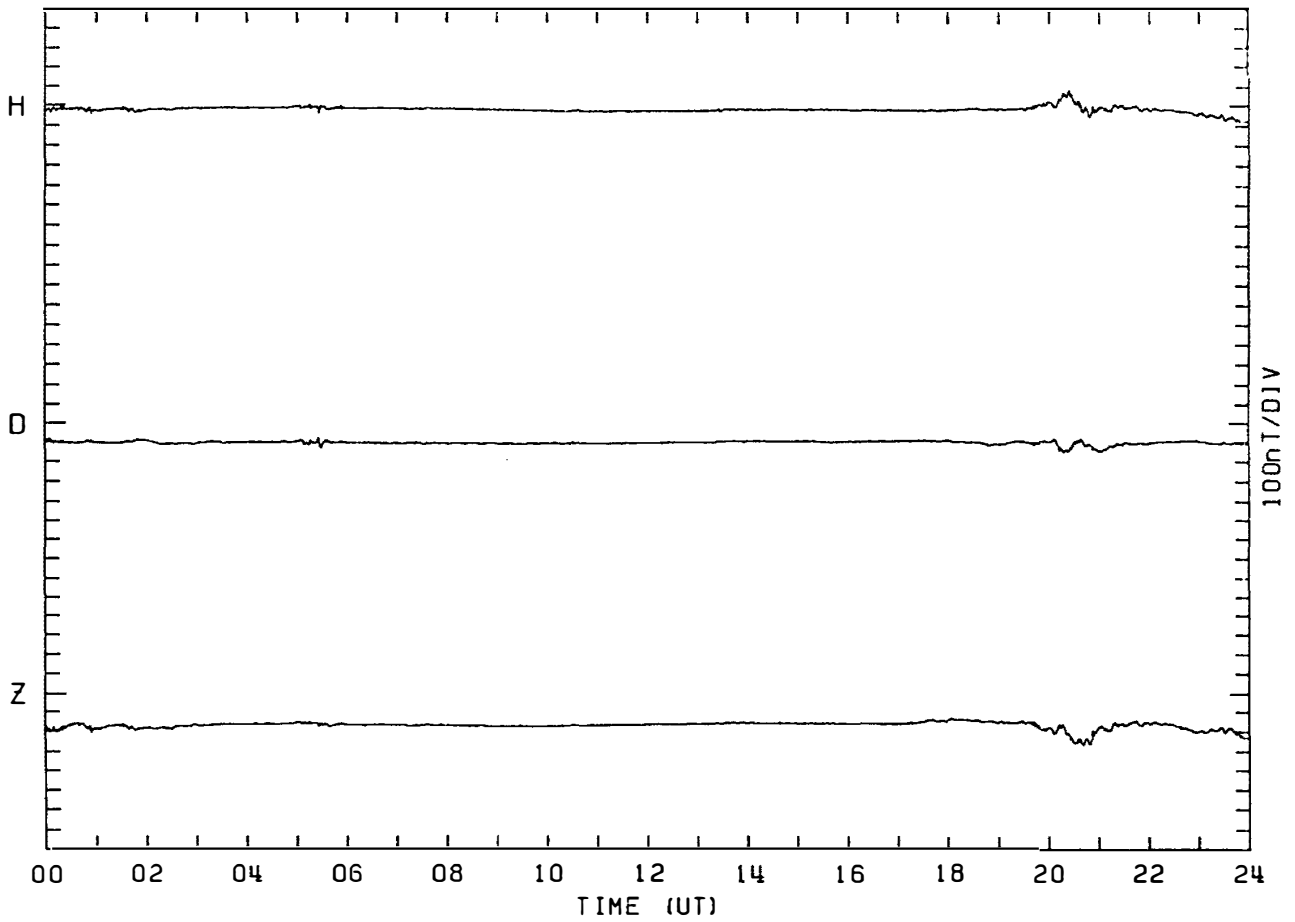
MAGNETOGRAM SYOWA STATION

DAY:217 AUGUST 5. 1983



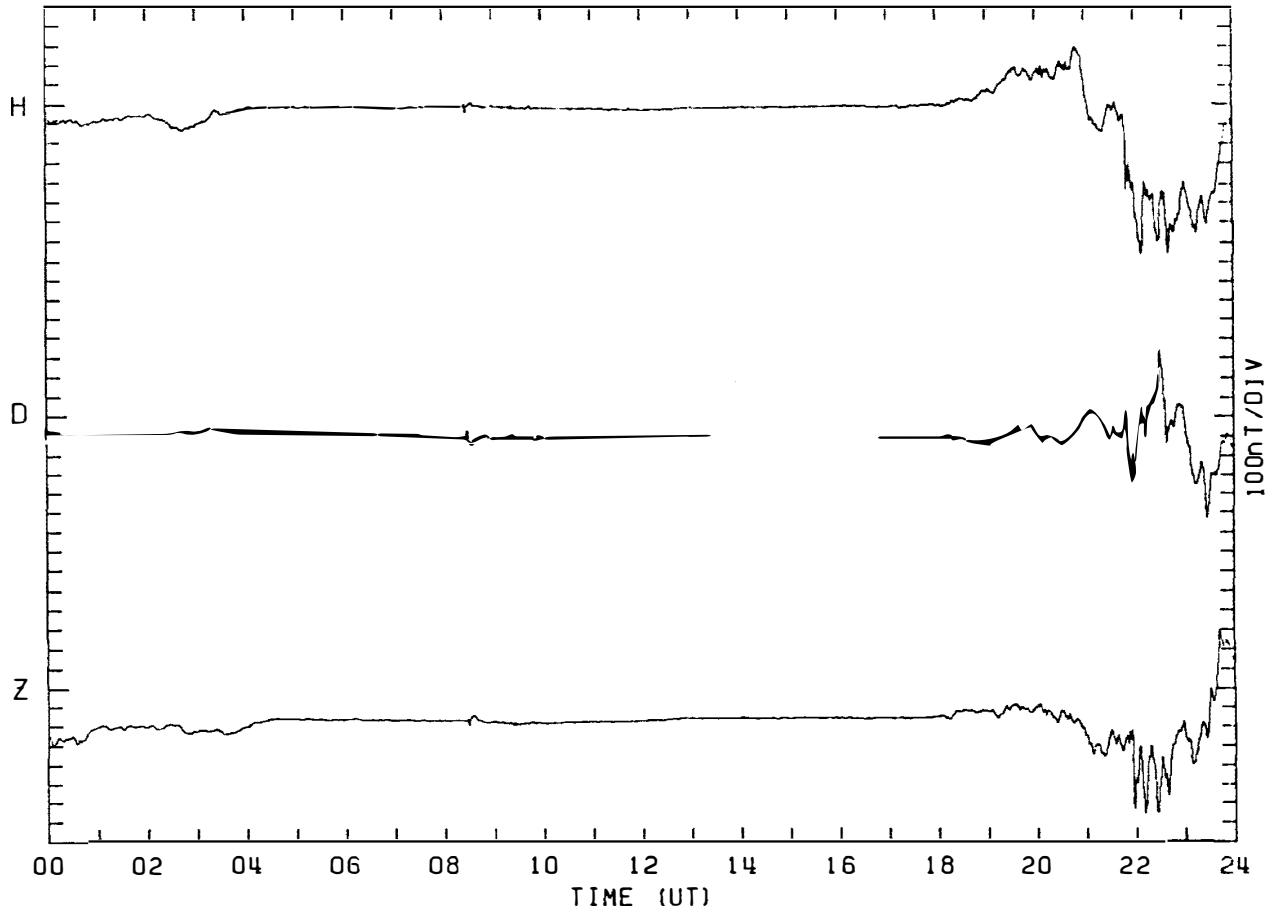
MAGNETOGRAM SYOWA STATION

DAY:218 AUGUST 6. 1983



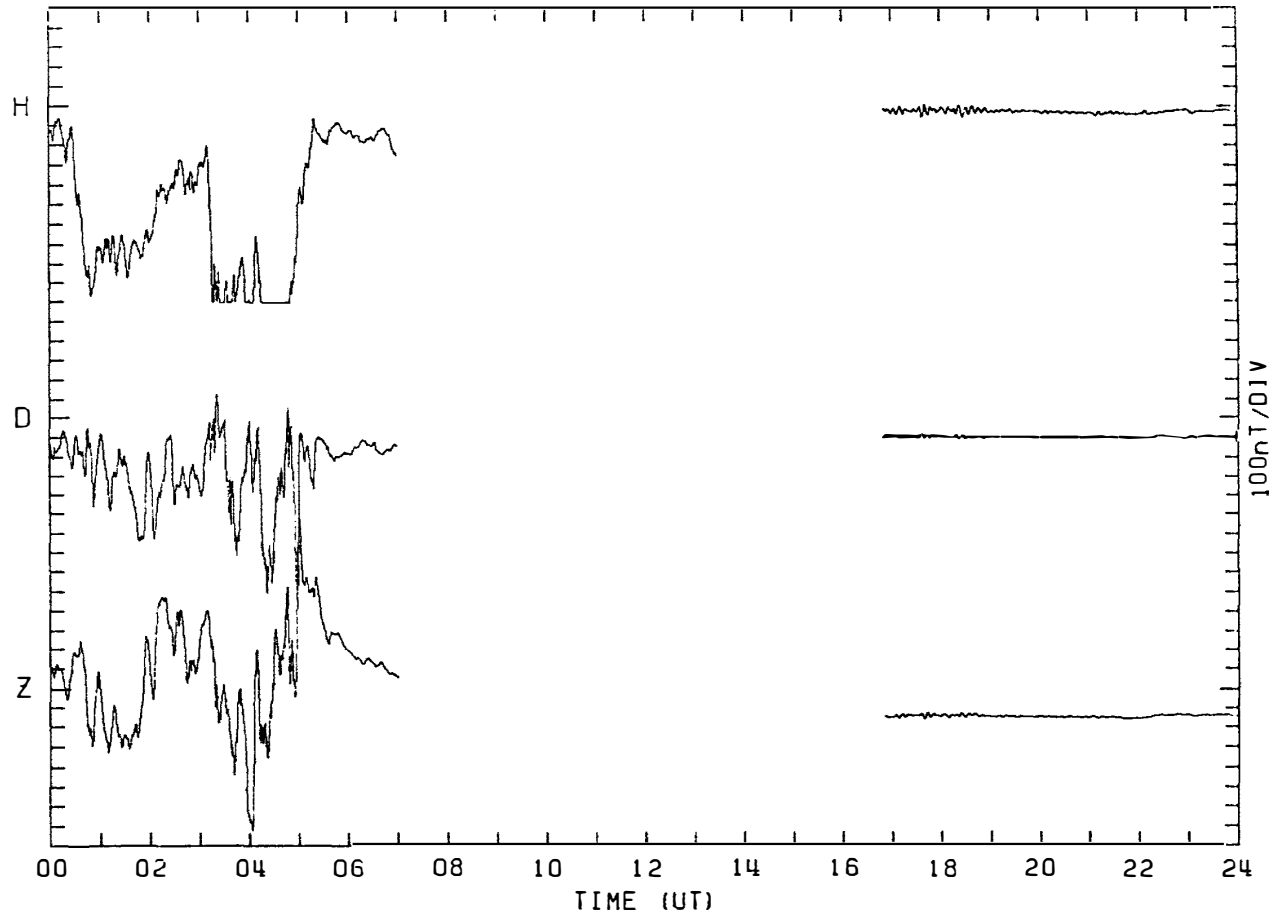
MAGNETOGRAM SYOWA STATION

DAY:219 AUGUST 7. 1983



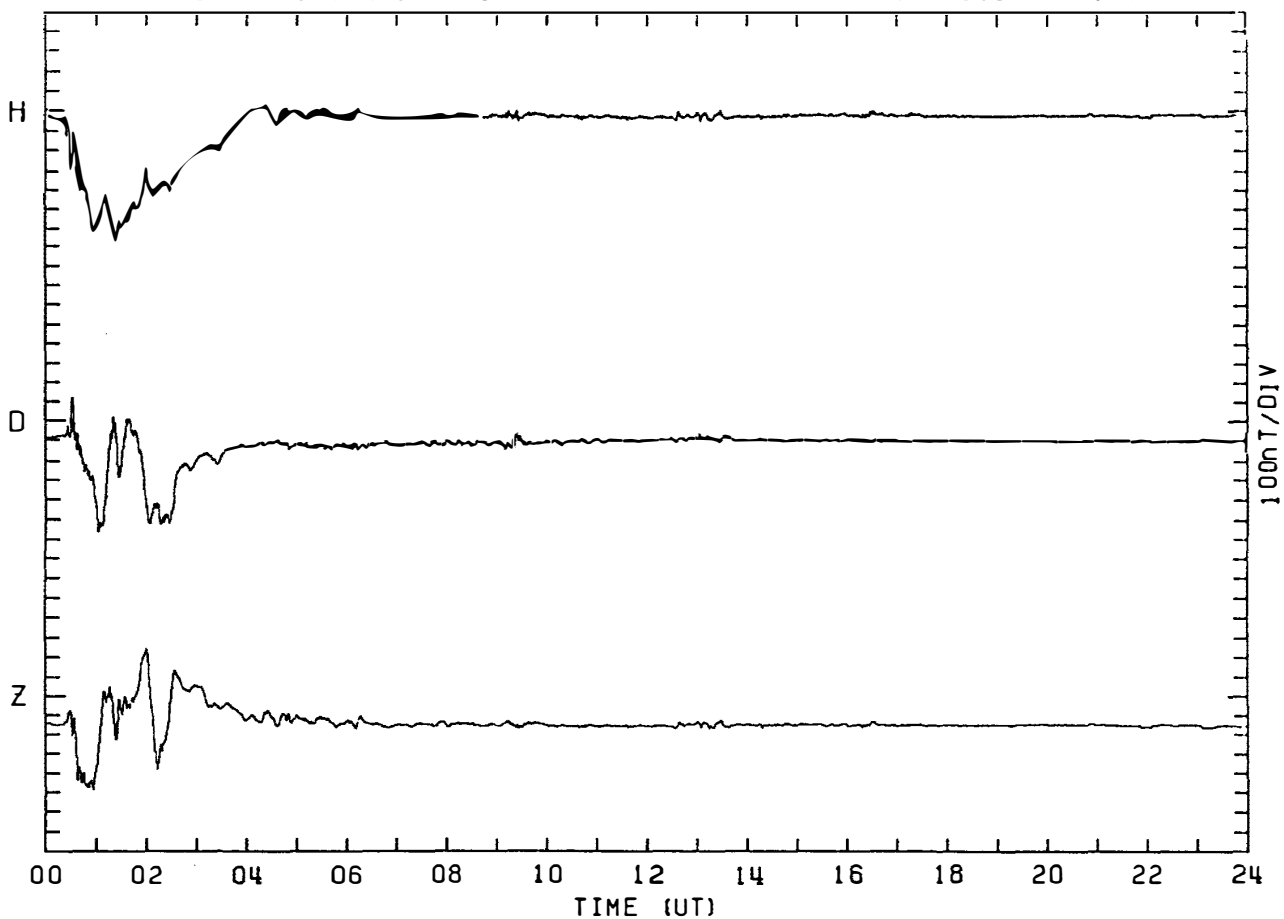
MAGNETOGRAM SYOWA STATION

DAY:220 AUGUST 8. 1983



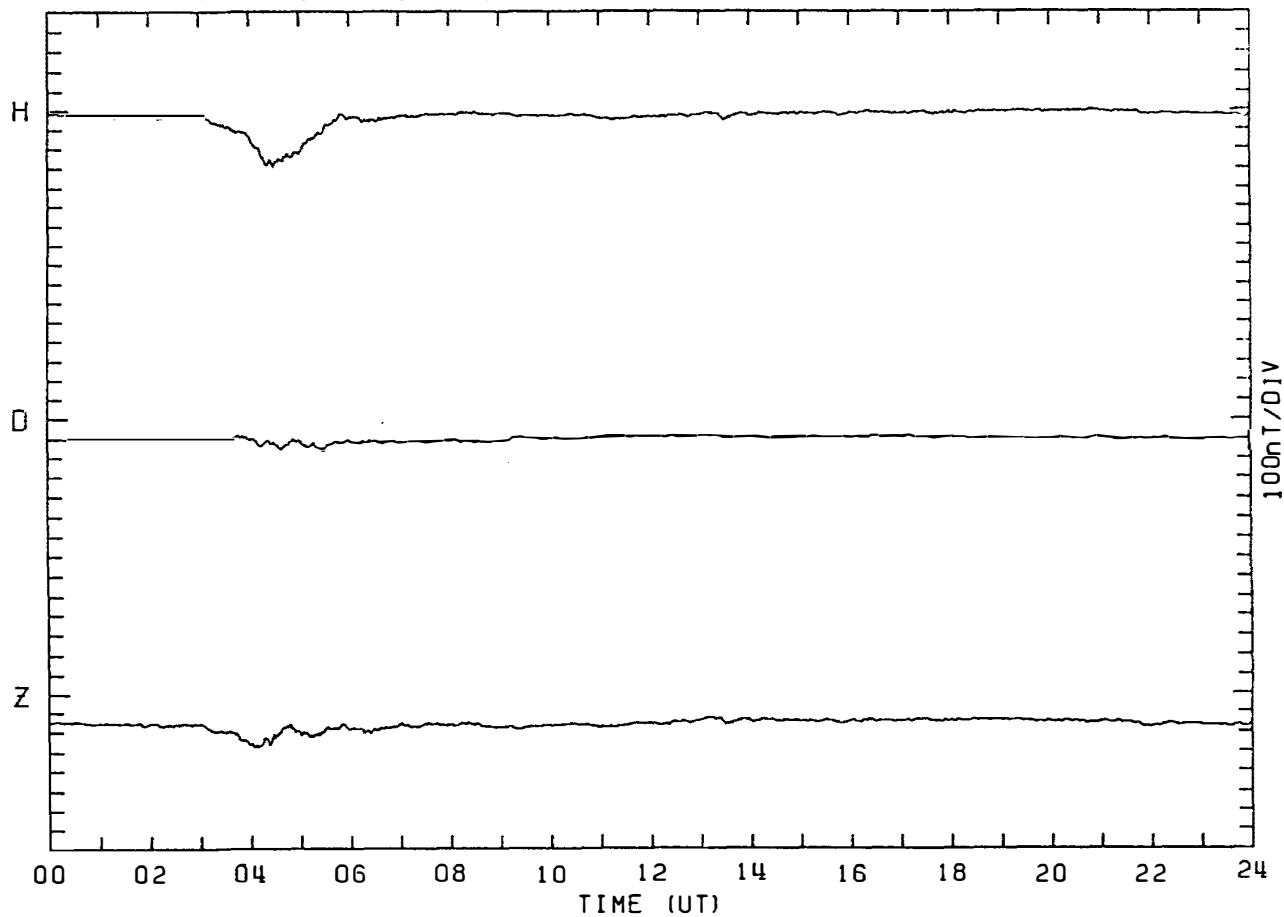
MAGNETOGRAM SYOWA STATION

DAY:221 AUGUST 9. 1983



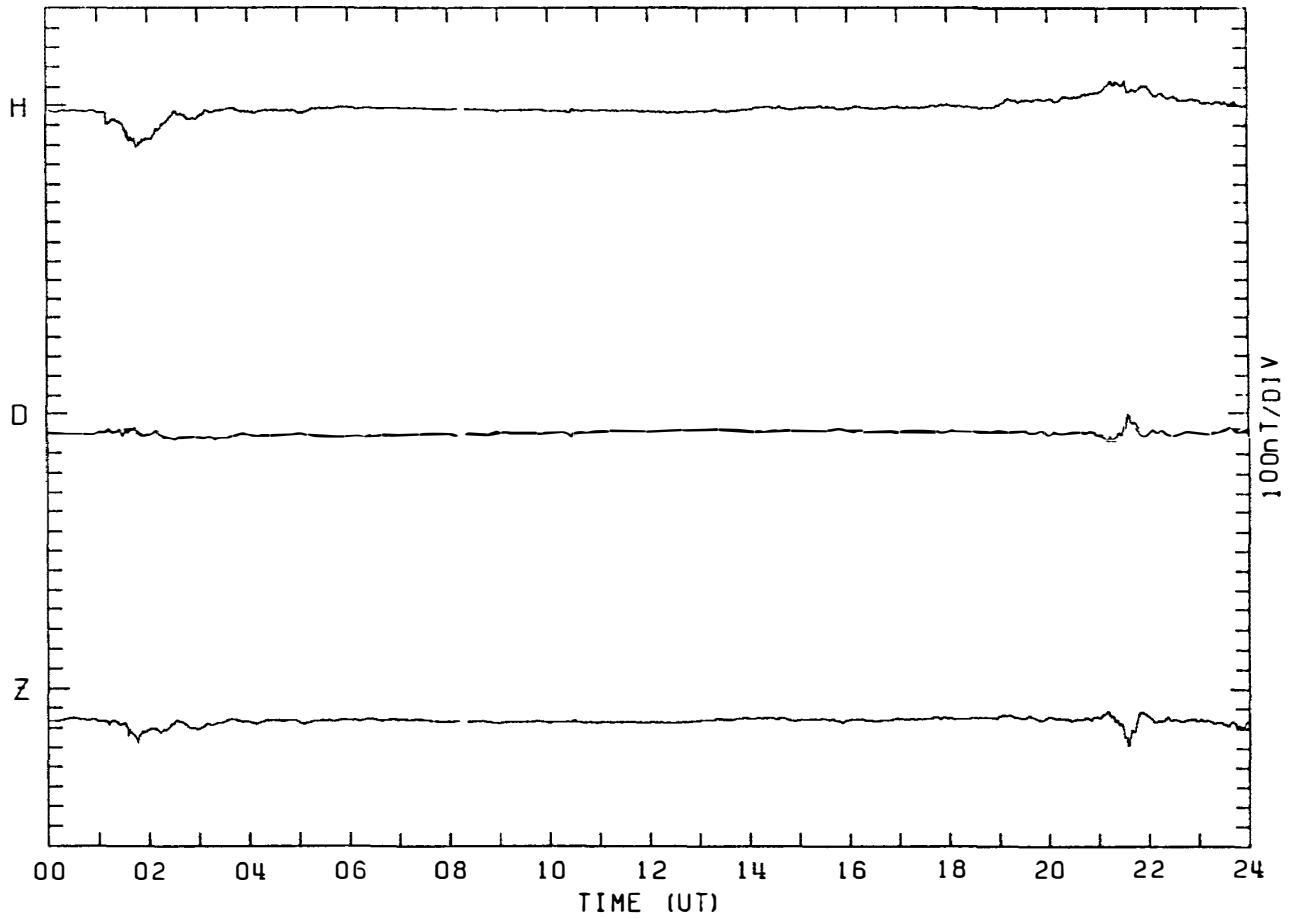
MAGNETOGRAM SYOWA STATION

DAY:222 AUGUST 10. 1983



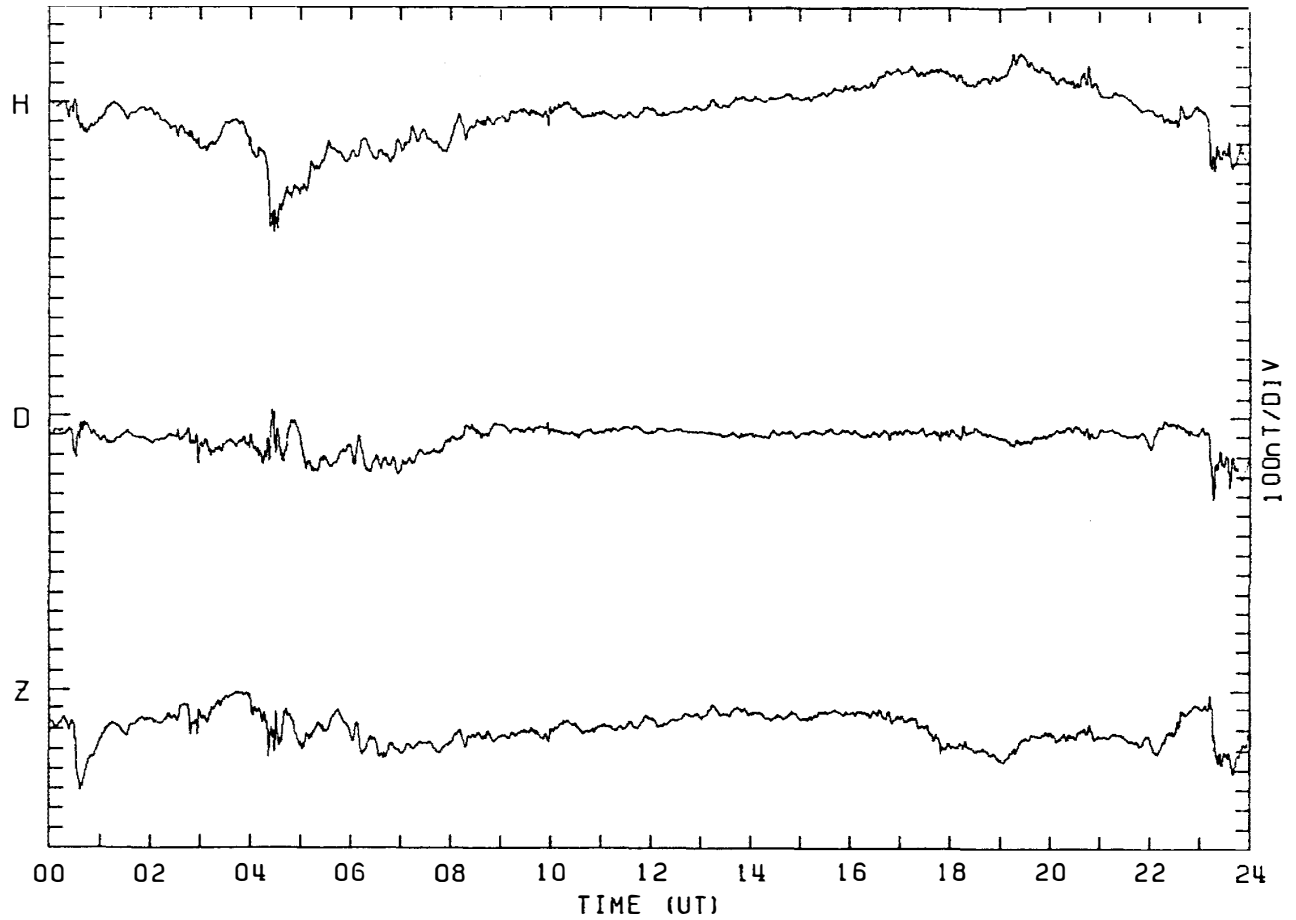
MAGNETOGRAM SYOWA STATION

DAY:223 AUGUST 11, 1983



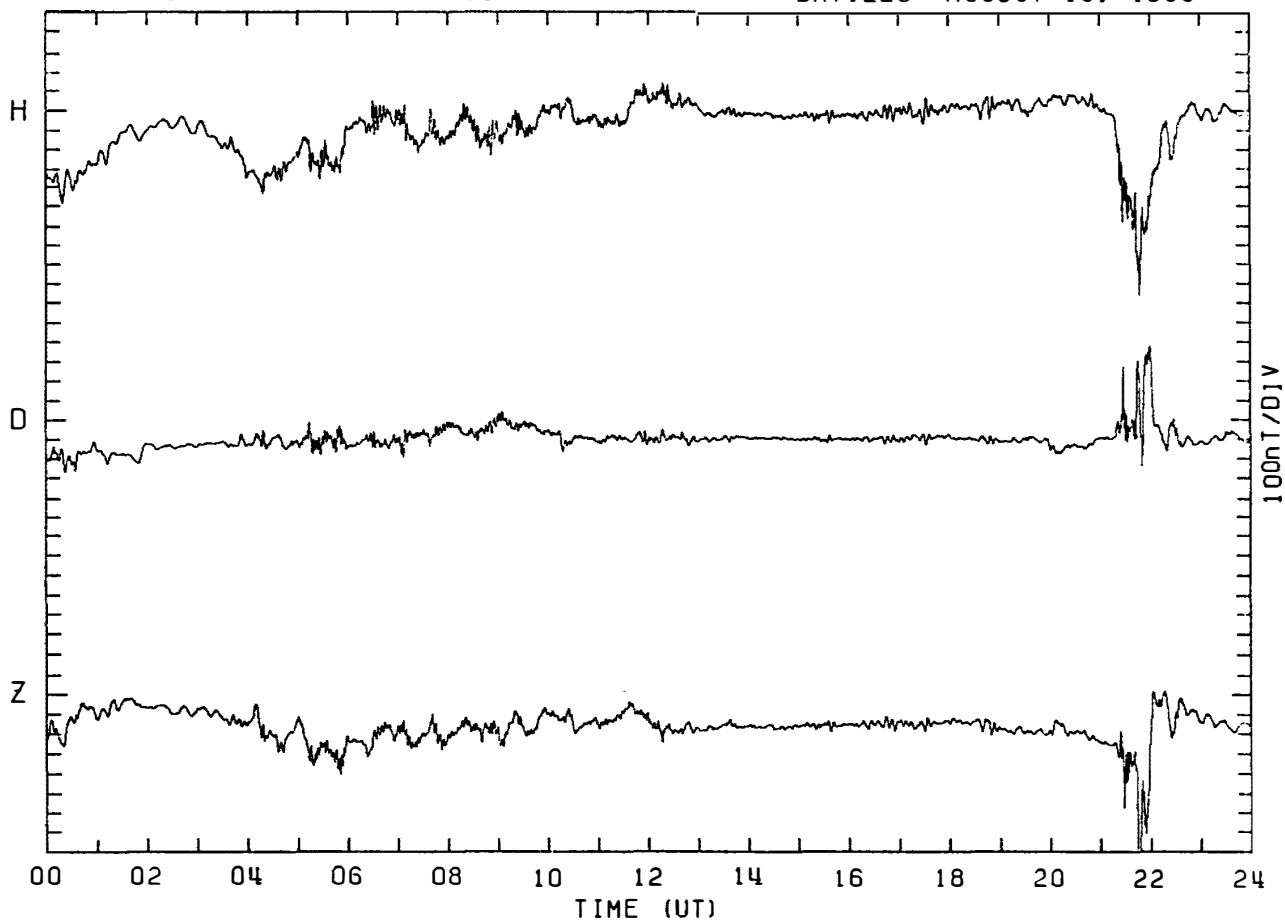
MAGNETOGRAM SYOWA STATION

DAY:224 AUGUST 12, 1983



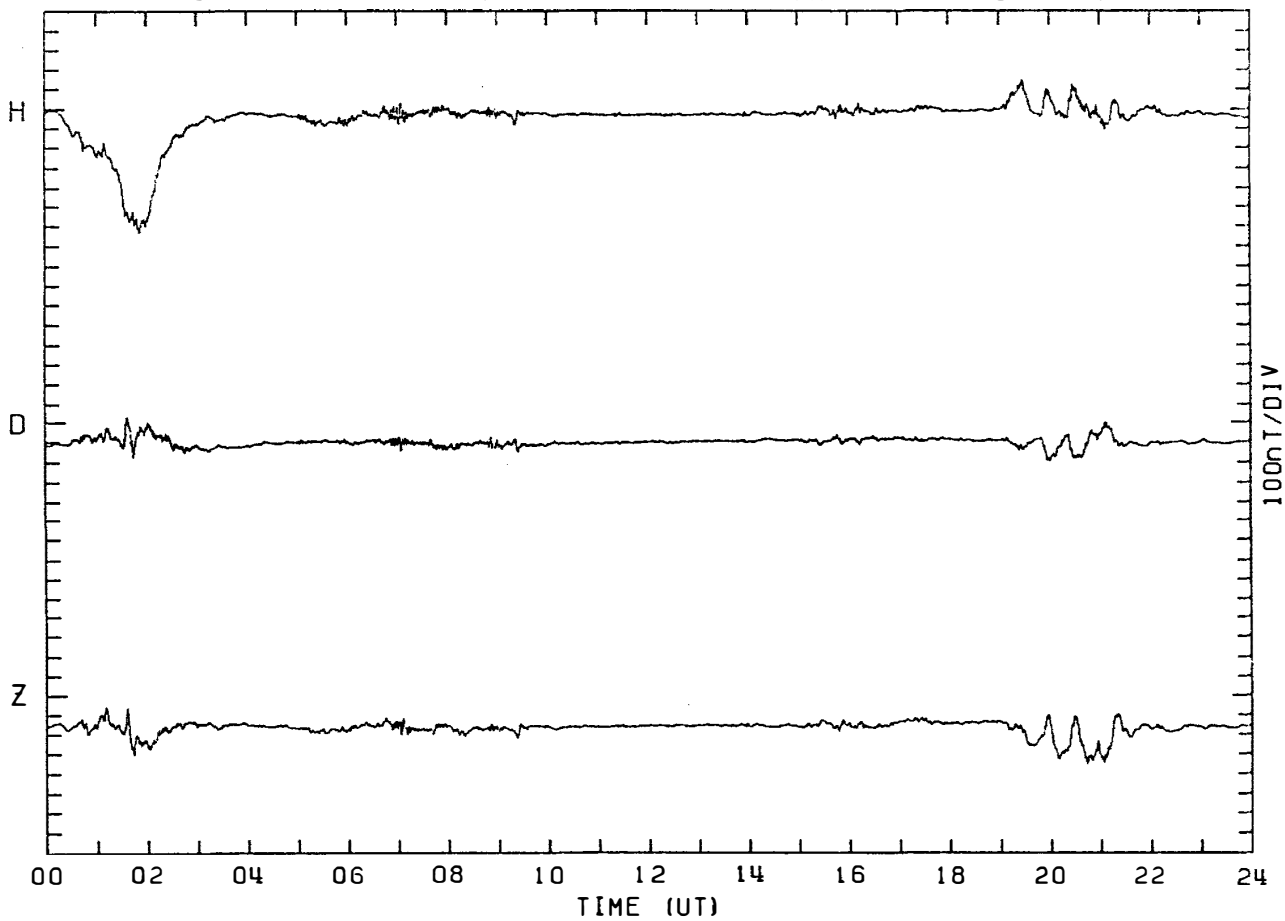
MAGNETOGRAM SYOWA STATION

DAY:225 AUGUST 13. 1983



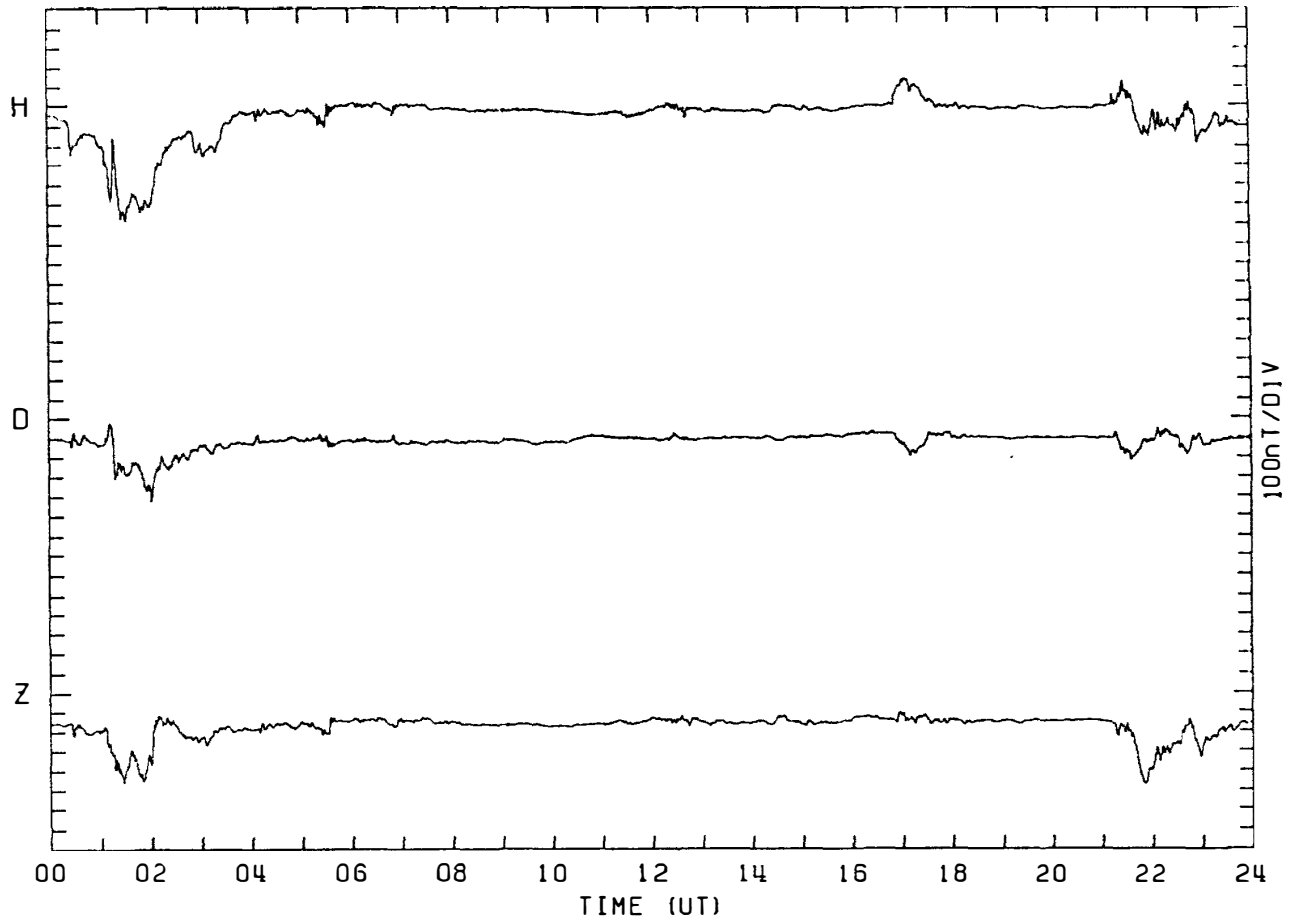
MAGNETOGRAM SYOWA STATION

DAY:226 AUGUST 14. 1983



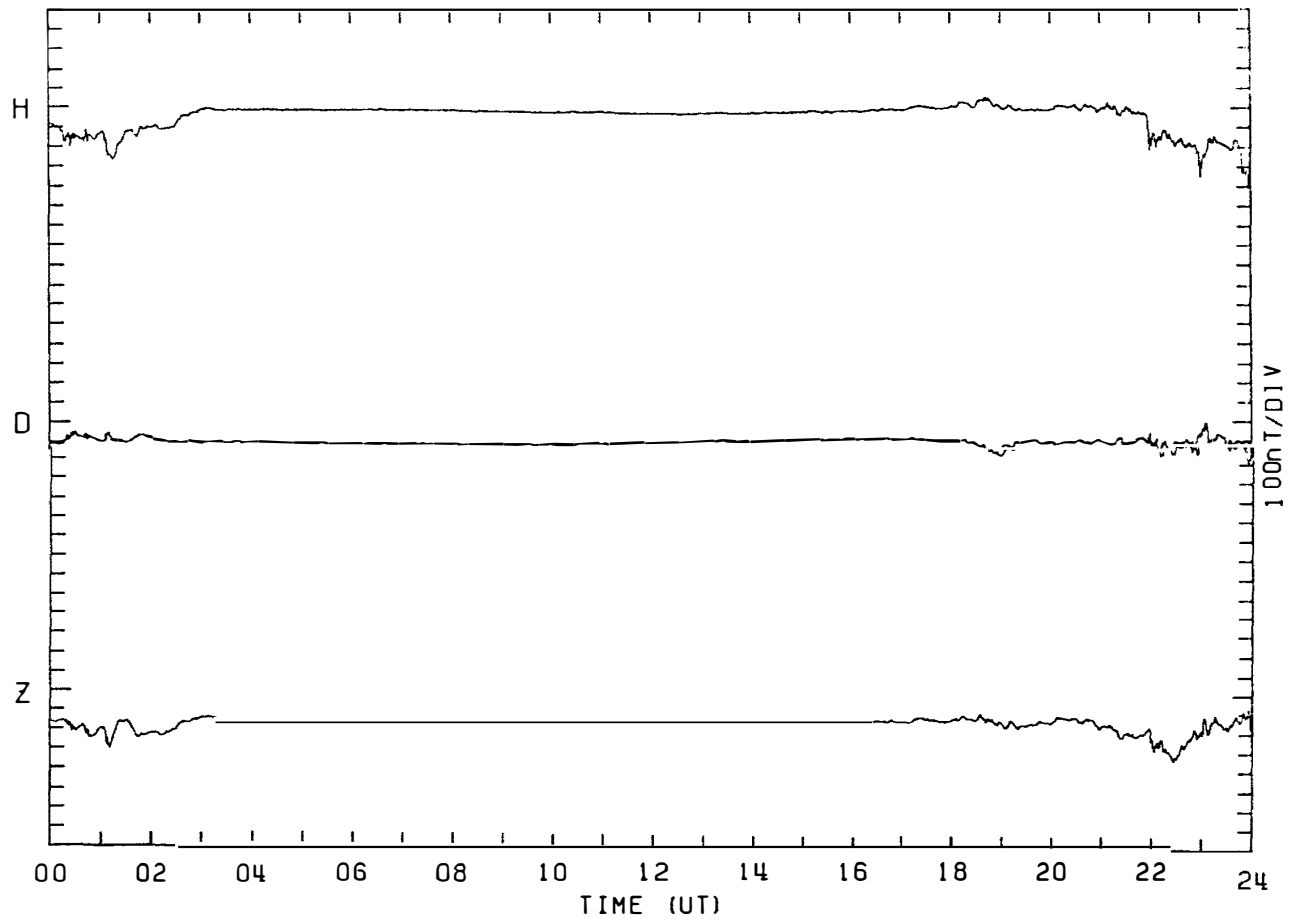
MAGNETOGRAM SYOWA STATION

DAY:227 AUGUST 15. 1983



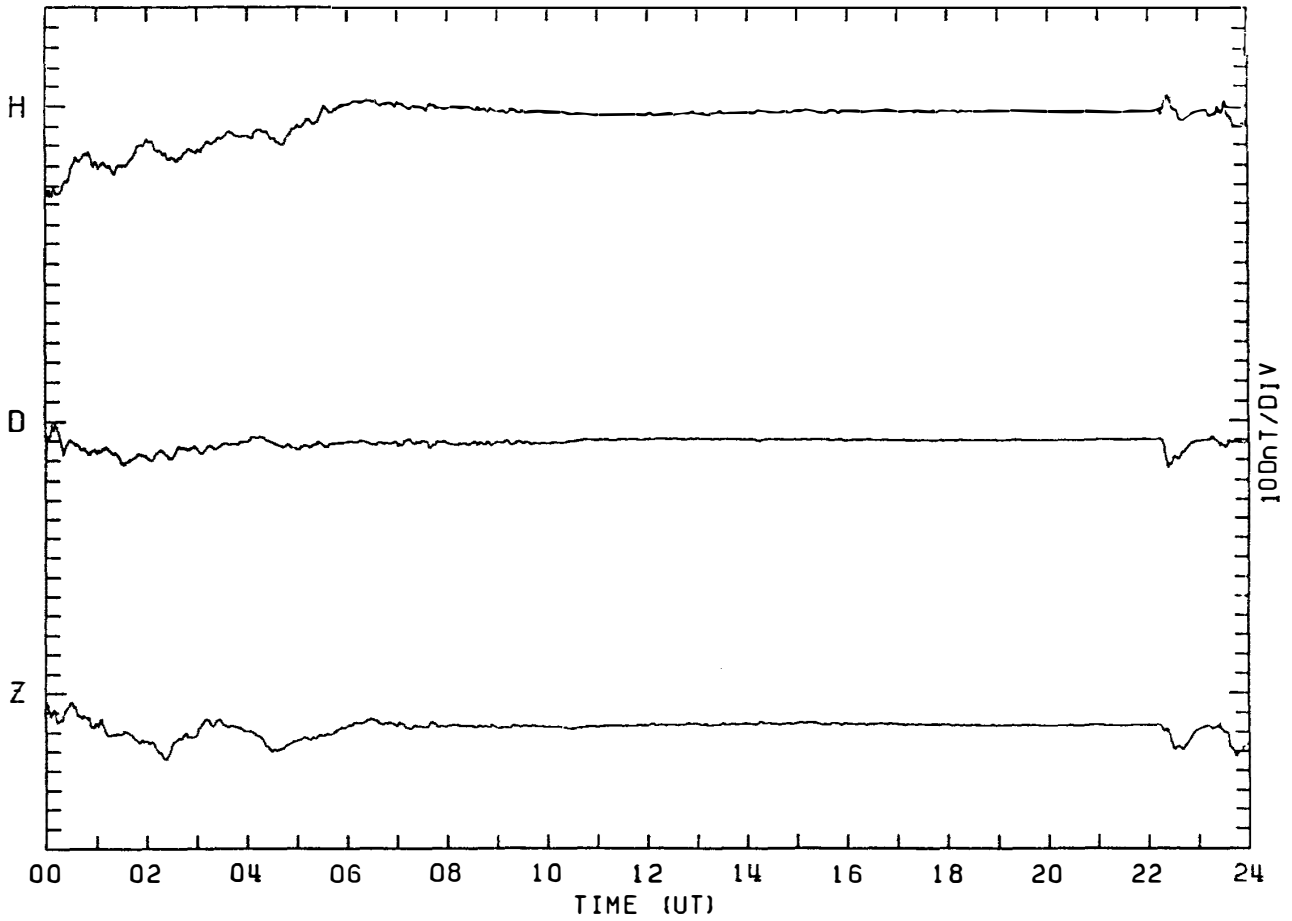
MAGNETOGRAM SYOWA STATION

DAY:228 AUGUST 16. 1983



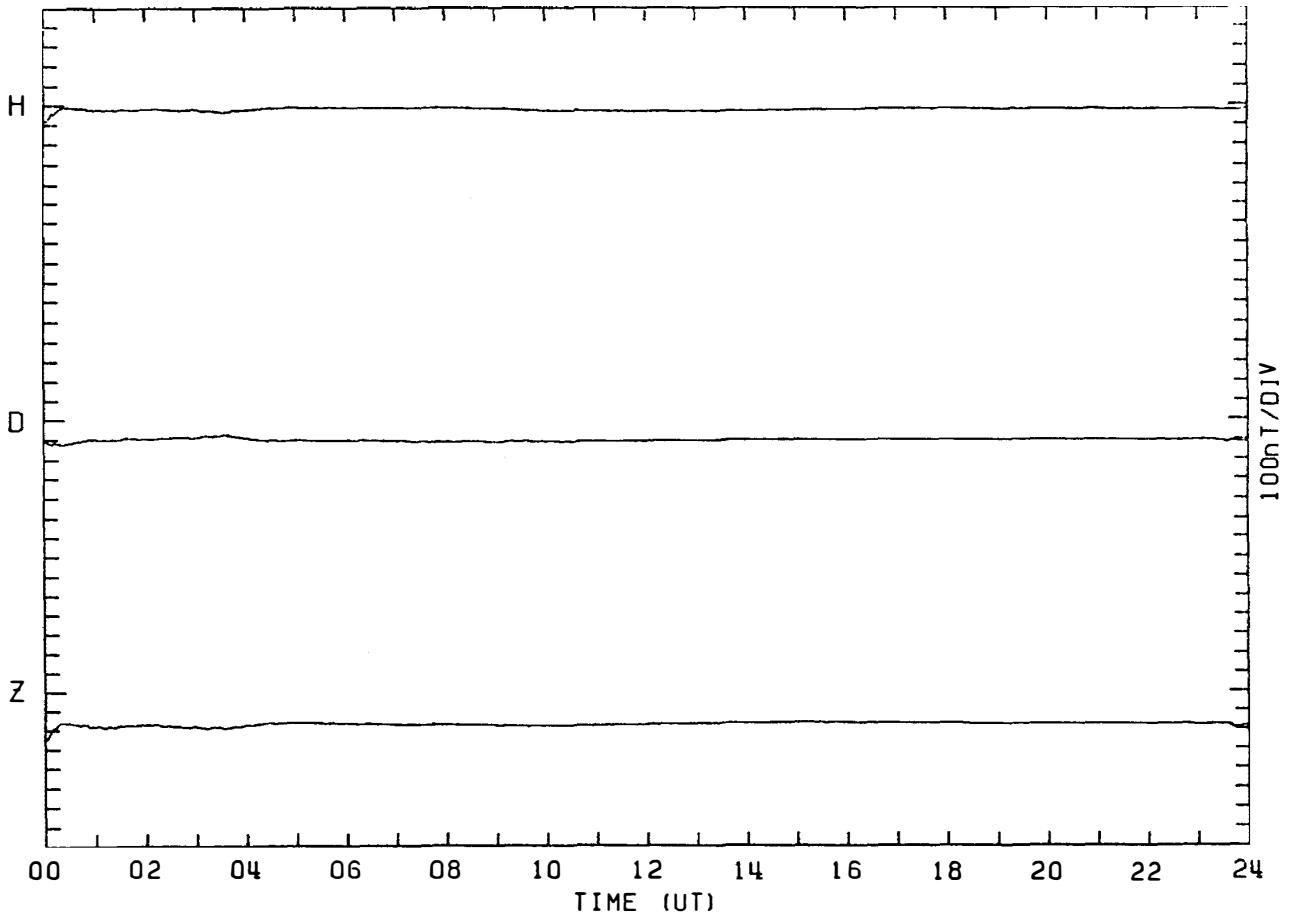
MAGNETOGRAM SYOWA STATION

DAY:229 AUGUST 17. 1983



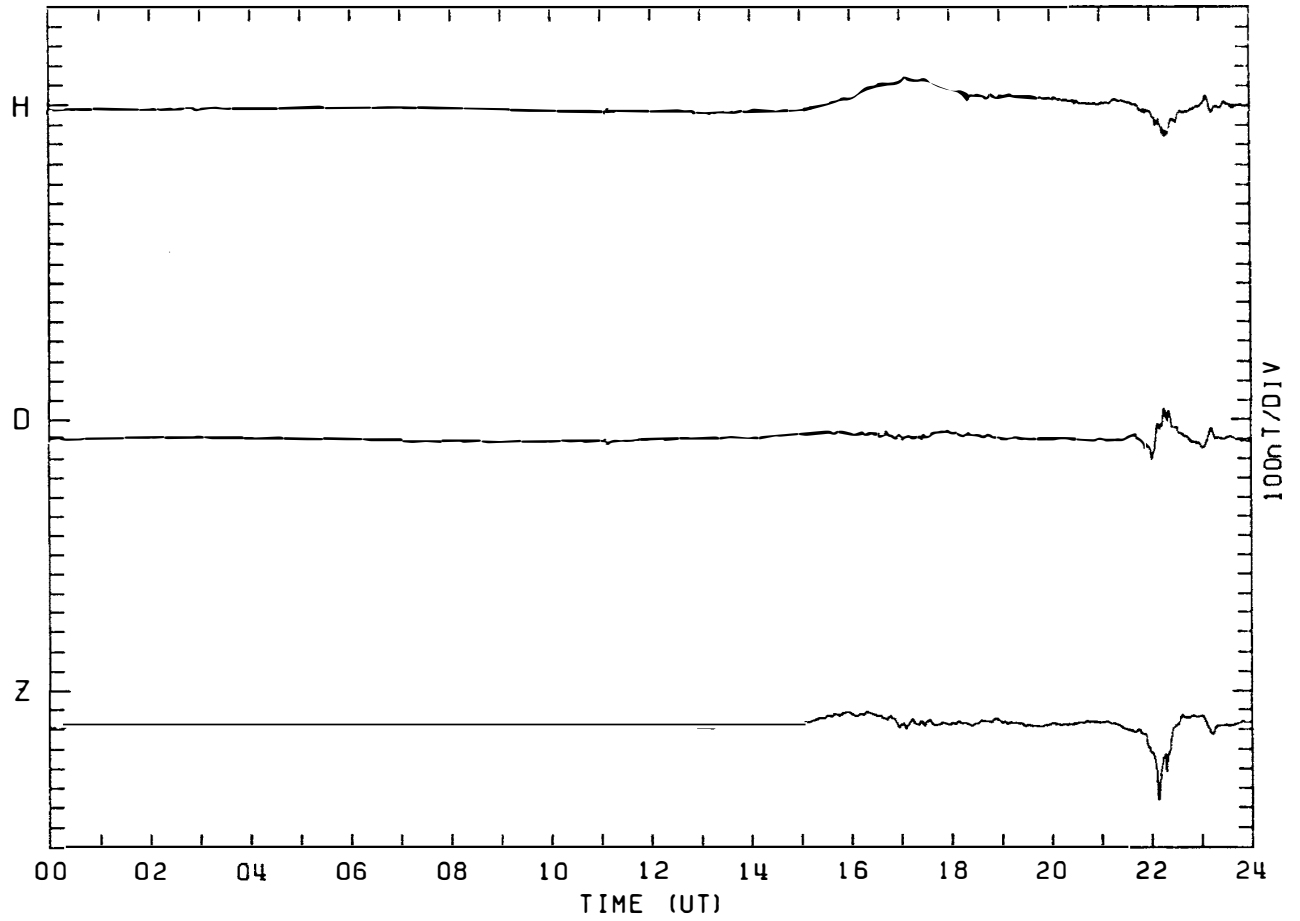
MAGNETOGRAM SYOWA STATION

DAY:230 AUGUST 18. 1983



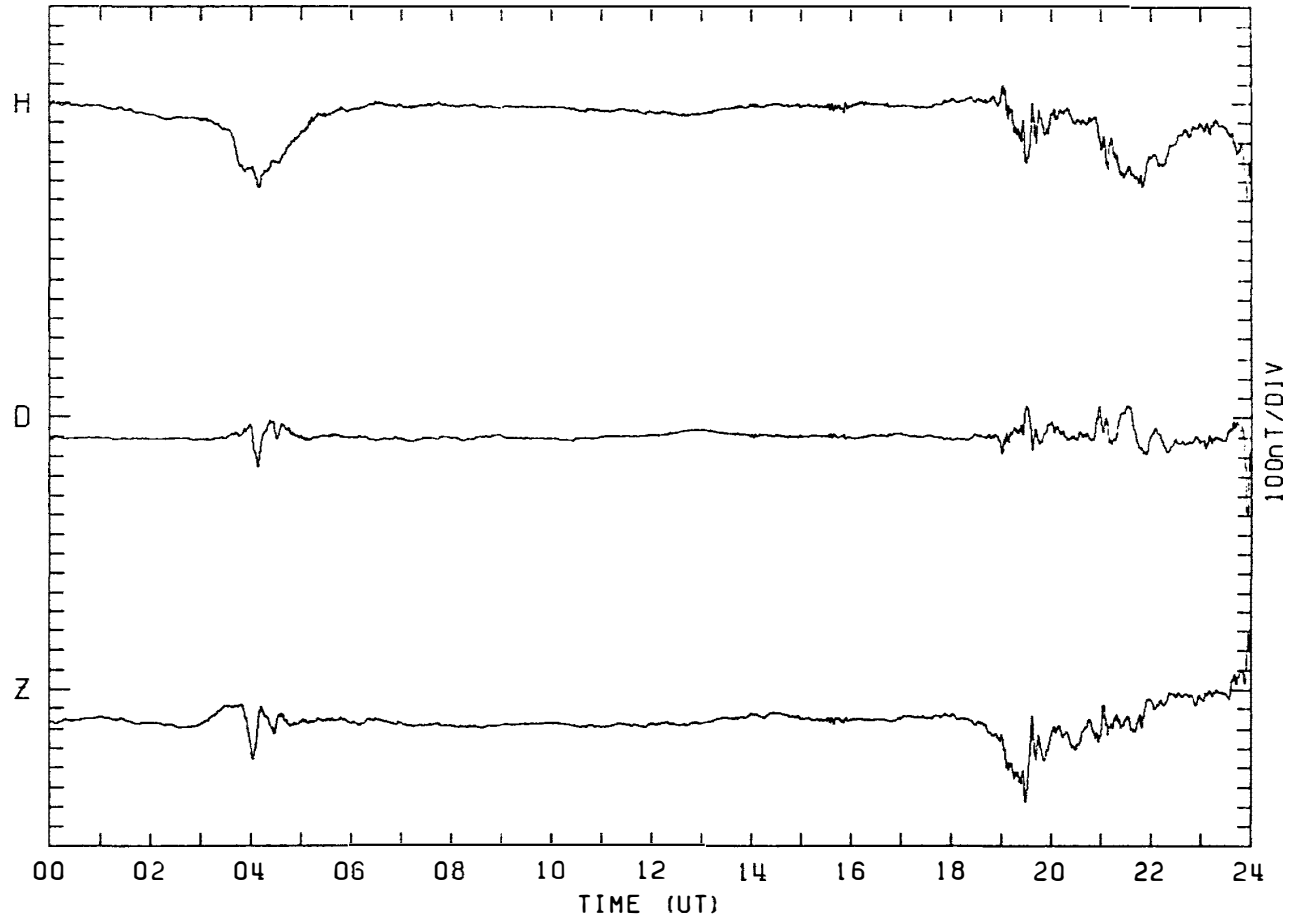
MAGNETOGRAM SYOWA STATION

DAY:231 AUGUST 19. 1983



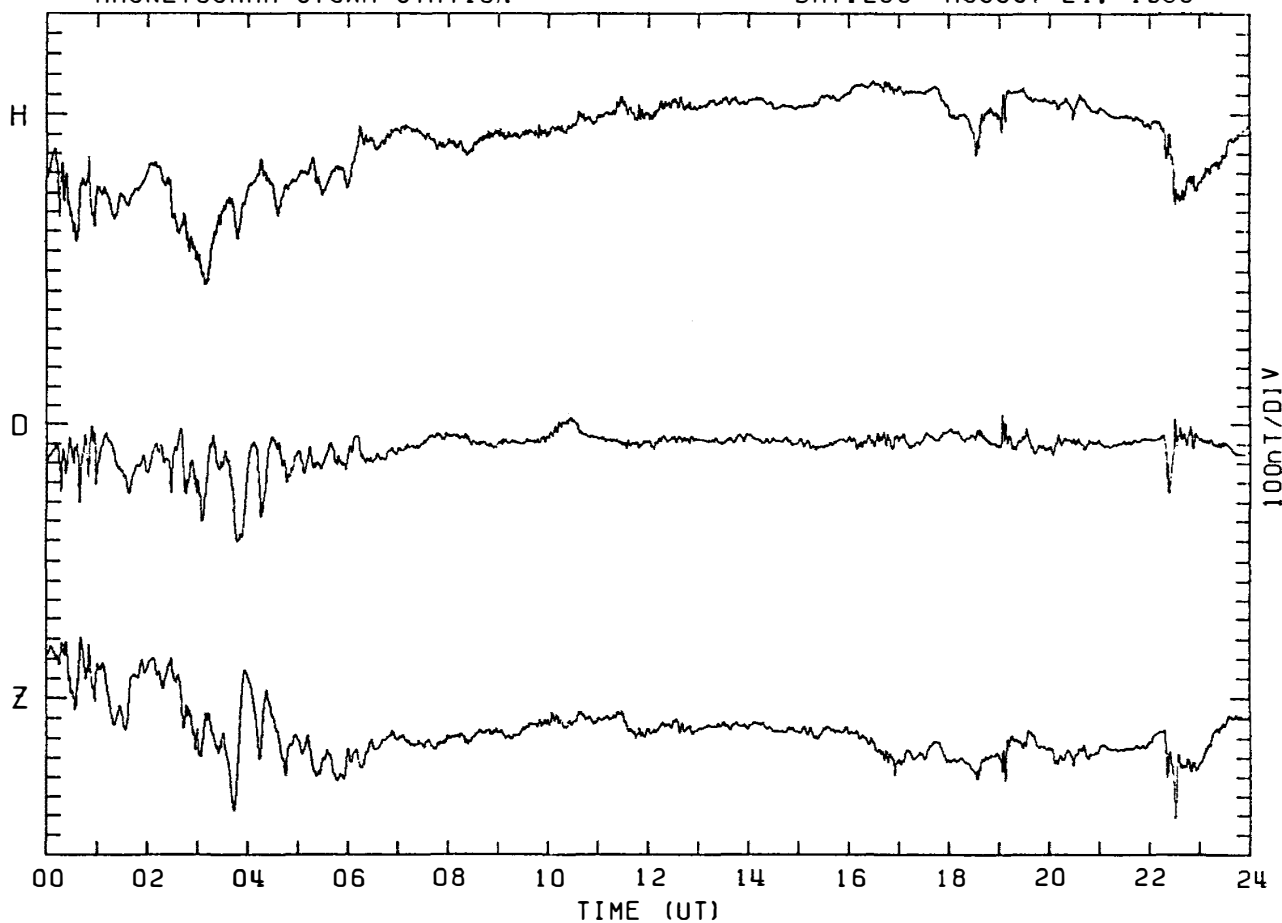
MAGNETOGRAM SYOWA STATION

DAY:232 AUGUST 20. 1983



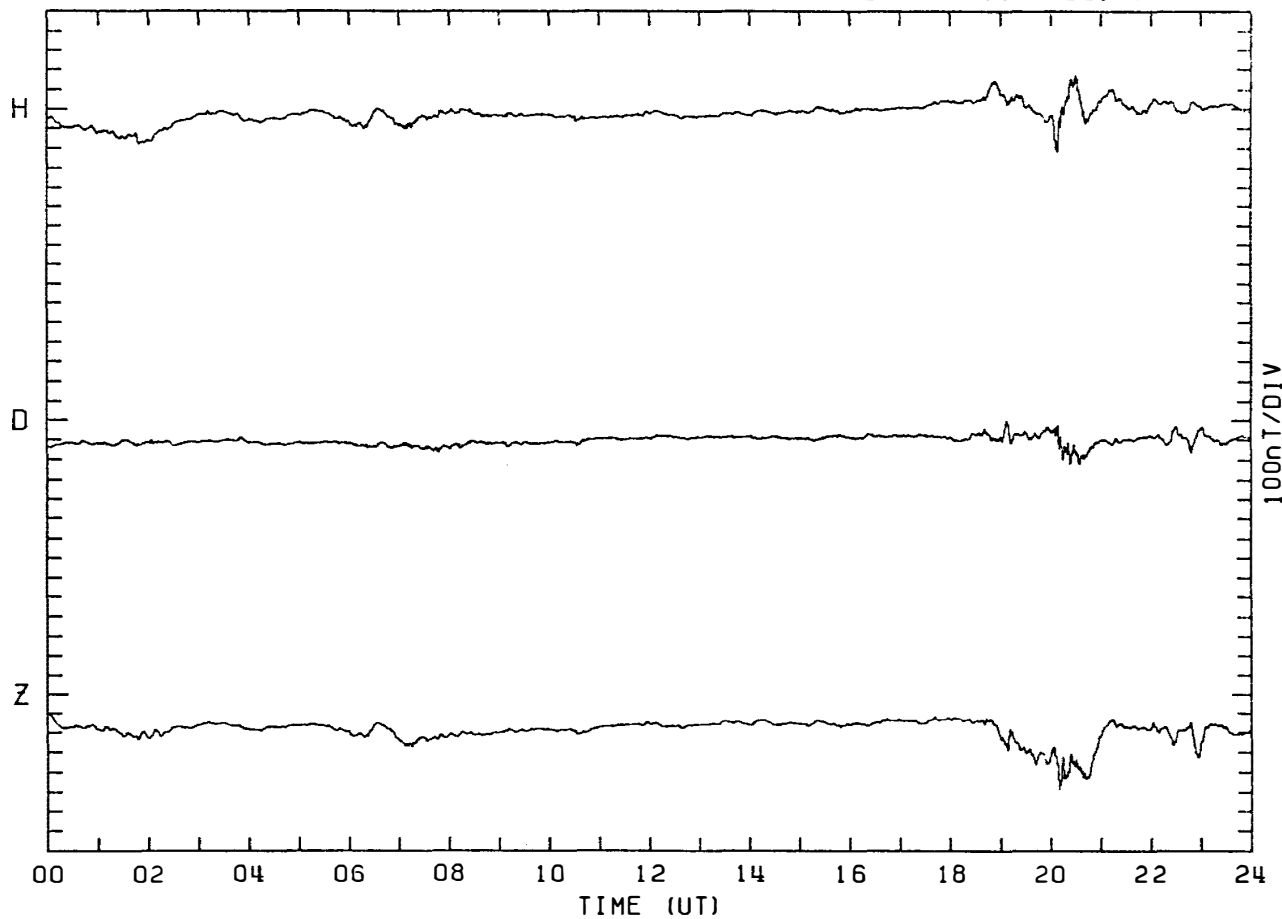
MAGNETOGRAM SYOWA STATION

DAY:233 AUGUST 21. 1983



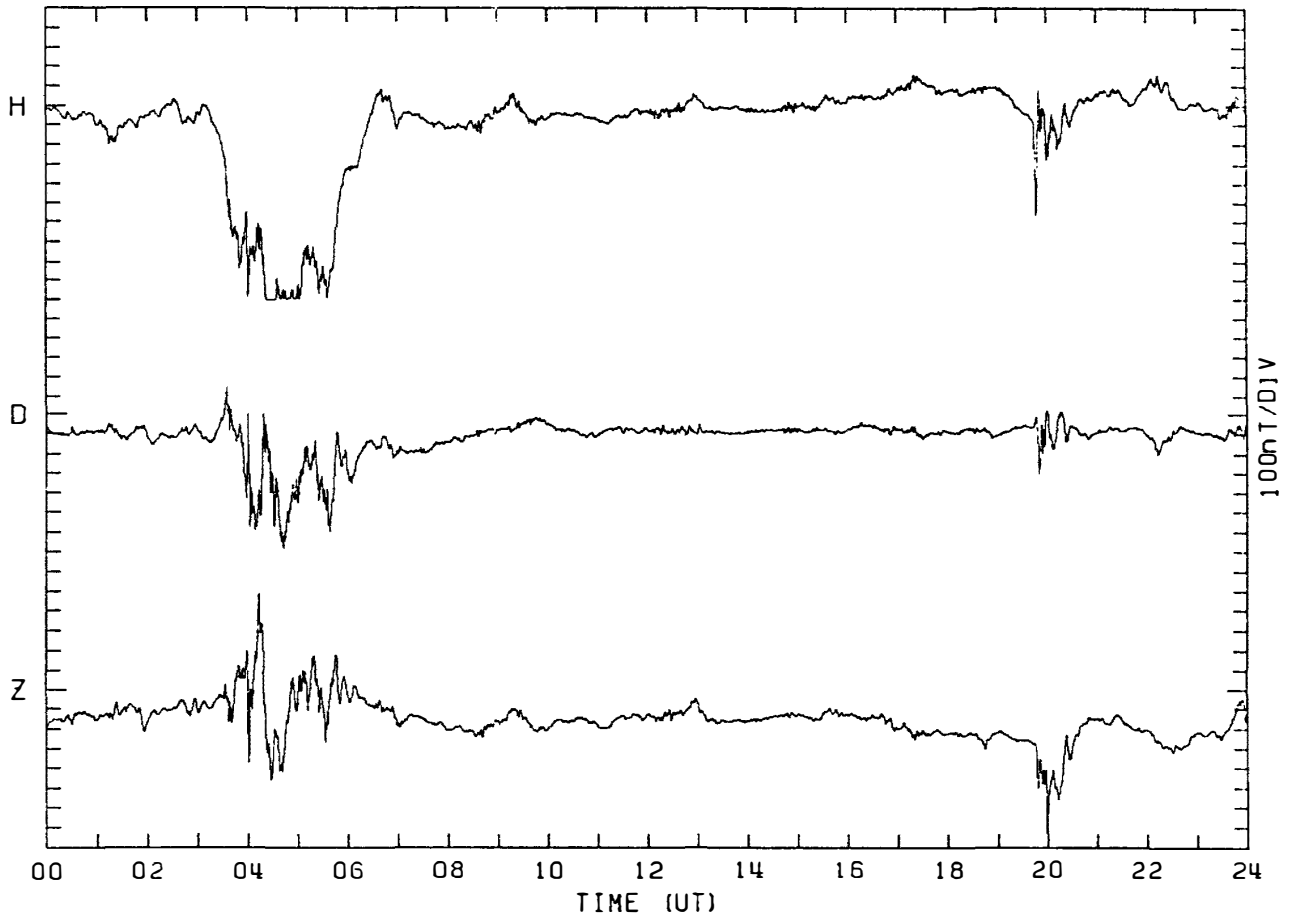
MAGNETOGRAM SYOWA STATION

DAY:234 AUGUST 22. 1983



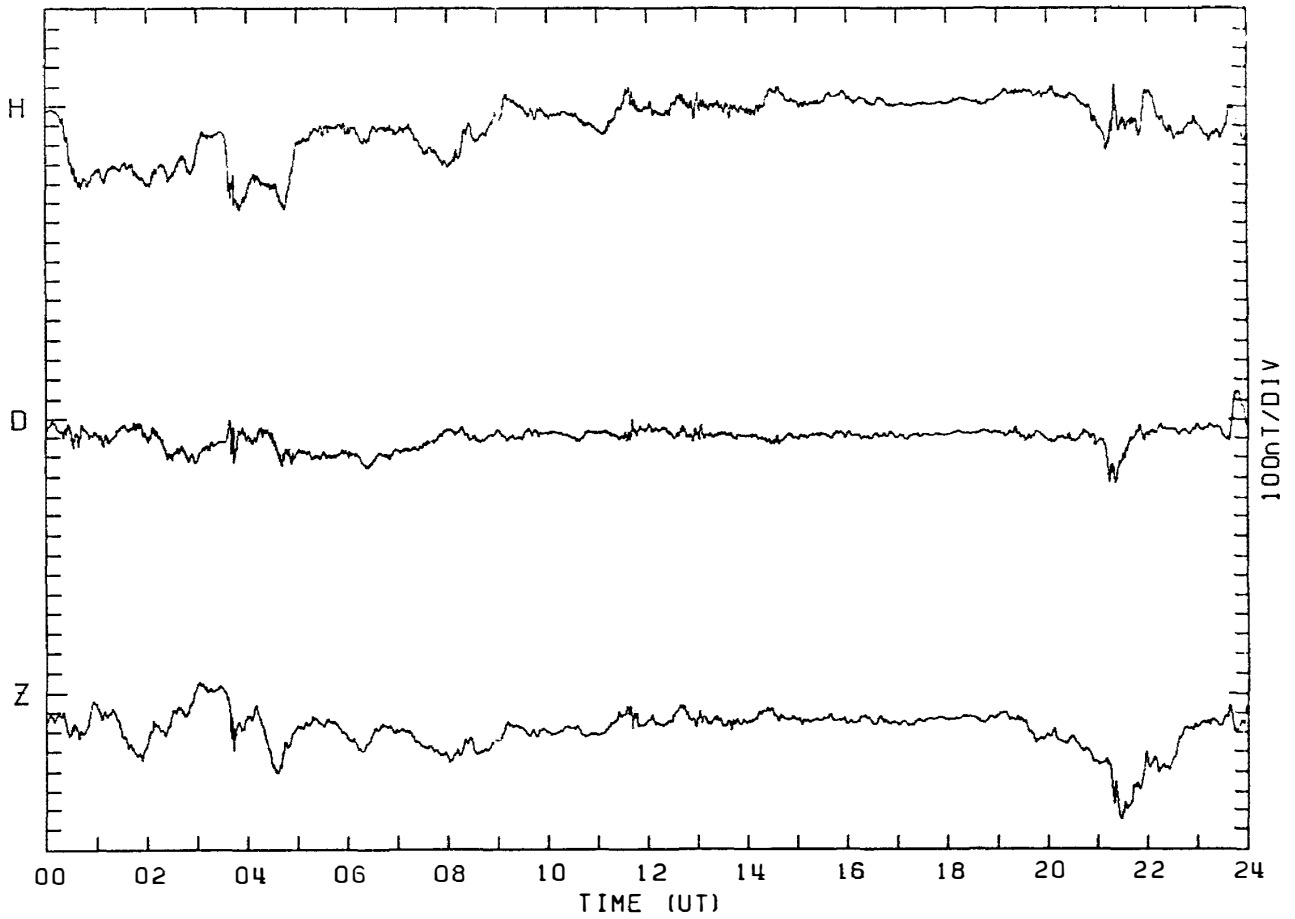
