

RADIO OBSERVATION DATA  
AT SYOWA STATION, ANTARCTICA DURING 1993

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1. Introduction

We have been observing the absorption of cosmic radio noise with a standard riometer (relative ionospheric opacity meter) at 30 MHz at Syowa Station, Antarctica since February 1966. This report presents the data observed between January 1 and December 31, 1993. Besides the observed riometer data, other observation data are presented in the combined data plots for reference. These plots include geomagnetic field, HF, VLF, and radar observations.

Copies of this data in digital form are available to users on request. Requestsshould be addressed to:

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2. Location

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Syowa Station			
Geographic		Geomagnetic	
Latitude	Longitude	Latitude	Longitude
69° 00' S	39° 35' E	-70.0°	80.2°

3. Observer

Takashi YAMAGUCHI (Communications Research Laboratory)

#### 4. Instrumentation

The riometer receiver has a center frequency of 30 MHz and a band width of 7.5 kHz; it is connected to a vertically directed five-element Yagi antenna whose elements are oriented in the east-west direction. The antenna is designed to match the 50-ohm coaxial transmission line (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 data are recorded on magnetic tape in digital form.

#### 5. Remarks

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 about four minutes earlier each day and returns to its initial time after one year. This diurnal variation of the cosmic noise power is deduced from the record on the 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:

$$A = -10 \times \log (T_1 / T_0) .$$

The combined data plots also include the variation of H-component of the geomagnetic field, HF field strength, phase variation of VLF waves, and auroral radar echo intensity at Syowa Station. In the panel of geomagnetic variations, the H-component increases upward and the calibration signals are added each hour as a depression of 200 nT.

Because of troubles in the data acquisition system, the variations of HF field strength after 20h UT on April 3, 1993 does not appear in the combined data plots. Variations of auroral radar echo intensity after 15h UT on April 6, 1993 are not shown because of troubles in the observation system.

We regret that cosmic noise data published in several JARE DATA REPORTS is not correct, as indicated in the next section, 6. Errata.

We also regret that we did not inform the renewing of the title in JARE DATA REPORTS No. 196 (IONOSPHERE 52), Radio Observation Data at Syowa Station, Antarctica during 1993, which was published in March, 1994. Please note that the title of that and this report differs from the corresponding to the previous ones.

Old title: Riometer Records of 30 MHz Cosmic Noise at Syowa Station, Antarctica  
New title: Radio Observation Data at Syowa Station, Antarctica

If there are some unclear points you would raise or have any questions, do not hesitate to write to us at the address described in the introduction.

## 6. Errata

Due to a misinterpretation of calibration signals, cosmic noise data published in the following JARE DATA REPORTS (Riometer Records of 30 MHz Cosmic Noise at Syowa Station), are not correct.

JARE DATA REPORTS No. 141 (IONOSPHERE 39), March 1989  
JARE DATA REPORTS No. 155 (IONOSPHERE 42), March 1990  
JARE DATA REPORTS No. 168 (IONOSPHERE 44), March 1991  
JARE DATA REPORTS No. 176 (IONOSPHERE 47), March 1992  
JARE DATA REPORTS No. 189 (IONOSPHERE 49), March 1993

These include tables of absorption hourly values, strip chart reproductions and panels within combined data plots, relating observations made with a new riometer from 17 UT on January 17, 1987. (The DATA REPORTS No. 141 and No. 155 do not include combined data plots.)

### 6.1. Tables

All hourly values of cosmic noise absorption indicated are not correct, because both actual received power variations and reference sidereal diurnal variations of cosmic noise were scaled using the mishandled calibration levels.

### 6.2. Strip charts

All strip charts should be read assuming that calibration levels correspond to:

20000 K (0 dB)	instead of	0 dB
16000 K (0.9691 dB)		-1 dB
12000 K (2.2185 dB)		-2 dB
8000 K (3.9794 dB)		-3 dB
4000 K (6.9897 dB)		-4 dB

(ref. Fig. 1)

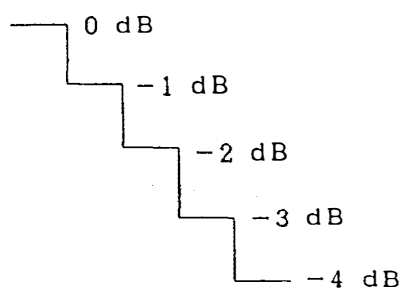


Fig. 1(a) (Error)

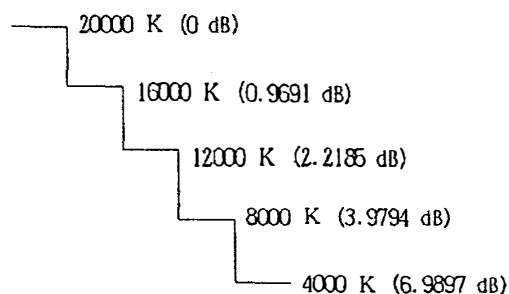


Fig. 1(b) (Correct)

6.3. Combined plots

Top panel (30 MHz Riometer) right scale should be changed in the same way as the strip chart case. (ref. Fig. 2)

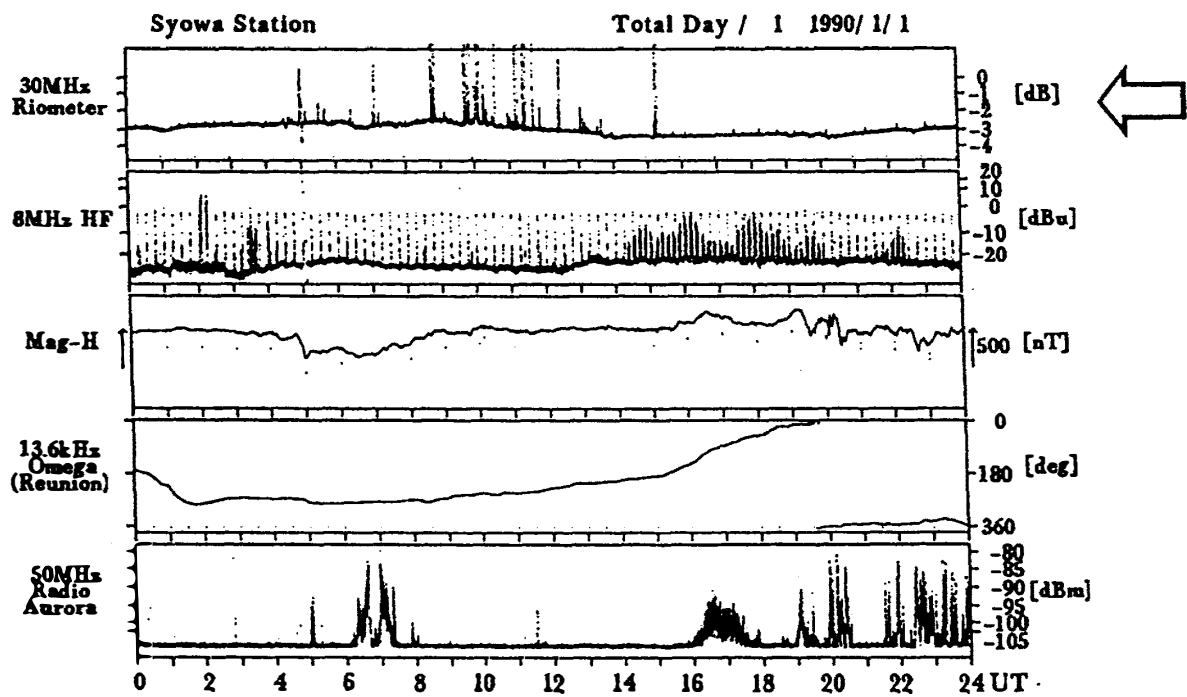


Fig. 2(a) (Error)

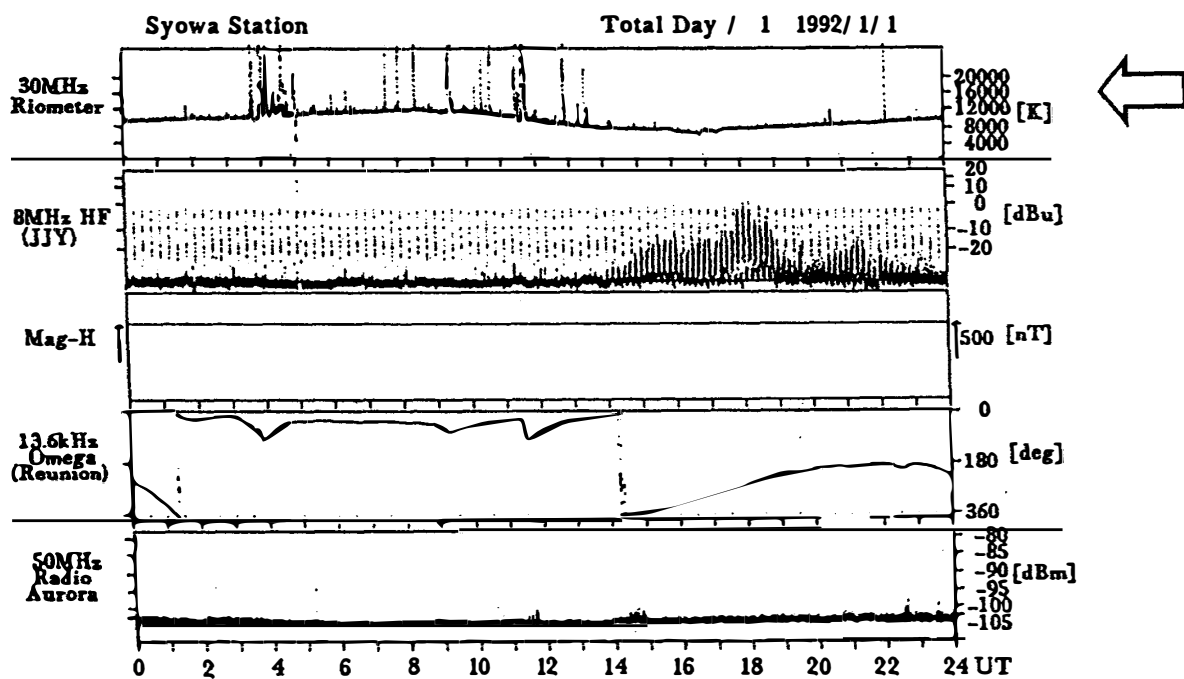


Fig. 2(b) (Correct)



Bibliography relevant to RADIO OBSERVATION DATA AT SYOWA STATION, ANTARCTICA (1)  
 (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. Komiyama, 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
(cont.)				

Bibliography relevant to RADIO OBSERVATION DATA AT SYOWA STATION, ANTARCTICA (2)  
 (RIOMETER RECORDS OF 30 MHz COSMIC NOISE AT SYOWA STATION, ANTARCTICA)

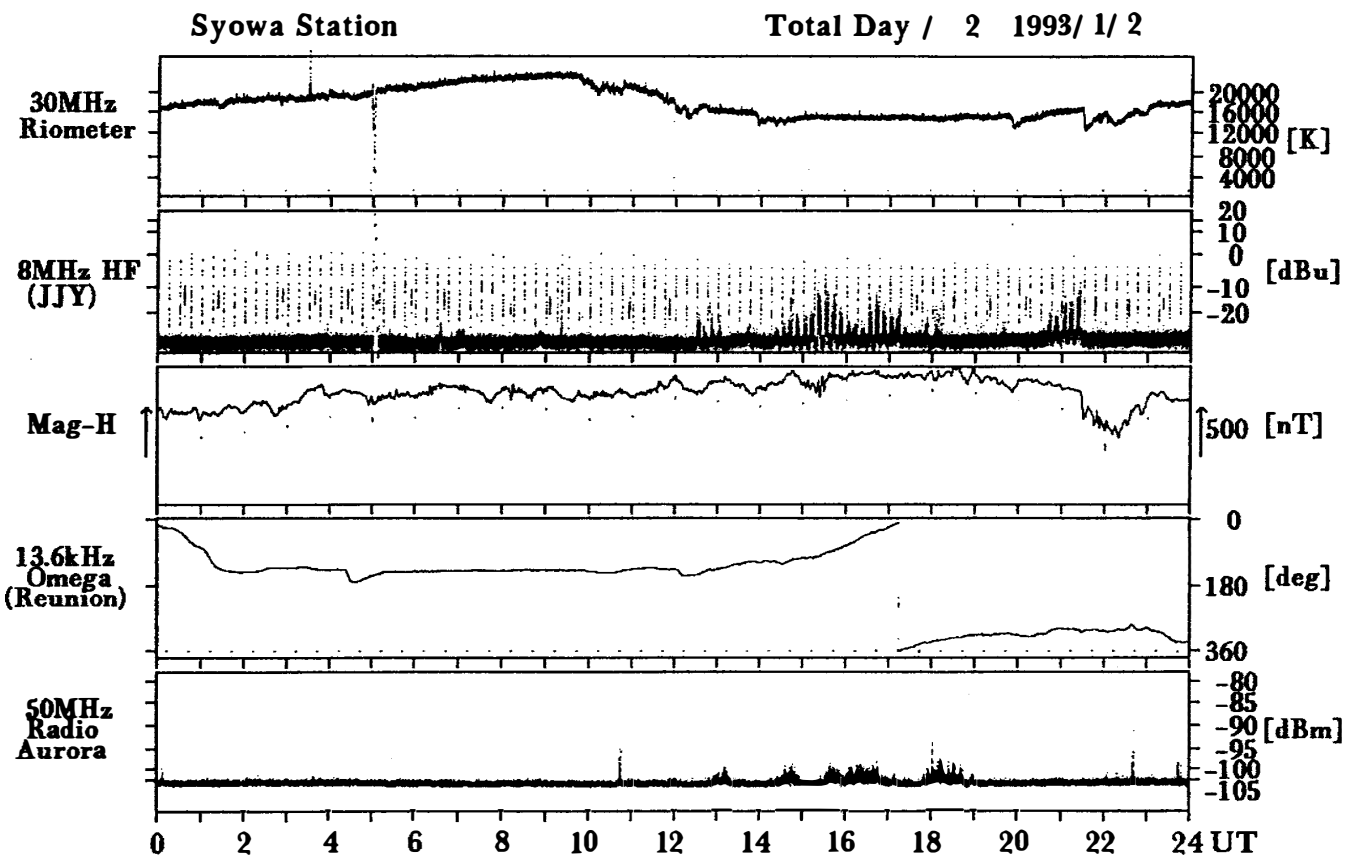
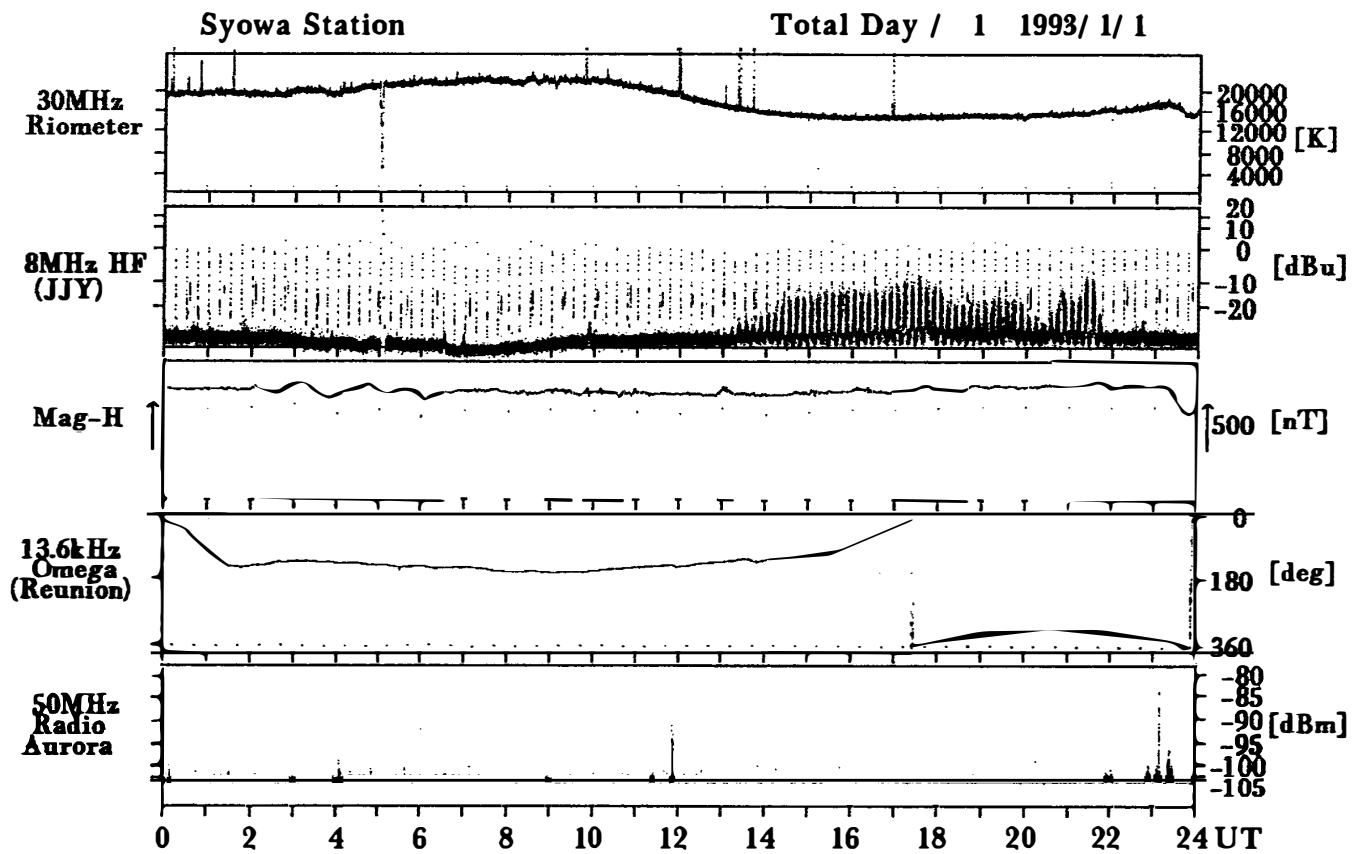
Observing Period	Observers	Literature		
		JARE Data Reports		
		Volume	Pages	Year
1979	Ose, M. Ojima, S. Komiya, N.	56 (Ionosphere 22)	84	1980
1980	Ose, M. Nozaki, K.	70 (Ionosphere 26)	97	1982
1981	Ose, M. Kurihara, N.	80 (Ionosphere 27)	94	1983
1982	Kuratani, Y. Igarashi, K.	87 (Ionosphere 29)	86	1984
1983	Kuratani, Y. Yamazaki, I. Tanaka, T.	99 (Ionosphere 31)	93	1985
1984	Kuratani, Y. Yamamoto, S.	112 (Ionosphere 33)	95	1986
1985	Kuratani, Y. Maeno, H.	122 (Ionosphere 35)	94	1987
1986	Maeno, H. Suzuki, A.	133 (Ionosphere 37)	96	1988
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
(cont.)				

Bibliography relevant to RADIO OBSERVATION DATA AT SYOWA STATION, ANTARCTICA (3)  
 (RIOMETER RECORDS OF 30 MHz COSMIC NOISE AT SYOWA STATION, ANTARCTICA)

Observing Period	Observers	Literature		
		JARE Data Reports		
		Volume	Pages	Year
1991	Nozaki, K. Kunitake, M.	189 (Ionosphere 49)	184	1993
1992	Kamata, M. Kunitake, M.	196 (Ionosphere 52)	202	1994

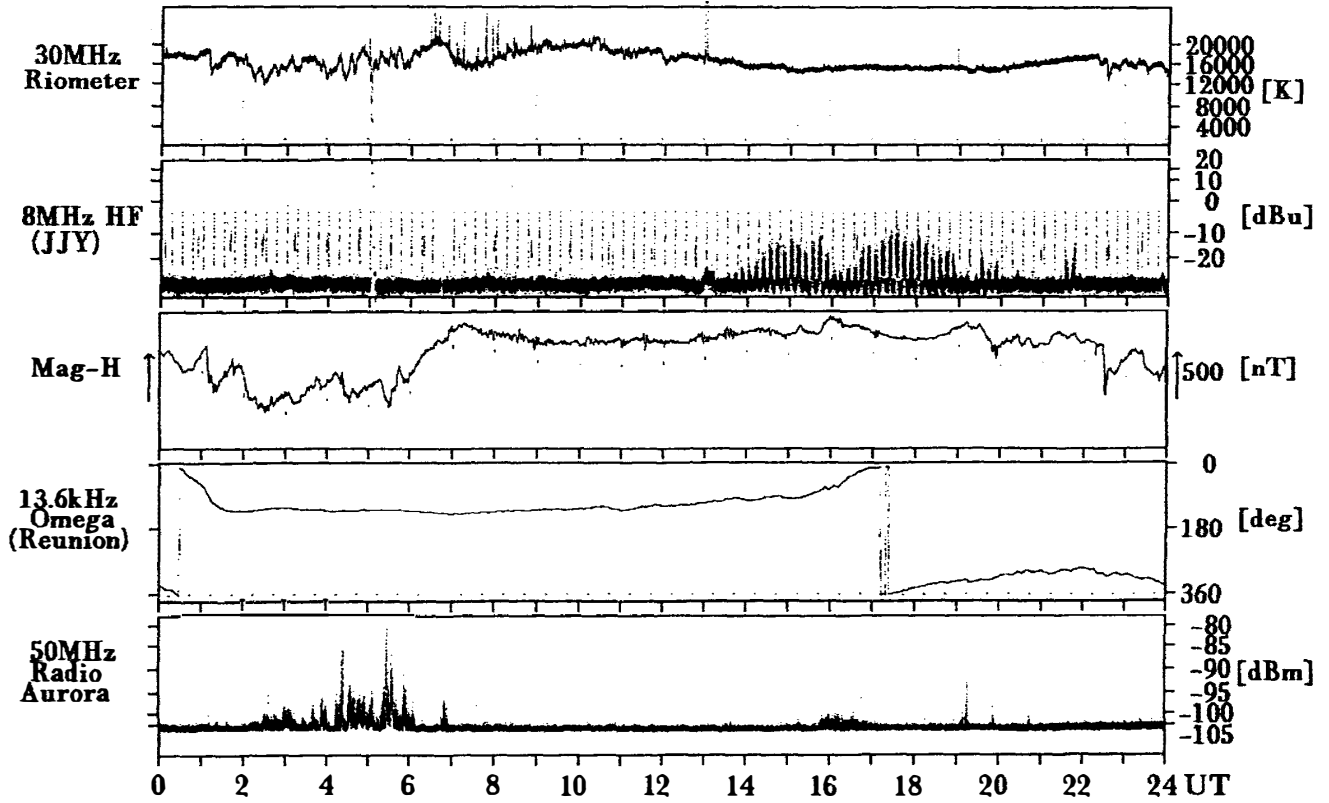
Period without combined data plots

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 14 - 0600



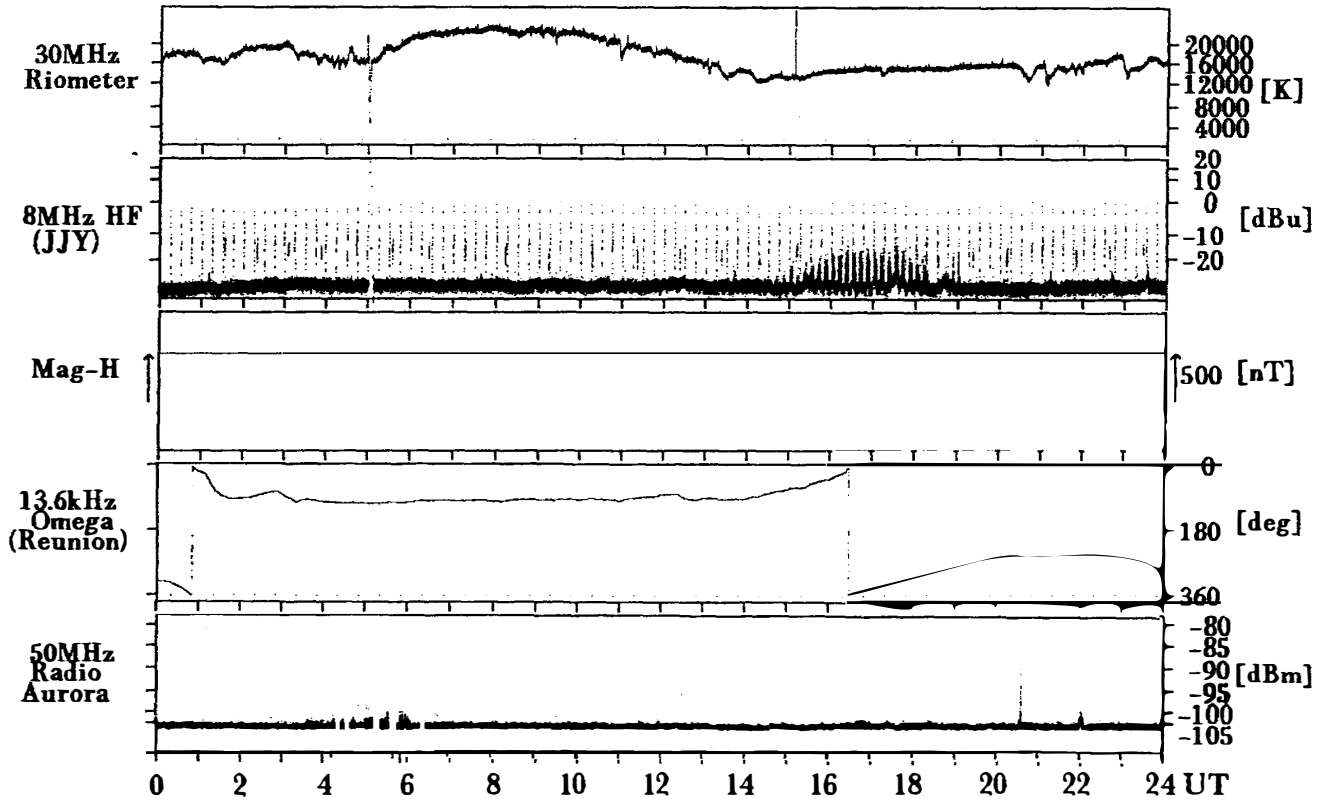
Syowa Station

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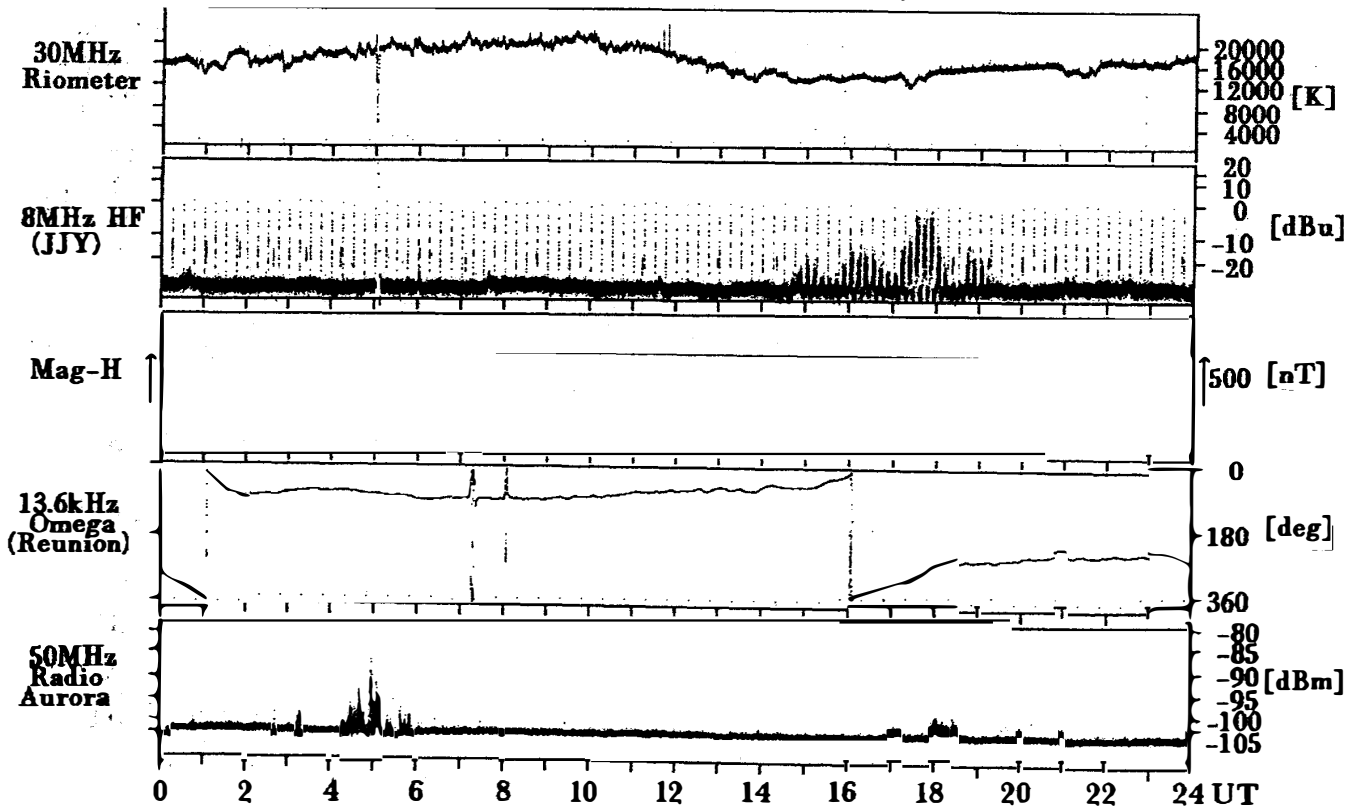
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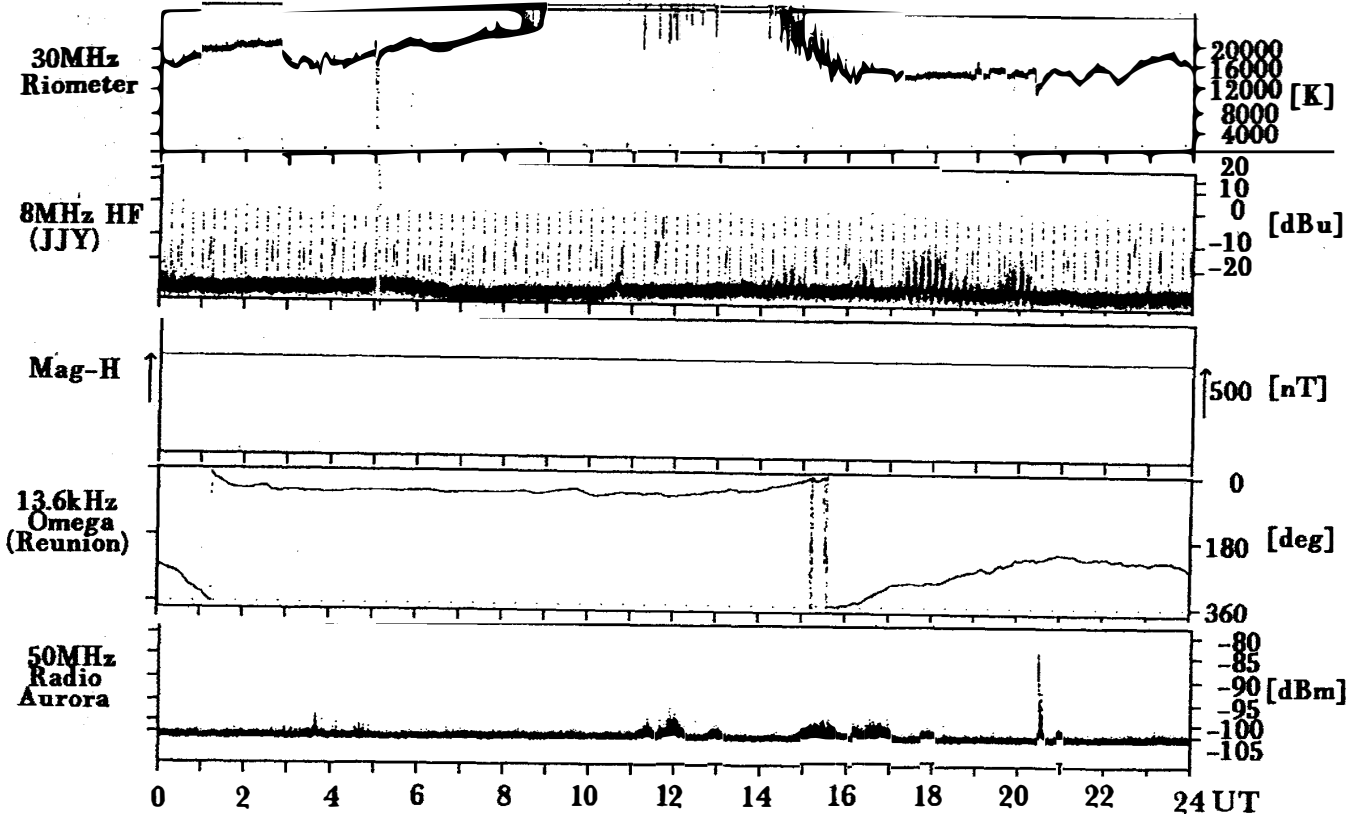
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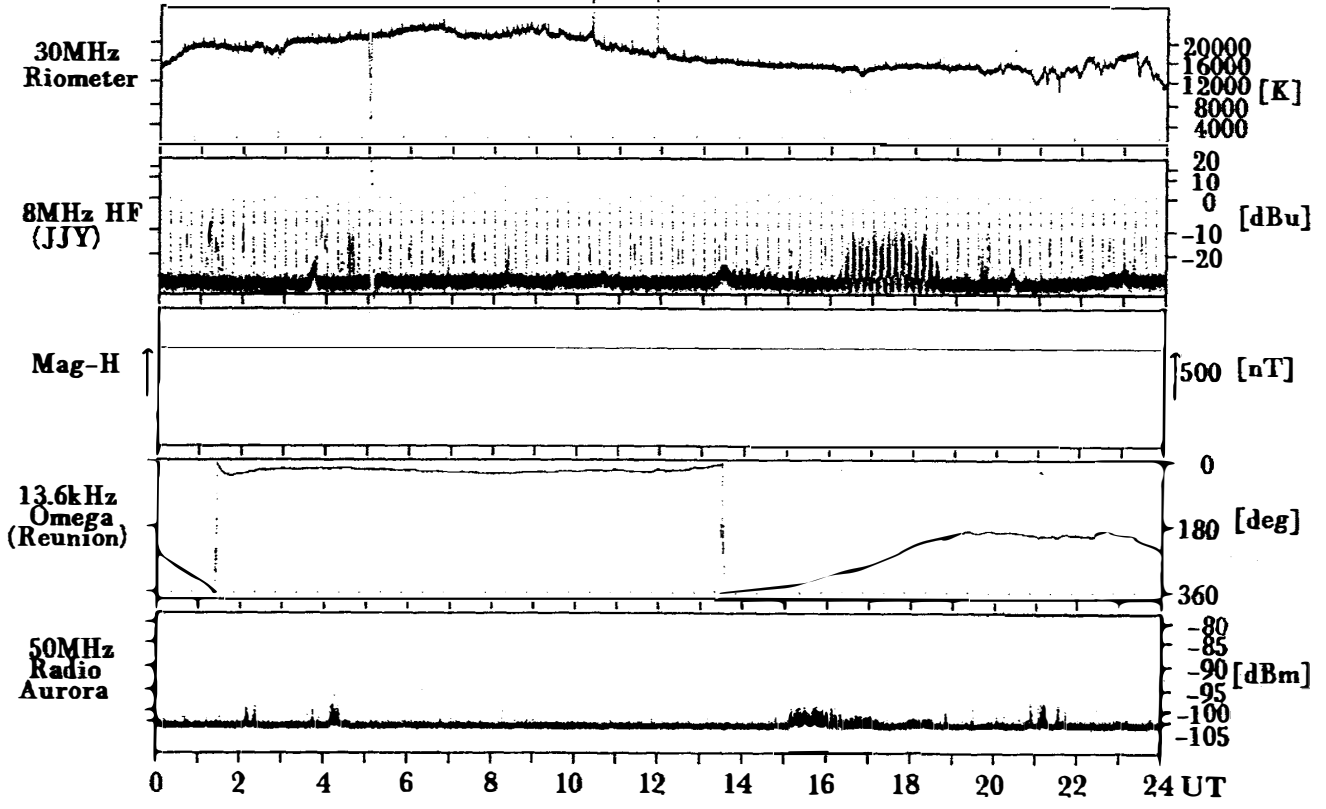
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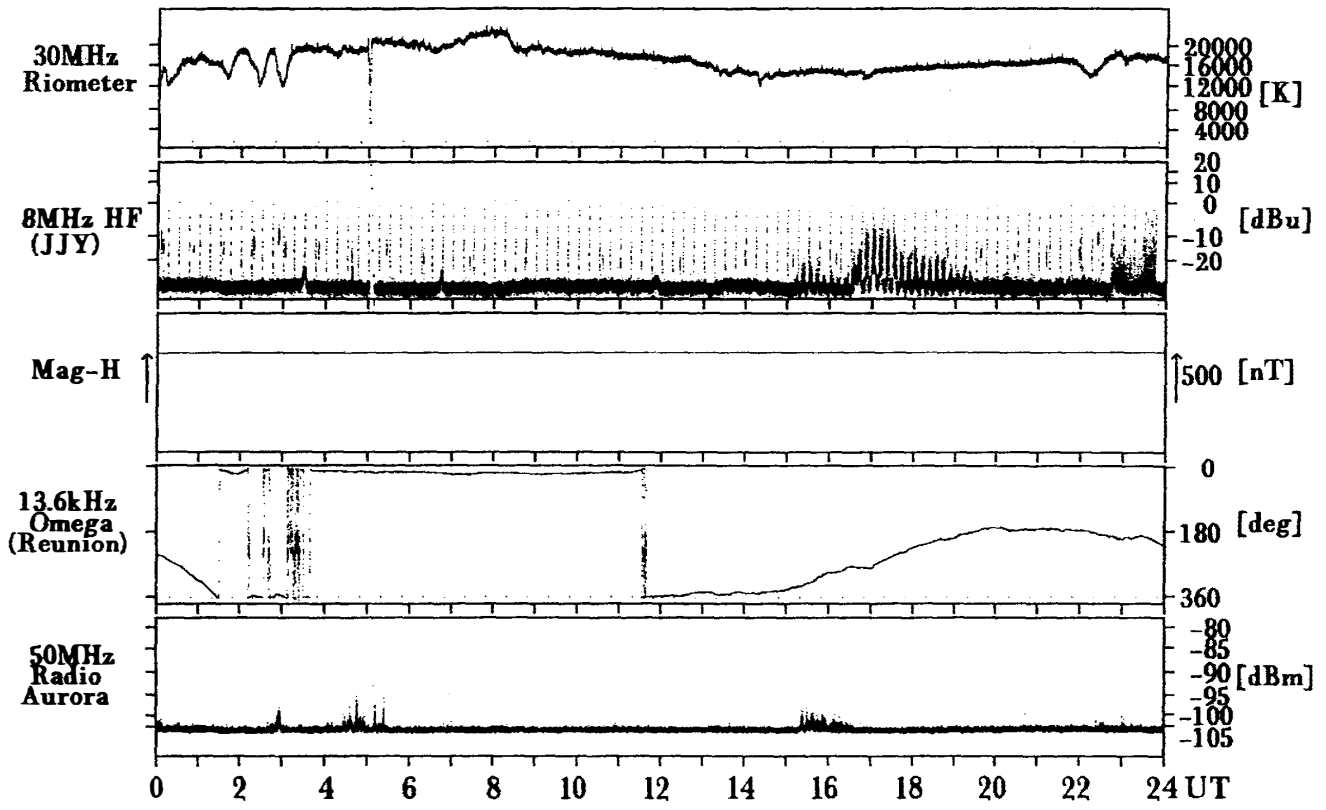
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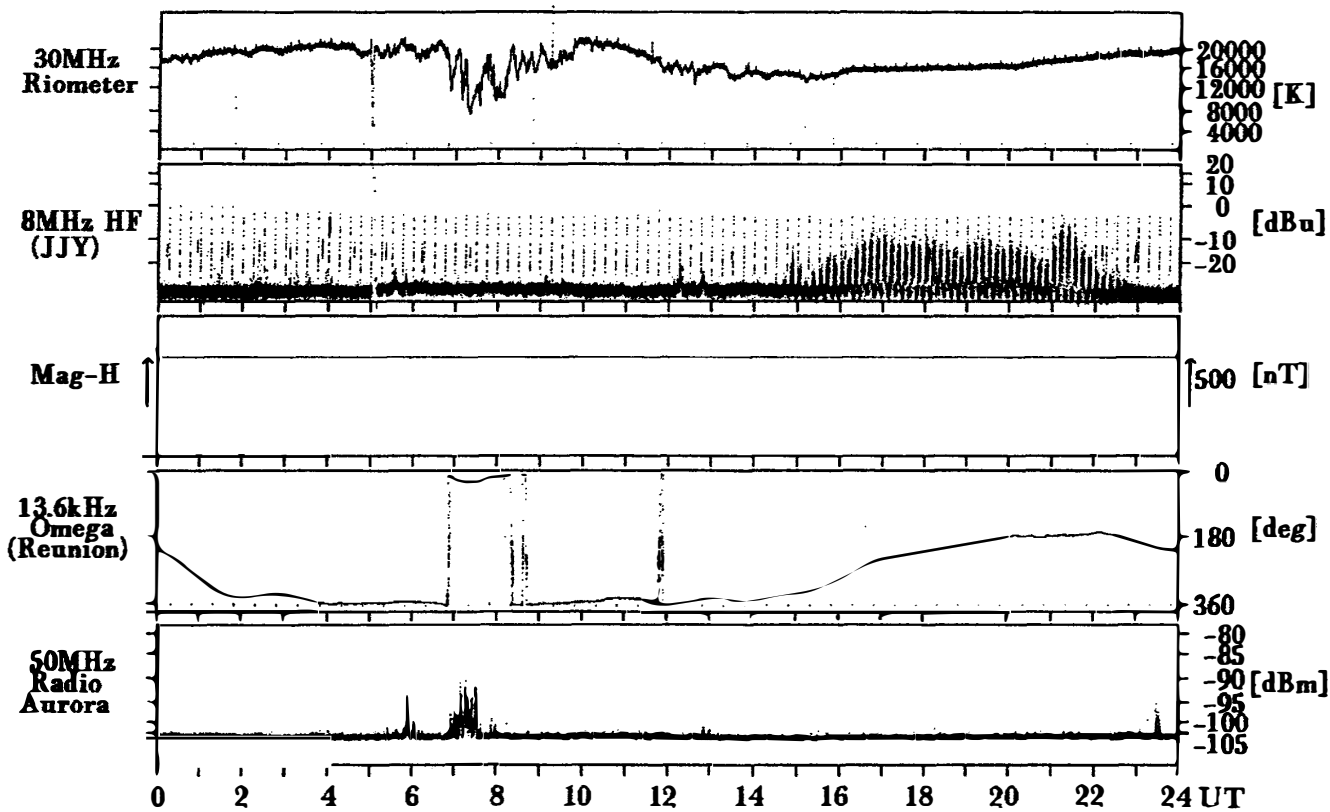
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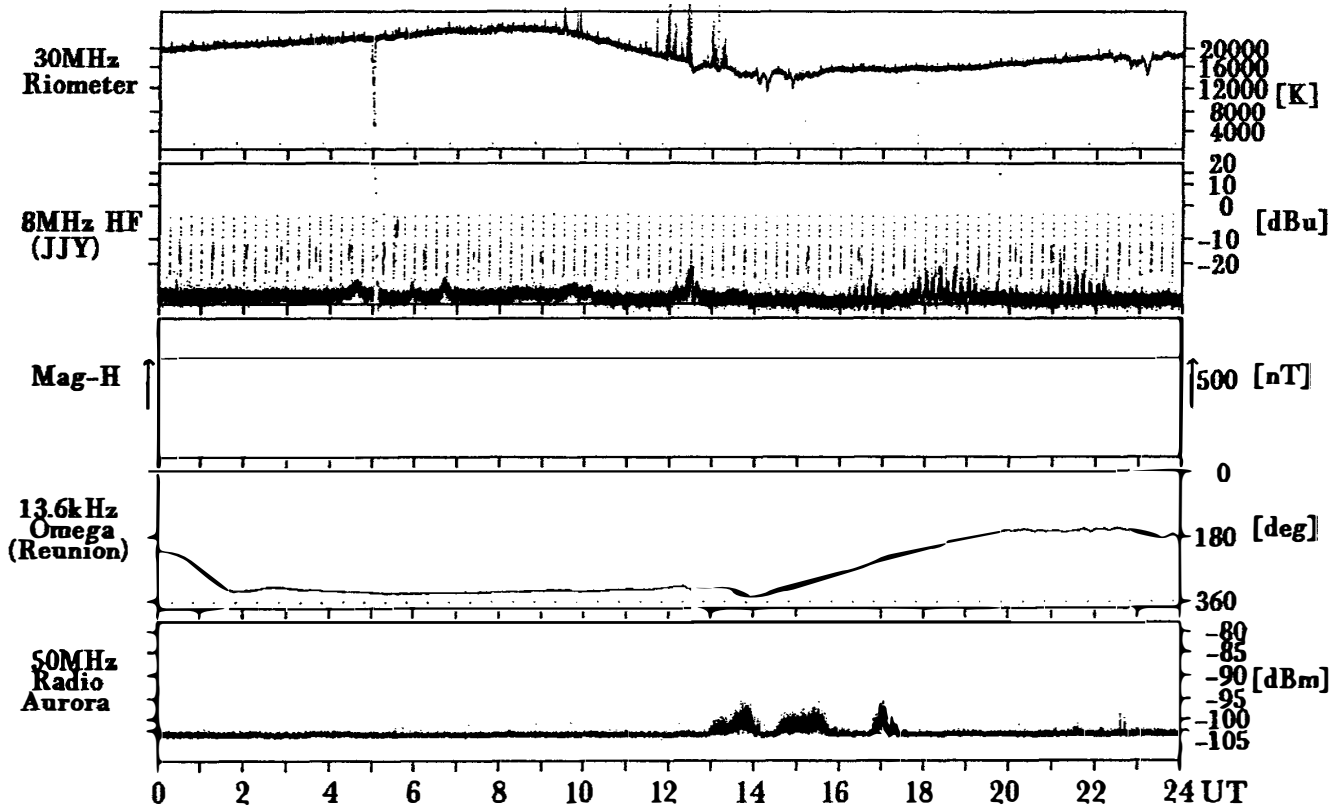
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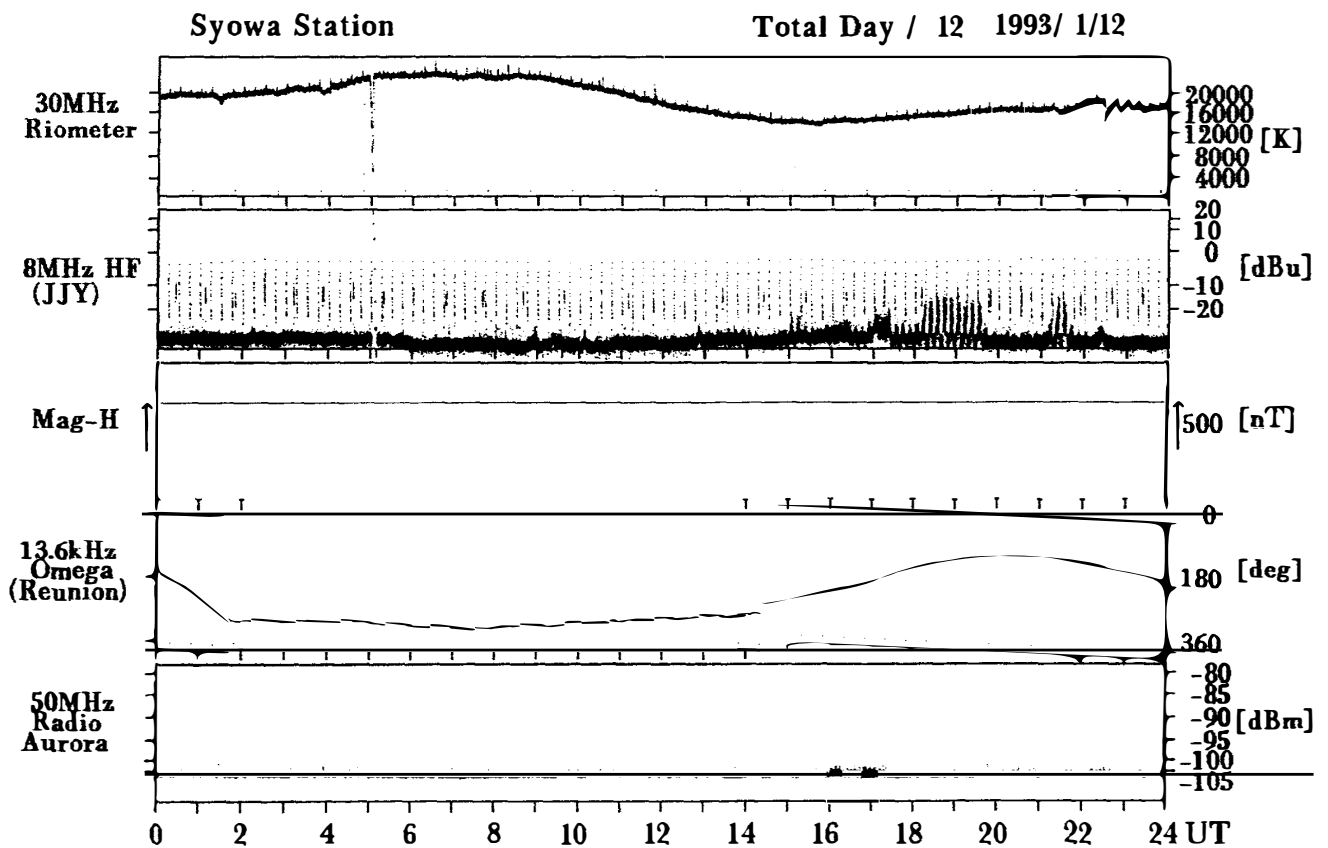
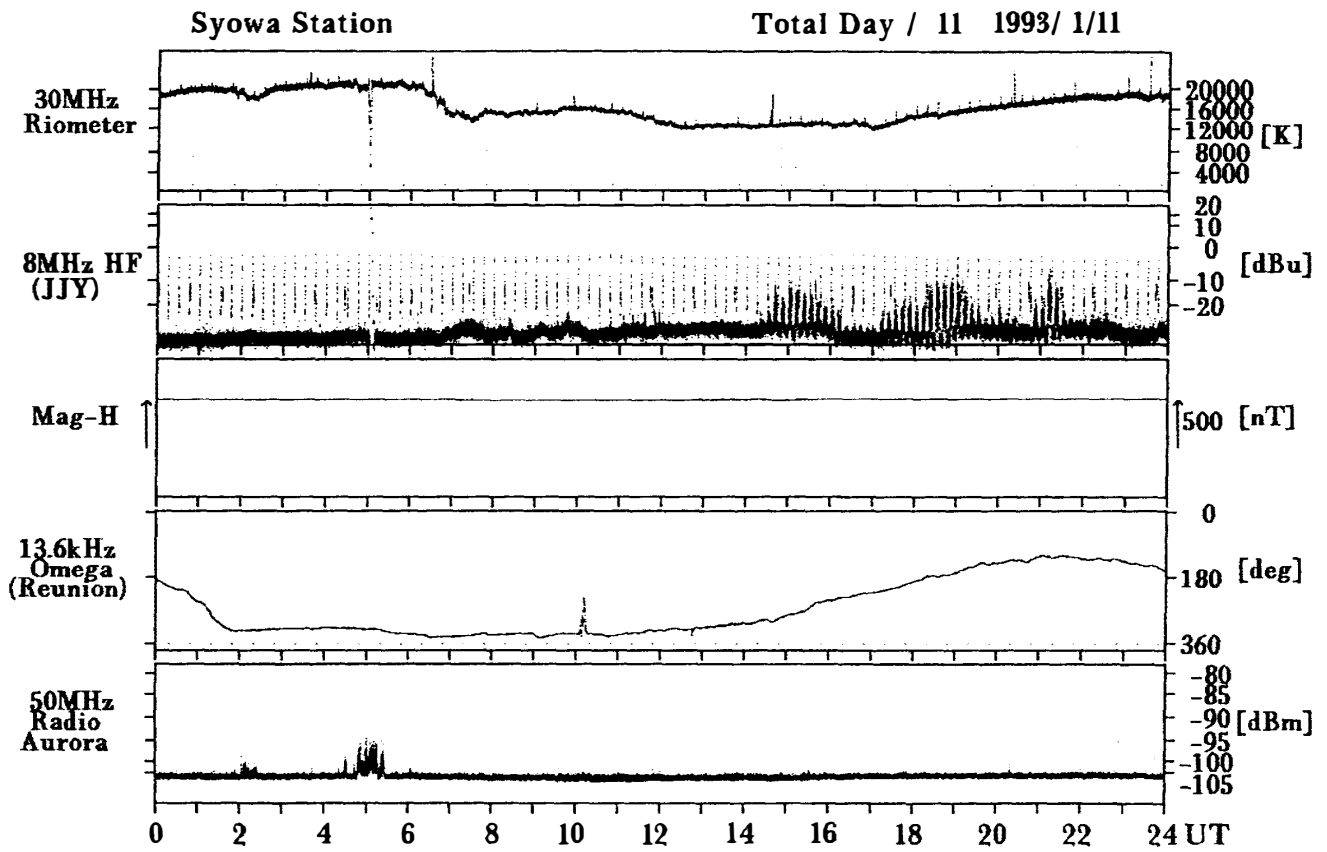


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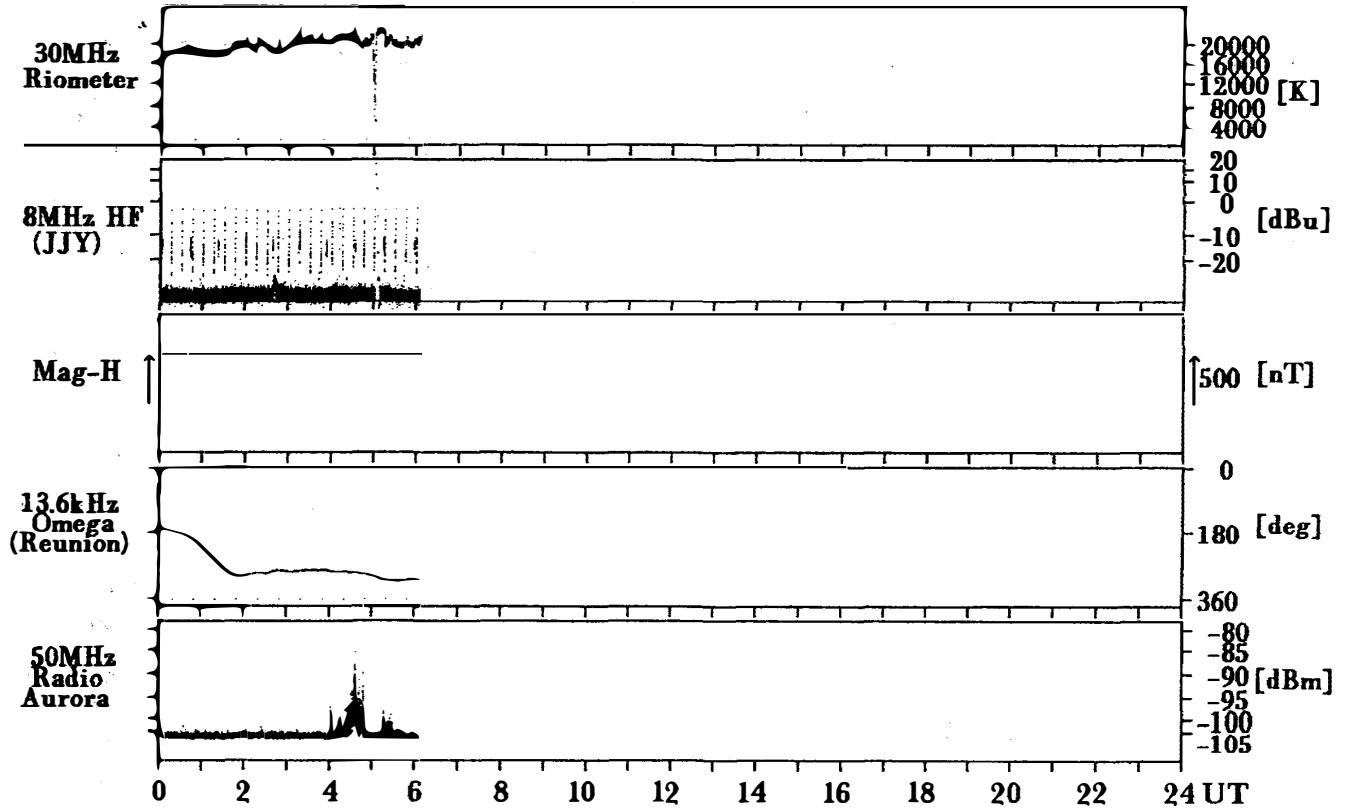






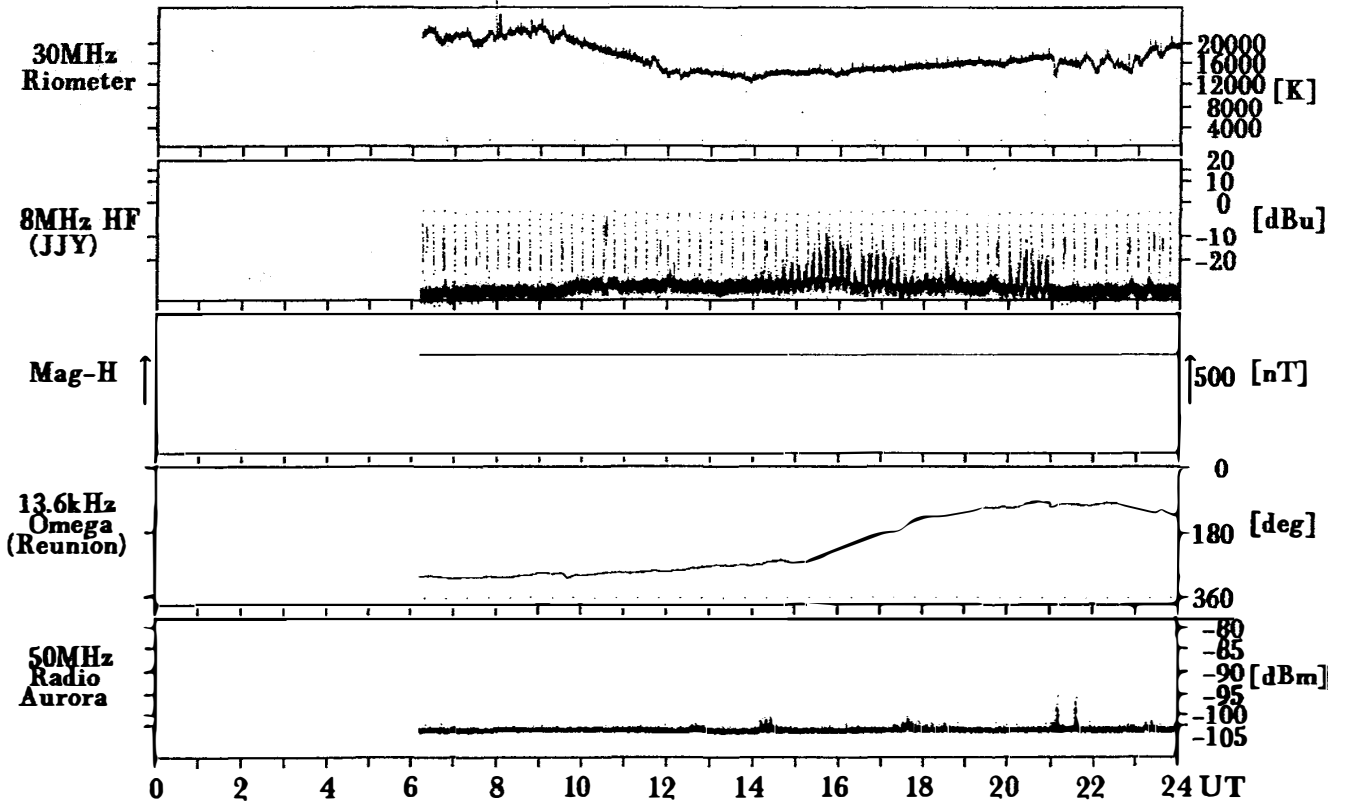
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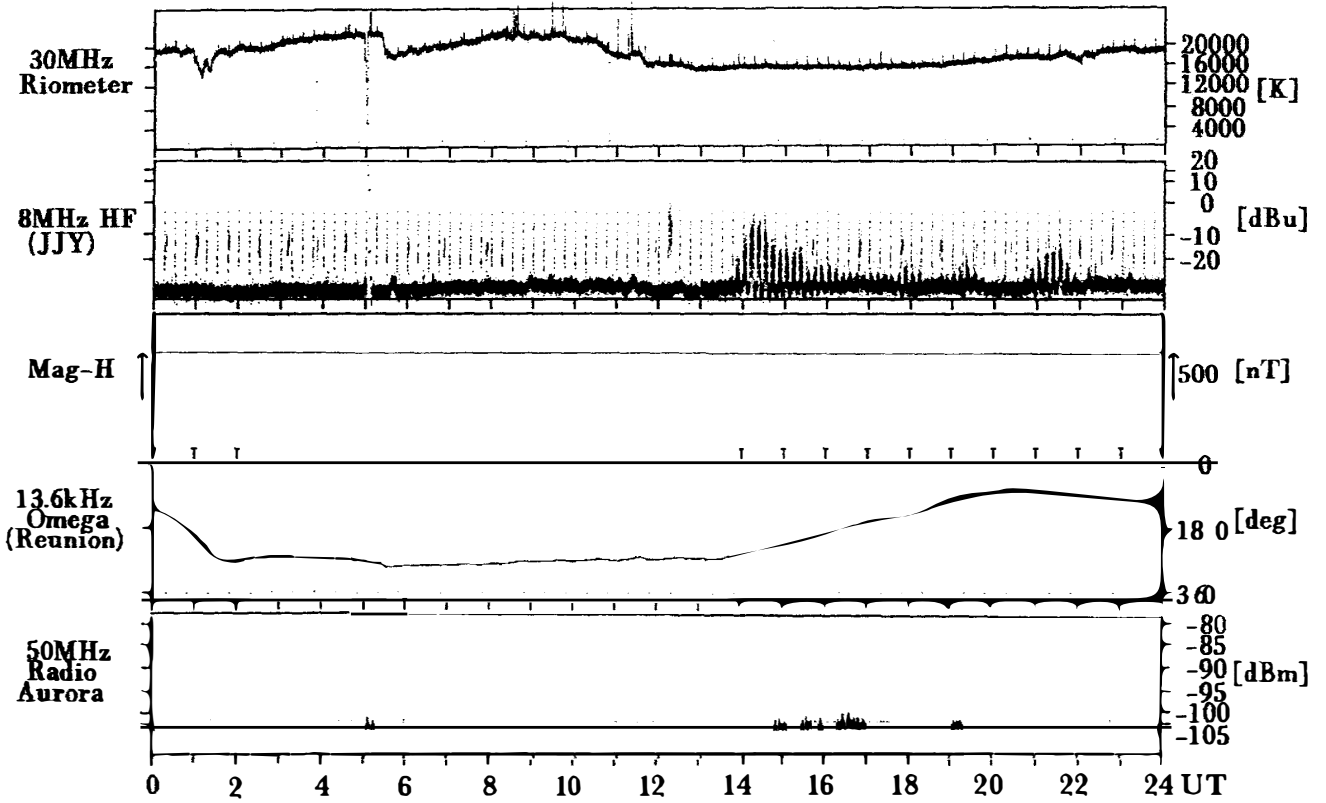
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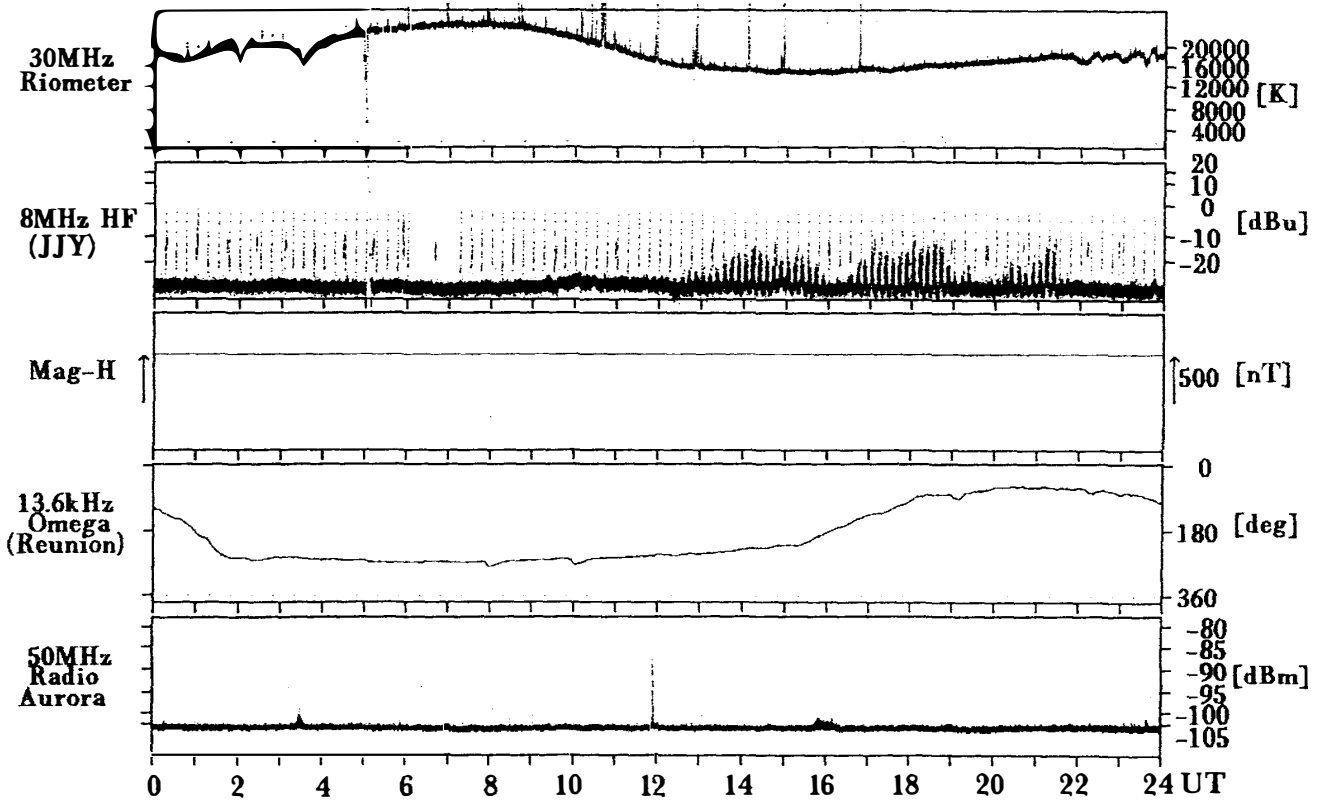
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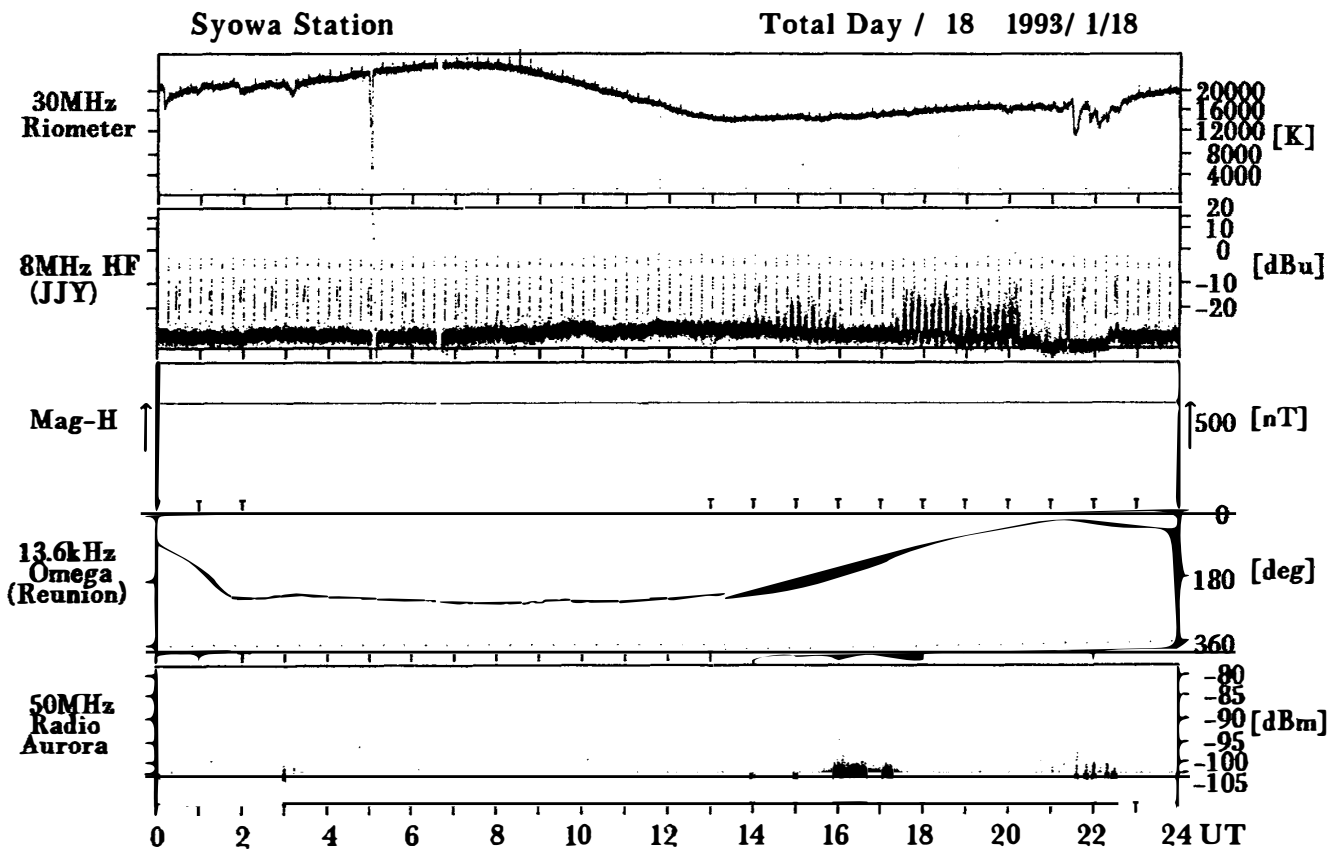
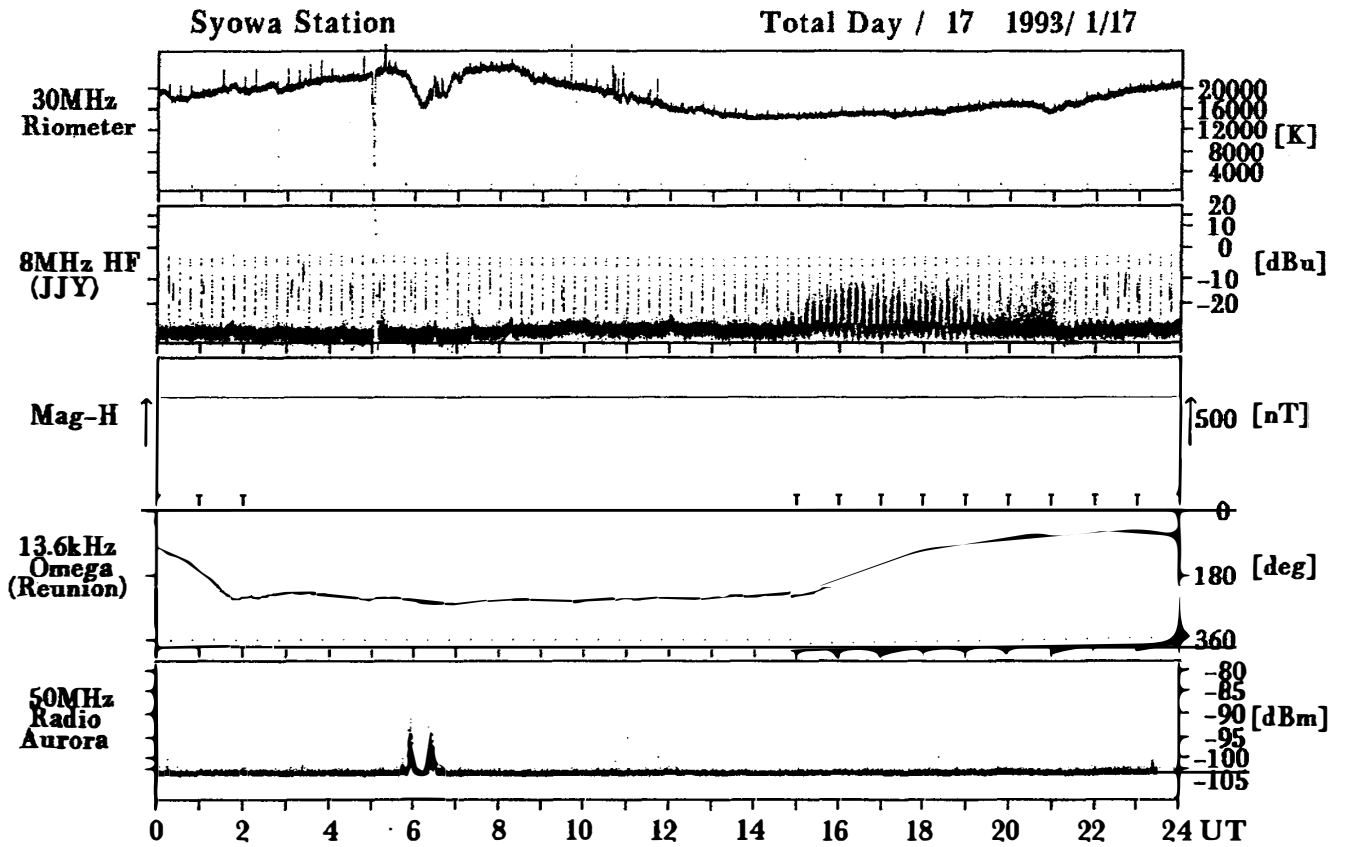
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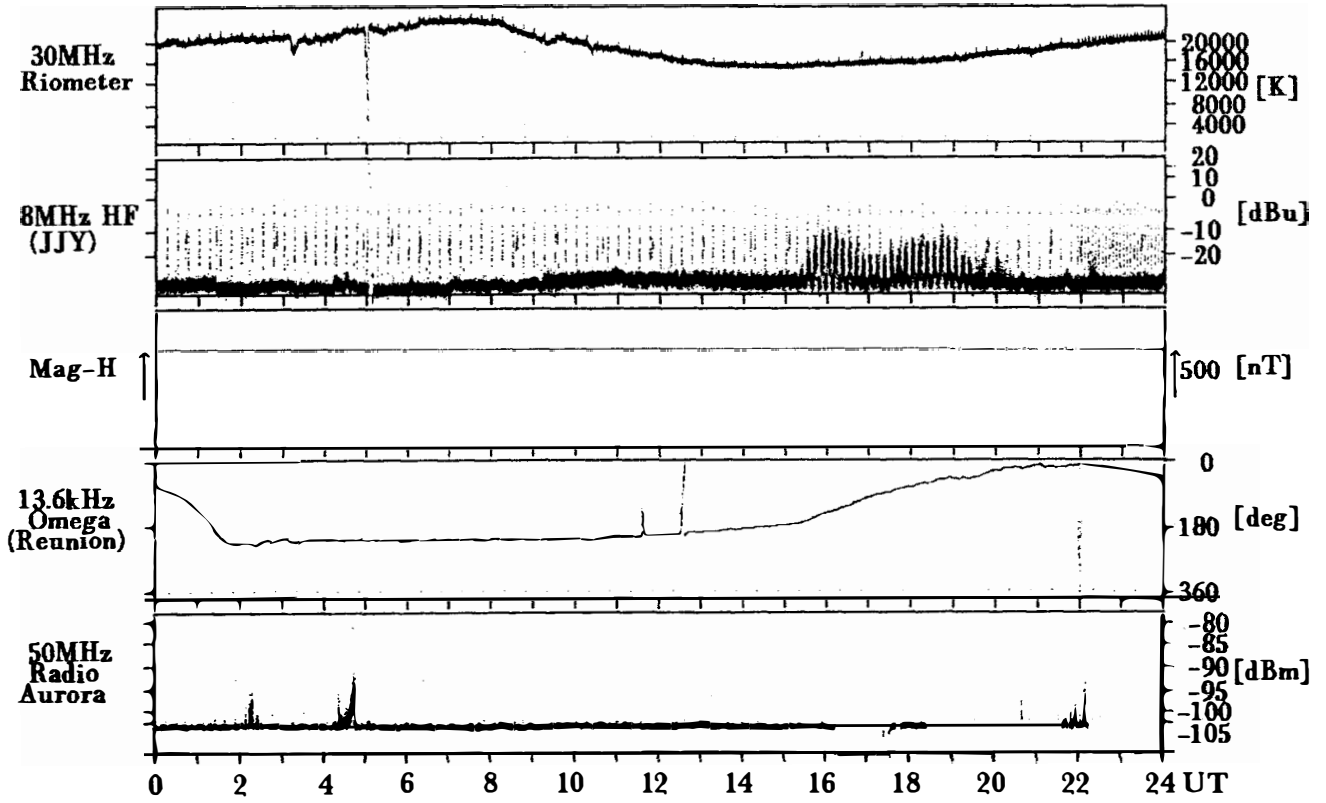
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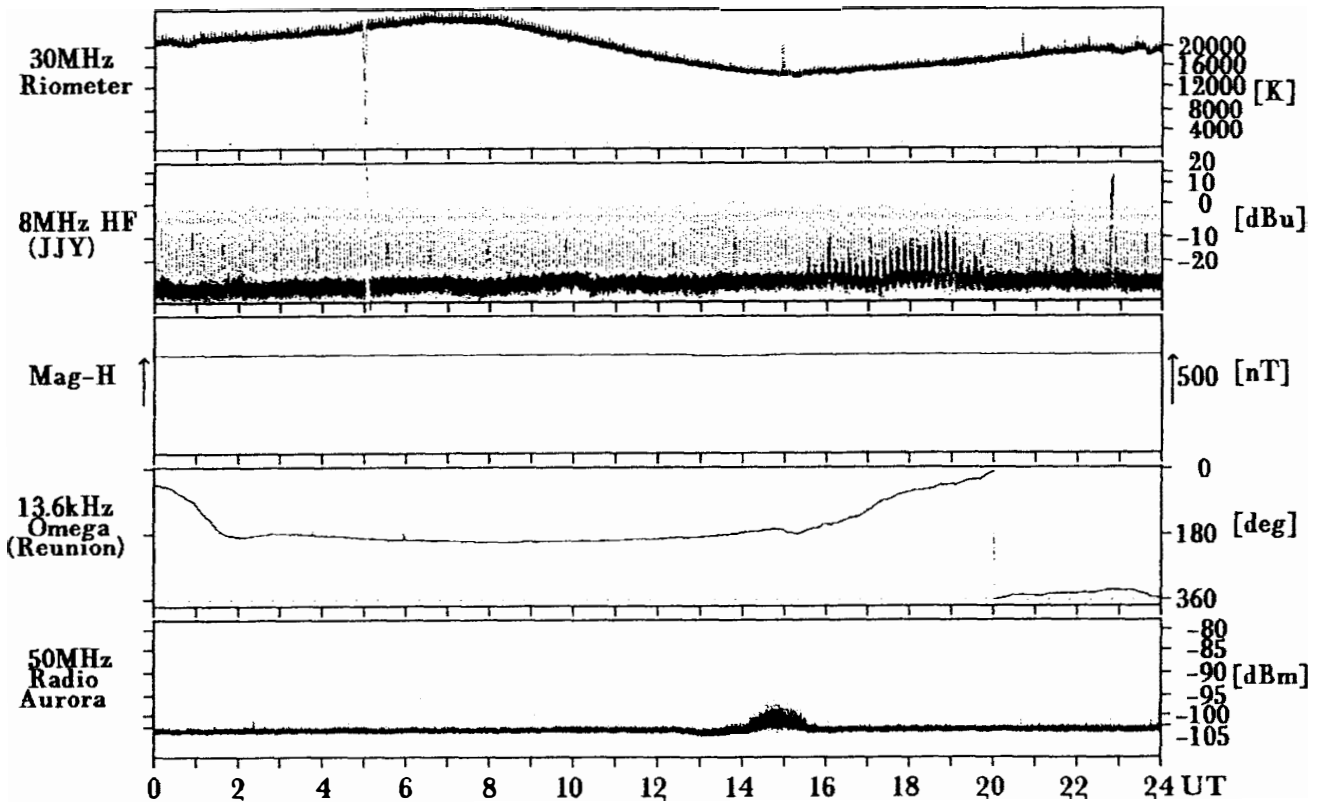
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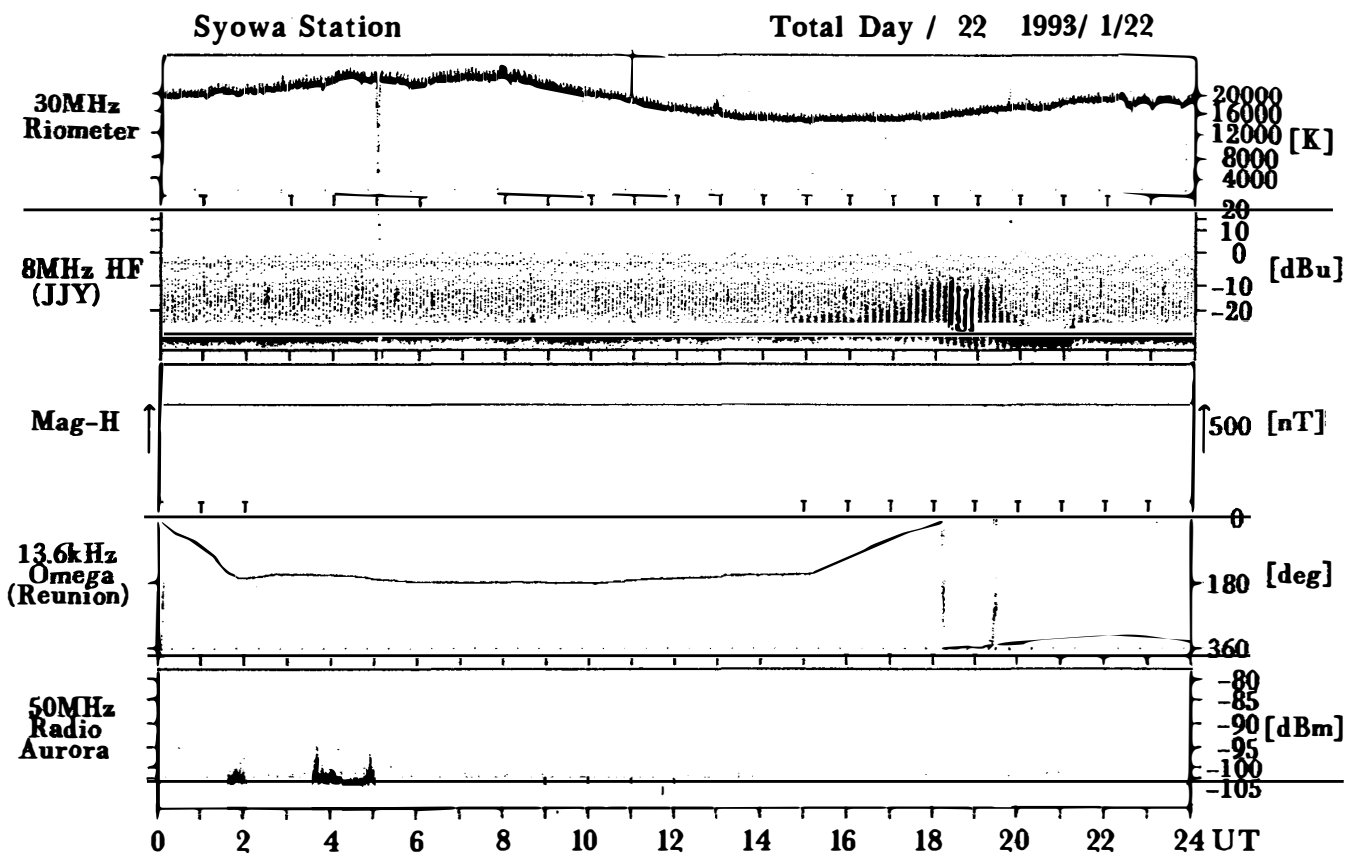
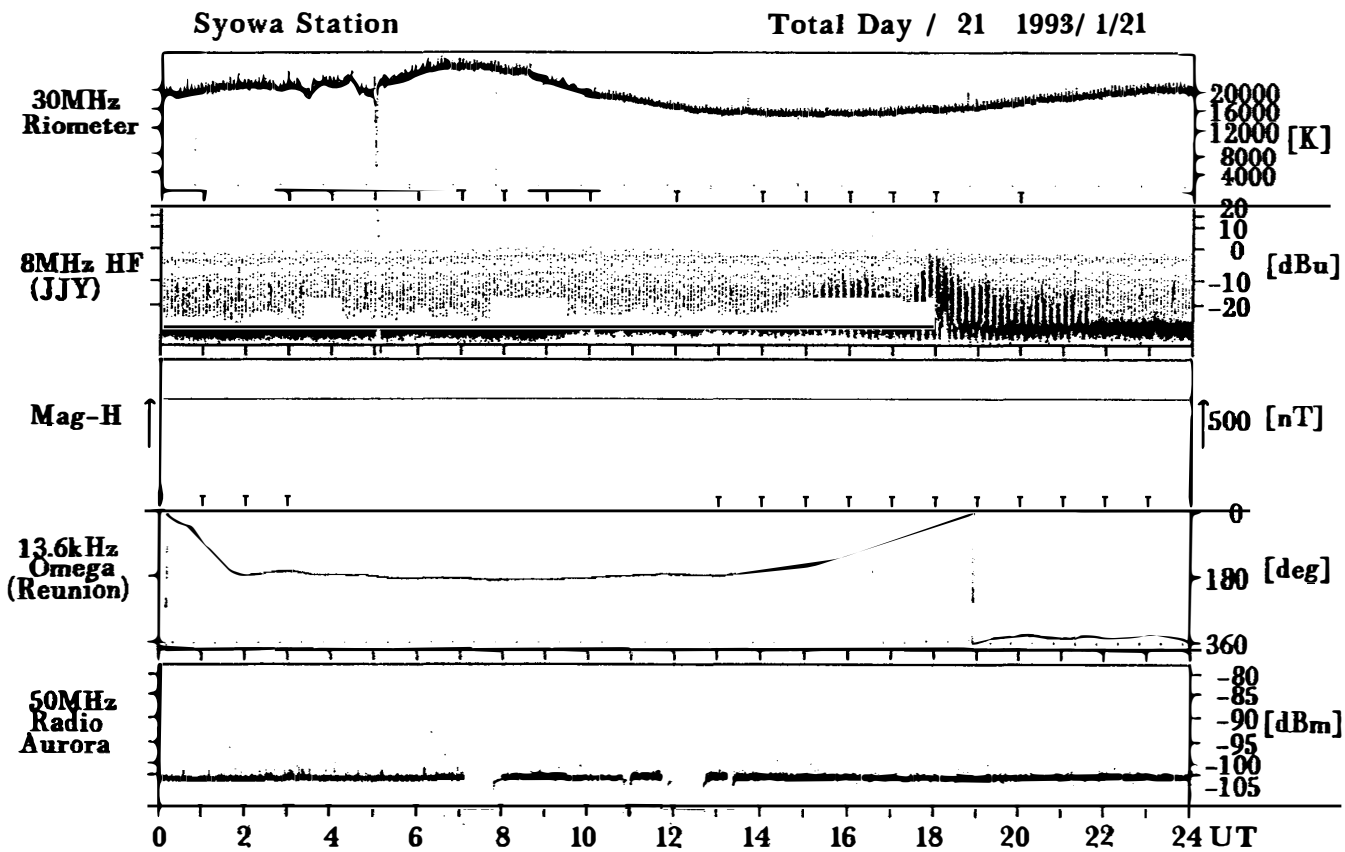
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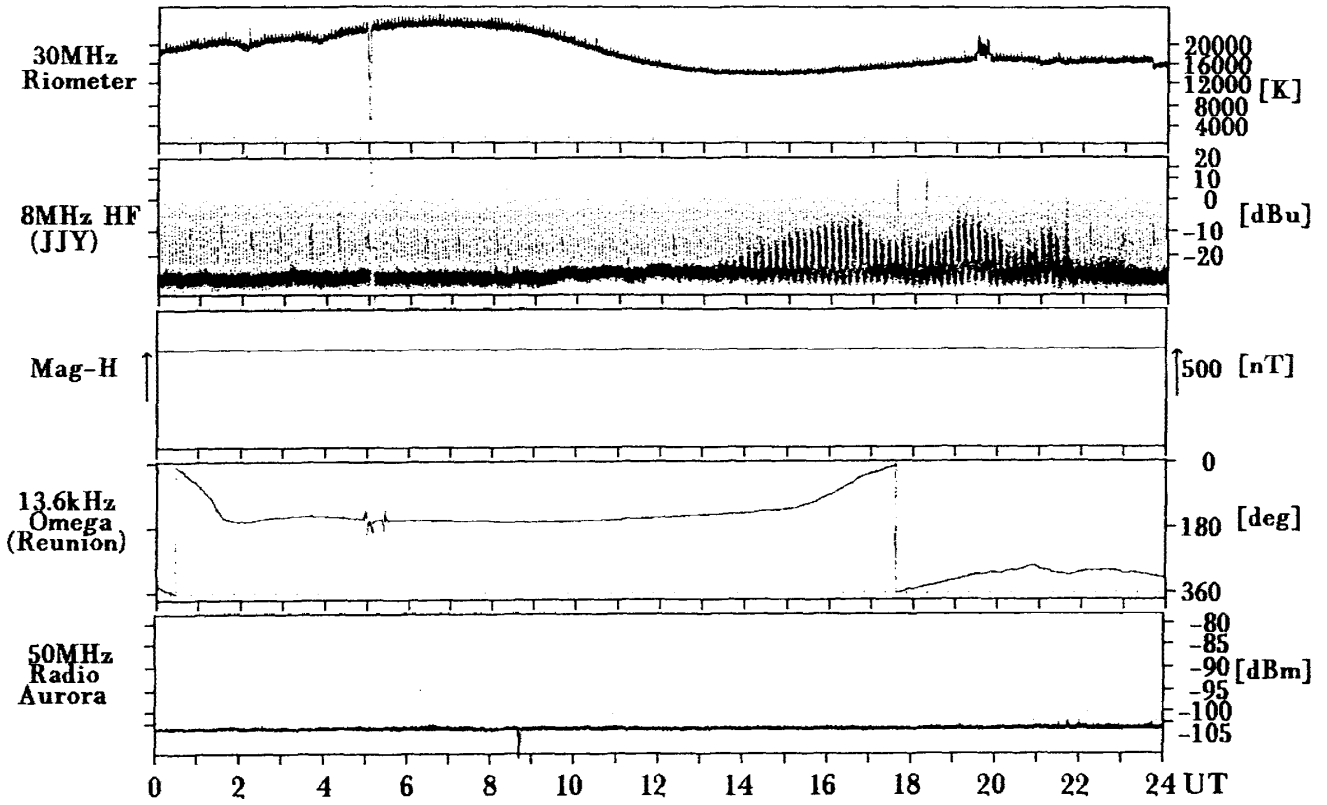
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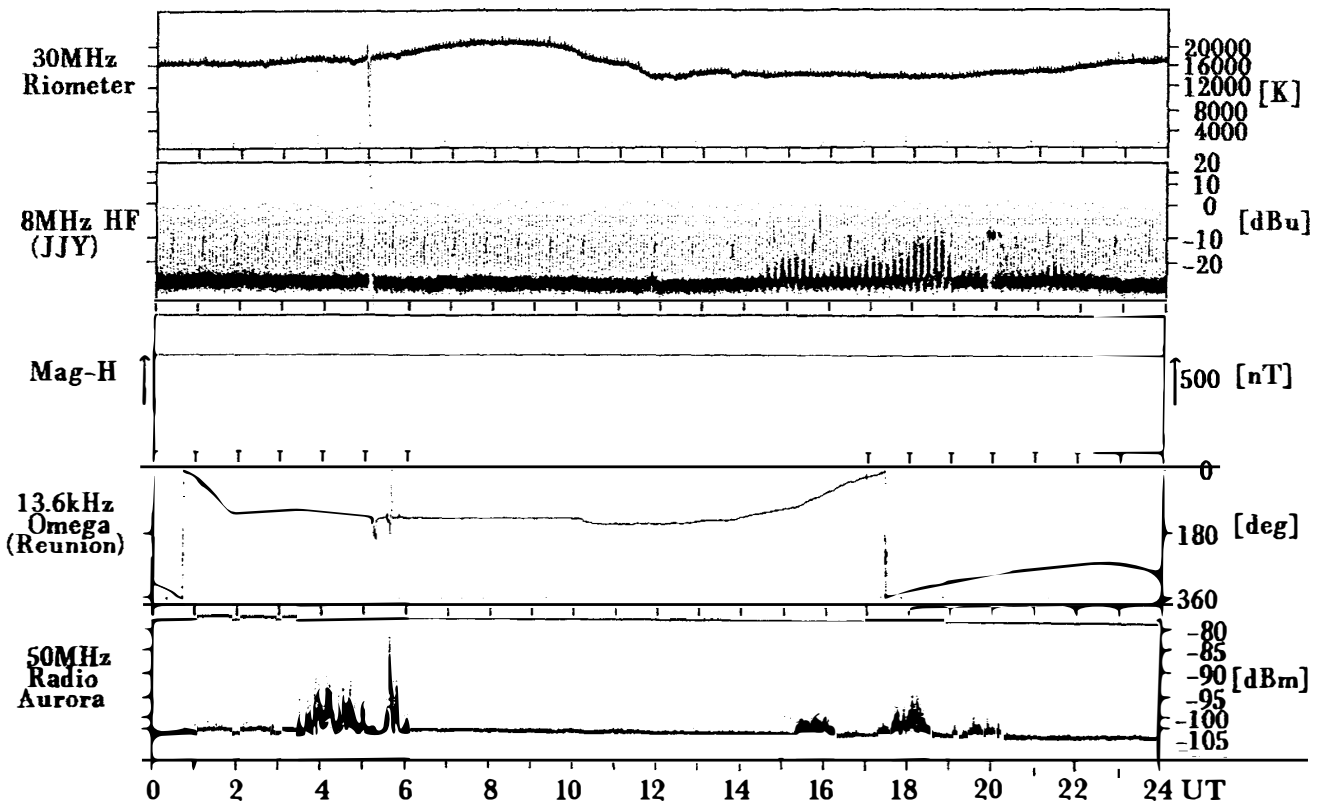
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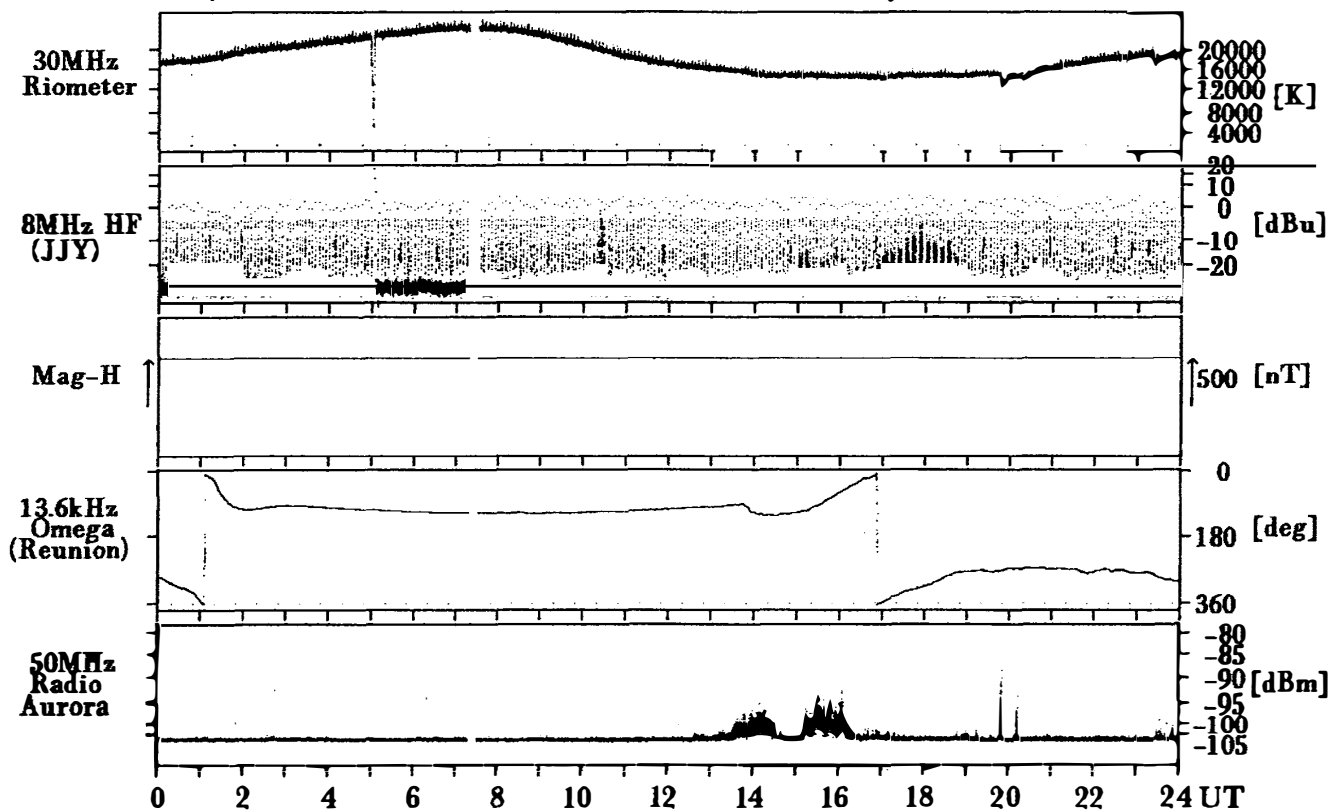
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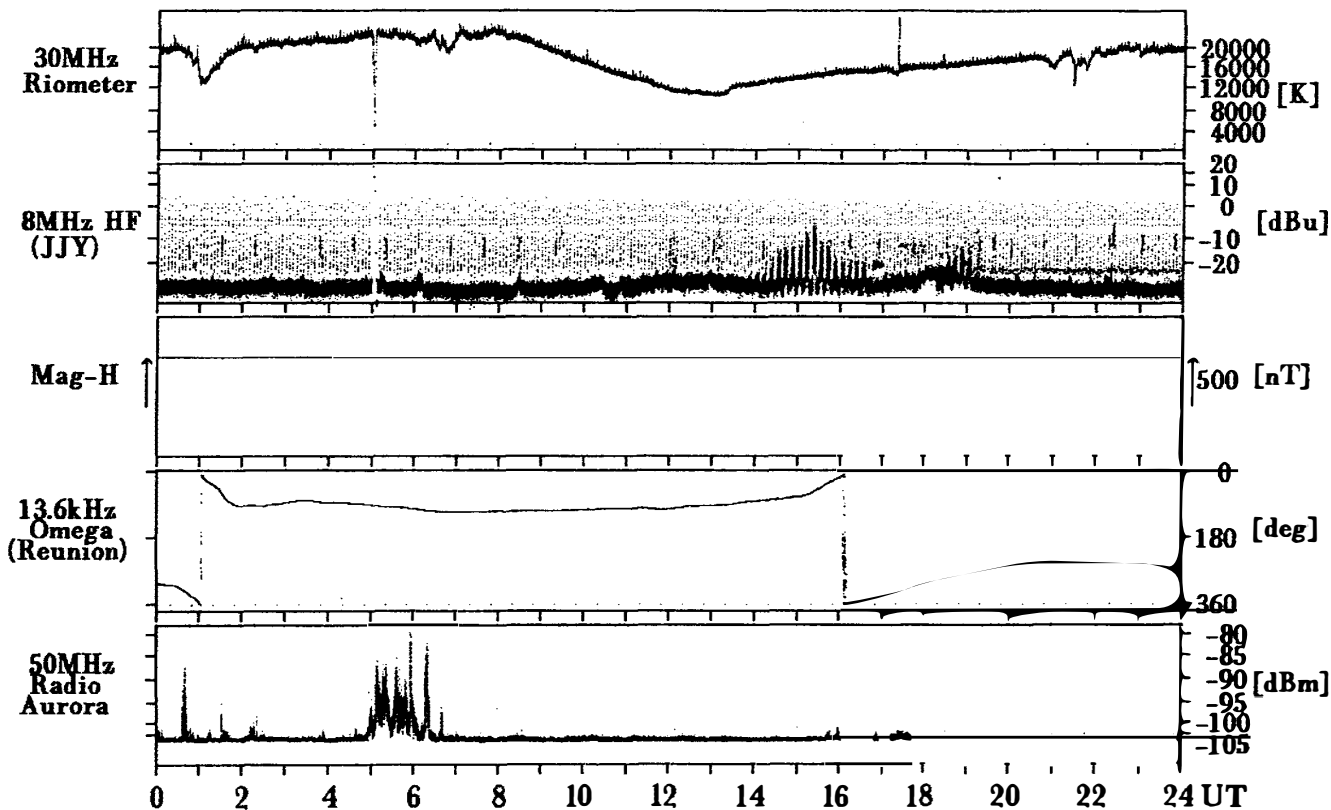
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Syowa Station

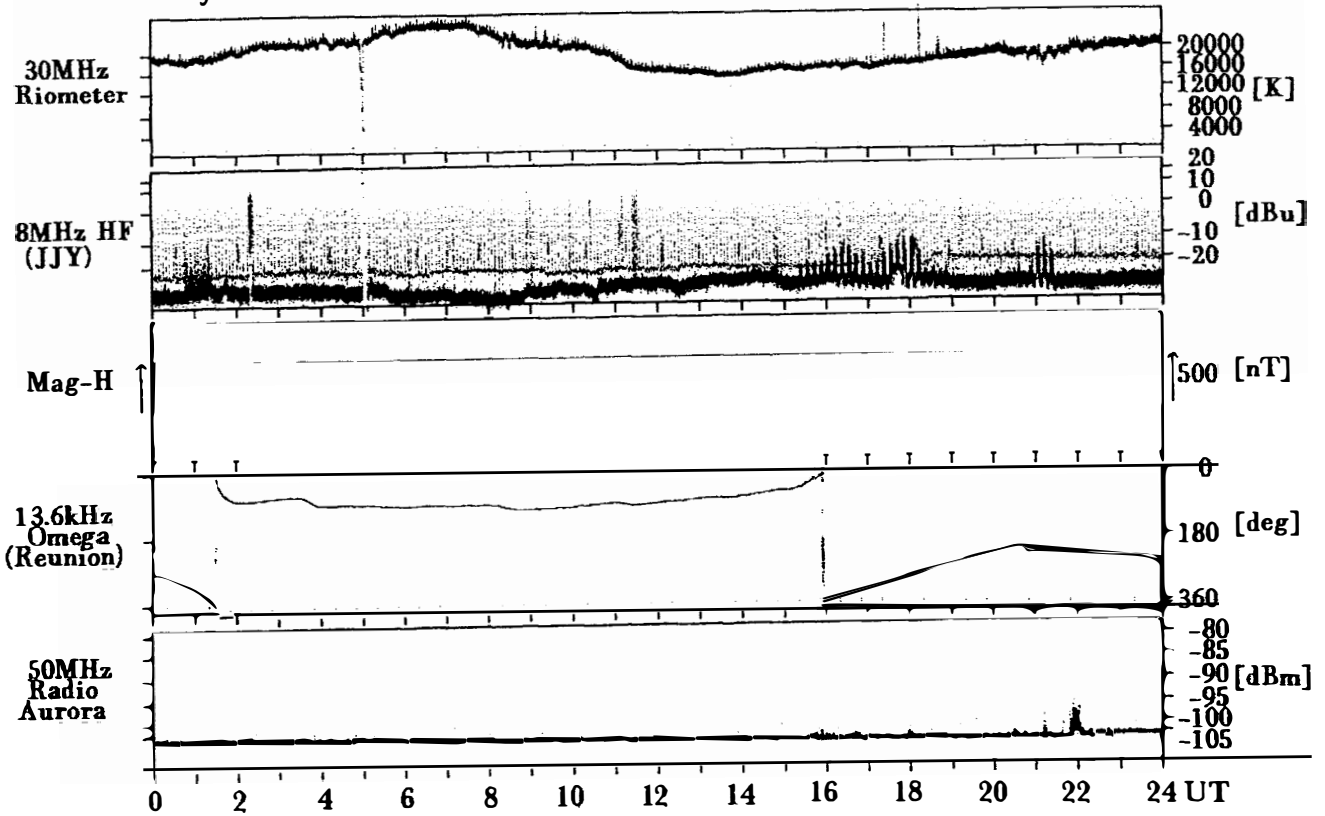
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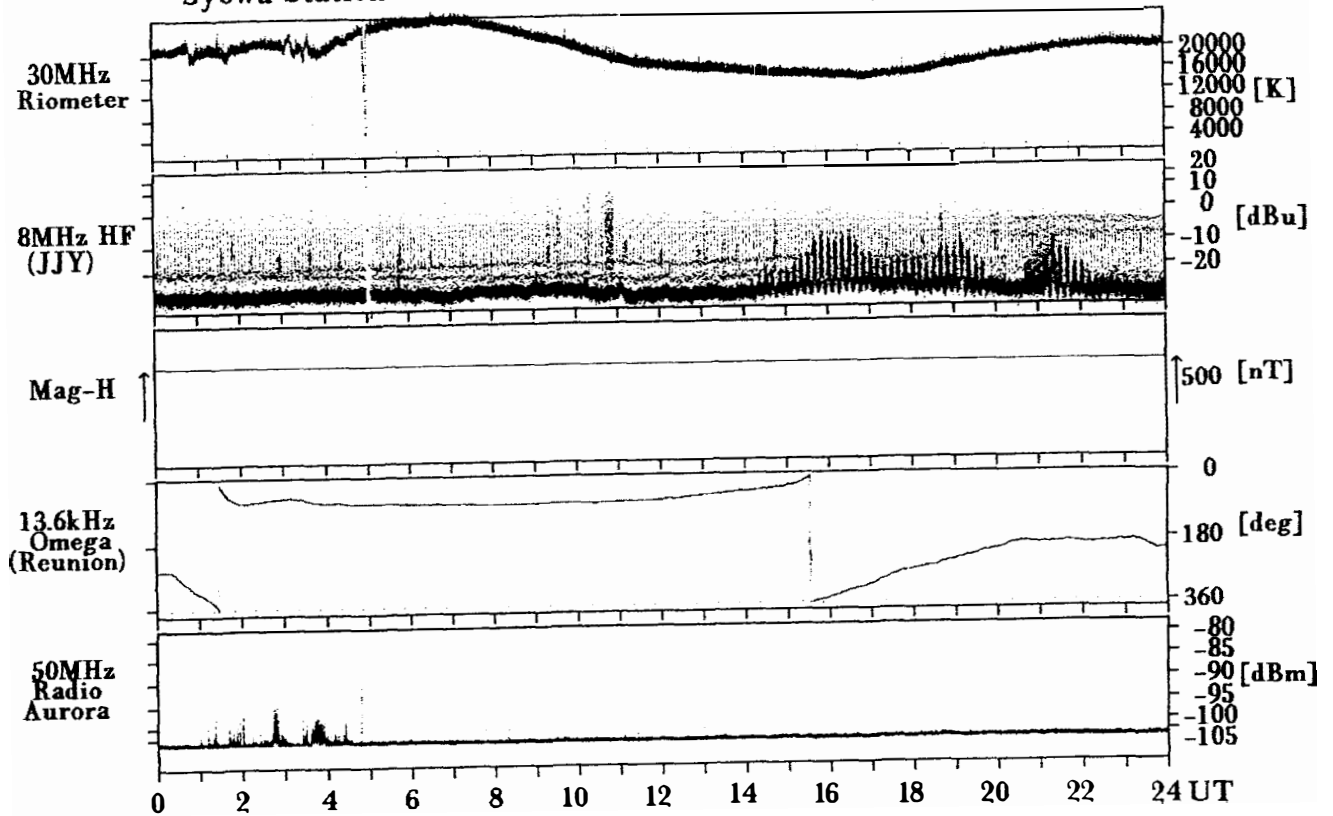
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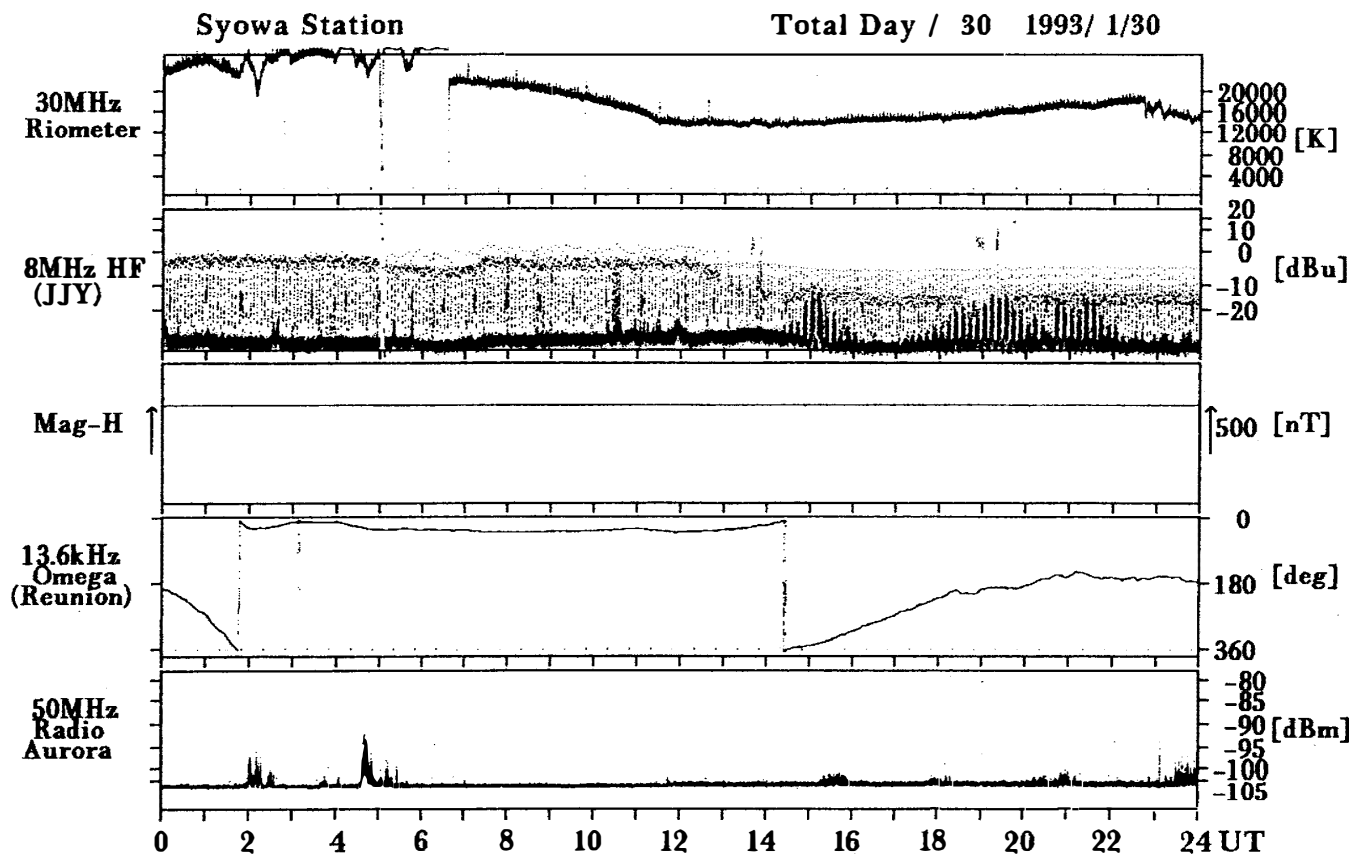
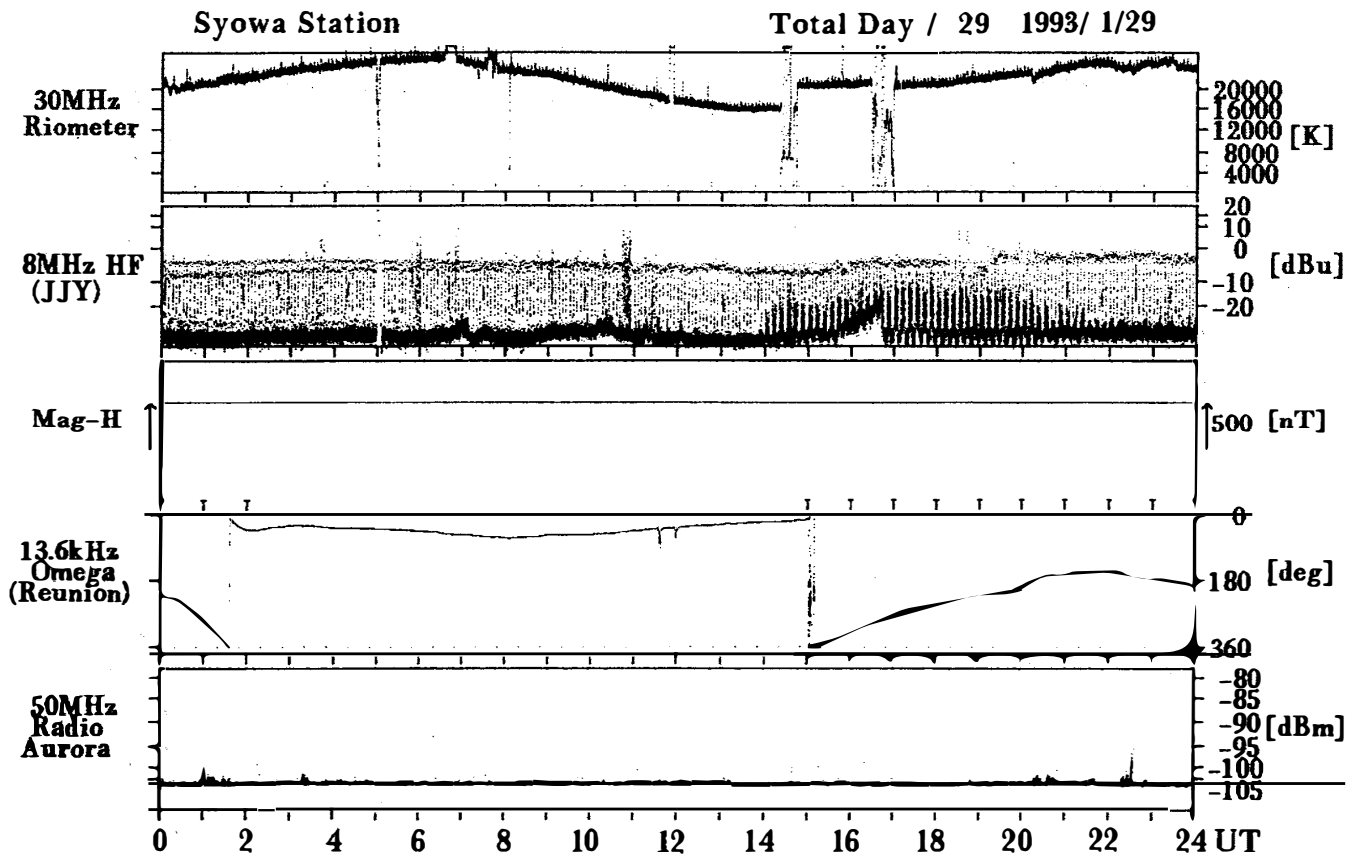
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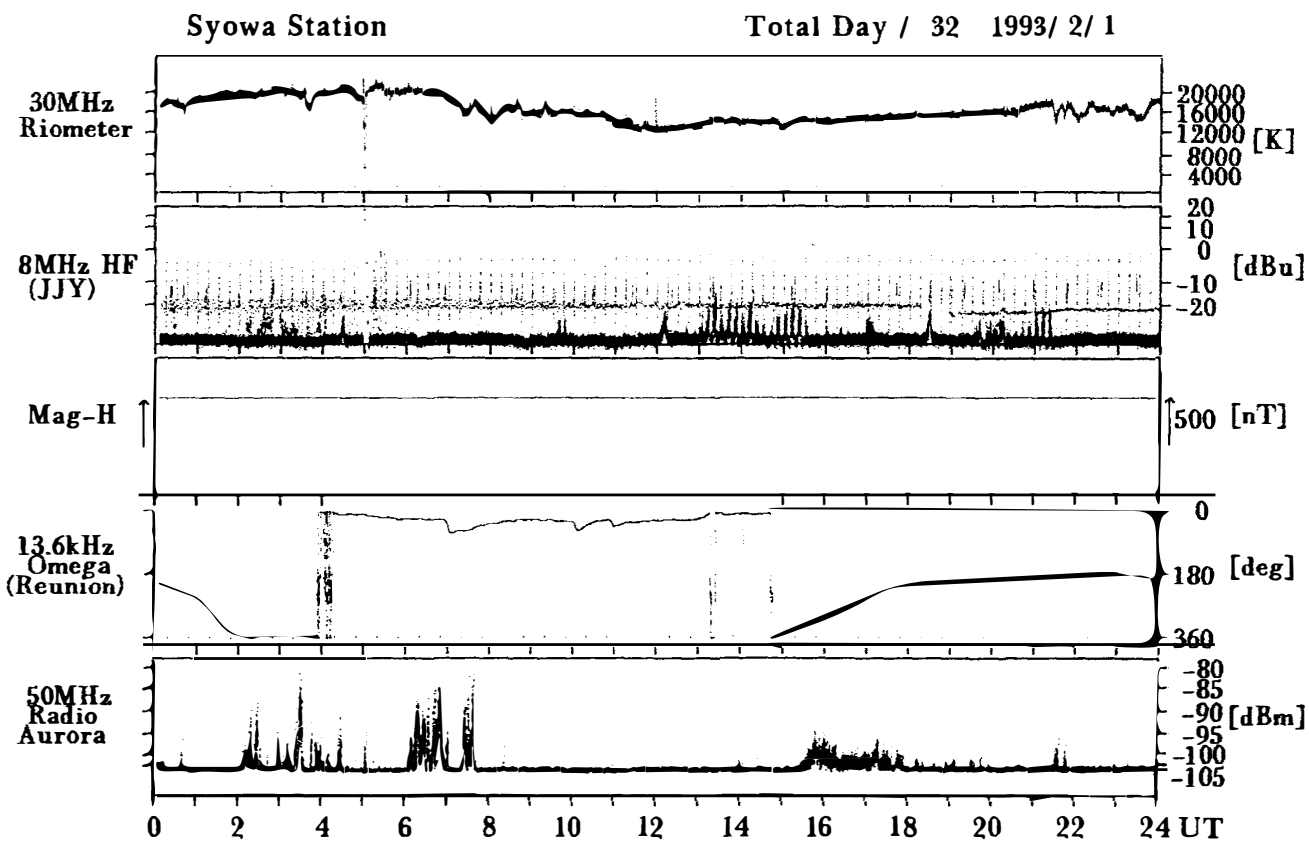
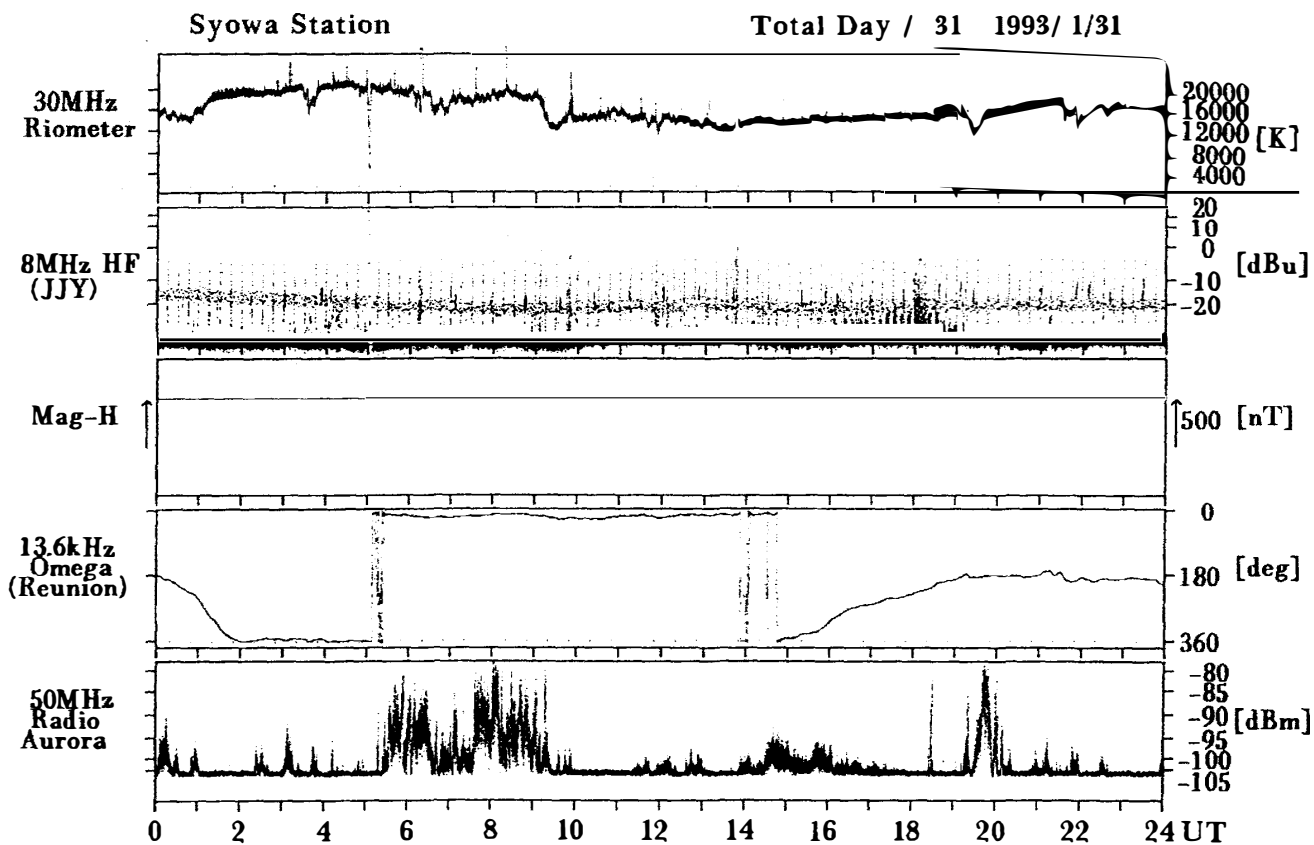


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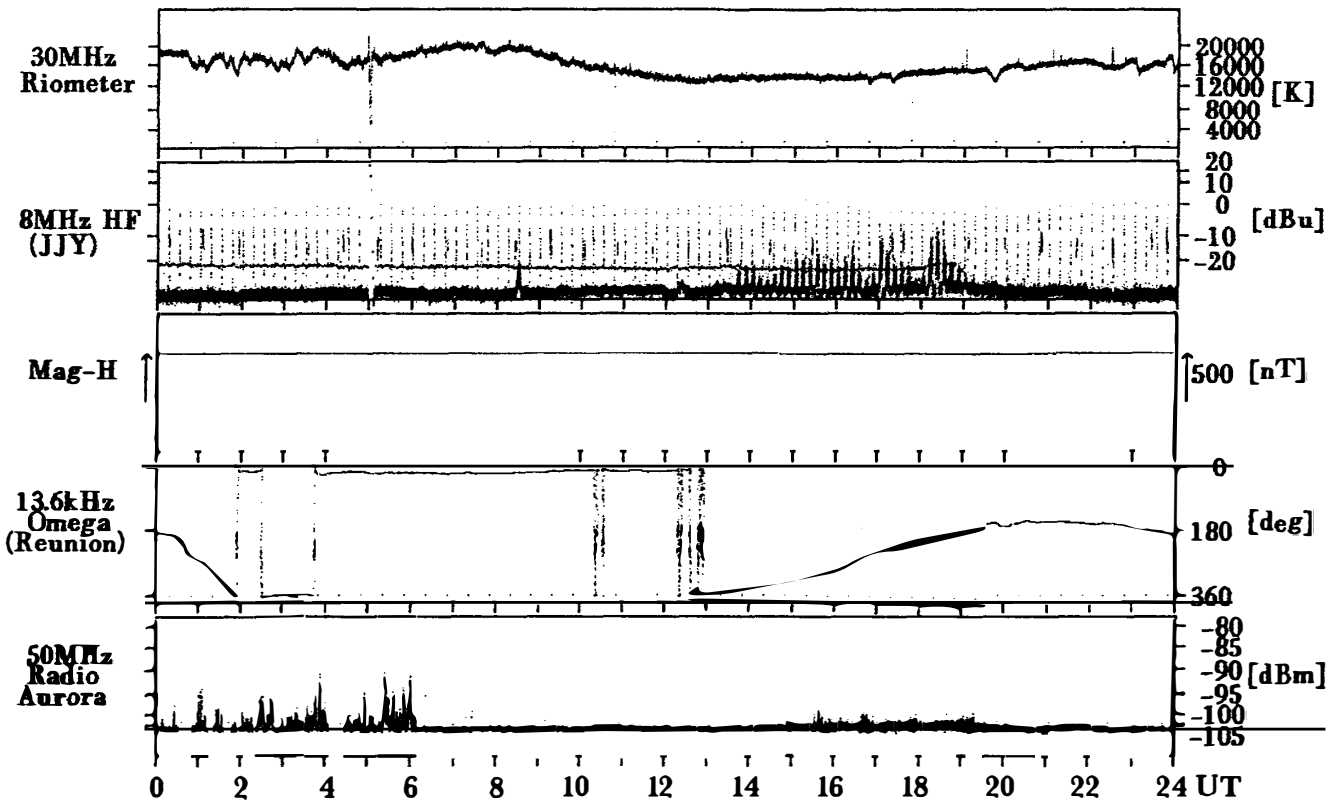






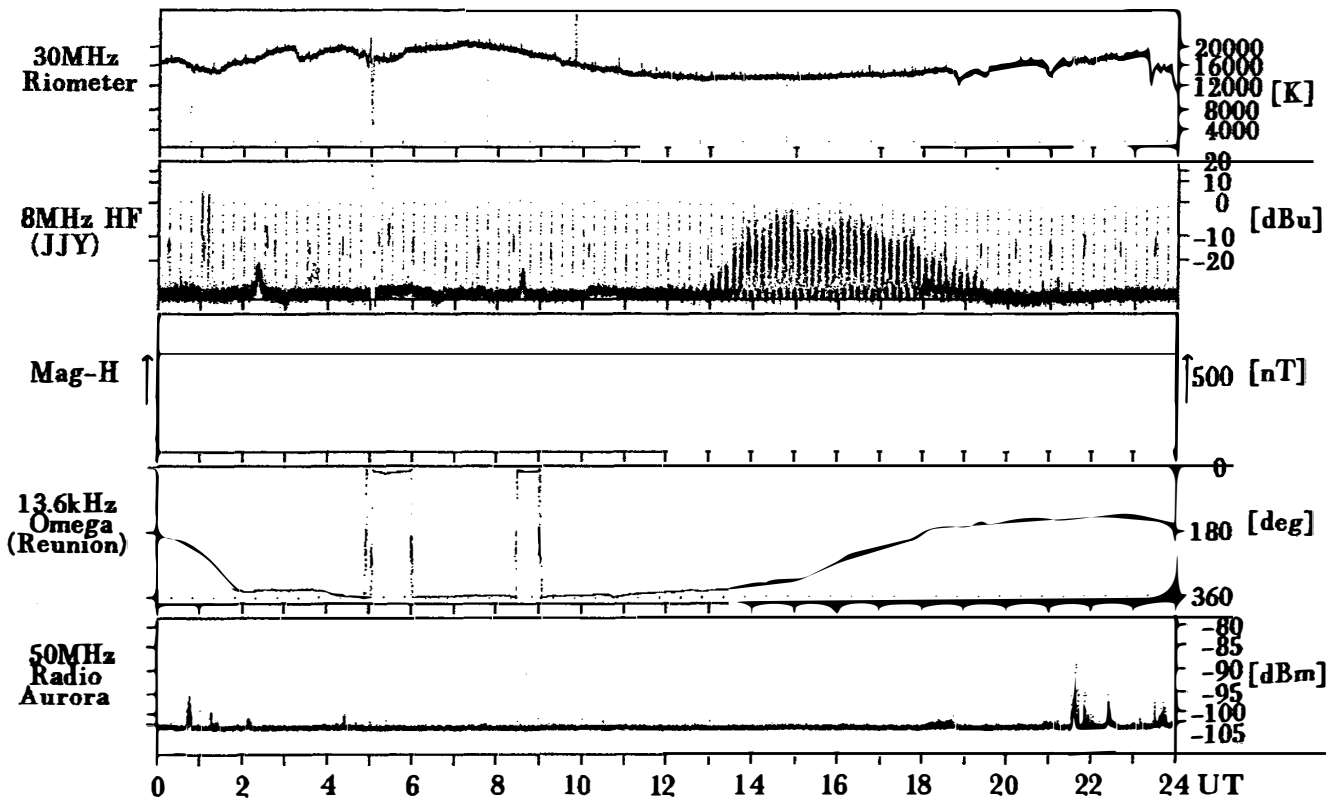
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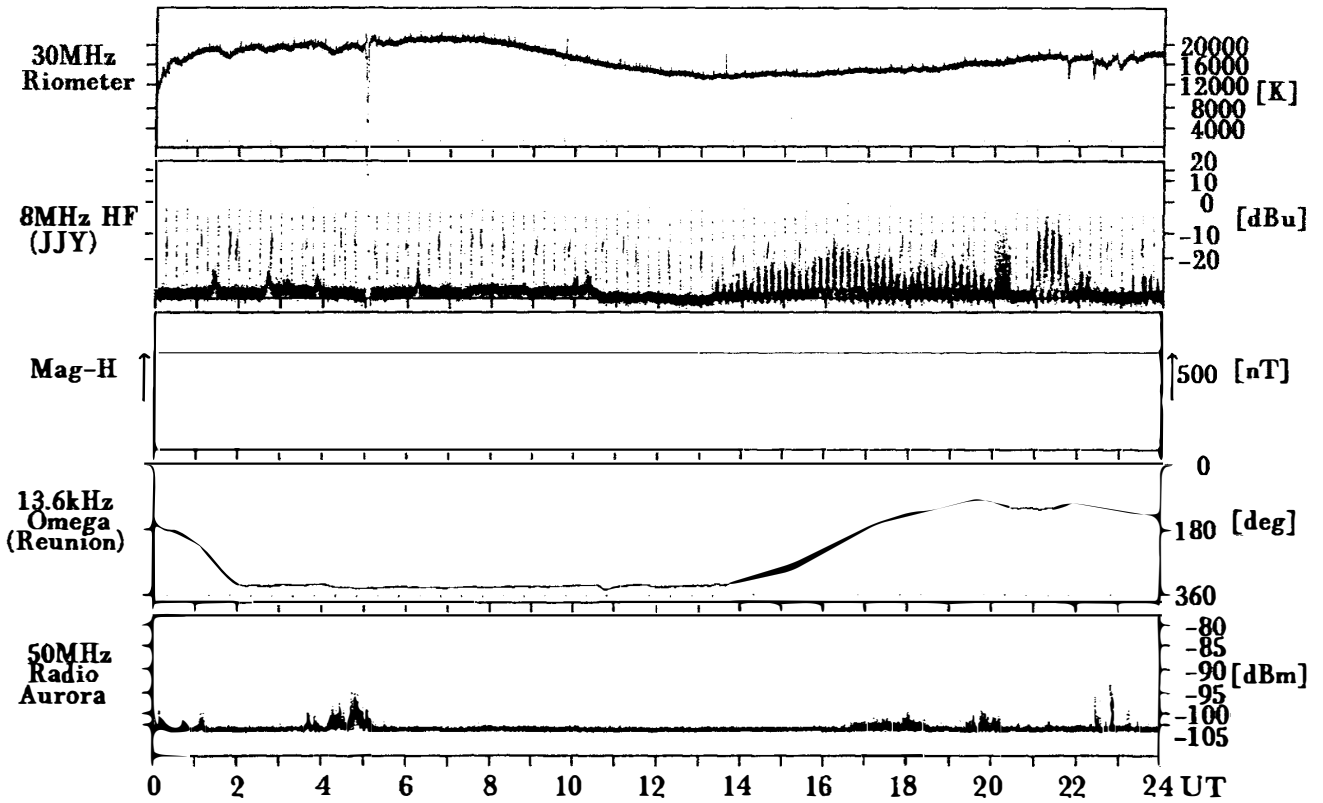
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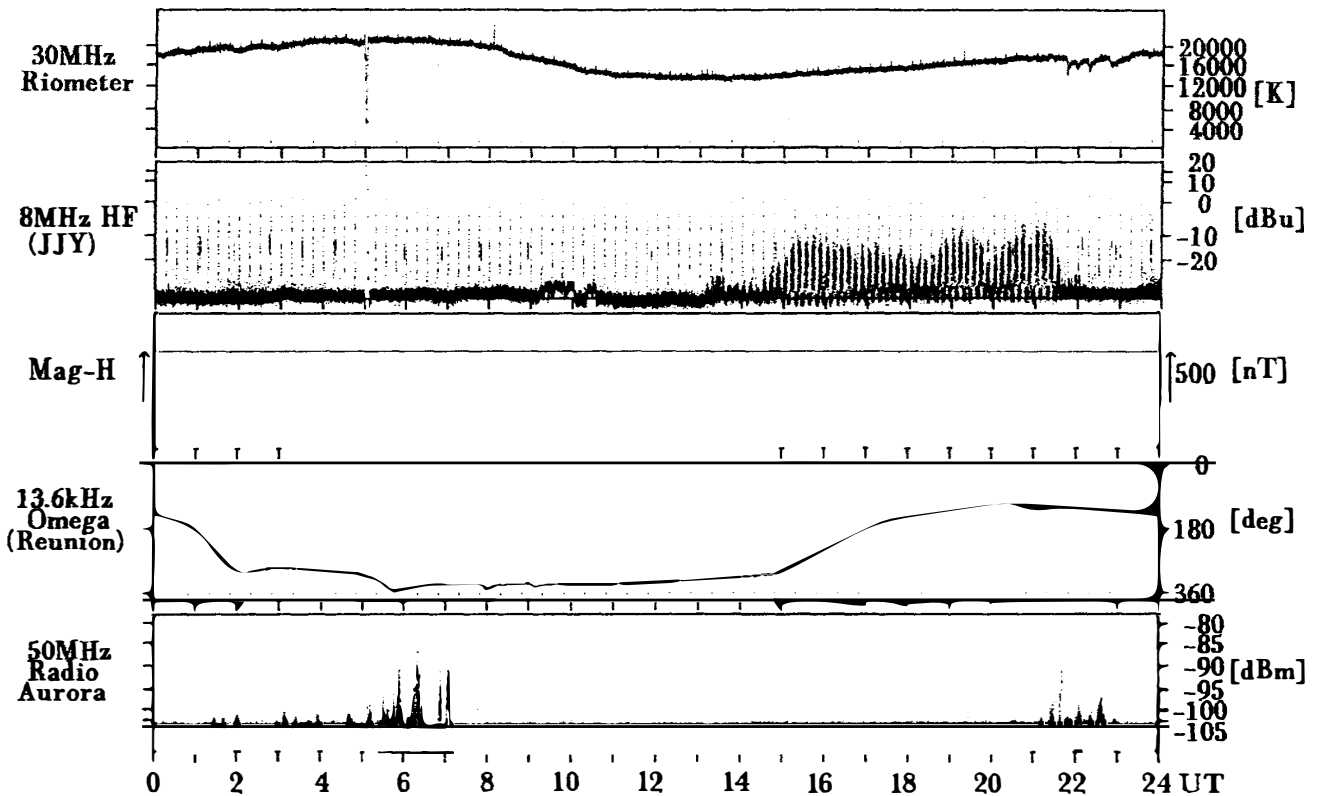
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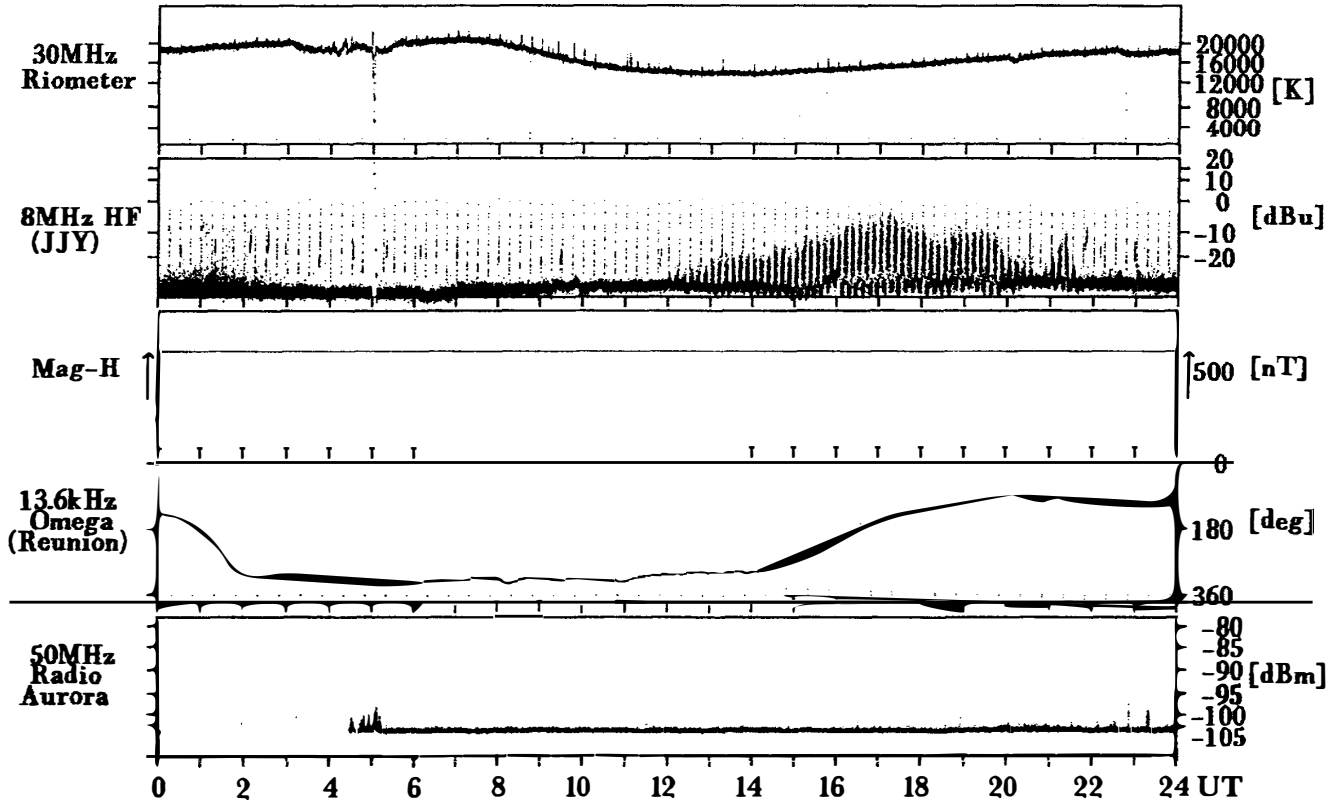
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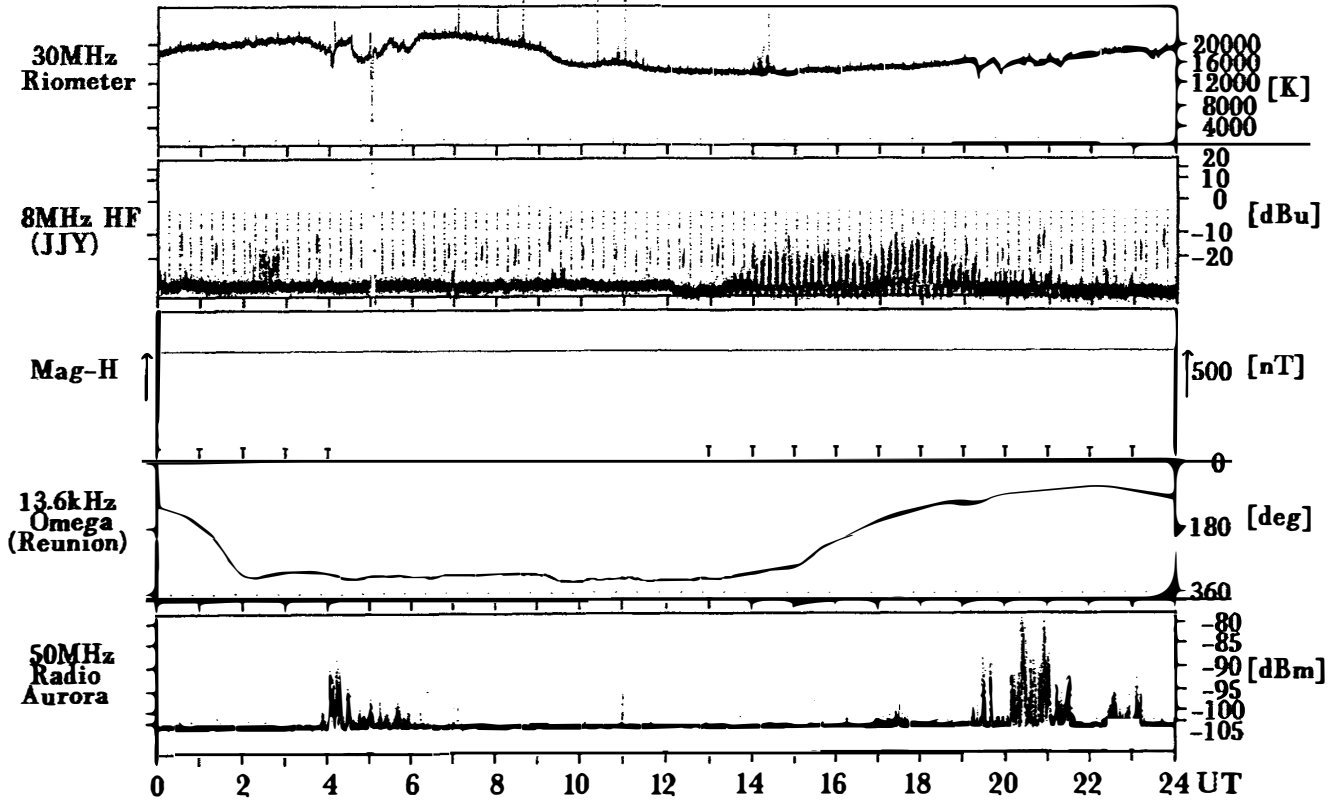
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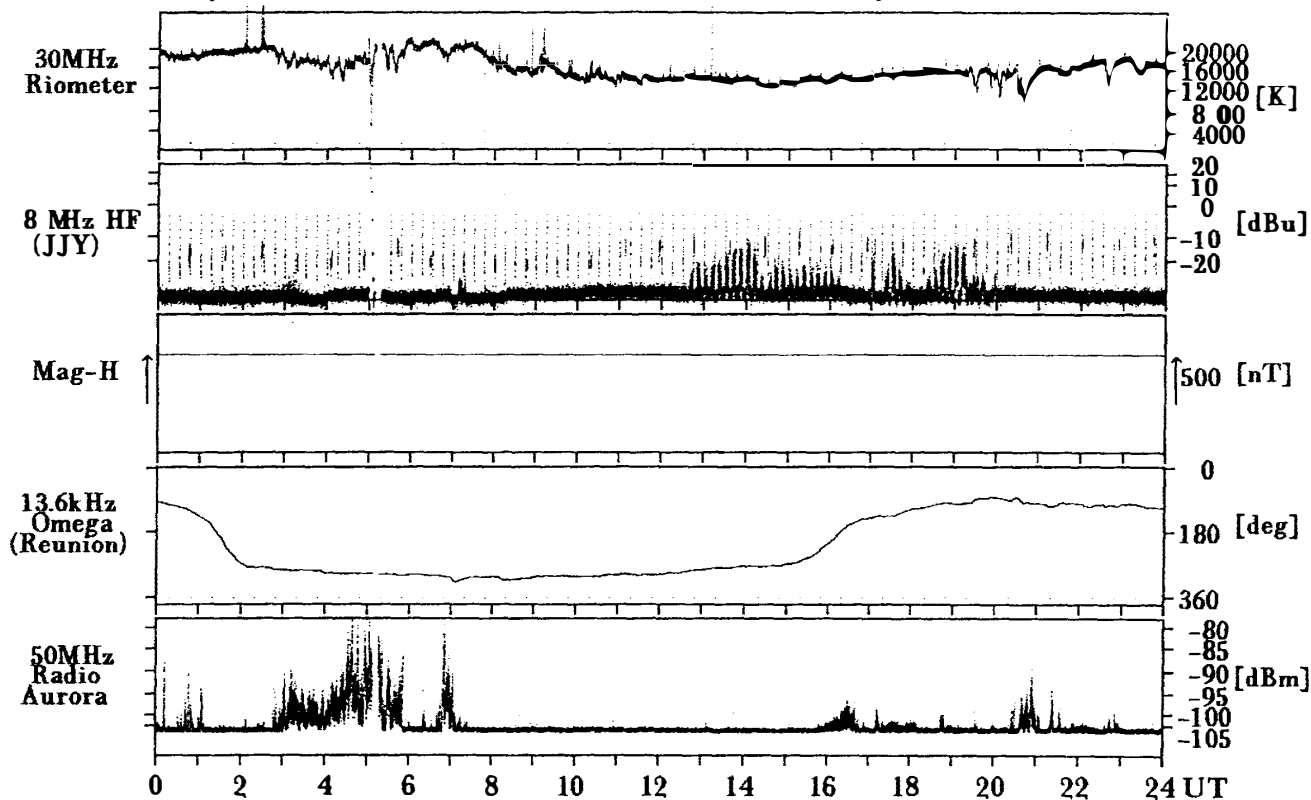
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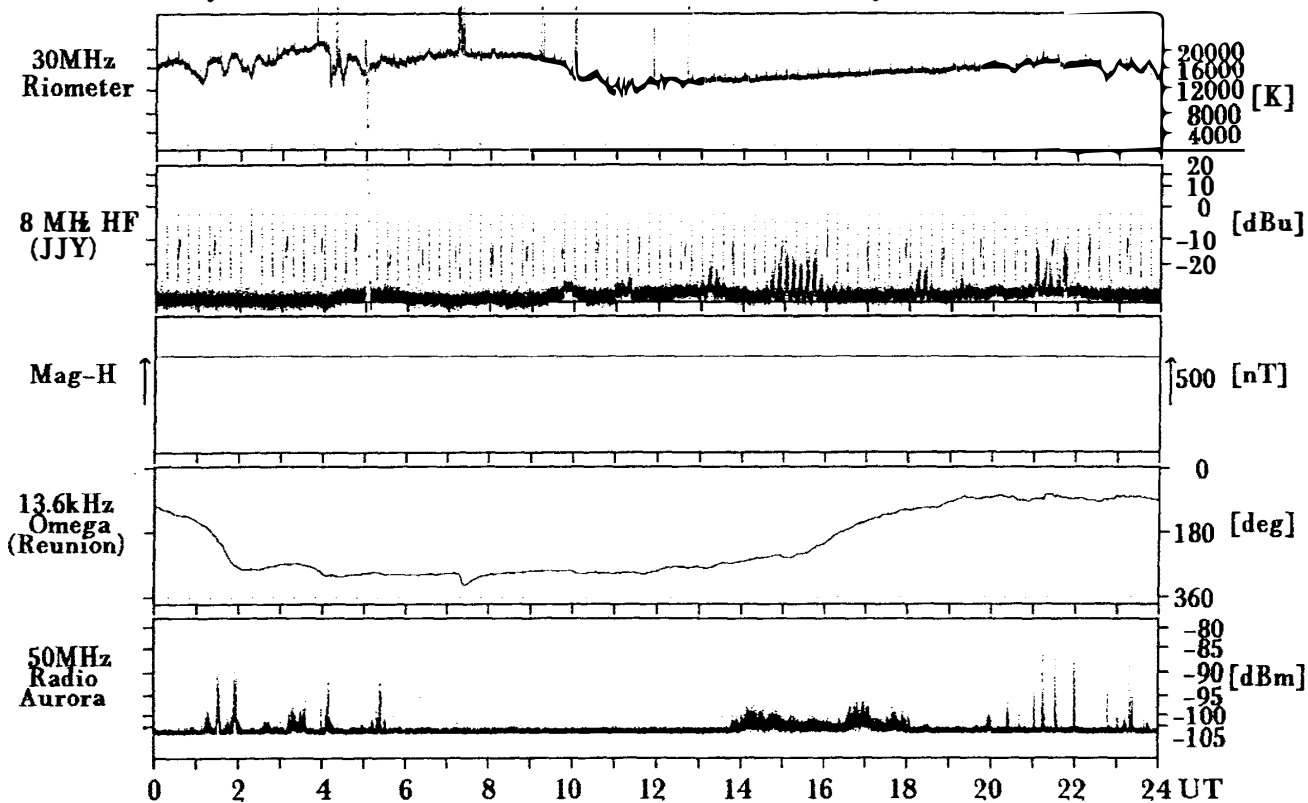
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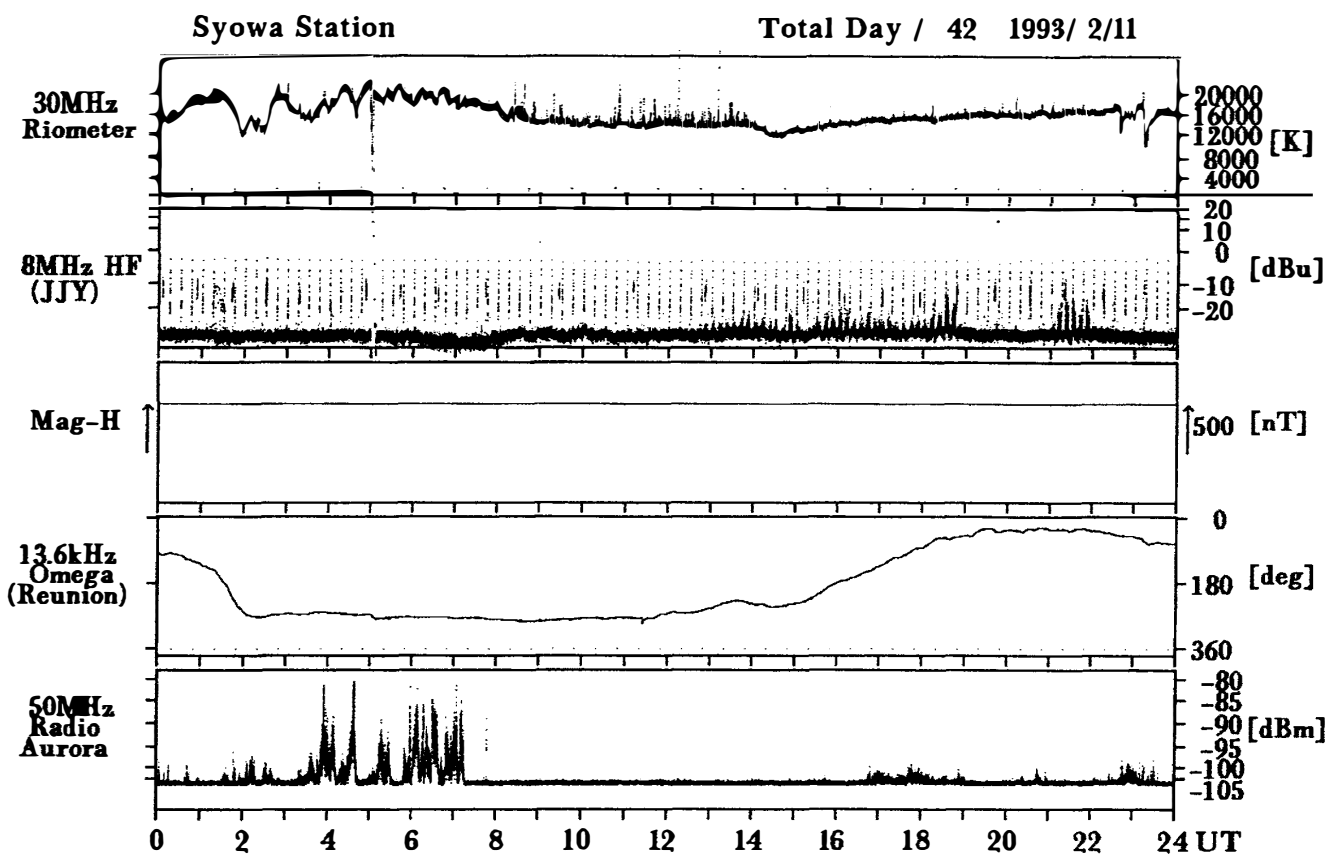
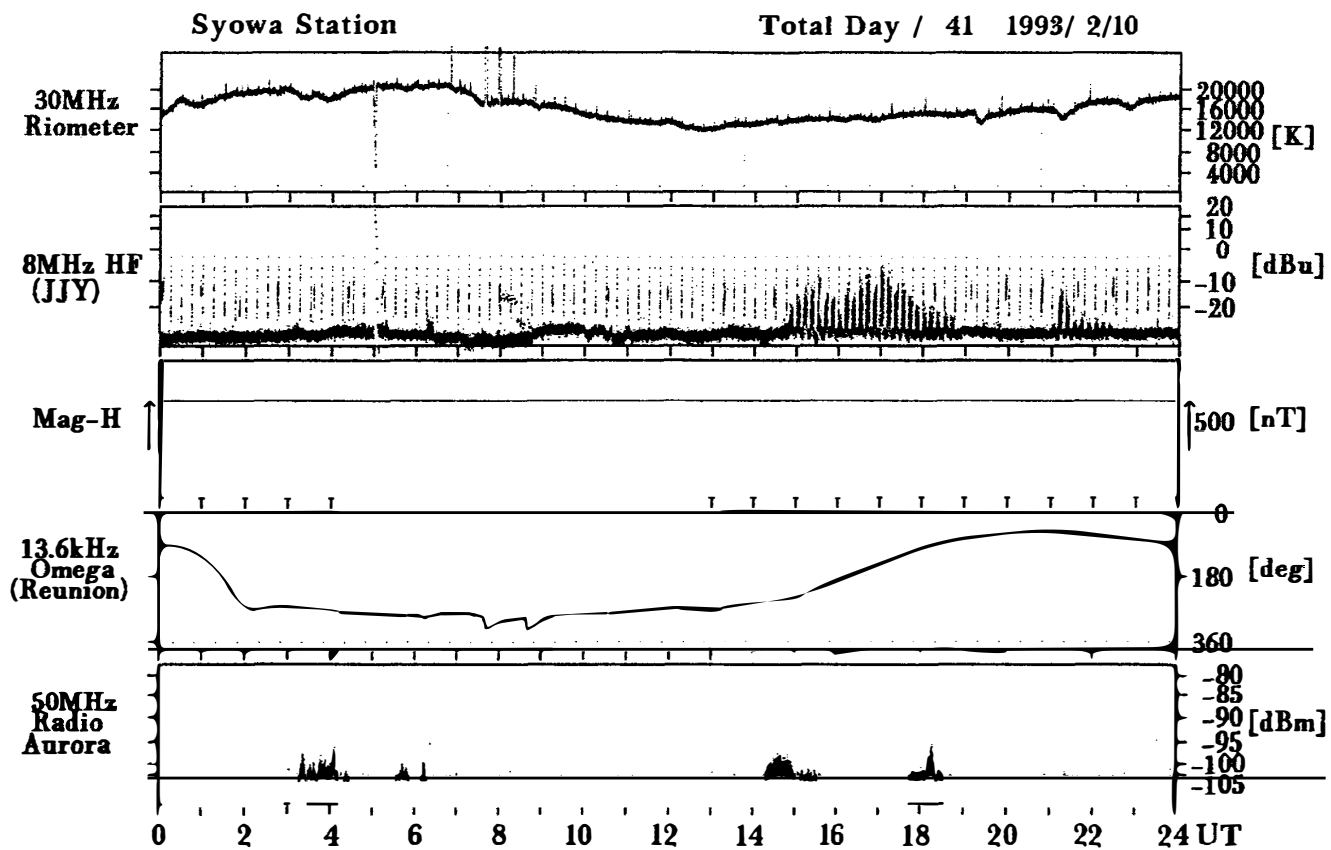
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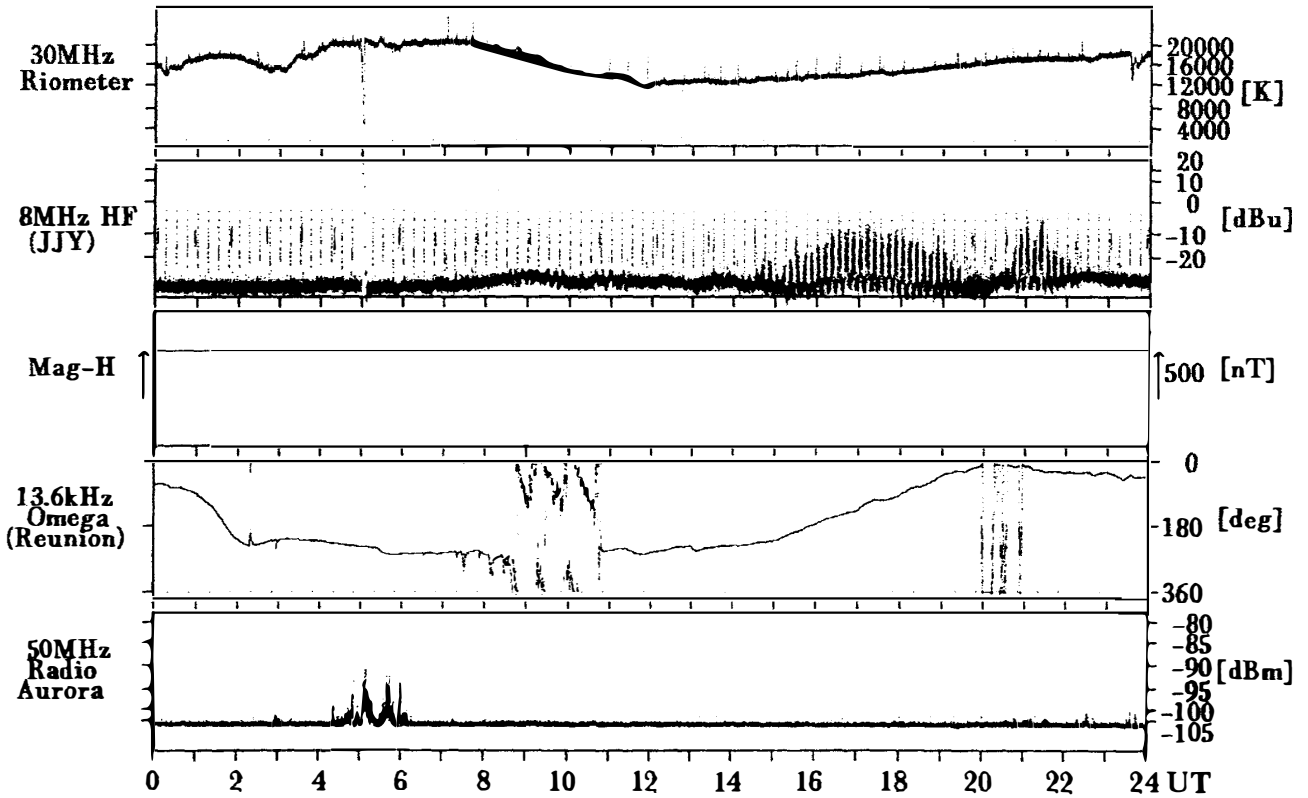






