

RADIO OBSERVATION DATA
AT SYOWA STATION, ANTARCTICA DURING 1997

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1. Introduction

CRL has been conducting radio observations at Syowa Station, Antarctica since February 1966. This data book reports daily cosmic noise absorption variations observed by 30-MHz riometer, HF field strength, VLF phase variation, and radio aurora intensity from January 1 to December 31, 1997. The geomagnetic field variation at Syowa Station, which is provided by the National Institute of Polar Research, is also plotted for reference. The data is recorded on magnetic tapes in digital form.

Copies of these data in digital form are available on request.

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2. Location

Syowa Station			
Geographic		Geomagnetic	
Latitude (Deg.)	Longitude (Deg.)	Latitude (Deg.)	Longitude (Deg.)
69.00 S	39.58 E	-70.0	80.2

3. Observer

Jun OZEKI (Communications Research Laboratory)

4. Instrumentation

4-1. Cosmic radio noise absorption

The riometer receiver has a center frequency of 30 MHz and has a band width of 7.5 kHz; it is connected to a vertically directed five-element Yagi antenna whose

elements are oriented in an east-west direction. The antenna is designed to match the 50-ohm coaxial cable (8D-2V), which is 80-m long. Noise from a reference noise diode, with power levels of 20000 K, 16000 K, 12000 K, 8000 K, and 4000 K, is inserted each day at 0800 at 45° EMT (Eastern Meridian Time: UT + 3 hours).

The cosmic noise power level shows a remarkable sidereal diurnal variation caused by the passage of the cosmic radio source across the zenith. Due to the earth's revolution, the time of the zenith passage of a particular cosmic radio source shifts by about four minutes earlier each day and returns to its initial time after one year. This diurnal variation in cosmic noise power is deduced from the measurements made on quiet days.

The ionospheric absorption (in dB) is obtained as follows:

- 1) The reference sidereal diurnal variation of the cosmic noise power in K, T_0 , is determined from the diurnal variations on several selected quiet days each month.
- 2) Actual received power, T_1 , is read in K.
- 3) Ionospheric absorption in dB, A, is calculated with the following conversion equation:

$$A = -10 \times \log\left(\frac{T_1}{T_0}\right)$$

4-2. HF field strength

The field strength of JJY (standard frequency radio waves) 8 MHz transmitted from Japan was received by a horizontal $\lambda/2$ dipole antenna. The receiver has a bandwidth of 100 Hz and detects only the upper sideband component of the signal in order to avoid co-channel interference. The frequency uncertainty of the receiver is $\pm 1 \times 10^{-11}$. A calibration signal with 10 dB steps from a standard signal generator was inserted once a day into the input terminal of the receiver. A portable field strength meter was used to assure absolute field strength measurements.

4-3. VLF phase variation

The Omega REUNION(20° 58' S, 55° 17' E) signal of 13.6 kHz was received by a VLF receiver with a vertical antenna. The measured phase is a deviation from a reference produced by a rubidium local oscillator. The diurnal phase change is in a trapezoidal form, and disturbances superimposed on the diurnal change may manifest precipitation of auroral particles, solar protons and electrons, solar X-rays, anomalous ionization in the ionospheric D-region during winter, and so on.

4-4. Radio aurora intensity

The auroral radar at Syowa Station is operated at a frequency of 50 MHz. Five transmitting antennas, each having an azimuthal-beam width of about 30 degrees, cover a wide area of about 160 degrees in azimuth. The outputs from four 5 kW solid-state power amplifiers are combined so that finally 20 kW peak power is available. Five Yagi antennas are interchanged, depending on the covered region of

the transmitting beam pattern. The receiving beam direction is scanned in 5-degree steps by using two sets of array antennas with a beam width of about 5 degrees. The beam direction and observation region can be changed from one observed object to another. Data of echo intensity and doppler velocity is available in digital form.

5. Remarks

Because of troubles in the observation and data acquisition systems, some of the observation data was not collected.

Table 1

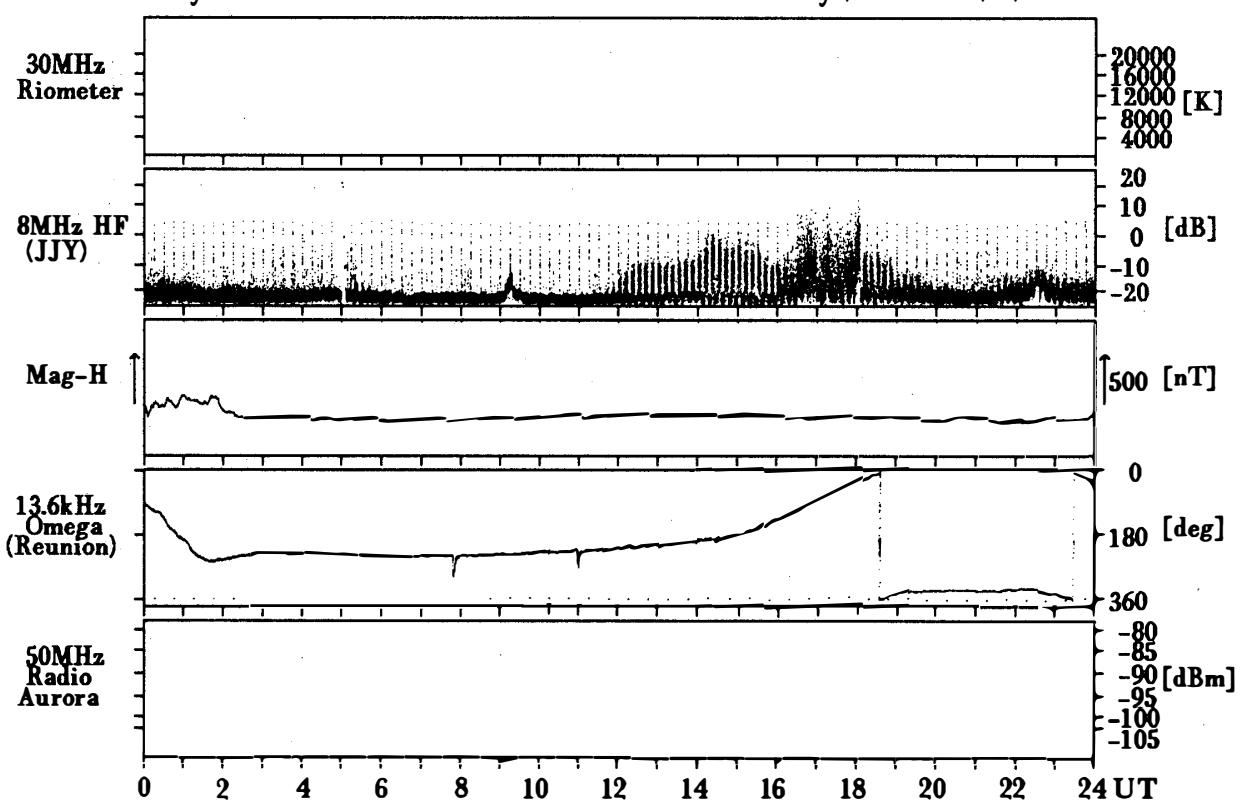
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1997. Apr. 19, 06:00	1997. Apr. 21, 06:00
1997. Sep. 15, 07:30	1997. Sep. 22, 08:30
1997. Nov. 3, 06:10	1997. Nov. 10, 07:50

Bibliography relevant to RADIO OBSERVATION DATA AT SYOWA STATION,ANTARCTICA
 (RIOMETER RECORDS OF 30 MHz COSMIC NOISE AT SYOWA STATION, ANTARCTICA)

Observing Period	Observers	Literature		
		JARE Data Reports		
		Volume	Pages	Year
Feb.1967 - Feb.1968	Ose, M Nishimuta, I.	2 (Ionosphere 1)	62	1968
Feb.1968 - Jan.1969	Ishizawa, K.	7 (Ionosphere 3)	65	1970
1969	Ota, Y.	8 (Ionosphere 4)	74	1970
1970	Shiro, I. Sakamoto, T.	14 (Ionosphere 5)	62	1971
1971	Ogata, T. Ose, M.	18 (Ionosphere 7)	62	1971
1972	Isozaki, S. Miyazaki, S.	20 (Ionosphere 8)	76	1973
1973	Nishimuta, I. Yabuuma, H.	24 (Ionosphere 11)	74	1974
1974	Yamazaki, I. Shiro, I.	29 (Ionosphere 13)	84	1975
1975	Sugiuchi, H. Komiya, N.	35 (Ionosphere 15)	84	1976
1976	Ose M. Yamakoshi, A. Sasaki, T.	41 (Ionosphere 17)	87	1977
1977	Ose M. Nishiyama, N. Sakamoto, J.	46 (Ionosphere 19)	82	1978
1978	Ose M. Igarashi, K. Tsuzurahara, S.	51 (Ionosphere 20)	86	1979
1979	Ose, M. Ojima, S. Komiya, N.	56 (Ionosphere 22)	84	1980
1980	Ose, M Nozaki, K.	70 (Ionosphere 26)	97	1982
1981	Ose, M. Kurihara, N.	80 (Ionosphere 27)	94	1983
1982	Kuratani, Y. Igarashi, K.	87 (Ionosphere 29)	86	1984
1983	Kuratani, Y. Yamazaki, I. Tanaka, T.	99 (Ionosphere 31)	93	1985
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1987	Maeno, H. Inamori, K.	141 (Ionosphere 39)	99	1989
1988	Maeno, H. Ohtsuka, A.	155 (Ionosphere 42)	98	1990
1989	Maeno, H. Yamamoto, S.	168 (Ionosphere 44)	184	1991
1990	Ohtaka, K. Kunitake, M.	176 (Ionosphere 47)	204	1992
1991	Nozaki, K. Kunitake, M.	189 (Ionosphere 49)	184	1993
1992	Kamata, M. Kunitake, M.	196 (Ionosphere 52)	202	1994
1993	Yamaguchi,T. Kunitake, M.	206 (Ionosphere 54)	190	1995
1994	Iwasaki, K. Ichinose, M.	212 (Ionosphere 55)	197	1996
1995	Inamori, K. Ichinose, M.	226 (Ionosphere 58)	181	1997
1996	Yumisashi,I. Makita, Y.	231 (Ionosphere 59)	182	1998

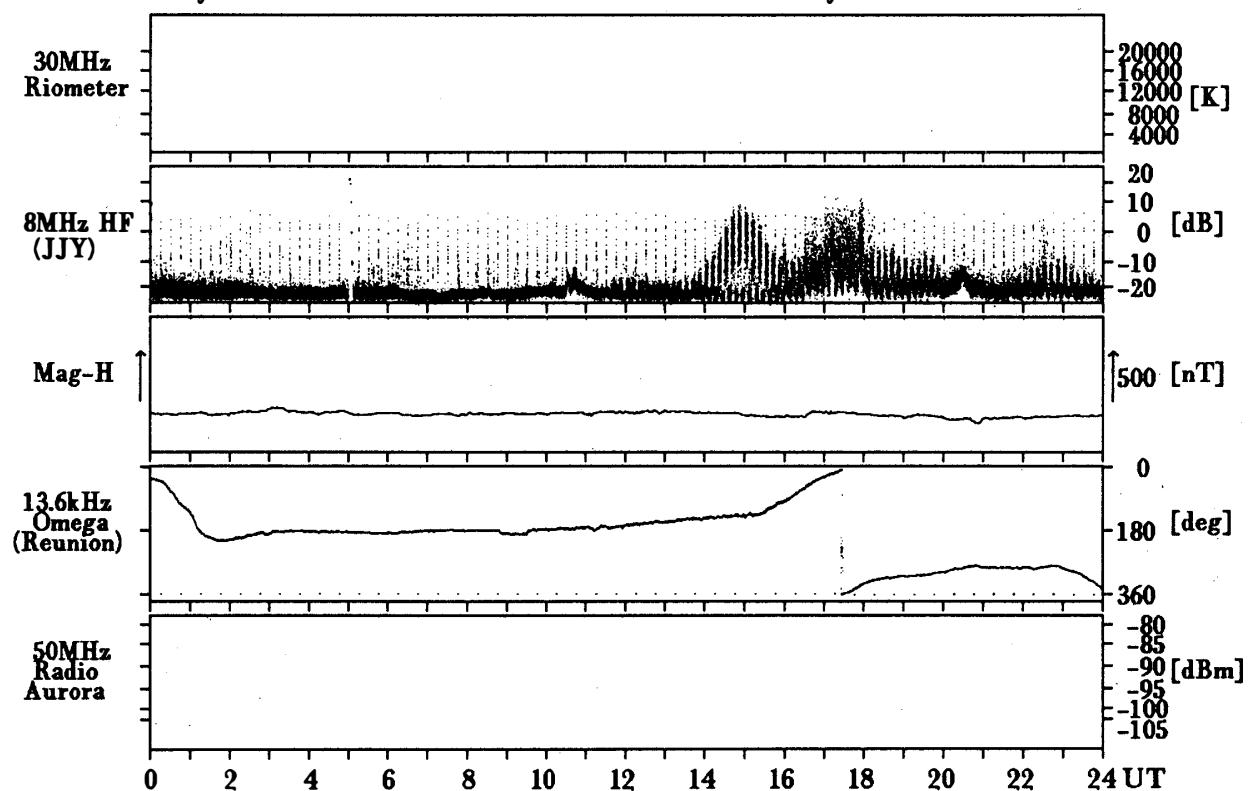
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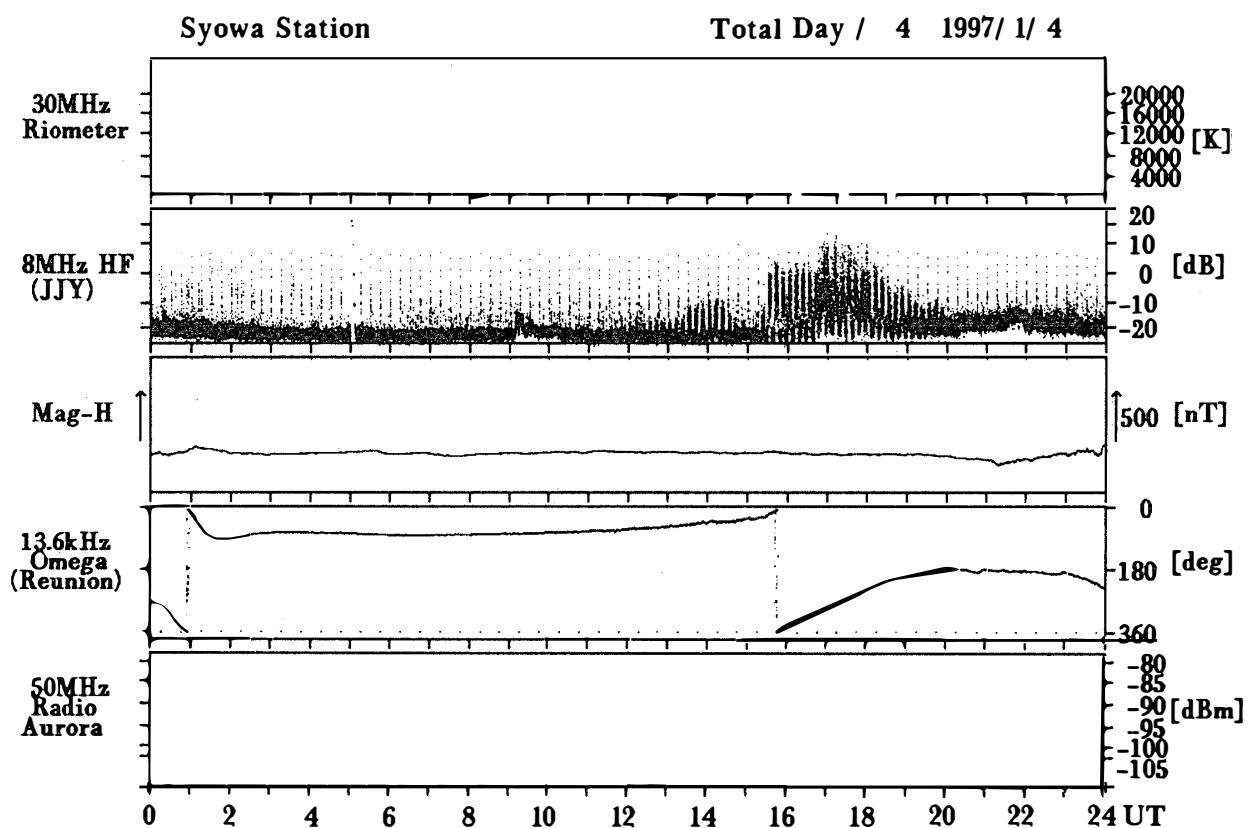
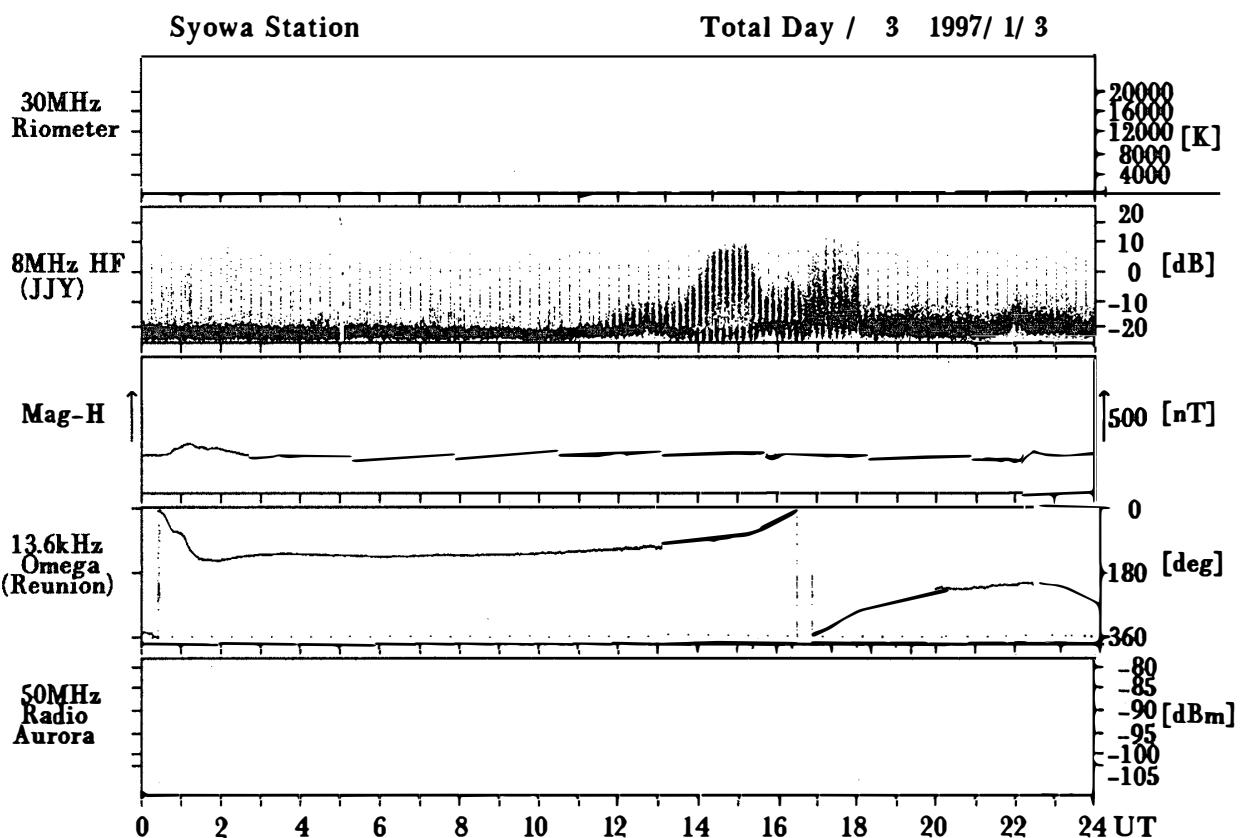
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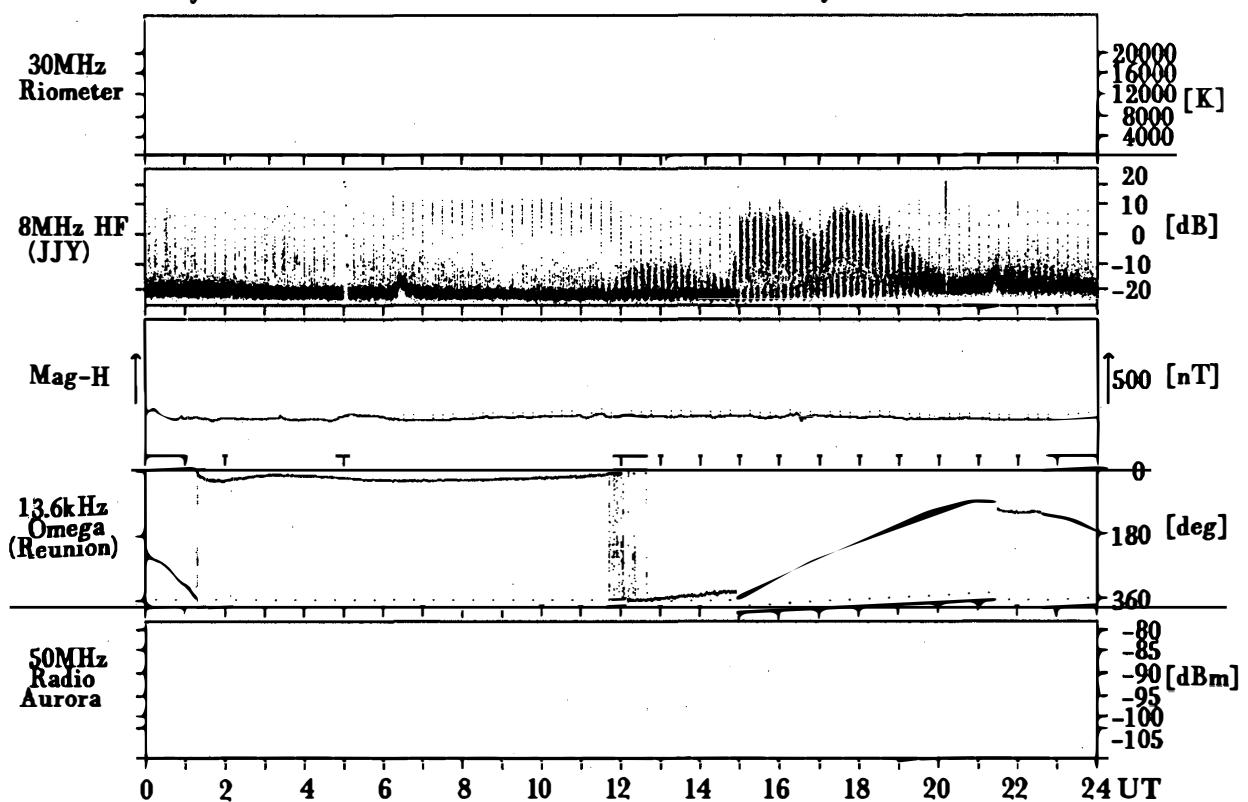
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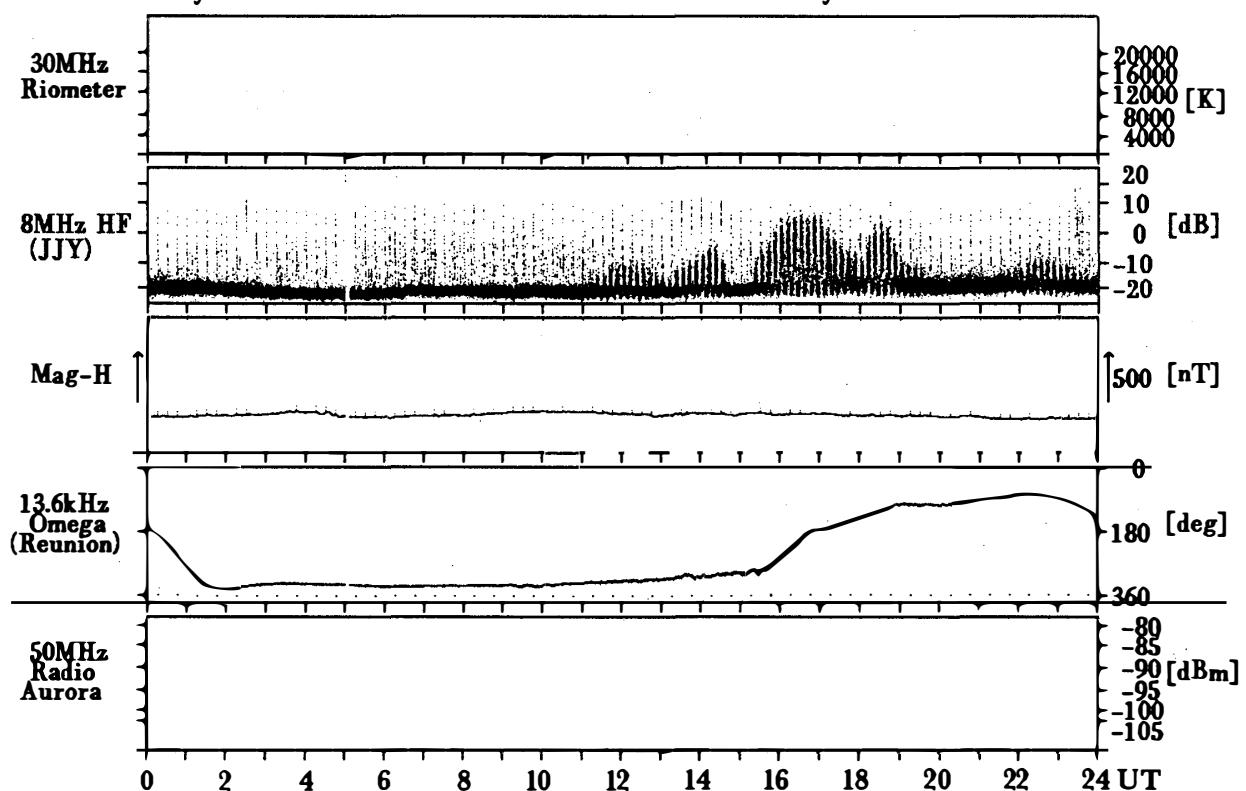
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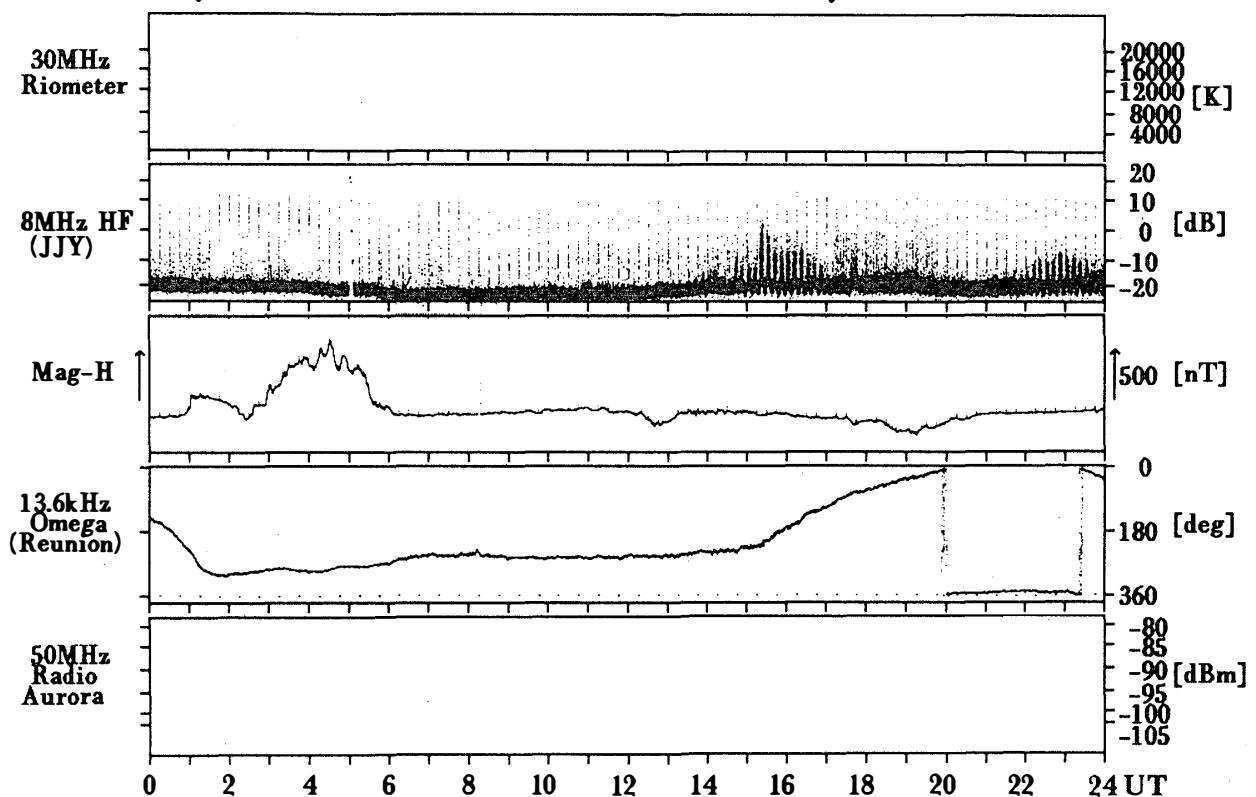
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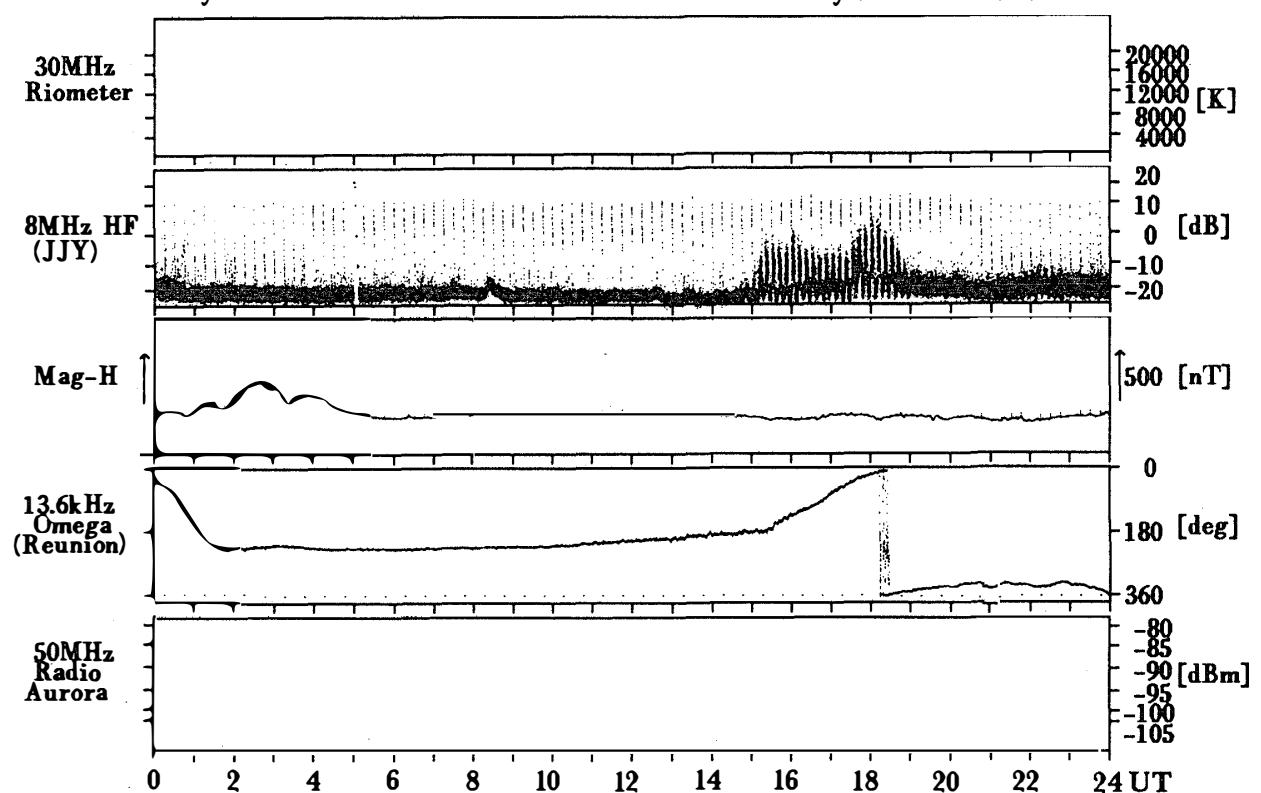
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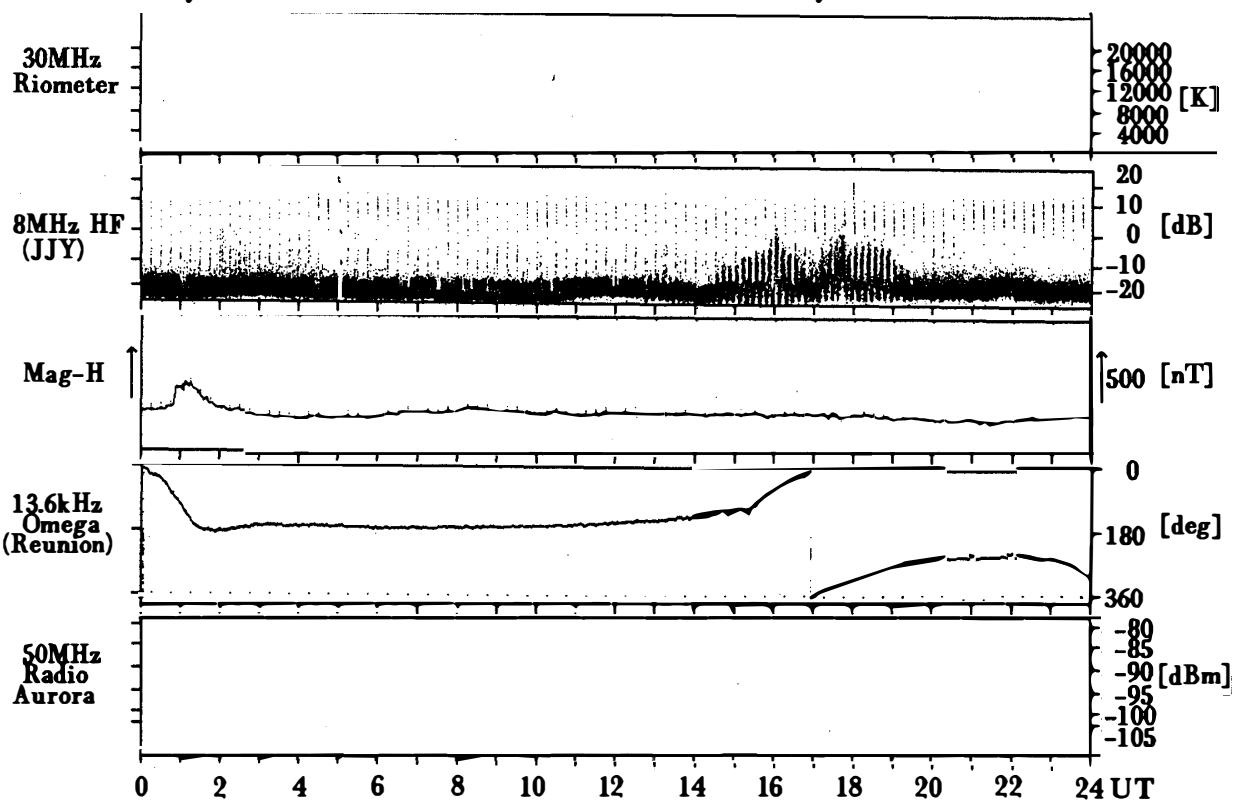
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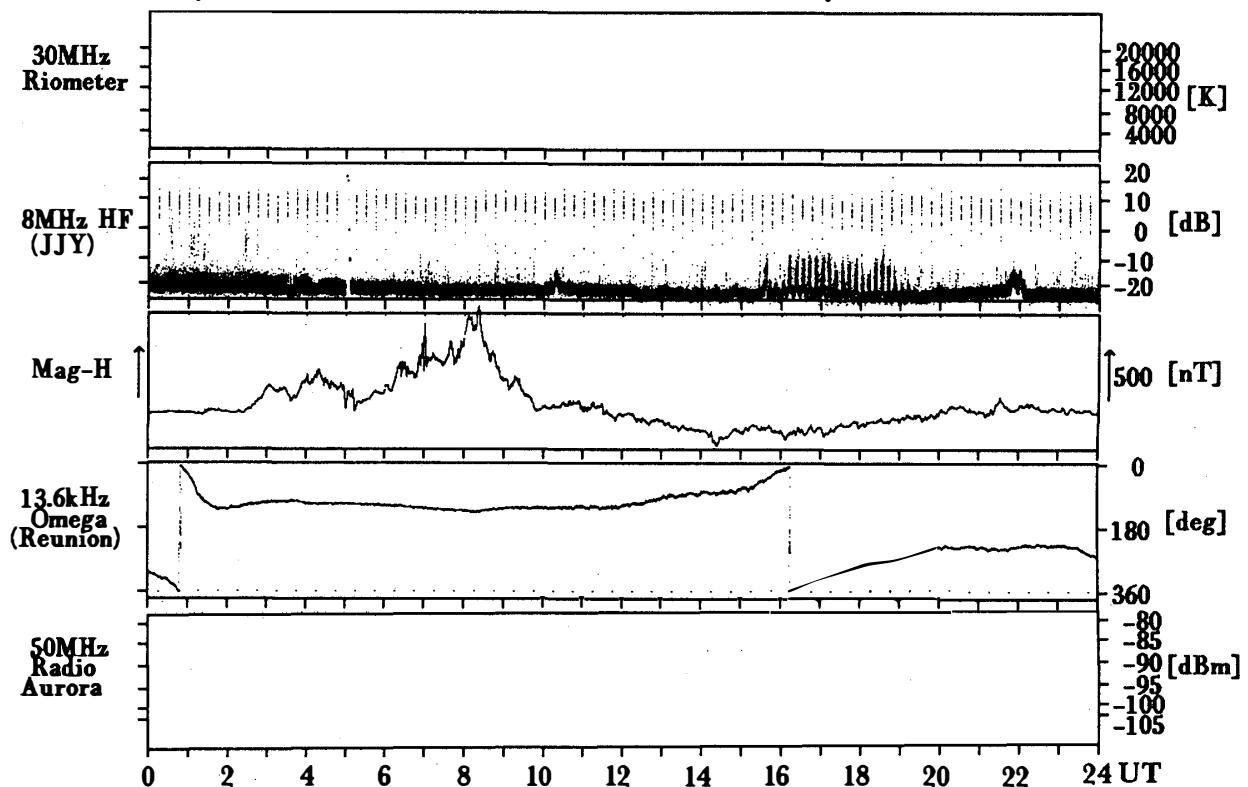


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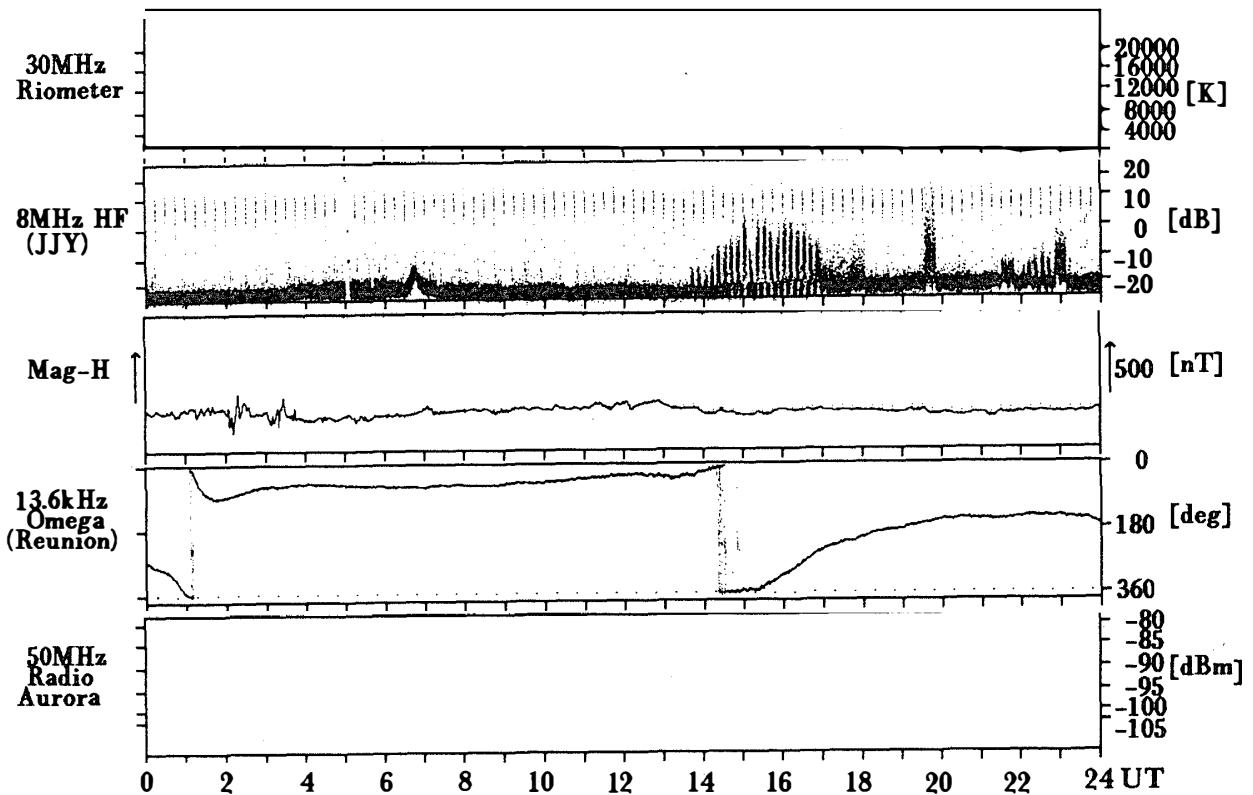
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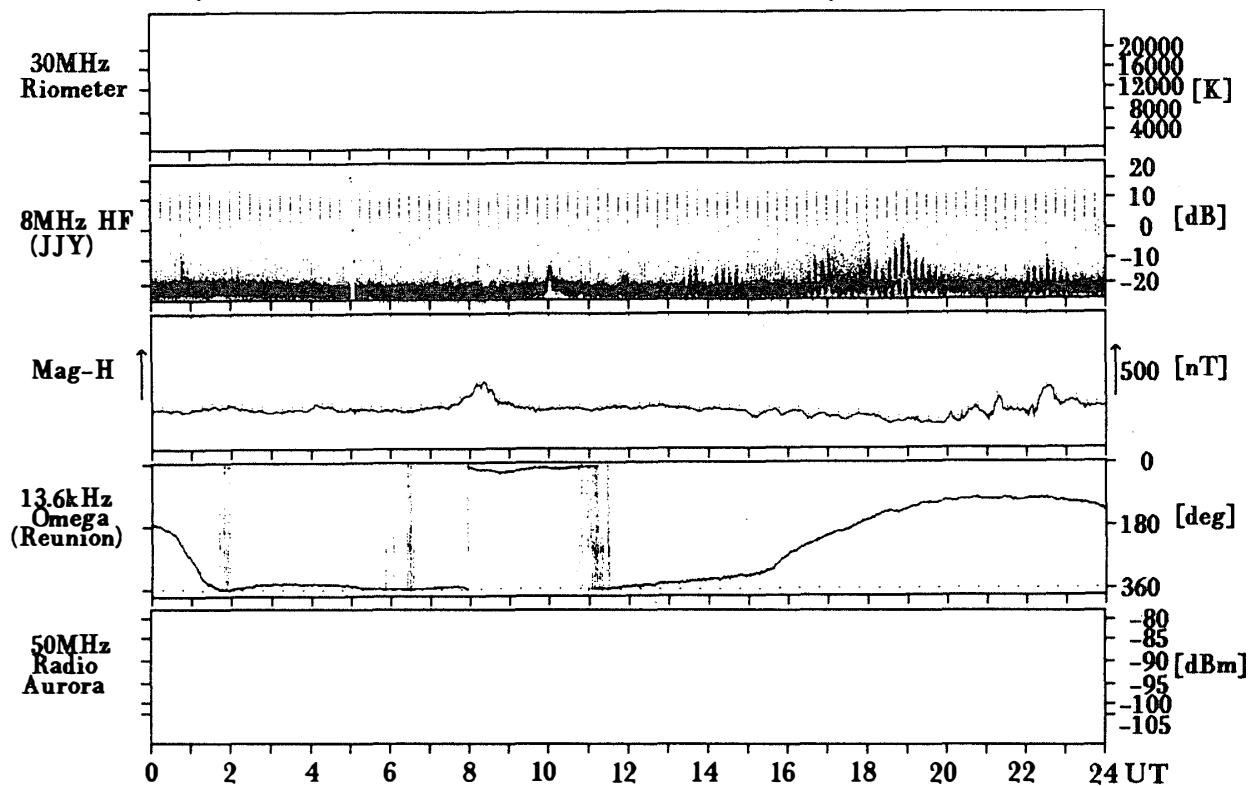
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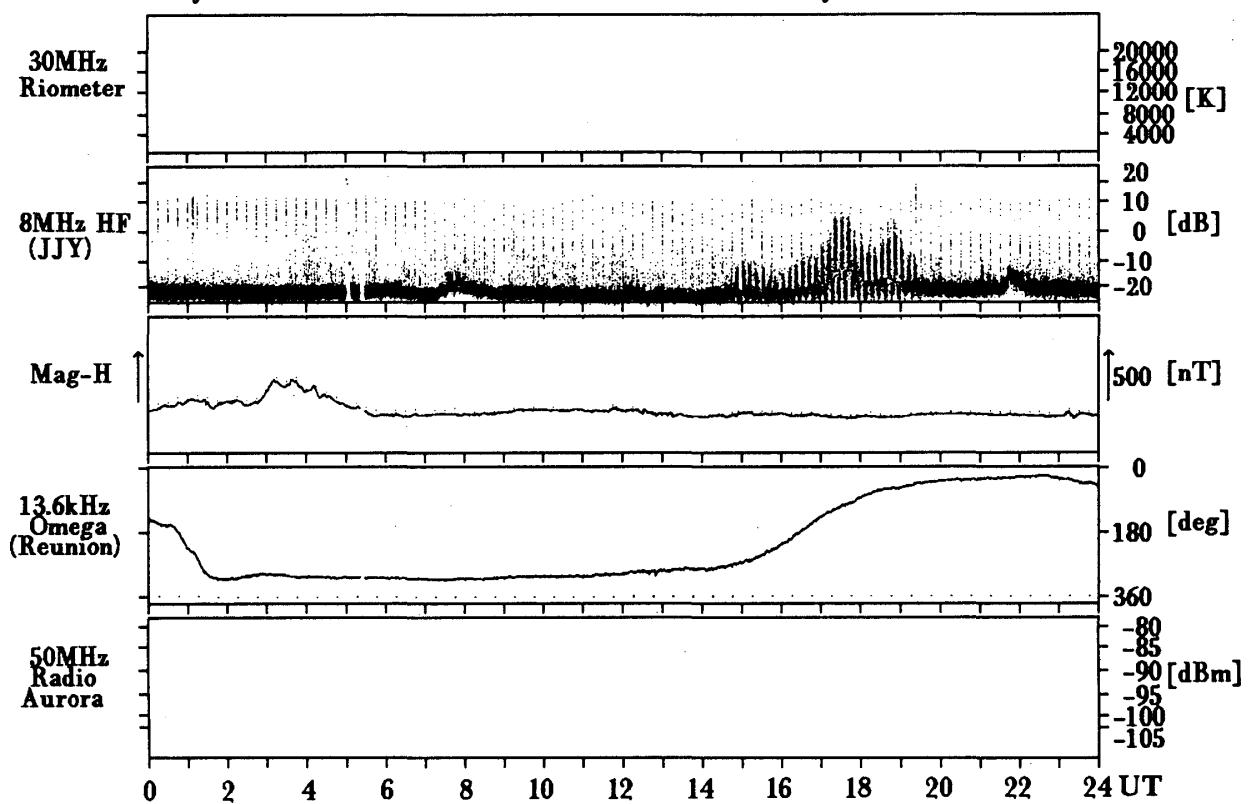
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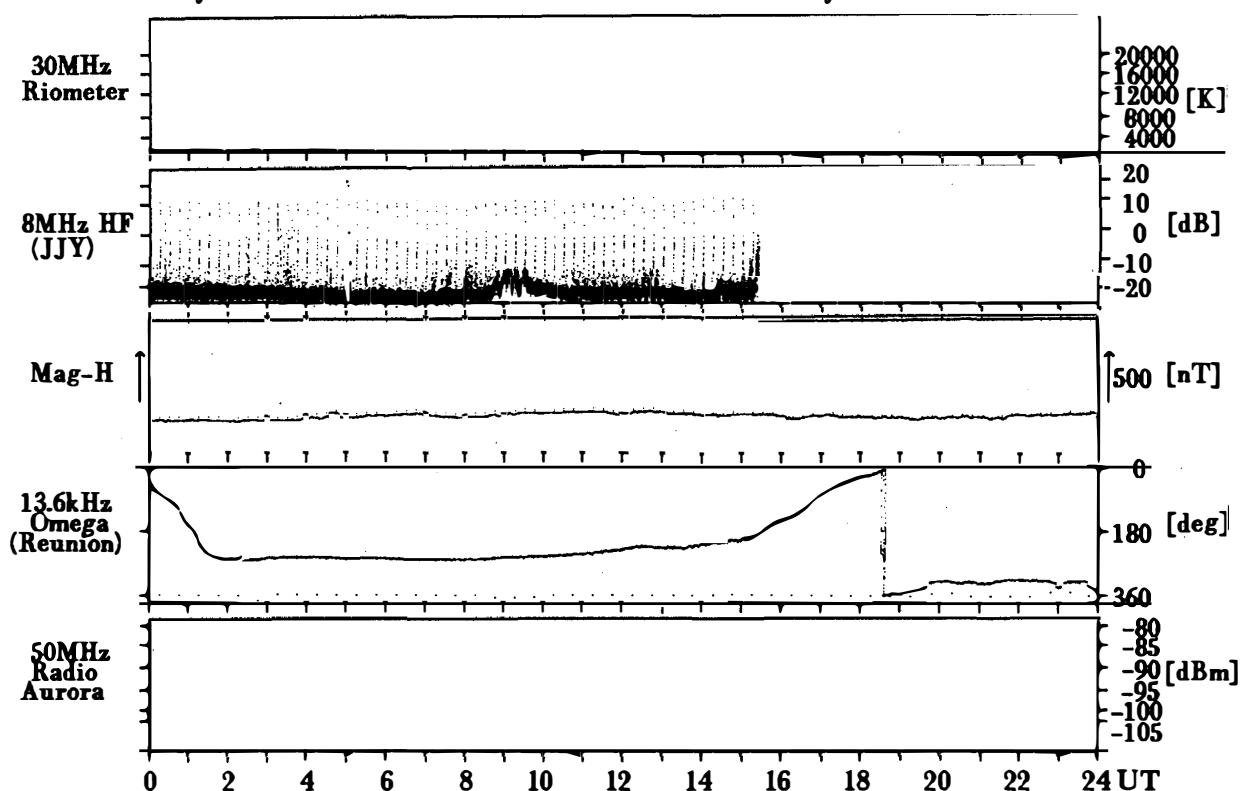
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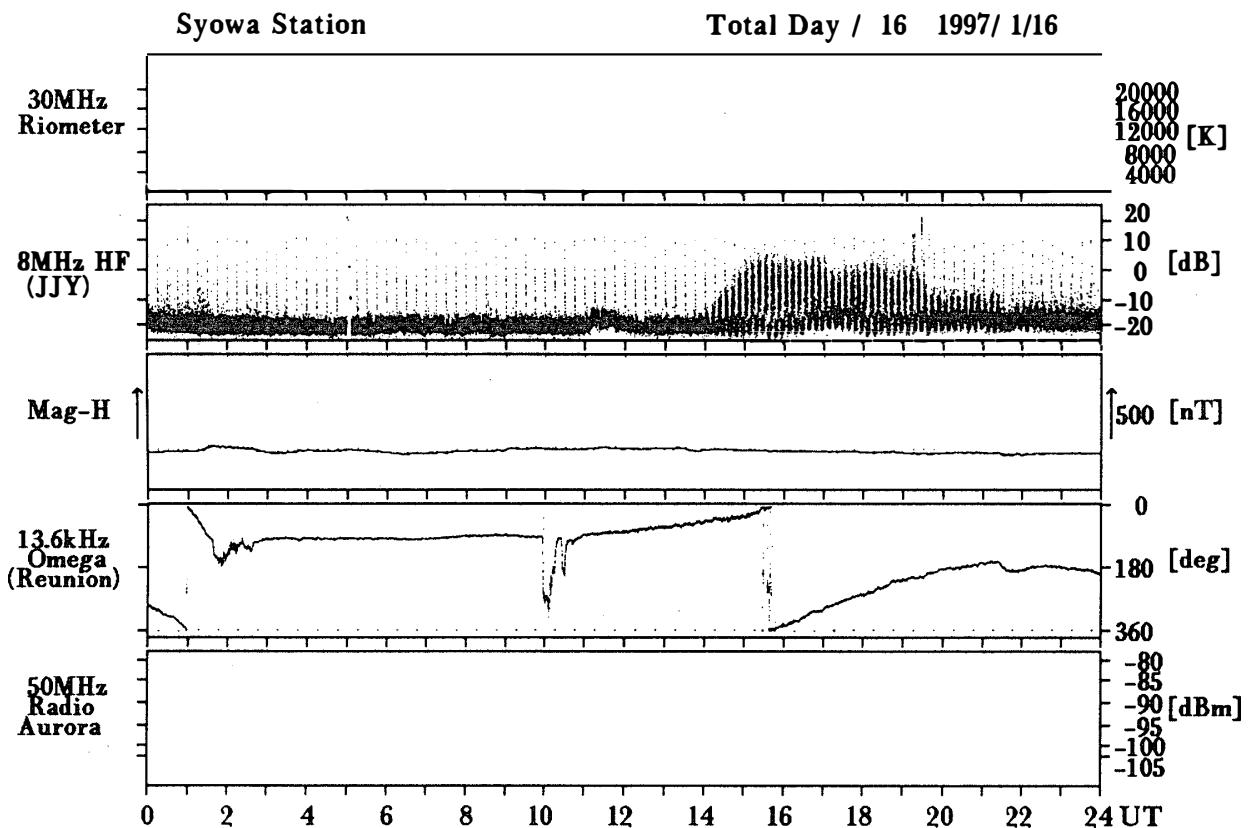
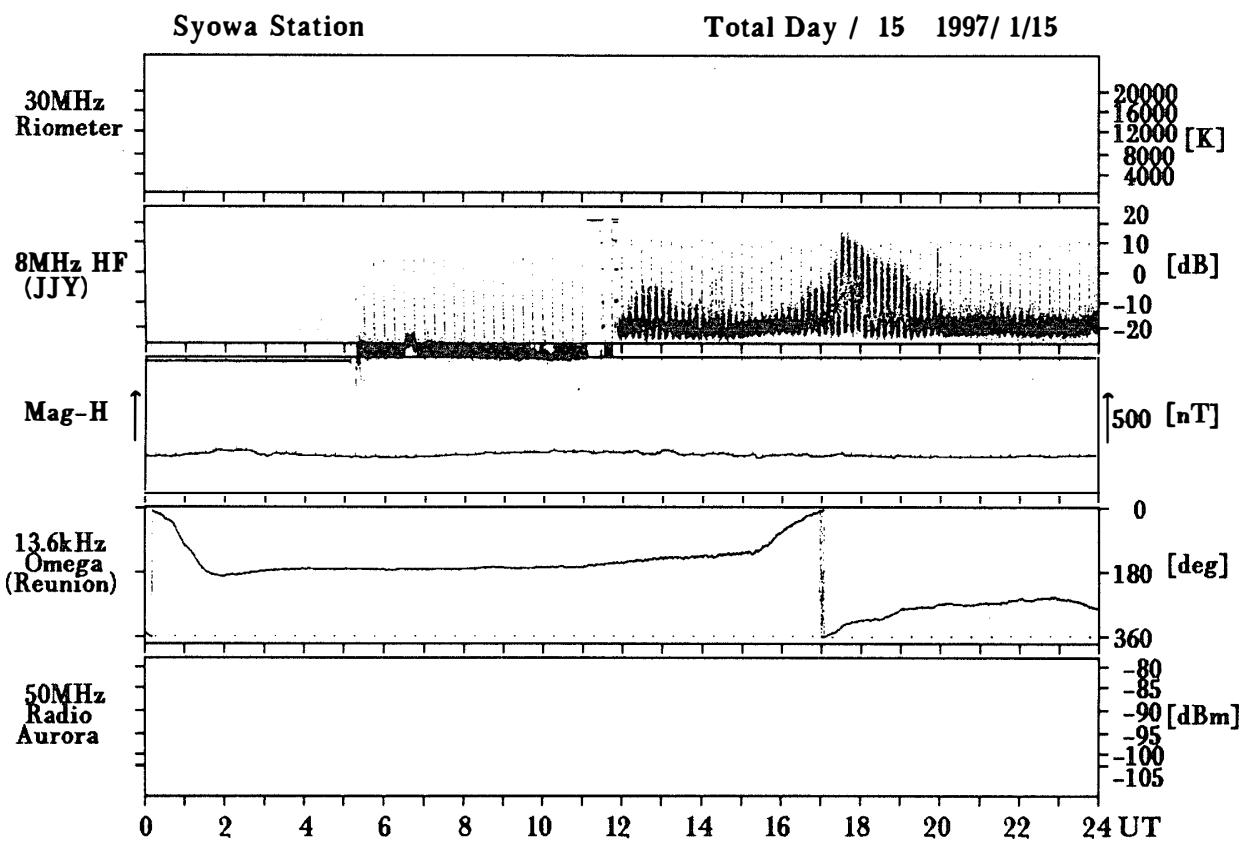
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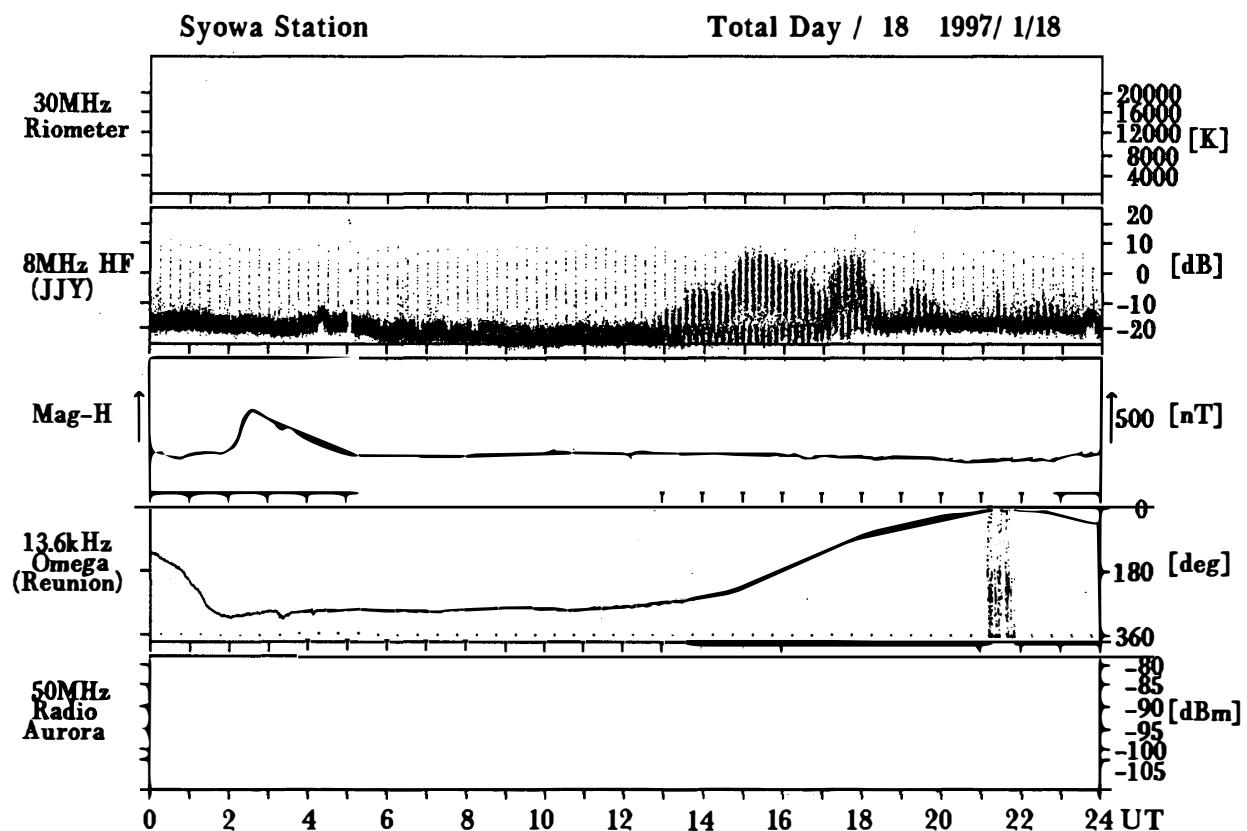
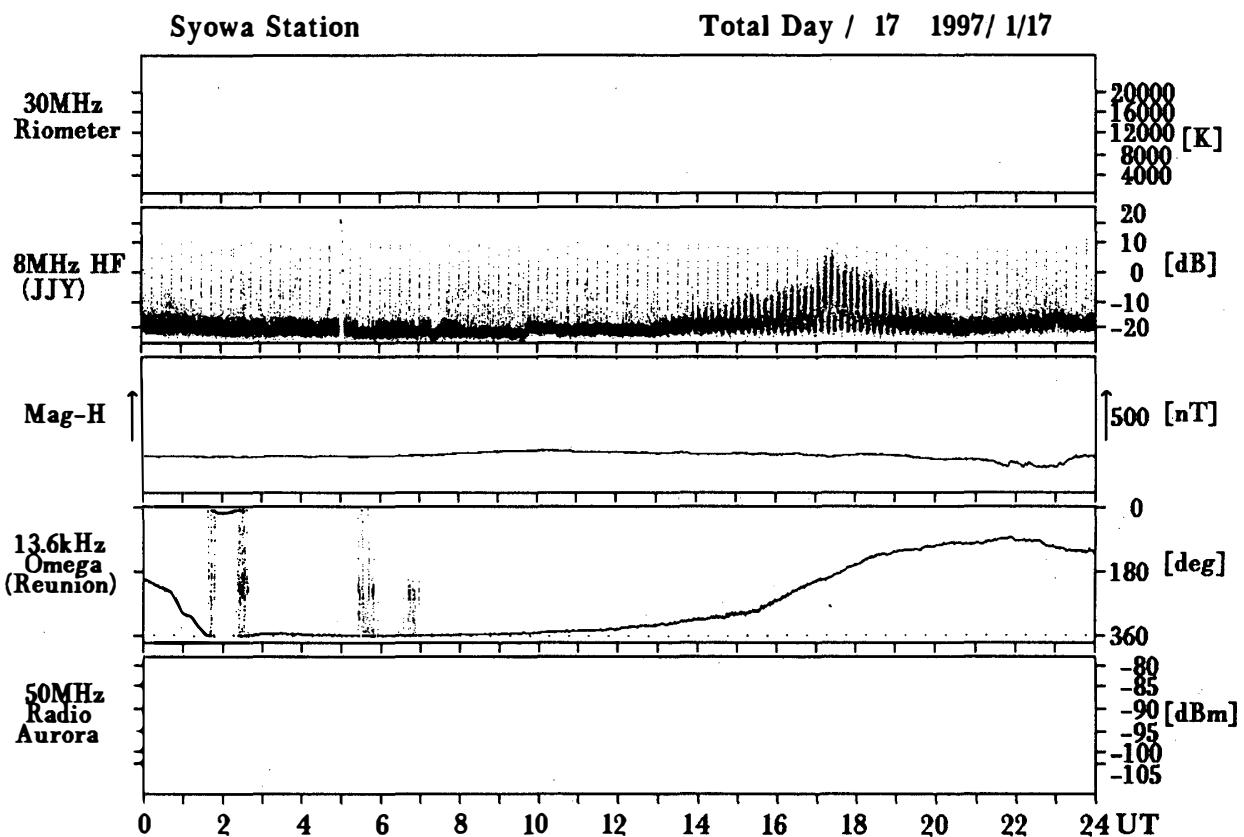


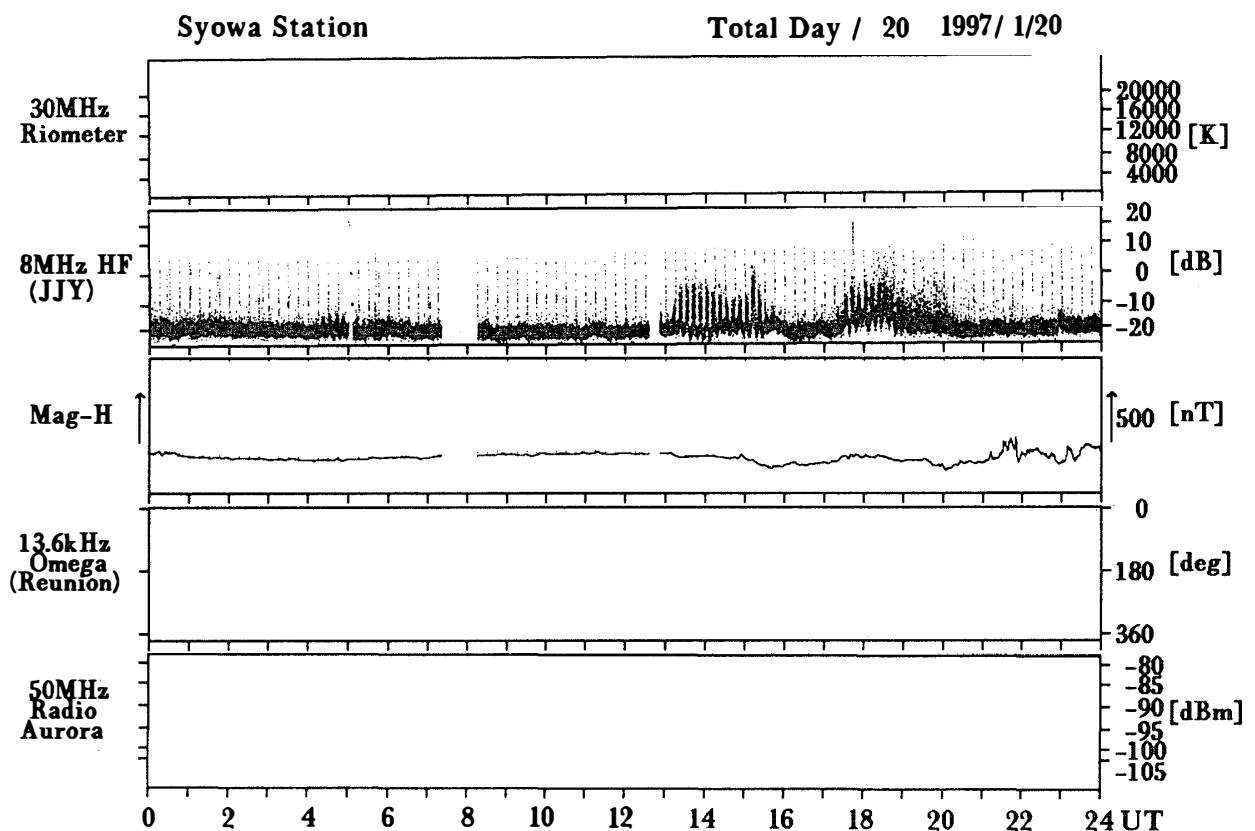
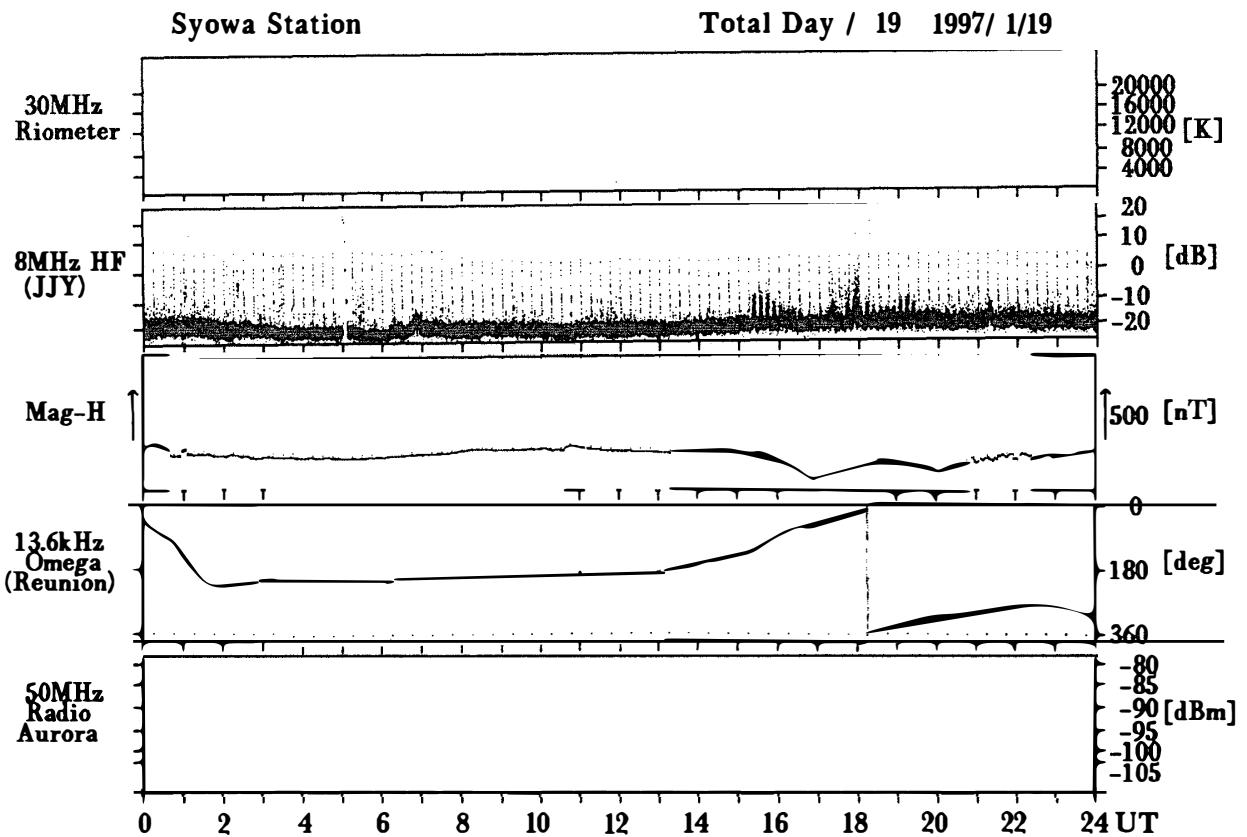
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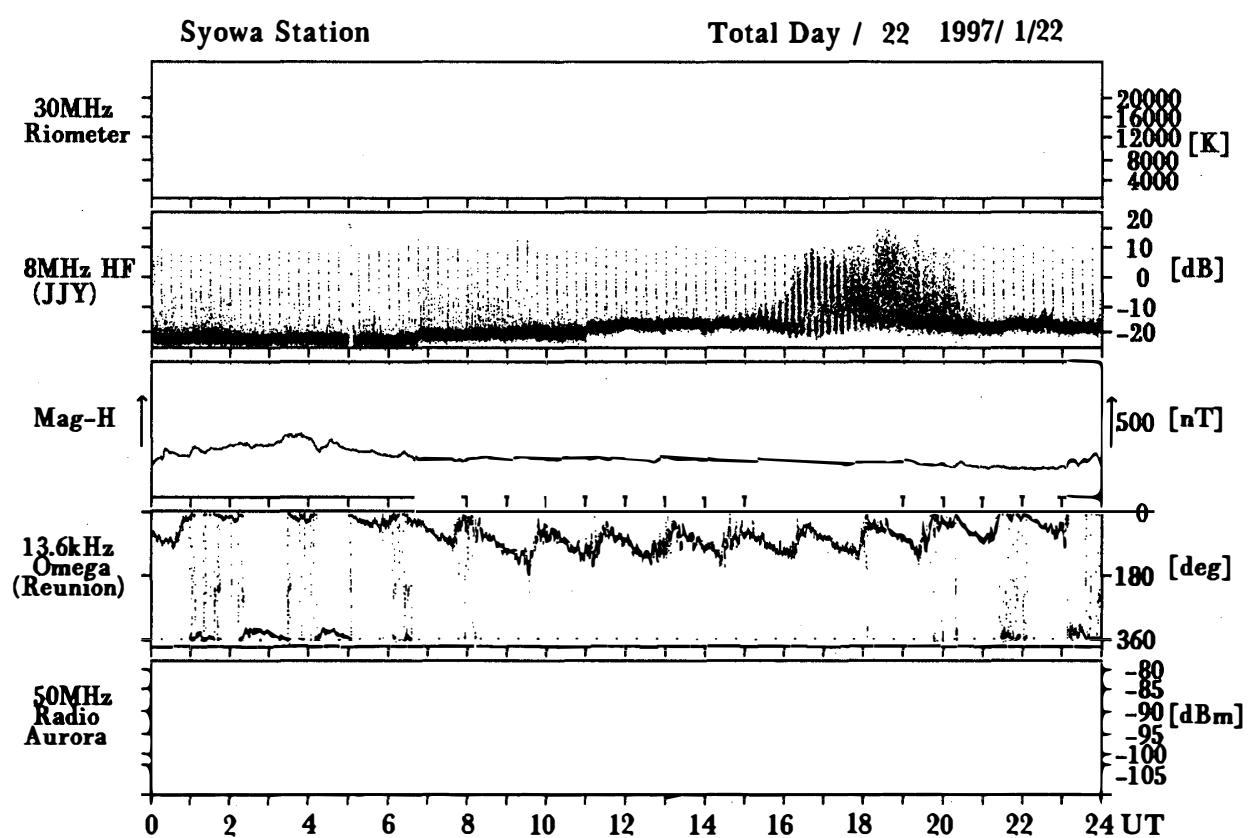
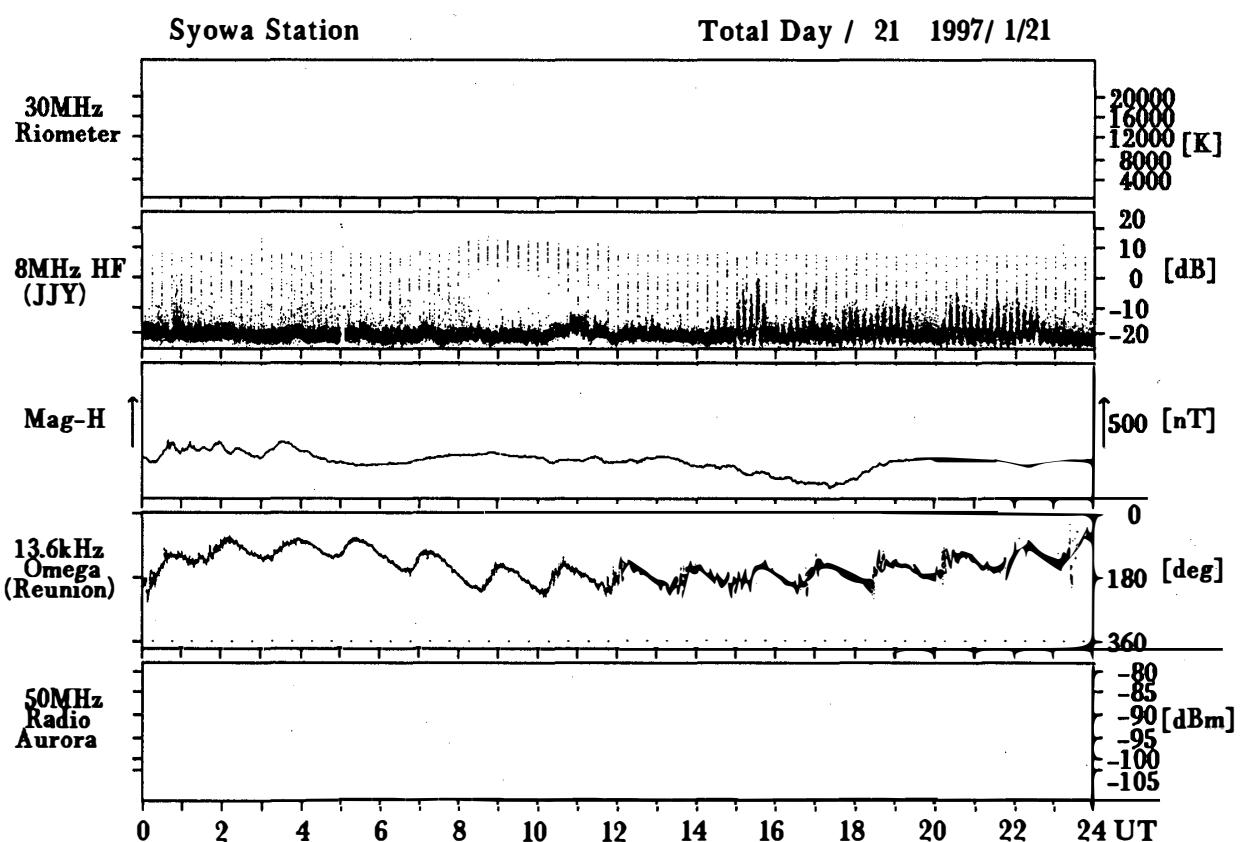
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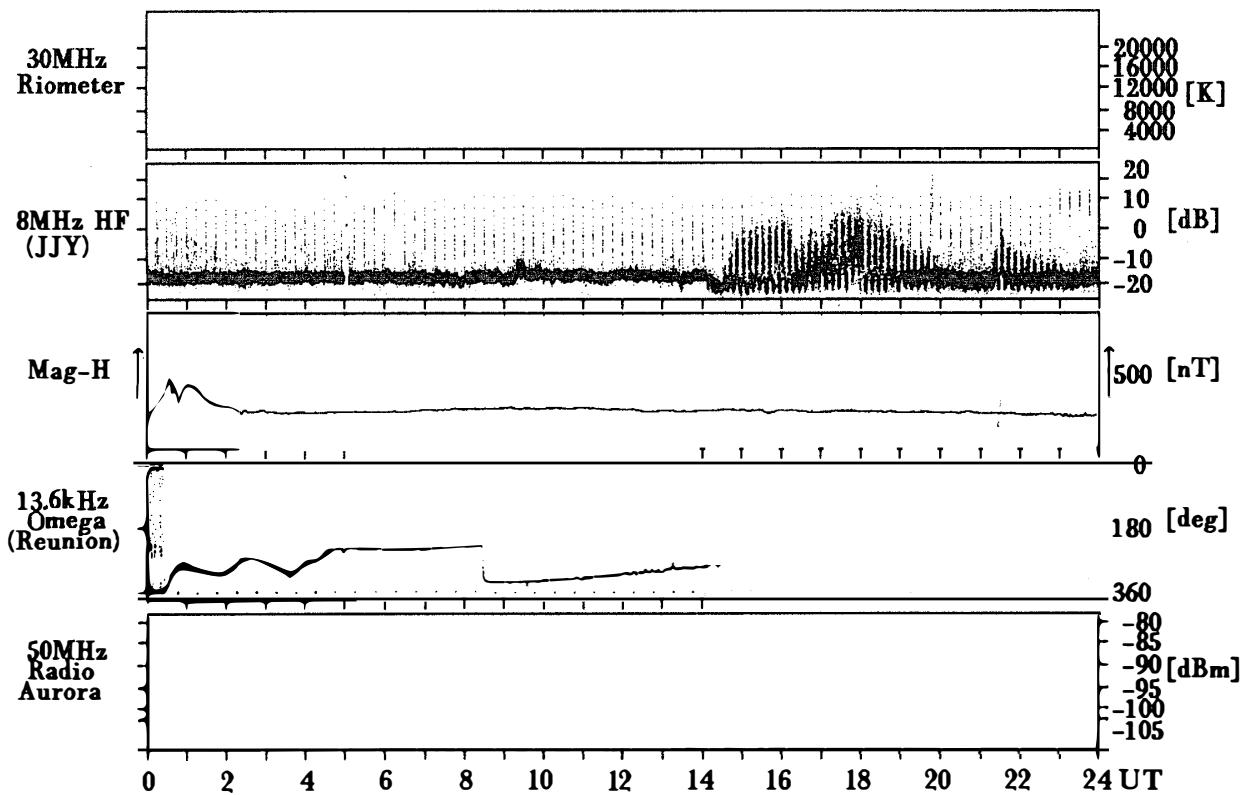






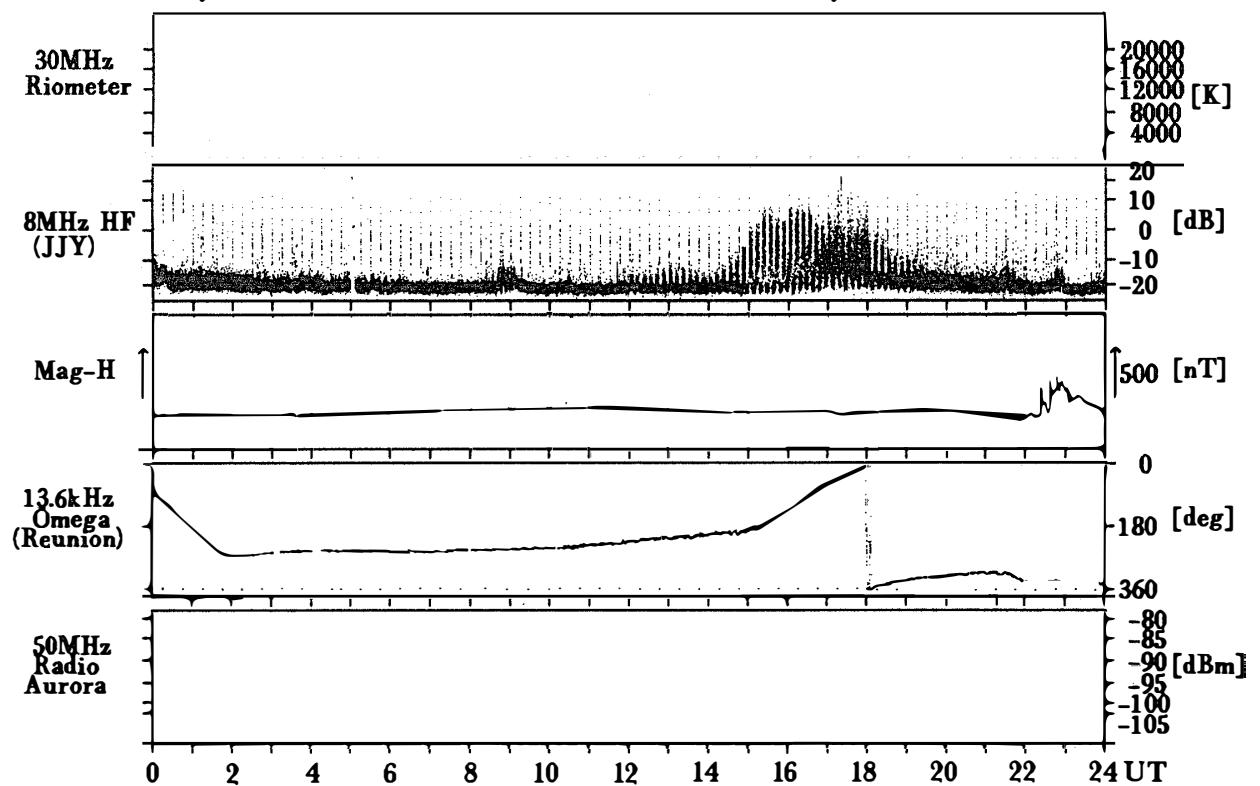
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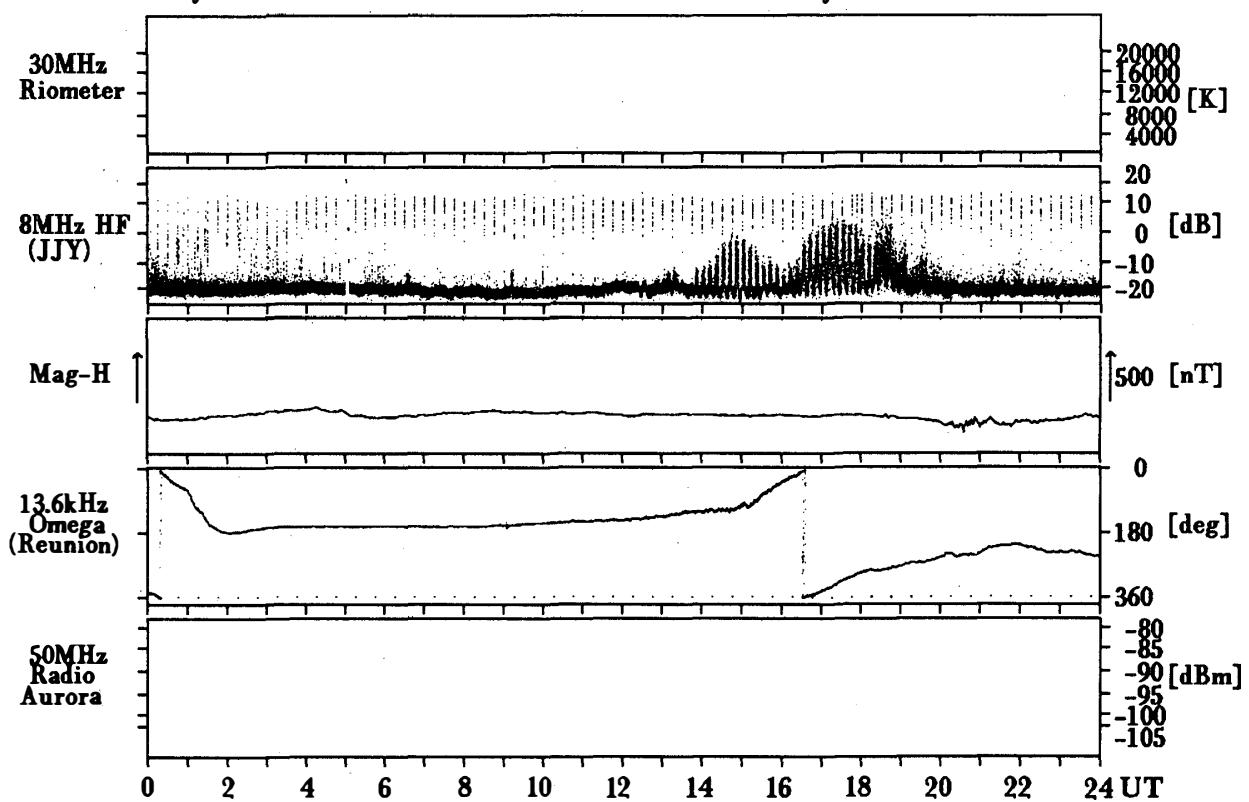
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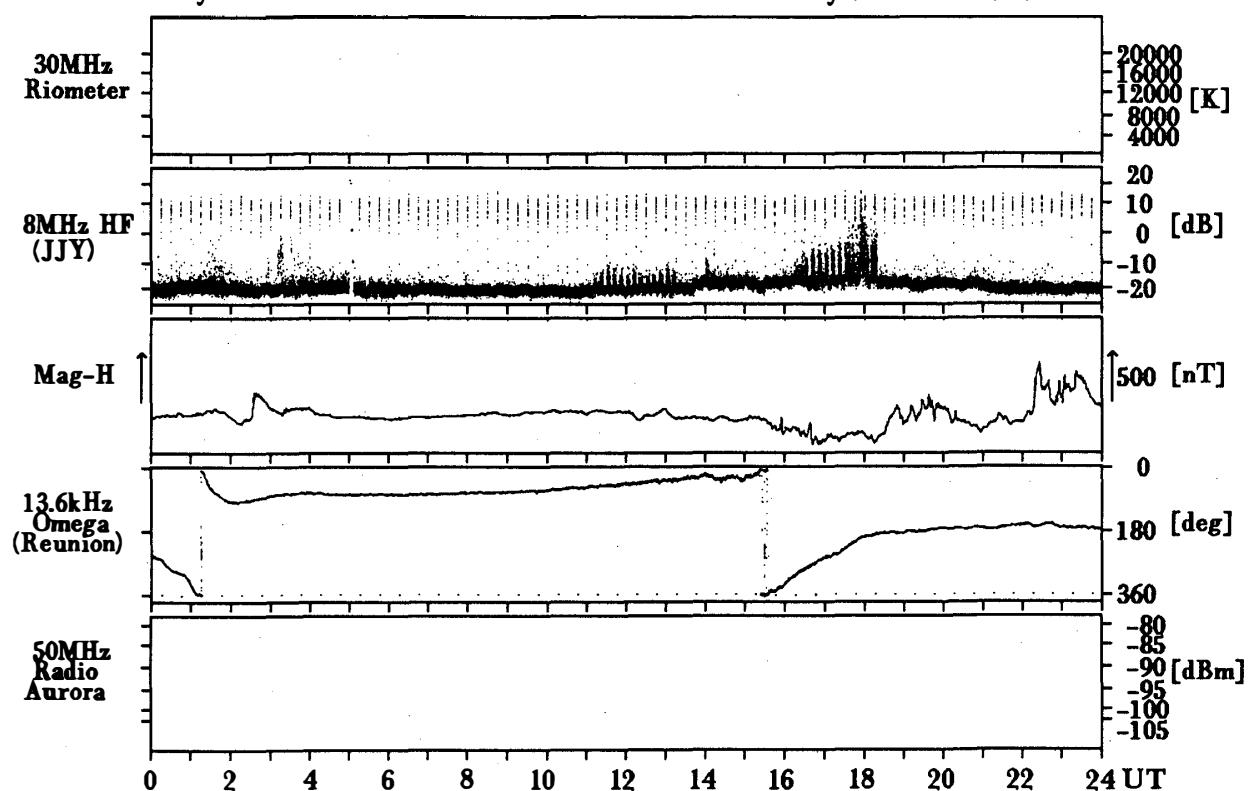
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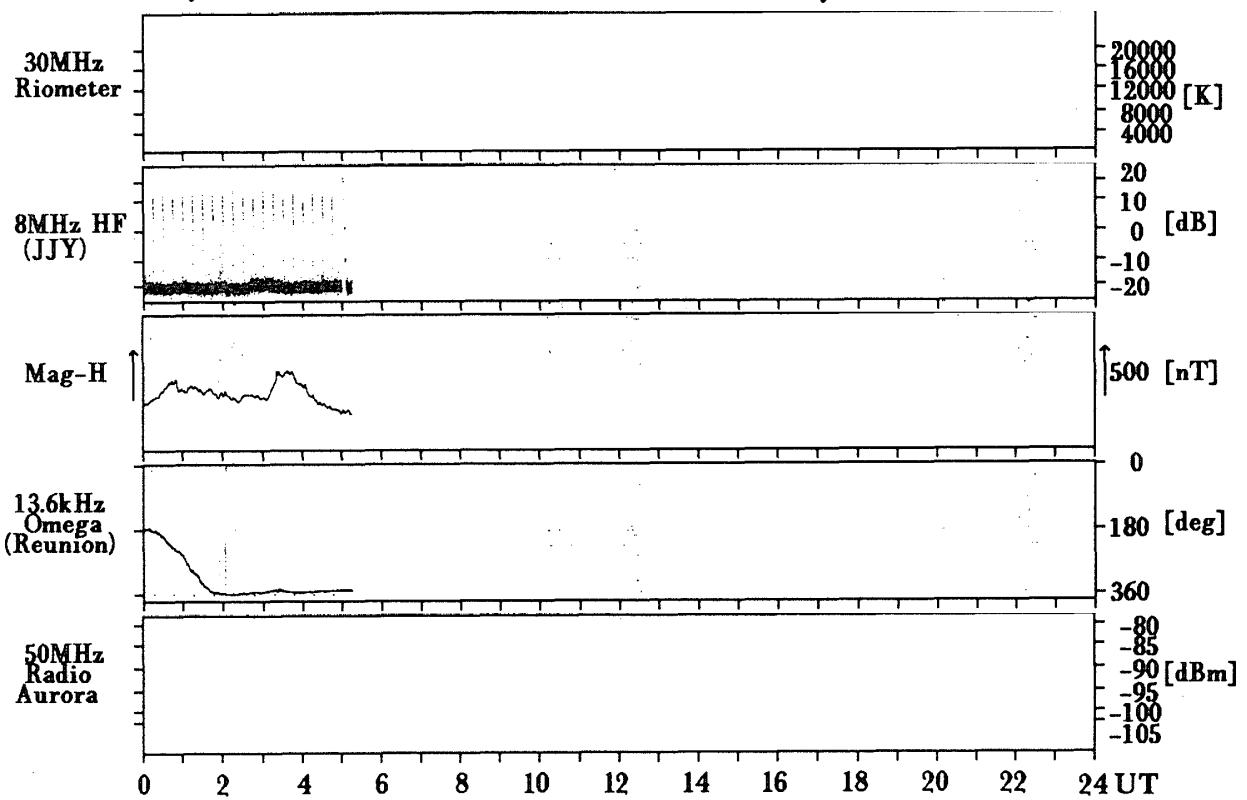
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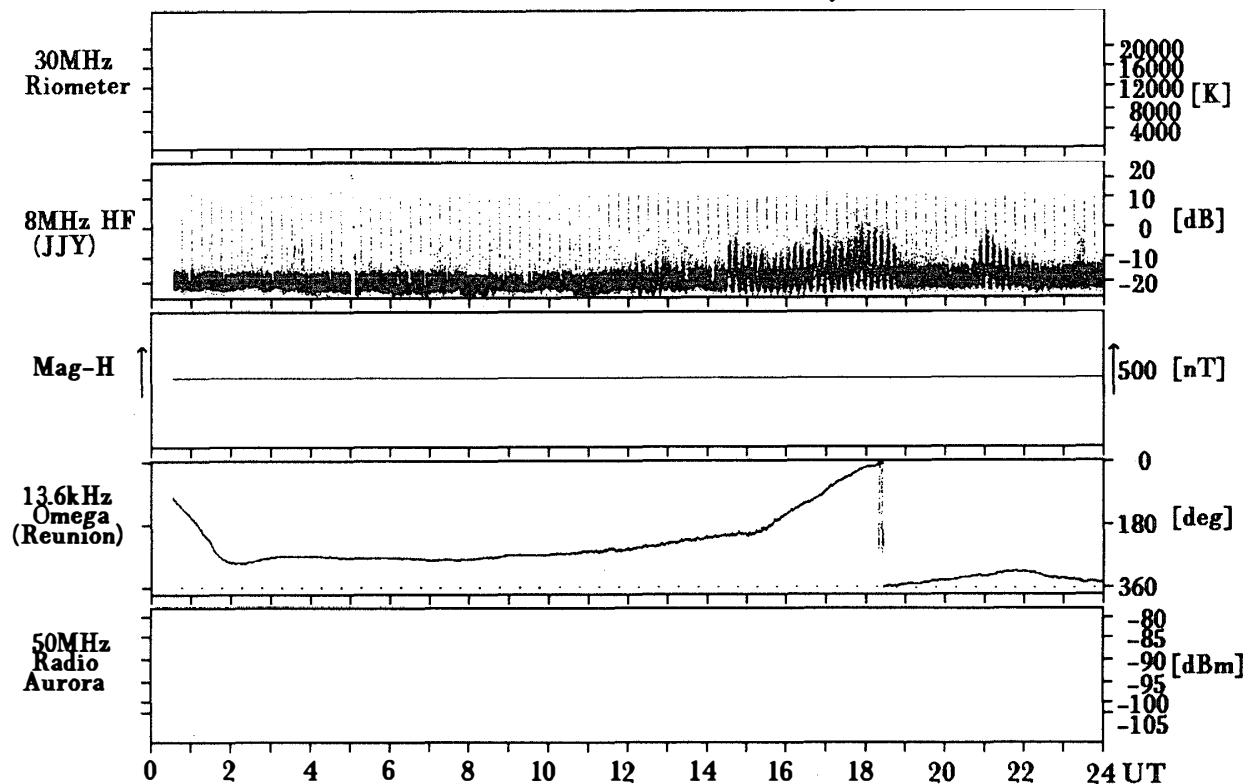
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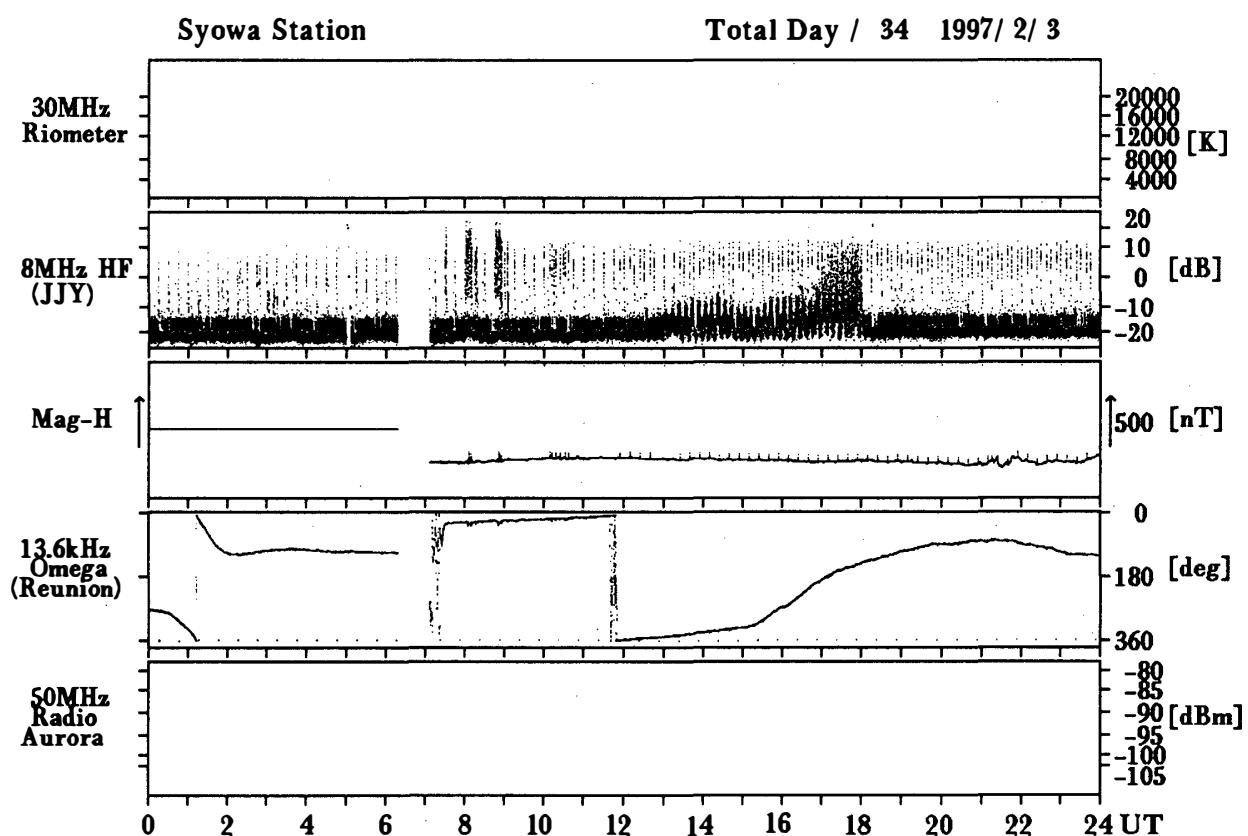
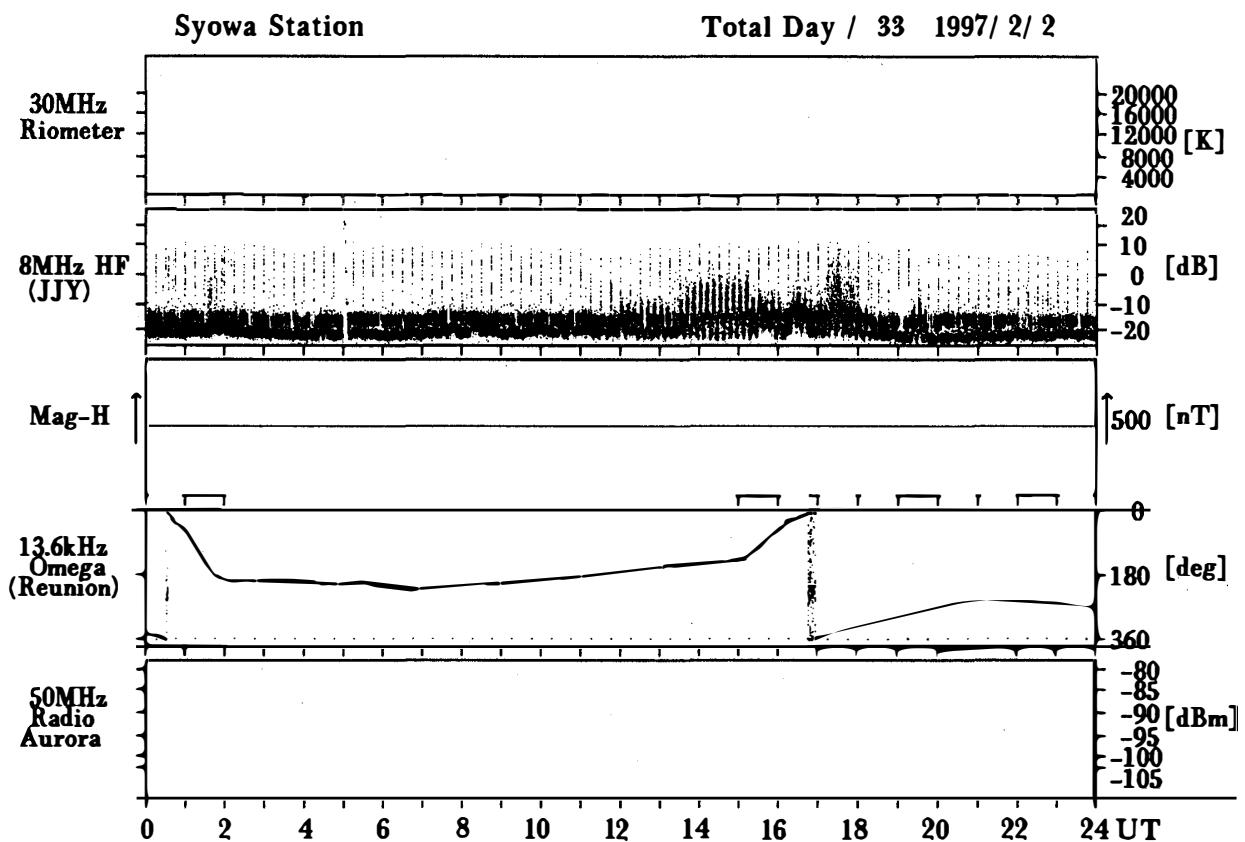
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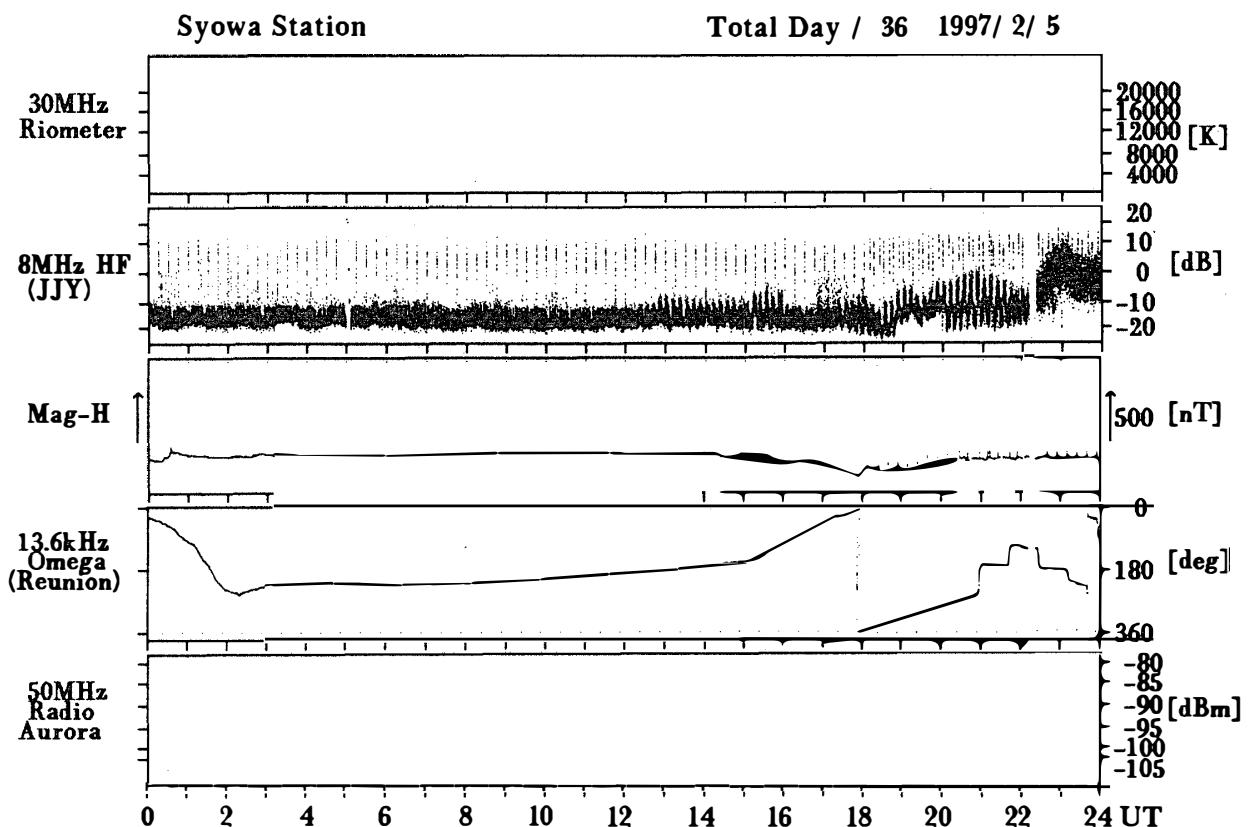
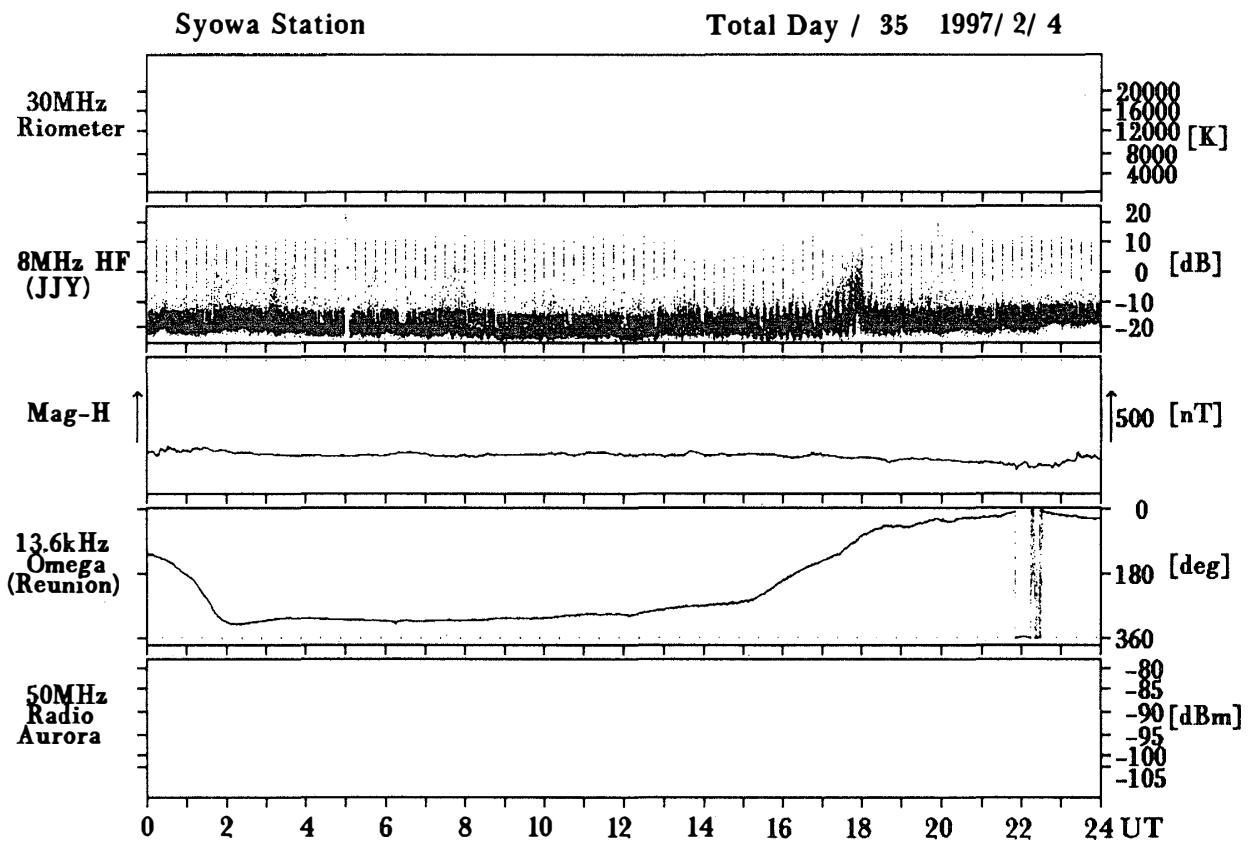


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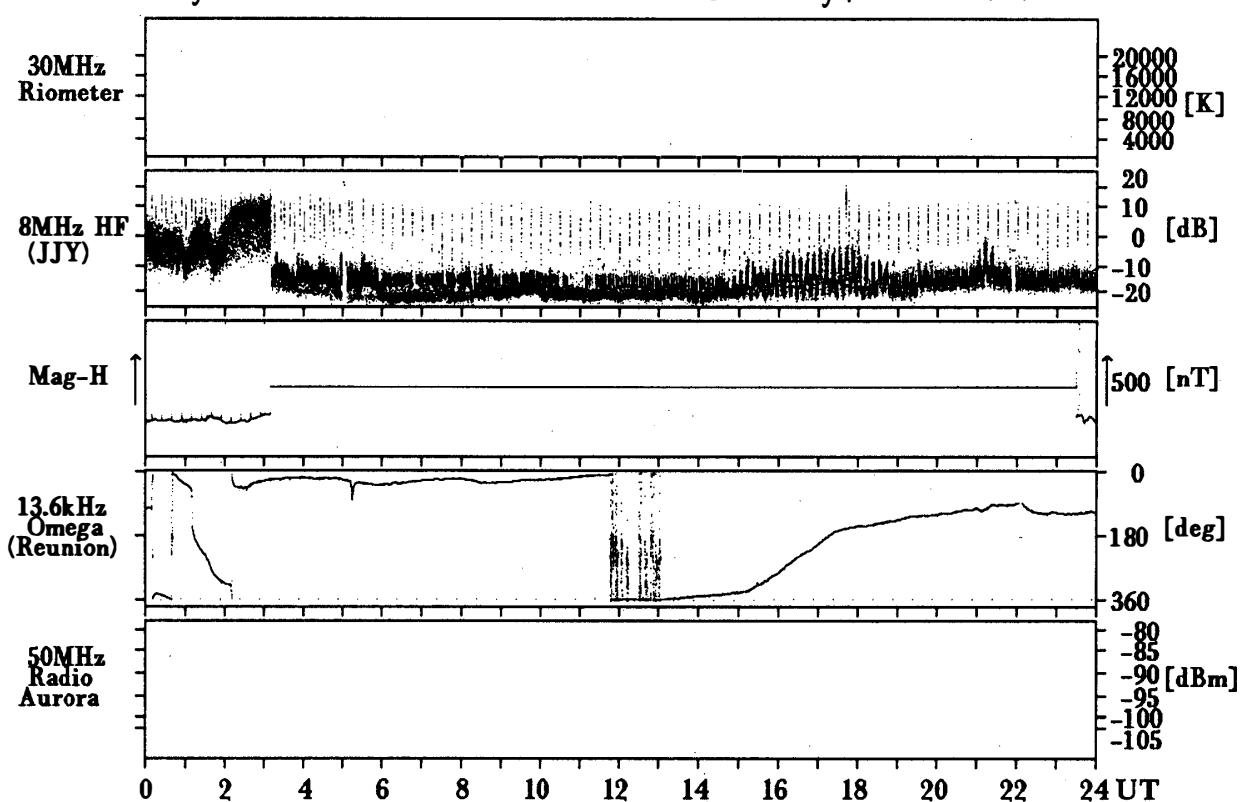