MAGNETOGRAM SYOWA STATION

DAY:235 AUGUST 23, 1983



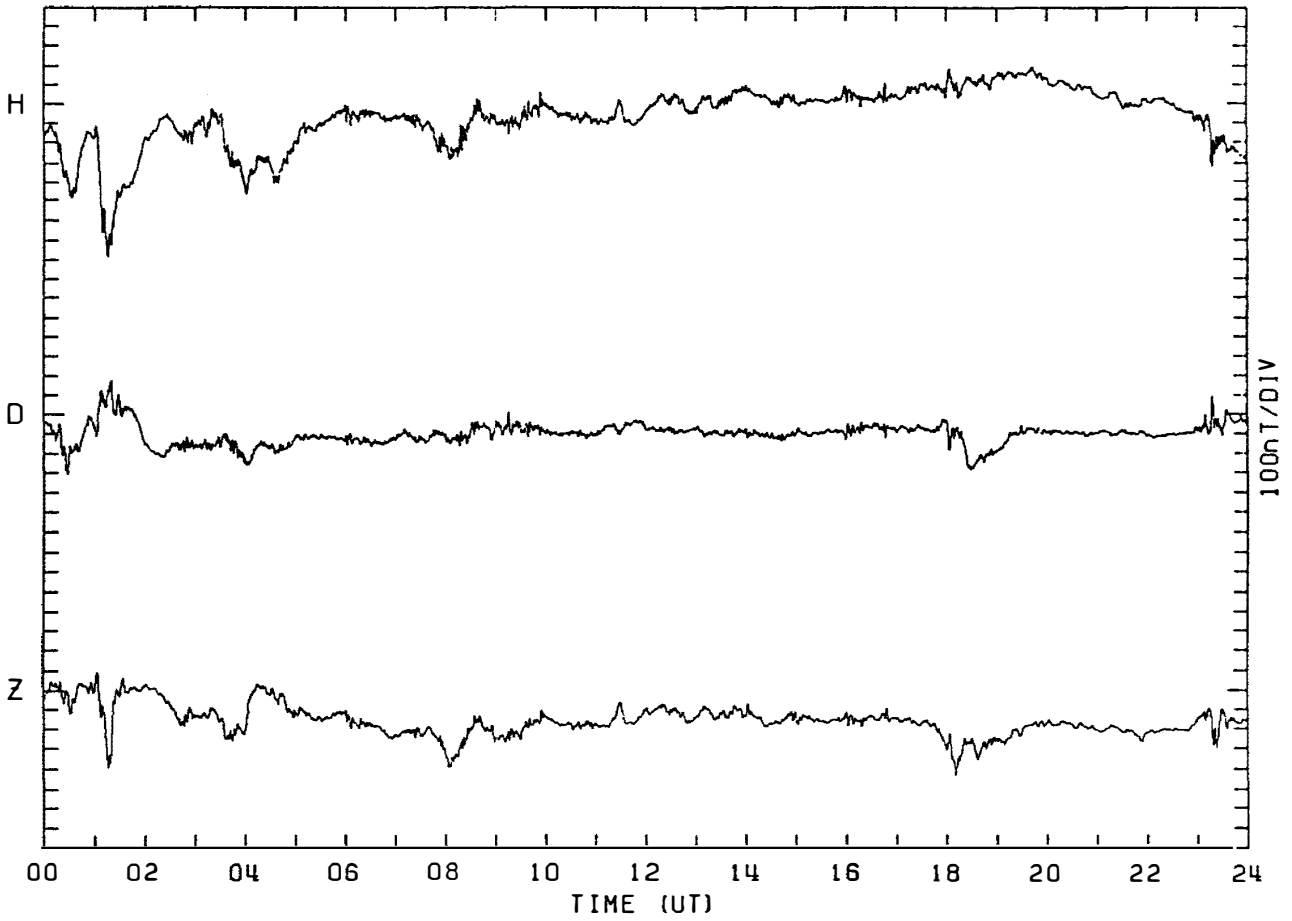
MAGNETOGRAM SYOWA STATION

DAY:236 AUGUST 24, 1983



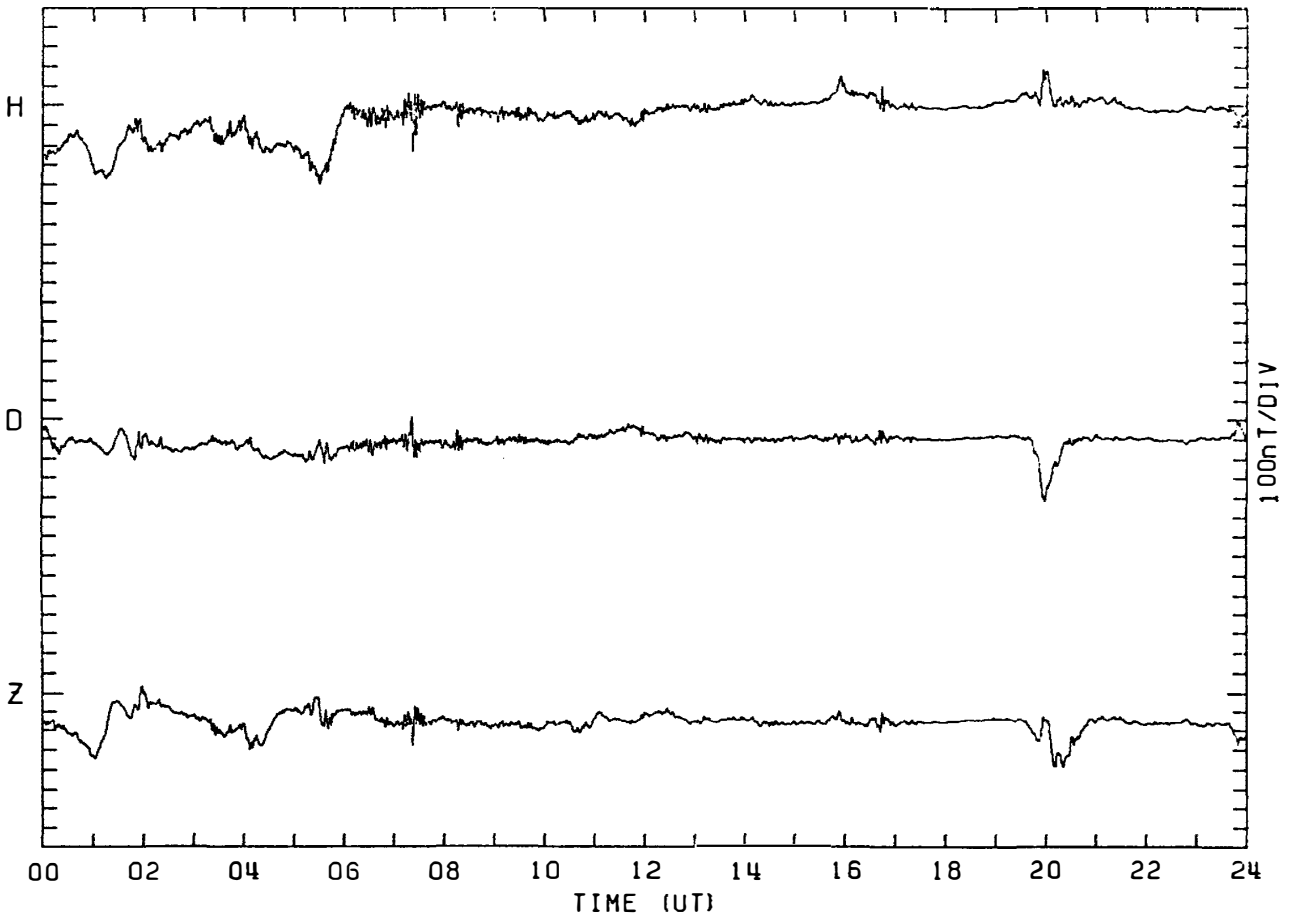
MAGNETOGRAM SYOWA STATION

DAY:237 AUGUST 25. 1983



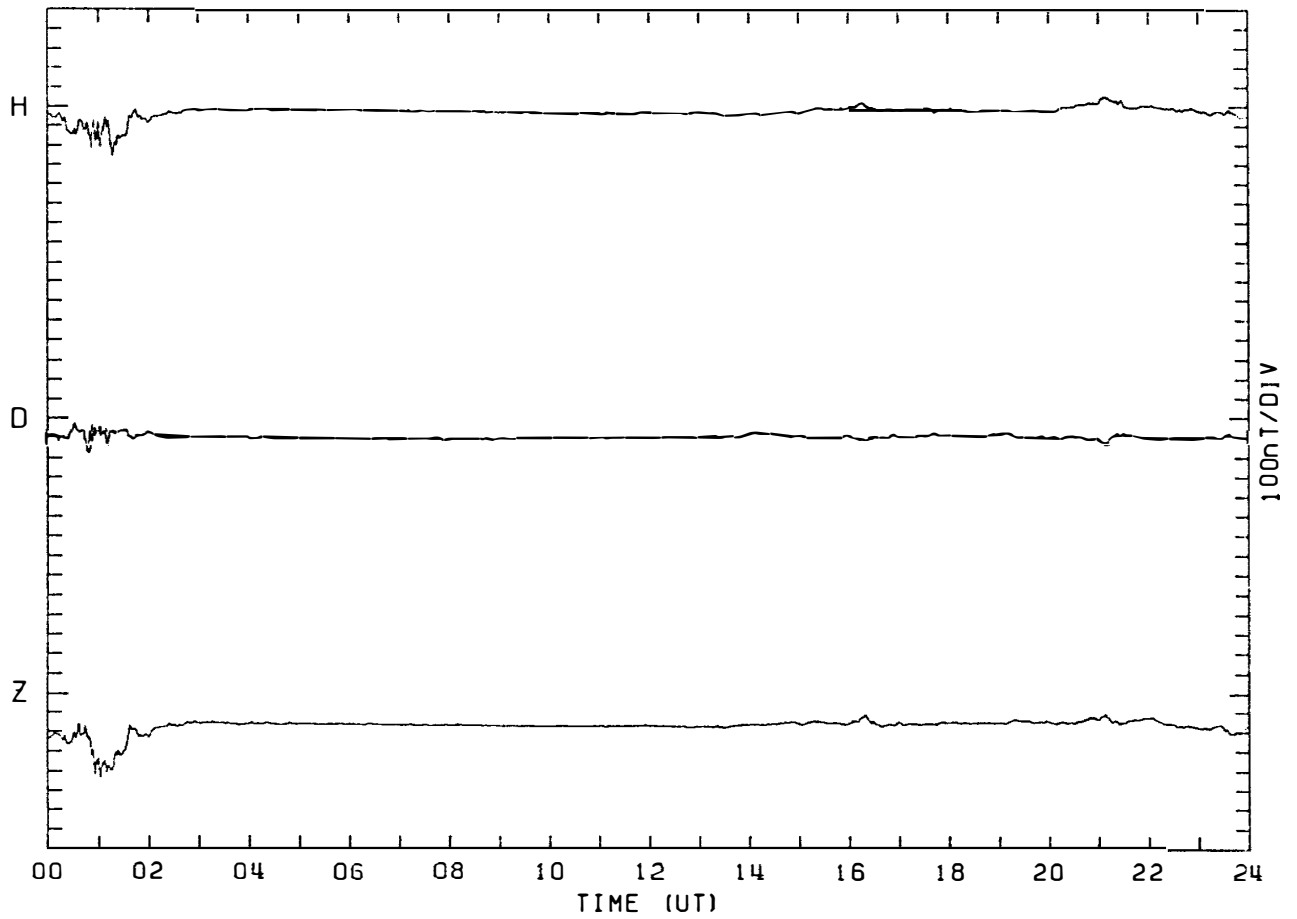
MAGNETOGRAM SYOWA STATION

DAY:238 AUGUST 26. 1983



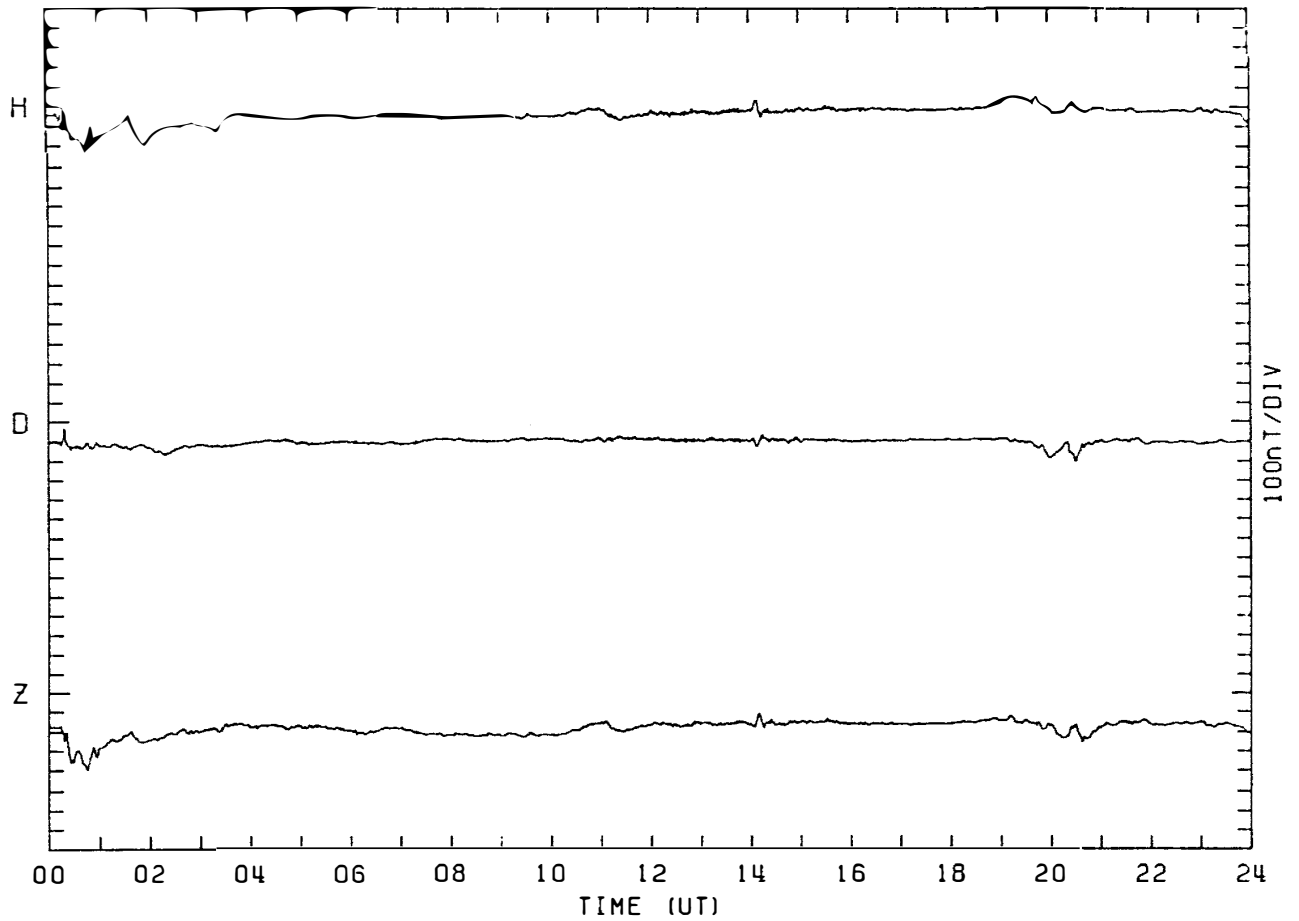
MAGNETOGRAM SYOWA STATION

DAY:239 AUGUST 27. 1983



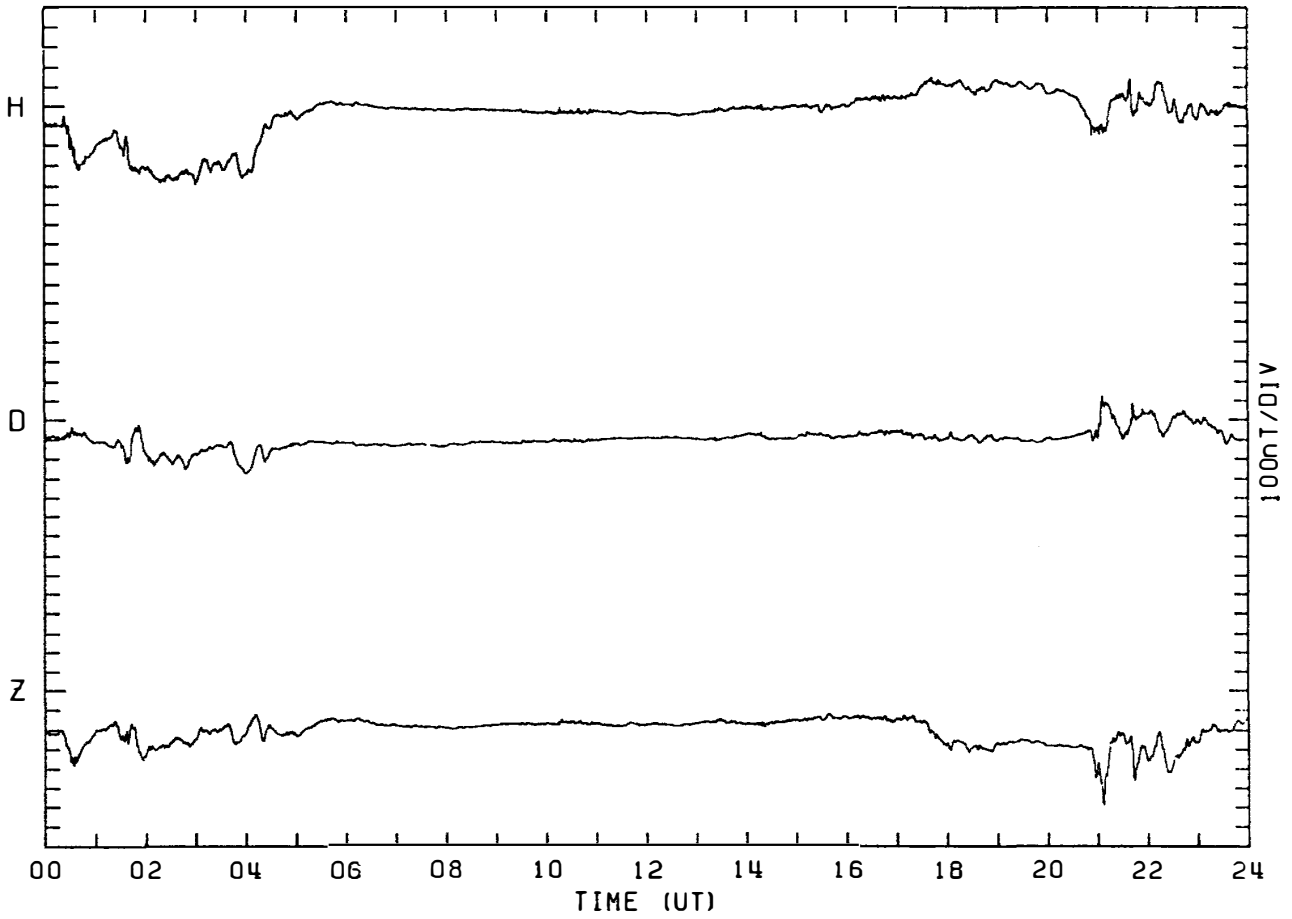
MAGNETOGRAM SYOWA STATION

DAY:240 AUGUST 28. 1983



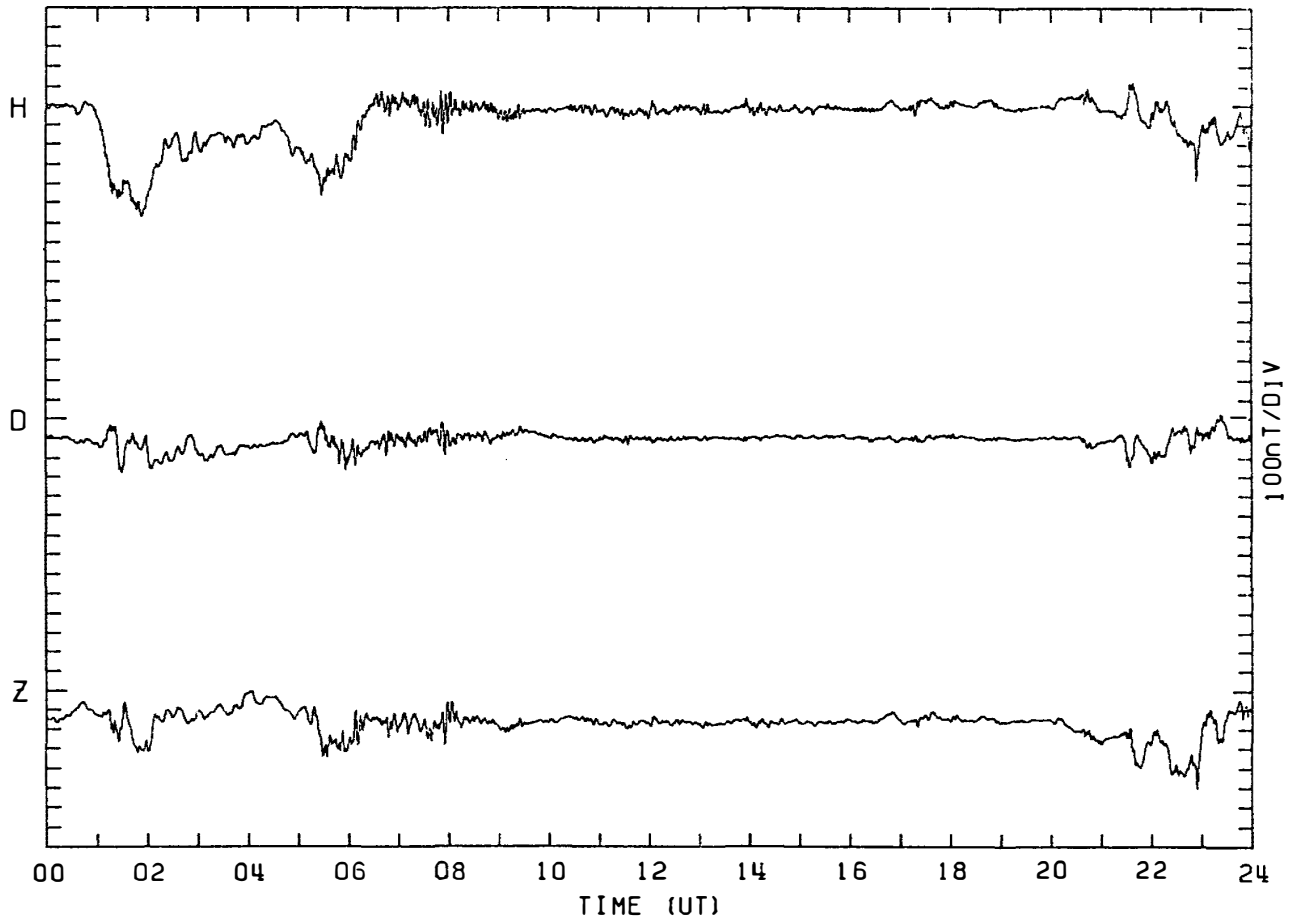
MAGNETOGRAM SYOWA STATION

DAY:241 AUGUST 29, 1983



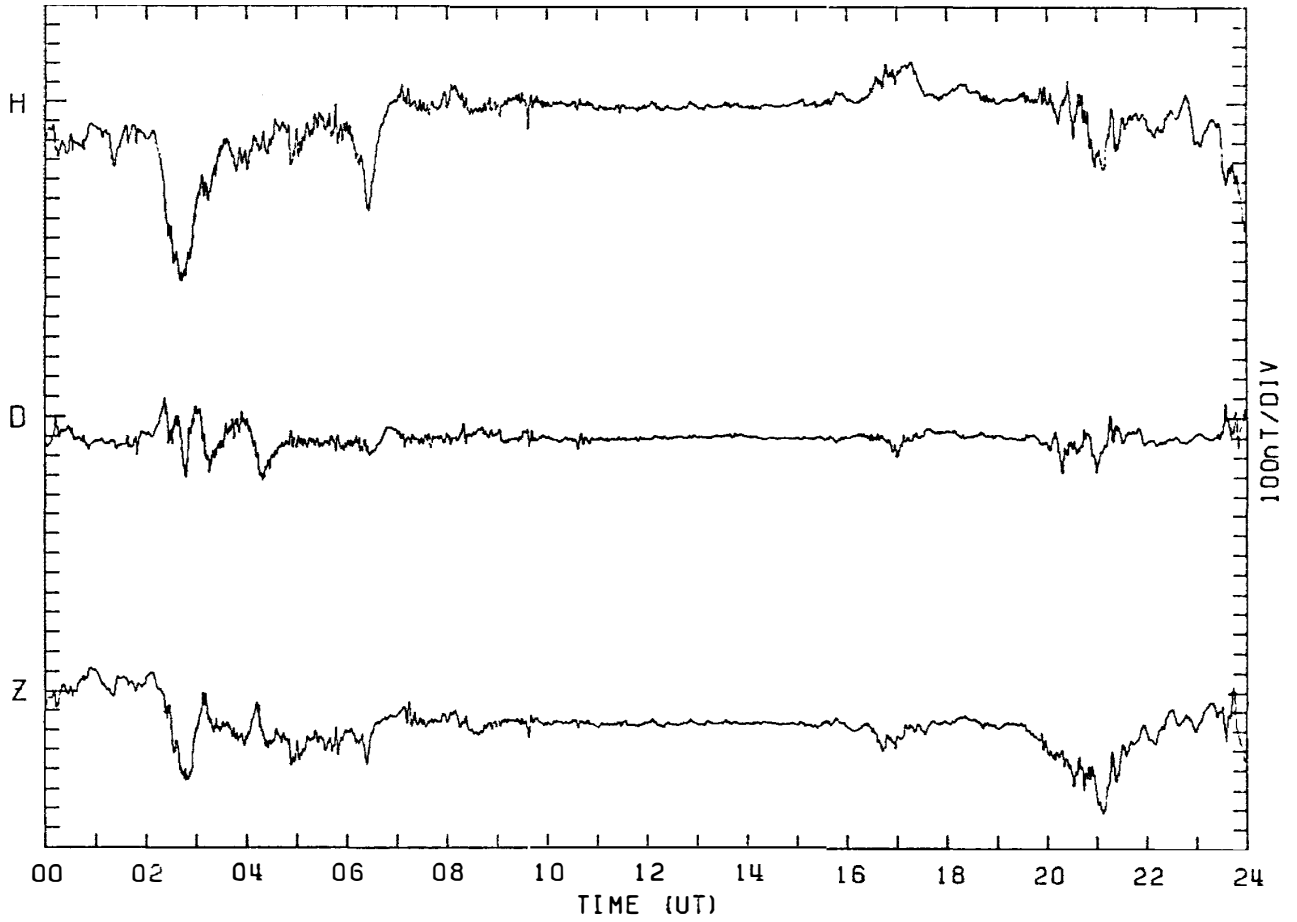
MAGNETOGRAM SYOWA STATION

DAY:242 AUGUST 30, 1983



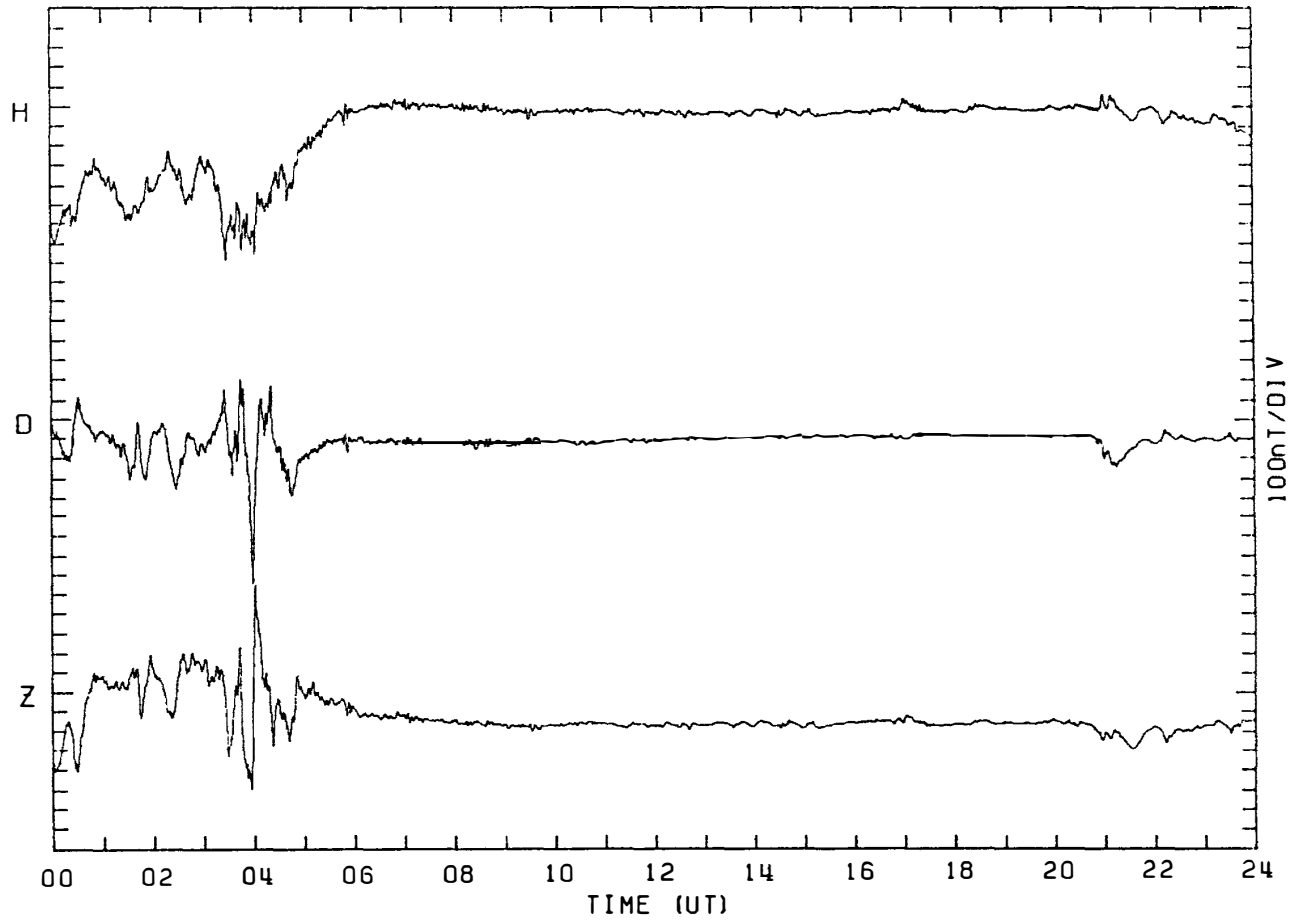
MAGNETOGRAM SYOWA STATION

DAY:243 AUGUST 31. 1983



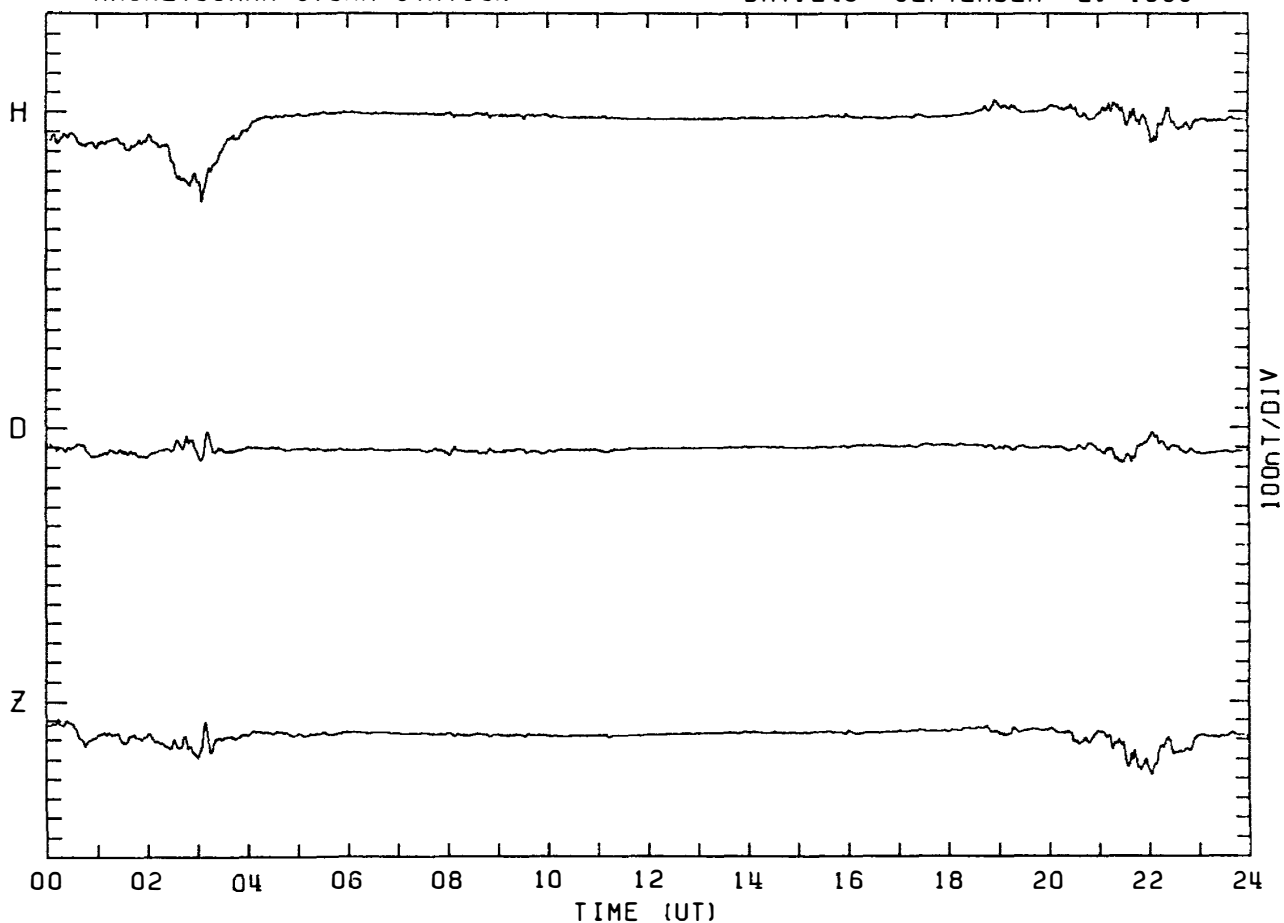
MAGNETOGRAM SYOWA STATION

DAY:244 SEPTEMBER 1. 1983



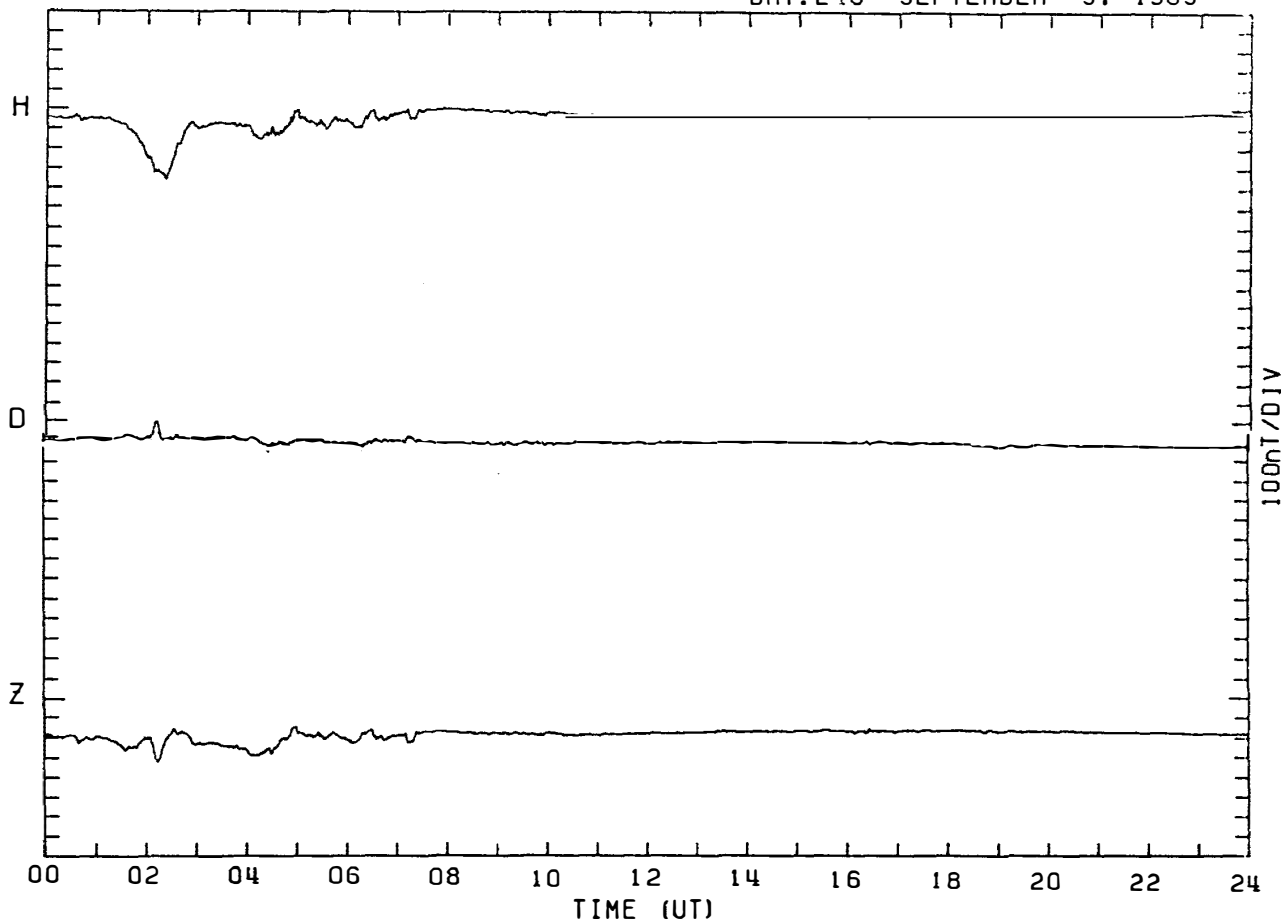
MAGNETOGRAM SYOWA STATION

DAY: 245 SEPTEMBER 2. 1983



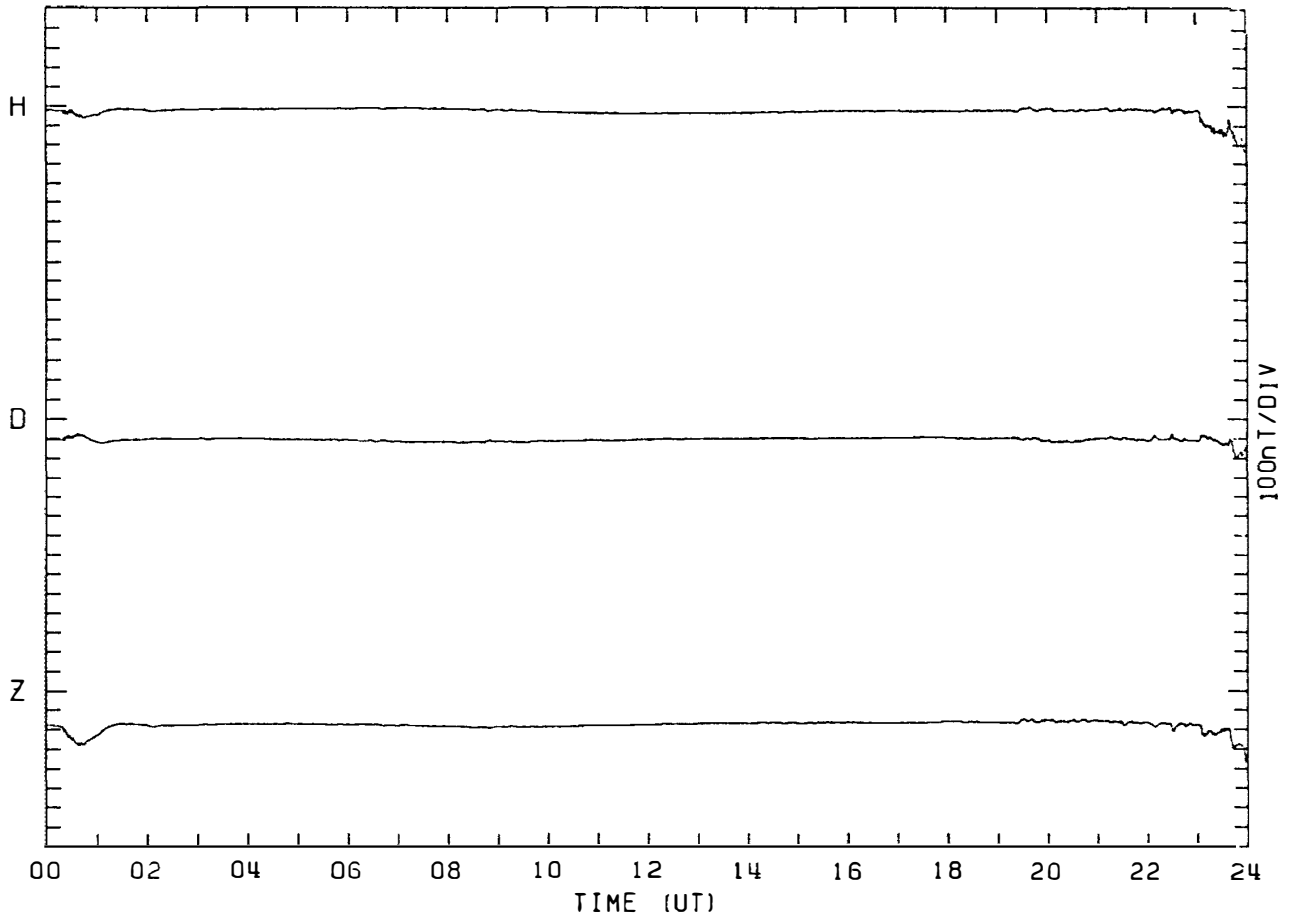
MAGNETOGRAM SYOWA STATION

DAY: 246 SEPTEMBER 3. 1983



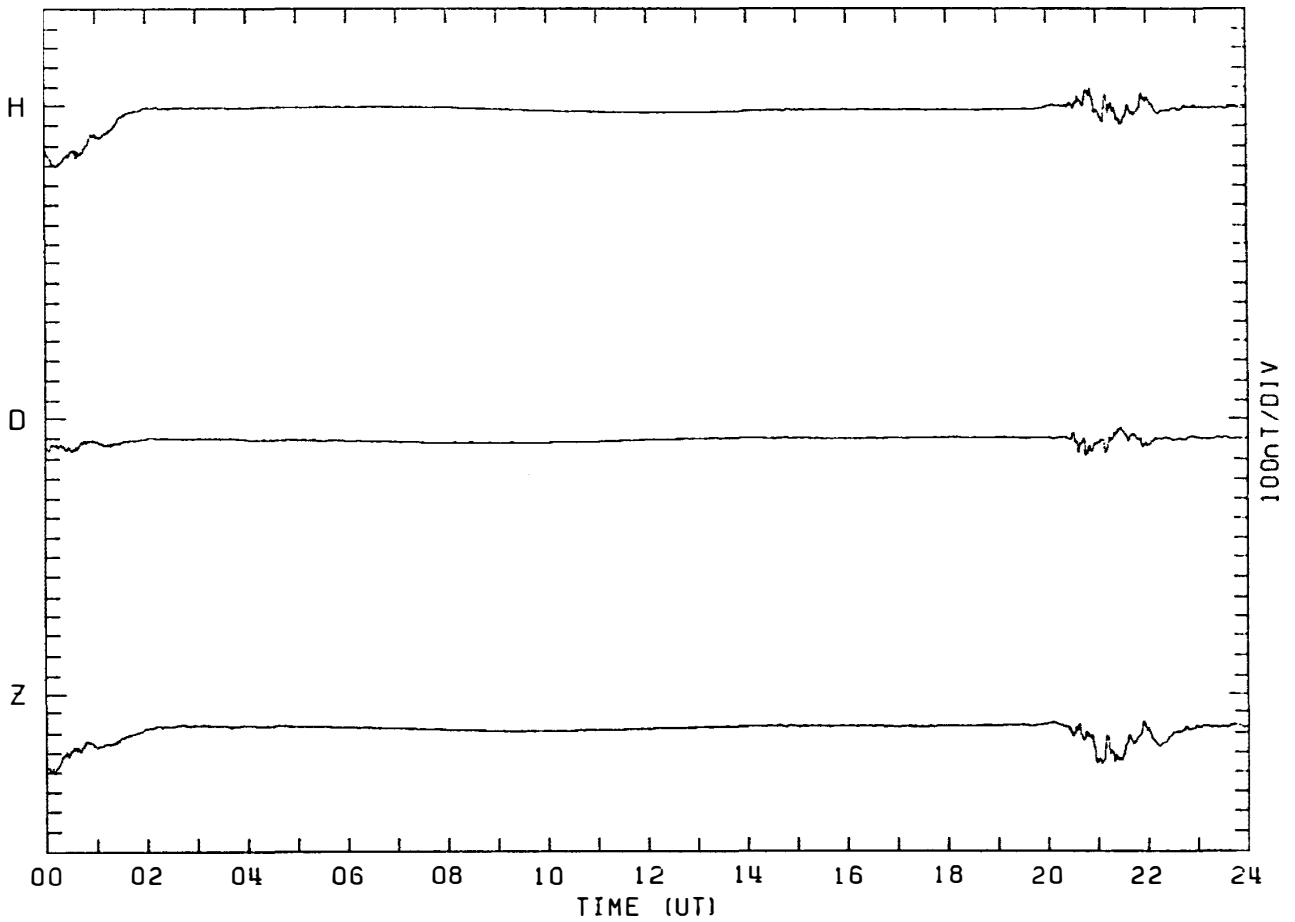
MAGNETOGRAM SYOWA STATION

DAY:247 SEPTEMBER 4. 1983



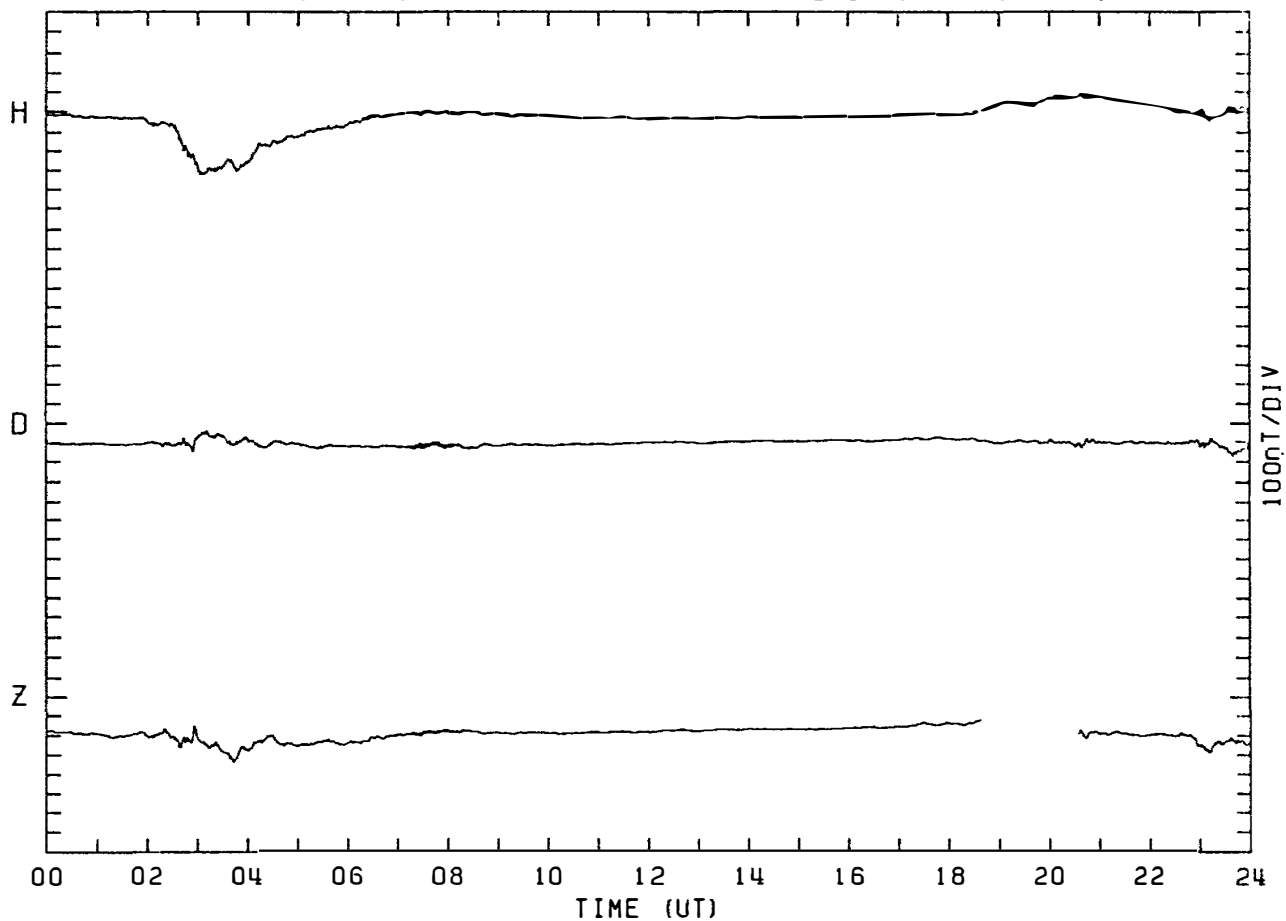
MAGNETOGRAM SYOWA STATION

DAY:248 SEPTEMBER 5. 1983



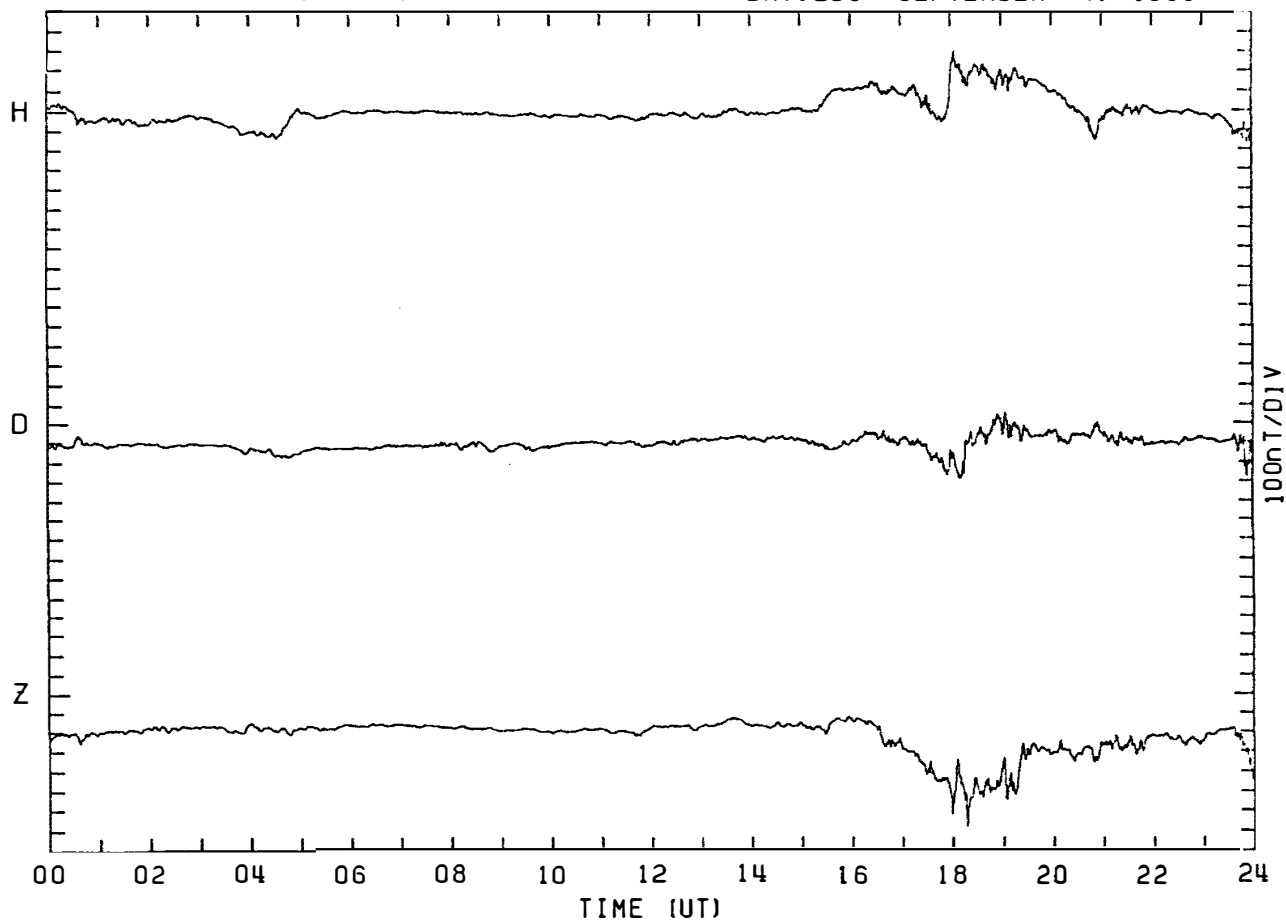
MAGNETOGRAM SYOWA STATION

DAY:249 SEPTEMBER 6. 1983



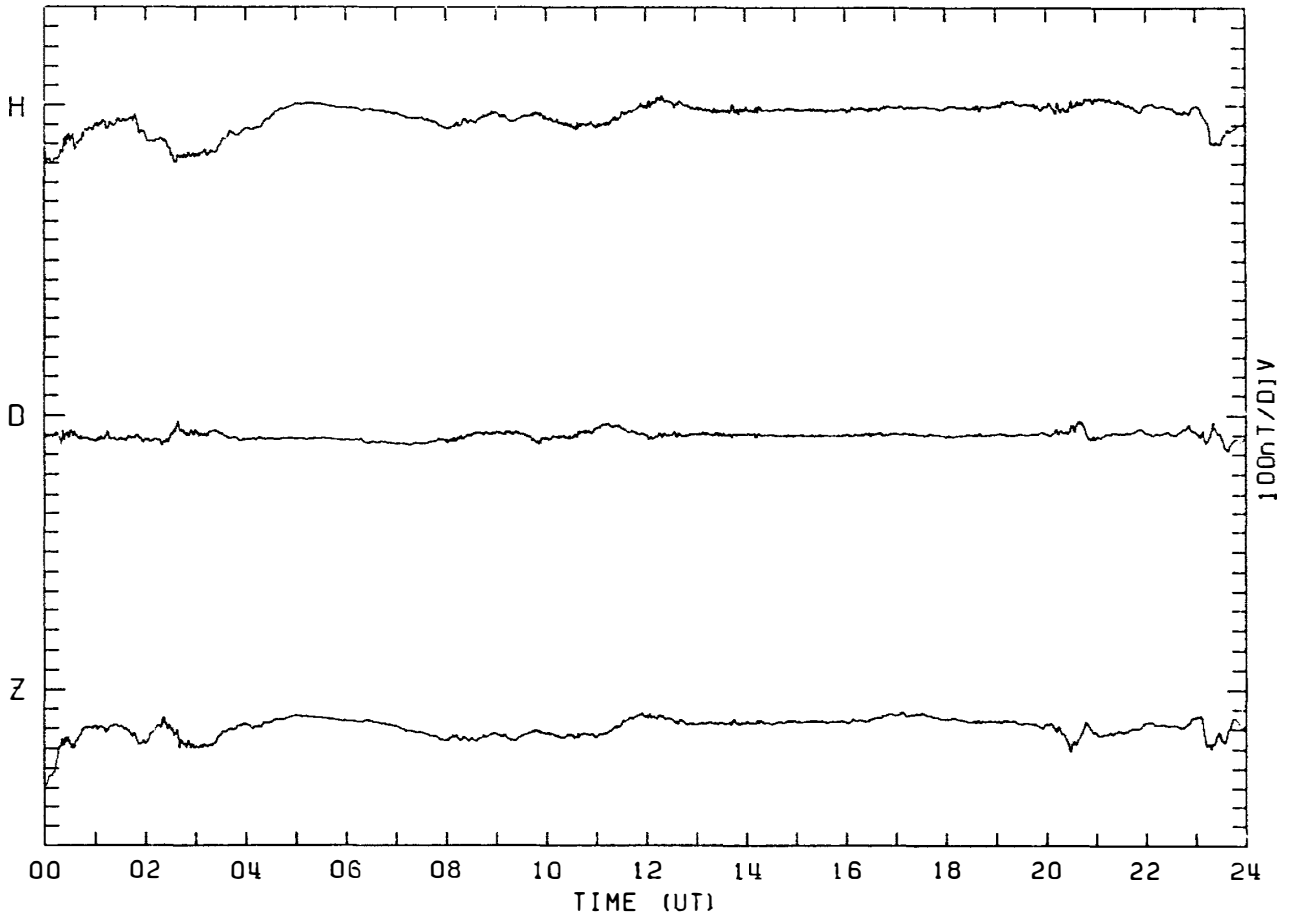
MAGNETOGRAM SYOWA STATION

DAY:250 SEPTEMBER 7. 1983



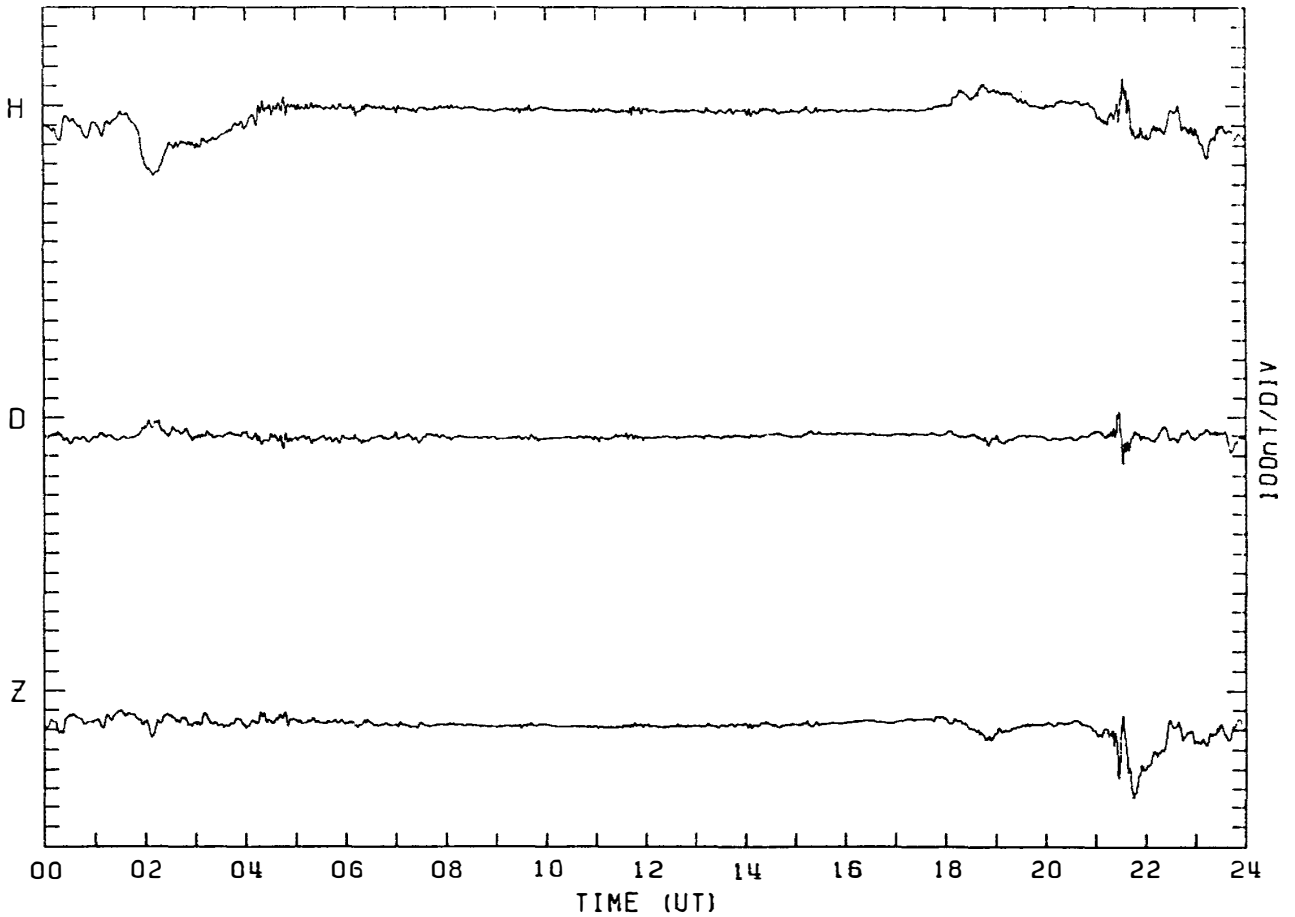
MAGNETOGRAM SYOWA STATION

DAY:251 SEPTEMBER 8. 1983



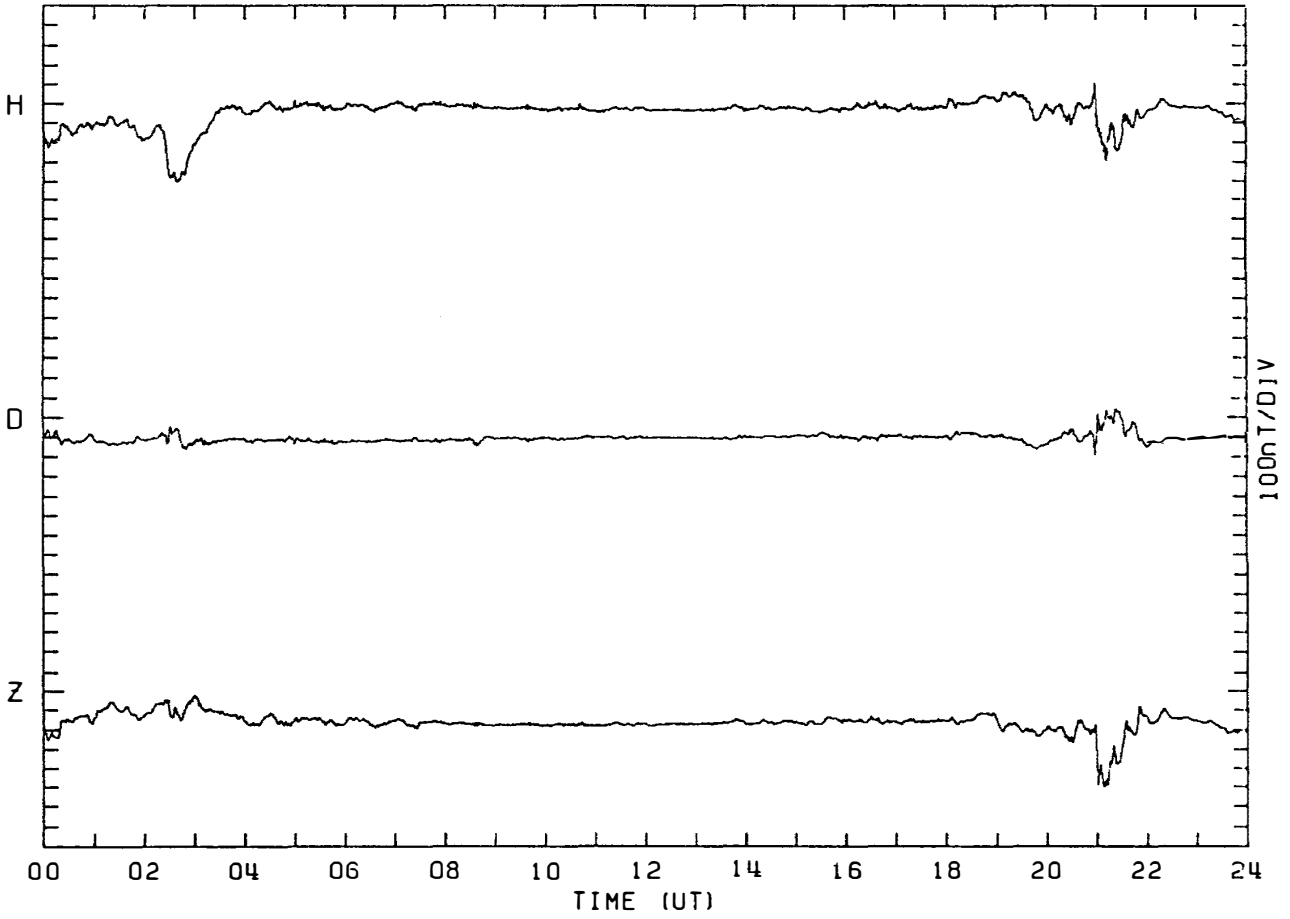
MAGNETOGRAM SYOWA STATION

DAY:252 SEPTEMBER 9. 1983



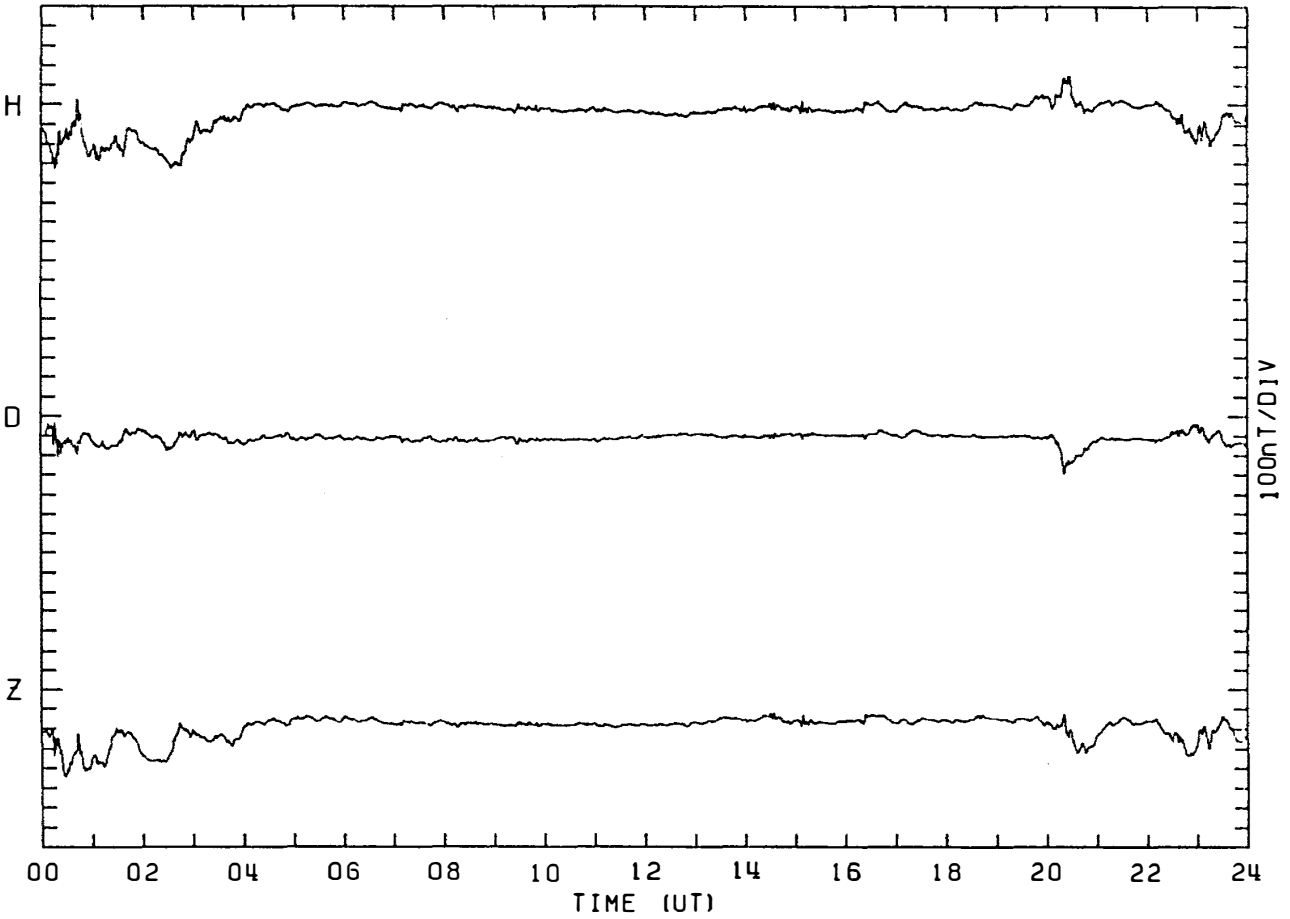
