UPPER ATMOSPHERE PHYSICS DATA OBTAINED AT SYOWA STATION IN 2004

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1. Introduction

This data book summarizes upper atmosphere physics data acquired by the 45th Japanese Antarctic Research Expedition (JARE-45) with the "Upper Atmosphere Physics Monitoring (UAPM) System" at Syowa Station in 2004. Observation items are as follows:

1) Geomagnetism :
- H-, D- and Z-components of magnetic variations
- H-, D- and Z-components of magnetic pulsations
- Absolute observation of geomagnetic field (once per month)

2) ELF-VLF wave :
- Intensities at 0.35, 0.75, 1.2, 2, 4, 8, 30, 60 and 95 kHz
- Wide-band (0–10 kHz) signal of ELF-VLF emissions

3) Ionosphere :
- Cosmic noise absorption at 30 MHz observed with a broad-beam riometer

4) Aurora :
- All-sky imagers :

  CCD type : Monochromatic images recorded in a digital format at the following three wavelengths: 557.7 nm (OI), 630.0 nm (OI), 427.8 nm (N_2^+1NG)

  Video type : Panchromatic video signal recorded by analog tapes
- Scanning photometers :

  Meridian-scanning record at the following seven wavelengths
  427.8 nm (N_2^+1NG), 485.2 nm (Hß), 487.4 nm (BG of Hß),
  557.7 nm (OI), 630.0 nm (OI), 777.4 nm (OI), and 844.6 nm (OI)

An outline of the observation system is given in Section 2. Section 3 describes specifications of the observation instruments and the data acquisition systems. Observation periods are also listed in Section 3. Format of the compiled digital data is shown in Section 4. Magnetograms in the period of January 1–December 31, 2004 are given in the Appendix.

All-sky imager observation data, magnetograms, summary plots and digital data of the monitoring data are available to users on the following Web site, or on request. The request should be addressed to:

Space and Upper Atmospheric Science Group
via World Data Center for Aurora
National Institute of Polar Research
9-10, Kaga 1-chome, Itabashi-ku,
Tokyo 173-8515, Japan.
E-mail: aurora@nipr.ac.jp
http://polaris.nipr.ac.jp/~aurora/

2. Upper Atmosphere Physics Monitoring (UAPM) System

A real-time digital data acquisition system for the upper atmosphere physics observation was constructed at Syowa Station in January 1981 (Sato *et al.*, 1984). Data obtained from the system have been collected and published annually in the JARE Data Reports (Upper Atmosphere Physics) (Sato *et al.*, 1984, 1991; Fujii *et al.*, 1985, 1994; Sakurai *et al.*, 1985; Ono *et al.*, 1986, 1993; Yamagishi *et al.*, 1987; Kikuchi *et al.*, 1988; Miyaoka *et al.*, 1990; Kadokura *et al.*, 1992, 2006; Yamazaki *et al.*, 1995; Tonegawa *et al.*, 1996; Obara *et al.*, 1996; Arisawa *et al.*, 1997; Kawana *et al.*, 1998; Takeuchi *et al.*, 1999; Okano *et al.*, 2000; Maegawa *et al.*, 2000; Kato *et al.*, 2001; Taguchi *et al.*, 2003; Yamada *et al.*, 2006). This report is the 24th of this series.

A block diagram of the system, including other ground observations, is shown in Fig. 1. The sensors for measuring weak natural electromagnetic waves such as ELF-VLF emissions, the three components of ULF magnetic pulsations and cosmic radio noise absorption (CNA) have been placed at a remote station on West Ongul Island, located about 5 km from Syowa Station in order to avoid man-made electromagnetic interference. Data of the magnetic pulsations and CNA are transmitted continuously to Syowa Station by a PCM telemeter in VHF band. Wide-band signals of ELF-VLF emissions are transmitted to Syowa Station through an FM telemeter in UHF band.

At the remote station, the electric power which drives all the instruments has been supplied by a solar battery system with maximum output power of 530 W since February 1985. An additional solar battery system with maximum power of 365 W was installed in January 1987 to reinforce the original battery system. The solar battery system consists of eighteen rechargeable car batteries (200 Ah each), five solar panels and three controllers in total. During winter when no sunlight is available, these batteries are charged manually about once a month by using a 10 kVA diesel-engine dynamo, which was installed in 1992 in place of the previous 16 kVA one.

The fluxgate magnetometer sensor is placed at Syowa Station on East Ongul Island, about 150 m distant from the Data Processing Building. All the auroral photometric instruments are placed on the roof of the building, and the data acquisition facilities are installed inside the building. All the outputs obtained from the observation instruments except the auroral photometric ones are transferred to the matrix terminal board and

then recorded with pen recorders, analog data recorders and a computer system. These data had been recorded simultaneously with two sets of the TEAC DR-200 digital data logger systems since January 1987 and with the Accurate Timing data Logging and Analysis support System (ATLAS) since February 1997. Recording by the TEAC systems was terminated in January 1999, and ATLAS was succeeded them since then. An 8 mm video tape recorder is used to record wide-band VLF emissions, and 24-hour data can be stored on one volume of 8 mm video tape.

Universal time (UT) is supplied from a precise time-keeping system. This system consists of a network time (NT) server equipped with the GPS satellite timing receiver. The NT server has the interface for the 10Base-T, IRIG-B, 1PPS and 10MPPS, supplies a time with an accuracy of less than 100 μs, and adjusts the time of client machines with an accuracy of less than 2 ms through the NT protocol (NTP). This NT server was introduced in January 2003, succeeding the former system using a quartz frequency standard with a stability of 2×10^{-11}/day, and time code generators.

3. Specifications of Instruments

3.1. Geomagnetism

(1) *Magnetogram*

Magnetic variations were measured by a three-axis fluxgate magnetometer. Full scale ranges were +1250 to −3750 nT for H-component and ±2500 nT for D- and Z-components, respectively, with the frequency response of DC–5 Hz and noise levels less than 0.1 nT. The magnetometer data were recorded in digital form at the sampling rate of 20 Hz, and also recorded on a chart recorder.

(2) *ULF magnetic pulsations*

The H-, D-, and Z-components of ULF magnetic pulsations are detected by three sets of search coil magnetometers. The search coil sensors have copper wires (0.4 mmϕ, 40000 turns each) wound around permalloy cores (1 cm in diameter × 100 cm in length). Measurable intensity range of the magnetometer is 0.001–5 nT/s and the frequency response is 0.001–5 Hz. The search coil magnetometers are installed at the remote station on West Ongul Island. The output signals transmitted by the PCM telemeter are recorded on a chart recorder and a digital data recorder. The sampling frequency of the digital data is 20 Hz for each component.

(3) *Absolute observation of geomagnetic field*

Absolute values of the magnetic field were observed, basically, once per month during a magnetically quiet day. At that time, total force observation was carried out using a portable proton magnetometer. Based on those observations, baseline values for the fluxgate magnetometer were calculated. Observed absolute values and baseline values are listed in Table 1 and Table 2, respectively.

(4) *K-index*

K-indices are calculated for every 3-hour interval measuring the amplitudes of the H- and D-component magnetic fields from the quiet-day variations. The definition of the K-indices at Syowa Station is as follows:

K-index		Deviation	K-index		Deviation
0	:	0 – 25 nT	5	:	350 – 600 nT
1	:	25 – 50	6	:	600 – 1000
2	:	50 – 100	7	:	1000 – 1650
3	:	100 – 200	8	:	1650 – 2500
4	:	200 – 350	9	:	2500 and more

The ordinary magnetogram is also available on chart papers with a recording speed of 5 cm/hr. The sensitivity of each component on the chart papers is about 100 nT/cm. Table 3 gives the K-indices at Syowa Station in February 2004–January 2005. Inquiries or requests for the data copies of the magnetic field measurements should be addressed to World Data Center for Aurora in NIPR.

3.2. ELF-VLF waves

The natural ELF-VLF wave receiving system at the remote station has consisted of a triangle-shaped three turn loop antenna (10 m in height, 20 m in the bottom side), a pre-amplifier and a main amplifier with gains of 60 and 40 dB, respectively. The ELF-VLF wave intensities at the frequency bands of 0.35, 0.75, 1.2, 2, 4, 8, 30, 60, 95 kHz were obtained from wide band waveforms using a 9-channel filter bank and detectors. The ELF-VLF emissions within the intensity range of 10^{-17} to 10^{-13} W/m^2 Hz were detectable with this system. These data were recorded continuously in digital form at the sampling rate of 20 Hz. Some of the wide-band ELF-VLF signals up to 10 kHz can be recorded on 8 mm video tape recorders. The wide-band recording is executed in the case of special requests. There were no requests for the wide-band recording in 2004.

3.3. Ionosphere

Cosmic noise absorption at 30 MHz was observed with a broad-beam riometer, which has been installed at the remote station on West Ongul Island since 1981. Its beam half-width is 60°. A receiver used is made by La Jolla Science, and bandwidth and time constant are 150 kHz and 0.25 s, respectively. The riometer data were recorded in digital form at the sampling rate of 20 Hz in the UAPM system.

3.4. Aurora

(1) *CCD all-sky imager*

All-sky observation of aurora is carried out with a CCD all-sky imager which was installed at Syowa Station by JARE-39 in 1998. Monochromatic auroral images at three wavelengths (557.7 nm (OI), 630.0 nm

(OI), and 427.8 (N_2^+)) are taken sequentially every twenty seconds with an exposure time of two seconds. Image data are saved in a DVD-RAM disk. Observations were carried out during 136 clear nights from February 20 until October 18 in 2004. An observation list for the all-sky imager is given in Table 4. This observation has been considered as an item of the UAPM observation since 2004, because the former panchromatic CCD all-sky imager had some troubles in 2003. Inquiries or requests for the all-sky data in past years should be addressed to World Data Center for Aurora in NIPR. Observation by the film-type all-sky camera, which had been operated until the end of the 1997 season, was terminated on April 8, 1998.

(2) *Aurora TV camera*

All-sky observation of aurora was also carried out with an all-sky TV camera, which was installed at Syowa Station by JARE-40 in 1999. The TV camera consists of an image intensifier and an interline CCD camera. Video signal from the CCD camera is recorded in S-VHS video tapes. Observations were carried out during 136 clear nights from February 20 until October 18 in 2004. Inquiries or requests for the all-sky data should be addressed to World Data Center for Aurora in NIPR.

(3) *Meridian-scanning photometer*

A meridian-scanning photometer (SPM) measures intensities of auroral emissions along a geomagnetic meridian at the seven wavelengths of 557.7 nm (OI), 630.0 nm (OI), 777.4 nm (OI), 844.6 nm (OI), 427.8 (N_2^+), 485.2 nm (Hβ), and 487.4 nm (Back-ground of Hβ). The photometers have a field-of-view of 3 degrees except for 6 degrees for the channels of Hβ and its background. A scan along a meridian is triggered every 20 s starting from the equatorward horizon to the poleward horizon, and requires approximately 18 s. Shutters of the photometers are closed during every first scan of hour to obtain dark correction signals. Each photometer has two outputs, of which signal gains differ exactly by ten times to expand its dynamic range. The output and scanning angle data are recorded with a PC at a sampling frequency of 10 Hz with a depth of 16 bits for each channel. The photometers are removable from a scanner for yearly calibration of sensitivity. We have two identical sets of photometers. While one is in operation at Syowa Station, the other is calibrated at NIPR. Observations were carried out during 125 clear nights from February 22 until October 12 in 2004.

4. Compiled Digital Data Format

Since the QNX PC ATLAS system had troubles in May, 2004, the data recording was carried out only by the Linux PC system since then. System clock is adjusted by the NTP server. Observed data are digitized by the 16bit straight binary A/D converter (from −10 V to 10 V), and recorded on a MO disk. Data in the MO are written in Common Data Format (CDF). As for the details of the CDF, please refer to the NASA Web page

(http://cdf.gsfc.nasa.gov/). Each record consists of one time stamp and 16 kinds of data. The names of the CDF variables in each record are as follows:

EPOCH:	Time stamp (unit: CDF Epoch)
MGFH:	H component of fluxgate magnetometer
MGFD:	D component of fluxgate magnetometer
MGFZ:	Z component of fluxgate magnetometer
CNA:	Output of the broad-beam riometer
ULFH:	H component of induction magnetometer
ULFD:	D component of induction magnetometer
ULFZ:	Z component of induction magnetometer
VLF350:	Intensity of natural VLF wave at 350 Hz
VLF750:	Intensity of natural VLF wave at 750 Hz
VLF1.2k:	Intensity of natural VLF wave at 1.2 kHz
VLF2.0k:	Intensity of natural VLF wave at 2.0 kHz
VLF4.0k:	Intensity of natural VLF wave at 4.0 kHz
VLF8.0k:	Intensity of natural VLF wave at 8.0 kHz
VLF30k:	Intensity of natural VLF wave at 30 kHz
VLF60k:	Intensity of natural VLF wave at 60 kHz
VLF95k:	Intensity of natural VLF wave at 95 kHz.

Each CDF variable has 5 attributes. The names of attributes (CDF standard attribute name) and characteristics are as follows:

Attribute name	Contents
VALIDMIN:	Minimum valid value of raw AD data (usually, –32768).
VALIDMAX:	Maximum valid value of raw AD data (usually, 32767)
SCALEMIN:	Minimum value in the UNIT for VALIDMIN (usually, –10.0)
SCALEMAX:	Maximum value in the UNIT for VALIDMAX (usually, 9.9997)
UNIT:	Unit of the scale (usually, "volt")

One can convert from A/D value to physical value with the following equation.

(Physical value) = SCALEMIN +
(SCALEMAX-SCALEMIN)/(VALIDMAX-VALIDMIN)*
((Variable data)-VALIDMIN)

Acknowledgments

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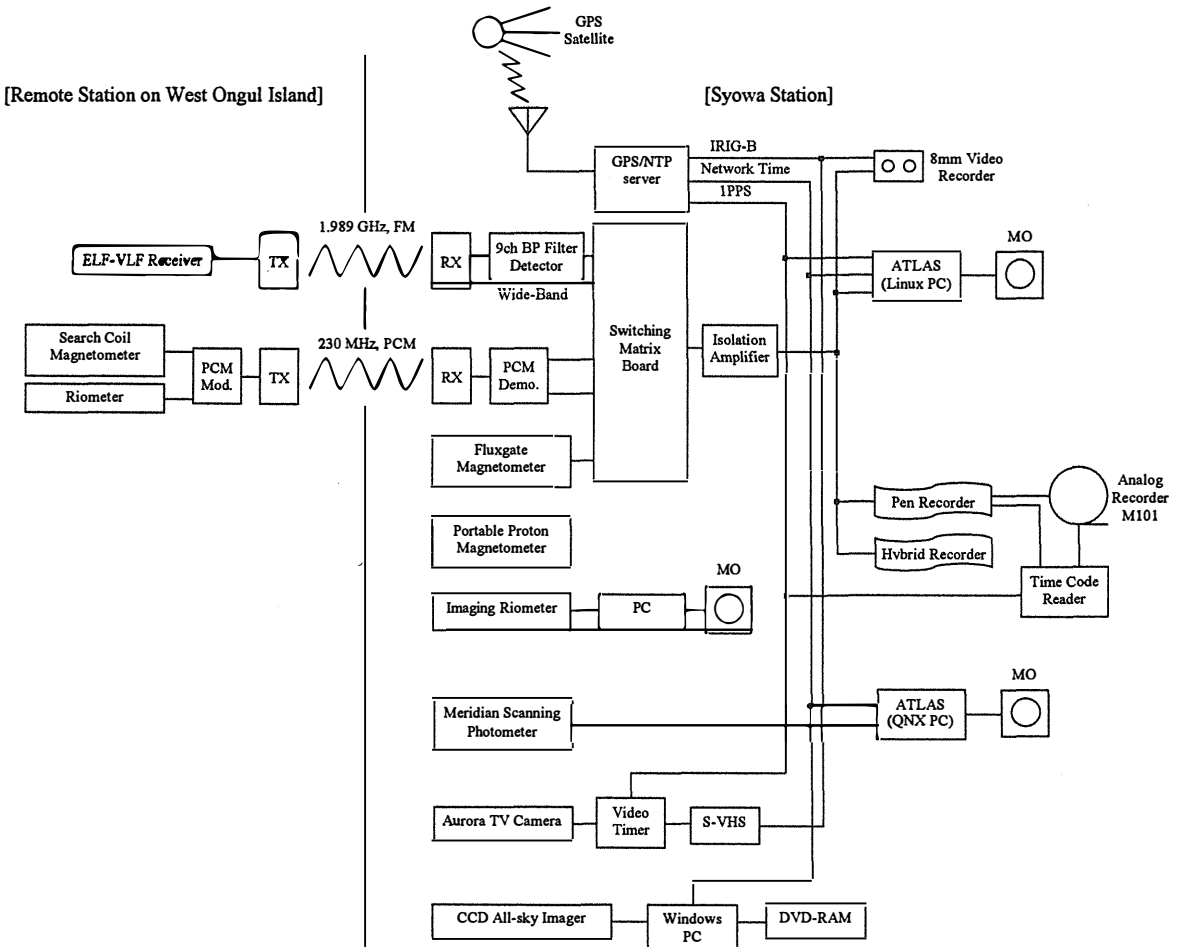


Fig. 1. Block diagram of the "Upper Atmosphere Physics" monitoring system at Syowa Station in 2004.

Table 1. Absolute values of geomagnetic field at Syowa Station in February 2004–January 2005.

DATE	TIME (hh:mm)	DECLINATION (deg:min)	DIP ANGLE (deg:min)	TOTAL (nT)	HORIZONTAL (nT)	VERTICAL (nT)
2004 02/17	11:27	-48:58.18	-63:40.37	43251.9	19182.3	-38766.0
2004 03/17	10:54	-49:03.09	-63:40.29	43243.8	19179.2	-38757.6
2004 04/18	12:00	-48:59.47	-63:39.64	43242.6	19185.7	-38752.5
2004 05/26	11:34	-48:45.74	-63:37.95	43237.5	19202.7	-38738.9
2004 06/26	11:26	-49:02.05	-63:37.55	43230.2	19204.3	-38730.6
2004 07/22	11:36	-49:01.94	-63:38.57	43216.8	19187.3	-38725.3
2004 09/03	11:34	-49:04.70	-63:38.58	43232.3	19193.5	-38738.0
2004 10/28	10:56	-49:05.09	-63:38.95	43199.2	19174.8	-38710.6
2004 11/19	12:07	-49:03.27	-63:39.30	43221.6	19180.5	-38732.2
2004 12/16	10:44	-49:04.62	-63:37.84	43217.3	19195.0	-38720.3
2005 01/26	13:33	-49:04.51	-63:38.01	43227.6	19197.9	-38730.9

Table 2. Baseline values of fluxgate magnetometer at Syowa Station in February 2004–January 2005.

DATE			TIME(UT)		H (nT)	D (nT)	Z (nT)
year	month	day	hour	min			
2004	02	17	11	27	18068.26	18664.267	-38786.85
2004	03	17	10	54	18069.88	18663.585	-38788.79
2004	04	18	12	00	18069.88	18664.040	-38790.53
2004	05	26	11	34	18065.42	18683.150	-38813.66
2004	06	26	11	26	18063.71	18667.367	-38807.66
2004	07	22	11	36	18073.21	18666.821	-38813.57
2004	09	03	11	34	18069.36	18667.356	-38813.12
2004	10	28	10	56	18062.43	18667.429	-38803.62
2004	11	19	12	07	18067.42	18666.896	-38799.54
2004	12	16	10	44	18060.50	18667.013	-38796.53
2005	01	26	13	33	18060.27	18667.090	-38793.73

Table 3. K-indices at Syowa Station in February 2004 –January 2005.

	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY
1	4532 3234	5333 3456	2111 1021	5532 2126	6543 3225	4333 3134	5421 0023	5311 1134	1191 1012	4211 2203	3433 2223	5433 4434
2	3243 3435	5533 3345	2111 0000	6311 0043	5433 2335	4412 1325	4423 1026	4222 1122	3332 3223	3122 2222	3121 1211	5423 3434
3	5553 3434	4423 3231	5532 3565	3322 1154	5522 1124	4111 2121	3410 0000	3200 0000	3222 3345	2212 2365	2111 1112	4533 3343
4	5232 3324	2222 1123	5312 2311	4532 1135	4422 3225	4322 1103	0011 1000	1011 0014	5522 2335	3421 1334	1121 1000	4433 4444
5	5523 2234	4422 1113	1111 2466	4633 3444	4411 1235	4511 1125	0111 1124	3112 1332	4311 0123	4311 0111	1232 2222	6533 4455
6	3553 3344	4311 1000	5563 3246	4323 2235	4532 3243	4431 1101	5210 0015	4233 2335	3211 0122	0111 1111	3543 4445	5542 2336
7	3322 2222	1111 1122	5432 1156	5533 2246	5212 1136	0110 0011	5443 2225	4453 3133	2211 1001	2322 2566	4332 3334	4665 4453
8	1122 1124	1122 1111	5542 2344	4522 2235	5423 2232	1000 0000	3311 0011	4432 1111	1111 2113	8877 4366	4432 3335	2222 2224
9	1121 2234	1322 3545	5643 1134	4411 2102	6443 3345	3211 0000	2232 2356	1211 0014	5210 1013	6655 5675	4822 3334	4343 4444
10	3222 1313	6764 3356	4532 1255	3311 1034	5421 1034	1321 0112	4311 2545	2111 0000	5522 1124	6776 5565	4322 4333	4443 3452
11	3113 4444	5543 3575	5332 2355	6511 1136	5322 1110	4302 3125	5323 3235	0000 0123	4531 2236	5544 1324	3221 4444	2233 3433
12	5553 4464	5643 3346	5342 1143	5722 0133	0111 0000	5431 1114	4322 2214	2100 0001	4522 1105	5544 3554	5443 4432	2211 3356
13	5543 3356	5352 3245	4321 1132	3432 1255	1000 0003	6543 1234	4321 1114	1001 0045	6563 4335	4322 2223	5532 2211	5523 5543
14	4433 3465	4333 3344	4411 0102	4421 1113	2123 3233	1332 1113	3332 0001	5563 4466	5442 3355	4422 2121	1233 2233	5422 3334
15	6554 2335	5522 2355	1211 1235	4332 1124	2352 3234	3111 0134	0100 0011	5522 3335	4412 2343	1121 1000	3331 2335	5432 4555
16	6222 1132	5311 2234	4553 2255	4321 1124	4332 2102	2011 1126	0011 2023	5532 3446	4311 1101	1223 3333	2531 3245	5533 4465
17	3211 0123	4422 0134	4422 1224	3301 1014	3332 2122	5442 2123	5301 0343	6542 3325	1101 0101	2222 1103	5543 3435	4533 3444
18	4321 1345	4562 2346	3331 2224	2211 1001	1222 3212	2332 0123	4542 1014	5522 2000	1011 1132	2111 1100	5533 2223	4442 2255
19	4421 1224	5321 1123	4421 2224	0111 2442	4111 1100	3311 1124	3001 0013	0011 1136	1111 2103	1311 4224	2111 0122	4332 3655
20	2311 1233	5431 2344	3311 0013	2134 2234	1011 1010	4431 1133	5332 3335	4132 3203	2432 3325	3533 3334	4322 2222	4542 4444
21	3--- ----	5422 2343	2422 1132	5331 2212	1112 1011	2210 0002	5633 2145	5532 1112	5532 1223	3323 4444	3223 3243	3343 3344
22	4422 2234	5432 1454	1111 1011	2333 1211	0010 0001	1002 3257	5443 2245	2222 3466	4311 1111	3432 1124	4653 3324	7665 5465
23	4412 2324	4421 1143	3433 4435	5422 1244	1000 0001	5676 4534	4321 1112	5531 2224	0111 1103	3311 1224	3222 2223	5544 4555
24	5332 2345	3201 1102	2233 1222	4243 3112	0011 1000	4463 3447	2111 1110	5512 0113	3212 1343	3322 3225	2121 2222	7332 2344
25	4331 2114	1111 1122	2443 2223	3221 2111	0000 0001	7874 4556	2221 1104	2111 2122	5533 2223	4542 4335	4541 1224	5654 4456
26	2311 1101	1211 2455	4311 0232	2110 0101	1001 0124	7623 2338	4101 4015	3111 1014	4111 1100	3332 2324	4422 2433	4432 3354
27	3522 1244	4422 3446	2100 0123	2111 0001	2100 0024	7677 5677	4120 1134	2111 1331	1011 1123	3332 3444	4331 1233	4432 3334
28	1442 2145	5743 3333	3021 0144	2011 1244	4522 1125	4543 3336	4322 1132	4421 1015	3211 1122	5452 3324	4432 3455	7453 3444
29	2323 3224	4522 2323	2211 0013	6633 3246	5563 3345	5432 1112	4411 0111	2111 0115	1112 2443	5433 3335	5443 3424	2323 3235
30		2333 4222	4531 1155	4323 3244	5332 2213	2312 1226	3334 3466	3111 0011	6533 3334	5442 3235	3543 4524	3433 3334
31		3321 1341		6533 3343		2211 3213	6663 3355		4312 3344		4212 1223	4323 2222

Table 4. Observation periods of the CCD all-sky imager at Syowa Station in 2004.

	Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct	
	start	end	start	end	start	end	start	end	start	end	start	end	start	end	start	end	start	end
1					16:31	02:30									16:00	02:50		
2			20:03	23:45	19:50	02:30	14:30	00:30							16:01	02:30	19:45	00:20
3			19:00	00:10	16:36	02:30							16:05	04:30	16:00	03:00	21:30	00:11
4			19:00	00:00									16:00	04:30	22:55	03:00		
5													15:02	21:00	16:16	02:15	19:48	23:32
6							14:30	03:40										
7							14:15	03:10			16:00	04:30			21:25	02:20	20:00	22:53
8					18:00	19:30	23:30	04:00			14:30	05:20			18:20	02:00		
9							20:05	04:22			14:30	05:30			16:30	01:00		
10							17:40	04:40			14:30	05:30	14:45	20:00	18:56	01:20	21:14	23:50
11			19:47	23:50			14:00	02:09			14:30	05:00					20:58	23:21
12			18:30	01:01	16:01	03:30	19:14	04:30			13:30	03:30	18:31	03:45	20:33	01:50	21:39	23:07
13			18:30	20:15	15:45	03:13	14:00	04:46							19:10	01:46	21:39	23:20
14			18:00	01:15	15:46	03:16	17:33	04:45	20:10	02:30			15:00	03:15	17:30	02:00	20:41	23:27
15			18:00	01:15	15:32	03:15	14:00	04:40	14:55	05:30			17:00	22:00	17:30	01:30	20:35	22:27
16			17:45	01:12	23:03	03:24	14:00	04:25	13:10	05:30	13:30	05:30	17:00	04:00	17:40	02:00		
17			17:45	01:27	15:30	02:05	13:45	04:00	13:00	05:40	22:40	01:00	17:00	03:45	18:00	02:00		
18			17:45	01:21	15:30	03:29			13:00	21:12	13:46	23:45					20:21	22:15
19			18:30	00:51			13:45	04:01			14:00	05:30						
20	21:15	22:15	17:31	01:46							13:45	05:20	16:30	22:15	21:27	01:05		
21	20:45	22:45	17:30	1:50	15:40	02:03	15:45	04:45			14:00	03:50			20:10	00:35		
22	20:30	23:00	18:32	01:45			13:45	04:50			16:11	22:36	17:00	02:55	19:52	23:37		
23	20:15	23:00	17:15	02:00	18:00	02:00	16:25	04:25					16:00	02:00	20:19	22:52		
24					16:00	03:50	18:21	05:00			19:56	05:20						
25			17:00	02:00	15:00	20:50	13:30	05:15	17:10	05:30	14:00	05:00						
26	22:55	00:10	17:00	02:00			13:30	05:20	18:35	03:01	14:00	05:00	16:00	03:20				
27	19:45	23:45			14:51	22:26	14:00	22:44	20:00	05:20	15:50	05:00	16:00	03:00				
28			20:32	21:50	15:30	03:48					14:00	03:06						
29			16:46	02:14	14:45	03:46												
30																		
31			18:03	02:21														

Appendix

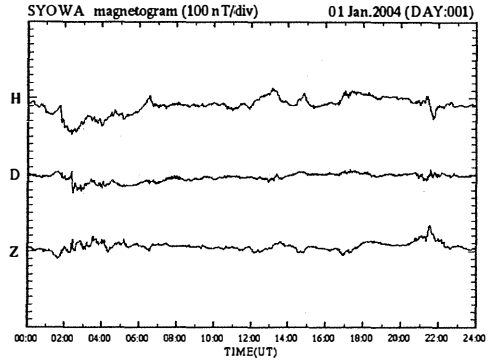
Magnetograms at Syowa Station in 2004

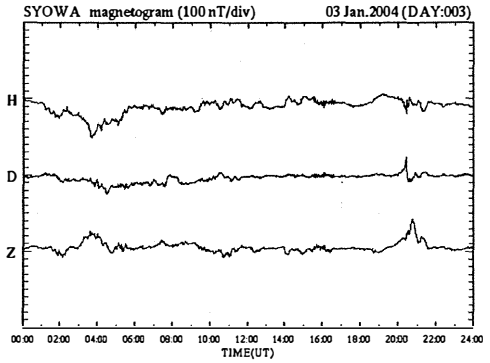
• Plotted data from top in each panel:

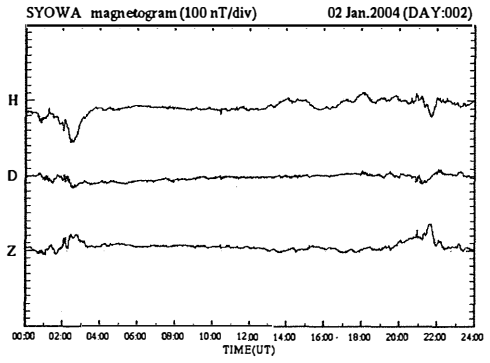
H : Local magnetic northward component of the magnetic variation
D : Local magnetic eastward component of the magnetic variation
Z : downward component of the magnetic variation

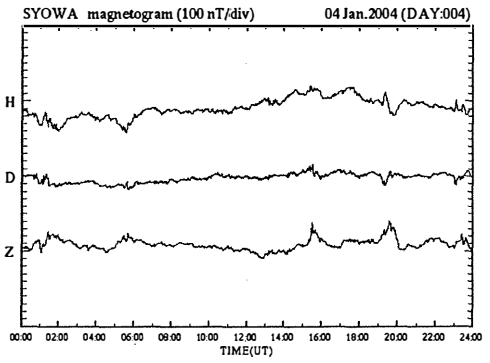
• Plotting vertical scale:

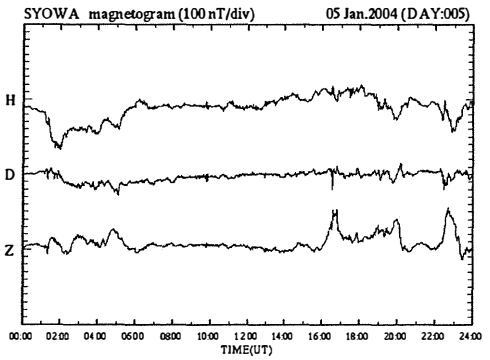
H, D, Z : 100 nT/div

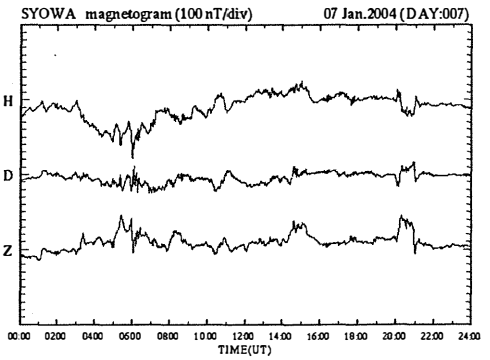

SYOWA magnetogram (100 nT/div)
01 Jan.2004 (DAY:001)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

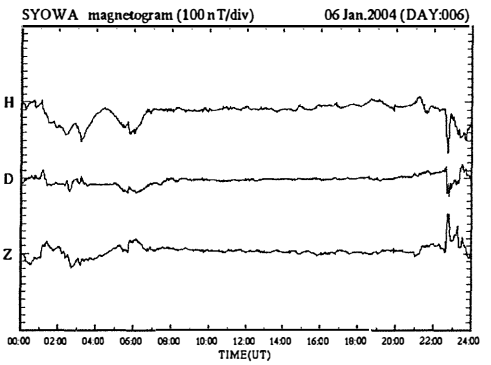

SYOWA magnetogram (100 nT/div)
03 Jan.2004 (DAY:003)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

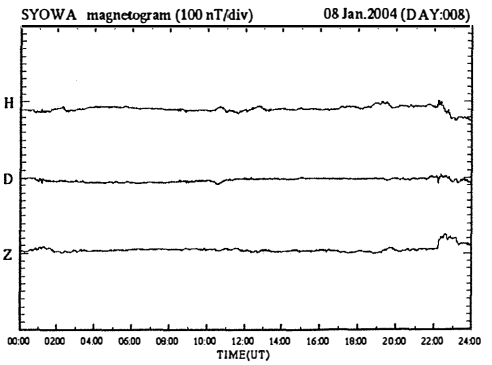

SYOWA magnetogram (100 nT/div)
02 Jan.2004 (DAY:002)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

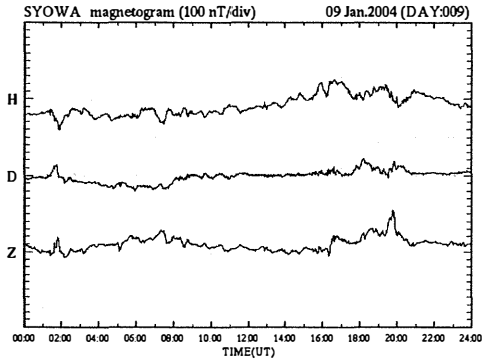

SYOWA magnetogram (100 nT/div)
04 Jan.2004 (DAY:004)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

