

RIOMETER RECORDS OF 30 MHz COSMIC NOISE

AT SYOWA STATION, ANTARCTICA IN 1989

Hideo MAENO and Shin-ichi YAMAMOTO

(Communications Research Laboratory, Koganei-shi, Tokyo 184)

1. Introduction

At Syowa Station, Antarctica, absorption of cosmic radio noise has been observed with a standard riometer (relative ionospheric opacity meter) at 30 MHz, since February 1966. The organization responsible for these observations is Communications Research Laboratory. This report presents data observed during the period from January 1 to December 31, 1989, in the format of hourly values and raw data plots. In the raw data plots, other observation data than riometer observation are also presented for reference. These data include HF, Mg, VLF and radar observations. Copies of digital MT are available to users on request. The request should be addressed to:

Communications Research Laboratory
Ministry of Posts and Telecommunications
2-1, Nukui-Kitamachi 4-chome, Koganei-shi
Tokyo 184, Japan.

2. Location

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

3. Observer

Shin-ichi YAMAMOTO (Communications Research Laboratory)

4. Instrumentation

The receiver of the riometer which has a center frequency of 30 MHz and a band width of 7.5 kHz 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 a 50 ohm coaxial transmission line (8D-2V) of 80 m in length.

Noise from a reference noise diode with power levels of 0, 1, 2, 3 and 4 dB is added once a day at 8h in 45° EMT (Eastern Meridian Time: UT + 3 hours). The data are recorded by digital recorder on MT.

The receiver having a band width of 3.5 kHz was used before 20h in 45° EMT on January 17, 1987.

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. According to the revolution of the earth, the time (local time) when the same cosmic radio source passes the zenith becomes earlier about 4 minutes a day and returns to its initial value after a year. If the ionosphere is in a quiet condition, the diurnal variation of the cosmic noise power is easily extracted from the record.

The hourly values of ionospheric absorption given in the CNA (Cosmic Noise Absorption) tables are the deviations (in dB) of cosmic noise intensity from the reference sidereal diurnal variation. The reference sidereal diurnal variation is determined from the diurnal variations on several selected quiet days in each month.

After March 2, the data plots include, not only cosmic noise intensity but also geomagnetic H-component, HF and VLF propagation, and VHF radar data at Syowa Station. In the figure, the H-component increases upward and the calibration signals are added at each hour as a depression by 200 nT. About details for the information of other data, please ask to CRL.

Bibliography relevant to

RIOMETER RECORDS OF 30 MHz COSMIC NOISE AT SYOWA STATION, ANTARCTICA (1)

Observation 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	1972
1972	Isozaki, S. Miyazaki, S.	20 (Ionosphere 8)	76	1973
1973	Nishimuta, I. Yabuuma, H.	24 (Ionosphere 11)	74	1974
1974	Yamazaki, I. Shiro, I.	29 (Ionosphere 13)	84	1975
1975	Sugiuchi, H. Komiya, N.	35 (Ionosphere 15)	84	1976
1976	Ose, M. Yamakoshi, A. Sasaki, T.	41 (Ionosphere 17)	87	1977
1977	Ose, M. Nishiyama, N. Sakamoto, J.	46 (Ionosphere 19)	82	1978
1978	Ose, M. Igarashi, K. Tsuzurahara, S.	51 (Ionosphere 20)	86	1979
1979	Ose, M. Ojima, S. Komiya, N.	56 (Ionosphere 22)	84	1980
1980	Ose, M. Nozaki, K.	70 (Ionosphere 26)	97	1982
1981	Ose, M. Kurihara, N.	80 (Ionosphere 27)	94	1983
(cont.)				

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

Observation period	Observers	Literature JARE Data Reports		
		Volume	Pages	Year
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

Table 1. 30 MHz cosmic noise absorption (in dB) at the first minute of each hour.

SYOWA STATION		45° EAST MERIDIAN TIME (U.T. + 3 hours)																				January 1989		
Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1				C	C	0.1	0.2			0.6	0.2				0.1				0.2	0.1				
2				0.1																				
3																								
4			0.9	0.1																				
5				0.2		C		0.1	0.1	0.2	1.2	1.0	0.5											
6																								
7																						0.1		
8				0.2	0.2						0.1						0.4		0.4					
9			0.1	0.4		C																		
10				0.5	0.5	C		0.1	0.2				0.2											
11																		C	0.2					
12			0.2						0.2															
13																	0.3							
14		0.2								0.1	1.2				0.2									0.1
15			0.3	0.1																0.1				
16		0.2		0.2	0.1					0.9	0.2	0.3			0.3		0.3						0.4	0.1
17		0.5				0.2		0.1		0.1	0.2	0.2	0.5	0.1	0.4	0.7	0.5							
18		0.1			0.5		0.2		0.1	0.2	0.7	0.2	0.8	0.2	0.2	0.1	0.2							
19		0.1				C																		
20				0.2	0.5	C													0.2	0.3				
21						C								0.7								0.3	0.2	0.1
22		1.0	0.2	0.1		C				0.4	0.1	0.2		0.3	0.1			S						
23			0.4	0.5	0.4	C	0.7	0.3	0.2		0.8	0.5												
24			0.5	0.5		C	0.1												0.1	0.3				
25			0.1	0.2	0.4	C		0.3			0.5	0.2					0.2		0.3	0.2	0.3		0.5	
26		0.1	0.2	0.5			0.2												S	0.3	0.1			
27	0.2			0.2		S	0.5	0.2	0.6	0.2	0.4	0.5								0.1				
28							0.2		0.1	0.1	0.5	0.2								0.1	0.1			
29																					0.1			
30		0.2	0.2				0.3			0.5	0.5	0.3	0.1	0.5			0.5	S	0.1					
31			0.3	0.3		0.6		0.4		0.5	0.5	0.3	0.1	0.5										
Mean	0.01	0.07	0.10	0.14	0.08	0.04	0.07	0.04	0.04	0.07	0.20	0.13	0.08	0.05	0.05	0.02	0.07	0.01	0.06	0.03	0.01	0.01	0.03	0.01

Open spaces without figures correspond to quiet level

* : Quiet day
 C : Failure of equipment
 S : Interference

SYOWA STATION

45° EAST MERIDIAN TIME (U.T. + 3 hours)

