UPPER ATMOSPHERE PHYSICS DATA OBTAINED AT SYOWA STATION IN 2003

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1. Introduction

This data book summarizes upper atmosphere physics data acquired by the 44th Japanese Antarctic Research Expedition (JARE-44) with the "Upper Atmosphere Physics Monitoring (UAPM) System" at Syowa Station in 2003. 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 : Panchromatic images recorded in a digital format
  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 (Hβ), 487.4 nm (BG of Hβ),
  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, 2003 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; 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 23rd 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 2003–January 2004. 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 2003.

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. Panchromatic auroral images are taken every twenty seconds with an exposure time of two seconds. Image data are saved in a DVD-RAM disk. Since there were some troubles in the mechanical and electrical parts of the system, there were no observations 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 newly introduced 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. An observation list for the all-sky TV camera is given in Table 4. Observations were carried out during 123 clear nights from February 26 until October 15 in 2003. 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 (H_β), and 487.4 nm (Back-ground of H_β). The photometers have a field-of-view of 3 degrees except for 6 degrees for the channels of H_β 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 100 clear nights from February 25 until October 15 in 2003.

4. Compiled Digital Data Format

One of the previous two QNX PC ATLAS systems was replaced by the Linux PC system in January, 2003. 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)

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References

Arisawa, T., Kato, Y., Otaka, K., Inamori, Y., Kaneko, M. and Taguchi, M. (1997): Upper atmosphere physics data obtained at Syowa Station in 1995. JARE Data Rep., **225** (Upper Atmos. Phys. 15), 204 p.

Fujii, R., Sato, N. and Fukunishi, H. (1985): Upper atmosphere physics data, Syowa Station, 1982. JARE Data Rep., **105** (Upper Atmos. Phys. 2), 266 p.

Fujii, R., Kotake, N., Murata, I., Nozaki, K., Umetsu, M., Makita, K., Minatoya, H. and Yukimatu, A. (1994): Upper atmosphere physics (UAP) data obtained at Syowa and Asuka Stations in 1991. JARE Data Rep., **193** (Upper Atmos. Phys. 11), 208 p.

Kadokura, A., Uchida, K., Kurihara, N., Kimura, K., Okamura, H., Ariyoshi, H., Yukimatsu, A. and Ejiri, M. (1992): Upper atmosphere physics data, Syowa and Asuka Stations, 1989. JARE Data Rep., **171** (Upper Atmos. Phys. 9), 335 p.

Kato, Y., Shigeno, N., Sato, M., Kitahara, T., Abe, A., Kikuchi, M., Kadokura, A. and Taguchi, M. (2001): Upper atmosphere physics data obtained at Syowa Station in 2000. JARE Data Rep., **260** (Upper Atmos. Phys. 20), 202 p.

Kawana, S., Kikuchi, M., Sakanoi, T., Yumisashi, I. and Taguchi, M. (1998): Upper atmosphere physics data obtained at Syowa Station in 1996. JARE Data Rep., **233** (Upper Atmos. Phys. 16), 202 p.

Kikuchi, T., Ohwada, T., Oginasa, T., Uchida, K., Sakurai, H., Yamagishi, H. and Sato, N. (1988): Upper atmosphere physics data, Syowa Station, 1986. JARE Data Rep., **138** (Upper Atmos. Phys. 6), 276 p.

Maegawa, K., Yamaoka, N., Kawahara, T. D., Tsutsumi, M., Nakamoto, H., Takeshita, S., Kikuchi, M., Kadokura, A. and Taguchi, M. (2000): Upper atmosphere physics data obtained at Syowa Station in 1999. JARE Data Rep., **252** (Upper Atmos. Phys. 19), 200 p.

Miyaoka, H., Uchida, K., Mukai, H., Saito, H., Akamatsu, J., Shibuya, K., Sakai, R., Ayukawa, M. and Sato, N. (1990): Upper atmosphere physics data, Syowa and Asuka Stations, 1987. JARE Data Rep., **159** (Upper Atmos. Phys. 7), 306 p.

Obara, N., Wakino, Y., Kubota, M., Iwasaki, K., Nishimura, H. and Kadokura, A. (1996): Upper atmosphere physics data obtained at Syowa Station in 1994. JARE Data Rep., **209** (Upper Atmos. Phys. 14), 208 p.

Okano, S., Meki, K., Sakanoi, K., Kusano, K., Kikuchi, M., Kadokura, A. and Taguchi, M. (2000): Upper atmosphere physics data obtained at Syowa Station in 1998. JARE Data Rep., **250** (Upper Atmos. Phys. 18), 200 p.

Ono, T., Tsunomura, S., Ejiri, M., Fujii, R. and Sato, N. (1986): Upper atmosphere physics data, Syowa Station, 1984. JARE Data Rep., **118** (Upper Atmos. Phys. 4), 271 p.

Ono, T., Nakajima, H., Satoh, M., Ohtaka, K., Kawahara, M. and Kumade, A. (1993): Upper atmosphere physics data, Syowa and Asuka Stations, 1990. JARE Data Rep., **186** (Upper Atmos. Phys. 10), 222 p.

Sakurai, H., Shibasaki, K., Fujii, R. and Sato, N. (1985): Upper atmosphere physics data, Syowa Station, 1983. JARE Data Rep., **108** (Upper Atmos. Phys. 3), 212 p.

Sato, N., Fujii, R., Fukunishi, H. and Nakajima, D. (1984): Upper atmosphere physics data, Syowa Station, 1981. JARE Data Rep., **93** (Upper Atmos. Phys. 1), 206 p.

Sato, N., Uchida, K., Saka, O., Yamaguchi, K., Iguchi, S., Aoki, T. and Miyaoka, H. (1991): Upper atmosphere physics data, Syowa and Asuka Stations, 1988. JARE Data Rep., **169** (Upper Atmos. Phys. 8), 212 p.

Taguchi, M., Kobayashi, F., Iokibe, K., Fujita, N., Kishida, H., Kikuchi, M. and Kadokura, A. (2003): Upper atmosphere physics data obtained at Syowa Station in 2001. JARE Data Rep., **273** (Upper Atmos. Phys. 21), 200 p.

Takeuchi, S., Ookawa, T., Setoguchi, T., Ozeki, J., Kikuchi, M., Kadokura, A. and Taguchi, M. (1999): Upper atmosphere physics data obtained at Syowa Station in 1997. JARE Data Rep., **243** (Upper Atmos. Phys. 17), 204 p.

Tonegawa, Y., Rokuyama, K., Makita, Y., Yang, H., Kadokura, A. and Sato, N. (1996): Upper atmosphere physics data obtained at Syowa Station in 1993. JARE Data Rep., **208** (Upper Atmos. Phys. 13), 202 p.

Uchida, K., Tonegawa, Y., Fujii, R. and Sato, N. (1988): Computer compilatory process of the data acquired by the conjugate observation system in Iceland. Nankyoku Shiryô (Antarct. Rec.), **32**, 238–257 (in Japanese with English abstract).

Yamada, Y., Yamashita, J., Yoshihiro, Y., Obara, N., Kikuchi, M., Kadokura, A. and Taguchi, M. (2006): Upper atmosphere physics data obtained at Syowa Station in 2002. JARE Data Rep., **287** (Upper Atmos. Phys. 22), 59 p.

Yamagishi, H. (1990): Development of Optical Disk data base system for Syowa Station-Iceland geomagnetically conjugate observation. Nankyoku Shiryô (Antarct. Rec.), **34**, 242–262 (in Japanese with English abstract).

Yamagishi, H., Ayukawa, M., Matsumura, S., Sakurai, H. and Sato, N. (1987): Upper atmosphere physics data, Syowa Station, 1985. JARE Data Rep., **128** (Upper Atmos. Phys. 5), 272 p.

Yamazaki, I., Takahashi, Y., Mineno, H., Kamata, M., Ogawa, Y. and Kadokura, A. (1995): Upper atmosphere physics data obtained at Syowa Stations in 1992. JARE Data Rep., **205** (Upper Atmos. Phys. 12), 207 p.

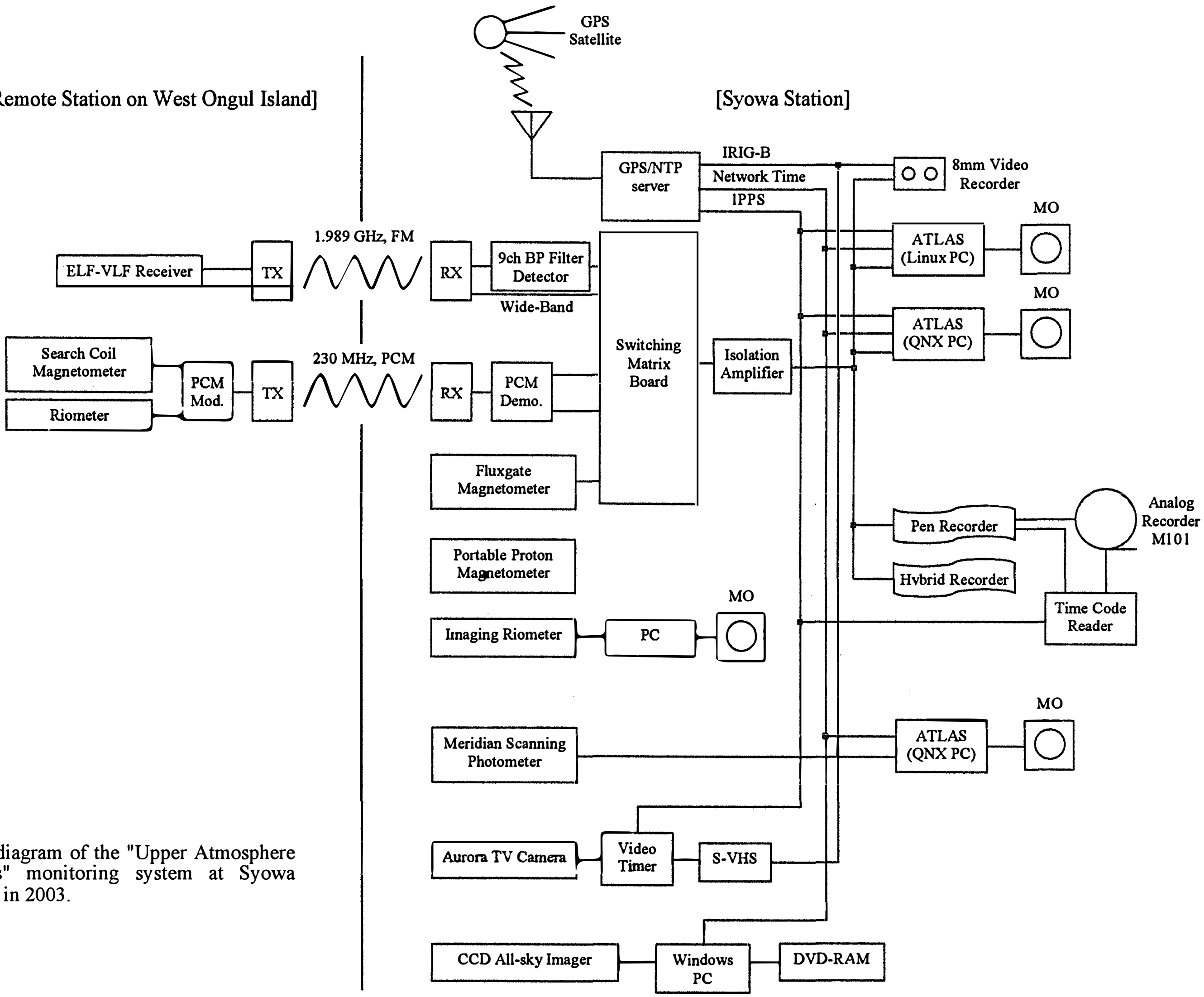


Fig. 1. Block diagram of the "Upper Atmosphere Physics" monitoring system at Syowa Station in 2003.

Table 1. Absolute values of geomagnetic field at Syowa Station in February 2003–January 2004.

DATE	TIME (hh:mm)	DECLINATION (deg:min)	DIP ANGLE (deg:min)	TOTAL (nT)	HORIZONTAL (nT)	VERTICAL (nT)
2003.02.19	11:38	-48:52.76	-63:40.31	43276.4	19194.1	-38788.3
2003.03.25	10:57	-48:55.89	-63:40.78	43267.4	19184.3	-38782.0
2003.04.29	12:42	-48:54.40	-63:39.89	43281.1	19200.5	-38789.2
2003.05.31	11:03	-48:55.17	-63:40.70	43302.2	19200.5	-38812.2
2003.06.13	10:31	-48:54.14	-63:39.60	43280.4	19203.4	-38786.9
2003.07.08	10:43	-48:54.71	-63:39.91	43273.0	19196.6	-38781.9
2003.08.17	10:45	-48:56.39	-63:39.39	43267.3	19200.0	-38774.1
2003.09.08	11:10	-48:58.97	-63:40.07	43254.3	19186.4	-38765.9
2003.10.06	11:35	-48:57.04	-63:40.35	43250.3	19181.8	-38764.5
2003.11.28	12:04	-48:50.75	-63:40.18	43303.1	19206.6	-38810.0
2003.12.03	07:10	-49:01.25	-63:38.52	43229.0	19191.7	-38732.6
2003.12.18	17:02	-48:55.19	-63:37.74	43300.5	19233.4	-38794.7
2003.12.19	09:22	-49:01.14	-63:40.03	43222.4	19172.9	-38737.6
2004.01.12	08:21	-49:00.32	-63:36.56	43246.7	19222.7	-38739.7
2004.01.12	09:34	-48:58.10	-63:37.76	43244.2	19212.6	-38742.0
2004.01.12	12:14	-48:55.88	-63:39.04	43255.4	19198.6	-38761.3
2004.01.12	13:56	-48:53.05	-63:39.27	43311.5	19221.1	-38813.2
2004.01.19	13:02	-48:51.53	-63:35.25	43352.6	19284.5	-38827.0

Table 2. Baseline values of fluxgate magnetometer at Syowa Station in February 2003–January 2004.

DATE			TIME(UT)		H (nT)	D (nT)	Z (nT)
year	month	day	hour	min			
2003	02	19	11	38	18151.76	18716.12	-39063.39
2003	03	25	10	57	18155.12	18716.01	-39064.96
2003	04	29	12	42	18155.06	18715.72	-39066.77
2003	05	31	11	03	18155.08	18715.63	-39067.25
2003	06	13	10	31	18154.35	18715.88	-39067.59
2003	07	08	10	43	18156.44	18715.63	-39069.66
2003	08	17	10	45	18154.98	18715.80	-39070.91
2003	09	08	11	10	18155.19	18716.11	-39074.51
2003	10	06	11	35	18154.59	18715.83	-39068.49
2003	11	28	12	04	18151.64	18715.14	-39060.98
2003	12	03	07	10	18151.27	18715.87	-39065.00
2003	12	18	17	02	18148.51	18716.04	-39058.50
2003	12	19	09	22	18066.23	18664.31	-38781.55
2003	12	19	09	22	18066.23	18664.31	-38781.55
2004	01	12	08	21	18065.92	18664.12	-38784.53
2004	01	12	09	34	18065.94	18664.35	-38784.17
2004	01	12	12	14	18064.07	18664.08	-38785.24
2004	01	12	13	56	18064.77	18664.20	-38785.18
2004	01	19	12	53	18037.71	18664.38	-38797.34
2004	01	19	13	02	18065.59	18664.39	-38782.87

Table 3. K-indices at Syowa Station in February 2003–January 2004.

	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY
1	4321 2366	6222 3244	6732 2355	6674 5454	4443 3356	4432 3222	6565 4348	4441 0254	4221 1145	6552 3356	4432 2224	2322 2135
2	6654 4666	5521 3145	4553 2357	5643 2245	5655 4335	3333 3333	5544 3356	4422 4226	4411 1144	4443 2454	4332 2123	3322 2232
3	5342 3455	4332 2456	4323 2345	3523 2334	6554 4376	4322 2255	5553 3346	5423 2235	5642 2333	5531 3335	2221 2313	3222 3554
4	4664 2365	5553 2356	5433 3356	4321 1102	5554 4445	5555 3336	4331 1243	4554 3346	3331 1100	5466 3233	2312 1234	5433 3235
5	5442 3332	6433 2346	5532 2354	2111 2444	4523 2233	5554 4443	2111 0005	6544 2324	1211 0225	3221 2335	4664 5446	3331 3334
6	2332 4455	6553 4546	3421 1224	4333 4457	4443 2335	4323 3223	6563 3123	4322 2224	2111 1235	5421 2265	5434 3335	1222 2225
7	5433 3353	6433 2235	3212 2211	6456 5565	5543 4235	4343 3221	3122 3366	4421 1112	6333 3335	4322 2323	4322 4454	3222 2333
8	5432 3344	2211 2345	2543 3332	6664 3556	5654 4465	0001 0000	7665 3445	2011 0014	3221 1125	3222 2333	3534 4456	3322 1122
9	5532 3554	4442 2235	6553 4222	6555 4335	5454 3366	0321 0112	5343 3345	3123 2356	5321 1100	4433 4455	4543 4446	3222 1332
10	4562 2235	3432 3446	2554 3355	7675 2355	4354 3434	3112 3212	5442 2223	6334 3345	0120 0103	4433 4456	5534 4566	3422 2334
11	5442 1221	5442 2311	3532 2356	7354 4434	4453 2232	4555 4458	3322 2245	5623 2234	2111 0102	5646 5675	6454 5436	4521 2324
12	3432 2444	4321 1123	3422 2311	4553 3354	1231 2213	7854 3236	6664 3355	5432 1222	2112 1124	5543 3475	5543 3354	3452 1332
13	3322 1114	5432 2111	5522 2211	4454 4356	3321 1114	4543 3335	5532 2236	5422 1026	4412 2425	5444 5567	4344 4355	4432 1224
14	3523 3444	3333 3355	3421 3334	5644 4665	2663 4344	4343 2226	5442 1245	5111 1115	5664 4476	5664 4366	5533 4465	3452 2223
15	5534 4433	6443 3345	5543 3225	5563 3436	6553 3335	6544 2256	4332 2225	3211 1024	2654 4367	3564 4566	5533 4445	4222 2323
16	3443 3336	4433 3465	6454 3454	5433 2235	6724 4565	6665 4367	5421 2233	6453 4454	6434 3456	4645 5556	4423 2334	3311 1233
17	4333 3333	3663 5447	3654 3443	5431 2221	6664 3435	6444 3235	3010 3256	5565 5565	6663 3236	5544 4566	3422 2322	3332 2322
18	3643 3335	6554 4224	3663 3334	3221 1244	6665 3445	5632 2235	6774 4676	5554 3566	4452 4445	6544 5465	2321 1101	3322 2333
19	4322 3234	6442 2323	3331 2236	5441 2234	5553 3342	−434 3447	5433 1312	6555 5456	4553 4576	4332 3341	2220 1112	3443 4443
20	4443 3445	1333 4566	5552 2326	4332 3126	3332 2233	5443 2235	1531 2236	6644 4434	4444 4465	3556 7665	2223 3545	6533 3334
21	4532 2343	5544 3337	6452 2365	5532 2555	6553 2345	5421 1122	5764 3566	5342 3333	6444 4657	5552 2344	5533 4354	5533 3324
22	4432 3223	5553 2226	3544 3356	7554 4344	3343 2345	4221 0120	6565 4455	5443 3351	5564 4532	4433 4665	4443 3445	3532 1436
23	4422 2224	5444 3345	3554 2345	4653 2325	7434 3234	3322 1344	4554 3456	5632 2245	3122 2110	4553 3345	4222 3233	6523 3323
24	3222 2124	3422 1210	5443 3466	4643 3346	6764 3324	3211 1116	5433 3344	5754 4465	1222 5745	4322 3335	3222 2323	5433 3454
25	3222 1111	2211 1112	5644 3336	6634 2335	3443 3336	2342 2012	5653 2325	6555 4465	4332 4433	4443 3423	3222 3312	5464 4433
26	2334 2236	1421 1135	4432 3355	6342 3135	5544 4324	3543 3455	5311 2335	5433 2346	4222 1155	4421 2324	3432 2323	6443 3333
27	5433 4365	6363 3446	5552 2256	5433 3366	4565 4446	6555 3344	3332 2245	5212 1114	4654 2332	2321 2132	4533 2335	3321 1324
28	5133 2456	4543 2377	5554 2112	6554 3346	5555 4456	3323 4334	5533 2233	3112 1122	5654 3566	4322 3311	4432 3344	4552 2234
29		6763 4475	4331 4476	5643 5688	6655 4346	5554 3477	2223 2454	3311 1122	6597 6876	5422 2212	3122 3311	3222 3454
30		5443 3576	6544 4376	5442 3456	5665 3233	4555 3357	5632 2233	1111 2223	7734 5777	3422 3454	3321 2354	5553 3443
31		4544 4576		7751 2212			3322 2223		7565 5455		3323 3466	4443 3343

Table 4. Observation periods of the all-sky TV camera at Syowa Station in 2003.

	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			21:19	22:48					15:07	5:00	1:27	4:20					18:35	0:07
2			20:03	22:53	18:41	1:43	16:48	3:17							19:31	2:30	19:02	23:44
3					18:34	1:39	16:10	3:24					20:53	4:01				
4			19:13	23:37	19:59	1:55	16:54	1:29							17:43	2:16		
5					17:35	1:50			19:25	23:26	16:15	5:00	0:32	4:00				
6					21:16	1:45	16:09	3:55	16:52	2:35					0:38	2:00		
7			19:13	23:06			18:37	3:58			20:37	4:47	20:56	3:25	17:50	2:00		
8			21:42	22:52	18:15	2:10	14:37	3:13			14:53	5:01			22:03	1:30		
9					18:11	1:45			18:43	5:00					19:52	1:45	22:06	22:43
10			23:00	0:16			18:00	4:04					16:38	20:46			21:13	22:36
11																		
12			18:59	23:51	1:00	2:15									17:47	1:45	20:28	22:30
13			20:00	0:15	22:17	0:06											19:50	22:39
14			18:39	0:19	22:37	1:13					19:50	5:00			23:01	1:15	20:04	22:51
15			18:13	23:28							19:22	1:26	18:33	3:20			20:14	22:17
16			18:56	23:08					22:06	2:36	17:41	22:36	19:09	3:35				
17									20:23	5:23	18:35	0:24	18:20	3:30				
18									18:47	5:41			16:28	3:15	17:28	0:19		
19			20:07	0:06			17:52	4:25	14:17	5:01	22:35	4:57	16:59	3:05				
20							18:39	23:54			15:07	4:45	16:36	3:20				
21			20:55	1:01			16:26	23:07	13:53	22:52	15:11	4:52	16:25	3:05	17:58	1:00		
22					20:35	1:42	15:08	4:30			15:05	2:50	16:18	3:04	0:23	0:45		
23					19:53	23:40	14:49	4:15					18:38	3:00	17:59	0:45		
24			0:00	1:25	20:22	2:58			23:23	2:07	21:03	4:30	16:56	3:00	23:39	1:02		
25									14:24	4:24	14:48	19:30	16:10	2:57	18:04	0:40		
26	21:32	22:55	18:56	1:24					14:35	5:07	14:42	4:23	20:18	2:50	18:13	0:30		
27			17:57	0:14	18:43	2:26			18:16	4:55	14:49	4:18	16:11	2:50	18:16	0:29		
28			17:41	1:33											19:55	0:14		
29			20:14	1:42			20:53	5:13							18:26	0:14		
30					16:35	3:13					15:01	1:54	16:38	1:36	18:25	0:07		
31													20:00	1:54				

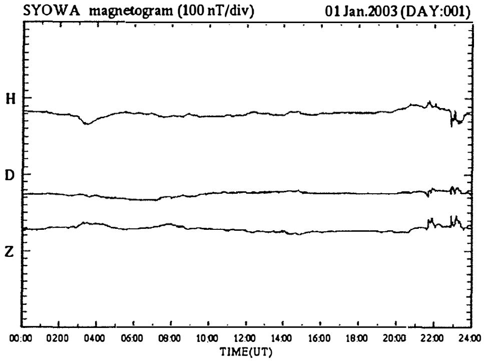
Appendix

Magnetograms at Syowa Station in 2003

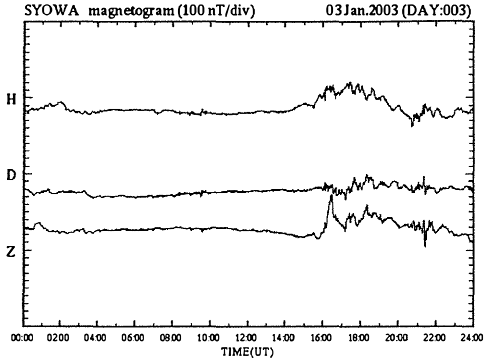
- Plotted data from top in each panel:
  - H : Local magnetic northward component of the magnetic variation
  - D : Local magnetic eastward component of the magnetic variation
  - Z : downward component of the magnetic variation

- Plotting vertical scale:
  - H, D, Z : 100 nT/div

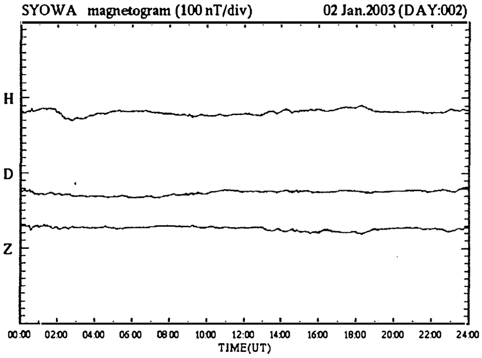
SYOWA magnetogram (100 nT/div) 01 Jan.2003 (DAY:001)



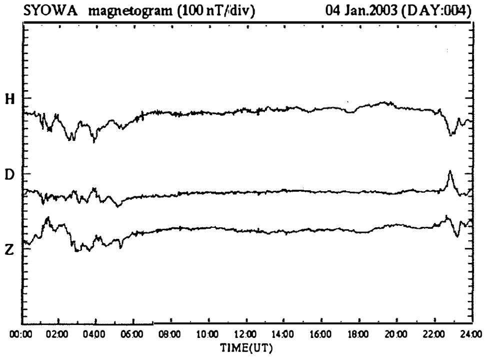
SYOWA magnetogram (100 nT/div) 03 Jan.2003 (DAY:003)



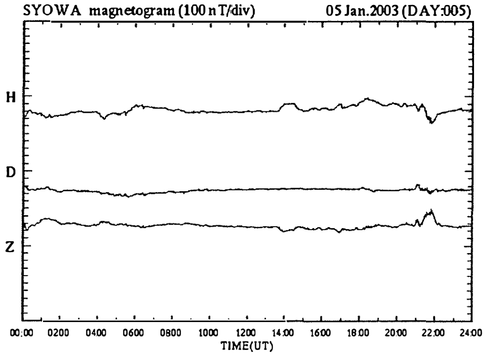
SYOWA magnetogram (100 nT/div) 02 Jan.2003 (DAY:002)



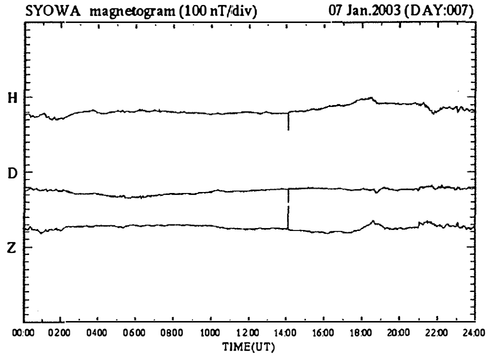
SYOWA magnetogram (100 nT/div) 04 Jan.2003 (DAY:004)



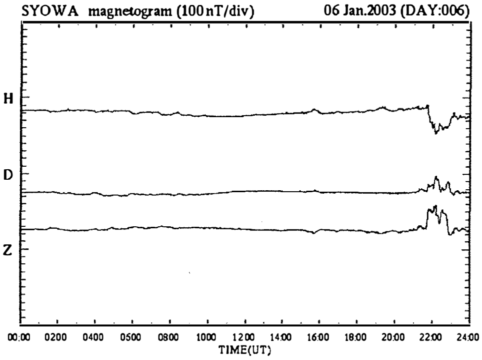
SYOWA magnetogram (100 nT/div) 05 Jan.2003 (DAY:005)



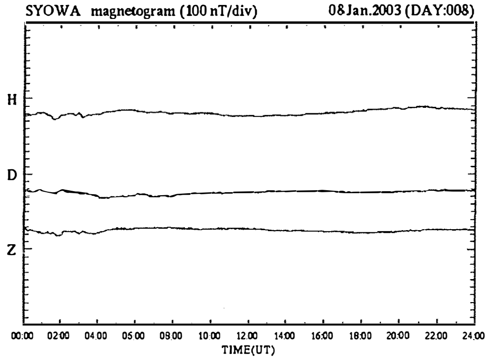
SYOWA magnetogram (100 nT/div) 07 Jan.2003 (DAY:007)



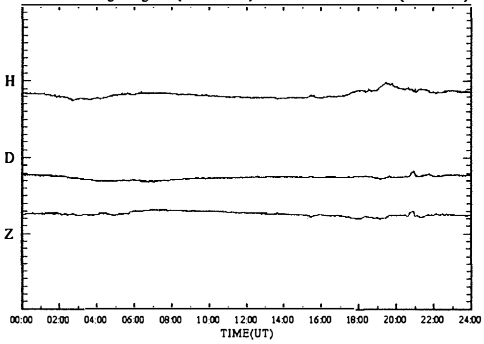
SYOWA magnetogram (100 nT/div) 06 Jan.2003 (DAY:006)



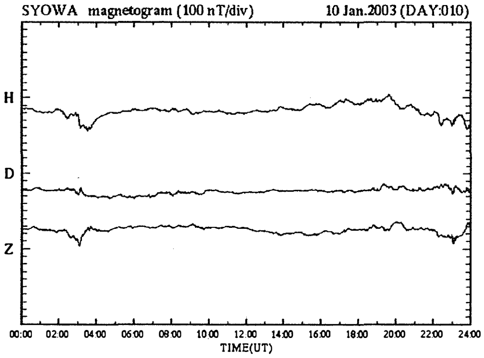
SYOWA magnetogram (100 nT/div) 0& Jan.2003 (DAY:008)



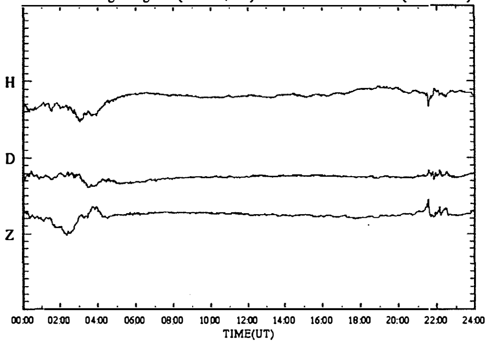
SYOWA magnetogram (100 nT/div) 09 Jan.2003 (DAY:009)



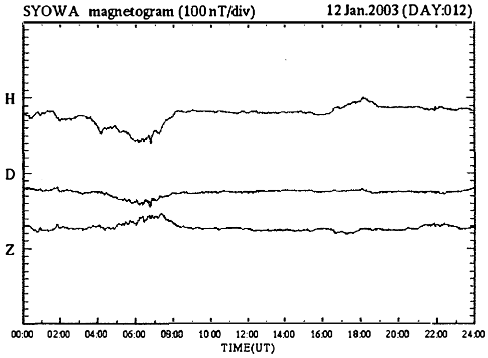
SYOWA magnetogram (100 nT/div) 10 Jan.2003 (DAY:010)



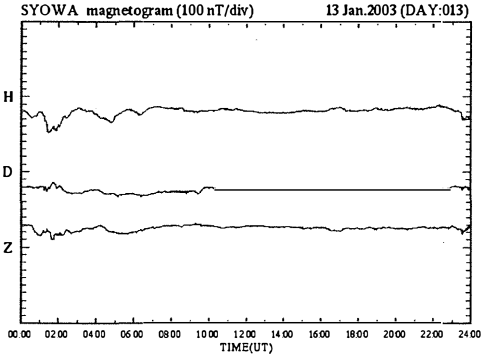
SYOWA magnetogram (100 nT/div) 11 Jan.2003 (DAY:011)



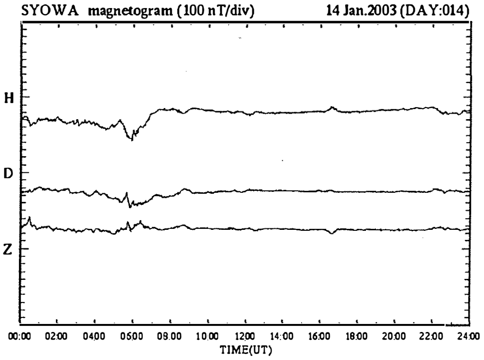
SYOWA magnetogram (100 nT/div) 12 Jan.2003 (DAY:012)



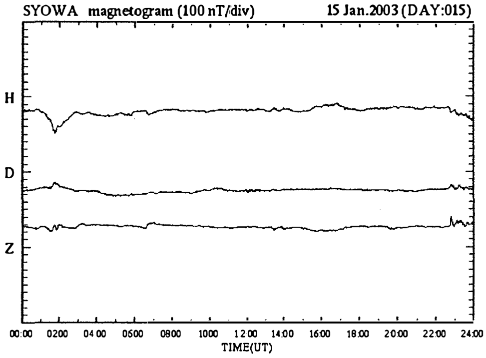
SYOWA magnetogram (100 nT/div) 13 Jan.2003 (DAY:013)