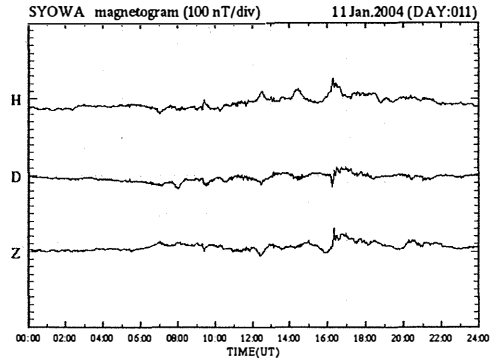

SYOWA magnetogram (100 nT/div)
05 Jan.2004 (DAY:005)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

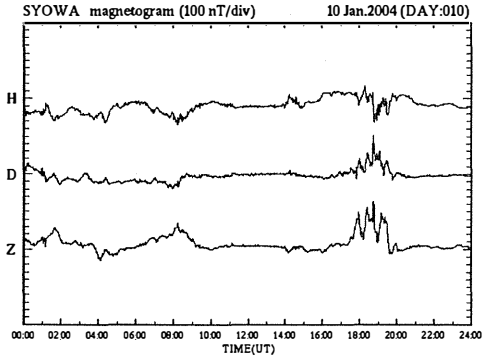

SYOWA magnetogram (100 nT/div)
07 Jan.2004 (DAY:007)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

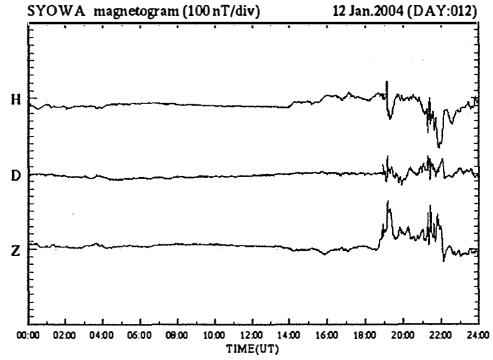

SYOWA magnetogram (100 nT/div)
06 Jan.2004 (DAY:006)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

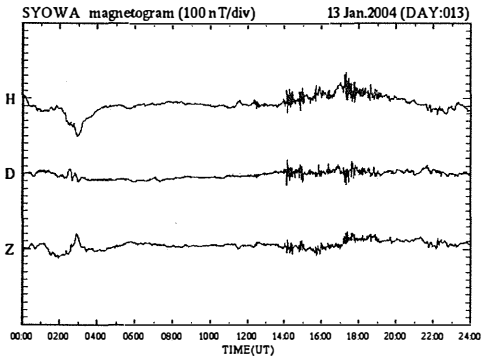

SYOWA magnetogram (100 nT/div)
08 Jan.2004 (DAY:008)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

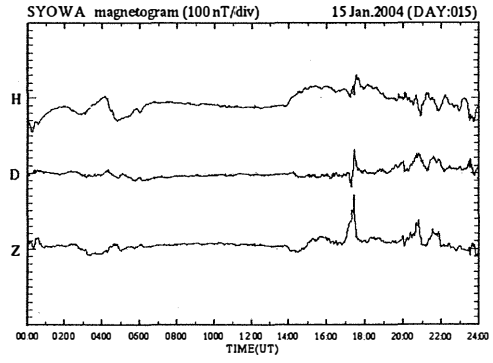

SYOWA magnetogram (100 nT/div)
09 Jan.2004 (DAY:009)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

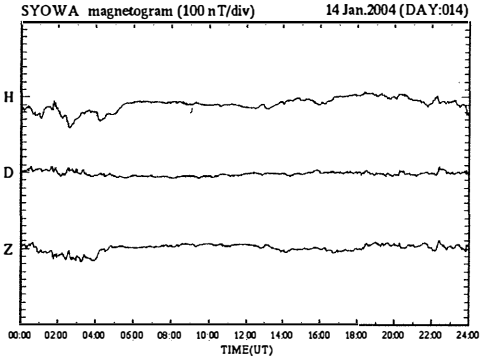

SYOWA magnetogram (100 nT/div)
11 Jan.2004 (DAY:011)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

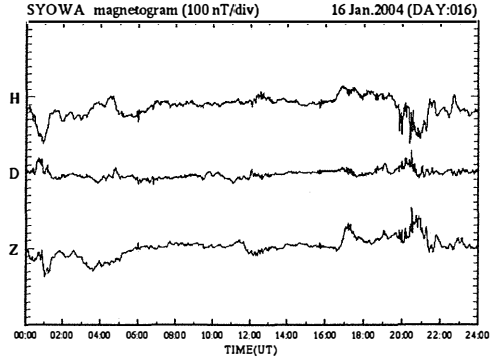

SYOWA magnetogram (100 nT/div)
10 Jan.2004 (DAY:010)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

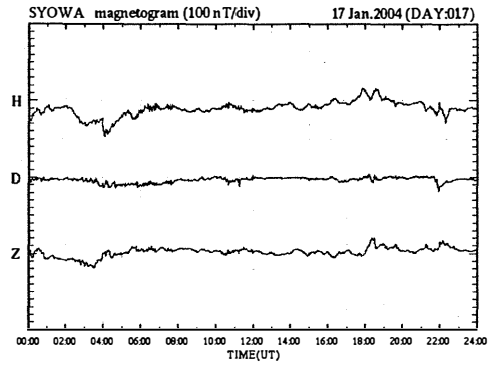

SYOWA magnetogram (100 nT/div)
12 Jan.2004 (DAY:012)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

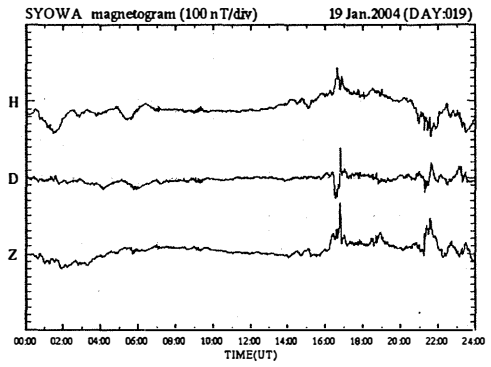

SYOWA magnetogram (100 nT/div)
13 Jan.2004 (DAY:013)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

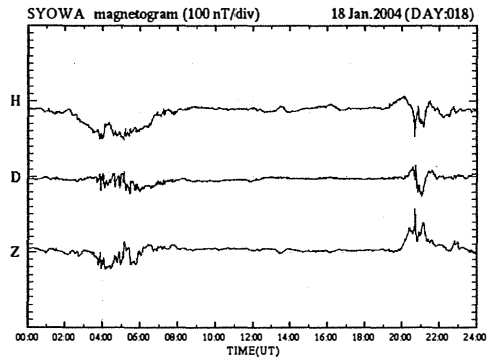

SYOWA magnetogram (100 nT/div)
15 Jan.2004 (DAY:015)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

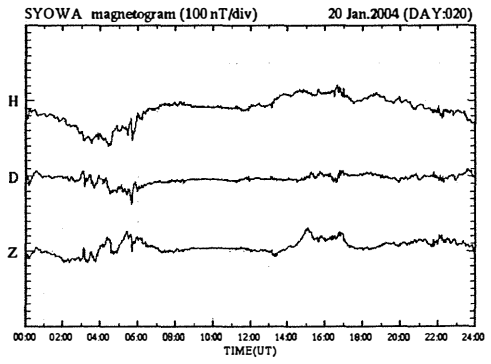

SYOWA magnetogram (100 nT/div)
14 Jan.2004 (DAY:014)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

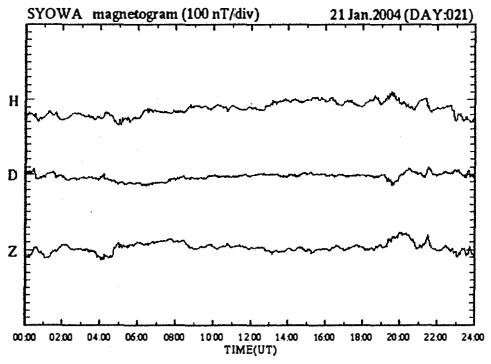

SYOWA magnetogram (100 nT/div)
16 Jan.2004 (DAY:016)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

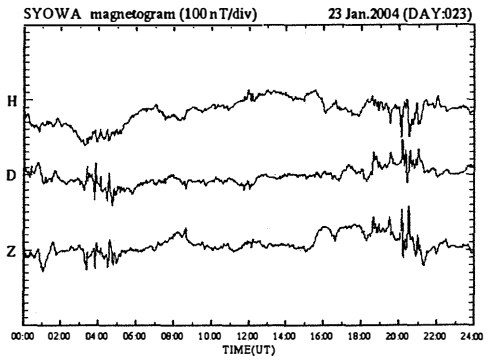

SYOWA magnetogram (100 nT/div)
17 Jan.2004 (DAY:017)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

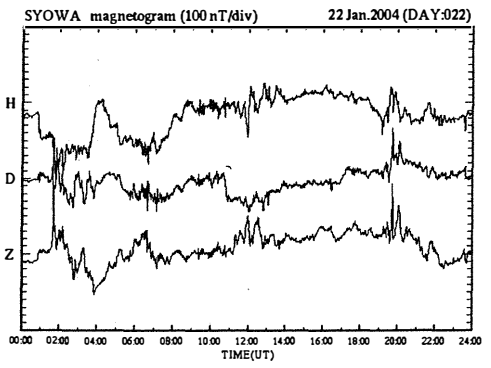

SYOWA magnetogram (100 nT/div)
19 Jan.2004 (DAY:019)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

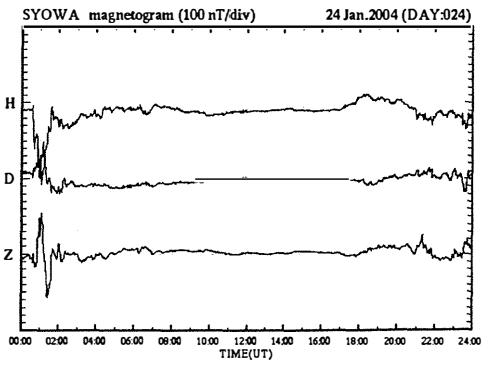

SYOWA magnetogram (100 nT/div)
18 Jan.2004 (DAY:018)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

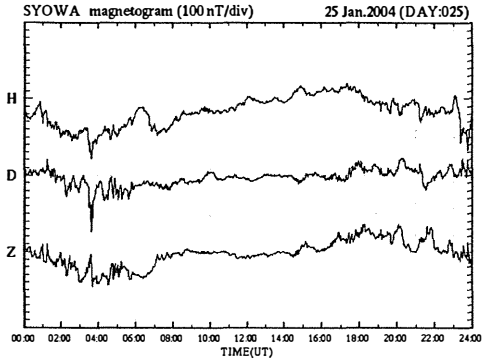

SYOWA magnetogram (100 nT/div)
20 Jan.2004 (DAY:020)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

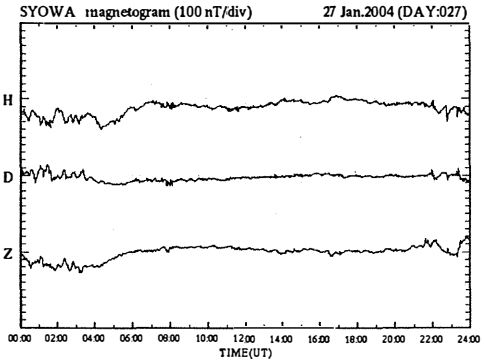

SYOWA magnetogram (100 nT/div)
21 Jan.2004 (DAY:021)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

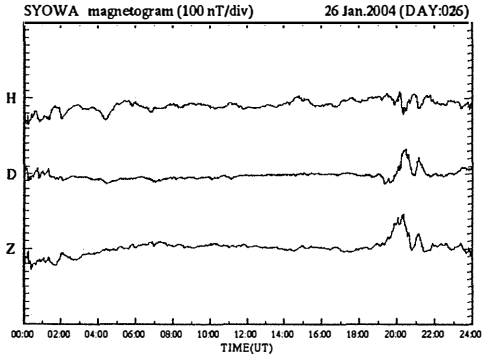

SYOWA magnetogram (100 nT/div)
23 Jan.2004 (DAY:023)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

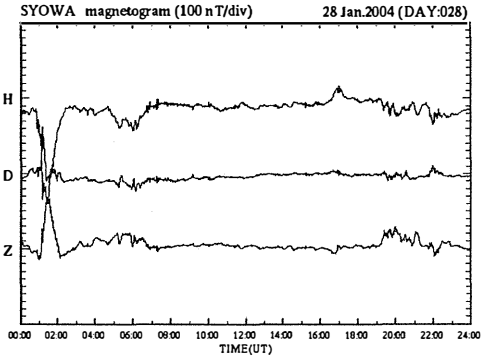

SYOWA magnetogram (100 nT/div)
22 Jan.2004 (DAY:022)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