February 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		0.4	0.2								0.3	0.1							0.2		0.3			0.3
2			0.1				0.2	0.4	0.2															
3						C			0.3		0.2	0.2										0.1		
4				0.1	0.2	C			0.1		1.0	1.0	0.6	0.7					0.2					0.1
5	0.4	0.1	0.2	0.1	0.1	C	0.1	0.6	0.2	1.0	0.9		0.1	0.1		0.2				0.1				0.5
6	0.2	0.5	1.0	0.1	0.1	C	C		0.5	0.2	1.0	0.9	0.3	0.5	0.3	0.4	0.2		0.1					
7	0.5	0.2			0.7	0.5	0.2		0.5	1.0	1.0	0.5	1.4	0.8	0.2	0.6			0.1					
8		0.1	0.5	1.4	0.1			0.2	0.1	0.2	1.0	0.2	0.1		0.2						0.1			0.1
9	0.1	0.2	0.1	1.0	1.8	C	0.6	0.2	0.2	0.2							1.7			0.2	0.2			
10	0.2	0.8			1.0	C	0.2	0.1			0.5								0.2				0.2	0.1
11			0.2	0.2	0.5	C																		0.1
12		0.1				C		0.2													0.1	0.3		
13		0.1	0.5	0.6	0.1		0.2		0.2	0.4	0.2					1.0	0.5		0.2	0.2				
14		0.1				C	C	C				0.5	0.3	0.5		0.5	0.2			0.2	0.2	0.1		0.2
15							0.1		0.5										0.2				0.2	0.2
16		0.8	0.2	0.2	0.2		0.5	0.1																
17																								
18										0.1														
19			0.1	0.1		C	0.5		0.2	0.5	0.5	0.5	0.1								0.2	0.1	0.3	0.1
20																								
21	0.2					0.2	0.1			0.1				0.4	0.1	0.3	0.5							
22						C	0.6							1.2	1.2	0.2		C					0.1	
23						C	C	C																
24						C	0.2	0.3	0.4	0.5														
25						C					0.8													
26						C																		
27						C																		
28							C	C																
29																								
30																								
31																								
Mean	0.05	0.12	0.11	0.13	0.17	0.02	0.14	0.07	0.12	0.15	0.26	0.14	0.16	0.15	0.03	0.11	0.11		0.04	0.02	0.03	0.01	0.03	0.05

Open spaces without figures correspond to quiet level

* : Quiet day
C : Failure of equipment

SYOWA STATION

45° EAST MERIDIAN TIME (U.T. + 3 hours)

March 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1				0.5	0.2	C	0.1						0.1				0.1			0.4	0.5			
2				0.9	0.6		0.2	0.3	0.5	2.4	0.7	0.5	0.2	0.3	0.8	0.5	0.4							
3	0.2				0.1	1.0	1.2	0.5	0.5	0.7	0.6	0.6	1.0	0.8	1.2	0.2								0.1
4						0.3	0.3		0.1					1.0	1.2	1.4	0.5		0.2	0.3				
5					0.1	C	0.7	0.2	0.2	1.0	1.8	2.7	2.3	1.3		0.5	0.3	0.1	0.2					
6	0.1		0.3	0.5		0.9	0.3	0.2	0.2	0.5	0.4	0.2	0.4	0.3	1.0	0.7	0.5	0.7	0.5	0.2				0.5
7	0.2	0.4	0.7	1.3	0.7	0.4	0.3	0.3	2.5		0.5		0.9	0.5	0.5	0.5			0.7	0.4				
8		C	0.1			0.1			0.2	0.4	0.1		0.6									0.2	0.2	
9		0.2	0.2			C	0.2		0.4	2.1	1.2	1.0									0.5	0.2		
10		0.2				0.1	0.5	0.4	0.5	0.1	0.8	1.0		0.1	0.2	0.5	0.5	0.2						
11	0.3	0.4	0.5	0.2		C			0.1	0.1	0.2			0.2				0.2						0.1
12		0.9	0.1	0.5	0.5	0.1	0.5	0.1				S	S	S	S		0.1	0.2	0.5	0.6	0.4			
13				0.4		0.3	0.5	0.7	0.1	1.2	2.2	2.2	S	S	3.5		0.1	0.3	1.0	0.5	0.2			1.2
14	0.3	0.6		1.2		1.5			2.1	1.2	2.4	1.2	2.5	S	S	2.0	3.5	C						0.5
15	0.2	0.2	0.5		C	C	C	C		1.0	S	S	S	S	S	S	S	S	S					0.2
16		C	C	C	C	C	C	C	C	S	0.5	0.2	0.3	0.3	0.2	0.2		0.2						
17	0.2			0.1	0.3	C	C		0.5	0.4	1.4	2.6	0.5	0.5	0.2	0.3	0.1		0.2	0.2	0.4	0.1		
18		0.5	0.2				1.0	1.0	0.2	0.1	0.2		0.1	0.5	0.4	0.4		0.2	0.2	0.4	0.1			
19		0.3				C	C	0.5	0.5	0.2	1.0	0.8	0.5	0.4	0.2	0.8	0.8	0.3	0.2	0.2	0.2			0.2
20				C	C	C	C	0.1			0.7										0.2			
21	0.1	0.2	0.5		0.6	C	C		0.4	0.7	0.7	0.2	0.6	0.5	0.1									
22			1.7	1.0	0.1	0.1	0.2			0.2	1.0	1.0	0.5		0.7	0.5	0.3	0.1		0.1	0.2			
23	1.0	0.3	0.8	1.0	0.9	0.2				C	C	0.2	0.1		0.4	0.6	0.2	0.9	0.2					
24	0.1	0.1	0.3	0.3	0.5		0.2	1.4	1.0	0.1		0.2	0.5	0.5	0.1	0.1								
25																								0.1
26	0.1	0.4	0.3	0.2	0.4		1.1	0.5	0.1									0.3	0.2					
27		0.5	0.2	0.1	0.1			0.2			0.2	0.1						S						
28		0.2									0.7	0.5	0.3	0.2	0.2	0.3	0.2		0.2	0.2				
29			0.1			1.9	0.8				0.2	0.5	1.2	1.2	1.0	0.2	0.2	0.2	0.2				1.1	0.1
30	0.1	0.3		0.2	0.1	0.1	1.1	0.3	1.5	1.0	0.5	0.9	0.5	0.6	0.2	0.1	0.5	0.5	0.5				0.2	
31			0.1	3.7	0.1	1.7	0.3	1.3	1.0	0.4			0.3	1.5							0.2	0.5		
Mean	0.09	0.17	0.19	0.41	0.18	0.41	0.38	0.28	0.42	0.46	0.60	0.53	0.43	0.34	0.37	0.31	0.26	0.14	0.14	0.10	0.05	0.03	0.04	0.10

Open spaces without figures correspond to quiet level

* : Quiet day
 C : Failure of equipment
 S : Interference

SYOWA STATION

45° EAST MERIDIAN TIME (U.T. + 3 hours)