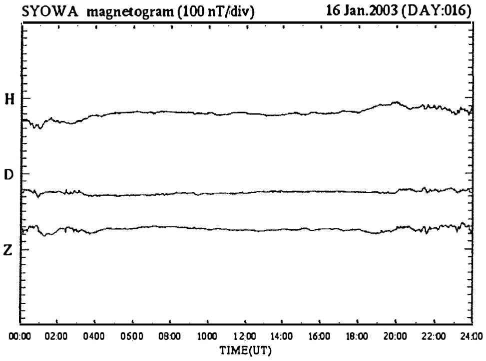
SYOWA magnetogram (100 nT/div) 14 Jan.2003 (DAY:014)

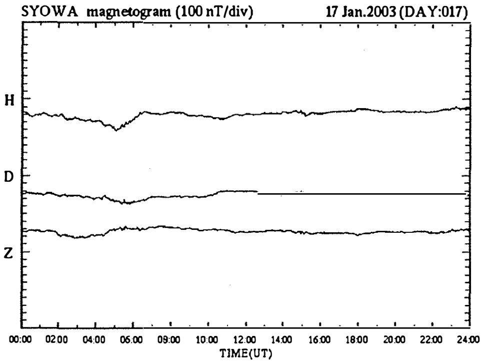


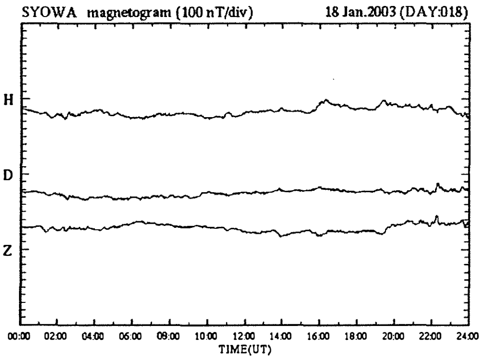
SYOWA magnetogram (100 nT/div) 15 Jan.2003 (DAY:015)

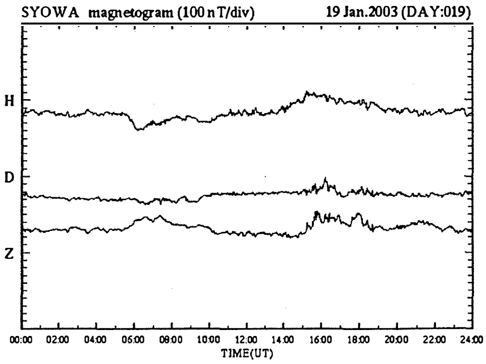


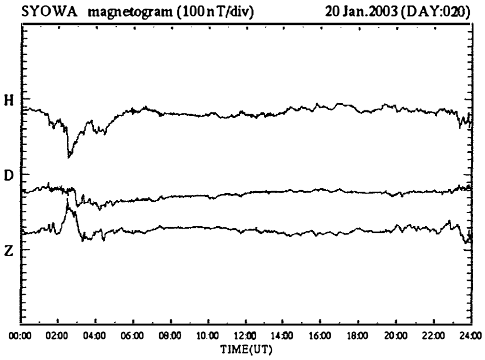
SYOWA magnetogram (100 nT/div) 16 Jan.2003 (DAY:016)

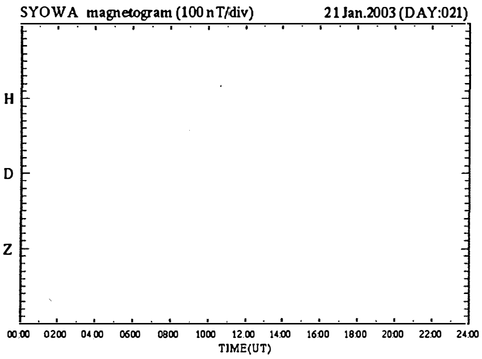


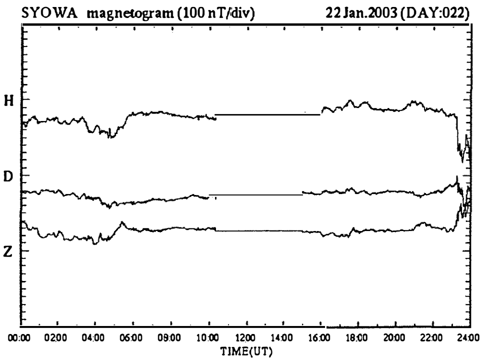

SYOWA magnetogram (100 nT/div)
17 Jan.2003 (DAY:017)
H
D
Z
00:00 02:00 04:00 06:00 09:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

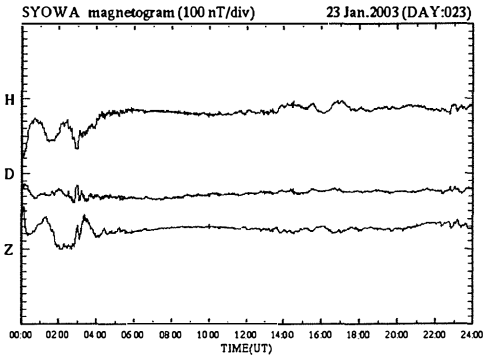

SYOWA magnetogram (100 nT/div)
18 Jan.2003 (DAY:018)
H
D
Z
00:00 02:00 04:00 06:00 09:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

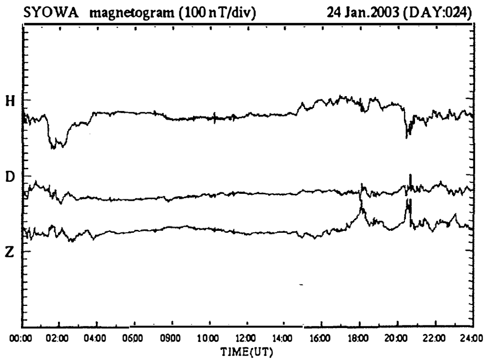

SYOWA magnetogram (100 nT/div)
19 Jan.2003 (DAY:019)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
20 Jan.2003 (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)

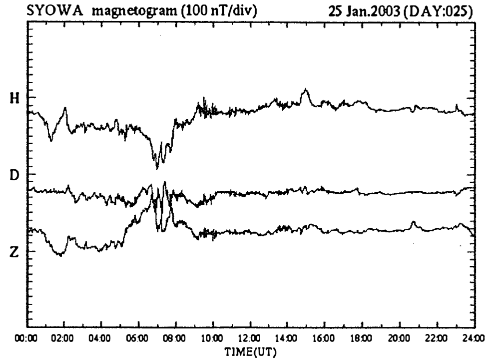

SYOWA magnetogram (100 nT/div)
21 Jan.2003 (DAY:021)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
22 Jan.2003 (DAY:022)
H
D
Z
00:00 02:00 04:00 06:00 09:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

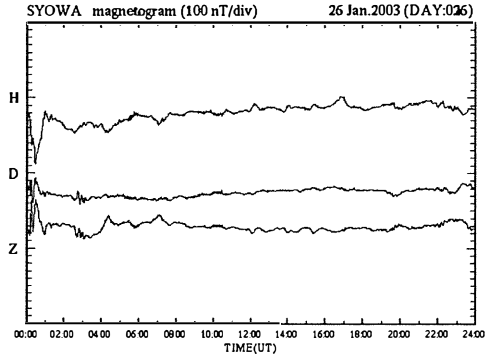

SYOWA magnetogram (100 nT/div)
23 Jan.2003 (DAY:023)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
24 Jan.2003 (DAY:024)
H
D
Z
00:00 02:00 04:00 06:00 09:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

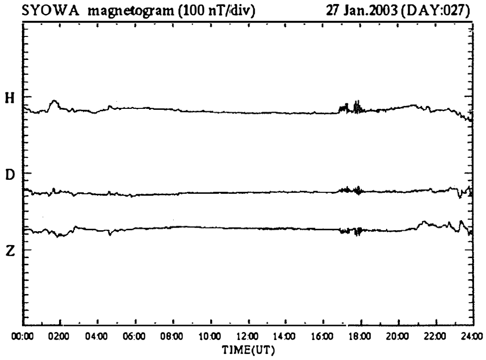
SYOWA magnetogram (100 nT/div) 25 Jan.2003 (DAY:025)



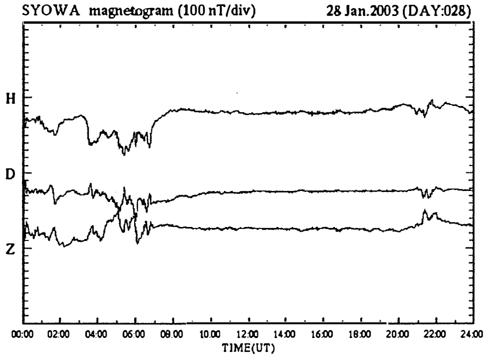
SYOWA magnetogram (100 nT/div) 26 Jan.2003 (DAY:026)



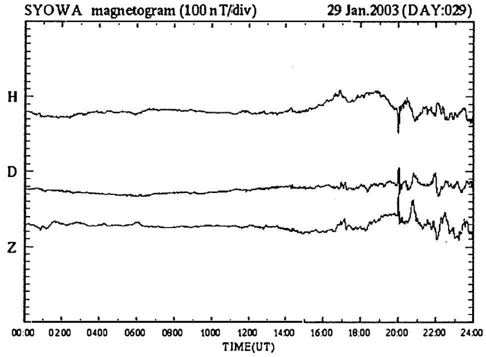
SYOWA magnetogram (100 nT/div) 27 Jan.2003 (DAY:027)



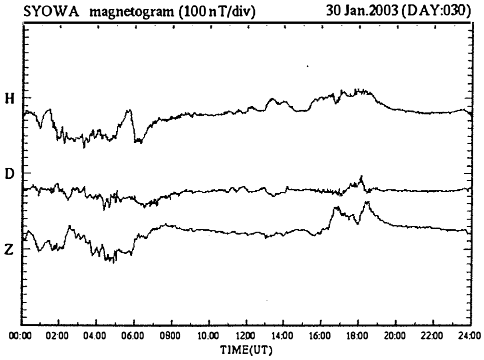
SYOWA magnetogram (100 nT/div) 28 Jan.2003 (DAY:028)



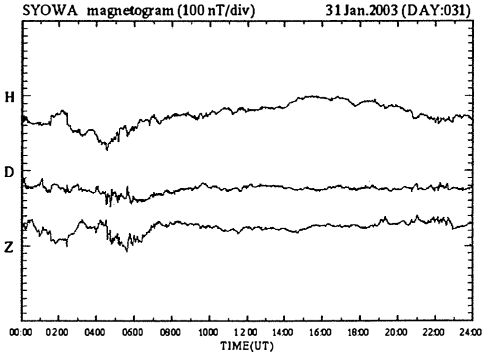
SYOWA magnetogram (100 nT/div) 29 Jan.2003 (DAY:029)



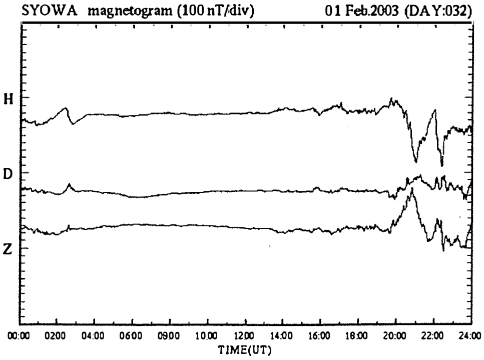
SYOWA magnetogram (100 nT/div) 30 Jan.2003 (DAY:030)



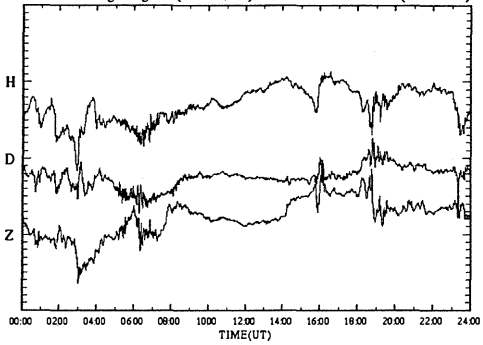
SYOWA magnetogram (100 nT/div) 31 Jan.2003 (DAY:031)



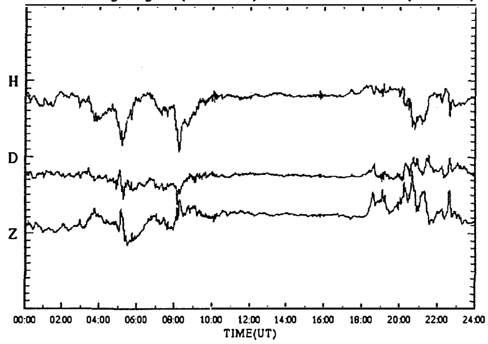
SYOWA magnetogram (100 nT/div) 01 Feb.2003 (DAY:032)



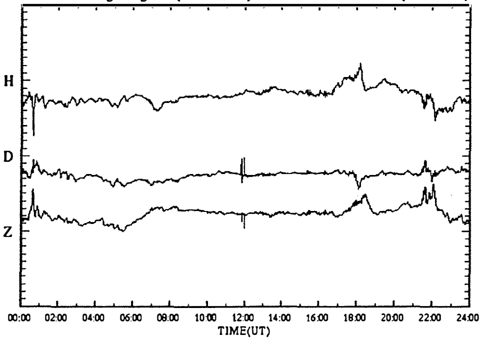
SYOWA magnetogram (100 nT/div) 02 Feb.2003 (DAY:033)



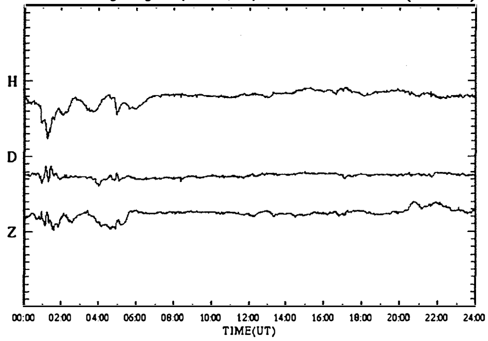
SYOWA magnetogram (100 nT/div) 04 Feb.2003 (DAY:035)



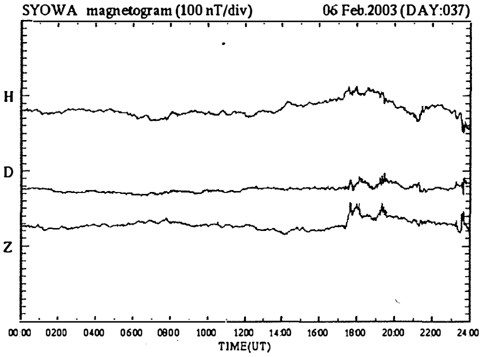
SYOWA magnetogram (100 nT/div) 03 Feb.2003 (DAY:034)



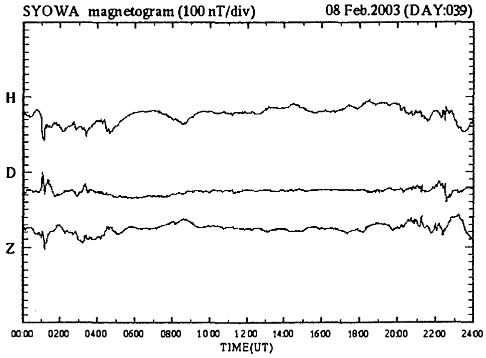
SYOWA magnetogram (100 nT/div) 05 Feb.2003 (DAY:036)



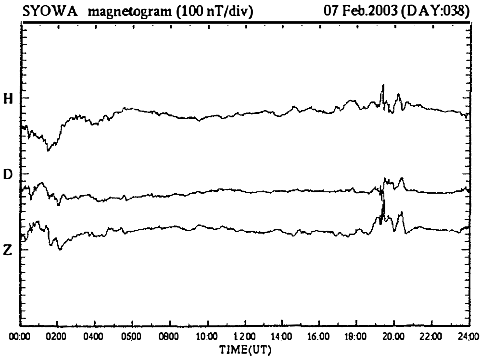
SYOWA magnetogram (100 nT/div) 06 Feb.2003 (DAY:037)



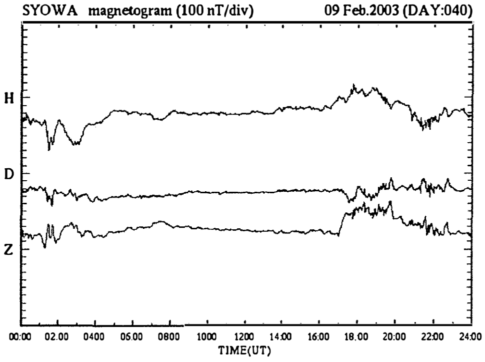
SYOWA magnetogram (100 nT/div) 08 Feb.2003 (DAY:039)



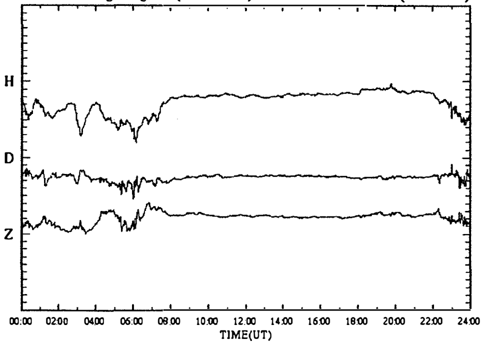
SYOWA magnetogram (100 nT/div) 07 Feb.2003 (DAY:038)



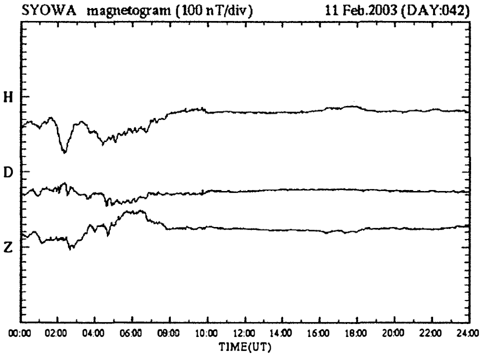
SYOWA magnetogram (100 nT/div) 09 Feb.2003 (DAY:040)



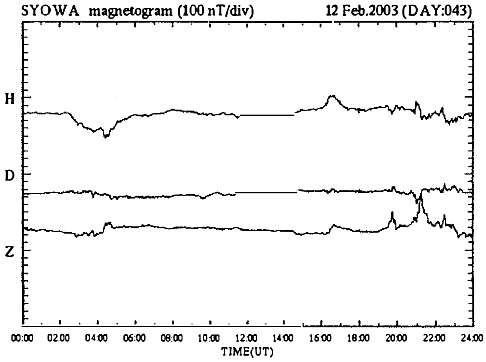
SYOWA magnetogram (100 nT/div) 10 Feb.2003 (DAY:041)



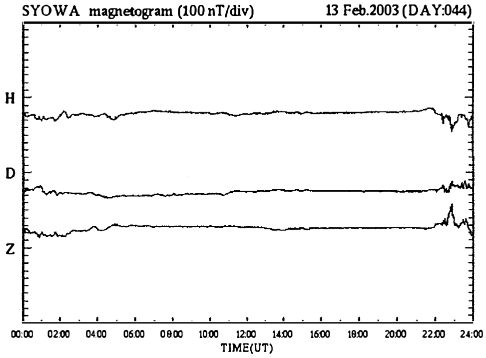
SYOWA magnetogram (100 nT/div) 11 Feb.2003 (DAY:042)



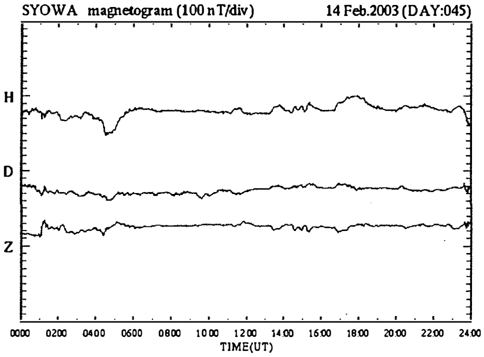
SYOWA magnetogram (100 nT/div) 12 Feb.2003 (DAY:043)



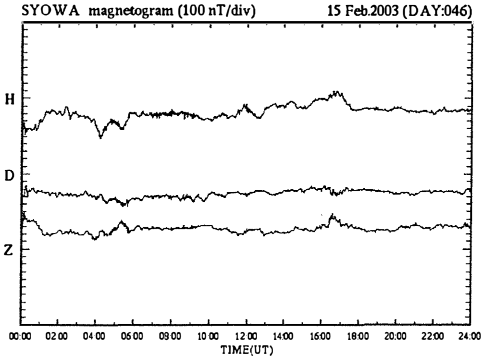
SYOWA magnetogram (100 nT/div) 13 Feb.2003 (DAY:044)



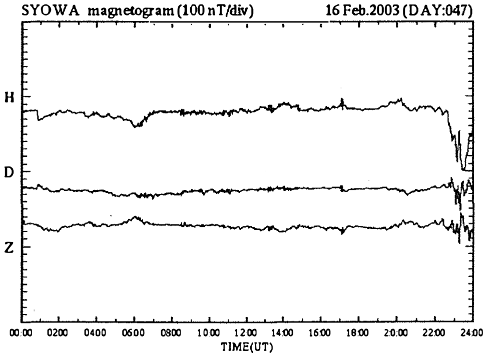
SYOWA magnetogram (100 nT/div) 14 Feb.2003 (DAY:045)



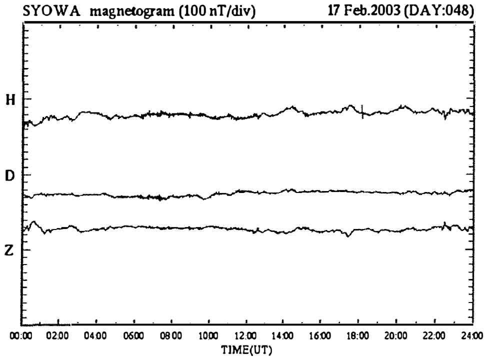
SYOWA magnetogram (100 nT/div) 15 Feb.2003 (DAY:046)



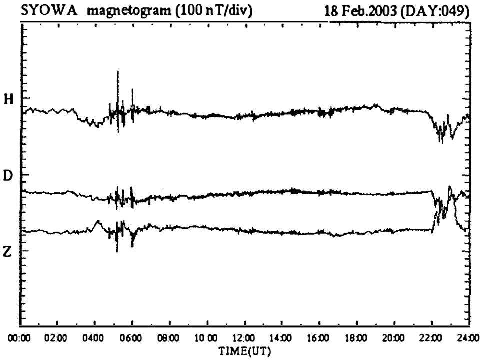
SYOWA magnetogram (100 nT/div) 16 Feb.2003 (DAY:047)



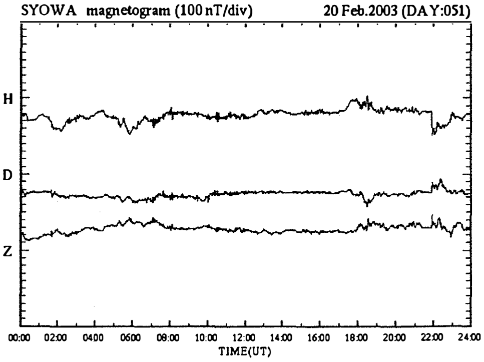
SYOWA magnetogram (100 nT/div) 17 Feb.2003 (DAY:048)



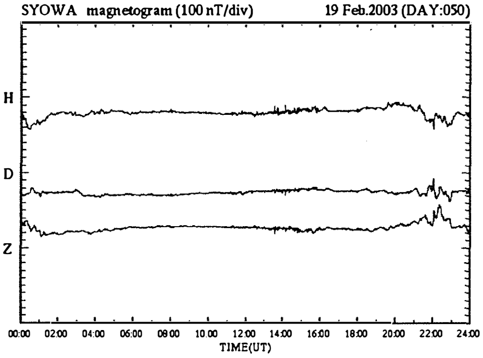
SYOWA magnetogram (100 nT/div) 18 Feb.2003 (DAY:049)



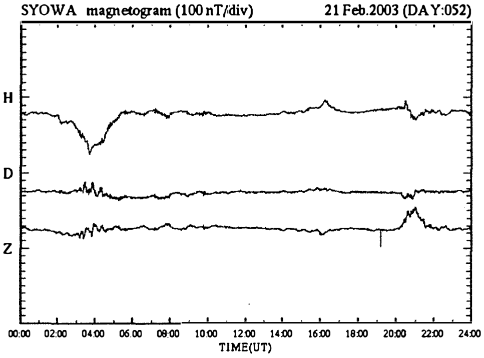
SYOWA magnetogram (100 nT/div) 20 Feb.2003 (DAY:051)



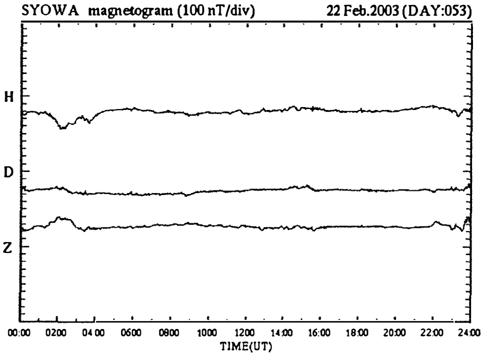
SYOWA magnetogram (100 nT/div) 19 Feb.2003 (DAY:050)



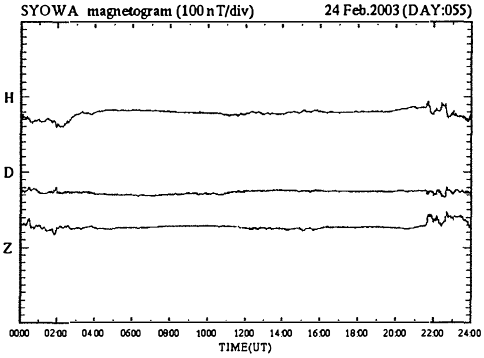
SYOWA magnetogram (100 nT/div) 21 Feb.2003 (DAY:052)



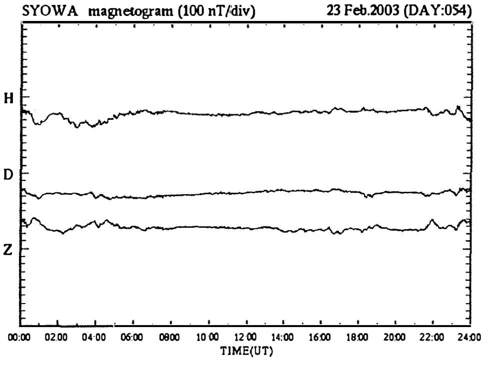
SYOWA magnetogram (100 nT/div) 22 Feb.2003 (DAY:053)



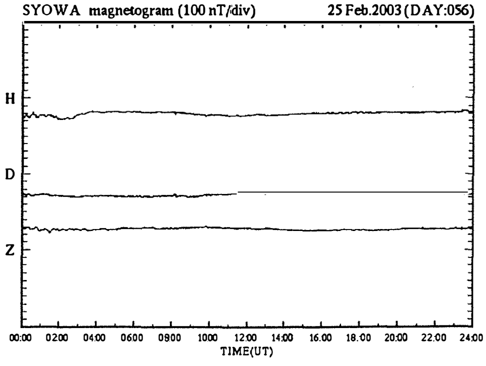
SYOWA magnetogram (100 nT/div) 24 Feb.2003 (DAY:055)

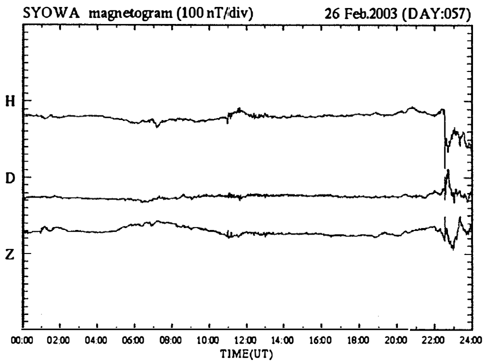


SYOWA magnetogram (100 nT/div) 23 Feb.2003 (DAY:054)



SYOWA magnetogram (100 nT/div) 25 Feb.2003 (DAY:056)




SYOWA magnetogram (100 nT/div)
26 Feb.2003 (DAY:057)
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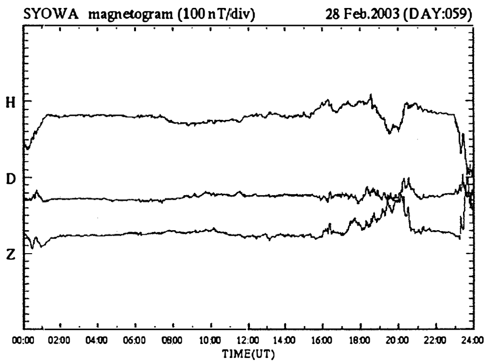
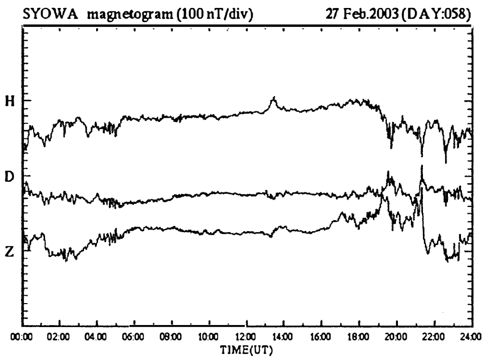
TIME(UT)


SYOWA magnetogram (100 nT/div)
28 Feb.2003 (DAY:059)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
27 Feb.2003 (DAY:058)
H
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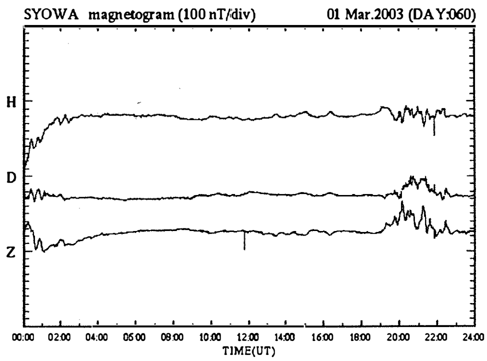
TIME(UT)


SYOWA magnetogram (100 nT/div)
01 Mar.2003 (DAY:060)
H
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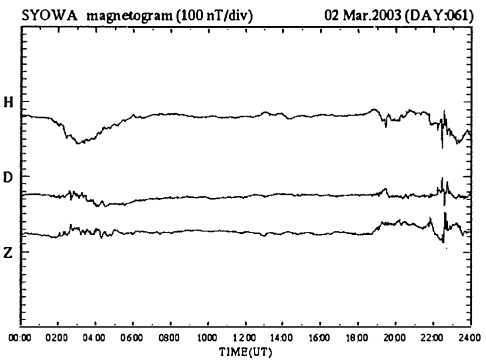
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
02 Mar.2003 (DAY:061)
H
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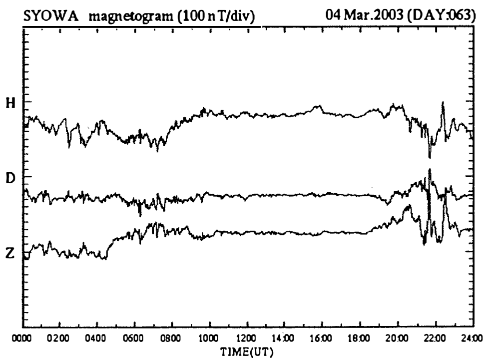
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
04 Mar.2003 (DAY:063)
H
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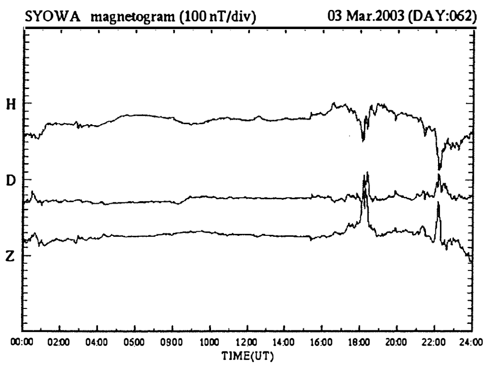
TIME(UT)


SYOWA magnetogram (100 nT/div)
03 Mar.2003 (DAY:062)
H
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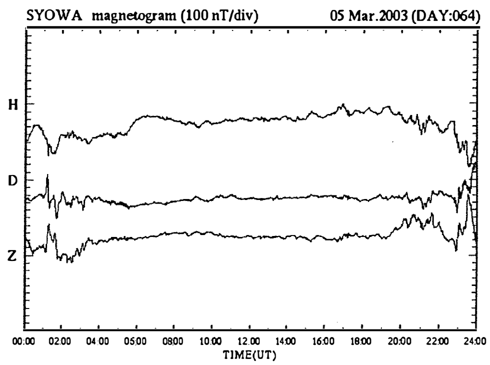
TIME(UT)