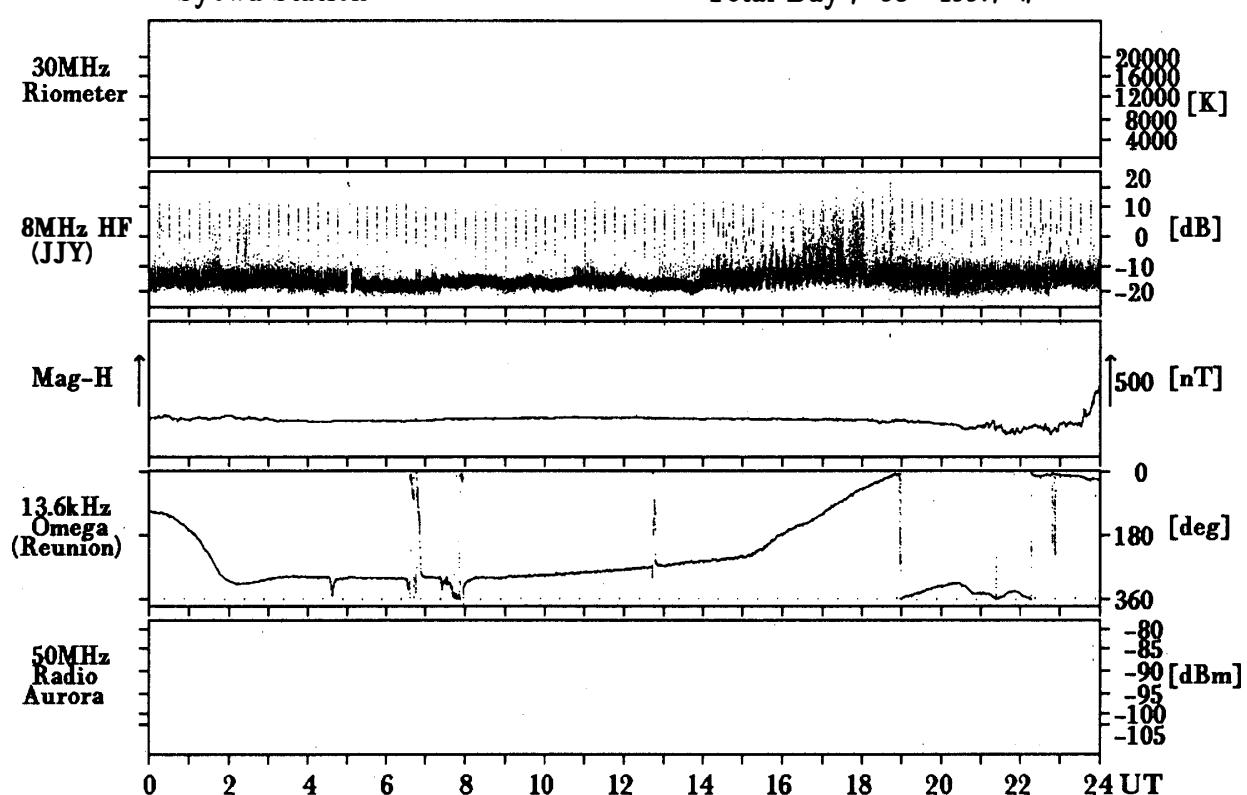
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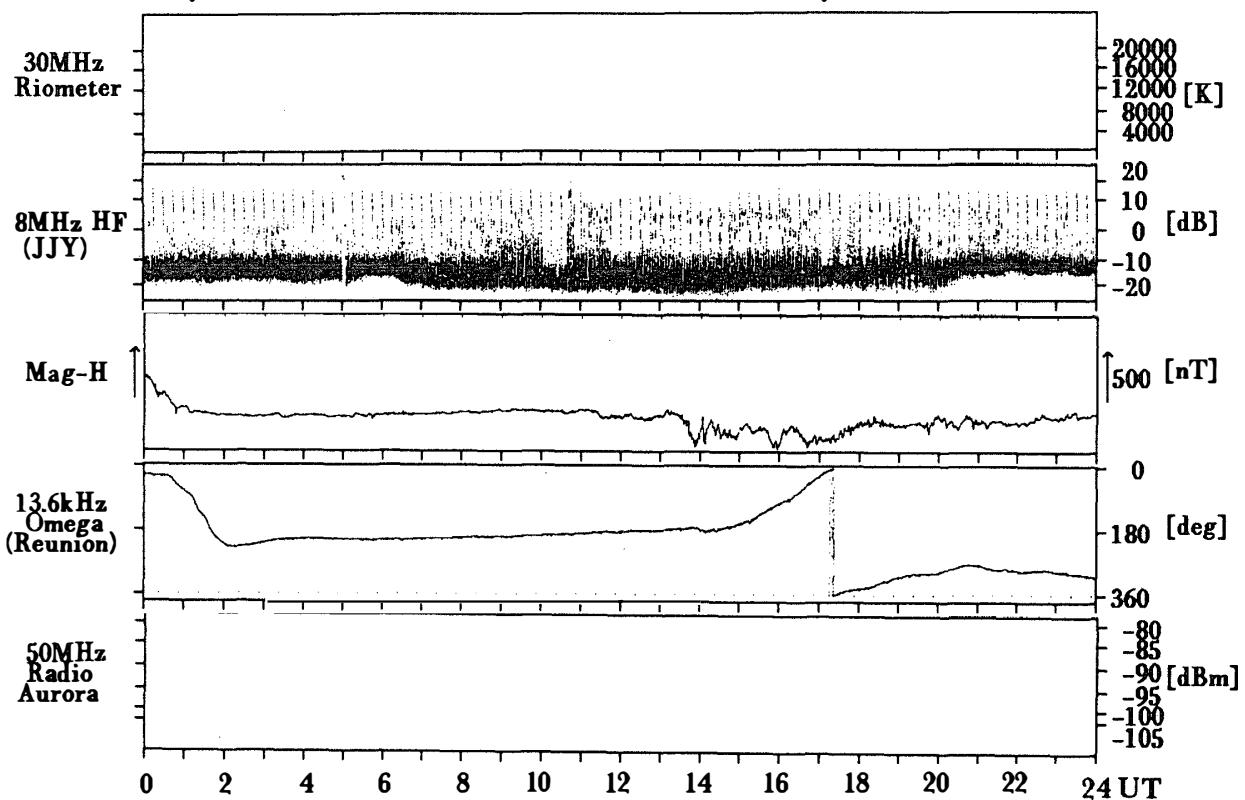
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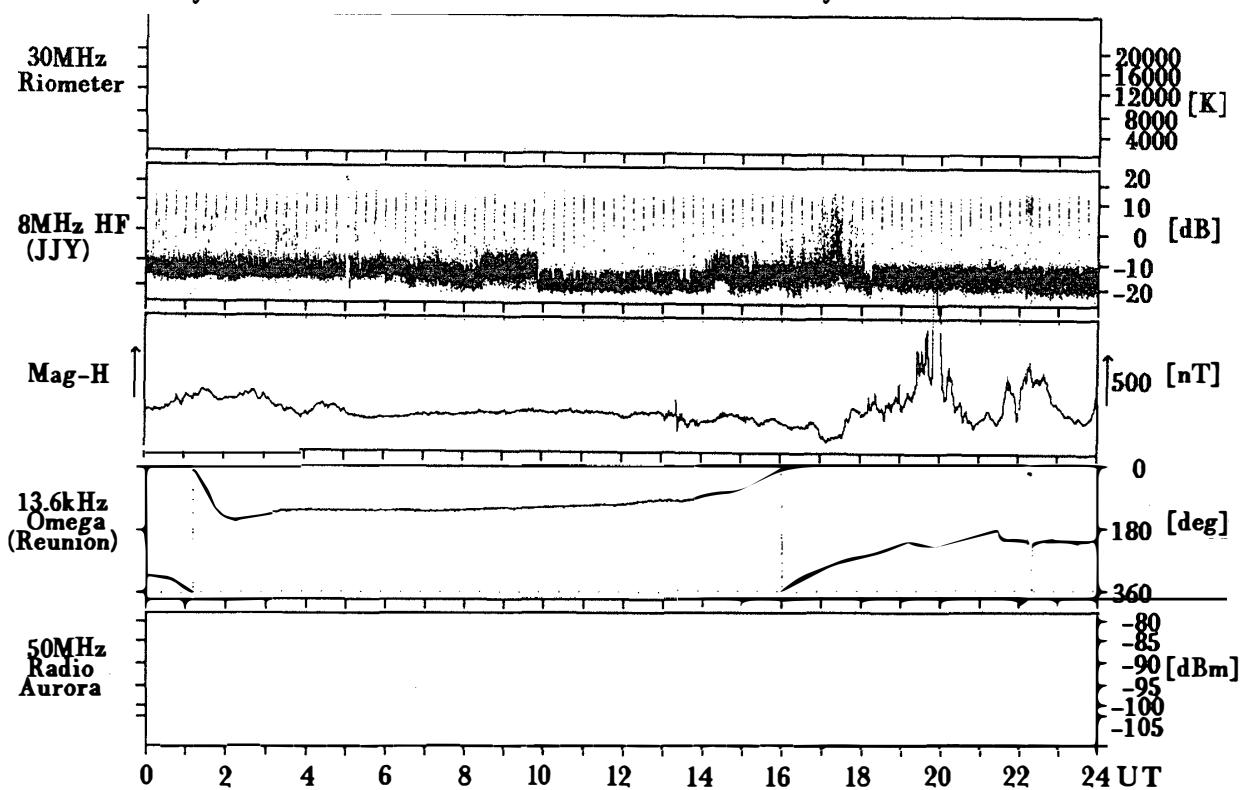
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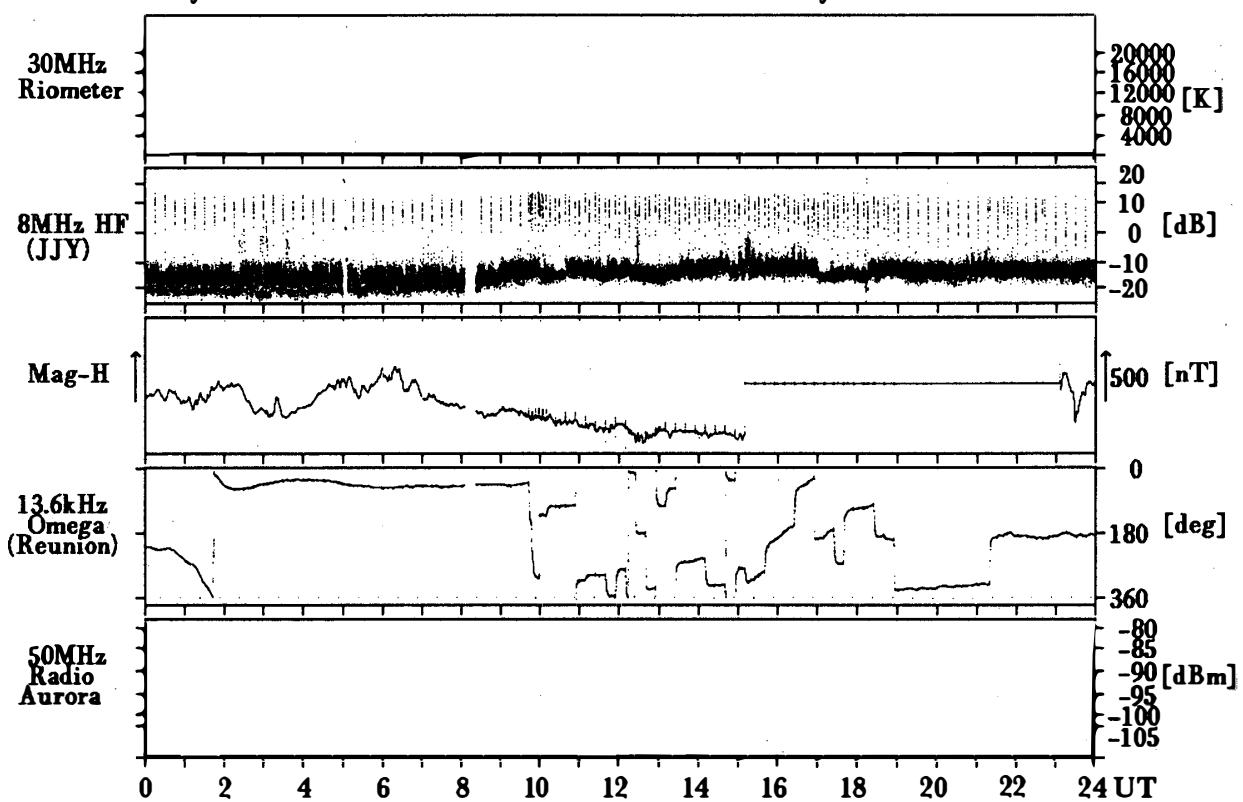
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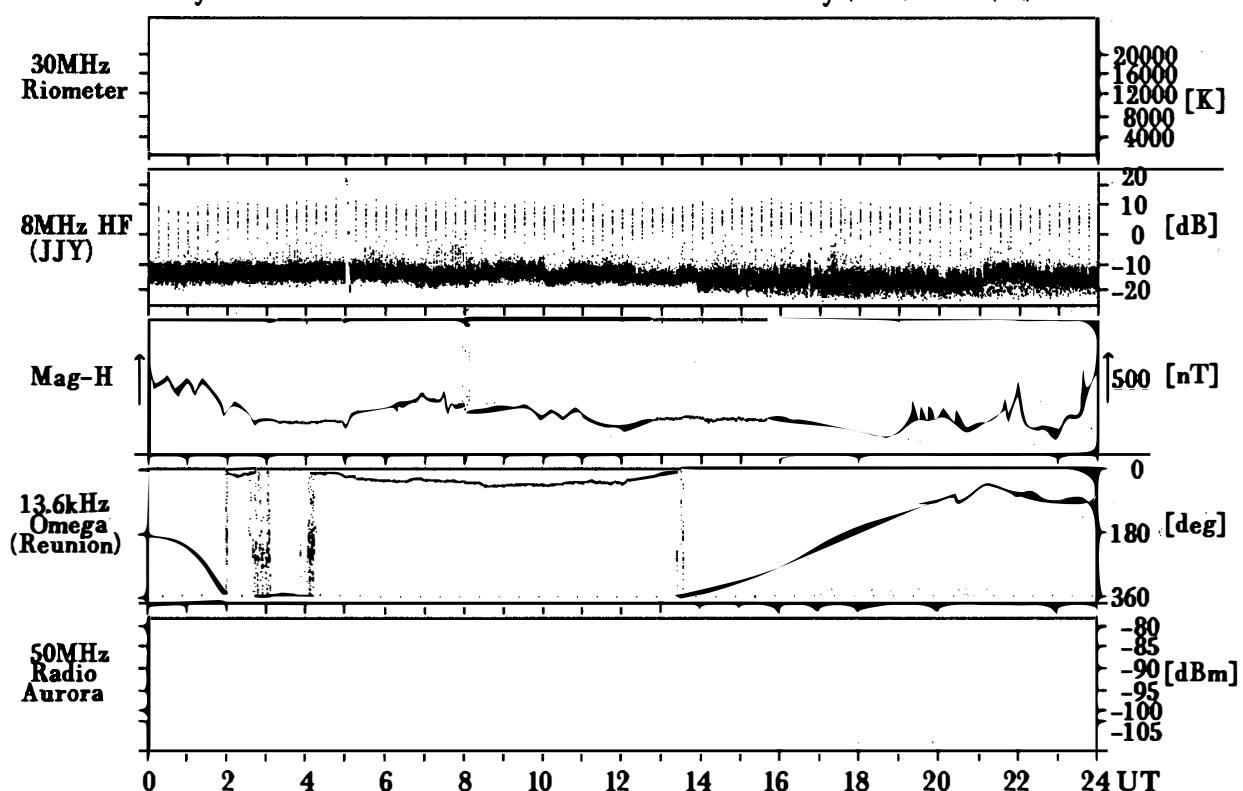
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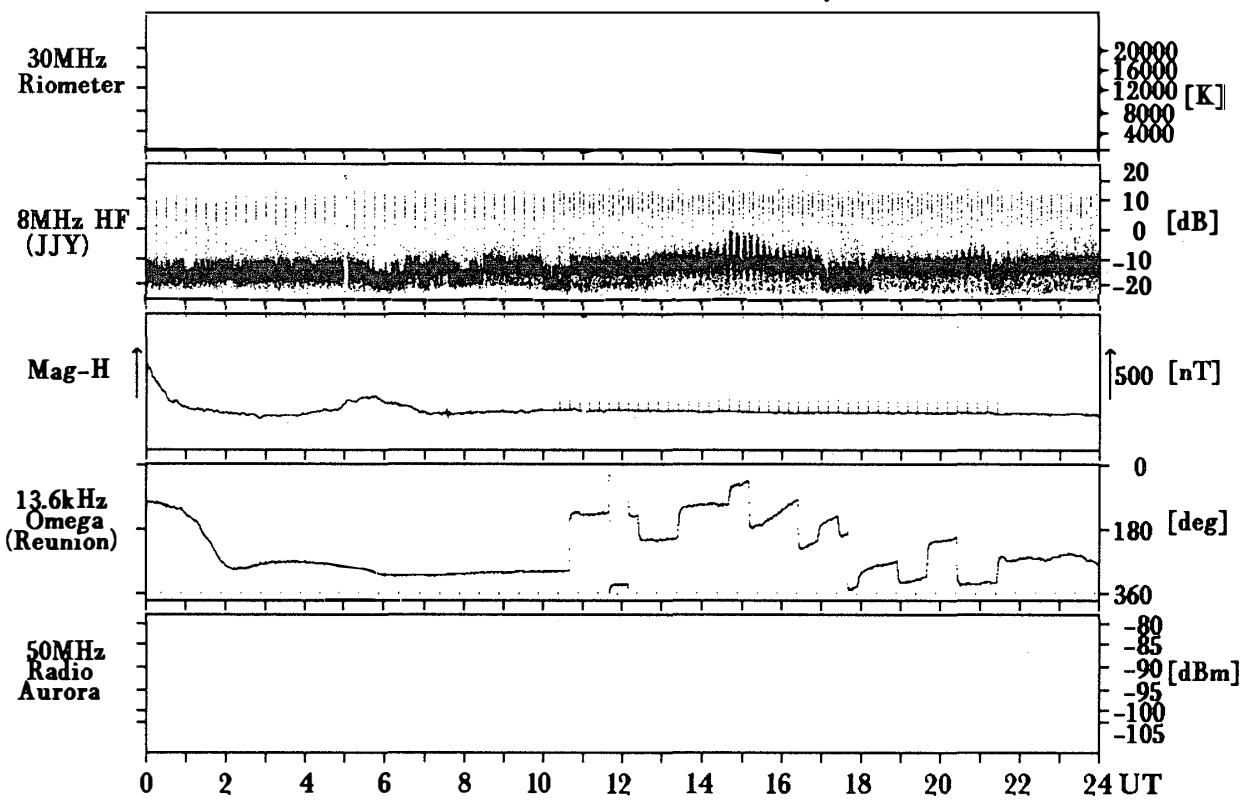
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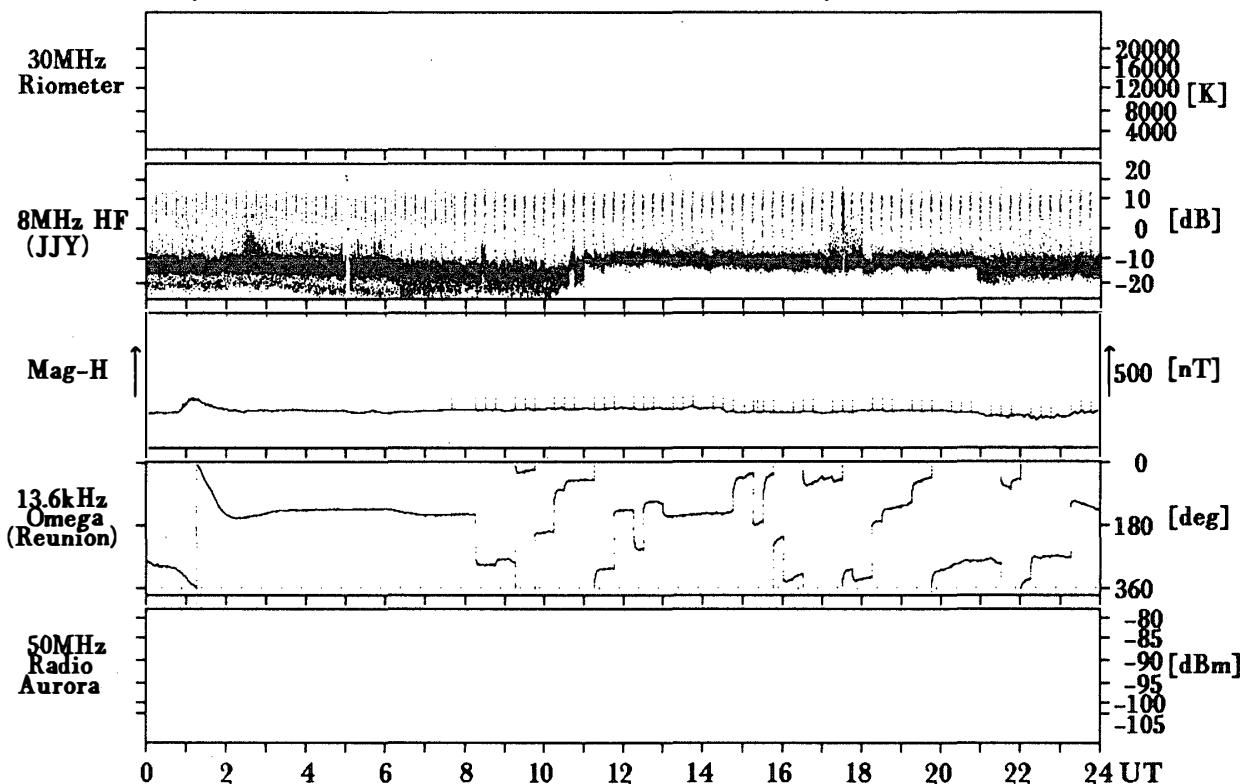
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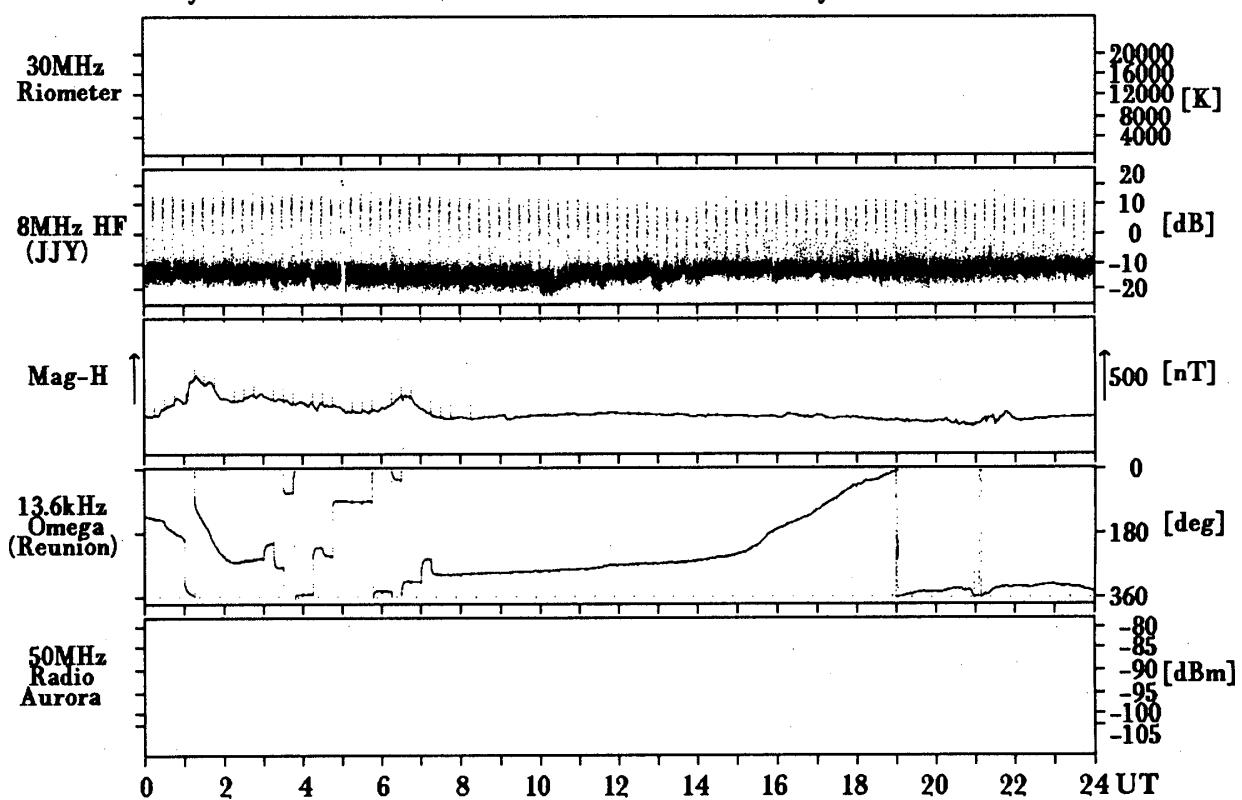
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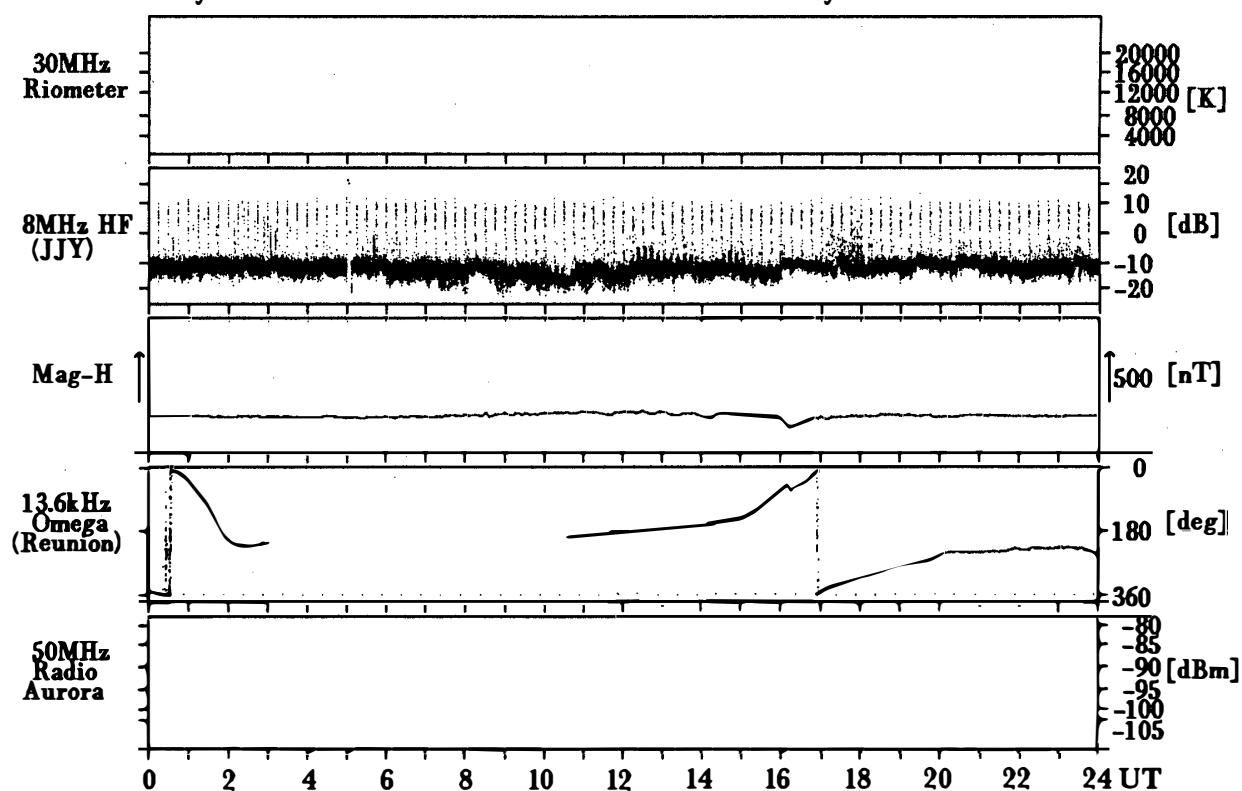
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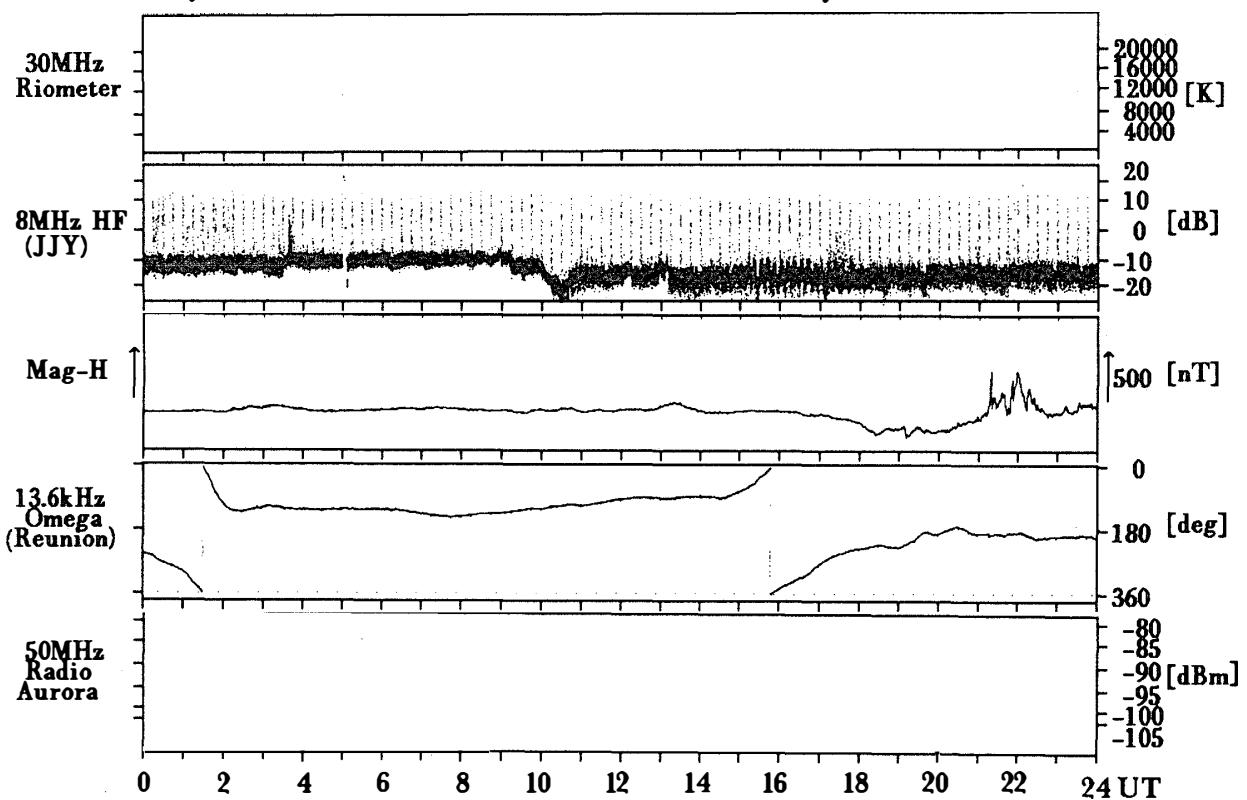
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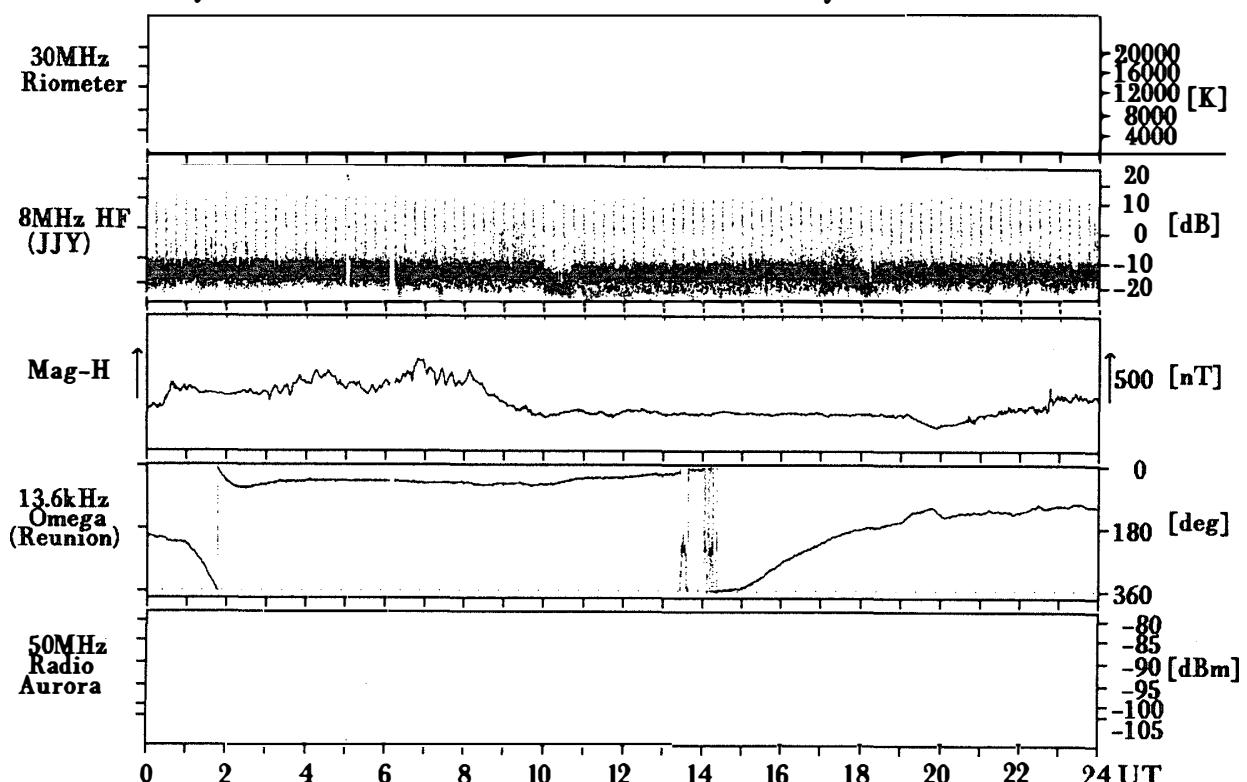
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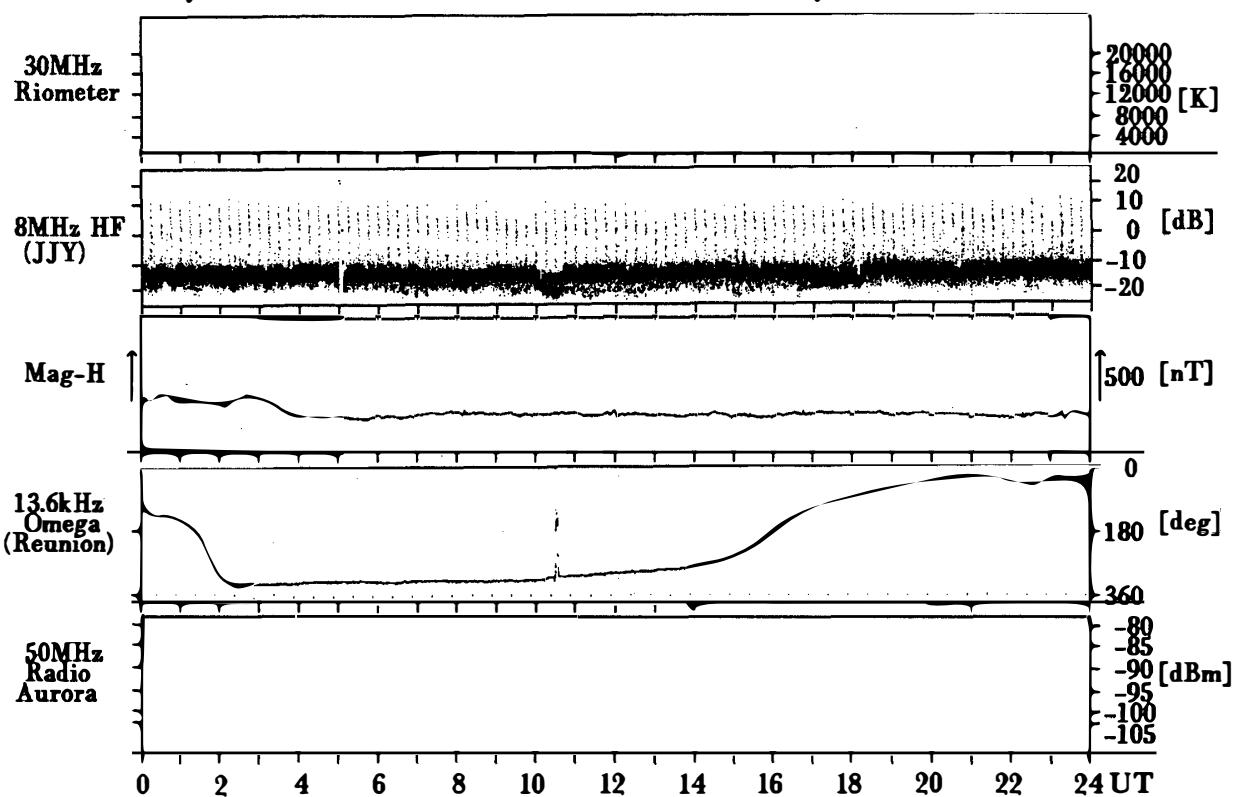
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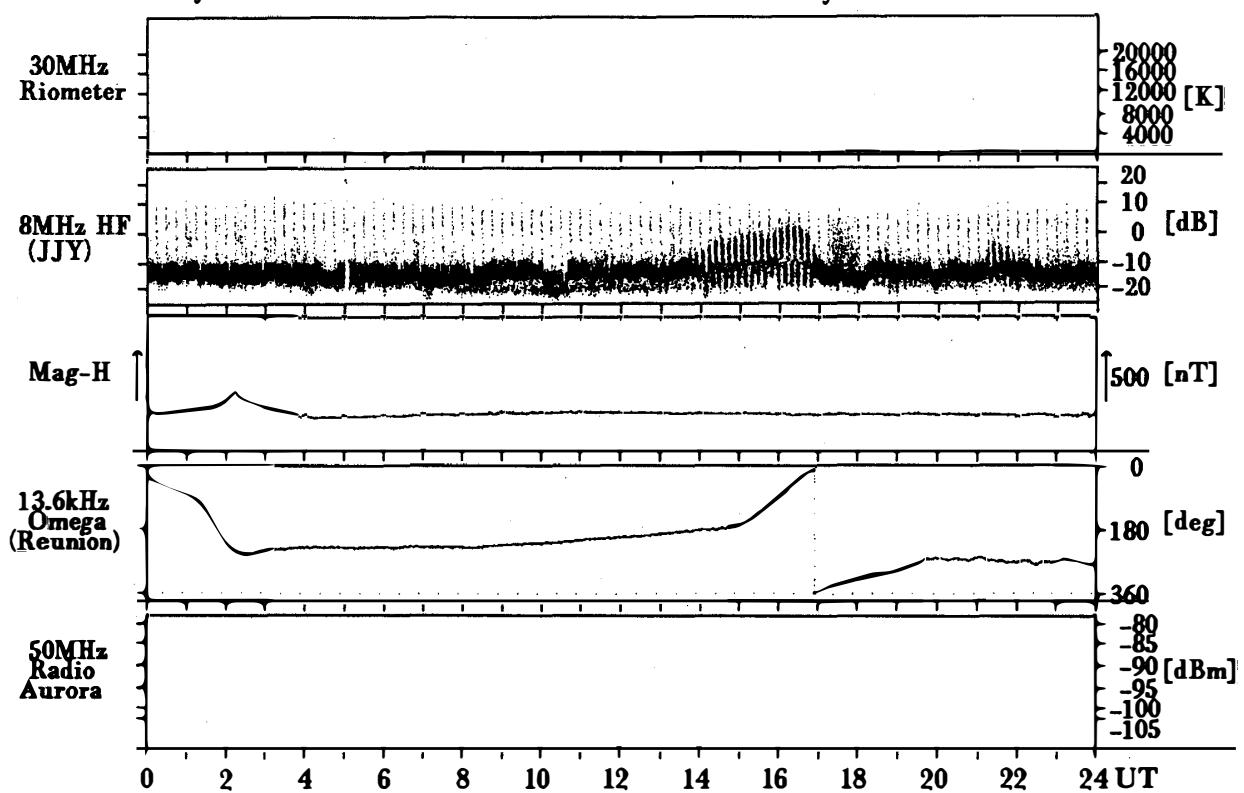
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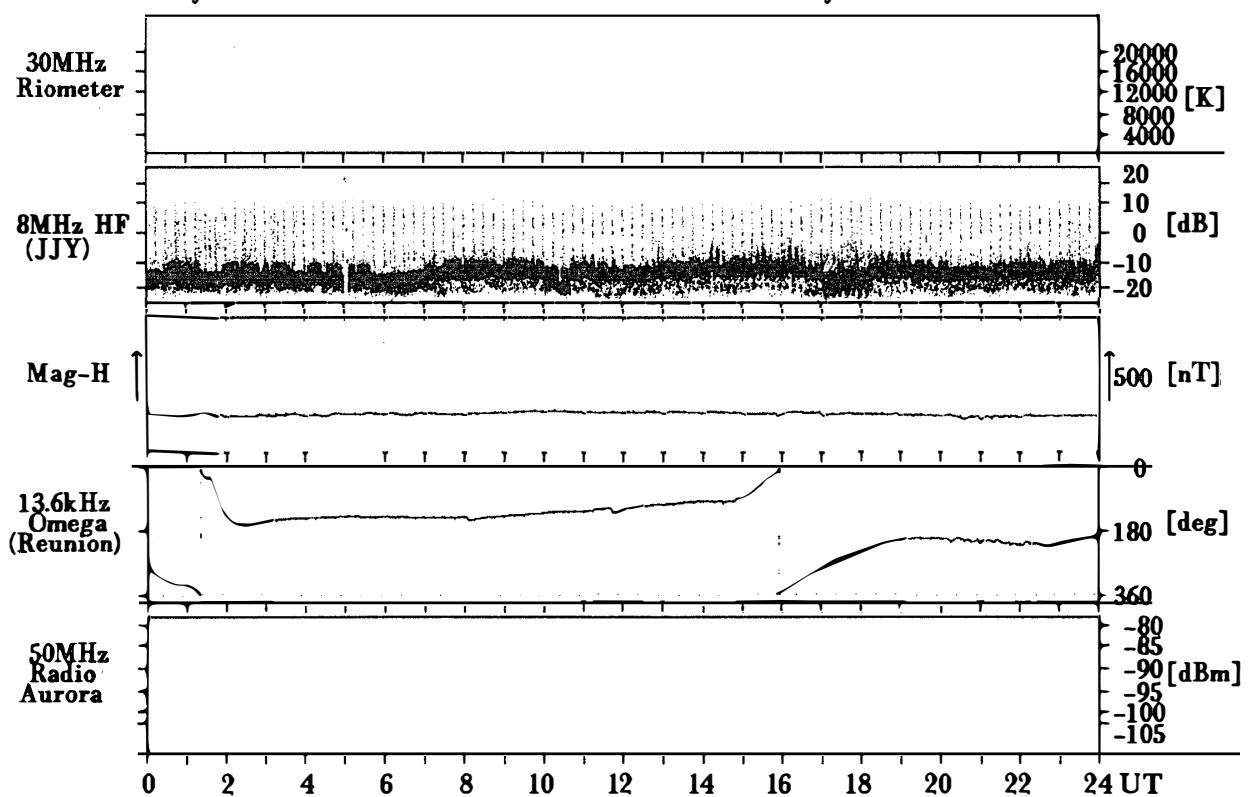
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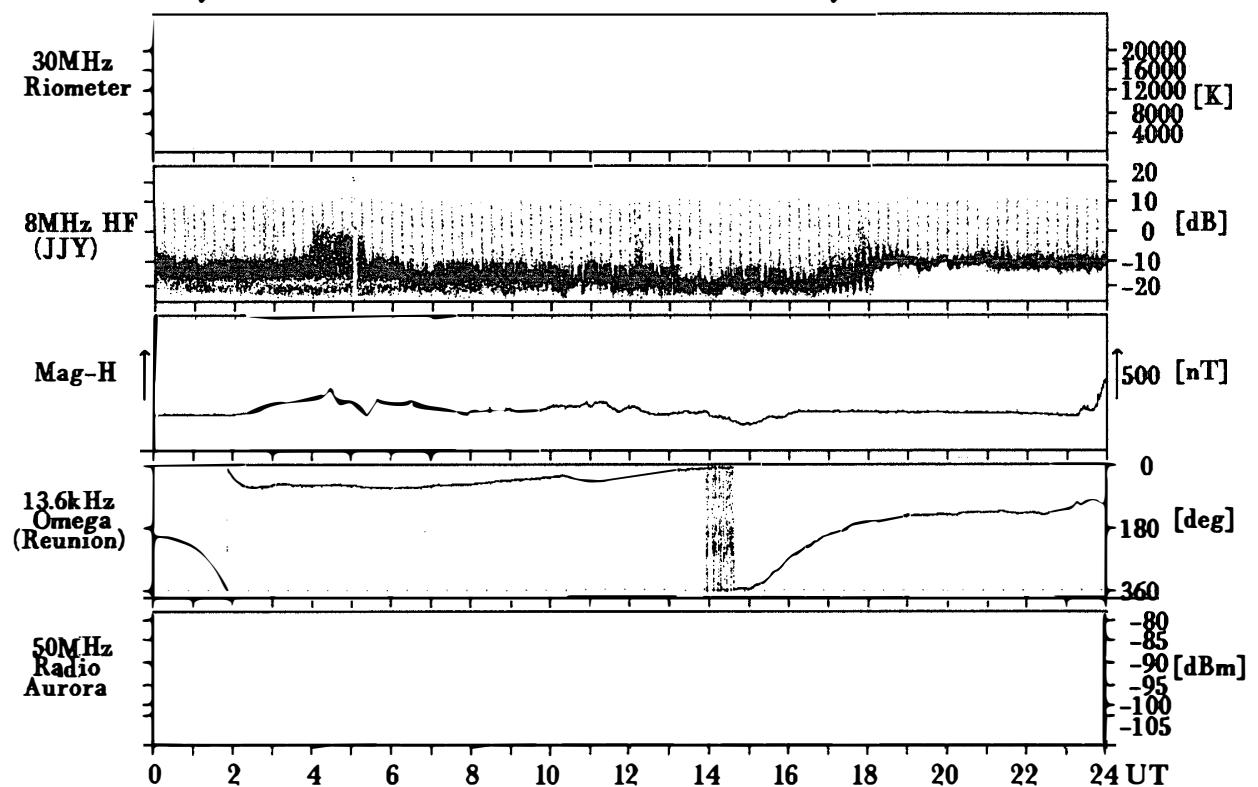
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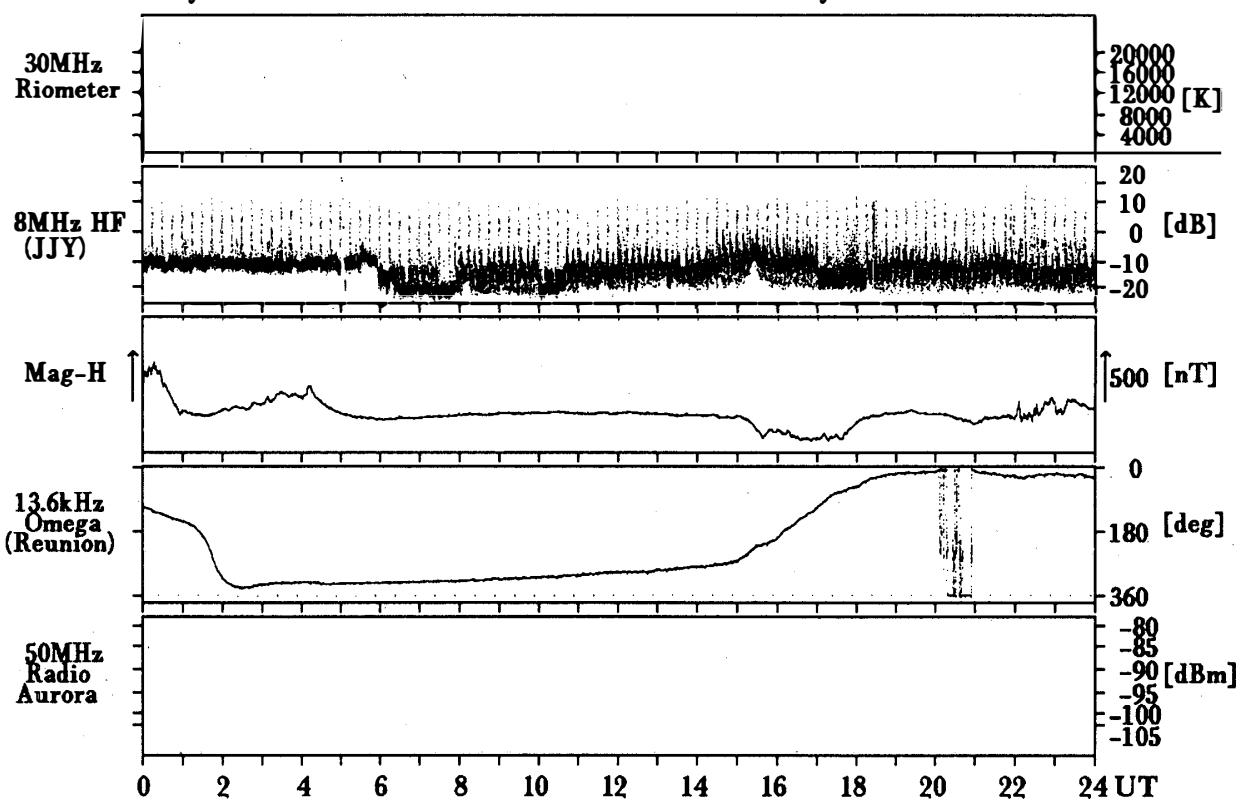
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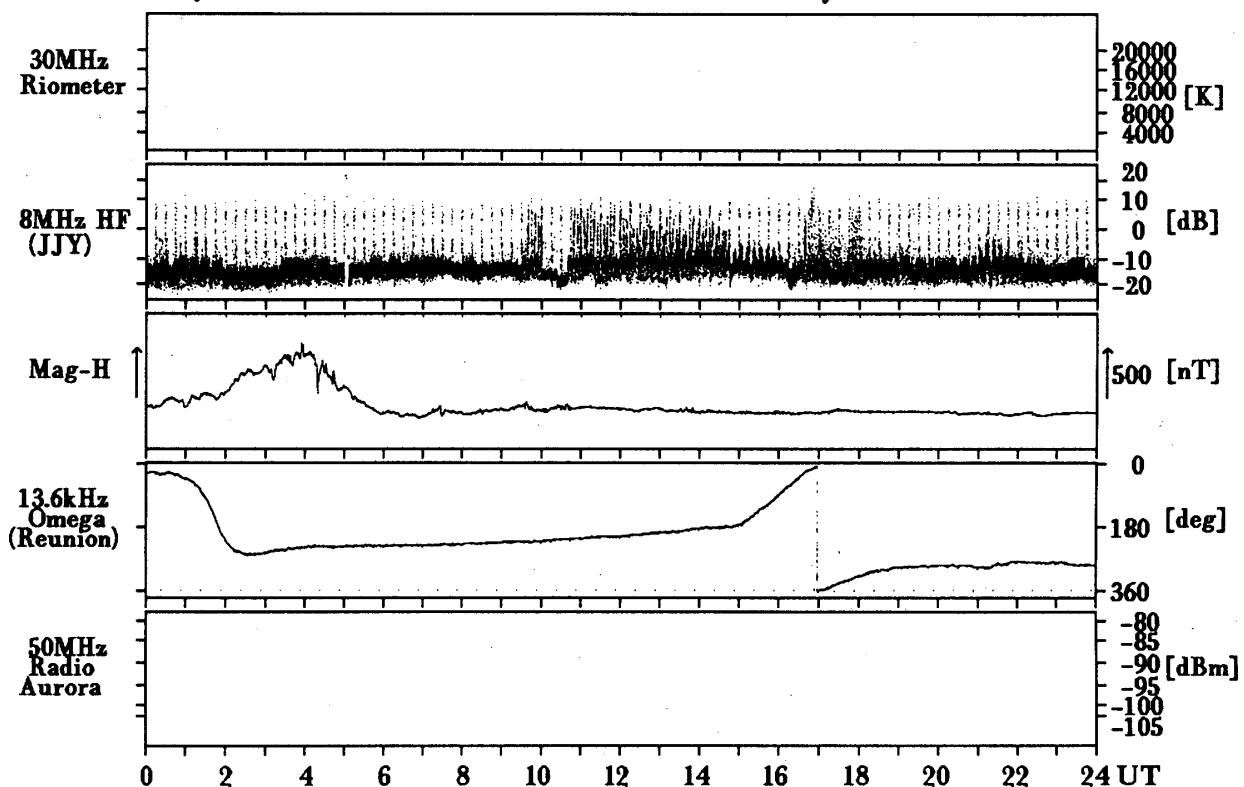
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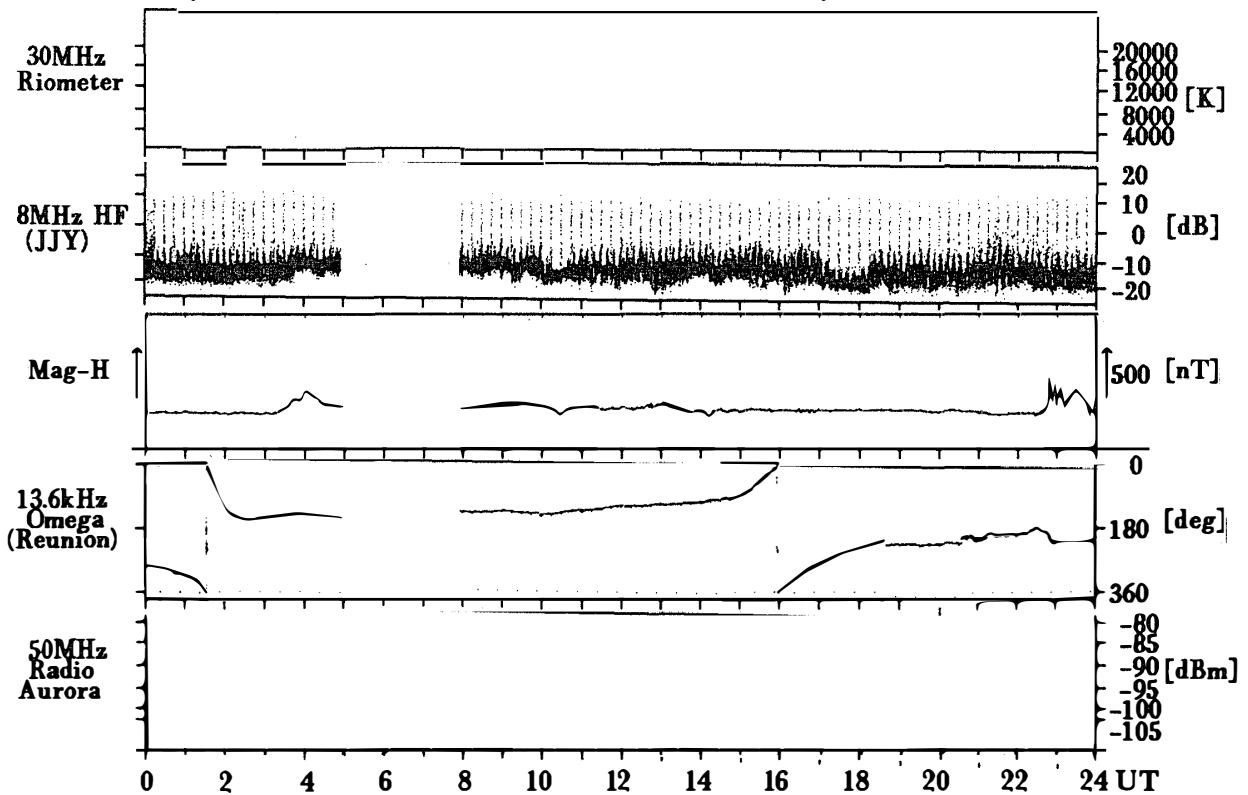
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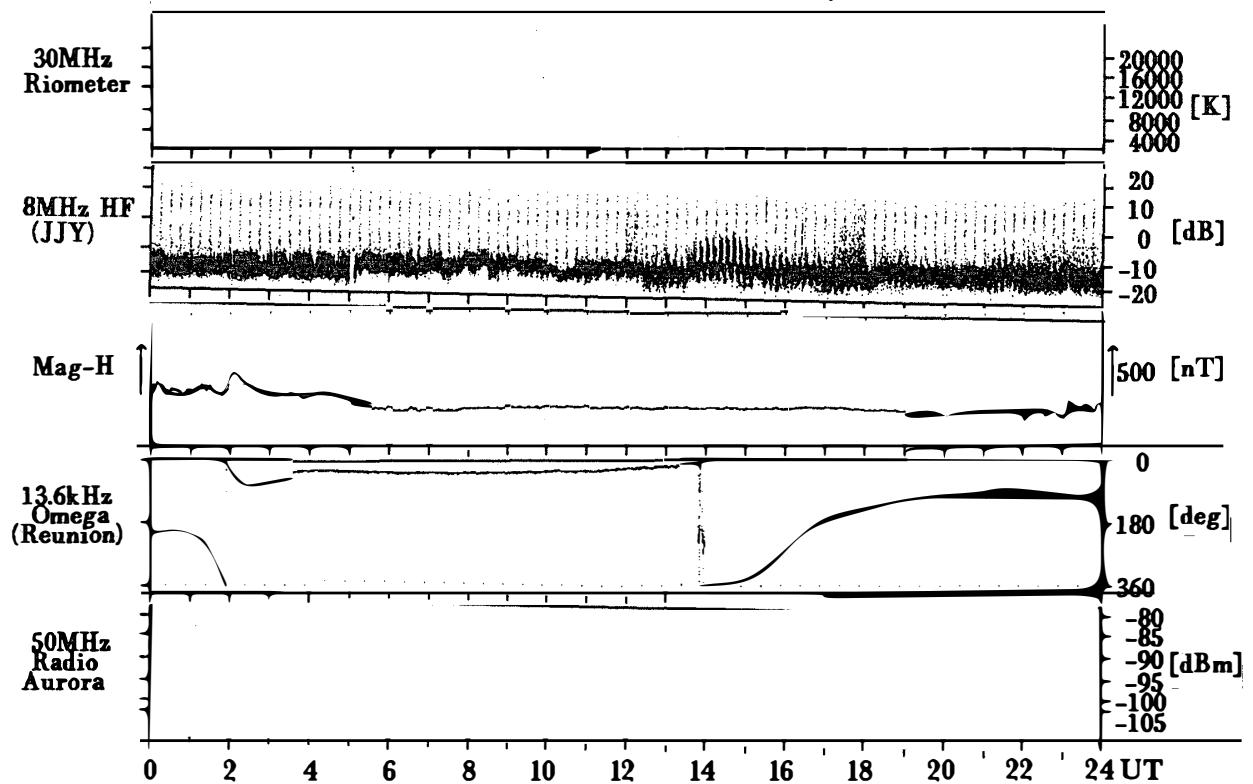
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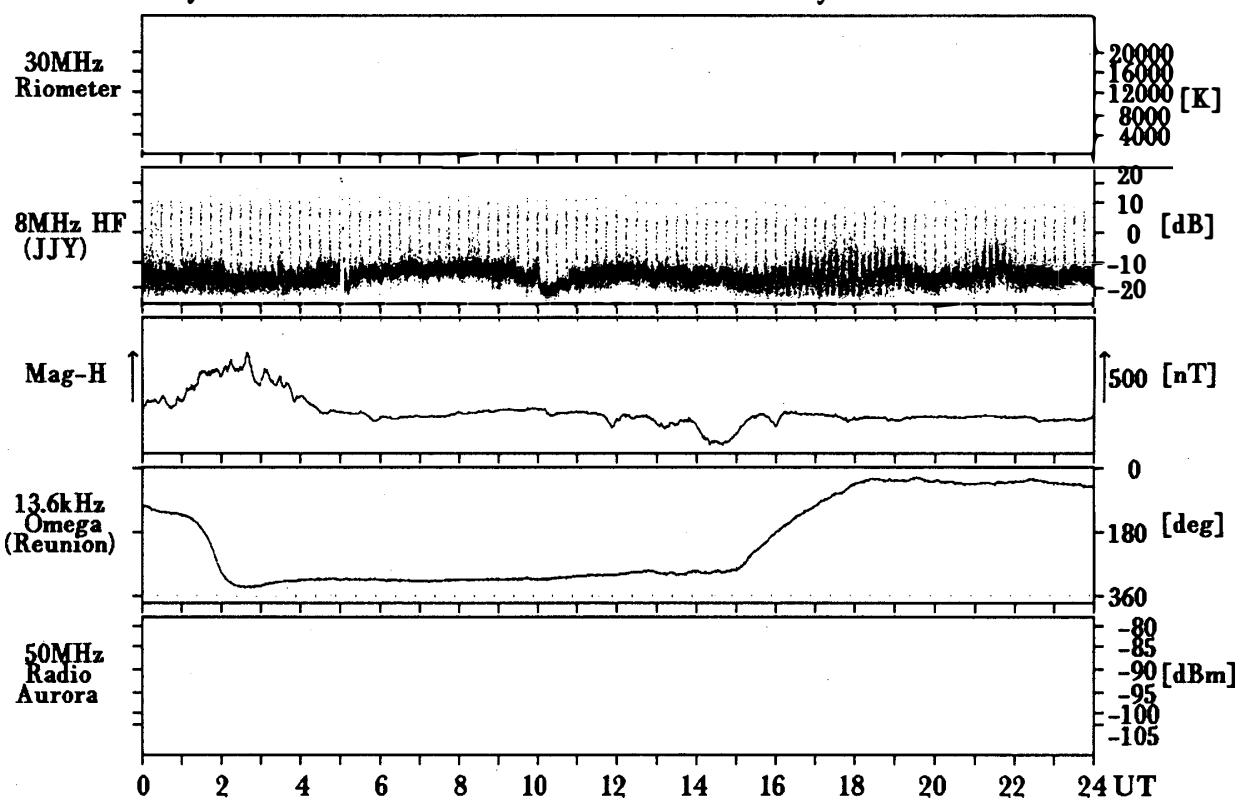
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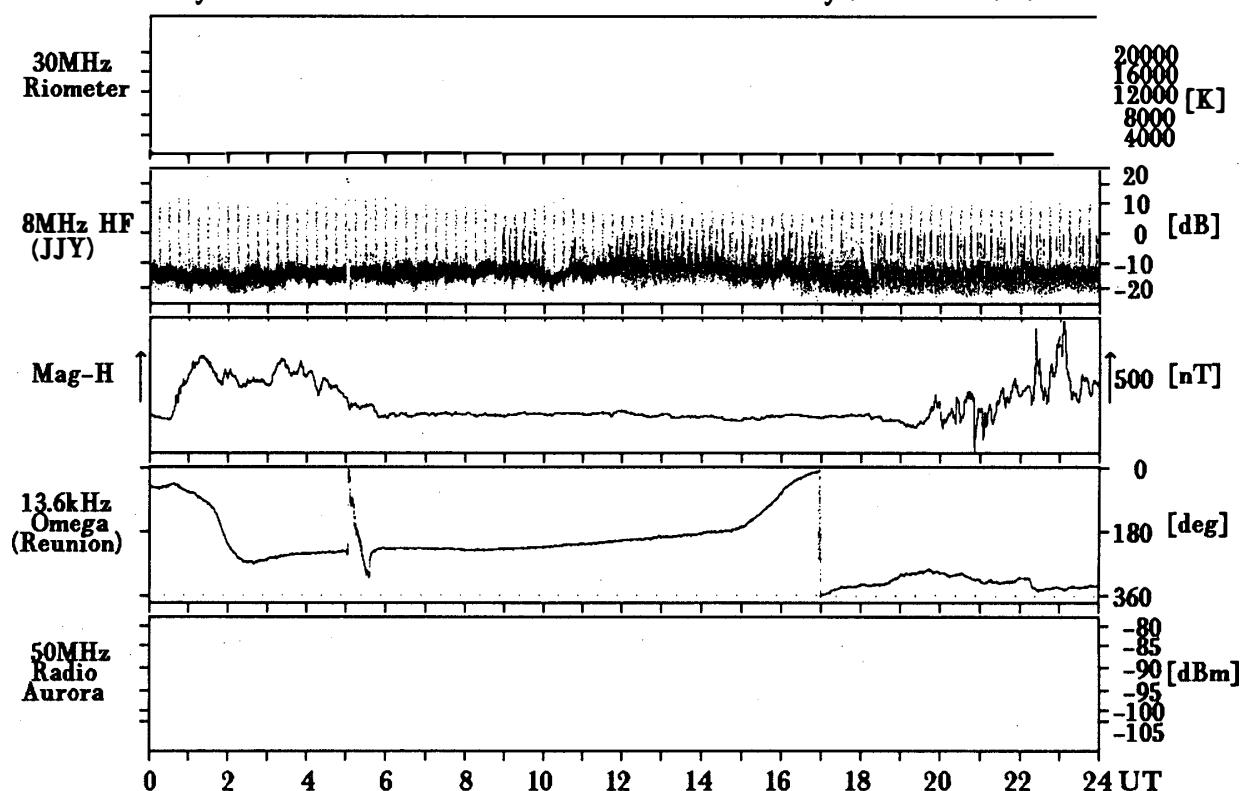
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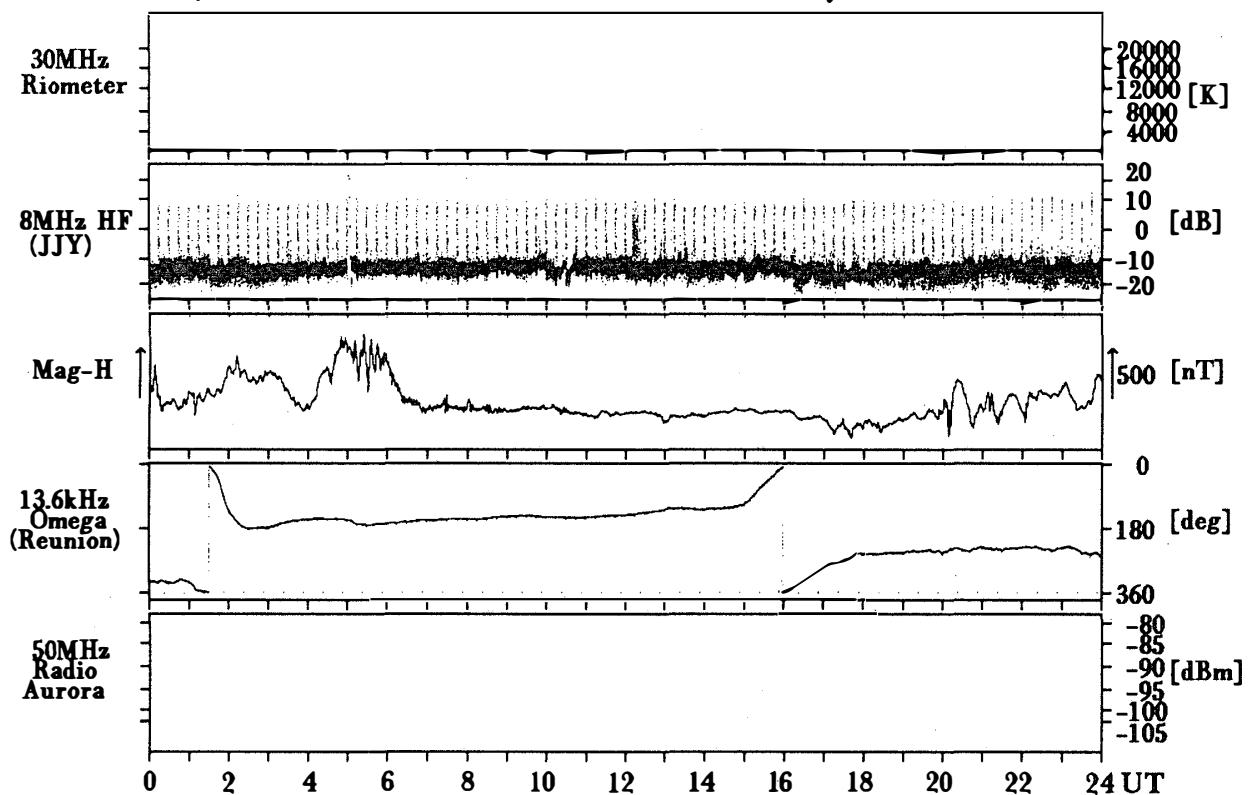
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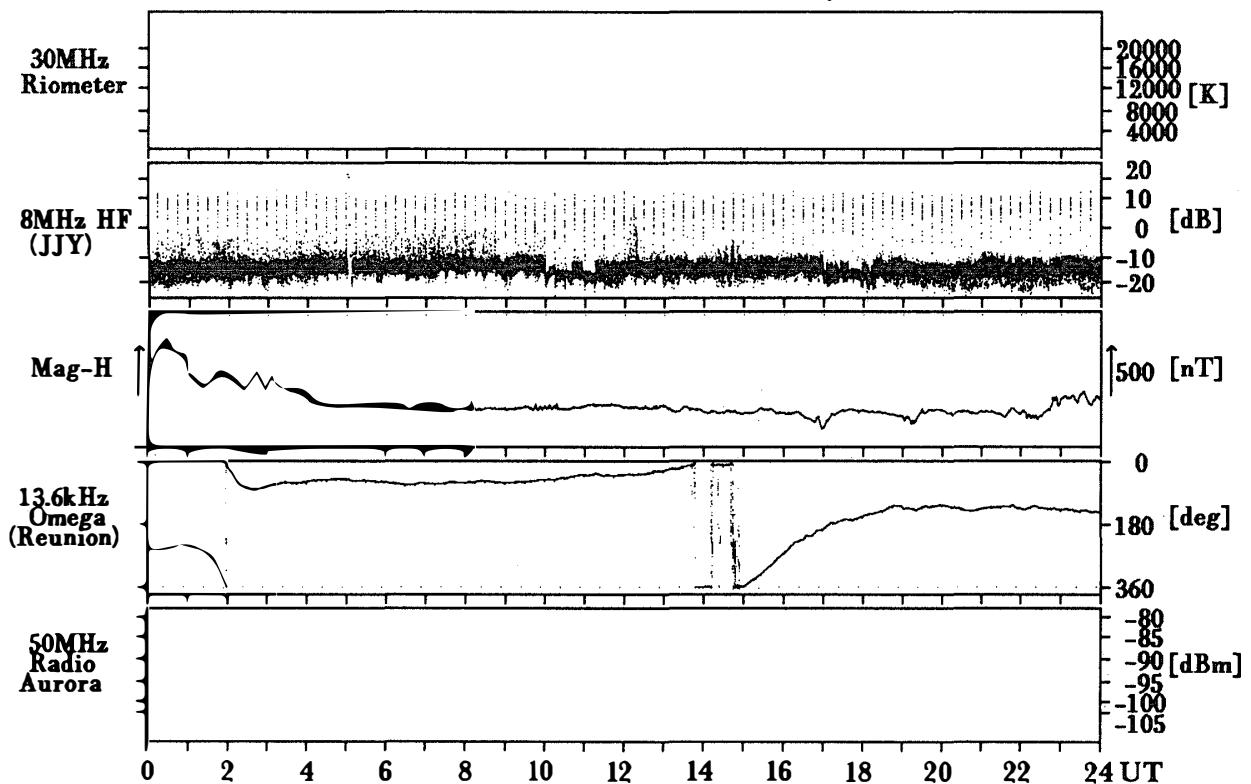
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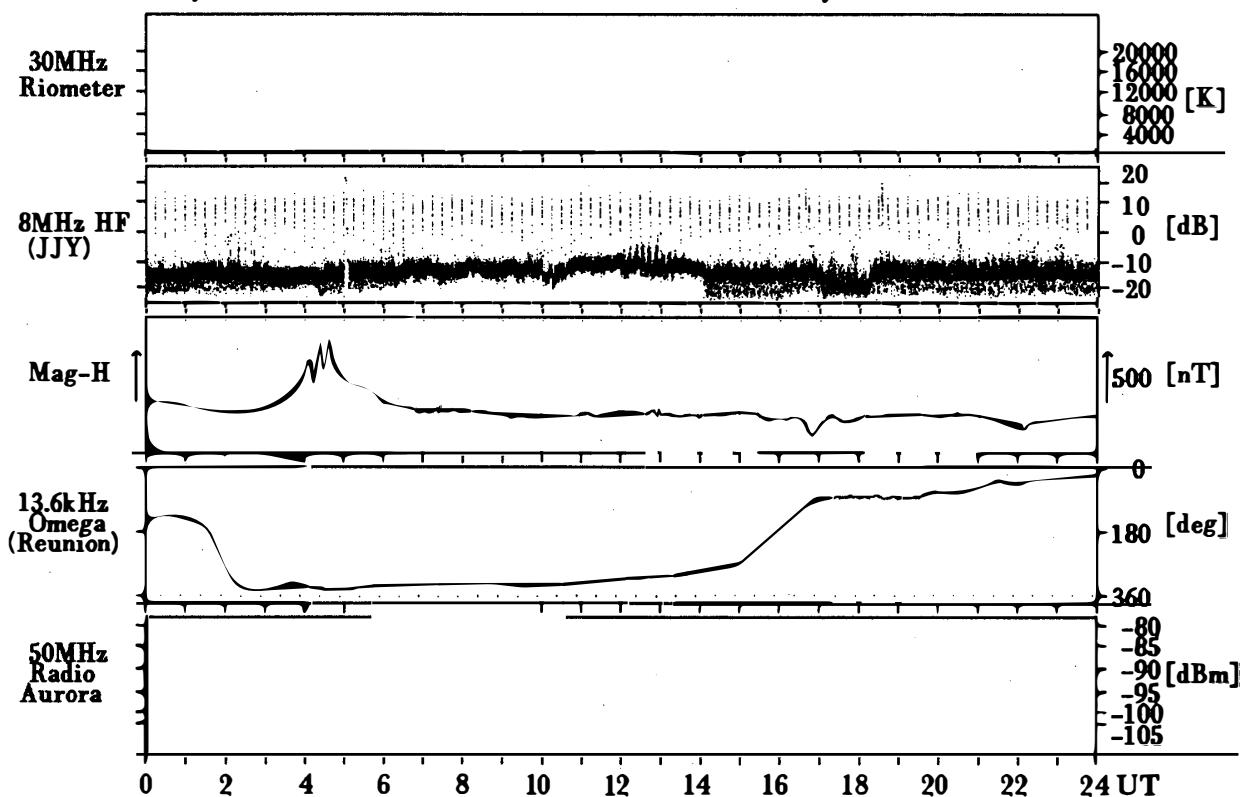
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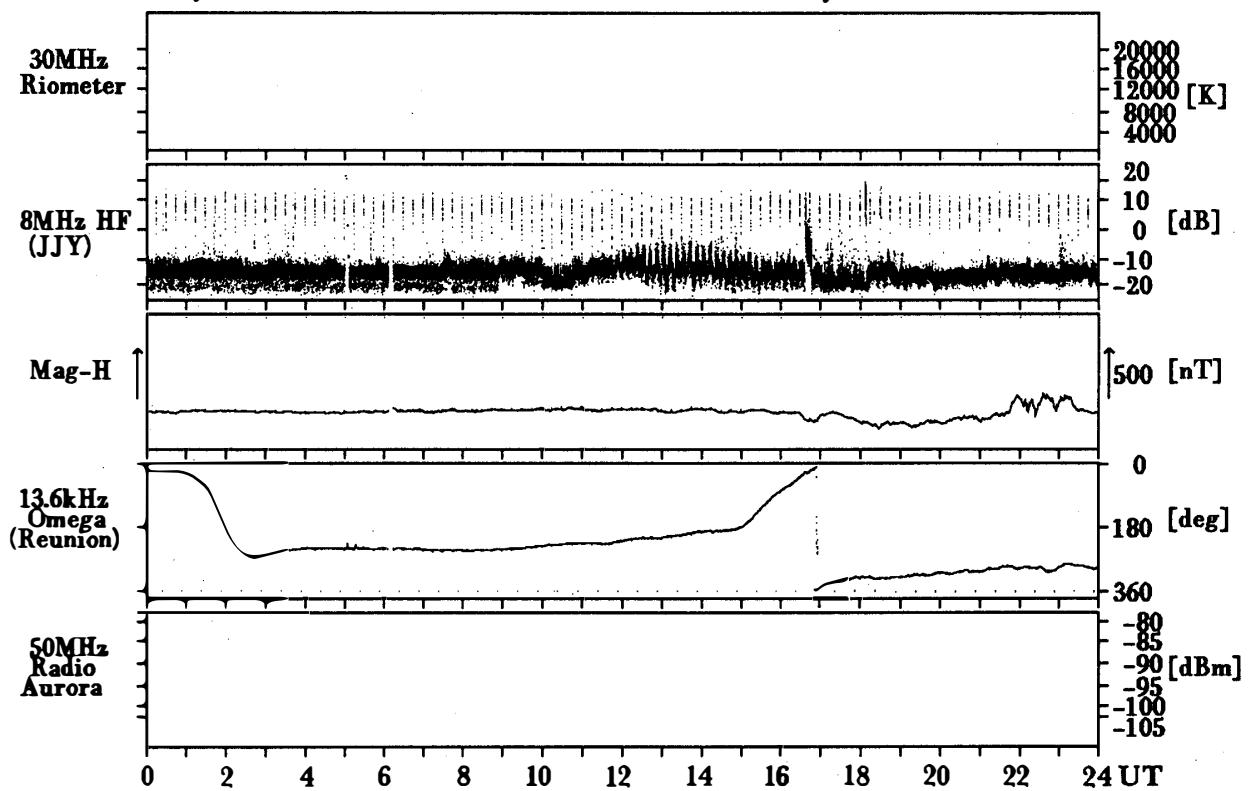
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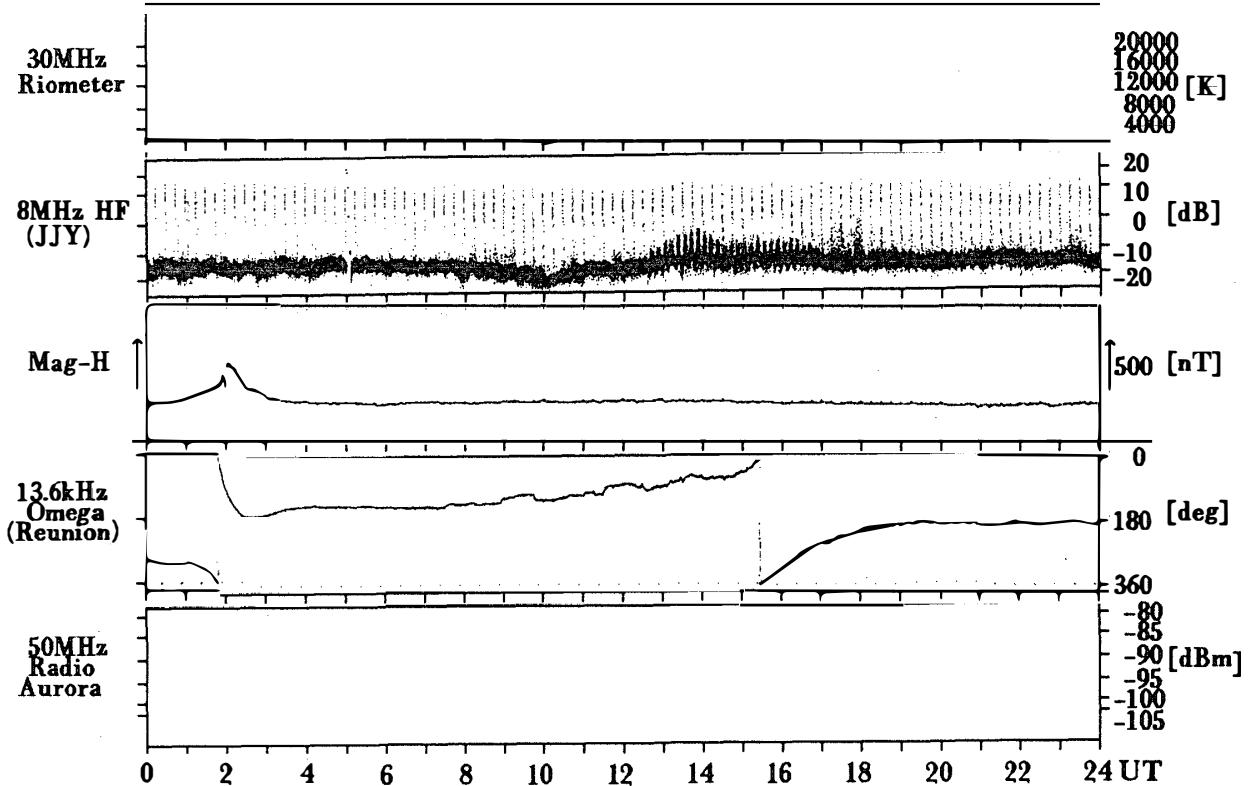
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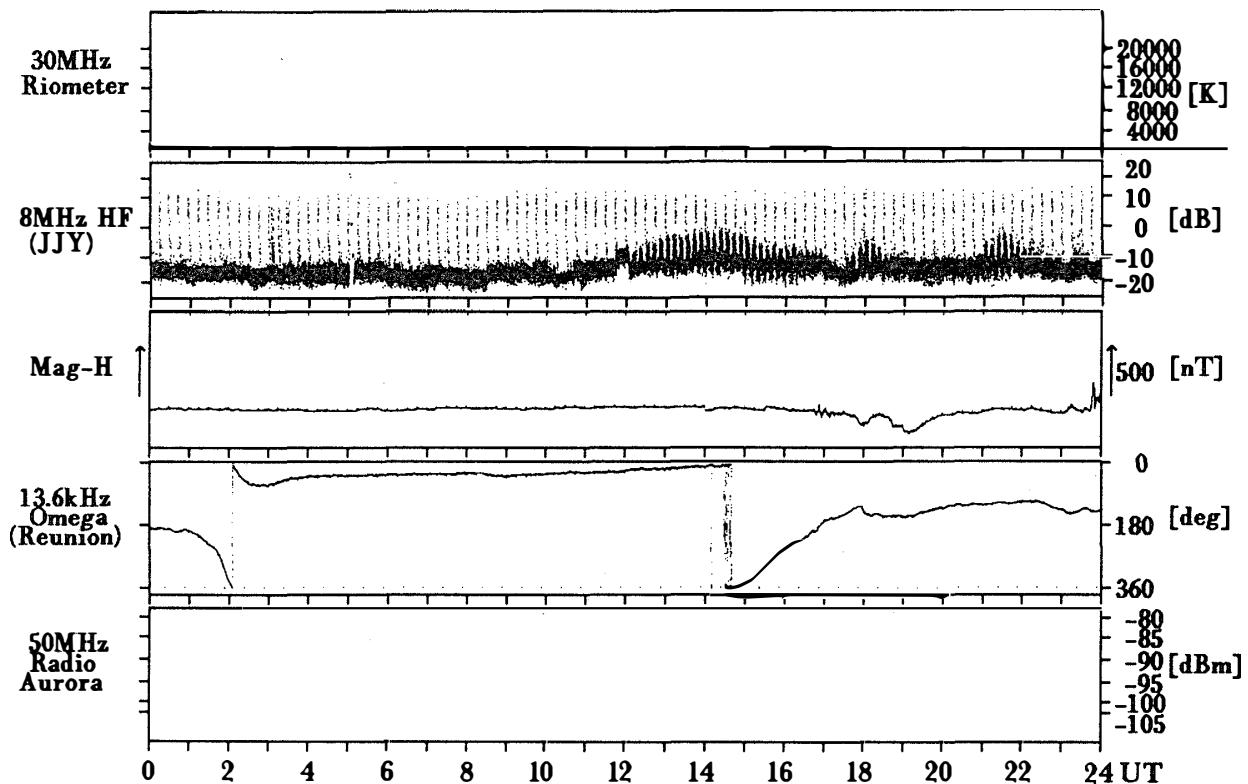
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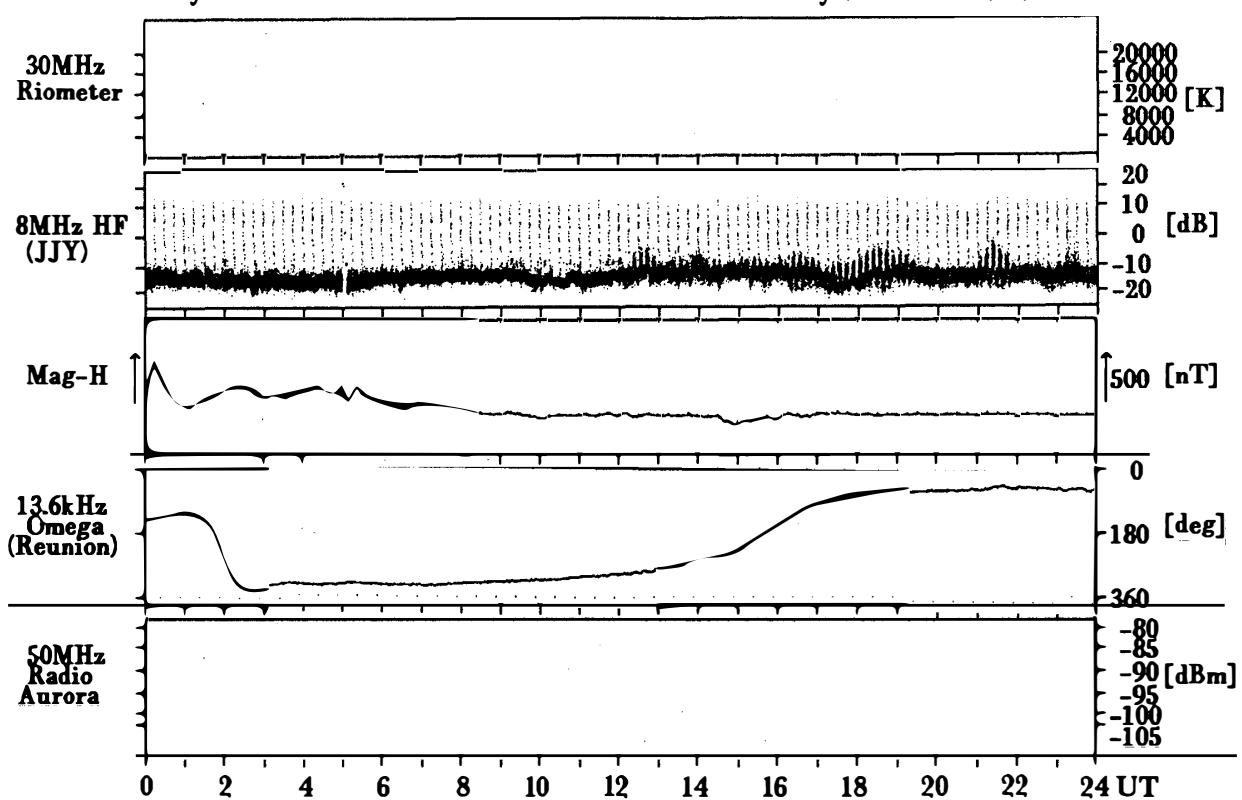
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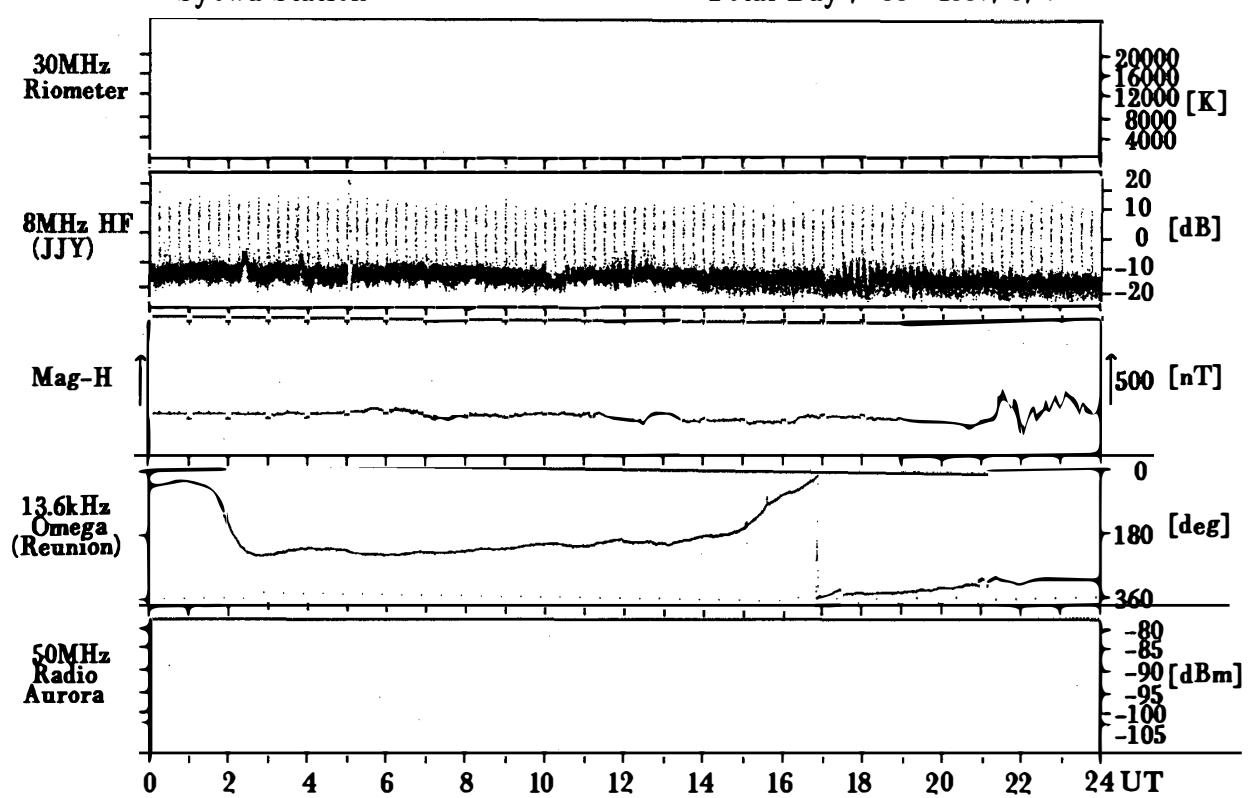
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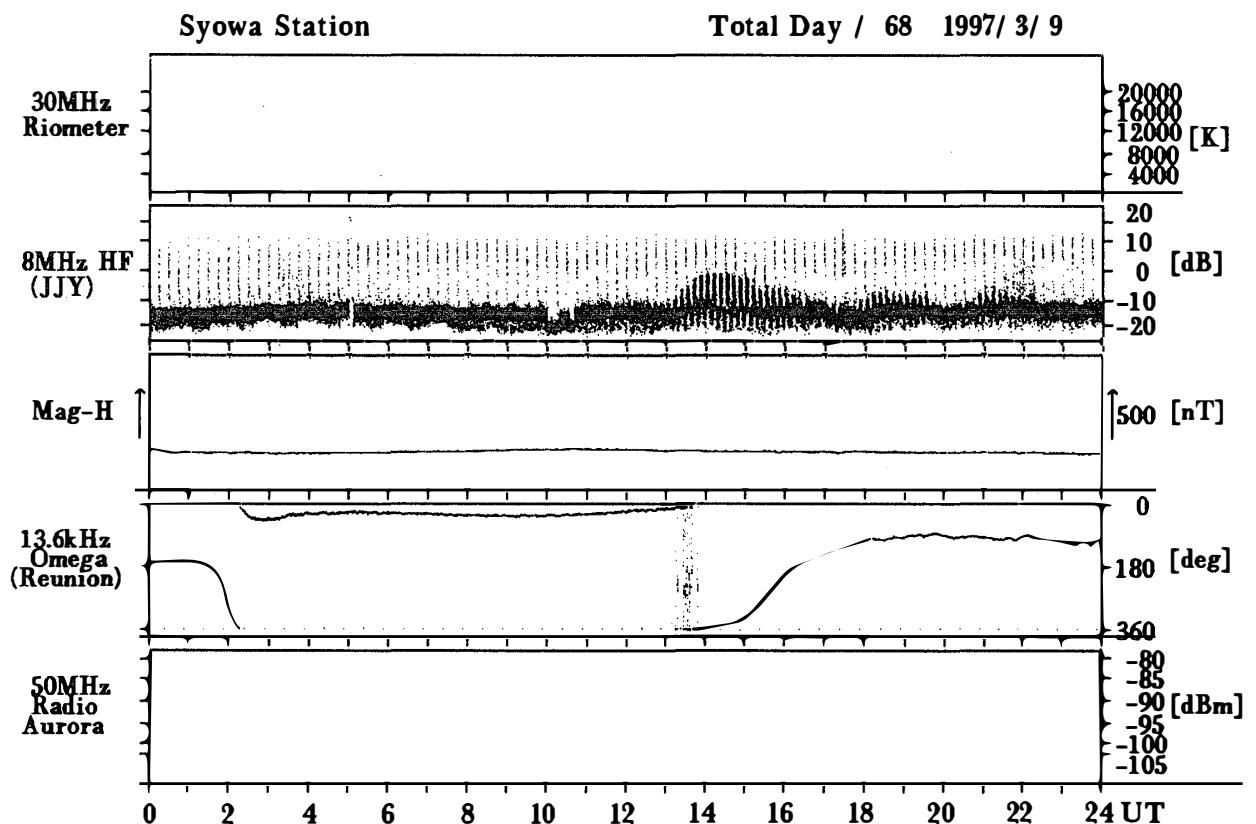
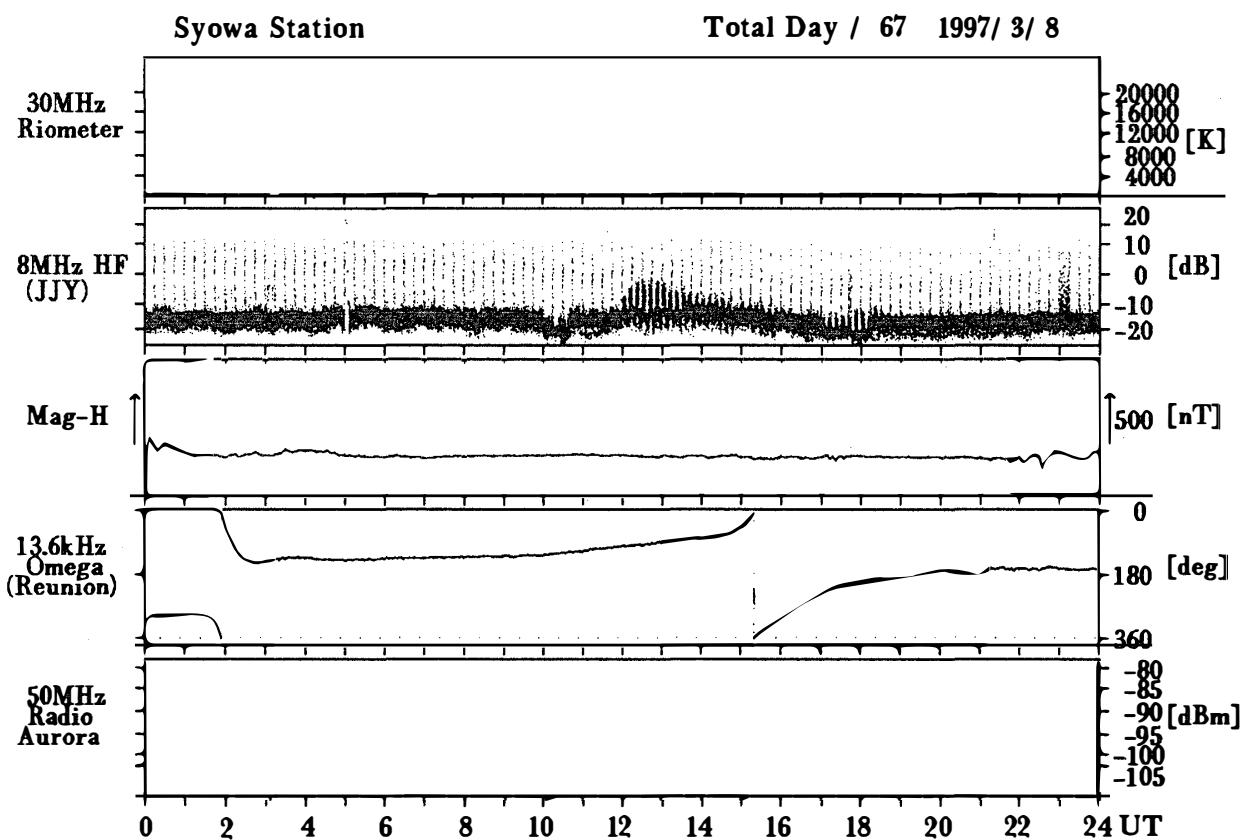
Total Day / 65 1997/ 3/ 6



Syowa Station

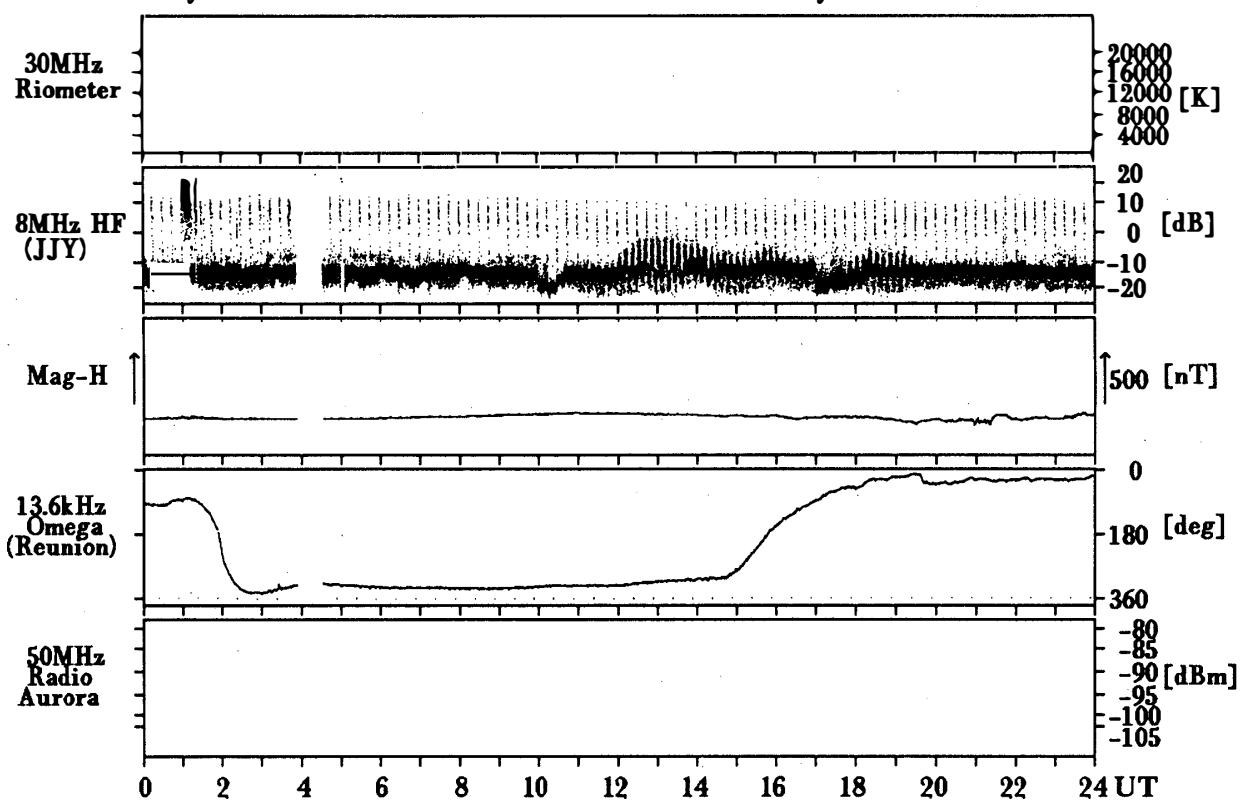
Total Day / 66 1997/ 3/ 7





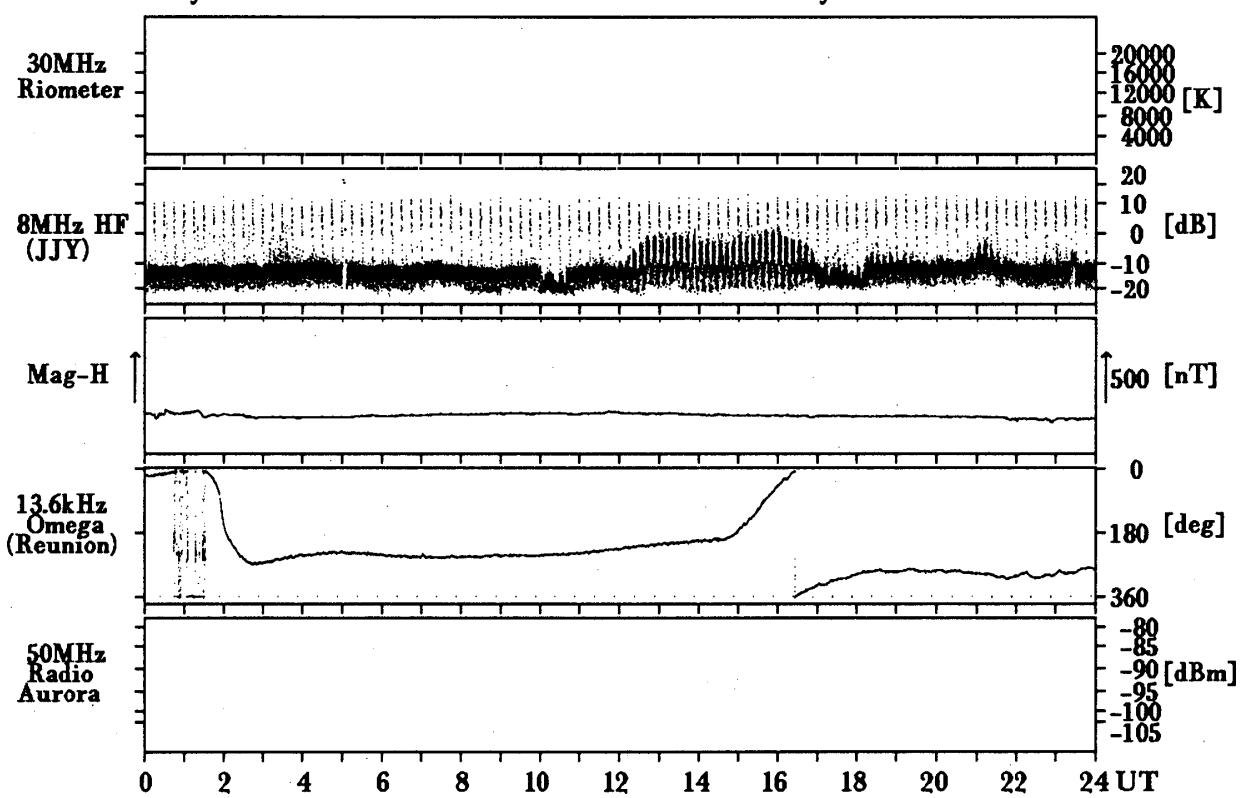
Syowa Station

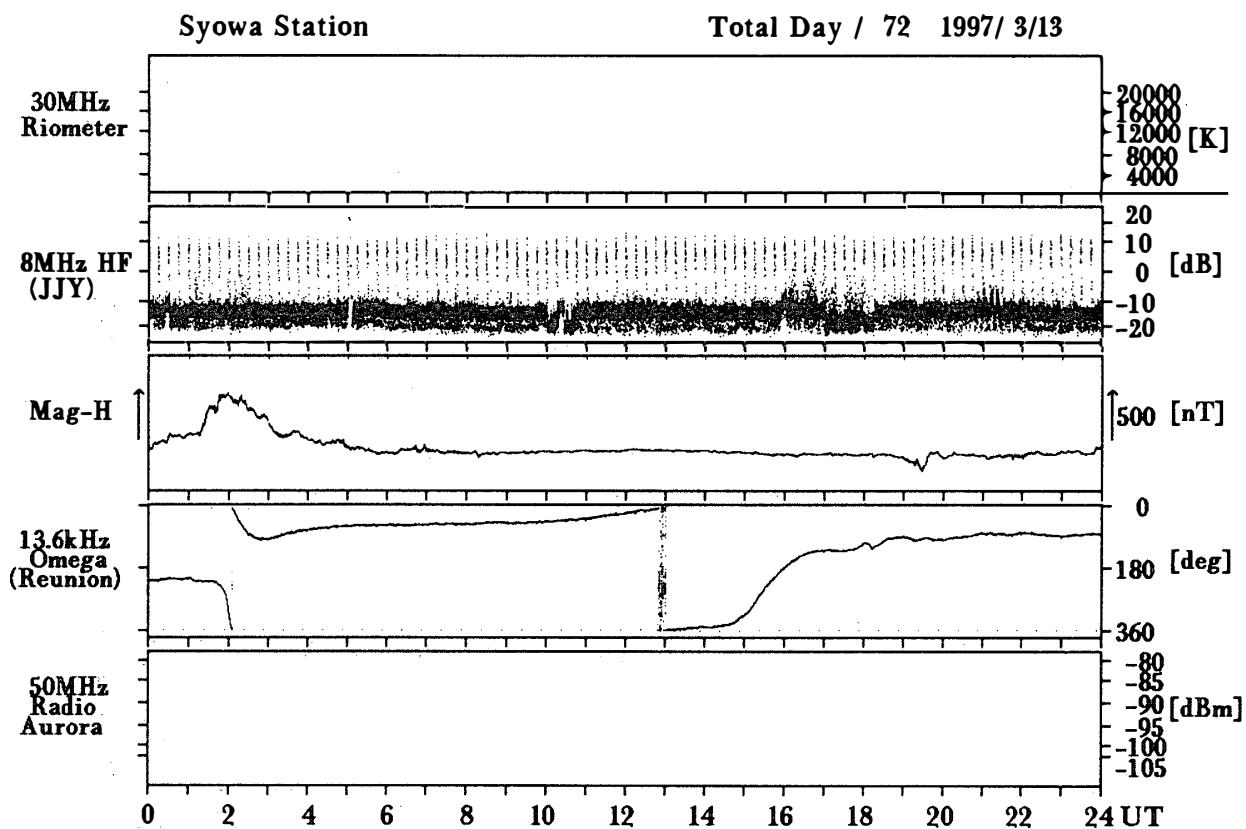
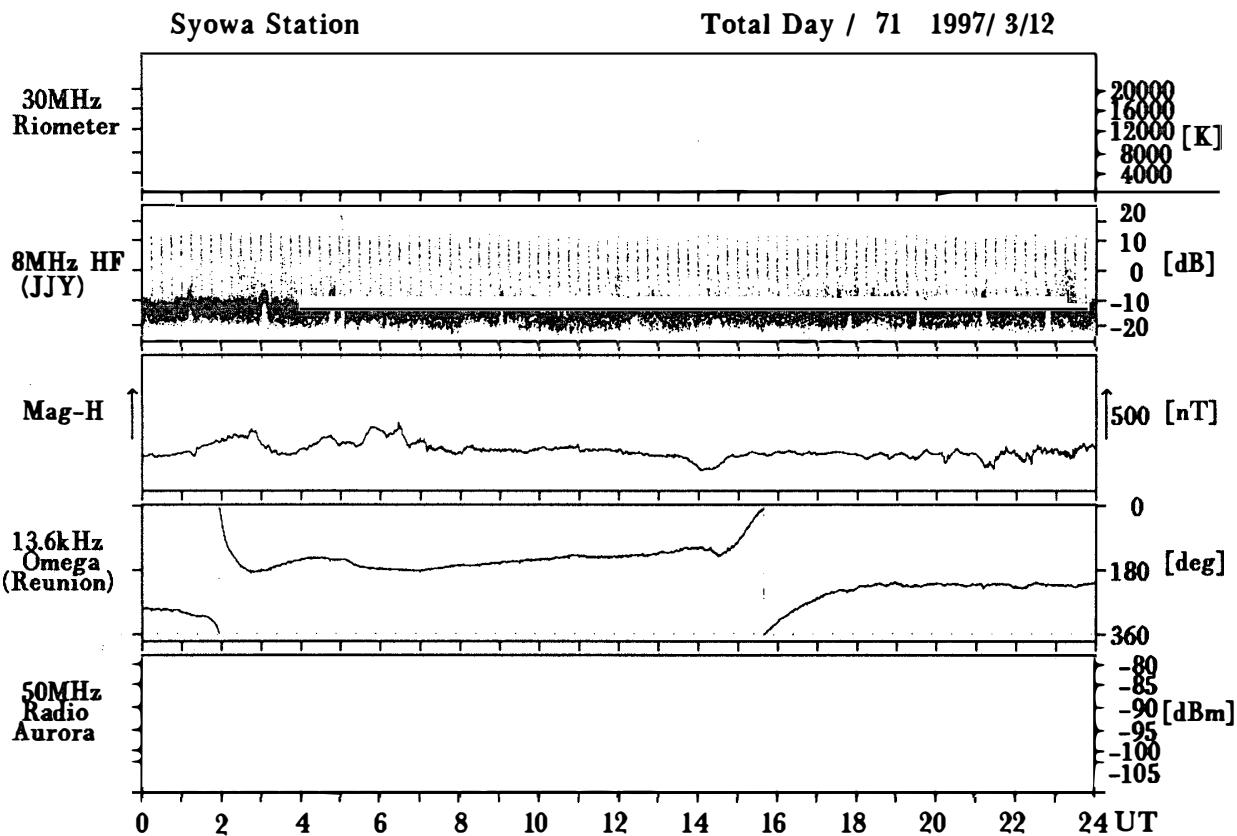
Total Day / 69 1997/ 3/10



Syowa Station

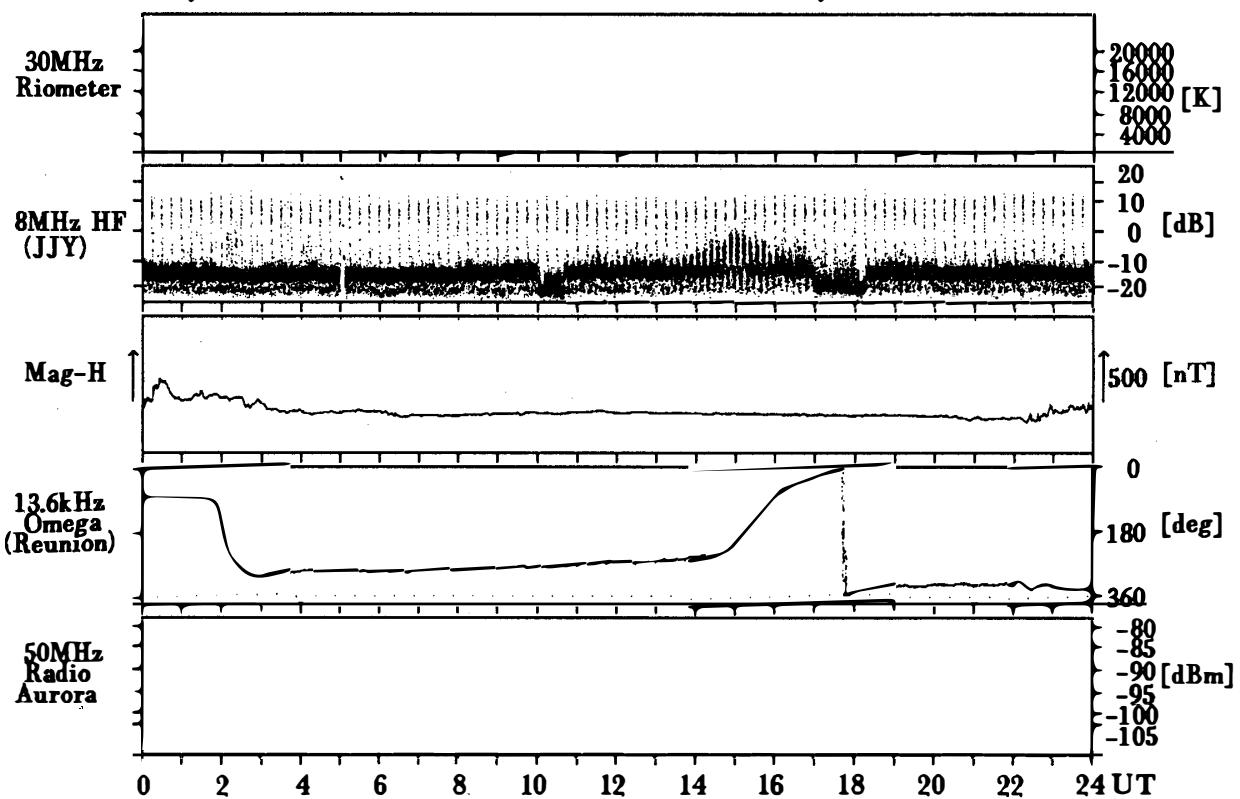
Total Day / 70 1997/ 3/11





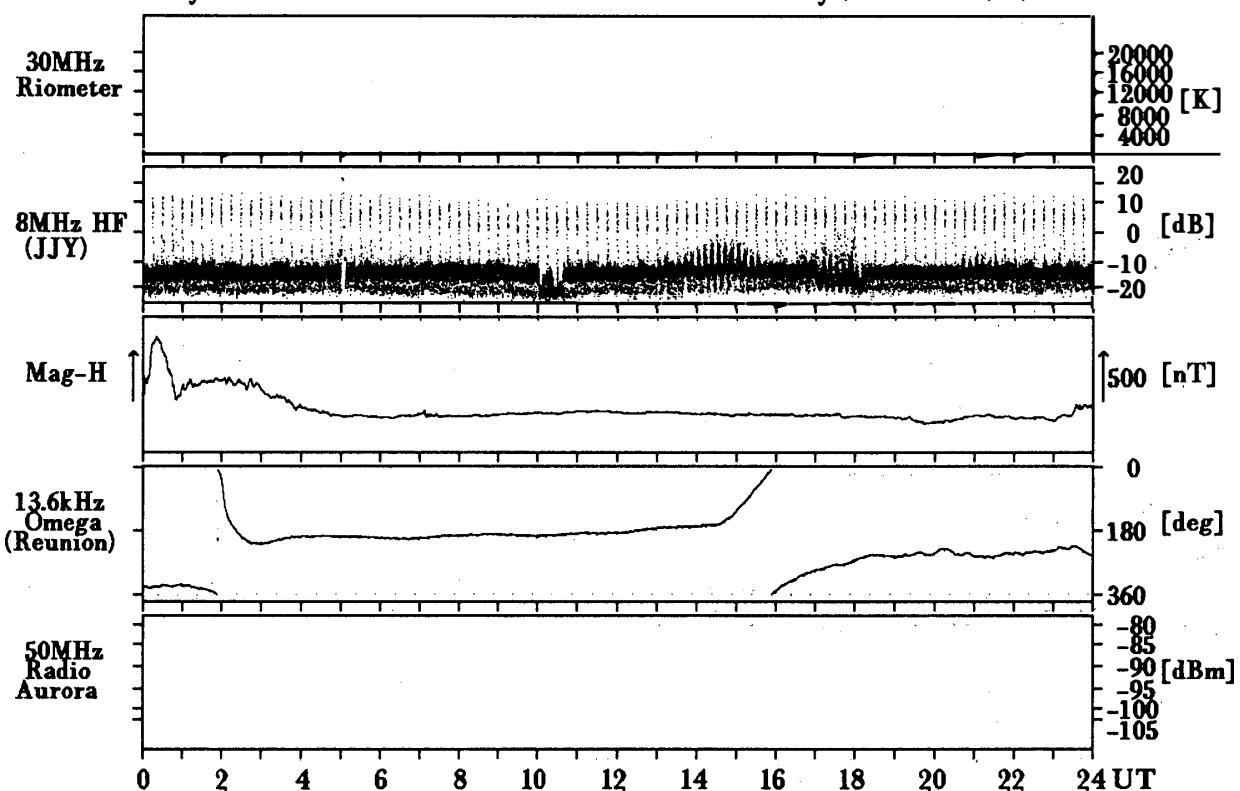
Syowa Station

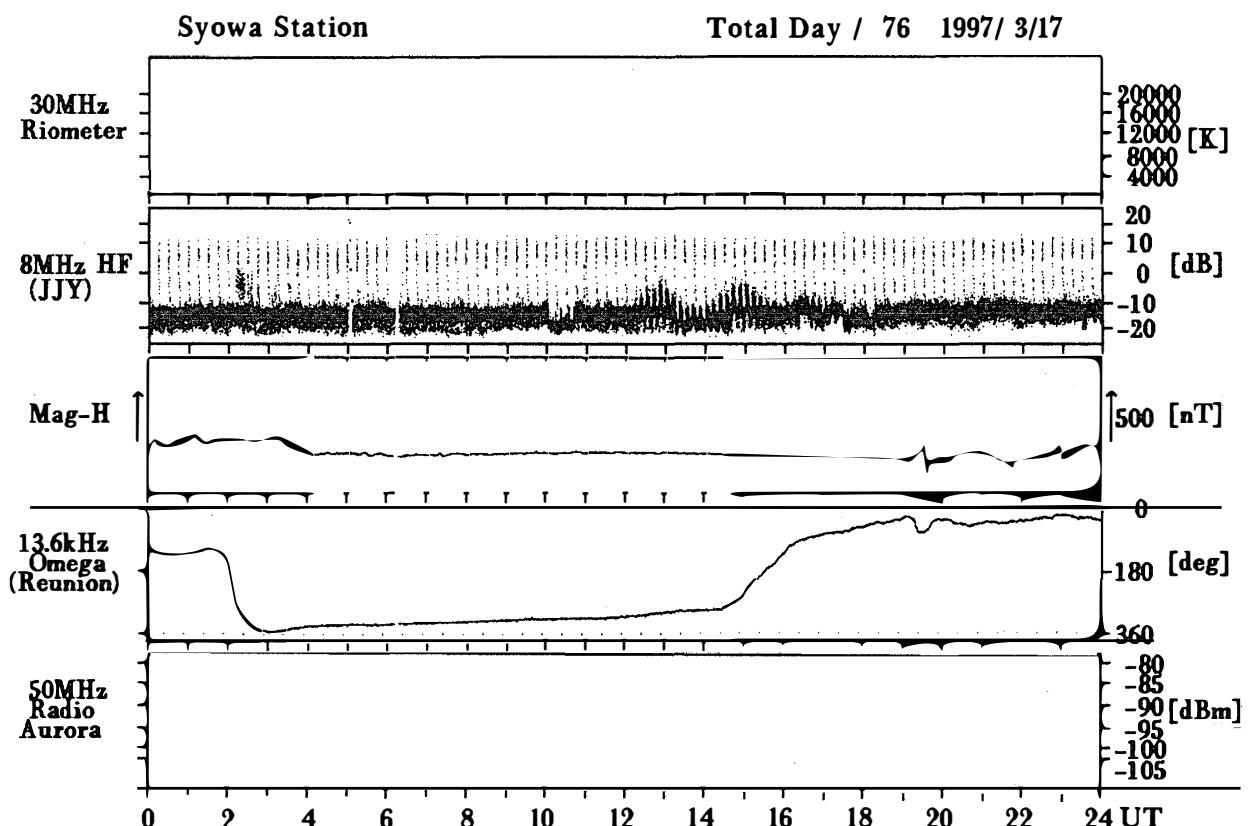
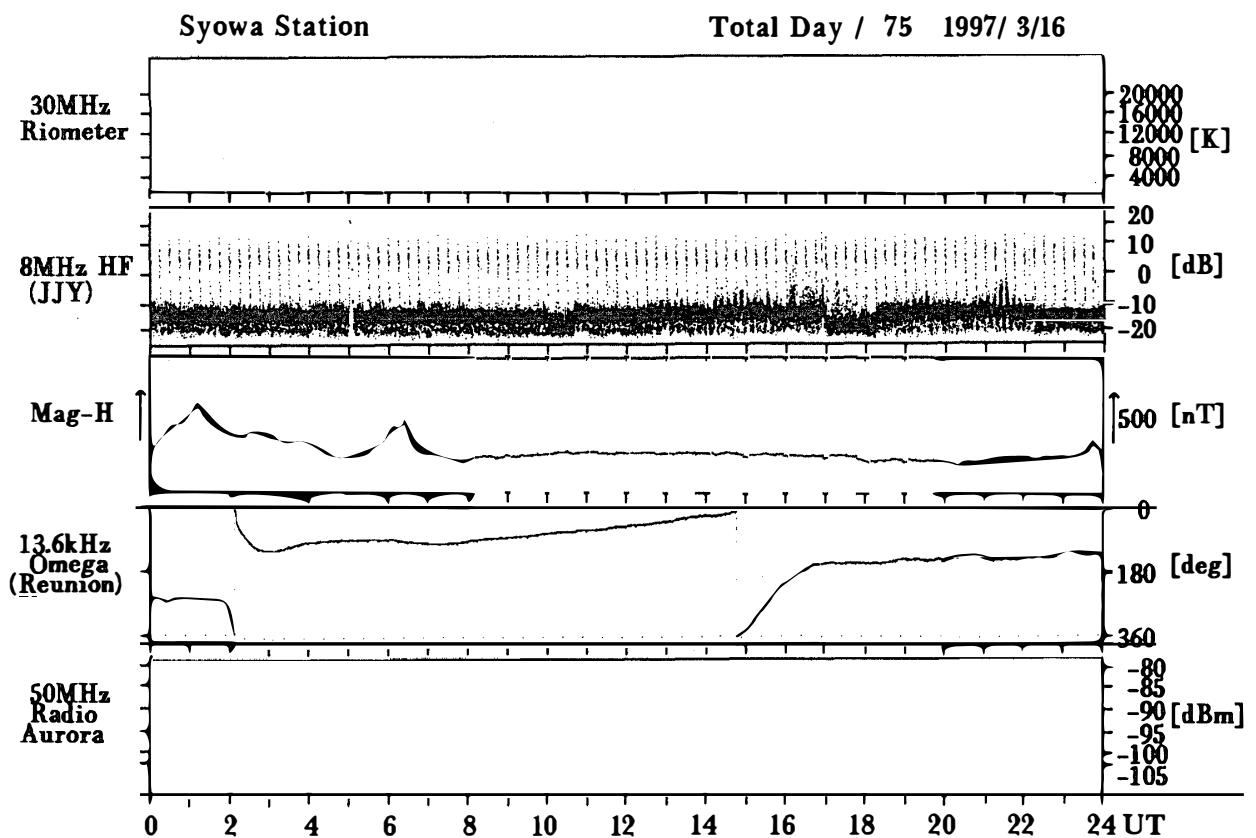
Total Day / 73 1997/ 3/14