April 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	0.3		1.0	0.5	0.2	1.0		0.2		0.1	0.2	1.3	0.5	S	0.5		0.2						1.5	0.7
2	0.1	2.0	1.0	0.2	0.7			1.8	1.0	1.4	1.5	1.0	0.3	0.8	0.5	0.2		1.0				0.2	0.1	0.2
3	0.1	0.5	0.1		0.5	2.0	1.2	0.3	0.2	0.7	0.5	0.2	0.1								0.2			
4	0.3	0.3	0.3	2.2	0.5	1.4	0.1	0.2	0.2	0.5	0.5	0.5	0.3	0.2		0.5	0.5						0.6	0.2
5		0.5	0.7	0.2		1.5		0.1			0.8	0.2	0.2	0.5	0.1	0.3								0.7
6	0.3	0.5	0.2	1.7	0.2	1.5	0.1	0.2	0.1		0.2	0.7	0.5											0.1
7	1.1	0.3	0.2	0.2	0.3			0.2	0.4	0.3	2.9	1.9	0.2	0.5									0.2	0.3
8		1.2	0.8	1.3	0.8	1.2	1.2	0.2	0.1	0.5	1.4	0.7	0.2	0.2	0.1	0.2		S	S	0.2	0.1		0.2	0.5
9	0.1	0.4	0.4	0.3	0.7		0.8	0.3	0.5	1.0	1.2	0.2	0.2		0.4							0.2		0.8
10	0.2		0.2																					
11		0.5							0.8	0.2														
12											0.6	0.2		0.6	0.3	0.2								
13			0.2																					
14			0.1	0.6	0.4																			0.3
15	0.2		0.9	0.3	0.2	1.4	1.1	0.2	0.7	0.3	0.2	0.2	0.3	0.2	0.1	0.8	0.4	0.1						
16																							0.1	
17		0.4	0.2	0.1												0.1	0.3	0.3	0.1					
18							0.3	0.2	0.1		0.1	0.1		0.1										
19																								
20					0.2		0.1	0.3	0.7	0.5		0.5												
21					0.1	0.2		0.2	0.4	0.1														
22		0.2		0.3	0.1	0.1	0.1								0.1									
23																								
24	0.1		0.2			0.3								S	S	S	S	S	S	S				
25			0.1	0.1															S			0.1		0.2
26		C	0.2	0.1	0.7	0.1	0.2	0.7	0.5	0.5	0.2			0.5	0.5	0.1								
27		0.4	0.2		1.8	0.2	0.1	0.4	0.6	0.1	1.2	1.0	0.2	0.2	0.2	0.1						0.1	0.1	0.5
28	0.2		0.1	0.1	1.3	1.0				0.8	0.5		0.6	0.5	0.4		0.3							
29	0.5	0.8	0.2	0.1				0.3	0.5	1.0	0.8	0.4	0.3	0.5	0.1	0.2	0.2						0.1	
30		0.2	0.2	0.5		0.2		0.2	0.2	0.2	0.6		0.5	0.3	0.2	0.2	0.2	0.5	0.1	0.2				
31																								
Mean	0.11	0.28	0.25	0.29	0.29	0.40	0.17	0.20	0.23	0.27	0.44	0.30	0.14	0.17	0.11	0.09	0.07	0.06	0.01	0.01	0.01	0.02	0.11	0.14

*

Open spaces without figures correspond to quiet level

* : Quiet day

S : Interference

SYOWA STATION

45 EAST MERIDIAN TIME (U.T. + 3 hours)

May 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	0.5	1.0	0.4	0.3	0.2				0.5	0.4	0.2													
2	0.2	0.8	0.4	0.3	0.1	0.8	1.0	0.5	0.5	0.5	0.2	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.2	0.3		0.8	0.2	0.2
3		0.5	1.6	1.2	0.5	0.5	0.6	0.4	0.9	1.0	0.4	0.2	0.2	0.2	0.2	0.2								
4		1.1	0.7	0.5	0.2	1.2	0.5	0.6	0.3	0.8	0.5	0.2									0.1	0.2	0.2	0.2
5		0.3	1.5	1.1	1.1	0.3	0.7	0.6	1.0	1.0	0.2		0.2	0.2										0.3
6	0.2	0.2	0.2	0.2	0.2	0.3	0.5	0.3	0.4	0.3	0.3	0.3	0.5	0.4	0.4	0.4	0.3	0.3			0.1	0.2	0.2	0.2
7	0.5	0.1							0.7	0.7	0.3	0.2	0.1	0.1	0.3	0.4	0.2			0.2			0.2	
8	1.8	0.8	0.2	0.5	0.1					0.2	0.2											0.2		
9	0.5	0.2	0.1							0.5	0.5	0.3									0.1			
10						0.3	0.5	0.1	0.1	0.1	0.1													
11		0.2	0.1	0.2																				
12		0.1						0.1		0.1														
13								0.2	0.1															
14										0.2	0.1													
15														0.3										
16	0.3																							
17							0.2	0.5	0.3															
18								0.1																
19																								
20																0.5								
21																	0.2							
22			0.1		0.2																			
23	0.2	0.2	0.2	0.1	0.1																			
24			0.5	0.5	0.8				0.5	1.0	1.2	0.2	0.7	0.5	0.2						0.2	0.1		0.3
25			0.1		0.1	0.7	0.4	0.3	0.3	0.4	0.6	0.9	0.7	1.0	0.5	0.1	0.1			0.1				
26	0.2	0.5			0.5	0.3	0.4	0.3		0.3	0.2													
27				0.3	0.3		0.2	0.5	0.4	0.4	0.1	0.1	0.2	0.5	0.2									
28	0.2	0.1	0.1	0.2		0.1	0.2	0.1	0.4	0.4	0.1	0.1	0.2	0.1	0.2	0.7	0.2		0.1			0.3	0.1	0.1
29		0.1	1.0	0.9	1.0	0.3	0.3	0.2	0.2	0.1	0.5	0.2	0.2	0.2	0.1	0.1	0.2			0.2	0.1			
30	0.1	0.1	0.2	0.5	0.1	0.2	0.2	0.2	0.5		0.1	0.4	0.4				0.5	0.2						
31		0.1			0.3	0.7	0.2			0.3	1.0	0.5	0.1		0.1	0.1				0.3	0.5	0.3	0.1	0.1
Mean	0.15	0.20	0.23	0.21	0.18	0.18	0.18	0.16	0.22	0.26	0.21	0.12	0.12	0.07	0.07	0.08	0.06	0.02	0.02	0.03	0.02	0.06	0.02	0.04

Open apaces without figures correspond to quiet level

* : Quiet day

S : Interference

SYOWA STATION

45 EAST MERIDIAN TIME (U.T. + 3 hours)

June 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	0.4	1.2	0.9	0.5	0.3	0.1	0.2	0.5	0.2	0.2	0.4	0.3												
2			0.4	0.1							0.3	0.1	0.2	0.7	0.5	0.2	0.2	0.2						
3	0.2	0.1	0.1	0.2			0.1		0.3	0.2														
4		0.1	0.1		0.8	0.5	0.4	0.2	0.5															
5			0.2		0.1																			
6		0.2		0.3		0.1	0.5	0.4	0.5			0.2		0.2	0.1									
7				0.2	0.5	0.8	0.4	0.5	0.3	0.1	0.1	0.4	0.2	0.1		0.2	1.0	0.2						
8	0.1		0.2	0.1	0.2	0.4	0.1			0.3	0.5	0.1												0.1
9	0.2	0.1	0.2		0.2	0.7	0.1																	
10	0.1			0.4	0.1		0.1	0.9			1.0	0.4											0.6	0.1
11								0.2		0.5	0.3	0.1	0.5	0.2				0.2		0.1				
12		0.1		0.2		0.1						0.3					0.2	0.2	0.2	0.1	0.1	0.1		
13																	0.2	0.2	0.3	0.1	0.5	0.5	0.6	
14								0.1	0.6	0.2	0.2	0.5	0.1	1.6	0.5	0.5	0.2	0.3	0.1	0.5	0.5	0.6		
15		0.1	0.5	0.5	0.5	0.5	0.5			0.1			0.7	0.2	0.1	0.1	0.2	0.1	0.1	0.5	0.5	0.6	0.1	
16	0.1		0.4		0.2	0.2		0.2	0.2				0.1		0.3				0.1	0.2	0.1	0.1		
17																								
18																								
19					0.1																			
20															0.5	0.3								0.1
21			0.1																					
22																								
23																								
24	0.1													0.1	0.2	0.1	0.2	0.4	0.2					
25	0.1	0.1		0.2						0.1									0.2					
26		0.1																0.1						
27		0.2		0.1	0.2	0.2																		
28		0.1			0.1					0.2	0.5	0.4	0.1		0.1									
29						0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1			S	S			0.2		
30				0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1		0.1	0.2	0.2	0.2	0.1		
31																								
Mean	0.04	0.08	0.10	0.09	0.11	0.13	0.08	0.11	0.09	0.07	0.12	0.10	0.06	0.11	0.08	0.05	0.07	0.06	0.03	0.03	0.03	0.02	0.02	0.01