SYOWA magnetogram (100 nT/div)
05 Mar.2003 (DAY:064)
H
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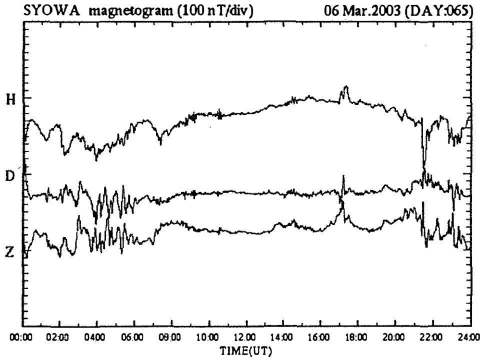
TIME(UT)


SYOWA magnetogram (100 nT/div)
06 Mar.2003 (DAY:065)
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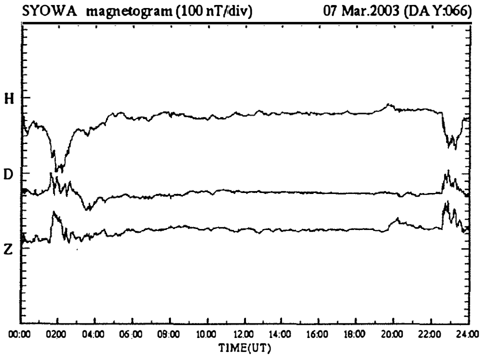
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
07 Mar.2003 (DAY:066)
H
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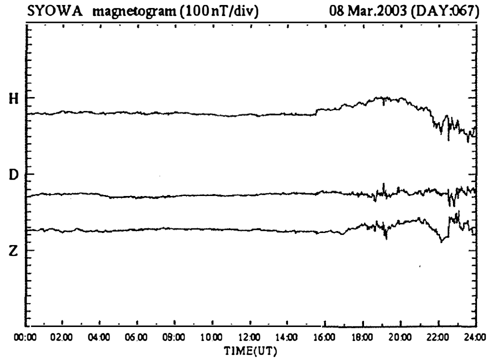
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
08 Mar.2003 (DAY:067)
H
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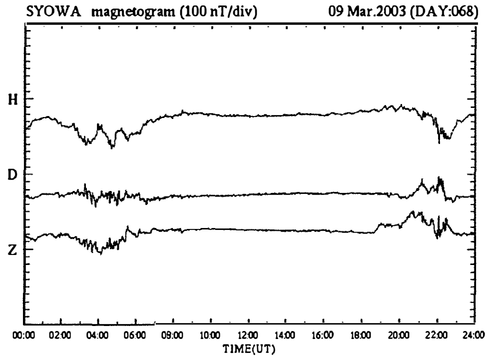
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
09 Mar.2003 (DAY:068)
H
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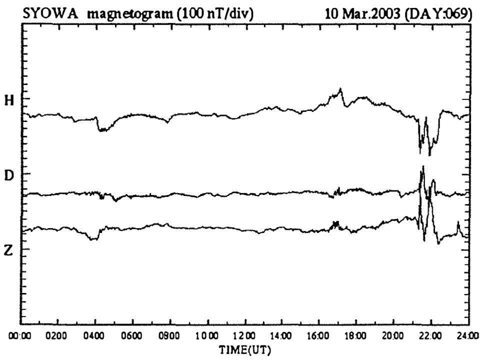
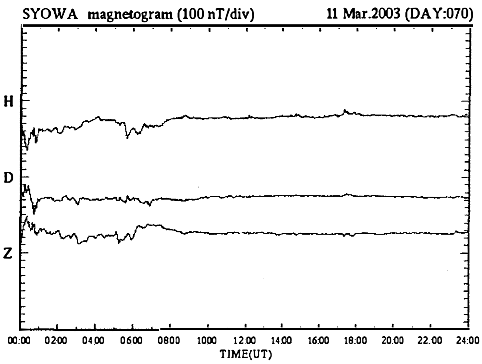
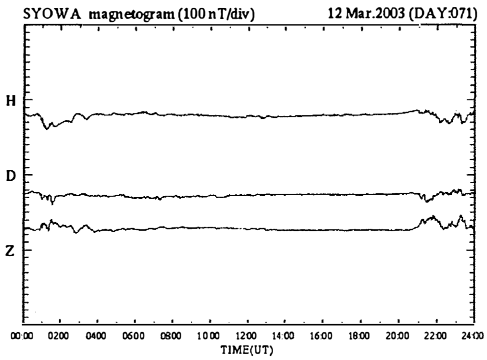
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
10 Mar.2003 (DAY:069)
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 Mar.2003 (DAY:070)
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 Mar.2003 (DAY:071)
H
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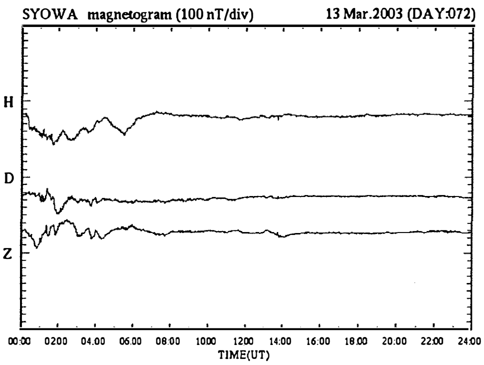
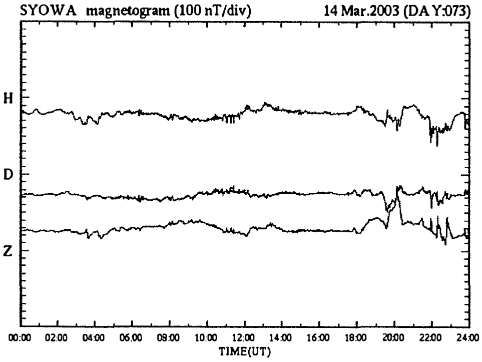
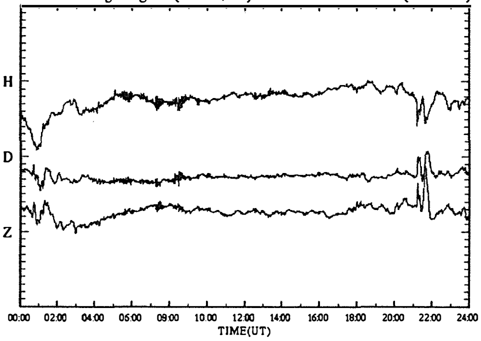
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
13 Mar.2003 (DAY:072)
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)

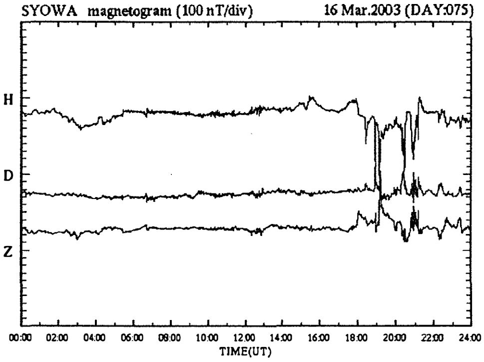
SYOWA magnetogram (100 nT/div) 14 Mar.2003 (DAY:073)



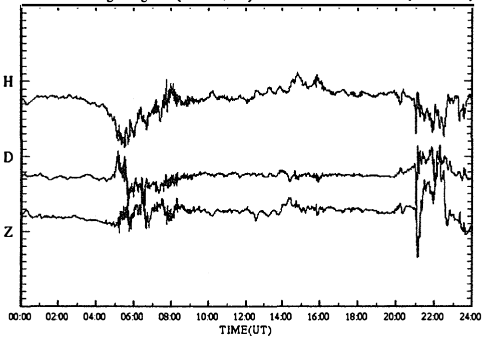
SYOWA magnetogram (100 nT/div) 15 Mar.2003 (DAY:074)



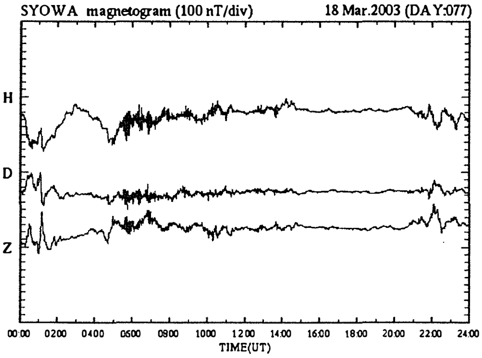
SYOWA magnetogram (100 nT/div) 16 Mar.2003 (DAY:075)



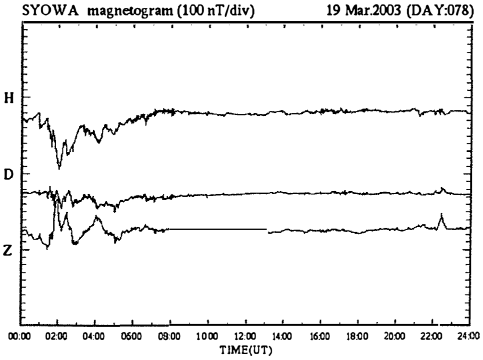
SYOWA magnetogram (100 nT/div) 17 Mar.2003 (DAY:076)



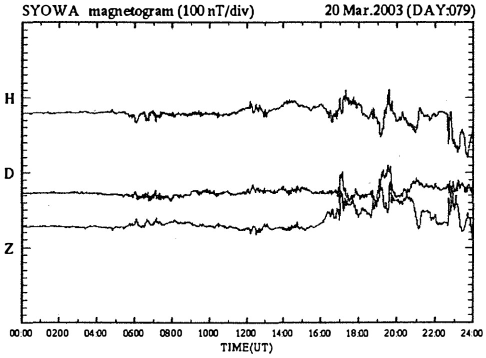
SYOWA magnetogram (100 nT/div) 18 Mar.2003 (DAY:077)



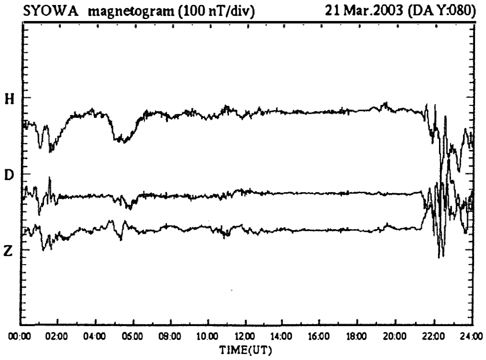
SYOWA magnetogram (100 nT/div) 19 Mar.2003 (DAY:078)



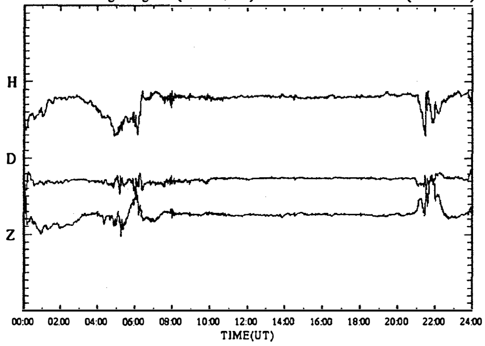
SYOWA magnetogram (100 nT/div) 20 Mar.2003 (DAY:079)



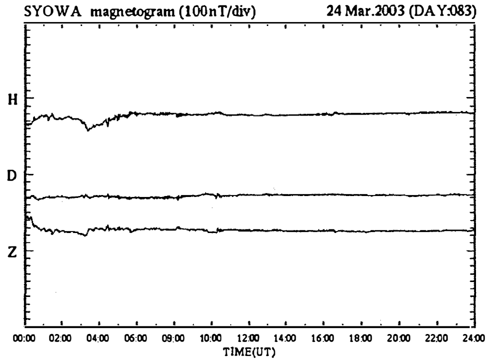
SYOWA magnetogram (100 nT/div) 21 Mar.2003 (DAY:080)



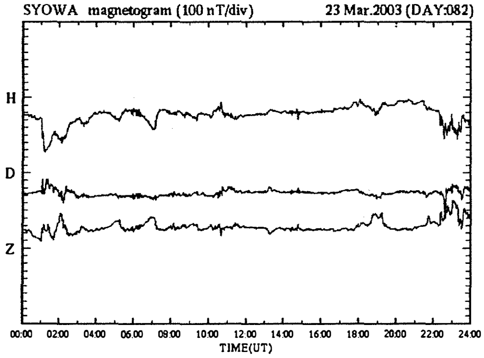
SYOWA magnetogram (100 nT/div) 22 Mar.2003 (DAY:081)



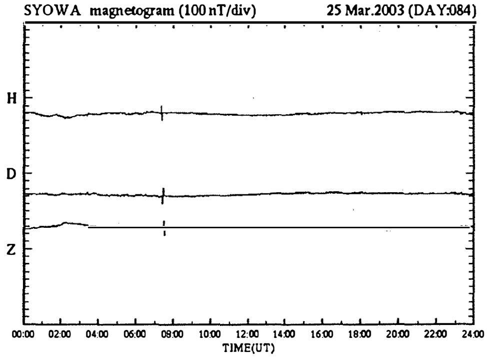
SYOWA magnetogram (100nT/div) 24 Mar.2003 (DAY:083)



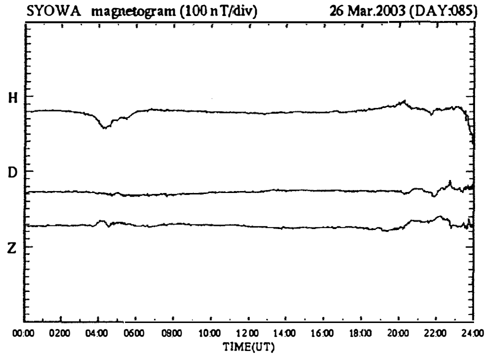
SYOWA magnetogram (100 nT/div) 23 Mar.2003 (DAY:082)



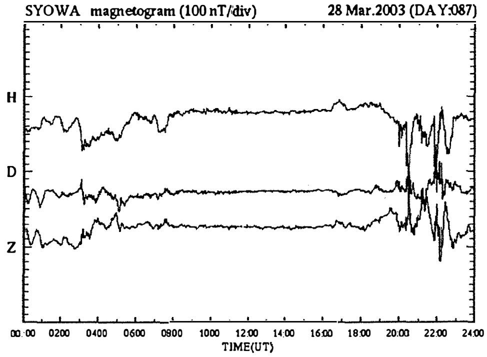
SYOWA magnetogram (100nT/div) 25 Mar.2003 (DAY:084)



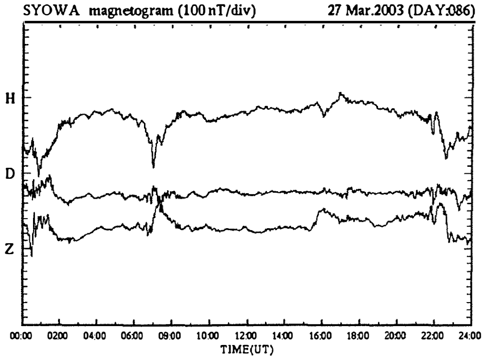
SYOWA magnetogram (100 nT/div) 26 Mar.2003 (DAY:085)



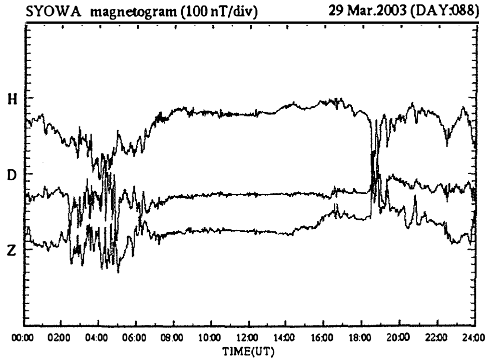
SYOWA magnetogram (100nT/div) 28 Mar.2003 (DAY:087)



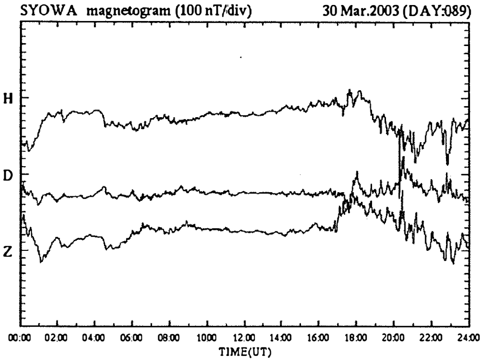
SYOWA magnetogram (100nT/div) 27 Mar.2003 (DAY:086)



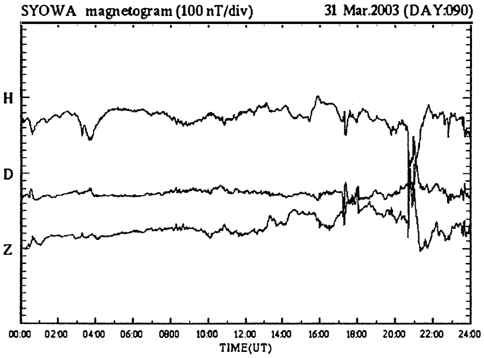
SYOWA magnetogram (100nT/div) 29 Mar.2003 (DAY:088)



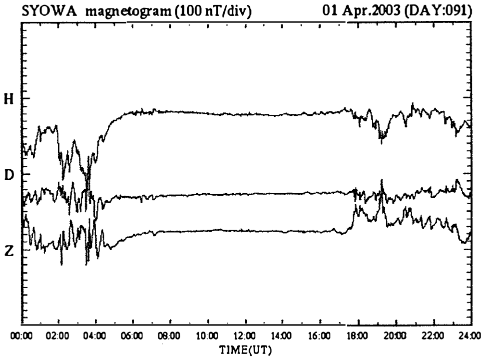
SYOWA magnetogram (100 nT/div) 30 Mar.2003 (DAY:089)



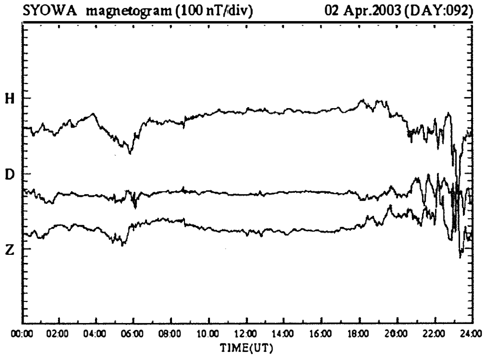
SYOWA magnetogram (100 nT/div) 31 Mar.2003 (DAY:090)



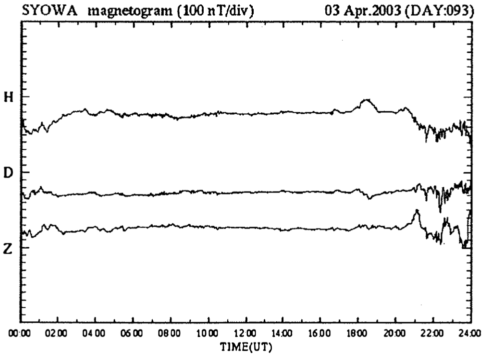
SYOWA magnetogram (100 nT/div) 01 Apr.2003 (DAY:091)



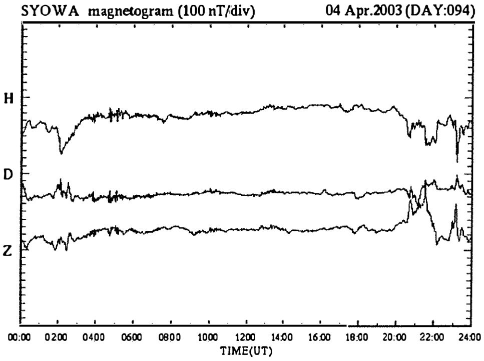
SYOWA magnetogram (100 nT/div) 02 Apr.2003 (DAY:092)



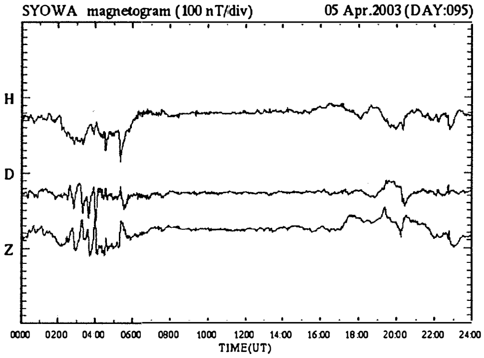
SYOWA magnetogram (100 nT/div) 03 Apr.2003 (DAY:093)



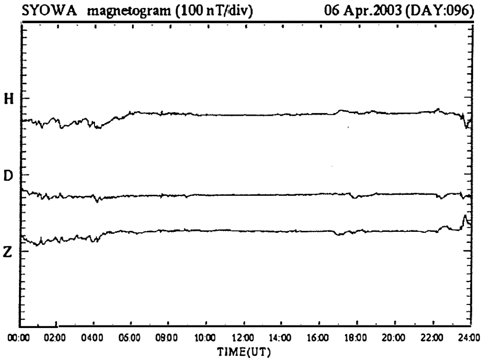
SYOWA magnetogram (100 nT/div) 04 Apr.2003 (DAY:094)



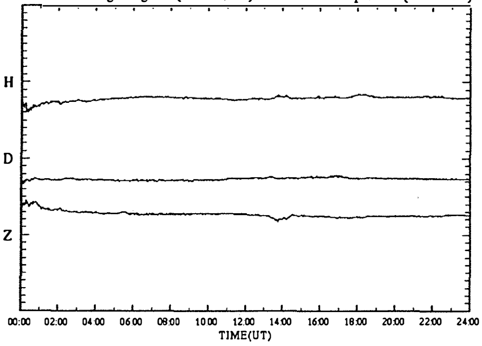
SYOWA magnetogram (100 nT/div) 05 Apr.2003 (DAY:095)



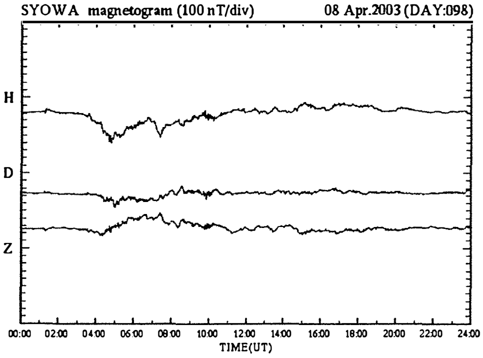
SYOWA magnetogram (100 nT/div) 06 Apr.2003 (DAY:096)



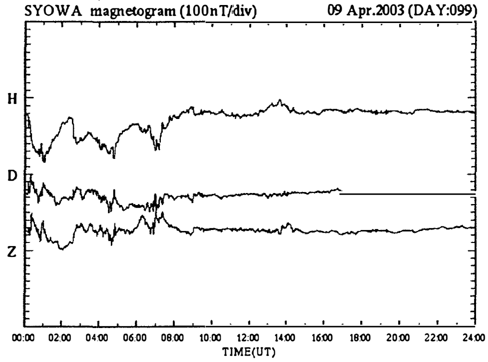
SYOWA magnetogram (100 nT/div) 07 Apr.2003 (DAY:097)



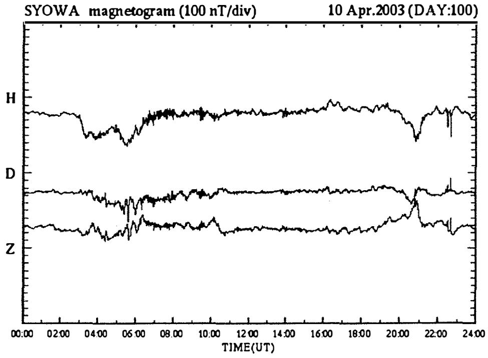
SYOWA magnetogram (100 nT/div) 08 Apr.2003 (DAY:098)



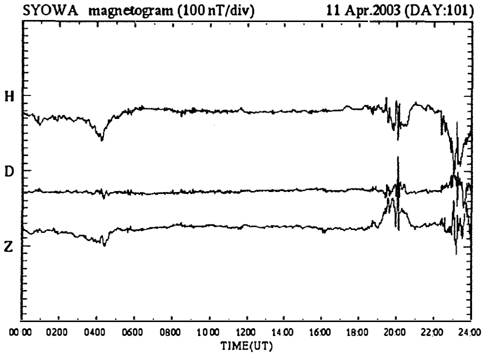
SYOWA magnetogram (100nT/div) 09 Apr.2003 (DAY:099)



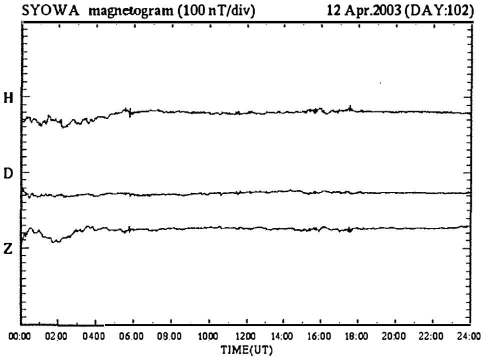
SYOWA magnetogram (100 nT/div) 10 Apr.2003 (DAY:100)



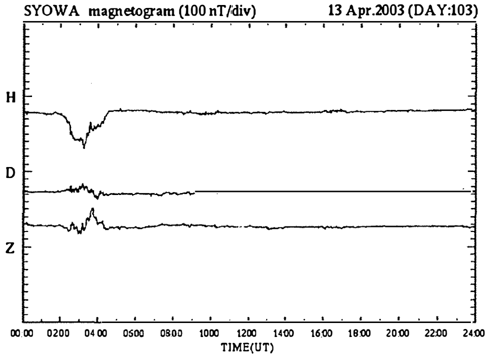
SYOWA magnetogram (100 nT/div) 11 Apr.2003 (DAY:101)



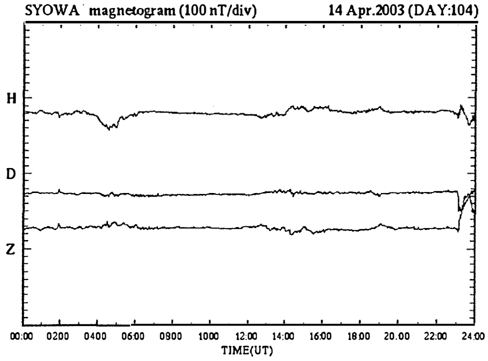
SYOWA magnetogram (100 nT/div) 12 Apr.2003 (DAY:102)



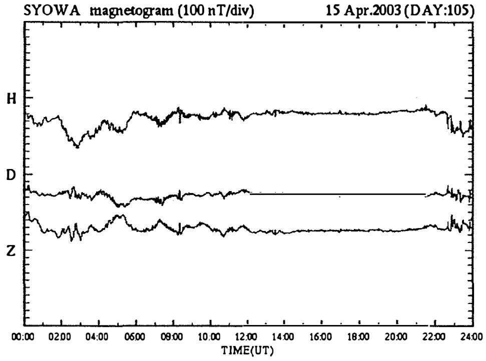
SYOWA magnetogram (100 nT/div) 13 Apr.2003 (DAY:103)



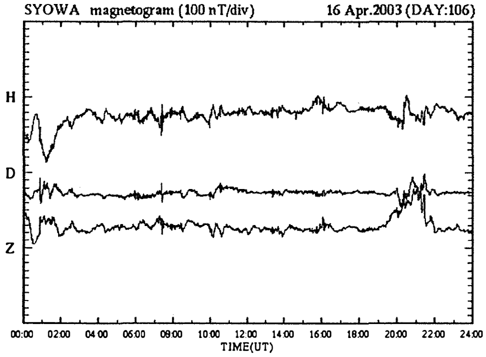
SYOWA magnetogram (100 nT/div) 14 Apr.2003 (DAY:104)



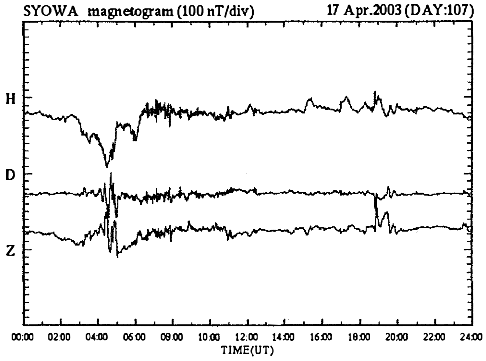
SYOWA magnetogram (100 nT/div) 15 Apr.2003 (DAY:105)



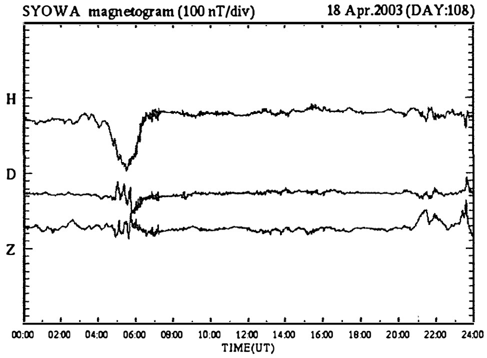
SYOWA magnetogram (100 nT/div) 16 Apr.2003 (DAY:106)



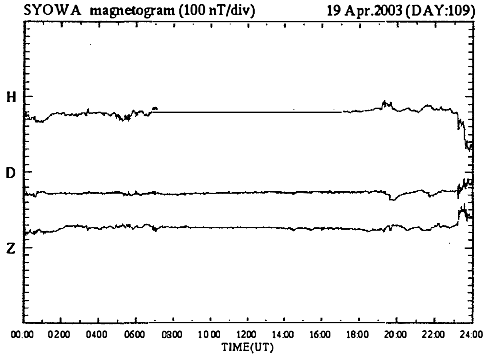
SYOWA magnetogram (100 nT/div) 17 Apr.2003 (DAY:107)



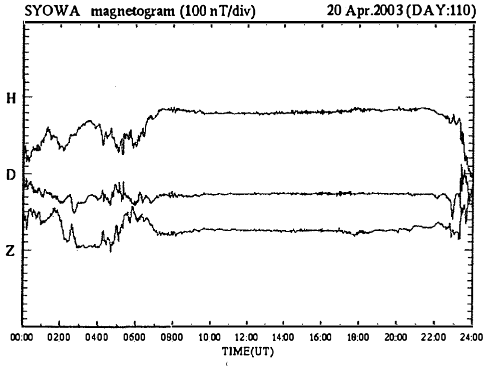
SYOWA magnetogram (100 nT/div) 18 Apr.2003 (DAY:108)



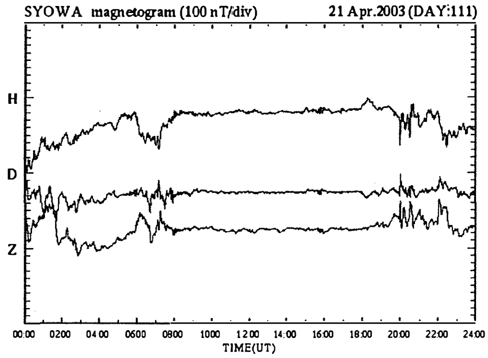
SYOWA magnetogram (100 nT/div) 19 Apr.2003 (DAY:109)



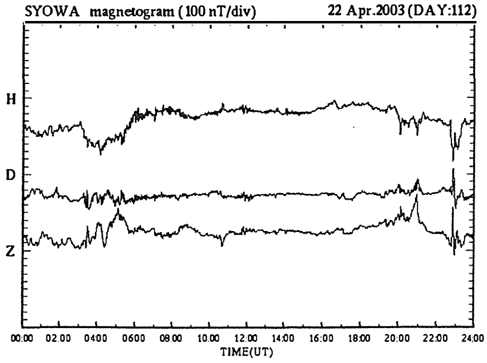
SYOWA magnetogram (100 nT/div) 20 Apr.2003 (DAY:110)



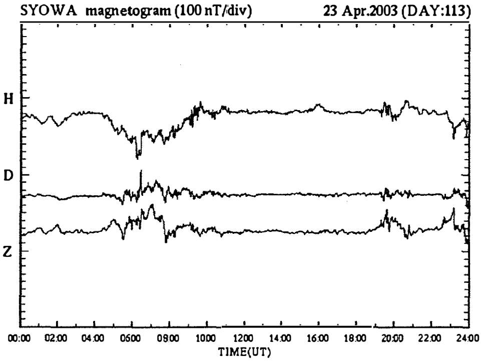
SYOWA magnetogram (100 nT/div) 21 Apr.2003 (DAY:111)



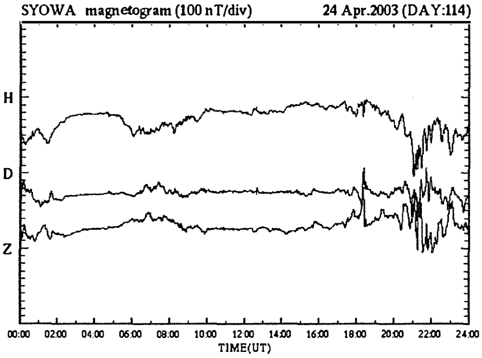
SYOWA magnetogram (100 nT/div) 22 Apr.2003 (DAY:112)



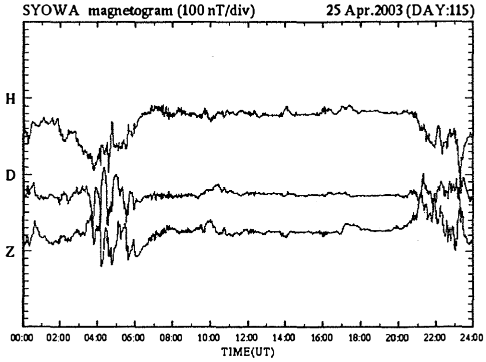
SYOWA magnetogram (100 nT/div) 23 Apr.2003 (DAY:113)