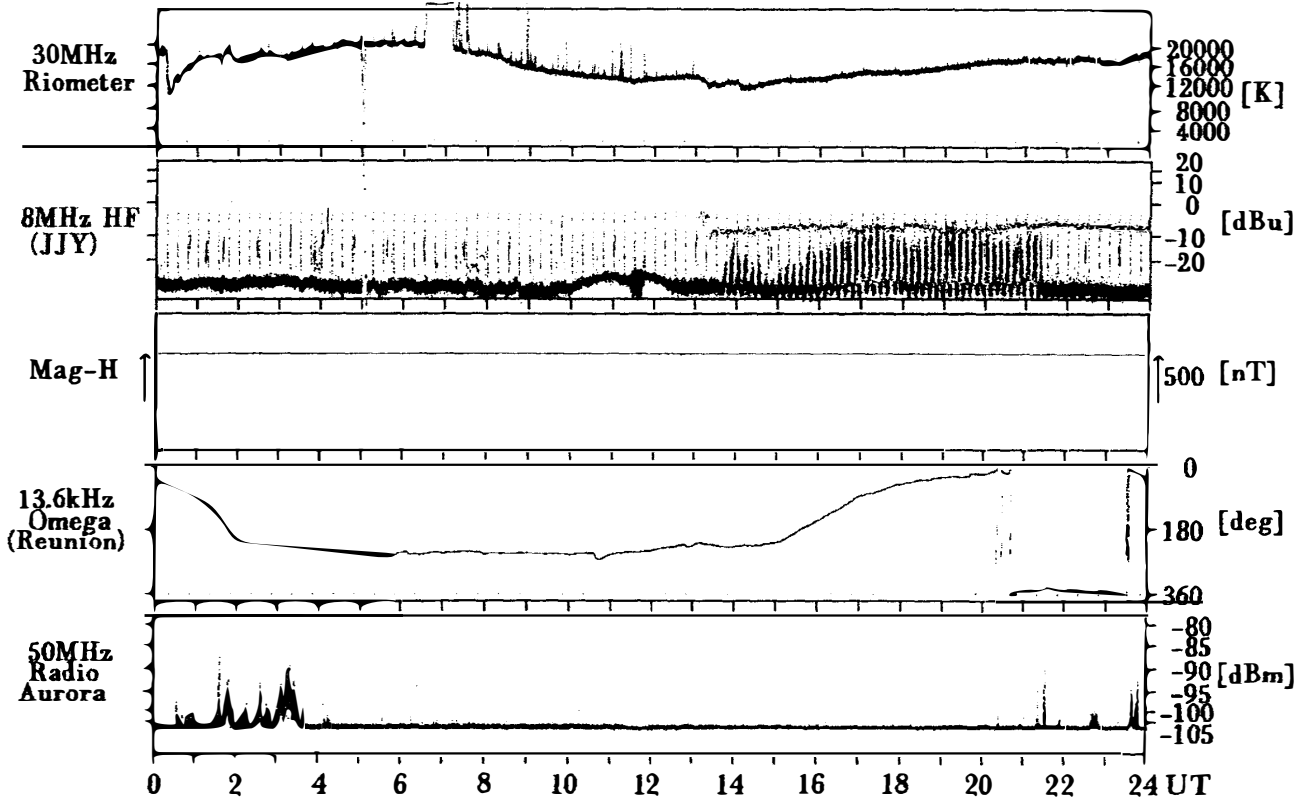
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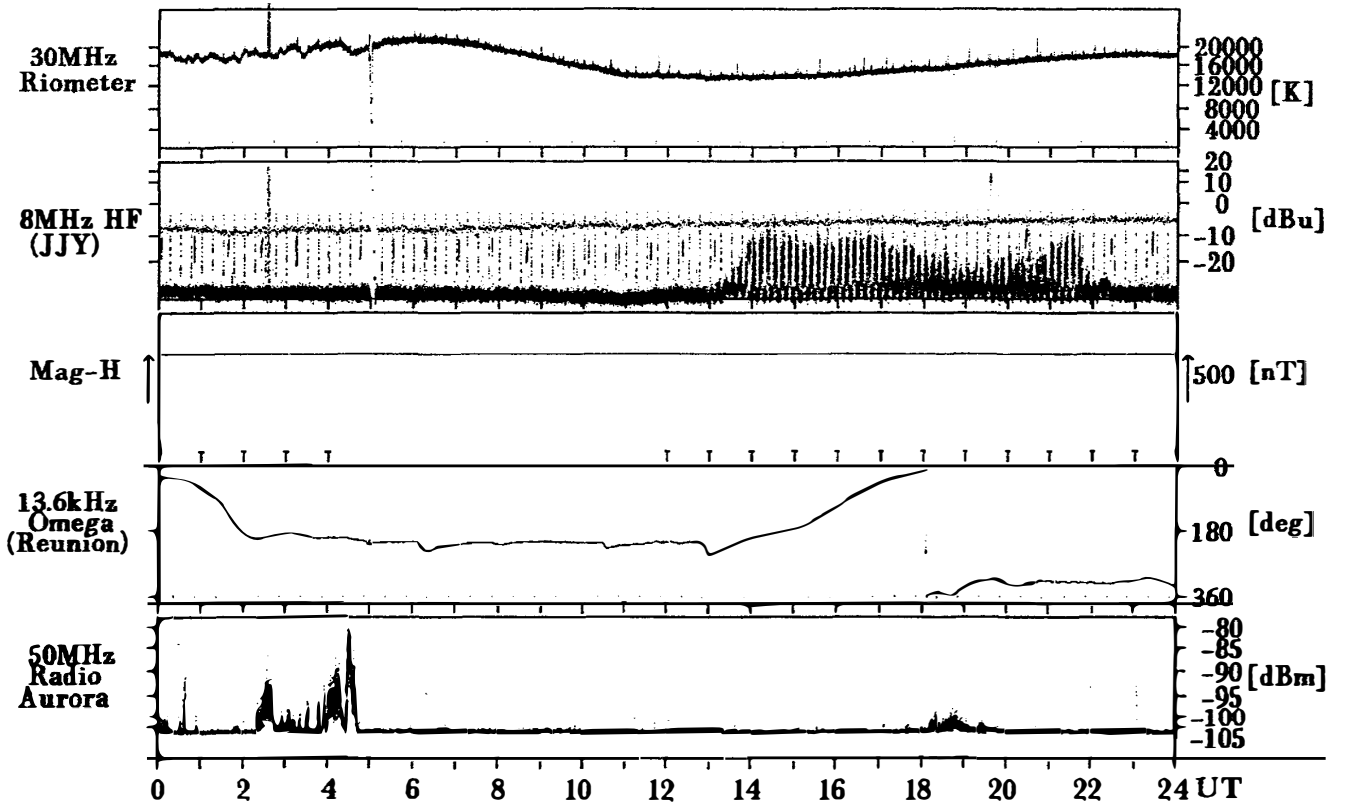
Syowa Station

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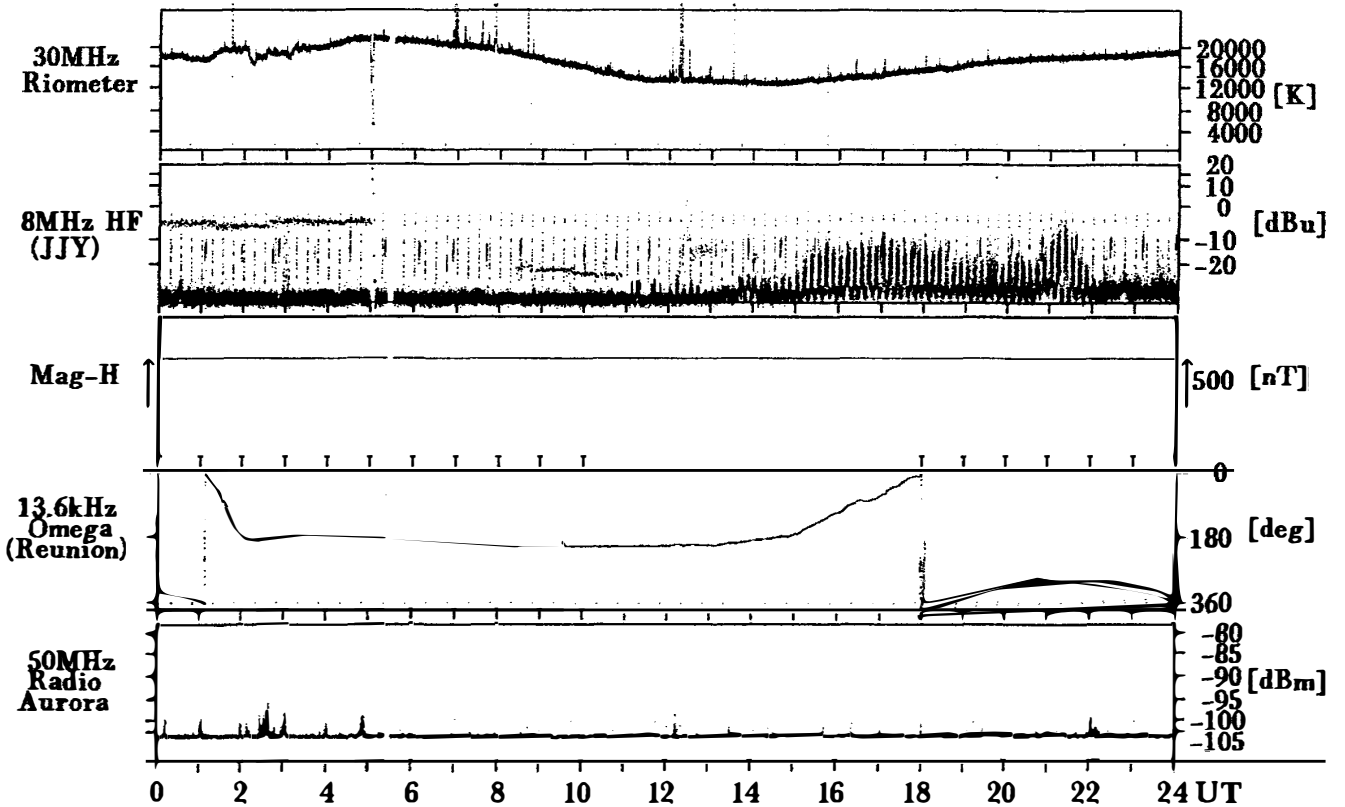
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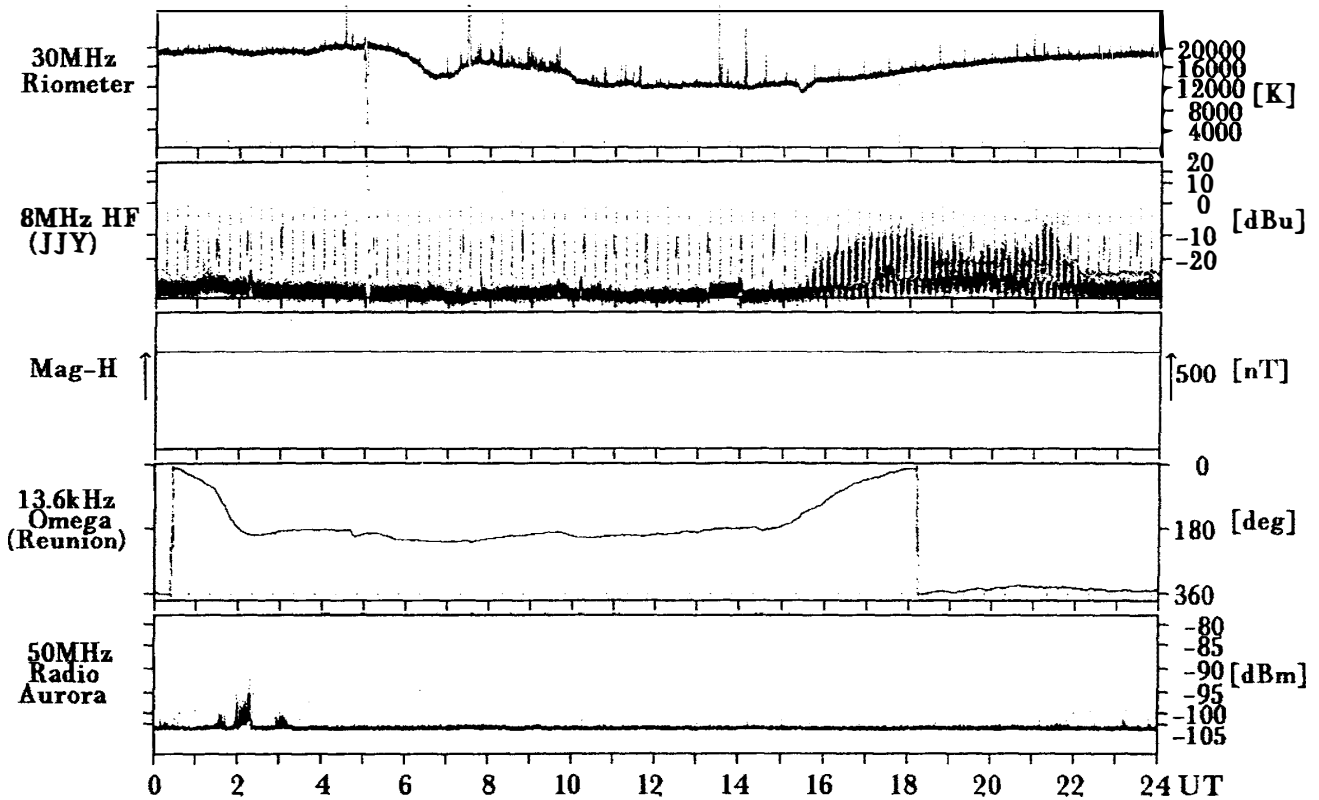
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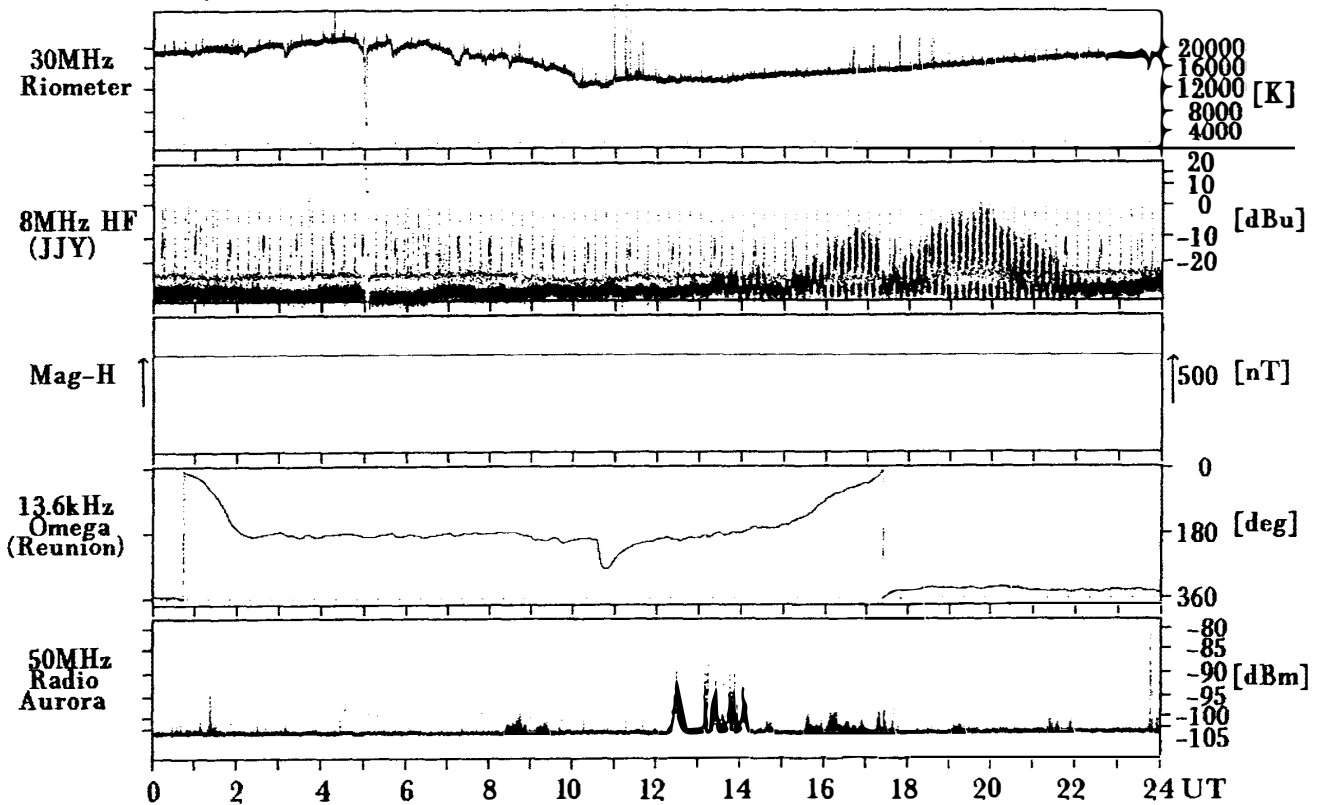
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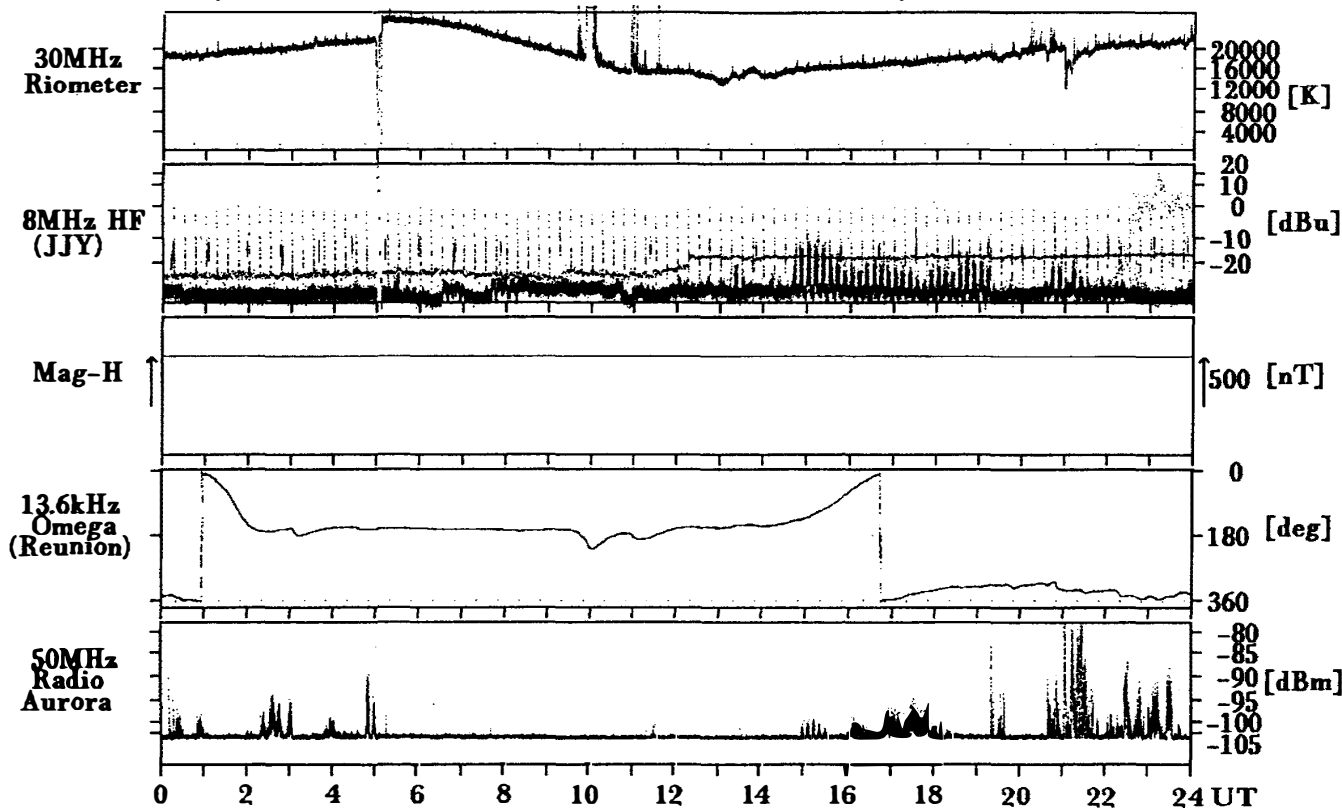
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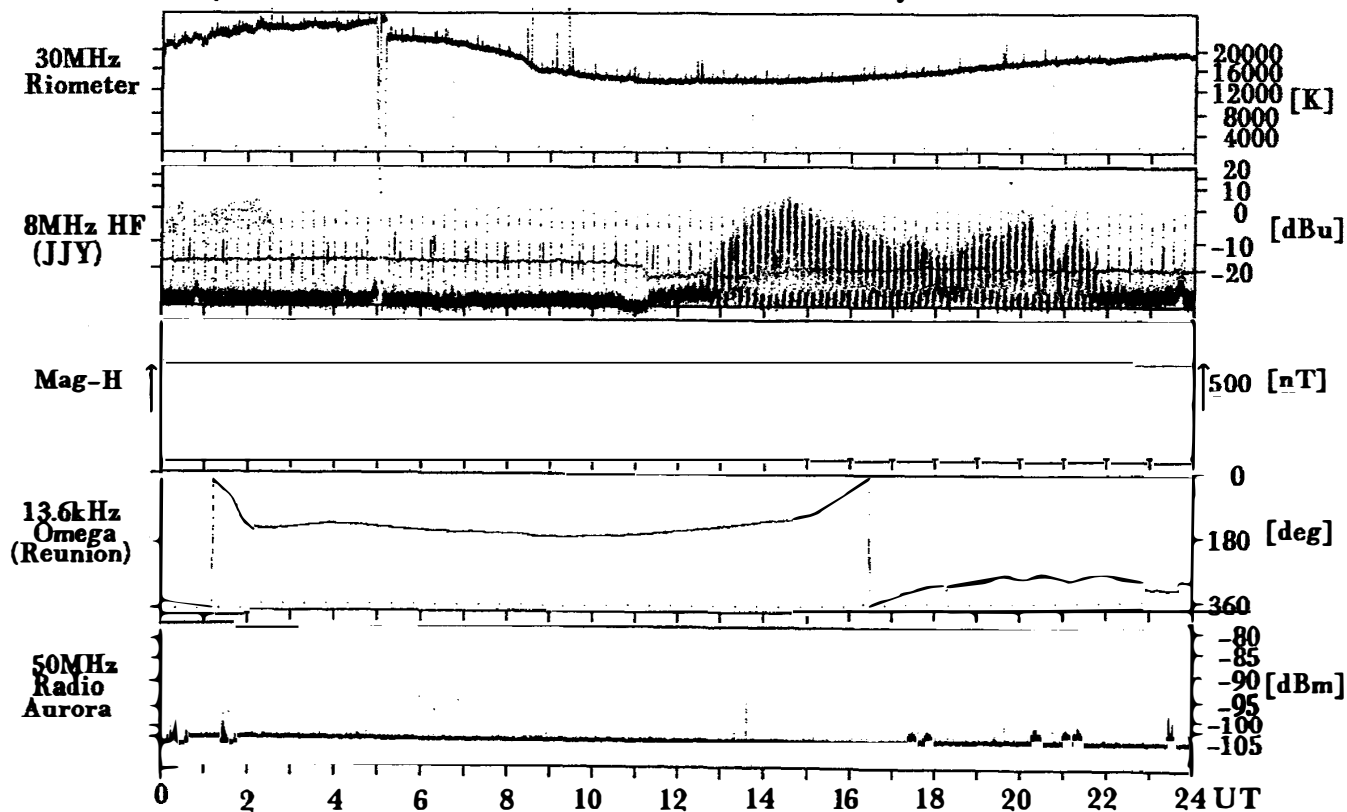
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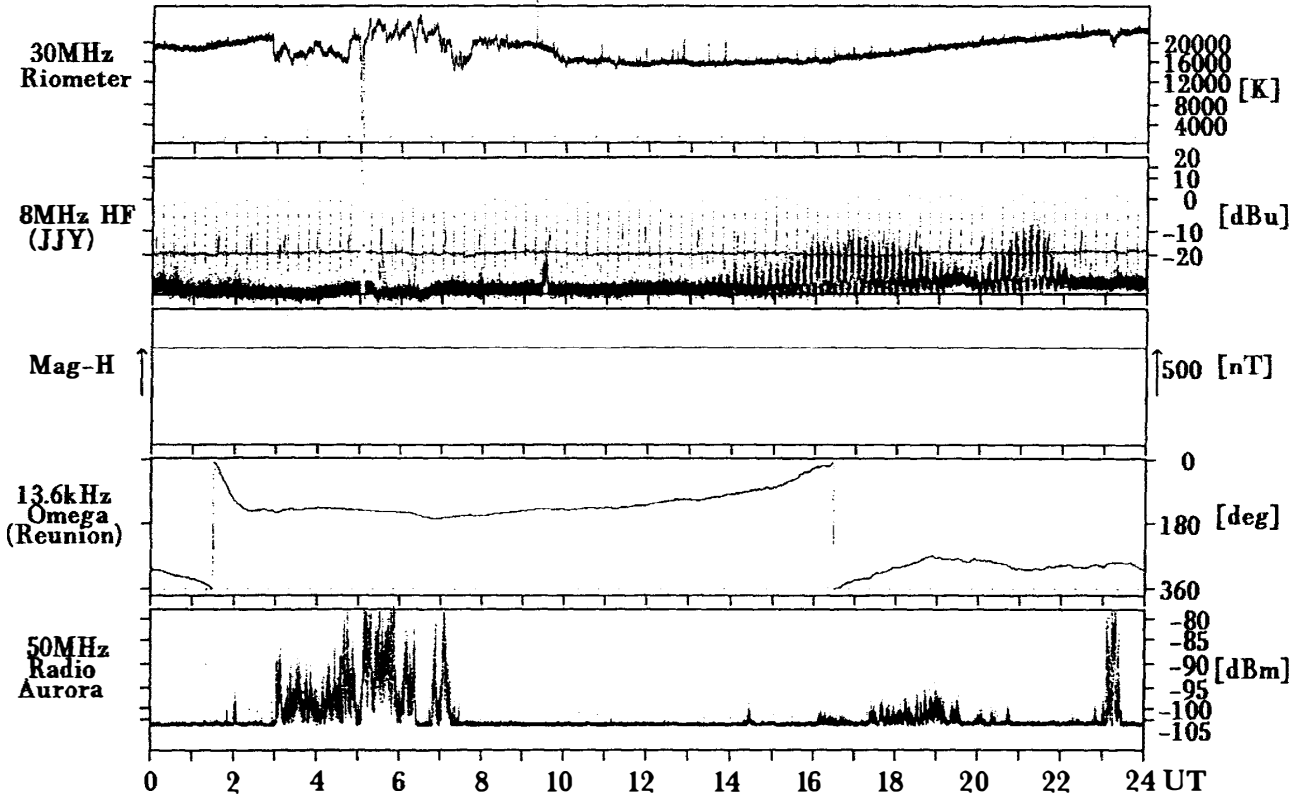
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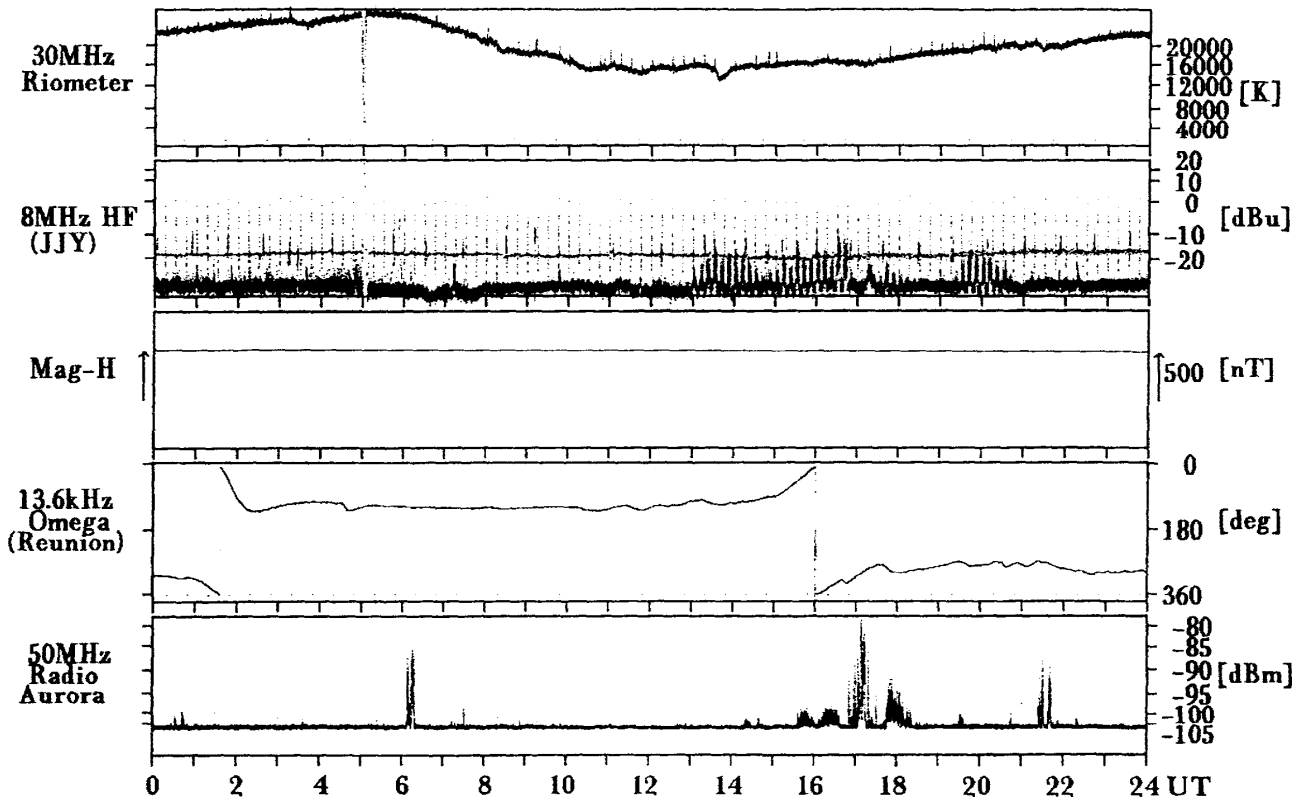
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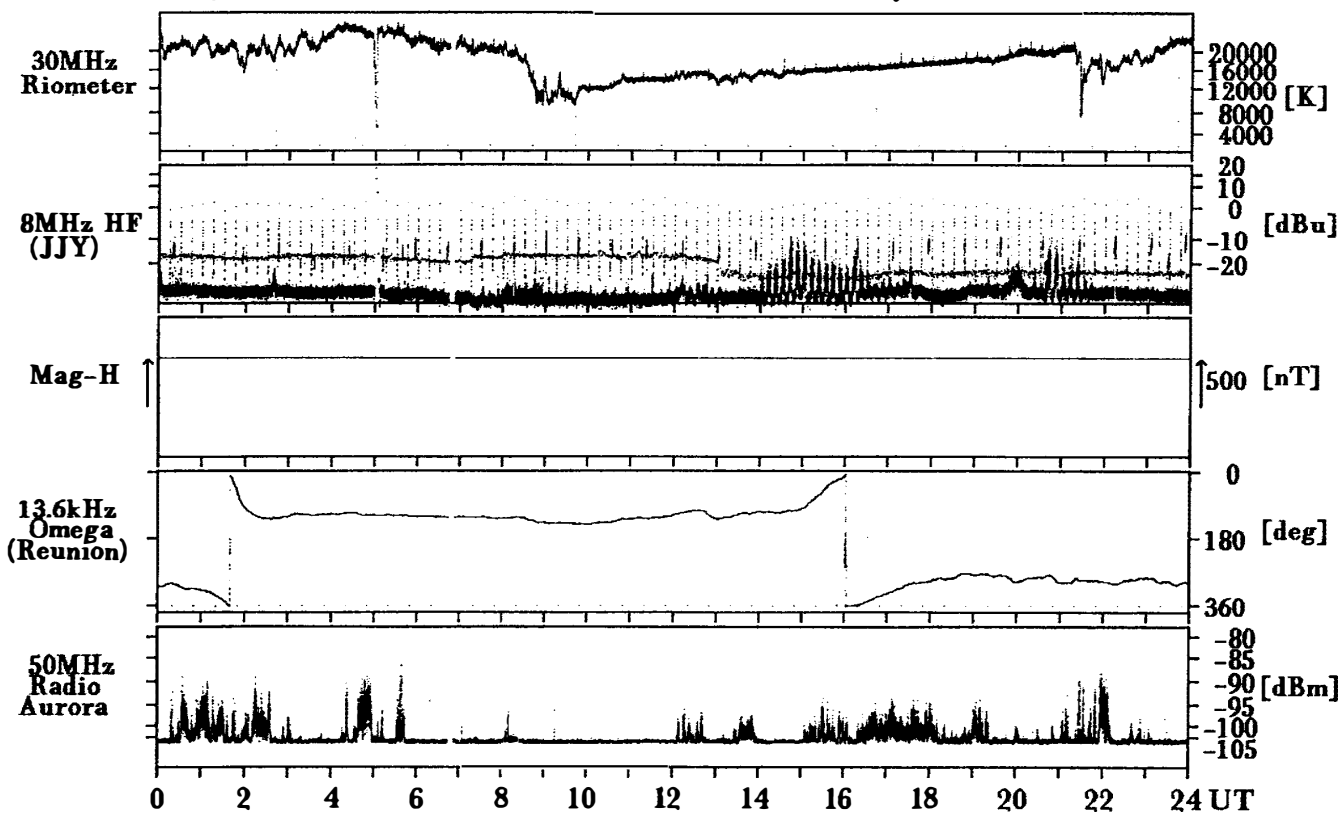
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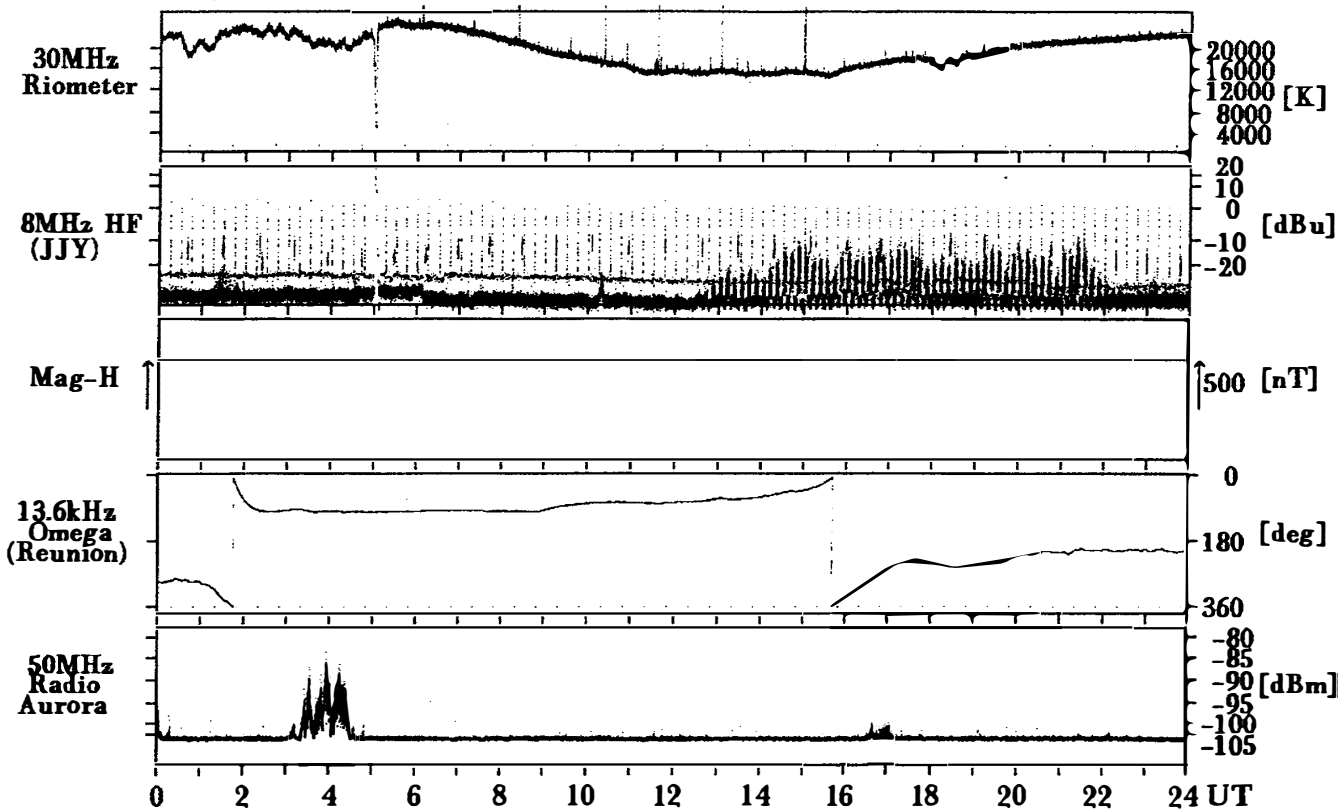
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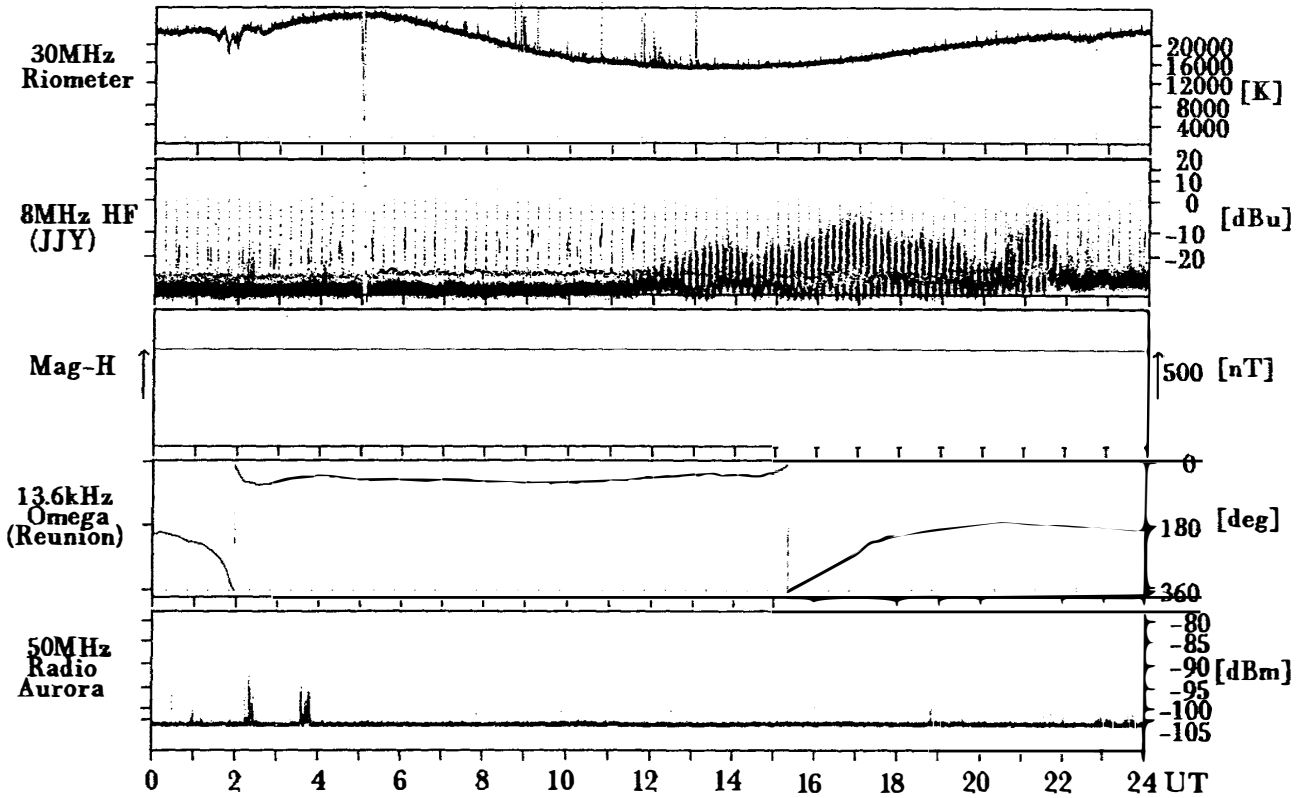
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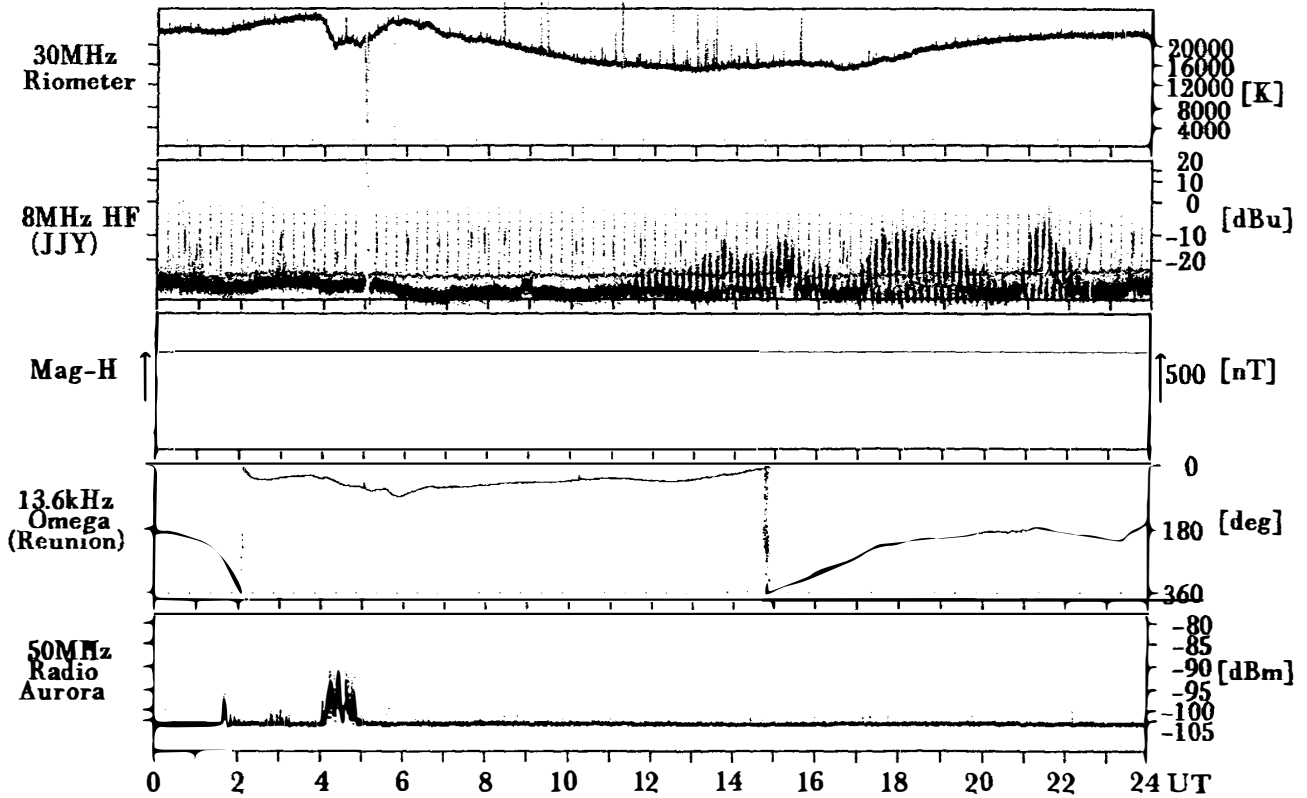
Syowa Station

Total Day / 55 1993/ 2/24



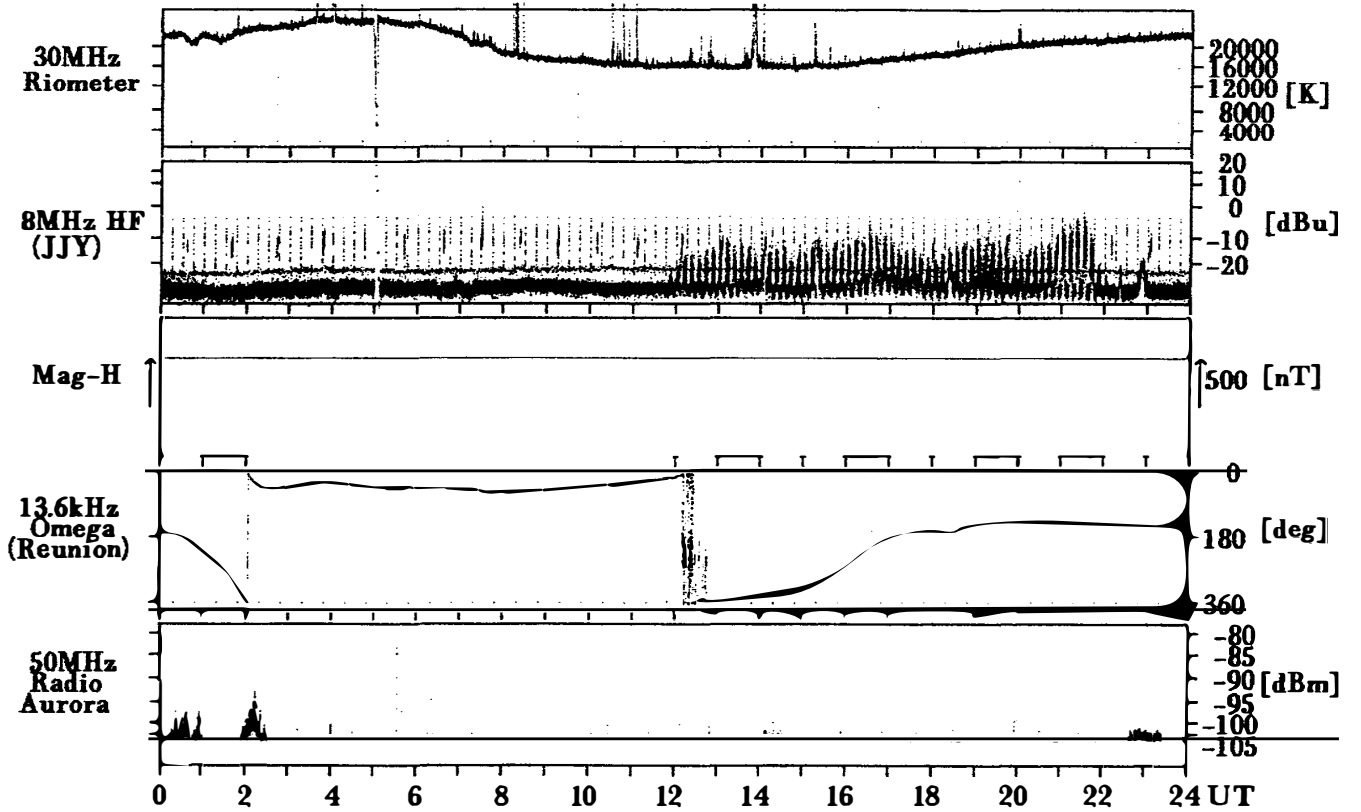
Syowa Station

Total Day / 56 1993/ 2/25



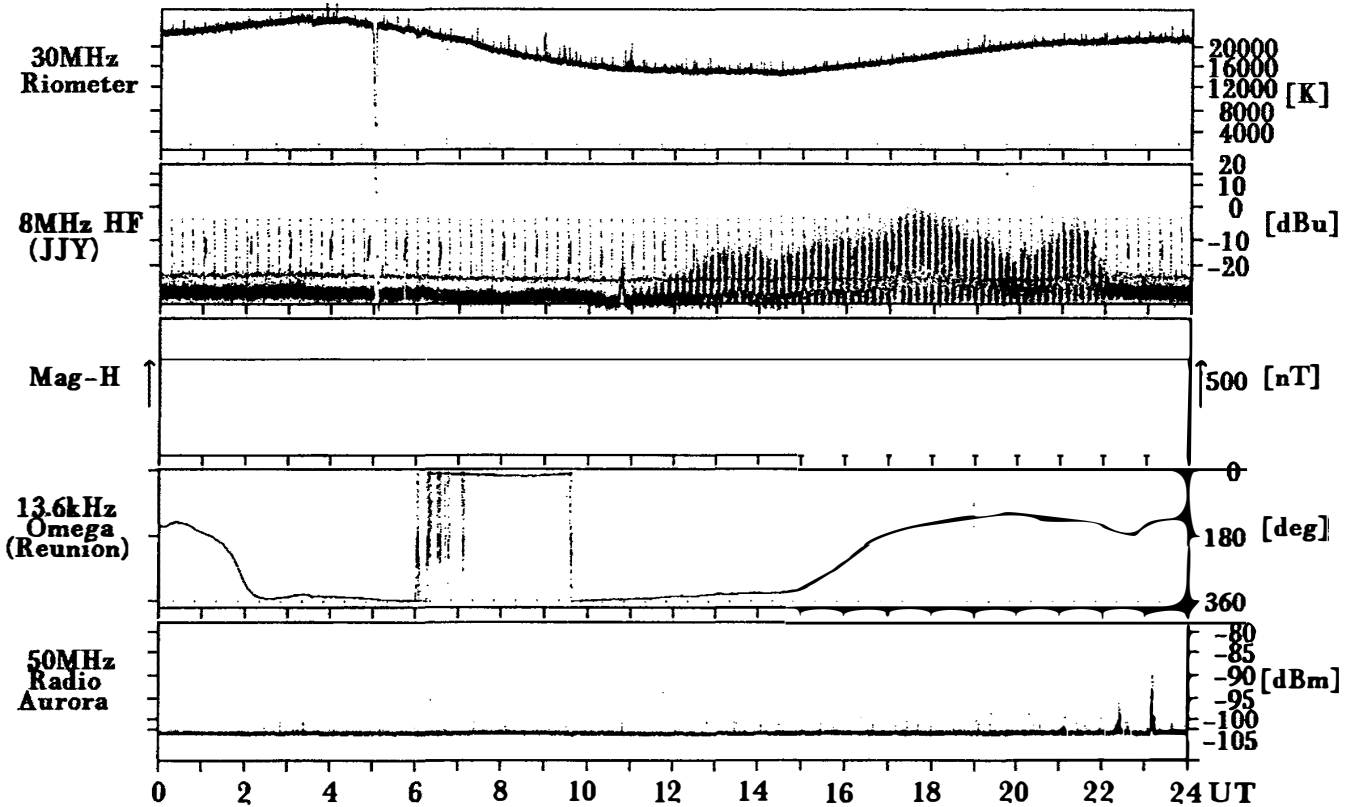
Syowa Station

Total Day / 57 1993/ 2/26



Syowa Station

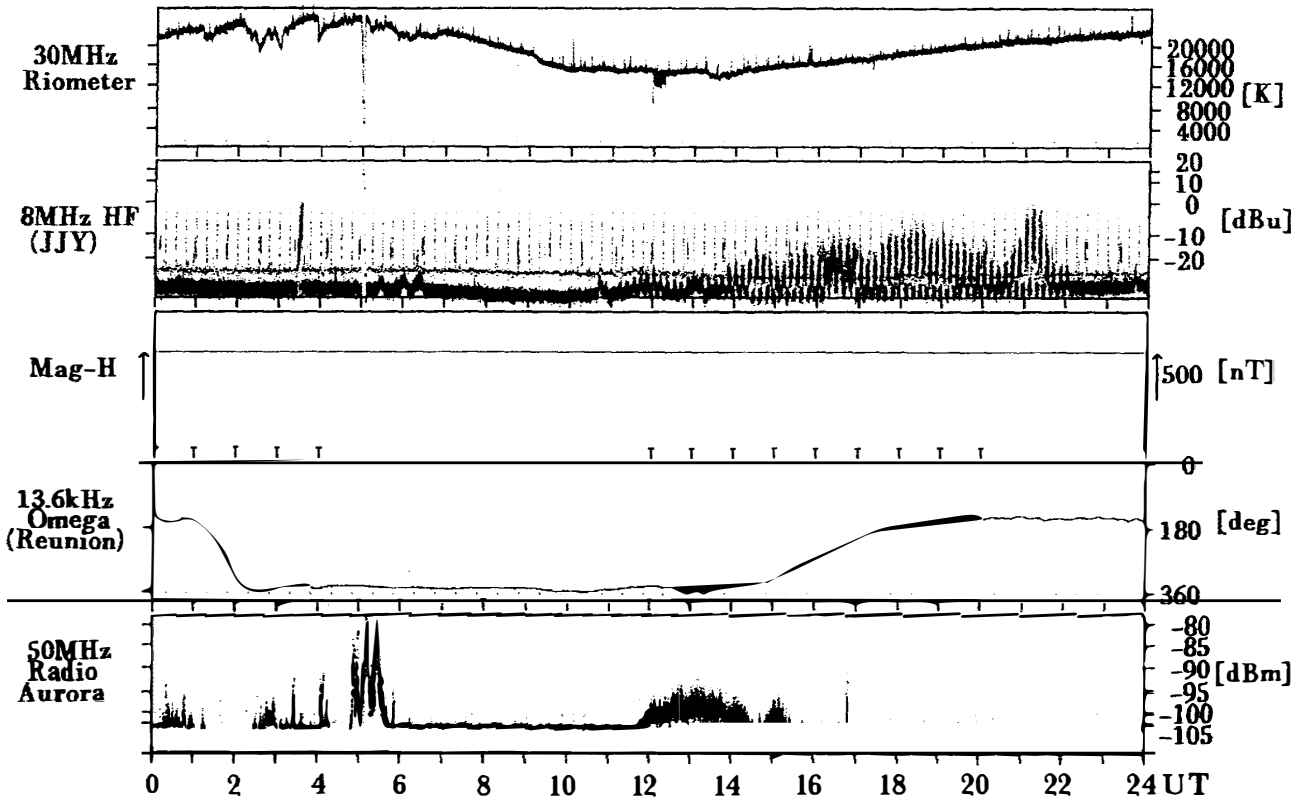
Total Day / 58 1993/ 2/27





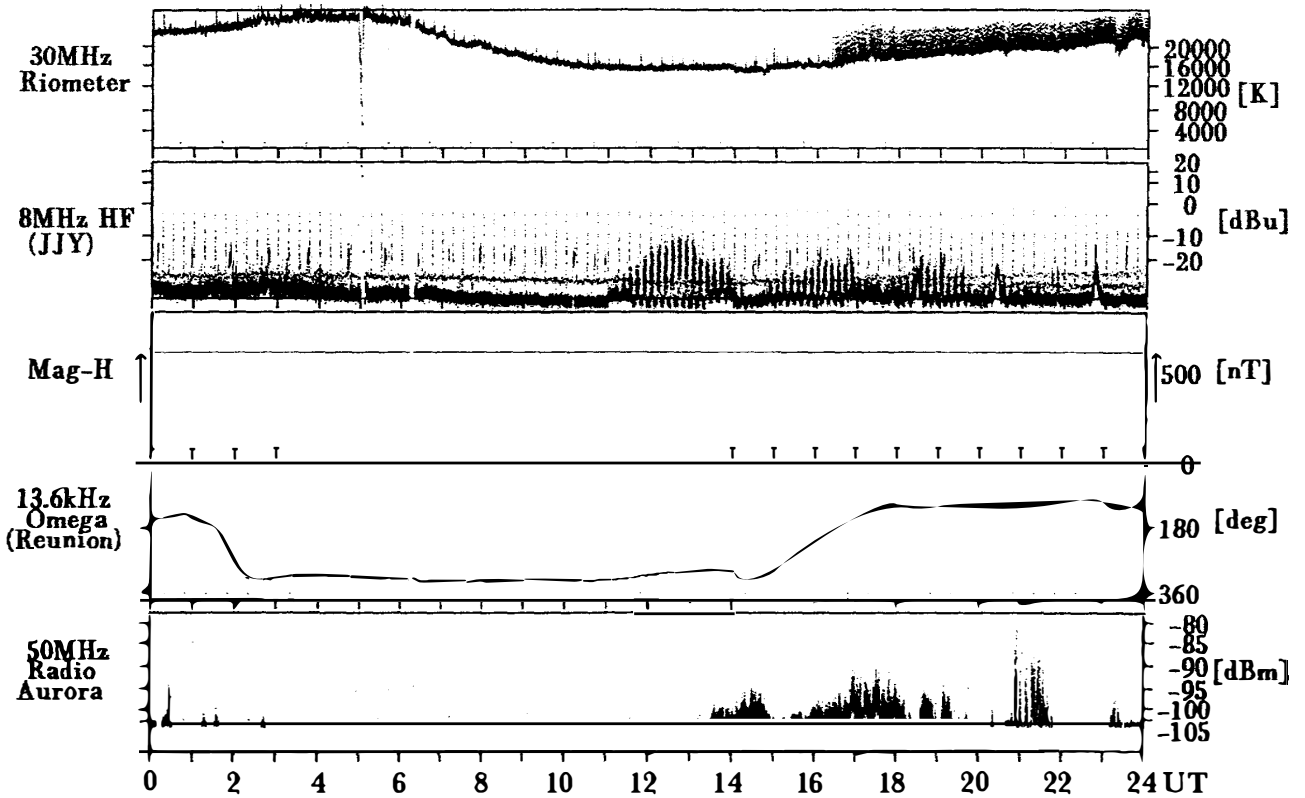
Syowa Station

Total Day / 59 1993/ 2/28



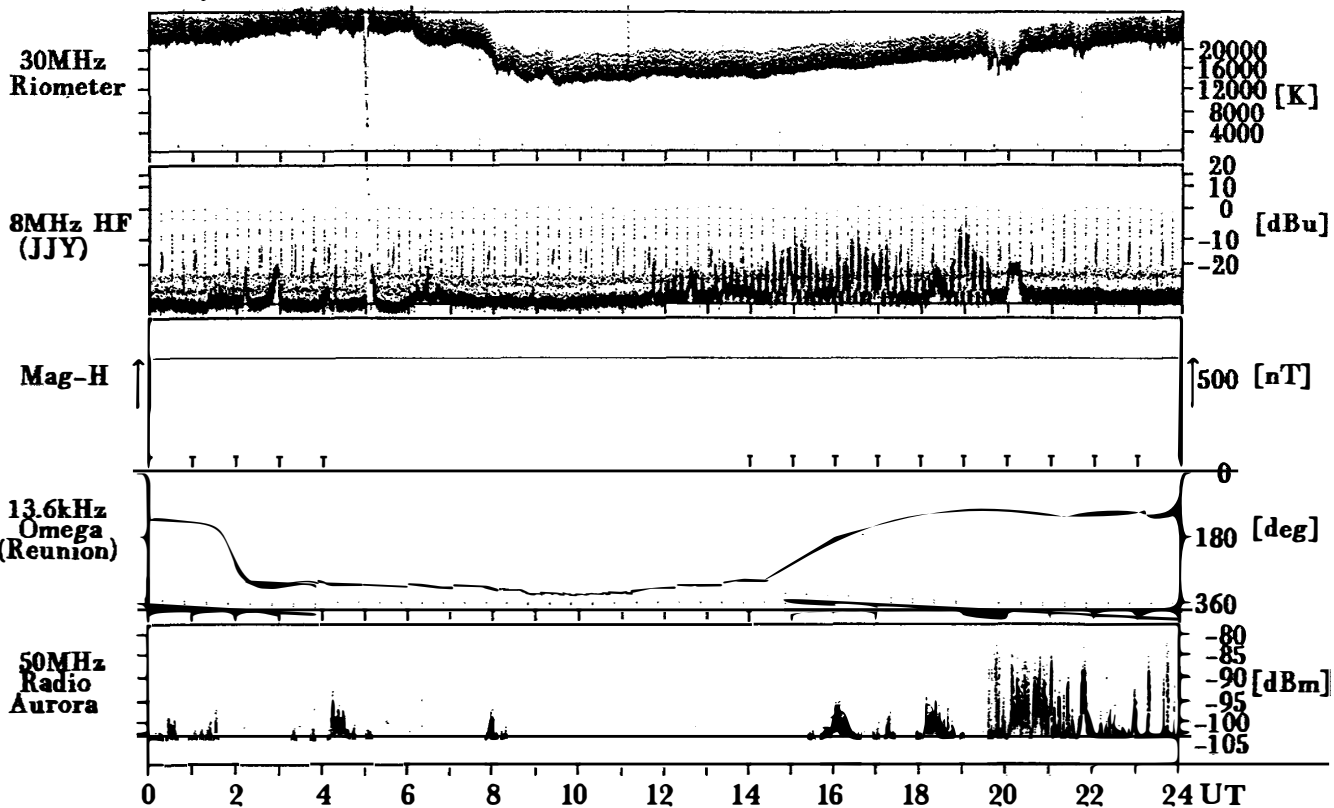
Syowa Station

Total Day / 60 1993/ 3/ 1



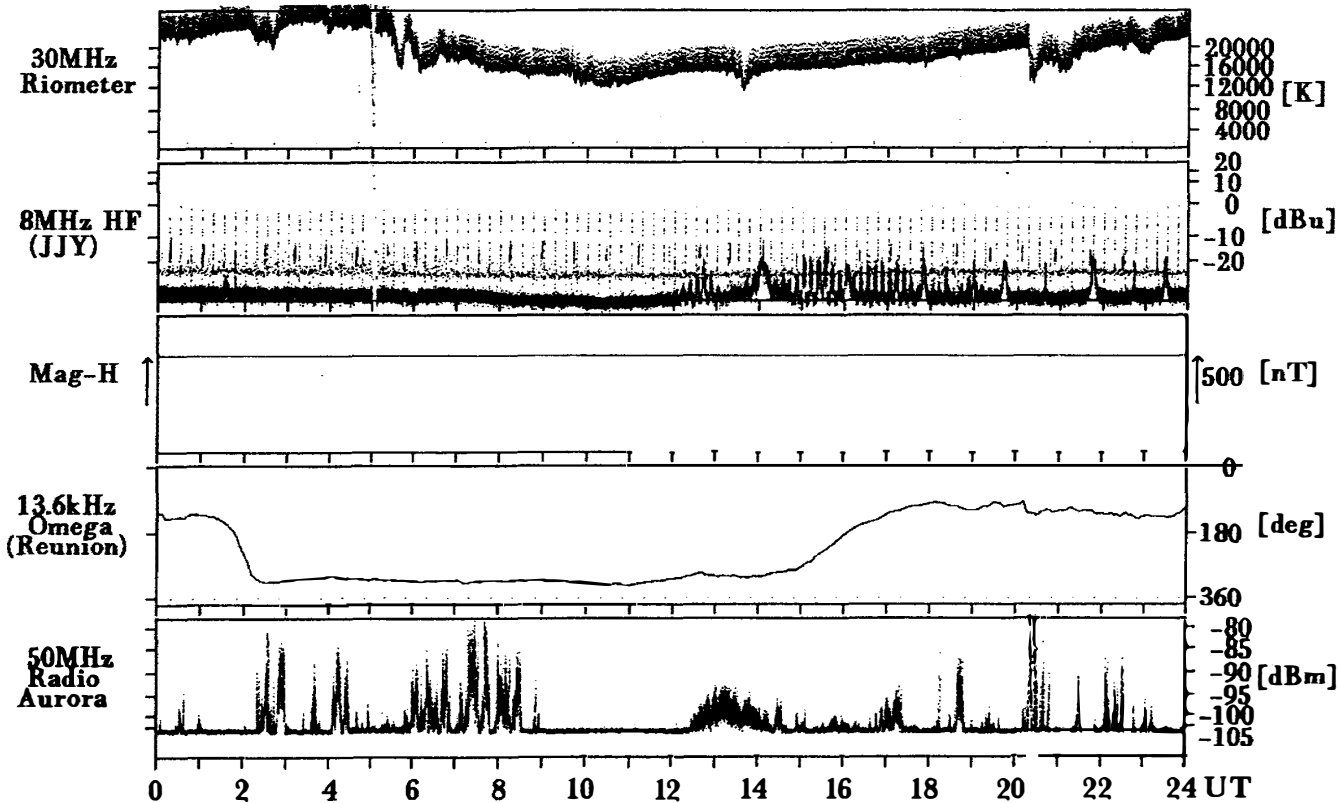
Syowa Station

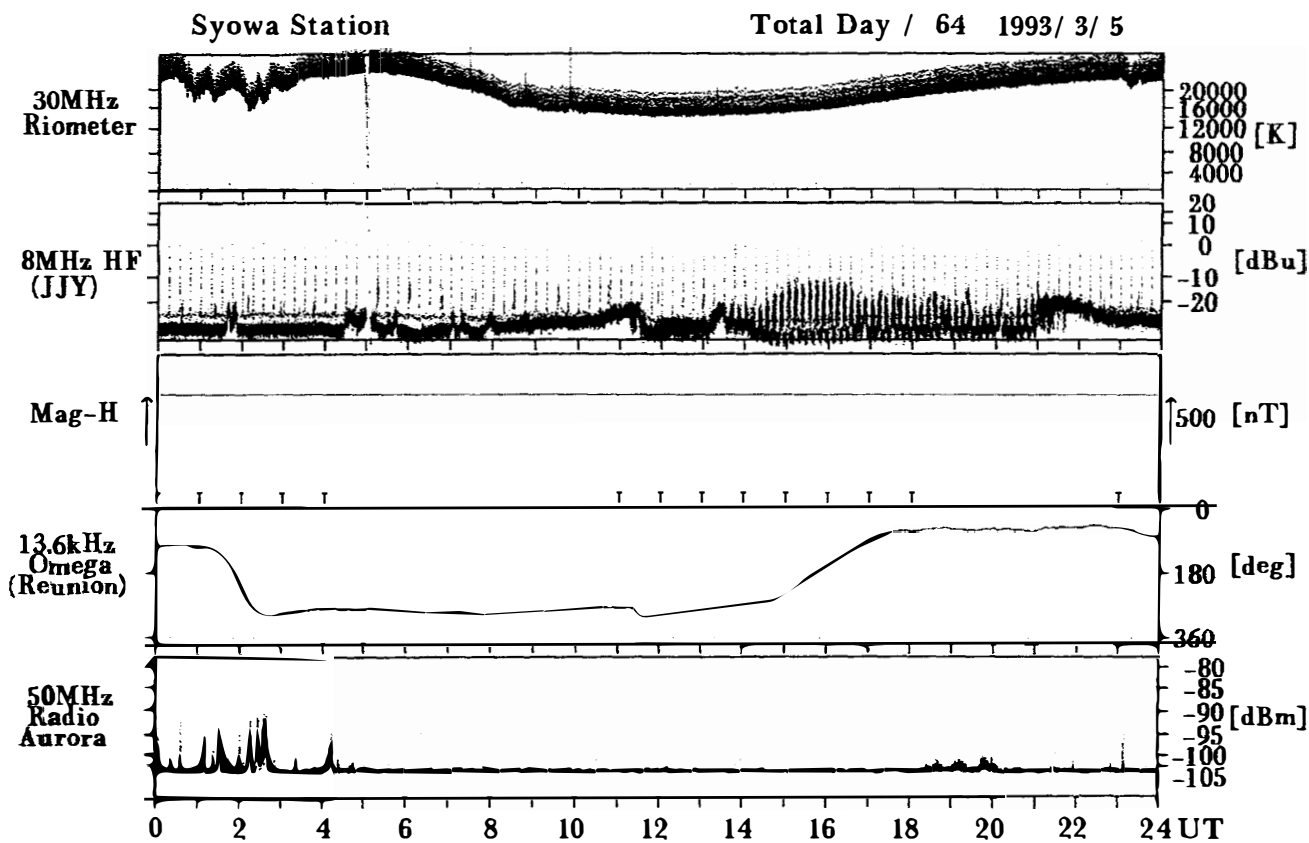
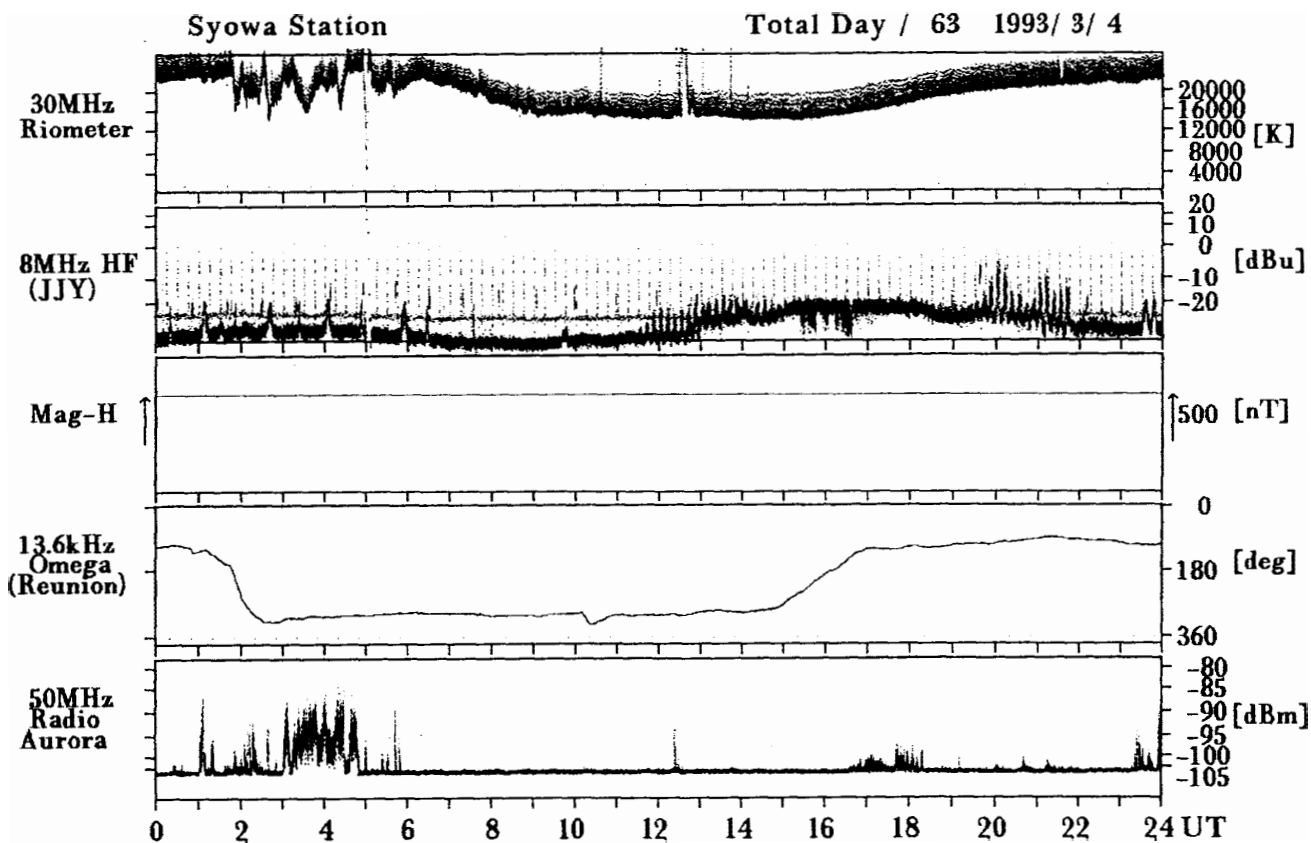
Total Day / 61 1993/ 3/ 2



Syowa Station

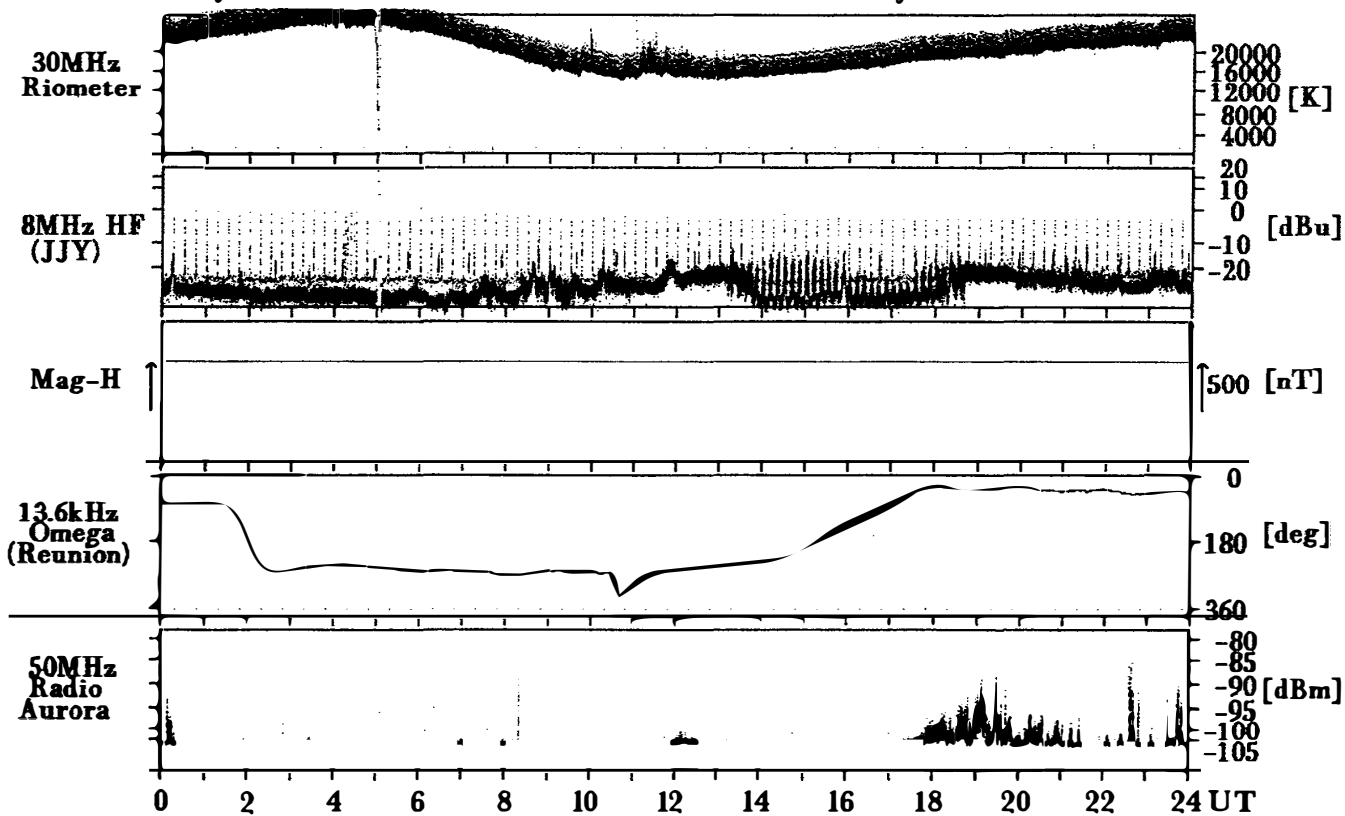
Total Day / 62 1993/ 3/ 3





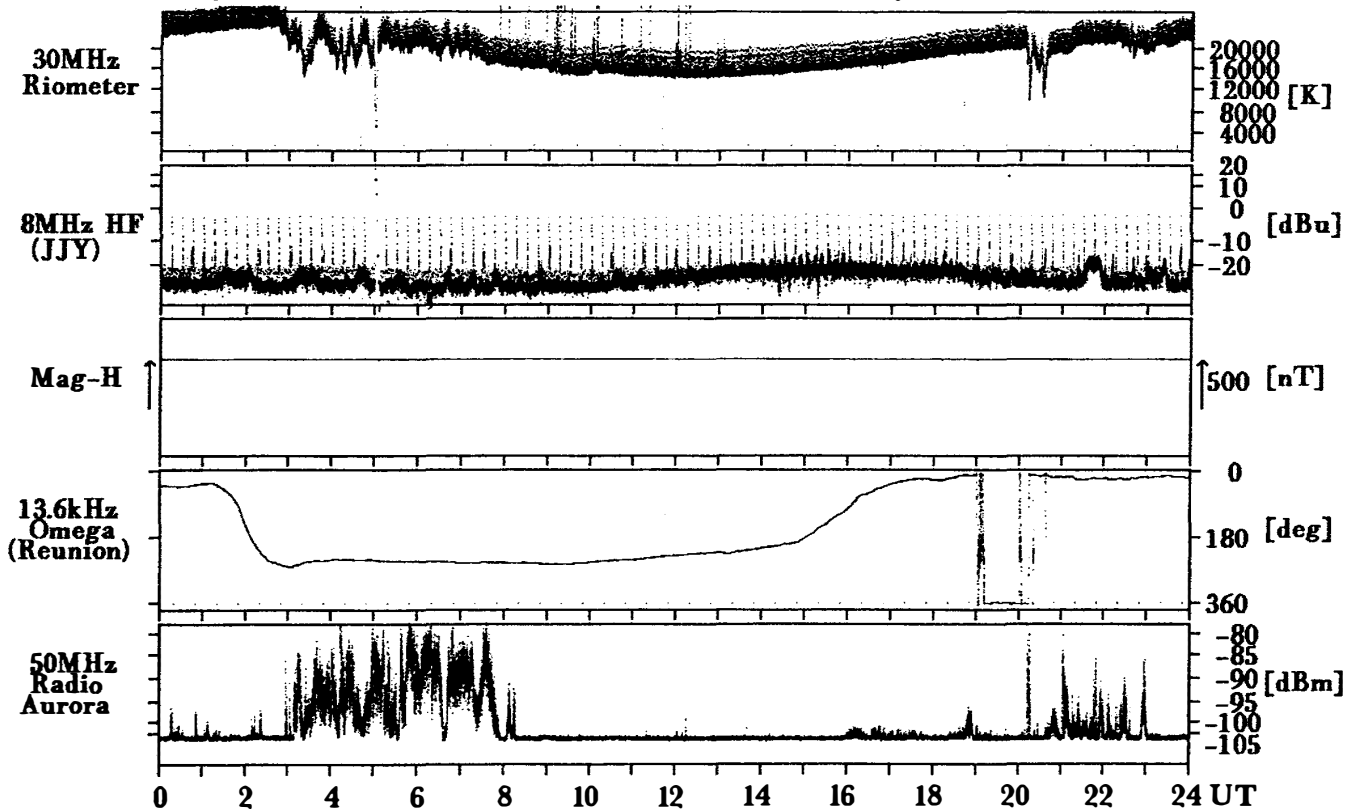
Syowa Station

Total Day / 65 1993/ 3/ 6



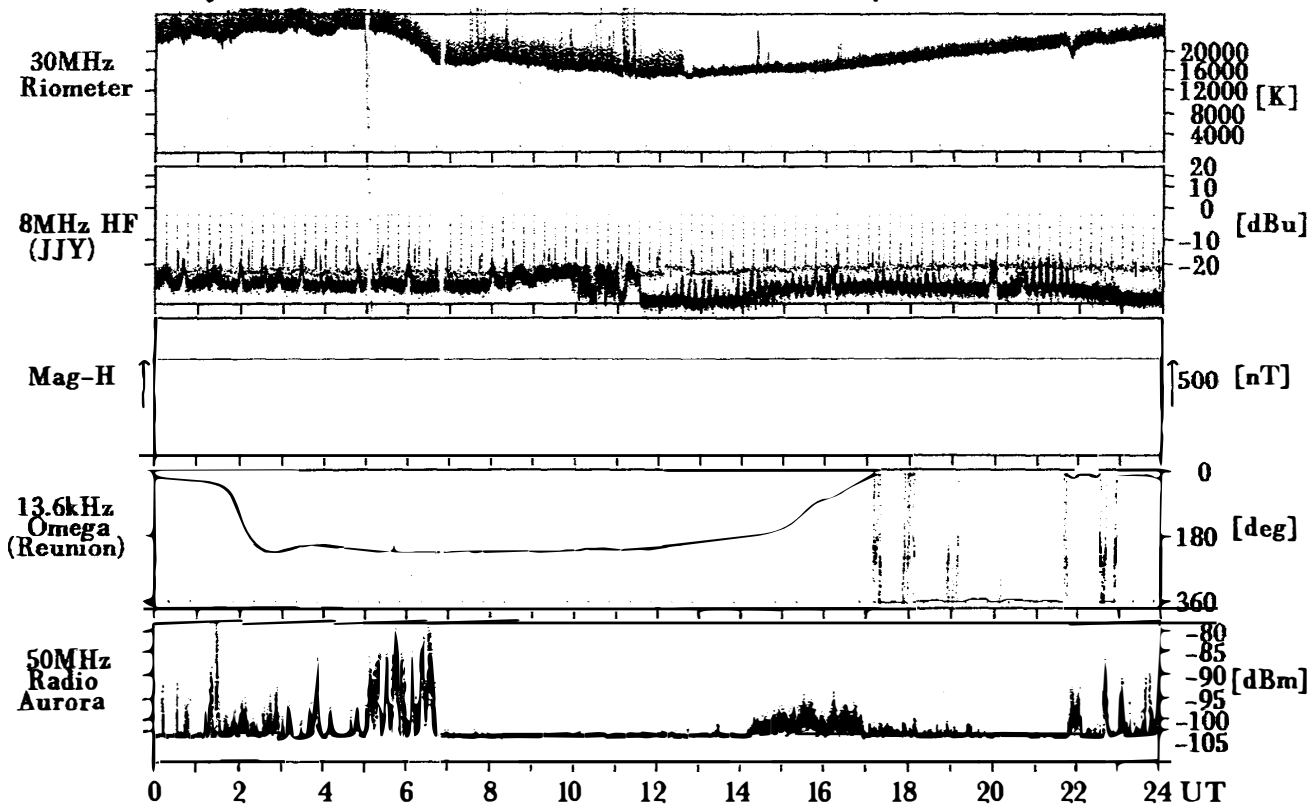
Syowa Station

Total Day / 66 1993/ 3/ 7



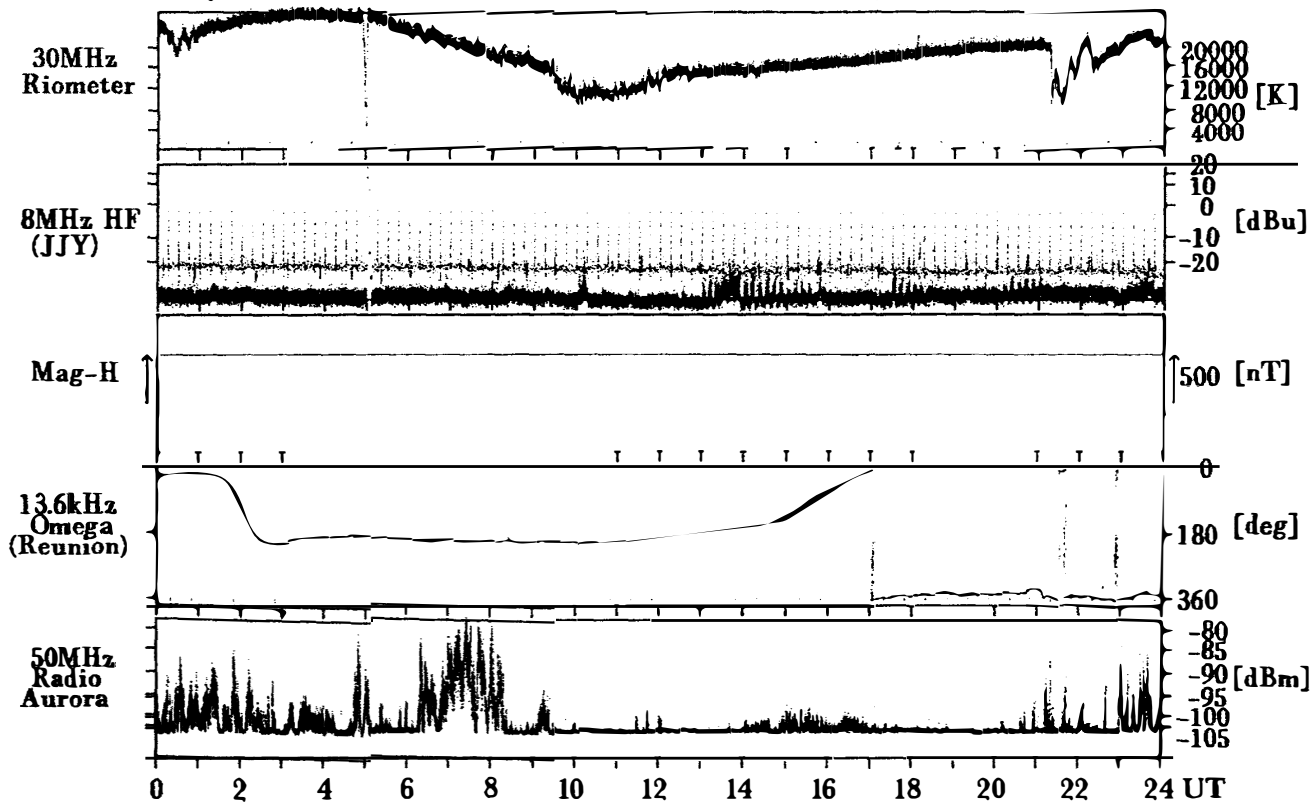
Syowa Station

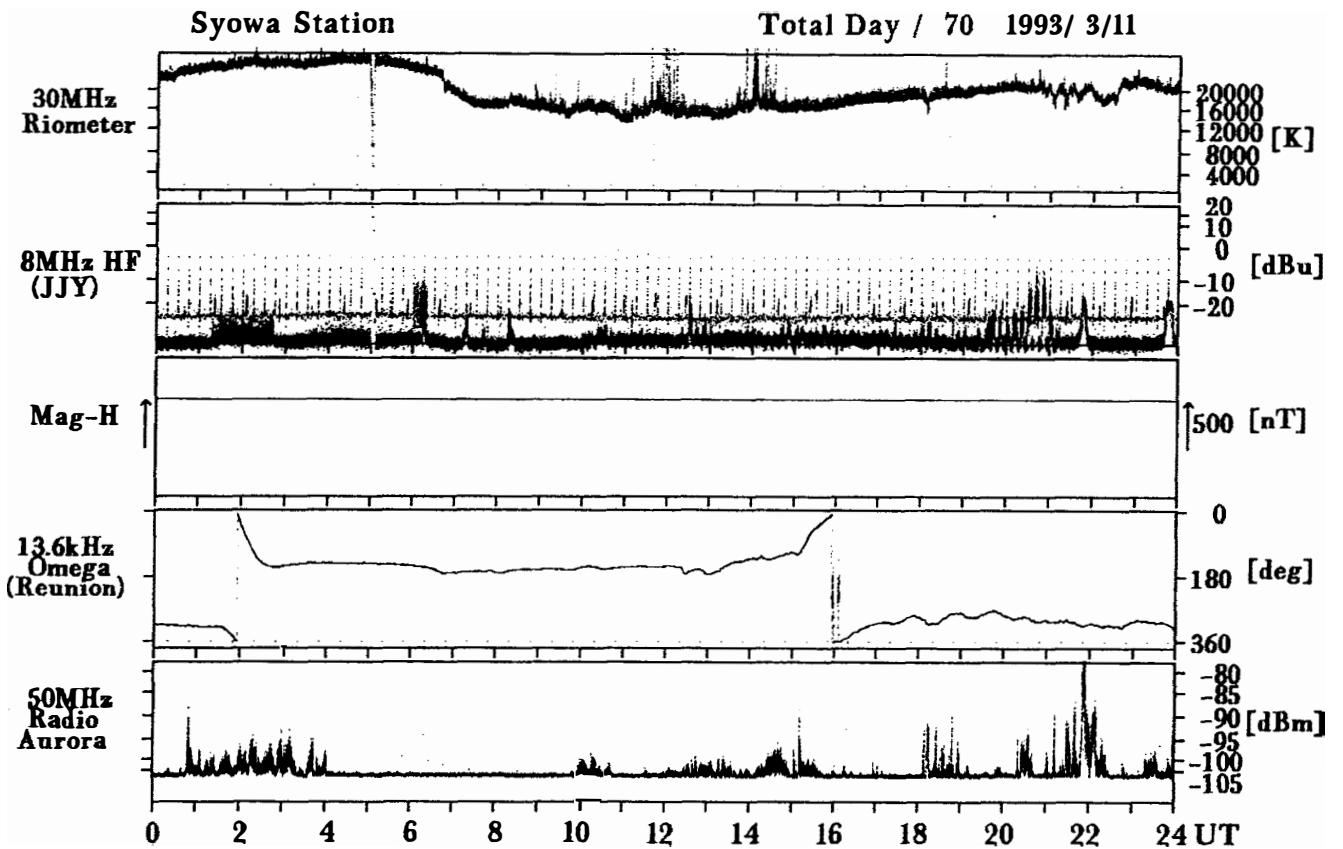
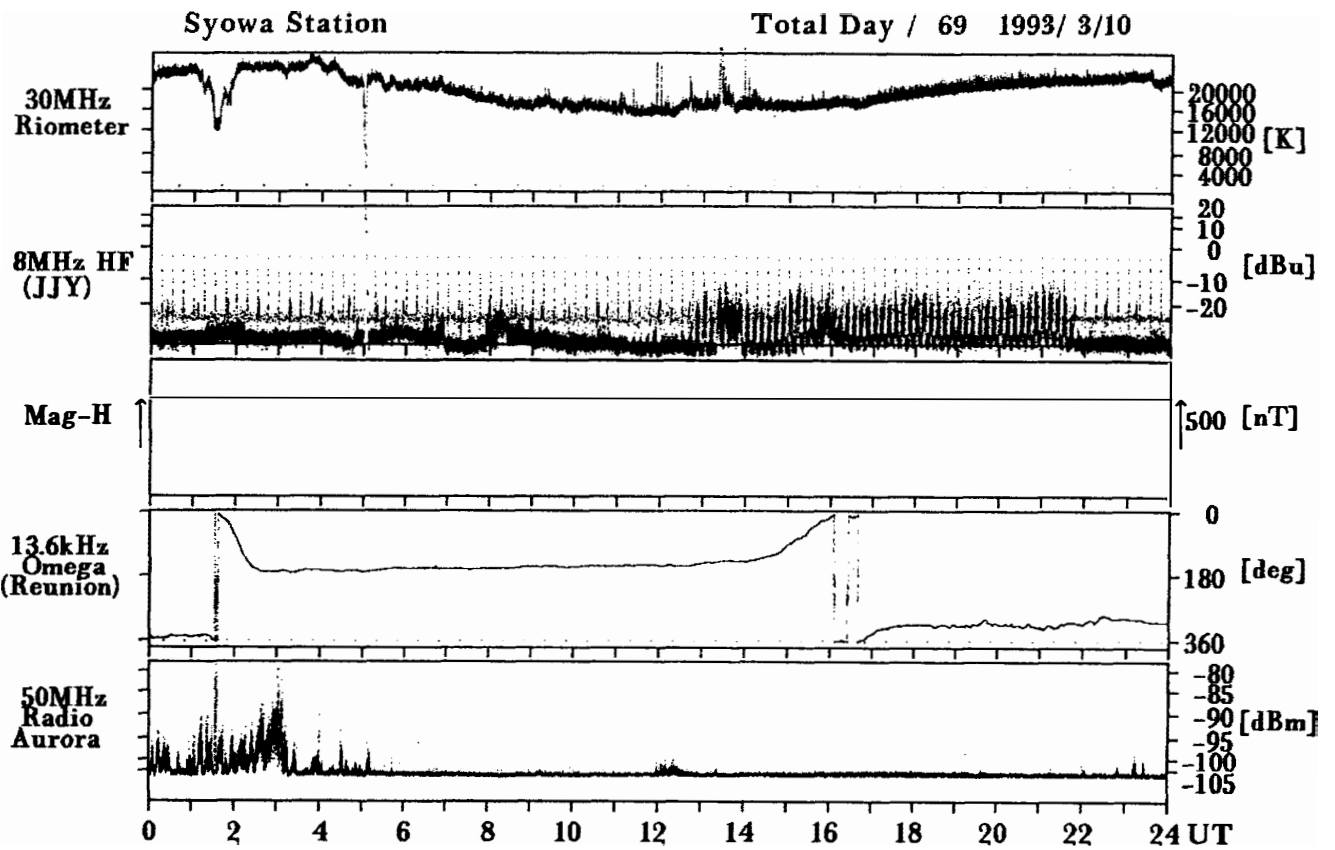
Total Day / 67 1993/ 3/ 8



Syowa Station

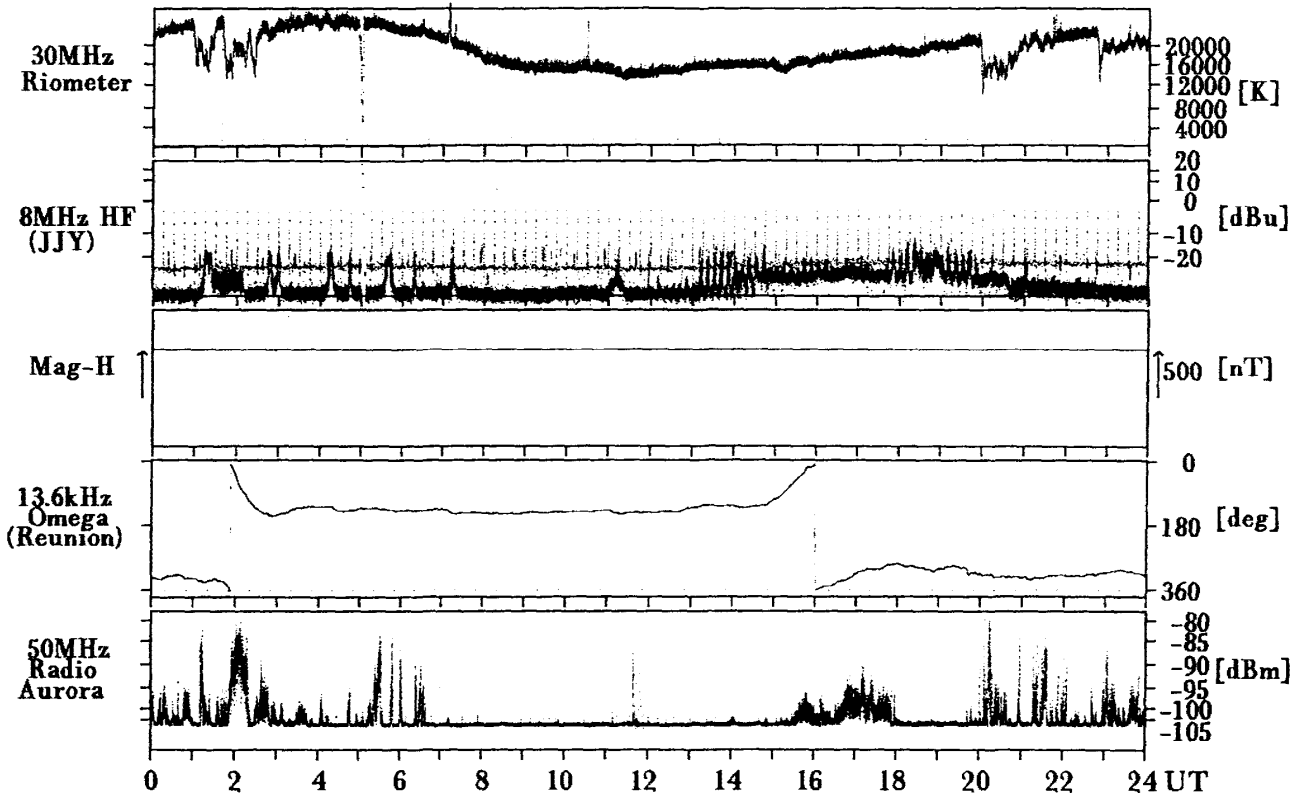
Total Day / 68 1993/ 3/ 9





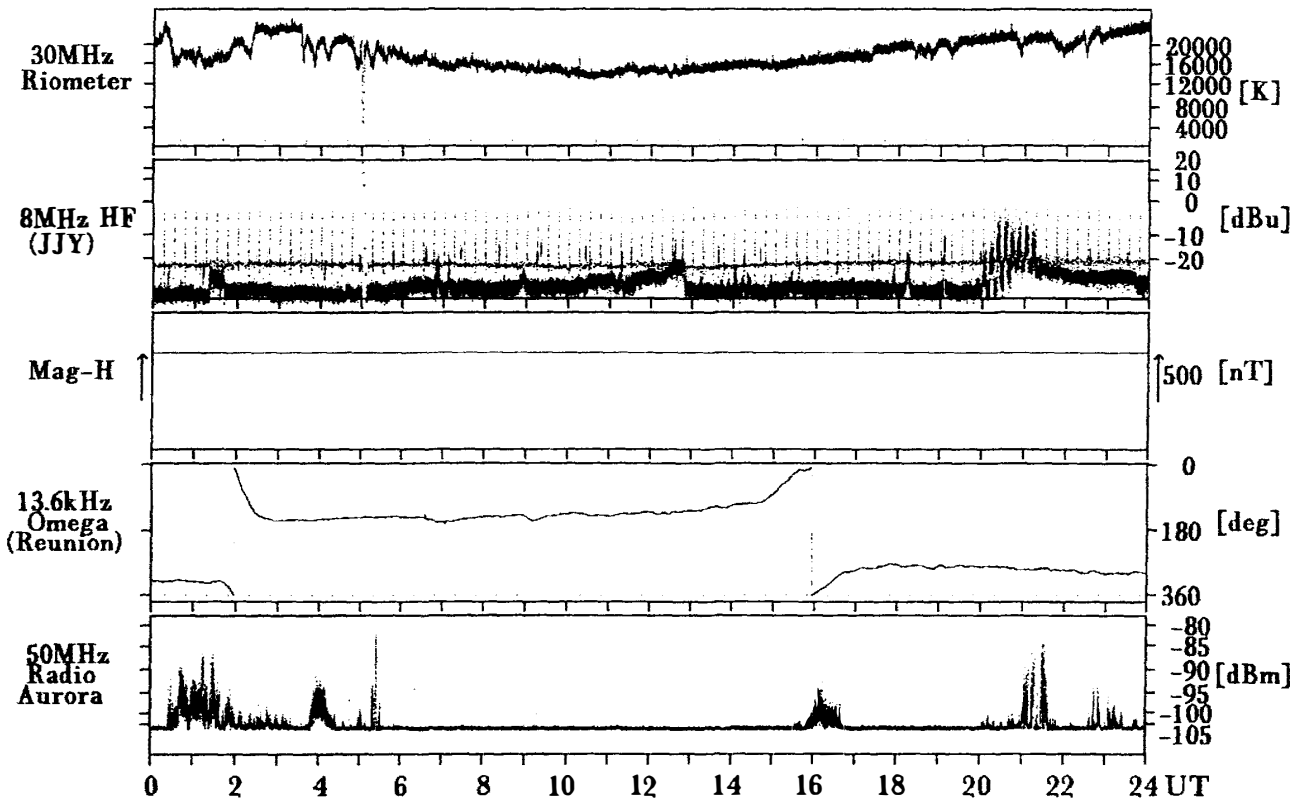
Syowa Station

Total Day / 71 1993/ 3/12



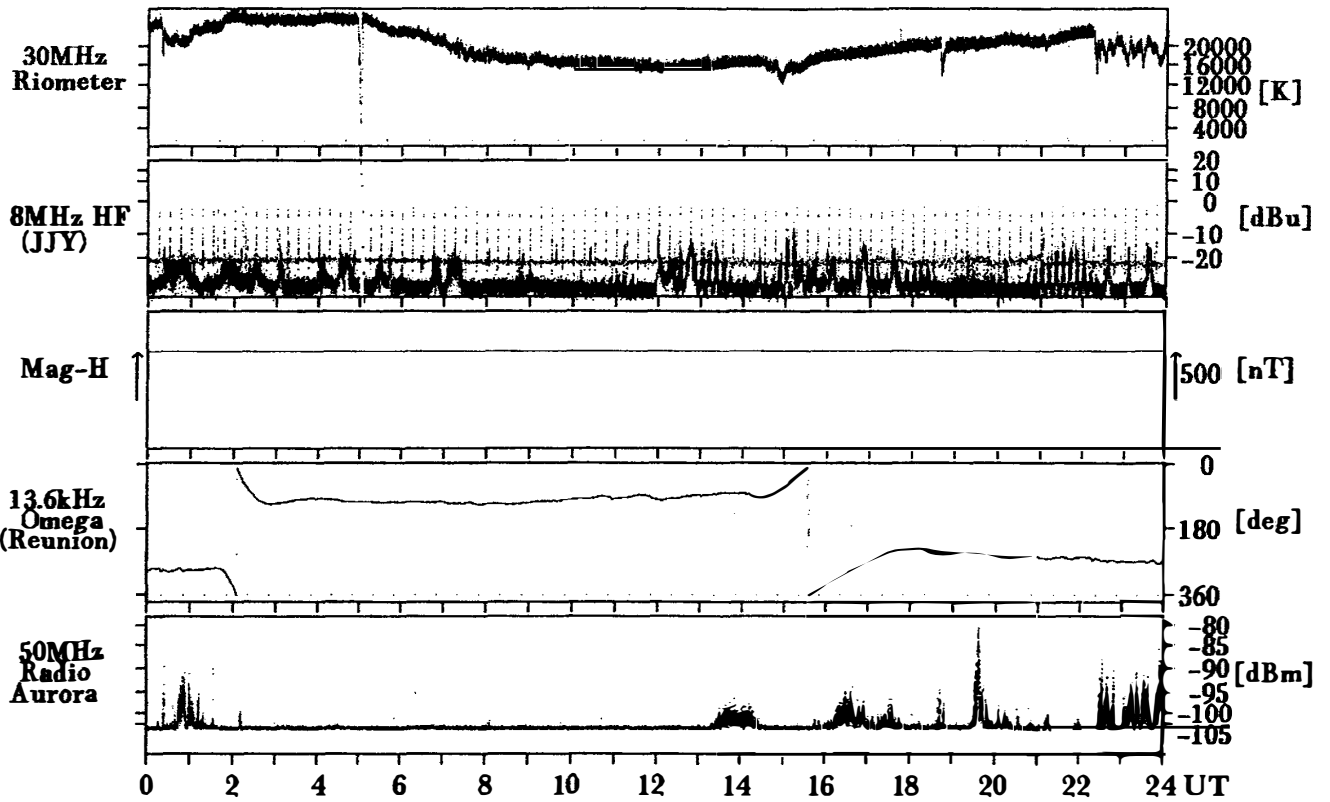
Syowa Station

Total Day / 72 1993/ 3/13



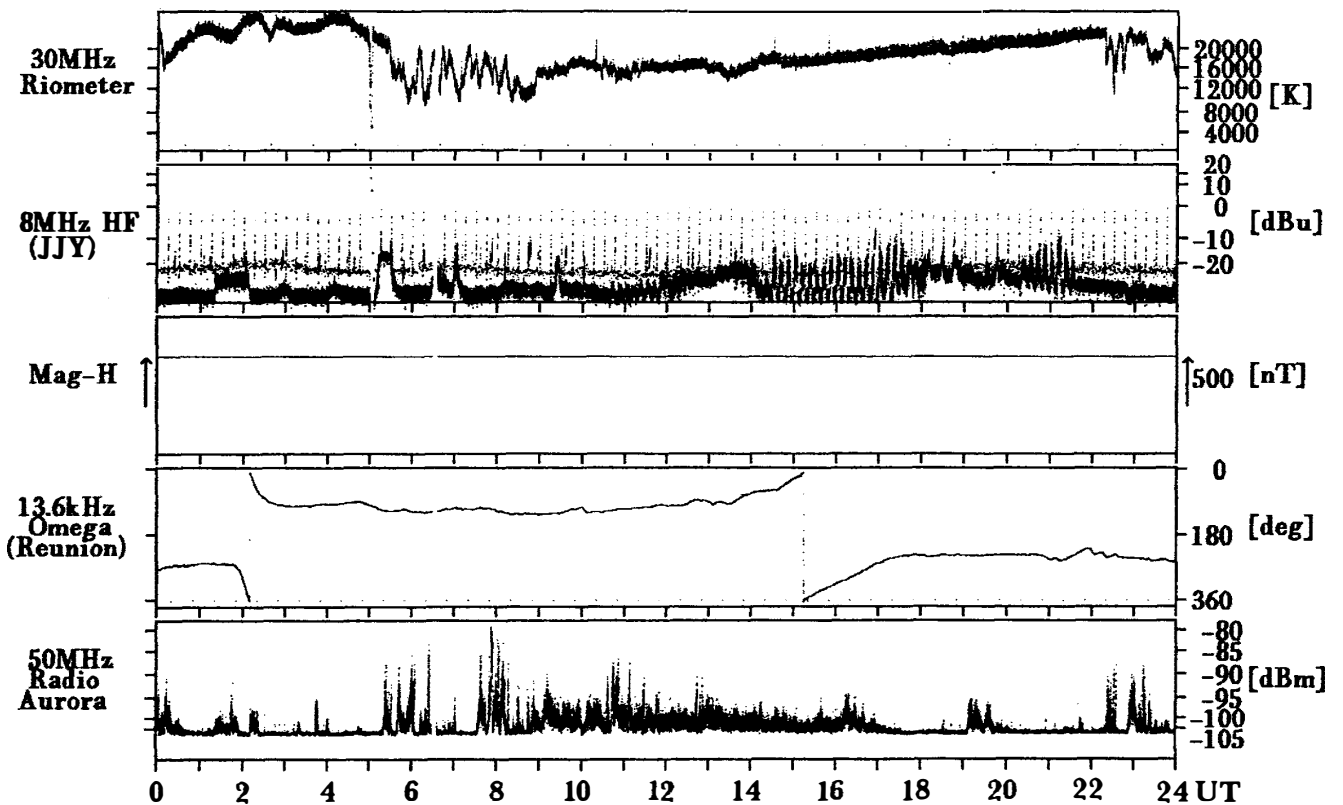
Syowa Station

Total Day / 73 1993/ 3/14



Syowa Station

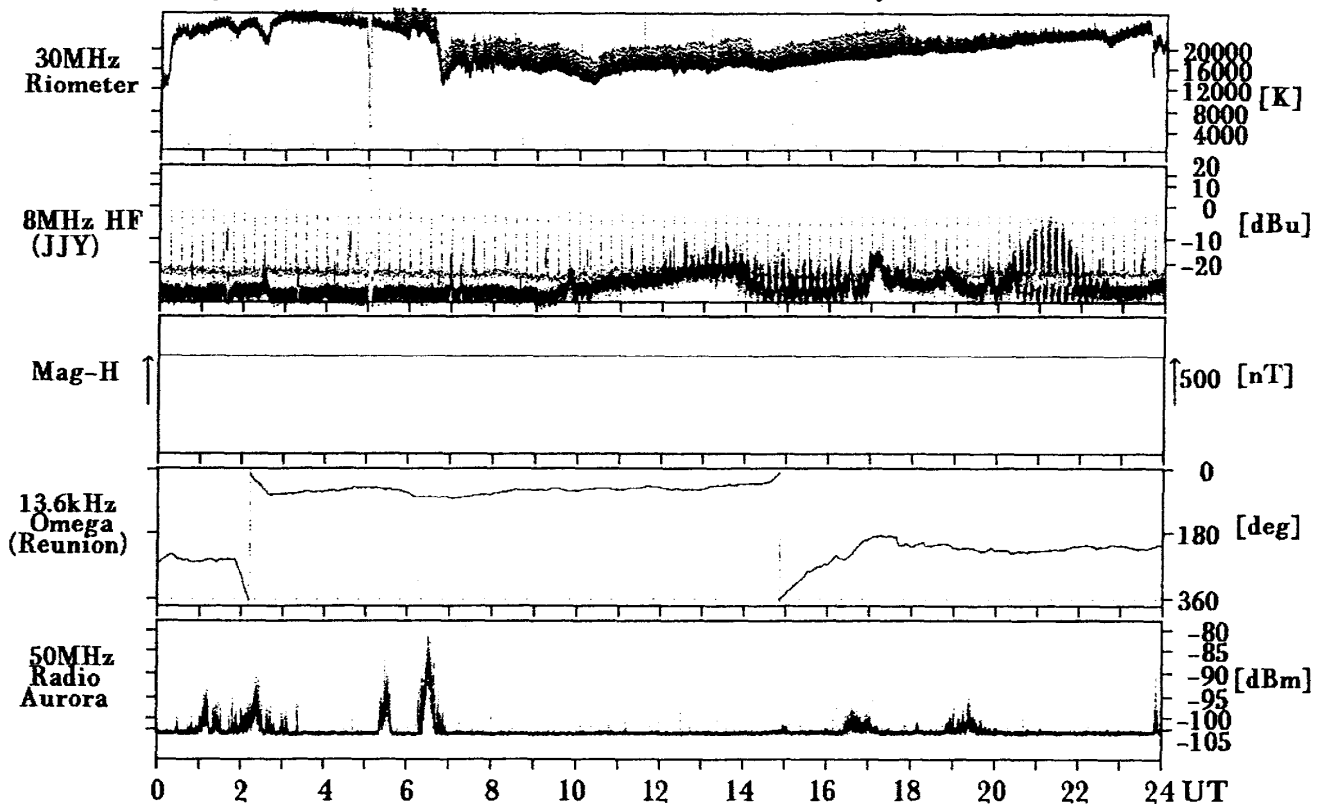
Total Day / 74 1993/ 3/15





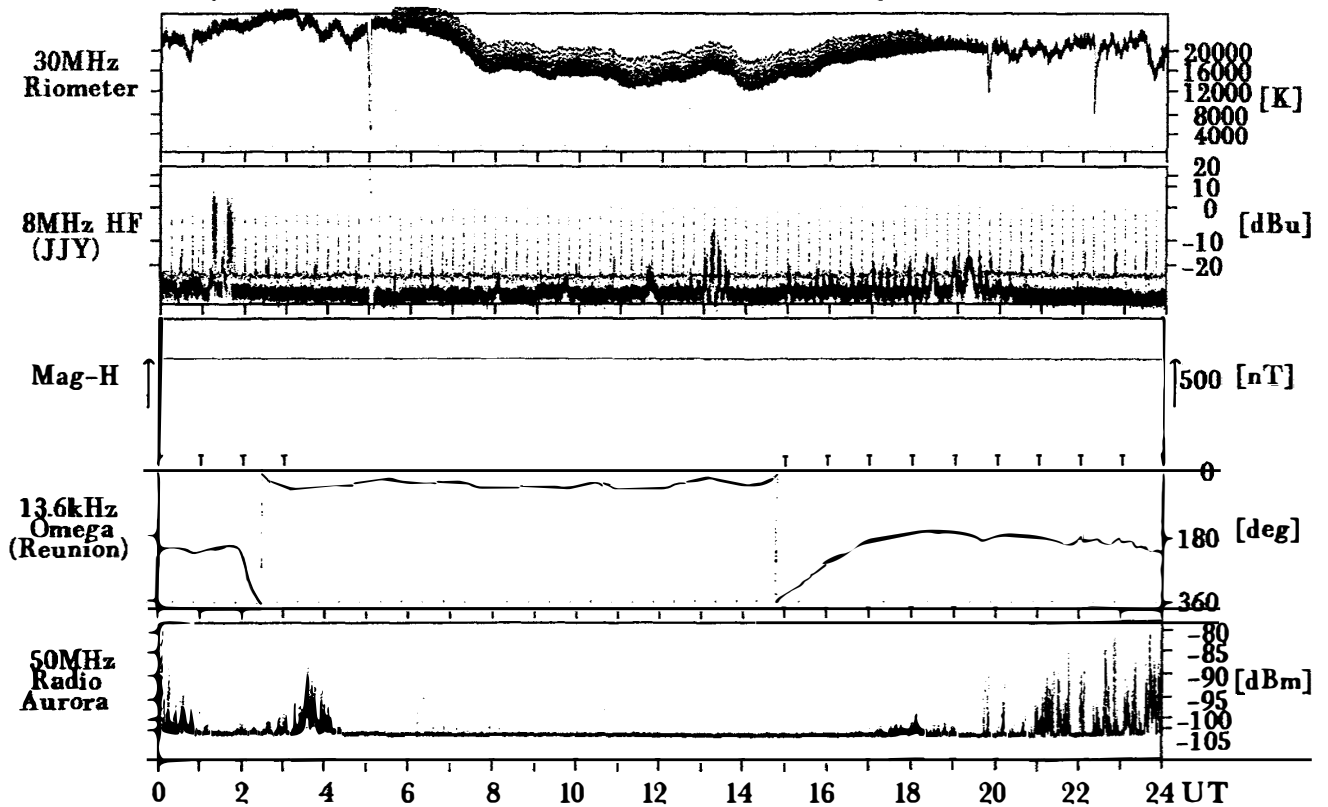
Syowa Station

Total Day / 75 1993/ 3/16



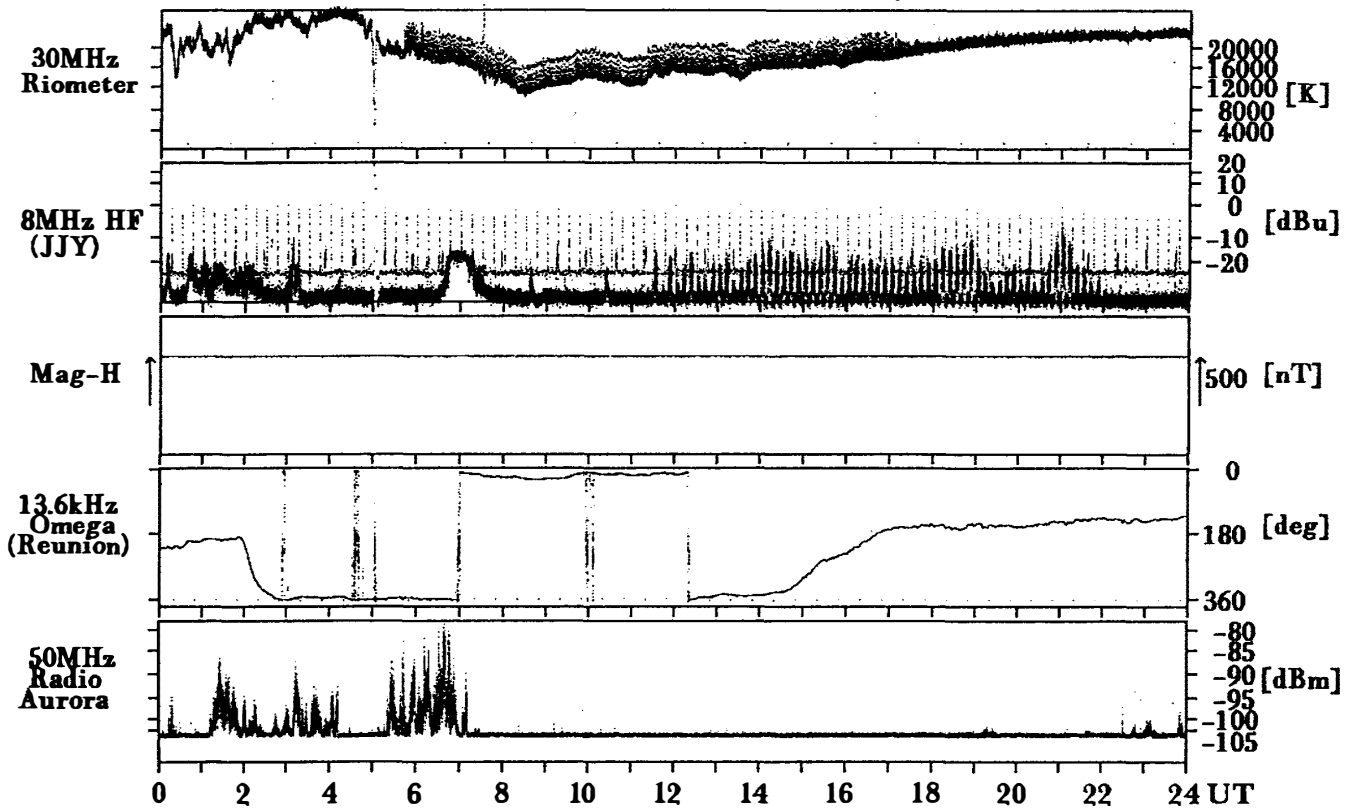
Syowa Station

Total Day / 76 1993/ 3/17



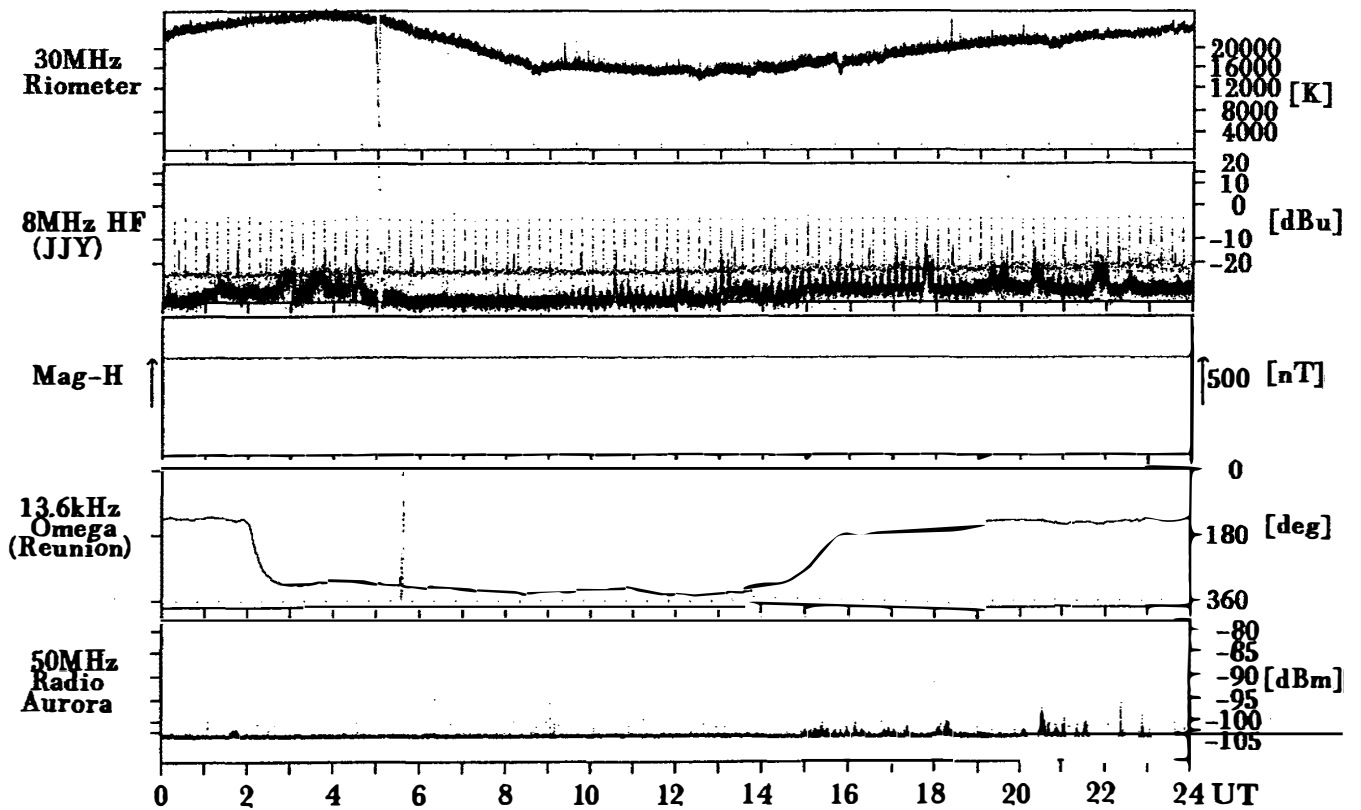
Syowa Station

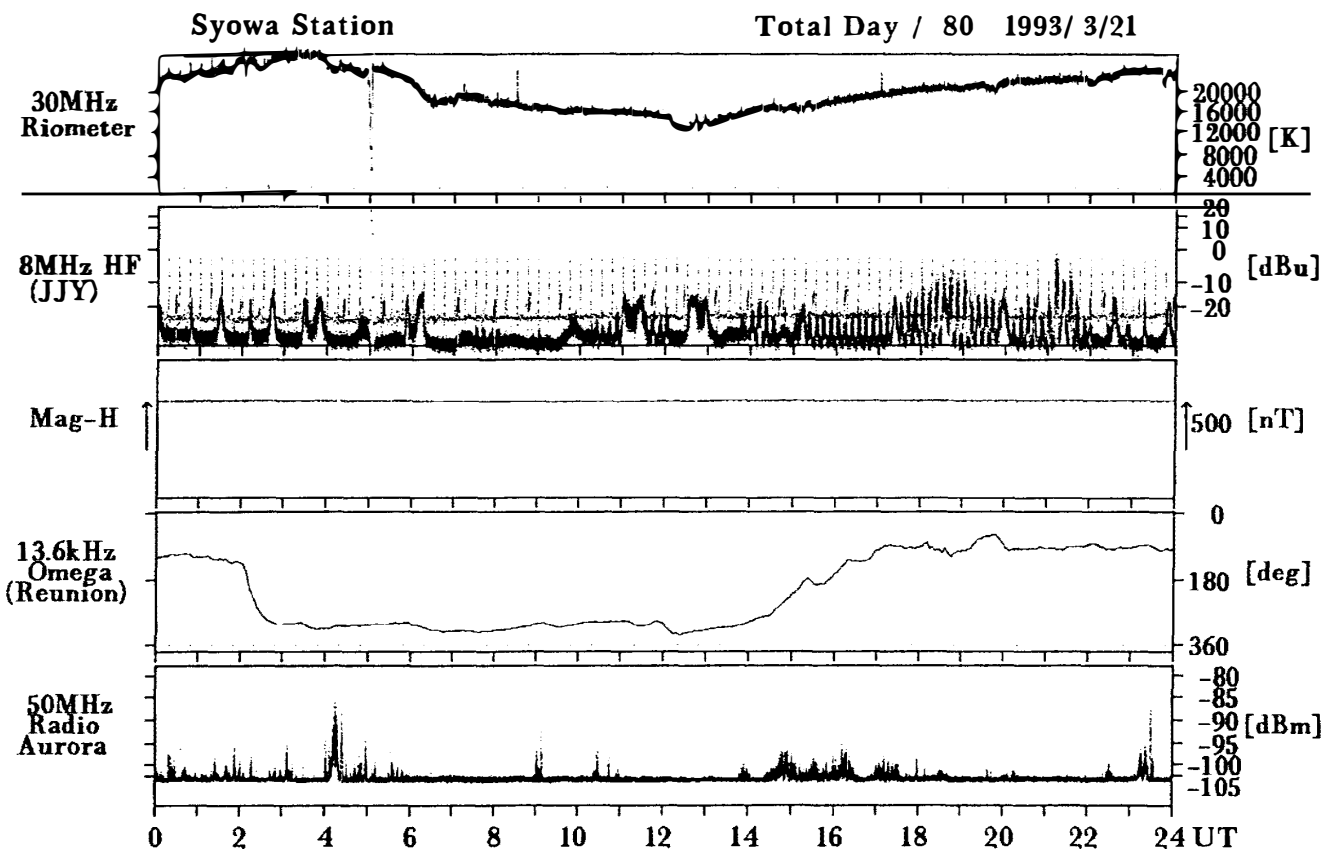
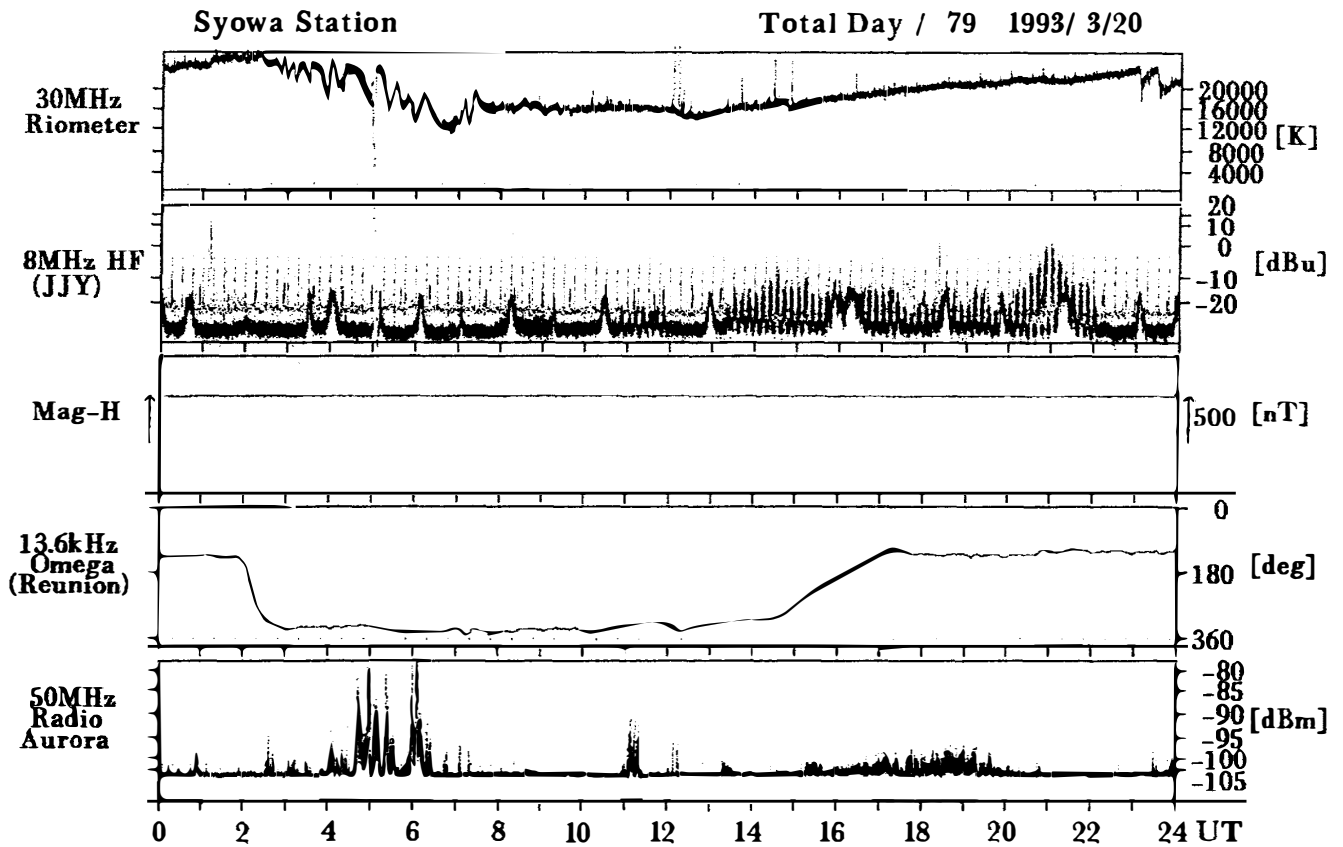
Total Day / 77 1993/ 3/18

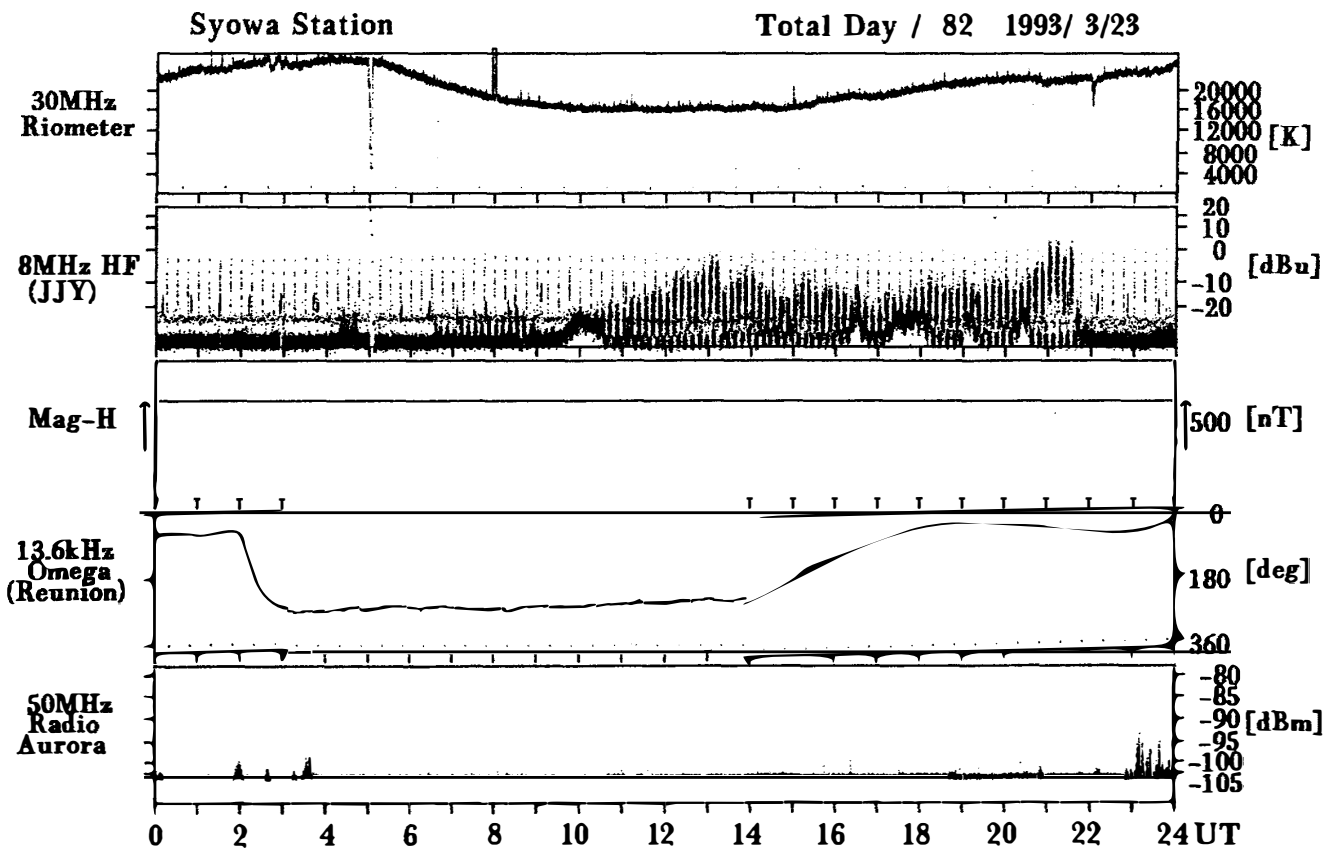
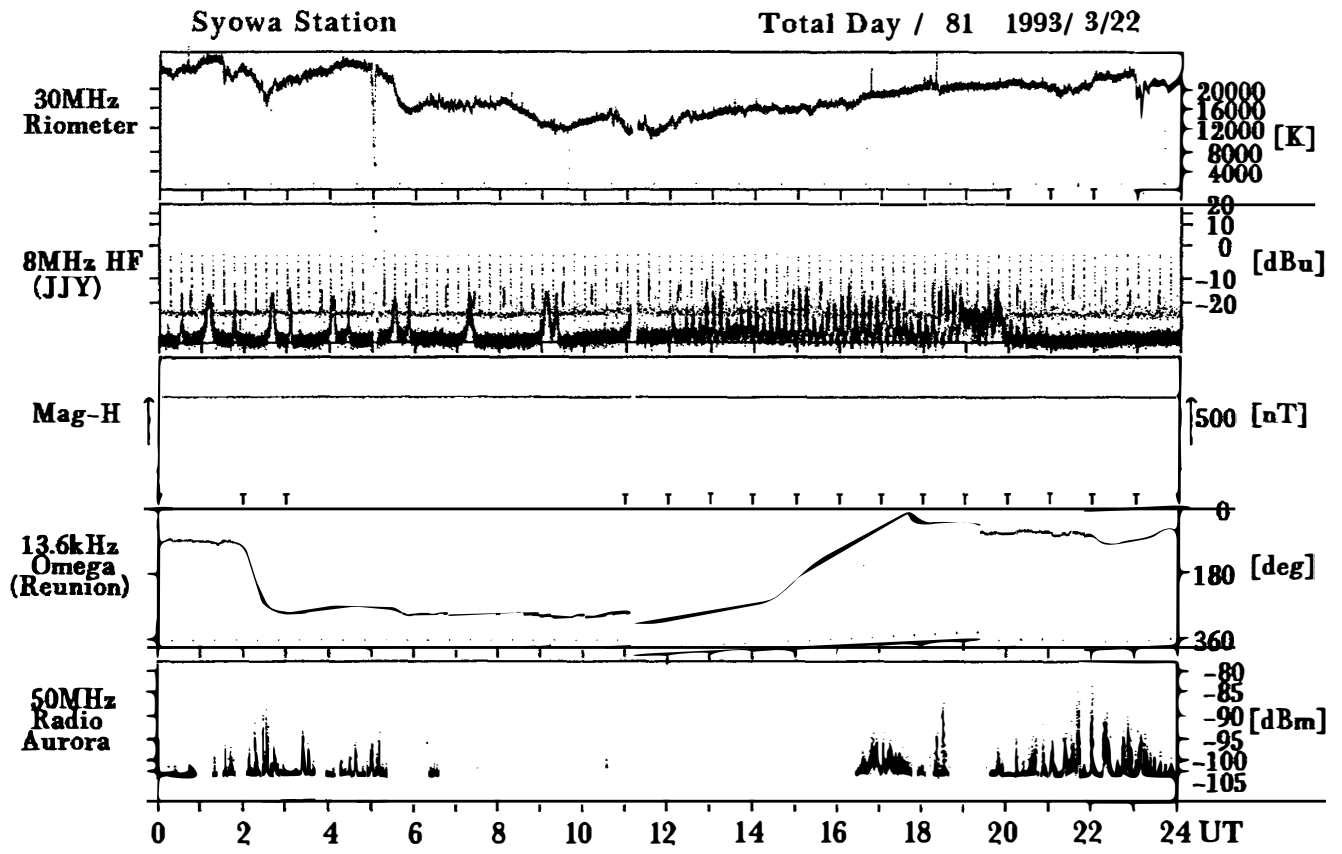


Syowa Station

Total Day / 78 1993/ 3/19

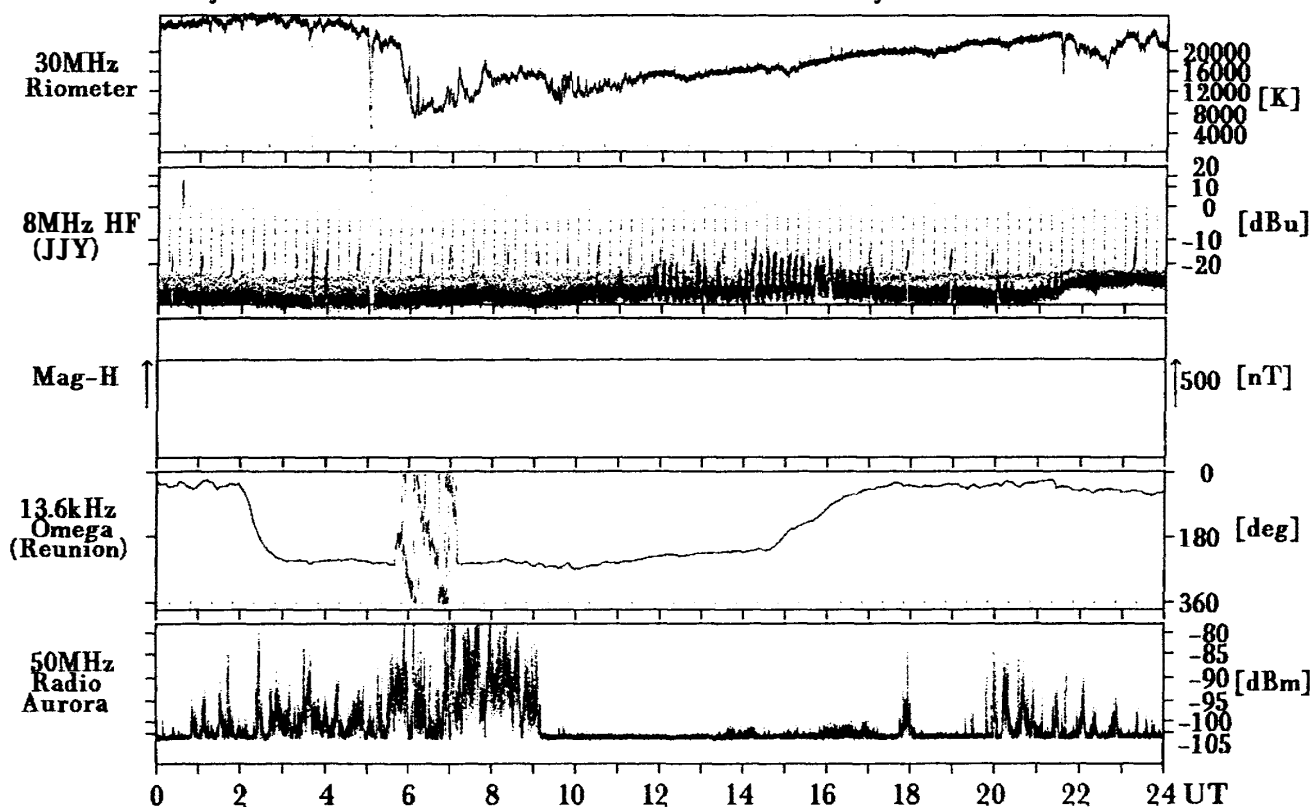






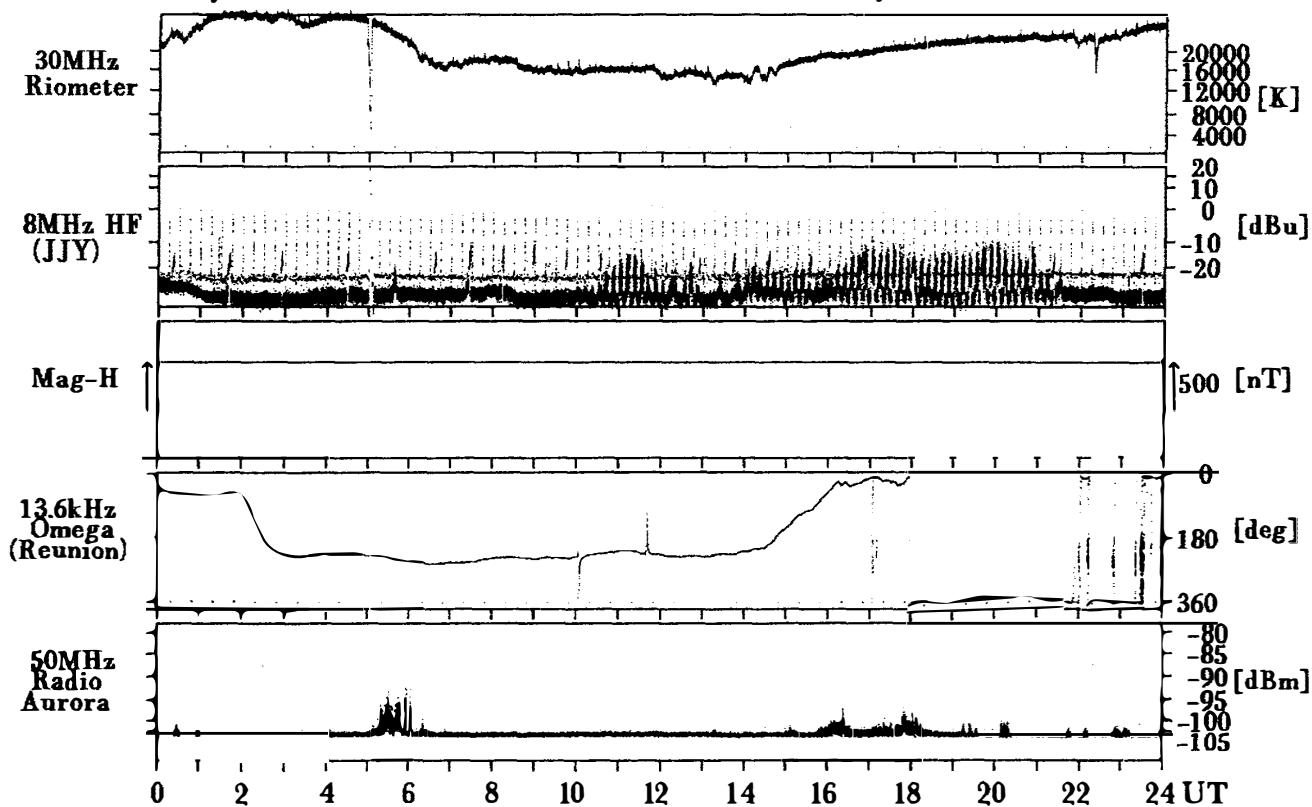
Syowa Station

Total Day / 83 1993/ 3/24



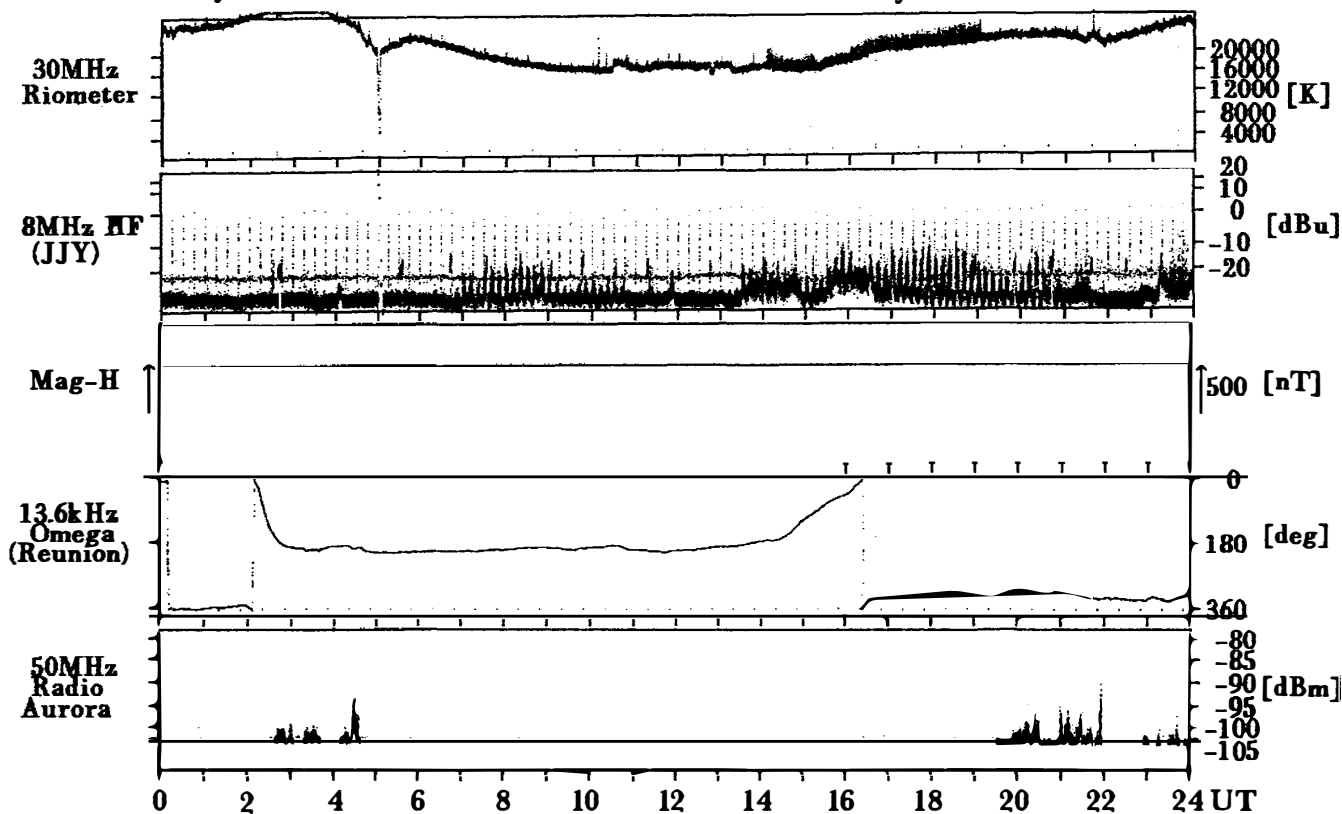
Syowa Station

Total Day / 84 1993/ 3/25



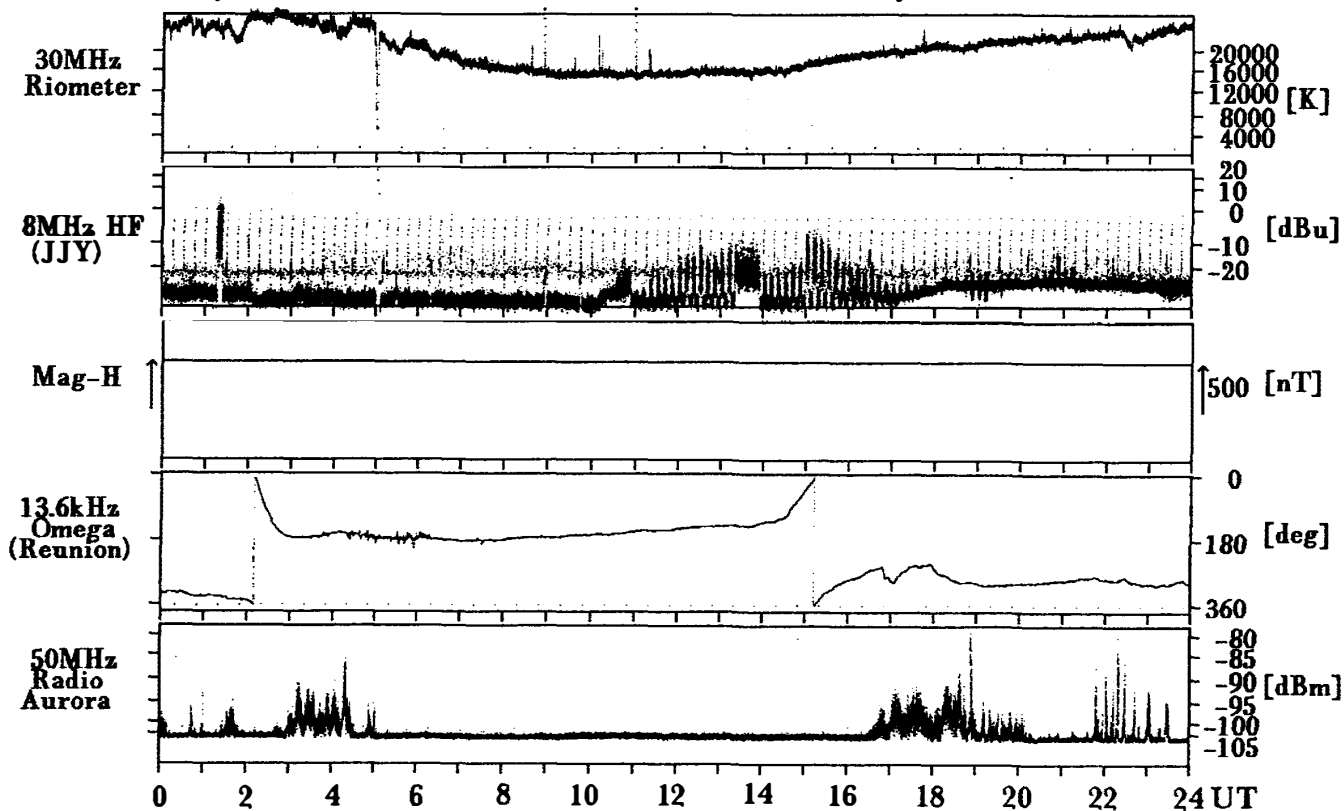
Syowa Station

Total Day / 85 1993/ 3/26



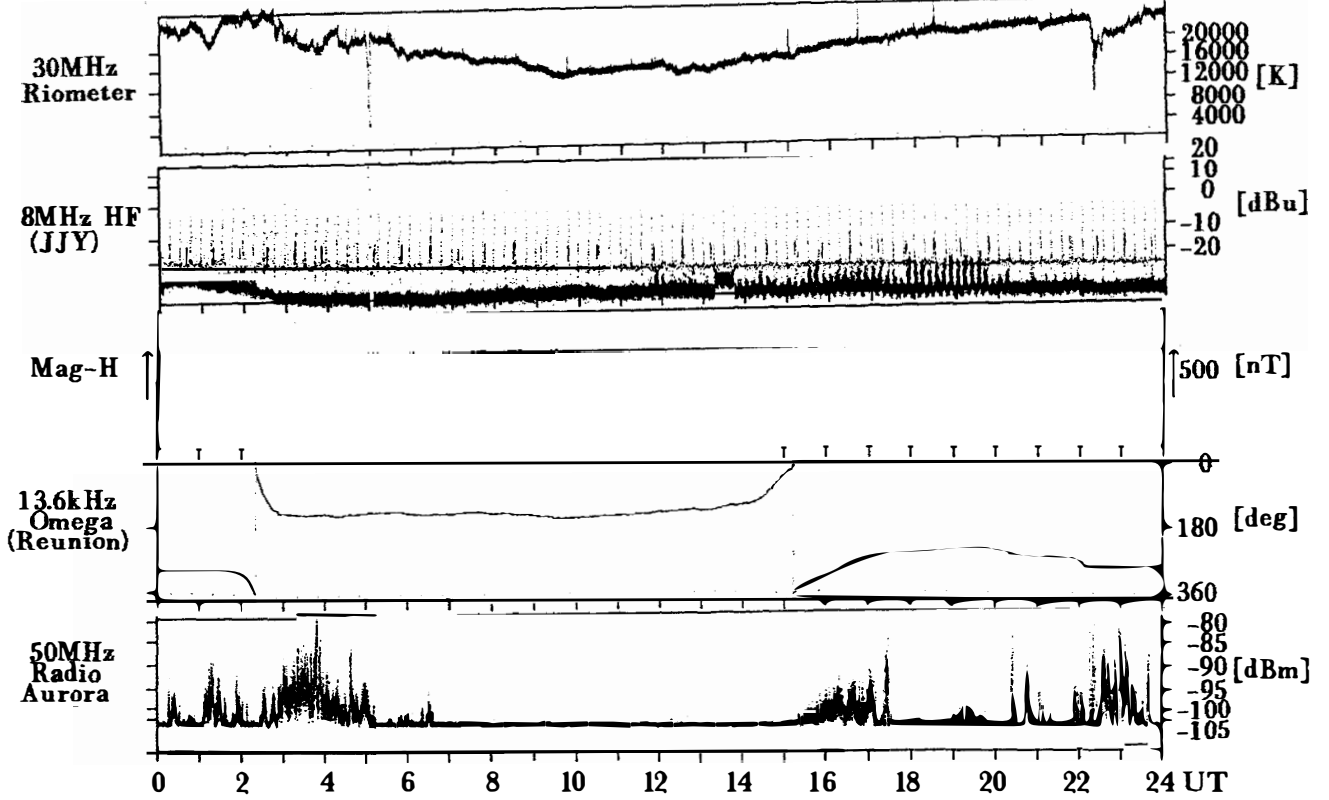
Syowa Station

Total Day / 86 1993/ 3/27



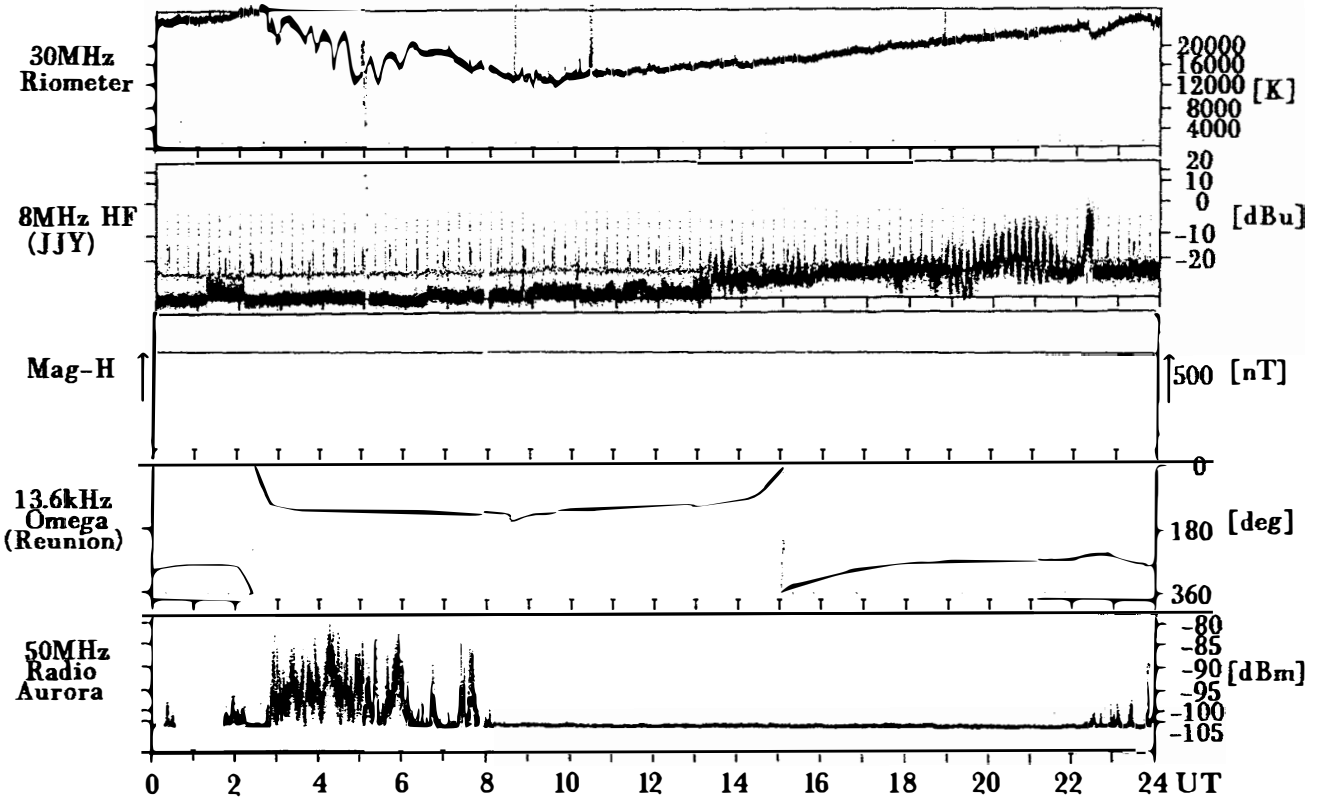
Syowa Station

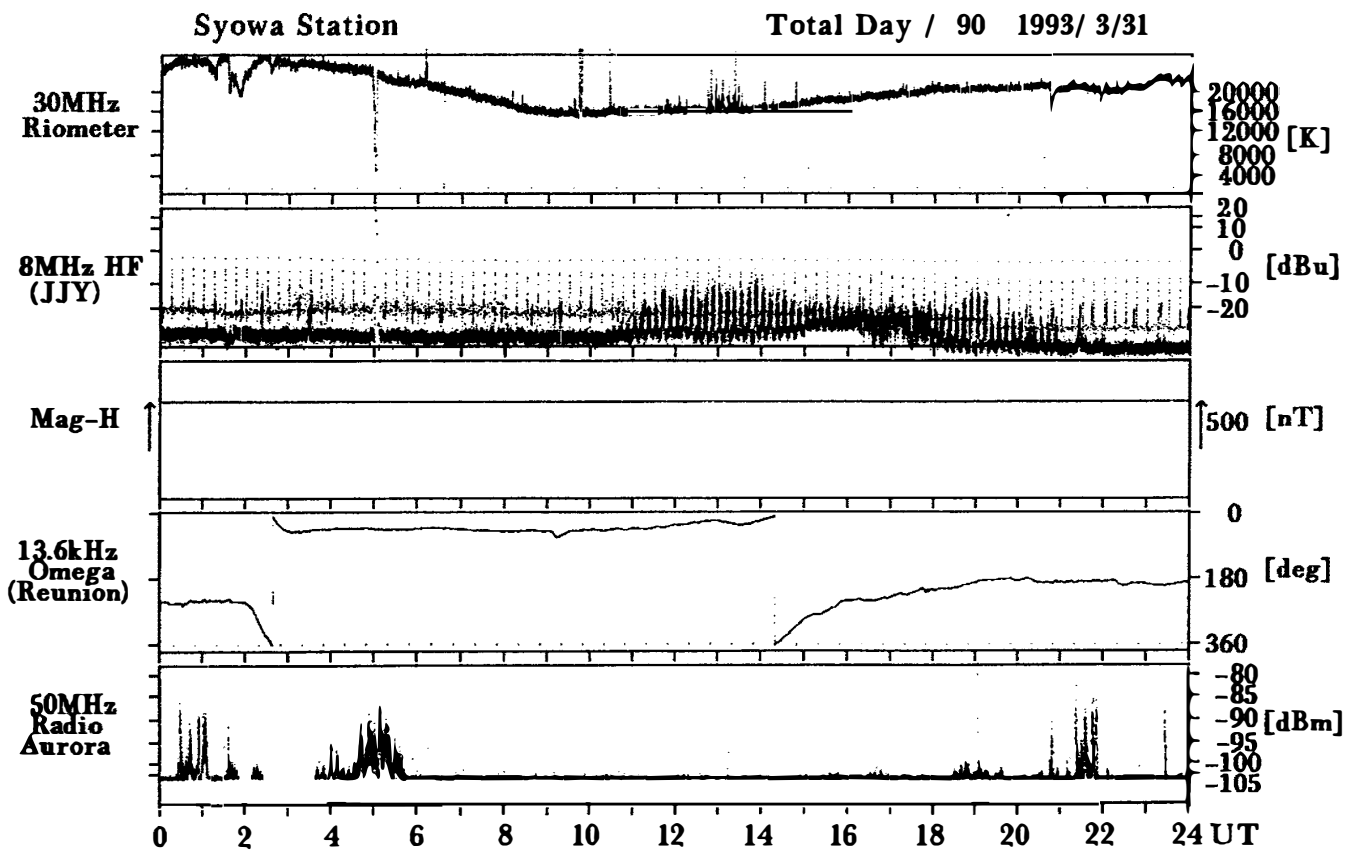
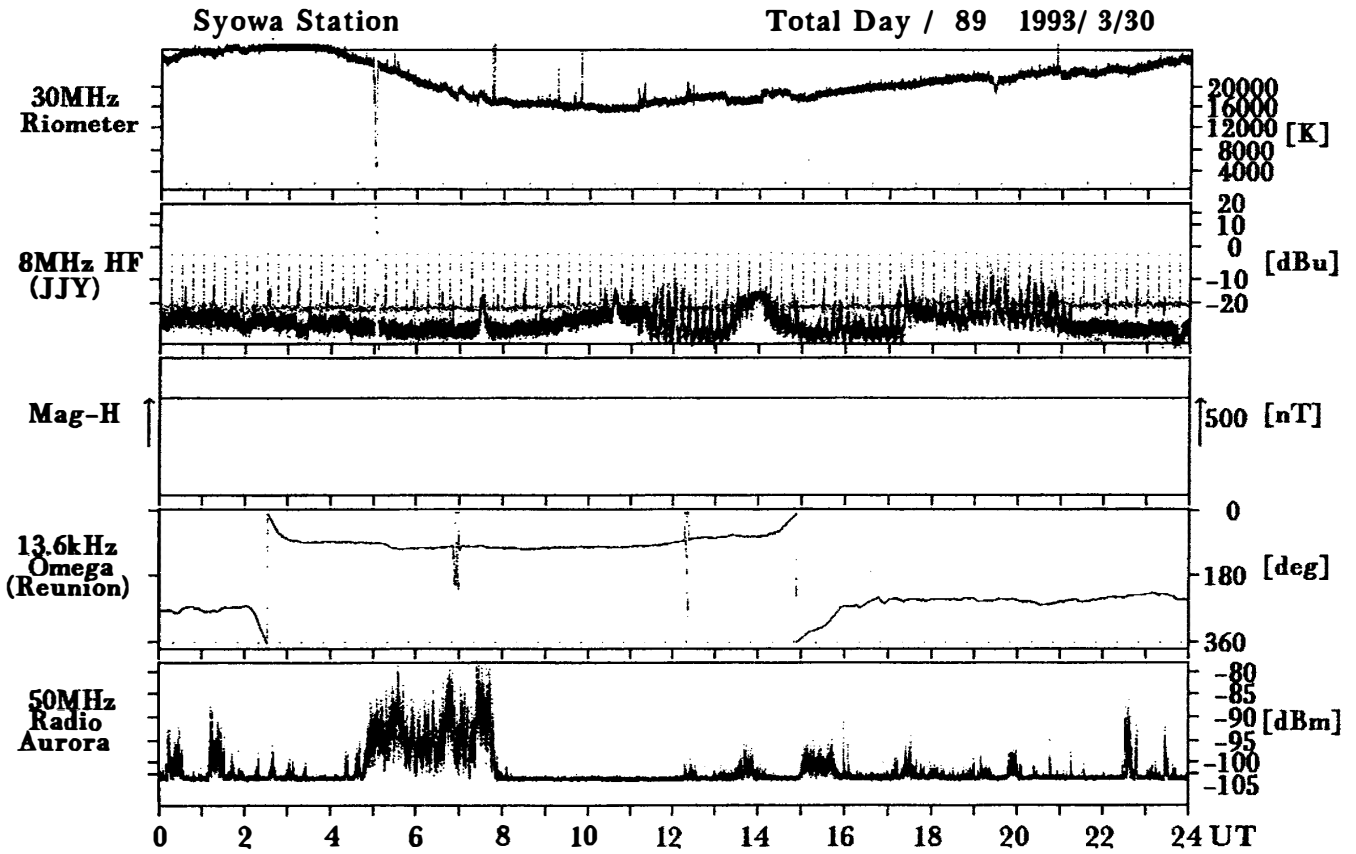
Total Day / 87 1993/ 3/28