Syowa Station

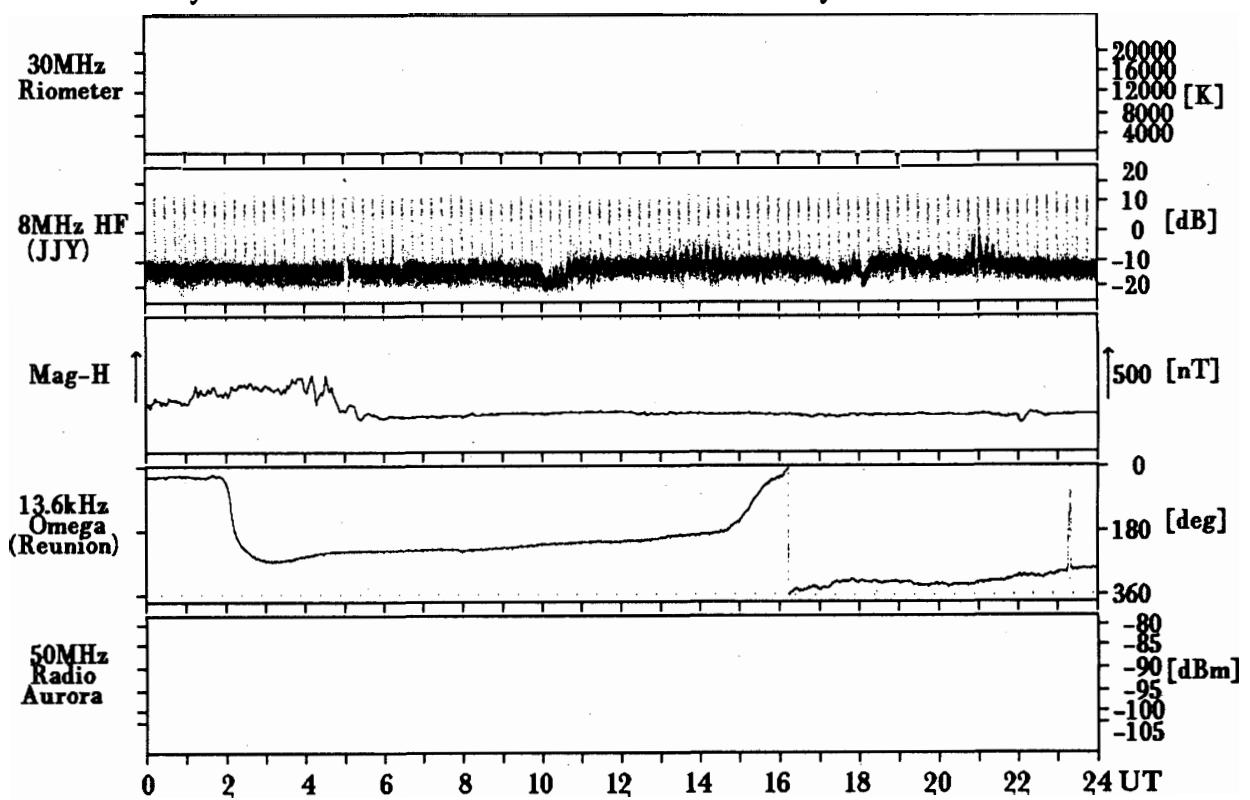
Total Day / 74 1997/ 3/15





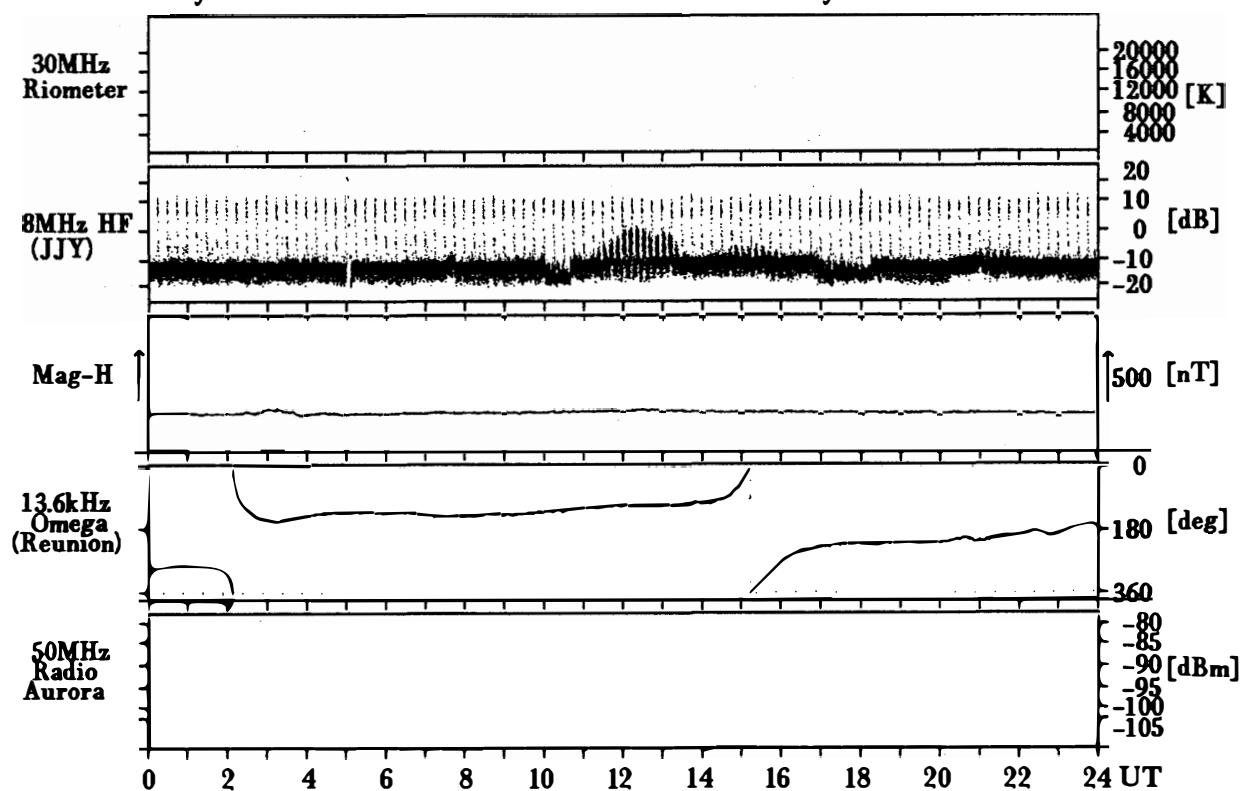
Syowa Station

Total Day / 77 1997/ 3/18



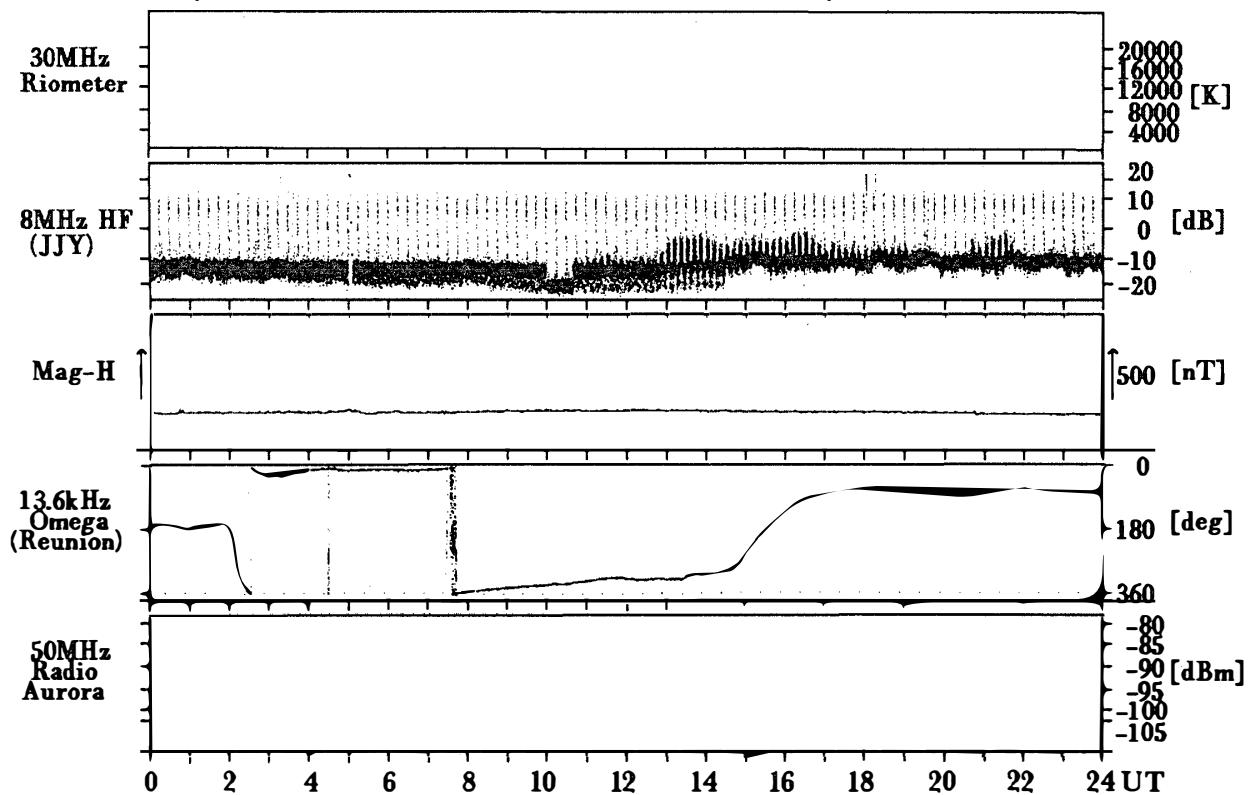
Syowa Station

Total Day / 78 1997/ 3/19



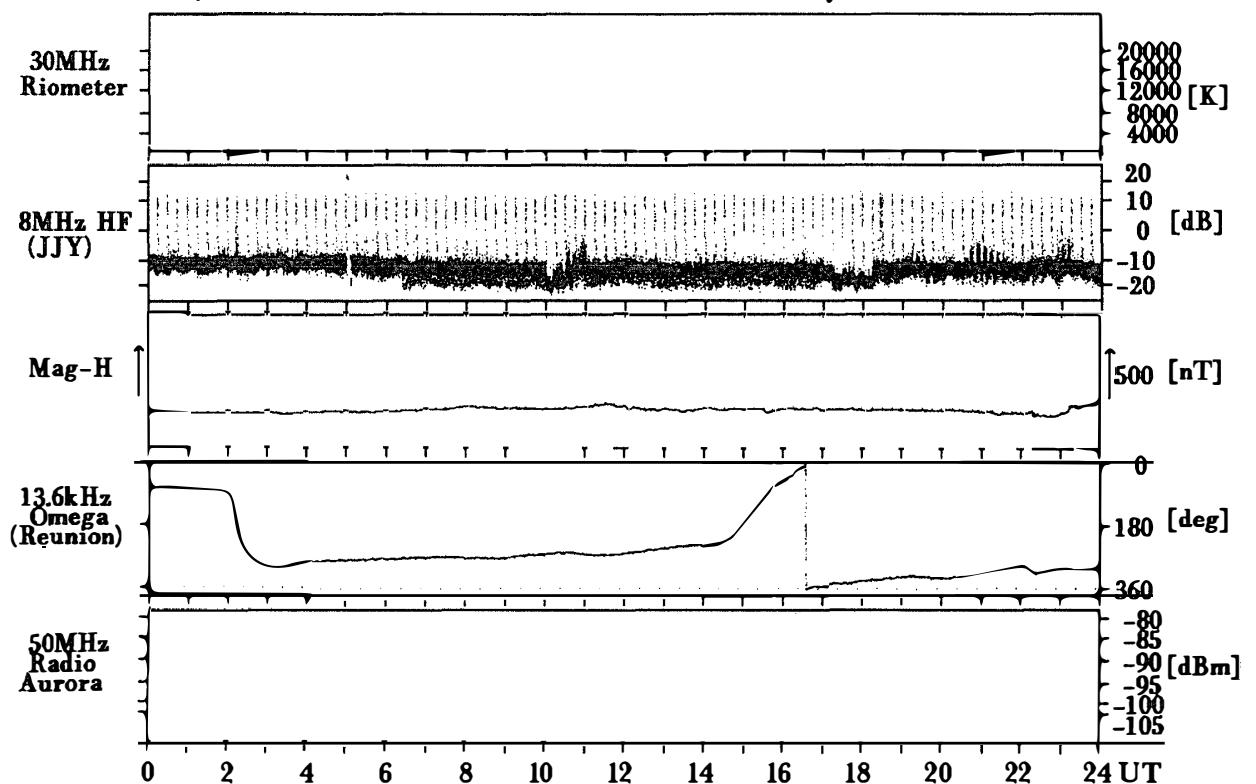
Syowa Station

Total Day / 79 1997/ 3/20



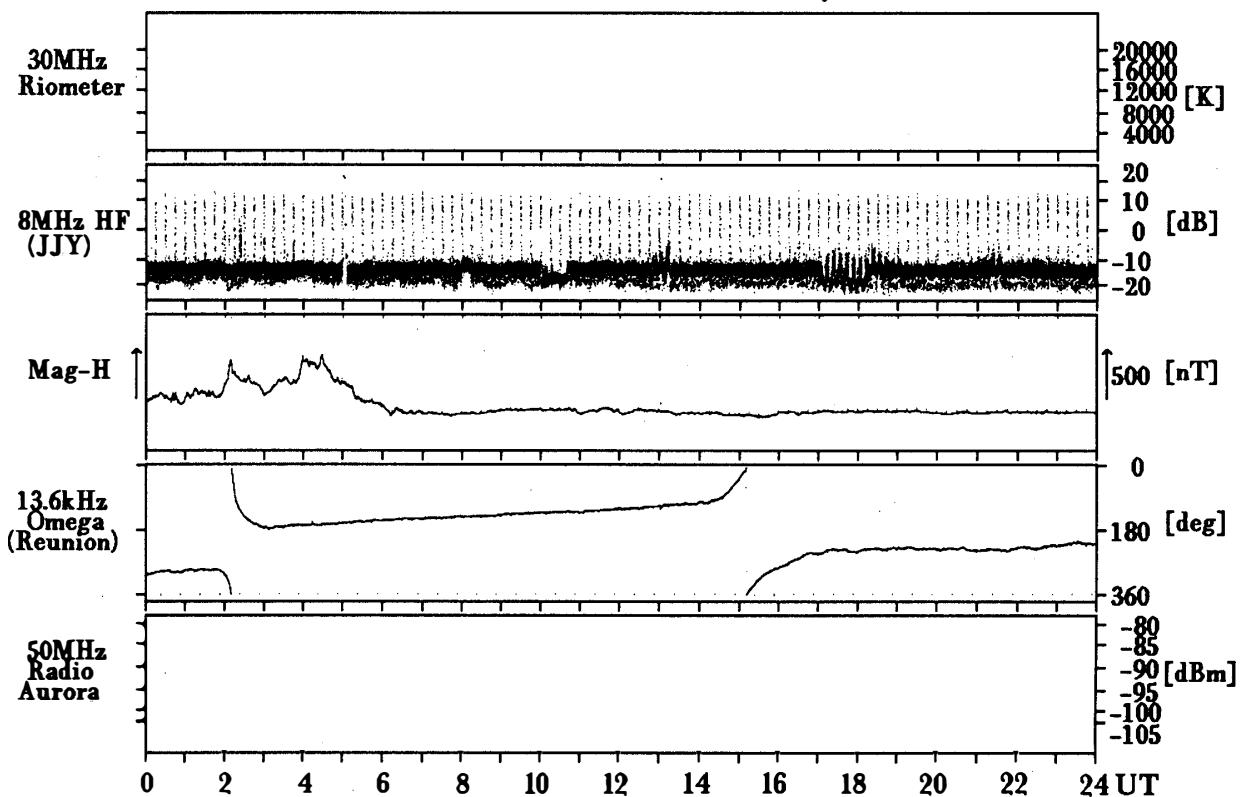
Syowa Station

Total Day / 80 1997/ 3/21



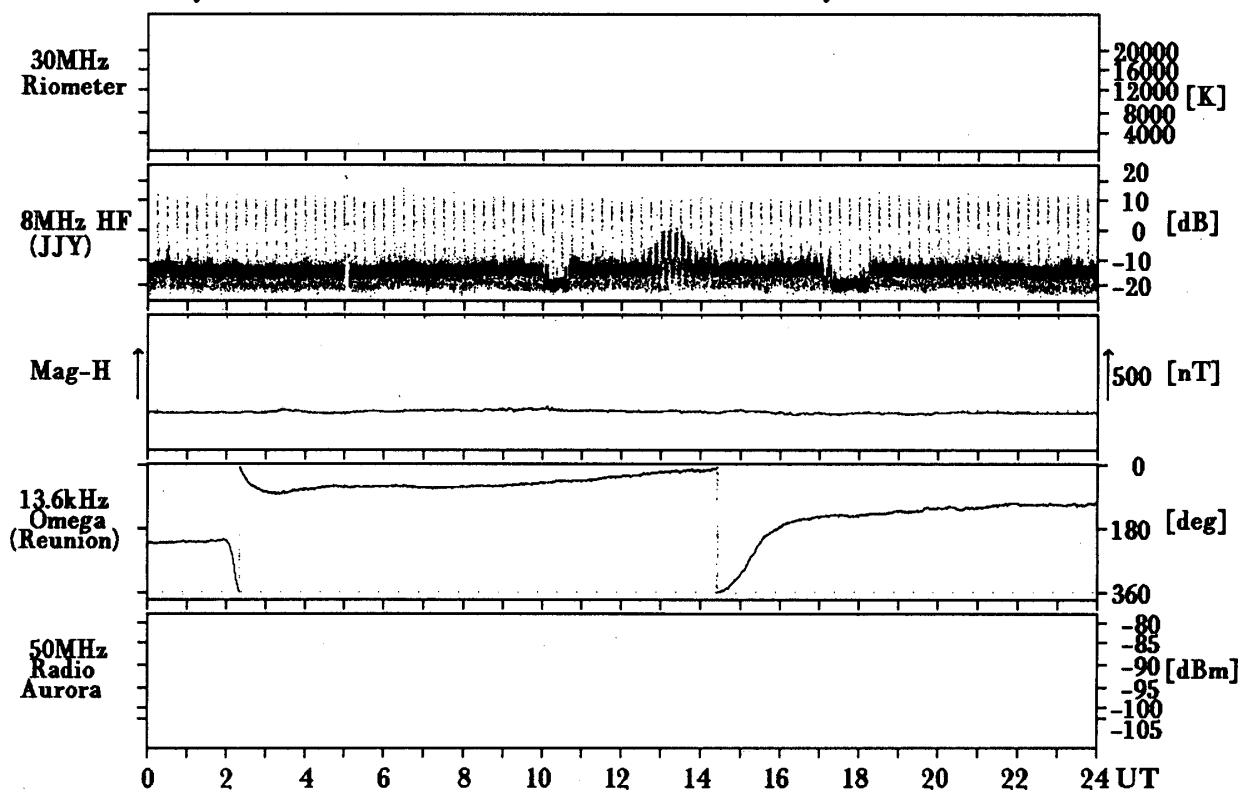
Syowa Station

Total Day / 81 1997/ 3/22



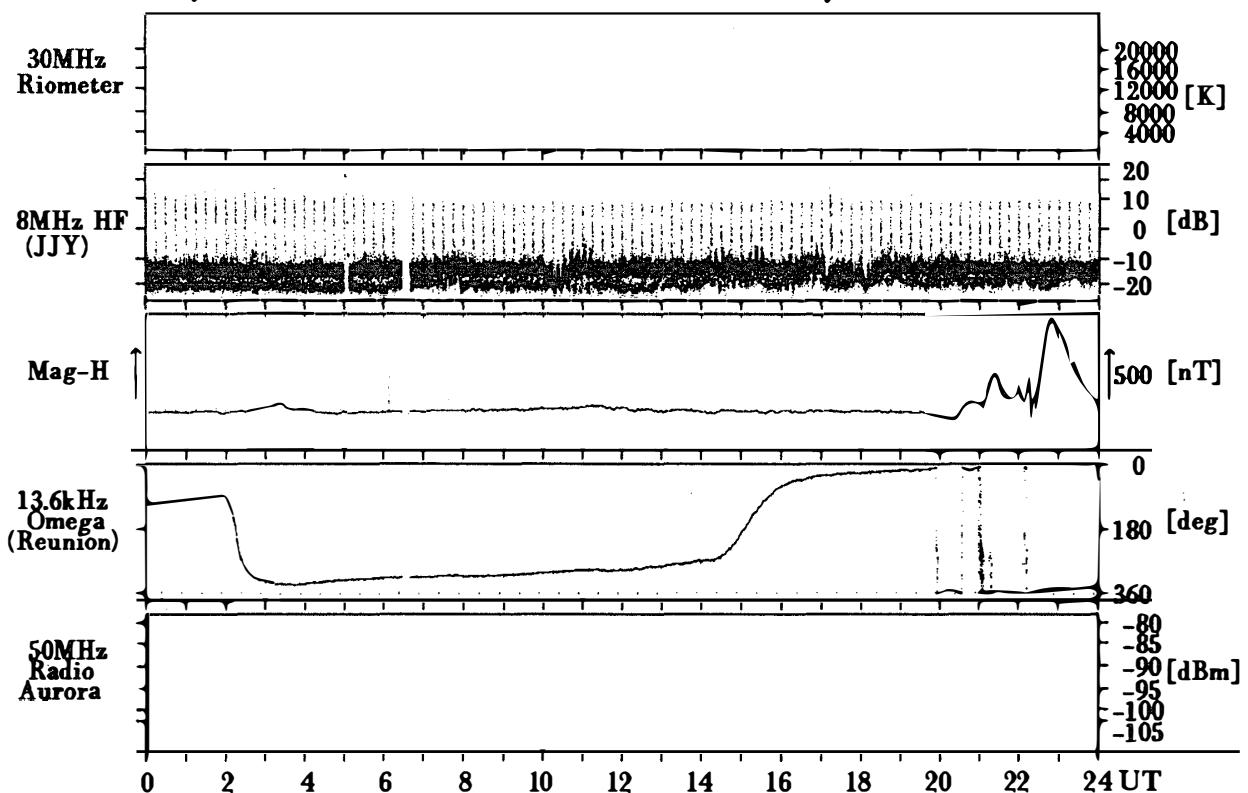
Syowa Station

Total Day / 82 1997/ 3/23



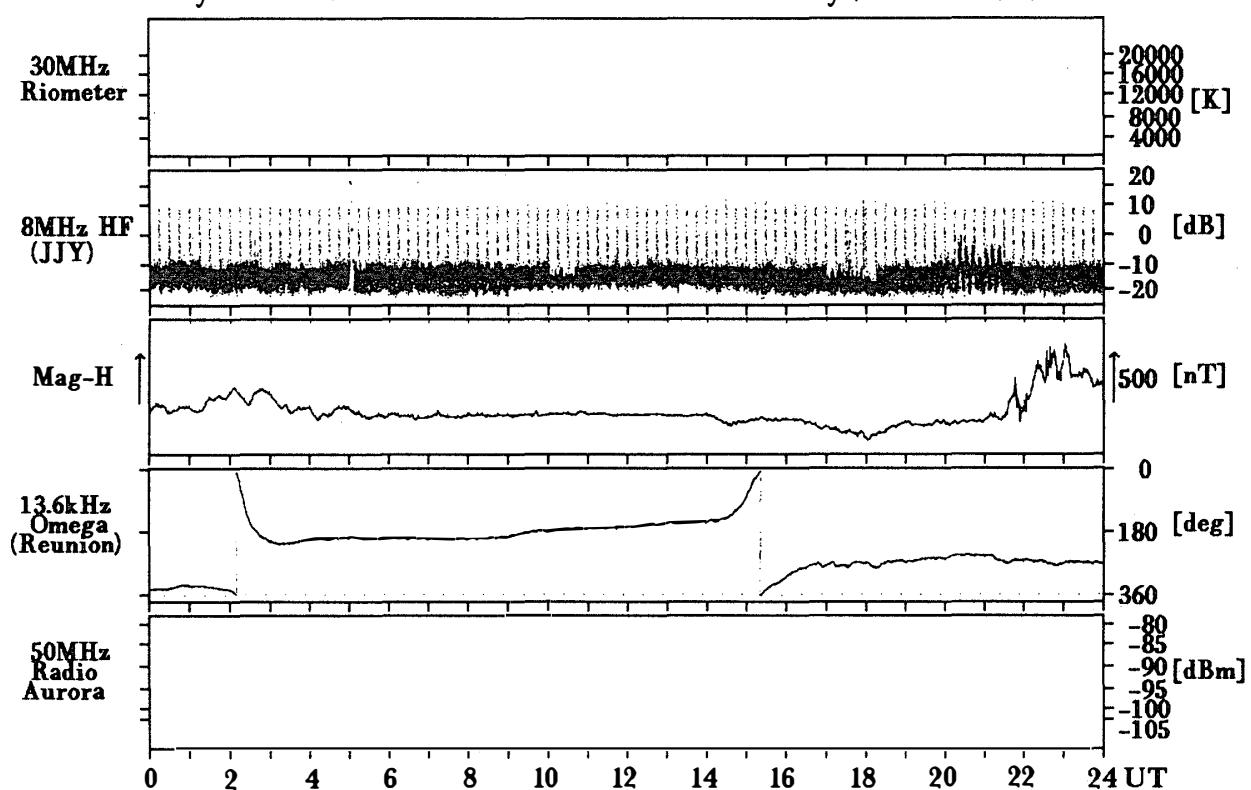
Syowa Station

Total Day / 83 1997/ 3/24



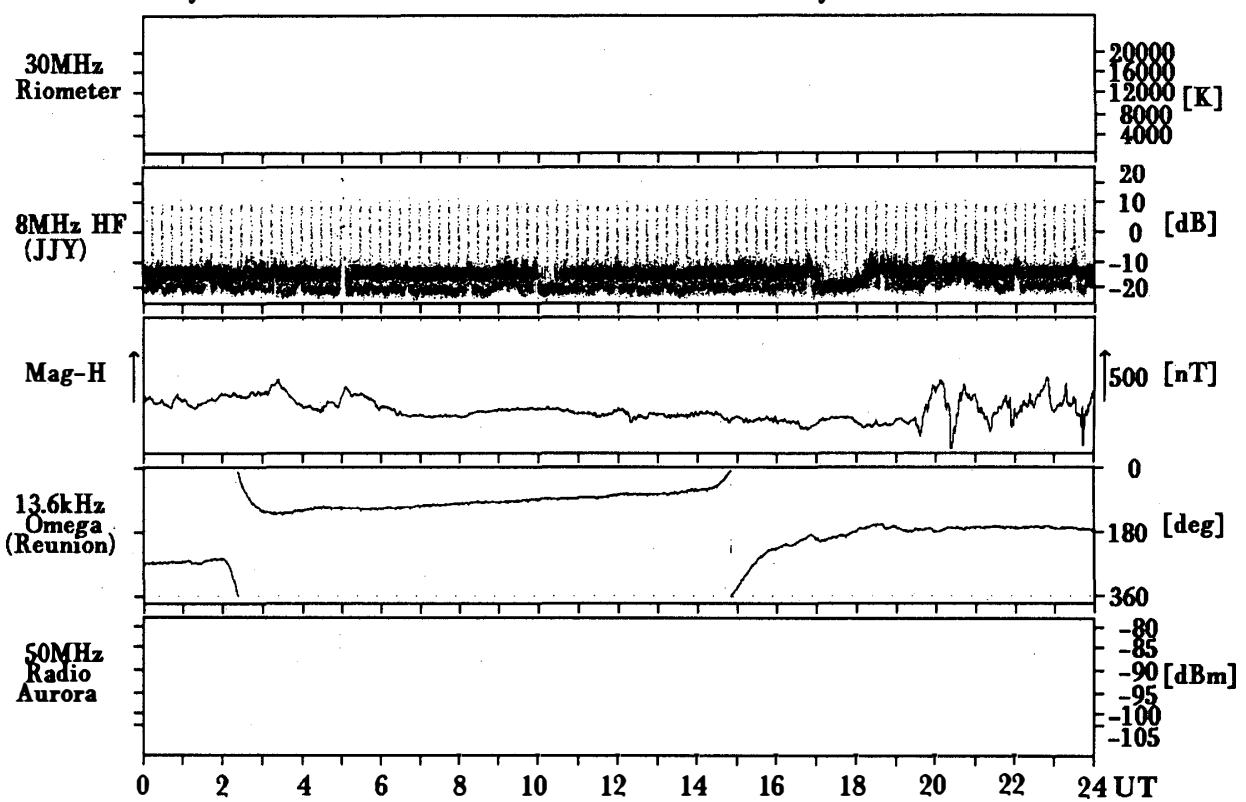
Syowa Station

Total Day / 84 1997/ 3/25



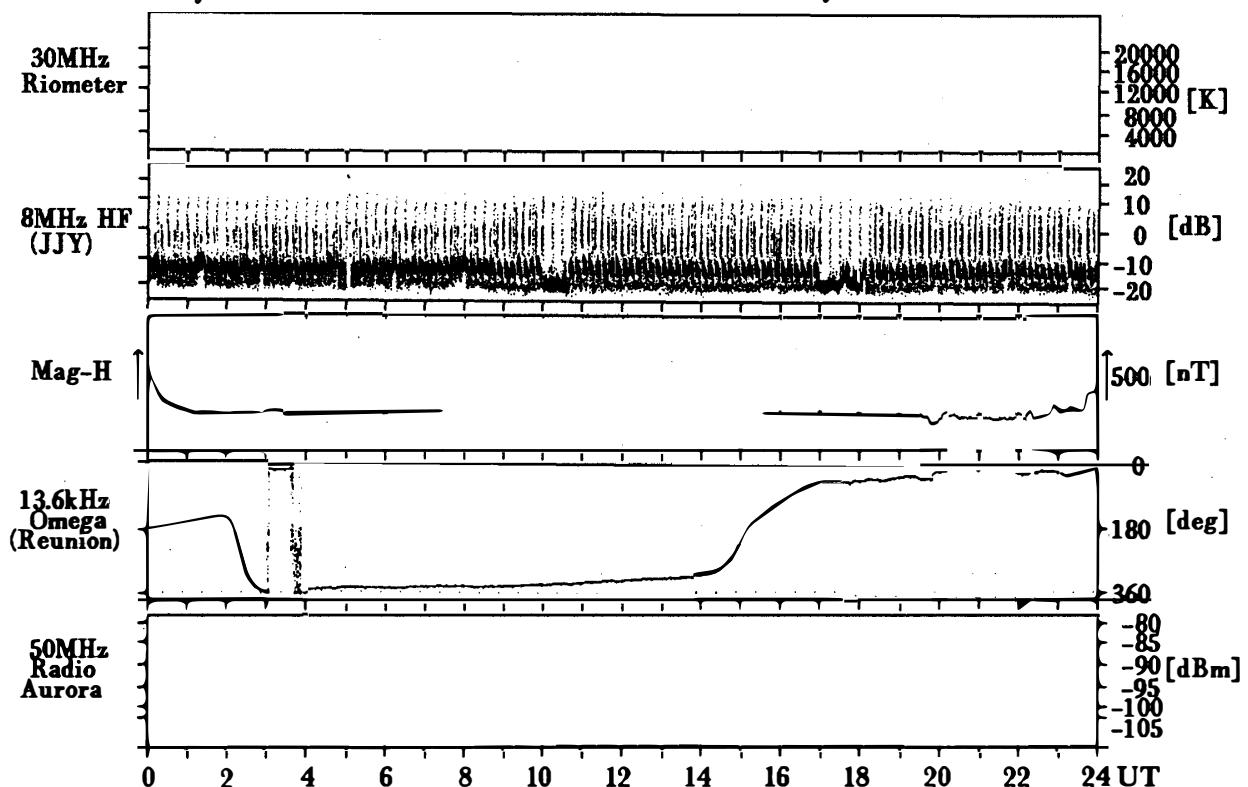
Syowa Station

Total Day / 85 1997/ 3/26



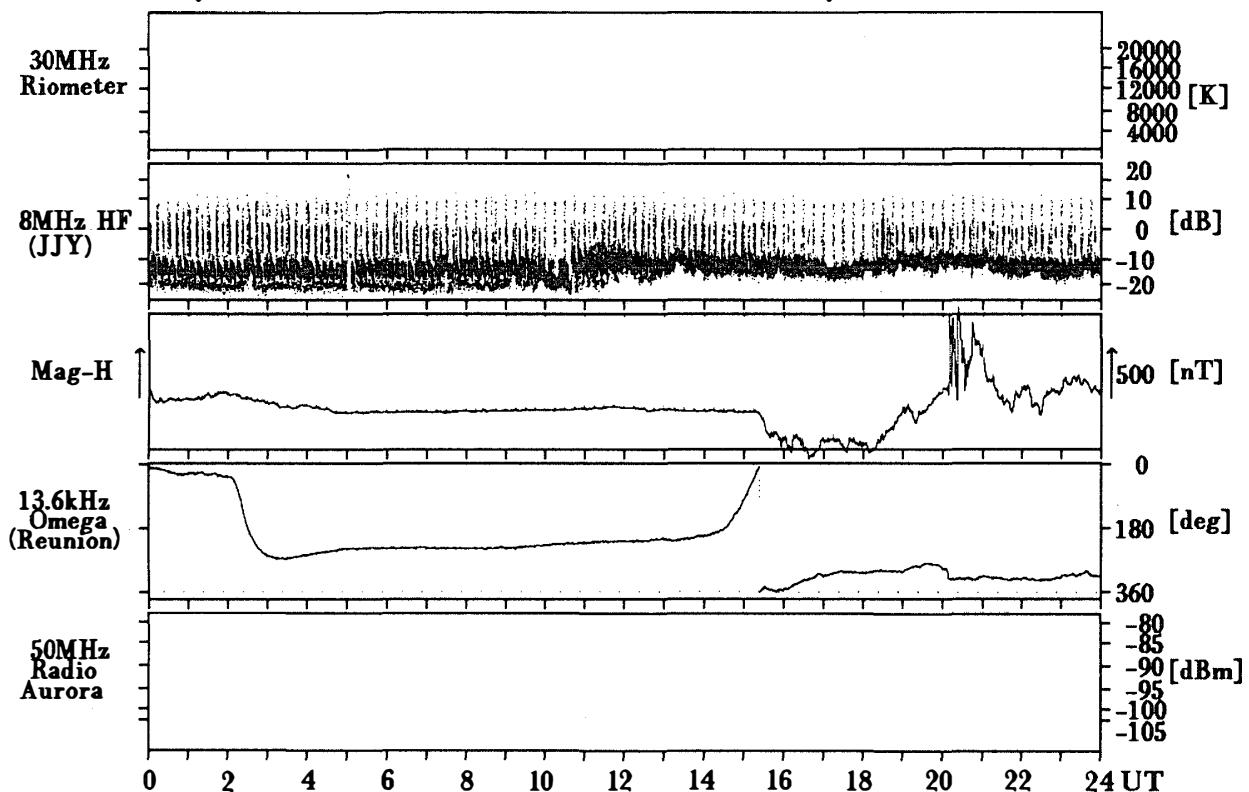
Syowa Station

Total Day / 86 1997/ 3/27



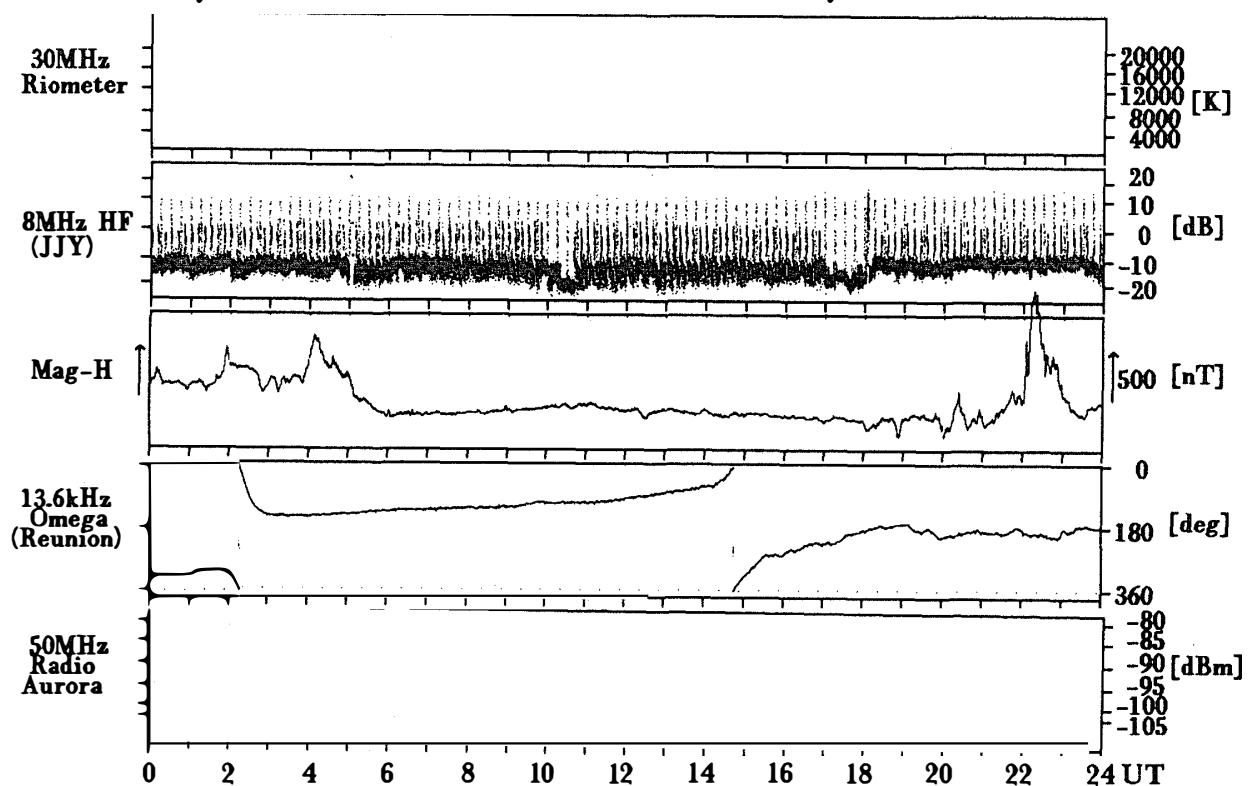
Syowa Station

Total Day / 87 1997/ 3/28



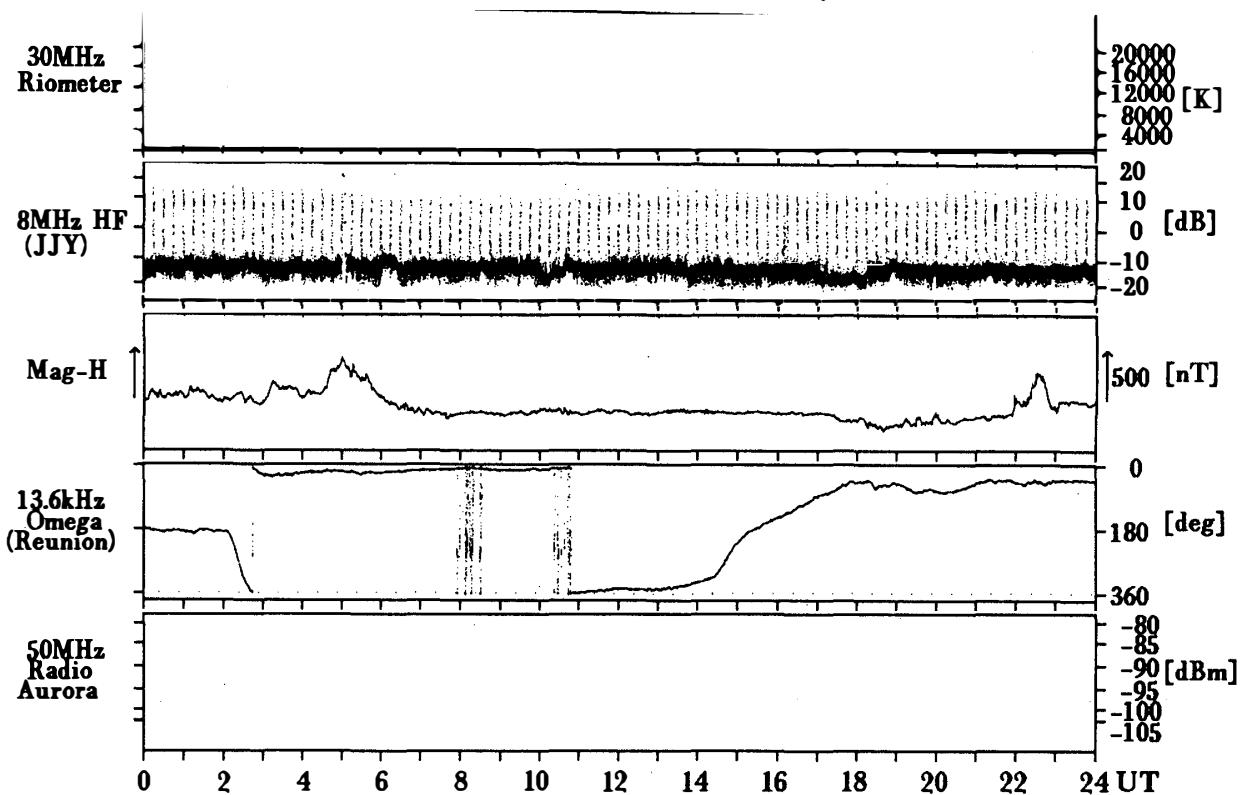
Syowa Station

Total Day / 88 1997/ 3/29



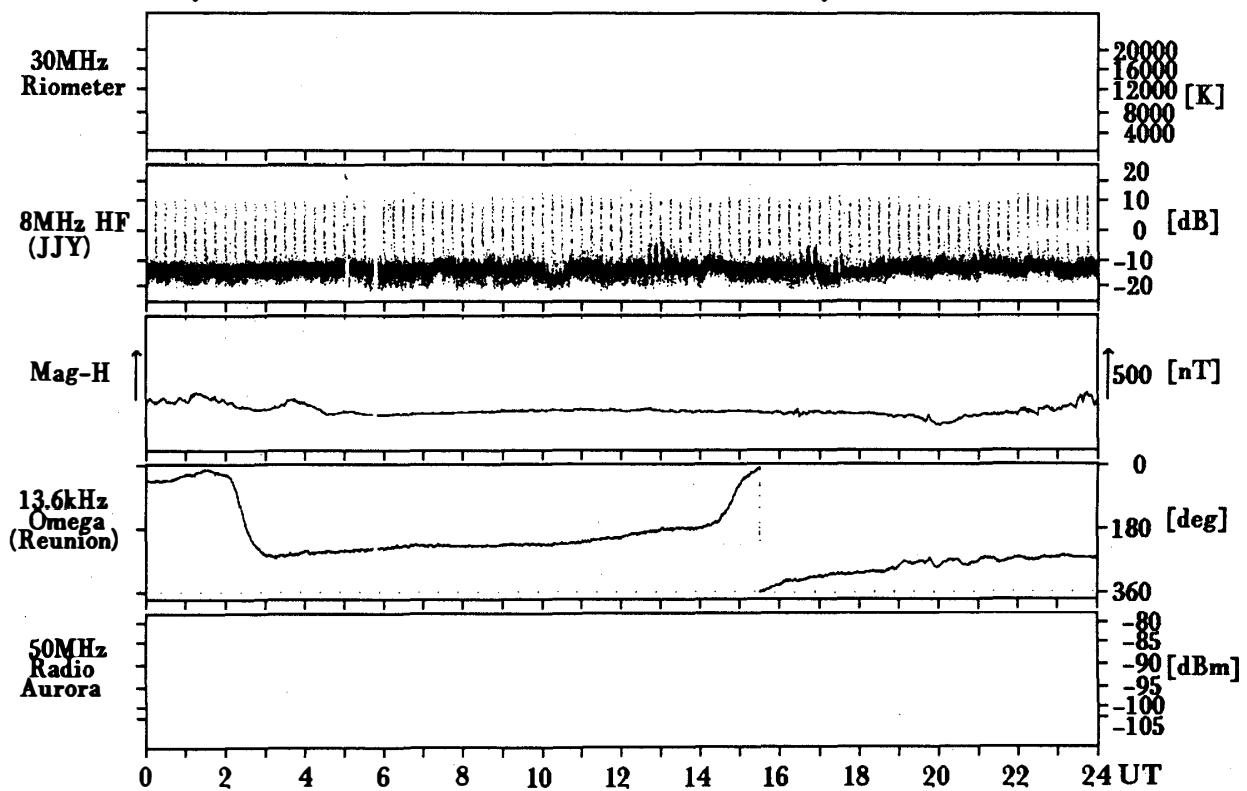
Syowa Station

Total Day / 89 1997/ 3/30



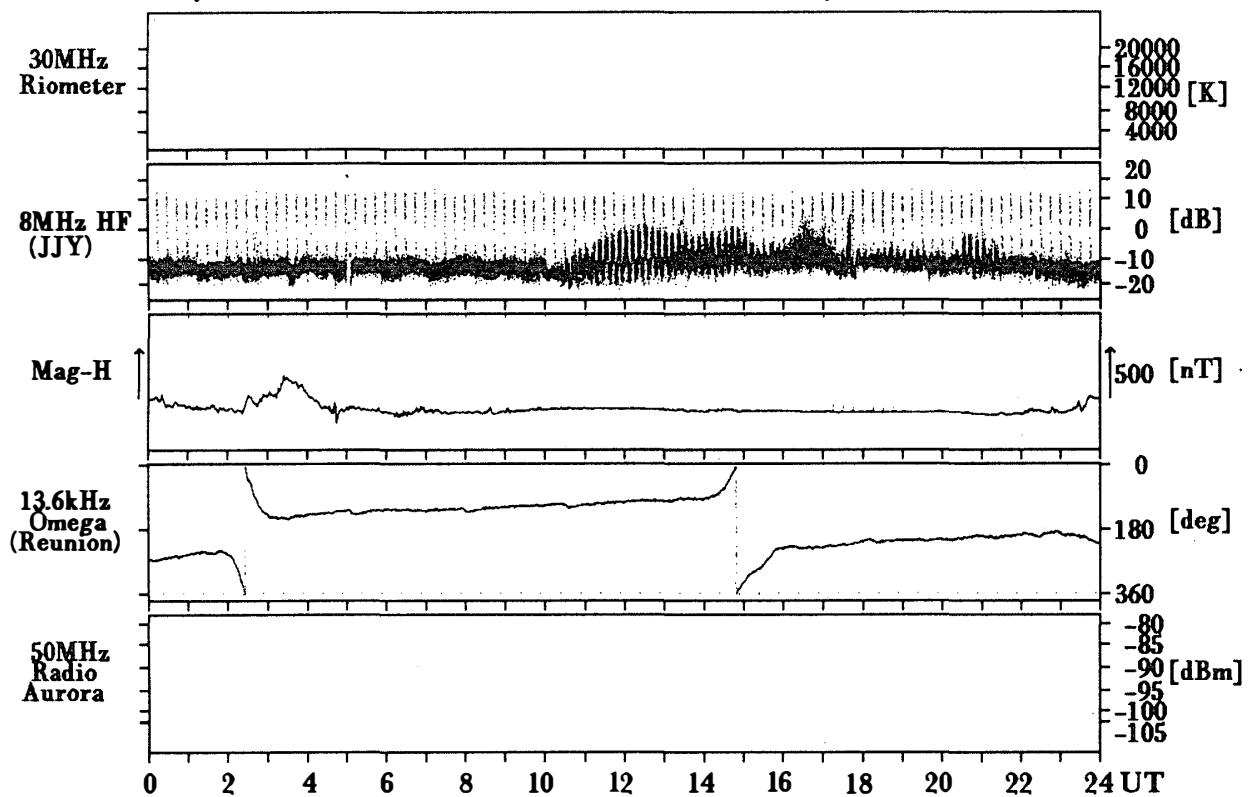
Syowa Station

Total Day / 90 1997/ 3/31



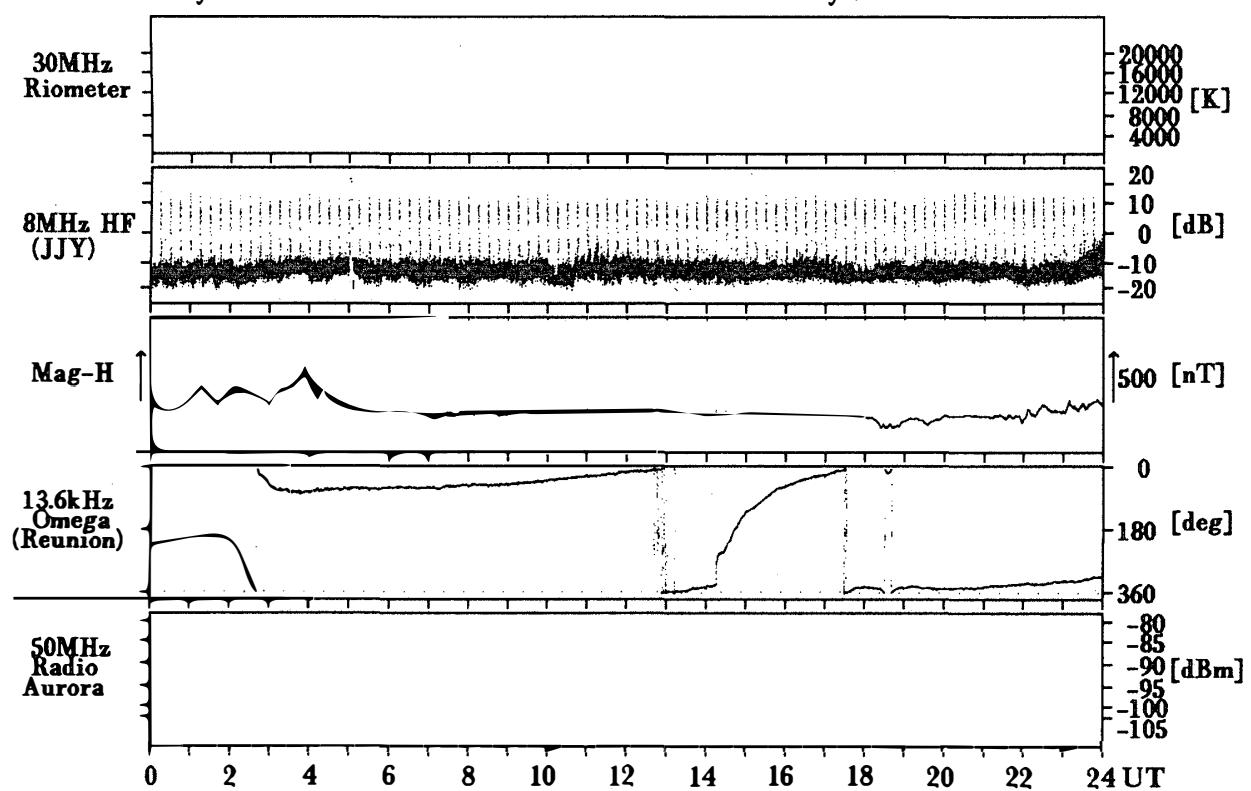
Syowa Station

Total Day / 91 1997/ 4/ 1



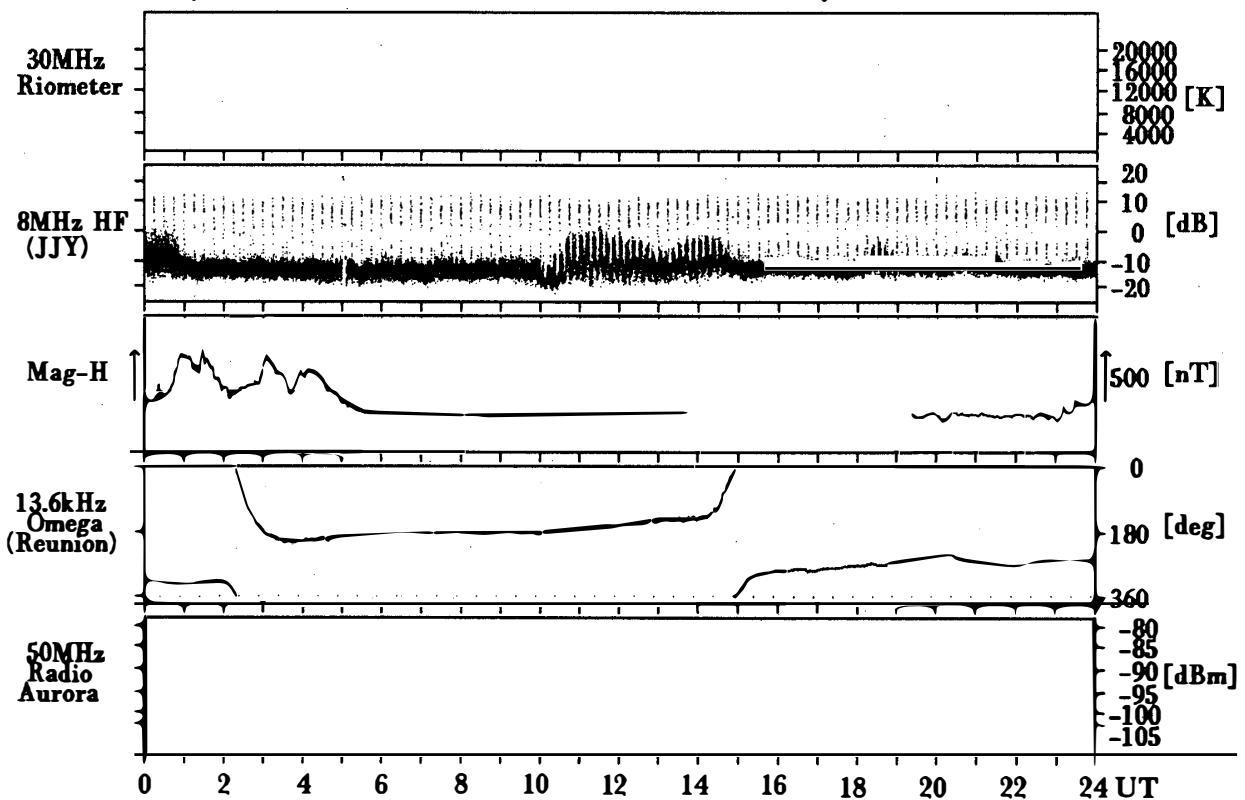
Syowa Station

Total Day / 92 1997/ 4/ 2



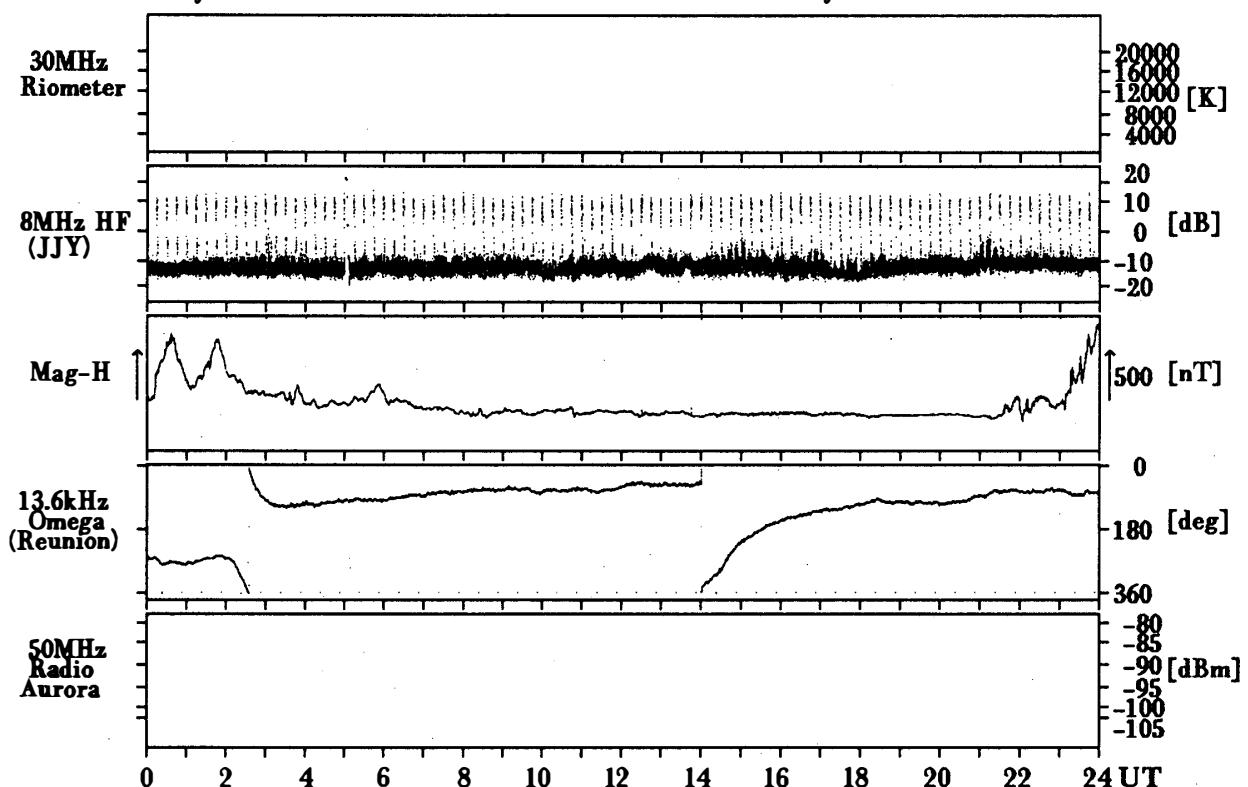
Syowa Station

Total Day / 93 1997/ 4/ 3



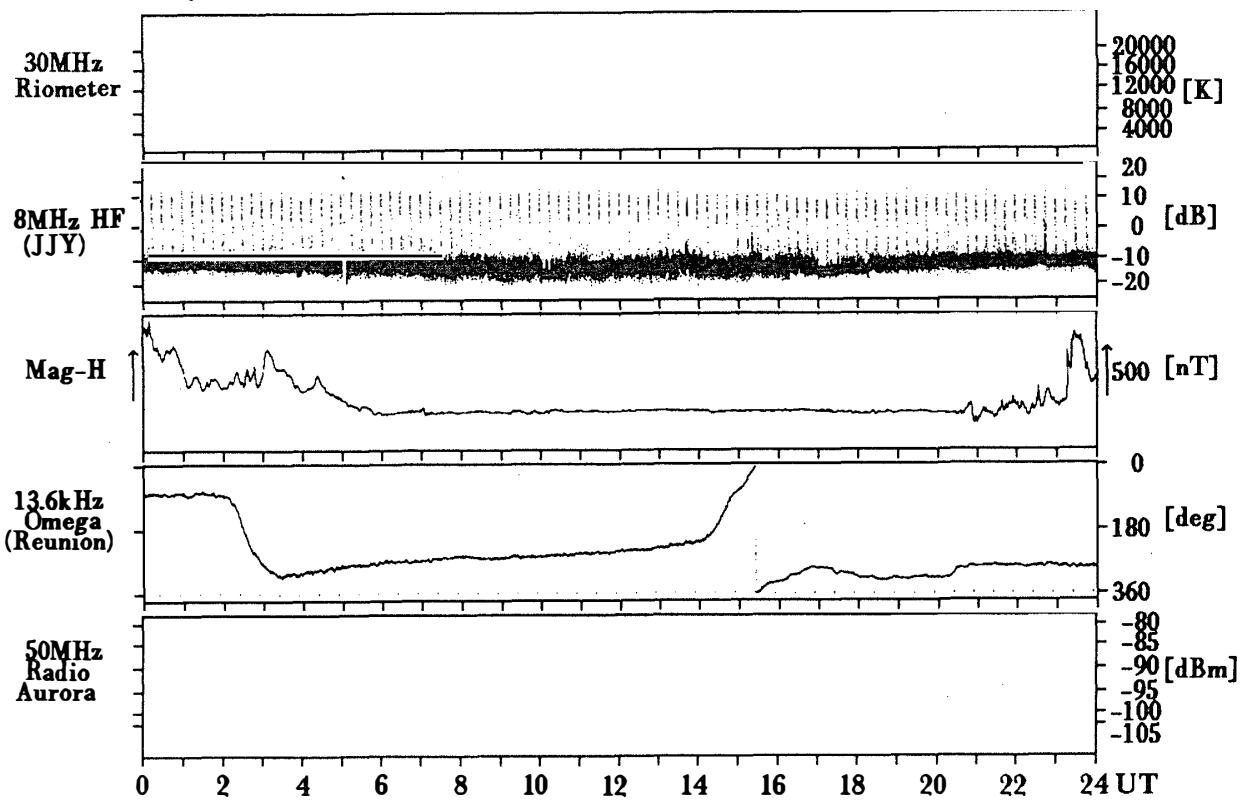
Syowa Station

Total Day / 94 1997/ 4/ 4



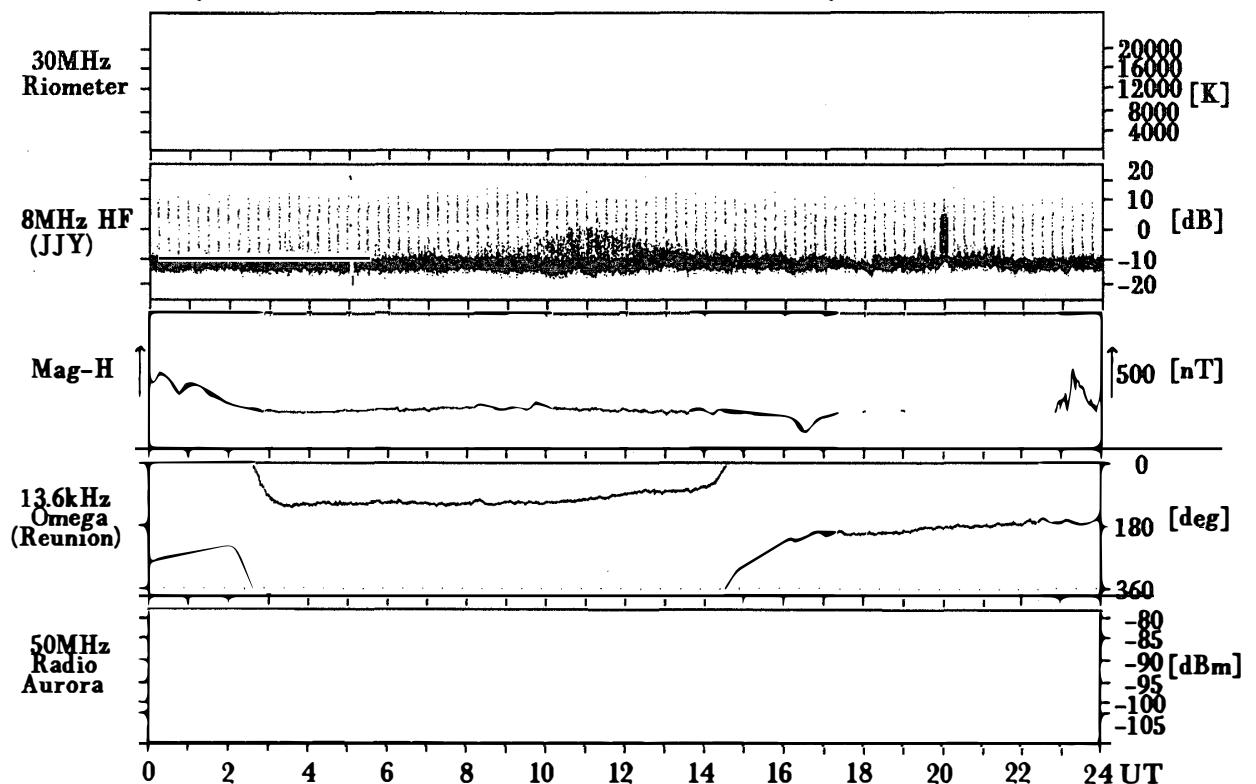
Syowa Station

Total Day / 95 1997/ 4/ 5



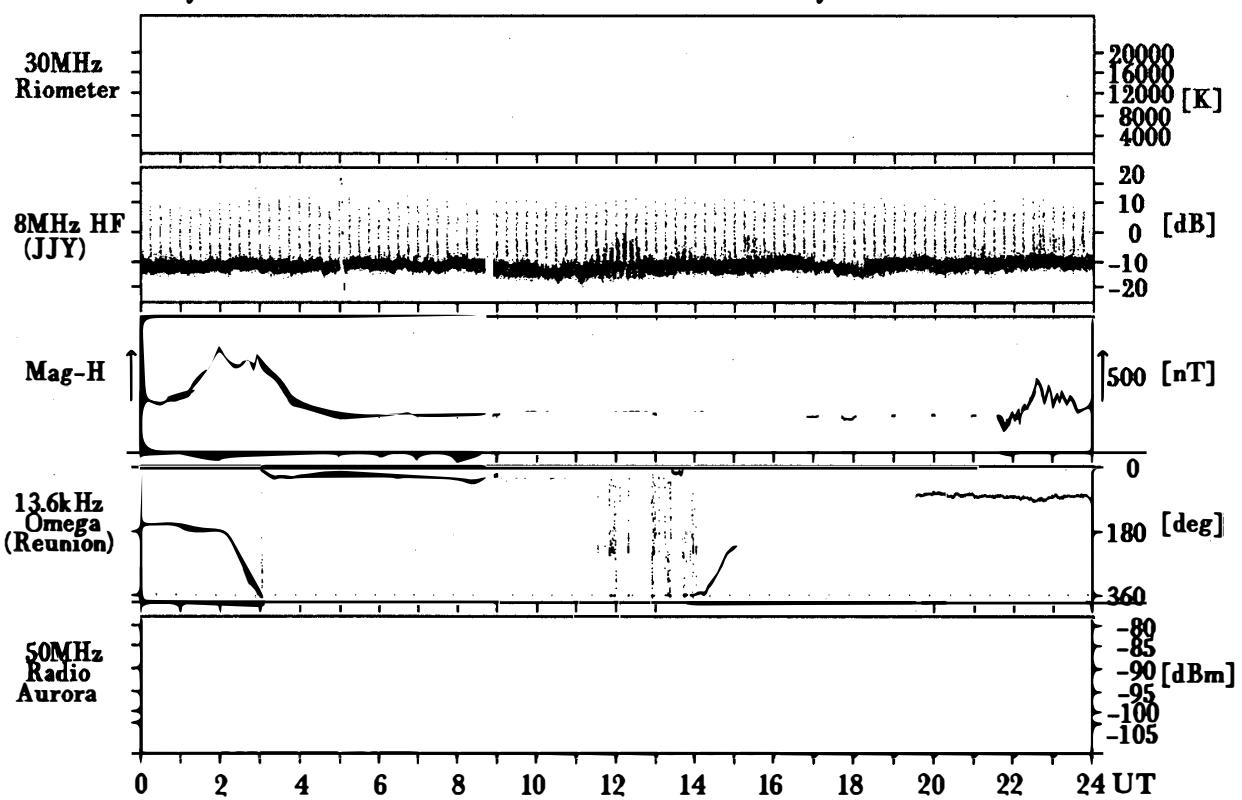
Syowa Station

Total Day / 96 1997/ 4/ 6



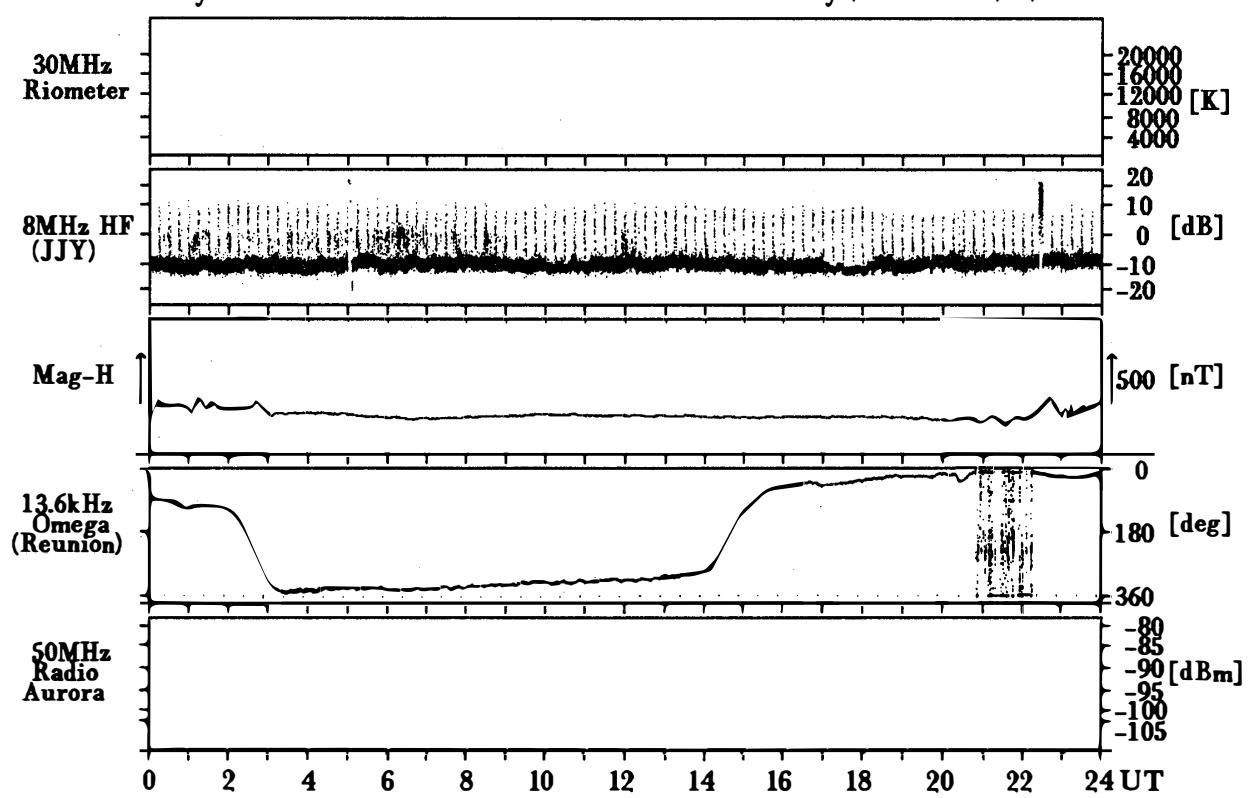
Syowa Station

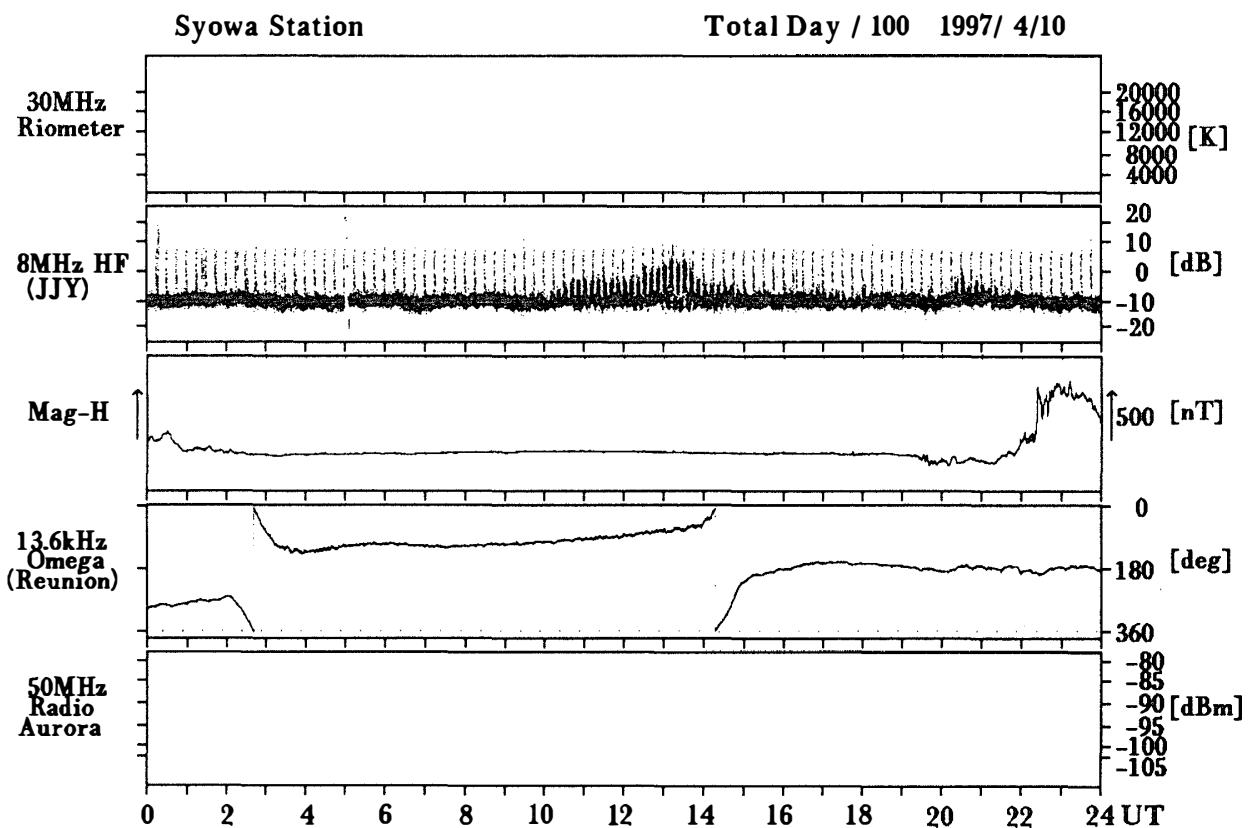
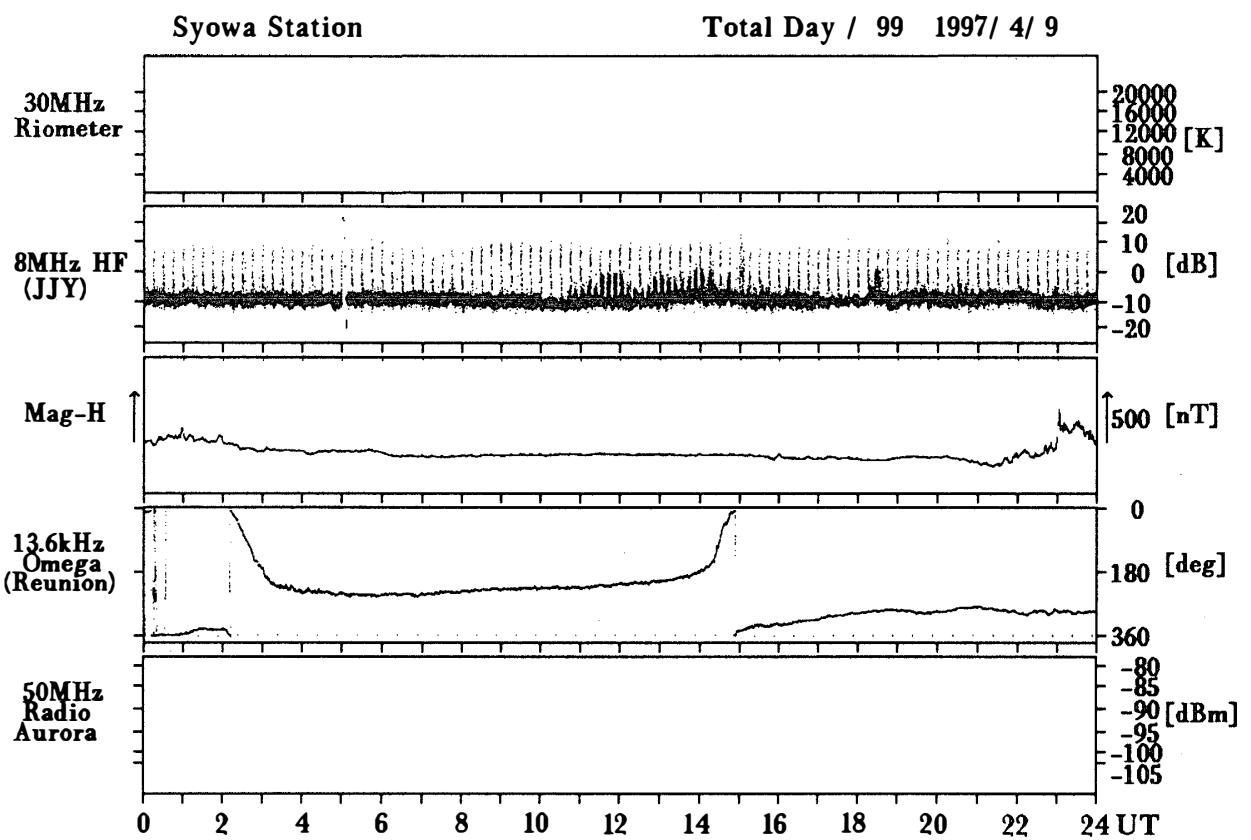
Total Day / 97 1997/ 4/ 7



Syowa Station

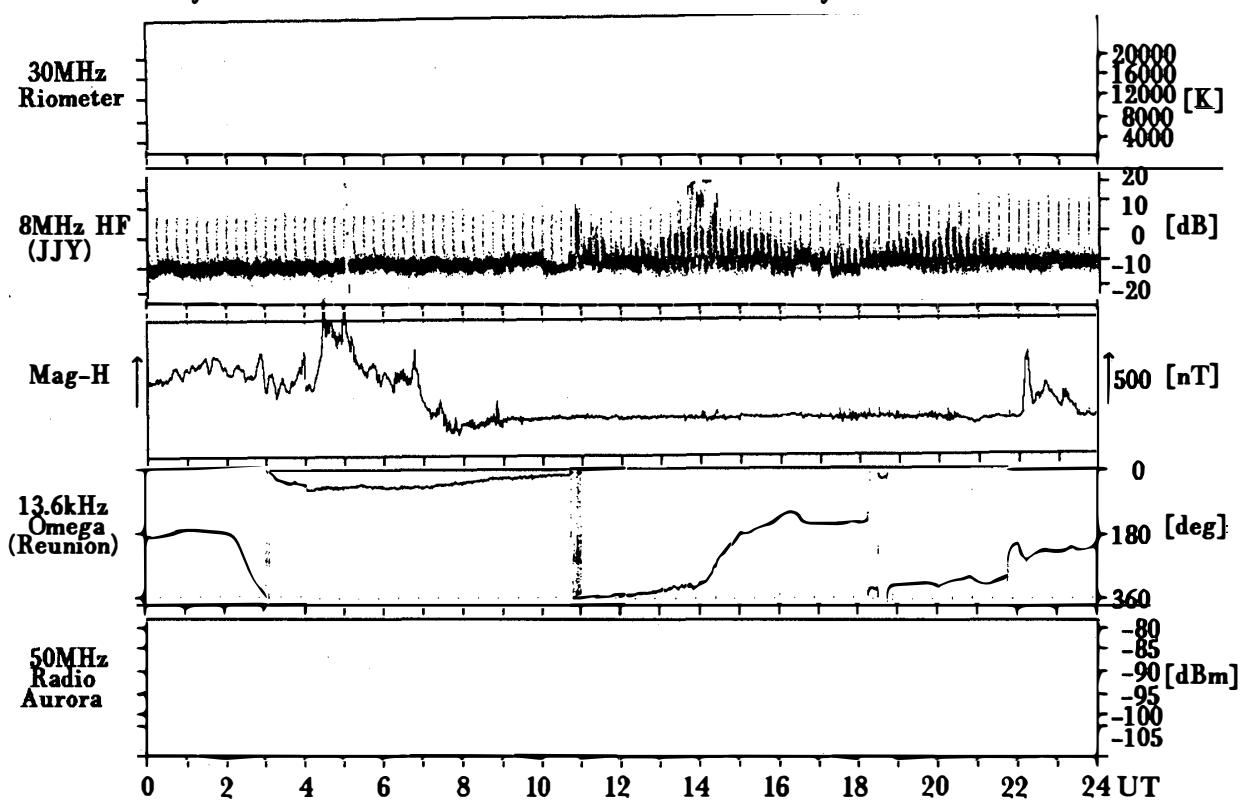
Total Day / 98 1997/ 4/ 8





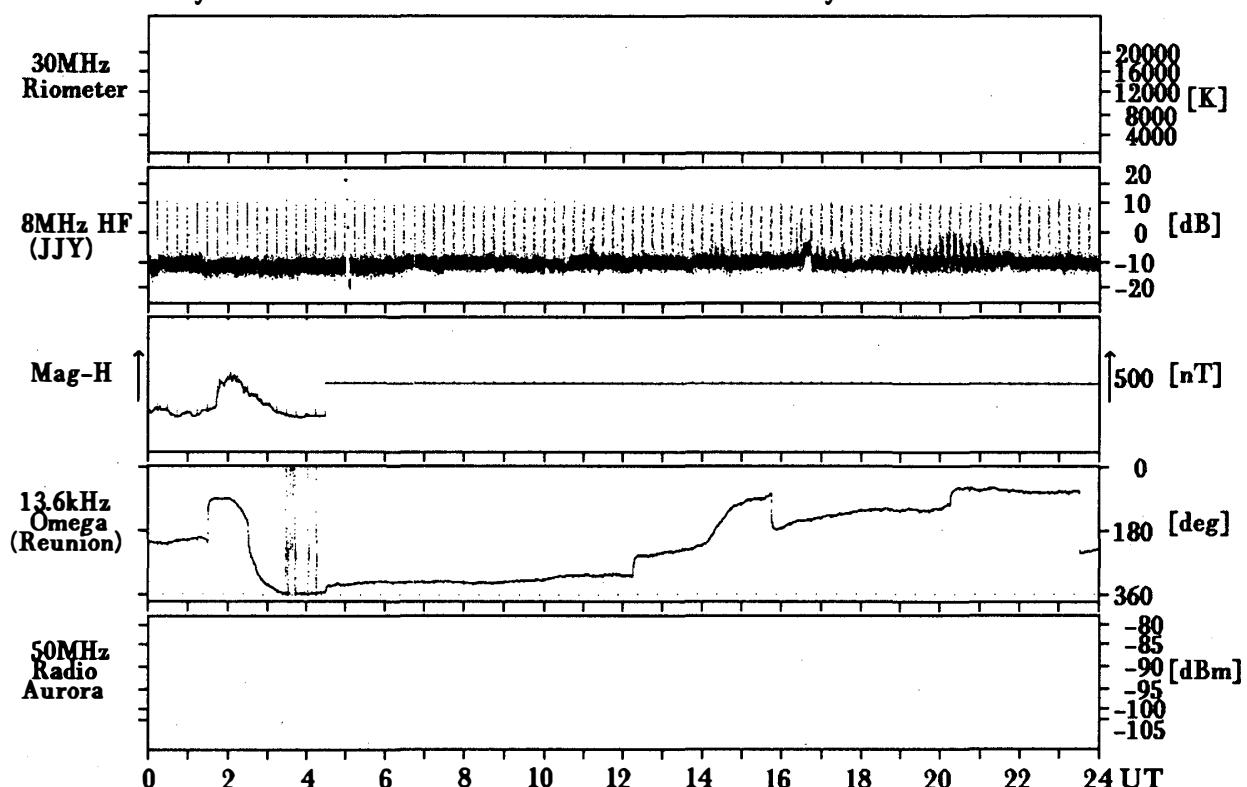
Syowa Station

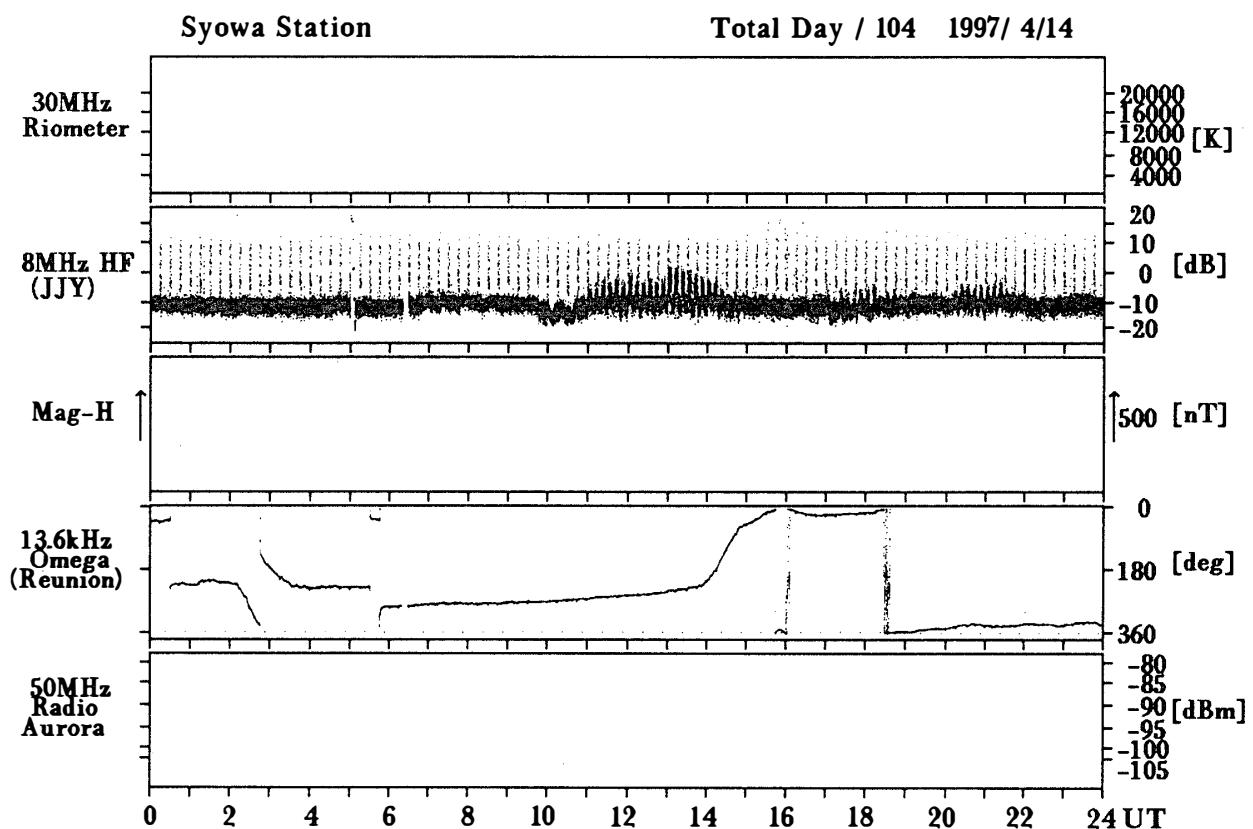
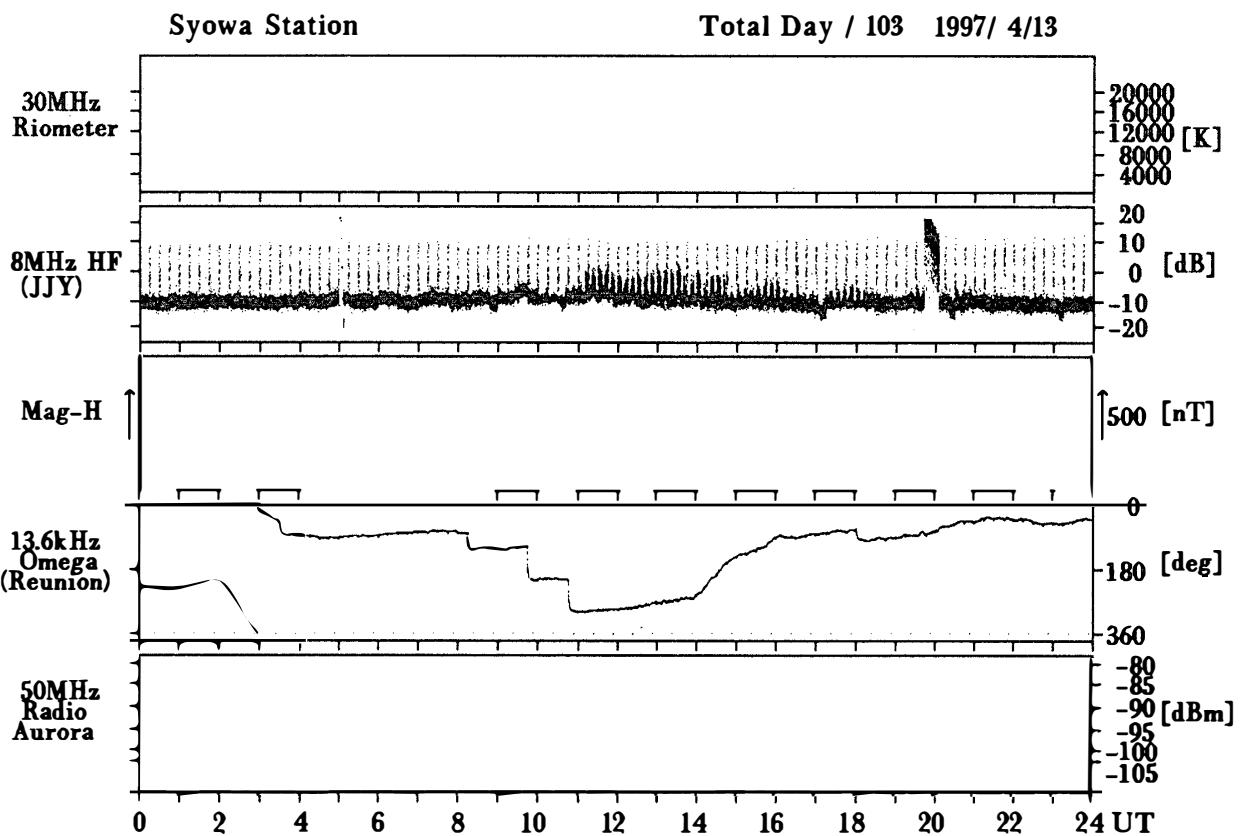
Total Day / 101 1997/ 4/11



Syowa Station

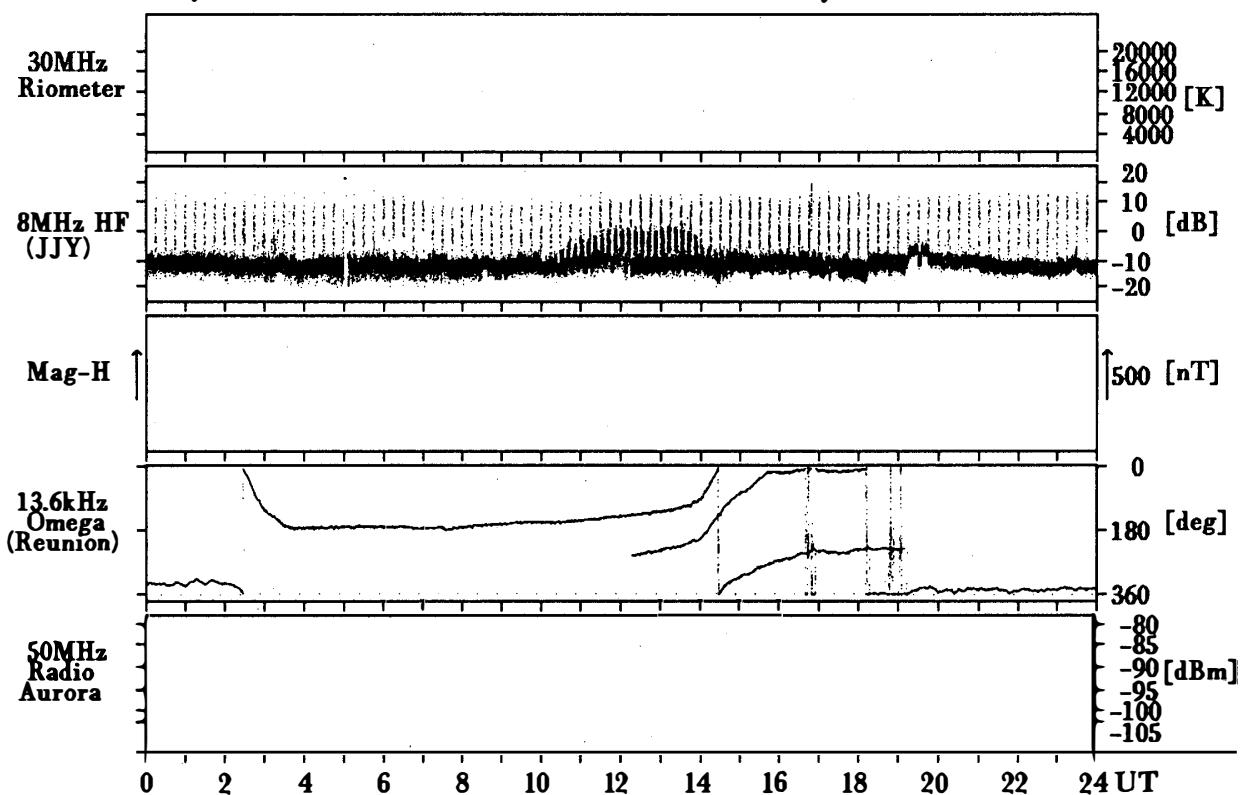
Total Day / 102 1997/ 4/12





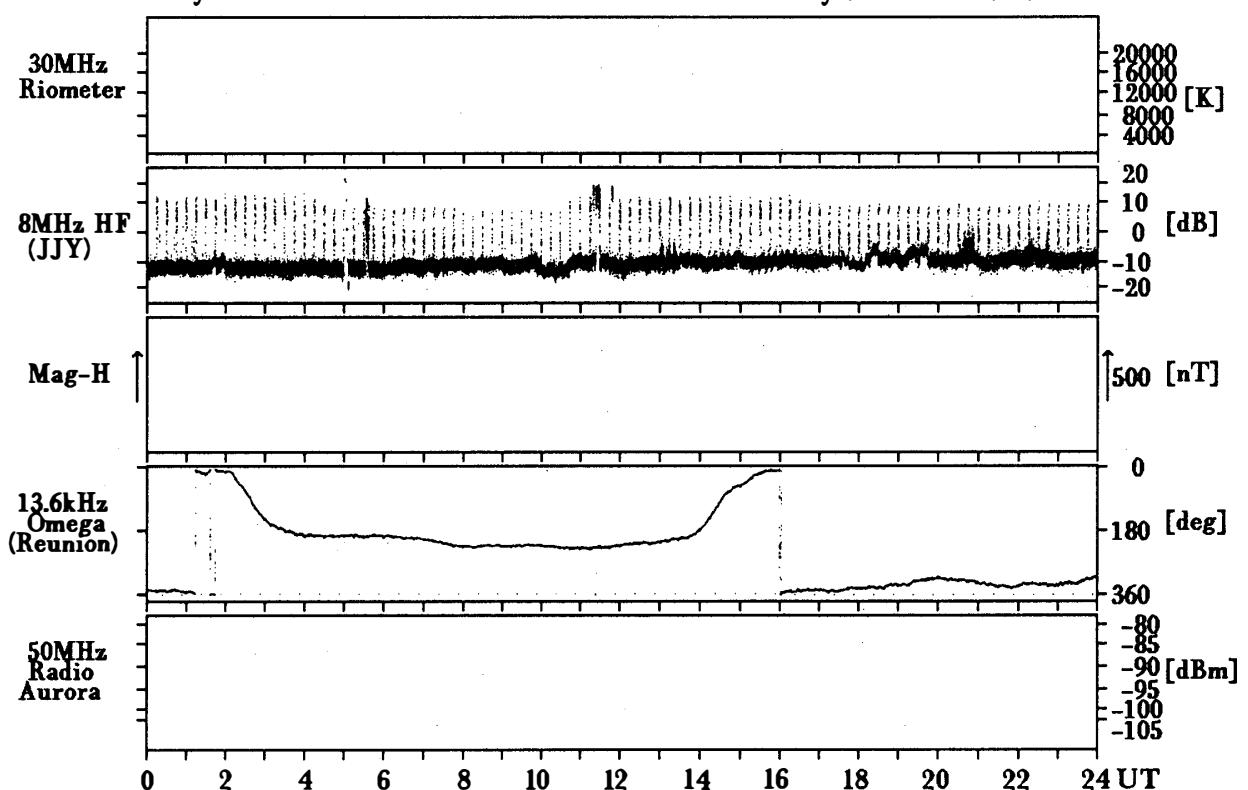
Syowa Station

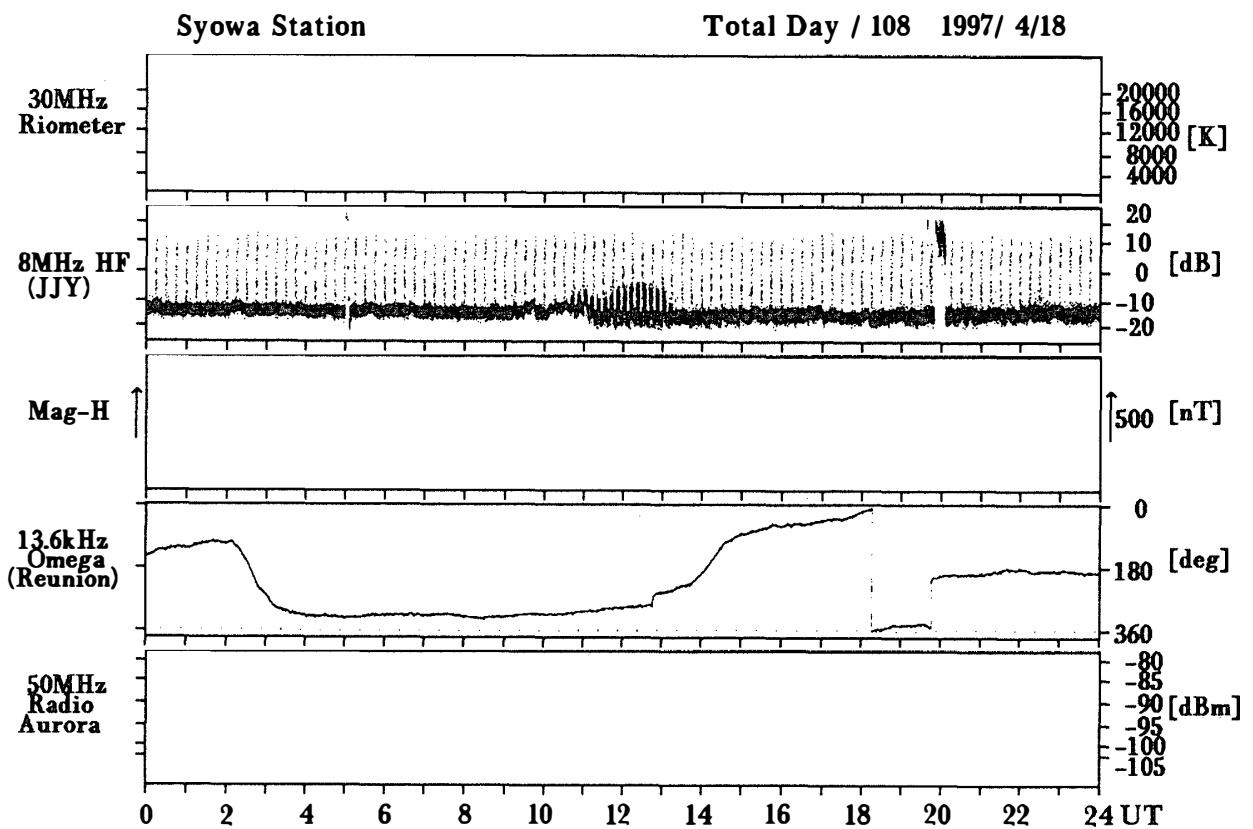
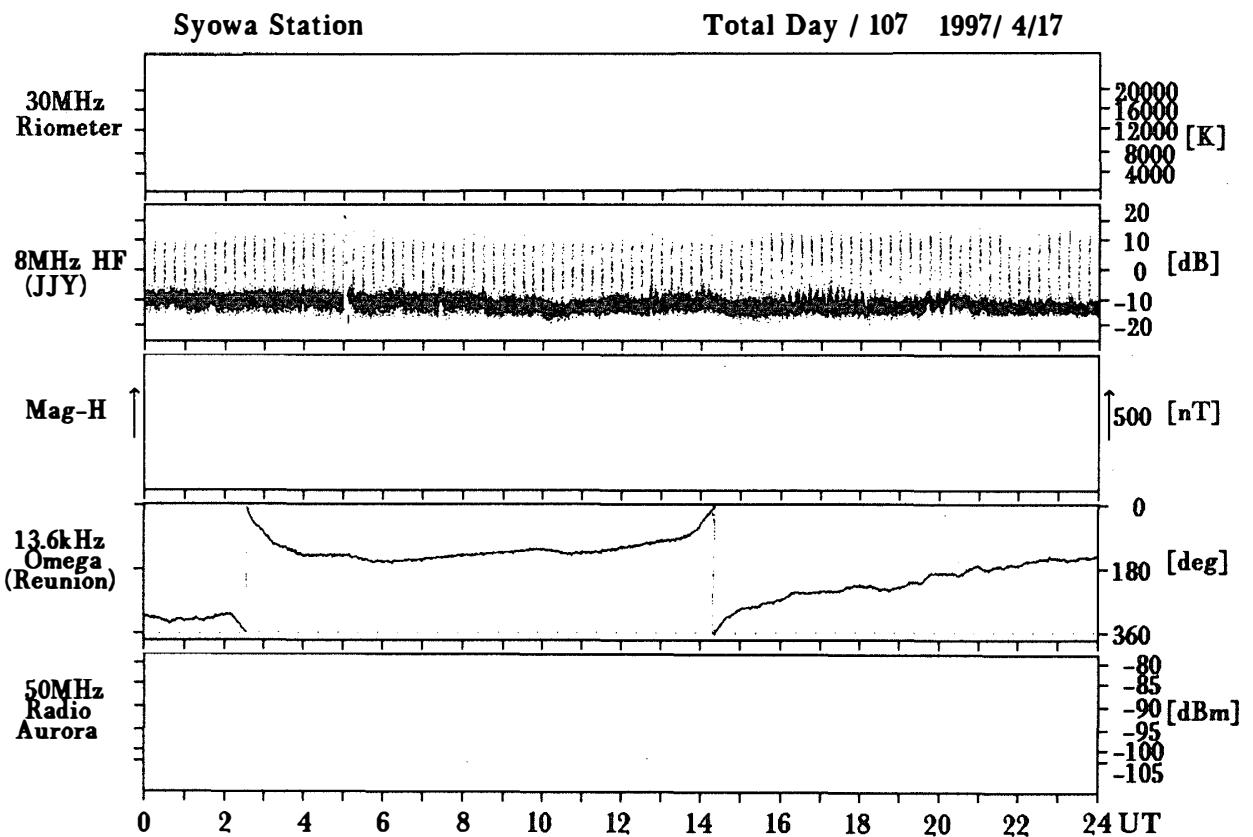
Total Day / 105 1997/ 4/15

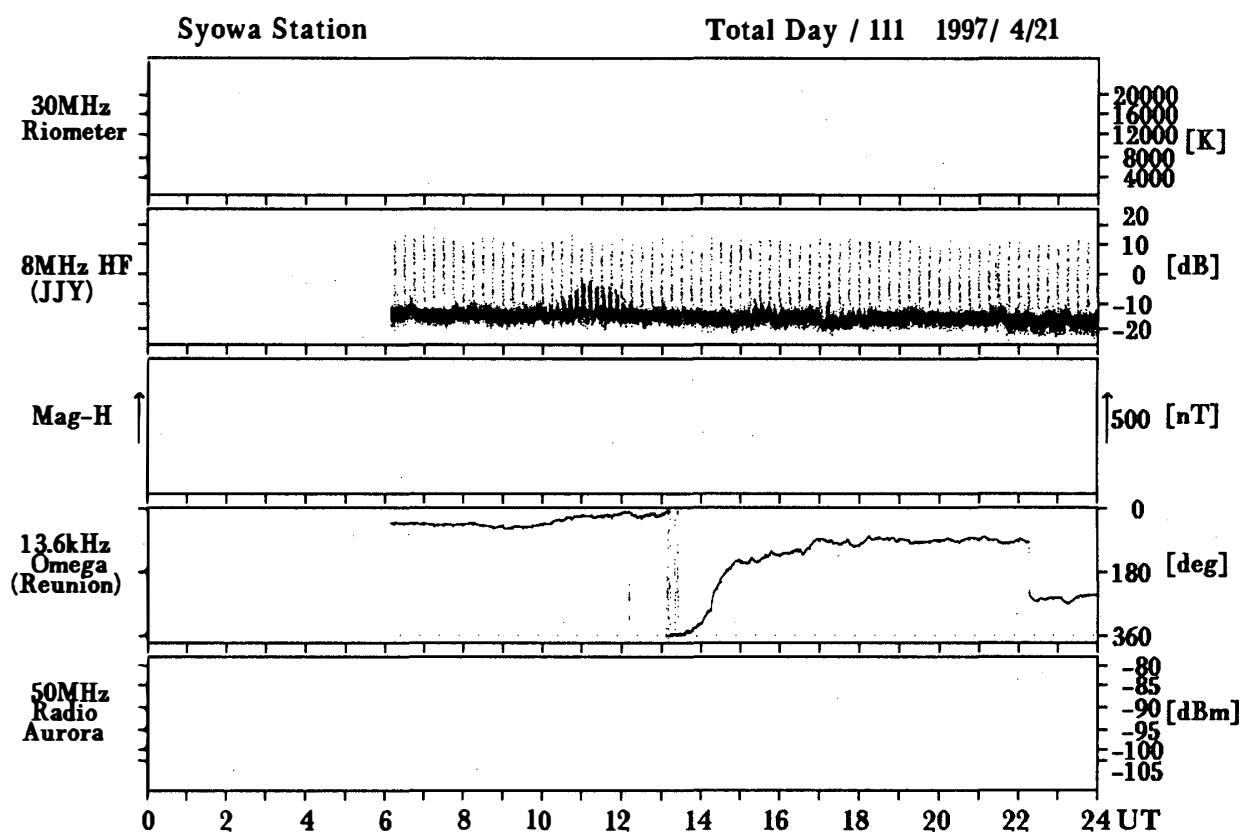
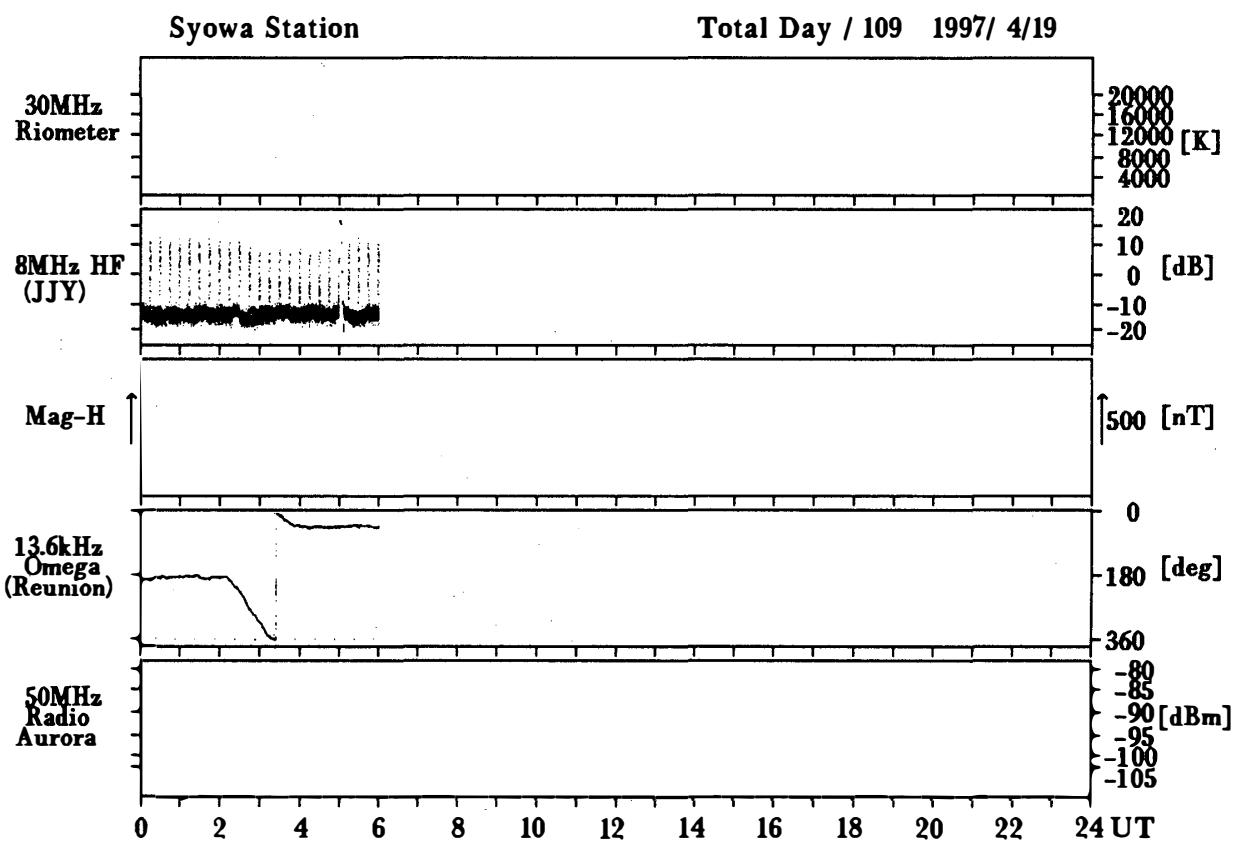


Syowa Station

Total Day / 106 1997/ 4/16

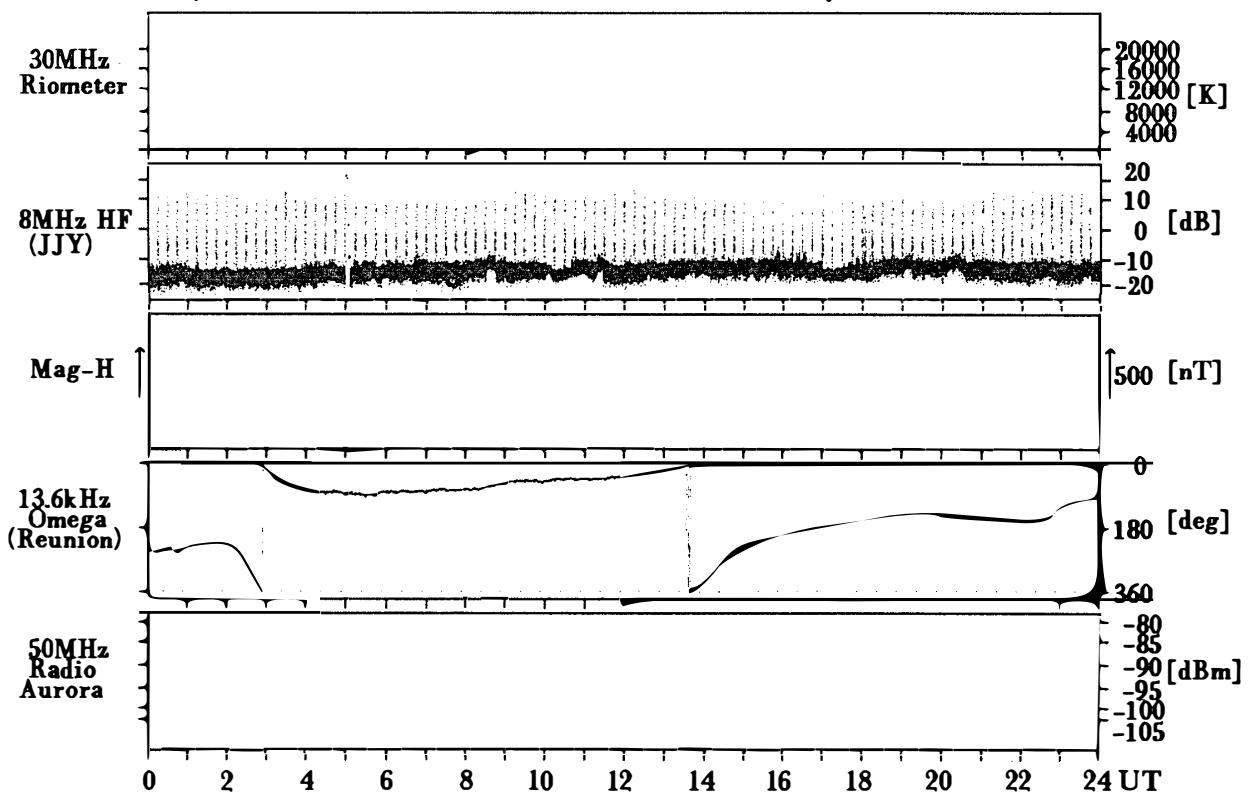






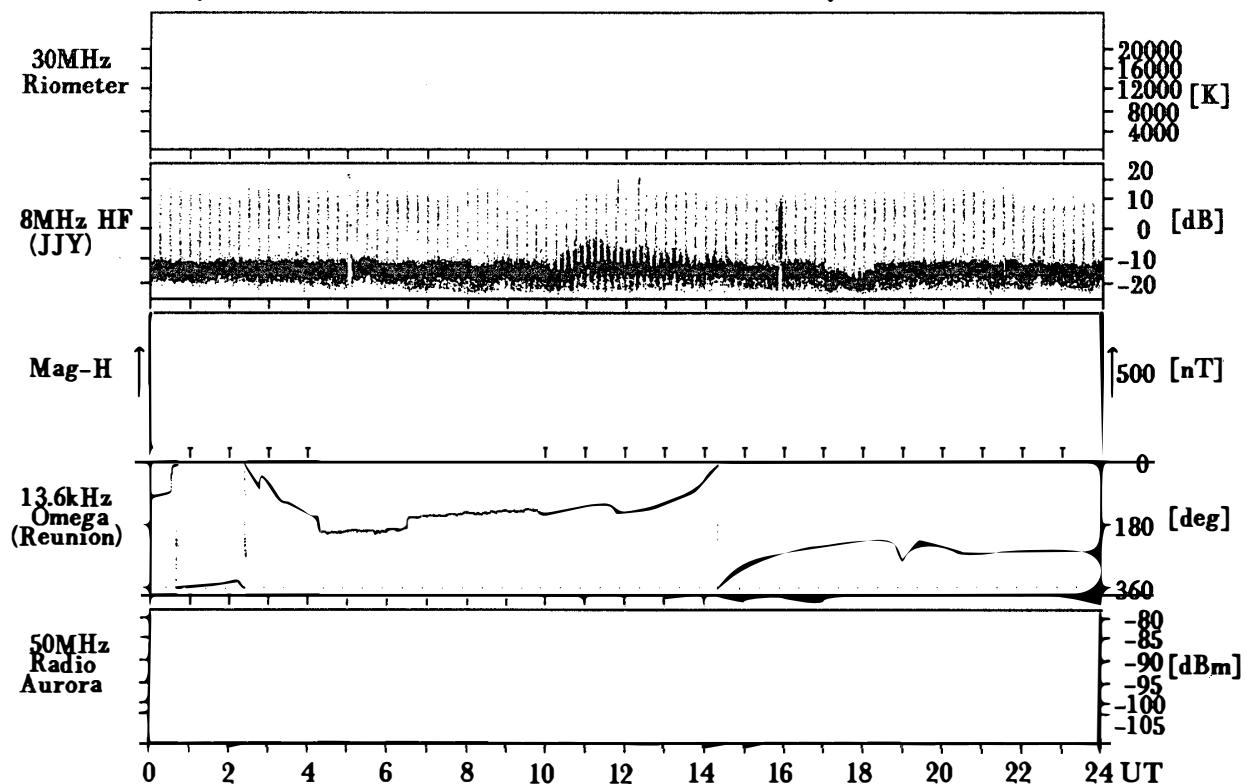
Syowa Station

Total Day / 112 1997/ 4/22



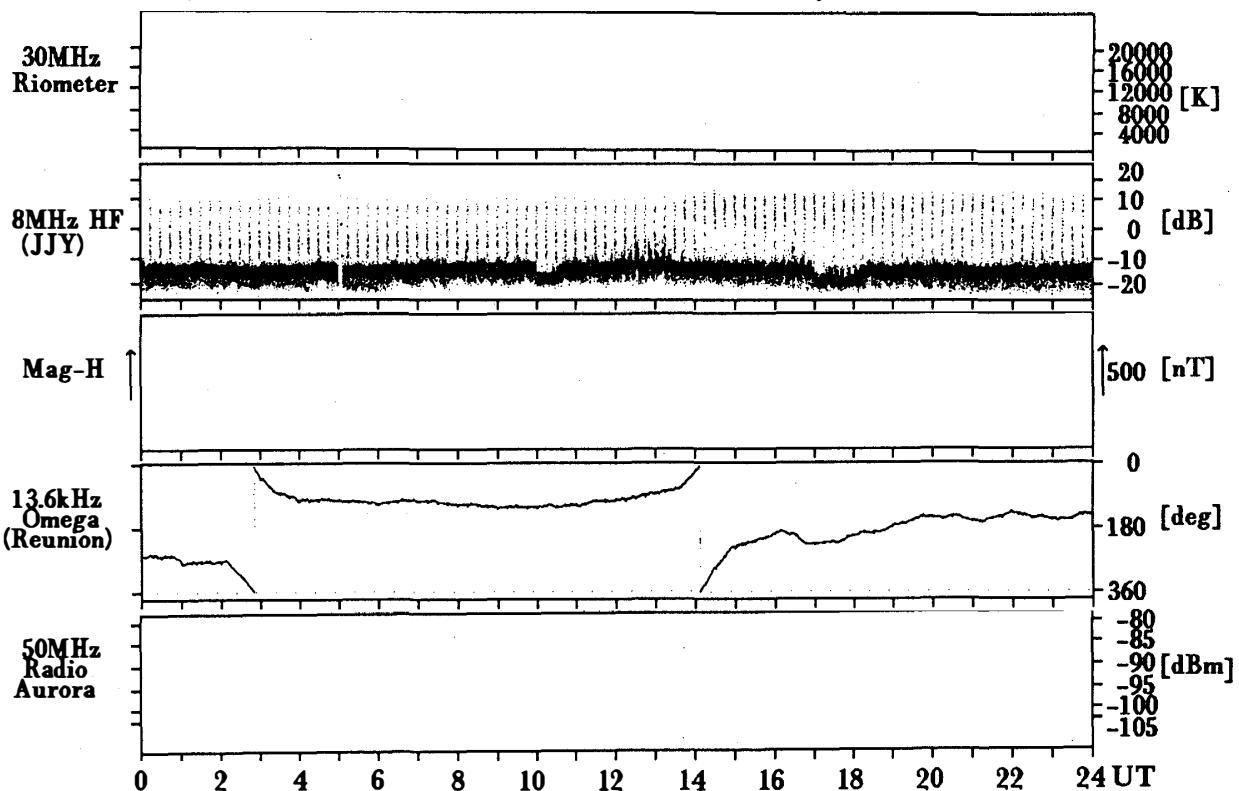
Syowa Station

Total Day / 113 1997/ 4/23



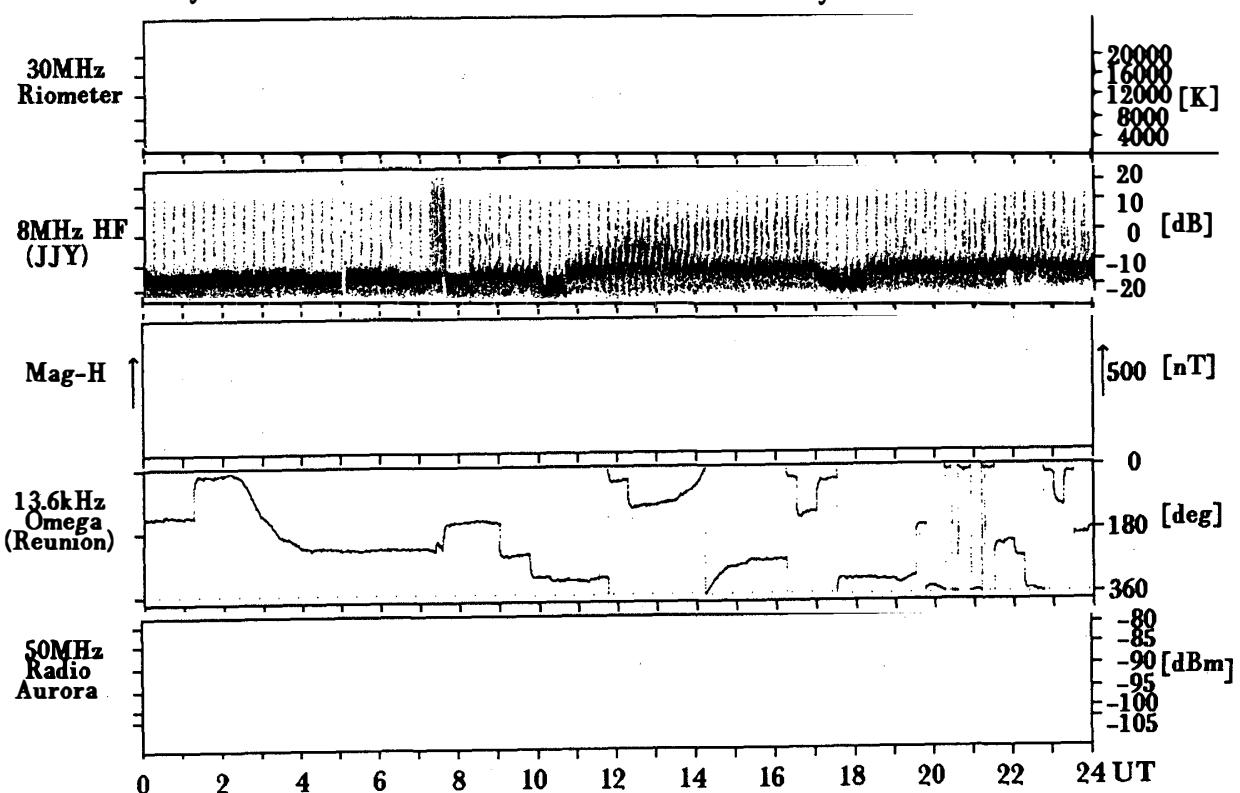
Syowa Station

Total Day / 114 1997/ 4/24



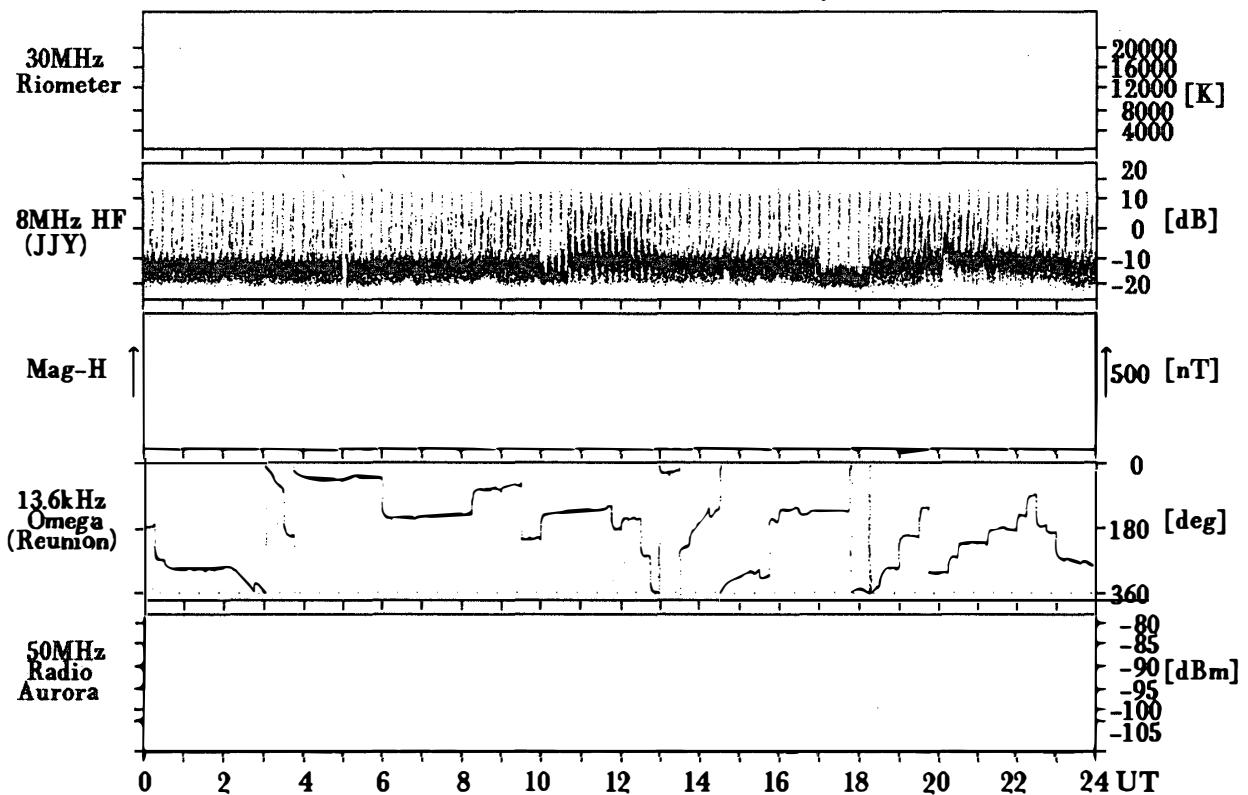
Syowa Station

Total Day / 115 1997/ 4/25



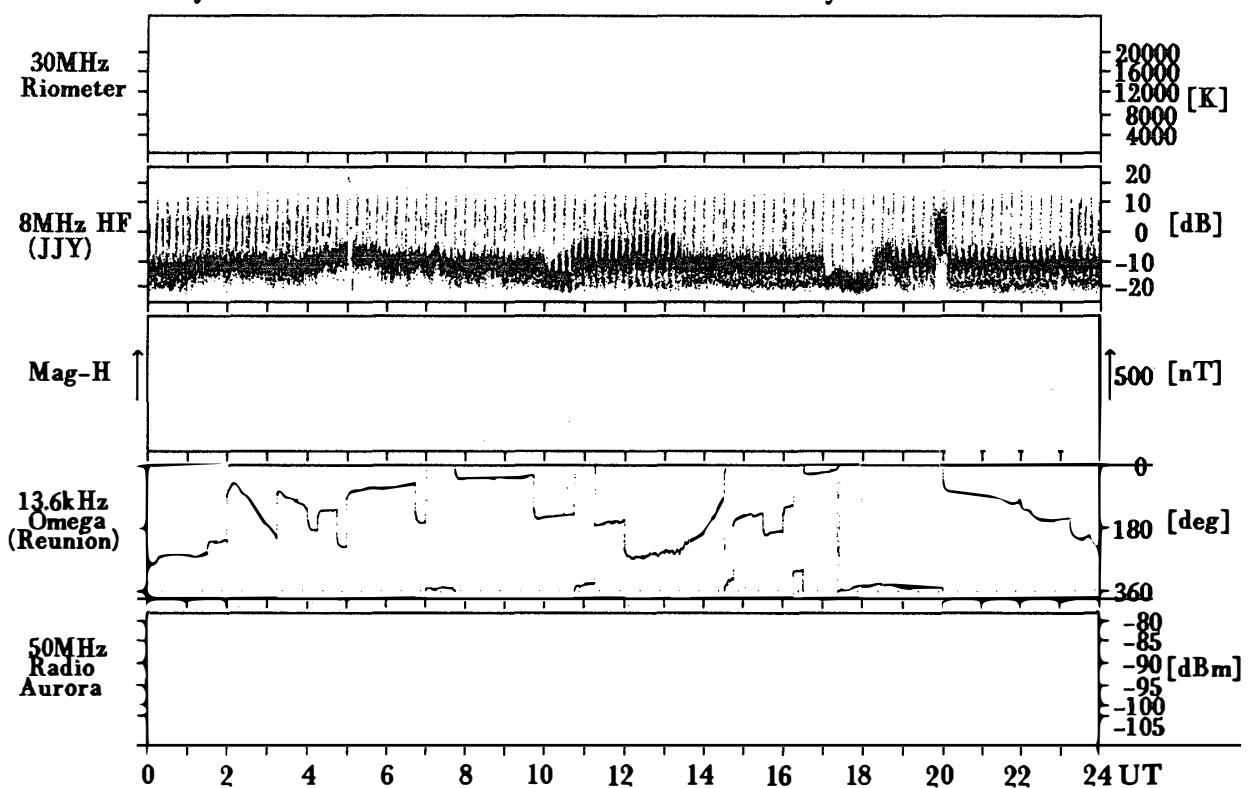
Syowa Station

Total Day / 116 1997/ 4/26



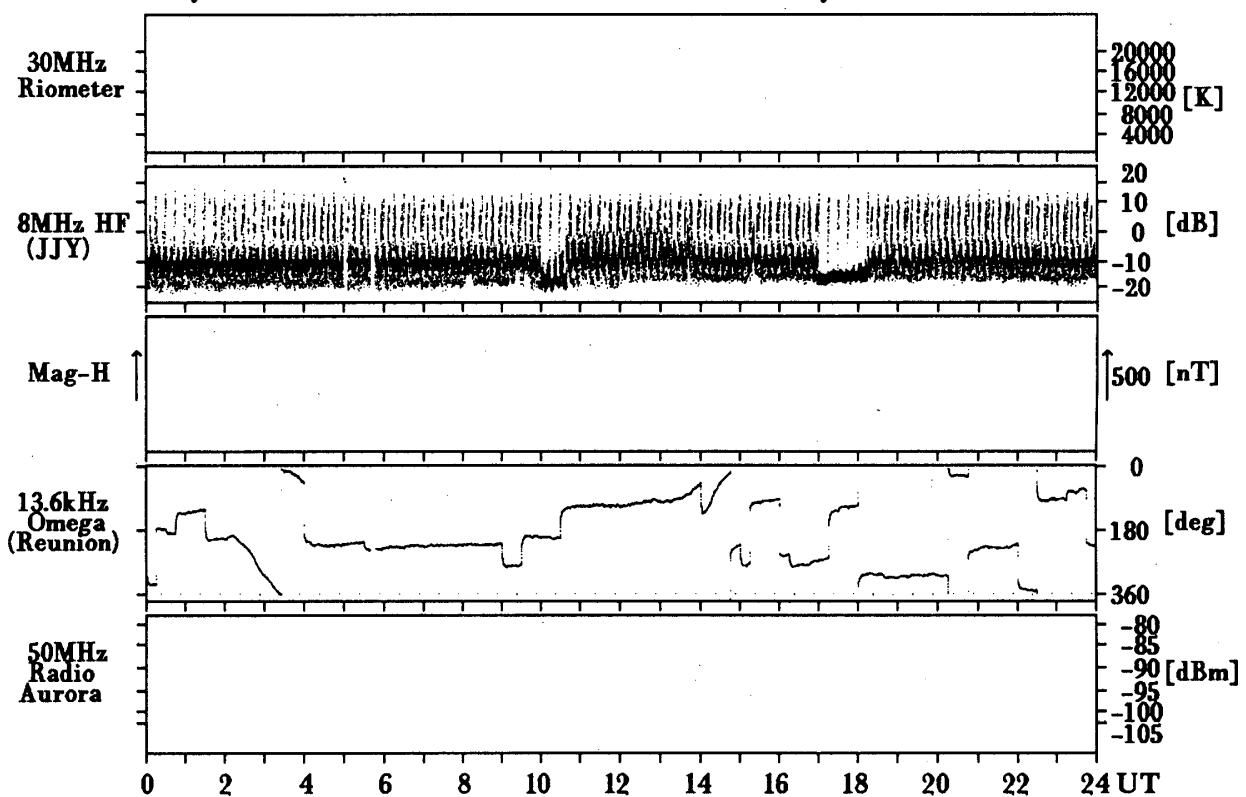
Syowa Station

Total Day / 117 1997/ 4/27



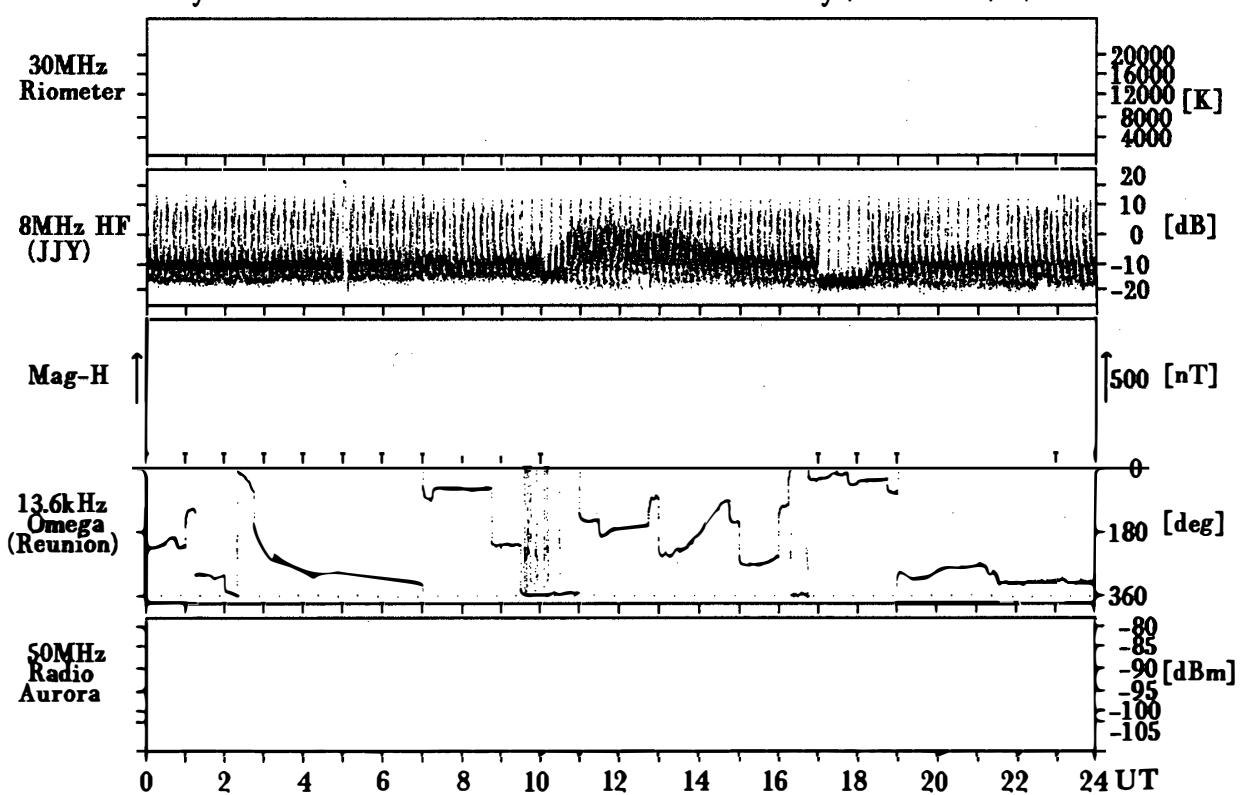
Syowa Station

Total Day / 118 1997/ 4/28



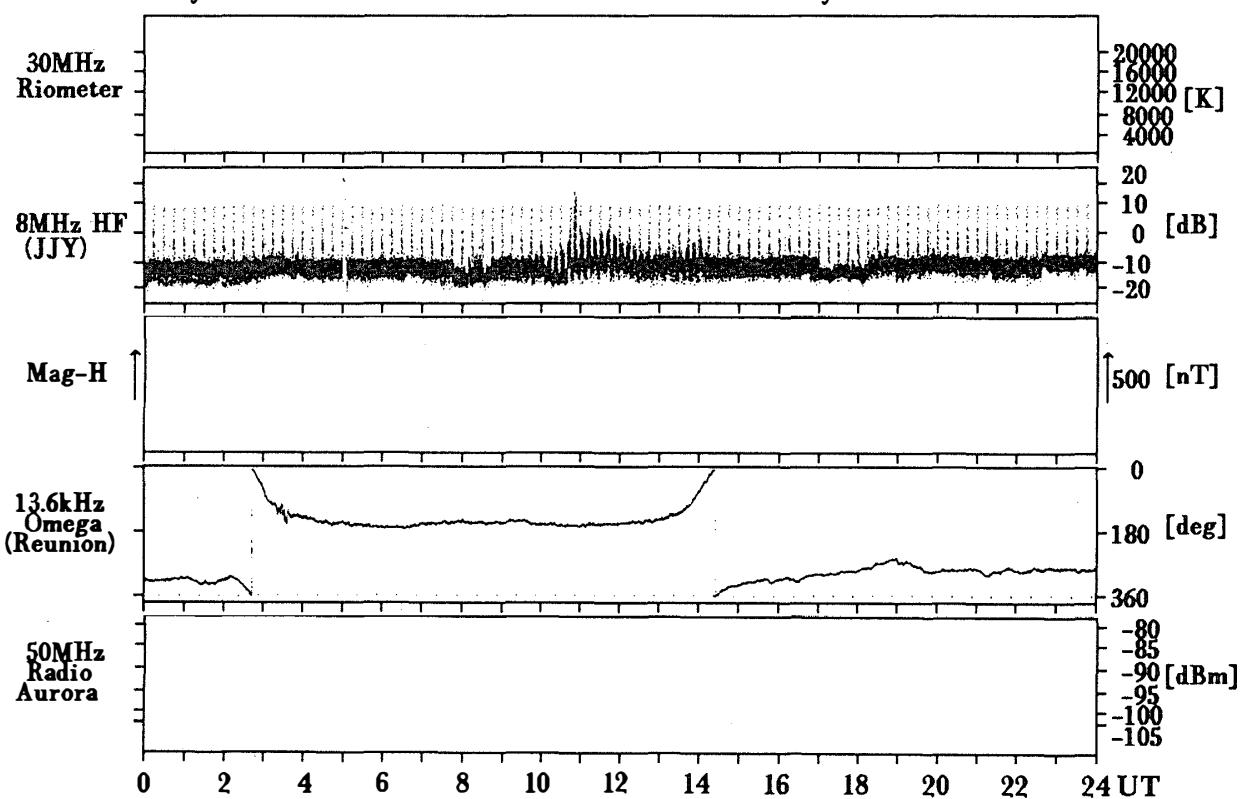
Syowa Station

Total Day / 119 1997/ 4/29



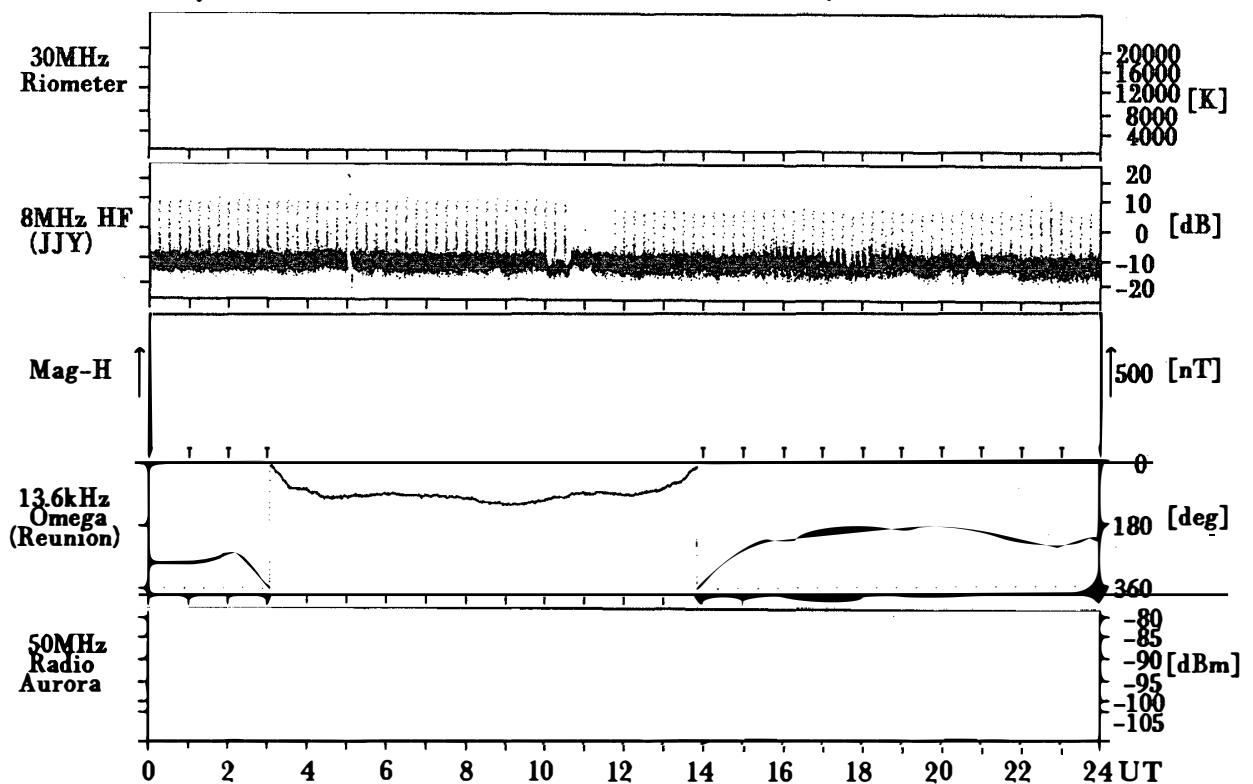
Syowa Station

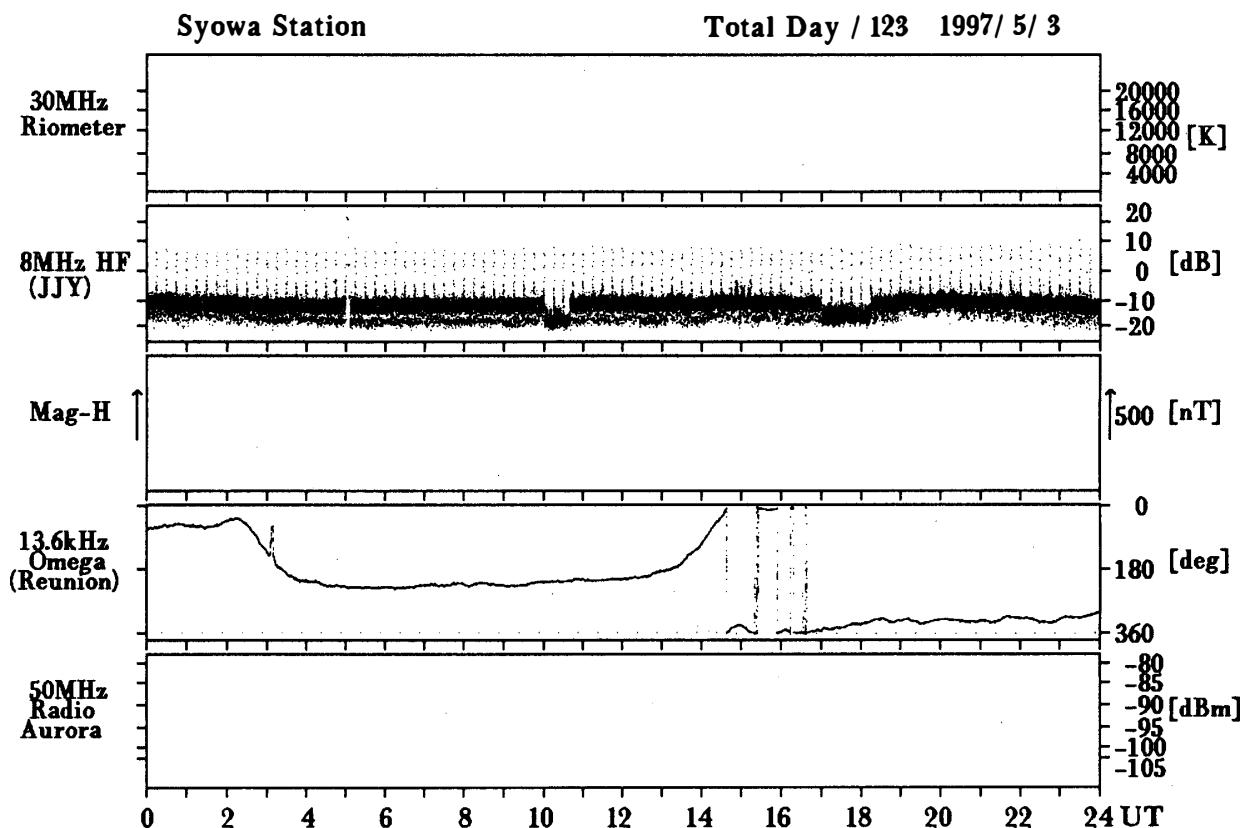
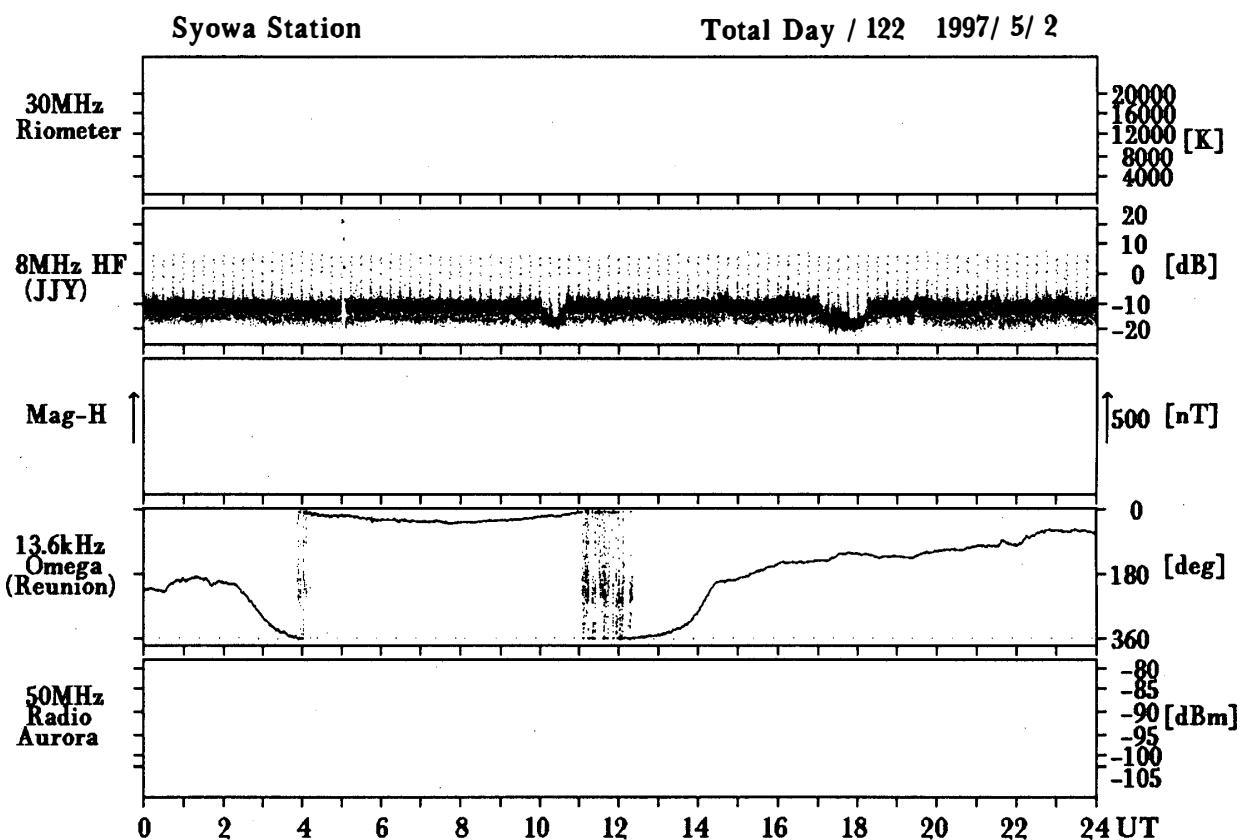
Total Day / 120 1997/ 4/30



Syowa Station

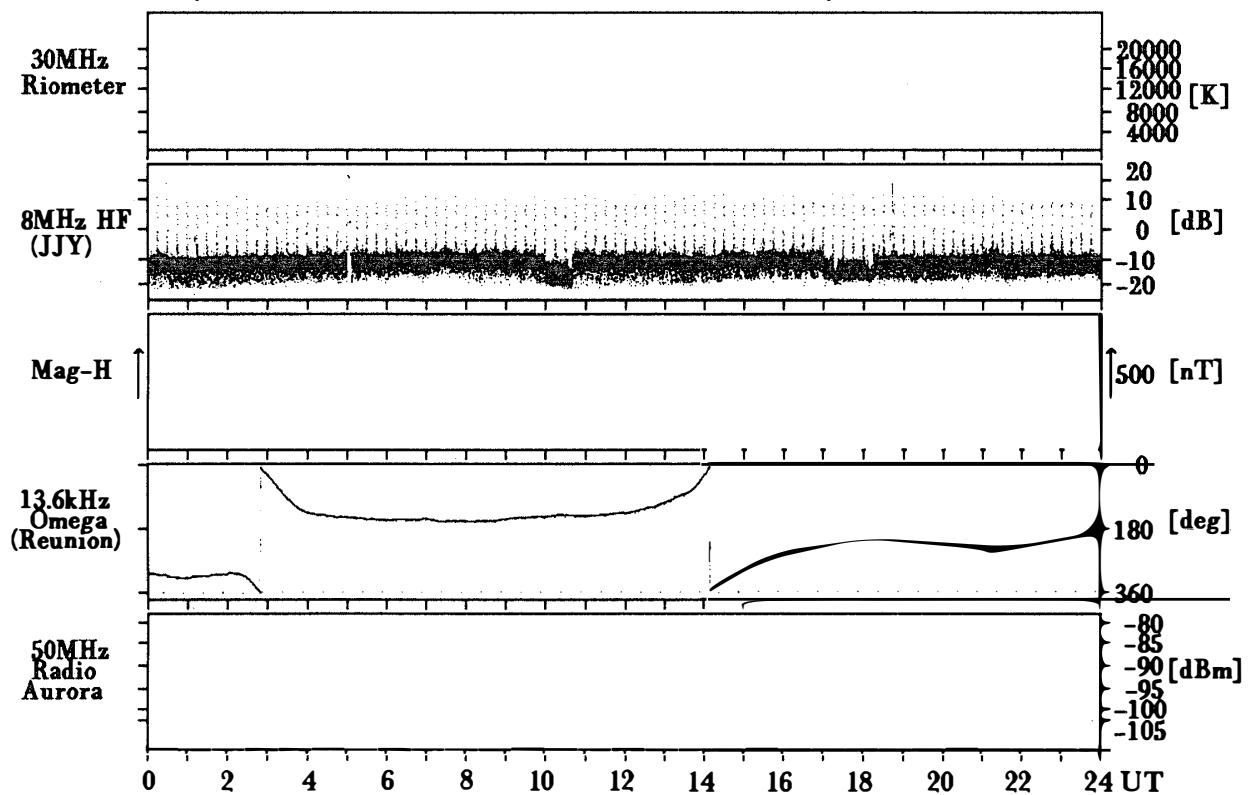
Total Day / 121 1997/ 5/ 1





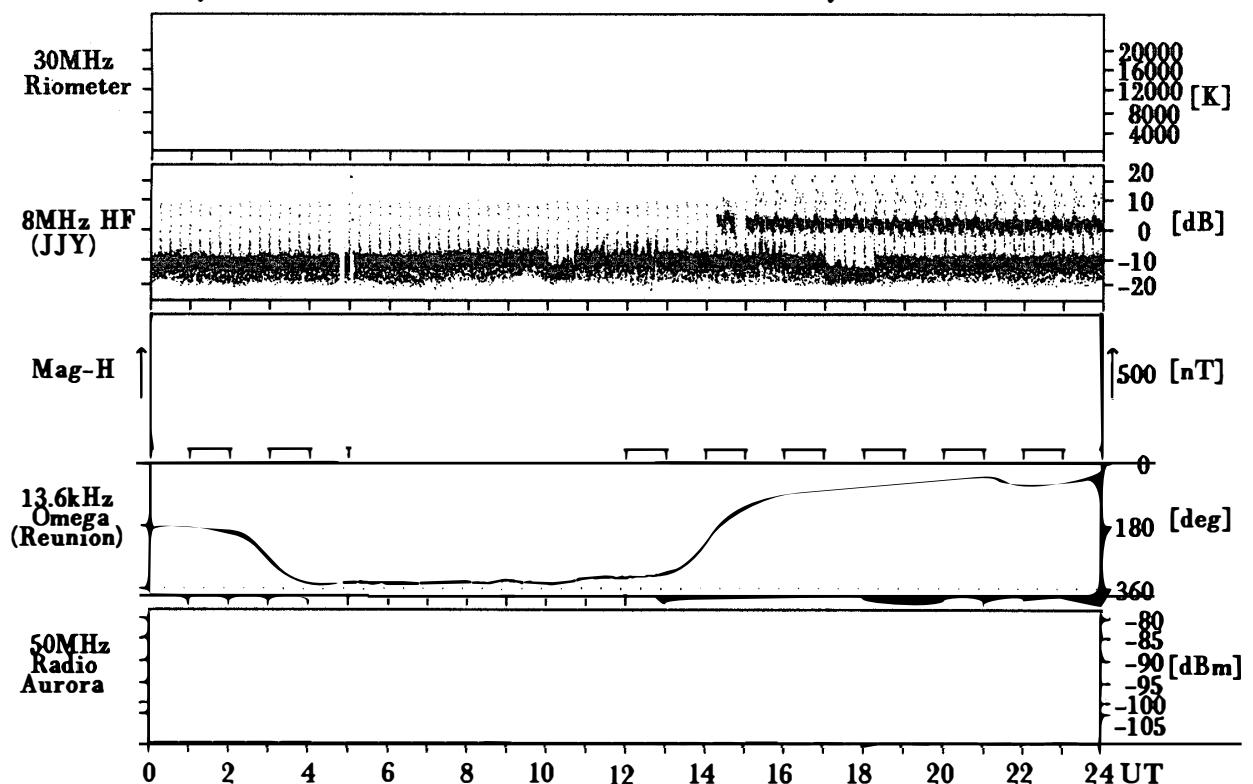
Syowa Station

Total Day / 124 1997/ 5/ 4



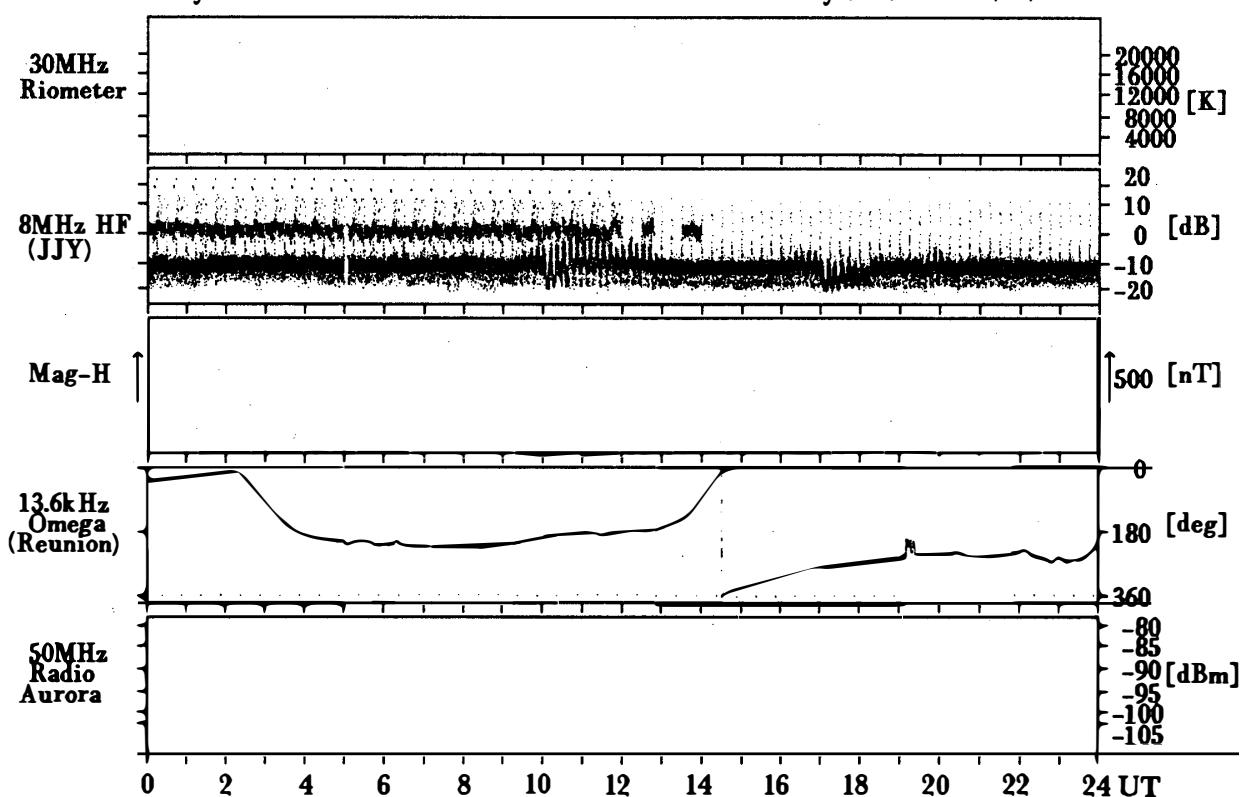
Syowa Station

Total Day / 125 1997/ 5/ 5



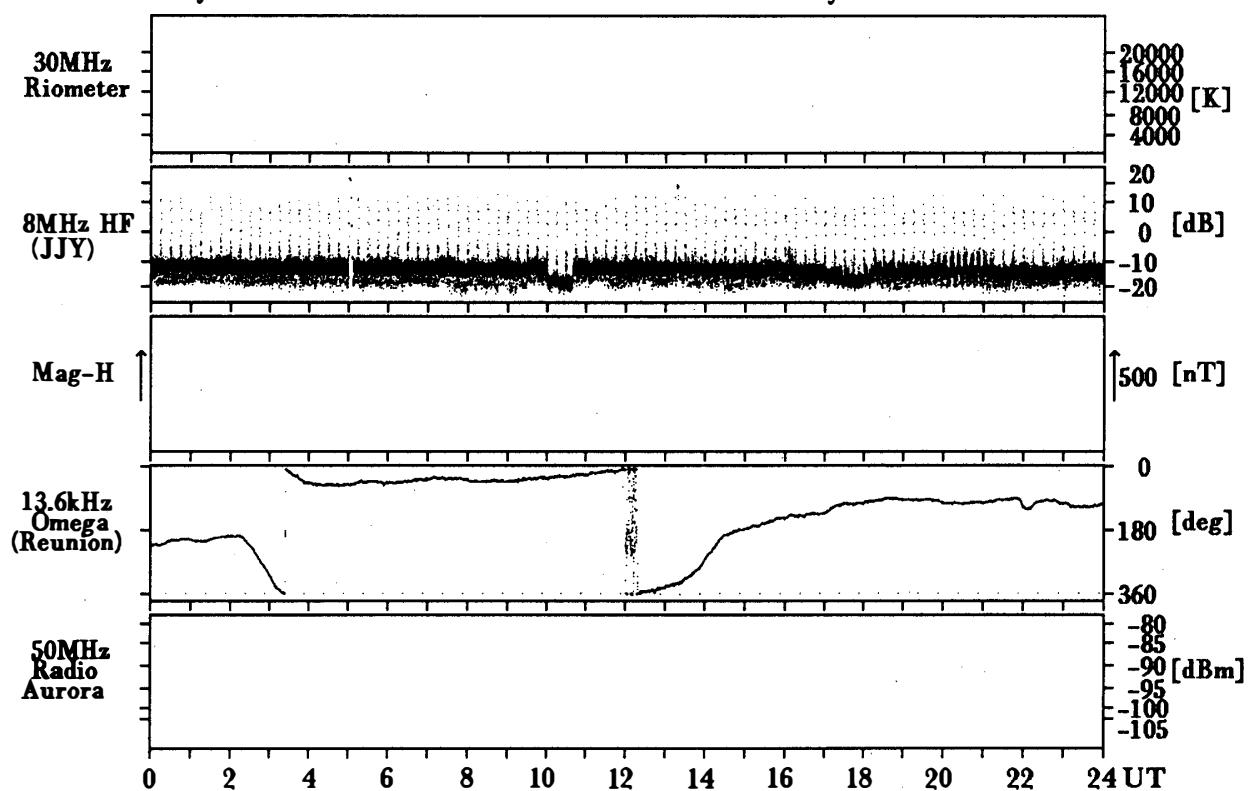
Syowa Station

Total Day / 126 1997/ 5/ 6



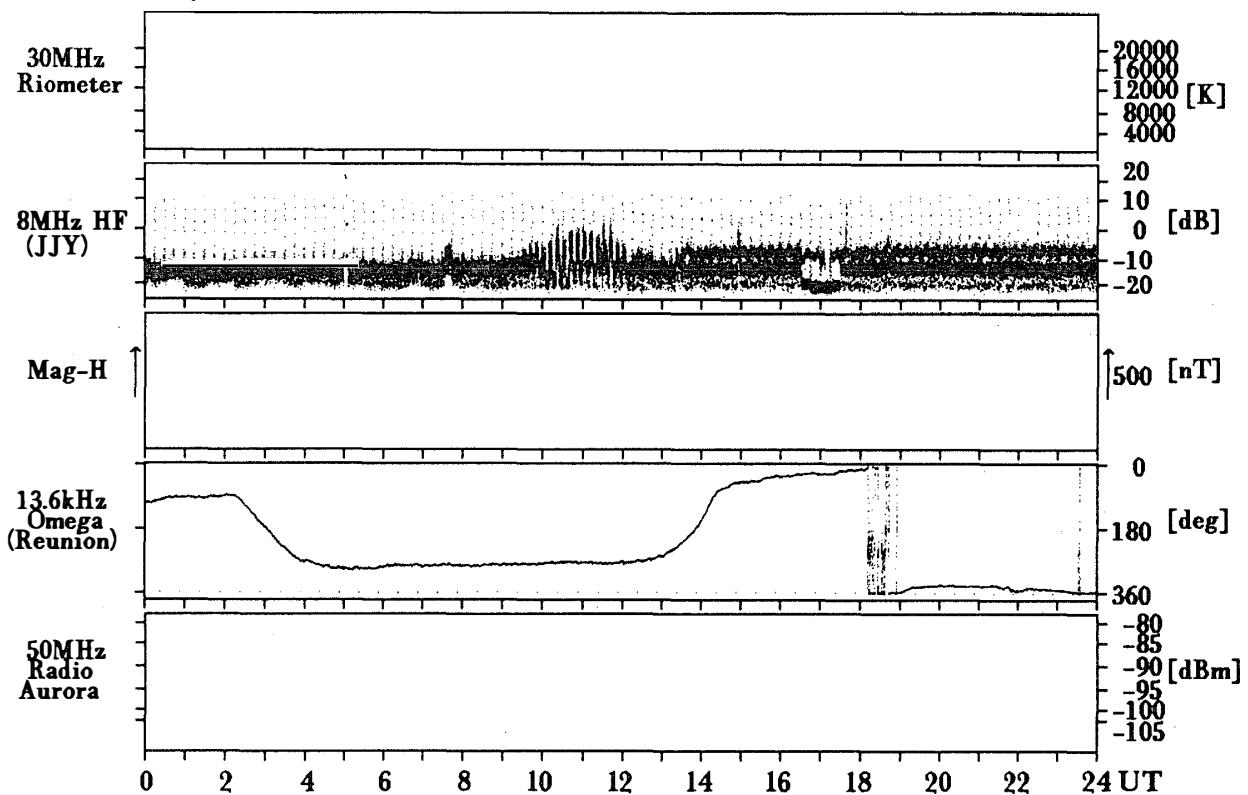
Syowa Station

Total Day / 127 1997/ 5/ 7



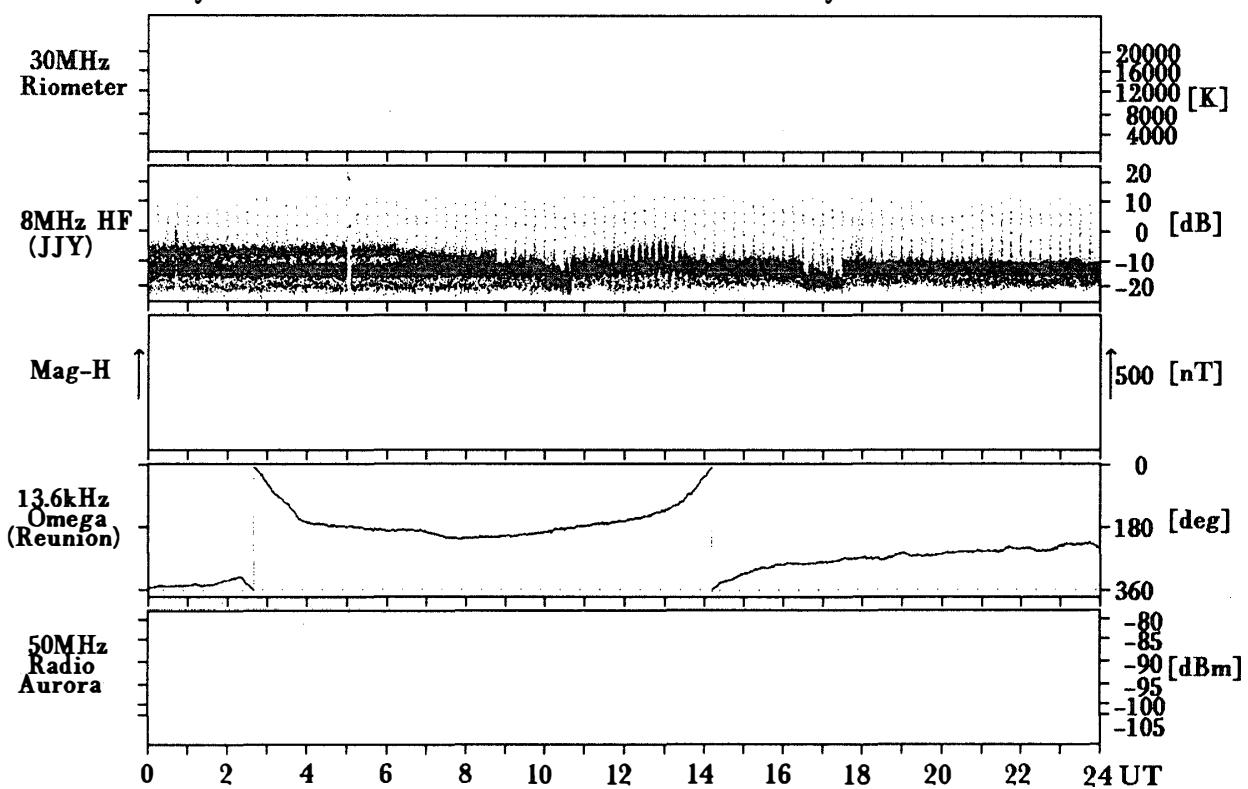
Syowa Station

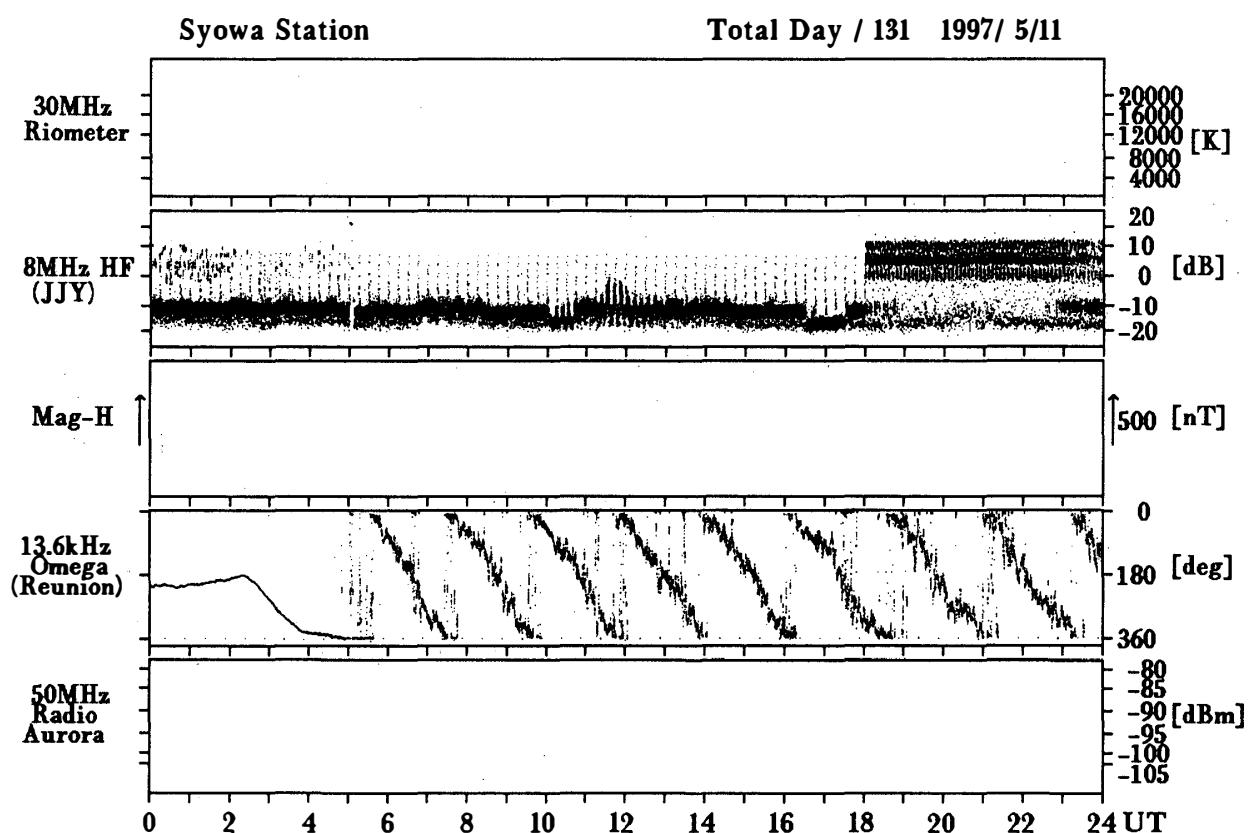
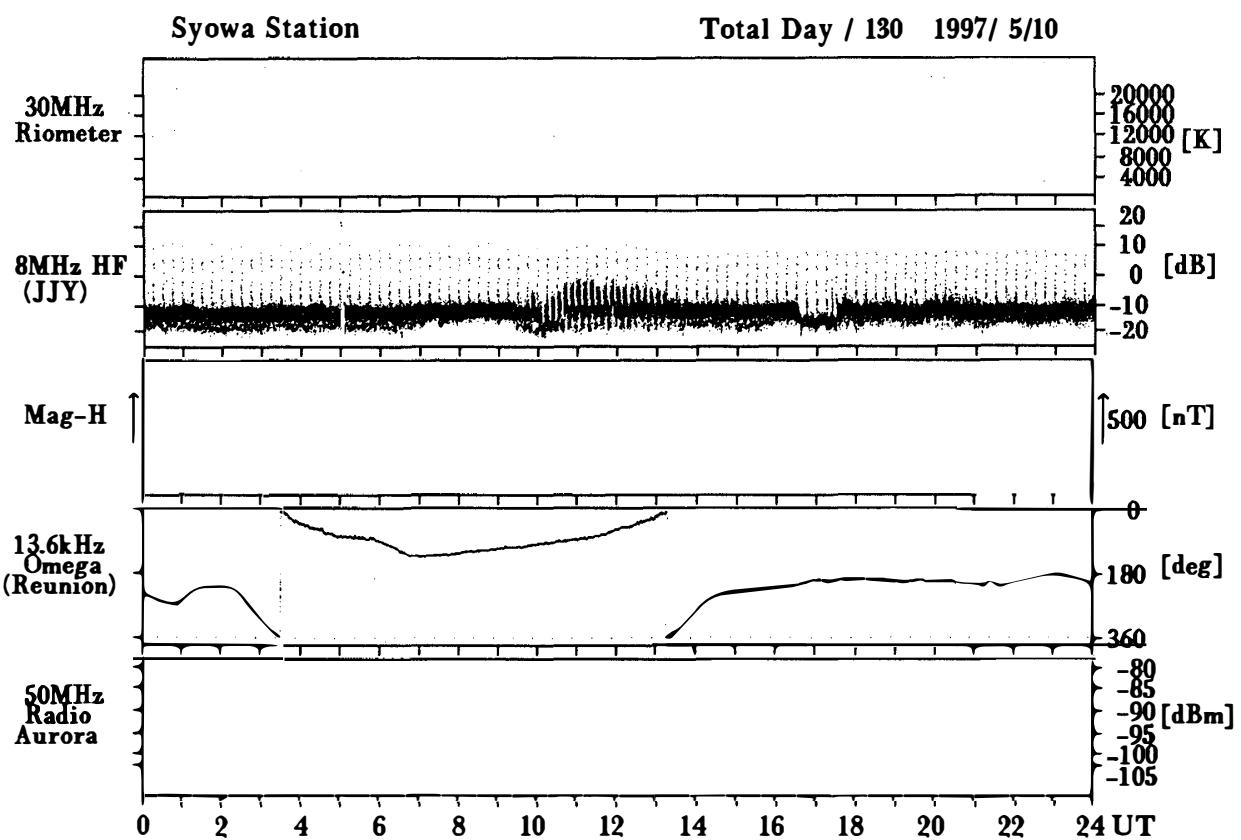
Total Day / 128 1997/ 5/ 8