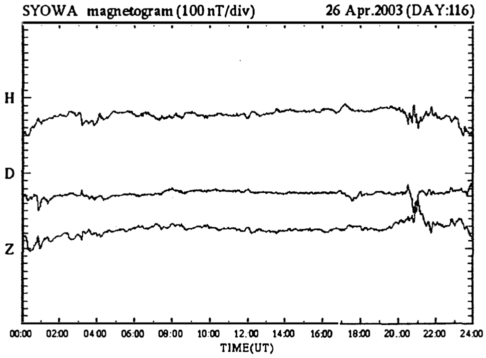
SYOWA magnetogram (100 nT/div) 24 Apr.2003 (DAY:114)



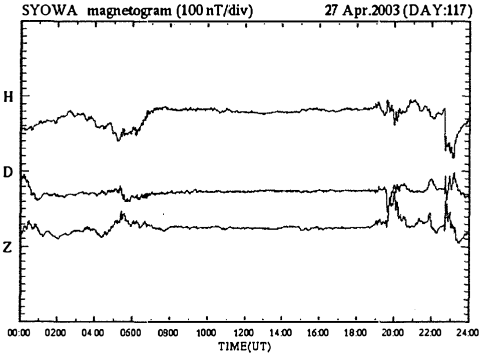
SYOWA magnetogram (100 nT/div) 25 Apr.2003 (DAY:115)



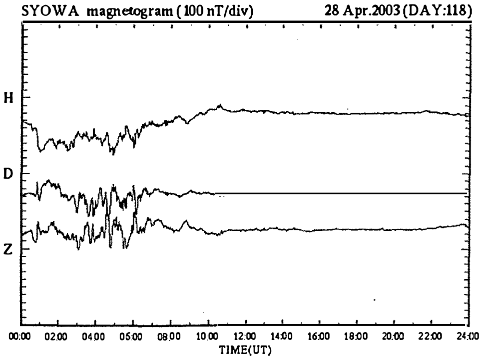
SYOWA magnetogram (100 nT/div) 26 Apr.2003 (DAY:116)



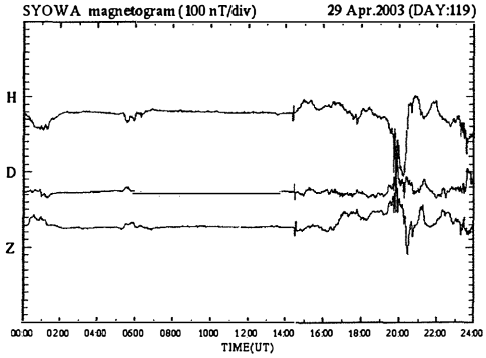
SYOWA magnetogram (100 nT/div) 27 Apr.2003 (DAY:117)



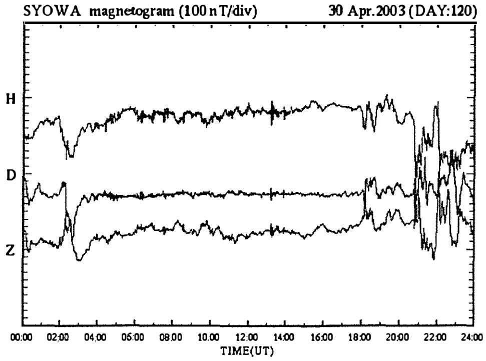
SYOWA magnetogram (100 nT/div) 28 Apr.2003 (DAY:118)



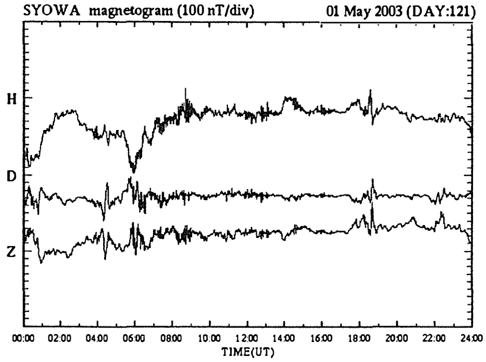
SYOWA magnetogram (100 nT/div) 29 Apr.2003 (DAY:119)



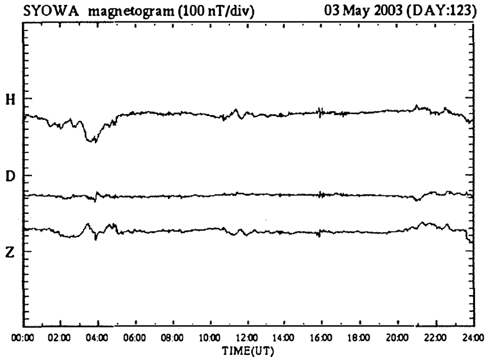
SYOWA magnetogram (100 nT/div) 30 Apr.2003 (DAY:120)



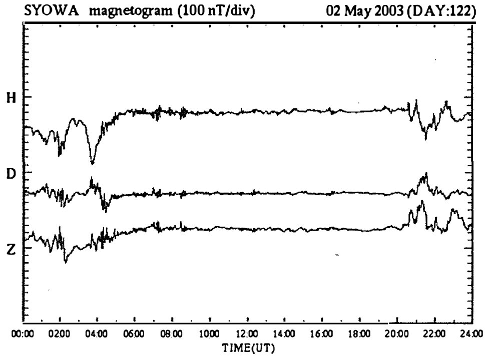
SYOWA magnetogram (100 nT/div) 01 May 2003 (DAY:121)



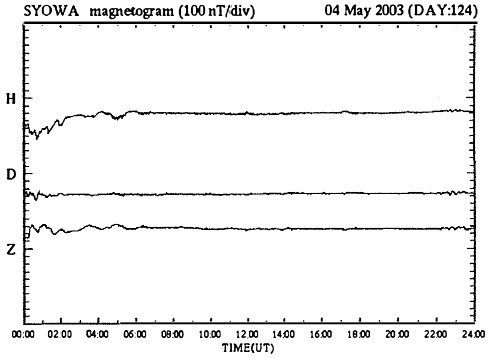
SYOWA magnetogram (100 nT/div) 03 May 2003 (DAY:123)



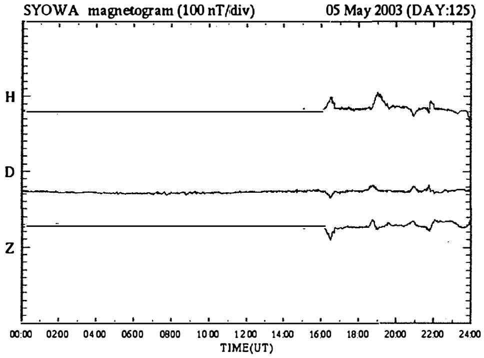
SYOWA magnetogram (100 nT/div) 02 May 2003 (DAY:122)



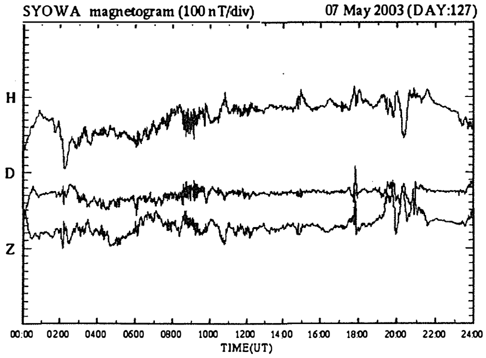
SYOWA magnetogram (100 nT/div) 04 May 2003 (DAY:124)



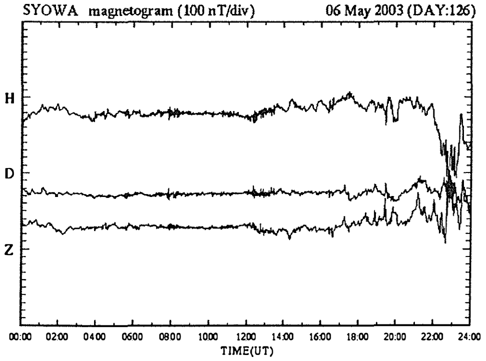
SYOWA magnetogram (100 nT/div) 05 May 2003 (DAY:125)



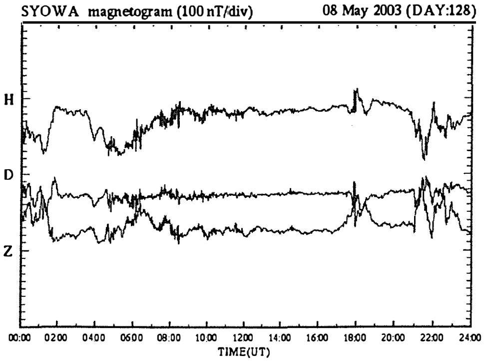
SYOWA magnetogram (100 nT/div) 07 May 2003 (DAY:127)



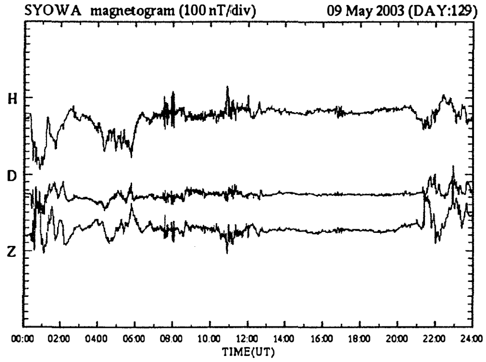
SYOWA magnetogram (100 nT/div) 06 May 2003 (DAY:126)



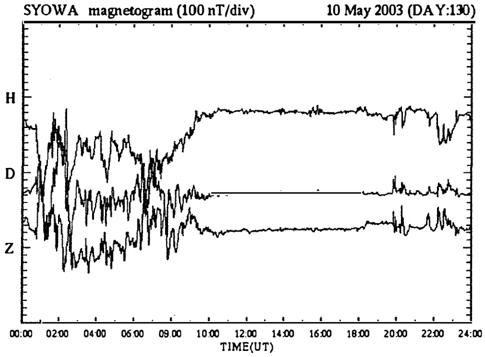
SYOWA magnetogram (100 nT/div) 08 May 2003 (DAY:128)



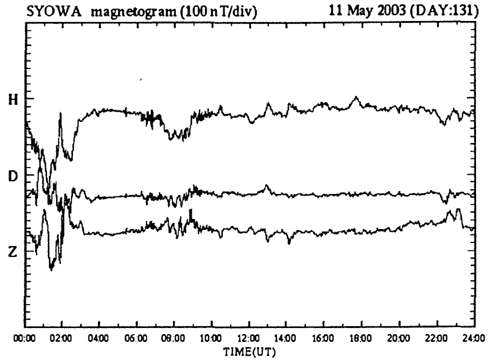
SYOWA magnetogram (100 nT/div) 09 May 2003 (DAY:129)



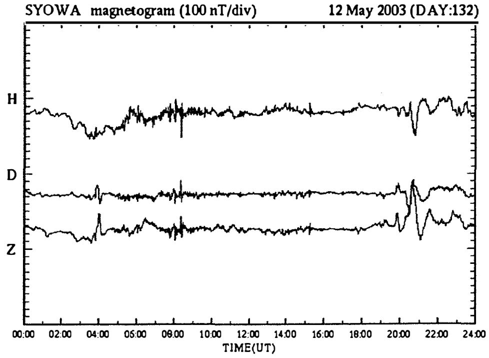
SYOWA magnetogram (100 nT/div) 10 May 2003 (DAY:130)



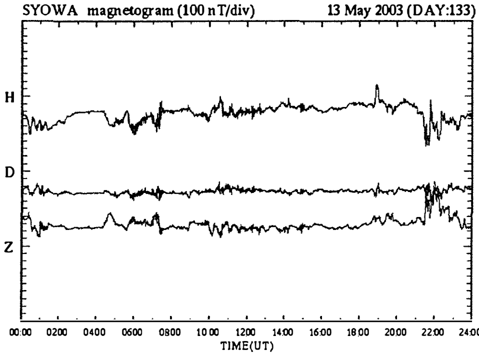
SYOWA magnetogram (100 nT/div) 11 May 2003 (DAY:131)



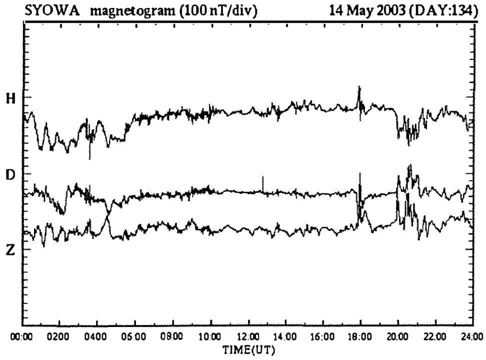
SYOWA magnetogram (100 nT/div) 12 May 2003 (DAY:132)



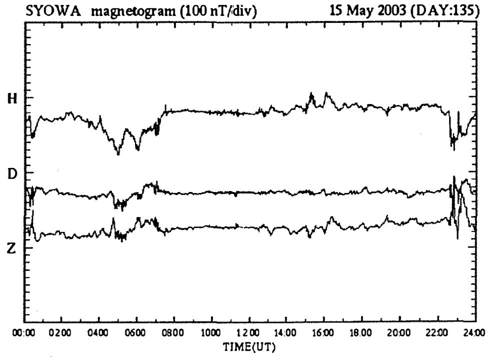
SYOWA magnetogram (100 nT/div) 13 May 2003 (DAY:133)



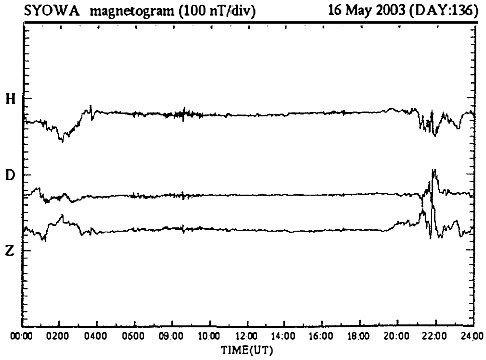
SYOWA magnetogram (100 nT/div) 14 May 2003 (DAY:134)



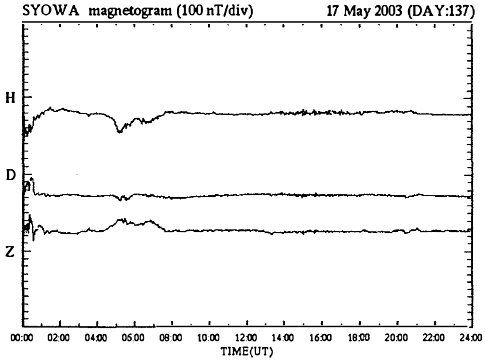
SYOWA magnetogram (100 nT/div) 15 May 2003 (DAY:135)



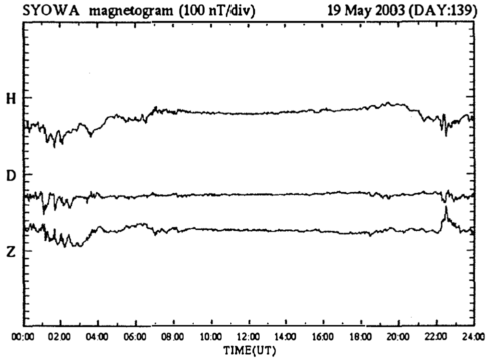
SYOWA magnetogram (100 nT/div) 16 May 2003 (DAY:136)



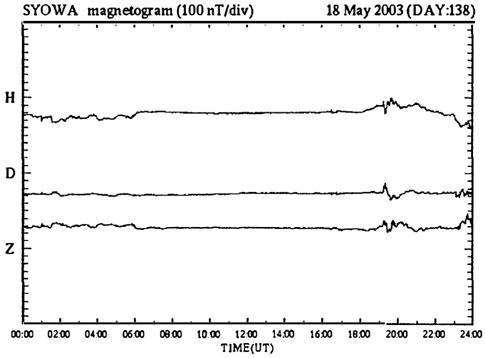
SYOWA magnetogram (100 nT/div) 17 May 2003 (DAY:137)



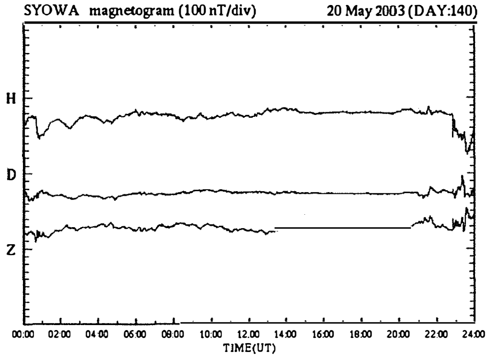
SYOWA magnetogram (100 nT/div) 19 May 2003 (DAY:139)



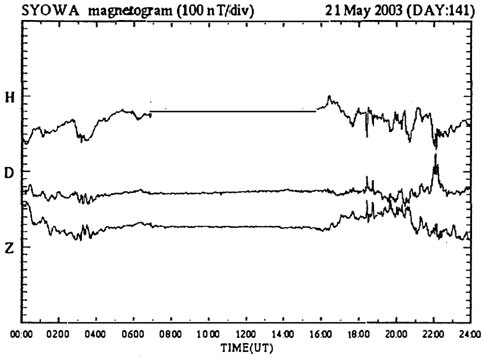
SYOWA magnetogram (100 nT/div) 18 May 2003 (DAY:138)



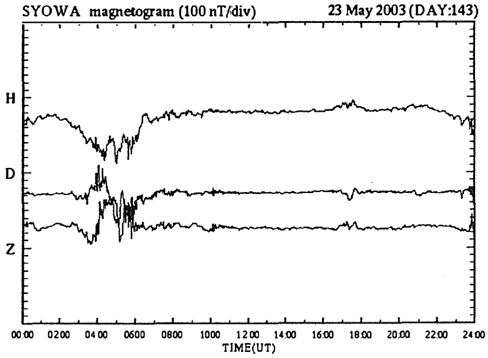
SYOWA magnetogram (100 nT/div) 20 May 2003 (DAY:140)



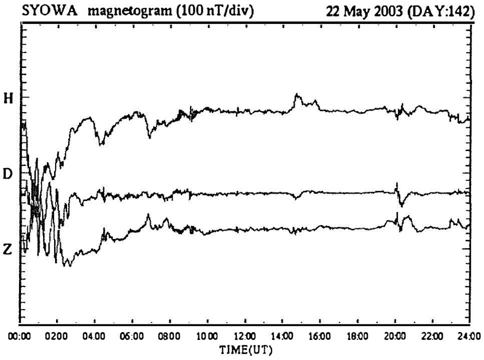
SYOWA magnetogram (100 nT/div) 21 May 2003 (DAY:141)



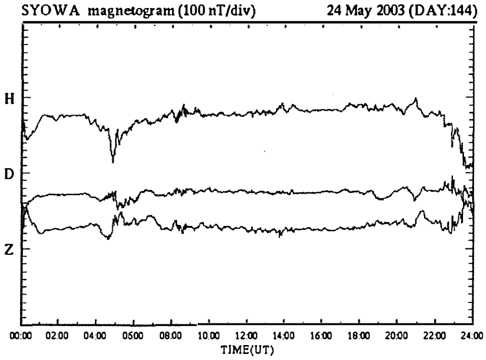
SYOWA magnetogram (100 nT/div) 23 May 2003 (DAY:143)

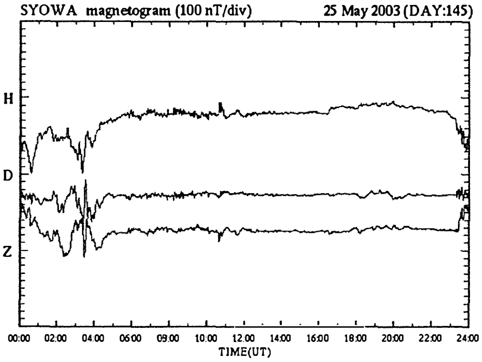


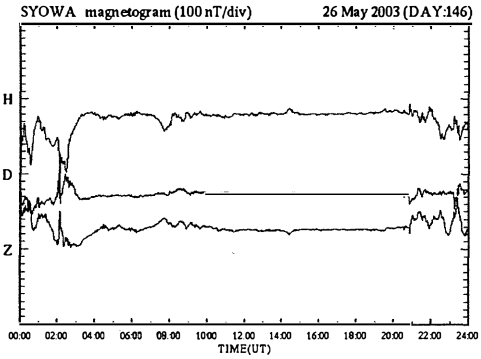
SYOWA magnetogram (100 nT/div) 22 May 2003 (DAY:142)

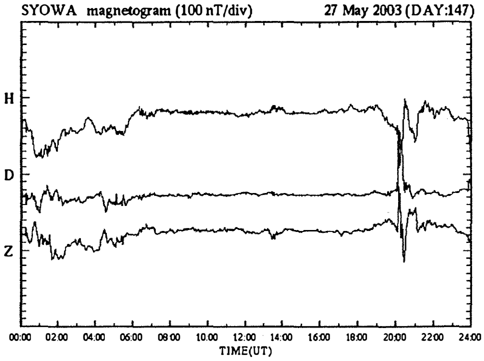


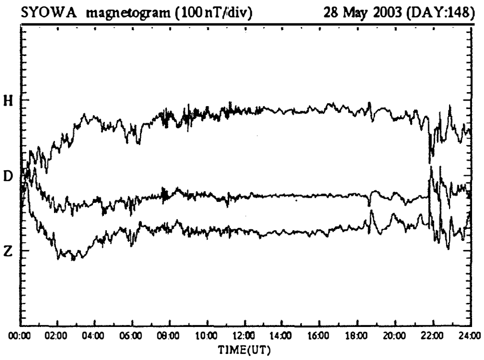
SYOWA magnetogram (100 nT/div) 24 May 2003 (DAY:144)

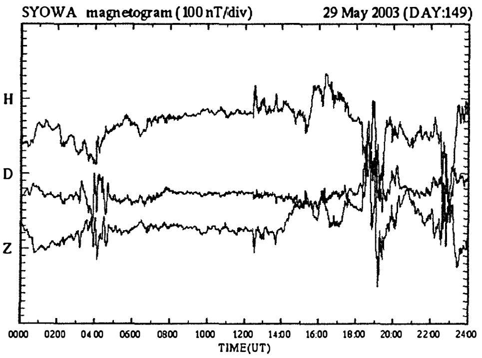


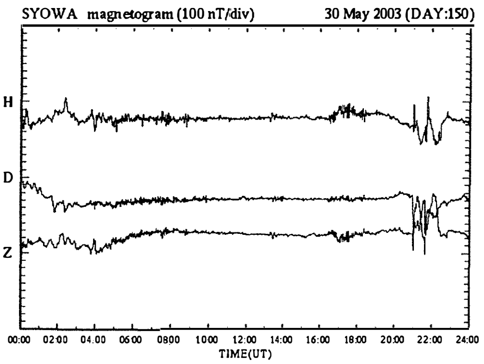

SYOWA magnetogram (100 nT/div)
25 May 2003 (DAY:145)
H
D
Z
TIME(UT)

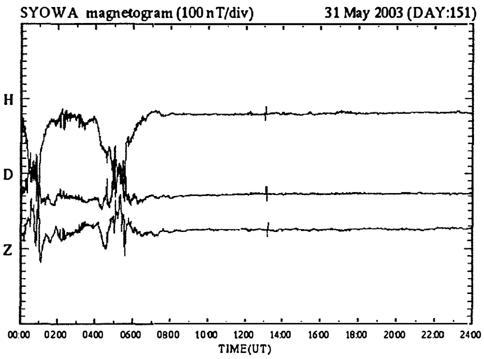

SYOWA magnetogram (100 nT/div)
26 May 2003 (DAY:146)
H
D
Z
TIME(UT)

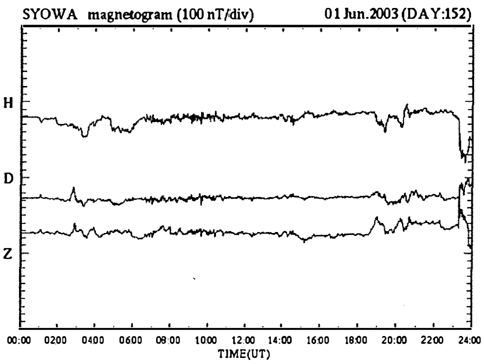

SYOWA magnetogram (100 nT/div)
27 May 2003 (DAY:147)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
28 May 2003 (DAY:148)
H
D
Z
TIME(UT)

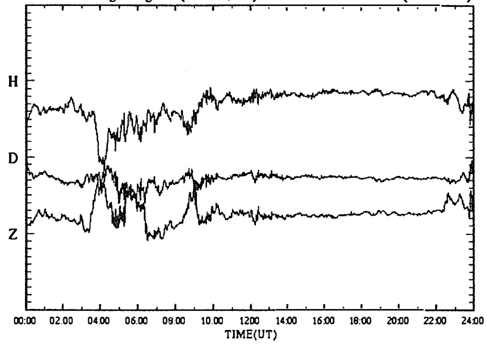

SYOWA magnetogram (100 nT/div)
29 May 2003 (DAY:149)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
30 May 2003 (DAY:150)
H
D
Z
TIME(UT)

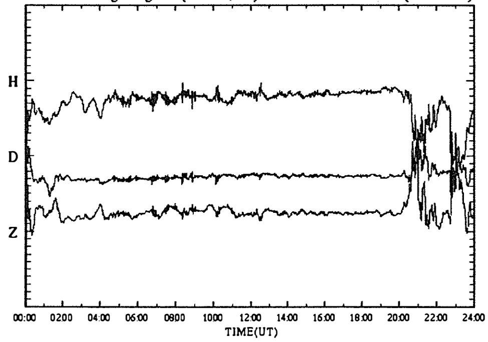

SYOWA magnetogram (100 nT/div)
31 May 2003 (DAY:151)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
01 Jun.2003 (DAY:152)
H
D
Z
TIME(UT)

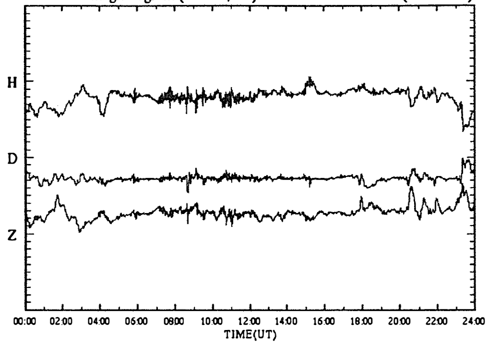
SYOWA magnetogram (100 nT/div) 02 Jun.2003 (DAY:153)



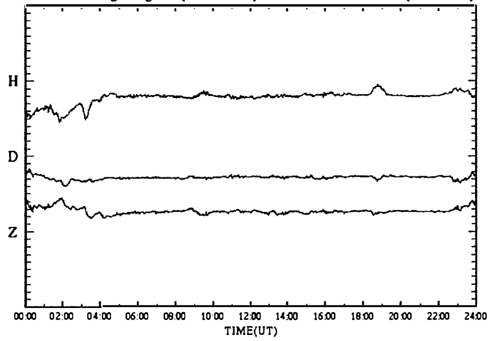
SYOWA magnetogram (100 nT/div) 03 Jun.2003 (DAY:154)



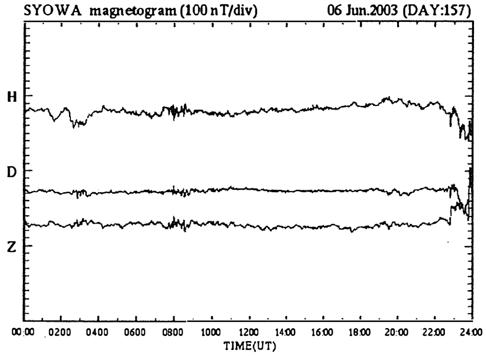
SYOWA magnetogram (100 nT/div) 04 Jun.2003 (DAY:155)



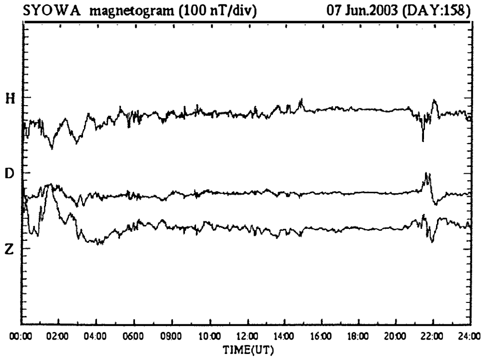
SYOWA magnetogram (100 nT/div) 05 Jun.2003 (DAY:156)



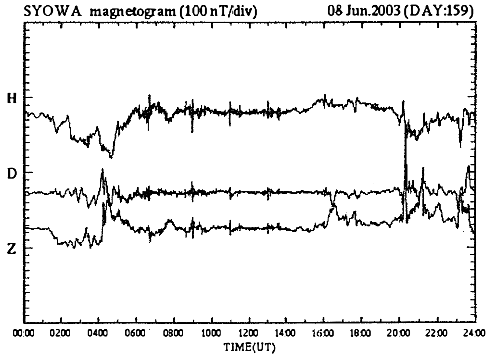
SYOWA magnetogram (100 nT/div) 06 Jun.2003 (DAY:157)



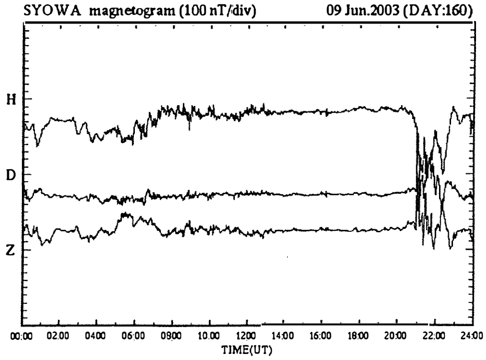
SYOWA magnetogram (100 nT/div) 07 Jun.2003 (DAY:158)



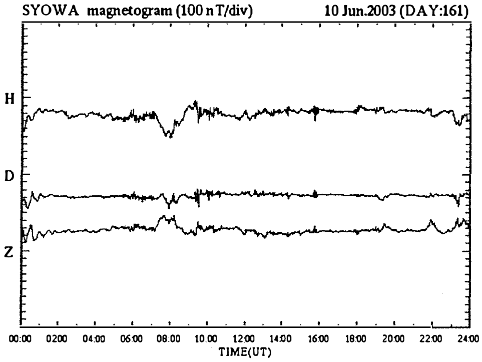
SYOWA magnetogram (100 nT/div) 08 Jun.2003 (DAY:159)



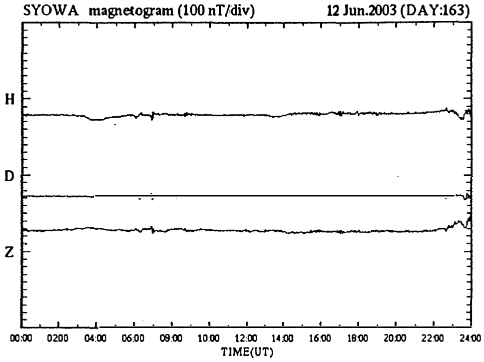
SYOWA magnetogram (100 nT/div) 09 Jun.2003 (DAY:160)



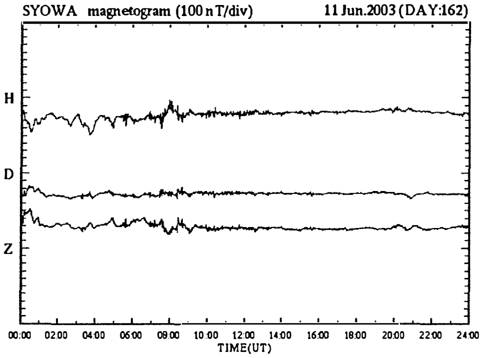
SYOWA magnetogram (100 nT/div) 10 Jun.2003 (DAY:161)



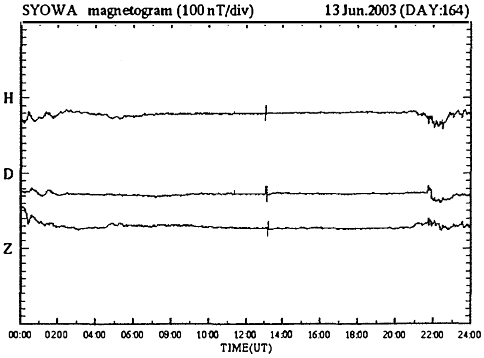
SYOWA magnetogram (100 nT/div) 12 Jun.2003 (DAY:163)



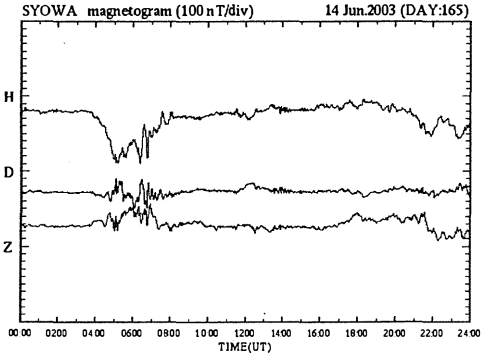
SYOWA magnetogram (100 nT/div) 11 Jun.2003 (DAY:162)