Syowa Station

Total Day / 88 1993/ 3/29

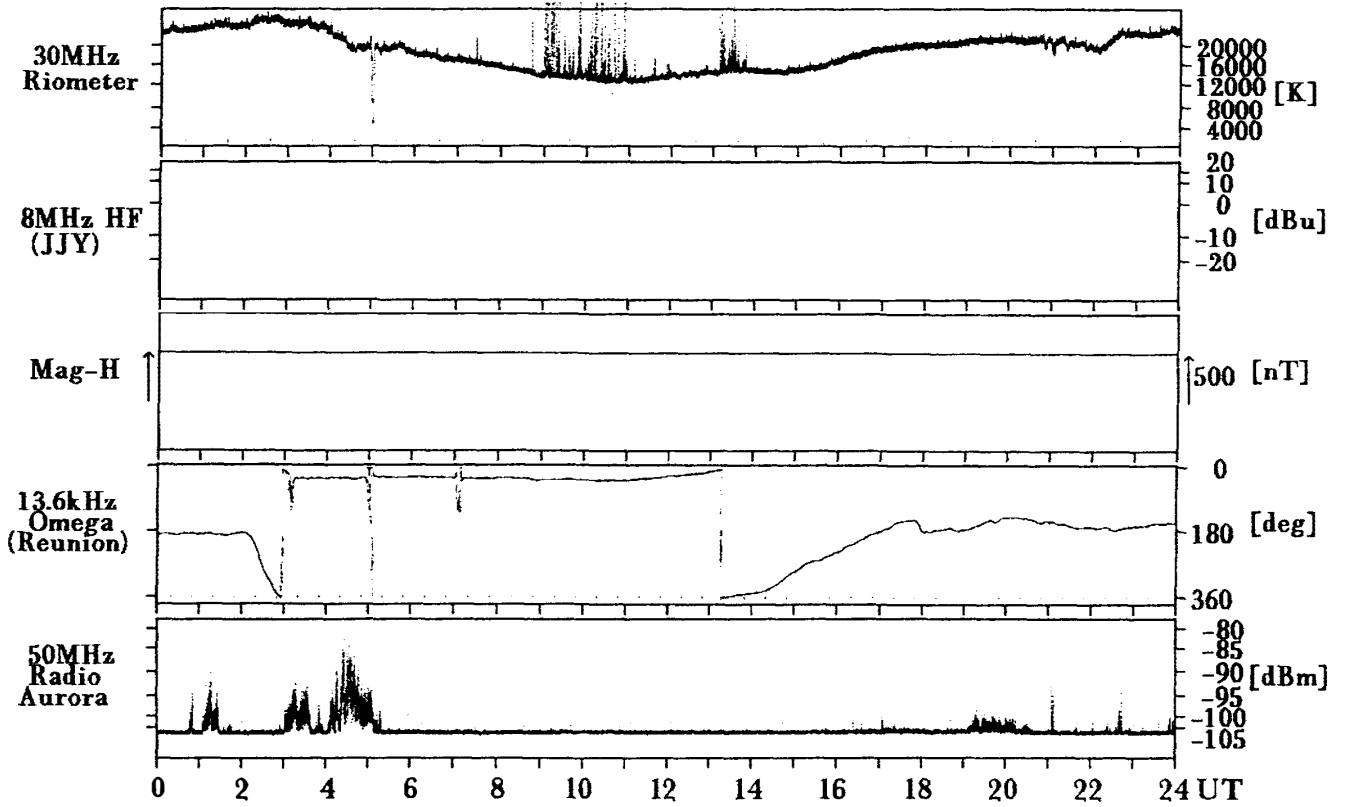






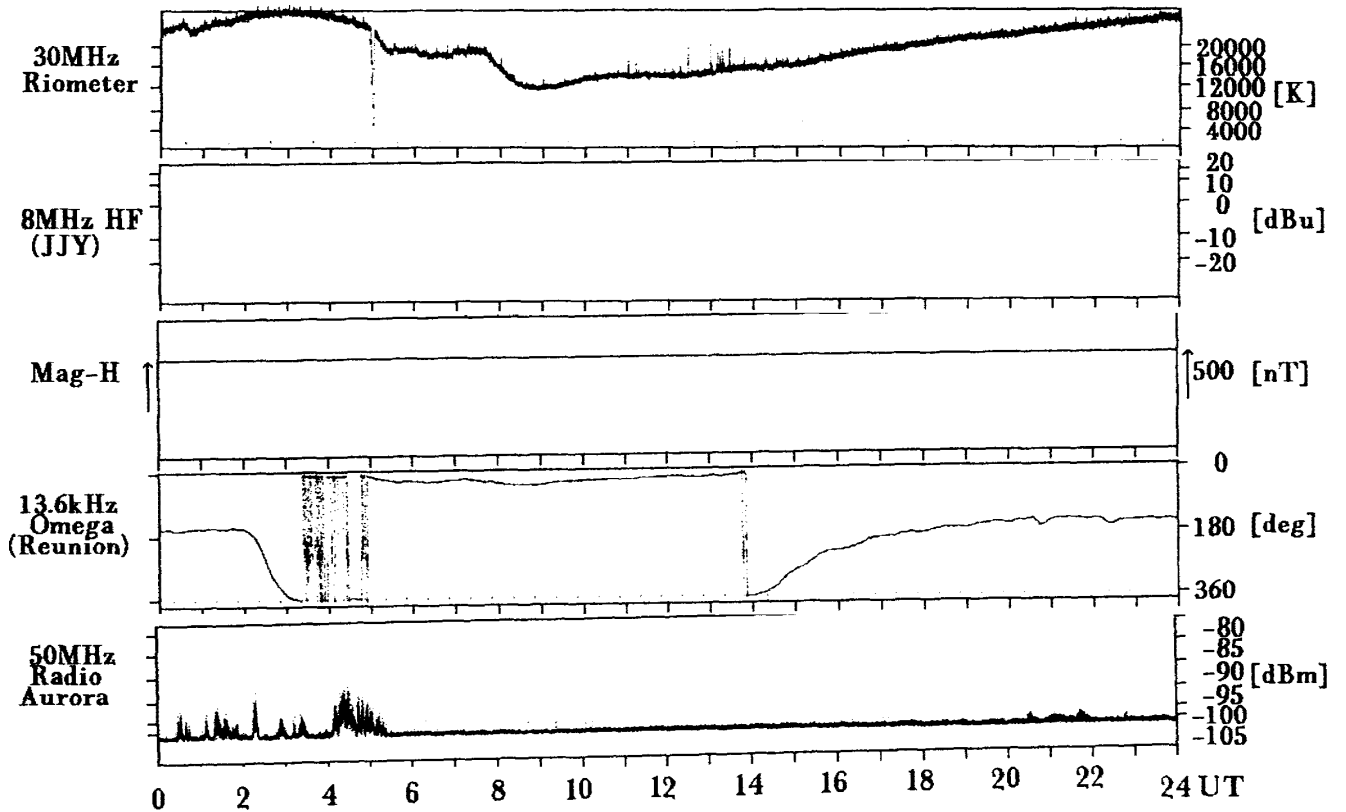
Syowa Station

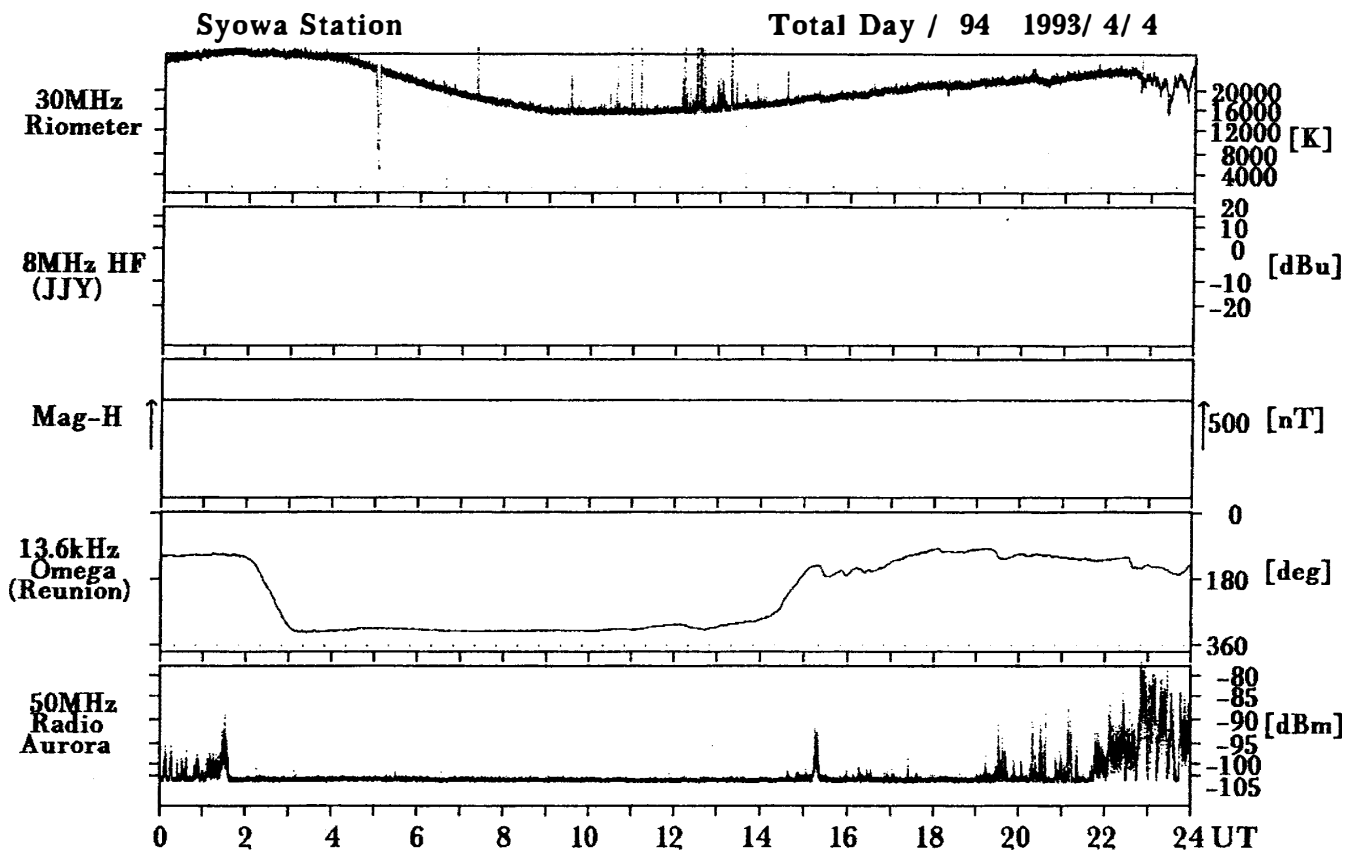
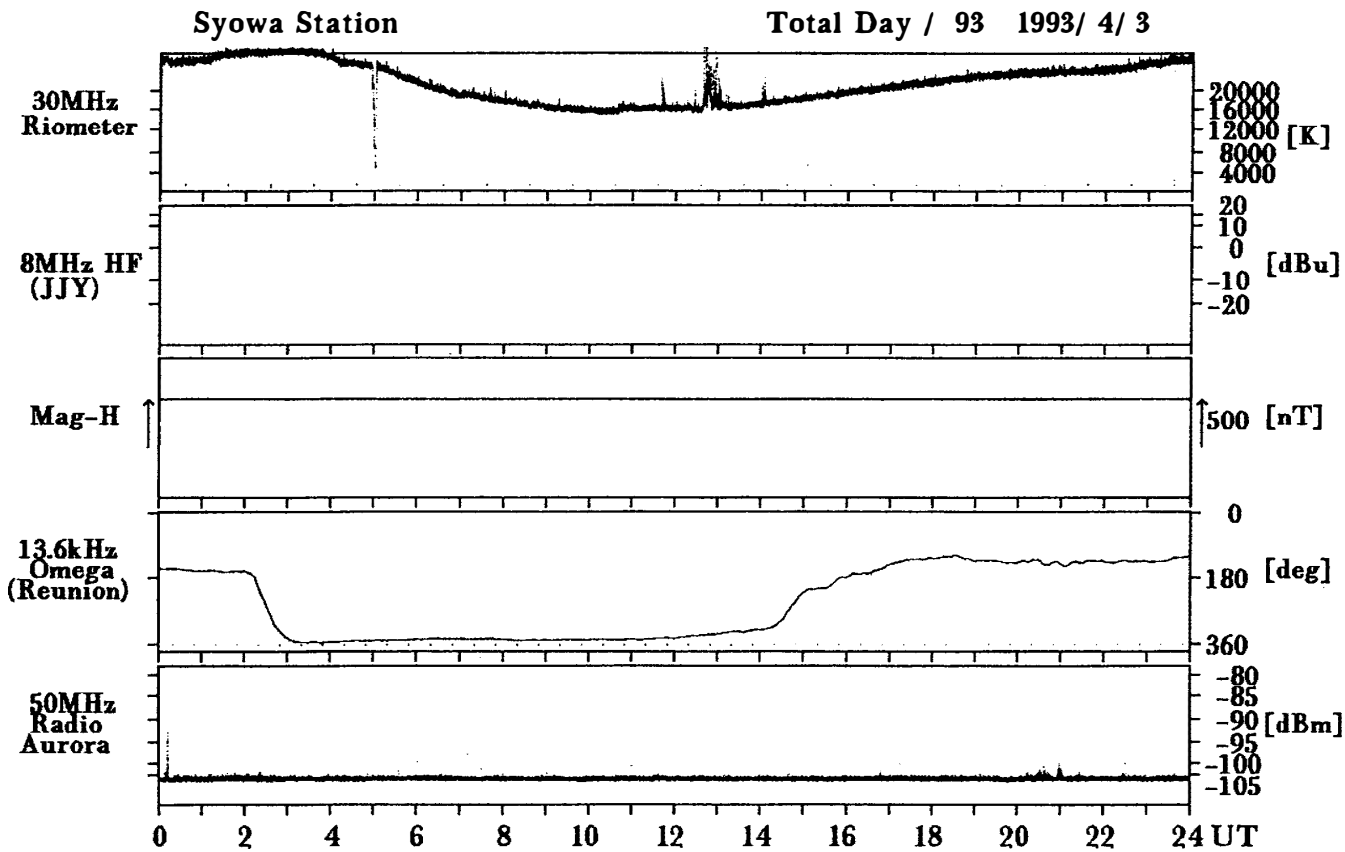
Total Day / 91 1993/ 4/ 1



Syowa Station

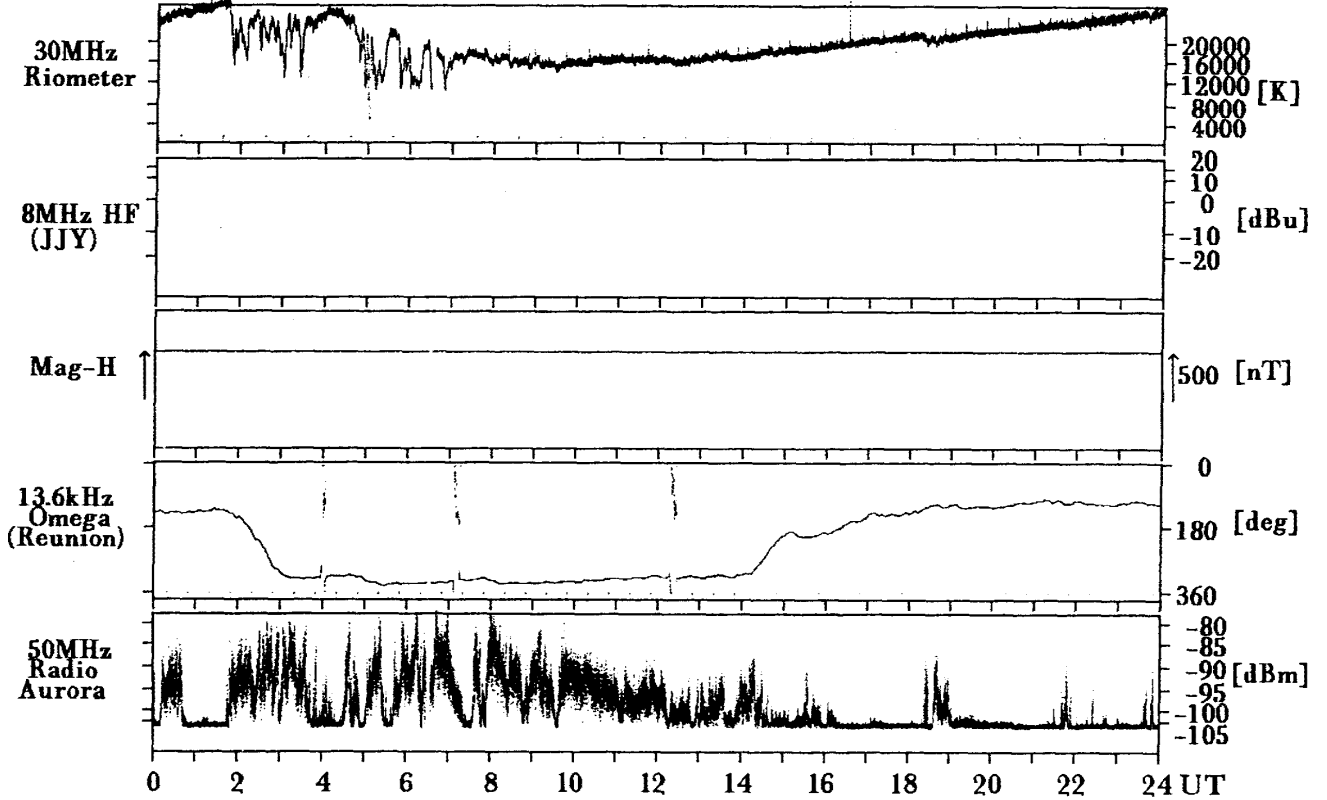
Total Day / 92 1993/ 4/ 2





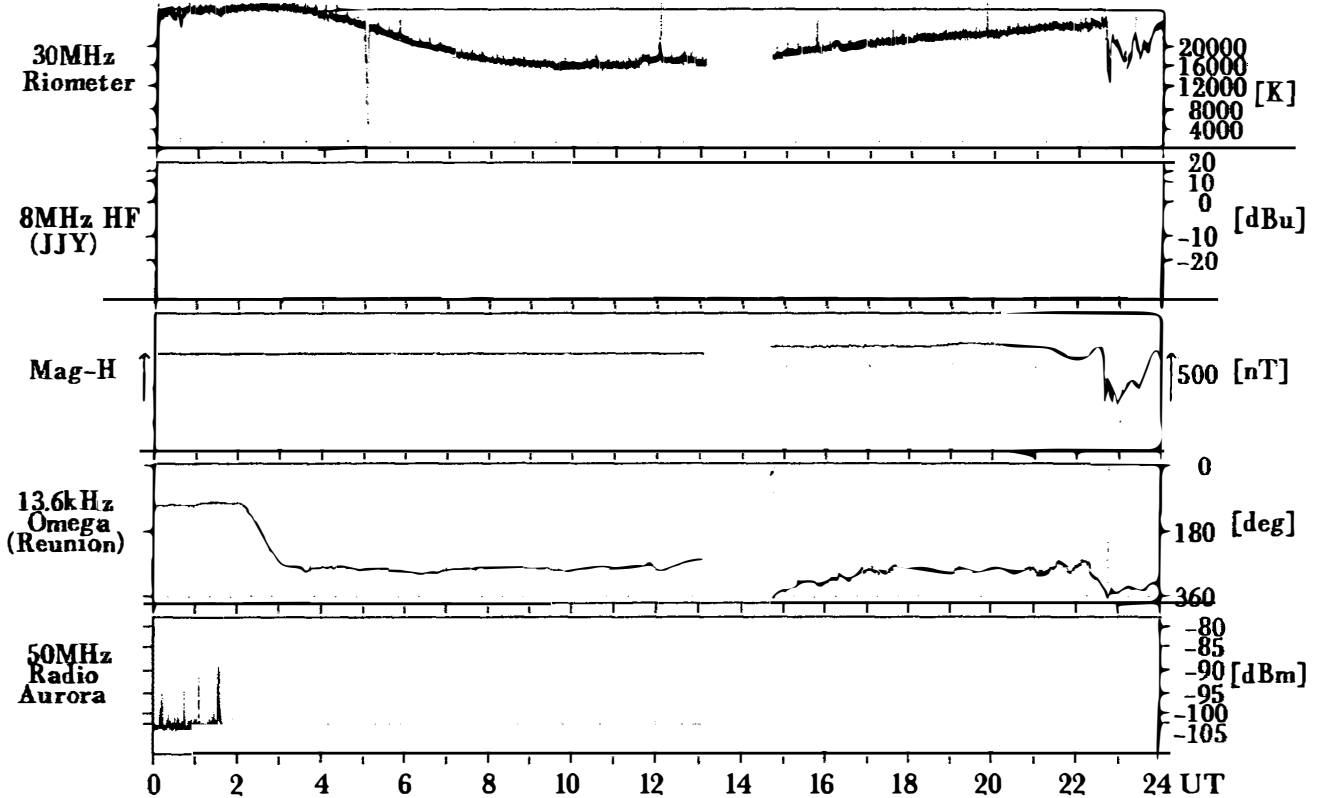
Syowa Station

Total Day / 95 1993/ 4/ 5



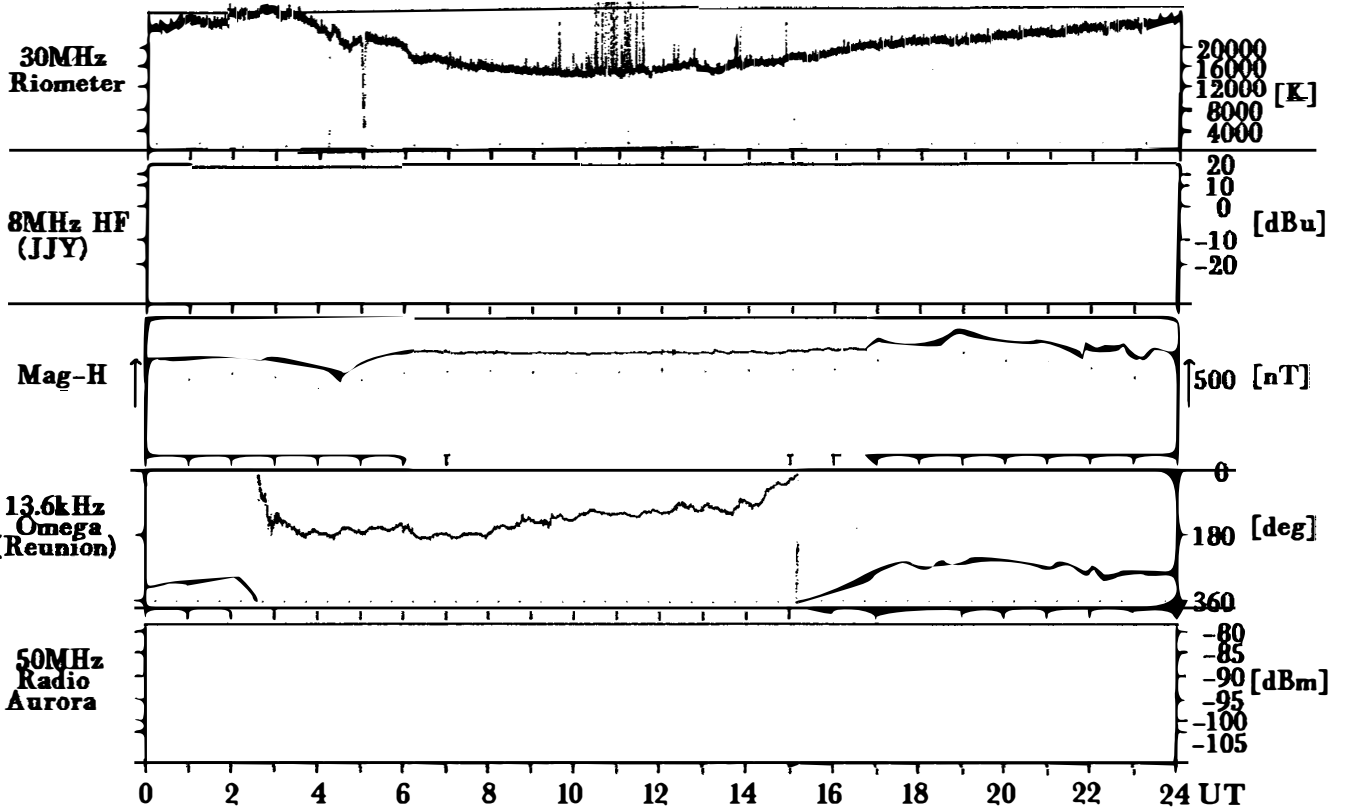
Syowa Station

Total Day / 96 1993/ 4/ 6



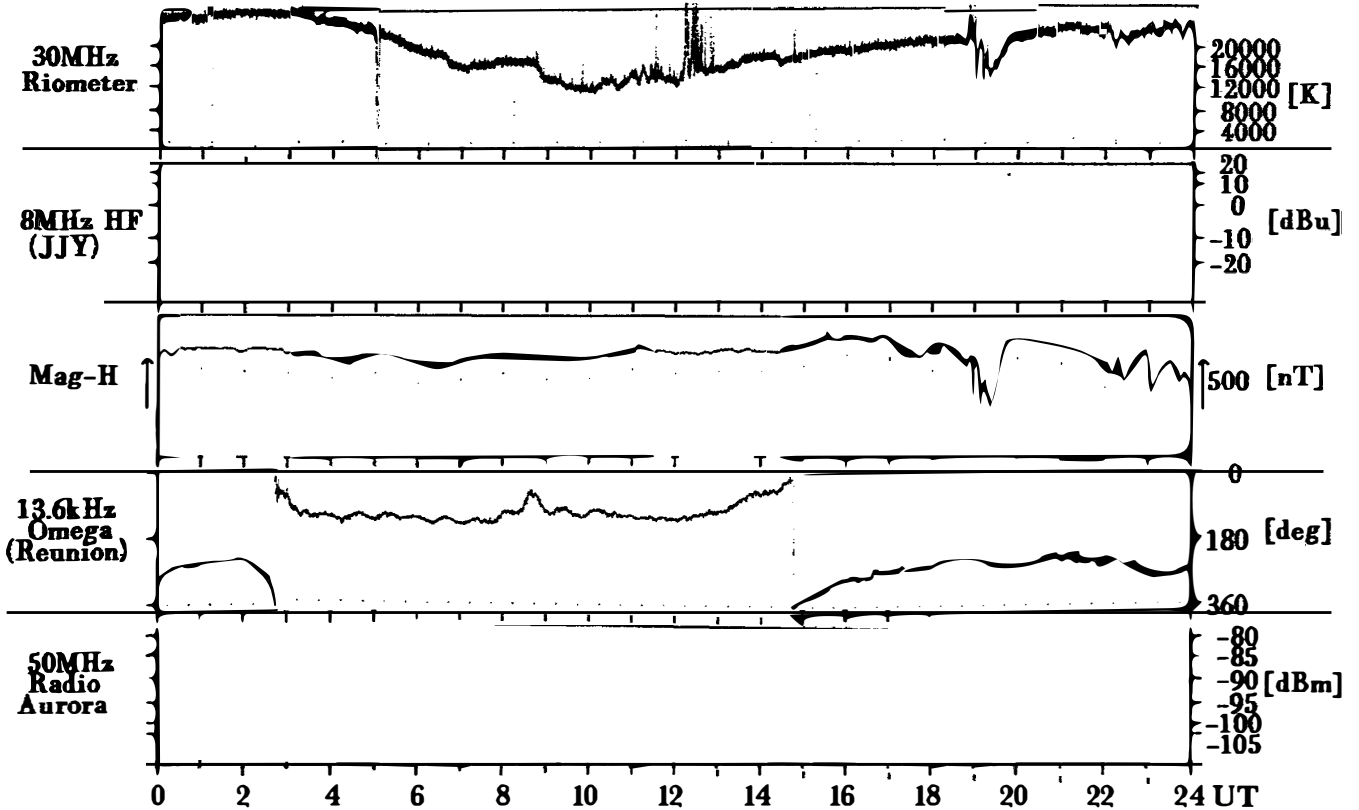
Syowa Station

Total Day / 97 1993/ 4/ 7



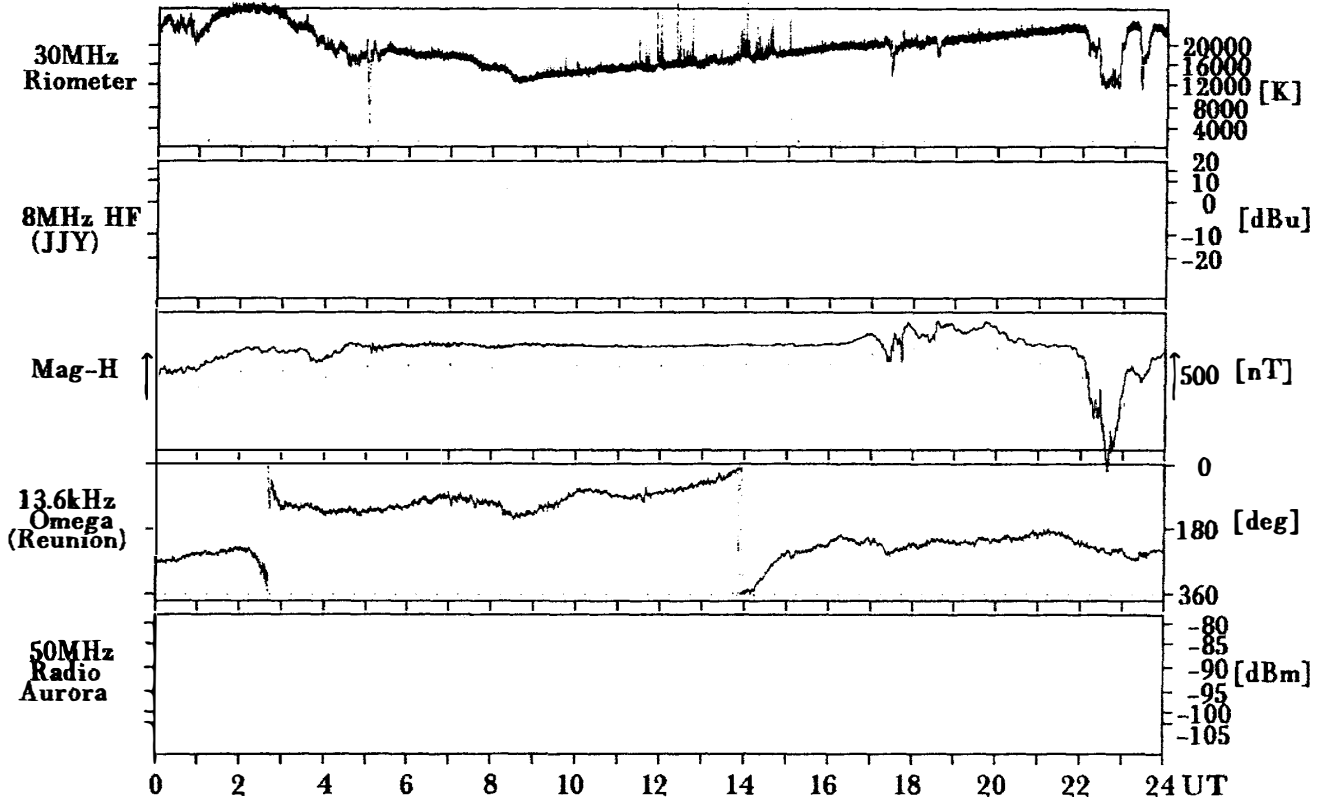
Syowa Station

Total Day / 98 1993/ 4/ 8



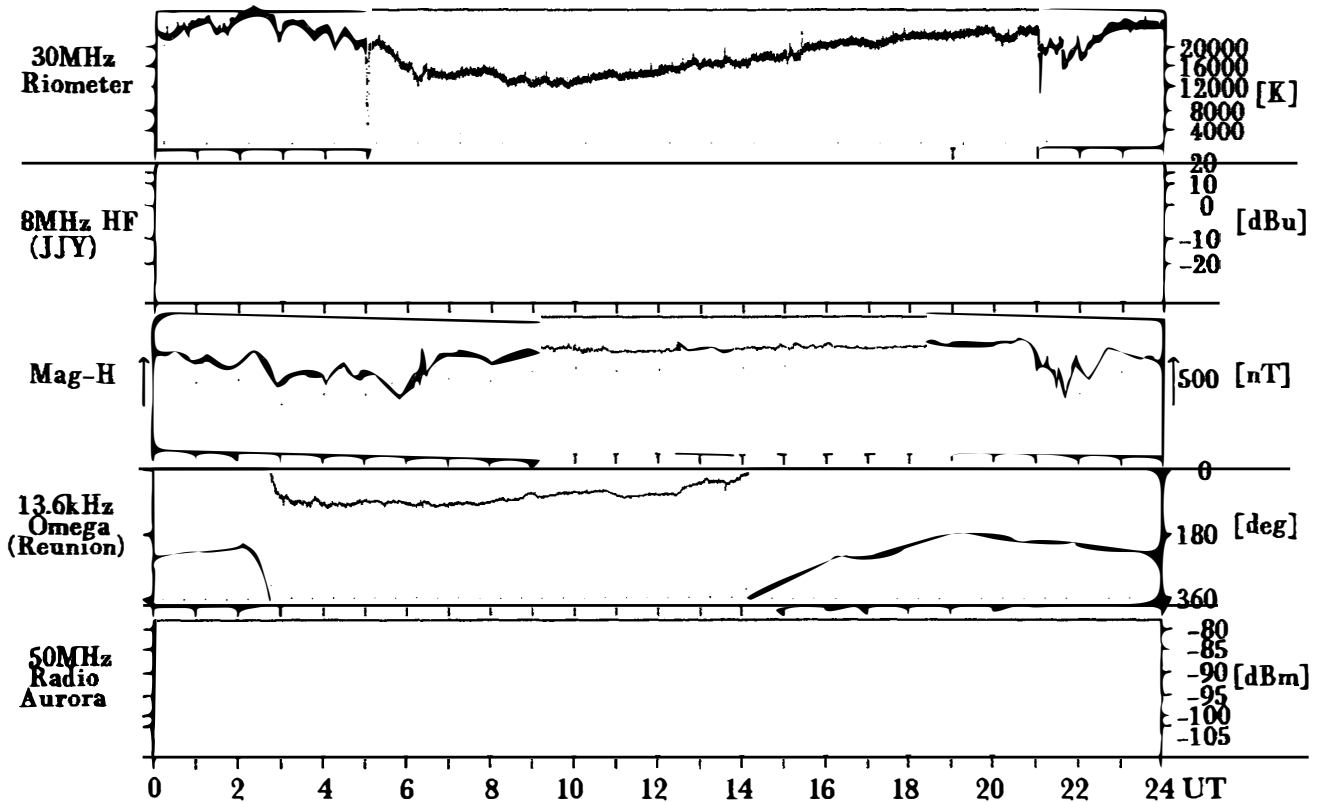
Syowa Station

Total Day / 99 1993/ 4/ 9



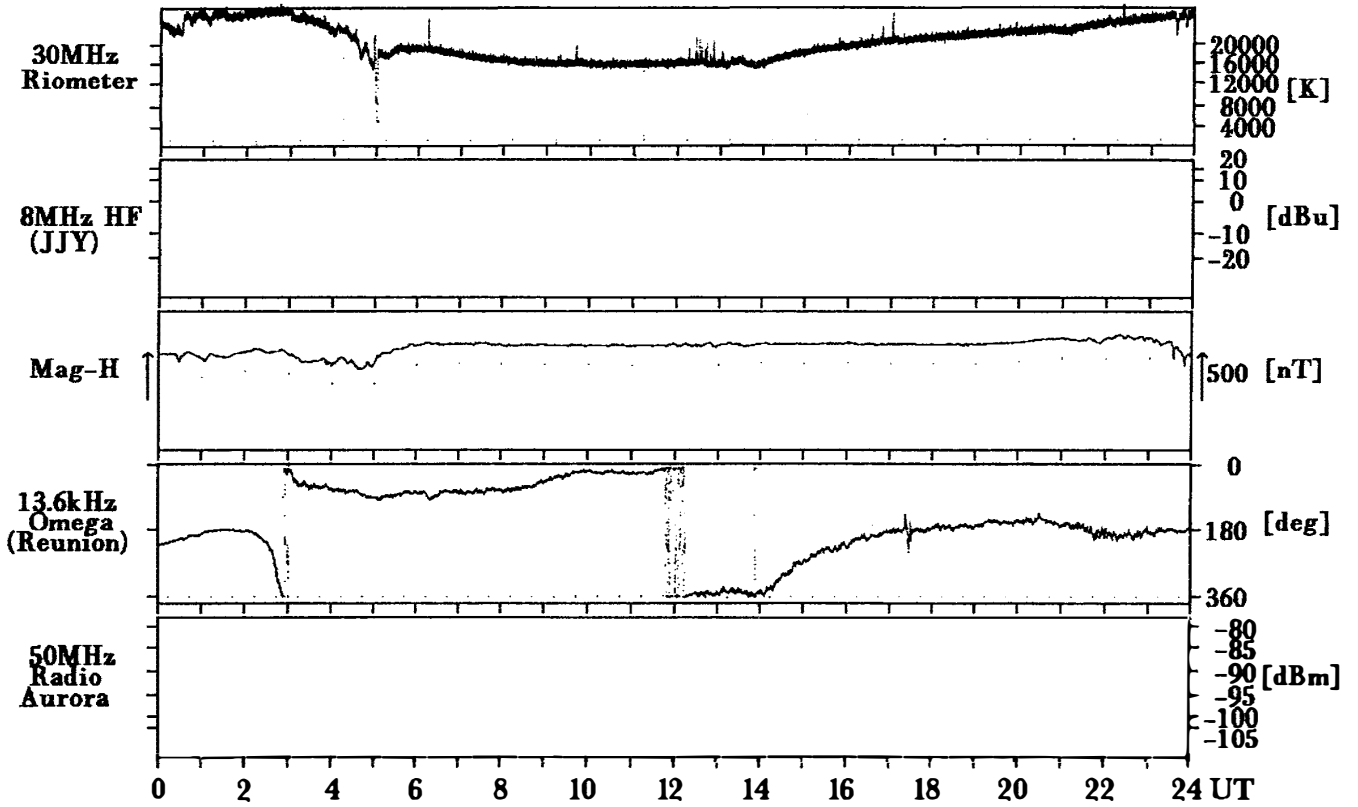
Syowa Station

Total Day / 100 1993/ 4/10



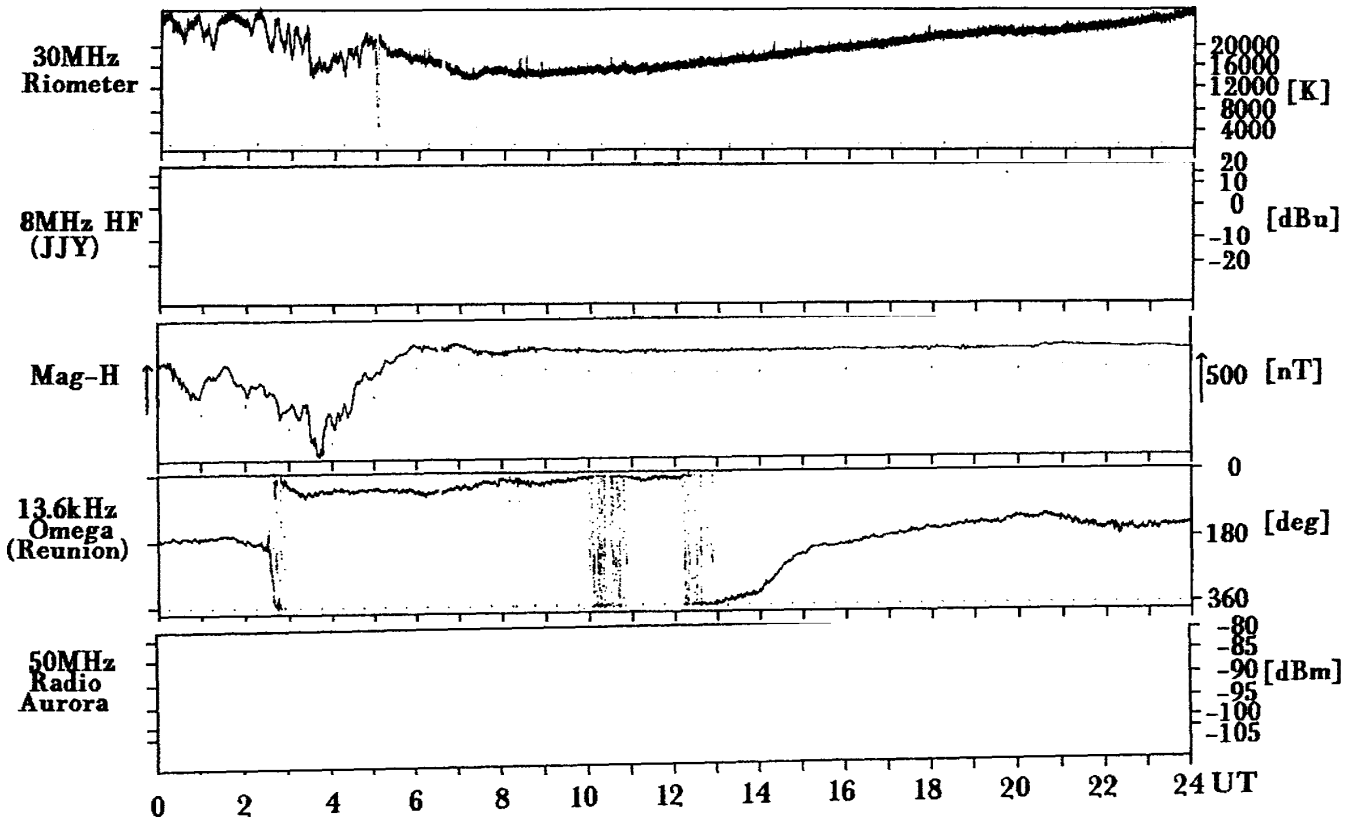
Syowa Station

Total Day / 101 1993/ 4/11



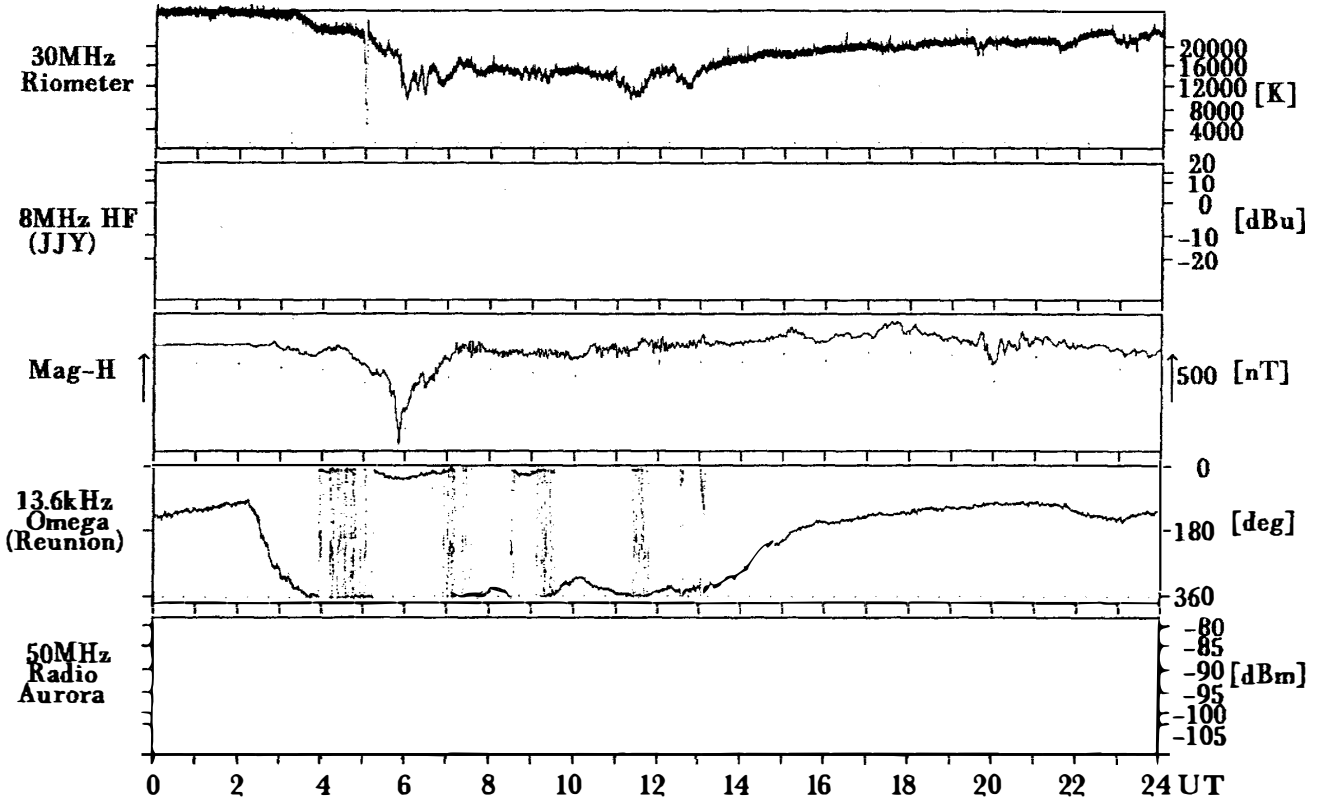
Syowa Station

Total Day / 102 1993/ 4/12



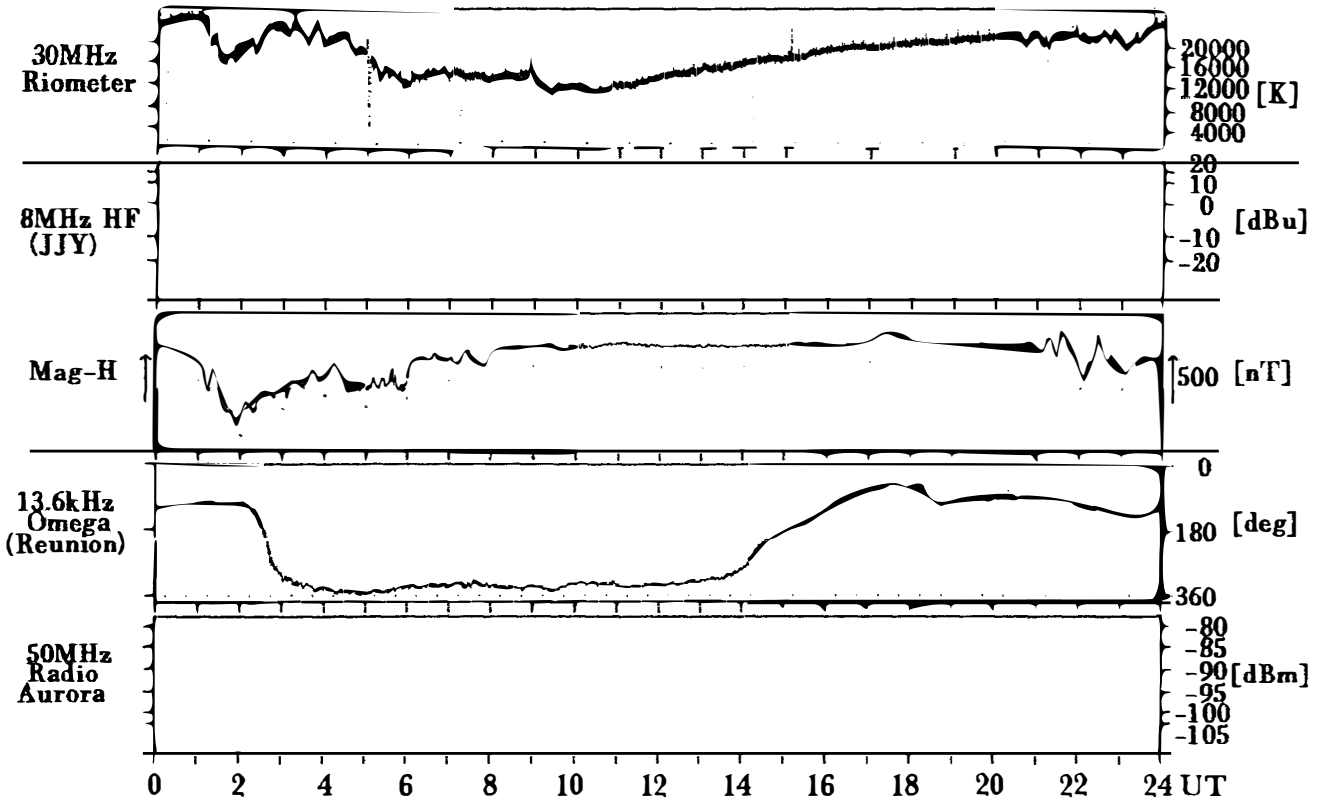
Syowa Station

Total Day / 103 1993/ 4/13



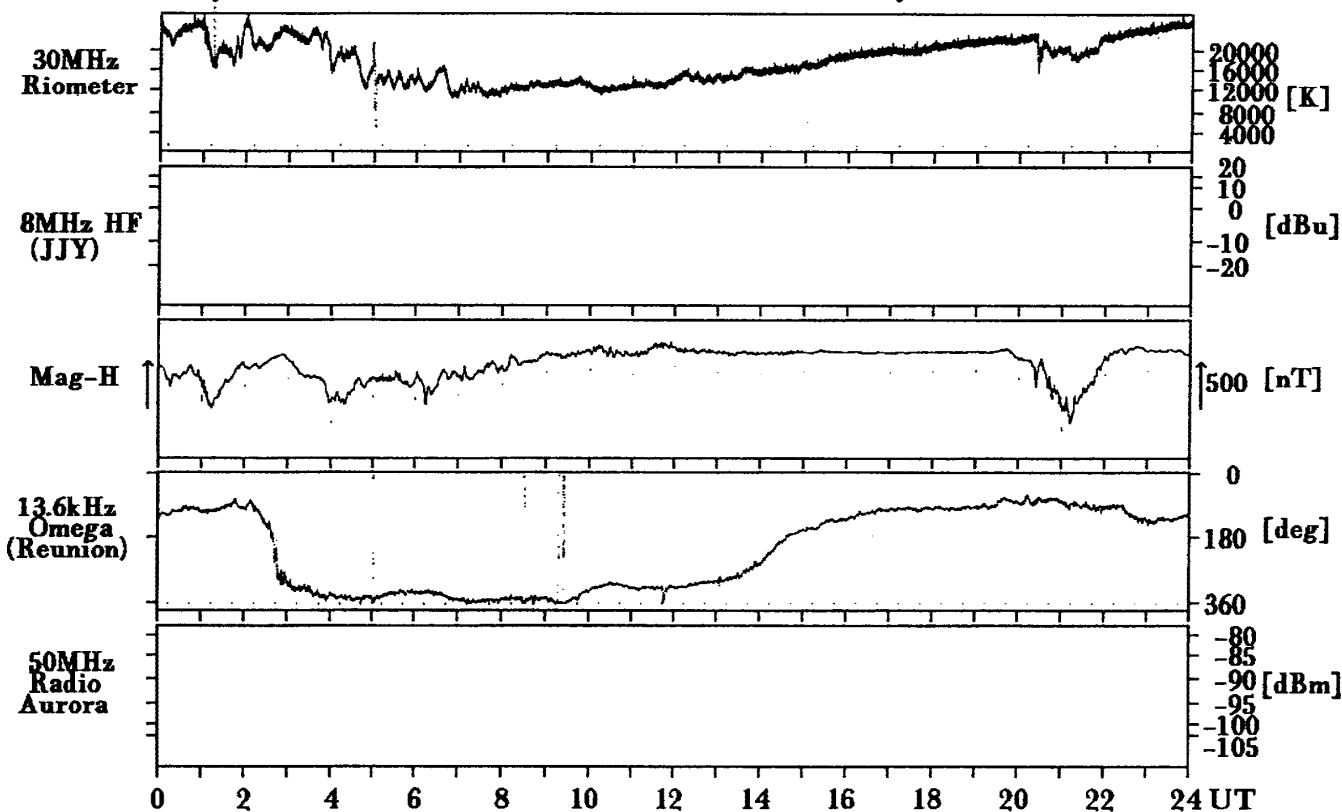
Syowa Station

Total Day / 104 1993/ 4/14



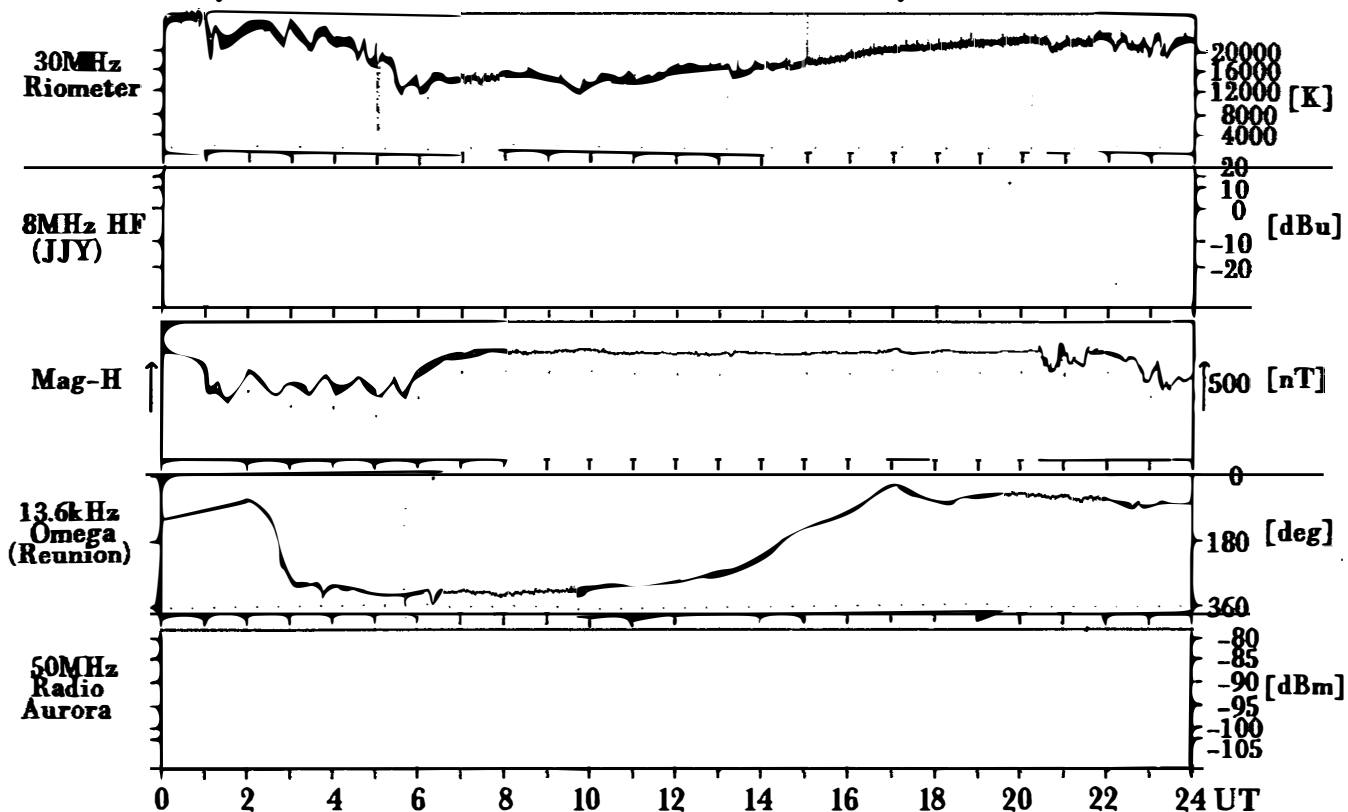
Syowa Station

Total Day / 105 1993/ 4/15



Syowa Station

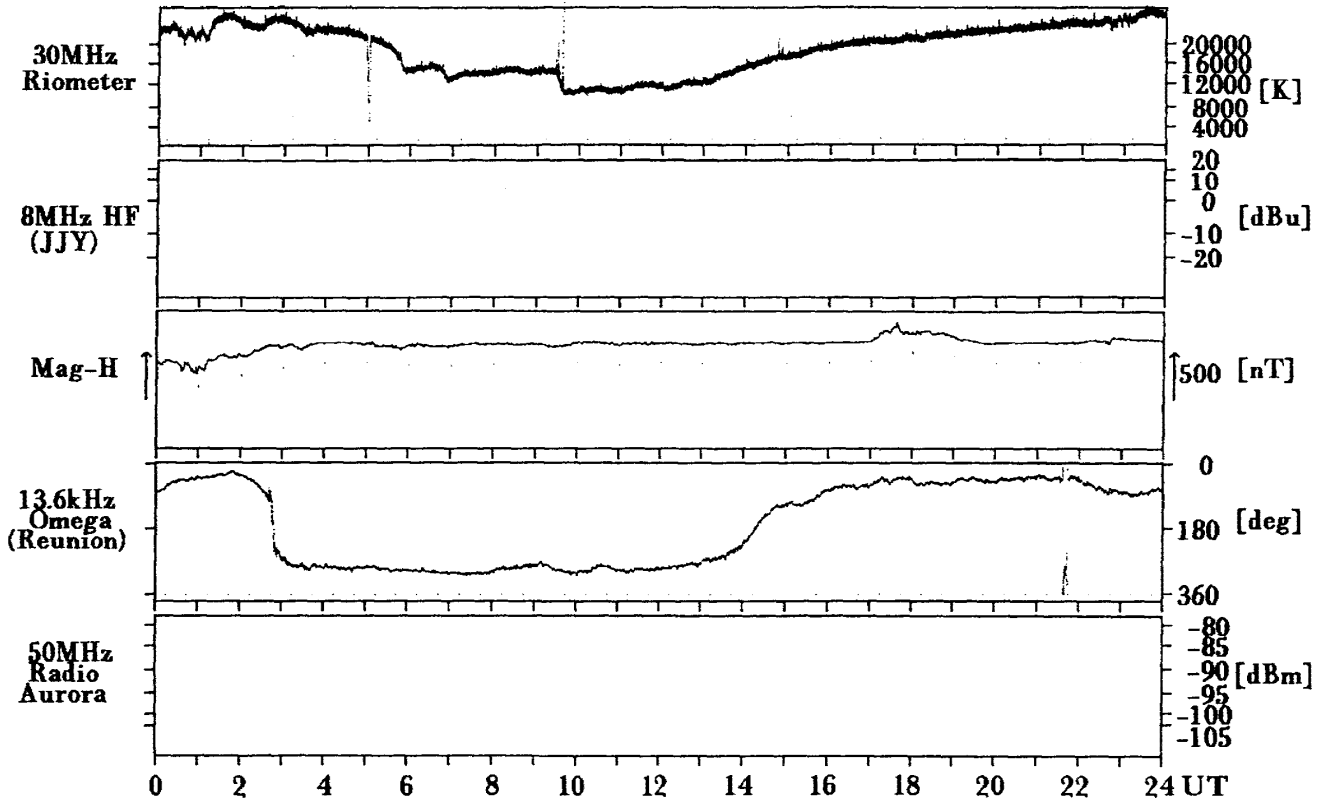
Total Day / 106 1993/ 4/16





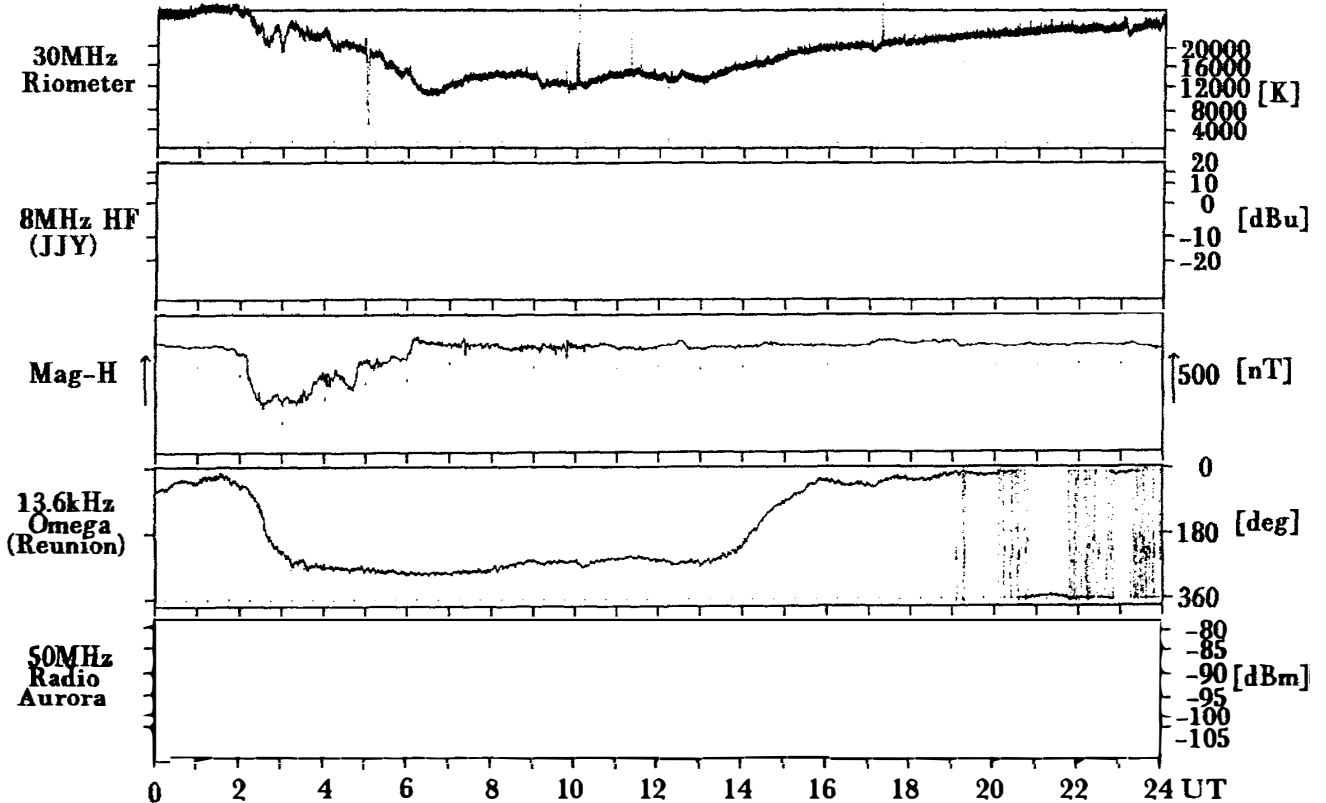
Syowa Station

Total Day / 107 1993/ 4/17



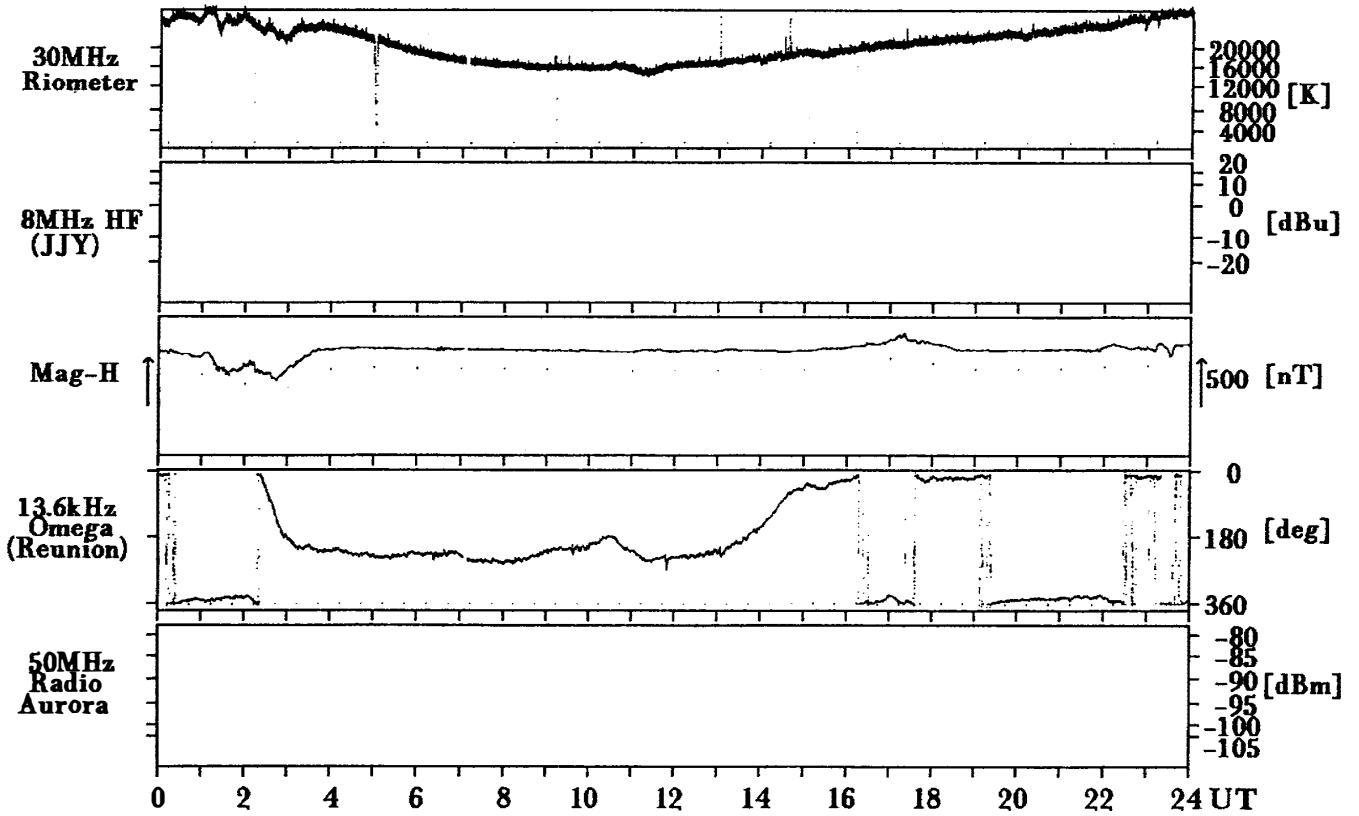
Syowa Station

Total Day / 108 1993/ 4/18



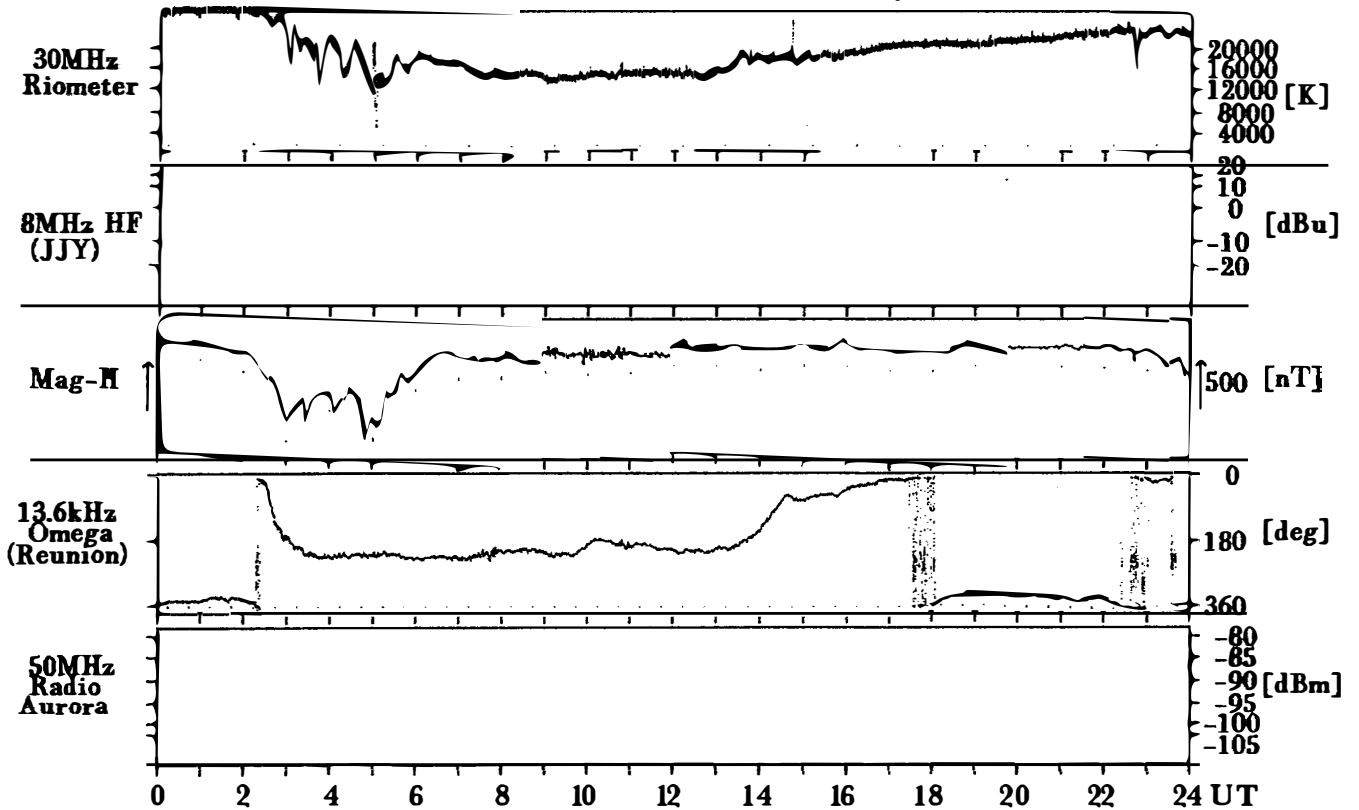
Syowa Station

Total Day / 109 1993/ 4/19



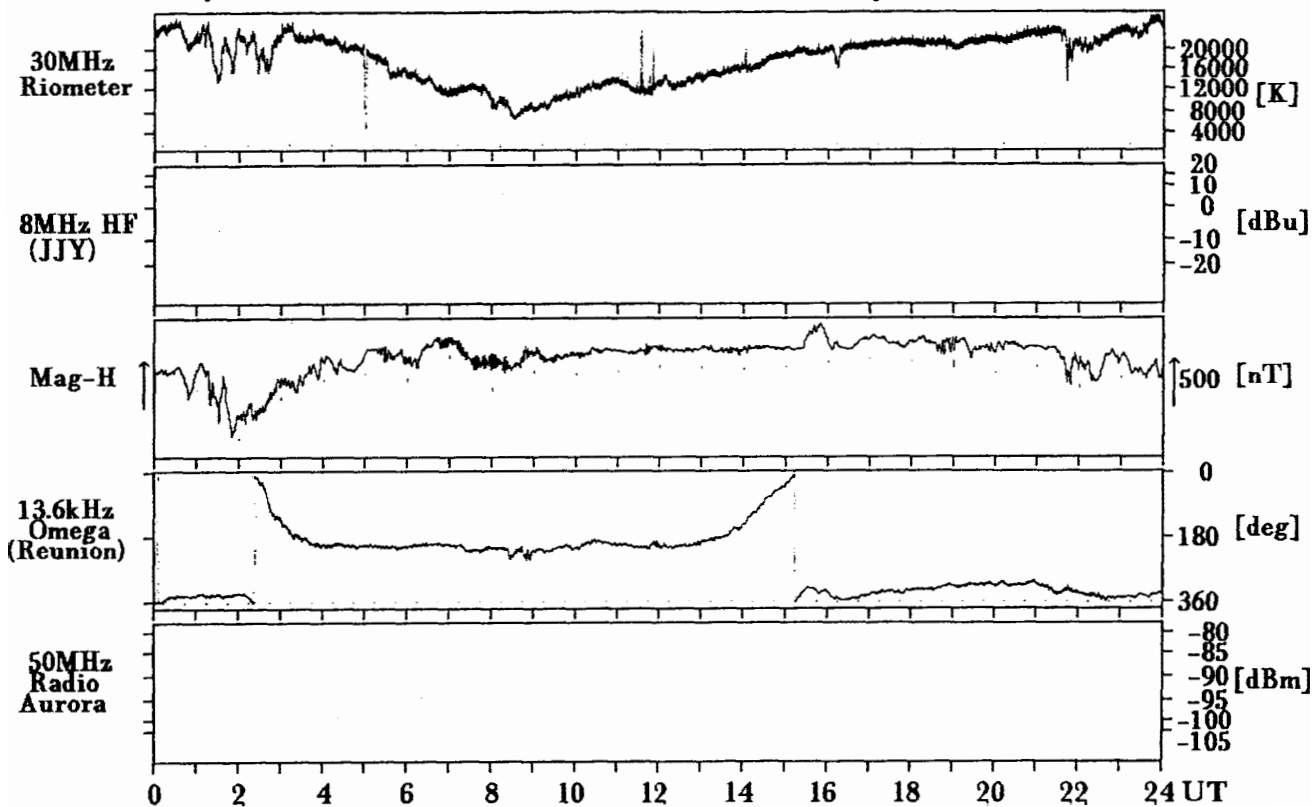
Syowa Station

Total Day / 110 1993/ 4/20



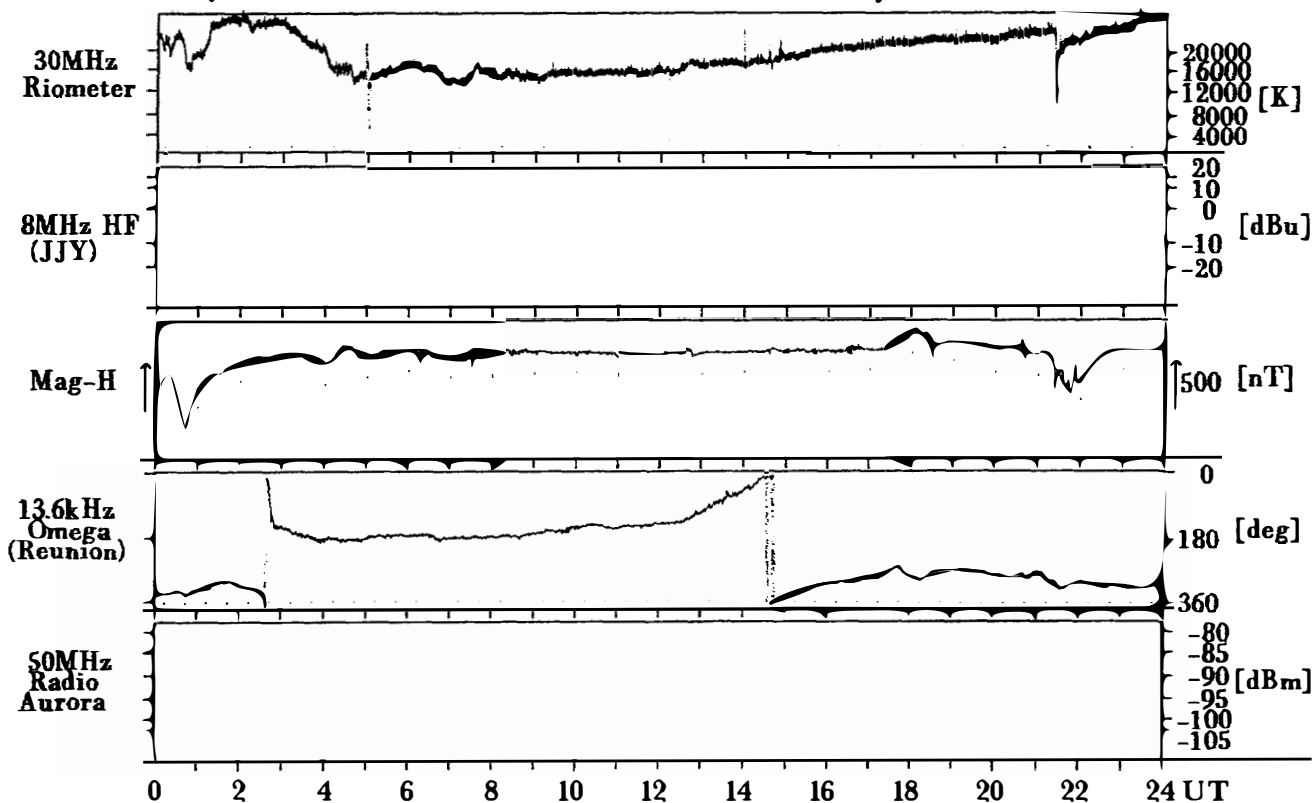
Syowa Station

Total Day / 111 1993/ 4/21



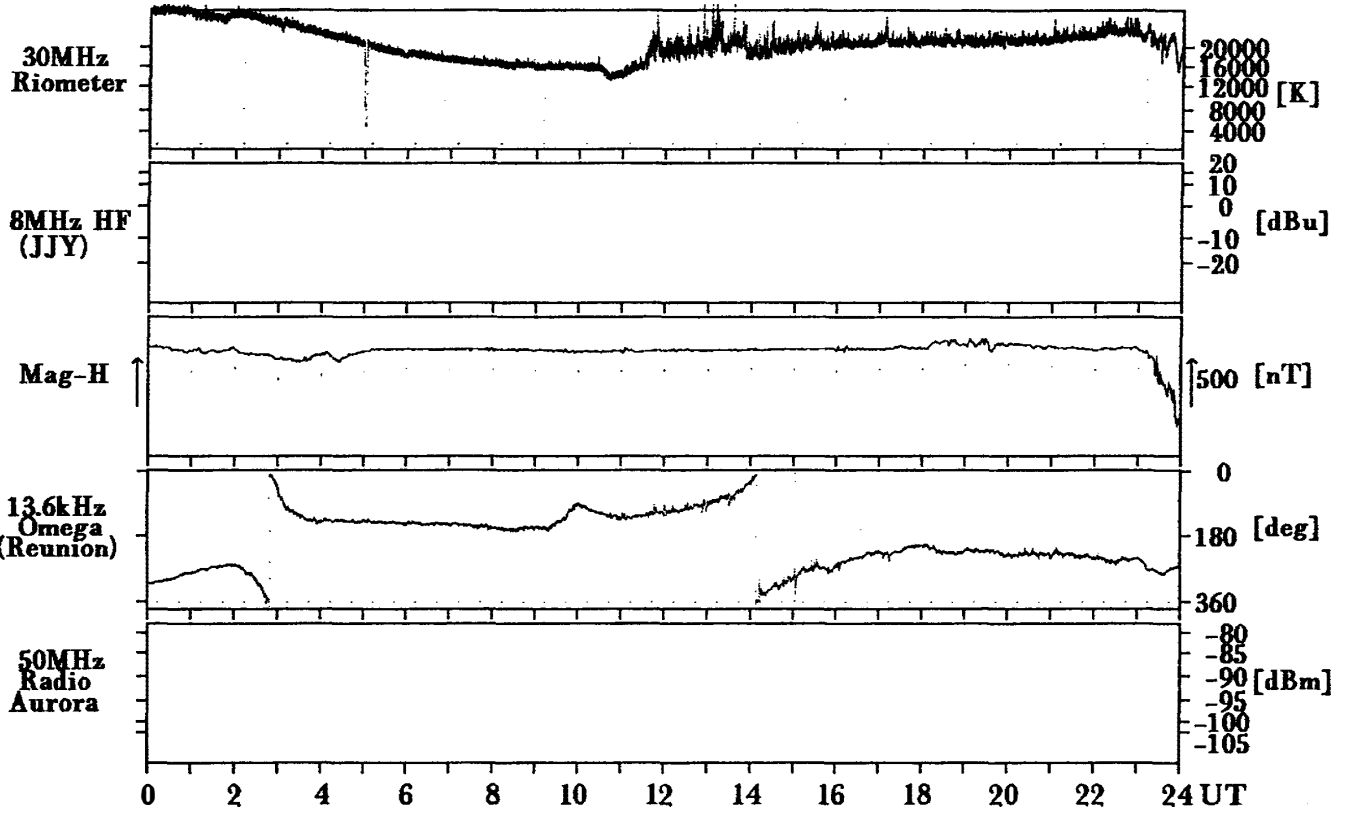
Syowa Station

Total Day / 112 1993/ 4/22



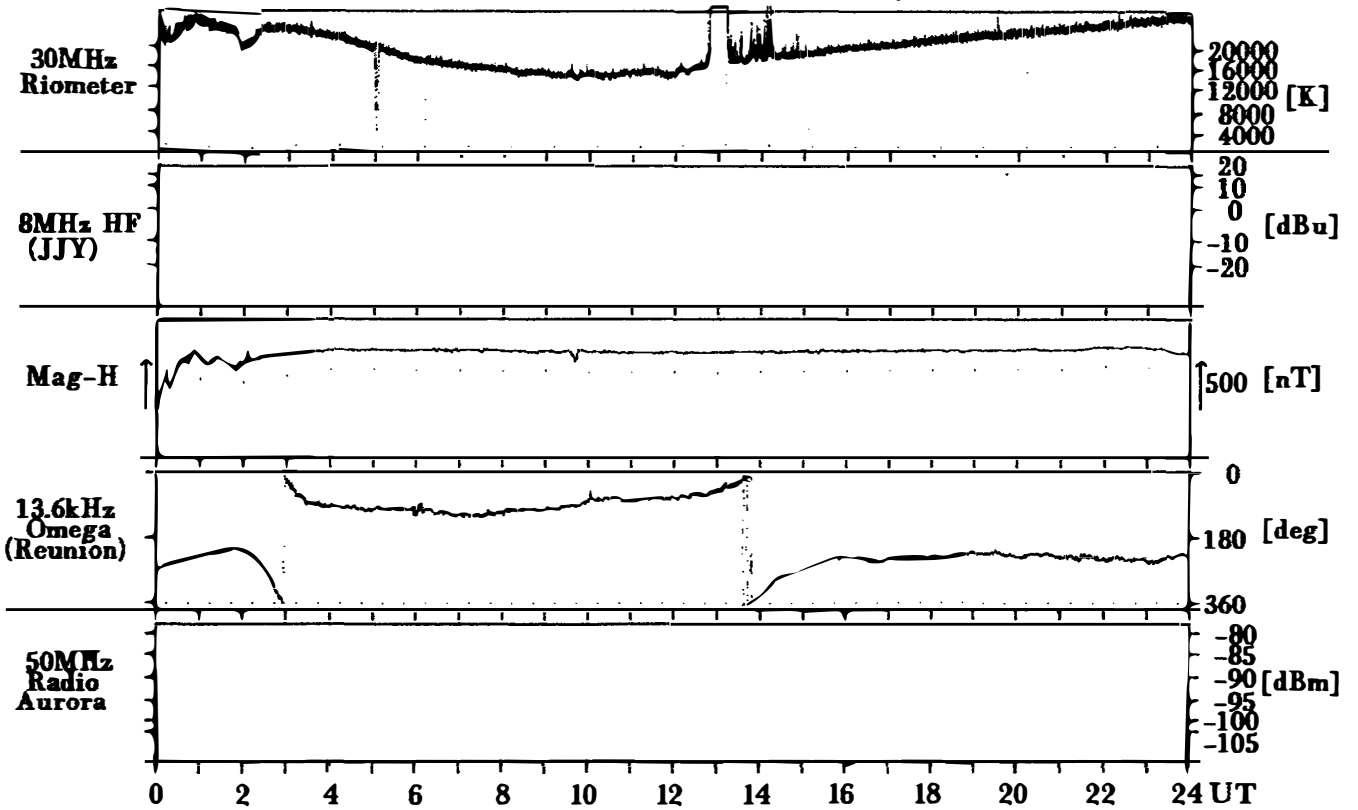
Syowa Station

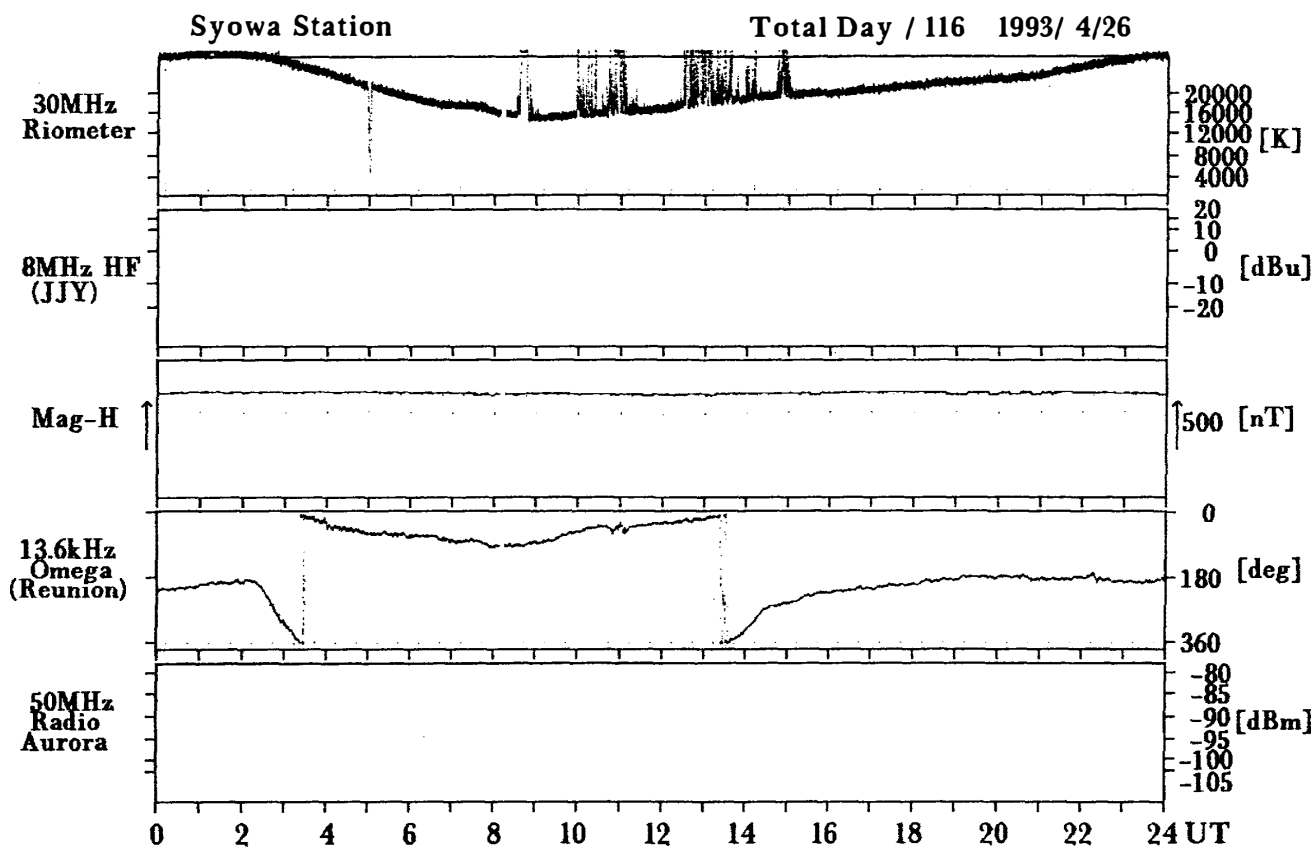
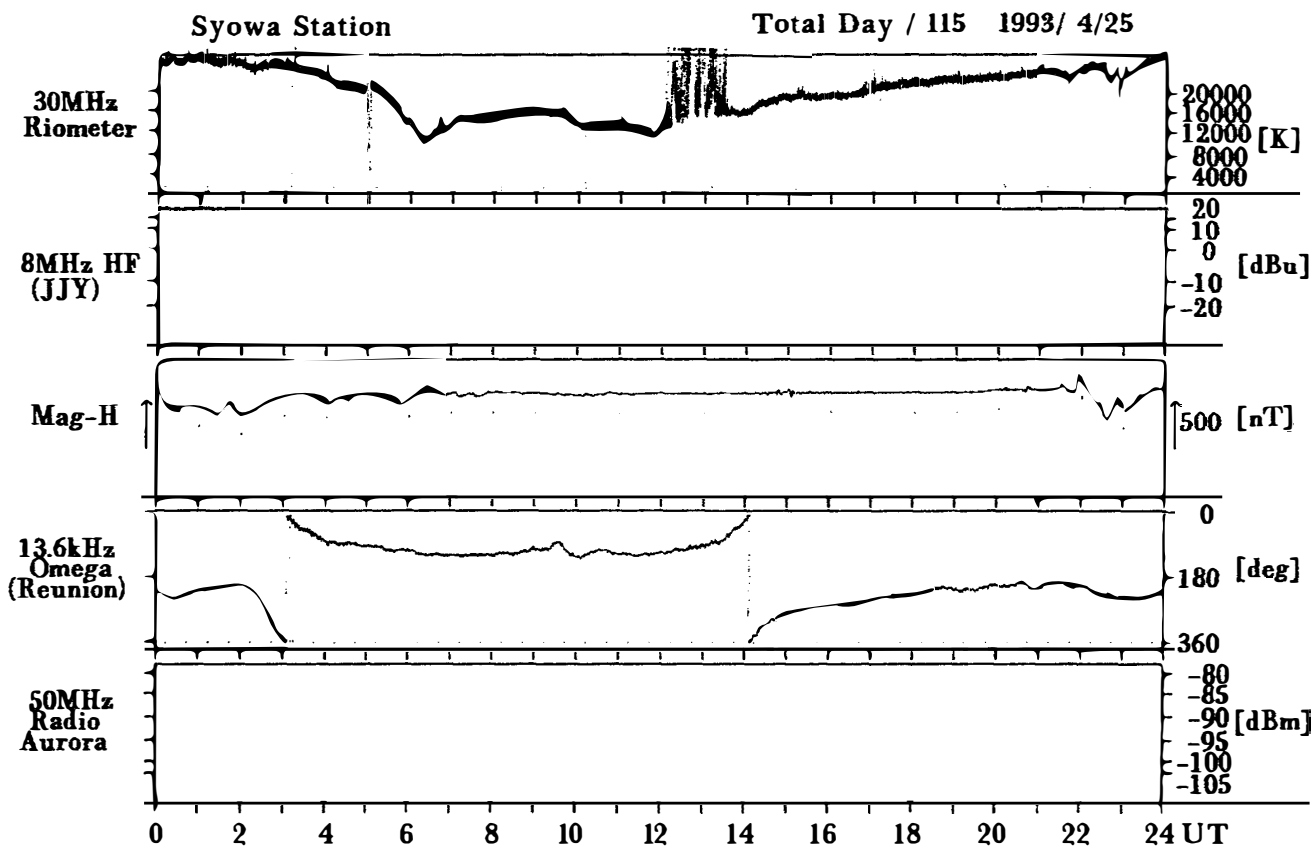
Total Day / 113 1993/ 4/23



Syowa Station

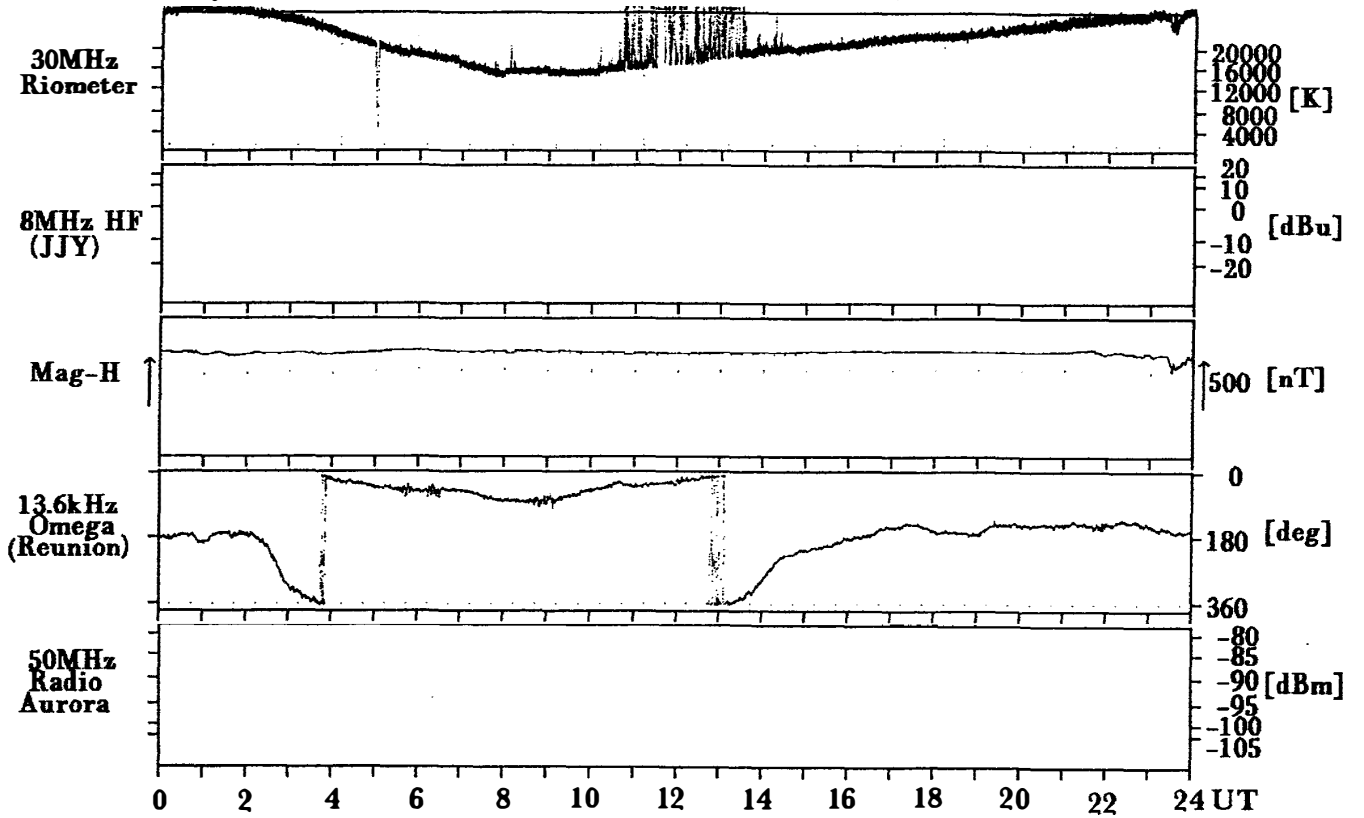
Total Day / 114 1993/ 4/24





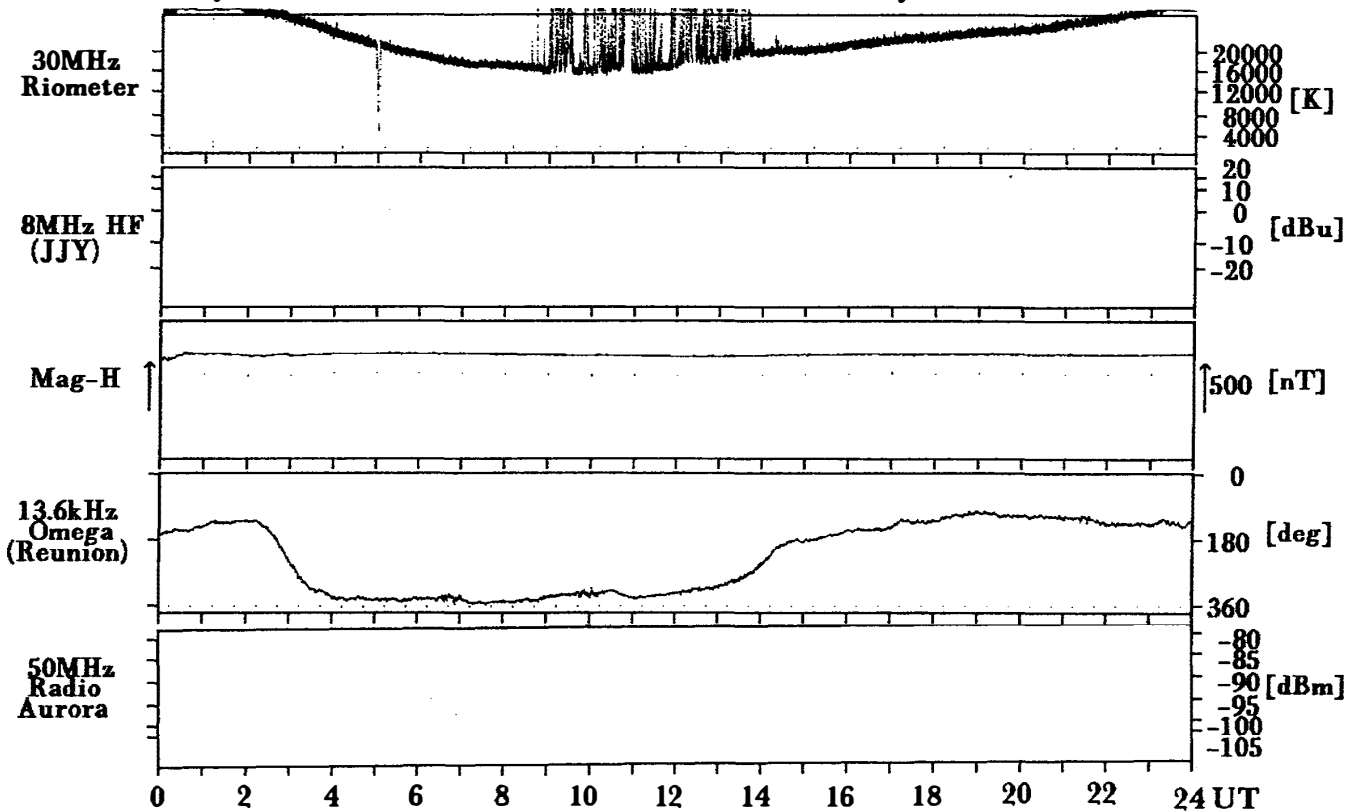
Syowa Station

Total Day / 117 1993/ 4/27



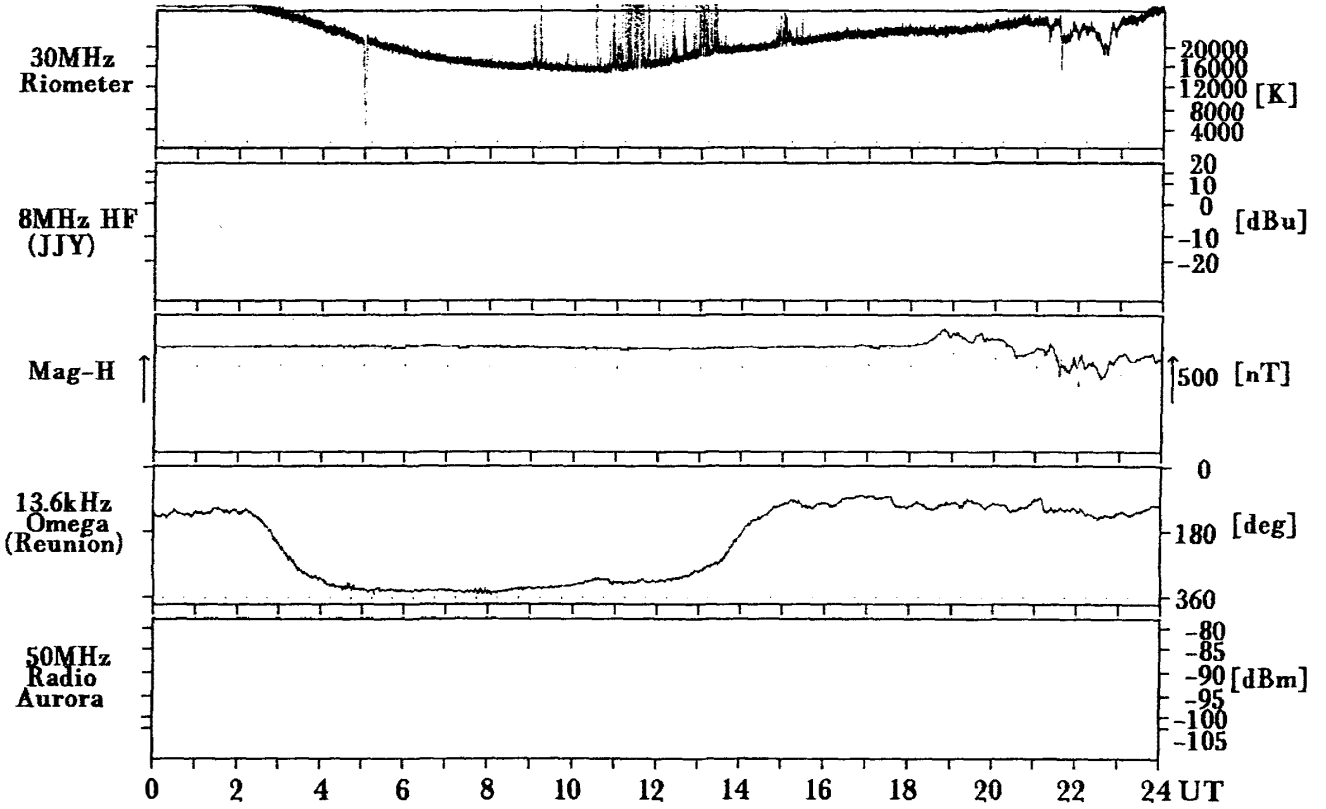
Syowa Station

Total Day / 118 1993/ 4/28



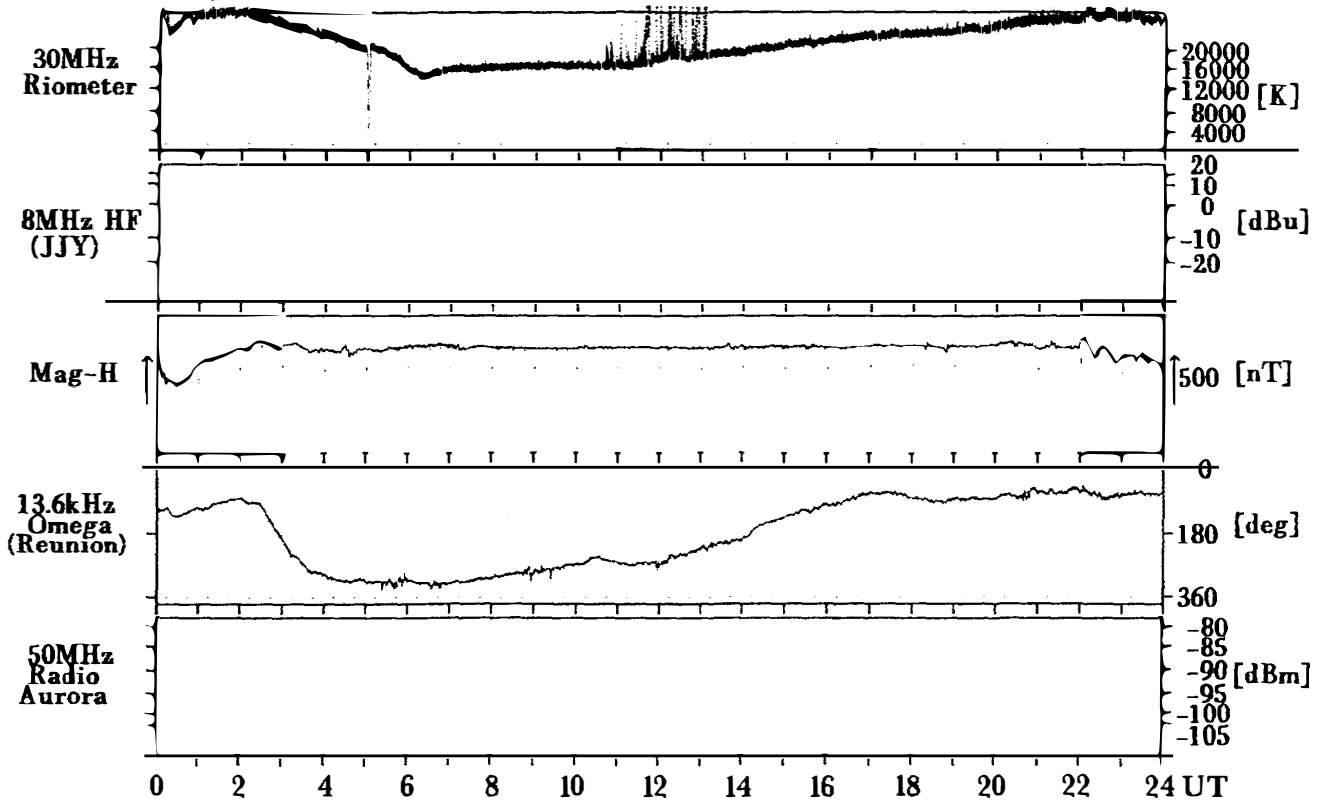
Syowa Station

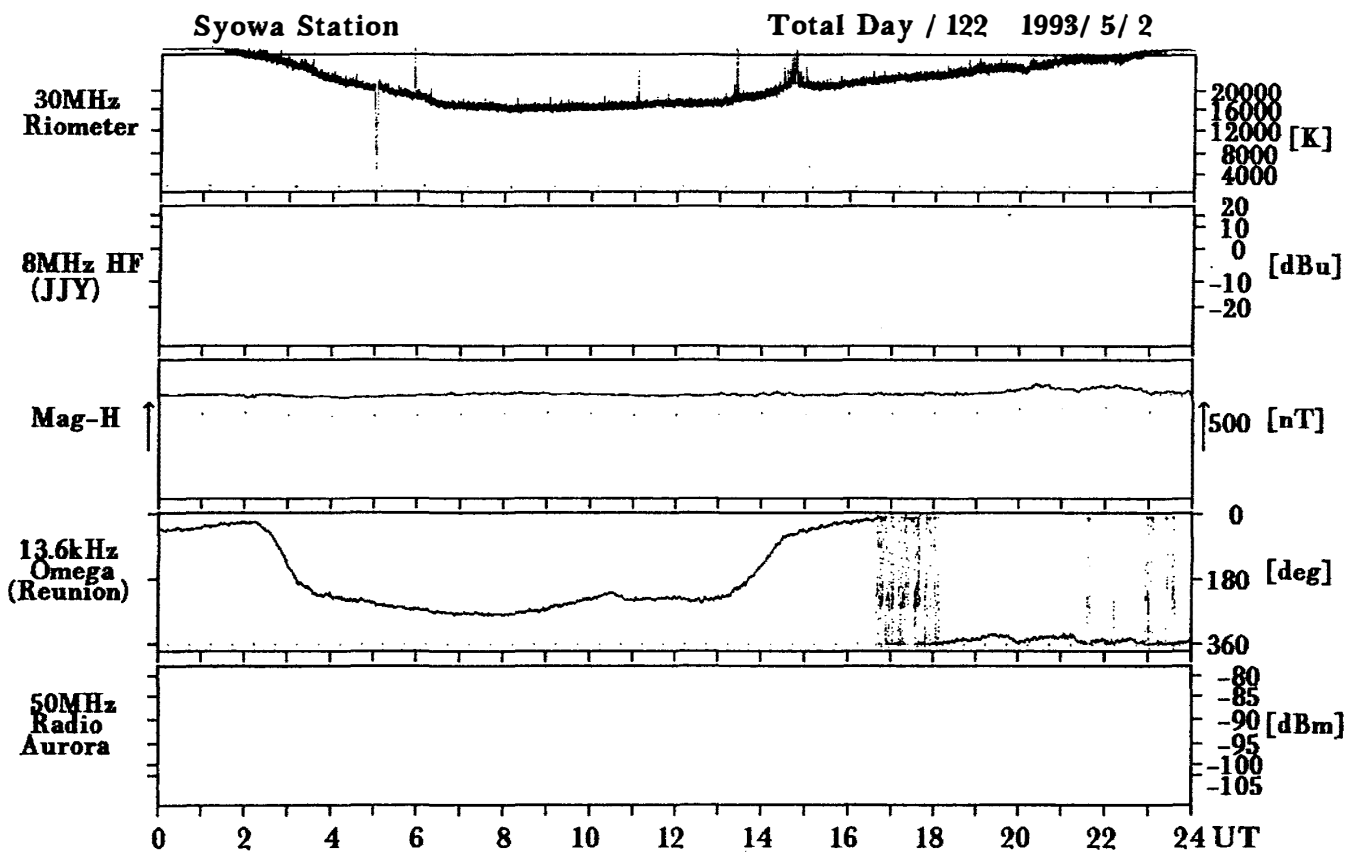
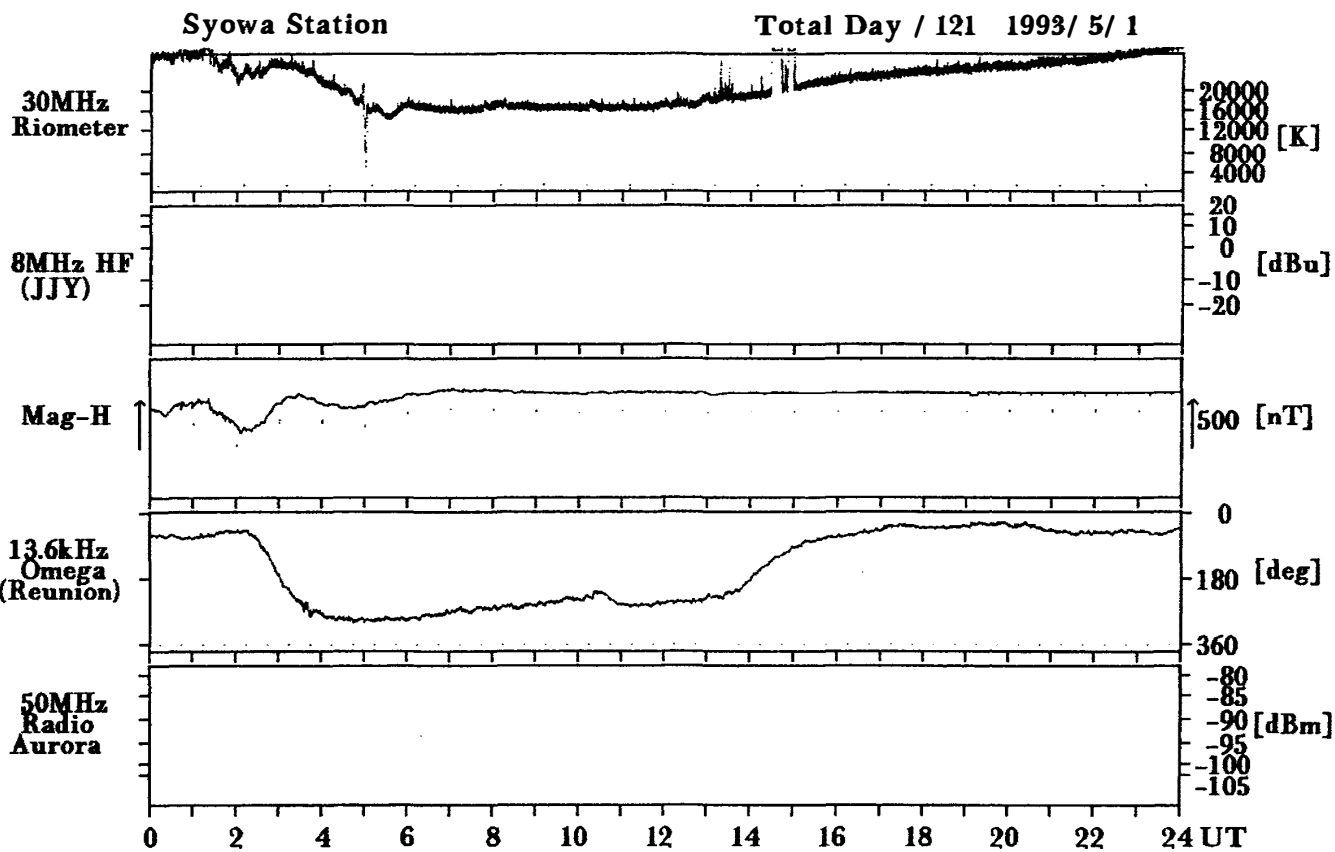
Total Day / 119 1993/ 4/29



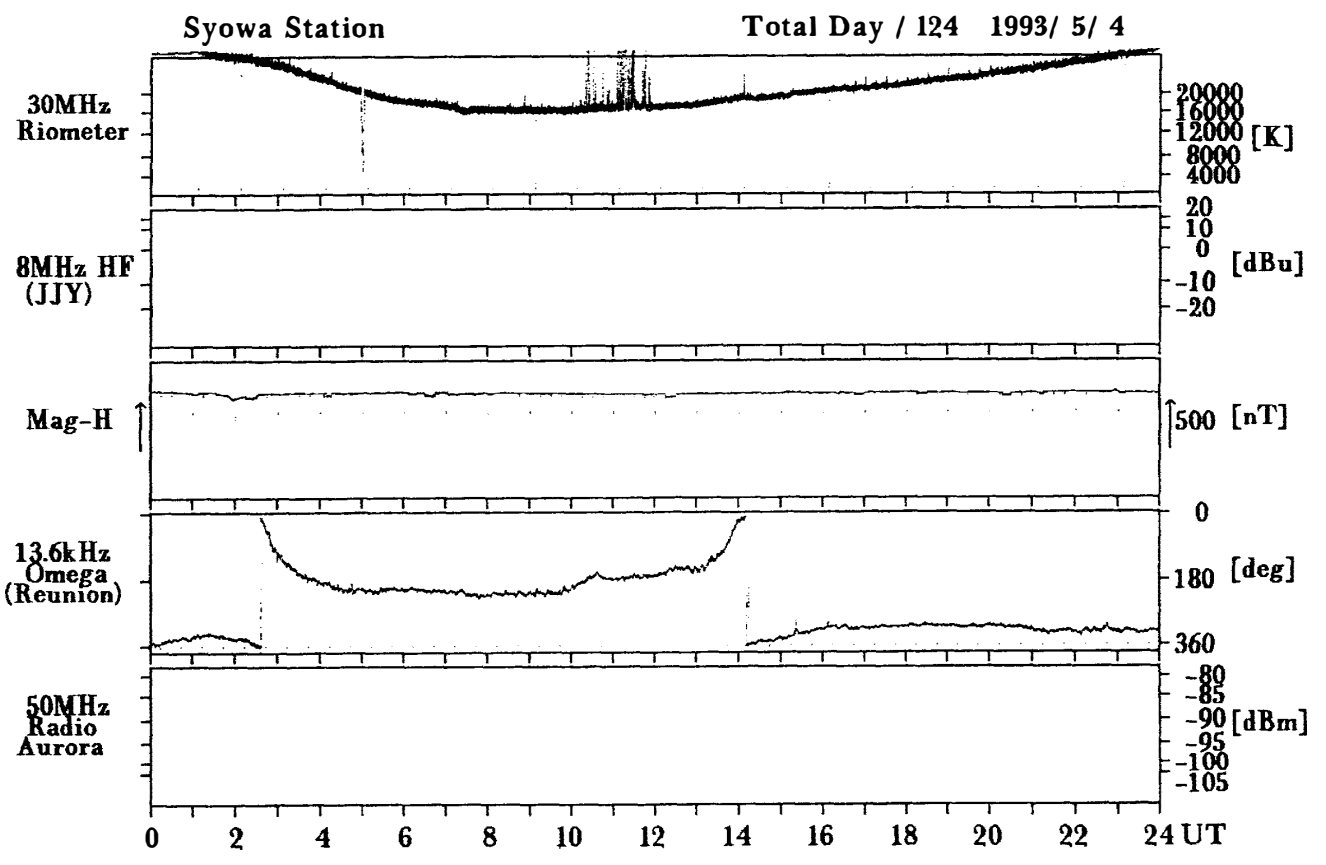
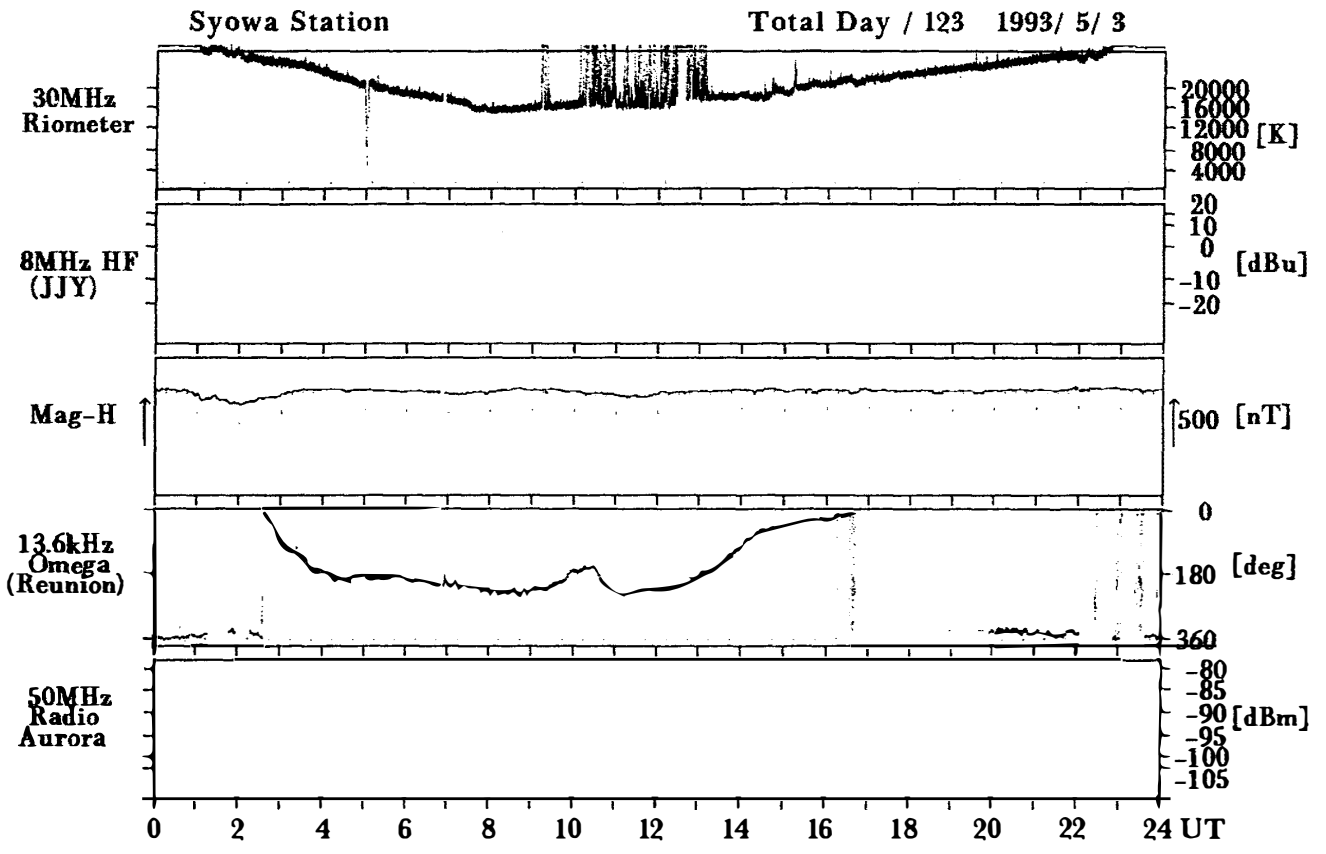
Syowa Station

Total Day / 120 1993/ 4/30



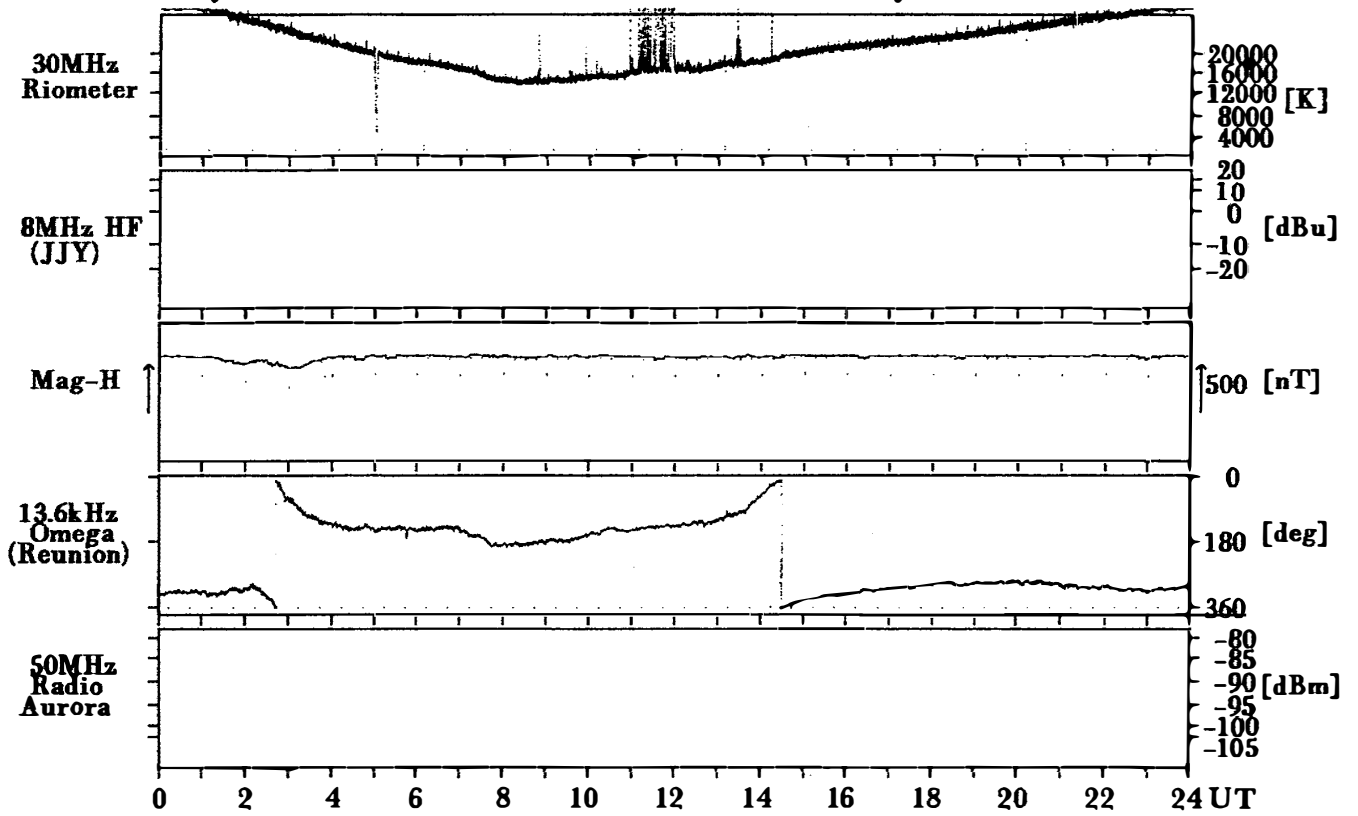






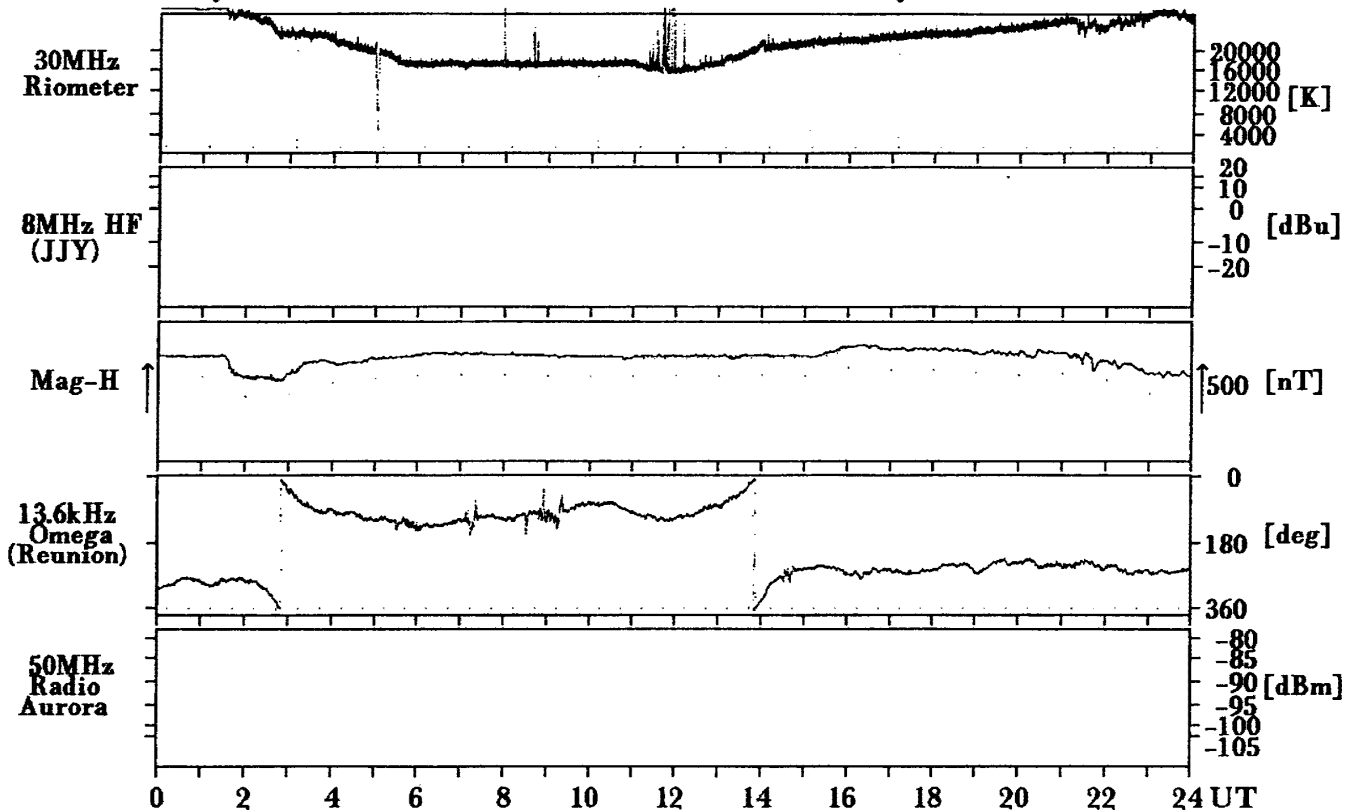
Syowa Station

Total Day / 125 1993/ 5/ 5



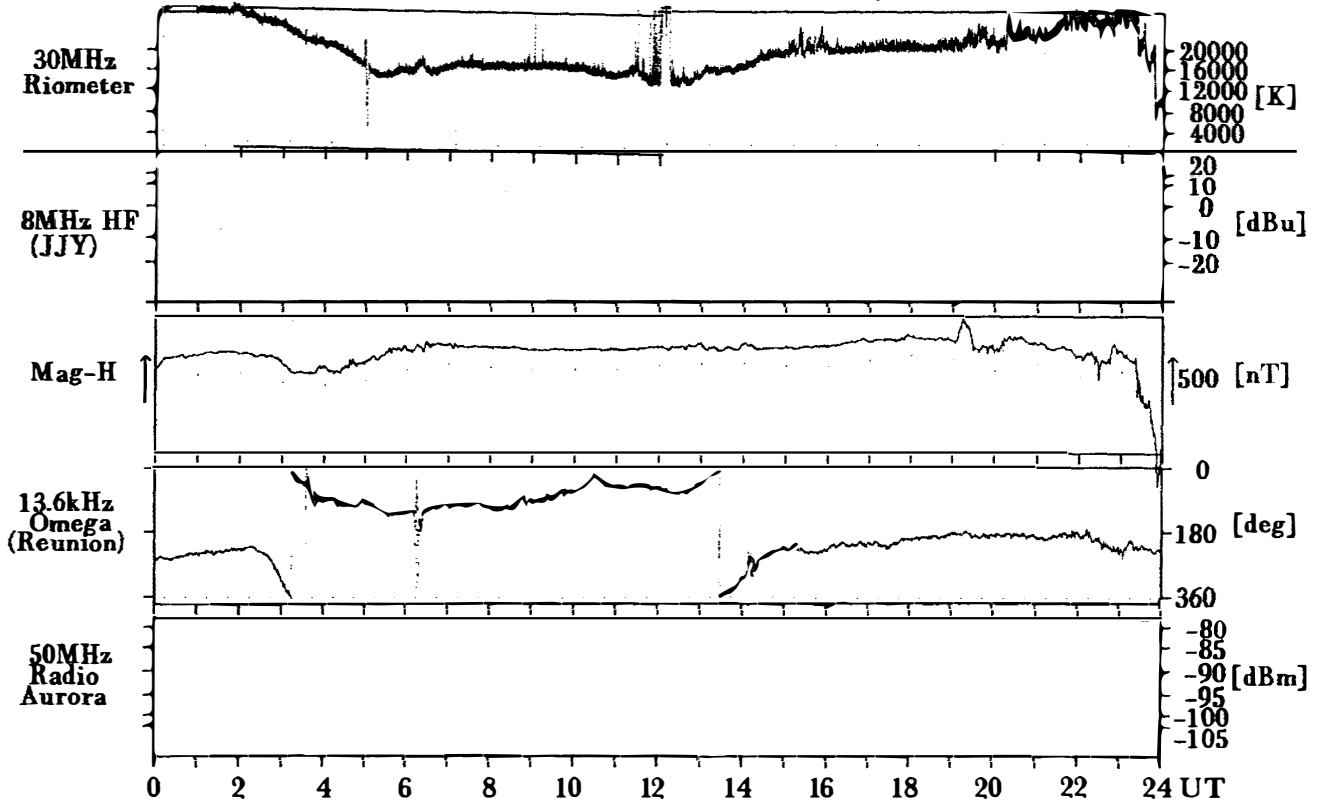
Syowa Station

Total Day / 126 1993/ 5/ 6



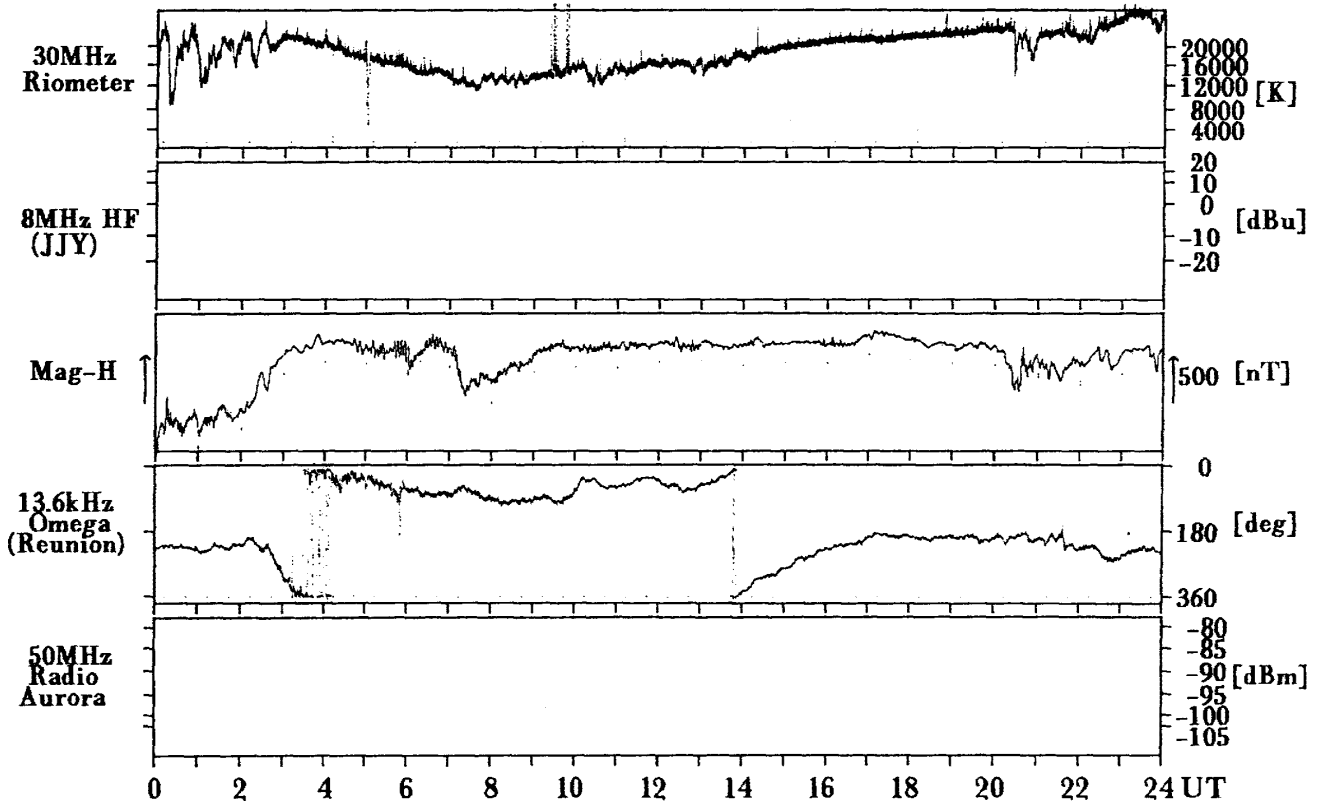
Syowa Station

Total Day / 127 1993/ 5/ 7



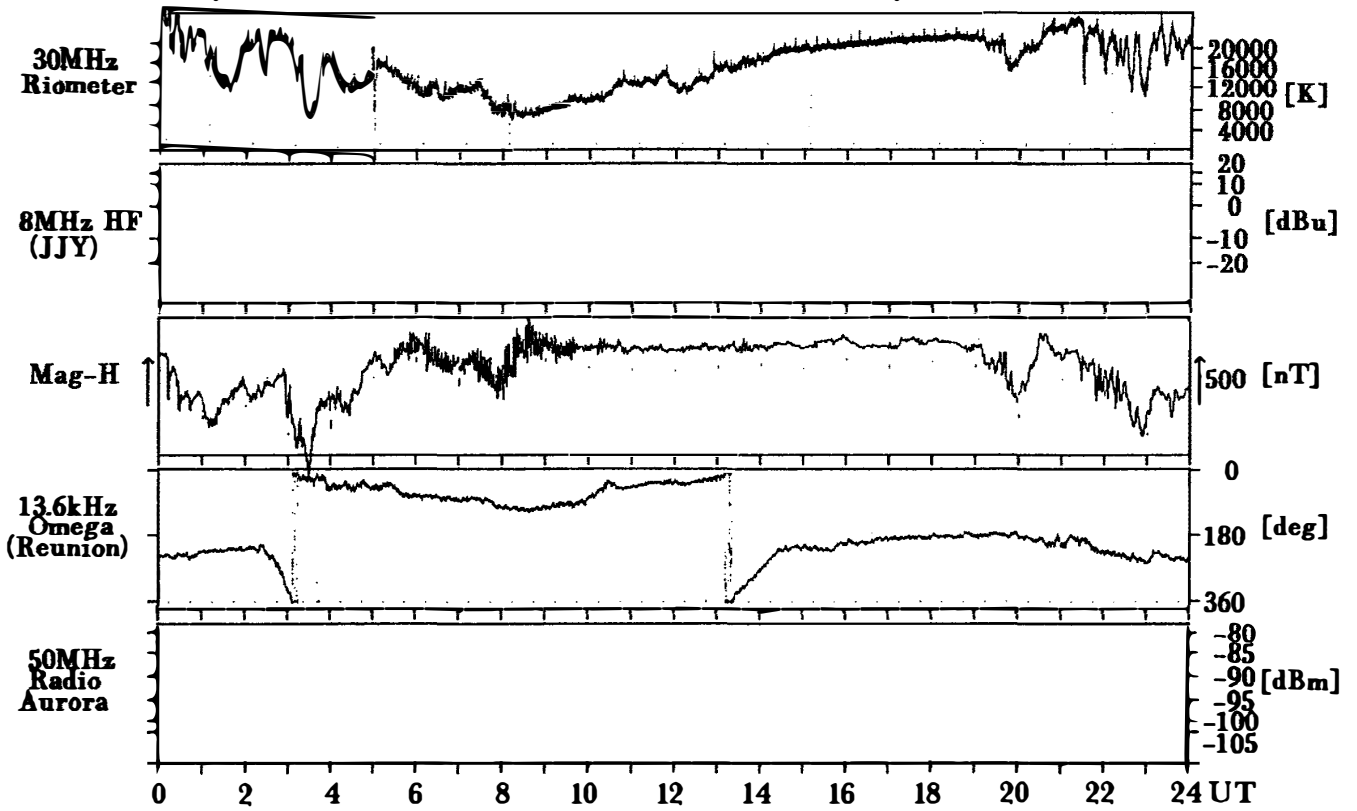
Syowa Station

Total Day / 128 1993/ 5/ 8



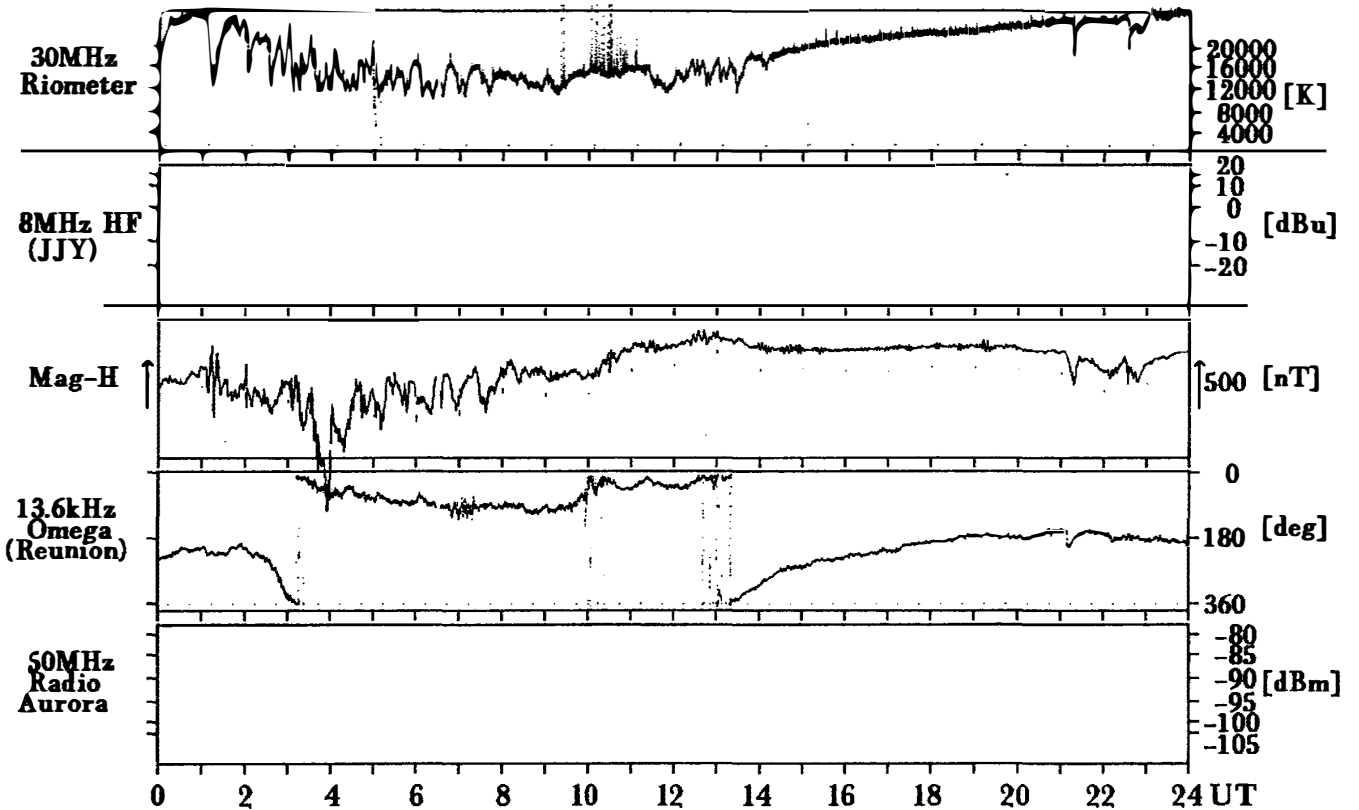
Syowa Station

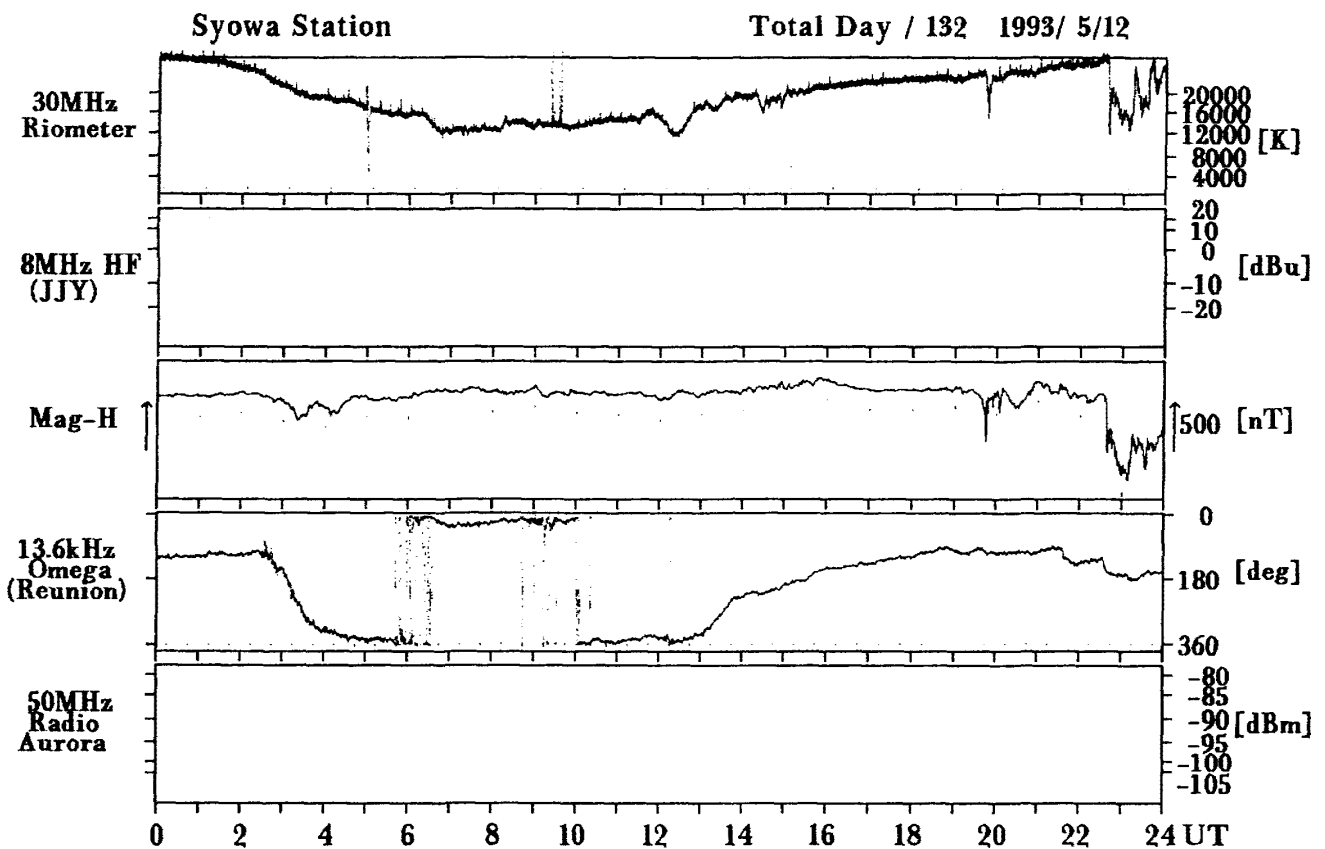
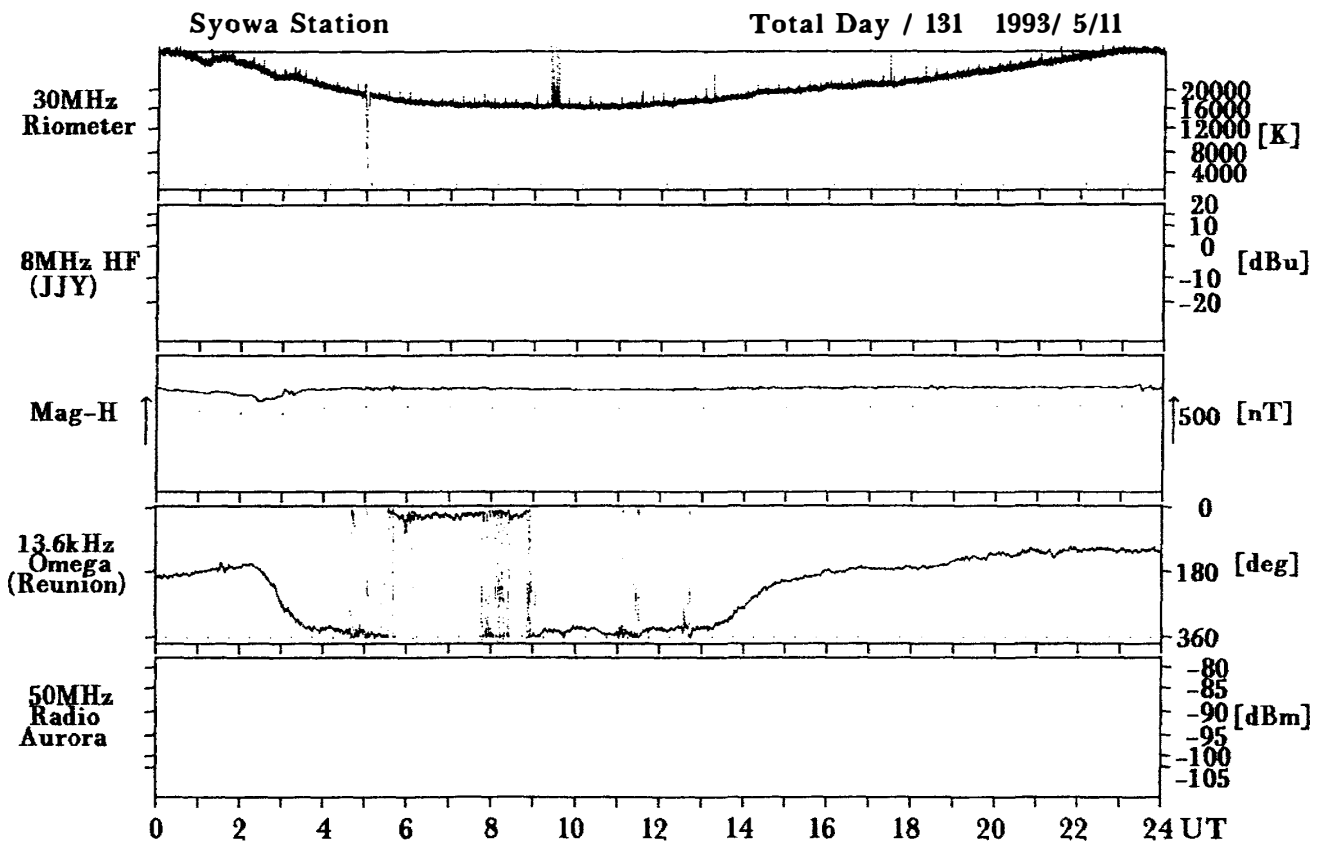
Total Day / 129 1993/ 5/ 9

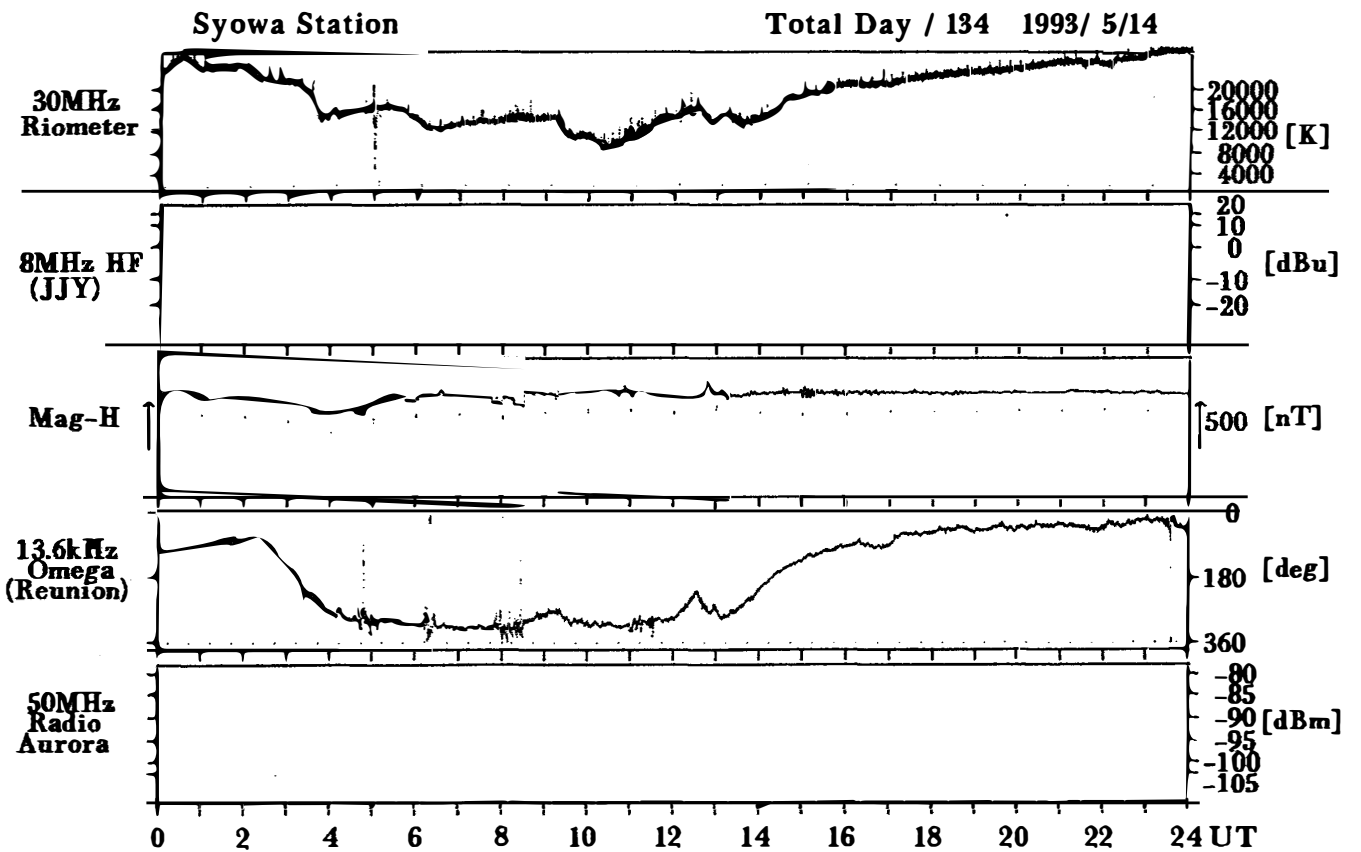
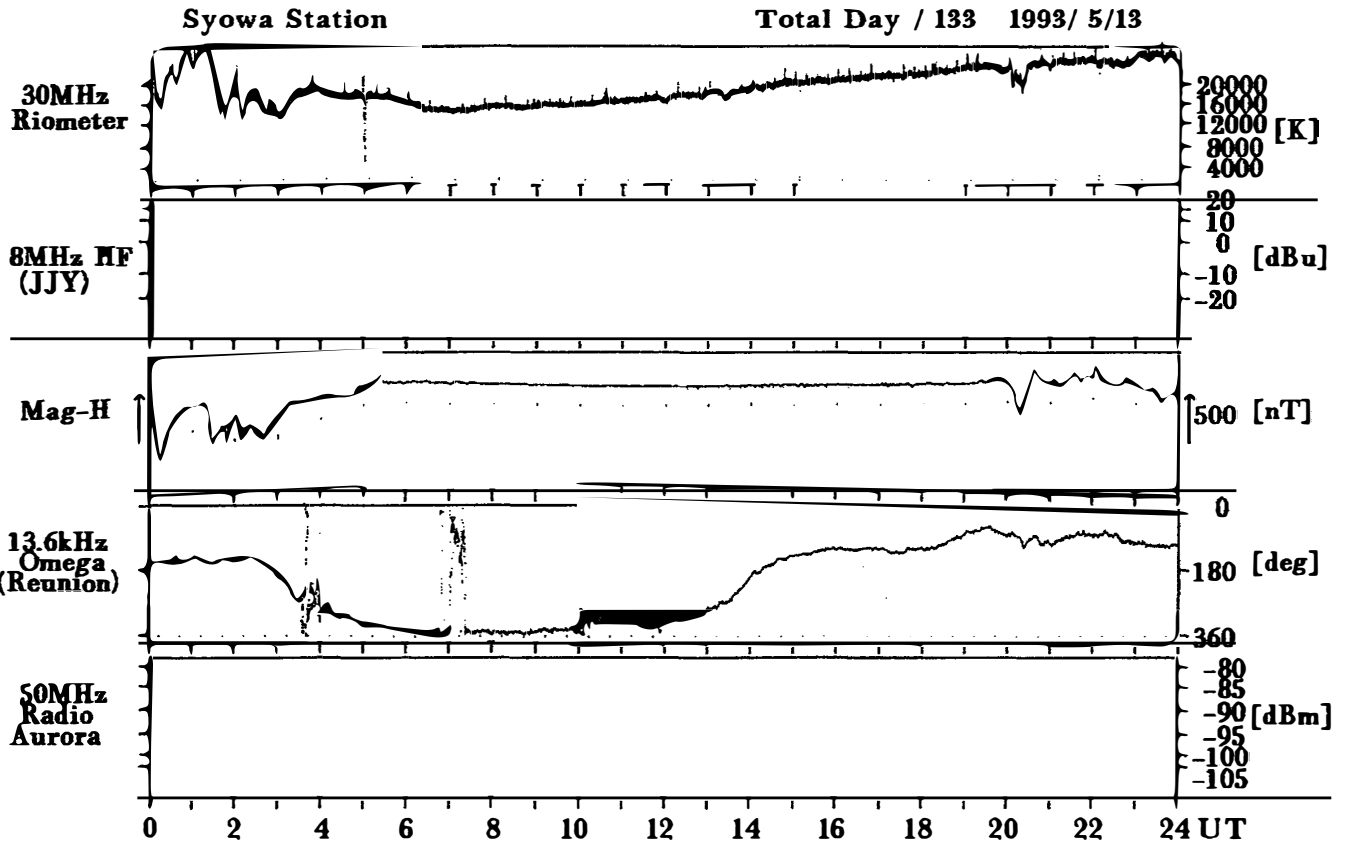