*
*
*
*
*
*

Open spaces without figures correspond to quiet level

* : Quiet day

S : Interference

SYOWA STATION

45° EAST MERIDIAN TIME (U.T. + 3 hours)

July 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1			0.1									0.1										0.1		
2	0.1		0.2																					
3																								
4																								
5																					0.1	0.1		0.1
6		0.2			0.1				0.1	0.2														
7				0.1							0.1	0.1	0.1		S	S								0.1
8																								
9							0.2																	
10										0.2														
11			0.1	0.2																				
12					0.1						0.2	0.3												
13																								
14										0.1	0.2	0.1												
15																								
16											0.2	0.4												
17																								
18		0.1	0.1	0.1	0.3		0.1			0.2	0.2	0.2	0.2	0.2	0.5	0.4								
19					0.2							0.1	0.1											
20																								
21										0.2														
22											0.2	0.1										0.1		
23																								
24				0.1	0.1						0.2													
25	0.2	0.1									0.1	0.2												
26									0.1	0.3	0.1		0.2	0.9	0.6	0.2	0.1	0.7	0.2	0.1				
27				0.1		0.1					0.5	0.2	0.1				0.1	0.3						
28		0.2	0.2				0.1	0.3	0.1		0.2	0.2	0.1	0.1	0.1						0.1			
29			0.2	0.1		0.3					0.2	0.1												
30										0.1	0.1													
31		0.2	0.1																					
Mean	0.01	0.02	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.05	0.06	0.05	0.02	0.03	0.03	0.01	0.01	0.03	0.01	0.01	0.01	0.01		0.01

Open spaces without figures correspond to quiet level

* : Quiet day

S : Interference

SYOWA STATION

45° EAST MERIDIAN TIME (U.T. + 3 hours)

August 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1					0.1																			
2											0.5													
3							0.1				0.1													
4														0.2										
5																								
6																								
7	0.1									0.3									0.2					
8									0.2															
9			0.1	0.2																				0.1
10							0.1	0.2	0.4		0.2	0.2												
11		0.2	0.2			0.4			0.3	0.2	0.3	0.2				0.2	0.4							
12				0.1	0.1	0.2	0.2	0.1			0.5	0.3										0.1		
13							0.2	0.2																
14								0.1	0.1	0.5	0.2	0.3	0.4			0.1	0.1							
15		0.3	0.4				0.2	0.1				0.4	0.1	0.2	0.4	0.3	0.6	0.4						
16			0.3						0.1	0.2	0.2													
17		0.2	0.1			0.2	0.1			0.1	0.2	0.2			0.2					0.2	0.2	0.1		
18								0.1	0.2	0.2			0.1	0.8	0.8	0.9	0.6	0.5		0.2	0.2	0.2	0.2	
19				0.1	0.8	0.3	0.4				0.2													
20											0.1	0.5	0.2	0.3		0.3			0.5	0.2	0.1			
21																						0.3	0.3	
22		0.1								0.2	0.3	0.1	0.2		0.1						0.3			
23					0.1				0.1	0.1								0.2	0.2		0.1			0.1
24		0.1																						
25																								
26									0.1	0.6	0.2				0.2	0.2			0.1					0.1
27																								0.1
28	0.1																							0.1
29			0.1	0.1	0.2		0.2	0.8	0.8	0.2	0.1	0.2		0.3	0.1		0.1				0.1		0.2	0.1
30						0.1	0.1	0.3	0.2	0.1						0.4	0.4							
31		0.1	0.1								0.1													
Mean	0.01	0.03	0.04	0.01	0.04	0.03	0.05	0.05	0.08	0.08	0.10	0.07	0.03	0.05	0.05	0.07	0.07	0.03	0.03	0.01	0.03	0.01	0.01	0.01

*
*
*

Open spaces without figures correspond to quiet level

* : Quiet day

SYOWA STATION

45° EAST MERIDIAN TIME (U.T. + 3 hours)

September 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
* 1					0.1									0.2										
2																								
3									0.2	0.1		0.1												
4																								
5			0.1				0.1				0.2	0.3	0.1	0.2	0.2			0.1						
6																								
7																								
8				0.2				0.2	0.2	0.9	0.5	0.2	0.2		0.4	0.1	0.1	0.2	0.2	0.2				
9				0.1																				
10										0.2	0.3	0.2	0.2							0.3	0.2			
* 11																								
12							0.1	0.1	0.1	0.2	0.3													
13																								0.1
14	0.1																							0.1
15								0.1	0.3	0.2														0.1
16	1.0		0.1		0.2		0.1	0.2					0.2	0.2	0.1	0.1								
17																								
18	0.1						0.2	0.2	0.1			0.1	0.1		0.1	0.1						0.1		0.2
19				0.2													0.2							
20																								
21								0.1																
22				0.1					0.1		0.2	1.0	0.7	0.1	0.5	0.6		0.1		0.1				
* 23																		0.2						
* 24																								
* 25		0.1	0.1																					
26													0.1	0.3		0.5		S						
* 27																								
28							0.1																	
29																0.5	0.1	0.6	0.7	0.7				
30																								
31																								
Mean	0.03	0.01	0.01	0.02	0.01		0.02	0.03	0.03	0.05	0.05	0.06	0.06	0.03	0.04	0.07	0.02	0.04	0.04	0.04		0.01		0.01

Open spaces without figures correspond to quiet level

* : Quiet day

S : Interference

SYOWA STATION

45° EAST MERIDIAN TIME (U.T. + 3 hours)