Syowa Station

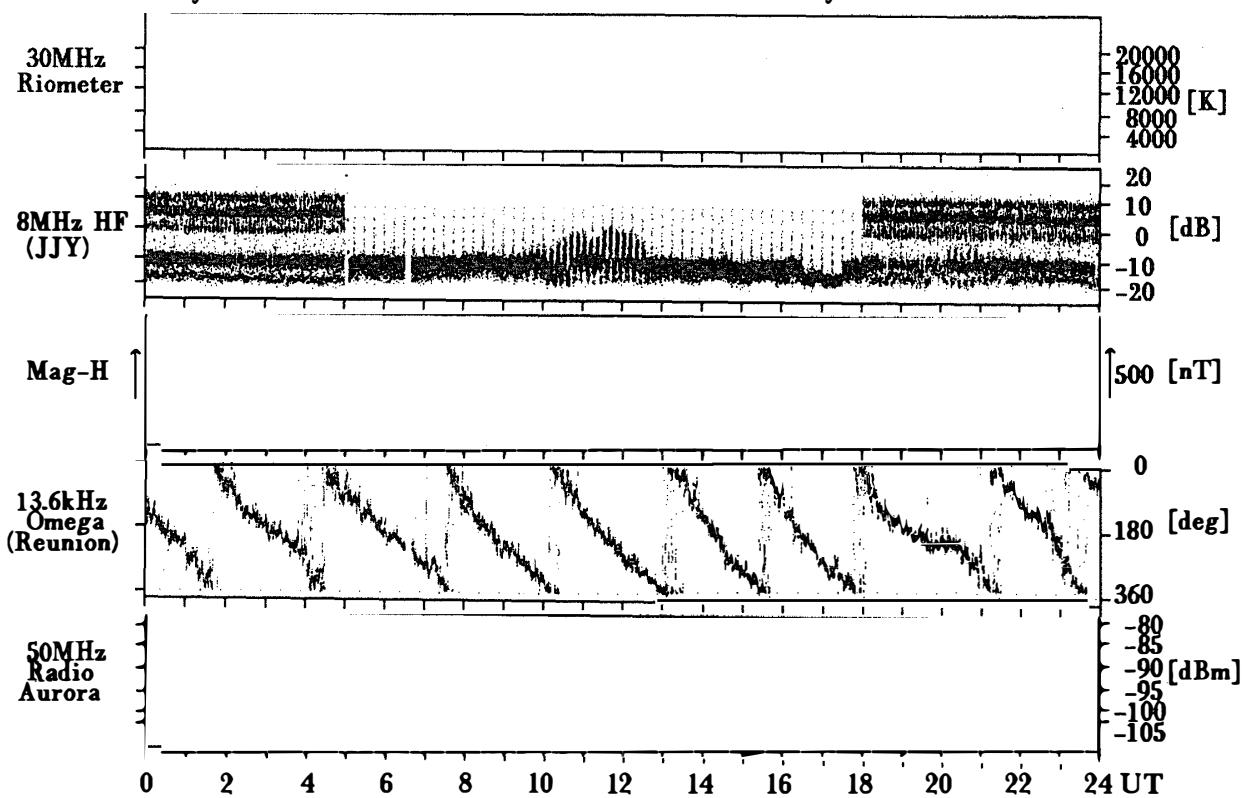
Total Day / 129 1997/ 5/ 9





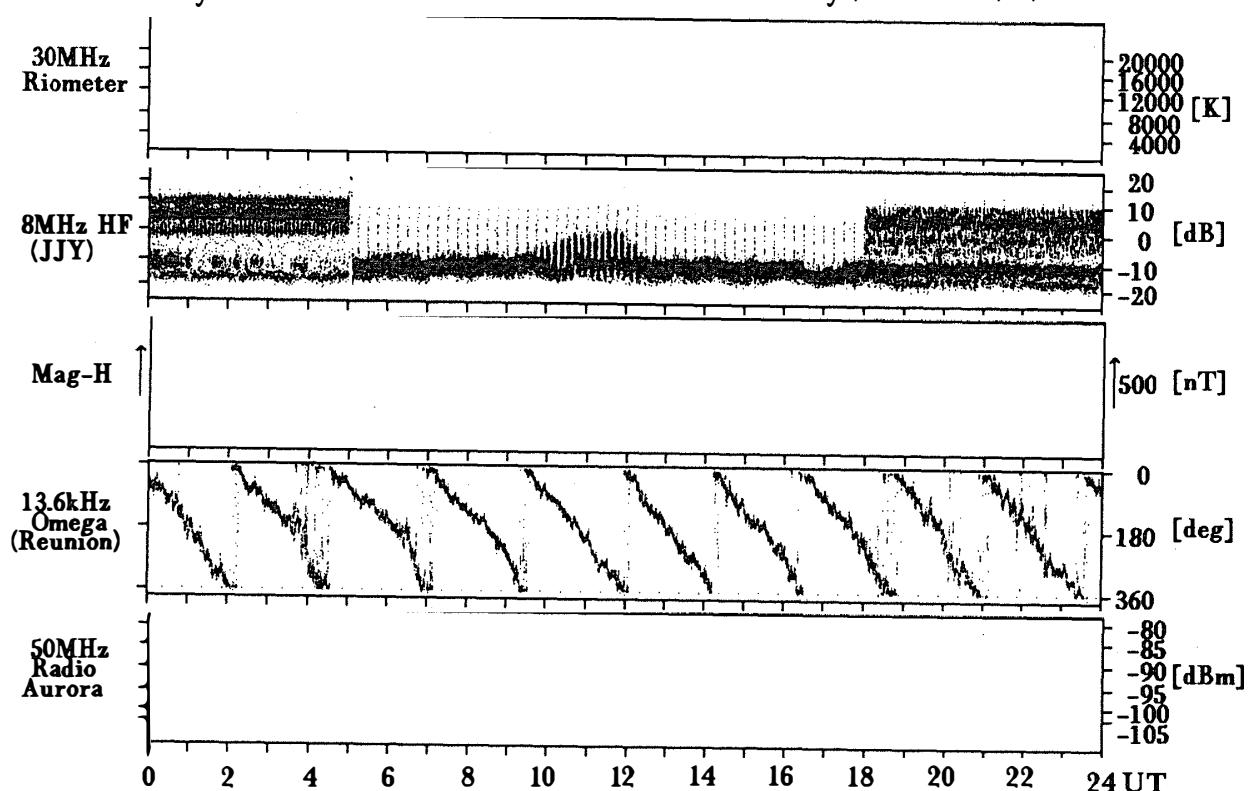
Syowa Station

Total Day / 132 1997/ 5/12



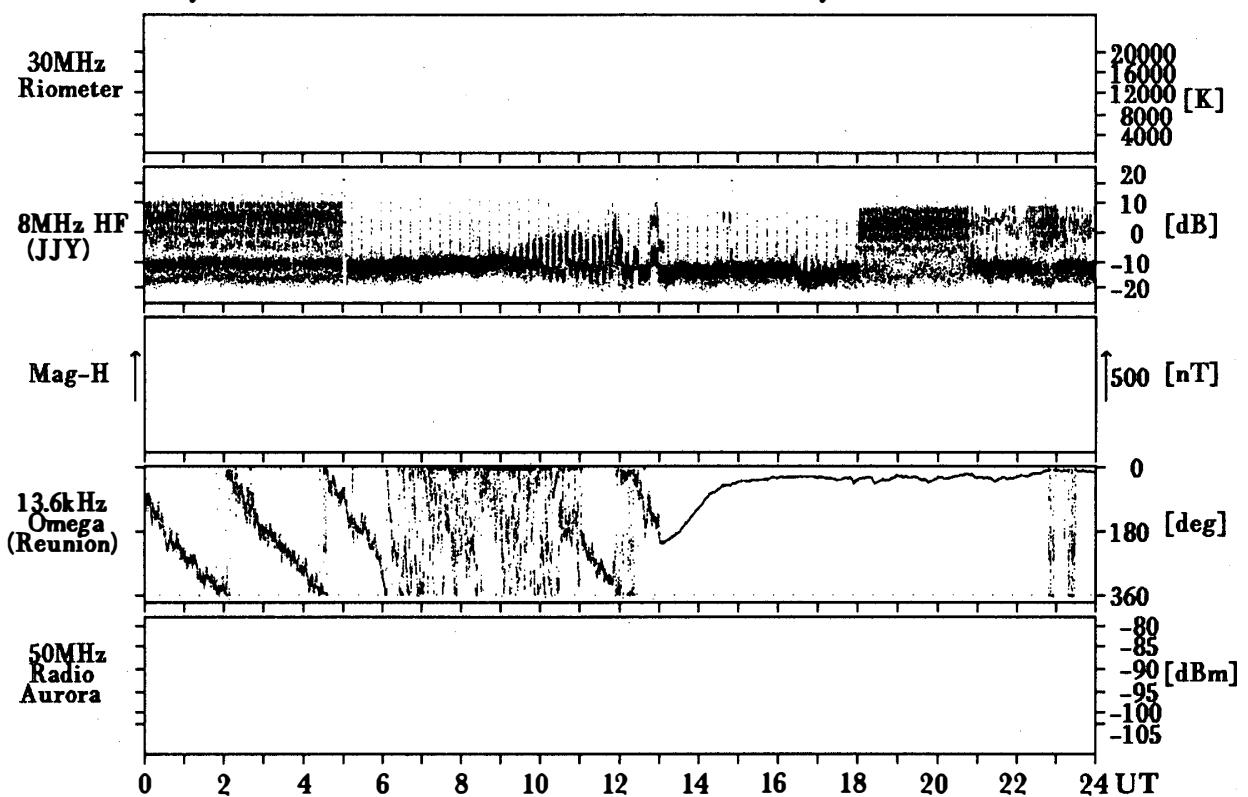
Syowa Station

Total Day / 133 1997/ 5/13



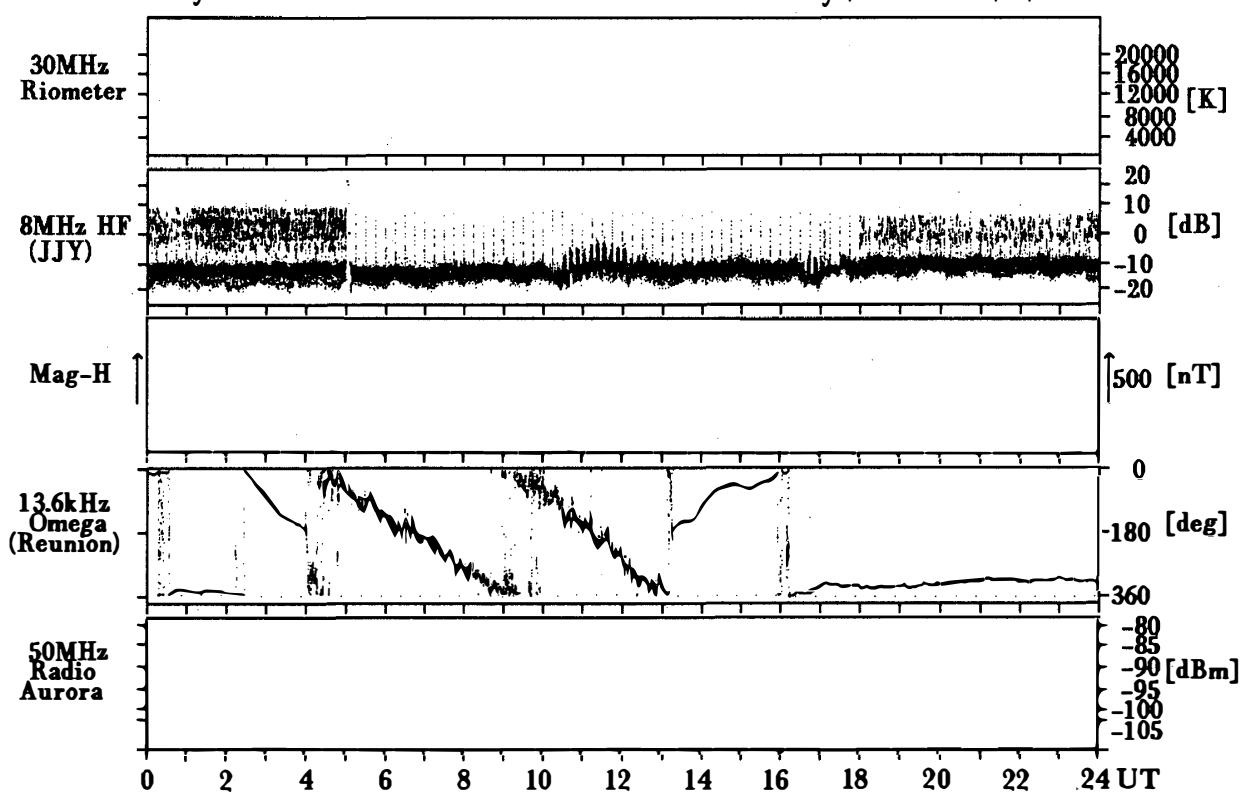
Syowa Station

Total Day / 134 1997/ 5/14



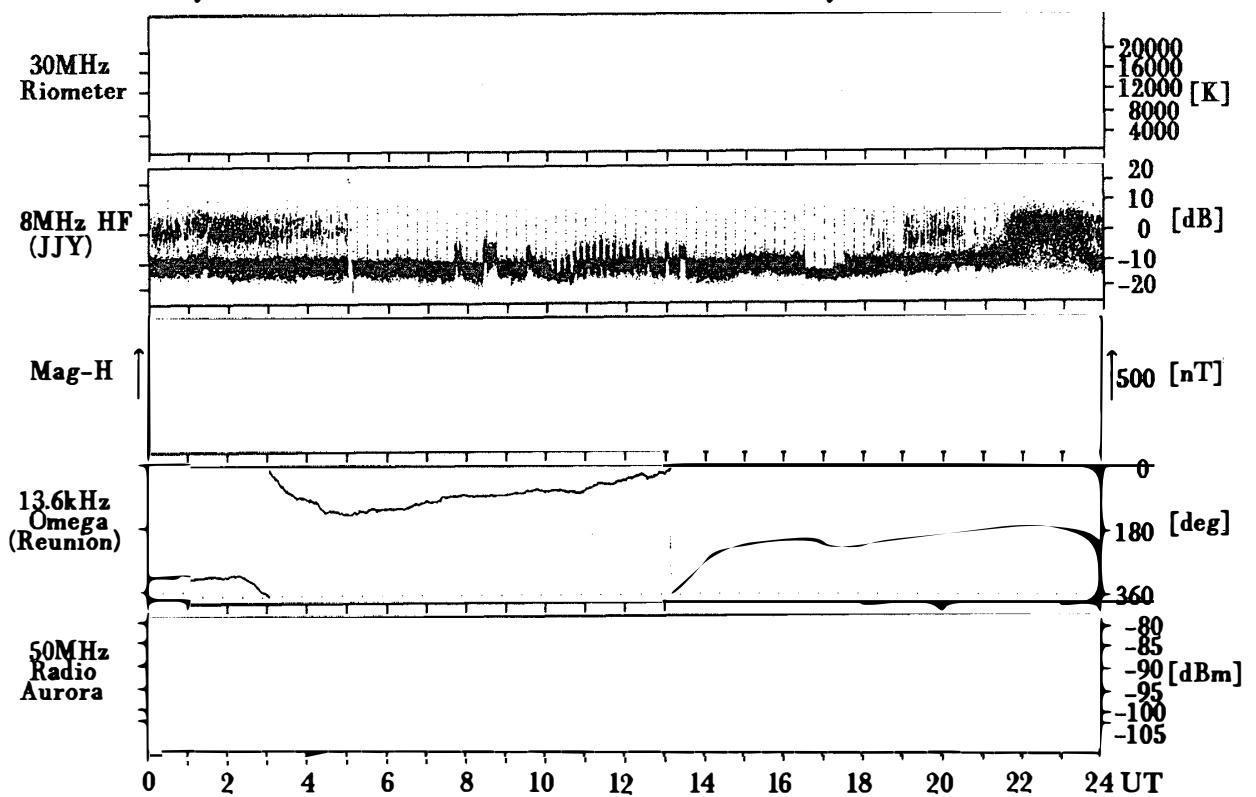
Syowa Station

Total Day / 135 1997/ 5/15



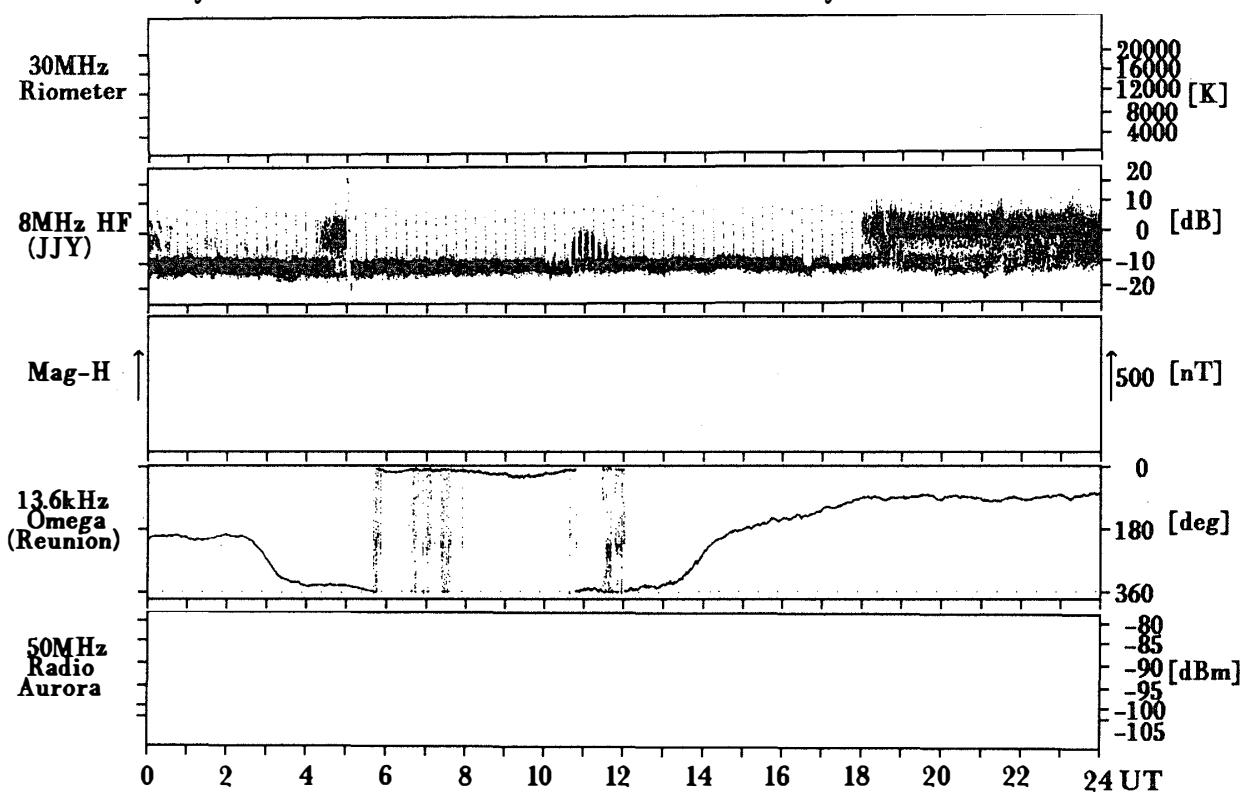
Syowa Station

Total Day / 136 1997/ 5/16



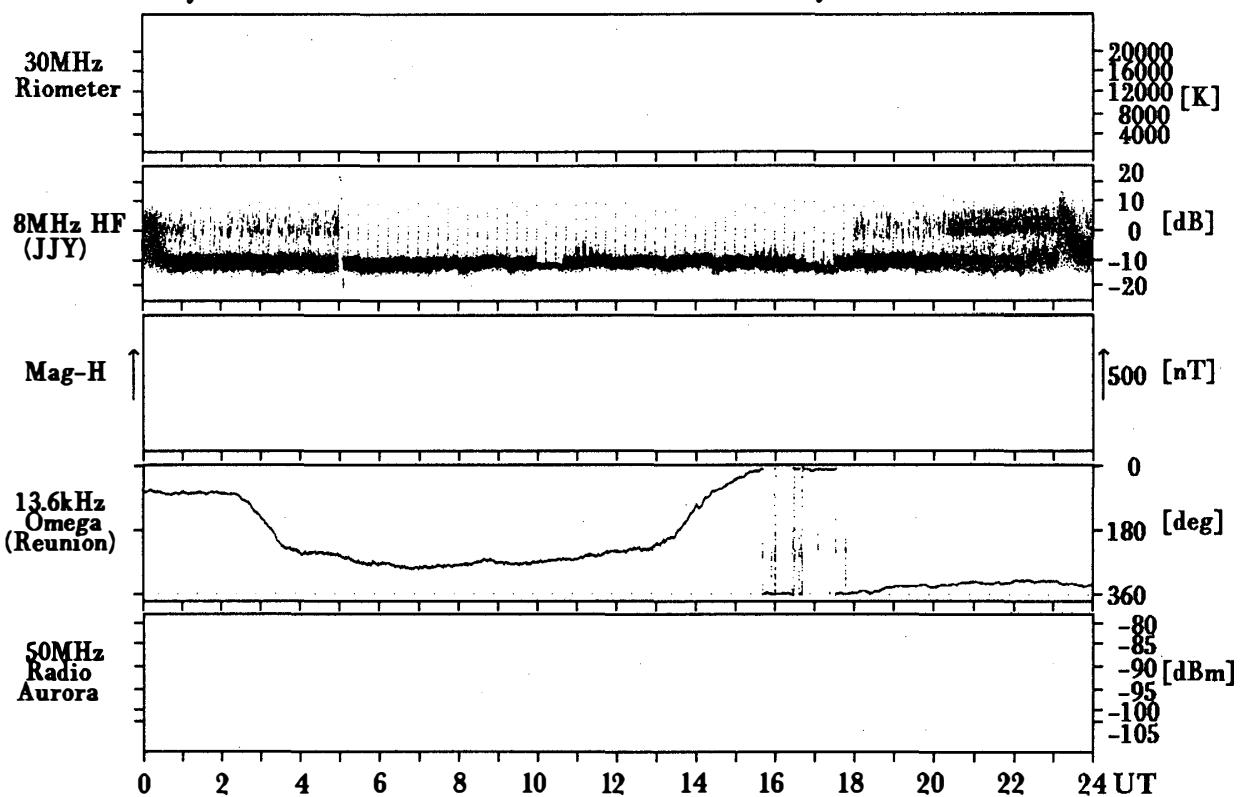
Syowa Station

Total Day / 137 1997/ 5/17



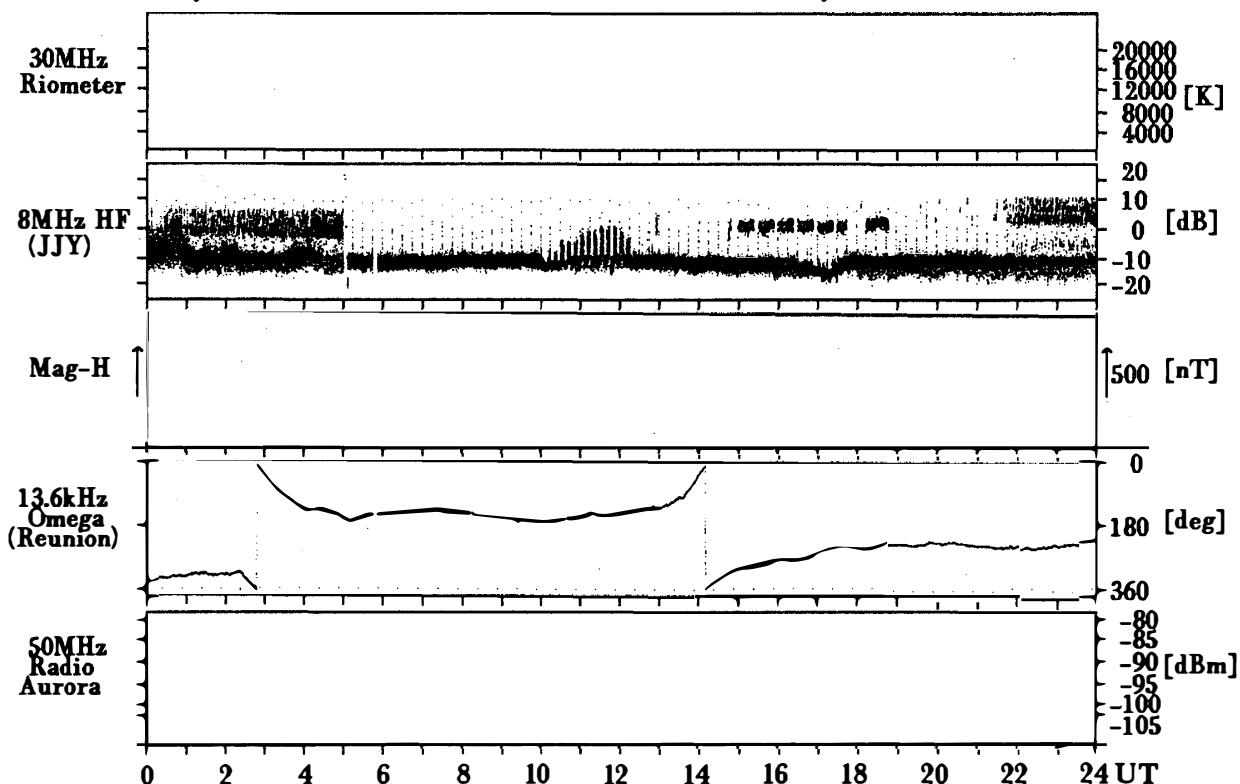
Syowa Station

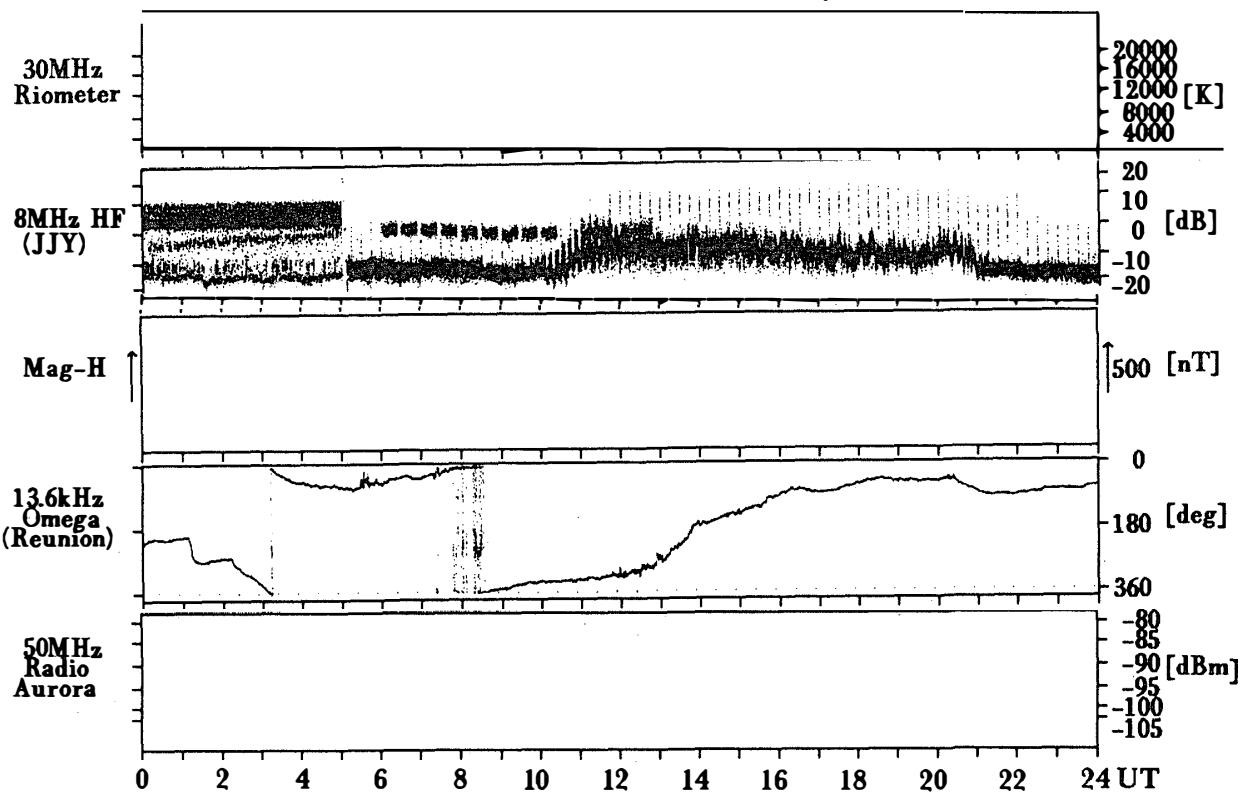
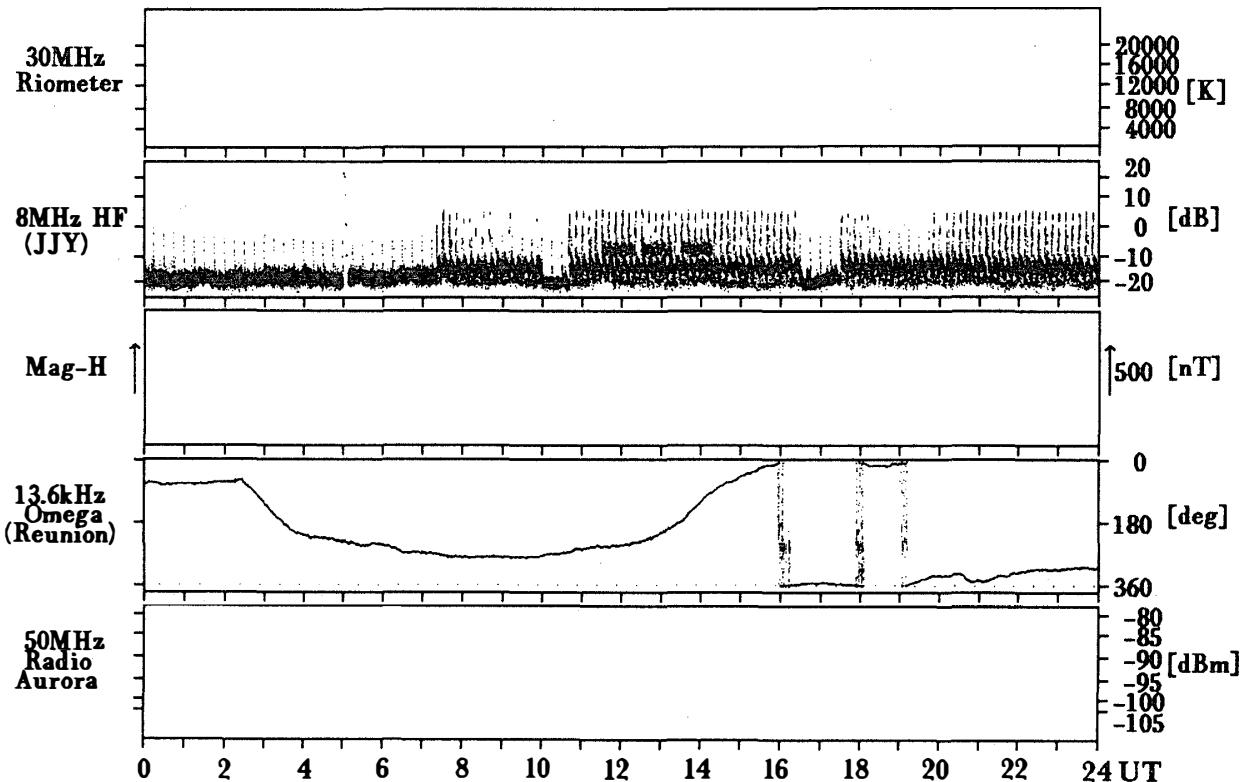
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Syowa Station

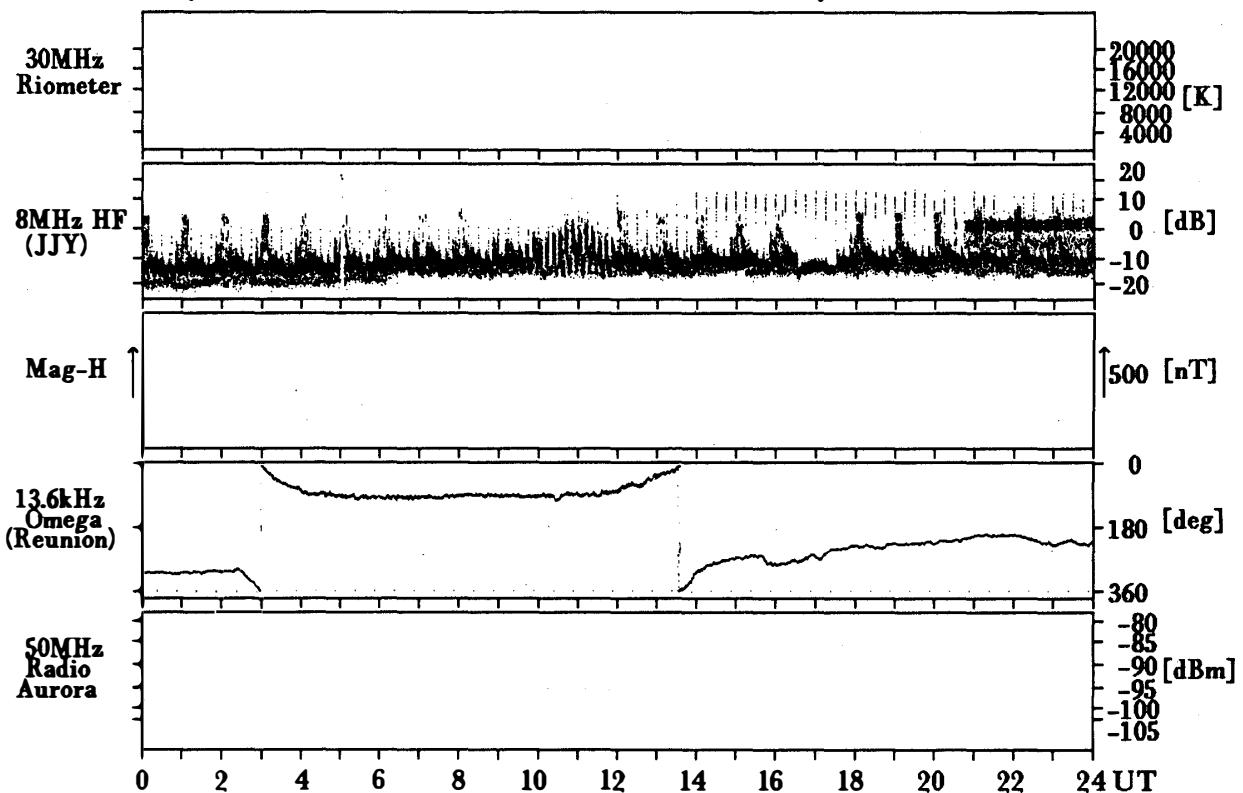
Total Day / 139 1997/ 5/19



Syowa Station**Total Day / 140 1997/ 5/20****Syowa Station****Total Day / 141 1997/ 5/21**

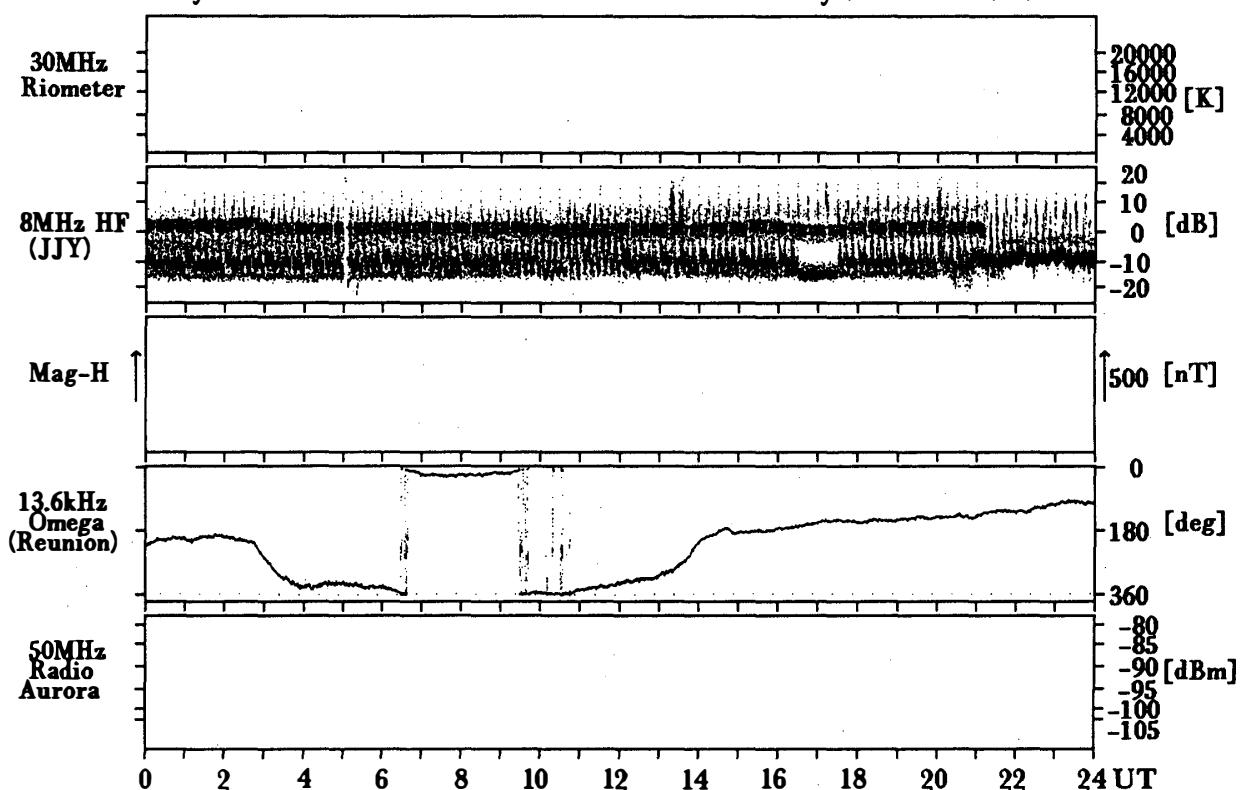
Syowa Station

Total Day / 142 1997/ 5/22



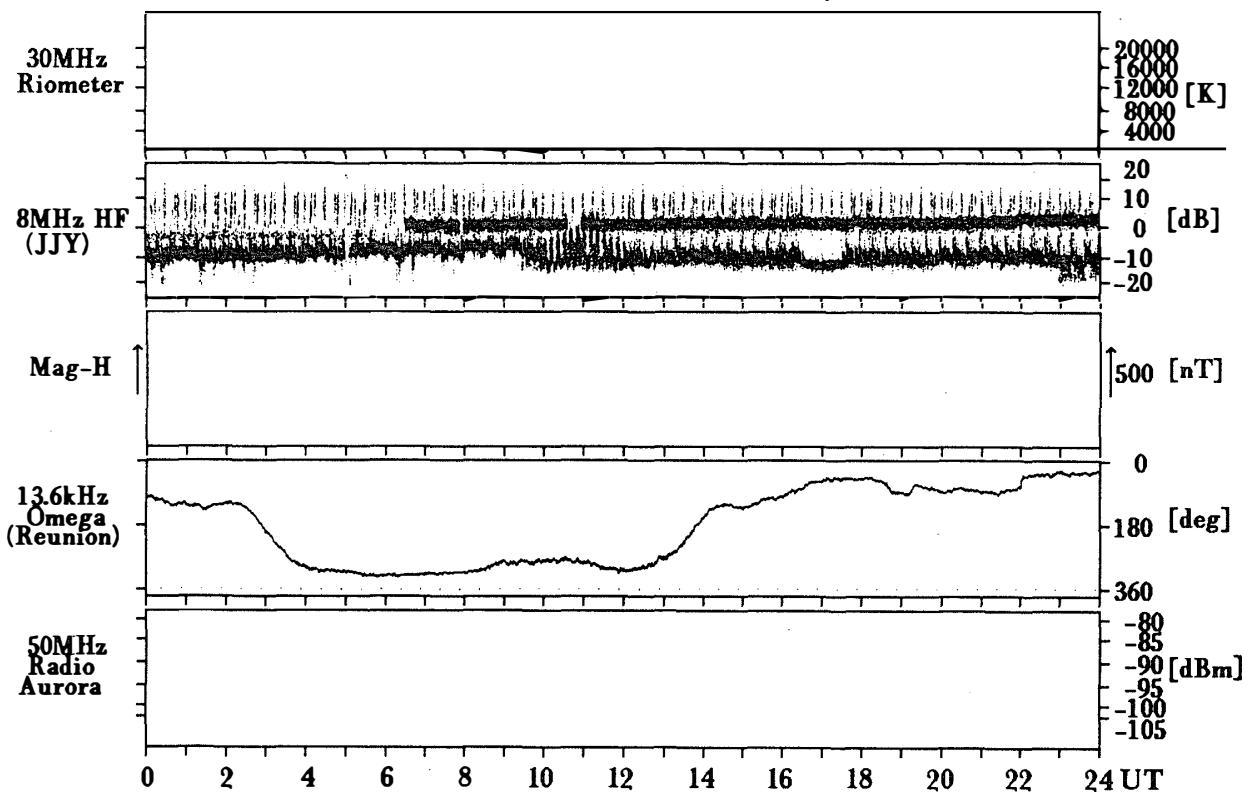
Syowa Station

Total Day / 143 1997/ 5/23



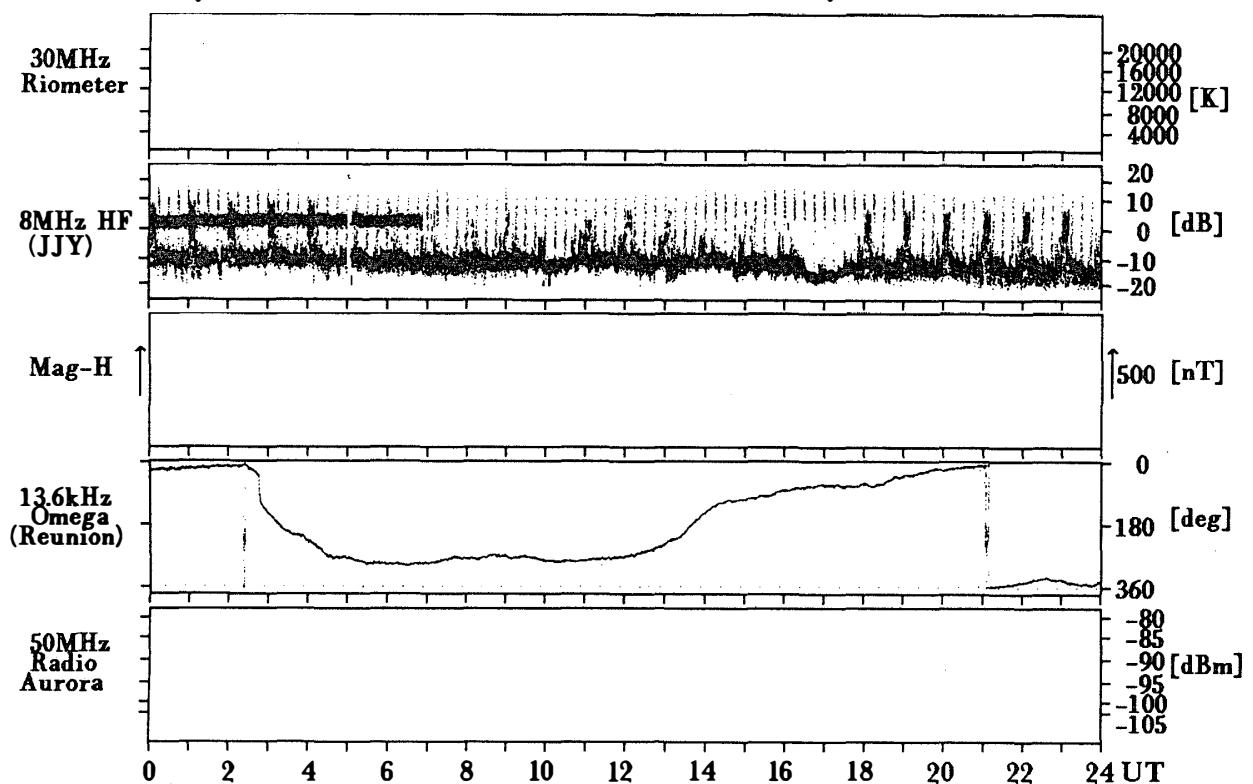
Syowa Station

Total Day / 144 1997/ 5/24



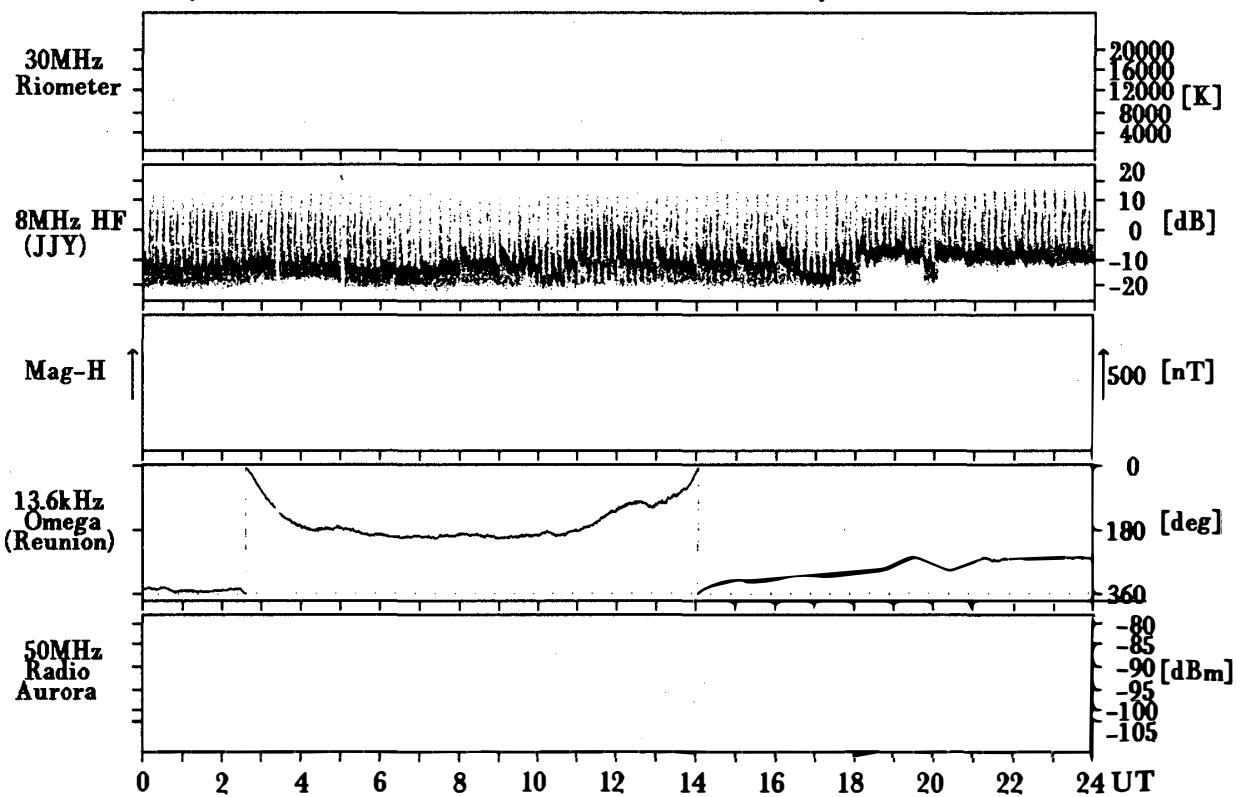
Syowa Station

Total Day / 145 1997/ 5/25



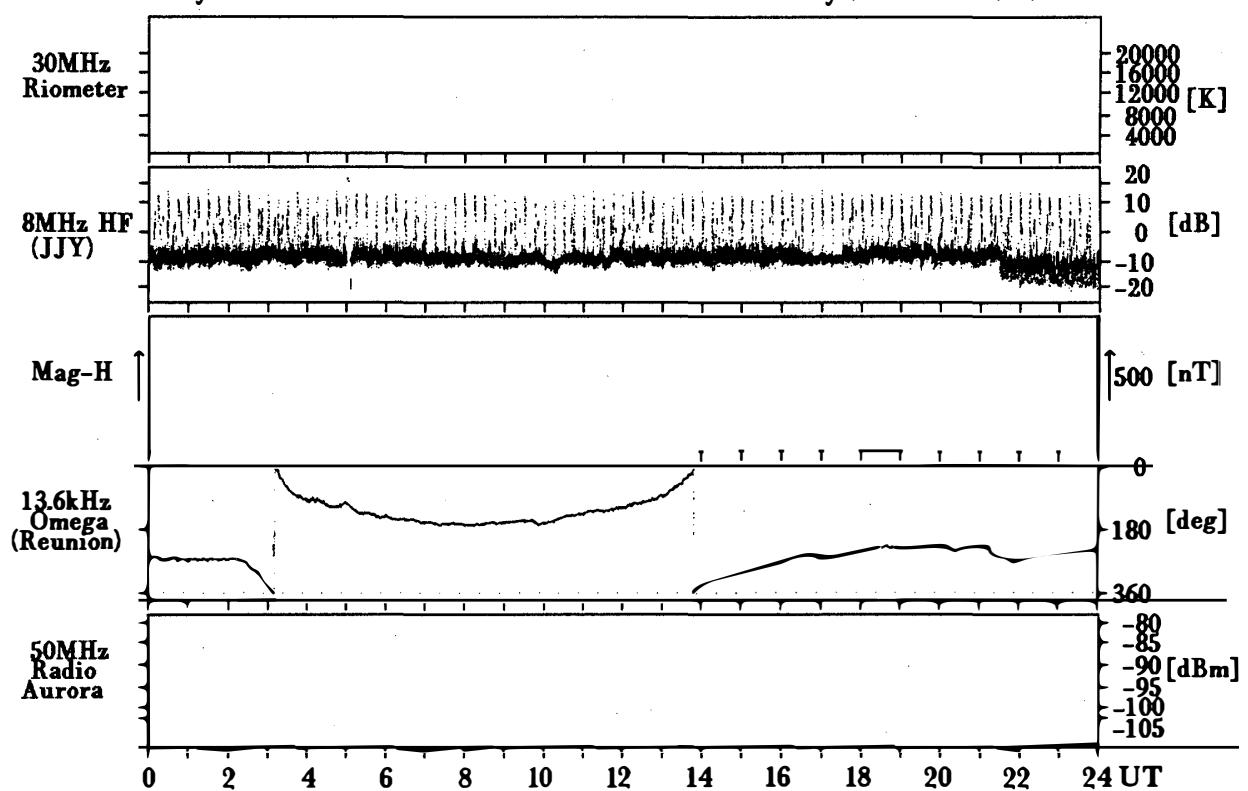
Syowa Station

Total Day / 146 1997/ 5/26



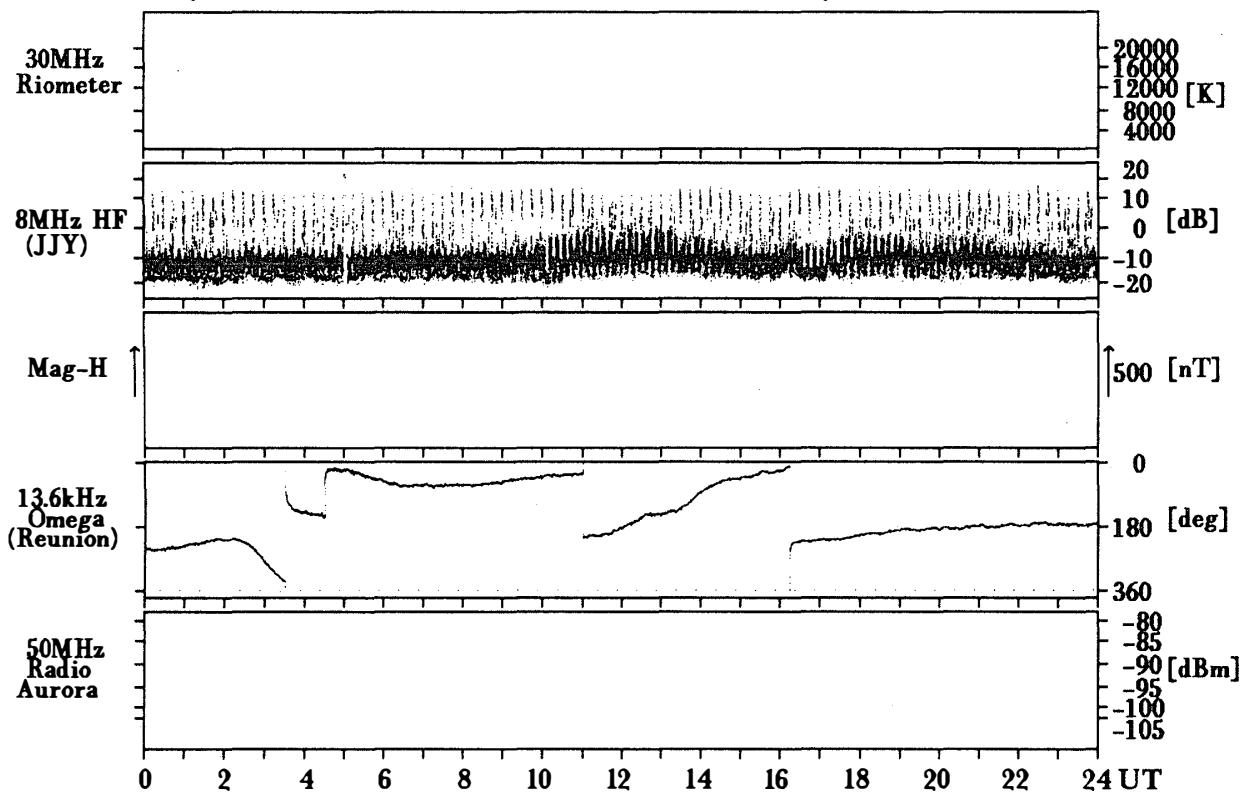
Syowa Station

Total Day / 147 1997/ 5/27



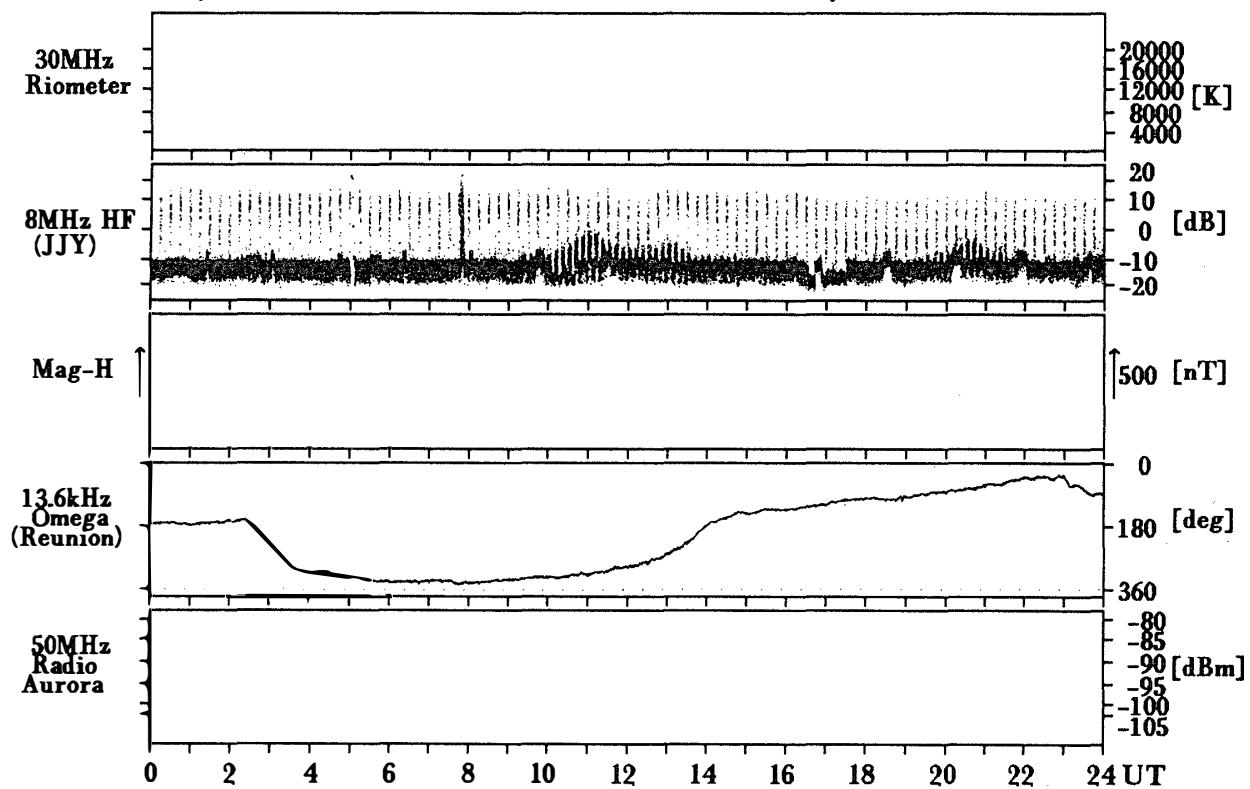
Syowa Station

Total Day / 148 1997/ 5/28



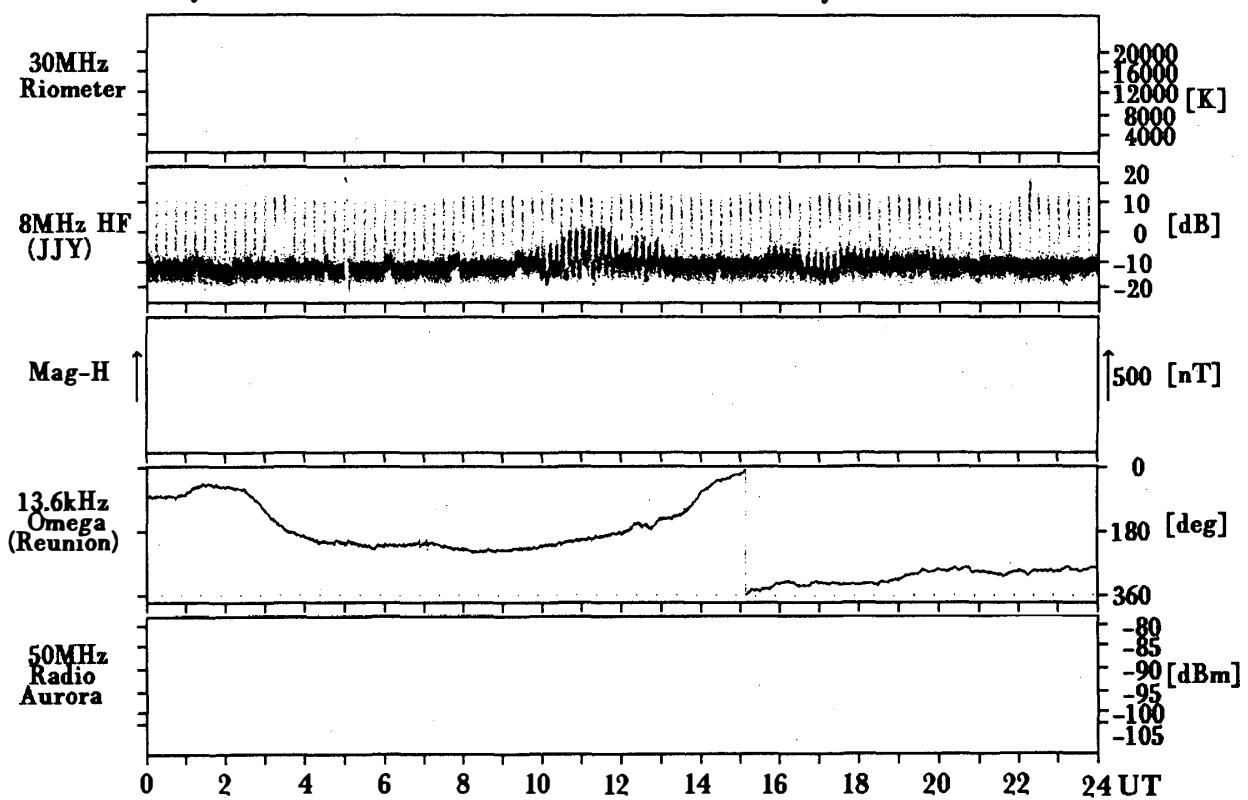
Syowa Station

Total Day / 149 1997/ 5/29



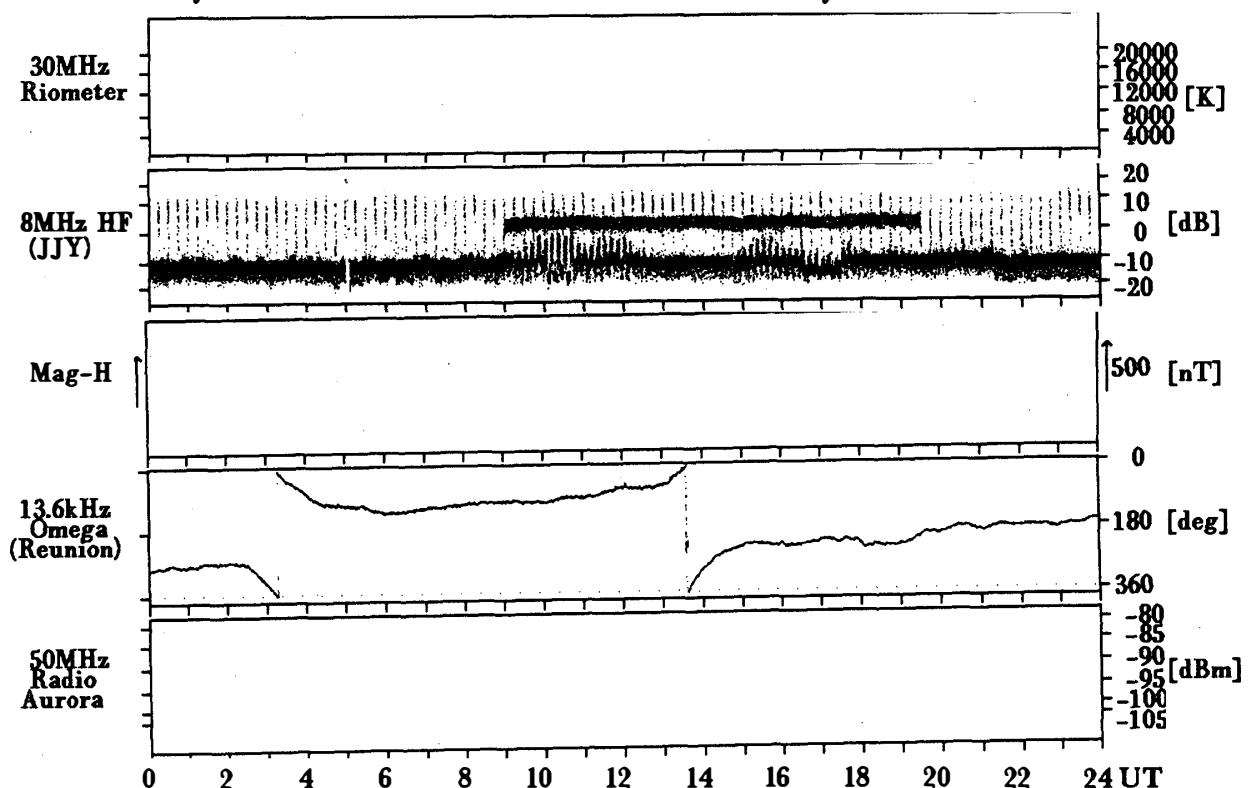
Syowa Station

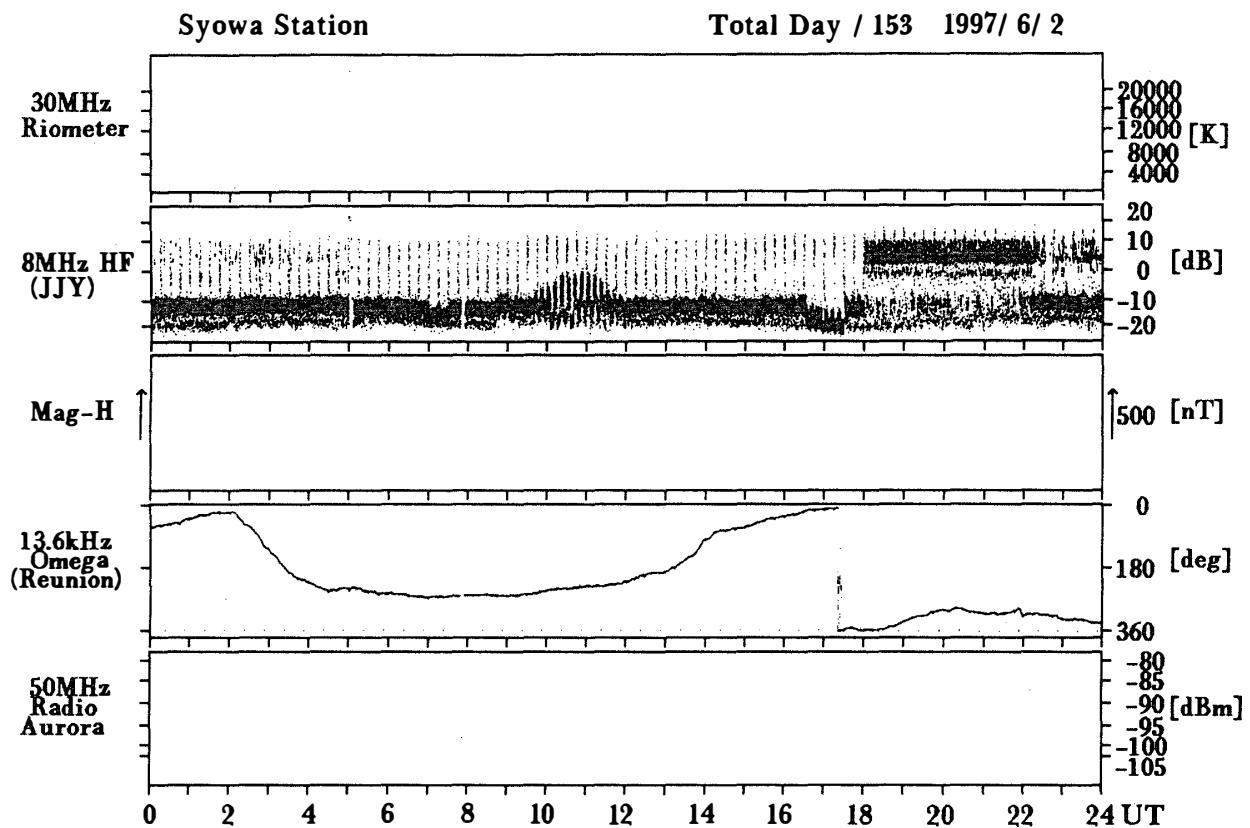
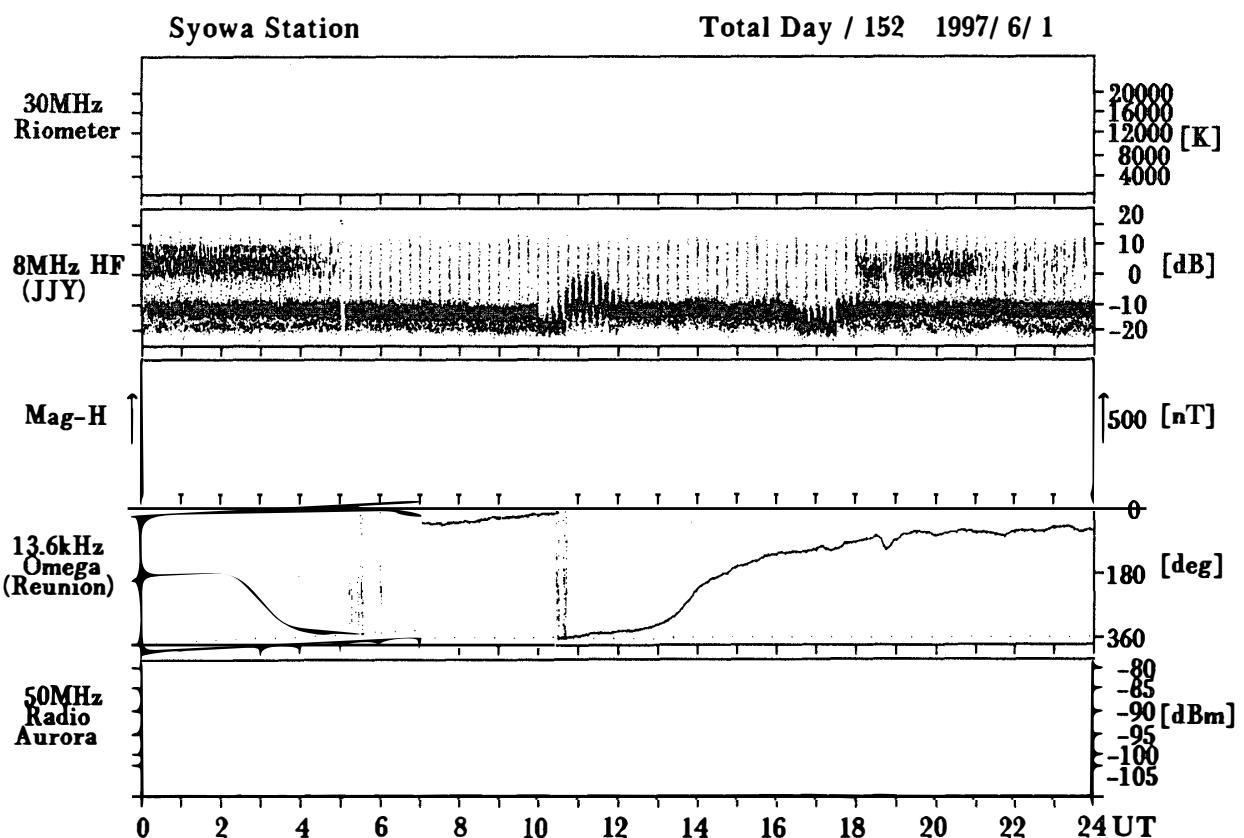
Total Day / 150 1997/ 5/30

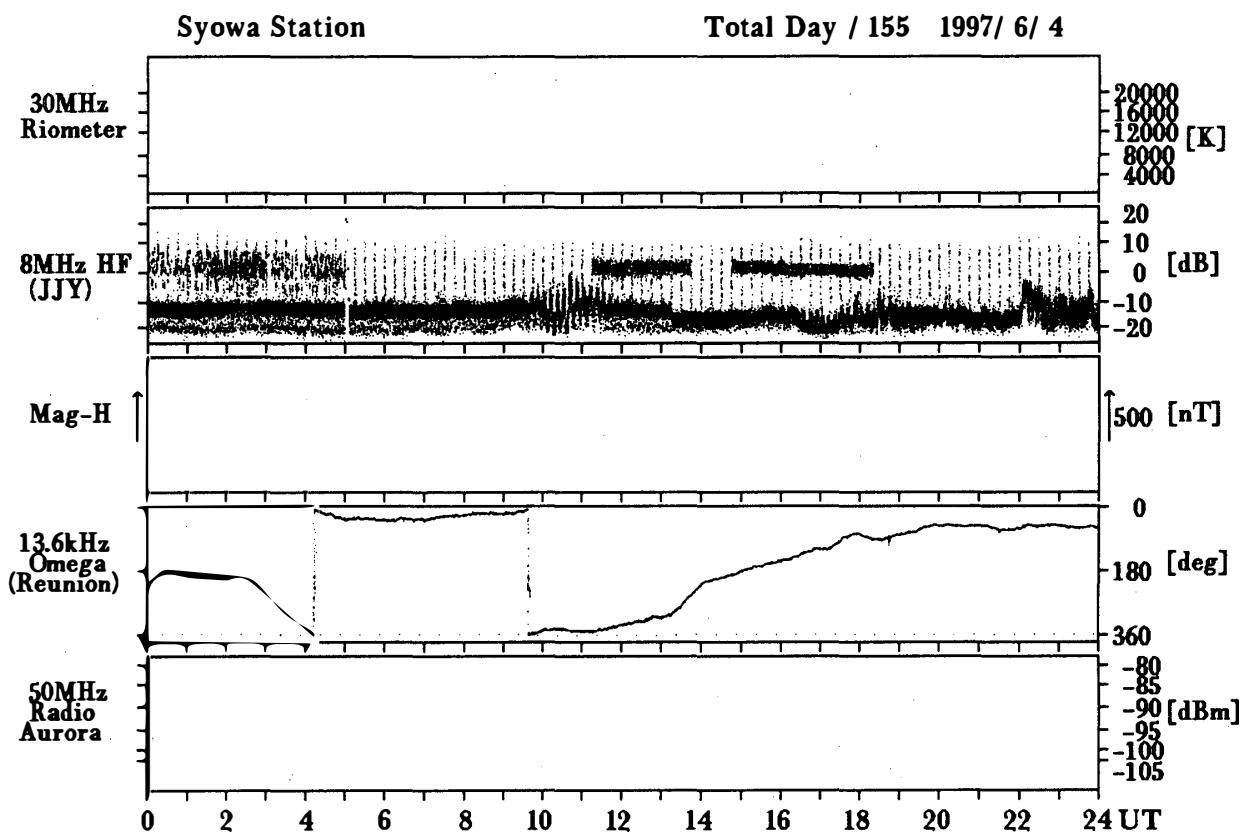
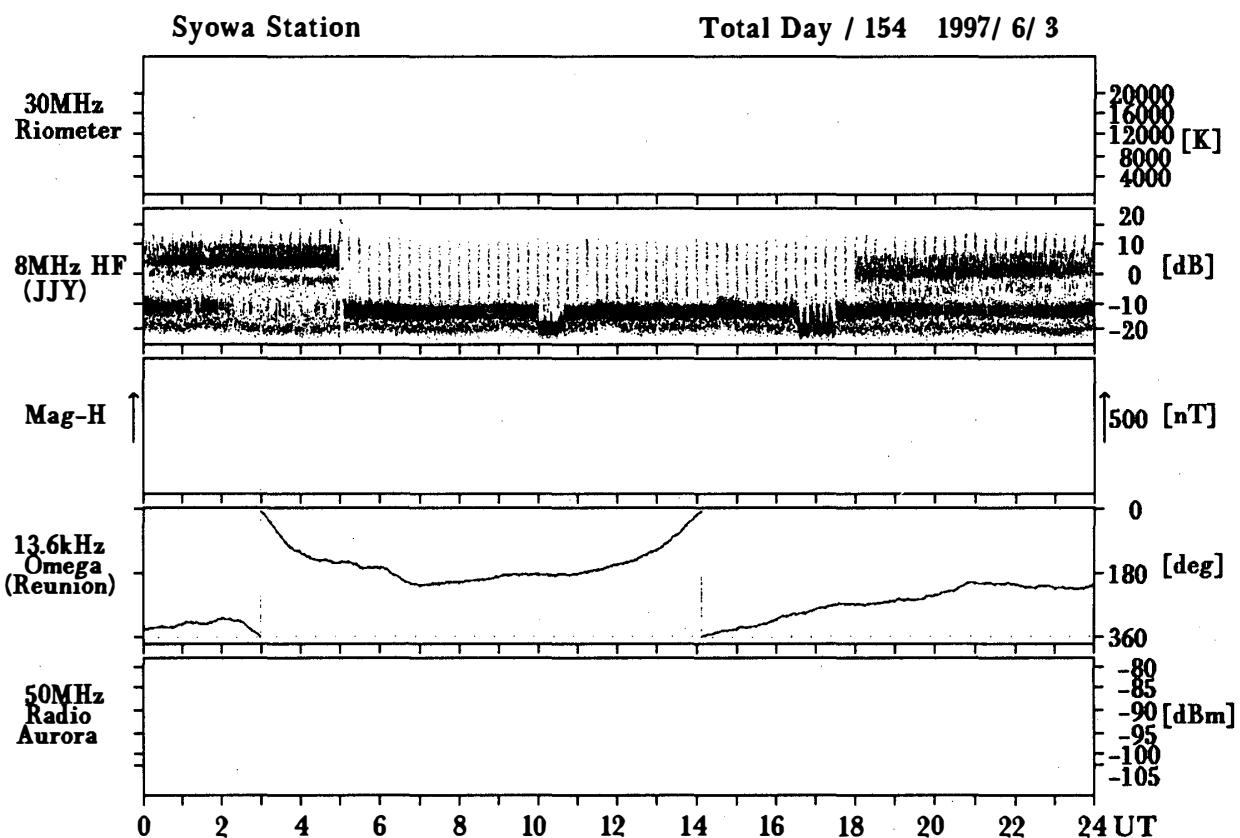


Syowa Station

Total Day / 151 1997/ 5/31

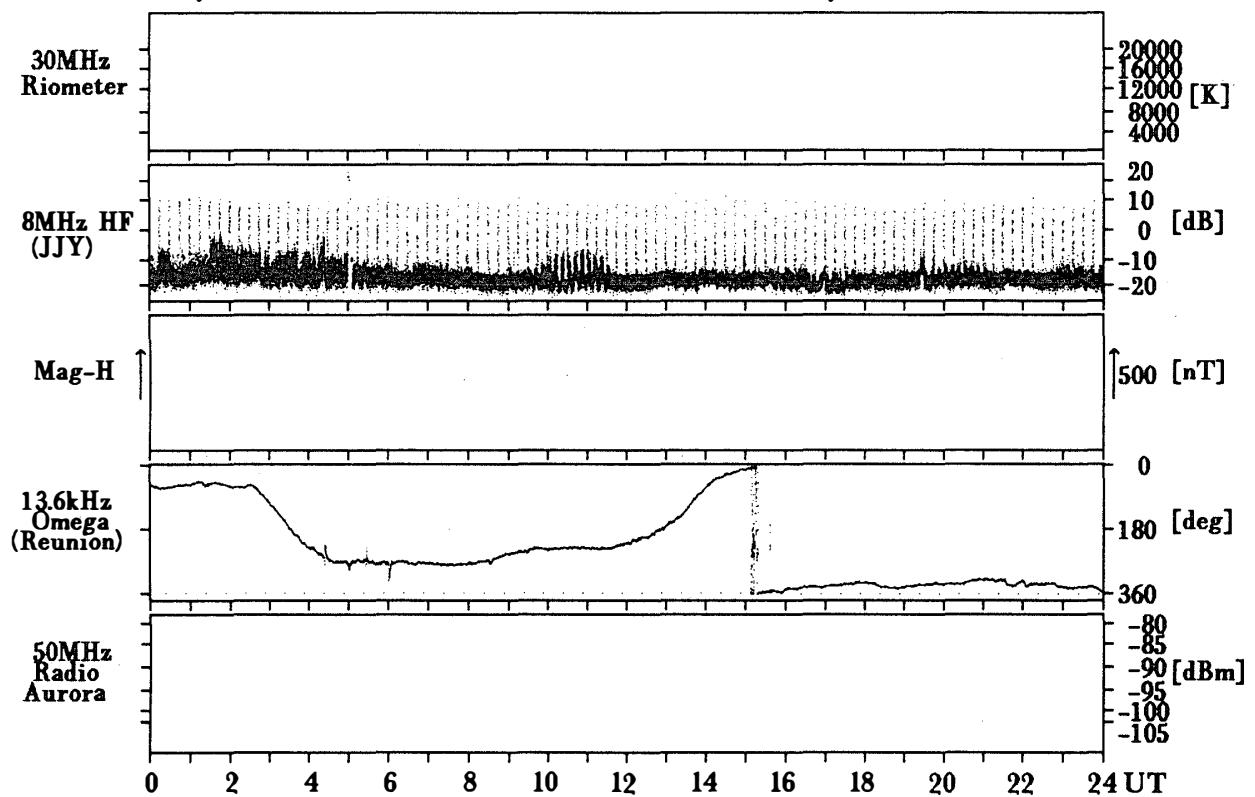






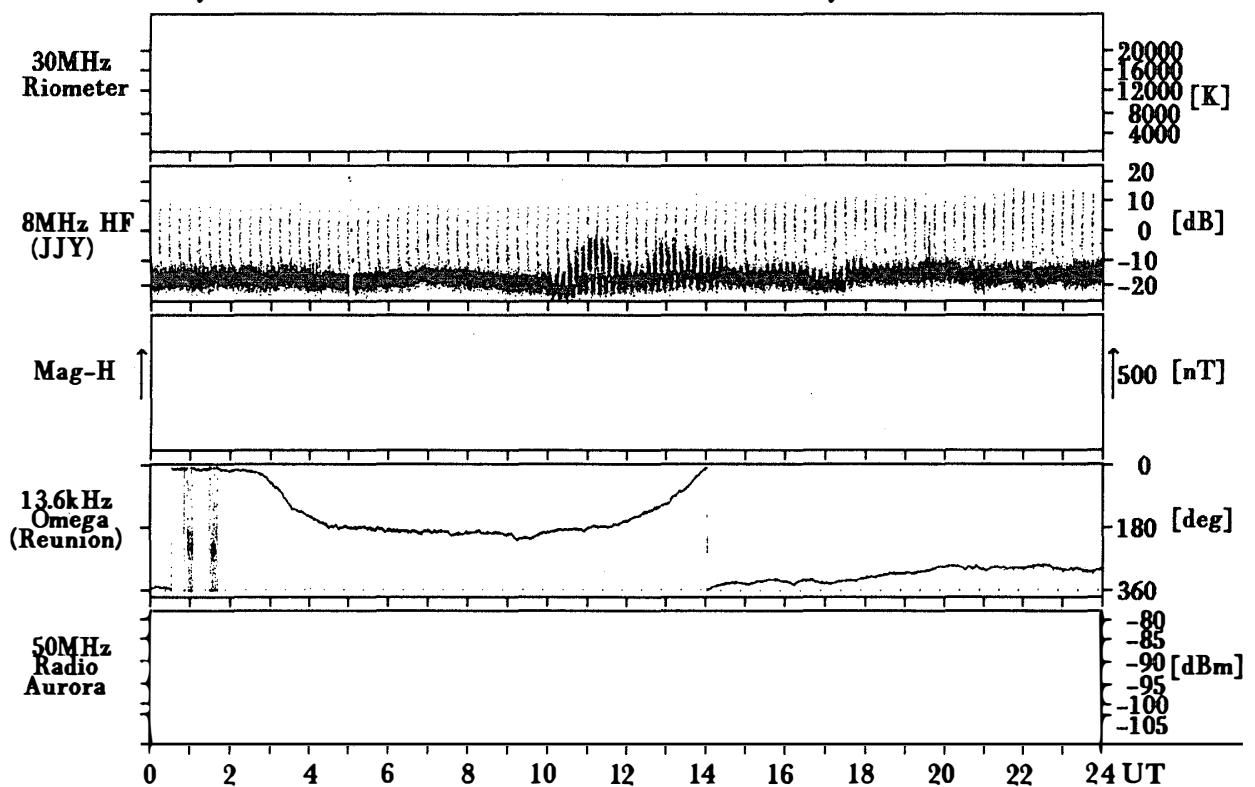
Syowa Station

Total Day / 156 1997/ 6/ 5



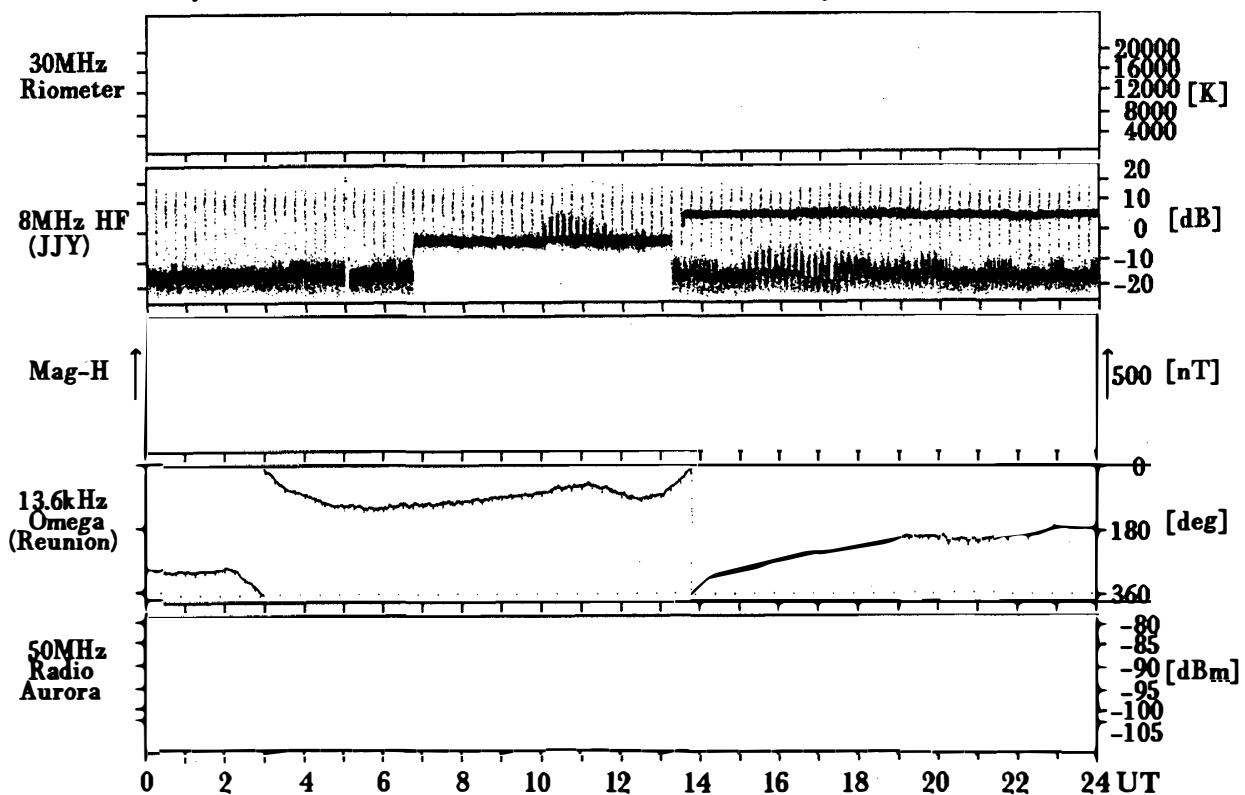
Syowa Station

Total Day / 157 1997/ 6/ 6



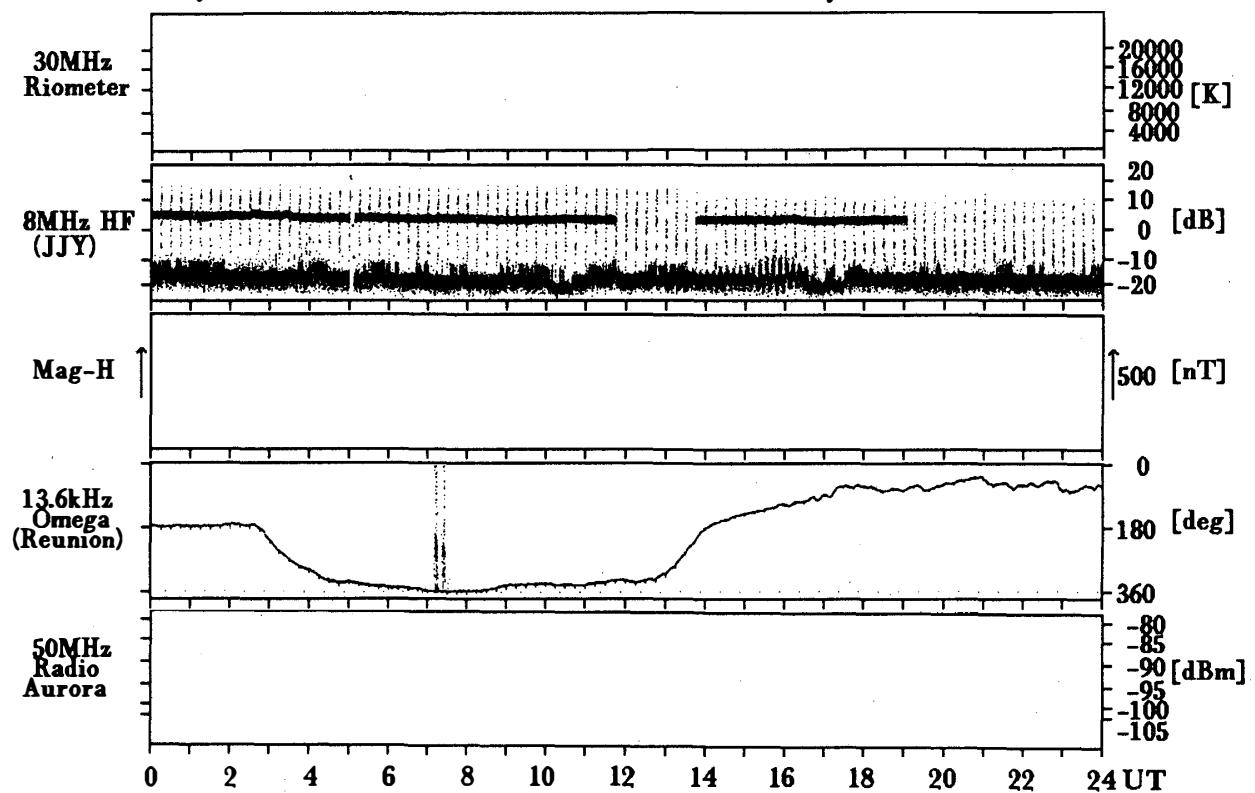
Syowa Station

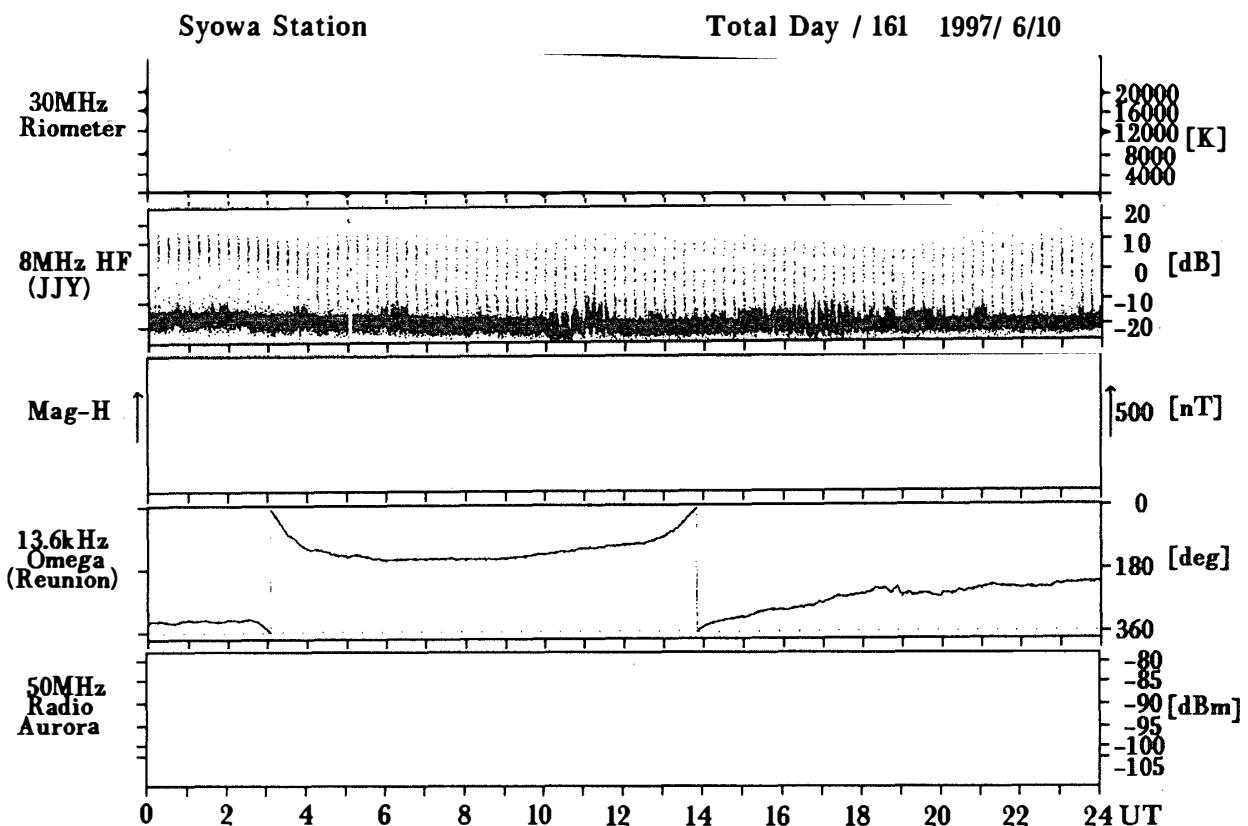
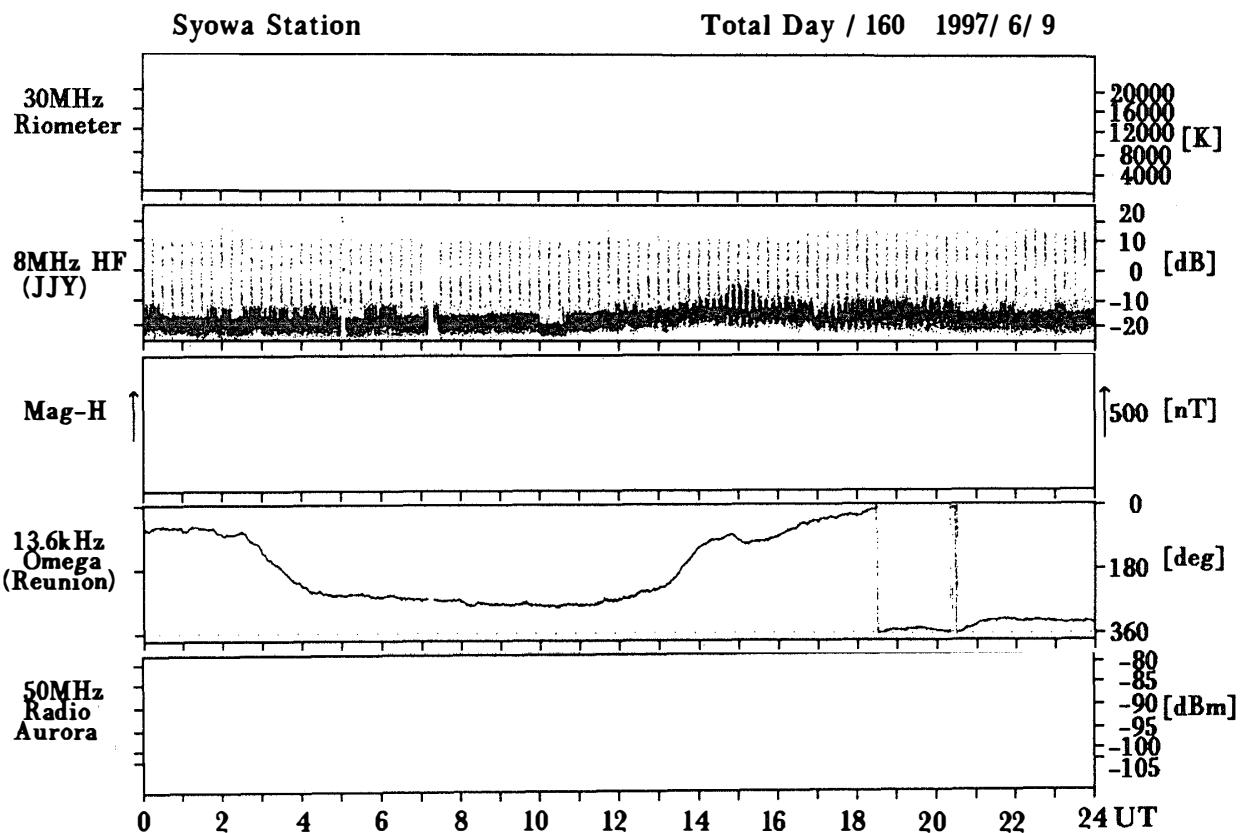
Total Day / 158 1997/ 6 / 7



Syowa Station

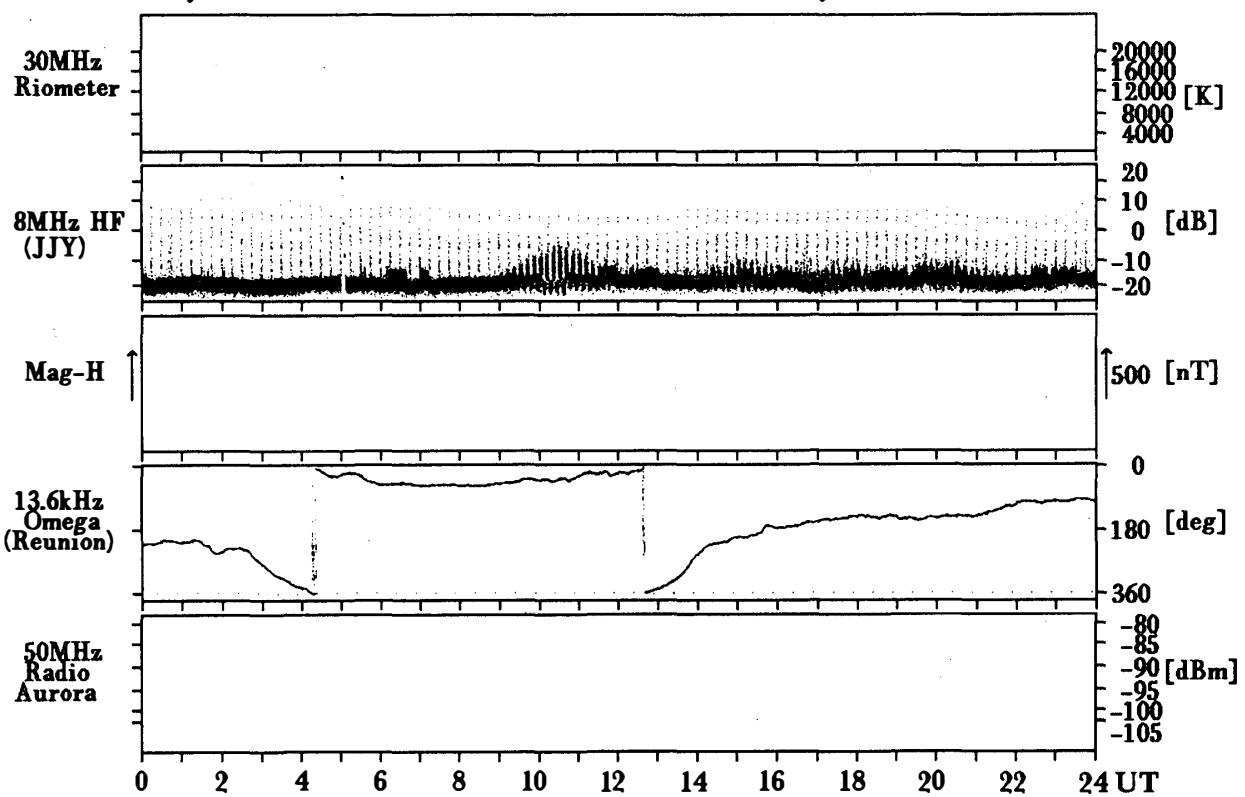
Total Day / 159 1997/ 6 / 8





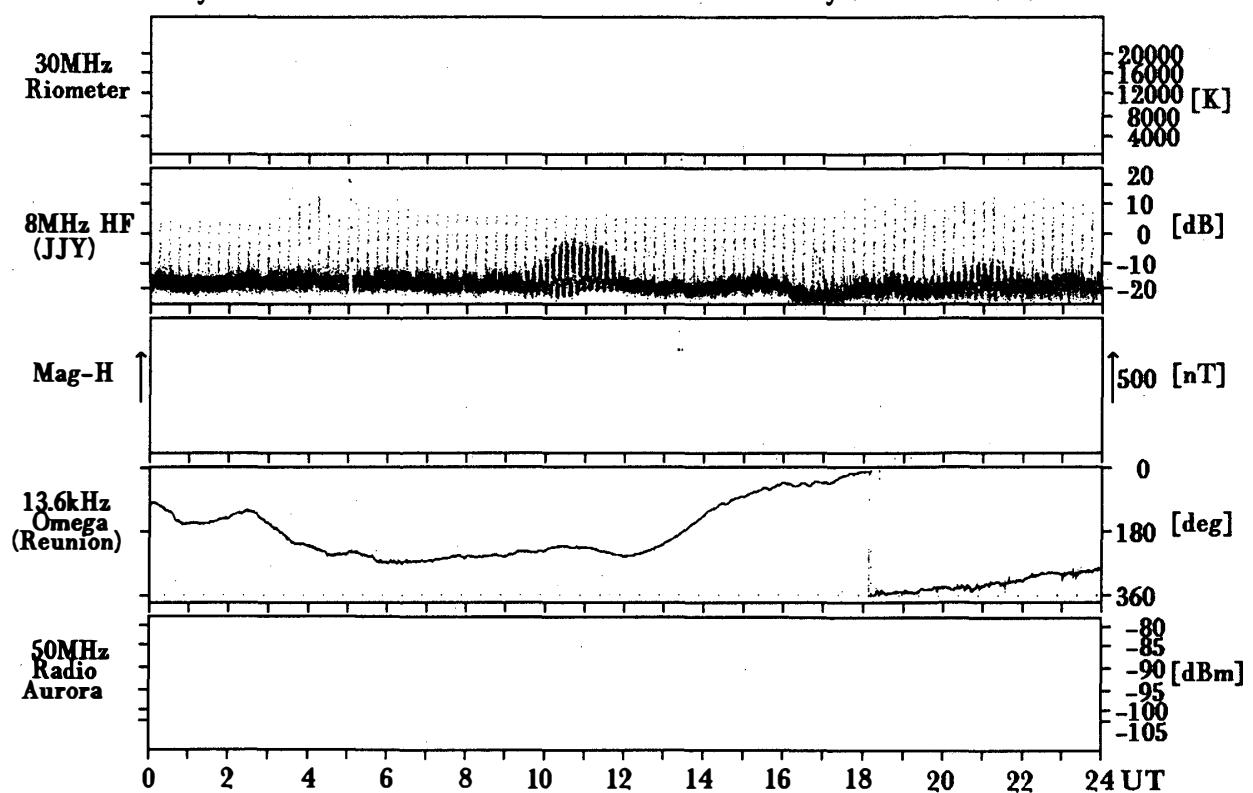
Syowa Station

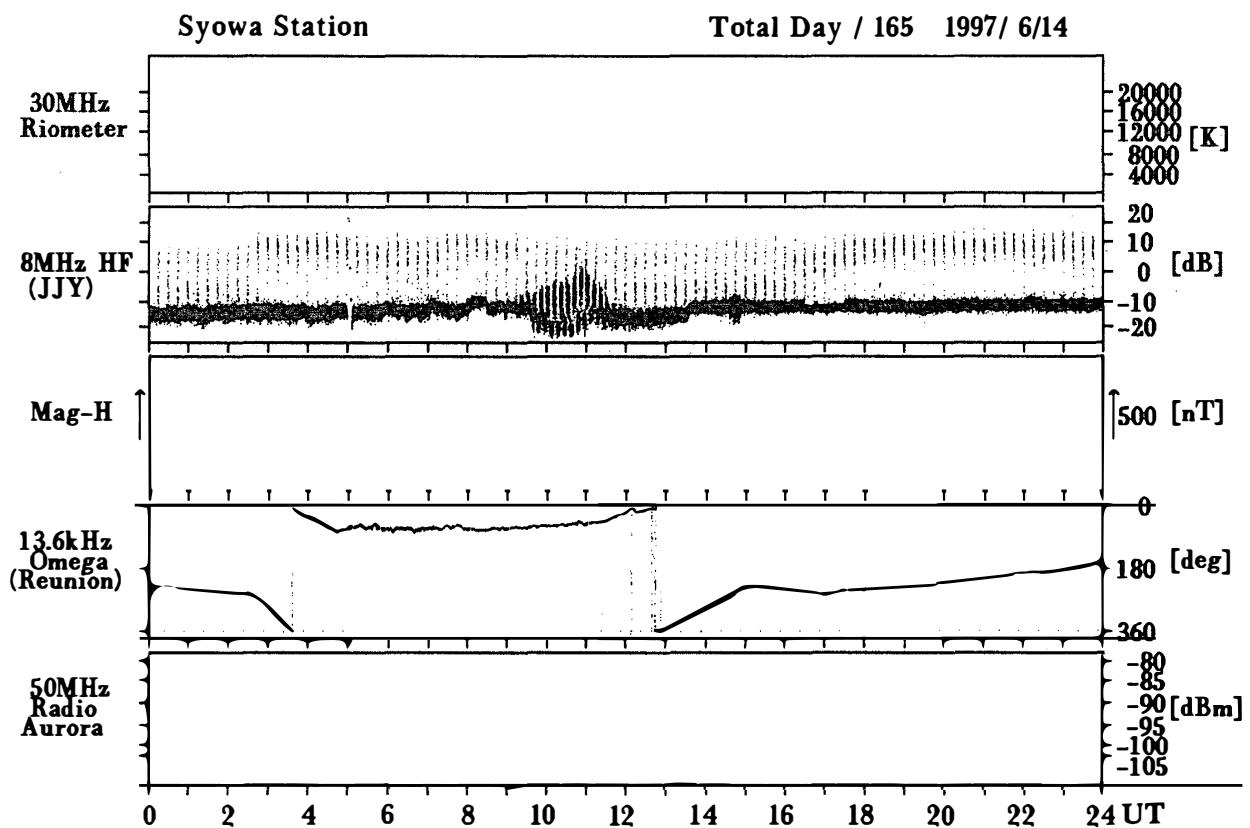
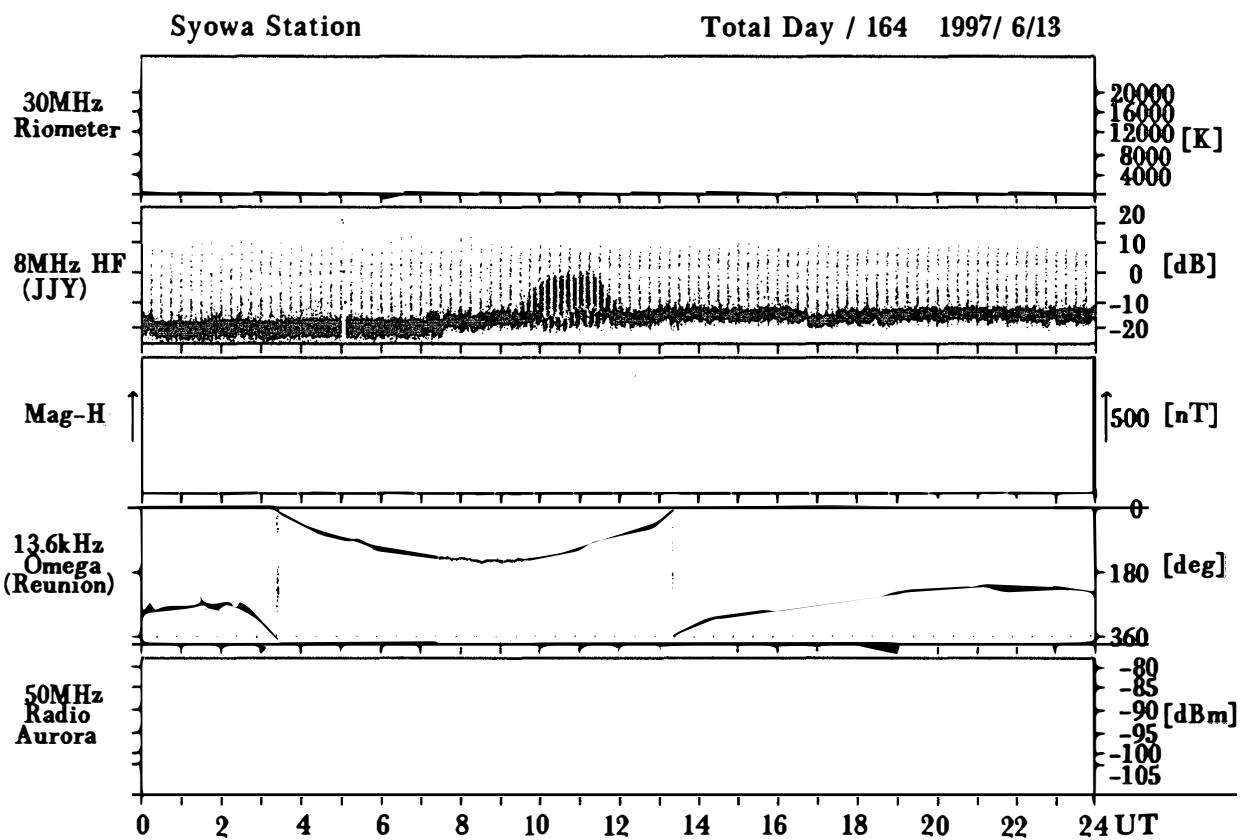
Total Day / 162 1997/ 6/11

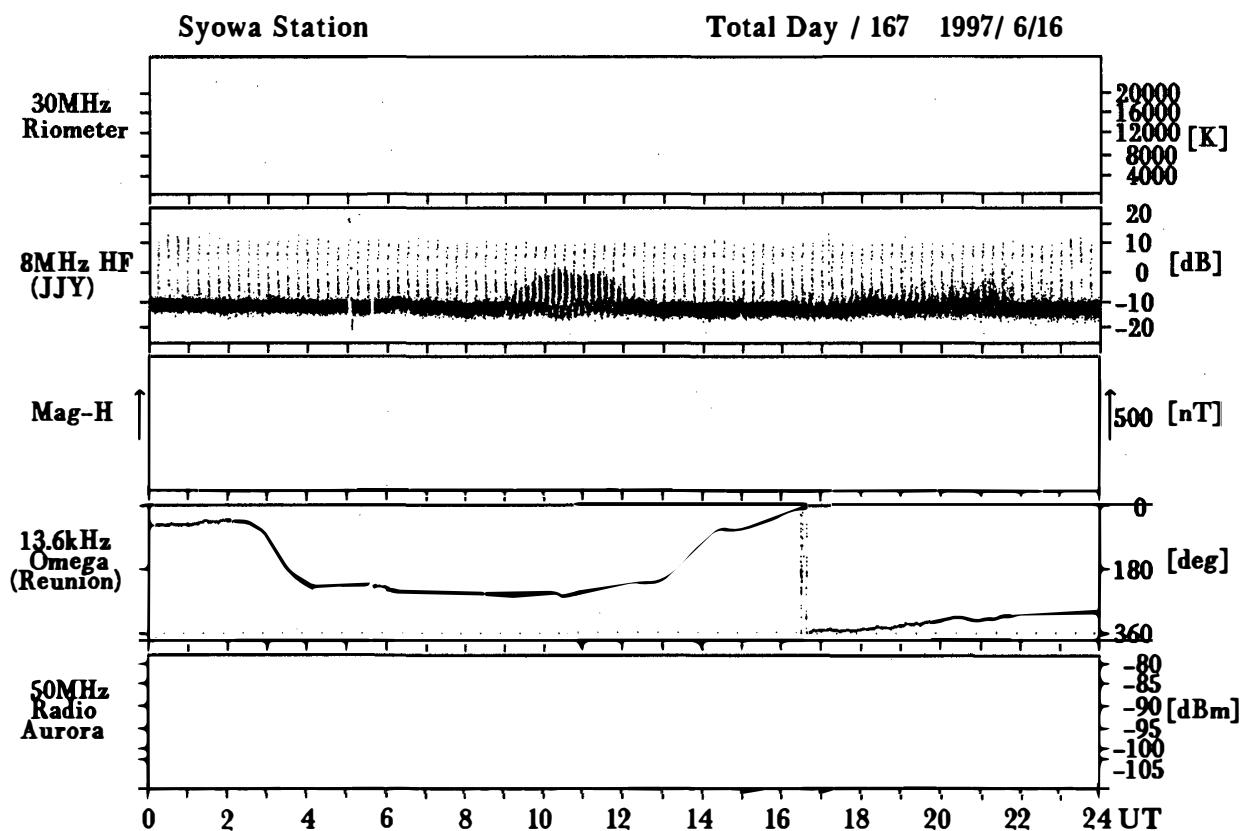
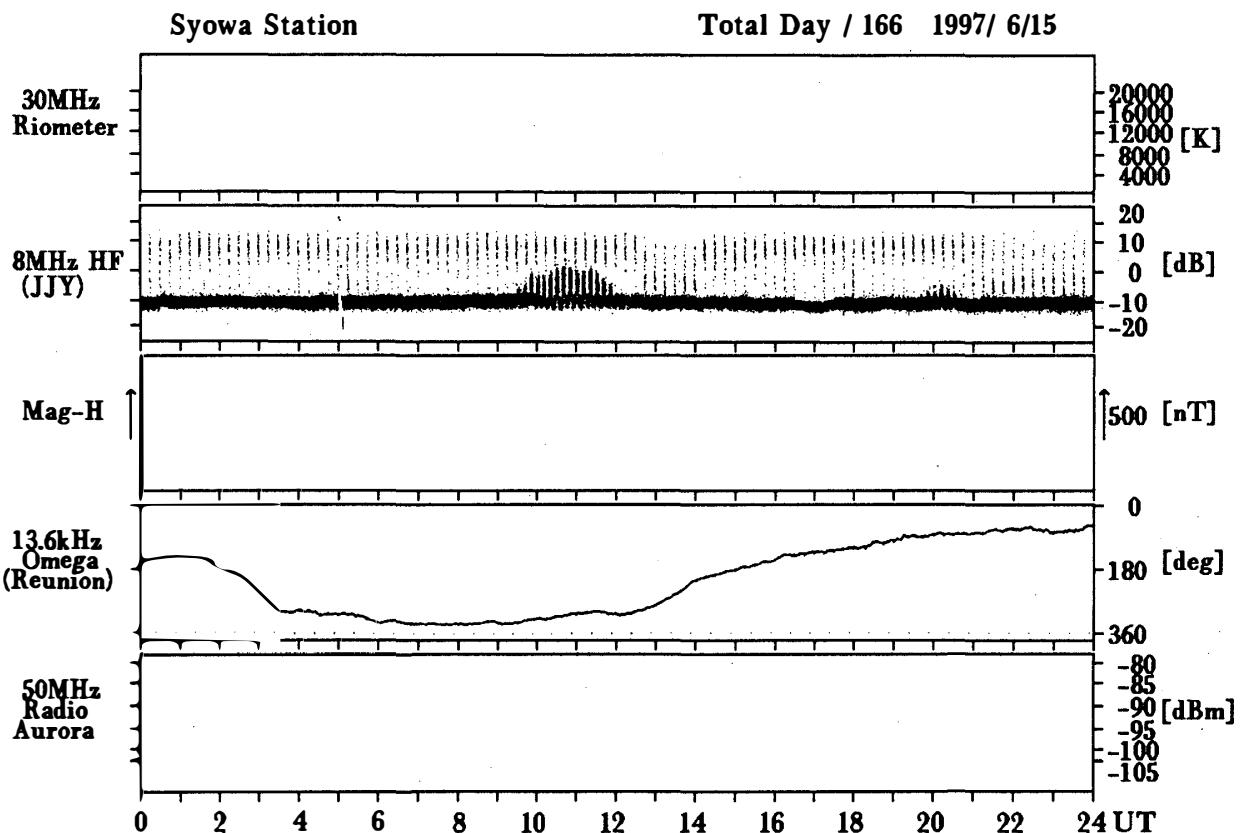


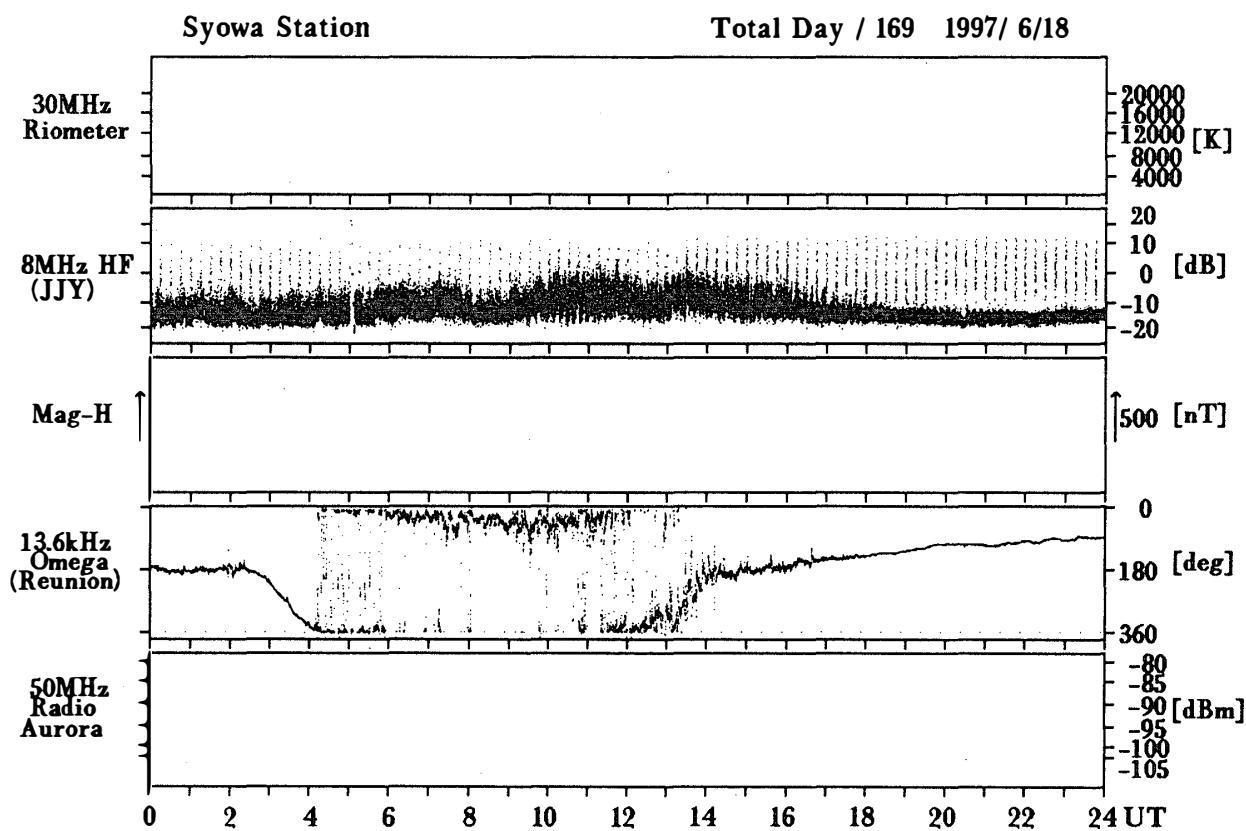
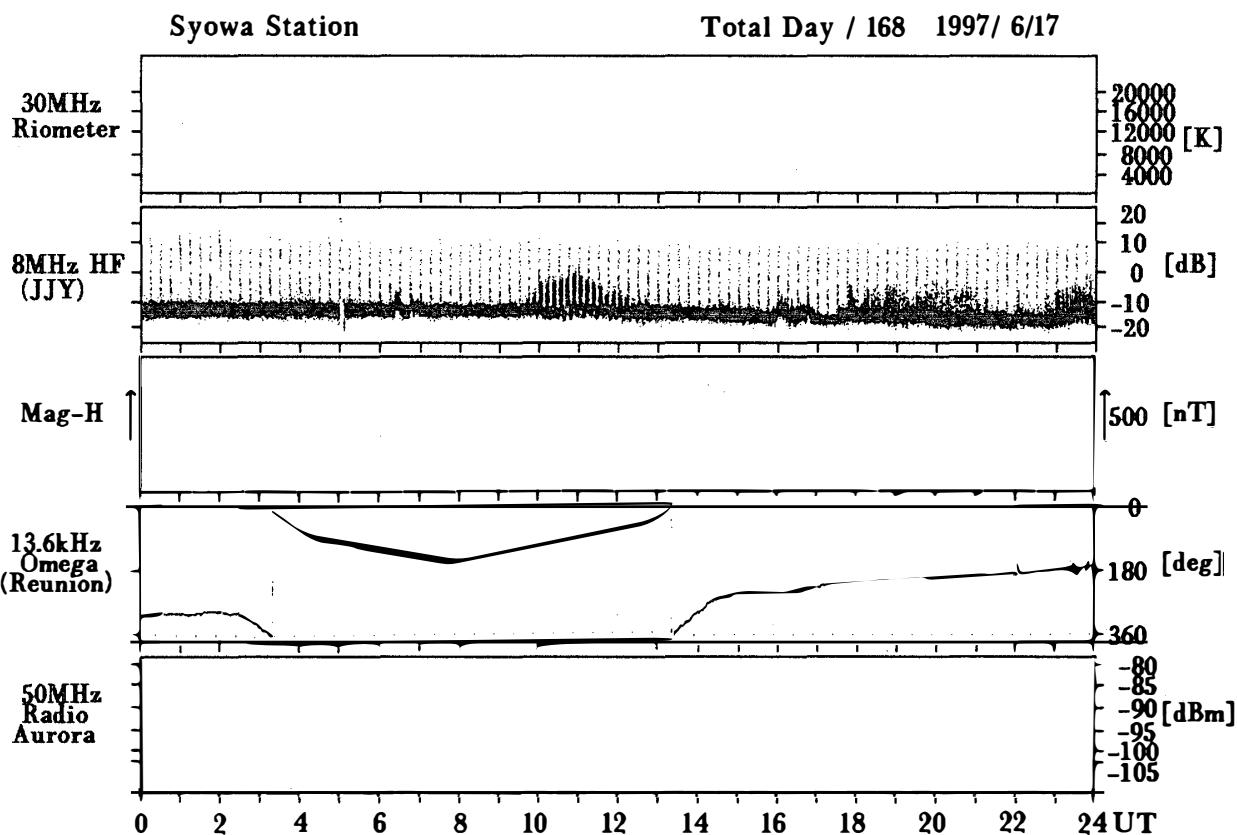
Syowa Station

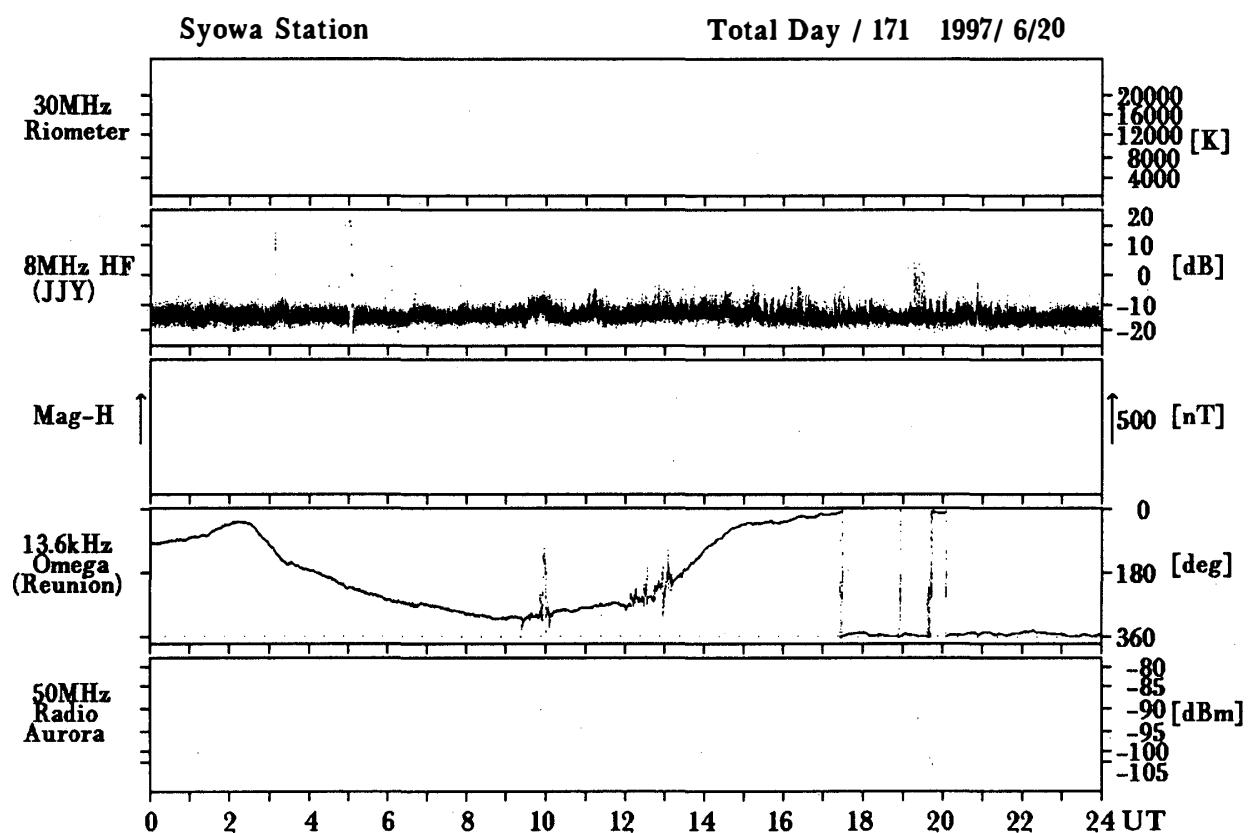
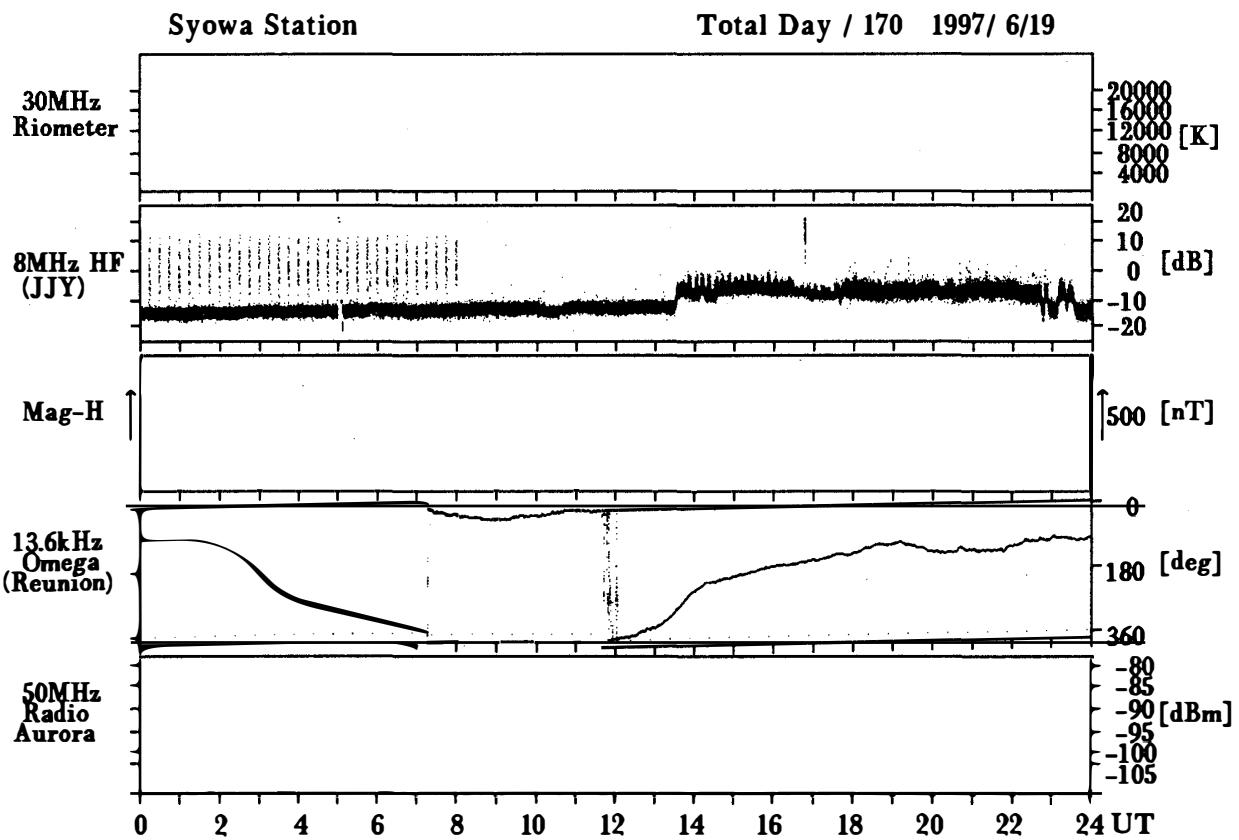
Total Day / 163 1997/ 6/12

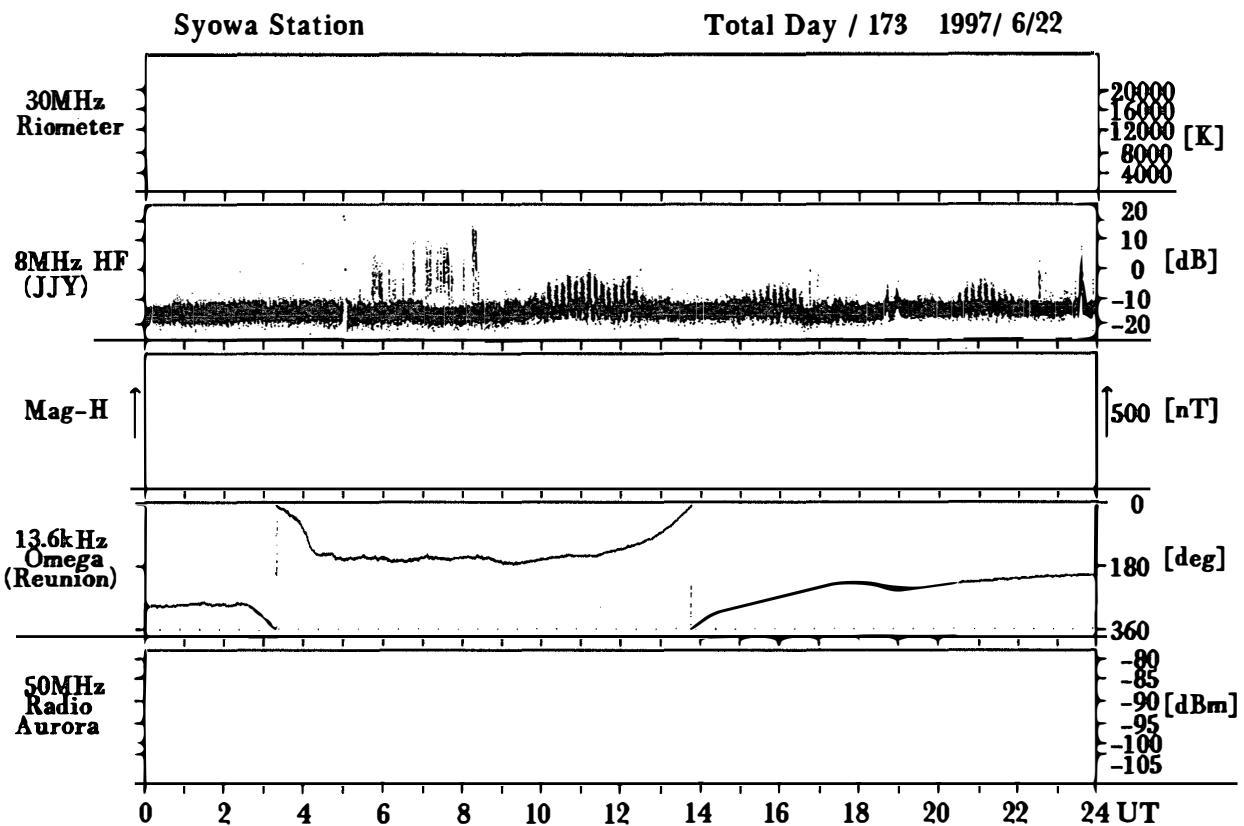
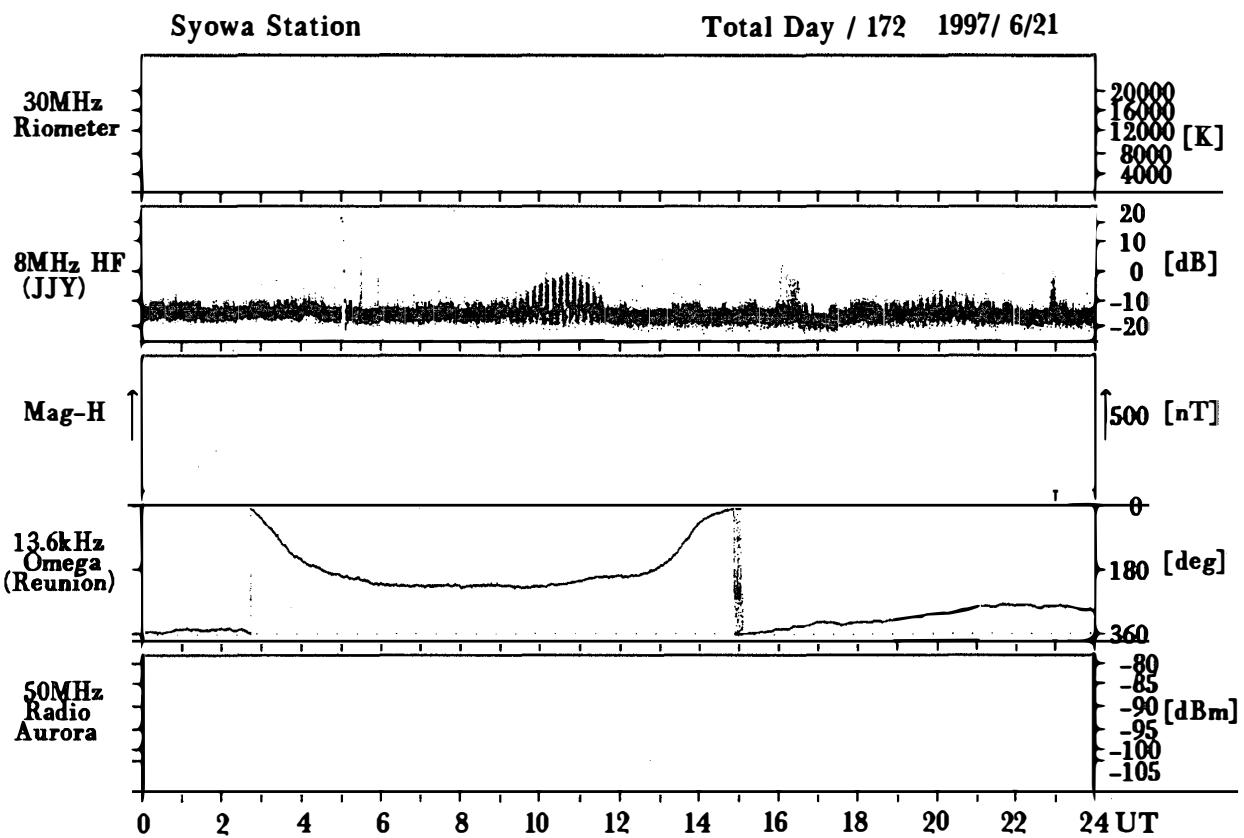






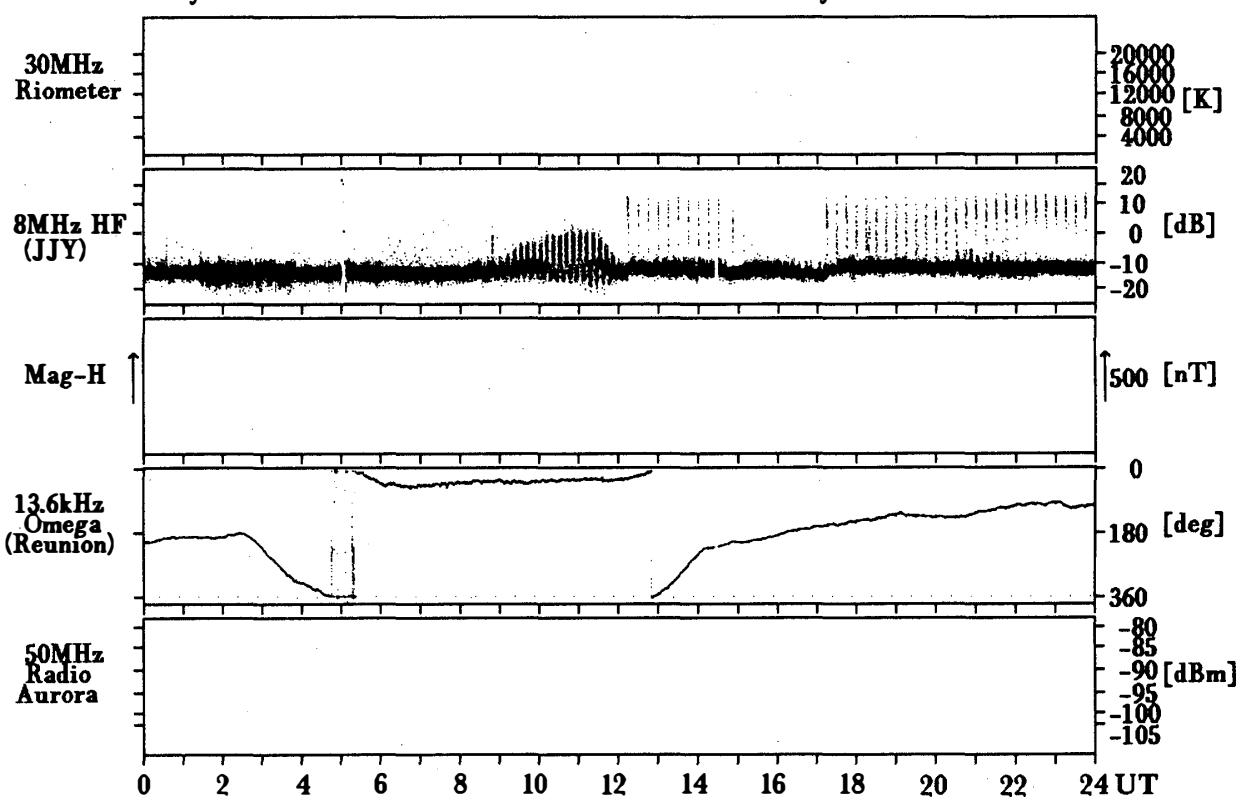






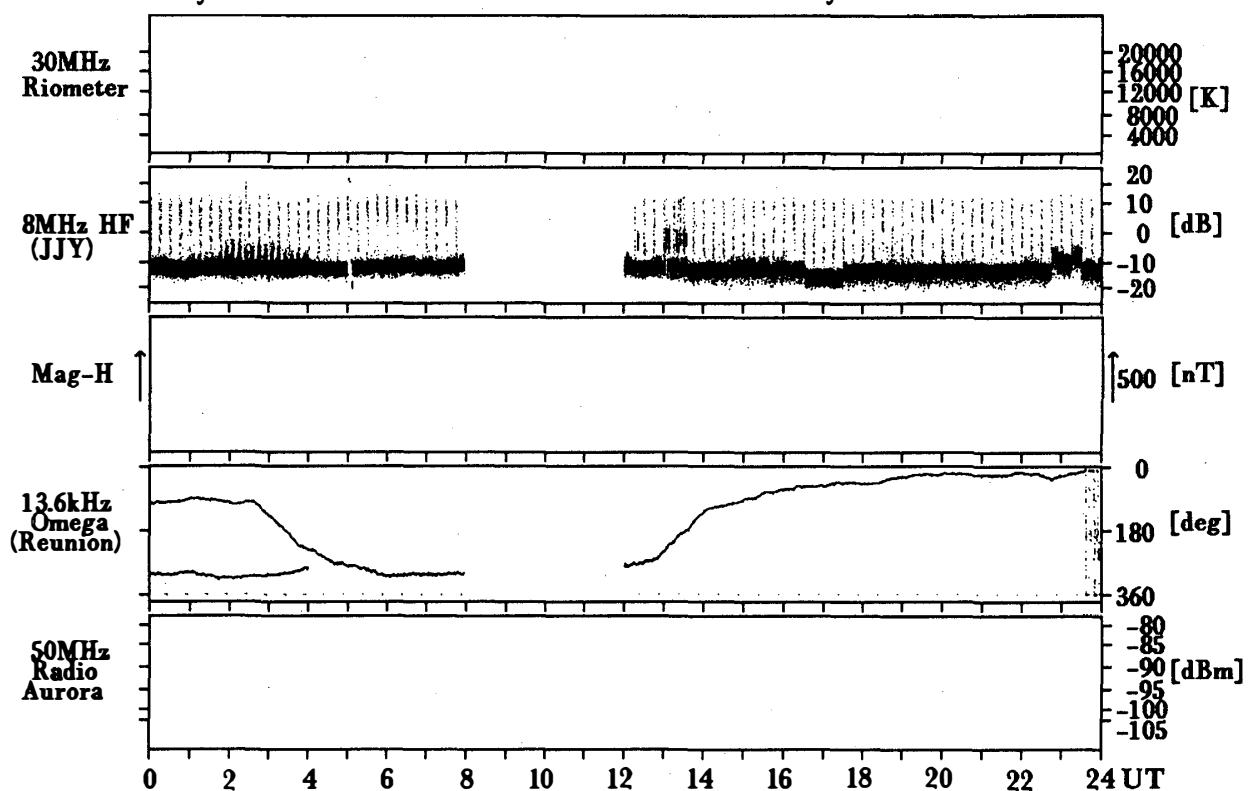
Syowa Station

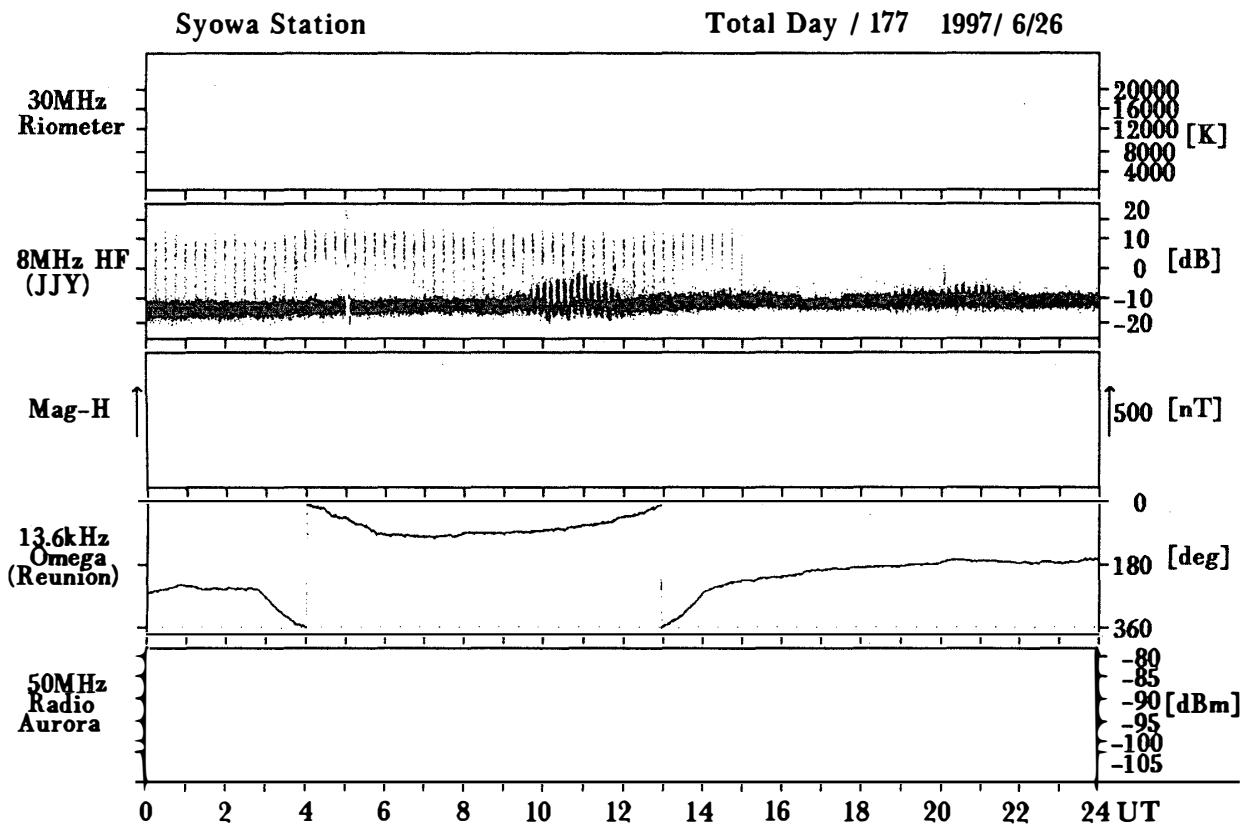
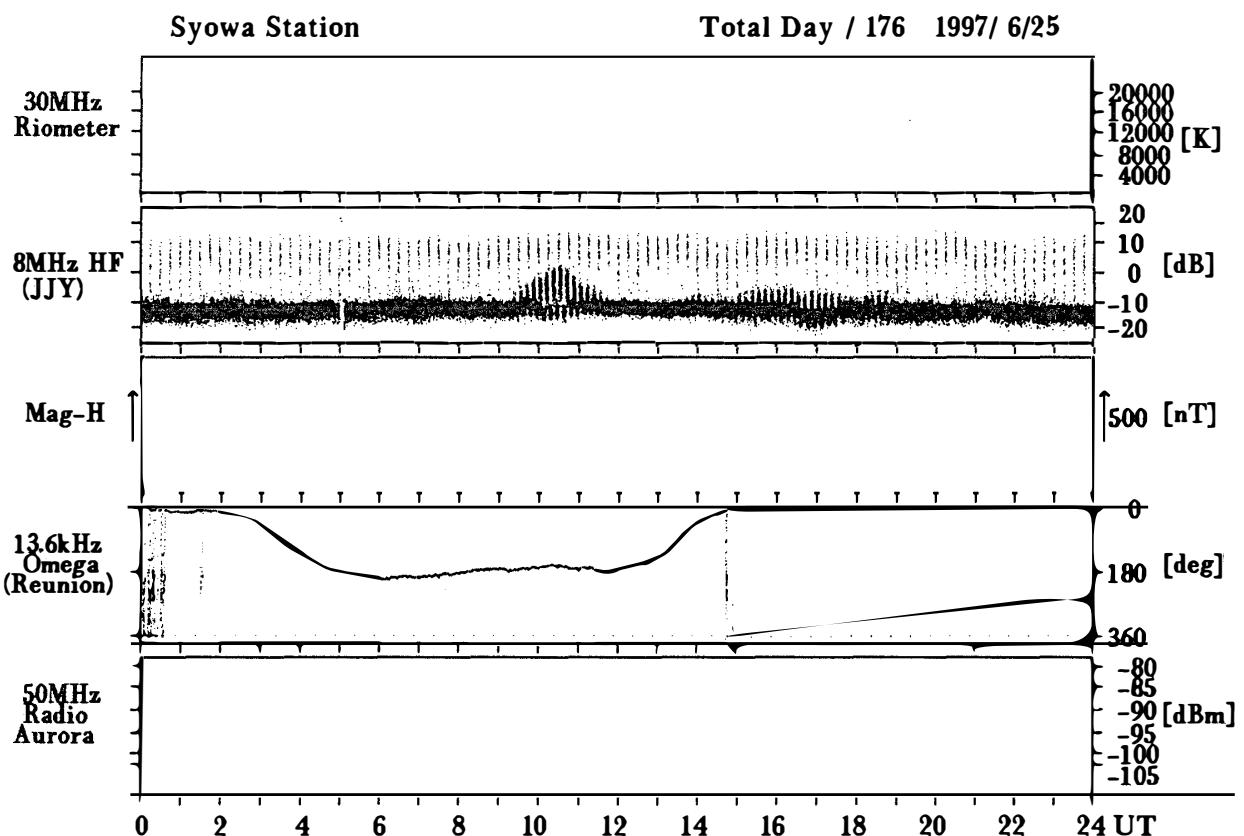
Total Day / 174 1997/ 6/23