MAGNETOGRAM SYOWA STATION

DAY:253 SEPTEMBER 10. 1983



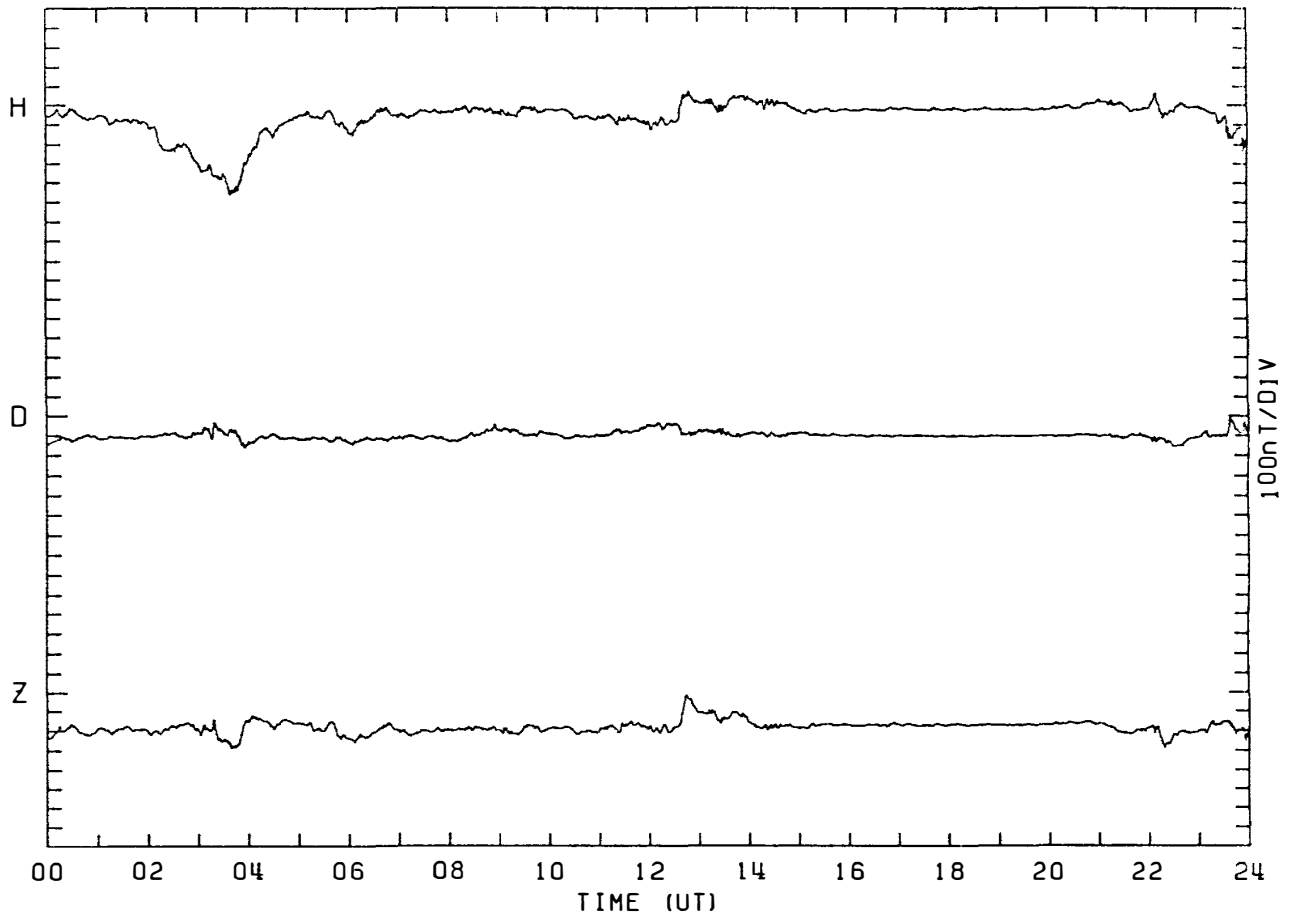
MAGNETOGRAM SYOWA STATION

DAY:254 SEPTEMBER 11. 1983



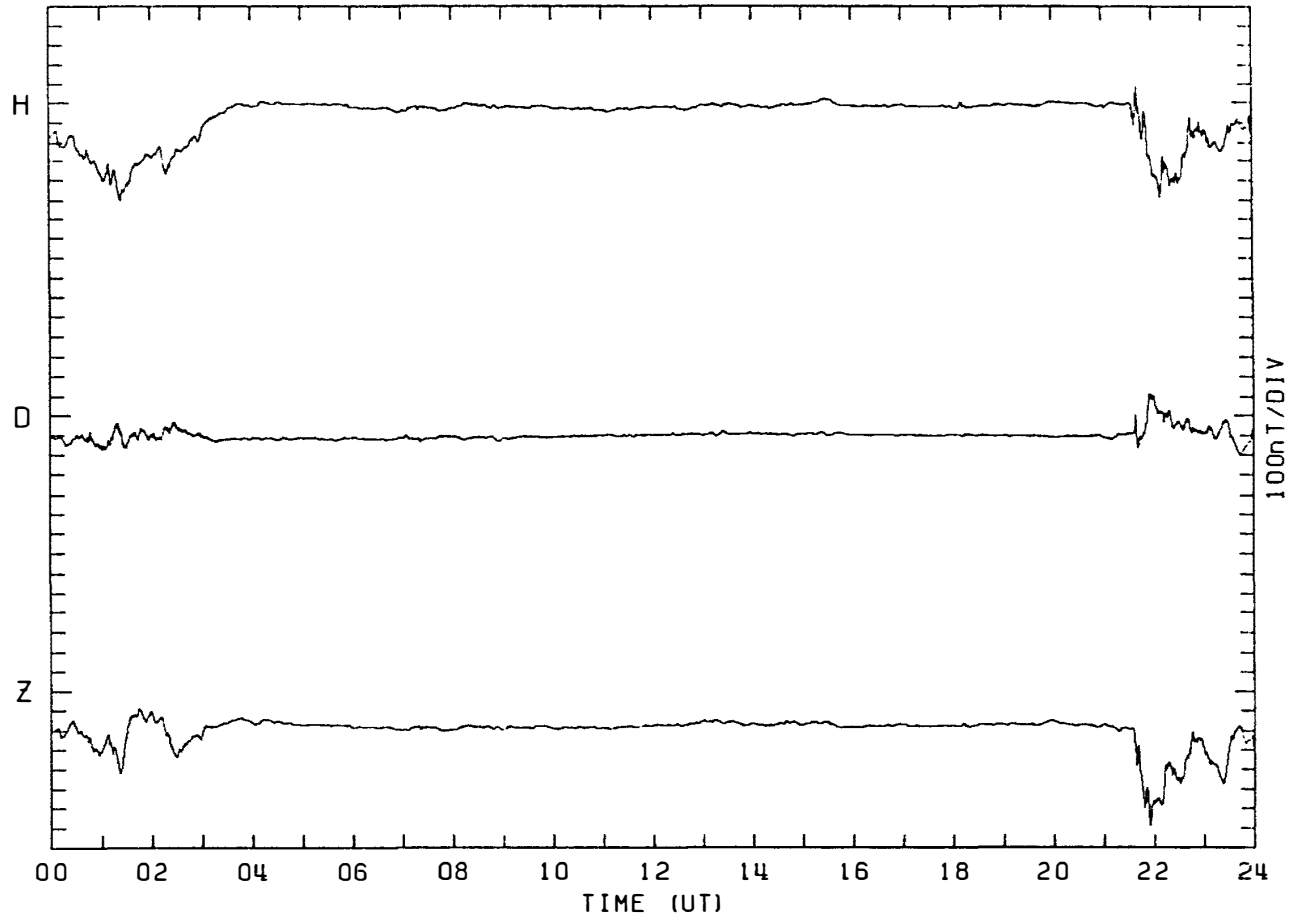
MAGNETOGRAM SYOWA STATION

DAY:255 SEPTEMBER 12, 1983



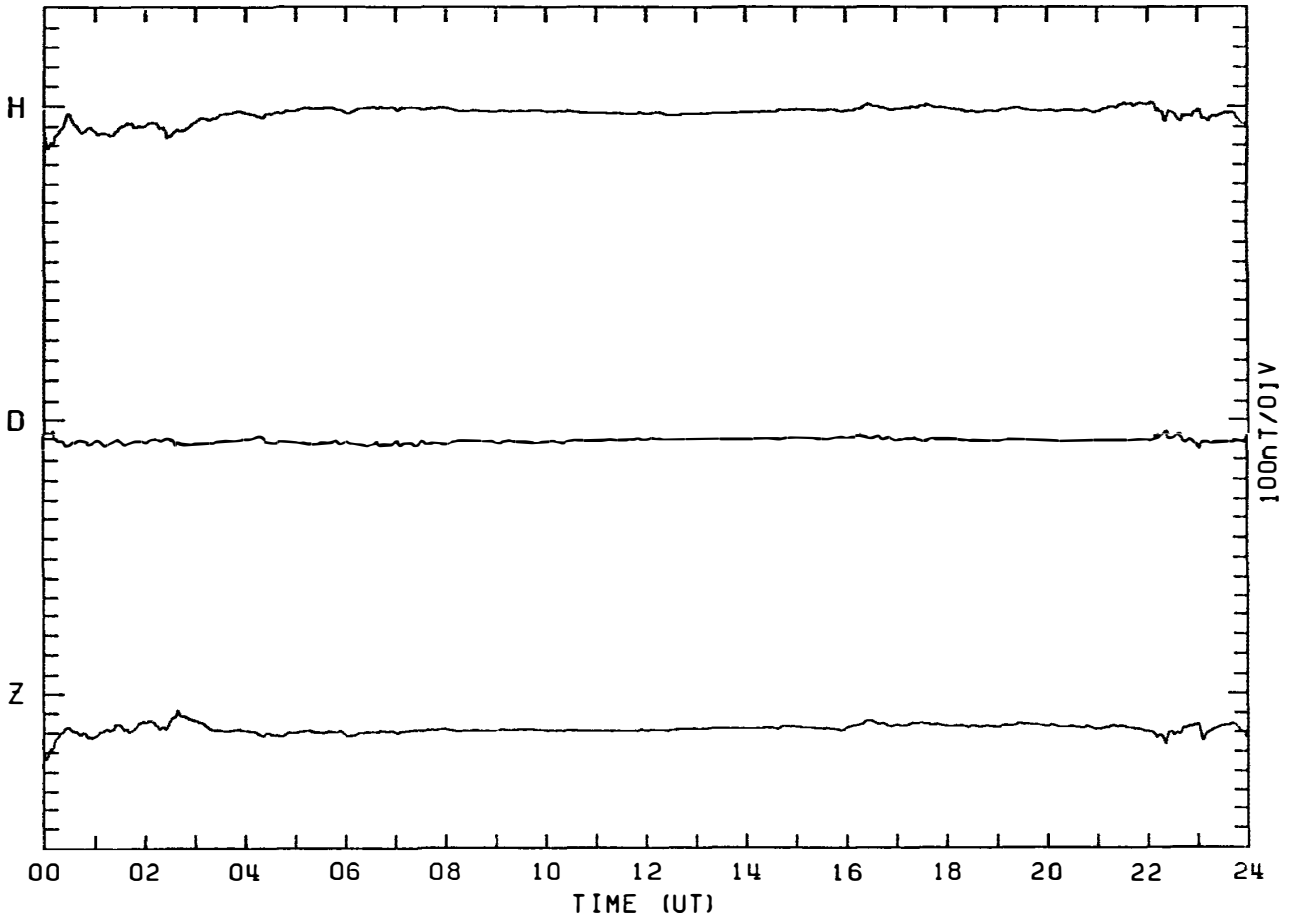
MAGNETOGRAM SYOWA STATION

DAY:256 SEPTEMBER 13, 1983



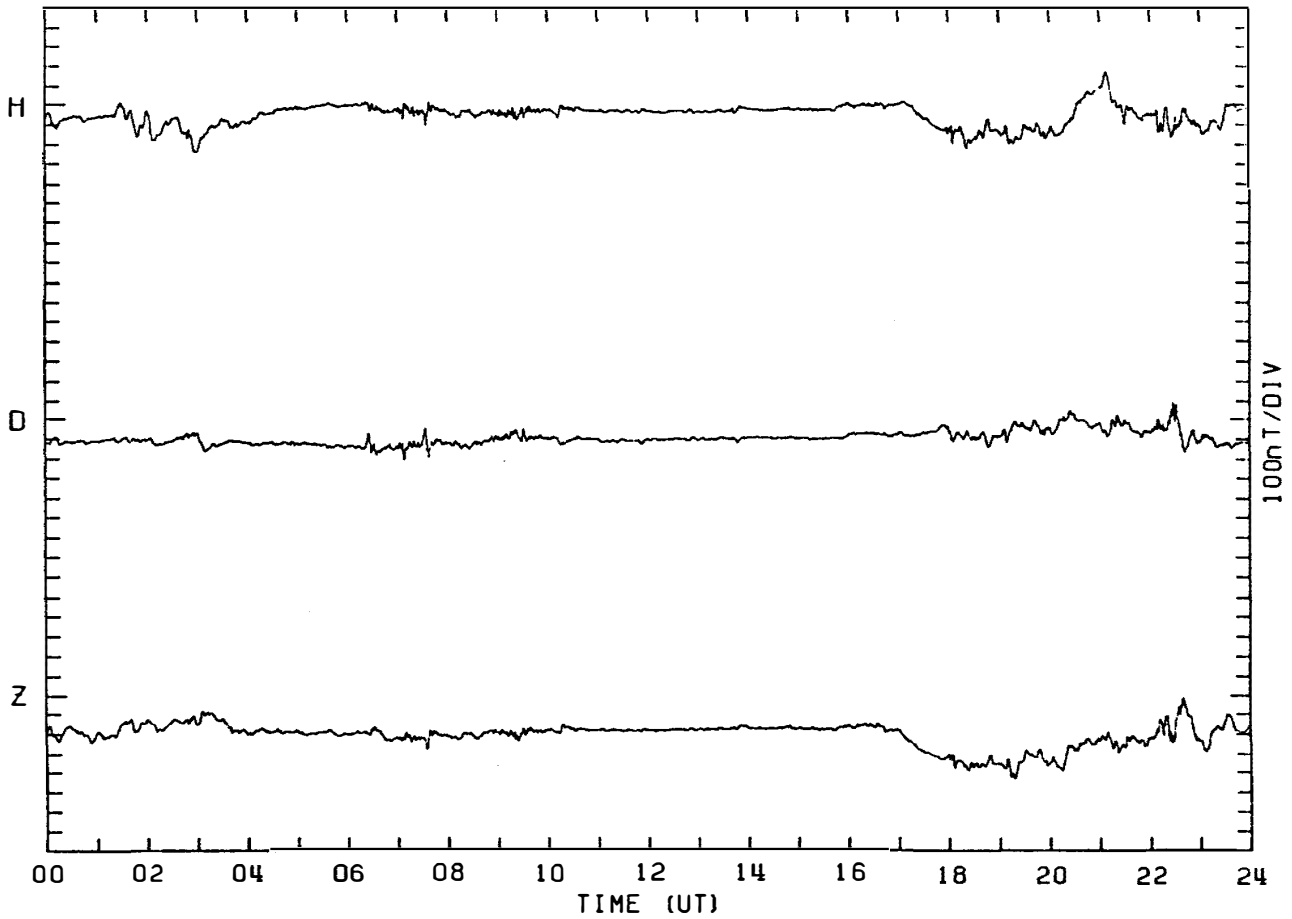
MAGNETOGRAM SYOWA STATION

DAY:257 SEPTEMBER 14. 1983



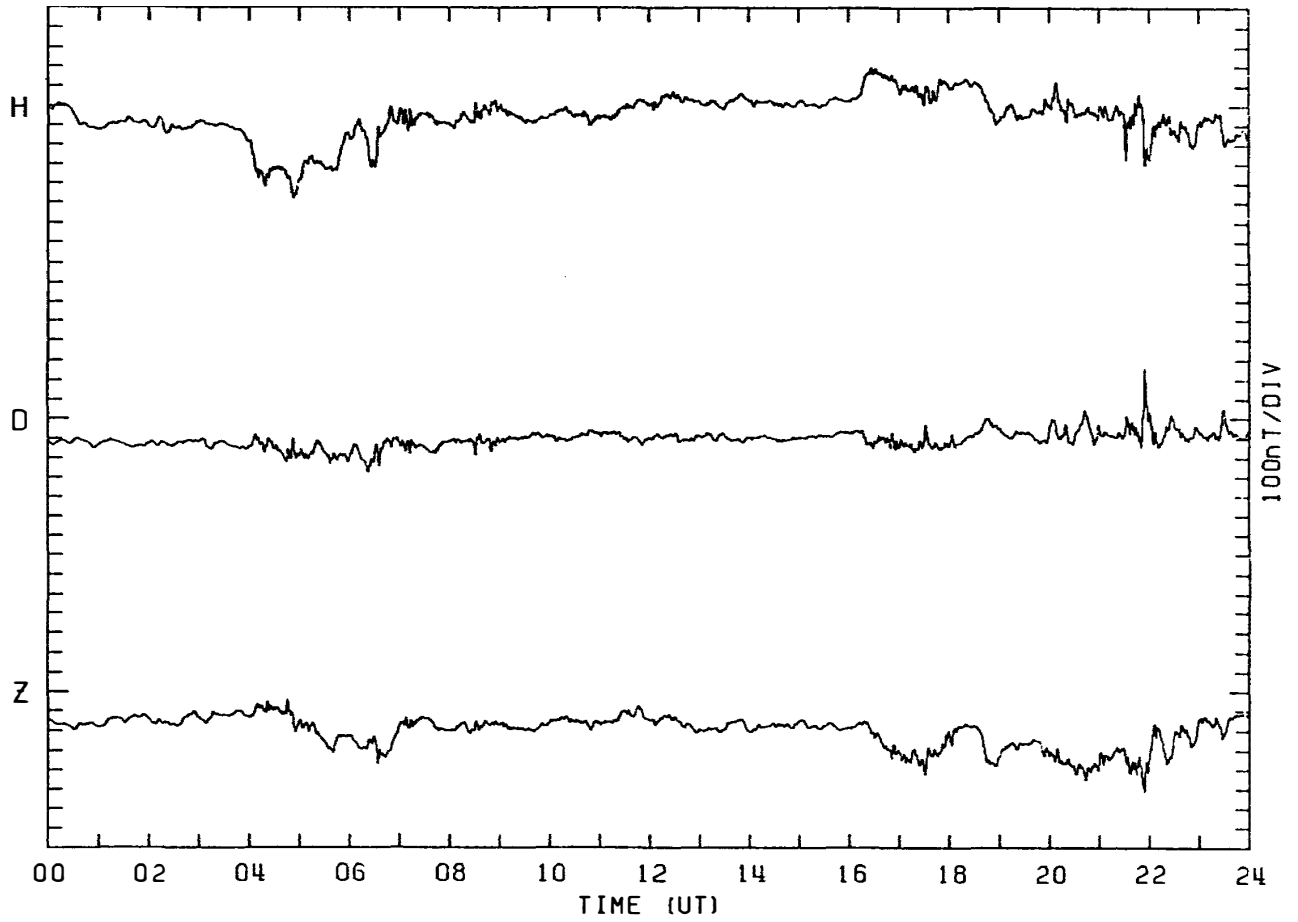
MAGNETOGRAM SYOWA STATION

DAY:258 SEPTEMBER 15. 1983



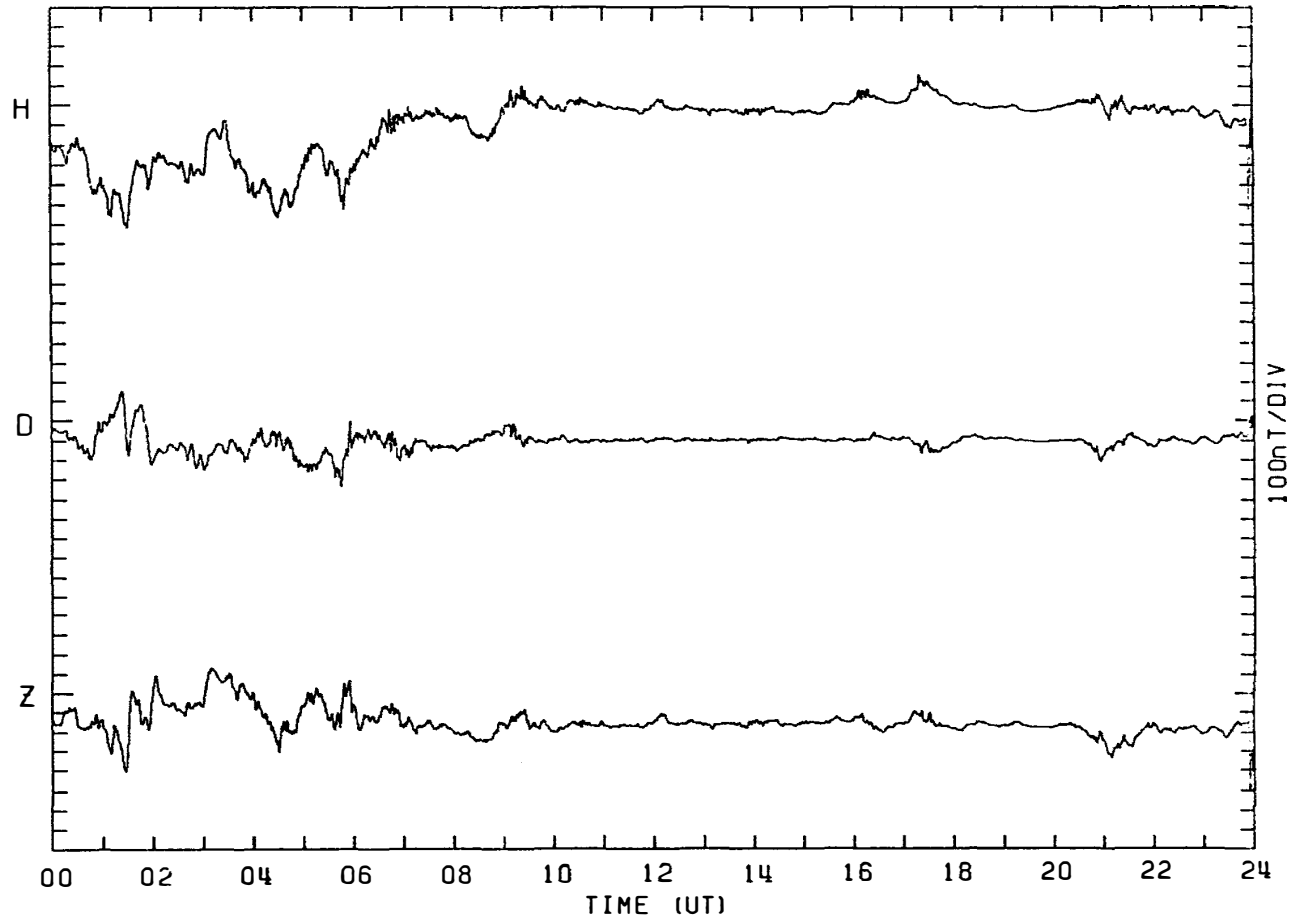
MAGNETOGRAM SYOWA STATION

DAY:259 SEPTEMBER 16. 1983



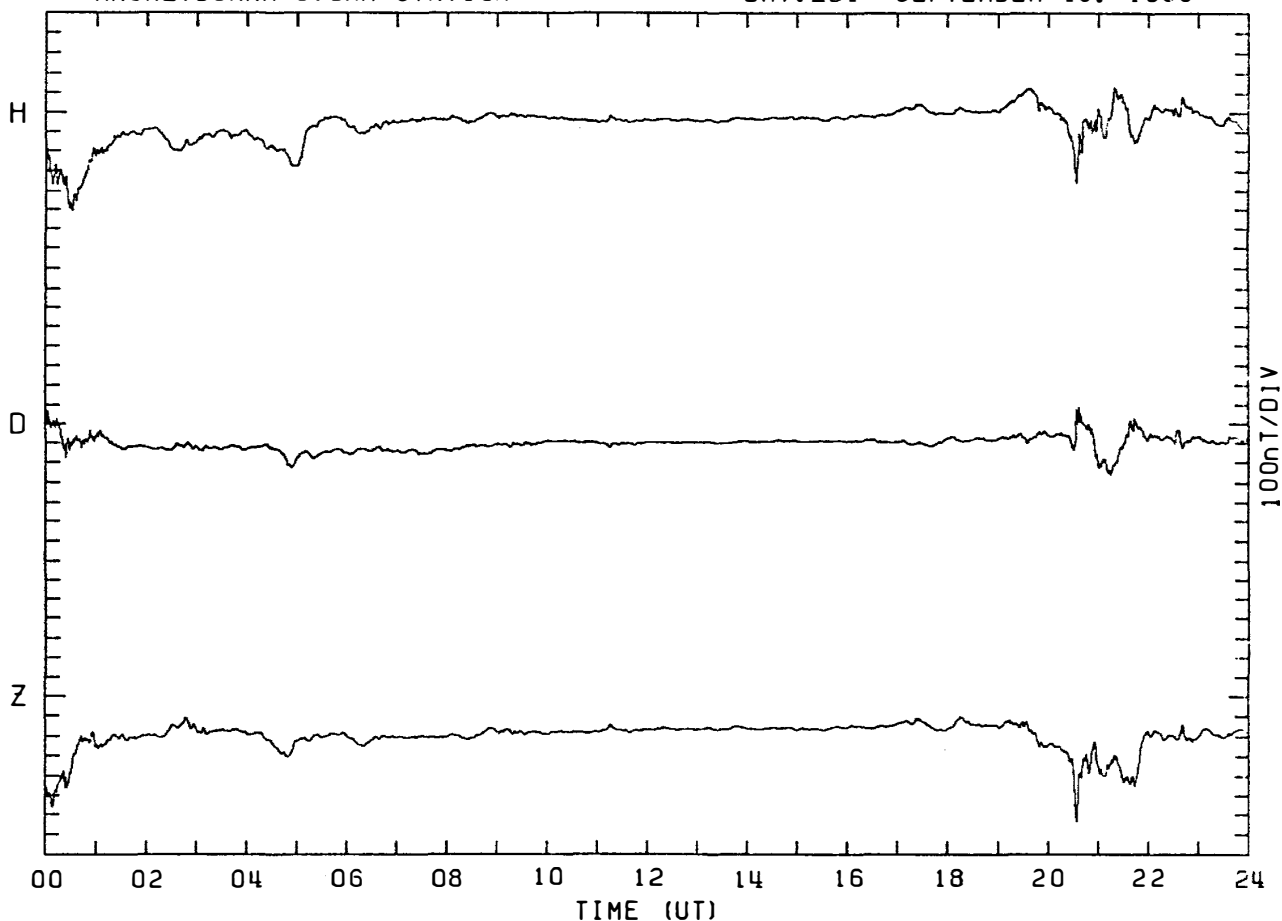
MAGNETOGRAM SYOWA STATION

DAY:260 SEPTEMBER 17. 1983



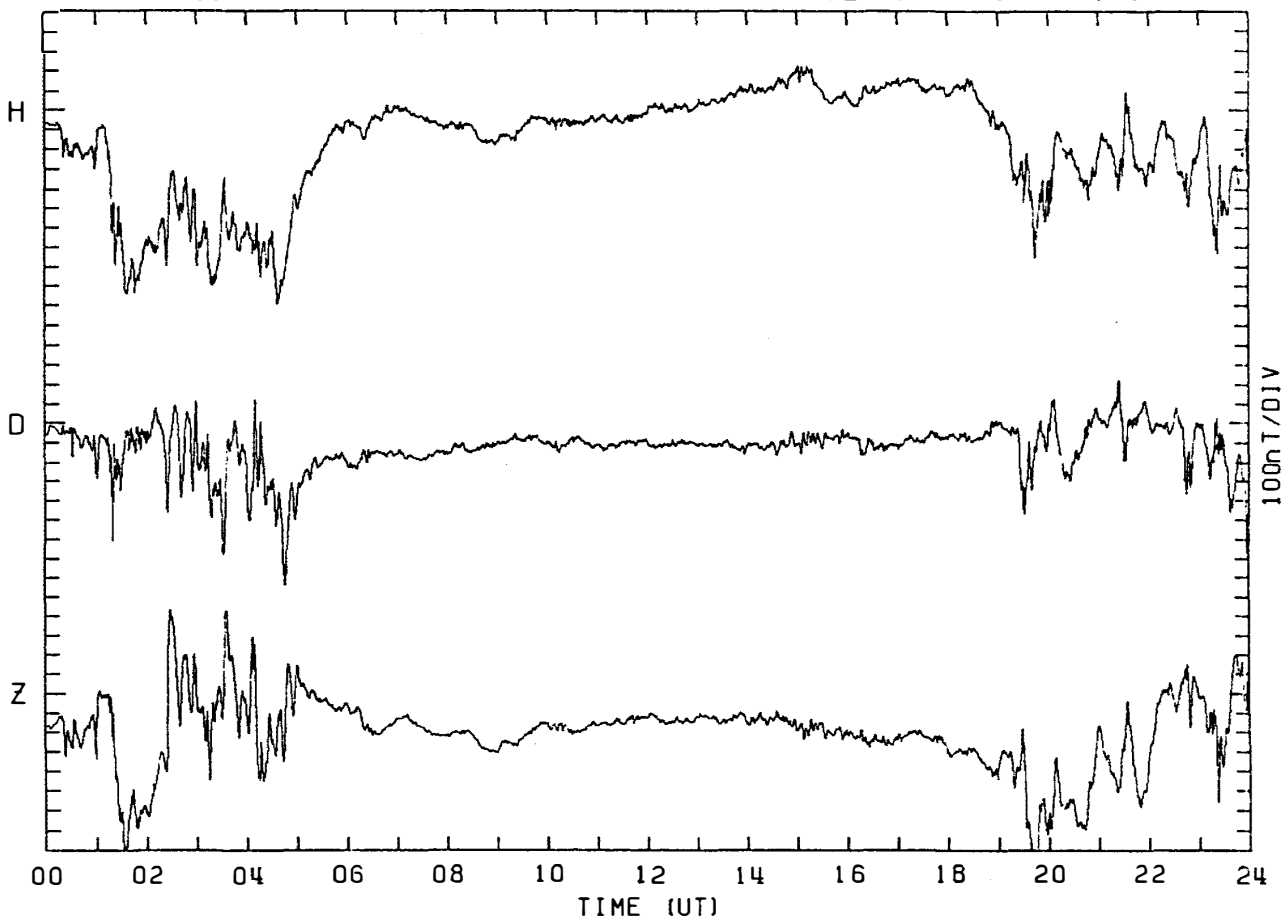
MAGNETOGRAM SYOWA STATION

DAY:261 SEPTEMBER 18. 1983



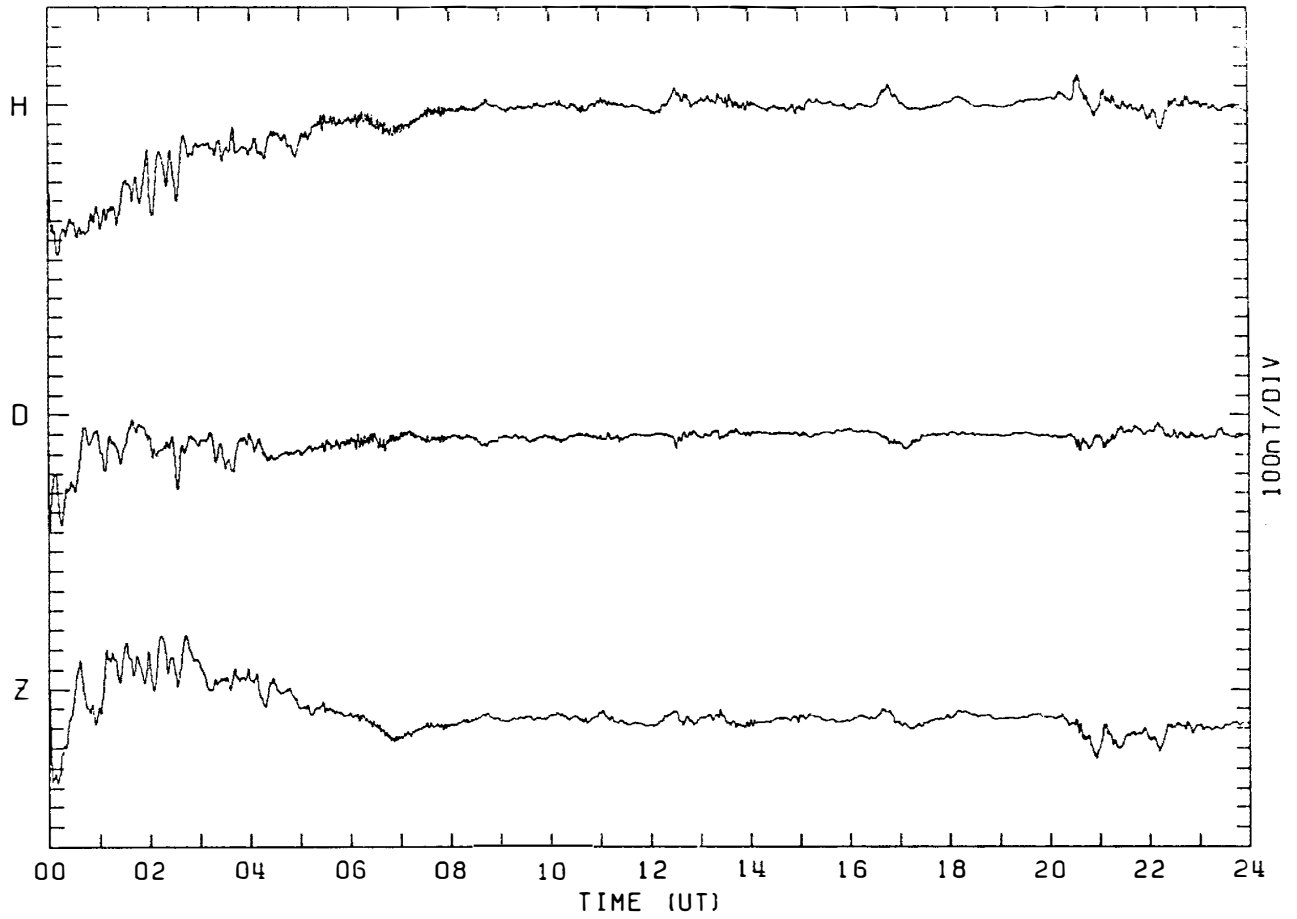
MAGNETOGRAM SYOWA STATION

DAY:262 SEPTEMBER 19. 1983



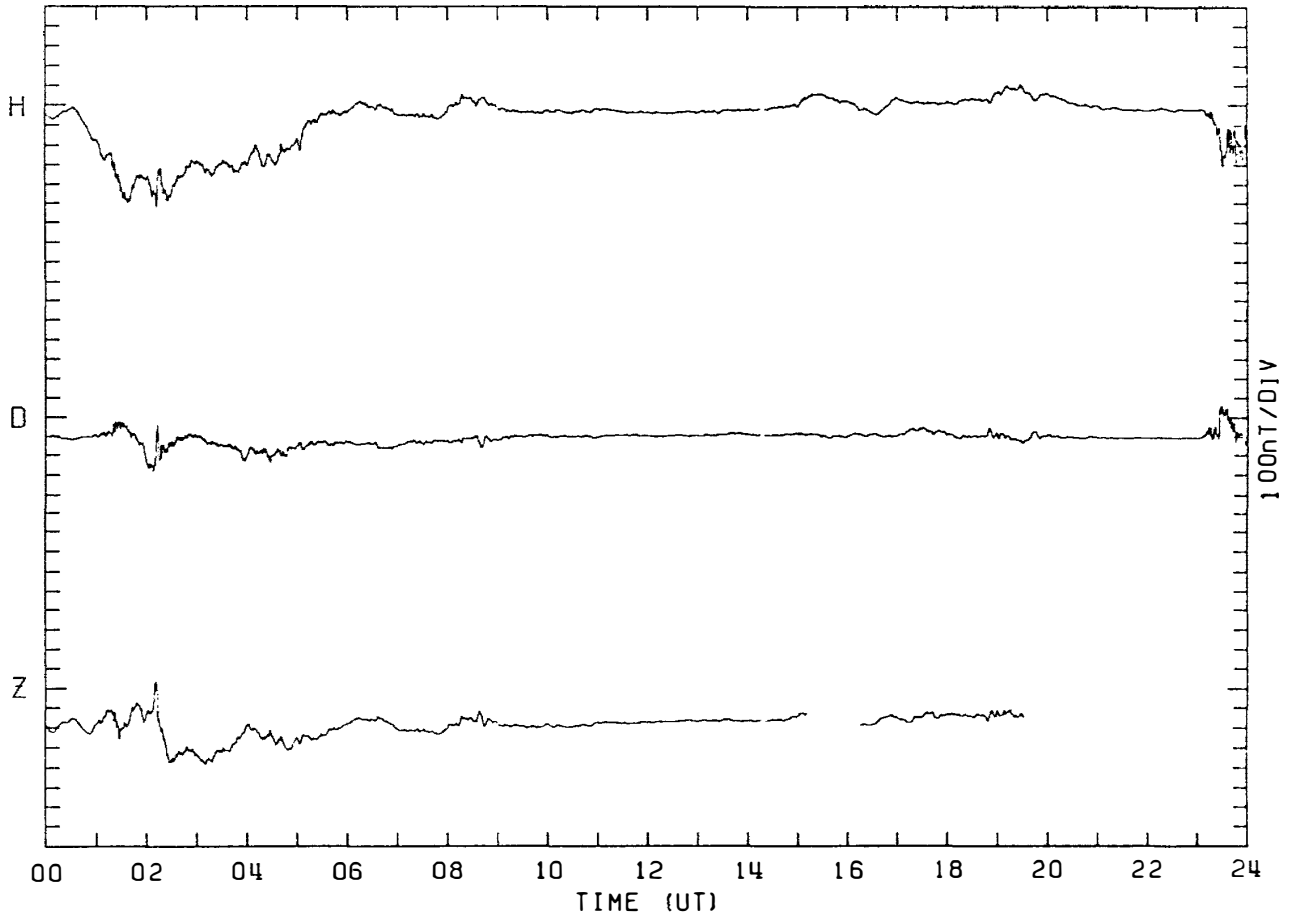
MAGNETOGRAM SYOWA STATION

DAY:263 SEPTEMBER 20. 1983



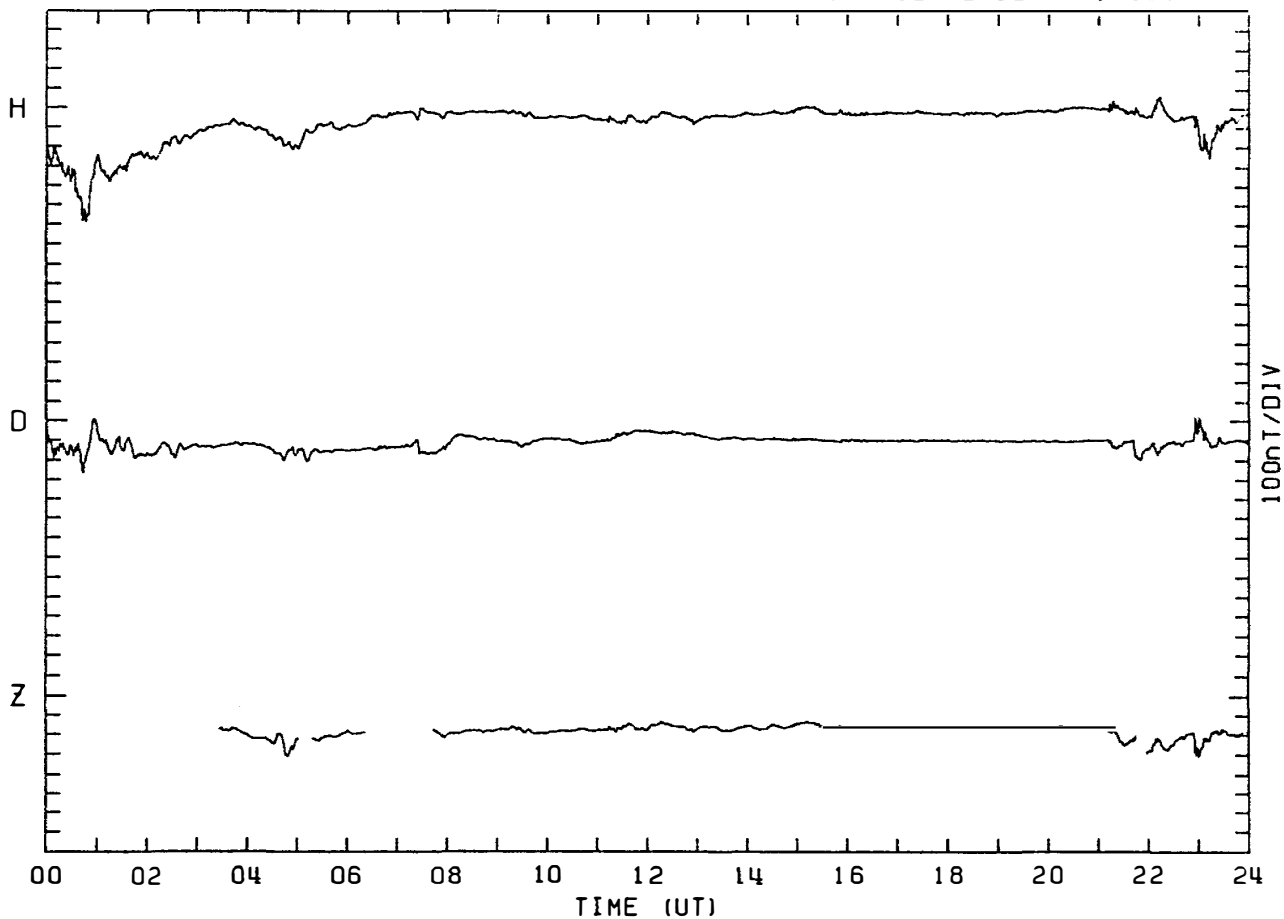
MAGNETOGRAM SYOWA STATION

DAY:264 SEPTEMBER 21. 1983



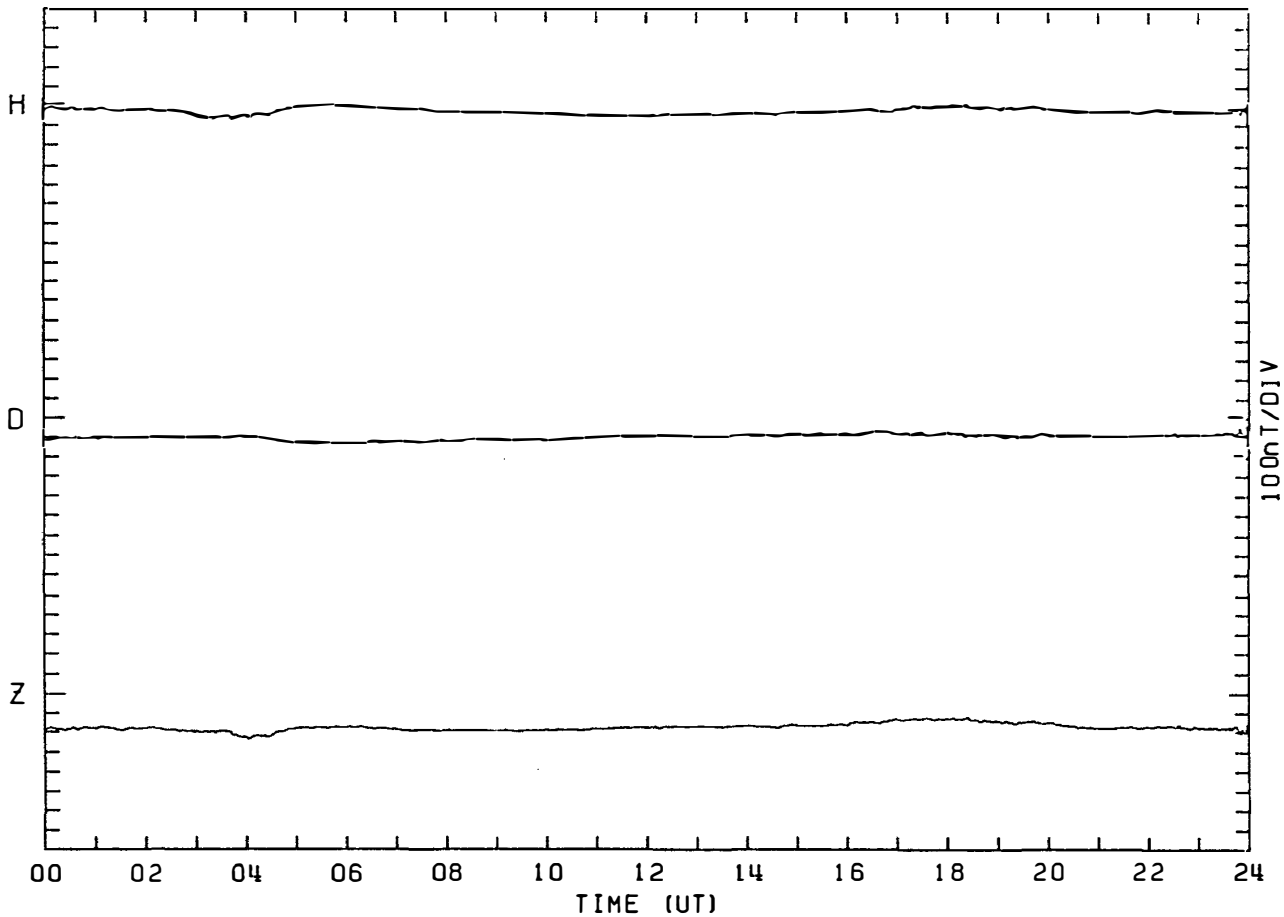
MAGNETOGRAM SYOWA STATION

DAY:265 SEPTEMBER 22. 1983



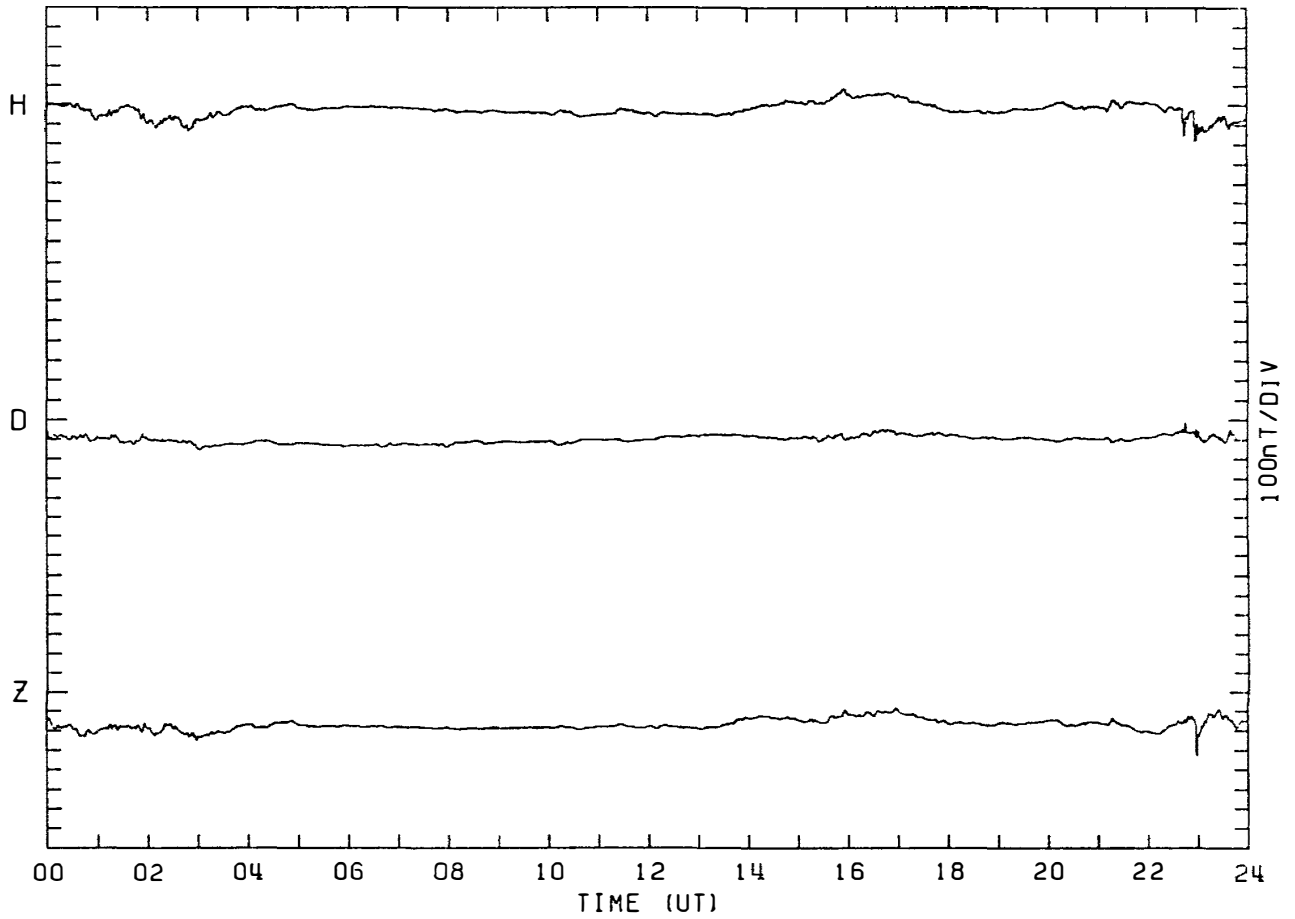
MAGNETOGRAM SYOWA STATION

DAY:266 SEPTEMBER 23. 1983



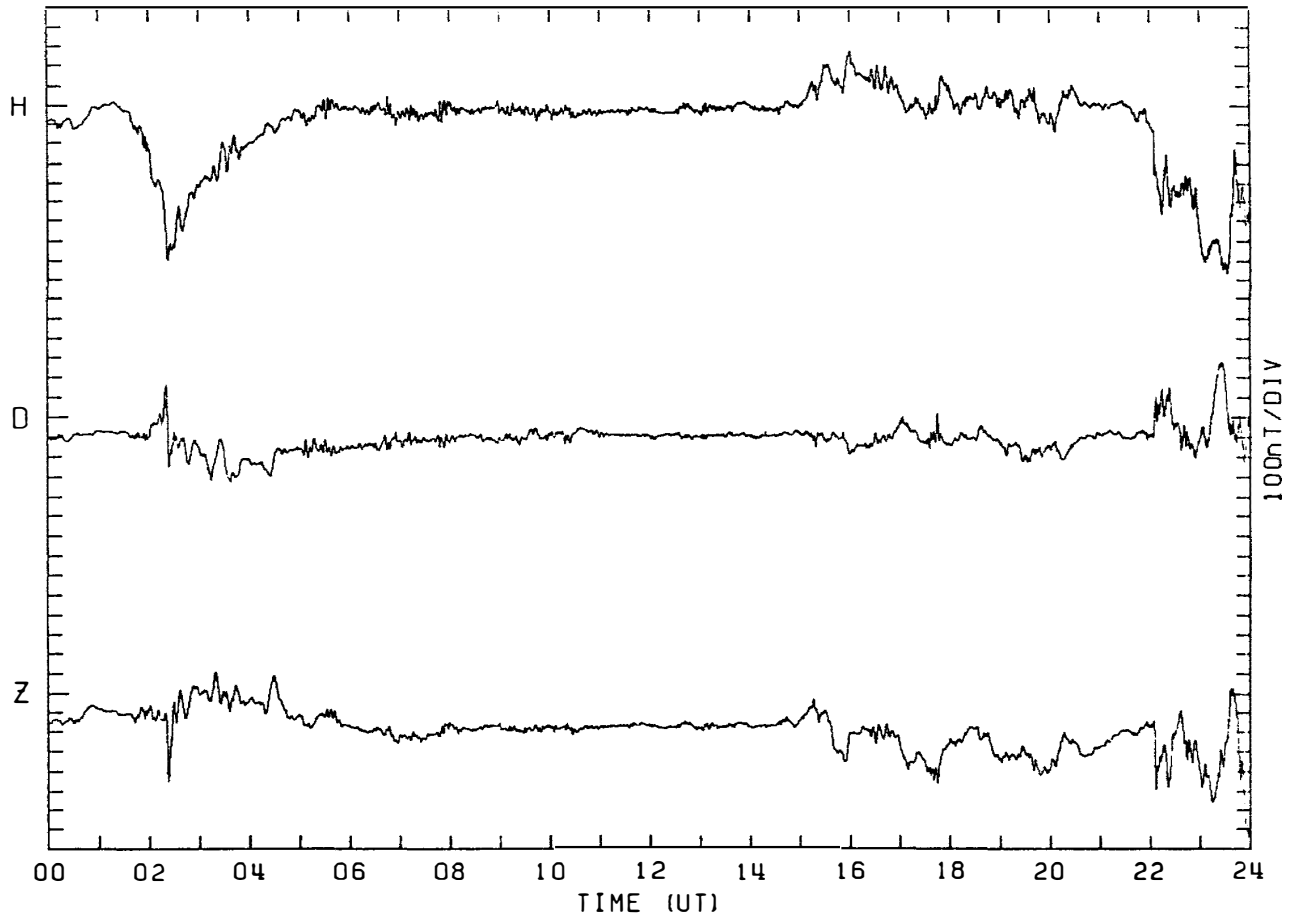
MAGNETOGRAM SYOWA STATION

DAY:267 SEPTEMBER 24, 1983



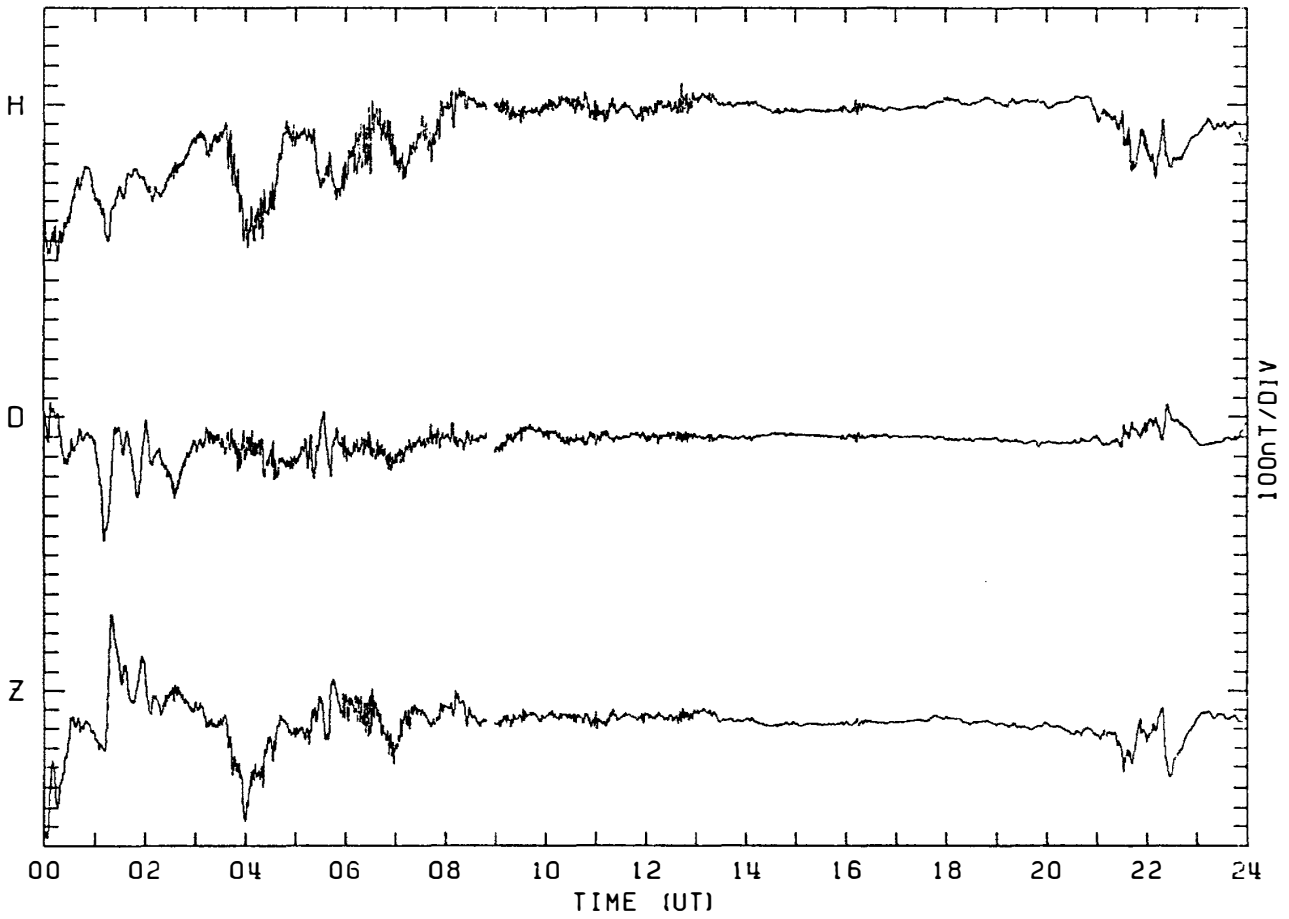
MAGNETOGRAM SYOWA STATION

DAY:268 SEPTEMBER 25, 1983



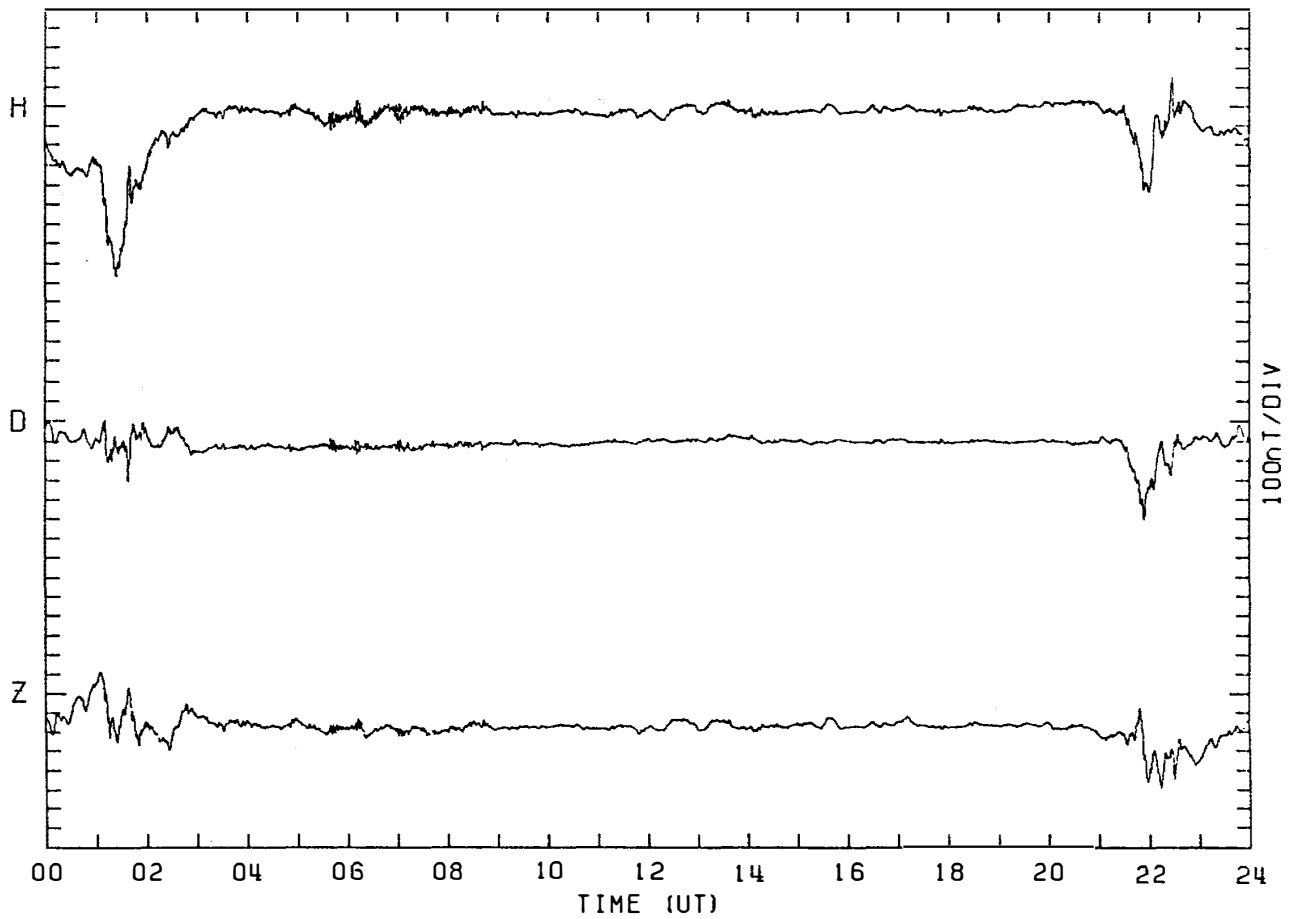
MAGNETOGRAM SYOWA STATION

DAY:269 SEPTEMBER 26. 1983



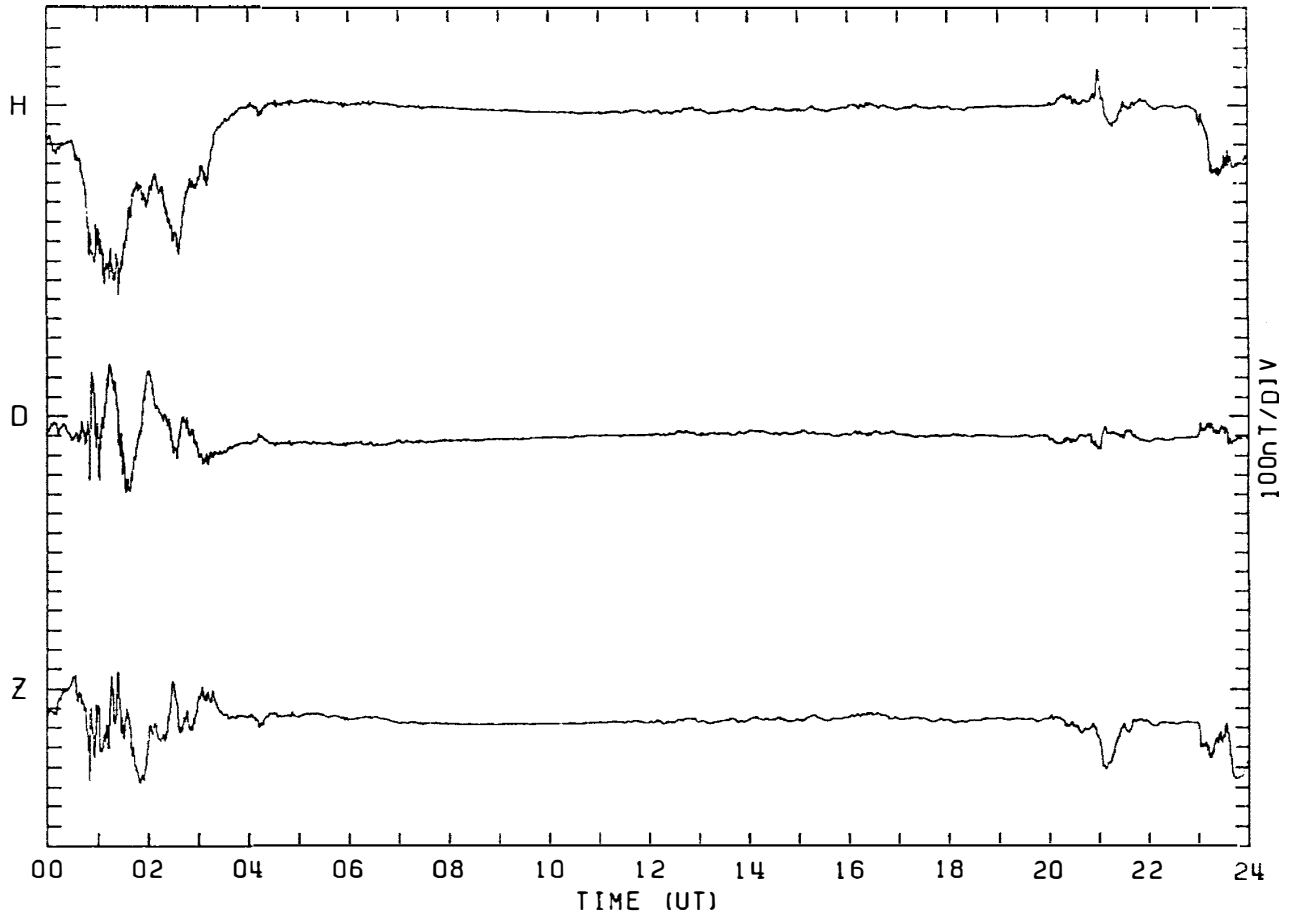
MAGNETOGRAM SYOWA STATION

DAY:270 SEPTEMBER 27. 1983