October 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1														0.2										
2																								
3																								
4		0.2																						
5		0.1		0.3																				
6																								
7				0.1					0.1															
8		0.2																						
9			0.1	0.3					0.4	0.2	0.1													
10										0.1							0.2							
11				0.2			0.3	0.1	0.1	0.1	0.2													
12								0.1	0.3															
13																								
14																								
15																								
16																		S	0.1	0.2				
17											0.1		0.3	S	S	0.1	0.2							
18				0.1			0.1			0.1			0.2	S		0.1	0.2							
19											0.1	0.2		S		S								0.1
20						0.1					0.1	0.1				0.2								
21																							0.2	
22	0.1			0.1	0.2		0.1			0.1			0.1			0.2			0.1				0.1	
23	0.1		0.2				0.1		0.1														0.1	
24												0.2	0.2	0.1										
25						0.2		0.2	0.2	0.1	0.1													
26																								
27				0.2								0.2		0.1		0.1	0.1	0.1						
28	0.3		0.1																					
29					0.1																			
30			0.2							0.1	0.4	0.7	0.4		0.1									
31		0.2	0.4	0.2	0.1					0.1														0.1
Mean	0.01	0.02	0.03	0.04	0.01	0.01	0.01	0.01	0.03	0.02	0.03	0.04	0.03	0.01	0.01	0.02	0.02	0.01	0.01	0.01			0.01	0.01

Open spaces without figures correspond to quiet level

* : Quiet day

S : Interference

SYOWA STATION

45° EAST MERIDIAN TIME (U.T. + 3 hours)

November 1989

Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
* 1																								
2											0.1													
3				0.2	0.4					0.2	0.2	0.2	0.6	0.2	0.2	0.2								
4												0.2	0.7	0.8	0.3	0.2								
5		0.1		0.7	0.2					0.5	0.2	0.2			0.3	0.2								
6	0.4	0.2		0.1							0.3	0.2												
7					0.1	0.2					0.1	0.3	0.1	0.2	0.1			0.1	0.2					0.1
8							0.2		0.2			0.2			0.2	0.1	0.2	0.1						
9													0.1											
10				0.1	0.2			0.1	0.2		0.2	0.1			0.1									
11				0.1			0.2	0.1																
12				0.4																				
13								0.2		0.8	0.5													
14			0.1																					
15						0.1					S	0.2	0.2											
16																								
17											0.2	0.2	0.1			0.1		0.2	0.2					
18												0.2	0.2	0.2										
19					0.1	0.2	0.2	0.3	0.2			0.1	0.1		0.1		0.2						0.5	0.1
20	0.2	0.3	0.2																					
21					0.7	0.2	0.1	0.1	0.1	0.1	0.4													
22																								
23				0.1	0.2	0.4																		
24					0.1											0.2	0.1							
* 25																								
26				S																				
27																								
28			0.2										0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.1		0.2	0.4
29																		0.2		0.2			0.2	0.1
30	0.2	0.1				0.2	0.2	0.1	0.3	0.2	0.1							0.1		0.1	0.2	0.2	0.1	0.1
31																								
Mean	0.02	0.02	0.01	0.05	0.06	0.04	0.02	0.02	0.02	0.08	0.09	0.05	0.08	0.05	0.05	0.04	0.02	0.02	0.03	0.01	0.01	0.01	0.02	0.02

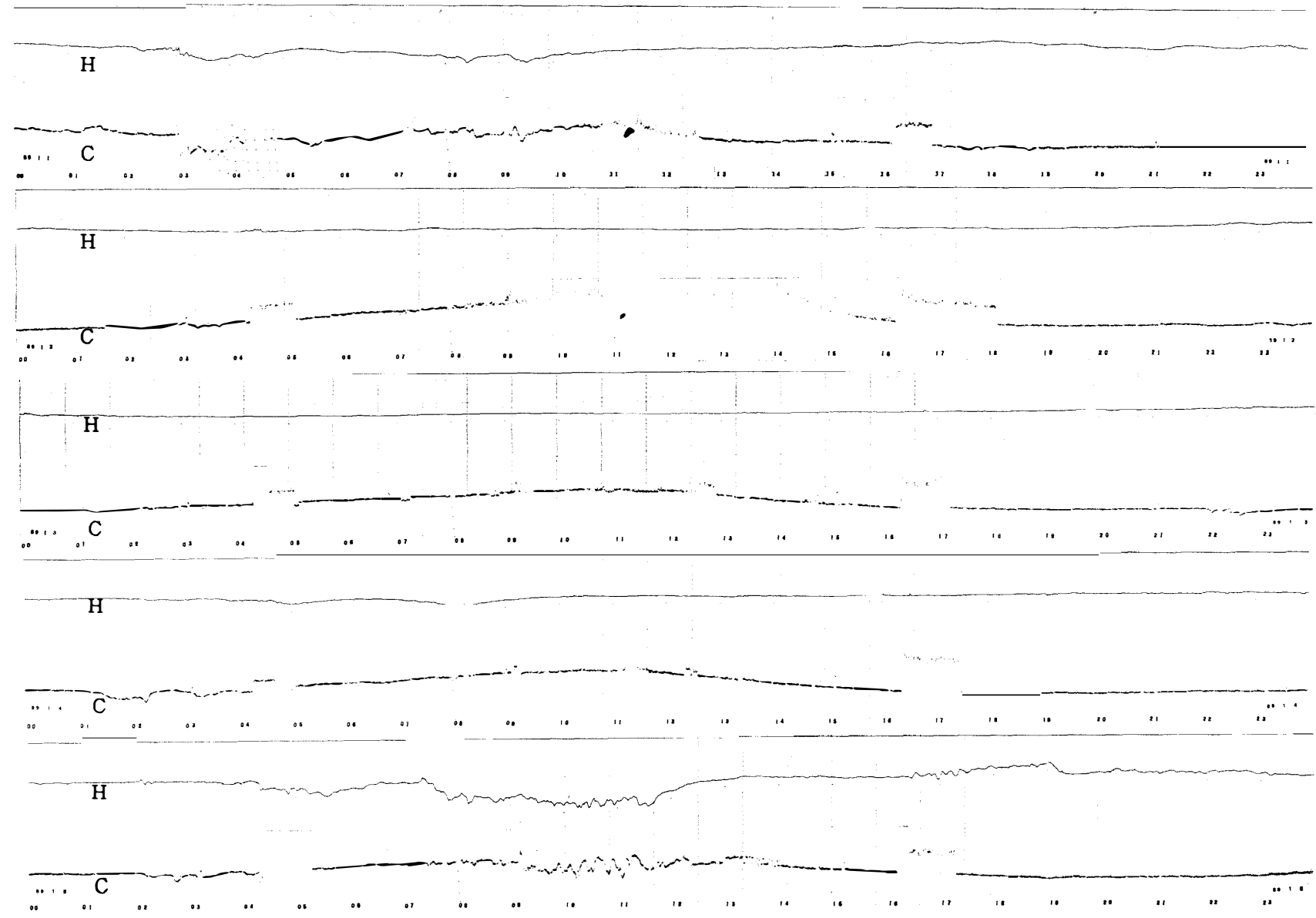
Open spaces without figures correspond to quiet level