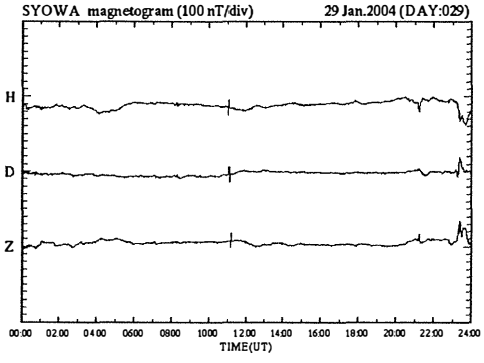

SYOWA magnetogram (100 nT/div)
24 Jan.2004 (DAY:024)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
25 Jan.2004 (DAY:025)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
27 Jan.2004 (DAY:027)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
26 Jan.2004 (DAY:026)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
28 Jan.2004 (DAY:028)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
29 Jan.2004 (DAY:029)
H
D
Z
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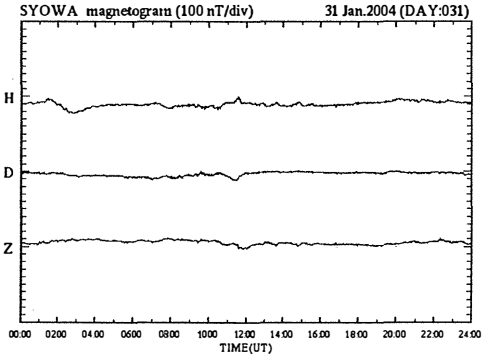
SYOWA magnetogram (100 nT/div)
31 Jan.2004 (DAY:031)
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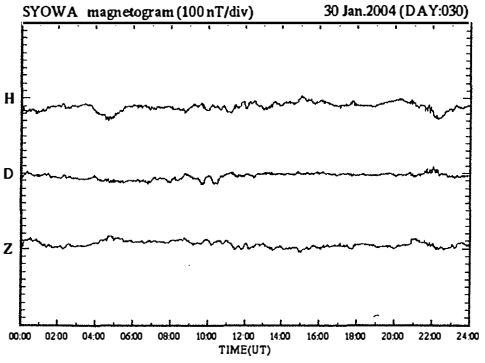
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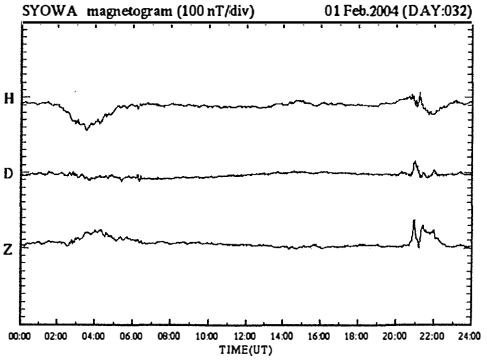
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01 Feb.2004 (DAY:032)
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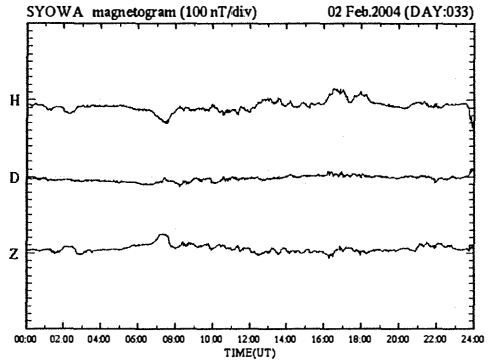
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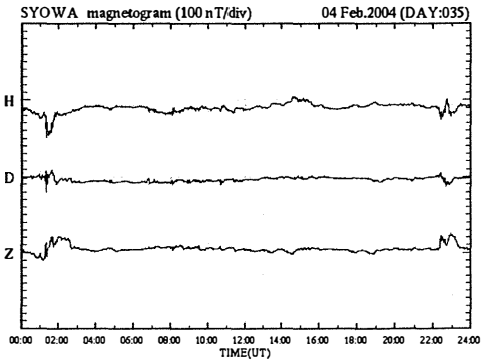
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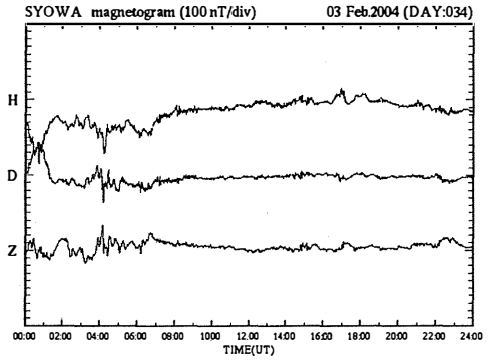
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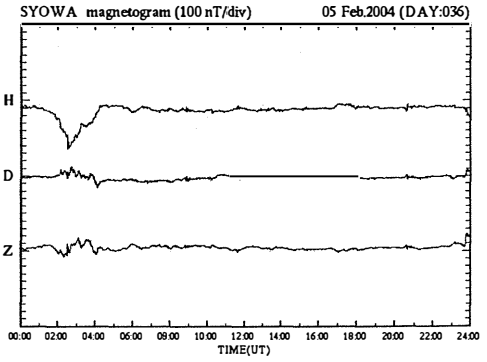
SYOWA magnetogram (100 nT/div)
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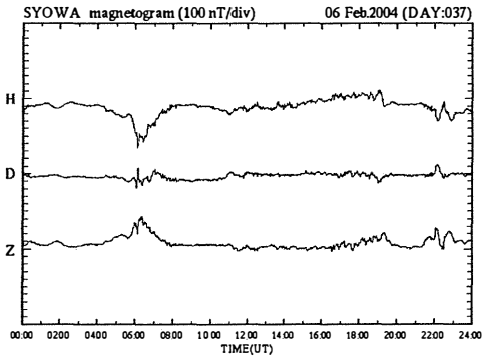
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06 Feb.2004 (DAY:037)
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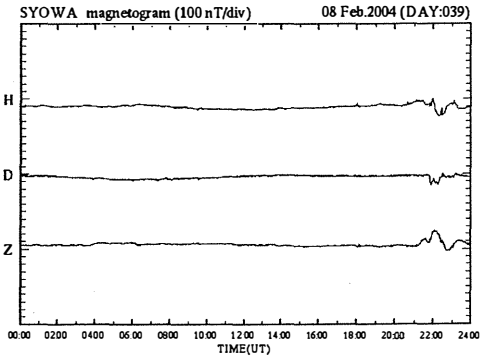
SYOWA magnetogram (100 nT/div)
08 Feb.2004 (DAY:039)
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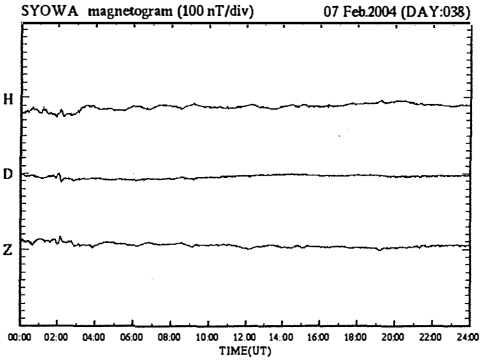
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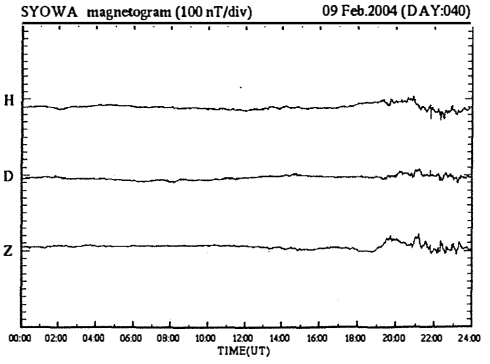
SYOWA magnetogram (100 nT/div)
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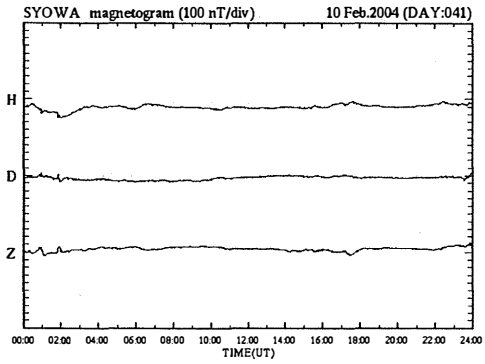
SYOWA magnetogram (100 nT/div)
10 Feb.2004 (DAY:041)
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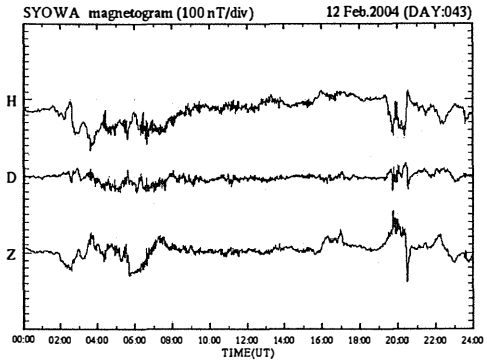
SYOWA magnetogram (100 nT/div)
12 Feb.2004 (DAY:043)
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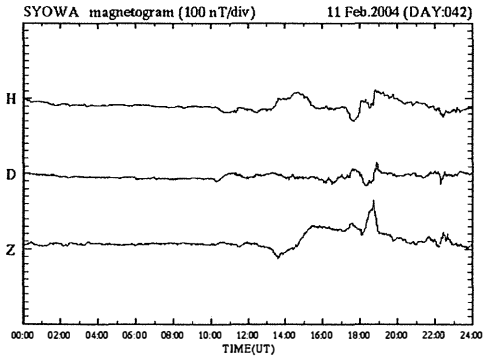
SYOWA magnetogram (100 nT/div)
11 Feb.2004 (DAY:042)
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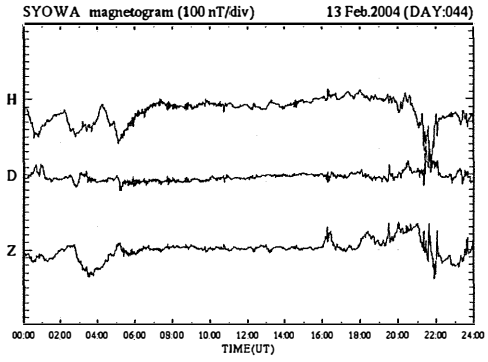
SYOWA magnetogram (100 nT/div)
13 Feb.2004 (DAY:044)
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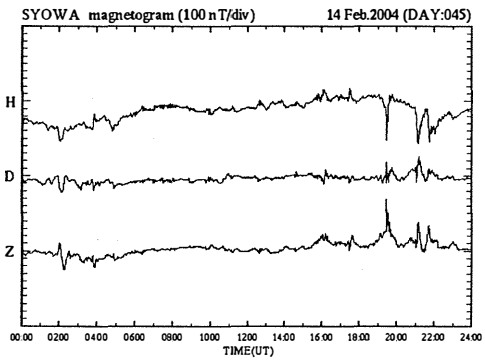
SYOWA magnetogram (100 nT/div)
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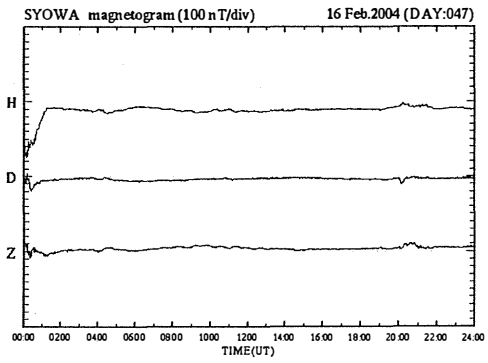
SYOWA magnetogram (100 nT/div)
16 Feb.2004 (DAY:047)
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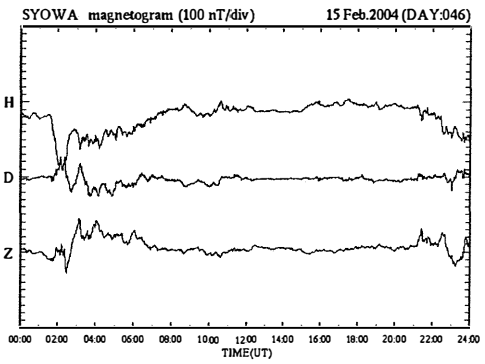
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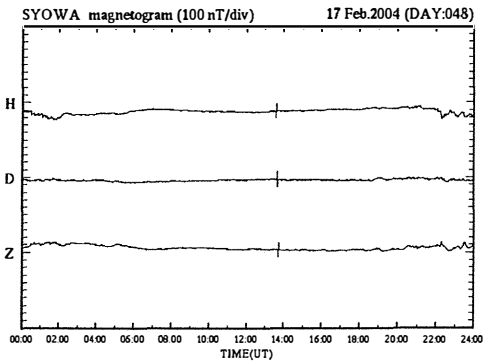
SYOWA magnetogram (100 nT/div)
17 Feb.2004 (DAY:048)
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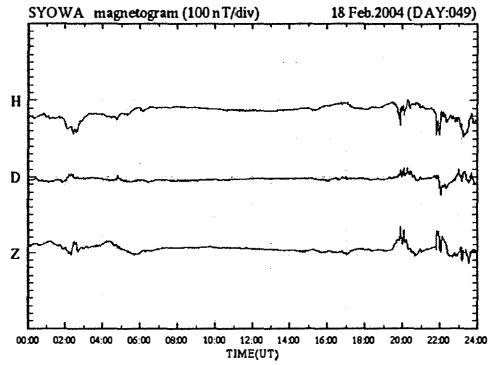
SYOWA magnetogram (100 nT/div)
18 Feb.2004 (DAY:049)
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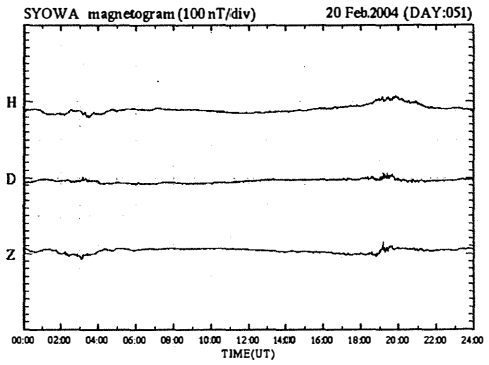
SYOWA magnetogram (100 nT/div)
20 Feb.2004 (DAY:051)
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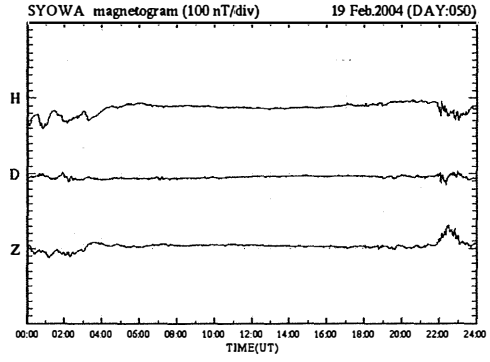
SYOWA magnetogram (100 nT/div)
19 Feb.2004 (DAY:050)
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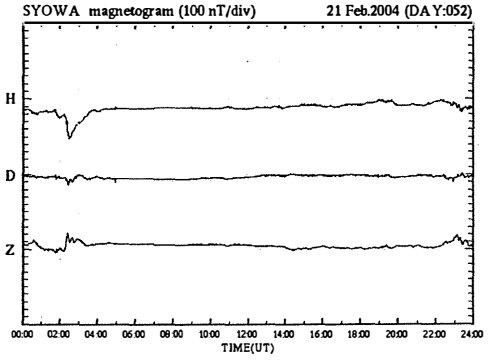
SYOWA magnetogram (100 nT/div)
21 Feb.2004 (DAY:052)
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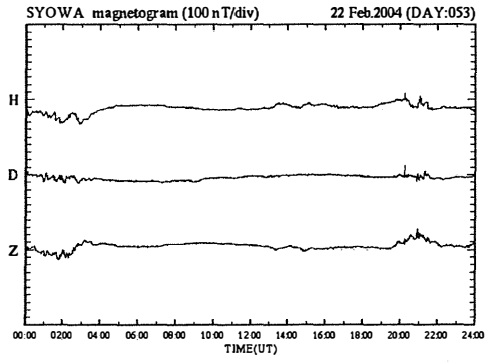
SYOWA magnetogram (100 nT/div)
22 Feb.2004 (DAY:053)
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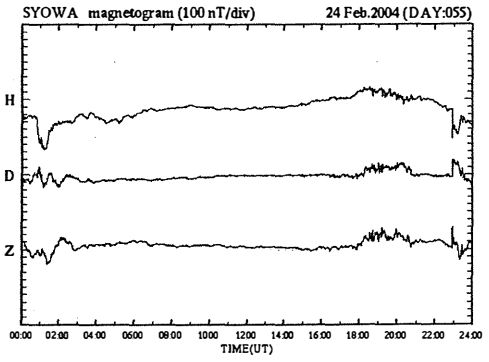
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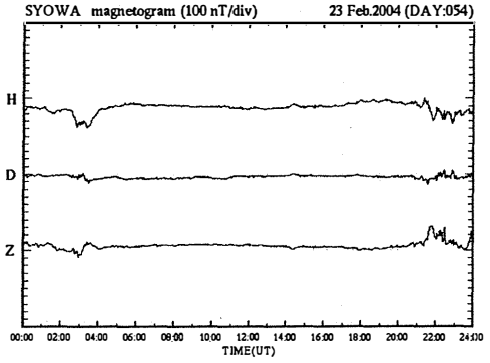
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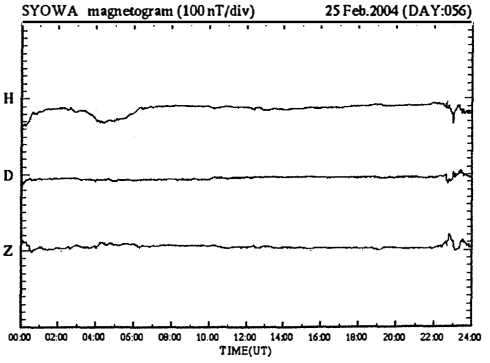
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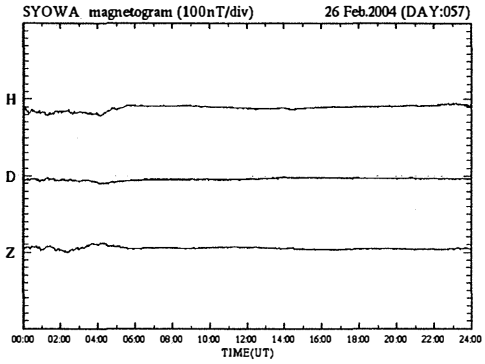
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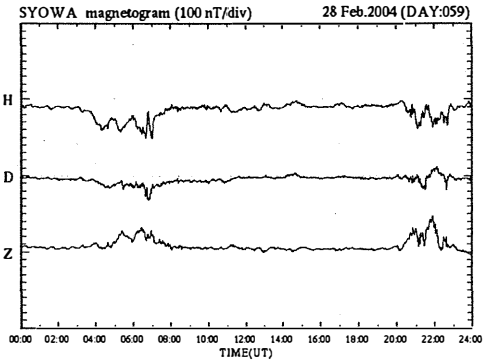
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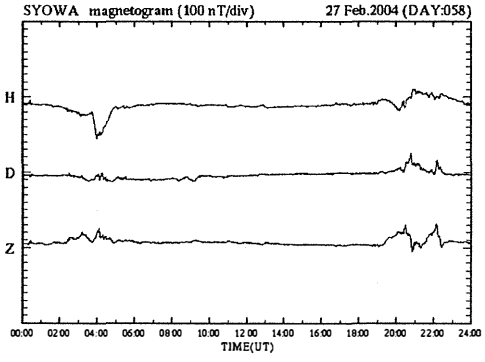
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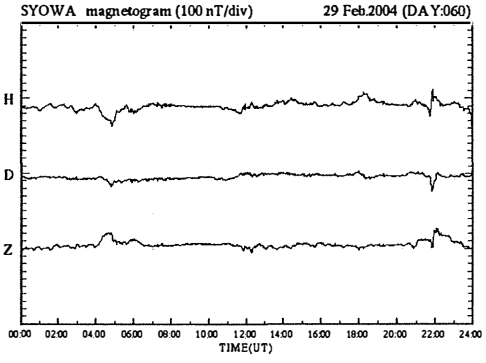
SYOWA magnetogram (100 nT/div)
29 Feb.2004 (DAY:060)
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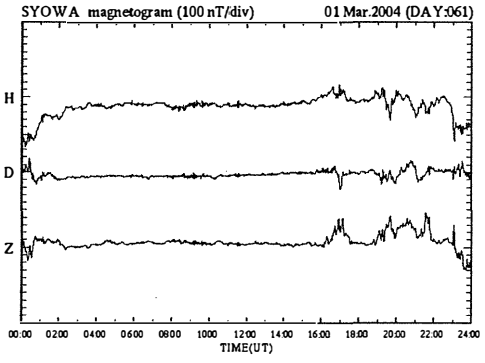
SYOWA magnetogram (100 nT/div)
01 Mar.2004 (DAY:061)
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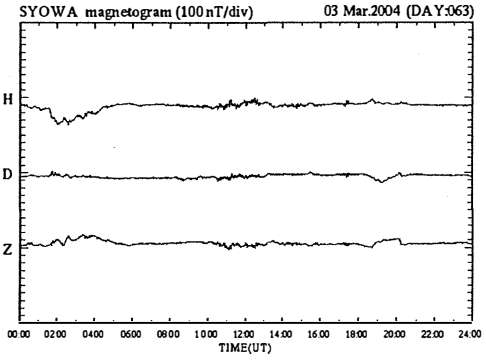
SYOWA magnetogram (100 nT/div)
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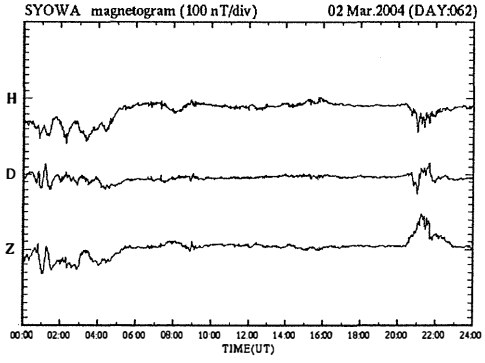
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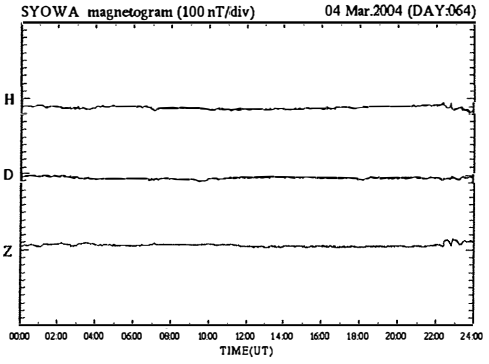
SYOWA magnetogram (100 nT/div)
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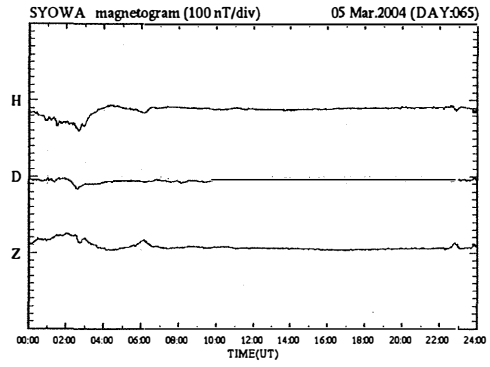
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05 Mar.2004 (DAY:065)
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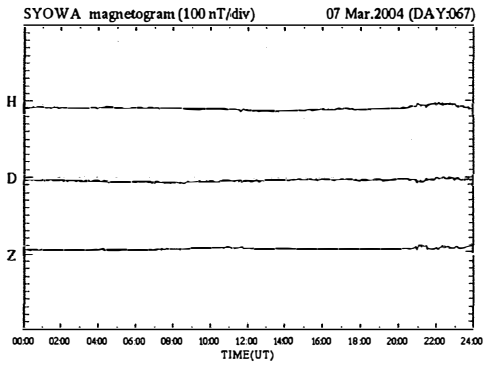
SYOWA magnetogram (100 nT/div)
07 Mar.2004 (DAY:067)
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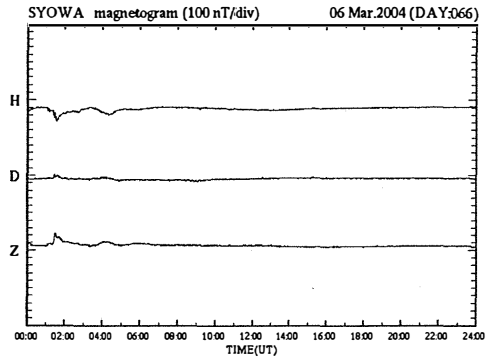
SYOWA magnetogram (100 nT/div)
06 Mar.2004 (DAY:066)
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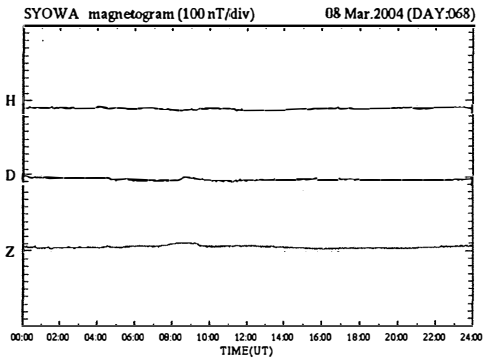
SYOWA magnetogram (100 nT/div)
08 Mar.2004 (DAY:068)
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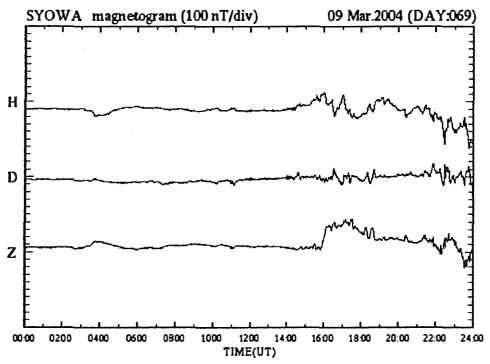
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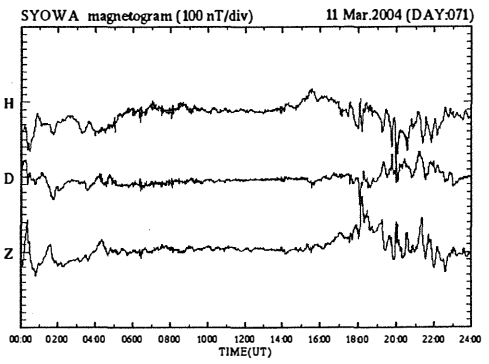
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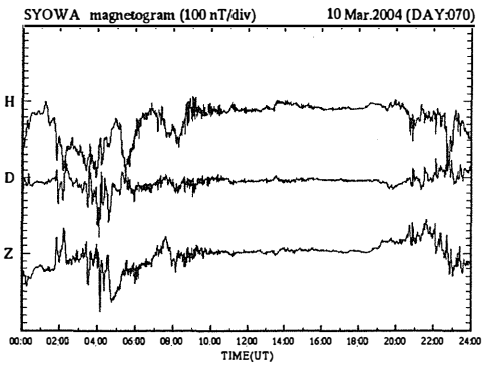
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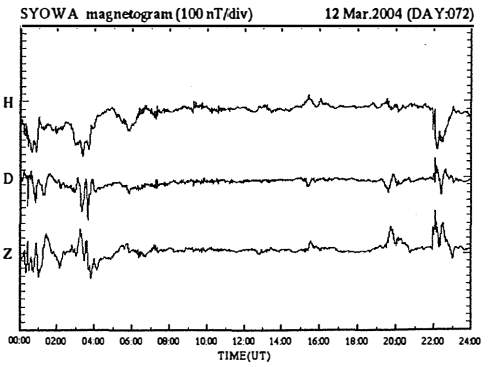
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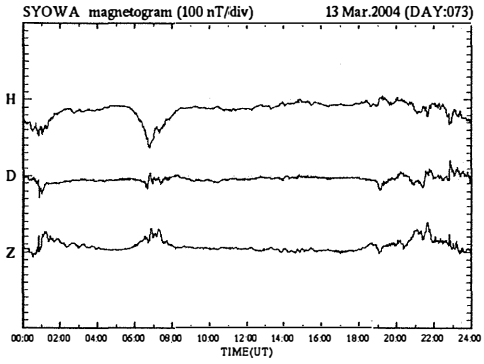
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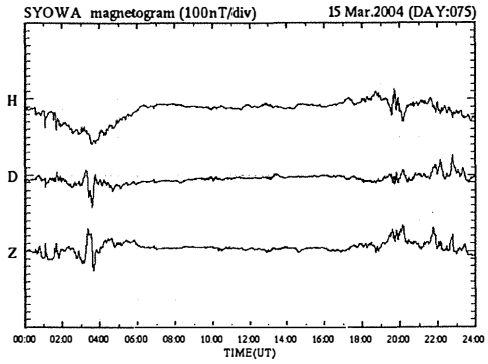
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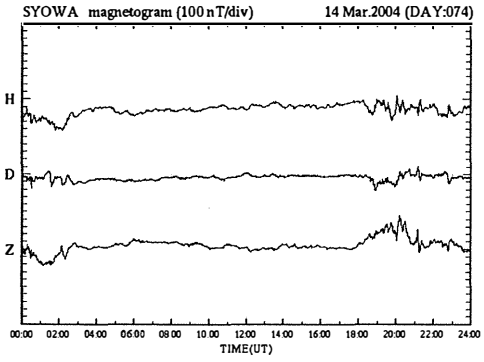
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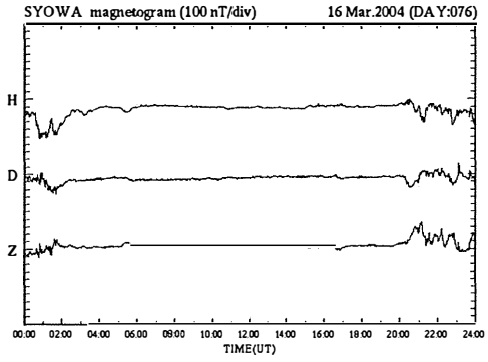
SYOWA magnetogram (100 nT/div)
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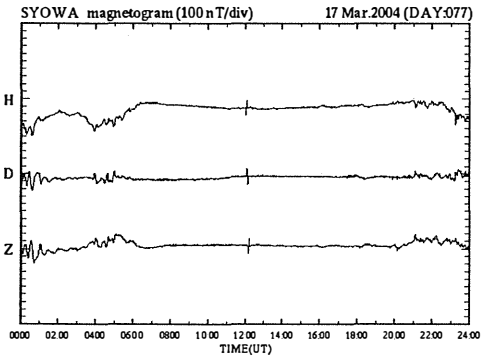
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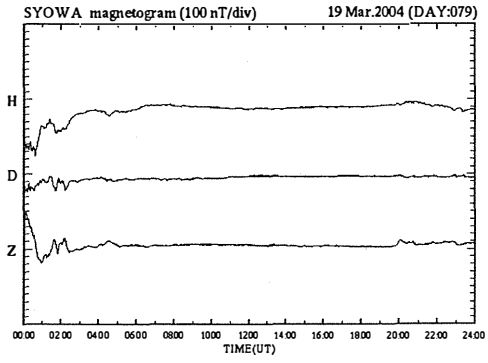
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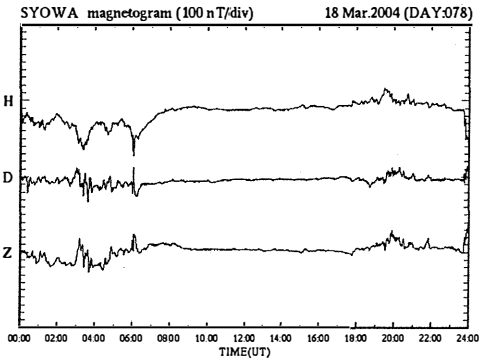
SYOWA magnetogram (100 nT/div)
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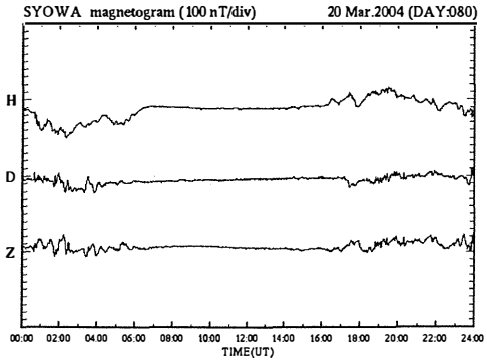
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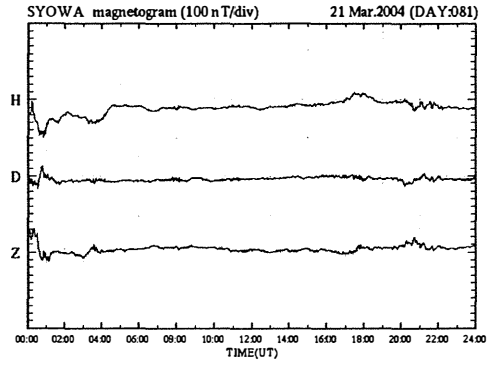
SYOWA magnetogram (100 nT/div)
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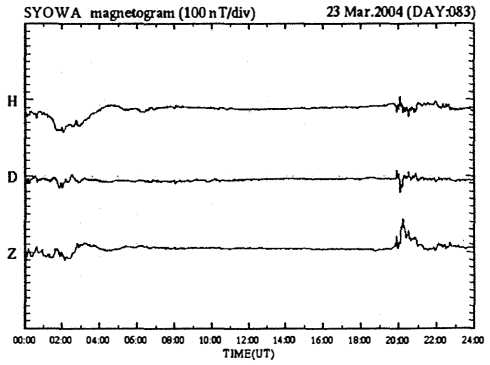
SYOWA magnetogram (100 nT/div)
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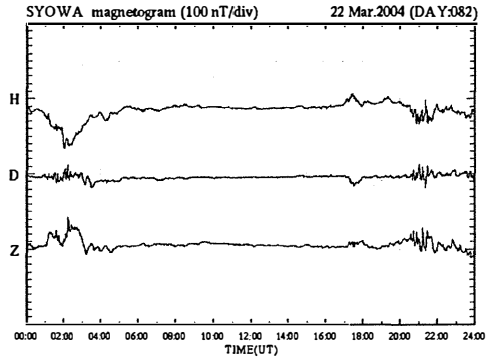
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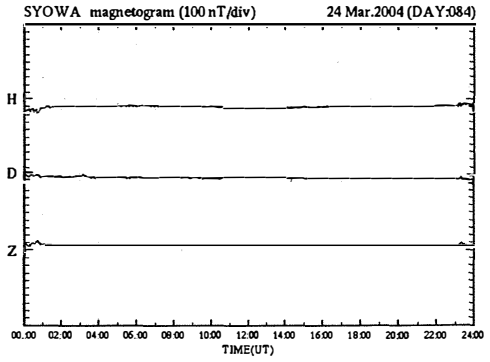
SYOWA magnetogram (100 nT/div)
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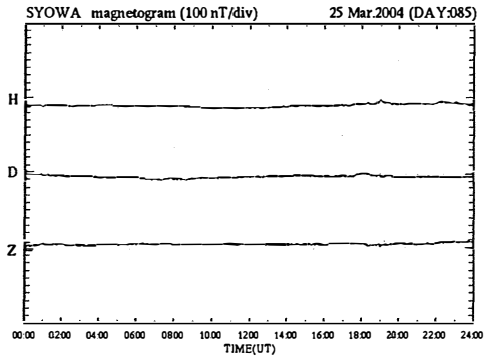
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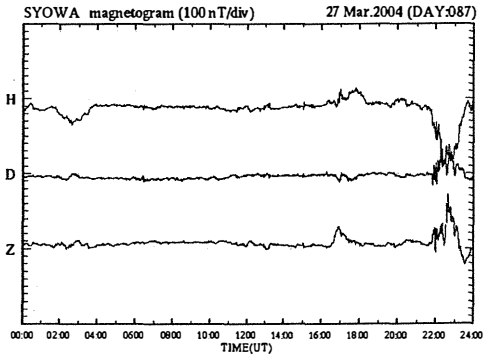
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27 Mar.2004 (DAY:087)
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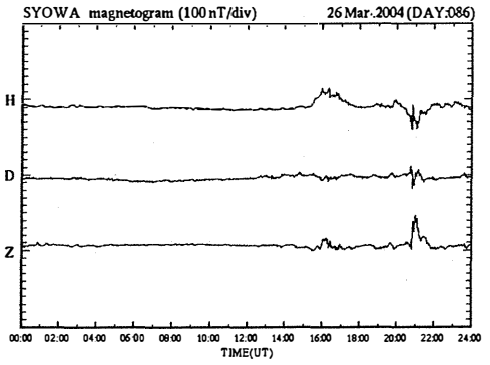
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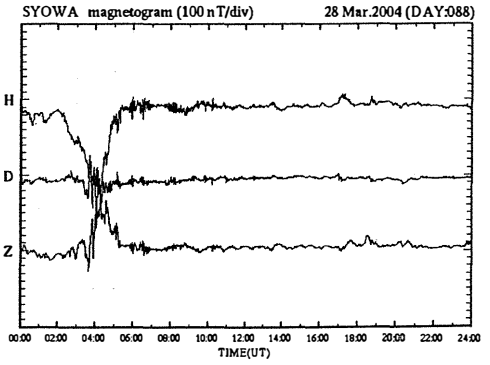
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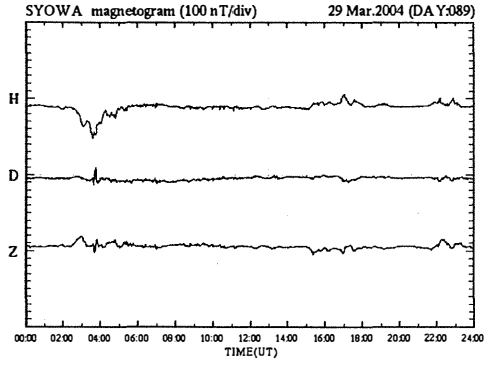
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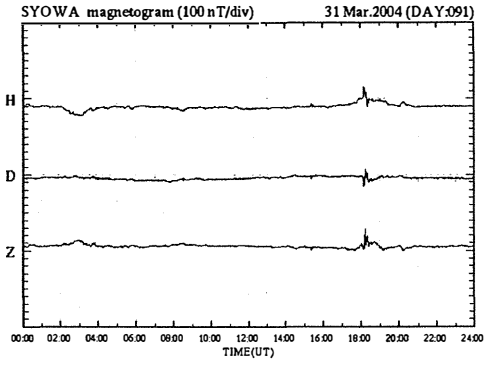
SYOWA magnetogram (100 nT/div)
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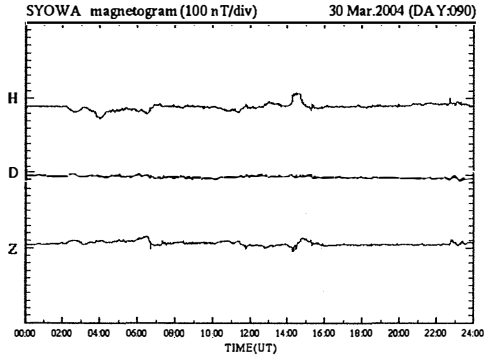
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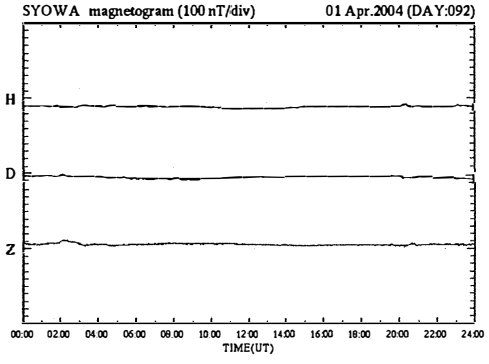
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01 Apr.2004 (DAY:092)
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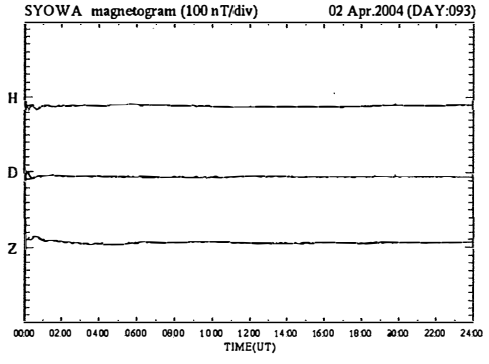
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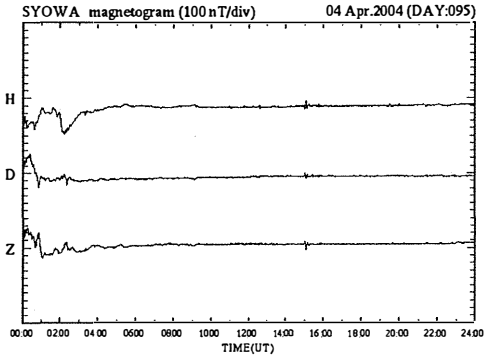
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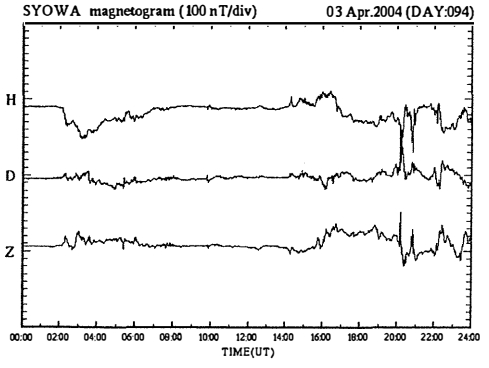
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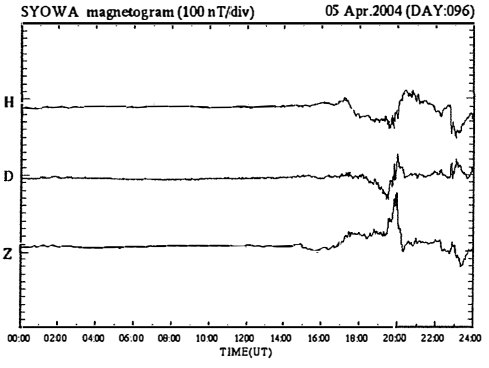
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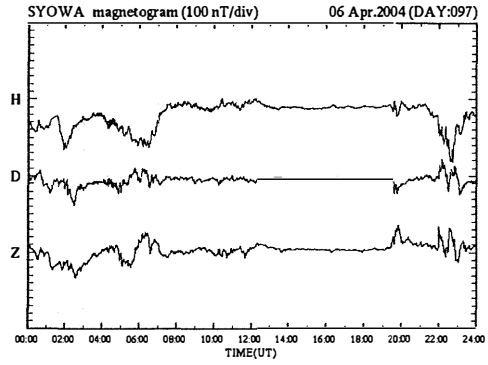
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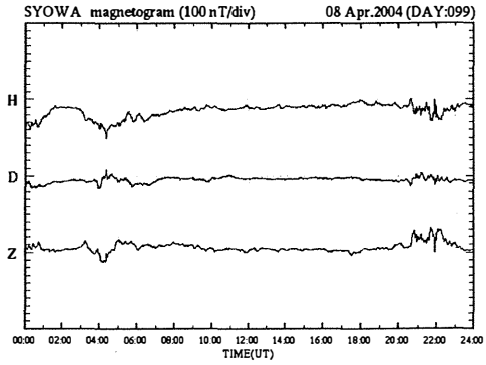
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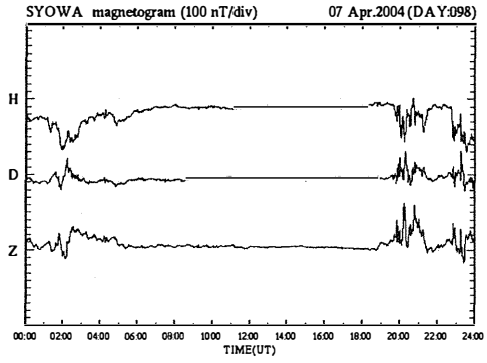
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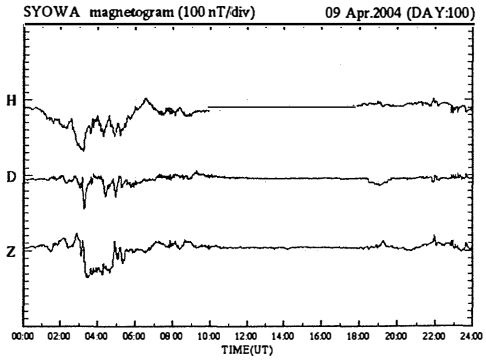
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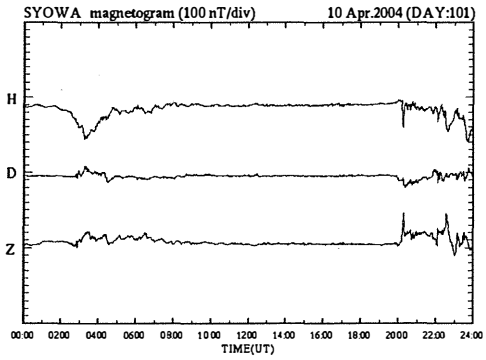
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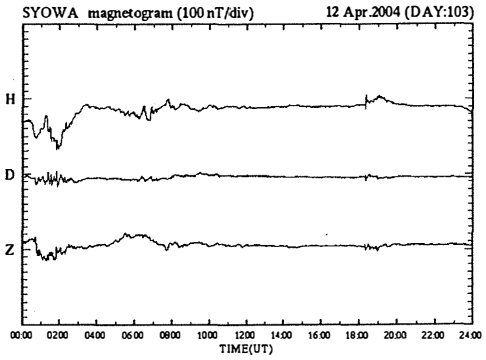
SYOWA magnetogram (100 nT/div)
12 Apr.2004 (DAY:103)
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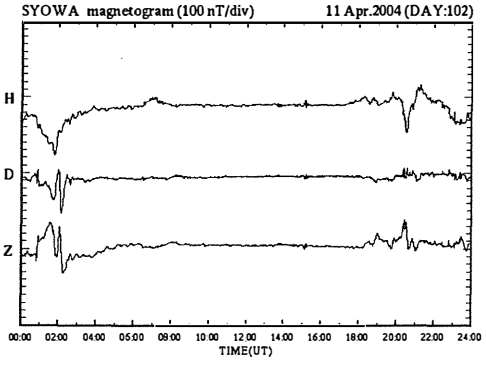
TIME(UT)


SYOWA magnetogram (100 nT/div)
11 Apr.2004 (DAY:102)
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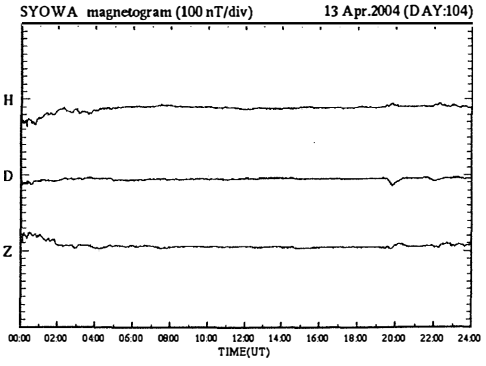
TIME(UT)