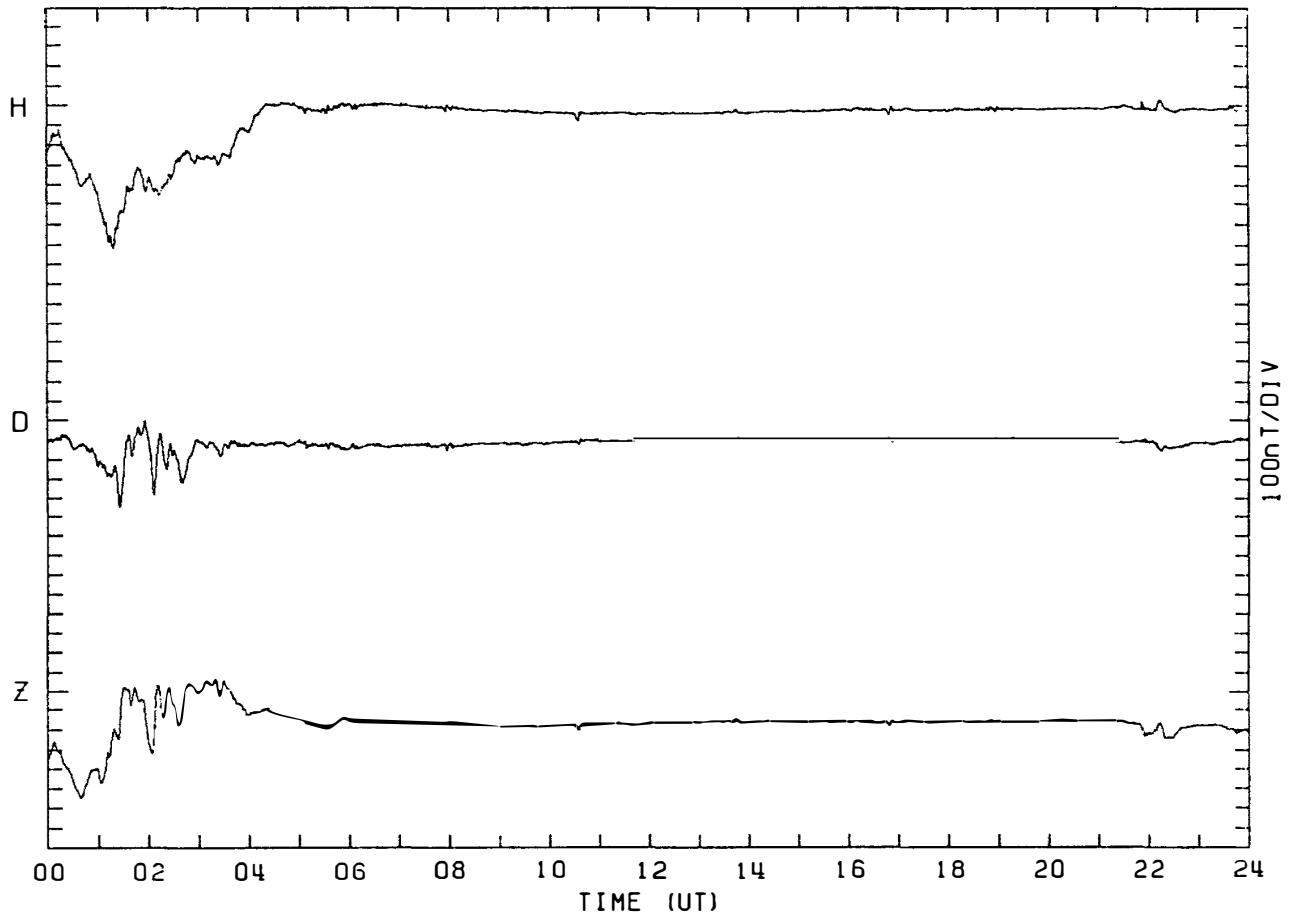
MAGNETOGRAM SYOWA STATION

DAY:271 SEPTEMBER 28. 1983



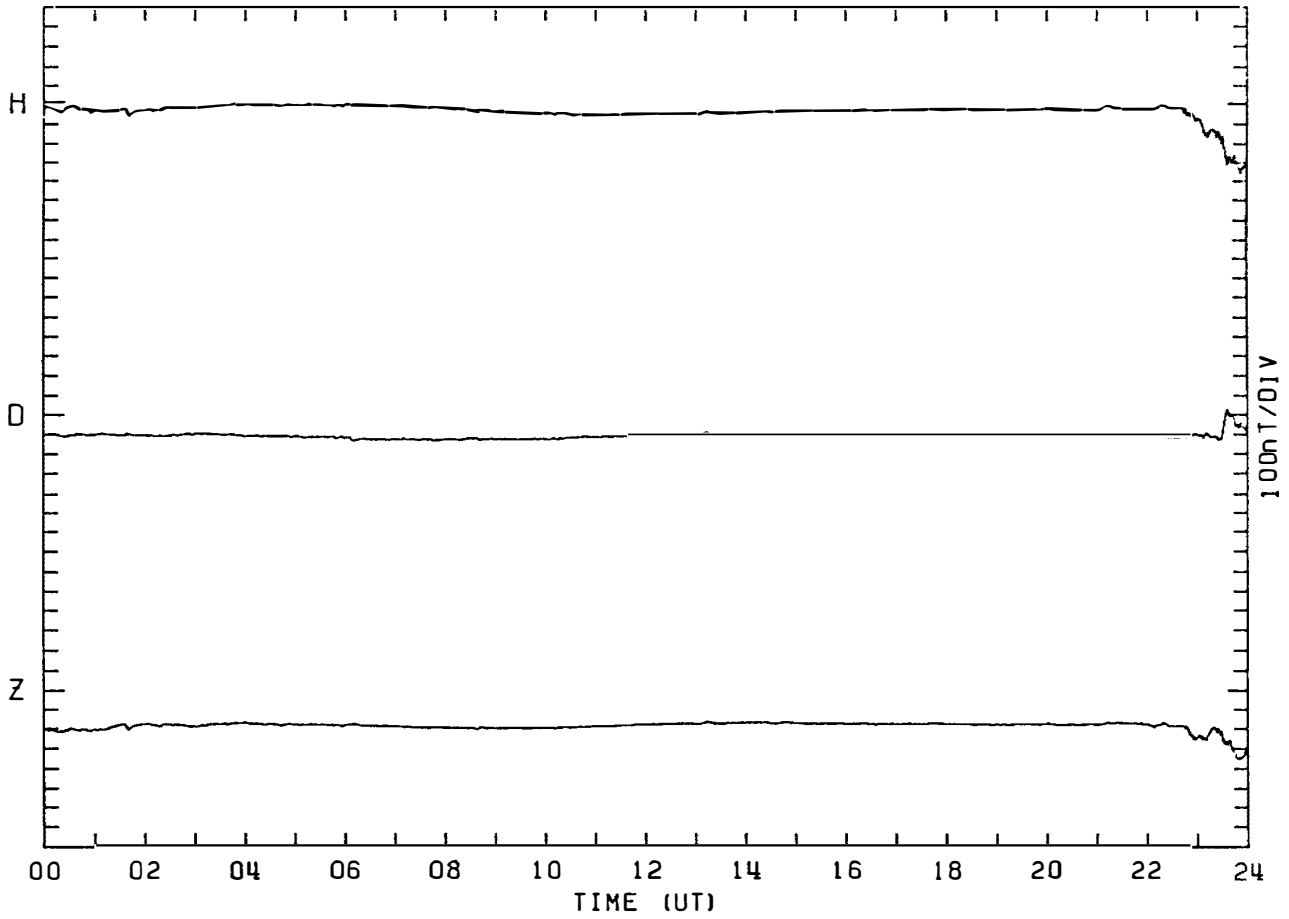
MAGNETOGRAM SYOWA STATION

DAY:272 SEPTEMBER 29. 1983



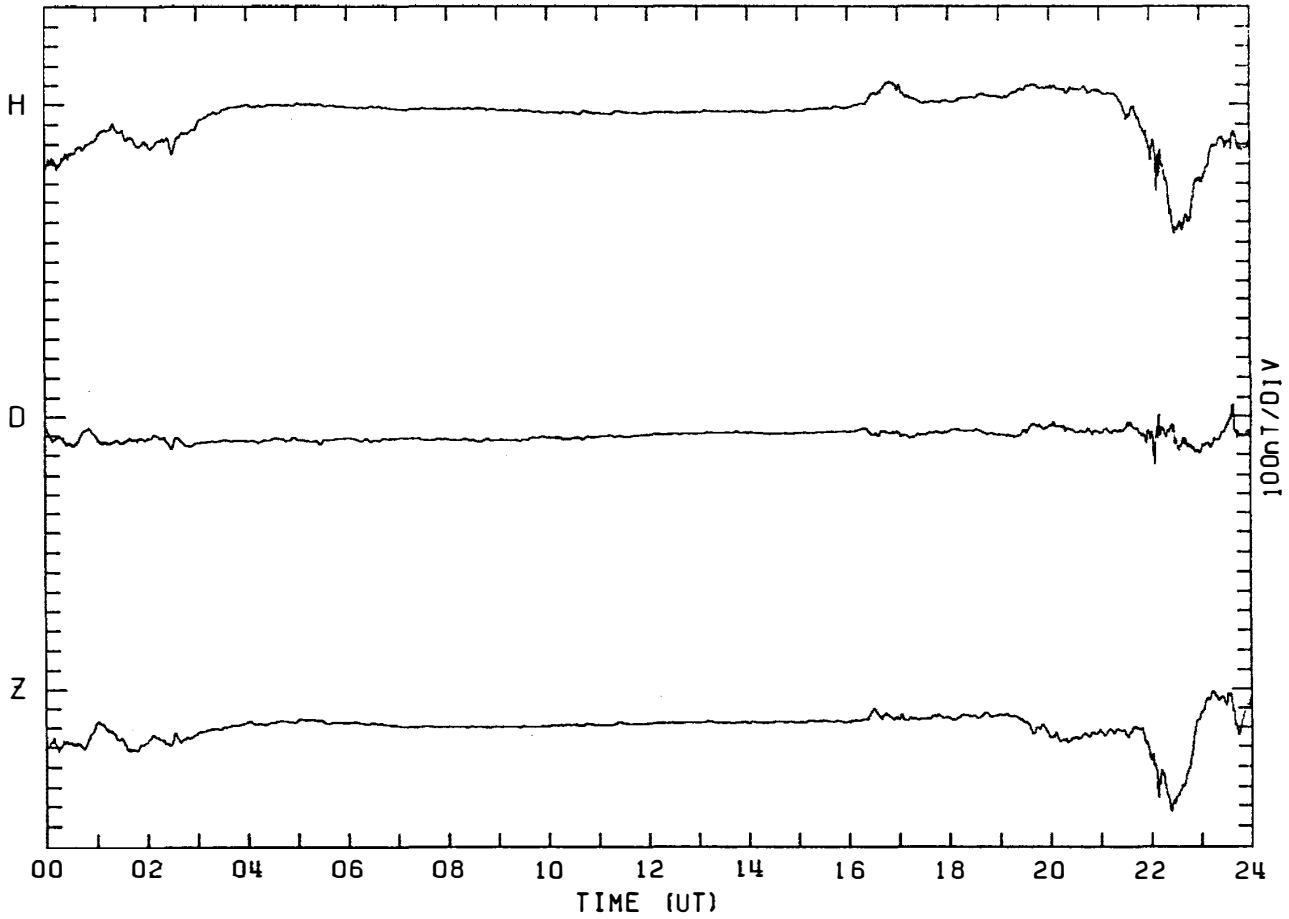
MAGNETOGRAM SYOWA STATION

DAY:273 SEPTEMBER 30, 1983



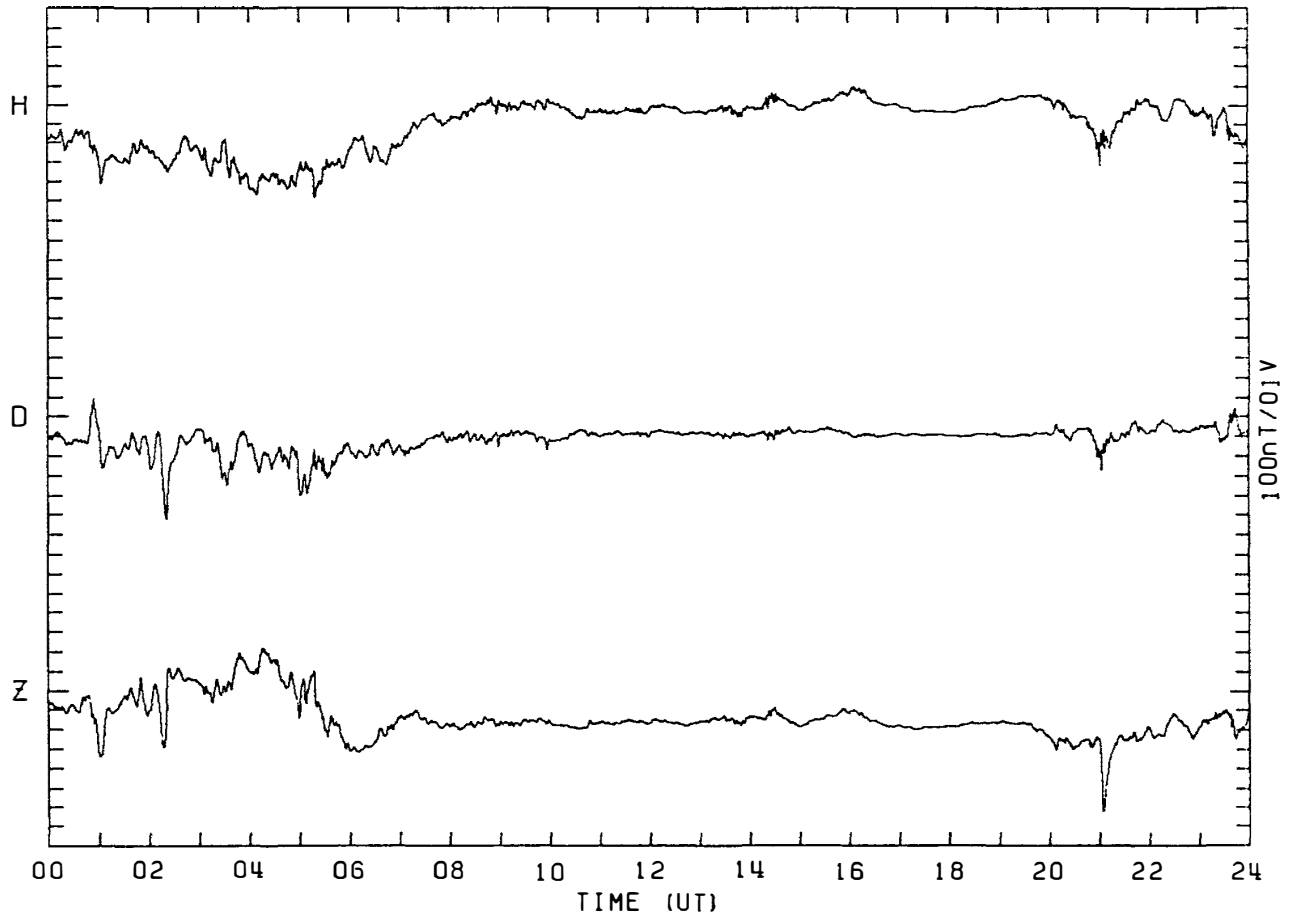
MAGNETOGRAM SYOWA STATION

DAY:274 OCTOBER 1, 1983



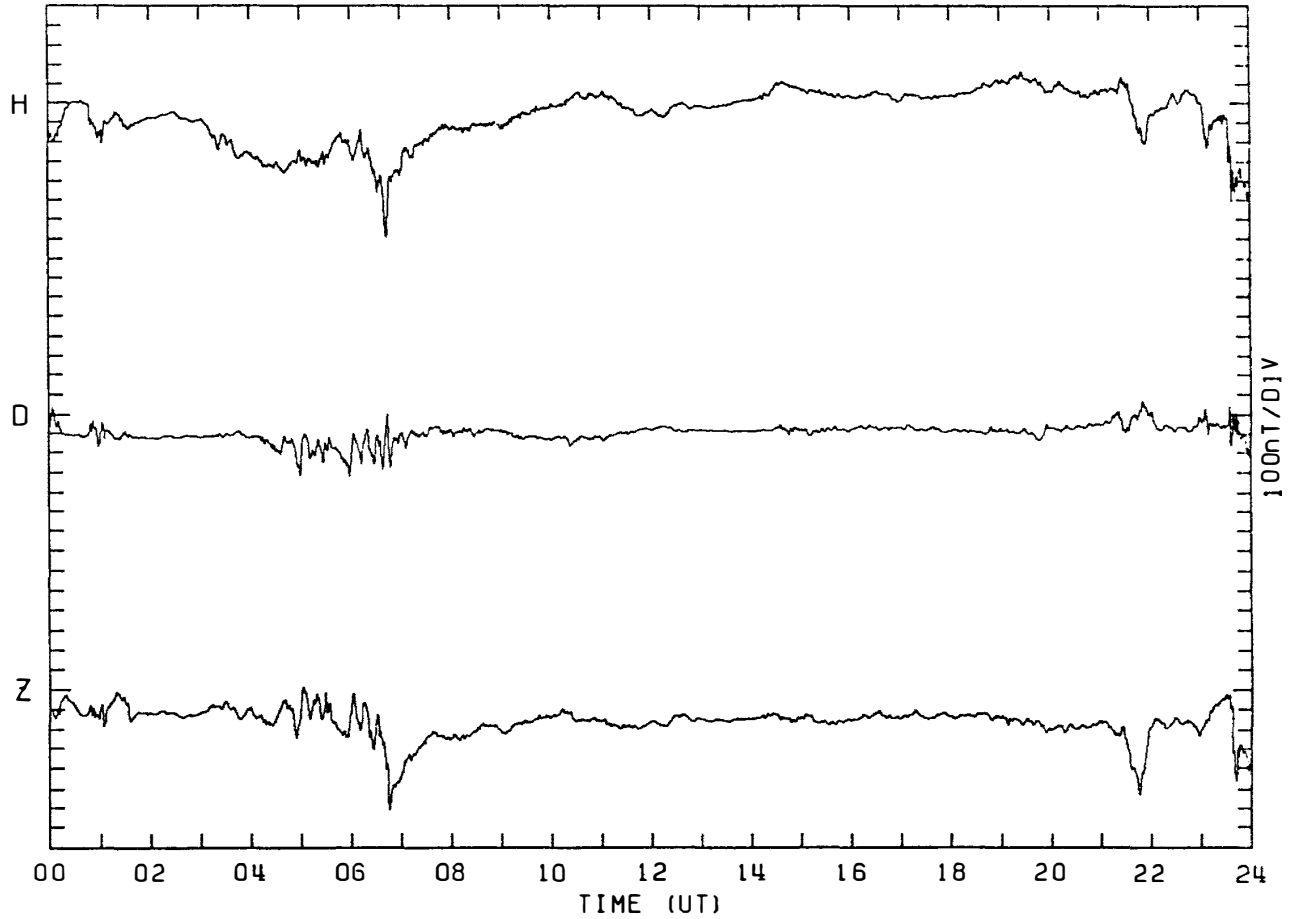
MAGNETOGRAM SYOWA STATION

DAY:275 OCTOBER 2. 1983



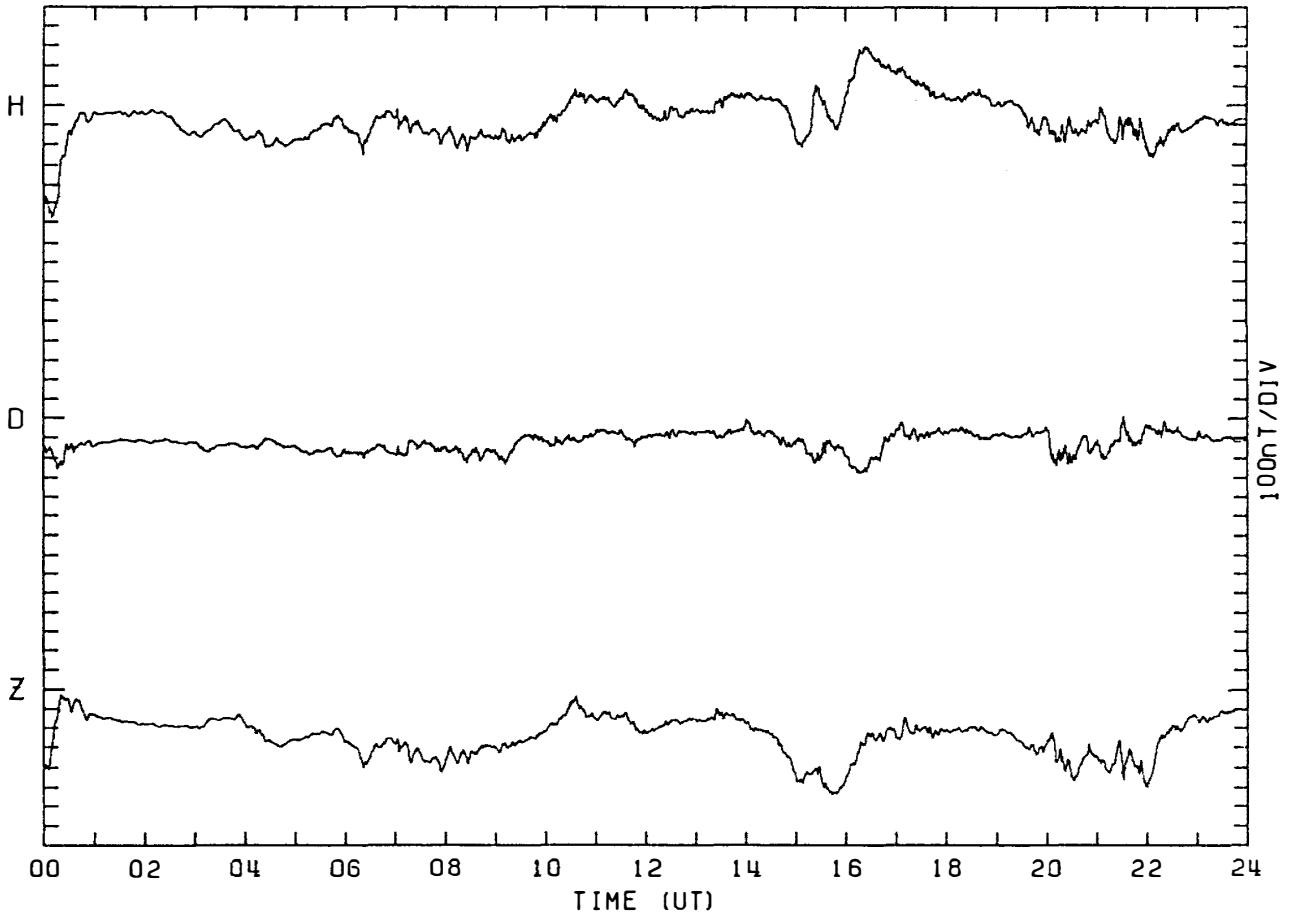
MAGNETOGRAM SYOWA STATION

DAY:276 OCTOBER 3. 1983



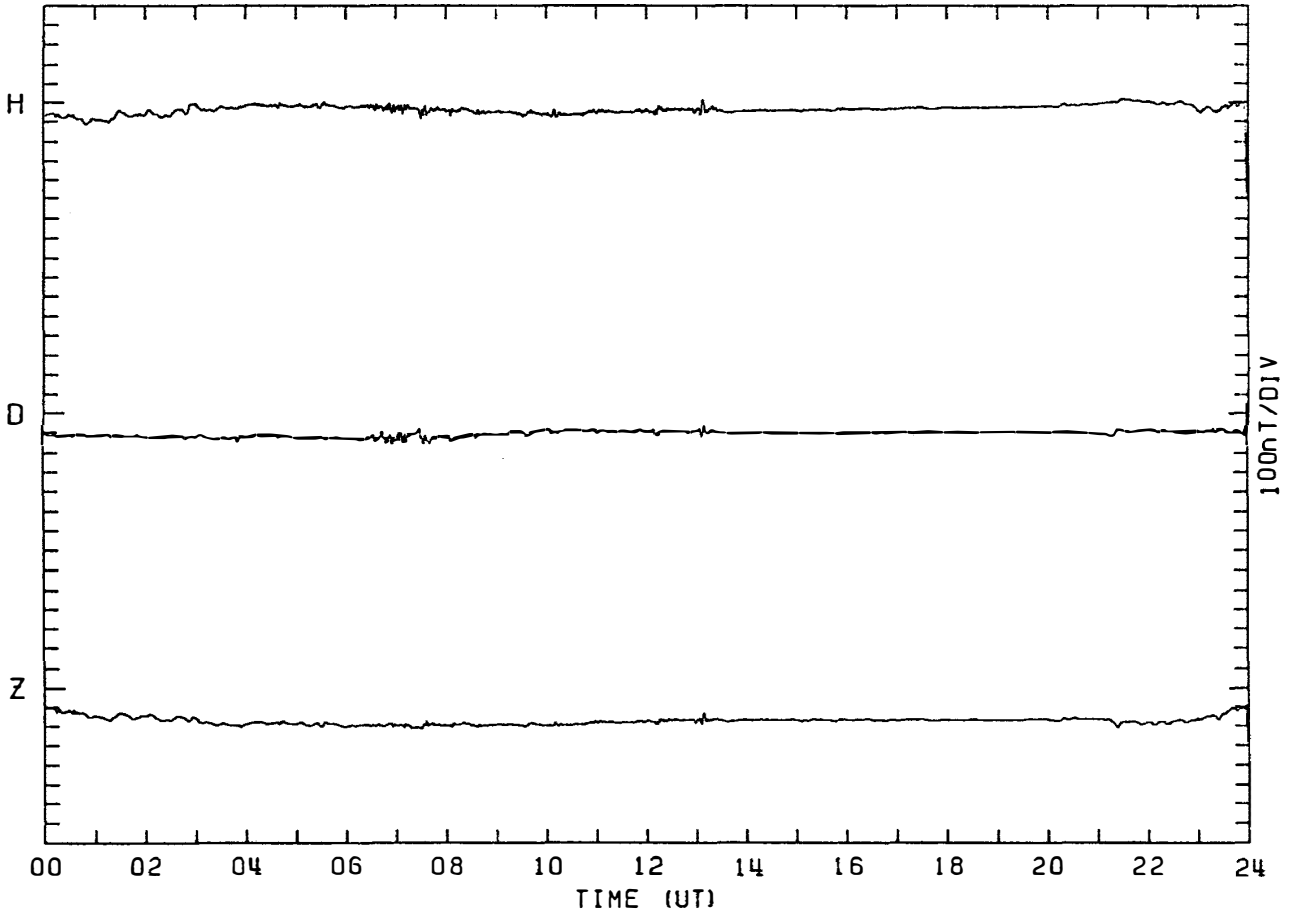
MAGNETOGRAM SYOWA STATION

DAY:277 OCTOBER 4, 1983



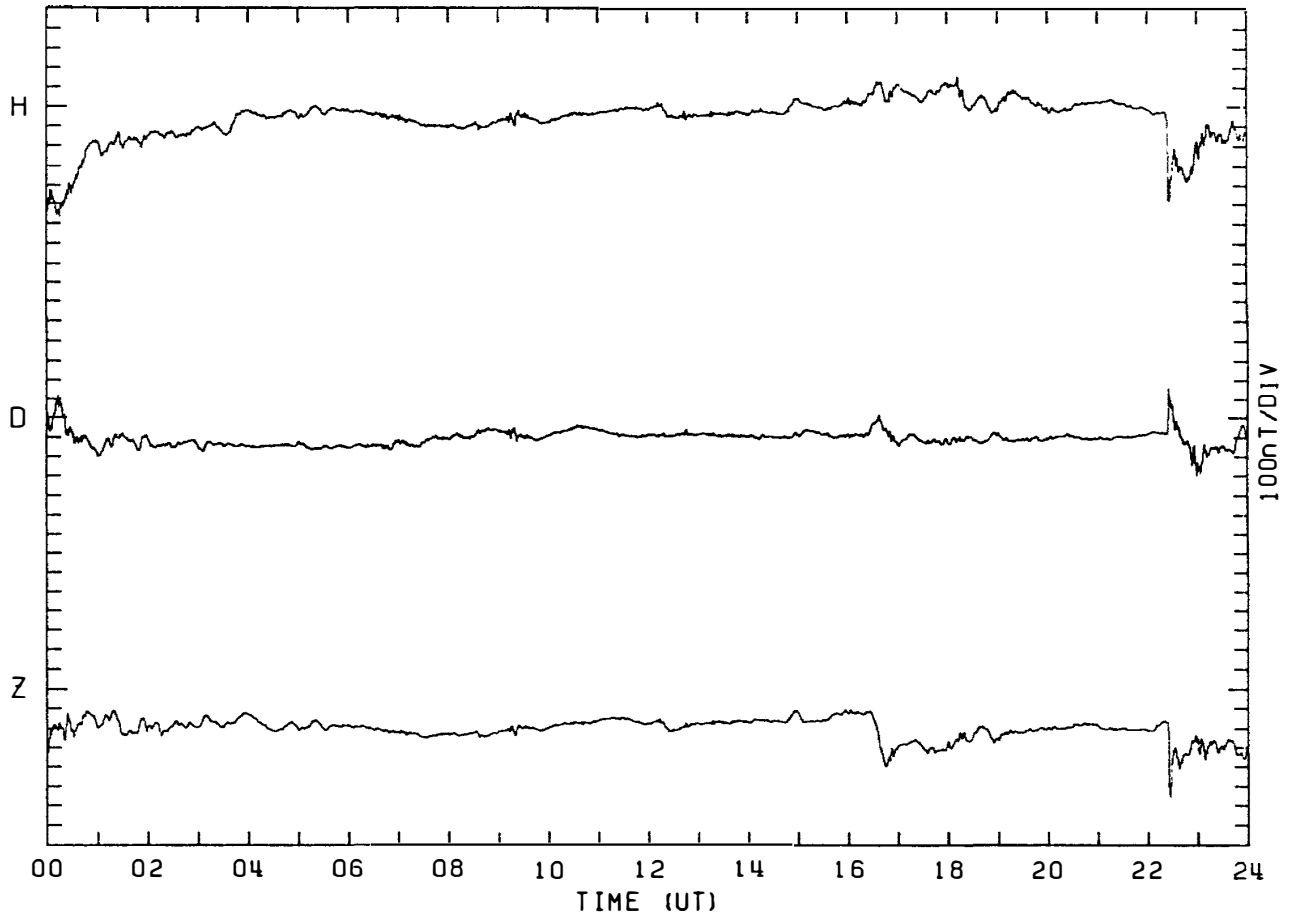
MAGNETOGRAM SYOWA STATION

DAY:278 OCTOBER 5, 1983



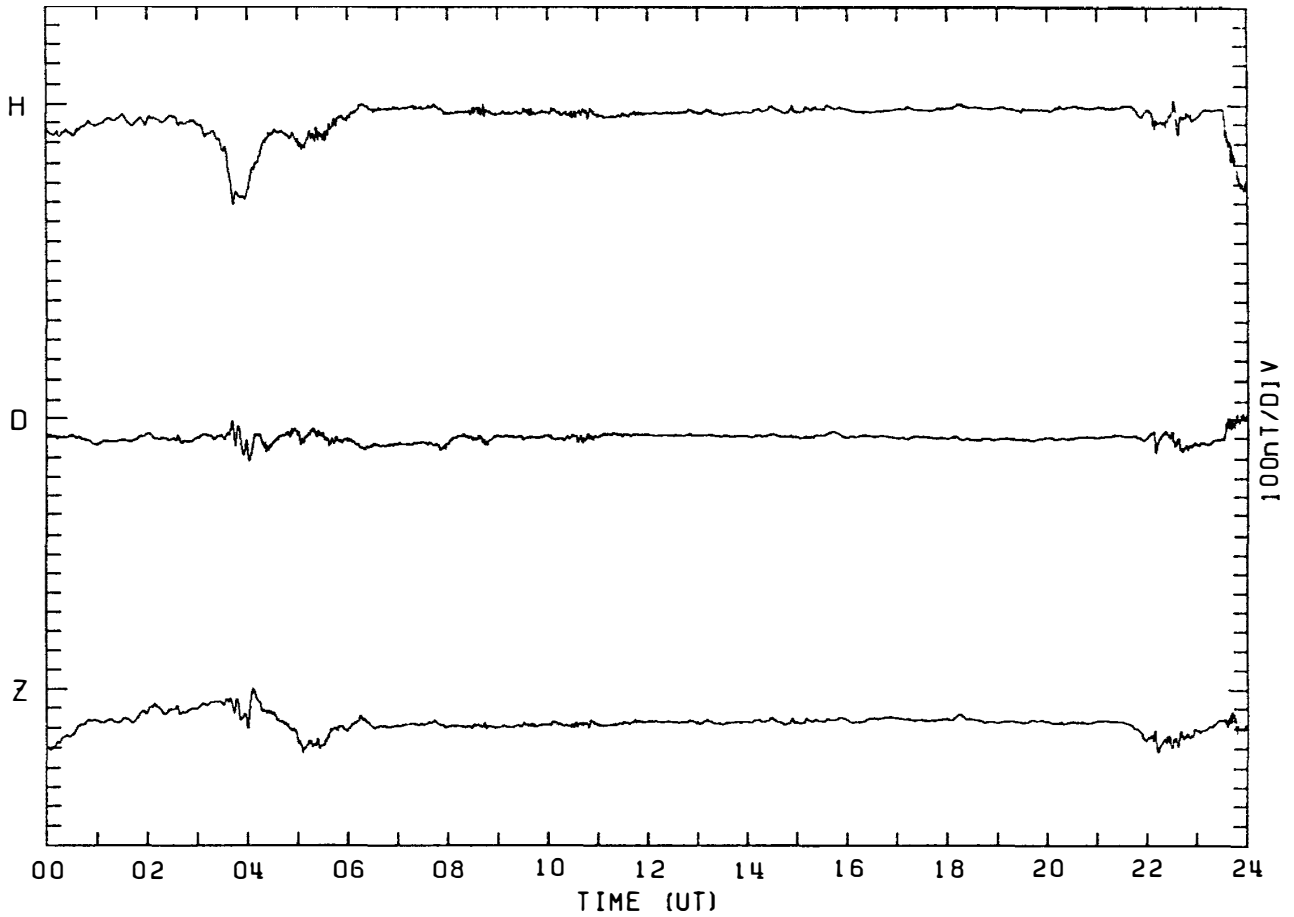
MAGNETOGRAM SYOWA STATION

DAY:279 OCTOBER 6. 1983



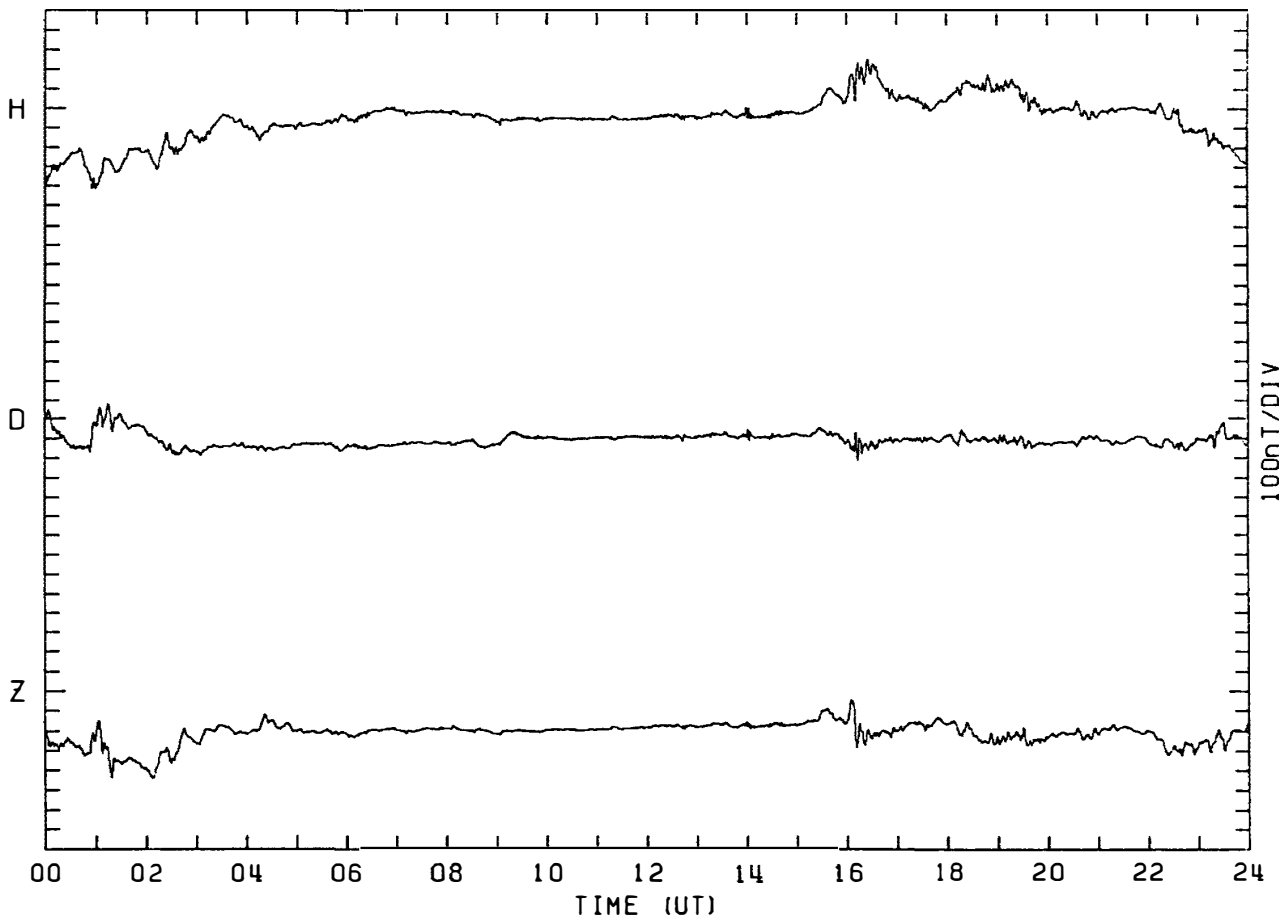
MAGNETOGRAM SYOWA STATION

DAY:280 OCTOBER 7. 1983



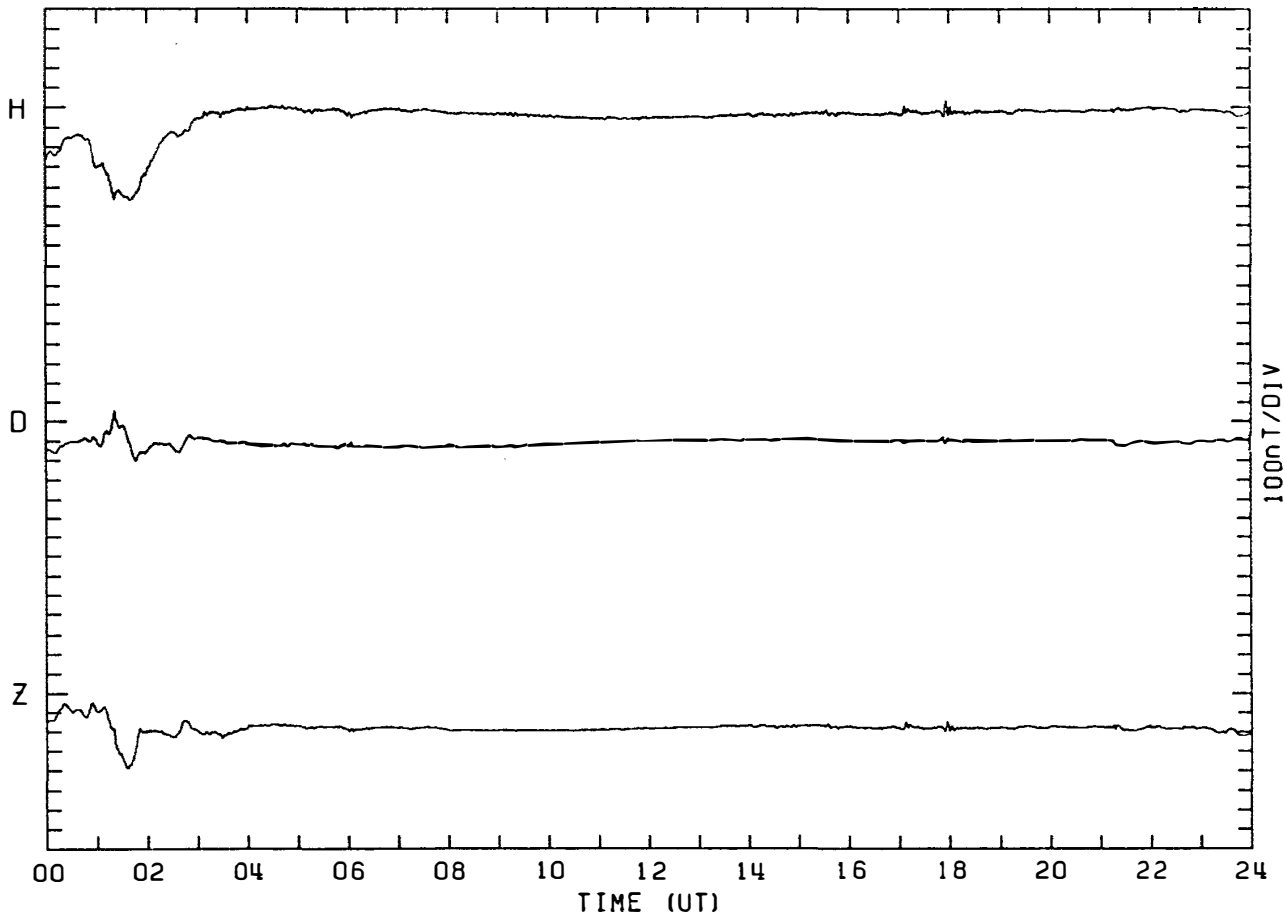
MAGNETOGRAM SYOWA STATION

DAY:281 OCTOBER 8. 1983



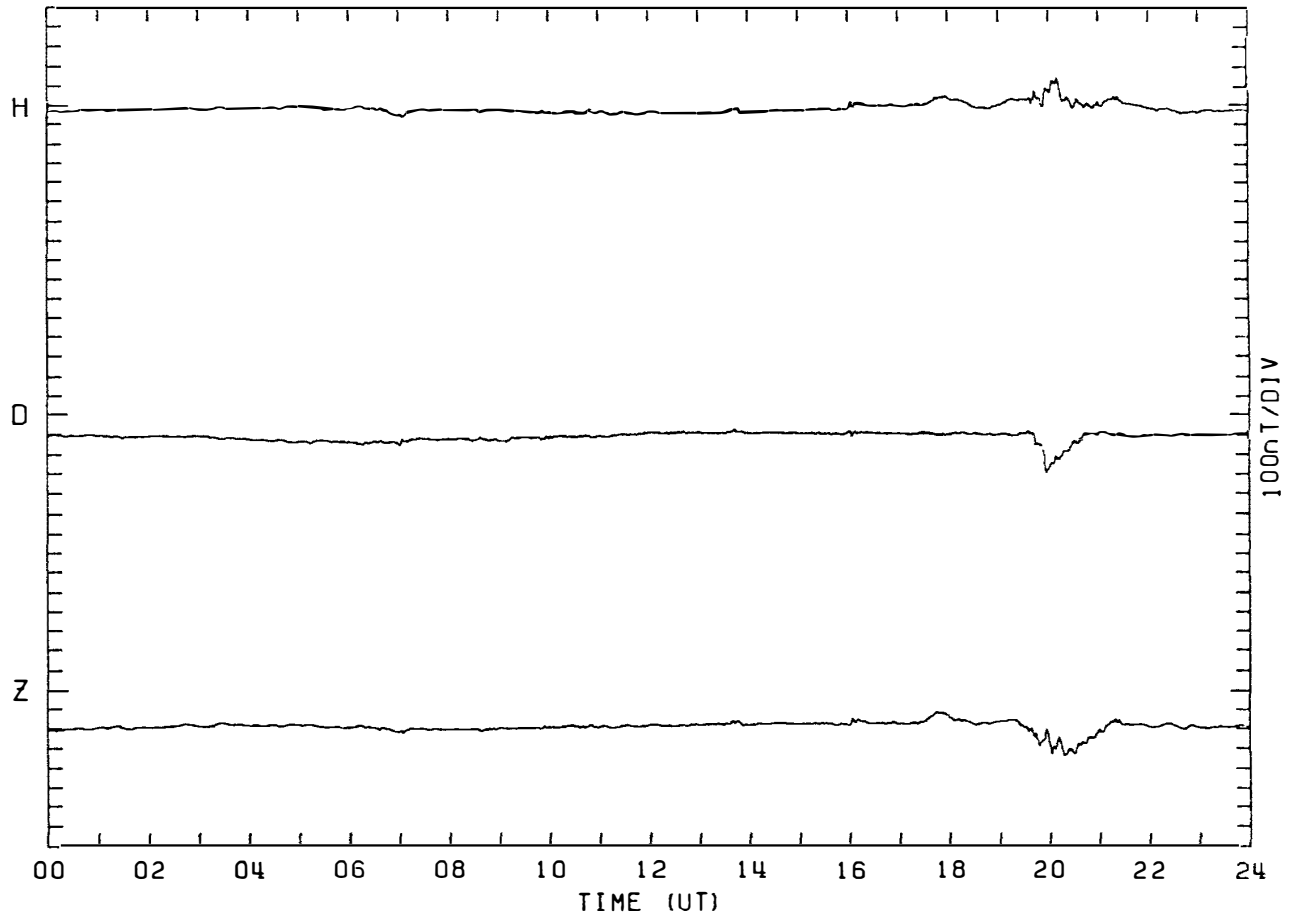
MAGNETOGRAM SYOWA STATION

DAY:282 OCTOBER 9. 1983



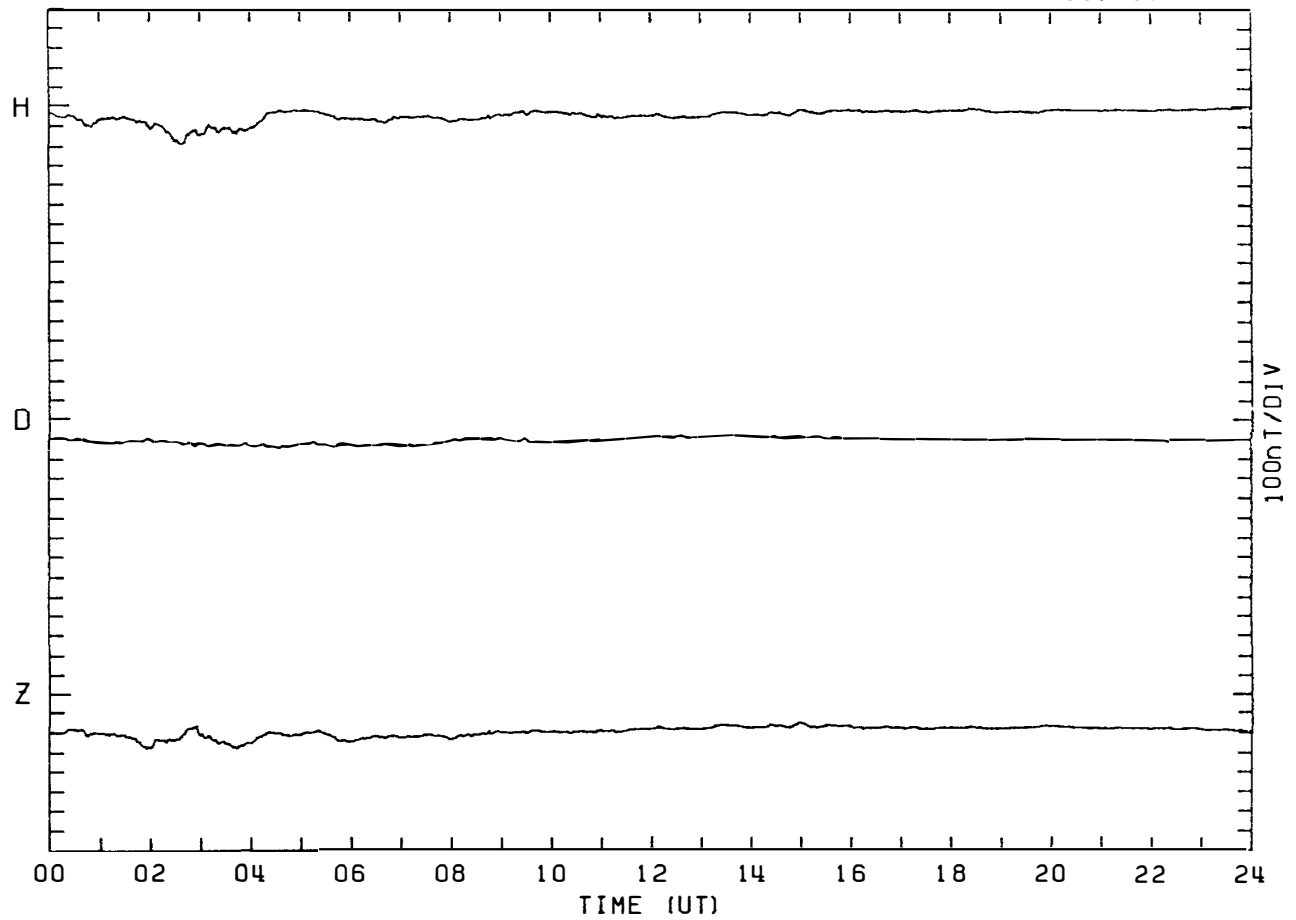
MAGNETOGRAM SYOWA STATION

DAY:283 OCTOBER 10, 1983



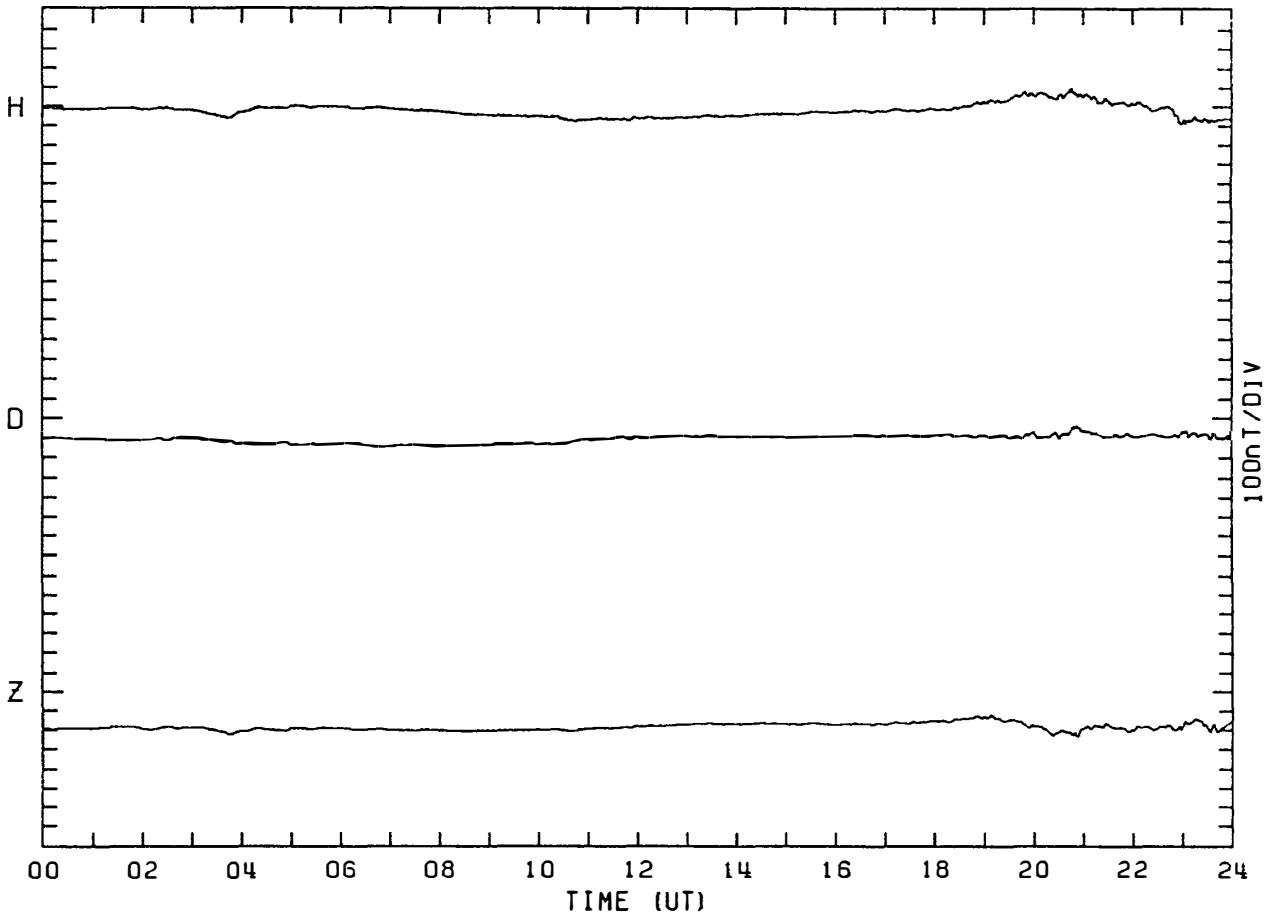
MAGNETOGRAM SYOWA STATION

DAY:284 OCTOBER 11, 1983



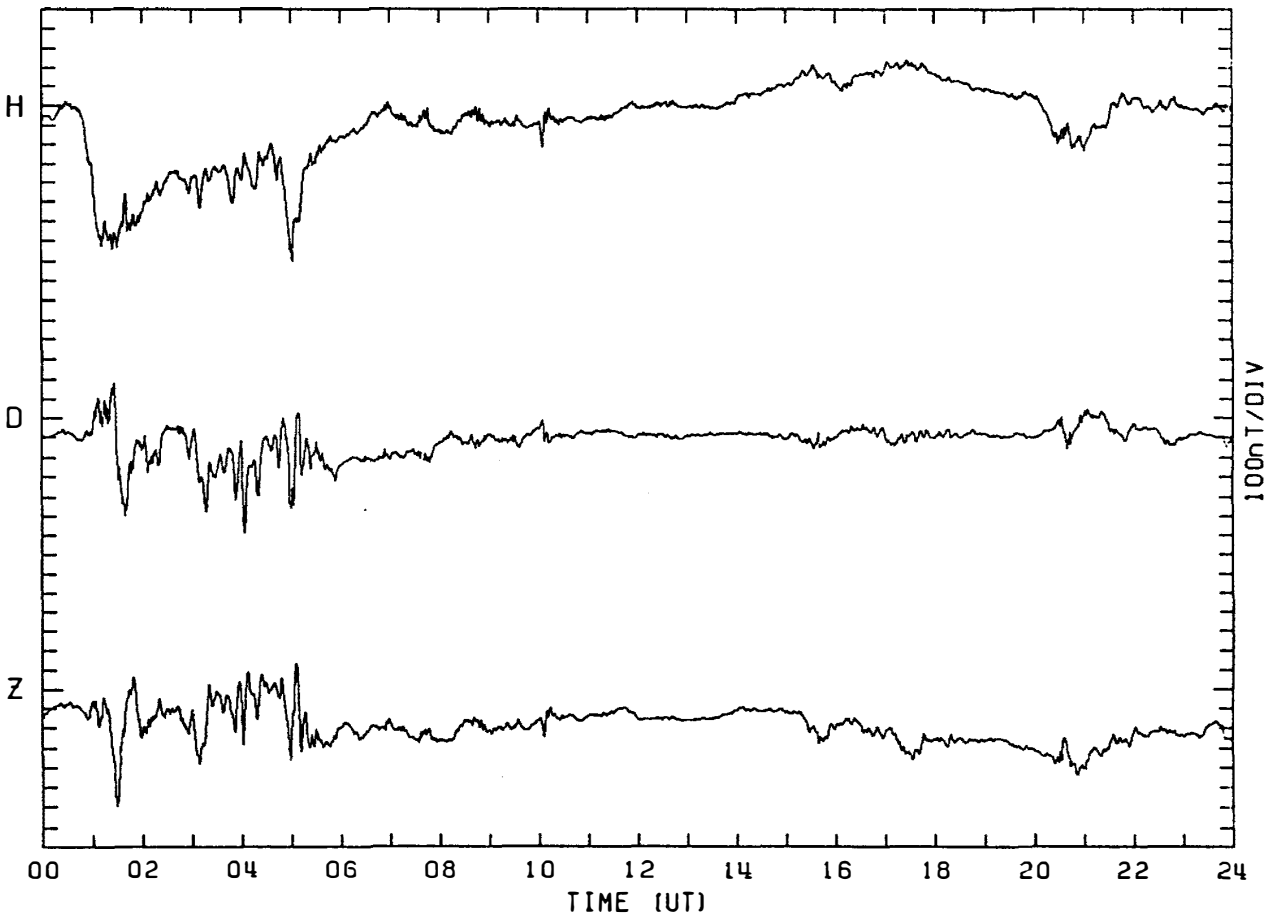
MAGNETOGRAM SYOWA STATION

DAY: 285 OCTOBER 12. 1983



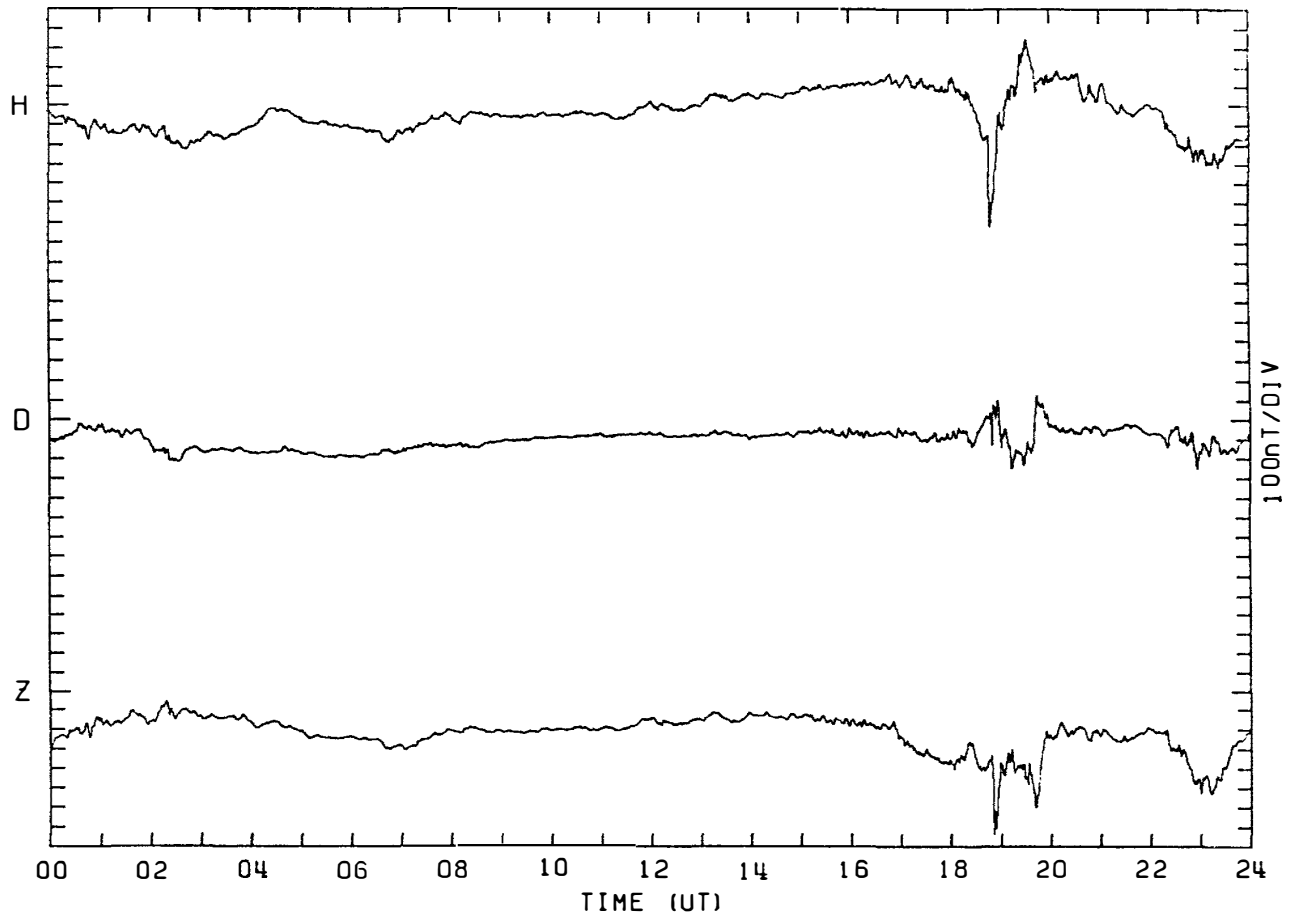
MAGNETOGRAM SYOWA STATION

DAY: 286 OCTOBER 13. 1983



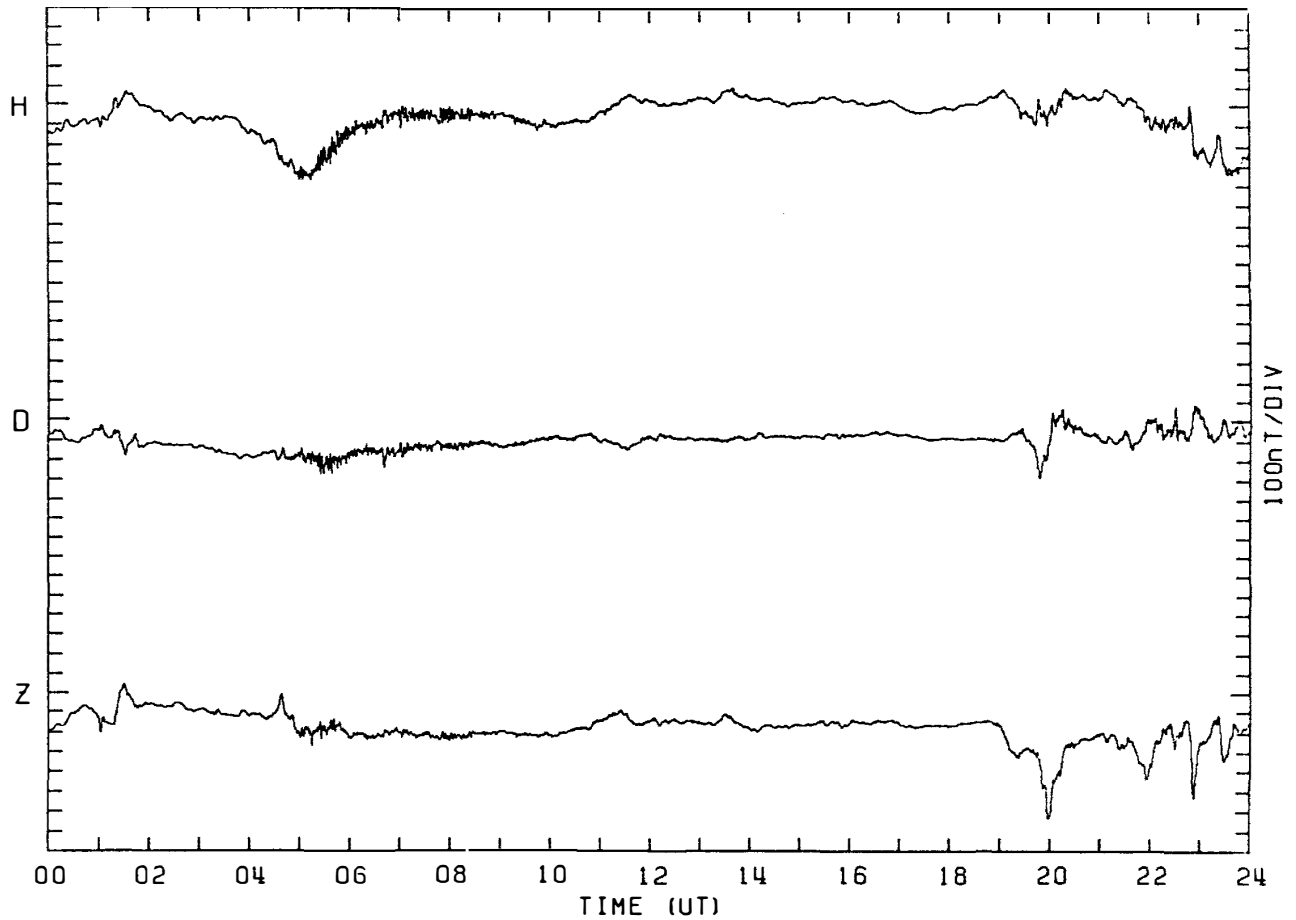
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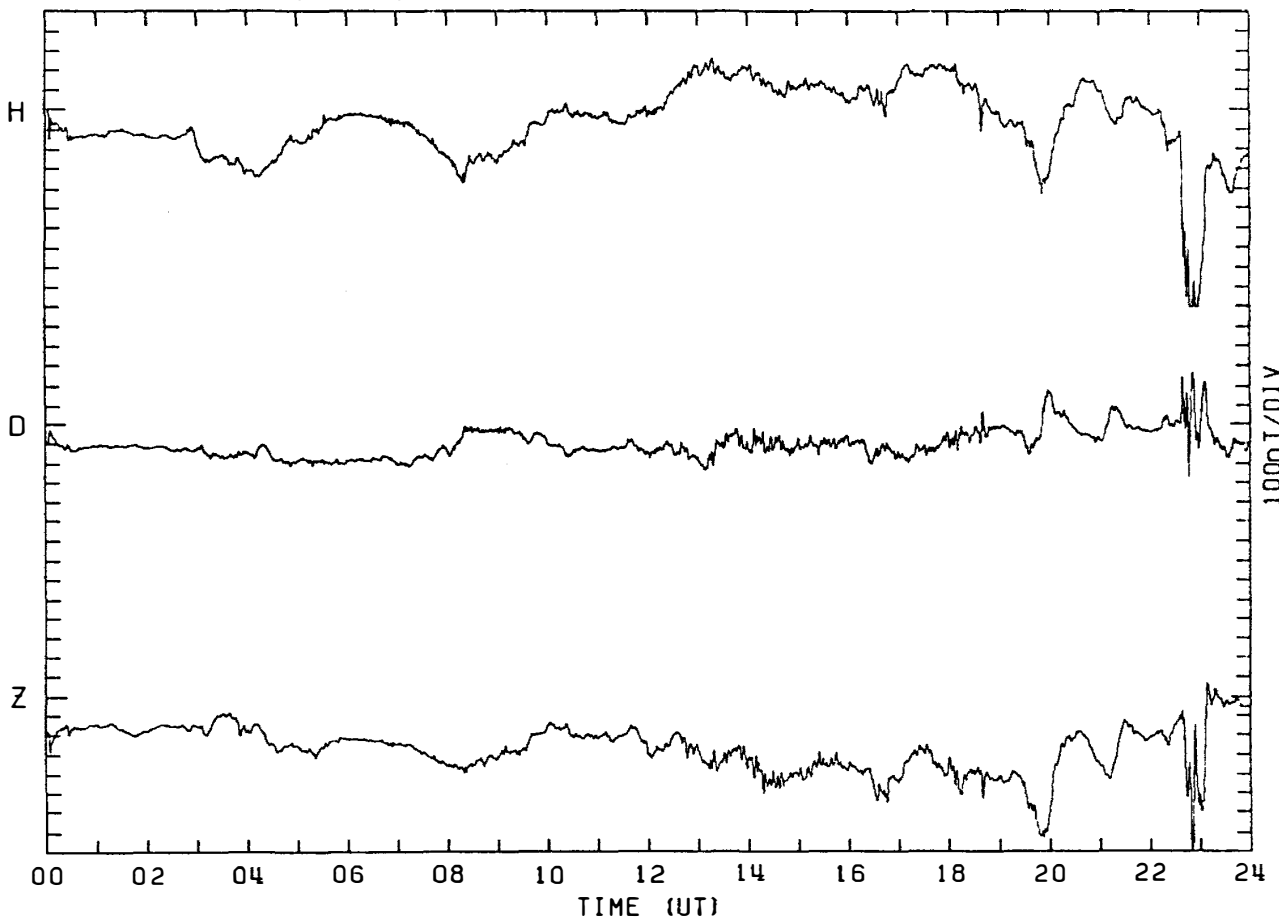
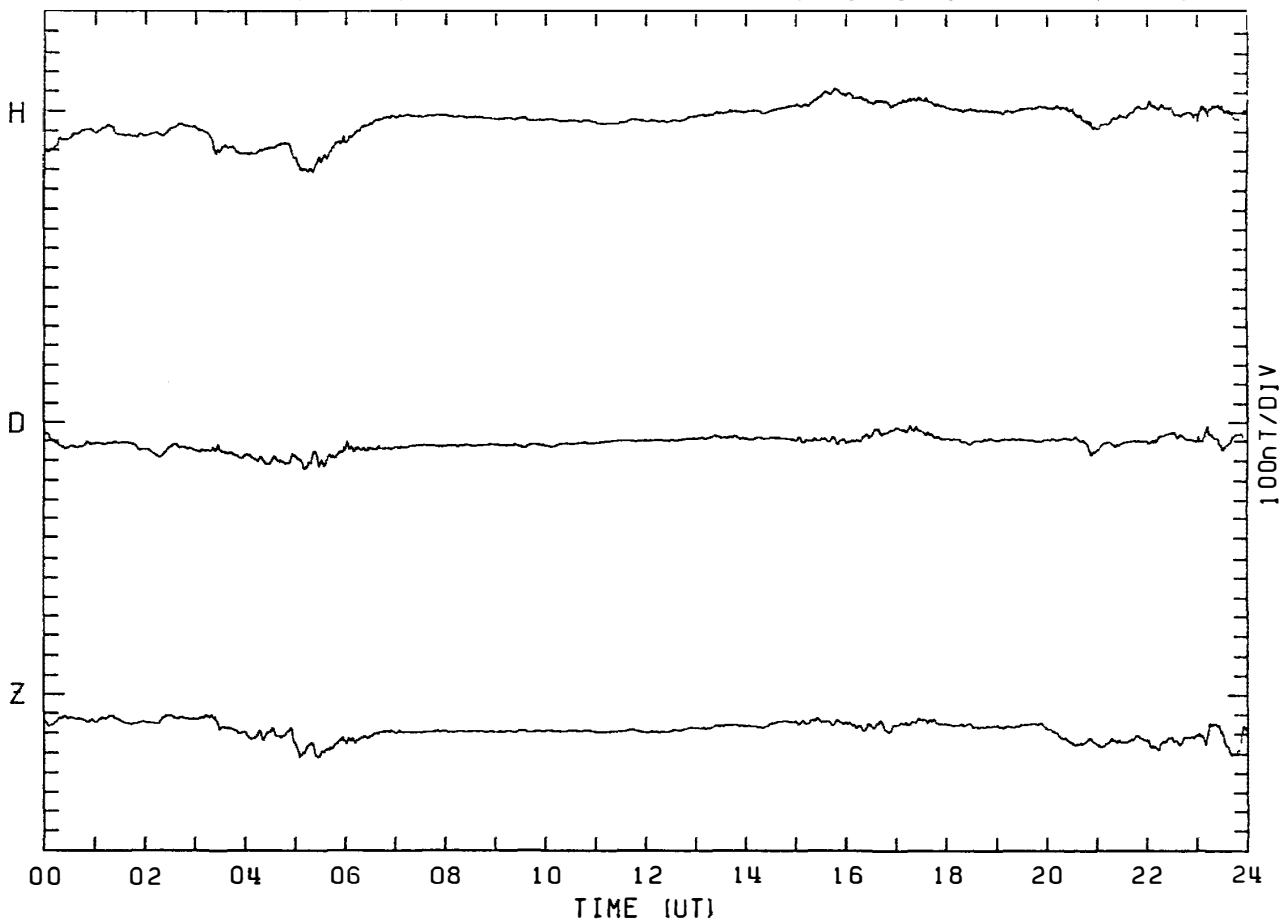
DAY:287 OCTOBER 14. 1983