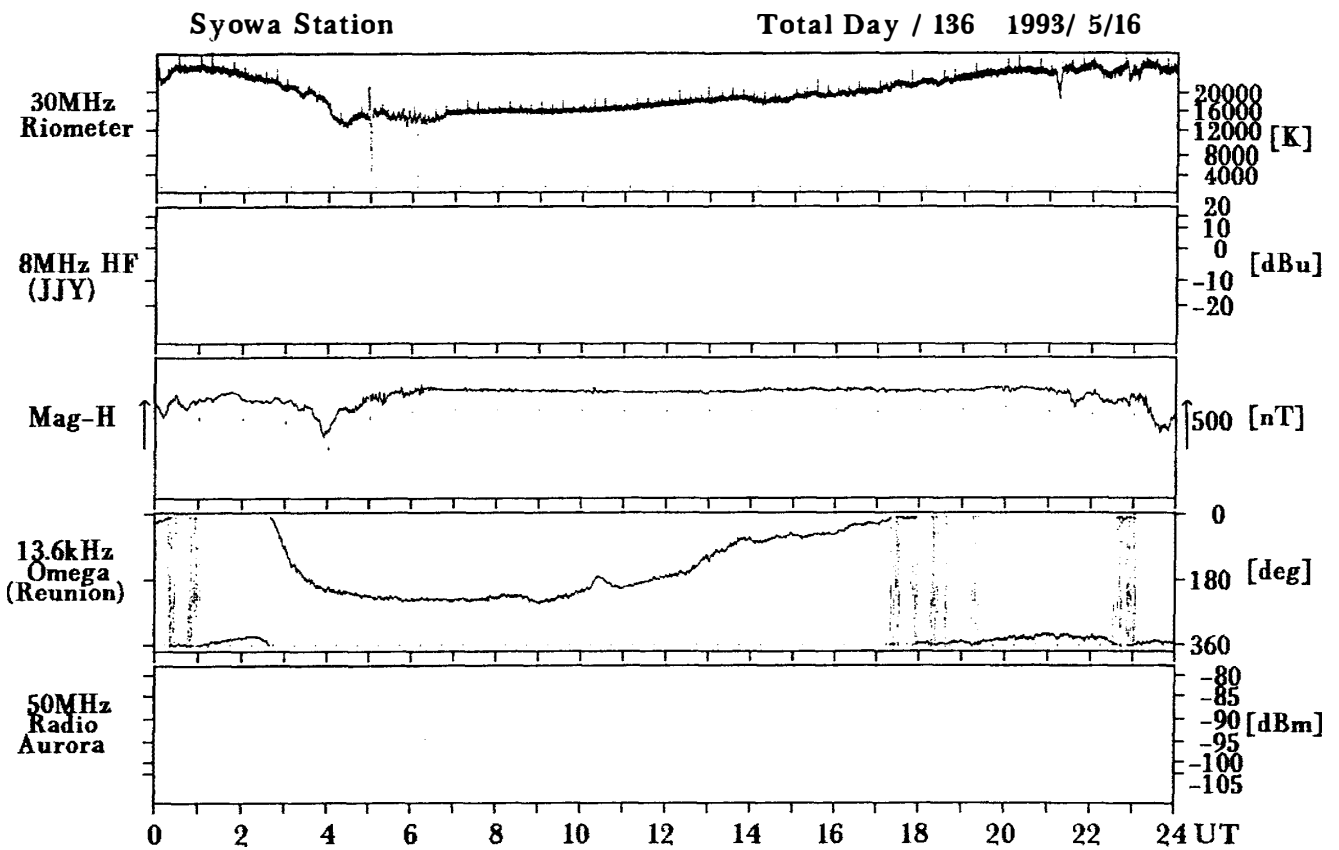
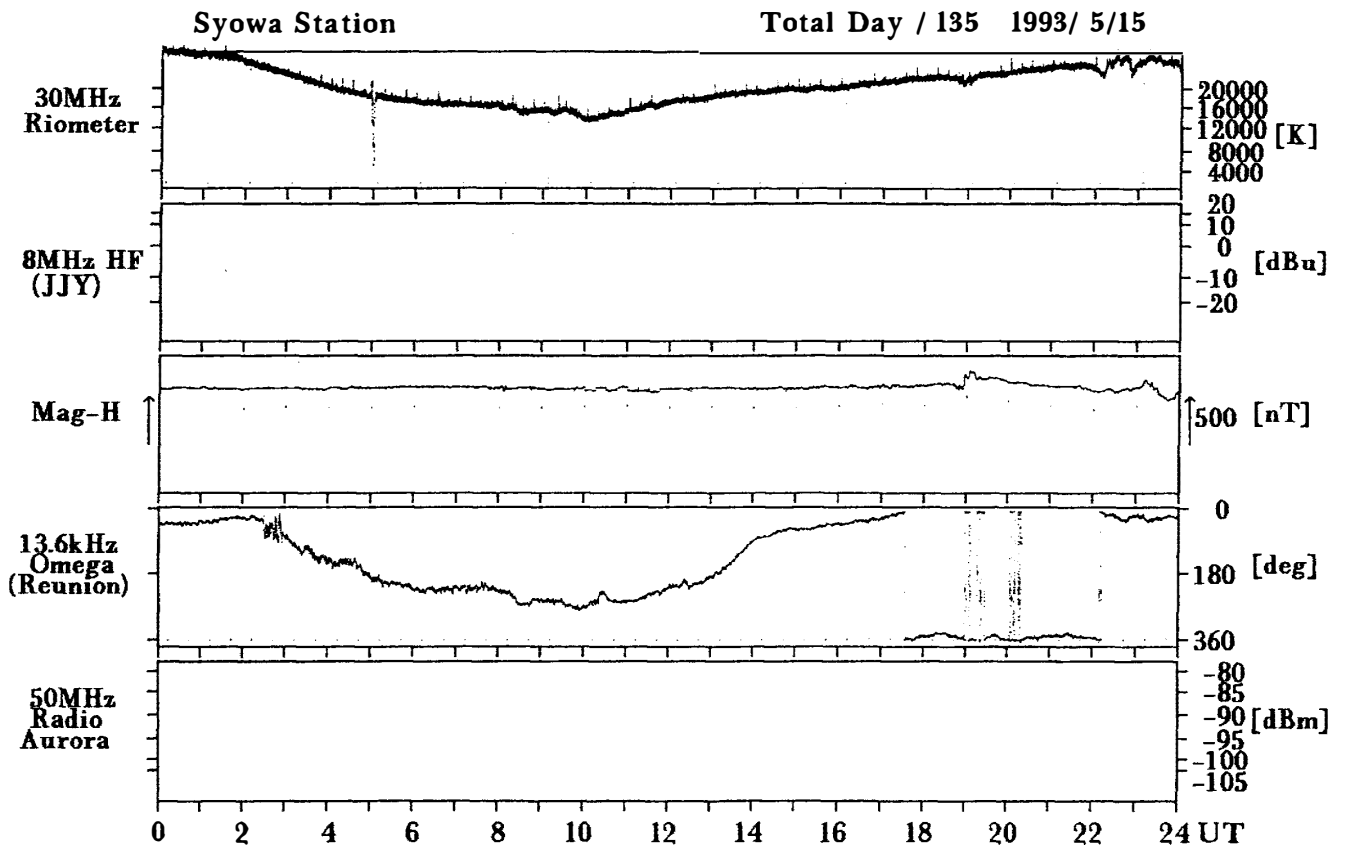
Syowa Station

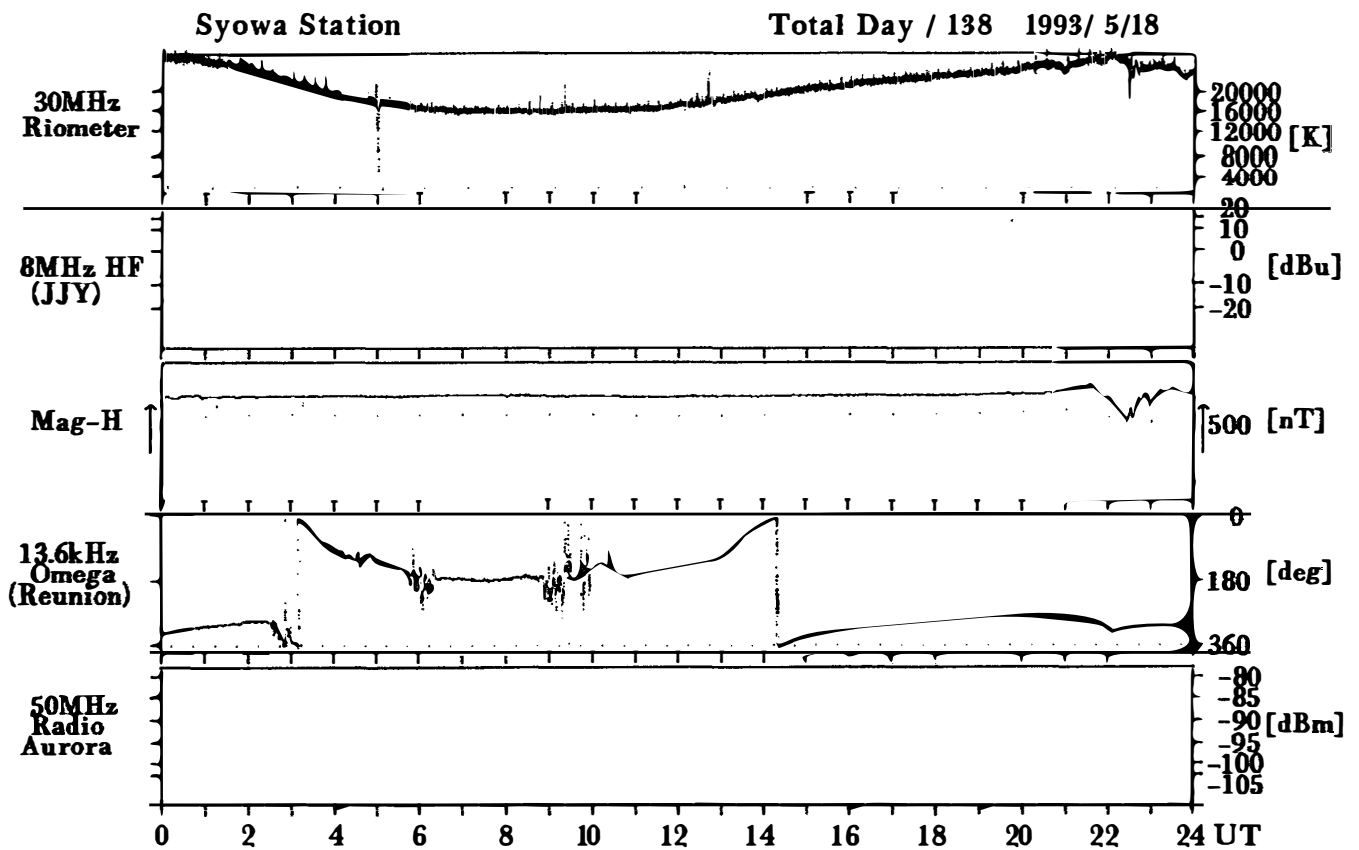
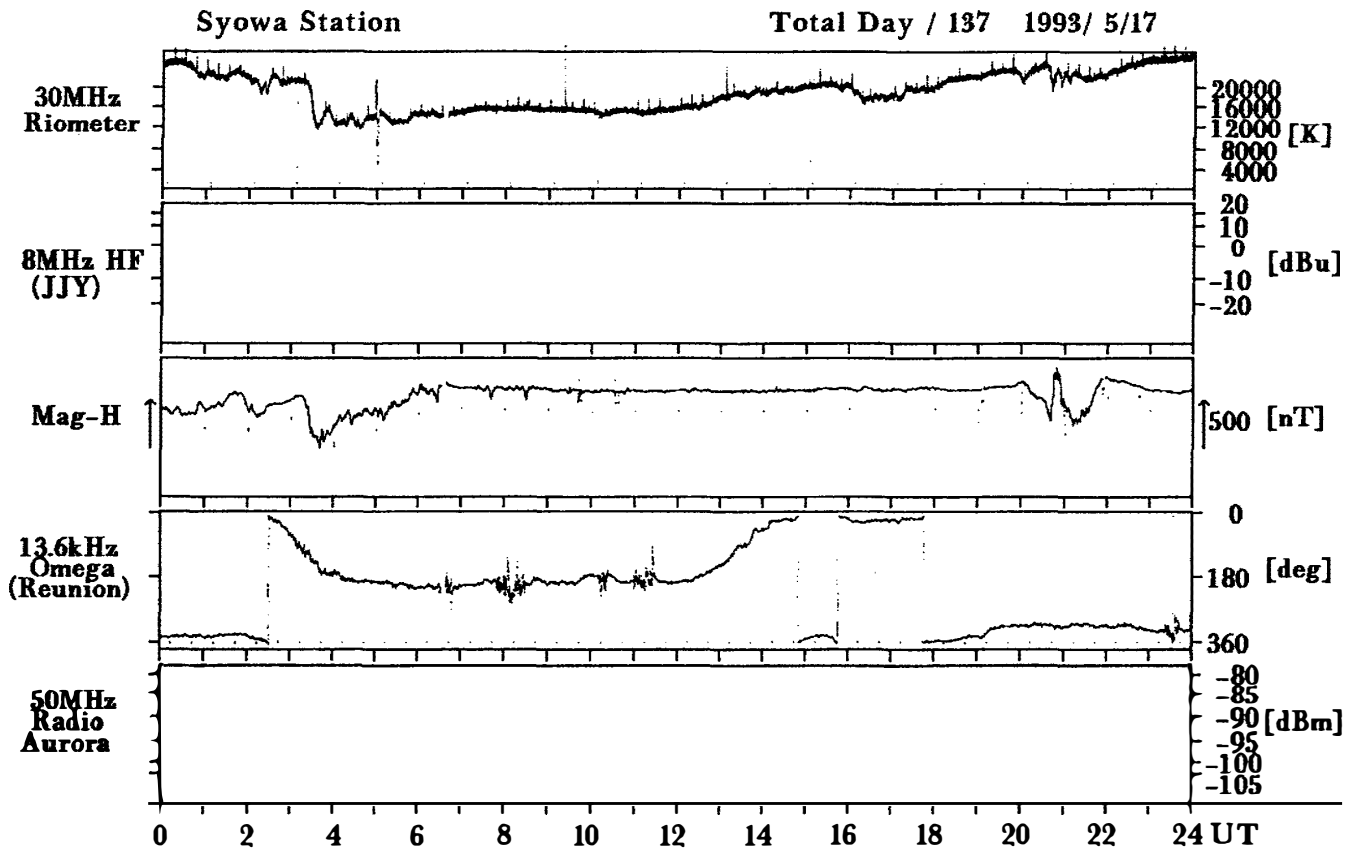
Total Day / 130 1993/ 5/10







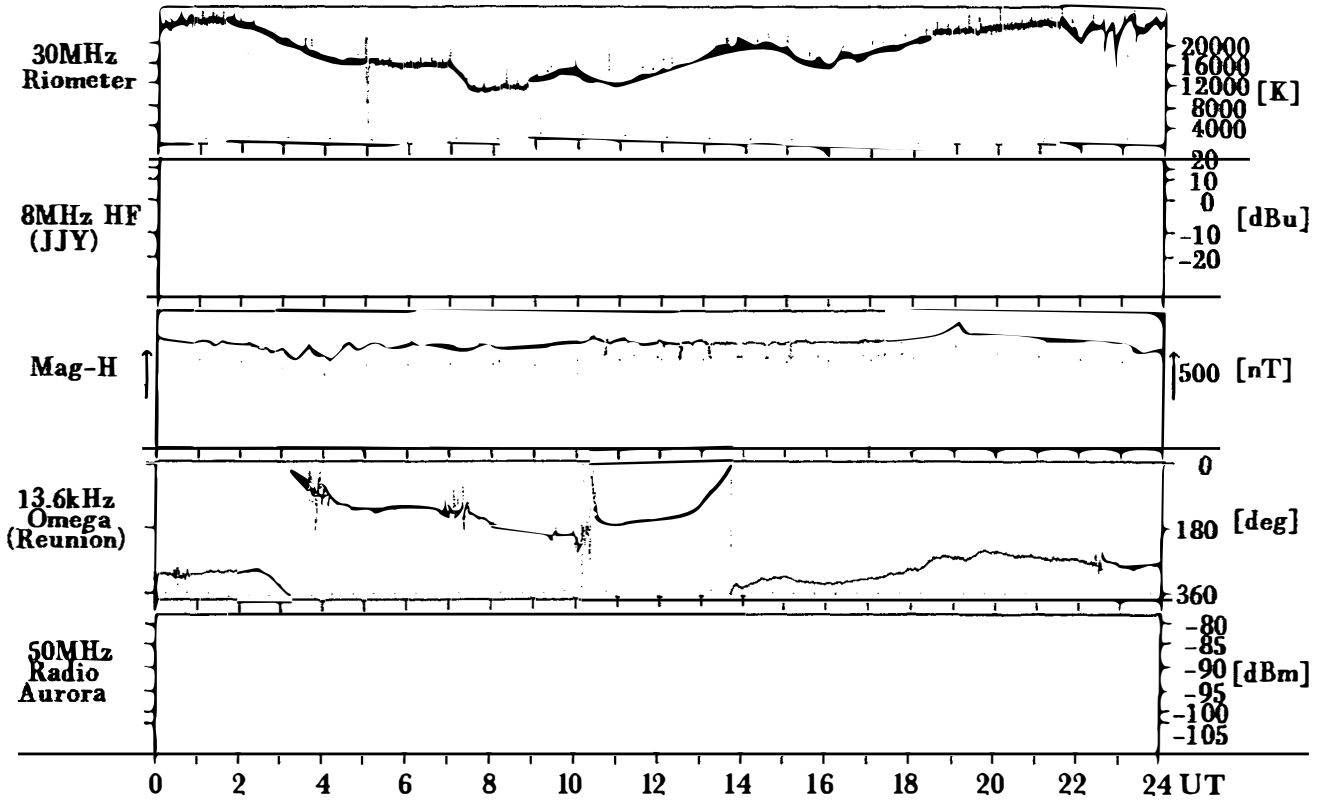






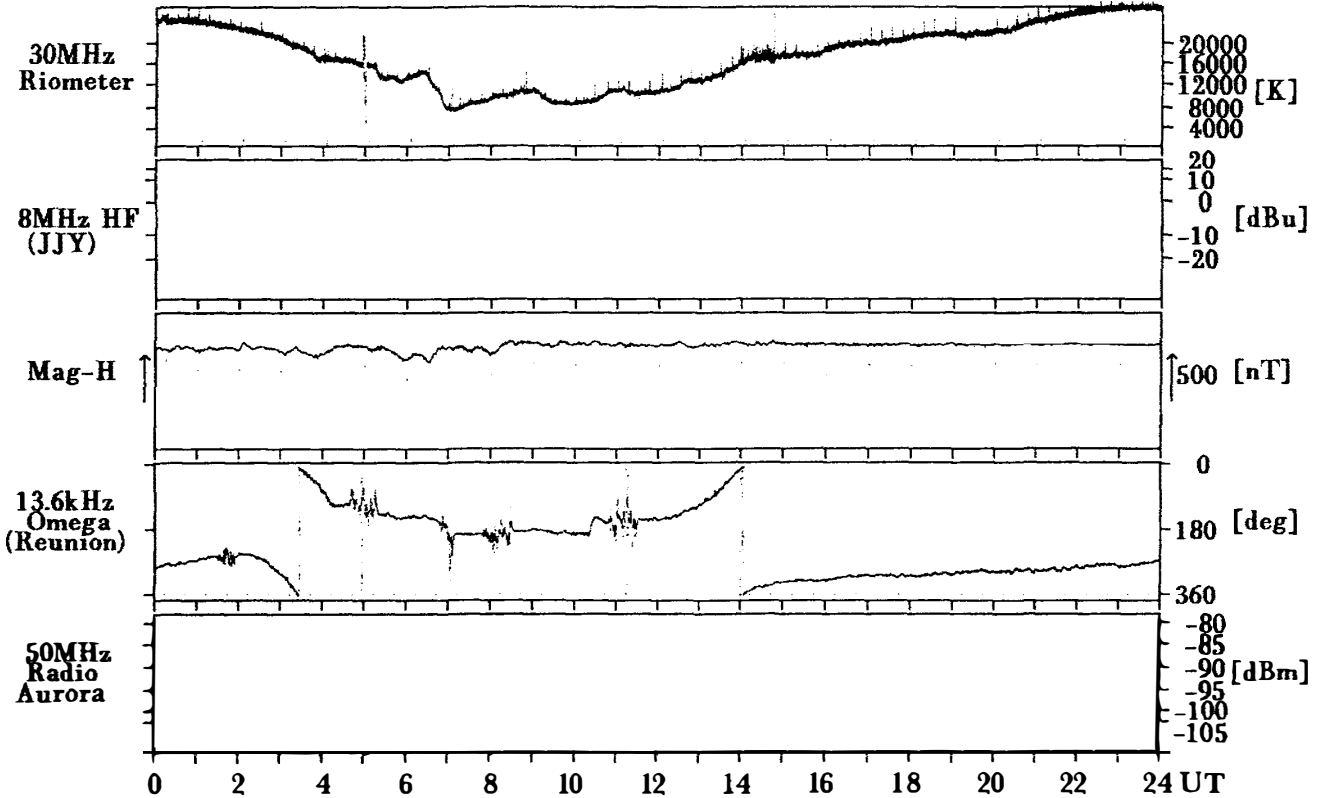
Syowa Station

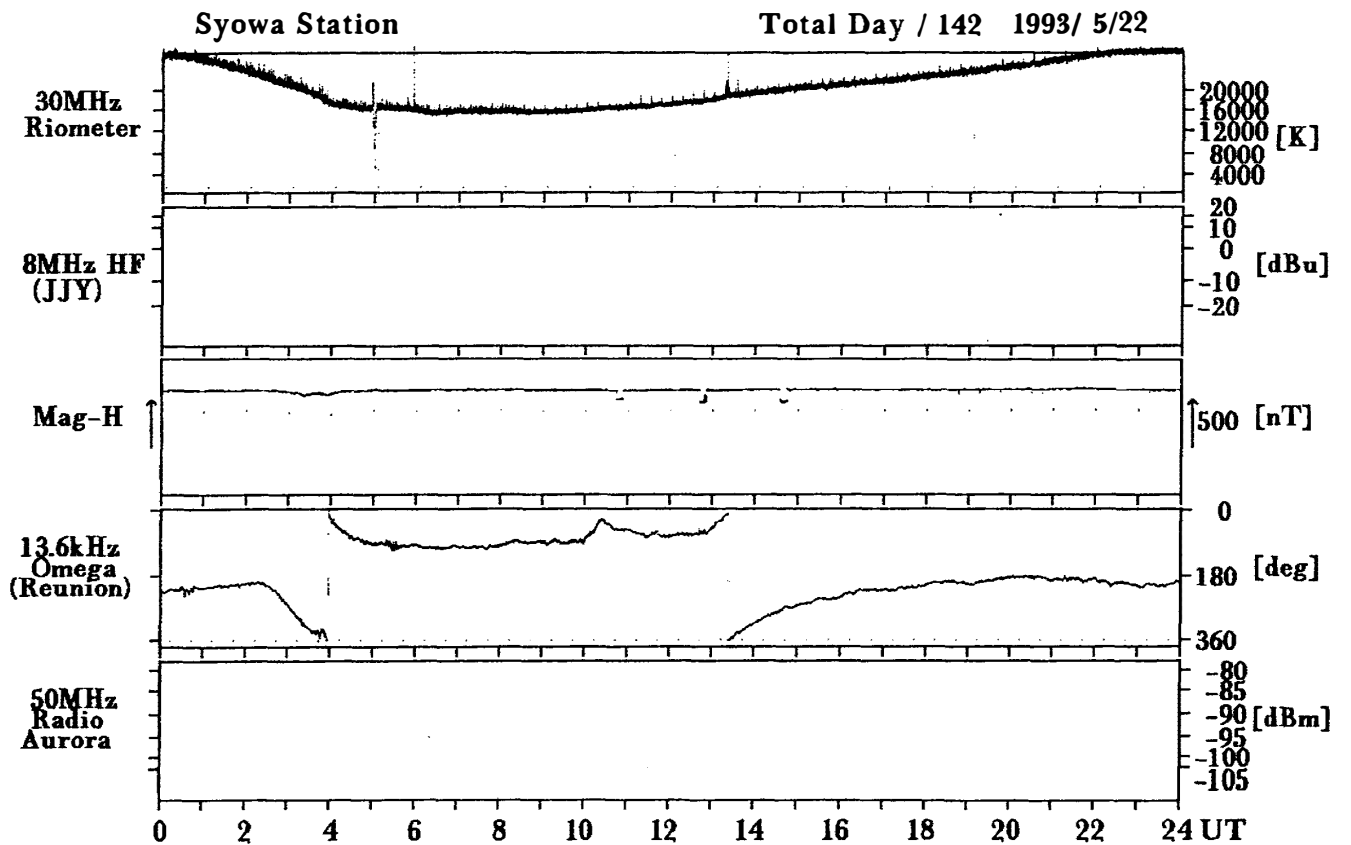
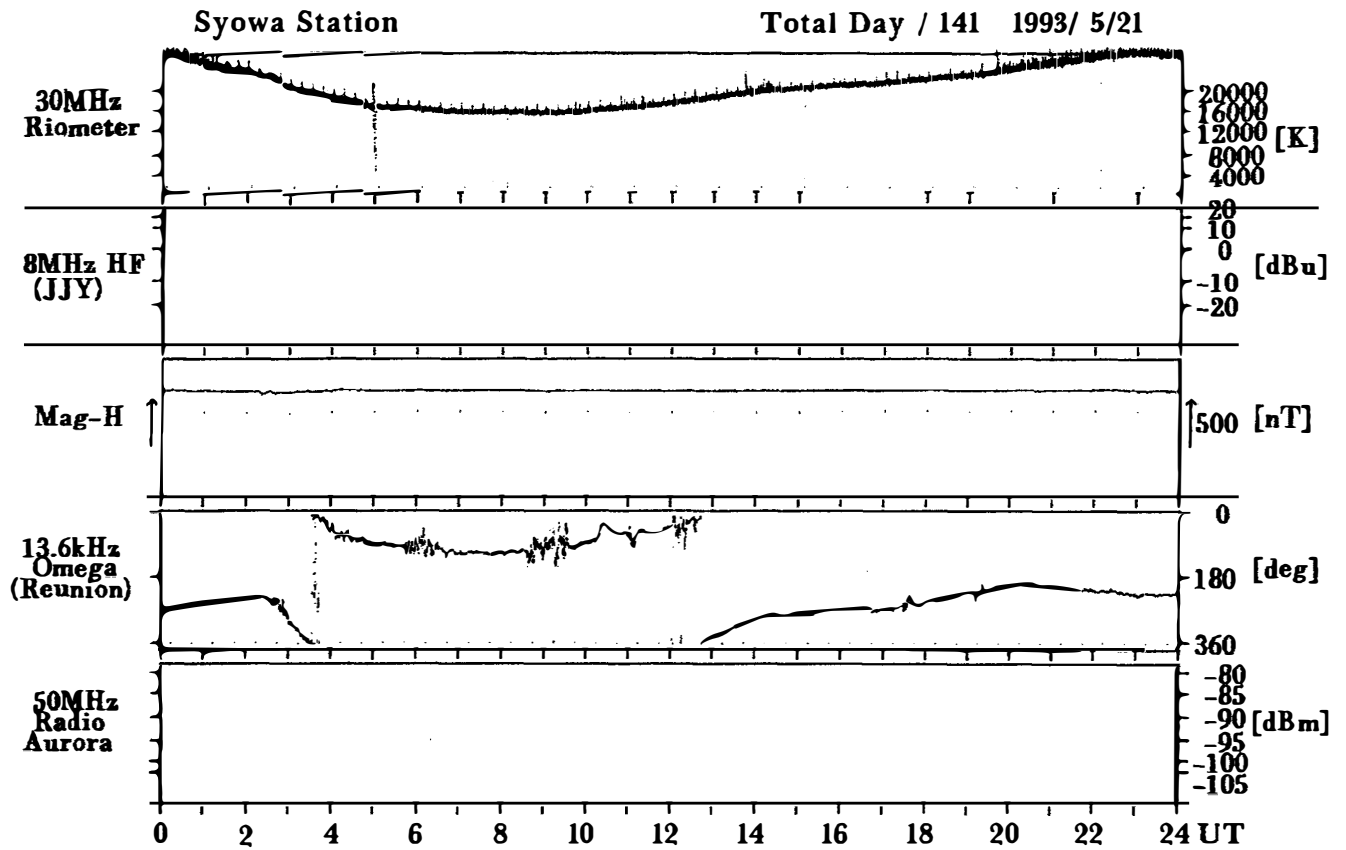
Total Day / 139 1993/ 5/19

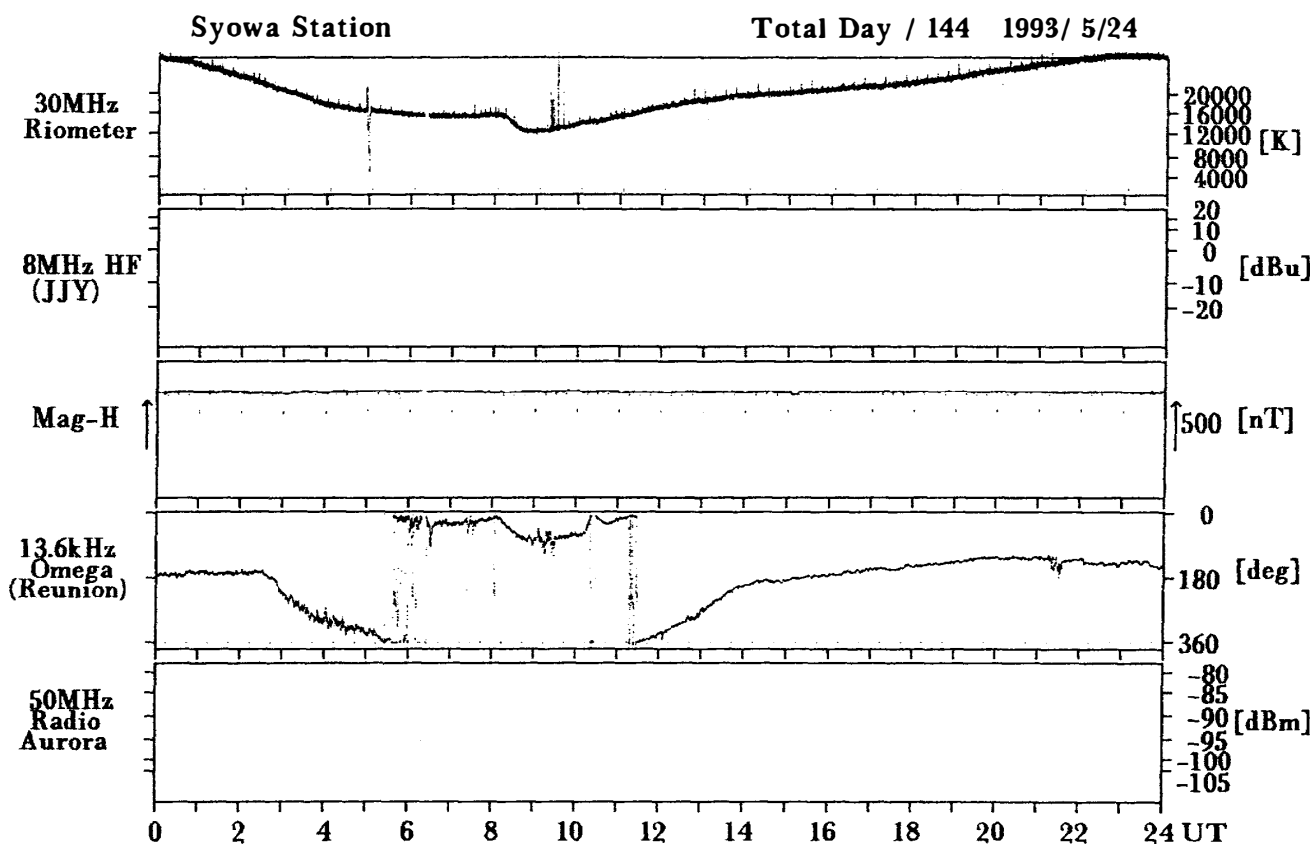
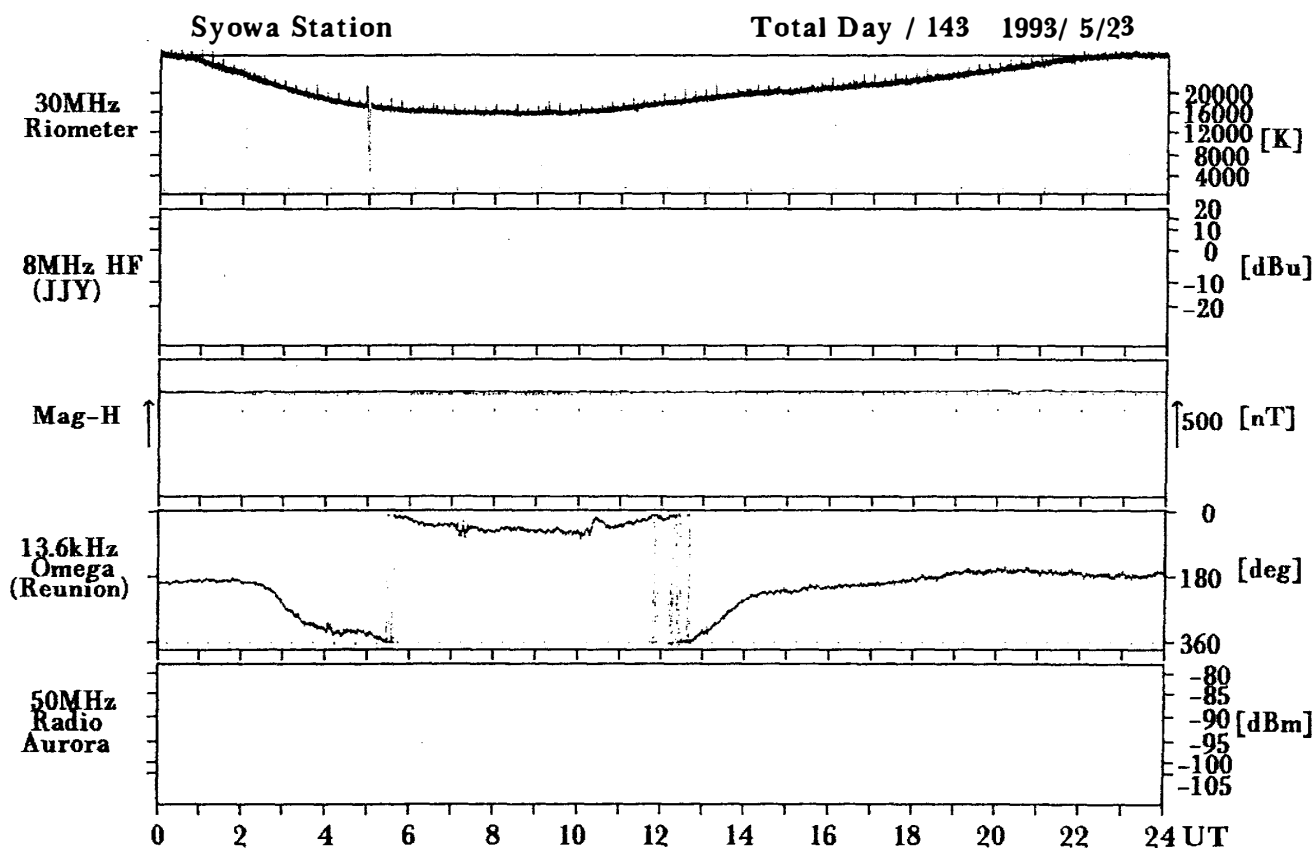


Syowa Station

Total Day / 140 1993/ 5/20

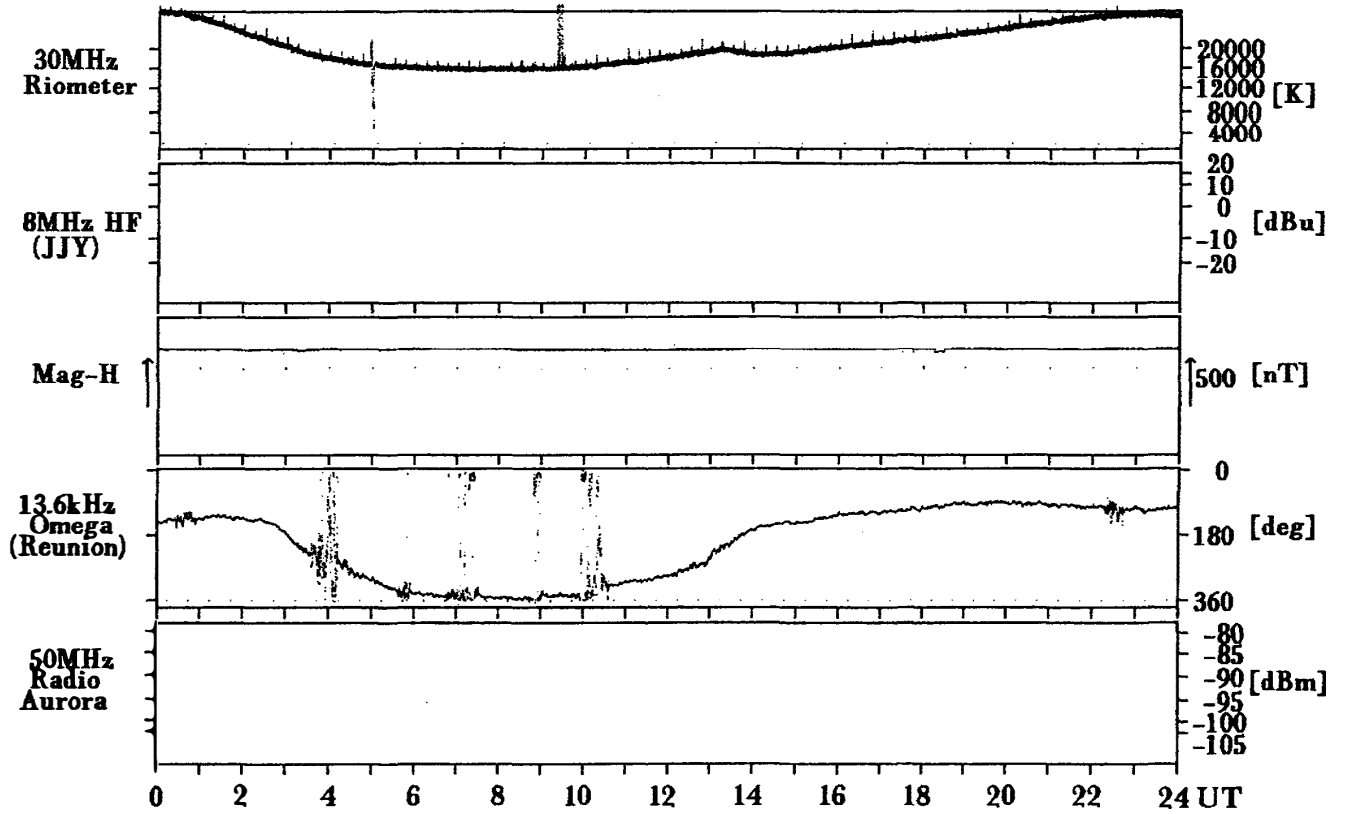






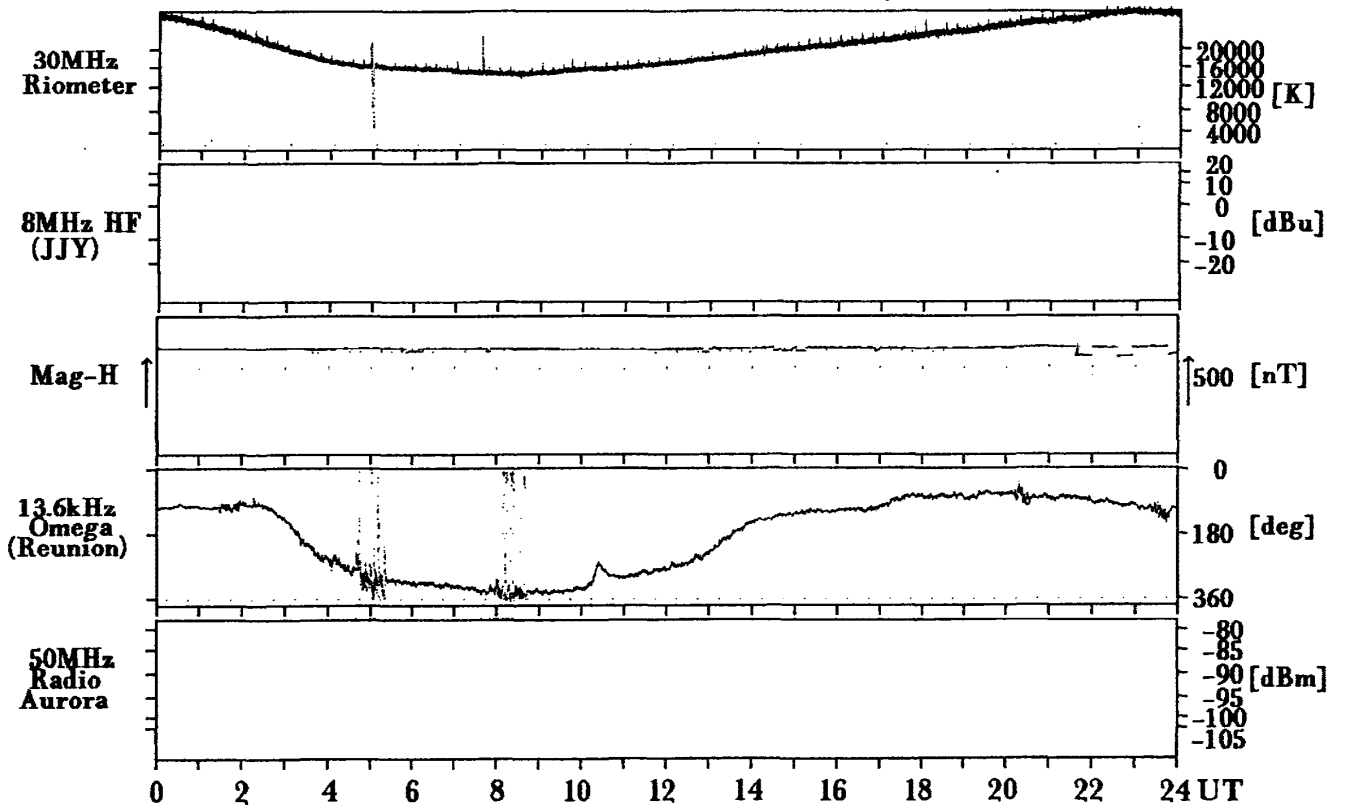
Syowa Station

Total Day / 145 1993/ 5/25



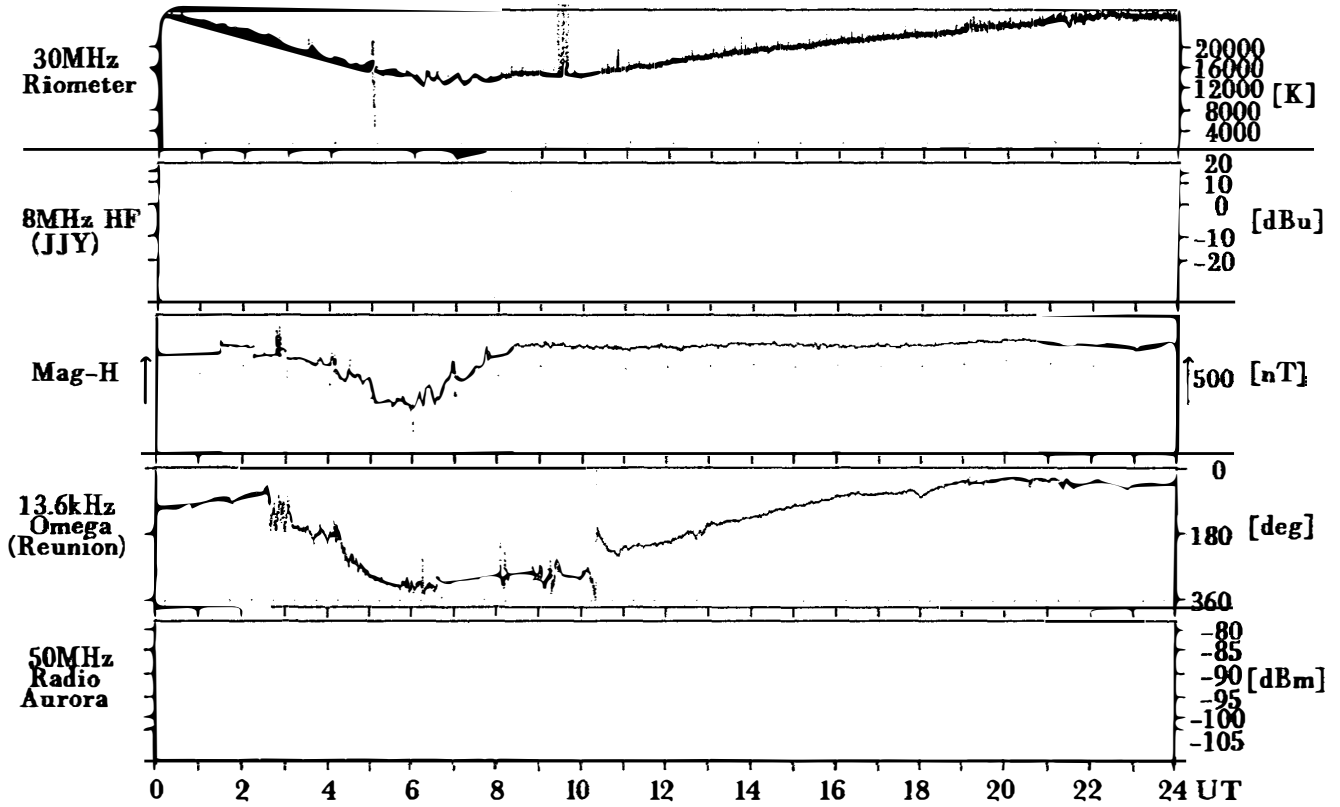
Syowa Station

Total Day / 146 1993/ 5/26



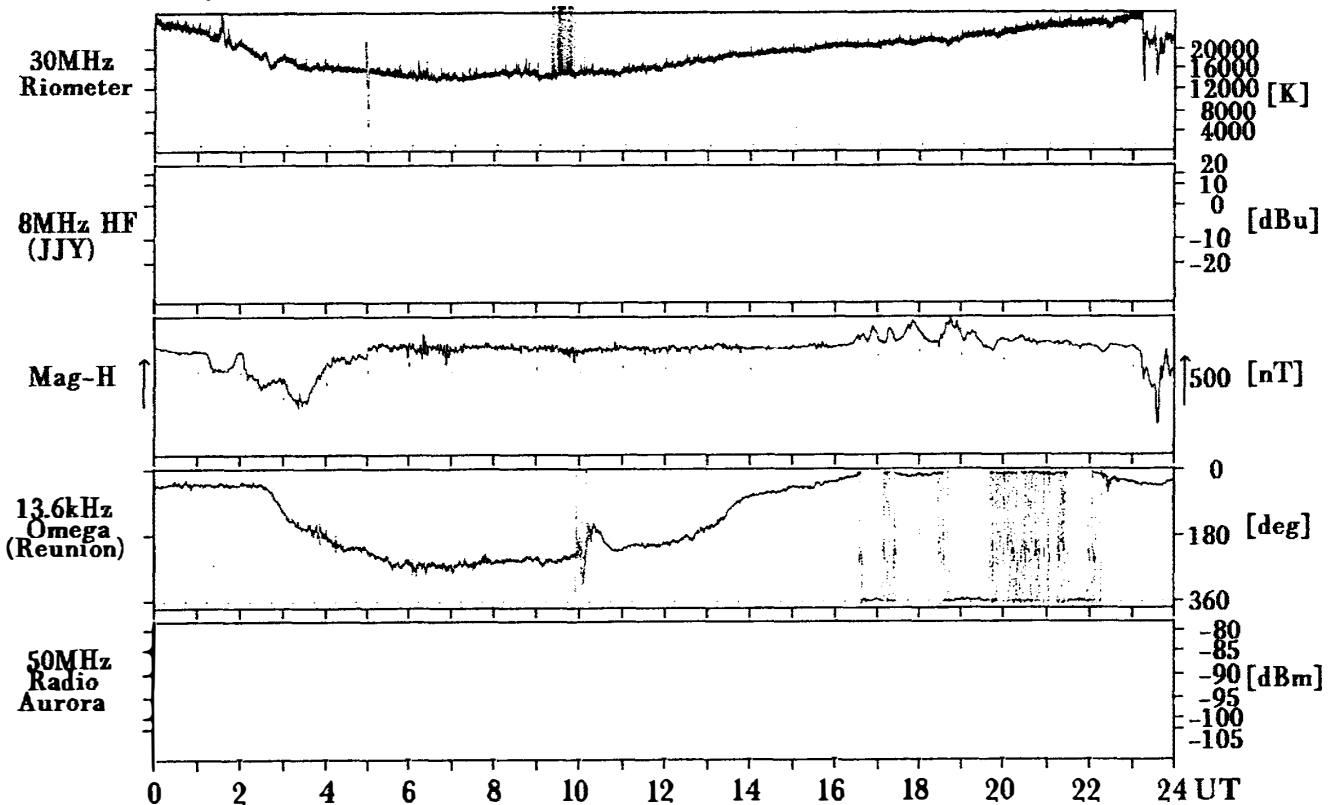
Syowa Station

Total Day / 147 1993/ 5/27



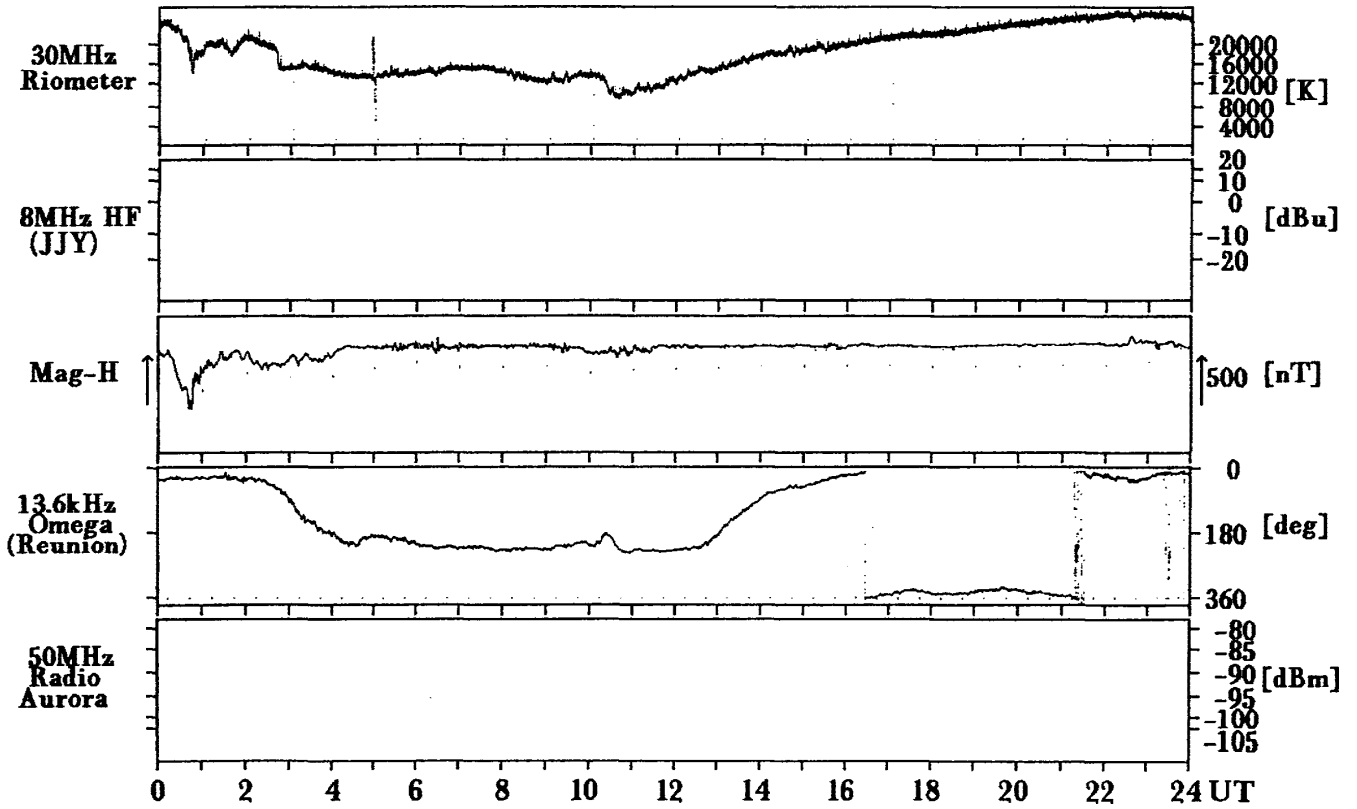
Syowa Station

Total Day / 148 1993/ 5/28



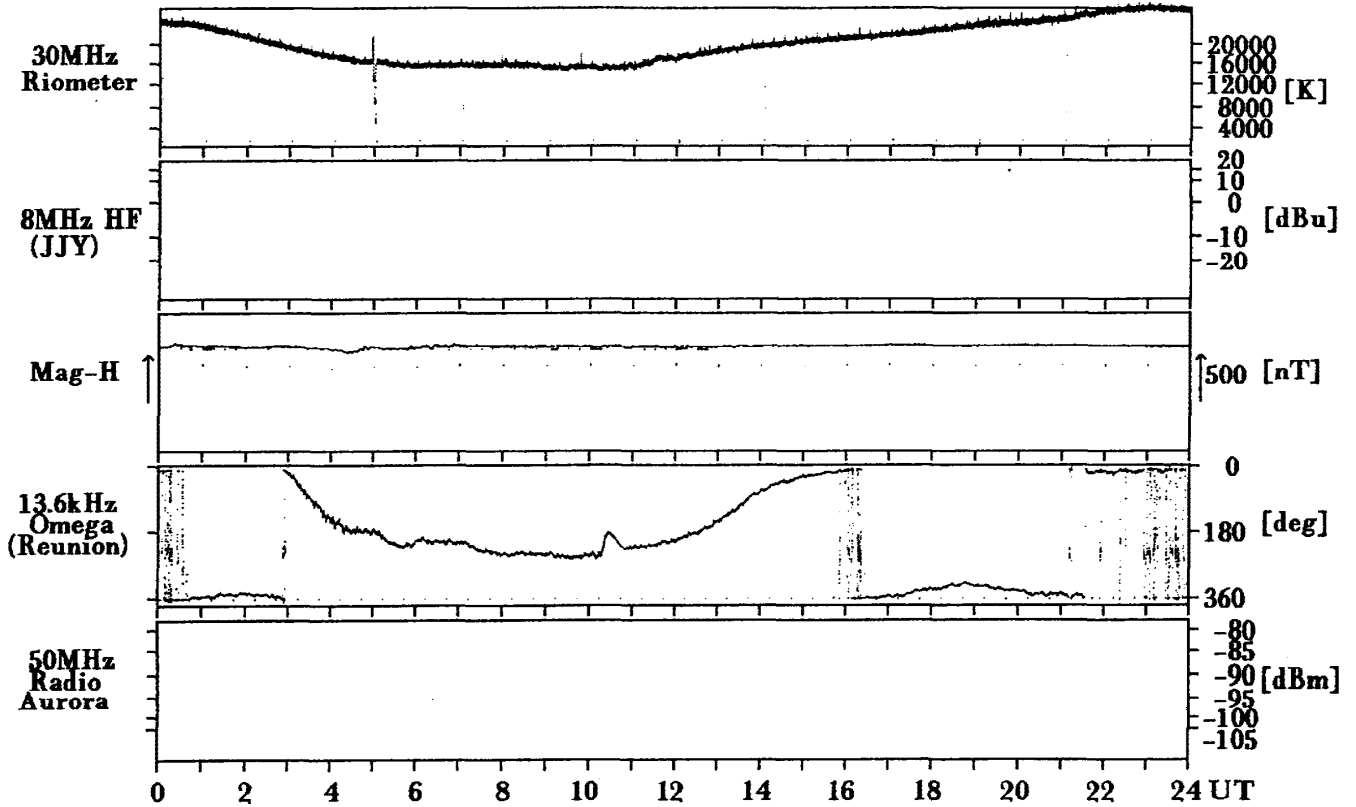
Syowa Station

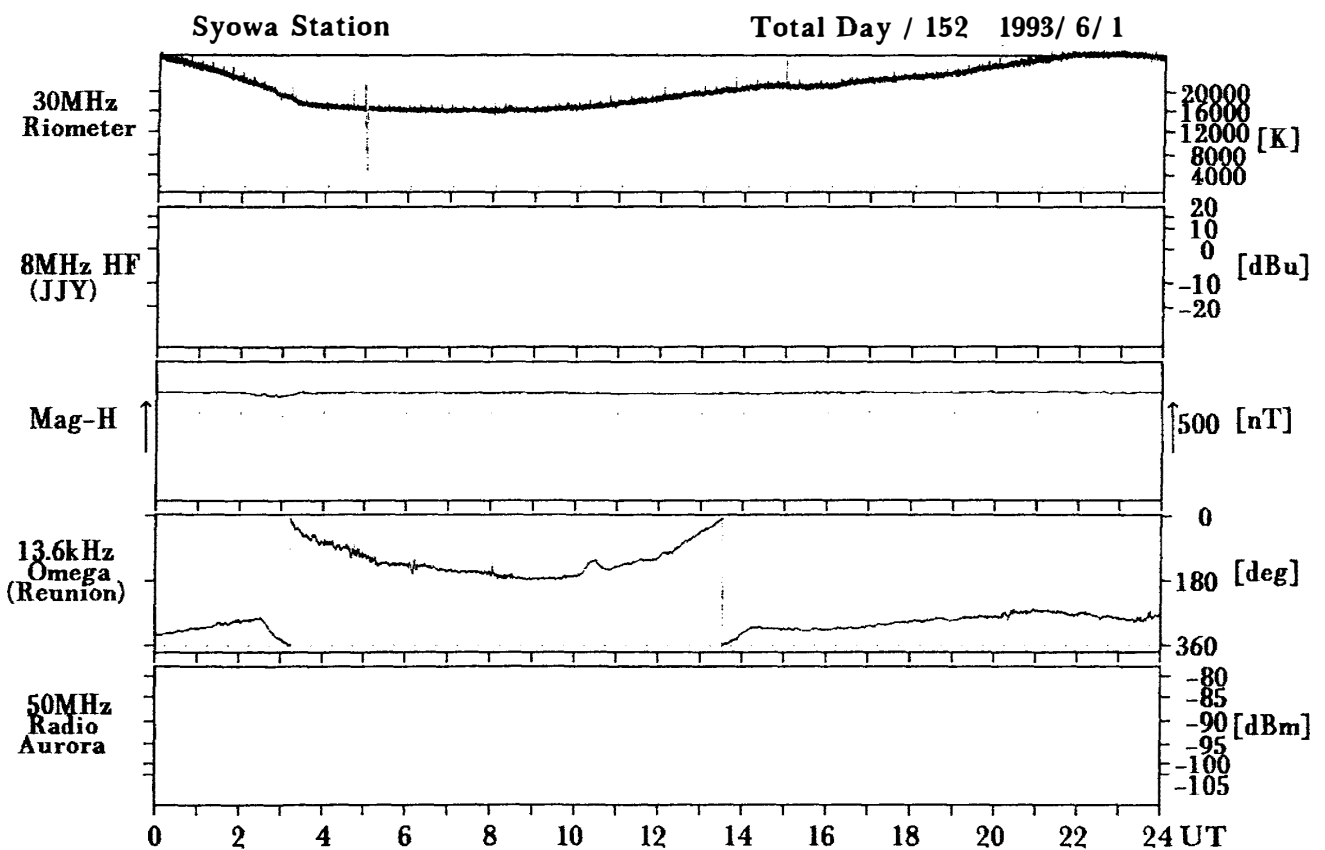
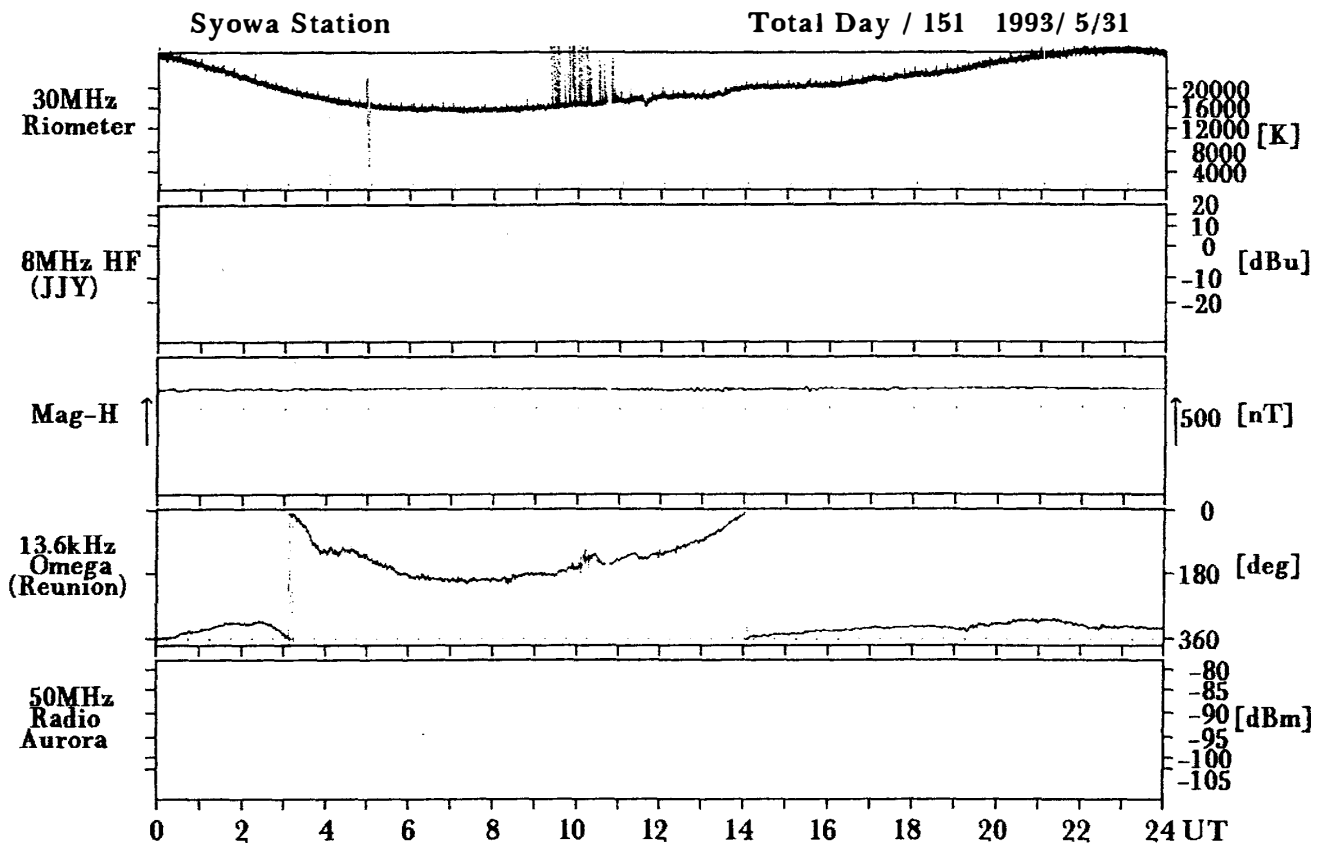
Total Day / 149 1993/ 5/29



Syowa Station

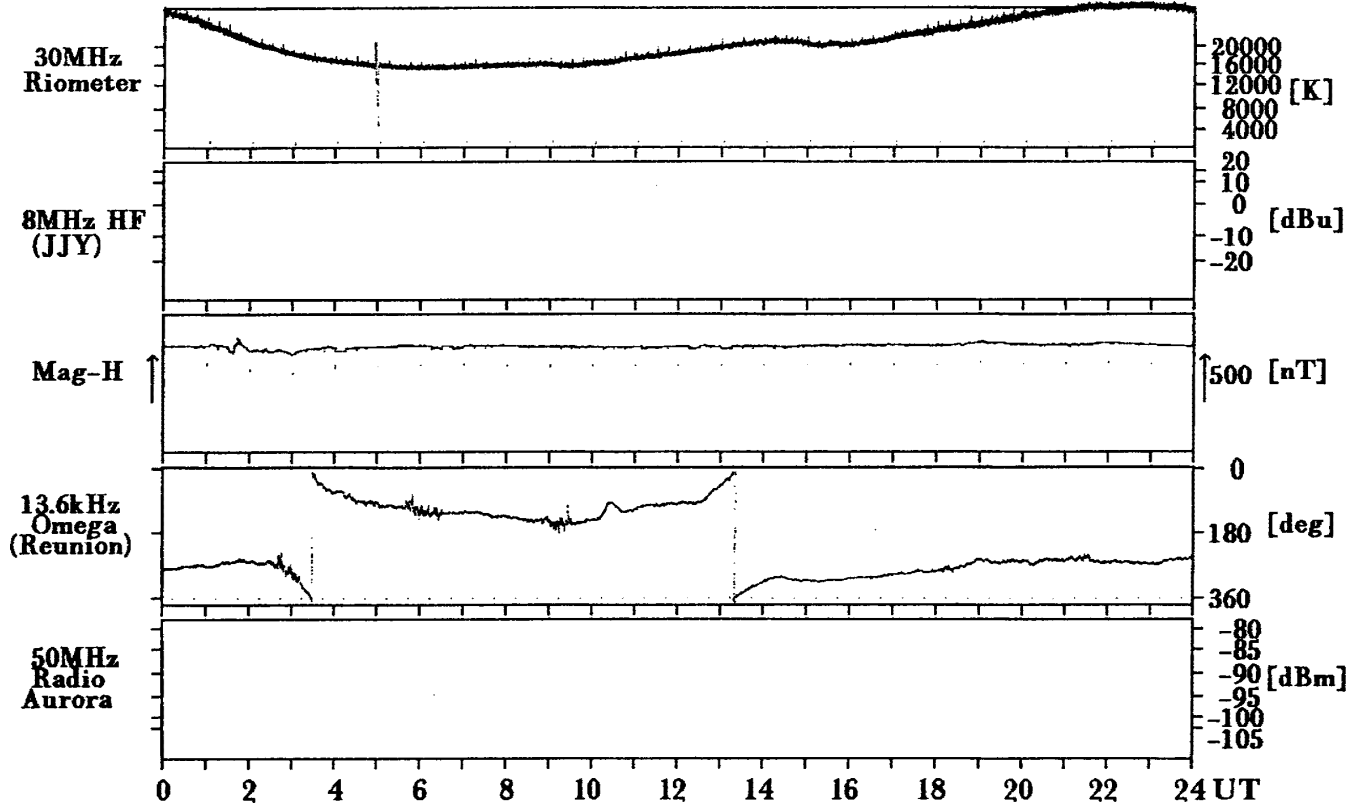
Total Day / 150 1993/ 5/30





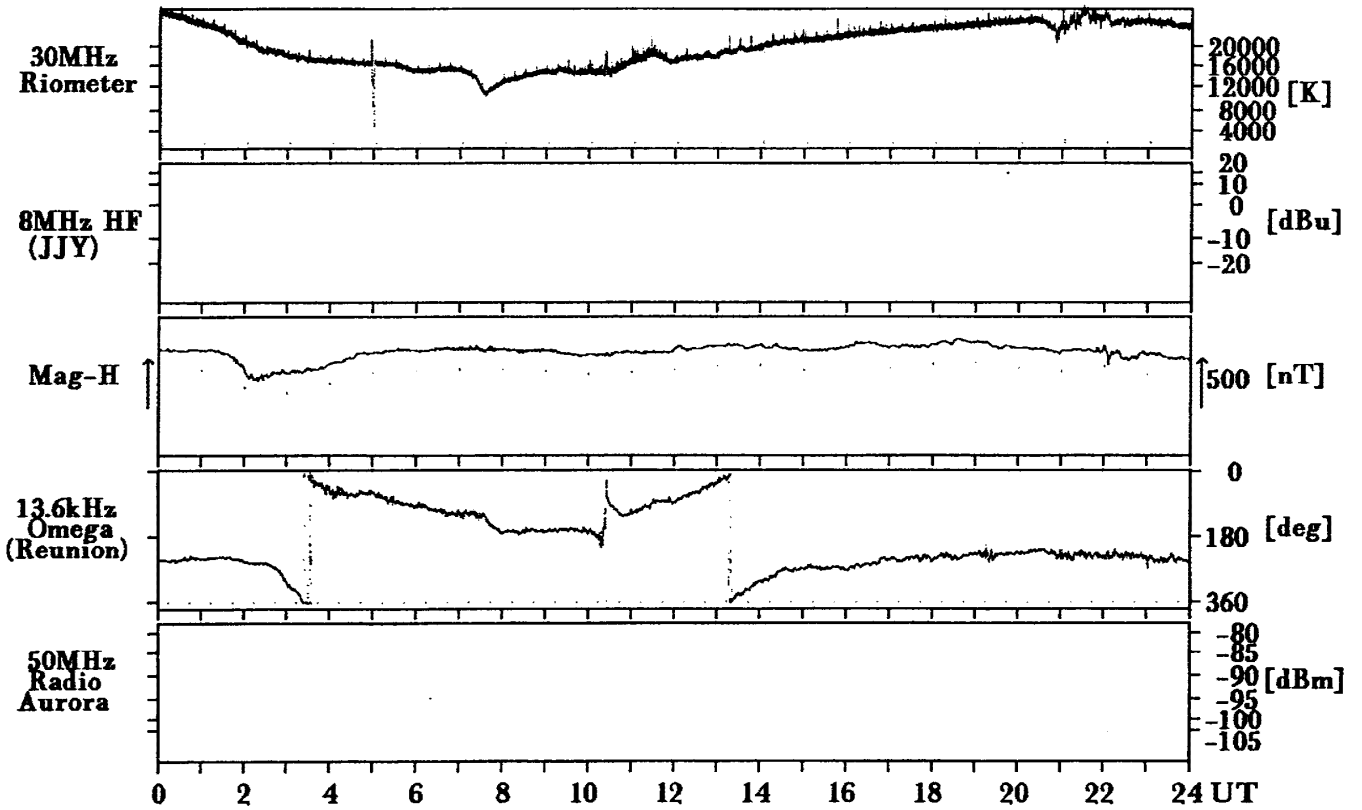
Syowa Station

Total Day / 153 1993/ 6/ 2

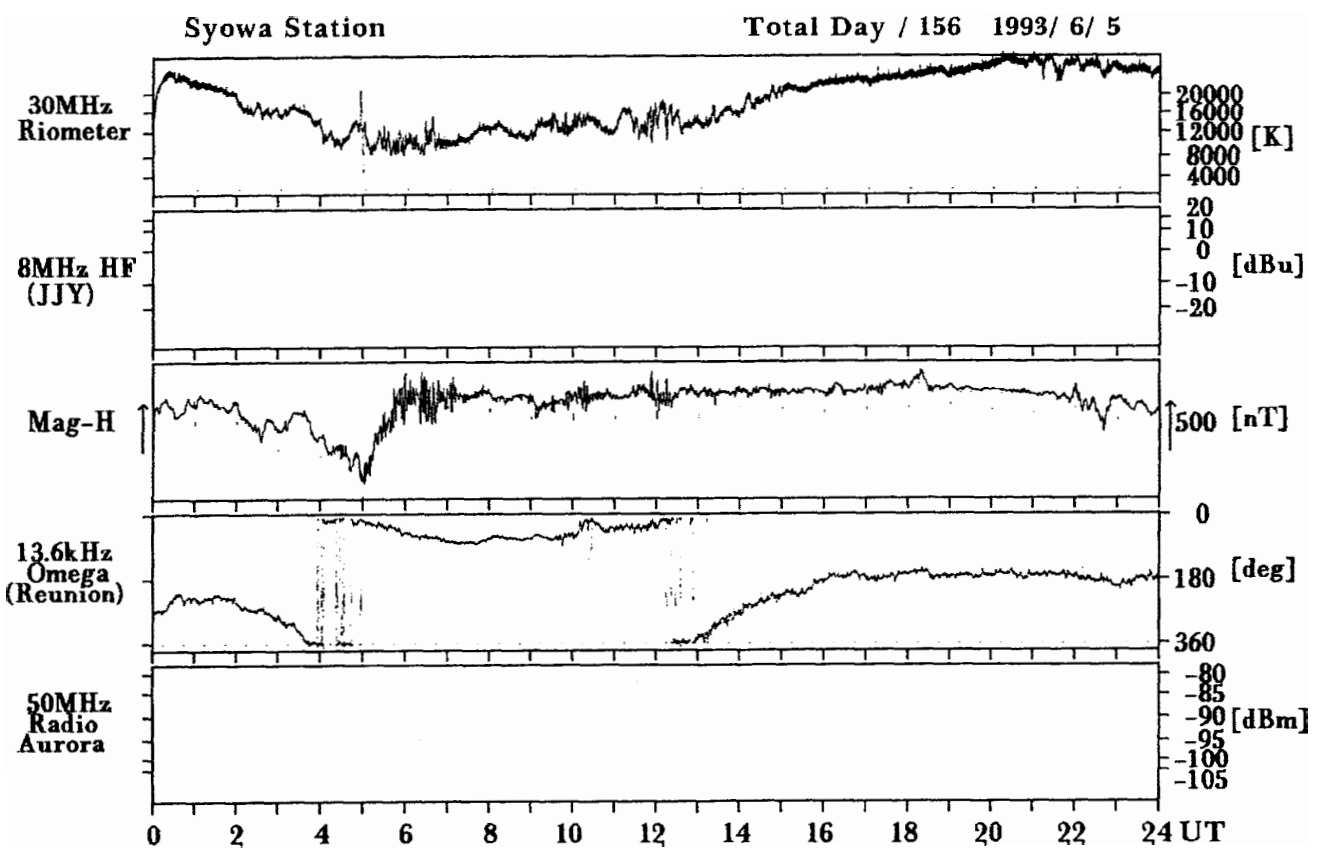
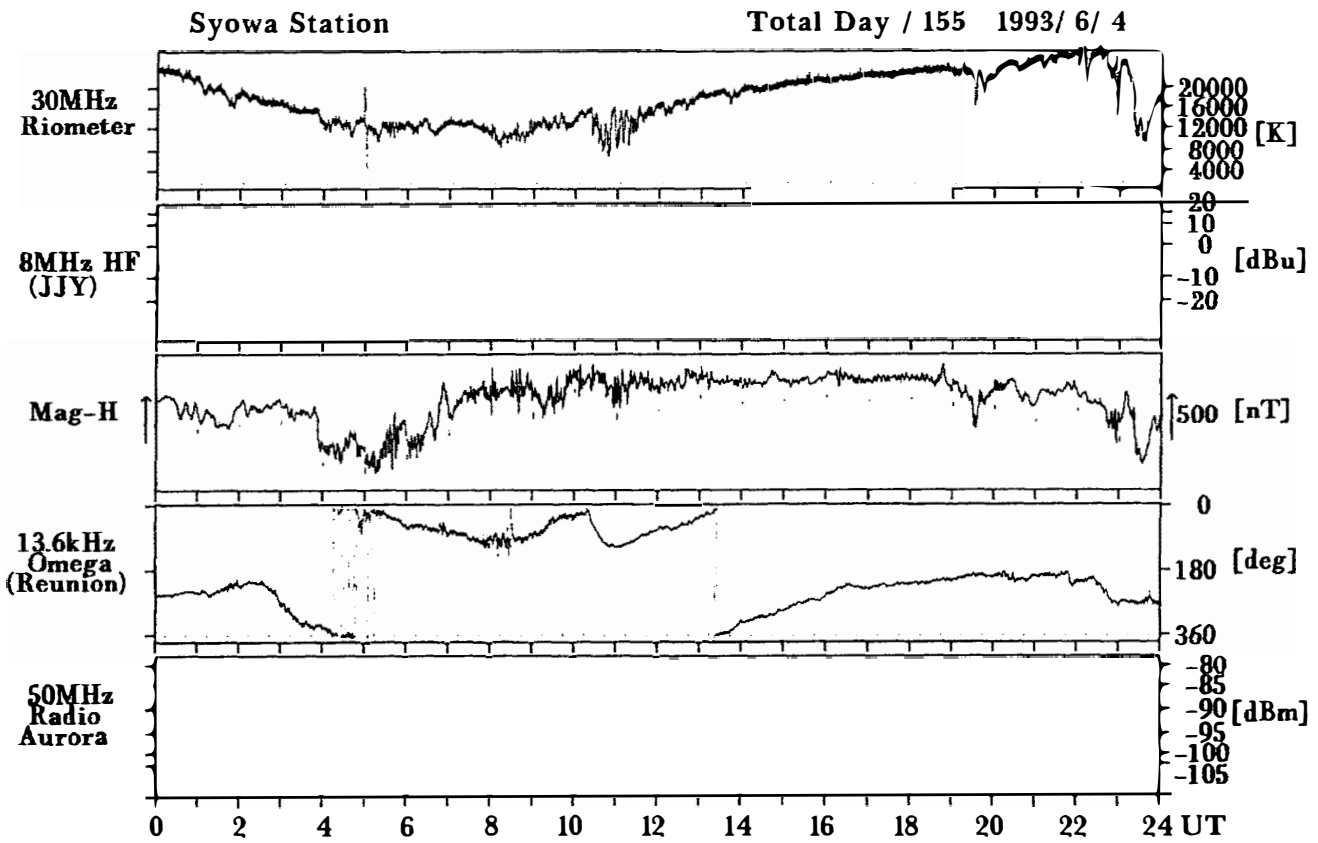


Syowa Station

Total Day / 154 1993/ 6/ 3

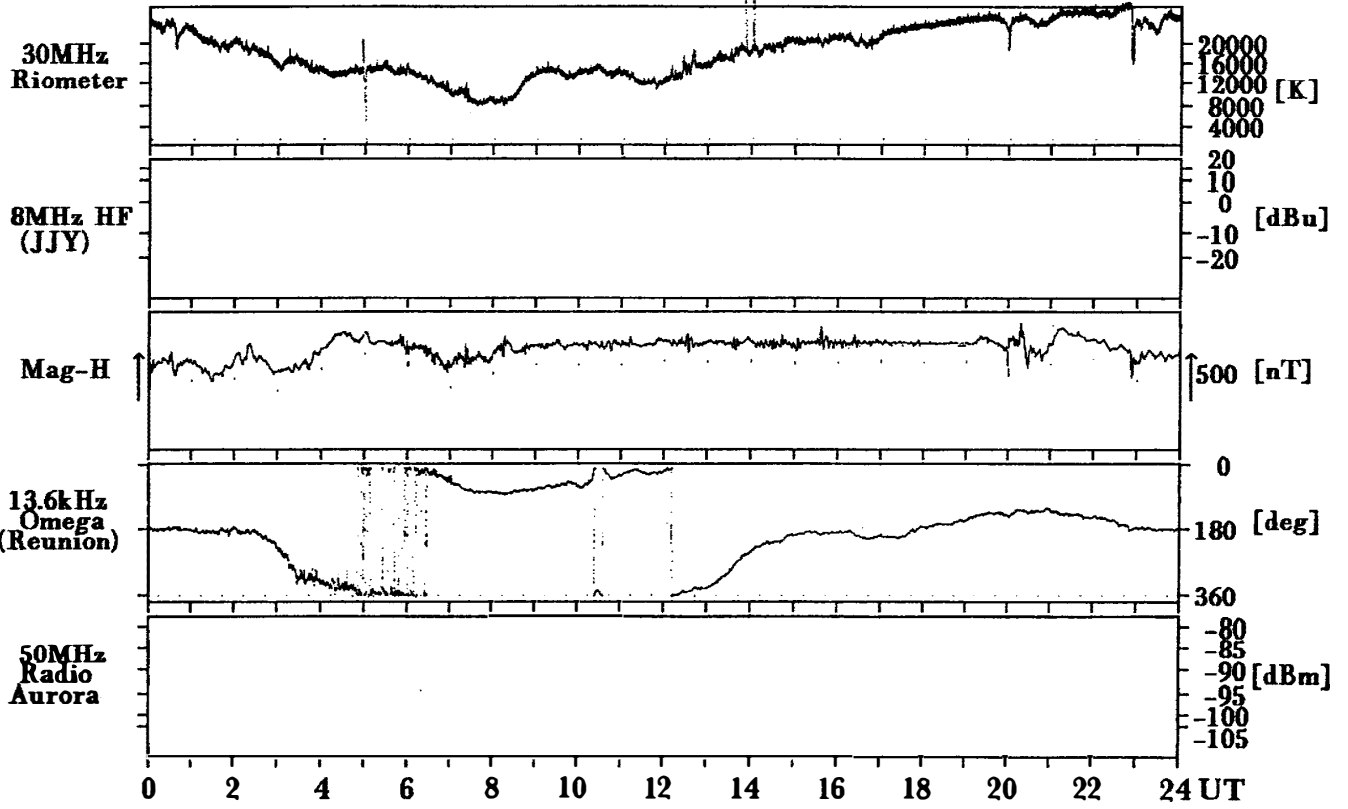






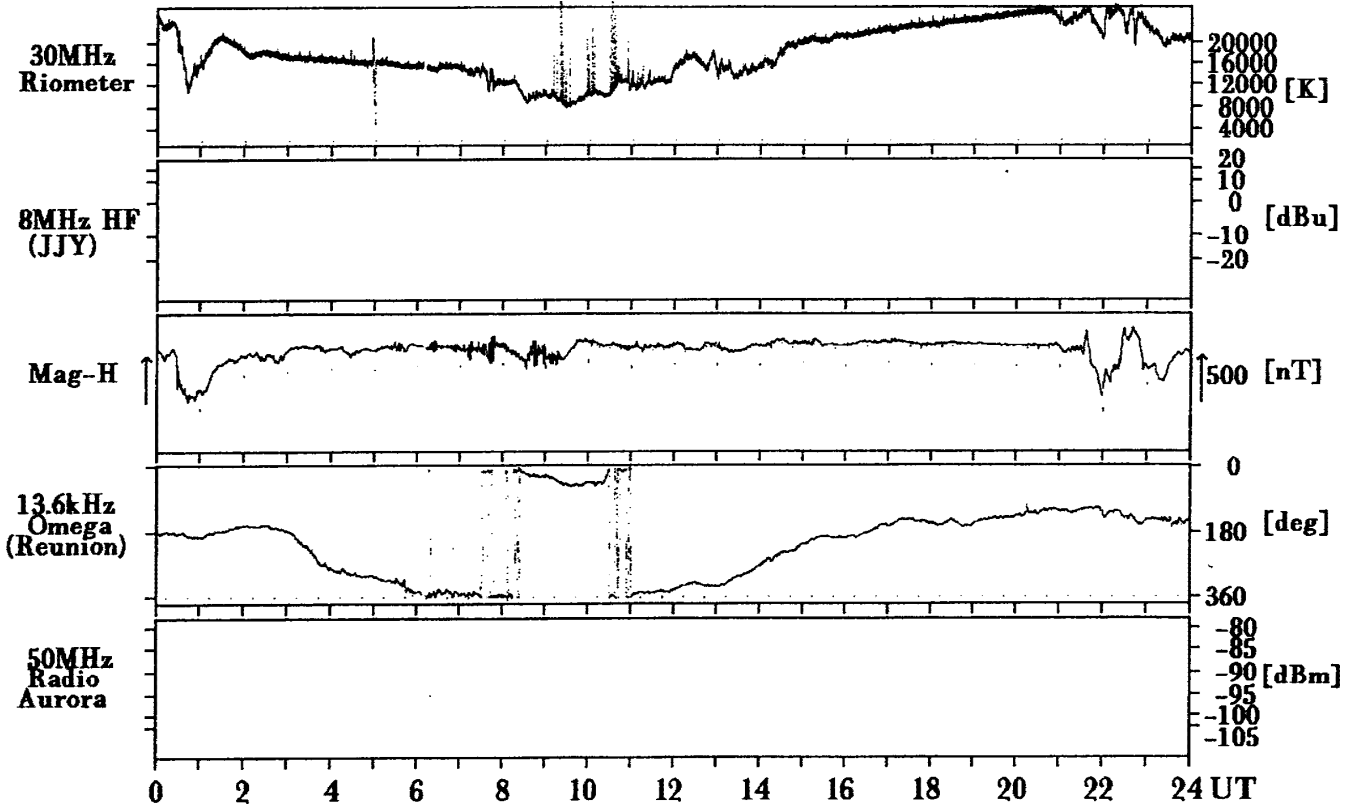
Syowa Station

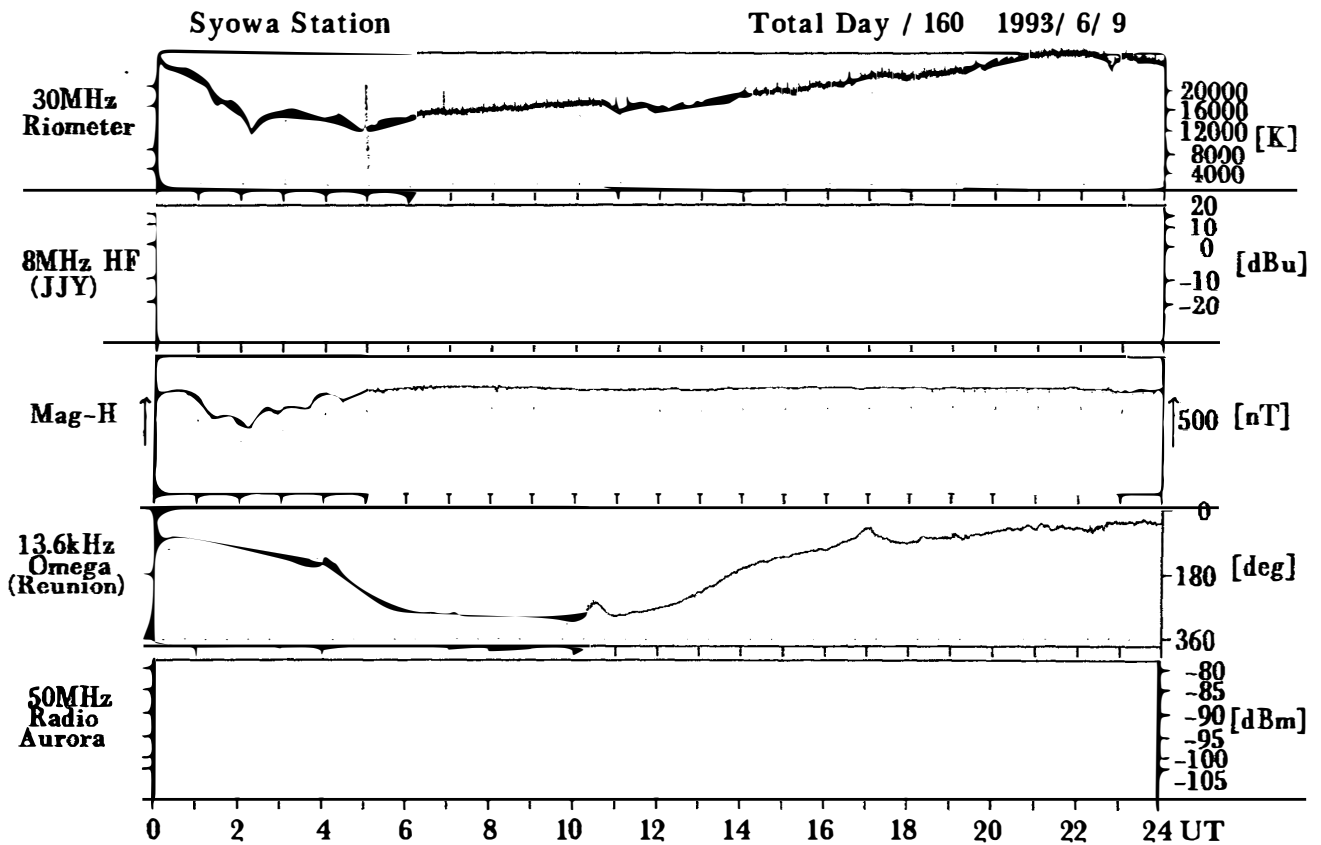
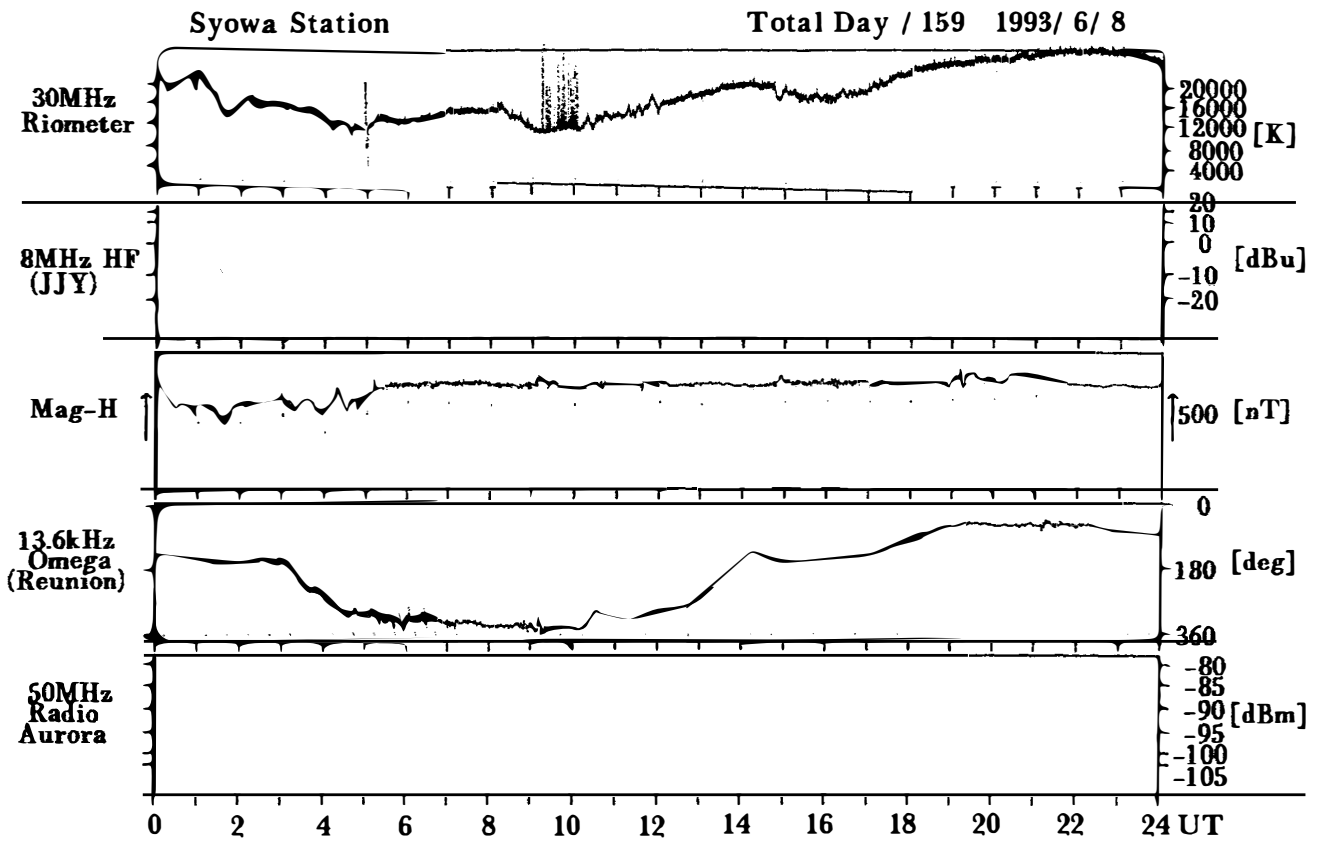
Total Day / 157 1993/ 6/ 6