Syowa Station

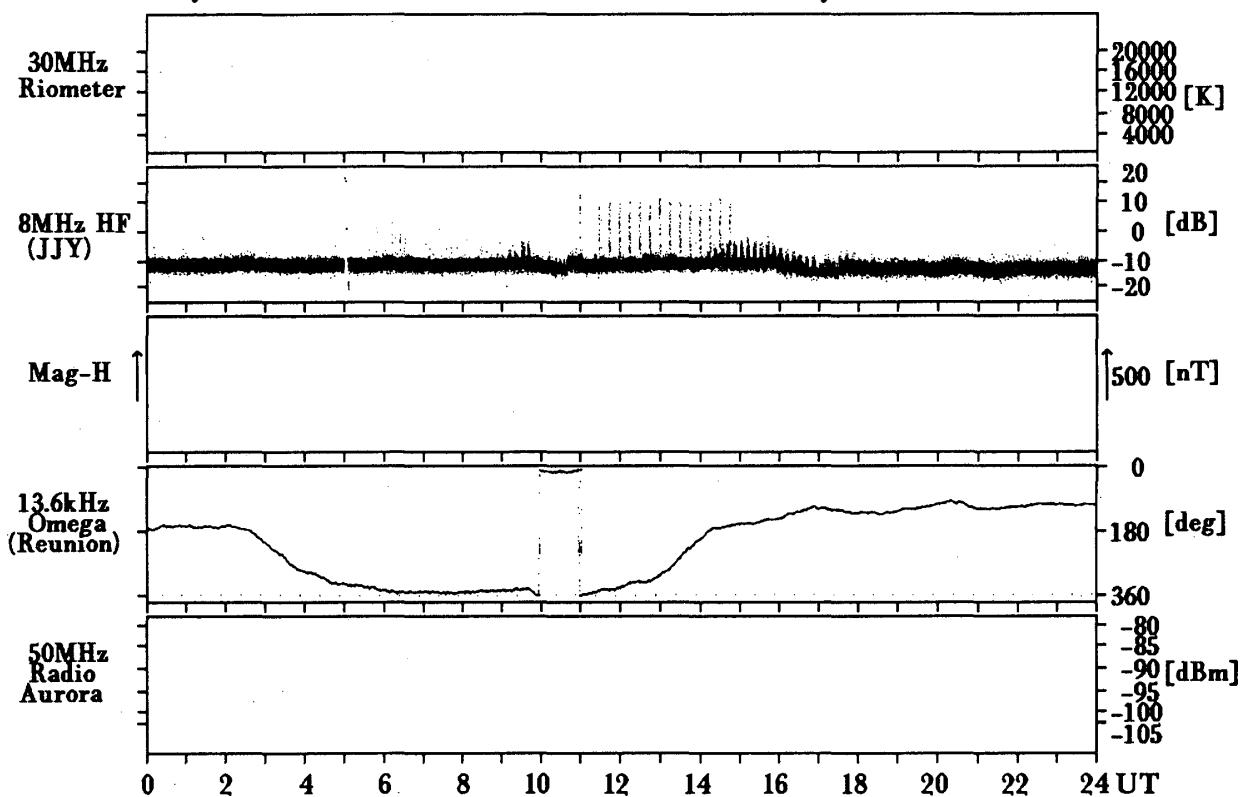
Total Day / 175 1997/ 6/24





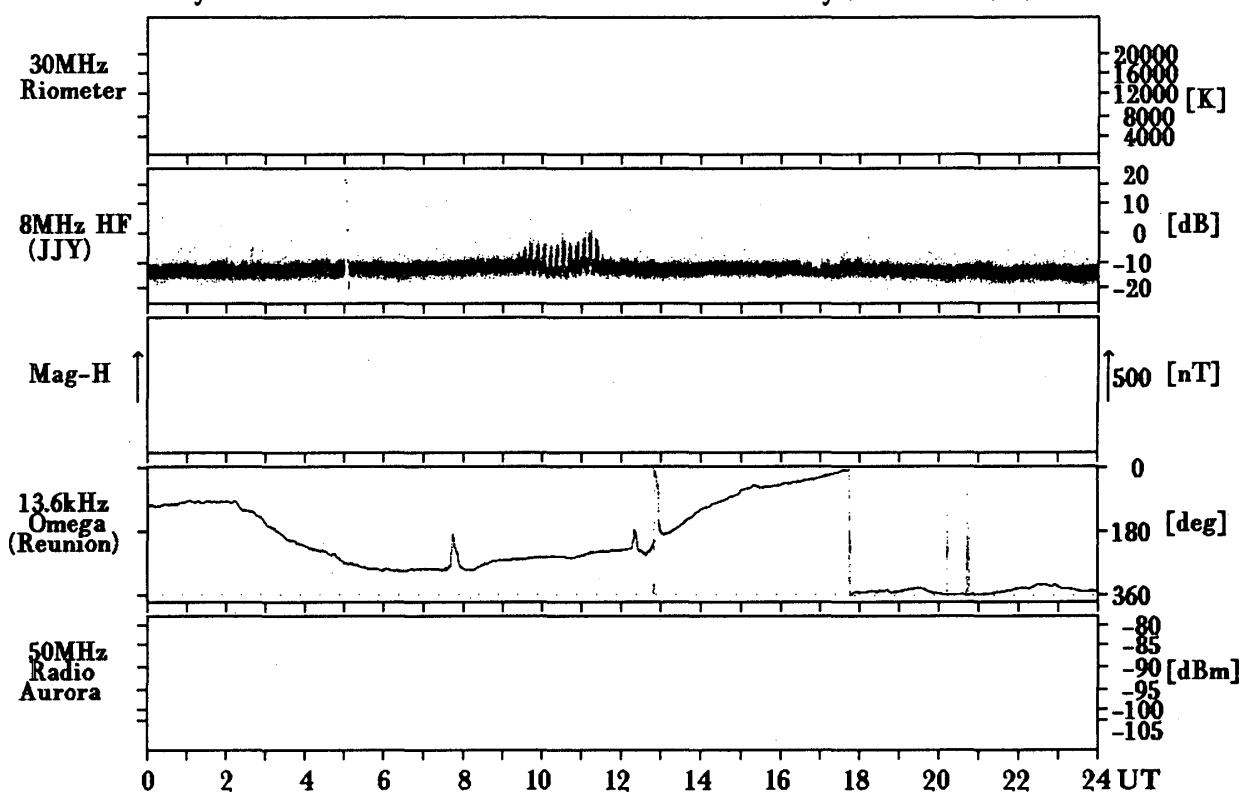
Syowa Station

Total Day / 178 1997/ 6/27



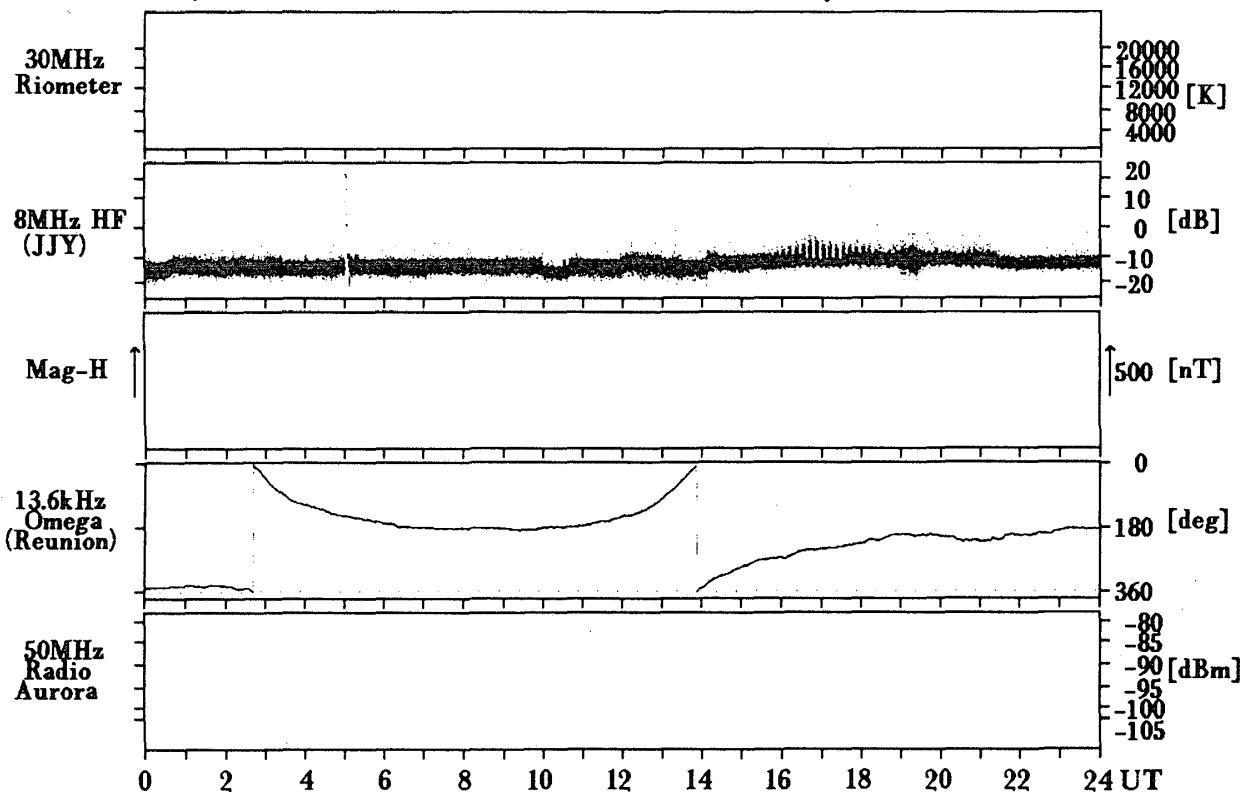
Syowa Station

Total Day / 179 1997/ 6/28



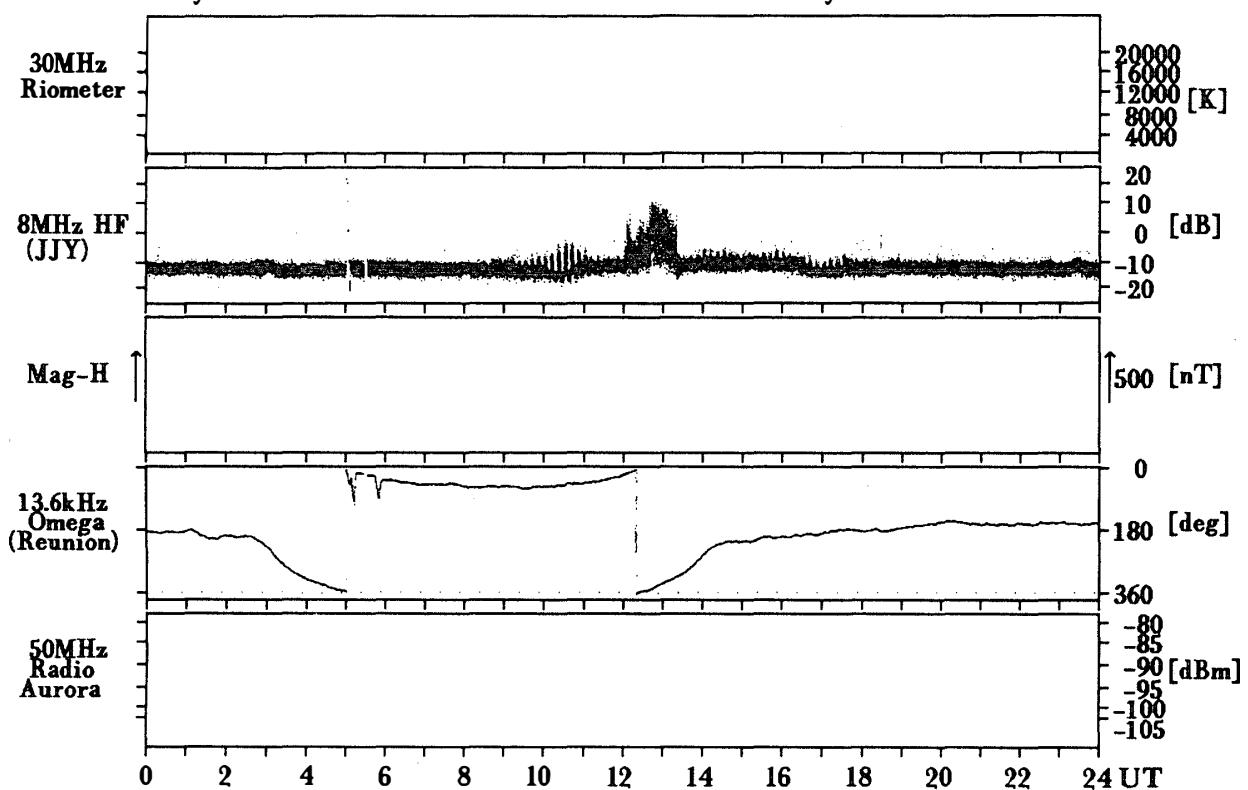
Syowa Station

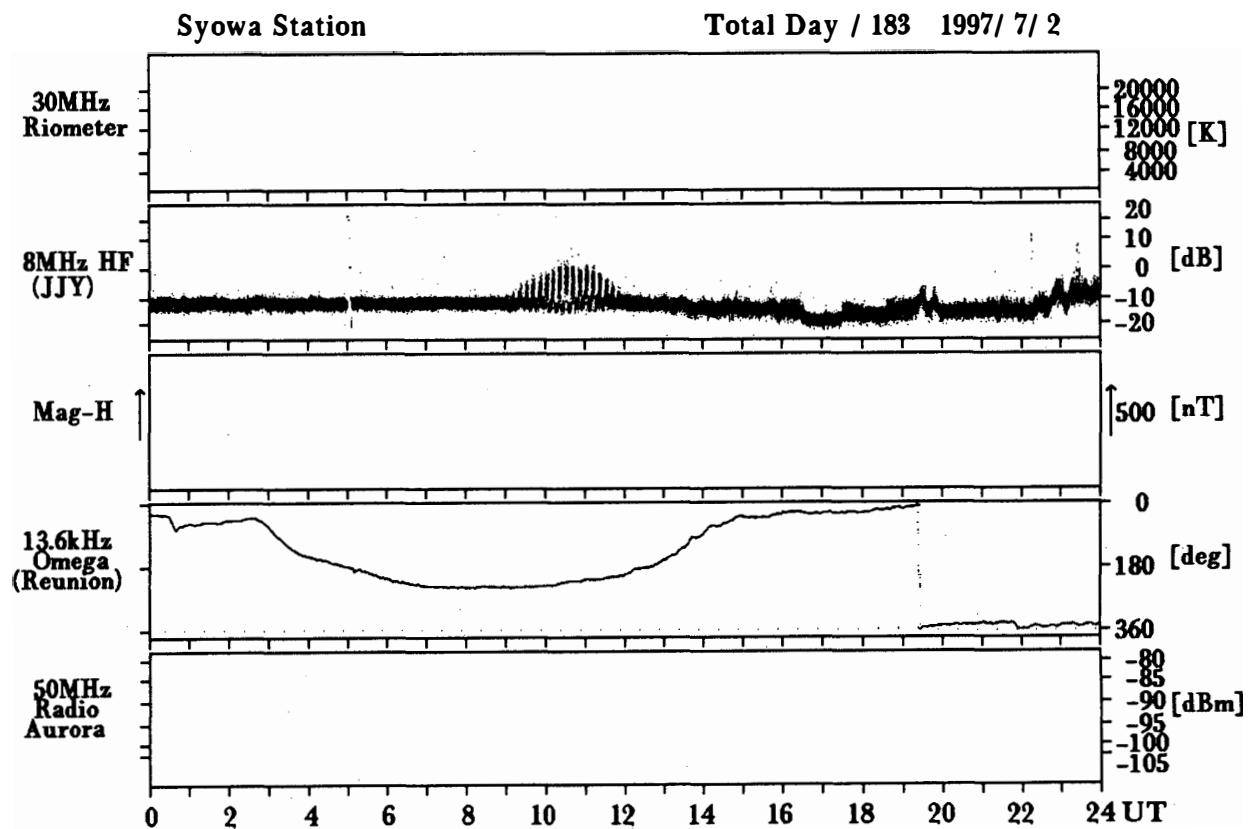
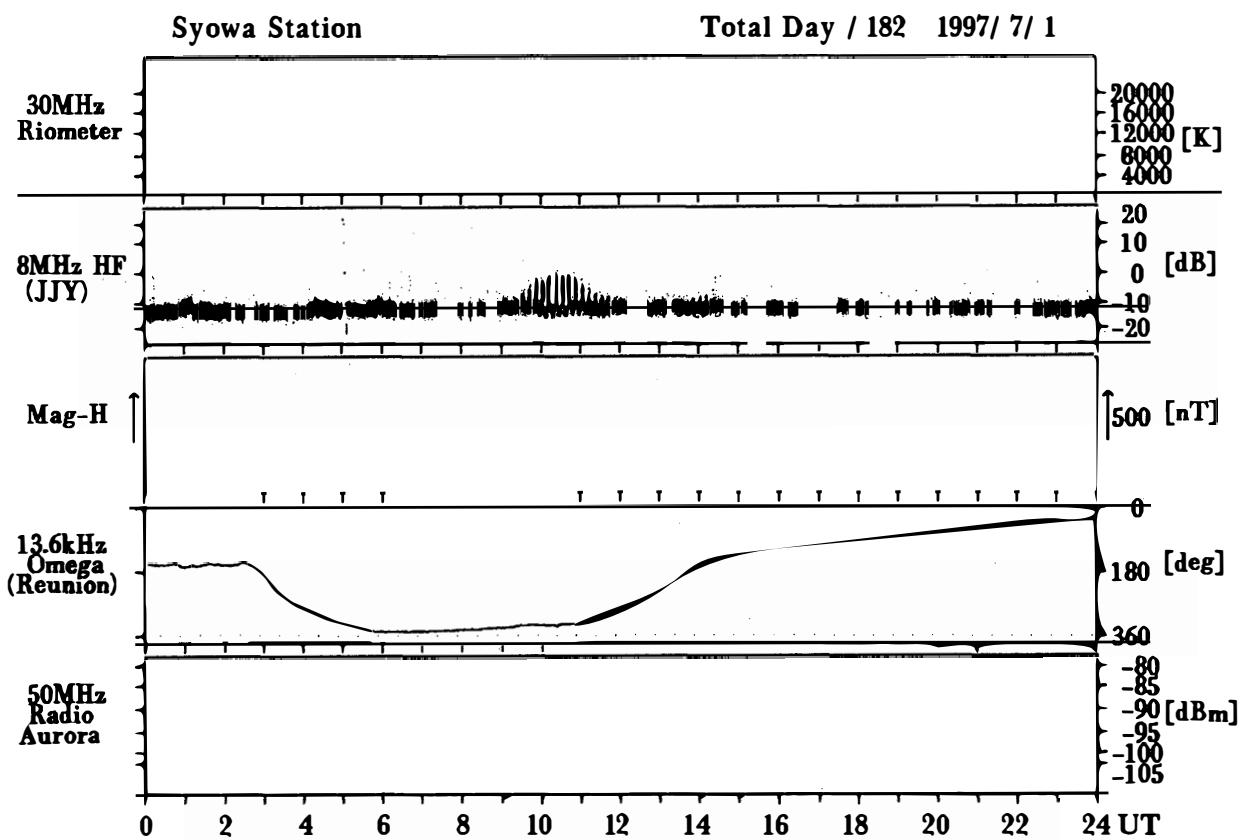
Total Day / 180 1997/ 6/29



Syowa Station

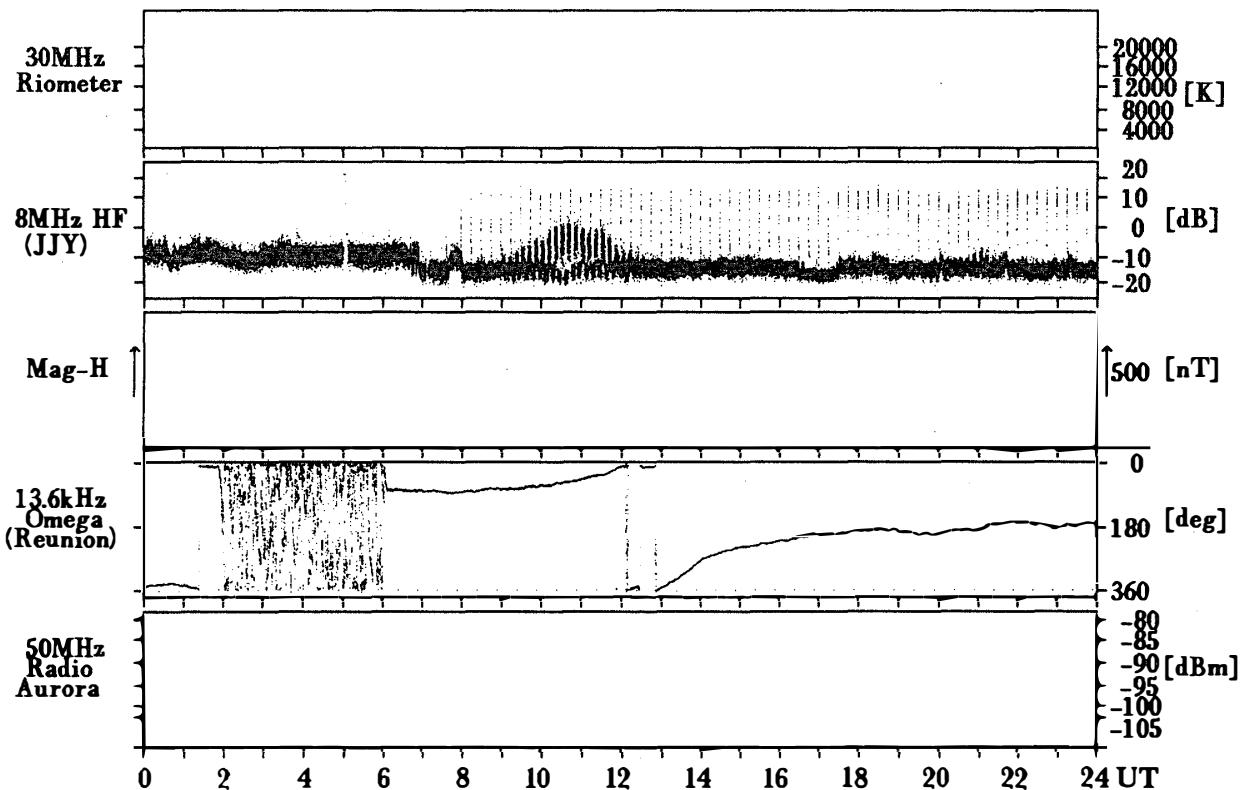
Total Day / 181 1997/ 6/30





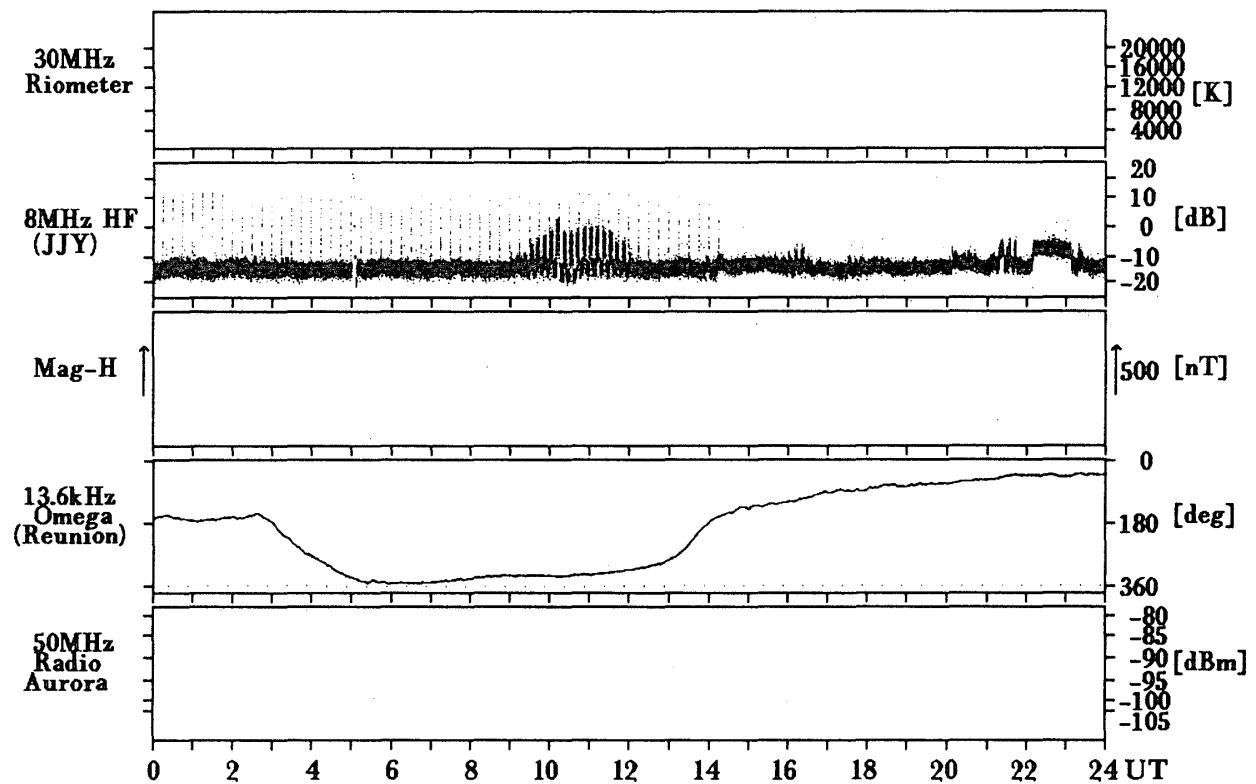
Syowa Station

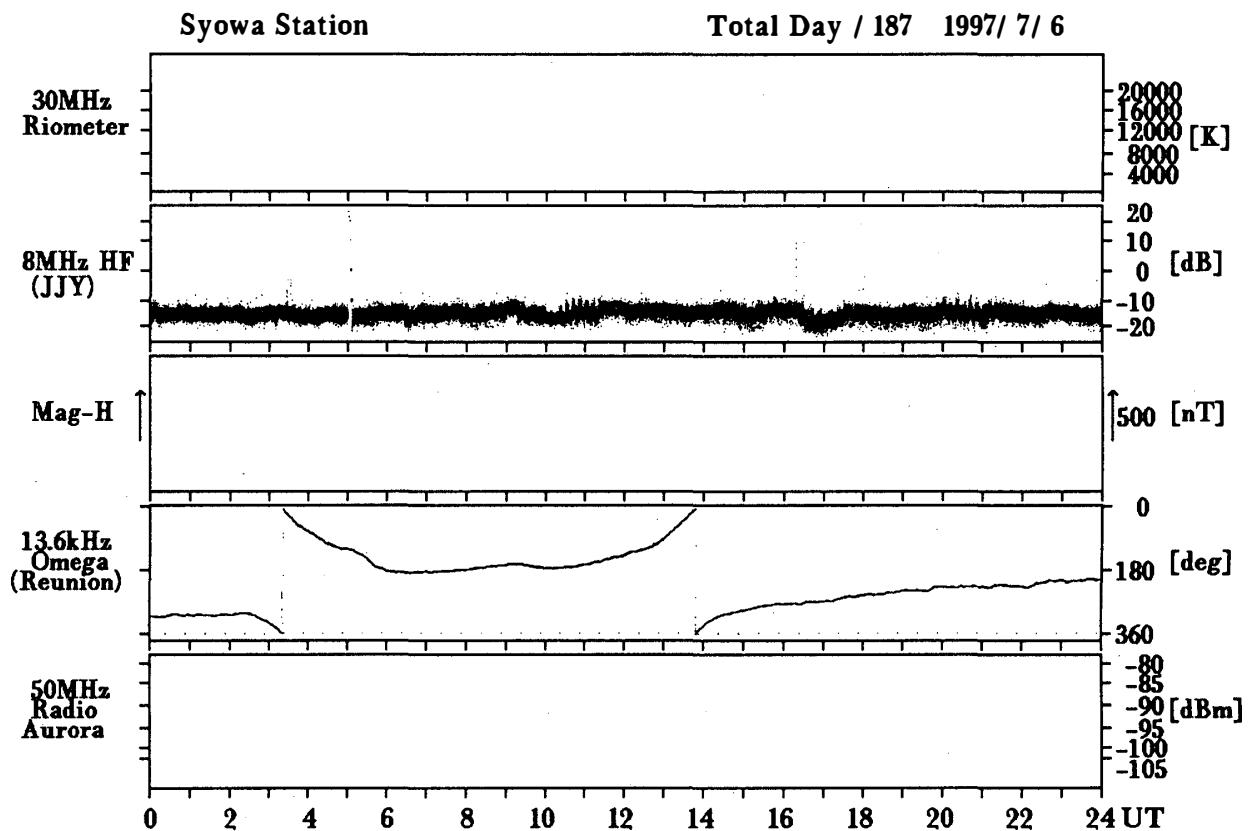
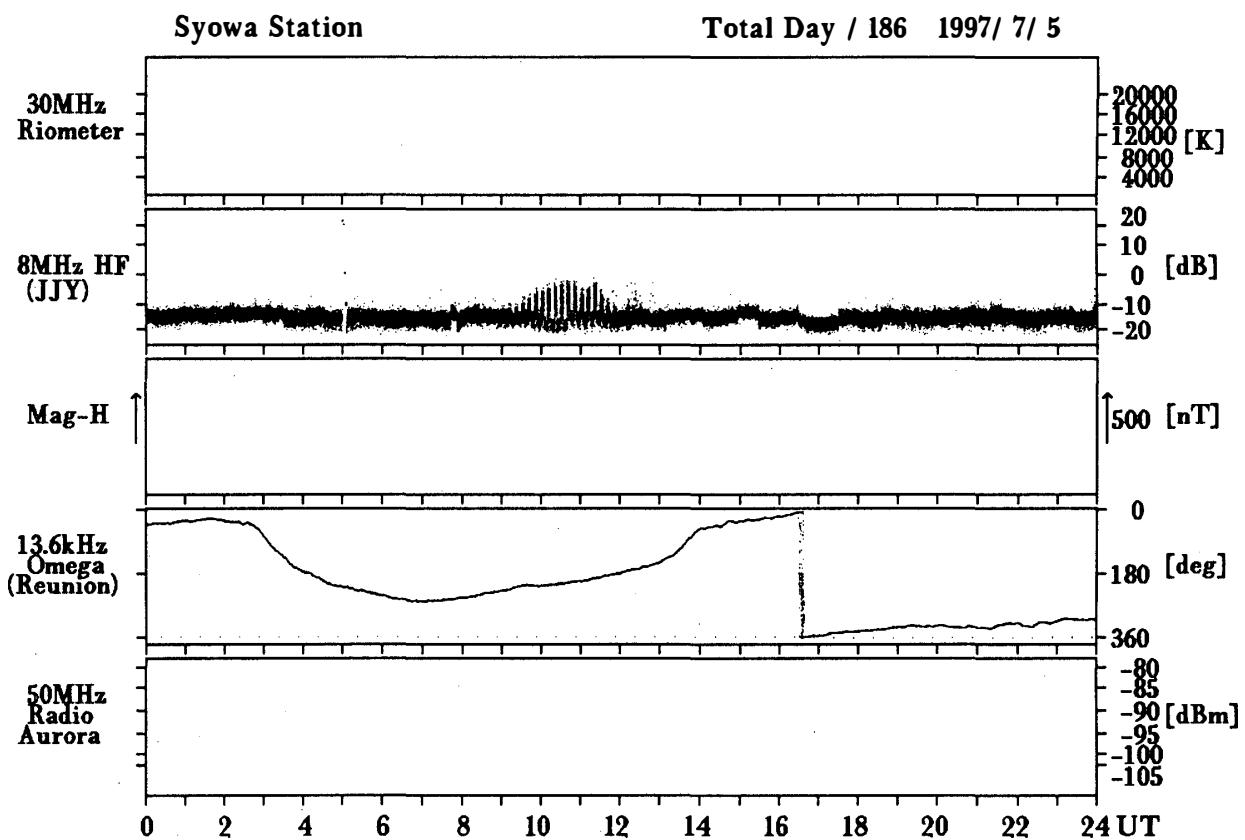
Total Day / 184 1997/ 7/ 3



Syowa Station

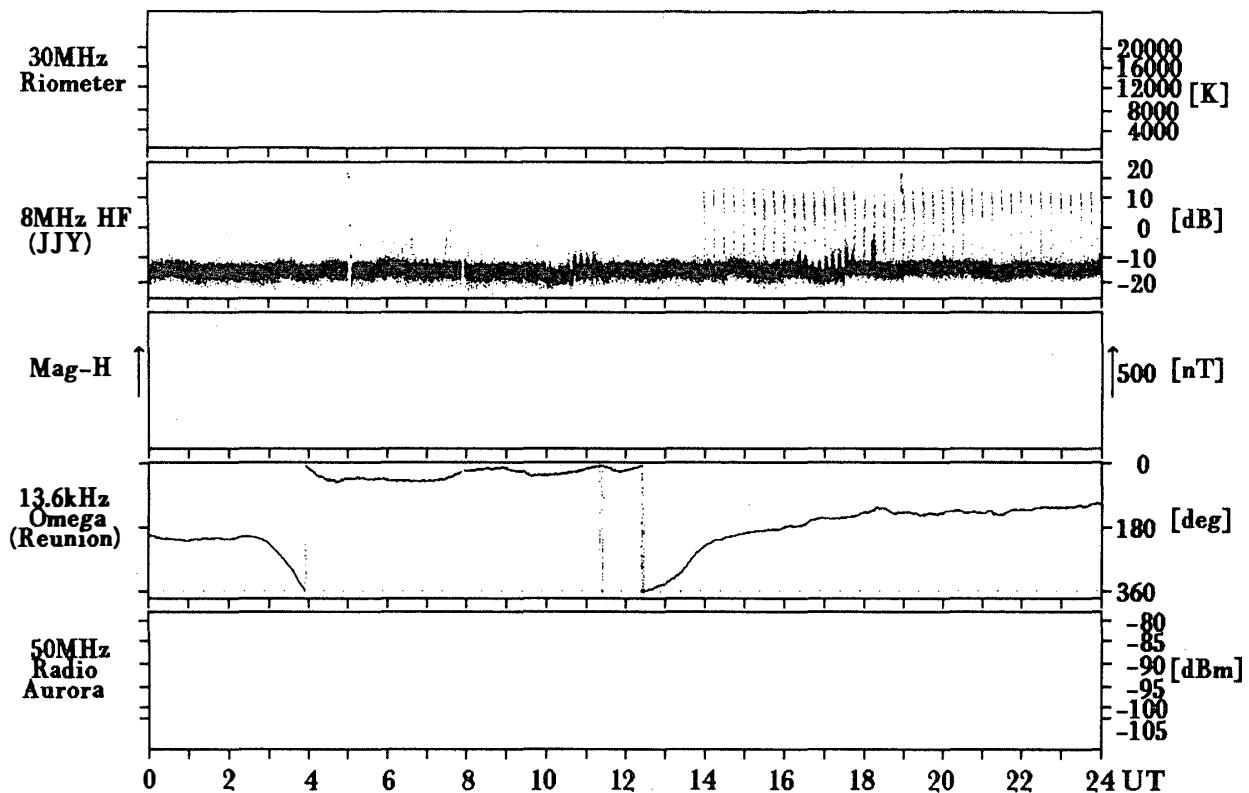
Total Day / 185 1997/ 7/ 4





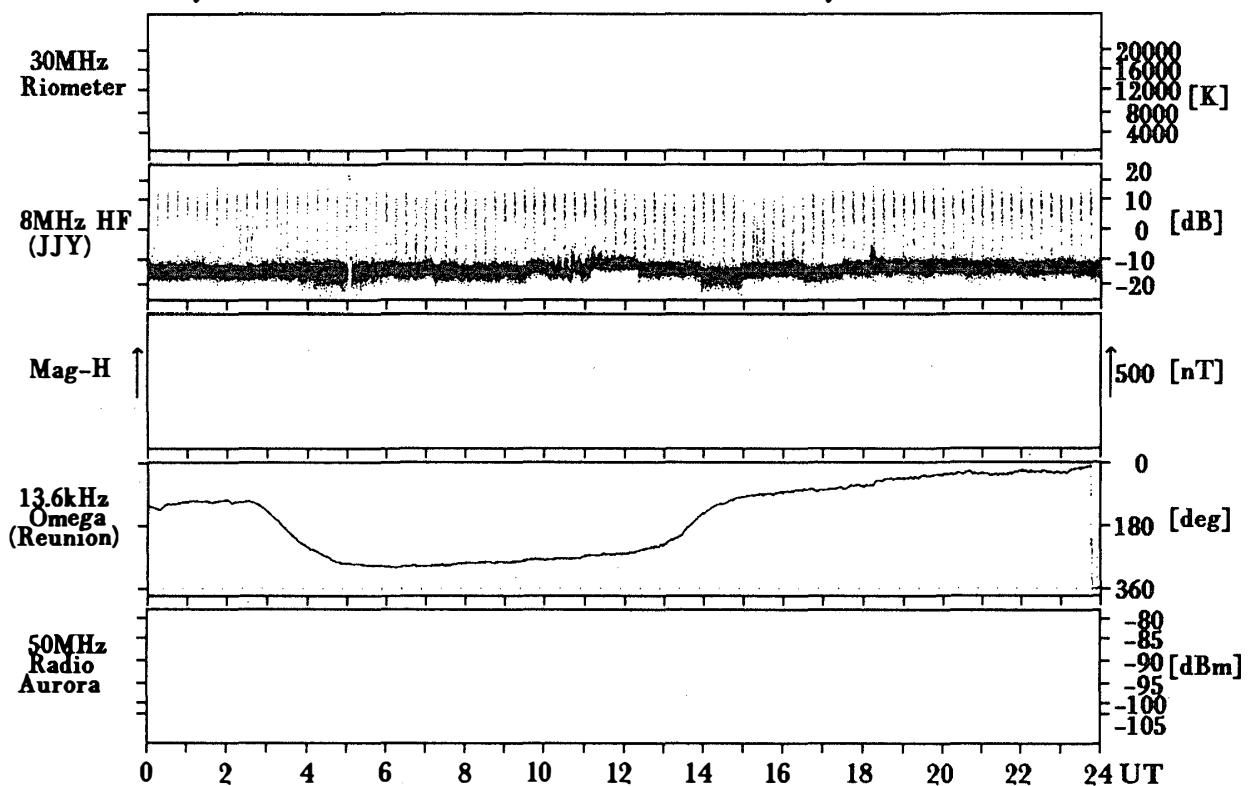
Syowa Station

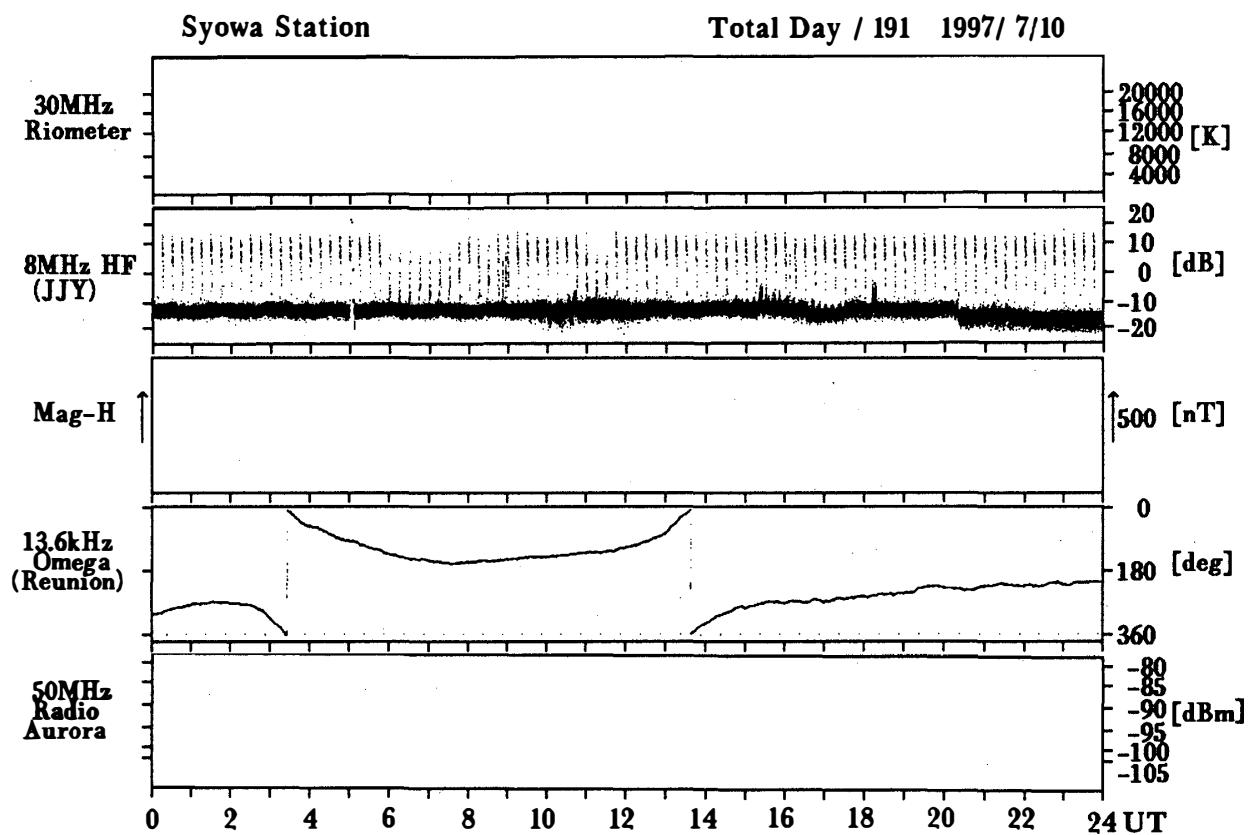
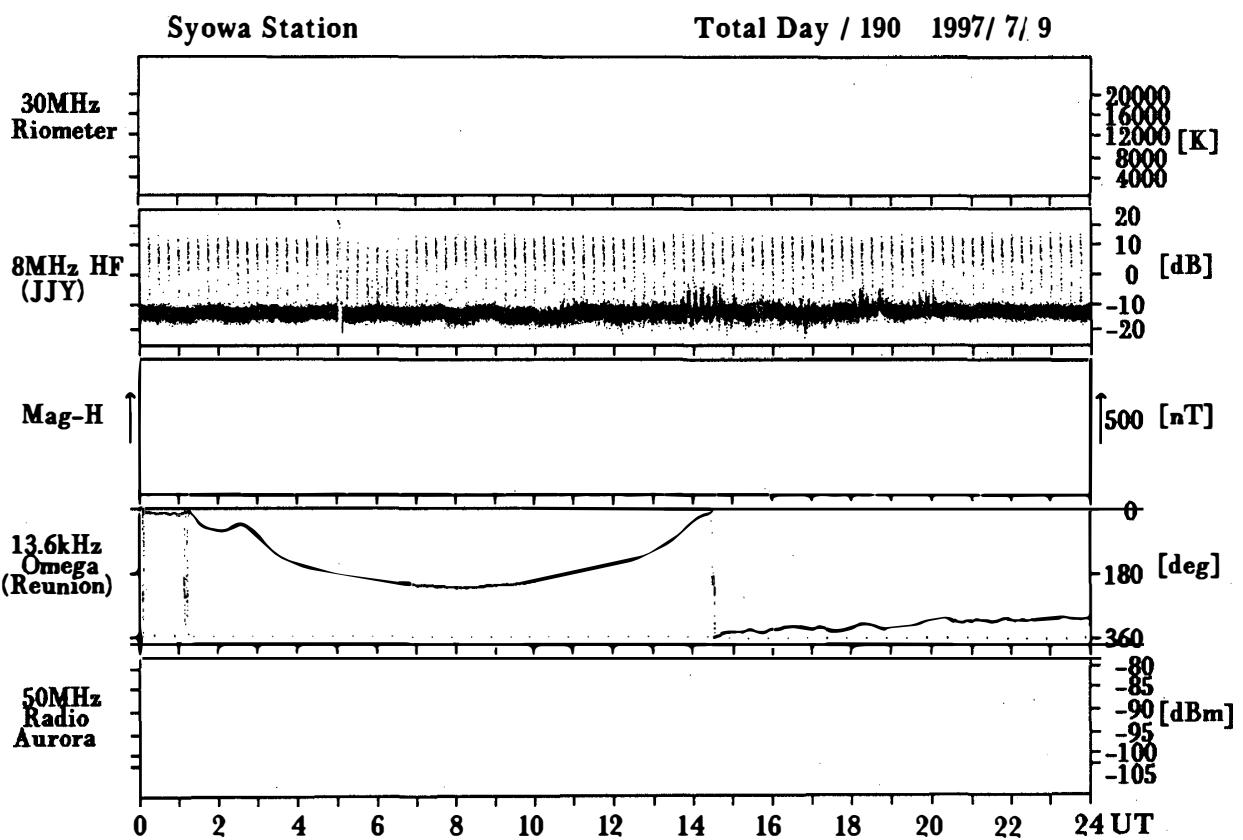
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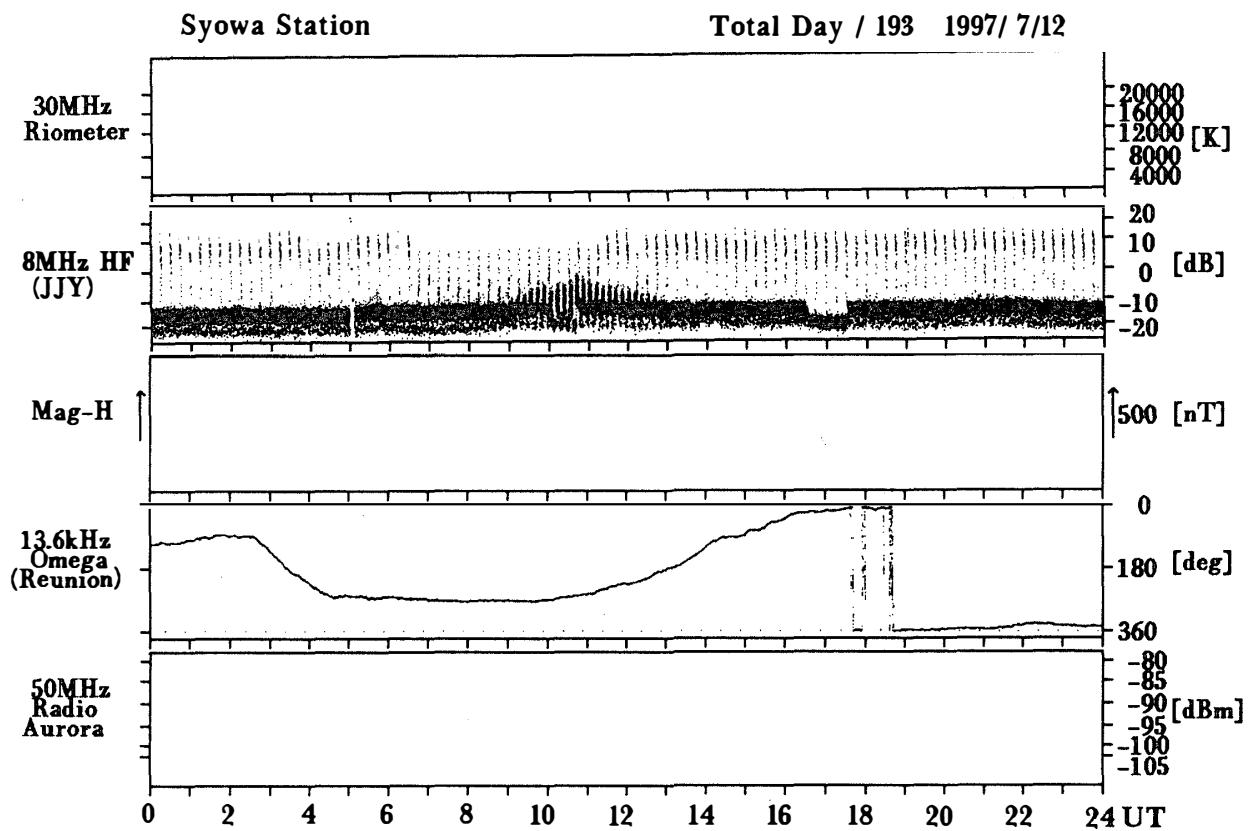
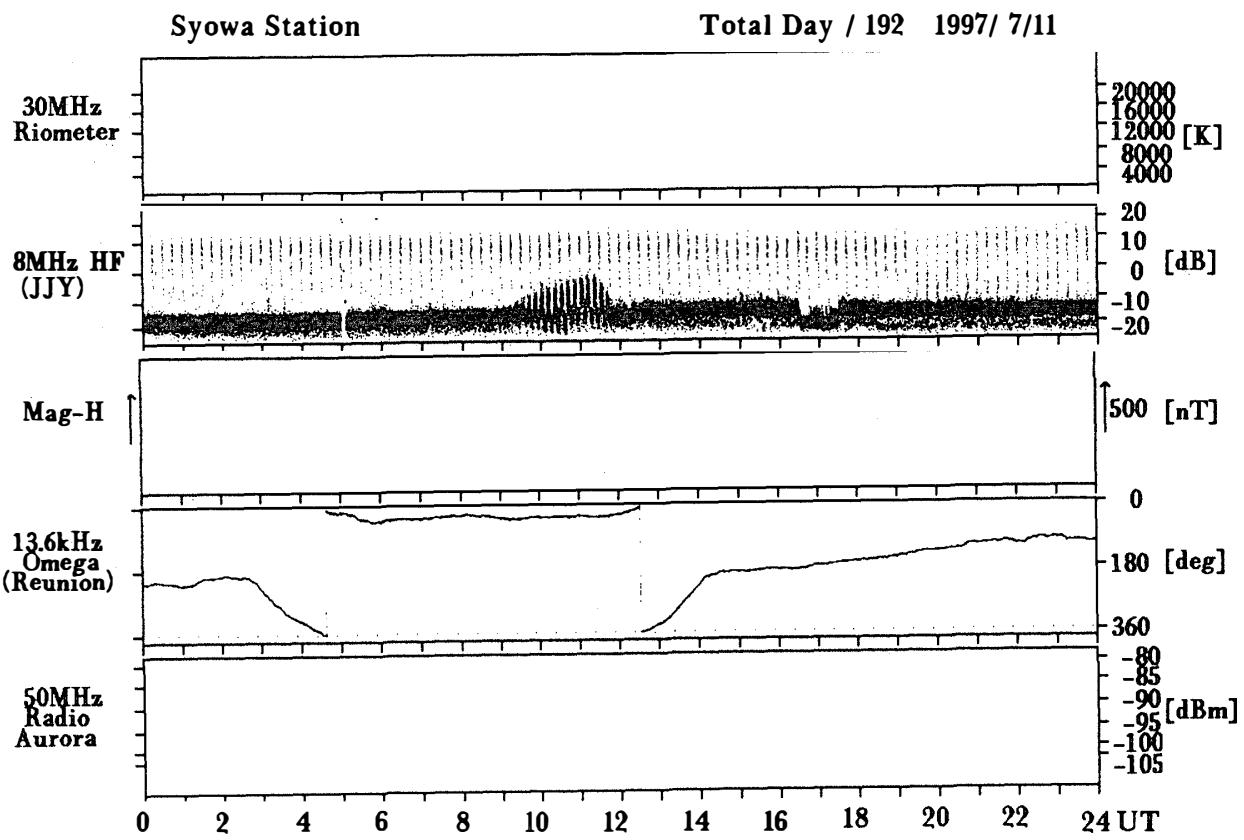


Syowa Station

Total Day / 189 1997/ 7/ 8

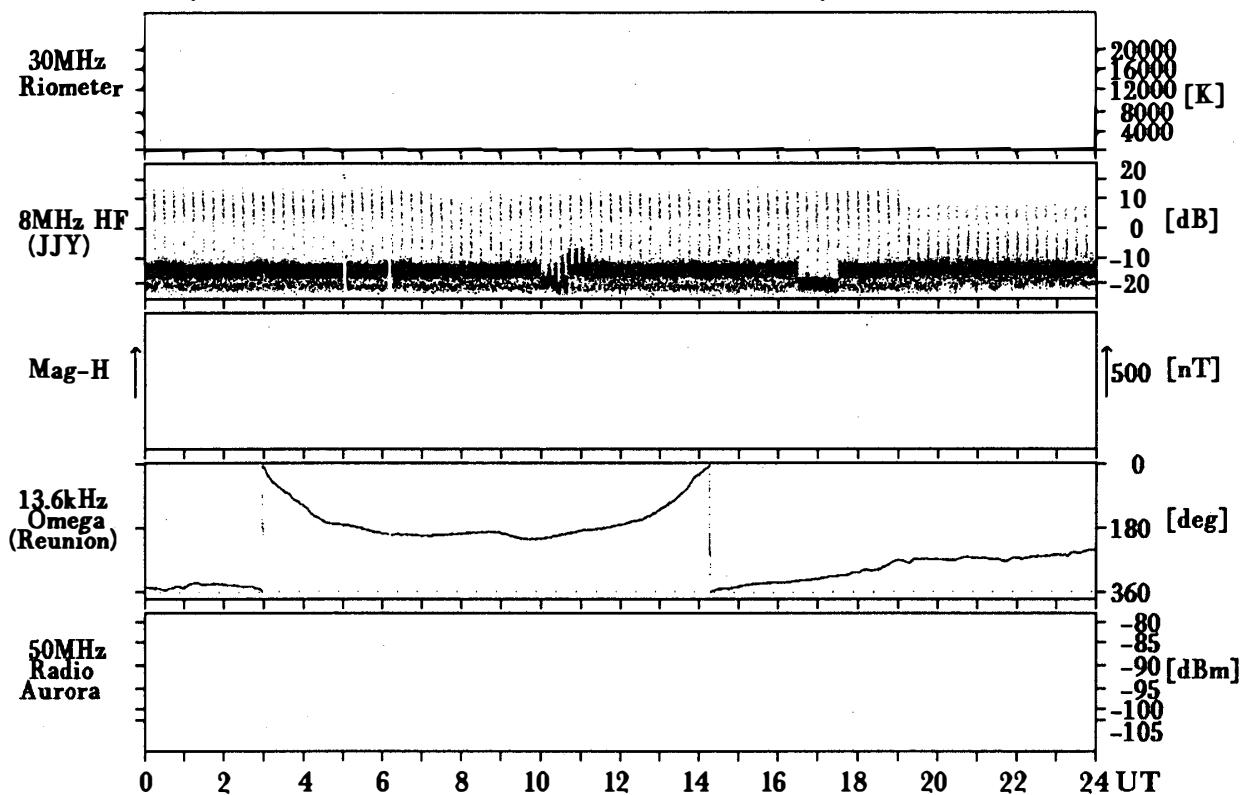






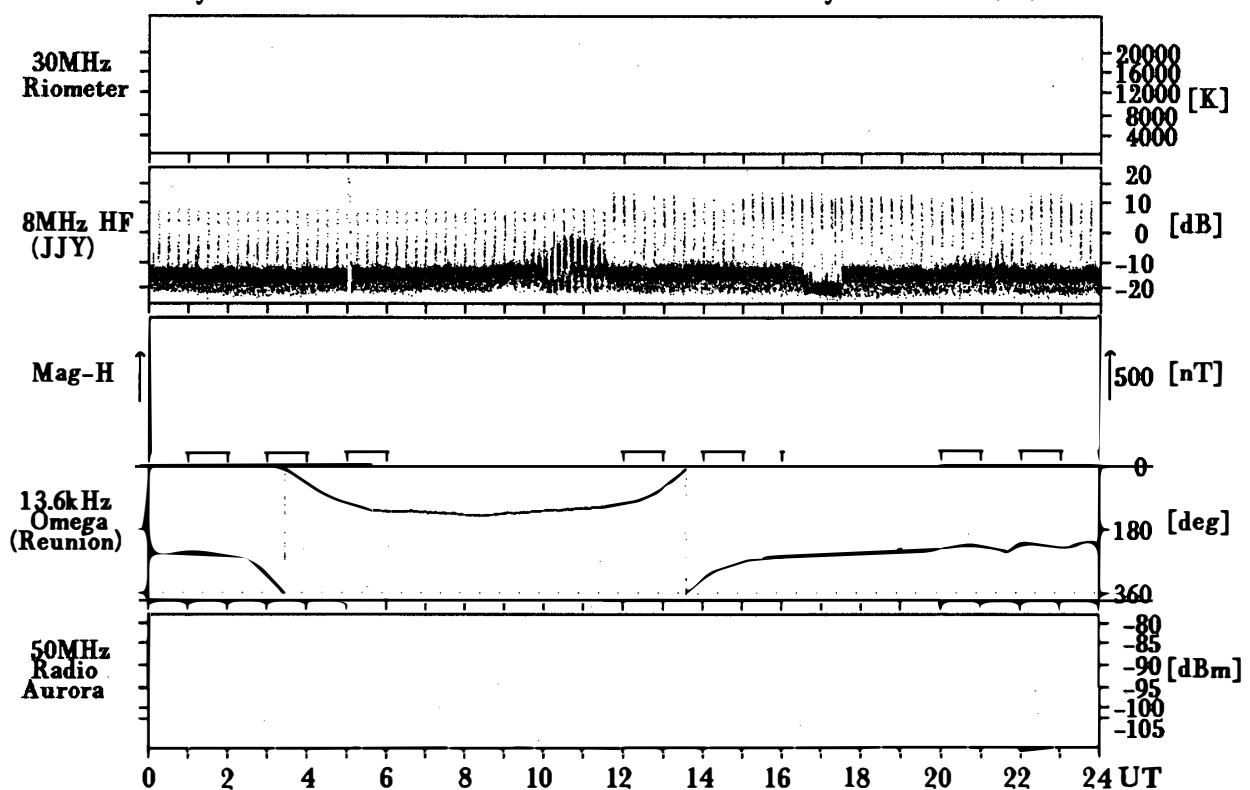
Syowa Station

Total Day / 194 1997/ 7/13



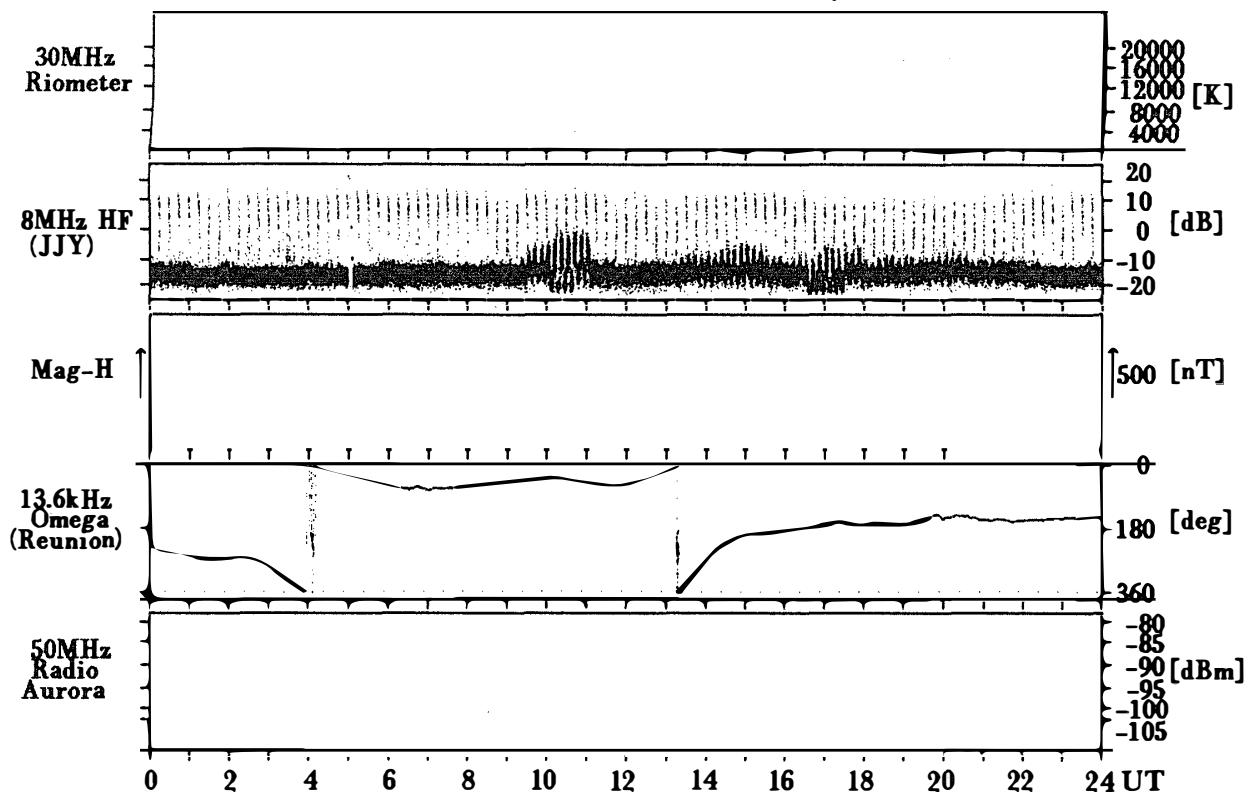
Syowa Station

Total Day / 195 1997/ 7/14



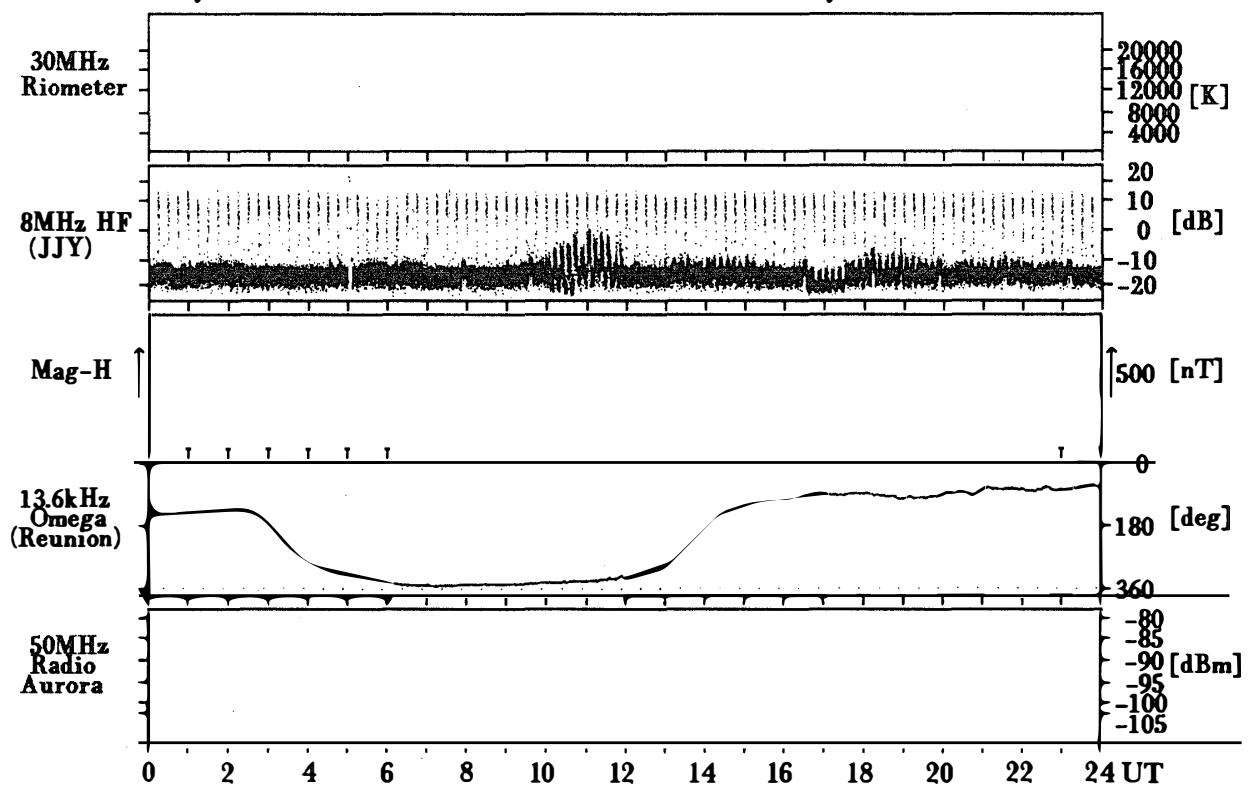
Syowa Station

Total Day / 196 1997/ 7/15



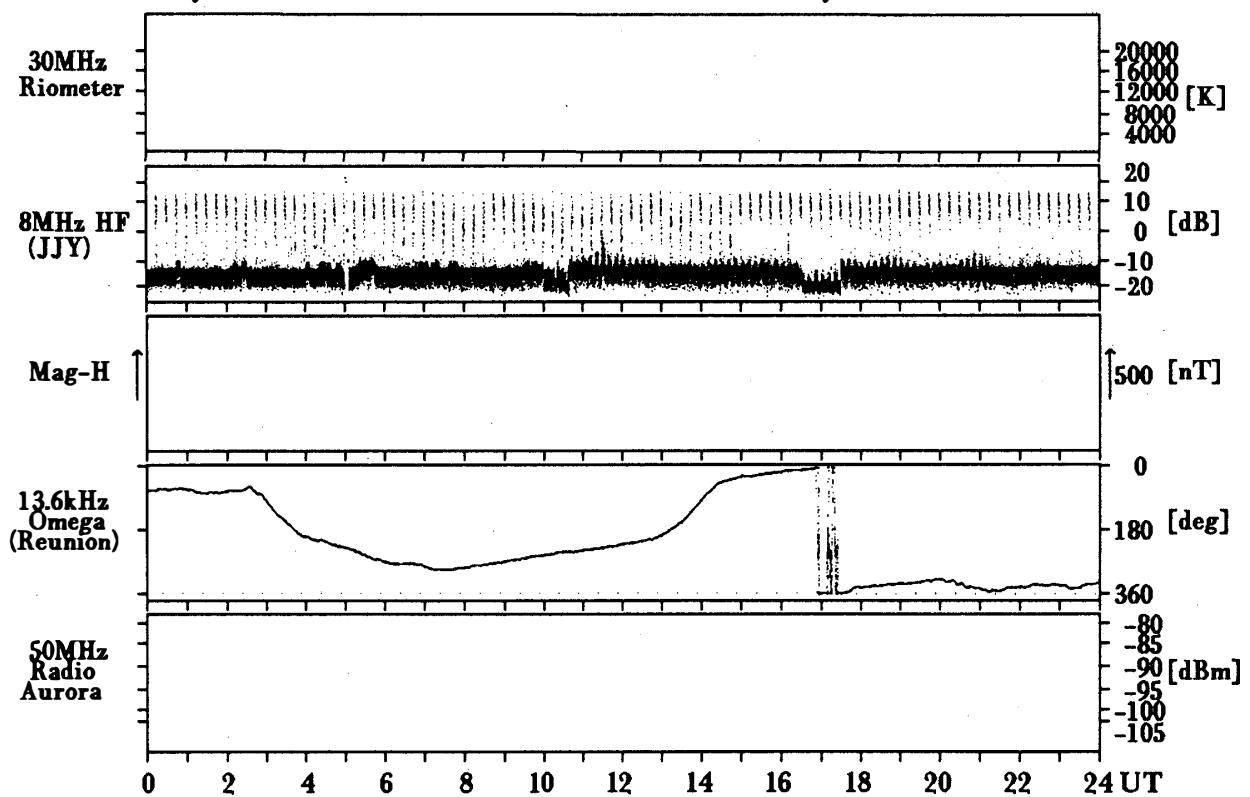
Syowa Station

Total Day / 197 1997/ 7/16



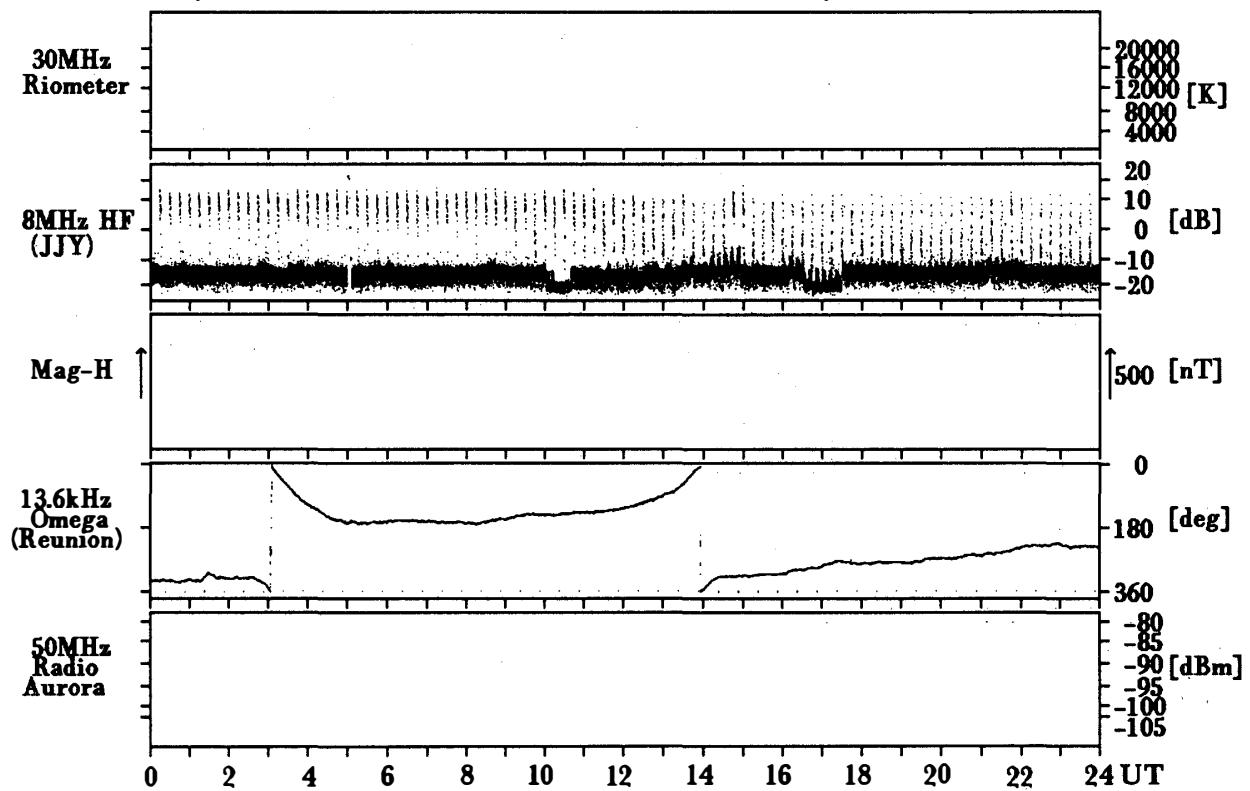
Syowa Station

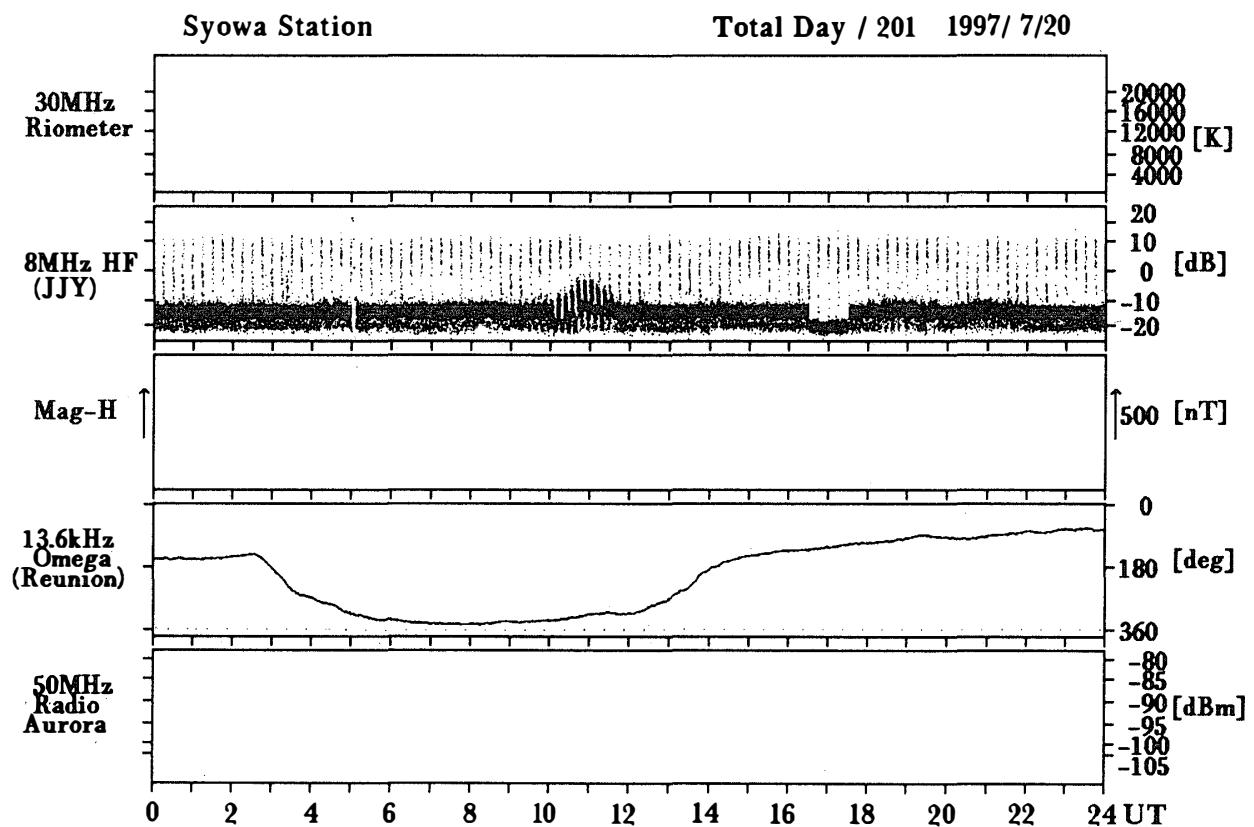
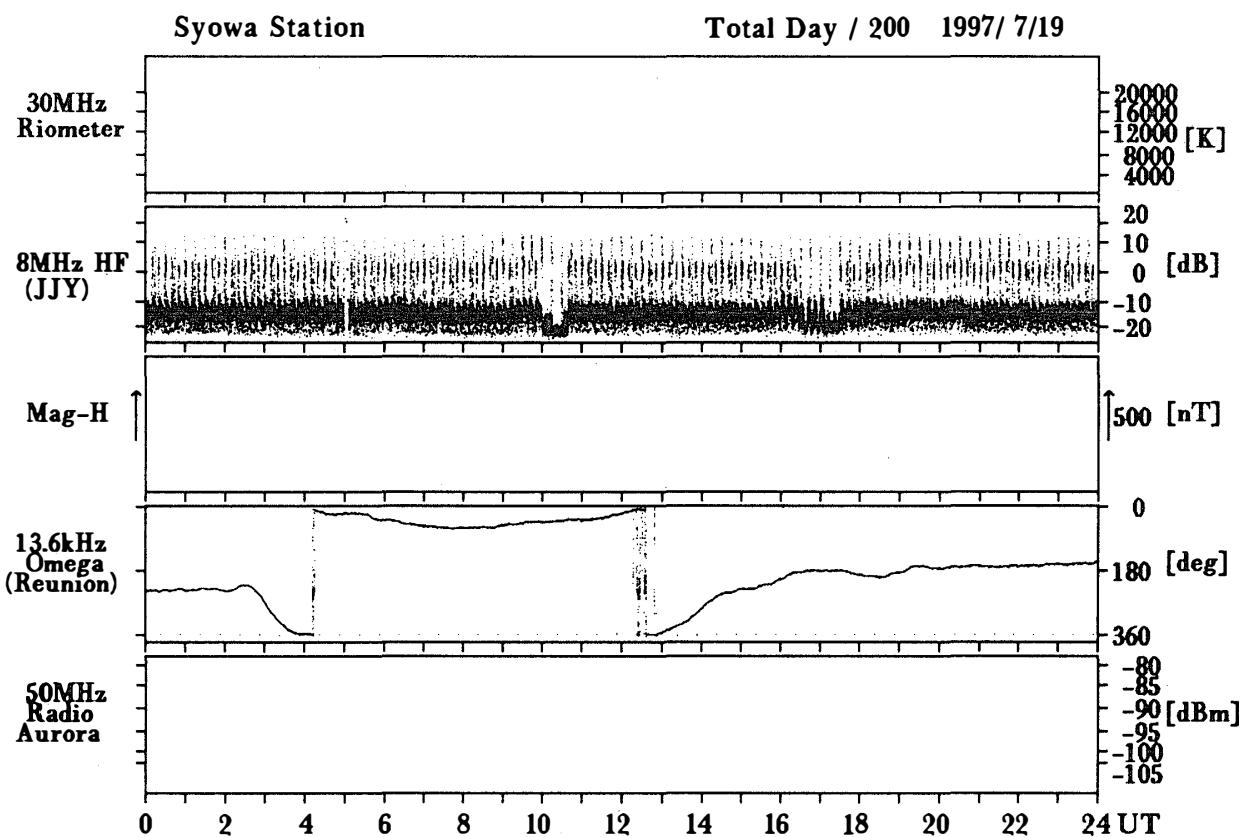
Total Day / 198 1997/ 7/17



Syowa Station

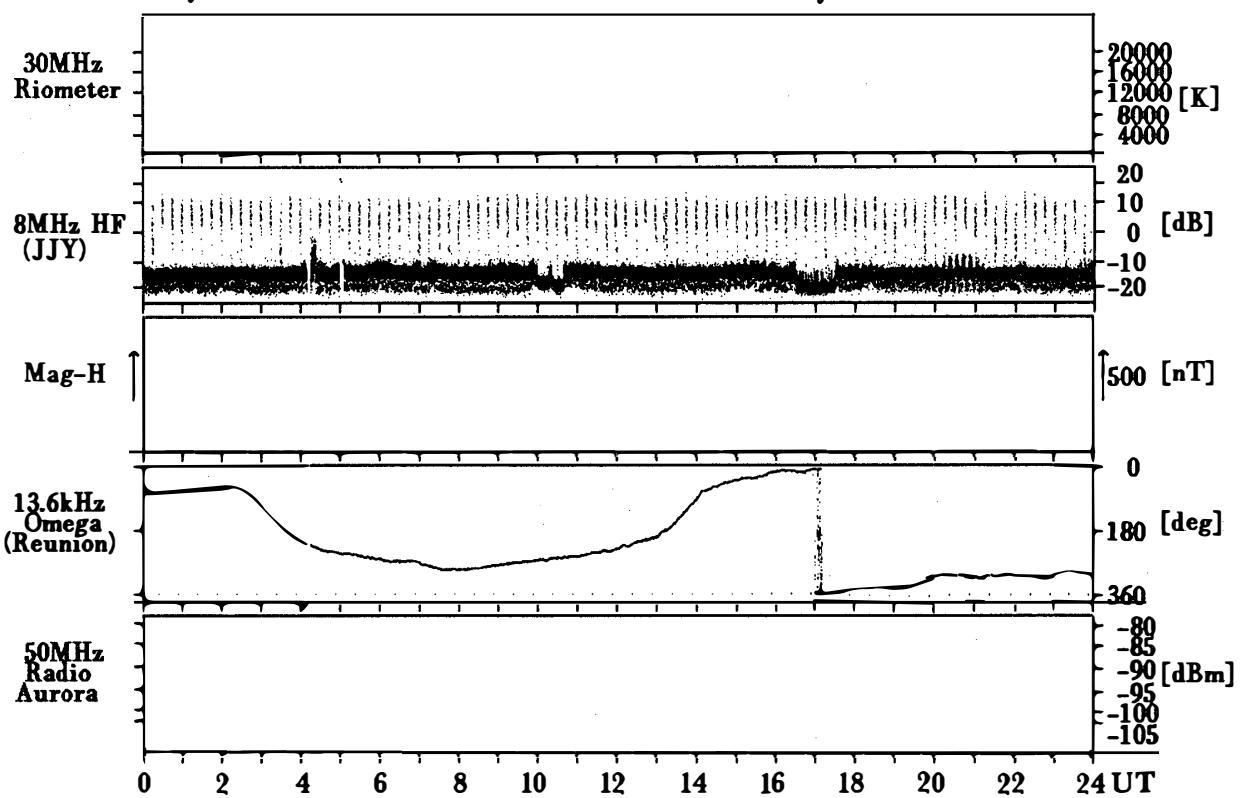
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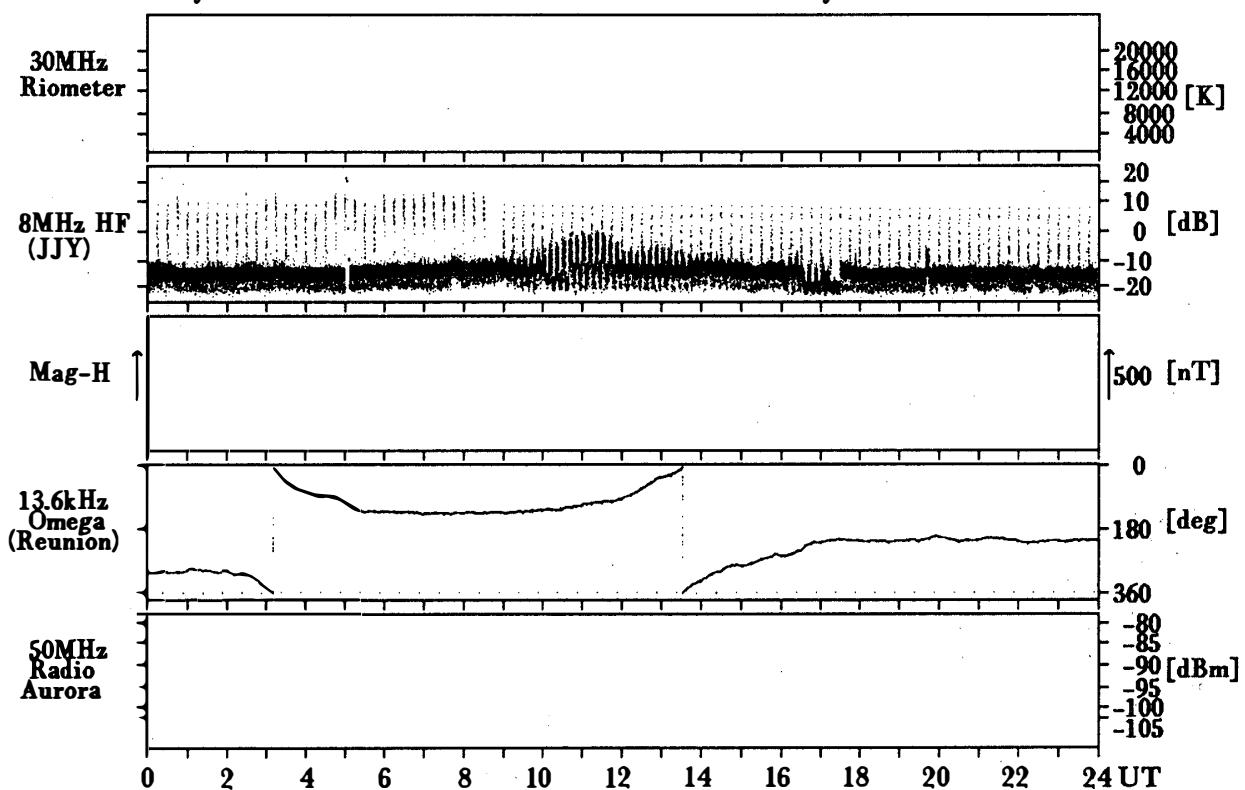
Syowa Station

Total Day / 202 1997/ 7/21



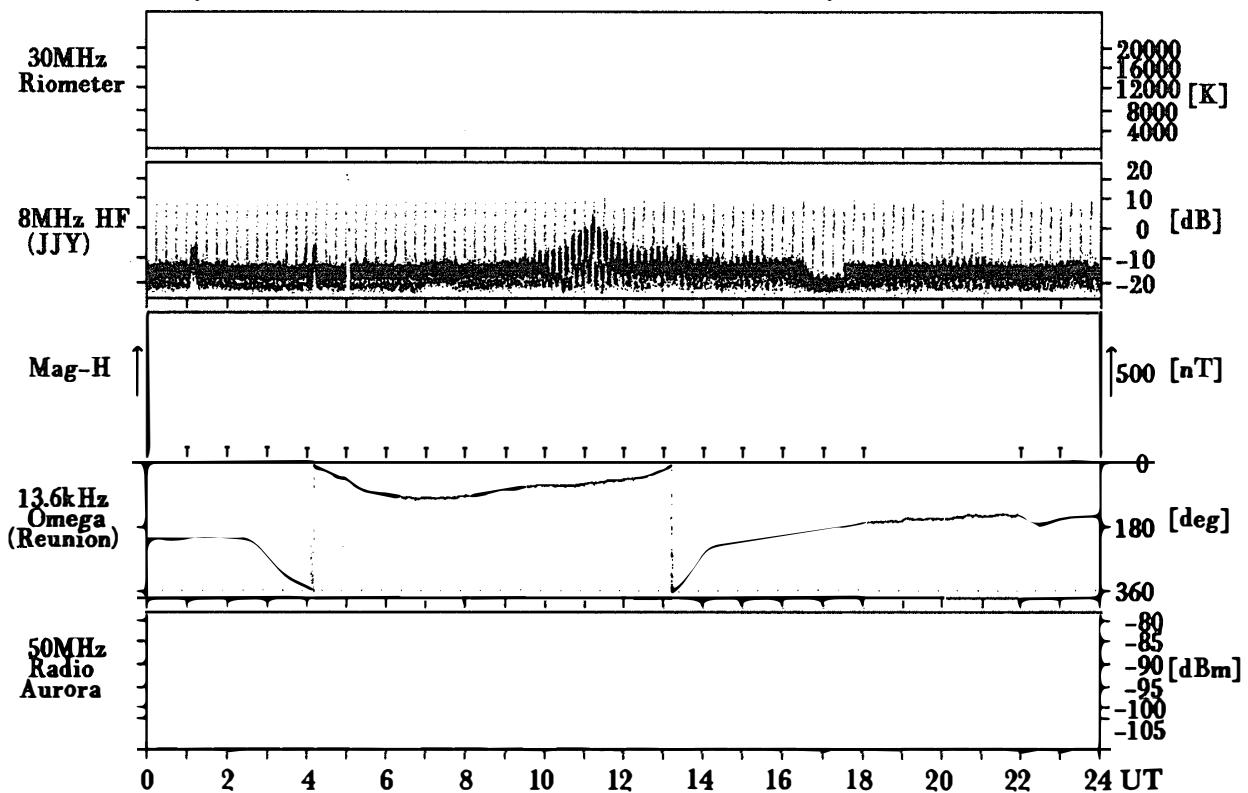
Syowa Station

Total Day / 203 1997/ 7/22



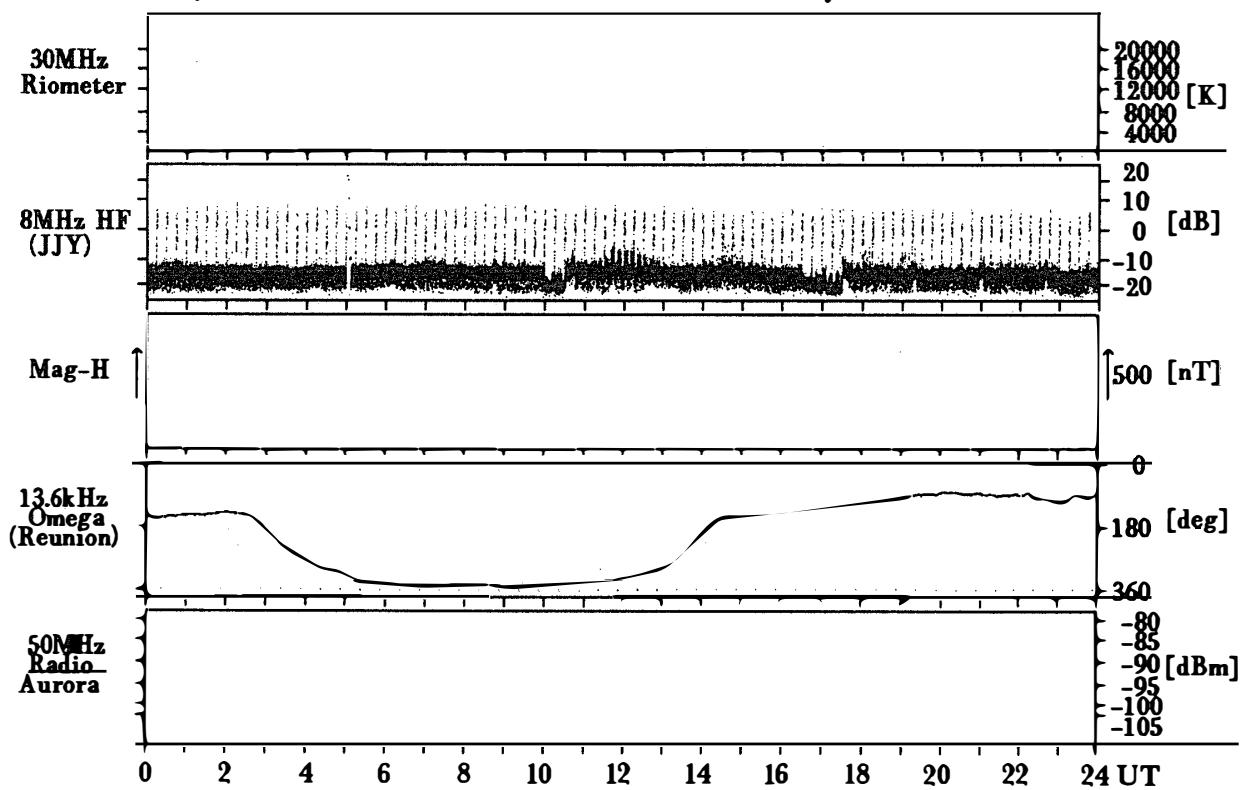
Syowa Station

Total Day / 204 1997/ 7/23



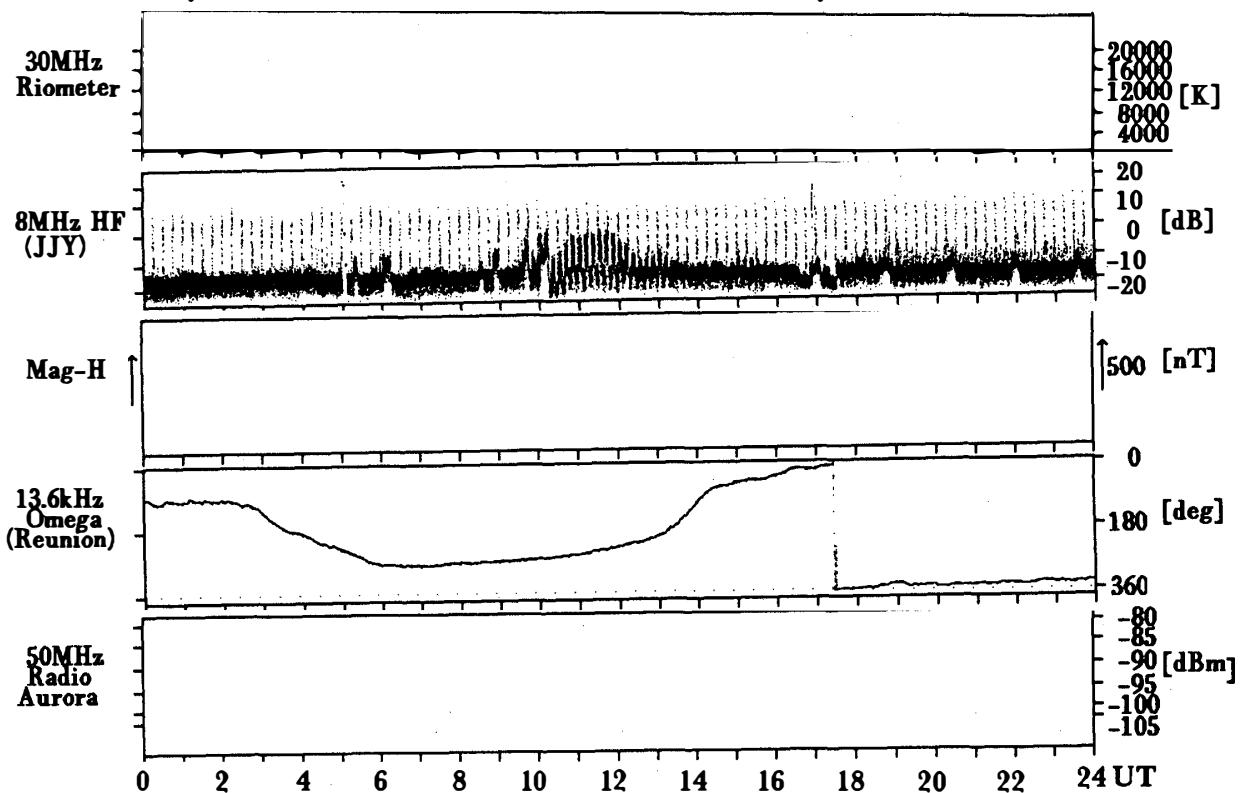
Syowa Station

Total Day / 205 1997/ 7/24



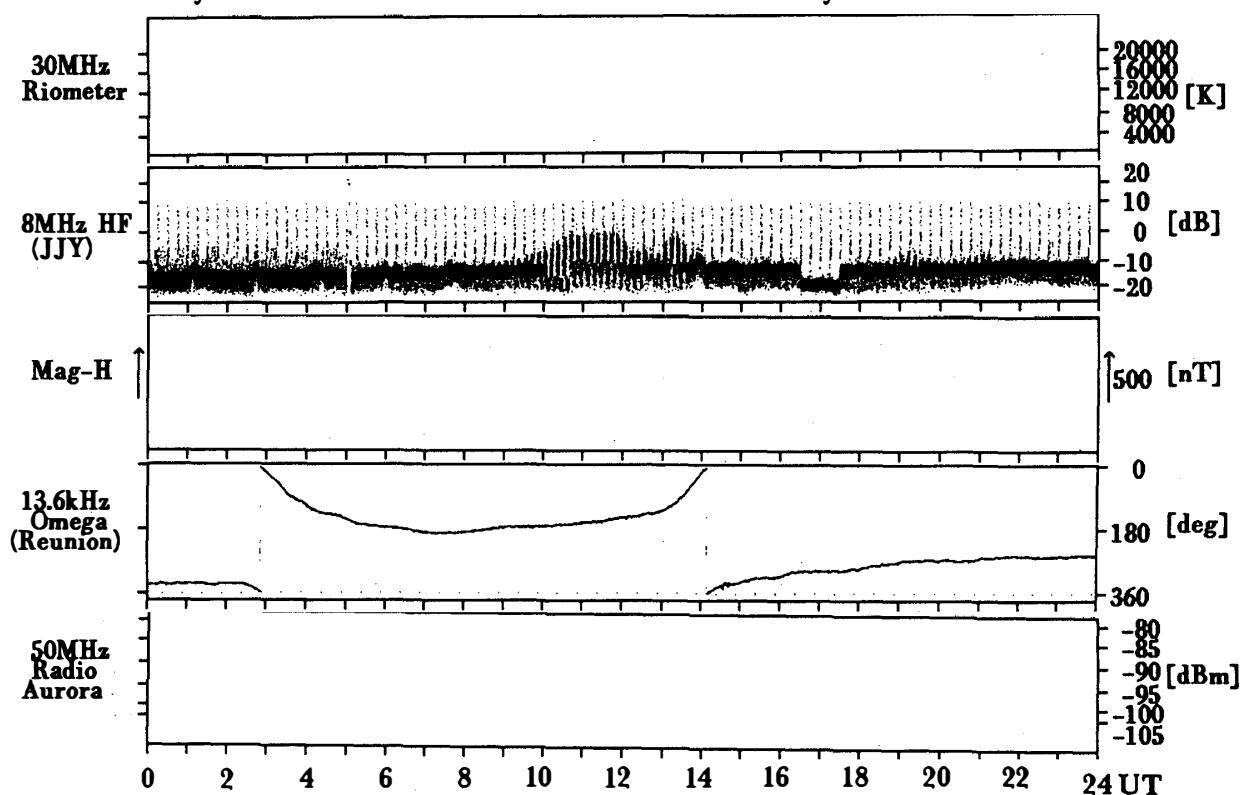
Syowa Station

Total Day / 206 1997/ 7/25



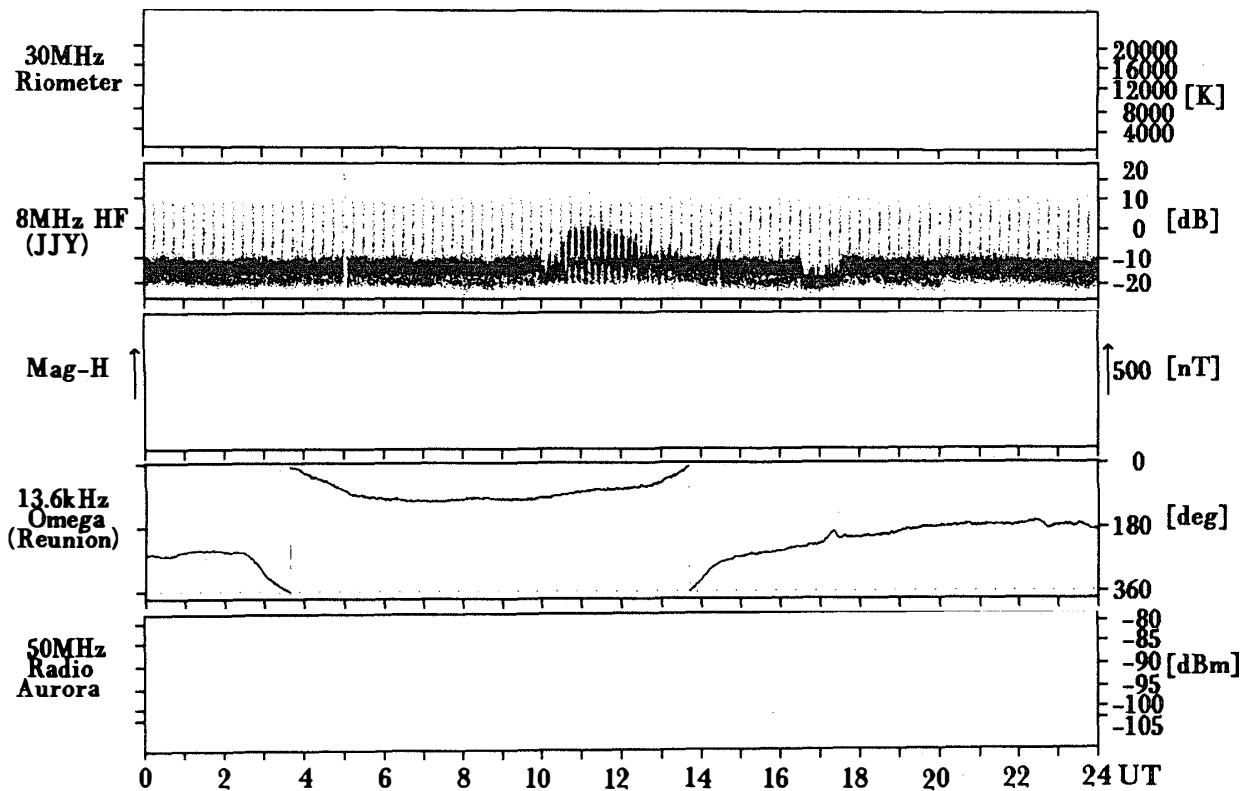
Syowa Station

Total Day / 207 1997/ 7/26



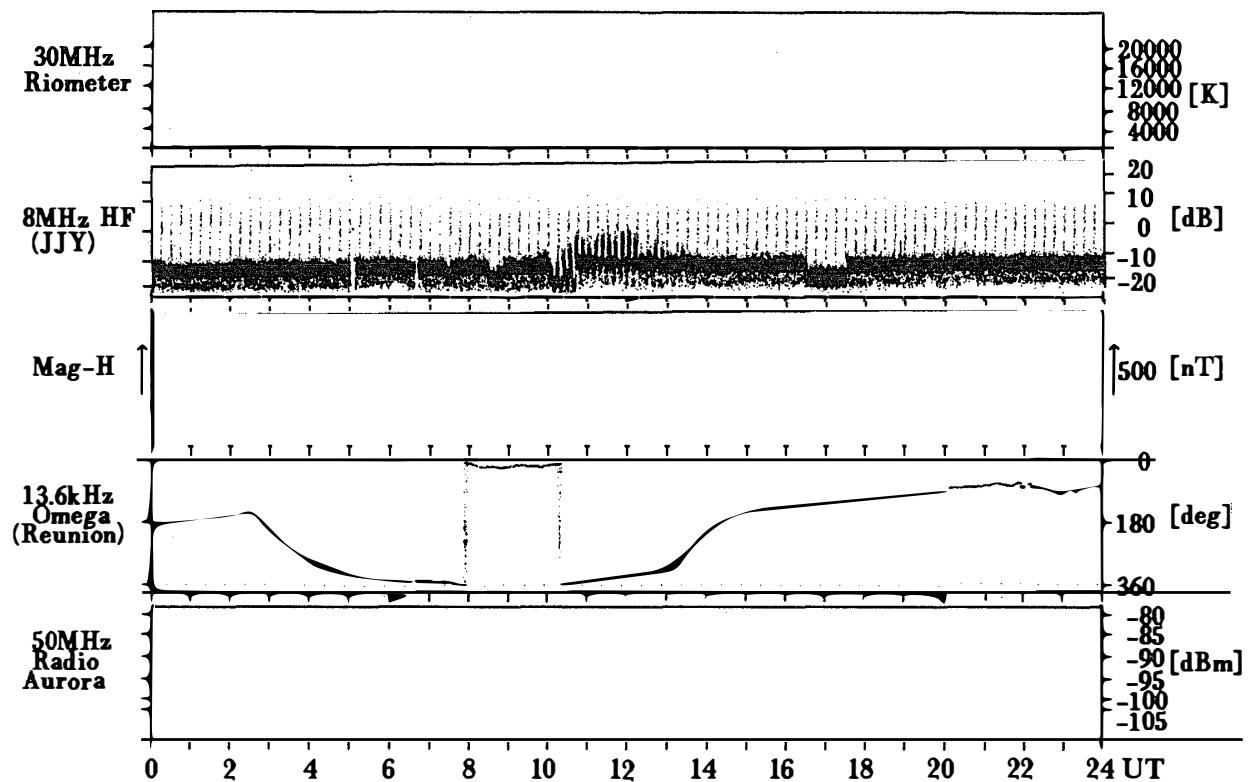
Syowa Station

Total Day / 208 1997/ 7/27



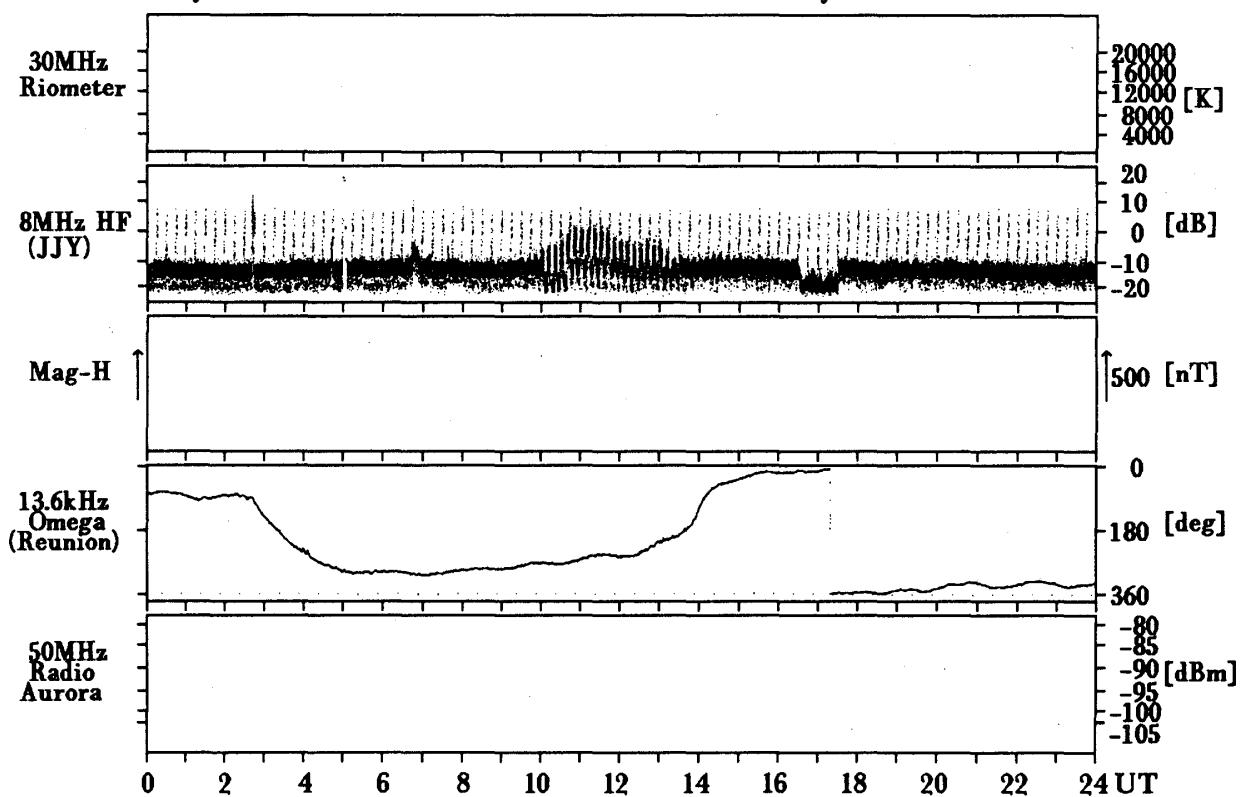
Syowa Station

Total Day / 209 1997/ 7/28



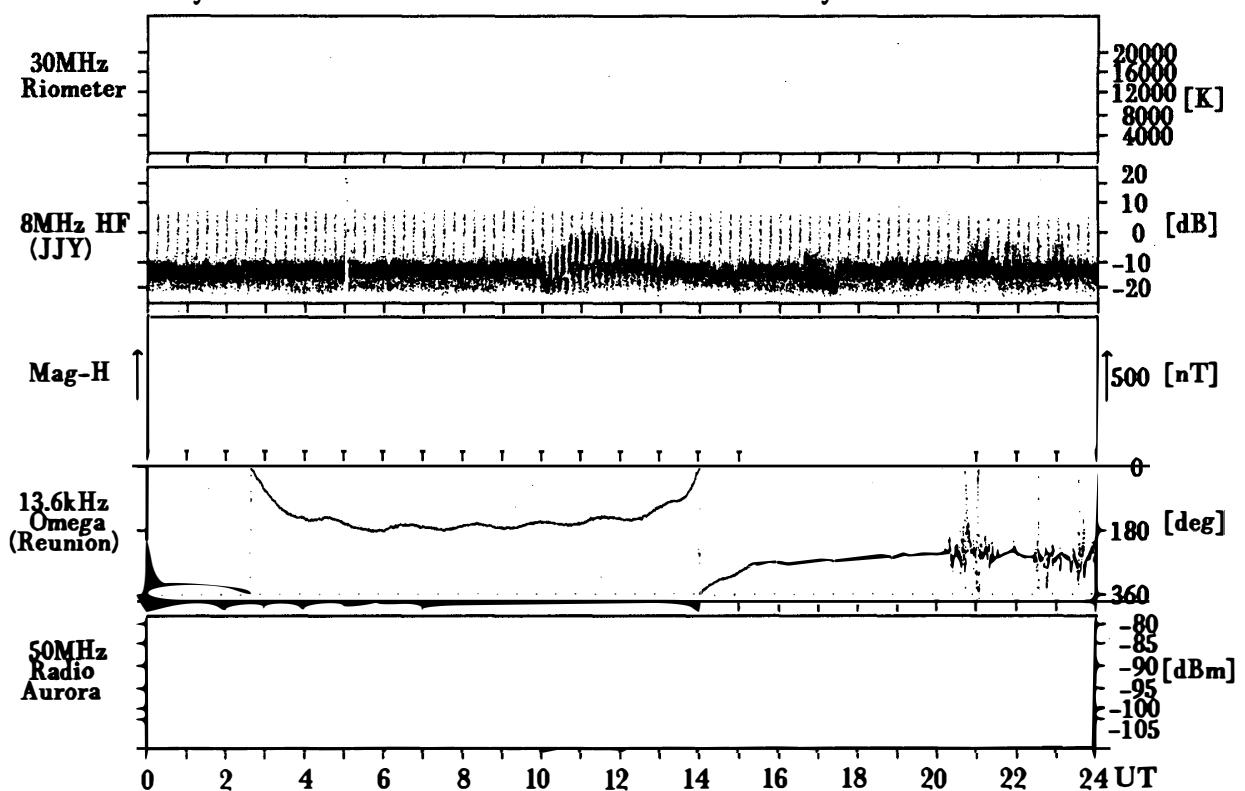
Syowa Station

Total Day / 210 1997/ 7/29



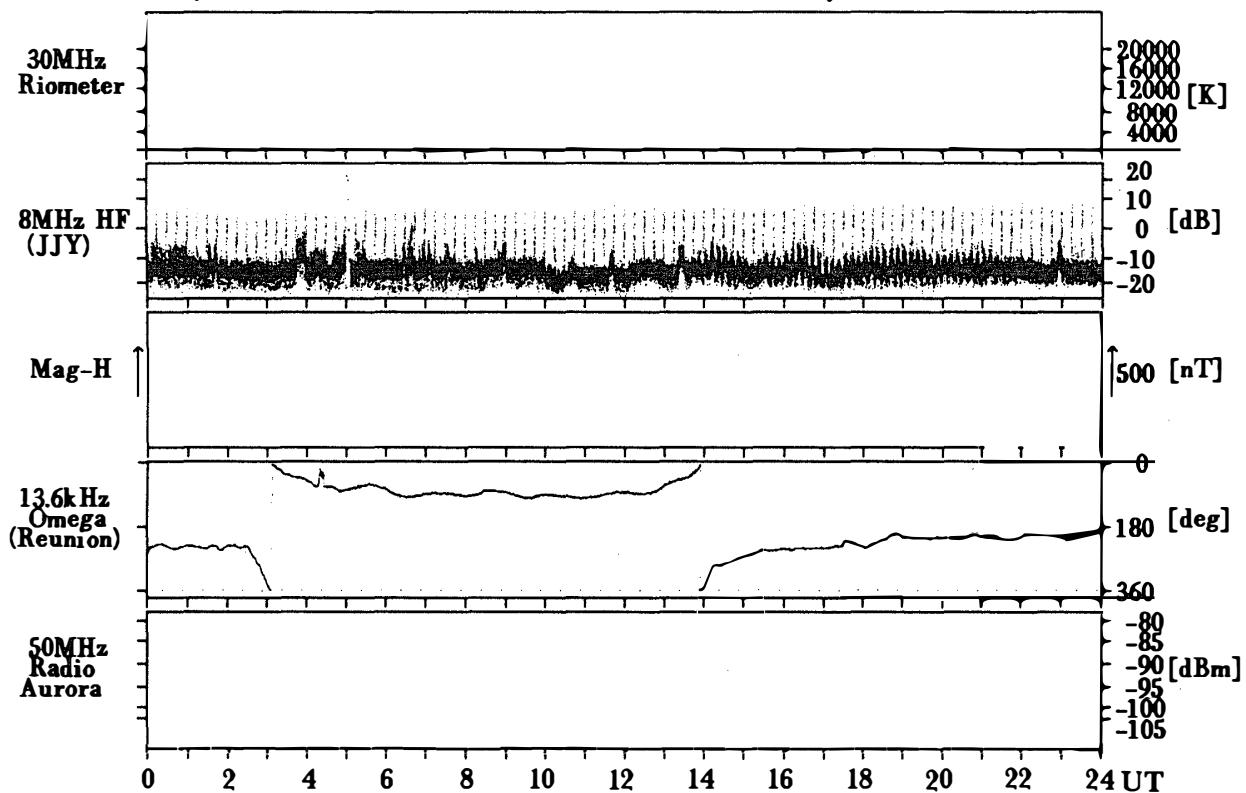
Syowa Station

Total Day / 211 1997/ 7/30



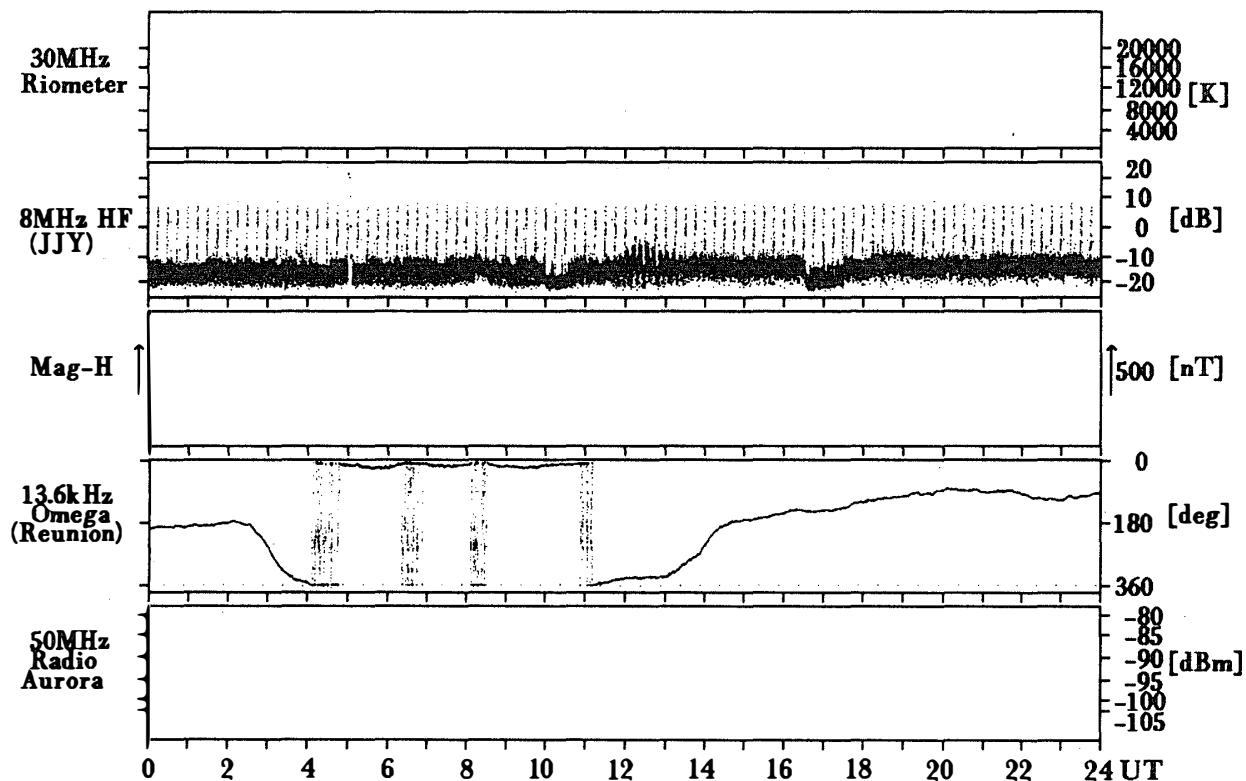
Syowa Station

Total Day / 212 1997/ 7/31



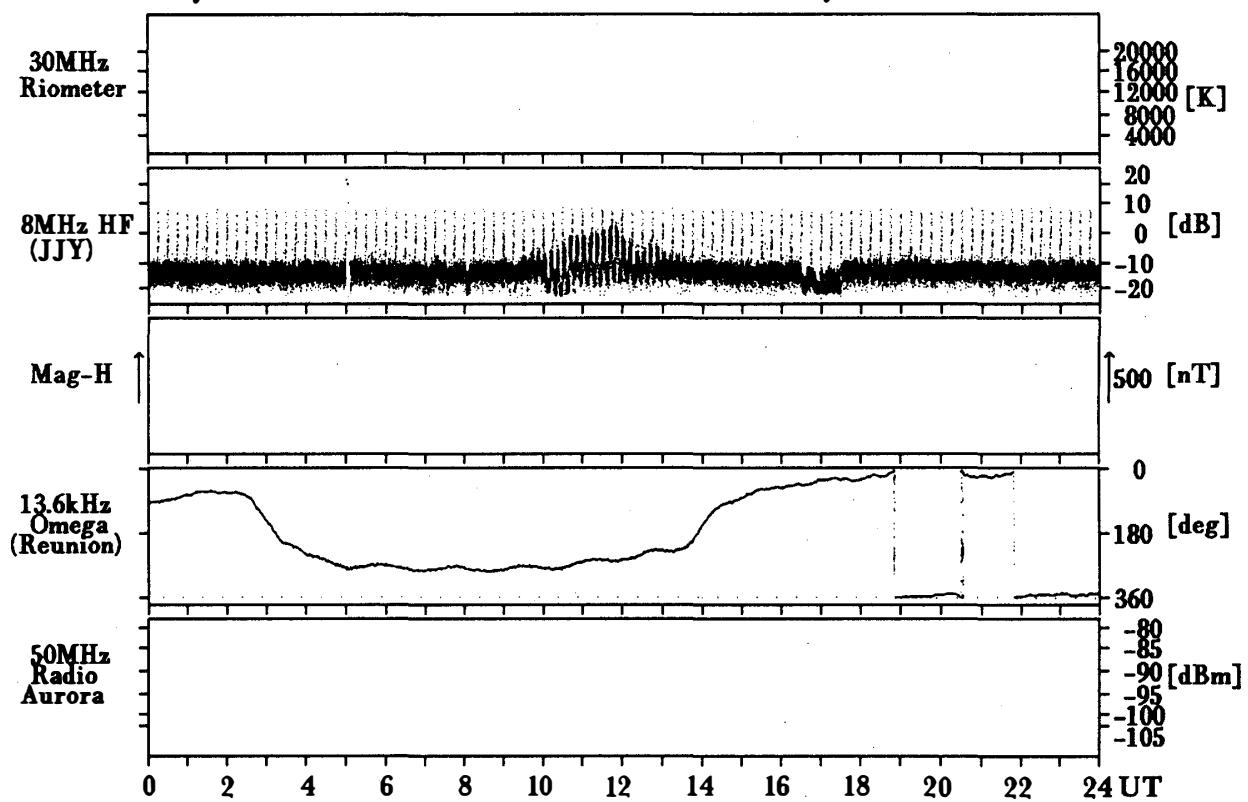
Syowa Station

Total Day / 213 1997/ 8/ 1



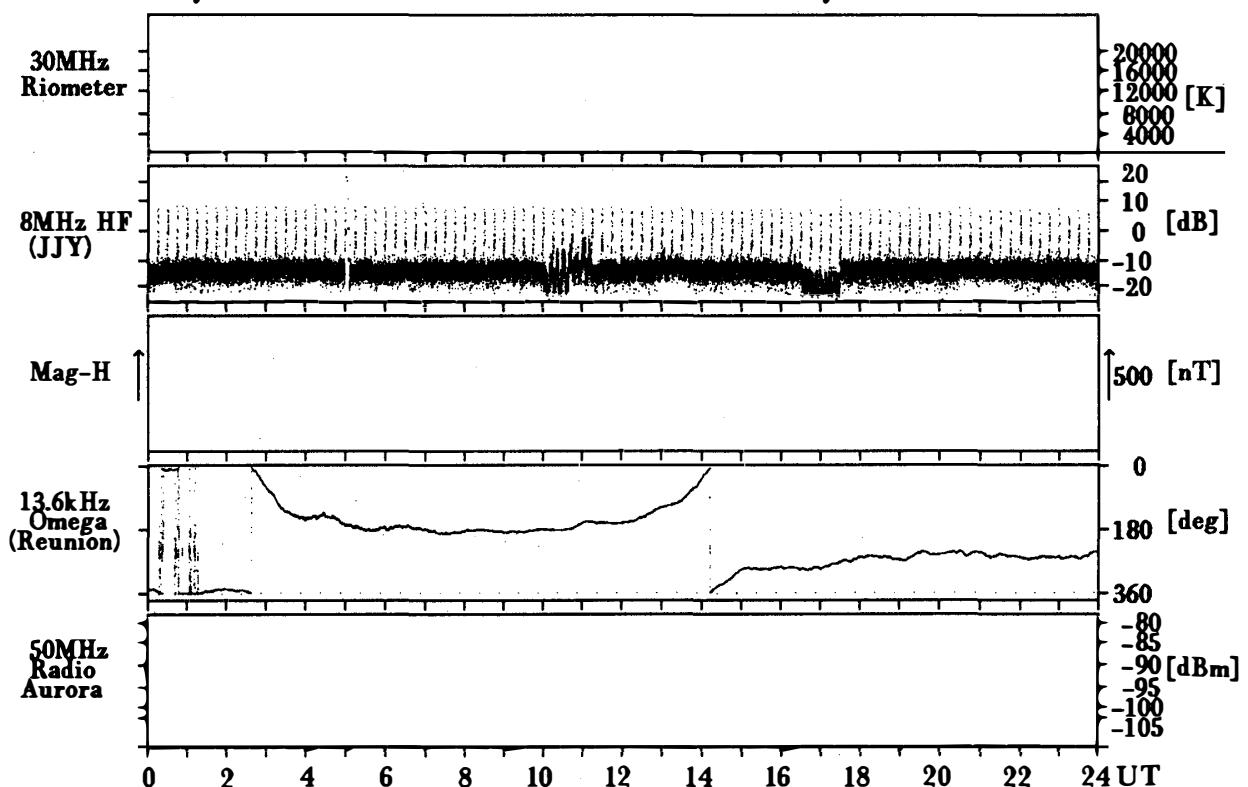
Syowa Station

Total Day / 214 1997/ 8/ 2



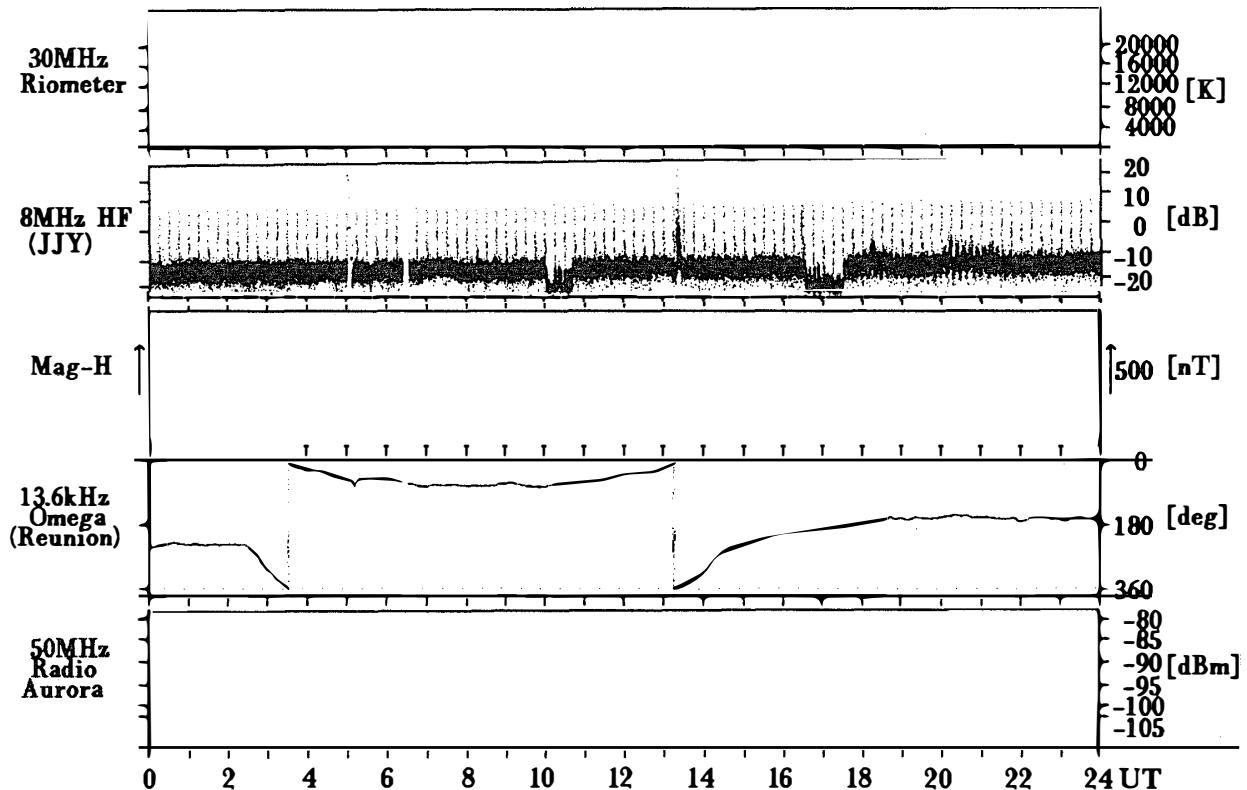
Syowa Station

Total Day / 215 1997/ 8/ 3



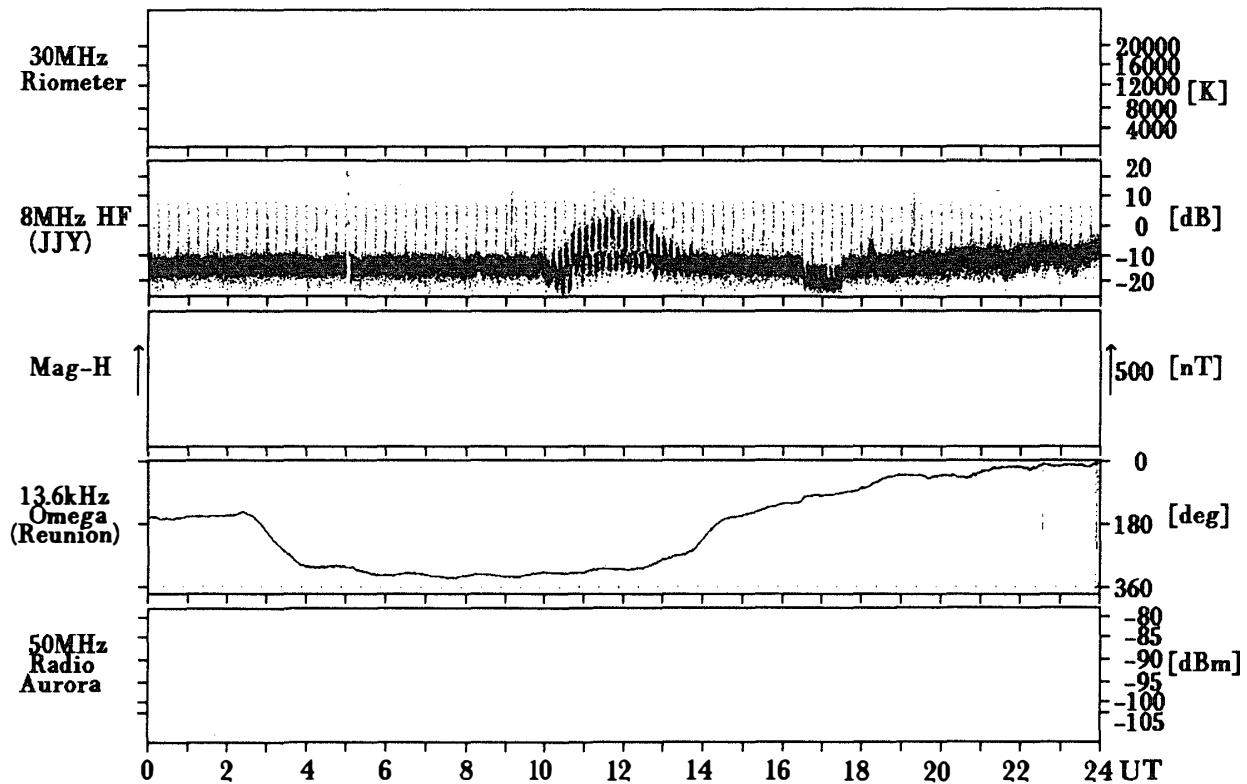
Syowa Station

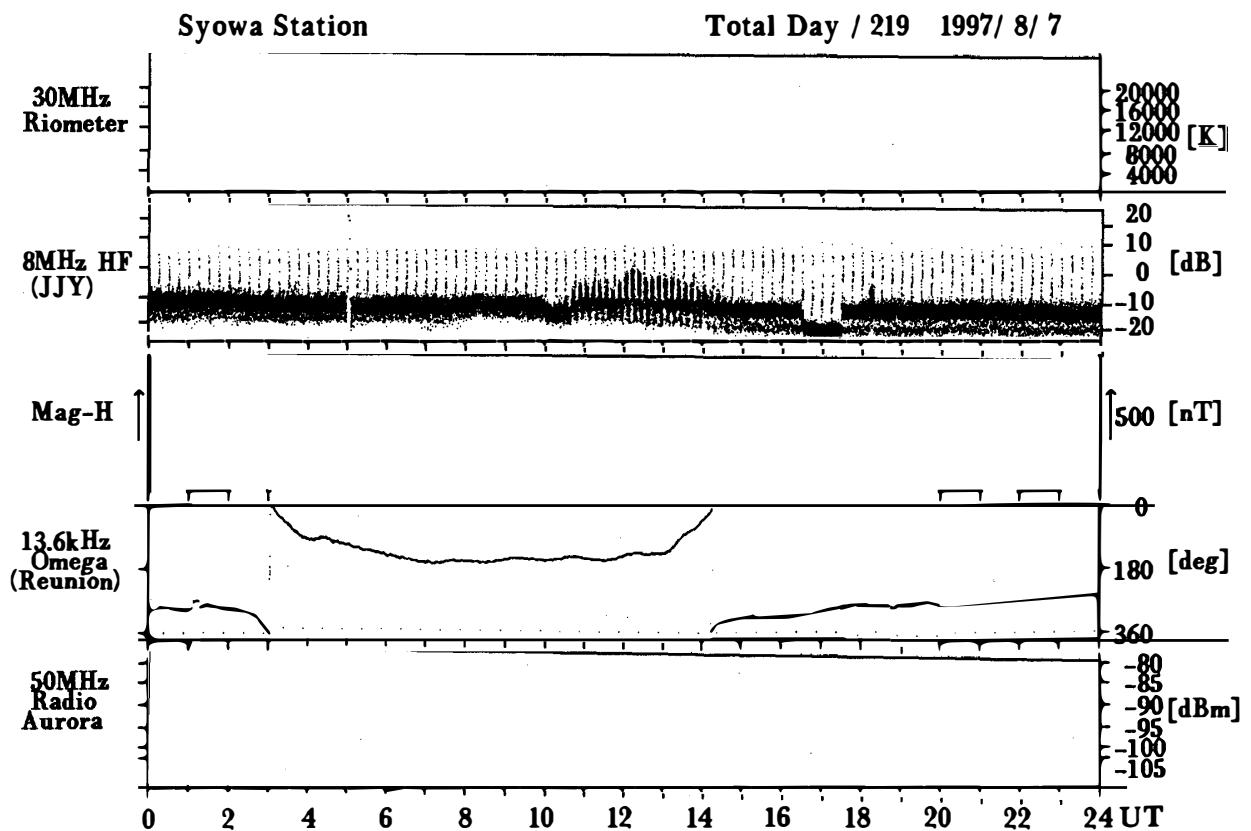
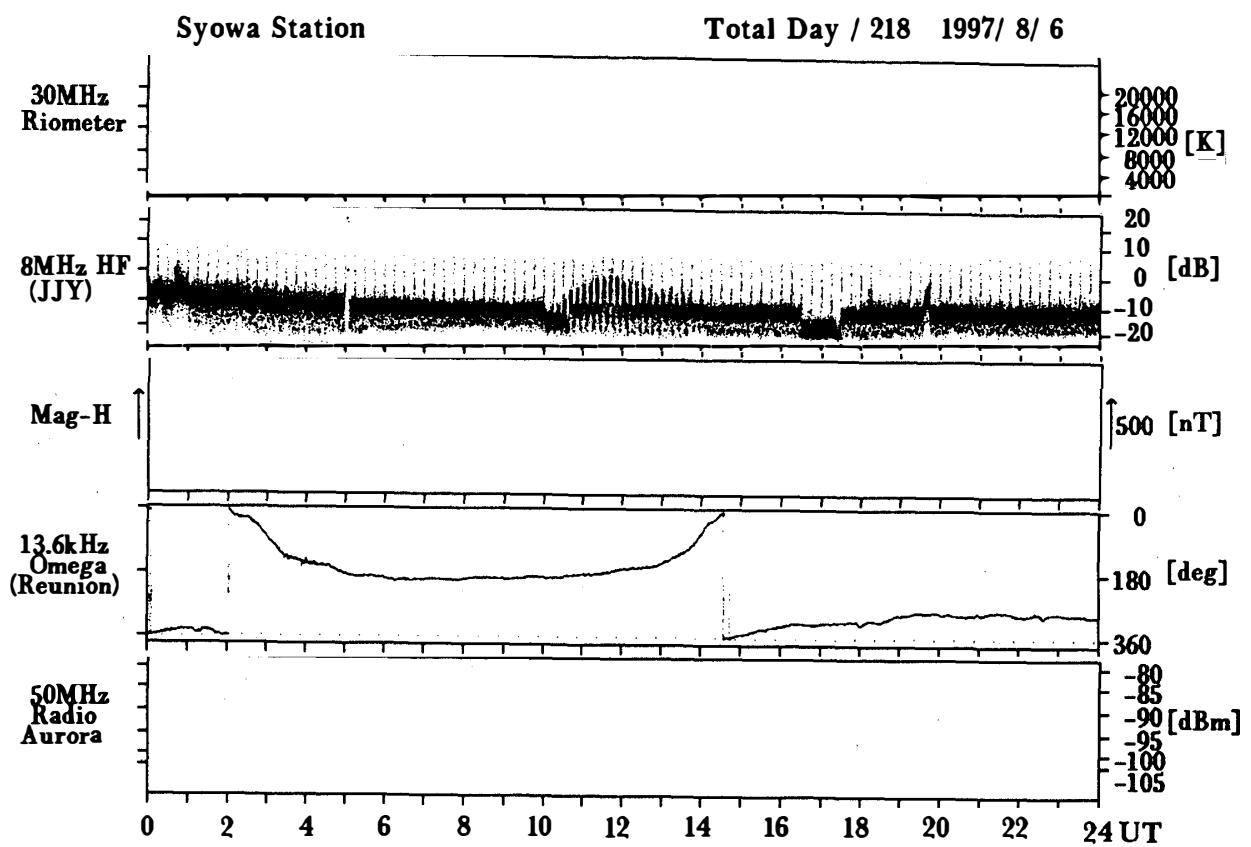
Total Day / 216 1997/ 8/ 4