MAGNETOGRAM SYOWA STATION

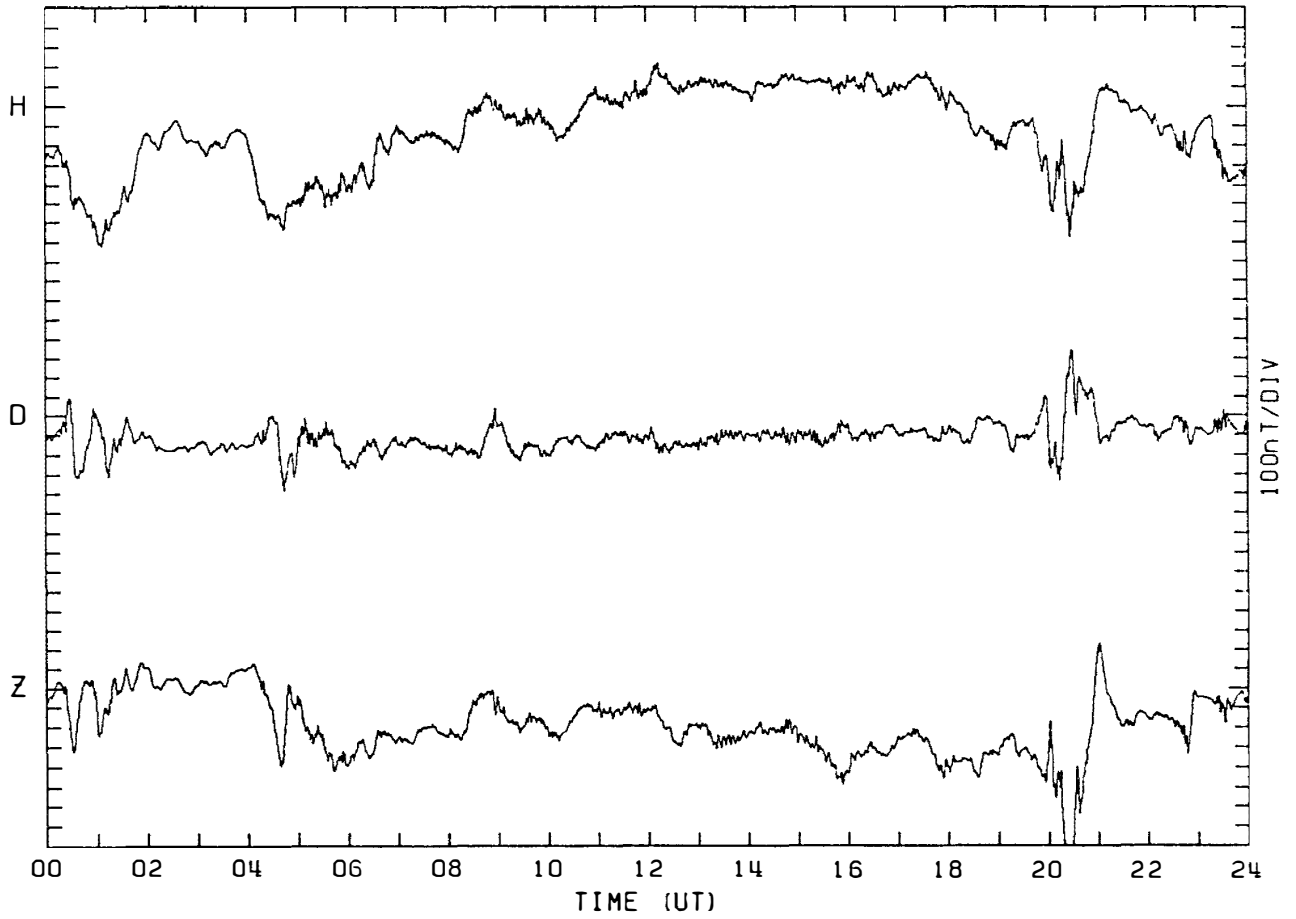
DAY:288 OCTOBER 15. 1983





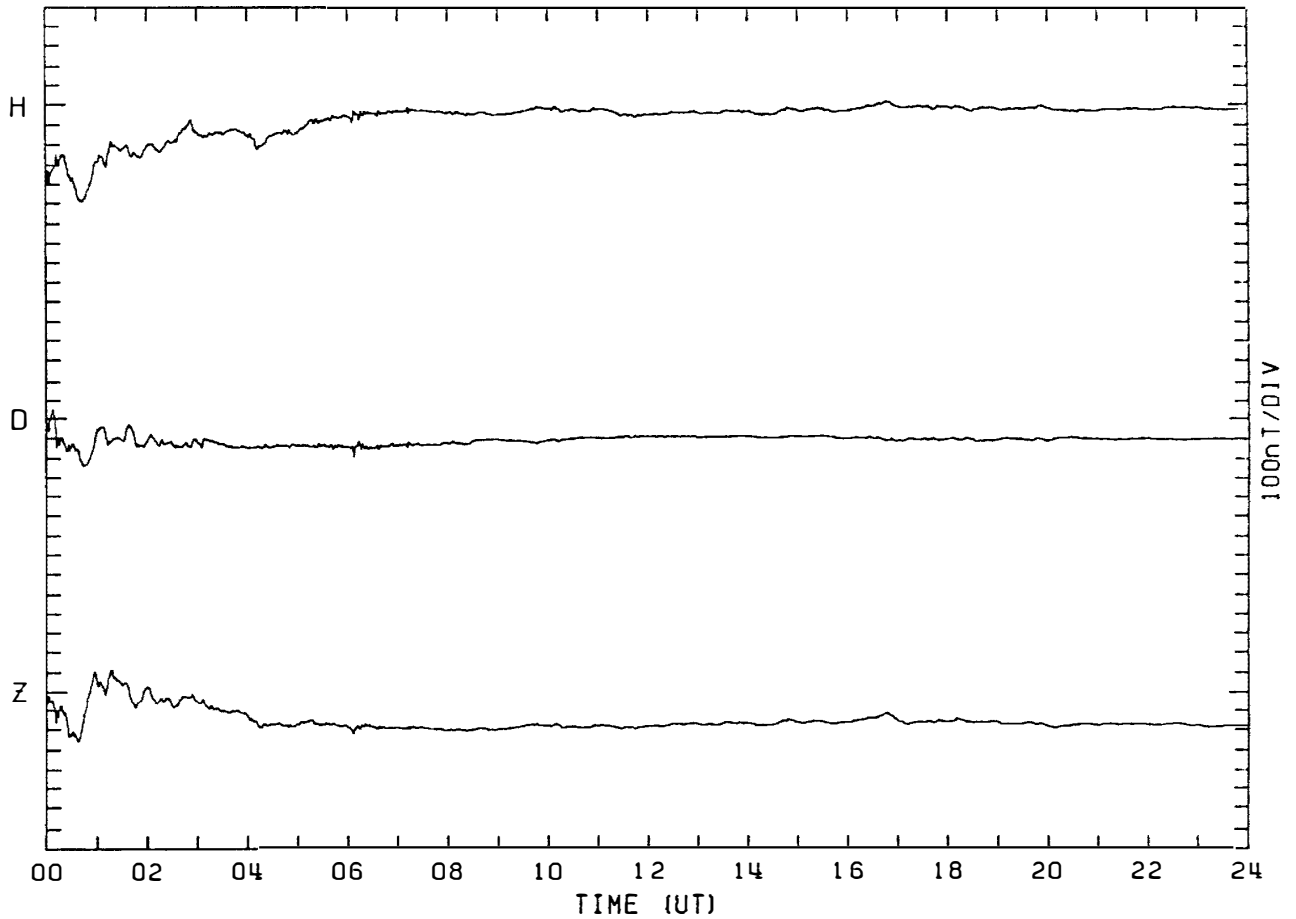
MAGNETOGRAM SYOWA STATION

DAY:291 OCTOBER 18. 1983



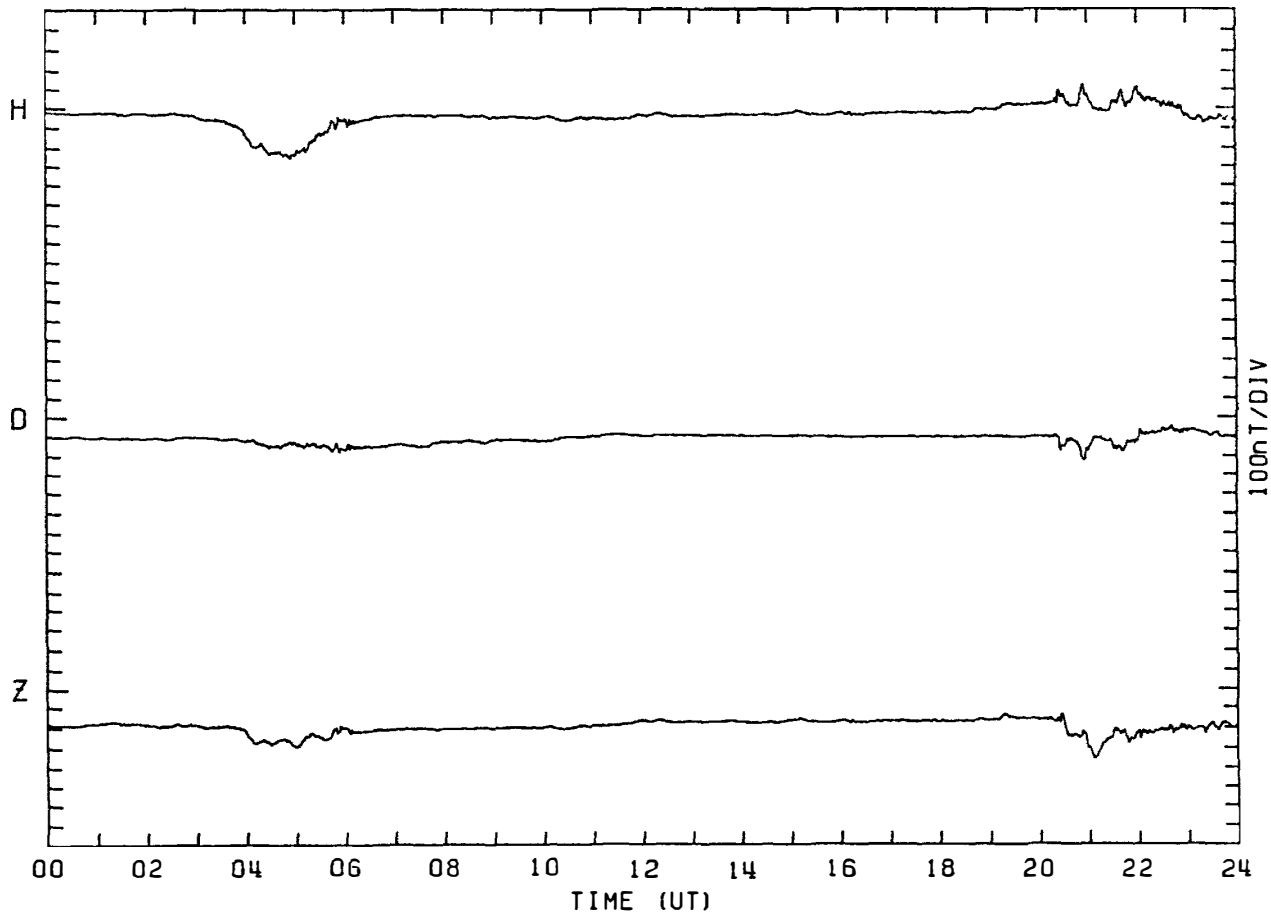
MAGNETOGRAM SYOWA STATION

DAY:292 OCTOBER 19. 1983



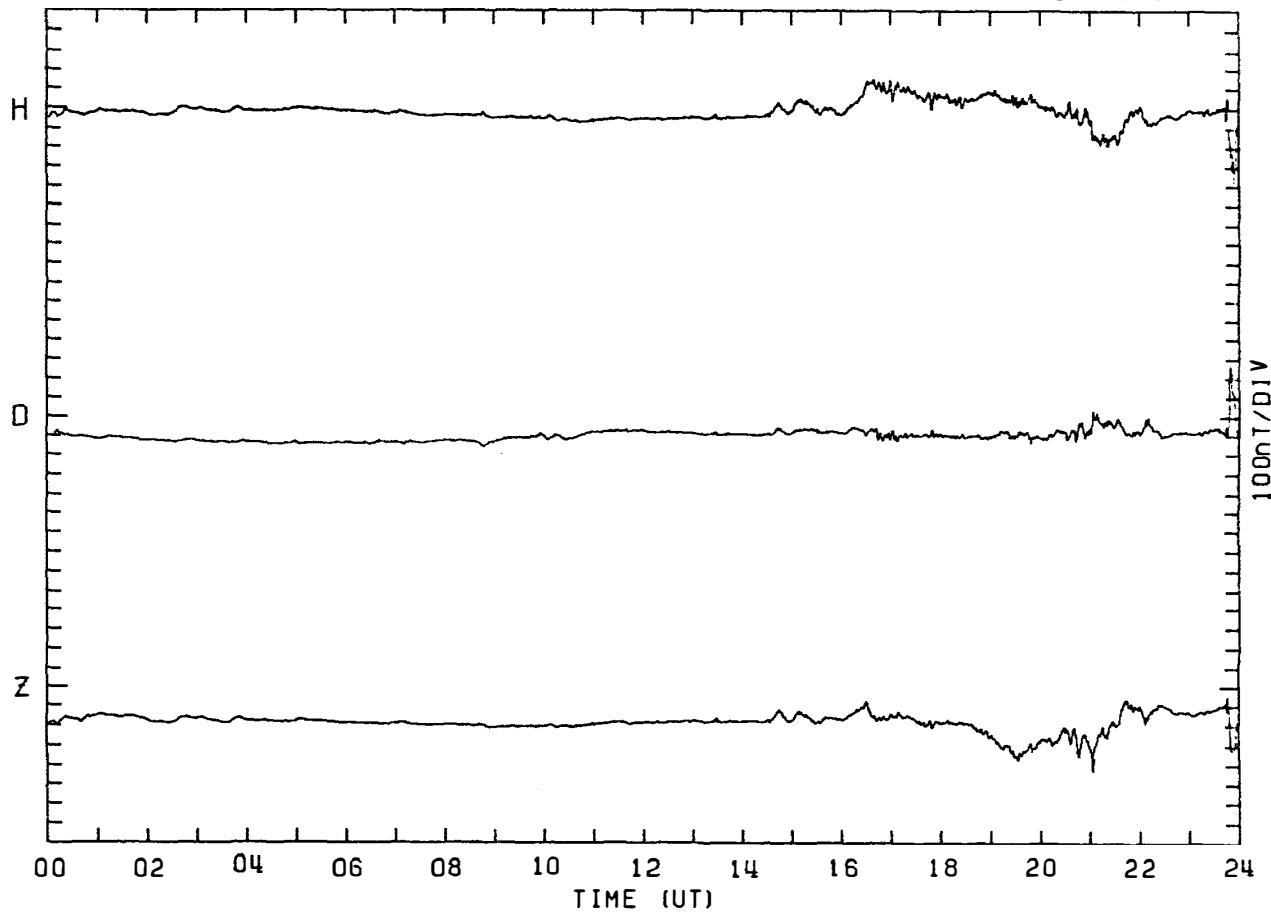
MAGNETOGRAM SYOWA STATION

DAY:293 OCTOBER 20. 1983



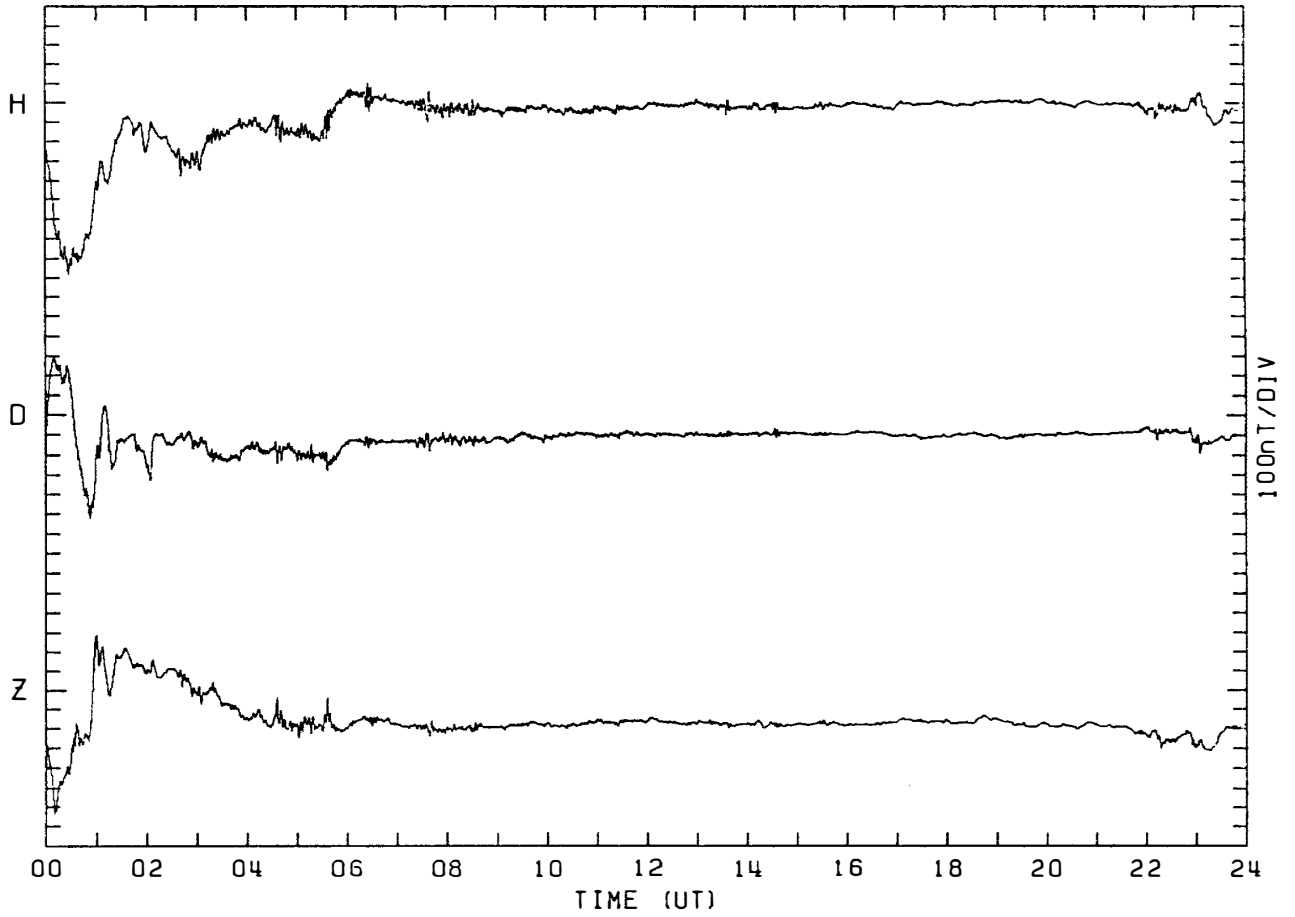
MAGNETOGRAM SYOWA STATION

DAY:294 OCTOBER 21. 1983



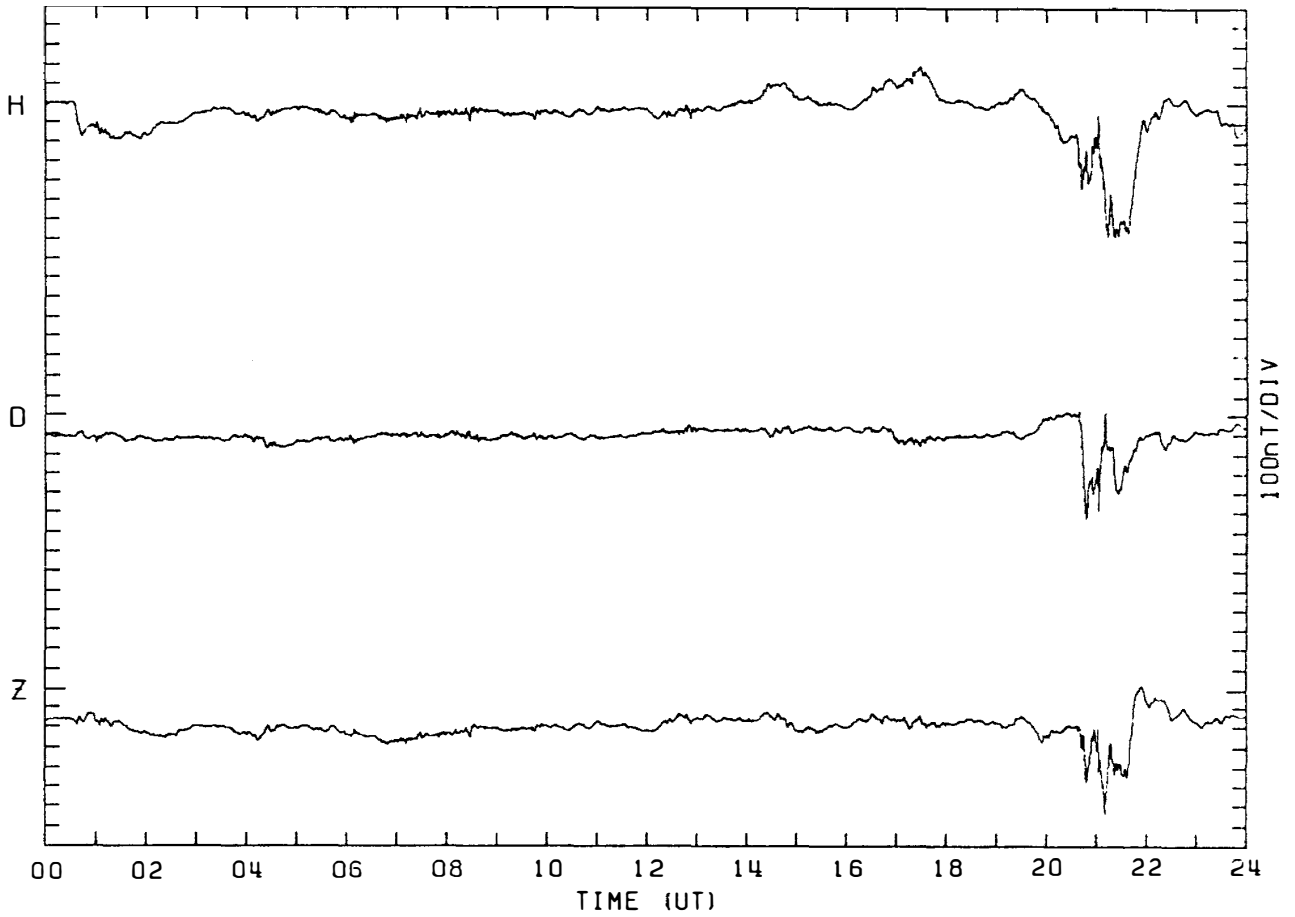
MAGNETOGRAM SYOWA STATION

DAY:295 OCTOBER 22. 1983



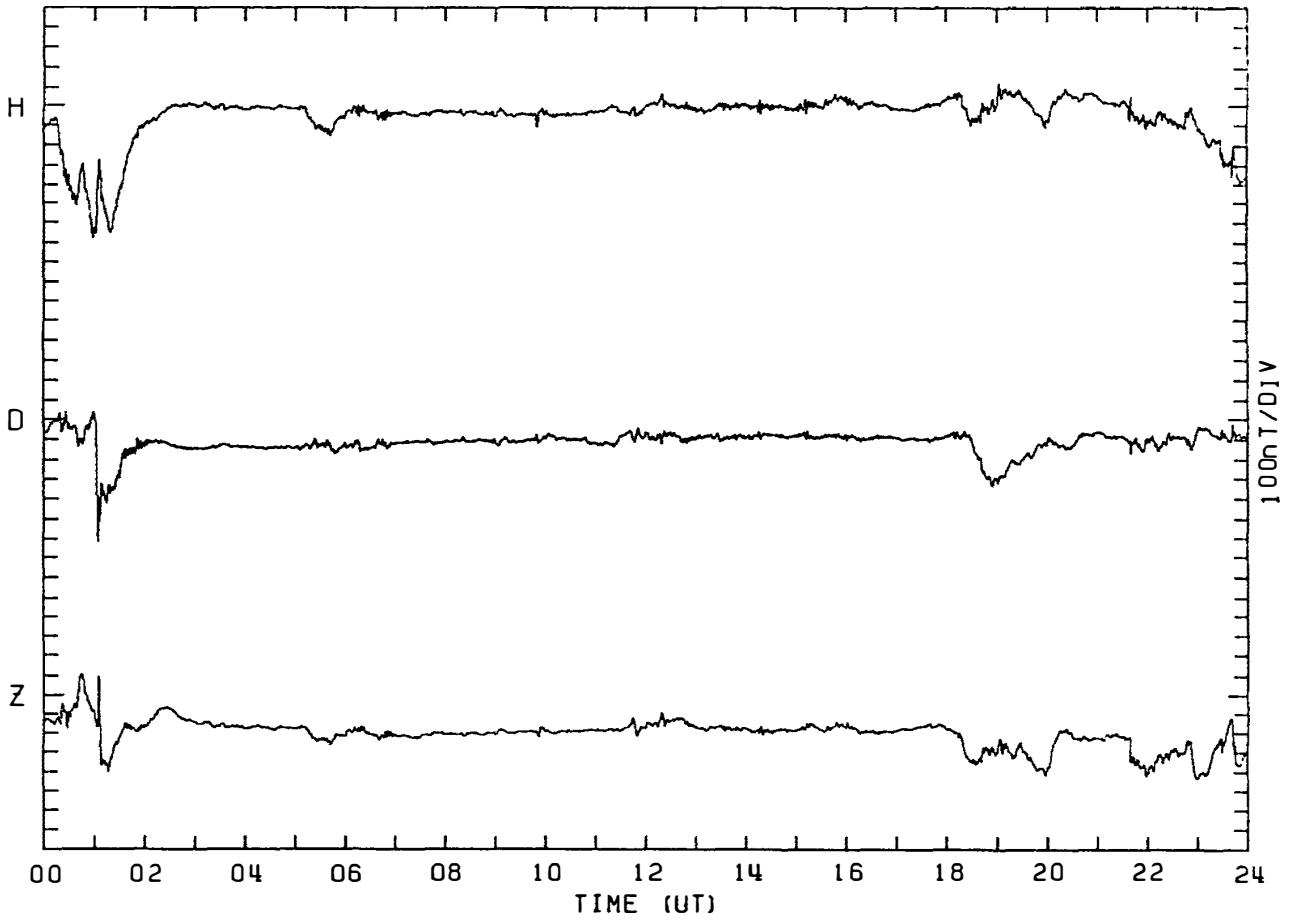
MAGNETOGRAM SYOWA STATION

DAY:296 OCTOBER 23. 1983



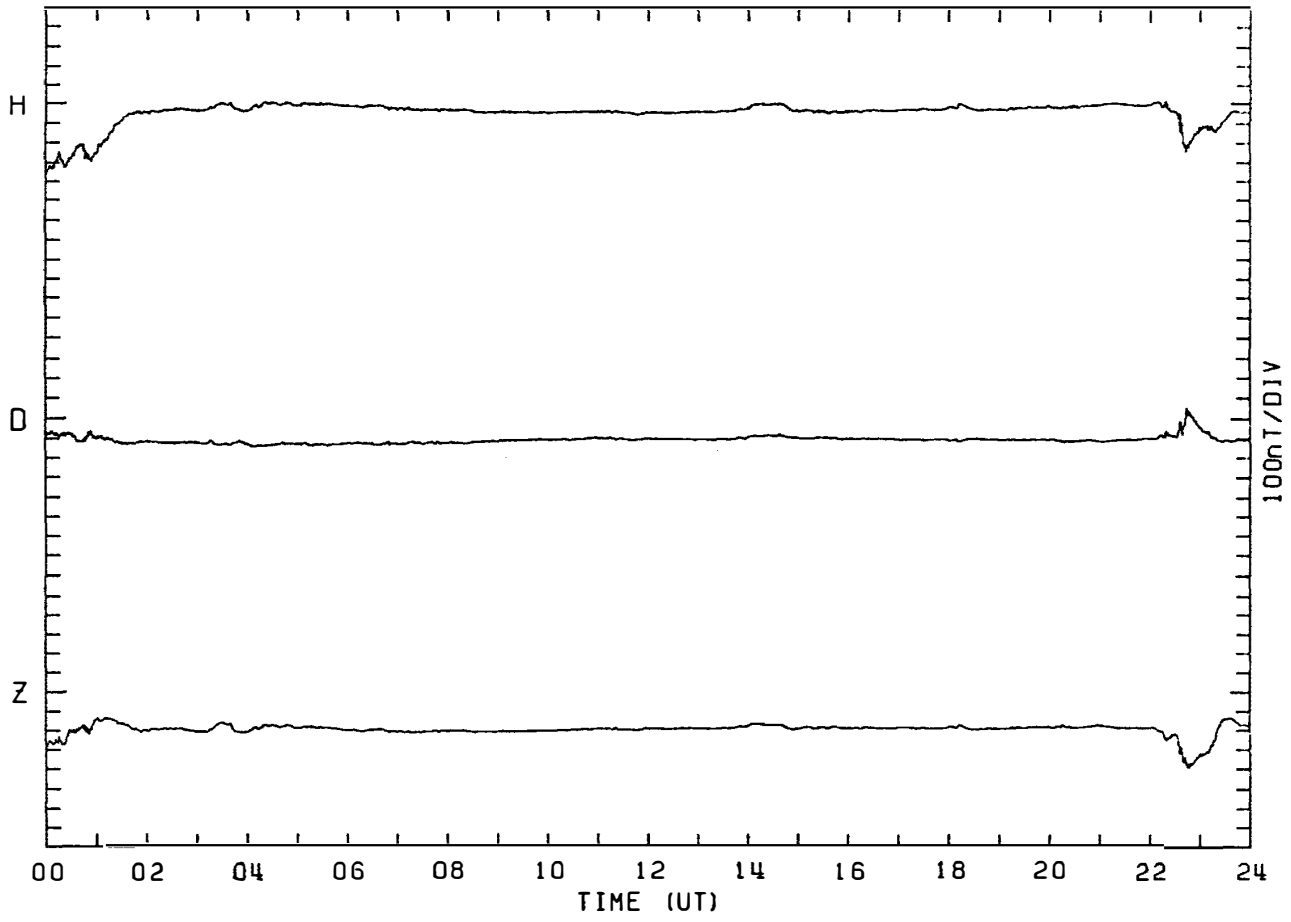
MAGNETOGRAM SYOWA STATION

DAY:297 OCTOBER 24. 1983



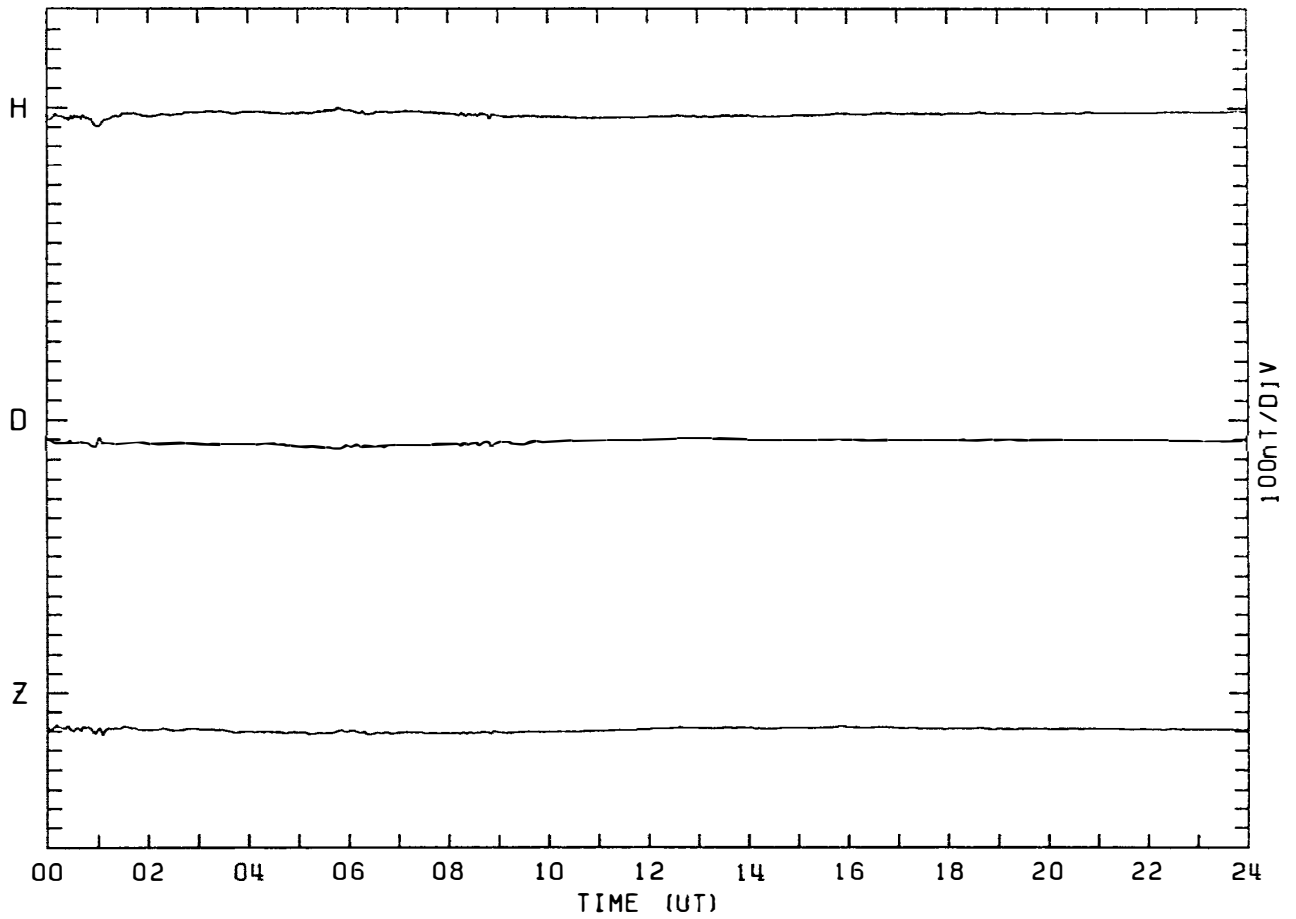
MAGNETOGRAM SYOWA STATION

DAY:298 OCTOBER 25. 1983



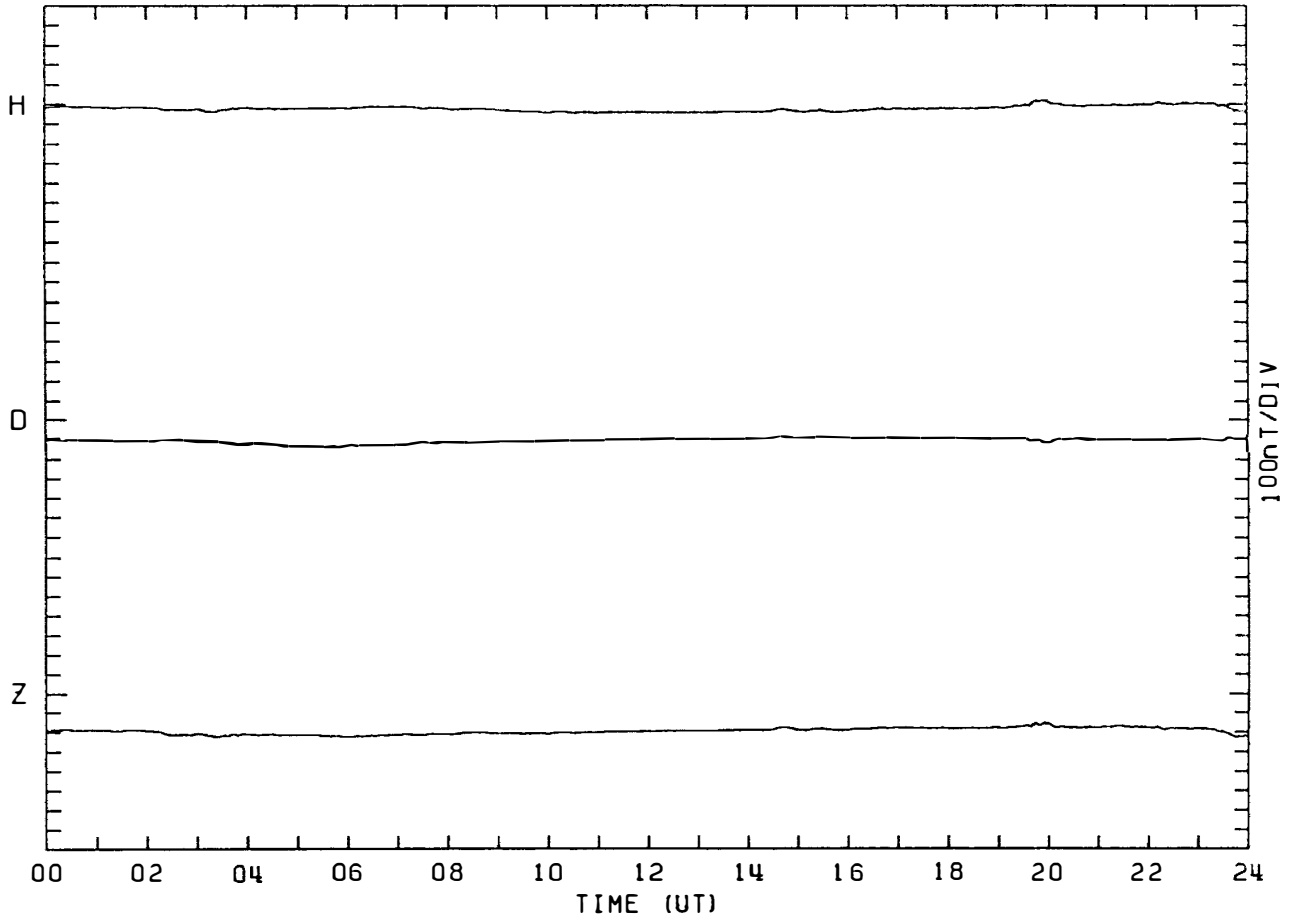
MAGNETOGRAM SYOWA STATION

DAY:299 OCTOBER 26, 1983



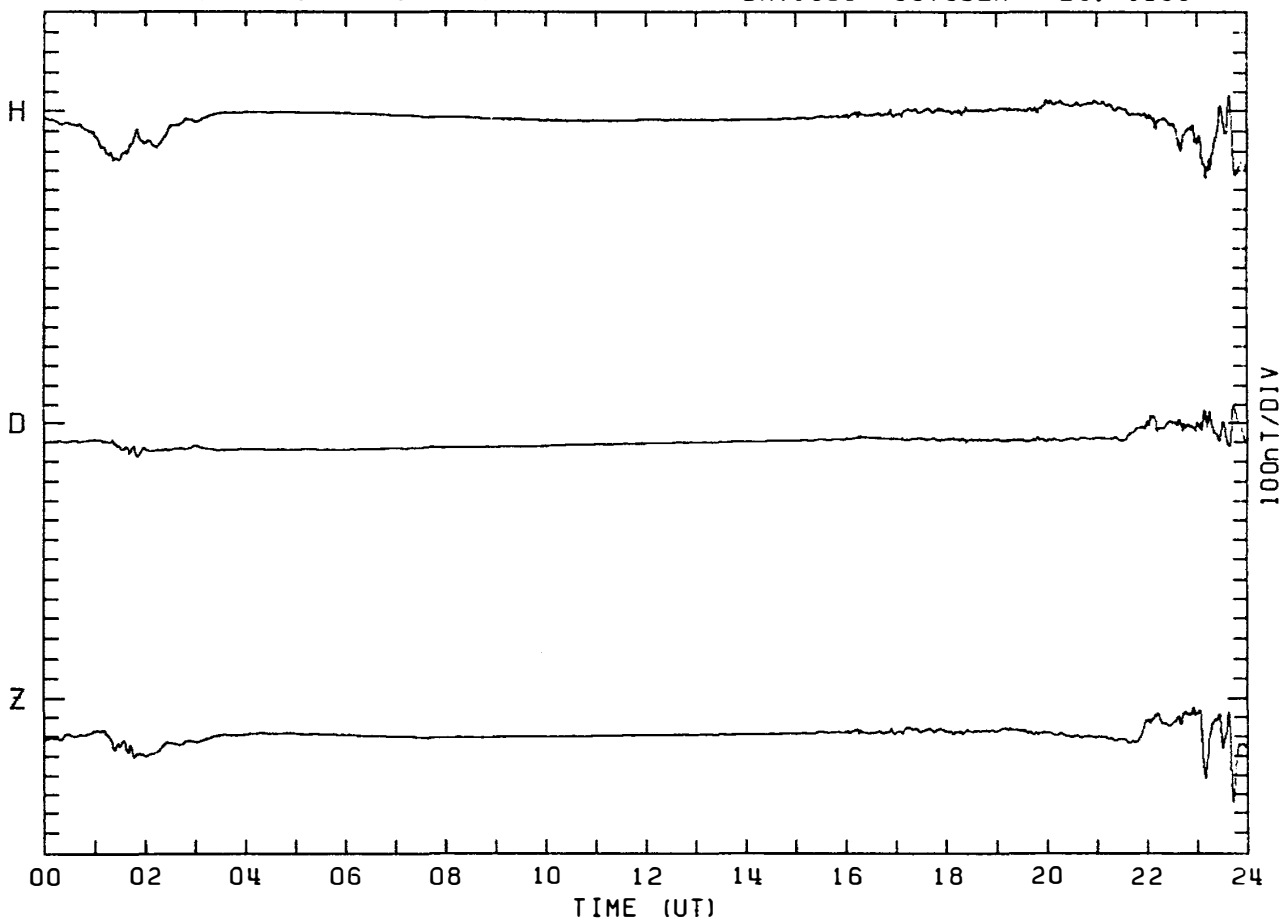
MAGNETOGRAM SYOWA STATION

DAY:300 OCTOBER 27, 1983



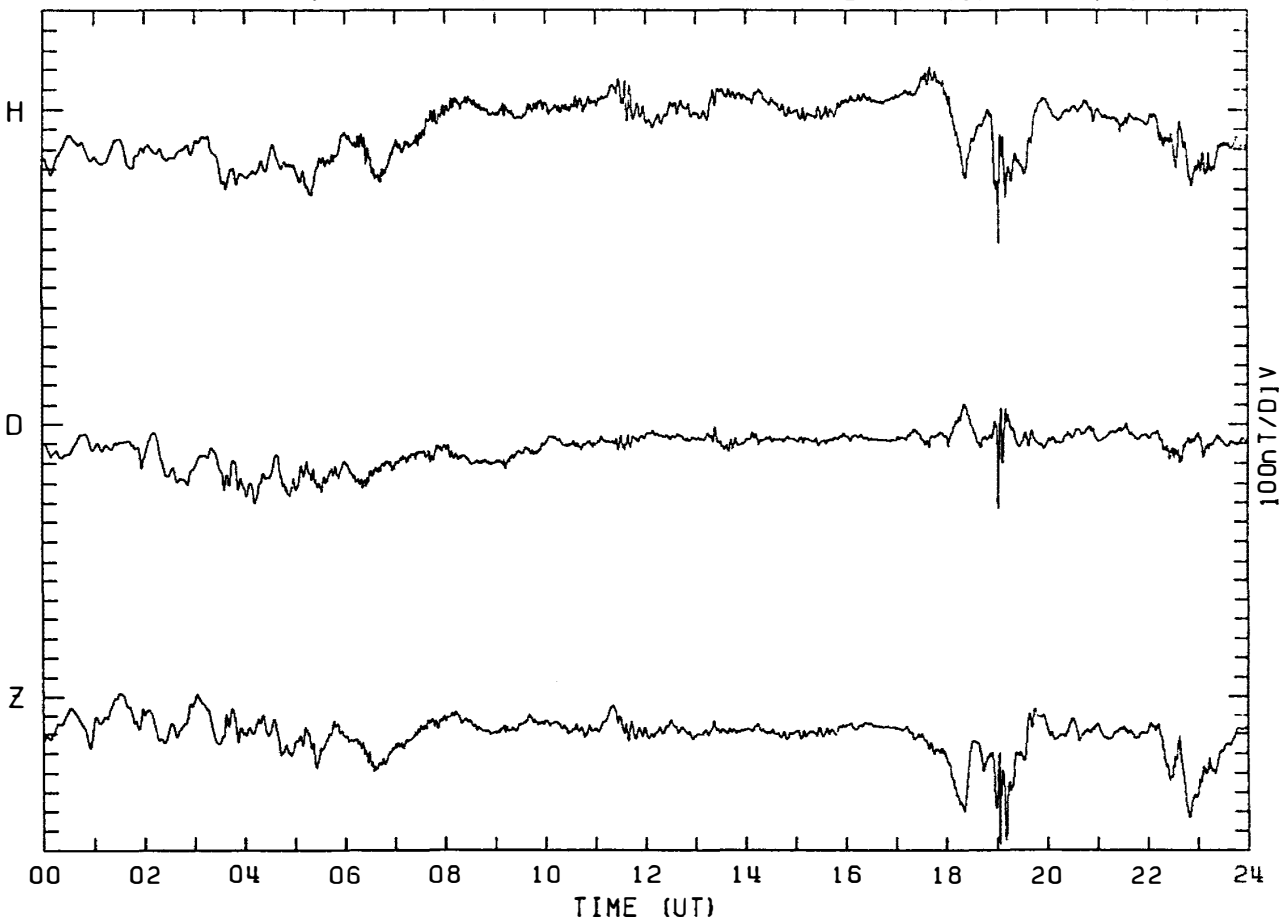
MAGNETOGRAM SYOWA STATION

DAY:301 OCTOBER 28. 1983



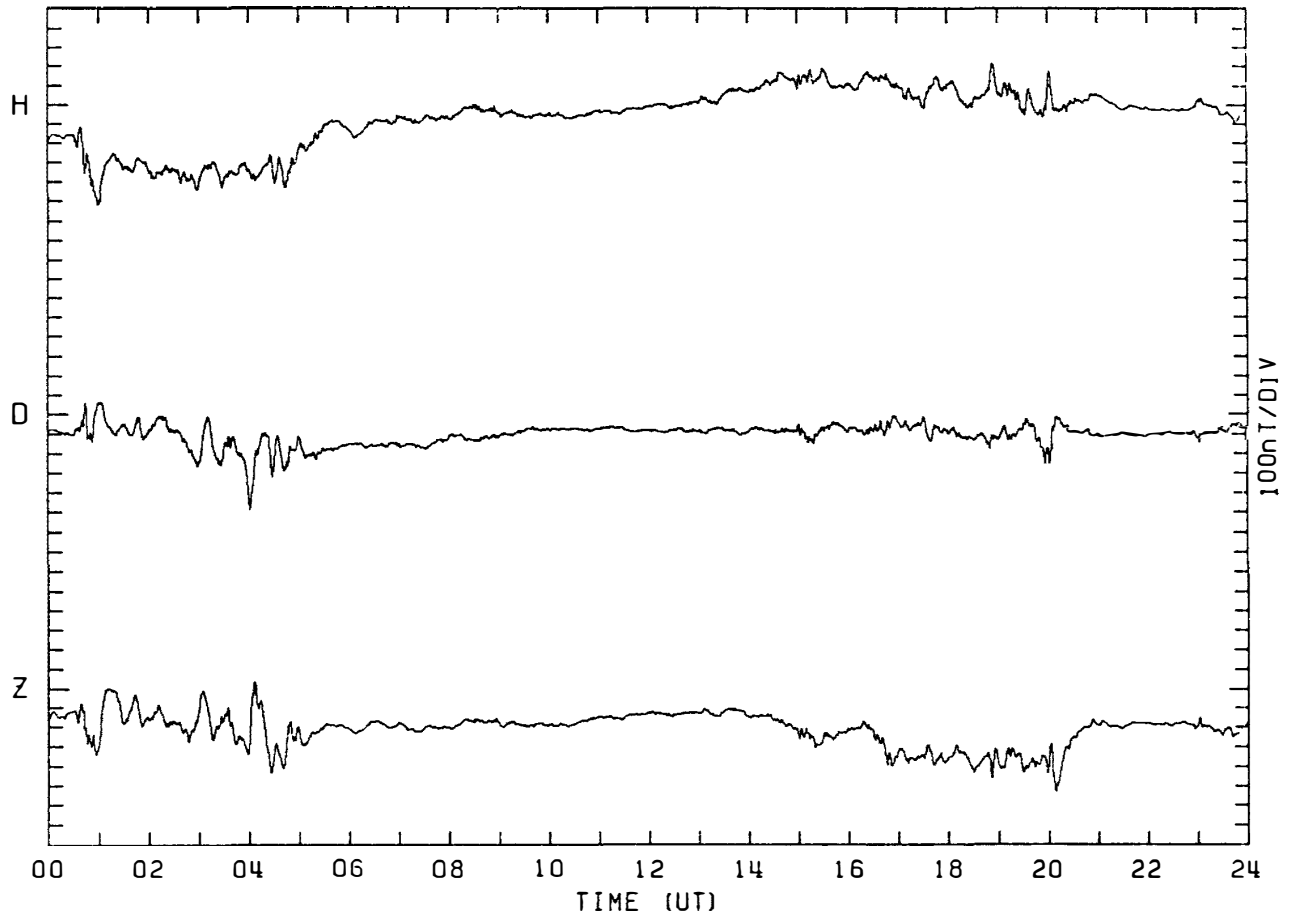
MAGNETOGRAM SYOWA STATION

DAY:302 OCTOBER 29. 1983



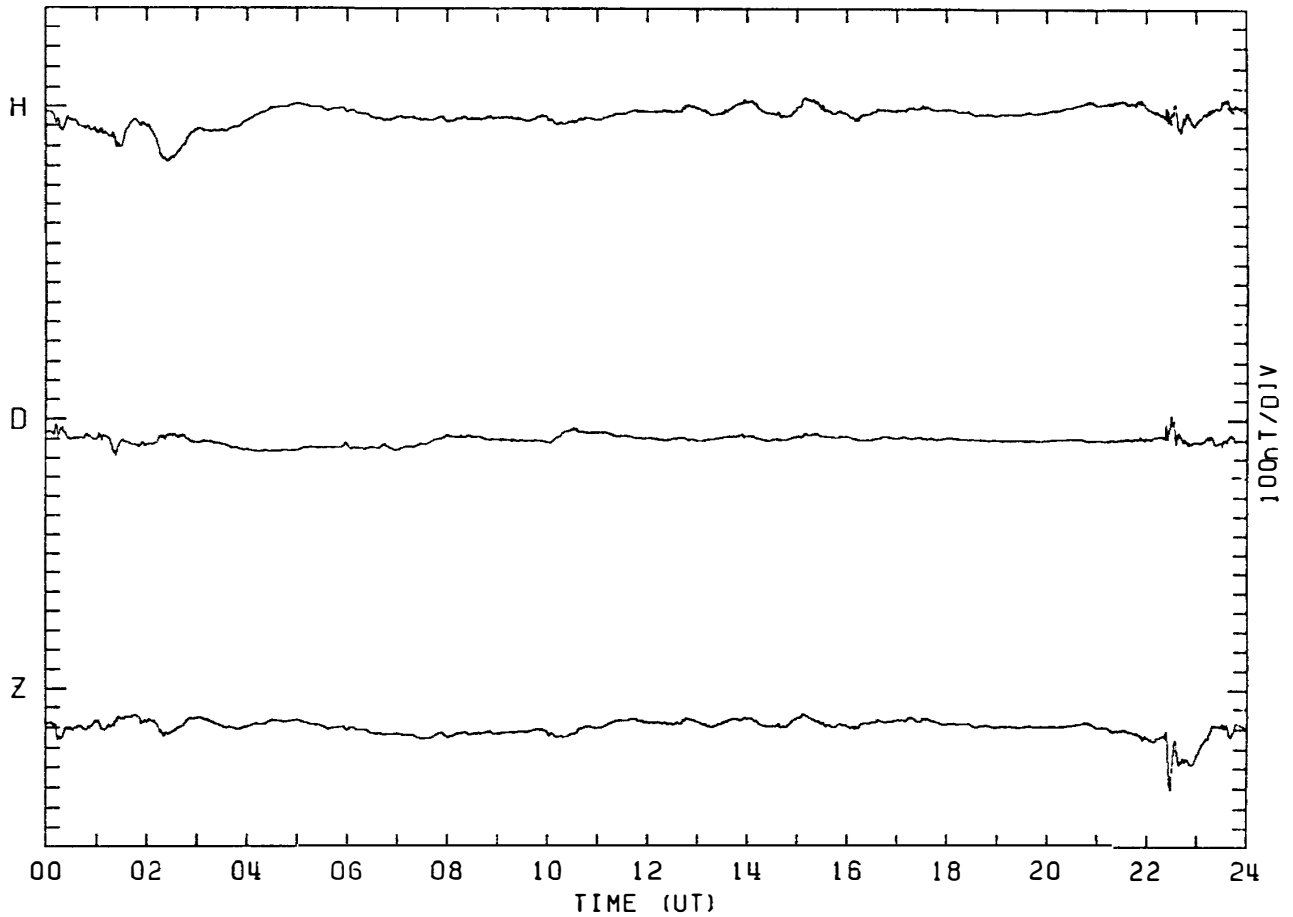
MAGNETOGRAM SYOWA STATION

DAY:303 OCTOBER 30. 1963



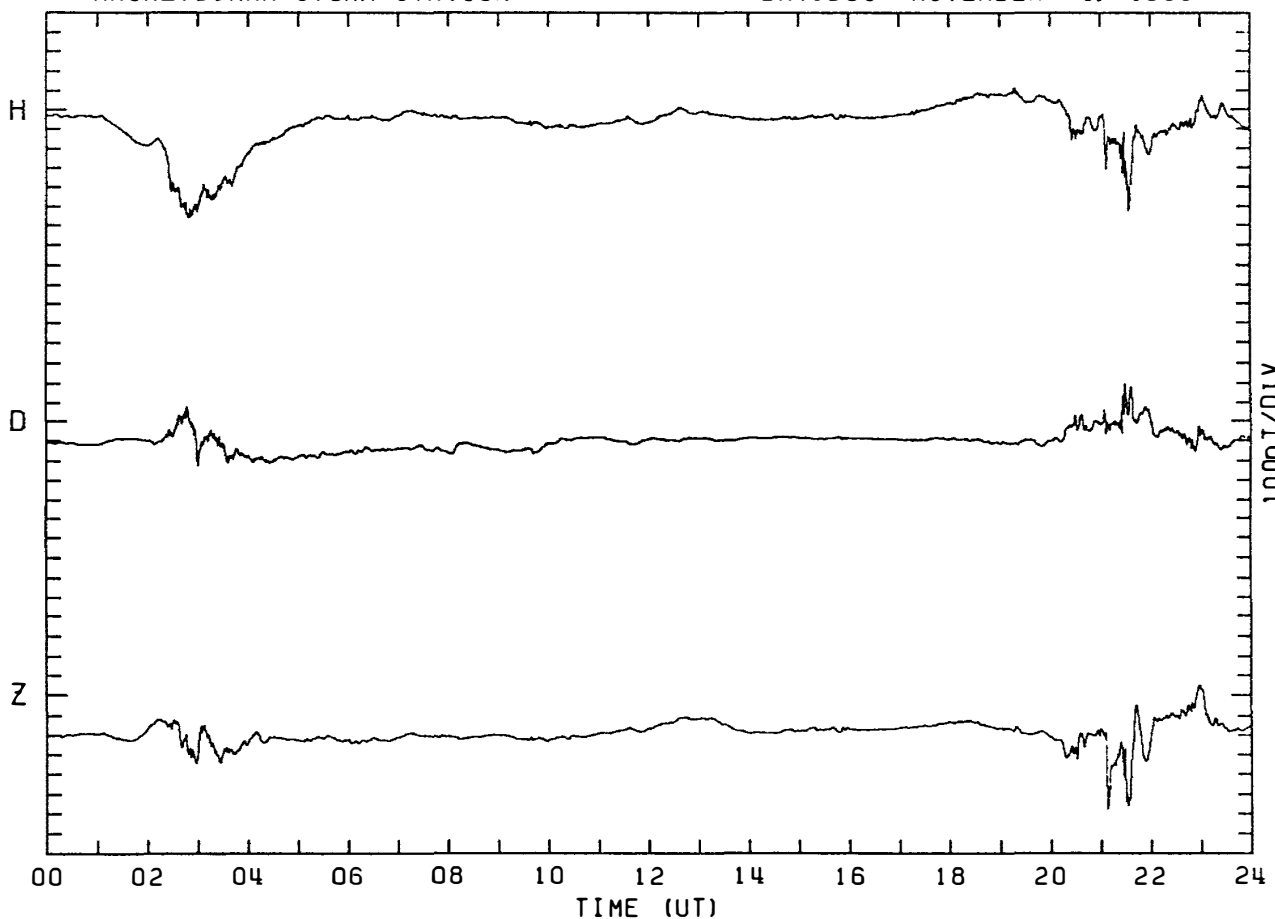
MAGNETOGRAM SYOWA STATION

DAY:304 OCTOBER 31. 1963



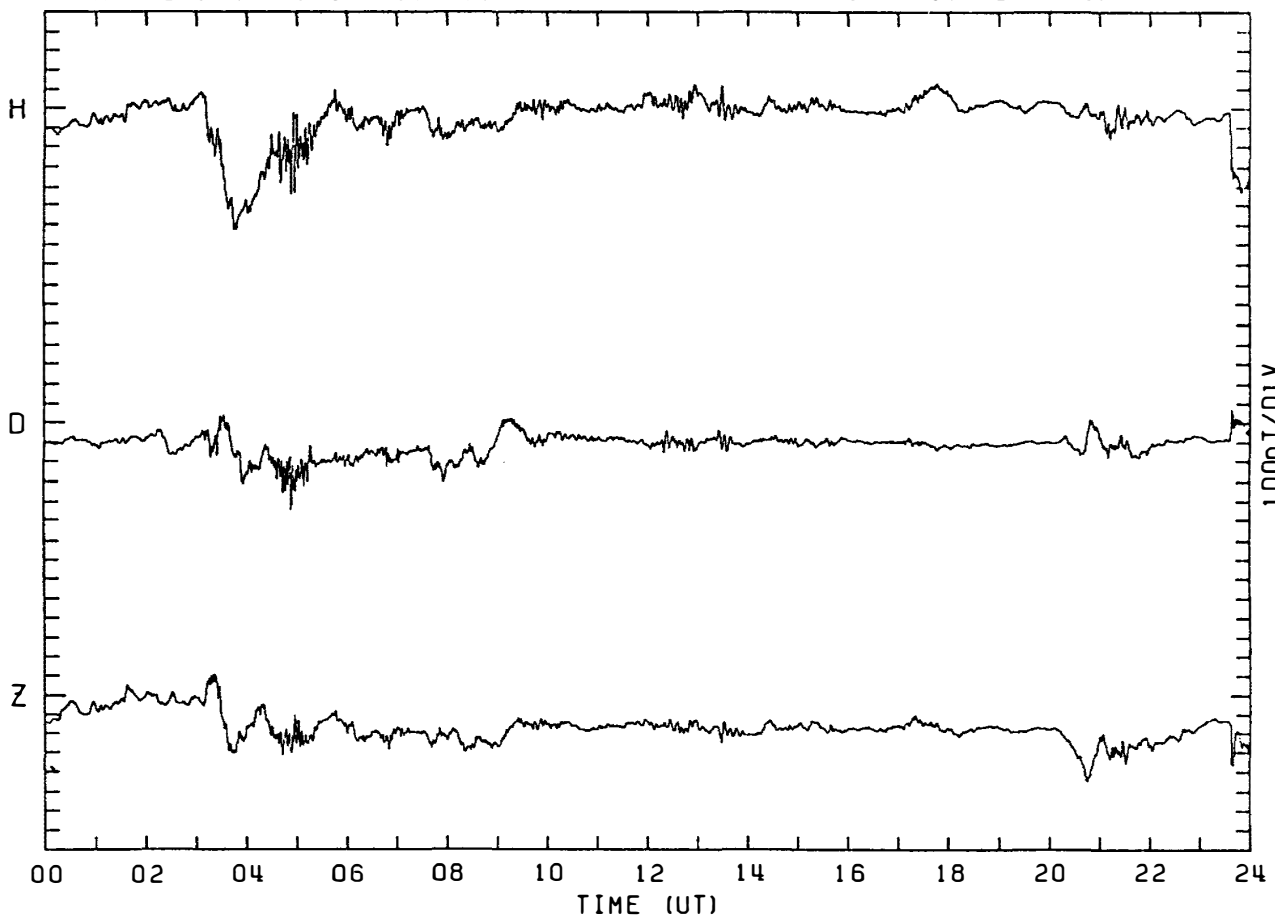
MAGNETOGRAM SYOWA STATION

DAY:305 NOVEMBER 1. 1983



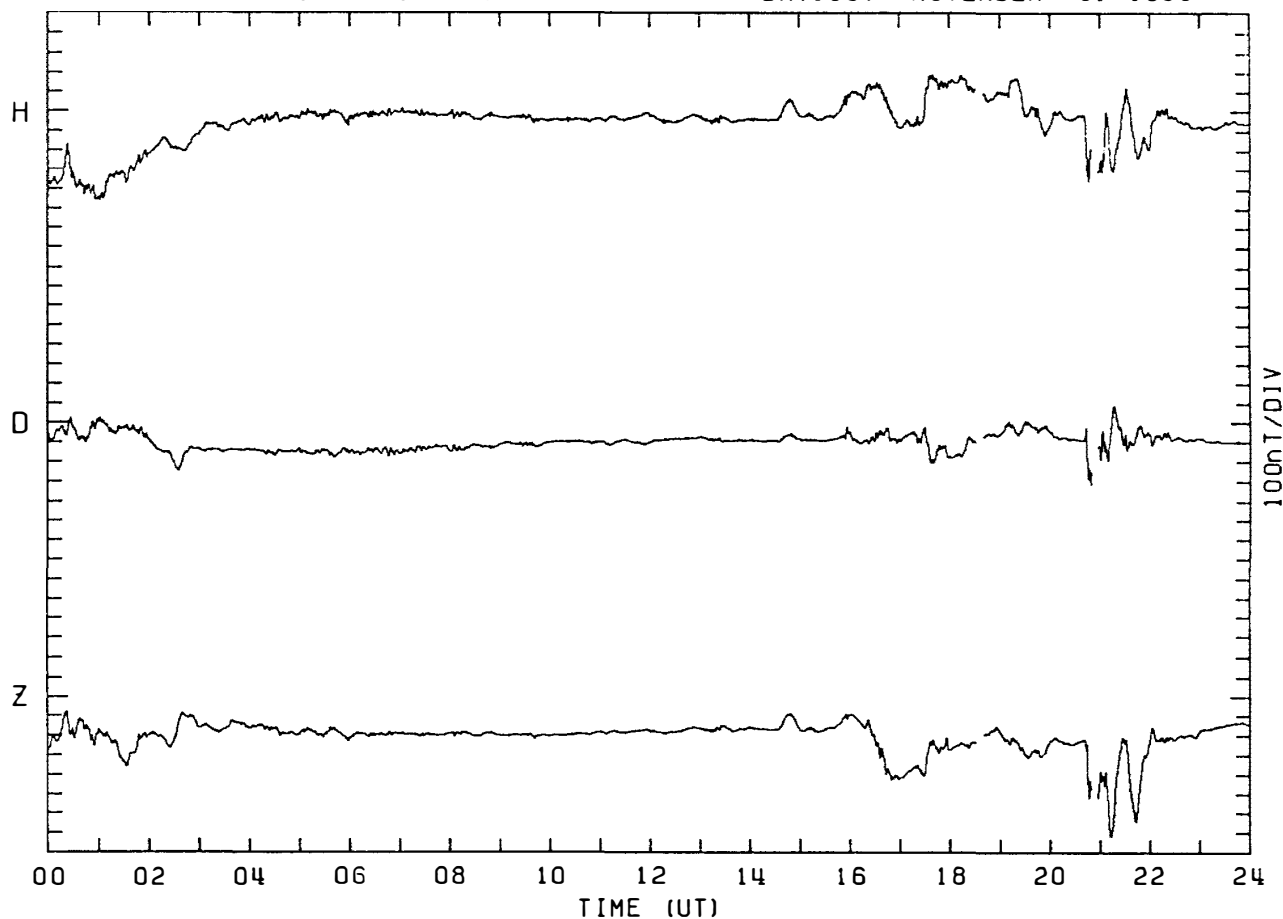
MAGNETOGRAM SYOWA STATION

DAY:306 NOVEMBER 2. 1983



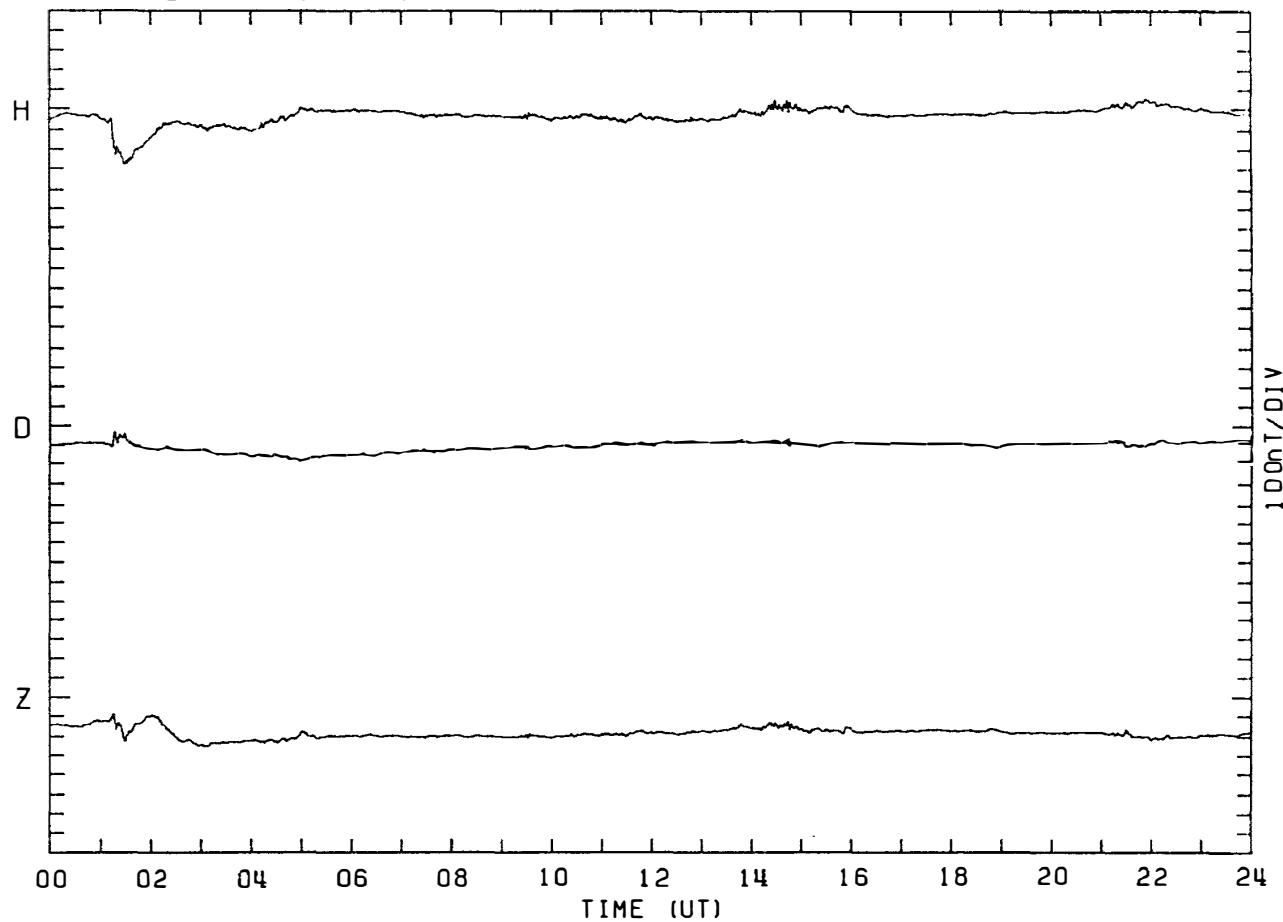
MAGNETOGRAM SYOWA STATION

DAY:307 NOVEMBER 3. 1983



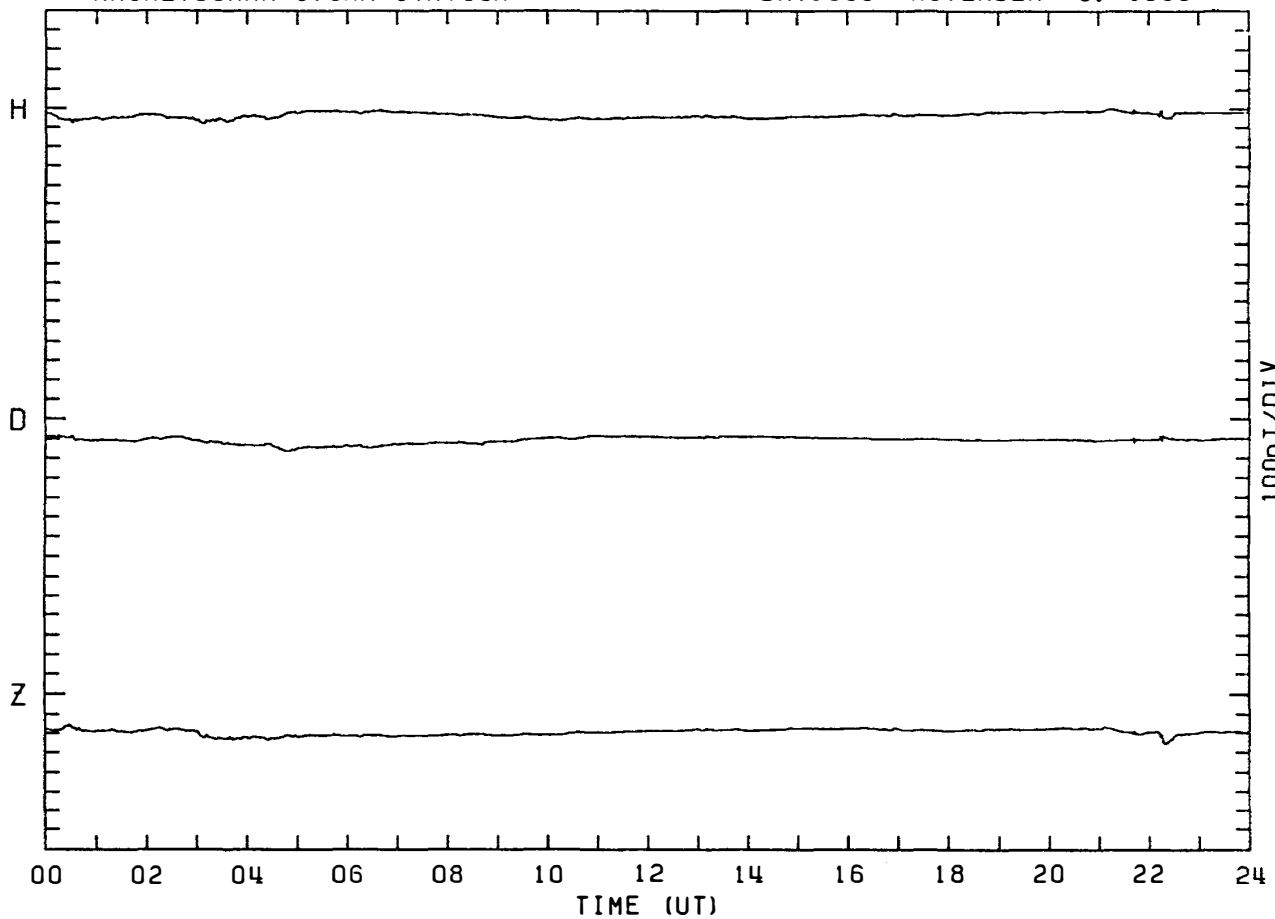
MAGNETOGRAM SYOWA STATION

DAY:308 NOVEMBER 4. 1983



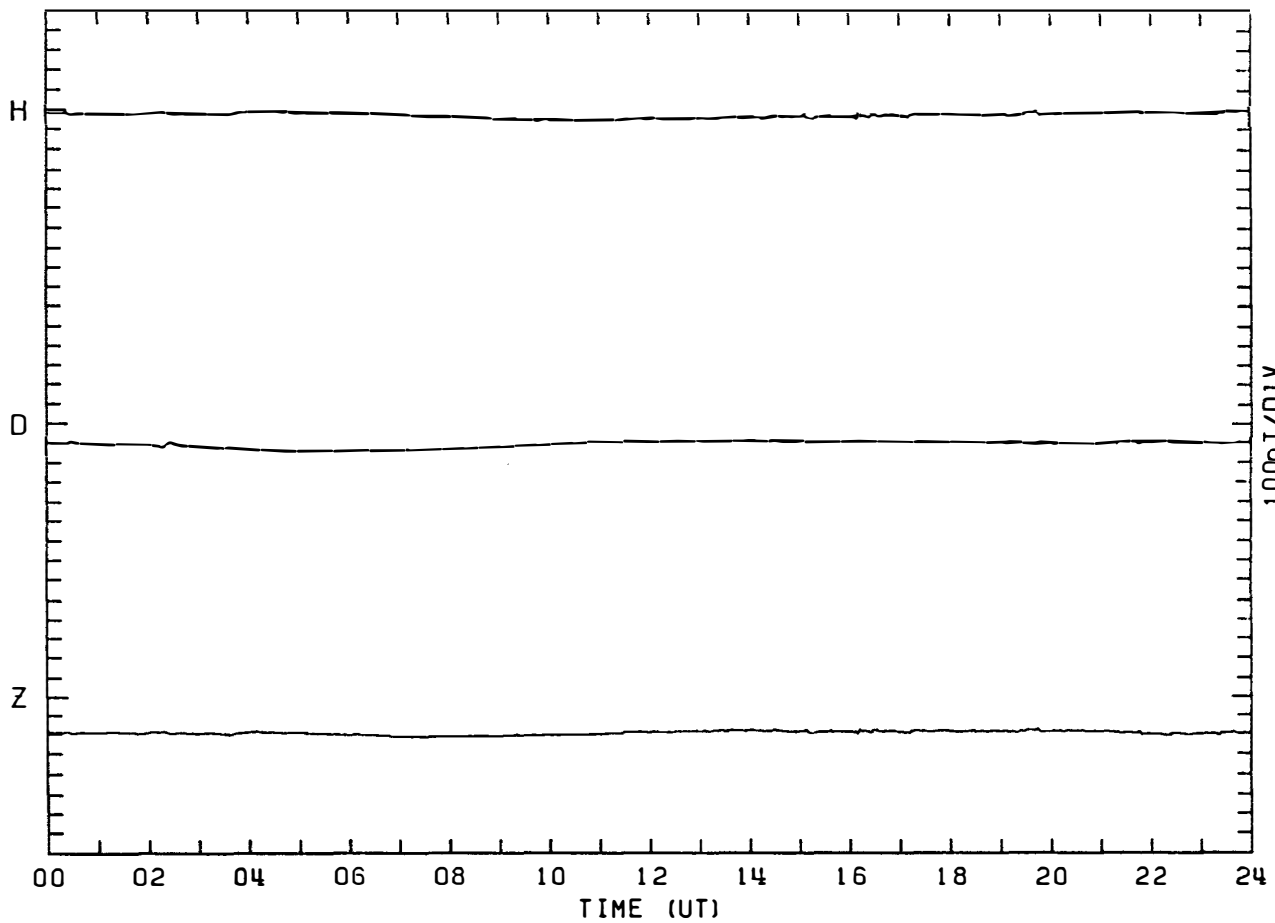