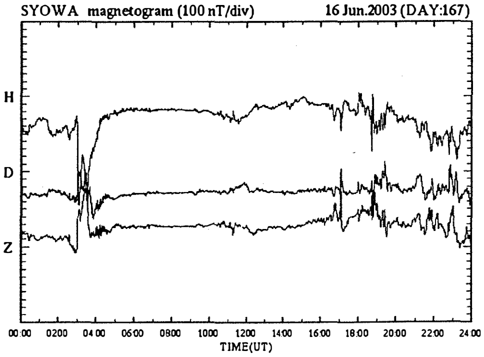
SYOWA magnetogram (100 nT/div) 13 Jun.2003 (DAY:164)



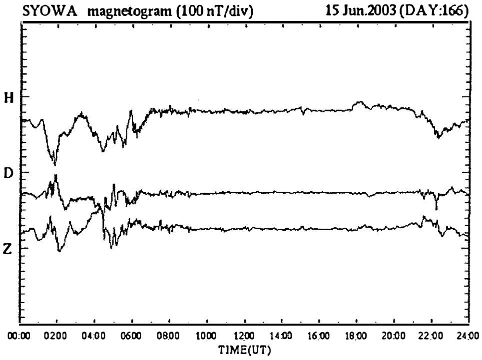
SYOWA magnetogram (100 nT/div) 14 Jun.2003 (DAY:165)



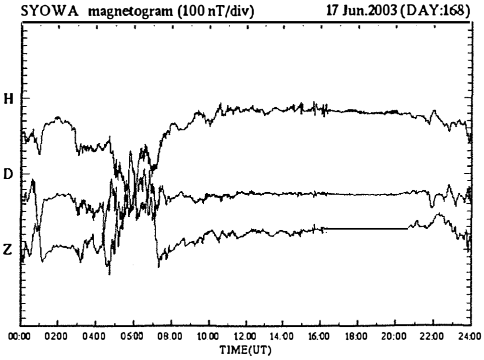
SYOWA magnetogram (100 nT/div) 16 Jun.2003 (DAY:167)

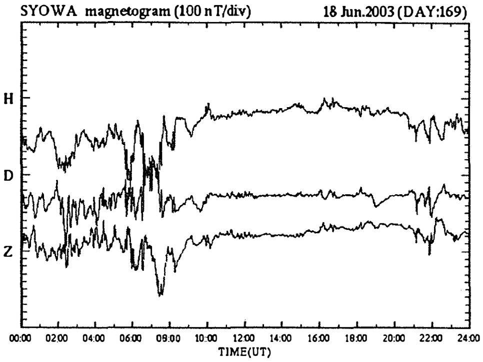


SYOWA magnetogram (100 nT/div) 15 Jun.2003 (DAY:166)



SYOWA magnetogram (100 nT/div) 17 Jun.2003 (DAY:168)




SYOWA magnetogram (100 nT/div)
18 Jun.2003 (DAY:169)
H
D
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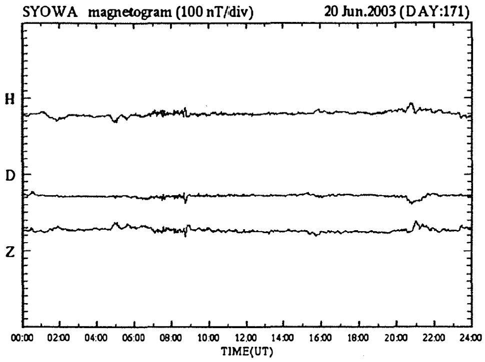
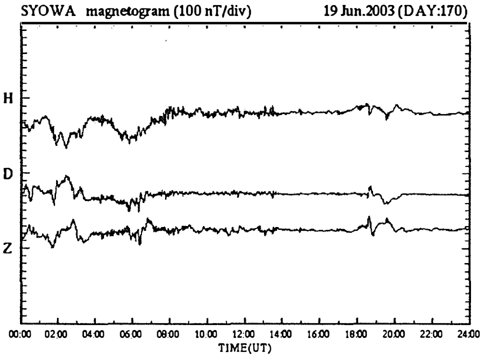
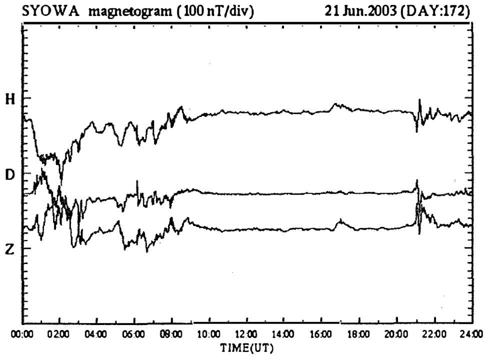
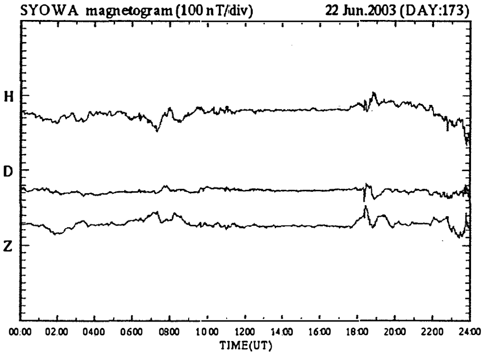
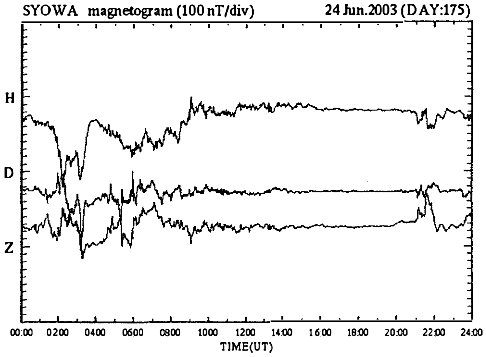
TIME(UT)

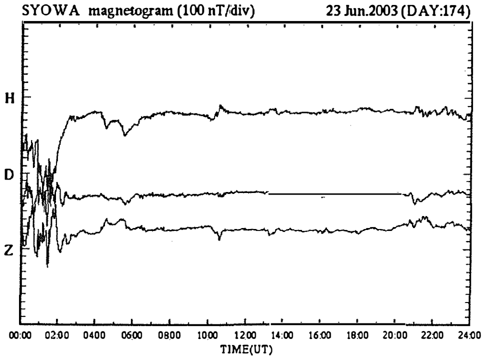

SYOWA magnetogram (100 nT/div)
20 Jun.2003 (DAY:171)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
19 Jun.2003 (DAY:170)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
21 Jun.2003 (DAY:172)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
22 Jun.2003 (DAY:173)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
24 Jun.2003 (DAY:175)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
23 Jun.2003 (DAY:174)
H
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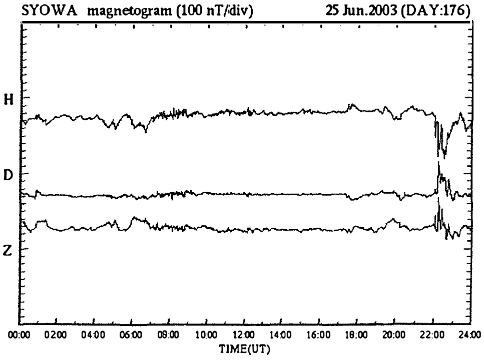
TIME(UT)


SYOWA magnetogram (100 nT/div)
25 Jun.2003 (DAY:176)
H
D
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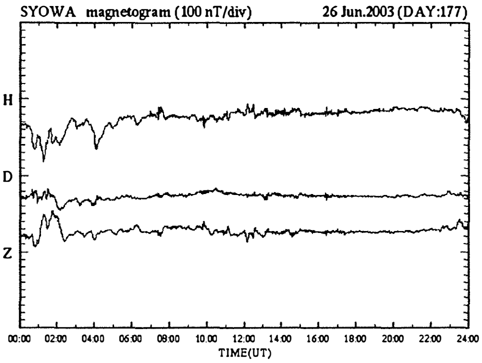
TIME(UT)


SYOWA magnetogram (100 nT/div)
26 Jun.2003 (DAY:177)
H
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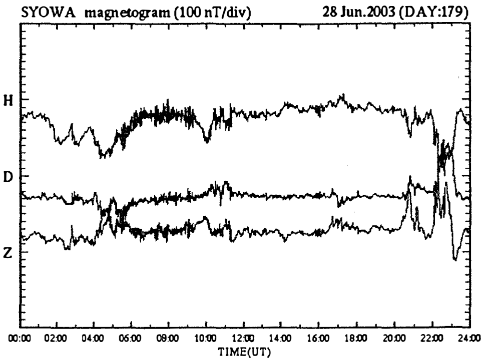
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
28 Jun.2003 (DAY:179)
H
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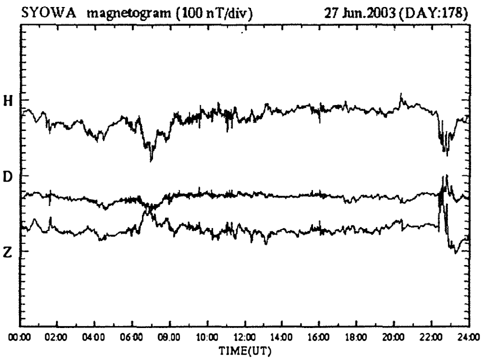
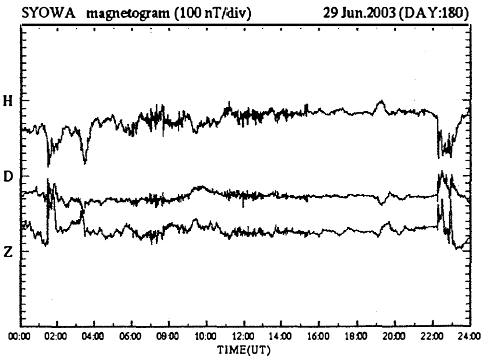
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
27 Jun.2003 (DAY:178)
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 Jun.2003 (DAY:180)
H
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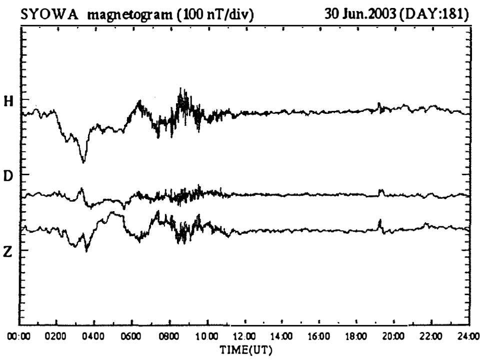
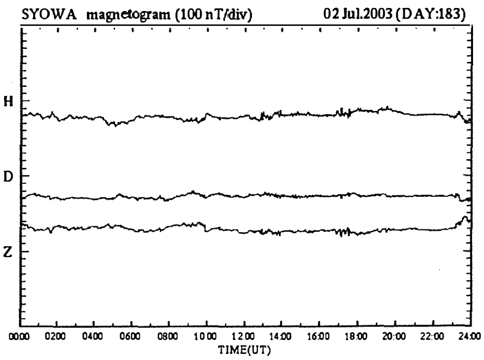
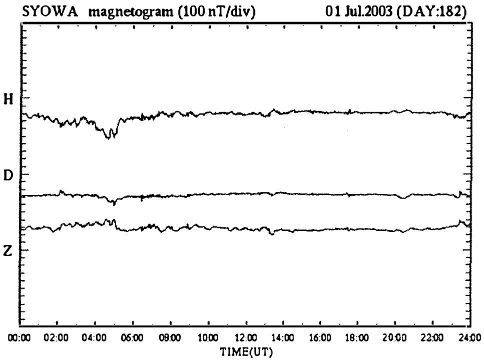
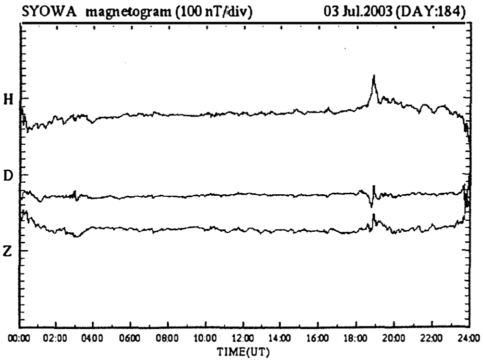
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

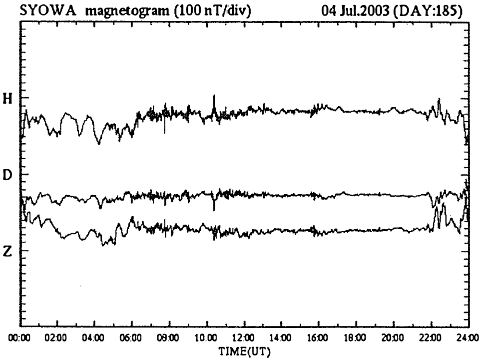

SYOWA magnetogram (100 nT/div)
30 Jun.2003 (DAY:181)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
02 Jul.2003 (DAY:183)
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)

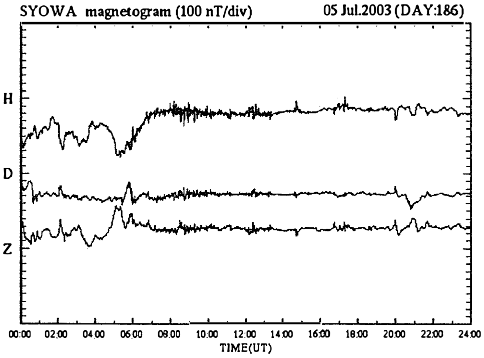

SYOWA magnetogram (100 nT/div)
01 Jul.2003 (DAY:182)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
03 Jul.2003 (DAY:184)
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)

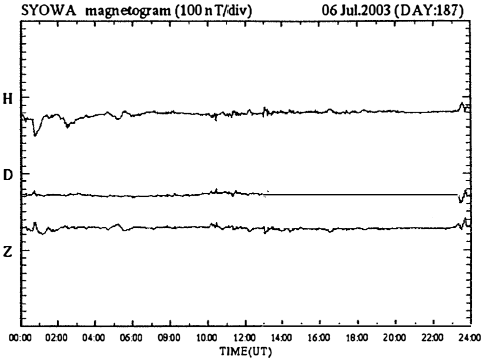
SYOWA magnetogram (100 nT/div) 04 Jul.2003 (DAY:185)



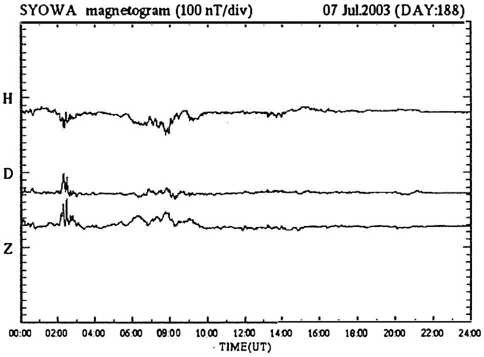
SYOWA magnetogram (100 nT/div) 05 Jul.2003 (DAY:186)



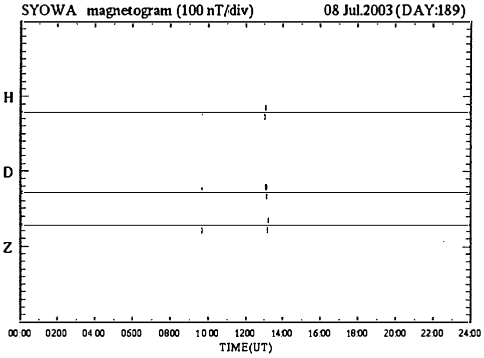
SYOWA magnetogram (100 nT/div) 06 Jul.2003 (DAY:187)



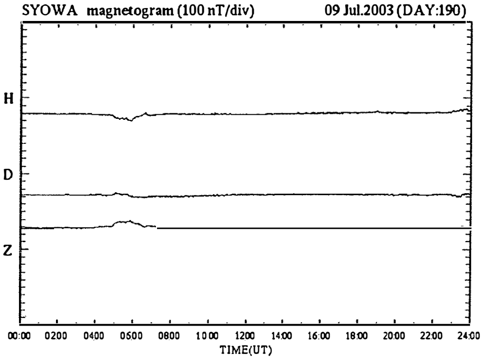
SYOWA magnetogram (100 nT/div) 07 Jul.2003 (DAY:188)



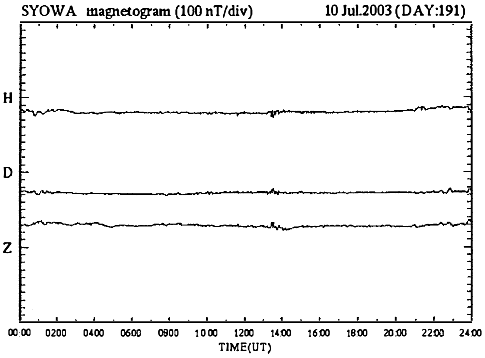
SYOWA magnetogram (100 nT/div) 08 Jul.2003 (DAY:189)



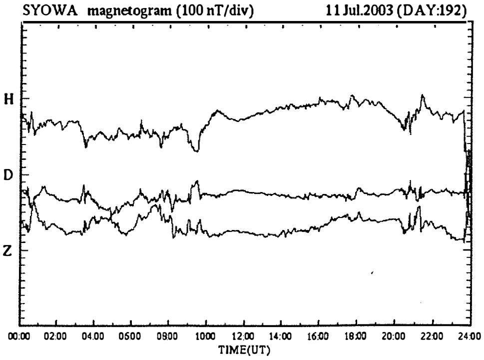
SYOWA magnetogram (100 nT/div) 09 Jul.2003 (DAY:190)



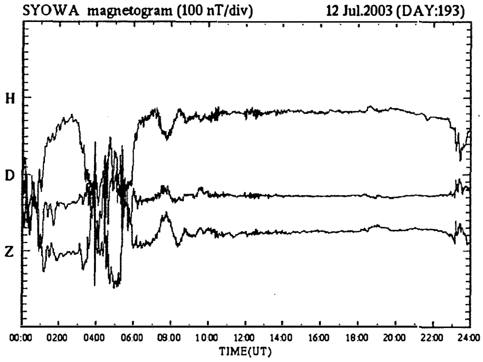
SYOWA magnetogram (100 nT/div) 10 Jul.2003 (DAY:191)



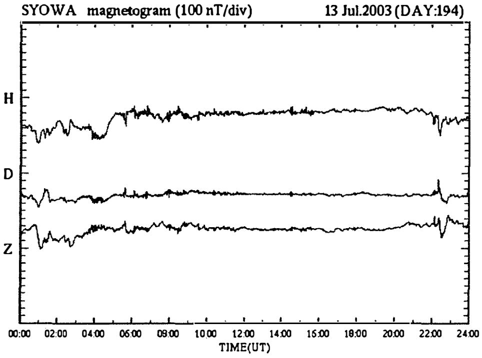
SYOWA magnetogram (100 nT/div) 11 Jul.2003 (DAY:192)



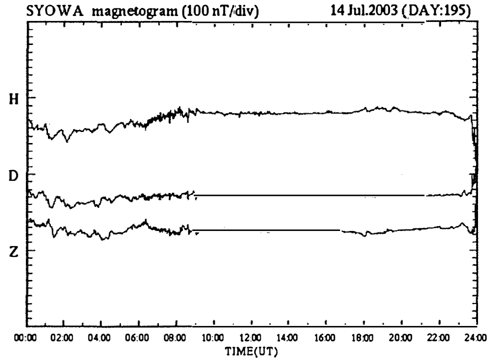
SYOWA magnetogram (100 nT/div) 12 Jul.2003 (DAY:193)



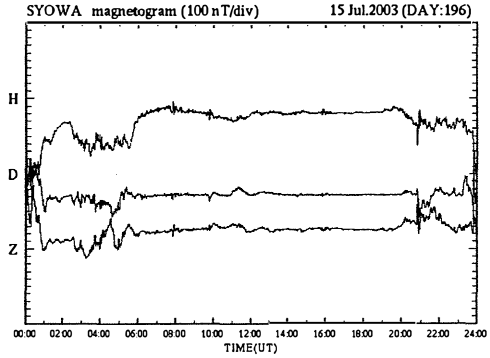
SYOWA magnetogram (100 nT/div) 13 Jul.2003 (DAY:194)



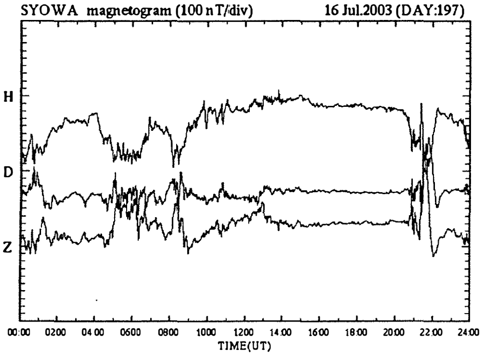
SYOWA magnetogram (100 nT/div) 14 Jul.2003 (DAY:195)



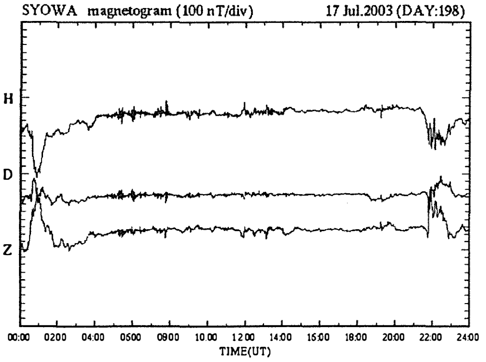
SYOWA magnetogram (100 nT/div) 15 Jul.2003 (DAY:196)



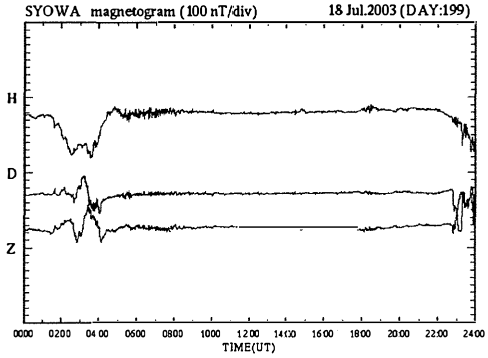
SYOWA magnetogram (100 nT/div) 16 Jul.2003 (DAY:197)



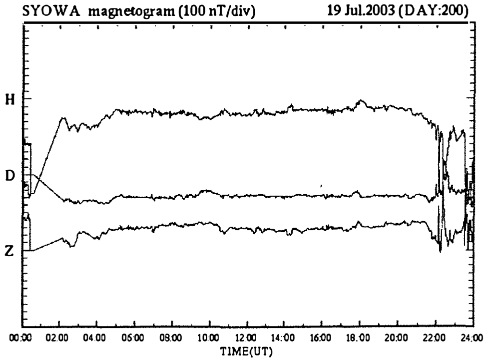
SYOWA magnetogram (100 nT/div) 17 Jul.2003 (DAY:198)



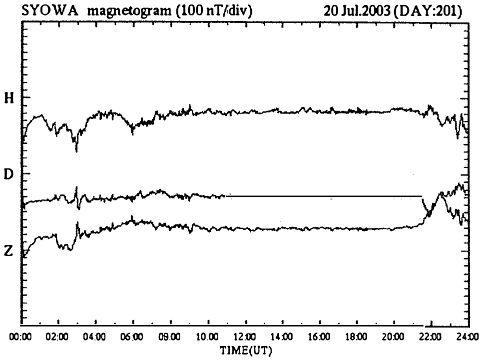
SYOWA magnetogram (100 nT/div) 18 Jul.2003 (DAY:199)



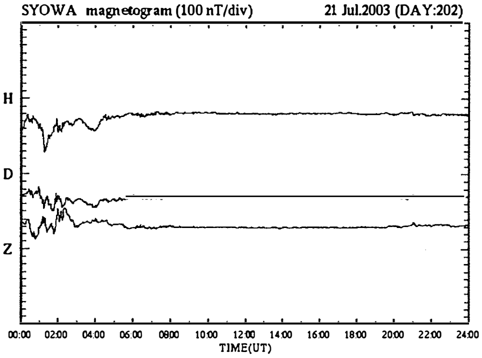
SYOWA magnetogram (100 nT/div) 19 Jul.2003 (DAY:200)



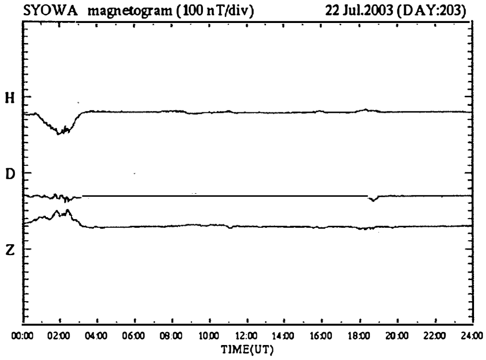
SYOWA magnetogram (100 nT/div) 20 Jul.2003 (DAY:201)



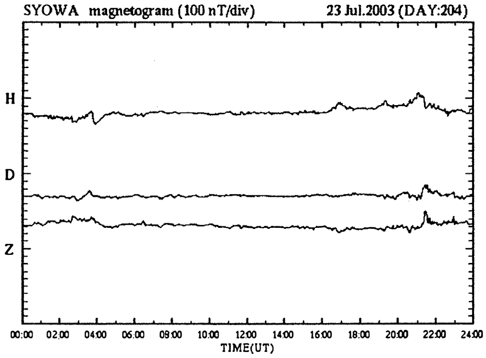
SYOWA magnetogram (100 nT/div) 21 Jul.2003 (DAY:202)



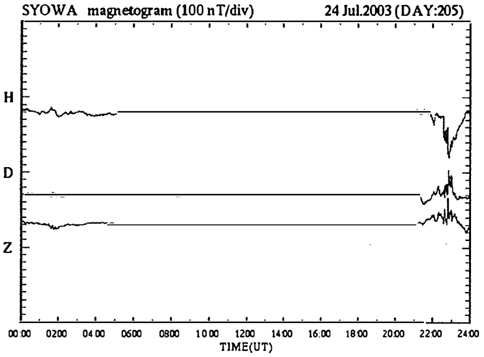
SYOWA magnetogram (100 nT/div) 22 Jul.2003 (DAY:203)



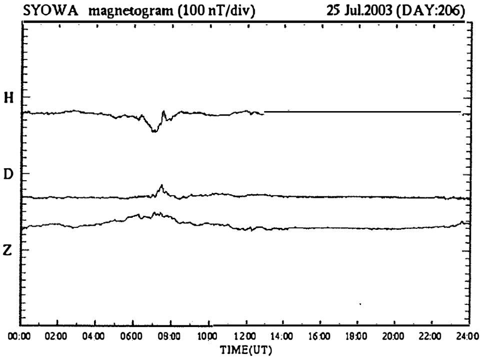
SYOWA magnetogram (100 nT/div) 23 Jul.2003 (DAY:204)



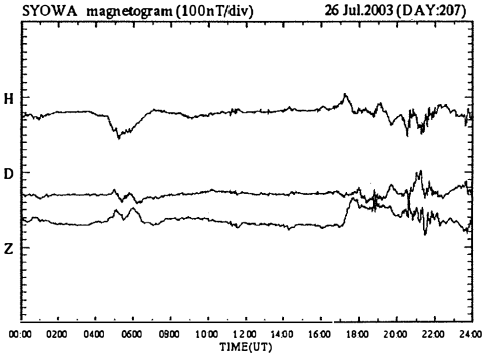
SYOWA magnetogram (100 nT/div) 24 Jul.2003 (DAY:205)



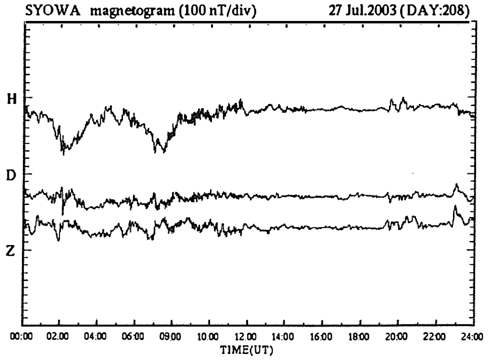
SYOWA magnetogram (100 nT/div) 25 Jul.2003 (DAY:206)



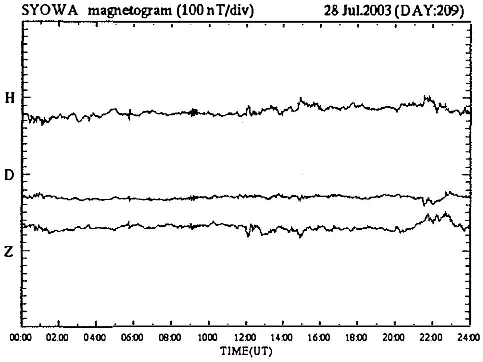
SYOWA magnetogram (100nT/div) 26 Jul.2003 (DAY:207)



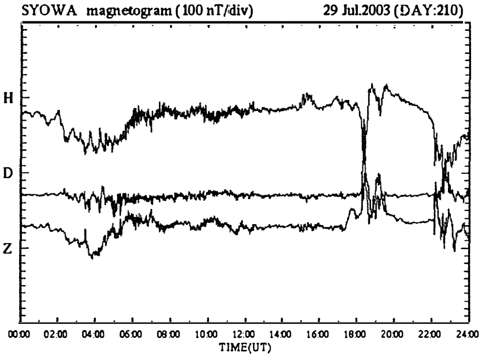
SYOWA magnetogram (100 nT/div) 27 Jul.2003 (DAY:208)



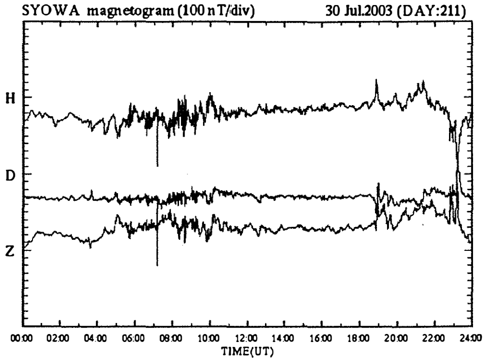
SYOWA magnetogram (100 nT/div) 28 Jul.2003 (DAY:209)



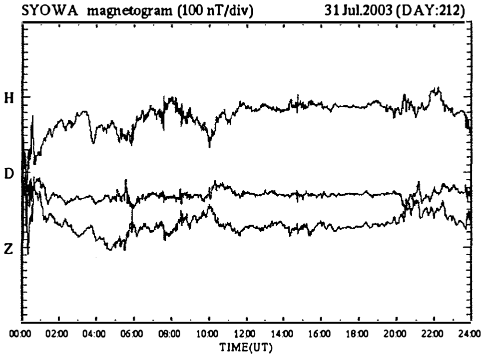
SYOWA magnetogram (100 nT/div) 29 Jul.2003 (DAY:210)



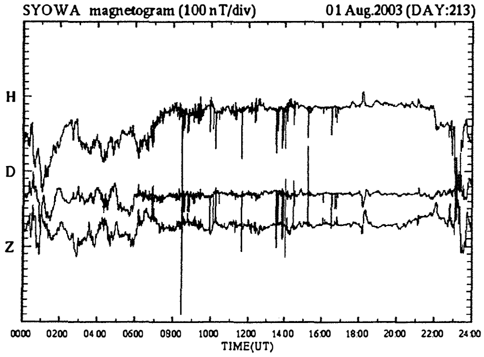
SYOWA magnetogram (100 nT/div) 30 Jul.2003 (DAY:211)



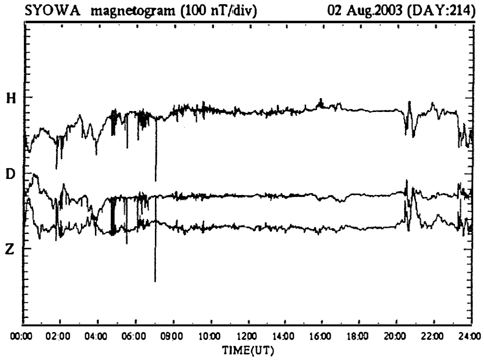
SYOWA magnetogram (100 nT/div) 31 Jul.2003 (DAY:212)



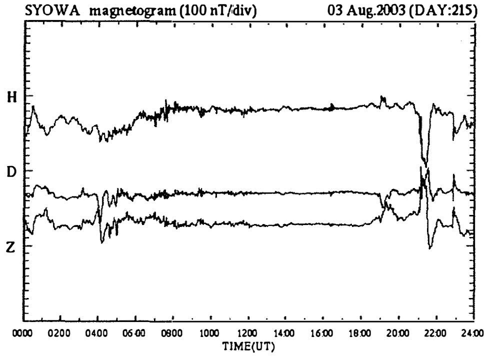
SYOWA magnetogram (100 nT/div) 01 Aug.2003 (DAY:213)



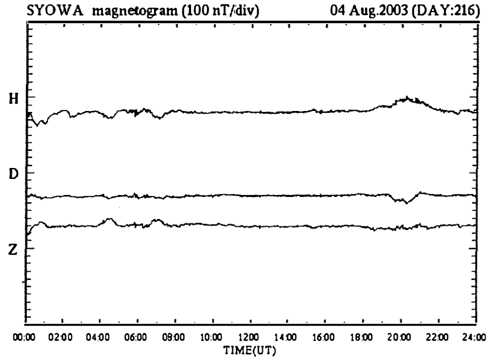
SYOWA magnetogram (100 nT/div) 02 Aug.2003 (DAY:214)