SYOWA magnetogram (100 nT/div)
13 Apr.2004 (DAY:104)
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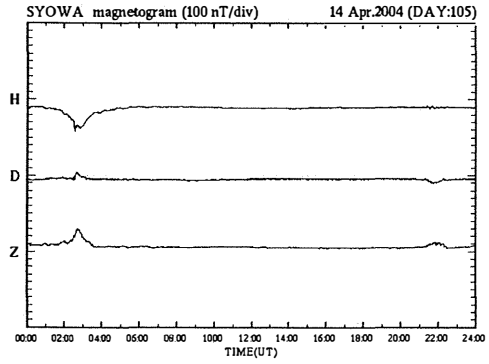
SYOWA magnetogram (100 nT/div)
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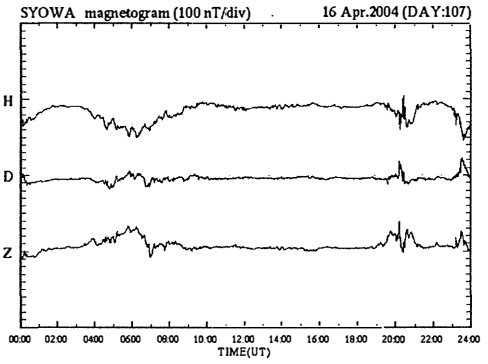
TIME(UT)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16 Apr.2004 (DAY:107)
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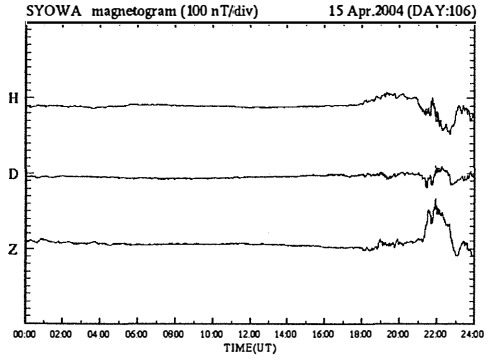
TIME(UT)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15 Apr.2004 (DAY:106)
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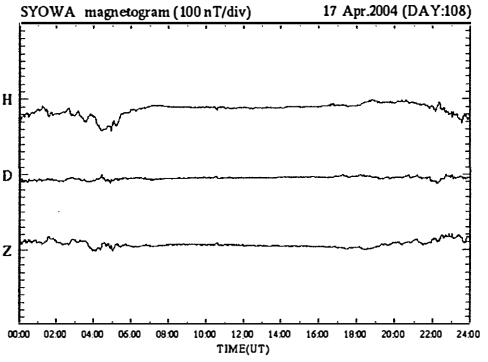
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17 Apr.2004 (DAY:108)
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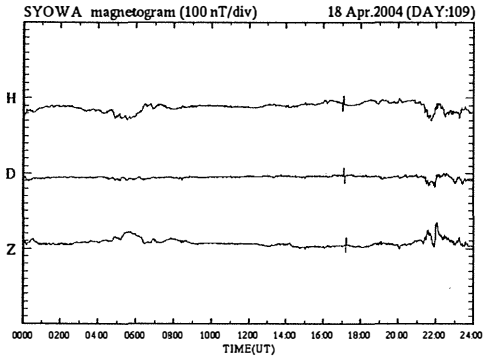
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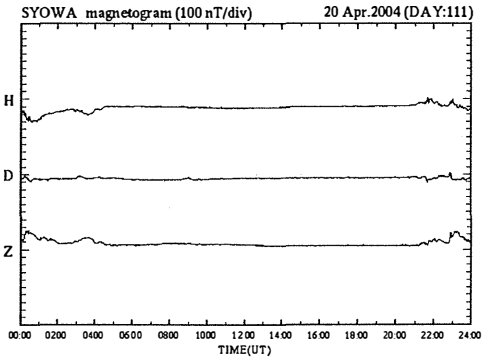
TIME(UT)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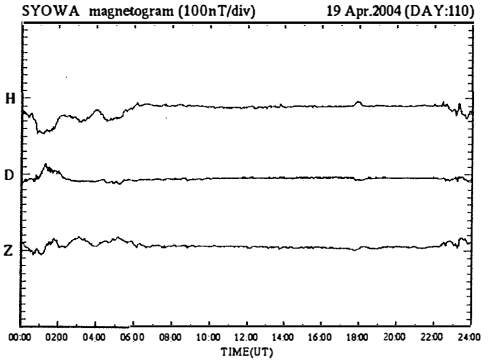
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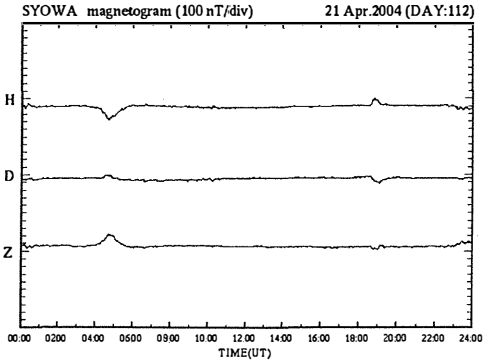
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21 Apr.2004 (DAY:112)
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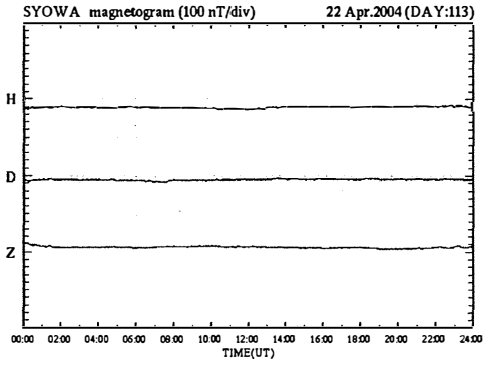
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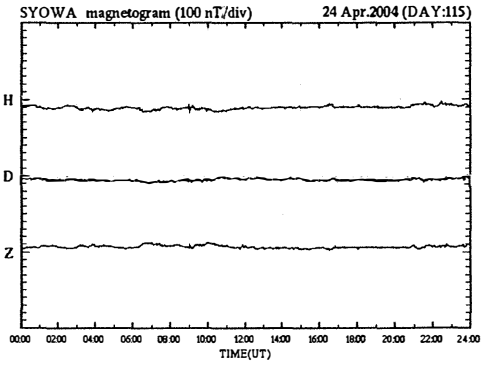
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24 Apr.2004 (DAY:115)
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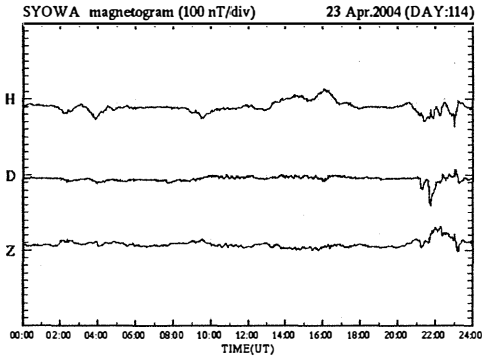
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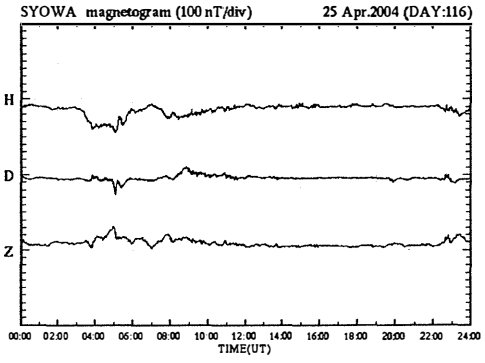
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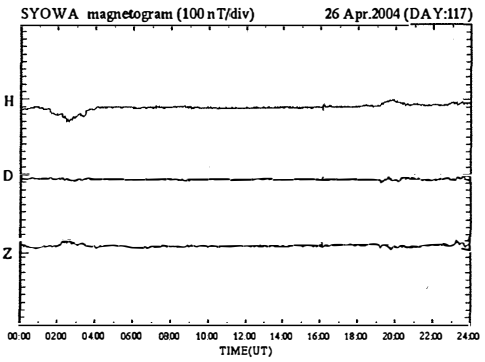
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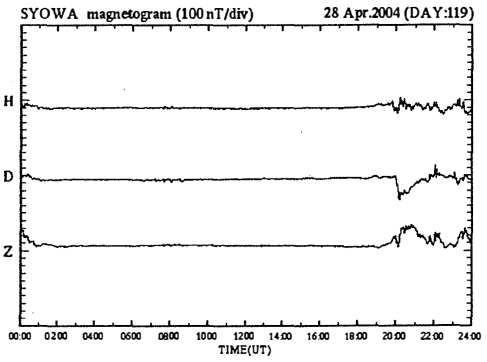
SYOWA magnetogram (100 nT/div)
28 Apr.2004 (DAY:119)
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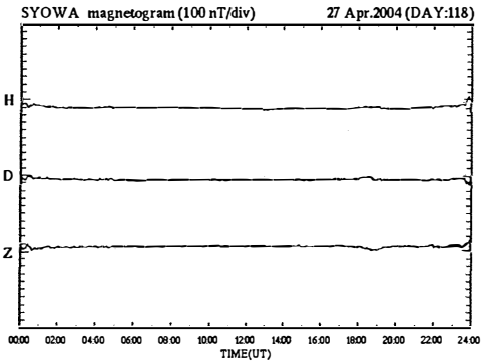
SYOWA magnetogram (100 nT/div)
27 Apr.2004 (DAY:118)
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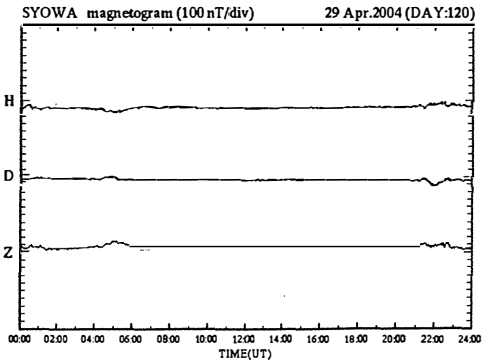
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29 Apr.2004 (DAY:120)
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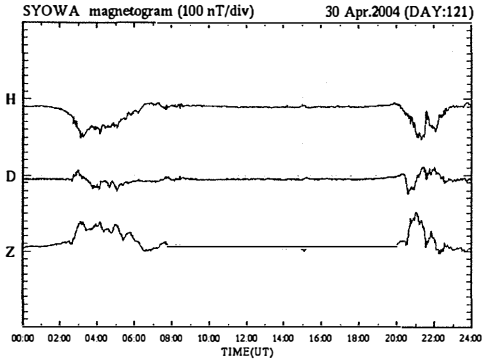
SYOWA magnetogram (100 nT/div)
30 Apr.2004 (DAY:121)
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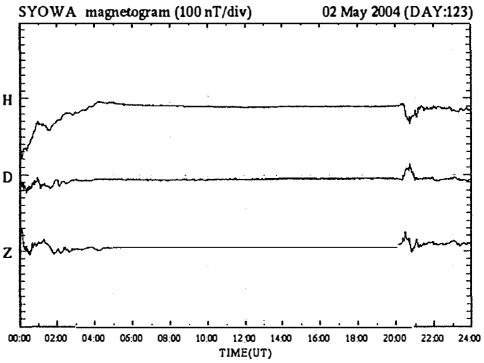
SYOWA magnetogram (100 nT/div)
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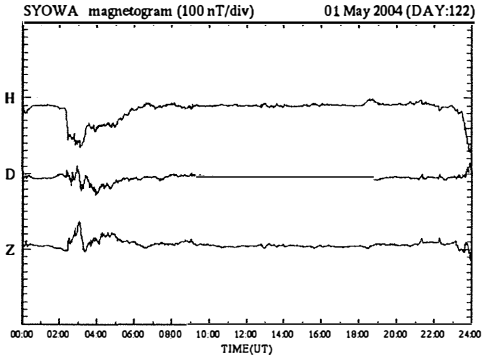
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01 May 2004 (DAY:122)
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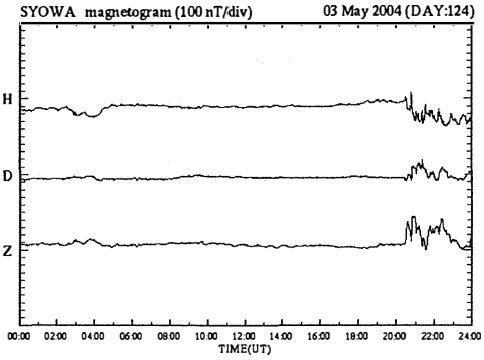
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03 May 2004 (DAY:124)
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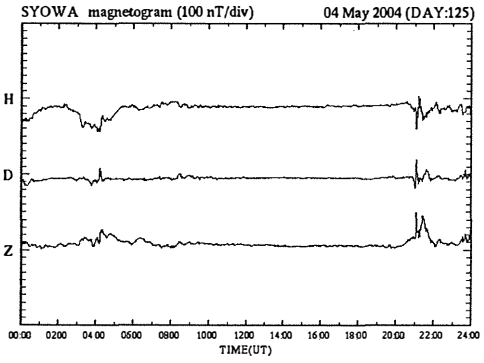
SYOWA magnetogram (100 nT/div)
04 May 2004 (DAY:125)
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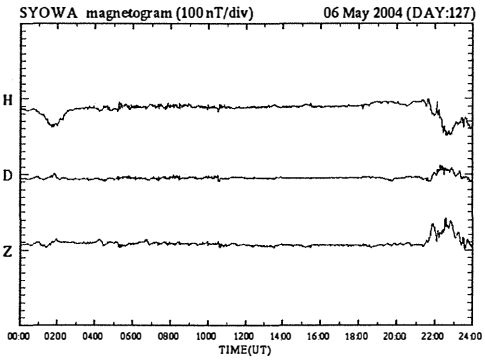
SYOWA magnetogram (100 nT/div)
06 May 2004 (DAY:127)
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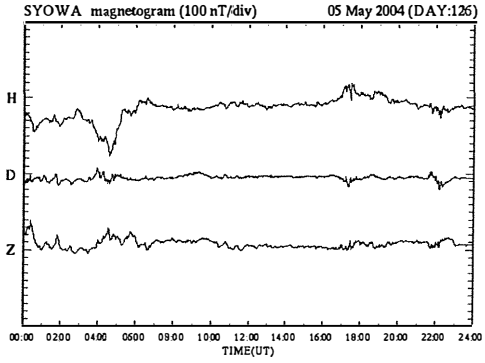
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05 May 2004 (DAY:126)
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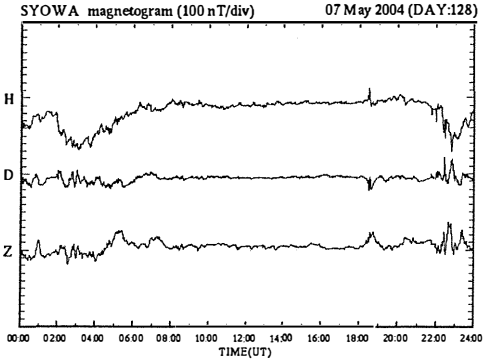
SYOWA magnetogram (100 nT/div)
07 May 2004 (DAY:128)
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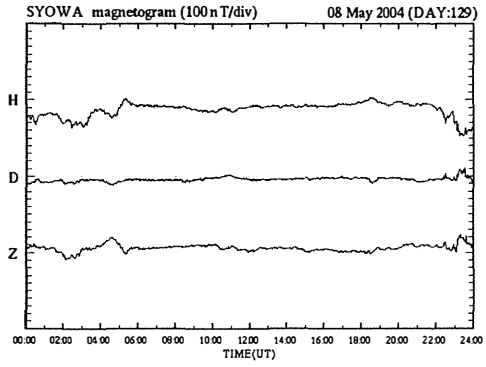
SYOWA magnetogram (100 n T/div)
08 May 2004 (DAY:129)
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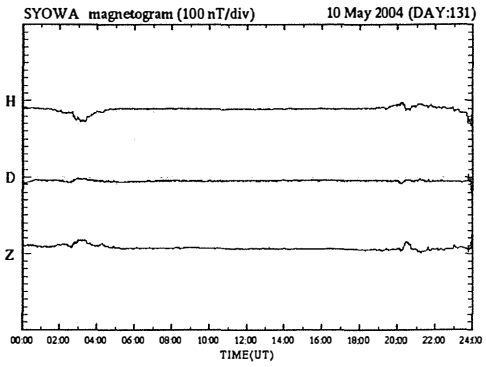
SYOWA magnetogram (100 nT/div)
10 May 2004 (DAY:131)
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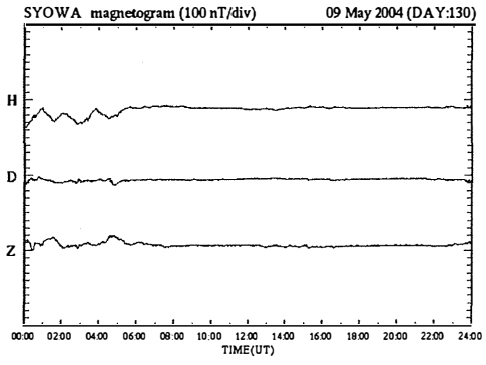
SYOWA magnetogram (100 nT/div)
09 May 2004 (DAY:130)
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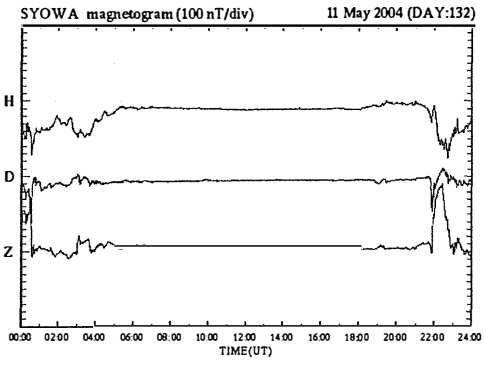
SYOWA magnetogram (100 nT/div)
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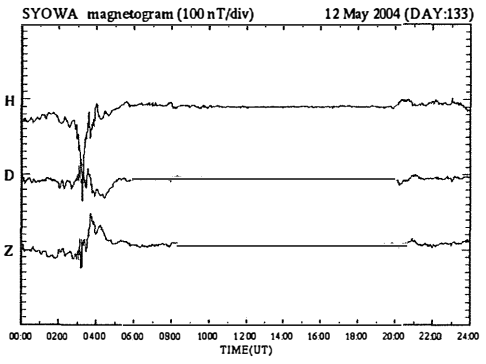
SYOWA magnetogram (100 nT/div)
12 May 2004 (DAY:133)
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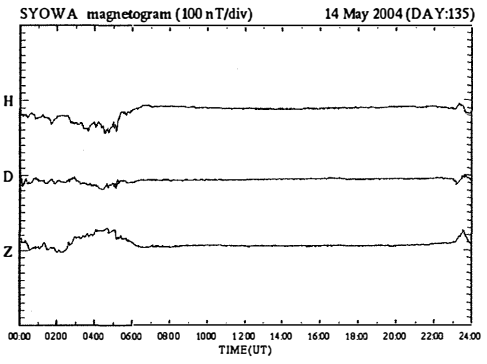
SYOWA magnetogram (100 nT/div)
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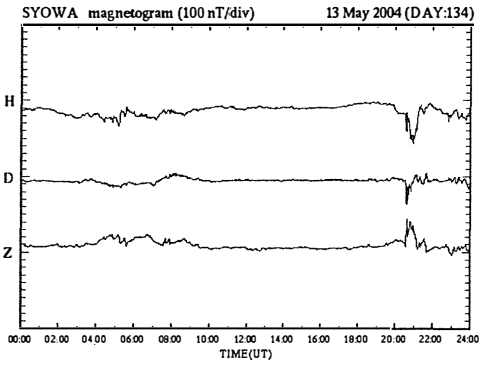
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13 May 2004 (DAY:134)
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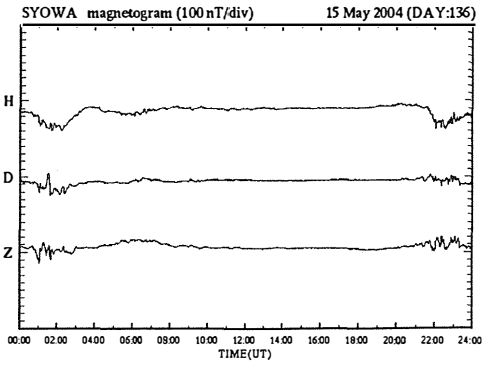
SYOWA magnetogram (100 nT/div)
15 May 2004 (DAY:136)
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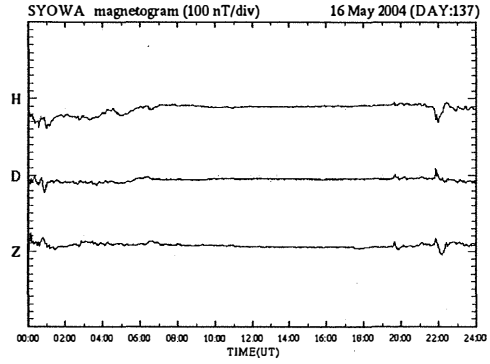
SYOWA magnetogram (100 nT/div)
16 May 2004 (DAY:137)
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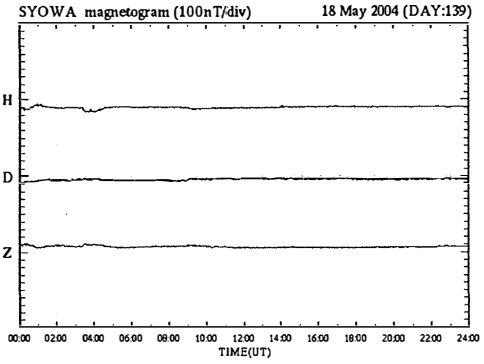
SYOWA magnetogram (100nT/div)
18 May 2004 (DAY:139)
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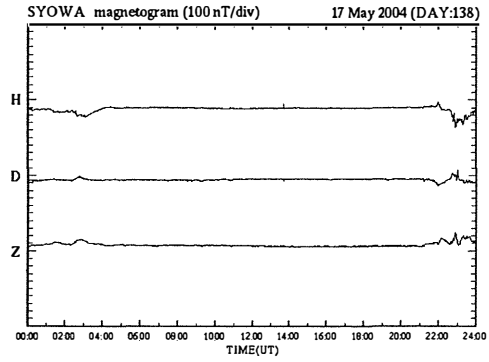
SYOWA magnetogram (100 nT/div)
17 May 2004 (DAY:138)
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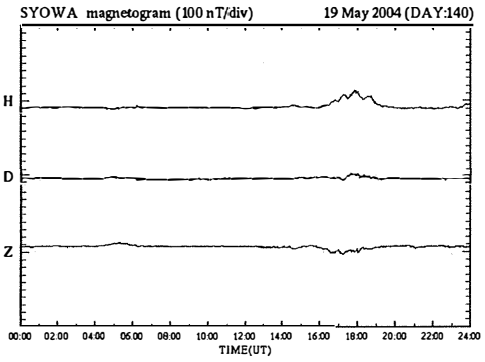
SYOWA magnetogram (100 nT/div)
19 May 2004 (DAY:140)
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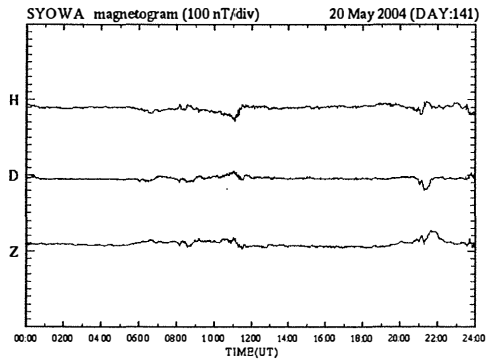
SYOWA magnetogram (100 nT/div)
20 May 2004 (DAY:141)
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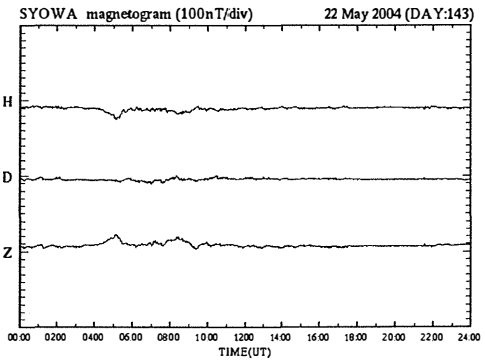
TIME(UT)


SYOWA magnetogram (100nT/div)
22 May 2004 (DAY:143)
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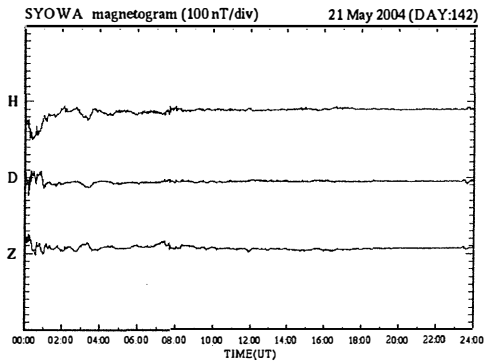
TIME(UT)


SYOWA magnetogram (100 nT/div)
21 May 2004 (DAY:142)
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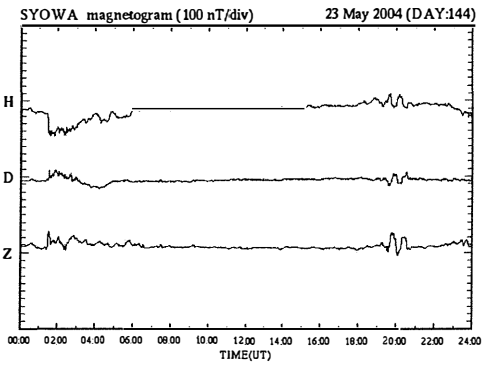
SYOWA magnetogram (100 nT/div)
23 May 2004 (DAY:144)
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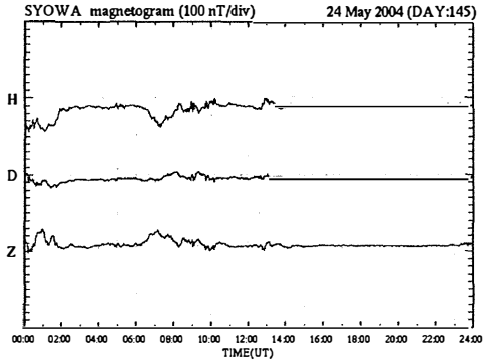
SYOWA magnetogram (100 nT/div)
24 May 2004 (DAY:145)
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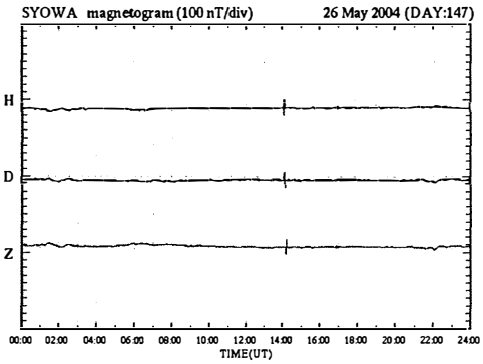
TIME(UT)


SYOWA magnetogram (100 nT/div)
26 May 2004 (DAY:147)
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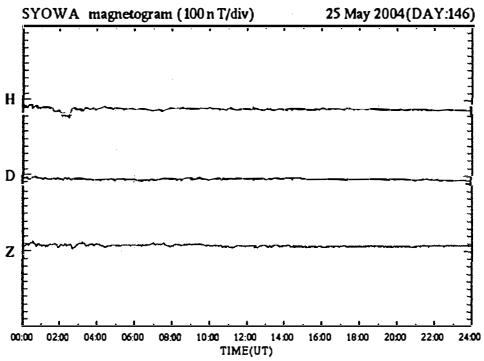
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25 May 2004 (DAY:146)
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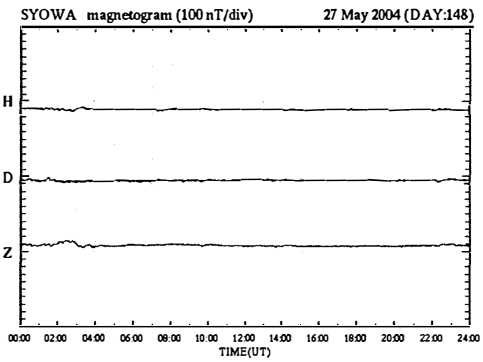
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27 May 2004 (DAY:148)
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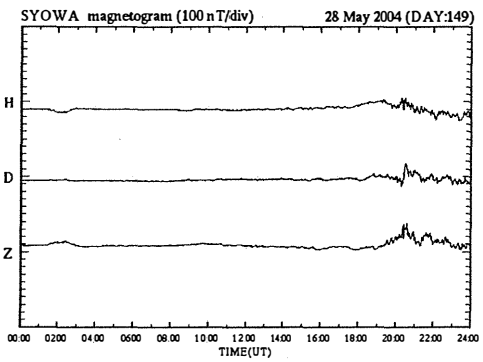
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28 May 2004 (DAY:149)
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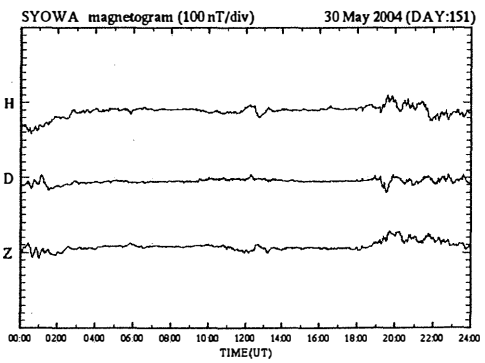
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30 May 2004 (DAY:151)
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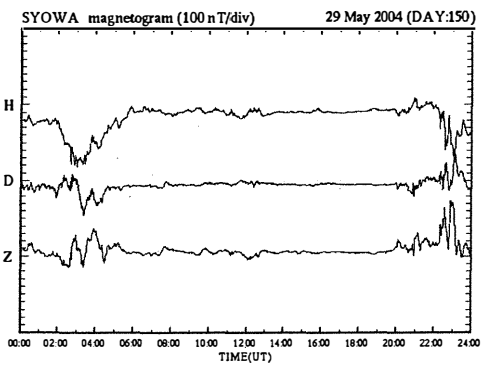
SYOWA magnetogram (100 nT/div)
29 May 2004 (DAY:150)
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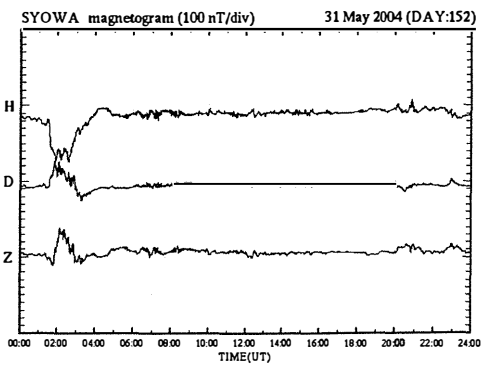
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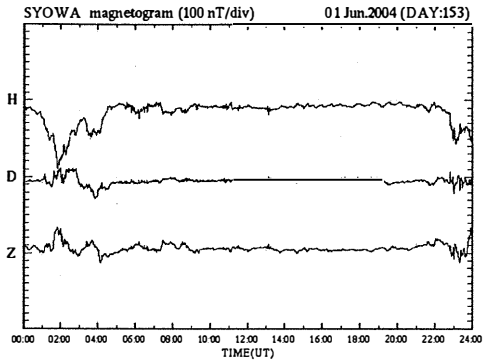
SYOWA magnetogram (100 nT/div)
01 Jun.2004 (DAY:153)
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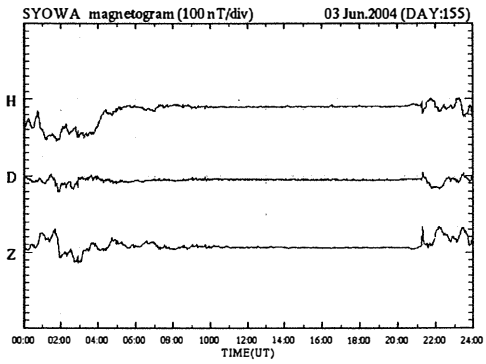
SYOWA magnetogram (100 nT/div)
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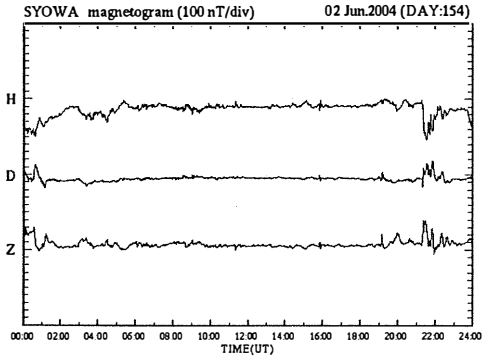
SYOWA magnetogram (100 nT/div)
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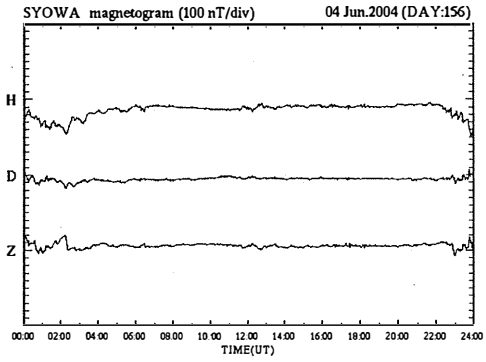
SYOWA magnetogram (100 nT/div)
04 Jun.2004 (DAY:156)
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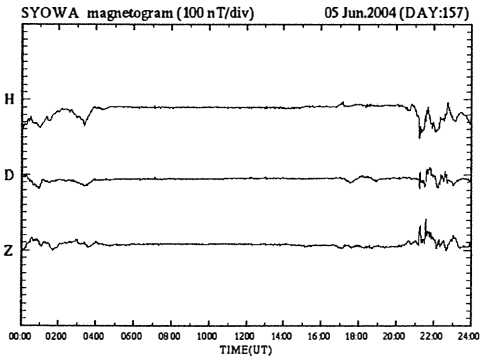
SYOWA magnetogram (100 nT/div)
05 Jun.2004 (DAY:157)
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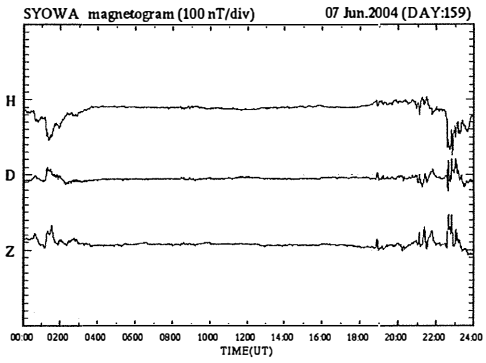
SYOWA magnetogram (100 nT/div)
07 Jun.2004 (DAY:159)
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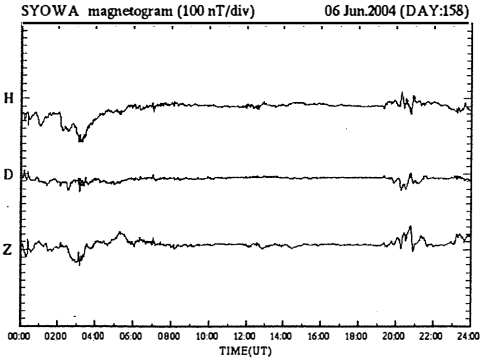
SYOWA magnetogram (100 nT/div)
06 Jun.2004 (DAY:158)
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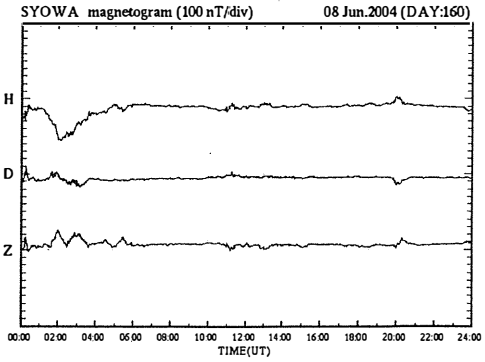
SYOWA magnetogram (100 nT/div)
08 Jun.2004 (DAY:160)
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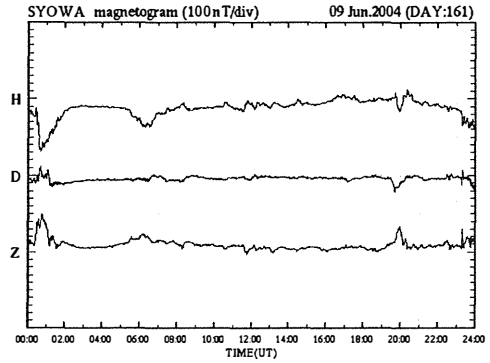
SYOWA magnetogram (100nT/div)
09 Jun.2004 (DAY:161)
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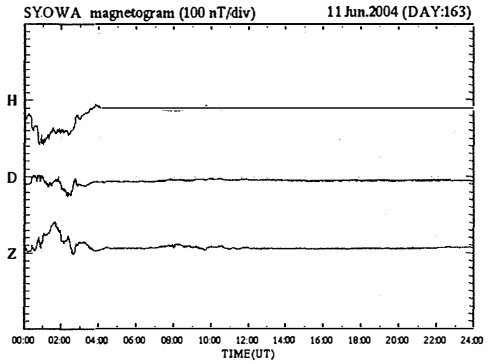
SYOWA magnetogram (100 nT/div)
11 Jun.2004 (DAY:163)
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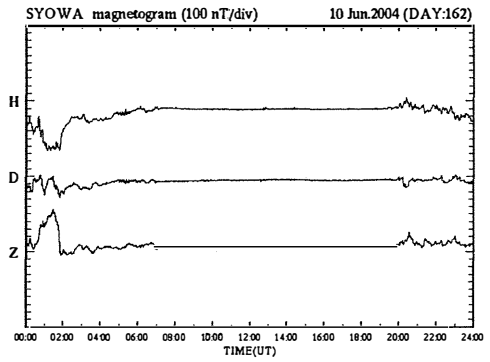
SYOWA magnetogram (100 nT/div)
10 Jun.2004 (DAY:162)
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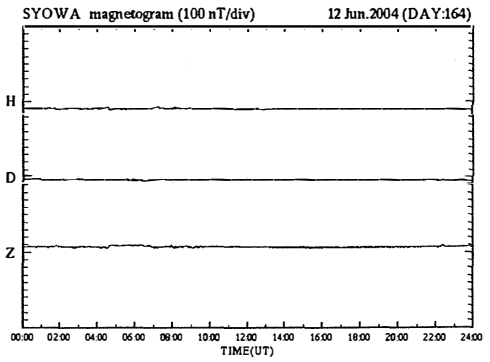
SYOWA magnetogram (100 nT/div)
12 Jun.2004 (DAY:164)
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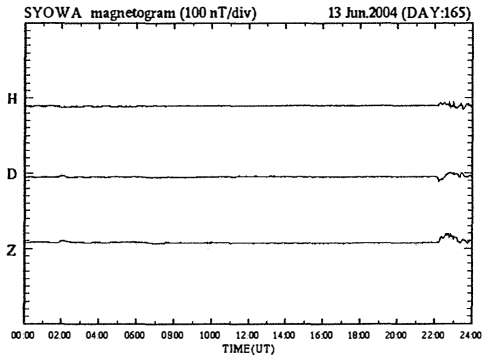
SYOWA magnetogram (100 nT/div)
13 Jun.2004 (DAY:165)
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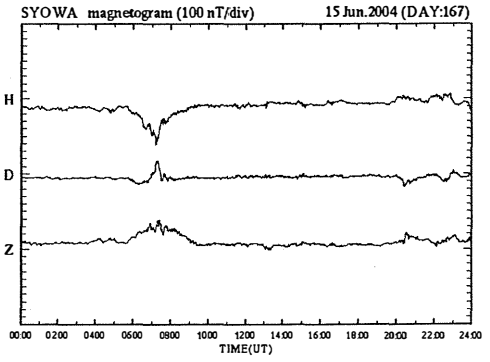
SYOWA magnetogram (100 nT/div)
15 Jun.2004 (DAY:167)
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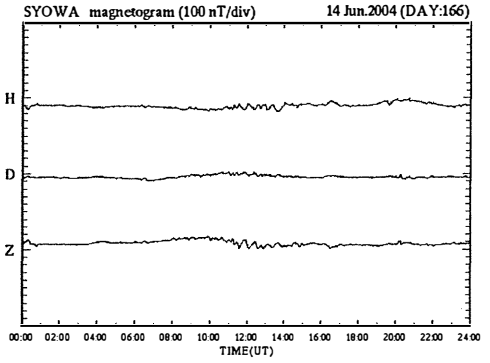
SYOWA magnetogram (100 nT/div)
14 Jun.2004 (DAY:166)
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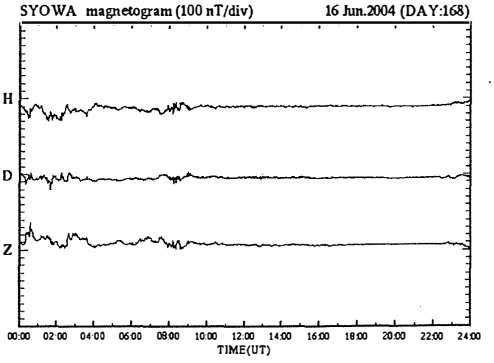
SYOWA magnetogram (100 nT/div)
16 Jun.2004 (DAY:168)
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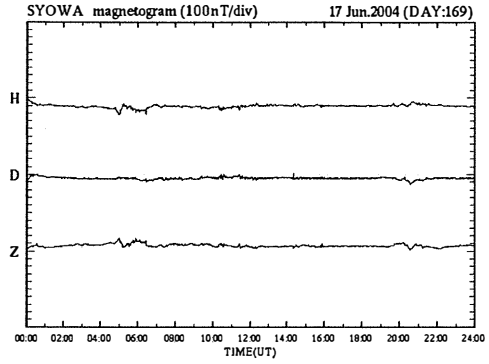
SYOWA magnetogram (100nT/div)
17 Jun.2004 (DAY:169)
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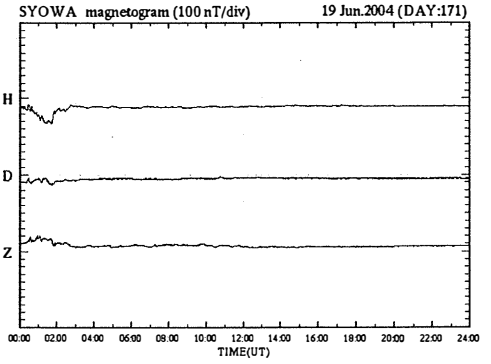
SYOWA magnetogram (100 nT/div)
19 Jun.2004 (DAY:171)
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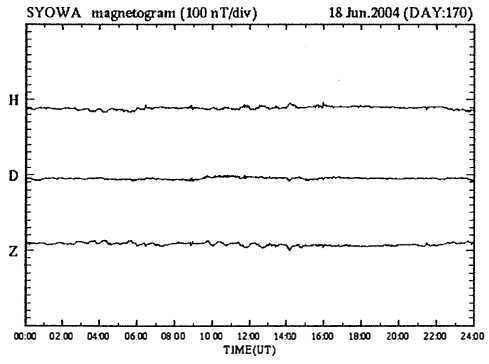
SYOWA magnetogram (100 nT/div)
18 Jun.2004 (DAY:170)
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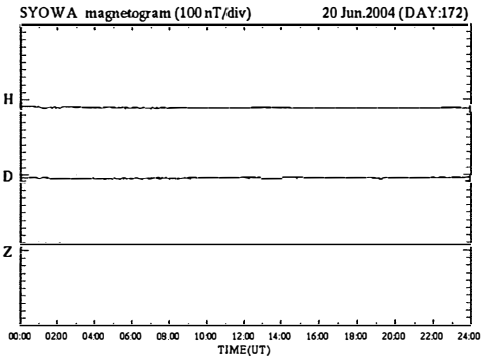
SYOWA magnetogram (100 nT/div)
20 Jun.2004 (DAY:172)
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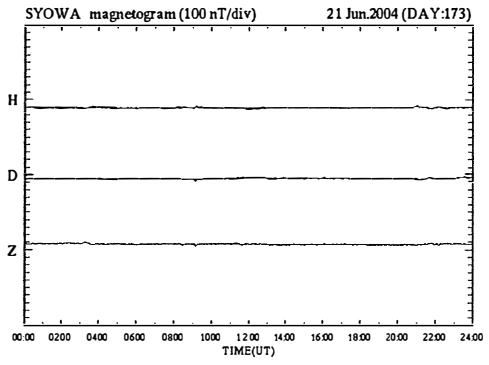
SYOWA magnetogram (100 nT/div)
21 Jun.2004 (DAY:173)
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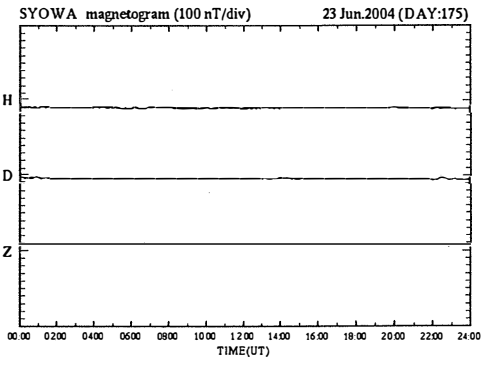
SYOWA magnetogram (100 nT/div)
23 Jun.2004 (DAY:175)
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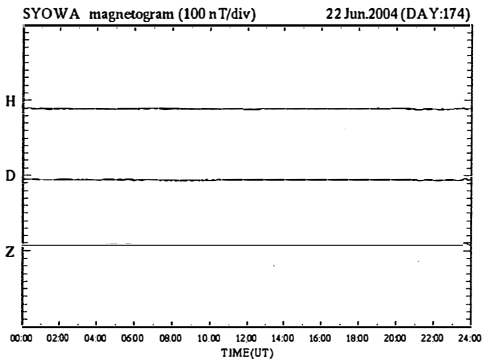
TIME(UT)