MAGNETOGRAM SYOWA STATION

DAY: 309 NOVEMBER 5. 1983



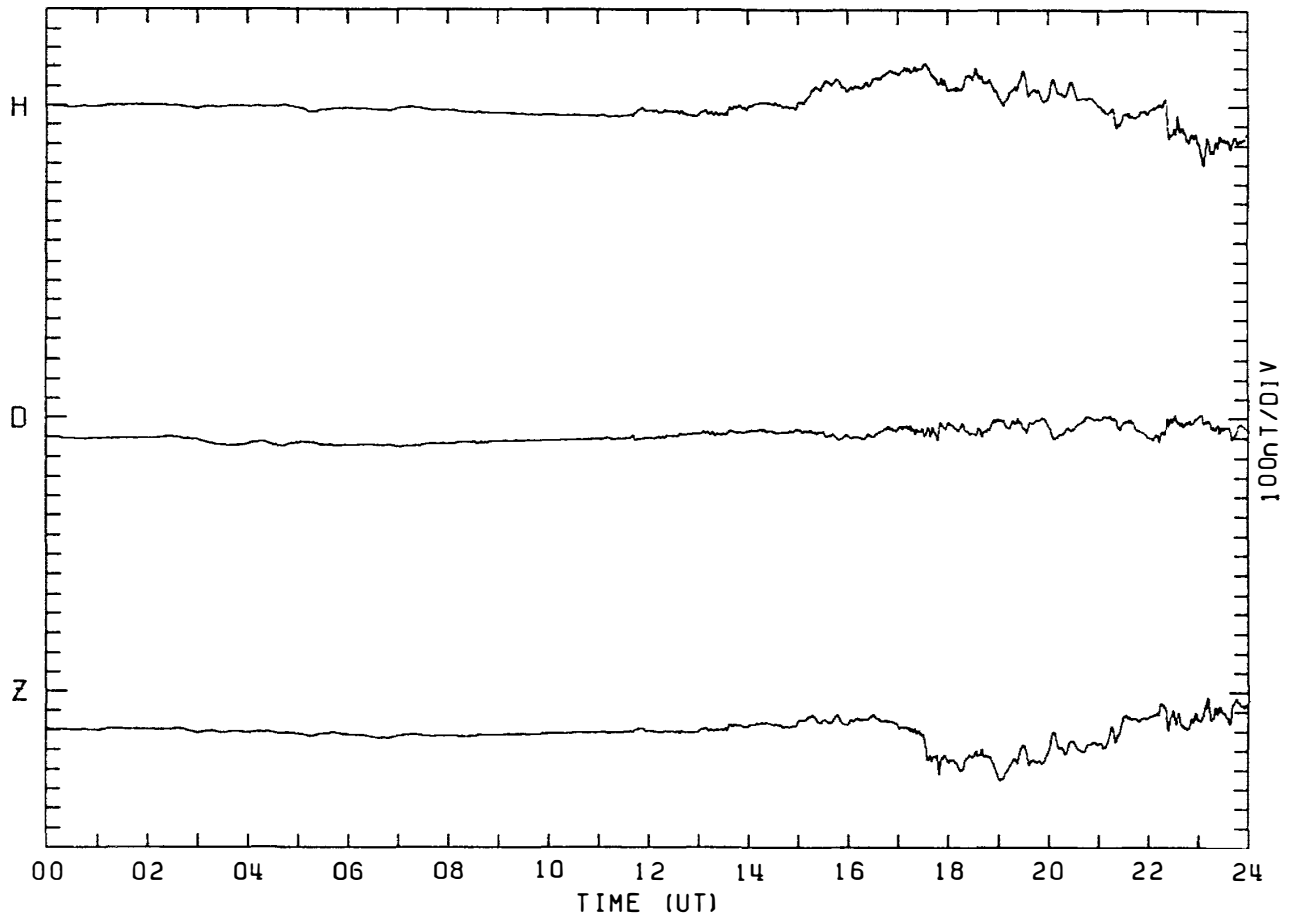
MAGNETOGRAM SYOWA STATION

DAY: 310 NOVEMBER 6. 1983



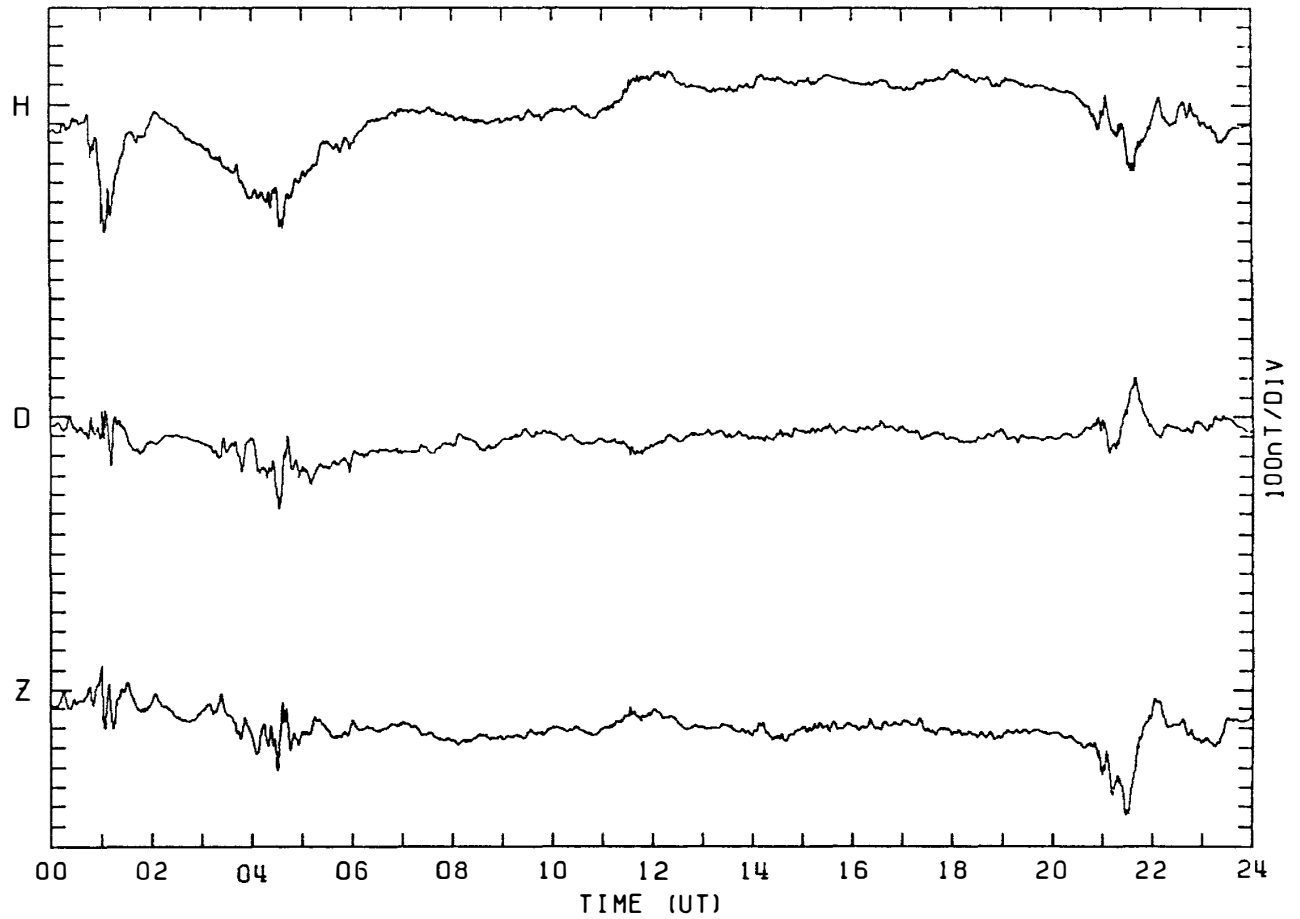
MAGNETOGRAM SYOWA STATION

DAY:311 NOVEMBER 7. 1983



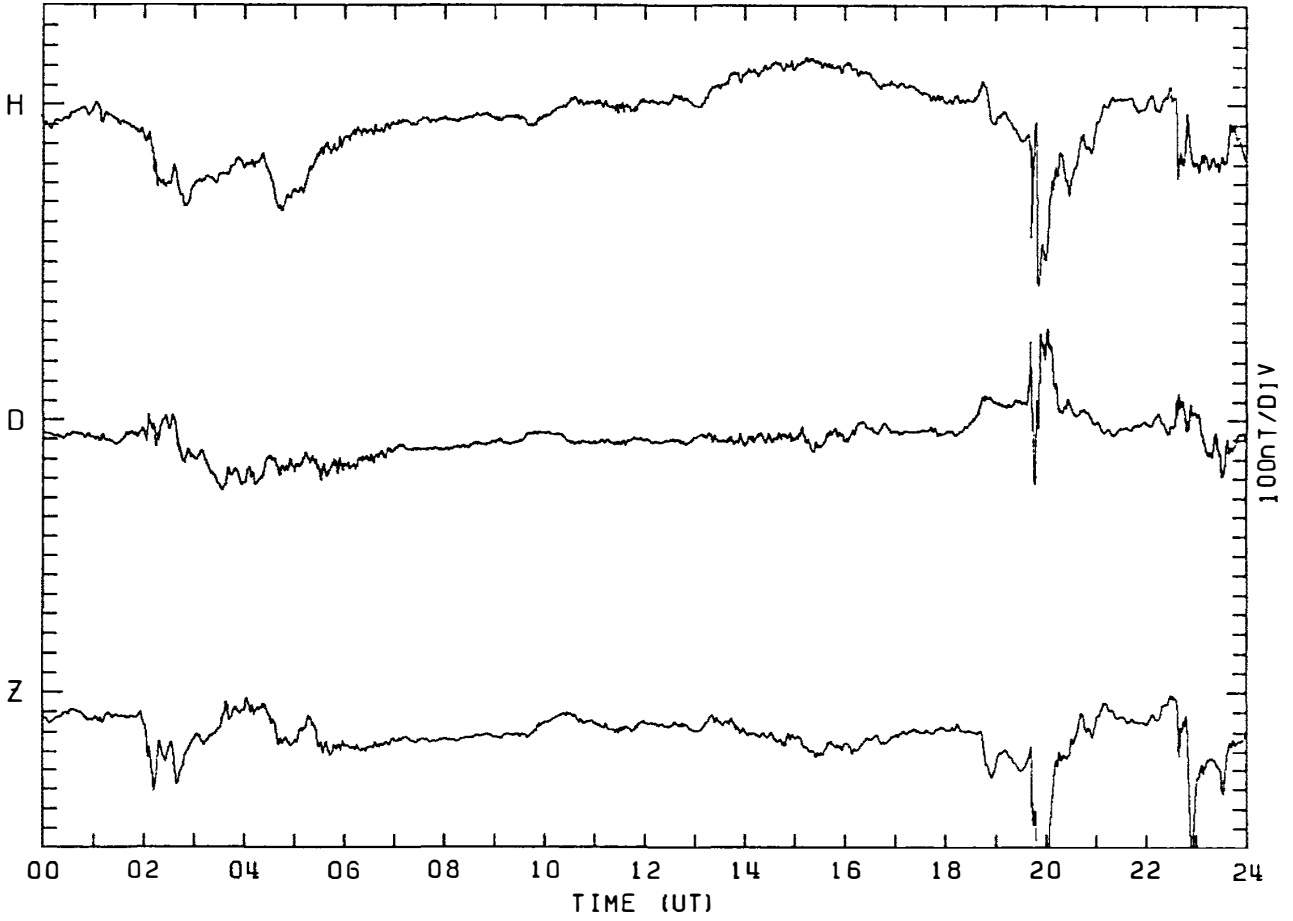
MAGNETOGRAM SYOWA STATION

DAY:312 NOVEMBER 8. 1983



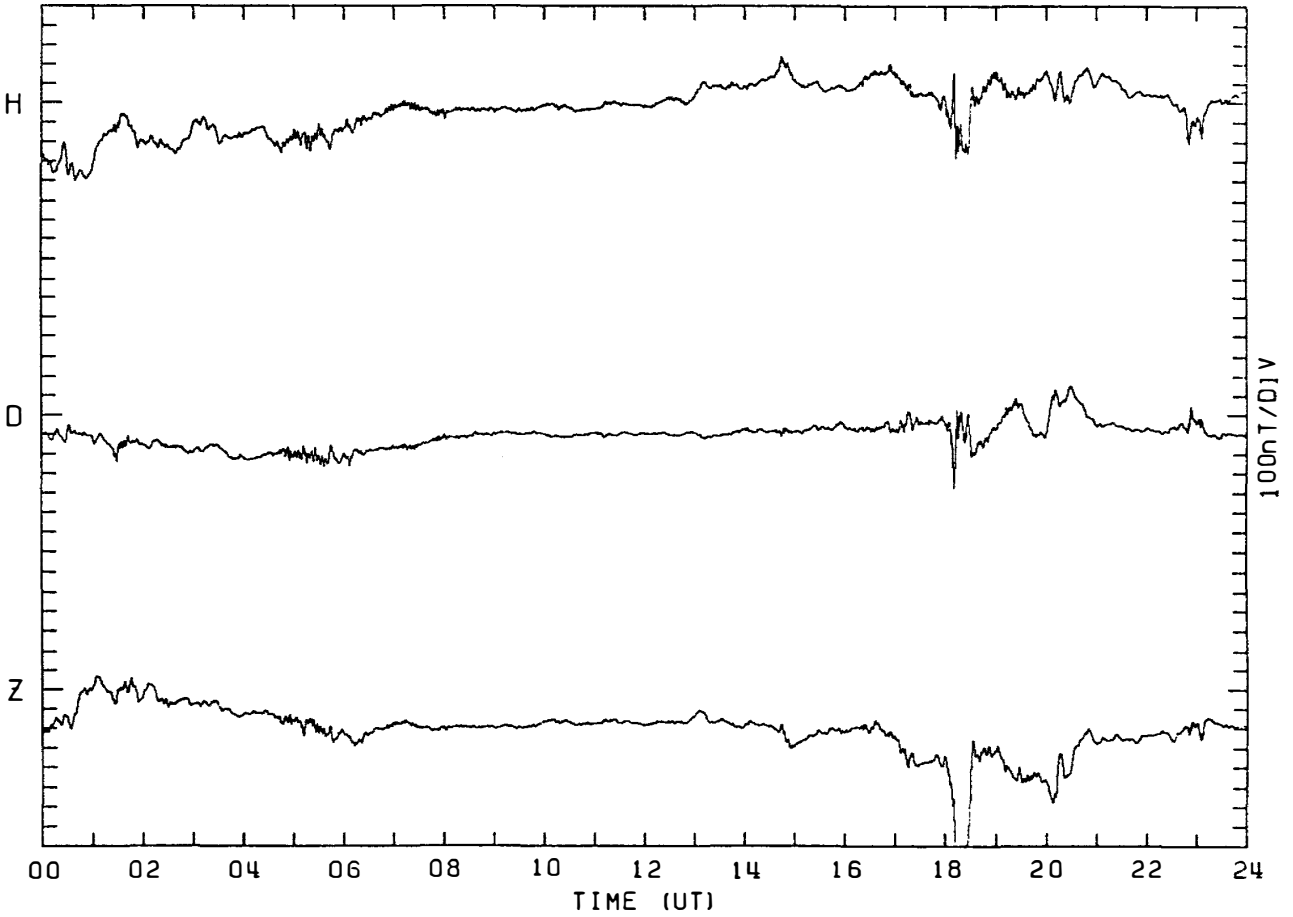
MAGNETOGRAM SYOWA STATION

DAY:313 NOVEMBER 9. 1983



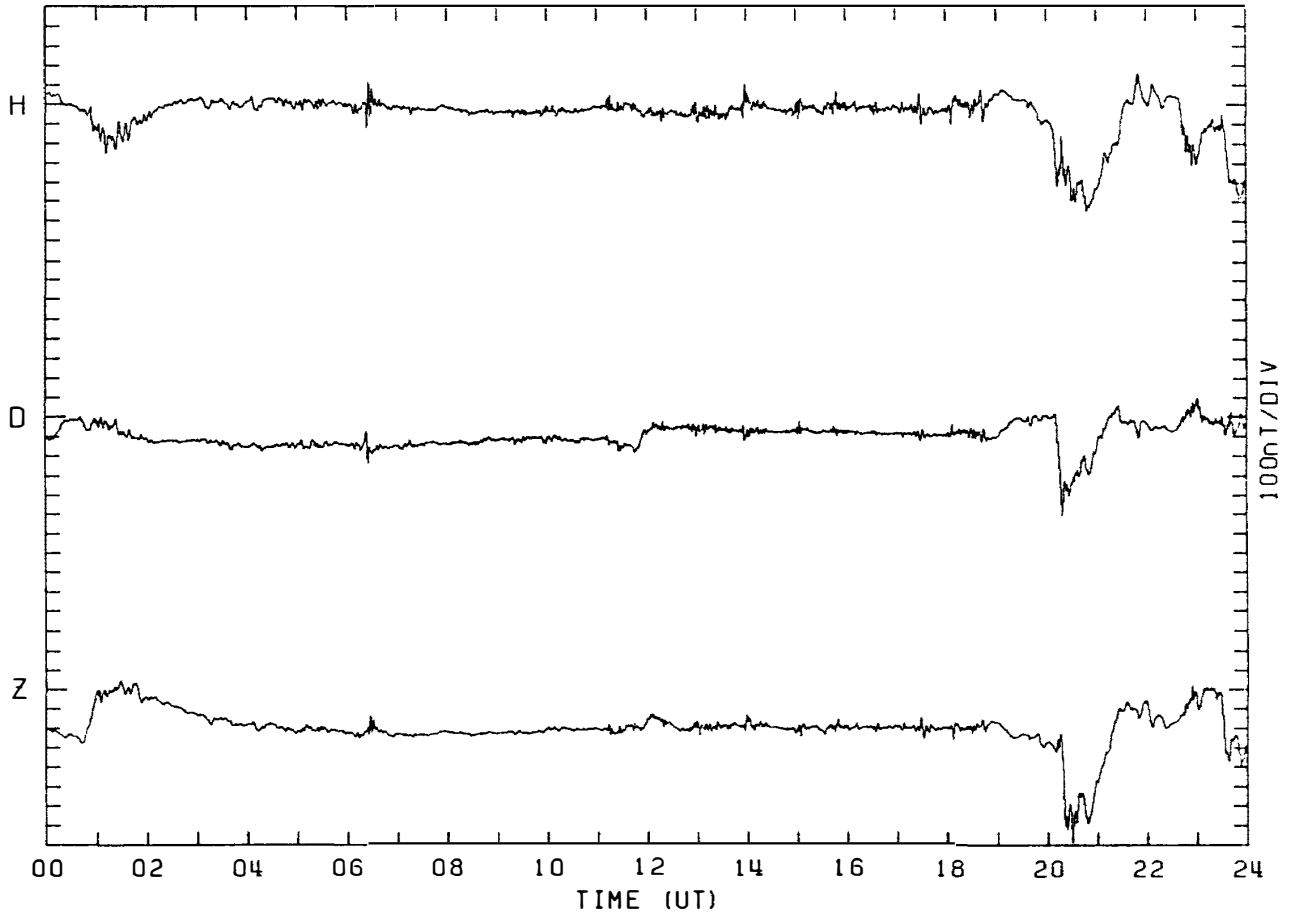
MAGNETOGRAM SYOWA STATION

DAY:314 NOVEMBER 10. 1983



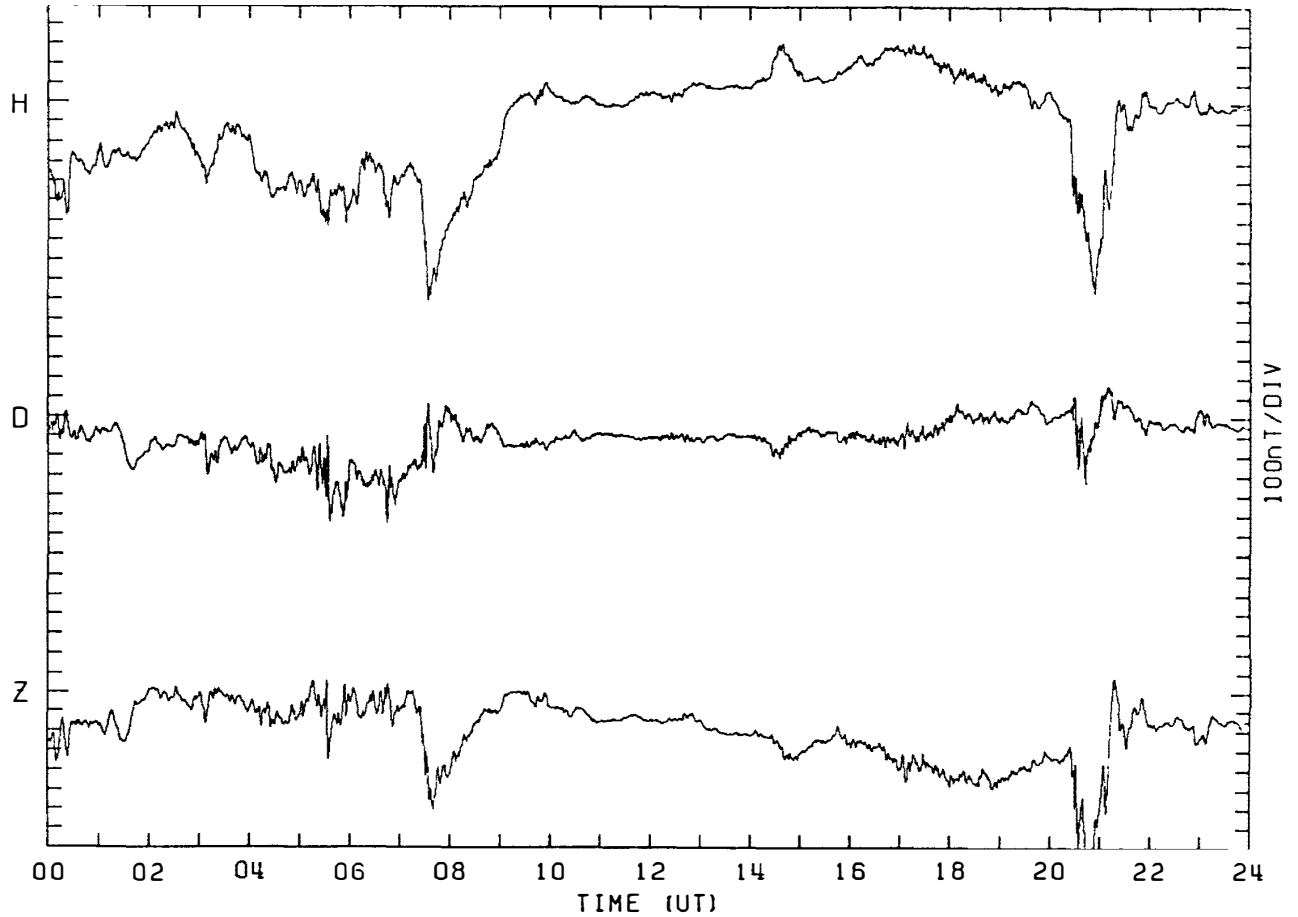
MAGNETOGRAM SYOWA STATION

DAY:315 NOVEMBER 11. 1983



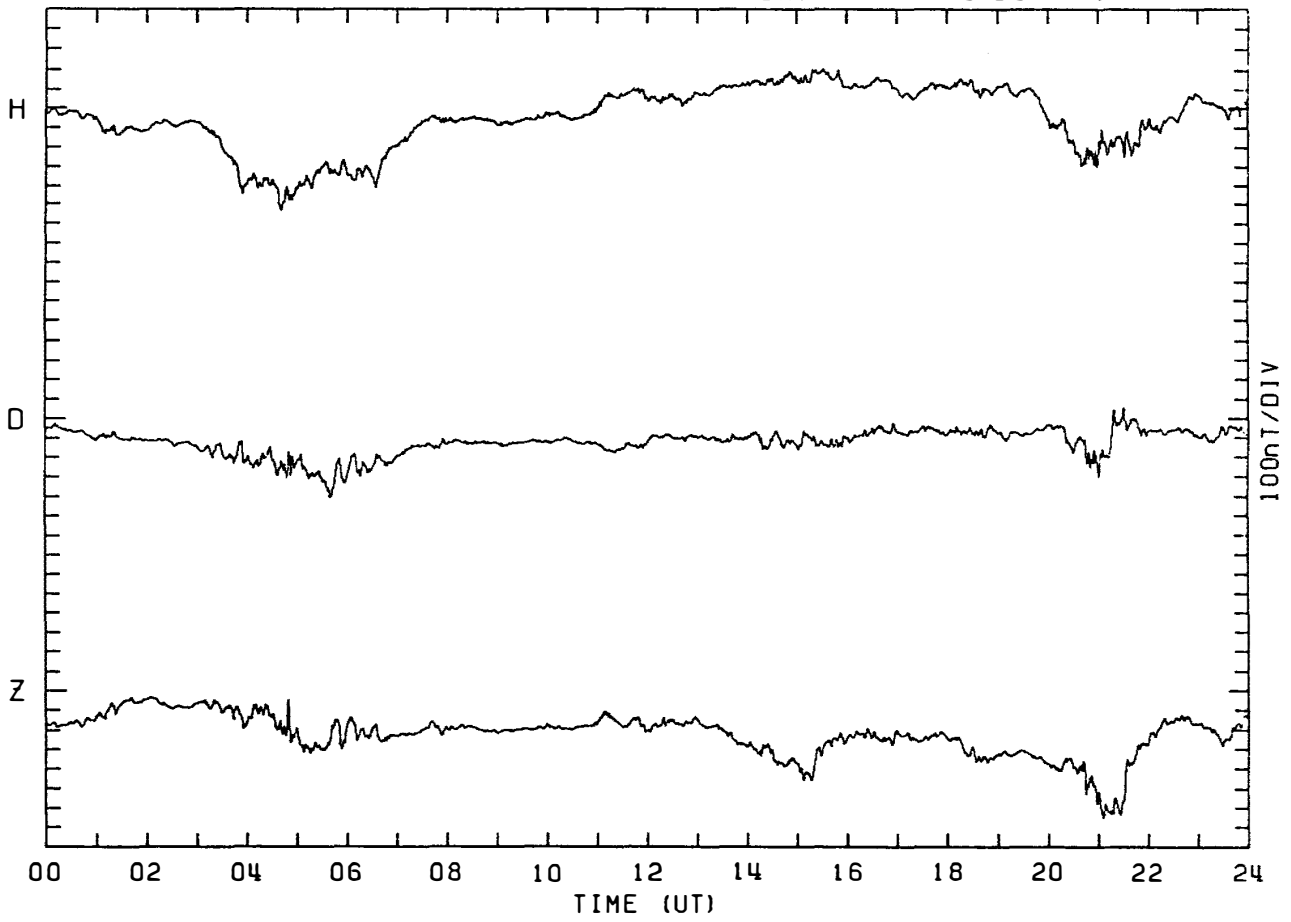
MAGNETOGRAM SYOWA STATION

DAY:316 NOVEMBER 12. 1983



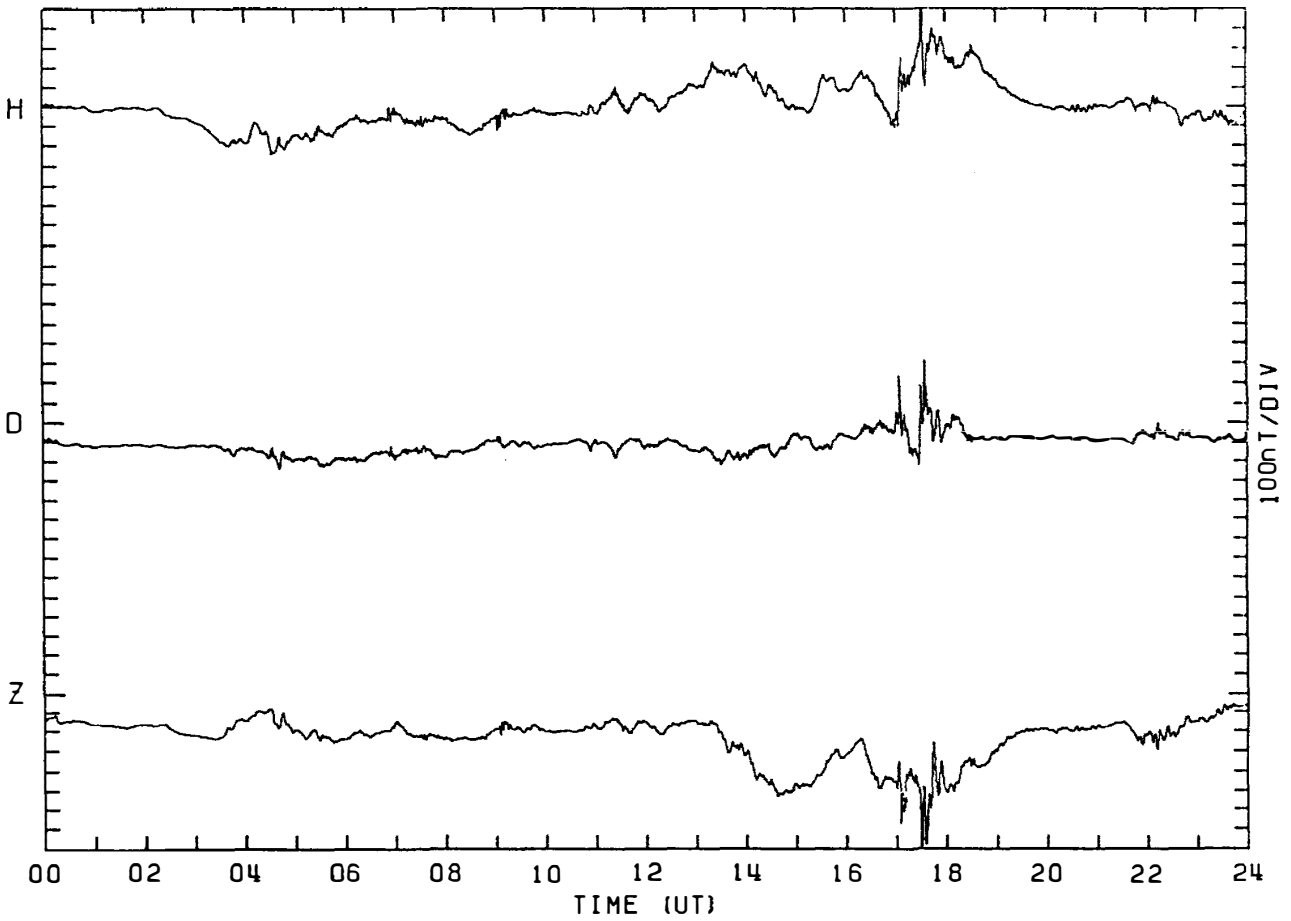
MAGNETOGRAM SYOWA STATION

DAY: 317 NOVEMBER 13, 1983



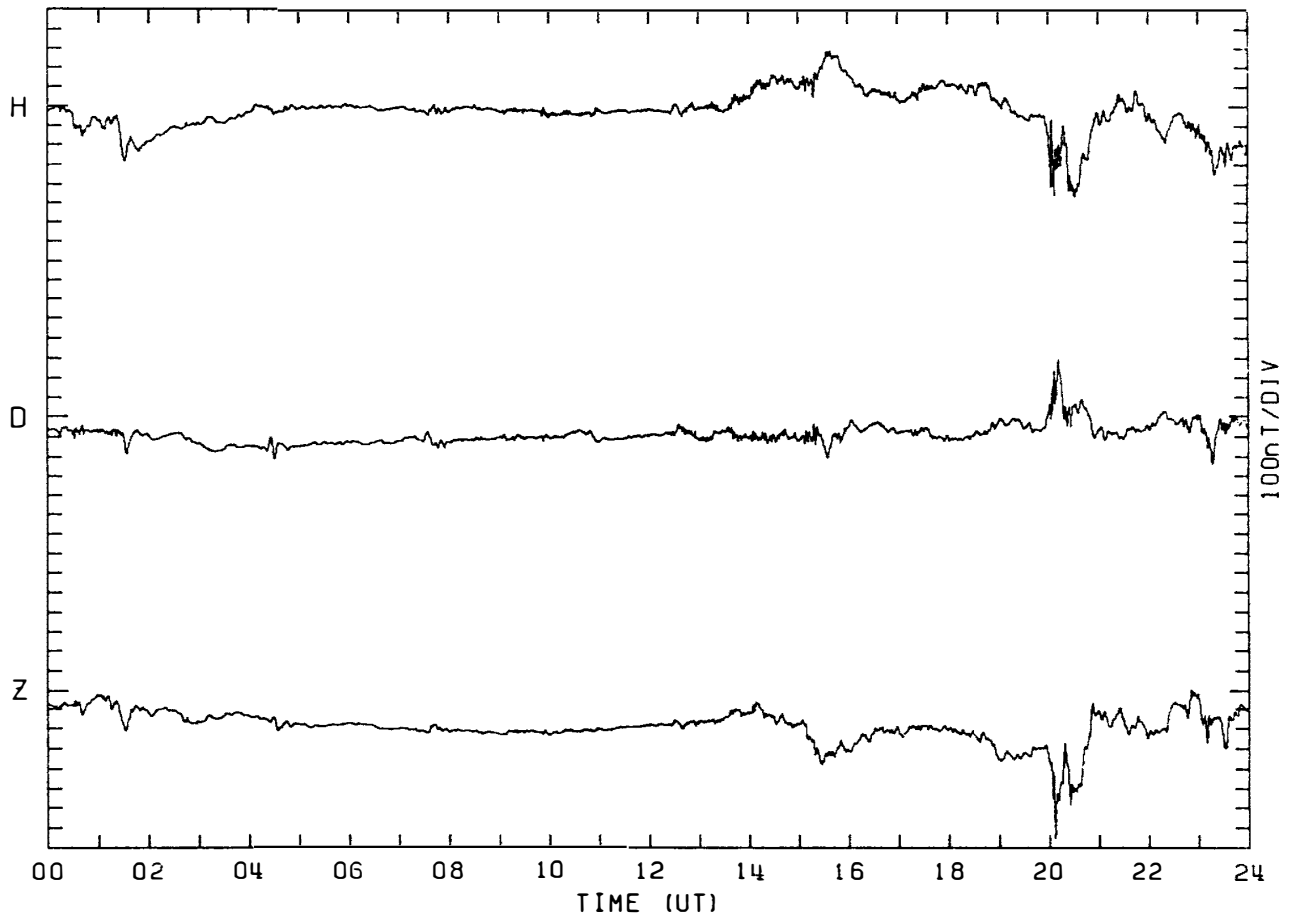
MAGNETOGRAM SYOWA STATION

DAY: 318 NOVEMBER 14, 1983



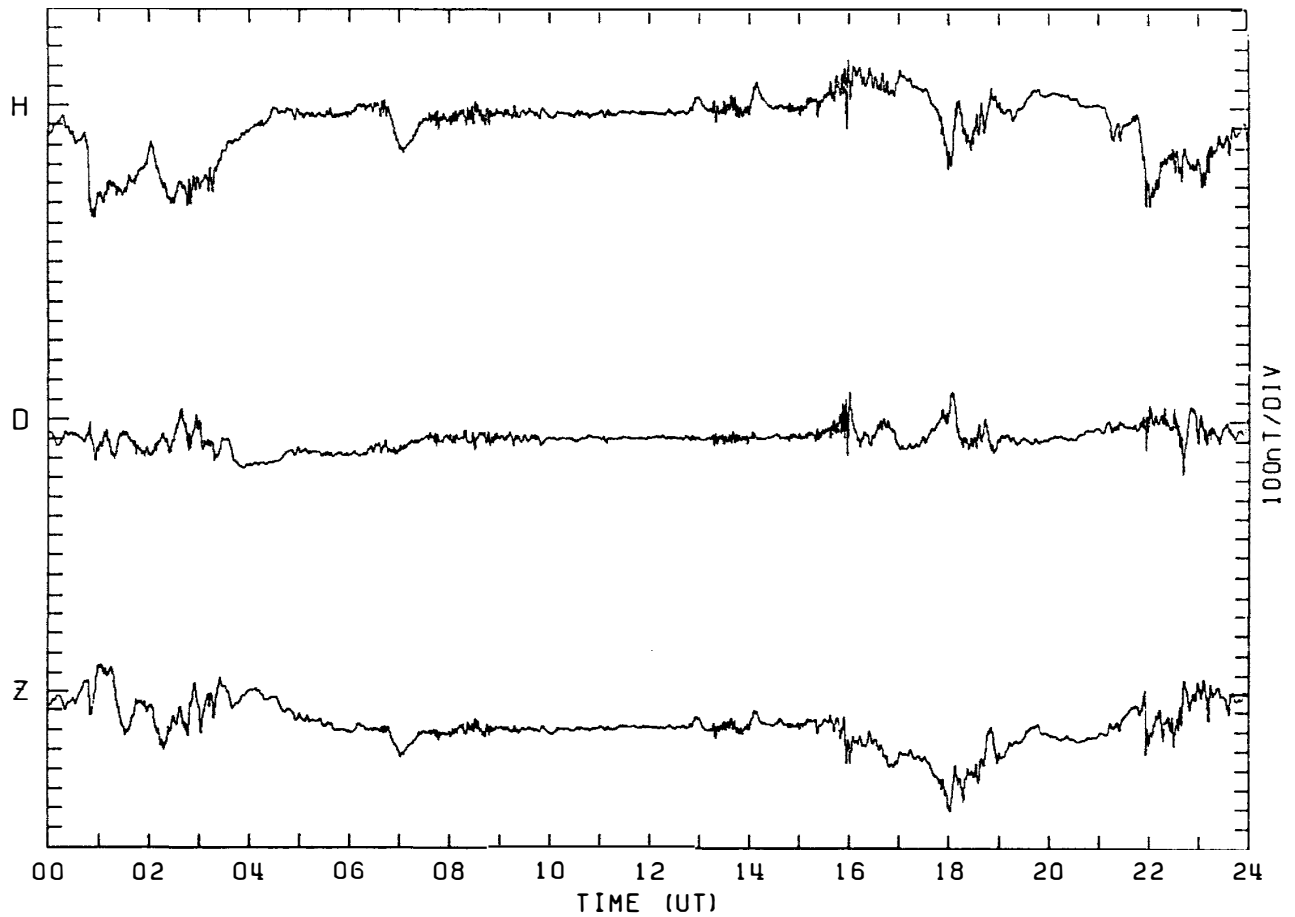
MAGNETOGRAM SYOWA STATION

DAY:319 NOVEMBER 15. 1983



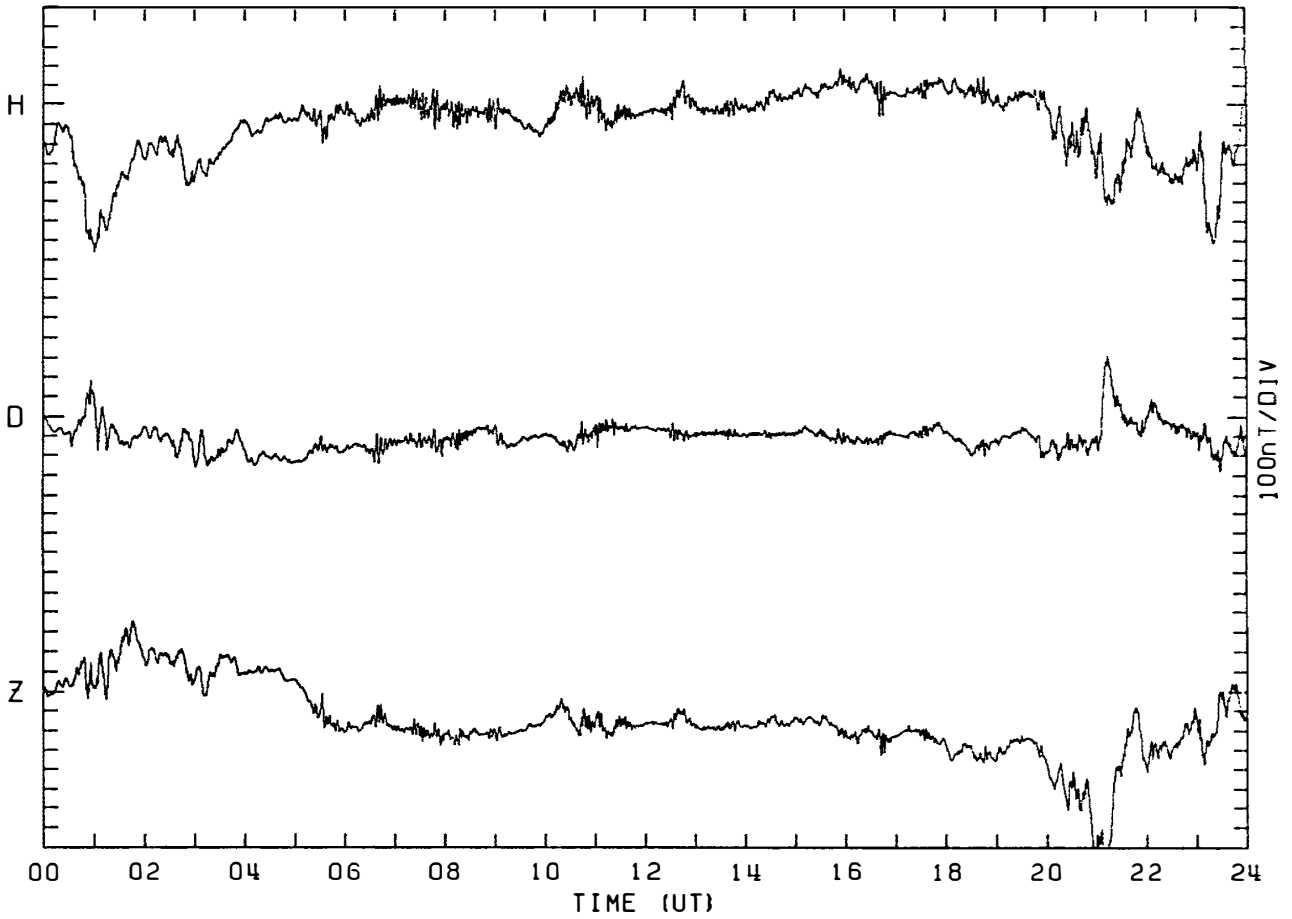
MAGNETOGRAM SYOWA STATION

DAY:320 NOVEMBER 16. 1983



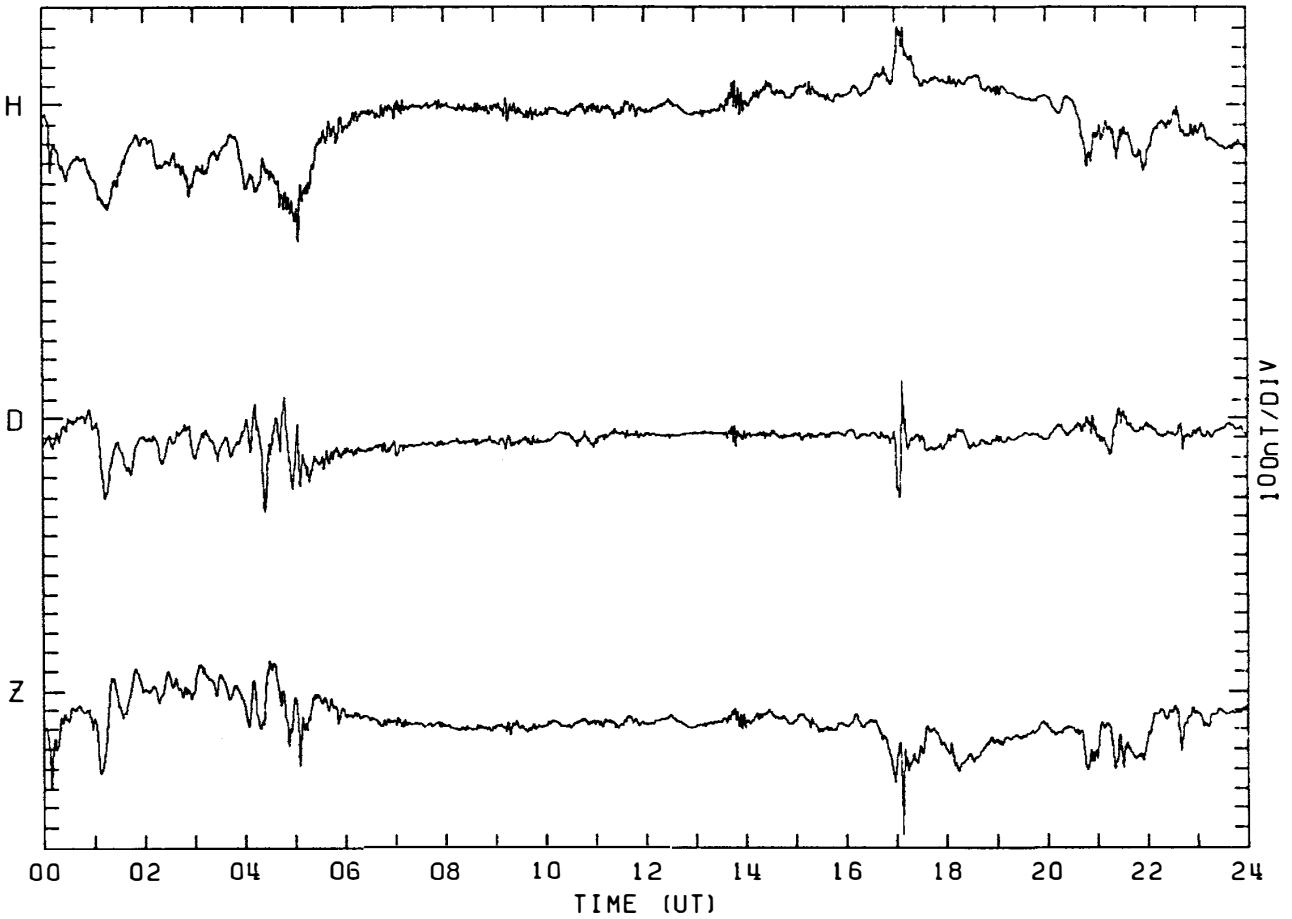
MAGNETOGRAM SYOWA STATION

DAY:321 NOVEMBER 17. 1983



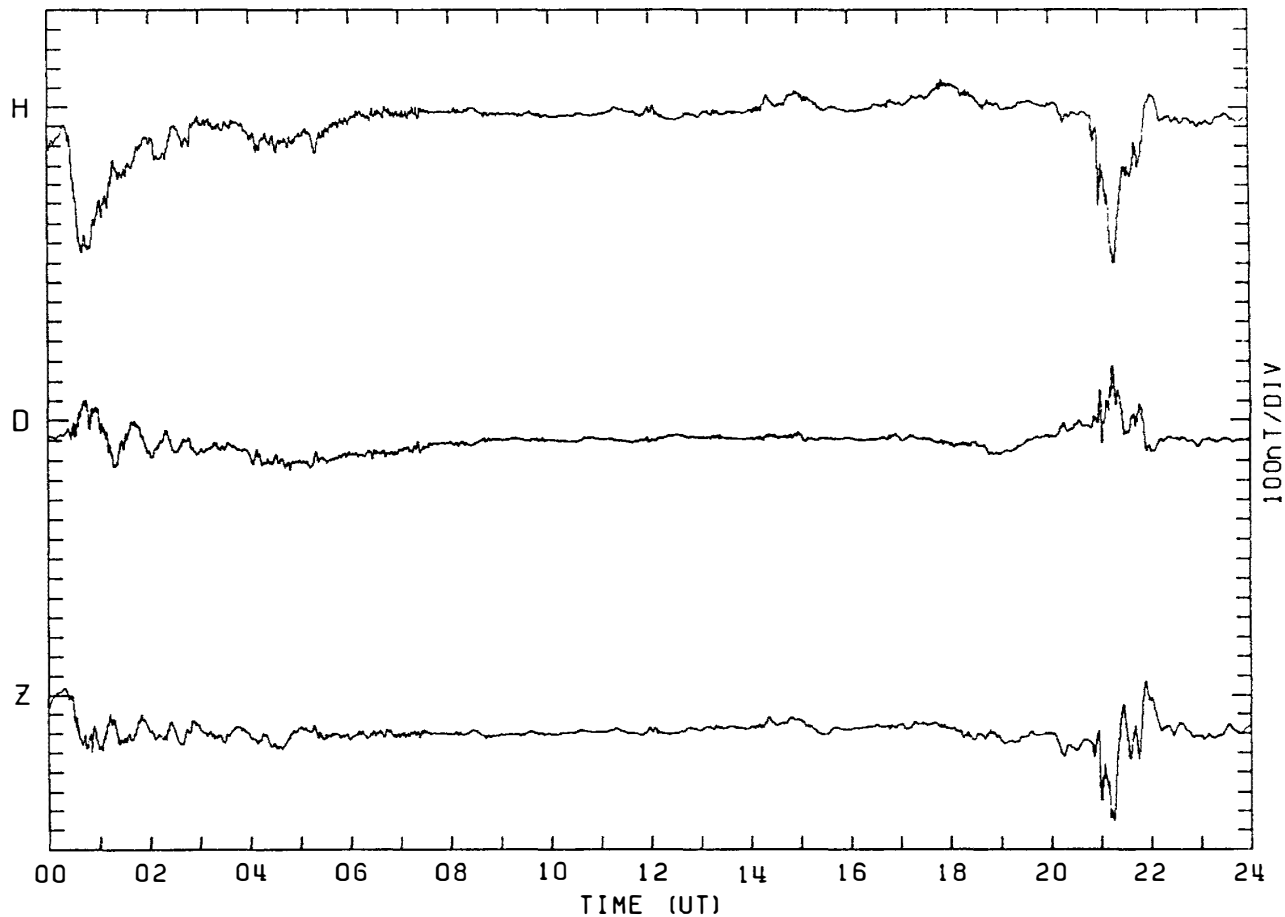
MAGNETOGRAM SYOWA STATION

DAY:322 NOVEMBER 18. 1983



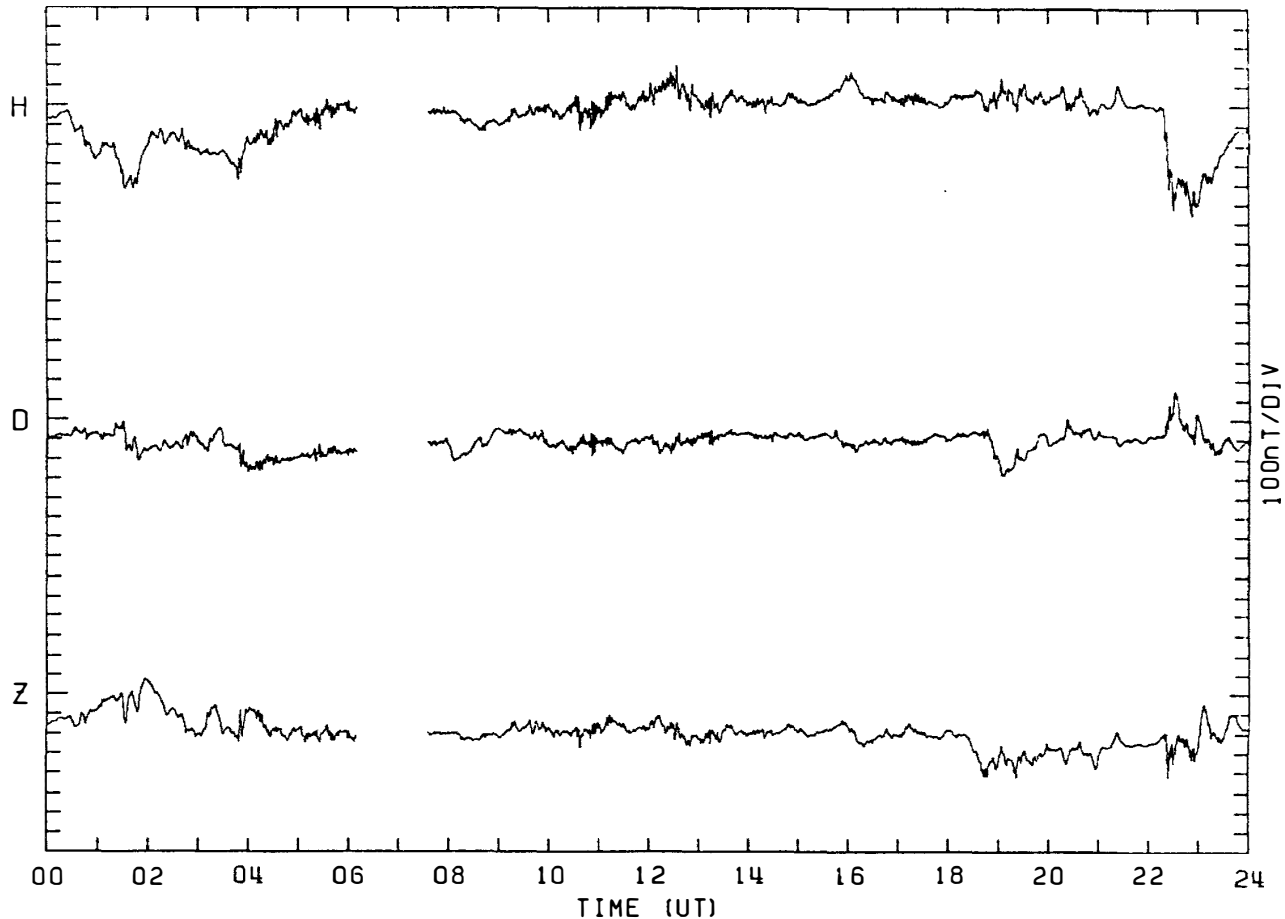
MAGNETOGRAM SYOWA STATION

DAY:323 NOVEMBER 19, 1983



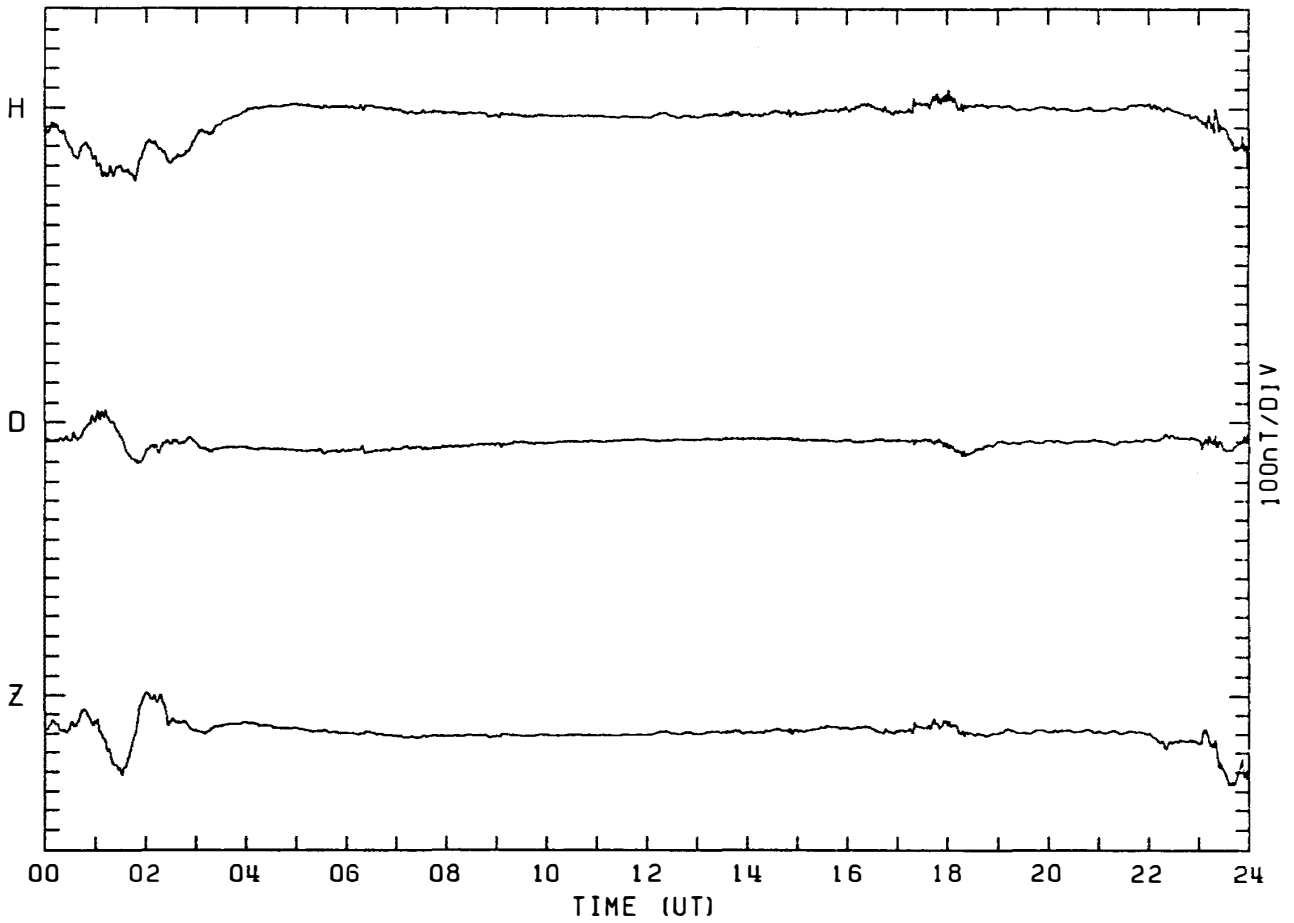
MAGNETOGRAM SYOWA STATION

DAY:324 NOVEMBER 20, 1983



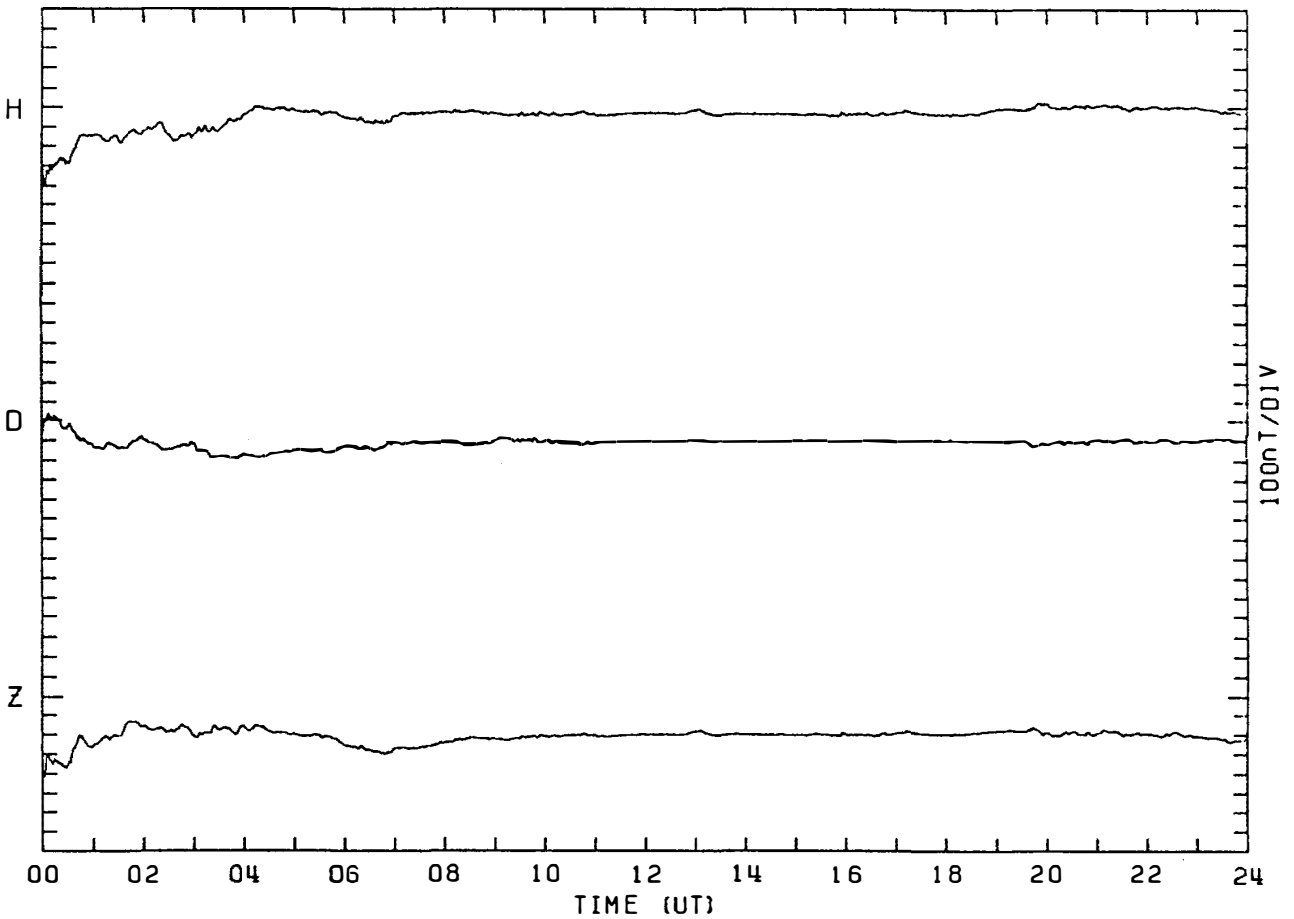
MAGNETOGRAM SYOWA STATION

DAY:325 NOVEMBER 21, 1983



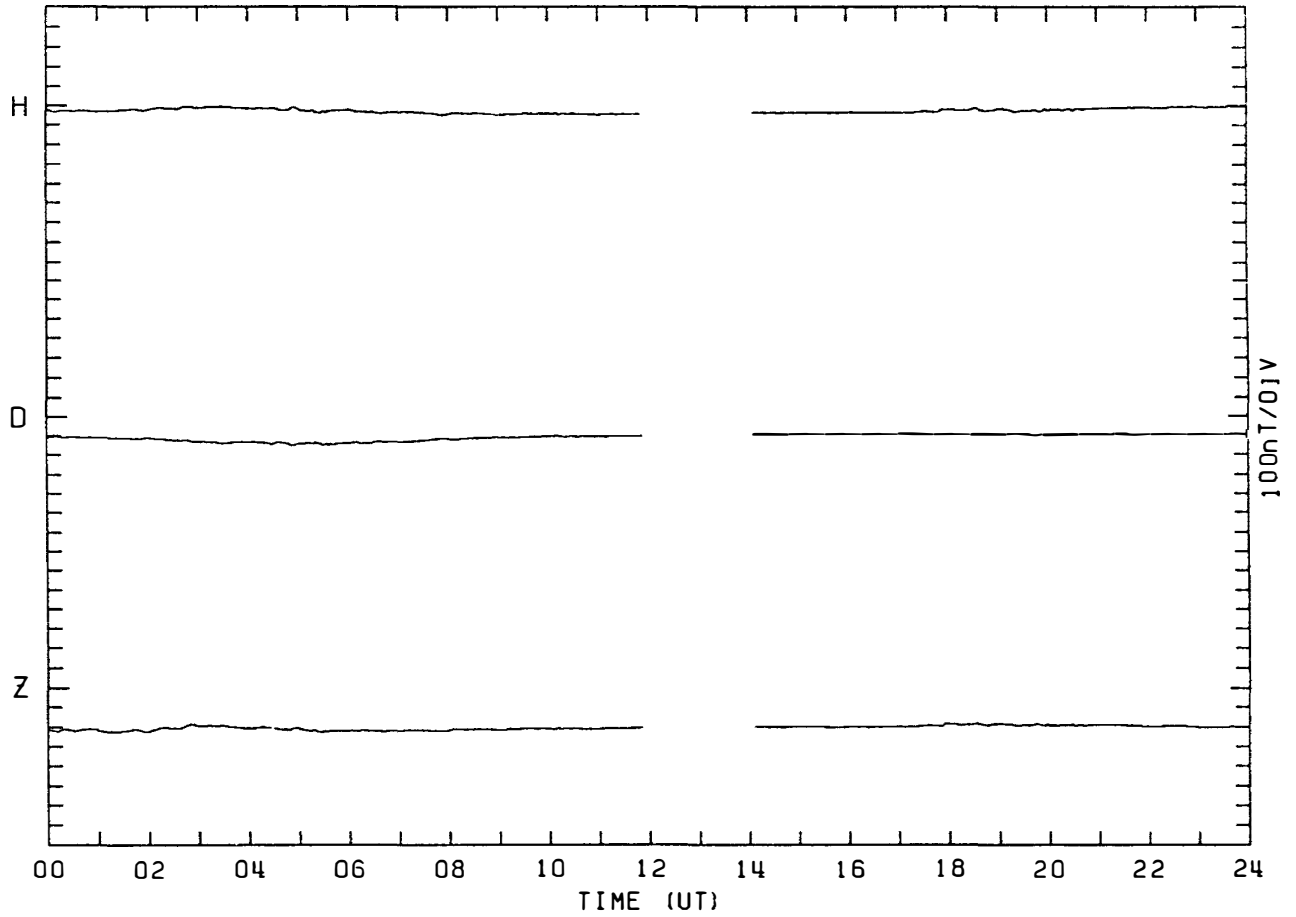
MAGNETOGRAM SYOWA STATION

DAY:326 NOVEMBER 22, 1983



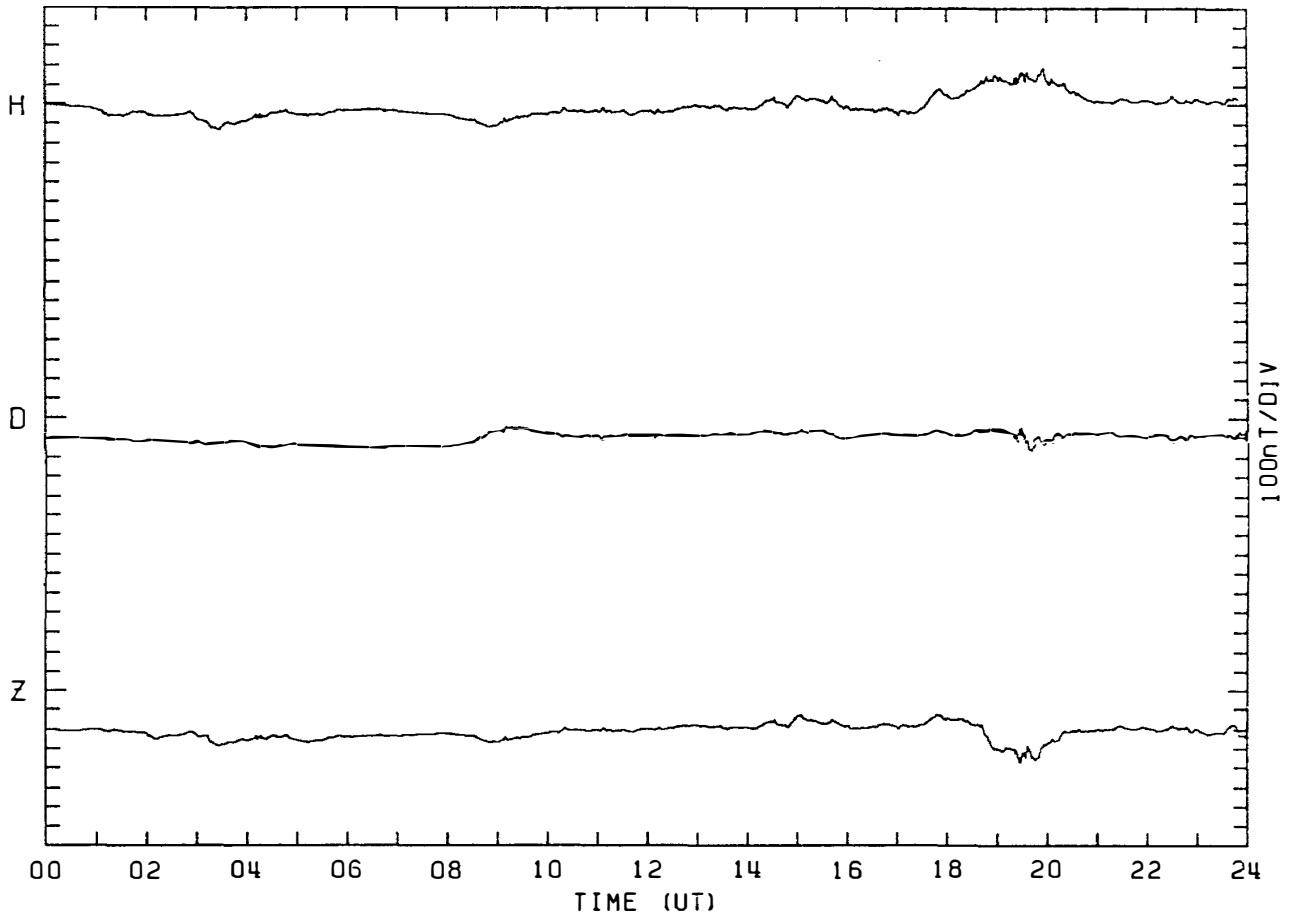
MAGNETOGRAM SYOWA STATION

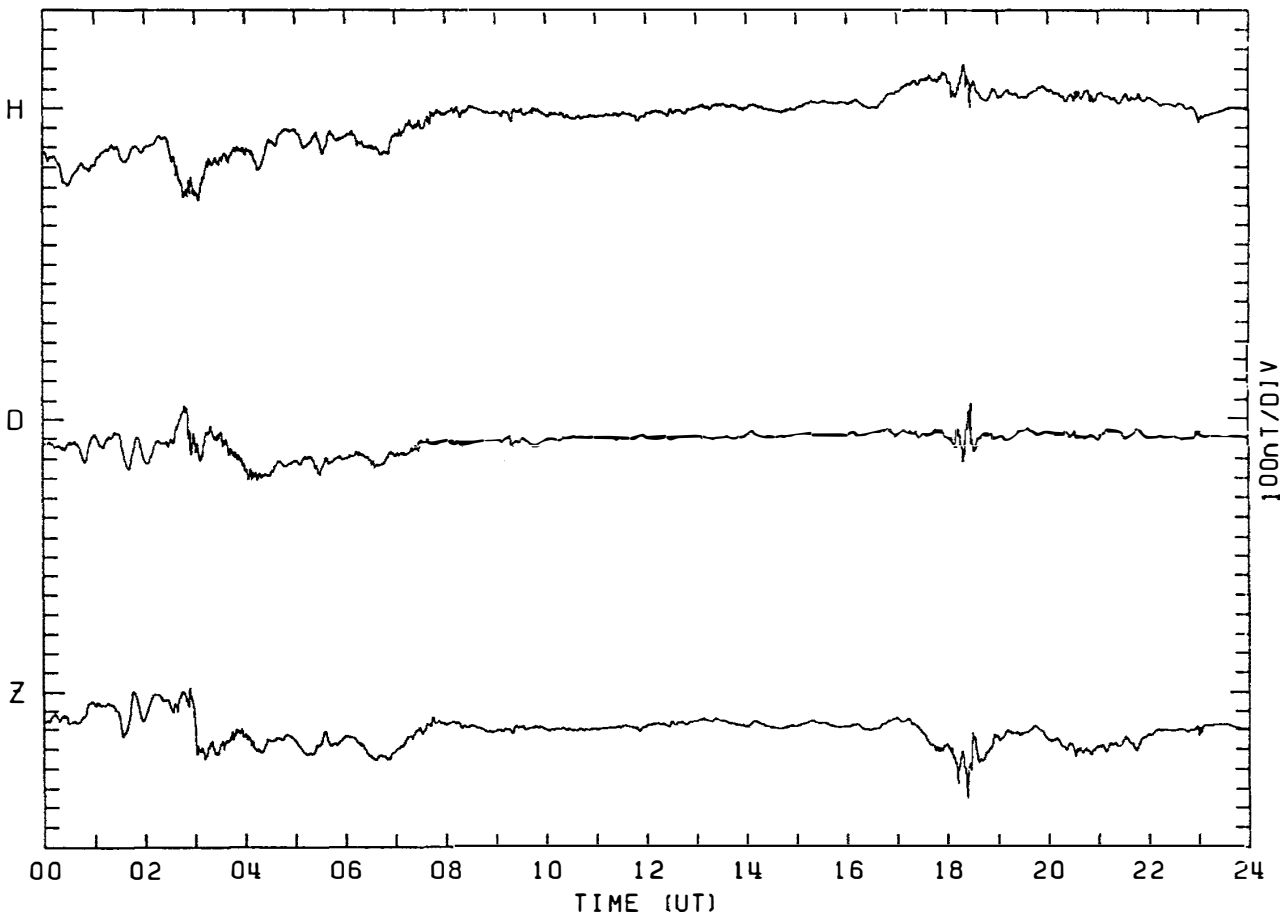
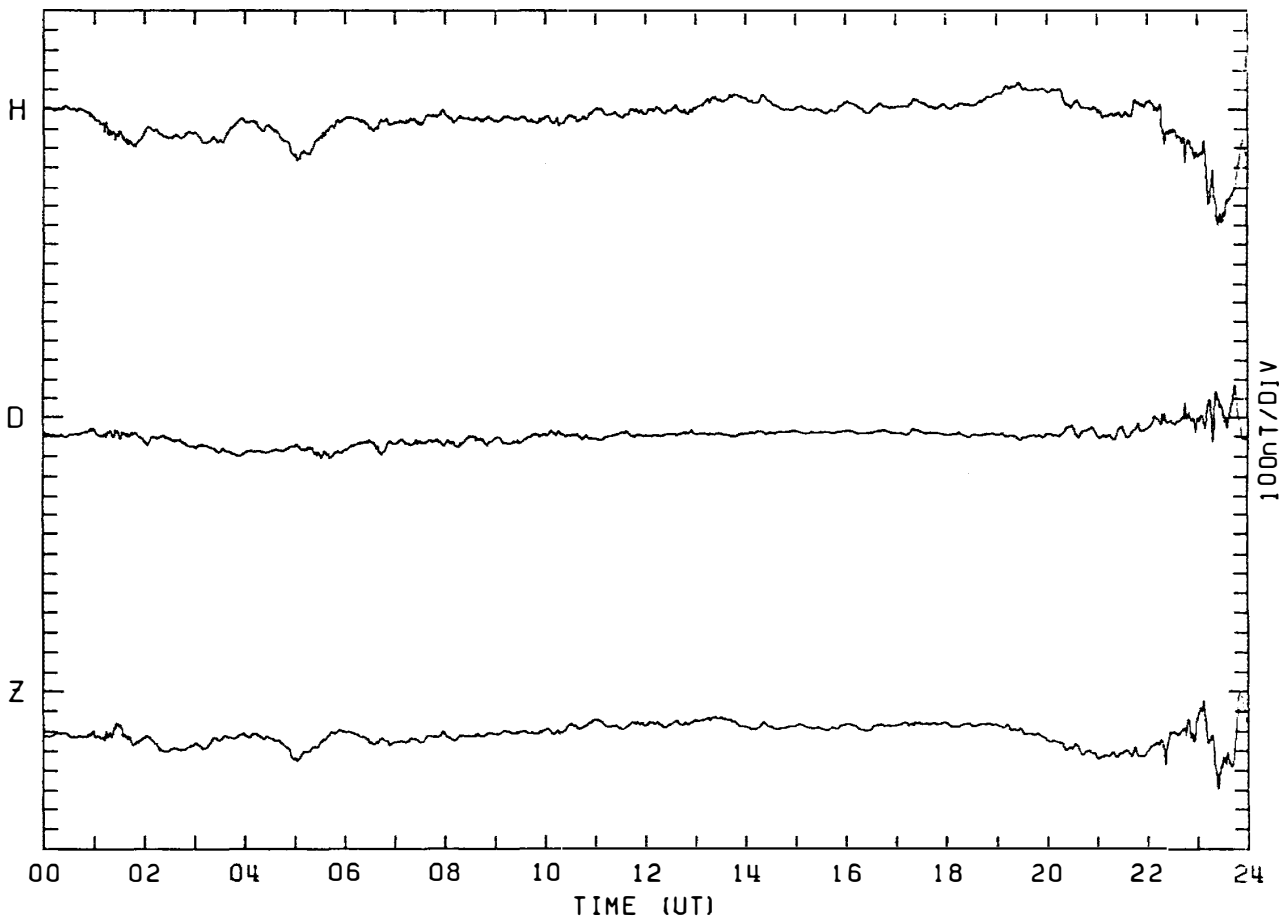
DAY:327 NOVEMBER 23. 1983