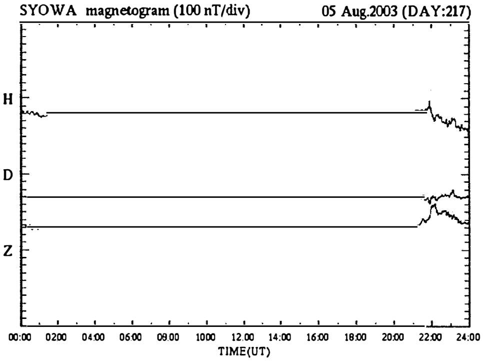
SYOWA magnetogram (100 nT/div) 03 Aug.2003 (DAY:215)



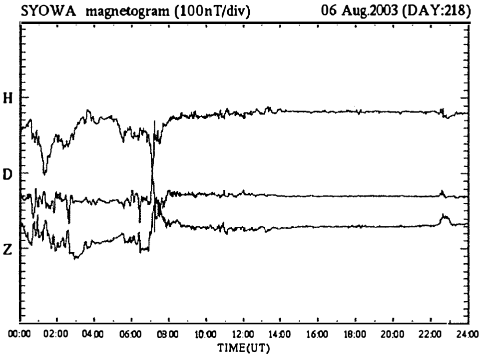
SYOWA magnetogram (100 nT/div) 04 Aug.2003 (DAY:216)



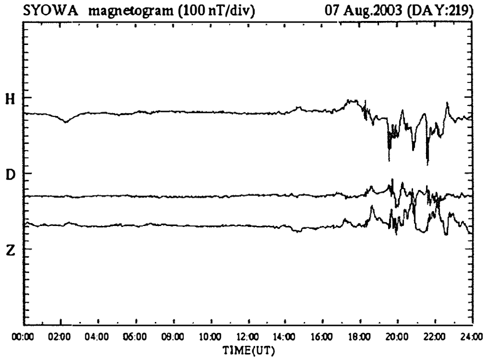
SYOWA magnetogram (100 nT/div) 05 Aug.2003 (DAY:217)



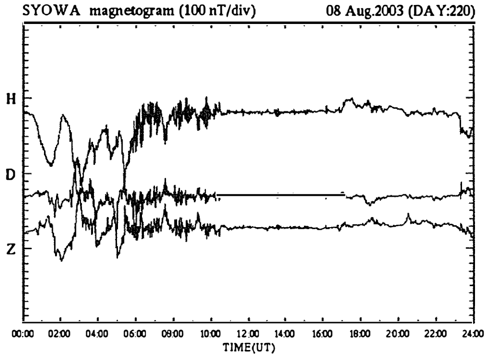
SYOWA magnetogram (100nT/div) 06 Aug.2003 (DAY:218)



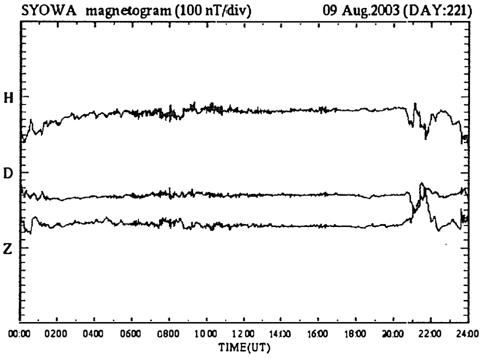
SYOWA magnetogram (100 nT/div) 07 Aug.2003 (DAY:219)



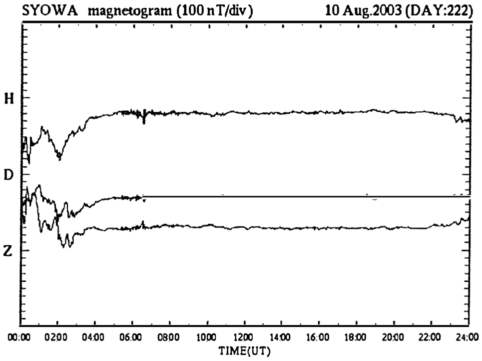
SYOWA magnetogram (100 nT/div) 08 Aug.2003 (DAY:220)



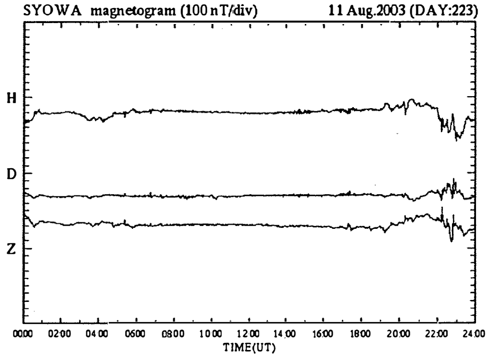
SYOWA magnetogram (100 nT/div) 09 Aug.2003 (DAY:221)



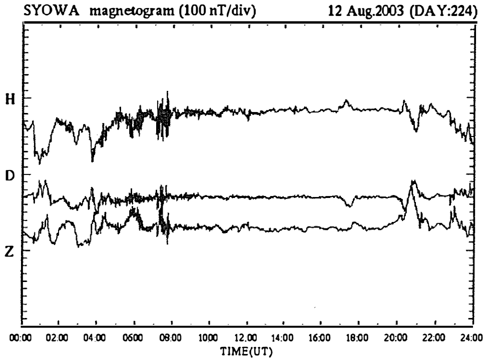
SYOWA magnetogram (100 nT/div) 10 Aug.2003 (DAY:222)

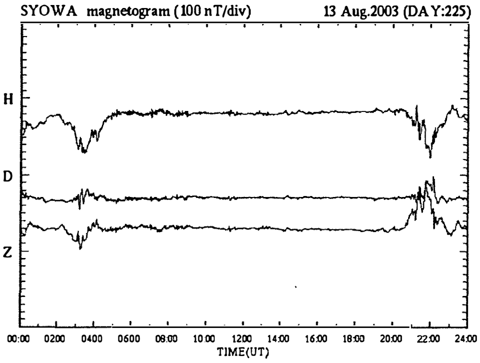


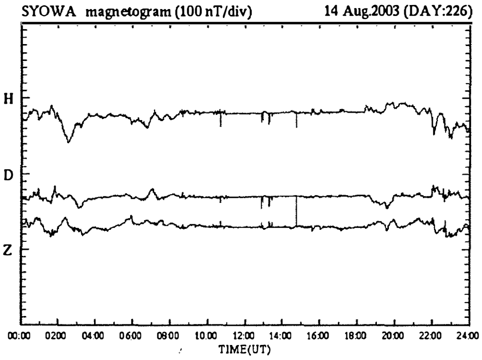
SYOWA magnetogram (100 nT/div) 11 Aug.2003 (DAY:223)

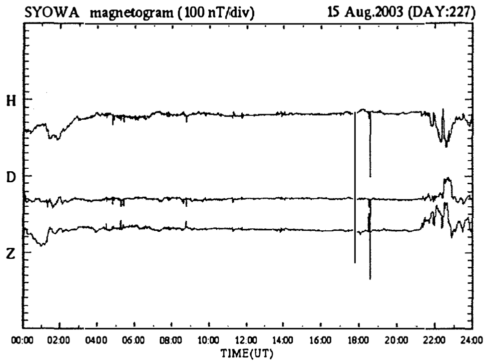


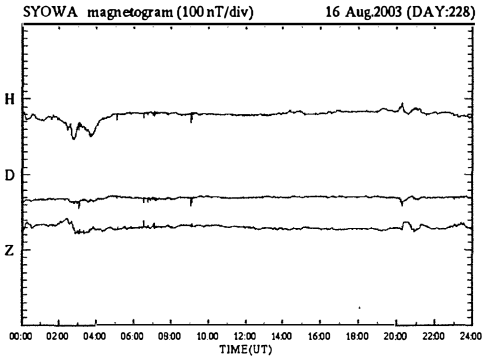
SYOWA magnetogram (100 nT/div) 12 Aug.2003 (DAY:224)

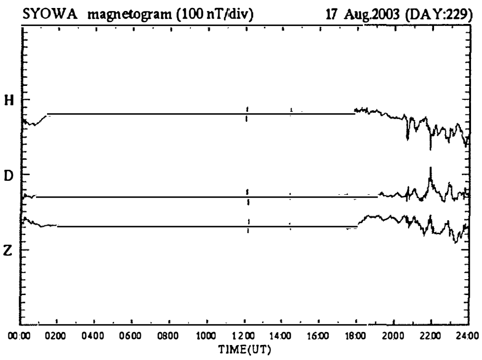


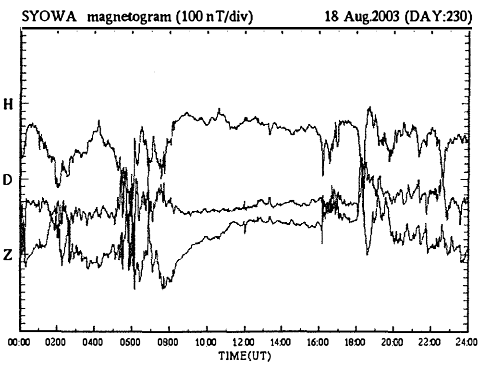

SYOWA magnetogram (100 nT/div)
13 Aug.2003 (DAY:225)
H
D
Z
00:00 0200 0400 0600 08:00 10:00 1200 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

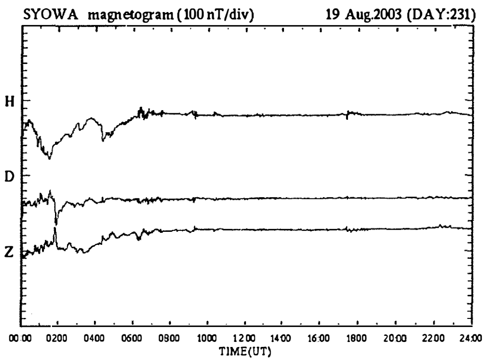

SYOWA magnetogram (100 nT/div)
14 Aug.2003 (DAY:226)
H
D
Z
00:00 0200 04:00 0600 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

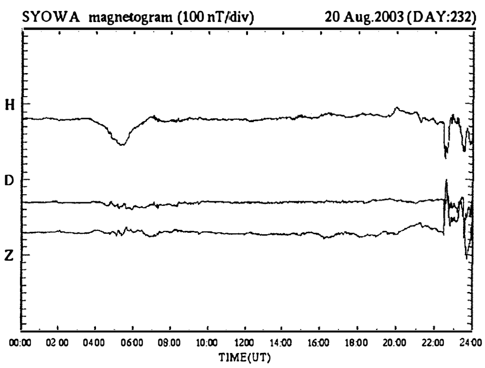

SYOWA magnetogram (100 nT/div)
15 Aug.2003 (DAY:227)
H
D
Z
00:00 02:00 0400 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
16 Aug.2003 (DAY:228)
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)

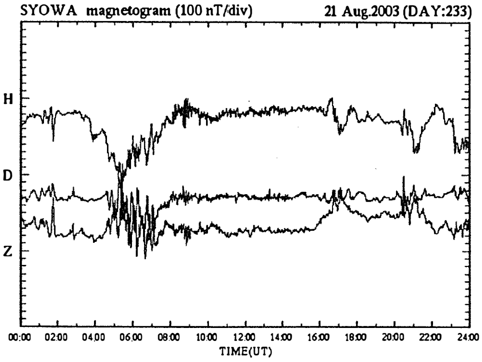

SYOWA magnetogram (100 nT/div)
17 Aug.2003 (DAY:229)
H
D
Z
00:00 0200 0400 0600 0800 1000 12:00 14:00 16:00 18:00 2000 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
18 Aug.2003 (DAY:230)
H
D
Z
00:00 0200 0400 0600 0800 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

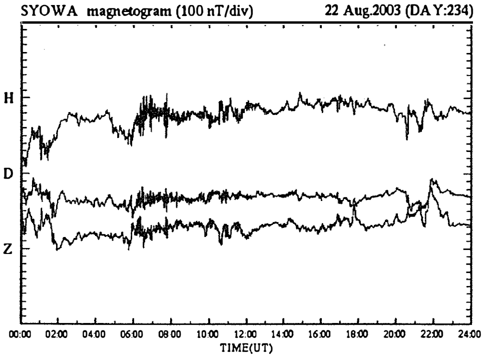

SYOWA magnetogram (100 nT/div)
19 Aug.2003 (DAY:231)
H
D
Z
00:00 0200 0400 0600 0800 1000 12:00 14:00 16:00 1800 20:00 2200 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div)
20 Aug.2003 (DAY:232)
H
D
Z
00:00 02:00 0400 0600 08:00 10:00 1200 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

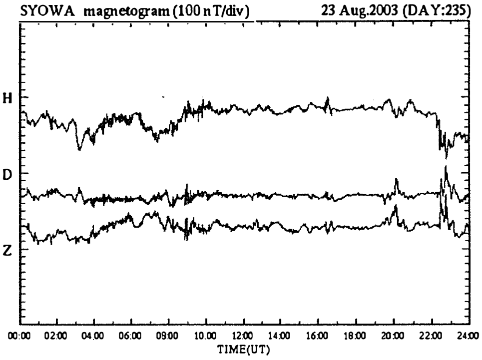
SYOWA magnetogram (100 nT/div) 21 Aug.2003 (DAY:233)



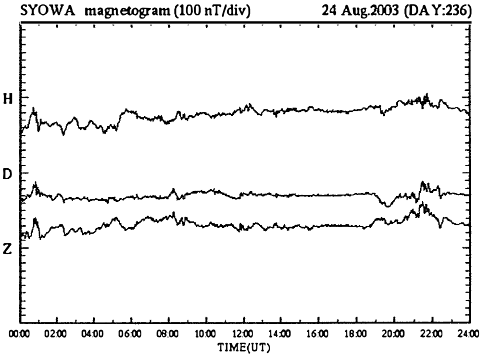
SYOWA magnetogram (100 nT/div) 22 Aug.2003 (DAY:234)



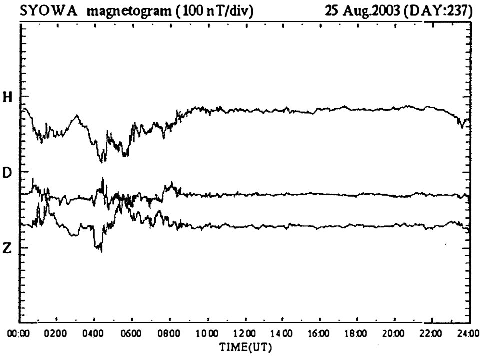
SYOWA magnetogram (100 nT/div) 23 Aug.2003 (DAY:235)



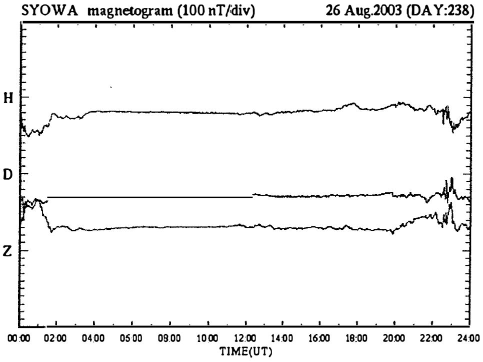
SYOWA magnetogram (100 nT/div) 24 Aug.2003 (DAY:236)



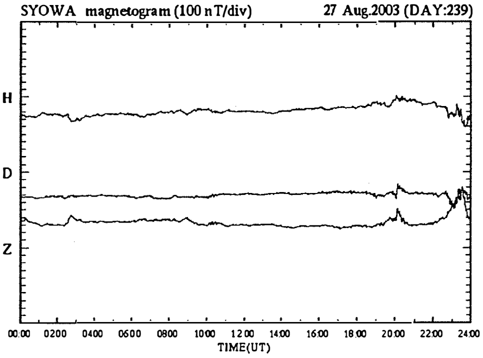
SYOWA magnetogram (100 nT/div) 25 Aug.2003 (DAY:237)



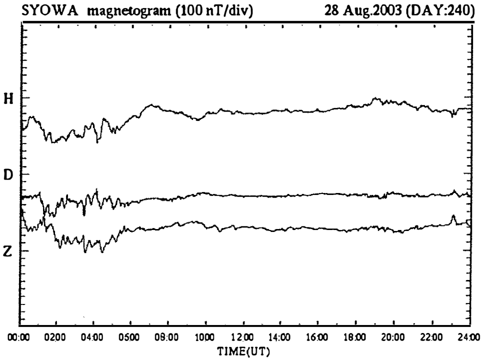
SYOWA magnetogram (100 nT/div) 26 Aug.2003 (DAY:238)

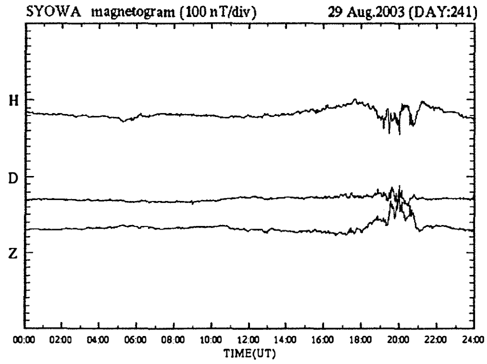


SYOWA magnetogram (100 nT/div) 27 Aug.2003 (DAY:239)



SYOWA magnetogram (100 nT/div) 28 Aug.2003 (DAY:240)




SYOWA magnetogram (100 nT/div) 29 Aug.2003 (DAY:241)
H
D
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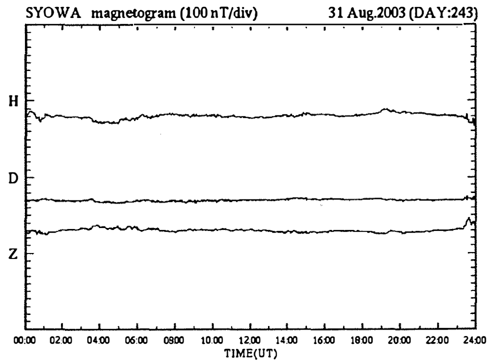
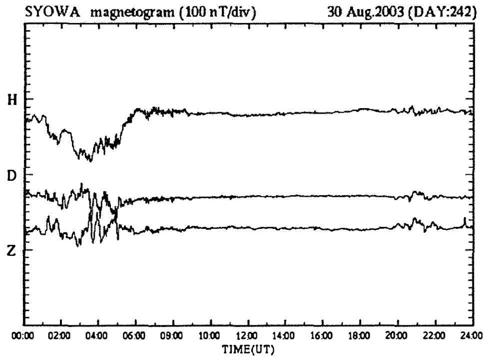
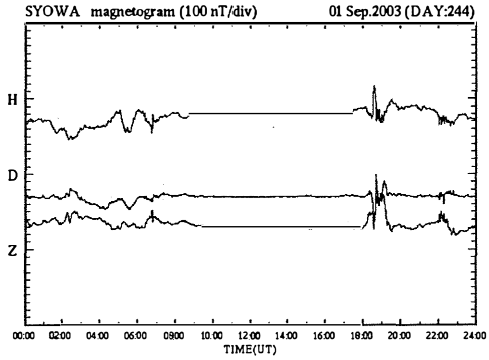
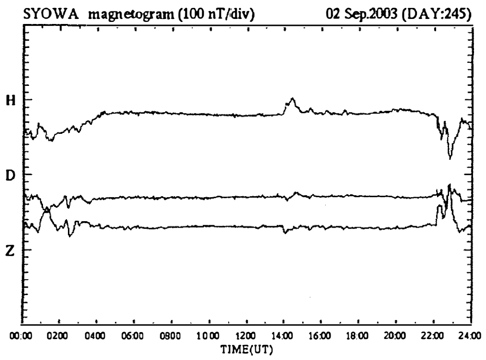
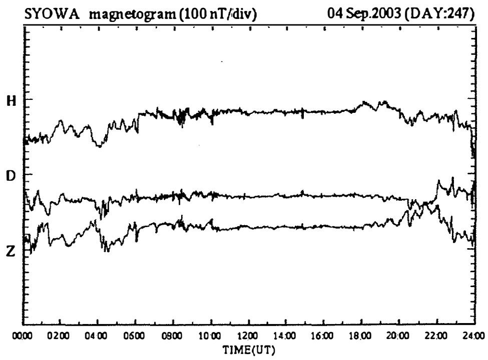
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

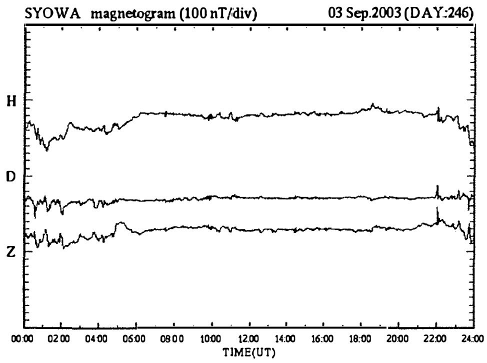

SYOWA magnetogram (100 nT/div) 31 Aug.2003 (DAY:243)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)

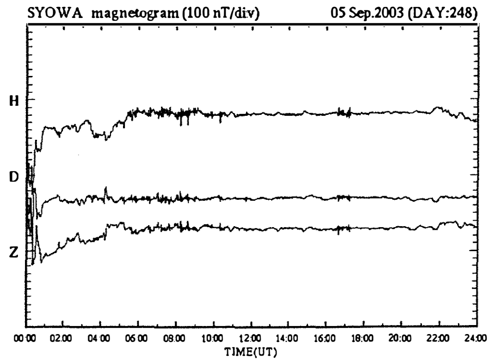

SYOWA magnetogram (100 nT/div) 30 Aug.2003 (DAY:242)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div) 01 Sep.2003 (DAY:244)
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)

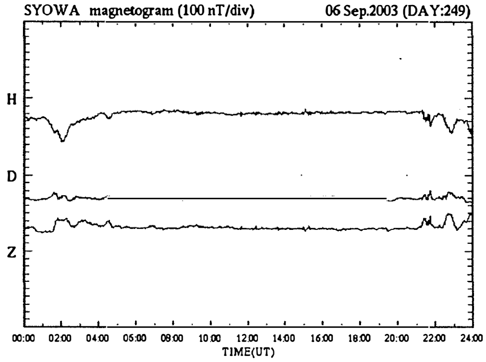

SYOWA magnetogram (100 nT/div) 02 Sep.2003 (DAY:245)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div) 04 Sep.2003 (DAY:247)
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)

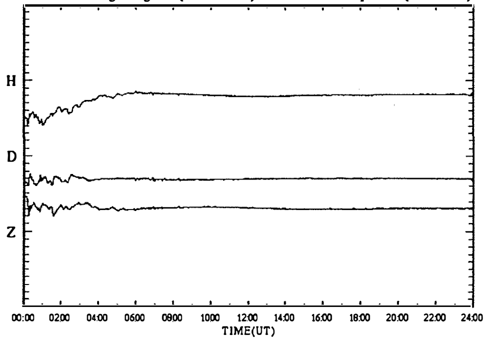

SYOWA magnetogram (100 nT/div) 03 Sep.2003 (DAY:246)
H
D
Z
00:00 02:00 04:00 06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div) 05 Sep.2003 (DAY:248)
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)

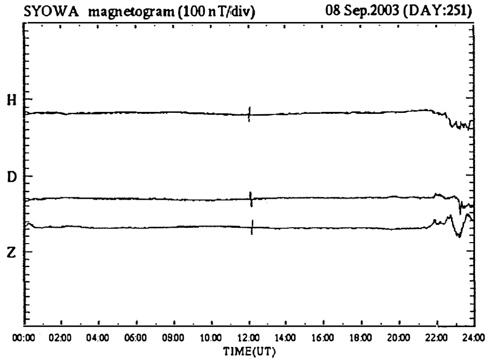
SYOWA magnetogram (100 nT/div) 06 Sep.2003 (DAY:249)



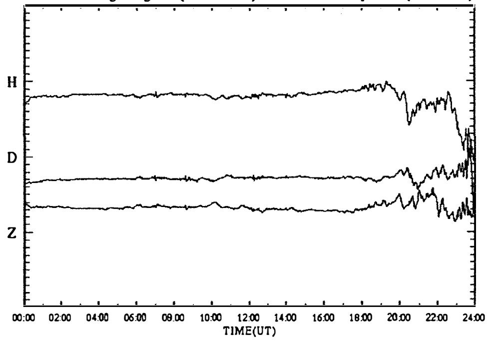
SYOWA magnetogram (100 nT/div) 07 Sep.2003 (DAY:250)



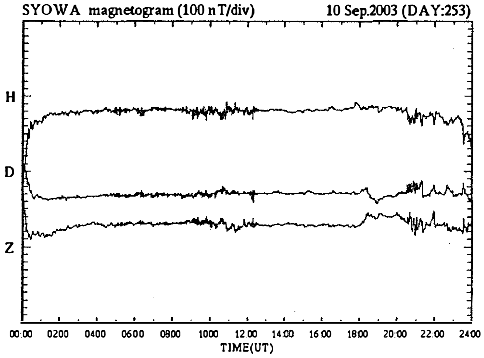
SYOWA magnetogram (100 nT/div) 08 Sep.2003 (DAY:251)



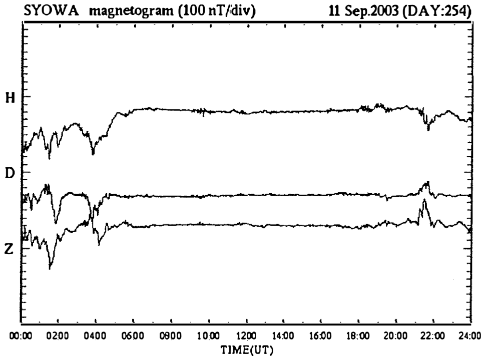
SYOWA magnetogram (100 nT/div) 09 Sep.2003 (DAY:252)



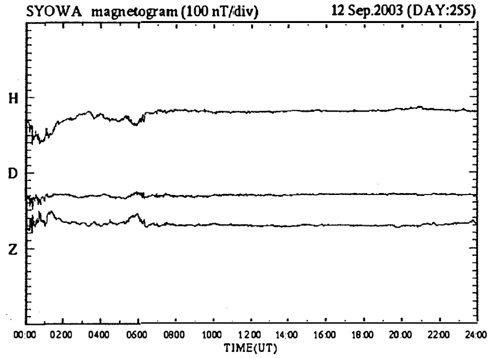
SYOWA magnetogram (100 nT/div) 10 Sep.2003 (DAY:253)



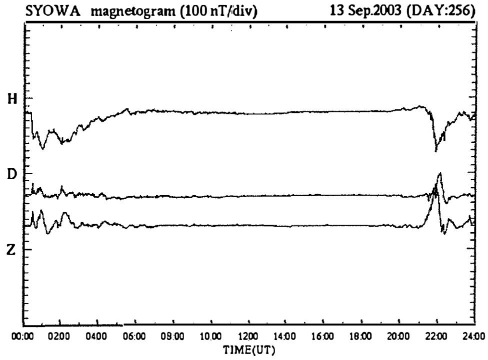
SYOWA magnetogram (100 nT/div) 11 Sep.2003 (DAY:254)



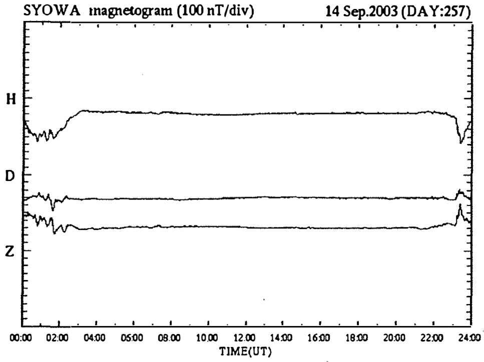
SYOWA magnetogram (100 nT/div) 12 Sep.2003 (DAY:255)



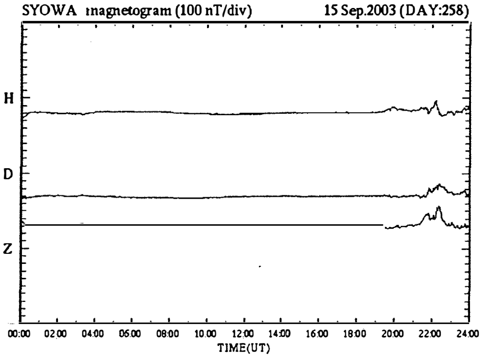
SYOWA magnetogram (100 nT/div) 13 Sep.2003 (DAY:256)



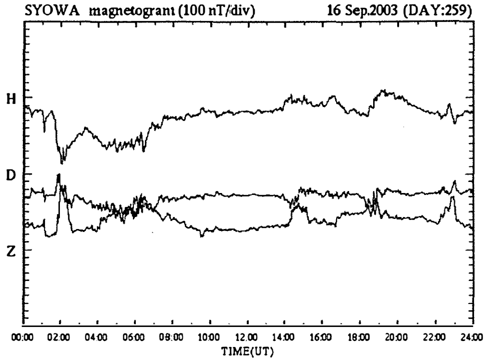
SYOWA magnetogram (100 nT/div) 14 Sep.2003 (DAY:257)



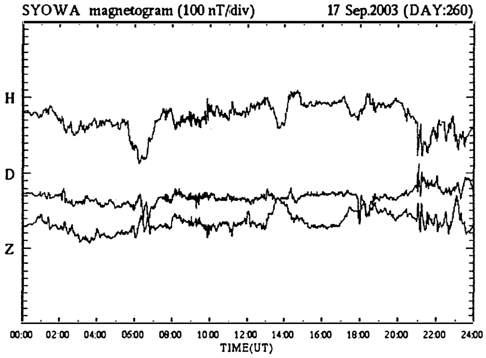
SYOWA magnetogram (100 nT/div) 15 Sep.2003 (DAY:258)



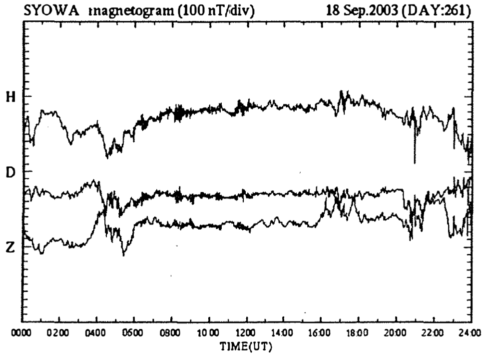
SYOWA magnetogram (100 nT/div) 16 Sep.2003 (DAY:259)



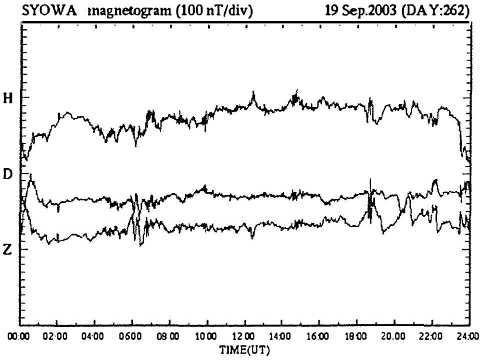
SYOWA magnetogram (100 nT/div) 17 Sep.2003 (DAY:260)



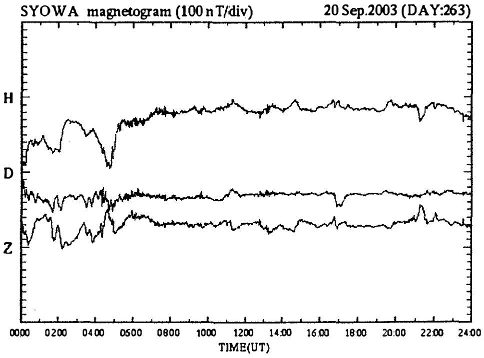
SYOWA magnetogram (100 nT/div) 18 Sep.2003 (DAY:261)



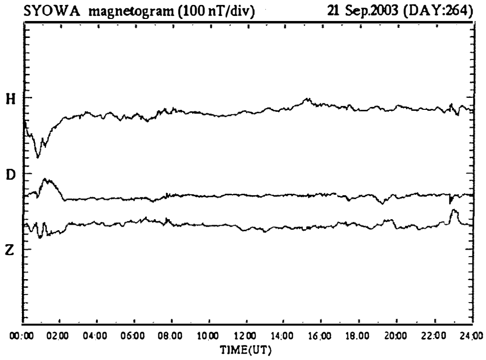
SYOWA magnetogram (100 nT/div) 19 Sep.2003 (DAY:262)

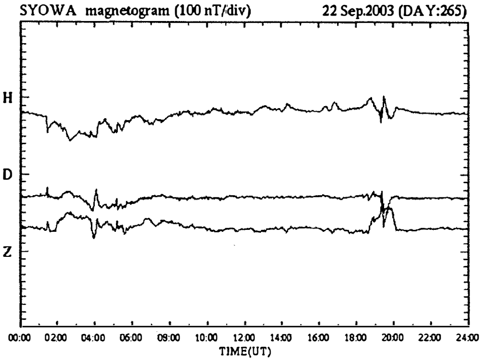


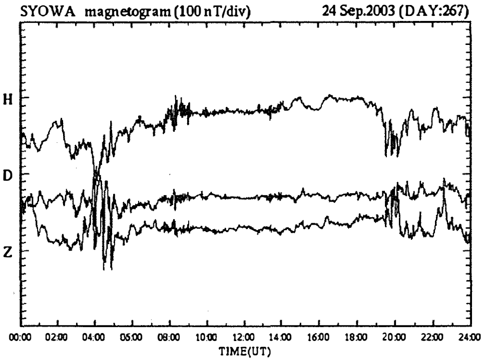
SYOWA magnetogram (100 nT/div) 20 Sep.2003 (DAY:263)