SYOWA magnetogram (100 nT/div)
22 Jun.2004 (DAY:174)
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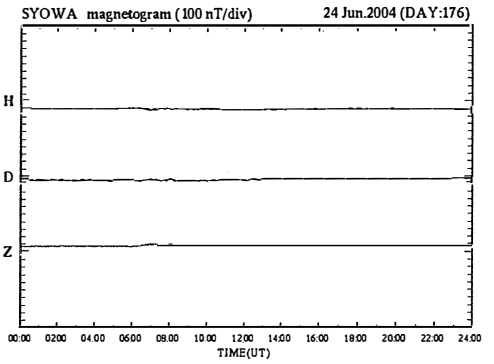
TIME(UT)


SYOWA magnetogram (100 nT/div)
24 Jun.2004 (DAY:176)
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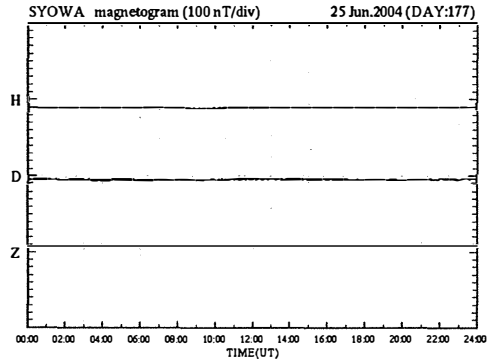
TIME(UT)


SYOWA magnetogram (100 nT/div)
25 Jun.2004 (DAY:177)
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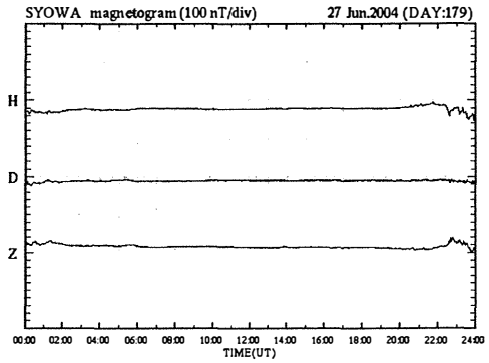
SYOWA magnetogram (100 nT/div)
27 Jun.2004 (DAY:179)
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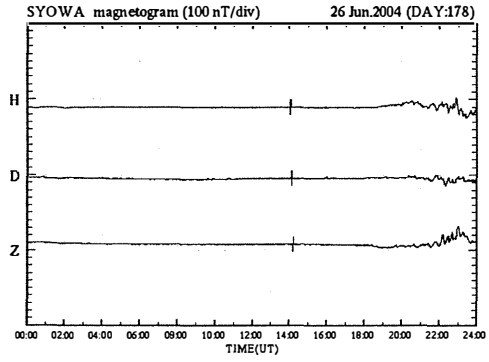
SYOWA magnetogram (100 nT/div)
26 Jun.2004 (DAY:178)
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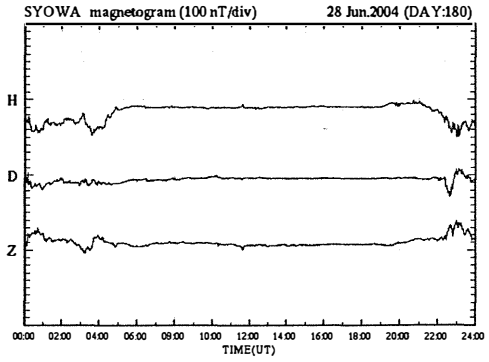
SYOWA magnetogram (100 nT/div)
28 Jun.2004 (DAY:180)
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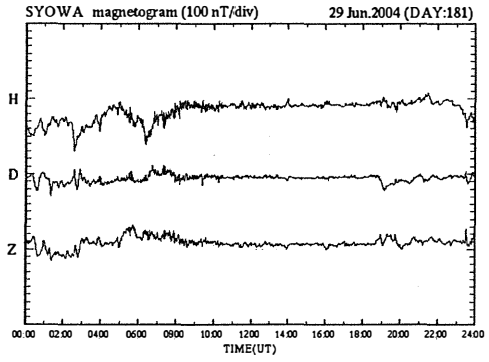
TIME(UT)


SYOWA magnetogram (100 nT/div)
29 Jun.2004 (DAY:181)
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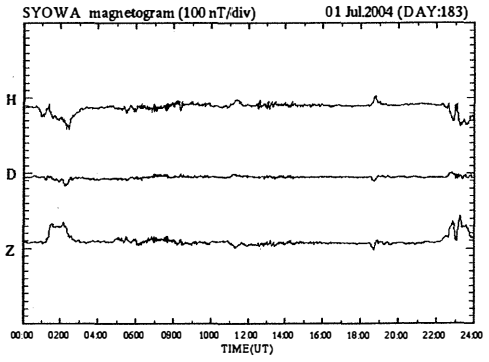
TIME(UT)


SYOWA magnetogram (100 nT/div)
01 Jul.2004 (DAY:183)
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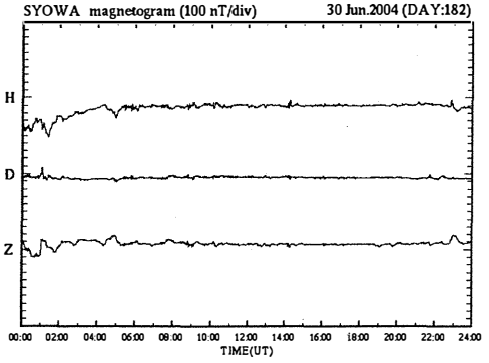
SYOWA magnetogram (100 nT/div)
30 Jun.2004 (DAY:182)
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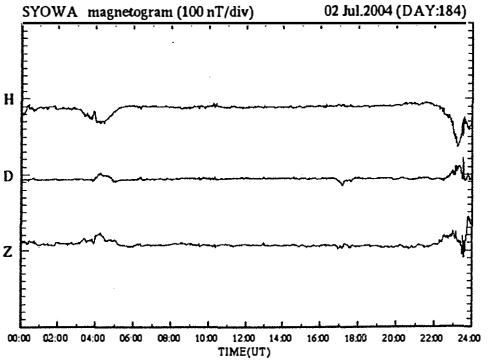
TIME(UT)


SYOWA magnetogram (100 nT/div)
02 Jul.2004 (DAY:184)
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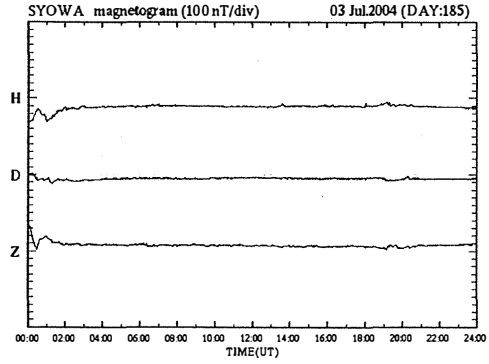
TIME(UT)


SYOWA magnetogram (100 nT/div)
03 Jul.2004 (DAY:185)
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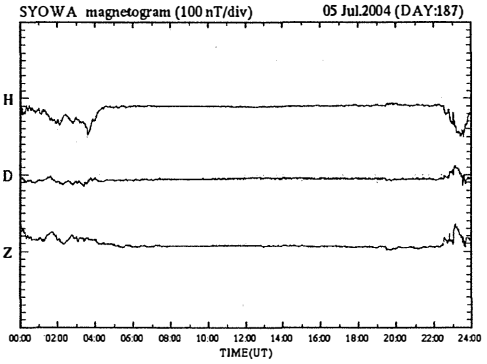
SYOWA magnetogram (100 nT/div)
05 Jul.2004 (DAY:187)
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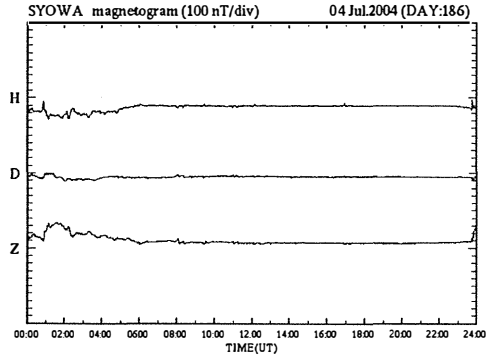
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04 Jul.2004 (DAY:186)
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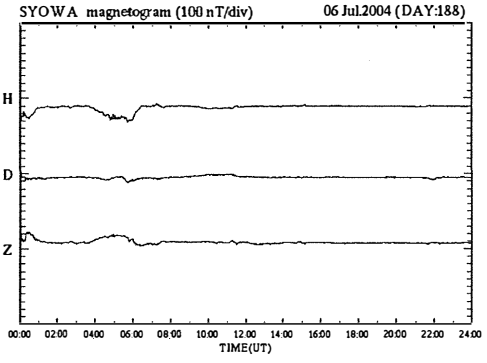
SYOWA magnetogram (100 nT/div)
06 Jul.2004 (DAY:188)
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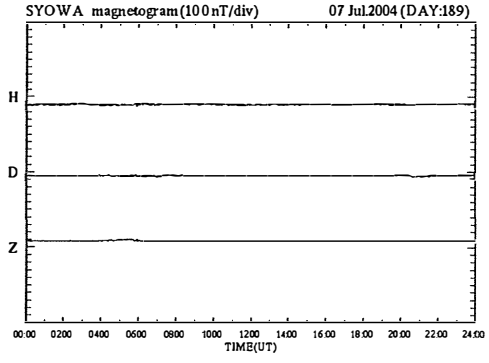
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07 Jul.2004 (DAY:189)
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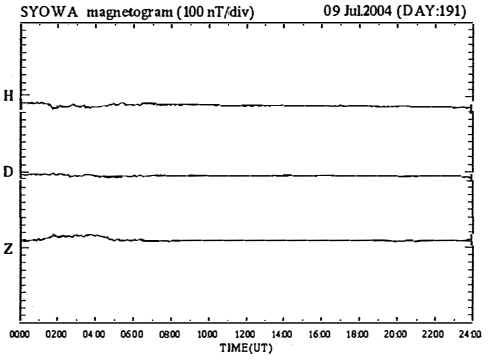
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09 Jul.2004 (DAY:191)
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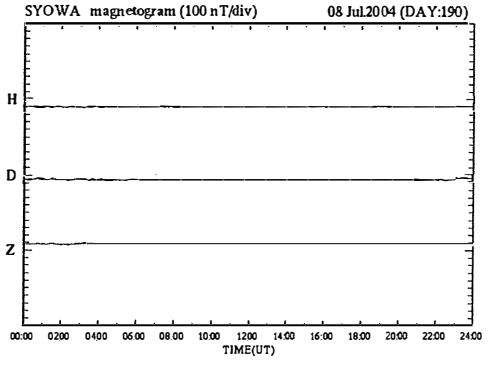
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08 Jul.2004 (DAY:190)
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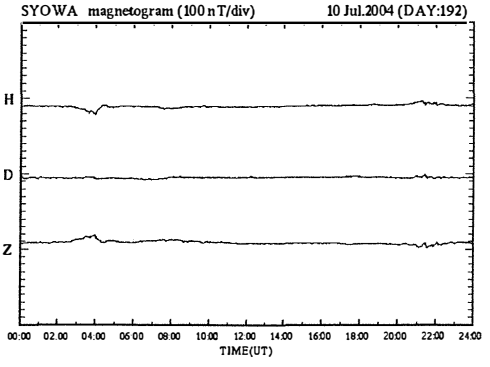
SYOWA magnetogram (100 nT/div)
10 Jul.2004 (DAY:192)
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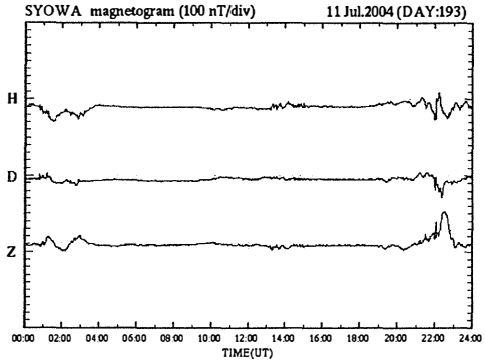
SYOWA magnetogram (100 nT/div)
11 Jul.2004 (DAY:193)
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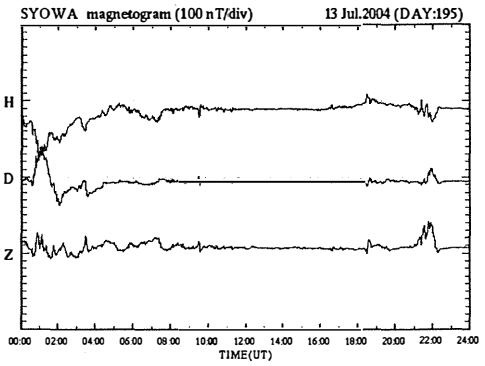
SYOWA magnetogram (100 nT/div)
13 Jul.2004 (DAY:195)
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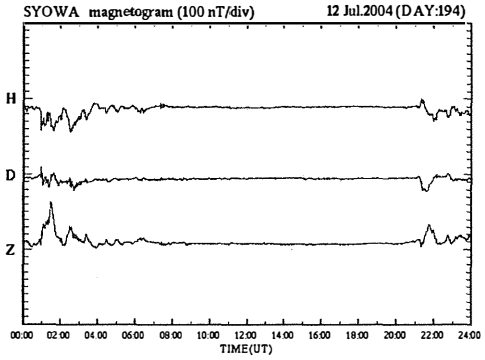
SYOWA magnetogram (100 nT/div)
12 Jul.2004 (DAY:194)
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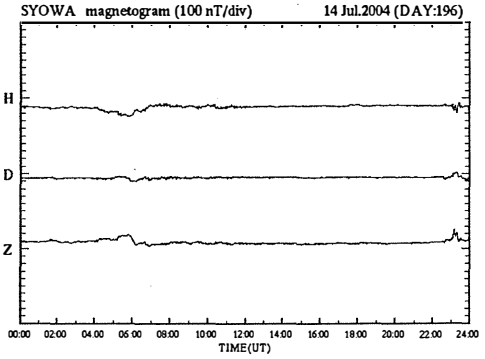
SYOWA magnetogram (100 nT/div)
14 Jul.2004 (DAY:196)
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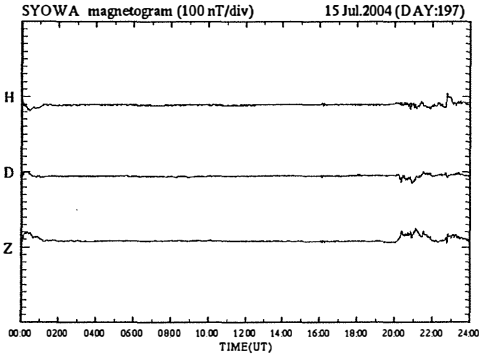
SYOWA magnetogram (100 nT/div)
15 Jul.2004 (DAY:197)
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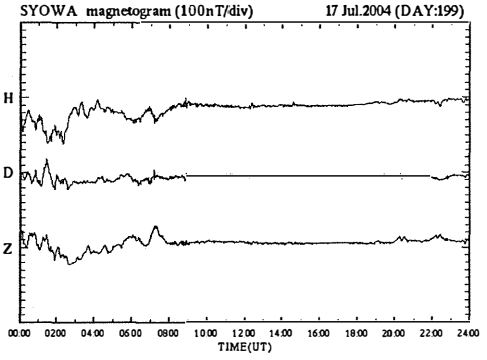
TIME(UT)


SYOWA magnetogram (100 nT/div)
17 Jul.2004 (DAY:199)
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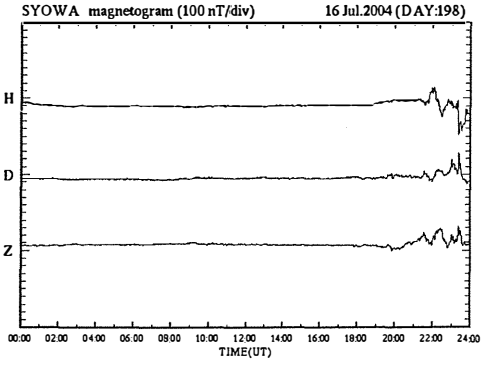
SYOWA magnetogram (100 nT/div)
16 Jul.2004 (DAY:198)
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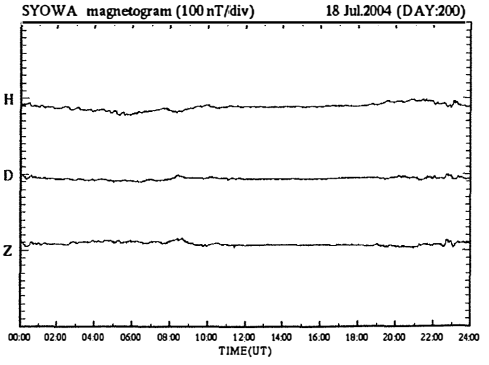
TIME(UT)


SYOWA magnetogram (100 nT/div)
18 Jul.2004 (DAY:200)
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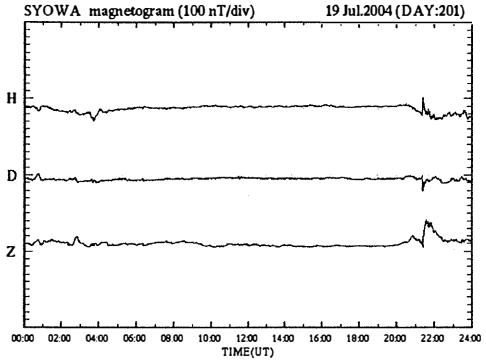
TIME(UT)


SYOWA magnetogram (100 nT/div)
19 Jul.2004 (DAY:201)
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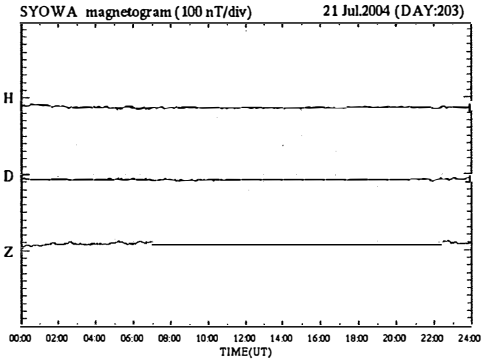
TIME(UT)


SYOWA magnetogram (100 nT/div)
21 Jul.2004 (DAY:203)
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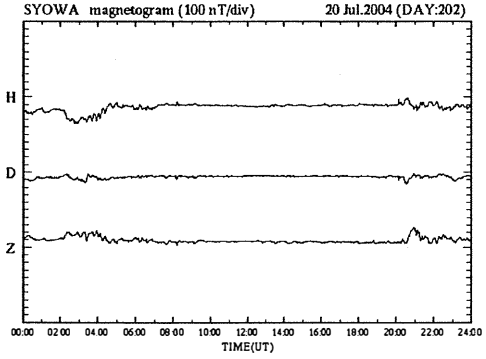
TIME(UT)


SYOWA magnetogram (100 nT/div)
20 Jul.2004 (DAY:202)
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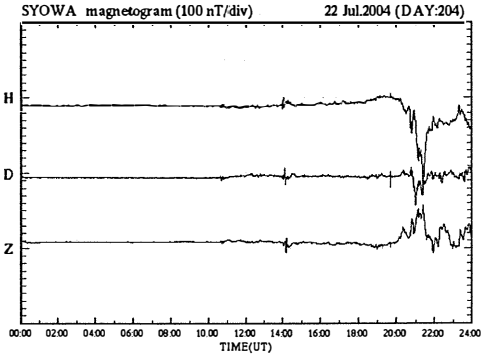
TIME(UT)


SYOWA magnetogram (100 nT/div)
22 Jul.2004 (DAY:204)
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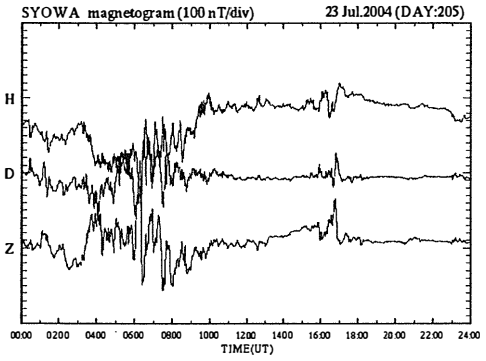
TIME(UT)


SYOWA magnetogram (100 nT/div)
23 Jul.2004 (DAY:205)
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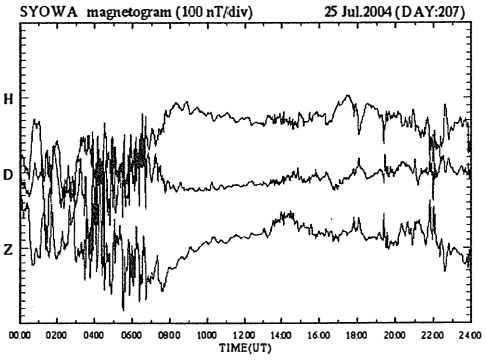
TIME(UT)


SYOWA magnetogram (100 nT/div)
25 Jul.2004 (DAY:207)
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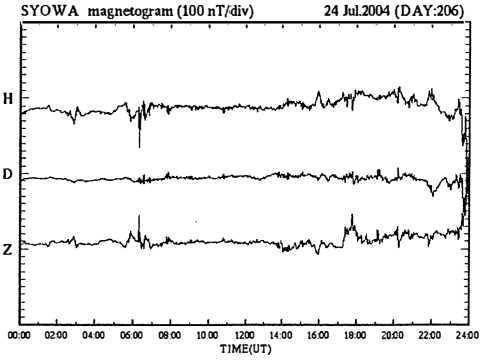
SYOWA magnetogram (100 nT/div)
24 Jul.2004 (DAY:206)
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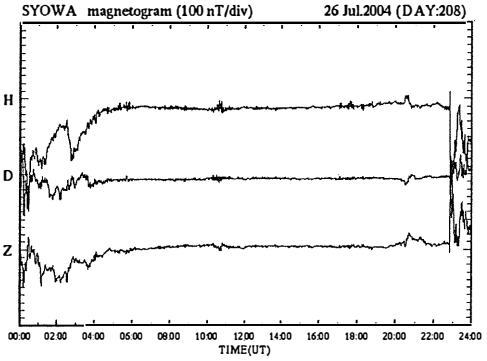
SYOWA magnetogram (100 nT/div)
26 Jul.2004 (DAY:208)
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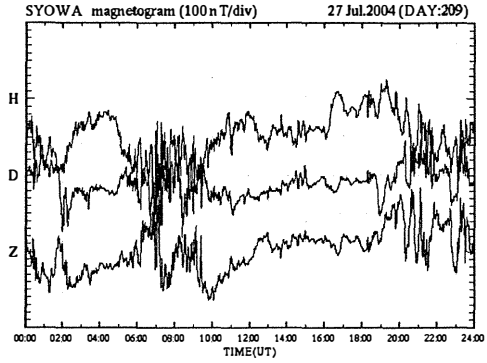
SYOWA magnetogram (100 nT/div)
27 Jul.2004 (DAY:209)
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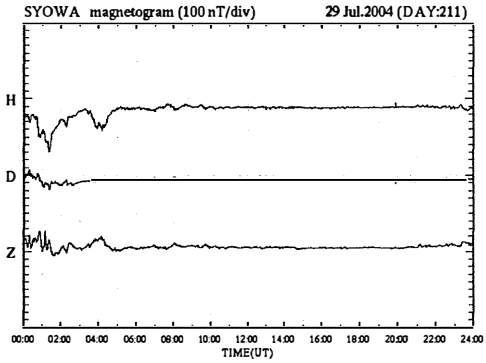
SYOWA magnetogram (100 nT/div)
29 Jul.2004 (DAY:211)
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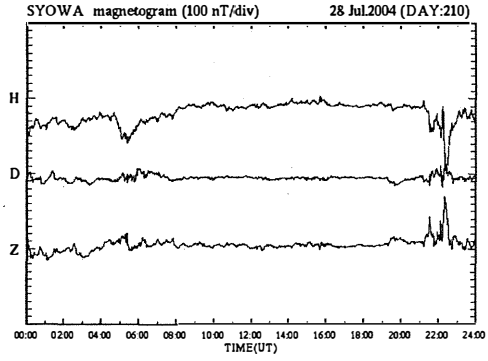
SYOWA magnetogram (100 nT/div)
28 Jul.2004 (DAY:210)
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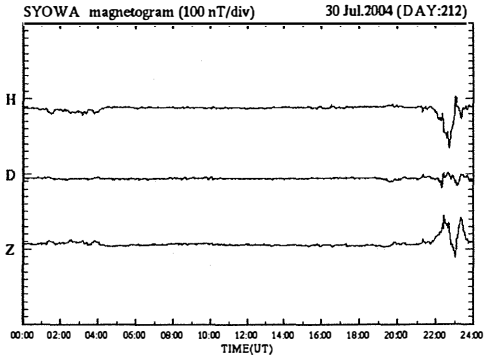
SYOWA magnetogram (100 nT/div)
30 Jul.2004 (DAY:212)
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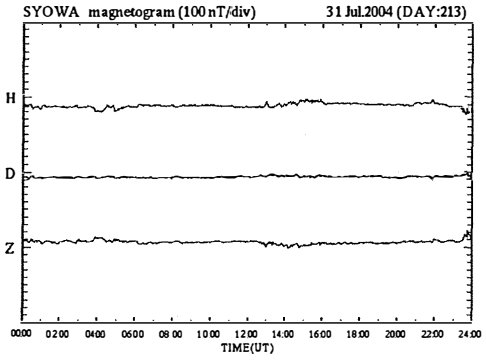
TIME(UT)


SYOWA magnetogram (100 nT/div)
31 Jul.2004 (DAY:213)
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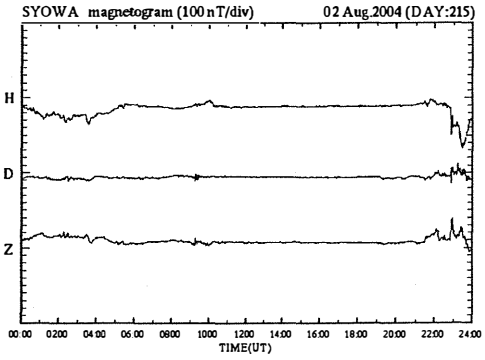
TIME(UT)


SYOWA magnetogram (100 nT/div)
02 Aug.2004 (DAY:215)
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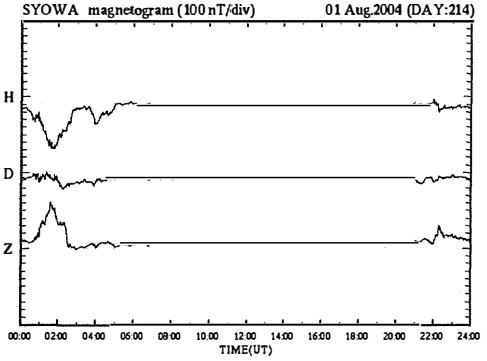
SYOWA magnetogram (100 nT/div)
01 Aug.2004 (DAY:214)
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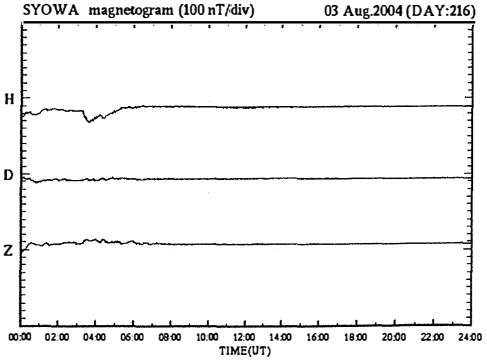
TIME(UT)


SYOWA magnetogram (100 nT/div)
03 Aug.2004 (DAY:216)
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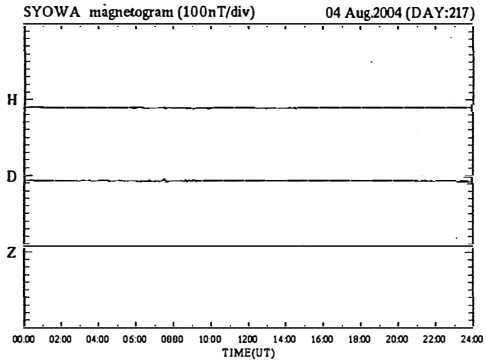
TIME(UT)