Syowa Station

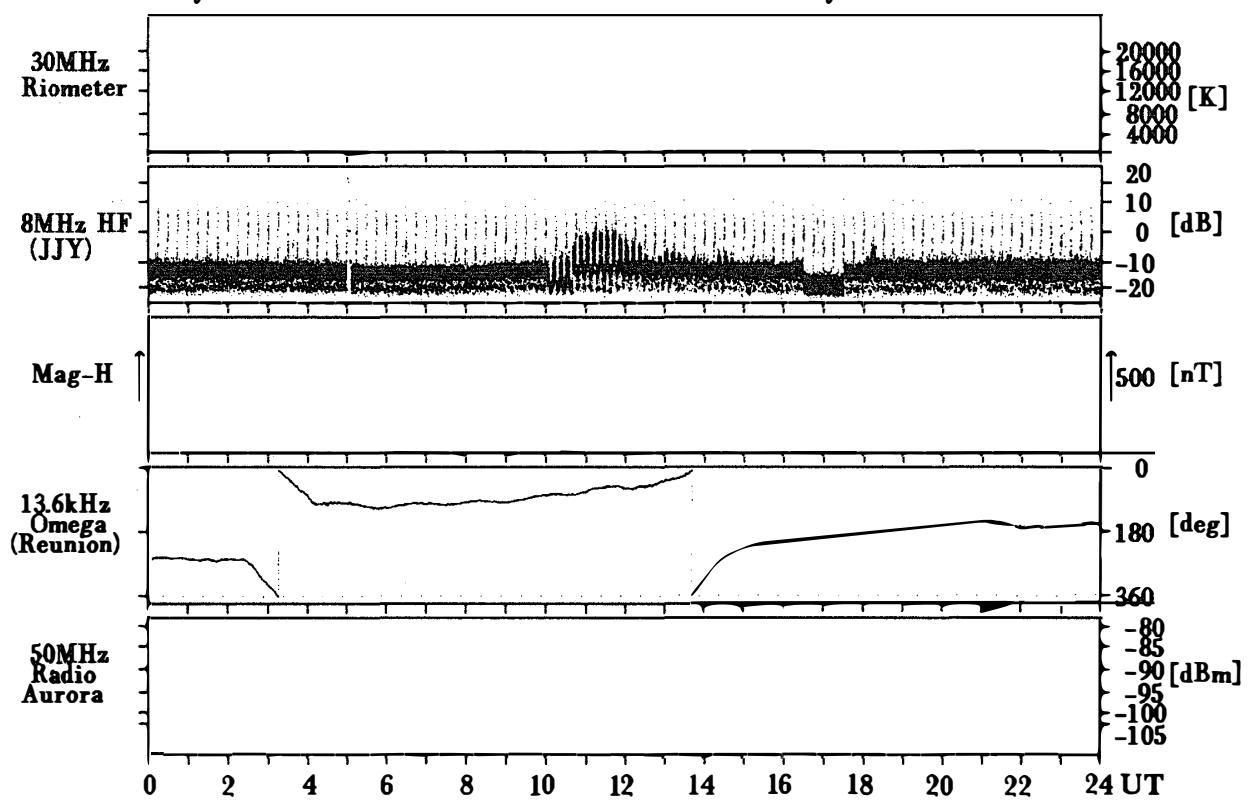
Total Day / 217 1997/ 8/ 5





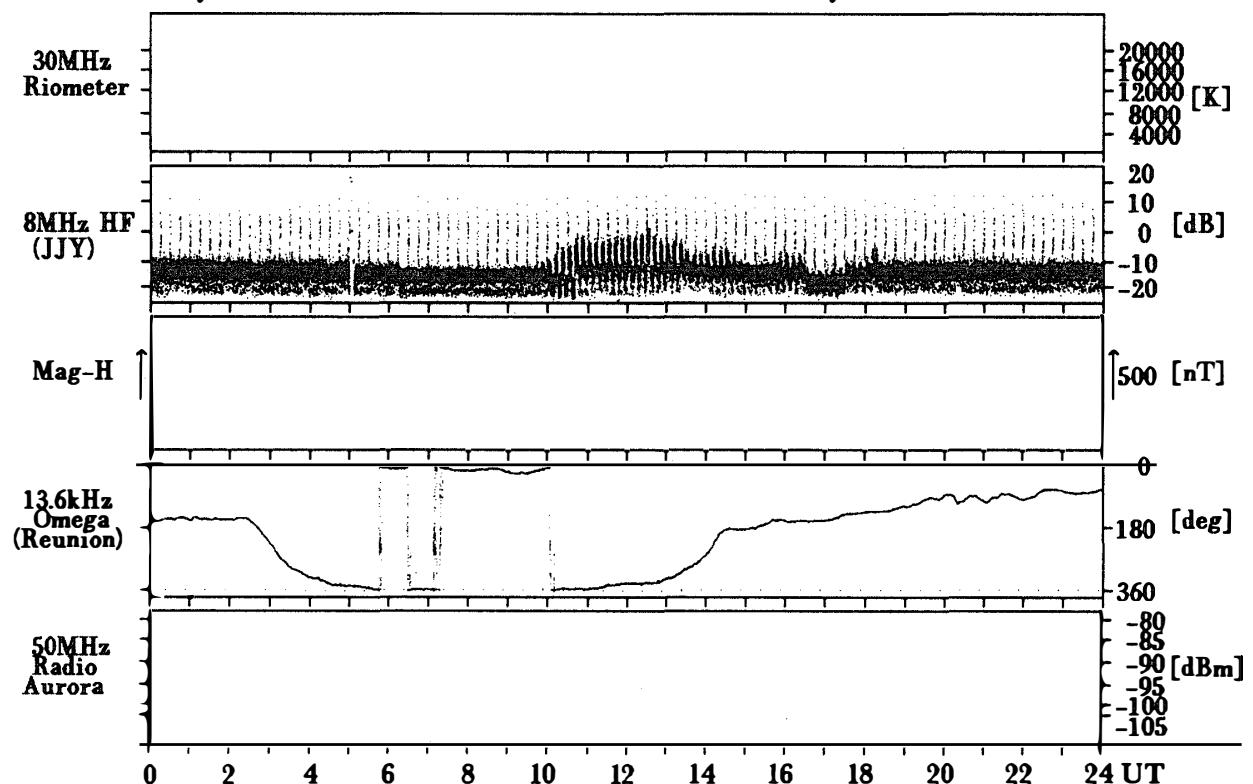
Syowa Station

Total Day / 220 1997/ 8/ 8



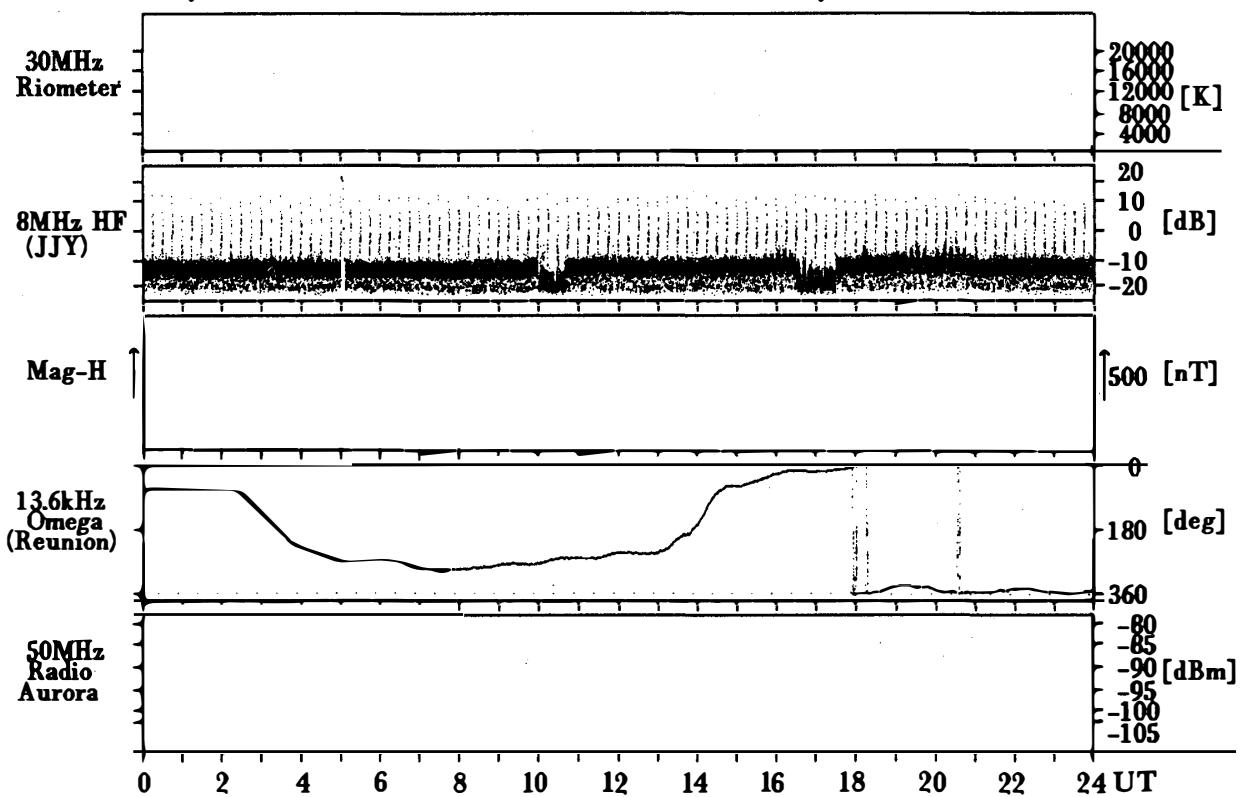
Syowa Station

Total Day / 221 1997/ 8/ 9



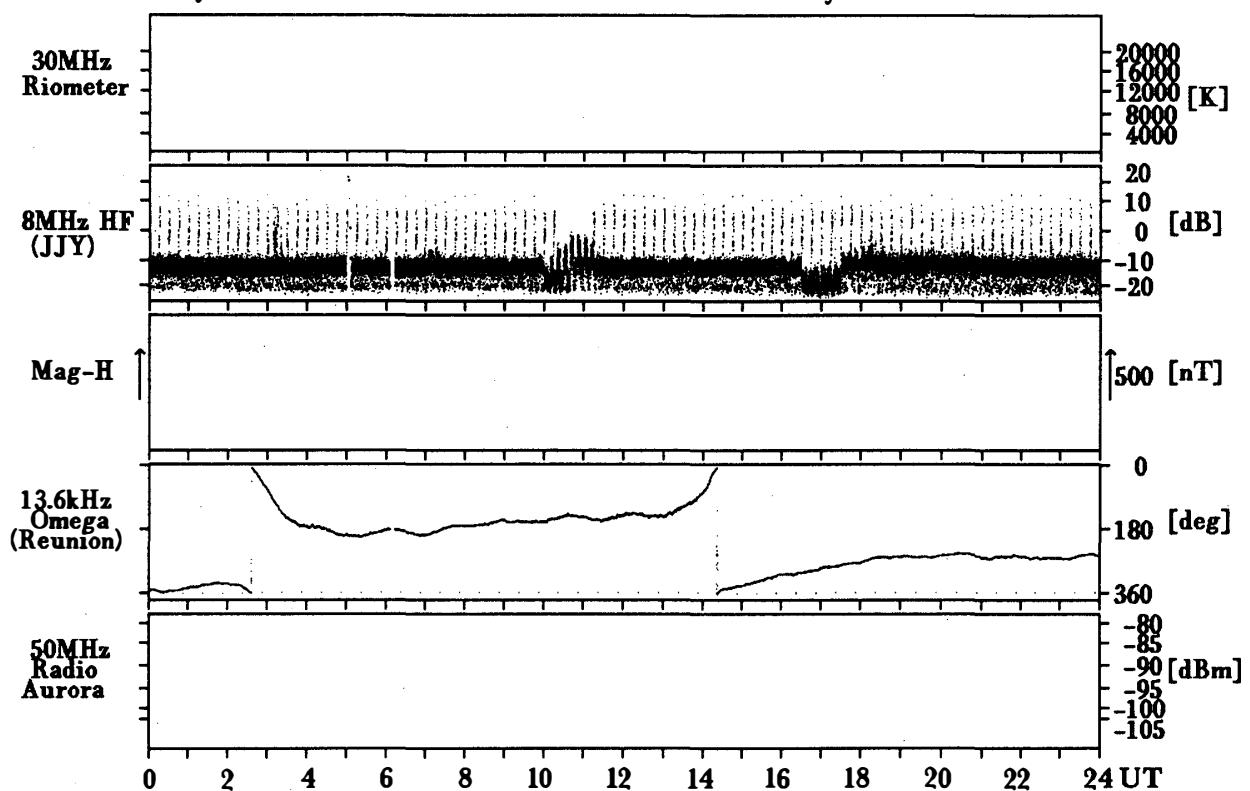
Syowa Station

Total Day / 222 1997/ 8/10



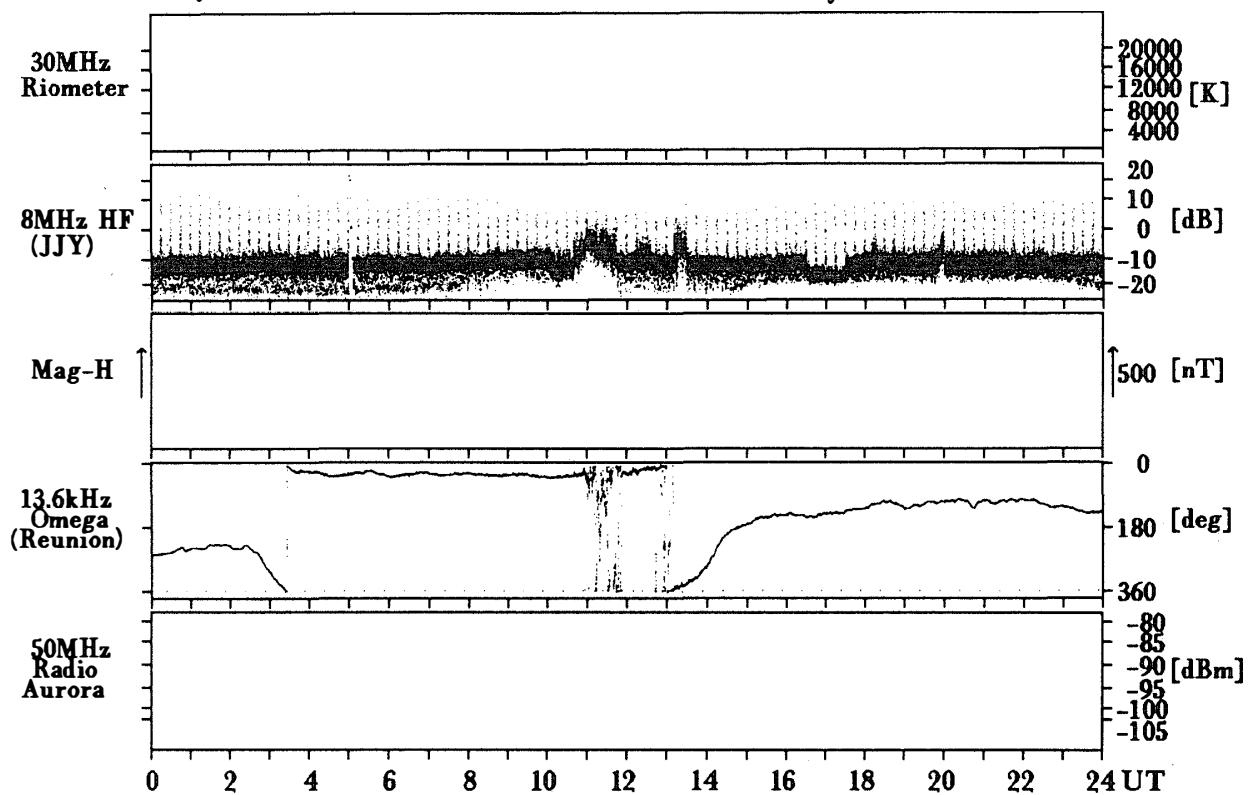
Syowa Station

Total Day / 223 1997/ 8/11



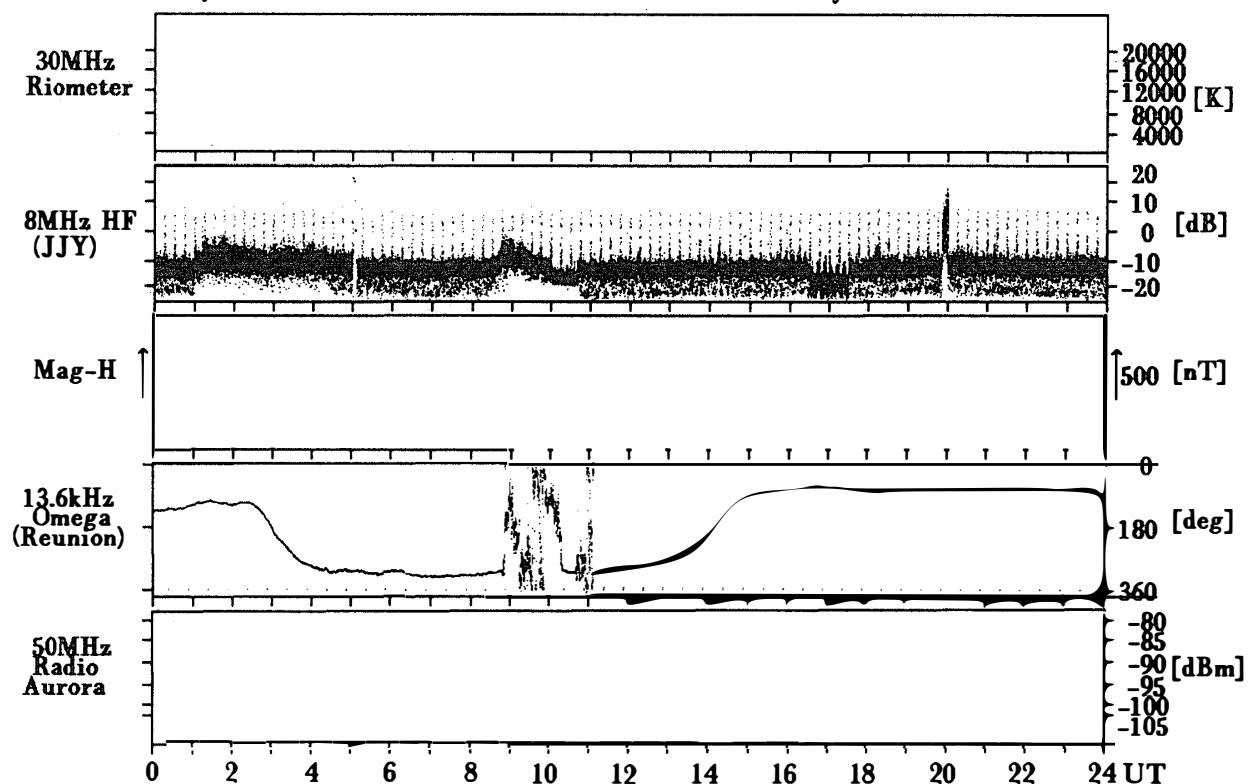
Syowa Station

Total Day / 224 1997/ 8/12



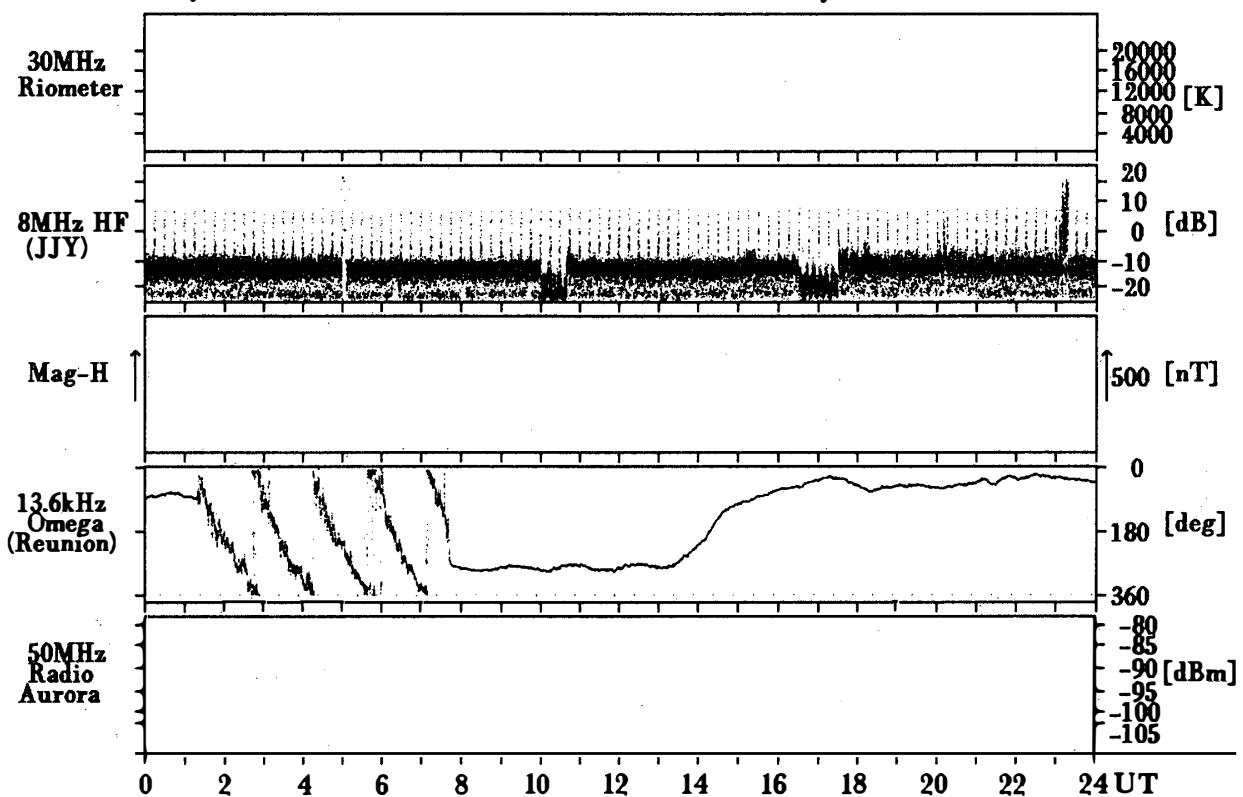
Syowa Station

Total Day / 225 1997/ 8/13



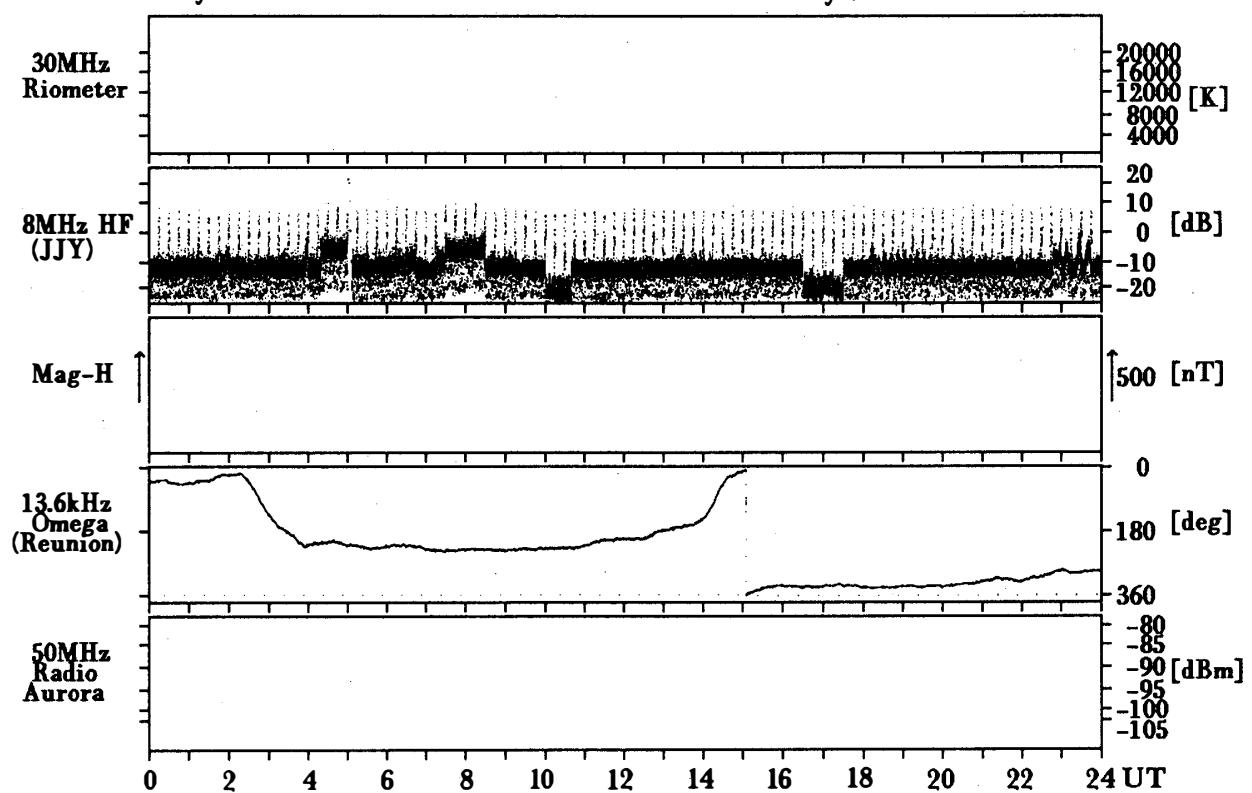
Syowa Station

Total Day / 226 1997/ 8/14



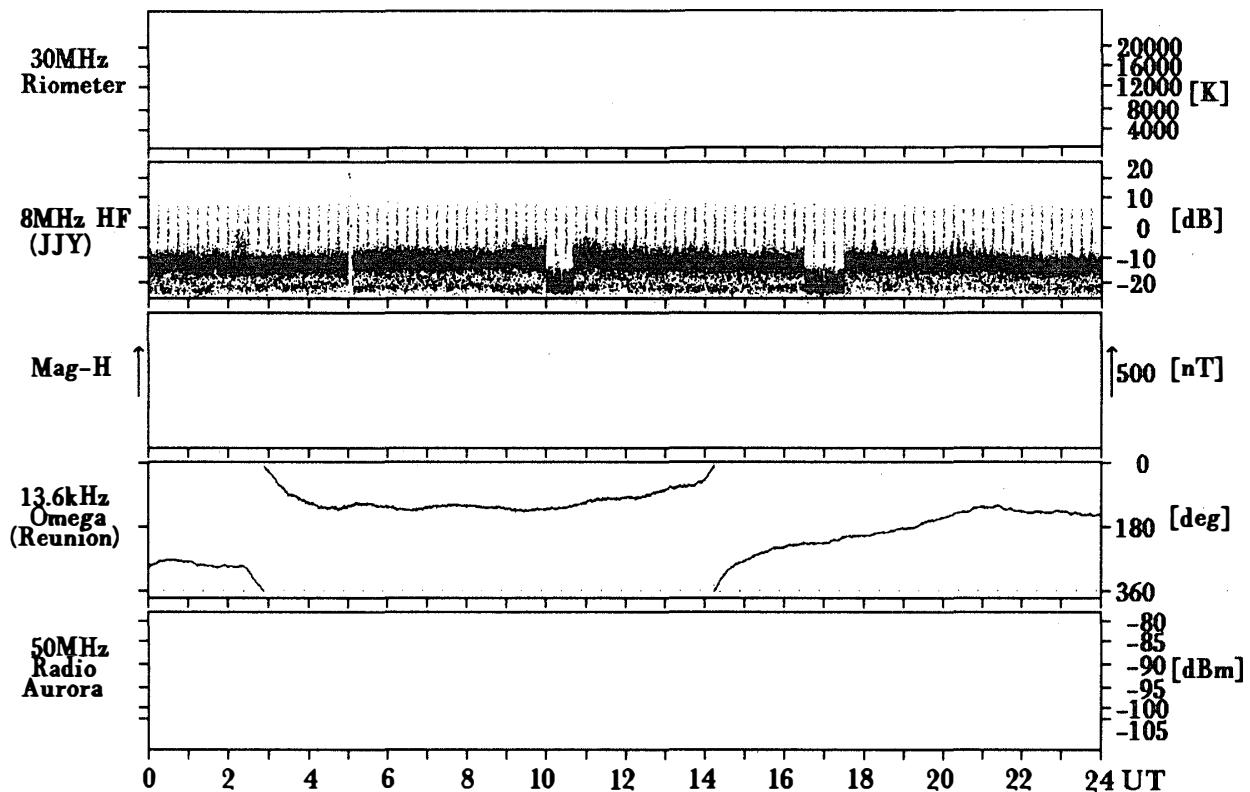
Syowa Station

Total Day / 227 1997/ 8/15



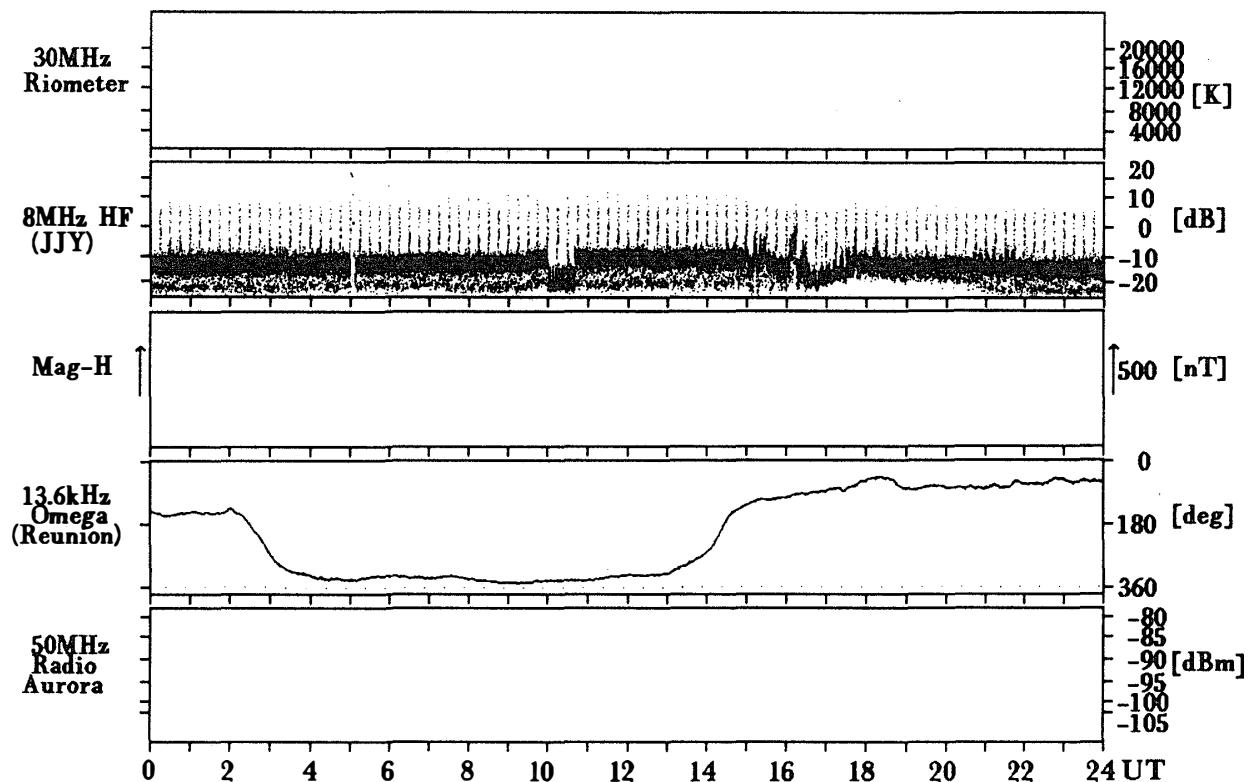
Syowa Station

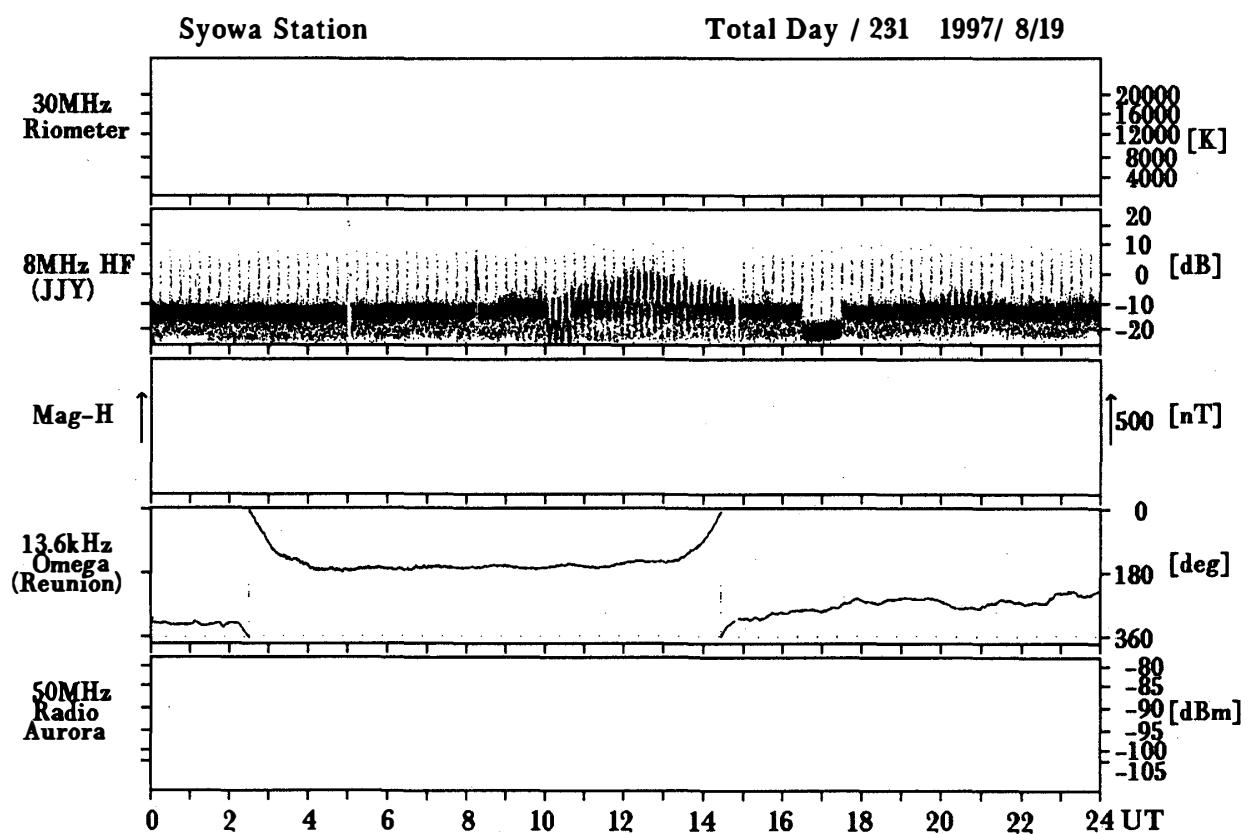
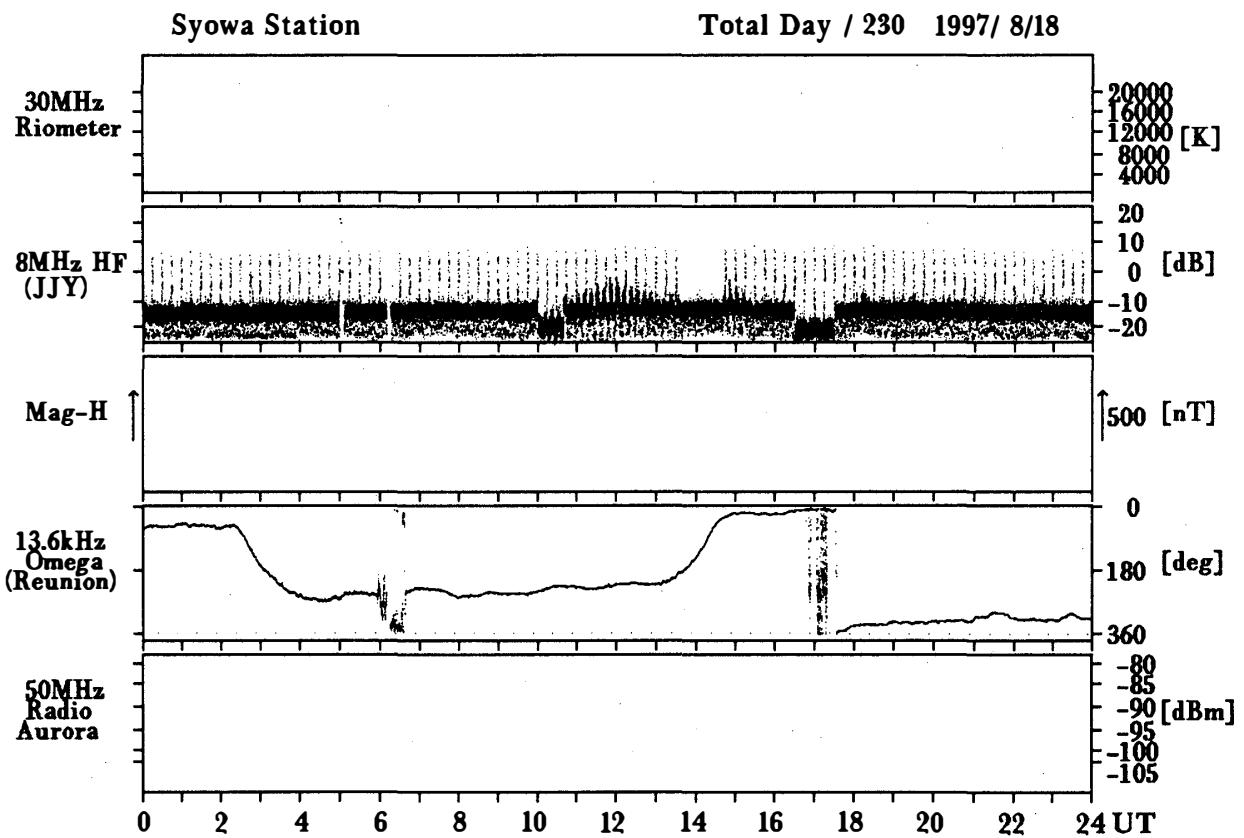
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Syowa Station

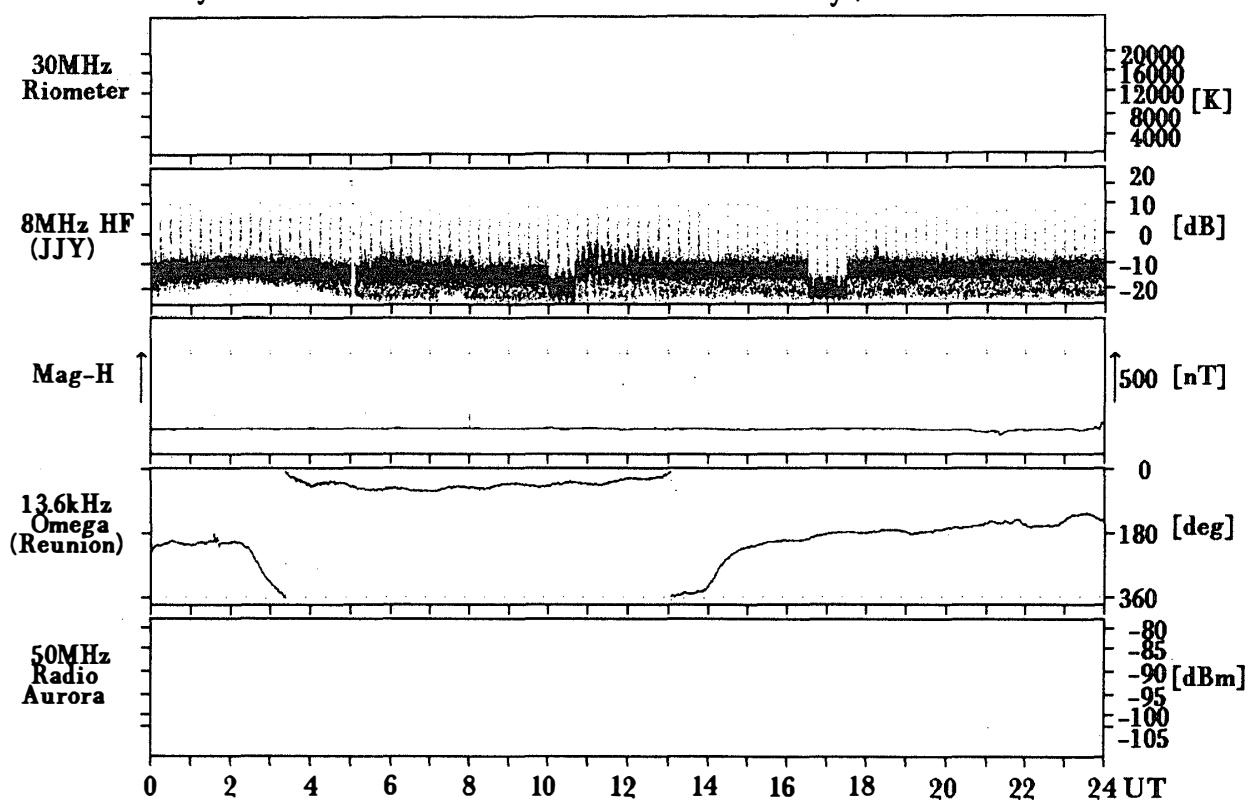
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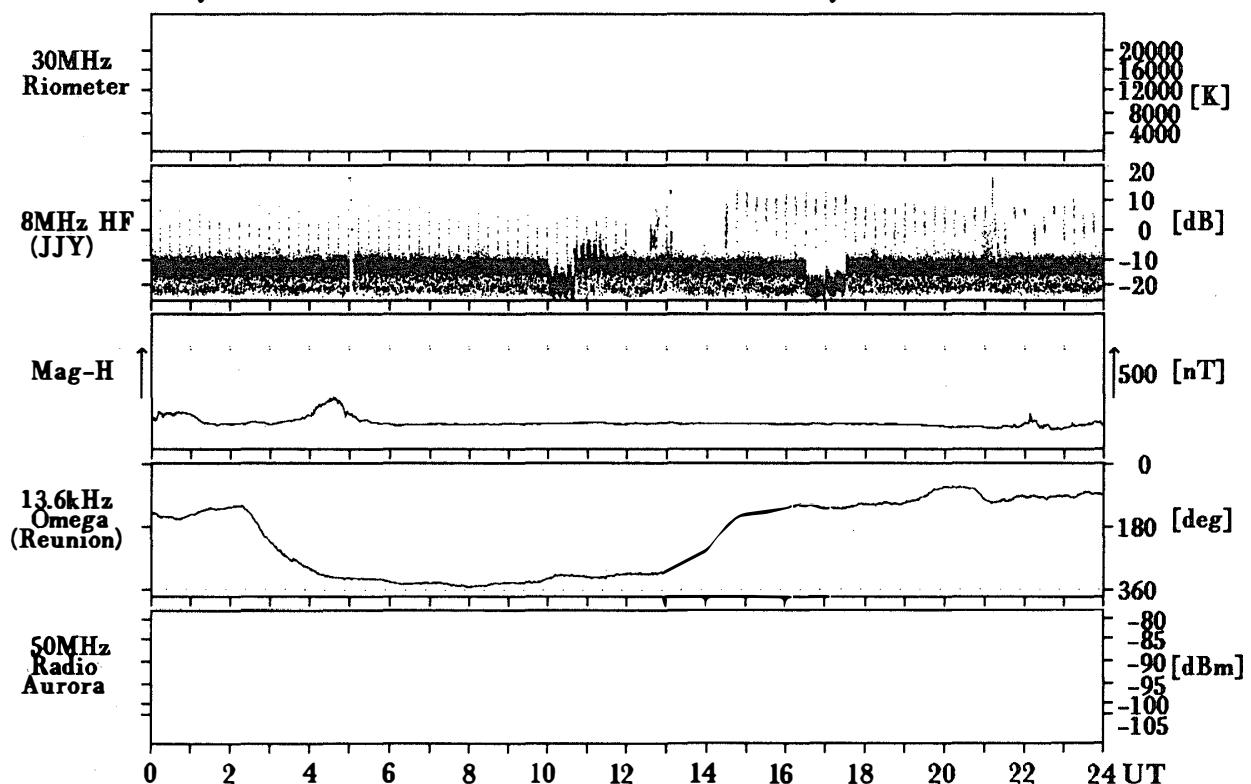
Syowa Station

Total Day / 232 1997/ 8/20



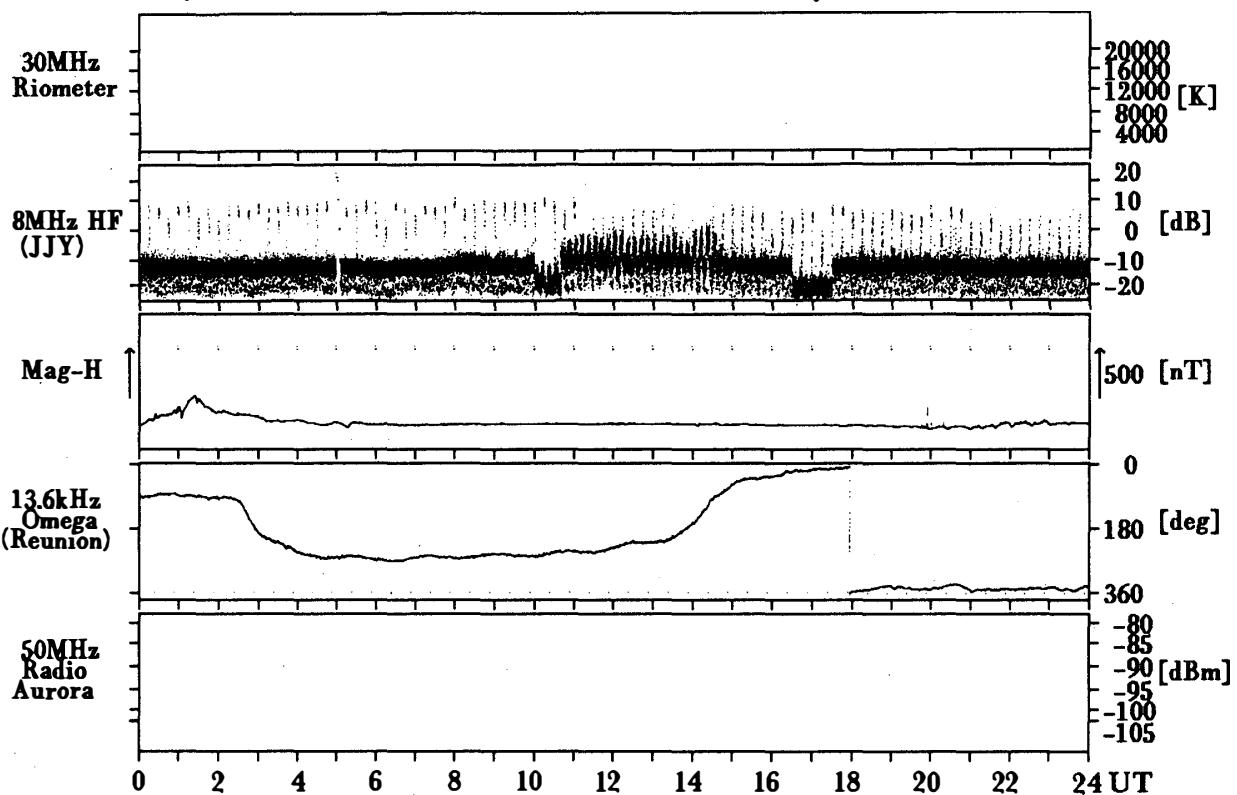
Syowa Station

Total Day / 233 1997/ 8/21



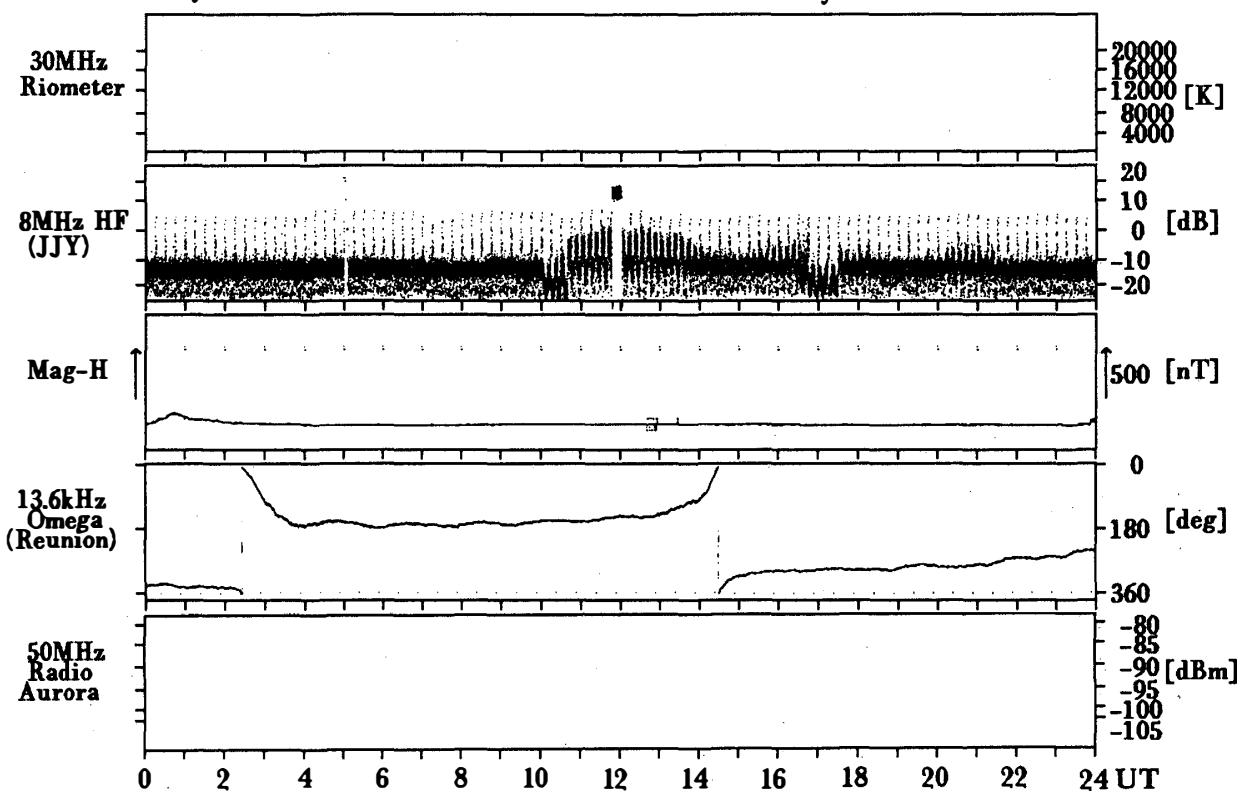
Syowa Station

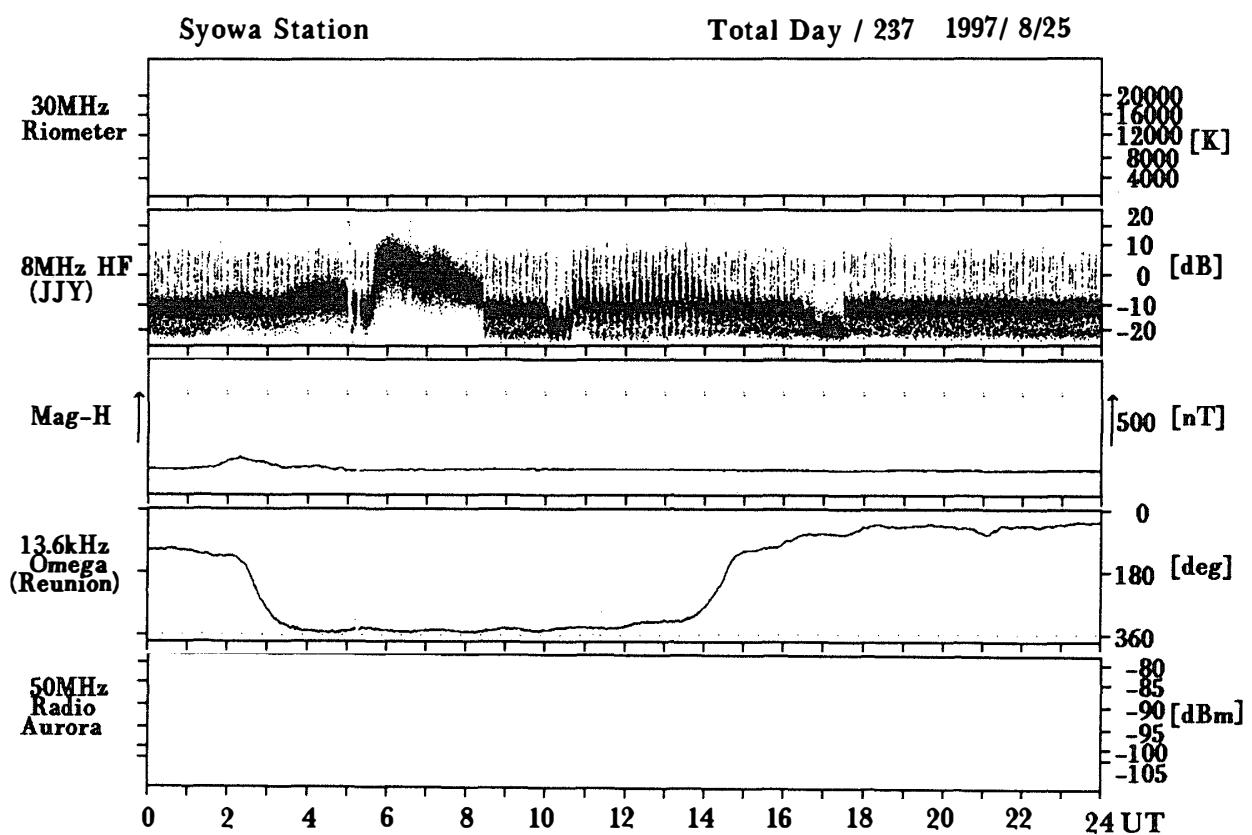
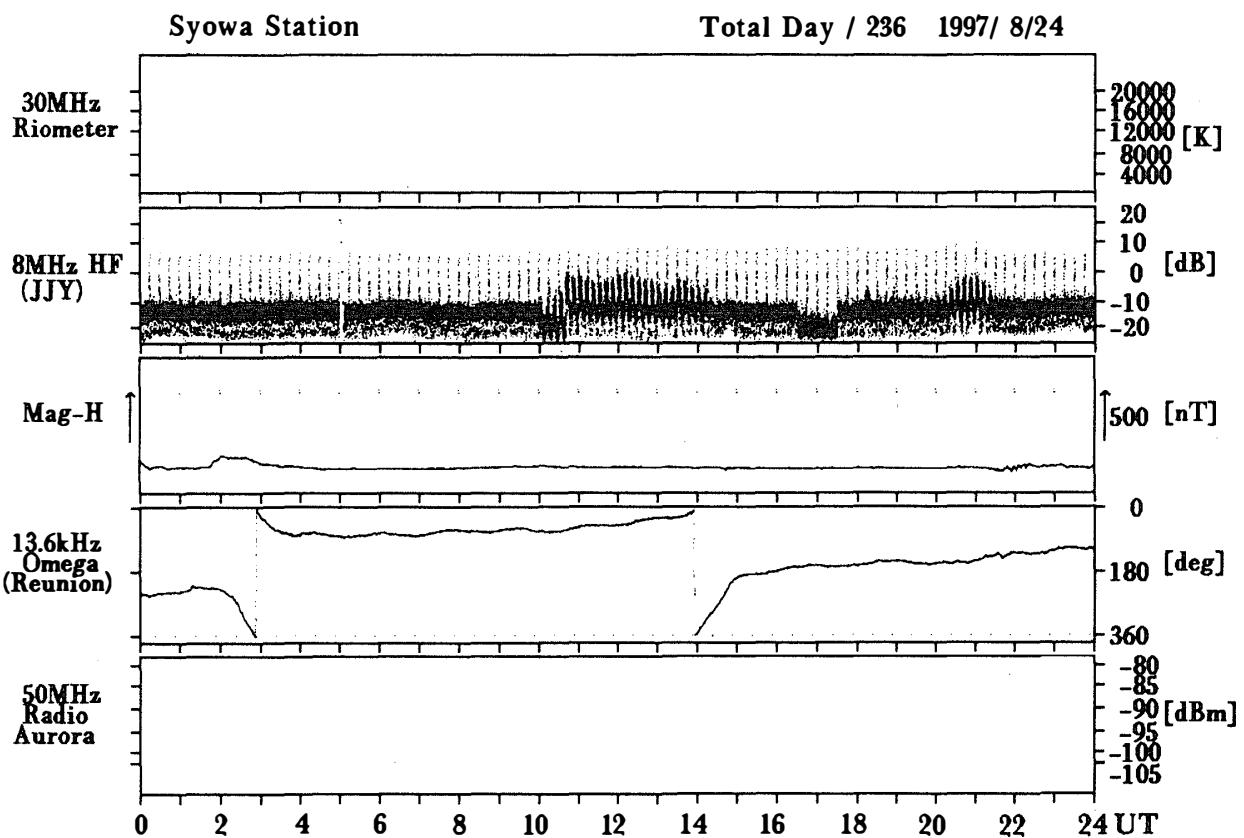
Total Day / 234 1997/ 8/22

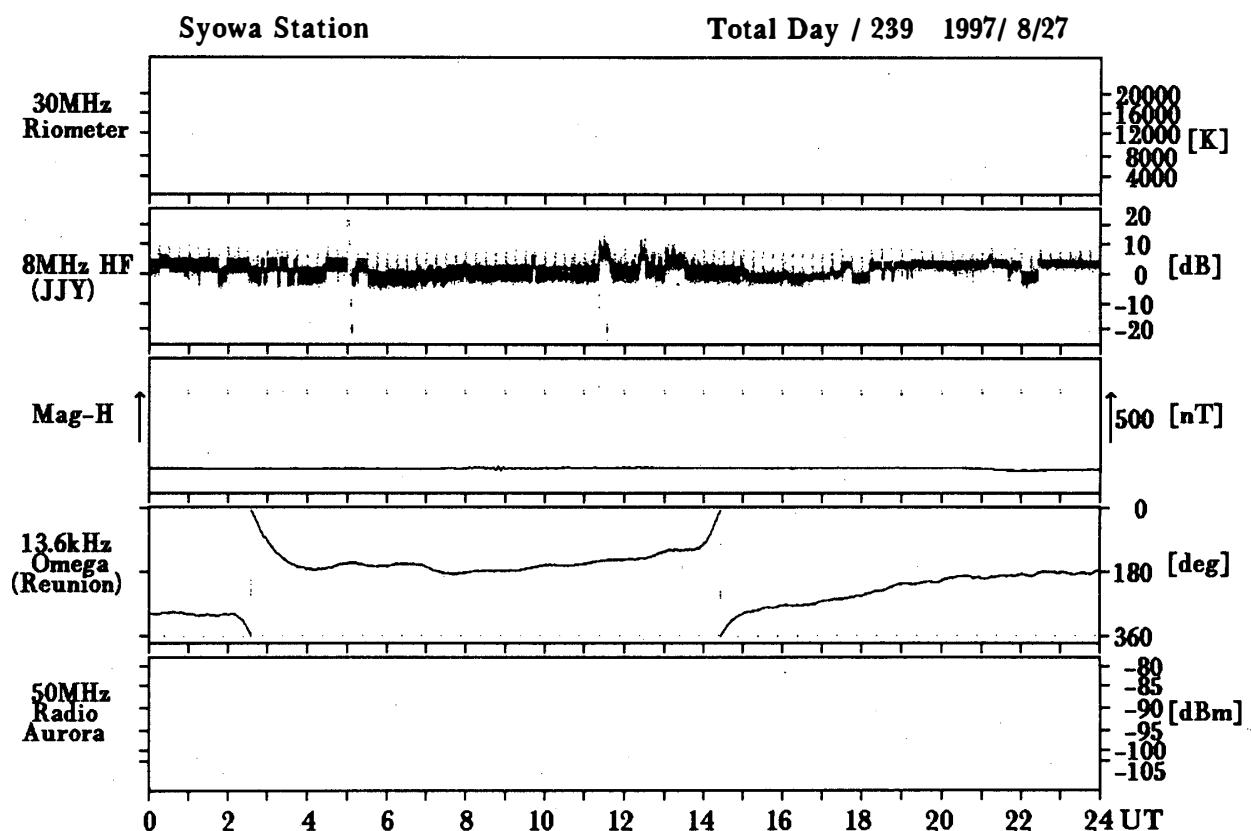
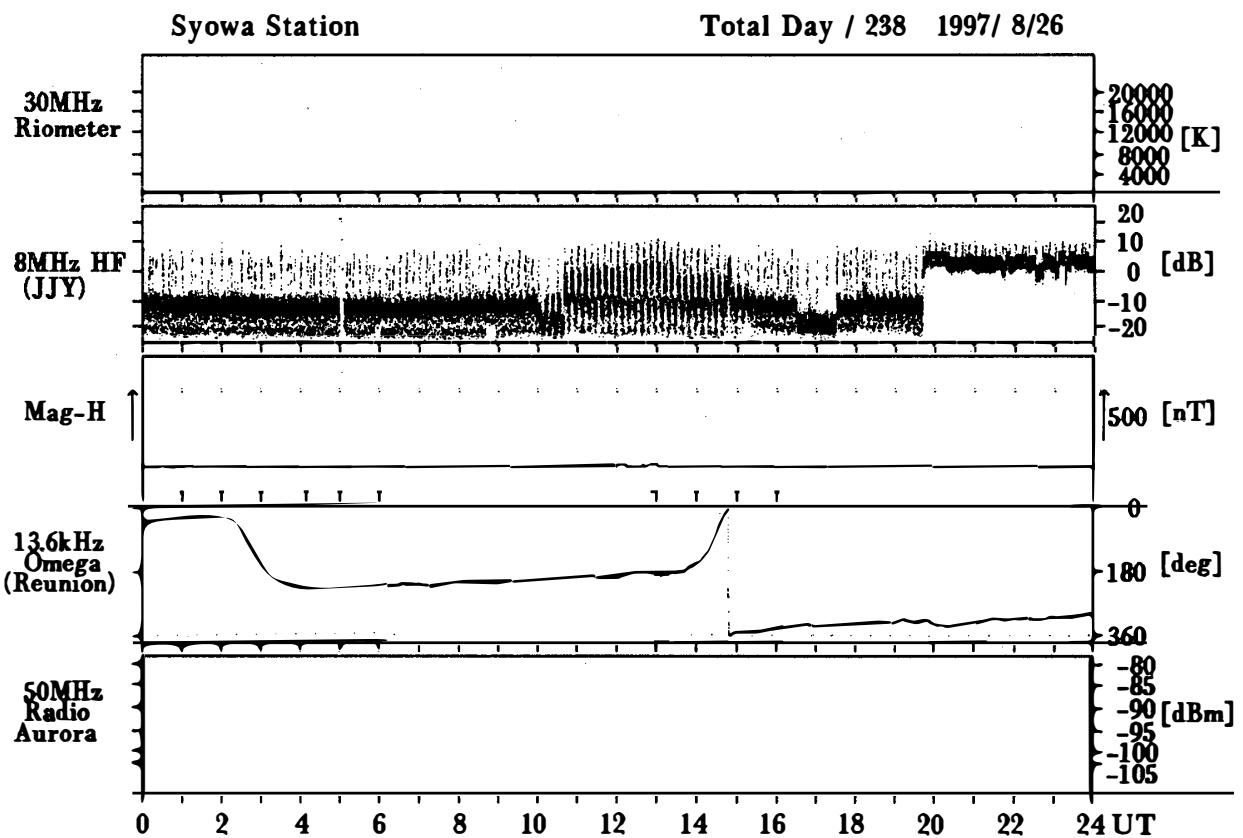


Syowa Station

Total Day / 235 1997/ 8/23

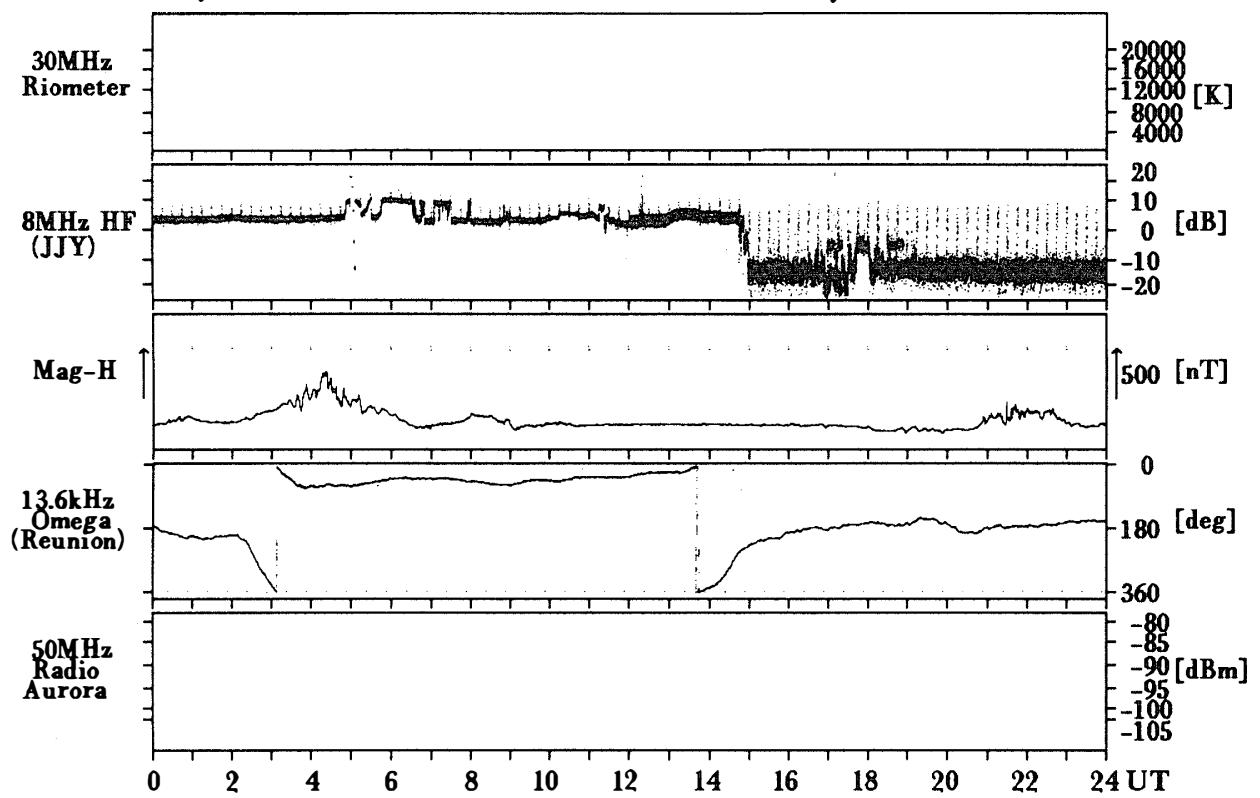






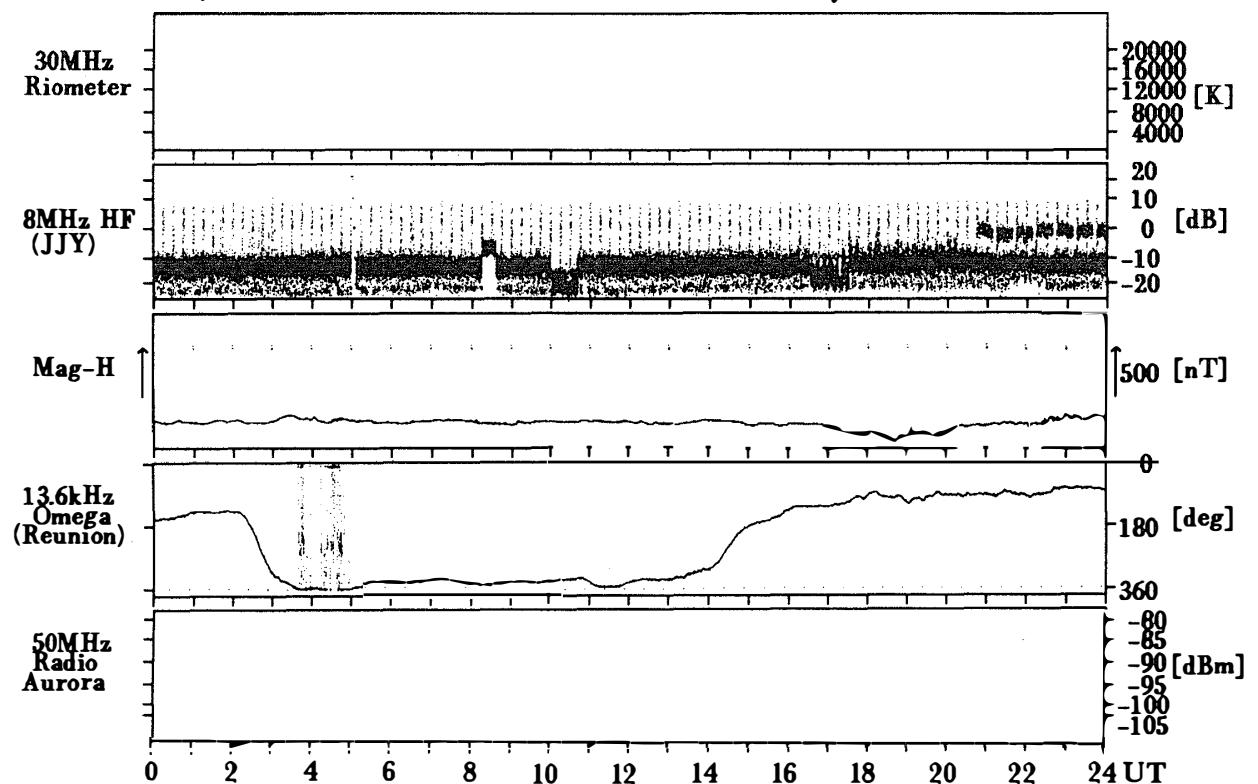
Syowa Station

Total Day / 240 1997/ 8/28



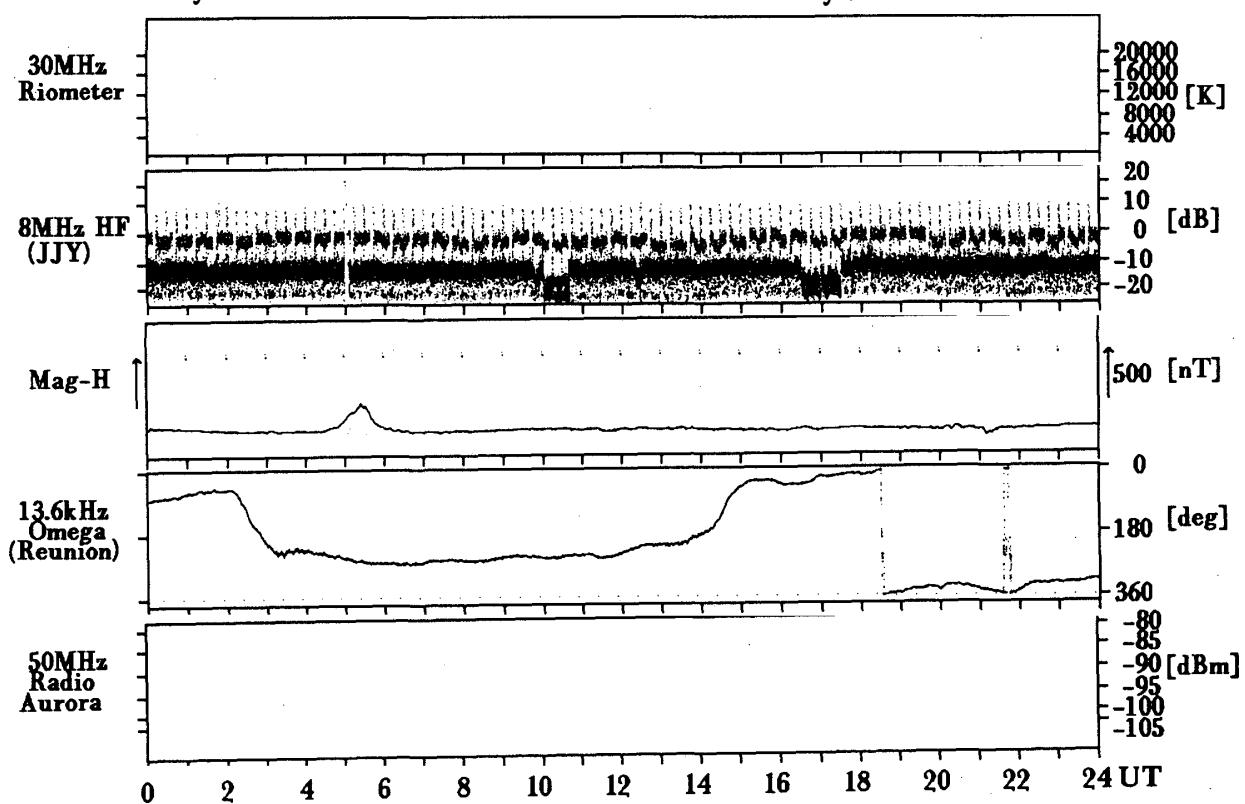
Syowa Station

Total Day / 241 1997/ 8/29



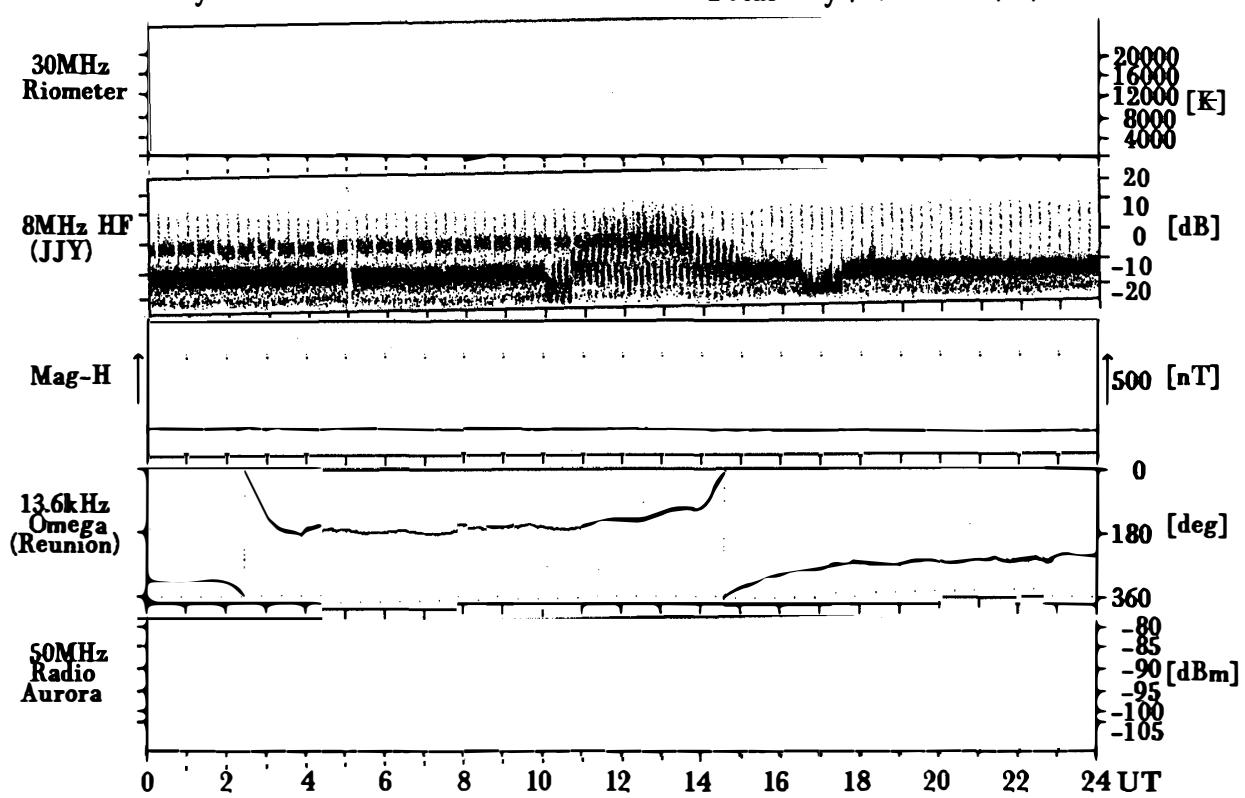
Syowa Station

Total Day / 242 1997/ 8/30



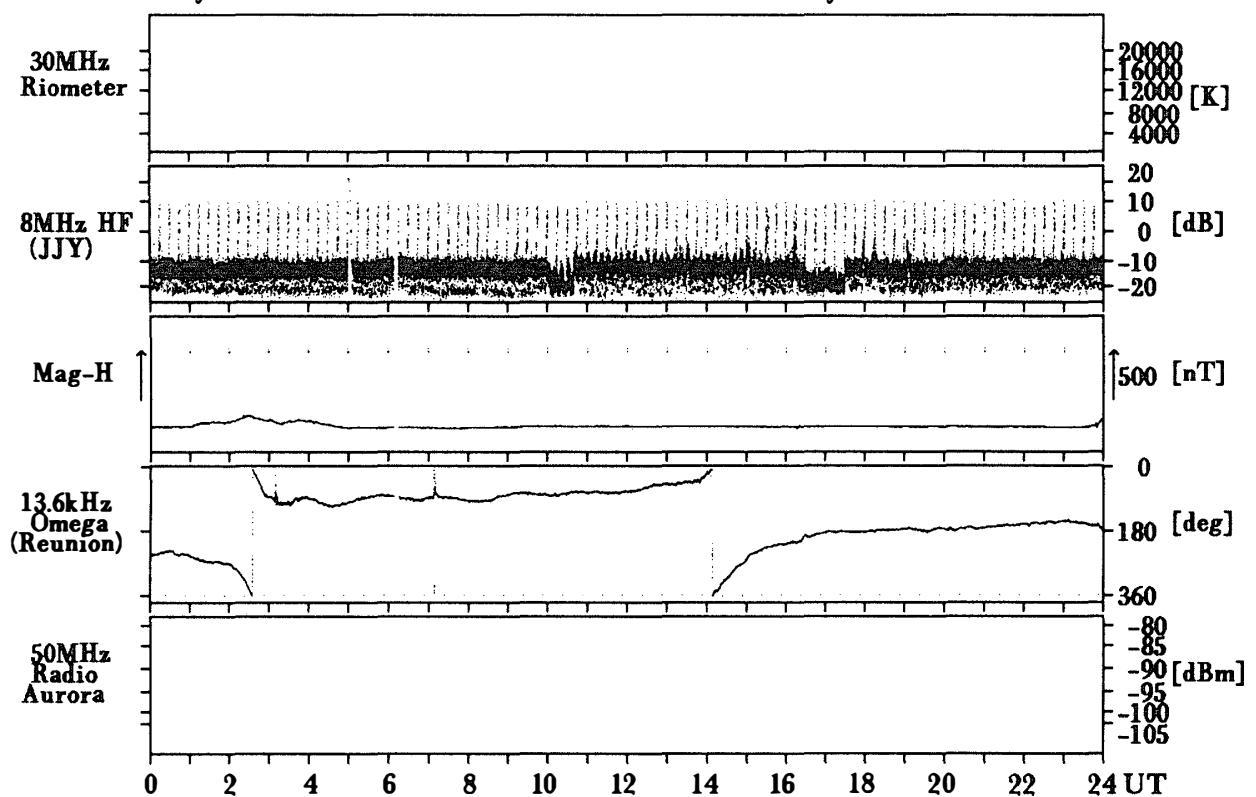
Syowa Station

Total Day / 243 1997/ 8/31



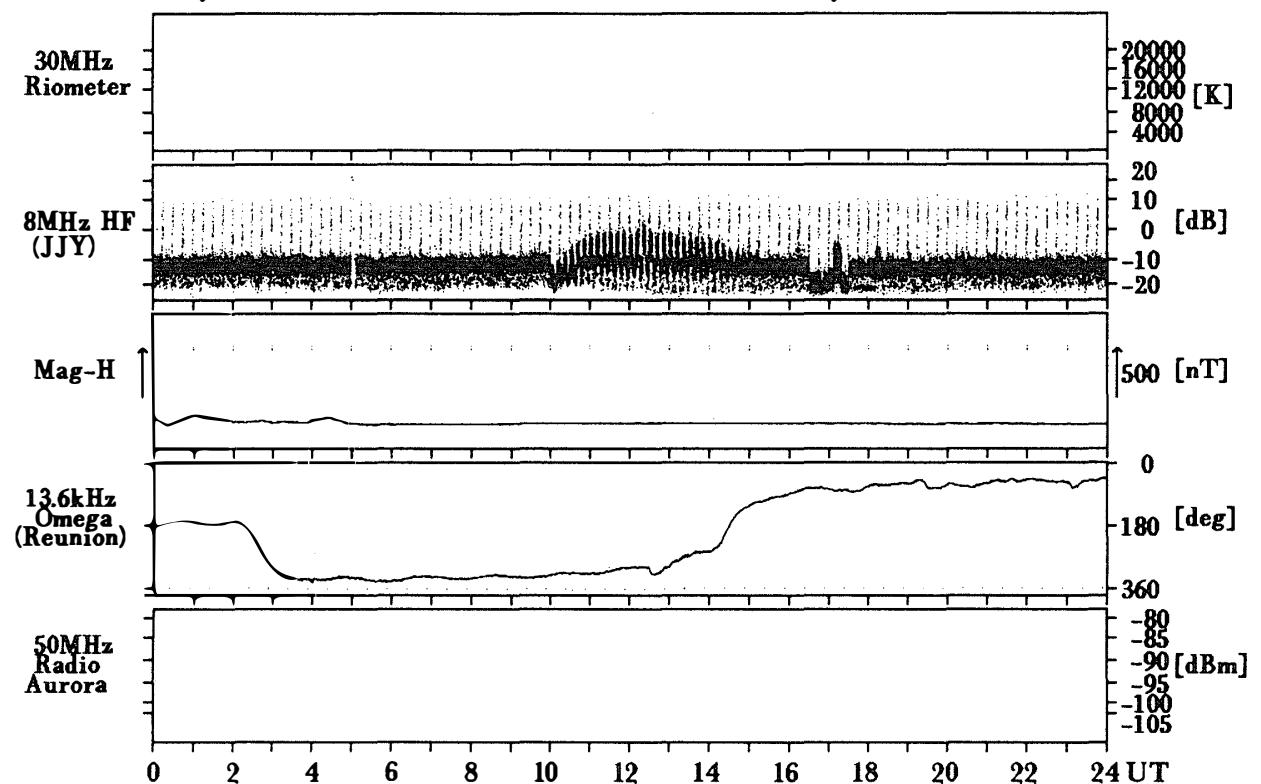
Syowa Station

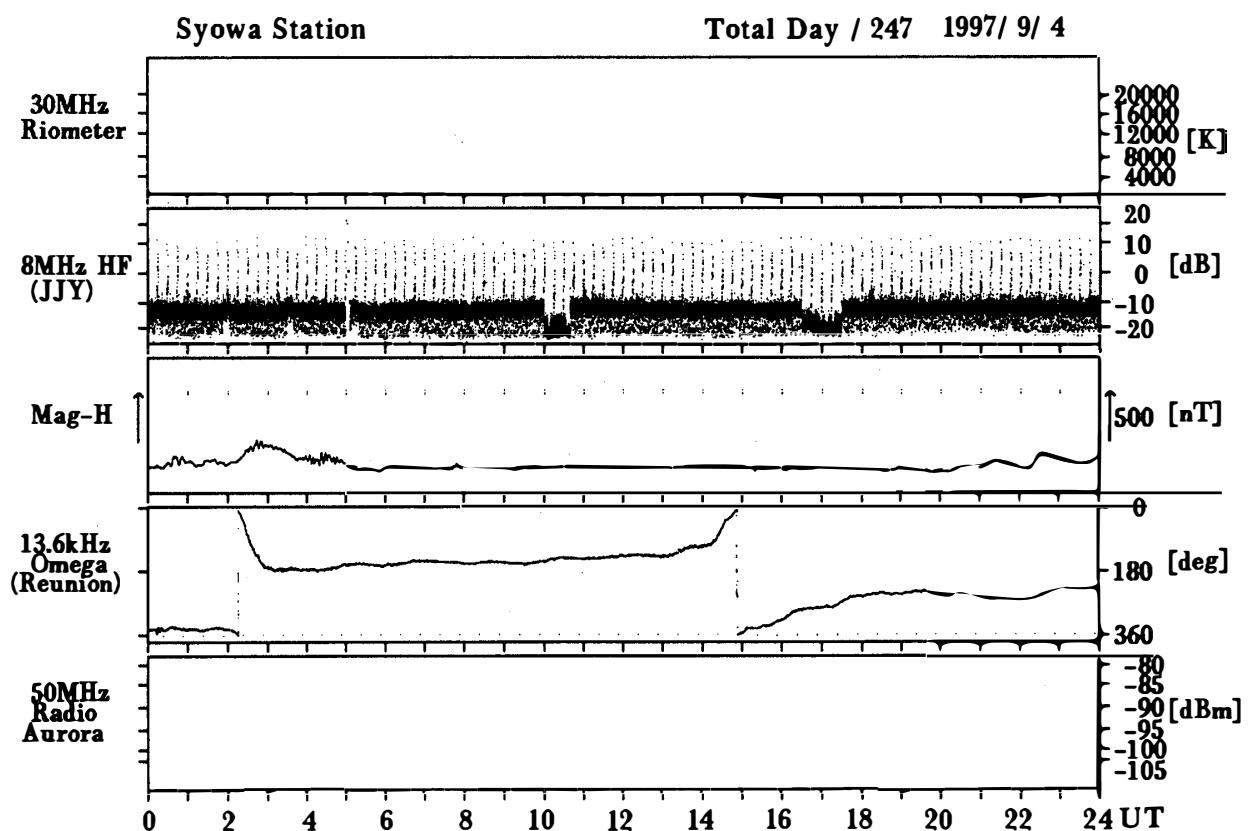
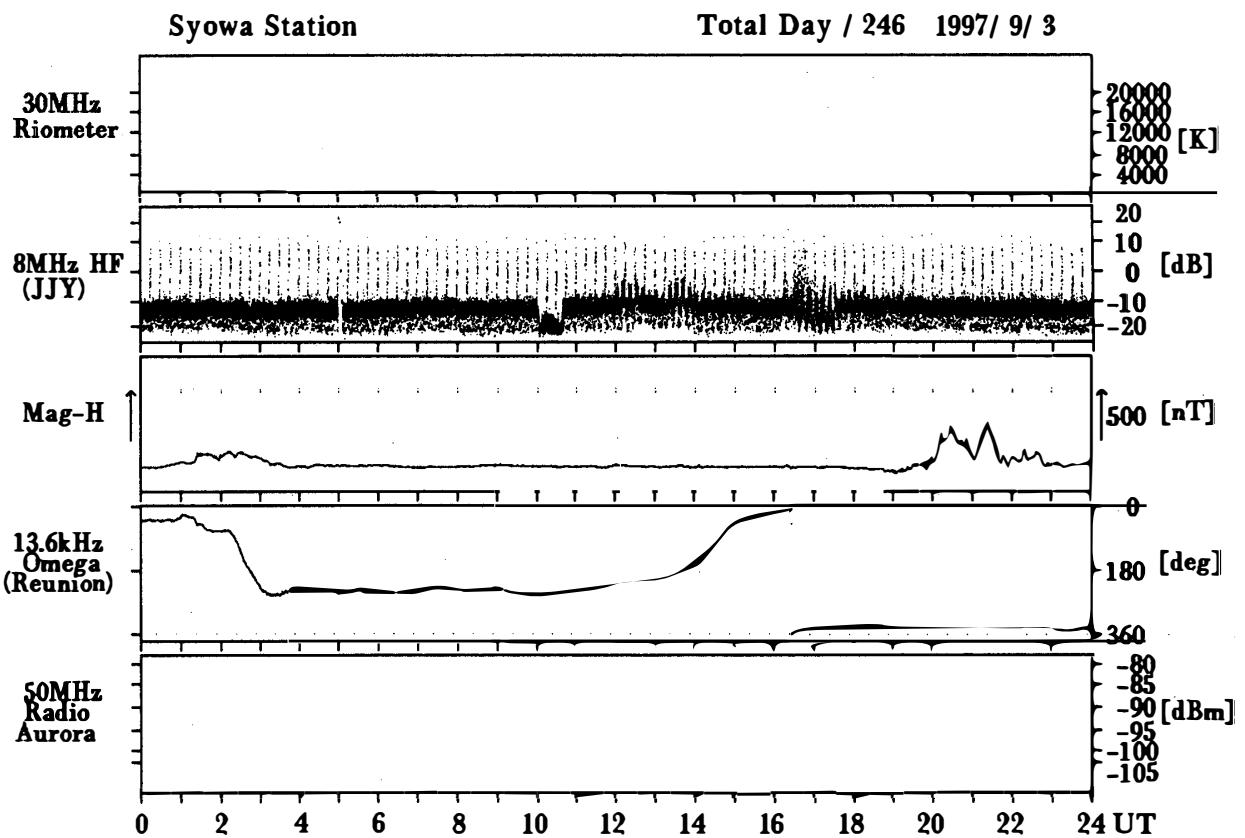
Total Day / 244 1997/ 9/ 1



Syowa Station

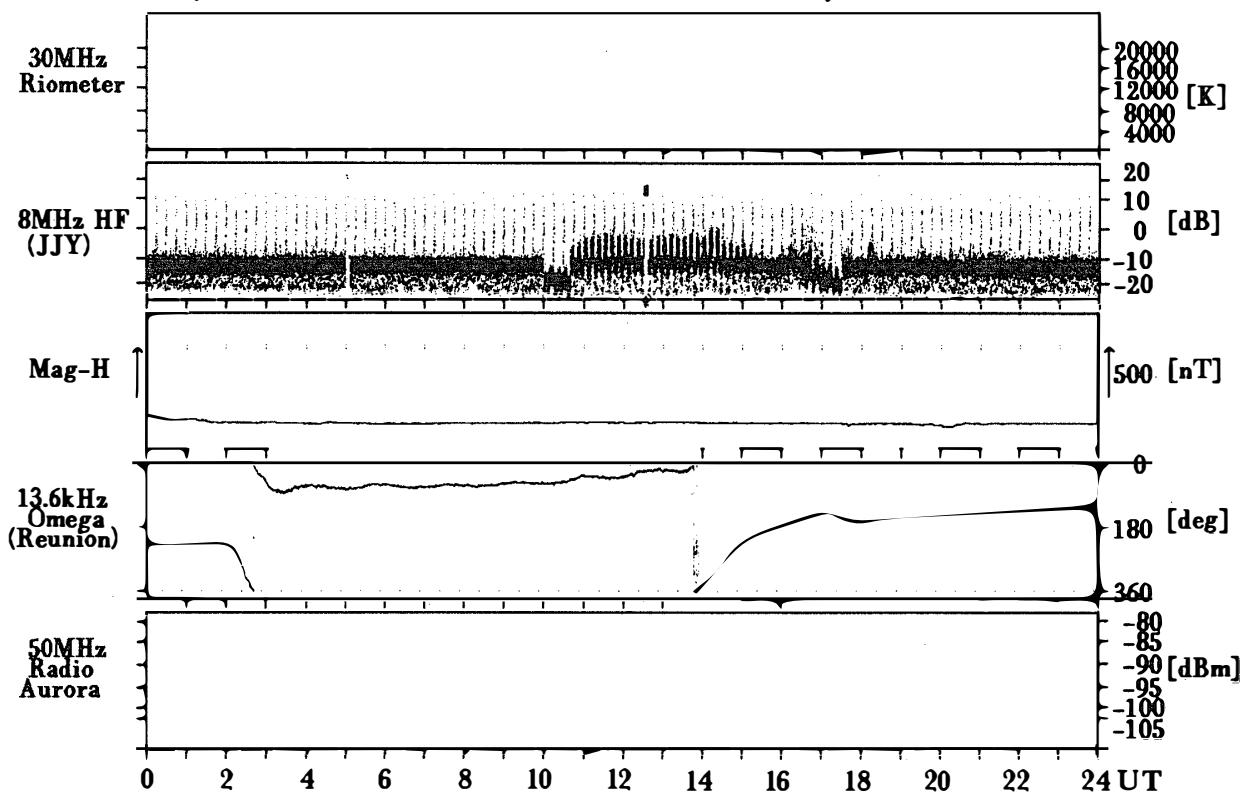
Total Day / 245 1997/ 9/ 2





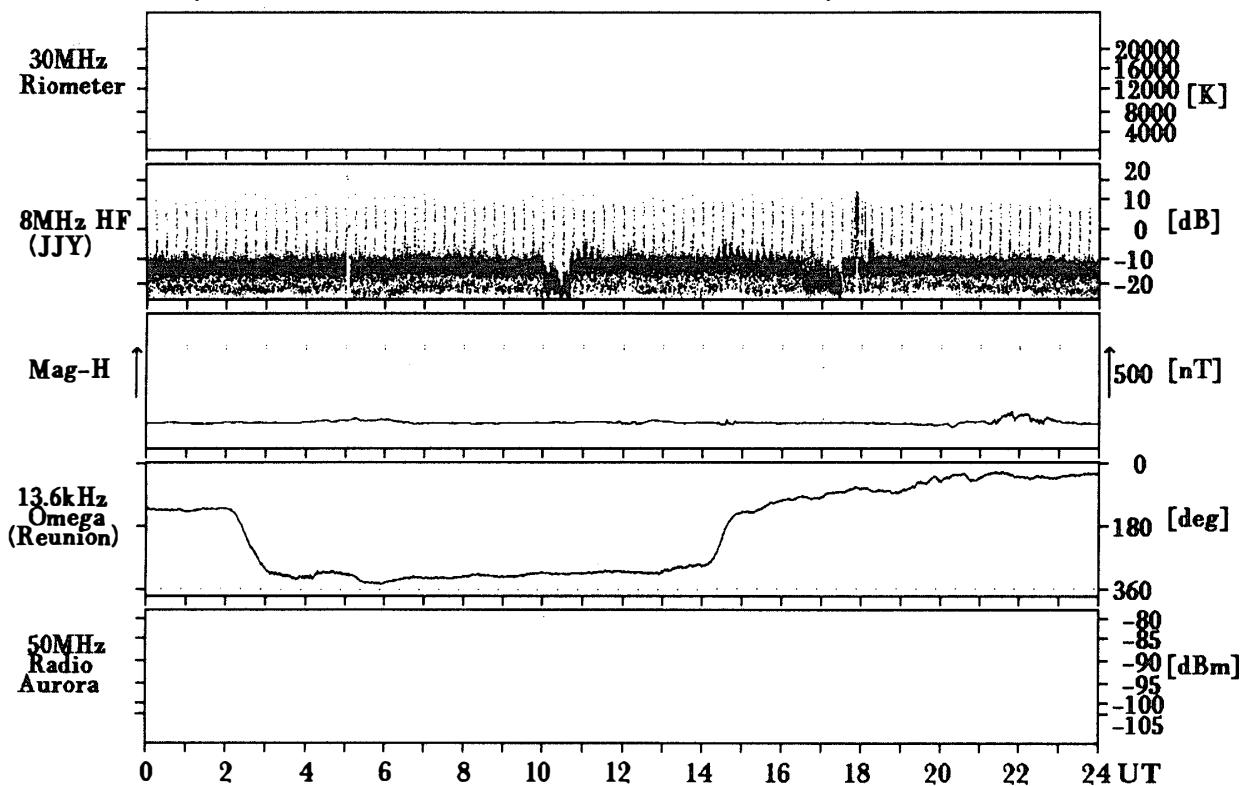
Syowa Station

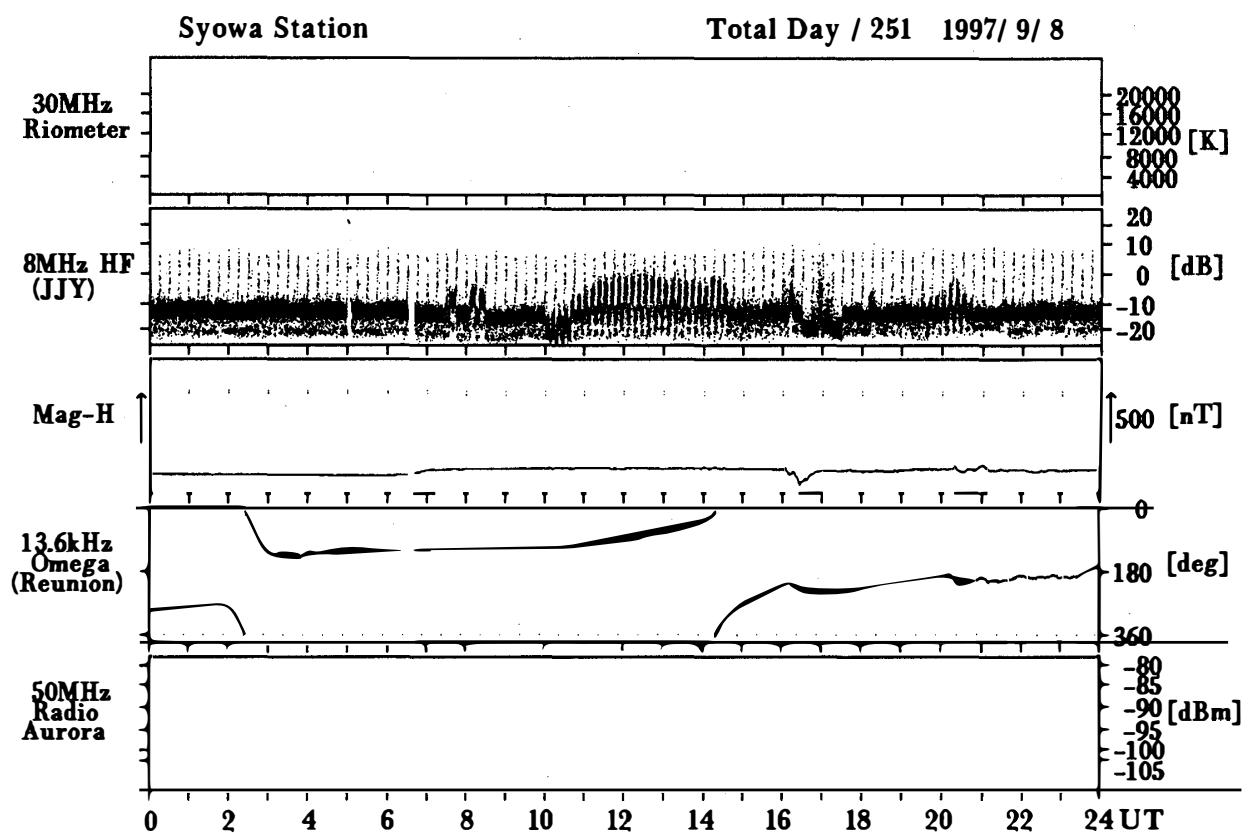
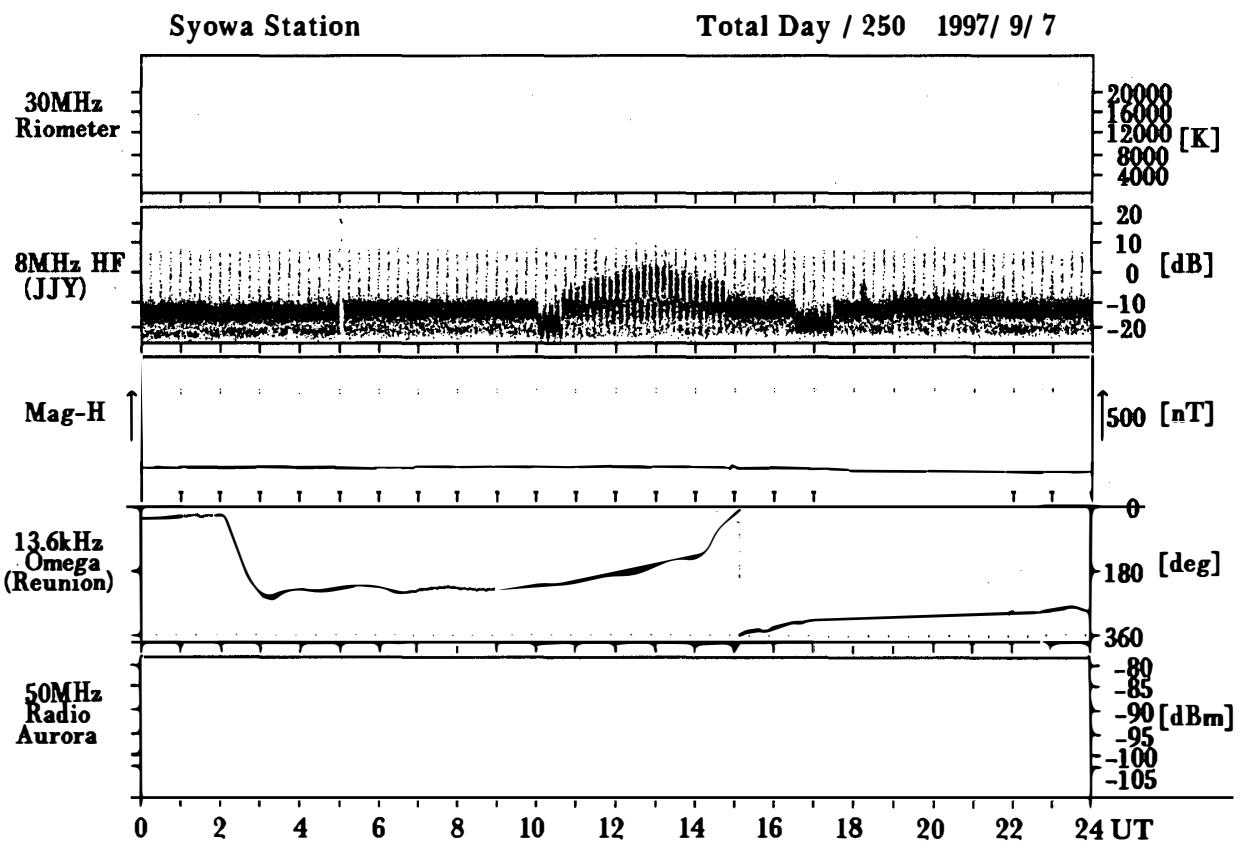
Total Day / 248 1997/ 9/ 5



Syowa Station

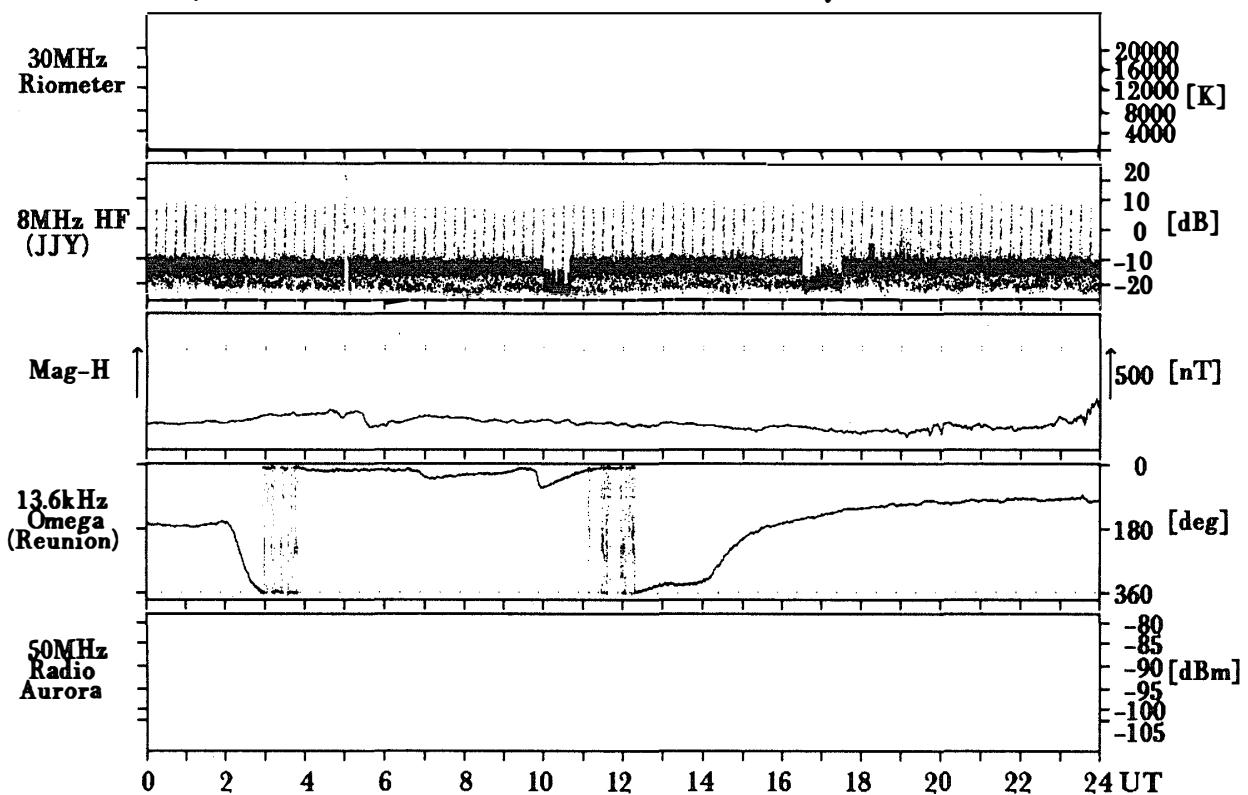
Total Day / 249 1997/ 9/ 6





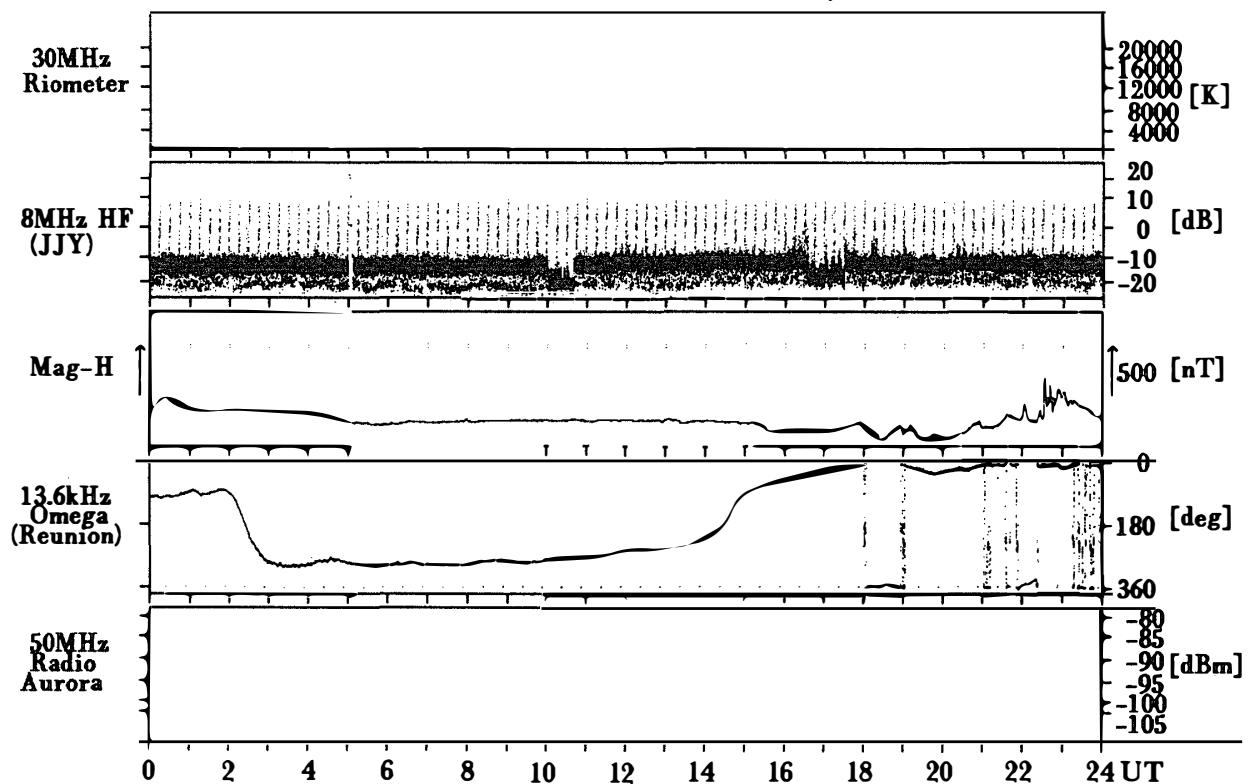
Syowa Station

Total Day / 252 1997/ 9/ 9



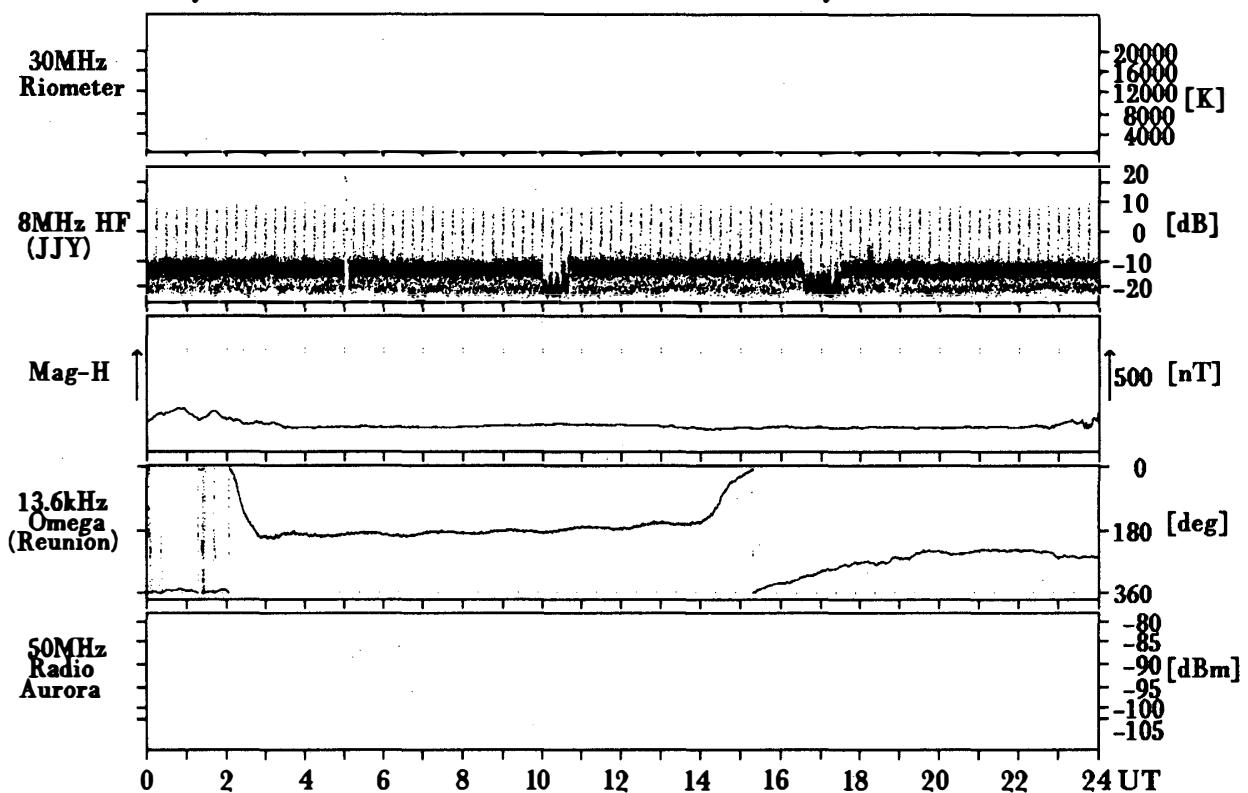
Syowa Station

Total Day / 253 1997/ 9/10



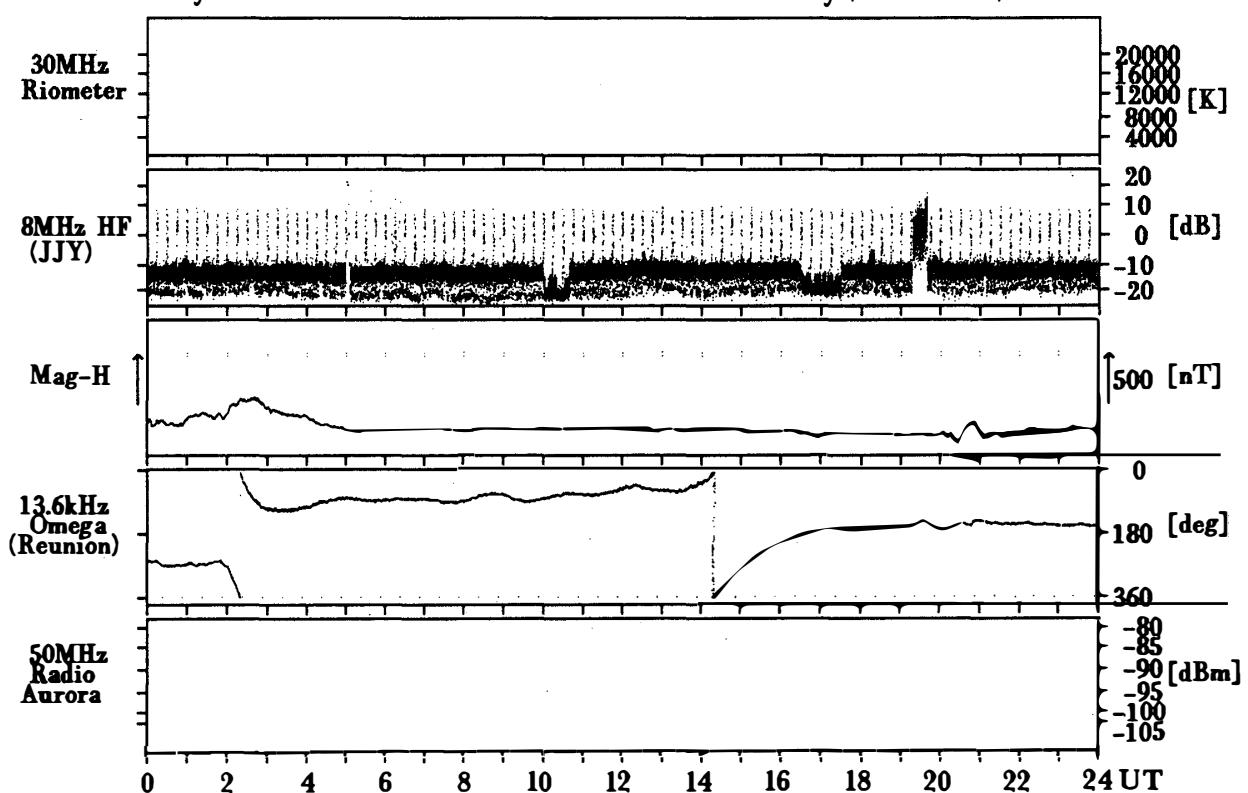
Syowa Station

Total Day / 254 1997/ 9/11



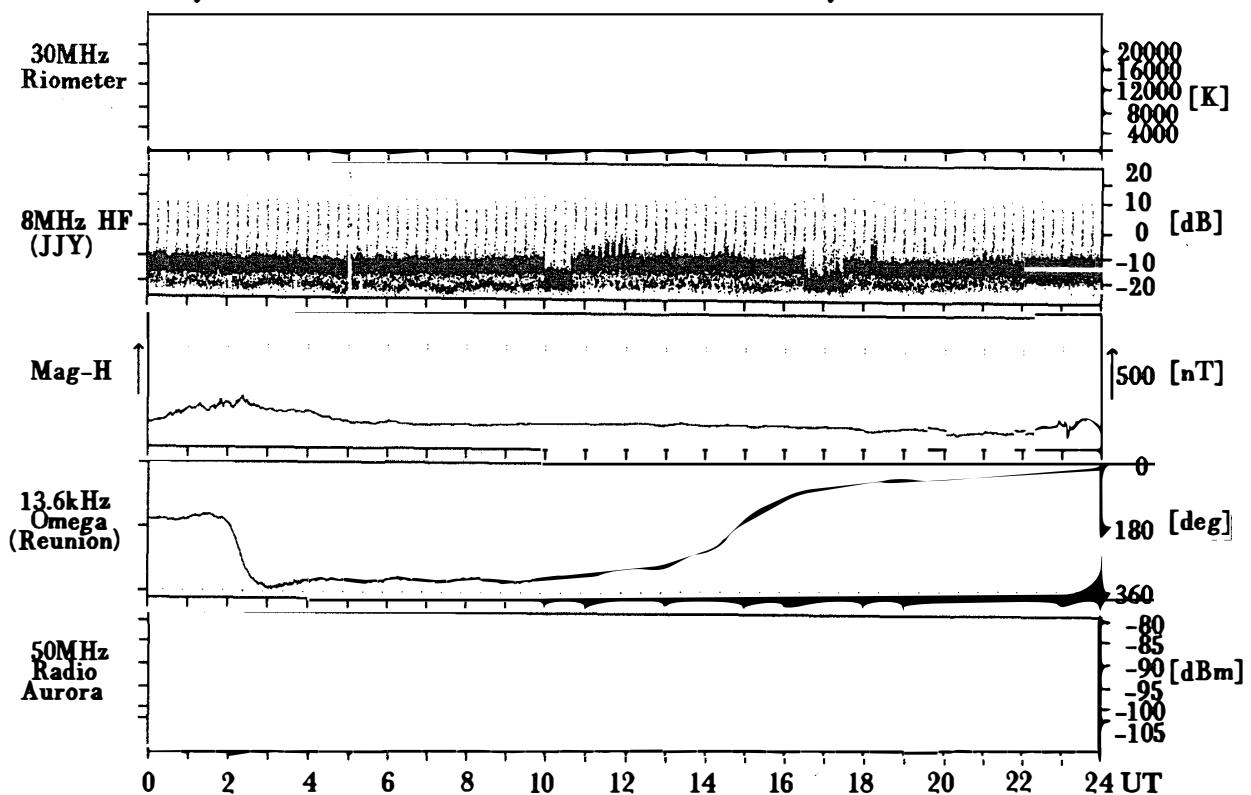
Syowa Station

Total Day / 255 1997/ 9/12



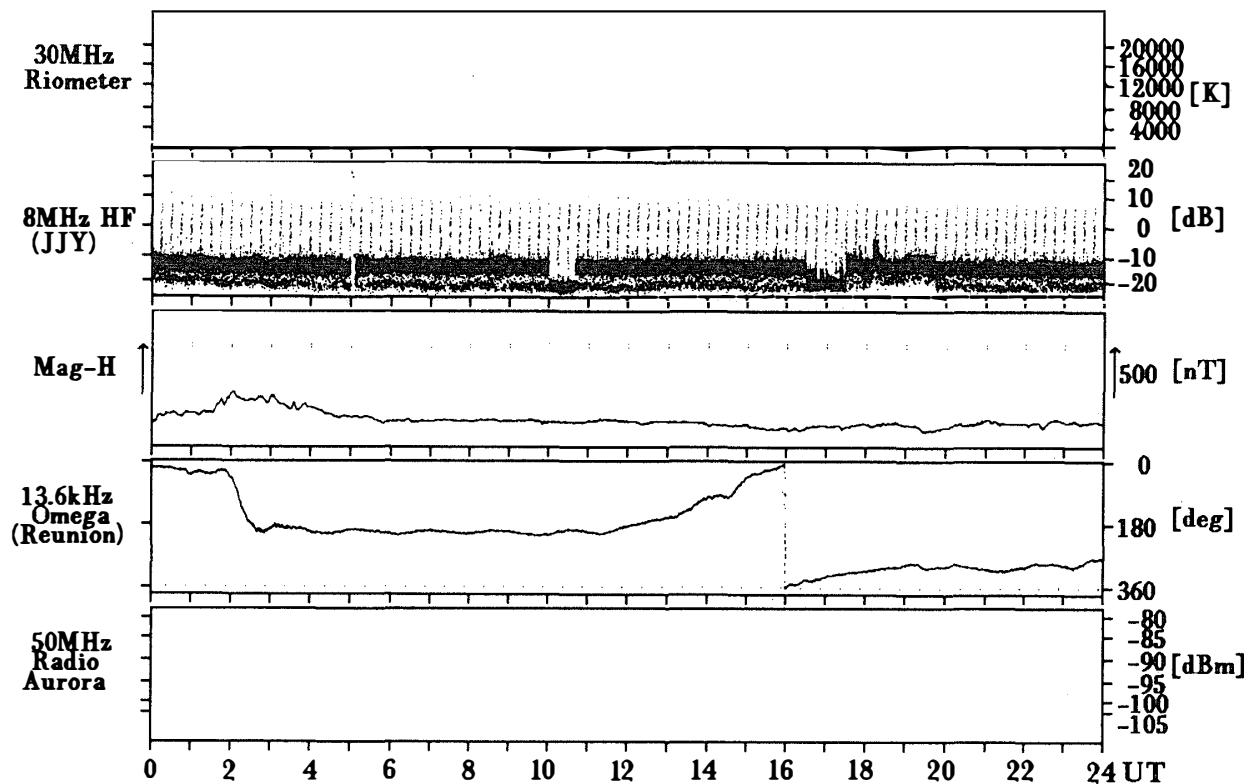
Syowa Station

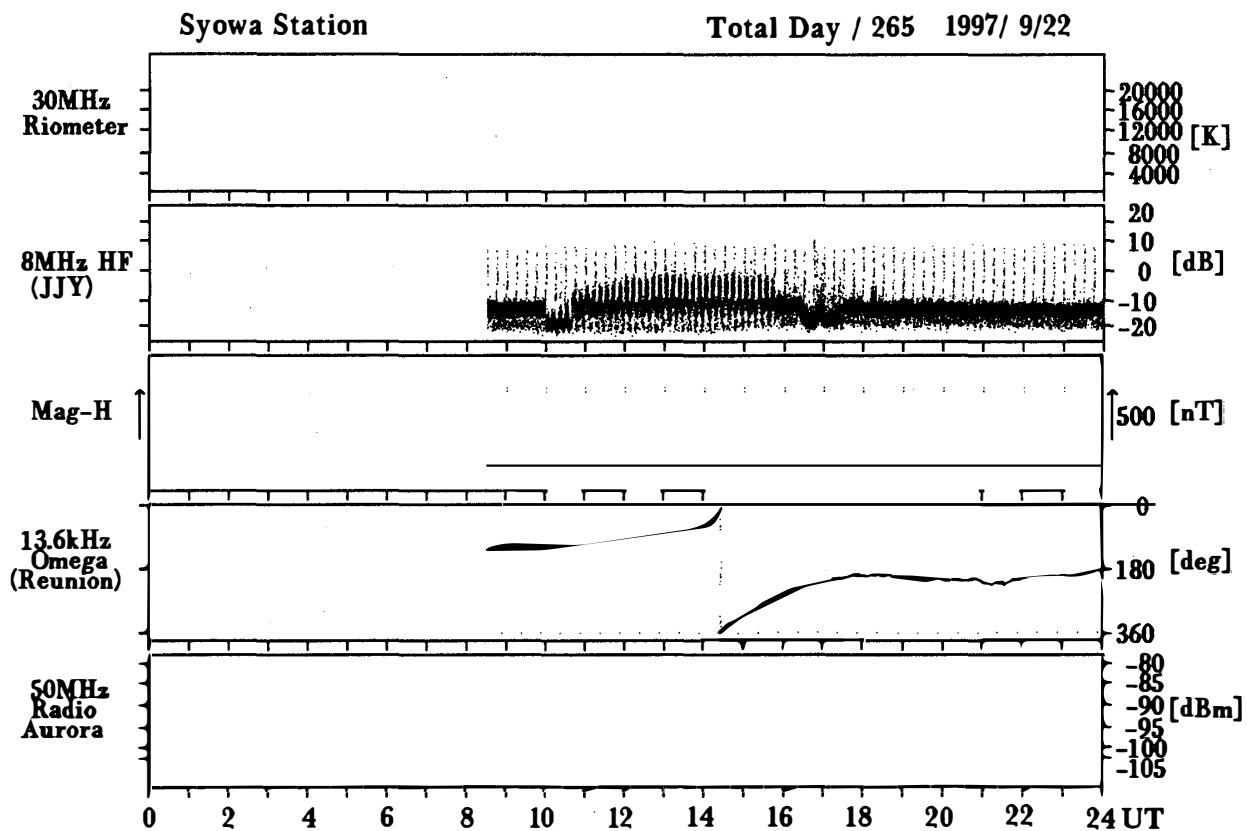
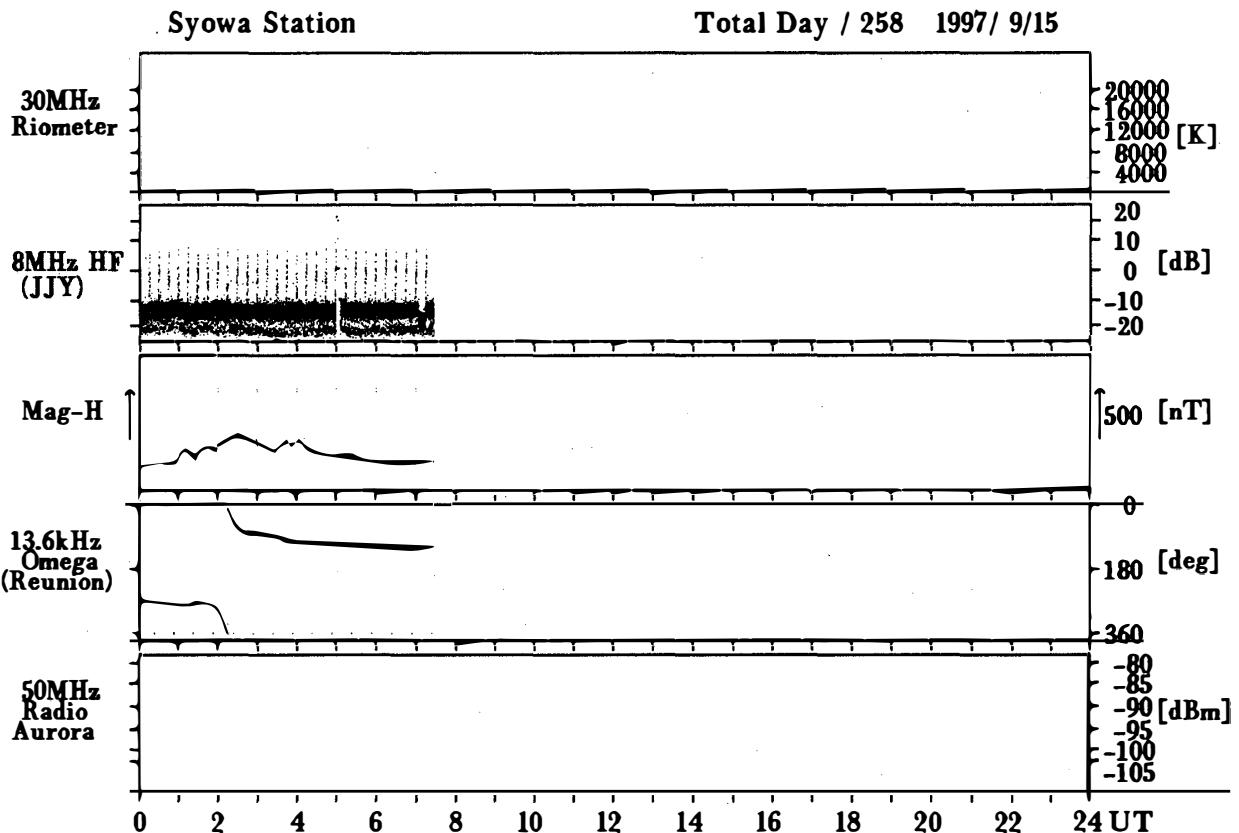
Total Day / 256 1997/ 9/13



Syowa Station

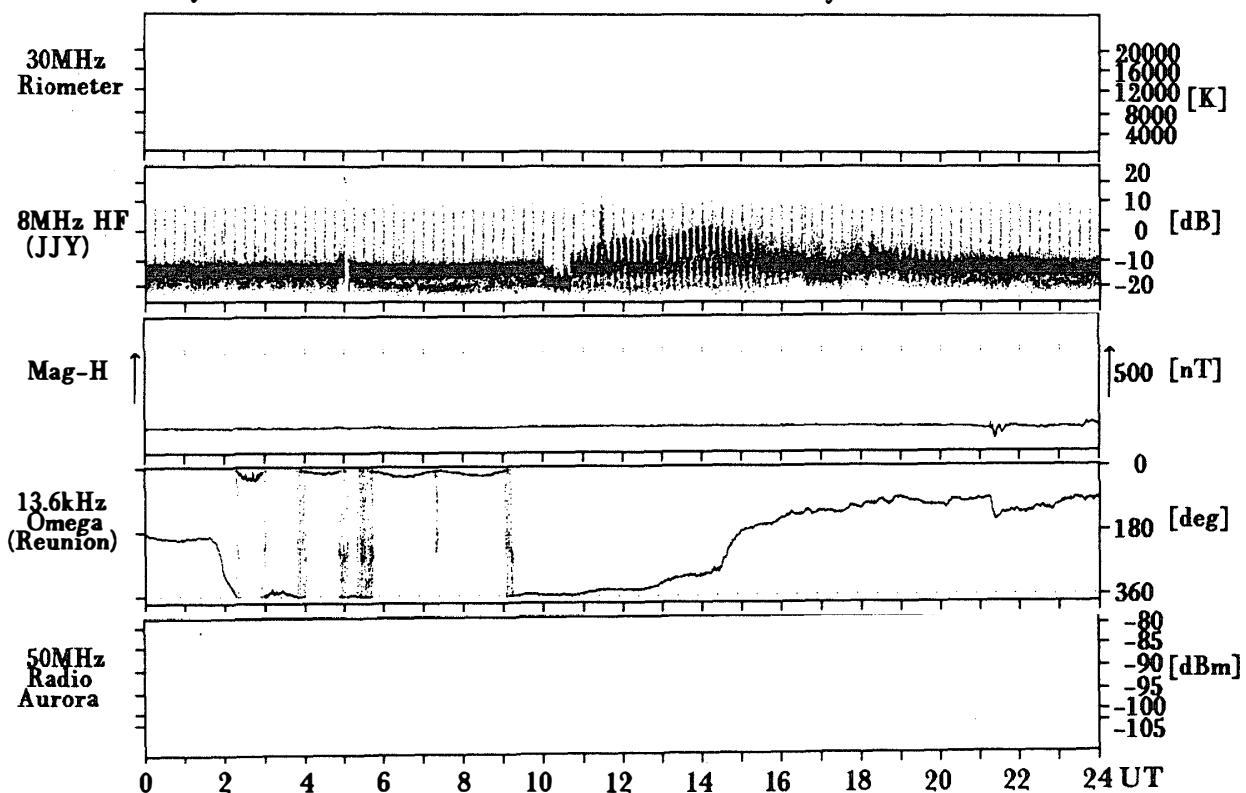
Total Day / 257 1997/ 9/14





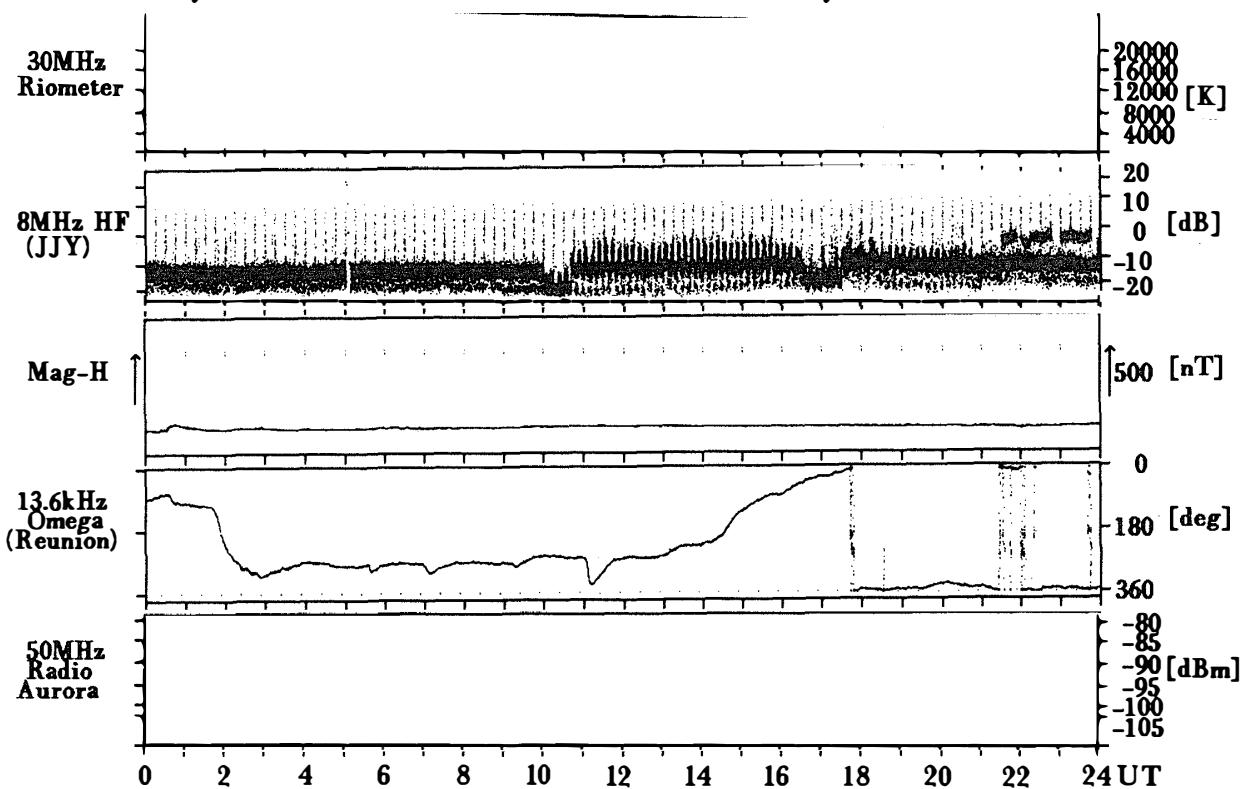
Syowa Station

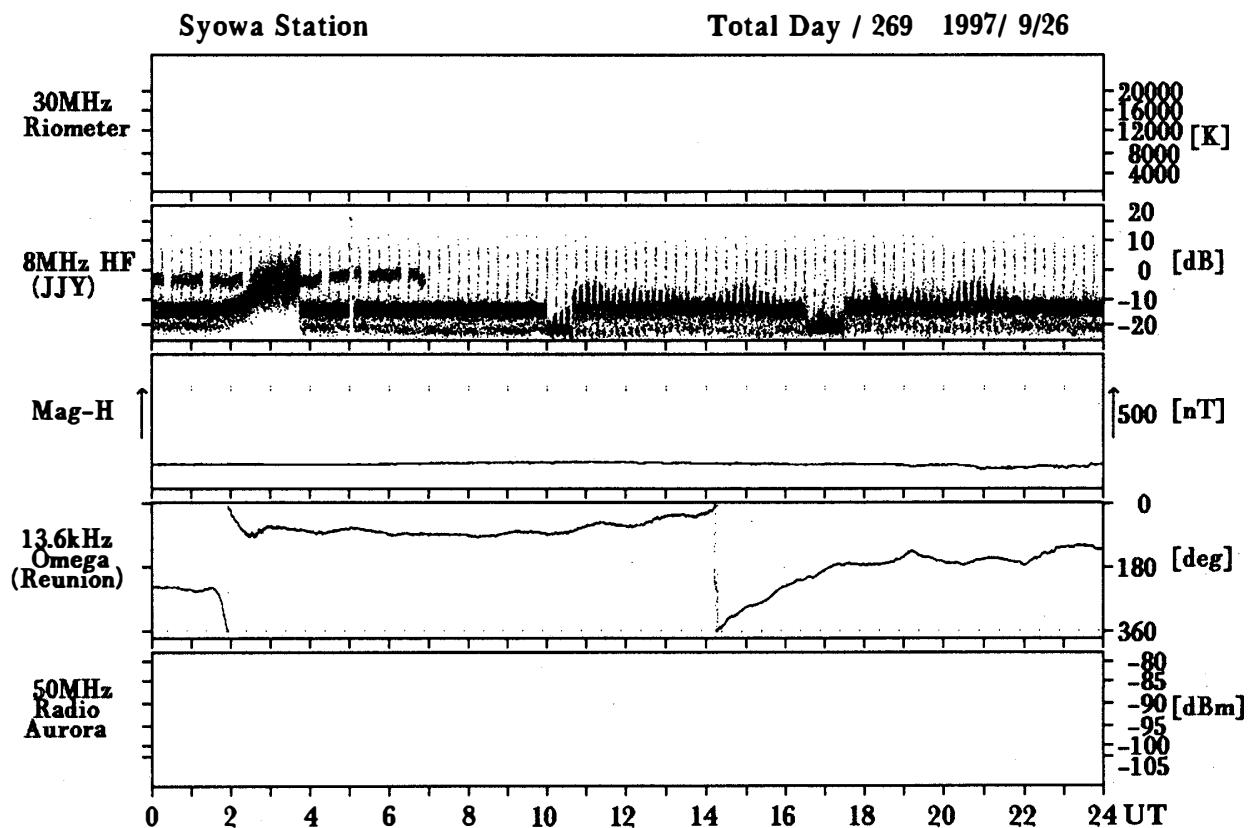
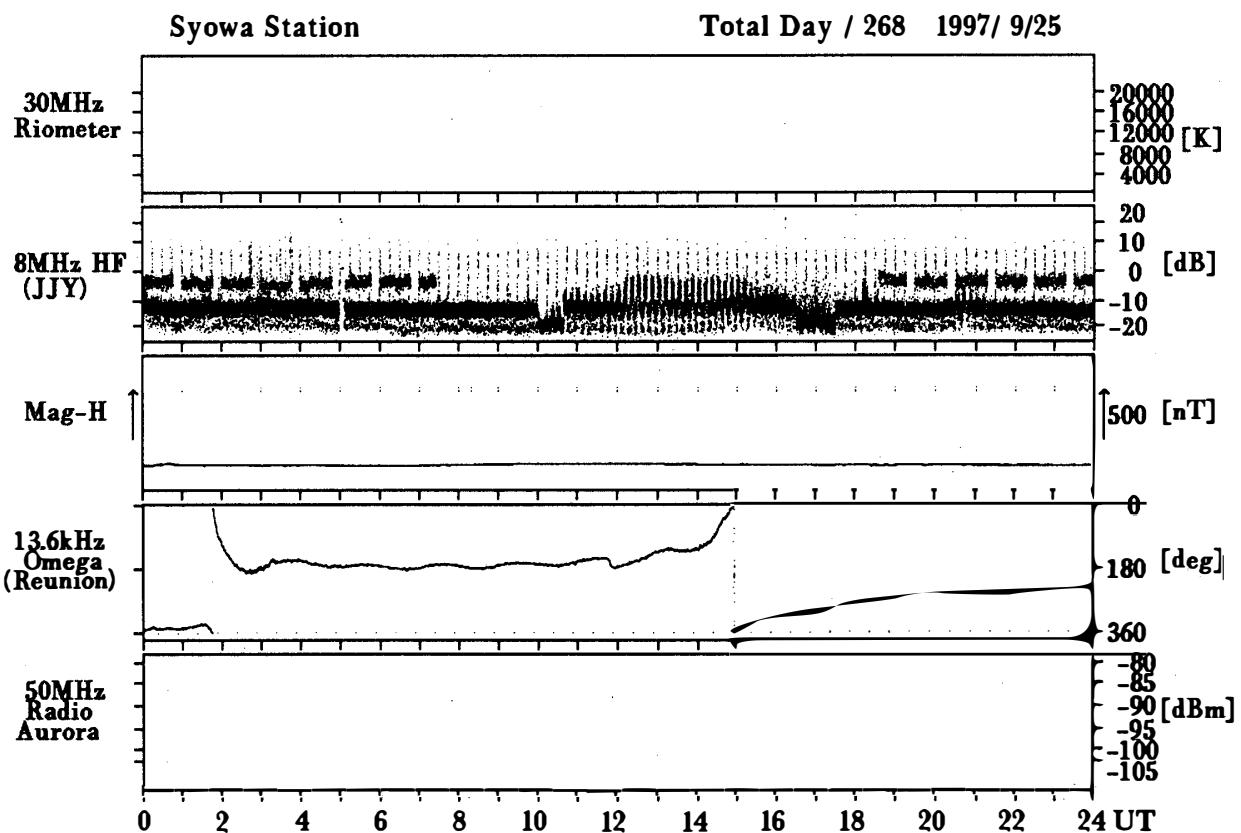
Total Day / 266 1997/ 9/23

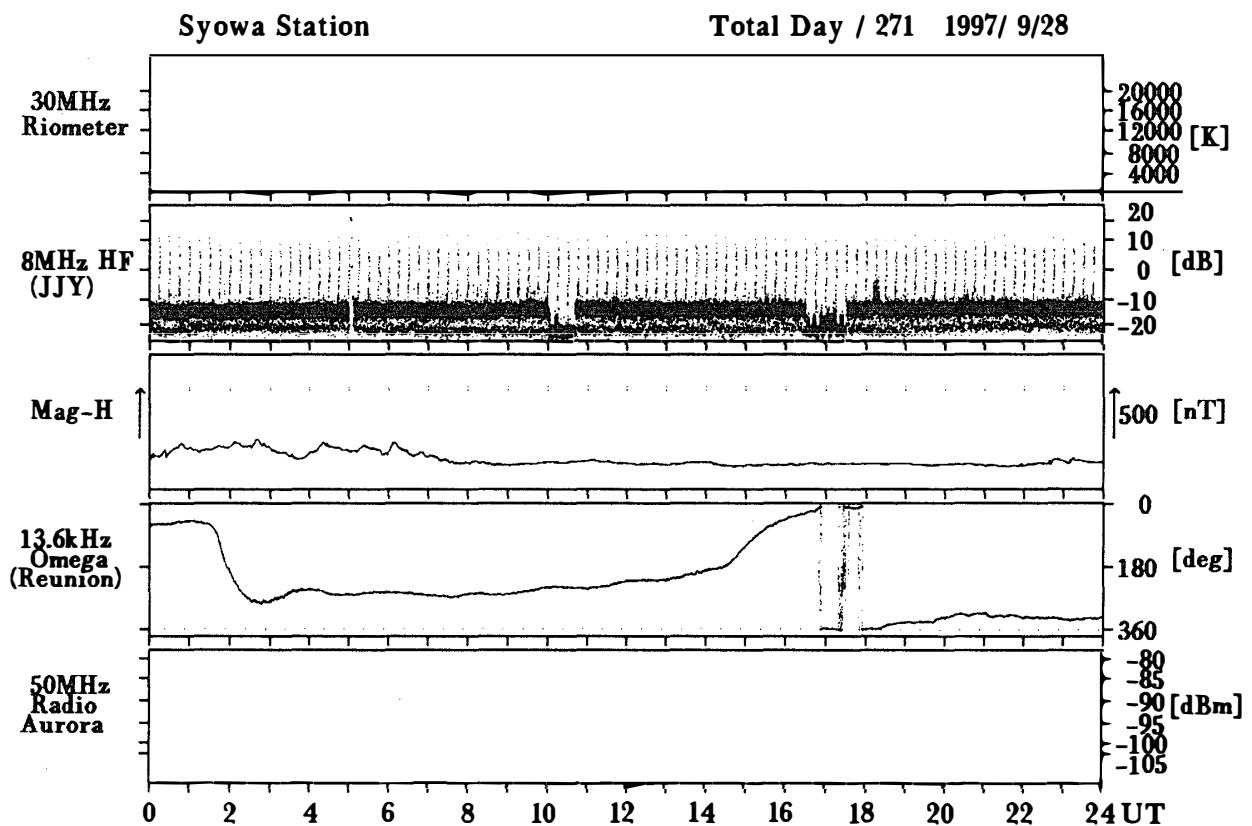
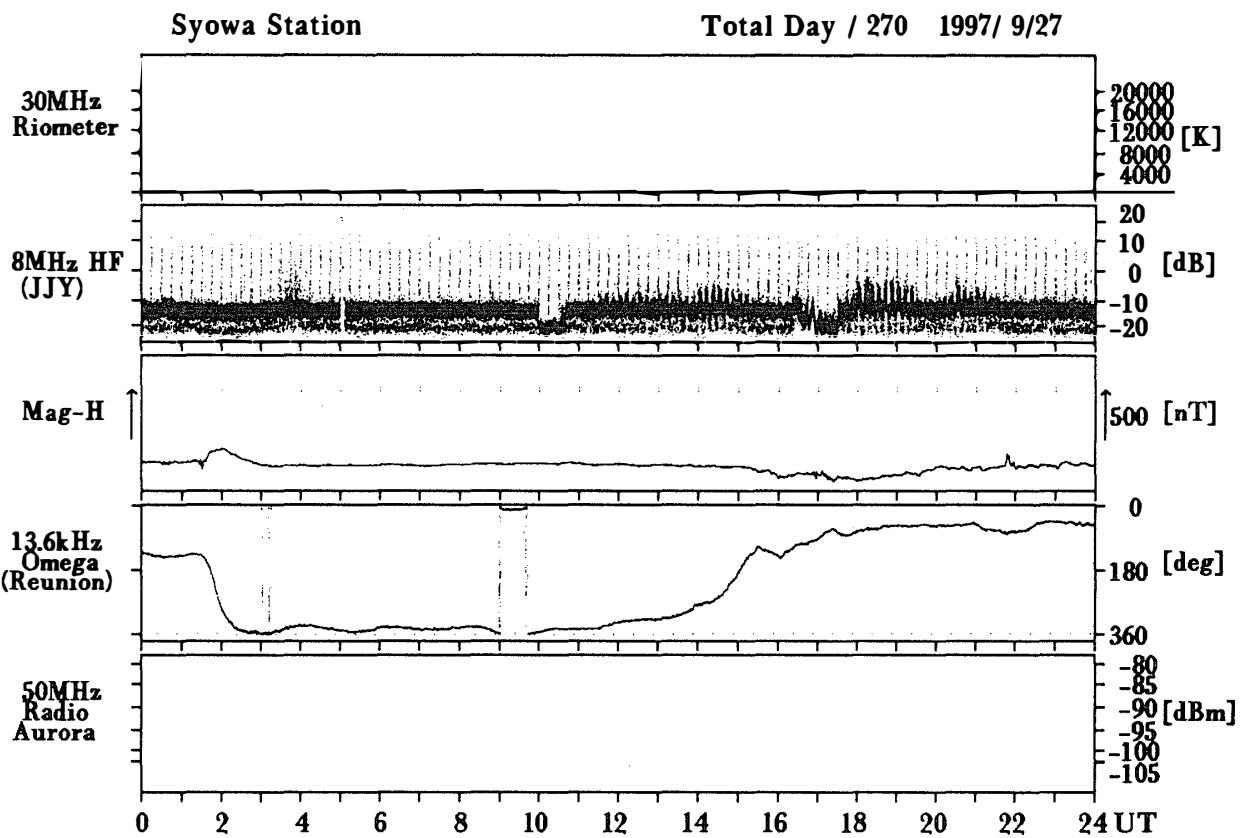