Syowa Station

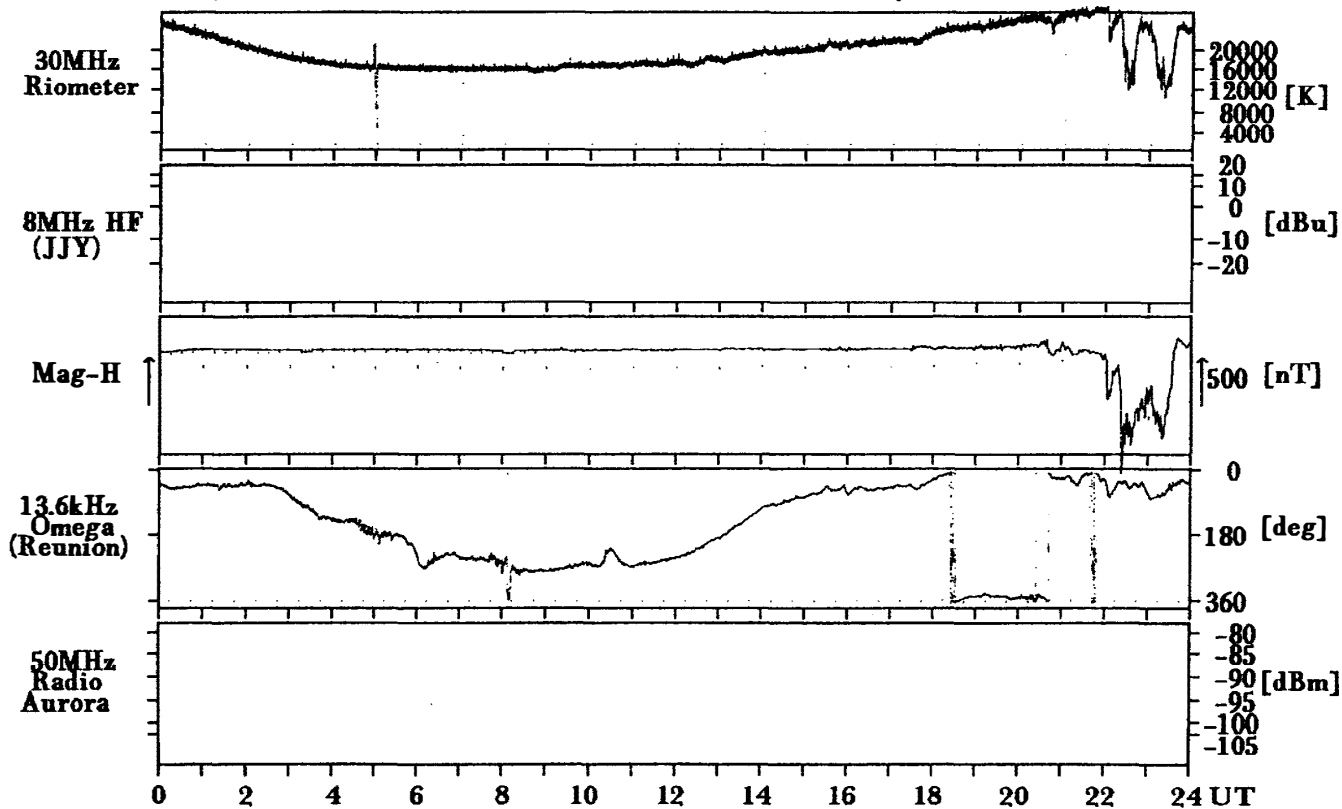
Total Day / 158 1993/ 6/ 7





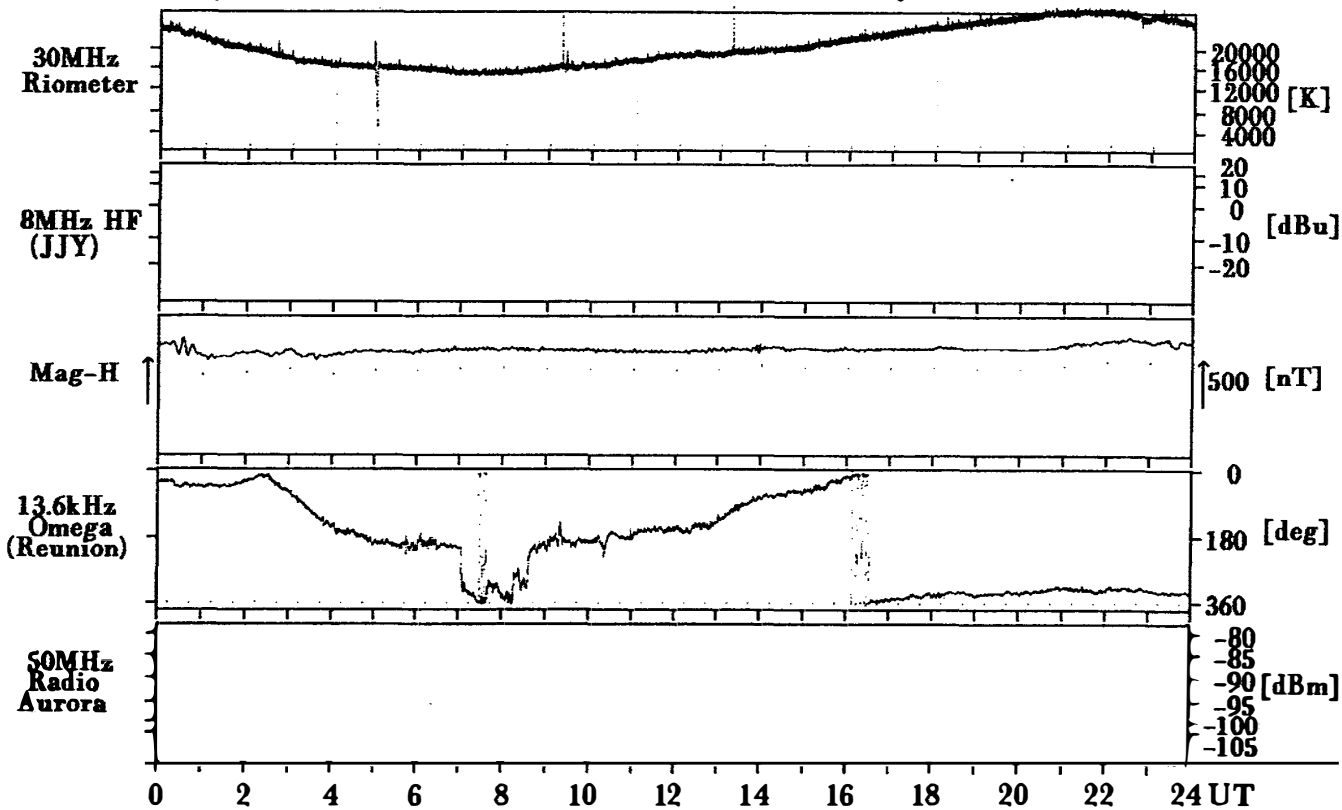
Syowa Station

Total Day / 161 1993/ 6/10



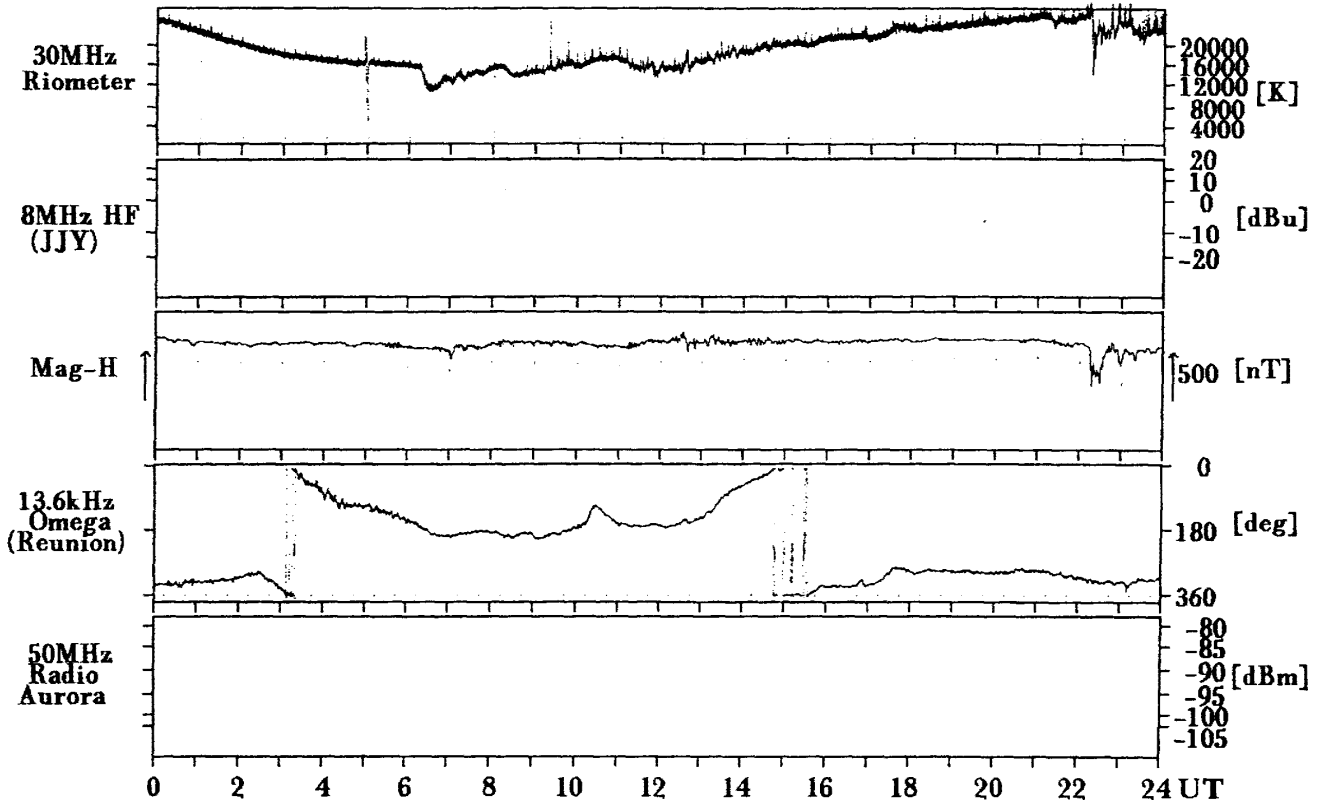
Syowa Station

Total Day / 162 1993/ 6/11



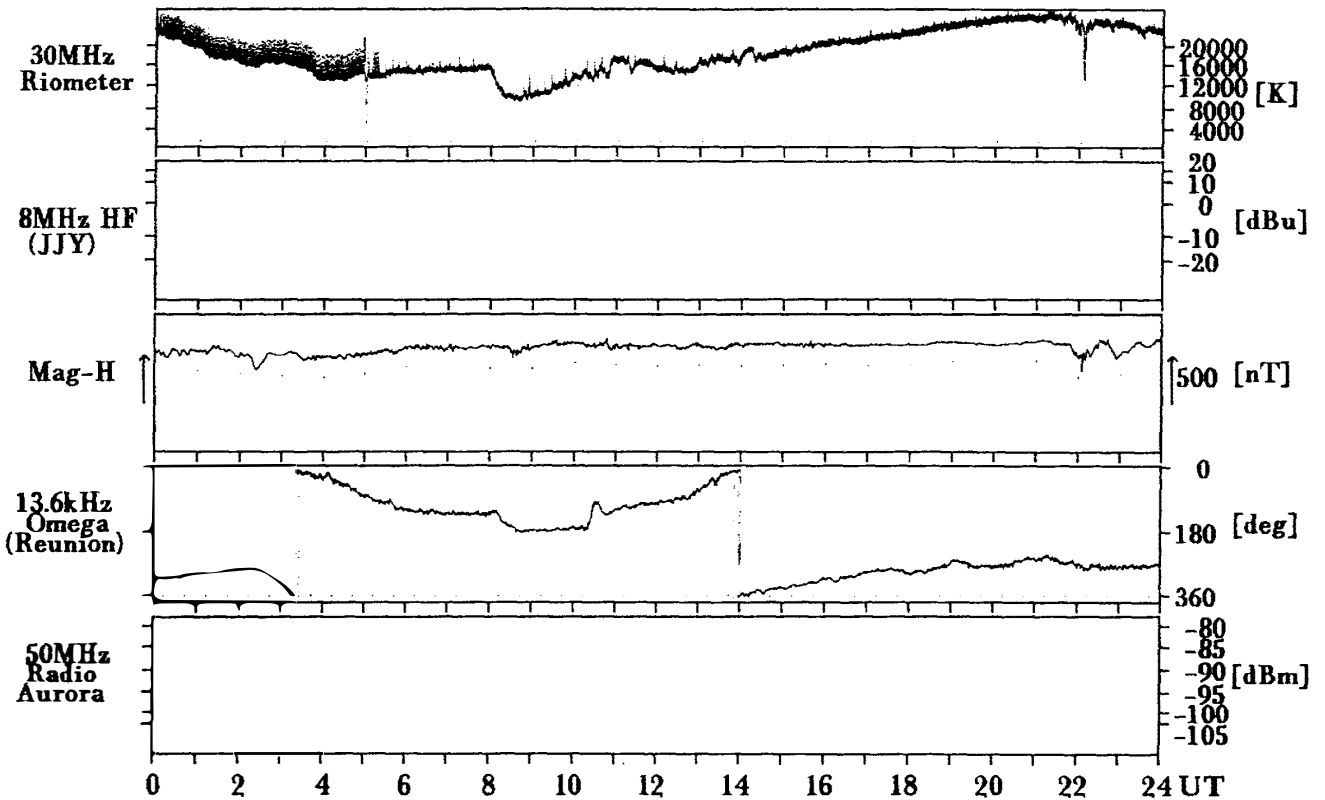
Syowa Station

Total Day / 163 1993/ 6/12



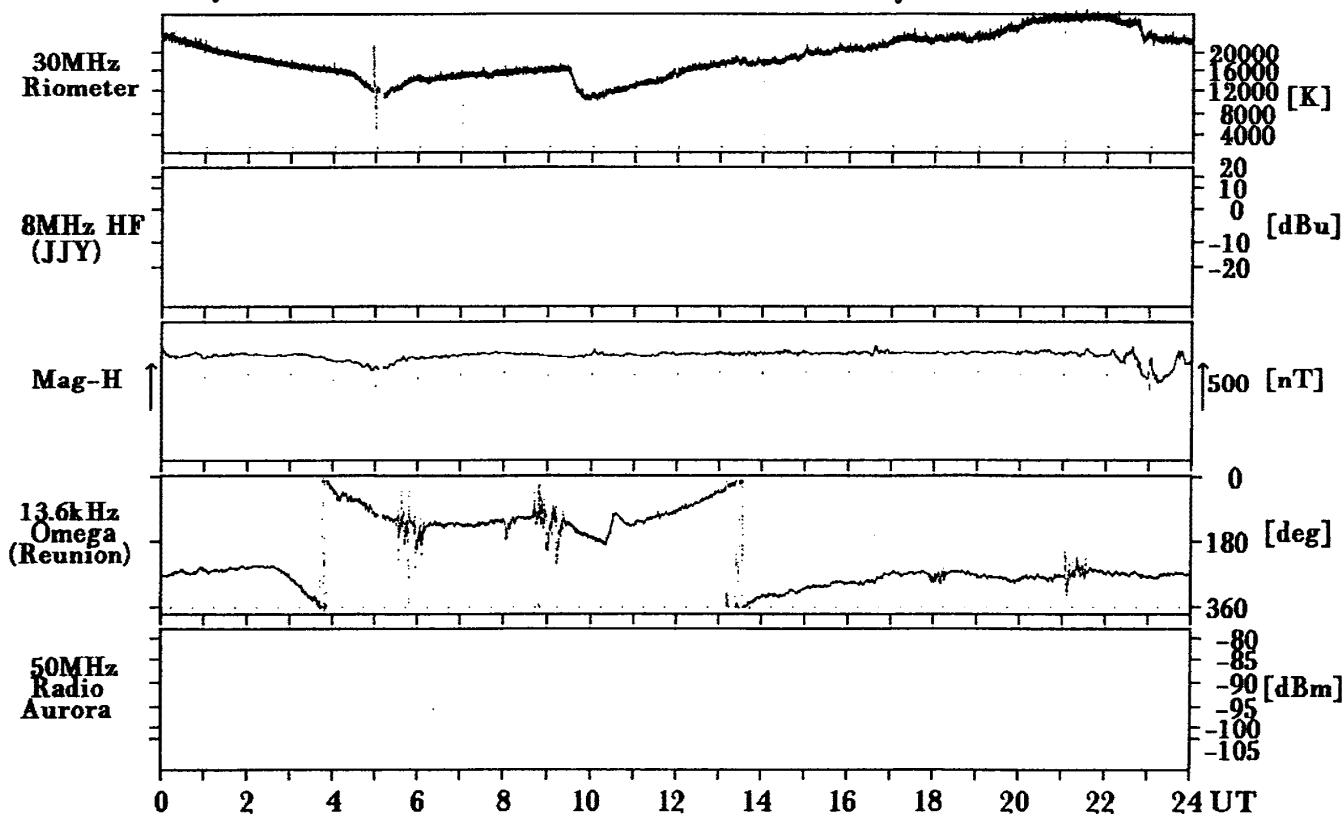
Syowa Station

Total Day / 164 1993/ 6/13



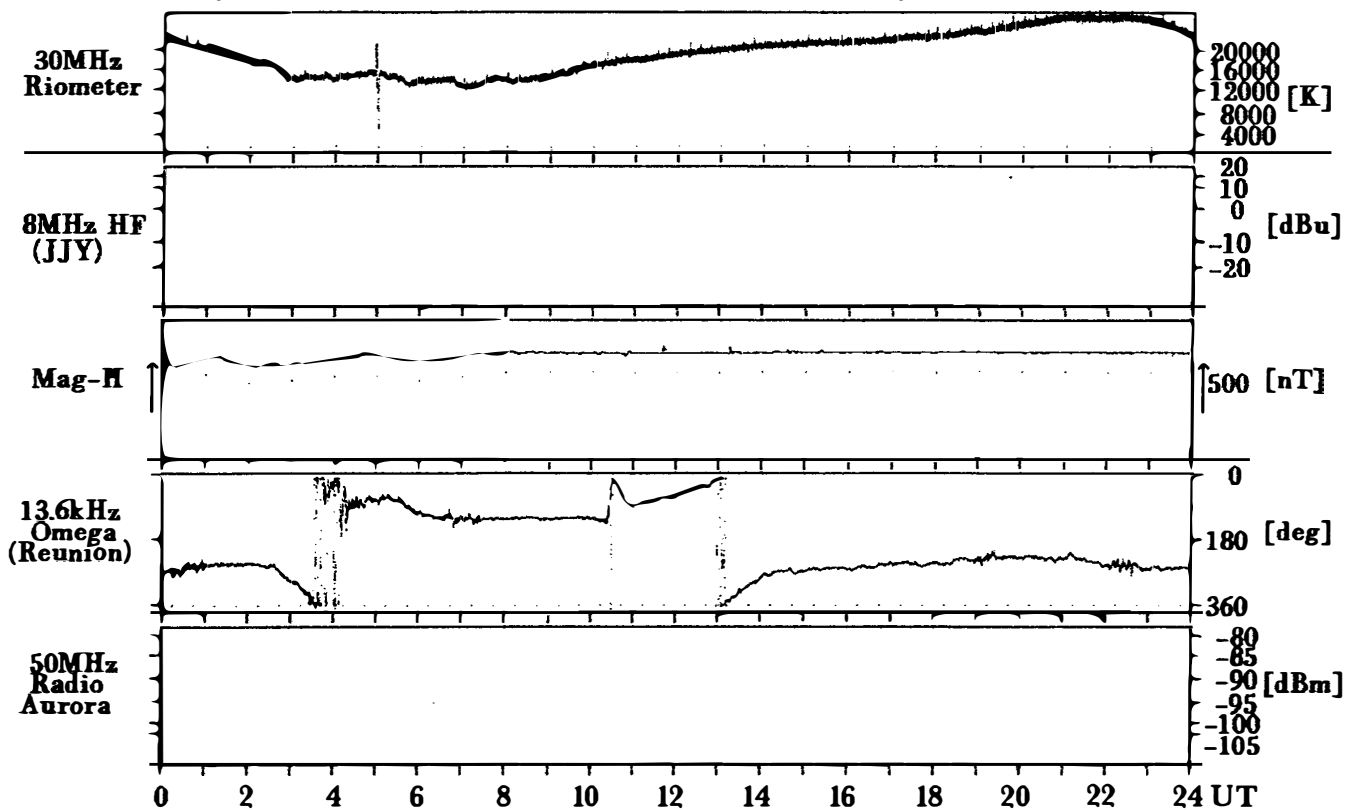
Syowa Station

Total Day / 165 1993/ 6/14



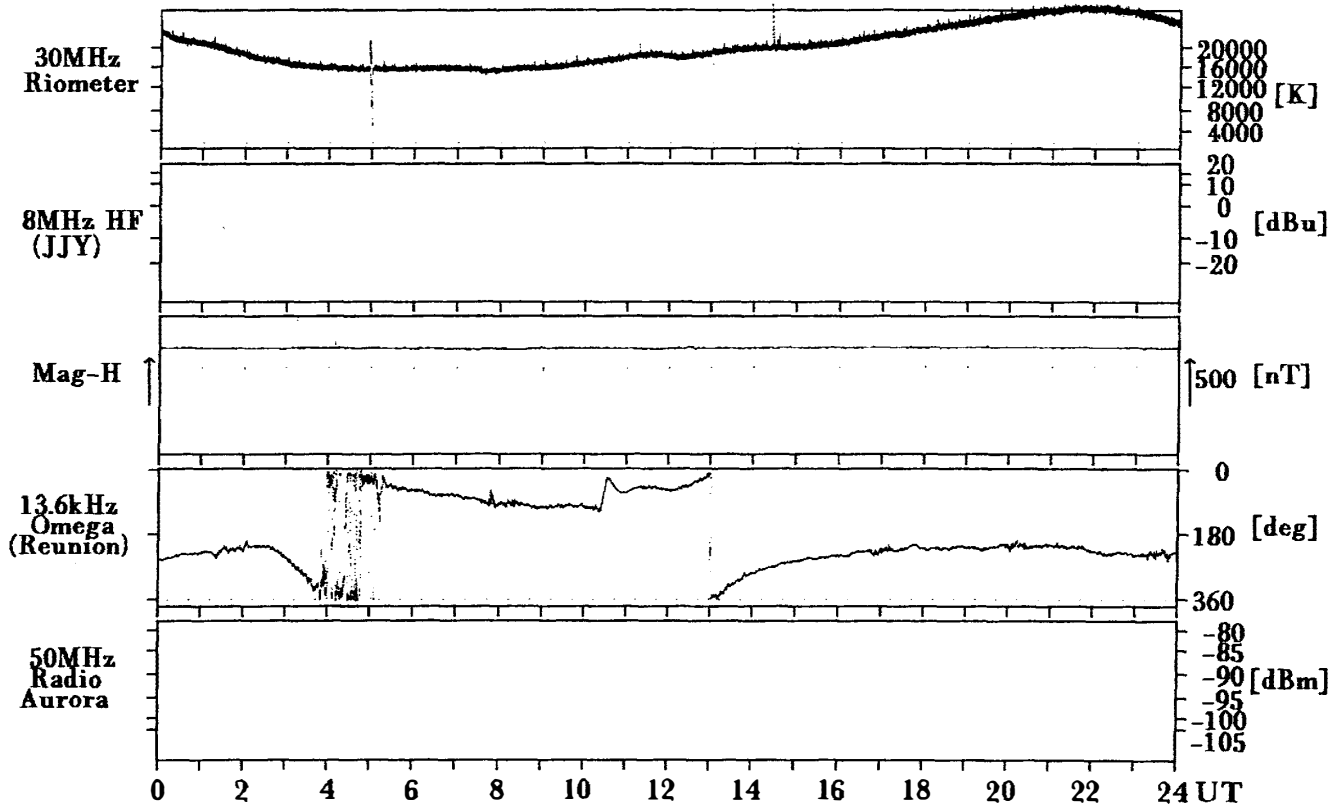
Syowa Station

Total Day / 166 1993/ 6/15



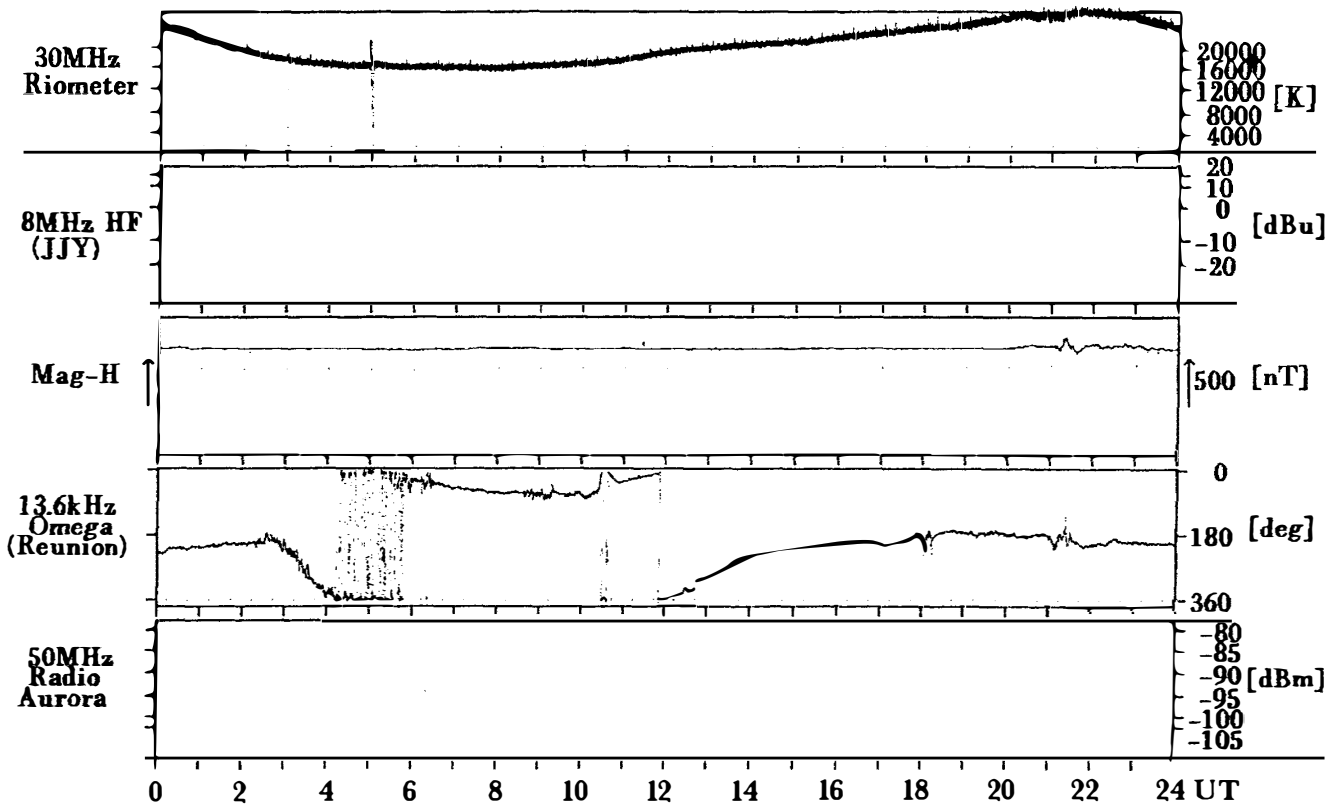
Syowa Station

Total Day / 167 1993/ 6/16



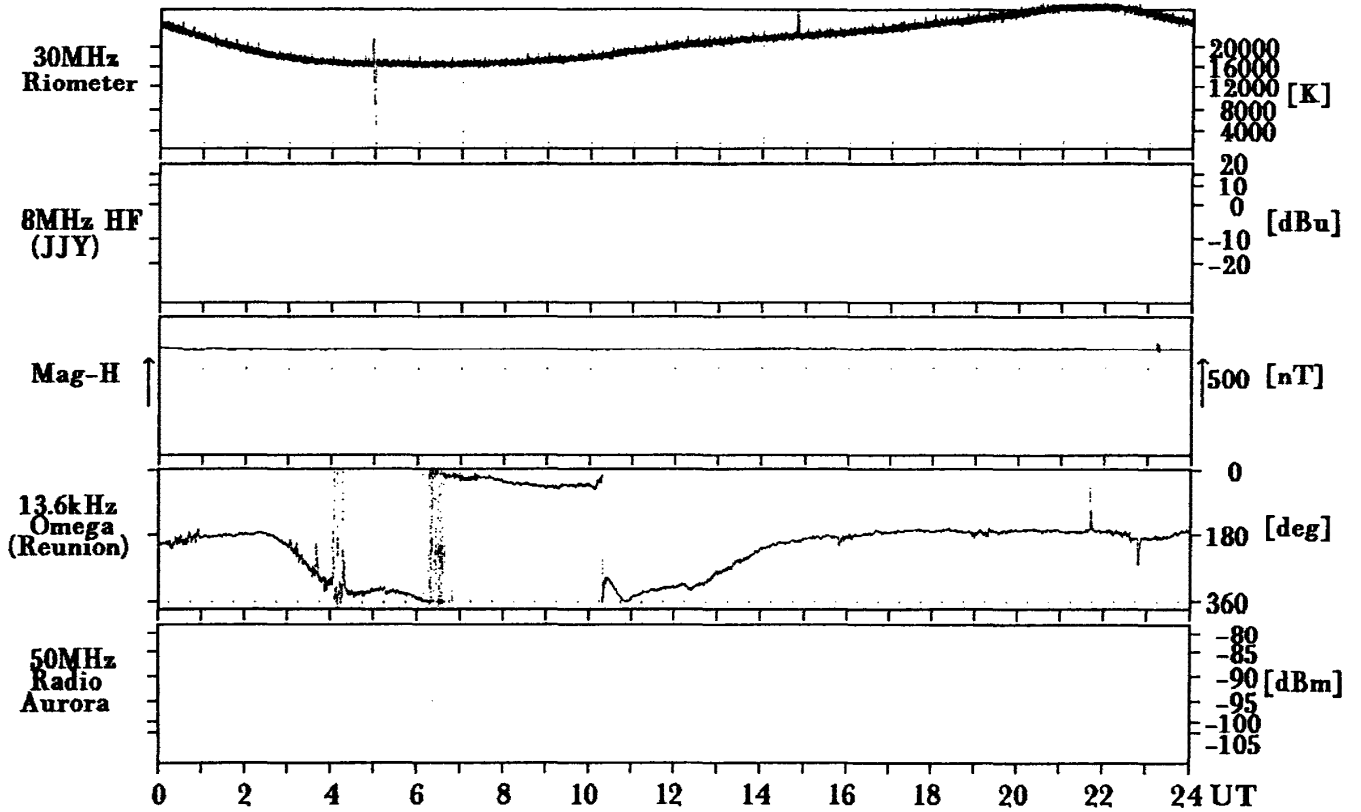
Syowa Station

Total Day / 168 1993/ 6/17



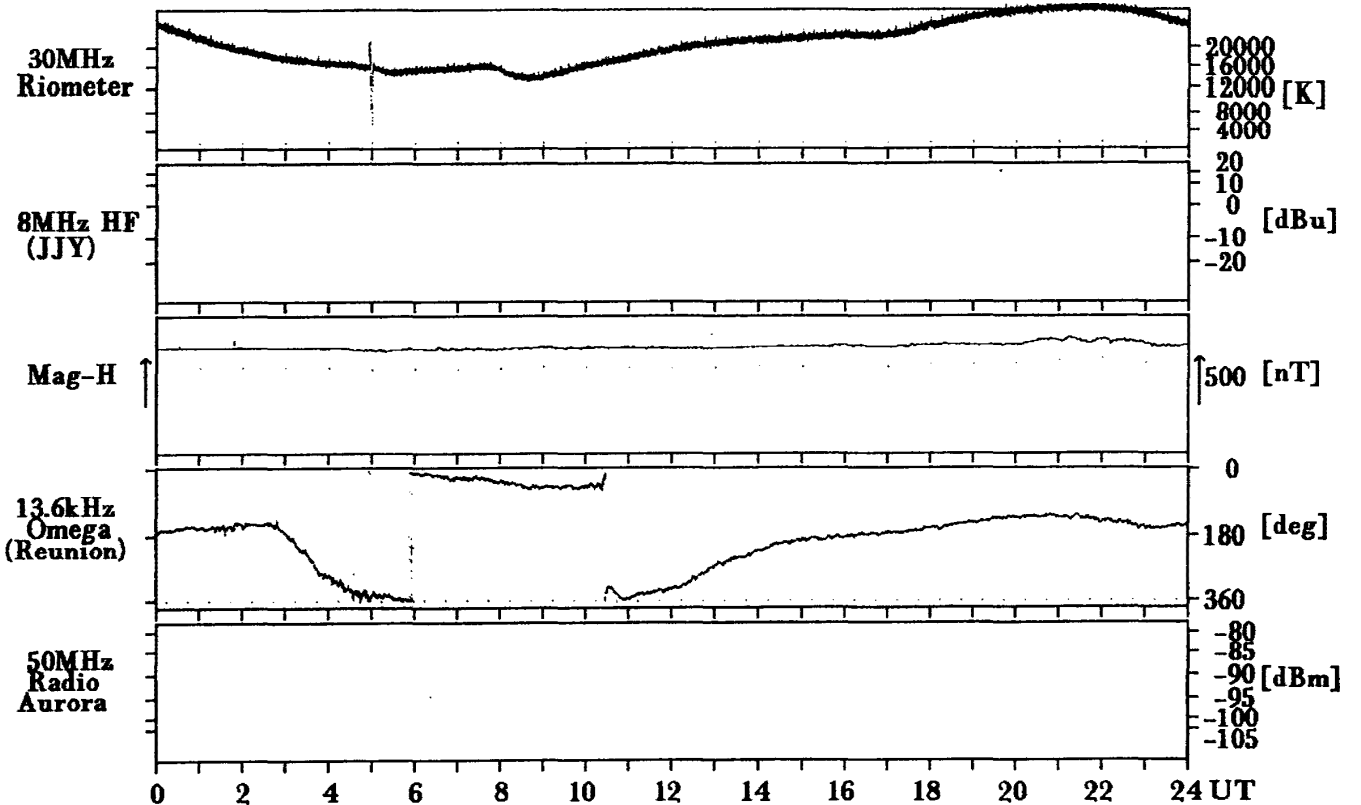
Syowa Station

Total Day / 169 1993/ 6/18



Syowa Station

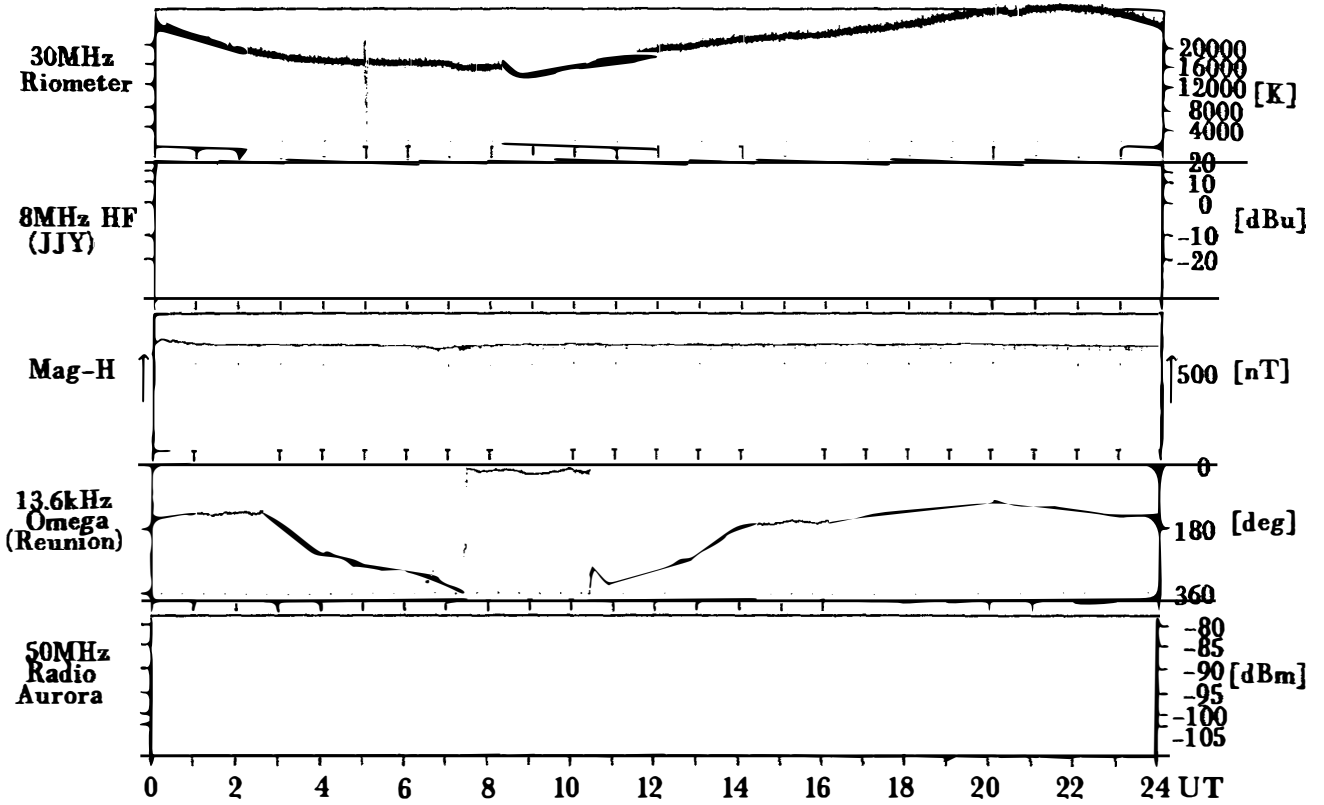
Total Day / 170 1993/ 6/19





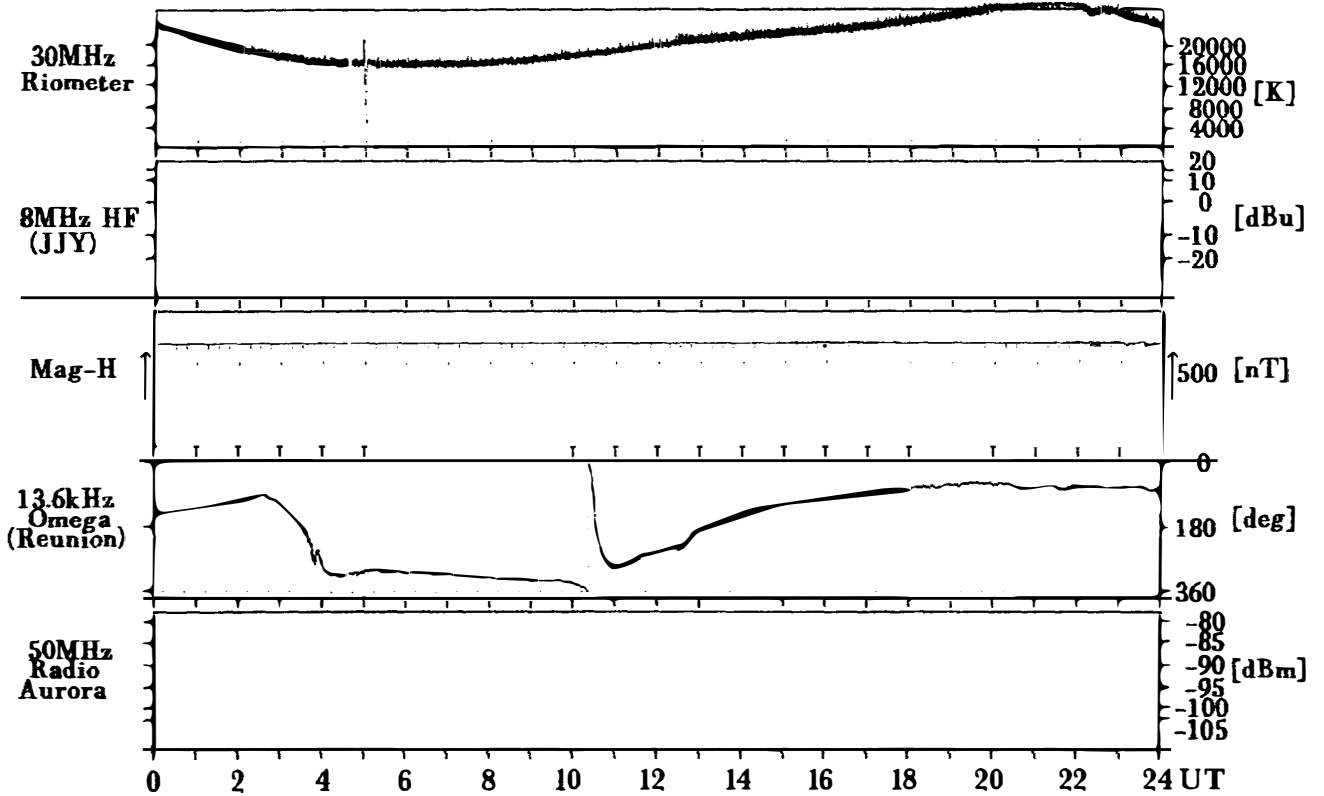
Syowa Station

Total Day / 171 1993/ 6/20



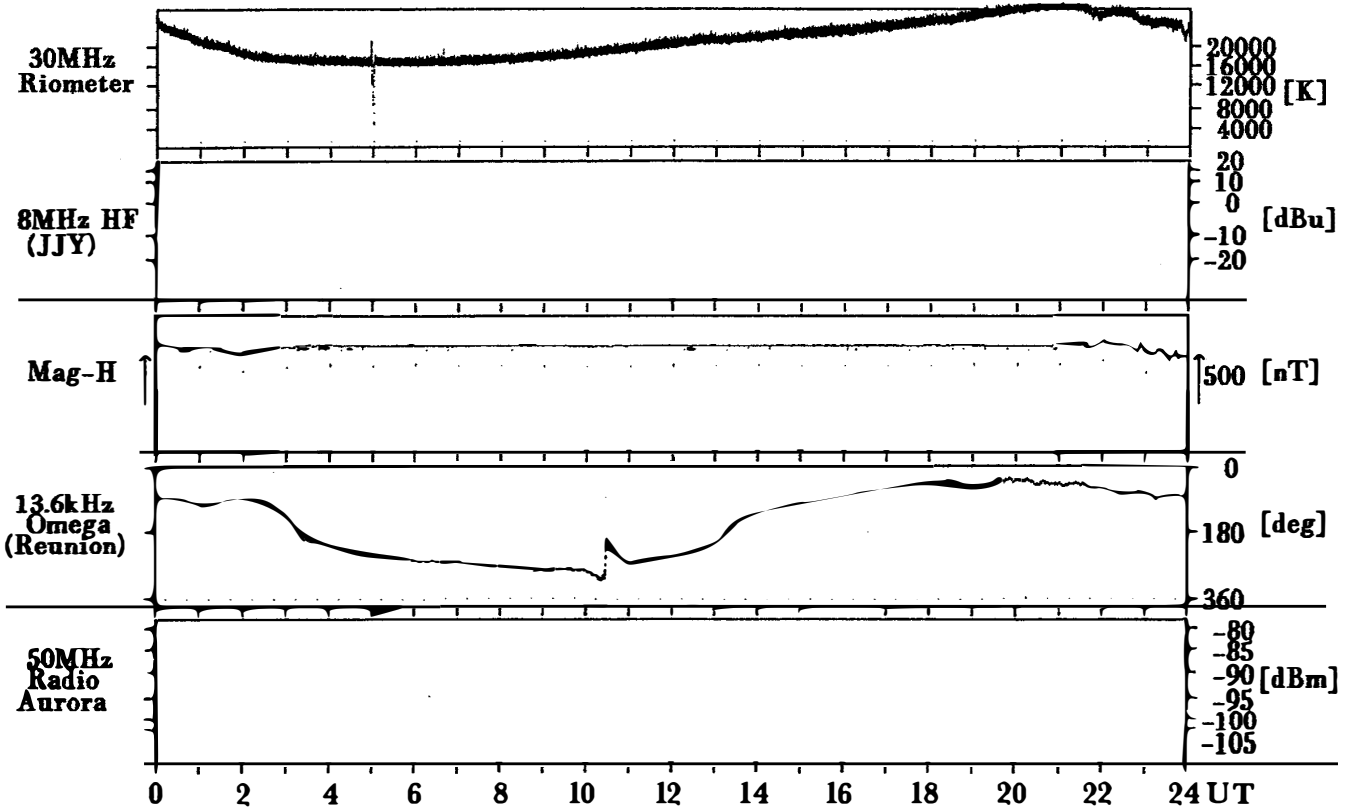
Syowa Station

Total Day / 172 1993/ 6/21



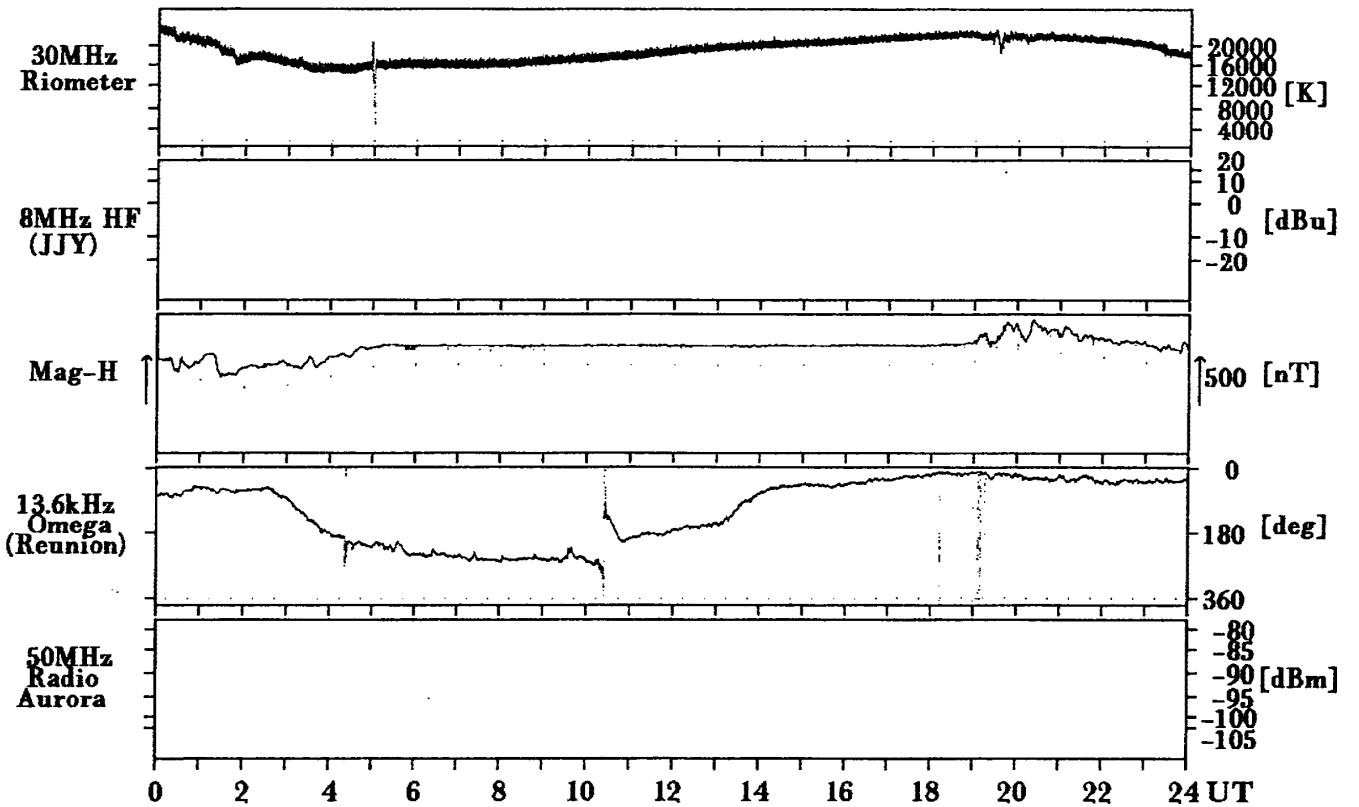
Syowa Station

Total Day / 173 1993/ 6/22



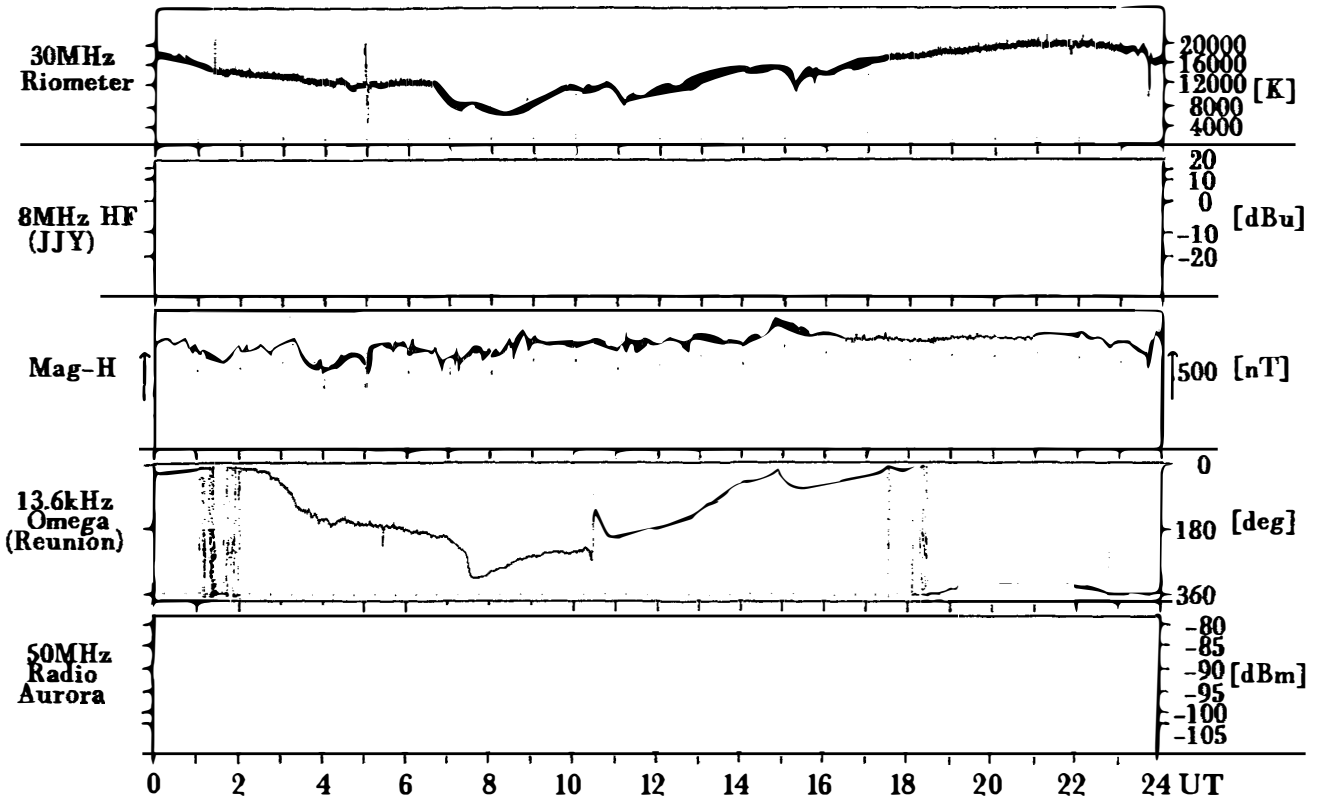
Syowa Station

Total Day / 174 1993/ 6/23



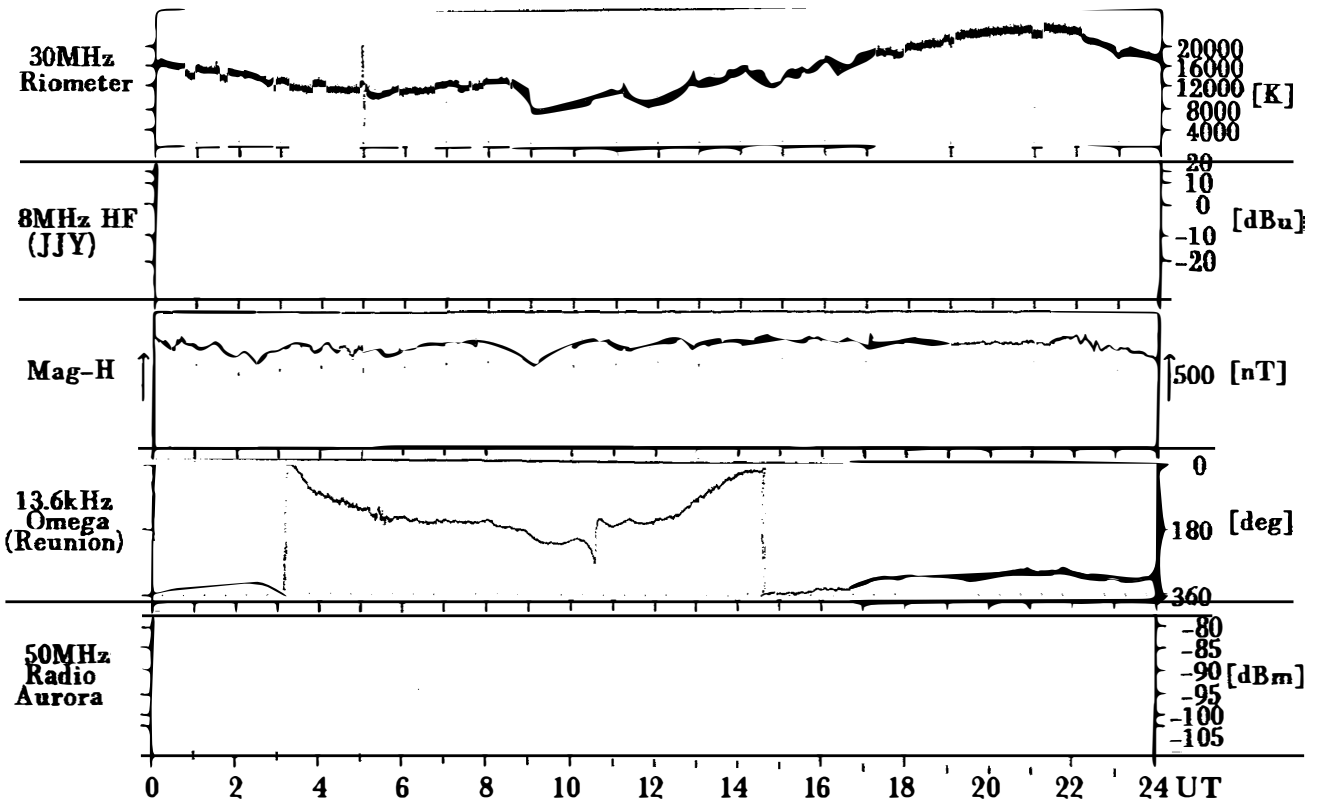
Syowa Station

Total Day / 175 1993/ 6/24



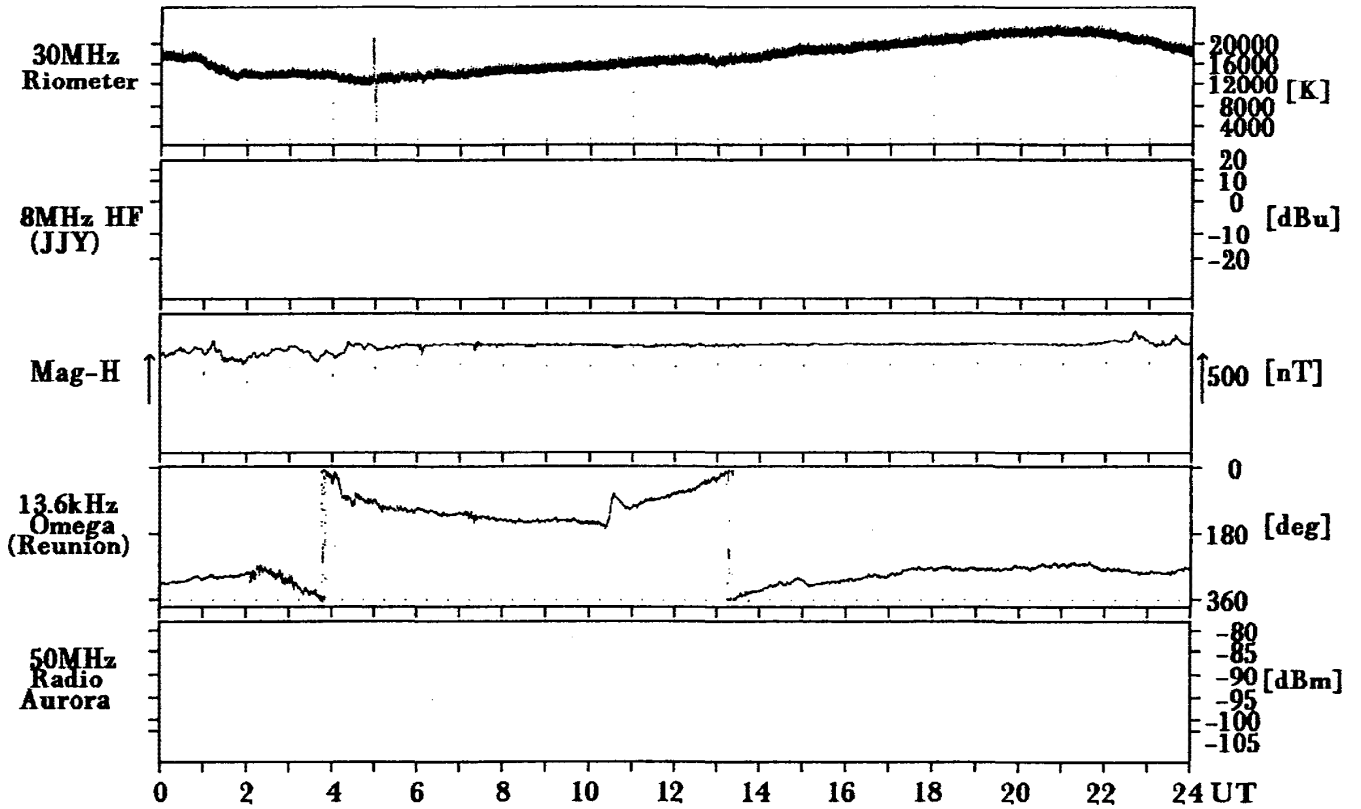
Syowa Station

Total Day / 176 1993/ 6/25



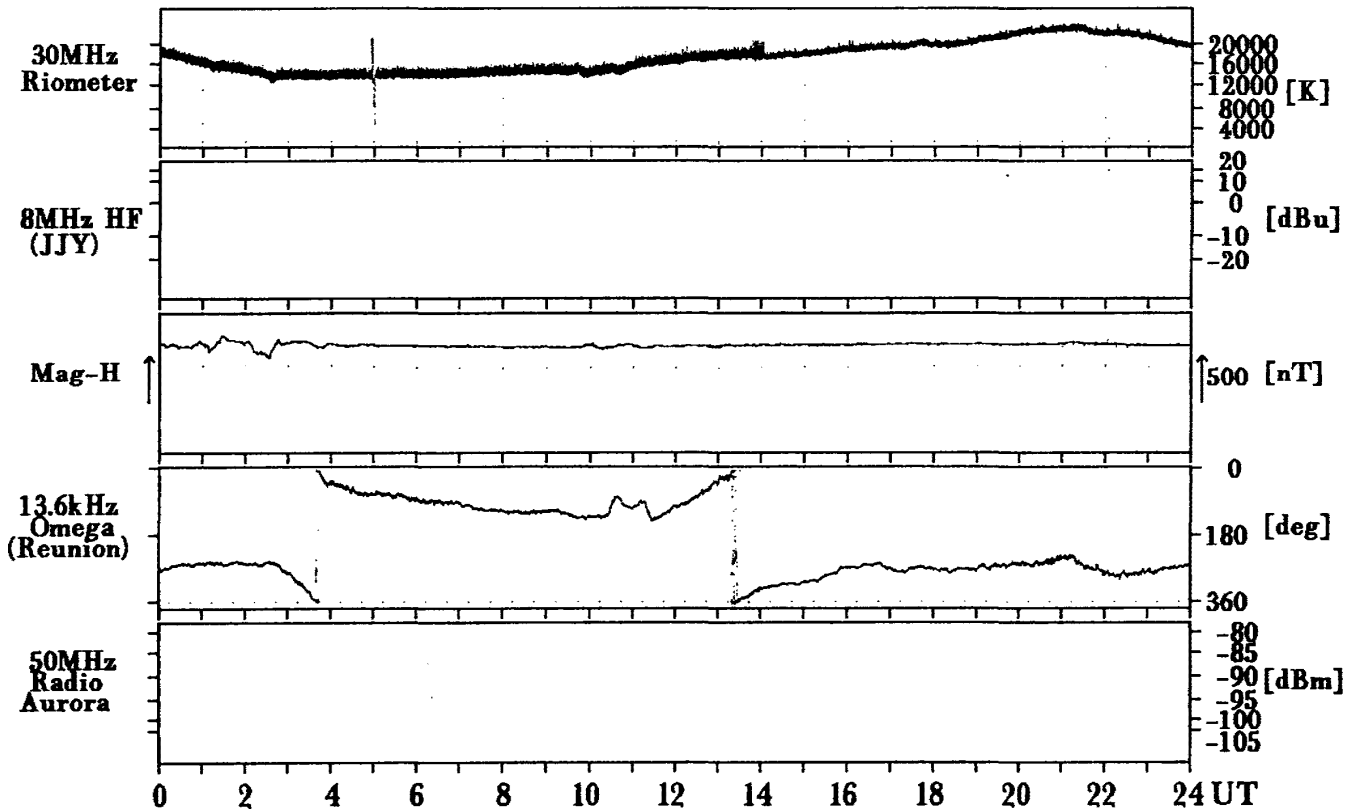
Syowa Station

Total Day / 177 1993/ 6/26



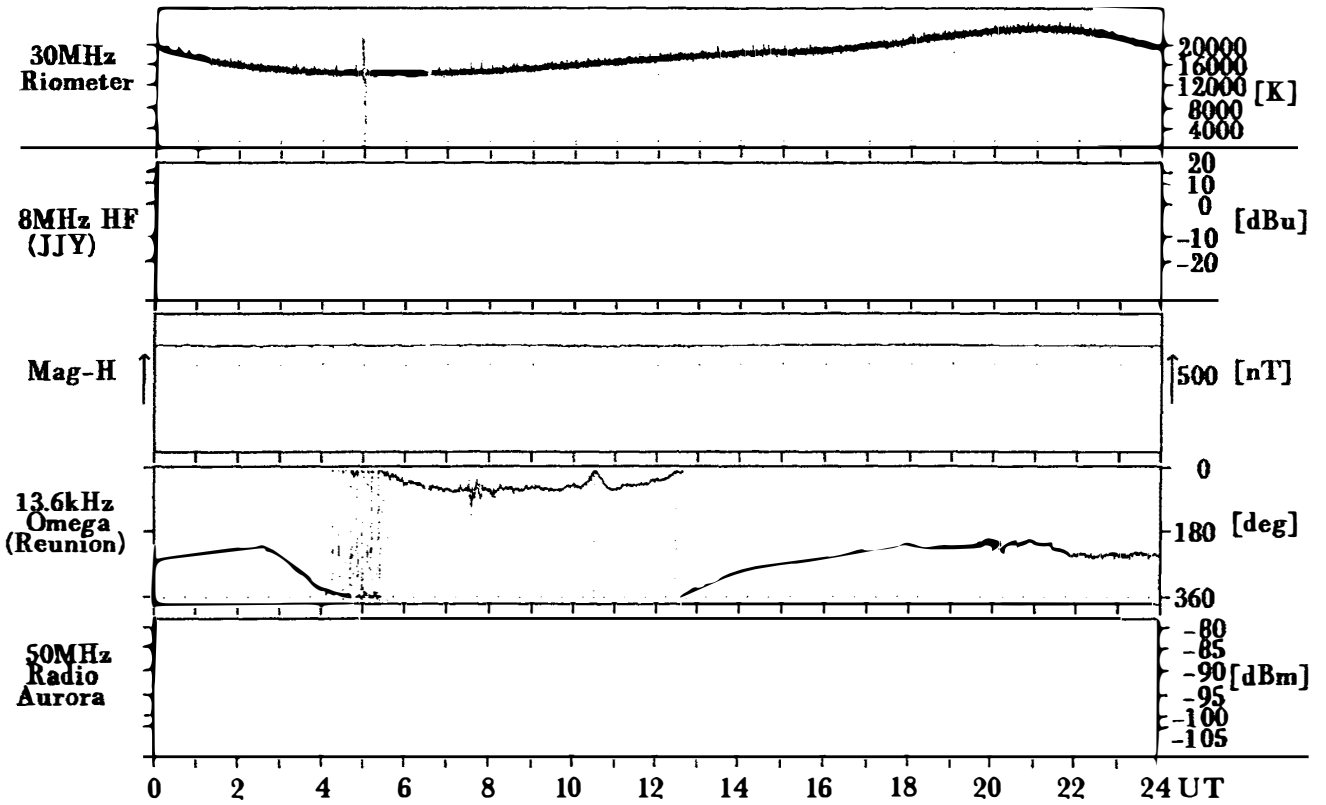
Syowa Station

Total Day / 178 1993/ 6/27



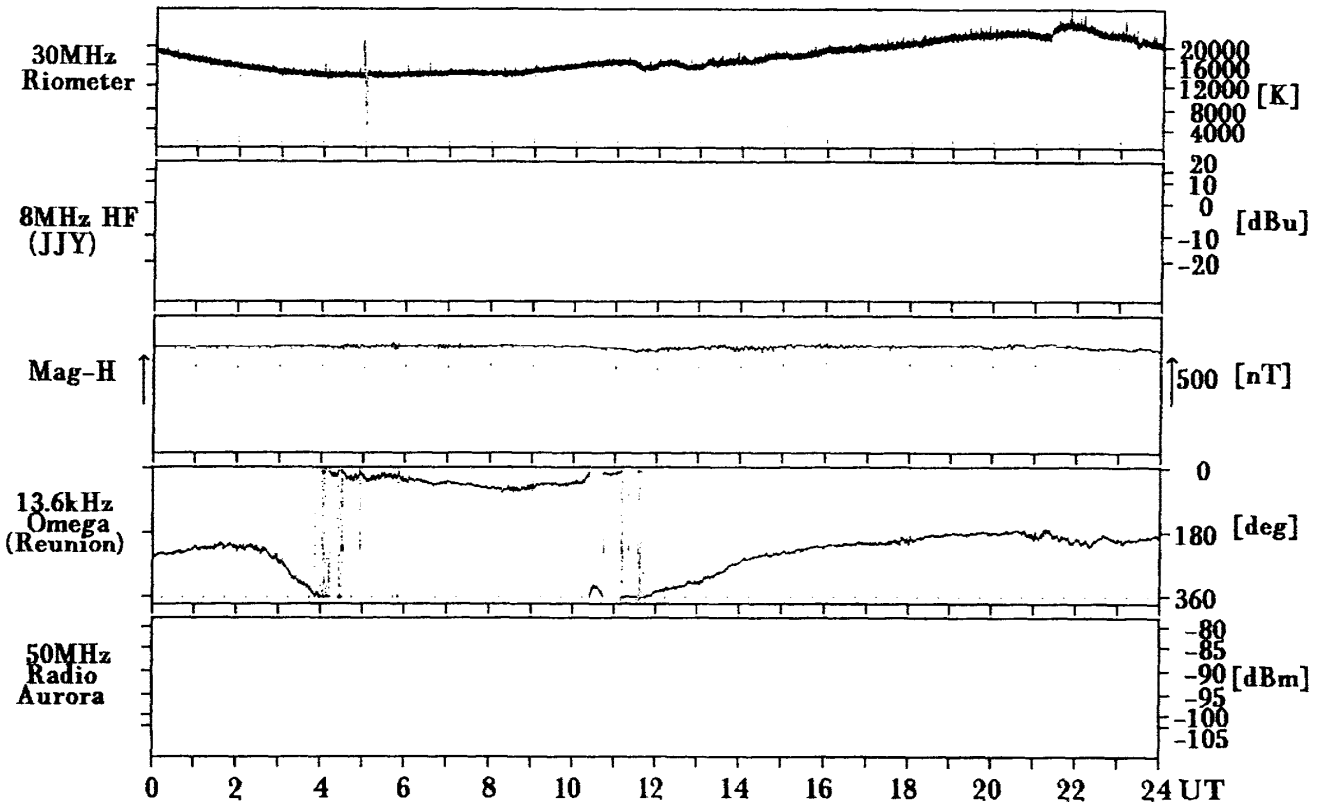
Syowa Station

Total Day / 179 1993/ 6/28



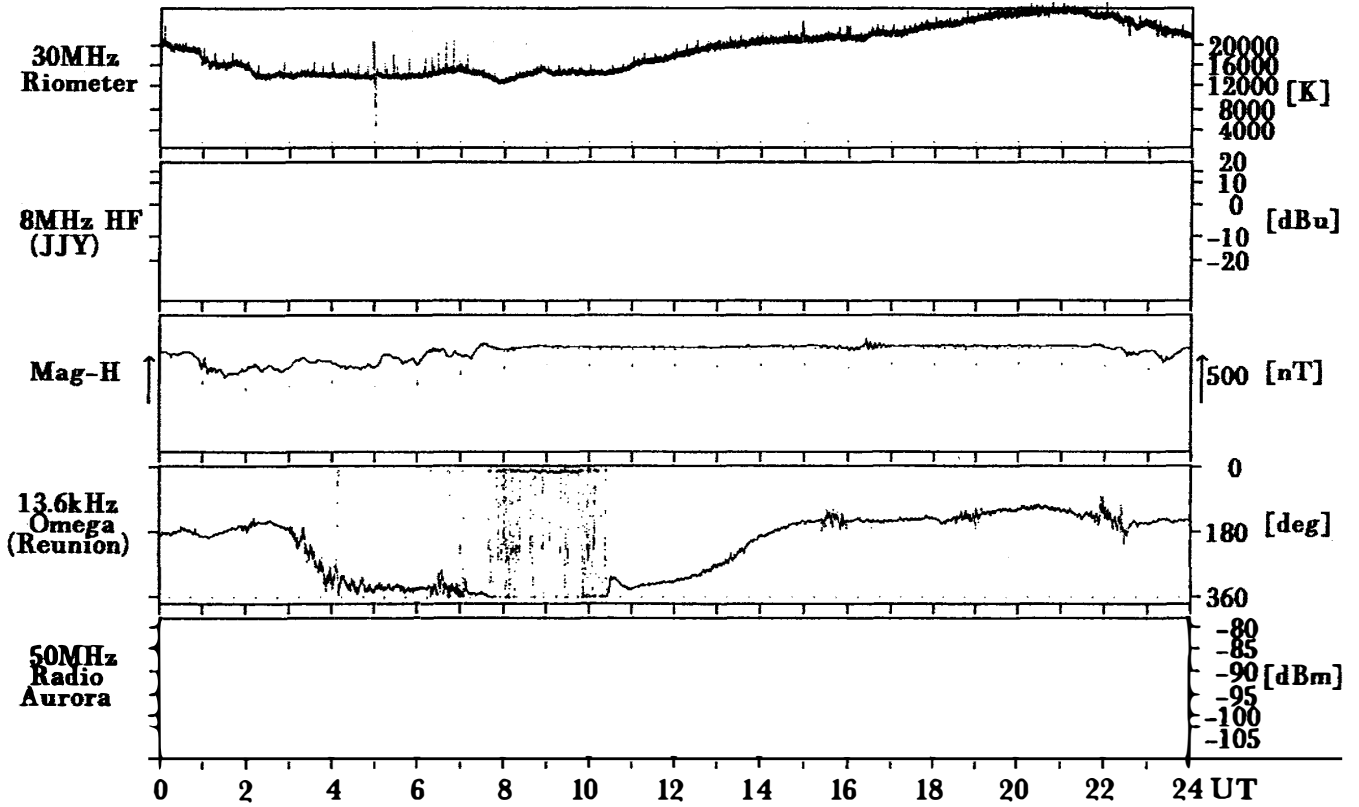
Syowa Station

Total Day / 180 1993/ 6/29



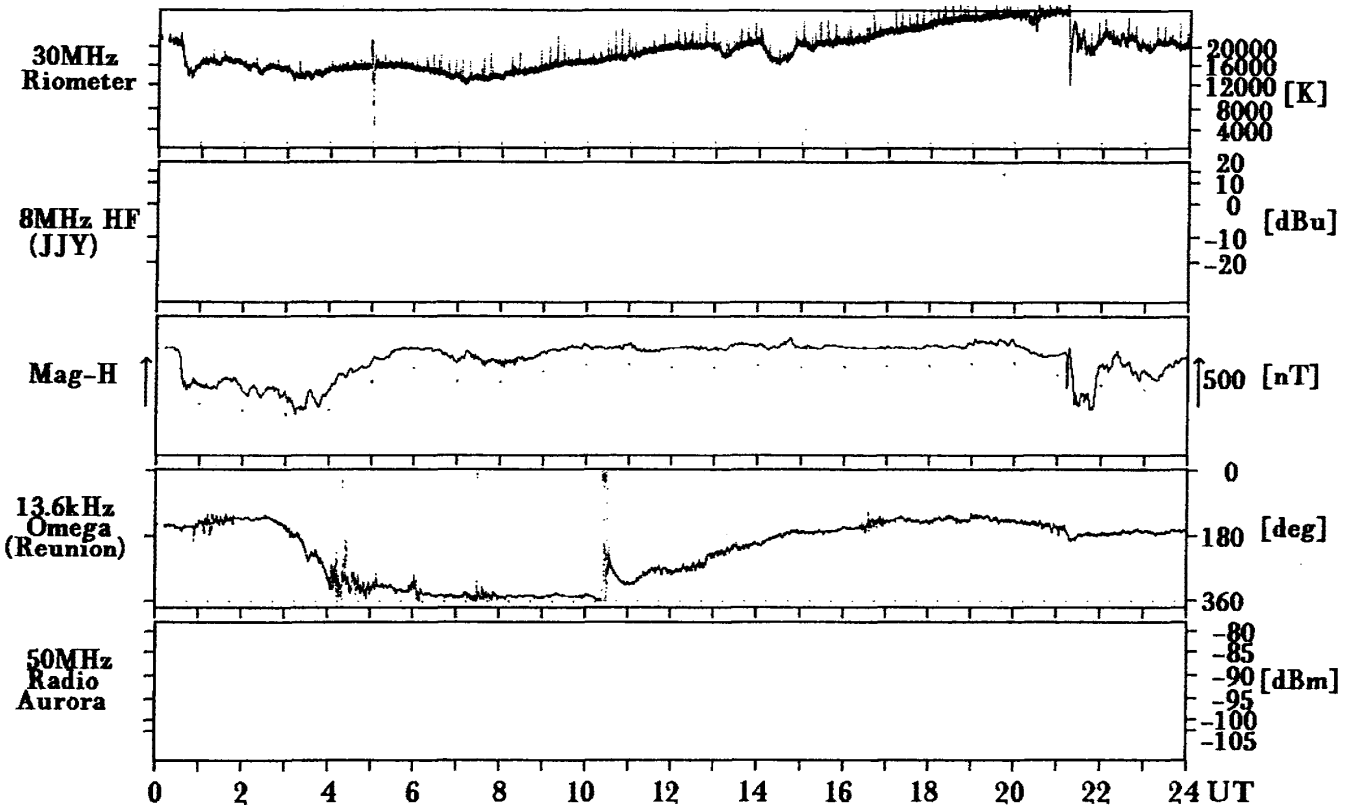
Syowa Station

Total Day / 181 1993/ 6/30



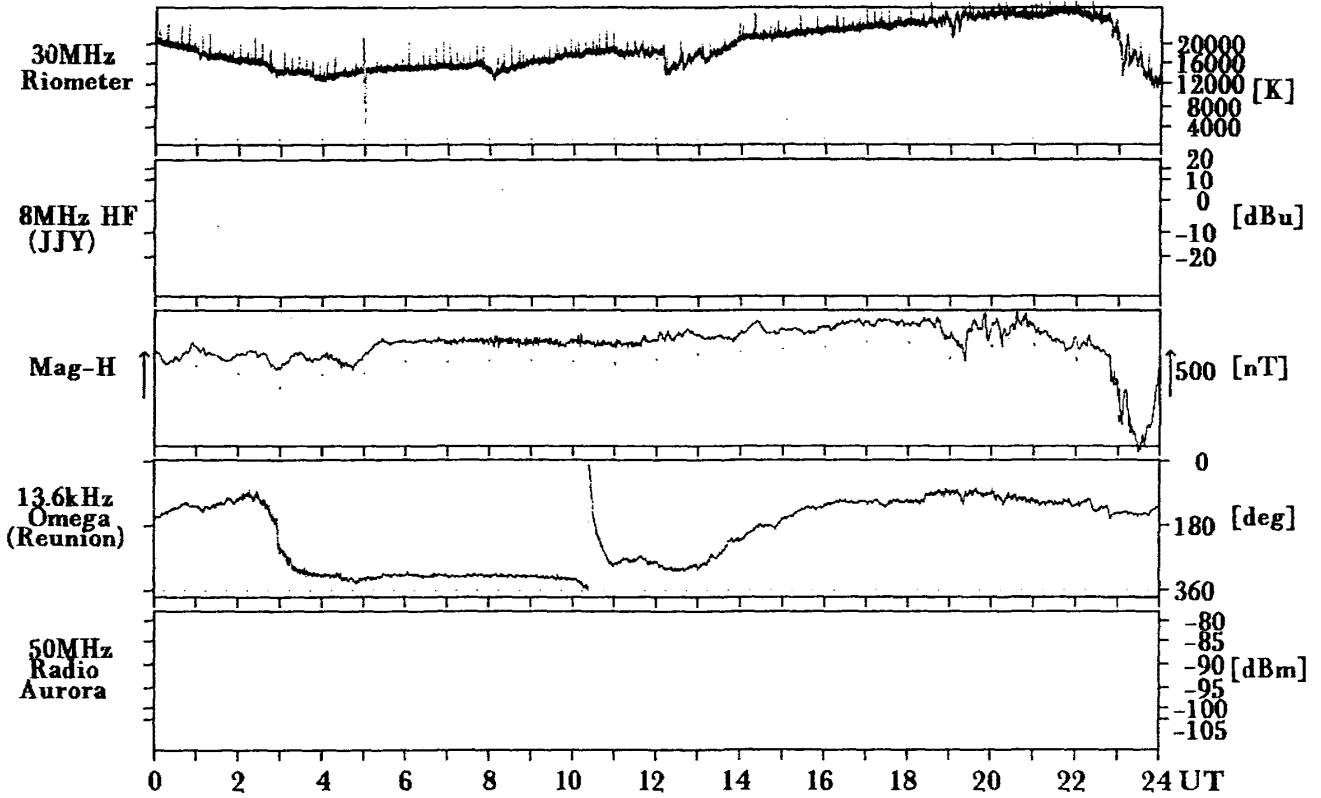
Syowa Station

Total Day / 182 1993/ 7/ 1



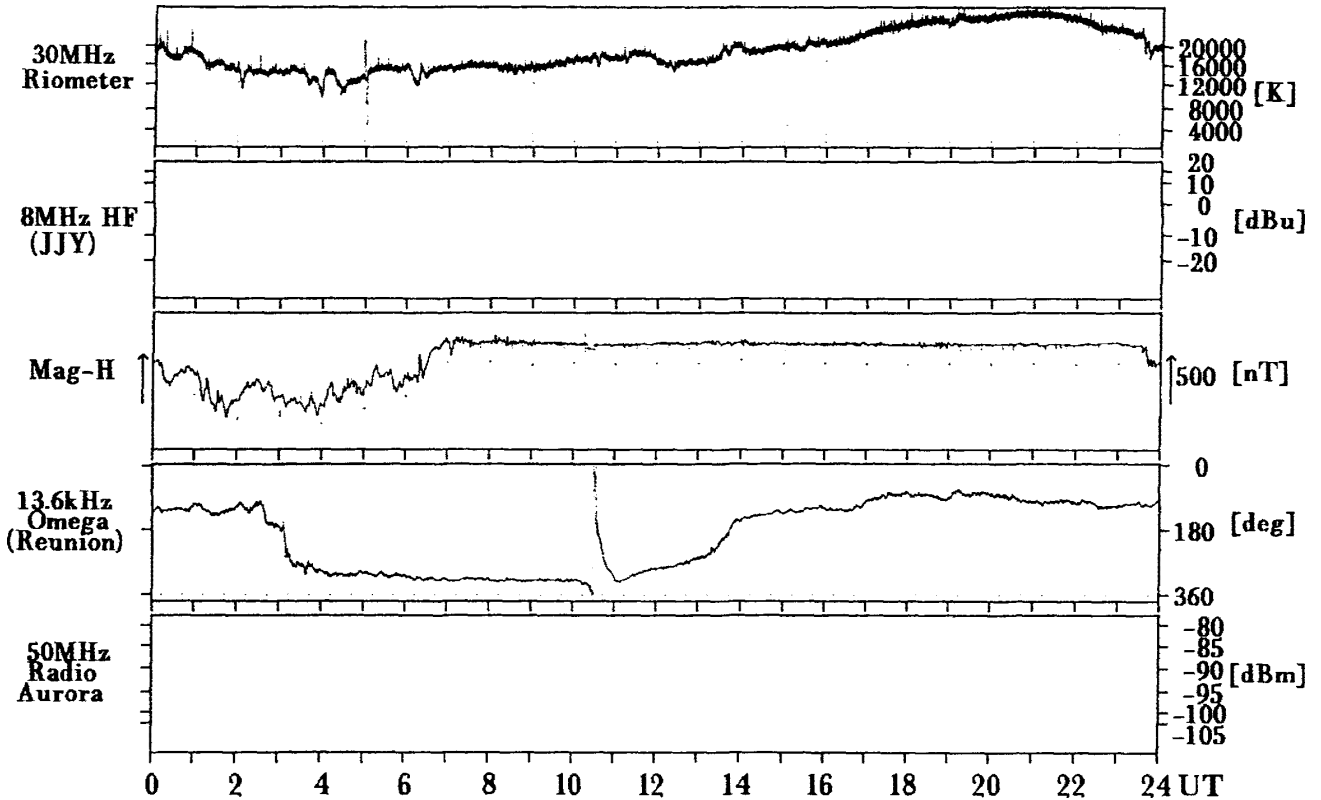
Syowa Station

Total Day / 183 1993/ 7/ 2



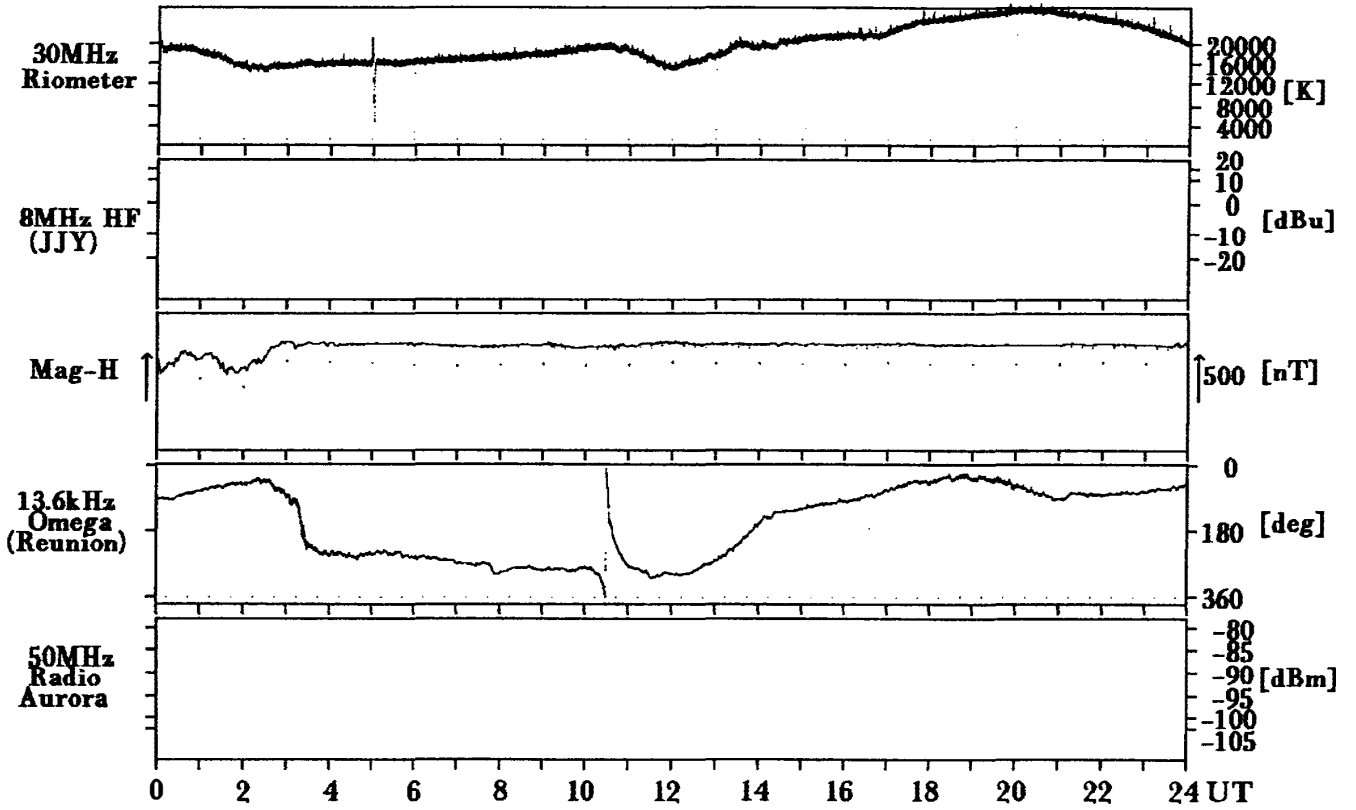
Syowa Station

Total Day / 184 1993/ 7/ 3



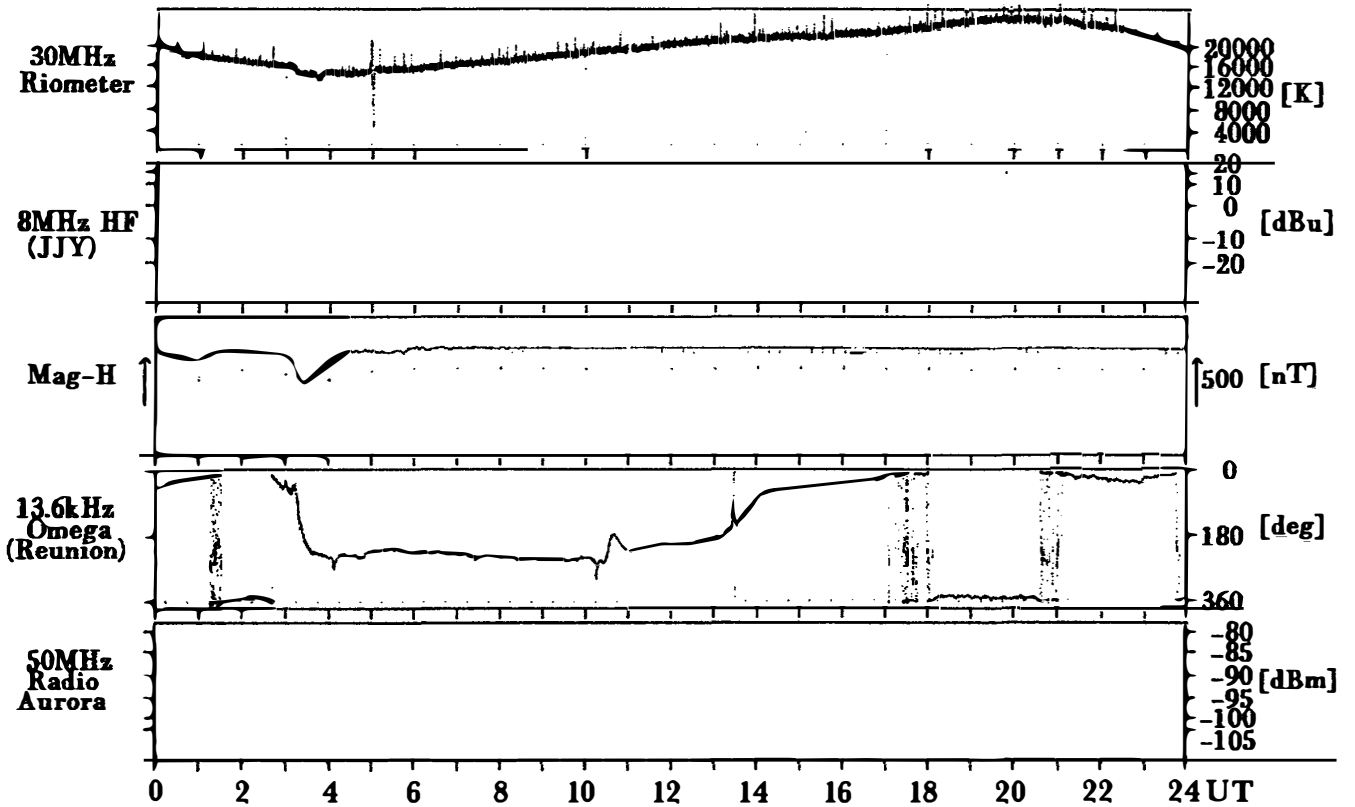
Syowa Station

Total Day / 185 1993/ 7/ 4



Syowa Station

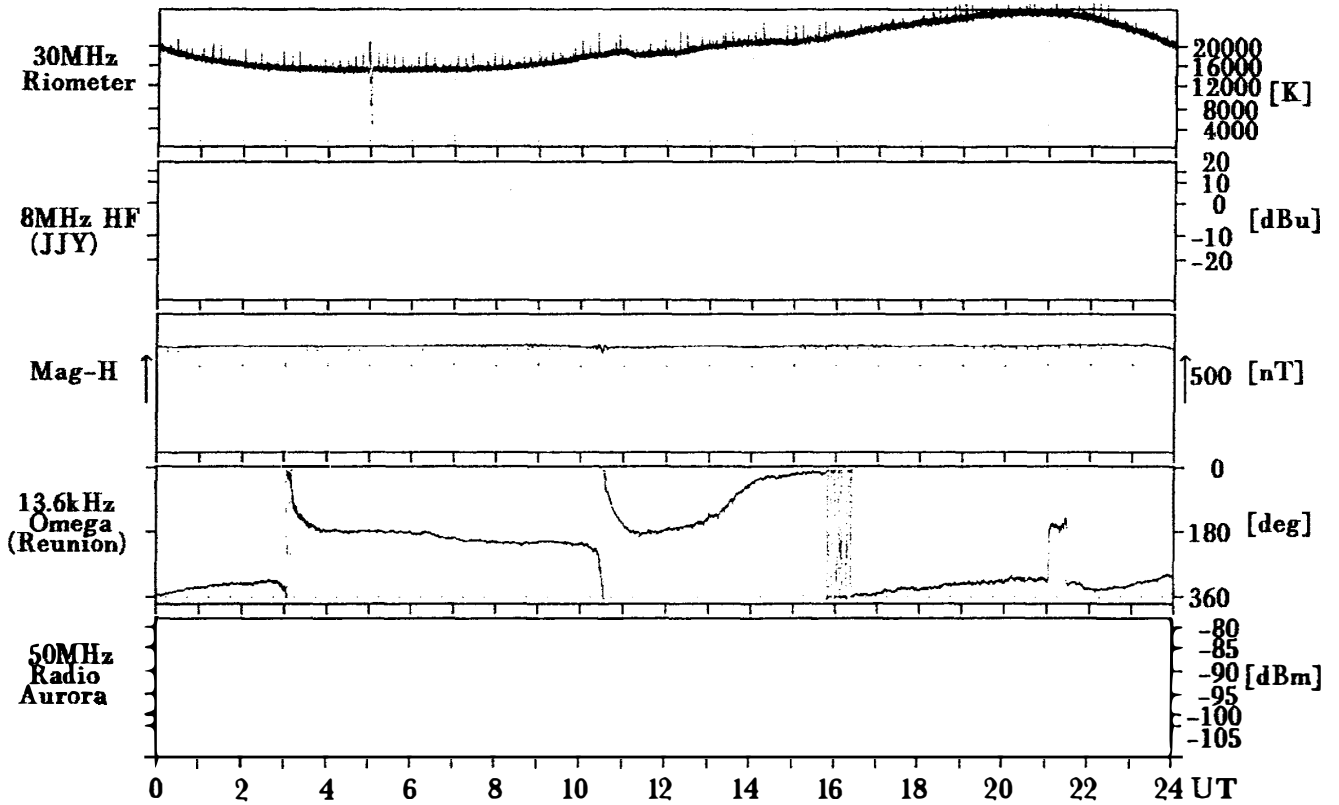
Total Day / 186 1993/ 7/ 5





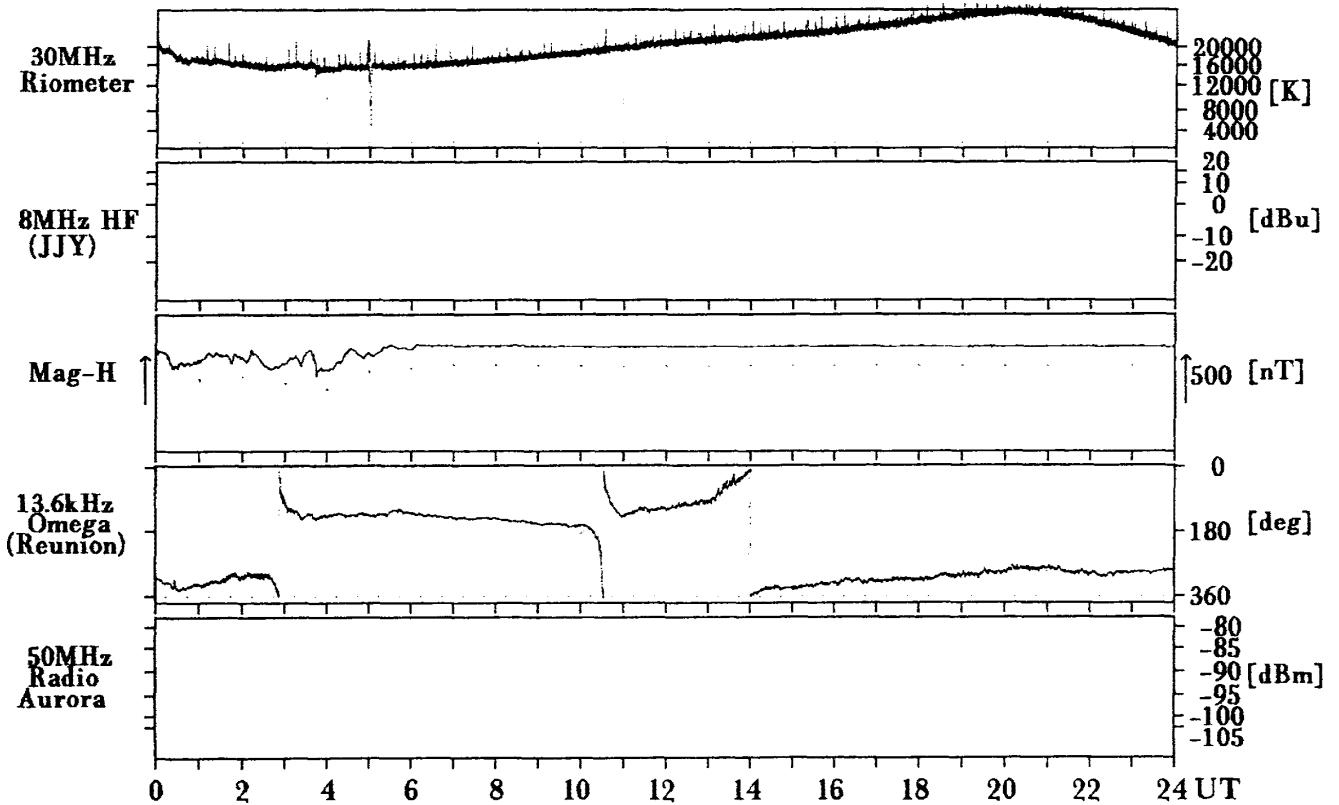
Syowa Station

Total Day / 187 1993/ 7/ 6



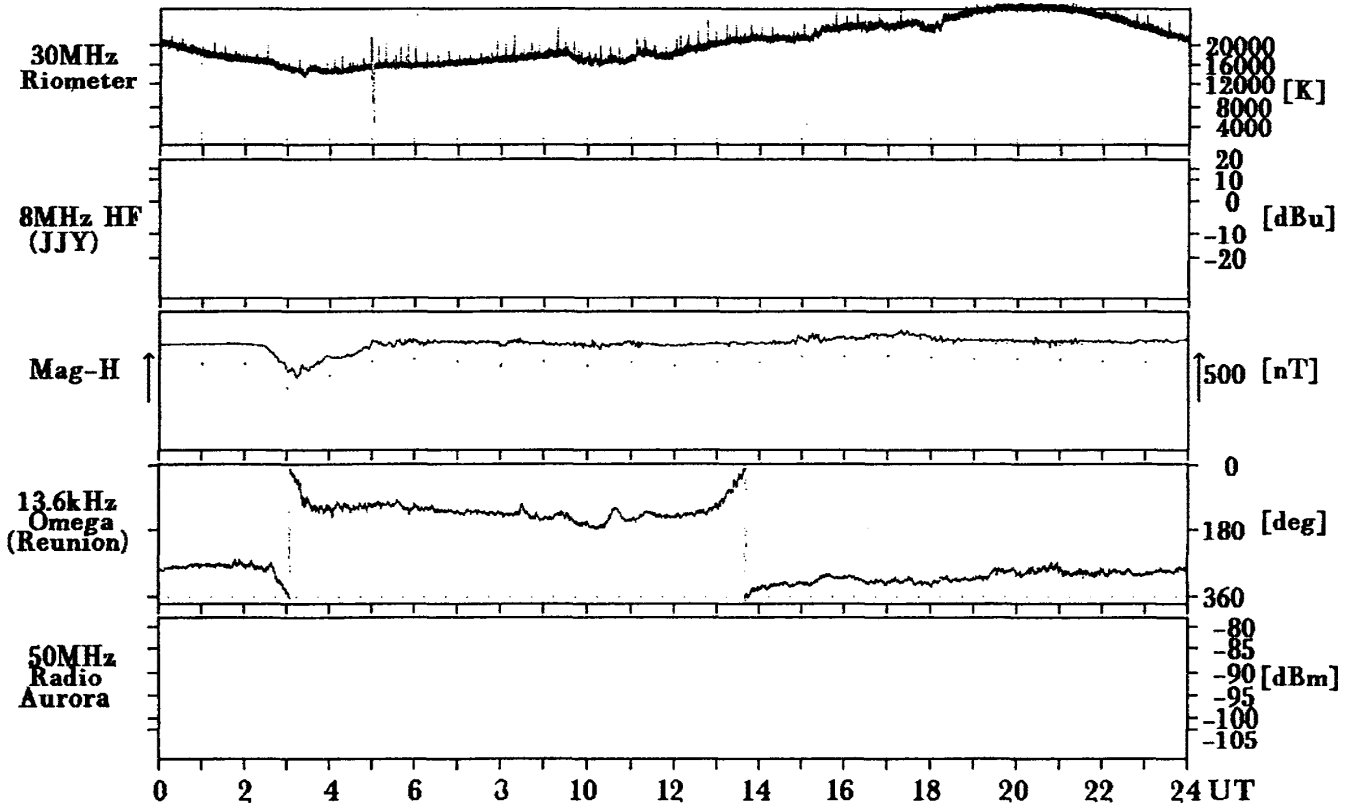
Syowa Station

Total Day / 188 1993/ 7/ 7



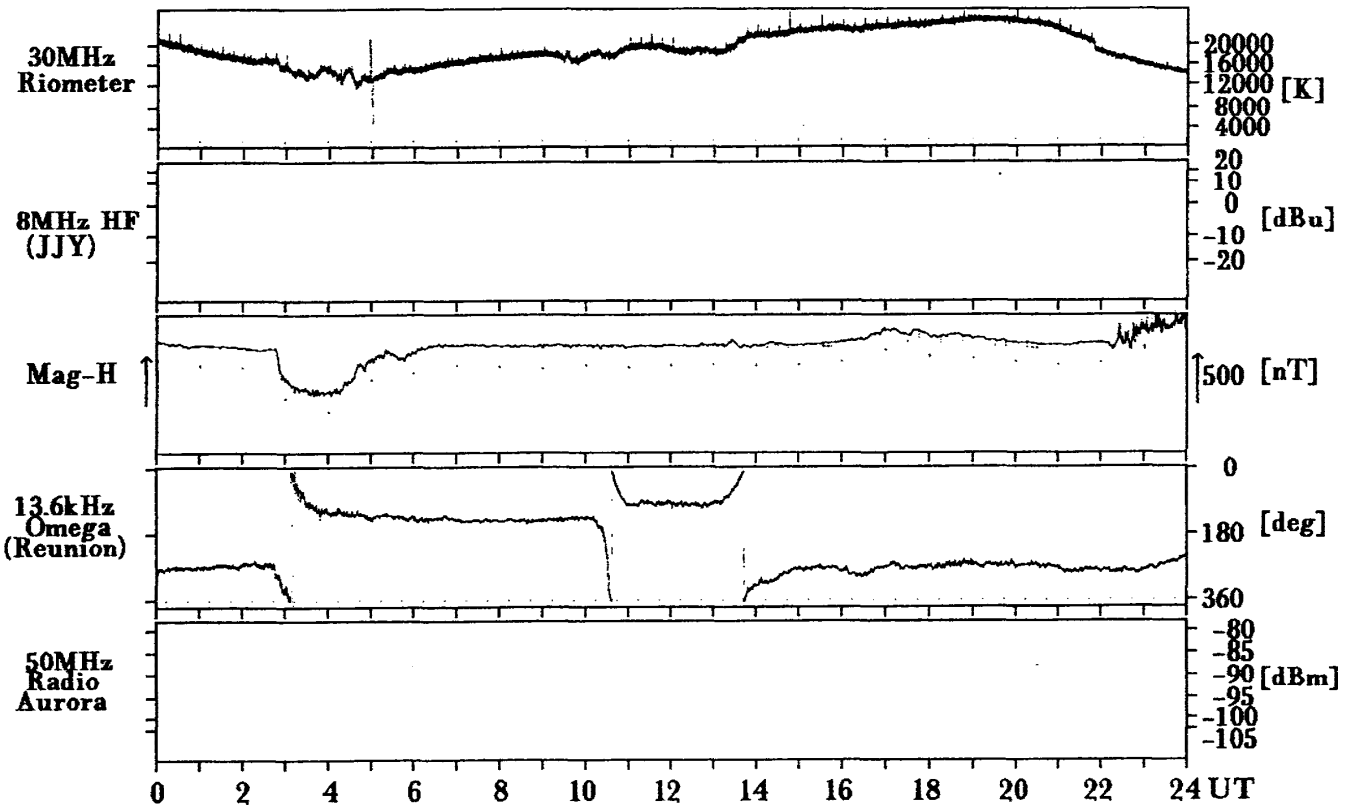
Syowa Station

Total Day / 189 1993/ 7/ 8



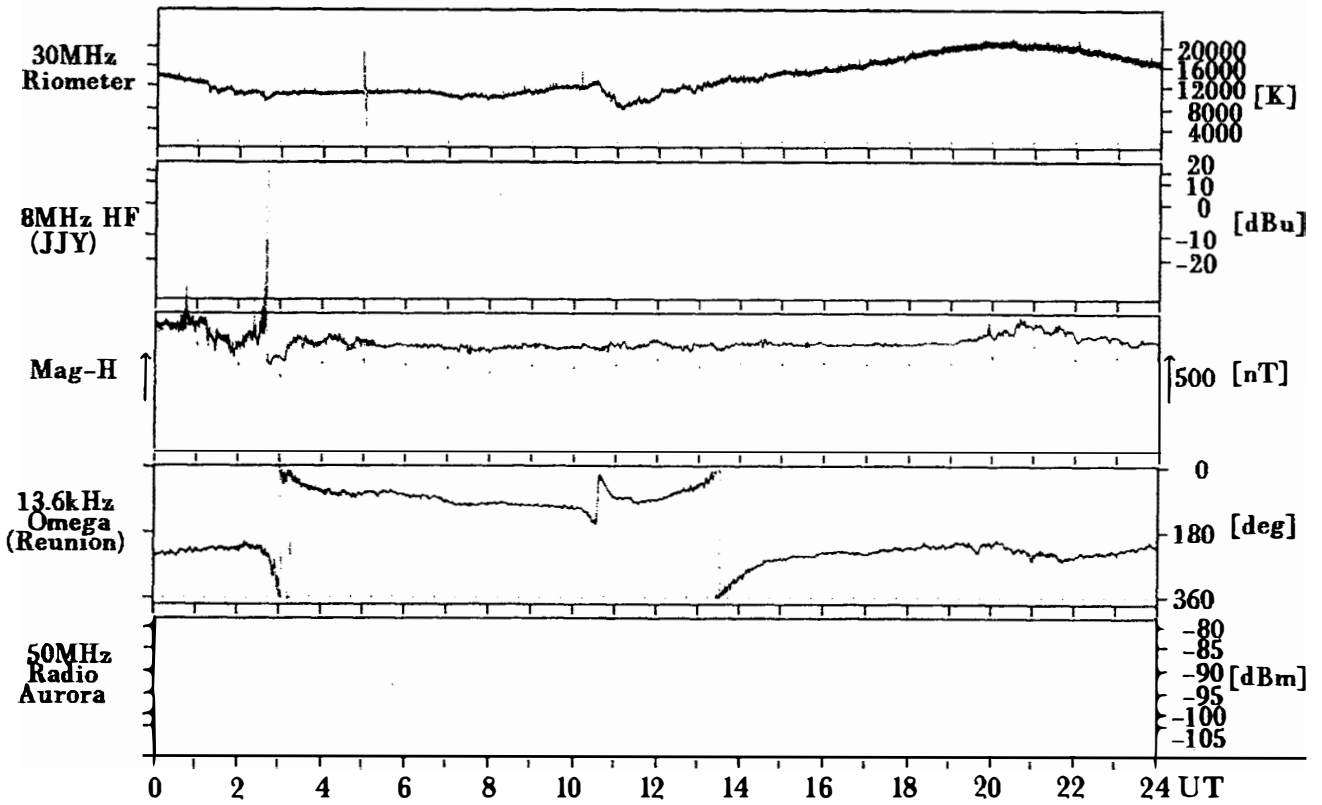
Syowa Station

Total Day / 190 1993/ 7/ 9



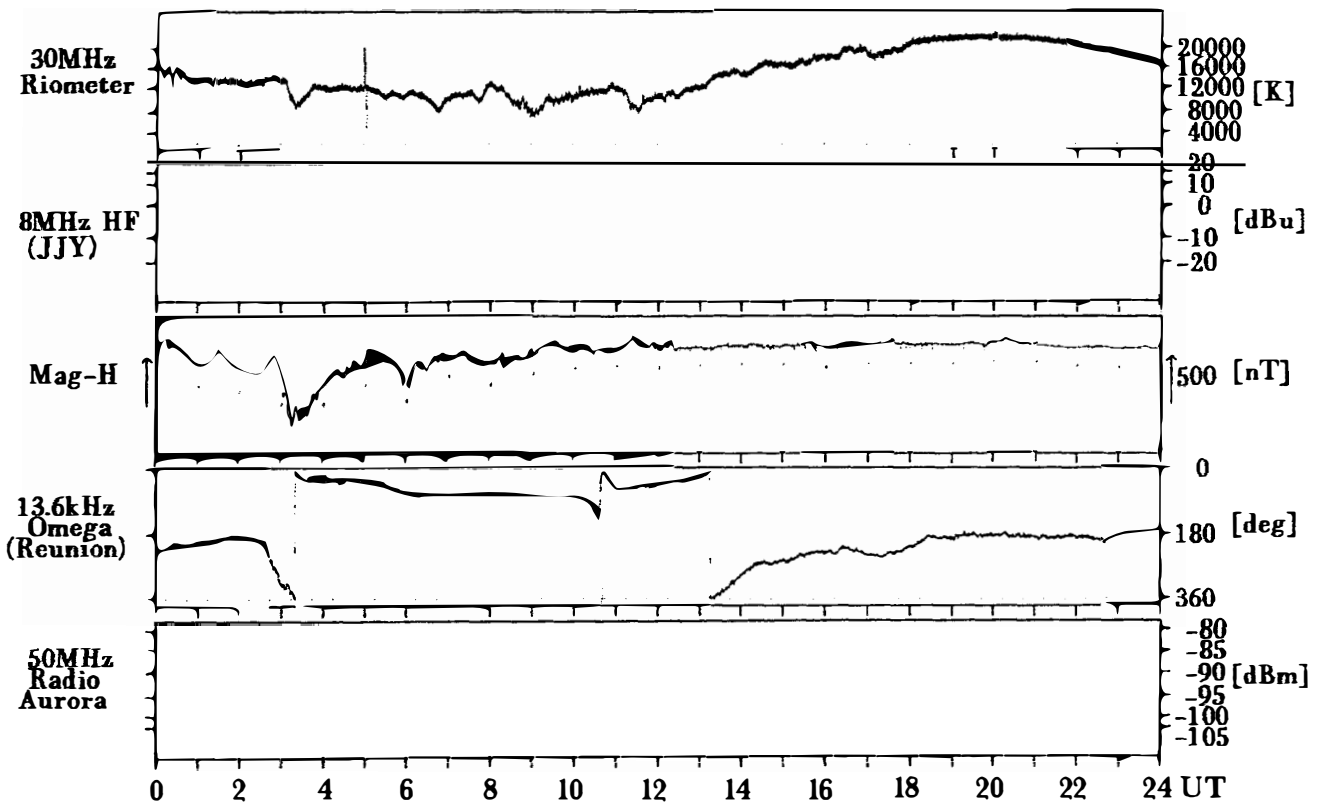
Syowa Station

Total Day / 191 1993/ 7/10



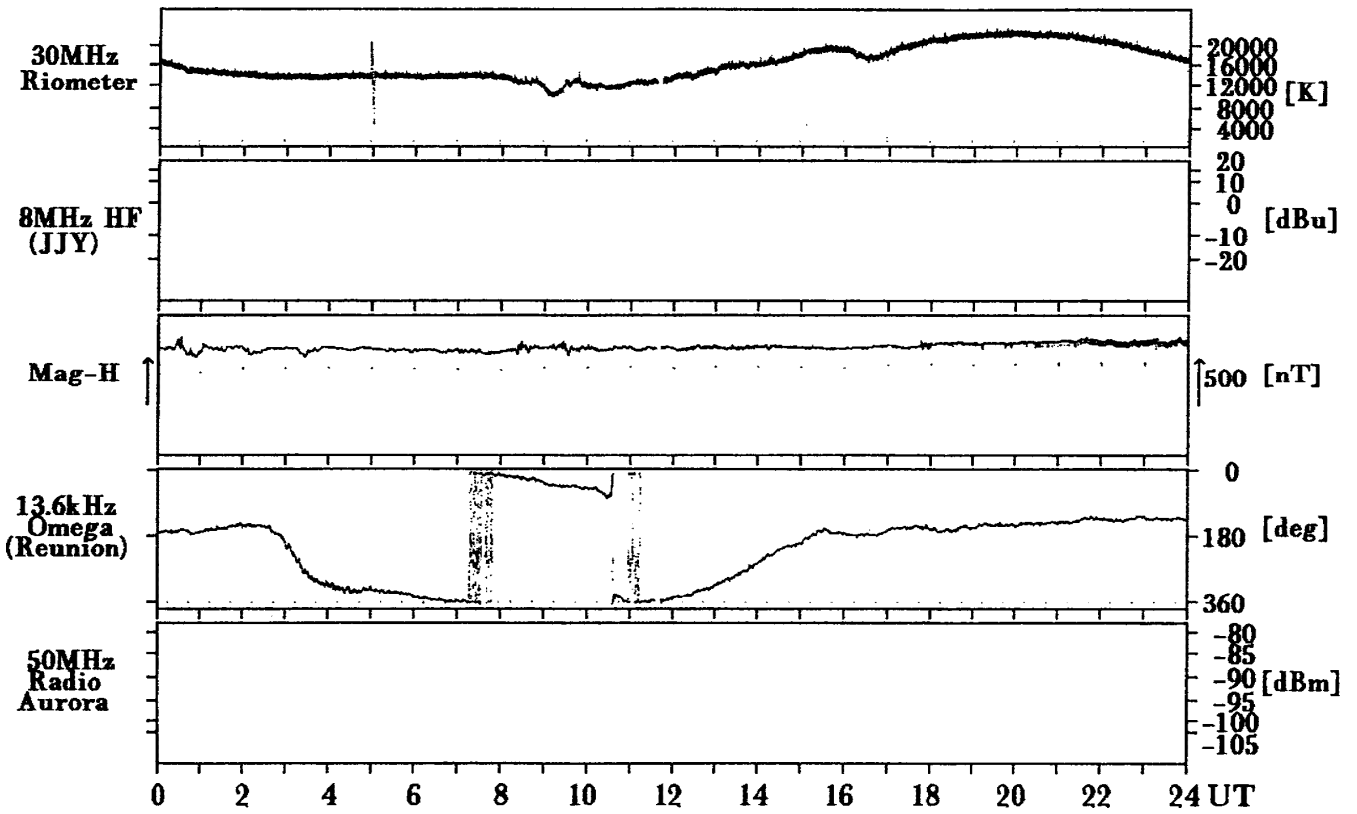
Syowa Station

Total Day / 192 1993/ 7/11



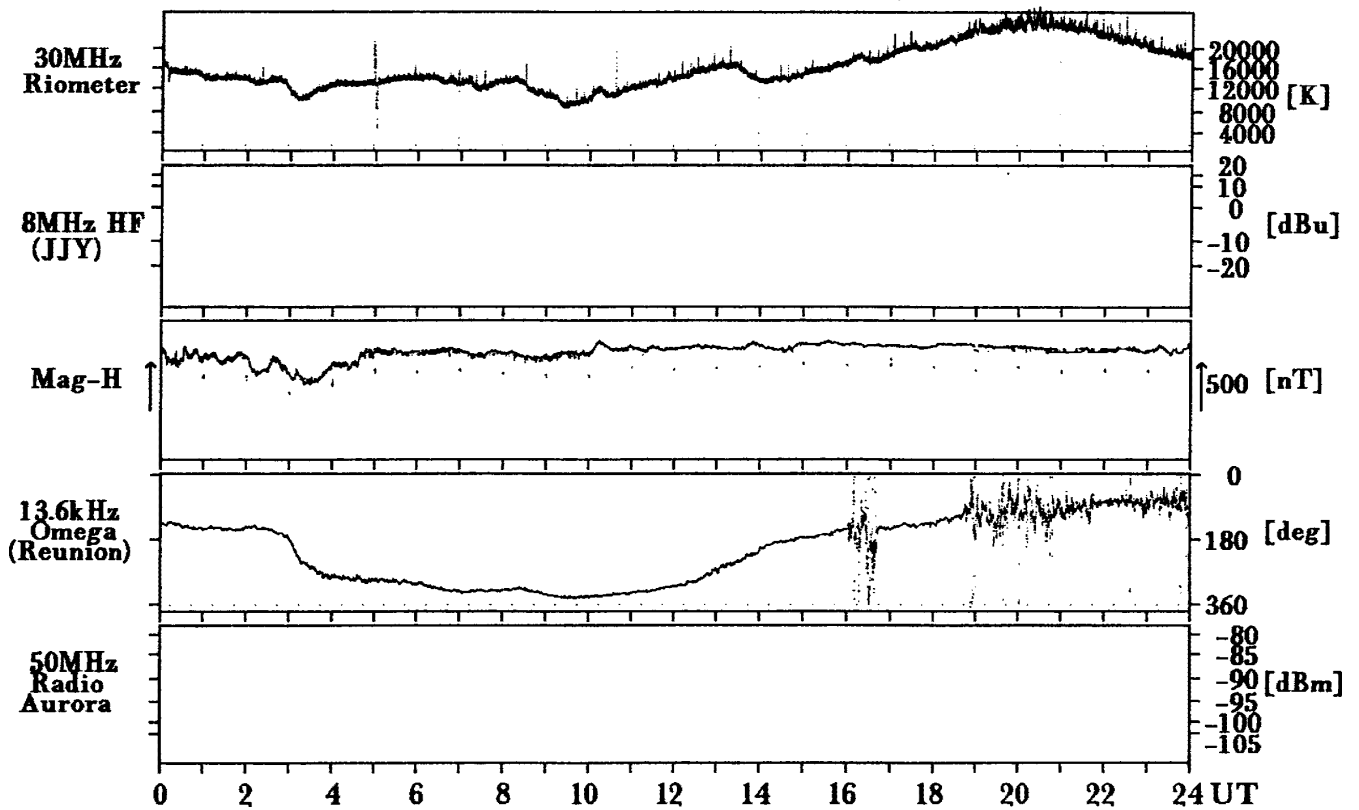
Syowa Station

Total Day / 193 1993/ 7/12



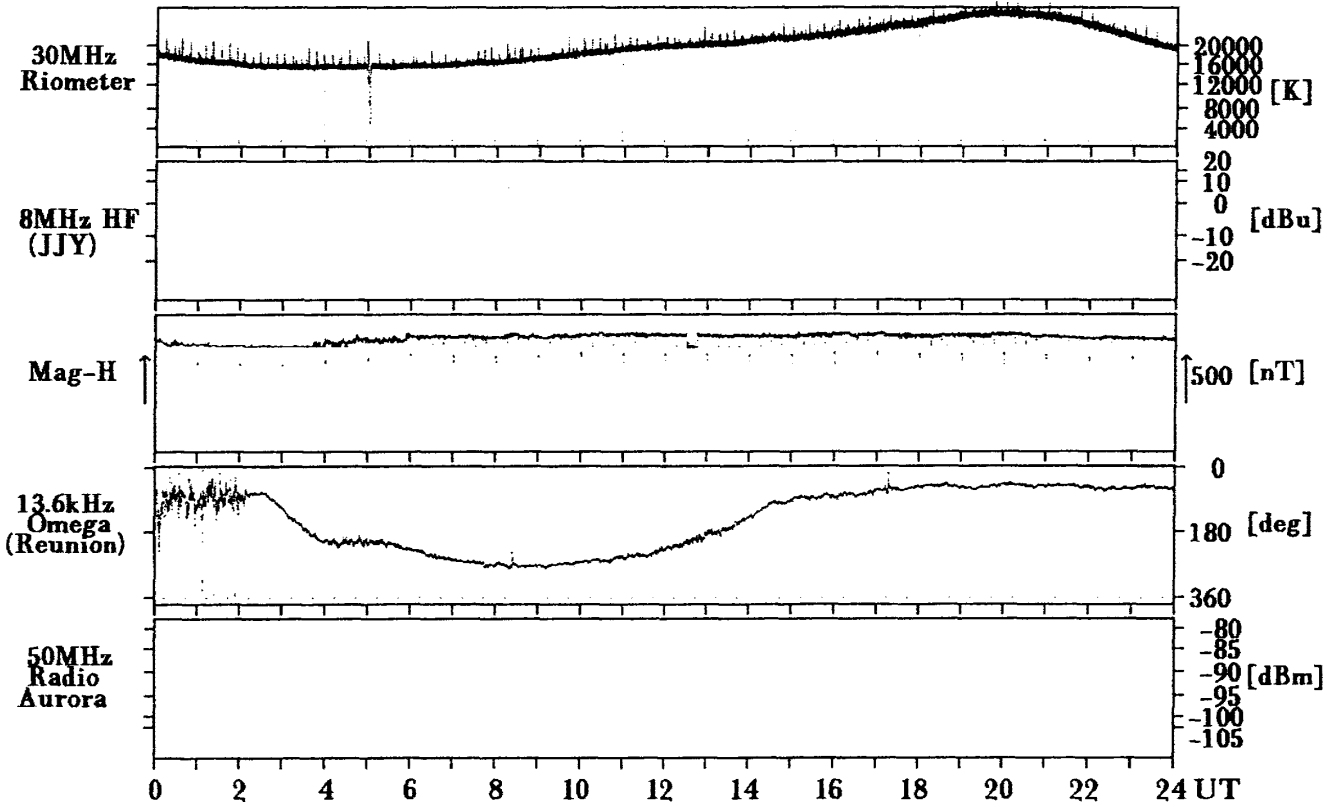
Syowa Station

Total Day / 194 1993/ 7/13



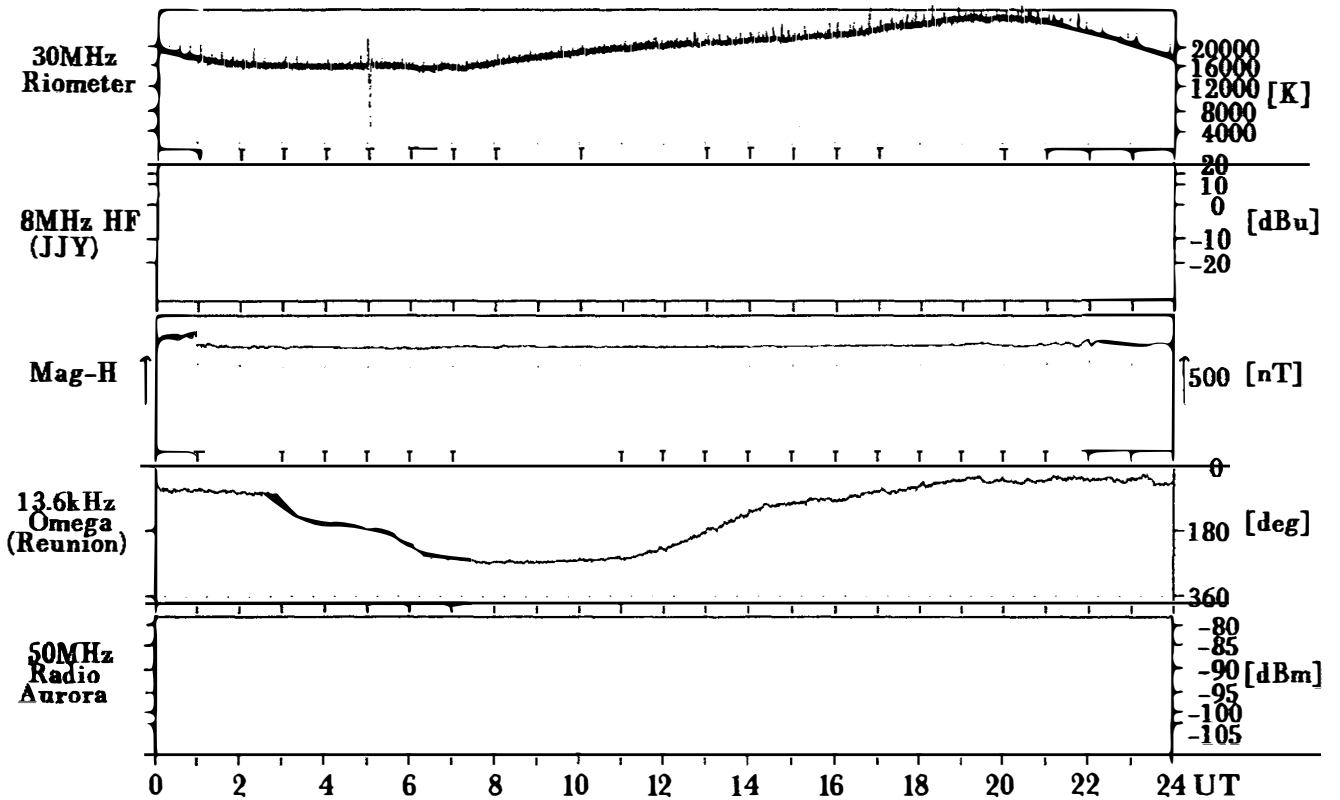
Syowa Station

Total Day / 195 1993/ 7/14



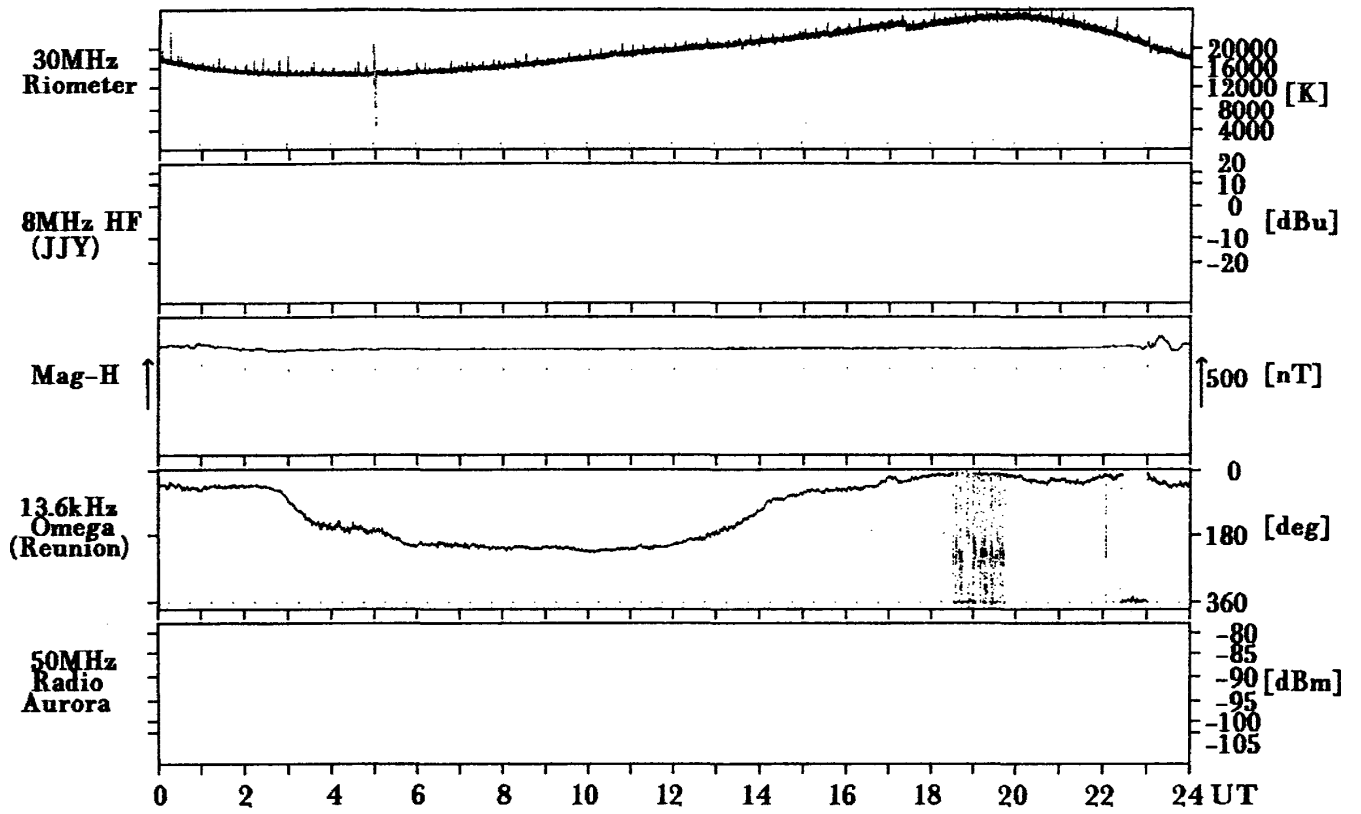
Syowa Station

Total Day / 196 1993/ 7/15



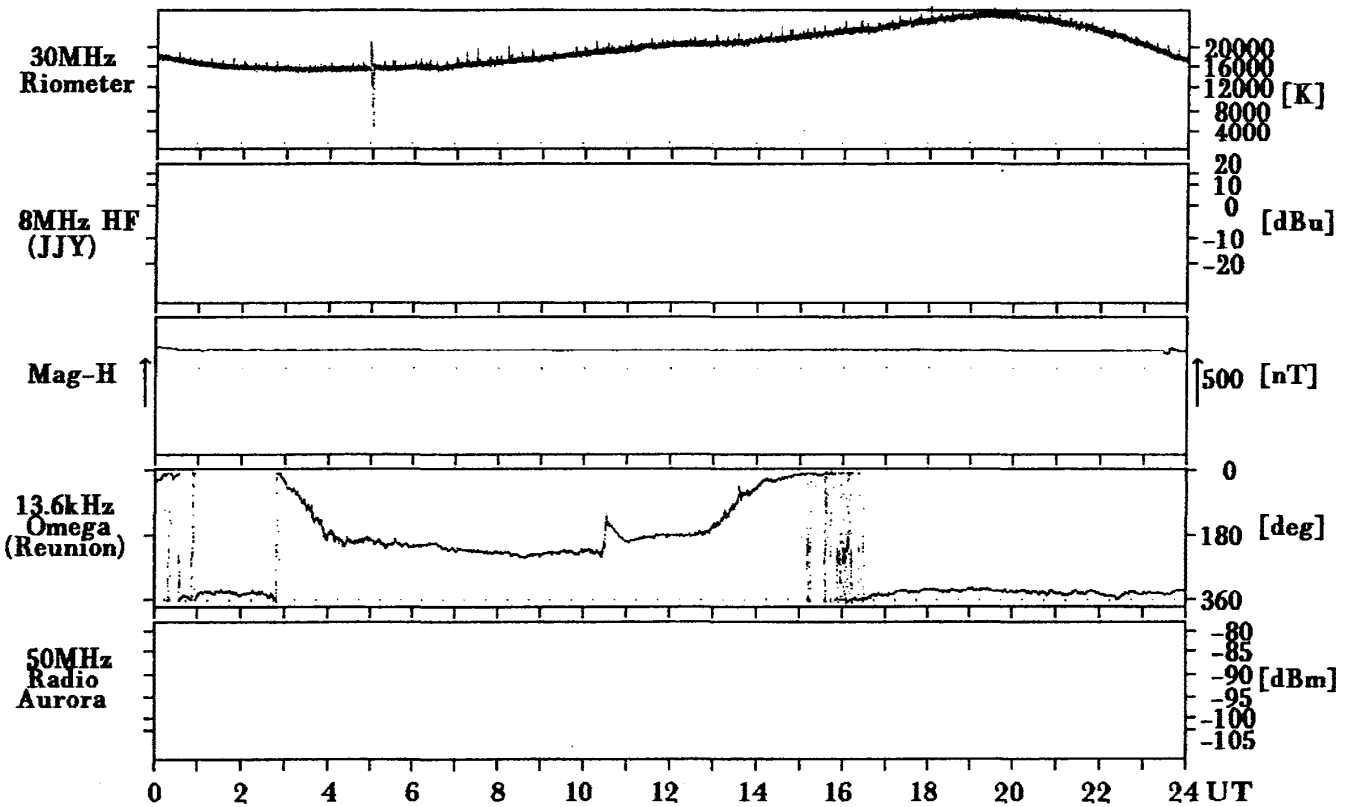
Syowa Station

Total Day / 197 1993/ 7/16



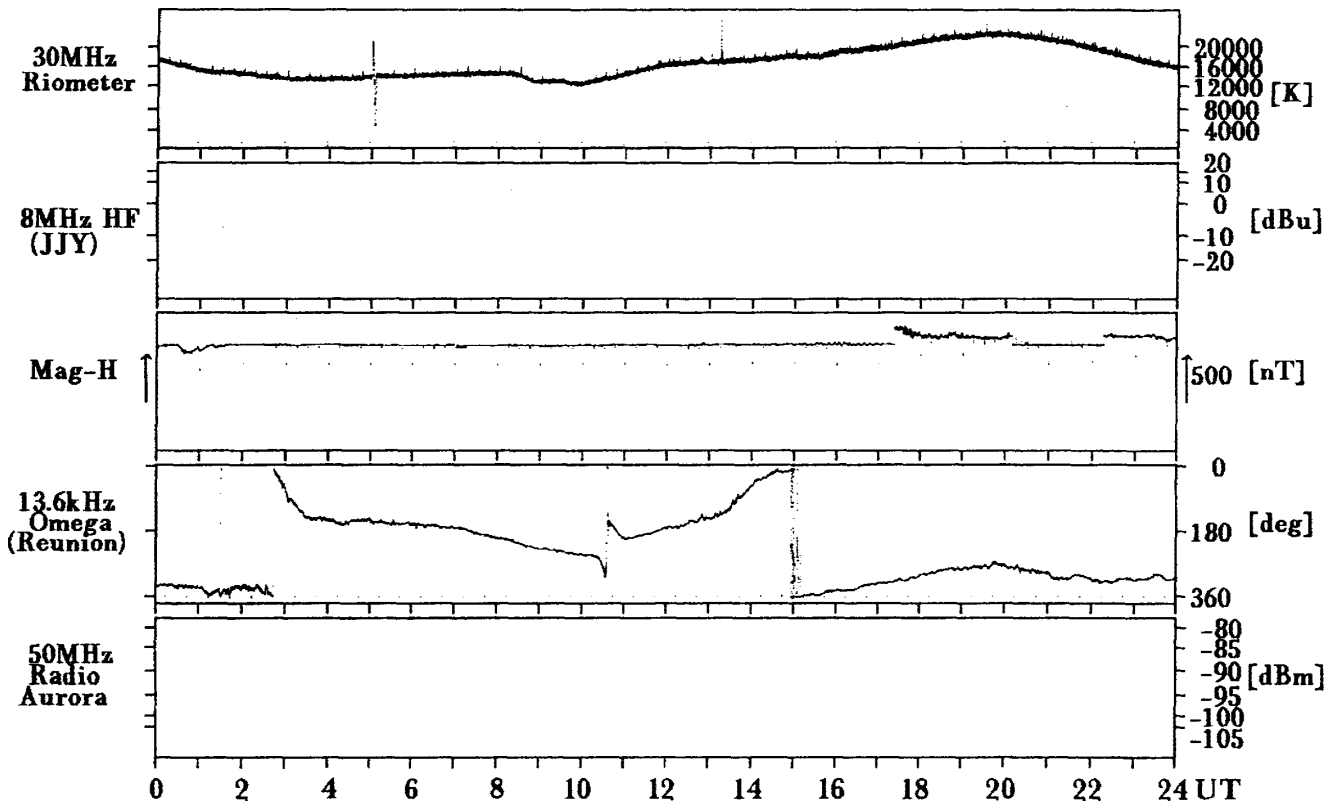
Syowa Station

Total Day / 198 1993/ 7/17



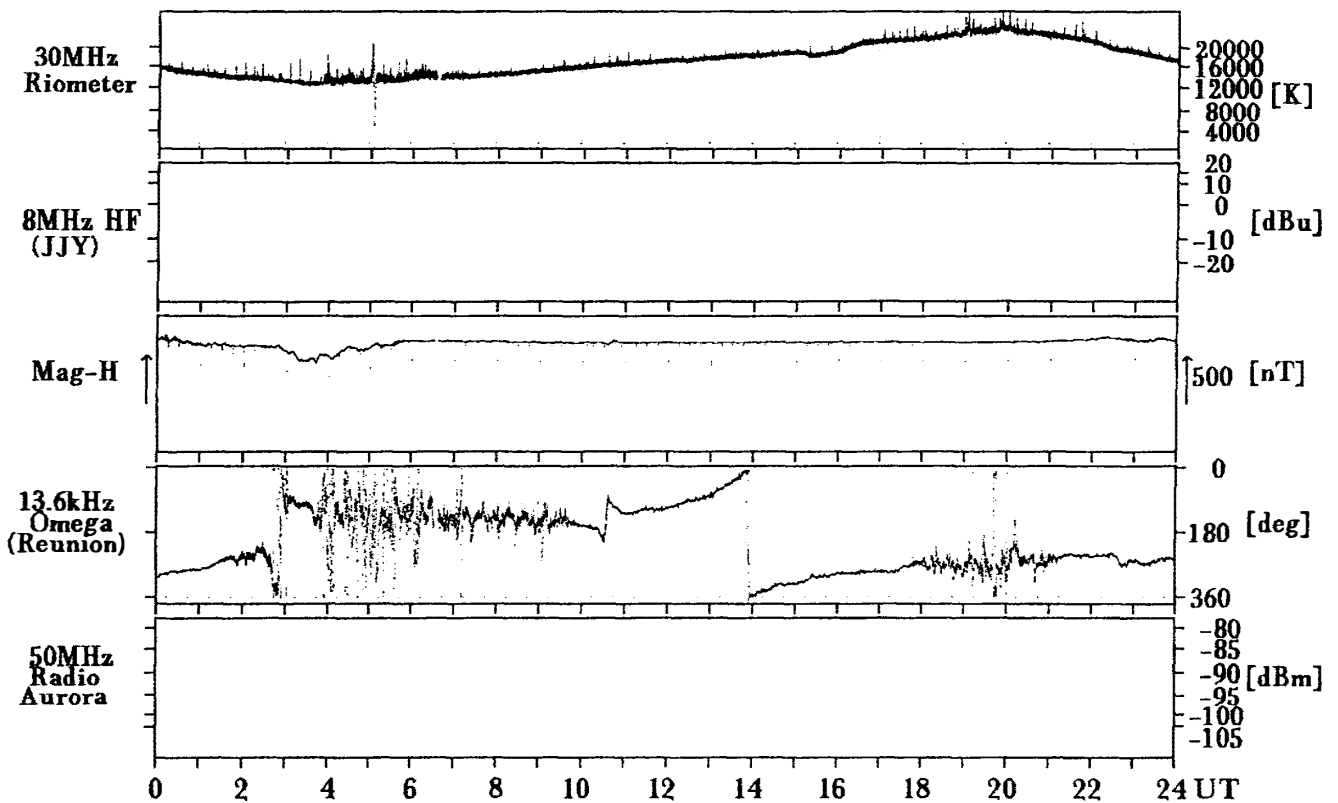
Syowa Station

Total Day / 199 1993/ 7/18



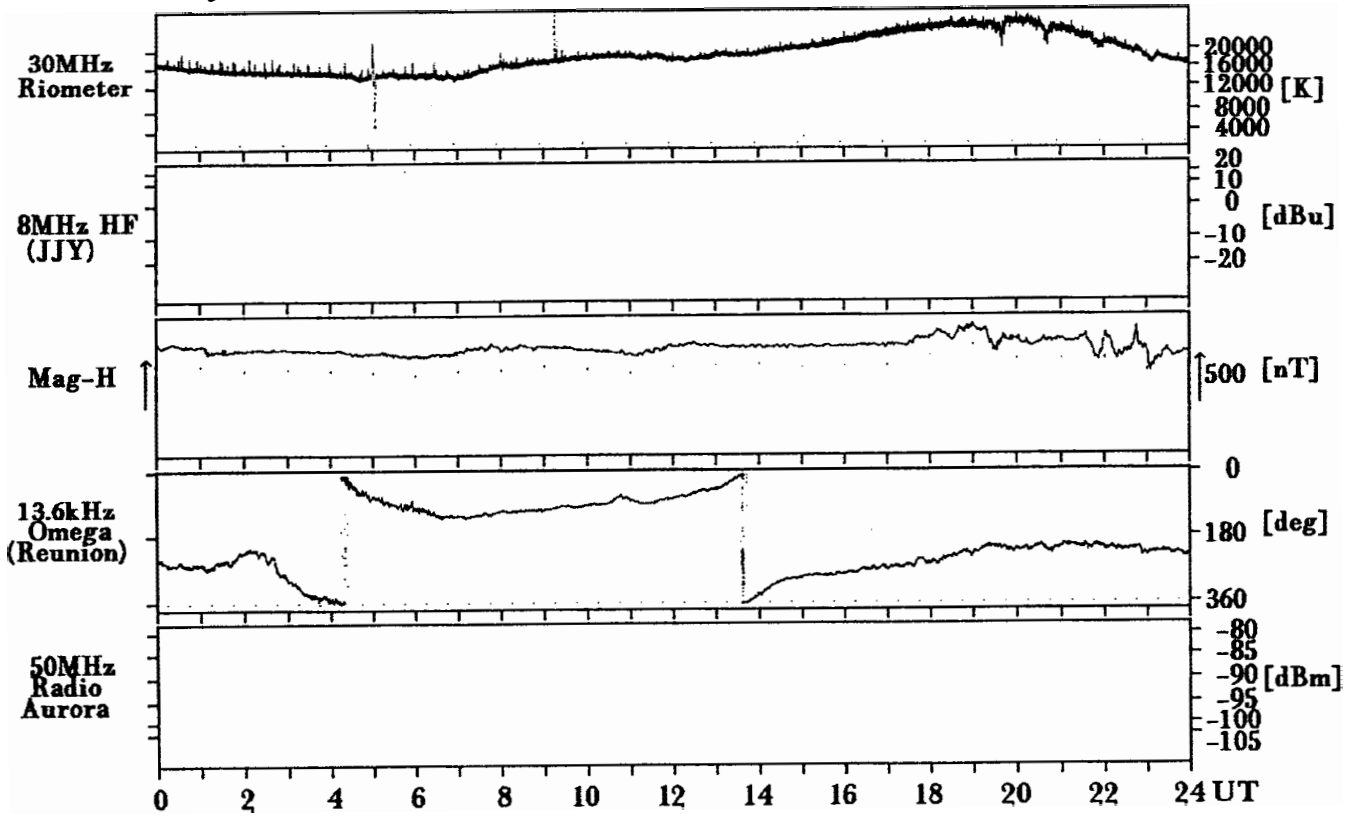
Syowa Station

Total Day / 200 1993/ 7/19



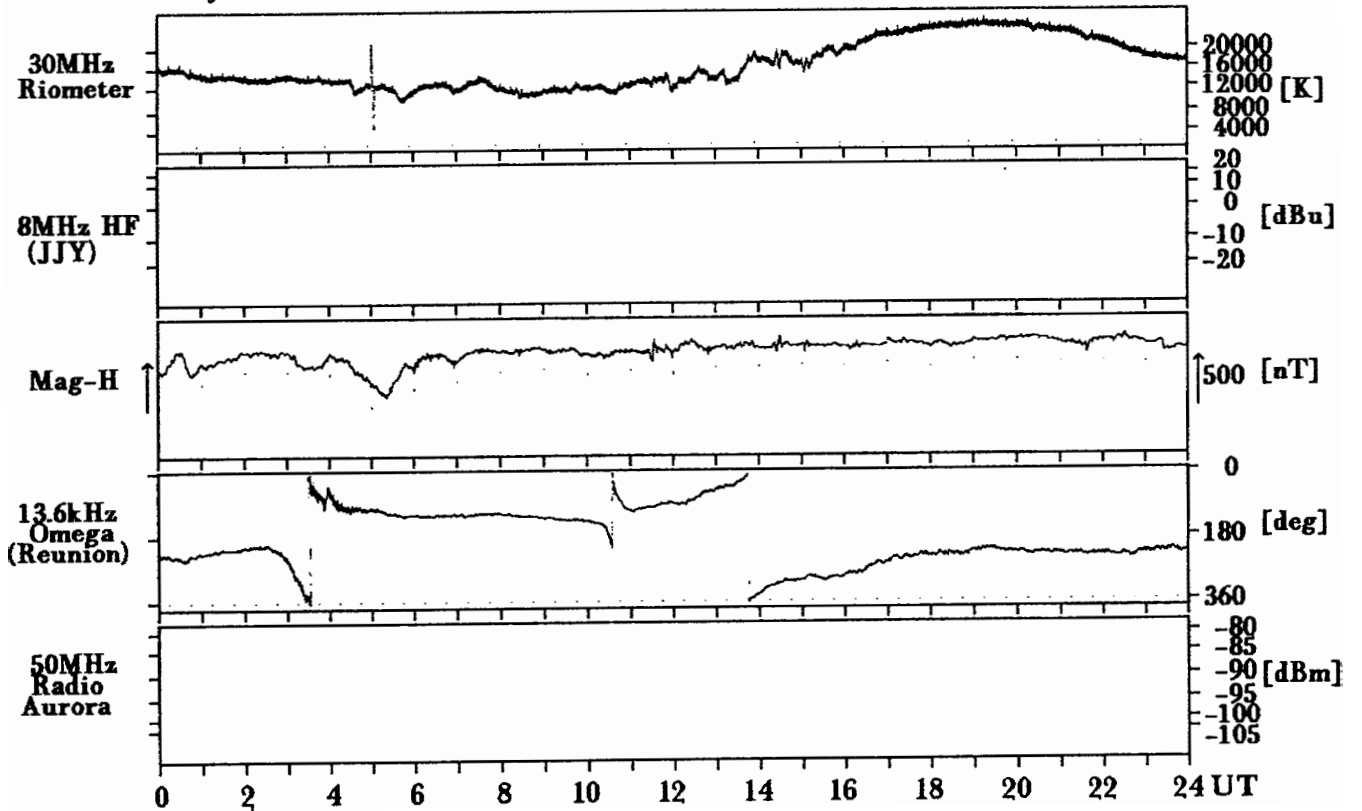
Syowa Station

Total Day / 201 1993/ 7/20



Syowa Station

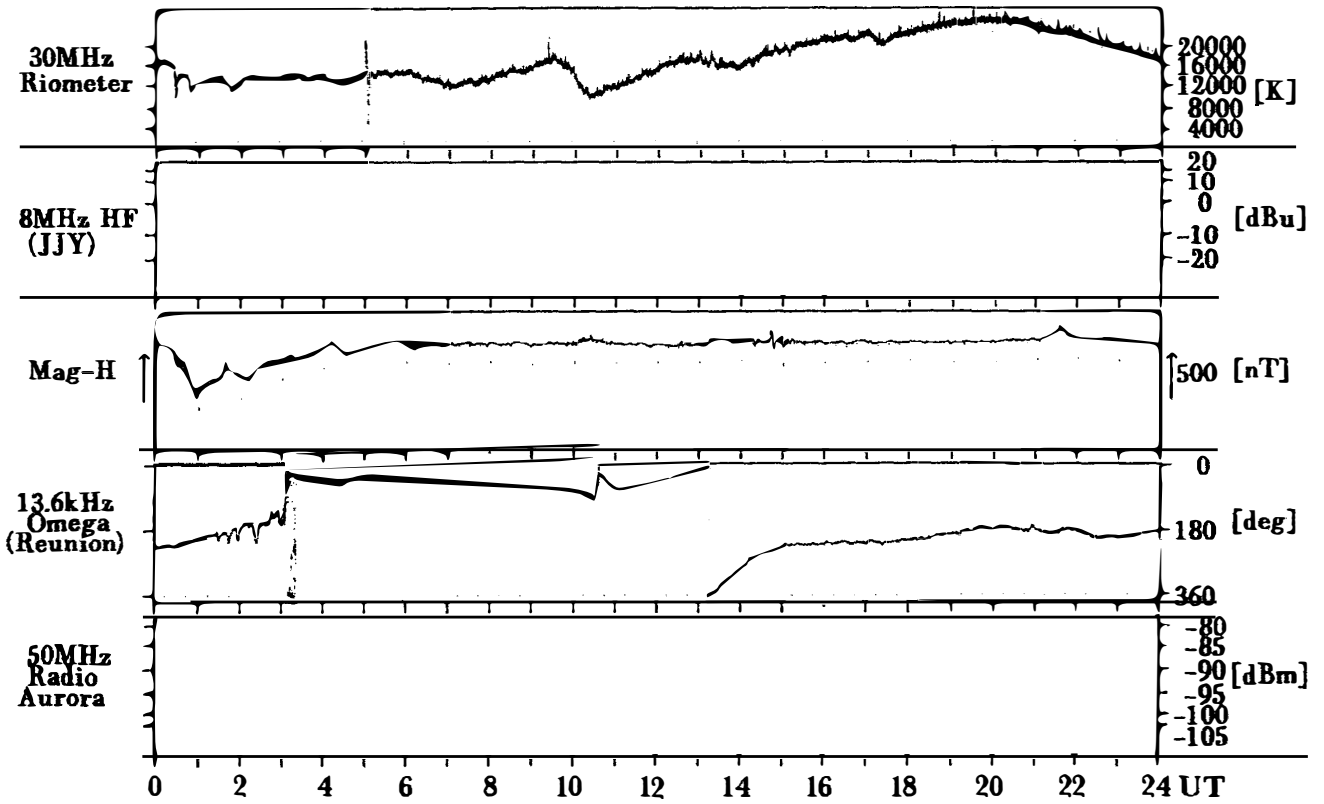
Total Day / 202 1993/ 7/21





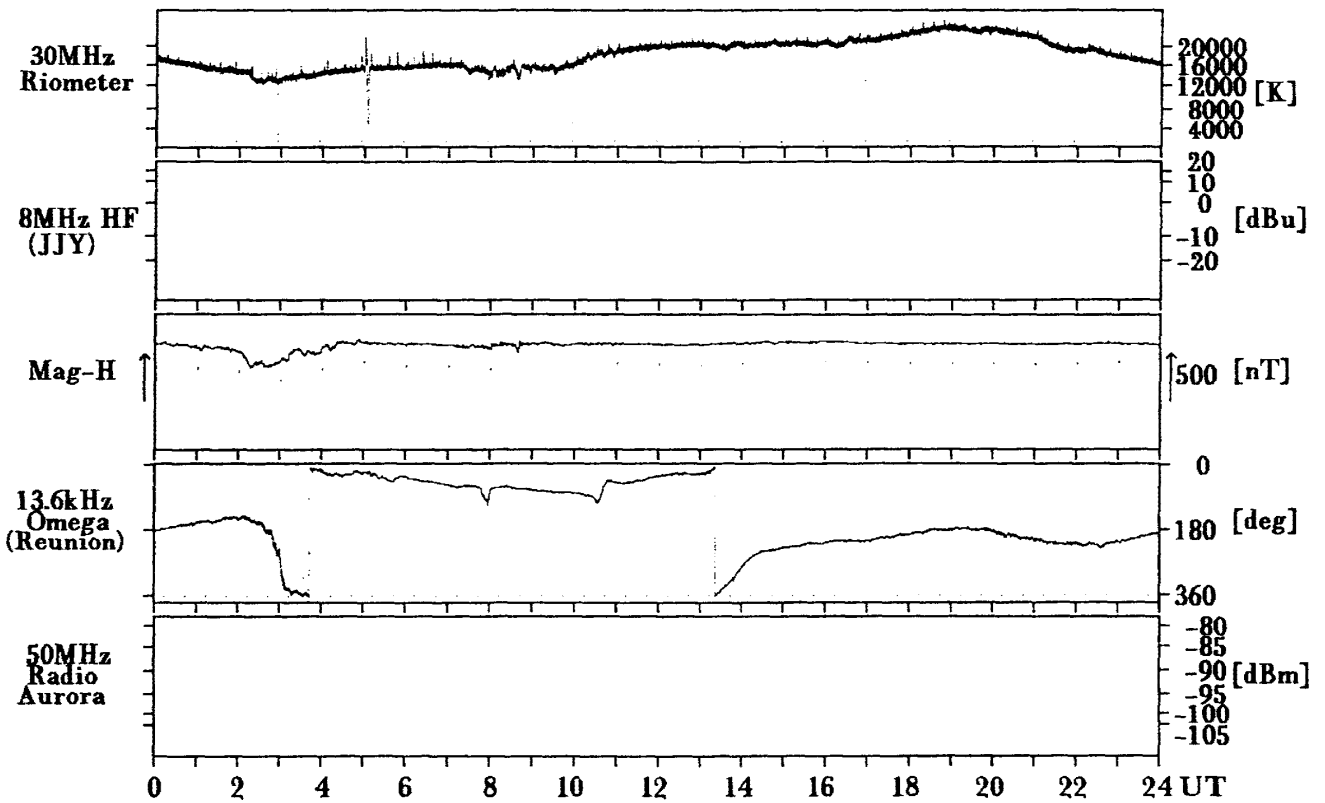
Syowa Station

Total Day / 203 1993/ 7/22



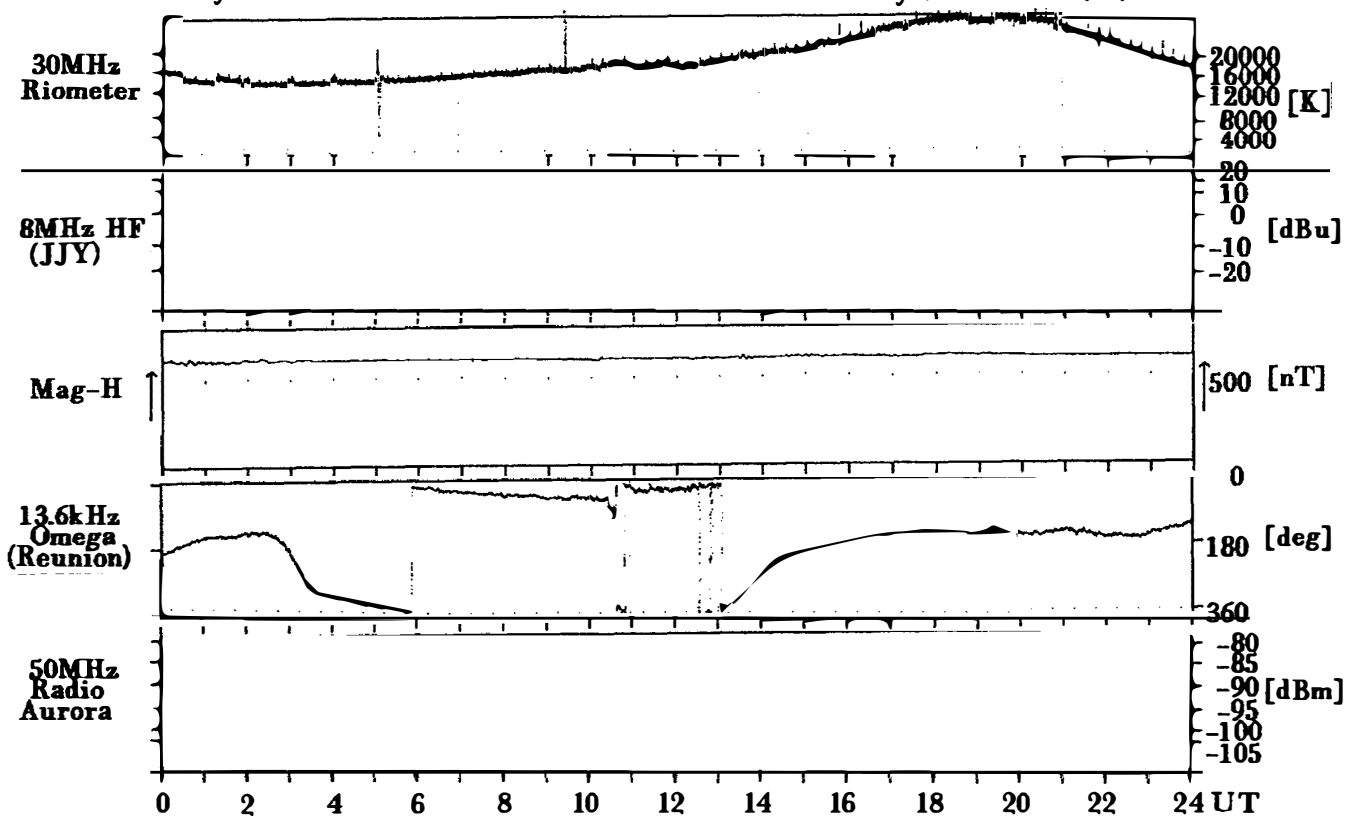
Syowa Station

Total Day / 204 1993/ 7/23



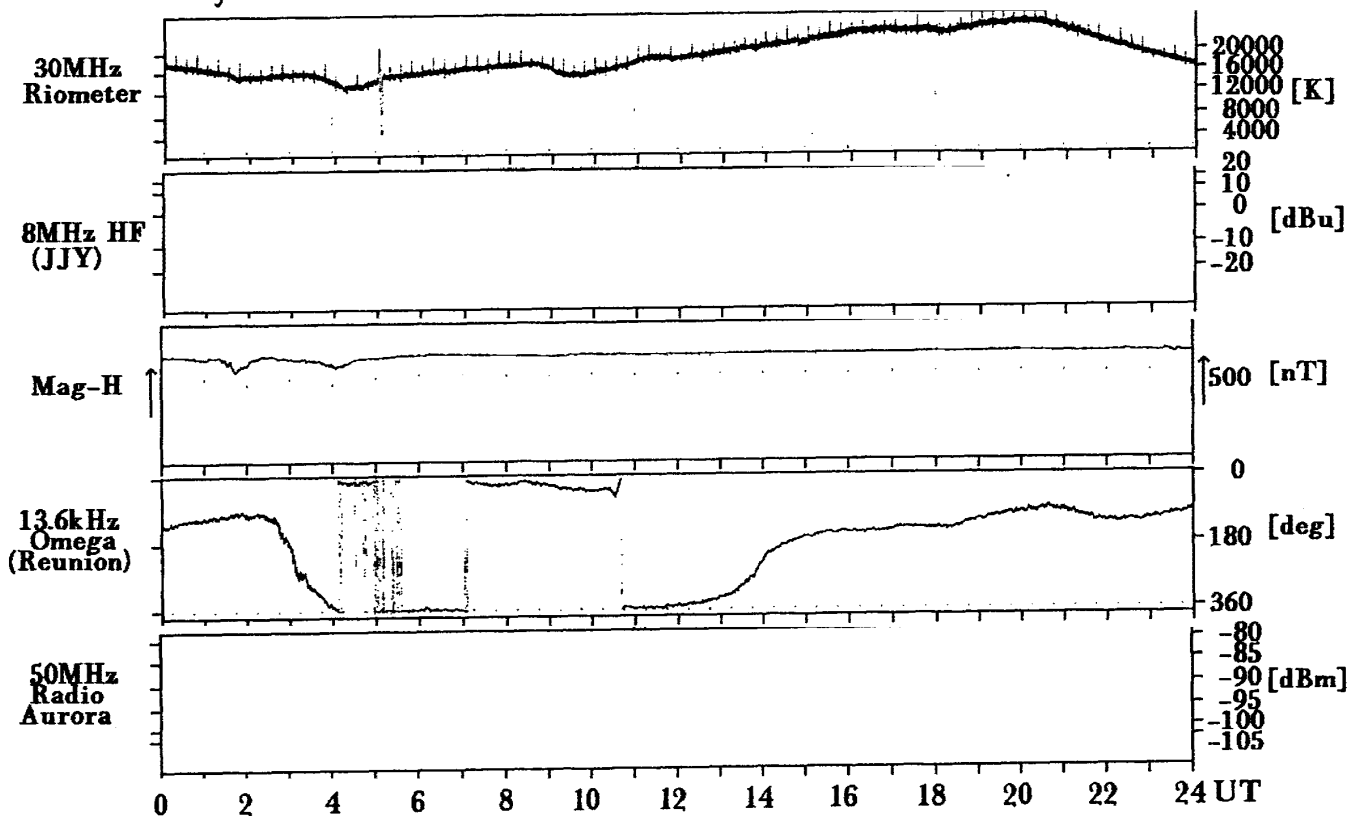
Syowa Station

Total Day / 205 1993/ 7/24



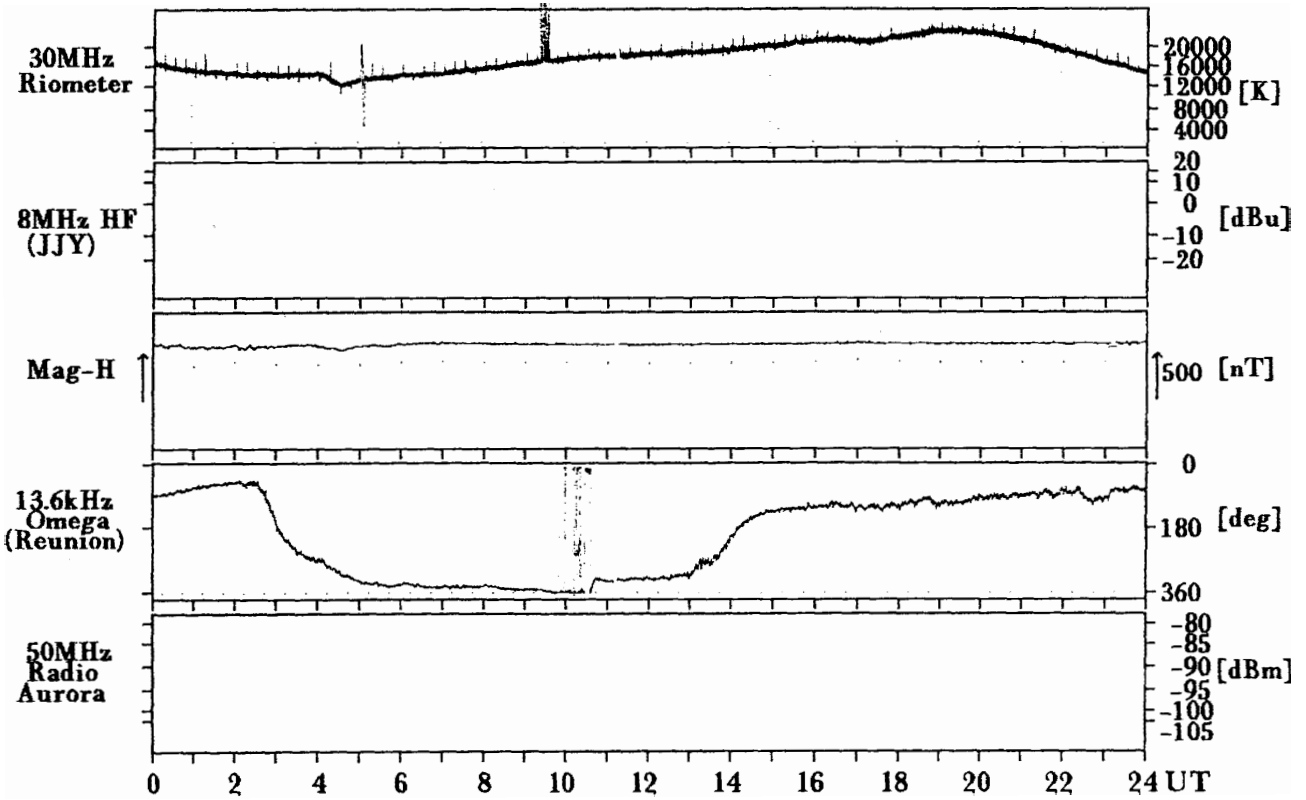
Syowa Station

Total Day / 206 1993/ 7/25



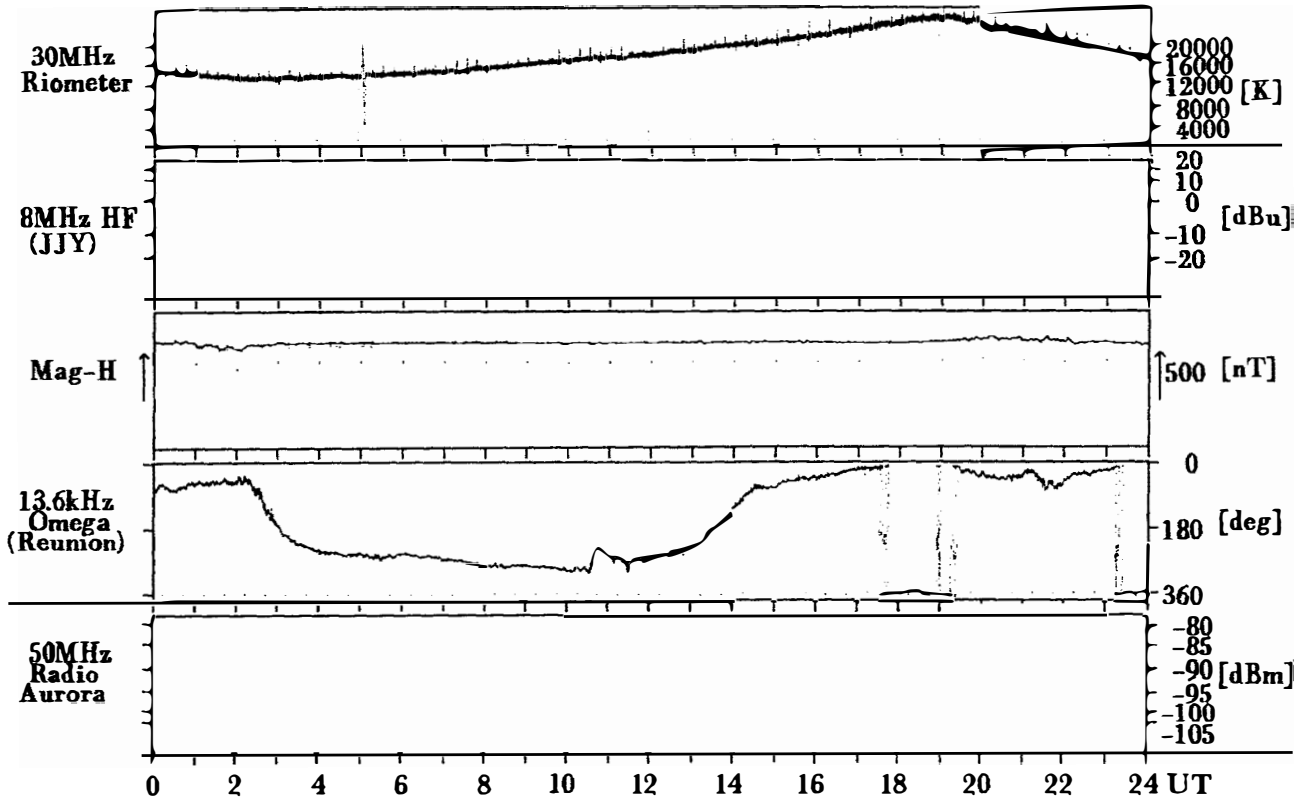
Syowa Station

Total Day / 207 1993/ 7/26



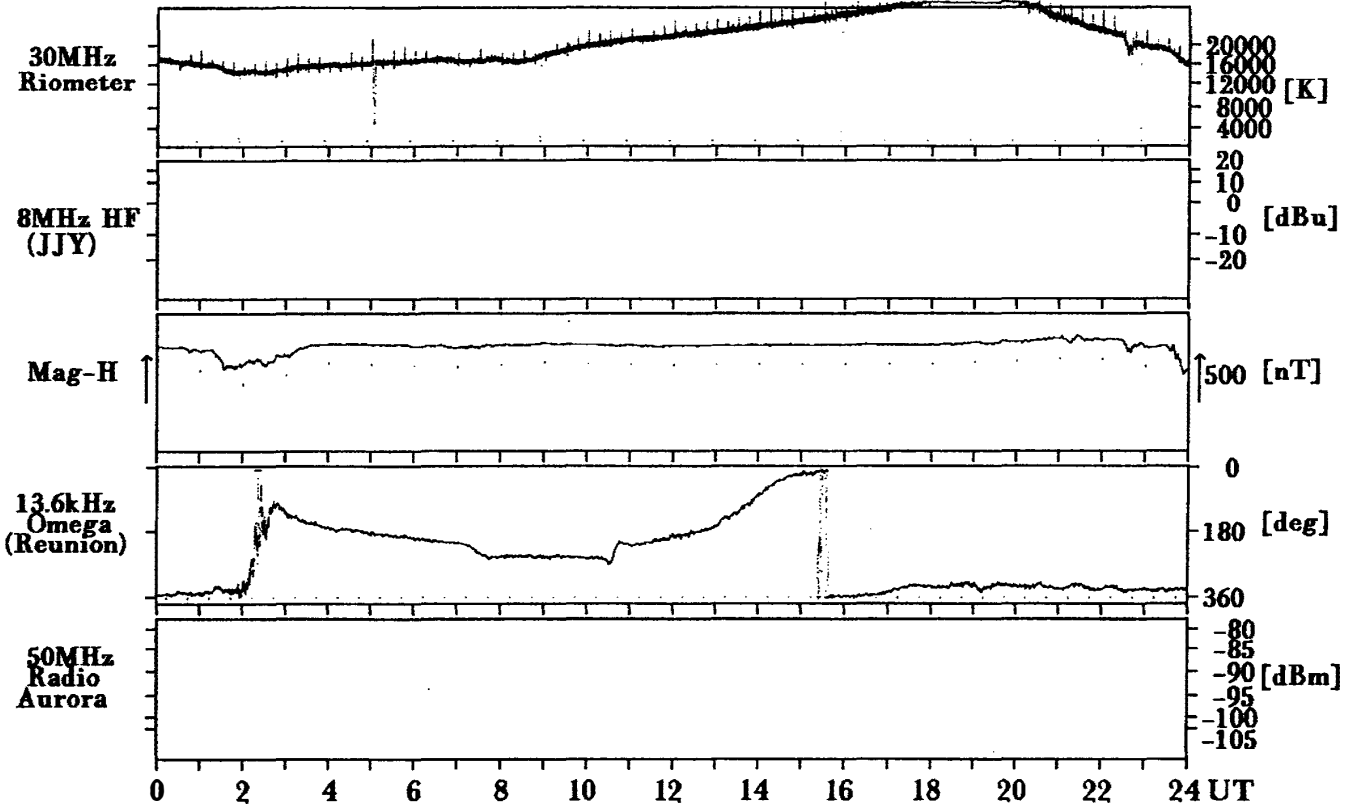
Syowa Station

Total Day / 208 1993/ 7/27



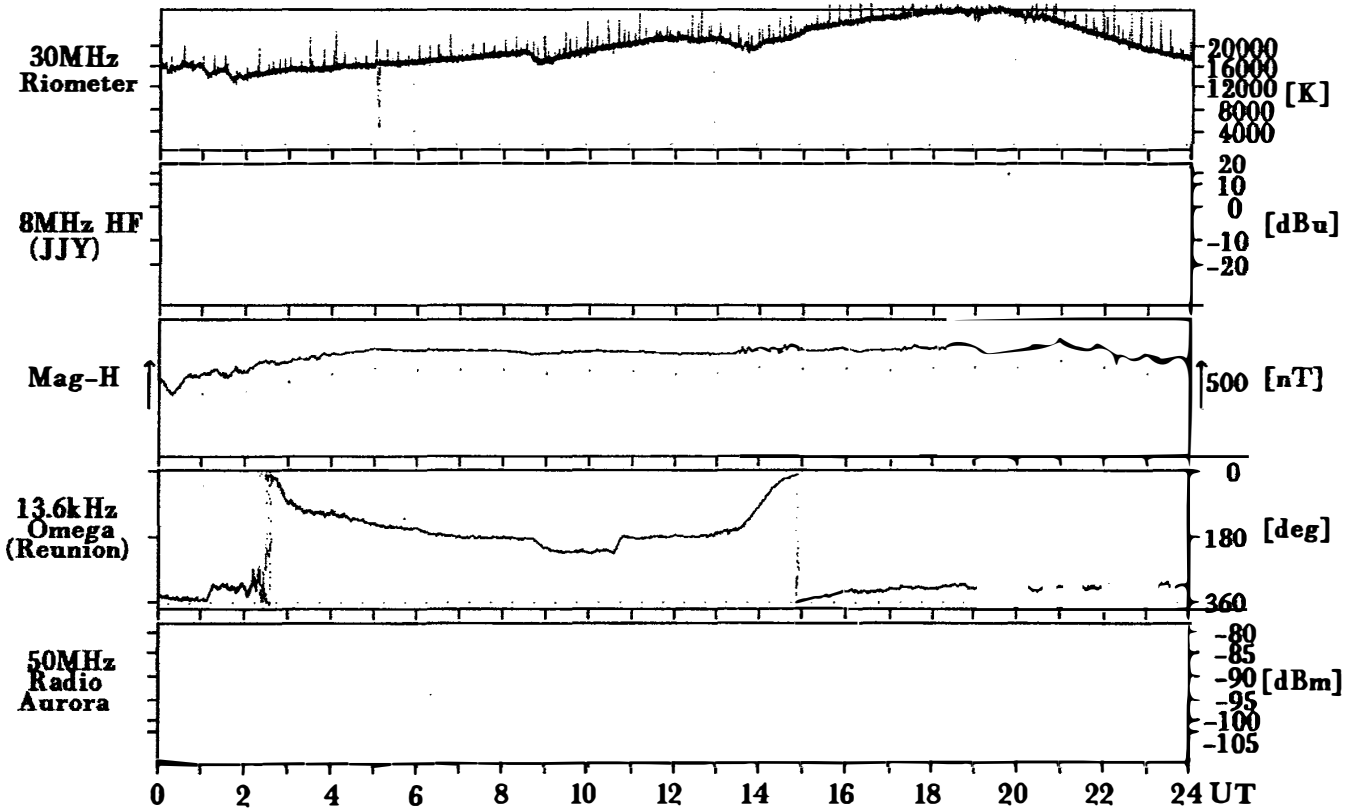
Syowa Station

Total Day / 209 1993/ 7/28



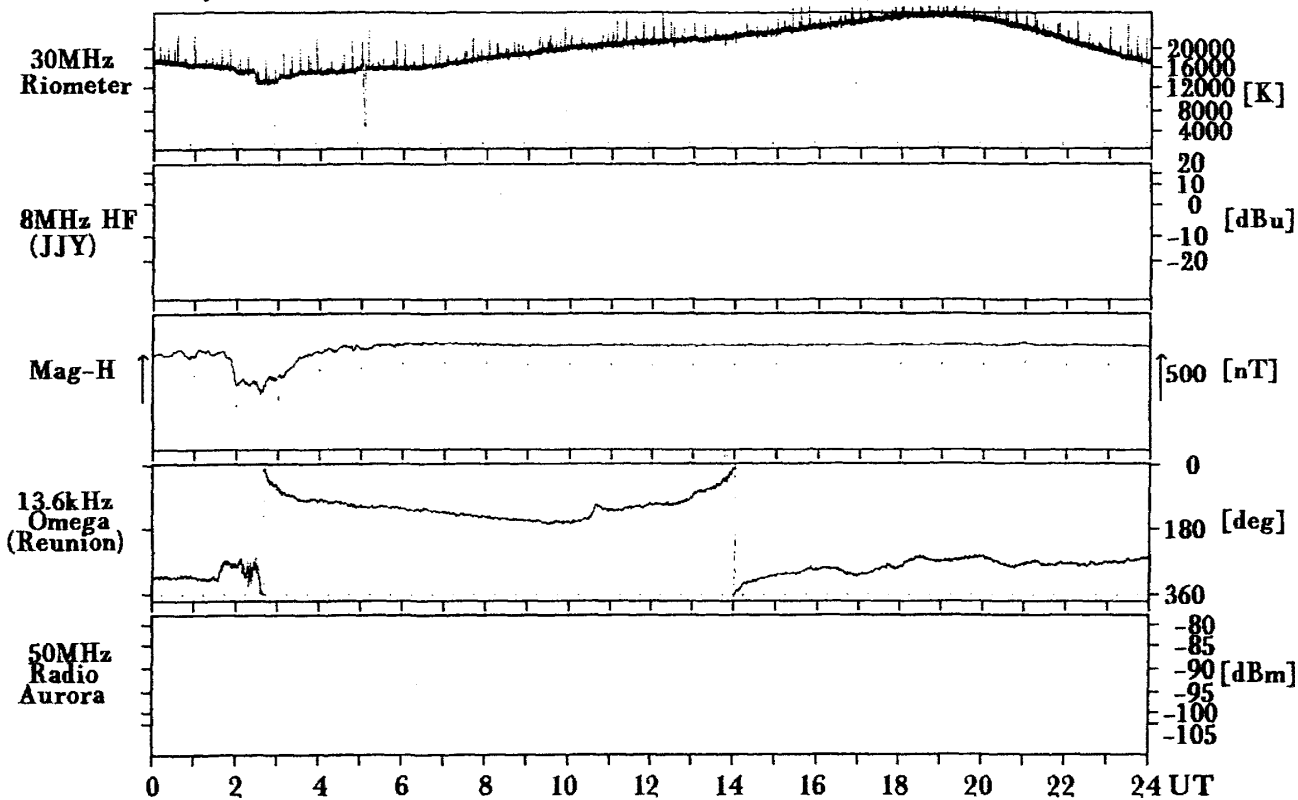
Syowa Station

Total Day / 210 1993/ 7/29



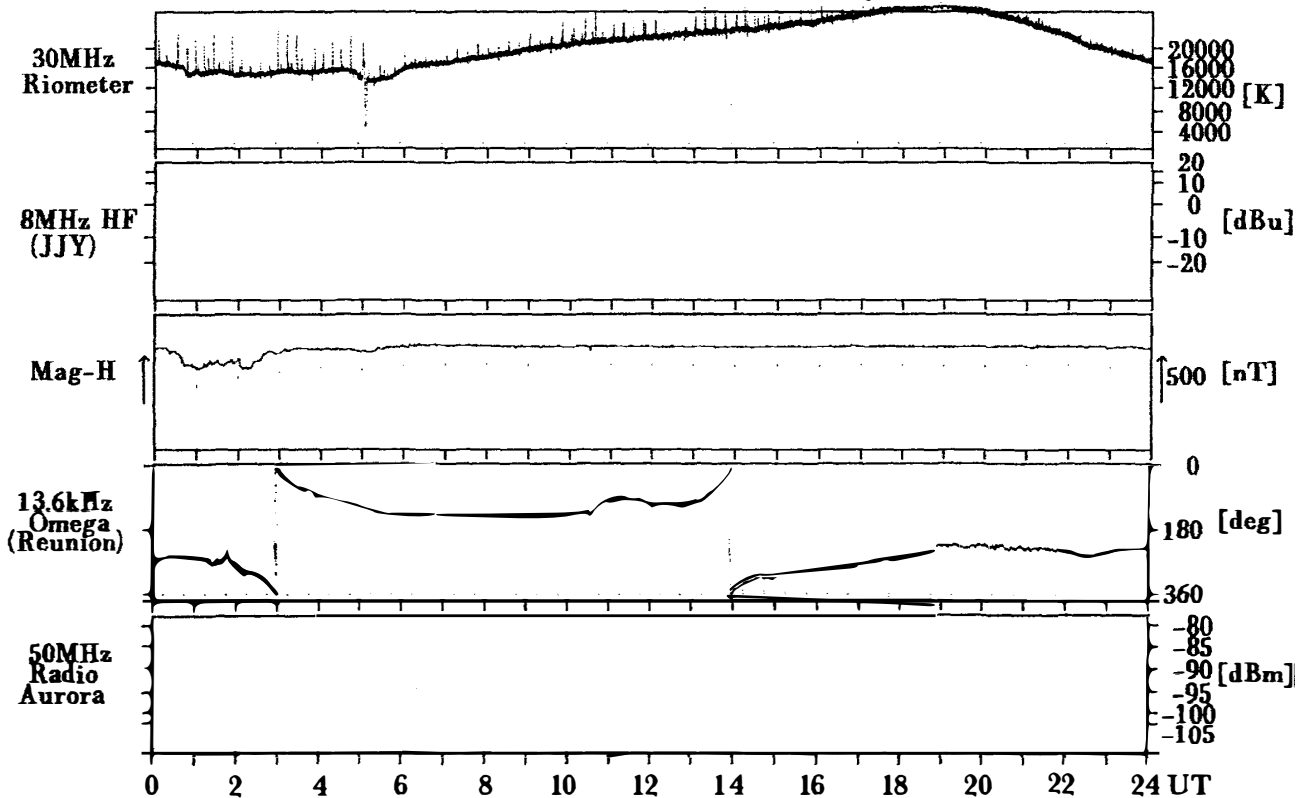
Syowa Station

Total Day / 211 1993/ 7/30



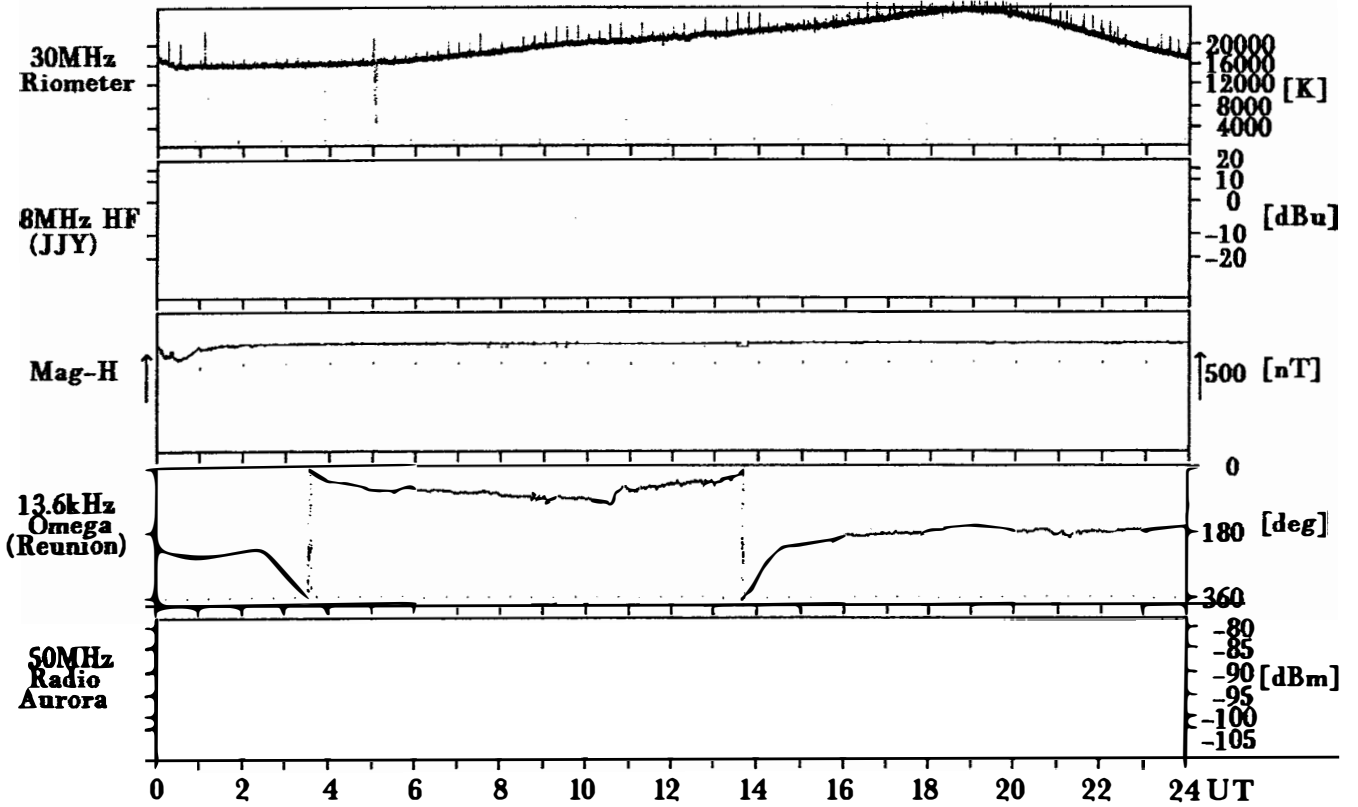
Syowa Station

Total Day / 212 1993/ 7/31



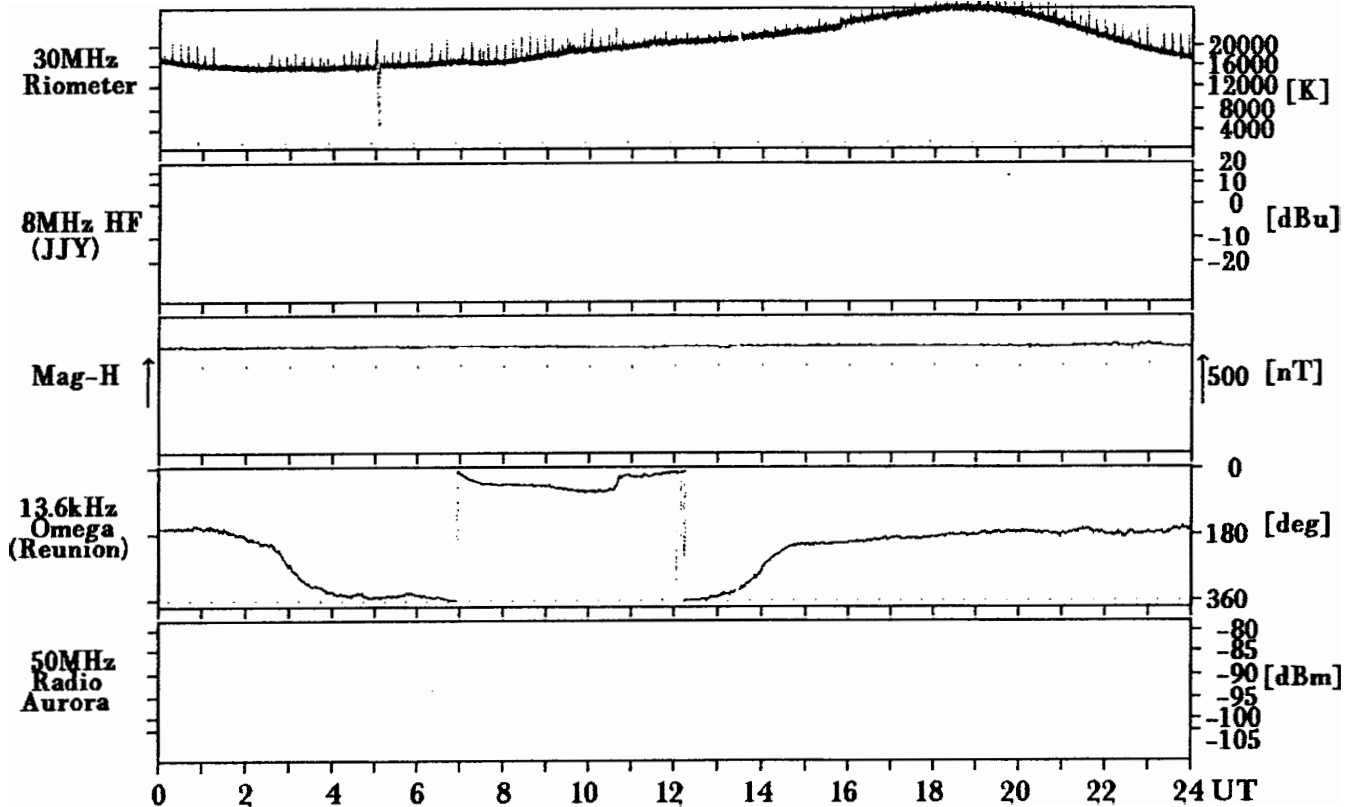
Syowa Station

Total Day / 213 1993/ 8/ 1



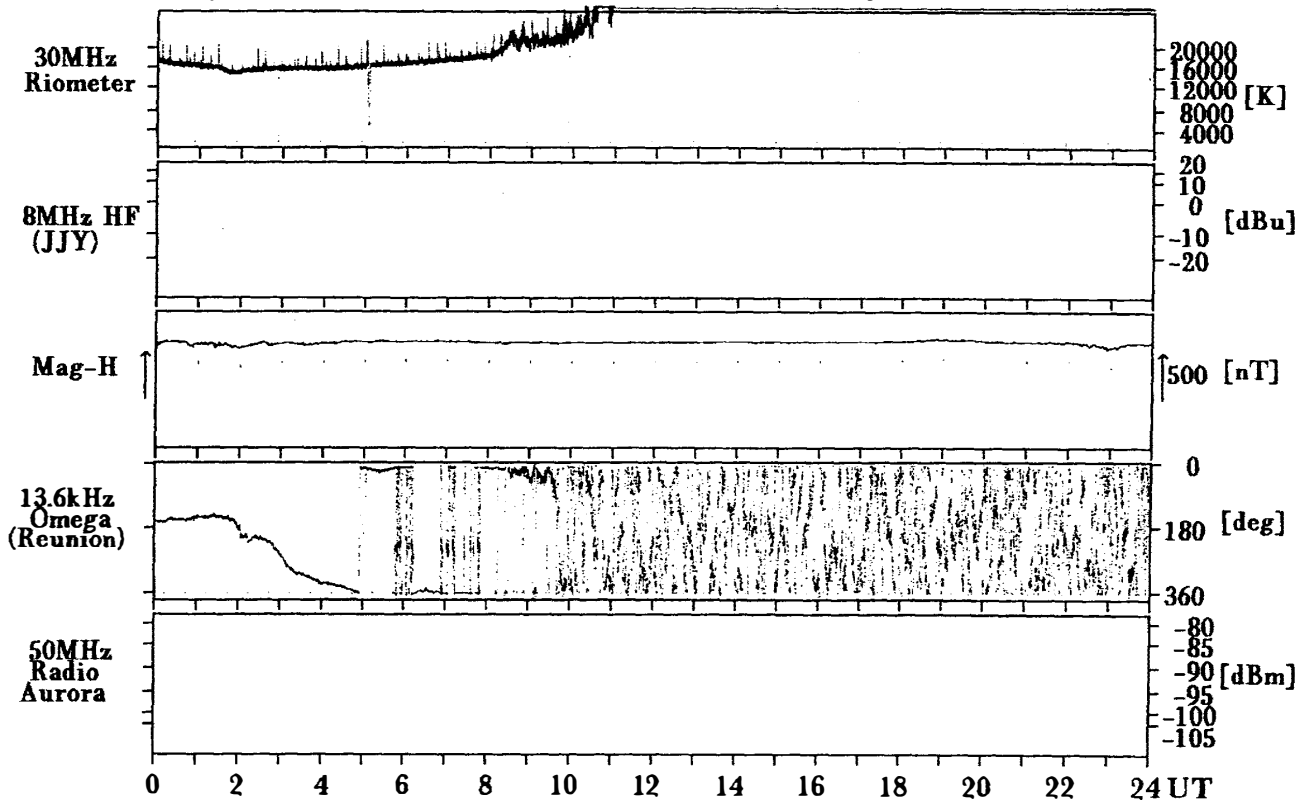
Syowa Station

Total Day / 214 1993/ 8/ 2



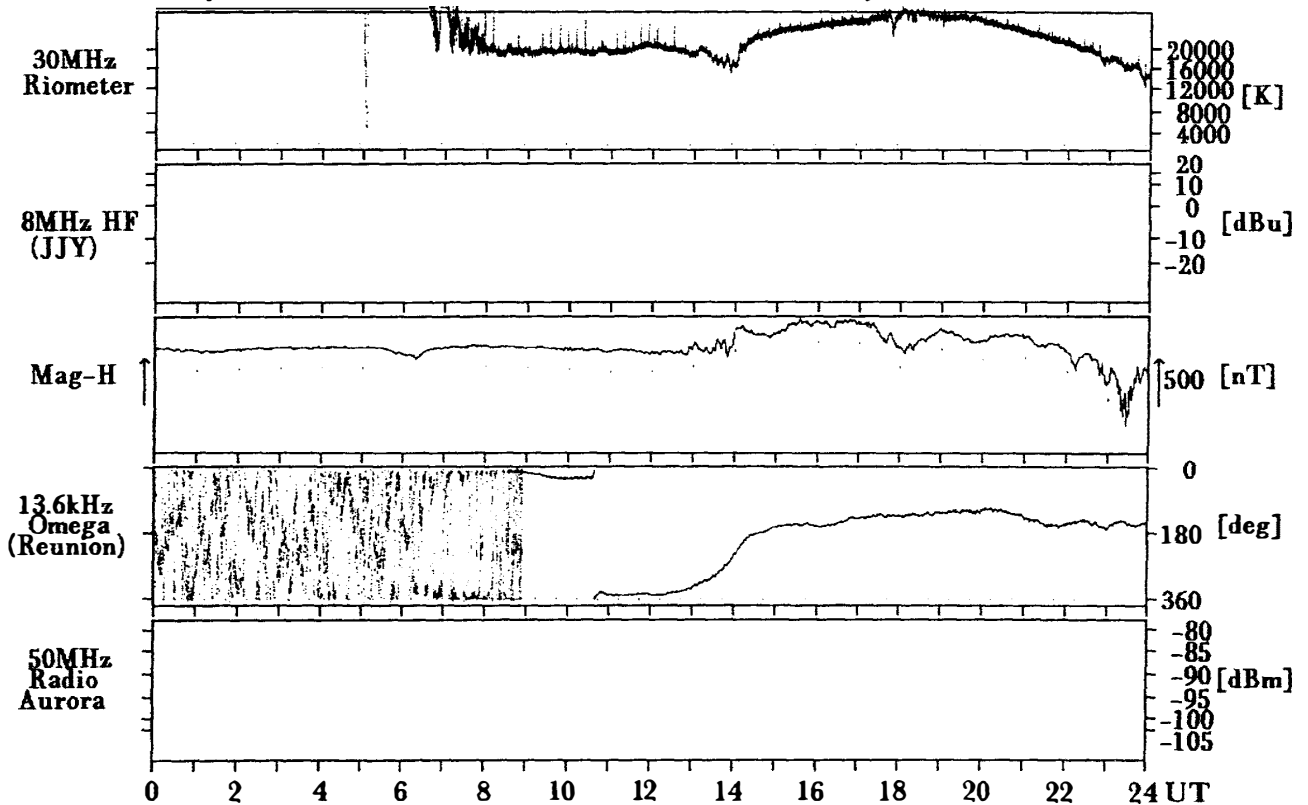
Syowa Station

Total Day / 215 1993/ 8/ 3



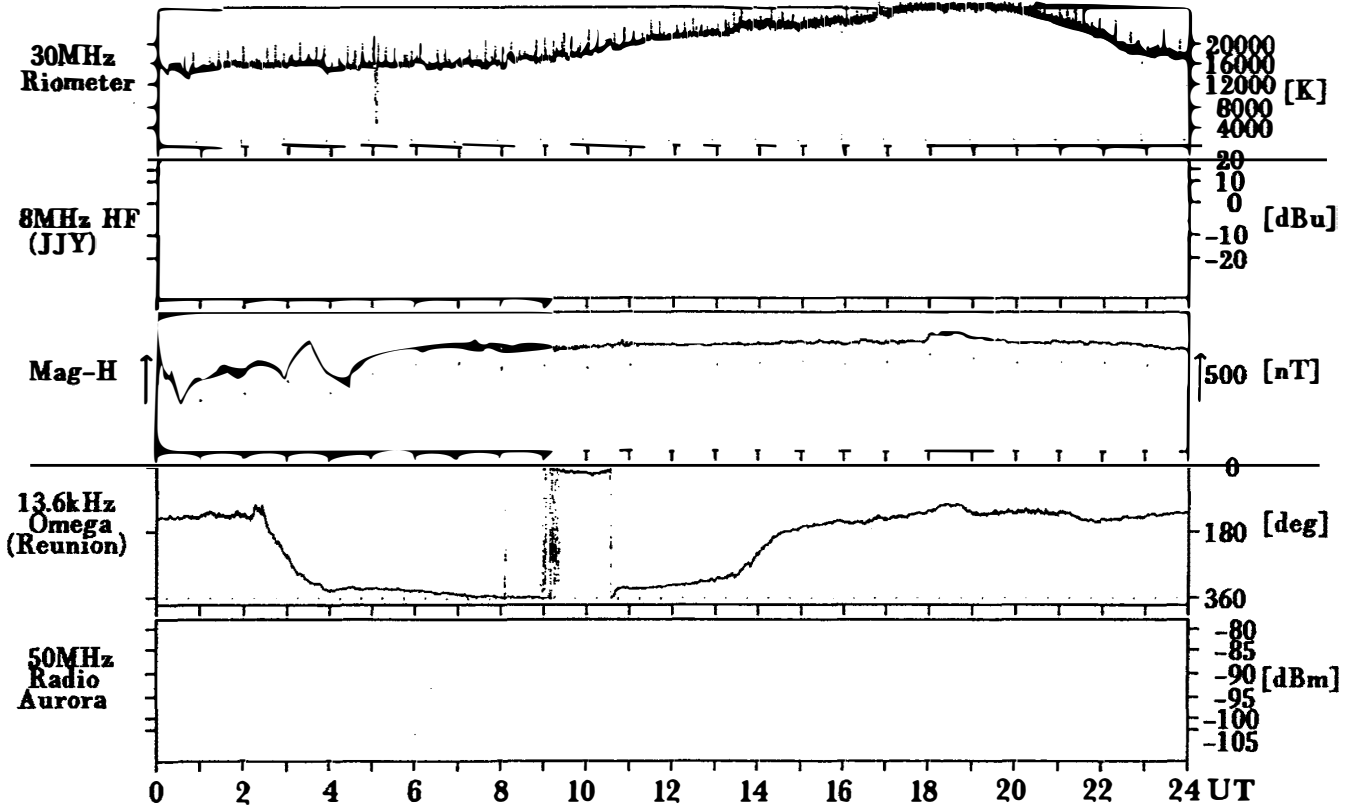
Syowa Station

Total Day / 216 1993/ 8/ 4



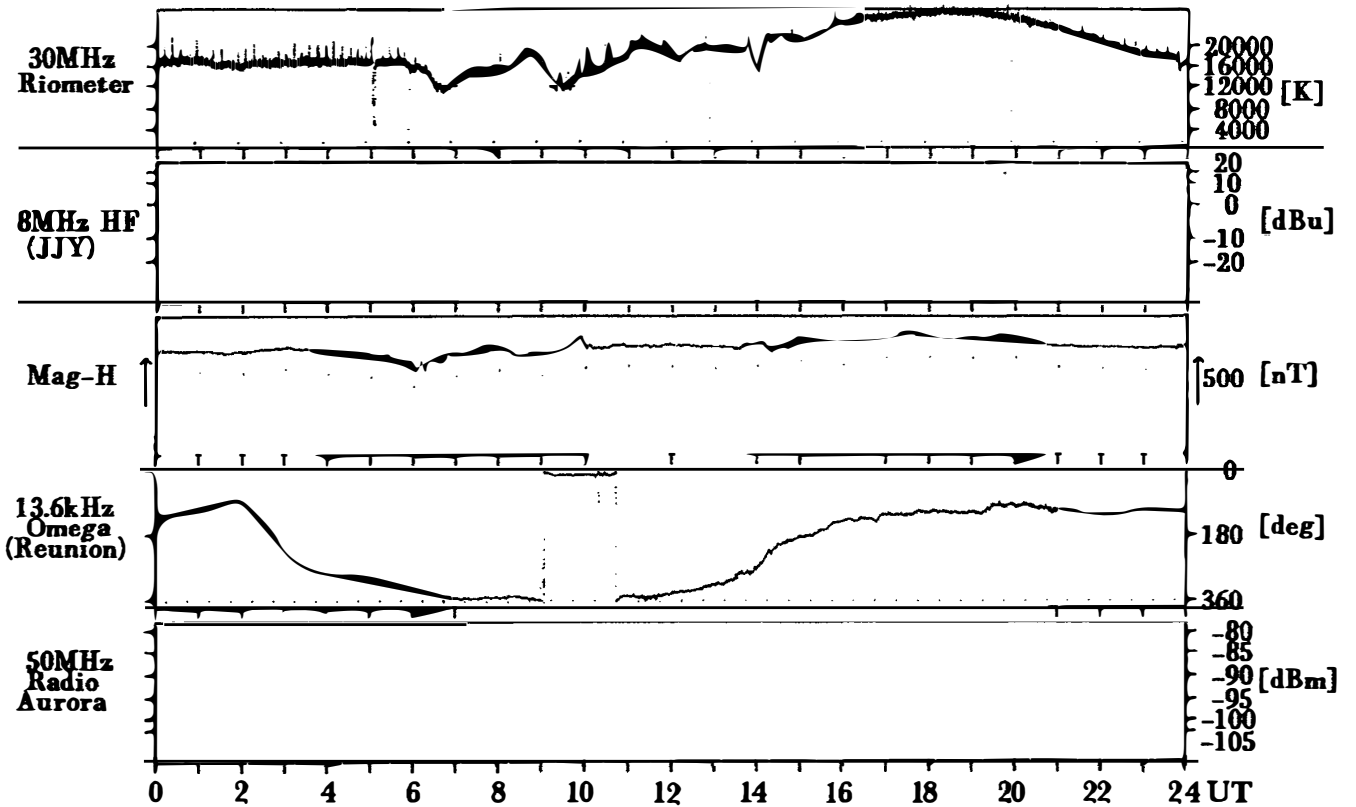
Syowa Station

Total Day / 217 1993/ 8/ 5



Syowa Station

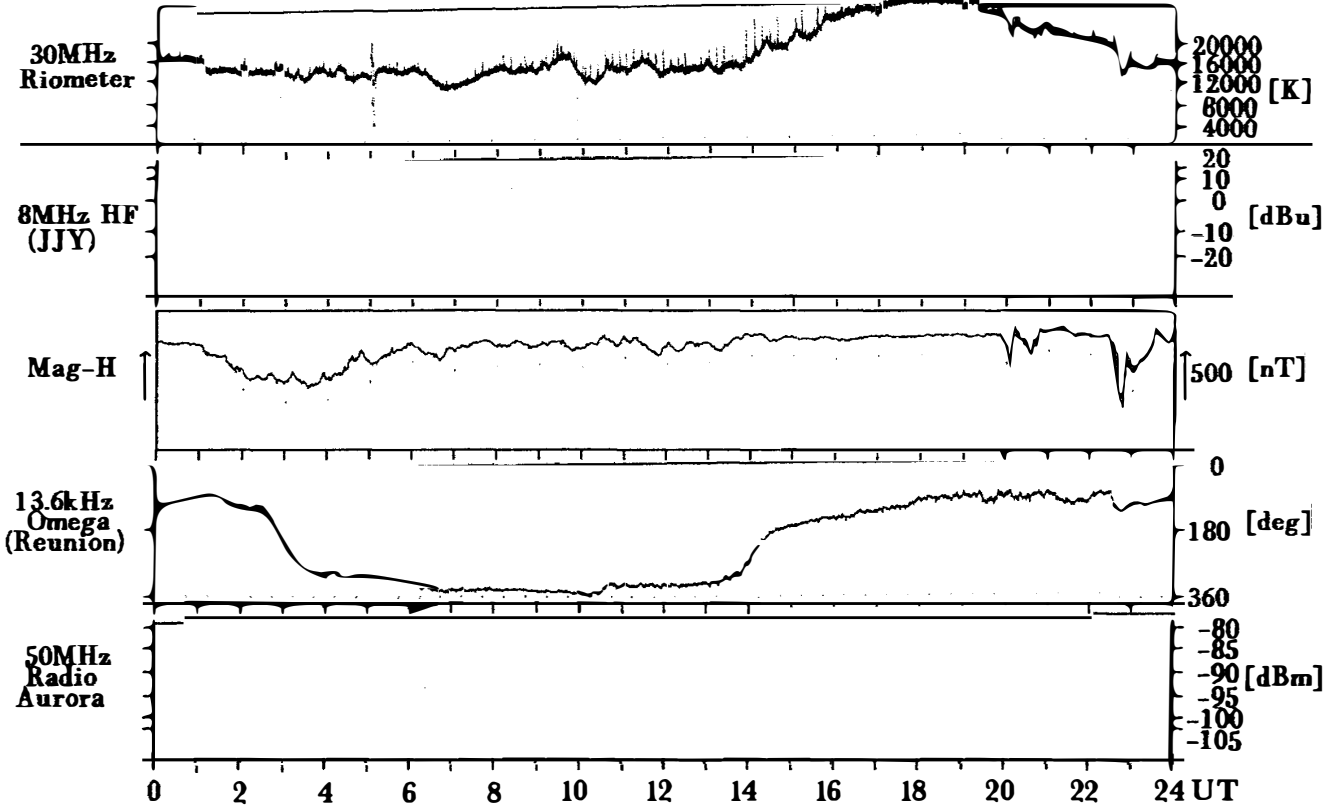
Total Day / 218 1993/ 8/ 6





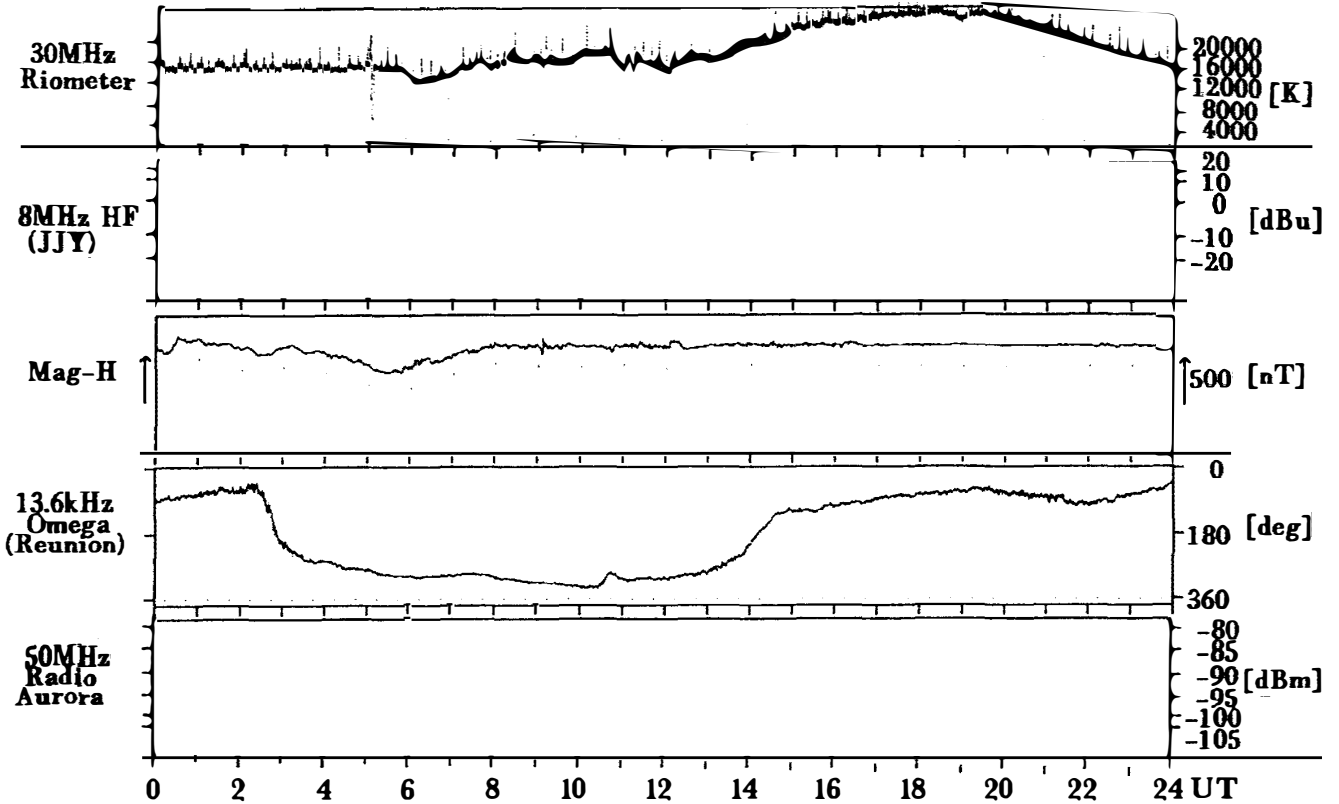
Syowa Station

Total Day / 219 1993/ 8/ 7



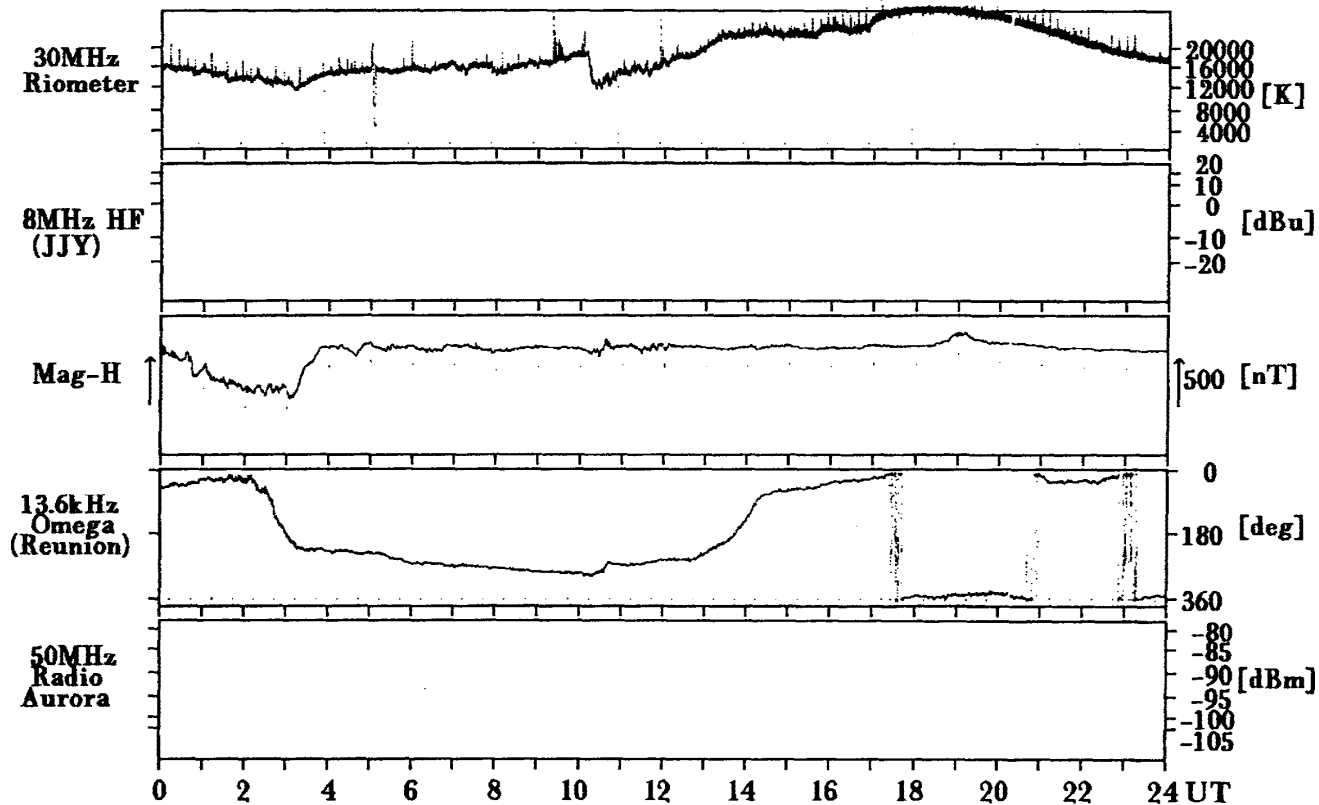
Syowa Station

Total Day / 220 1993/ 8/ 8



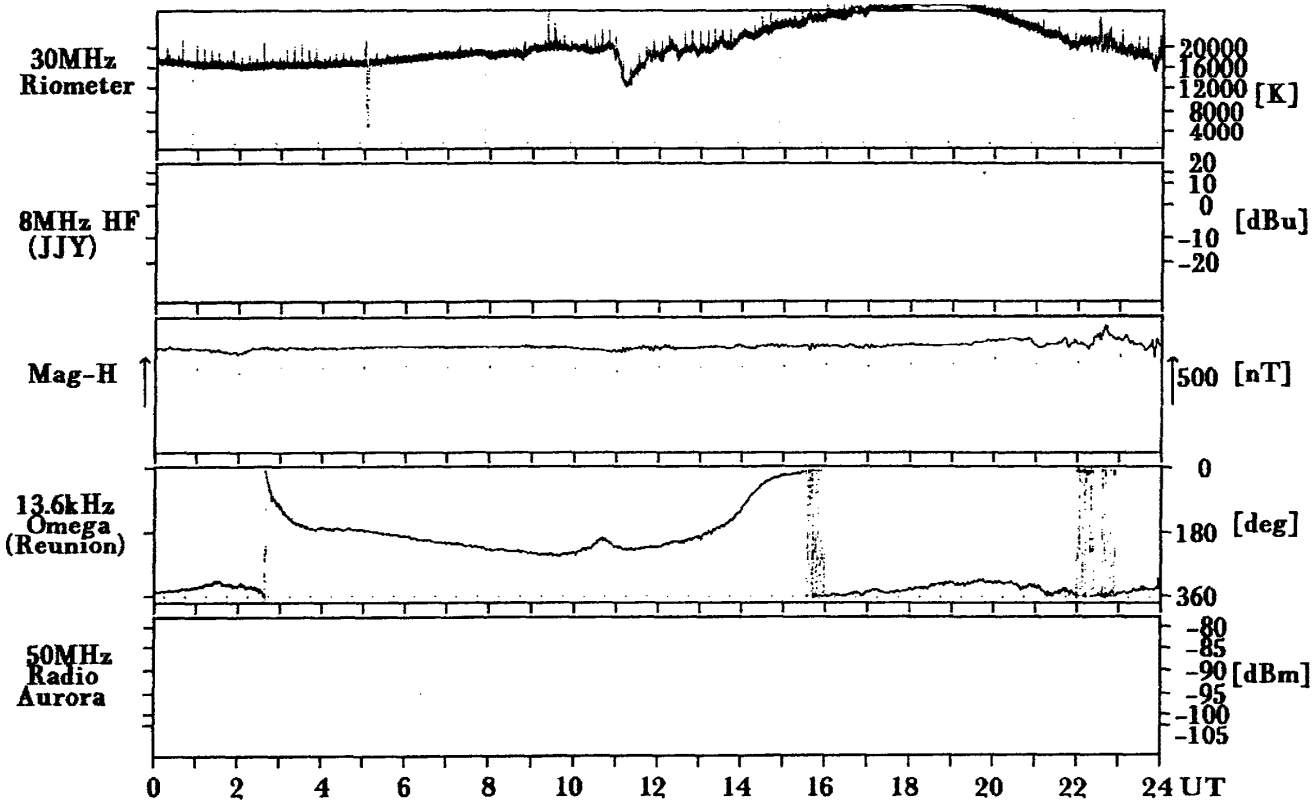
Syowa Station

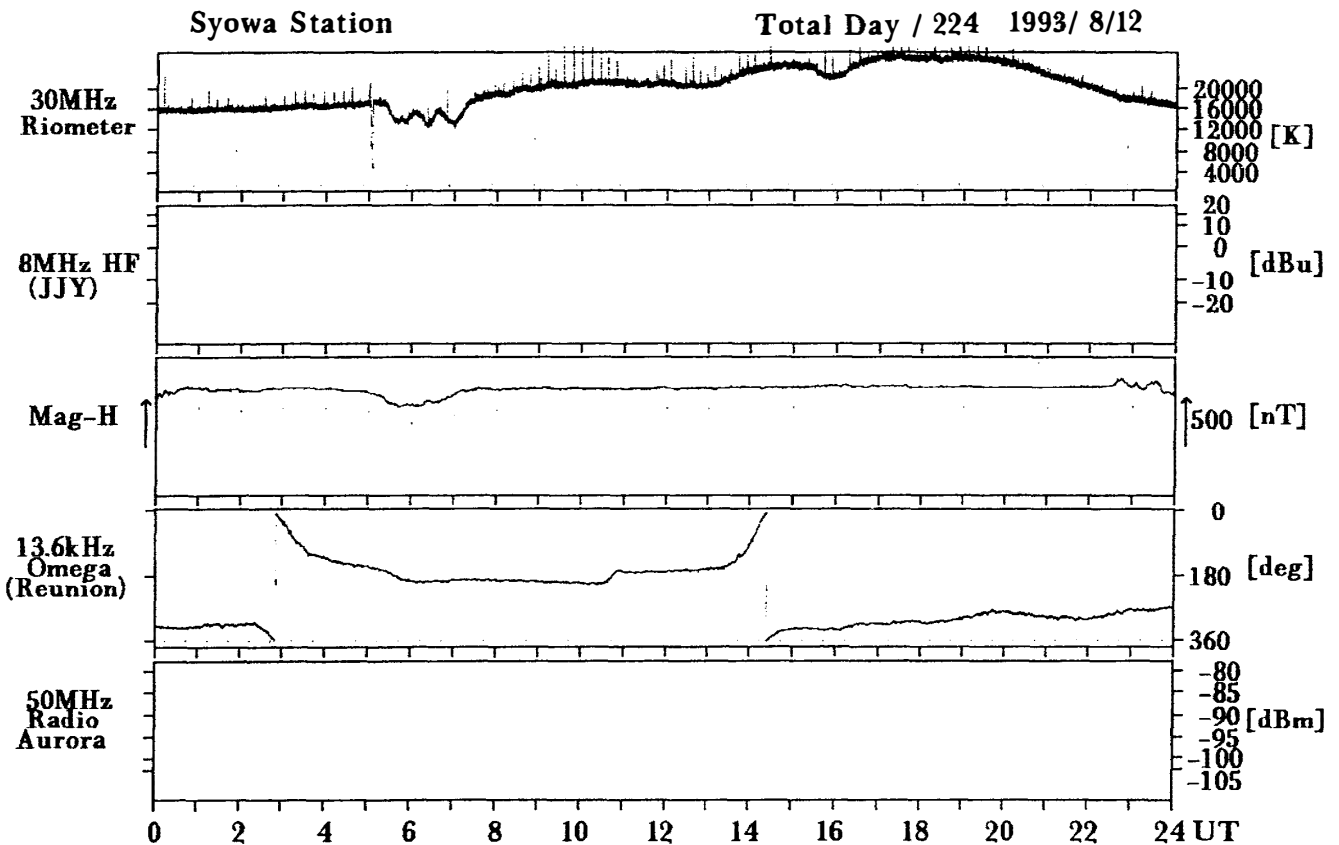
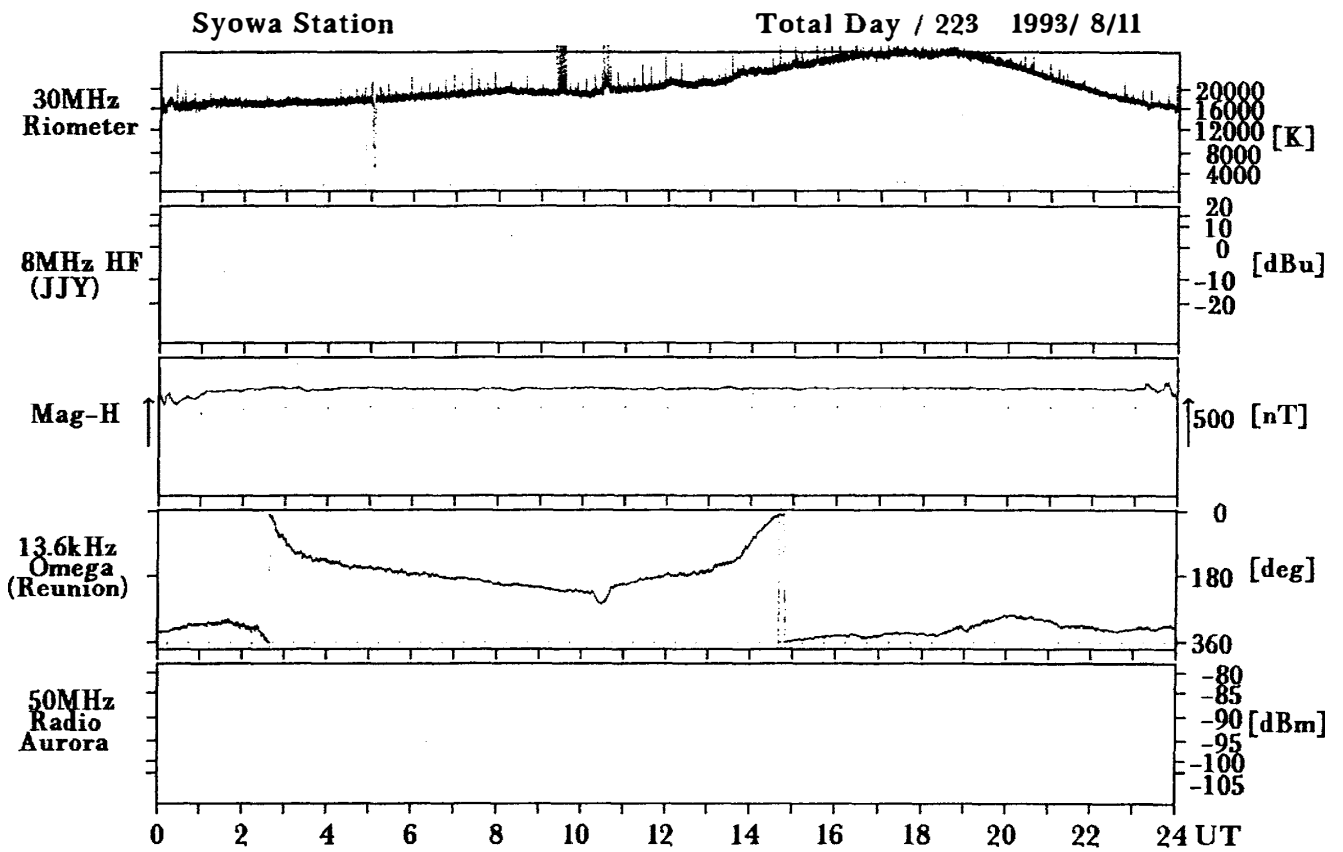
Total Day / 221 1993/ 8/ 9

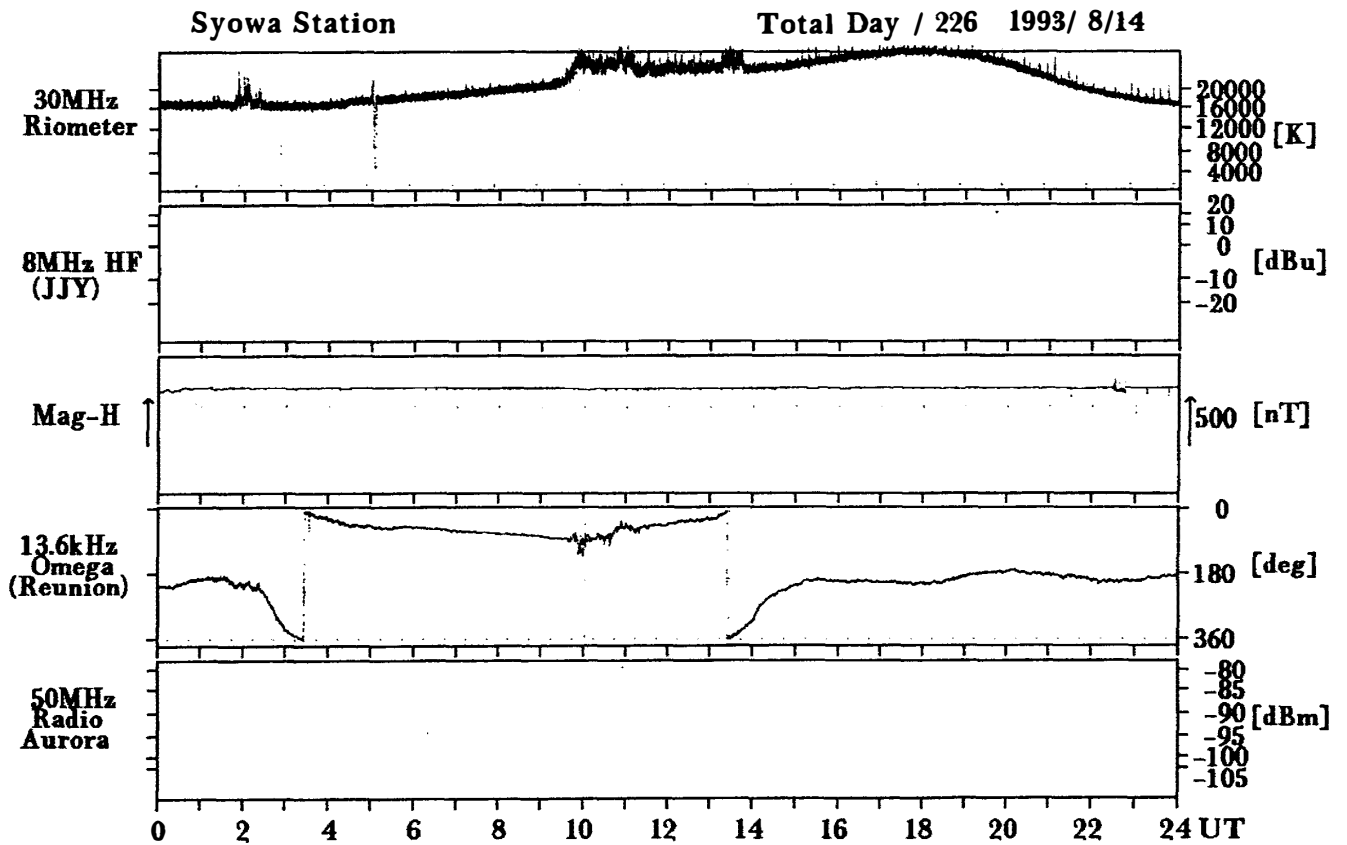
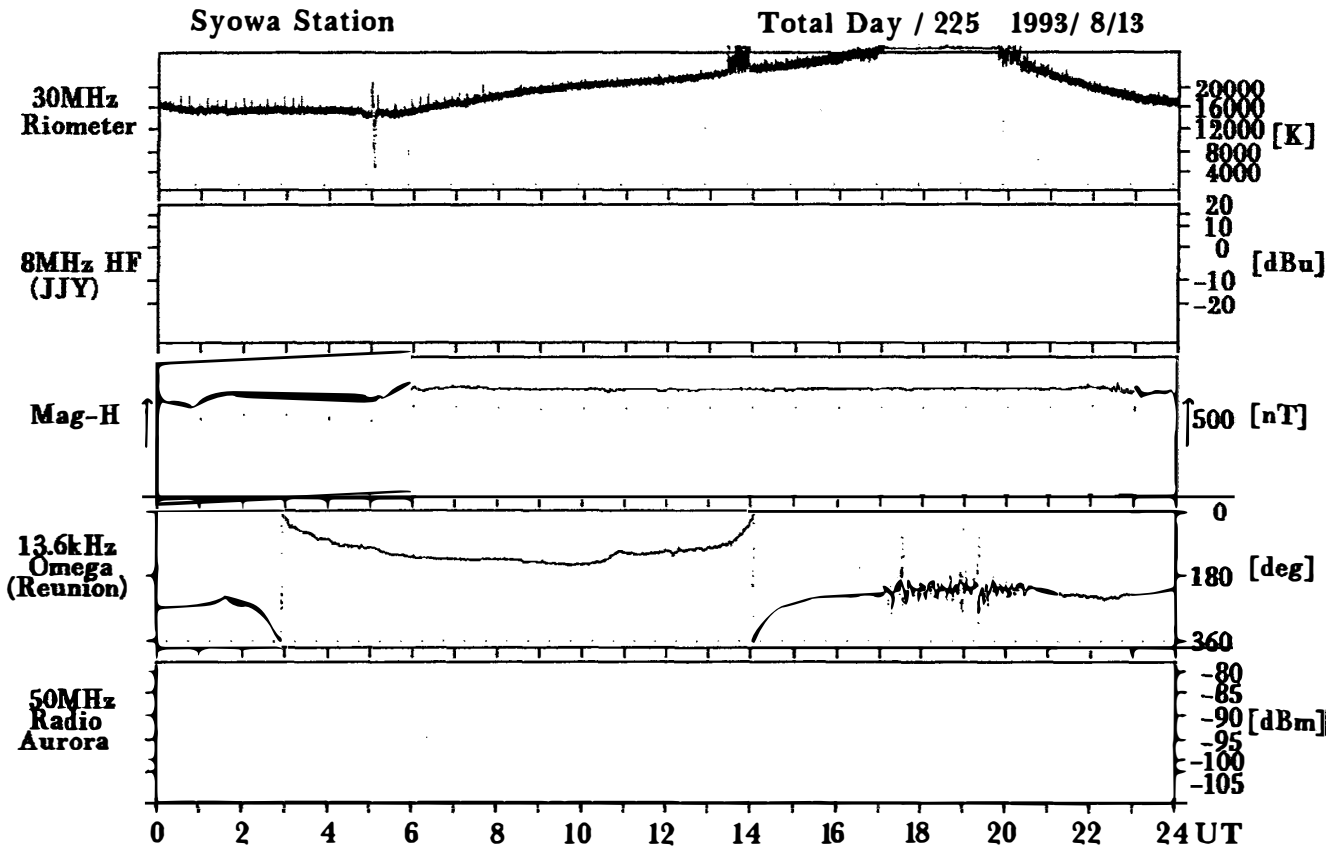