SYOWA magnetogram (100nT/div)
04 Aug.2004 (DAY:217)
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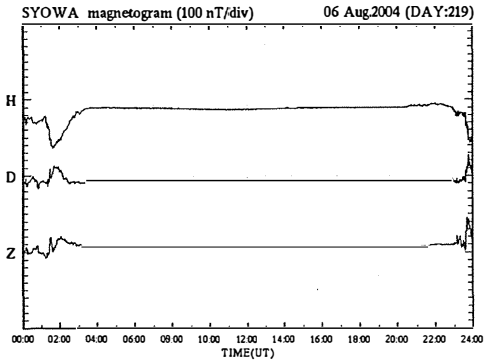
SYOWA magnetogram (100 nT/div)
06 Aug.2004 (DAY:219)
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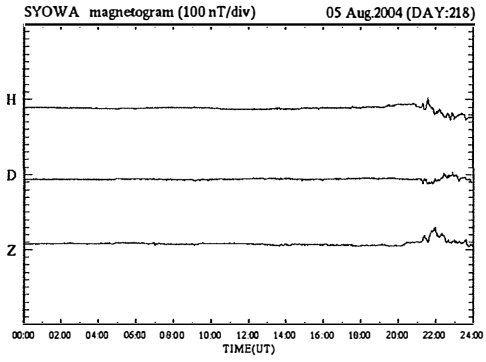
SYOWA magnetogram (100 nT/div)
05 Aug.2004 (DAY:218)
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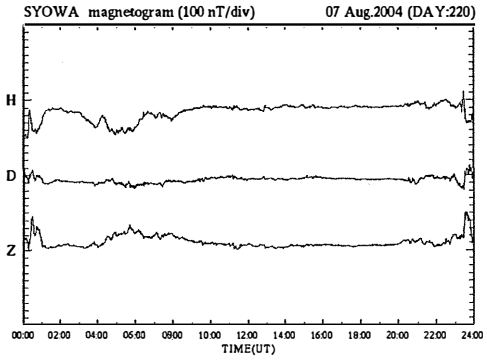
TIME(UT)


SYOWA magnetogram (100 nT/div)
07 Aug.2004 (DAY:220)
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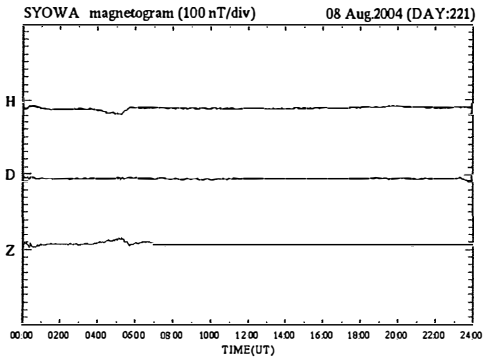
TIME(UT)


SYOWA magnetogram (100 nT/div)
08 Aug.2004 (DAY:221)
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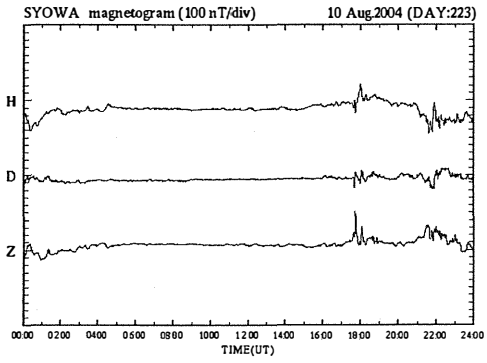
TIME(UT)


SYOWA magnetogram (100 nT/div)
10 Aug.2004 (DAY:223)
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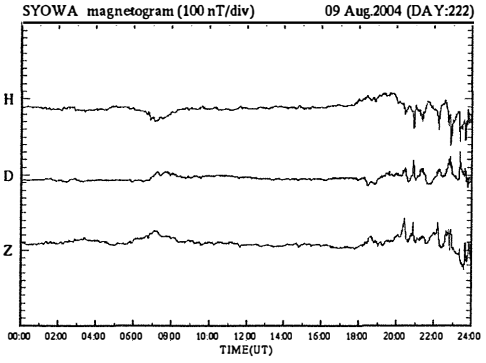
TIME(UT)


SYOWA magnetogram (100 nT/div)
09 Aug.2004 (DAY:222)
H
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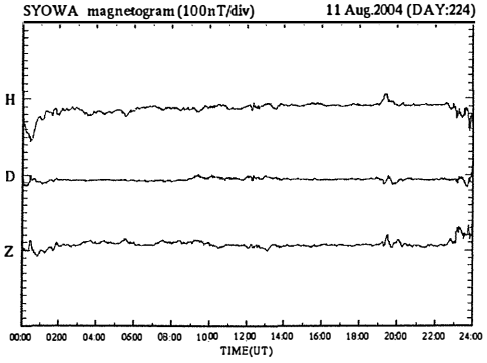
TIME(UT)


SYOWA magnetogram (100nT/div)
11 Aug.2004 (DAY:224)
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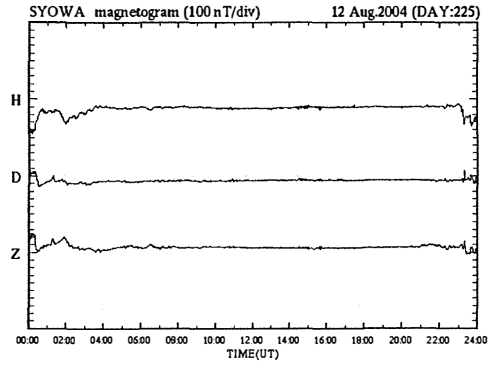
SYOWA magnetogram (100 nT/div)
12 Aug.2004 (DAY:225)
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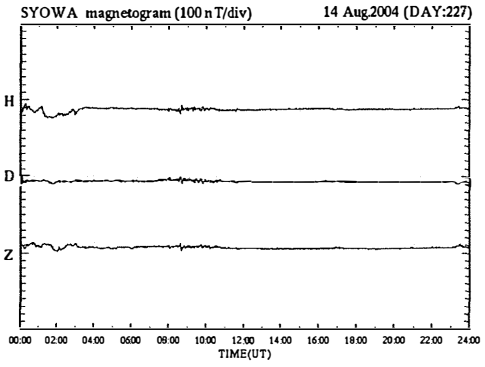
SYOWA magnetogram (100 nT/div)
14 Aug.2004 (DAY:227)
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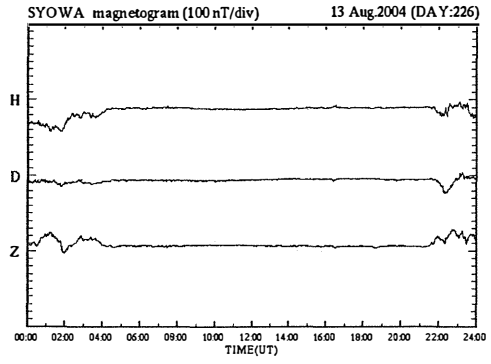
TIME(UT)


SYOWA magnetogram (100 nT/div)
13 Aug.2004 (DAY:226)
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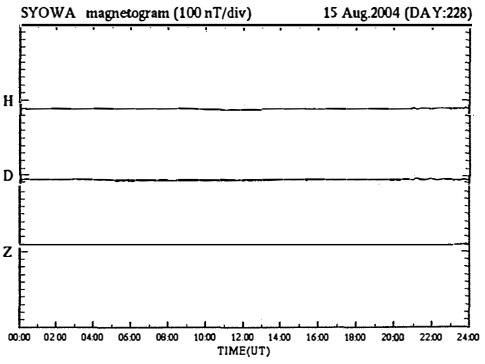
TIME(UT)


SYOWA magnetogram (100 nT/div)
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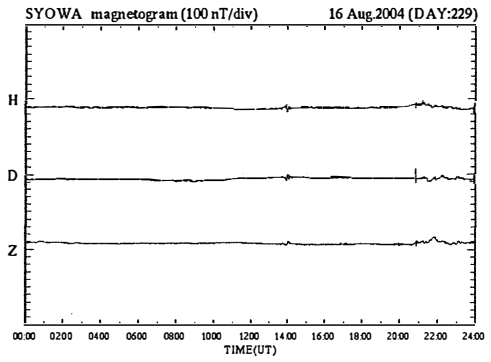
TIME(UT)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16 Aug.2004 (DAY:229)
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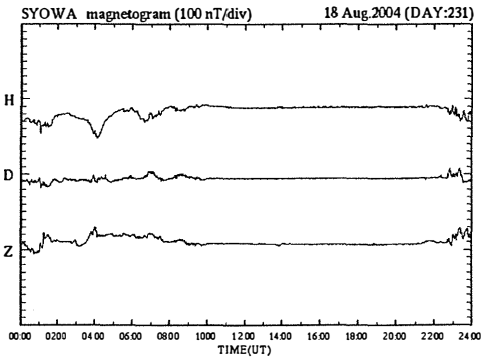
SYOWA magnetogram (100 nT/div)
18 Aug.2004 (DAY:231)
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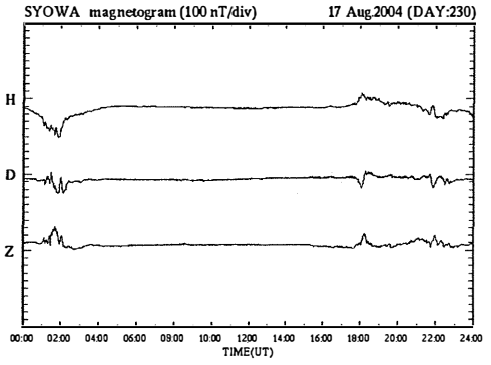
SYOWA magnetogram (100 nT/div)
17 Aug.2004 (DAY:230)
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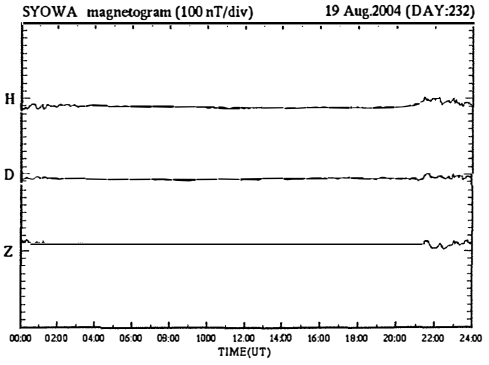
SYOWA magnetogram (100 nT/div)
19 Aug.2004 (DAY:232)
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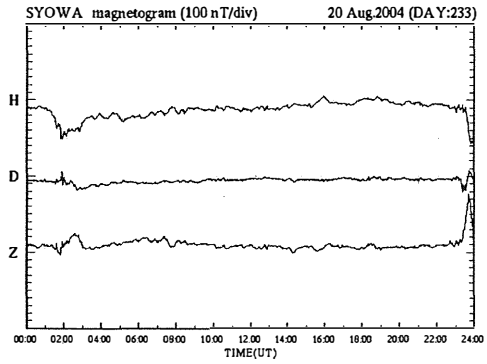
TIME(UT)


SYOWA magnetogram (100 nT/div)
20 Aug.2004 (DAY:233)
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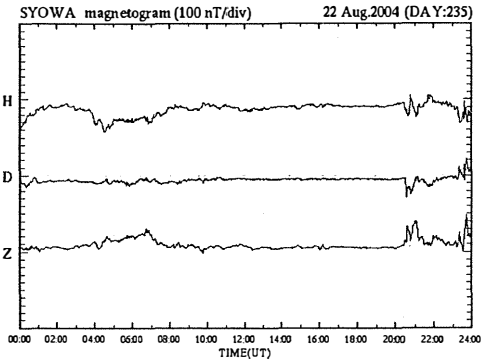
SYOWA magnetogram (100 nT/div)
22 Aug.2004 (DAY:235)
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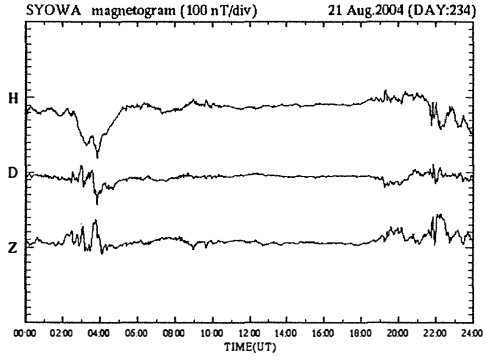
TIME(UT)


SYOWA magnetogram (100 nT/div)
21 Aug.2004 (DAY:234)
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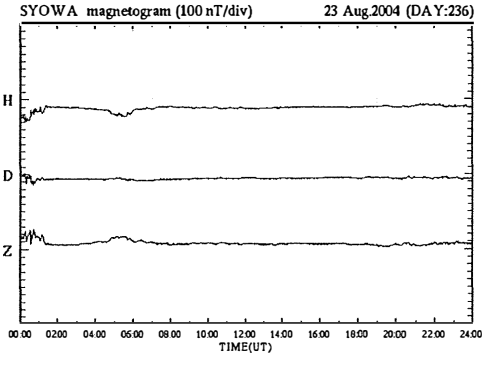
SYOWA magnetogram (100 nT/div)
23 Aug.2004 (DAY:236)
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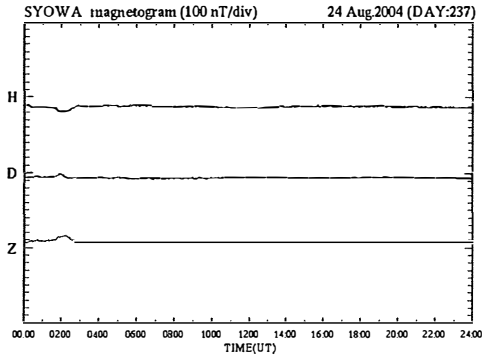
SYOWA magnetogram (100 nT/div)
24 Aug.2004 (DAY:237)
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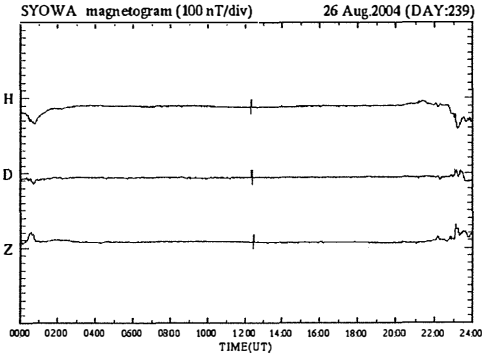
SYOWA magnetogram (100 nT/div)
26 Aug.2004 (DAY:239)
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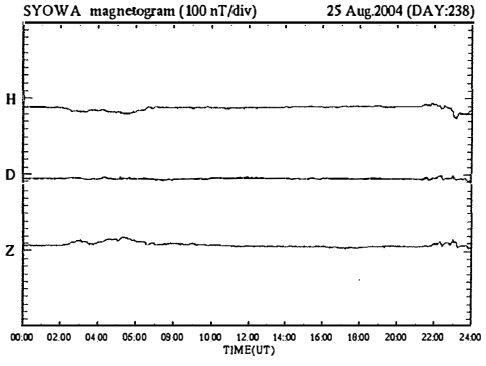
TIME(UT)


SYOWA magnetogram (100 nT/div)
25 Aug.2004 (DAY:238)
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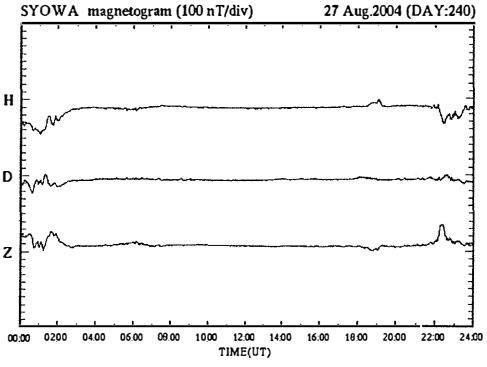
TIME(UT)


SYOWA magnetogram (100 nT/div)
27 Aug.2004 (DAY:240)
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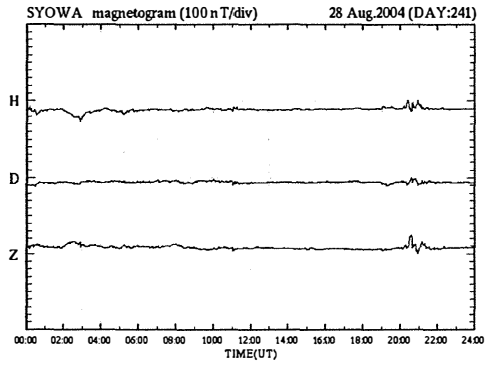
SYOWA magnetogram (100 nT/div)
28 Aug.2004 (DAY:241)
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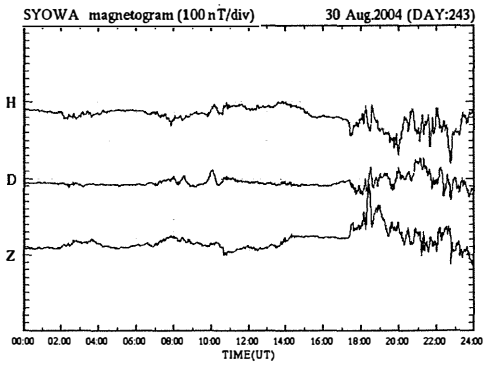
SYOWA magnetogram (100 nT/div)
30 Aug.2004 (DAY:243)
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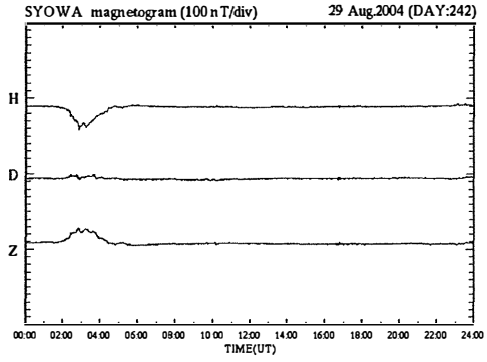
SYOWA magnetogram (100 nT/div)
29 Aug.2004 (DAY:242)
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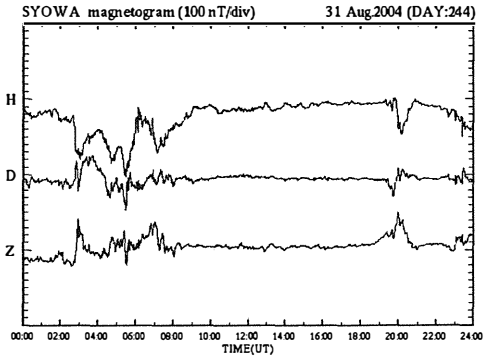
SYOWA magnetogram (100 nT/div)
31 Aug.2004 (DAY:244)
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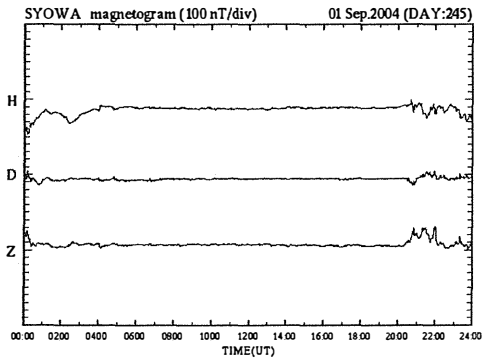
SYOWA magnetogram (100 nT/div)
01 Sep.2004 (DAY:245)
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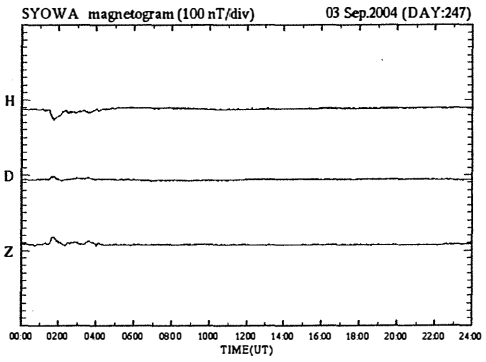
SYOWA magnetogram (100 nT/div)
03 Sep.2004 (DAY:247)
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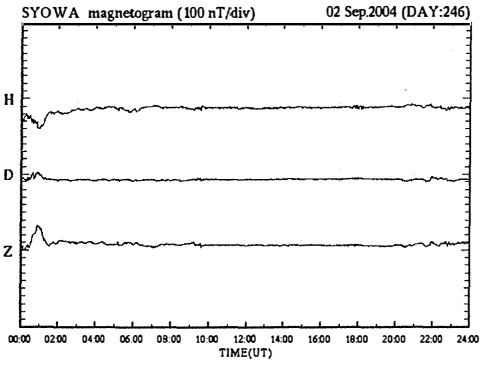
SYOWA magnetogram (100 nT/div)
02 Sep.2004 (DAY:246)
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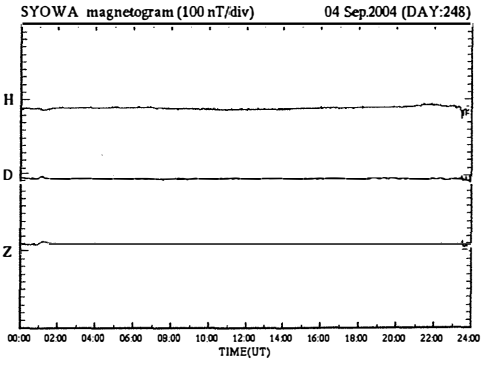
SYOWA magnetogram (100 nT/div)
04 Sep.2004 (DAY:248)
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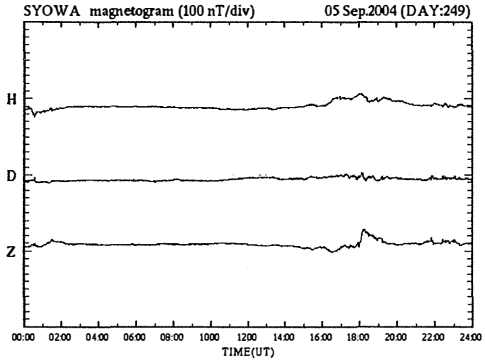
SYOWA magnetogram (100 nT/div)
05 Sep.2004 (DAY:249)
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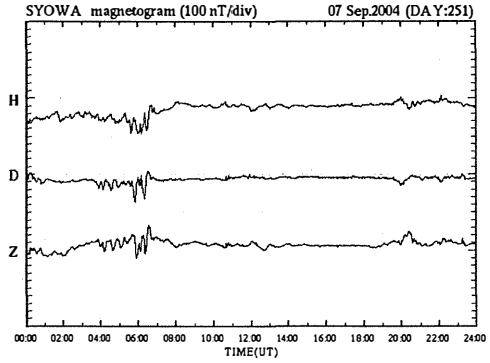
SYOWA magnetogram (100 nT/div)
07 Sep.2004 (DAY:251)
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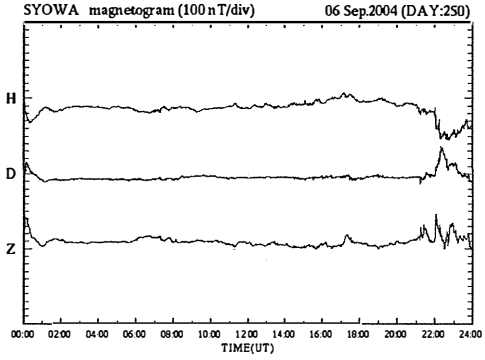
SYOWA magnetogram (100 nT/div)
06 Sep.2004 (DAY:250)
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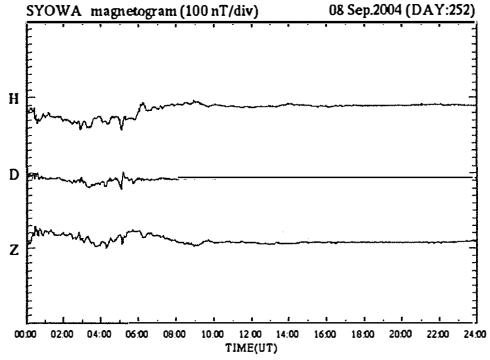
SYOWA magnetogram (100 nT/div)
08 Sep.2004 (DAY:252)
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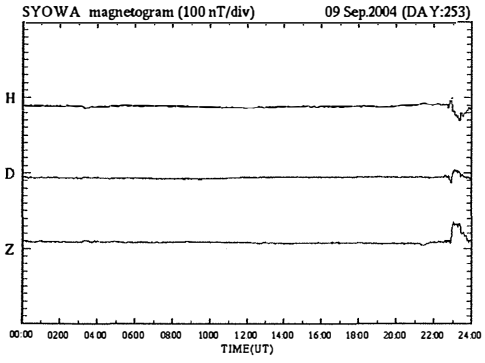
SYOWA magnetogram (100 nT/div)
09 Sep.2004 (DAY:253)
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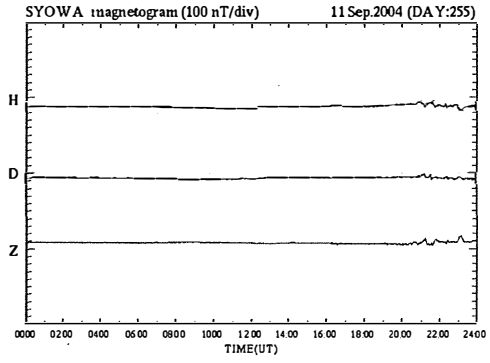
SYOWA magnetogram (100 nT/div)
11 Sep.2004 (DAY:255)
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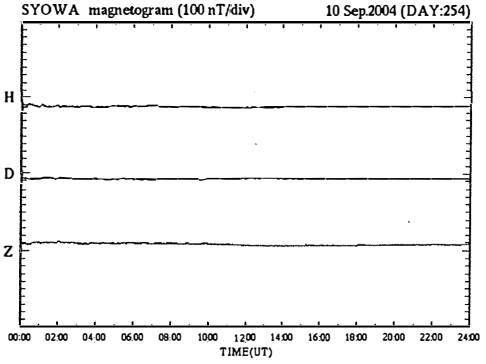
SYOWA magnetogram (100 nT/div)
10 Sep.2004 (DAY:254)
H
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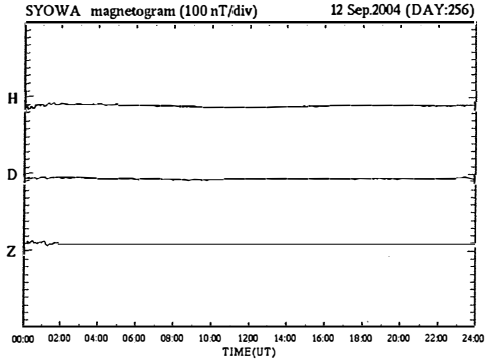
TIME(UT)


SYOWA magnetogram (100 nT/div)
12 Sep.2004 (DAY:256)
H
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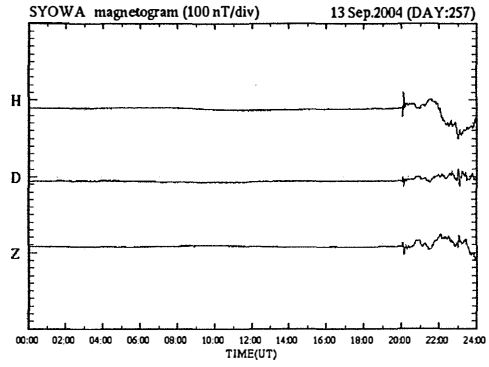
TIME(UT)


SYOWA magnetogram (100 nT/div)
13 Sep.2004 (DAY:257)
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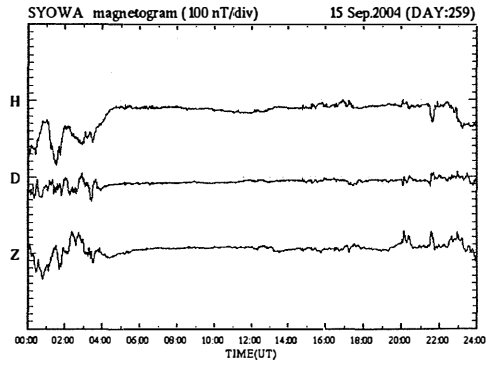
TIME(UT)


SYOWA magnetogram (100 nT/div)
15 Sep.2004 (DAY:259)
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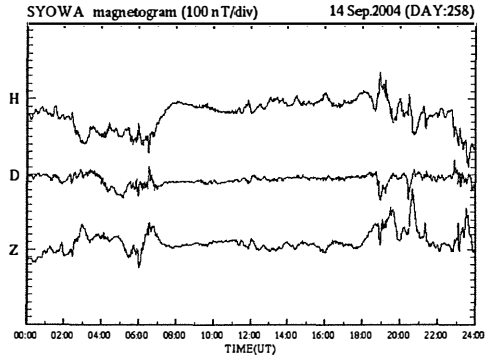
TIME(UT)


SYOWA magnetogram (100 nT/div)
14 Sep.2004 (DAY:258)
H
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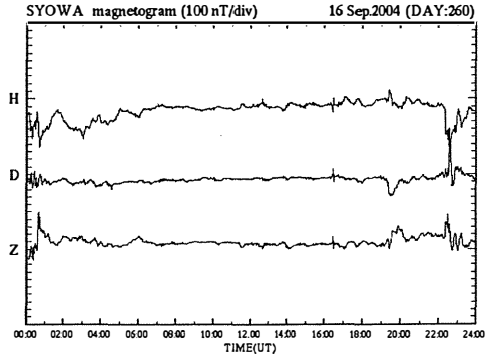
TIME(UT)


SYOWA magnetogram (100 nT/div)
16 Sep.2004 (DAY:260)
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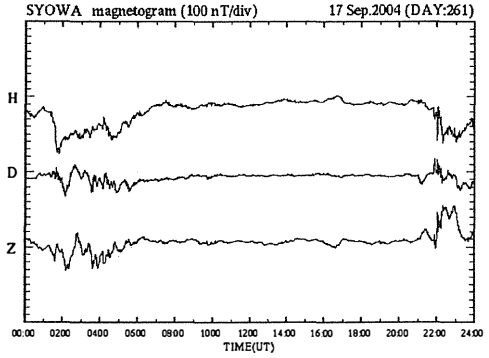
SYOWA magnetogram (100 nT/div)
17 Sep.2004 (DAY:261)
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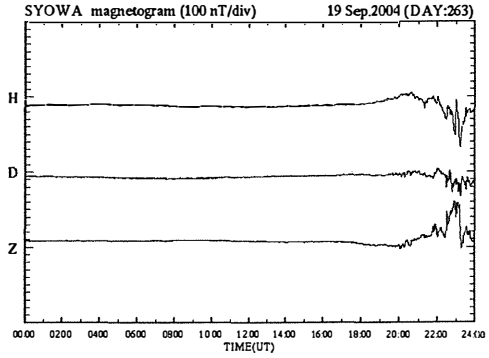
TIME(UT)


SYOWA magnetogram (100 nT/div)
19 Sep.2004 (DAY:263)
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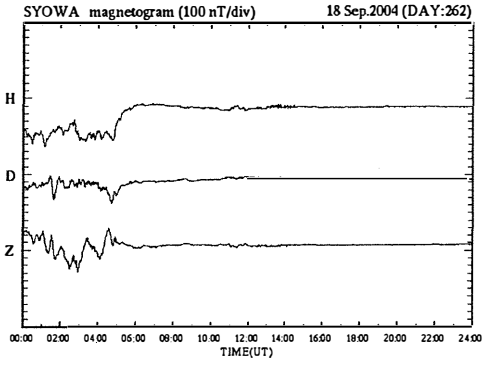
TIME(UT)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18 Sep.2004 (DAY:262)
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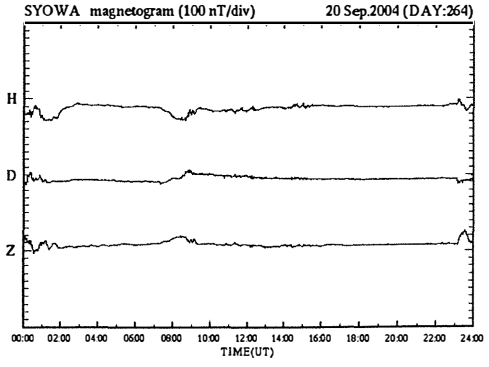
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20 Sep.2004 (DAY:264)
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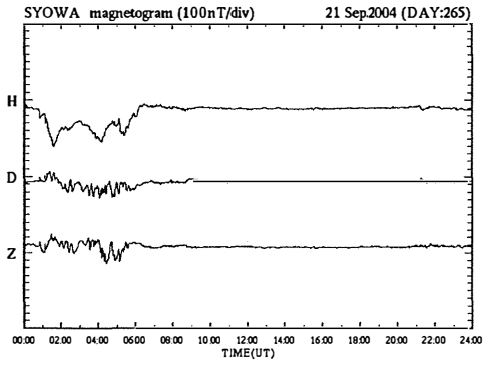
TIME(UT)


SYOWA magnetogram (100nT/div)
21 Sep.2004 (DAY:265)
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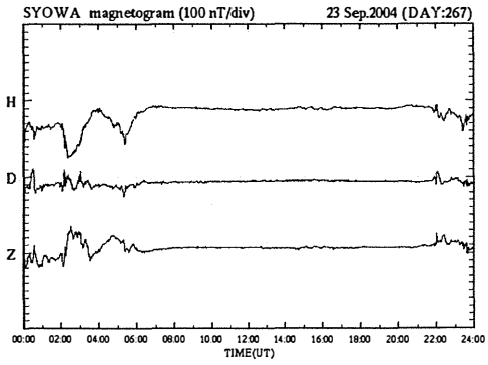
TIME(UT)


SYOWA magnetogram (100 nT/div)
23 Sep.2004 (DAY:267)
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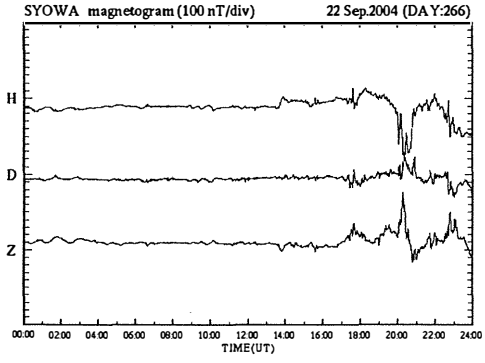
TIME(UT)