Syowa Station

Total Day / 267 1997/ 9/24

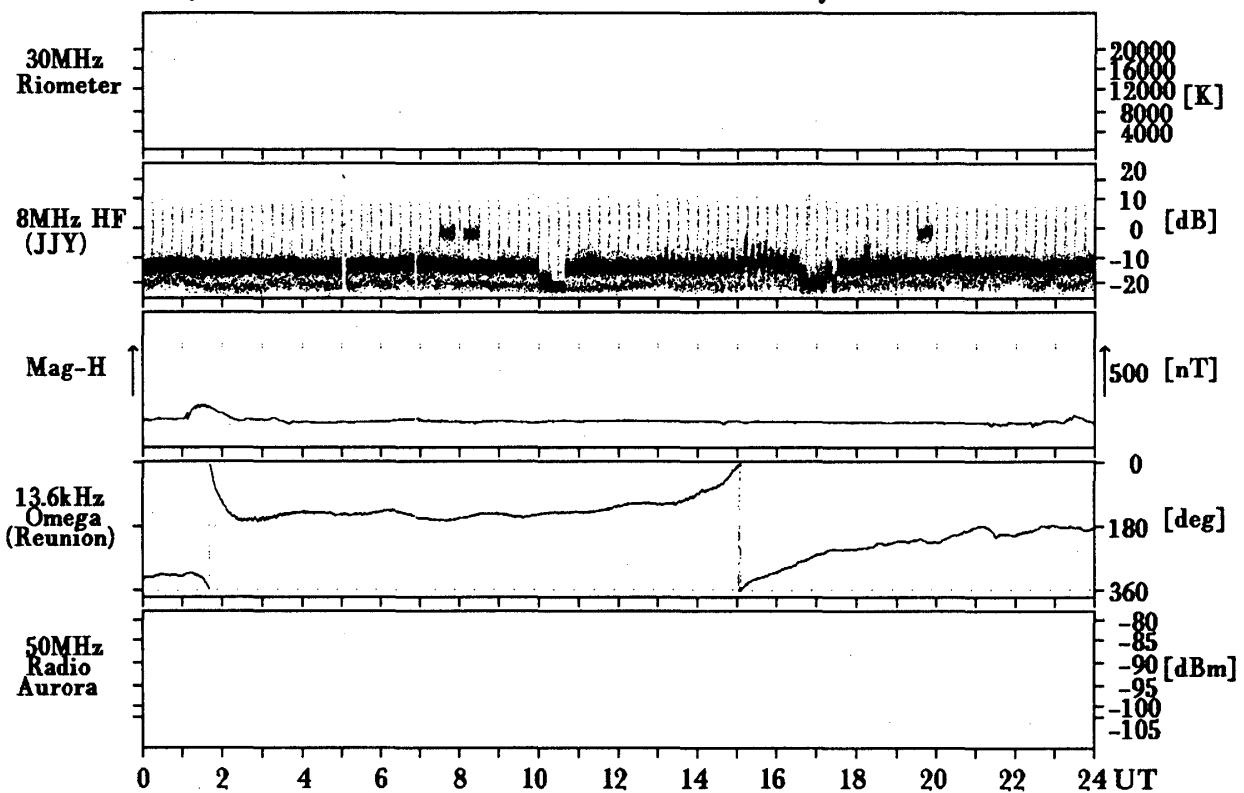






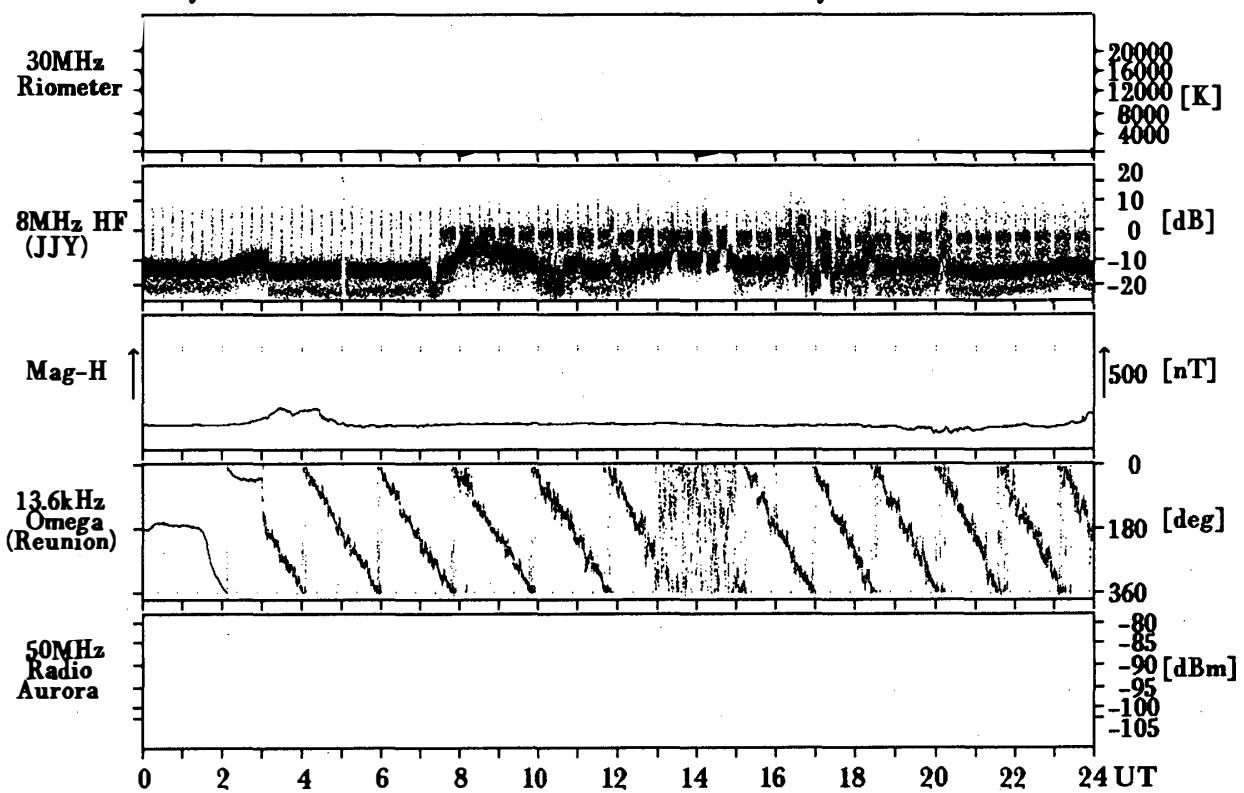
Syowa Station

Total Day / 272 1997/ 9/29



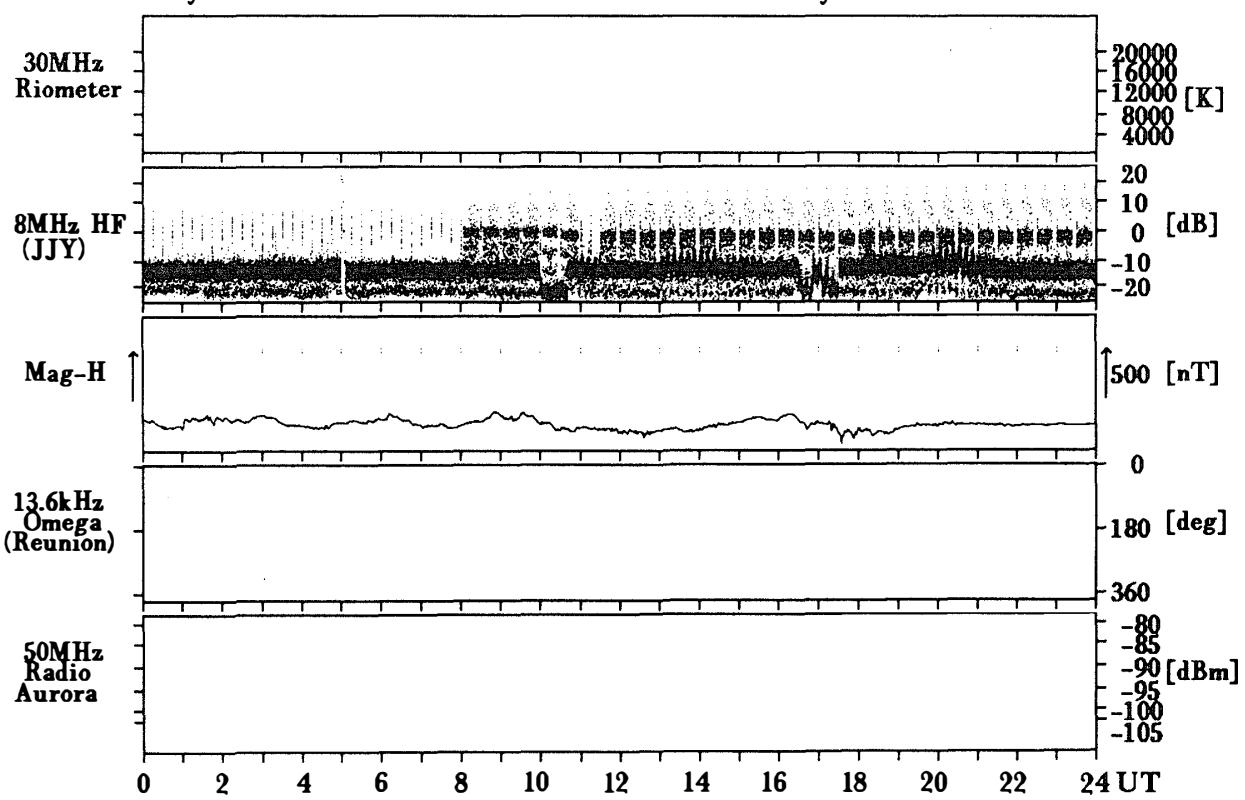
Syowa Station

Total Day / 273 1997/ 9/30



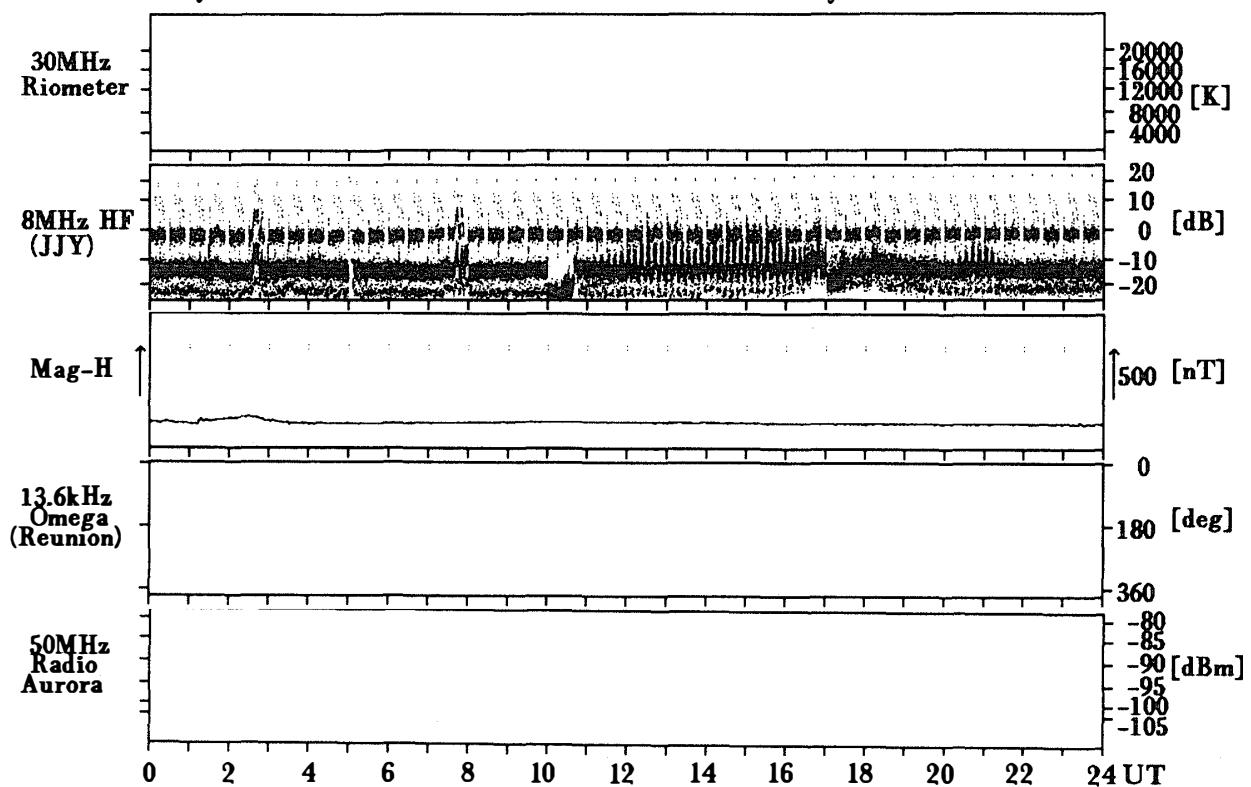
Syowa Station

Total Day / 274 1997/10/ 1



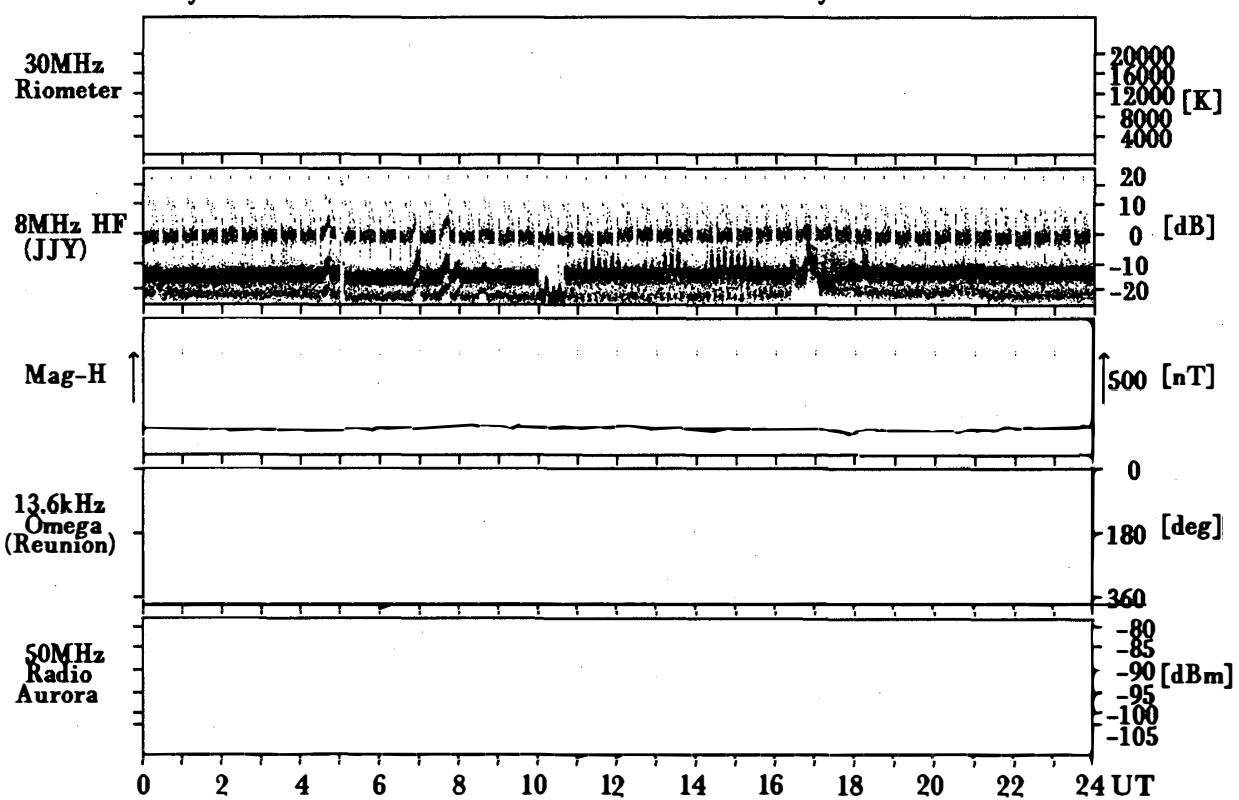
Syowa Station

Total Day / 275 1997/10/ 2



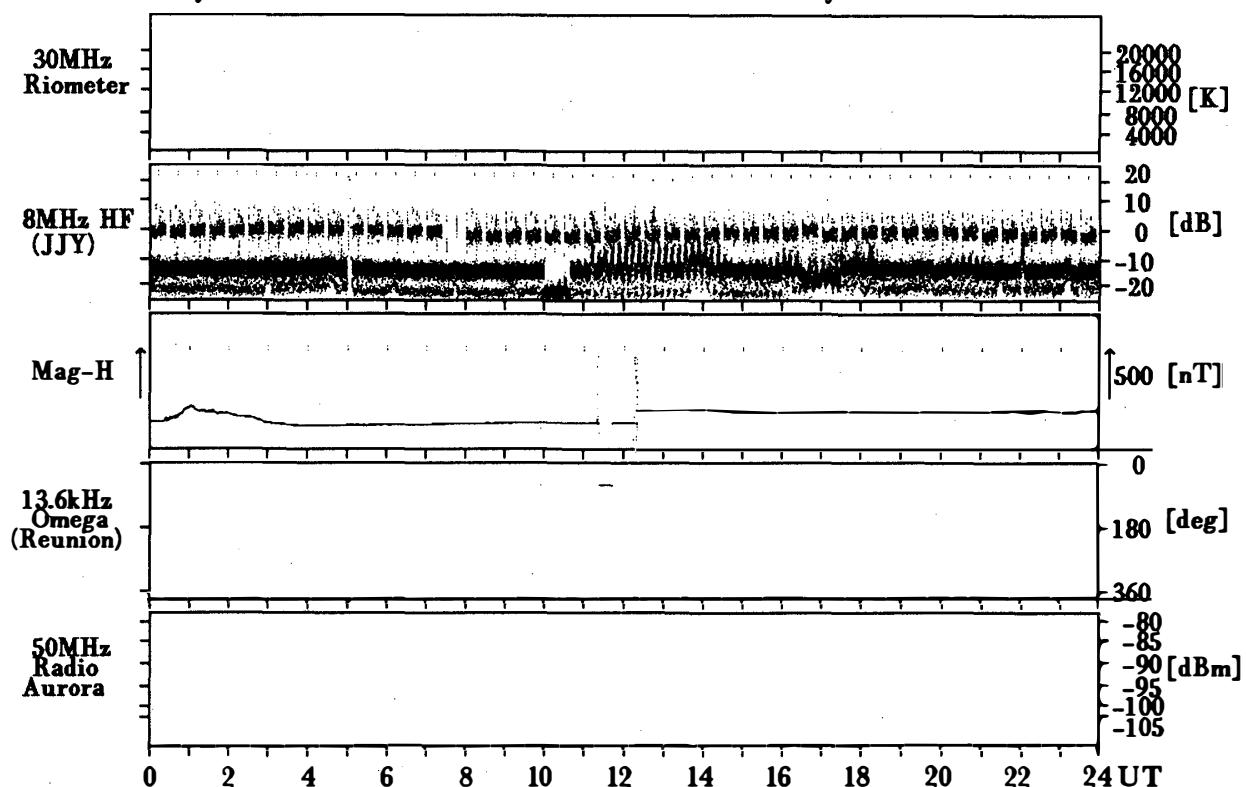
Syowa Station

Total Day / 276 1997/10/ 3



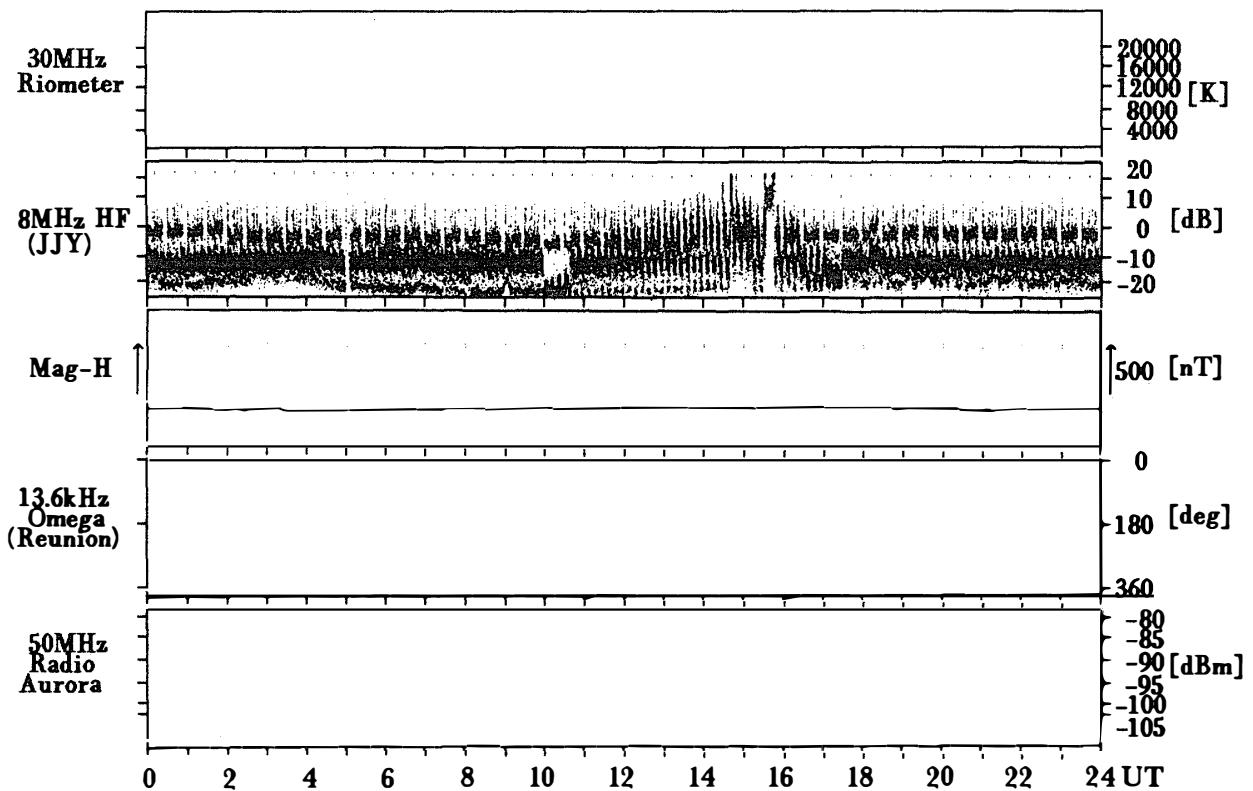
Syowa Station

Total Day / 277 1997/10/ 4



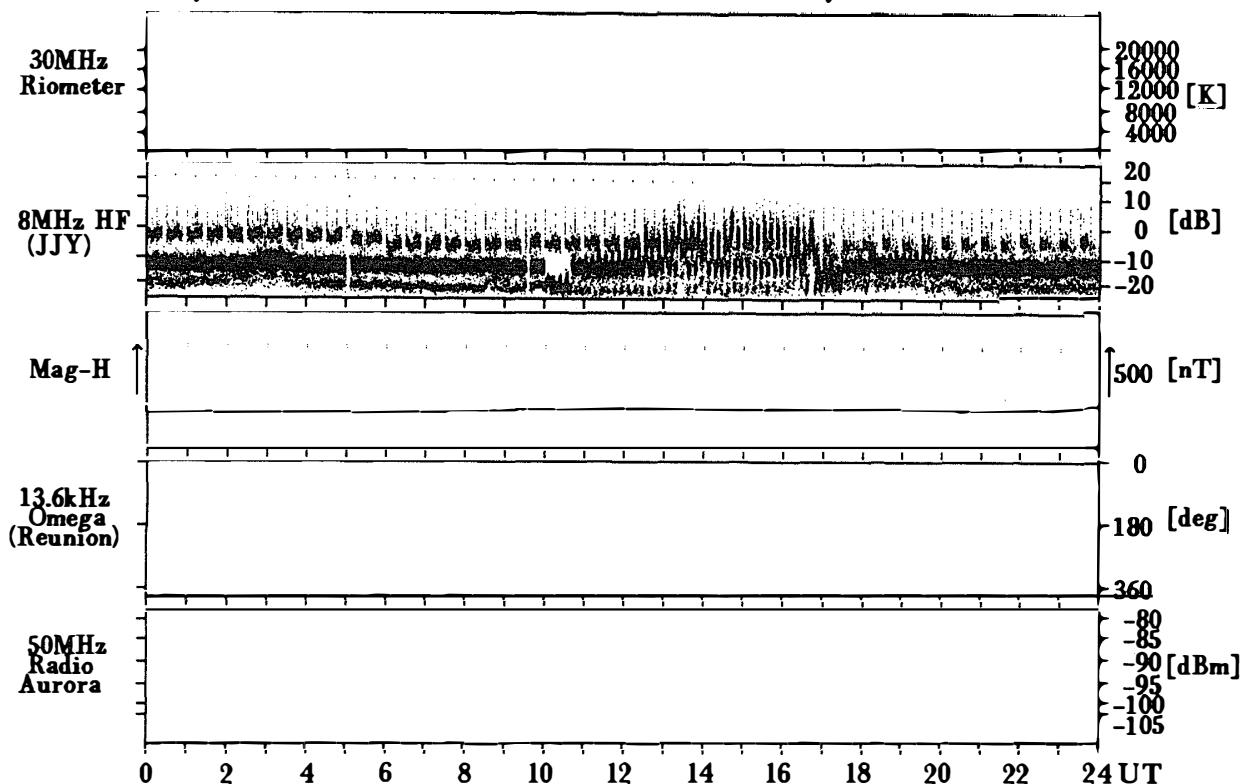
Syowa Station

Total Day / 278 1997/10/ 5



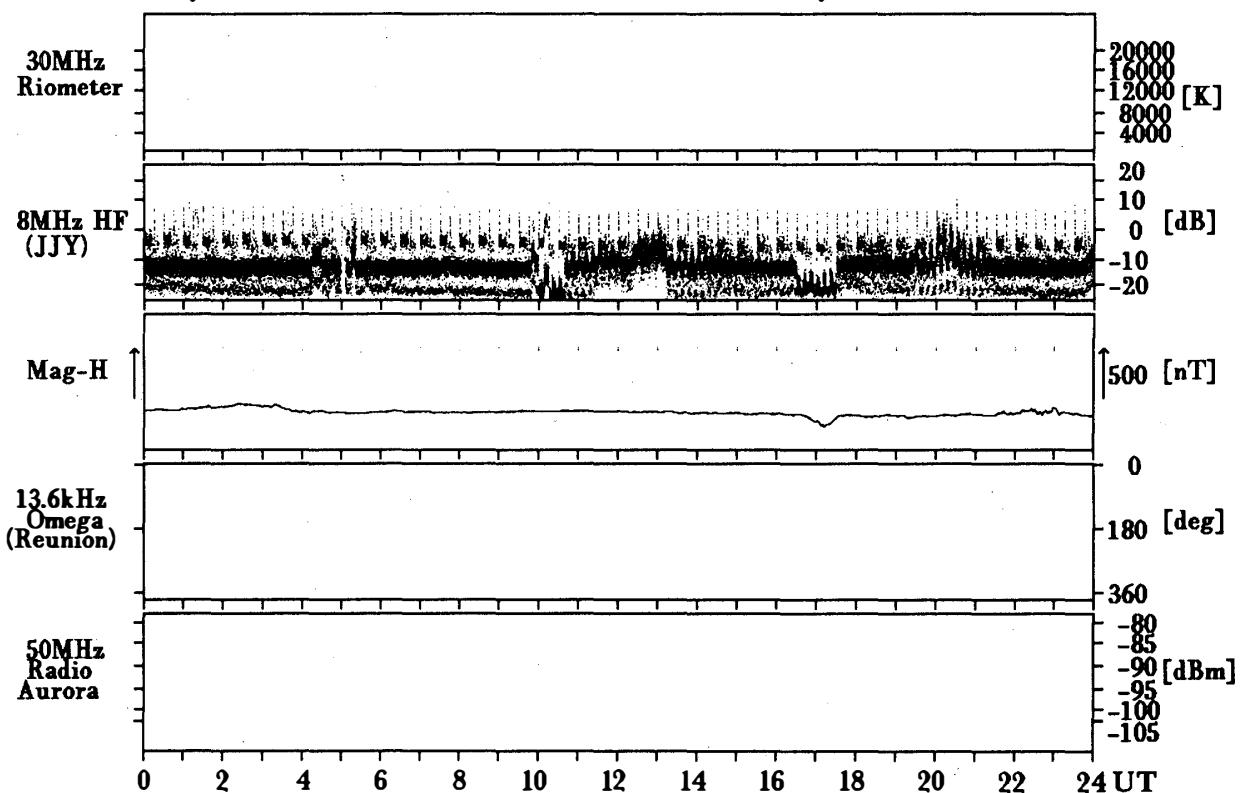
Syowa Station

Total Day / 279 1997/10/ 6



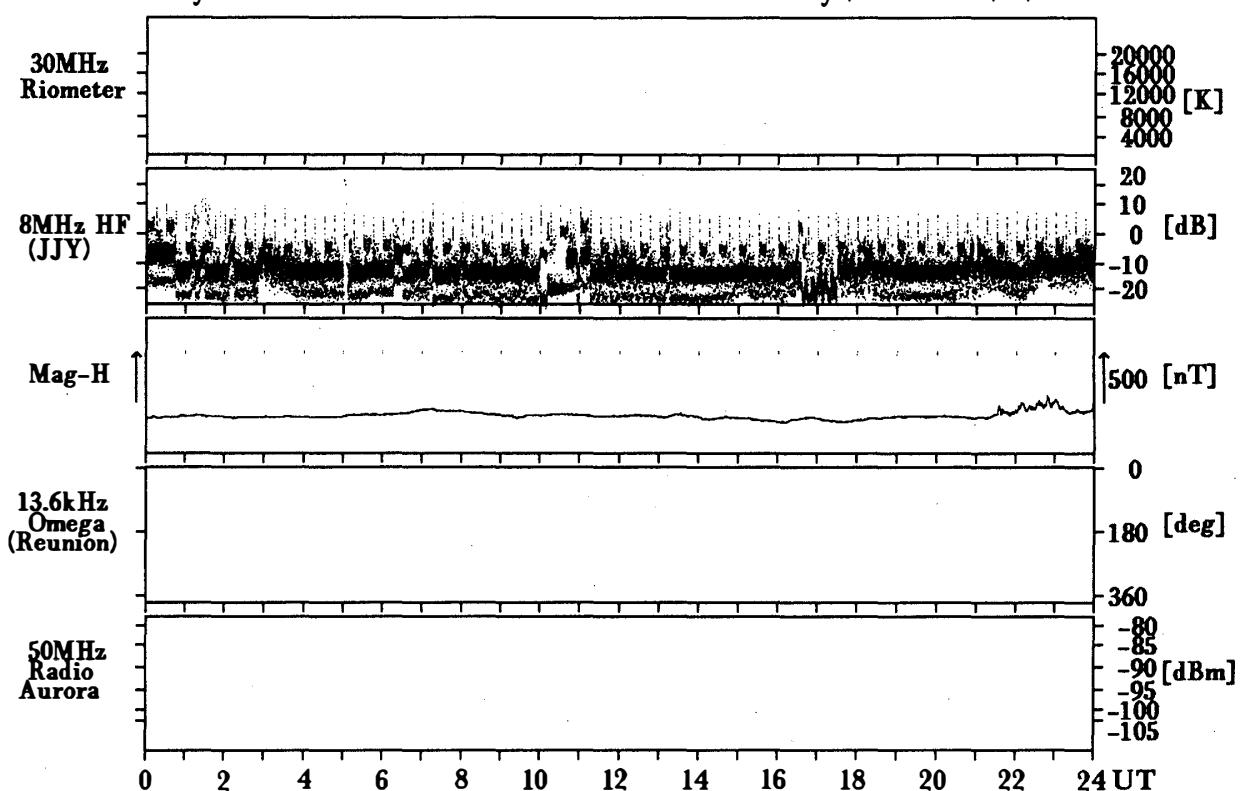
Syowa Station

Total Day / 280 1997/10/ 7



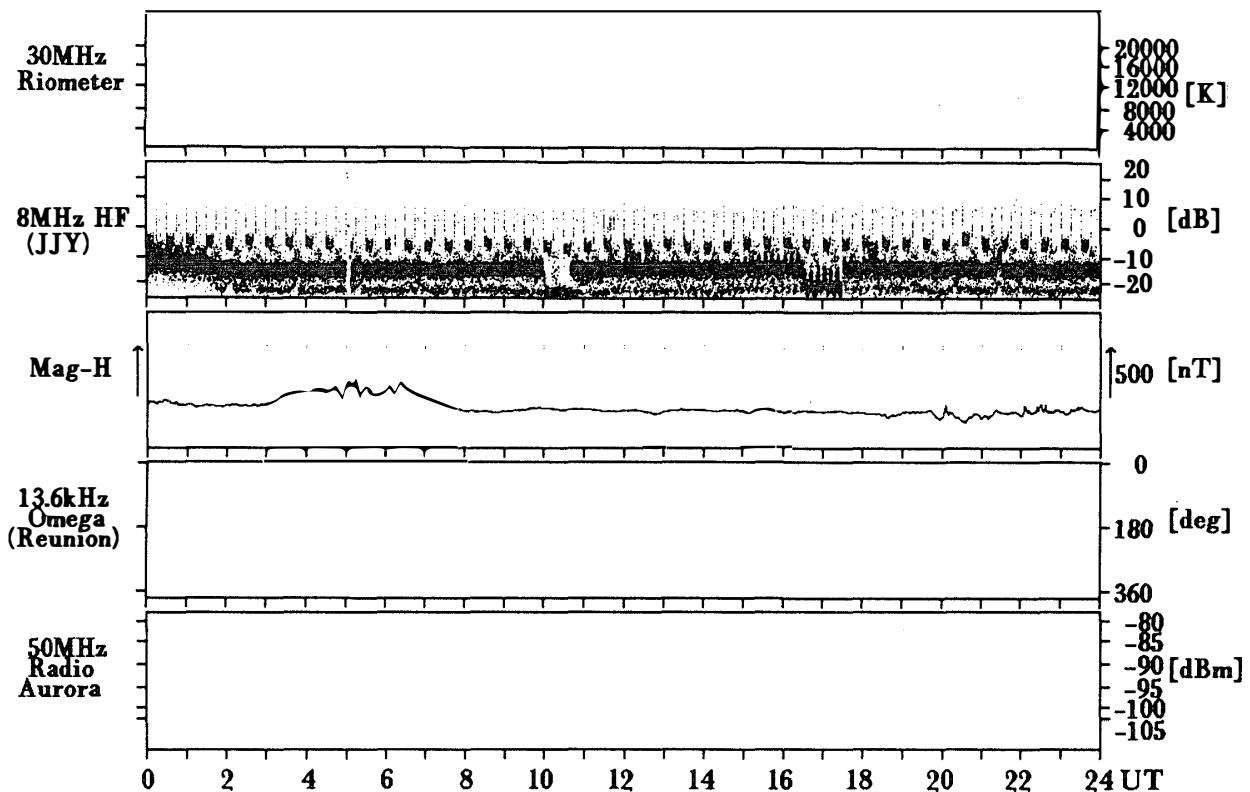
Syowa Station

Total Day / 281 1997/10/ 8



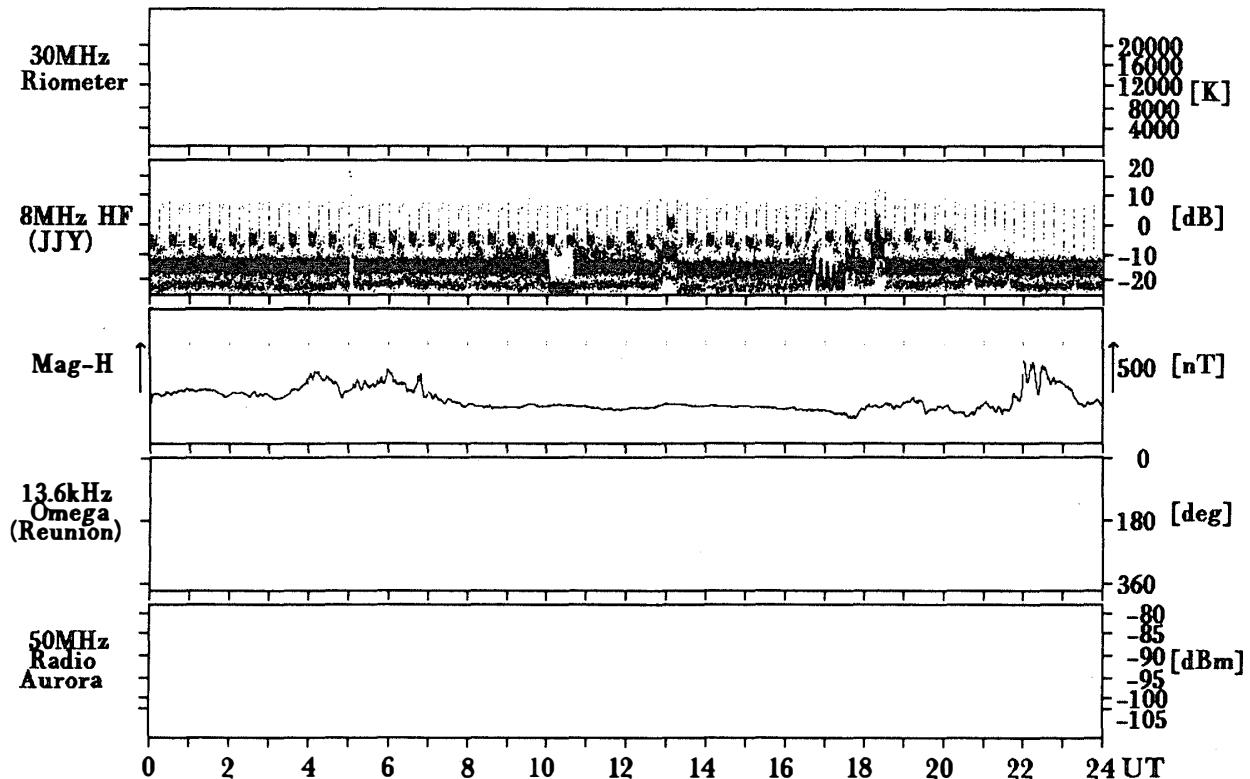
Syowa Station

Total Day / 282 1997/10/ 9



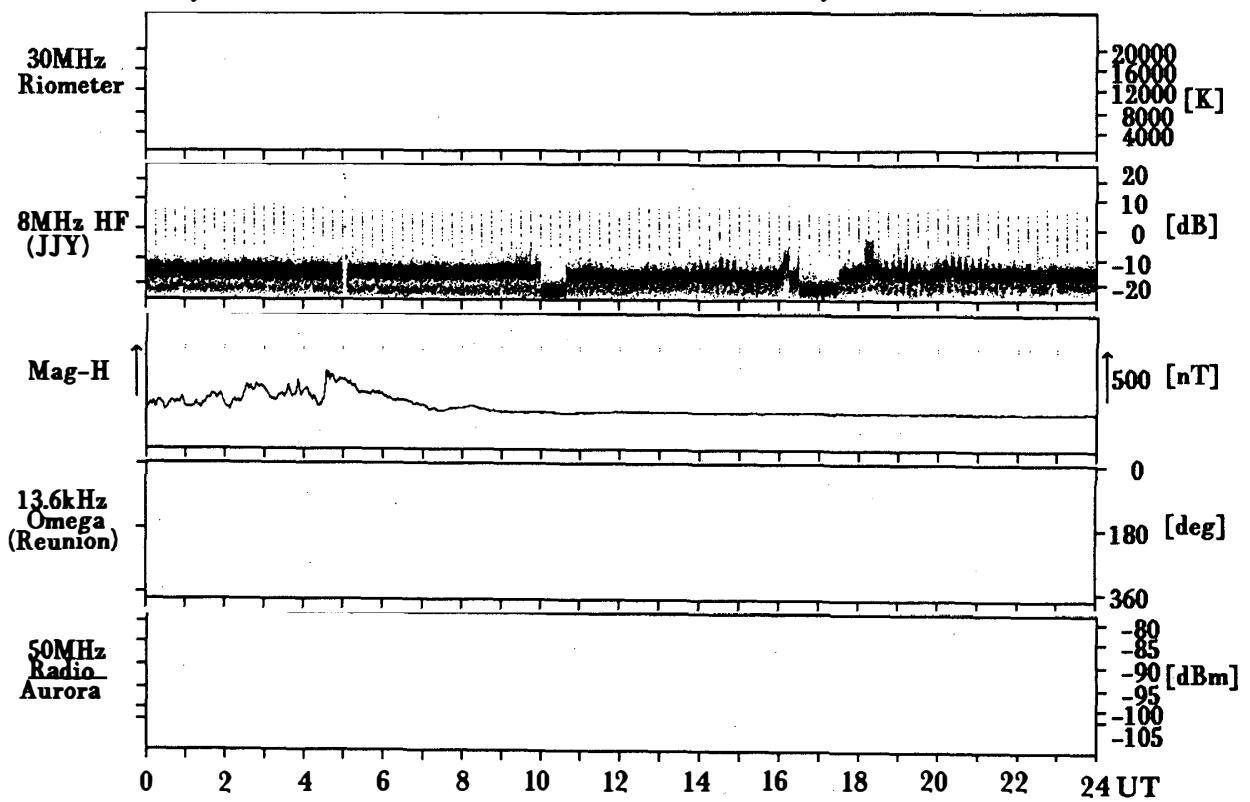
Syowa Station

Total Day / 283 1997/10/10



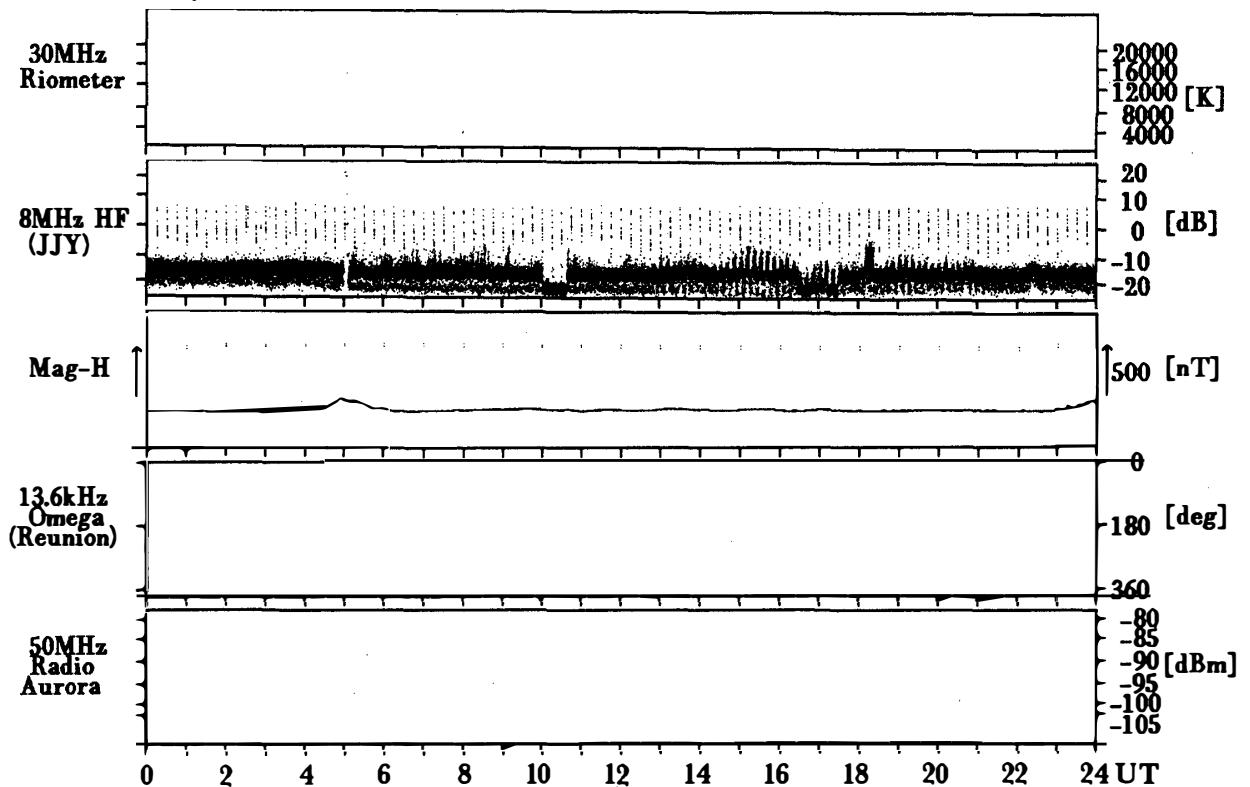
Syowa Station

Total Day / 284 1997/10/11



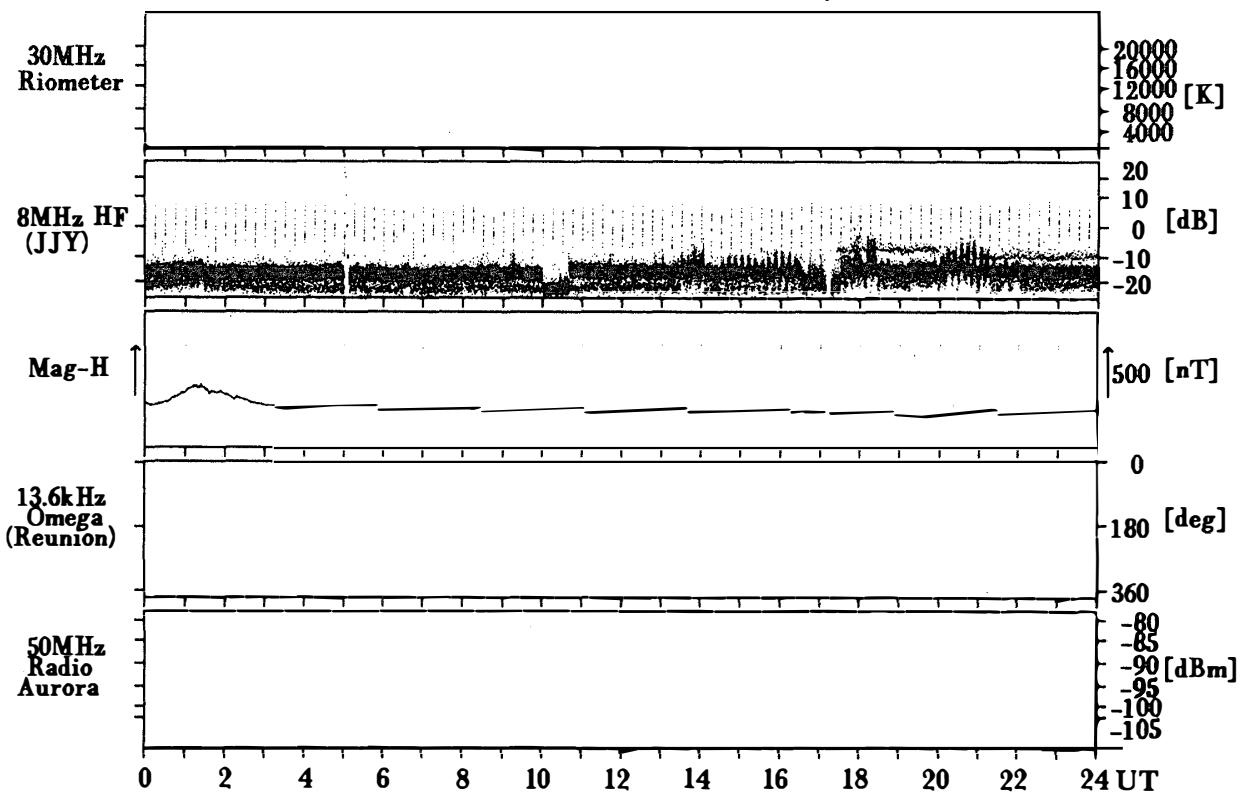
Syowa Station

Total Day / 285 1997/10/12



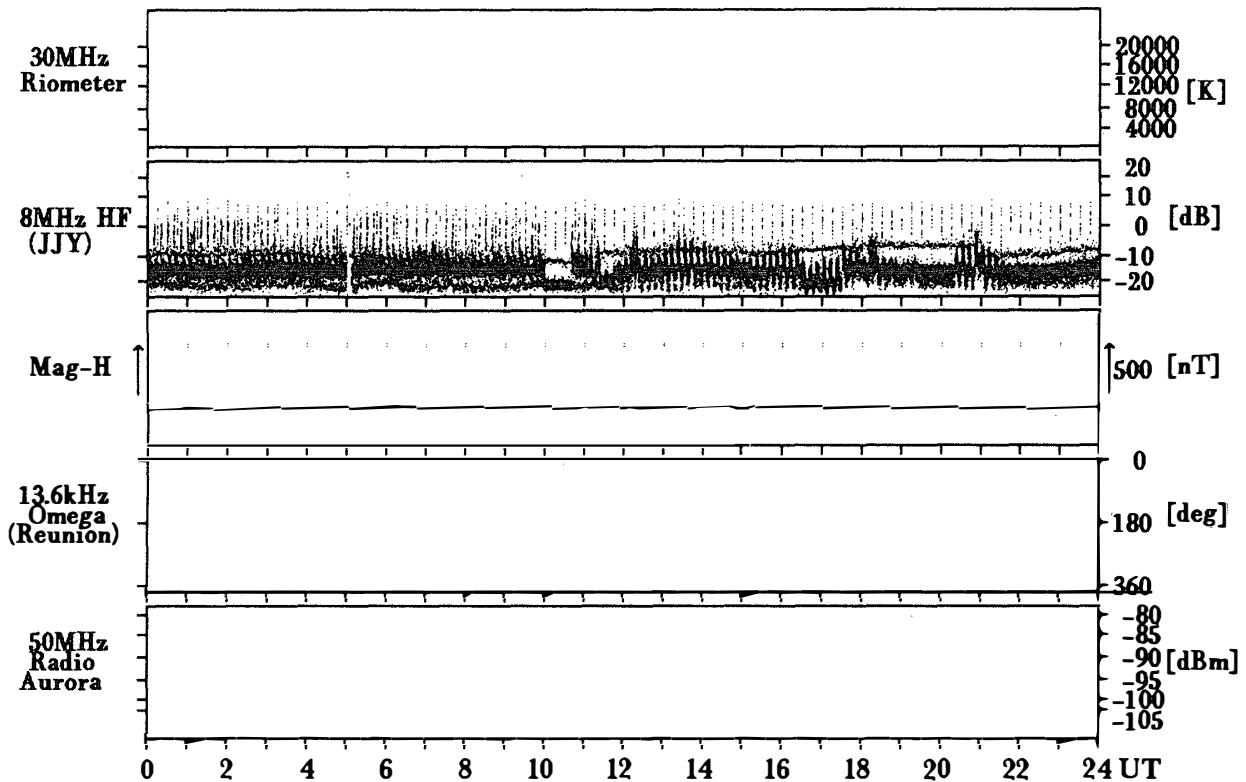
Syowa Station

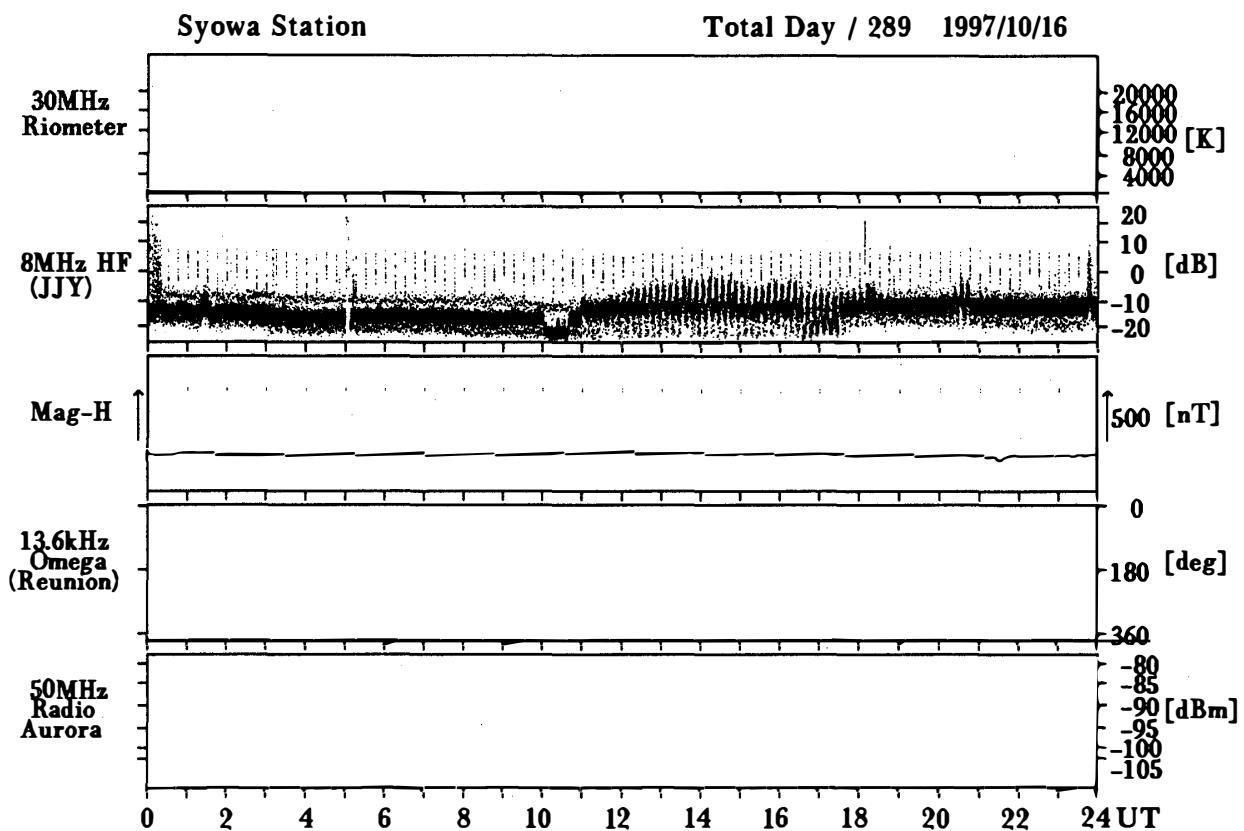
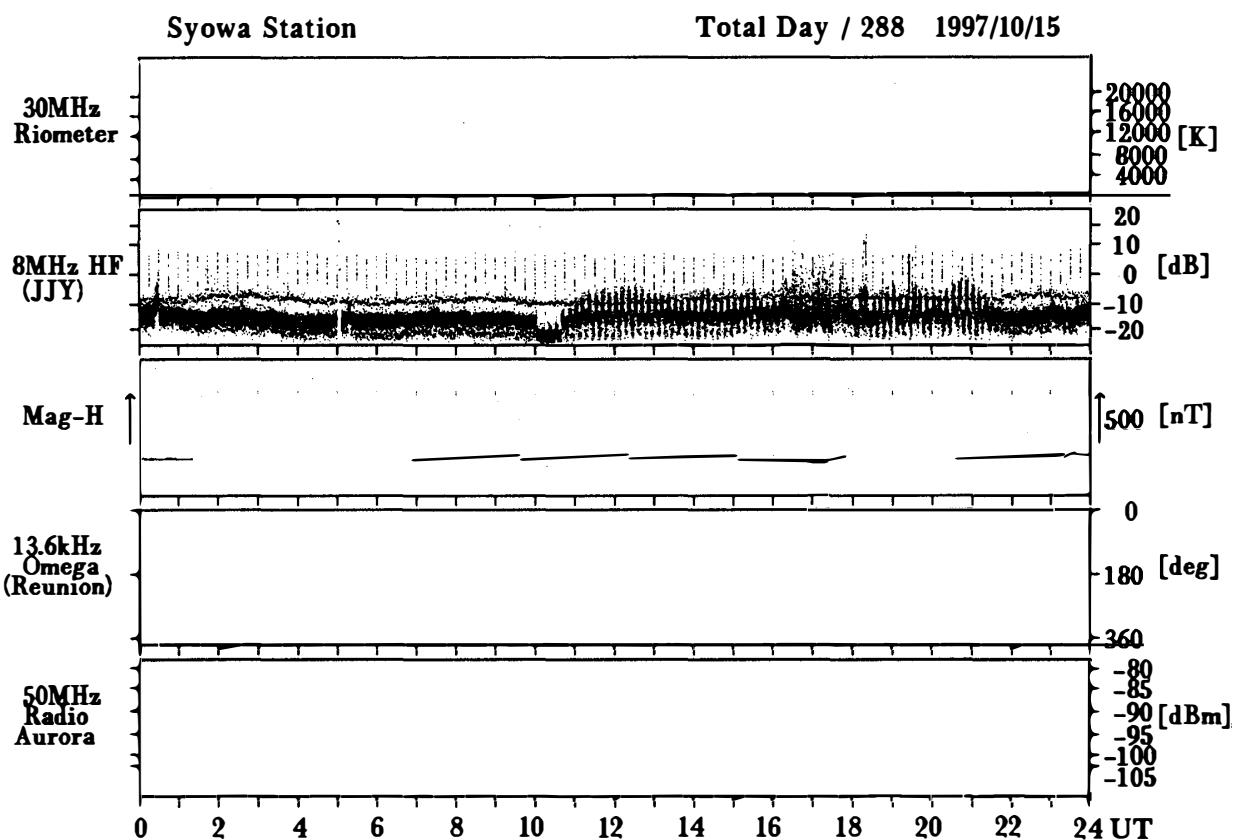
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Syowa Station

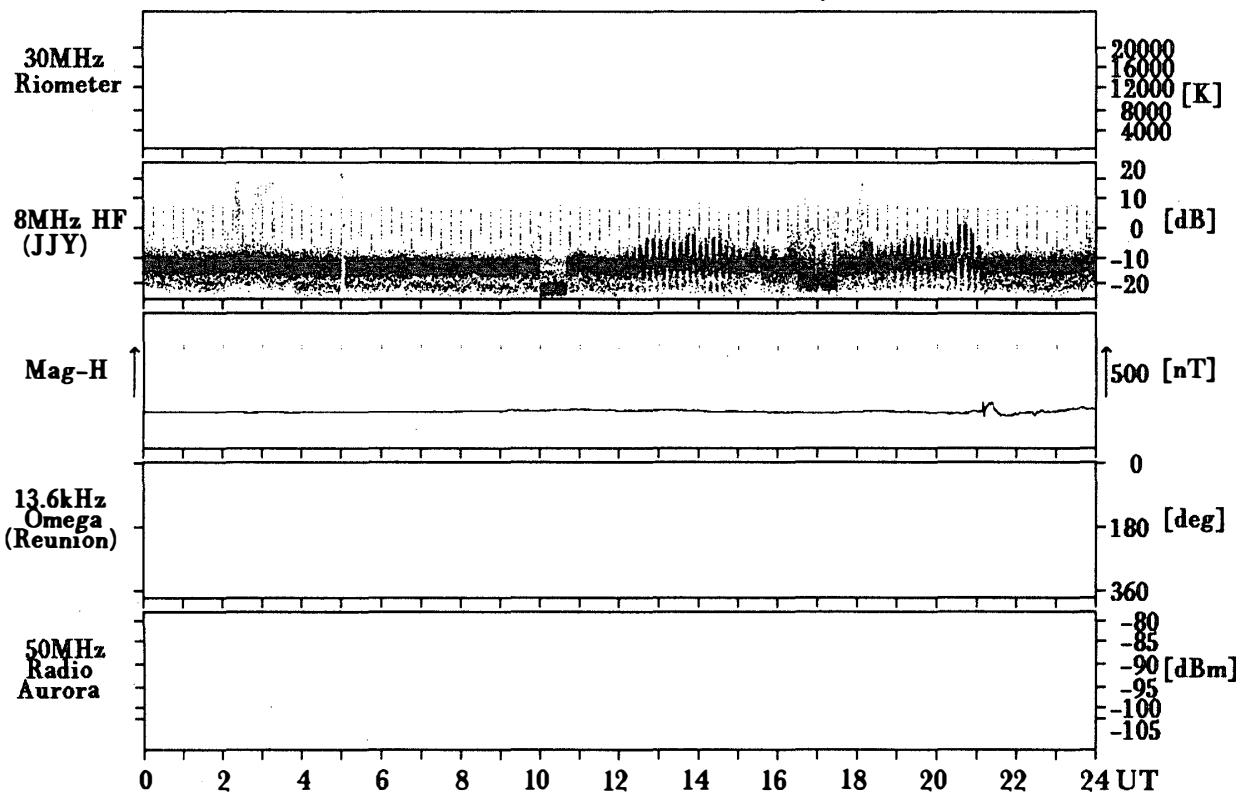
Total Day / 287 1997/10/14





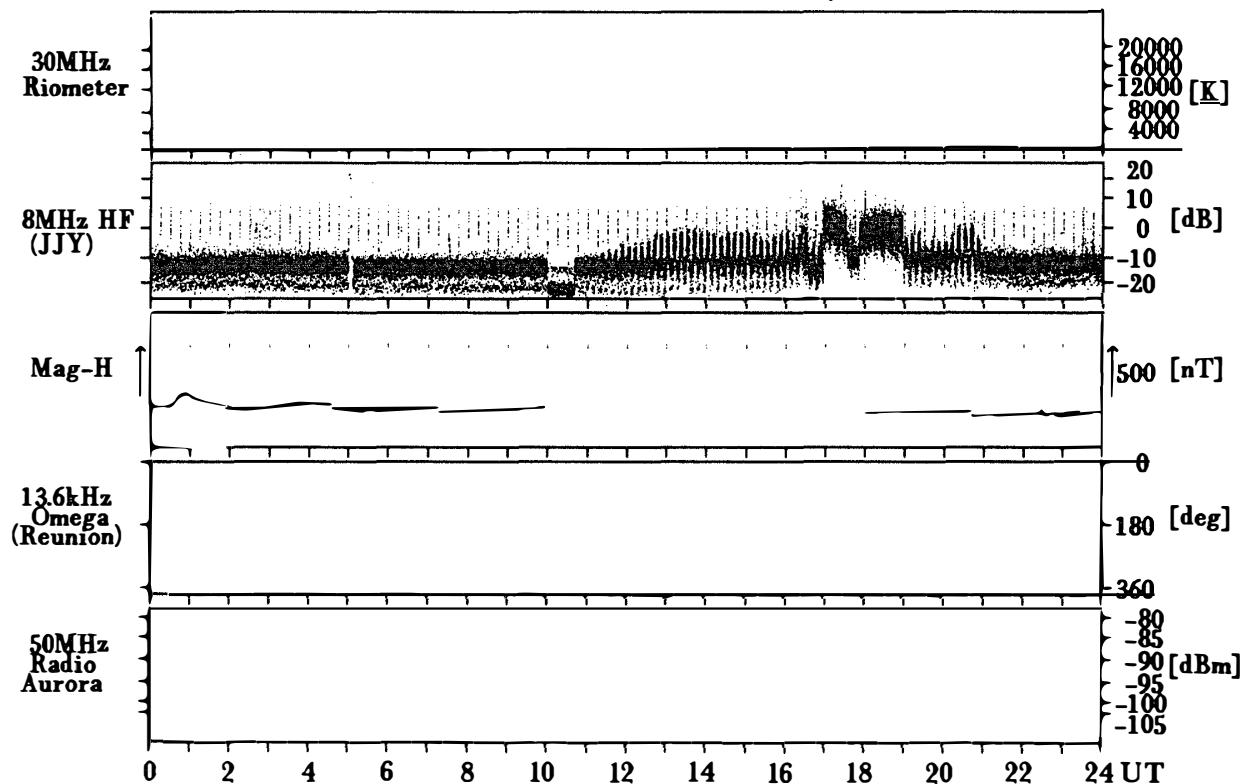
Syowa Station

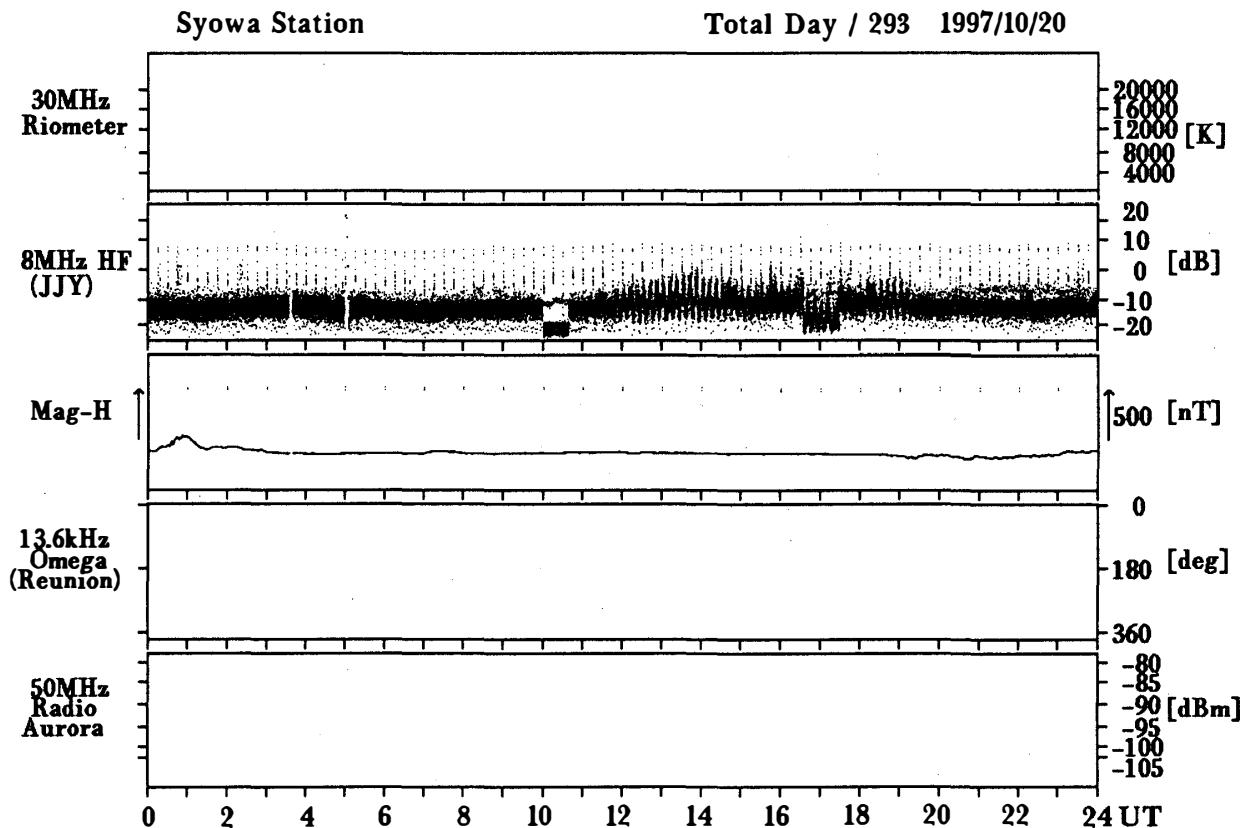
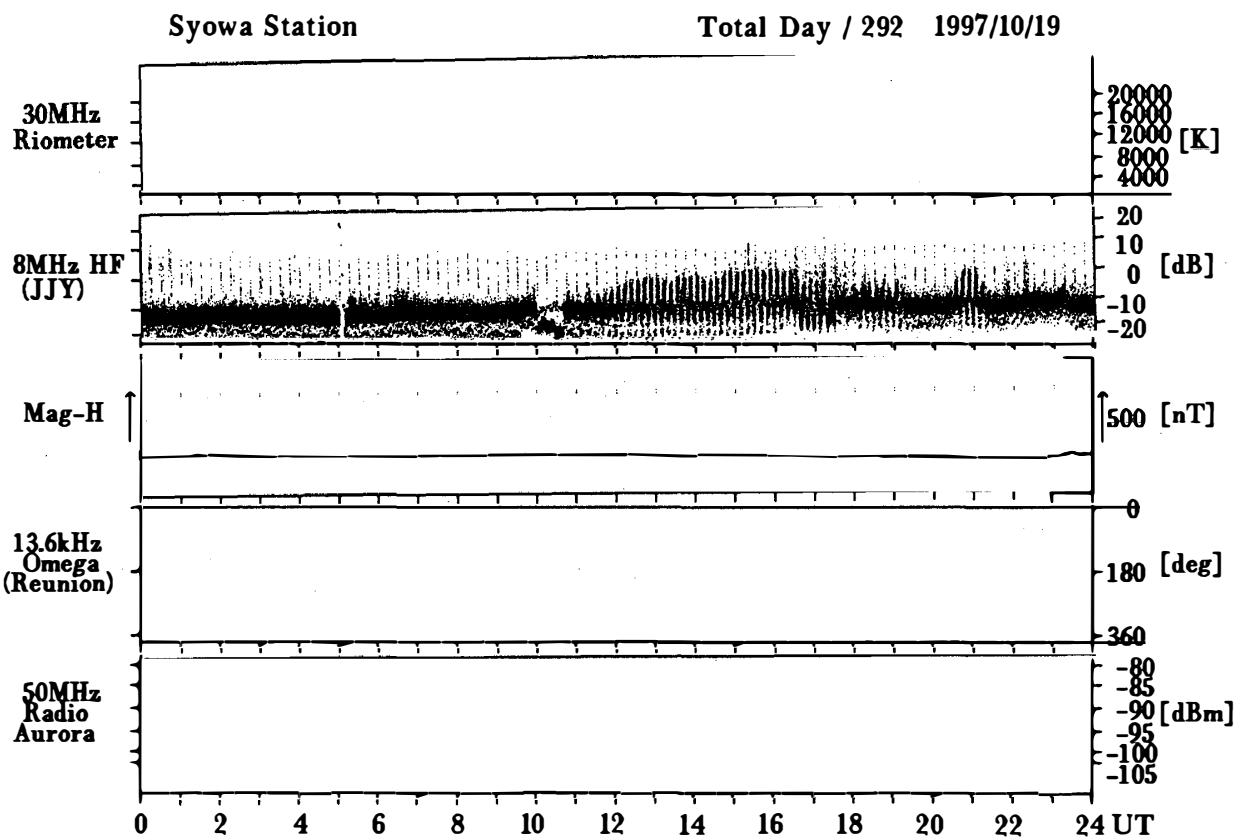
Total Day / 290 1997/10/17

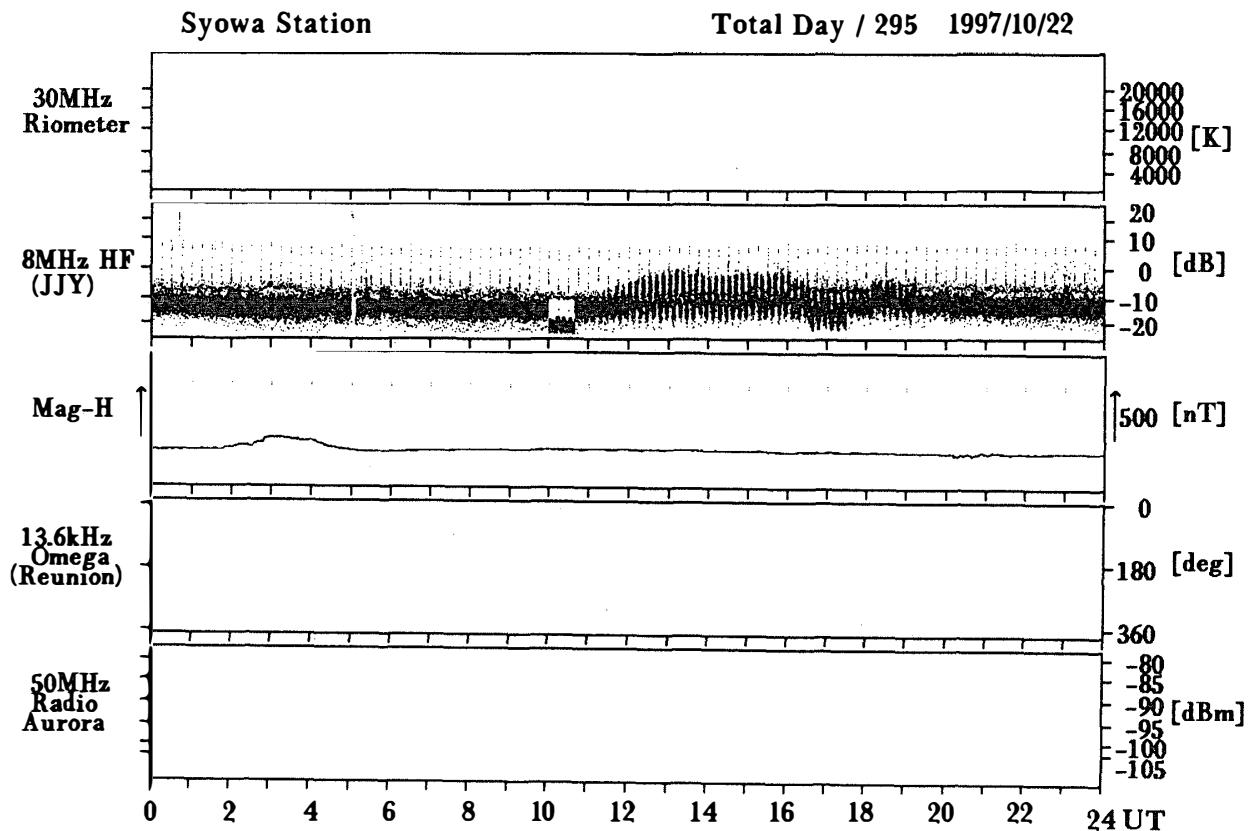
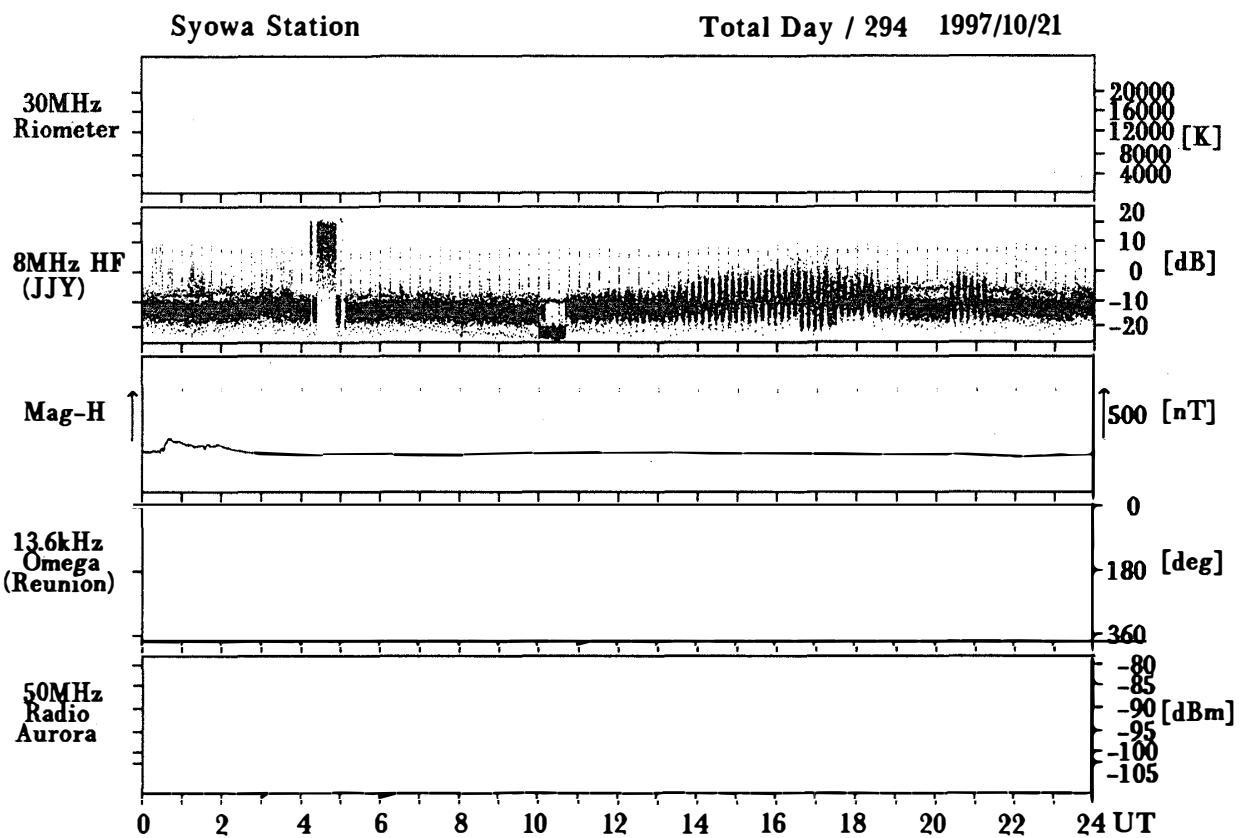


Syowa Station

Total Day / 291 1997/10/18

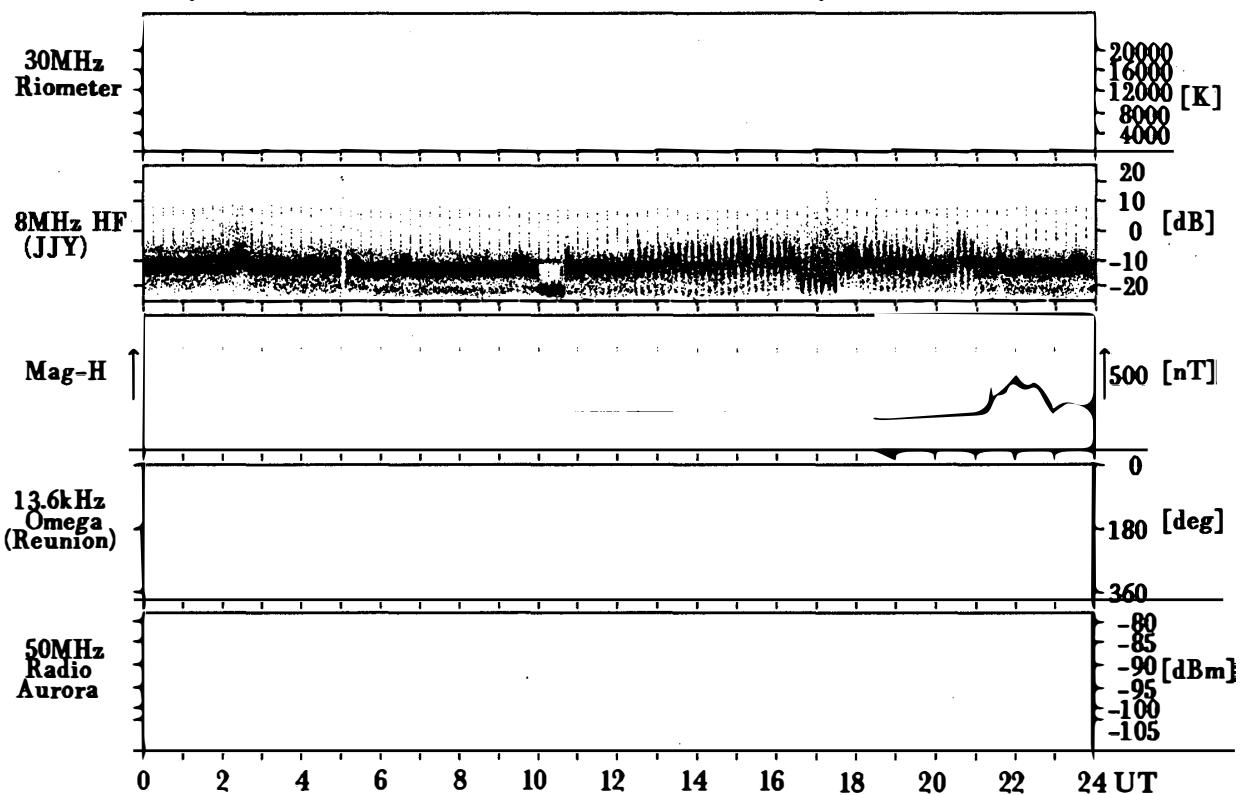






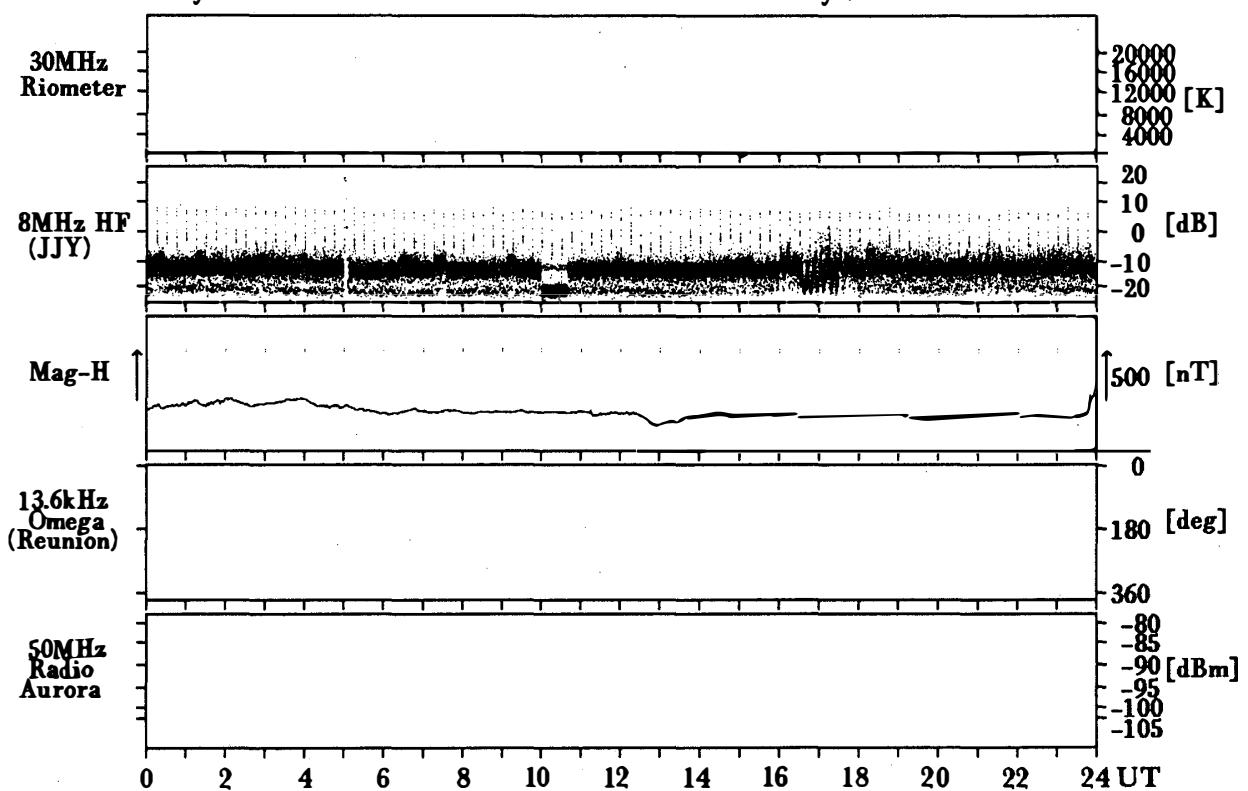
Syowa Station

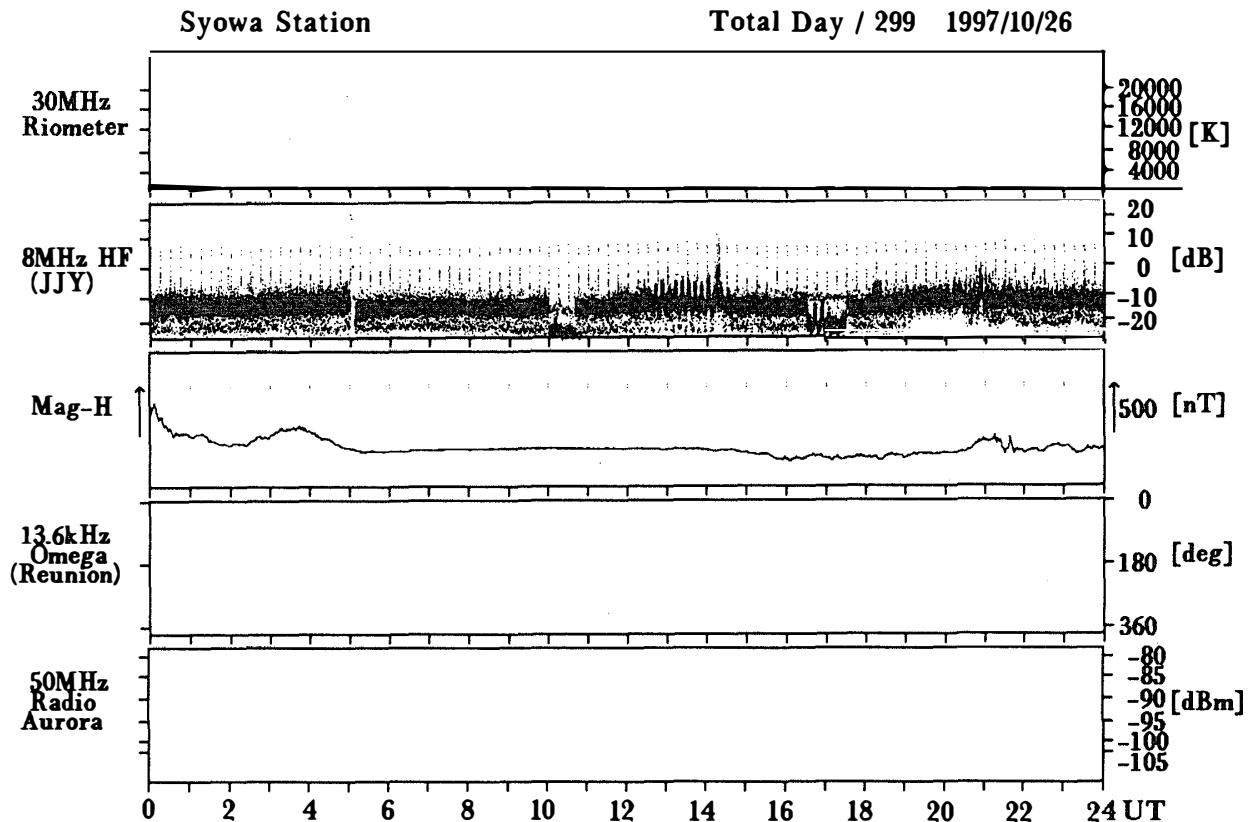
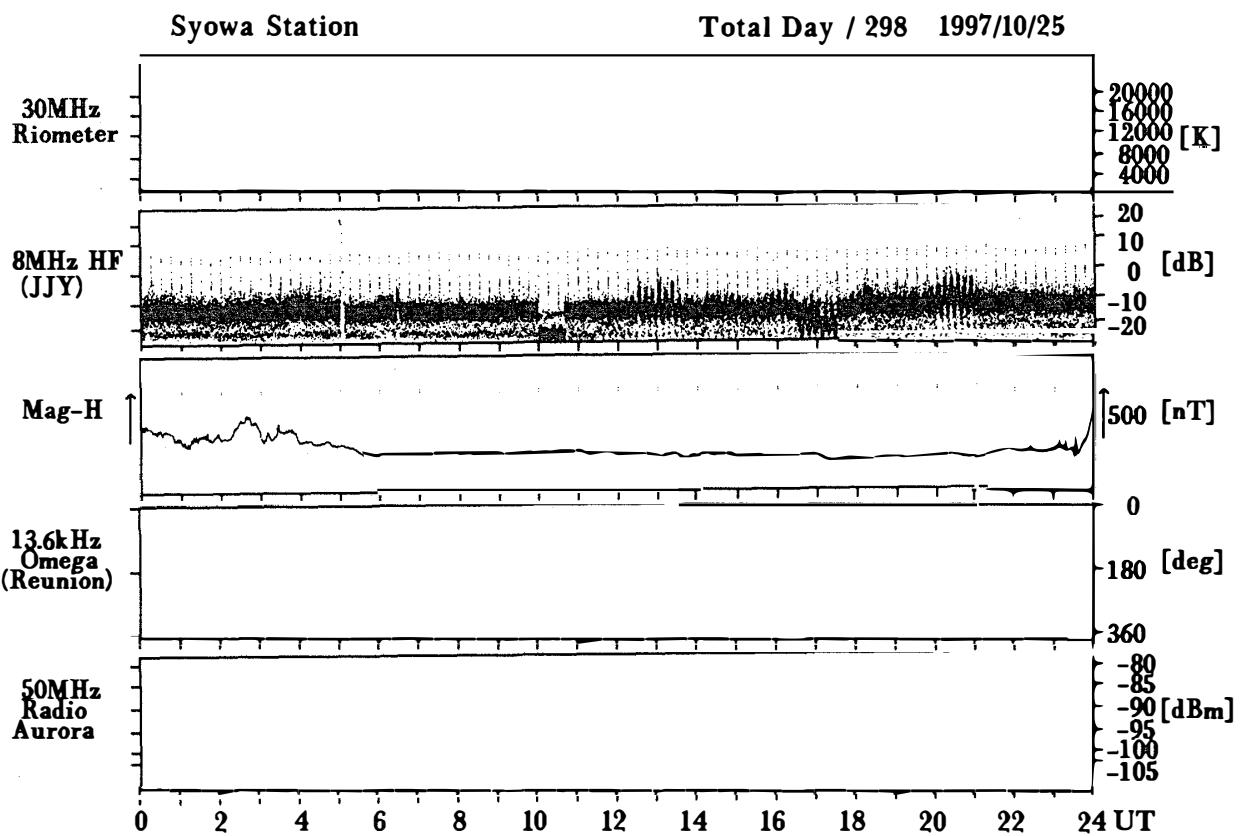
Total Day / 296 1997/10/23



Syowa Station

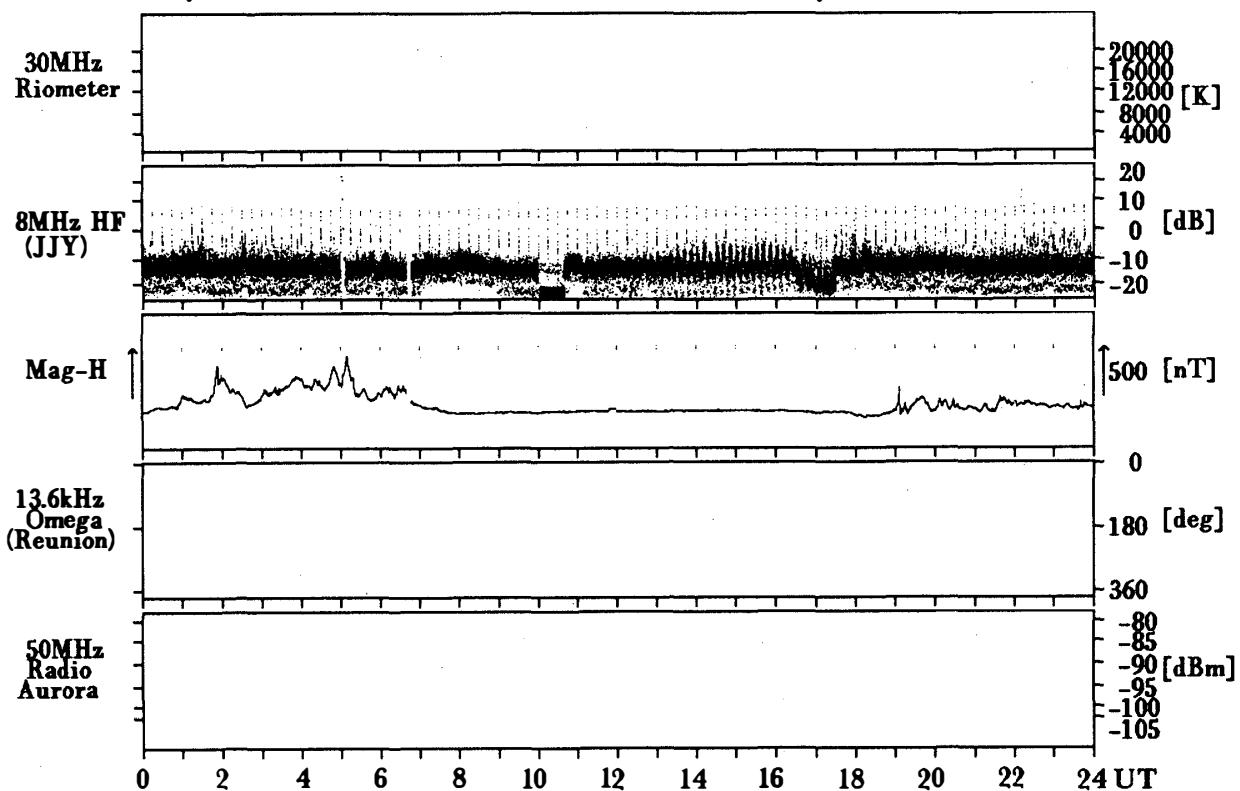
Total Day / 297 1997/10/24





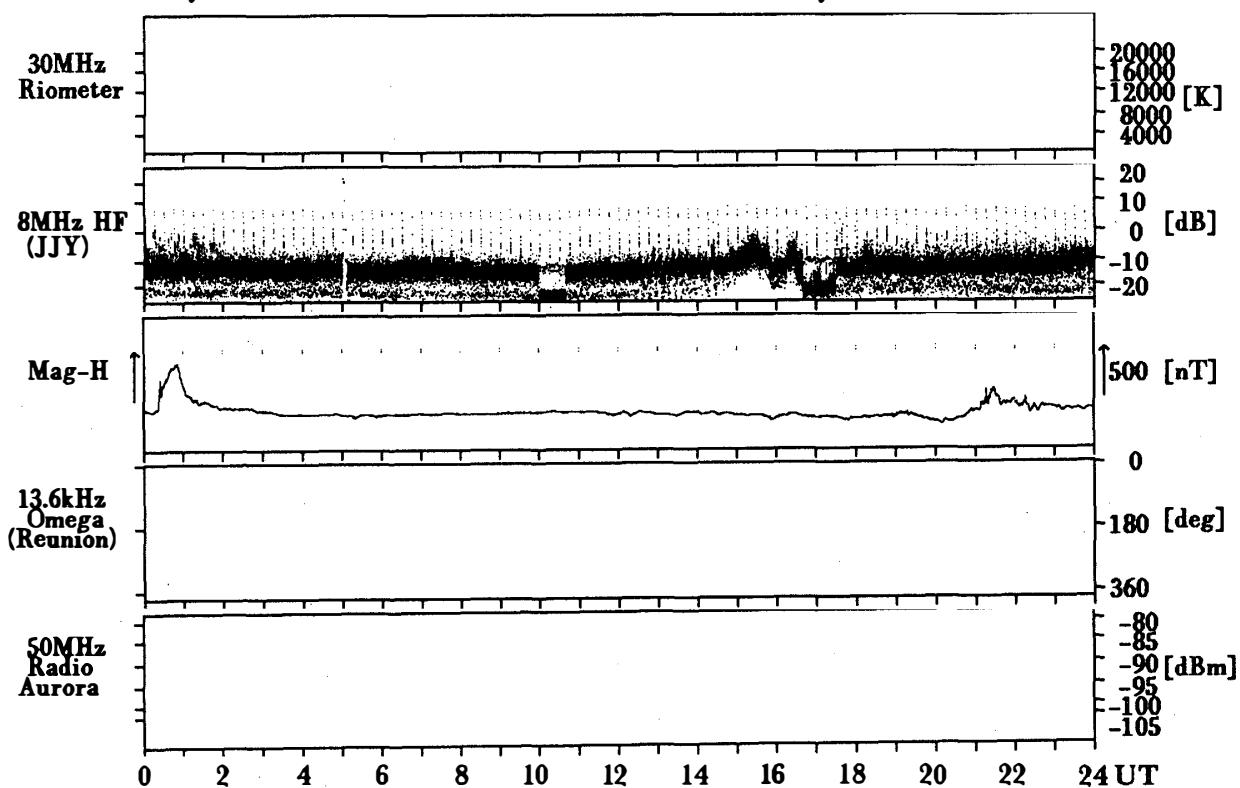
Syowa Station

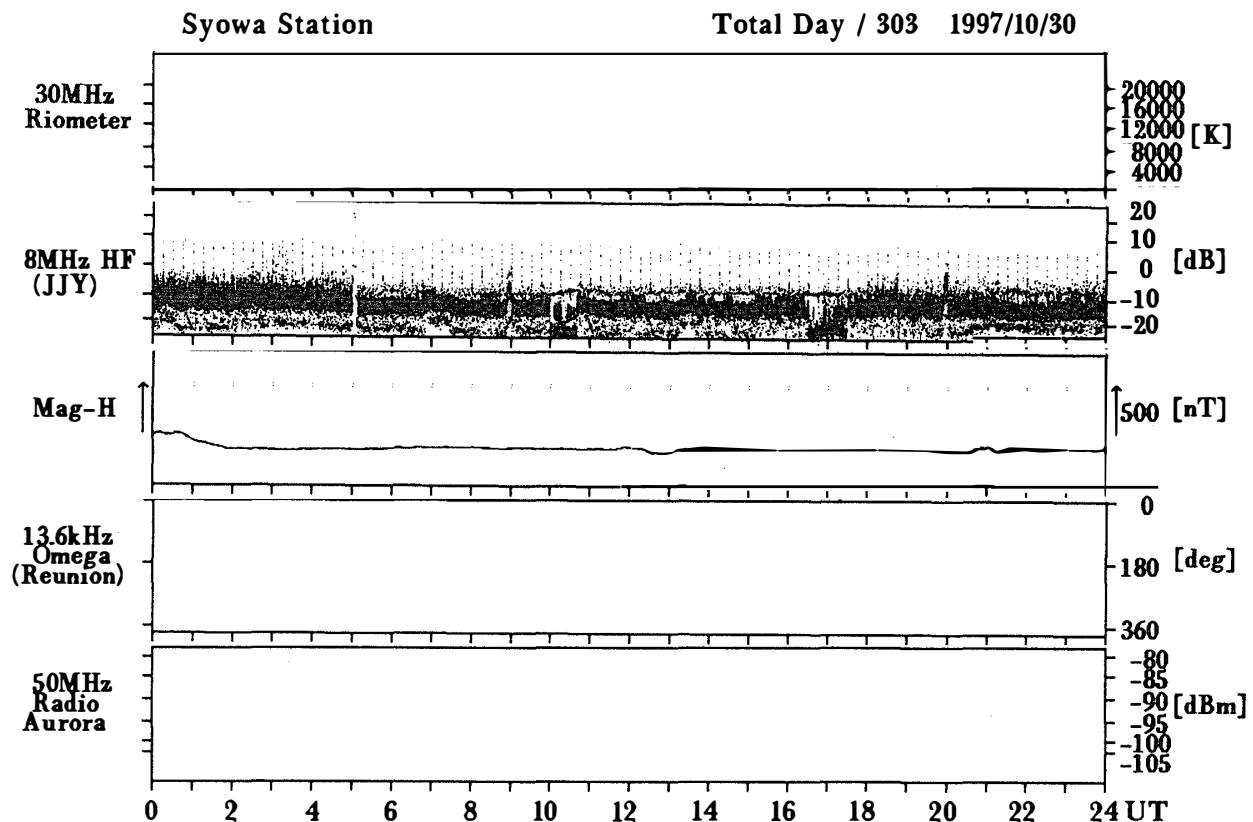
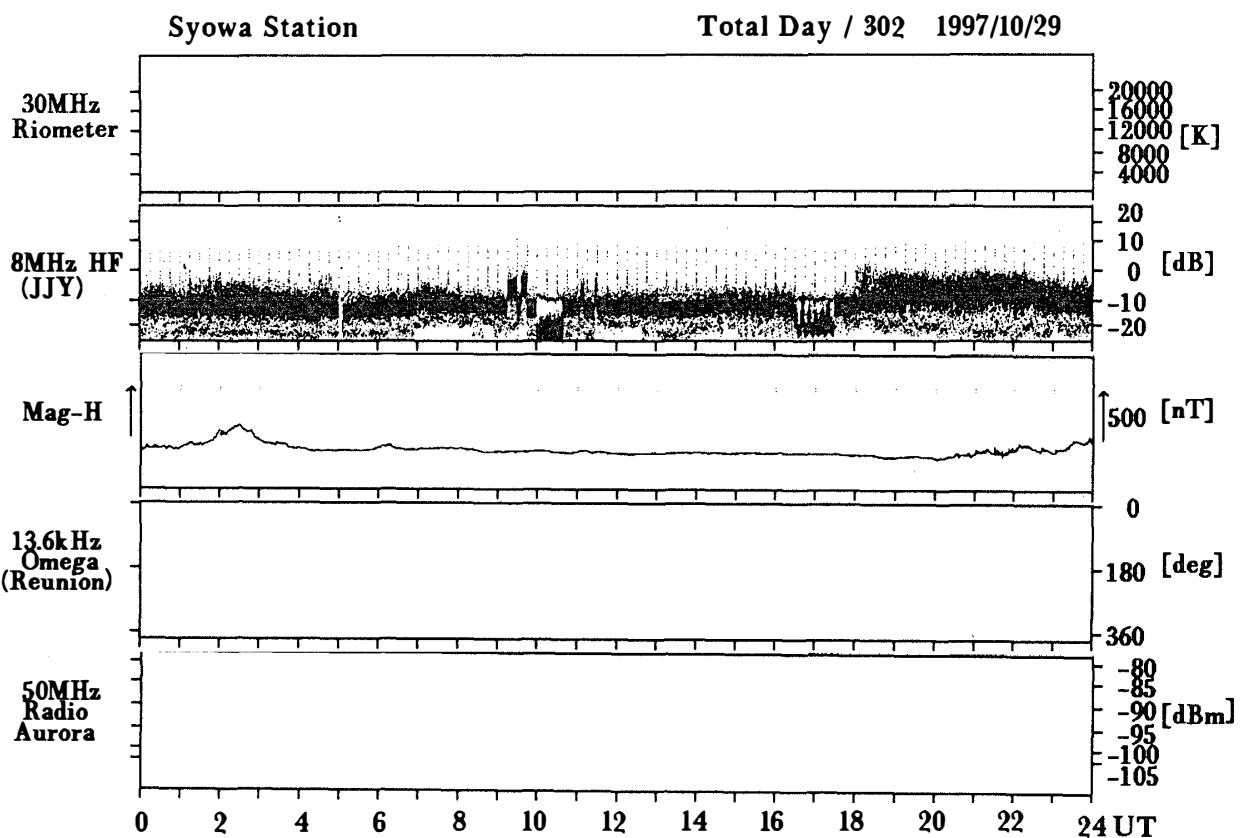
Total Day / 300 1997/10/27

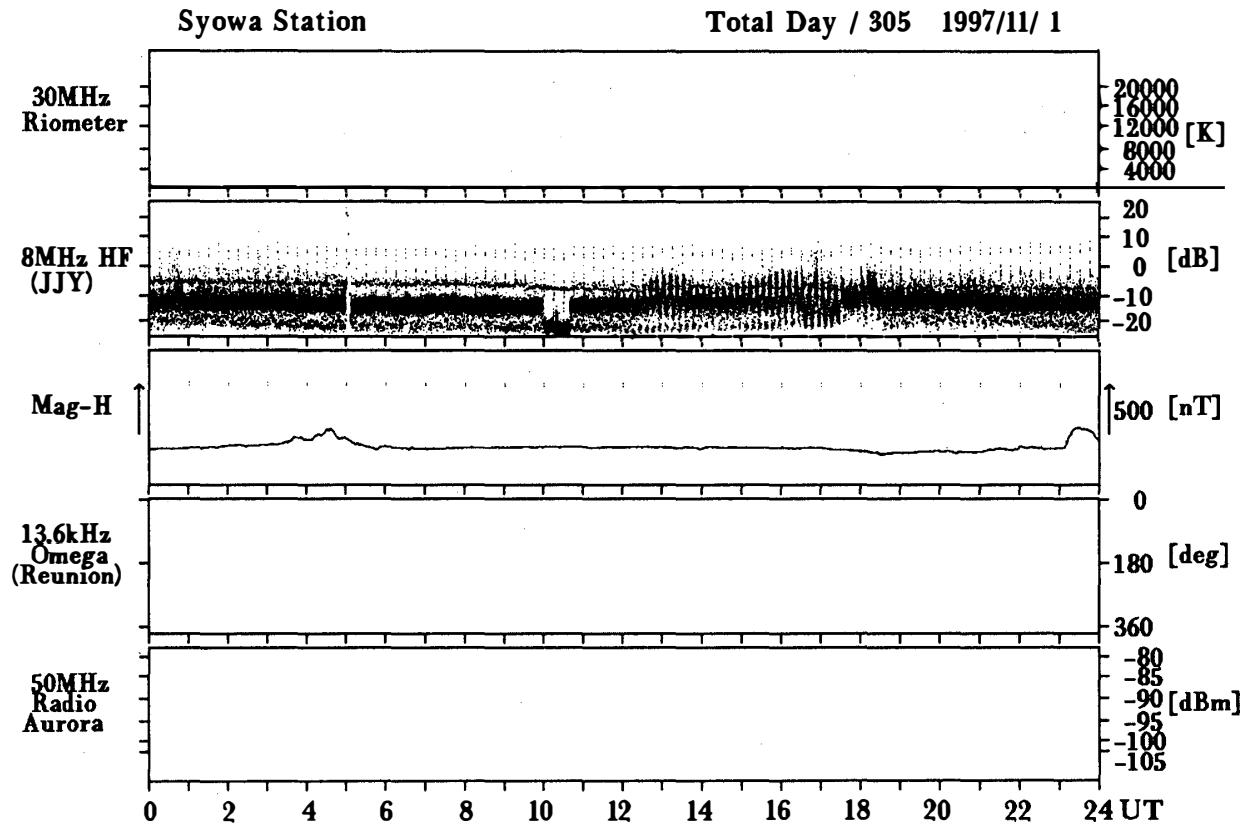
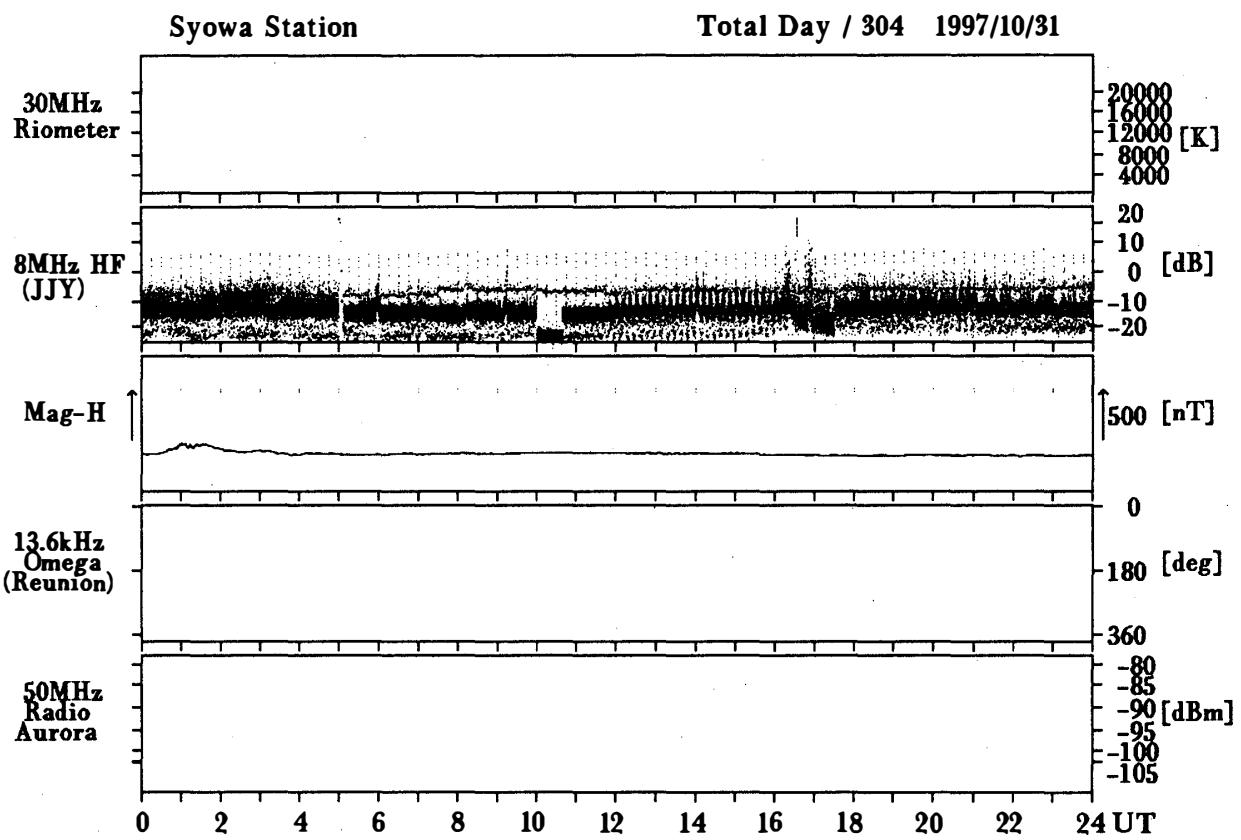


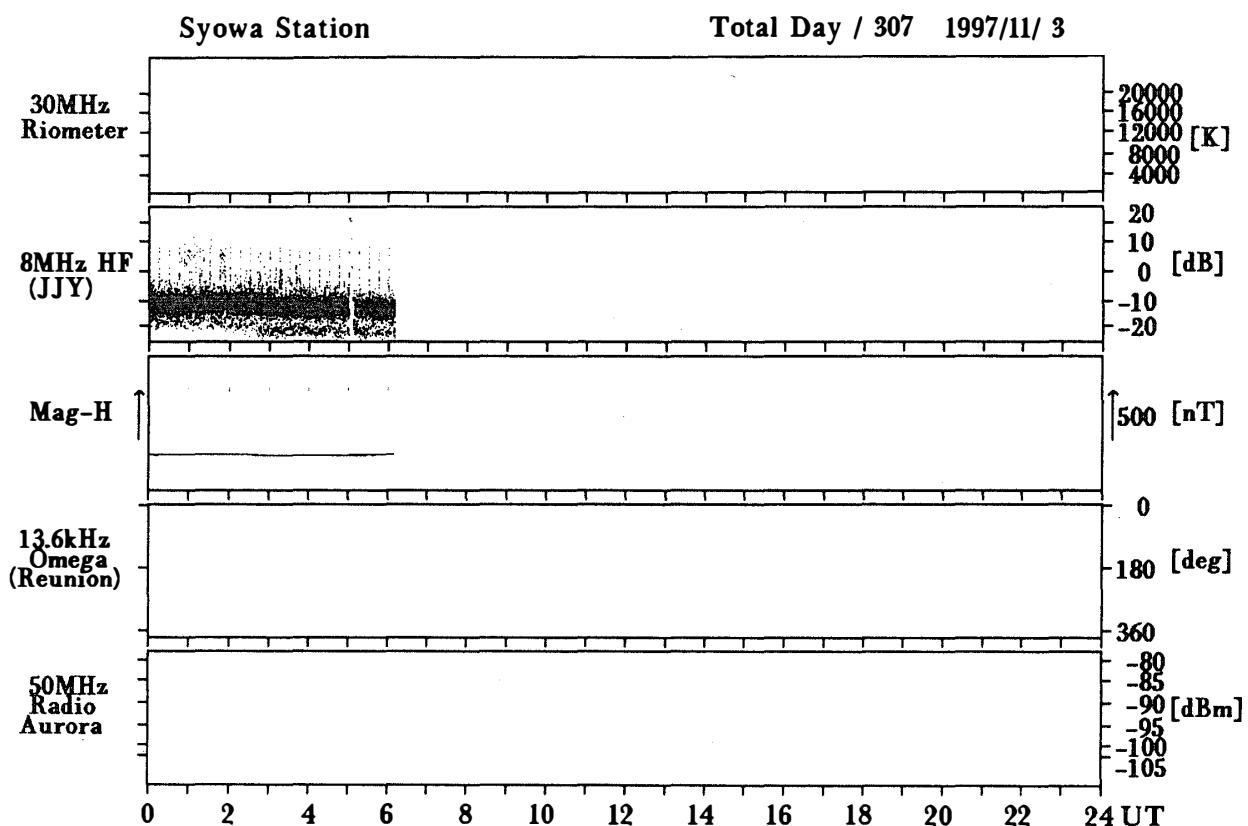
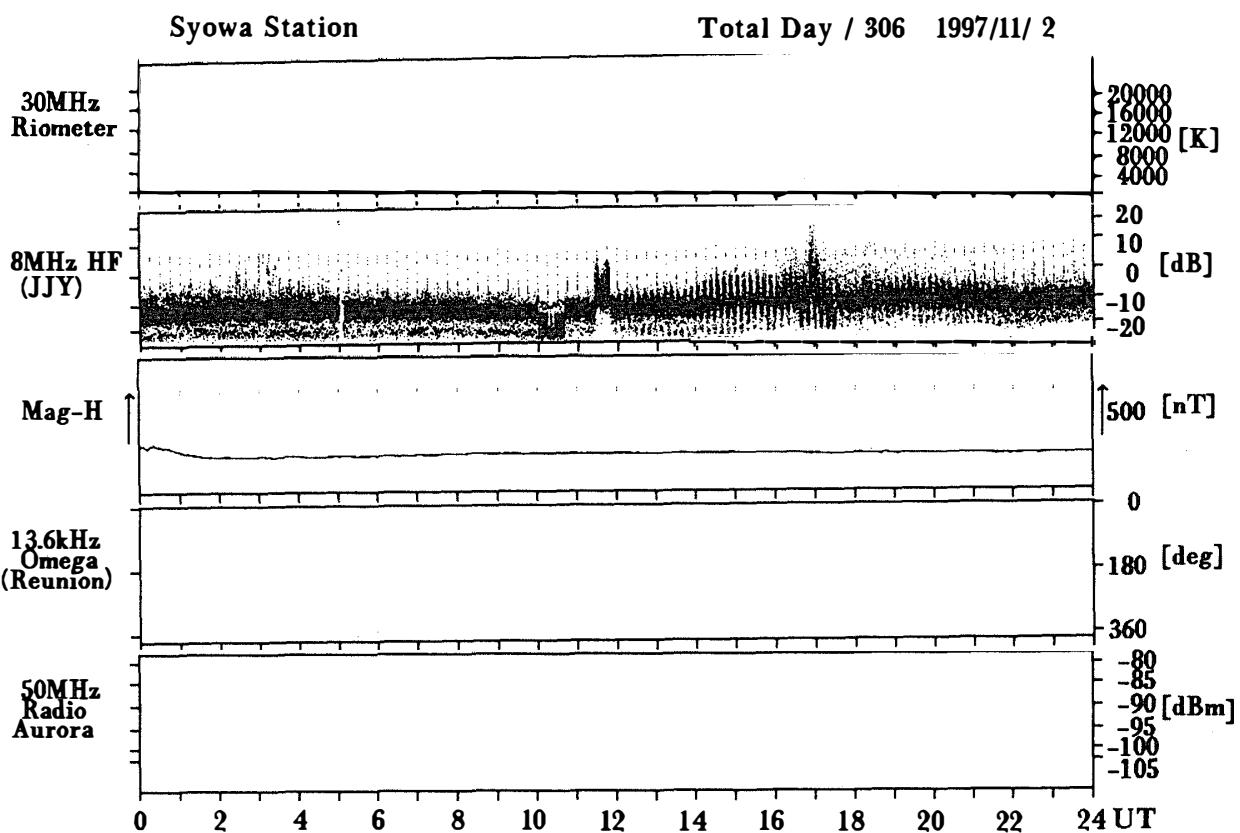
Syowa Station

Total Day / 301 1997/10/28



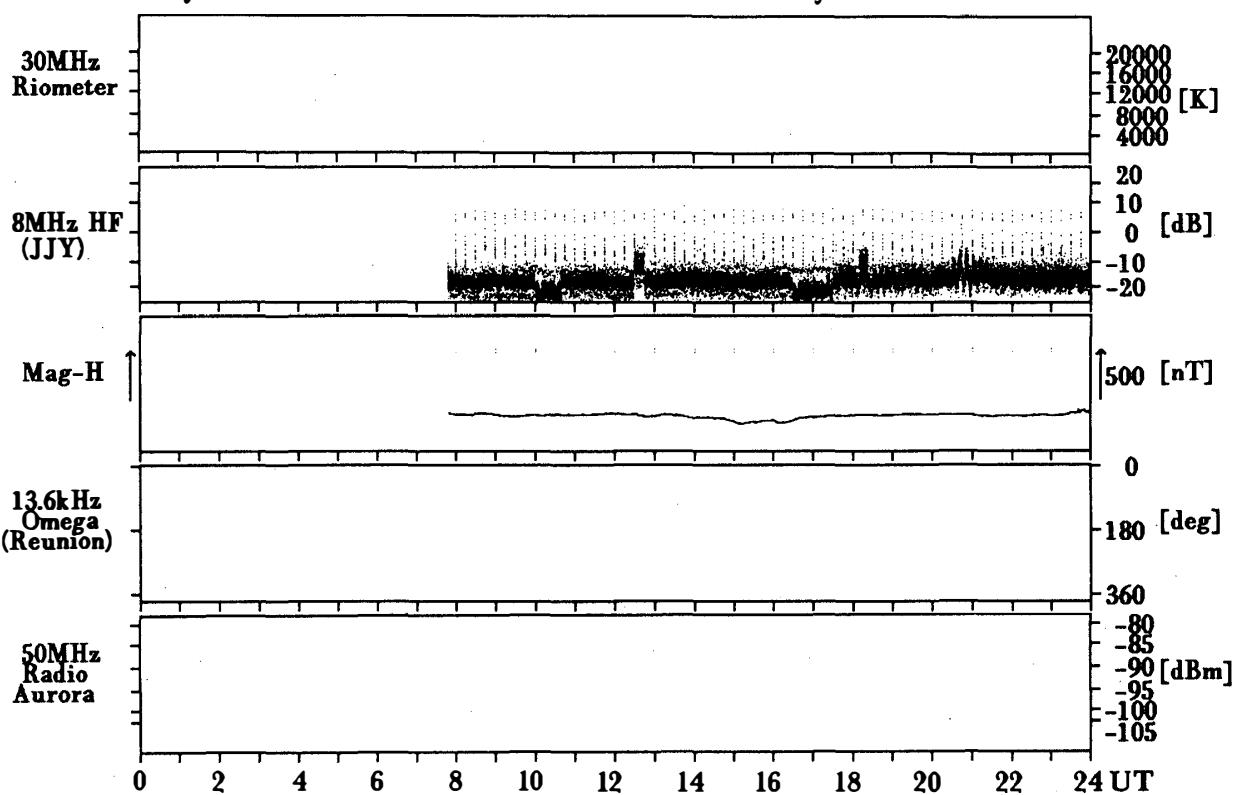






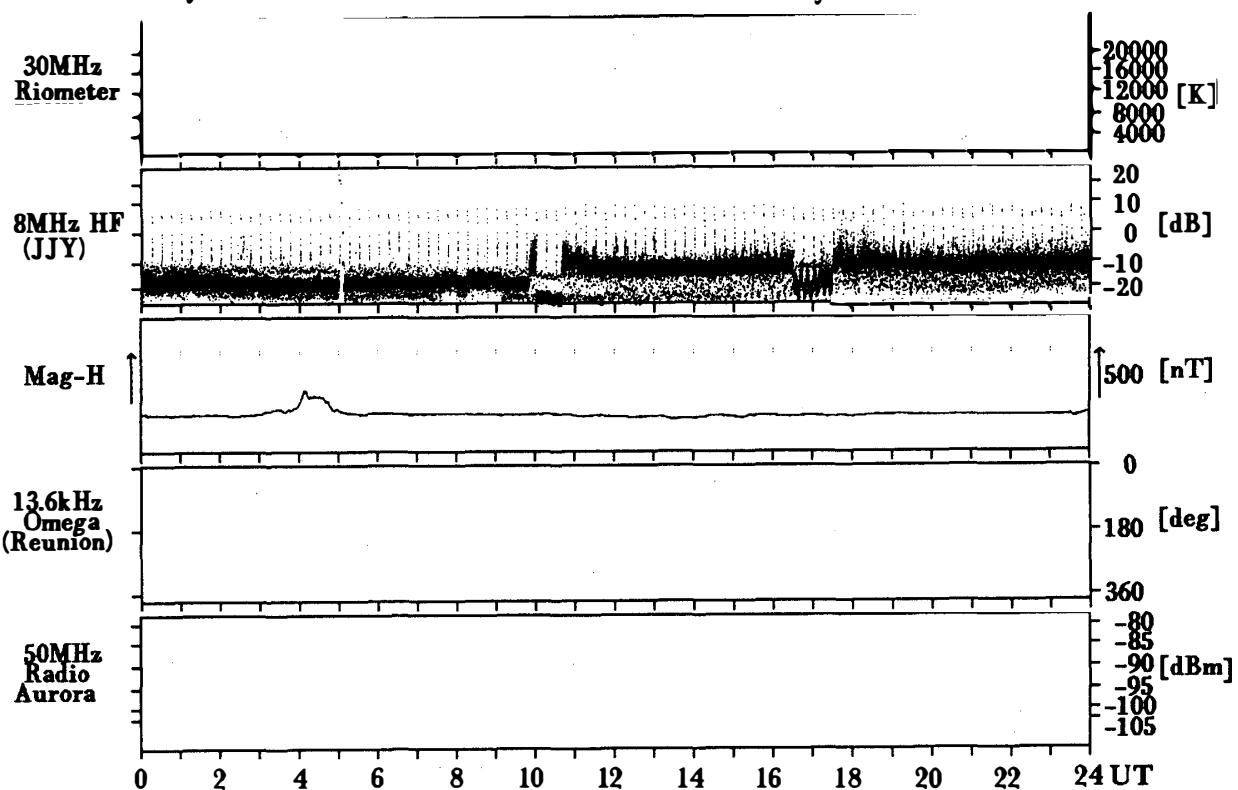
Syowa Station

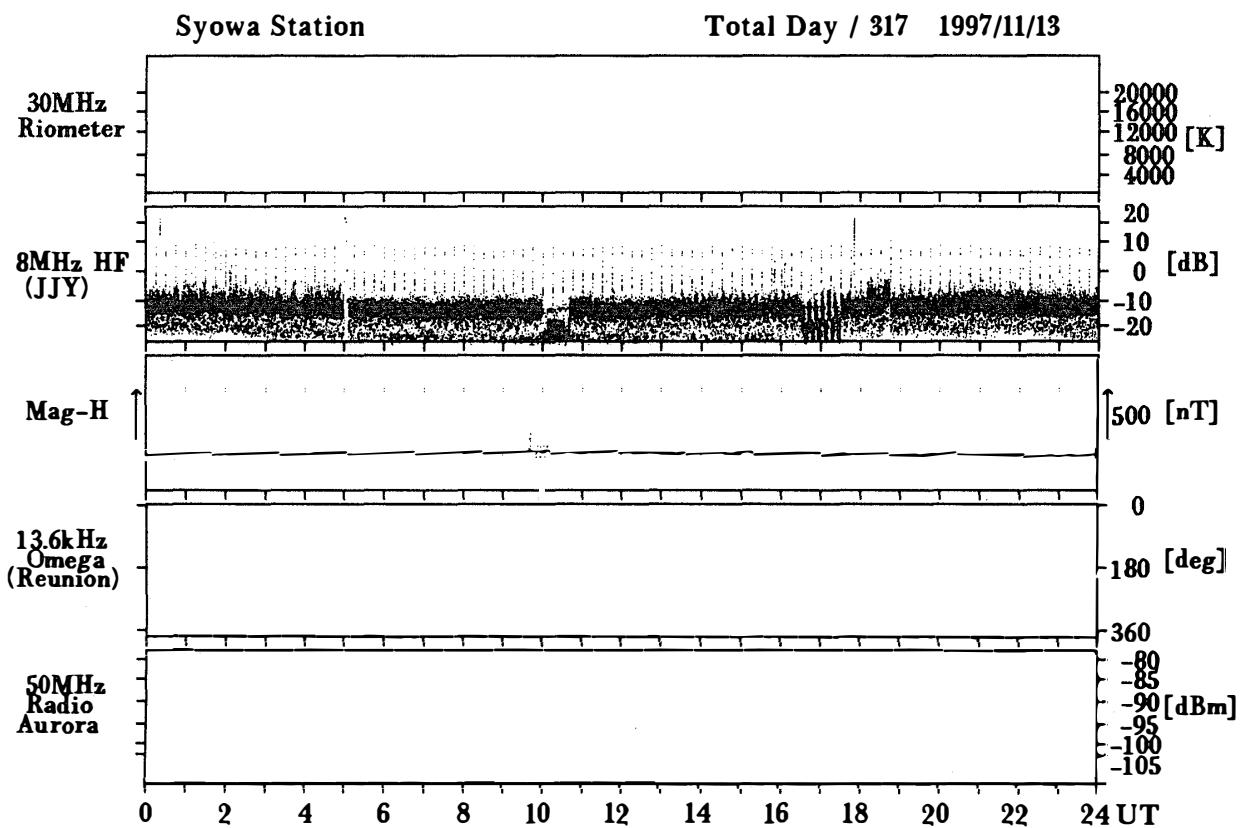
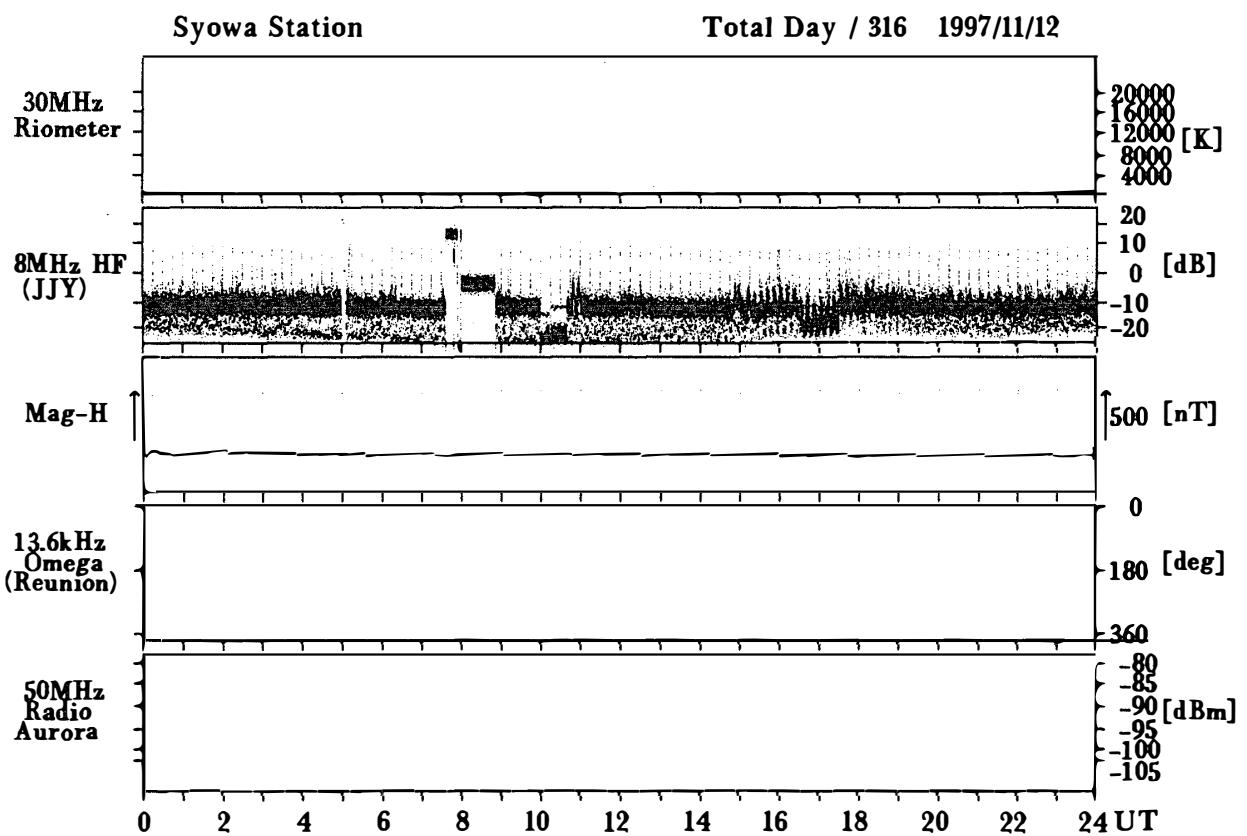
Total Day / 314 1997/11/10

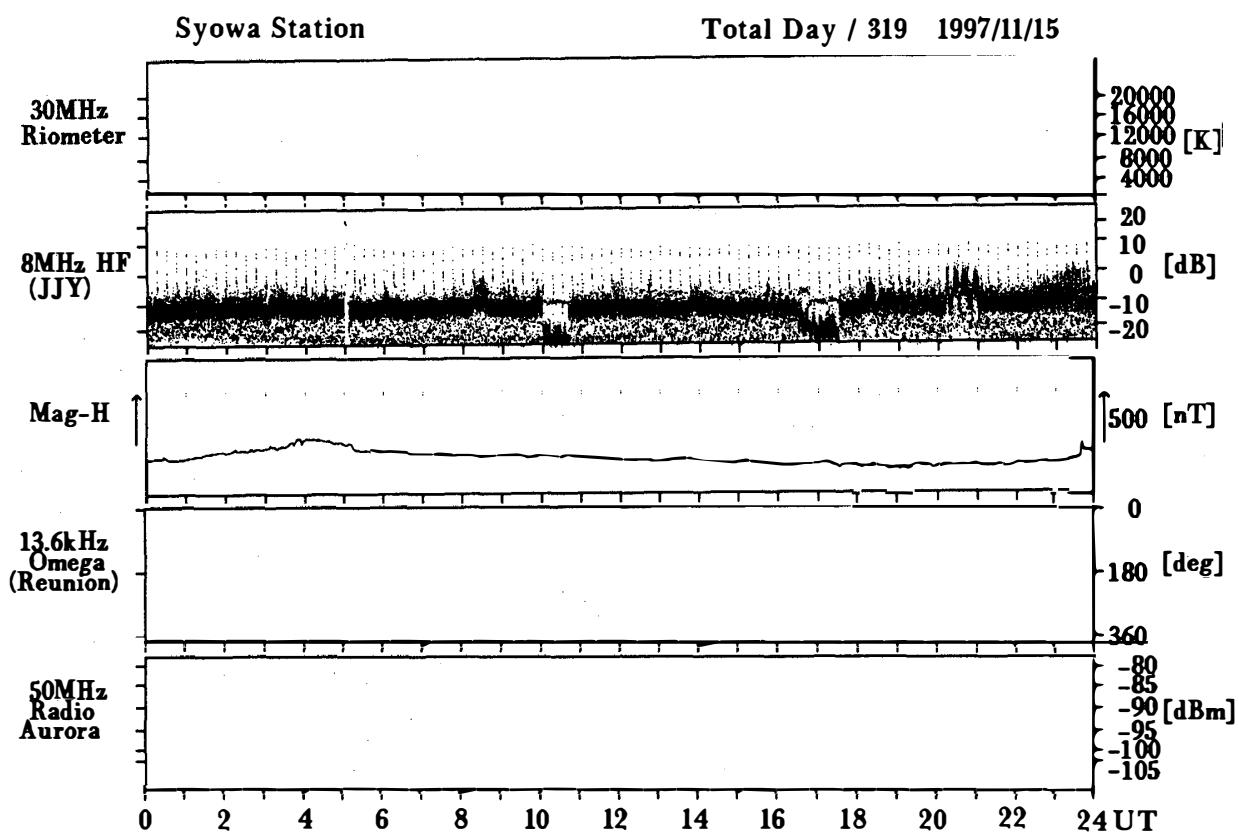
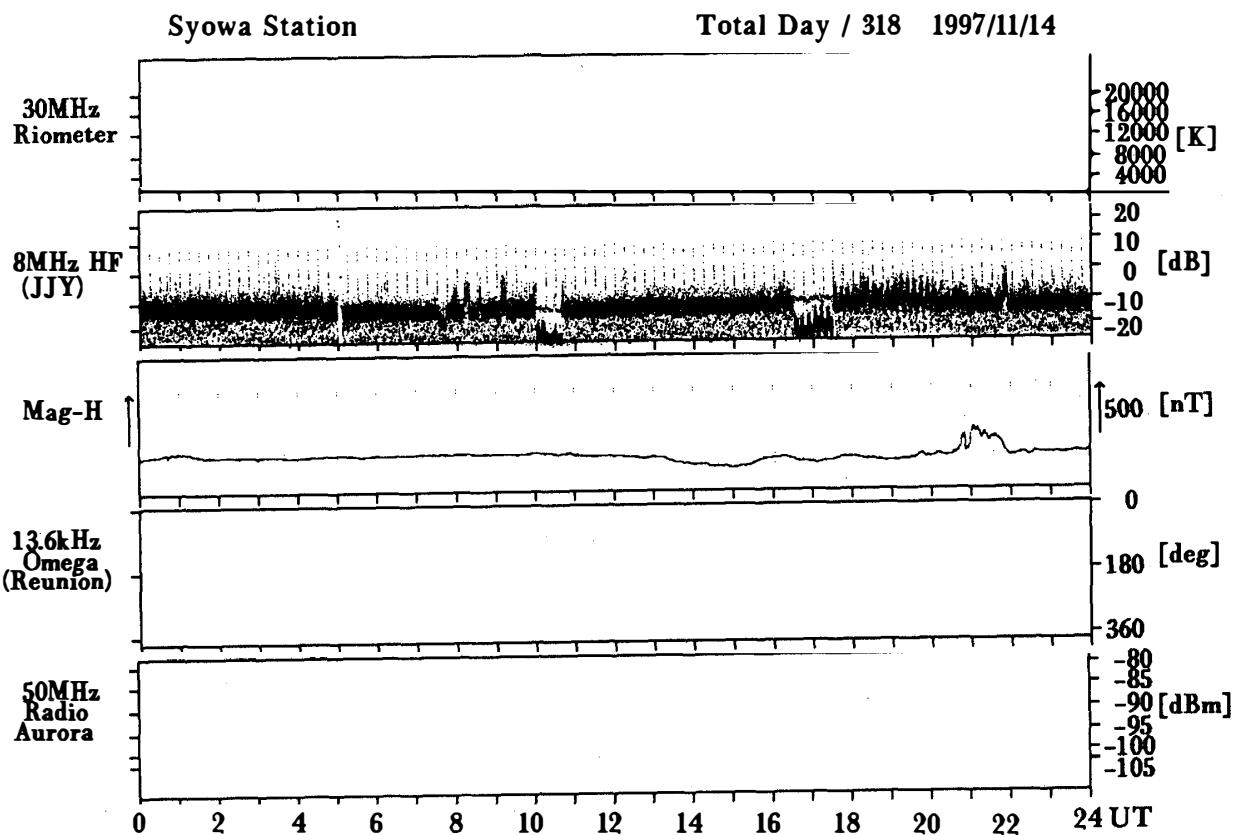


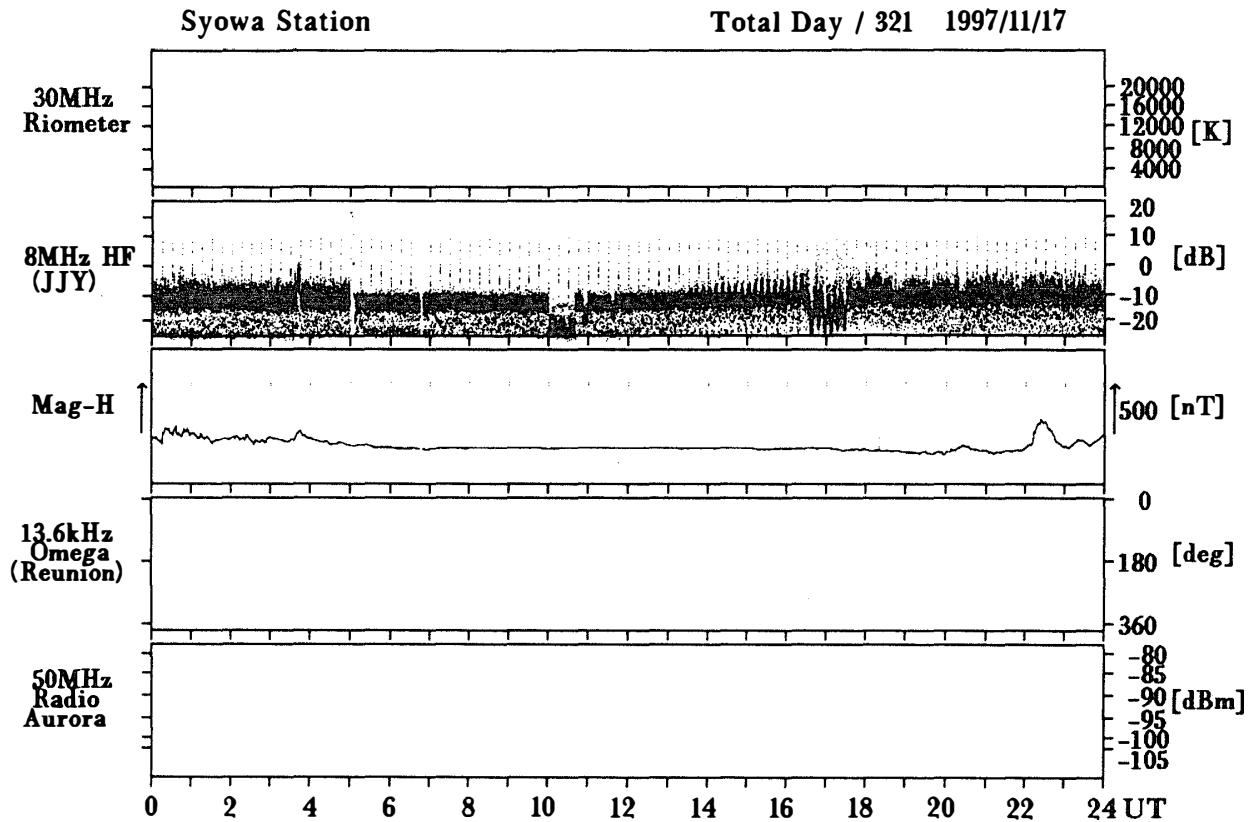
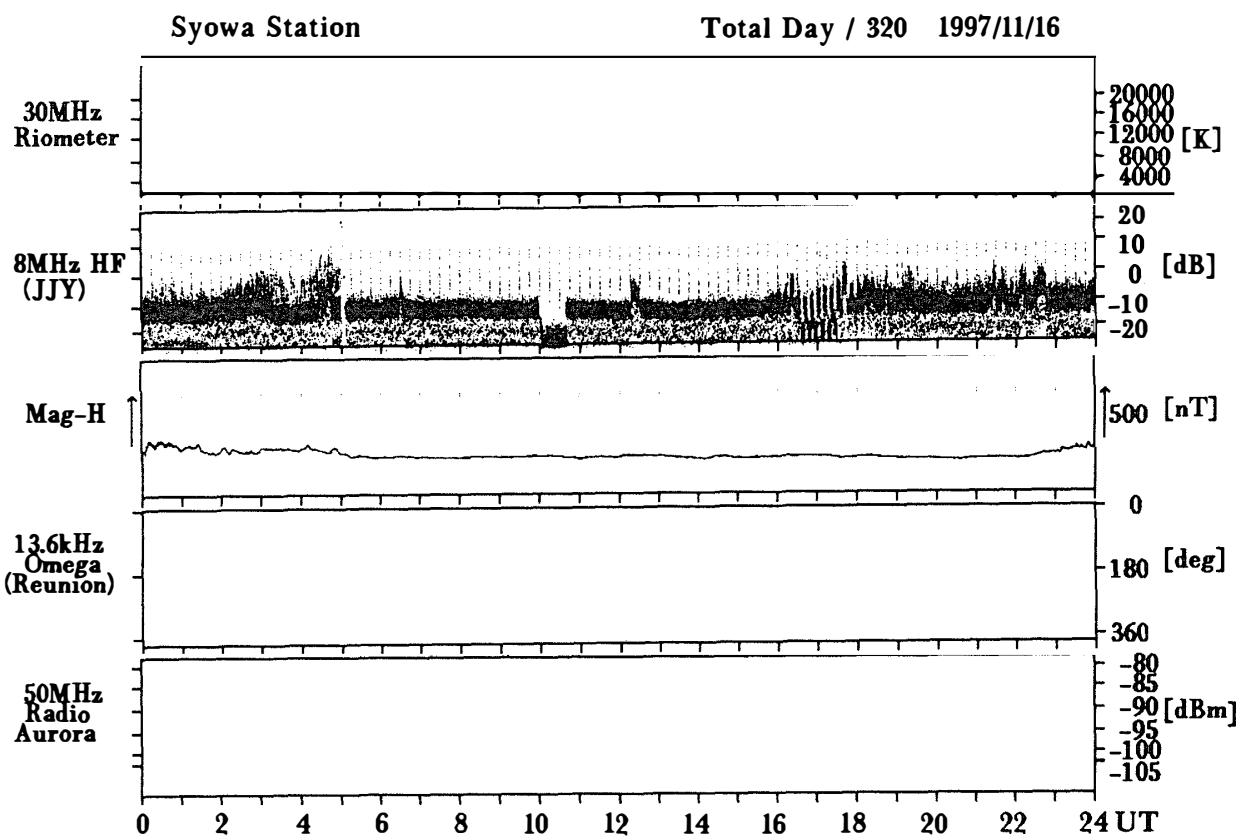
Syowa Station