MAGNETOGRAM SYOWA STATION

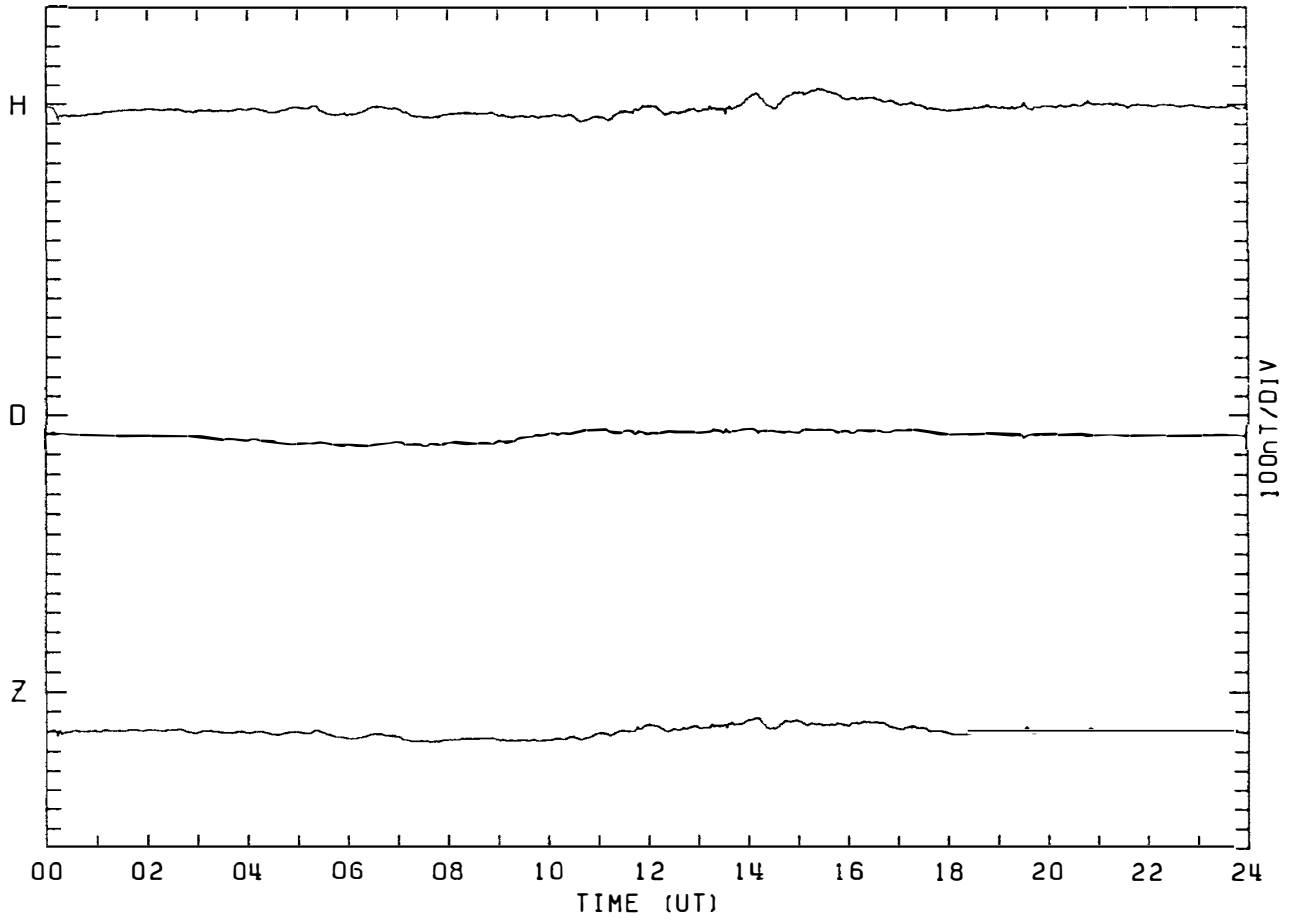
DAY:328 NOVEMBER 24. 1983





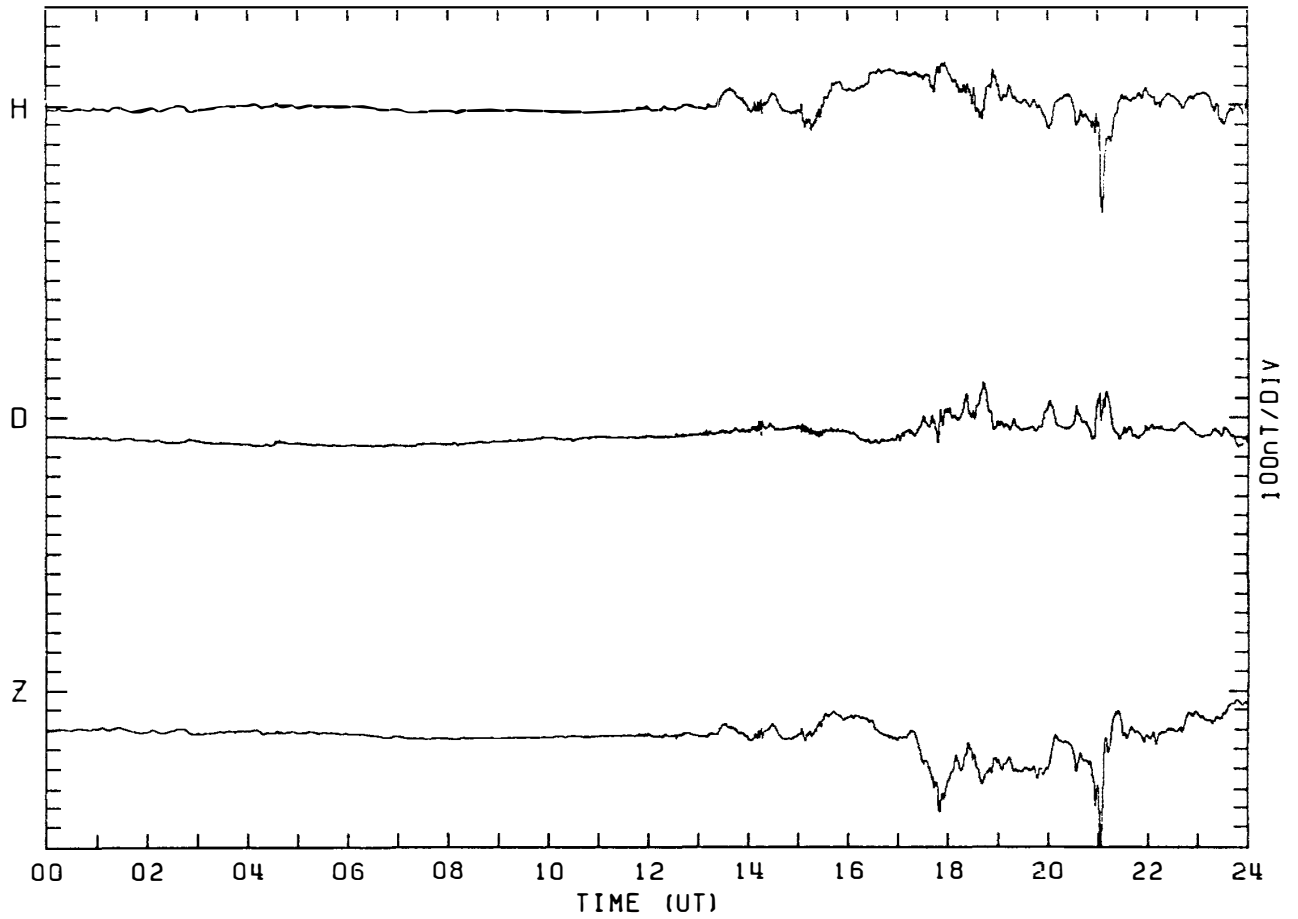
MAGNETOGRAM SYOWA STATION

DAY:331 NOVEMBER 27, 1983



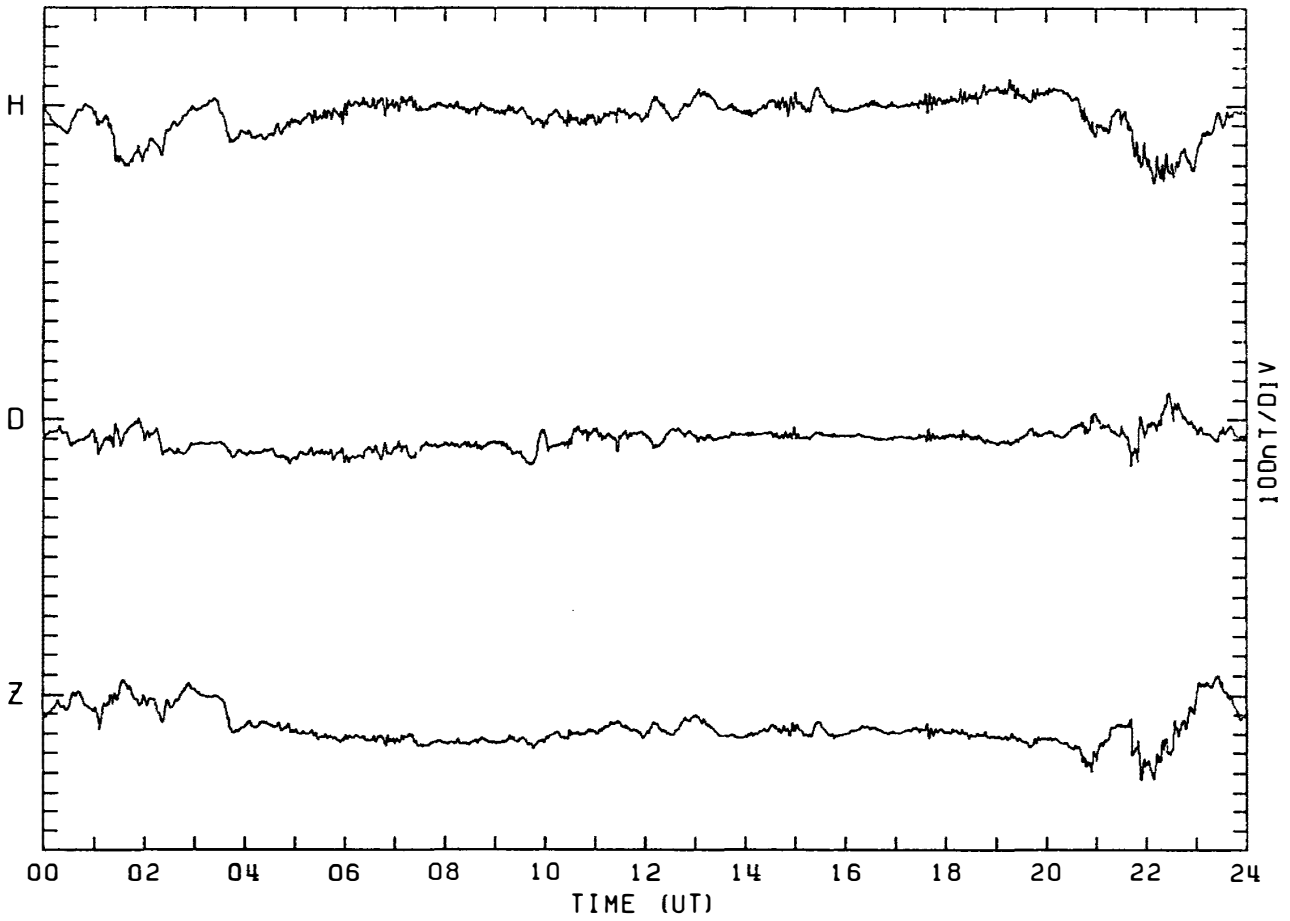
MAGNETOGRAM SYOWA STATION

DAY:332 NOVEMBER 28, 1983



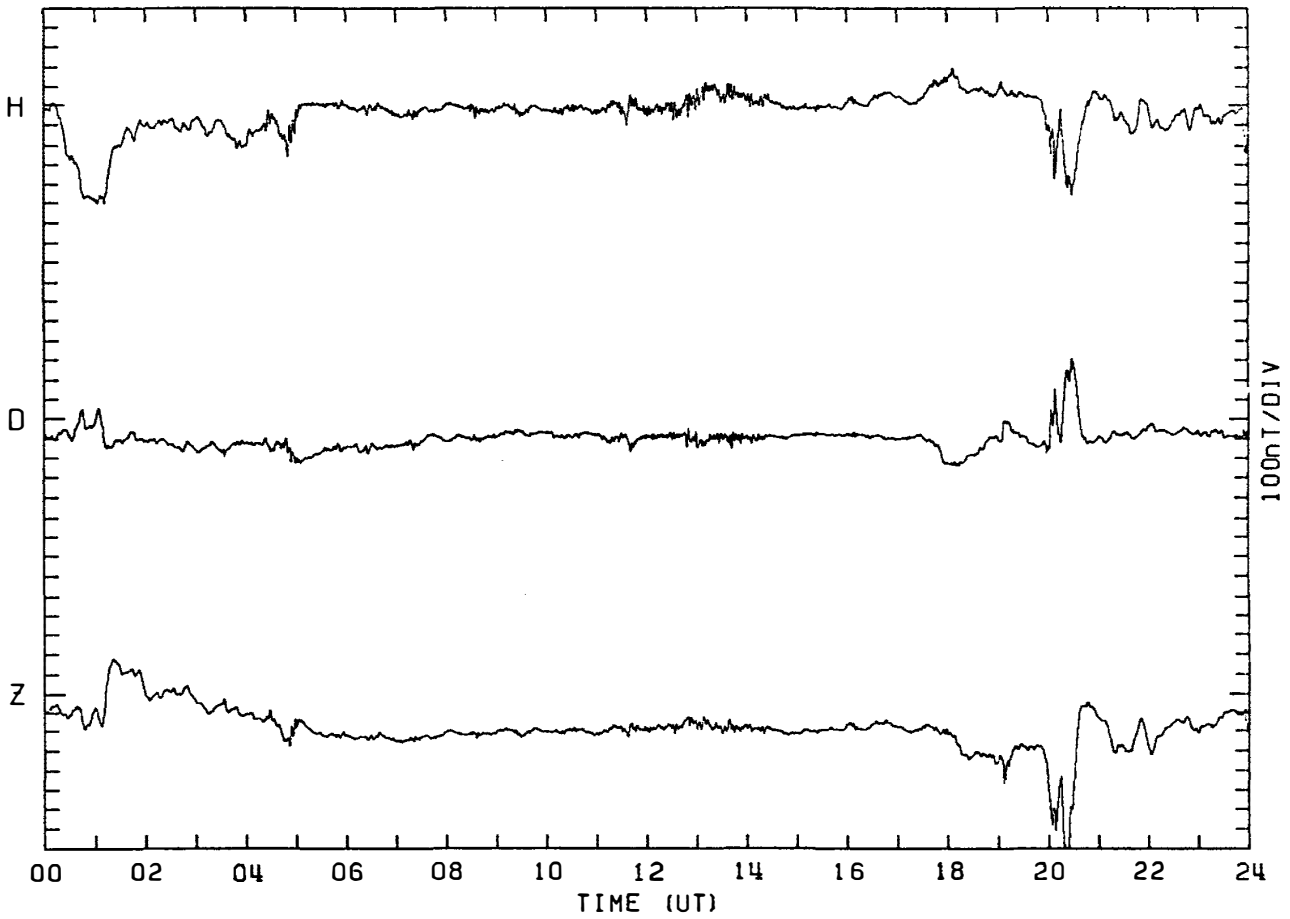
MAGNETOGRAM SYOWA STATION

DAY:333 NOVEMBER 29. 1983



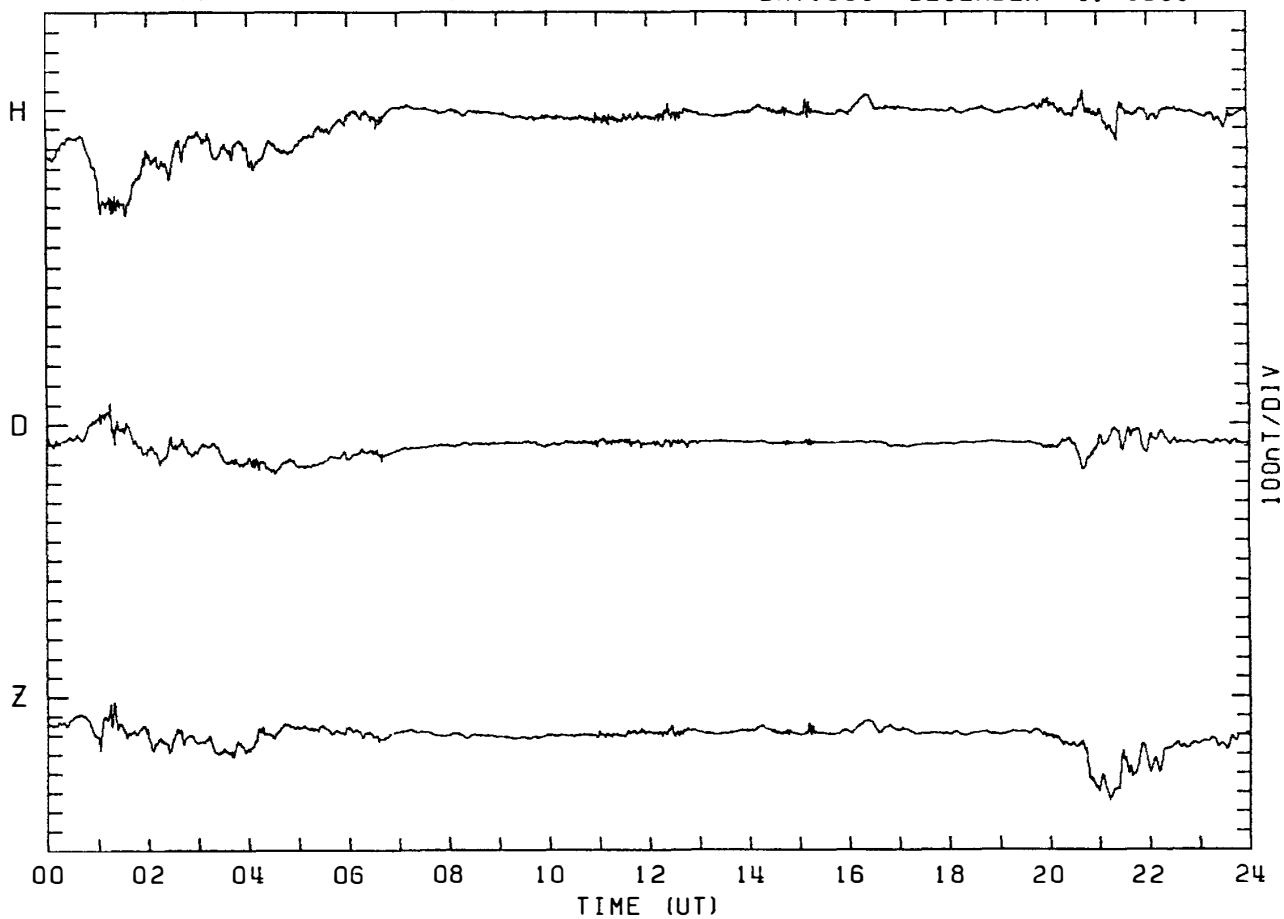
MAGNETOGRAM SYOWA STATION

DAY:334 NOVEMBER 30. 1983



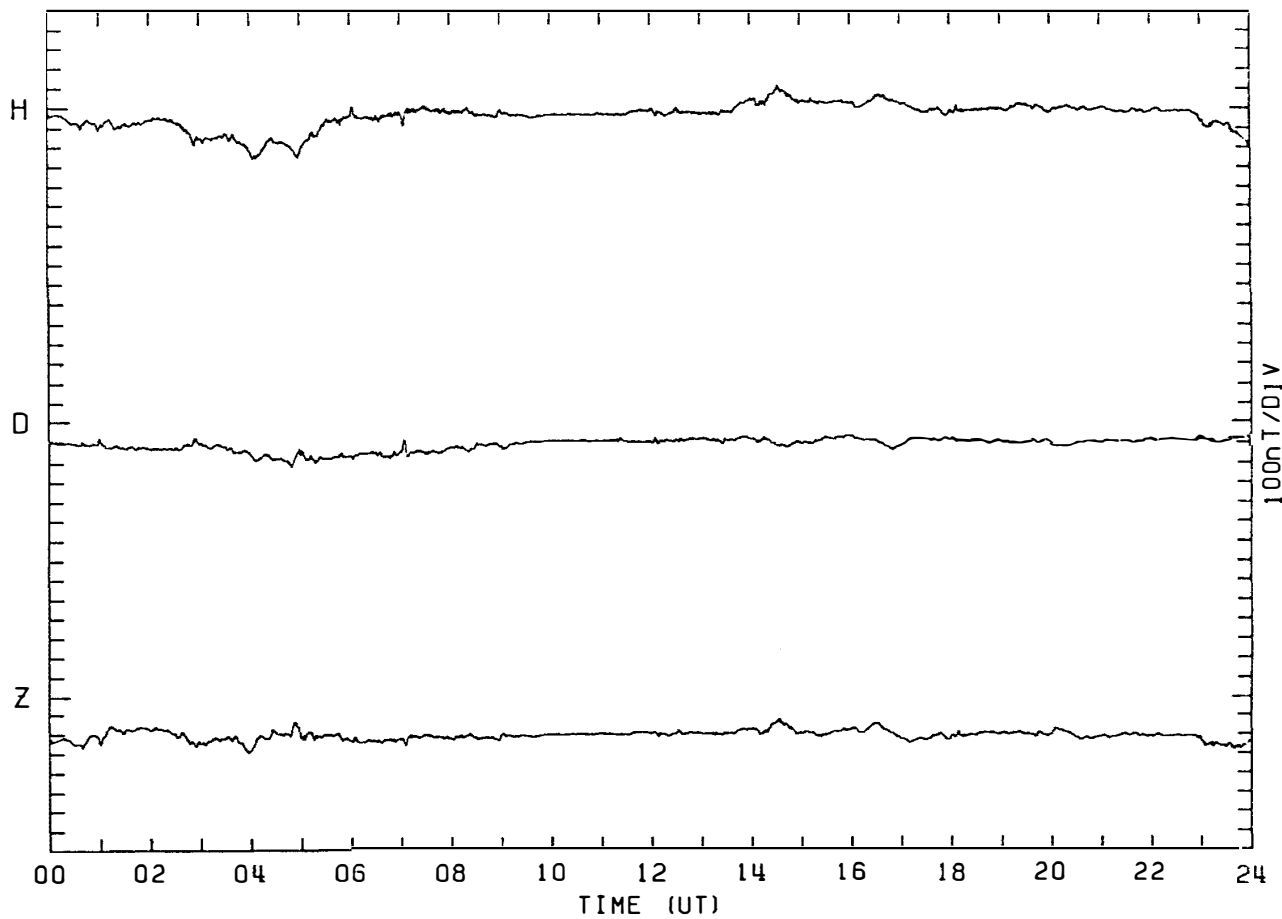
MAGNETOGRAM SYOWA STATION

DAY:335 DECEMBER 1. 1983



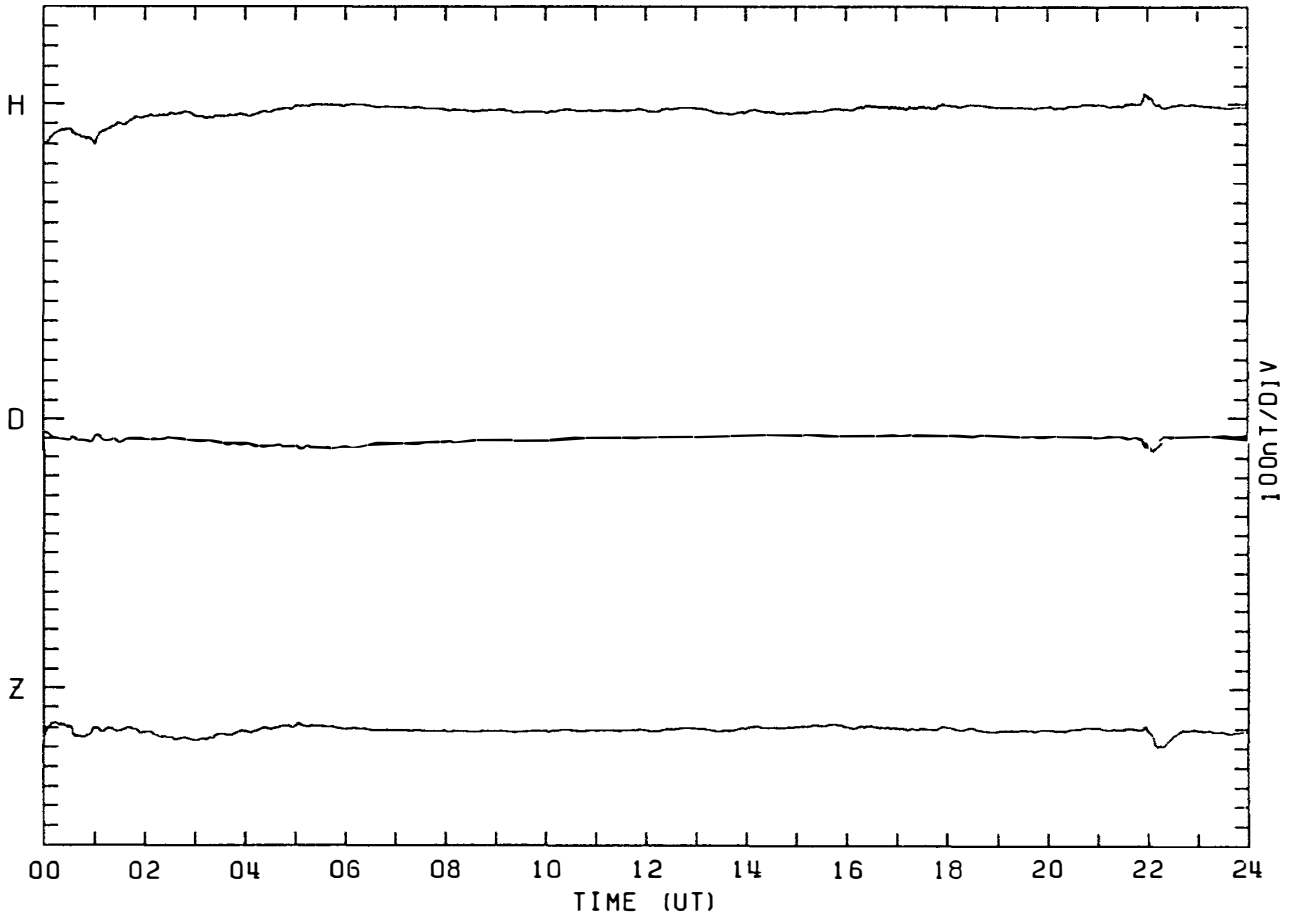
MAGNETOGRAM SYOWA STATION

DAY:336 DECEMBER 2. 1983



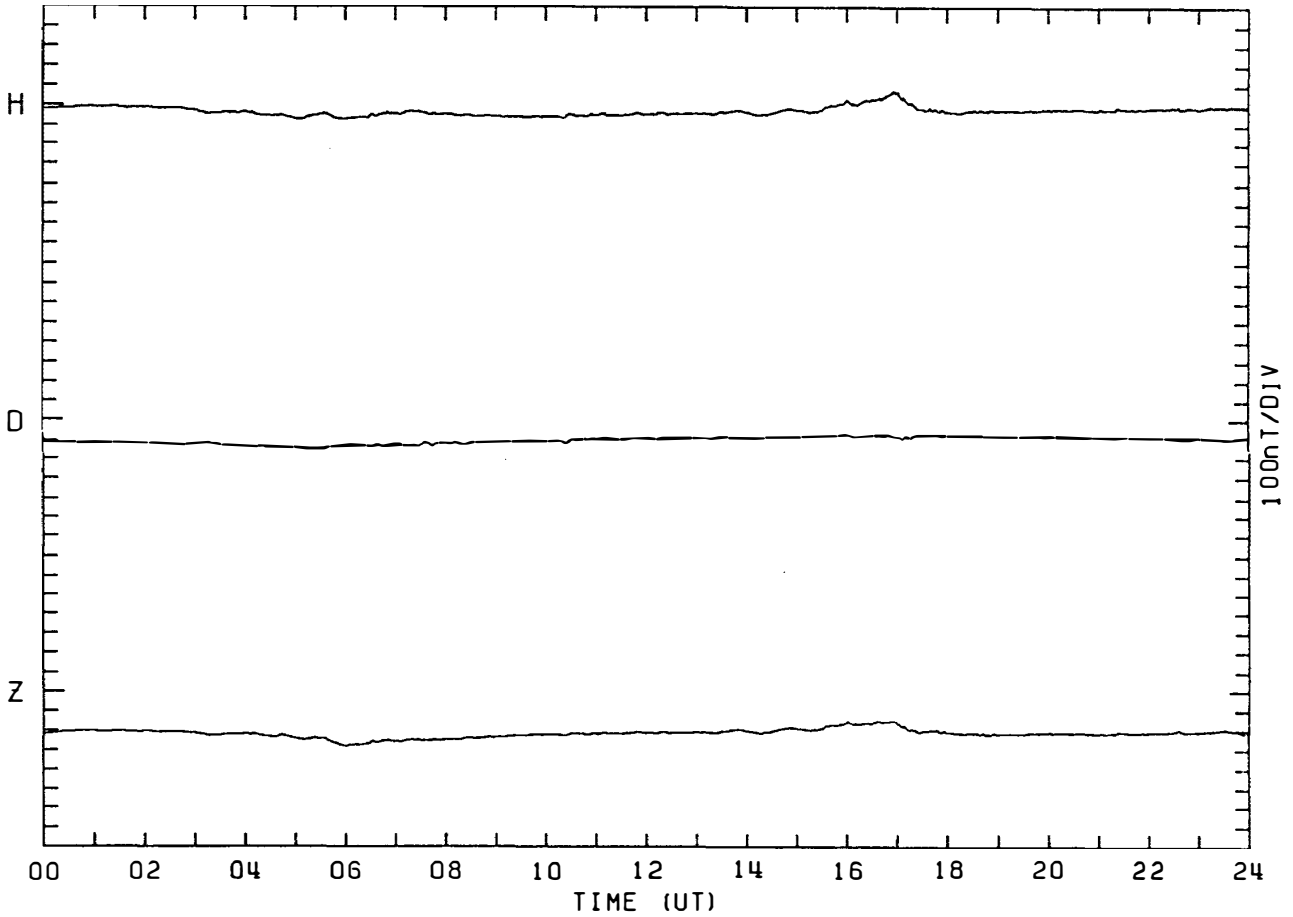
MAGNETOGRAM SYOWA STATION

DAY:337 DECEMBER 3, 1983



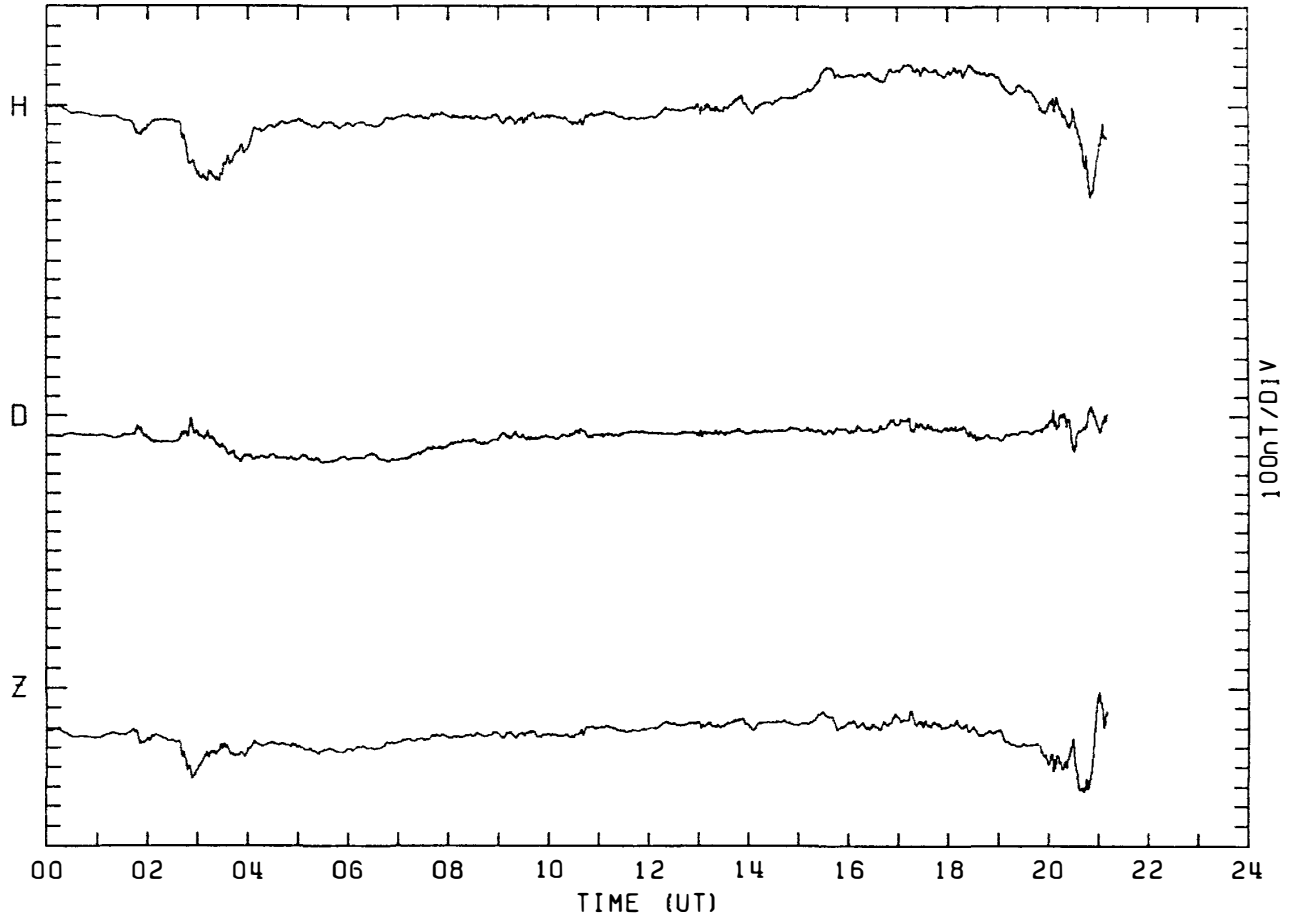
MAGNETOGRAM SYOWA STATION

DAY:338 DECEMBER 4, 1983



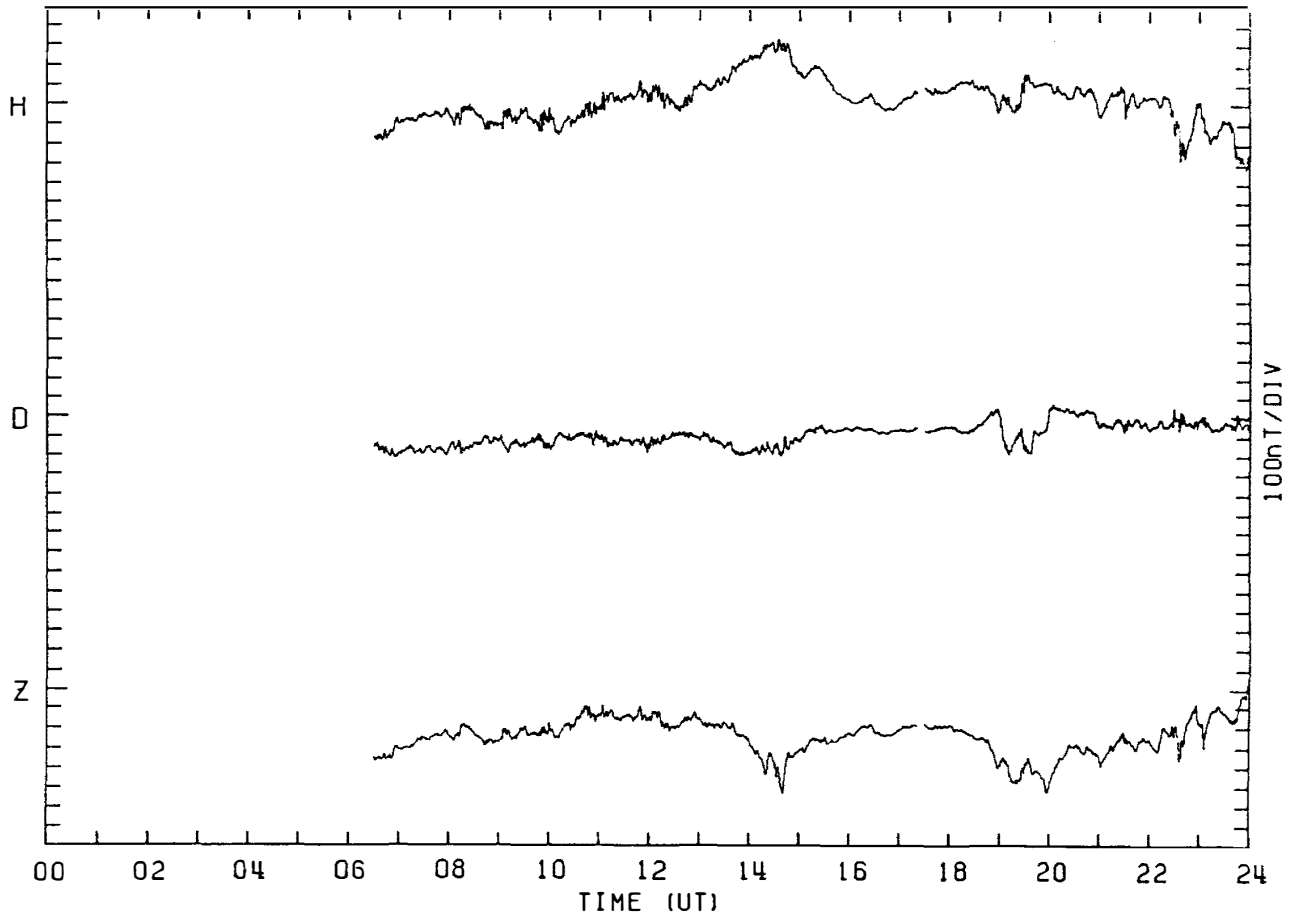
MAGNETOGRAM SYOWA STATION

DAY:339 DECEMBER 5. 1983



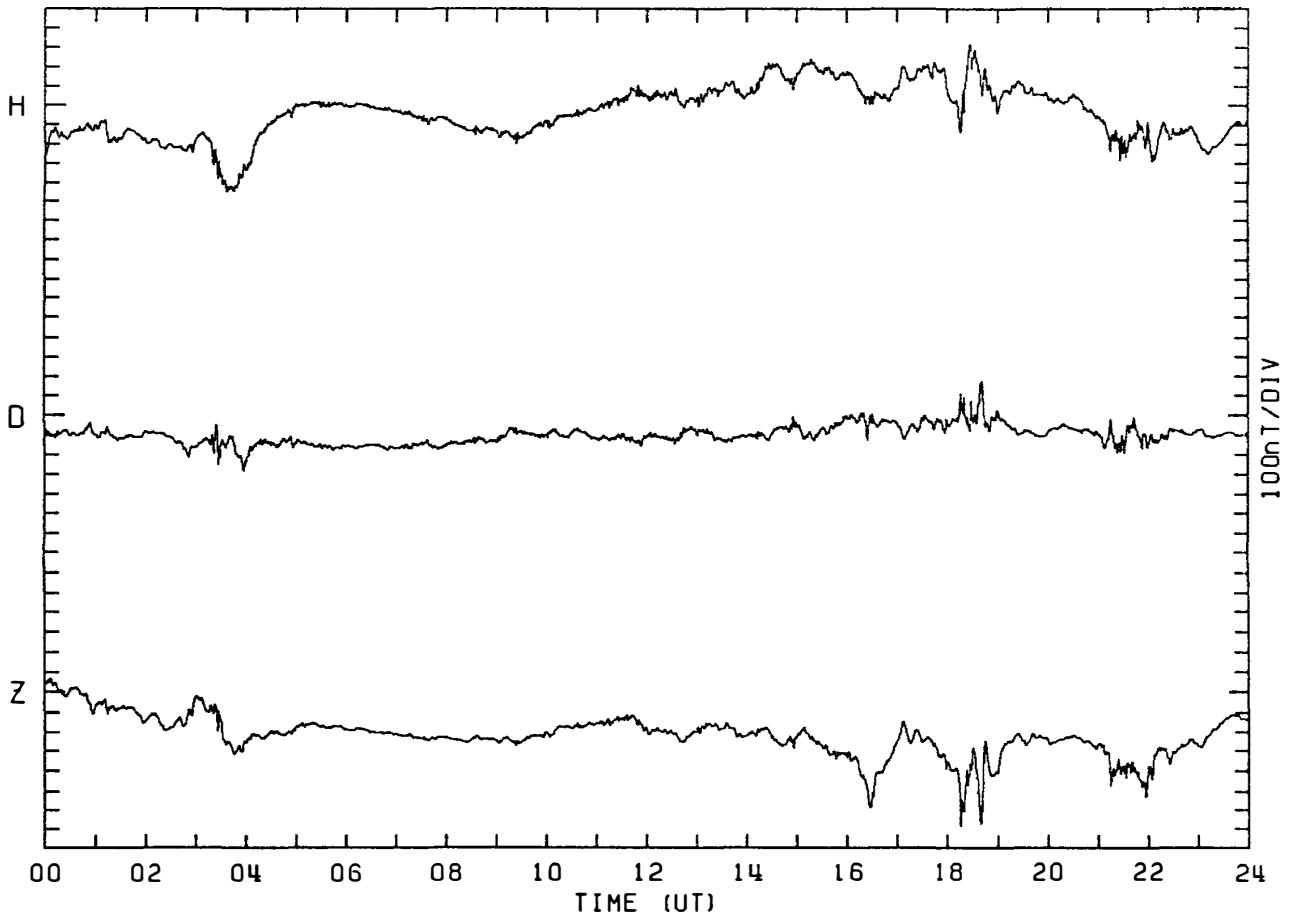
MAGNETOGRAM SYOWA STATION

DAY:340 DECEMBER 6. 1983



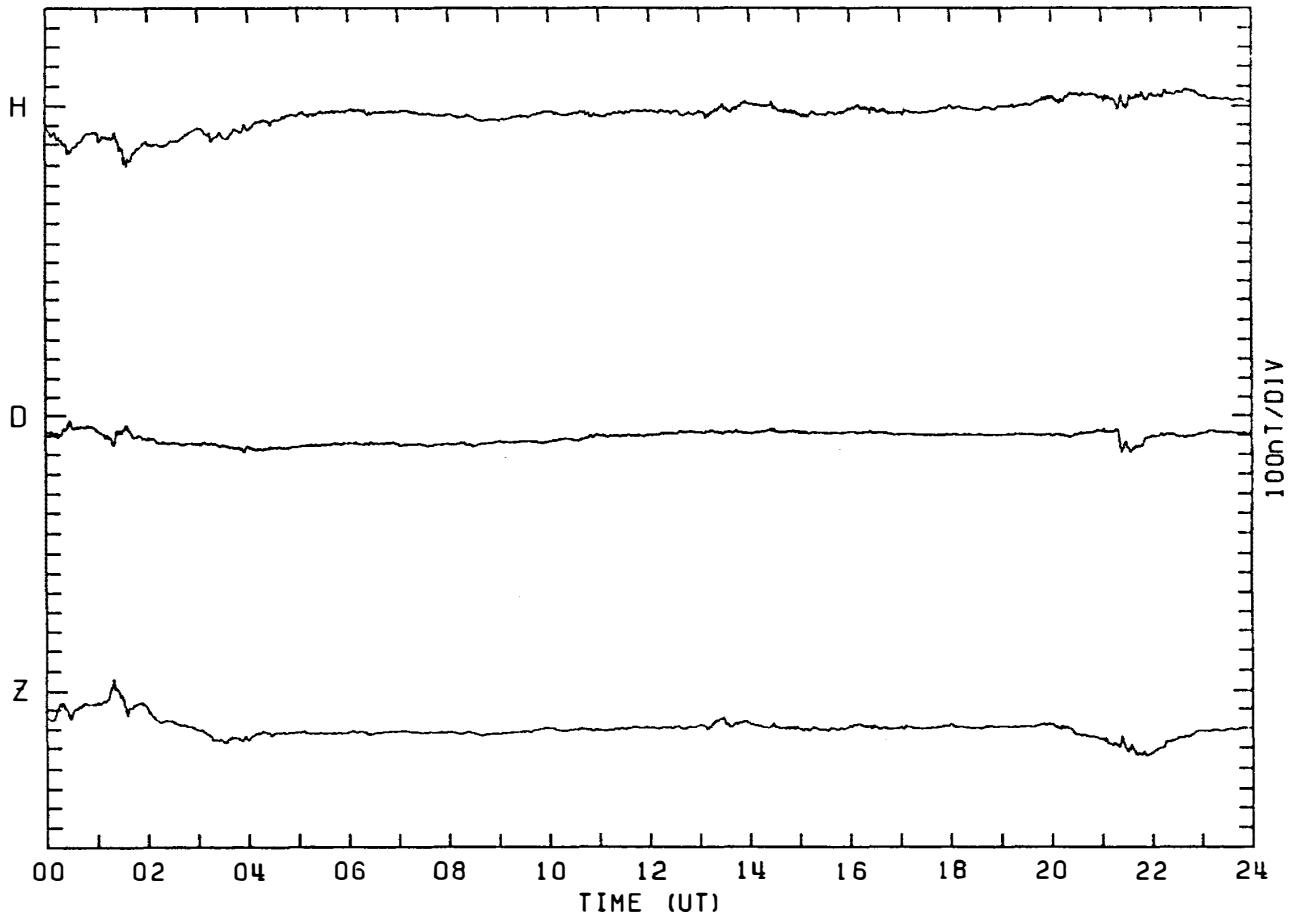
MAGNETOGRAM SYOWA STATION

DAY: 341 DECEMBER 7, 1983



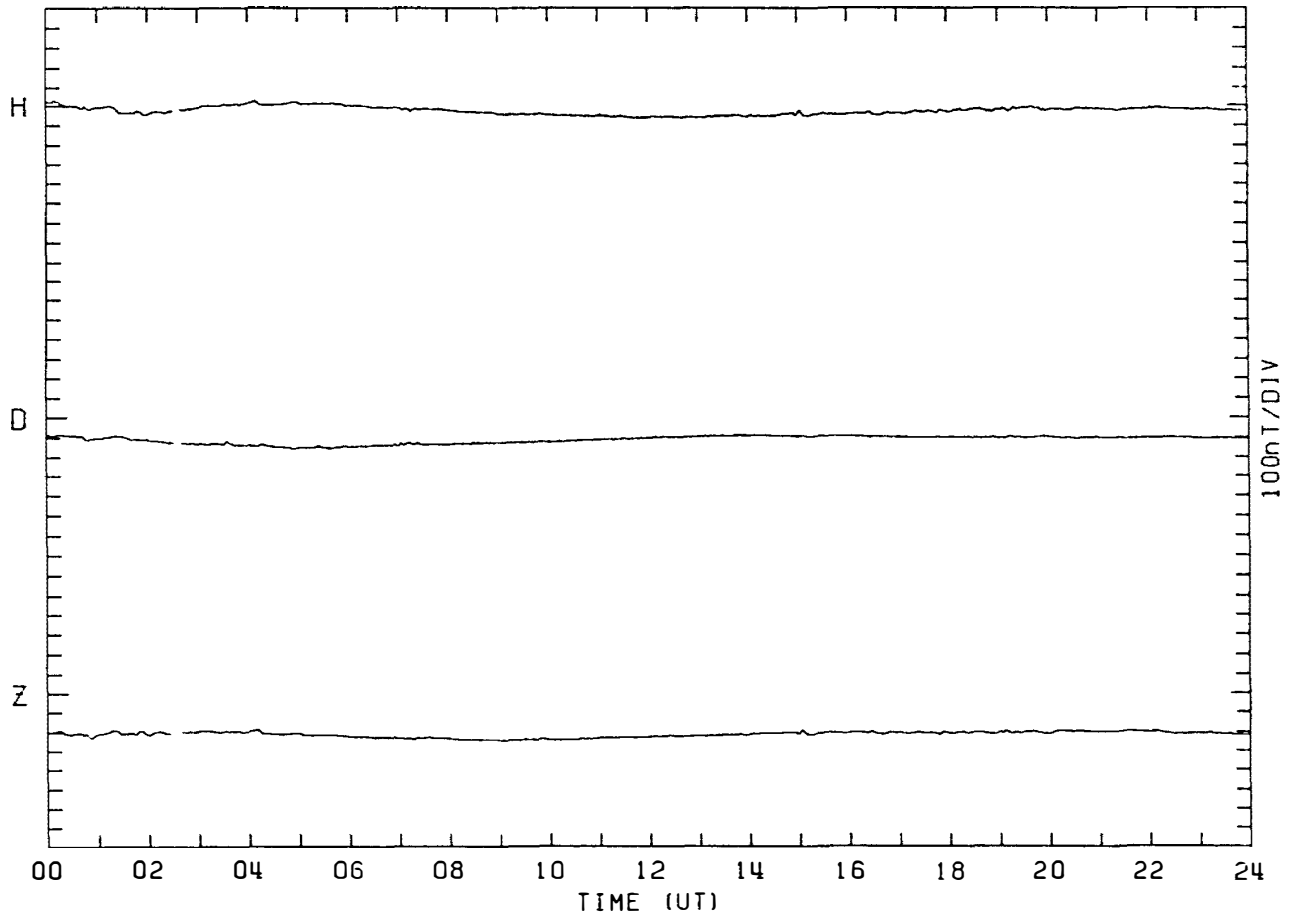
MAGNETOGRAM SYOWA STATION

DAY: 342 DECEMBER 8, 1983



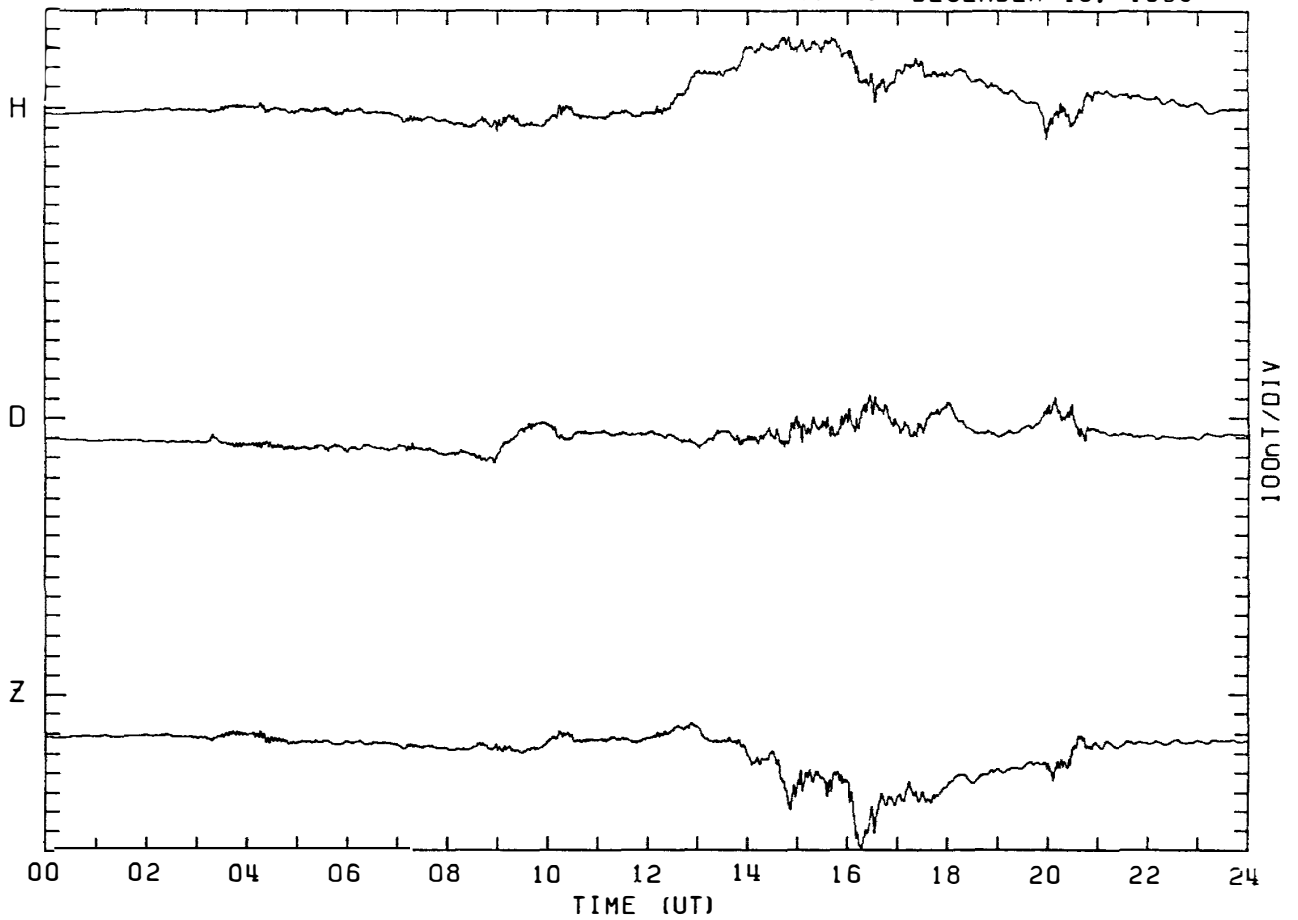
MAGNETOGRAM SYOWA STATION

DAY:343 DECEMBER 9, 1963



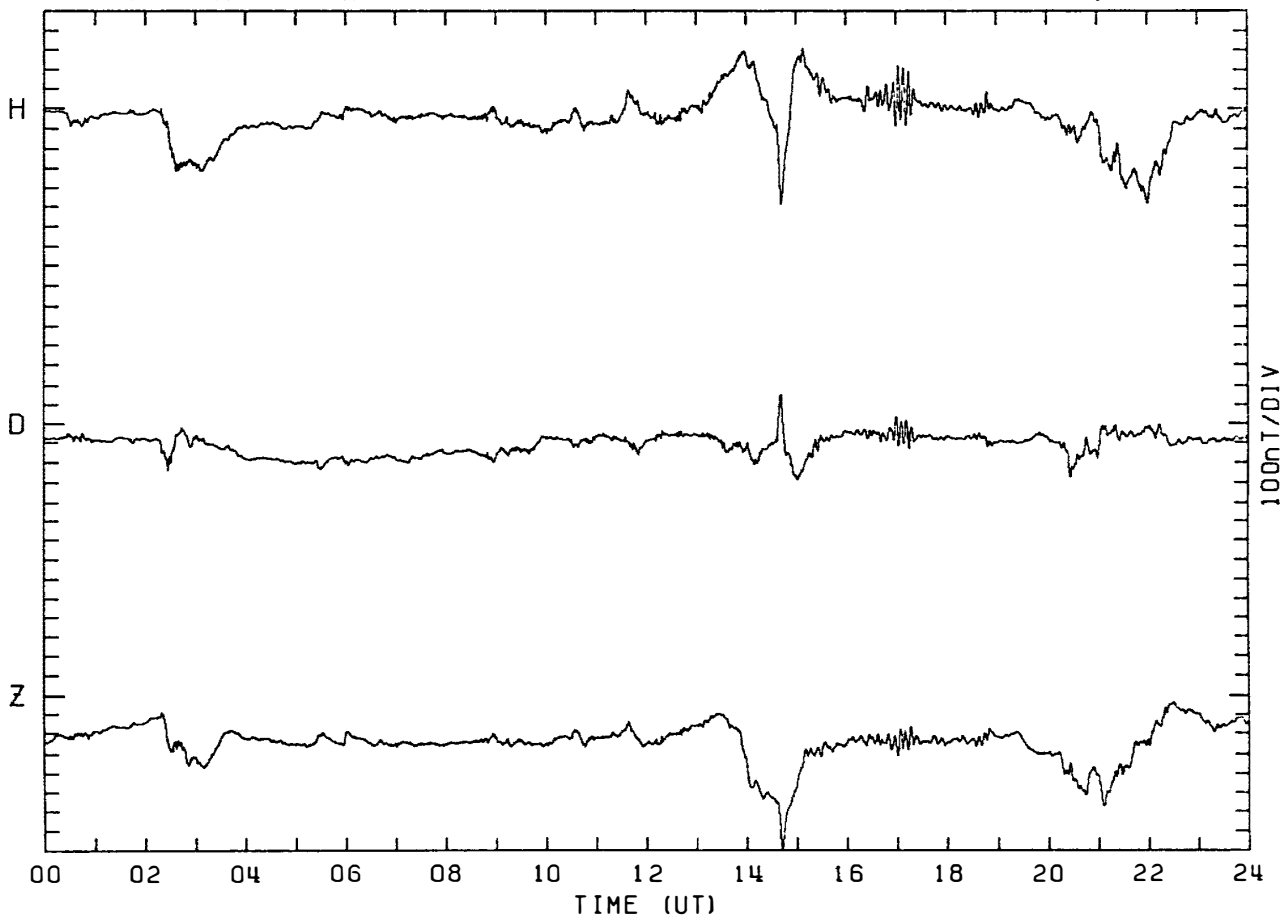
MAGNETOGRAM SYOWA STATION

DAY:344 DECEMBER 10, 1963



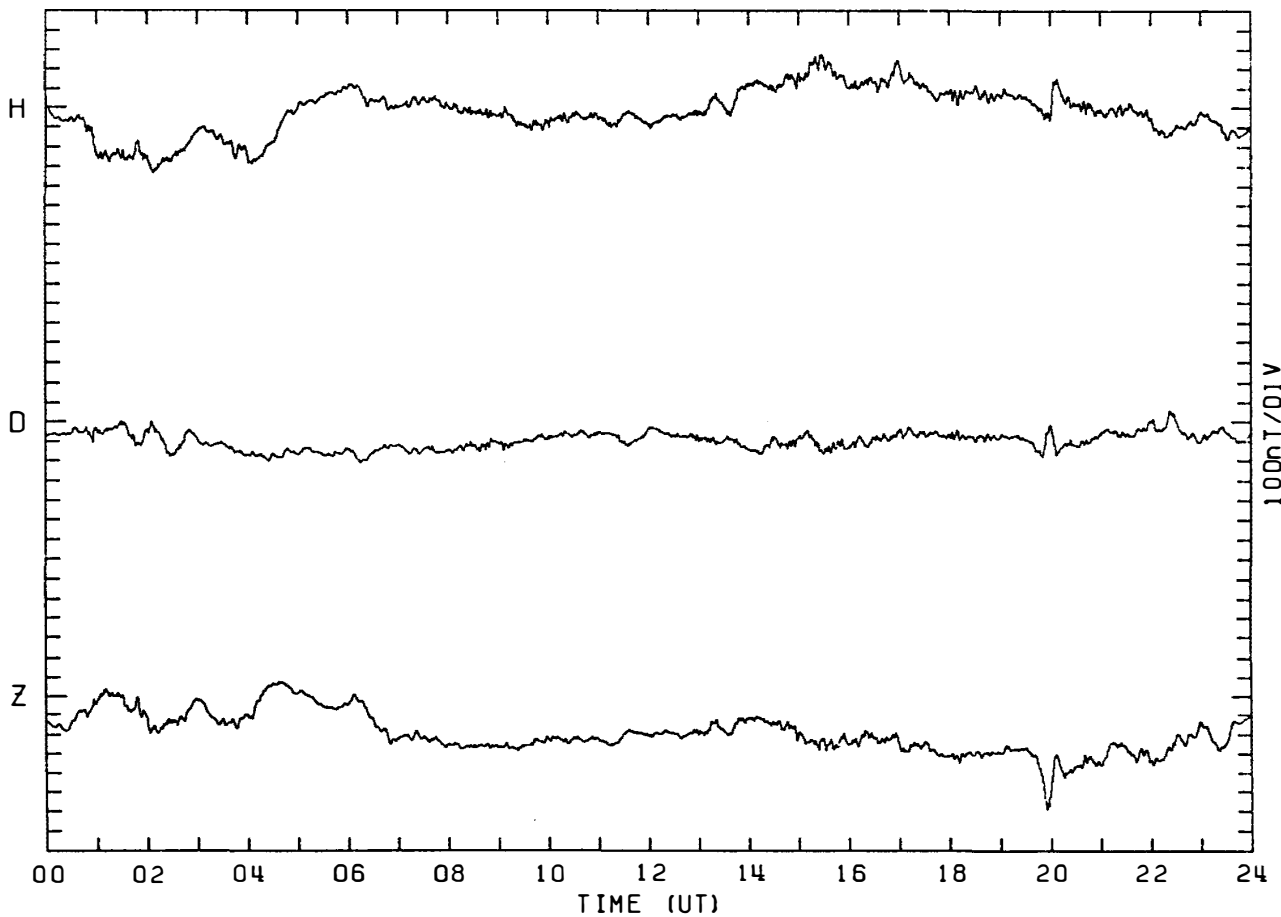
MAGNETOGRAM SYOWA STATION

DAY:345 DECEMBER 11, 1983



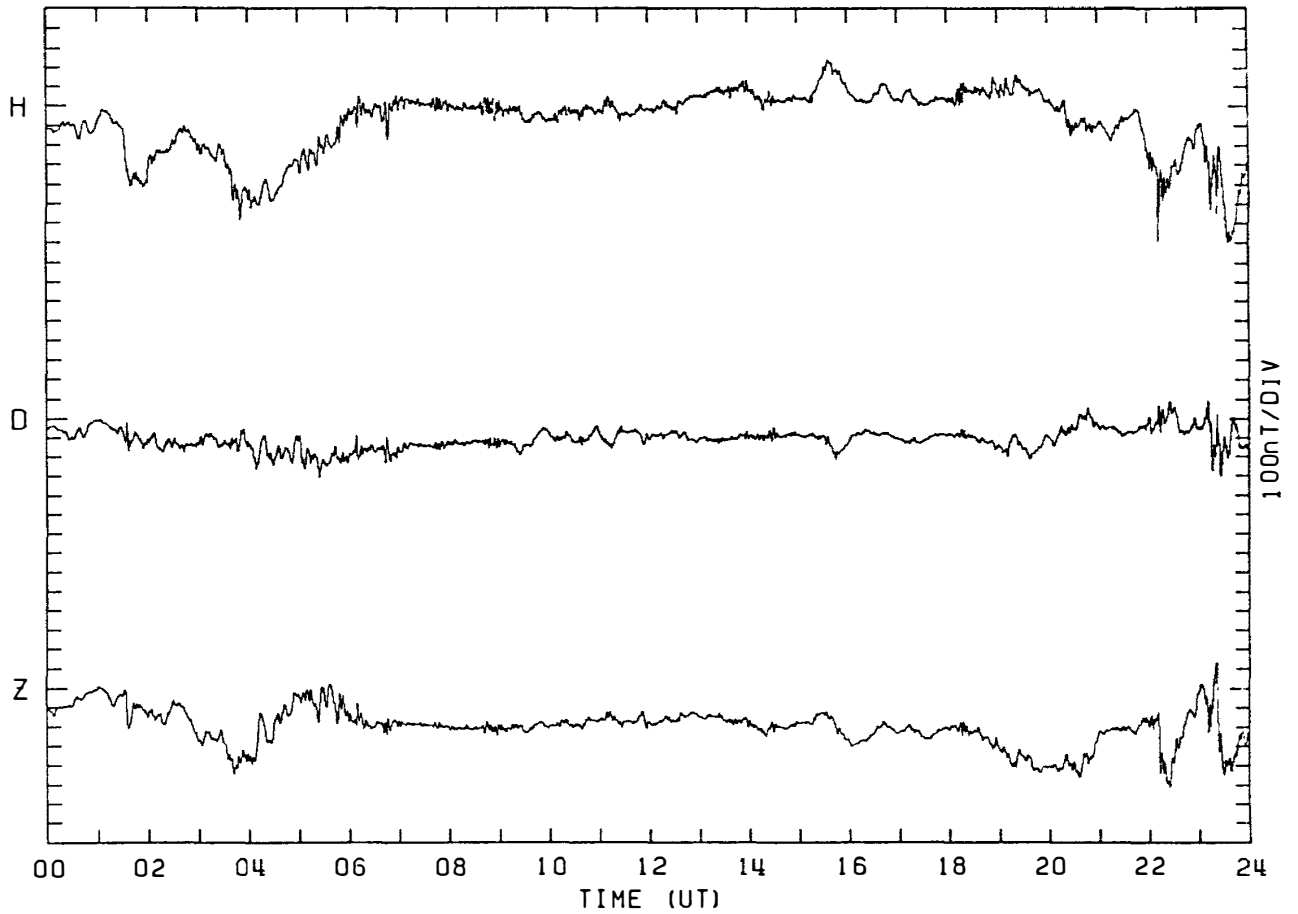
MAGNETOGRAM SYOWA STATION

DAY:346 DECEMBER 12, 1983



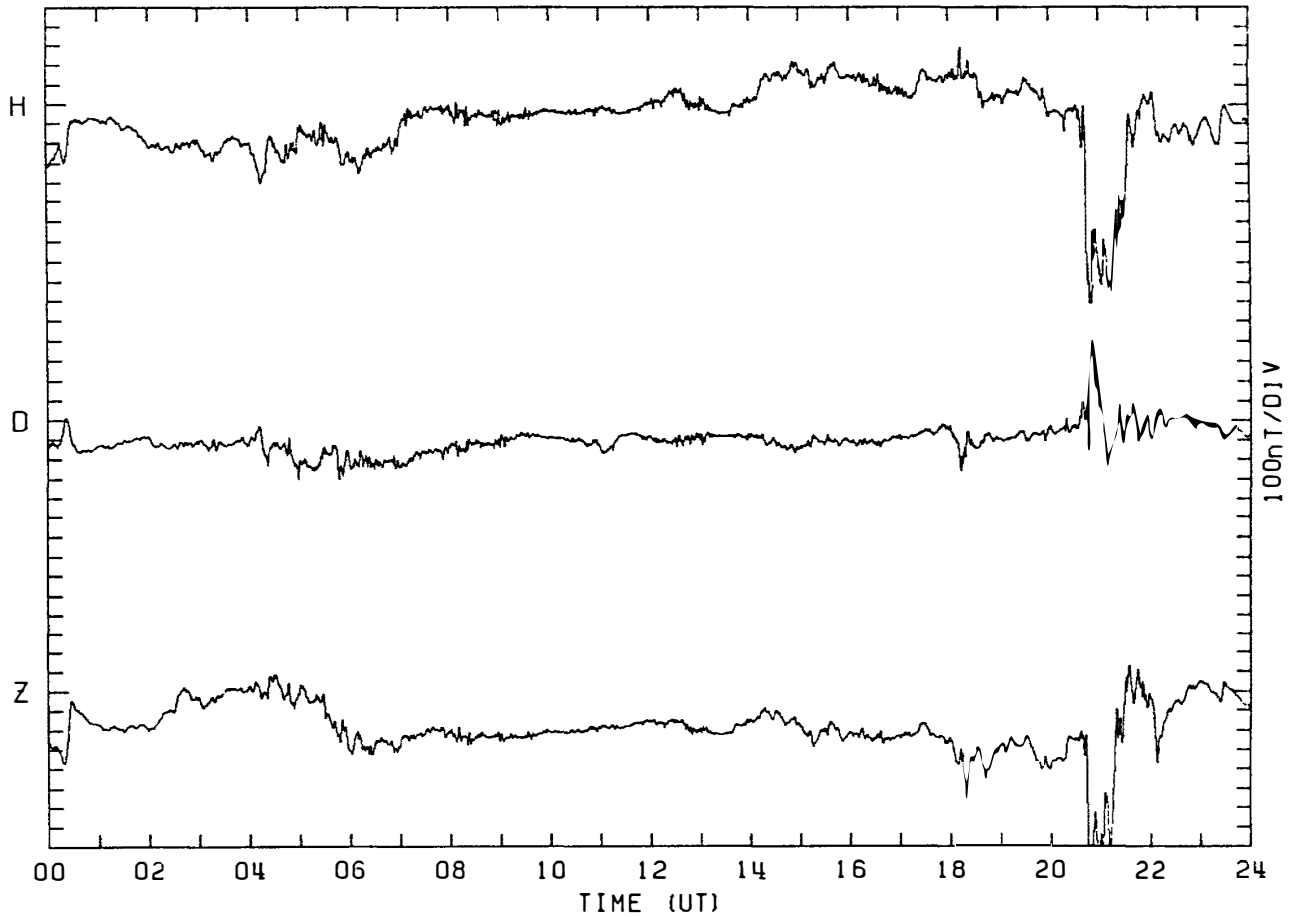