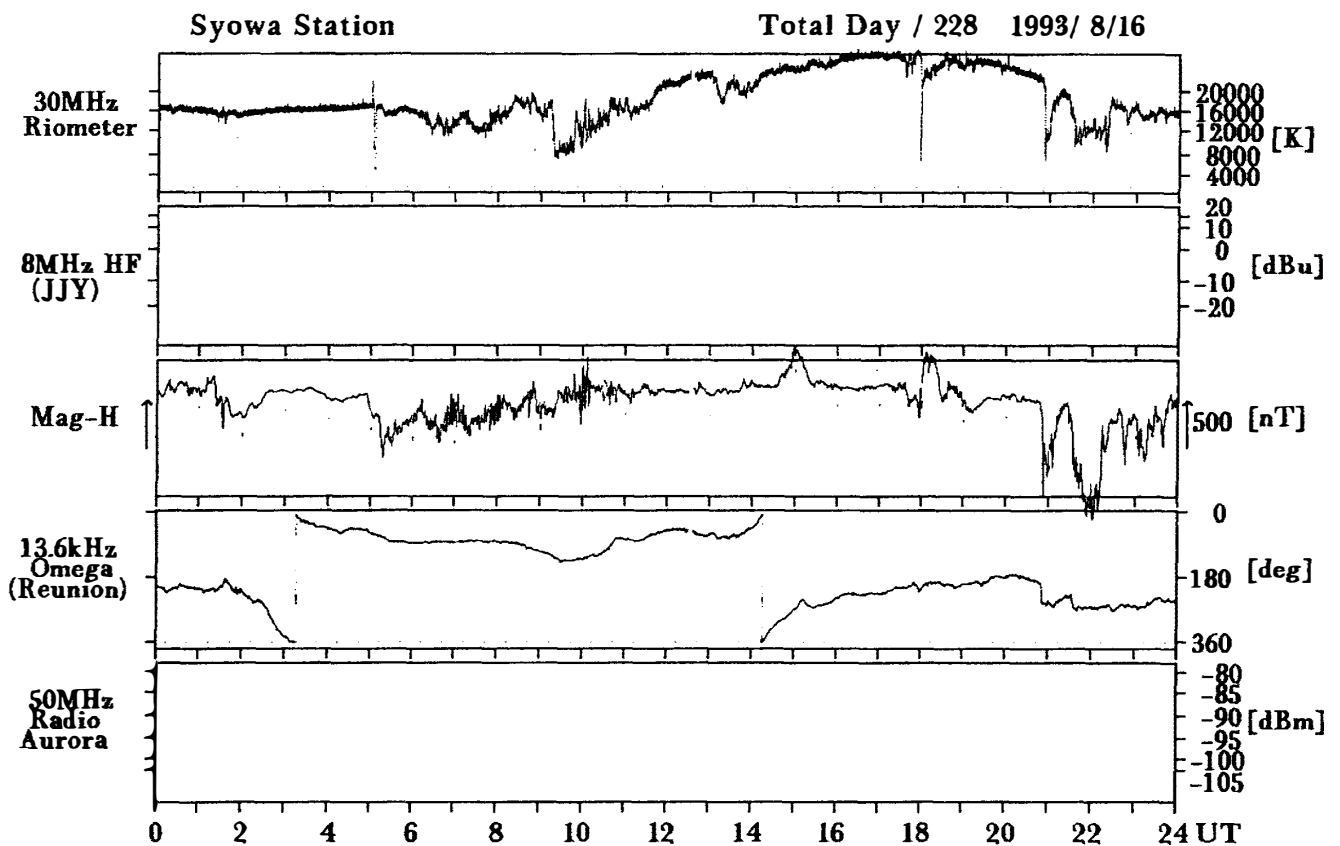
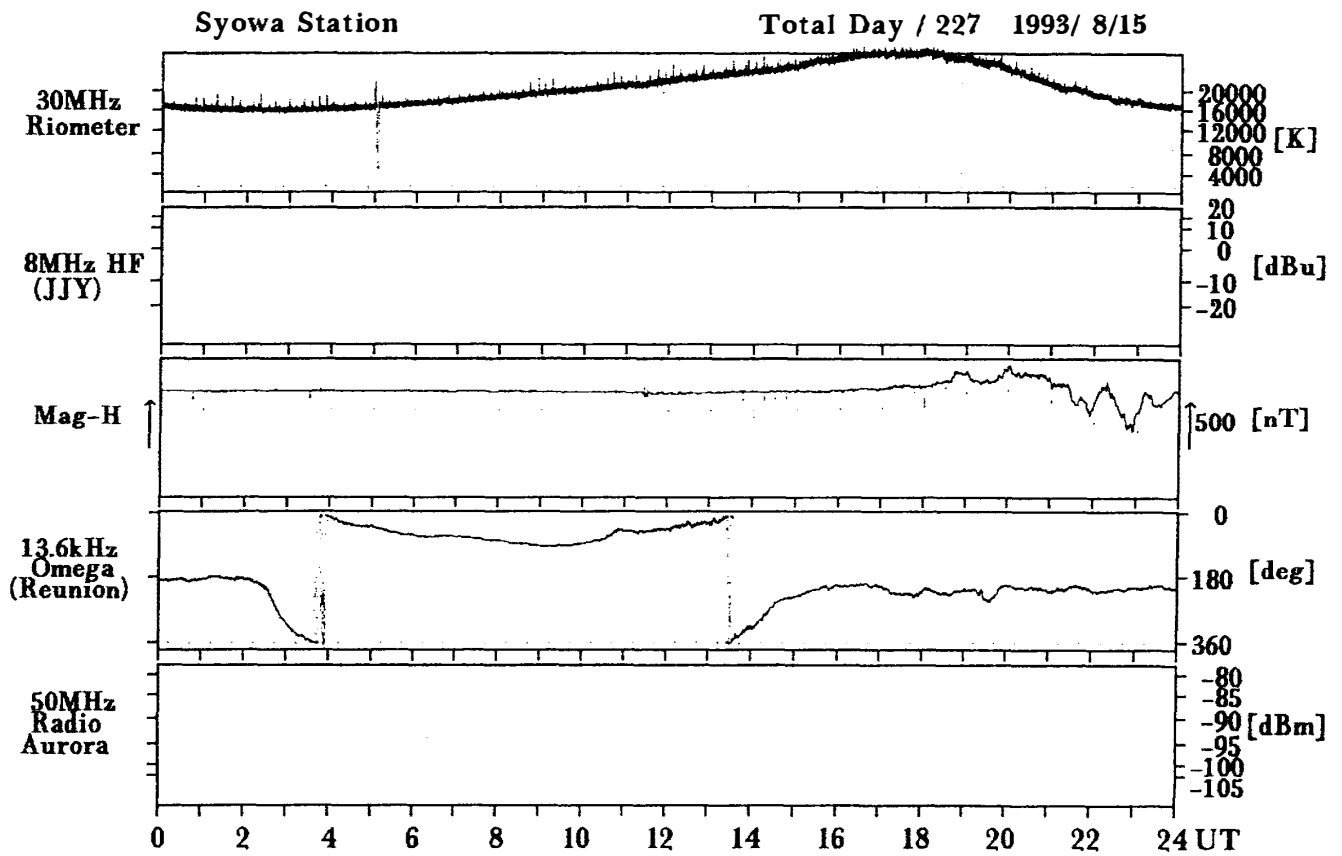
Syowa Station

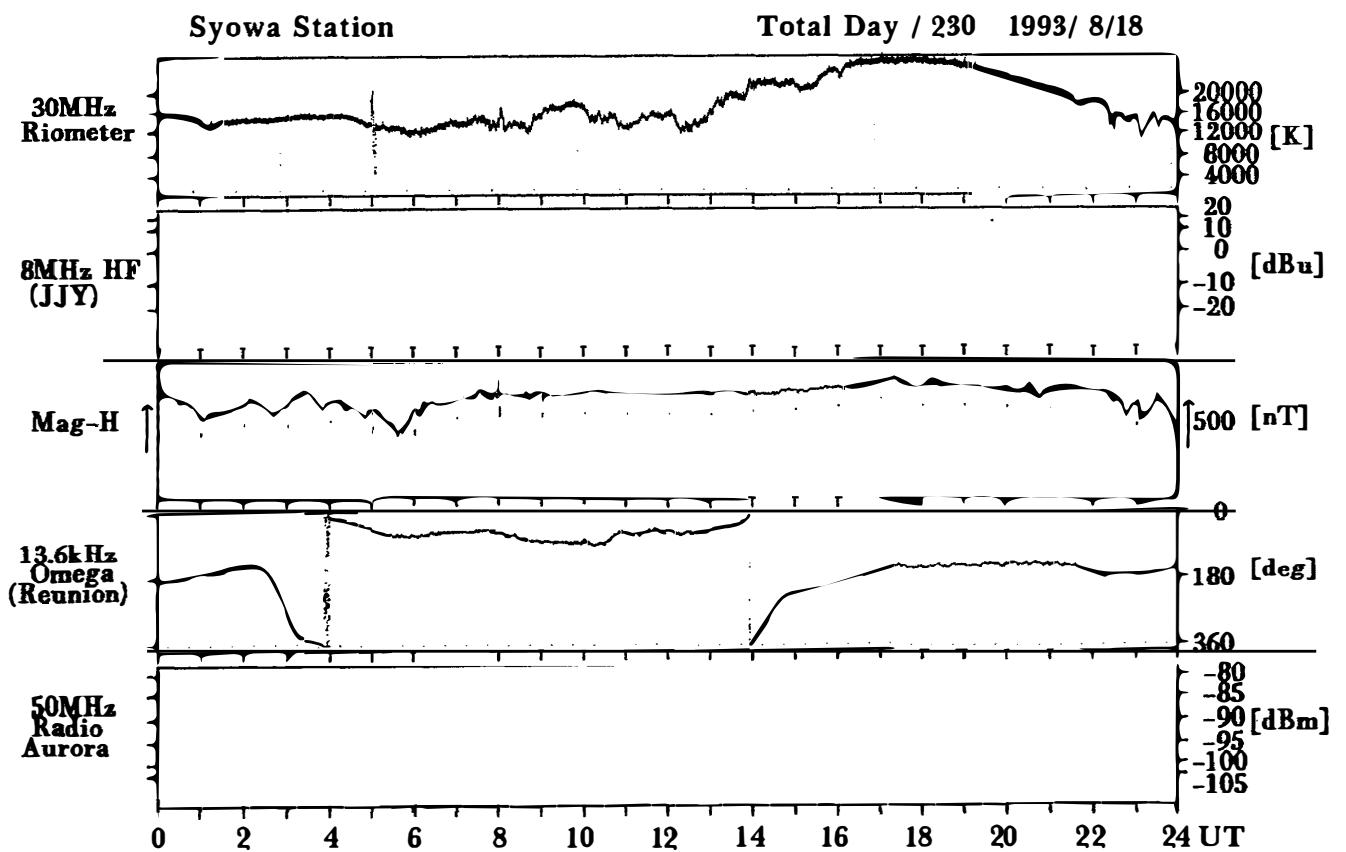
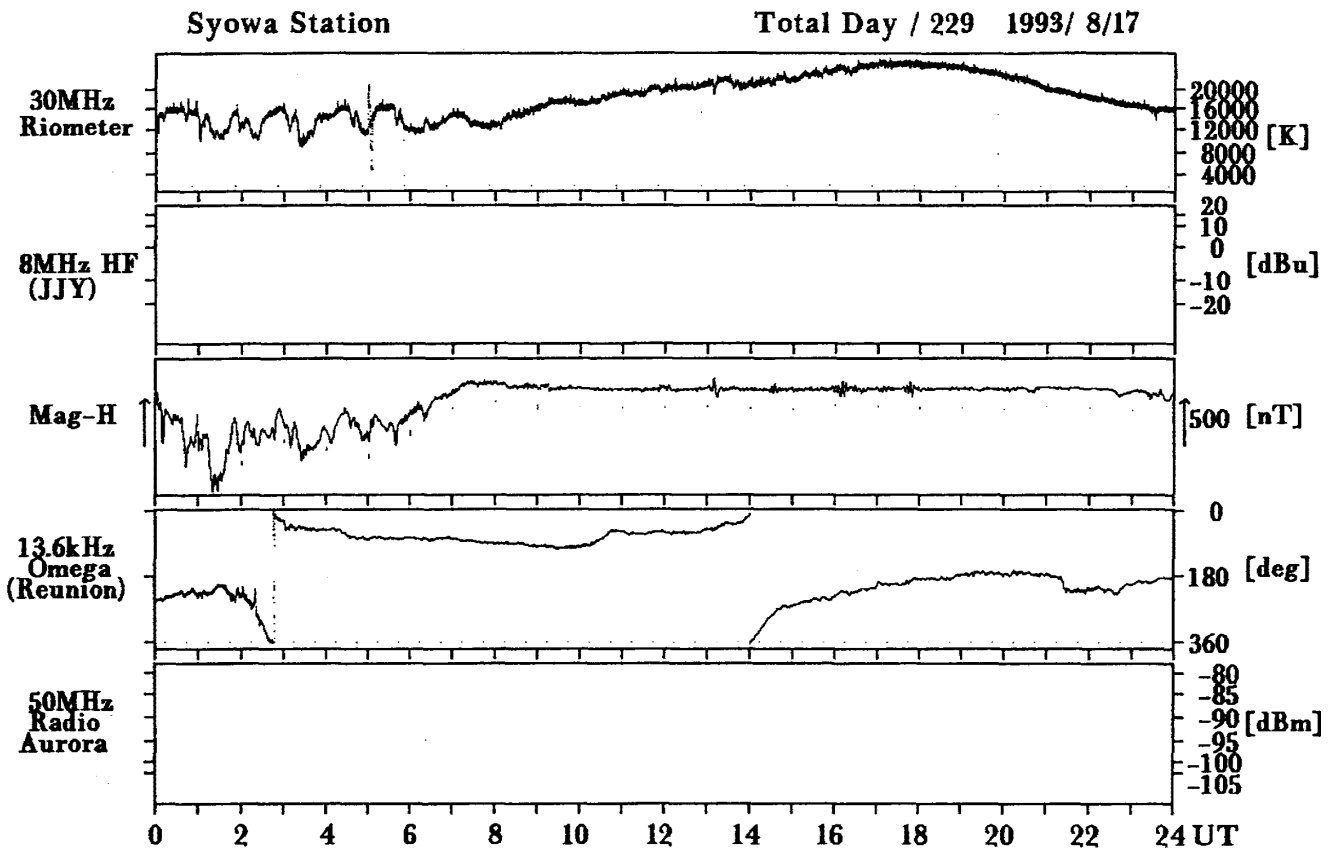
Total Day / 222 1993/ 8/10





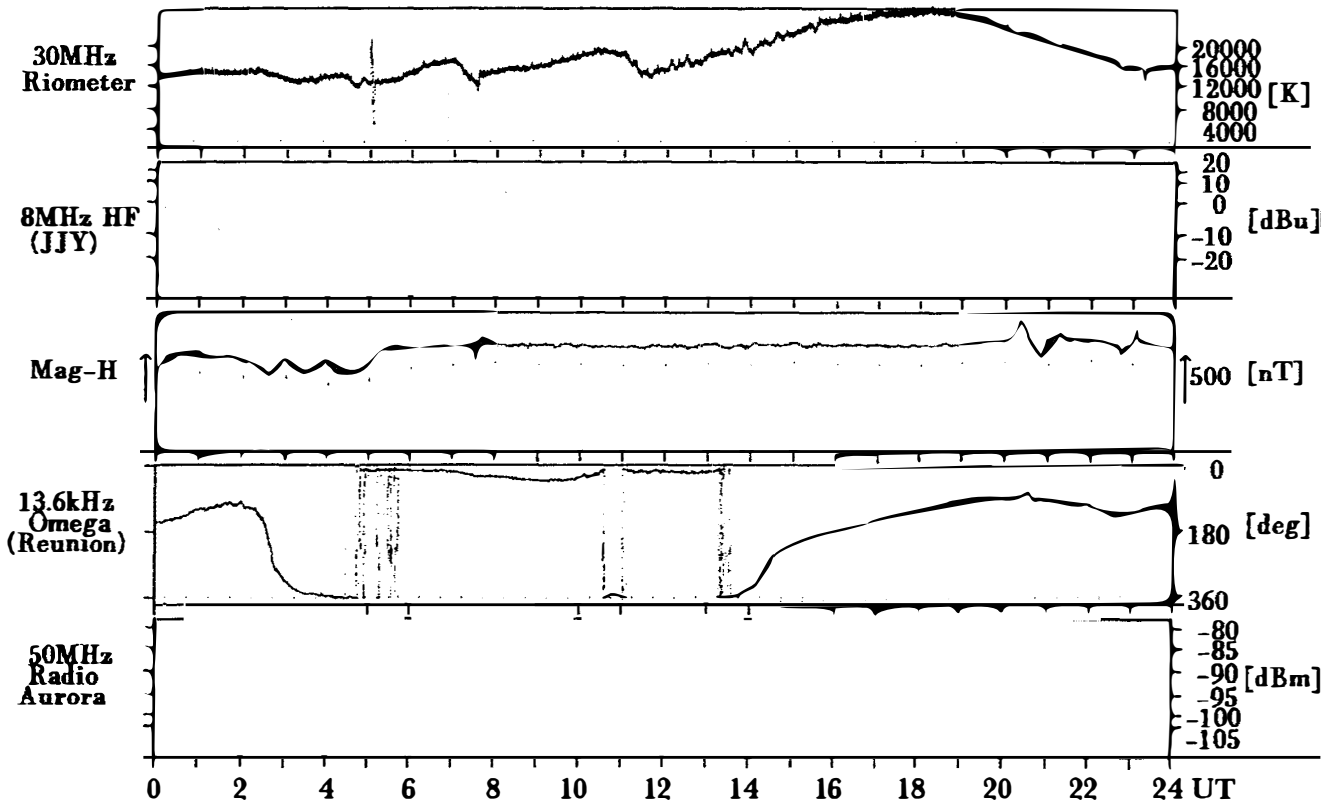






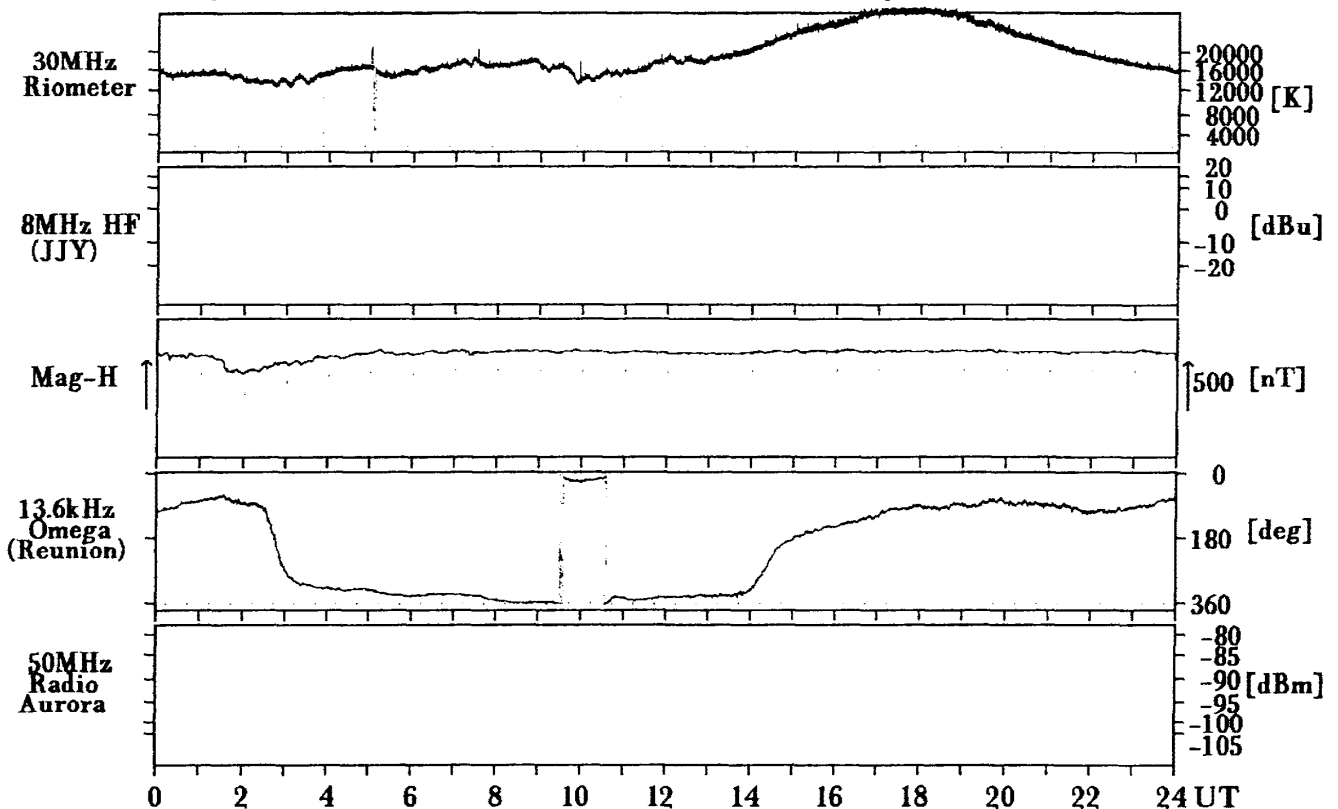
Syowa Station

Total Day / 231 1993/ 8/19



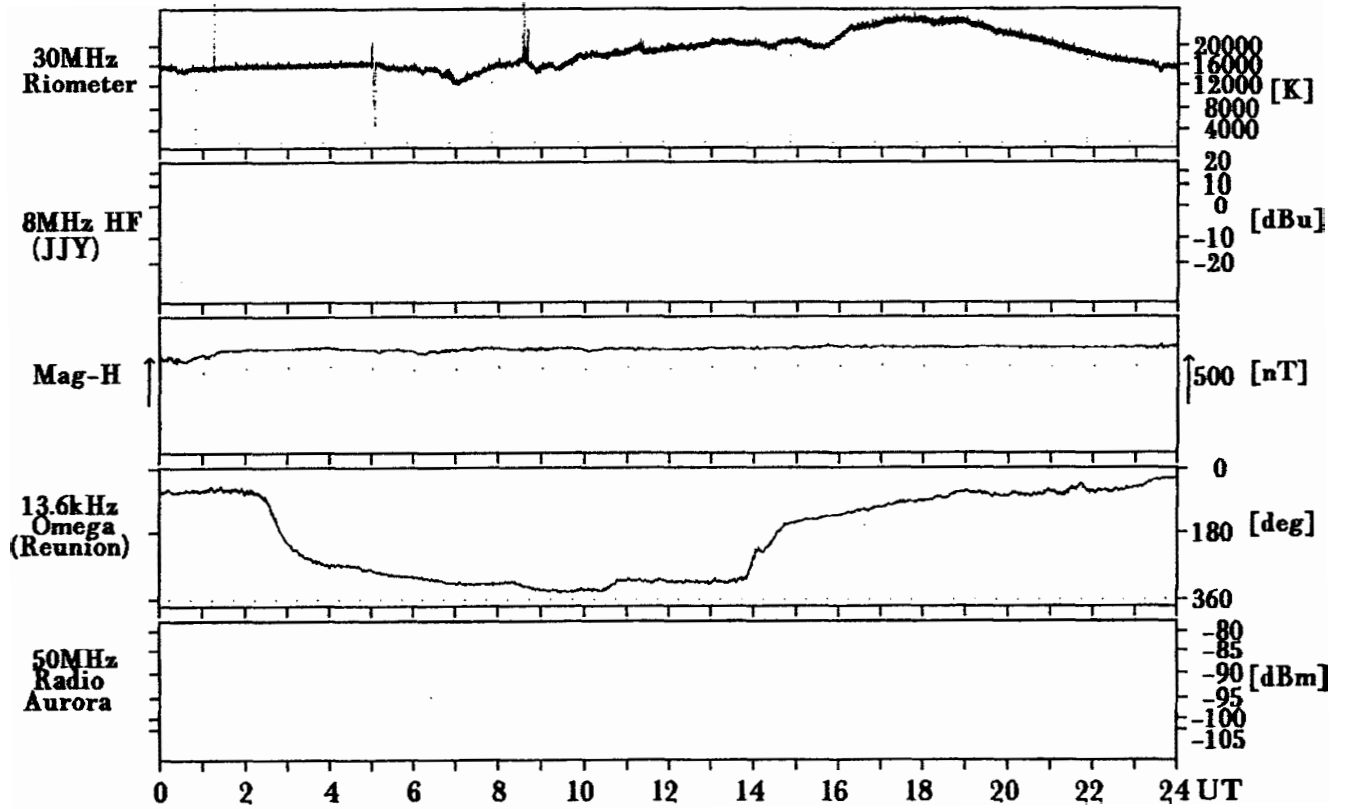
Syowa Station

Total Day / 232 1993/ 8/20



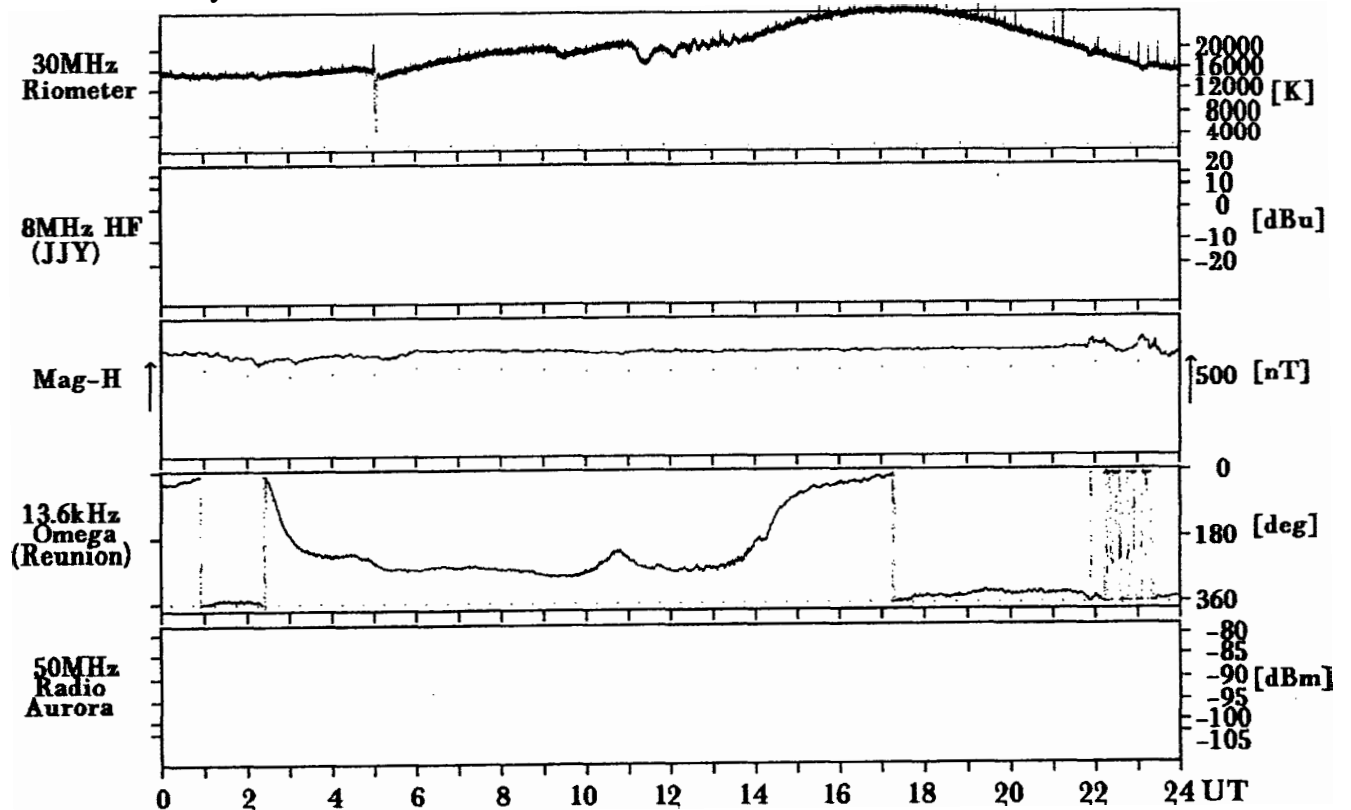
Syowa Station

Total Day / 233 1993/ 8/21



Syowa Station

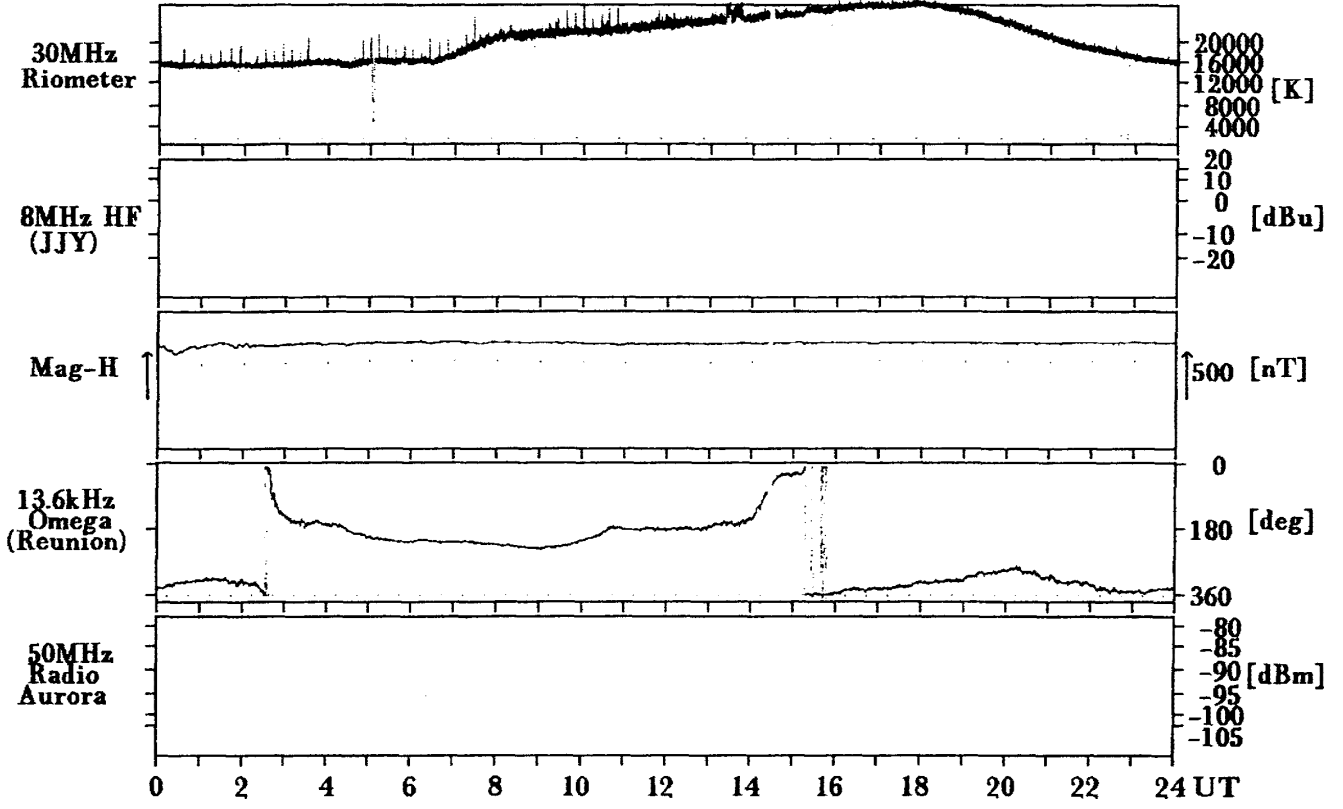
Total Day / 234 1993/ 8/22





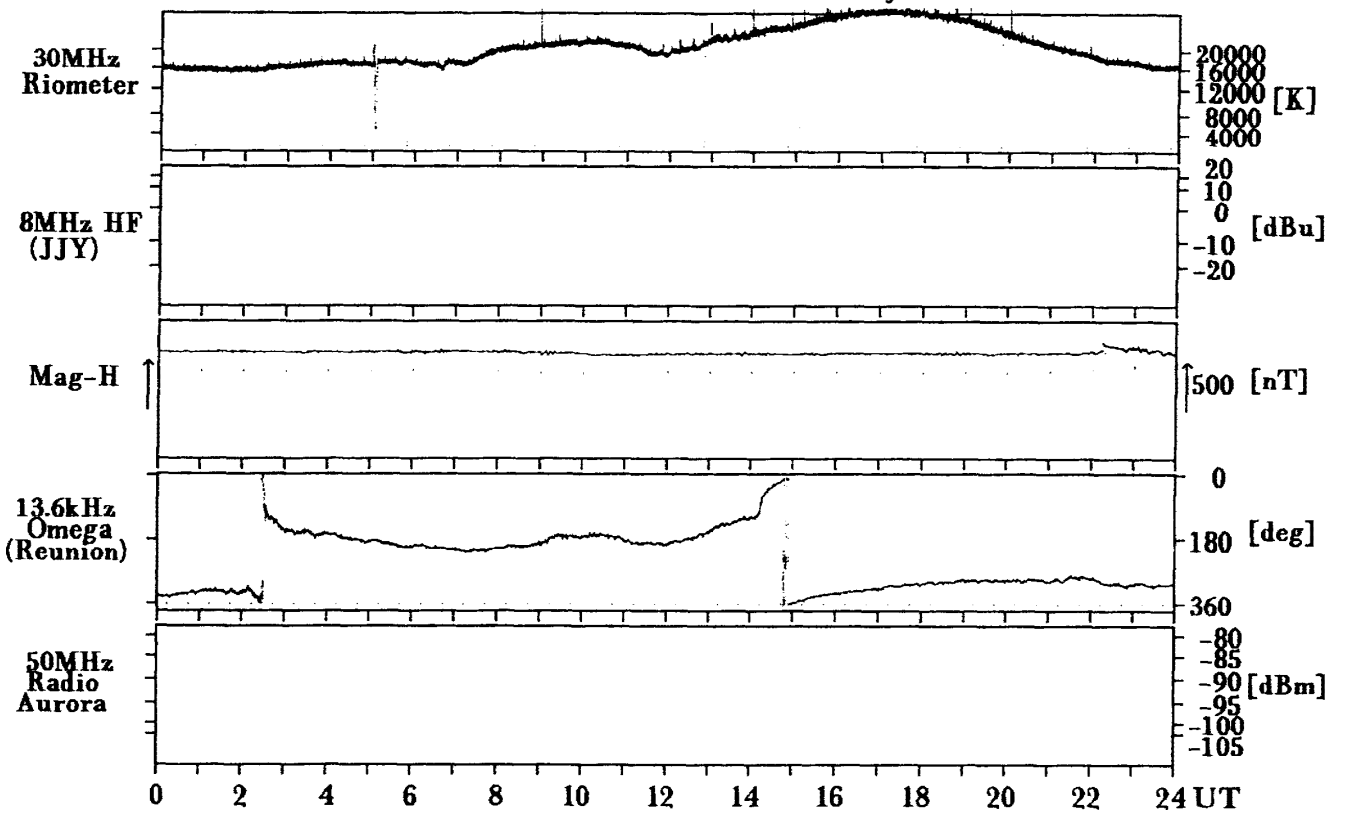
Syowa Station

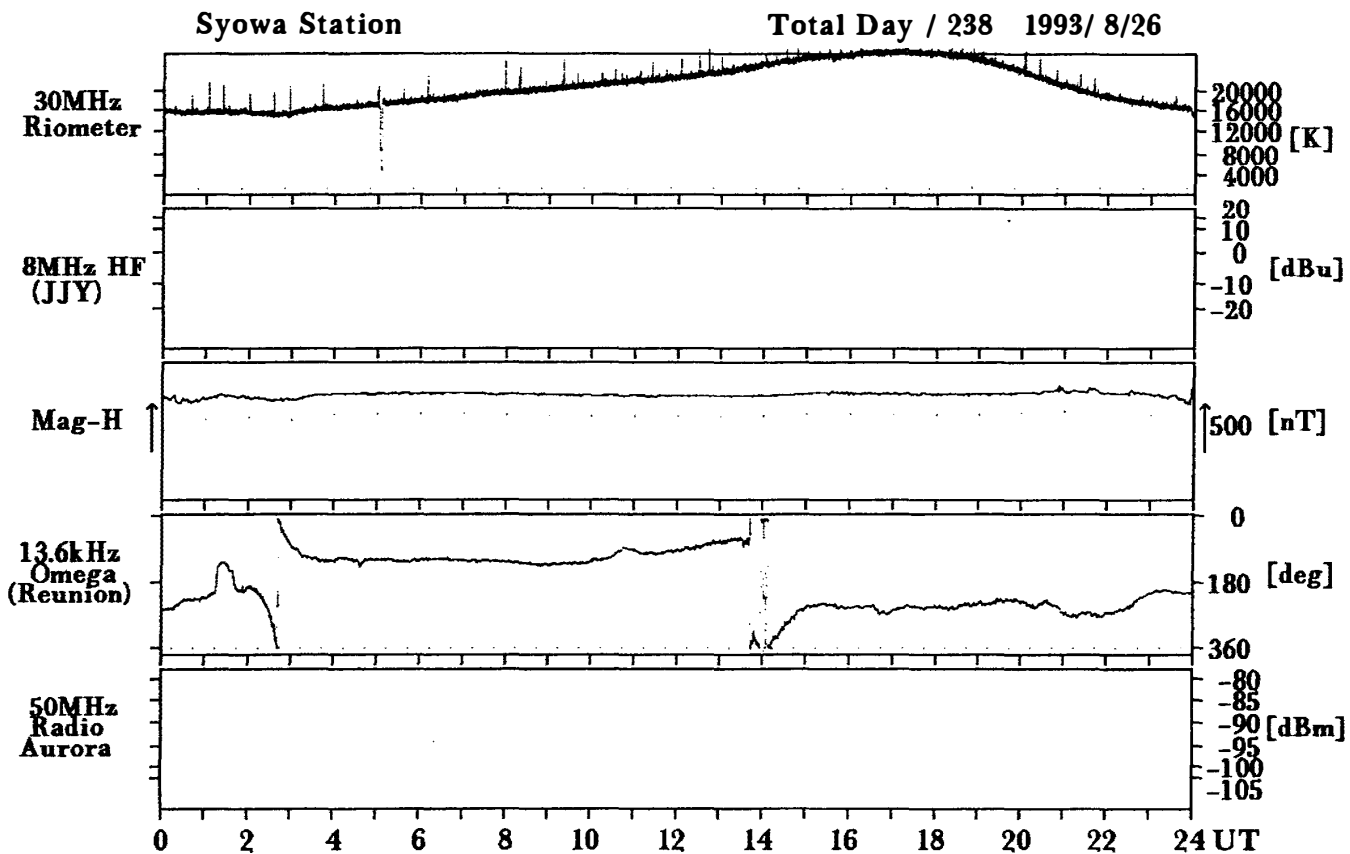
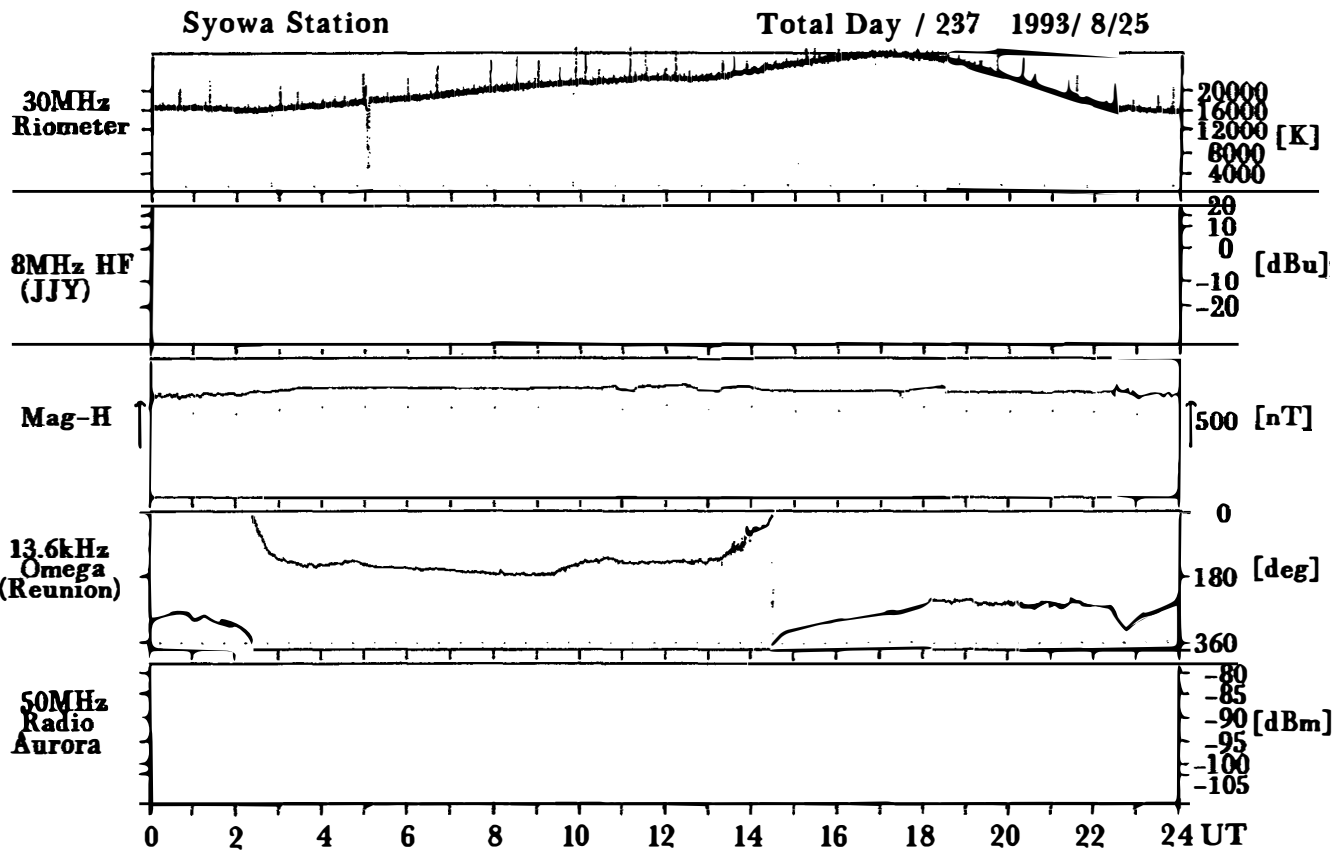
Total Day / 235 1993/ 8/23



Syowa Station

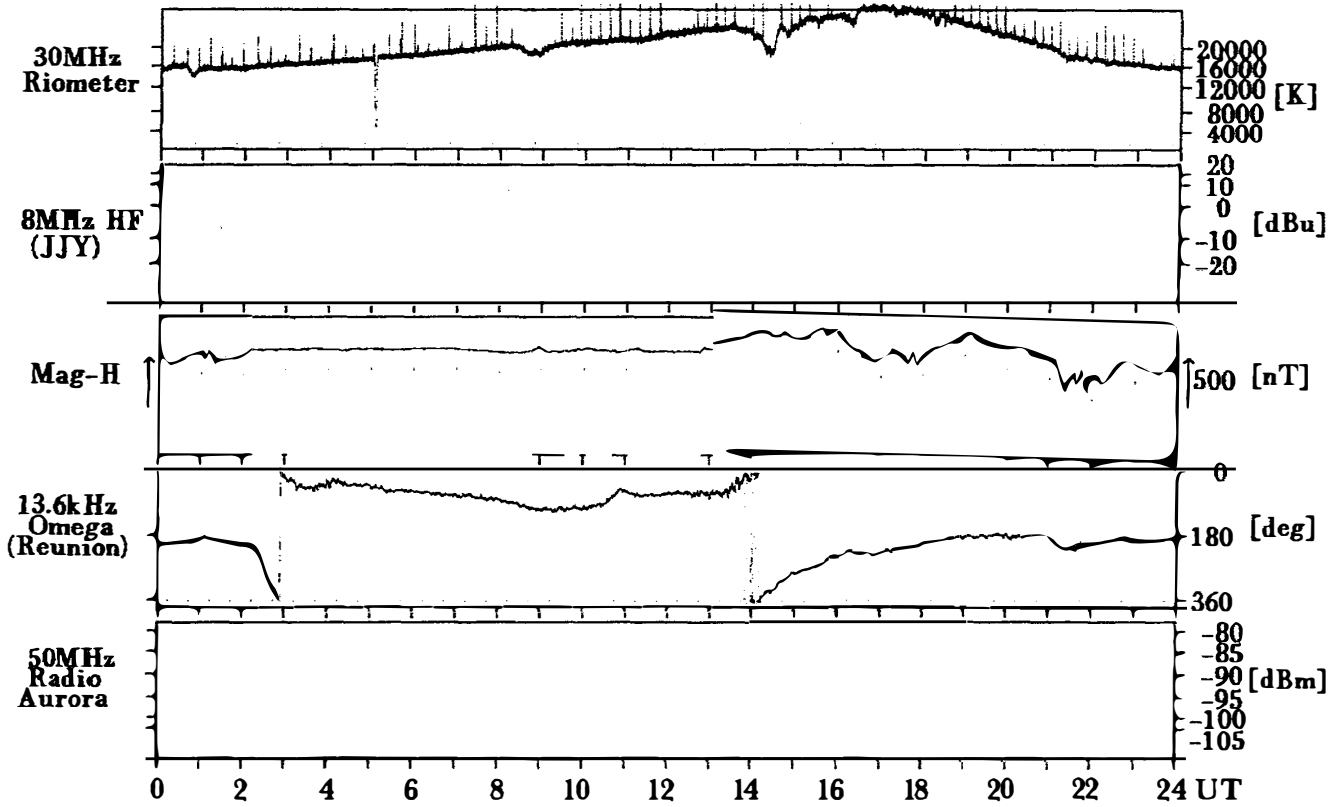
Total Day / 236 1993/ 8/24





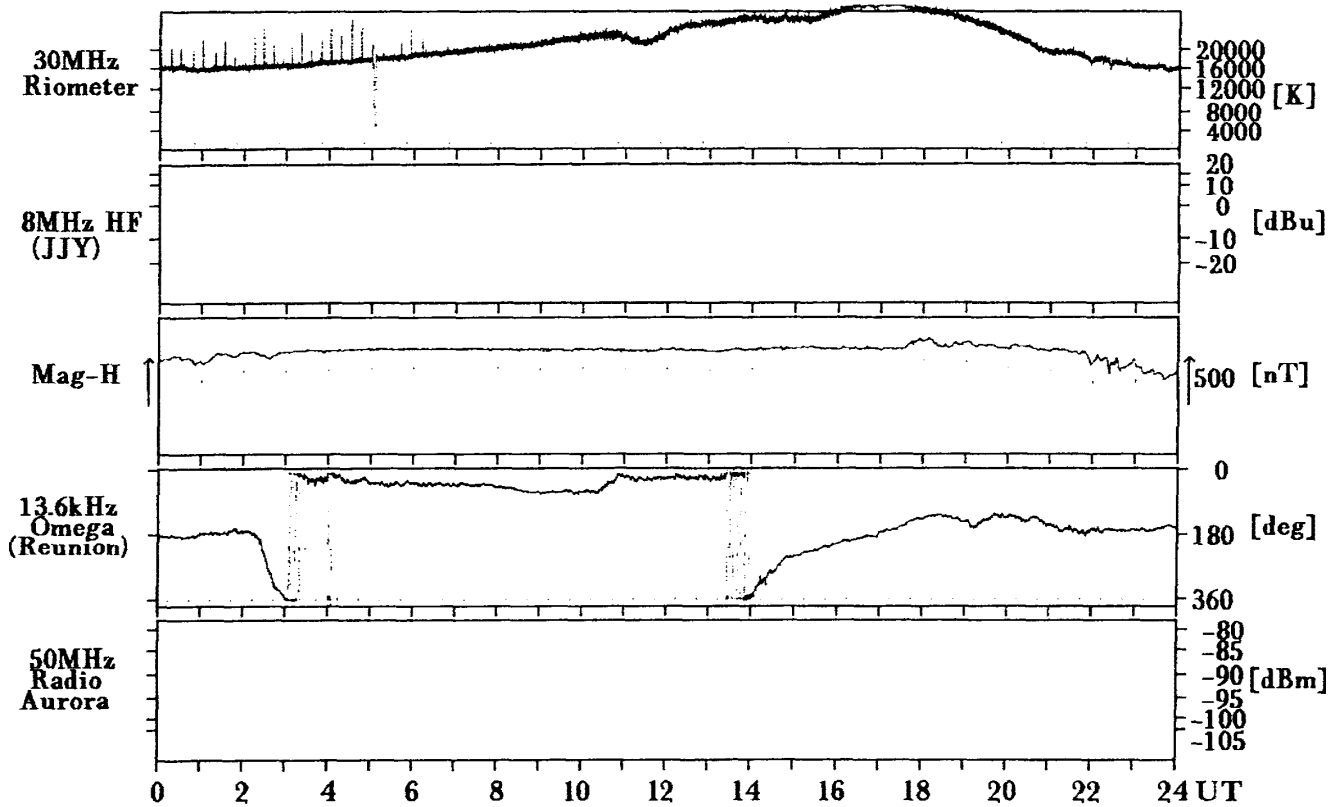
Syowa Station

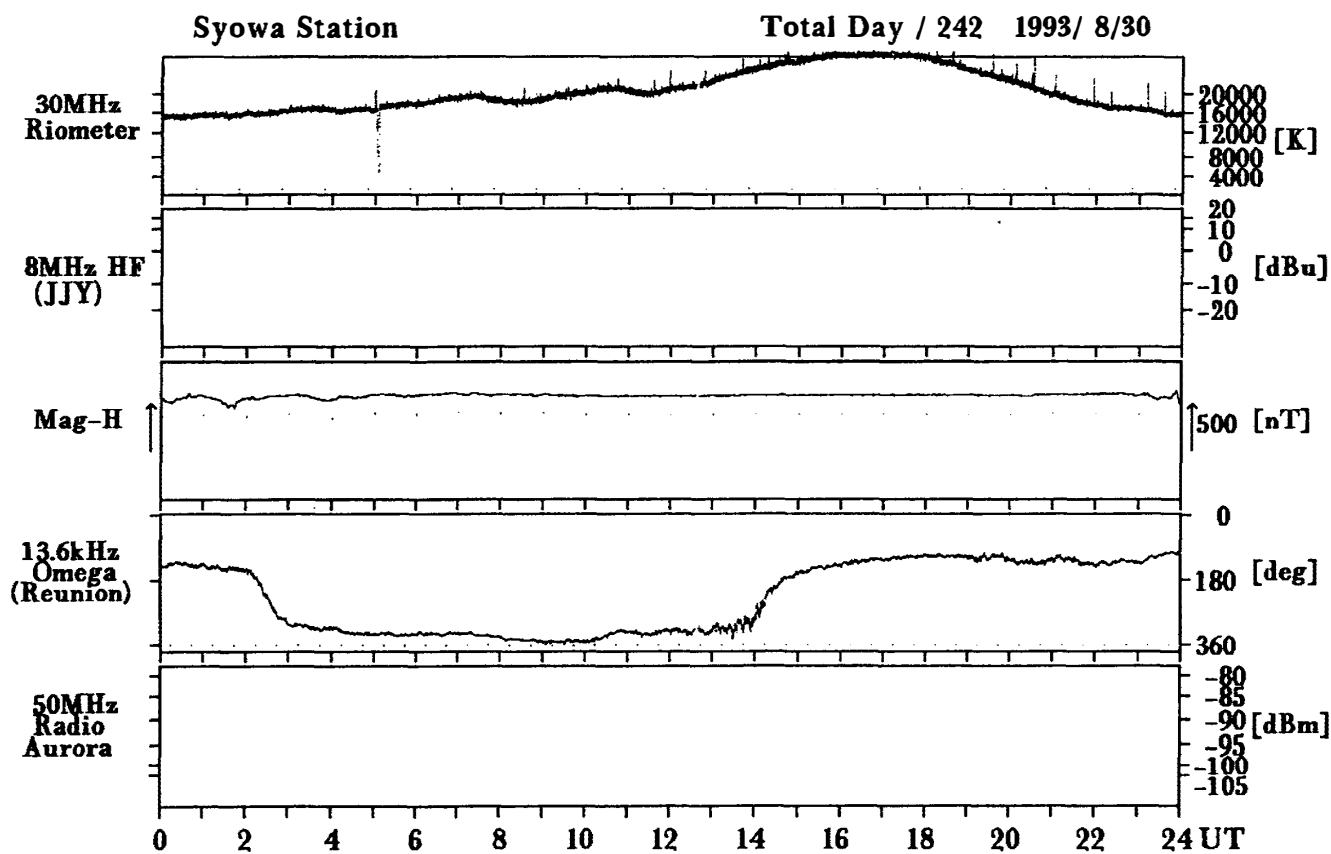
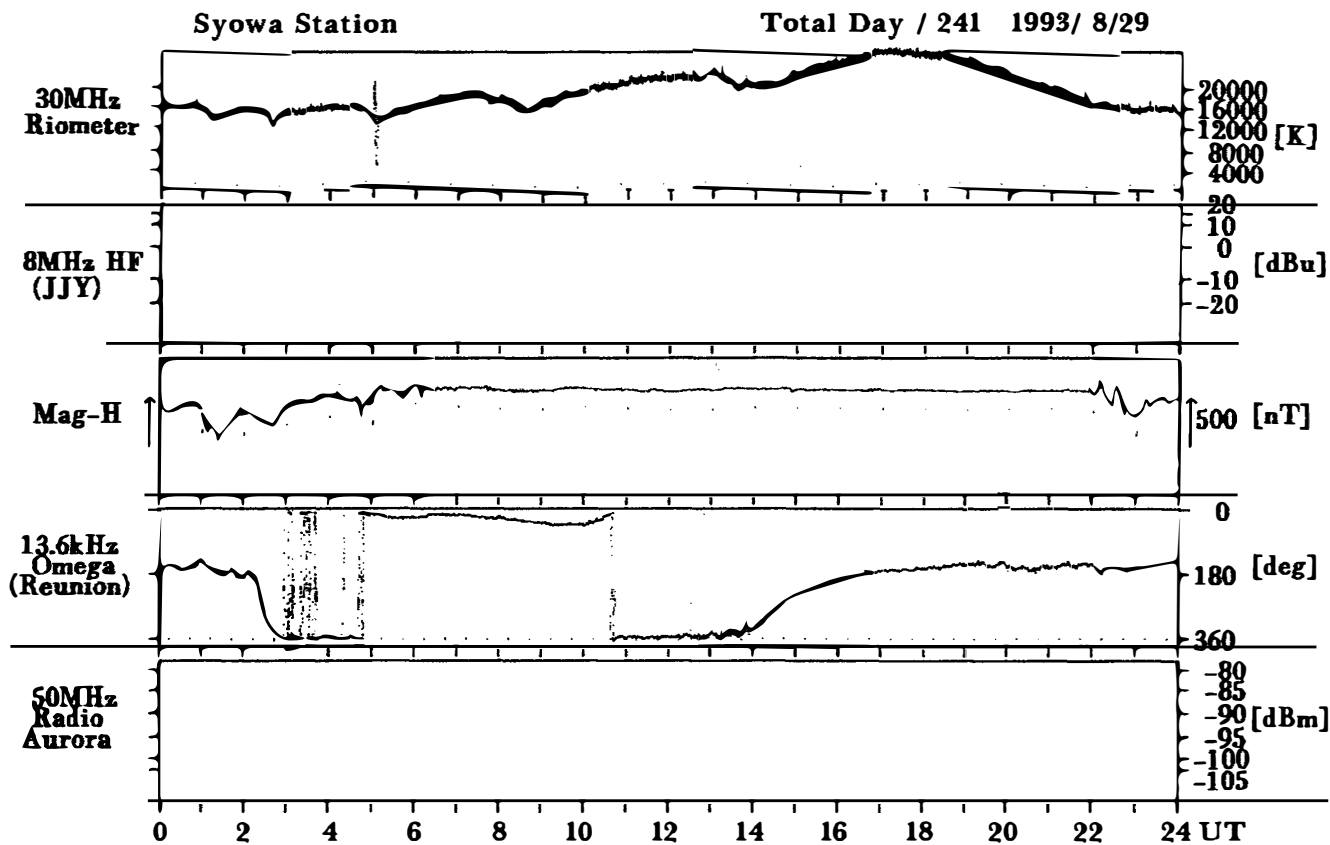
Total Day / 239 1993/ 8/27

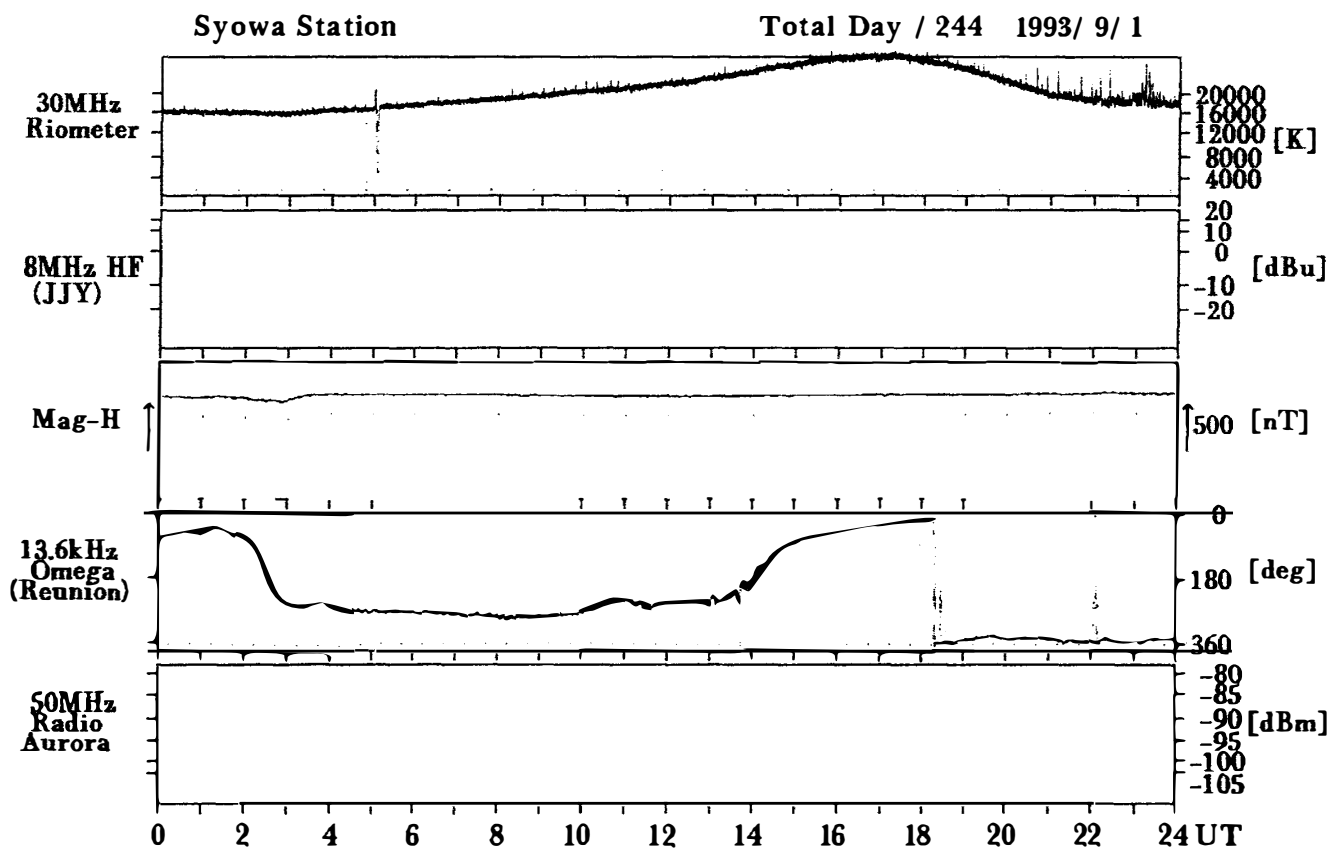
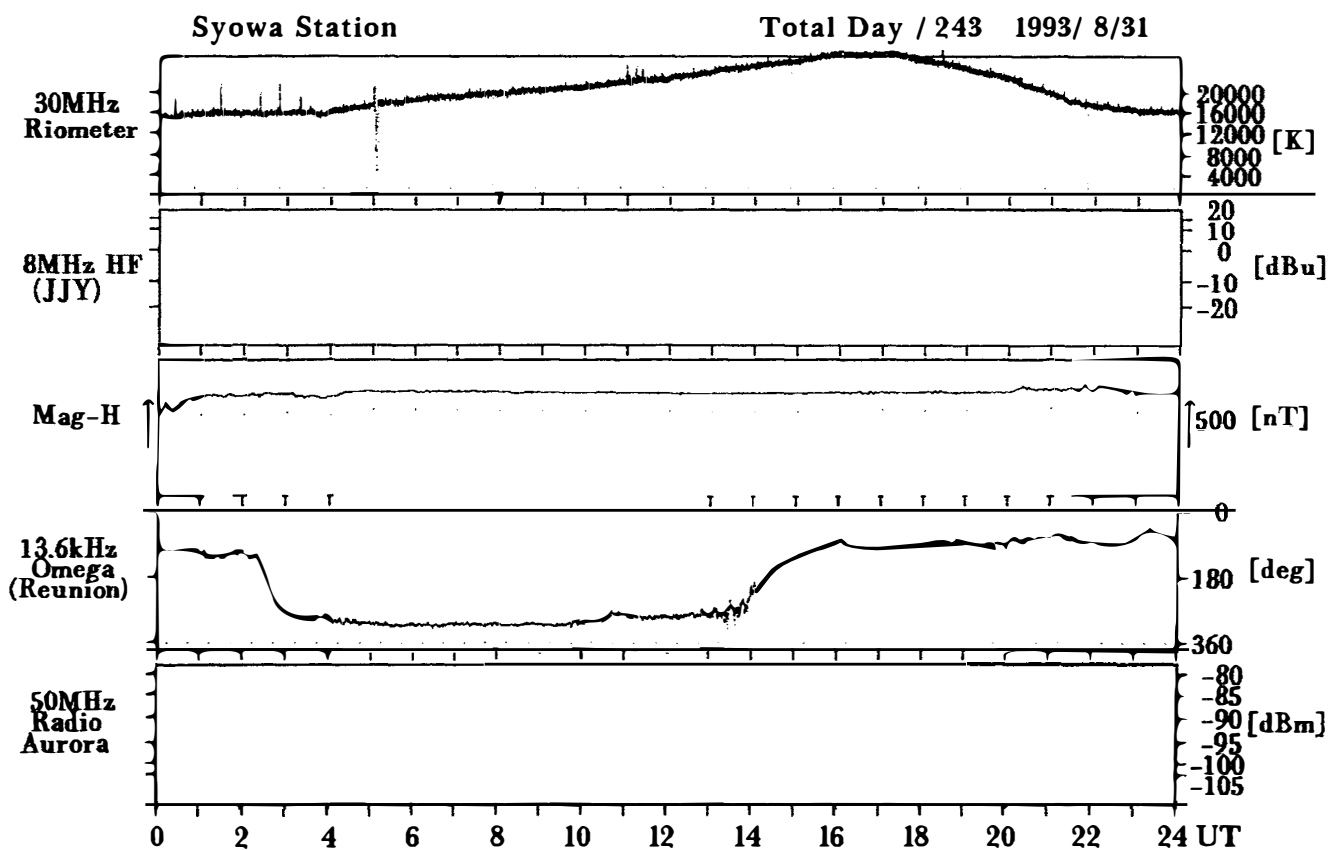


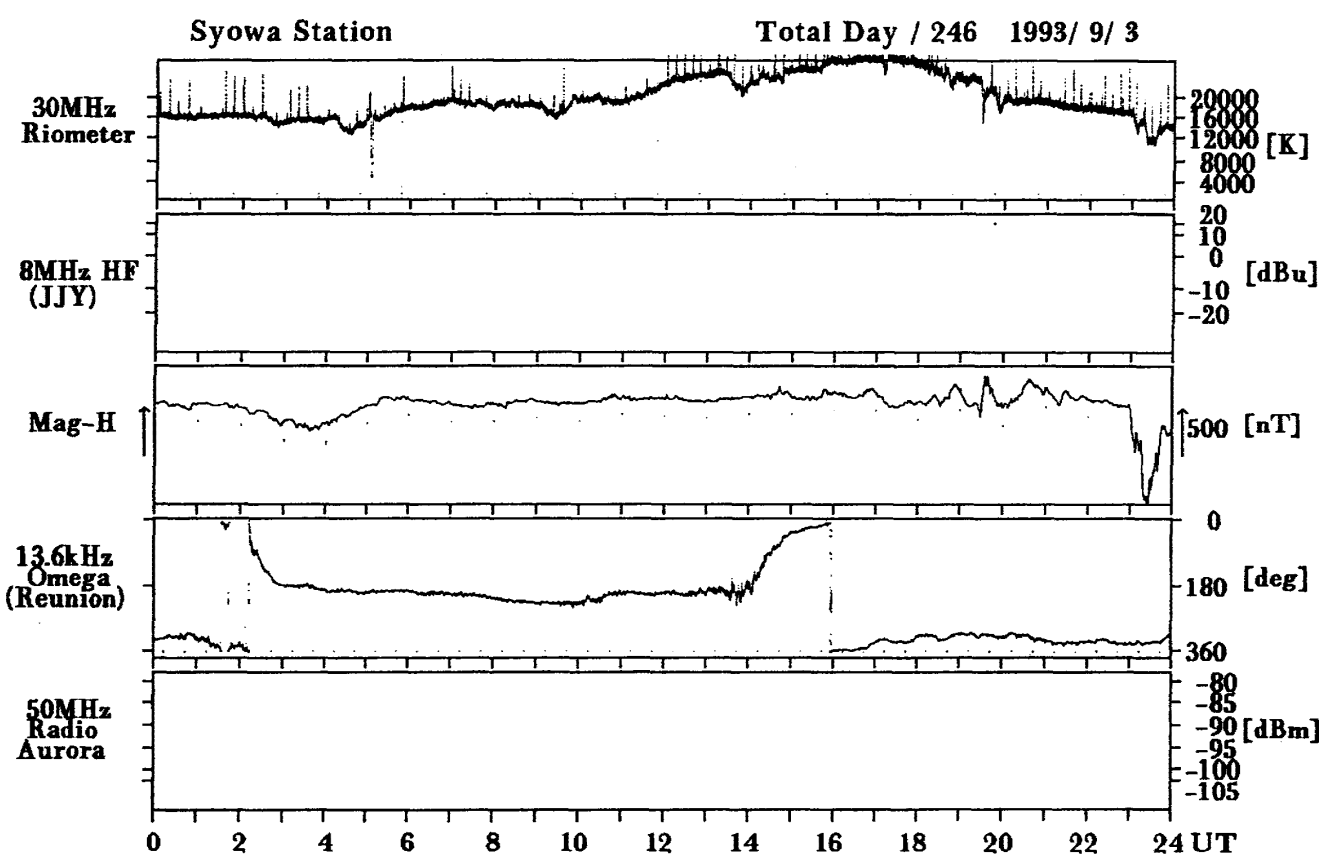
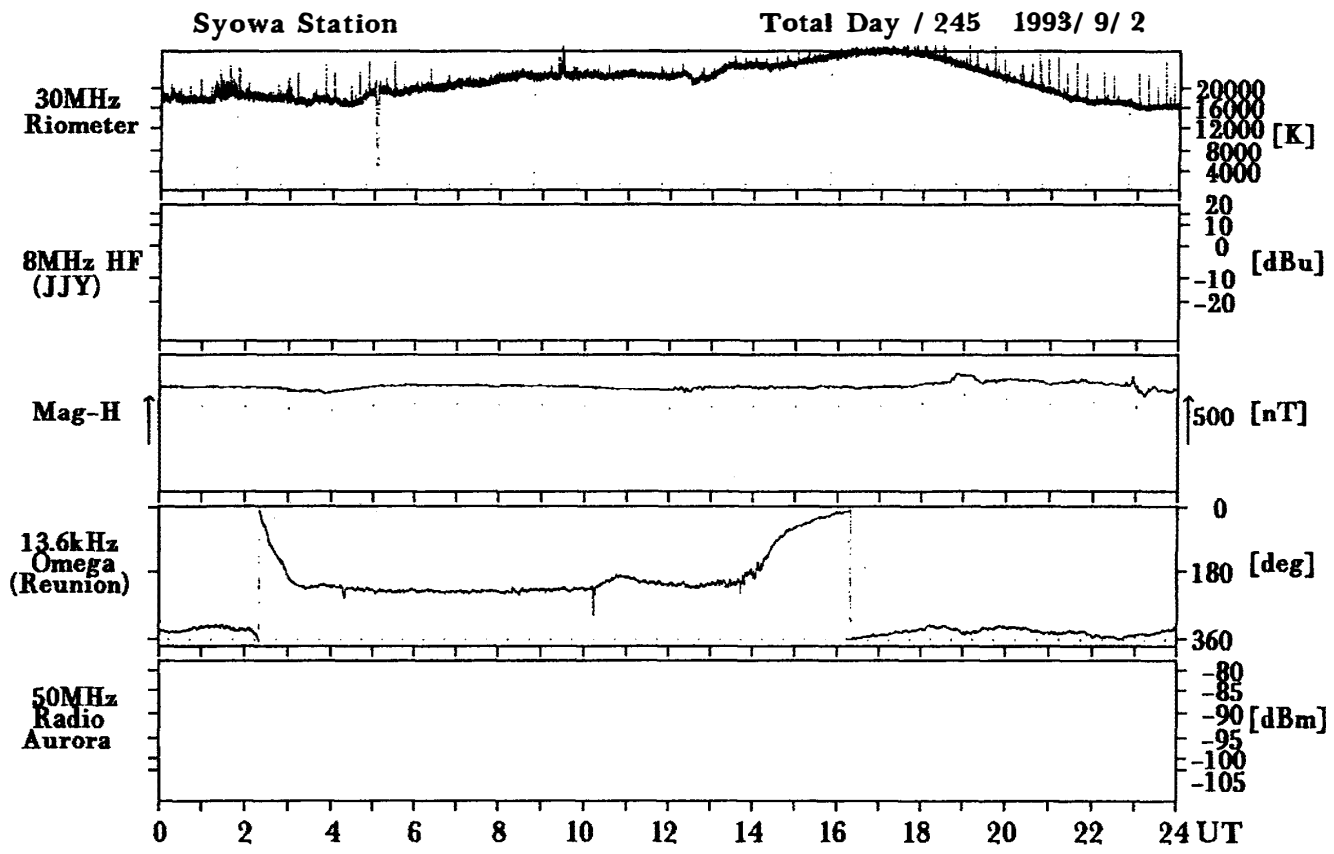
Syowa Station

Total Day / 240 1993/ 8/28



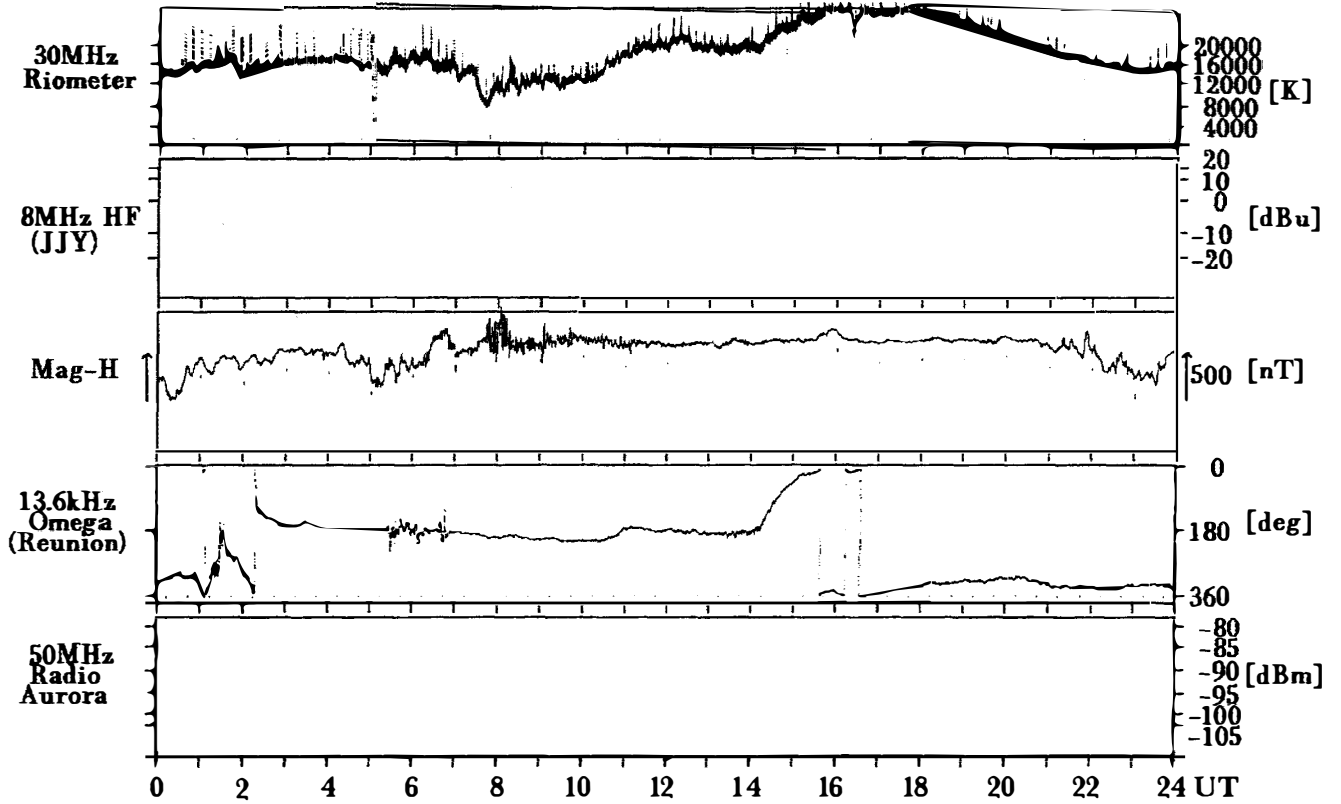






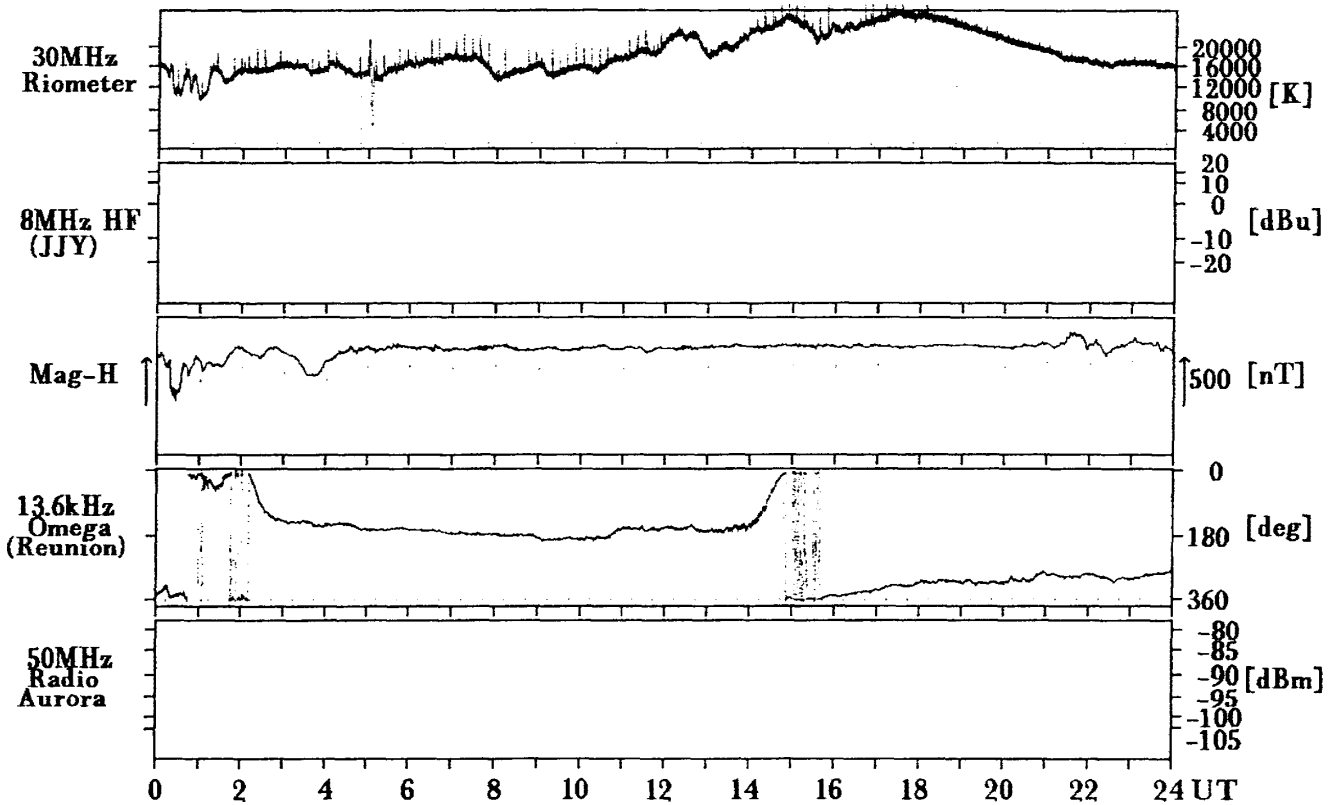
Syowa Station

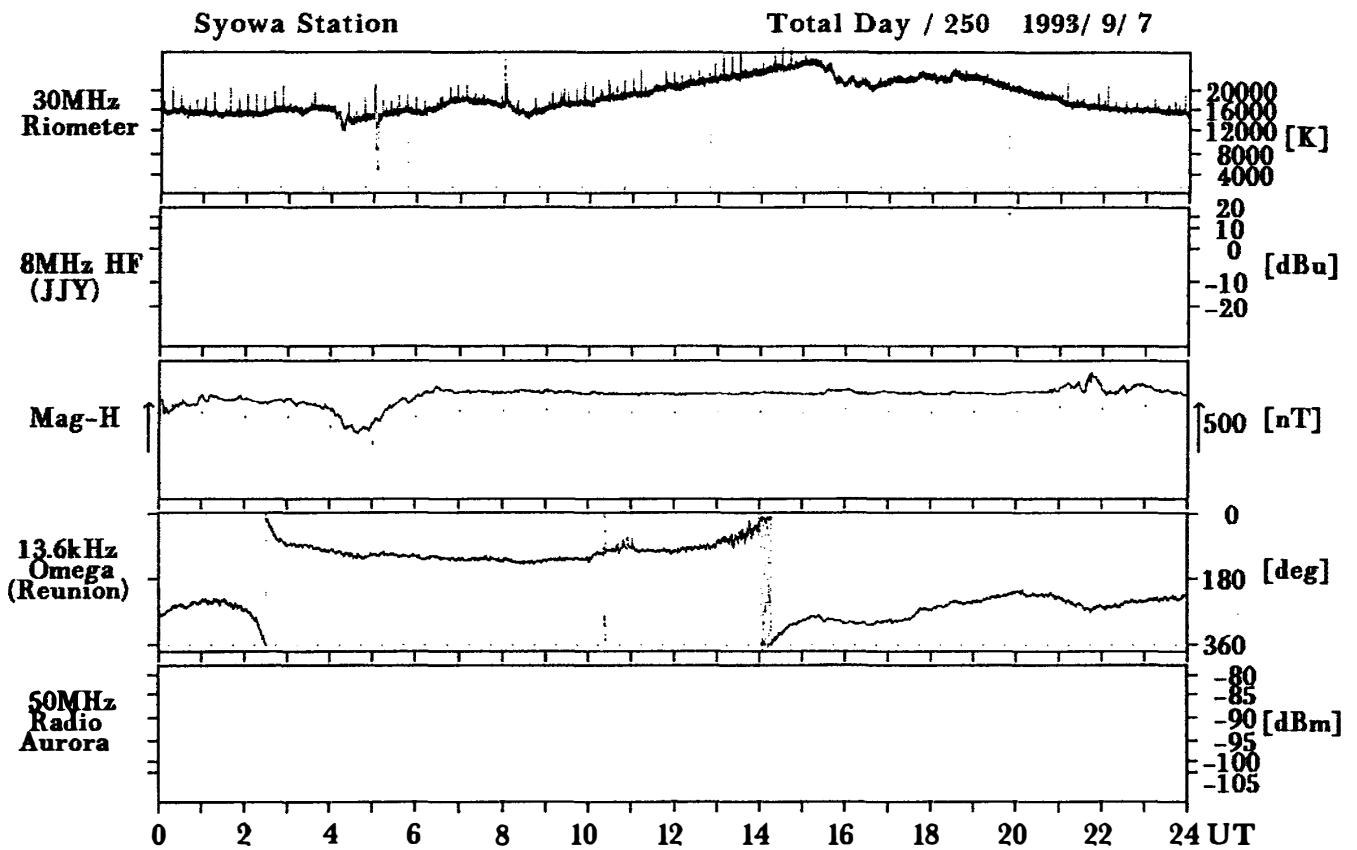
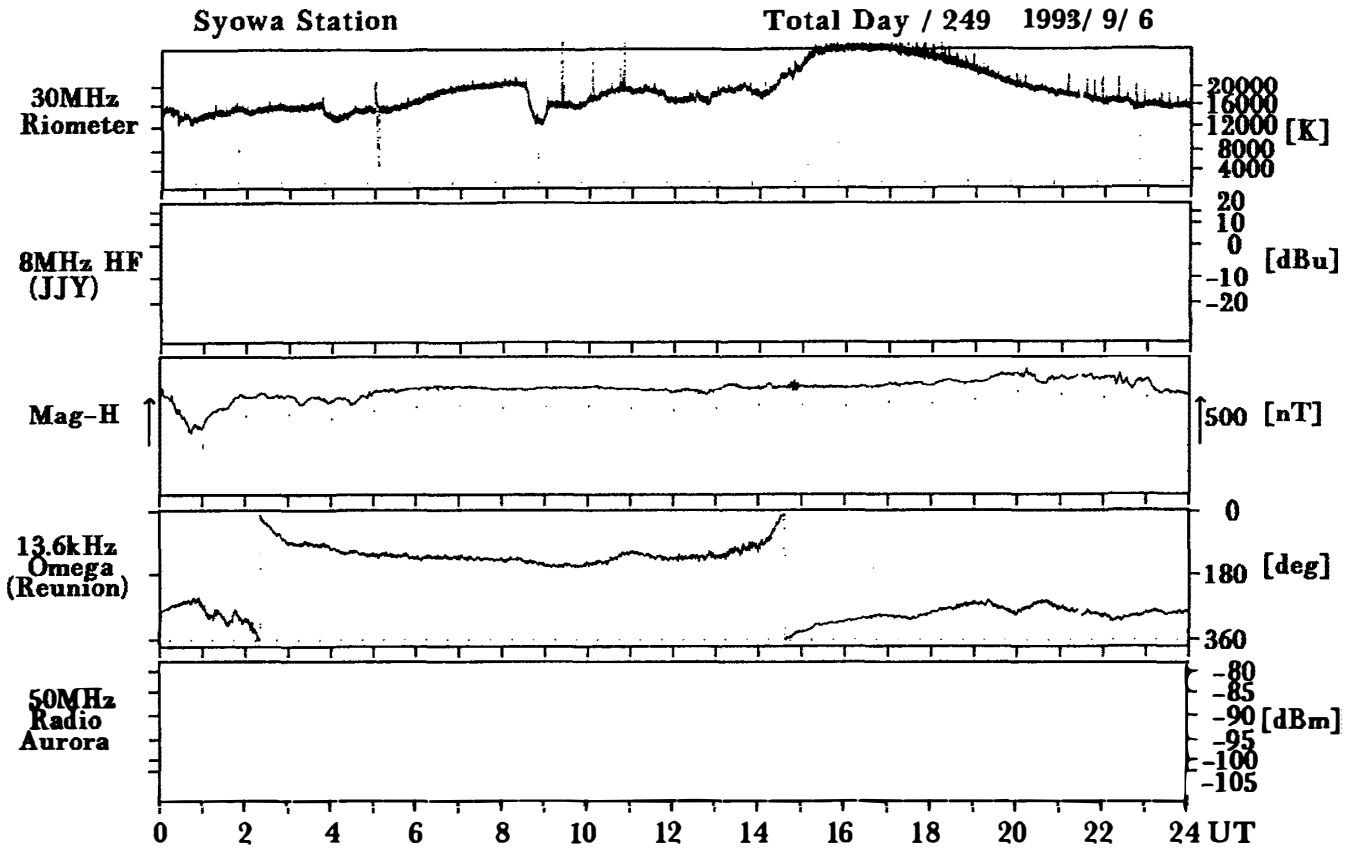
Total Day / 247 1993/ 9/ 4



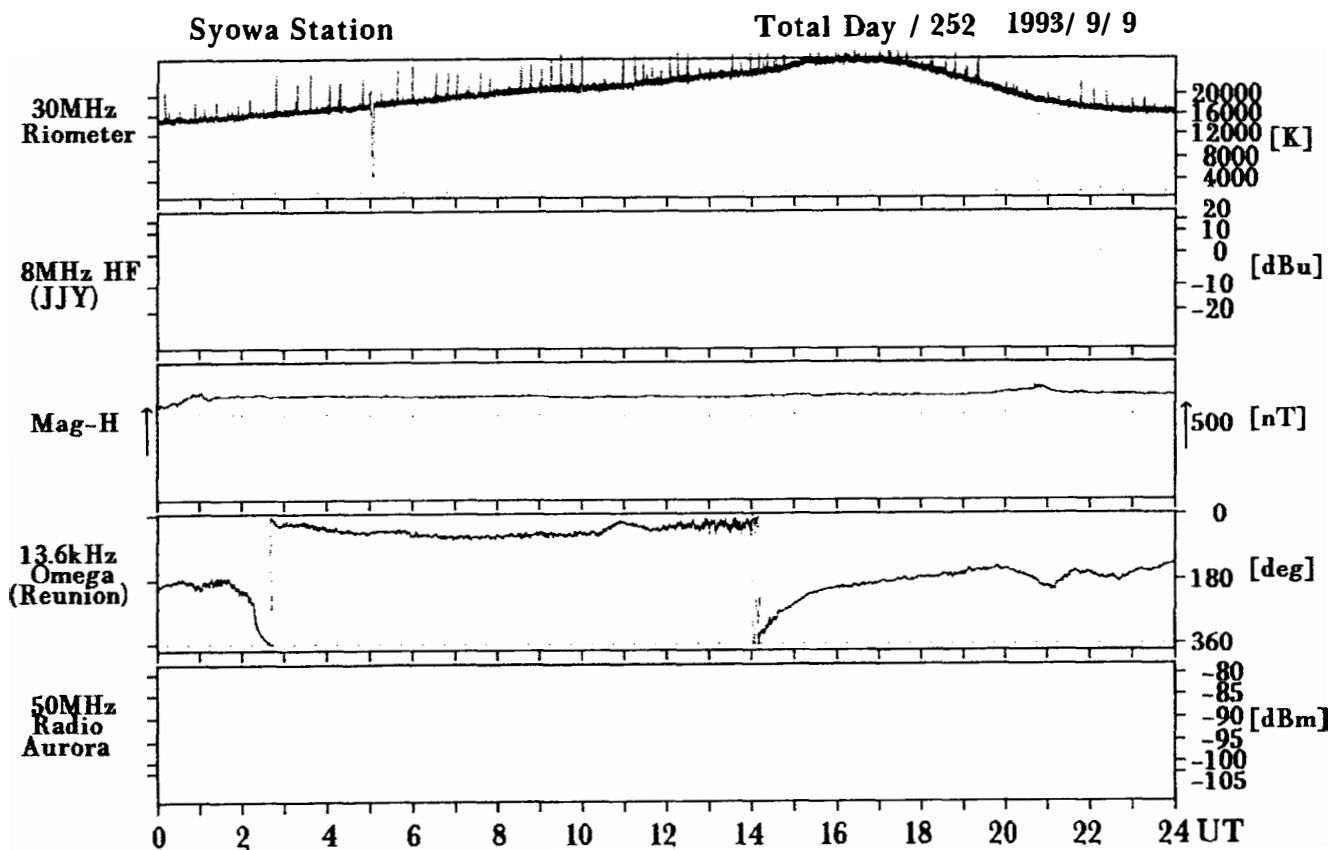
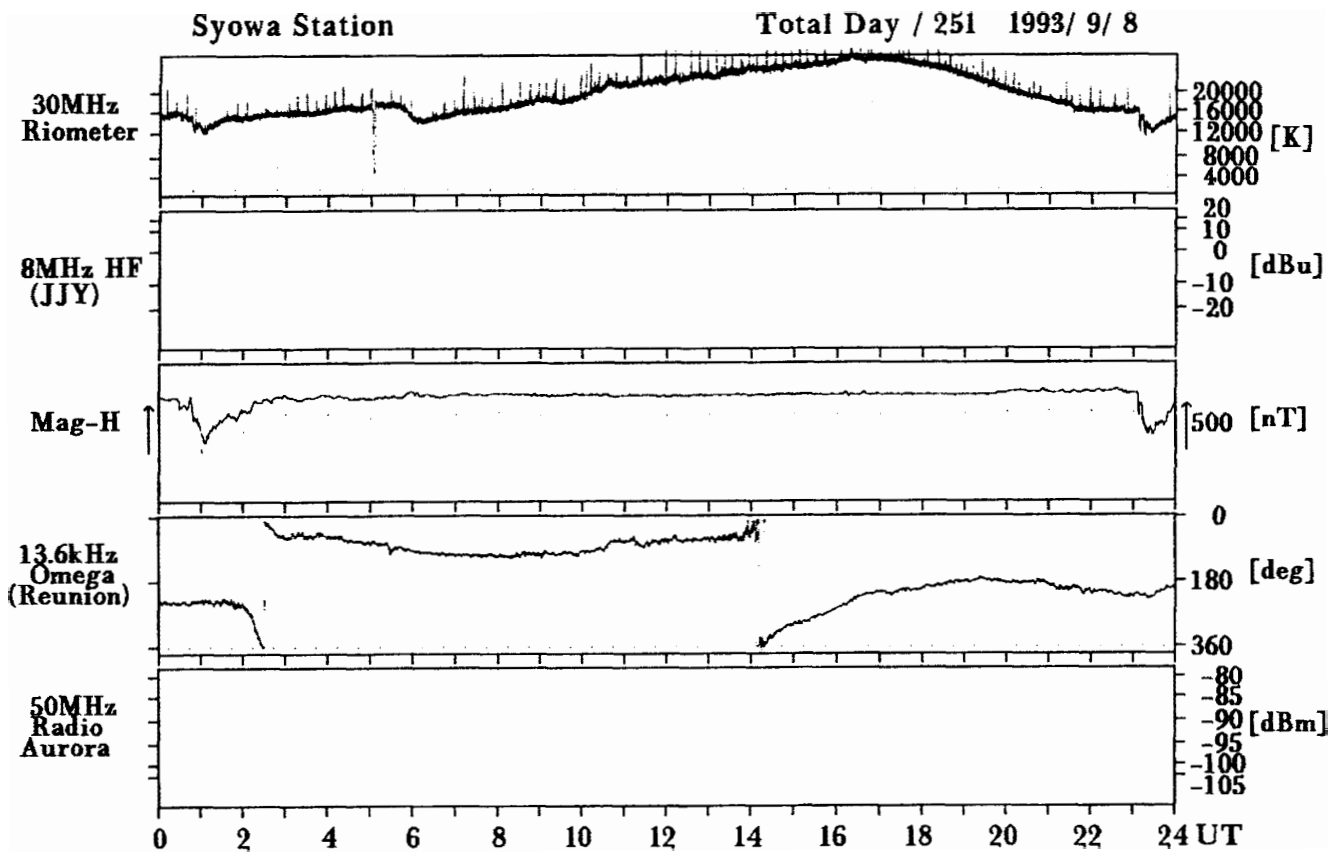
Syowa Station

Total Day / 248 1993/ 9/ 5



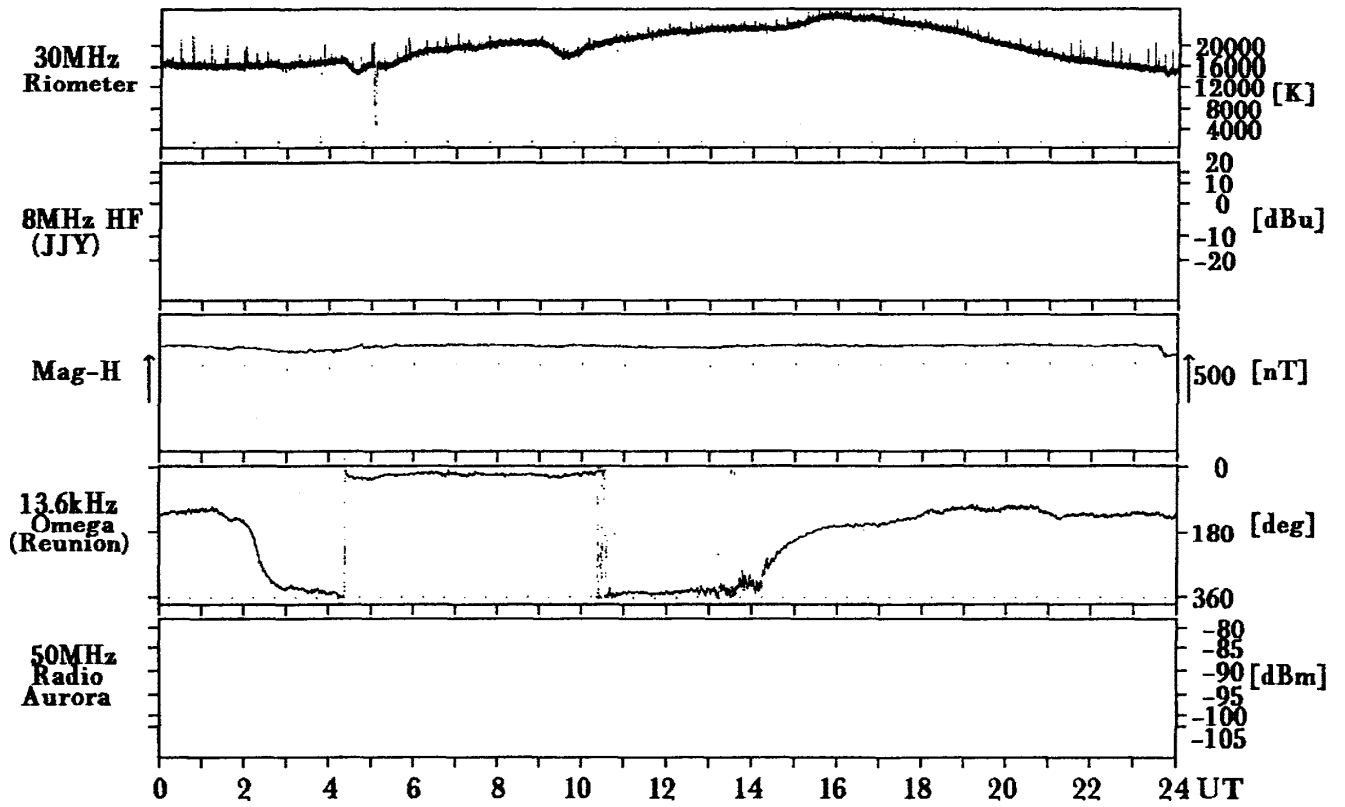






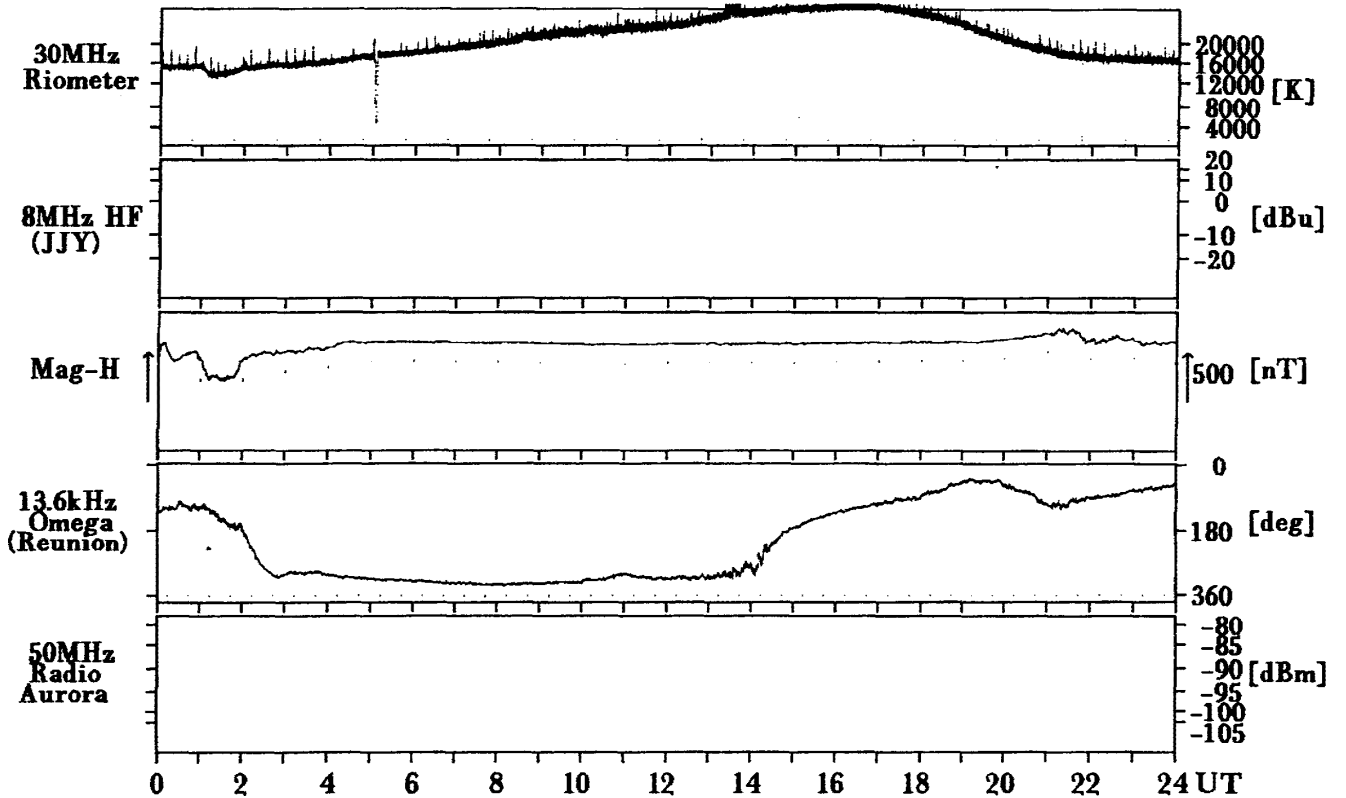
Syowa Station

Total Day / 253 1993/ 9/10



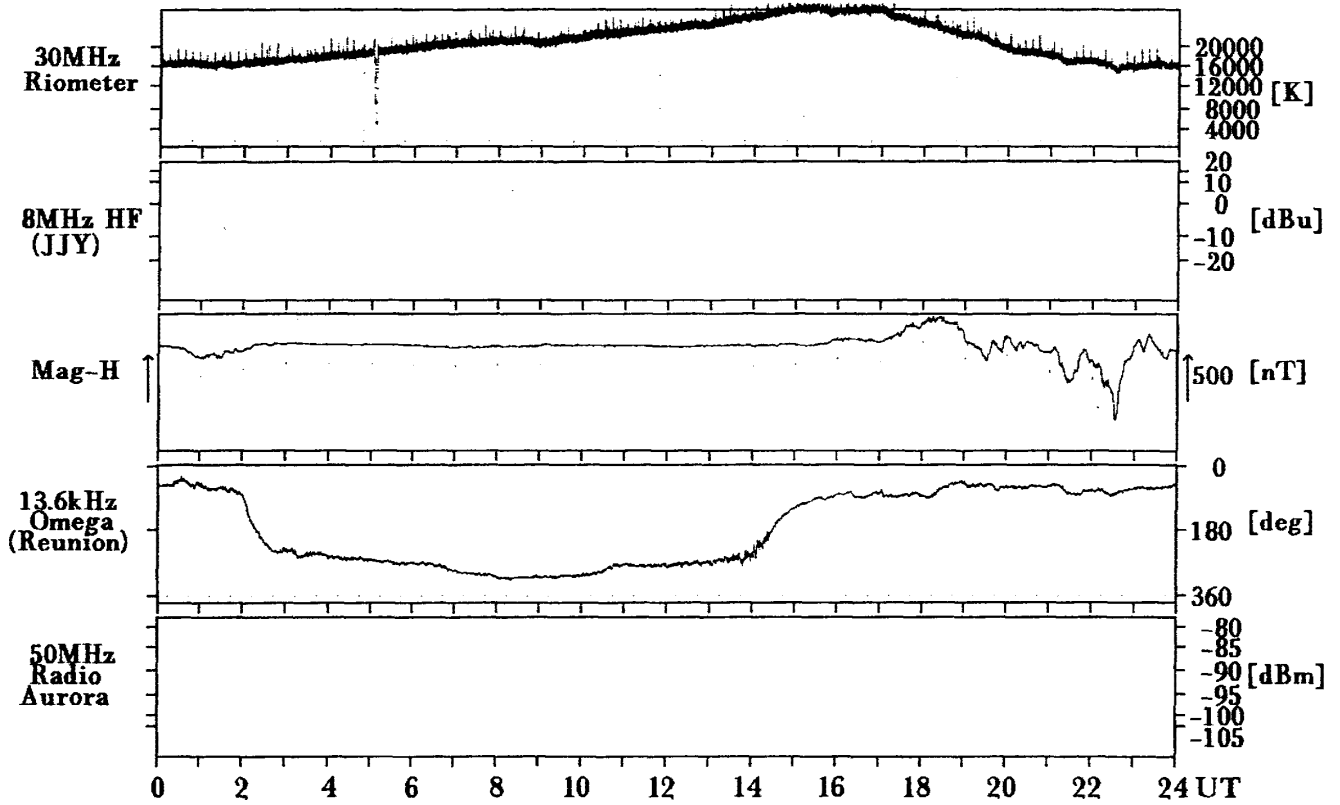
Syowa Station

Total Day / 254 1993/ 9/11



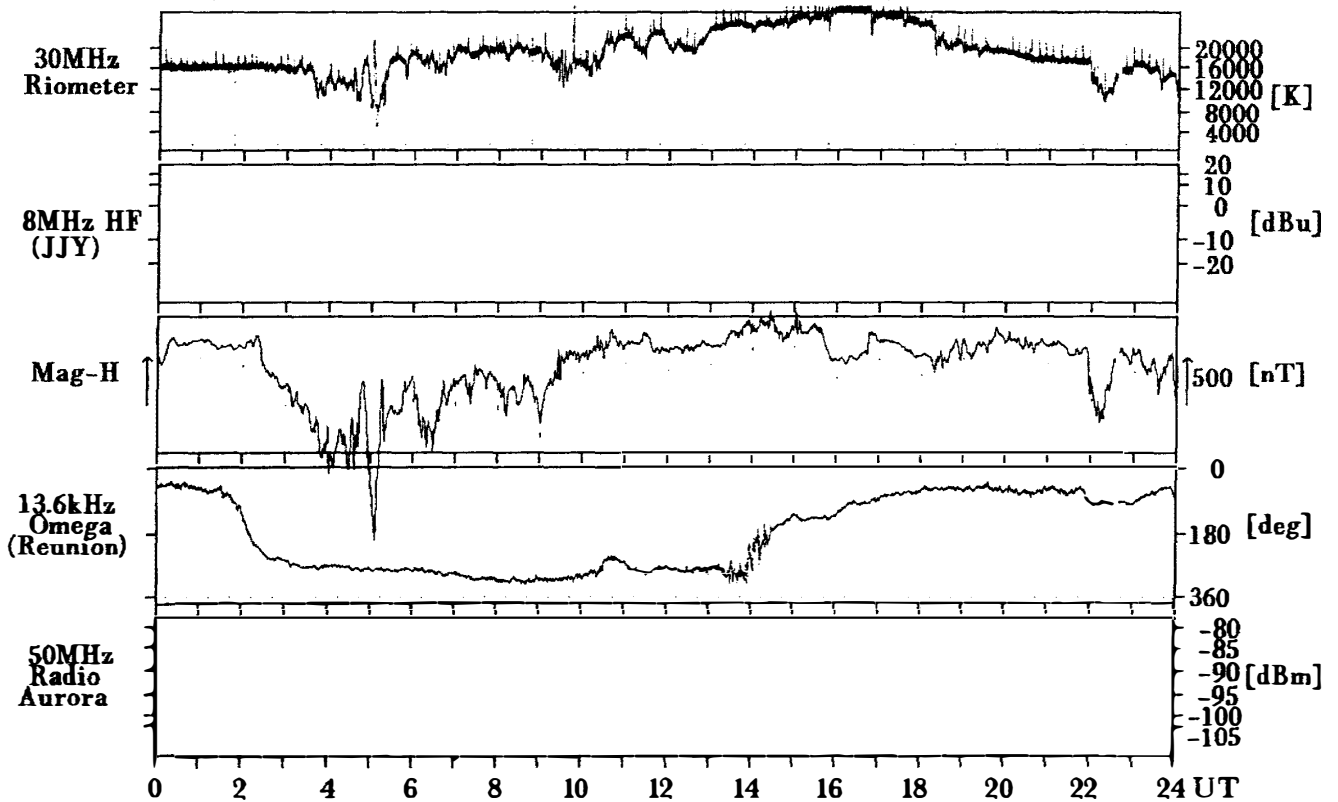
Syowa Station

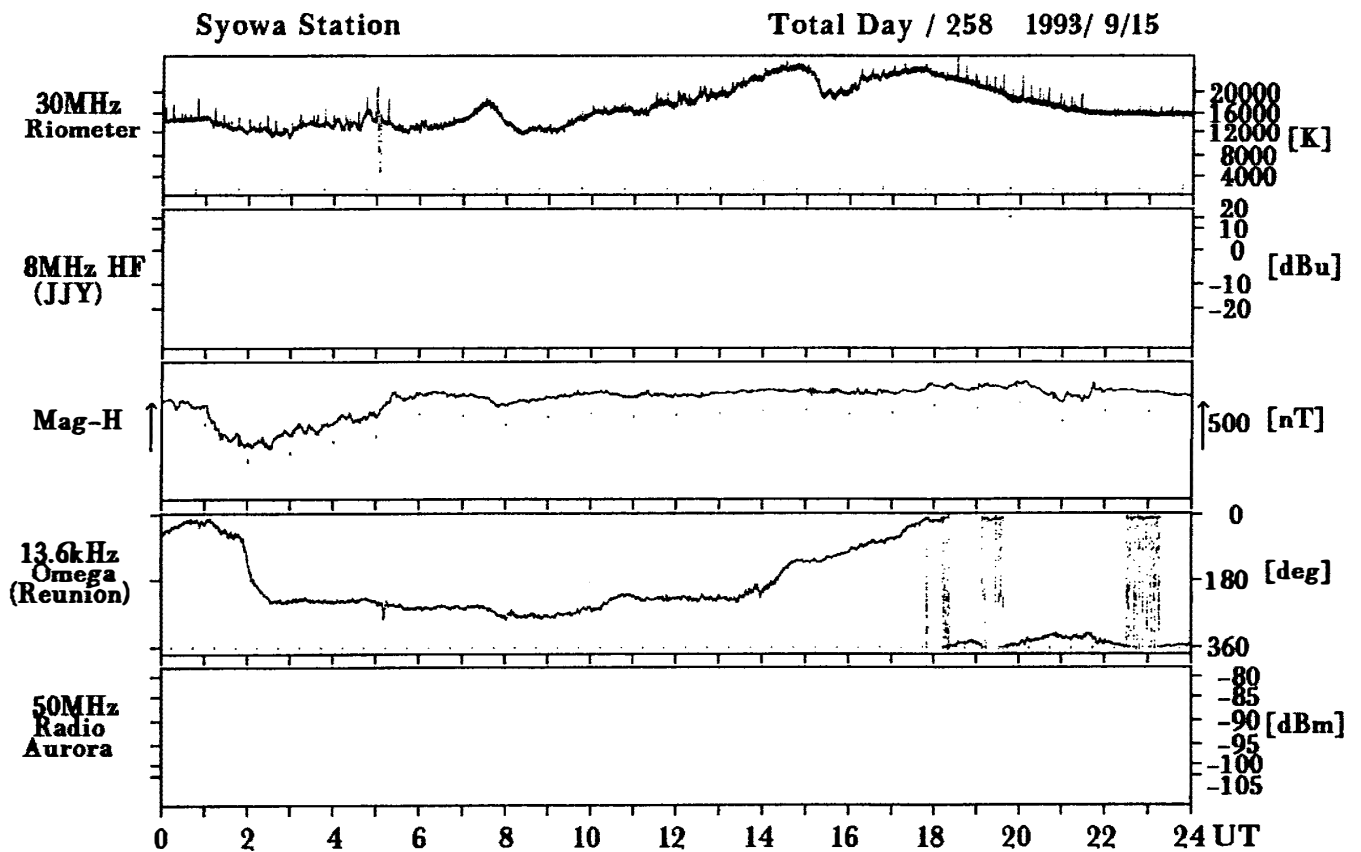
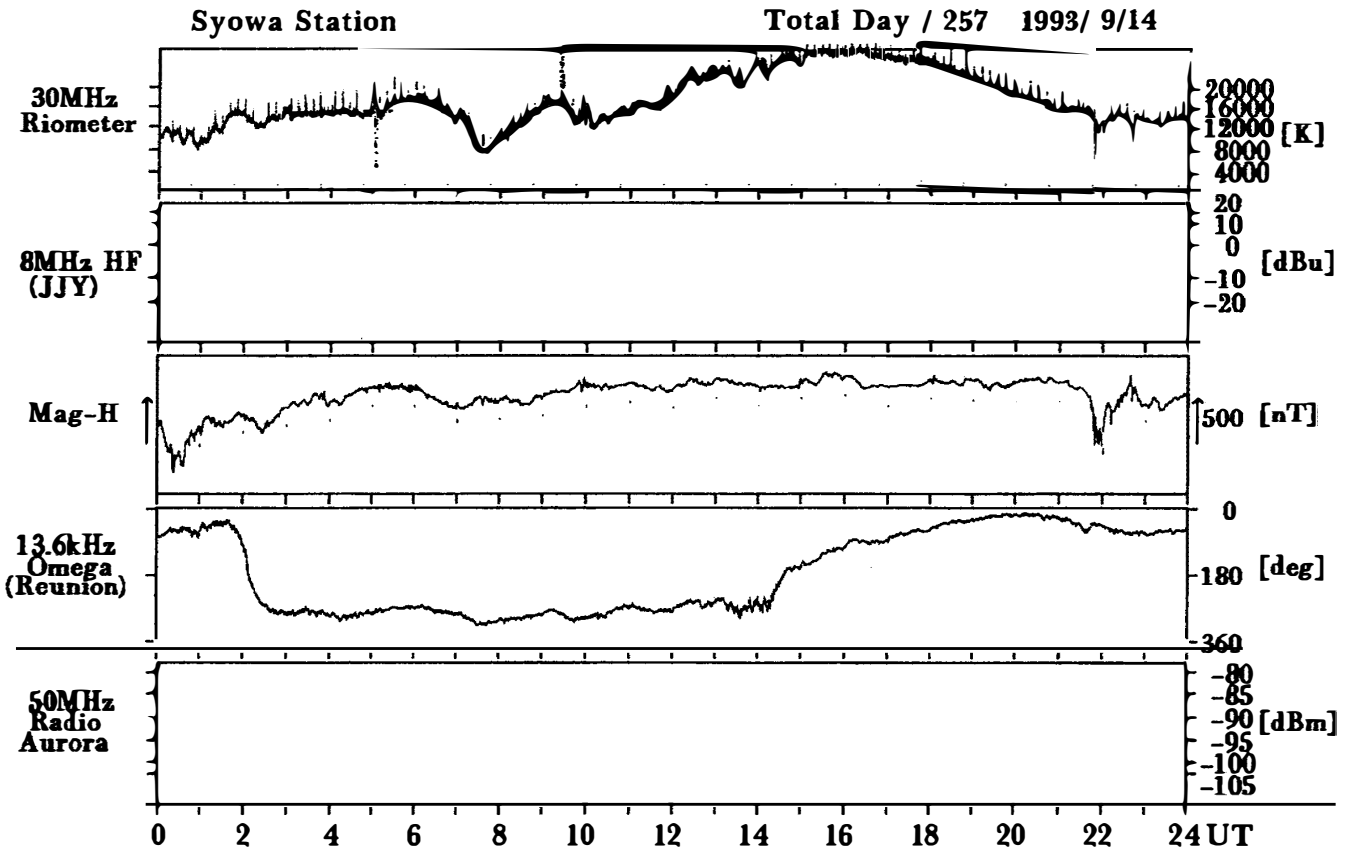
Total Day / 255 1993/ 9/12



Syowa Station

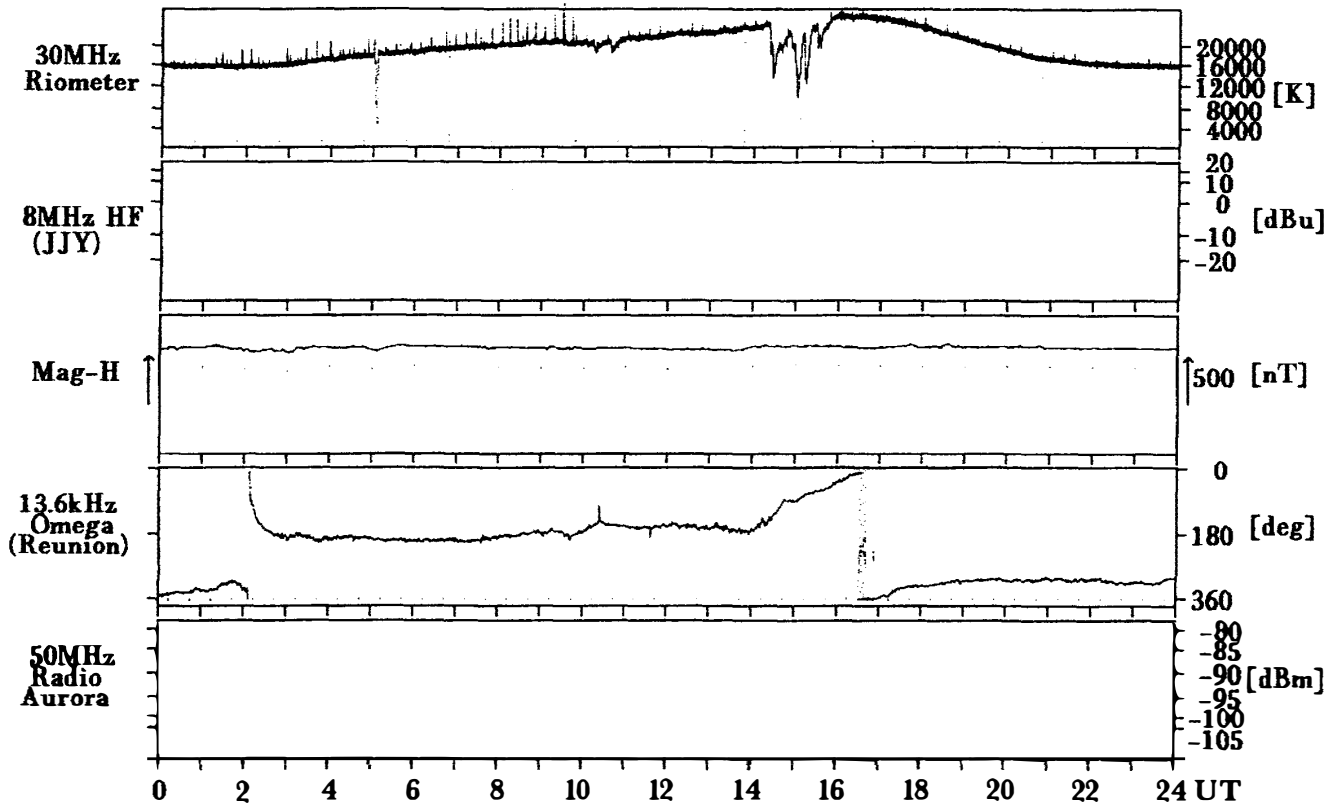
Total Day / 256 1993/ 9/13





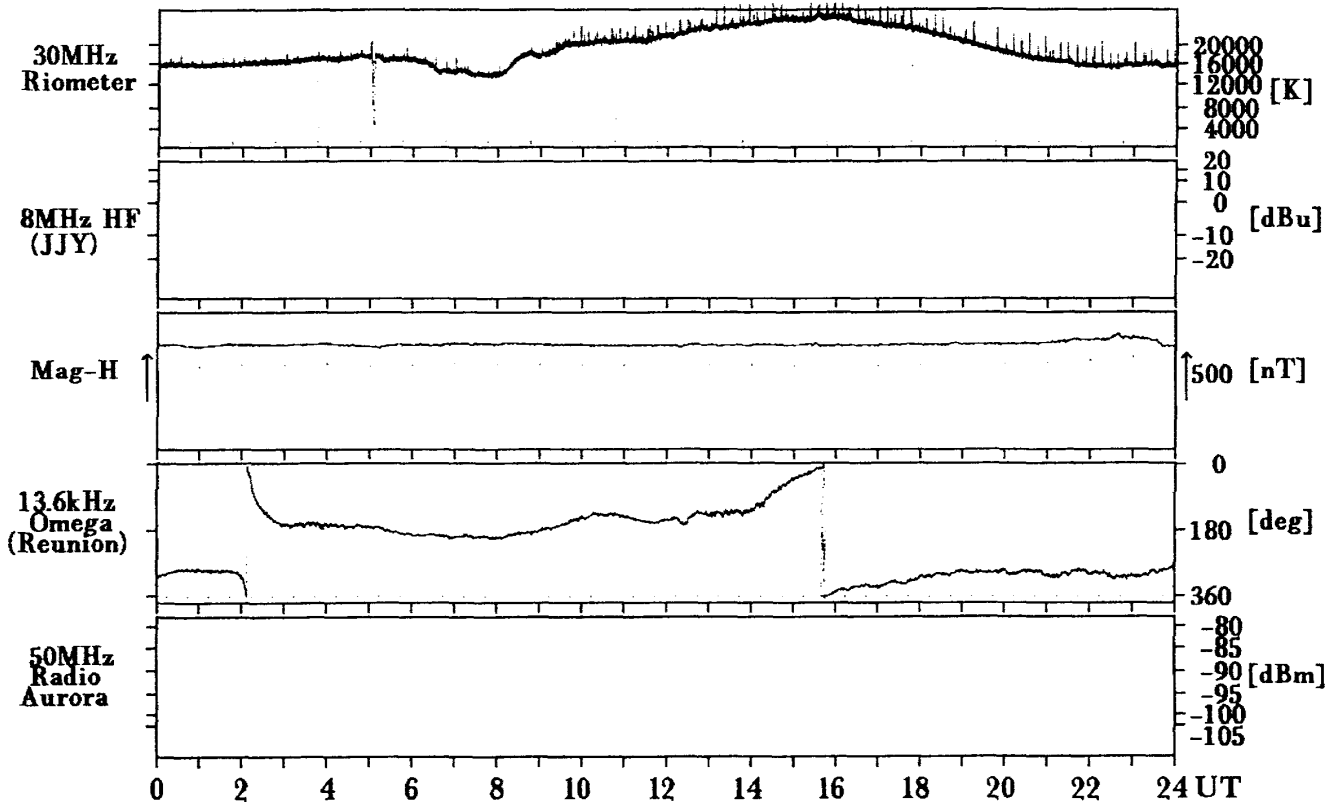
Syowa Station

Total Day / 259 1993/ 9/16



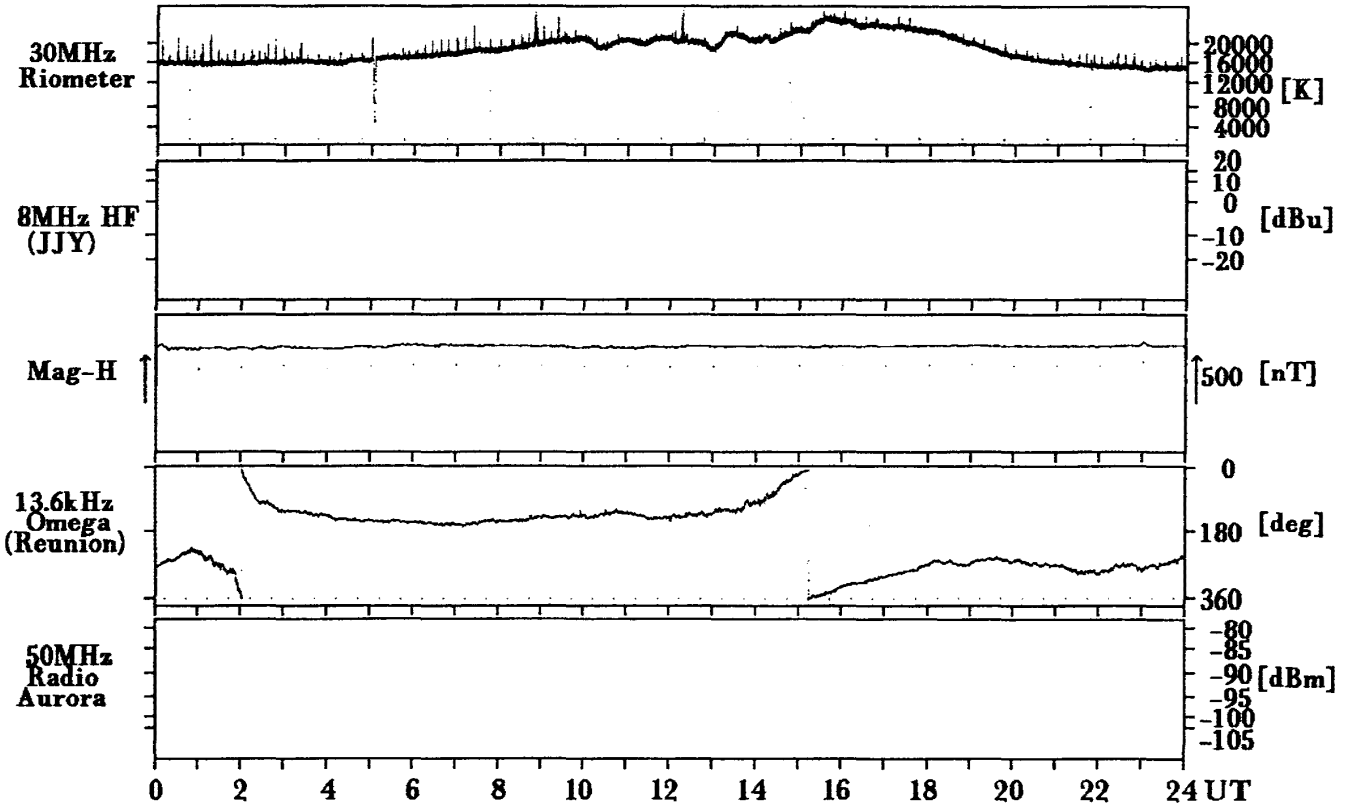
Syowa Station

Total Day / 260 1993/ 9/17



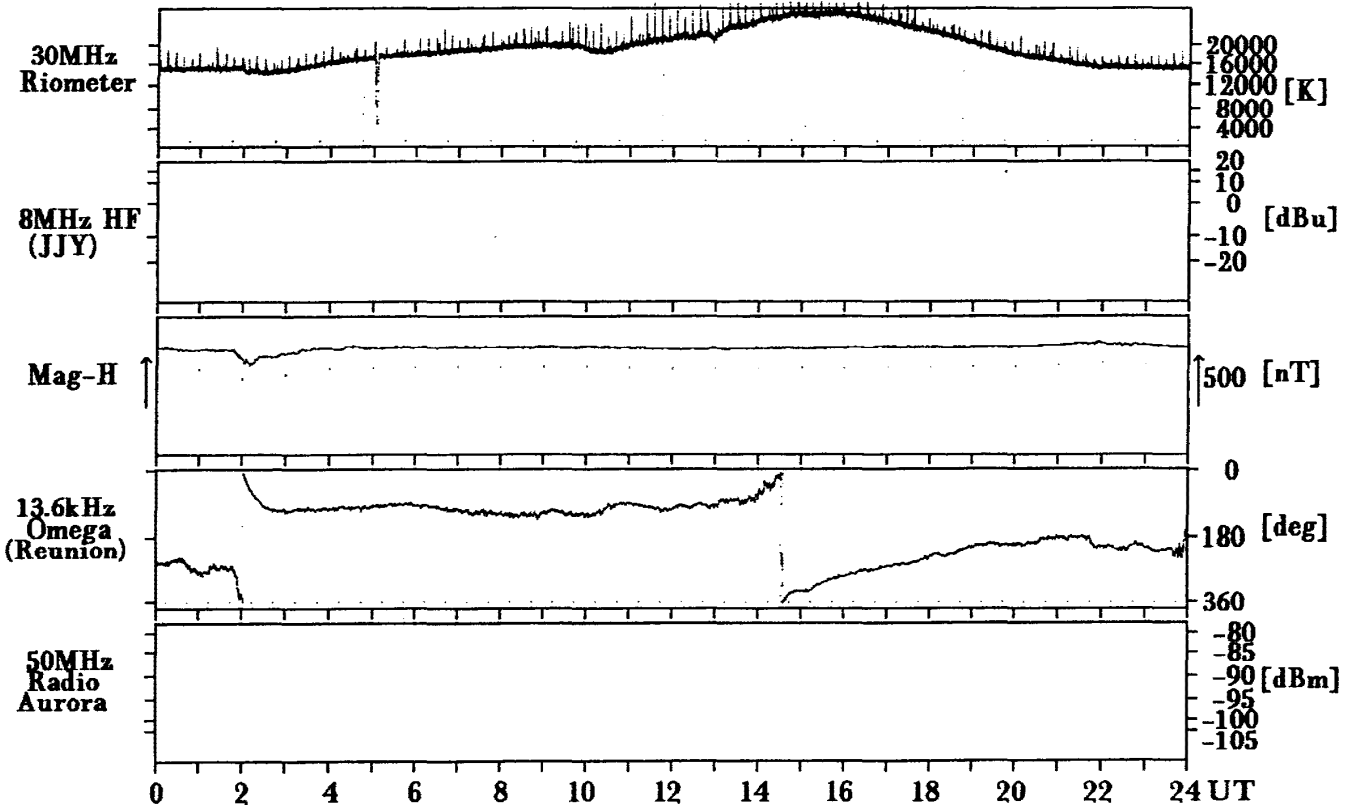
Syowa Station

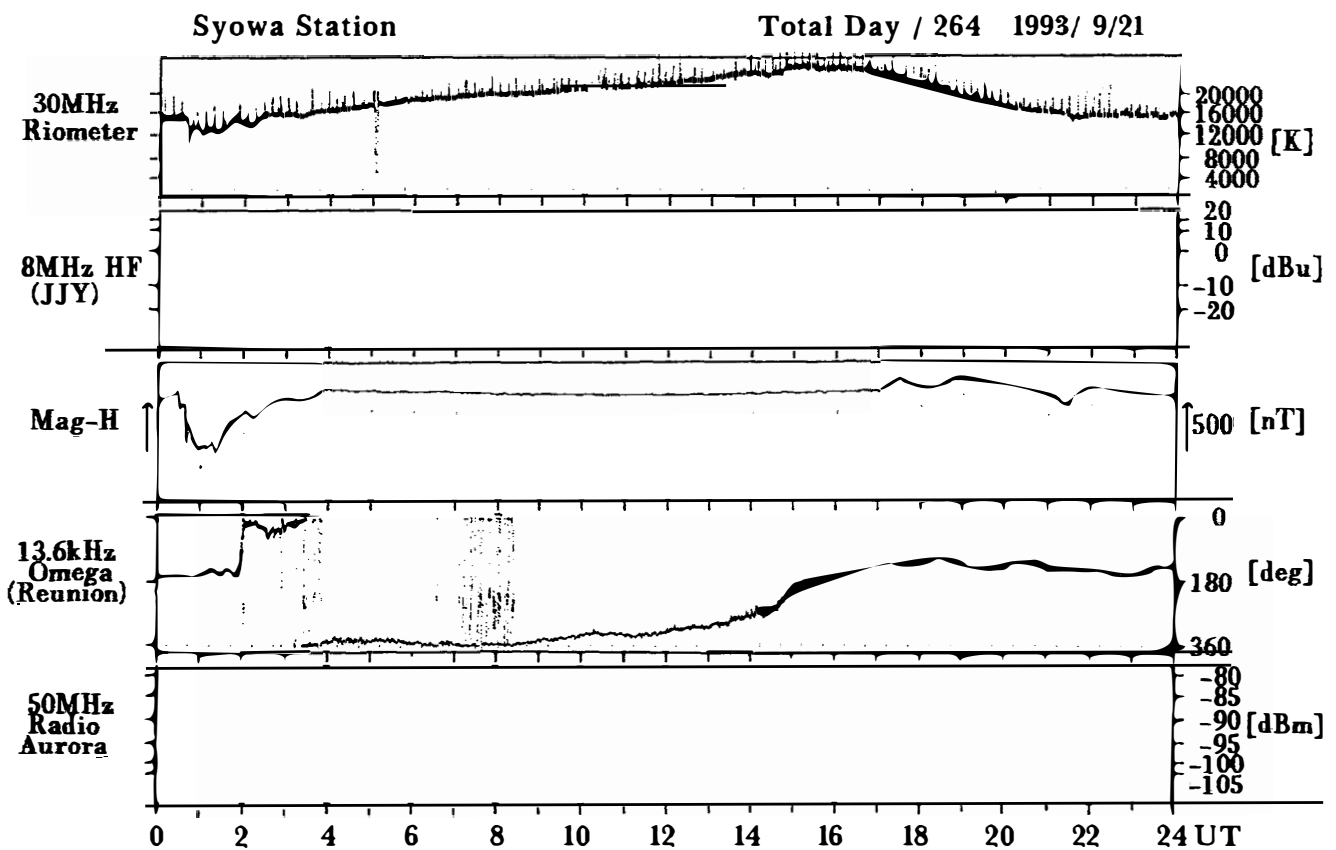
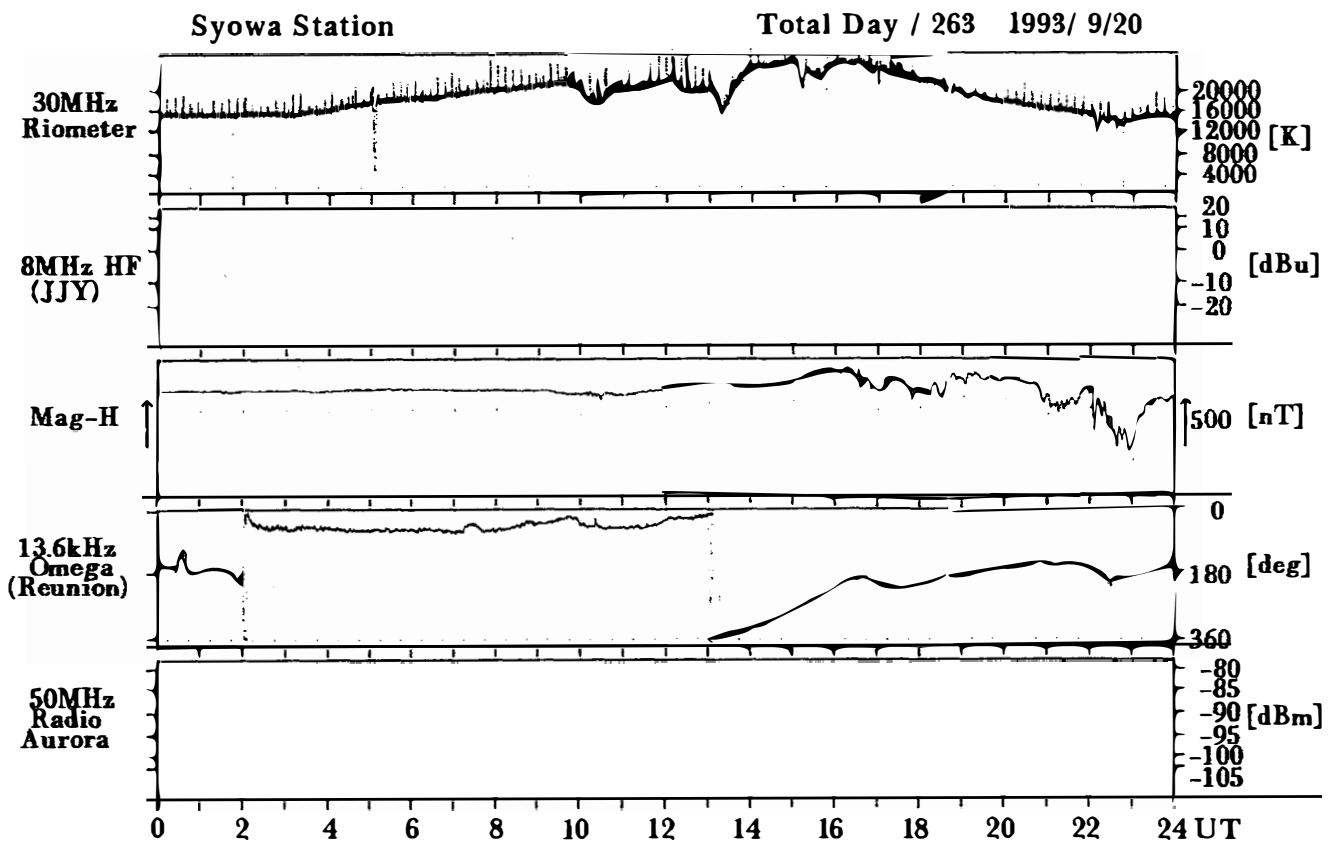
Total Day / 261 1993/ 9/18



Syowa Station

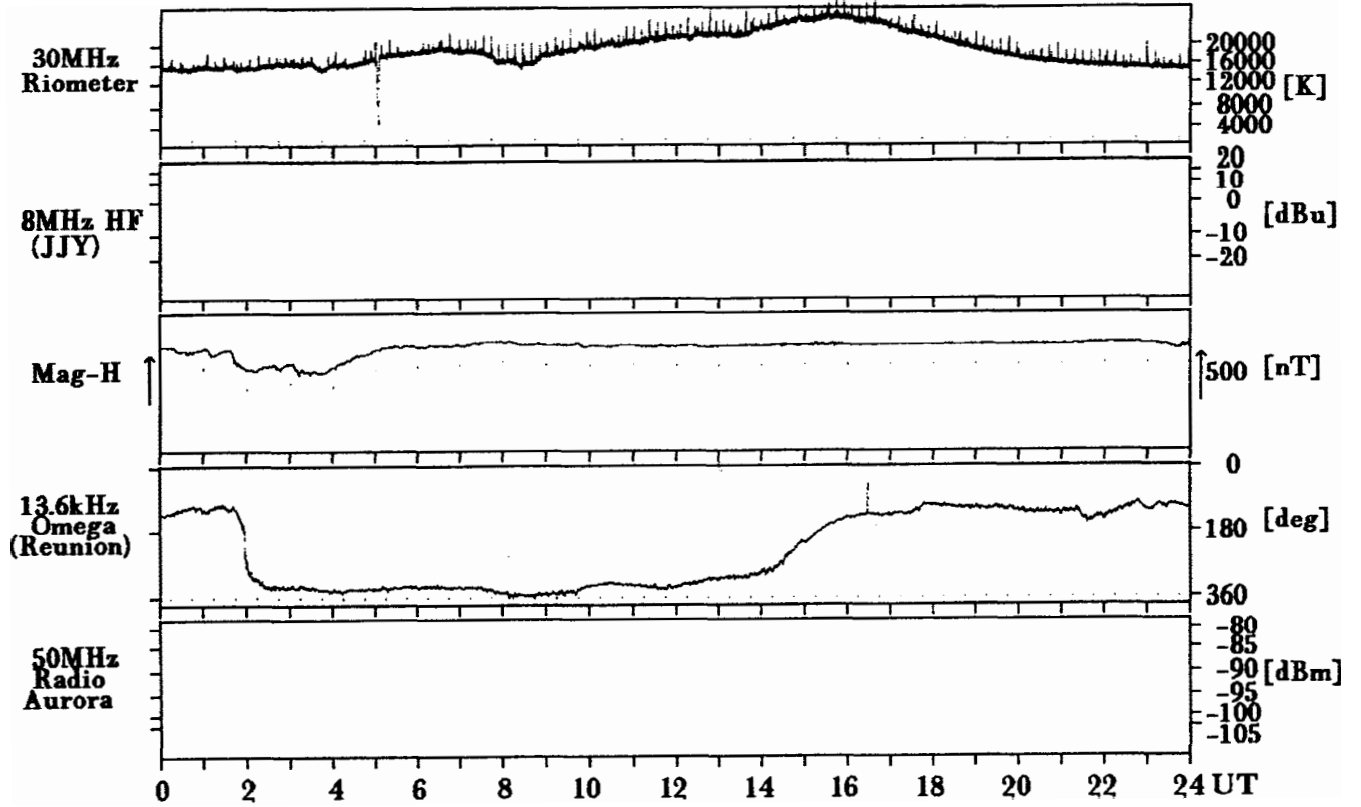
Total Day / 262 1993/ 9/19





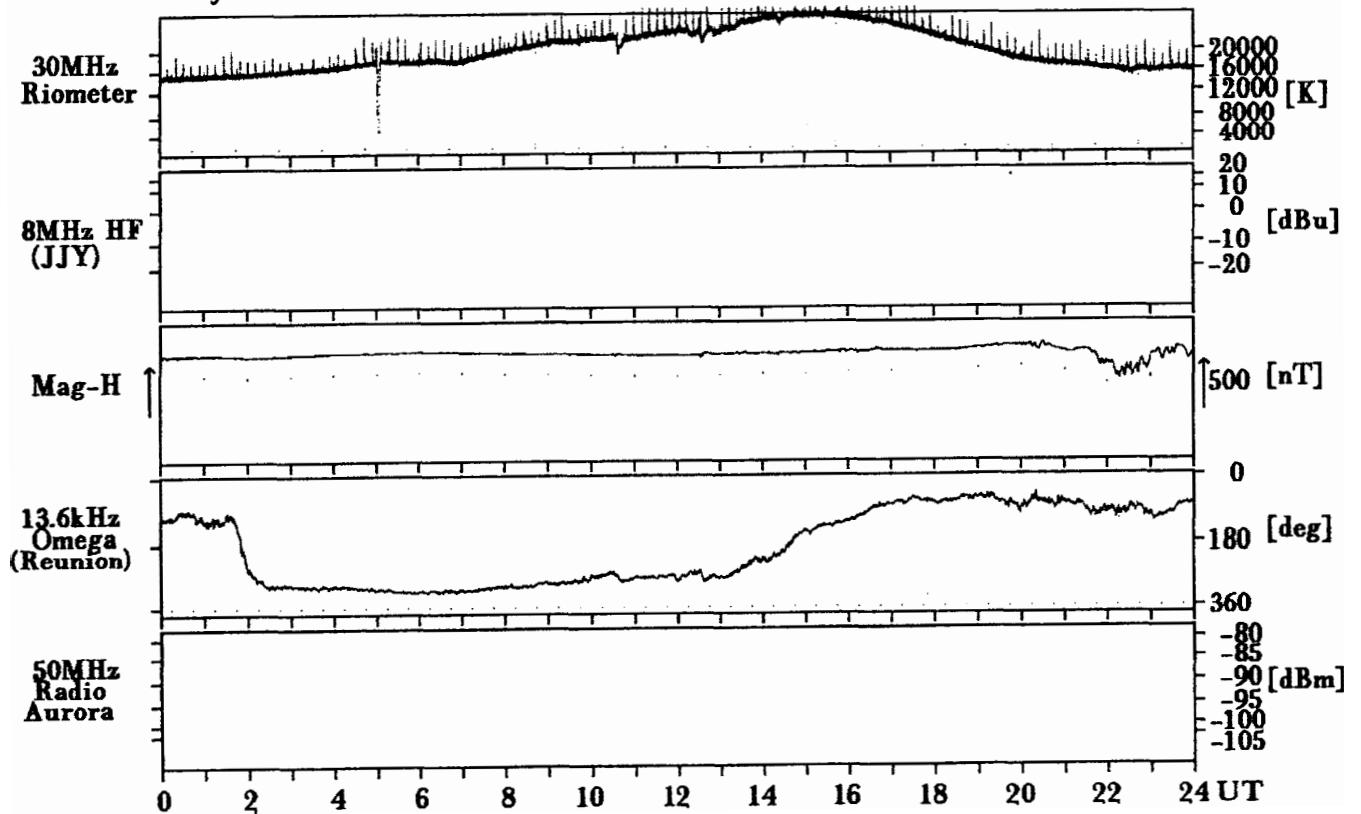
Syowa Station

Total Day / 265 1993/ 9/22



Syowa Station

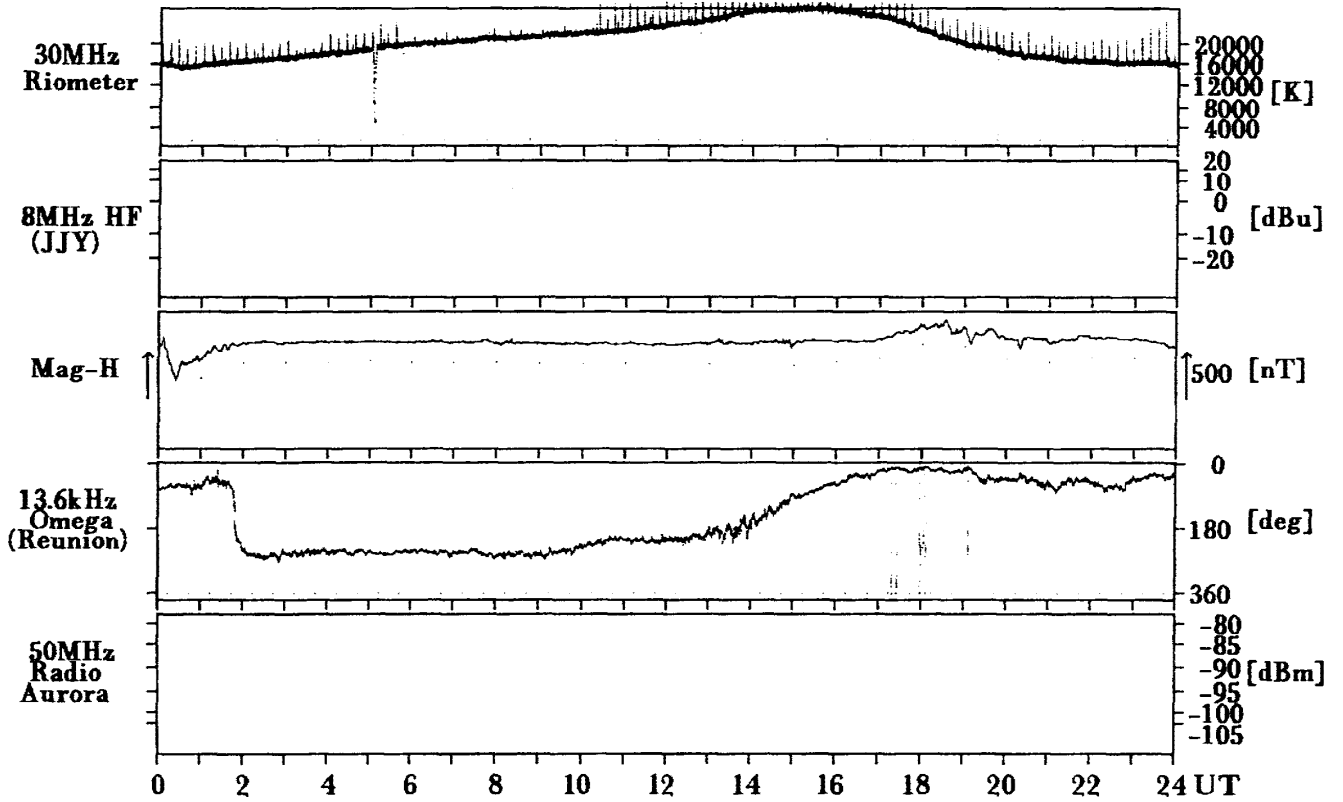
Total Day / 266 1993/ 9/23





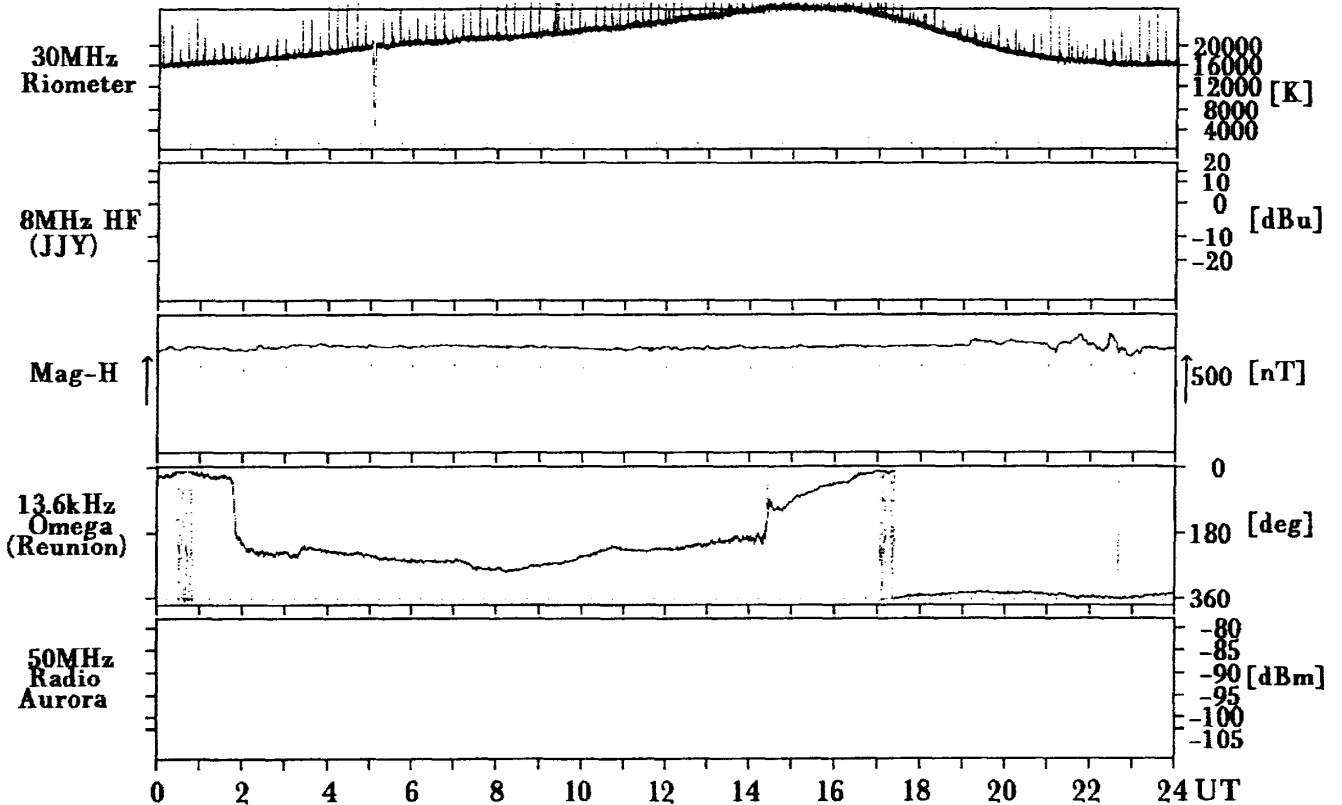
Syowa Station

Total Day / 267 1993/ 9/24



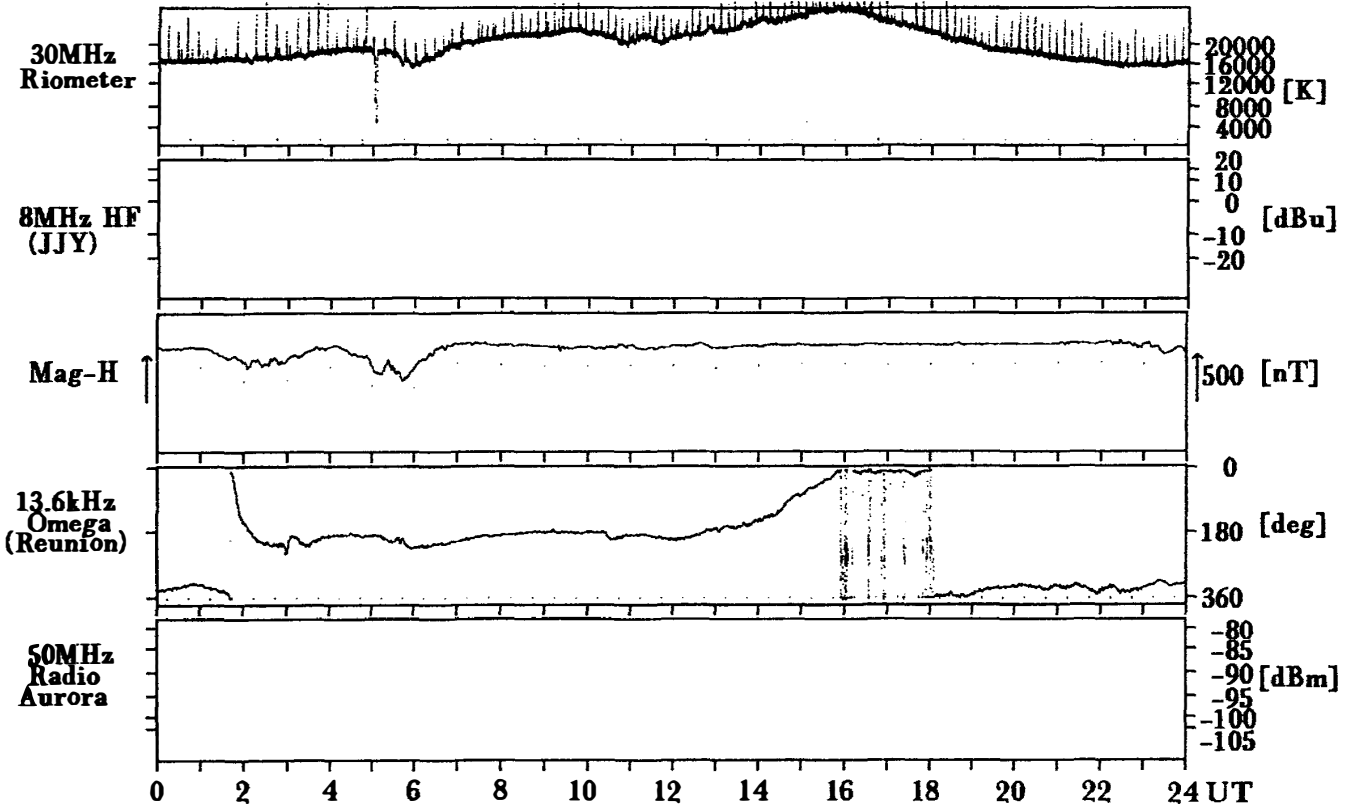
Syowa Station

Total Day / 268 1993/ 9/25



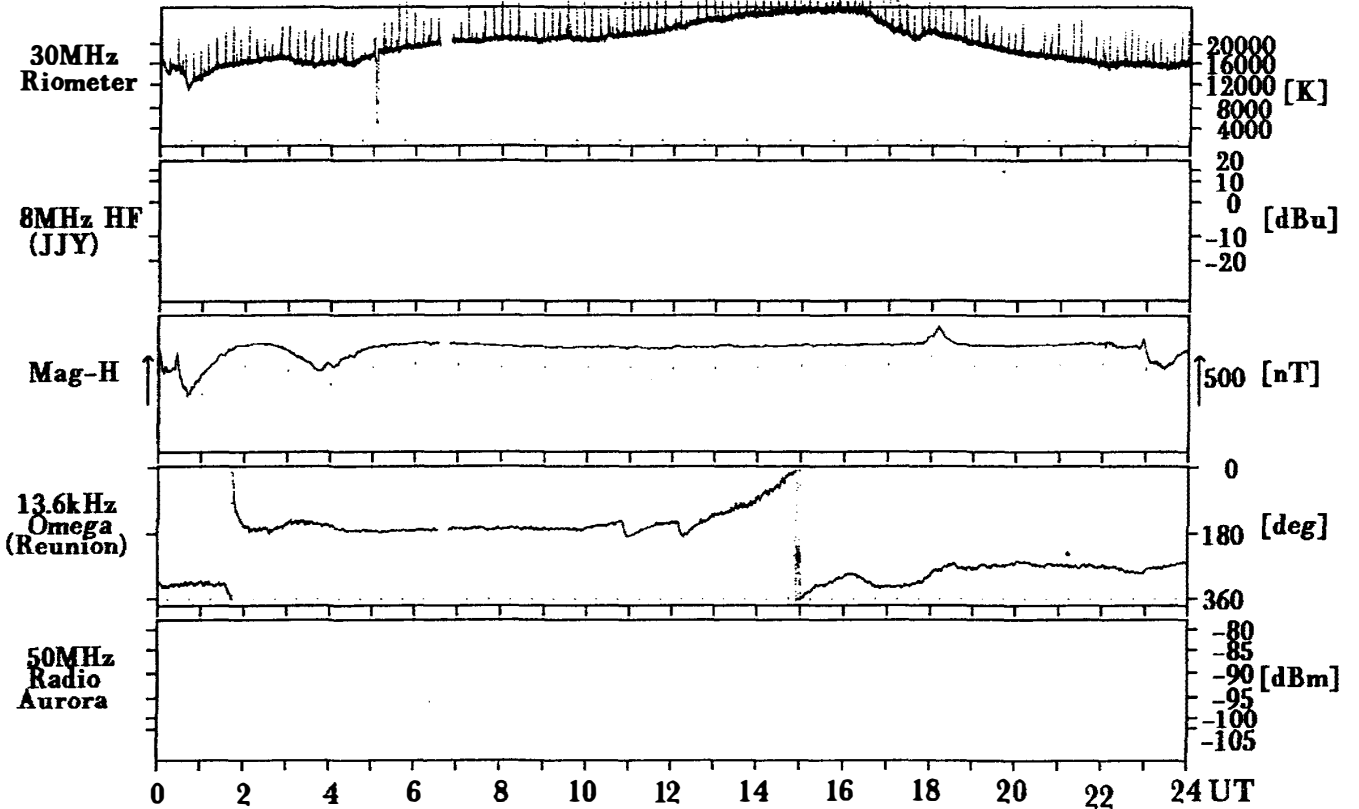
Syowa Station

Total Day / 269 1993/ 9/26



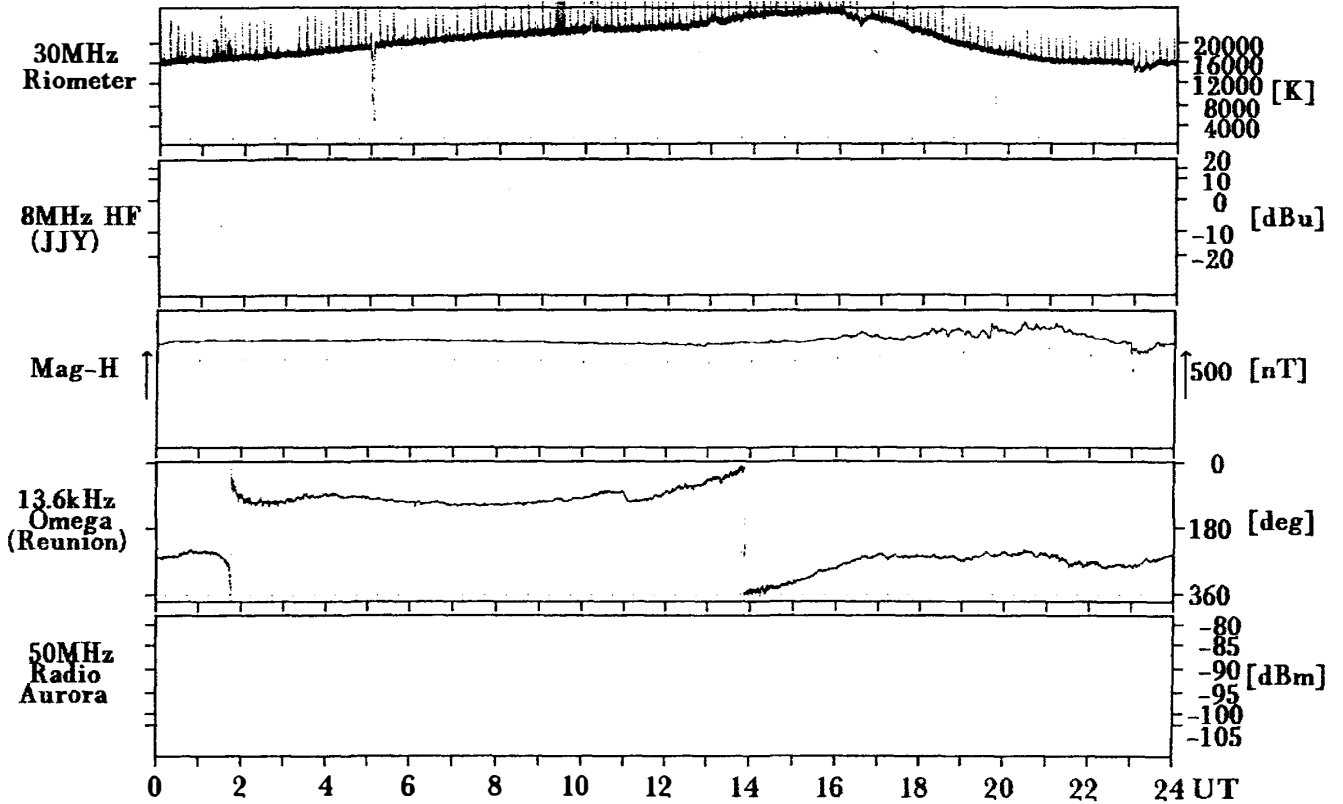
Syowa Station

Total Day / 270 1993/ 9/27



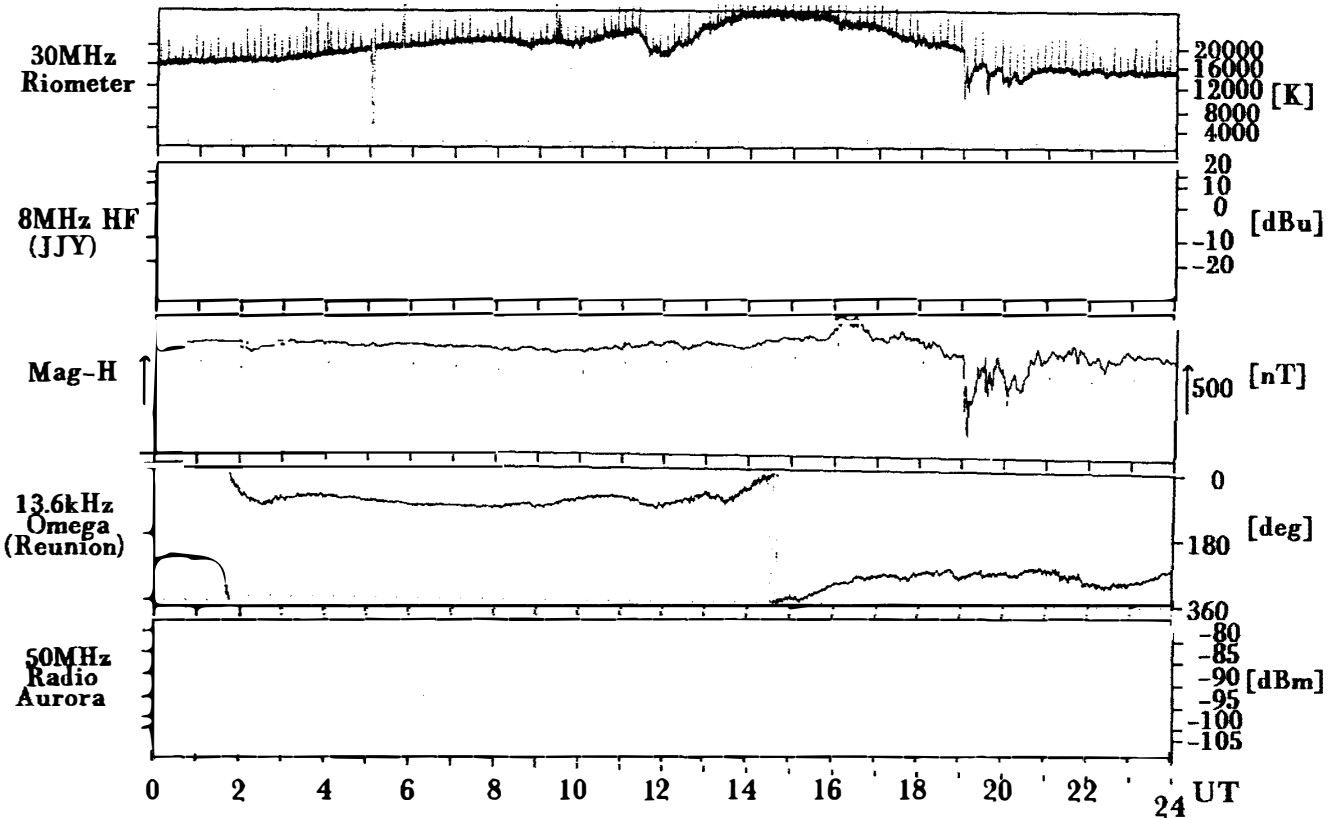
Syowa Station

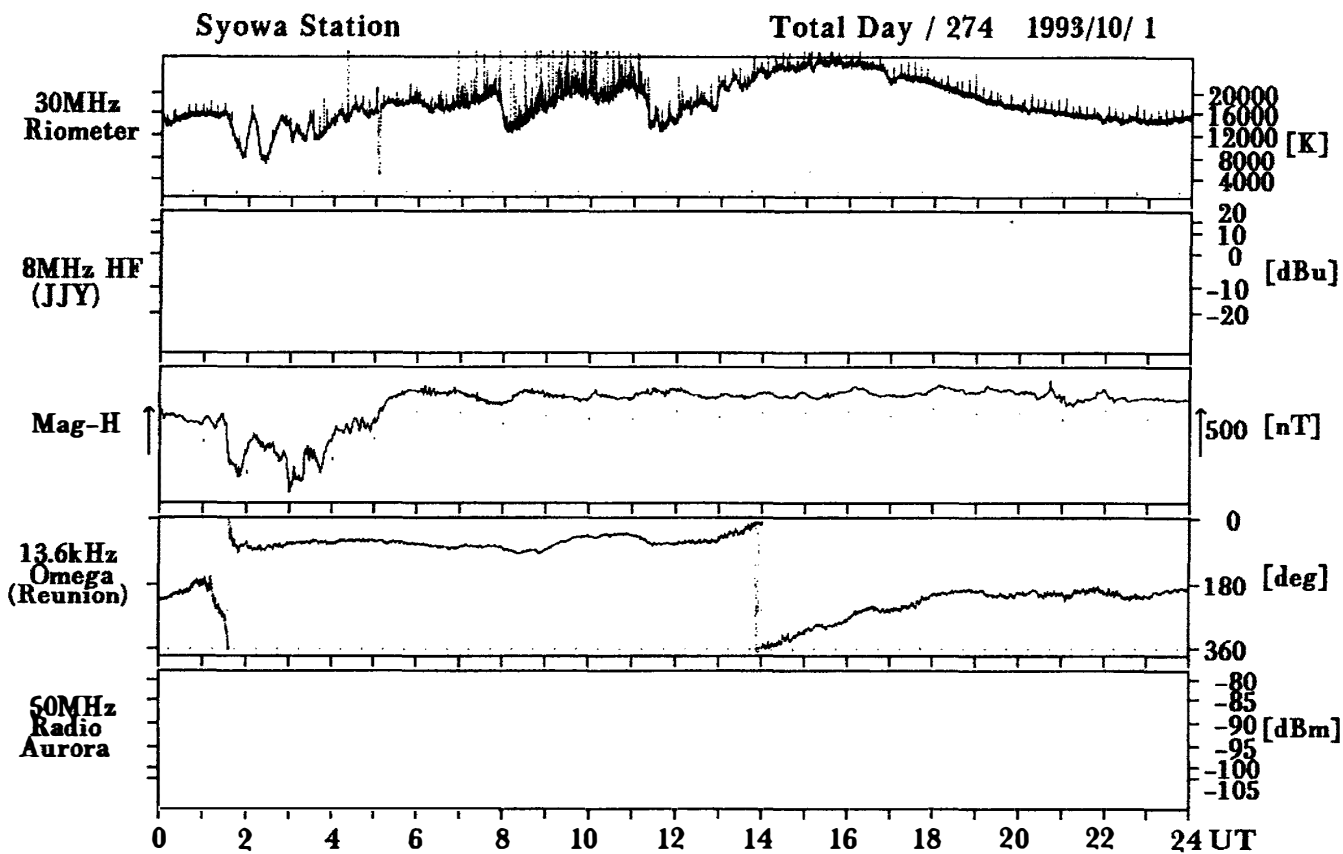
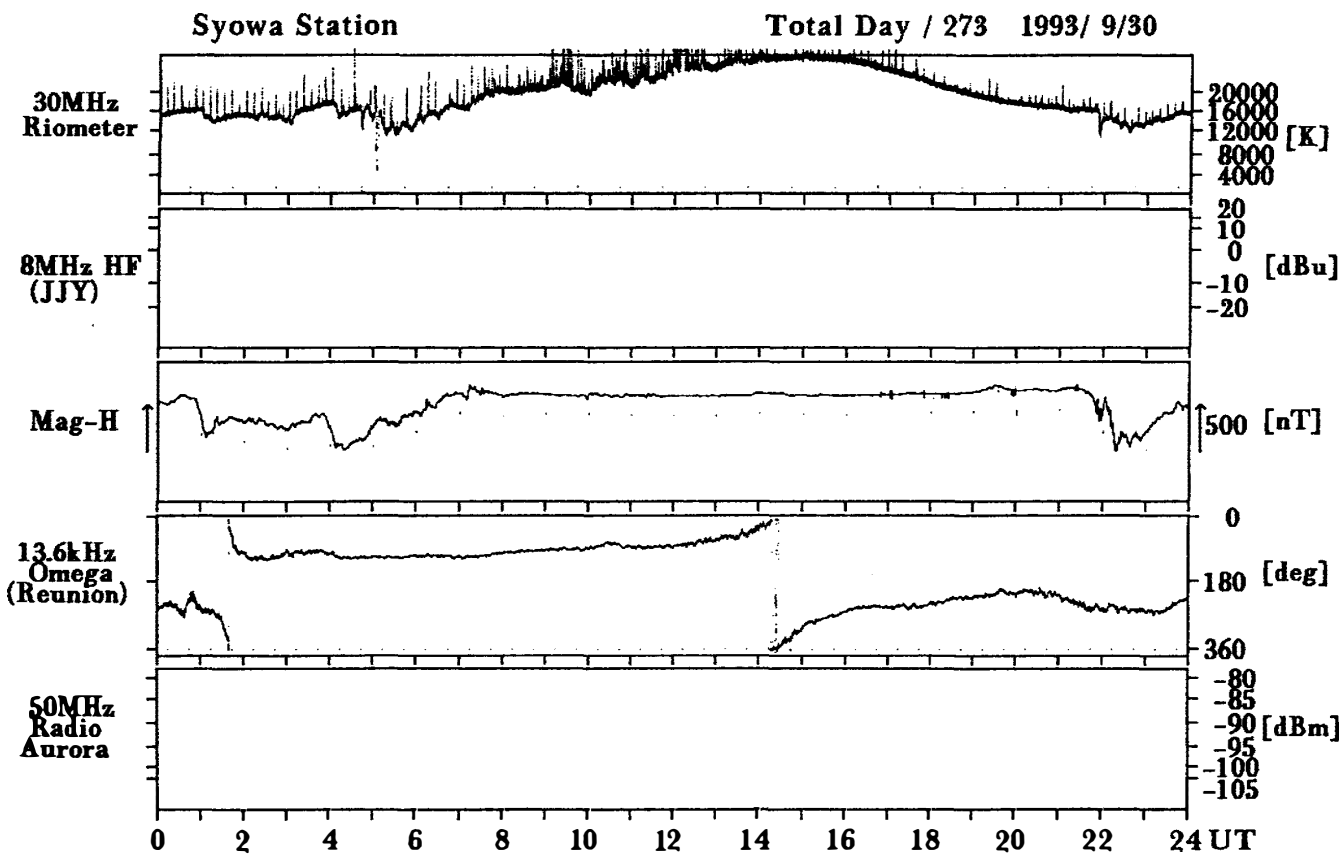
Total Day / 271 1993/ 9/28