* : Quiet day

S : Interference

JAN. 1989

1
2
3
4
5



00 04 08 12 16 20 24

45° EAST MERIDIAN TIME IN HOURS

30 MHz COSMIC NOISE

JAN. 1989

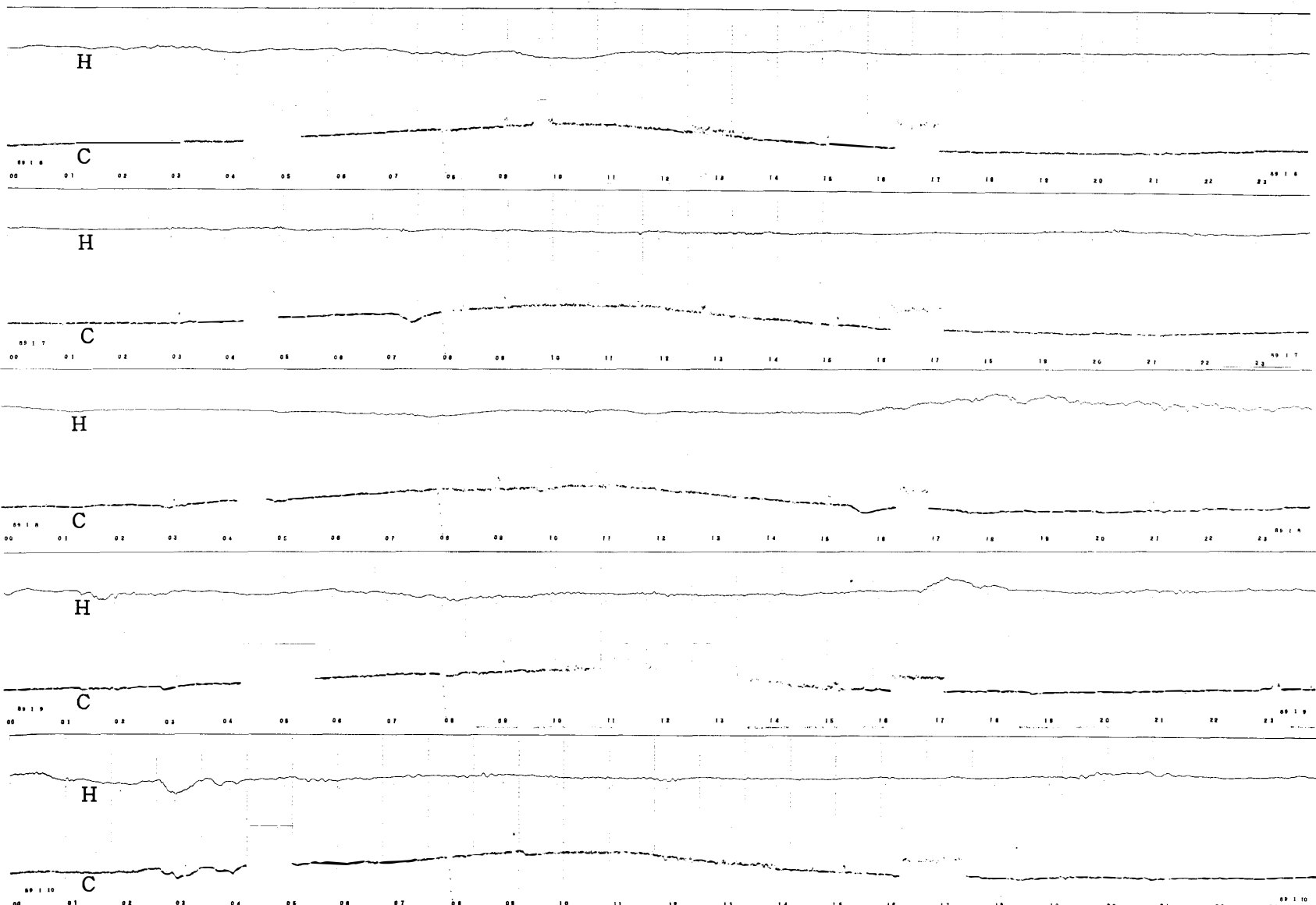
6

7

8

9

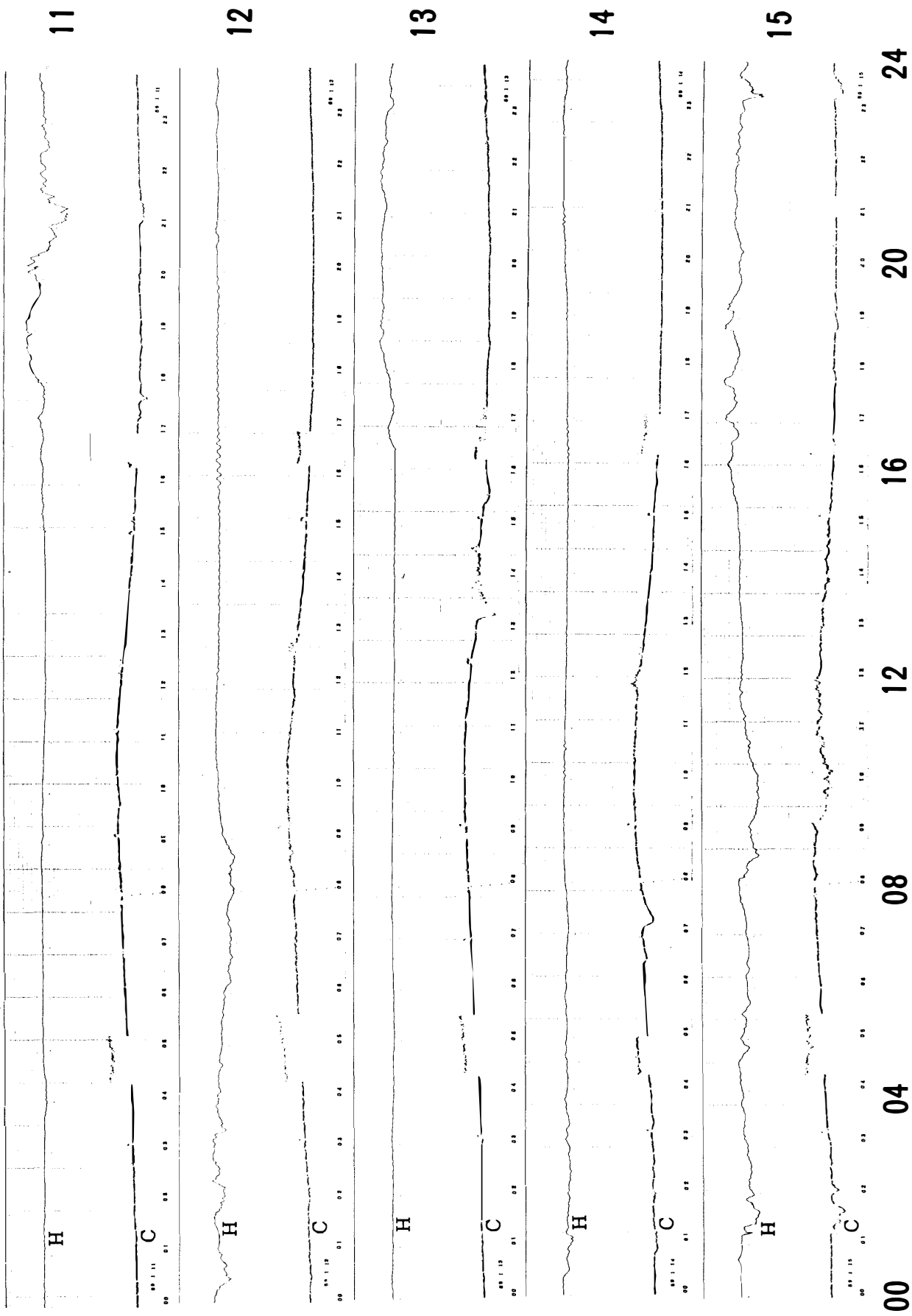