SYOWA magnetogram (100 nT/div)
22 Sep.2004 (DAY:266)
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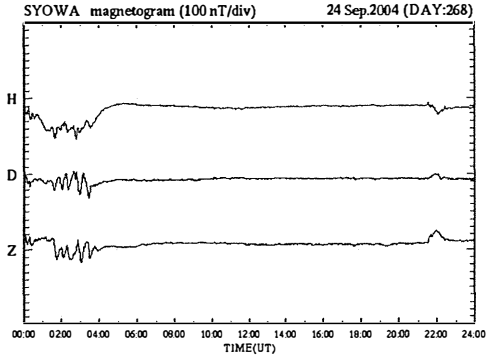
SYOWA magnetogram (100 nT/div)
24 Sep.2004 (DAY:268)
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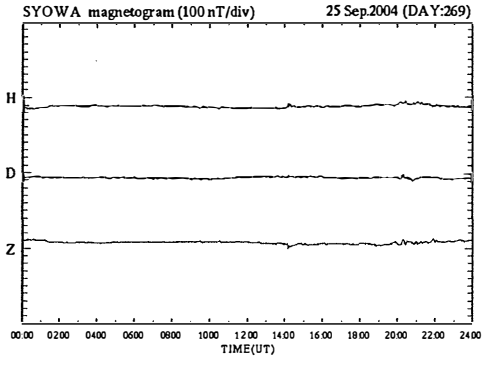
TIME(UT)


SYOWA magnetogram (100 nT/div)
25 Sep.2004 (DAY:269)
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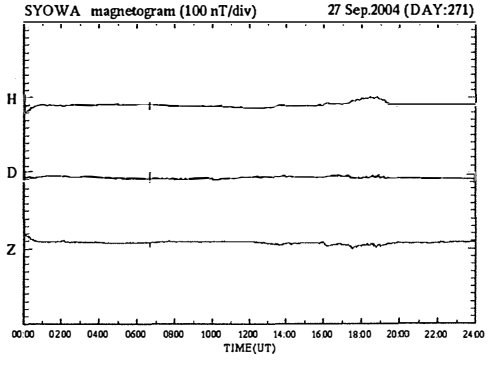
TIME(UT)


SYOWA magnetogram (100 nT/div)
27 Sep.2004 (DAY:271)
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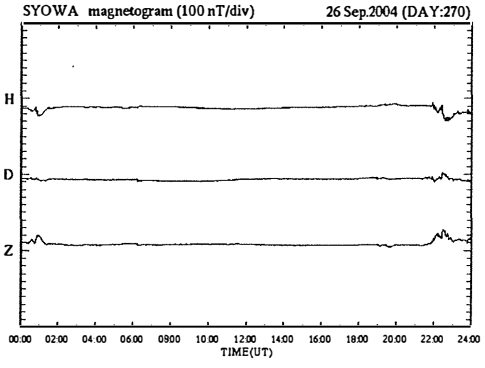
TIME(UT)


SYOWA magnetogram (100 nT/div)
26 Sep.2004 (DAY:270)
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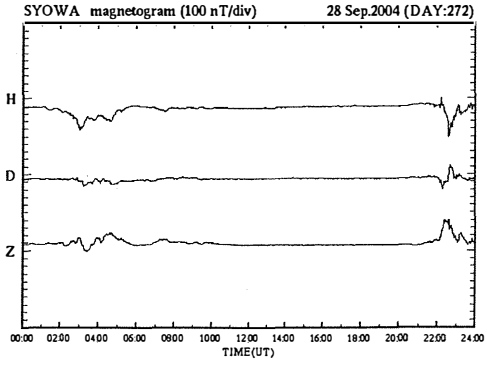
TIME(UT)


SYOWA magnetogram (100 nT/div)
28 Sep.2004 (DAY:272)
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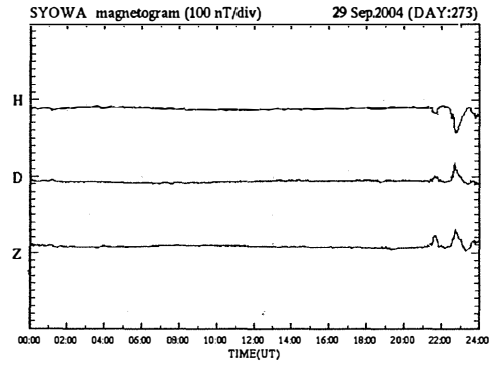
TIME(UT)


SYOWA magnetogram (100 nT/div)
29 Sep.2004 (DAY:273)
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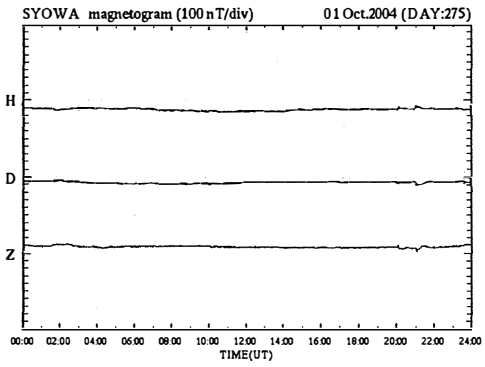
TIME(UT)


SYOWA magnetogram (100 nT/div)
01 Oct.2004 (DAY:275)
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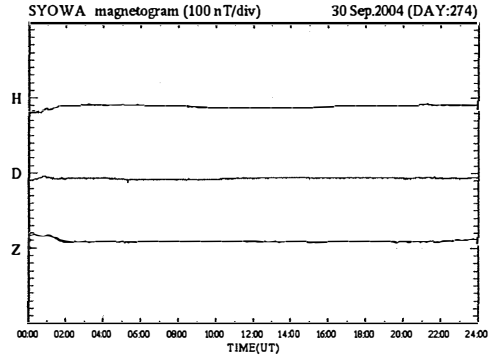
TIME(UT)


SYOWA magnetogram (100 nT/div)
30 Sep.2004 (DAY:274)
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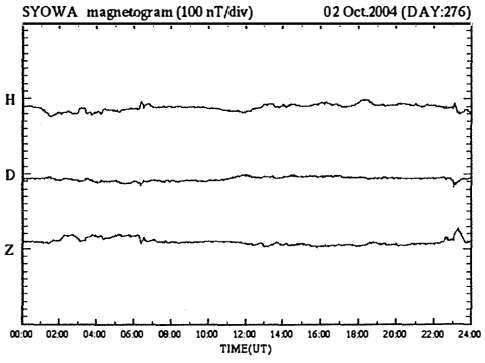
TIME(UT)


SYOWA magnetogram (100 nT/div)
02 Oct.2004 (DAY:276)
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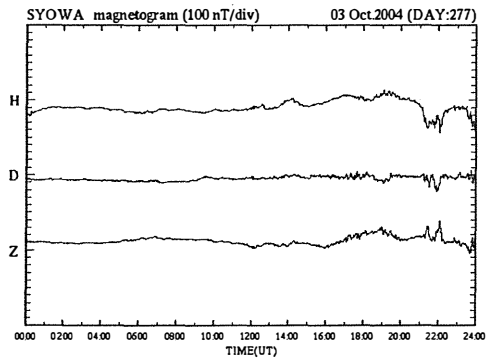
TIME(UT)


SYOWA magnetogram (100 nT/div)
03 Oct.2004 (DAY:277)
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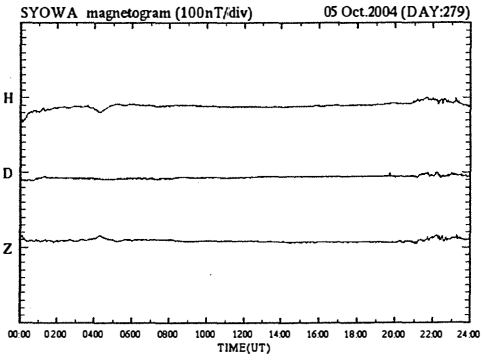
TIME(UT)


SYOWA magnetogram (100 nT/div)
05 Oct.2004 (DAY:279)
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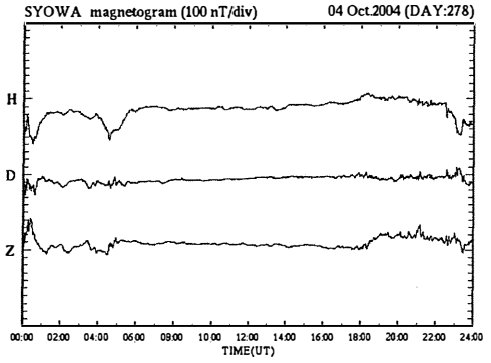
TIME(UT)


SYOWA magnetogram (100 nT/div)
04 Oct.2004 (DAY:278)
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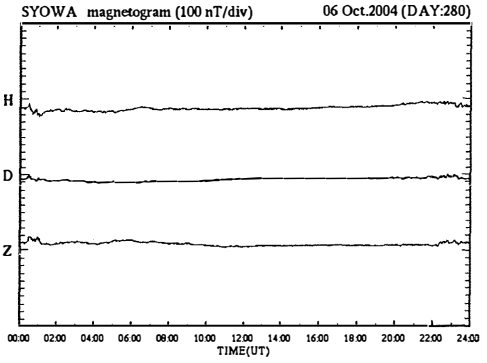
TIME(UT)


SYOWA magnetogram (100 nT/div)
06 Oct.2004 (DAY:280)
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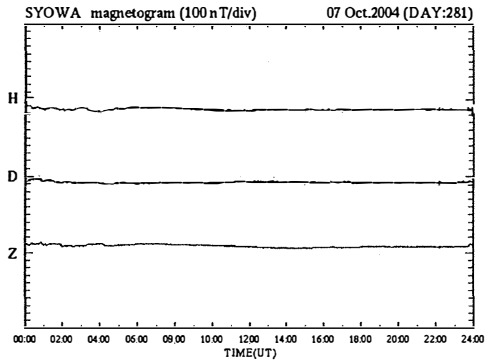
SYOWA magnetogram (100 nT/div)
07 Oct.2004 (DAY:281)
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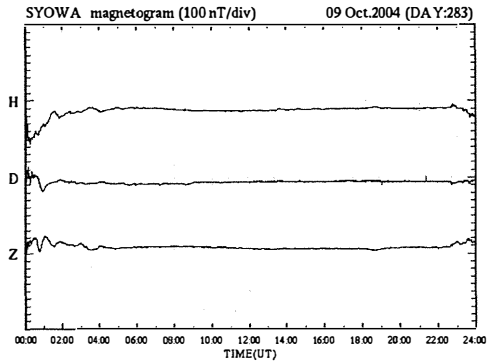
TIME(UT)


SYOWA magnetogram (100 nT/div)
09 Oct.2004 (DAY:283)
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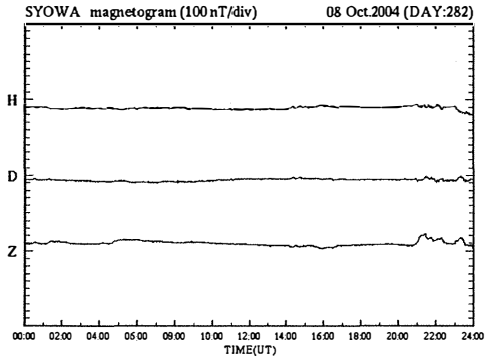
TIME(UT)


SYOWA magnetogram (100 nT/div)
08 Oct.2004 (DAY:282)
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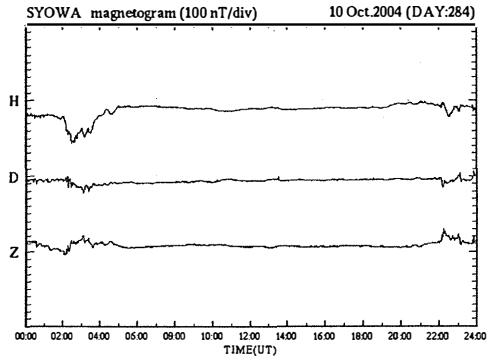
TIME(UT)


SYOWA magnetogram (100 nT/div)
10 Oct.2004 (DAY:284)
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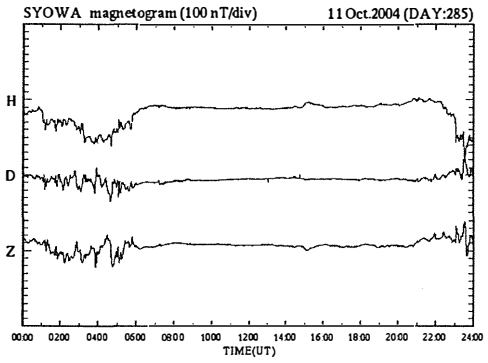
SYOWA magnetogram (100 nT/div)
11 Oct.2004 (DAY:285)
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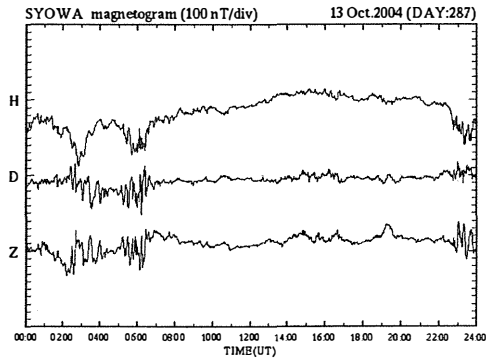
TIME(UT)


SYOWA magnetogram (100 nT/div)
13 Oct.2004 (DAY:287)
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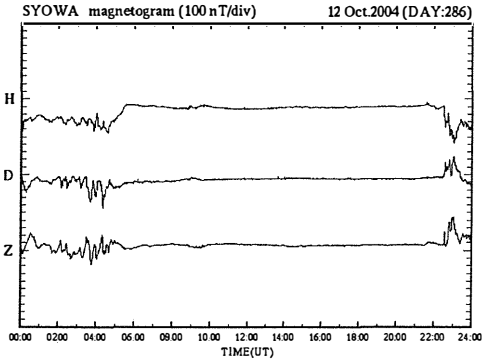
TIME(UT)


SYOWA magnetogram (100 nT/div)
12 Oct.2004 (DAY:286)
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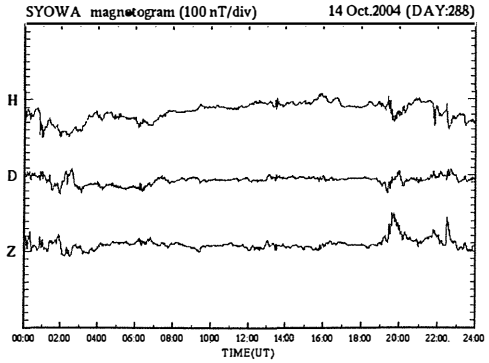
TIME(UT)


SYOWA magnetogram (100 nT/div)
14 Oct.2004 (DAY:288)
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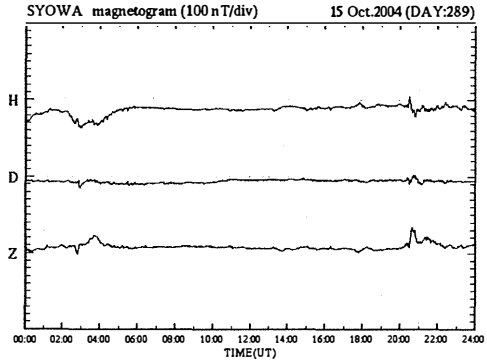
TIME(UT)


SYOWA magnetogram (100 nT/div)
15 Oct.2004 (DAY:289)
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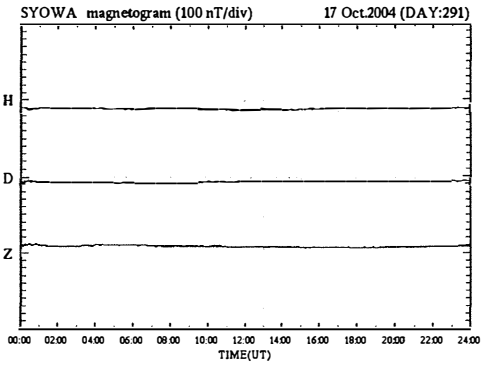
TIME(UT)


SYOWA magnetogram (100 nT/div)
17 Oct.2004 (DAY:291)
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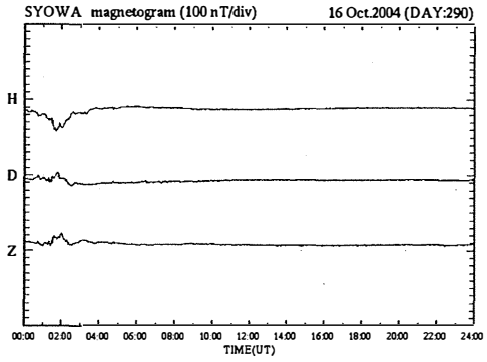
TIME(UT)


SYOWA magnetogram (100 nT/div)
16 Oct.2004 (DAY:290)
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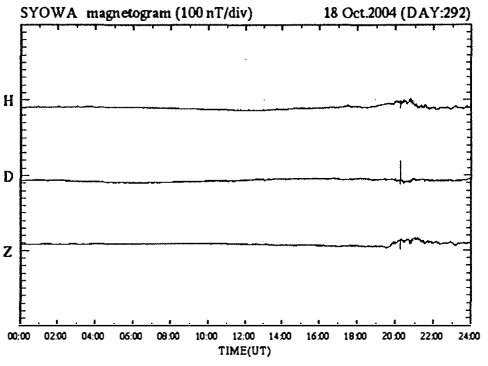
TIME(UT)


SYOWA magnetogram (100 nT/div)
18 Oct.2004 (DAY:292)
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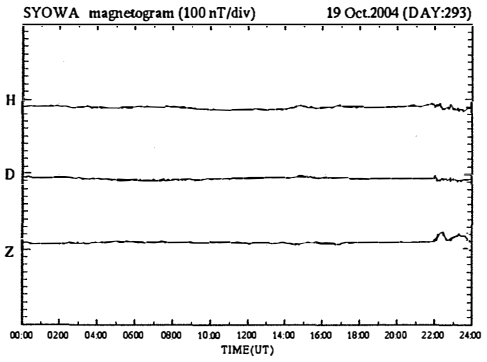
TIME(UT)


SYOWA magnetogram (100 nT/div)
19 Oct.2004 (DAY:293)
H
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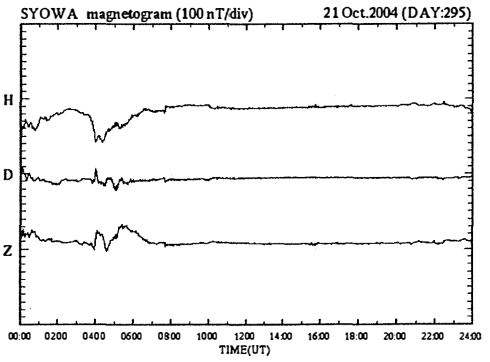
TIME(UT)


SYOWA magnetogram (100 nT/div)
21 Oct.2004 (DAY:295)
H
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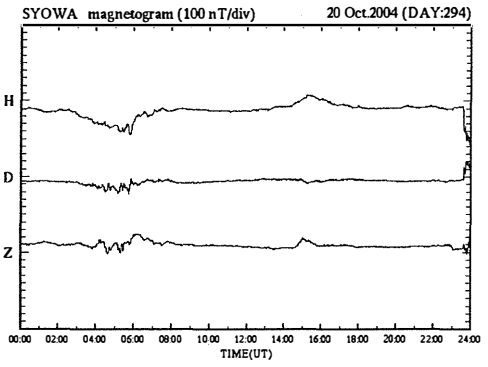
TIME(UT)


SYOWA magnetogram (100 nT/div)
20 Oct.2004 (DAY:294)
H
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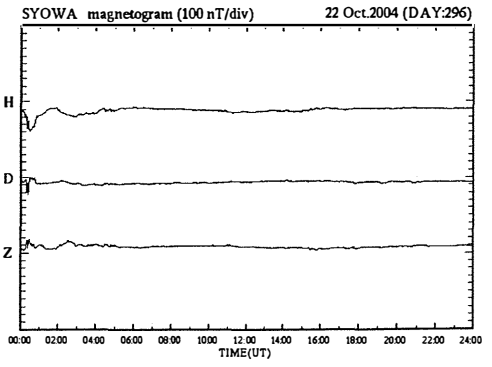
TIME(UT)


SYOWA magnetogram (100 nT/div)
22 Oct.2004 (DAY:296)
H
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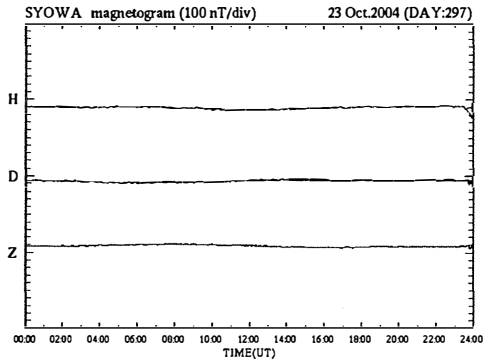
TIME(UT)


SYOWA magnetogram (100 nT/div)
23 Oct.2004 (DAY:297)
H
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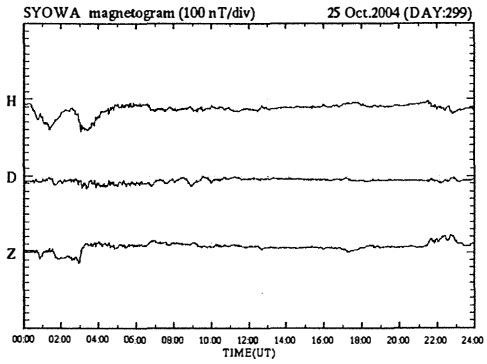
TIME(UT)


SYOWA magnetogram (100 nT/div)
25 Oct.2004 (DAY:299)
H
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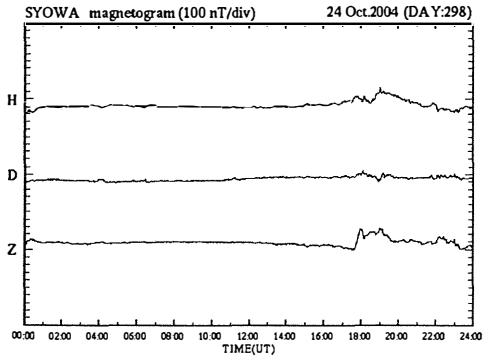
TIME(UT)


SYOWA magnetogram (100 nT/div)
24 Oct.2004 (DAY:298)
H
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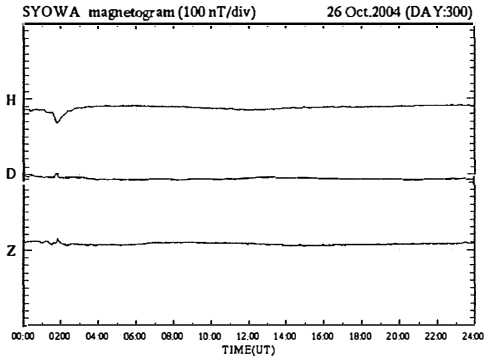
TIME(UT)


SYOWA magnetogram (100 nT/div)
26 Oct.2004 (DAY:300)
H
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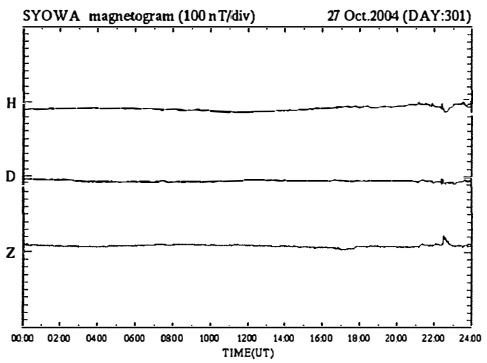
TIME(UT)


SYOWA magnetogram (100 nT/div)
27 Oct.2004 (DAY:301)
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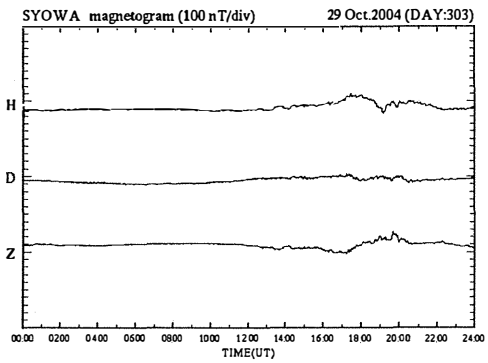
SYOWA magnetogram (100 nT/div)
29 Oct.2004 (DAY:303)
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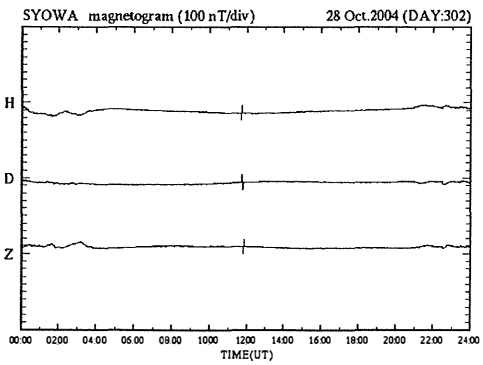
SYOWA magnetogram (100 nT/div)
28 Oct.2004 (DAY:302)
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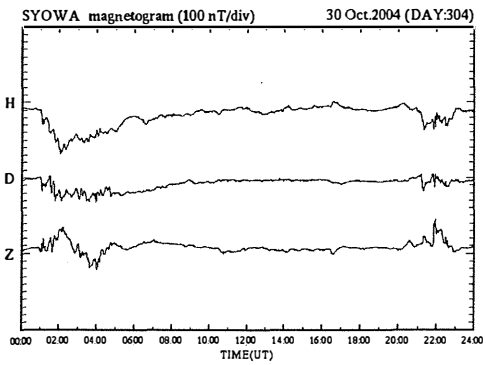
SYOWA magnetogram (100 nT/div)
30 Oct.2004 (DAY:304)
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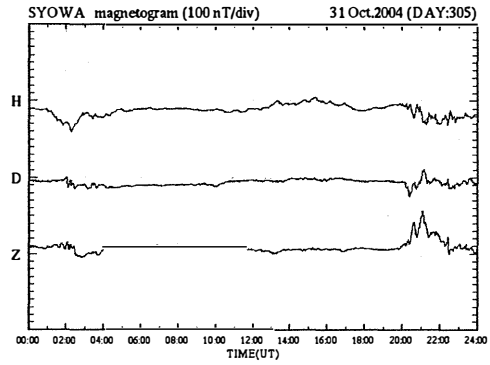
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31 Oct.2004 (DAY:305)
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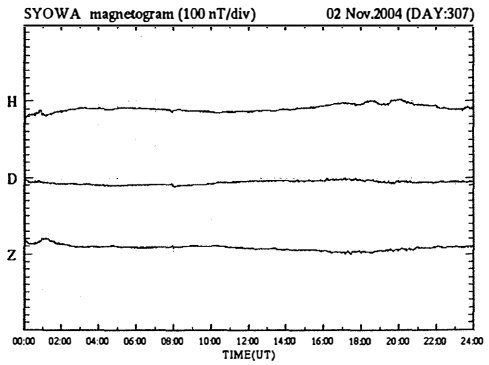
TIME(UT)


SYOWA magnetogram (100 nT/div)
02 Nov.2004 (DAY:307)
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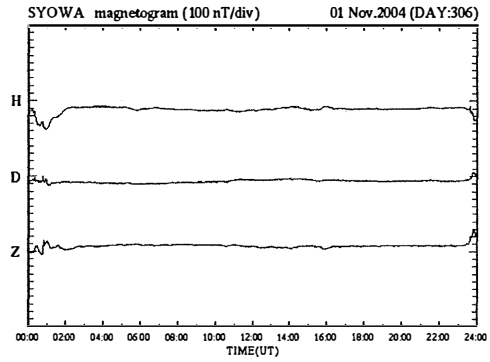
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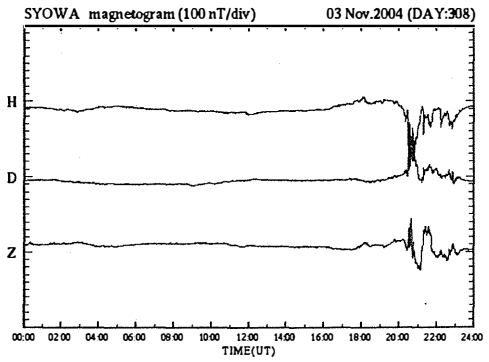
SYOWA magnetogram (100 nT/div)
03 Nov.2004 (DAY:308)
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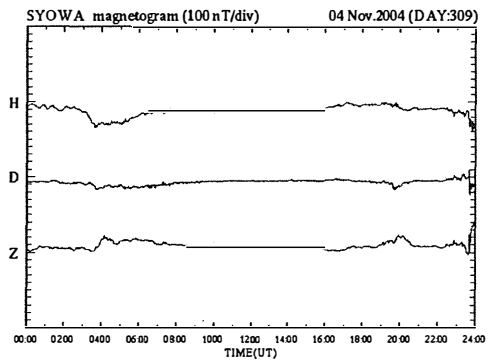
SYOWA magnetogram (100 nT/div)
04 Nov.2004 (DAY:309)
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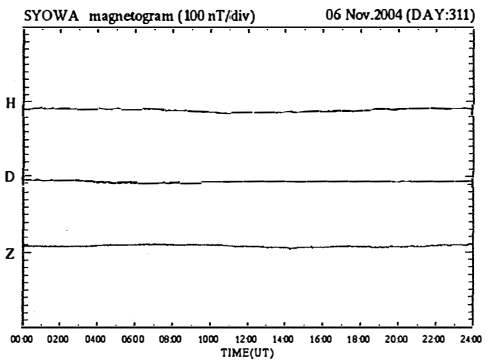
SYOWA magnetogram (100 nT/div)
06 Nov.2004 (DAY:311)
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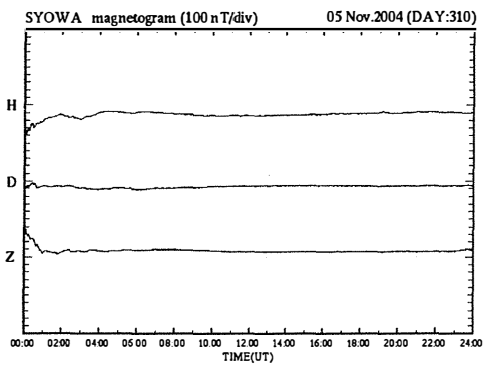
SYOWA magnetogram (100 nT/div)
05 Nov.2004 (DAY:310)
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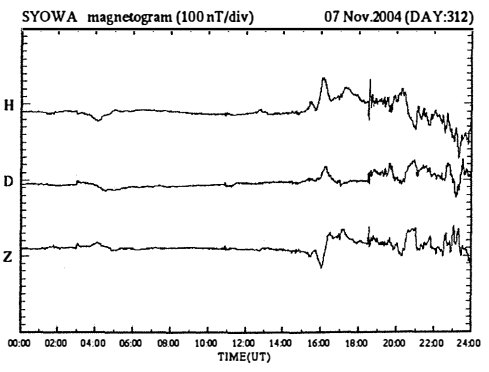
TIME(UT)


SYOWA magnetogram (100 nT/div)
07 Nov.2004 (DAY:312)
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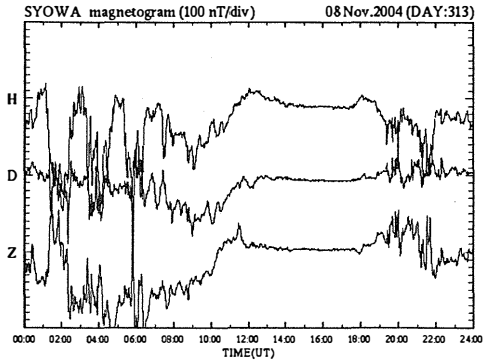
SYOWA magnetogram (100 nT/div)
08 Nov.2004 (DAY:313)
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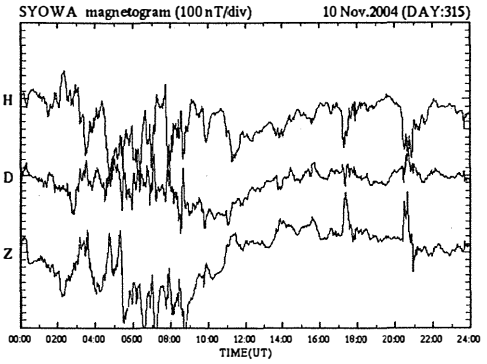
TIME(UT)


SYOWA magnetogram (100 nT/div)
10 Nov.2004 (DAY:315)
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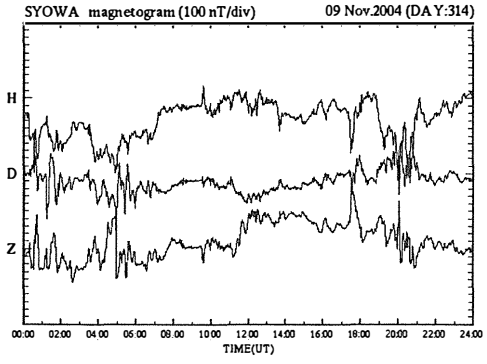
TIME(UT)


SYOWA magnetogram (100 nT/div)
09 Nov.2004 (DAY:314)
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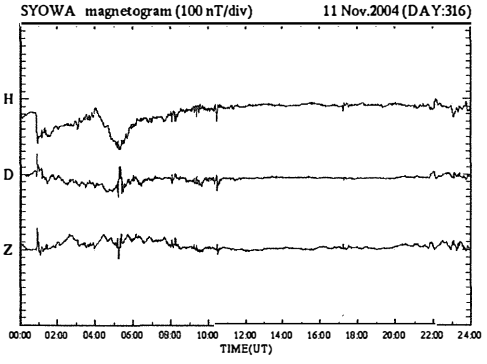
TIME(UT)


SYOWA magnetogram (100 nT/div)
11 Nov.2004 (DAY:316)
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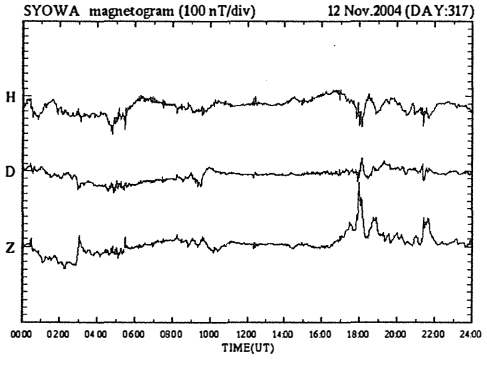
TIME(UT)