Syowa Station

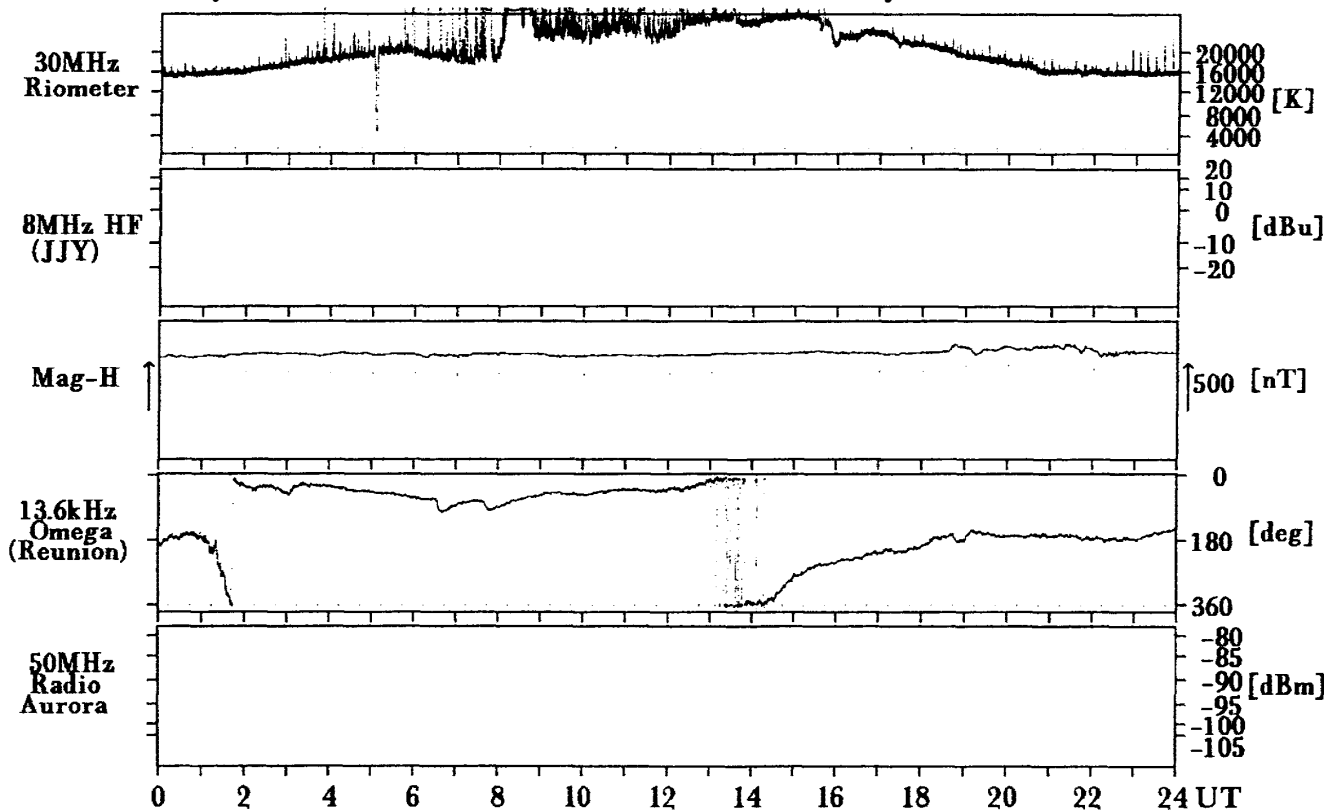
Total Day / 272 1993/ 9/29





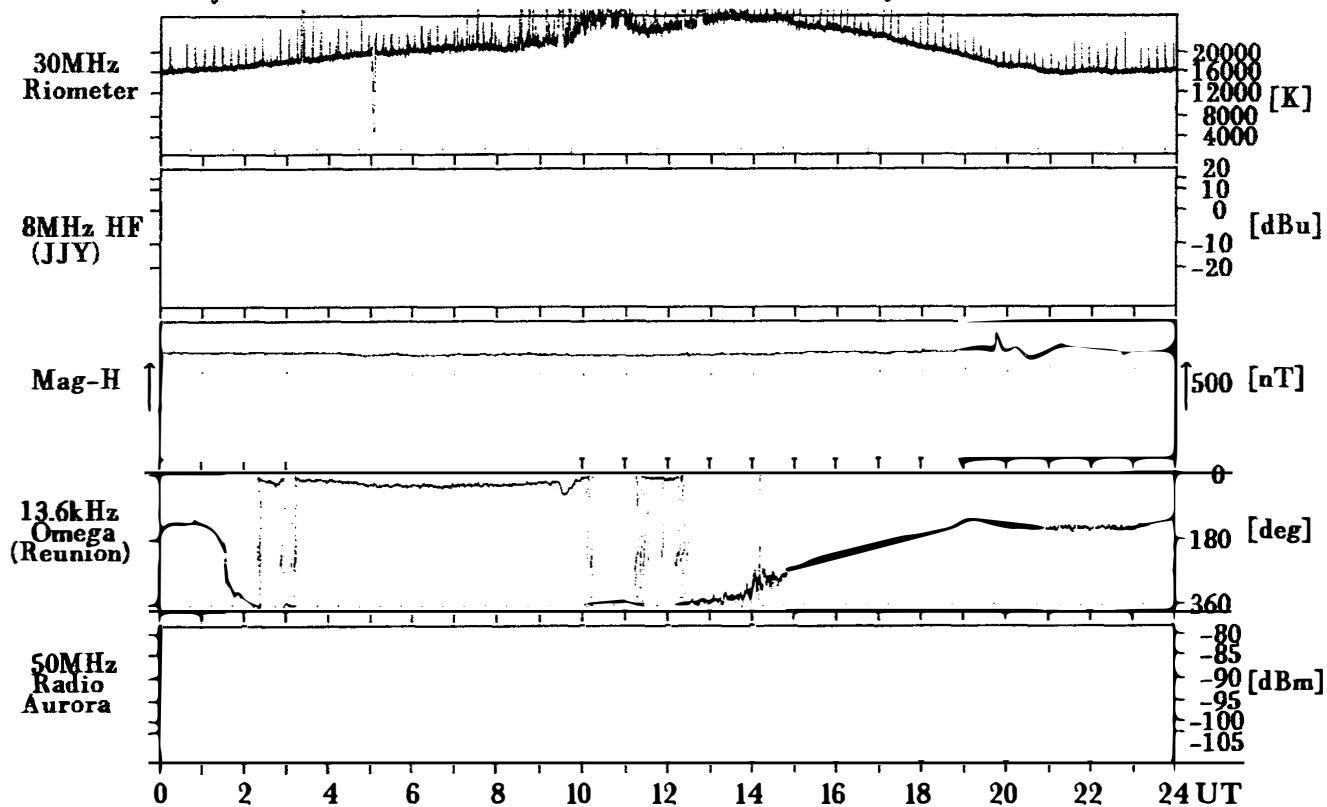
Syowa Station

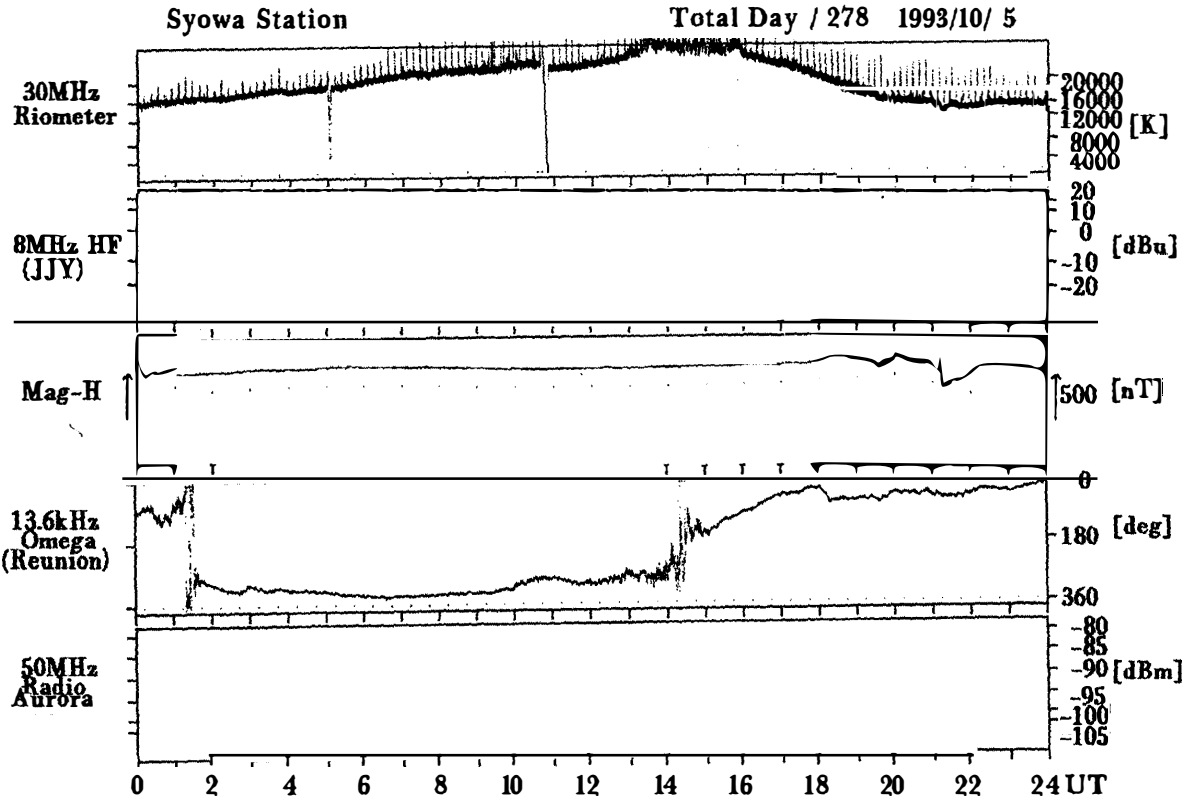
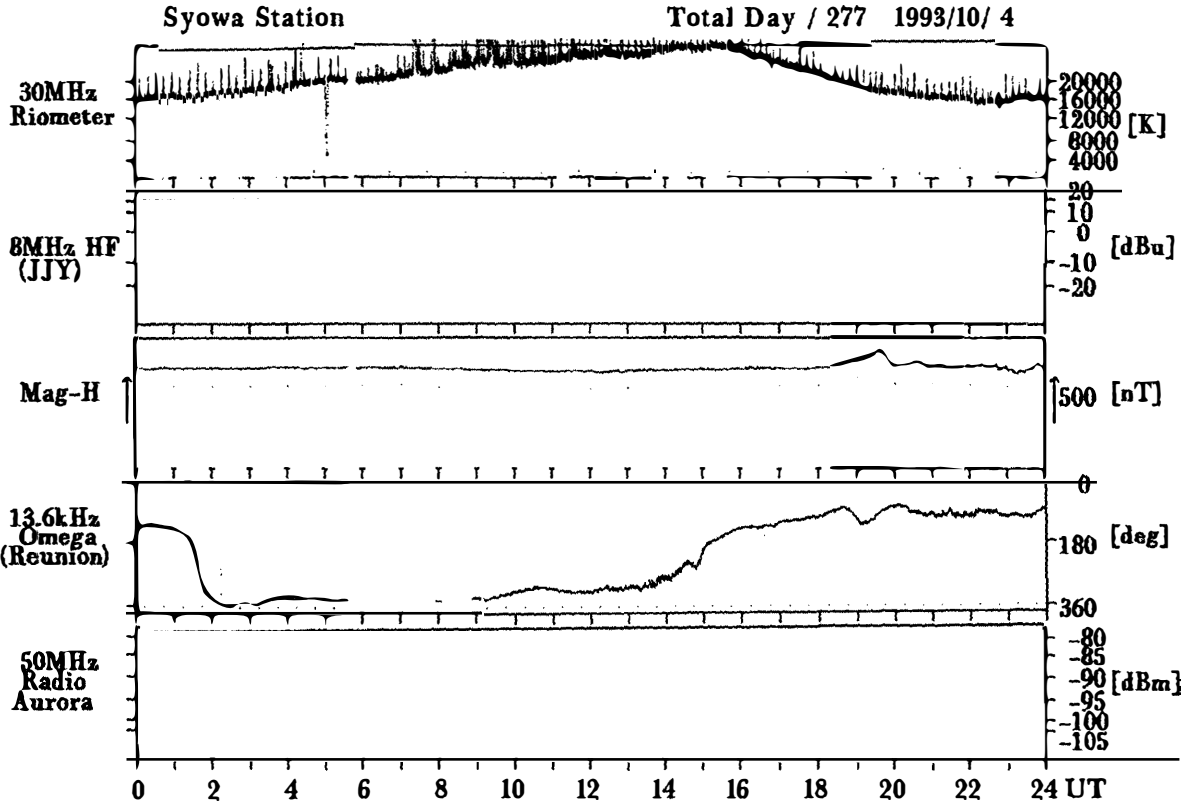
Total Day / 275 1993/10/ 2



Syowa Station

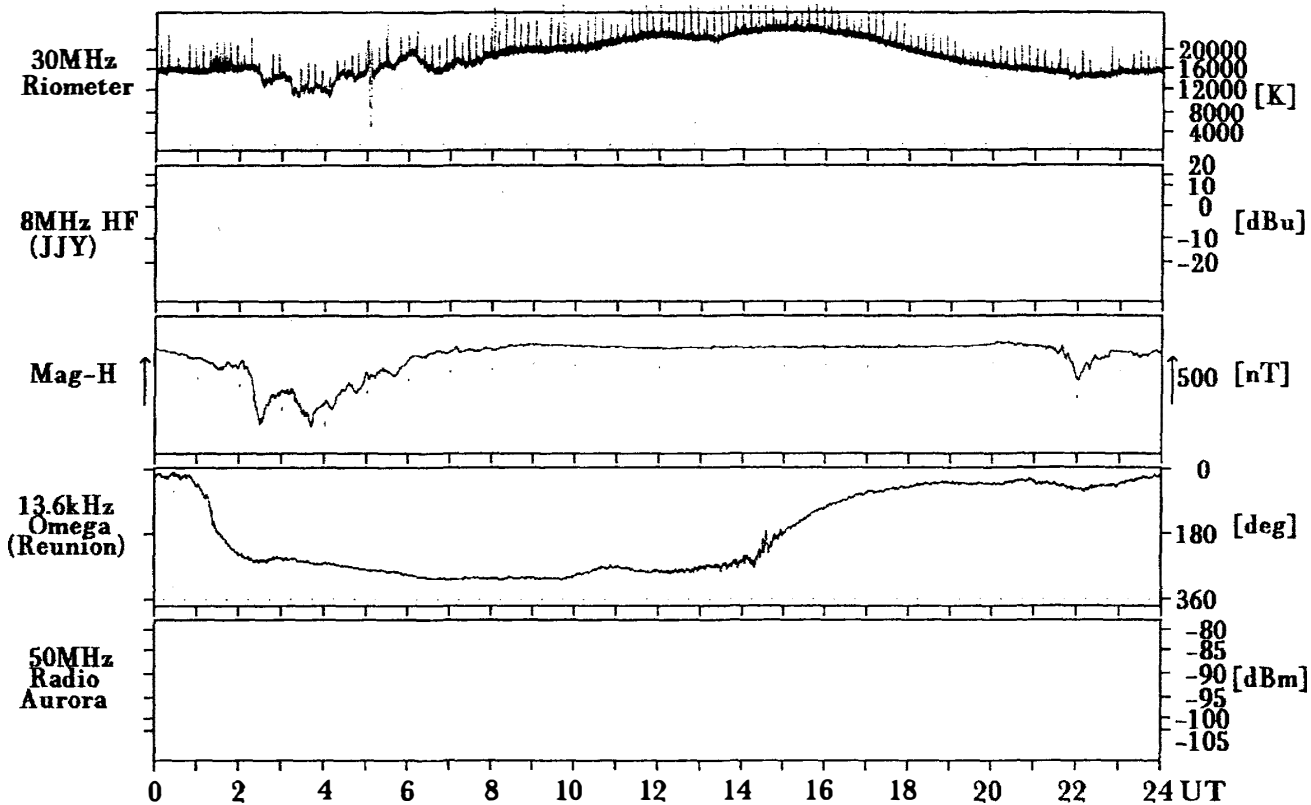
Total Day / 276 1993/10/ 3





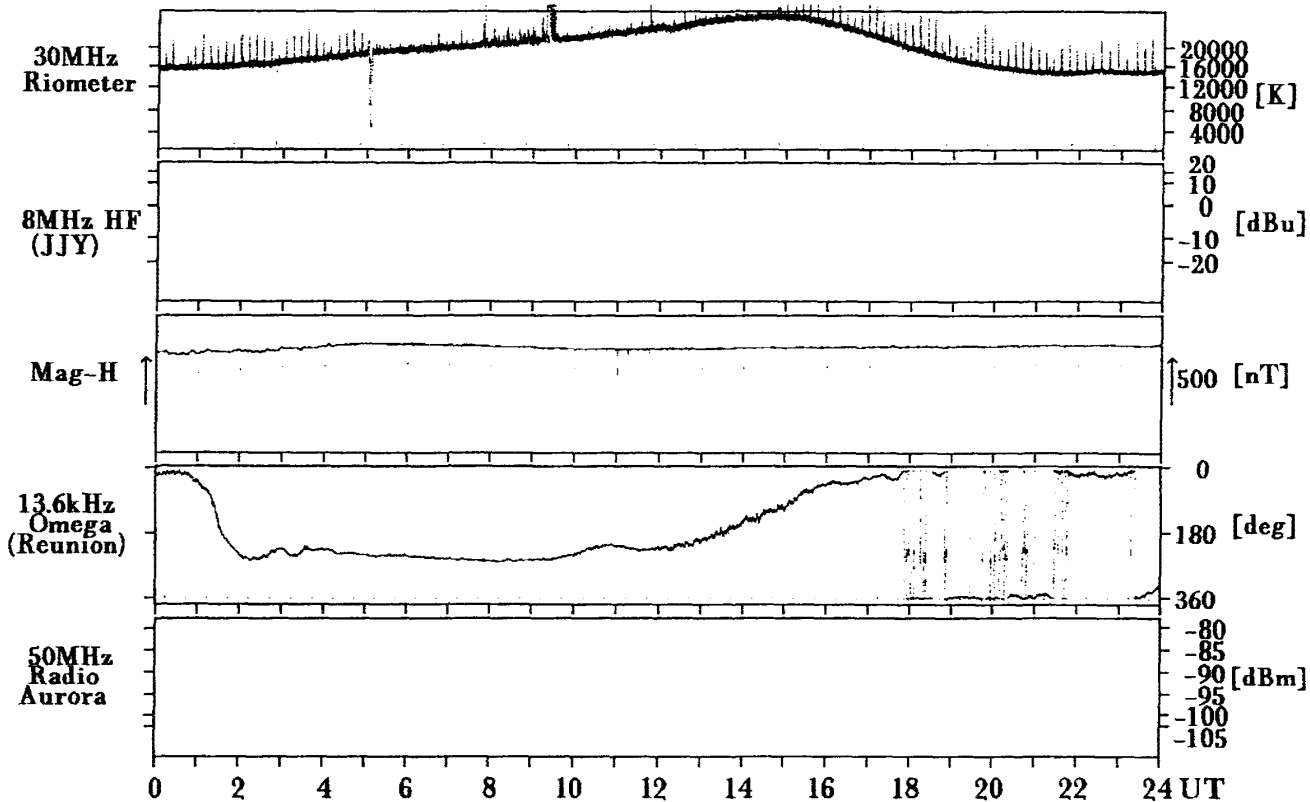
Syowa Station

Total Day / 279 1993/10/ 6



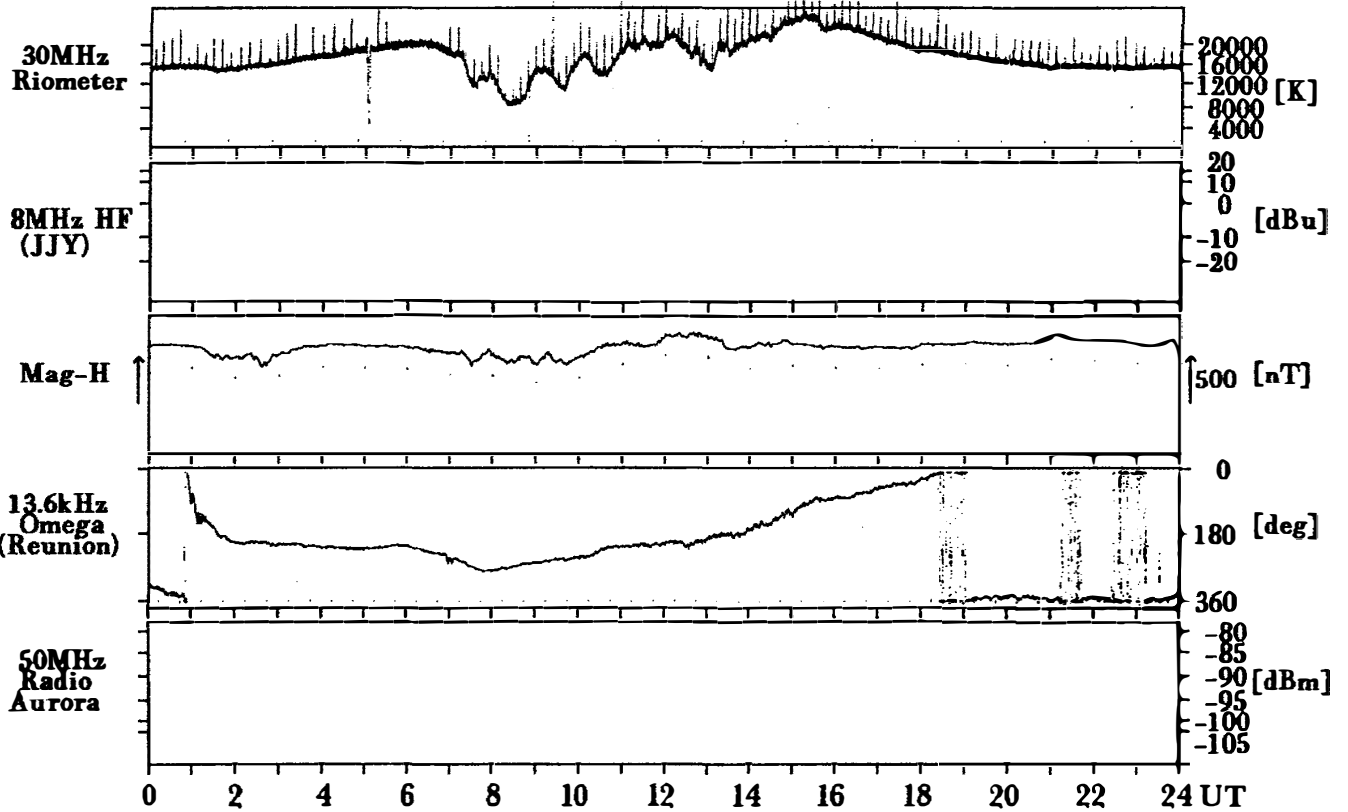
Syowa Station

Total Day / 280 1993/10/ 7



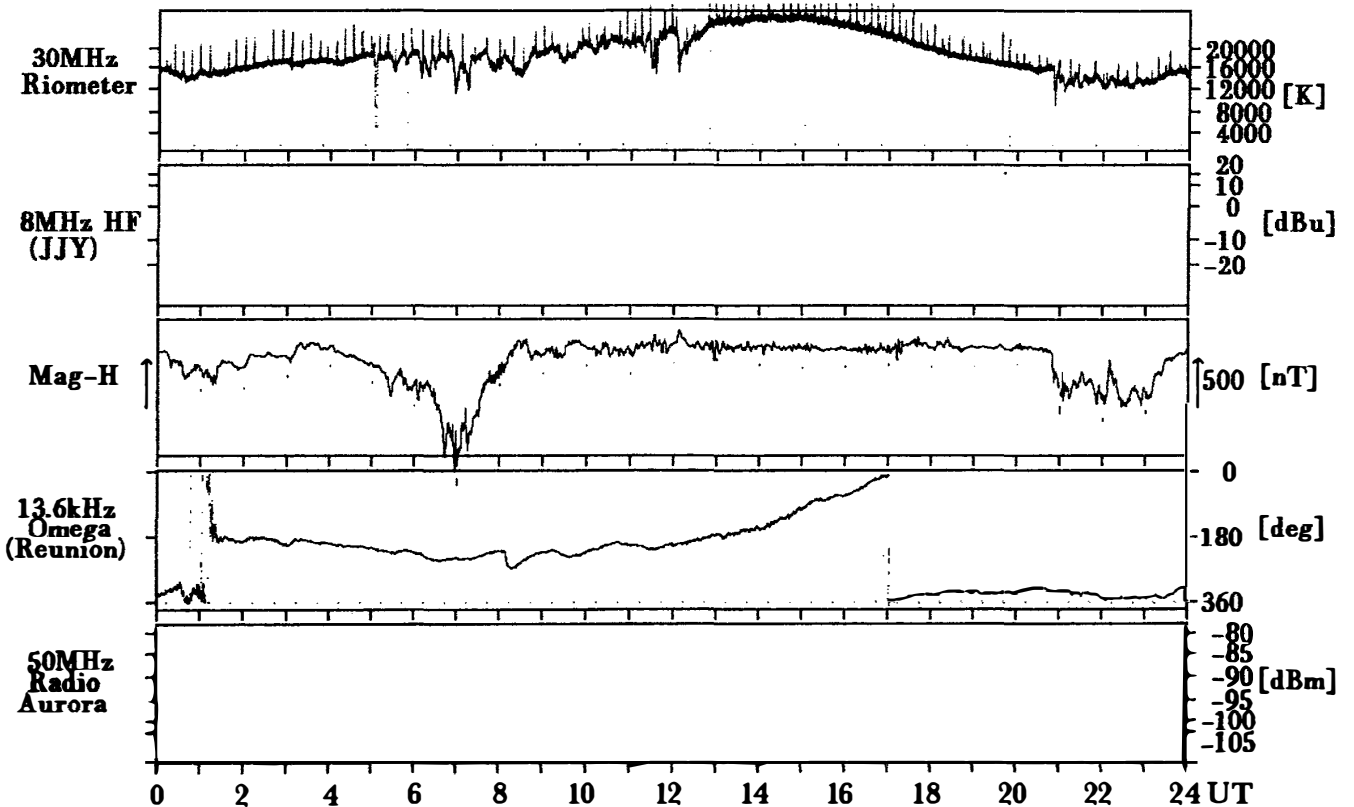
Syowa Station

Total Day / 281 1993/10/ 8



Syowa Station

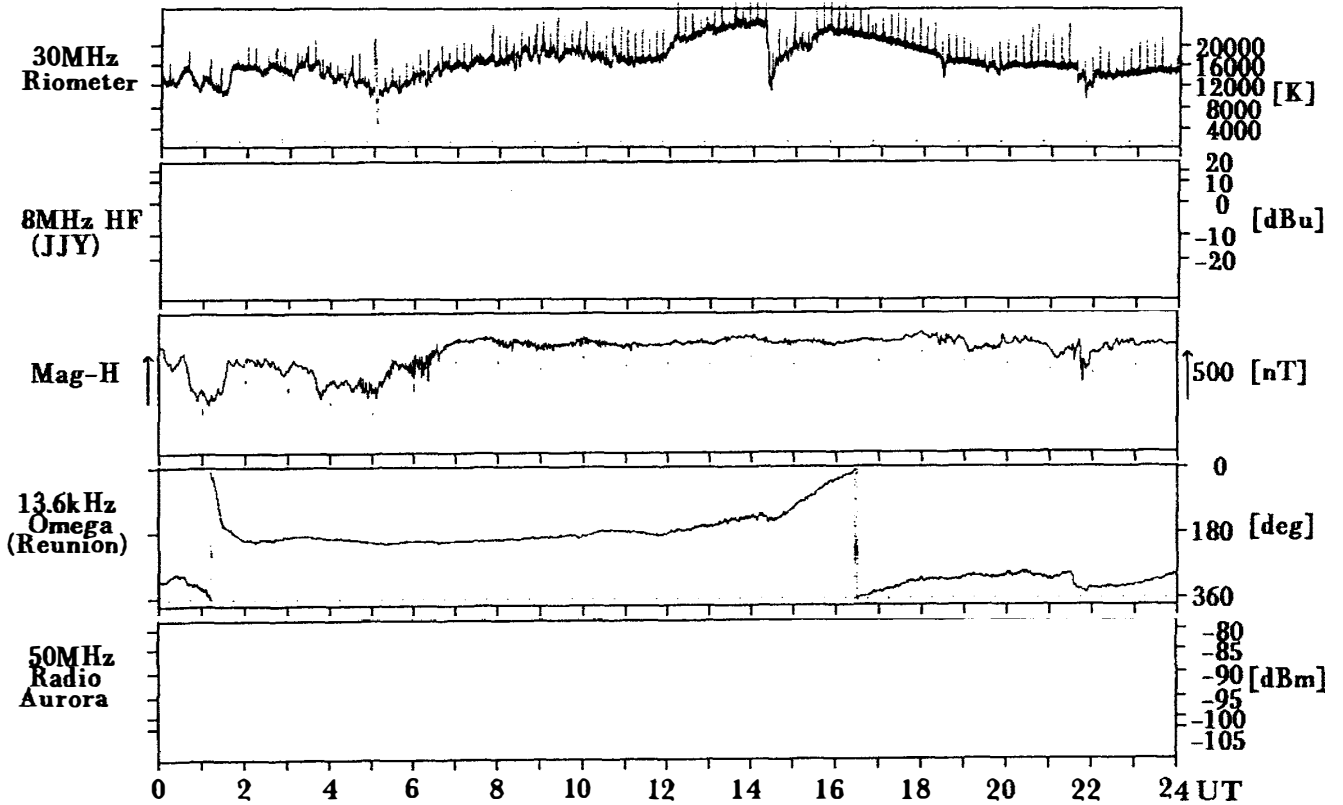
Total Day / 282 1993/10/ 9





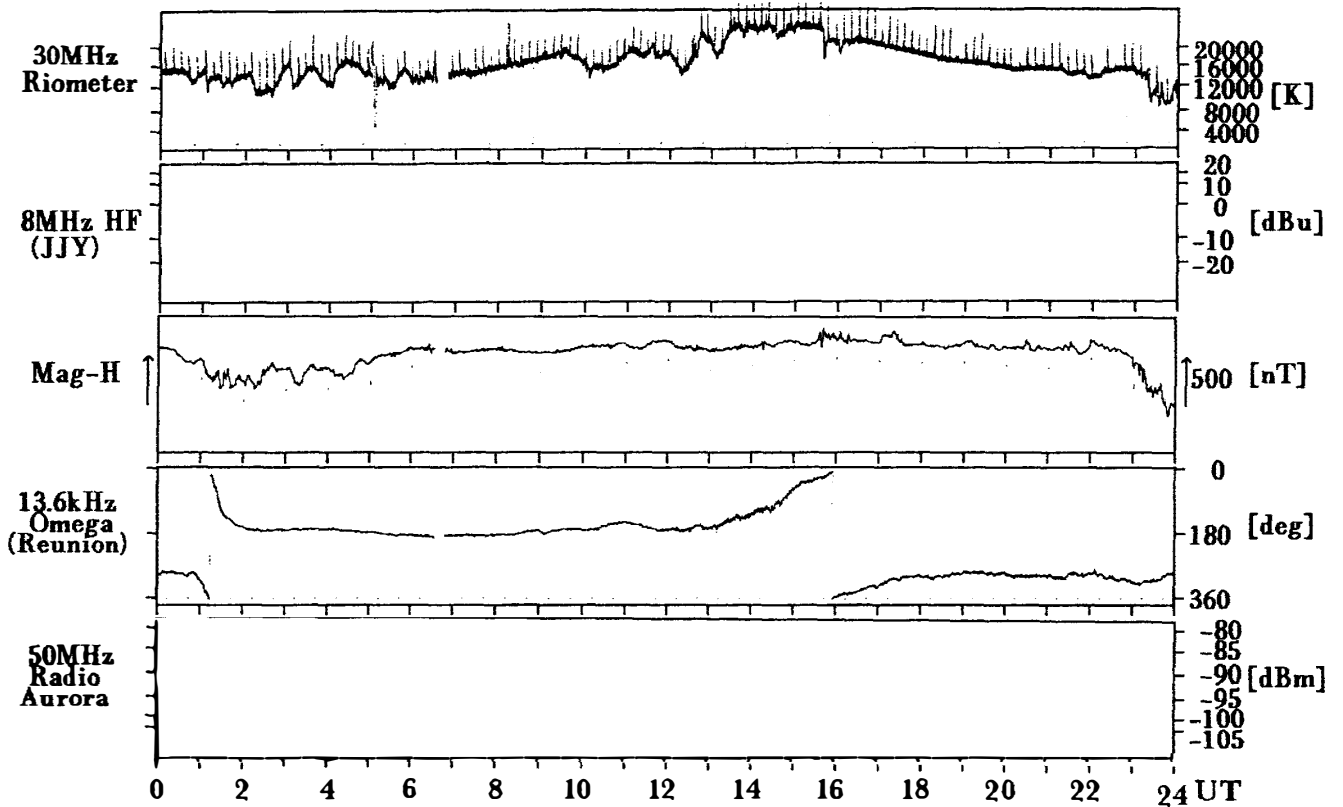
Syowa Station

Total Day / 283 1993/10/10



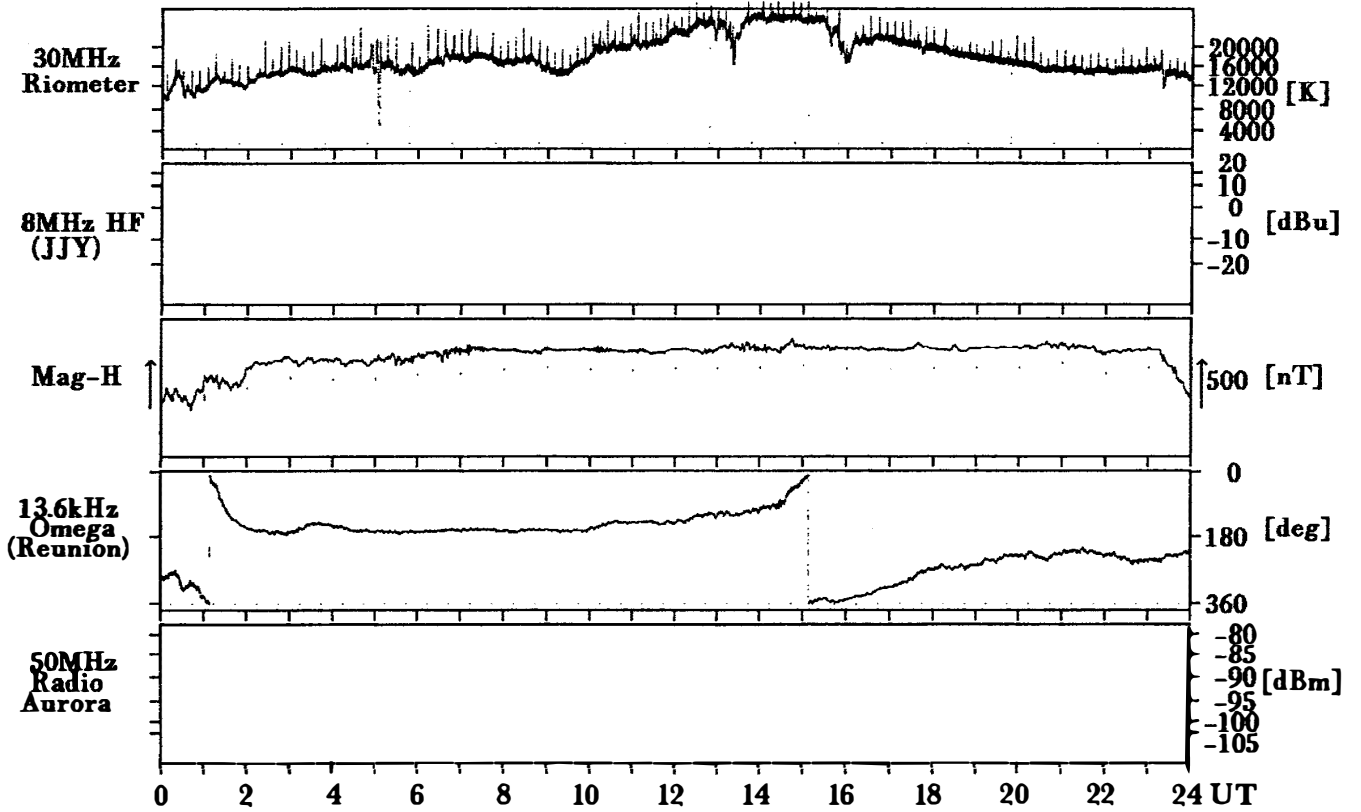
Syowa Station

Total Day / 284 1993/10/11



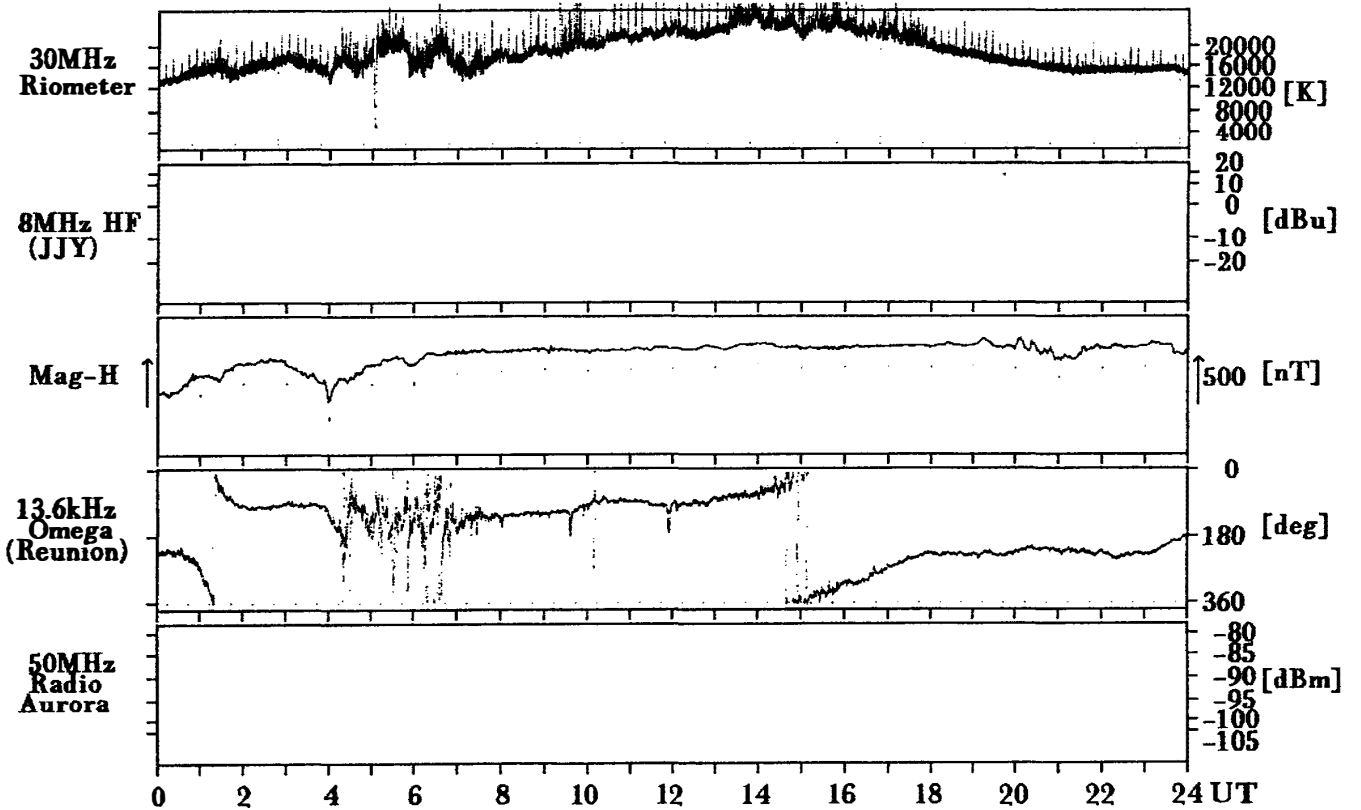
Syowa Station

Total Day / 285 1993/10/12



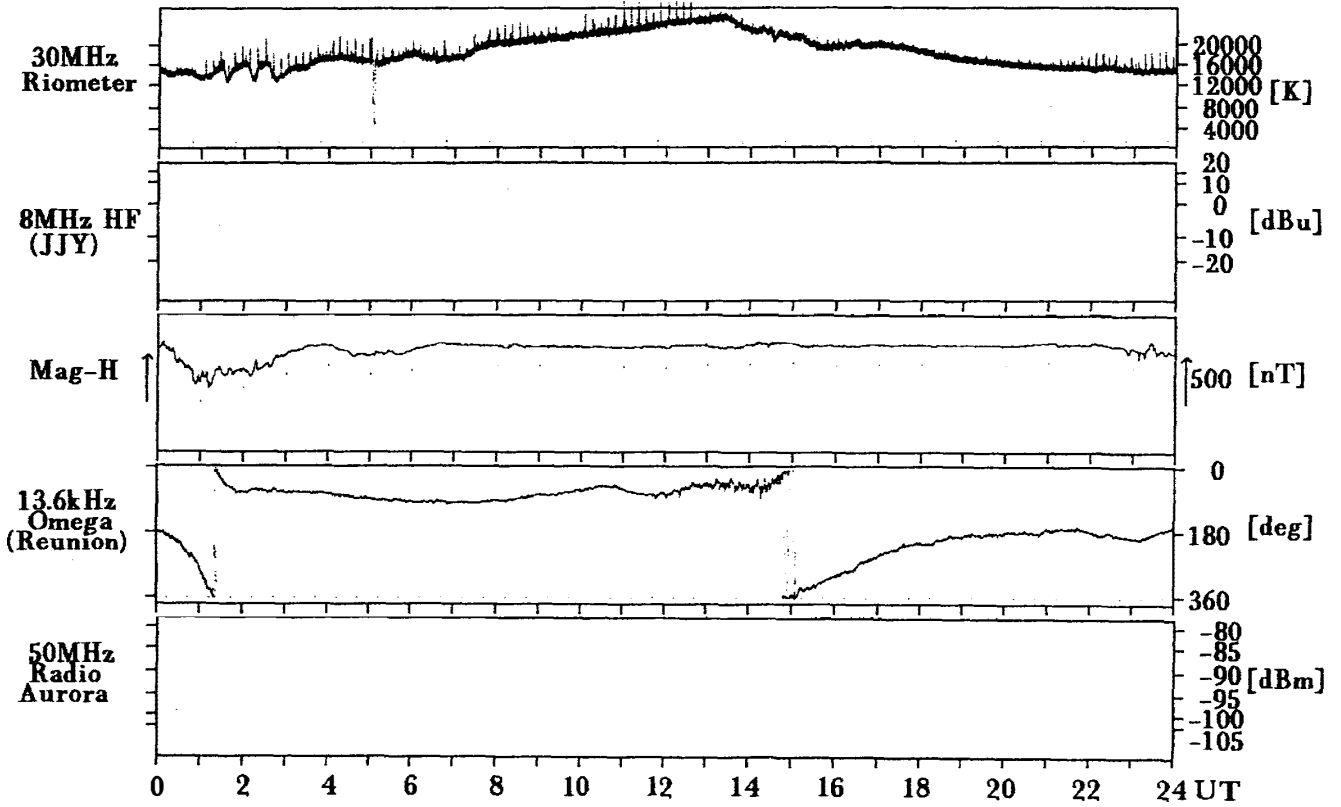
Syowa Station

Total Day / 286 1993/10/13



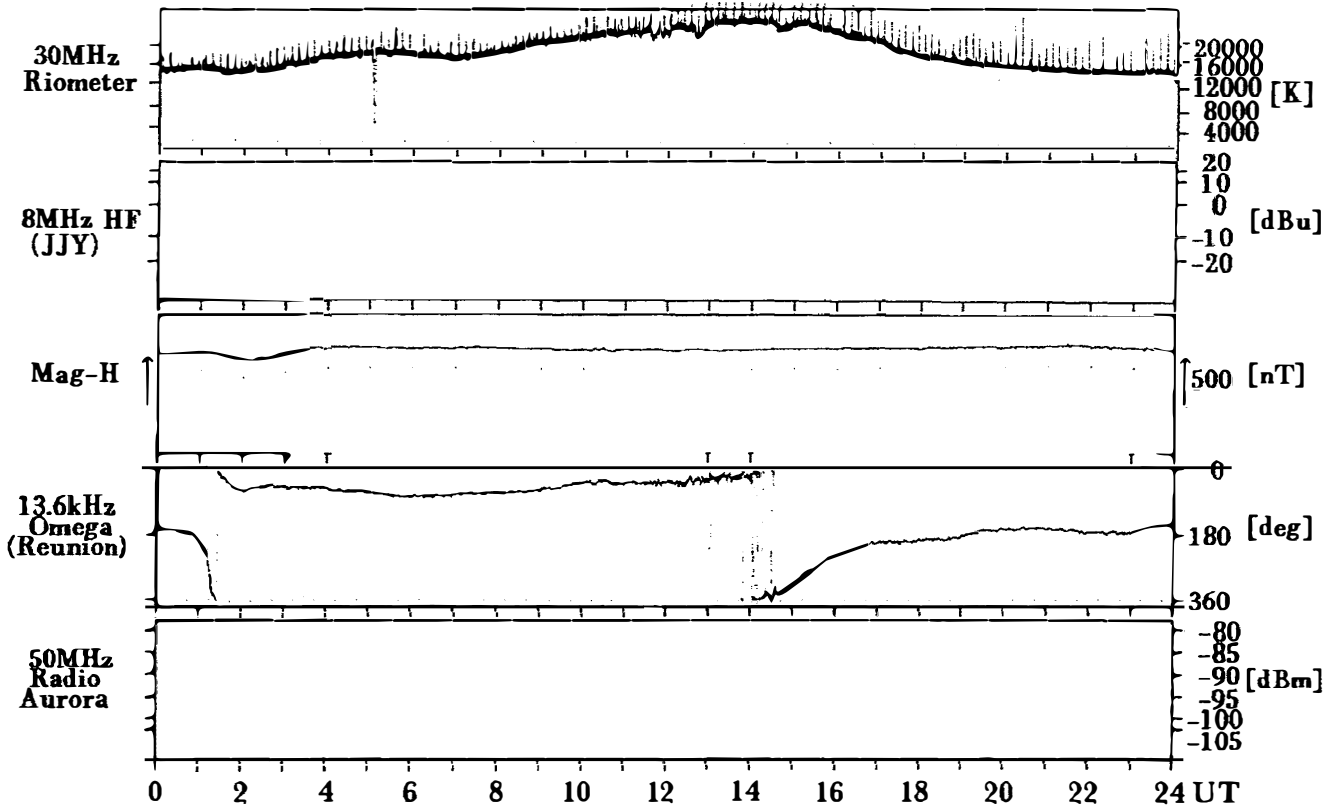
Syowa Station

Total Day / 287 1993/10/14



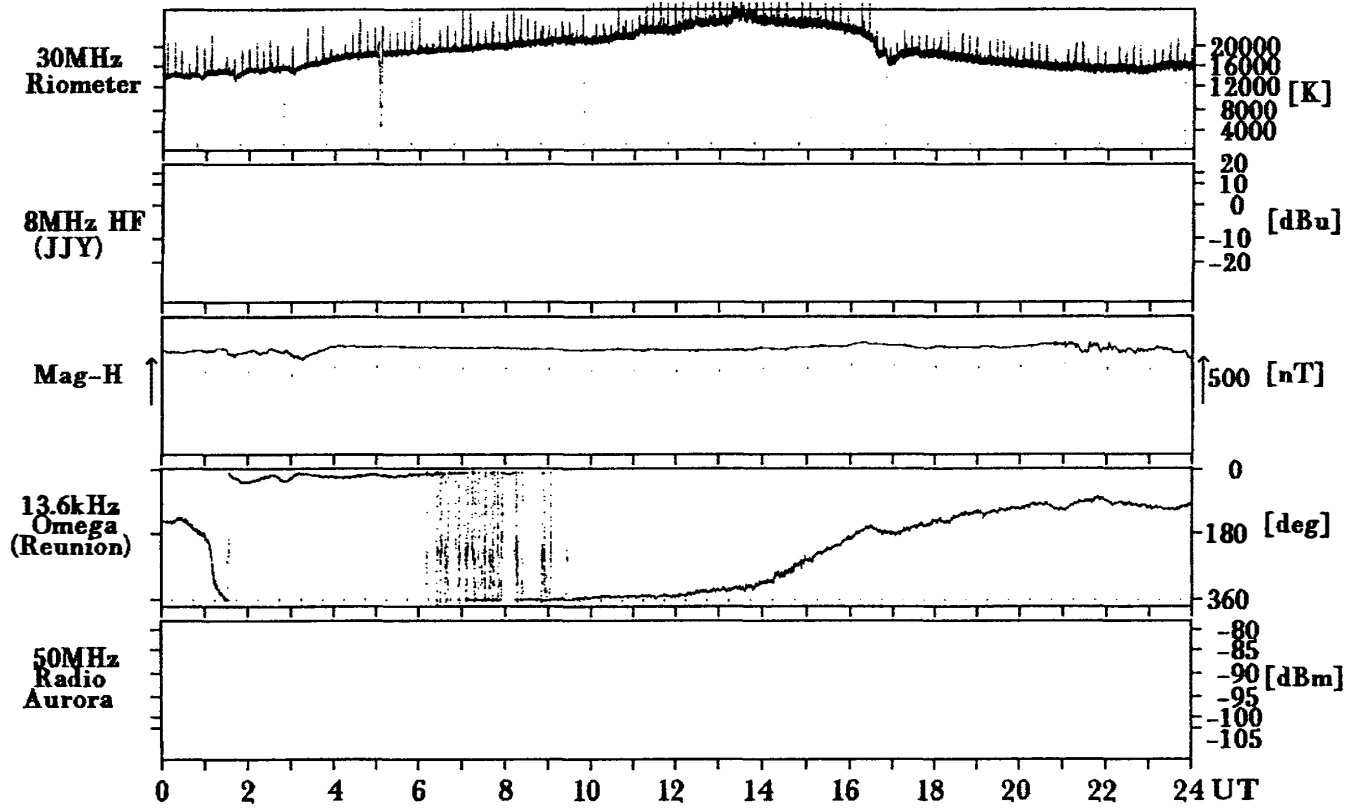
Syowa Station

Total Day / 288 1993/10/15



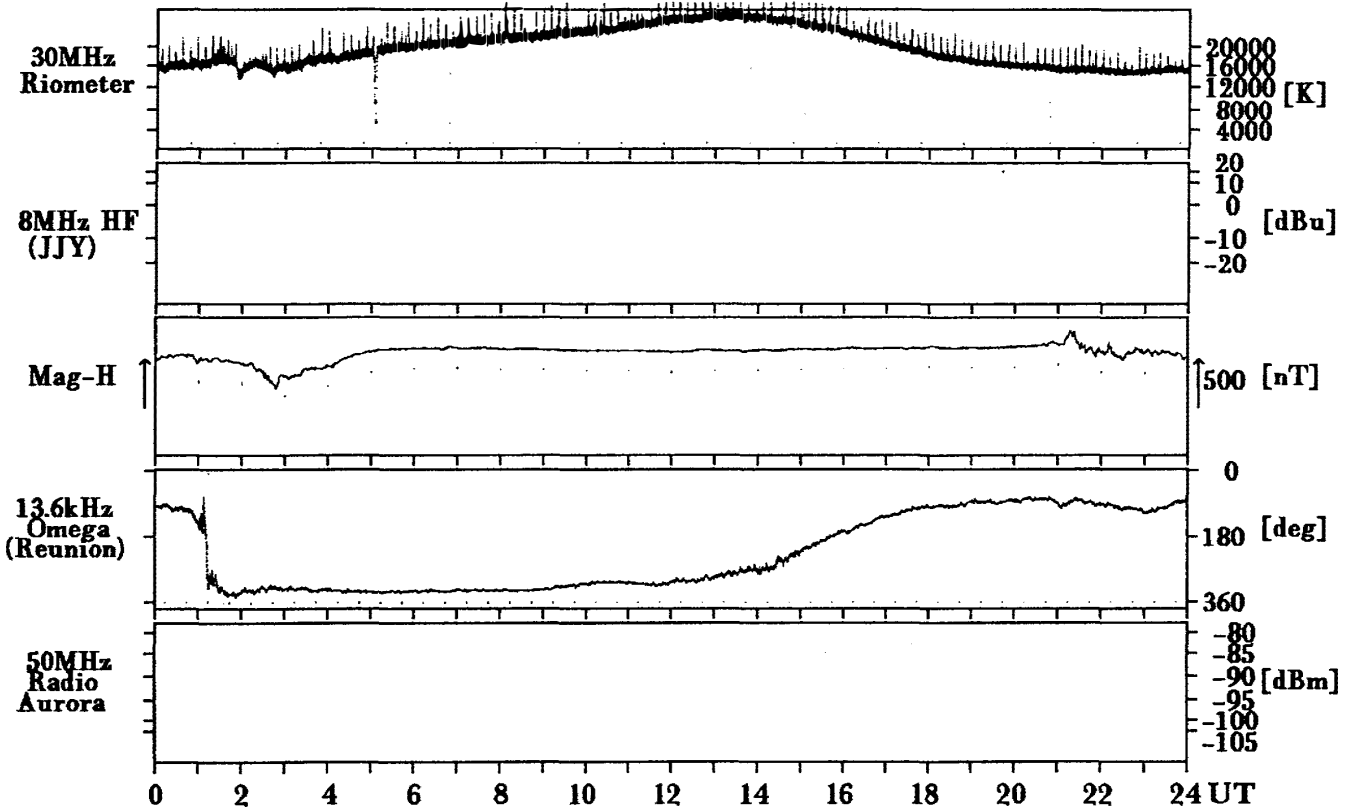
Syowa Station

Total Day / 289 1993/10/16



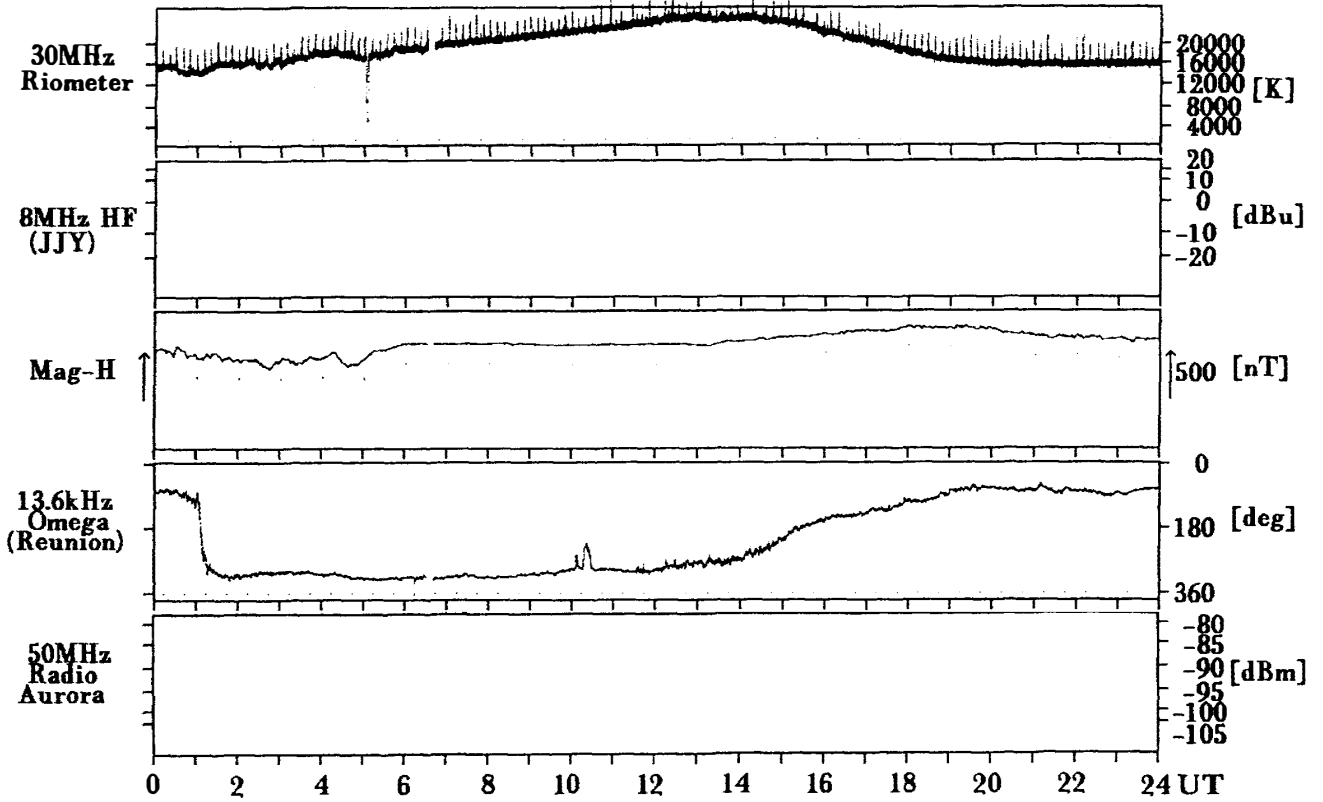
Syowa Station

Total Day / 290 1993/10/17



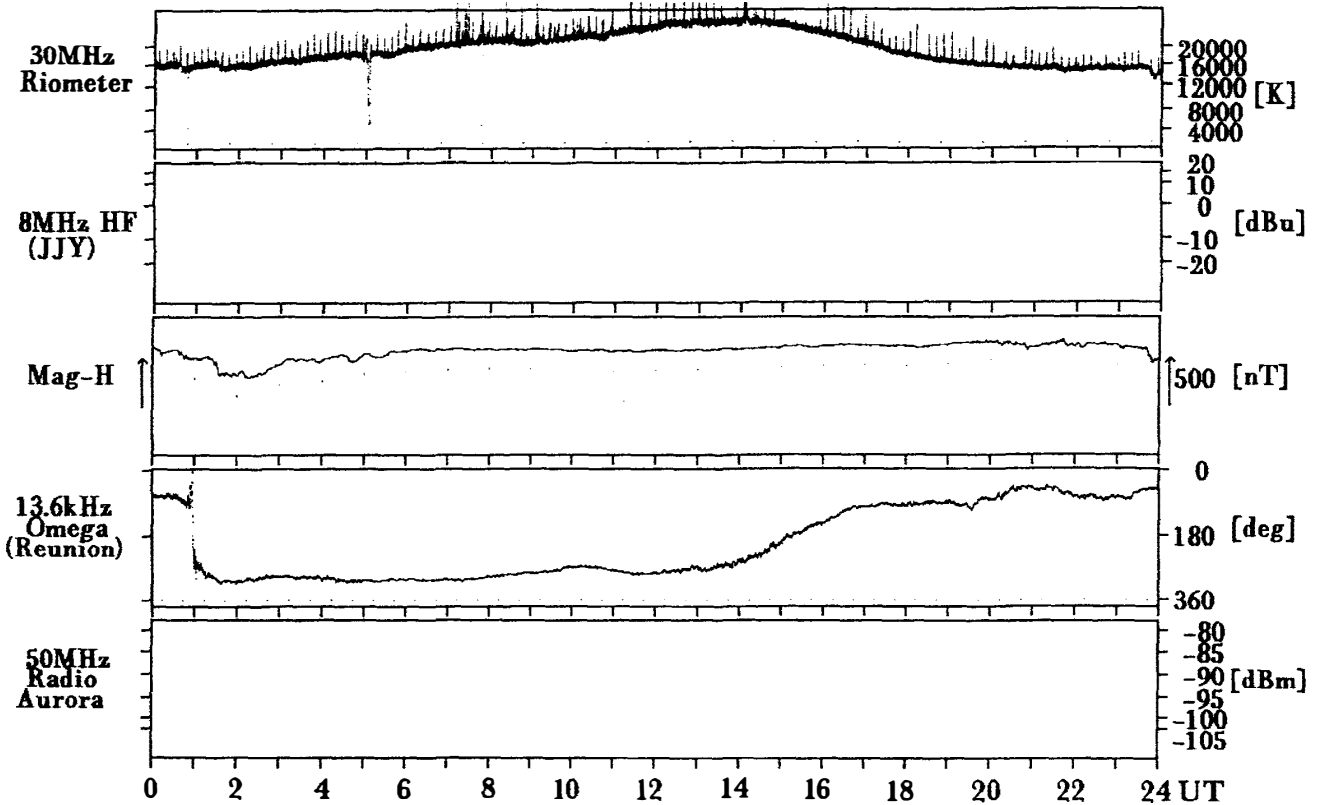
Syowa Station

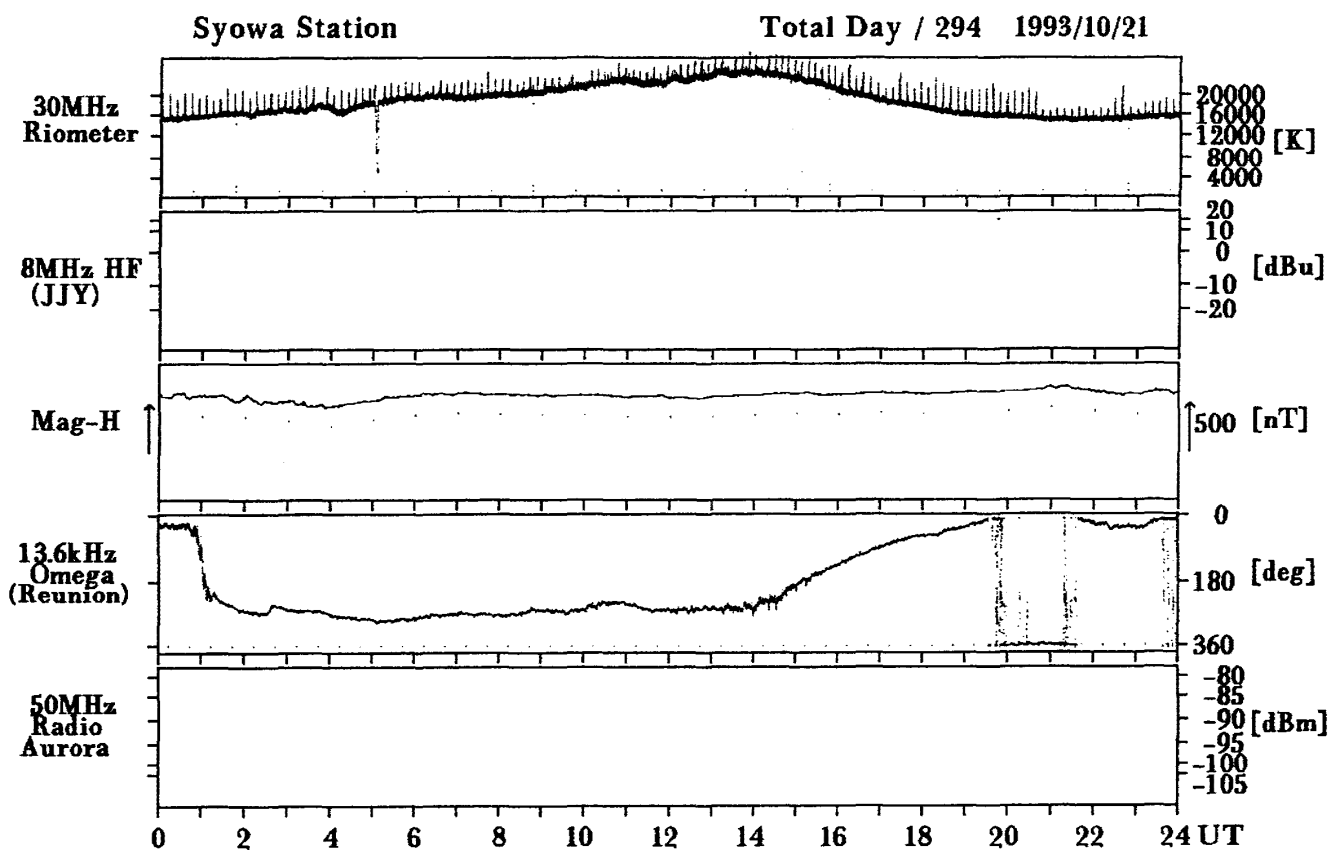
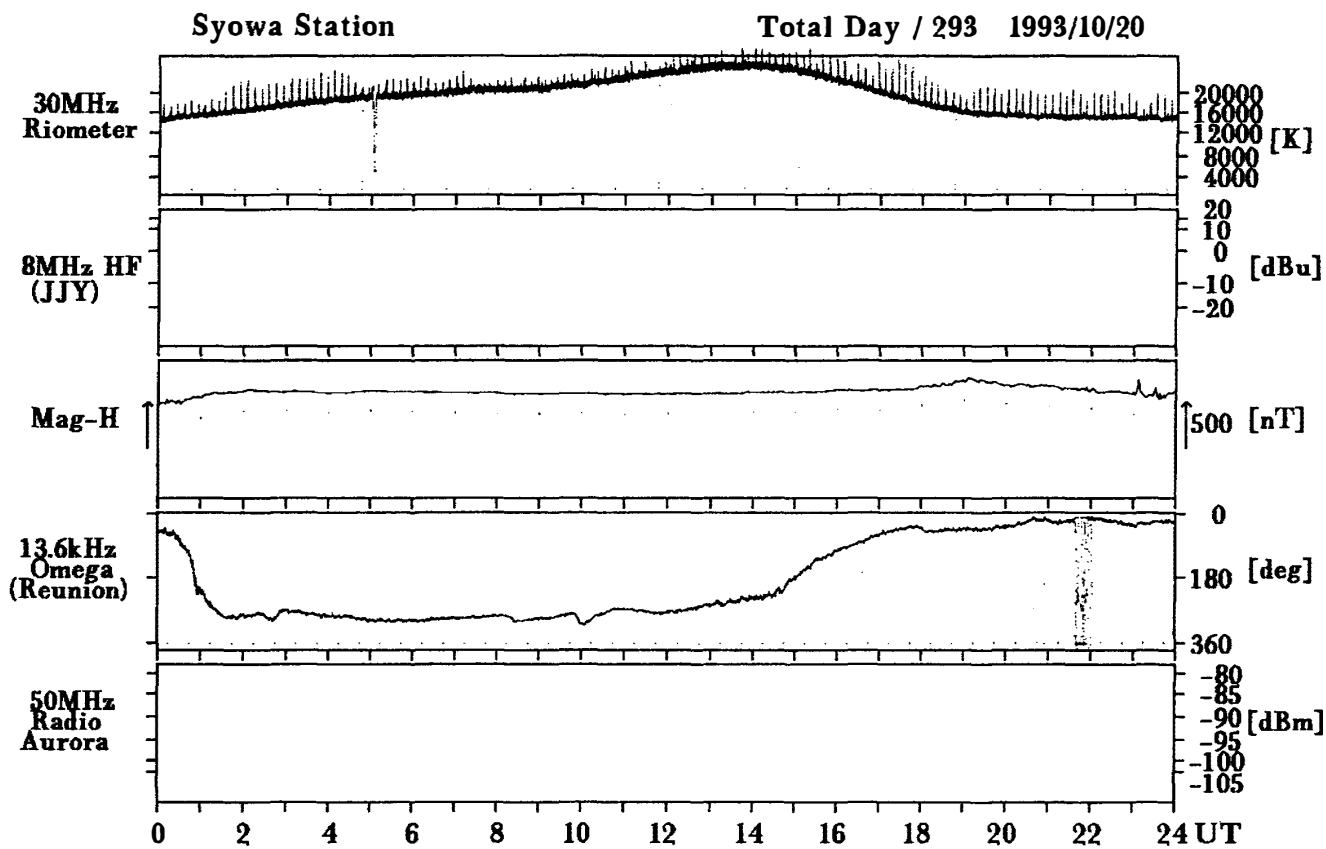
Total Day / 291 1993/10/18



Syowa Station

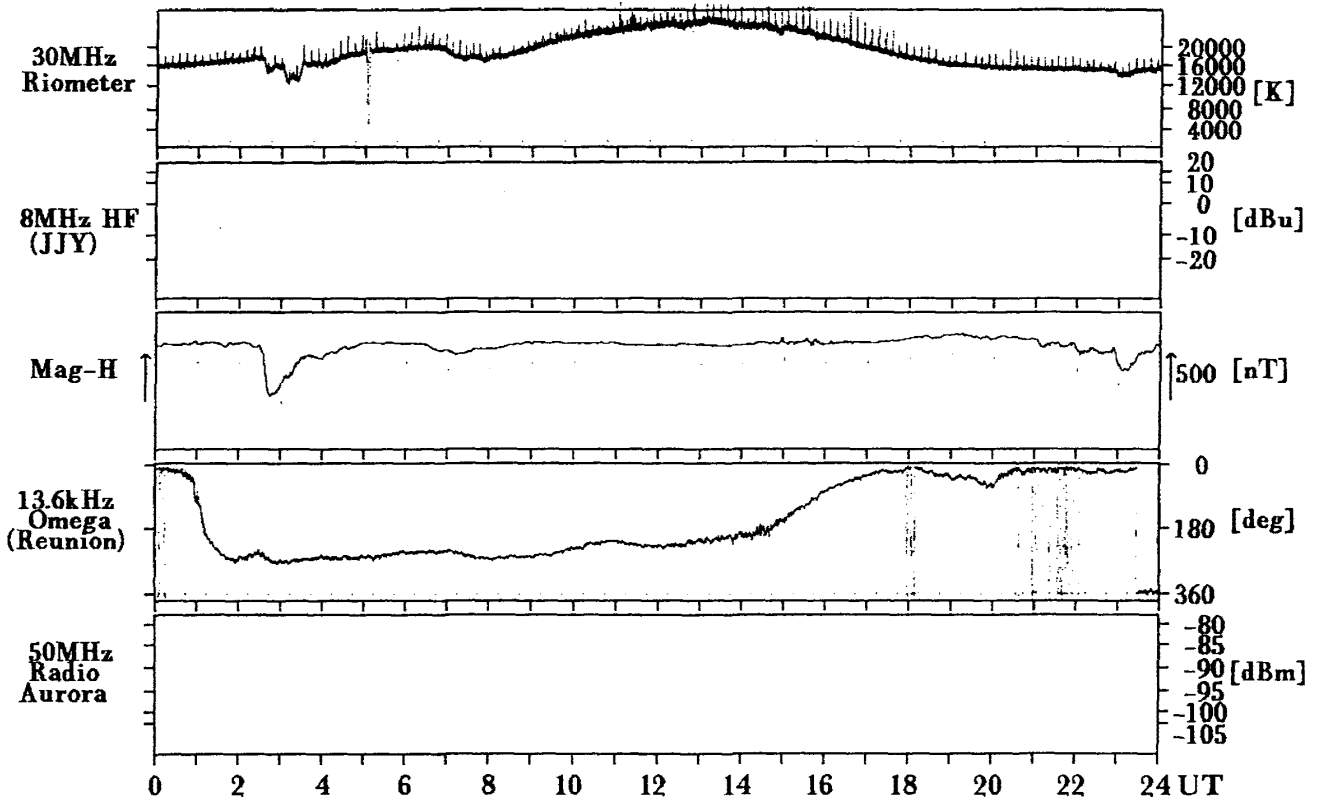
Total Day / 292 1993/10/19





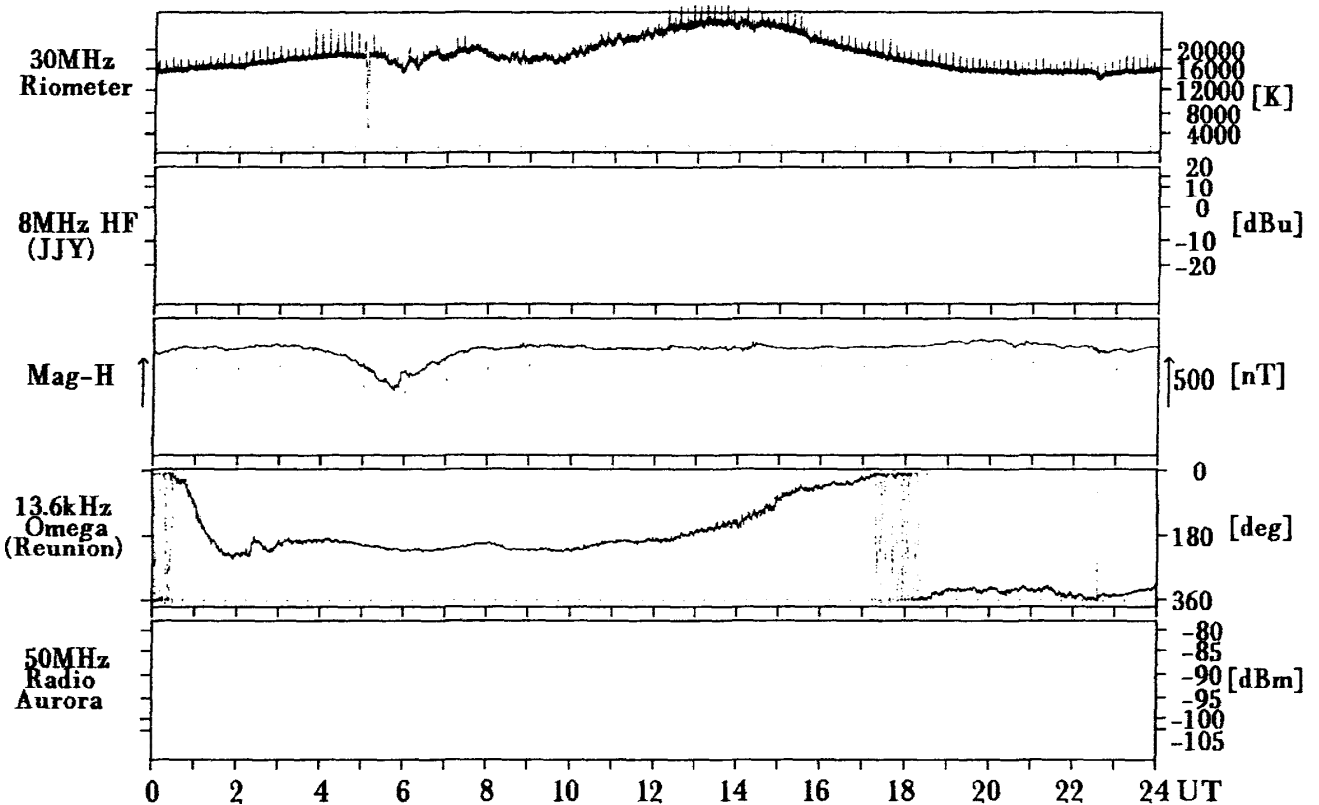
Syowa Station

Total Day / 295 1993/10/22



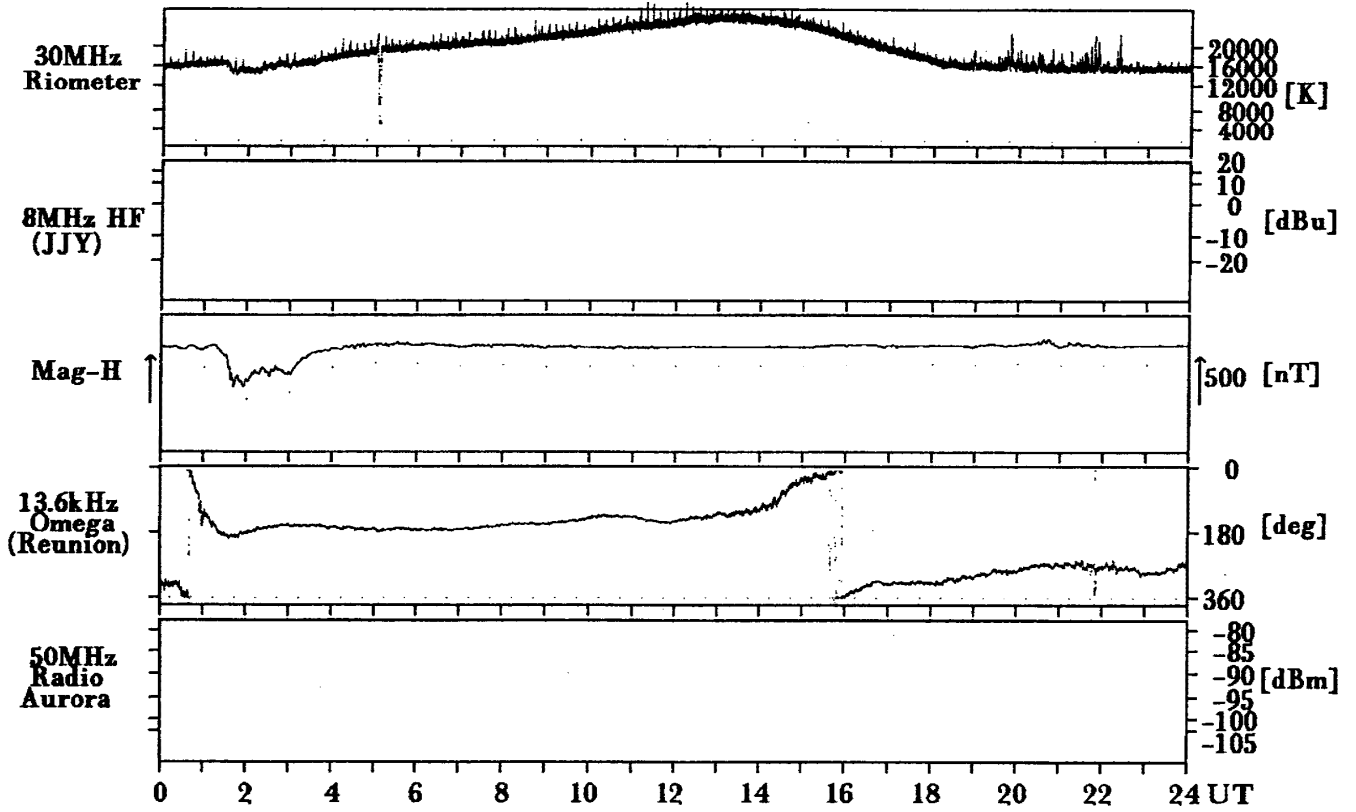
Syowa Station

Total Day / 296 1993/10/23



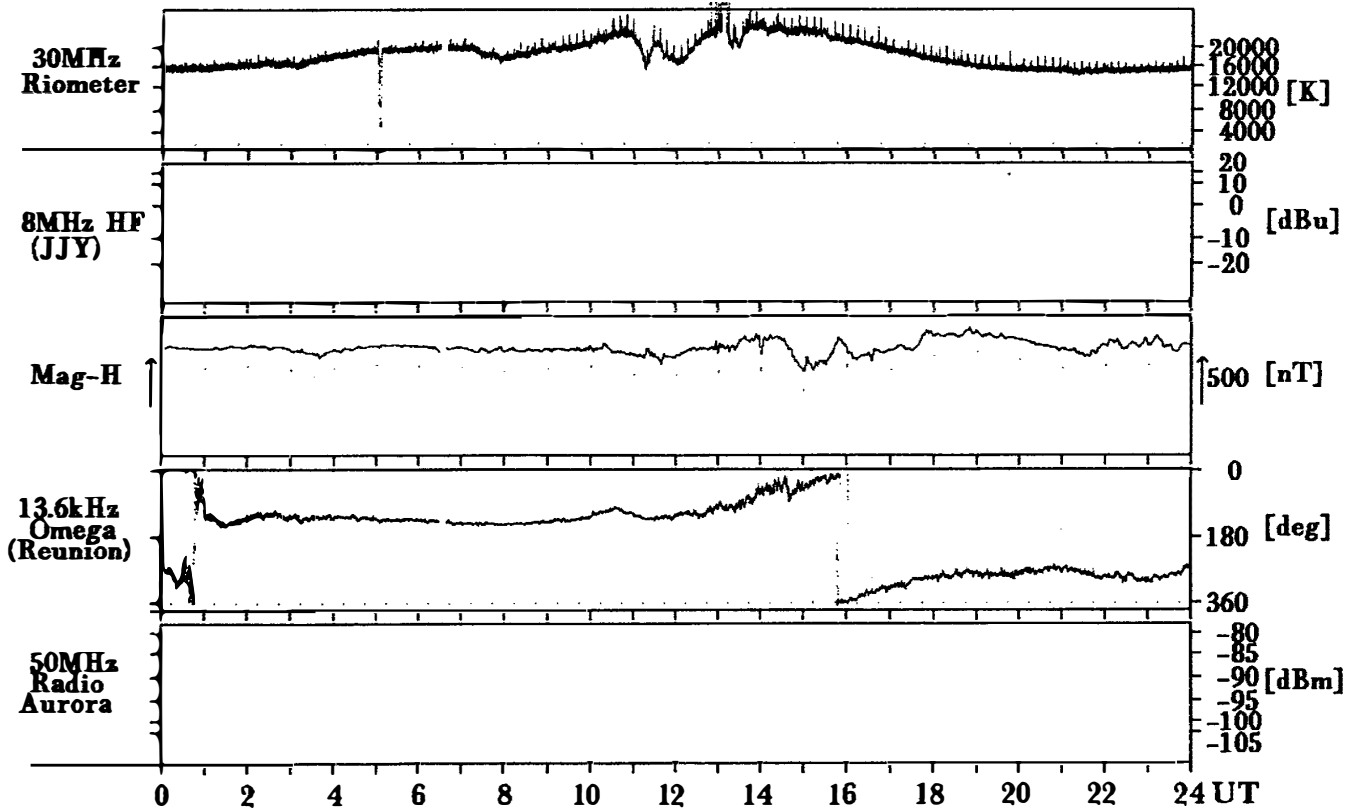
Syowa Station

Total Day / 297 1993/10/24



Syowa Station

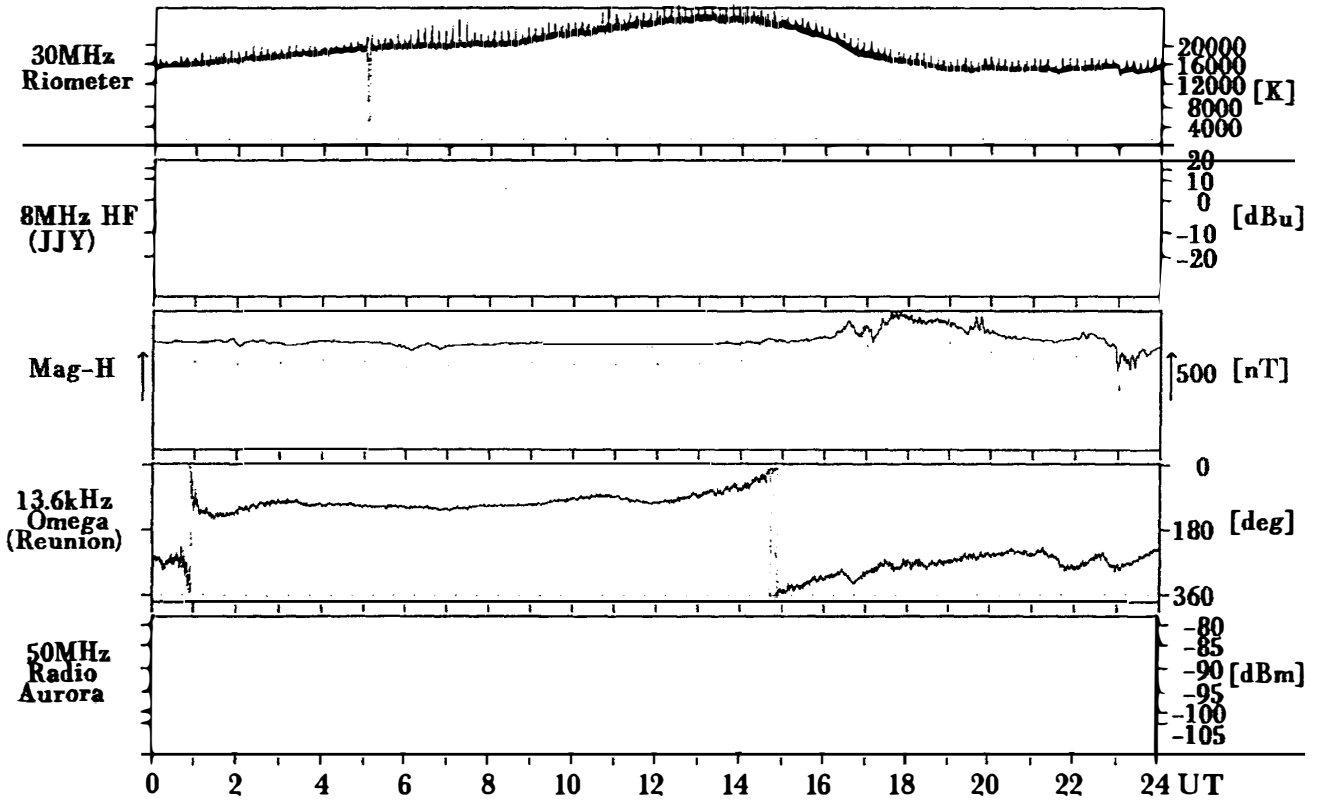
Total Day / 298 1993/10/25





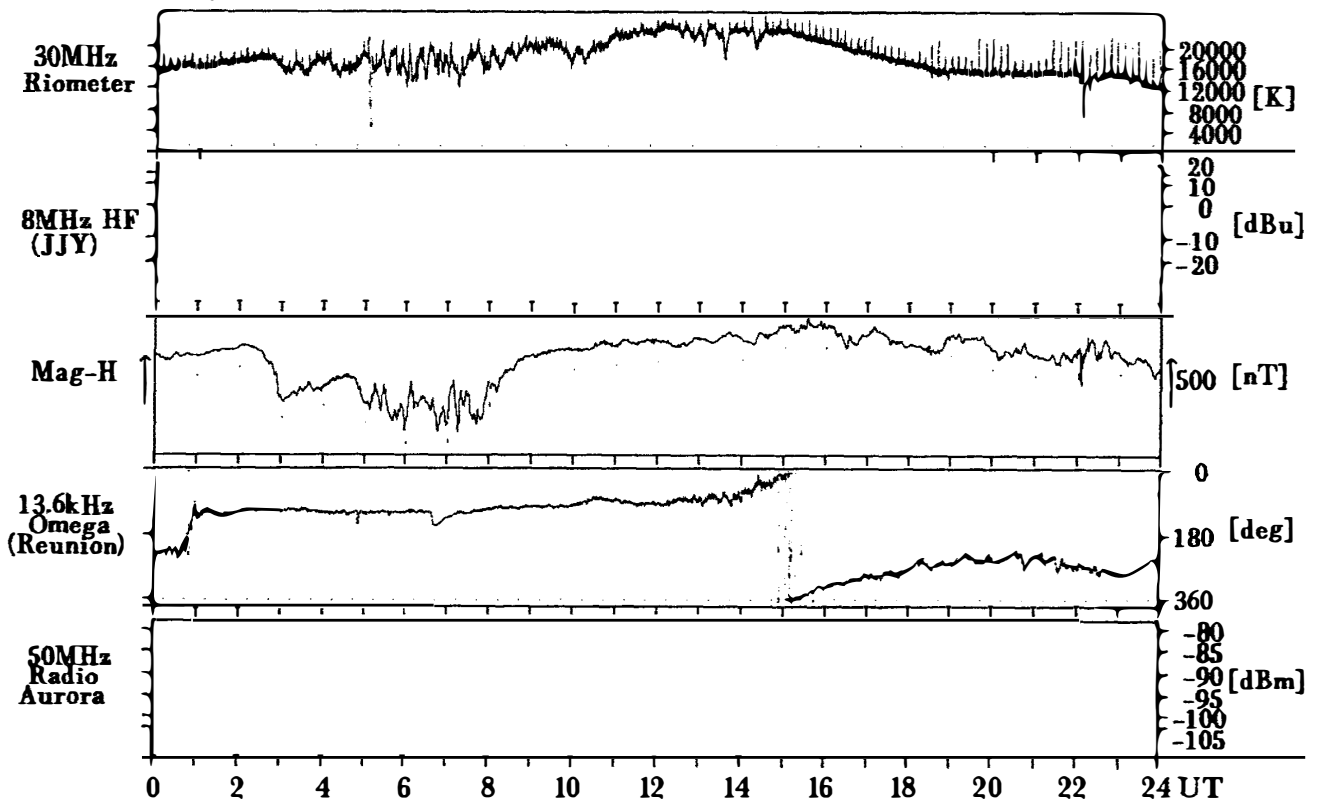
Syowa Station

Total Day / 299 1993/10/26



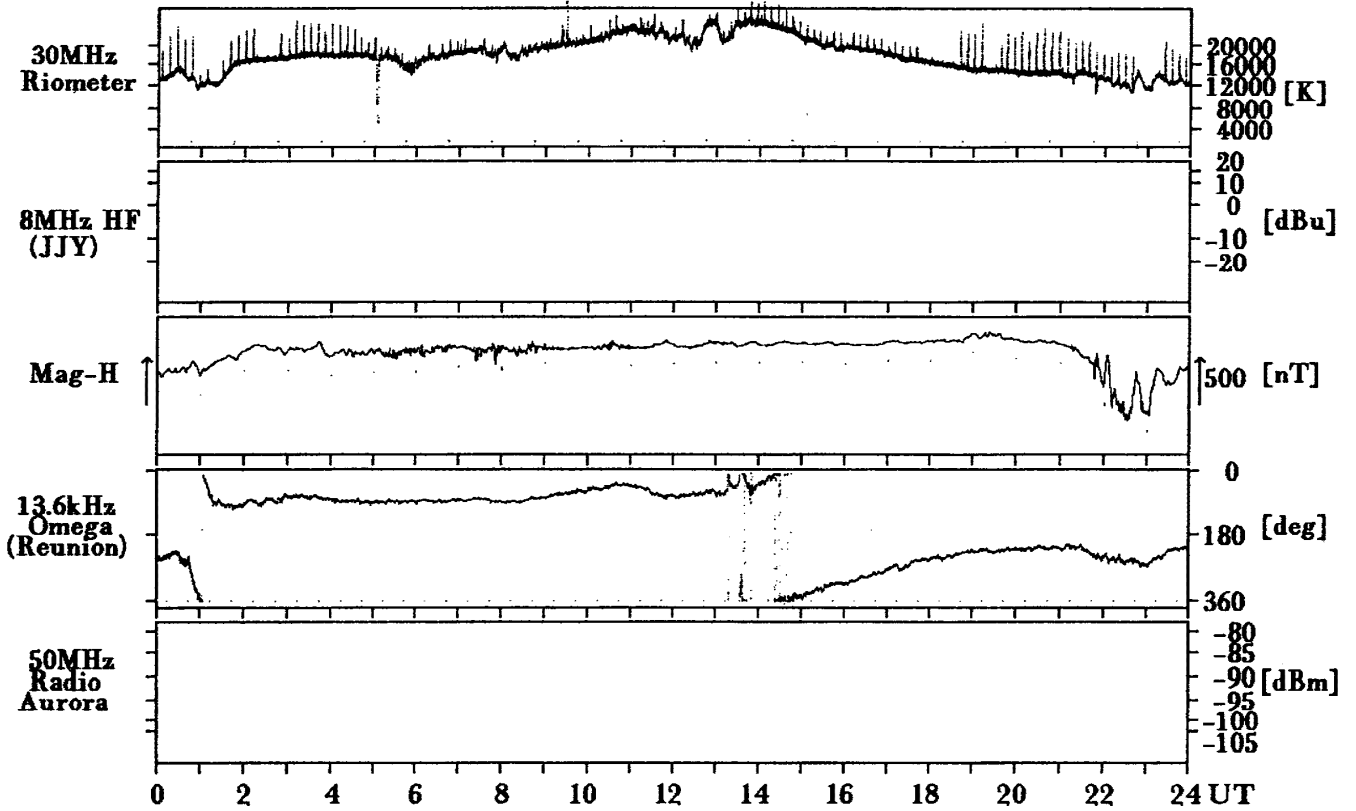
Syowa Station

Total Day / 300 1993/10/27



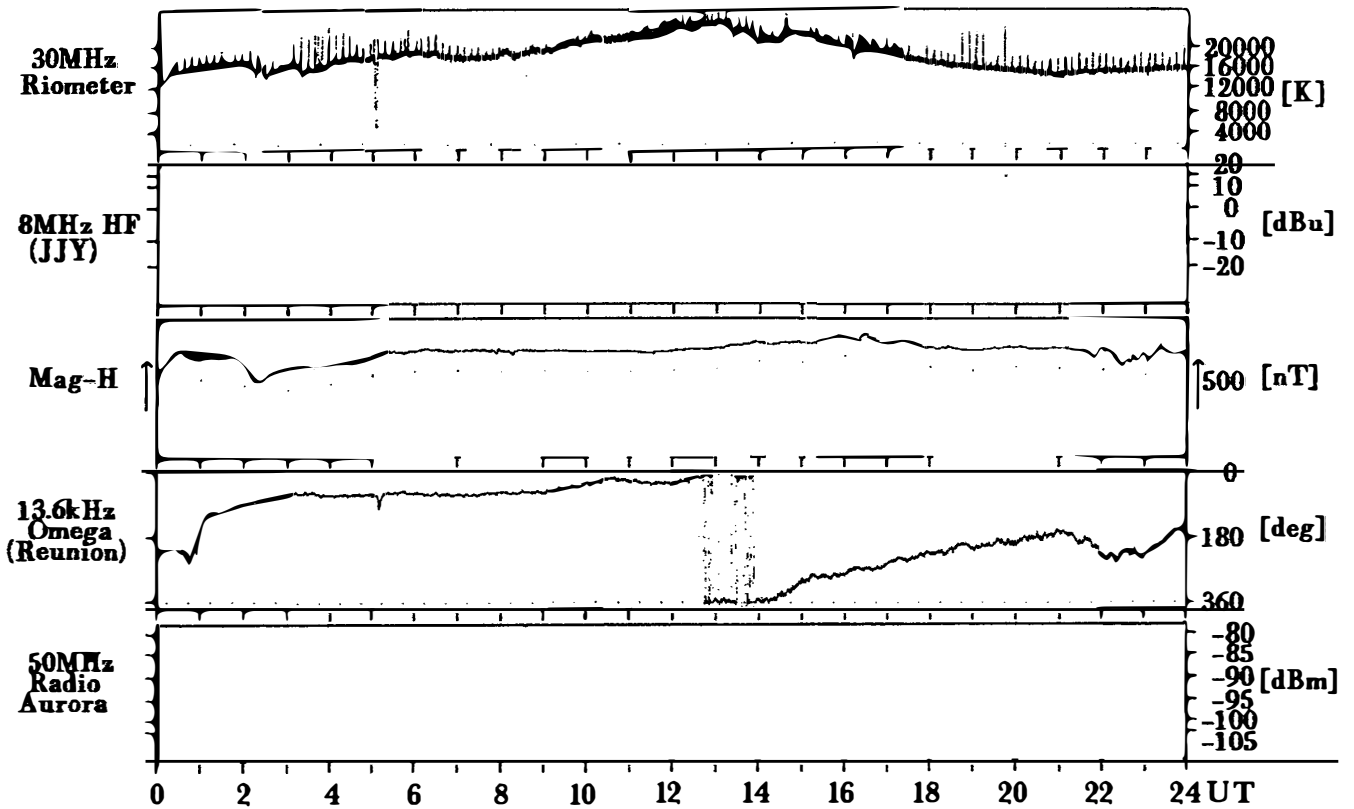
Syowa Station

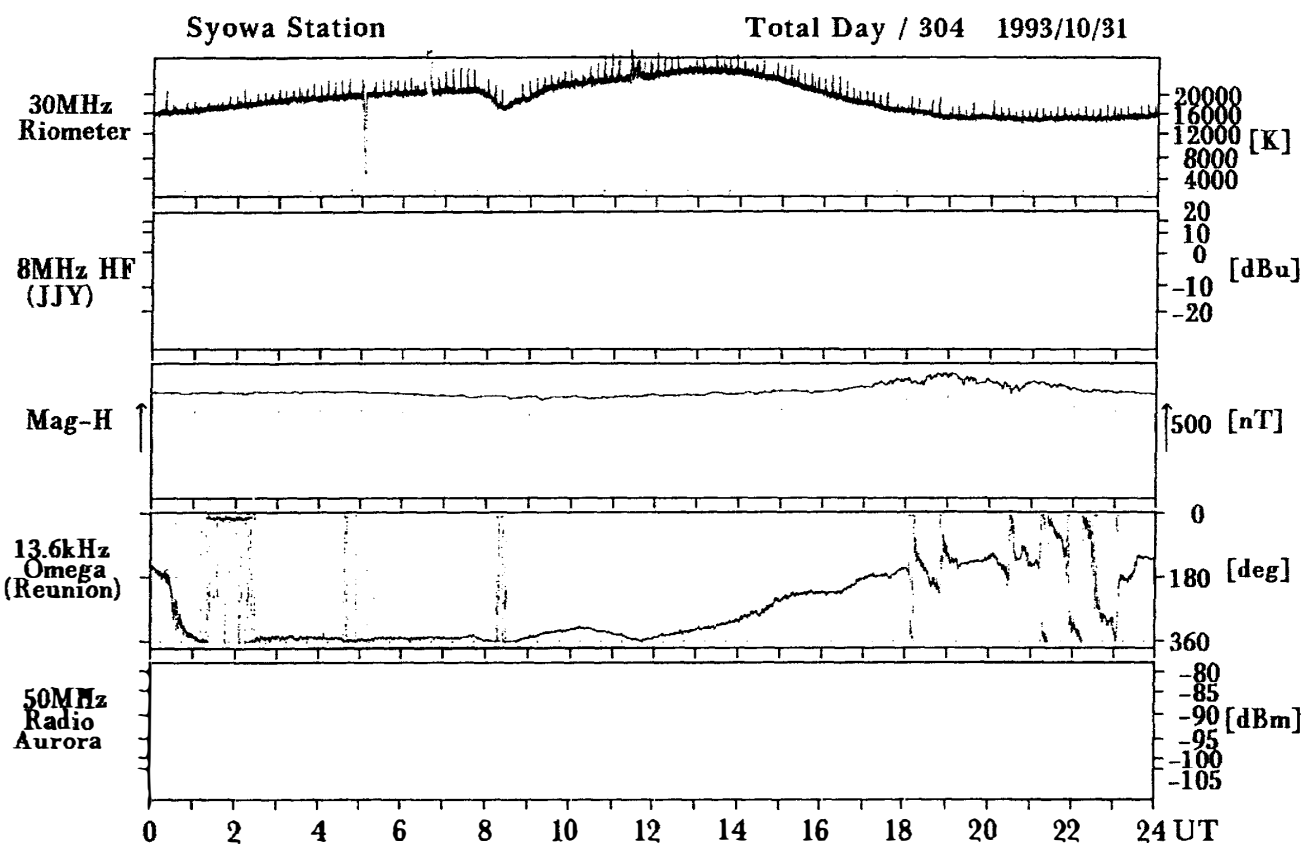
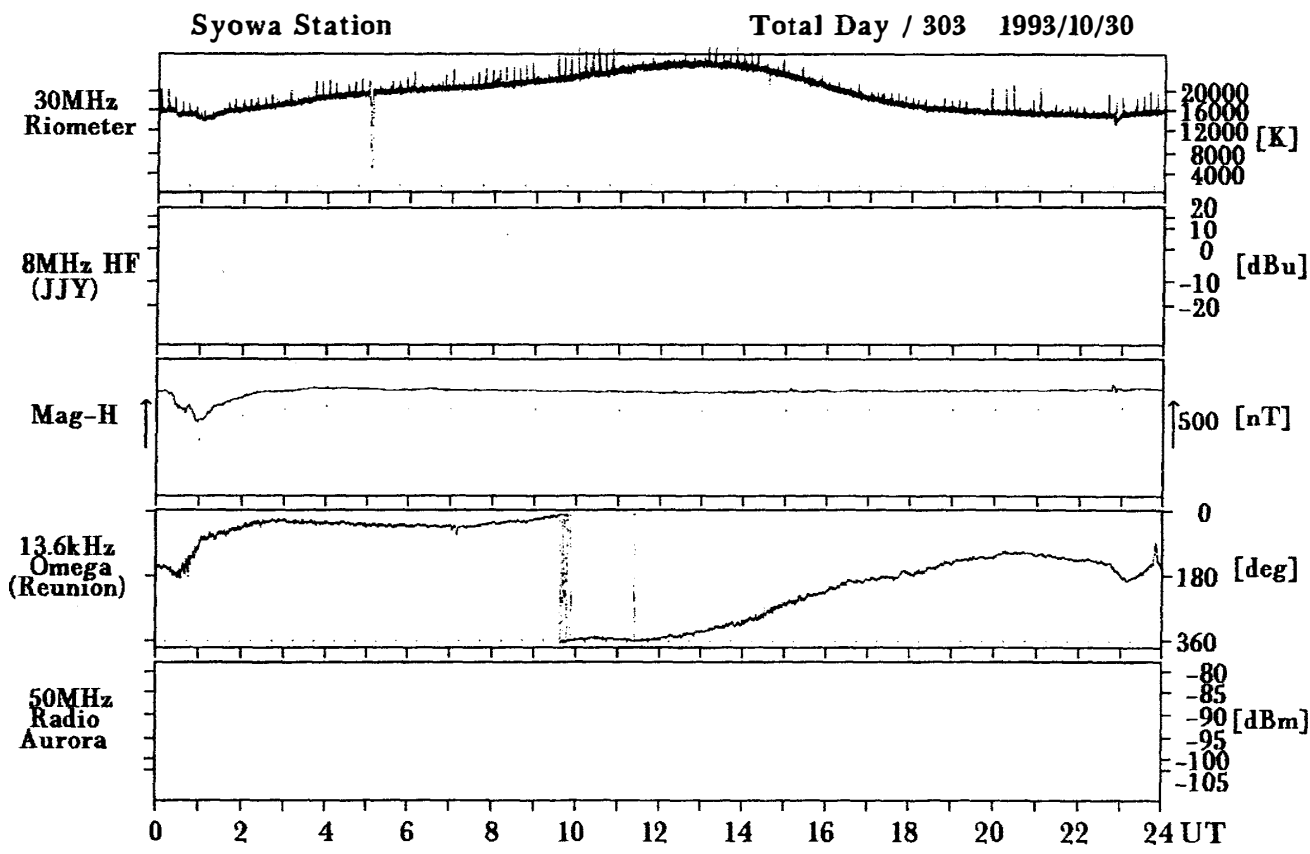
Total Day / 301 1993/10/28

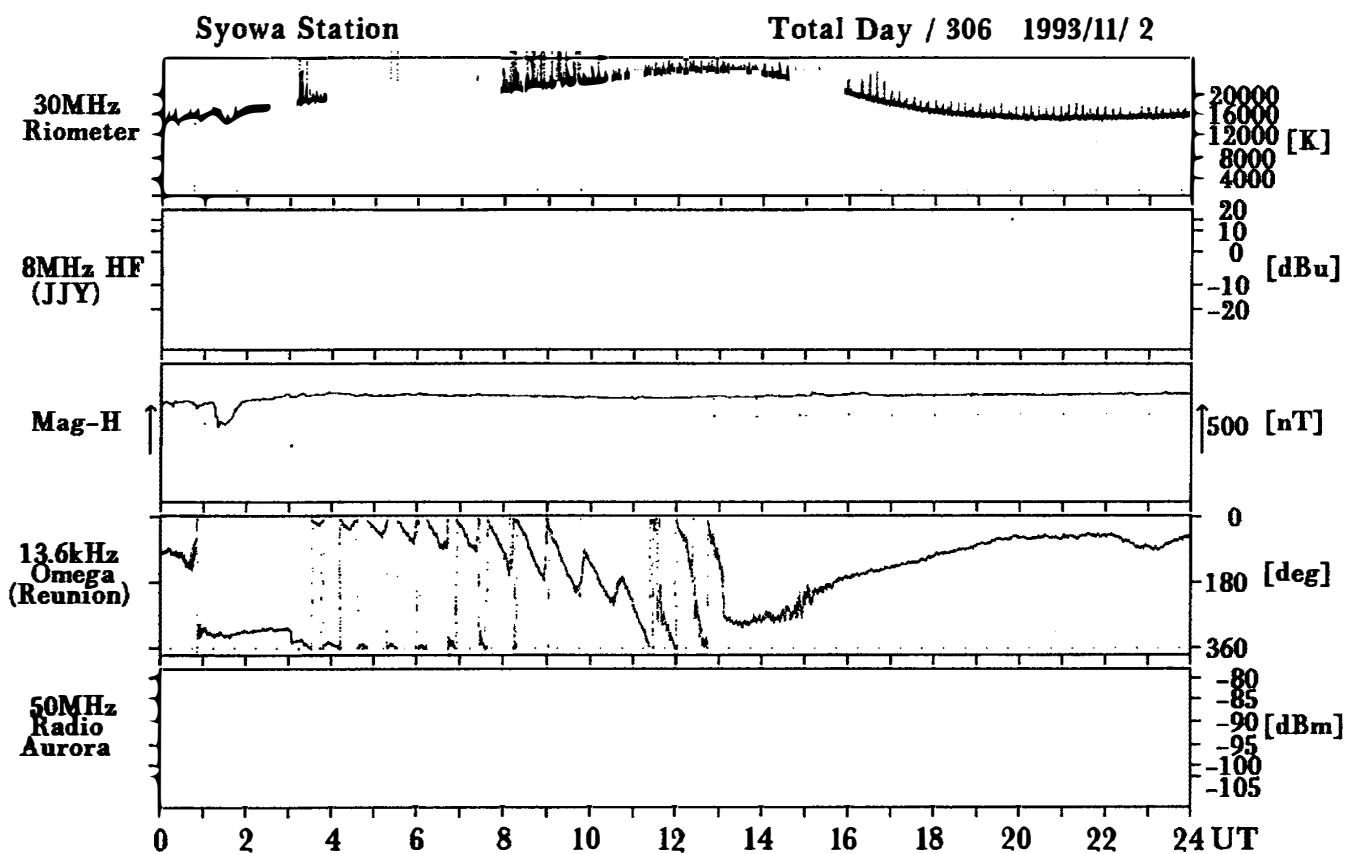
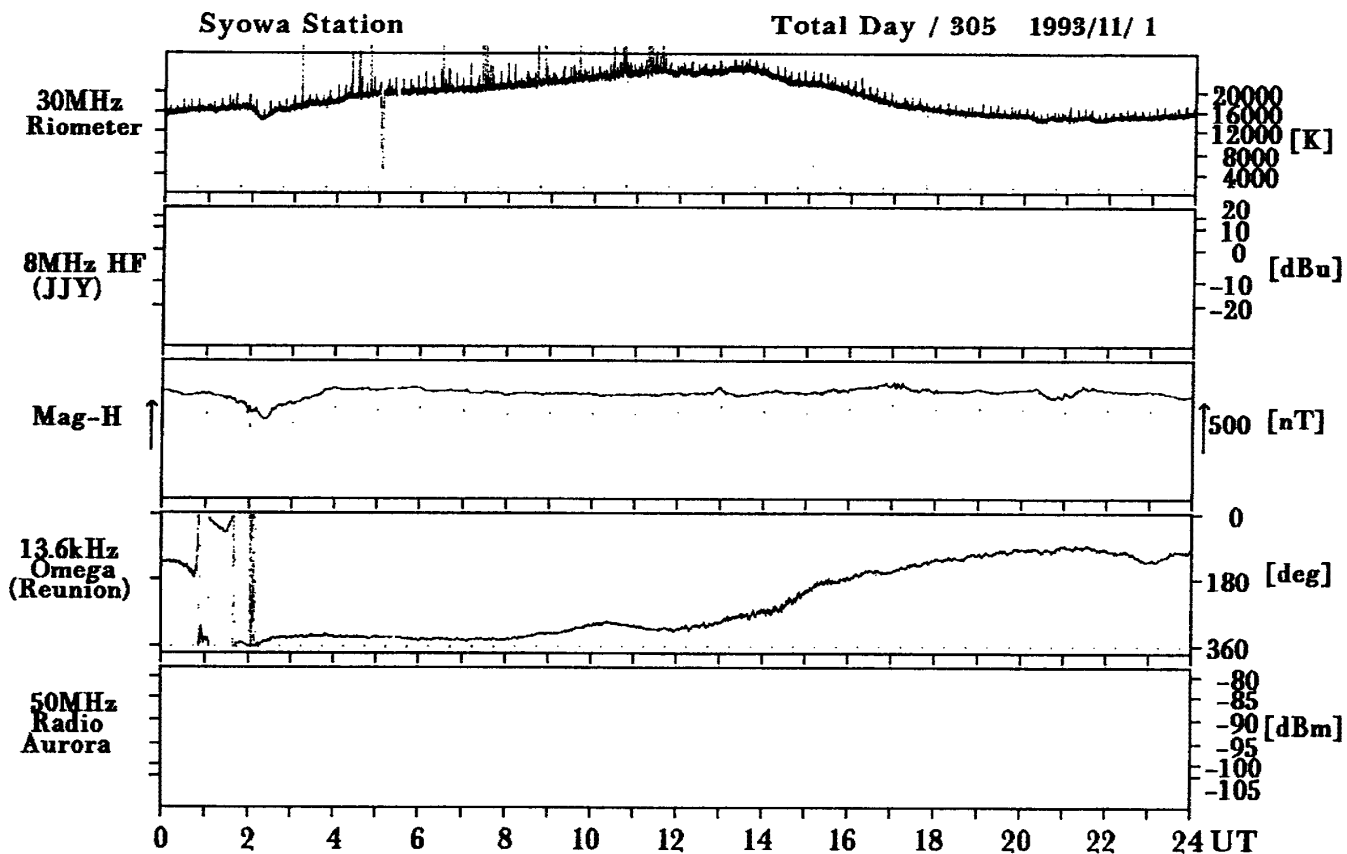


Syowa Station

Total Day / 302 1993/10/29

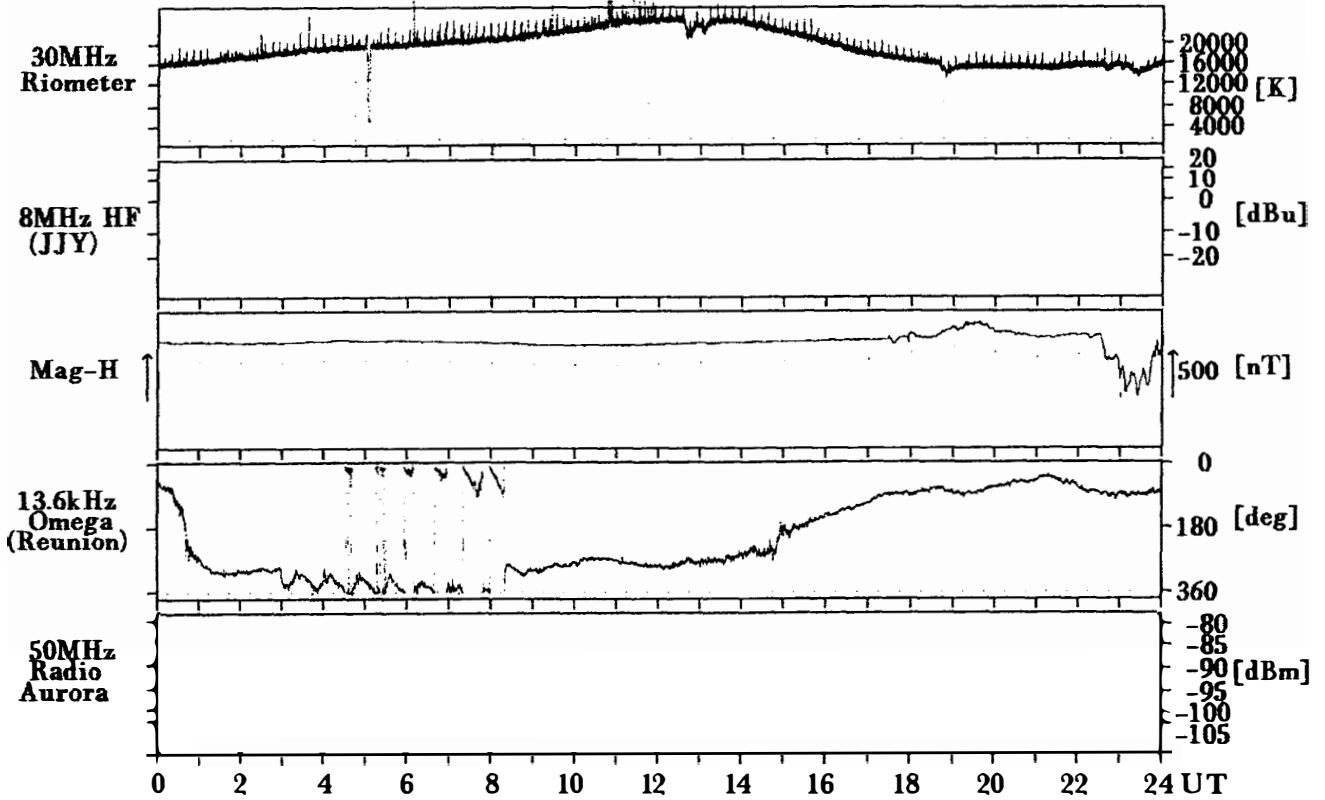






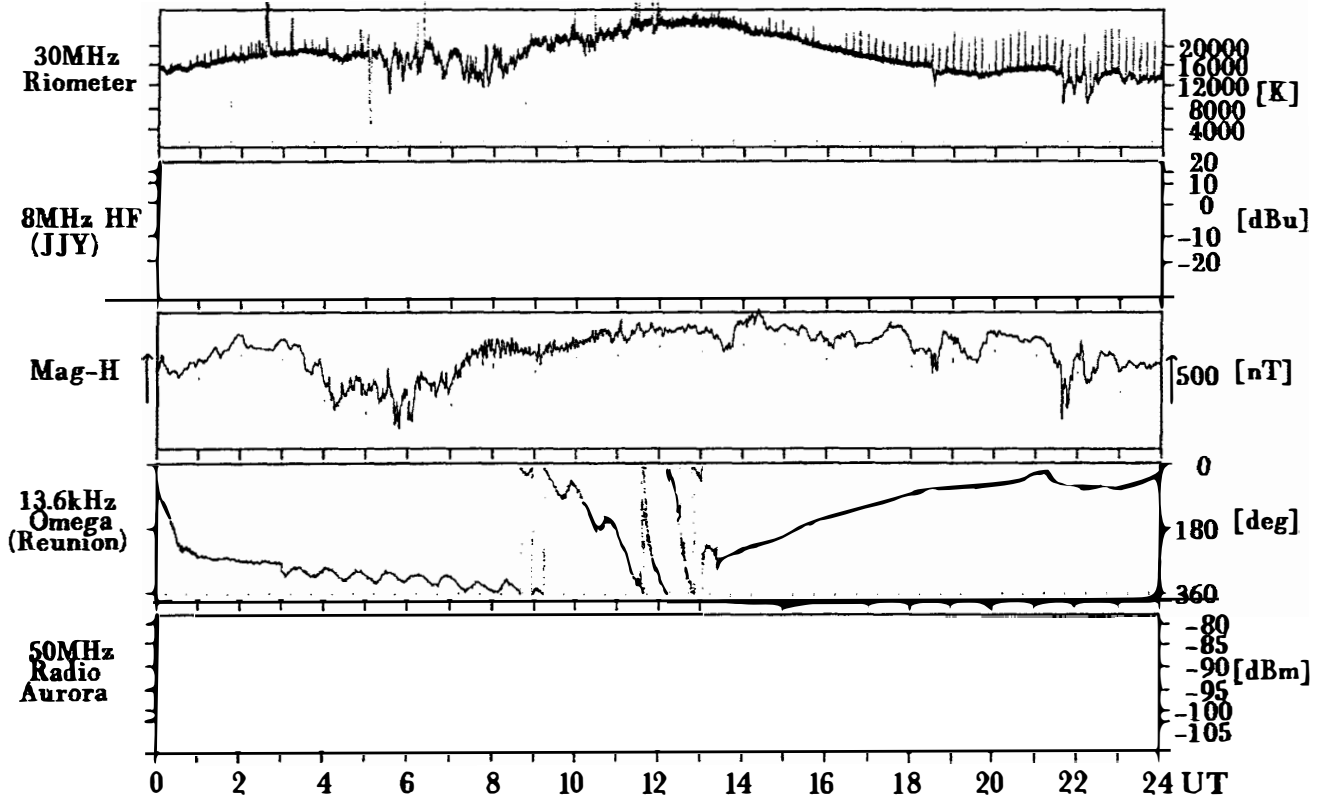
Syowa Station

Total Day / 307 1993/11/ 3



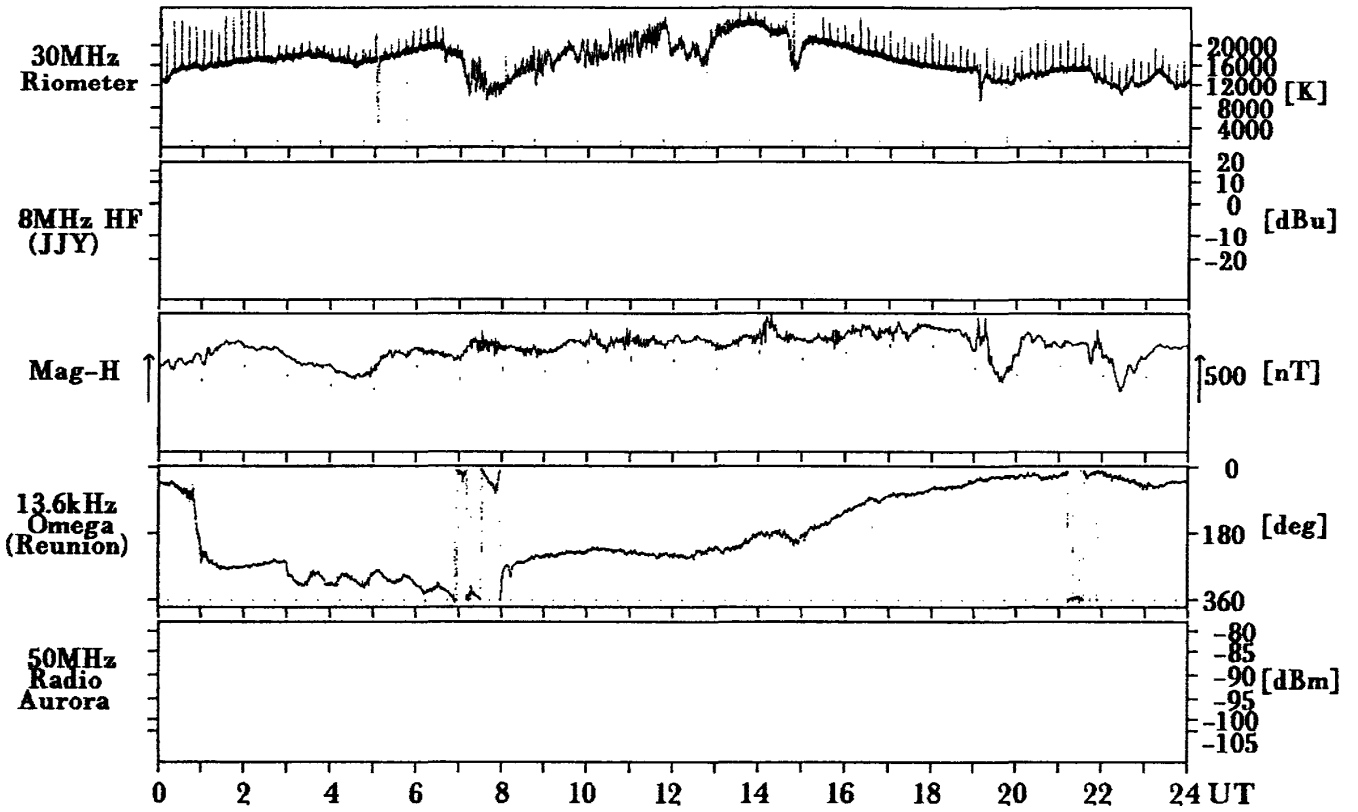
Syowa Station

Total Day / 308 1993/11/ 4



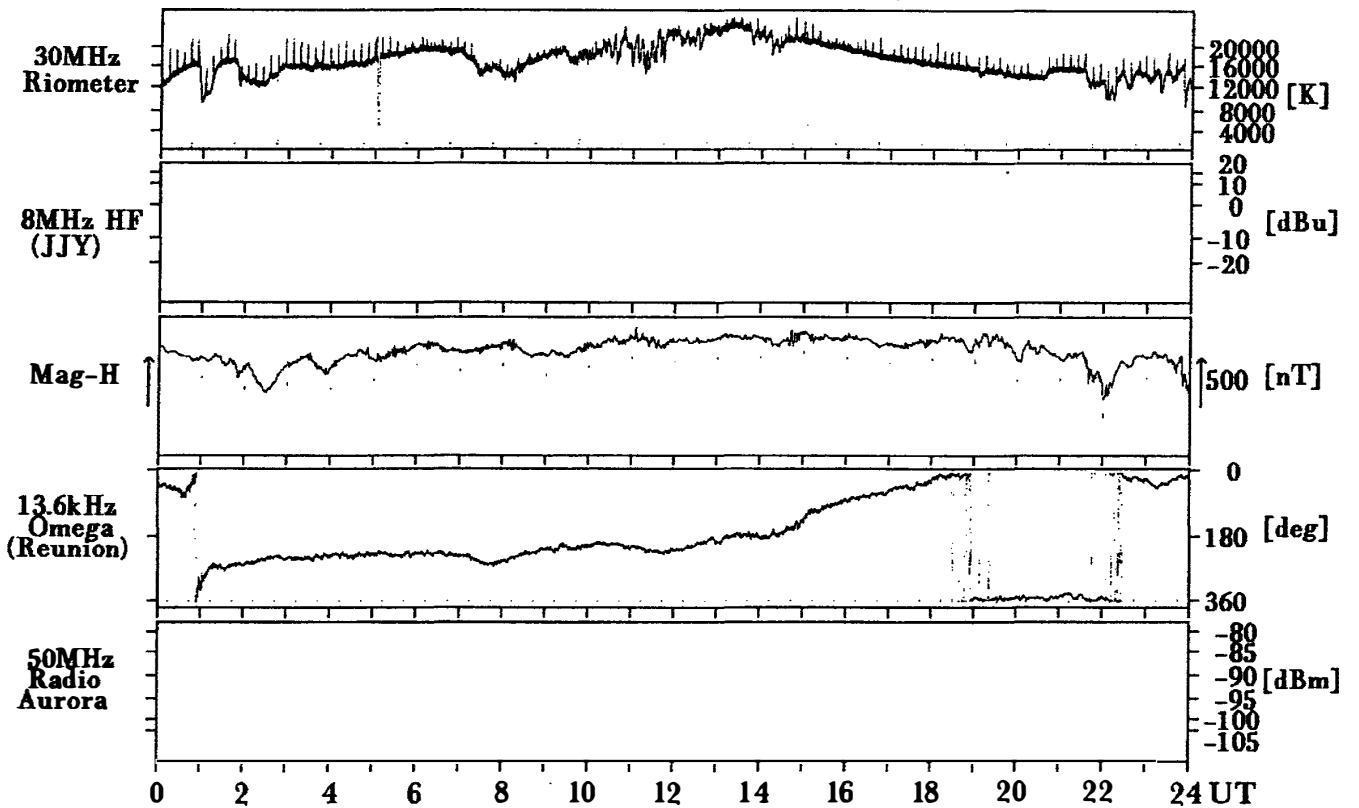
Syowa Station

Total Day / 309 1993/11/ 5



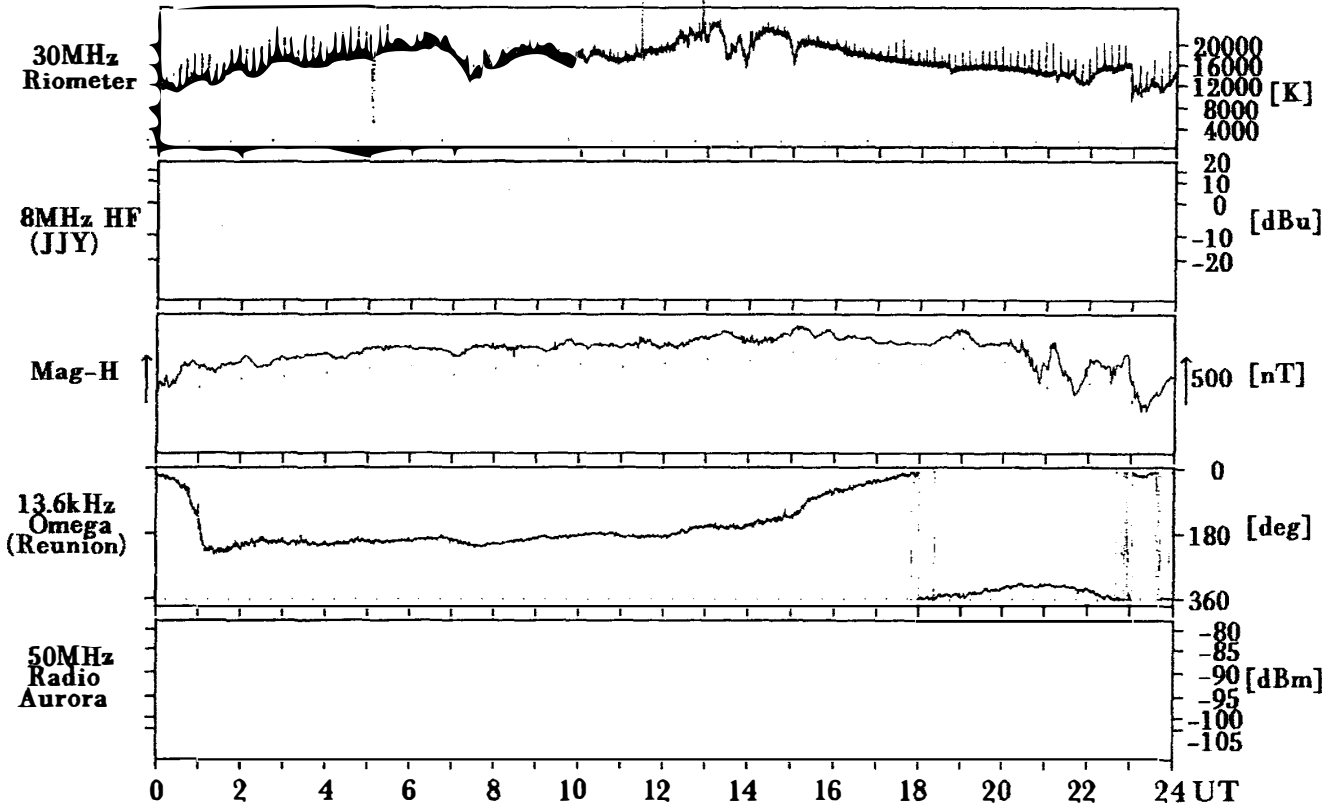
Syowa Station

Total Day / 310 1993/11/ 6



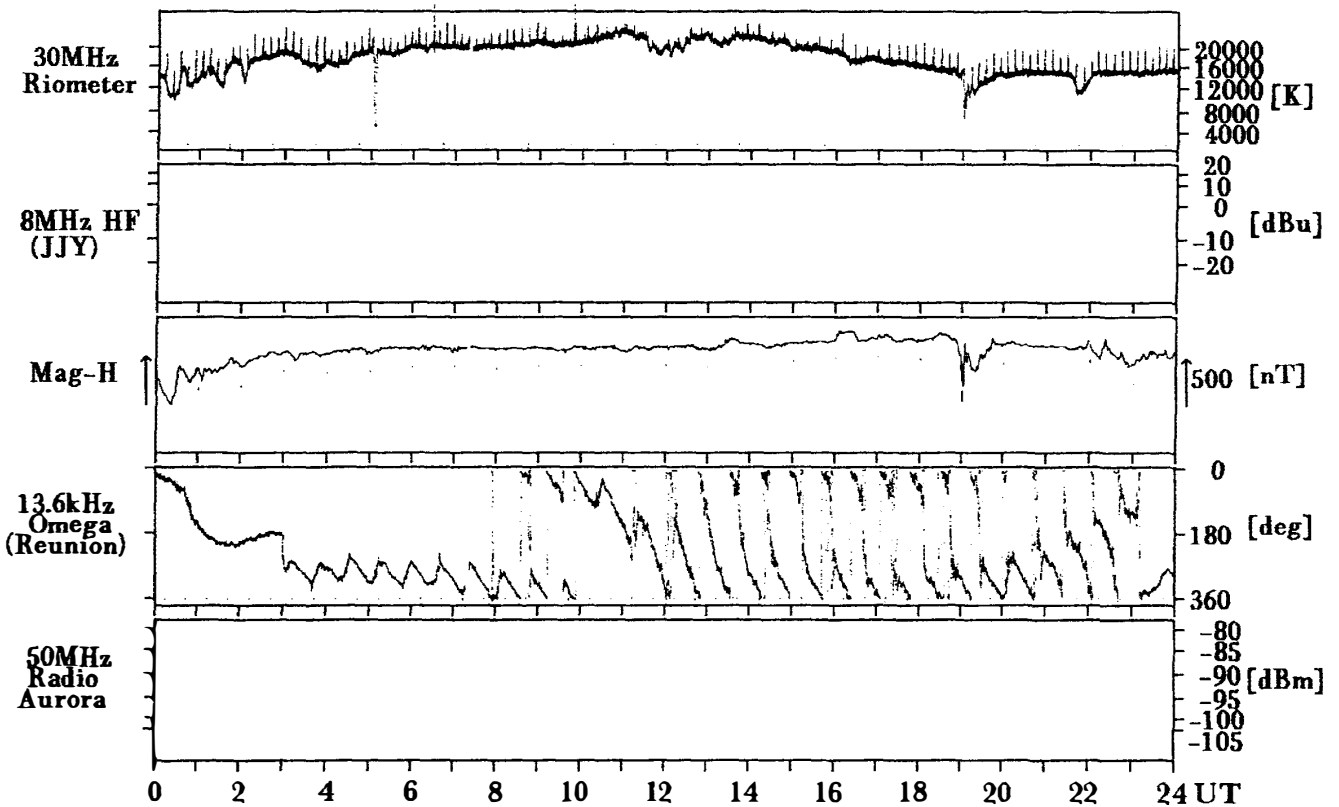
Syowa Station

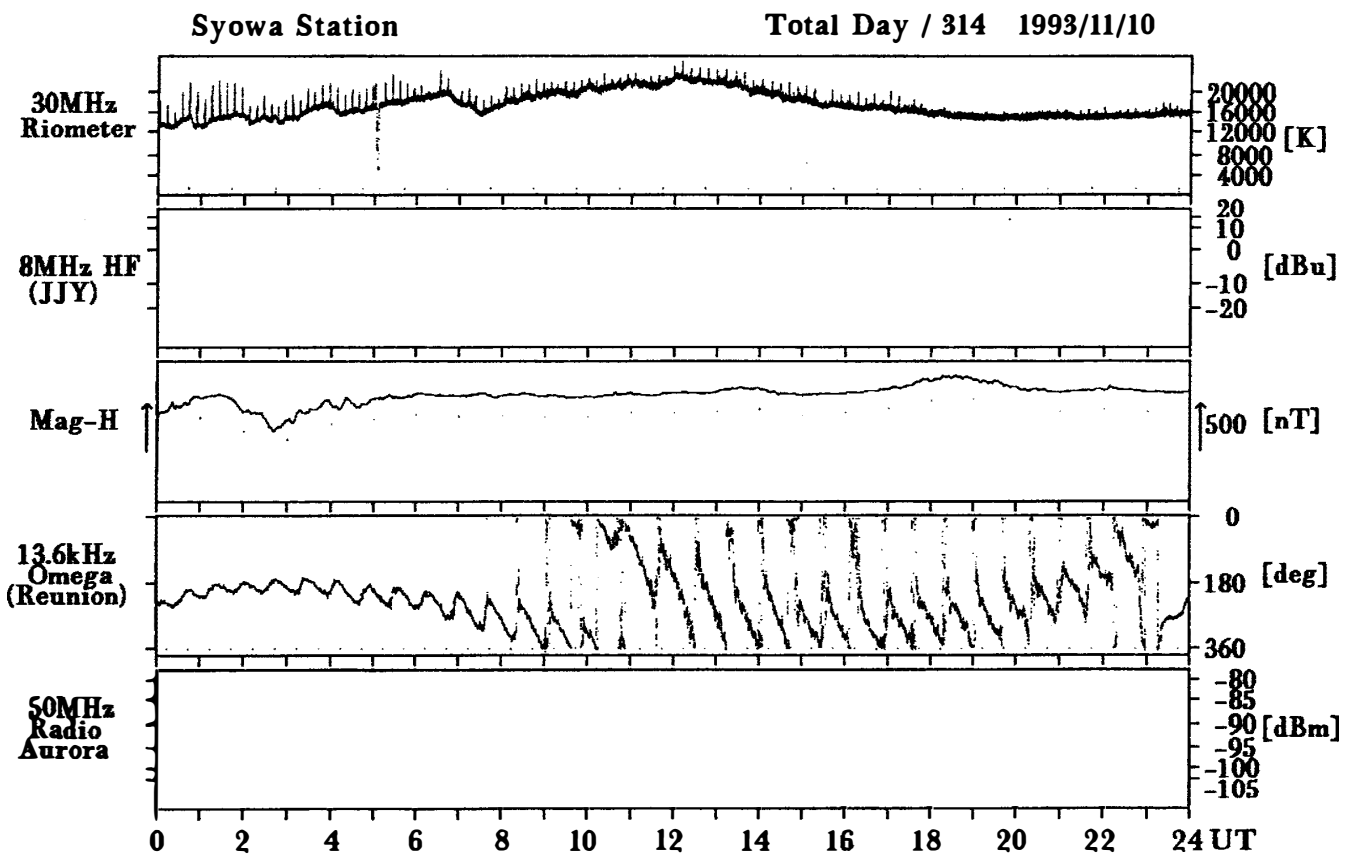
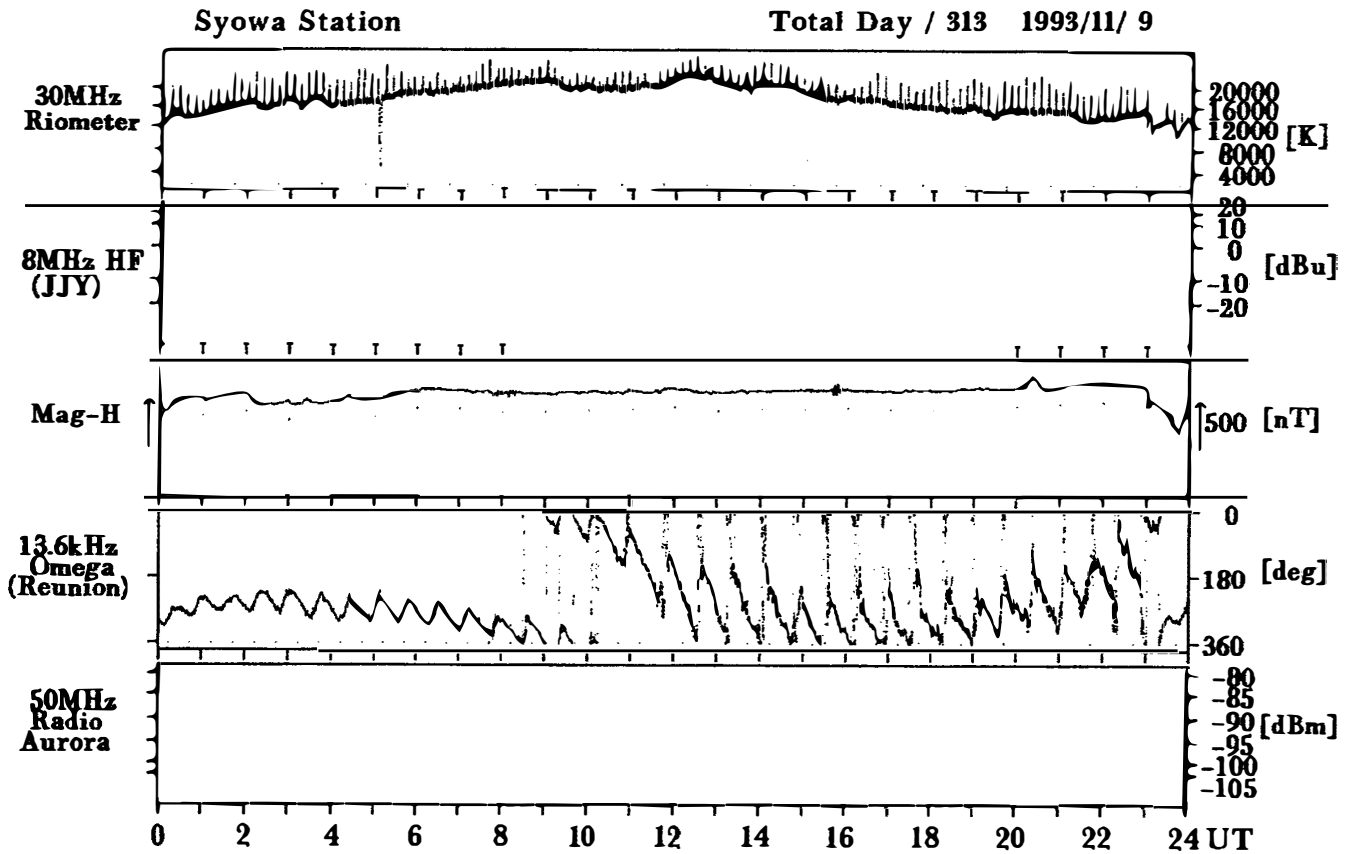
Total Day / 311 1993/11/ 7