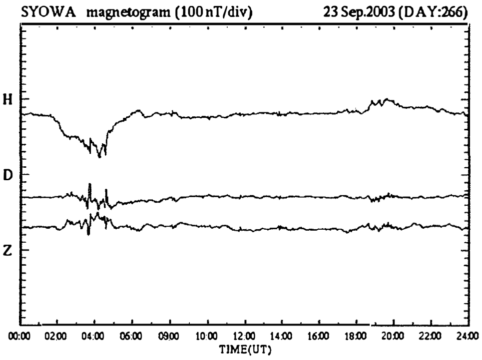


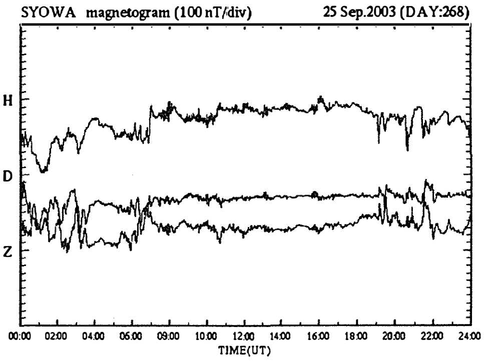
SYOWA magnetogram (100 nT/div) 21 Sep.2003 (DAY:264)

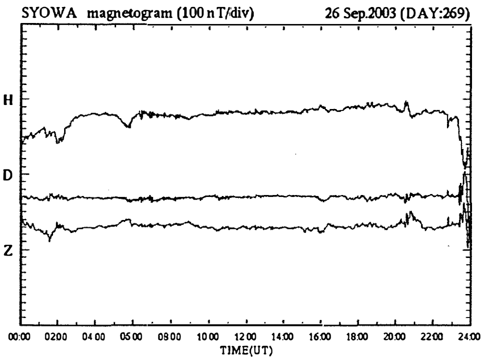


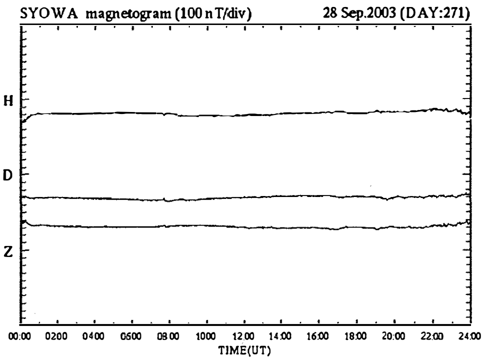

SYOWA magnetogram (100 nT/div)
22 Sep.2003 (DAY:265)
H
D
Z
TIME(UT)

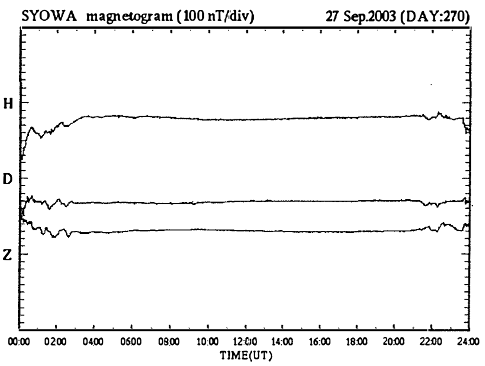

SYOWA magnetogram (100 nT/div)
24 Sep.2003 (DAY:267)
H
D
Z
TIME(UT)

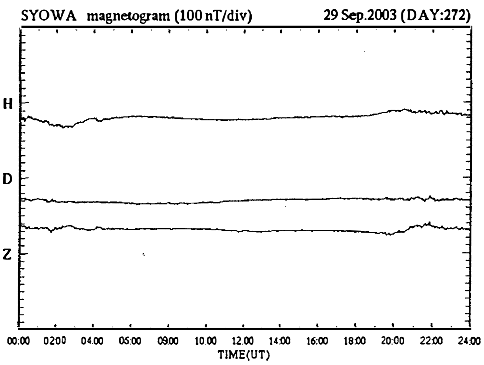

SYOWA magnetogram (100 nT/div)
23 Sep.2003 (DAY:266)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
25 Sep.2003 (DAY:268)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
26 Sep.2003 (DAY:269)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
28 Sep.2003 (DAY:271)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
27 Sep.2003 (DAY:270)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
29 Sep.2003 (DAY:272)
H
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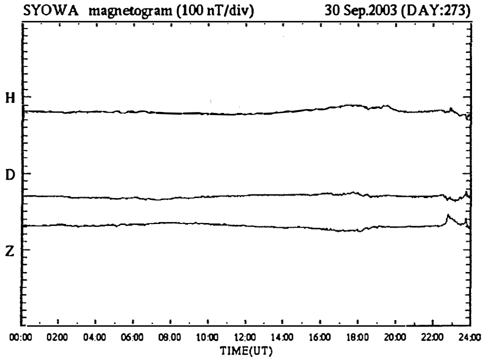
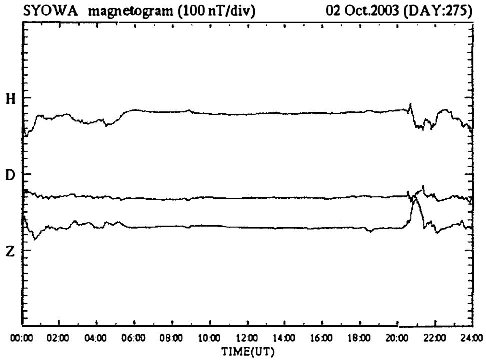
Z
TIME(UT)

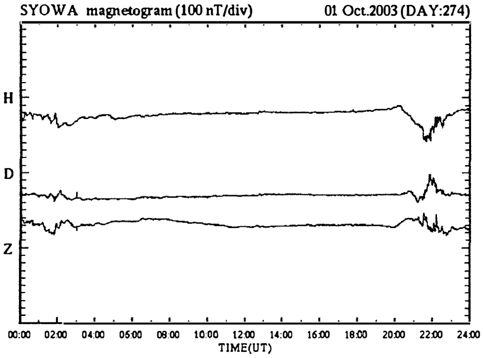
SYOWA magnetogram (100 nT/div) 30 Sep.2003 (DAY:273)



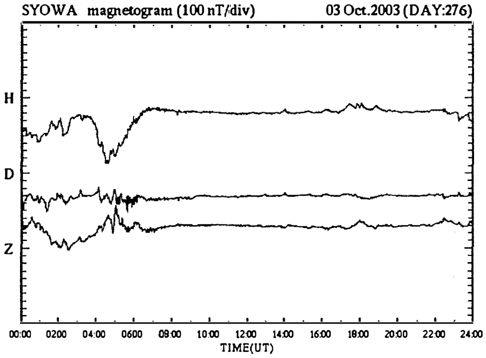
SYOWA magnetogram (100 nT/div) 02 Oct.2003 (DAY:275)



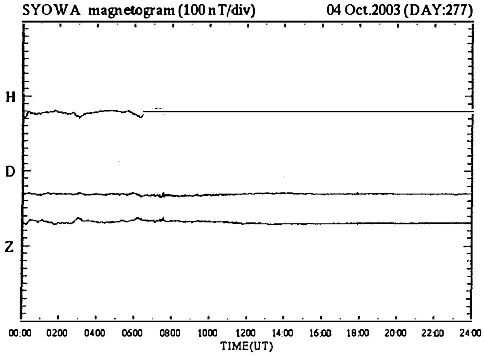
SYOWA magnetogram (100 nT/div) 01 Oct.2003 (DAY:274)



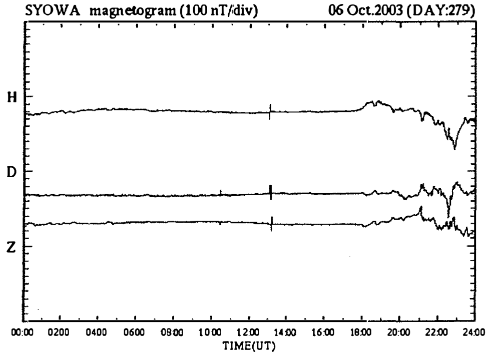
SYOWA magnetogram (100 nT/div) 03 Oct.2003 (DAY:276)



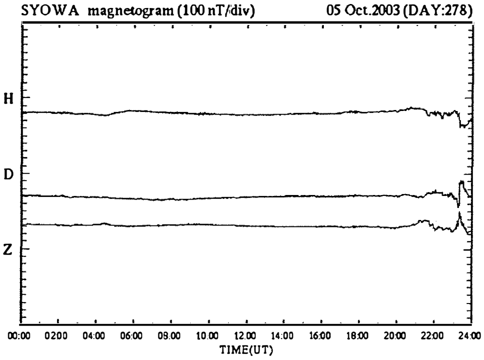
SYOWA magnetogram (100 nT/div) 04 Oct.2003 (DAY:277)



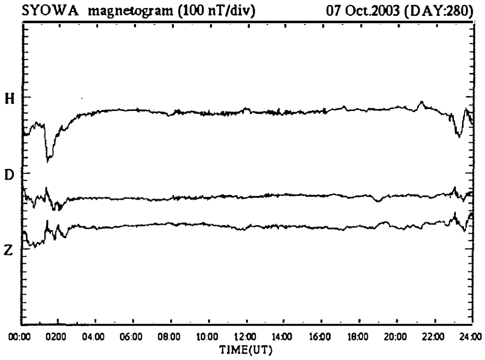
SYOWA magnetogram (100 nT/div) 06 Oct.2003 (DAY:279)



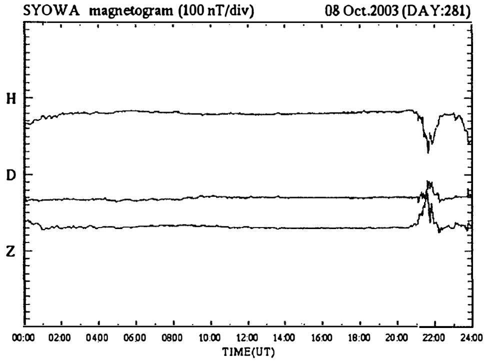
SYOWA magnetogram (100 nT/div) 05 Oct.2003 (DAY:278)



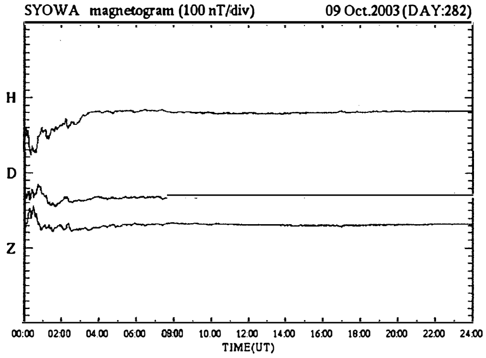
SYOWA magnetogram (100 nT/div) 07 Oct.2003 (DAY:280)



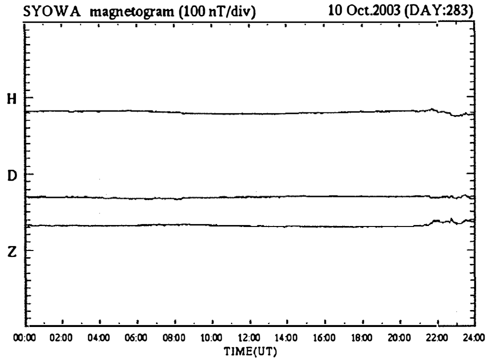
SYOWA magnetogram (100 nT/div) 08 Oct.2003 (DAY:281)



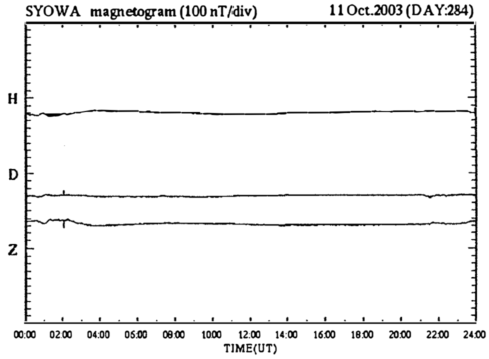
SYOWA magnetogram (100 nT/div) 09 Oct.2003 (DAY:282)



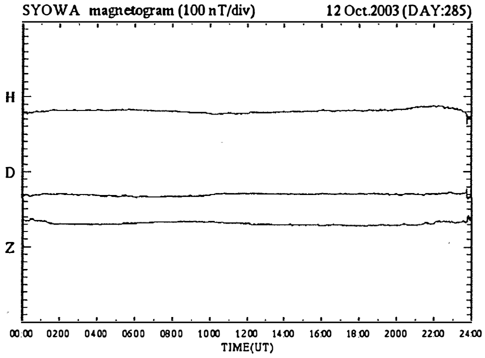
SYOWA magnetogram (100 nT/div) 10 Oct.2003 (DAY:283)



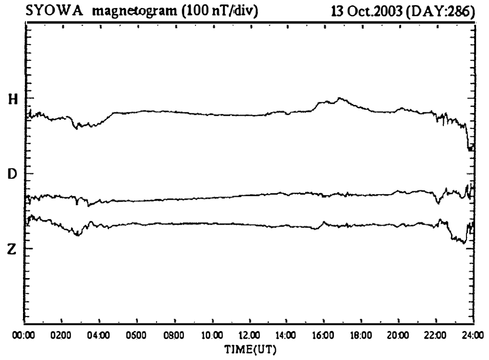
SYOWA magnetogram (100 nT/div) 11 Oct.2003 (DAY:284)



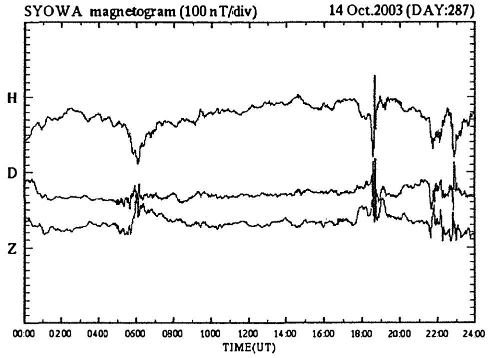
SYOWA magnetogram (100 nT/div) 12 Oct.2003 (DAY:285)



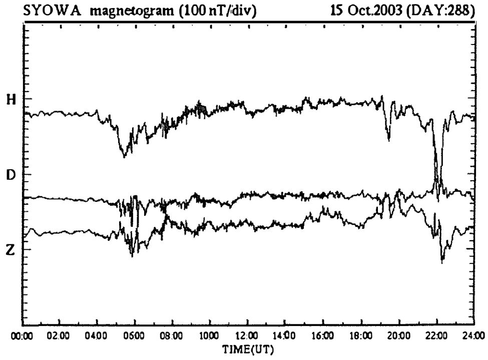
SYOWA magnetogram (100 nT/div) 13 Oct.2003 (DAY:286)



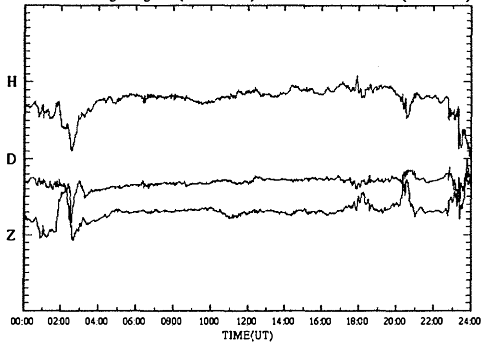
SYOWA magnetogram (100 nT/div) 14 Oct.2003 (DAY:287)



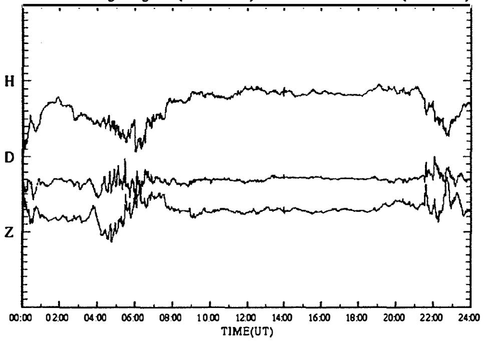
SYOWA magnetogram (100 nT/div) 15 Oct.2003 (DAY:288)



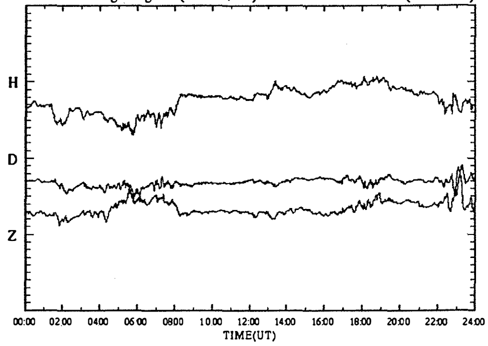
SYOWA magnetogram (100 nT/div) 16 Oct.2003 (DAY:289)



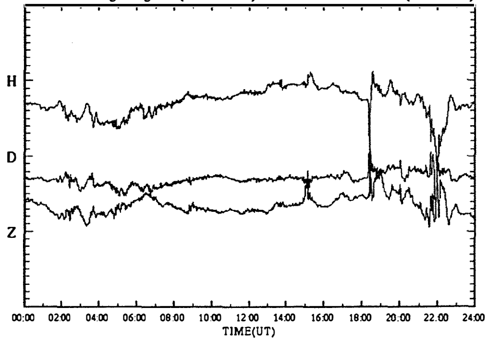
SYOWA magnetogram (100 nT/div) 17 Oct.2003 (DAY:290)



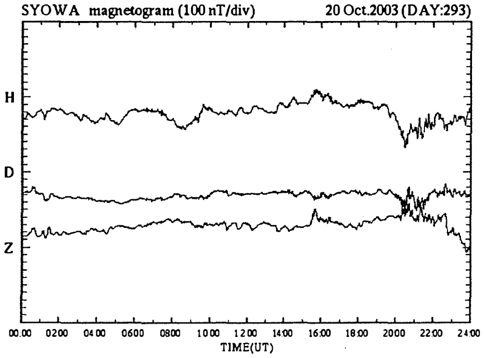
SYOWA magnetogram (100 nT/div) 18 Oct.2003 (DAY:291)



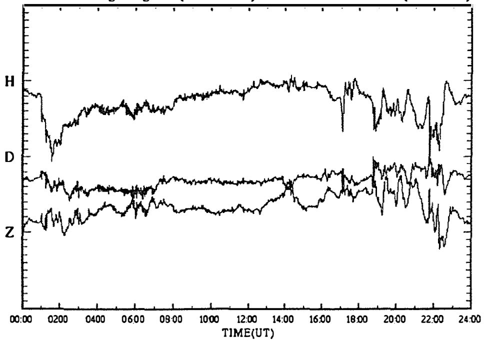
SYOWA magnetogram (100 nT/div) 19 Oct.2003 (DAY:292)



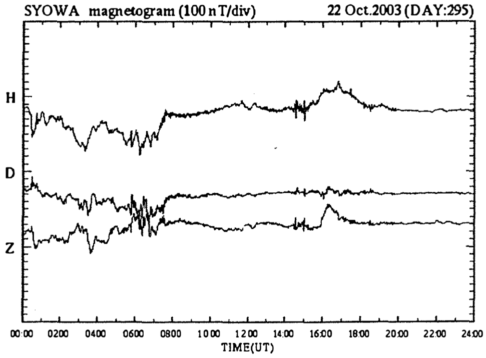
SYOWA magnetogram (100 nT/div) 20 Oct.2003 (DAY:293)



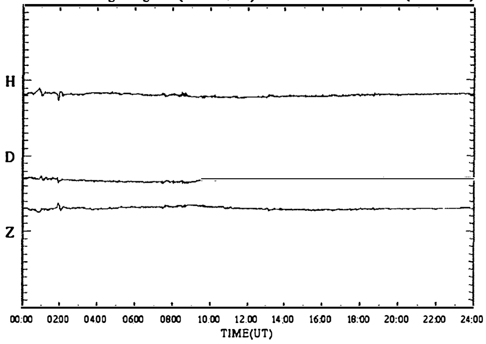
SYOWA magnetogram (100 nT/div) 21 Oct.2003 (DAY:294)



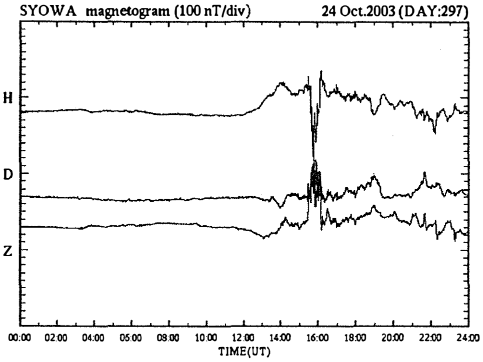
SYOWA magnetogram (100 nT/div) 22 Oct.2003 (DAY:295)



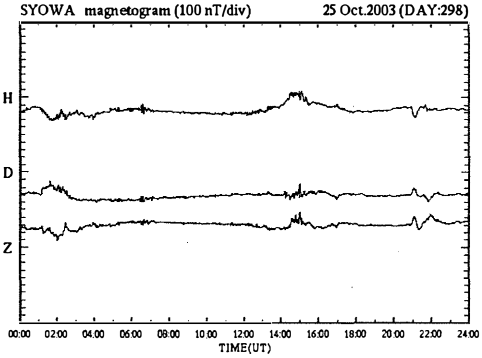
SYOWA magnetogram (100 nT/div) 23 Oct.2003 (DAY:296)



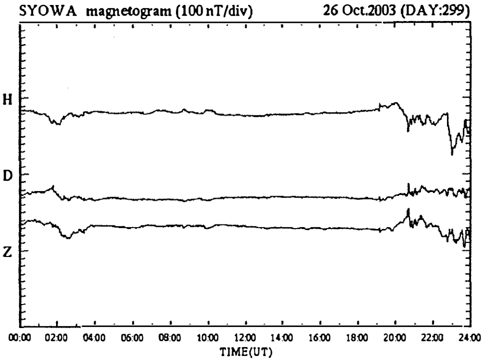
SYOWA magnetogram (100 nT/div) 24 Oct.2003 (DAY:297)



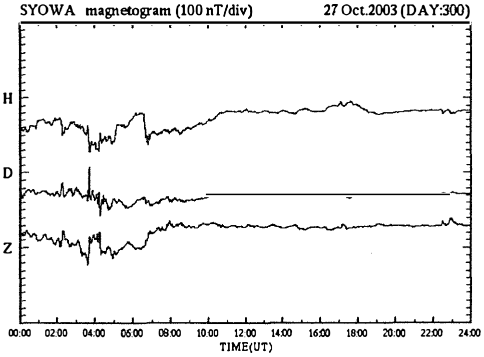
SYOWA magnetogram (100 nT/div) 25 Oct.2003 (DAY:298)



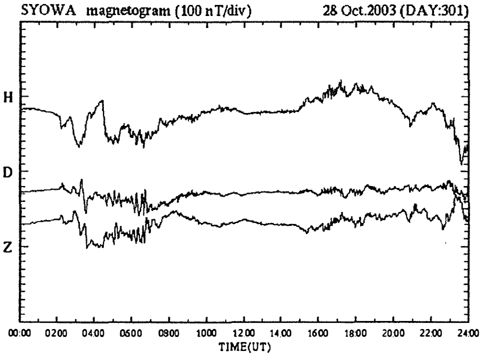
SYOWA magnetogram (100 nT/div) 26 Oct.2003 (DAY:299)



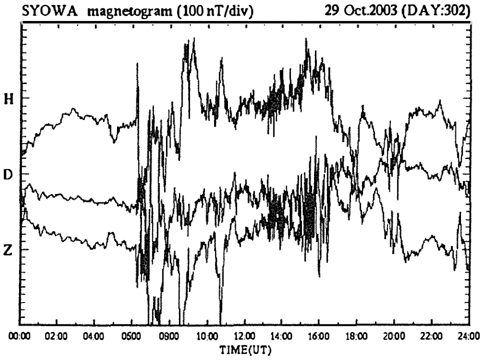
SYOWA magnetogram (100 nT/div) 27 Oct.2003 (DAY:300)



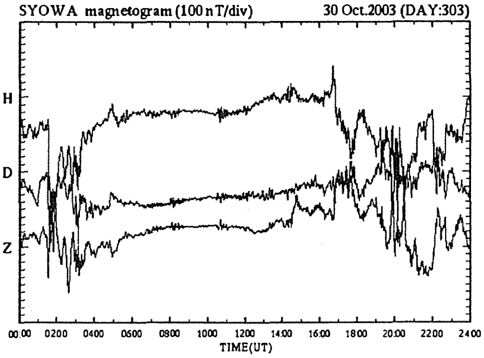
SYOWA magnetogram (100 nT/div) 28 Oct.2003 (DAY:301)



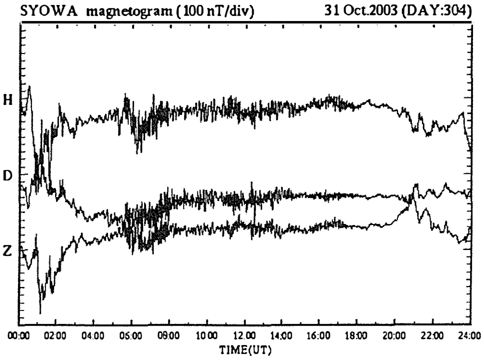
SYOWA magnetogram (100 nT/div) 29 Oct.2003 (DAY:302)



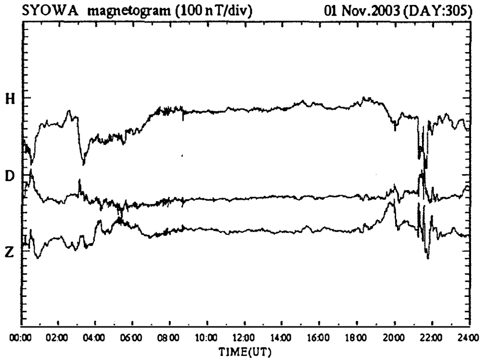
SYOWA magnetogram (100 nT/div) 30 Oct.2003 (DAY:303)



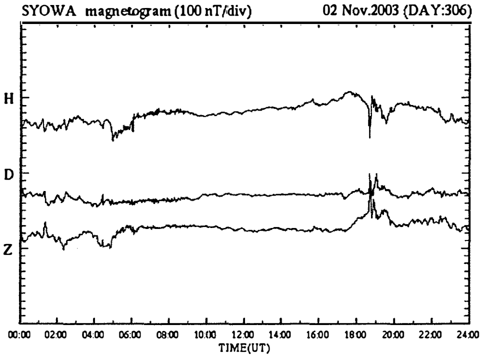
SYOWA magnetogram (100 nT/div) 31 Oct.2003 (DAY:304)



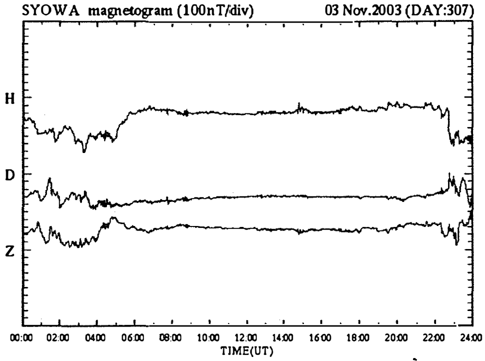
SYOWA magnetogram (100nT/div) 01 Nov.2003 (DAY:305)



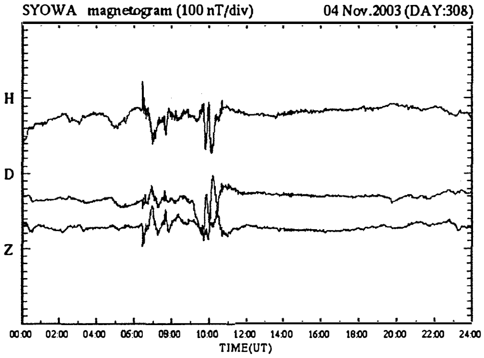
SYOWA magnetogram (100nT/div) 02 Nov.2003 (DAY:306)



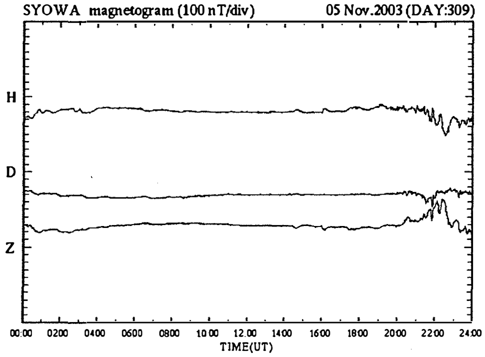
SYOWA magnetogram (100nT/div) 03 Nov.2003 (DAY:307)



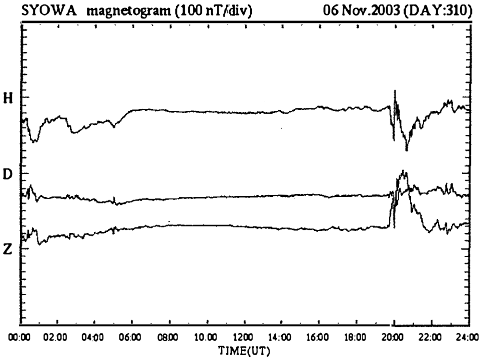
SYOWA magnetogram (100nT/div) 04 Nov.2003 (DAY:308)



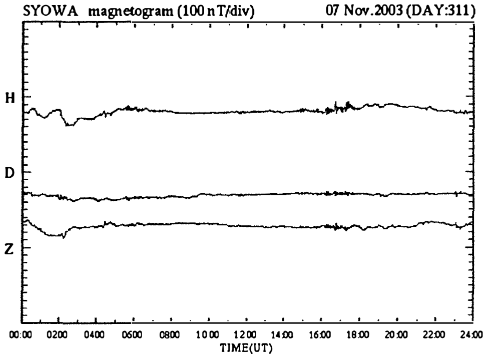
SYOWA magnetogram (100nT/div) 05 Nov.2003 (DAY:309)



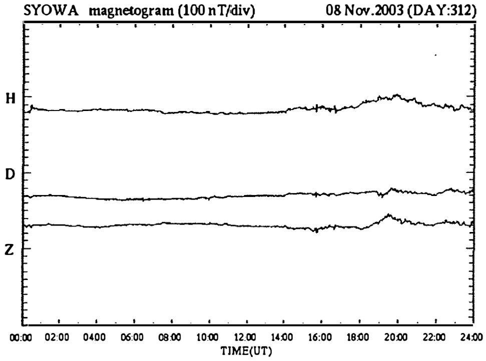
SYOWA magnetogram (100nT/div) 06 Nov.2003 (DAY:310)



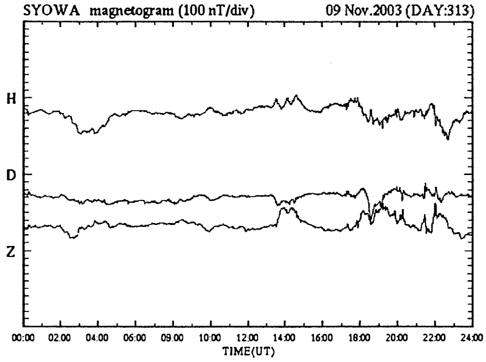
SYOWA magnetogram (100nT/div) 07 Nov.2003 (DAY:311)



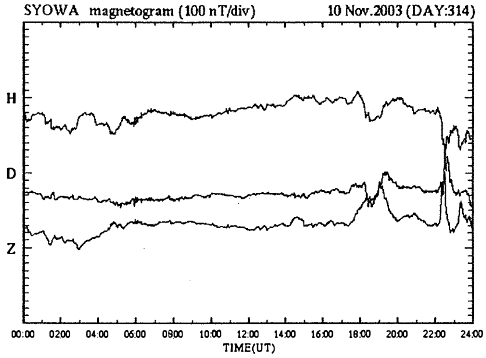
SYOWA magnetogram (100nT/div) 08 Nov.2003 (DAY:312)



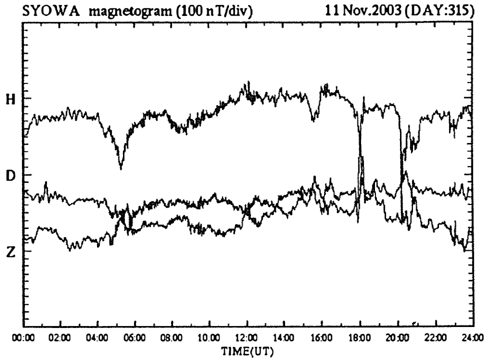
SYOWA magnetogram (100 nT/div) 09 Nov.2003 (DAY:313)



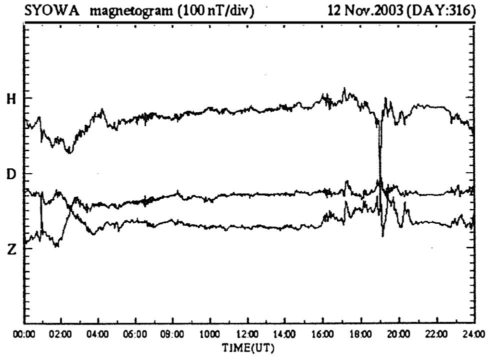
SYOWA magnetogram (100 nT/div) 10 Nov.2003 (DAY:314)