MAGNETOGRAM SYOWA STATION

DAY:347 DECEMBER 13, 1983



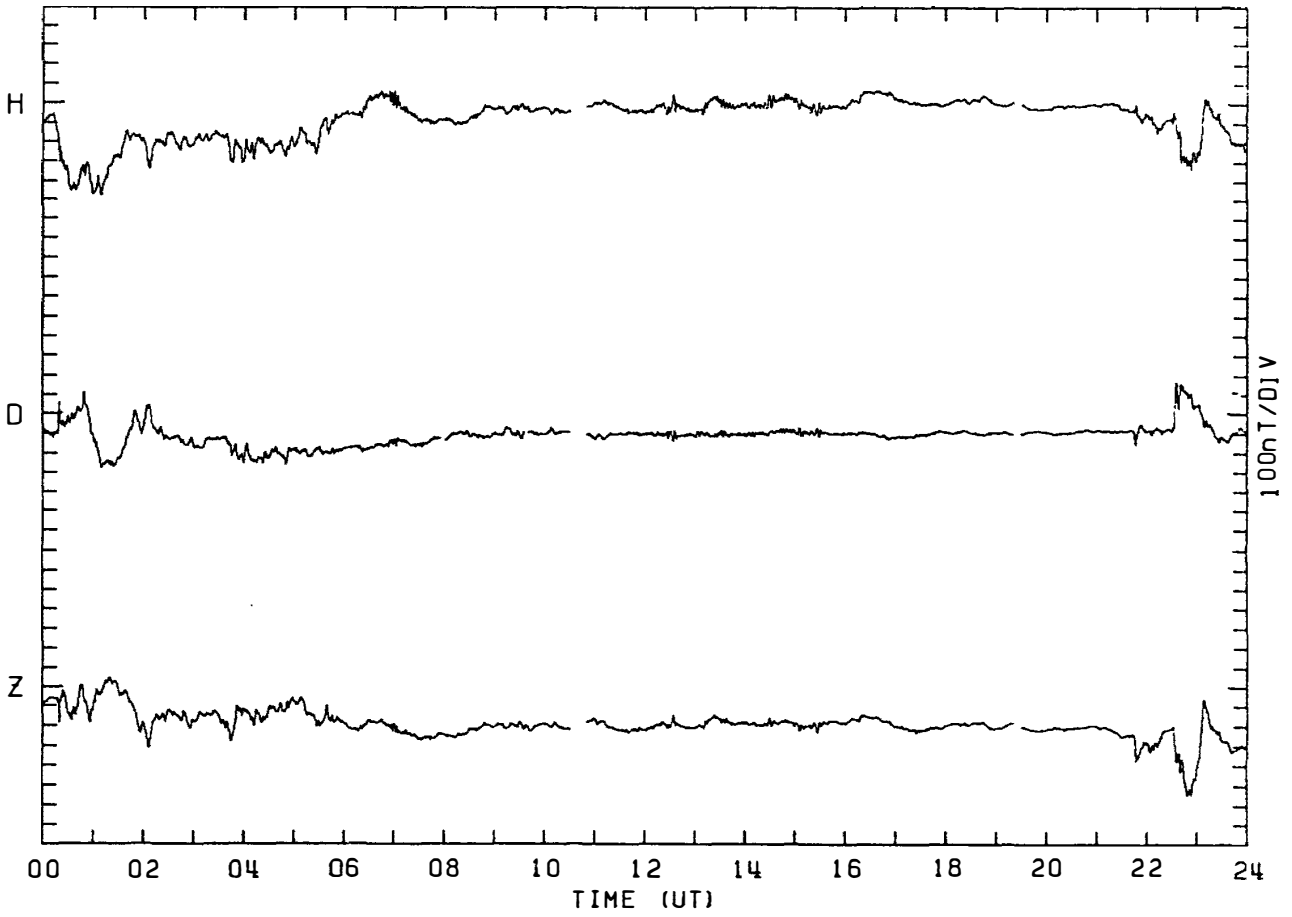
MAGNETOGRAM SYOWA STATION

DAY:348 DECEMBER 14, 1983



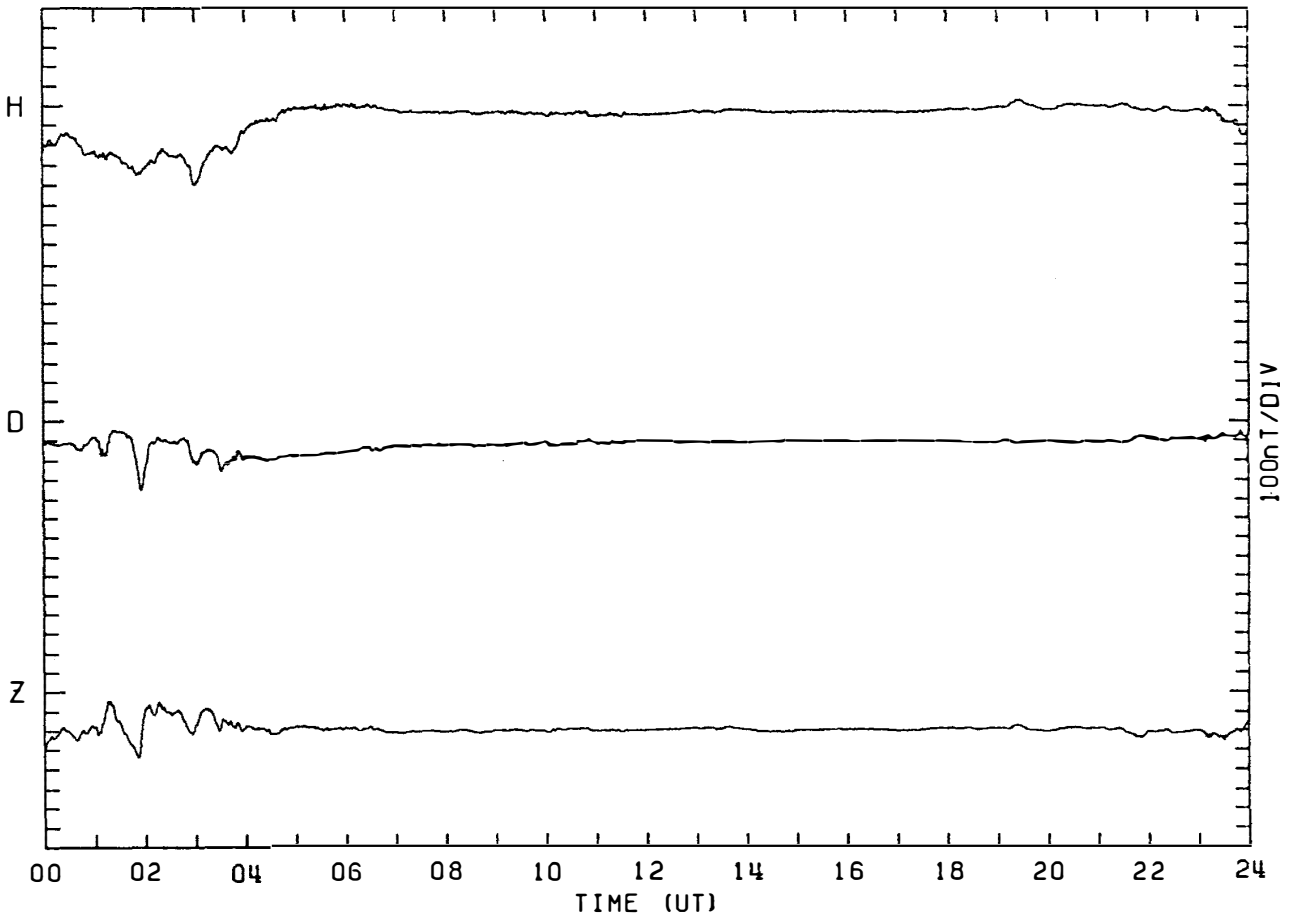
MAGNETOGRAM SYOWA STATION

DAY: 349 DECEMBER 15. 1983



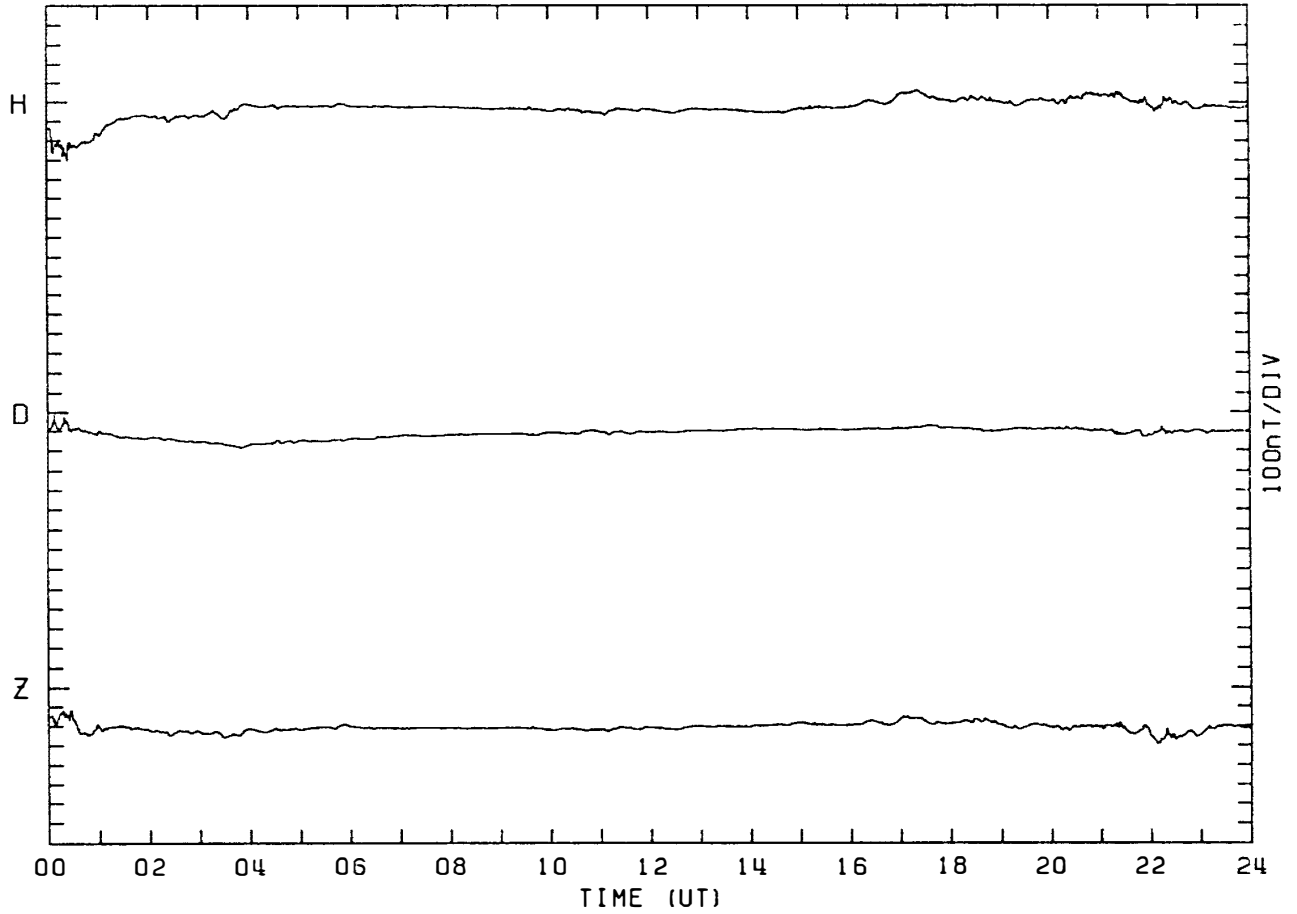
MAGNETOGRAM SYOWA STATION

DAY: 350 DECEMBER 16. 1983



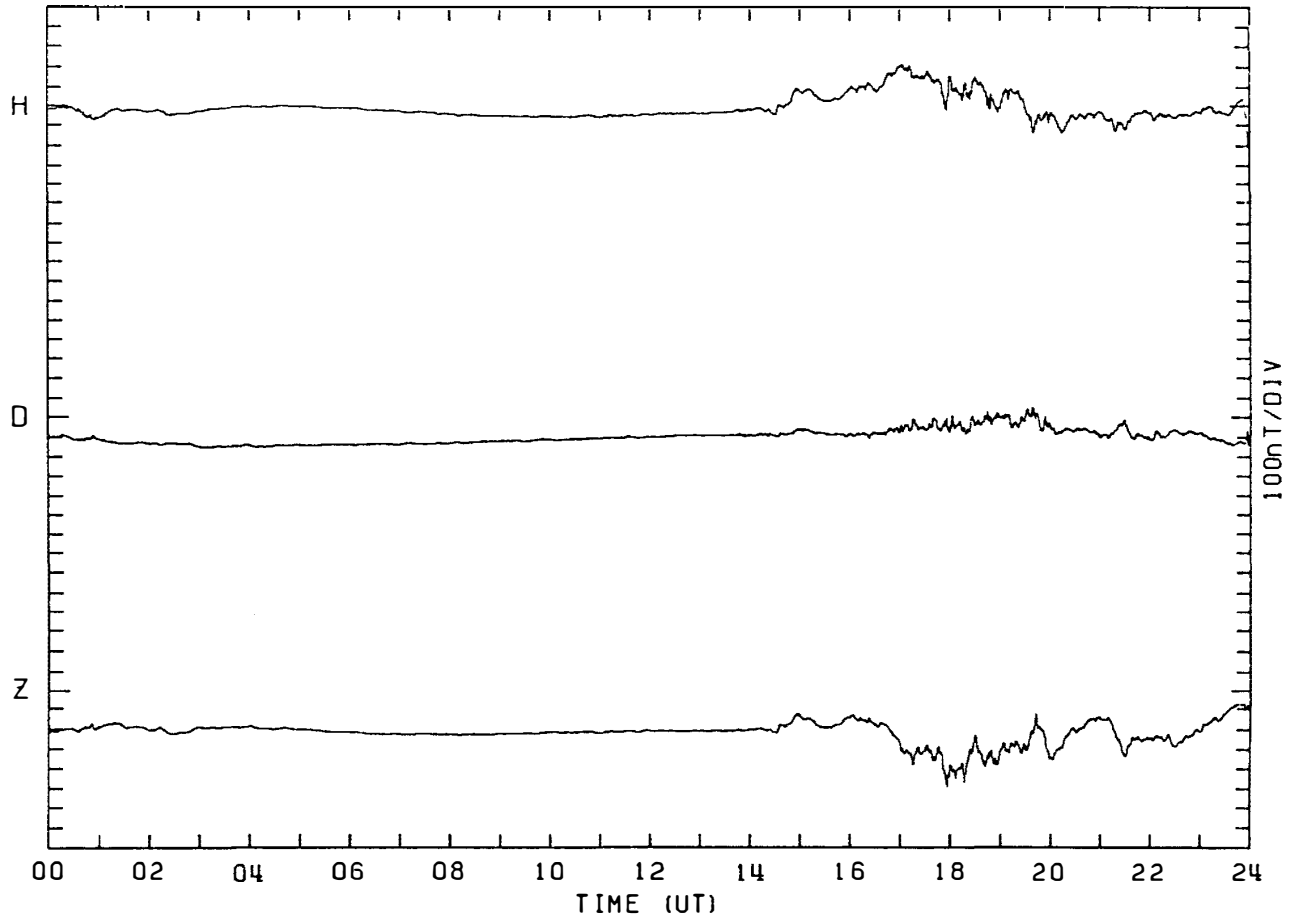
MAGNETOGRAM SYOWA STATION

DAY:351 DECEMBER 17. 1983



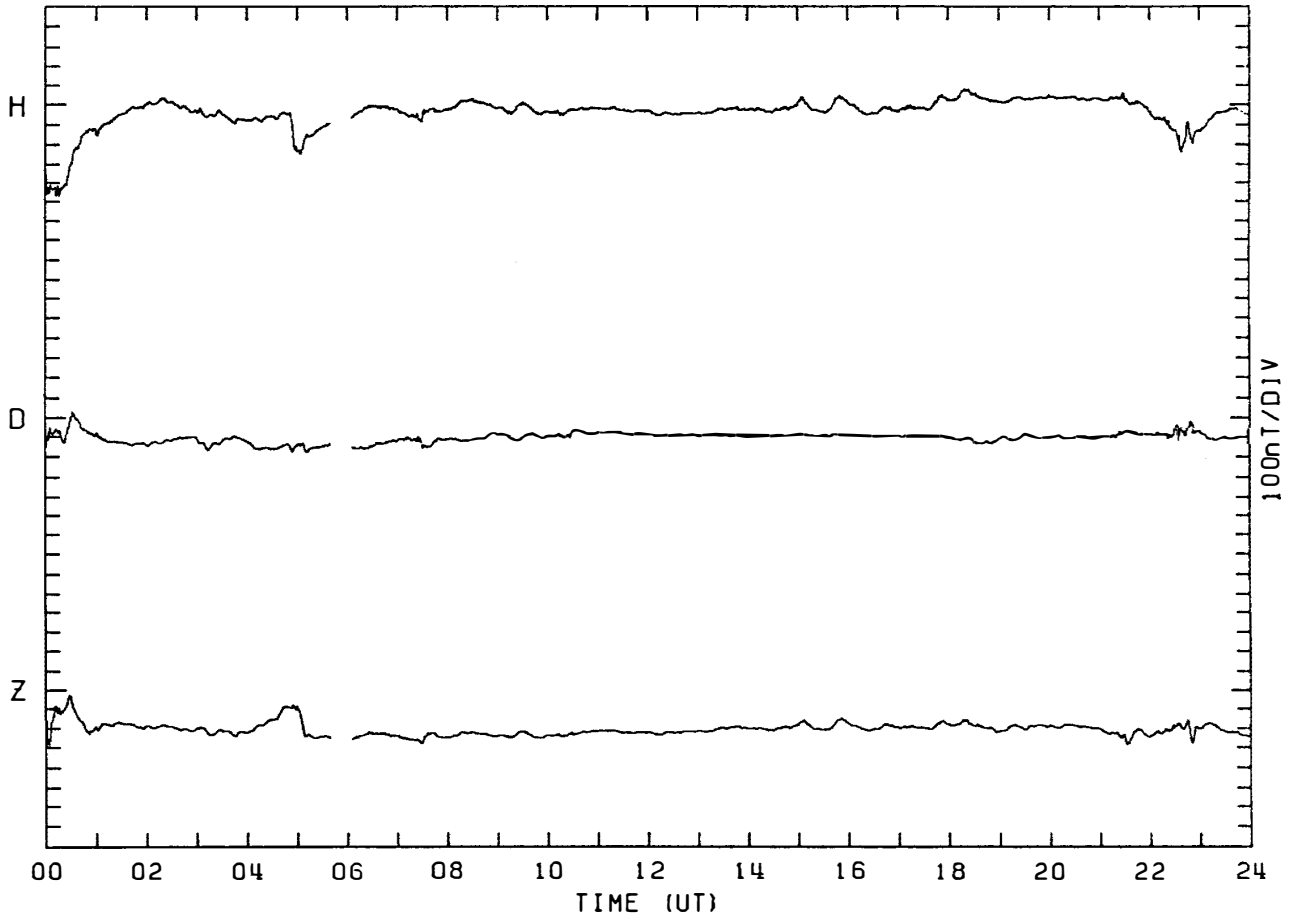
MAGNETOGRAM SYOWA STATION

DAY:352 DECEMBER 18. 1983



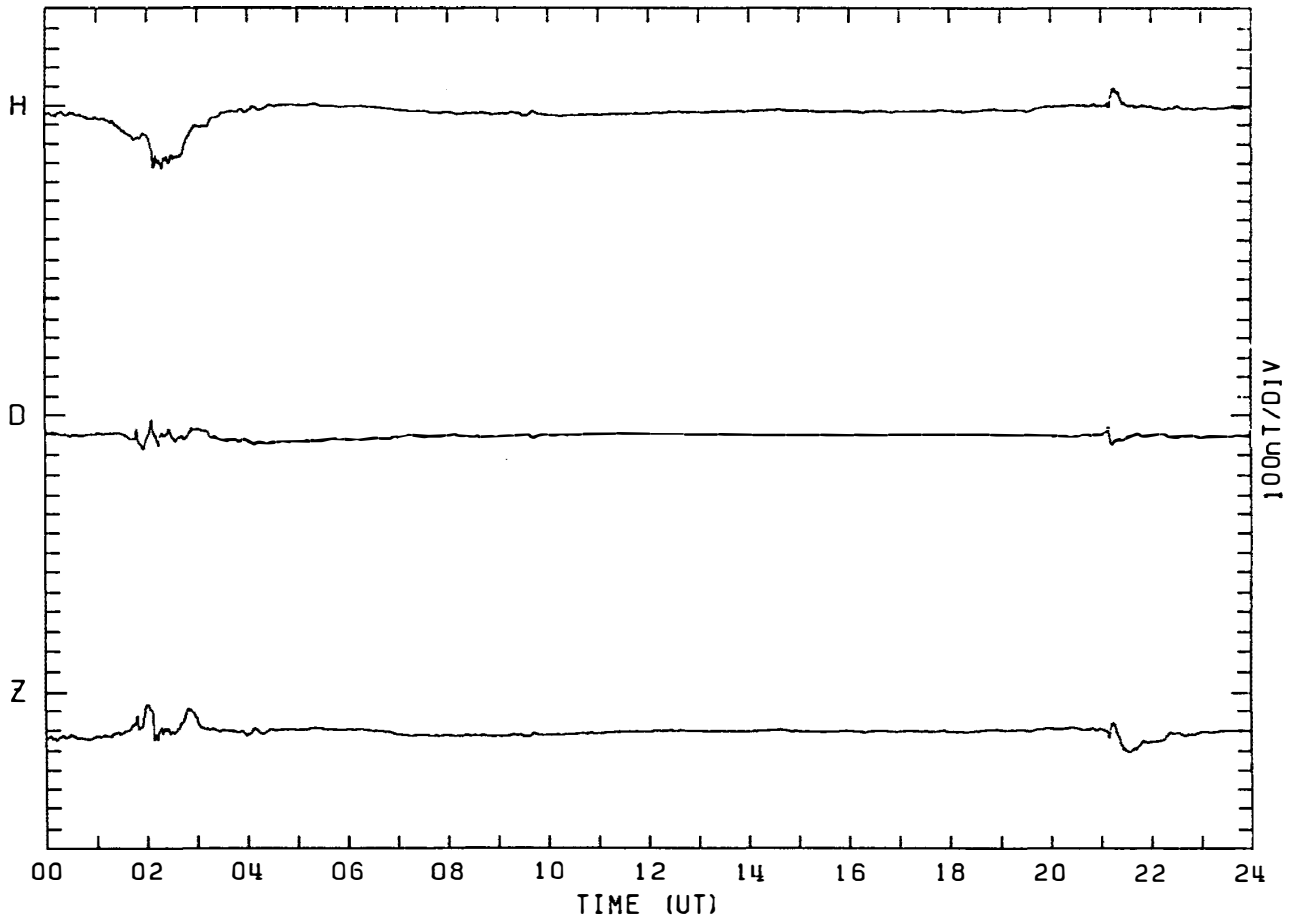
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DAY: 353 DECEMBER 19, 1983



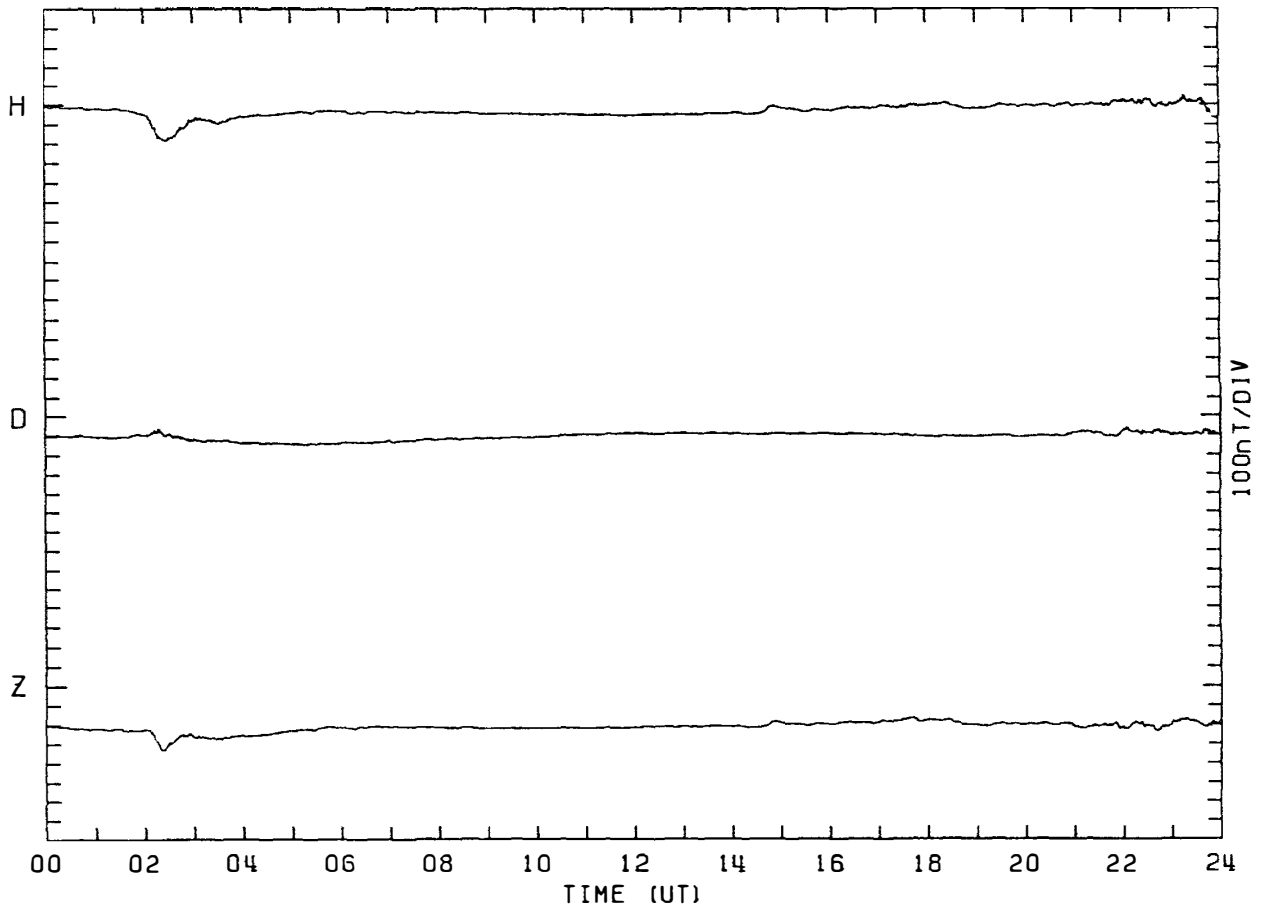
MAGNETOGRAM SYOWA STATION

DAY: 354 DECEMBER 20, 1983



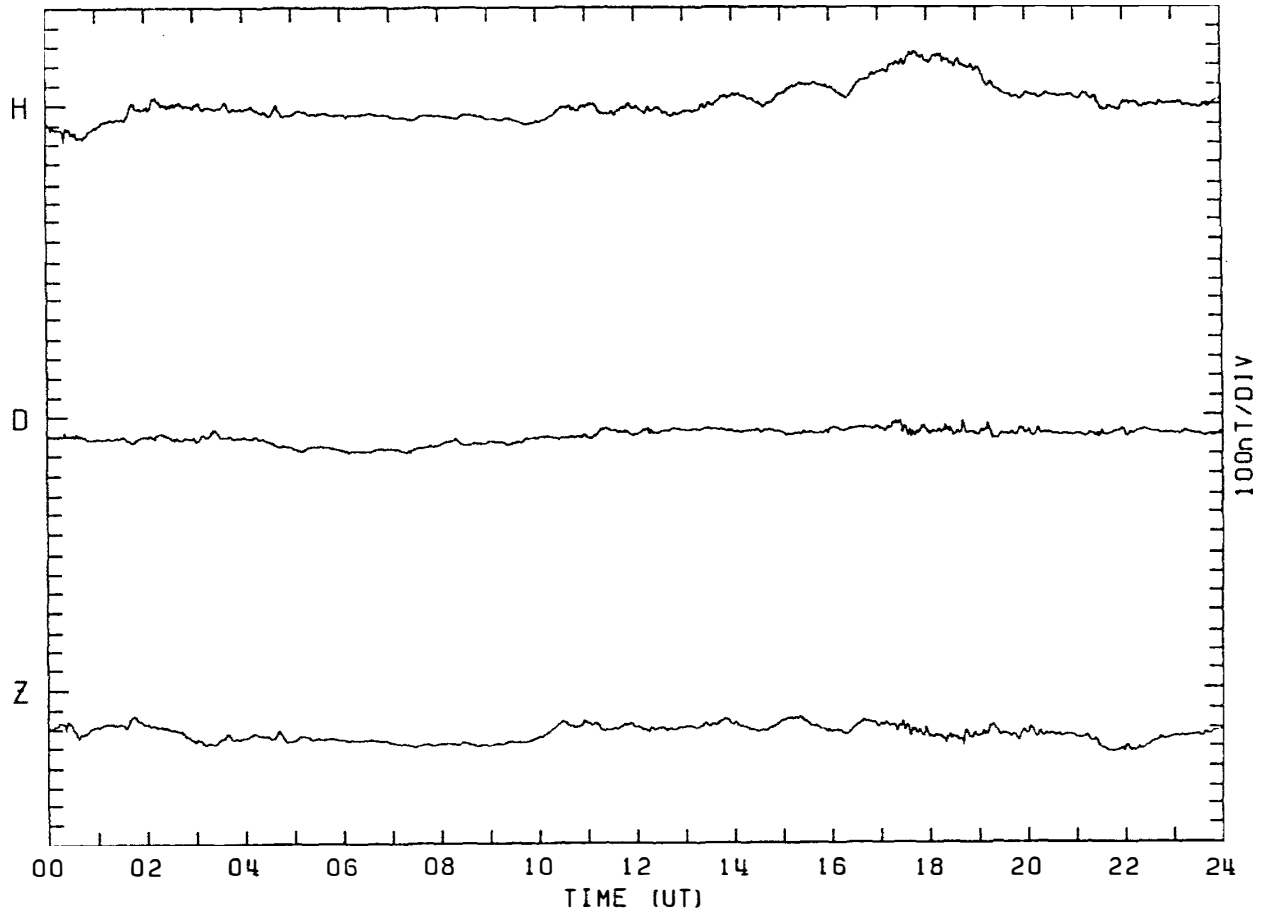
MAGNETOGRAM SYOWA STATION

DAY:355 DECEMBER 21, 1983



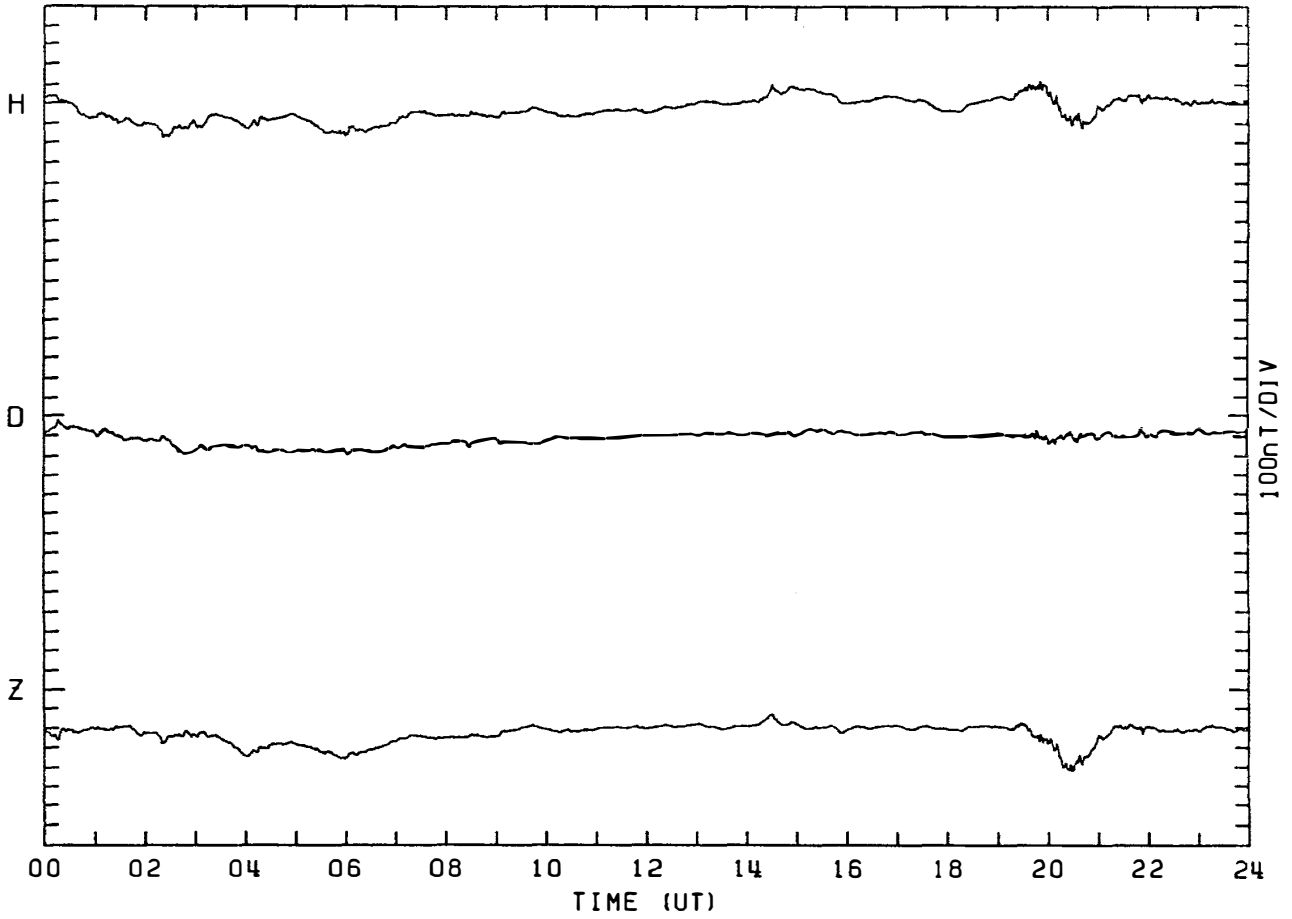
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DAY:356 DECEMBER 22, 1983



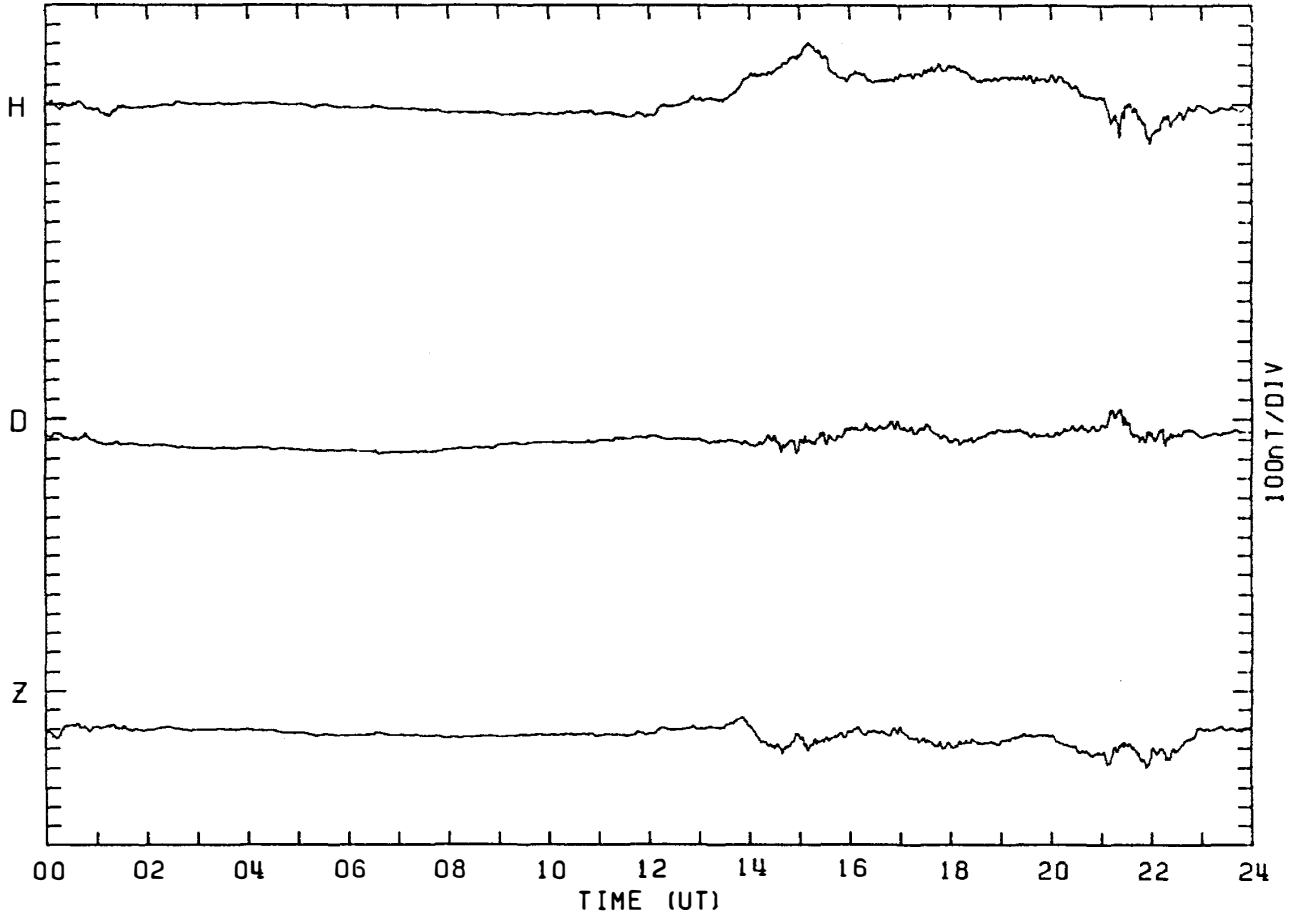
MAGNETOGRAM SYOWA STATION

DAY:357 DECEMBER 23, 1983



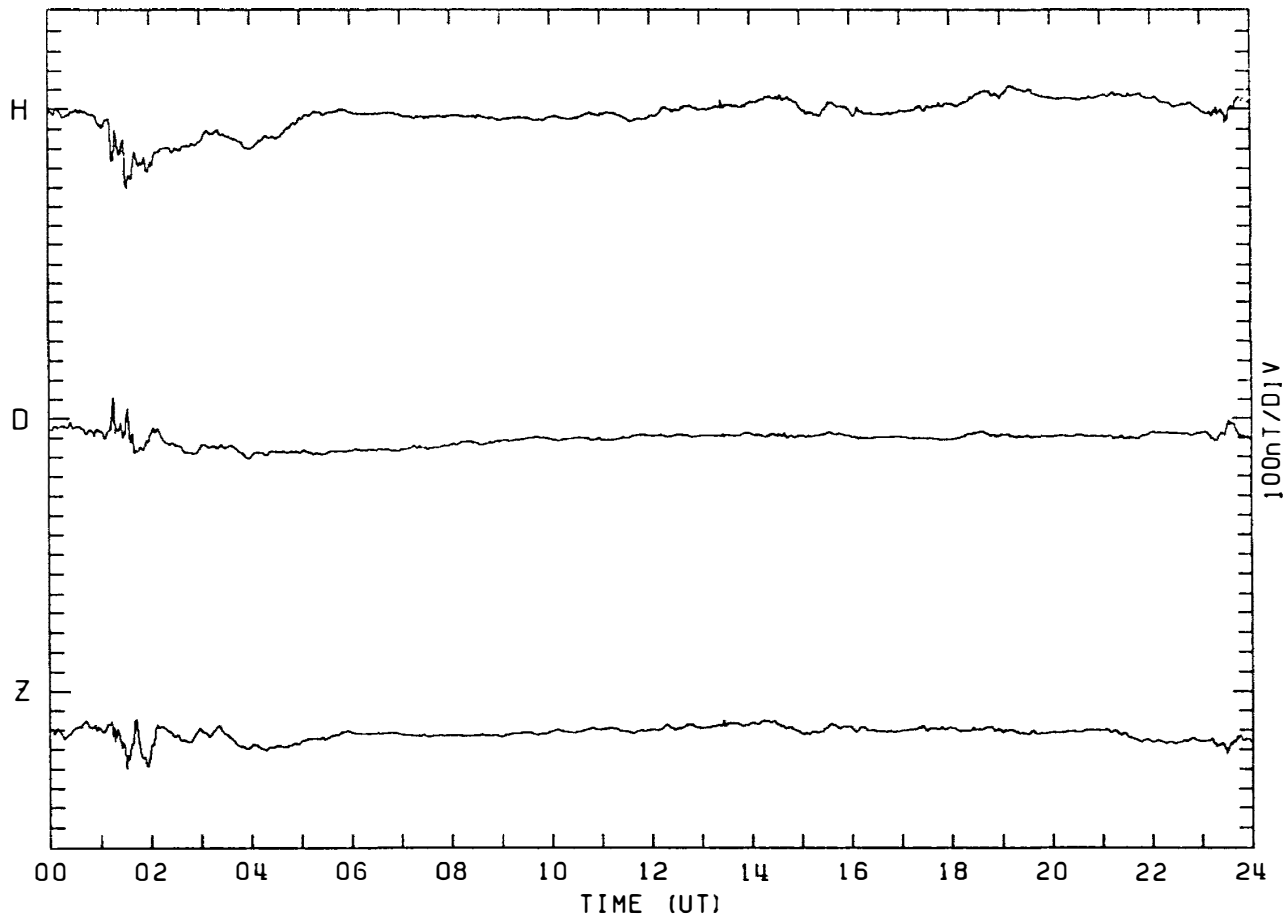
MAGNETOGRAM SYOWA STATION

DAY:358 DECEMBER 24, 1983



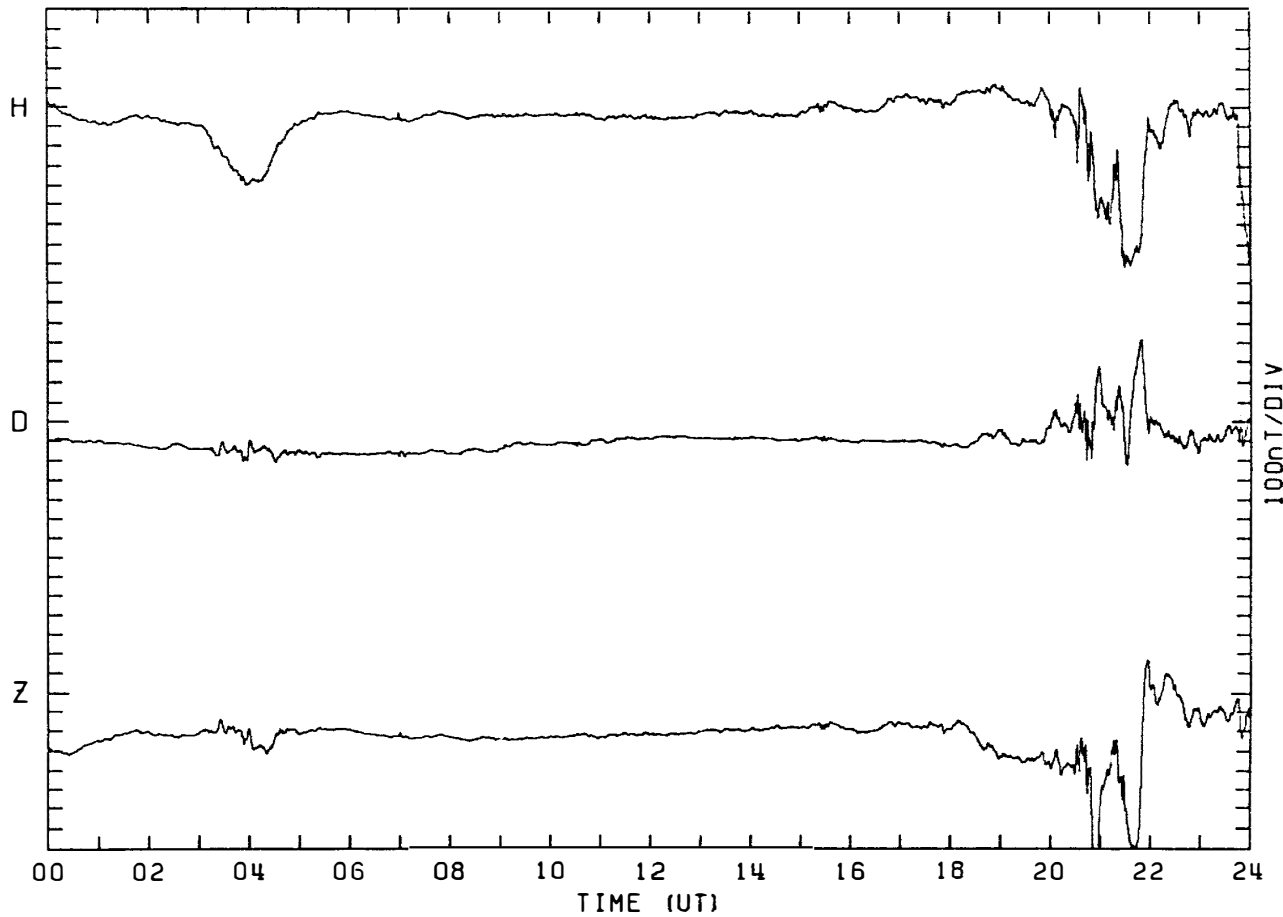
MAGNETOGRAM SYOWA STATION

DAY:359 DECEMBER 25, 1983



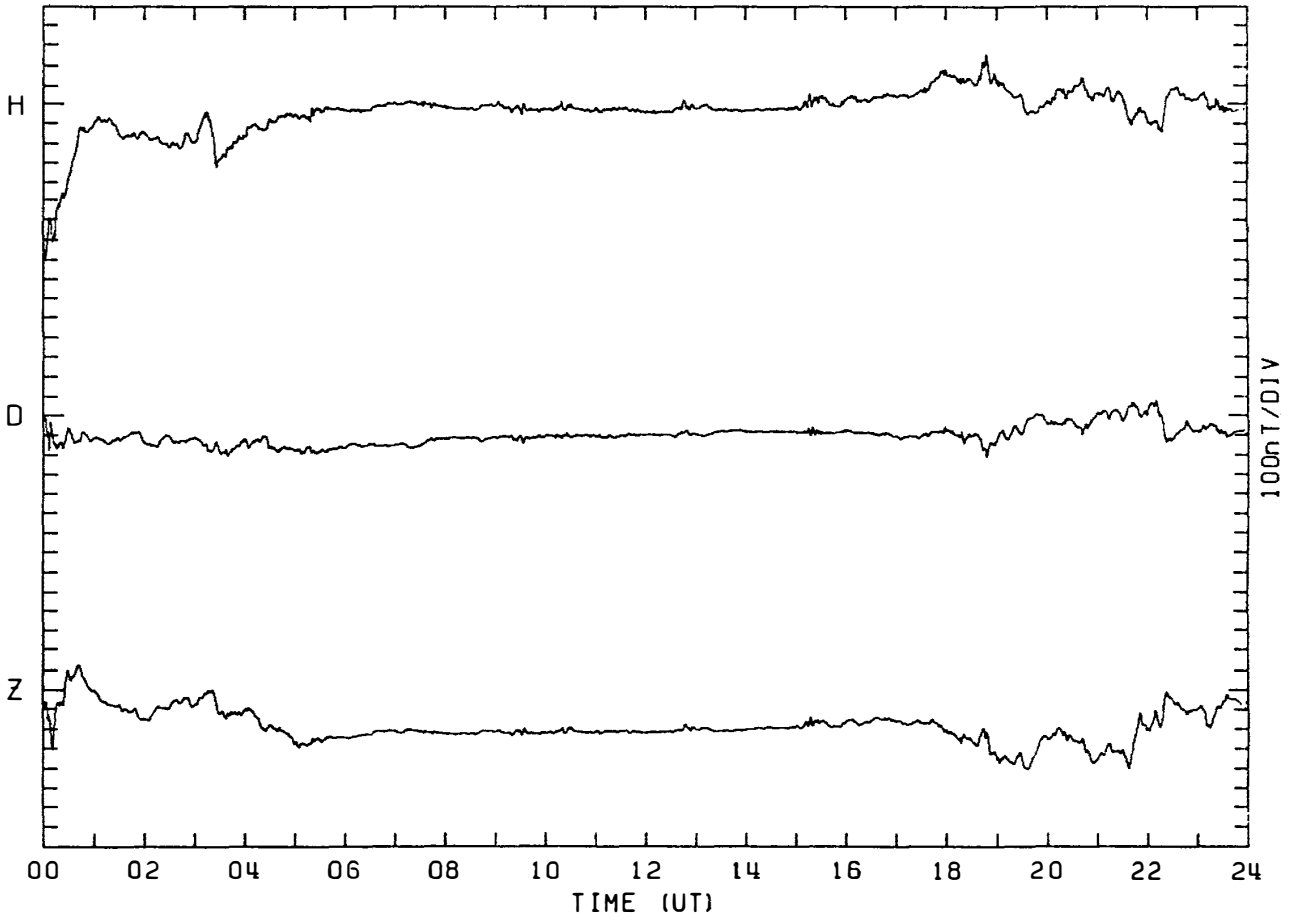
MAGNETOGRAM SYOWA STATION

DAY:360 DECEMBER 26, 1983



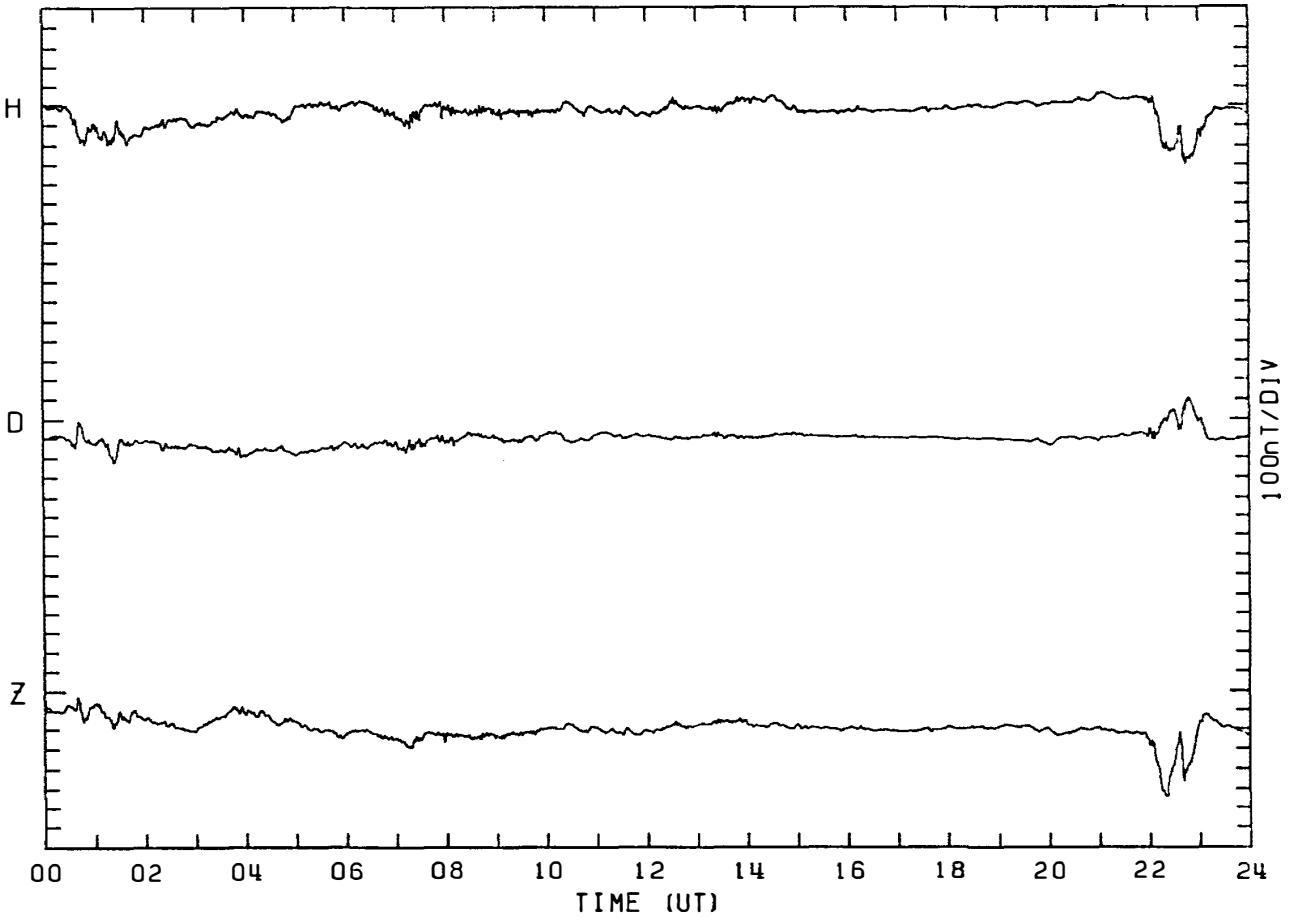
MAGNETOGRAM SYOWA STATION

DAY:361 DECEMBER 27. 1983



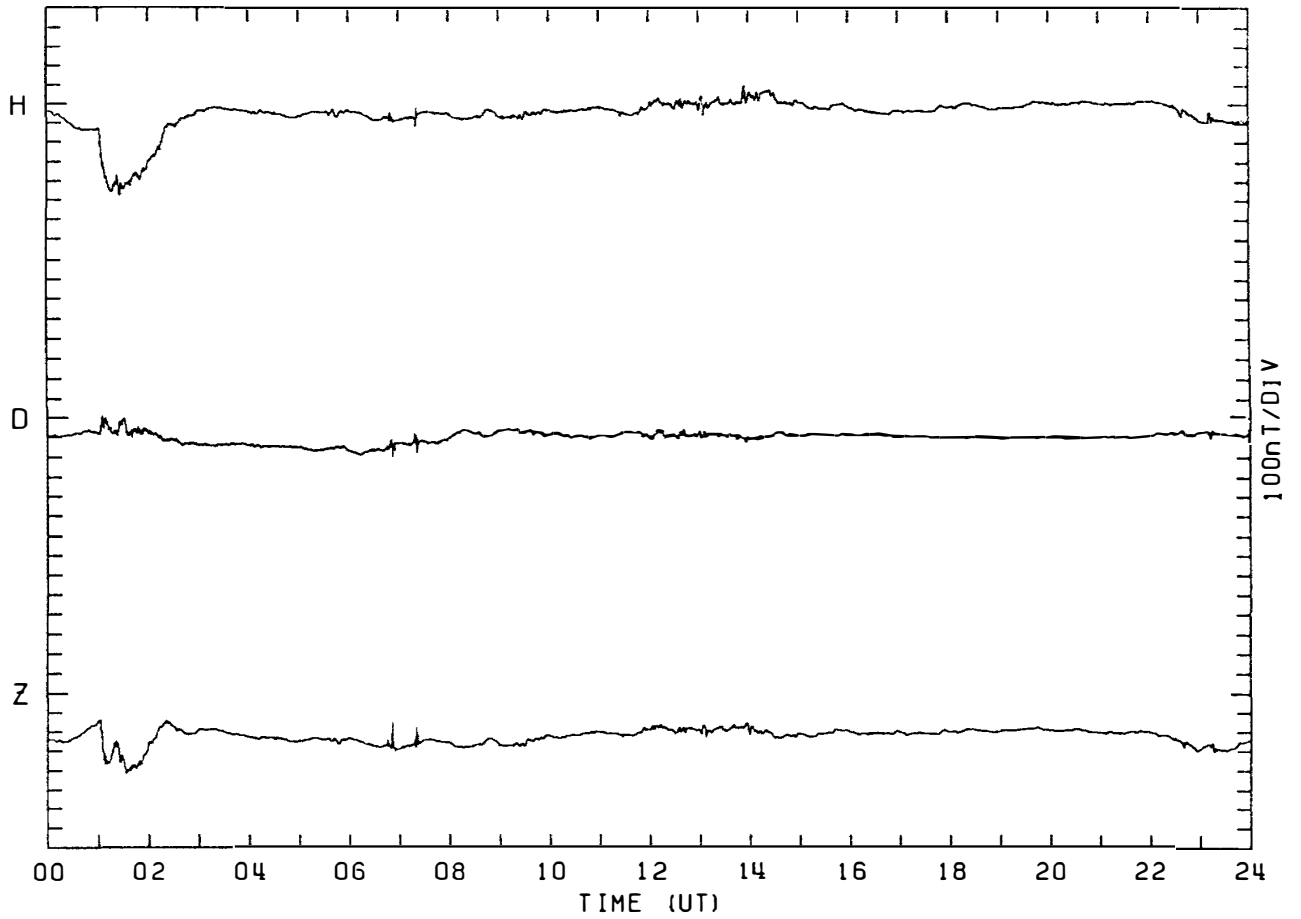
MAGNETOGRAM SYOWA STATION

DAY:362 DECEMBER 28. 1983



MAGNETOGRAM SYOWA STATION

DAY:363 DECEMBER 29, 1983



MAGNETOGRAM SYOWA STATION

DAY:364 DECEMBER 30, 1983