SYOWA magnetogram (100 nT/div)
12 Nov.2004 (DAY:317)
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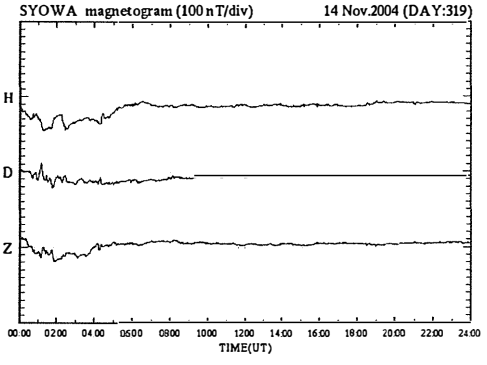
SYOWA magnetogram (100 nT/div)
14 Nov.2004 (DAY:319)
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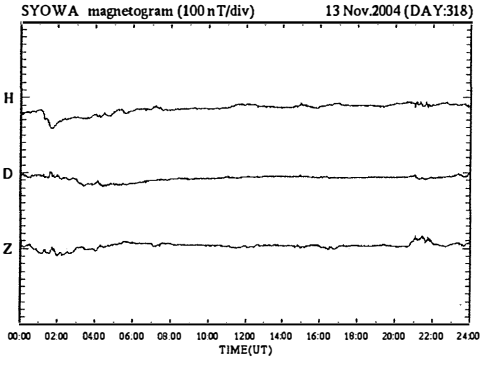
TIME(UT)


SYOWA magnetogram (100 nT/div)
13 Nov.2004 (DAY:318)
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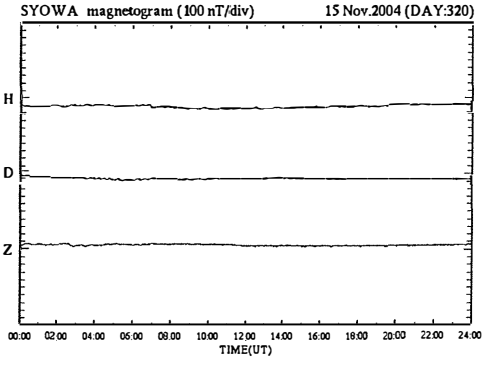
SYOWA magnetogram (100 nT/div)
15 Nov.2004 (DAY:320)
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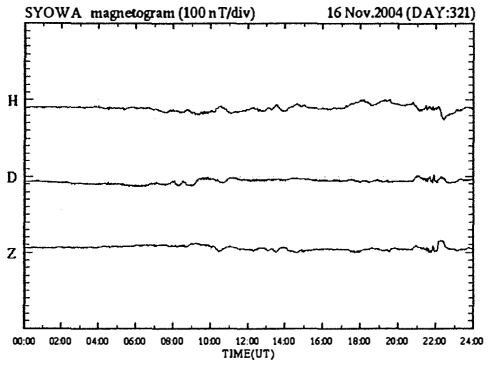
SYOWA magnetogram (100 nT/div)
16 Nov.2004 (DAY:321)
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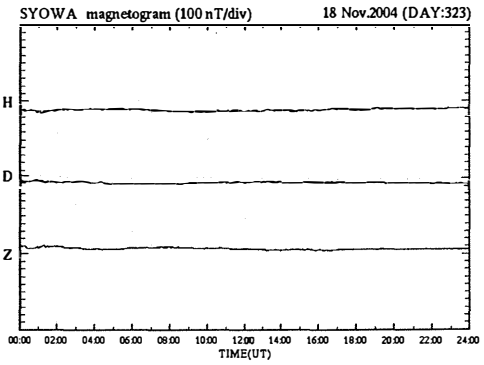
SYOWA magnetogram (100 nT/div)
18 Nov.2004 (DAY:323)
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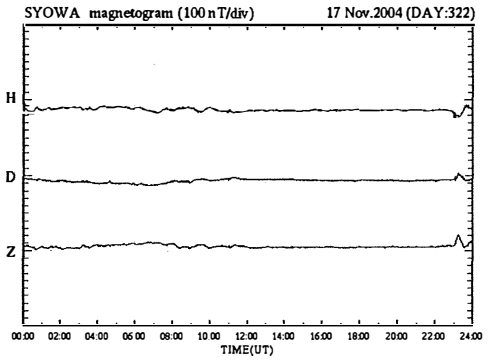
SYOWA magnetogram (100 nT/div)
17 Nov.2004 (DAY:322)
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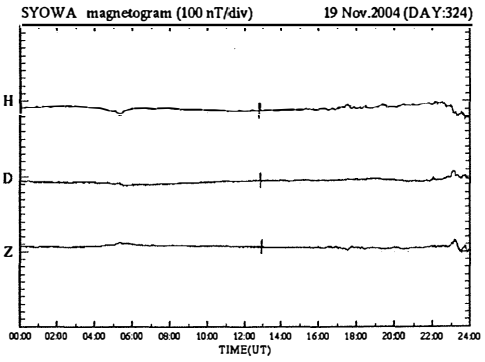
SYOWA magnetogram (100 nT/div)
19 Nov.2004 (DAY:324)
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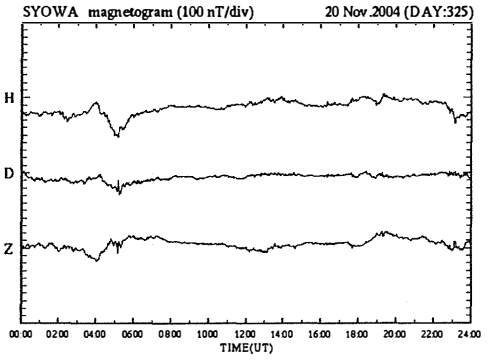
SYOWA magnetogram (100 nT/div)
20 Nov.2004 (DAY:325)
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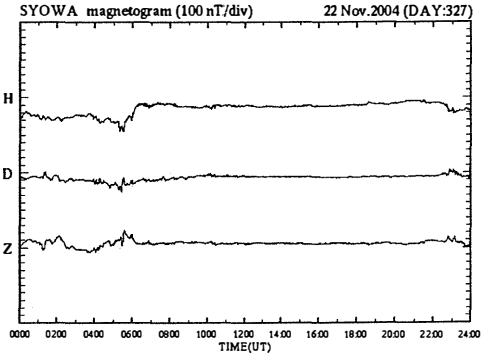
SYOWA magnetogram (100 nT/div)
22 Nov.2004 (DAY:327)
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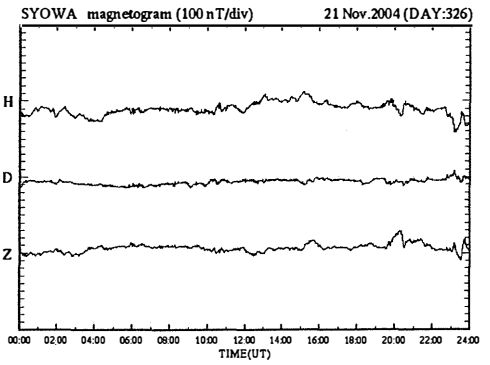
TIME(UT)


SYOWA magnetogram (100 nT/div)
21 Nov.2004 (DAY:326)
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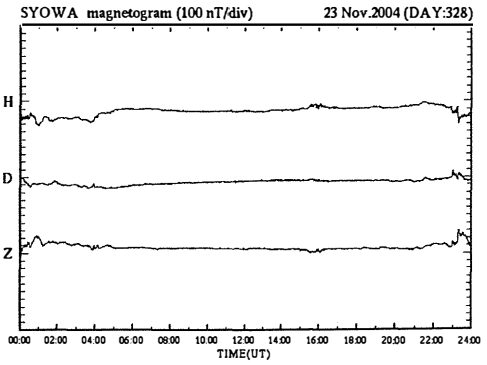
TIME(UT)


SYOWA magnetogram (100 nT/div)
23 Nov.2004 (DAY:328)
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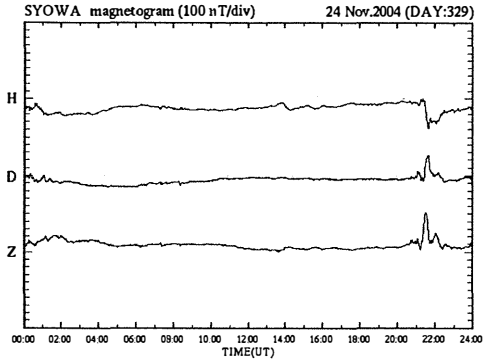
SYOWA magnetogram (100 nT/div)
24 Nov.2004 (DAY:329)
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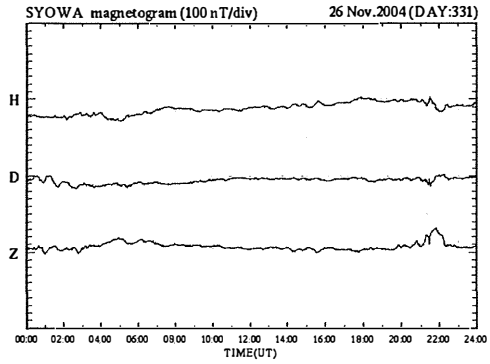
TIME(UT)


SYOWA magnetogram (100 nT/div)
26 Nov.2004 (DAY:331)
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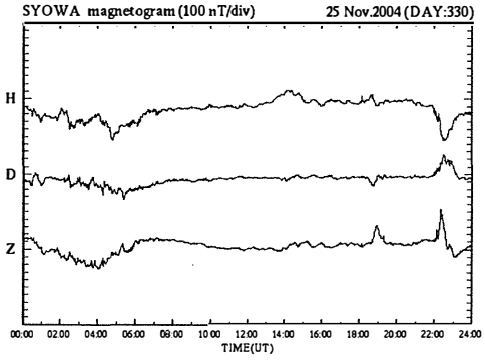
SYOWA magnetogram (100 nT/div)
25 Nov.2004 (DAY:330)
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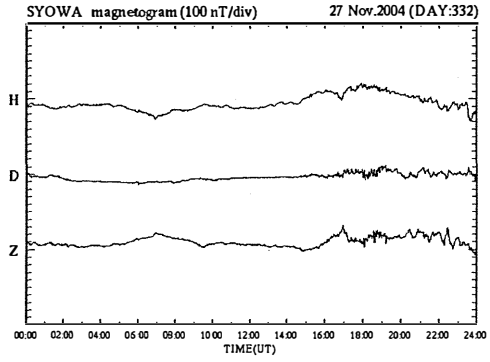
SYOWA magnetogram (100 nT/div)
27 Nov.2004 (DAY:332)
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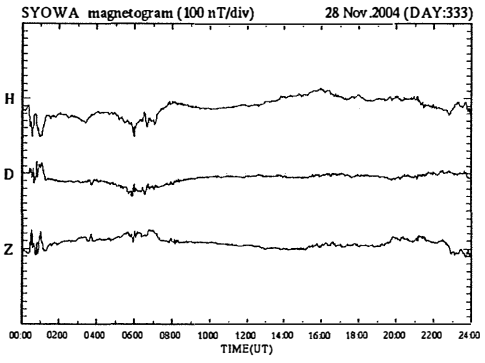
TIME(UT)


SYOWA magnetogram (100 nT/div)
28 Nov.2004 (DAY:333)
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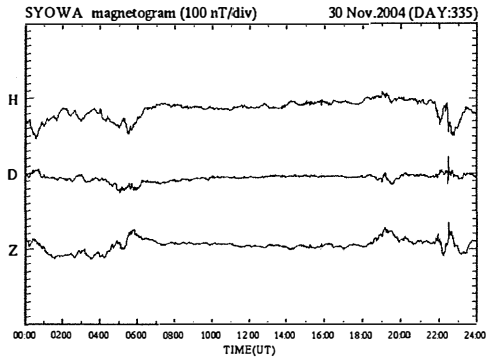
TIME(UT)


SYOWA magnetogram (100 nT/div)
30 Nov.2004 (DAY:335)
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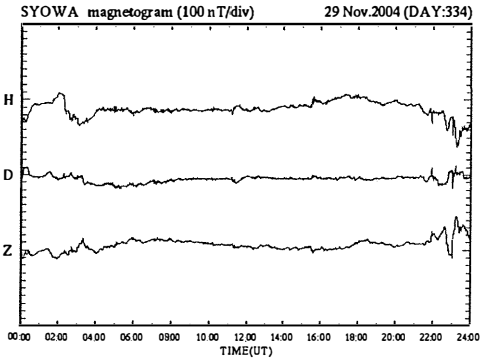
TIME(UT)


SYOWA magnetogram (100 nT/div)
29 Nov.2004 (DAY:334)
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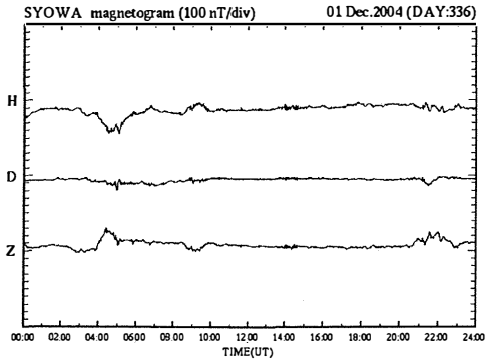
TIME(UT)


SYOWA magnetogram (100 nT/div)
01 Dec.2004 (DAY:336)
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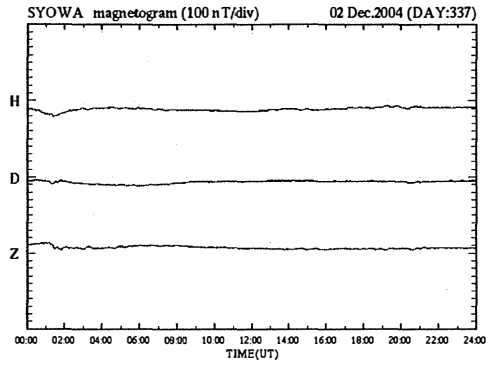
TIME(UT)


SYOWA magnetogram (100 nT/div)
02 Dec.2004 (DAY:337)
H
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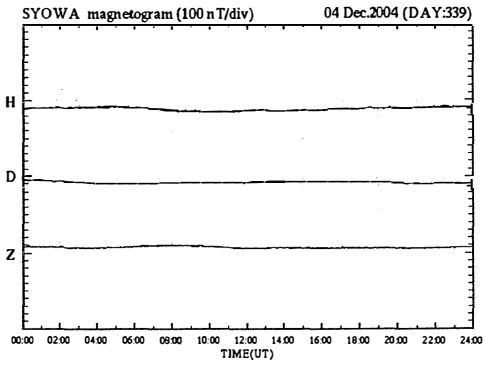
TIME(UT)


SYOWA magnetogram (100 nT/div)
04 Dec.2004 (DAY:339)
H
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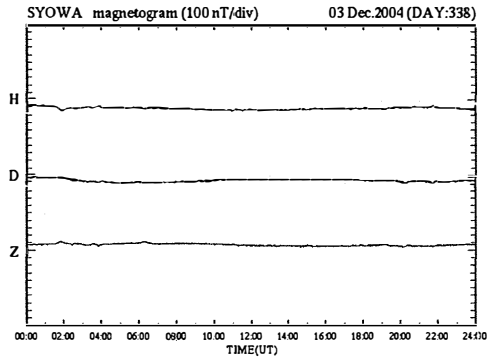
TIME(UT)


SYOWA magnetogram (100 nT/div)
03 Dec.2004 (DAY:338)
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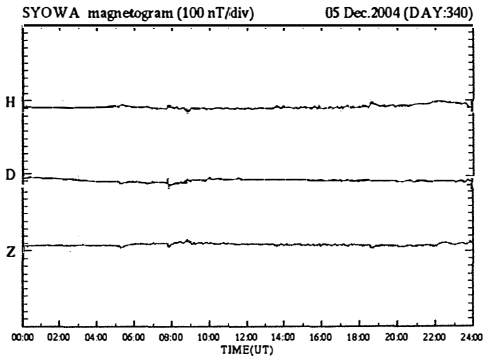
TIME(UT)


SYOWA magnetogram (100 nT/div)
05 Dec.2004 (DAY:340)
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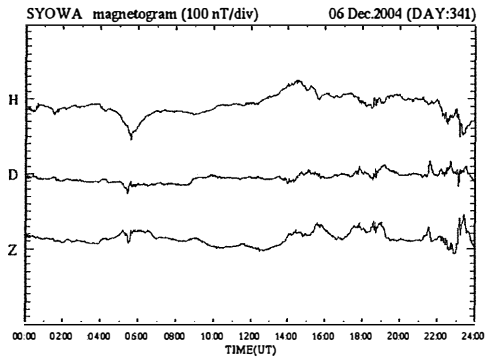
SYOWA magnetogram (100 nT/div)
06 Dec.2004 (DAY:341)
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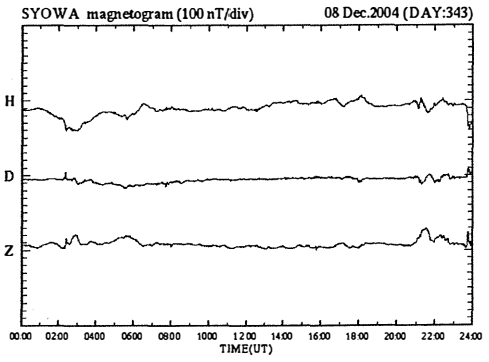
TIME(UT)


SYOWA magnetogram (100 nT/div)
08 Dec.2004 (DAY:343)
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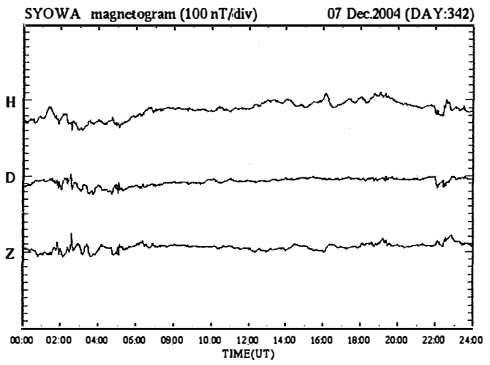
TIME(UT)


SYOWA magnetogram (100 nT/div)
07 Dec.2004 (DAY:342)
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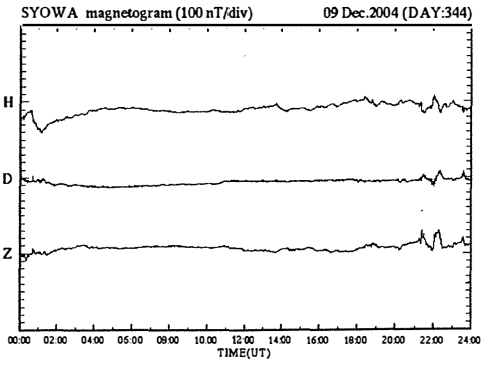
SYOWA magnetogram (100 nT/div)
09 Dec.2004 (DAY:344)
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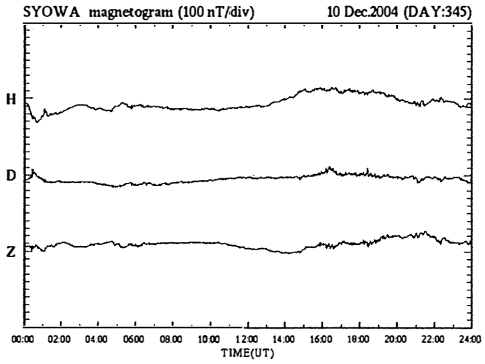
SYOWA magnetogram (100 nT/div)
10 Dec.2004 (DAY:345)
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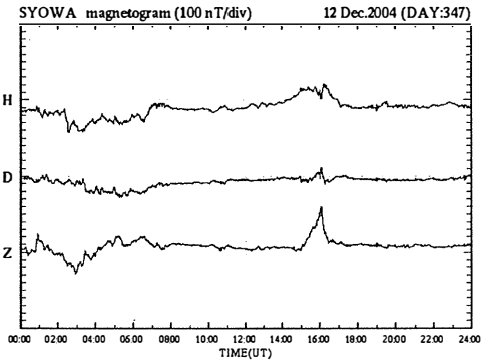
SYOWA magnetogram (100 nT/div)
12 Dec.2004 (DAY:347)
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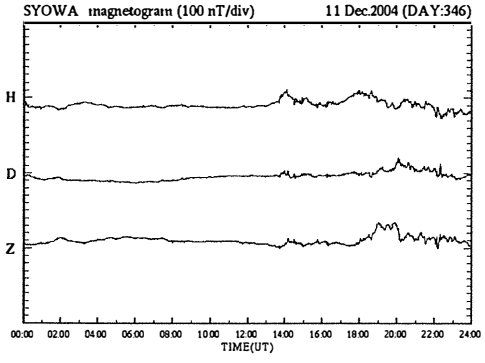
TIME(UT)


SYOWA magnetogram (100 nT/div)
11 Dec.2004 (DAY:346)
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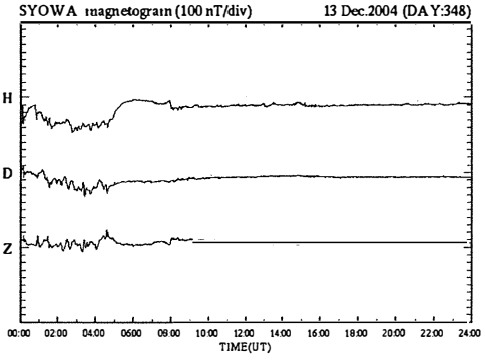
SYOWA magnetogram (100 nT/div)
13 Dec.2004 (DAY:348)
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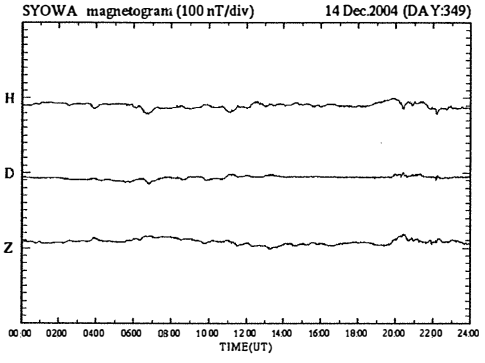
TIME(UT)


SYOWA magnetogram (100 nT/div)
14 Dec.2004 (DAY:349)
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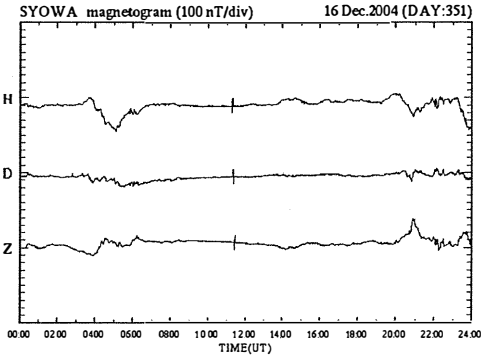
TIME(UT)


SYOWA magnetogram (100 nT/div)
16 Dec.2004 (DAY:351)
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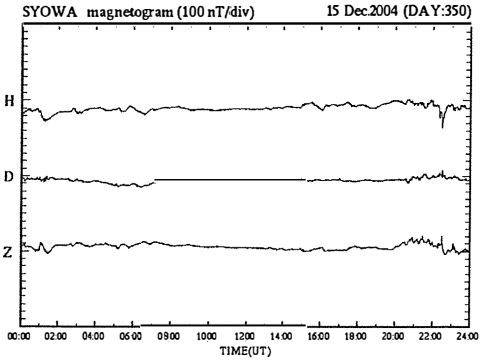
TIME(UT)


SYOWA magnetogram (100 nT/div)
15 Dec.2004 (DAY:350)
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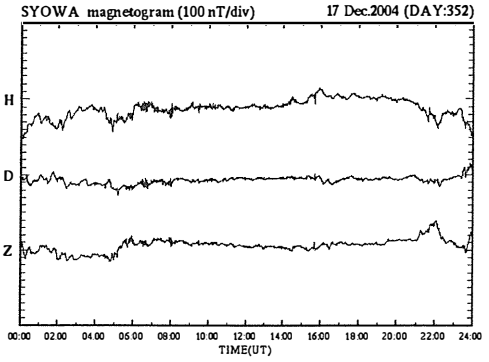
TIME(UT)


SYOWA magnetogram (100 nT/div)
17 Dec.2004 (DAY:352)
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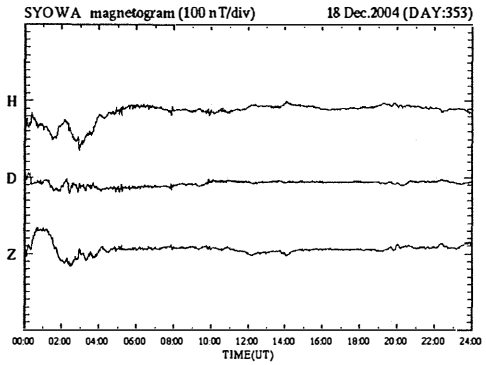
TIME(UT)


SYOWA magnetogram (100 nT/div)
18 Dec.2004 (DAY:353)
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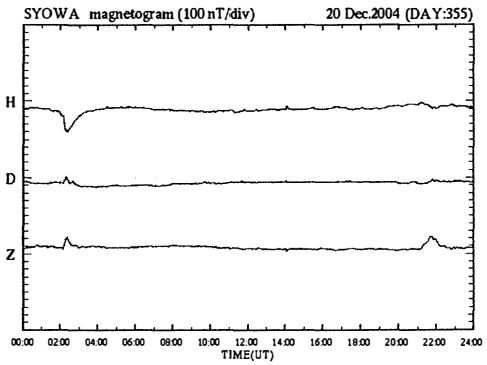
TIME(UT)


SYOWA magnetogram (100 nT/div)
20 Dec.2004 (DAY:355)
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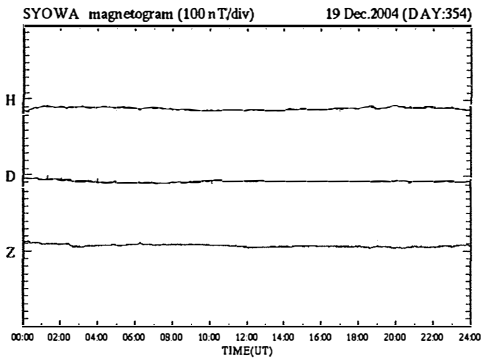
TIME(UT)


SYOWA magnetogram (100 nT/div)
19 Dec.2004 (DAY:354)
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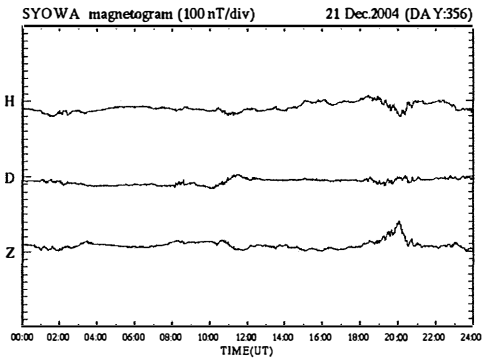
SYOWA magnetogram (100 nT/div)
21 Dec.2004 (DAY:356)
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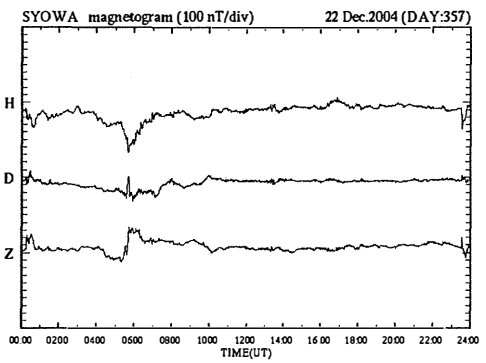
SYOWA magnetogram (100 nT/div)
22 Dec.2004 (DAY:357)
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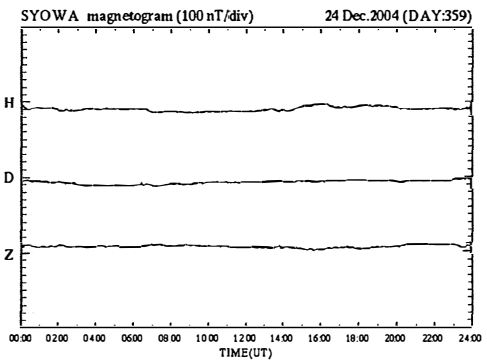
SYOWA magnetogram (100 nT/div)
24 Dec.2004 (DAY:359)
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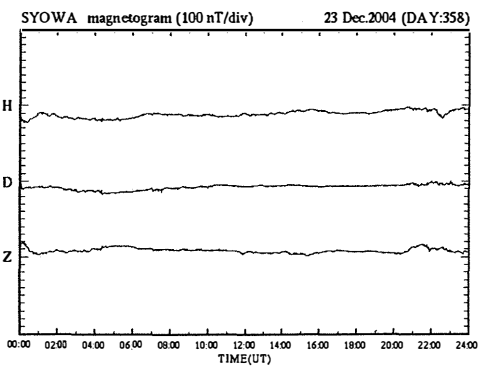
SYOWA magnetogram (100 nT/div)
23 Dec.2004 (DAY:358)
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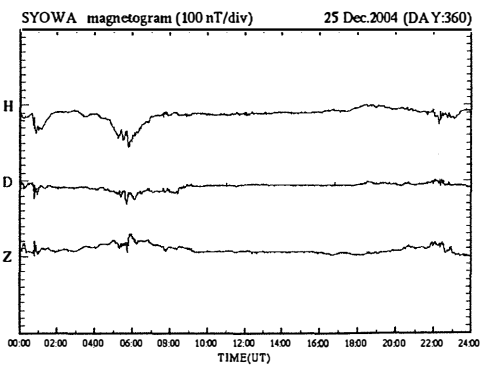
SYOWA magnetogram (100 nT/div)
25 Dec.2004 (DAY:360)
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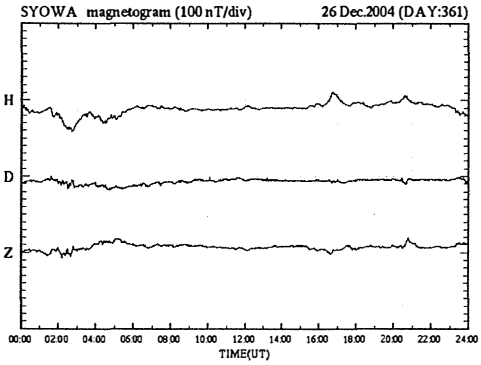
SYOWA magnetogram (100 nT/div)
26 Dec.2004 (DAY:361)
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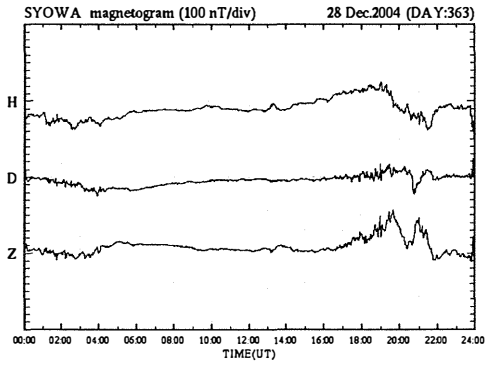
SYOWA magnetogram (100 nT/div)
28 Dec.2004 (DAY:363)
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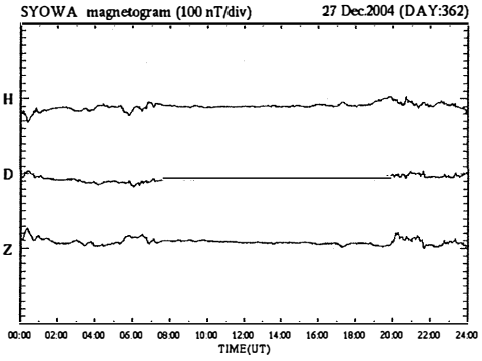
SYOWA magnetogram (100 nT/div)
27 Dec.2004 (DAY:362)
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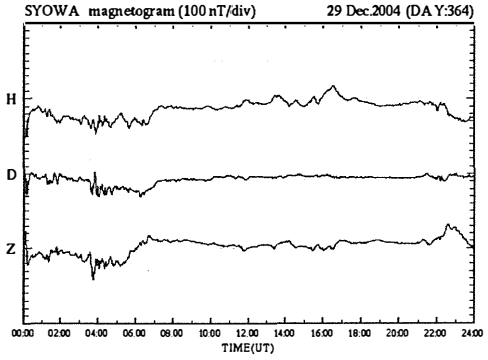
SYOWA magnetogram (100 nT/div)
29 Dec.2004 (DAY:364)
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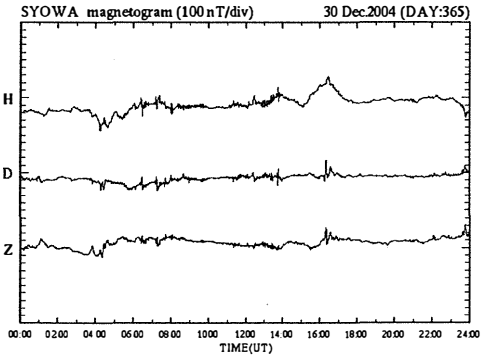
SYOWA magnetogram (100 nT/div)
30 Dec.2004 (DAY:365)
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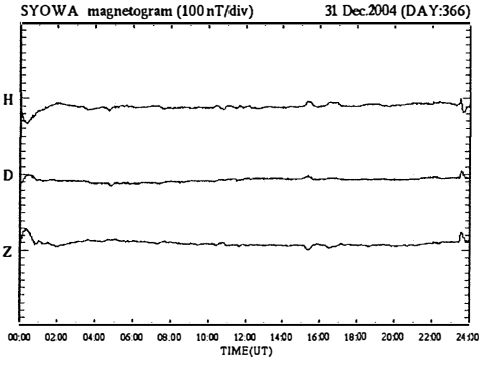
TIME(UT)


SYOWA magnetogram (100 nT/div)
31 Dec.2004 (DAY:366)
H
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TIME(UT)