Total Day / 315 1997/11/11



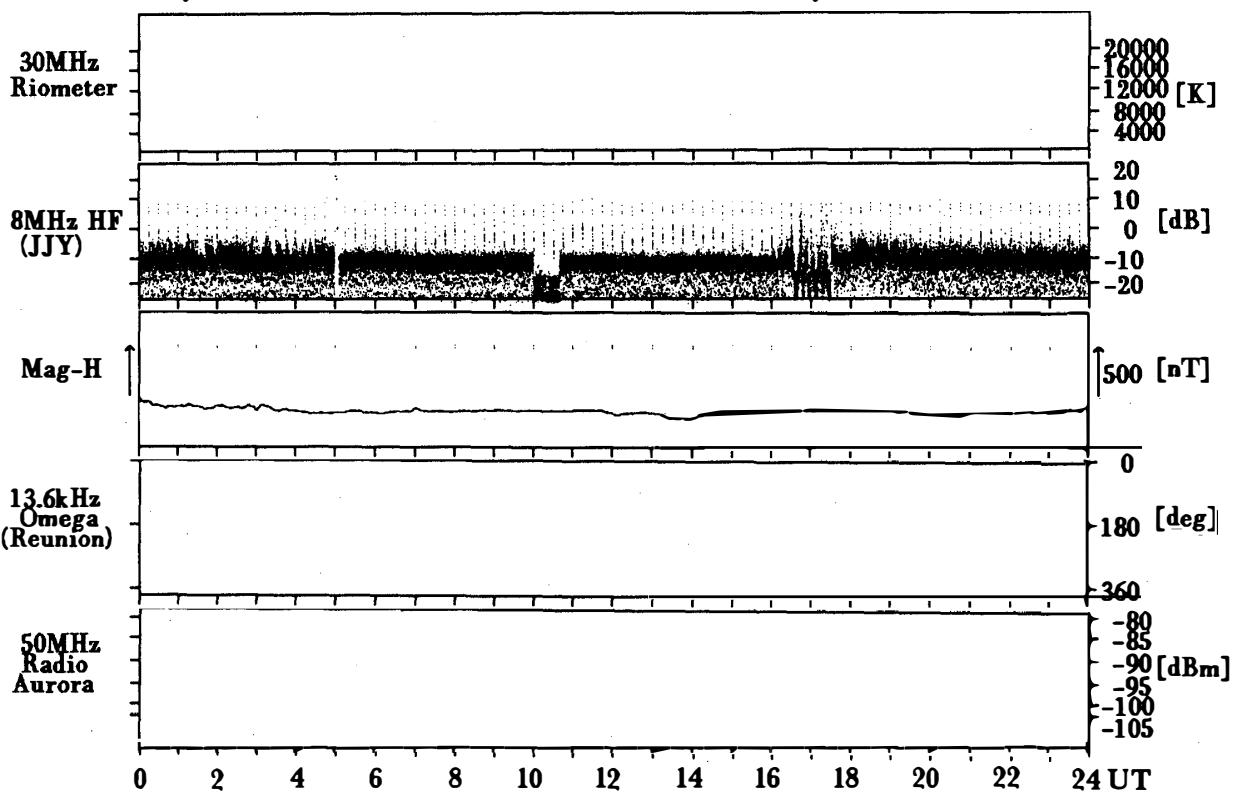






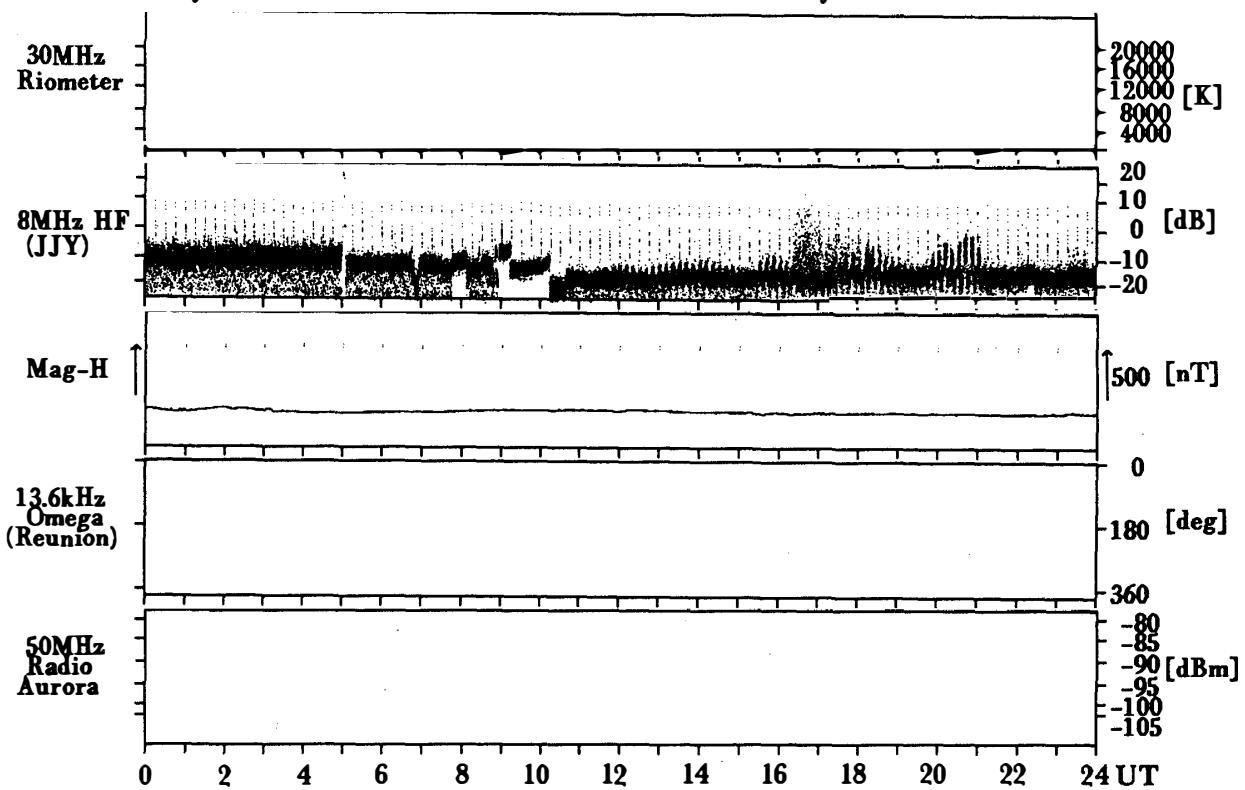
Syowa Station

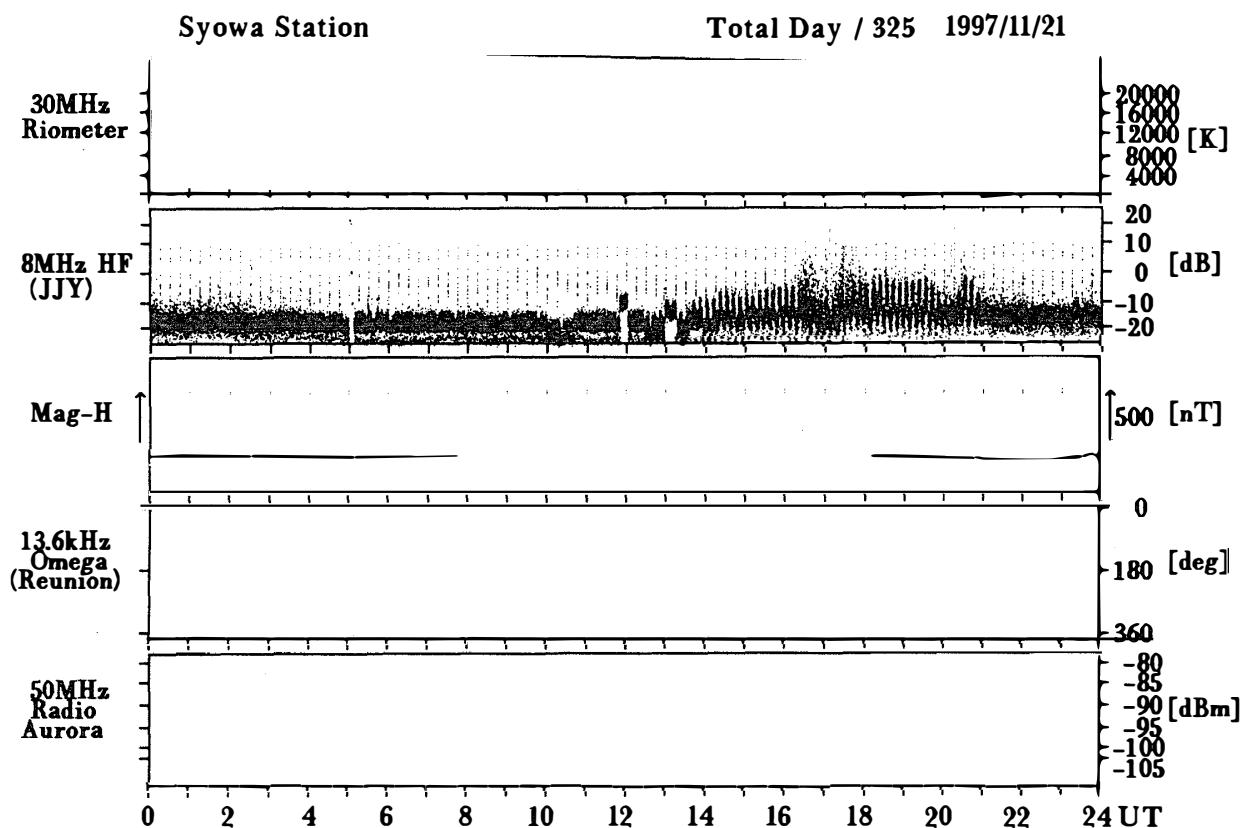
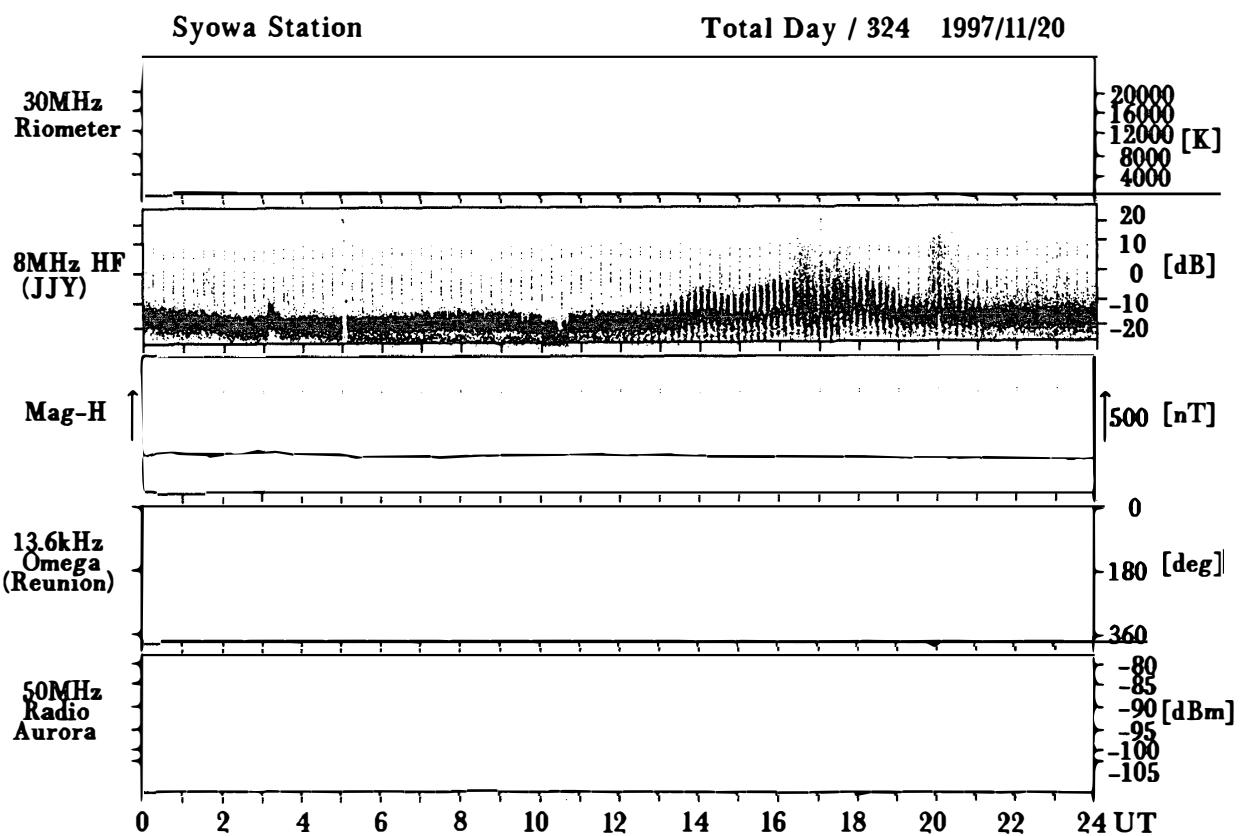
Total Day / 322 1997/11/18

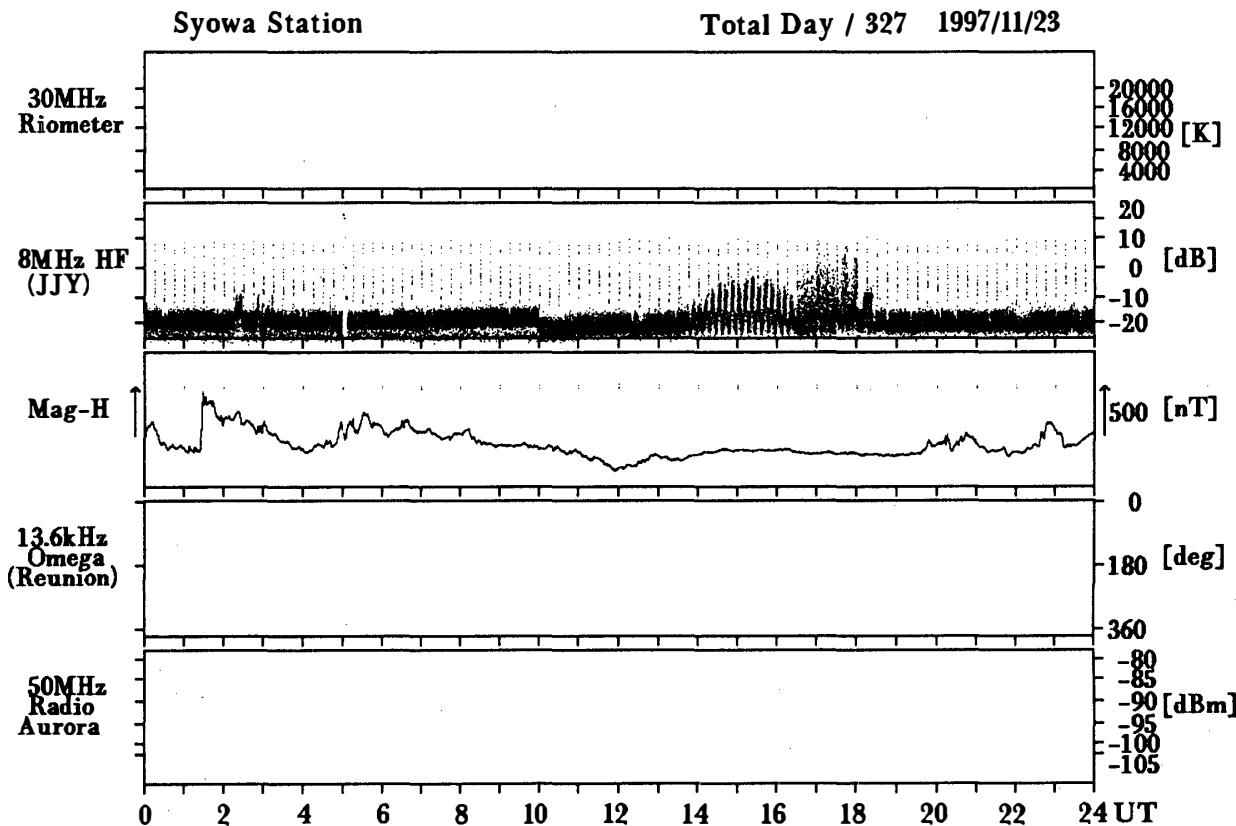
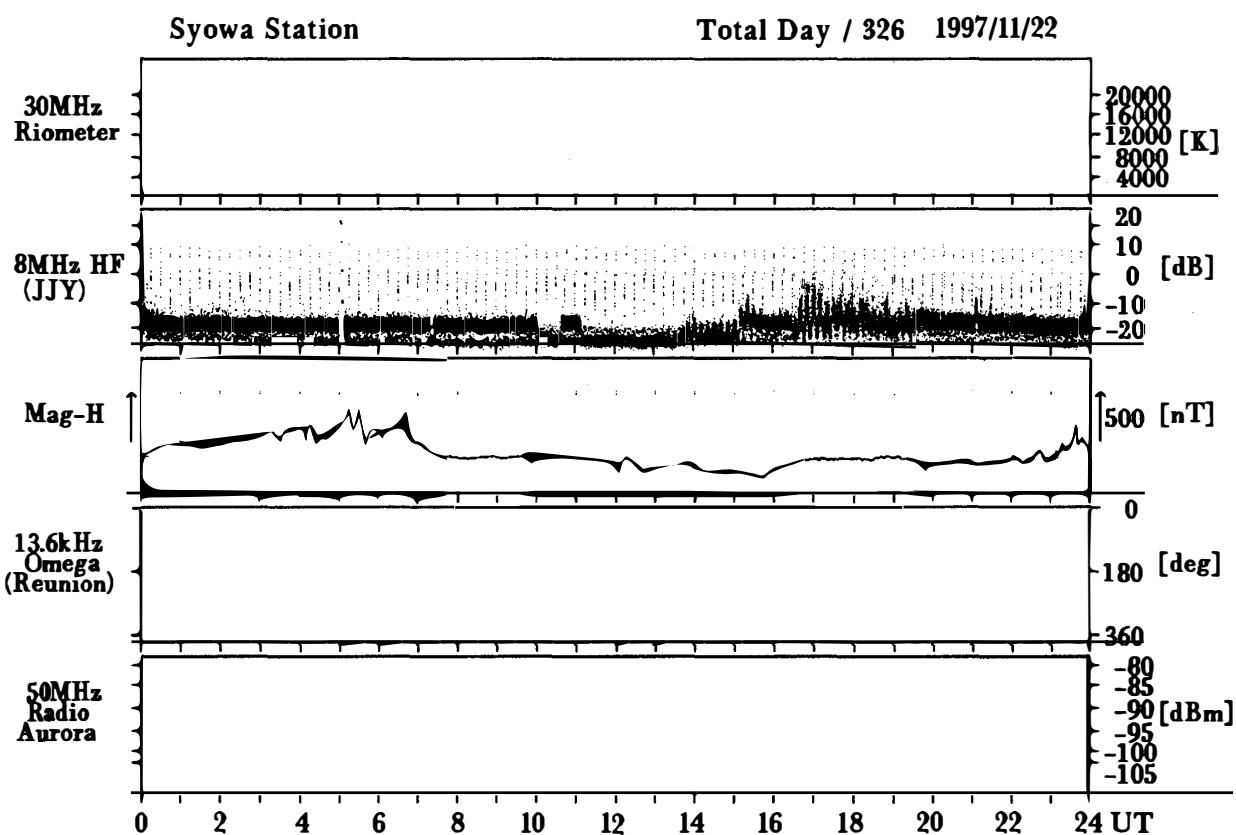


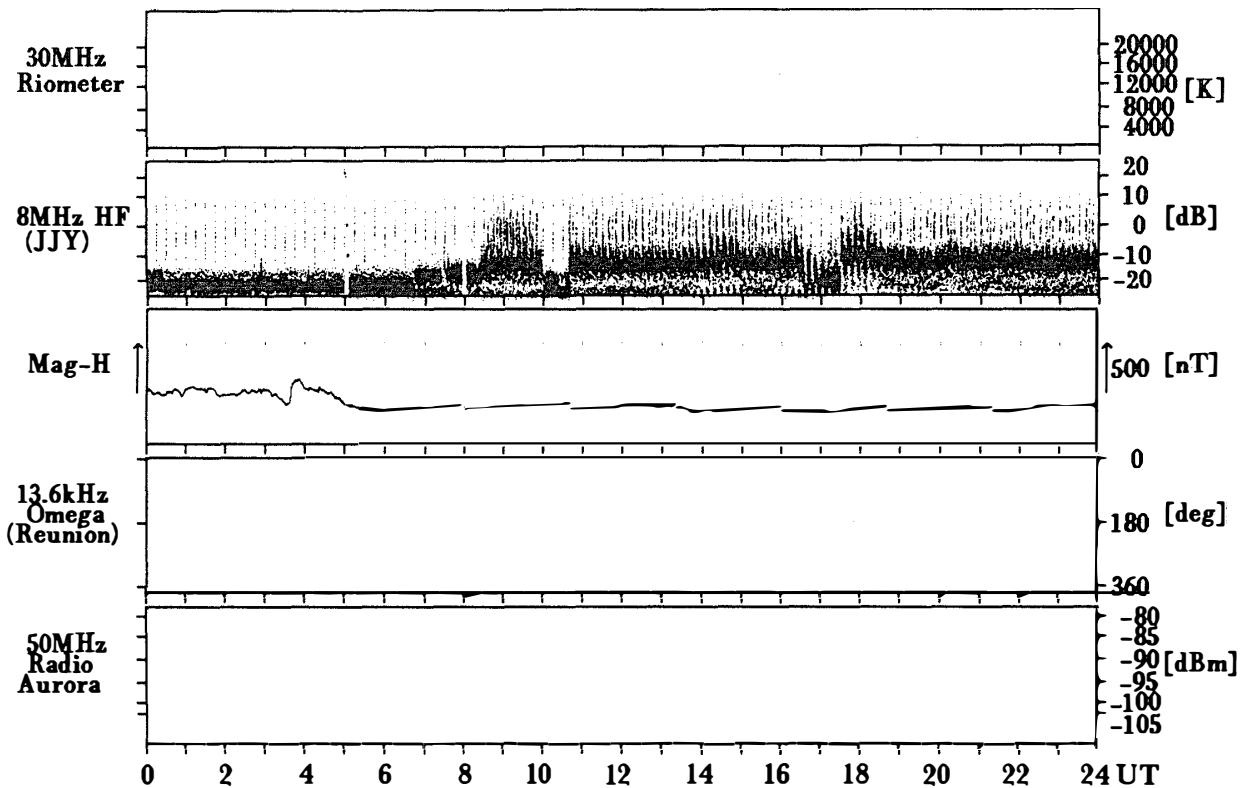
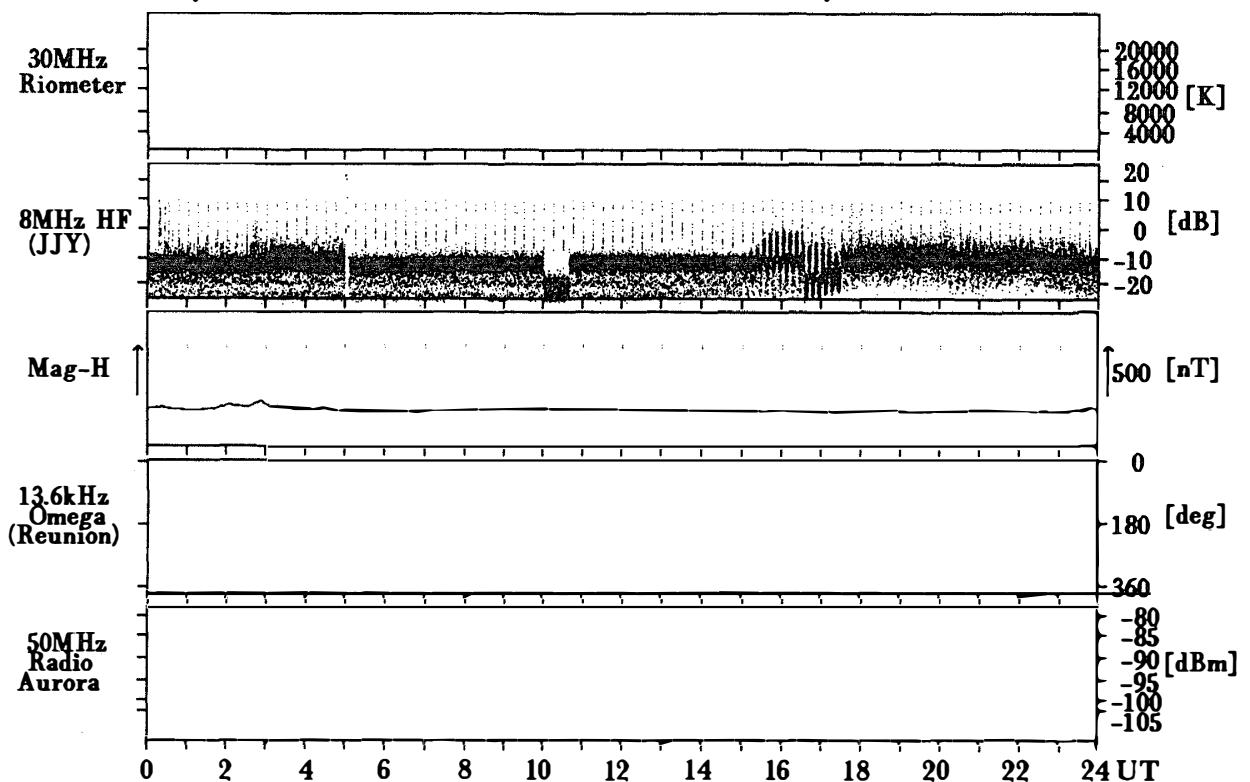
Syowa Station

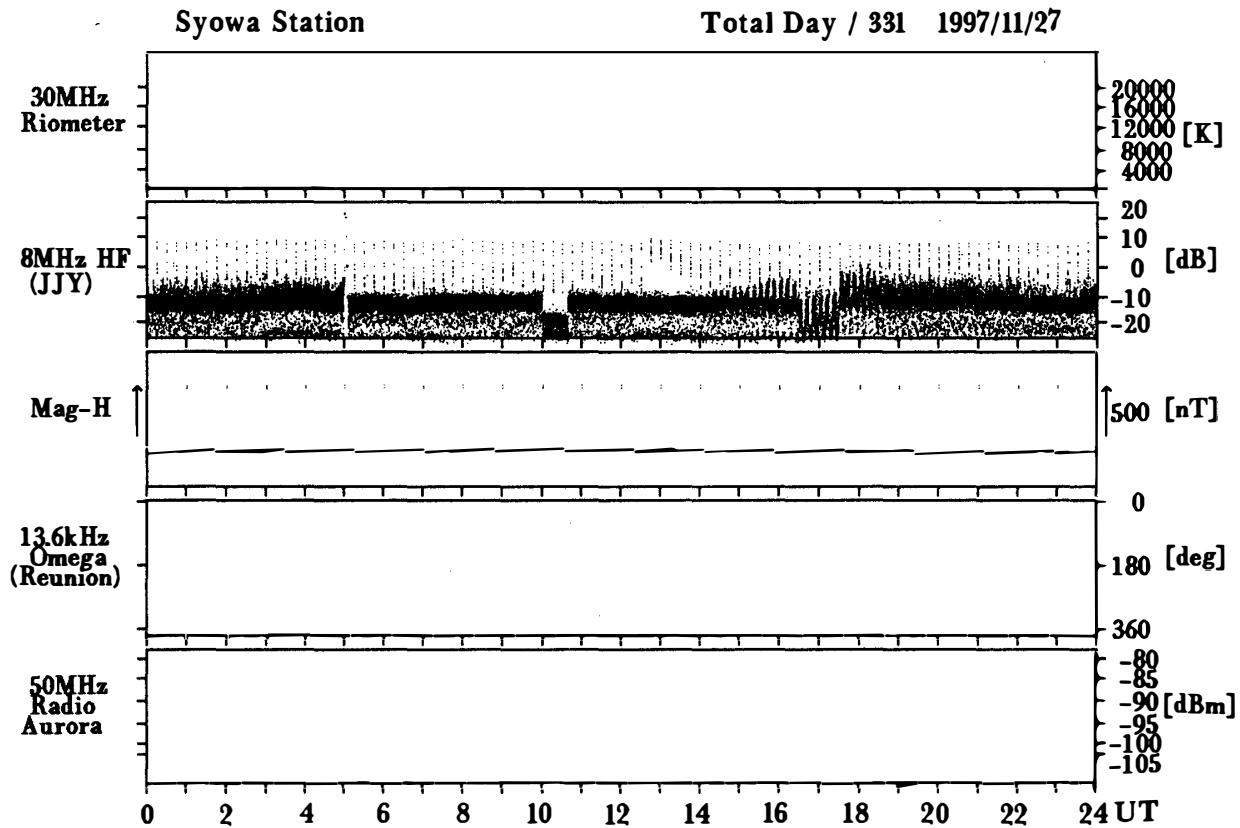
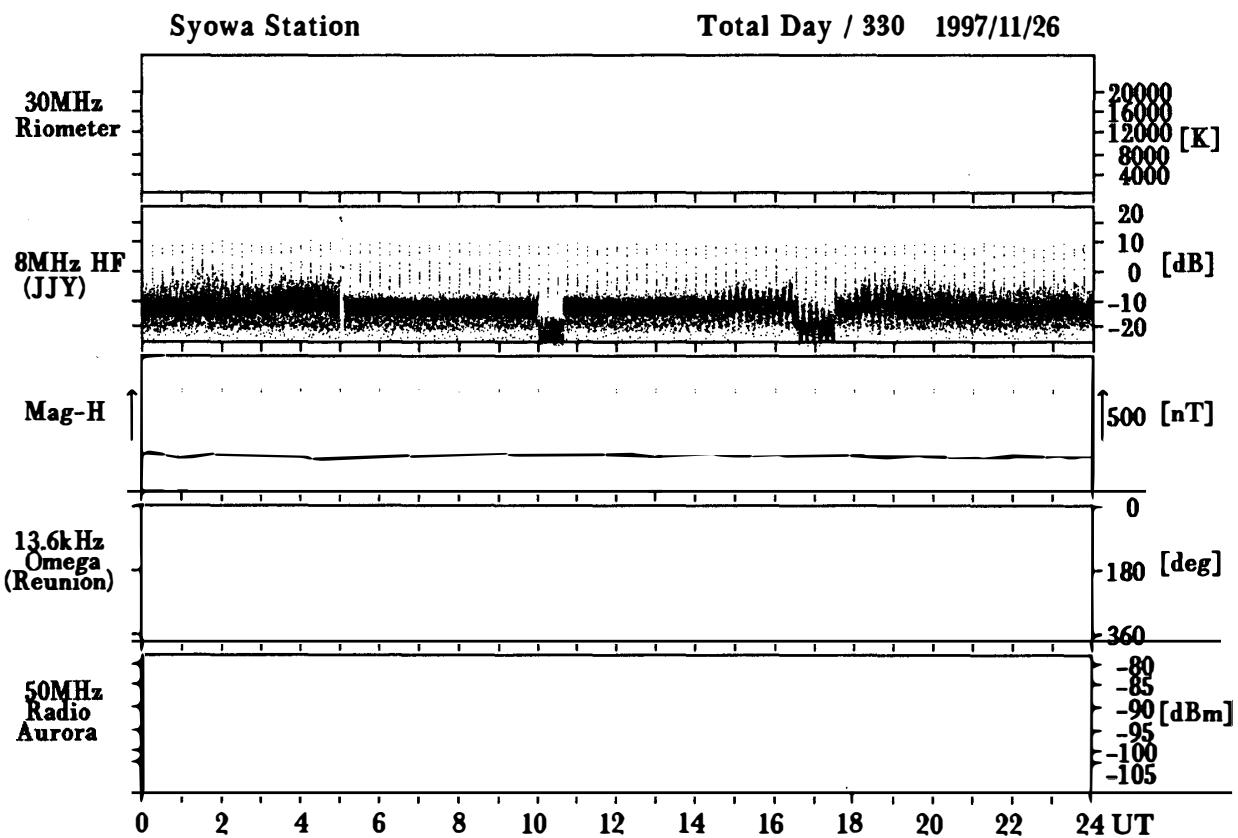
Total Day / 323 1997/11/19





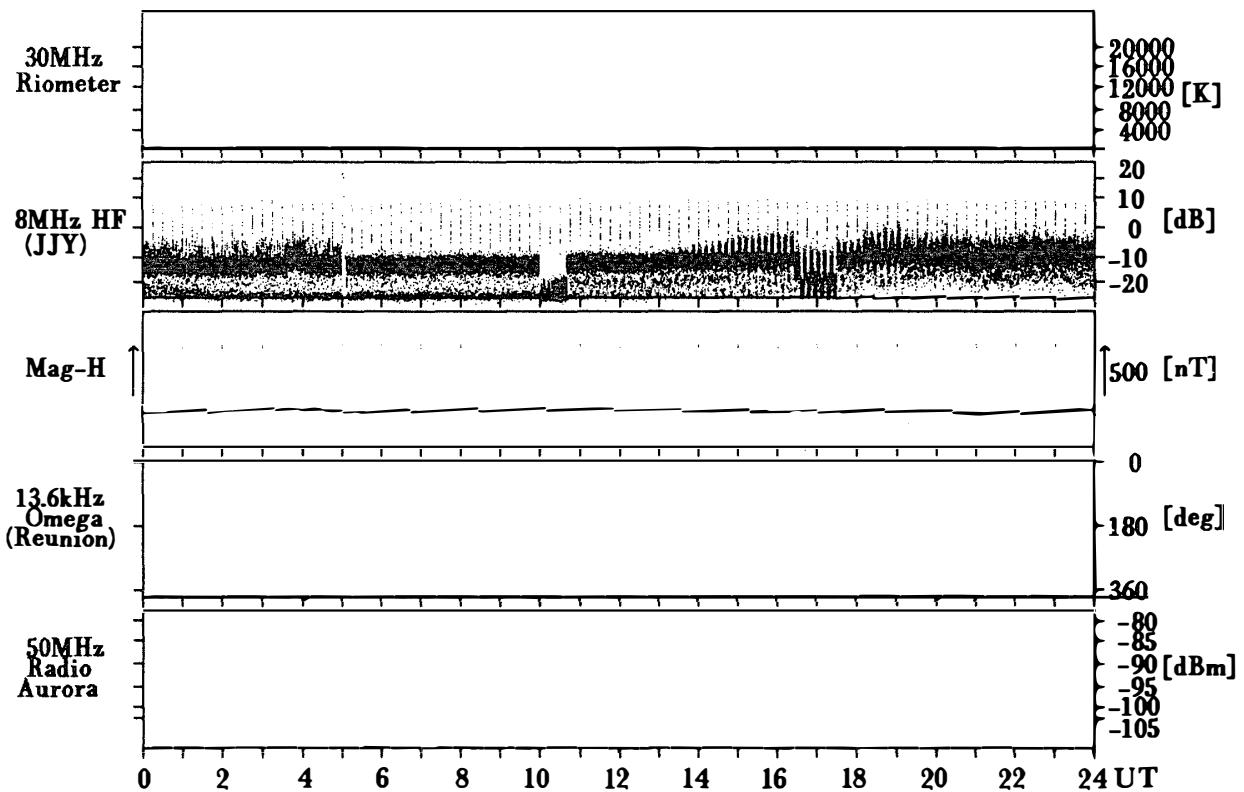


Syowa Station**Total Day / 328 1997/11/24****Syowa Station****Total Day / 329 1997/11/25**



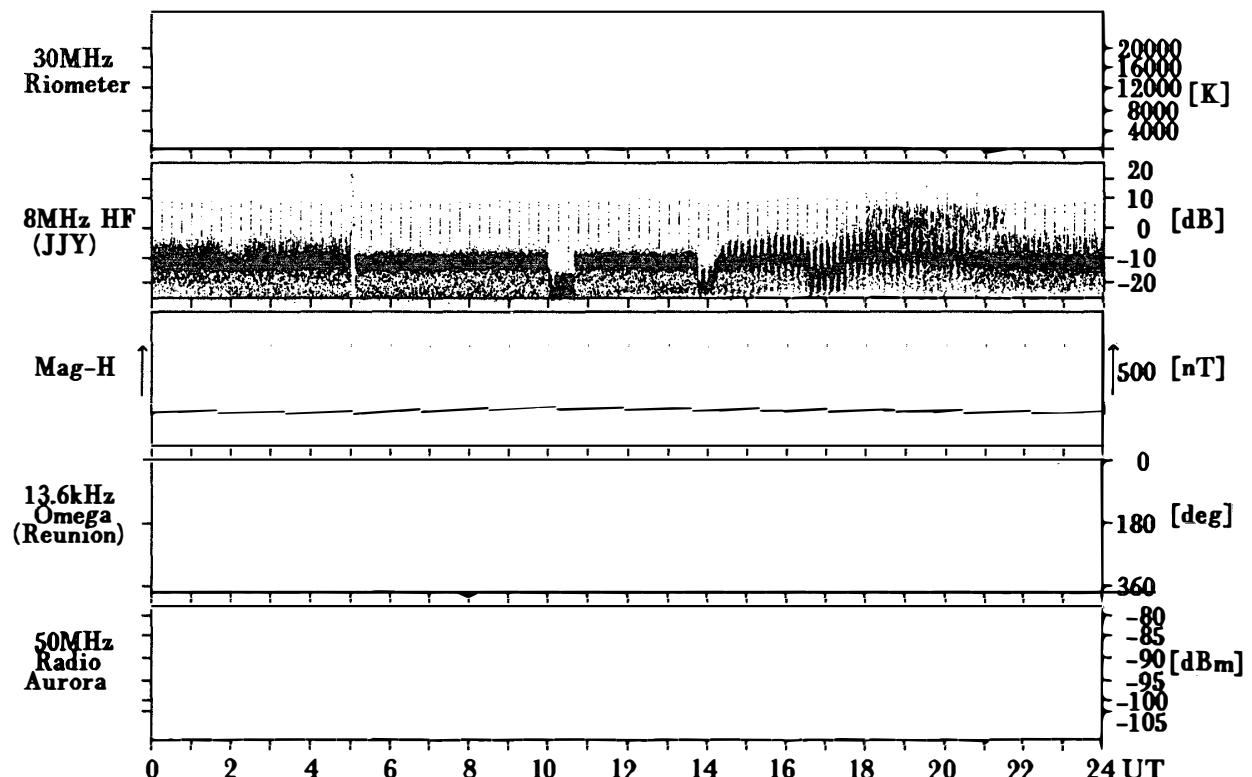
Syowa Station

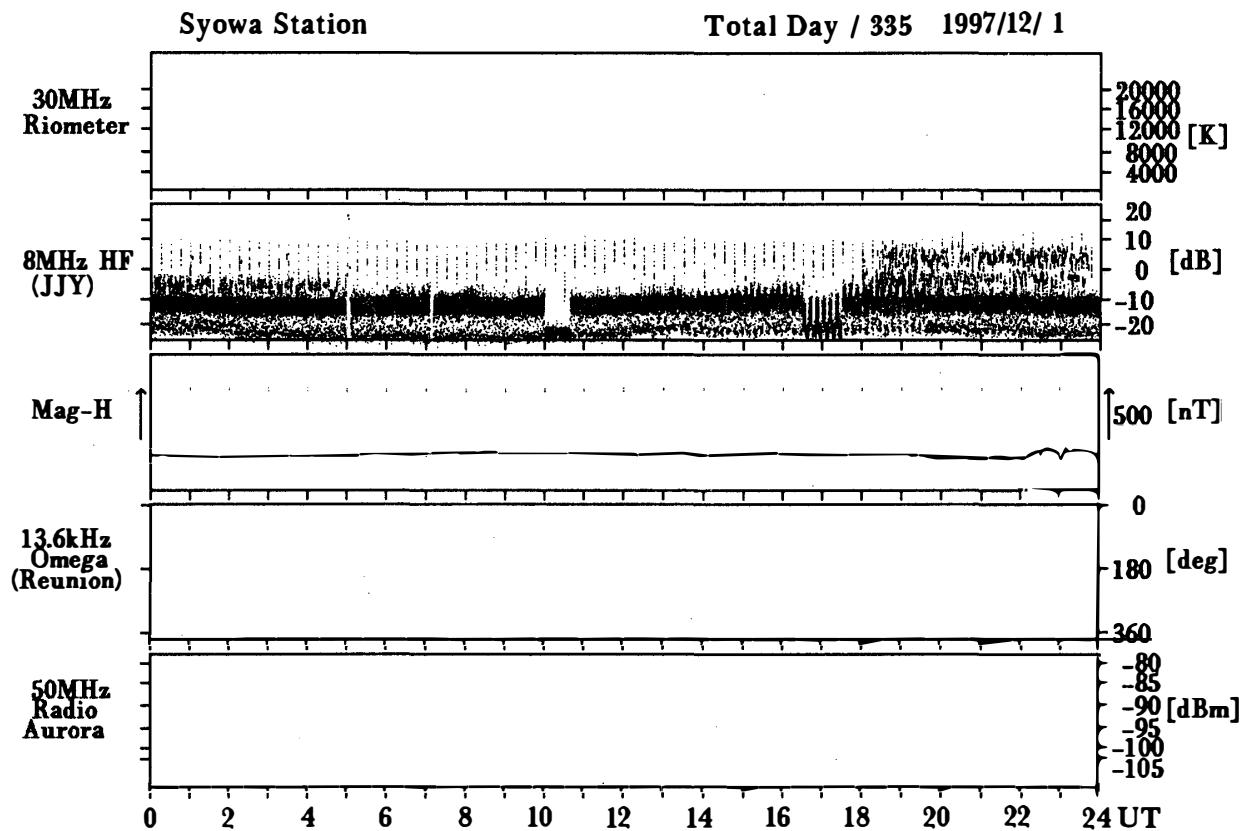
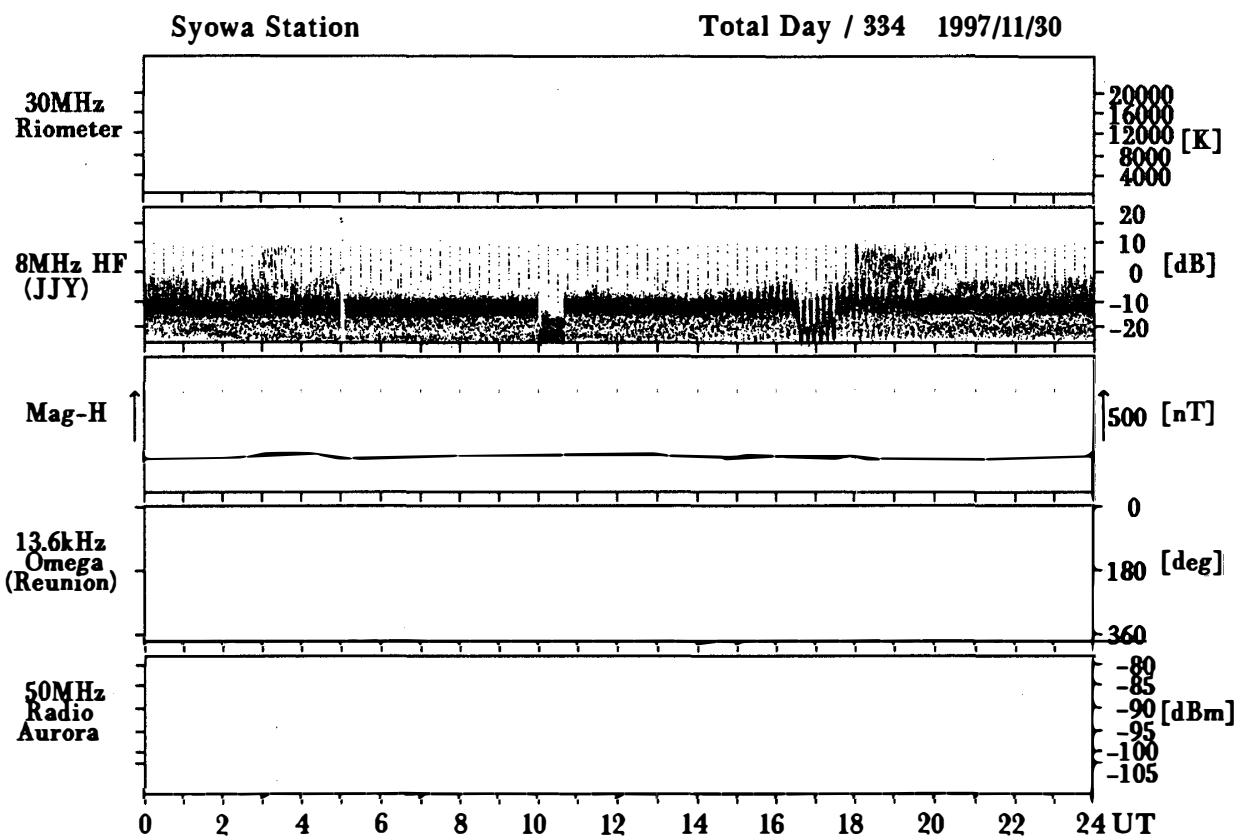
Total Day / 332 1997/11/28



Syowa Station

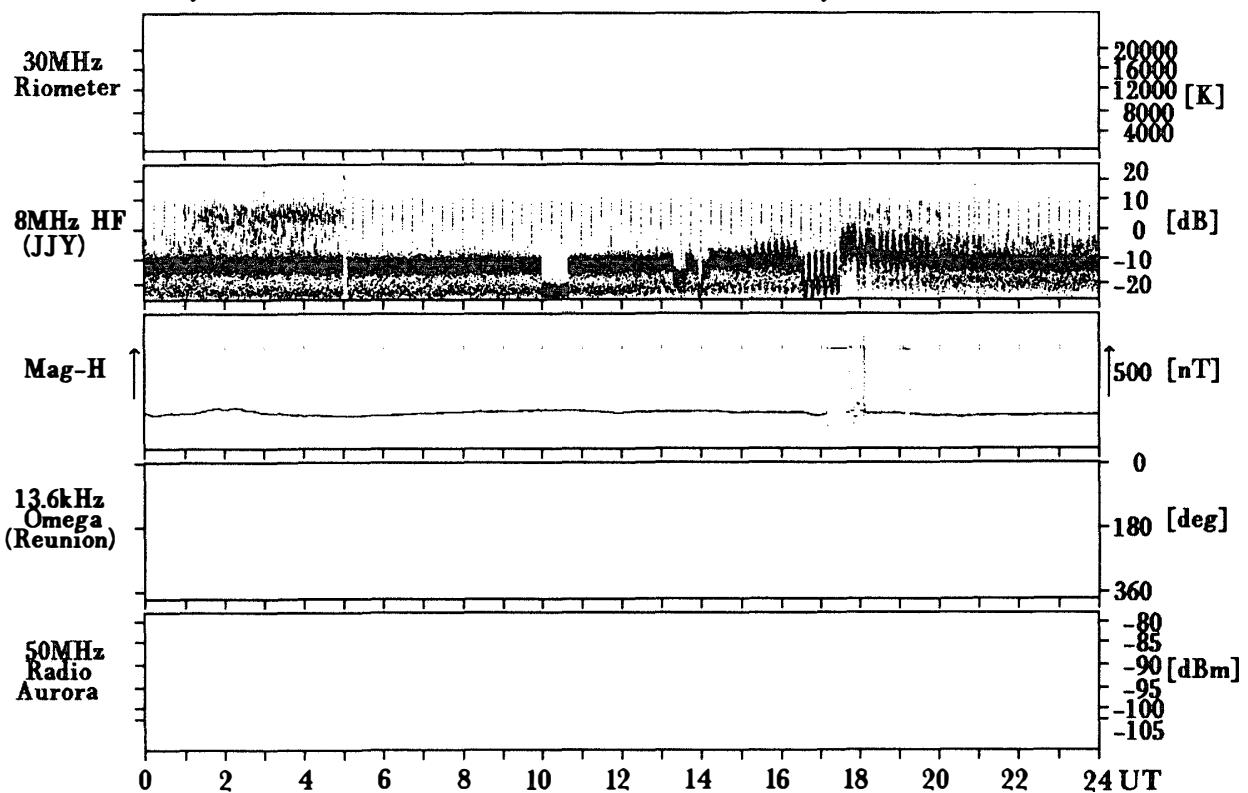
Total Day / 333 1997/11/29





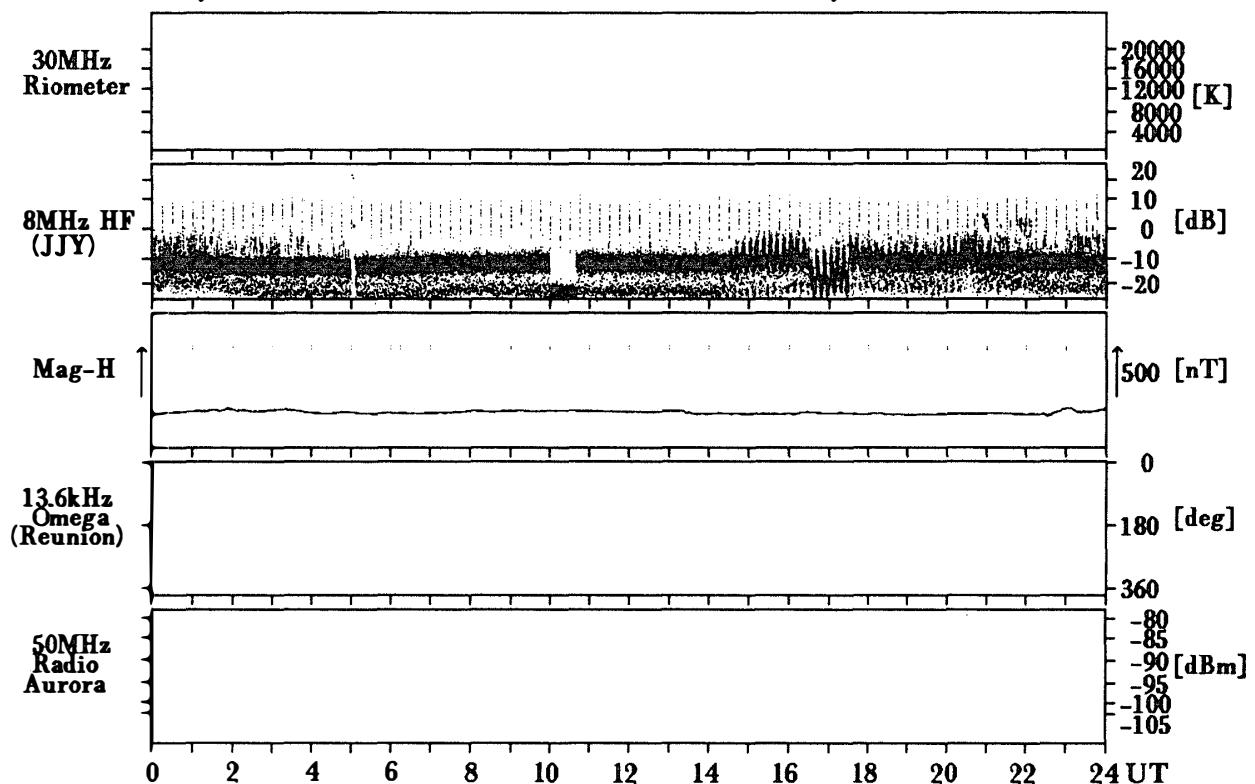
Syowa Station

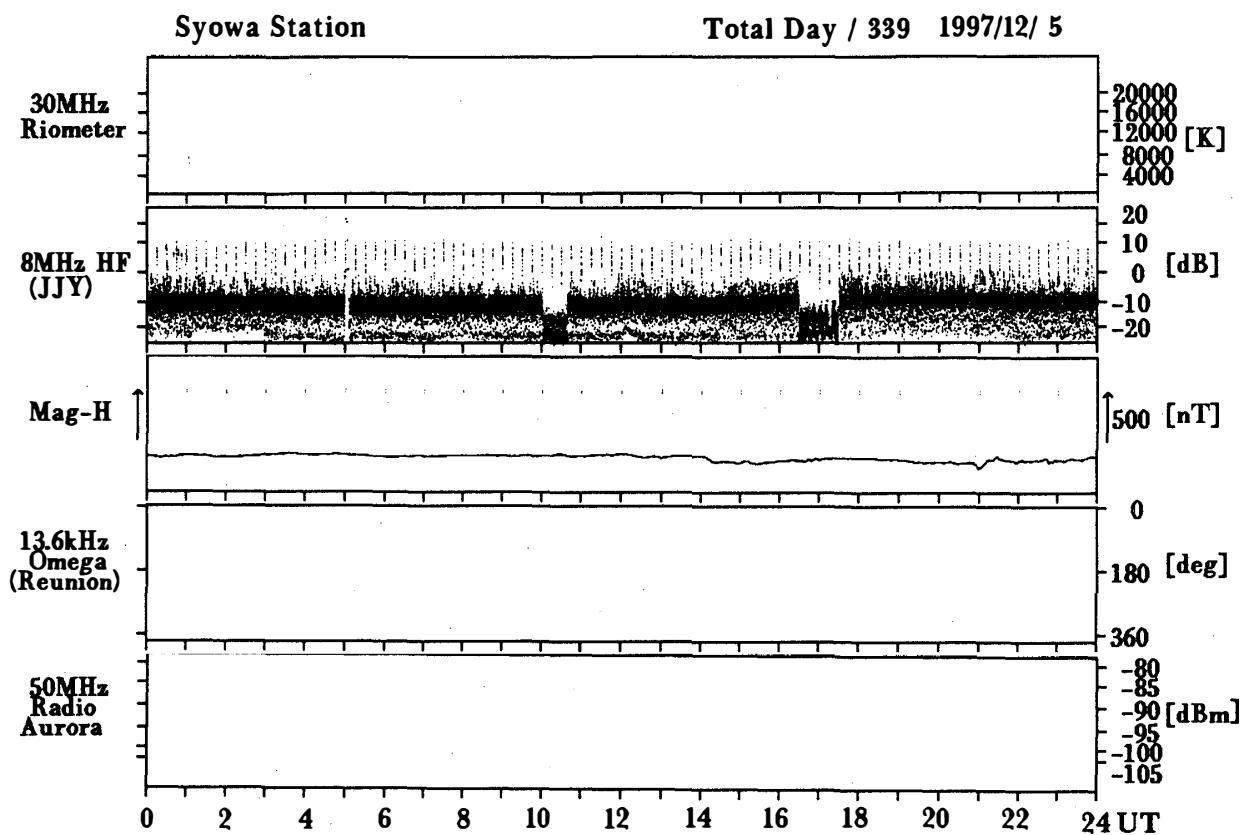
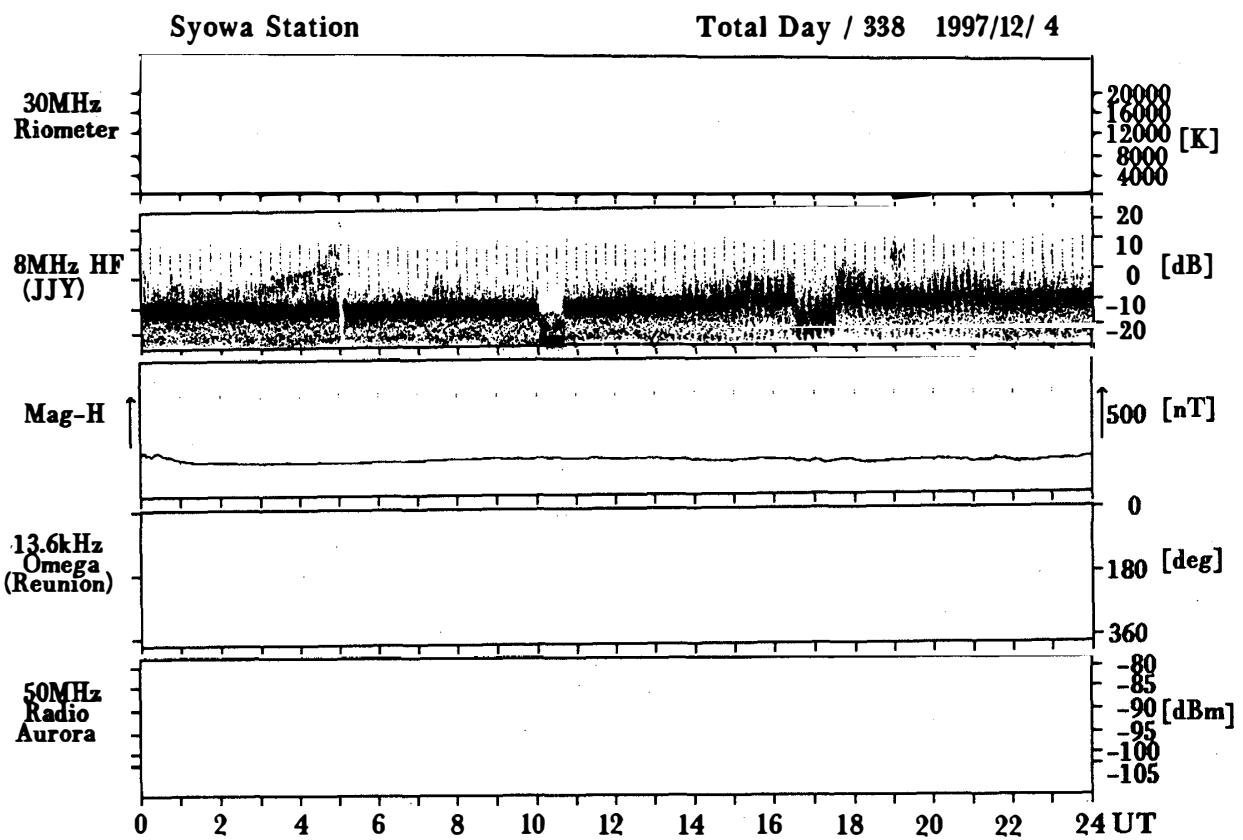
Total Day / 336 1997/12/ 2



Syowa Station

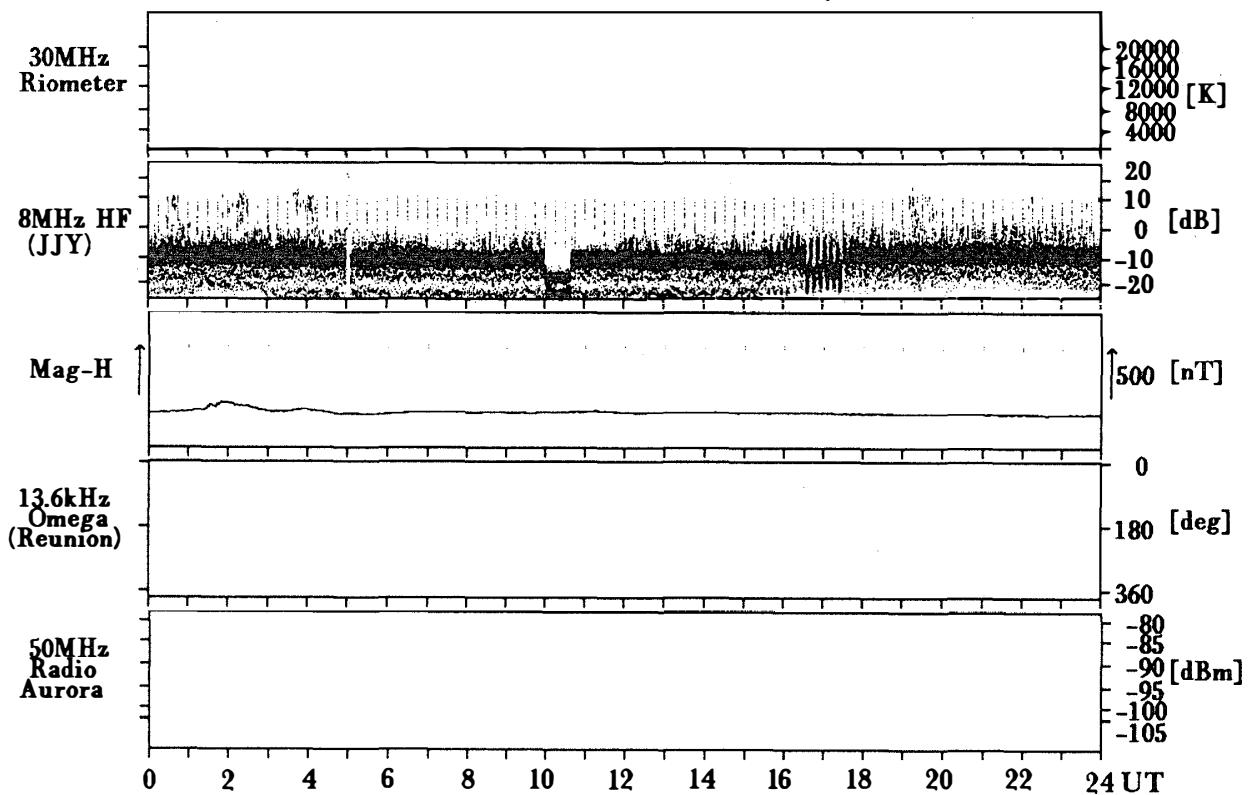
Total Day / 337 1997/12/ 3





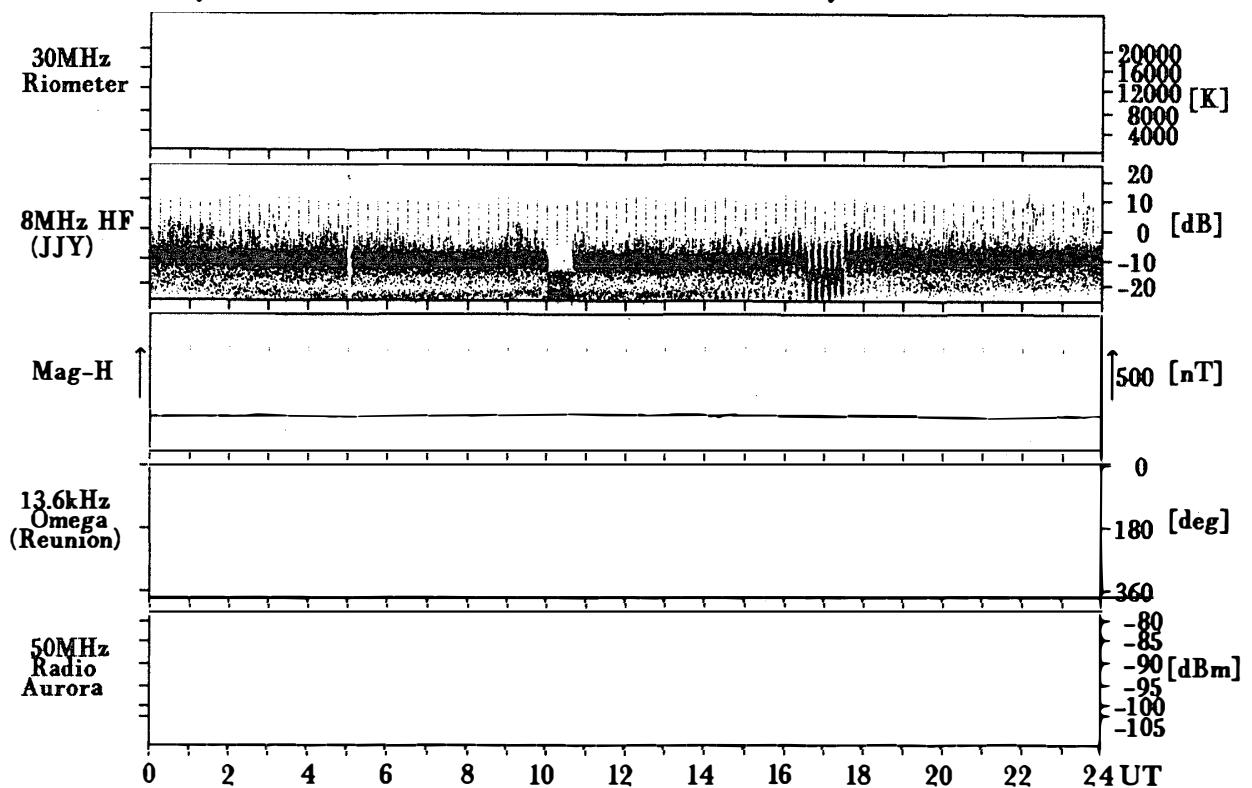
Syowa Station

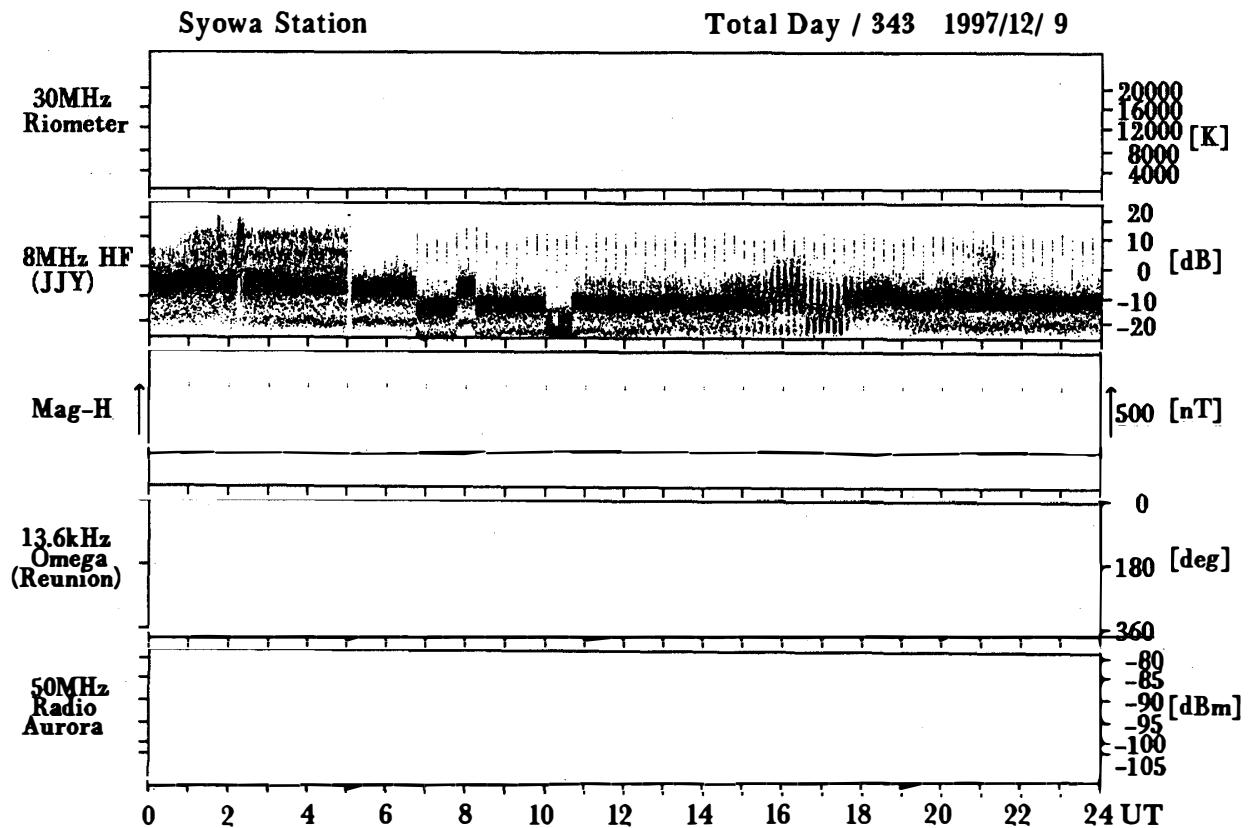
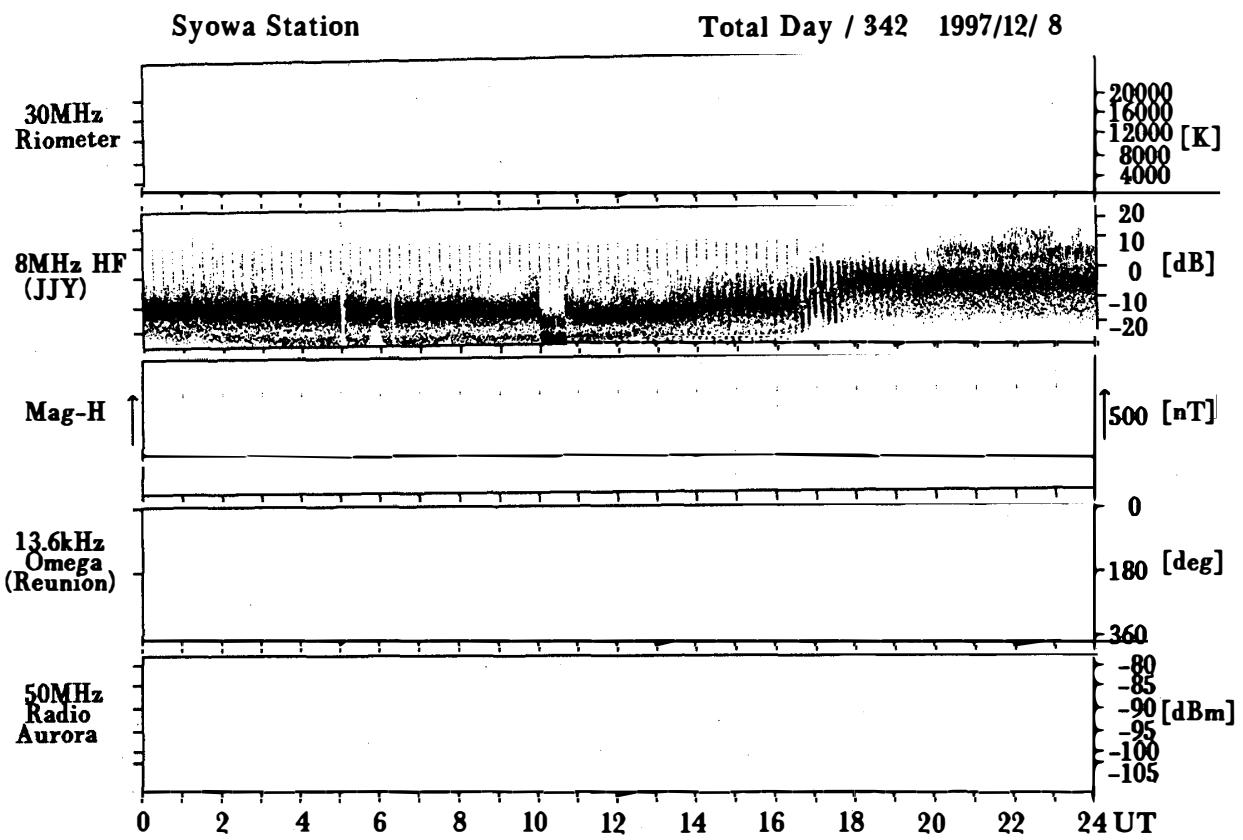
Total Day / 340 1997/12/ 6



Syowa Station

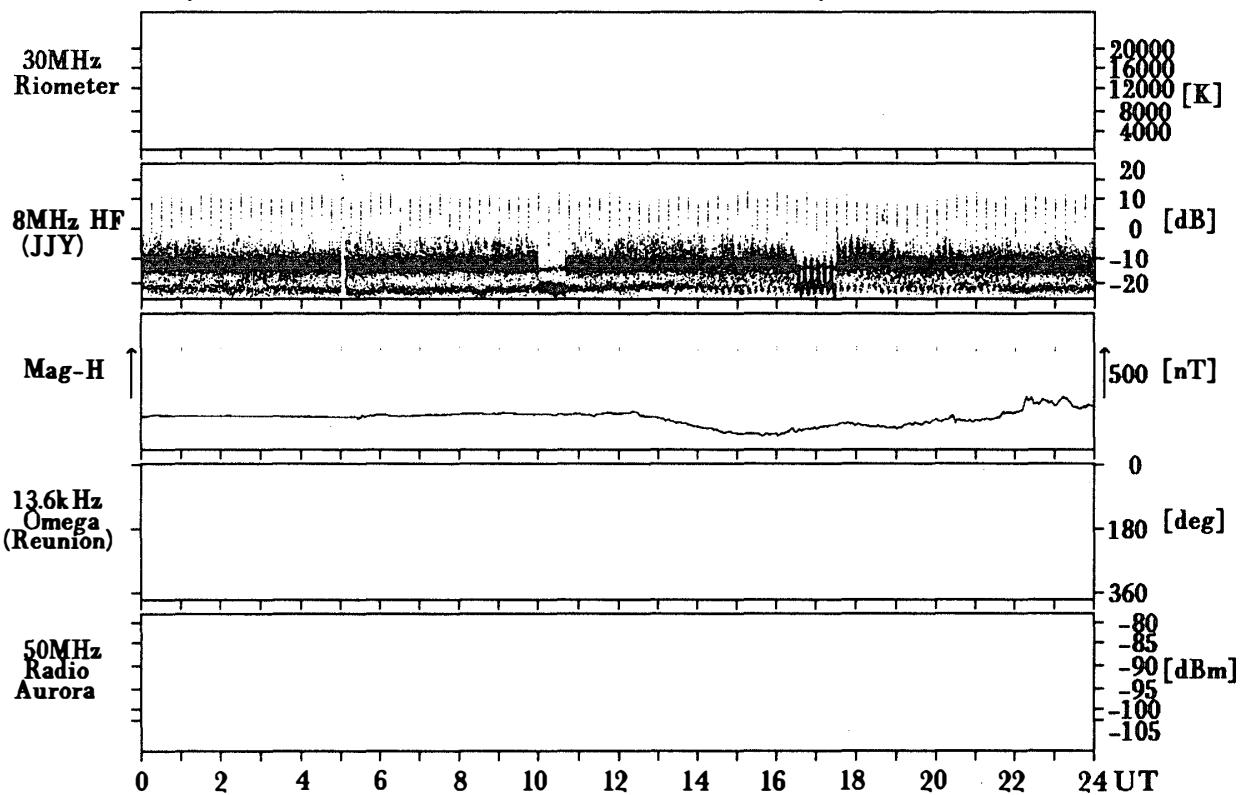
Total Day / 341 1997/12/ 7





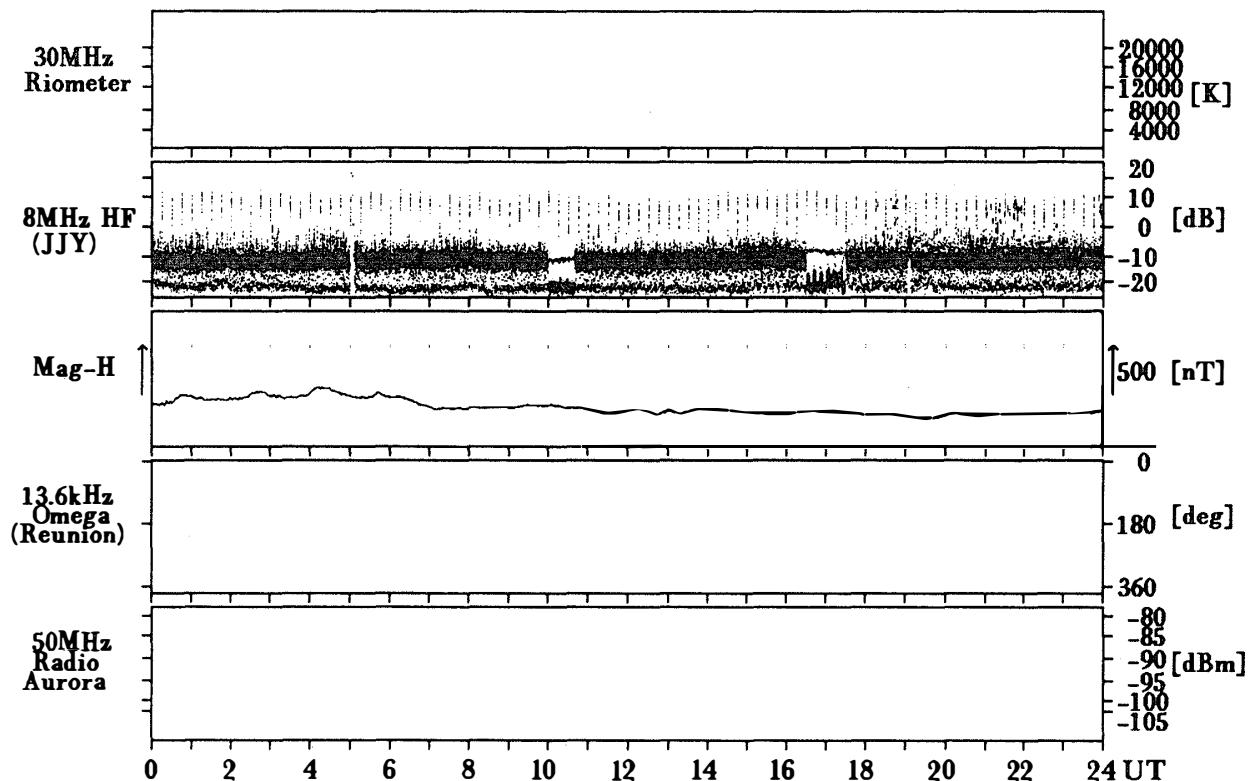
Syowa Station

Total Day / 344 1997/12/10



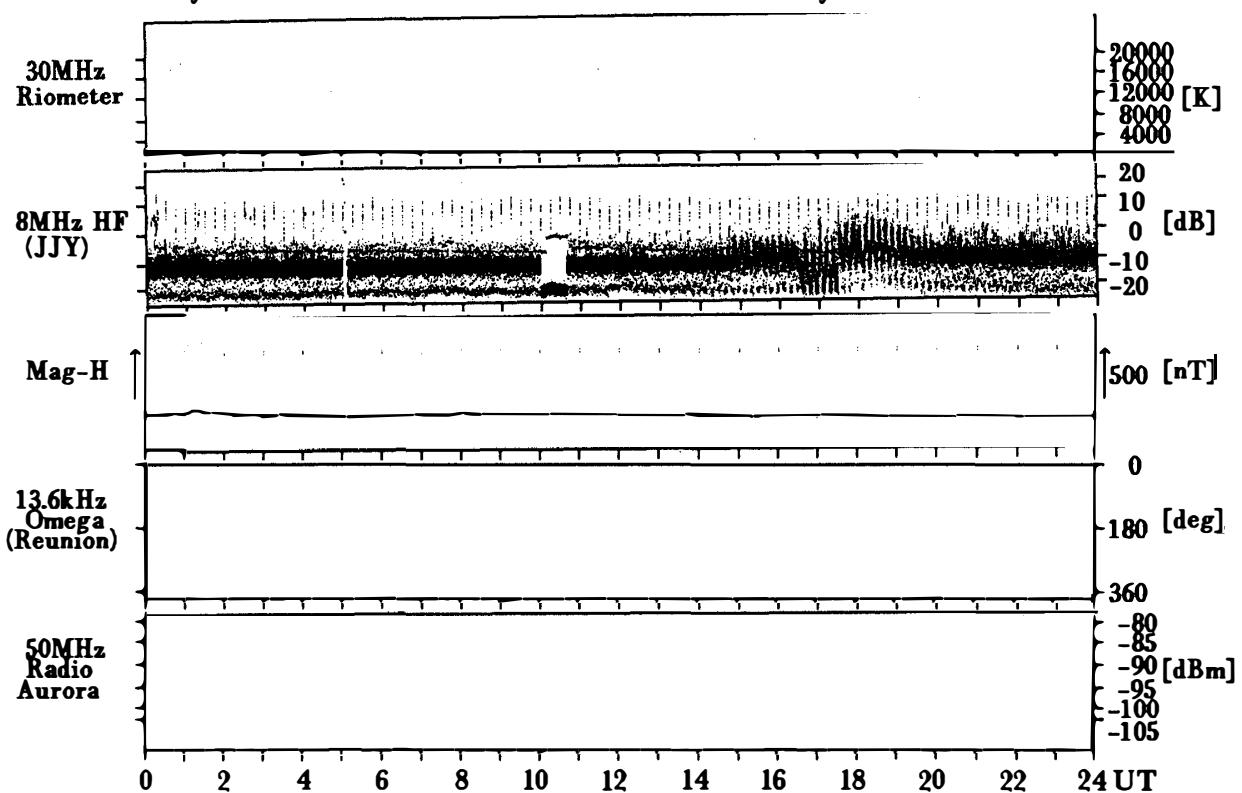
Syowa Station

Total Day / 345 1997/12/11



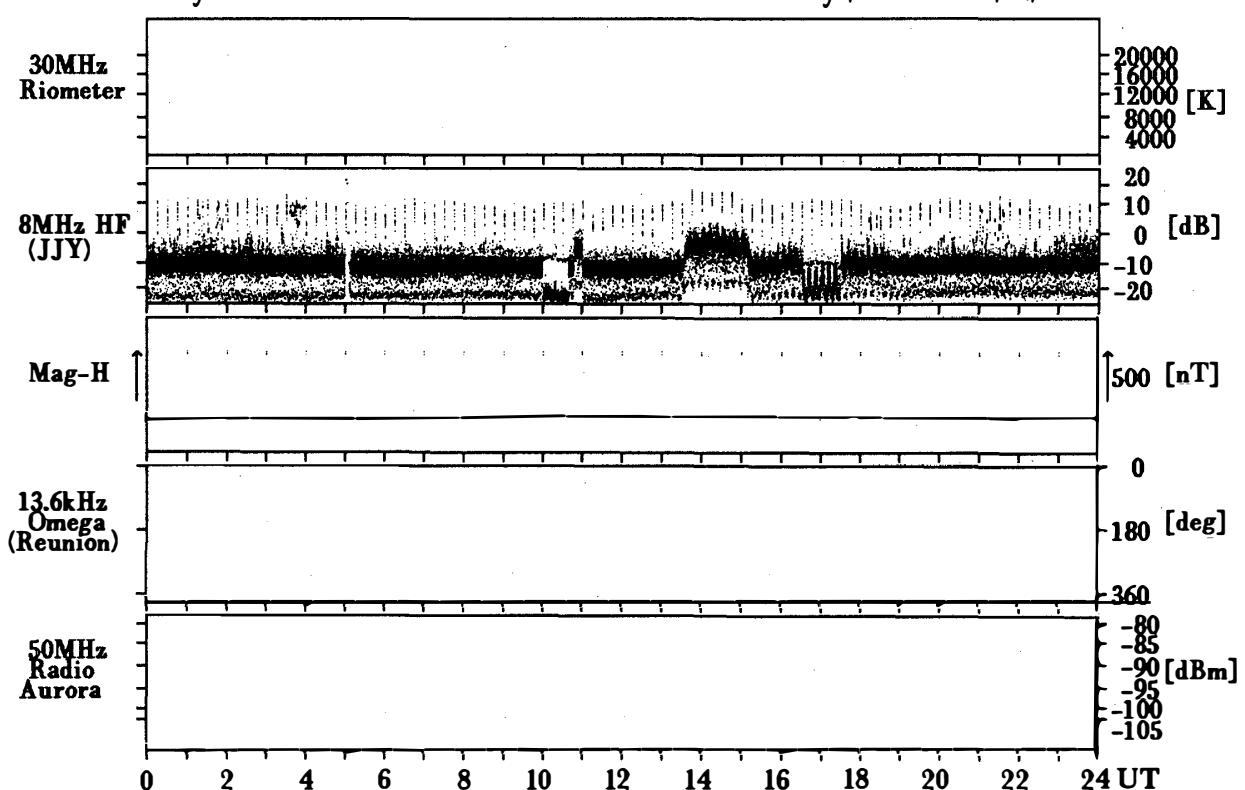
Syowa Station

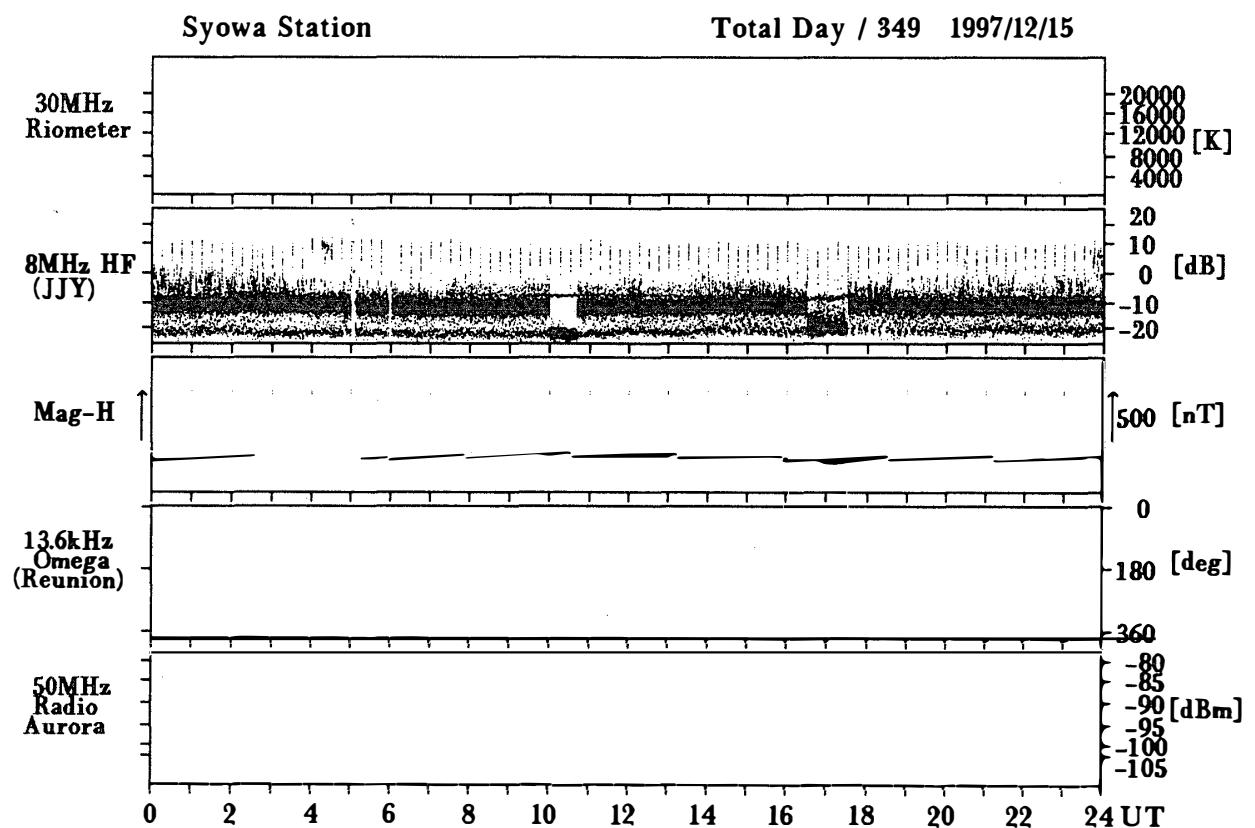
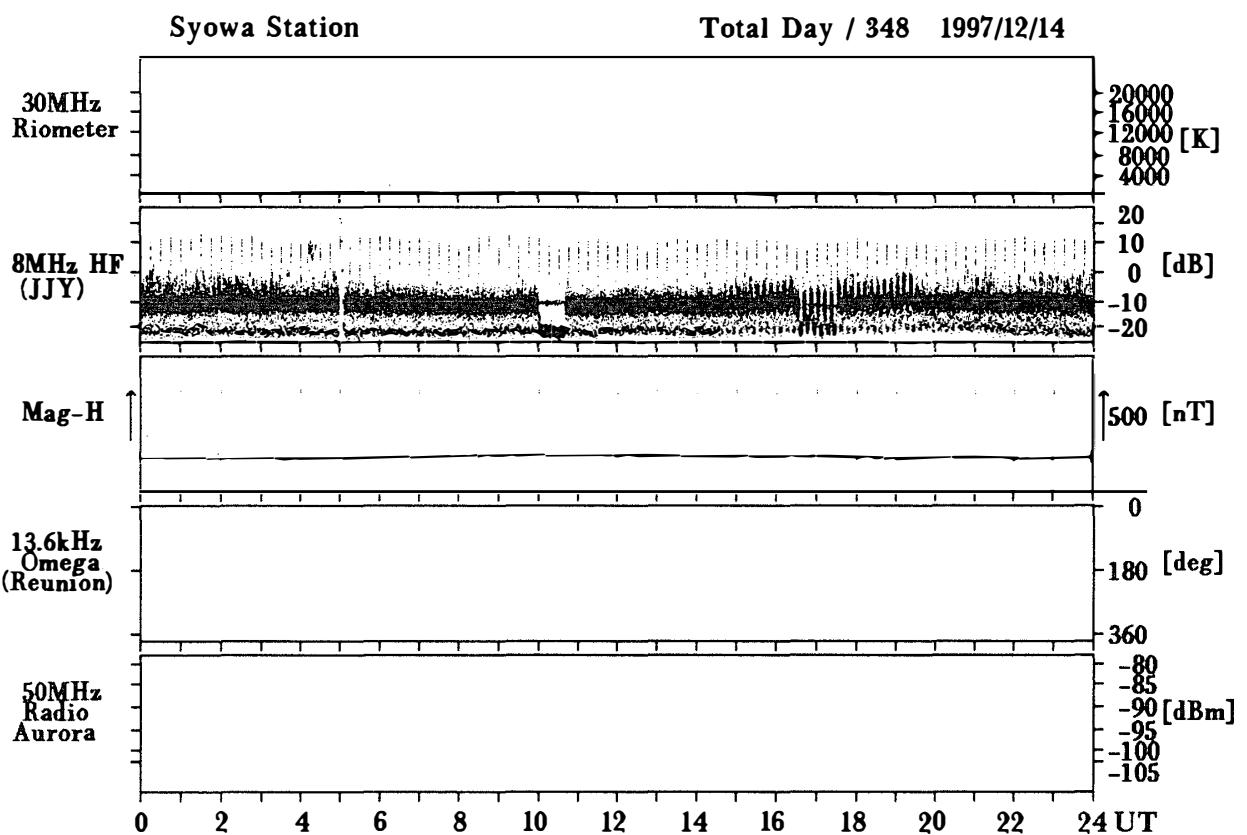
Total Day / 346 1997/12/12

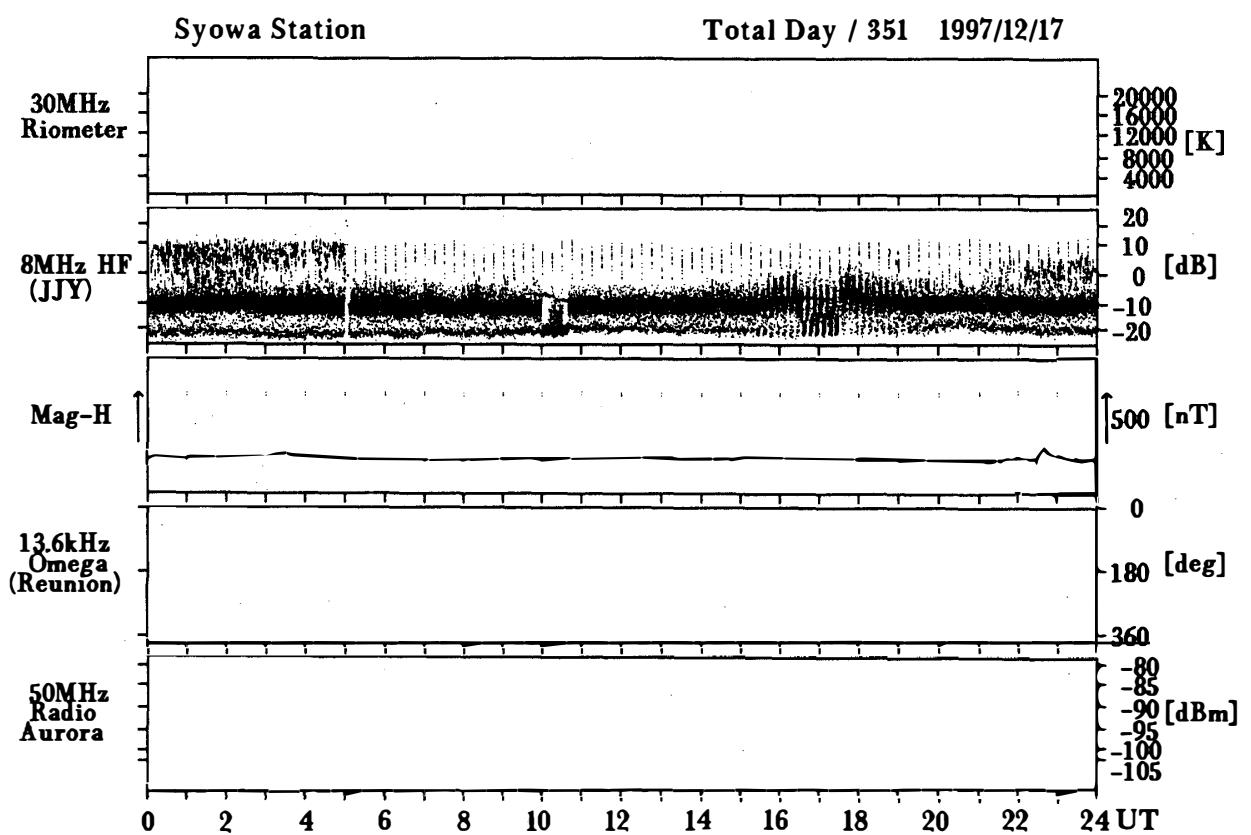
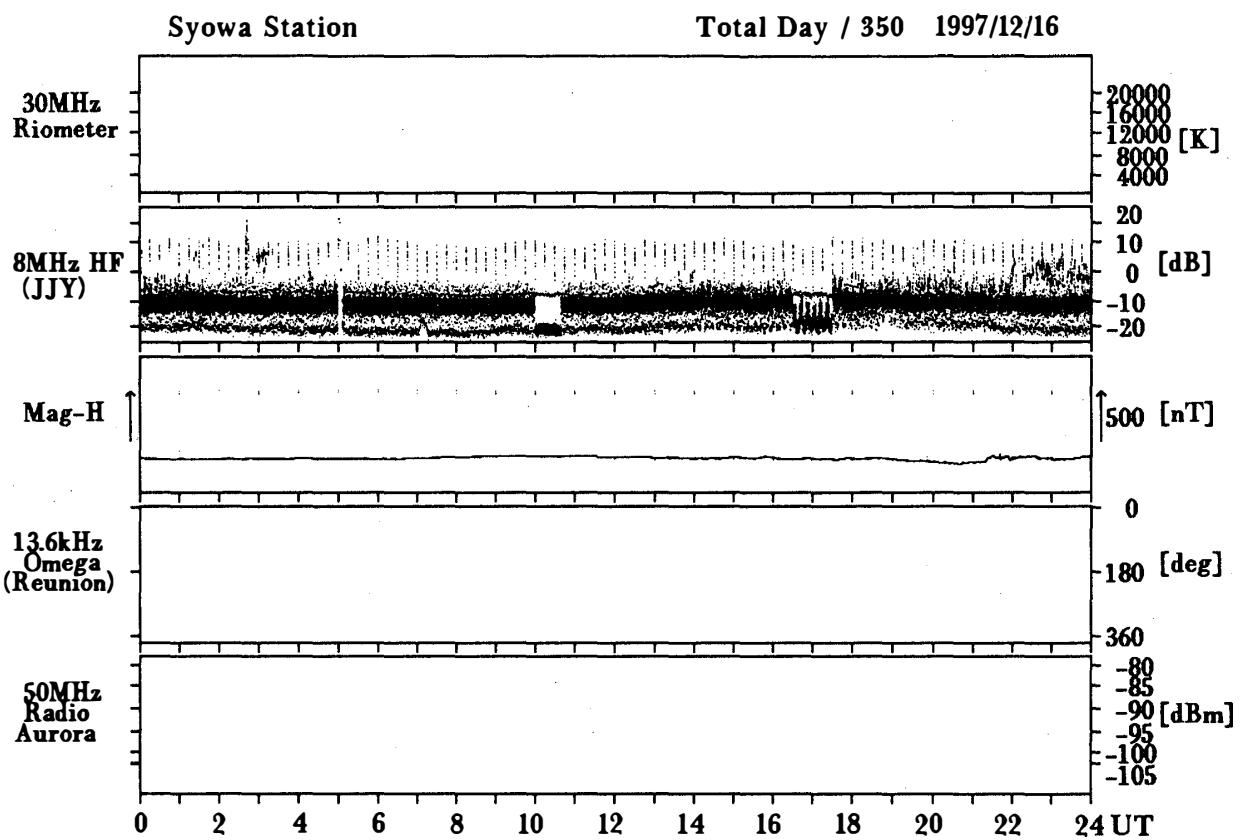


Syowa Station

Total Day / 347 1997/12/13

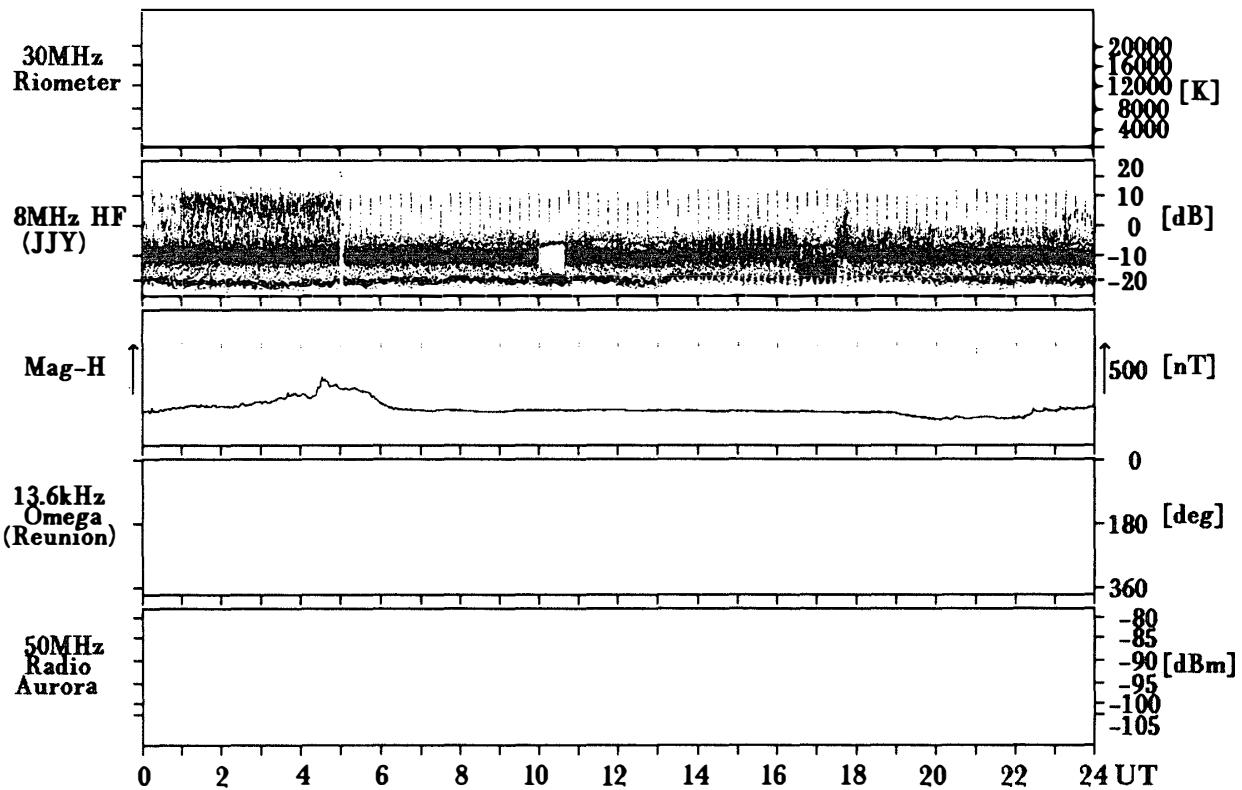






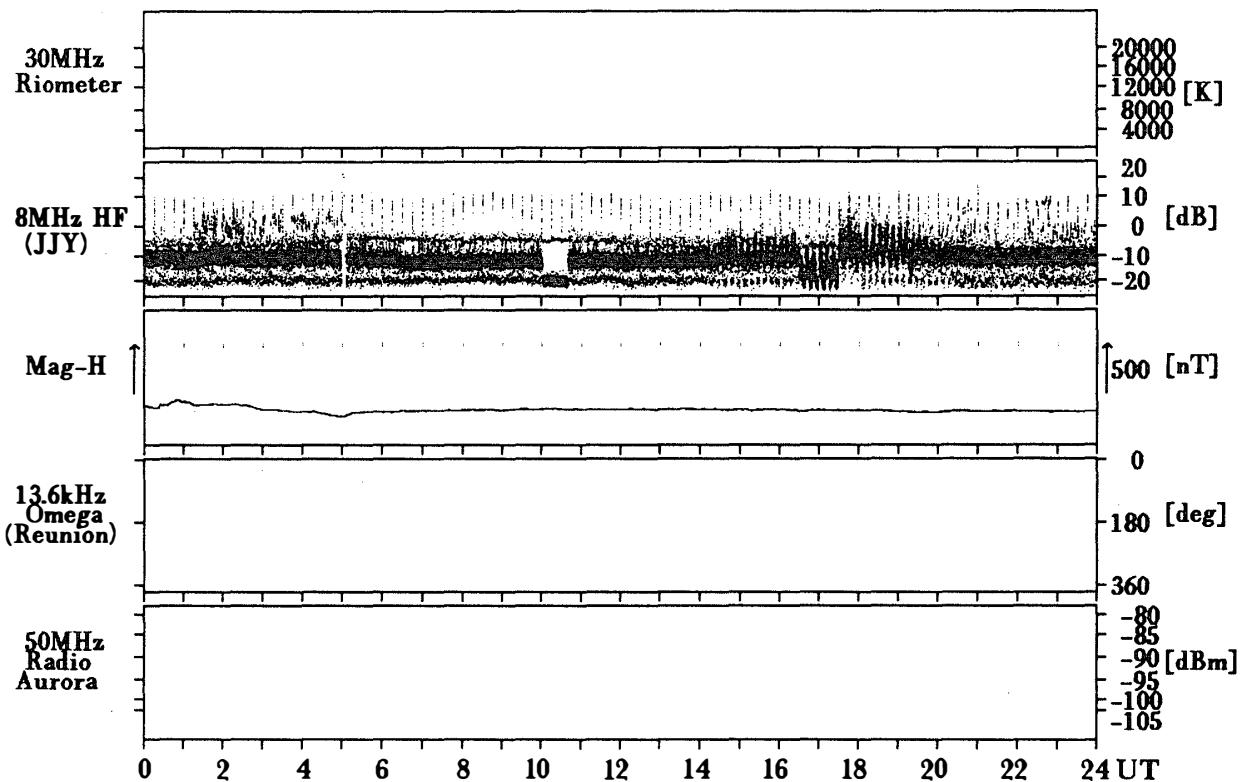
Syowa Station

Total Day / 352 1997/12/18



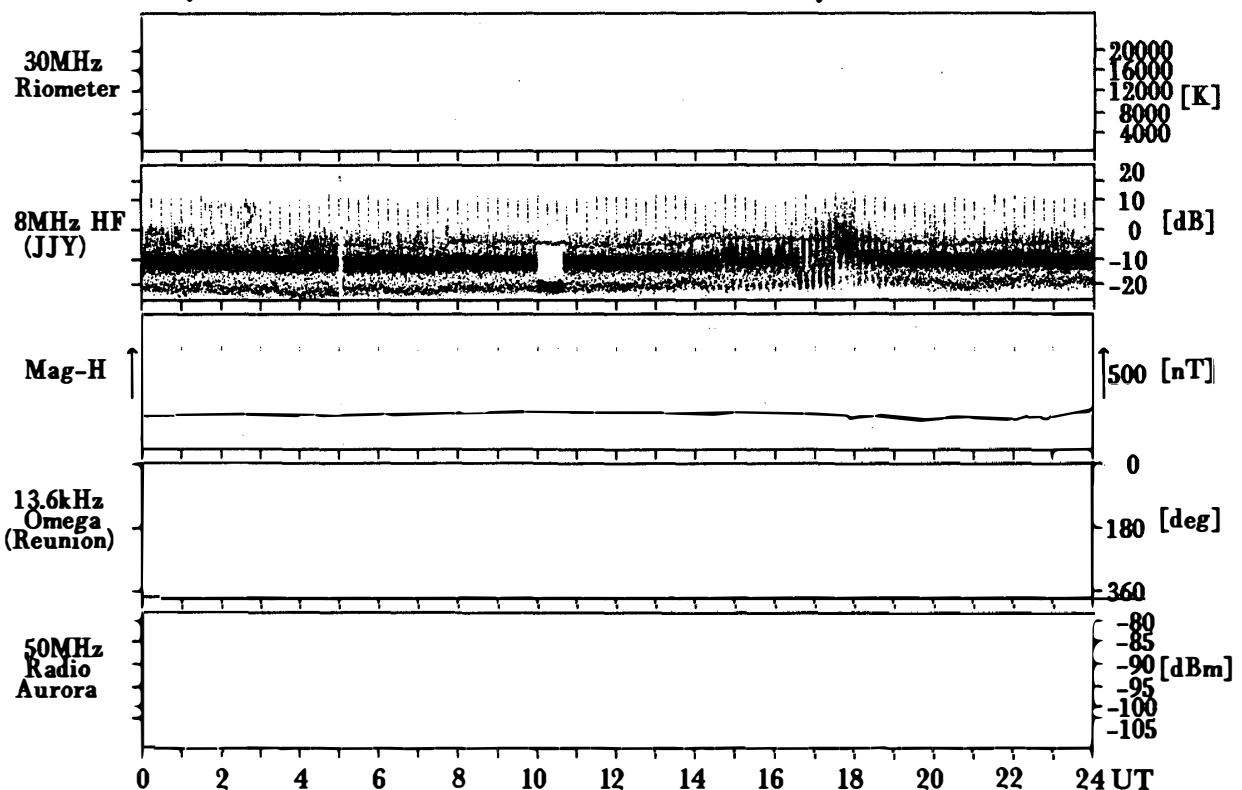
Syowa Station

Total Day / 353 1997/12/19



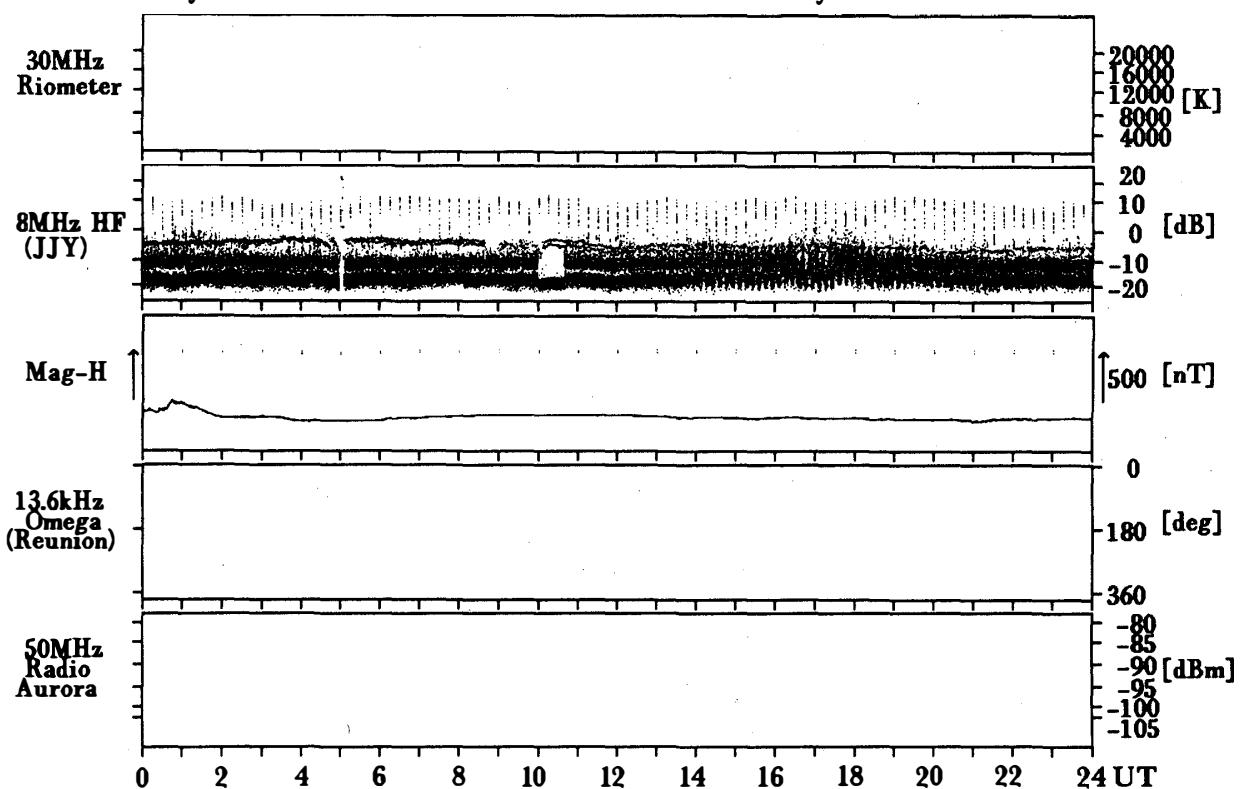
Syowa Station

Total Day / 354 1997/12/20



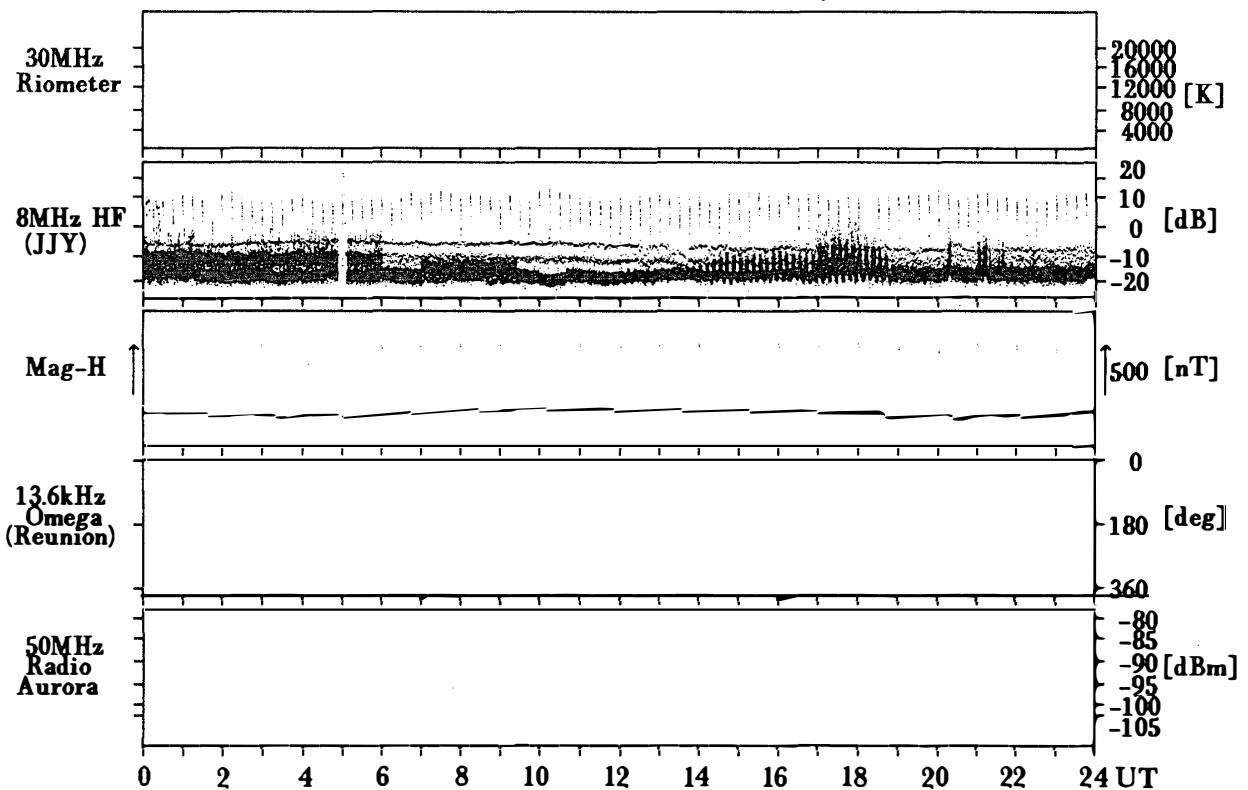
Syowa Station

Total Day / 355 1997/12/21



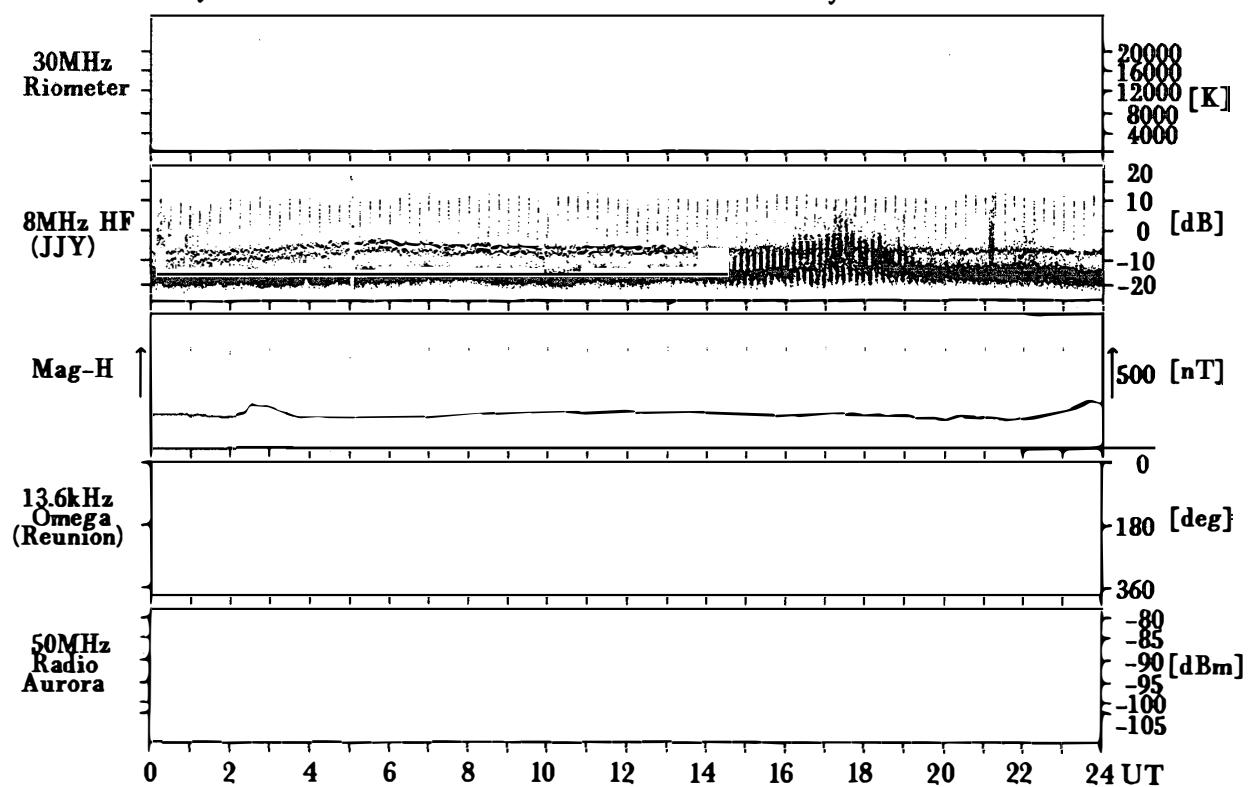
Syowa Station

Total Day / 356 1997/12/22



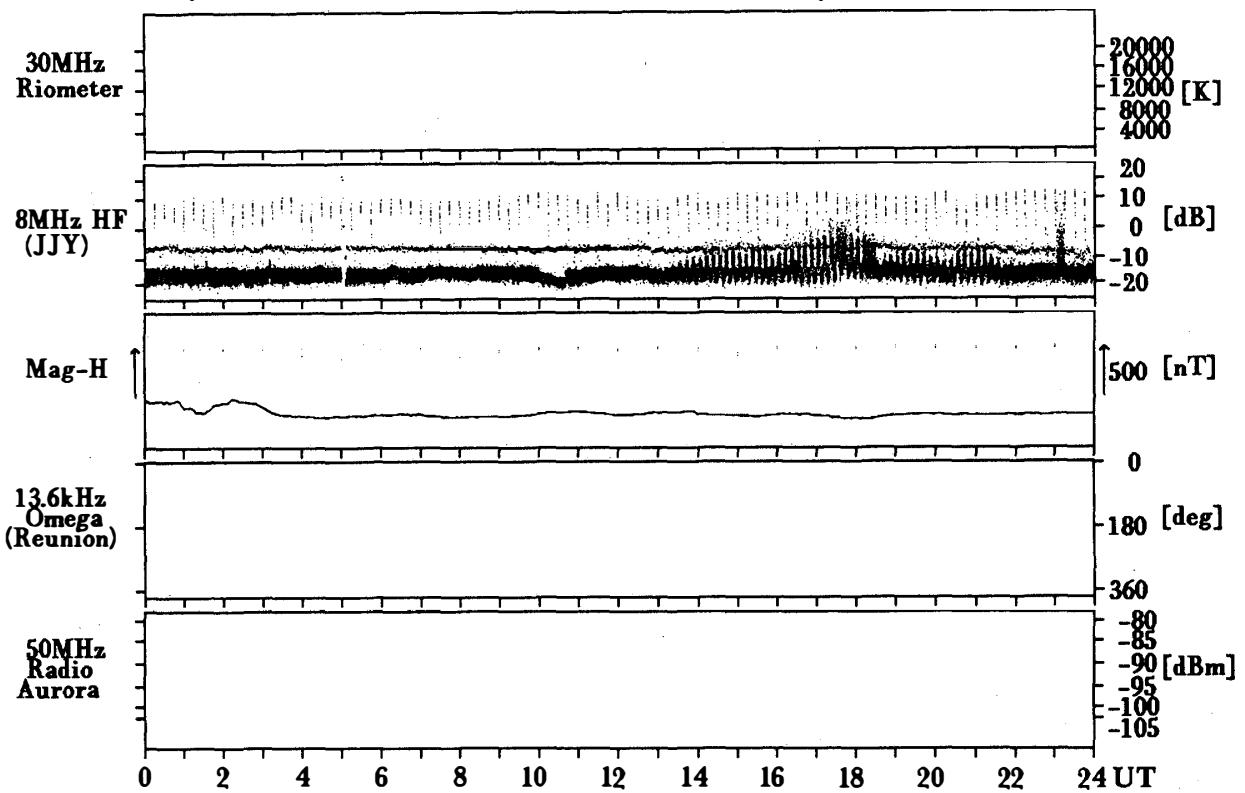
Syowa Station

Total Day / 357 1997/12/23



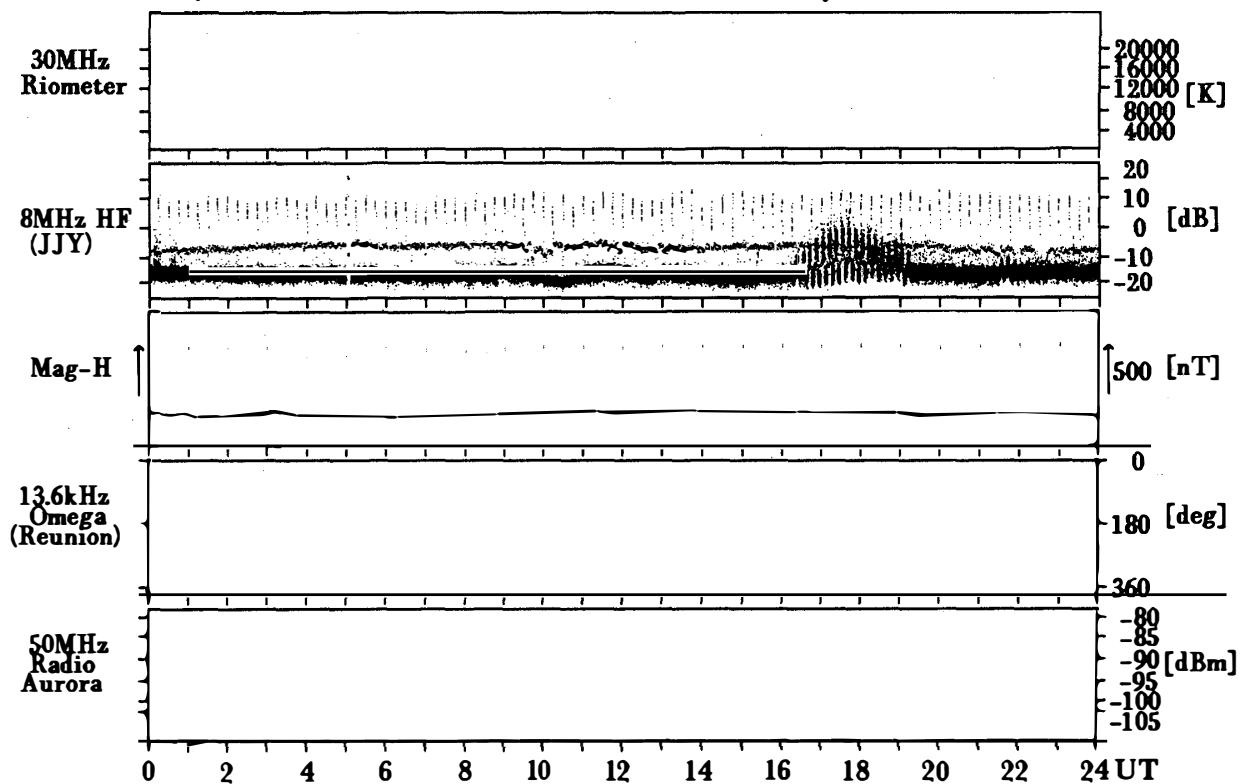
Syowa Station

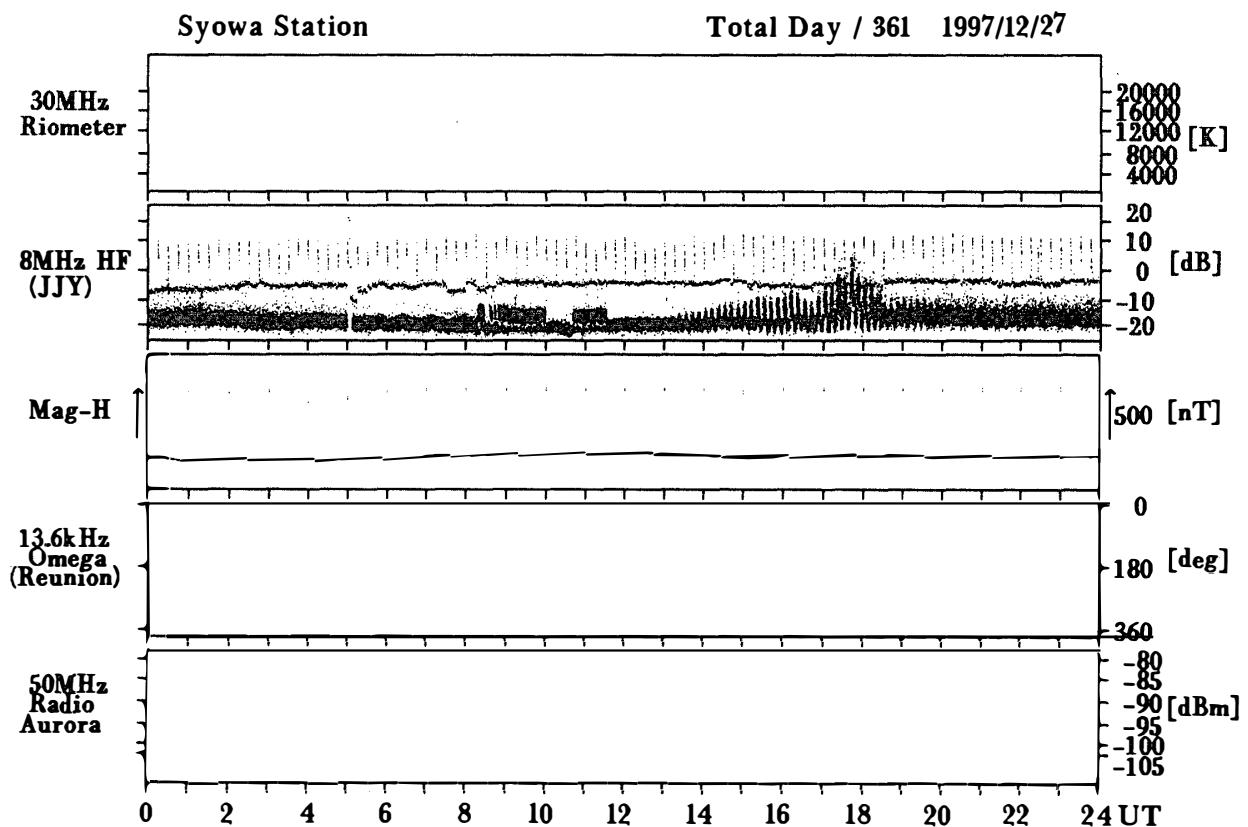
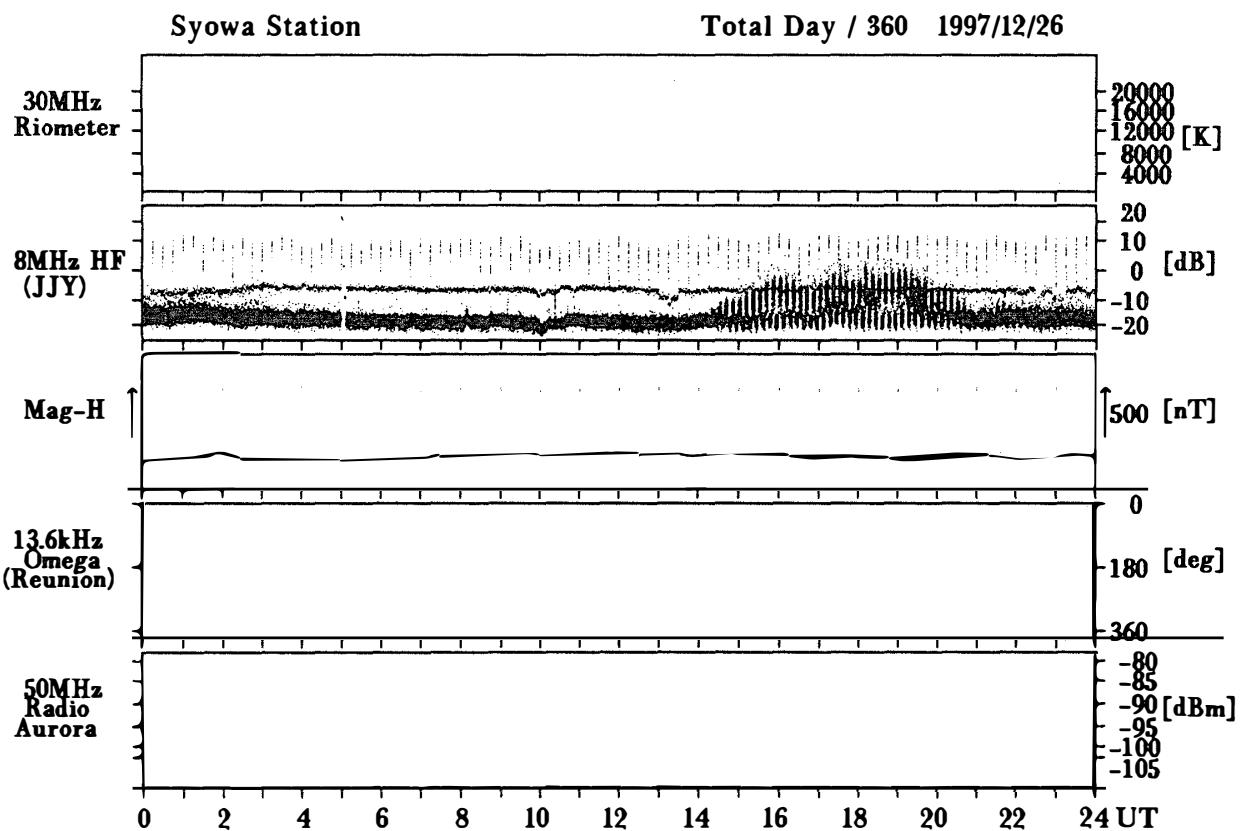
Total Day / 358 1997/12/24



Syowa Station

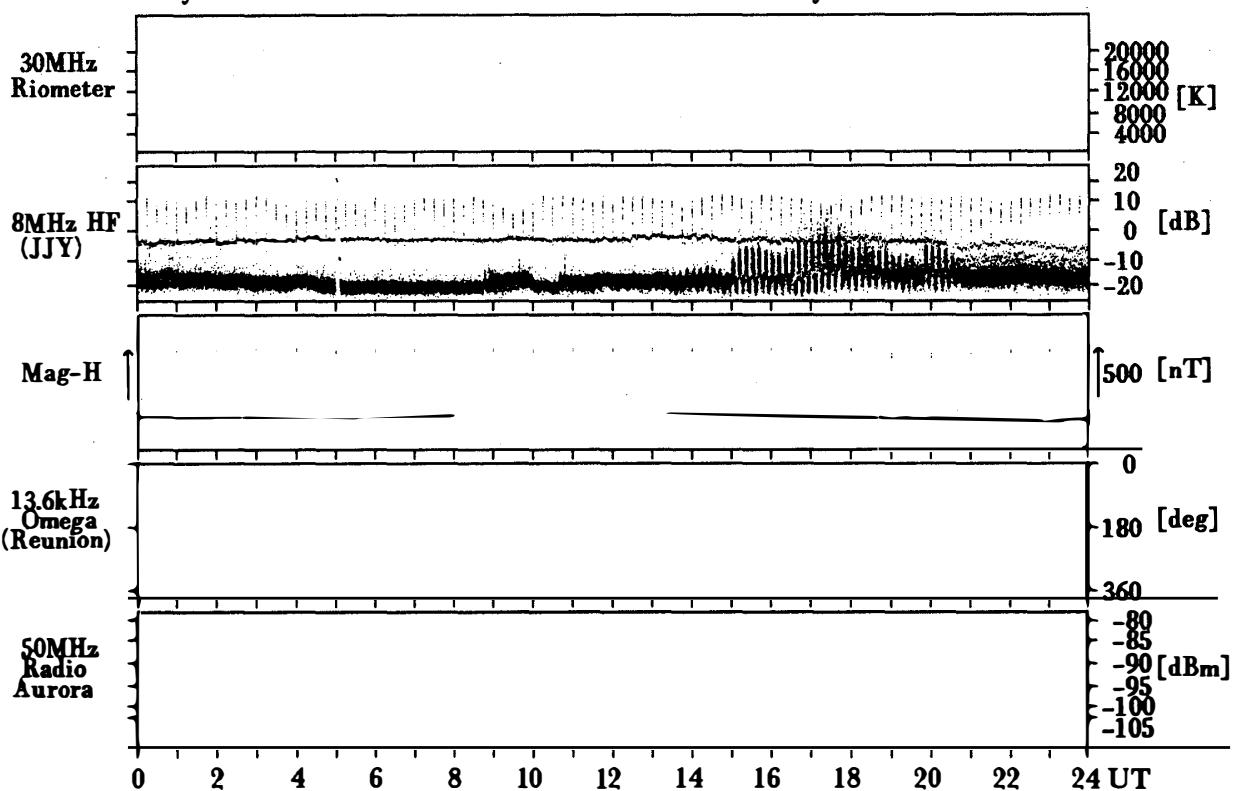
Total Day / 359 1997/12/25





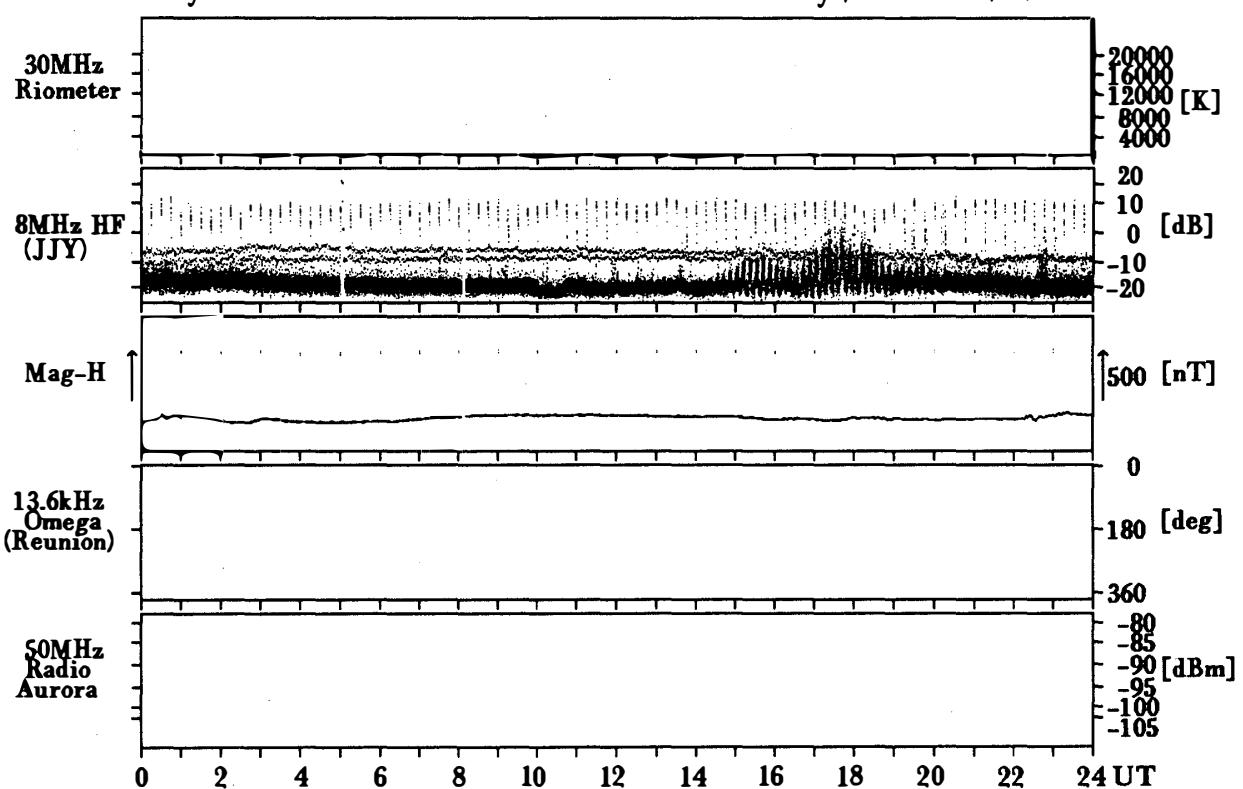
Syowa Station

Total Day / 362 1997/12/28



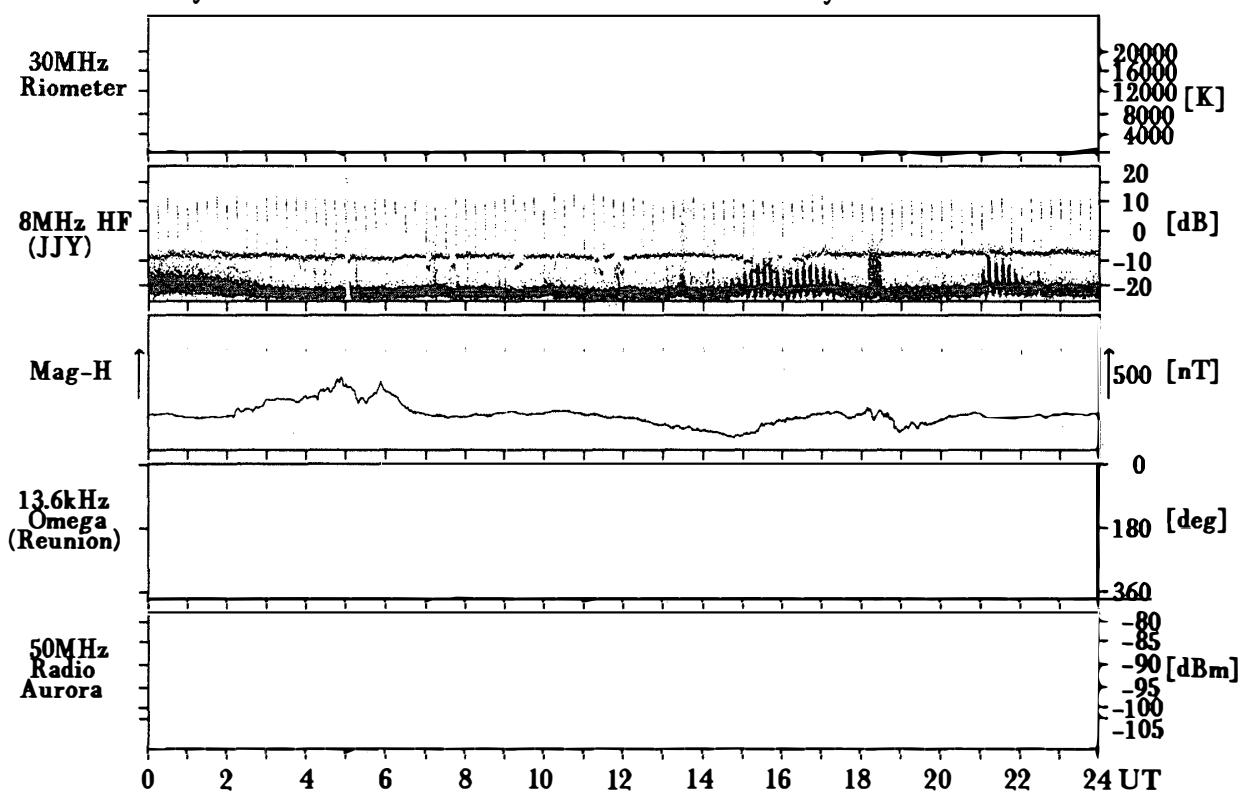
Syowa Station

Total Day / 363 1997/12/29



Syowa Station

Total Day / 364 1997/12/30



Syowa Station

Total Day / 365 1997/12/31