10



00 04 08 12 16 20 24

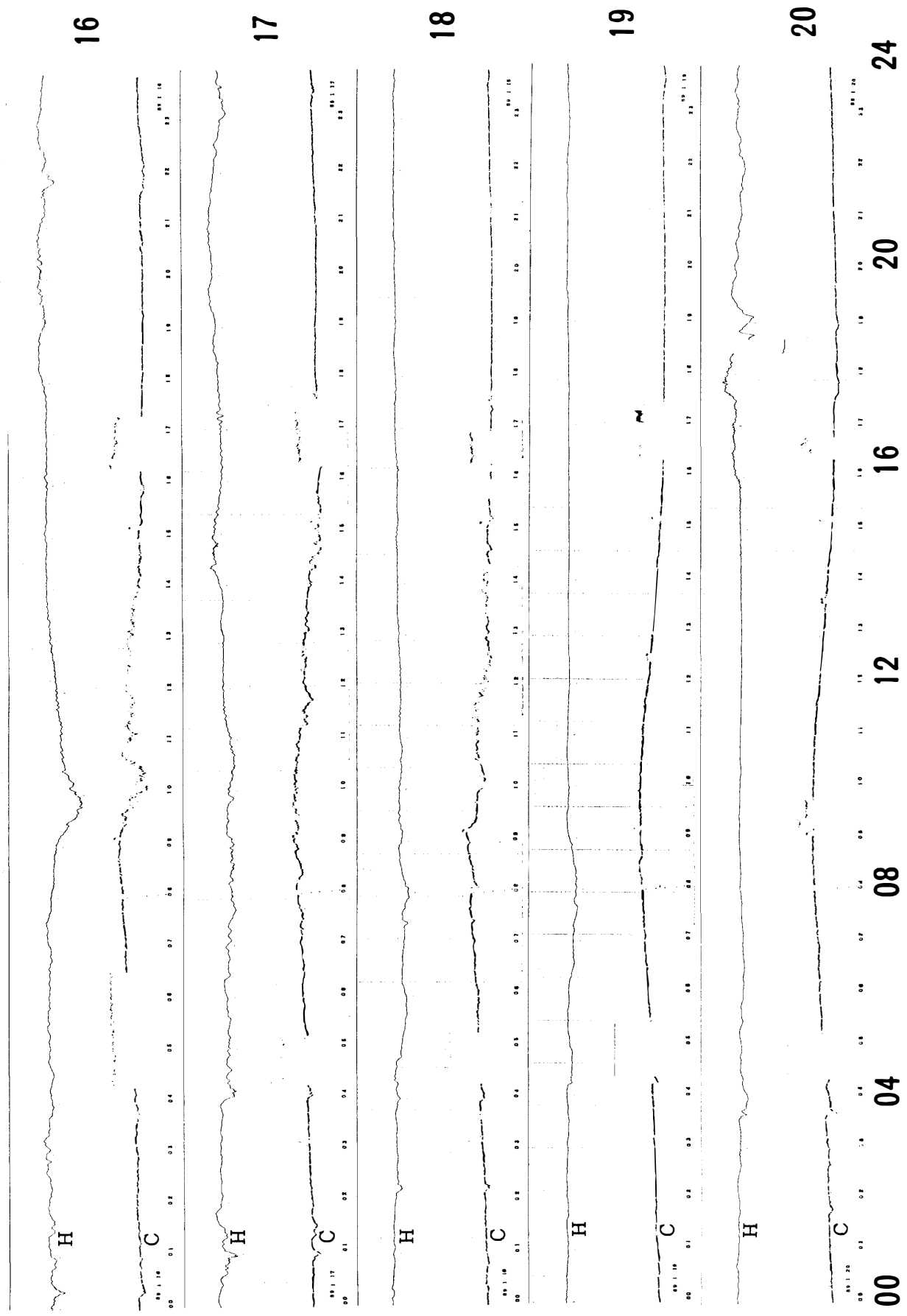
45° EAST MERIDIAN TIME IN HOURS 30 MHz COSMIC NOISE

JAN. 1989



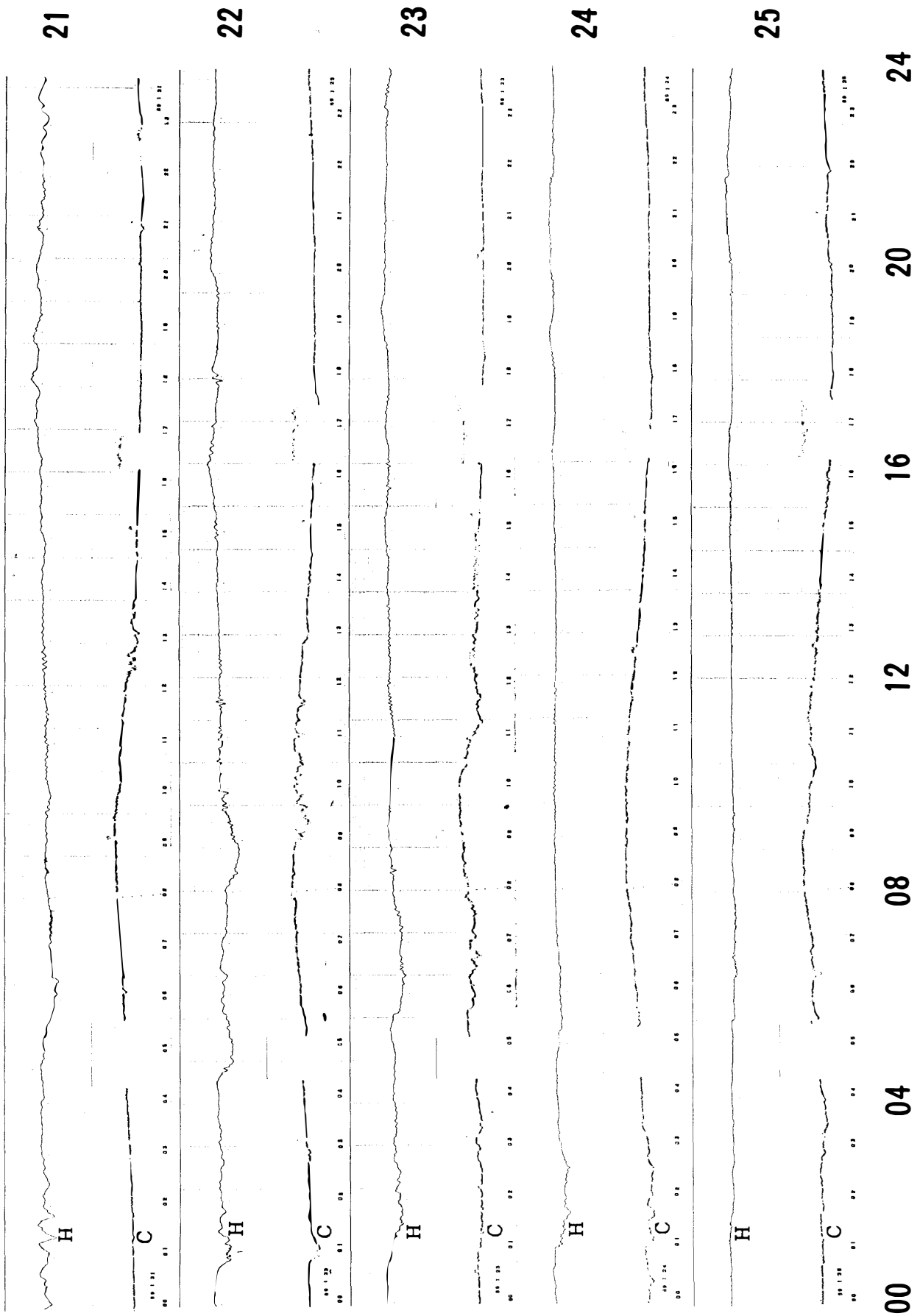
45° EAST MERIDIAN TIME IN HOURS 30 MHz COSMIC NOISE