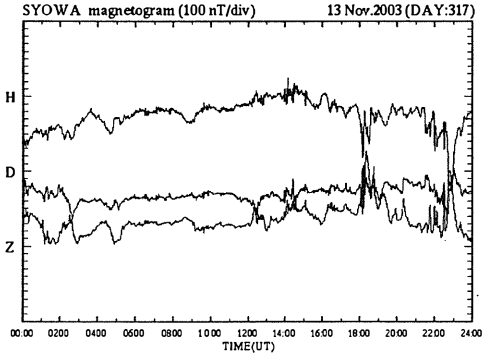
SYOWA magnetogram (100 nT/div) 11 Nov.2003 (DAY:315)



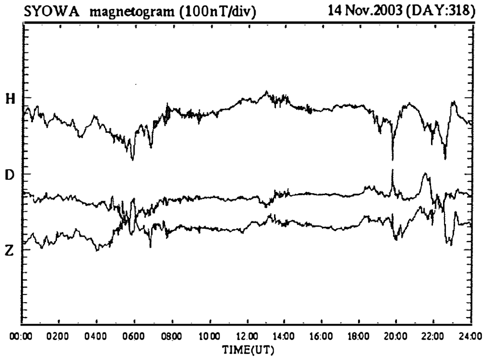
SYOWA magnetogram (100 nT/div) 12 Nov.2003 (DAY:316)



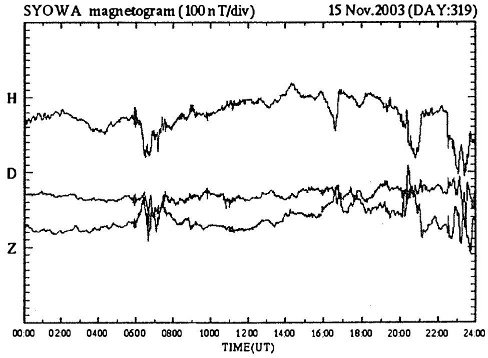
SYOWA magnetogram (100 nT/div) 13 Nov.2003 (DAY:317)



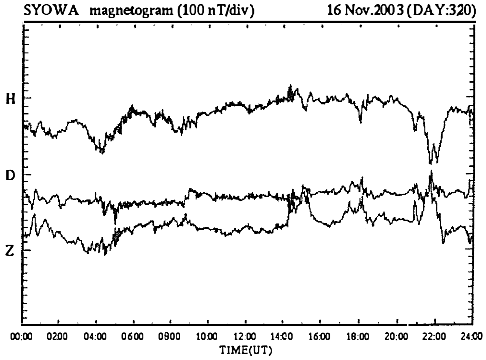
SYOWA magnetogram (100nT/div) 14 Nov.2003 (DAY:318)

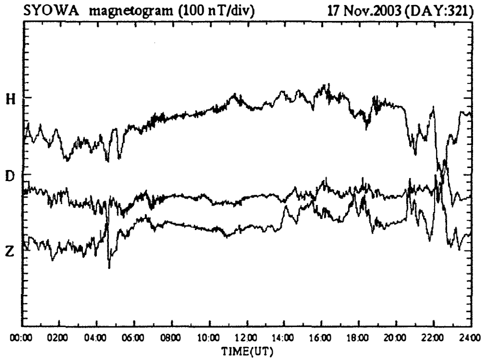


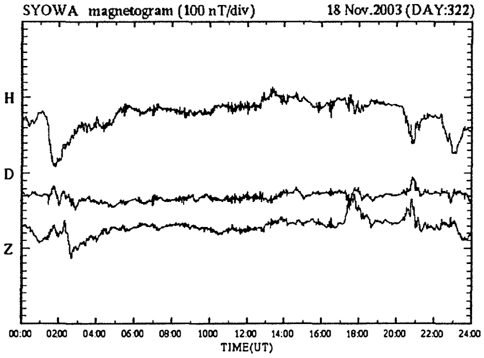
SYOWA magnetogram (100 n T/div) 15 Nov.2003 (DAY:319)

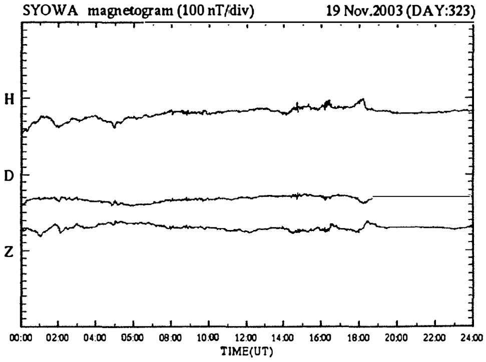


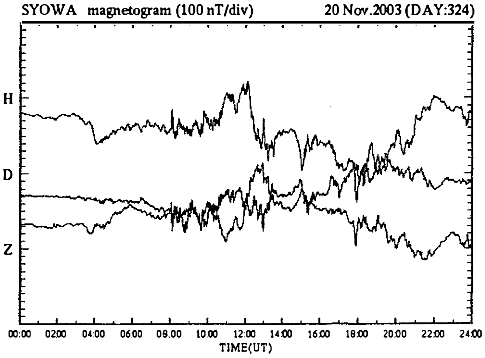
SYOWA magnetogram (100 nT/div) 16 Nov.2003 (DAY:320)

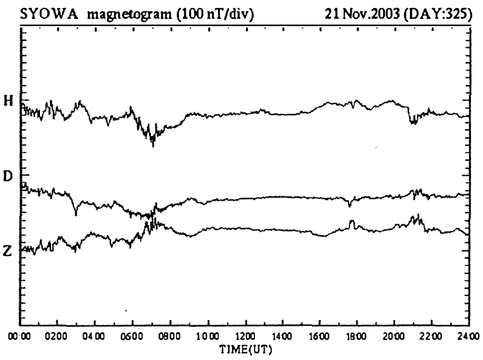


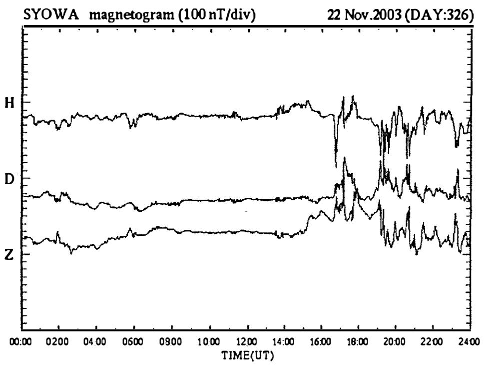

SYOWA magnetogram (100 nT/div)
17 Nov.2003 (DAY:321)
H
D
Z
TIME(UT)

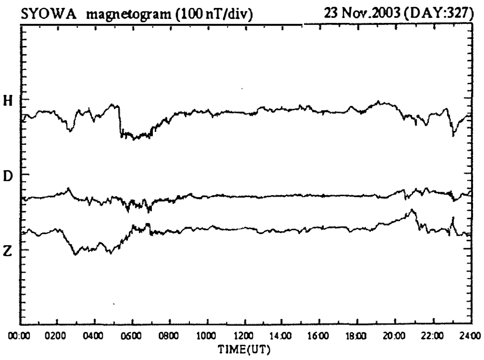

SYOWA magnetogram (100 nT/div)
18 Nov.2003 (DAY:322)
H
D
Z
TIME(UT)

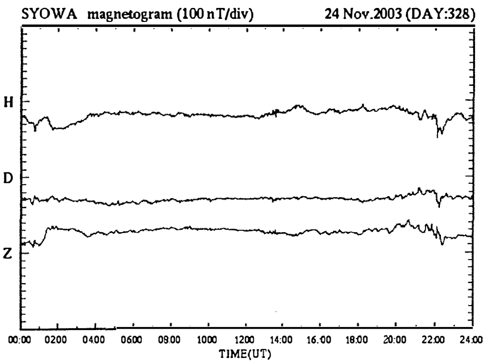

SYOWA magnetogram (100 nT/div)
19 Nov.2003 (DAY:323)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
20 Nov.2003 (DAY:324)
H
D
Z
TIME(UT)

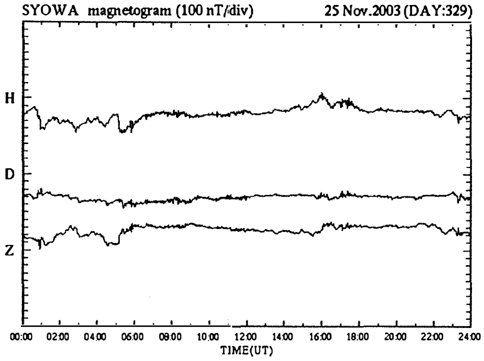

SYOWA magnetogram (100 nT/div)
21 Nov.2003 (DAY:325)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
22 Nov.2003 (DAY:326)
H
D
Z
TIME(UT)

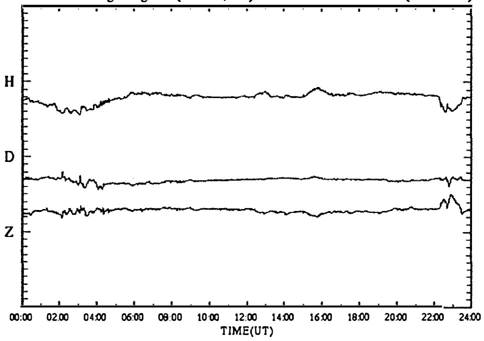

SYOWA magnetogram (100 nT/div)
23 Nov.2003 (DAY:327)
H
D
Z
TIME(UT)


SYOWA magnetogram (100 nT/div)
24 Nov.2003 (DAY:328)
H
D
Z
TIME(UT)

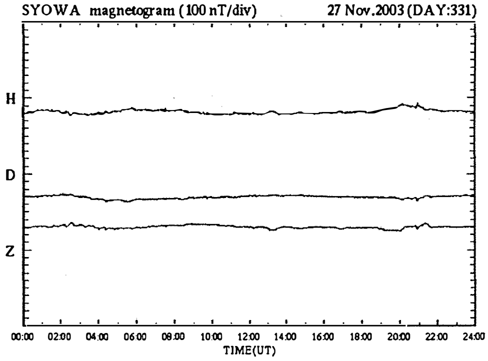
SYOWA magnetogram (100 nT/div) 25 Nov.2003 (DAY:329)



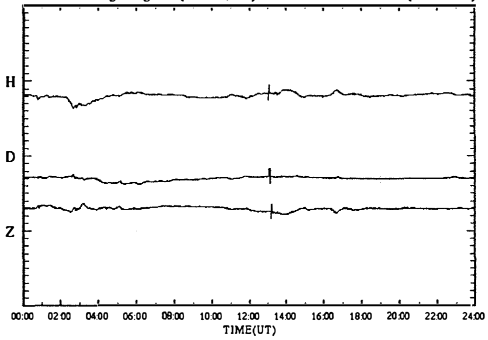
SYOWA magnetogram (100 nT/div) 26 Nov.2003 (DAY:330)



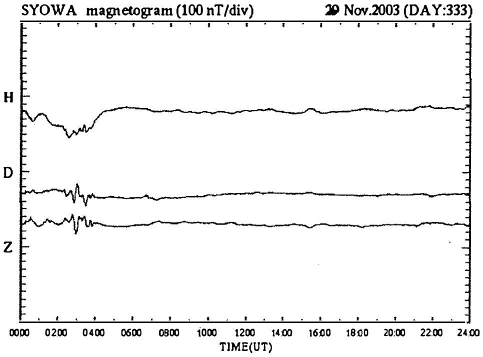
SYOWA magnetogram (100 nT/div) 27 Nov.2003 (DAY:331)



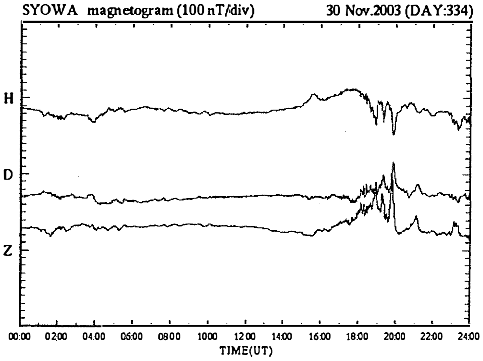
SYOWA magnetogram (100 nT/div) 28 Nov.2003 (DAY:332)



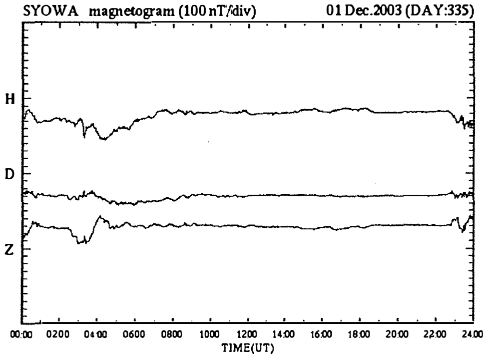
SYOWA magnetogram (100 nT/div) 29 Nov.2003 (DAY:333)



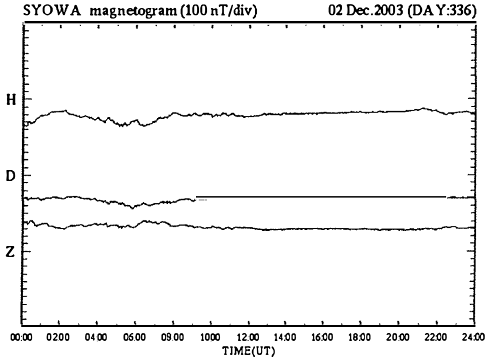
SYOWA magnetogram (100 nT/div) 30 Nov.2003 (DAY:334)



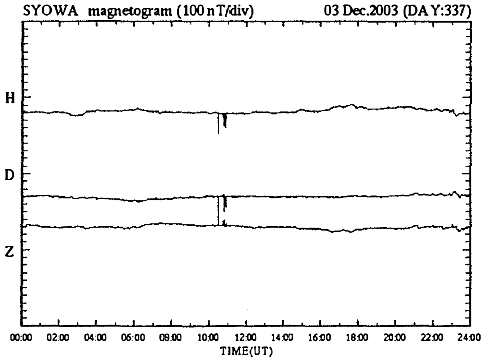
SYOWA magnetogram (100 nT/div) 01 Dec.2003 (DAY:335)



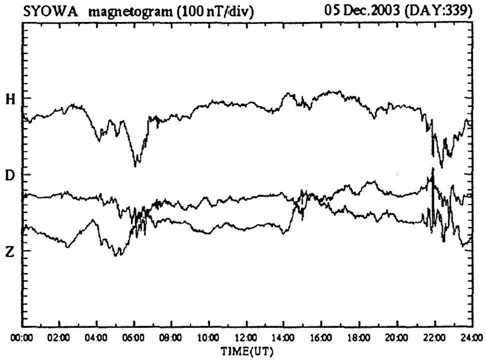
SYOWA magnetogram (100 nT/div) 02 Dec.2003 (DAY:336)



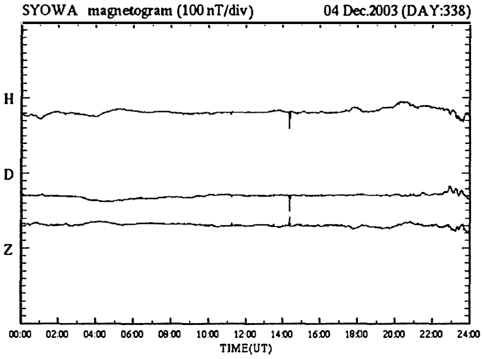
SYOWA magnetogram (100 nT/div) 03 Dec.2003 (DAY:337)



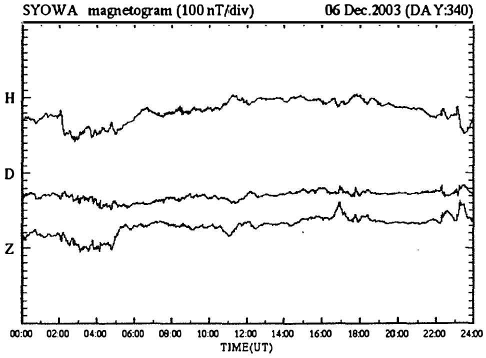
SYOWA magnetogram (100 nT/div) 05 Dec.2003 (DAY:339)



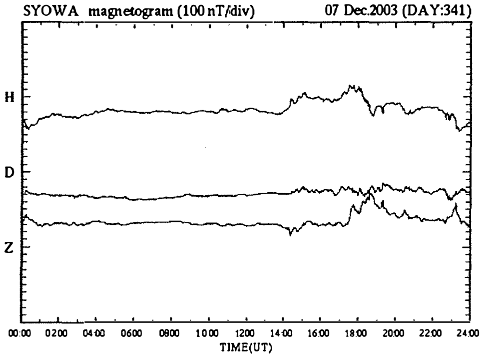
SYOWA magnetogram (100 nT/div) 04 Dec.2003 (DAY:338)



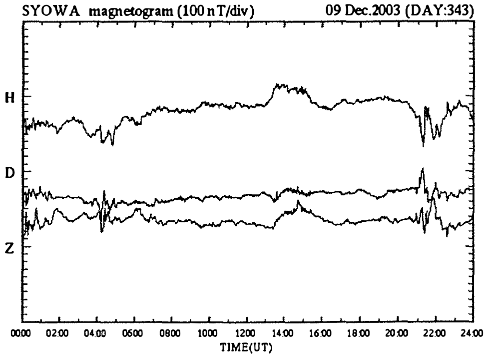
SYOWA magnetogram (100 nT/div) 06 Dec.2003 (DAY:340)



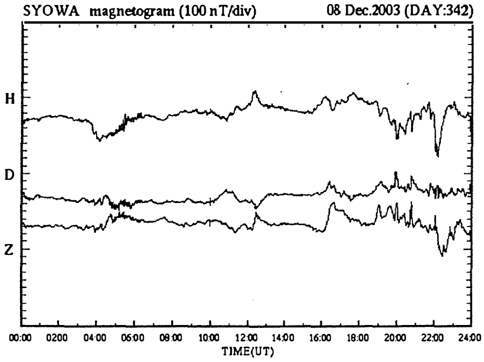
SYOWA magnetogram (100 nT/div) 07 Dec.2003 (DAY:341)



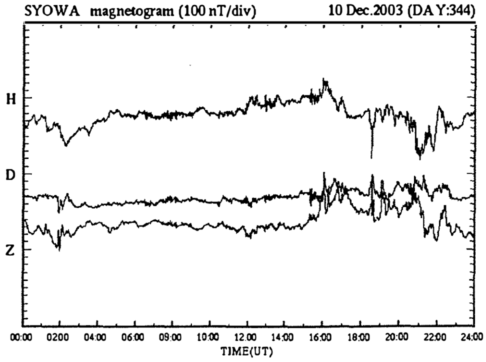
SYOWA magnetogram (100 nT/div) 09 Dec.2003 (DAY:343)



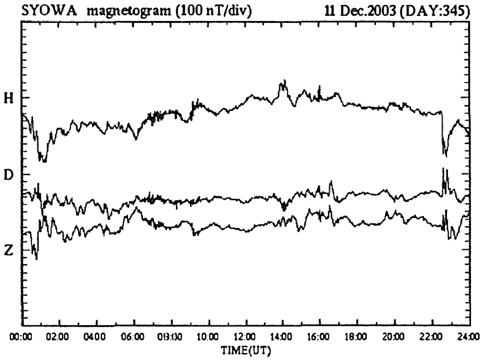
SYOWA magnetogram (100 nT/div) 08 Dec.2003 (DAY:342)



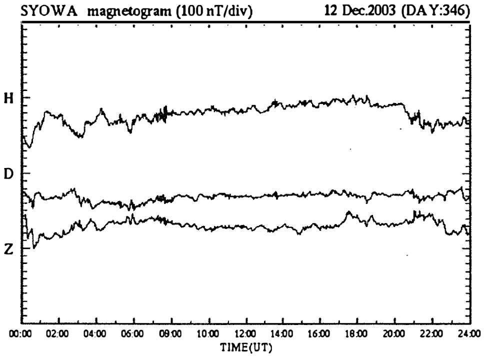
SYOWA magnetogram (100 nT/div) 10 Dec.2003 (DAY:344)



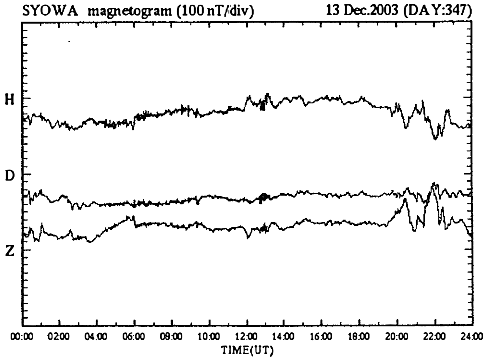
SYOWA magnetogram (100 nT/div) 11 Dec.2003 (DAY:345)



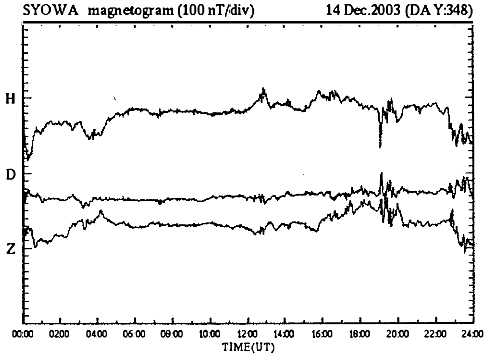
SYOWA magnetogram (100 nT/div) 12 Dec.2003 (DAY:346)



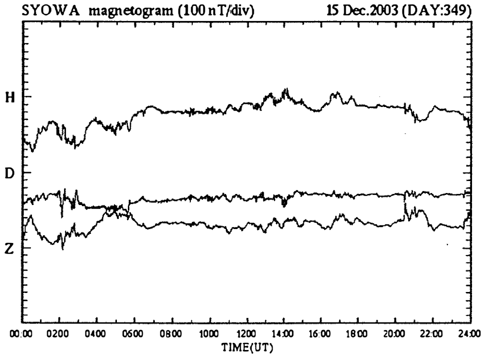
SYOWA magnetogram (100 nT/div) 13 Dec.2003 (DAY:347)



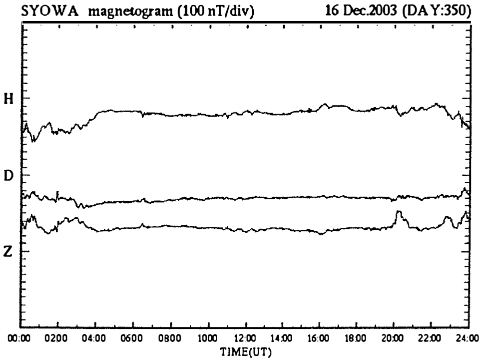
SYOWA magnetogram (100 nT/div) 14 Dec.2003 (DAY:348)



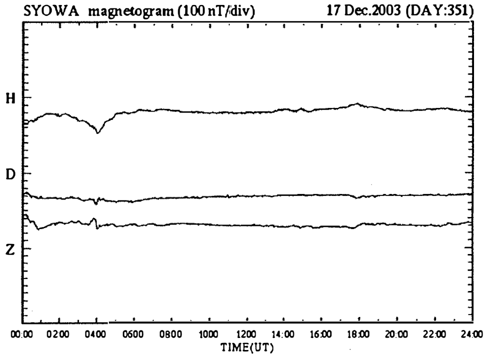
SYOWA magnetogram (100 nT/div) 15 Dec.2003 (DAY:349)



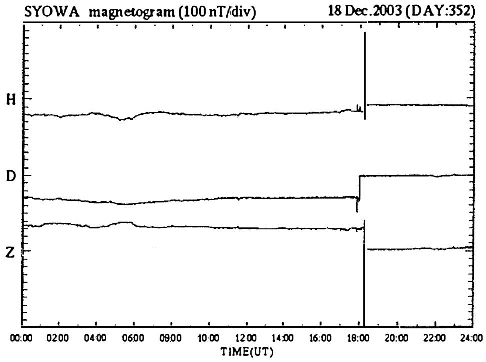
SYOWA magnetogram (100 nT/div) 16 Dec.2003 (DAY:350)



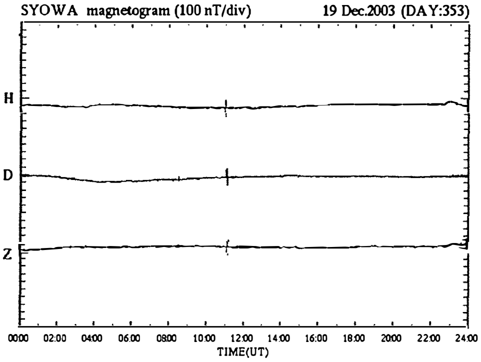
SYOWA magnetogram (100 nT/div) 17 Dec.2003 (DAY:351)



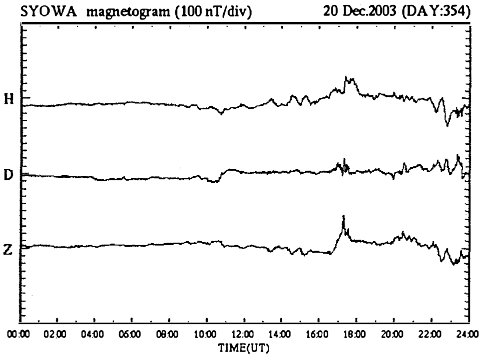
SYOWA magnetogram (100 nT/div) 18 Dec.2003 (DAY:352)



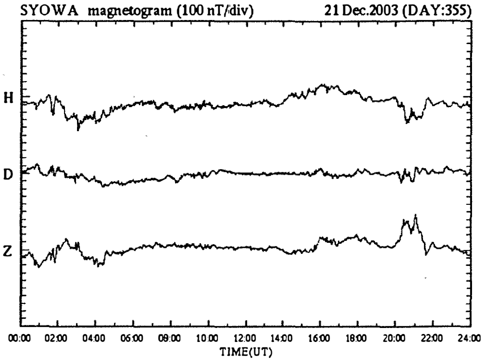
SYOWA magnetogram (100 nT/div) 19 Dec.2003 (DAY:353)



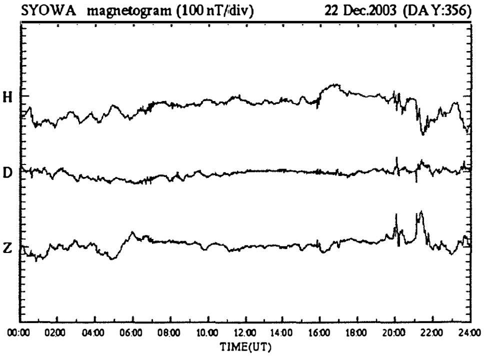
SYOWA magnetogram (100 nT/div) 20 Dec.2003 (DAY:354)



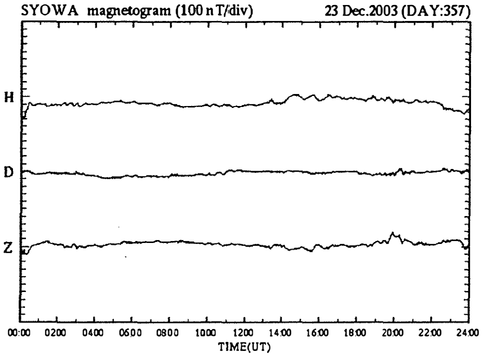
SYOWA magnetogram (100 nT/div) 21 Dec.2003 (DAY:355)



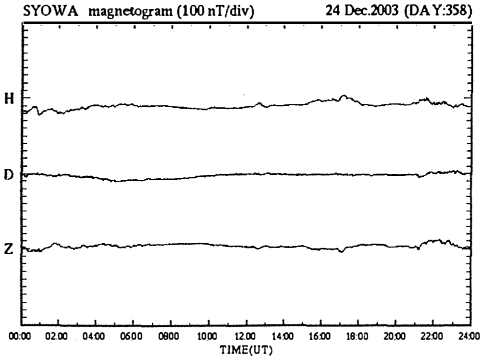
SYOWA magnetogram (100 nT/div) 22 Dec.2003 (DAY:356)



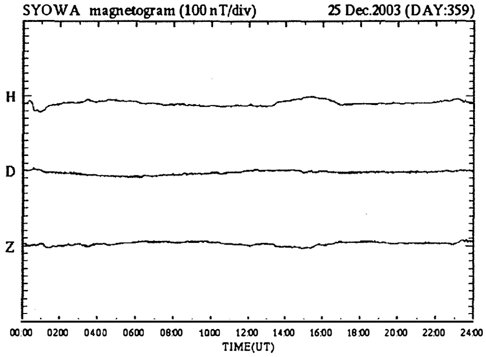
SYOWA magnetogram (100 nT/div) 23 Dec.2003 (DAY:357)



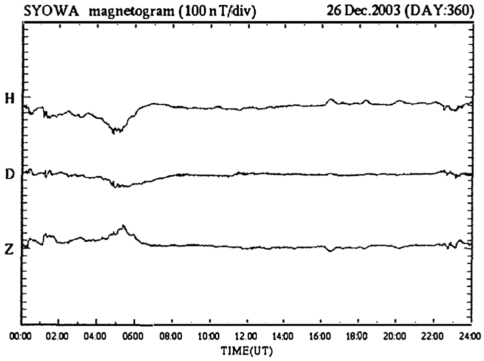
SYOWA magnetogram (100 nT/div) 24 Dec.2003 (DAY:358)

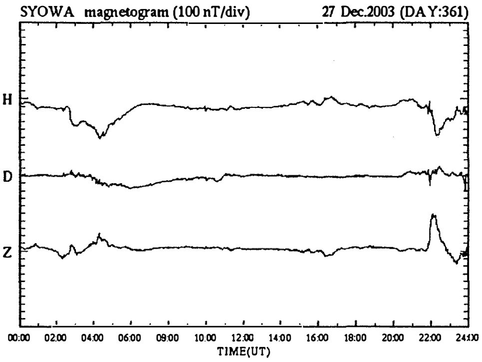


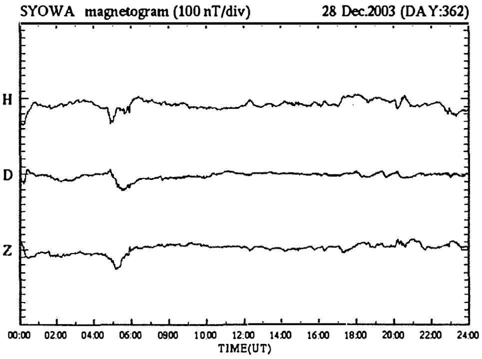
SYOWA magnetogram (100 nT/div) 25 Dec.2003 (DAY:359)

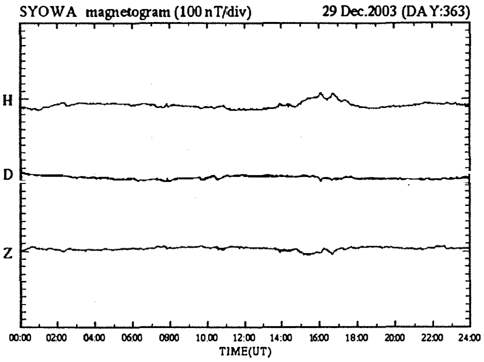


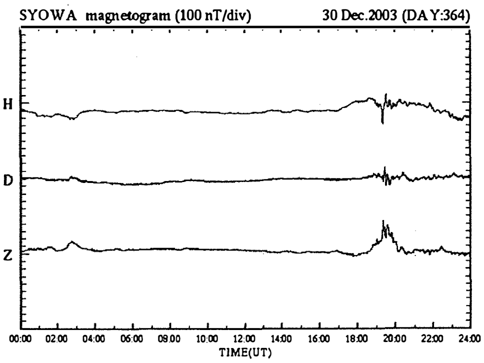
SYOWA magnetogram (100 nT/div) 26 Dec.2003 (DAY:360)

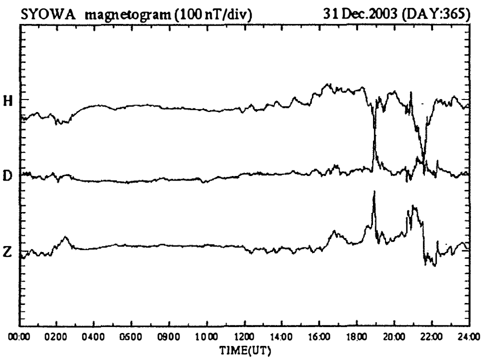



SYOWA magnetogram (100 nT/div) 27 Dec.2003 (DAY:361)
H
D
Z
00:00 02:00 04:00 06:00 09:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:X0
TIME(UT)


SYOWA magnetogram (100 nT/div) 28 Dec.2003 (DAY:362)
H
D
Z
00:00 02:00 04:00 06:00 0900 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div) 29 Dec.2003 (DAY:363)
H
D
Z
00:00 02:00 04:00 06:00 0900 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div) 30 Dec.2003 (DAY:364)
H
D
Z
00:00 02:00 04:00 06:00 09:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)


SYOWA magnetogram (100 nT/div) 31 Dec.2003 (DAY:365)
H
D
Z
00:00 0200 0400 0600 0900 1000 1200 14:00 16:00 18:00 20:00 22:00 24:00
TIME(UT)