Syowa Station

Total Day / 312 1993/11/ 8

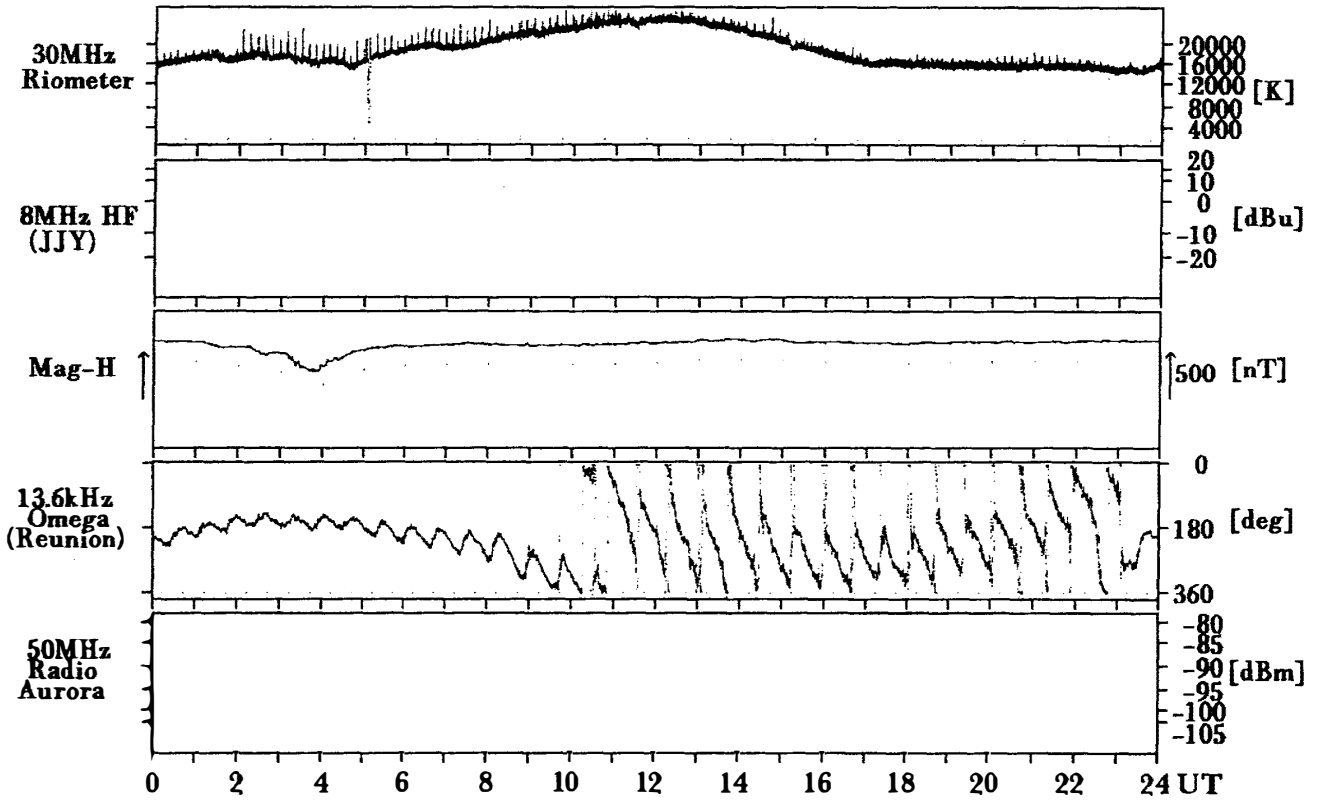






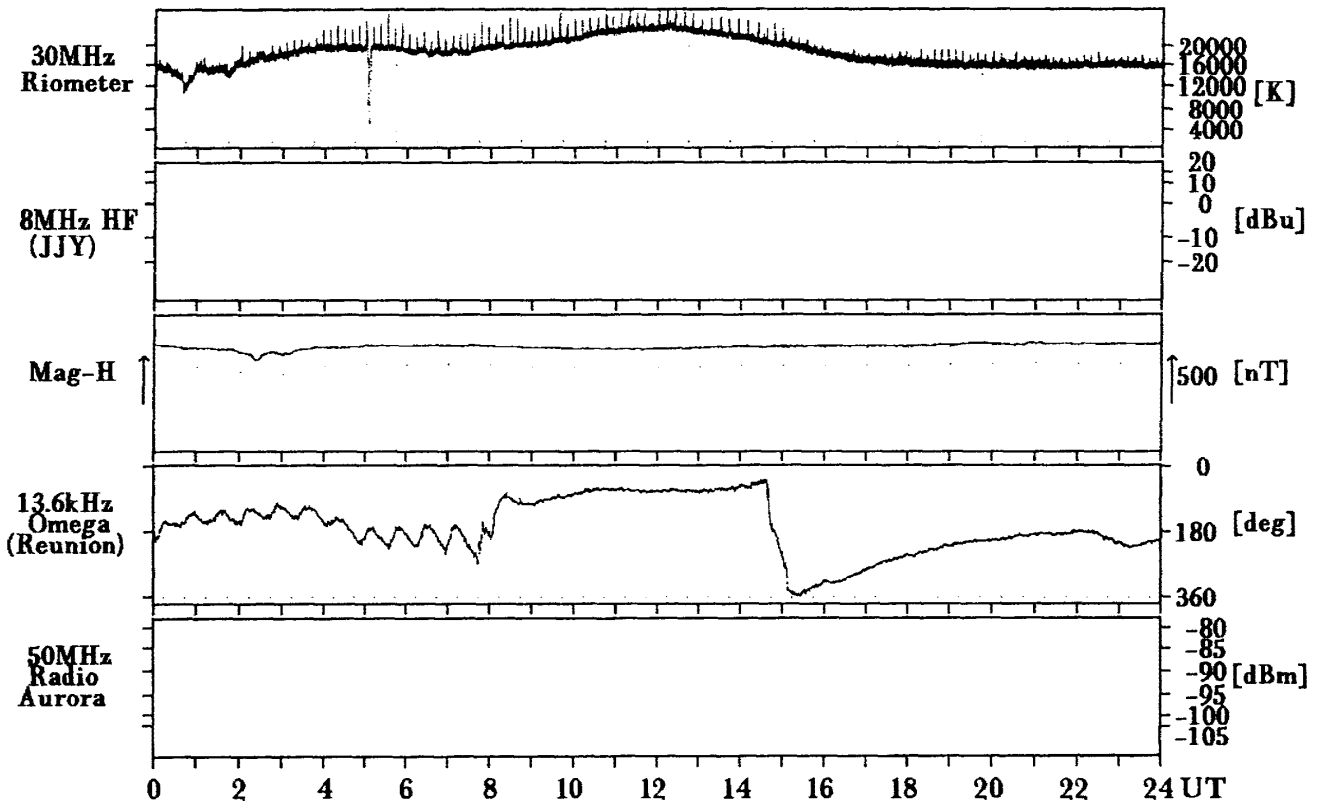
Syowa Station

Total Day / 315 1993/11/11



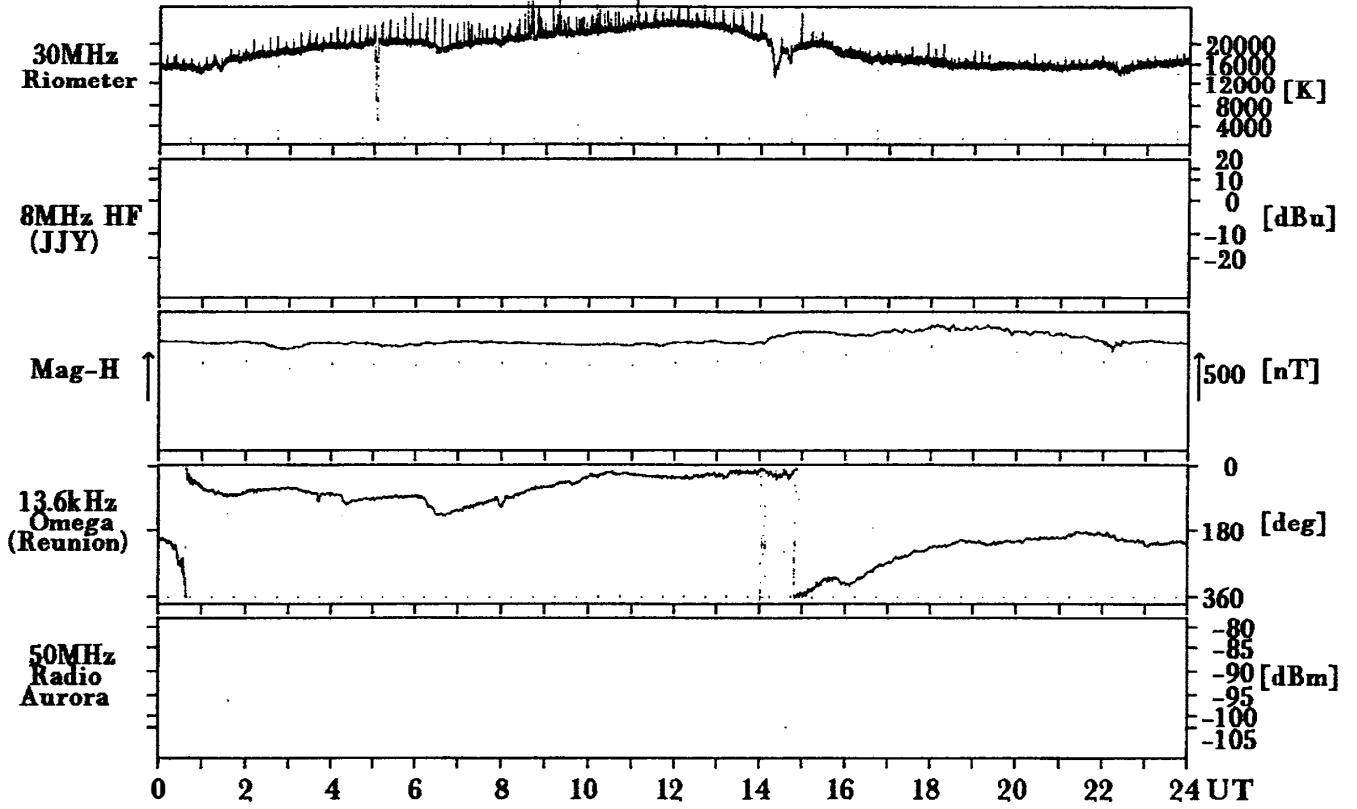
Syowa Station

Total Day / 316 1993/11/12



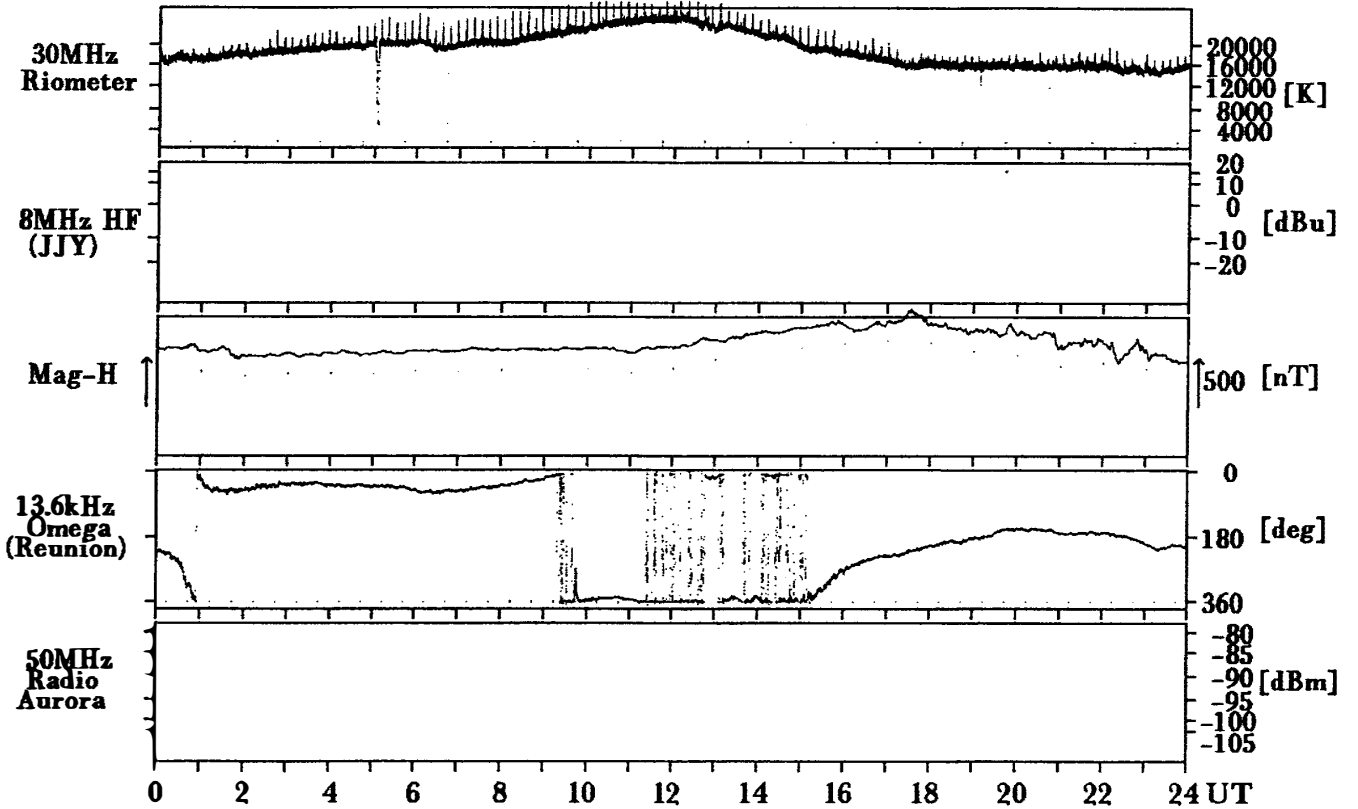
Syowa Station

Total Day / 317 1993/11/13



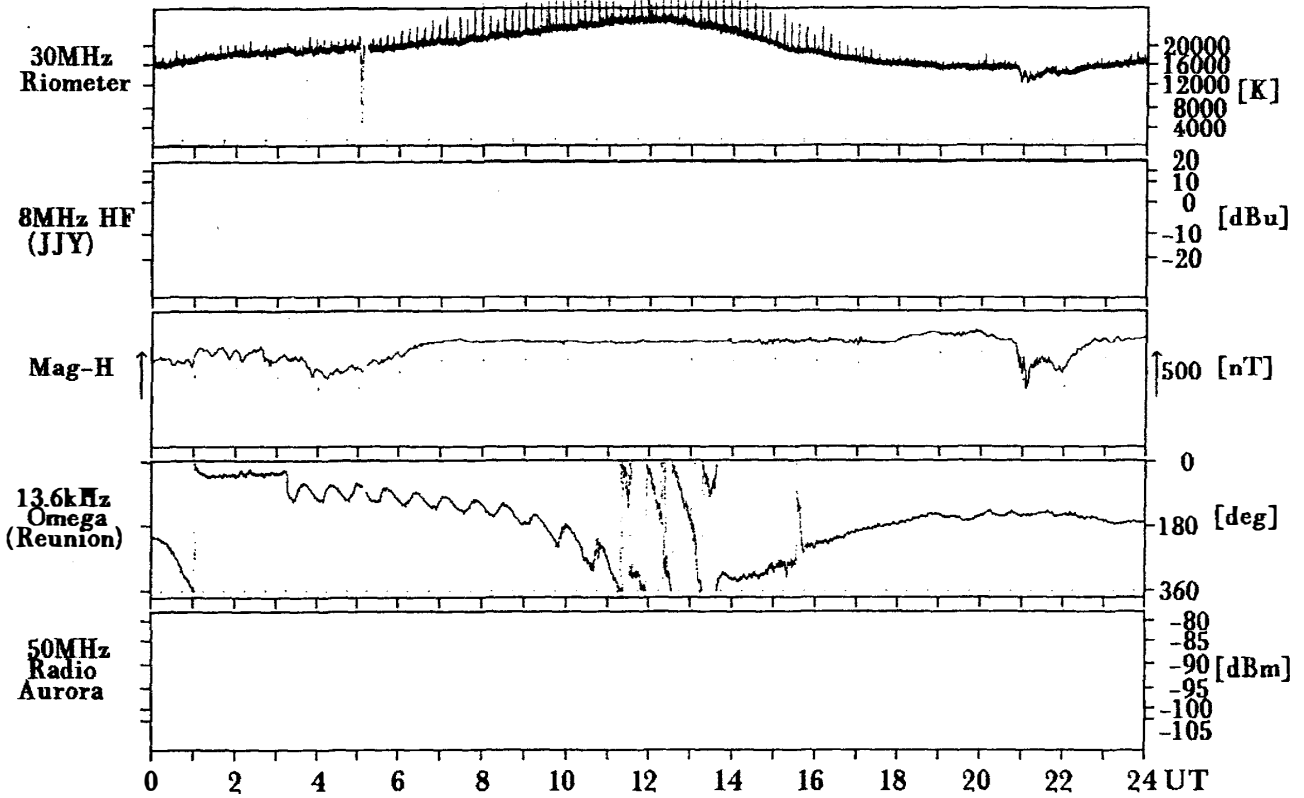
Syowa Station

Total Day / 318 1993/11/14



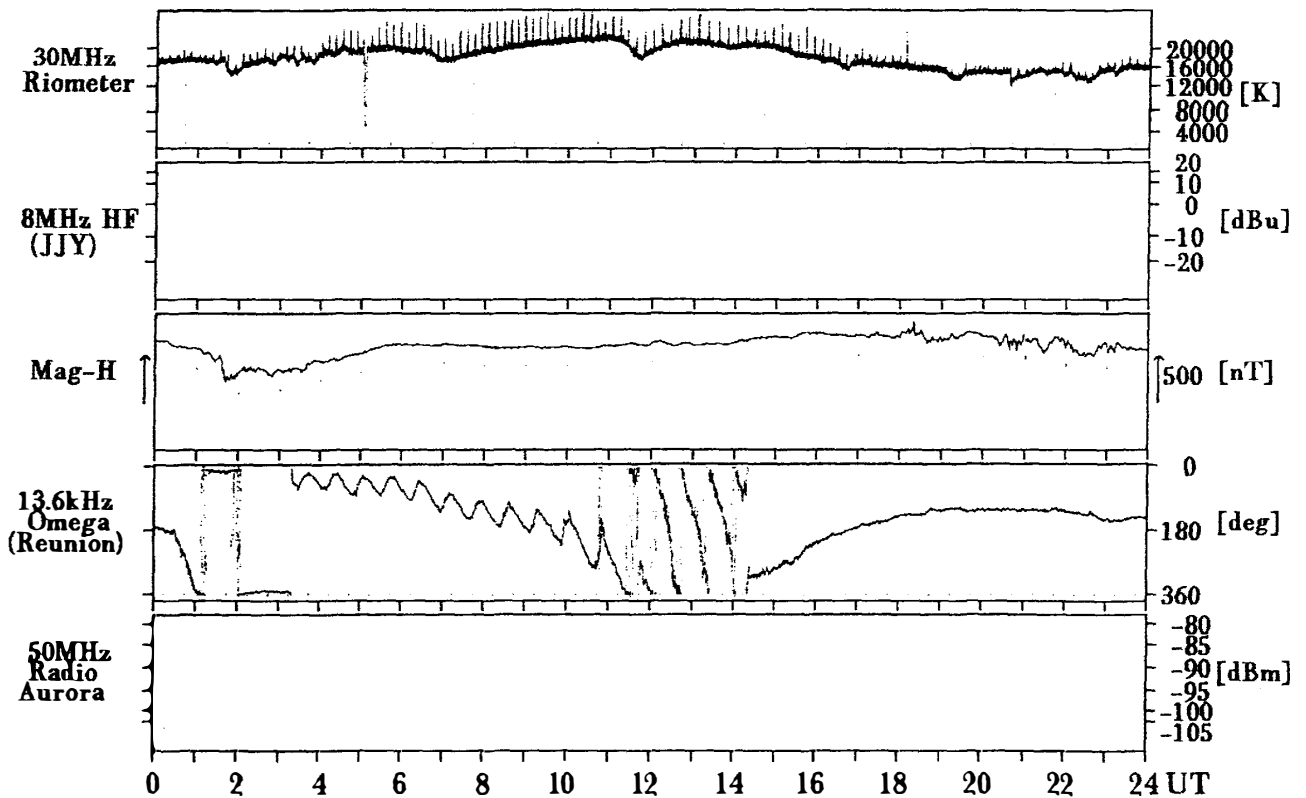
Syowa Station

Total Day / 319 1993/11/15



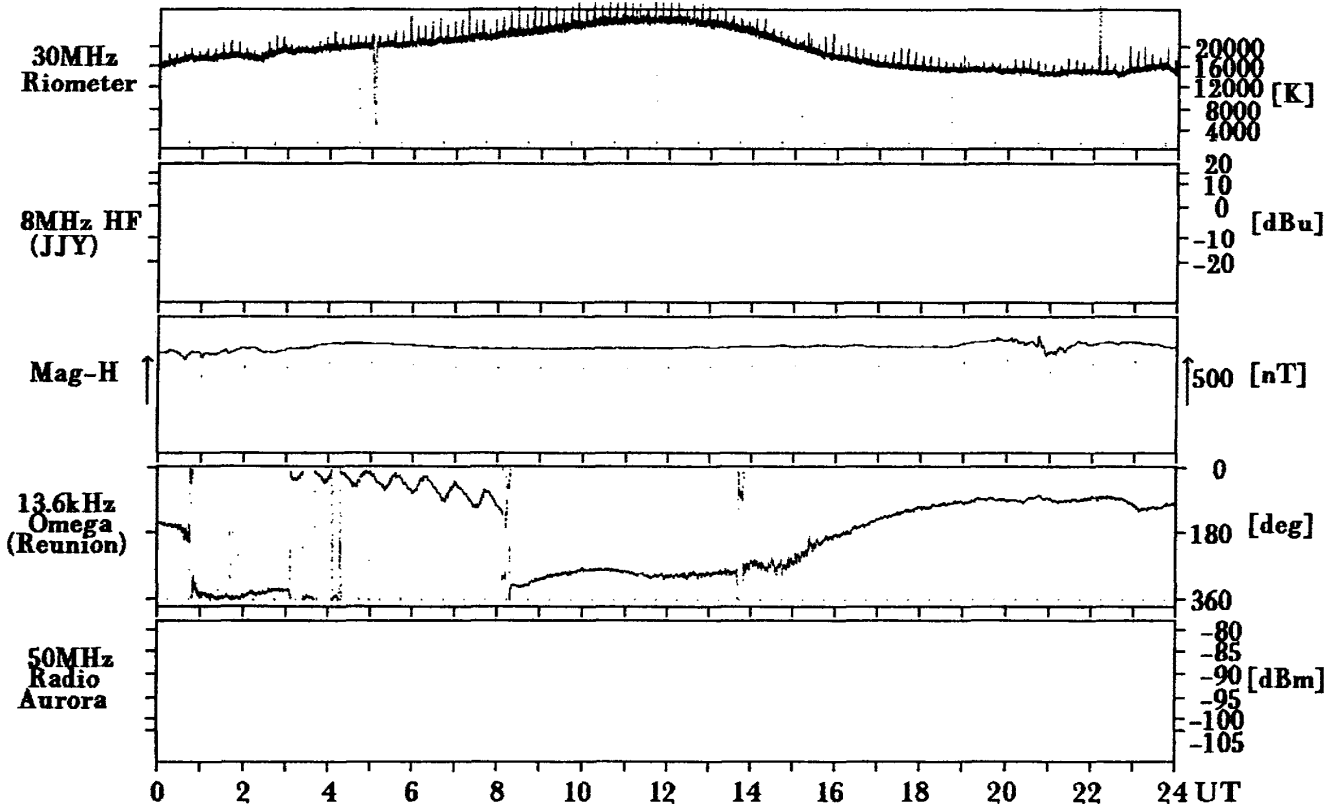
Syowa Station

Total Day / 320 1993/11/16



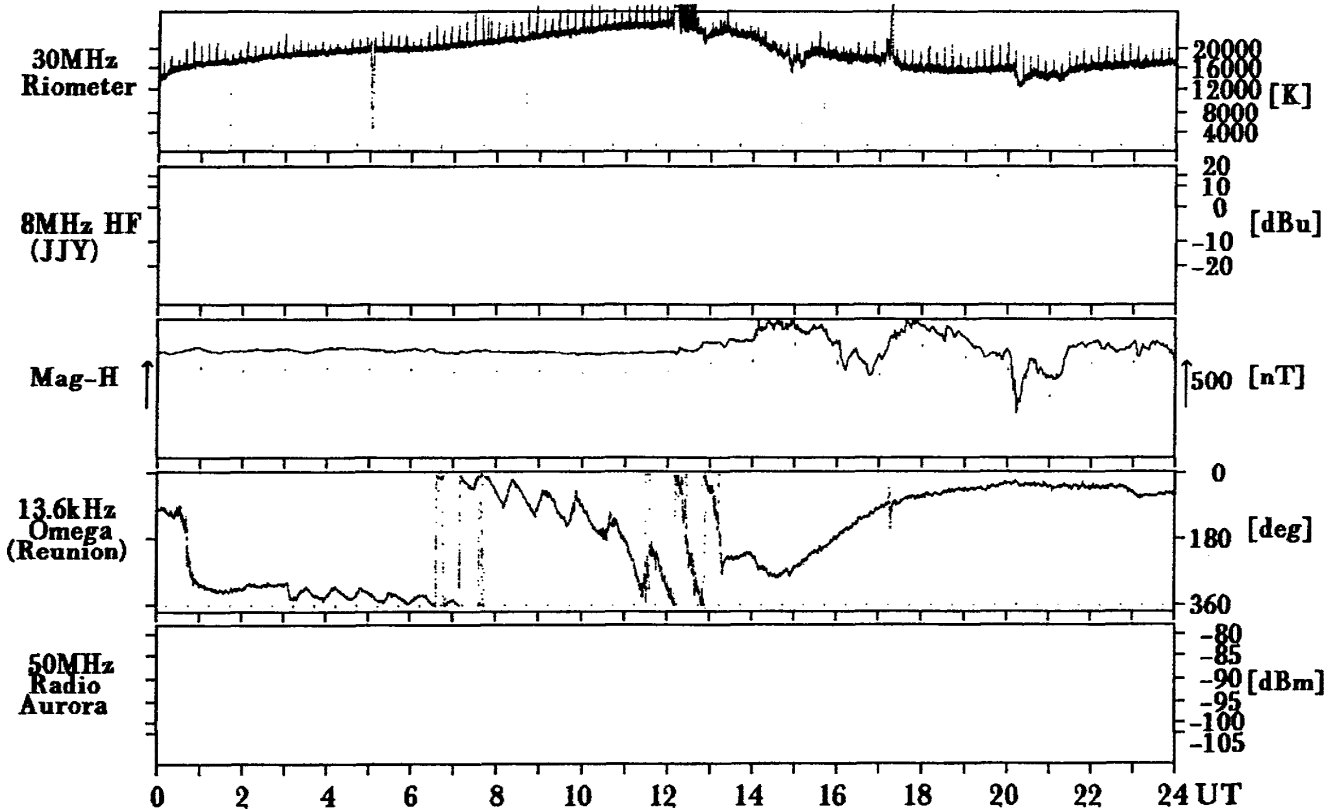
Syowa Station

Total Day / 321 1993/11/17



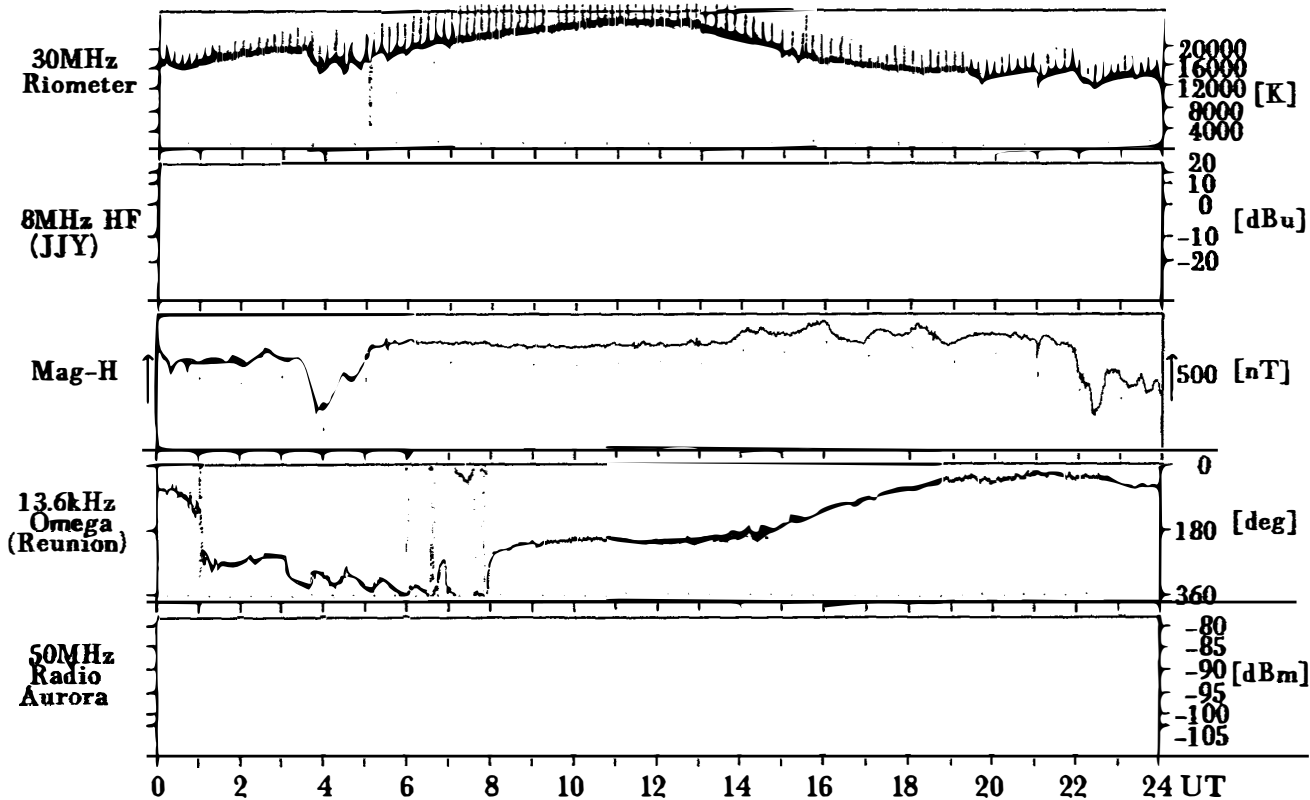
Syowa Station

Total Day / 322 1993/11/18



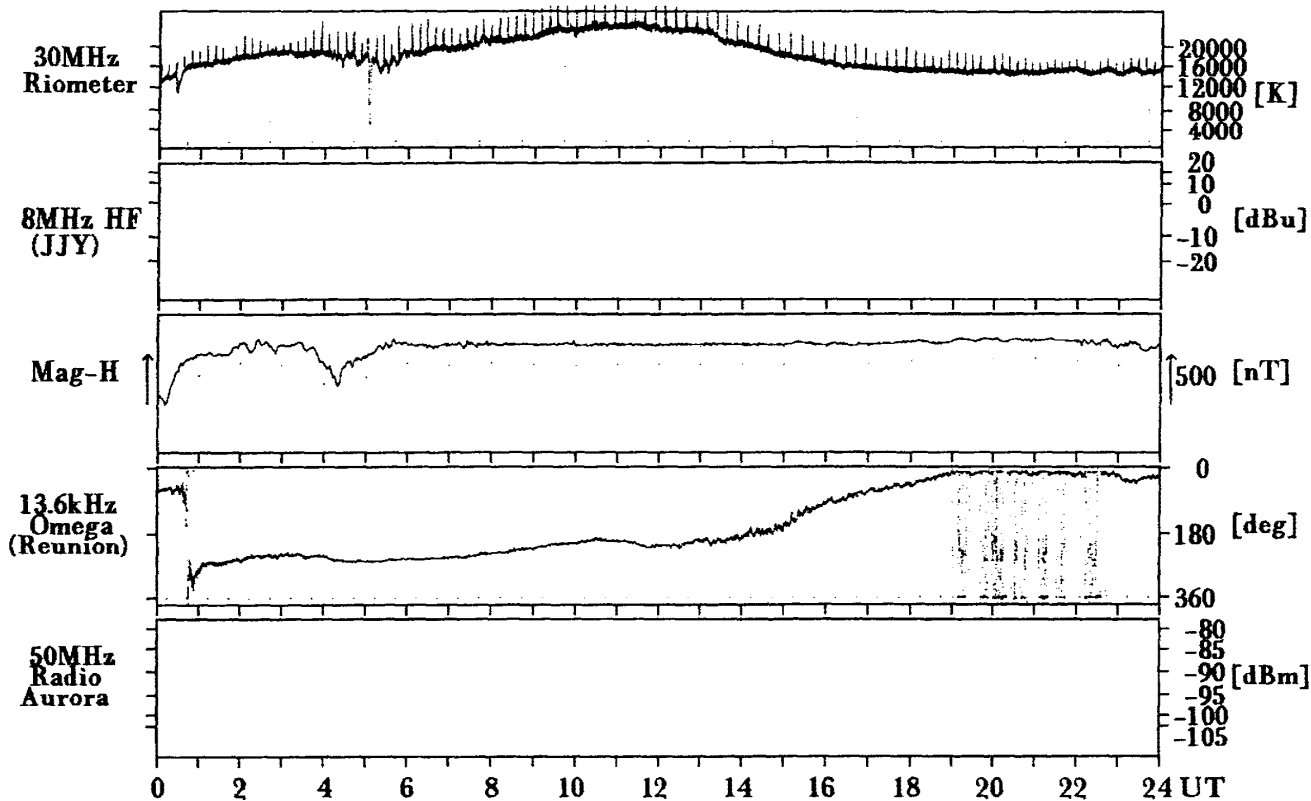
Syowa Station

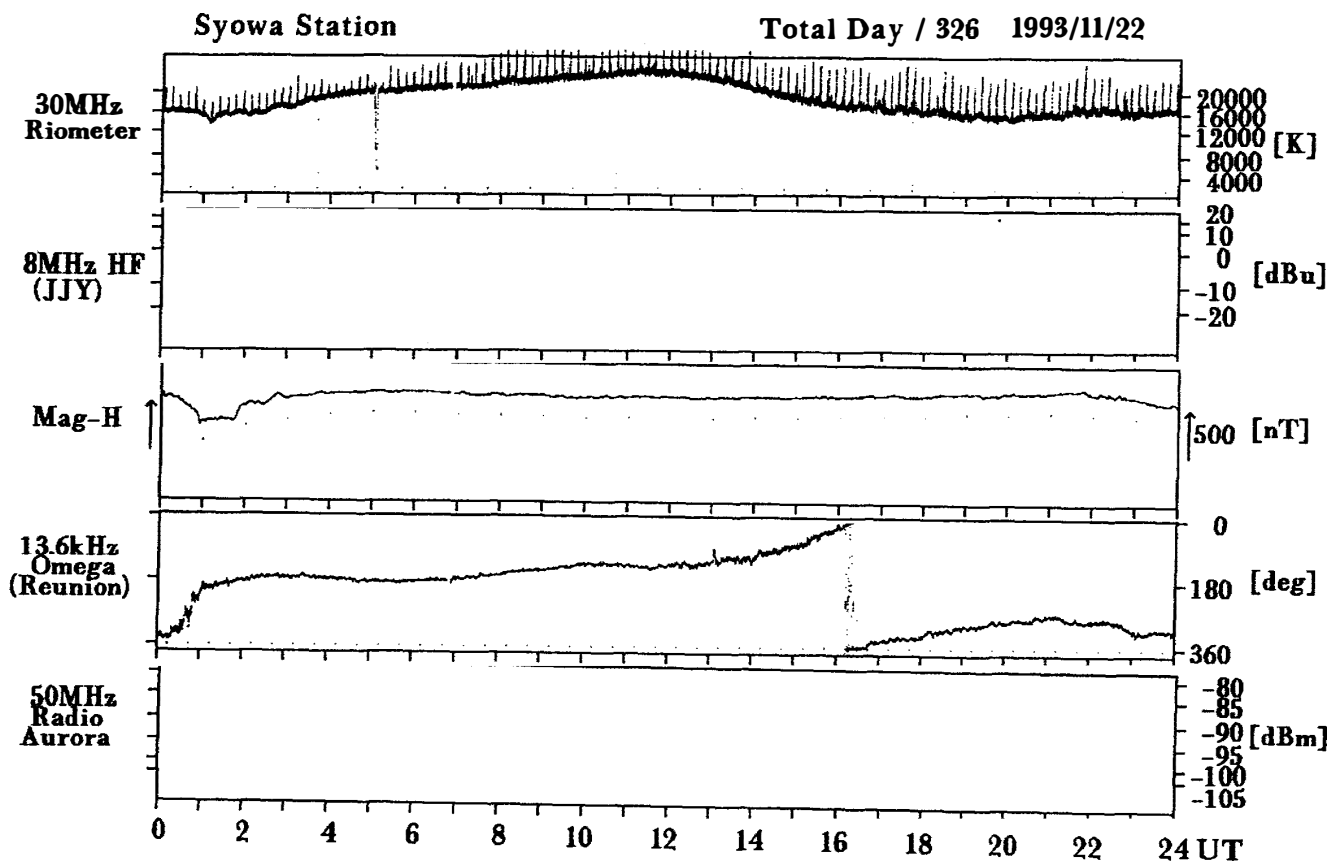
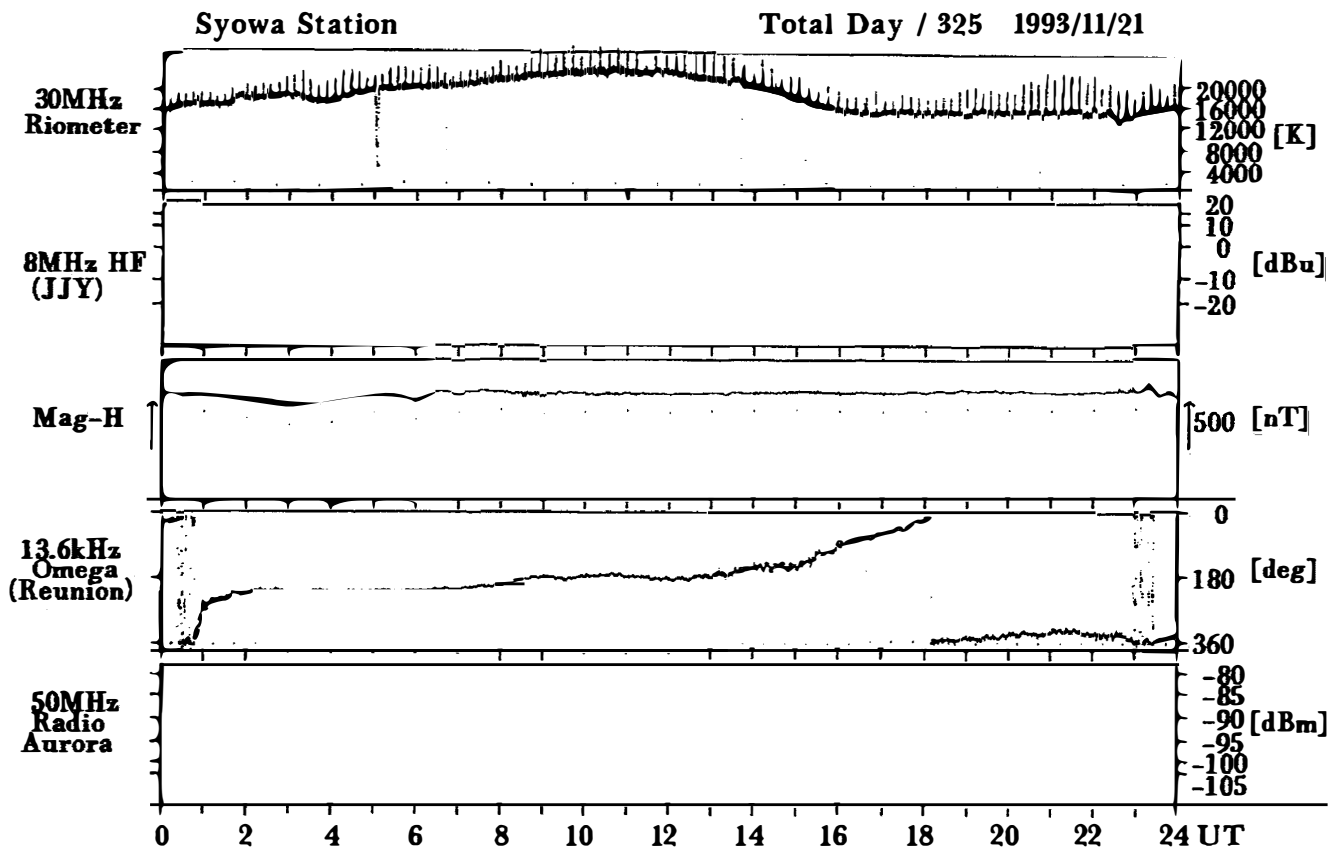
Total Day / 323 1993/11/19



Syowa Station

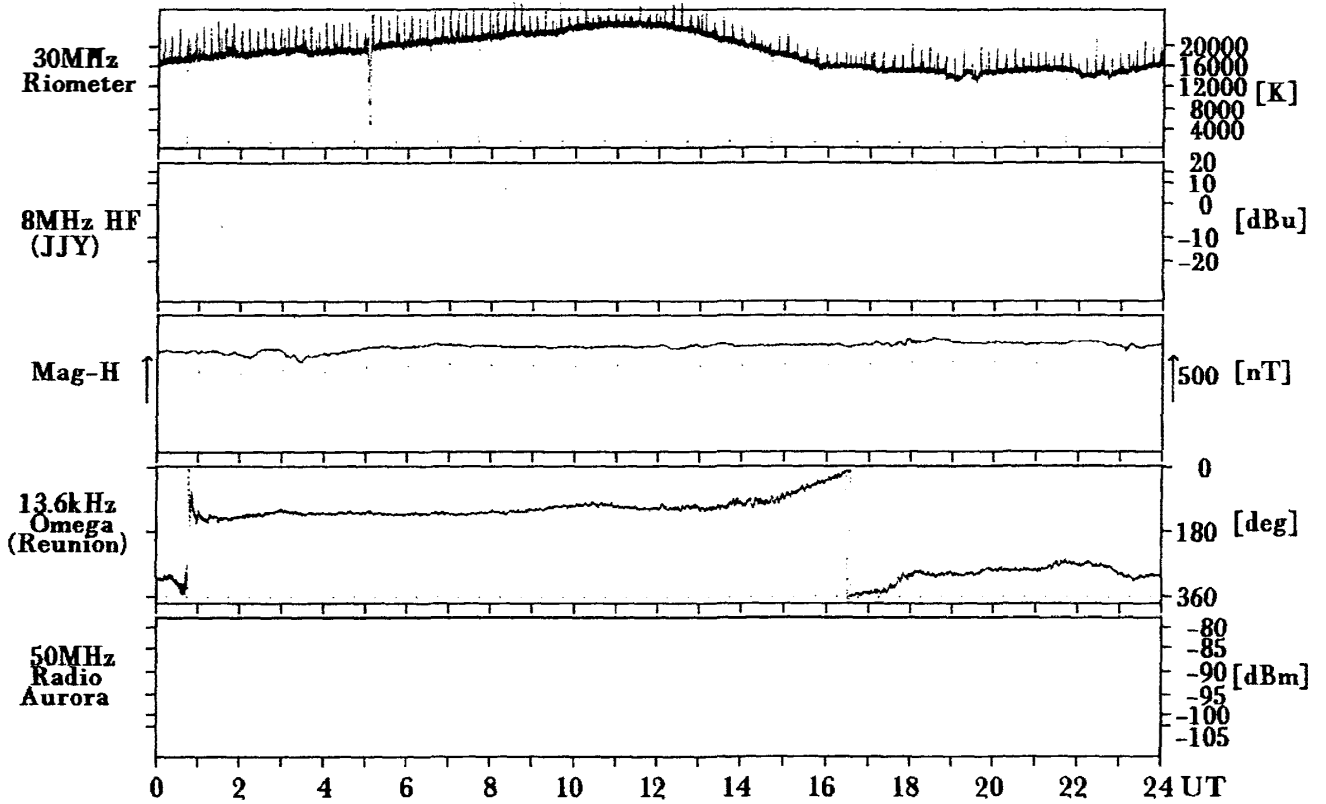
Total Day / 324 1993/11/20





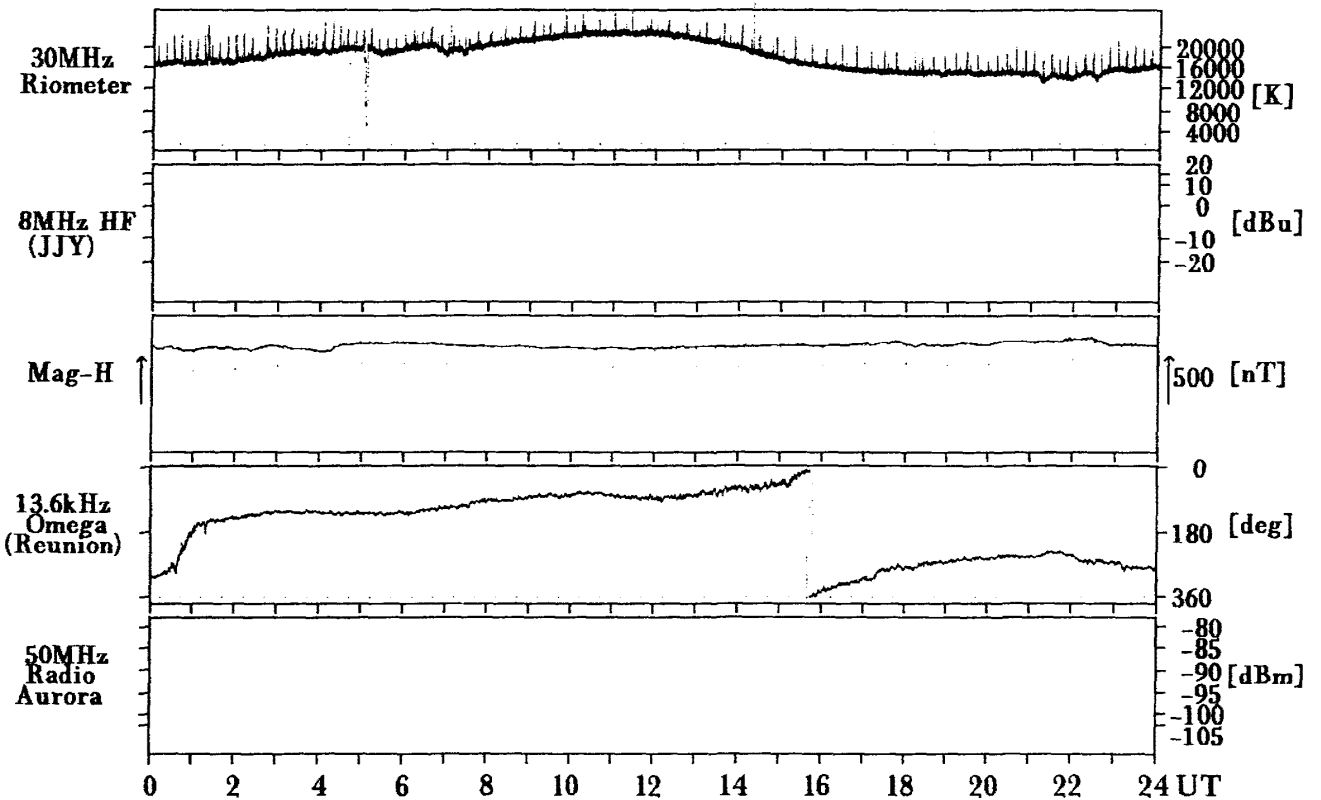
Syowa Station

Total Day / 327 1993/11/23



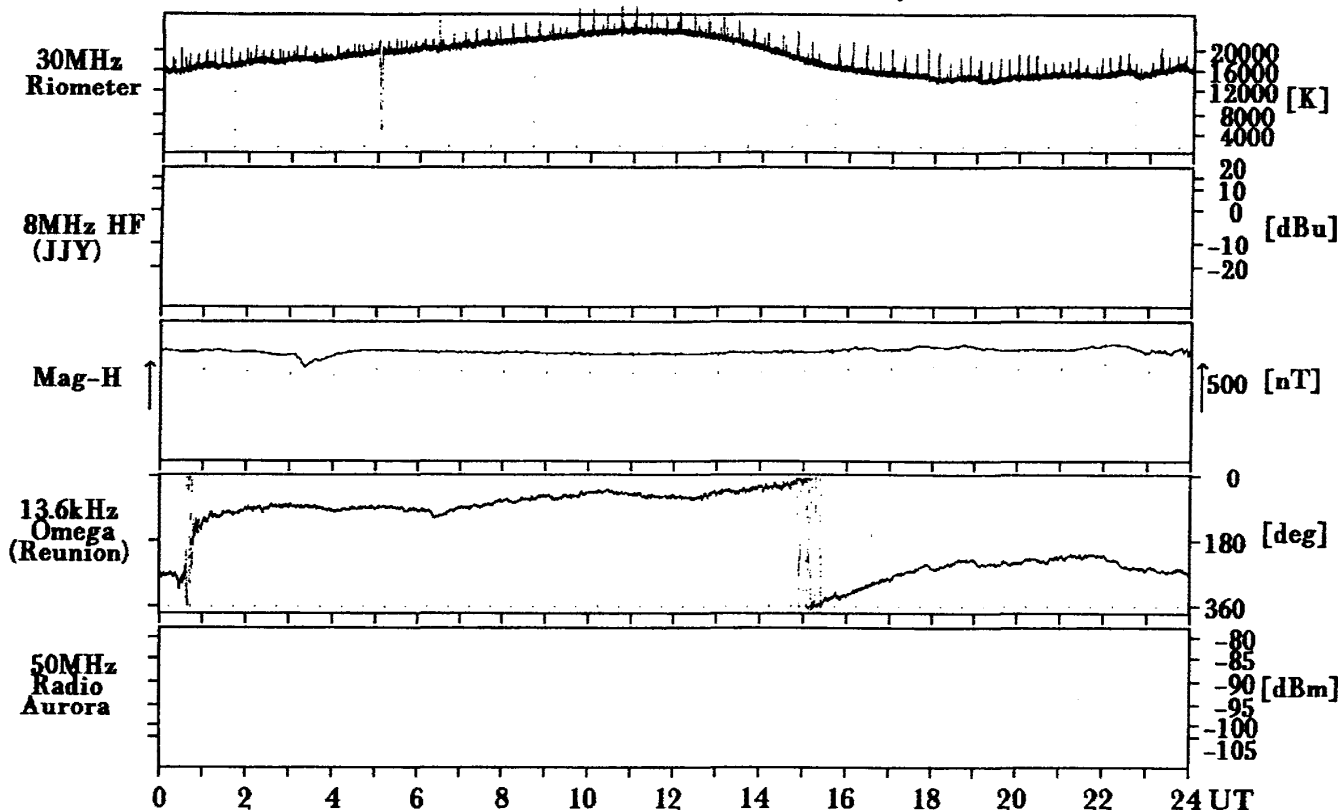
Syowa Station

Total Day / 328 1993/11/24



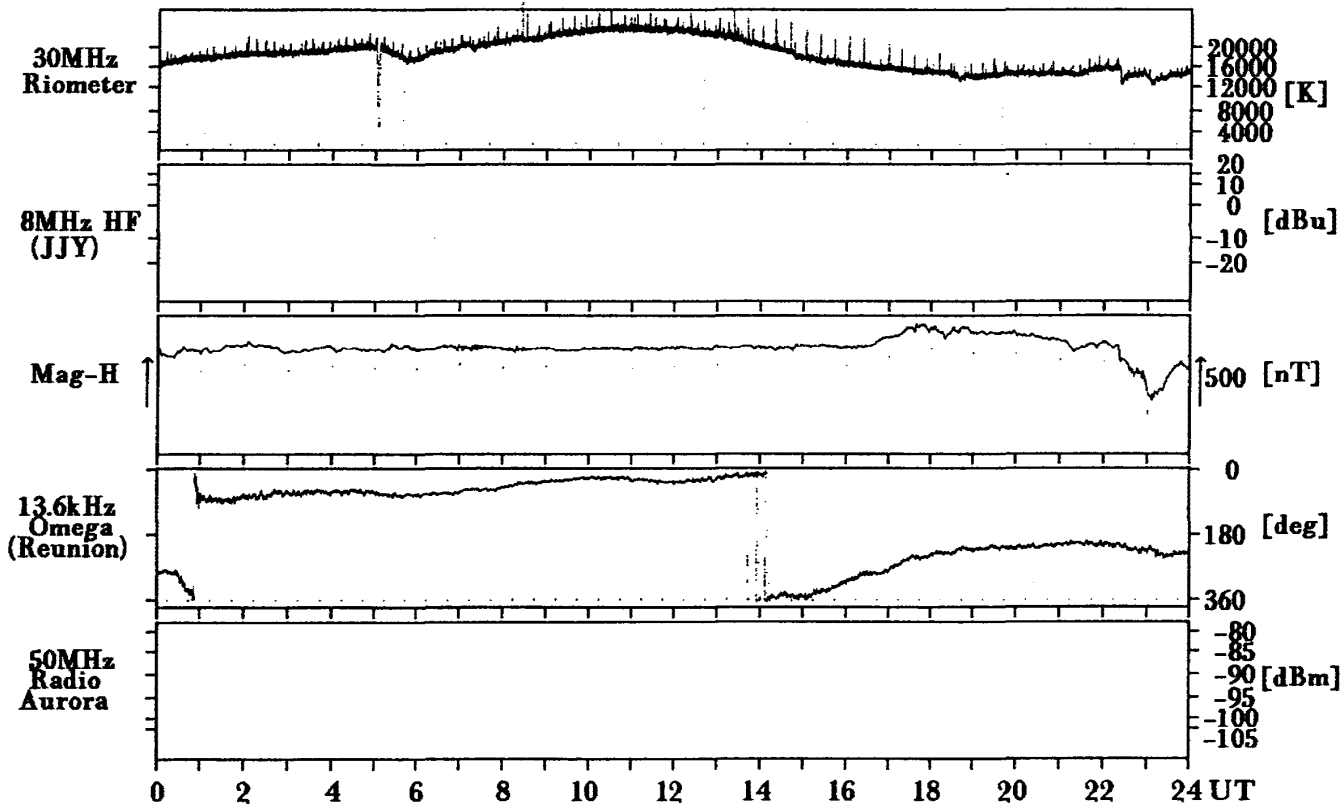
Syowa Station

Total Day / 329 1993/11/25



Syowa Station

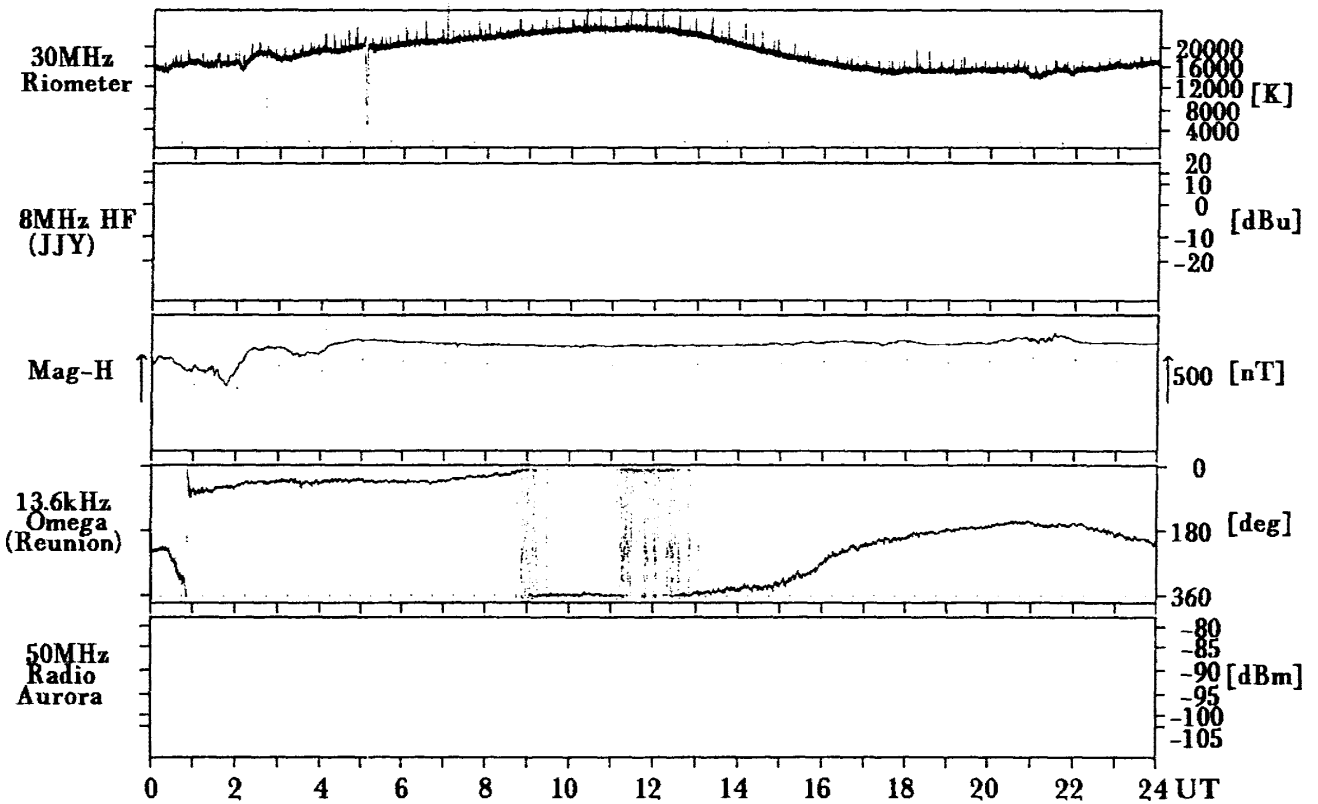
Total Day / 330 1993/11/26





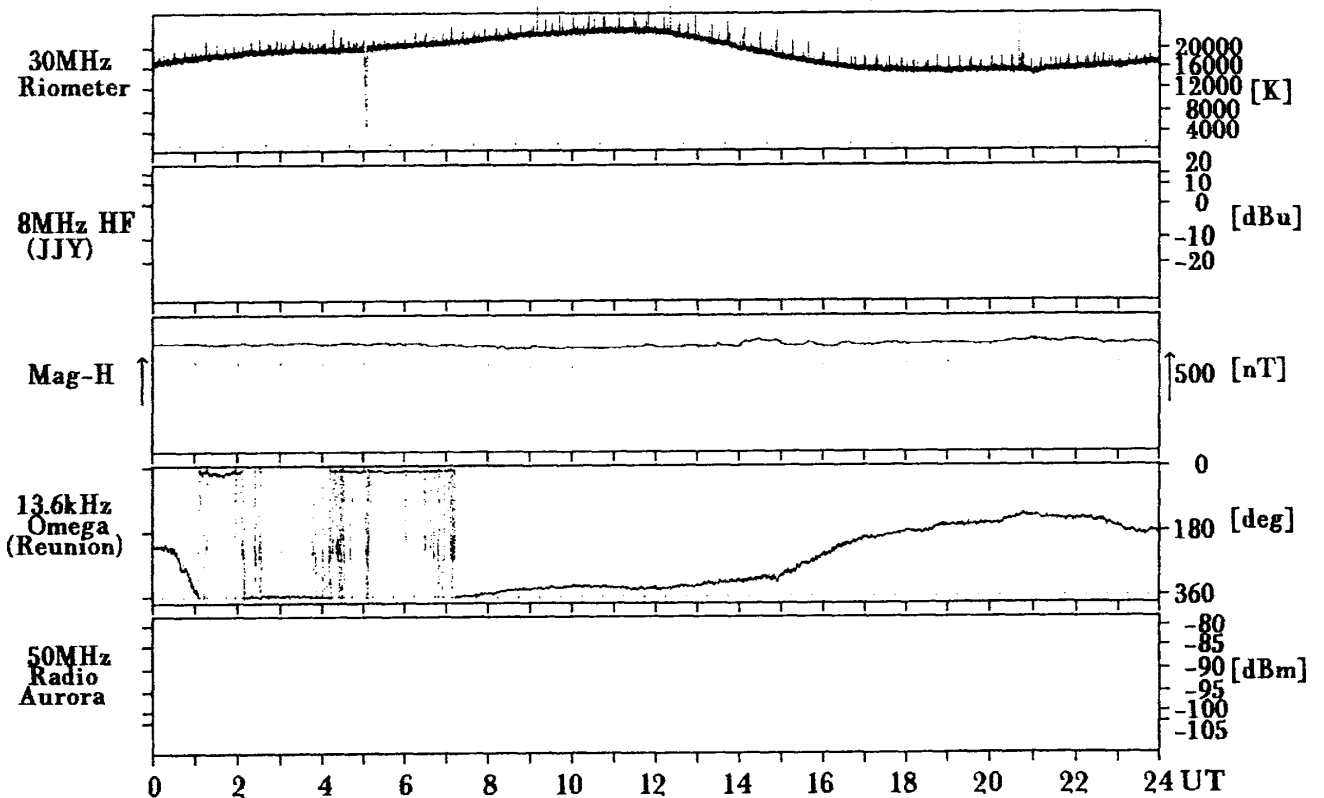
Syowa Station

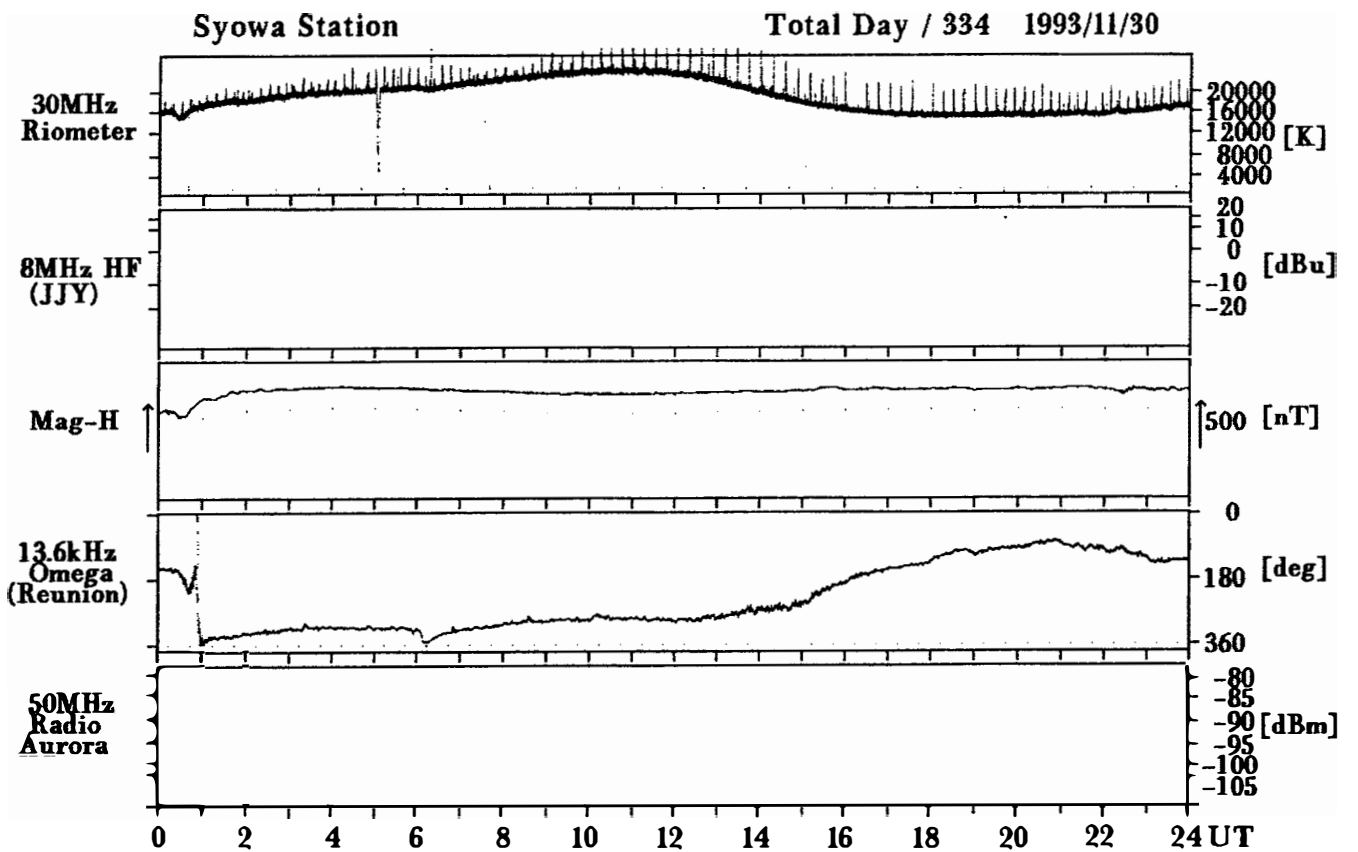
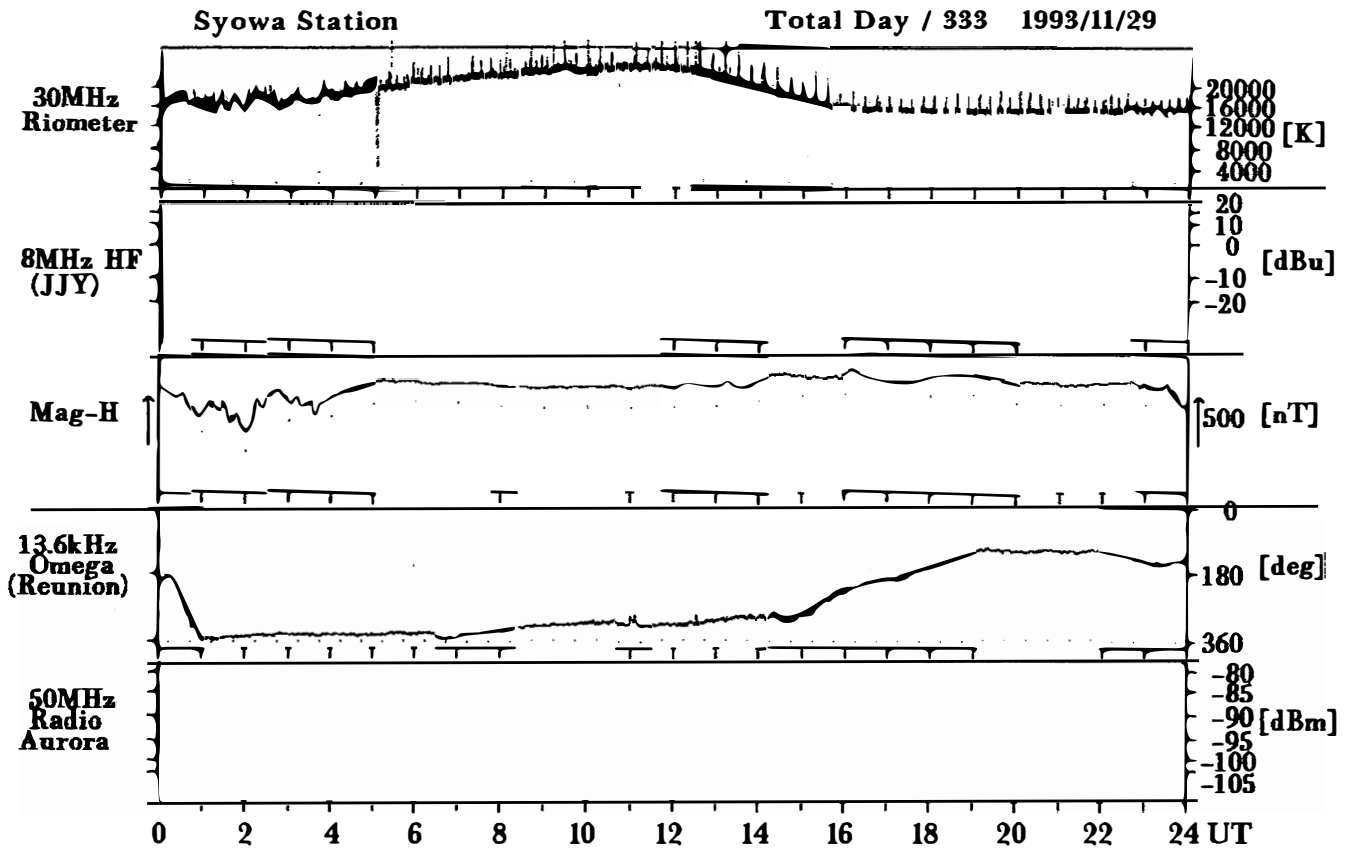
Total Day / 331 1993/11/27

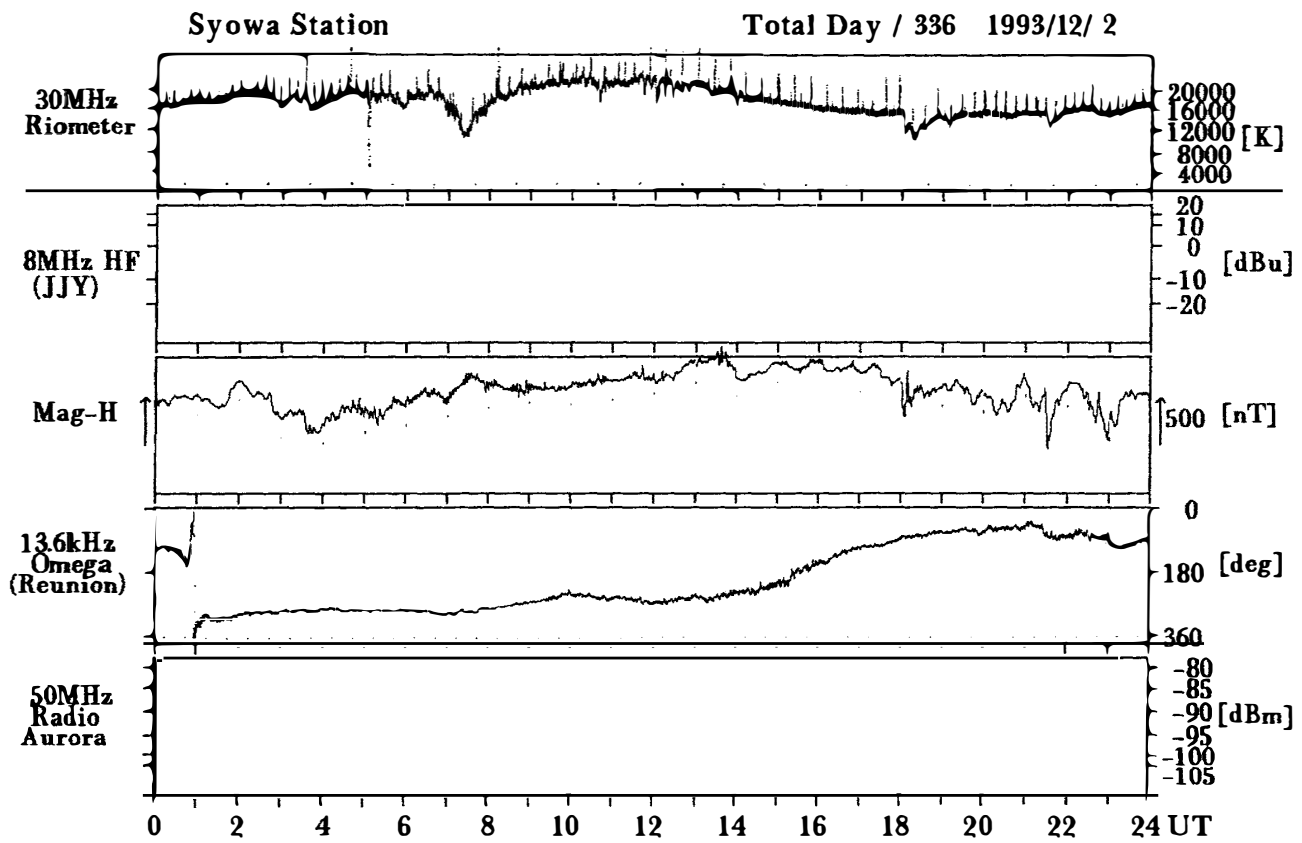
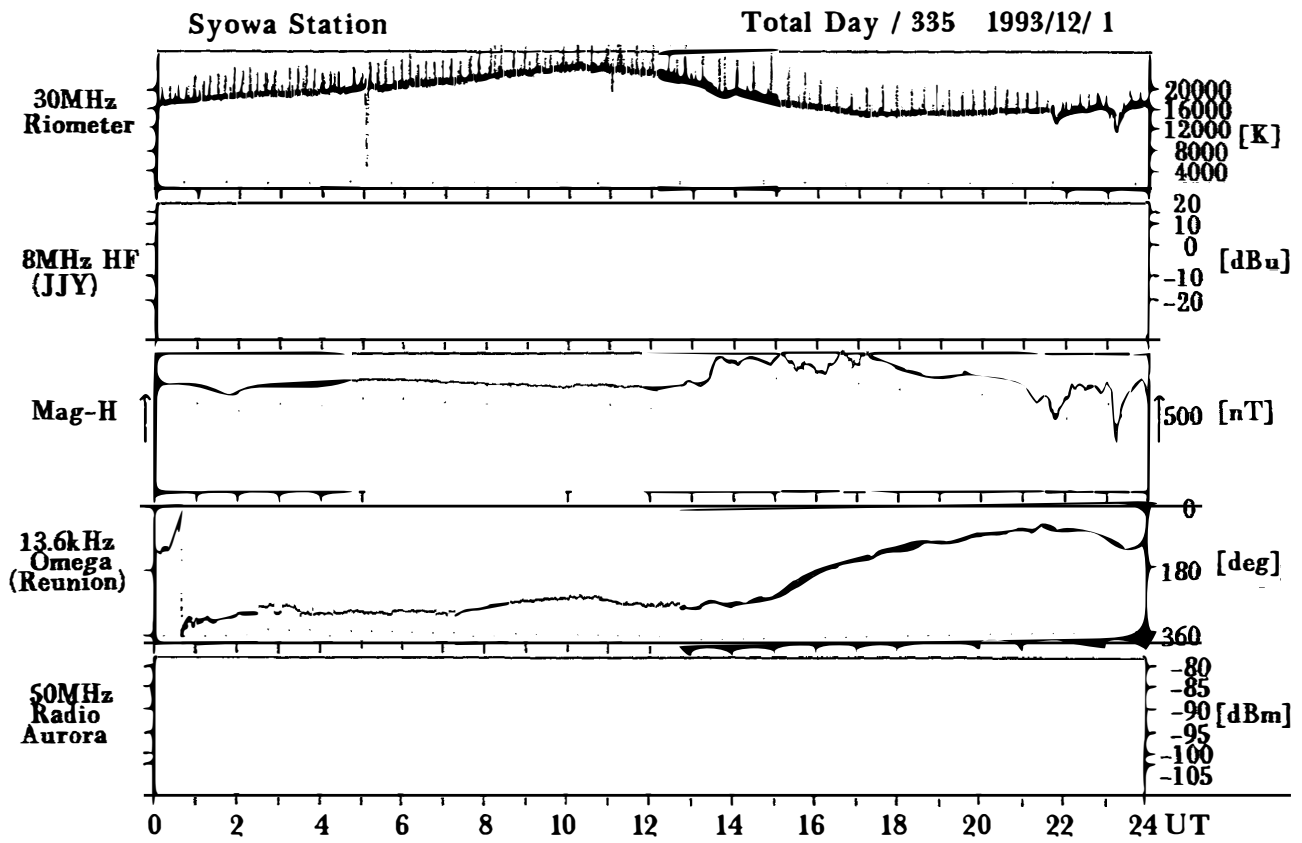


Syowa Station

Total Day / 332 1993/11/28

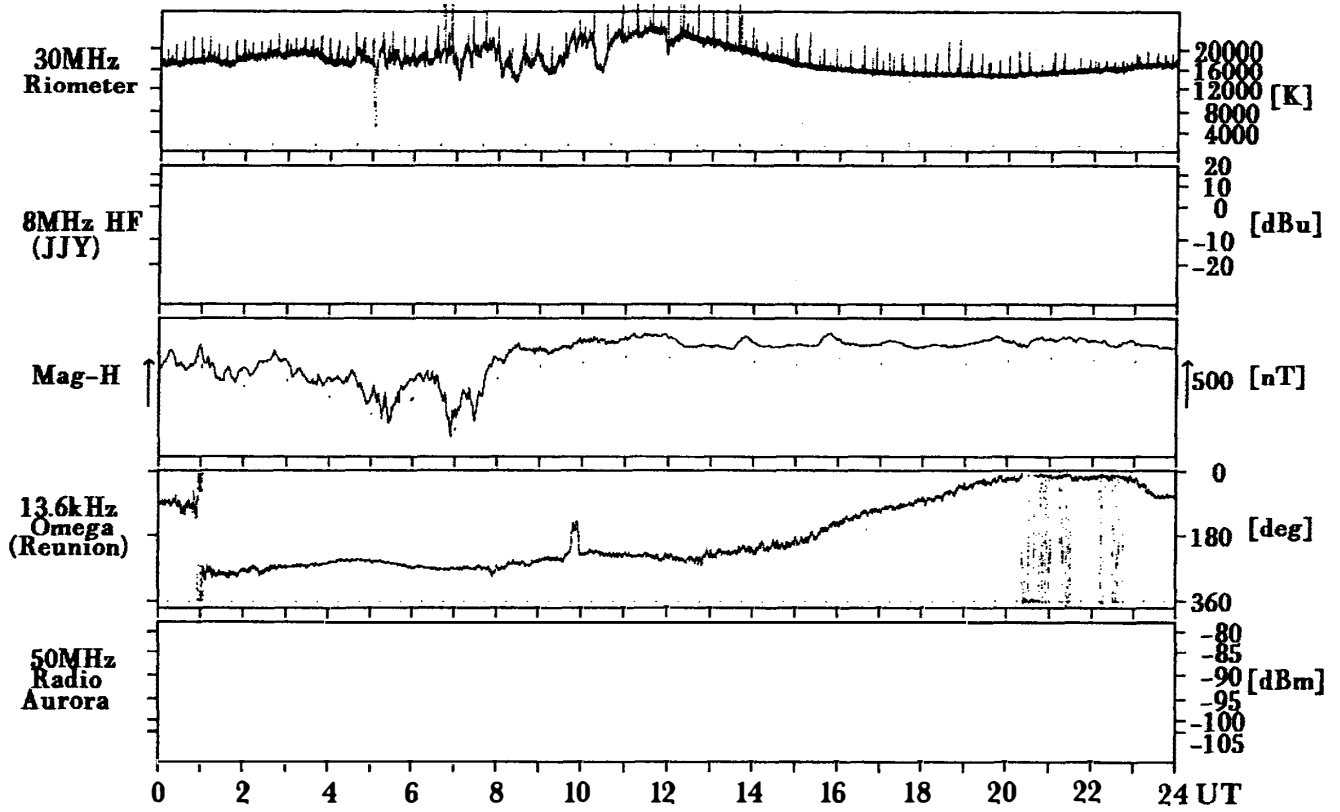






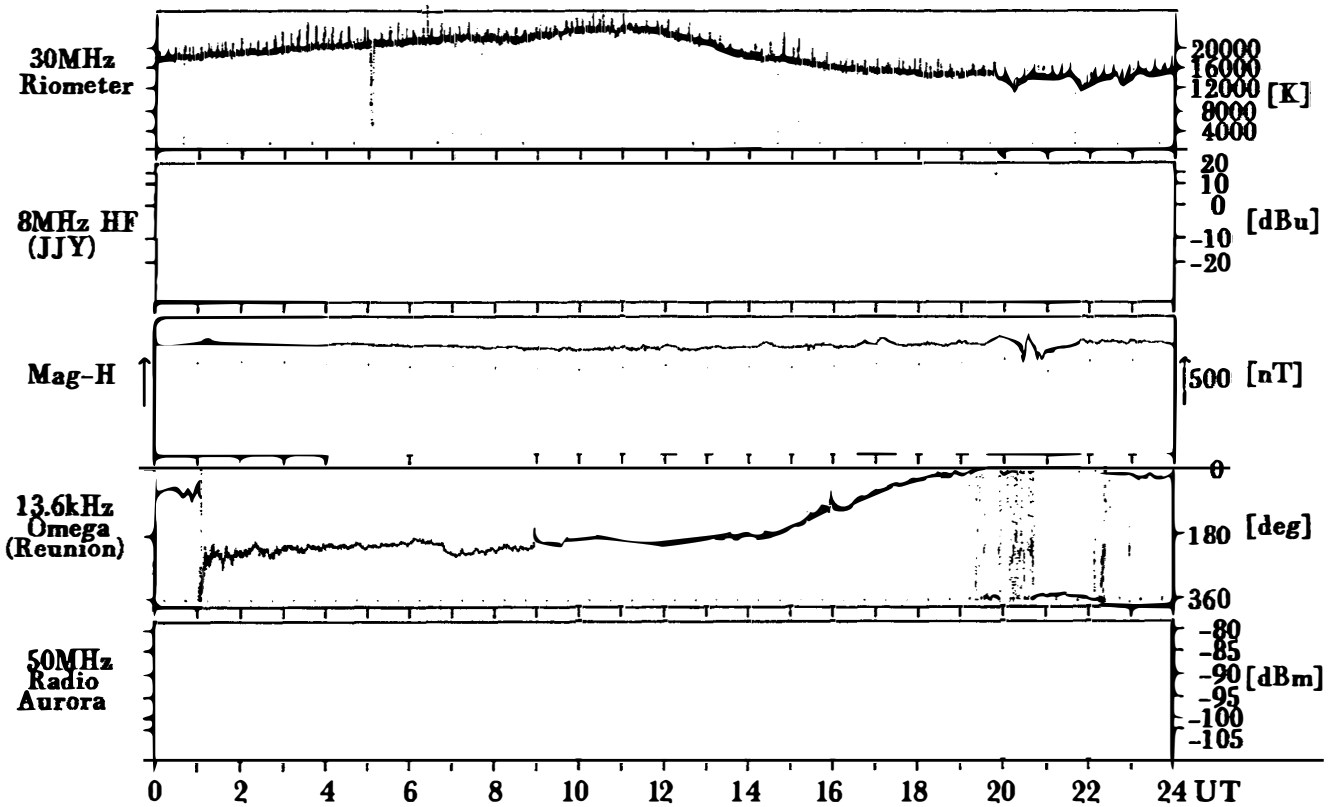
Syowa Station

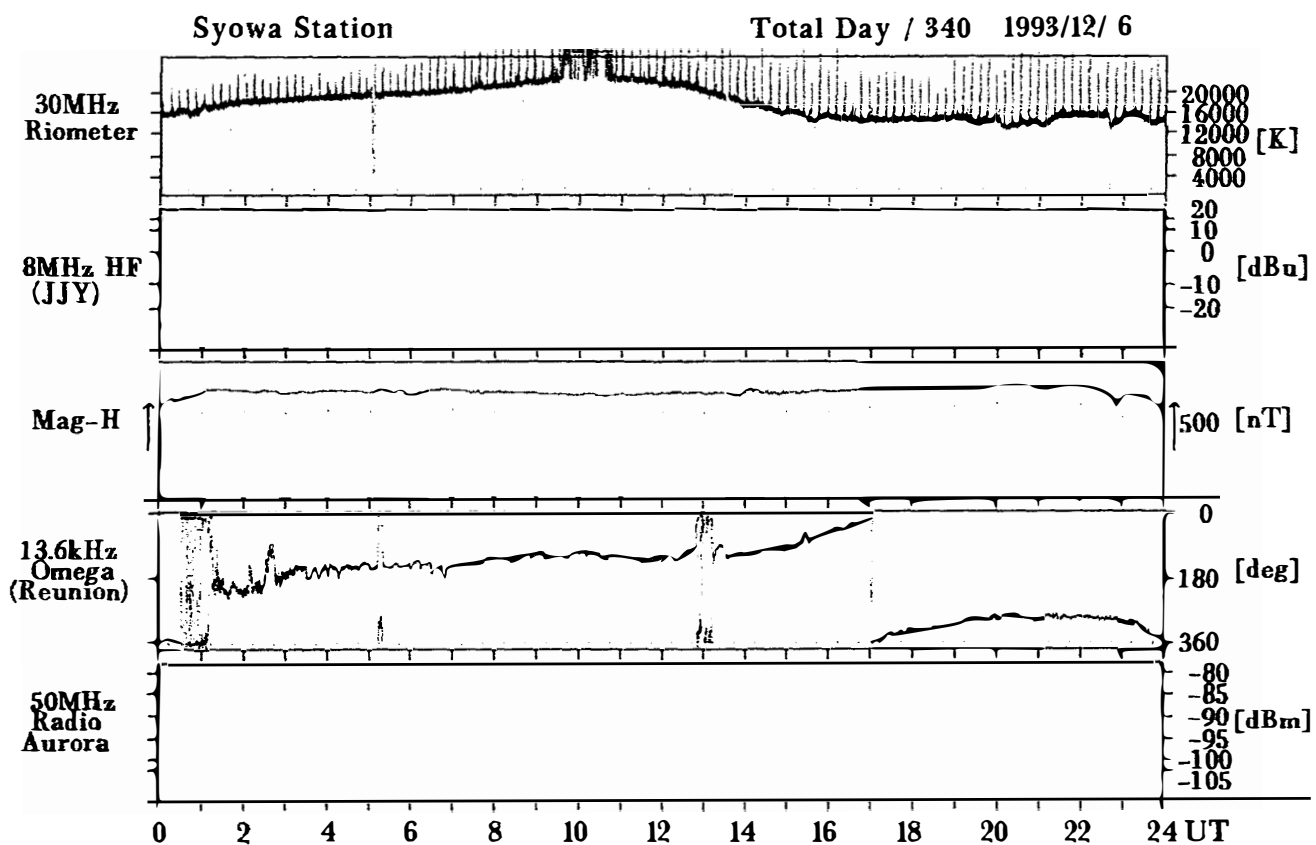
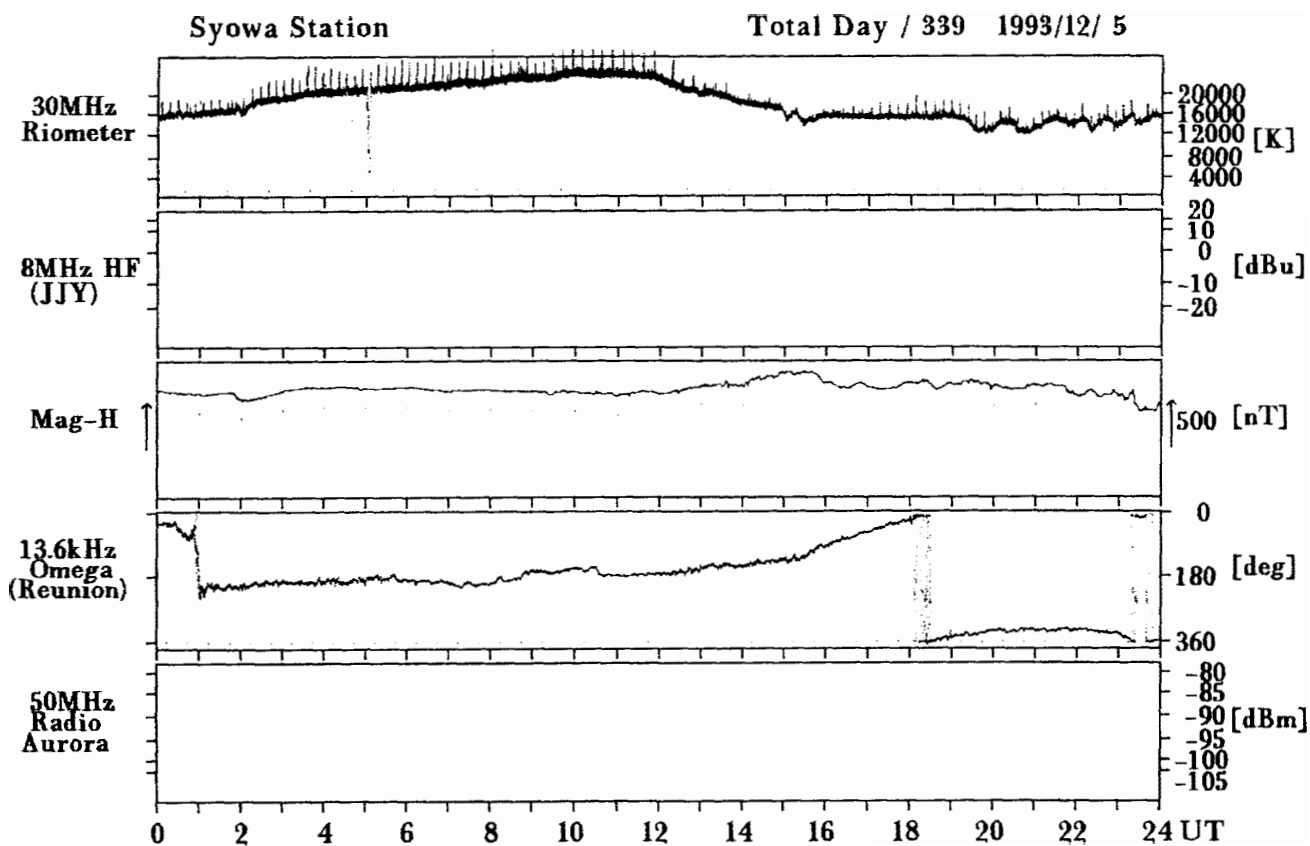
Total Day / 337 1993/12/ 3

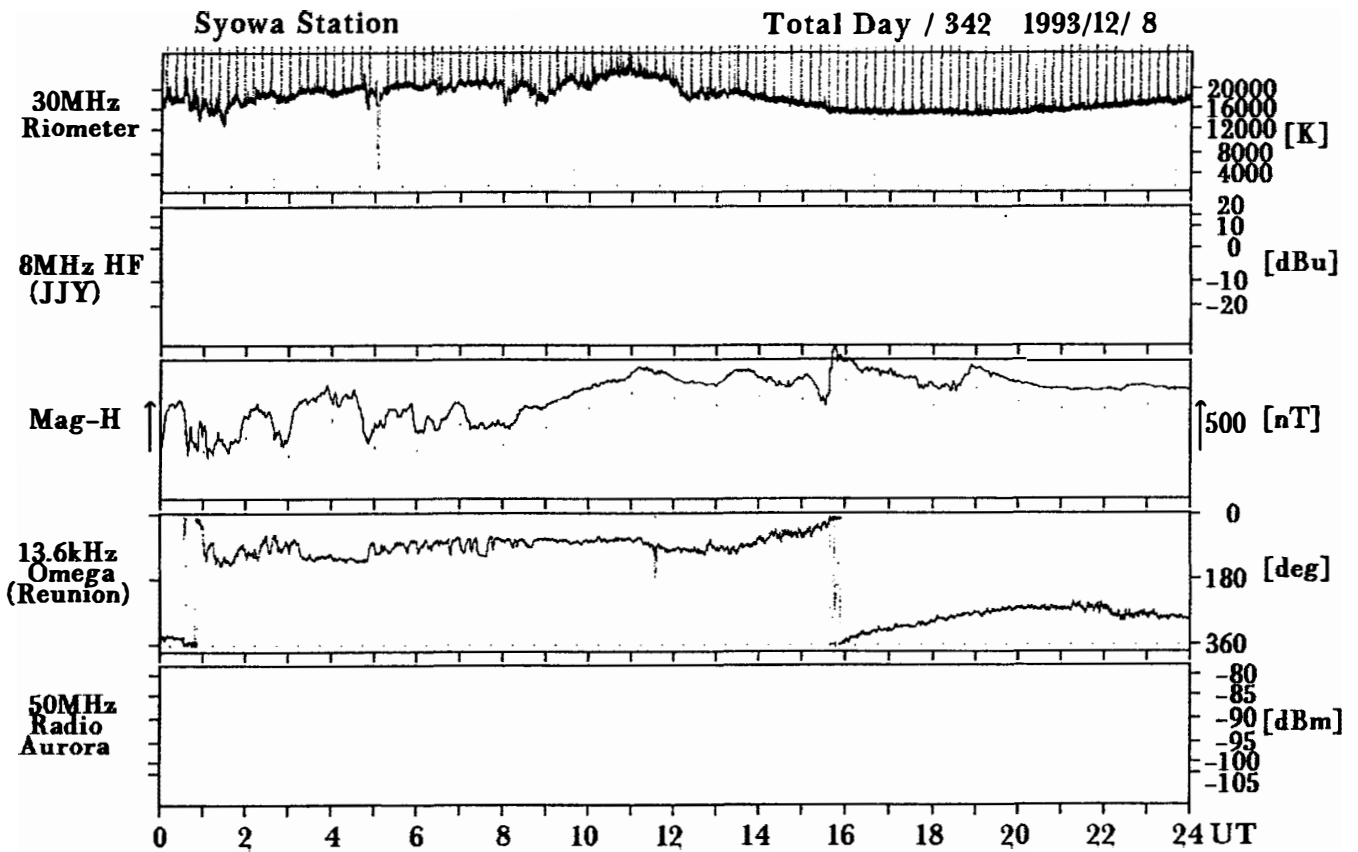
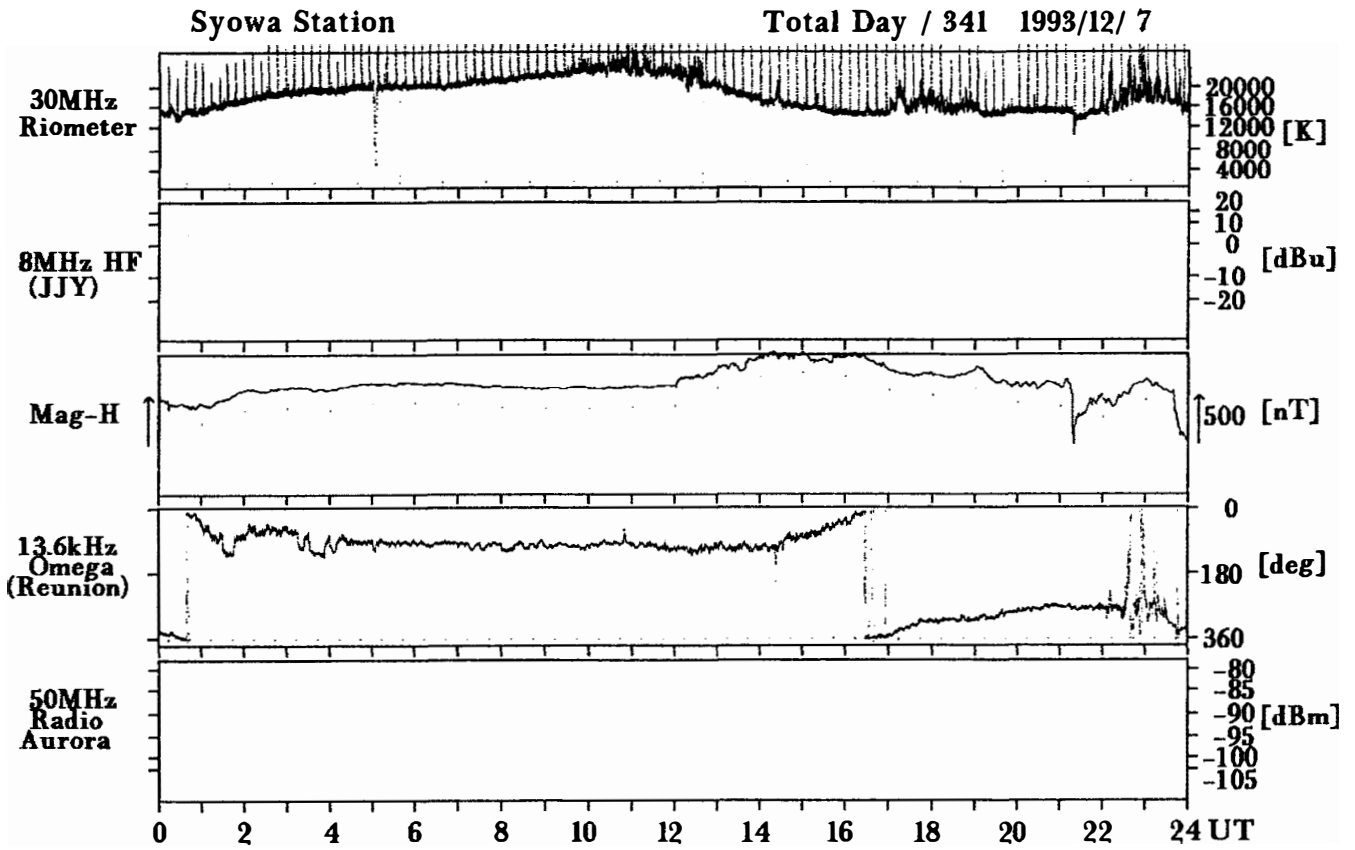


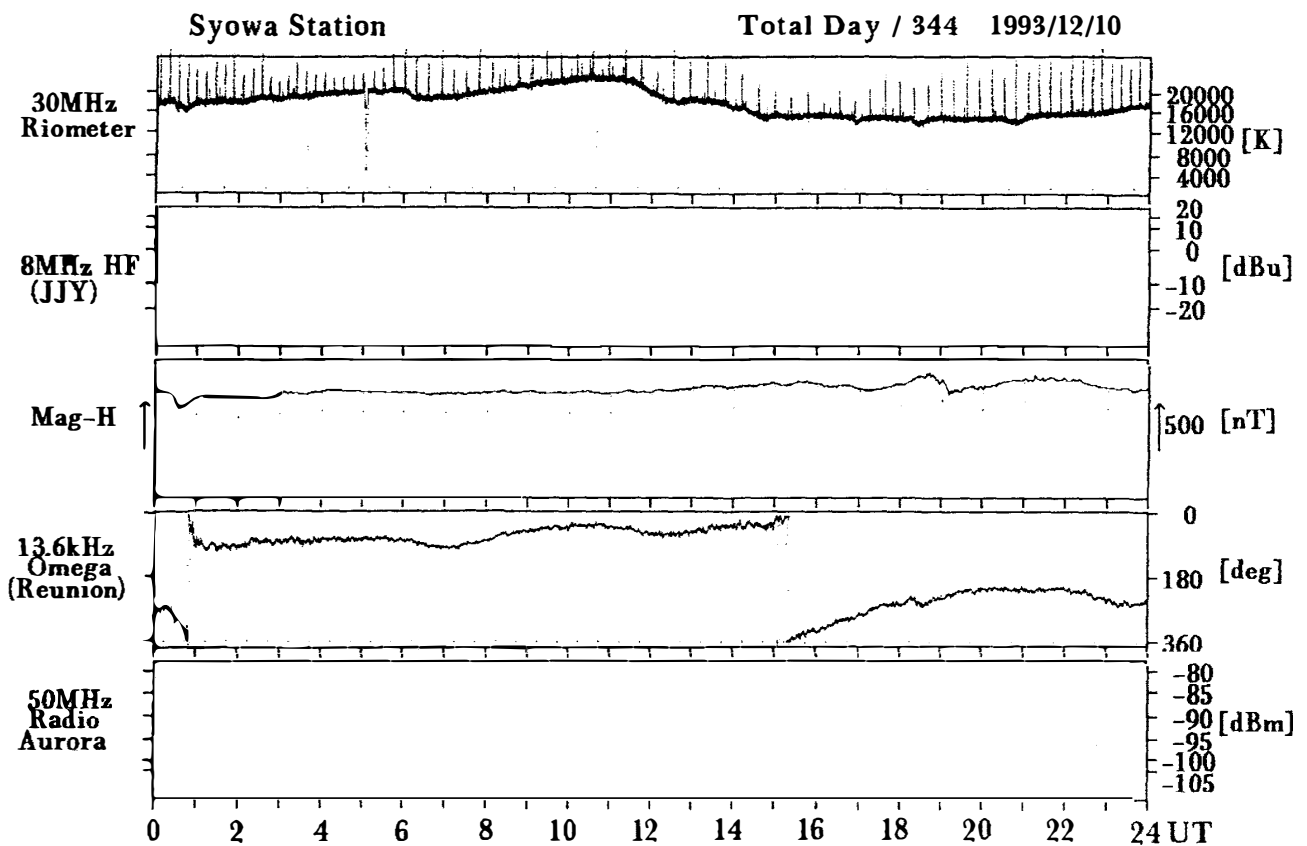
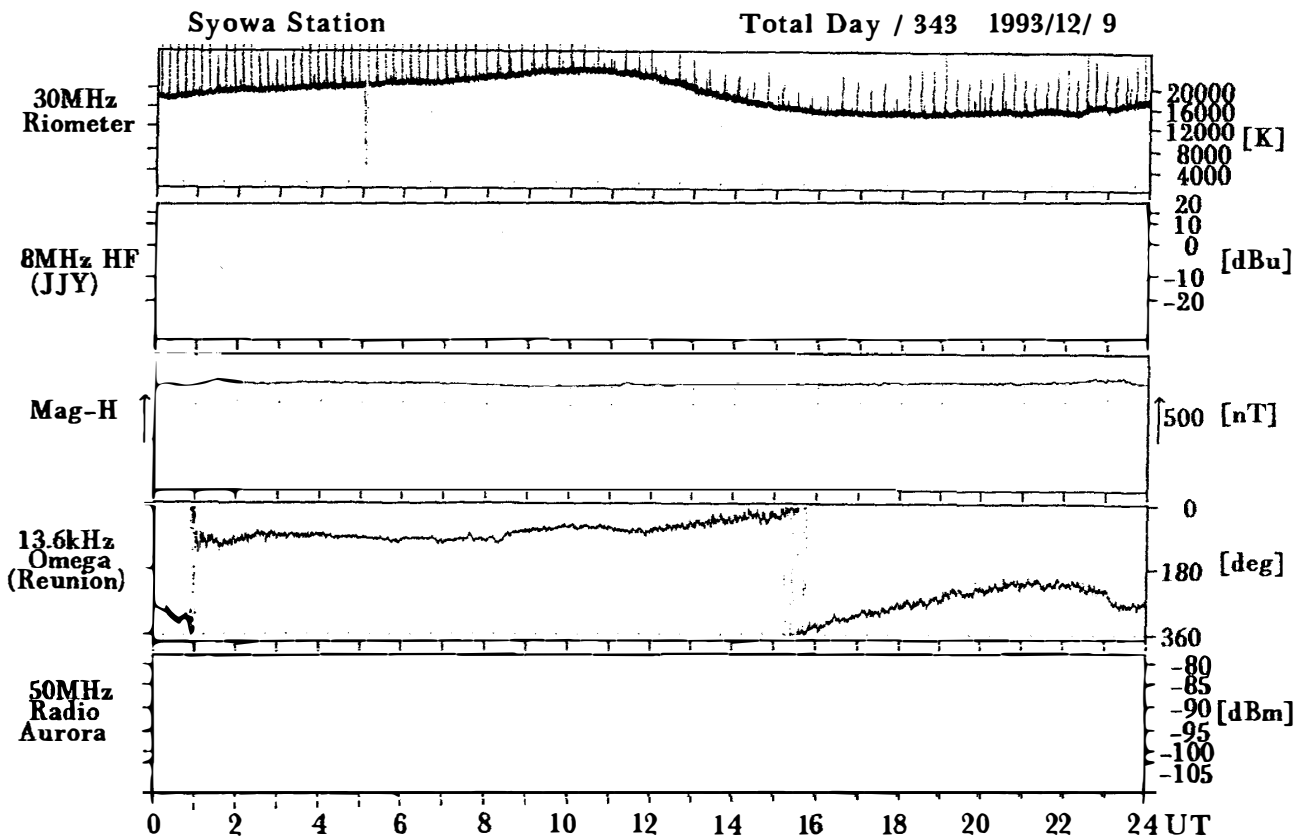
Syowa Station

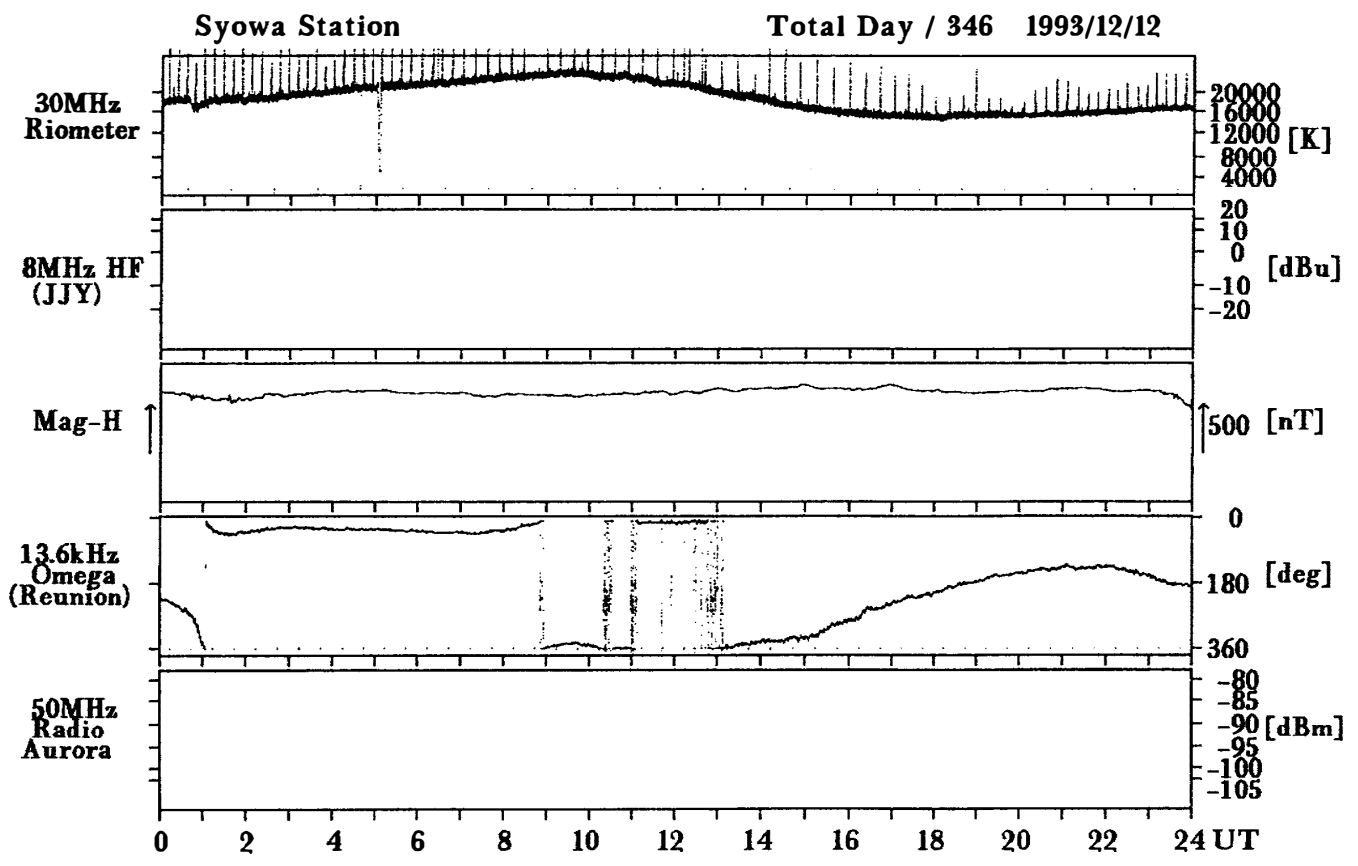
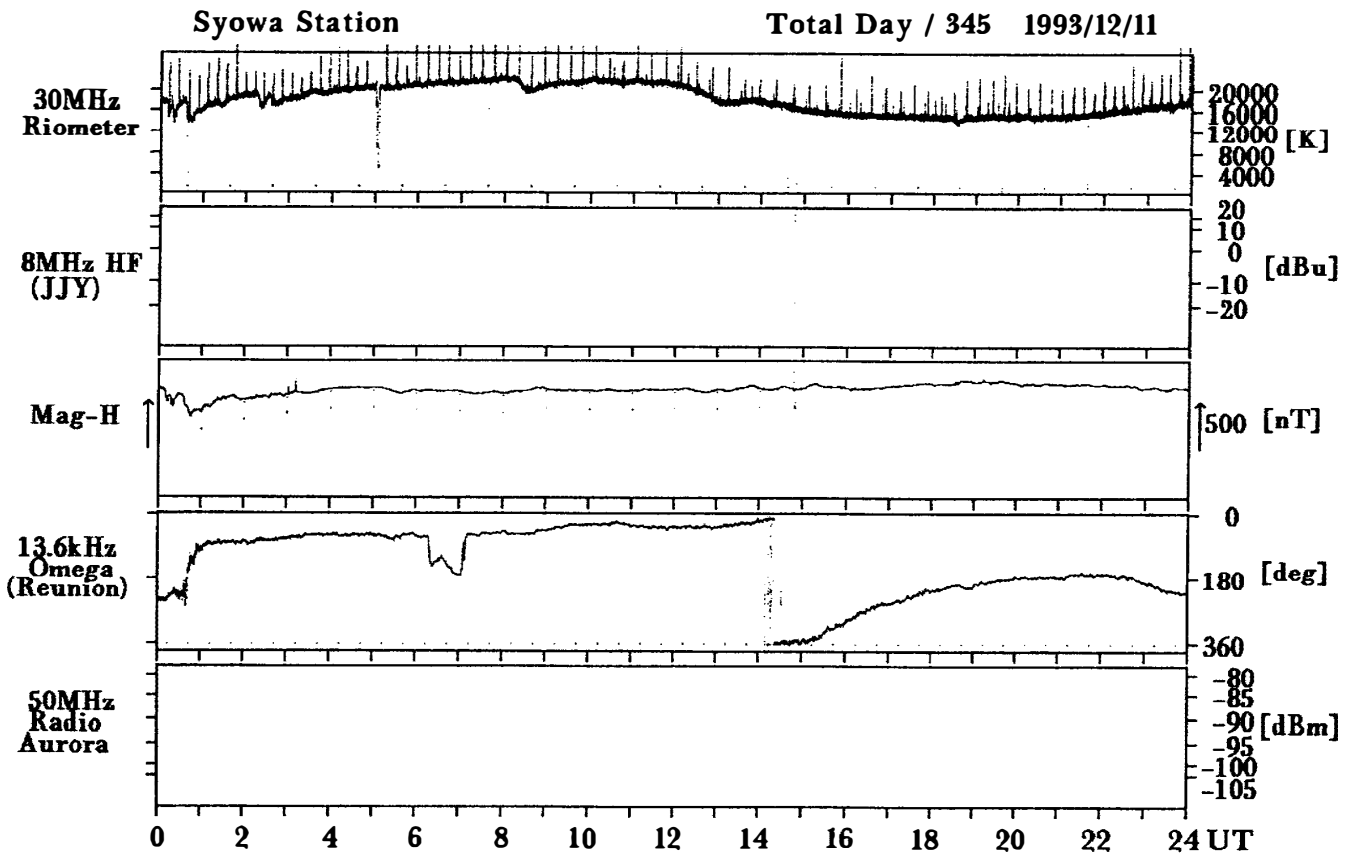
Total Day / 338 1993/12/ 4



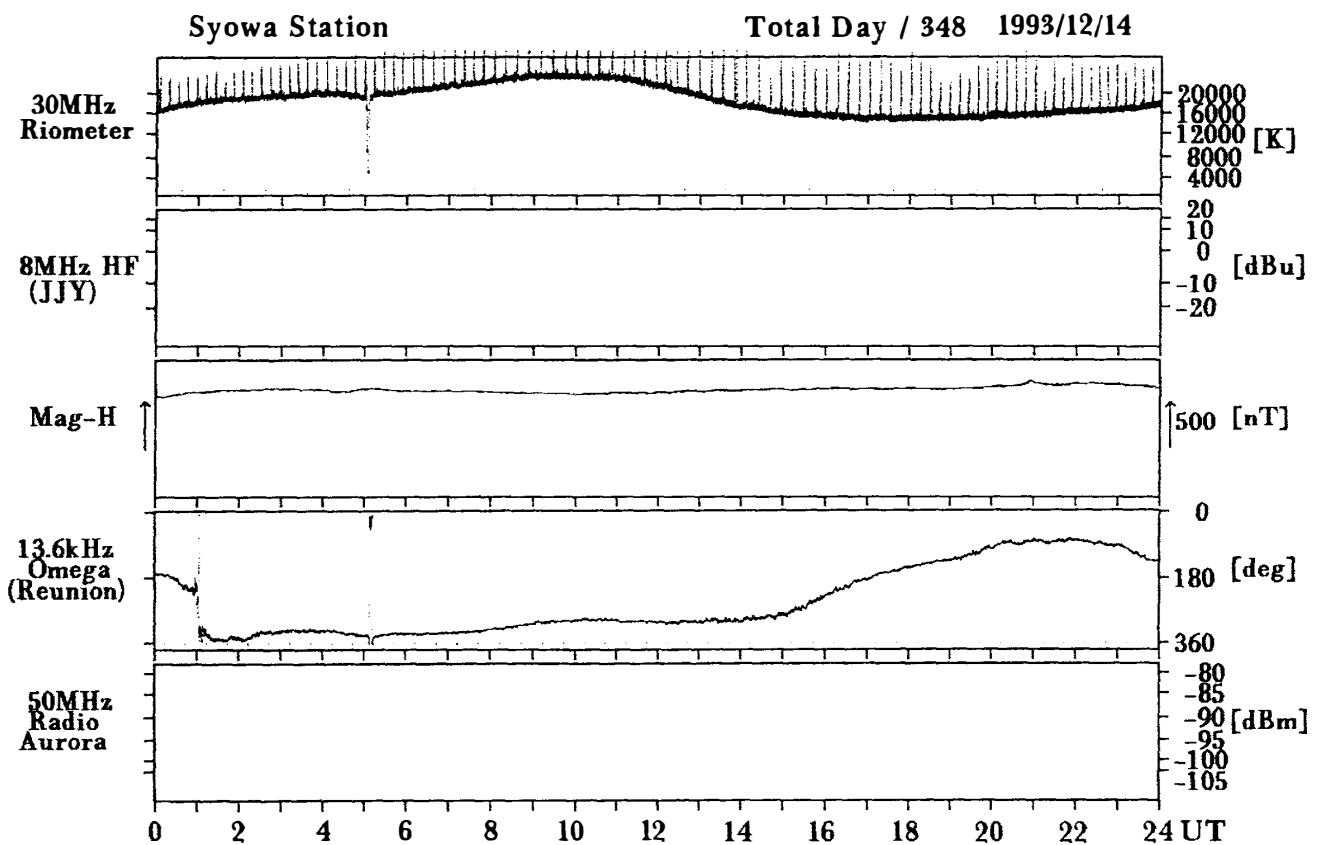
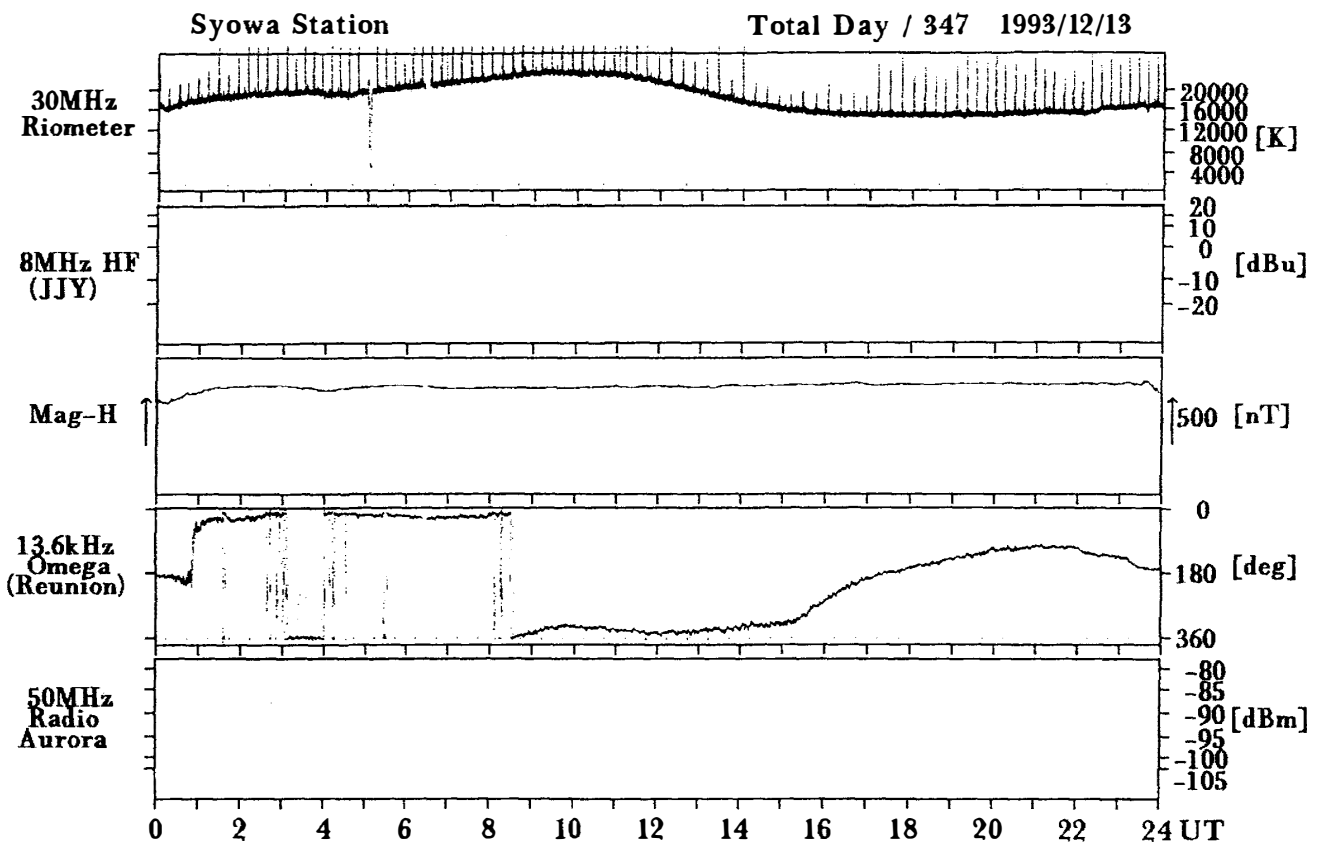






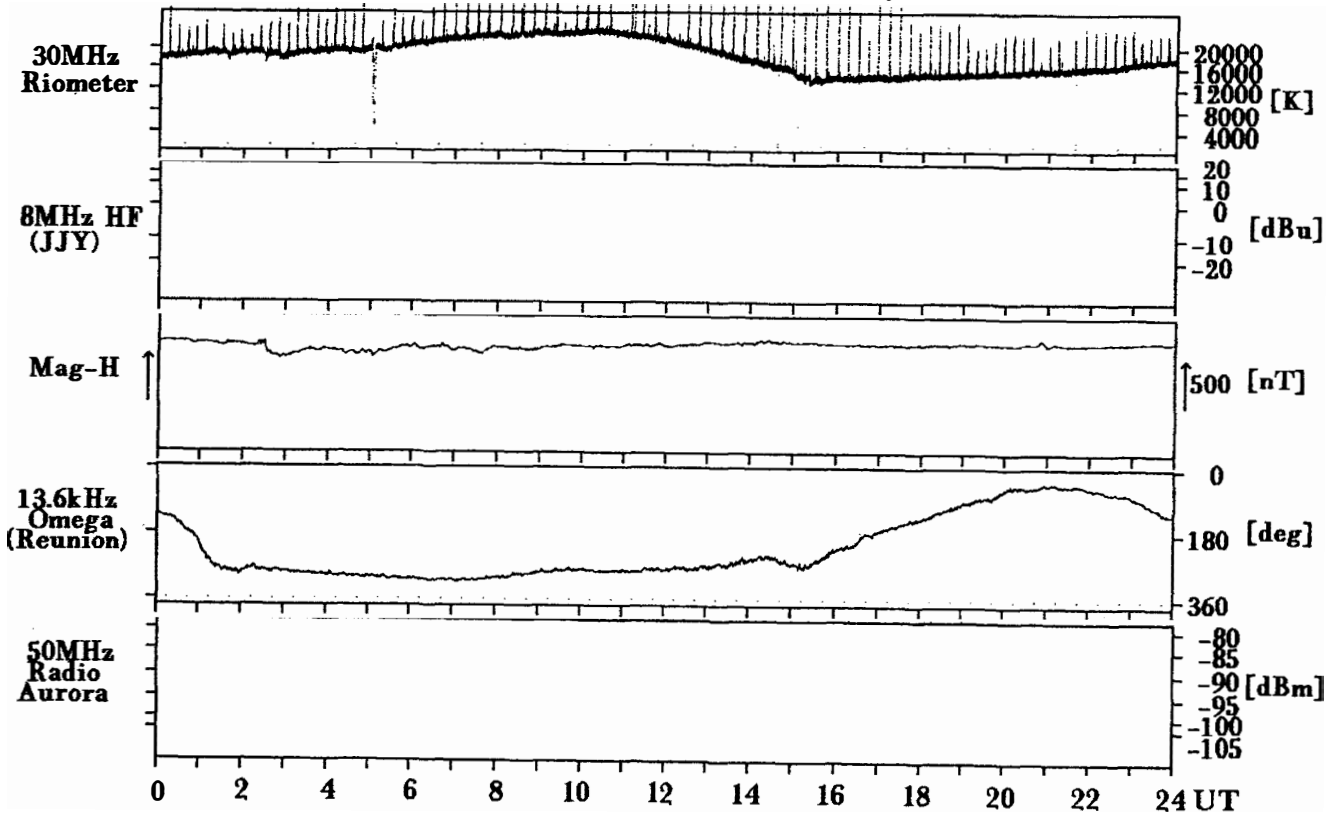






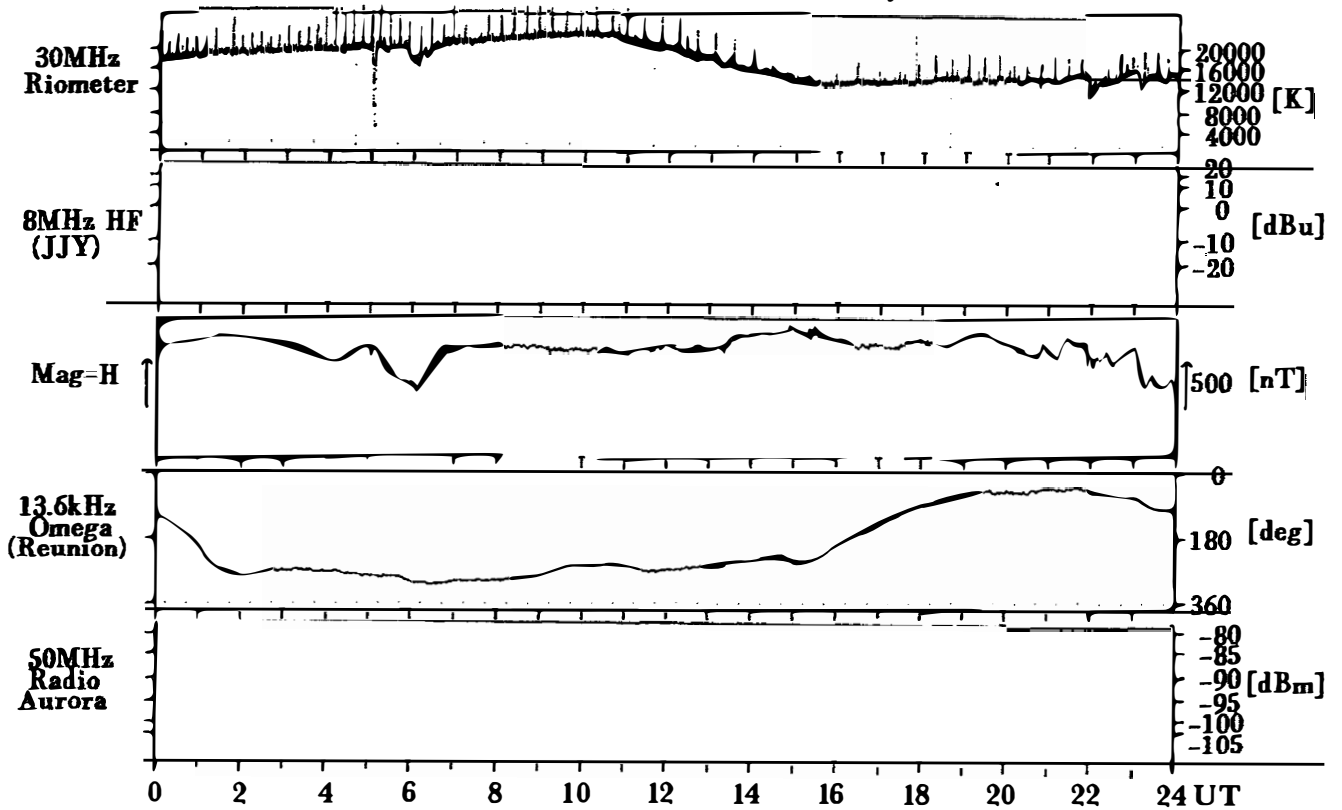
Syowa Station

Total Day / 349 1993/12/15



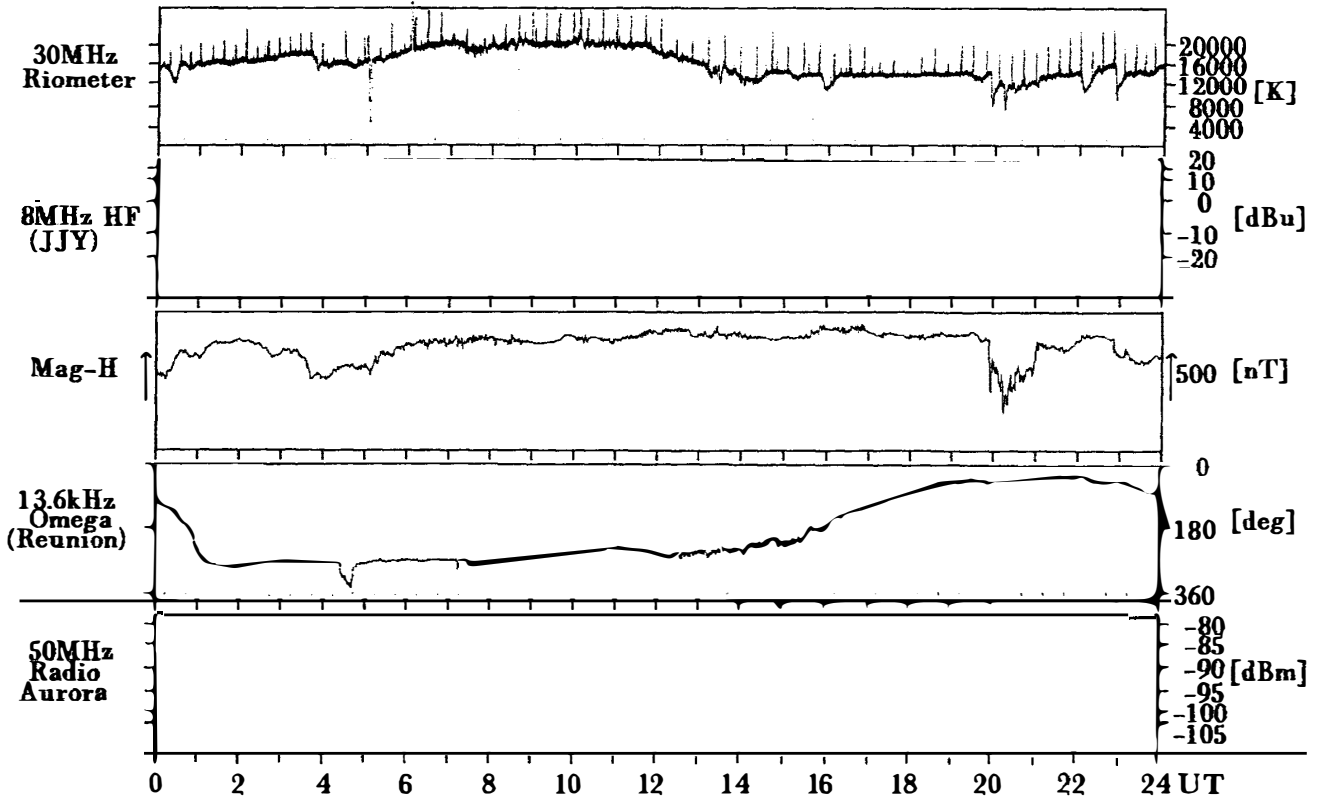
Syowa Station

Total Day / 350 1993/12/16



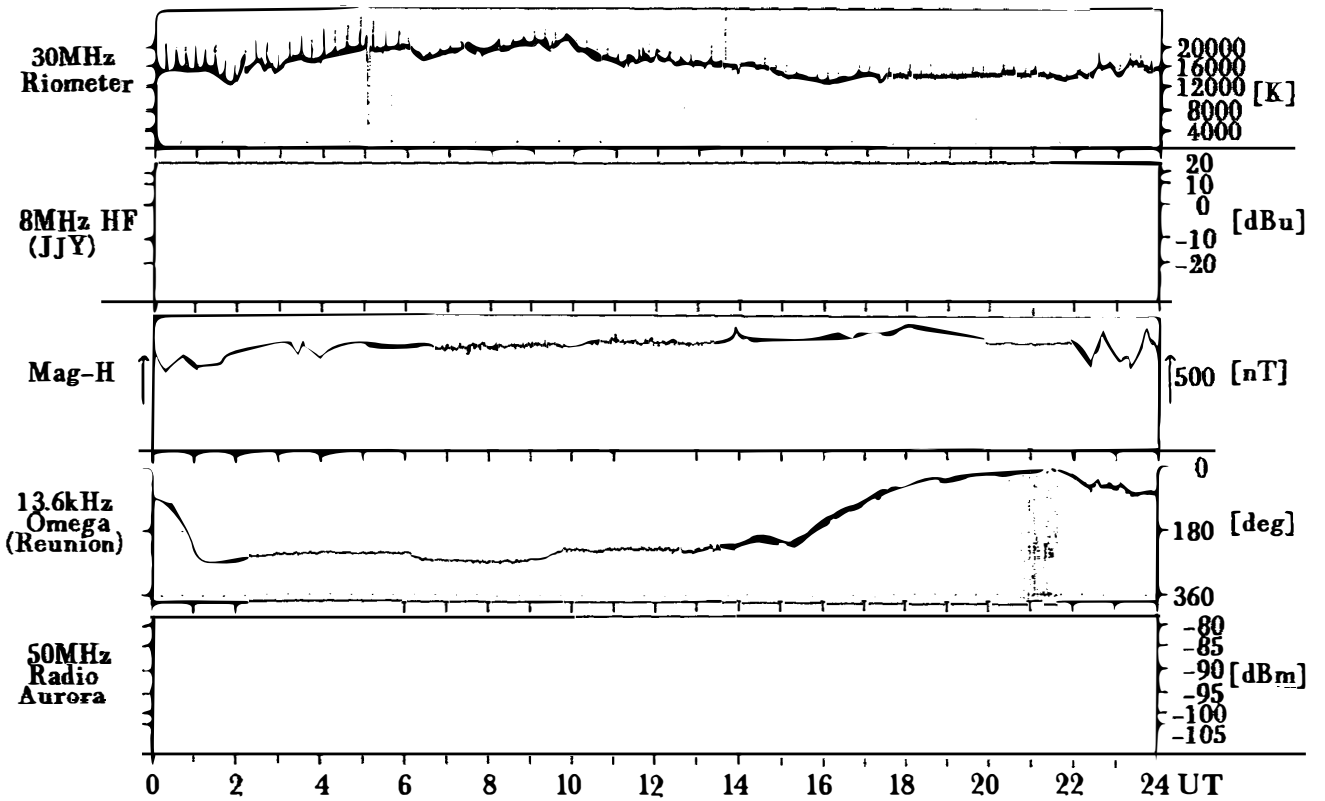
Syowa Station

Total Day / 351 1993/12/17



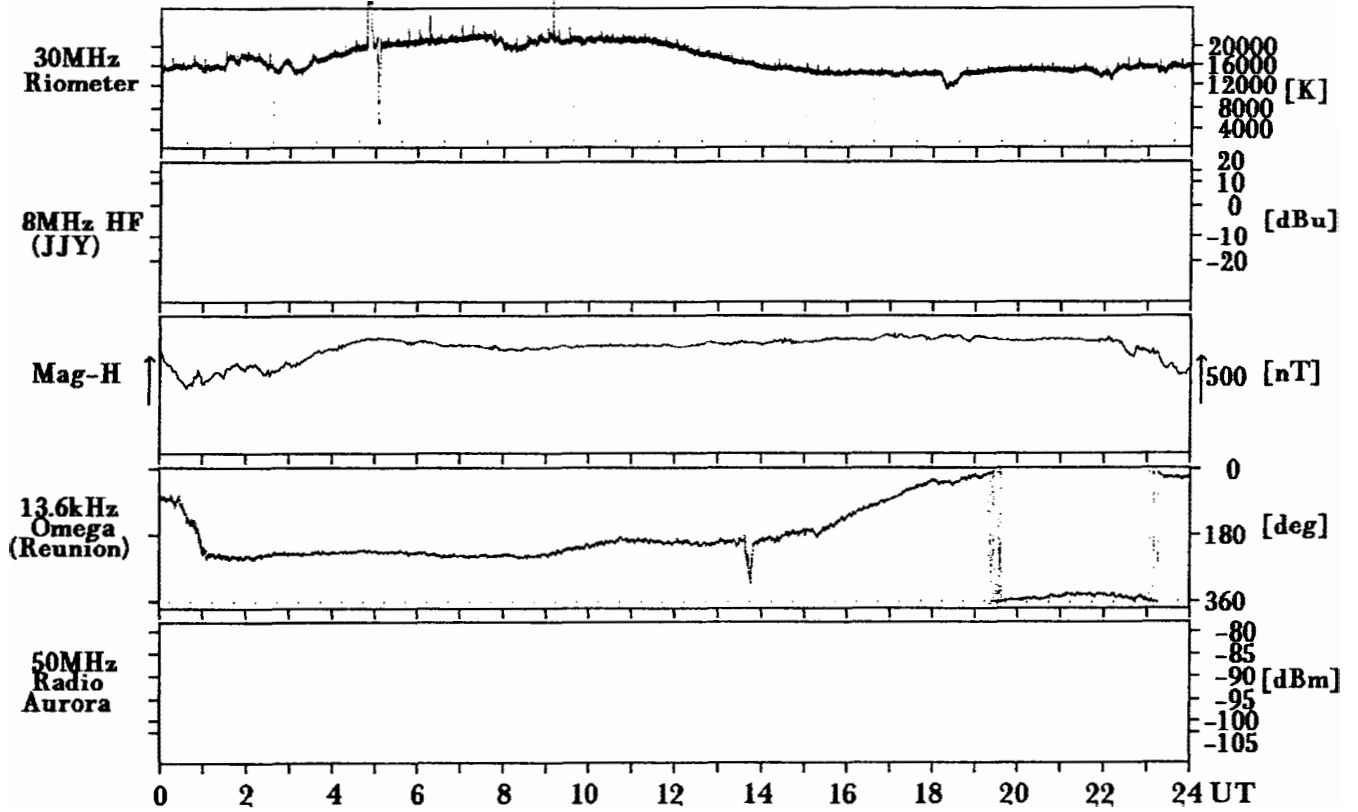
Syowa Station

Total Day / 352 1993/12/18



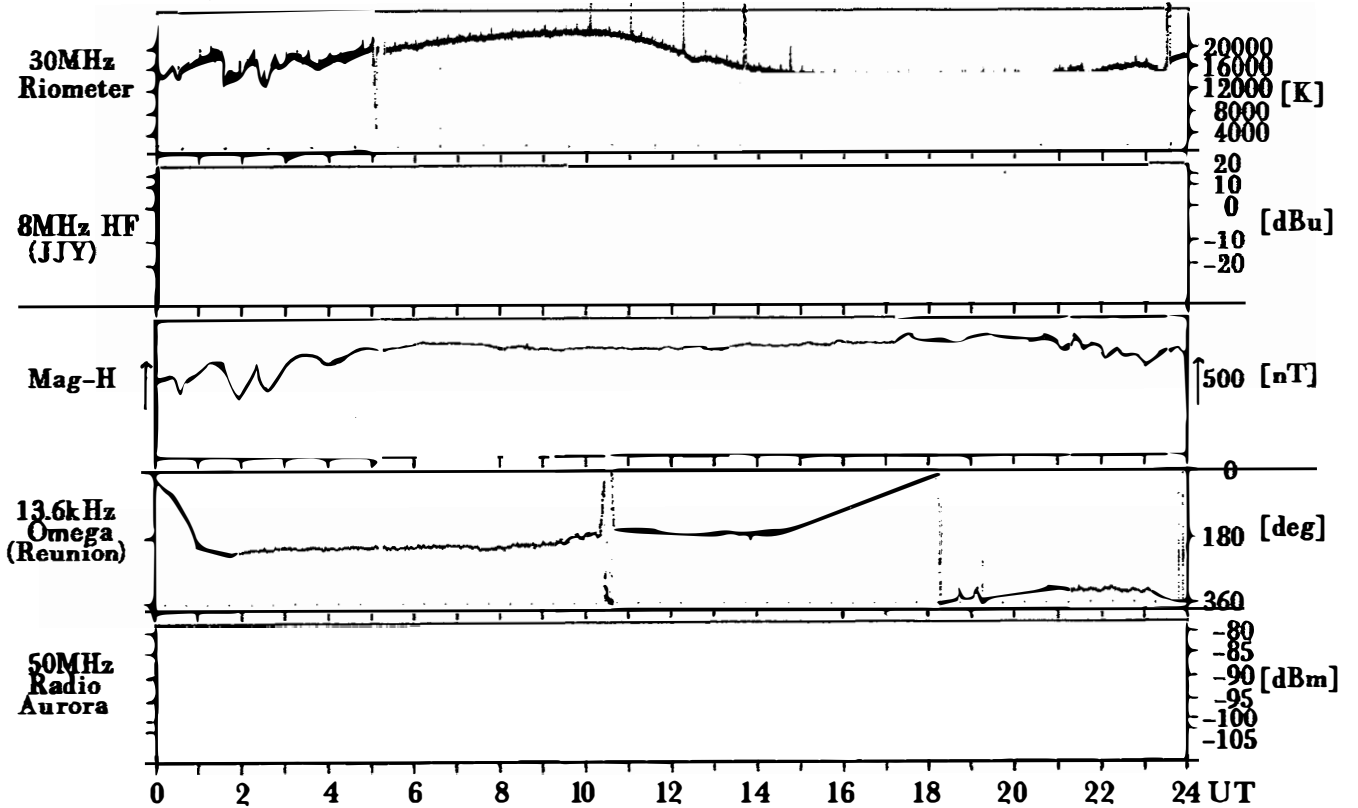
Syowa Station

Total Day / 353 1993/12/19



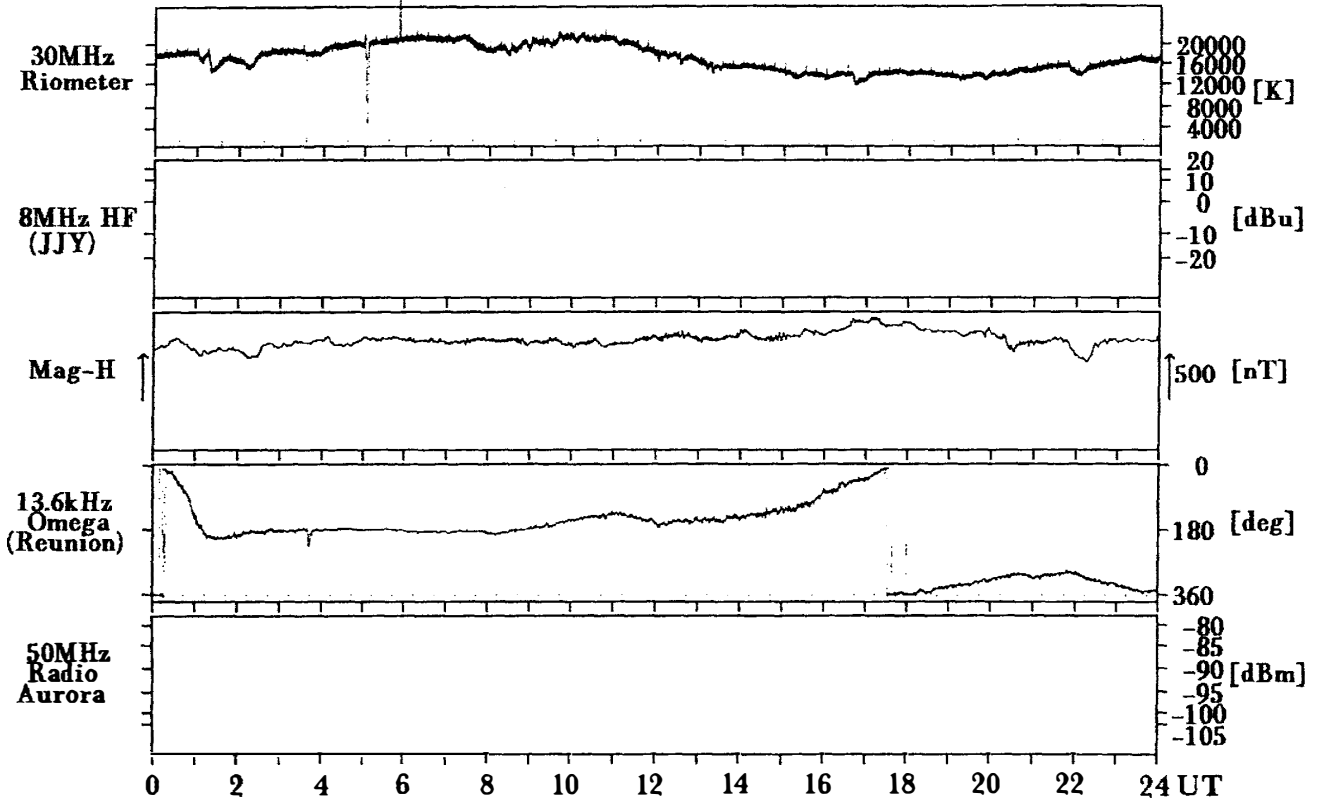
Syowa Station

Total Day / 354 1993/12/20



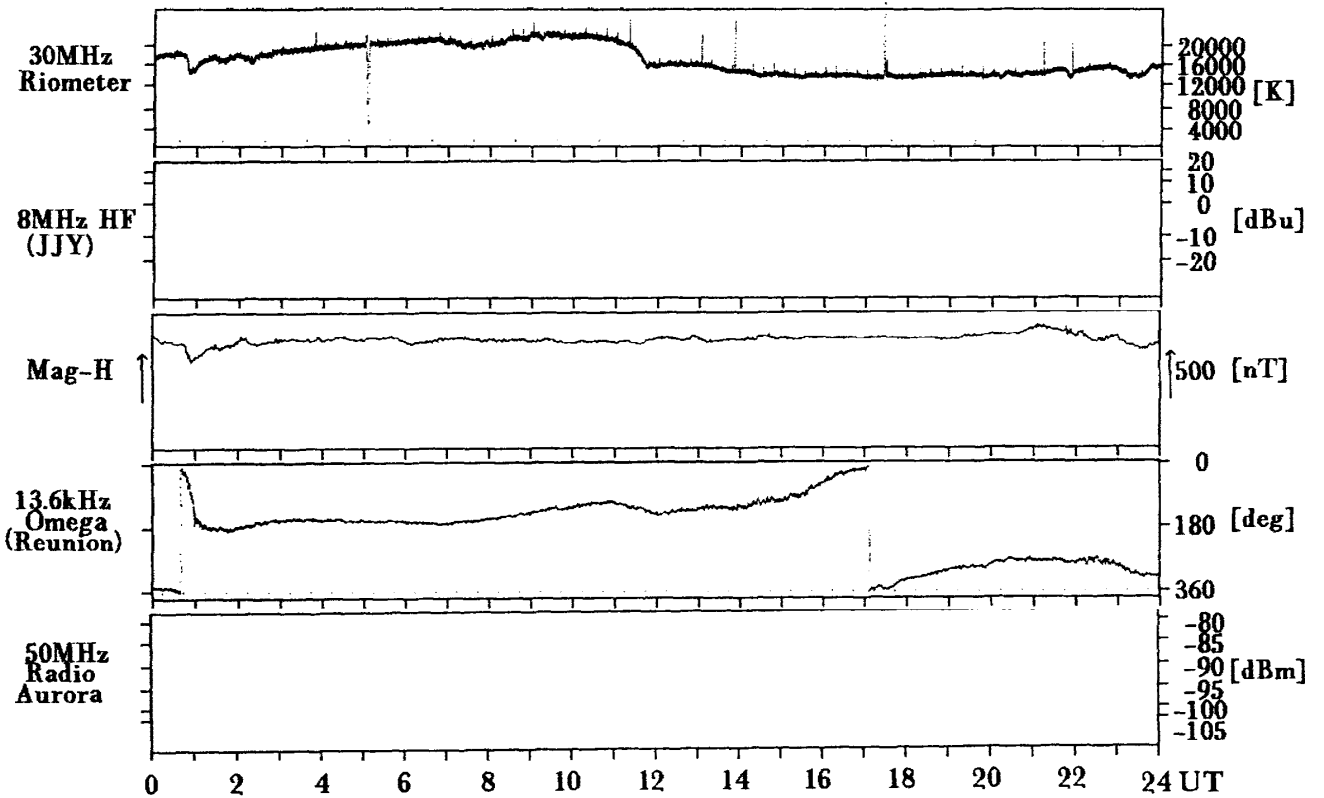
Syowa Station

Total Day / 355 1993/12/21



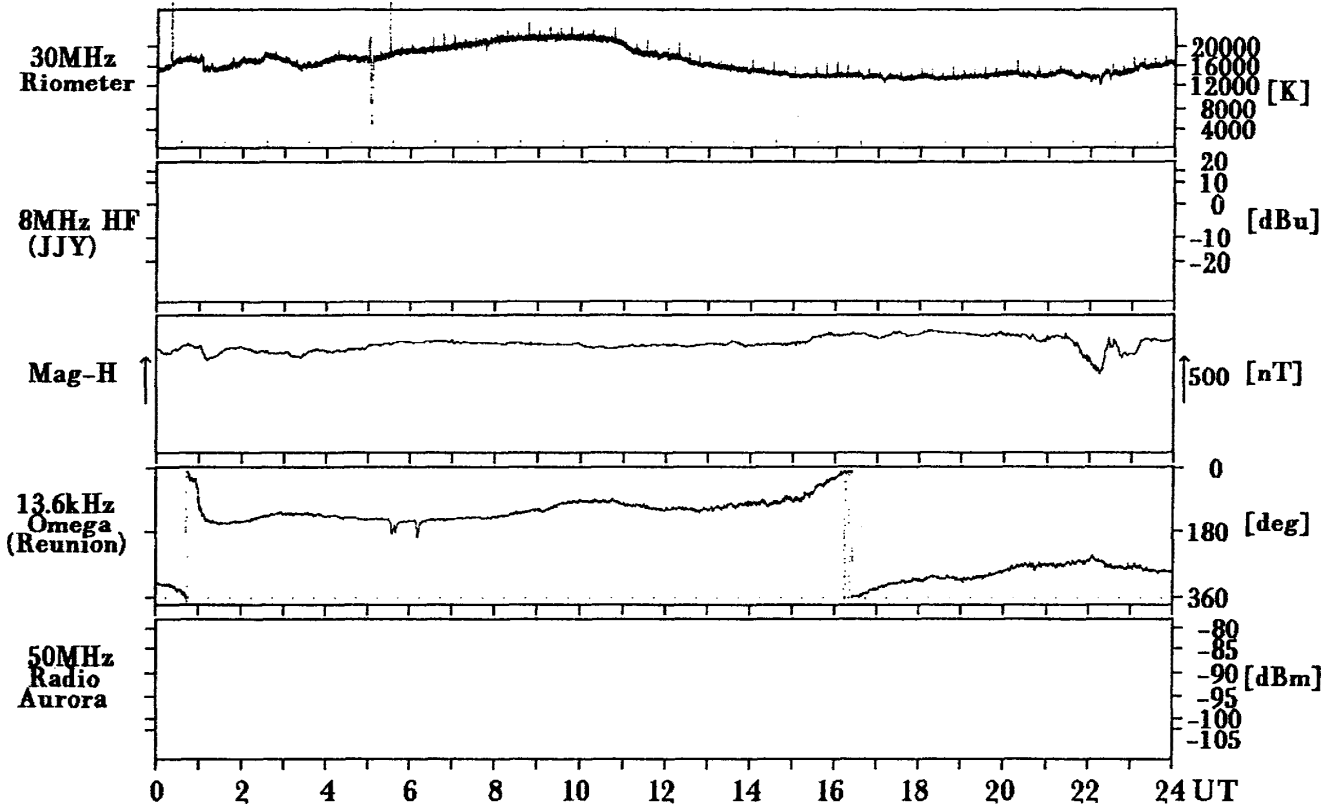
Syowa Station

Total Day / 356 1993/12/22



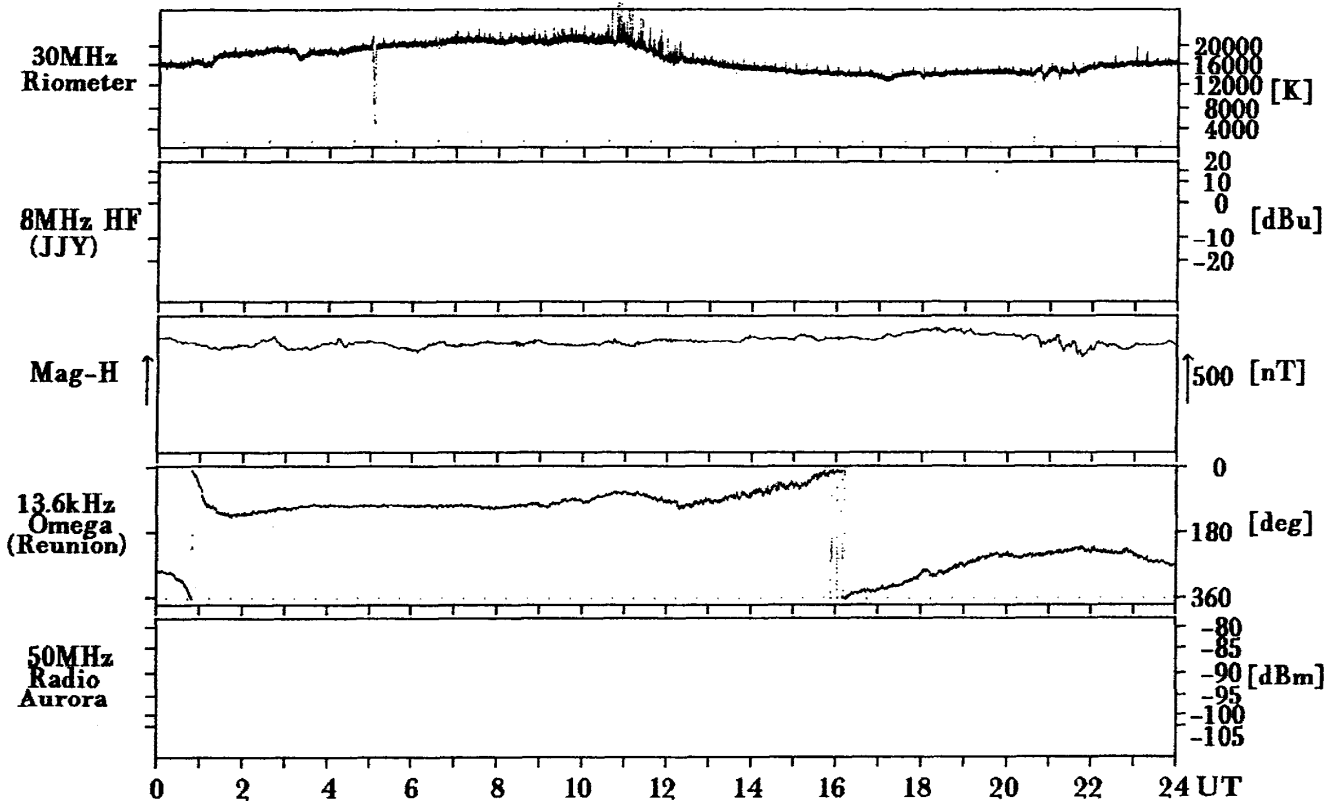
Syowa Station

Total Day / 357 1993/12/23



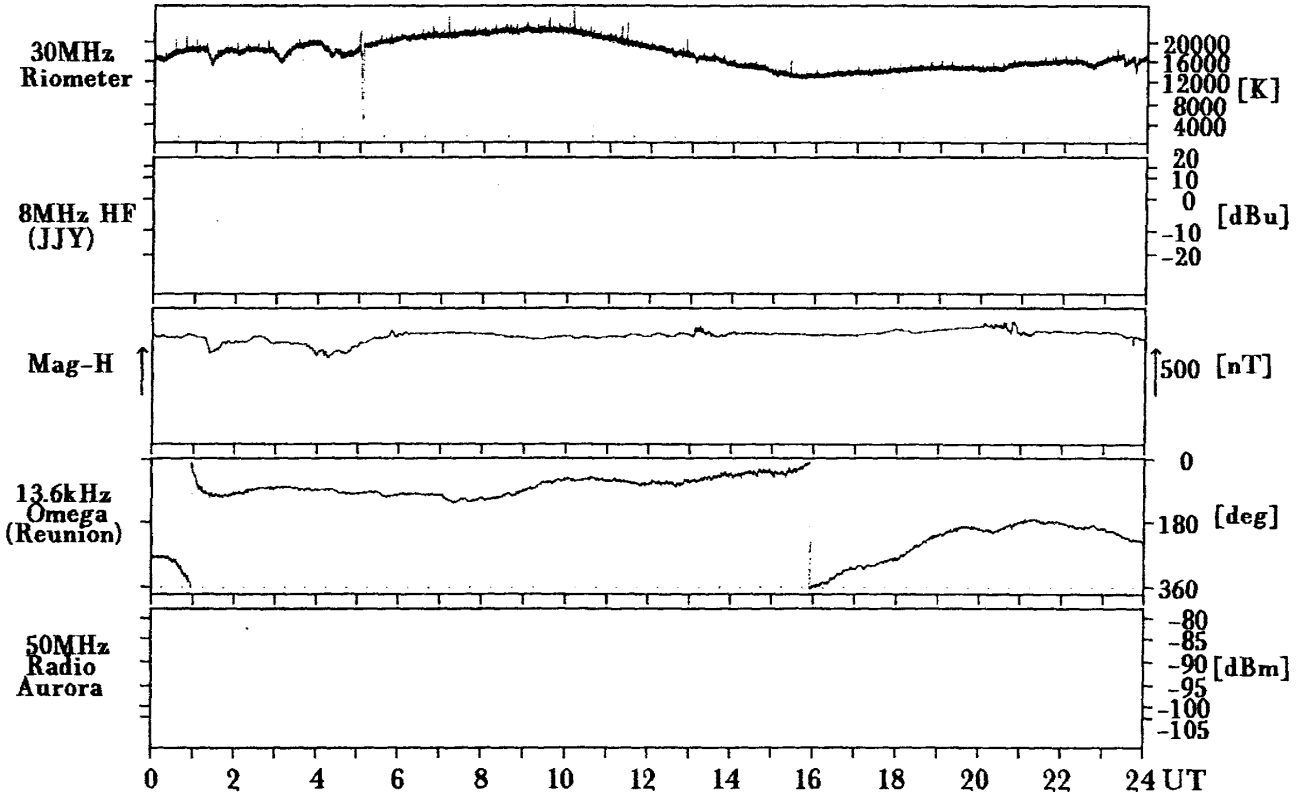
Syowa Station

Total Day / 358 1993/12/24



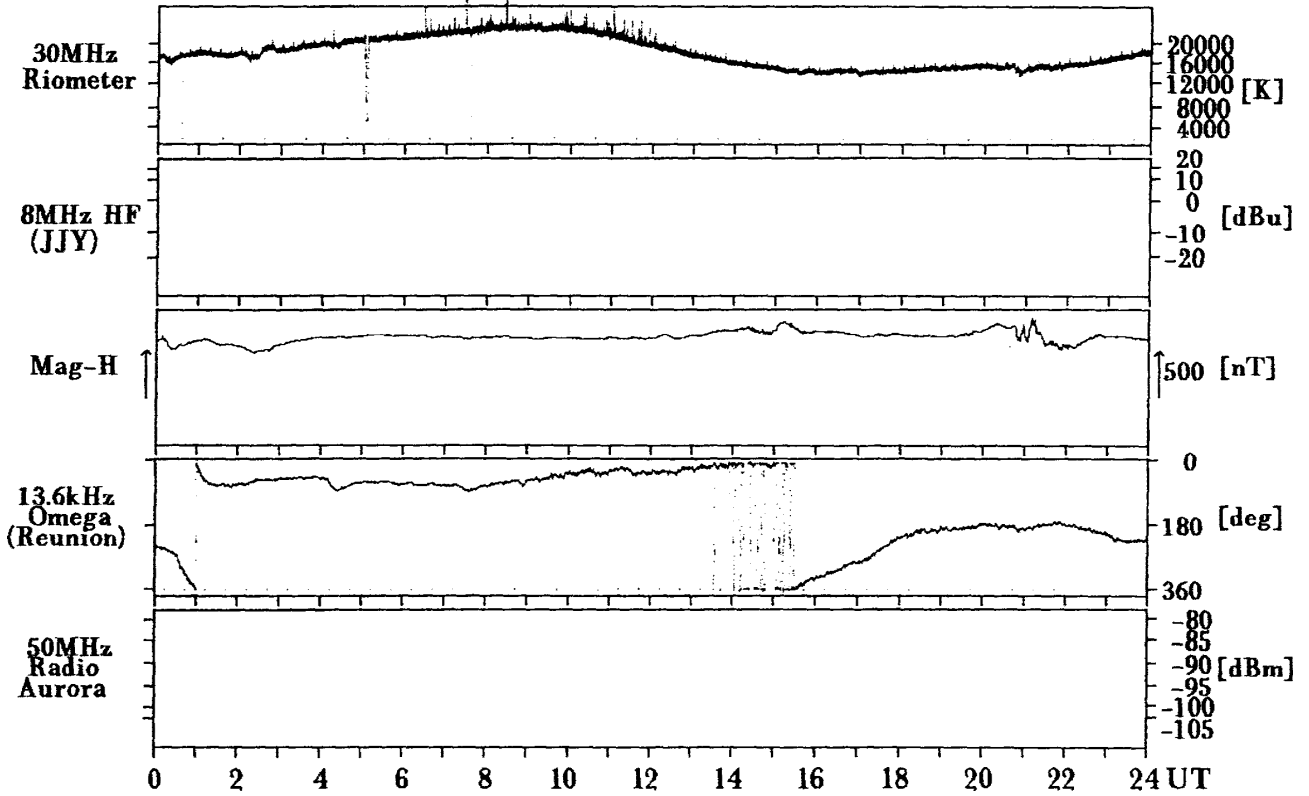
Syowa Station

Total Day / 359 1993/12/25



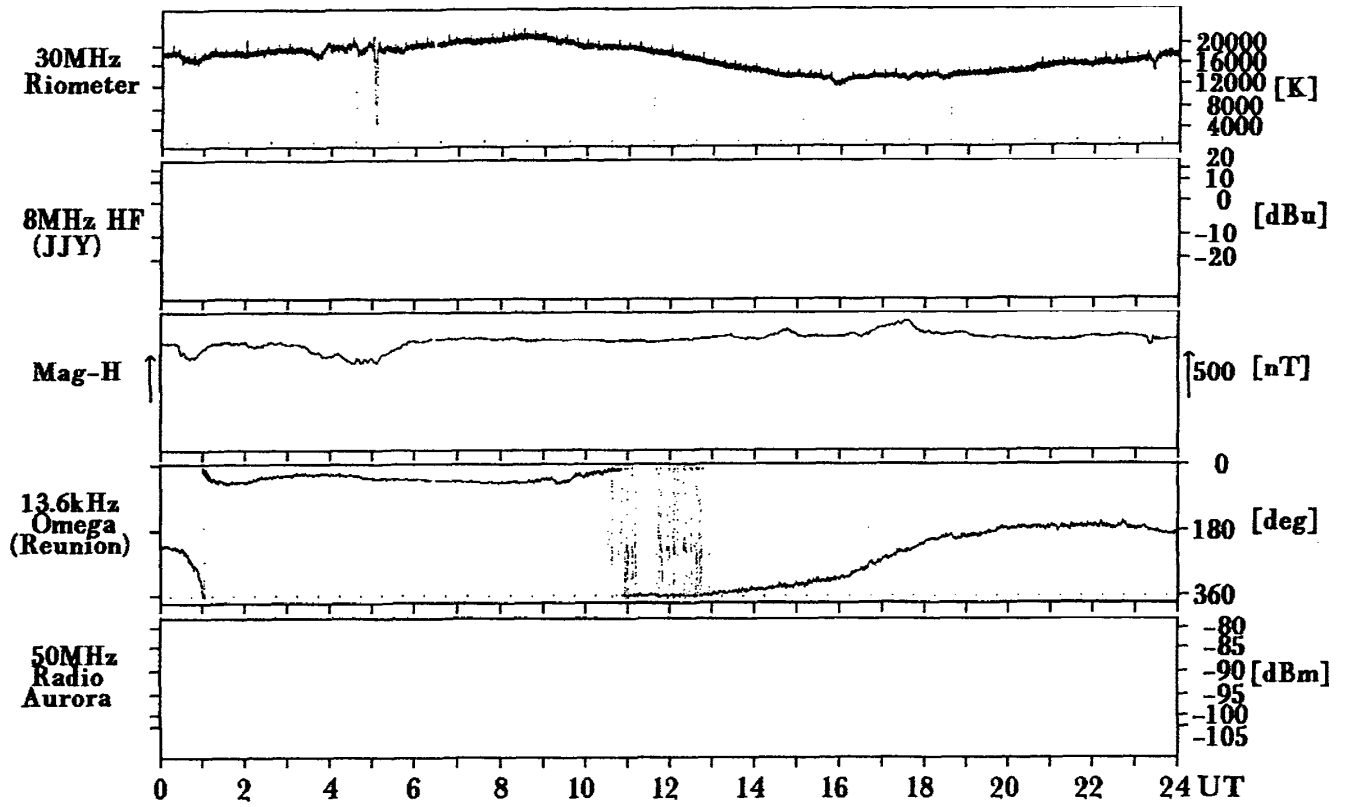
Syowa Station

Total Day / 360 1993/12/26



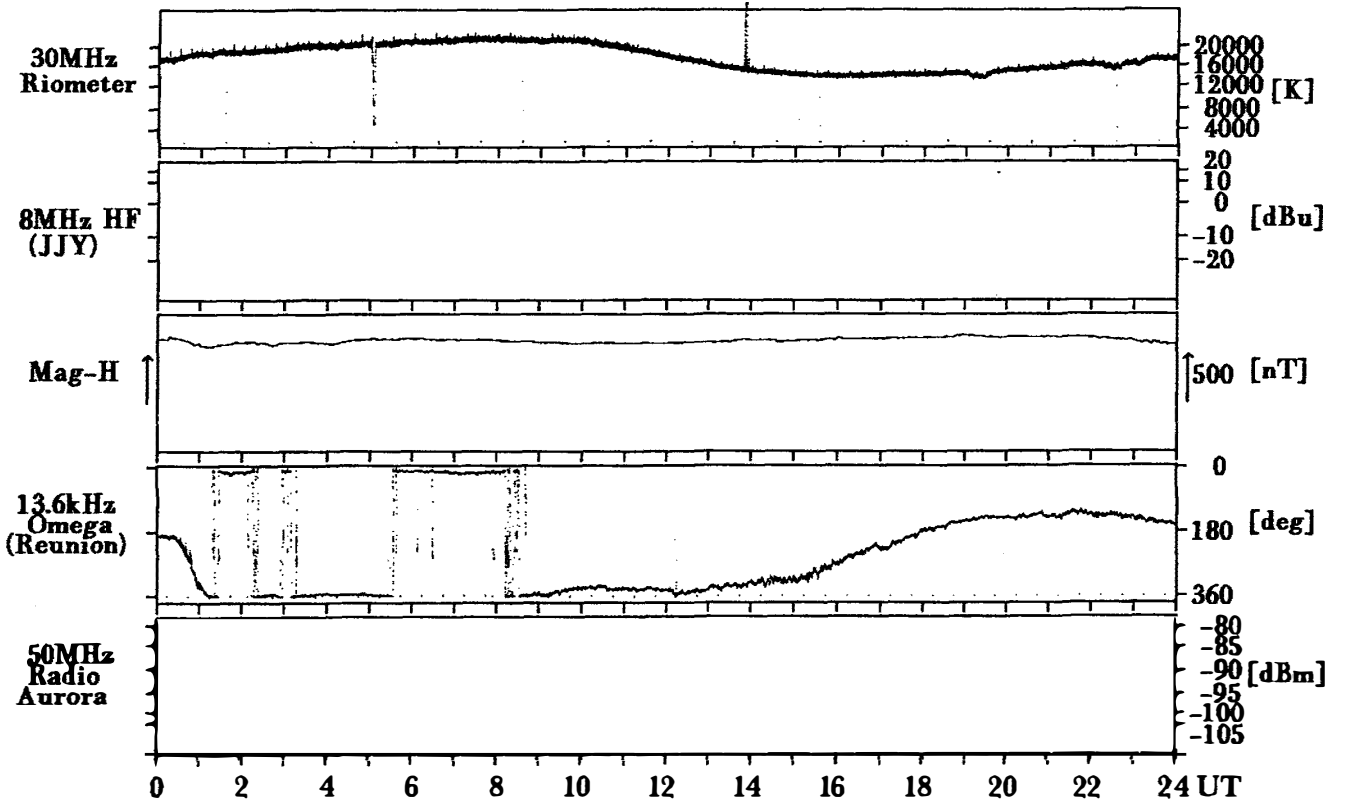
Syowa Station

Total Day / 361 1993/12/27



Syowa Station

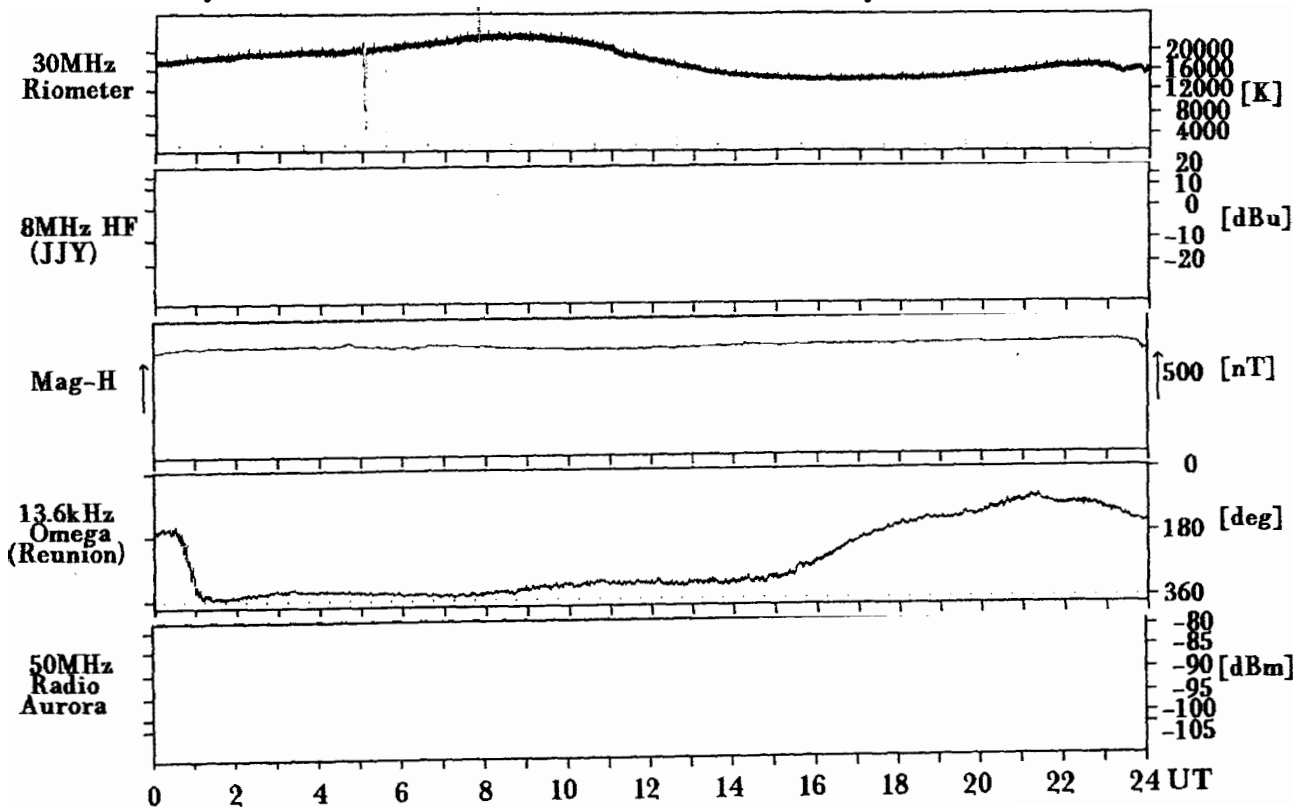
Total Day / 362 1993/12/28





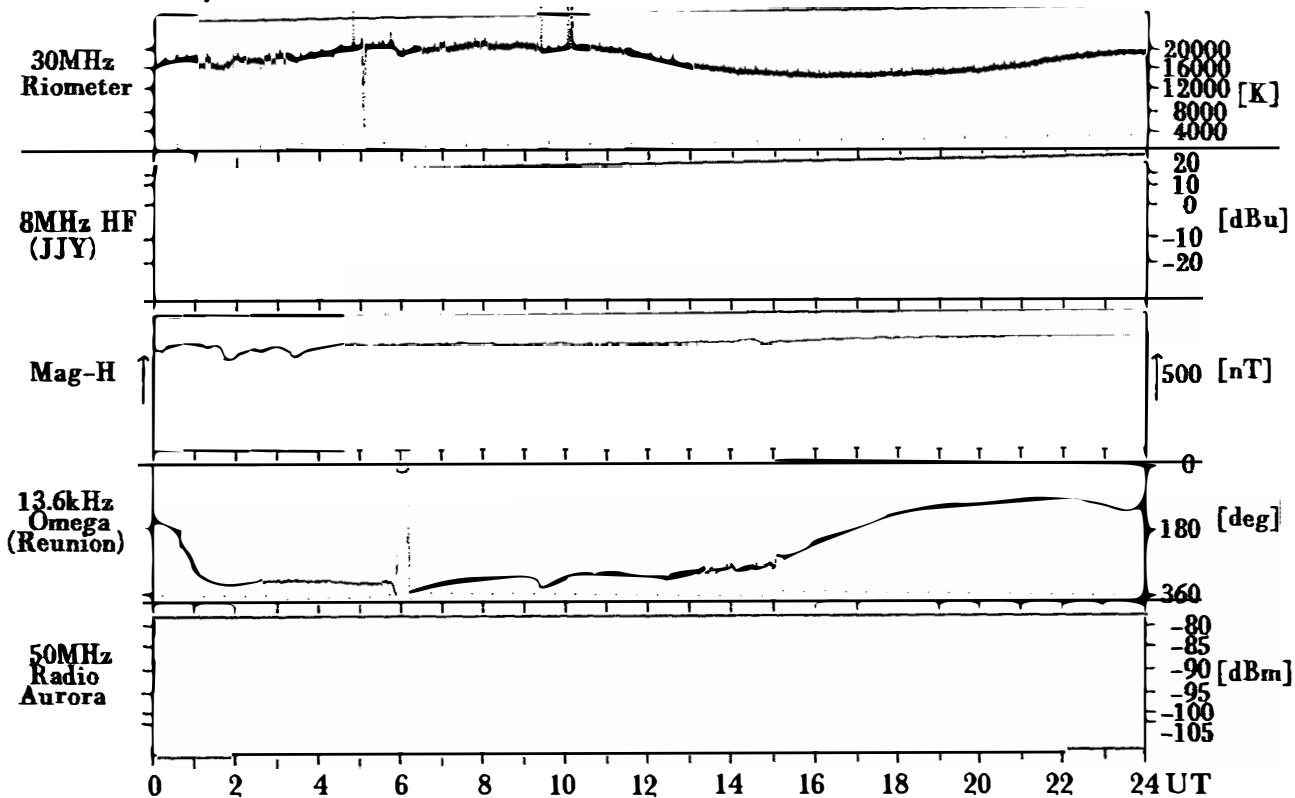
Syowa Station

Total Day / 363 1993/12/29



Syowa Station

Total Day / 364 1993/12/30



Syowa Station

Total Day / 365 1993/12/31