JAN. 1989



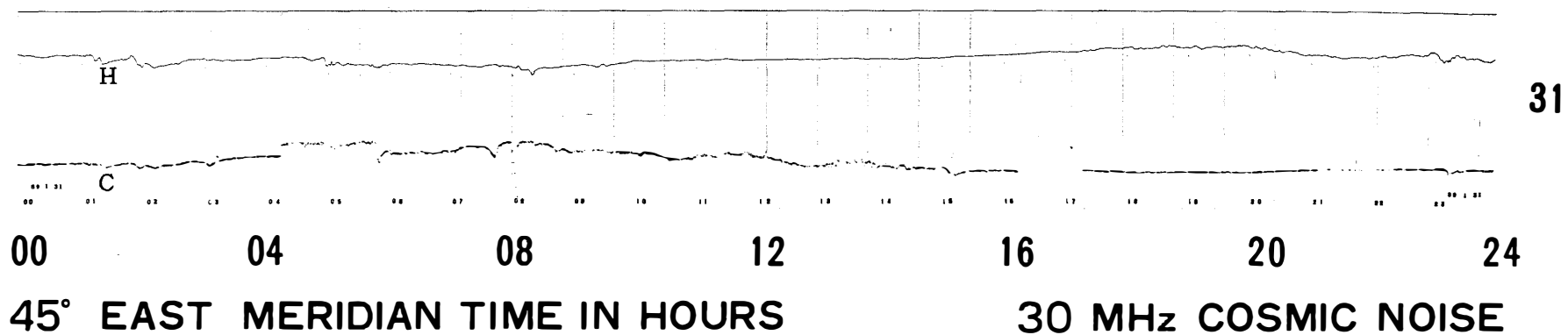
45° EAST MERIDIAN TIME IN HOURS 30 MHz COSMIC NOISE

JAN. 1989



45° EAST MERIDIAN TIME IN HOURS 30 MHz COSMIC NOISE

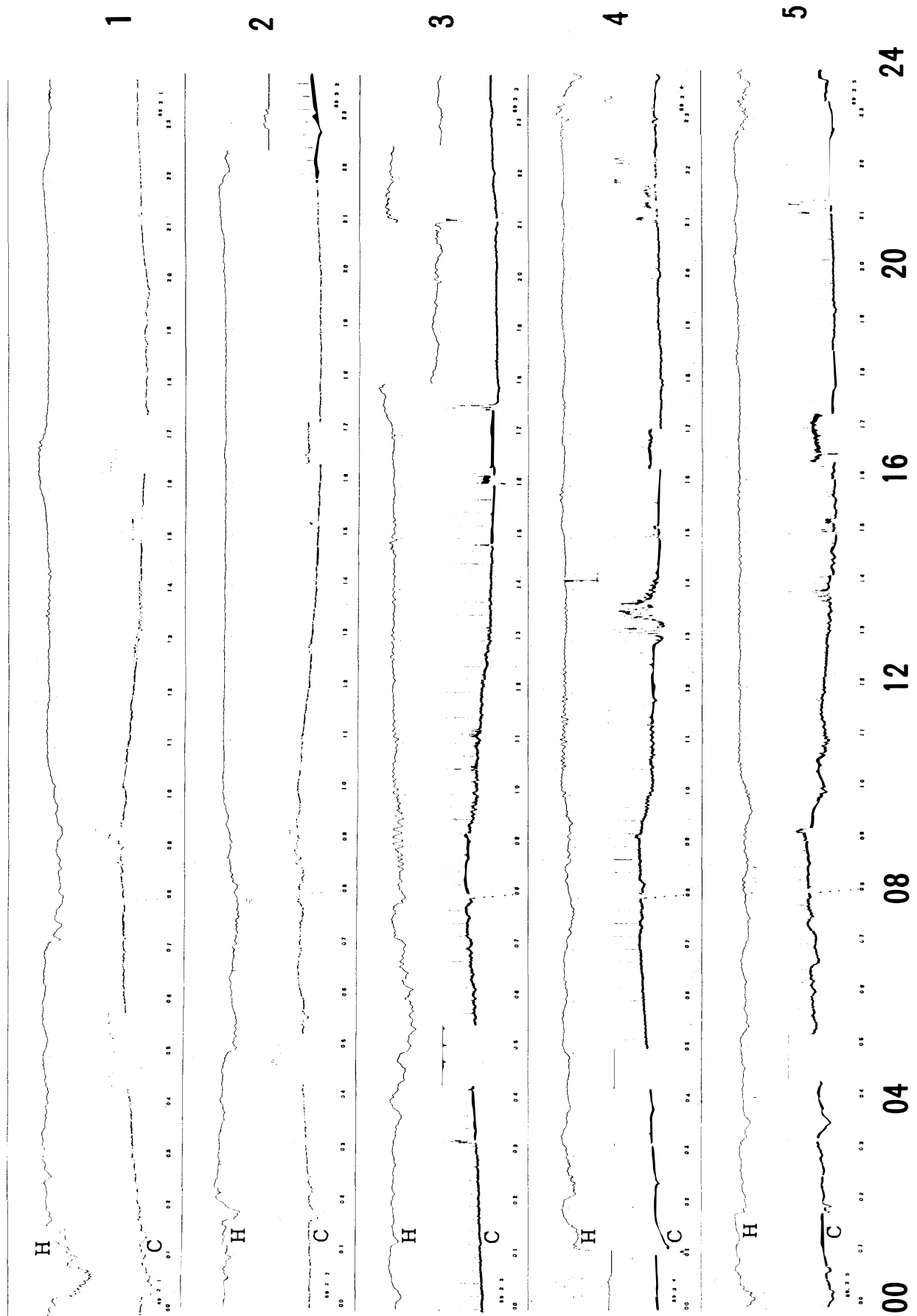
JAN. 1989



Cosmic noise level obscured or equipment malfunction

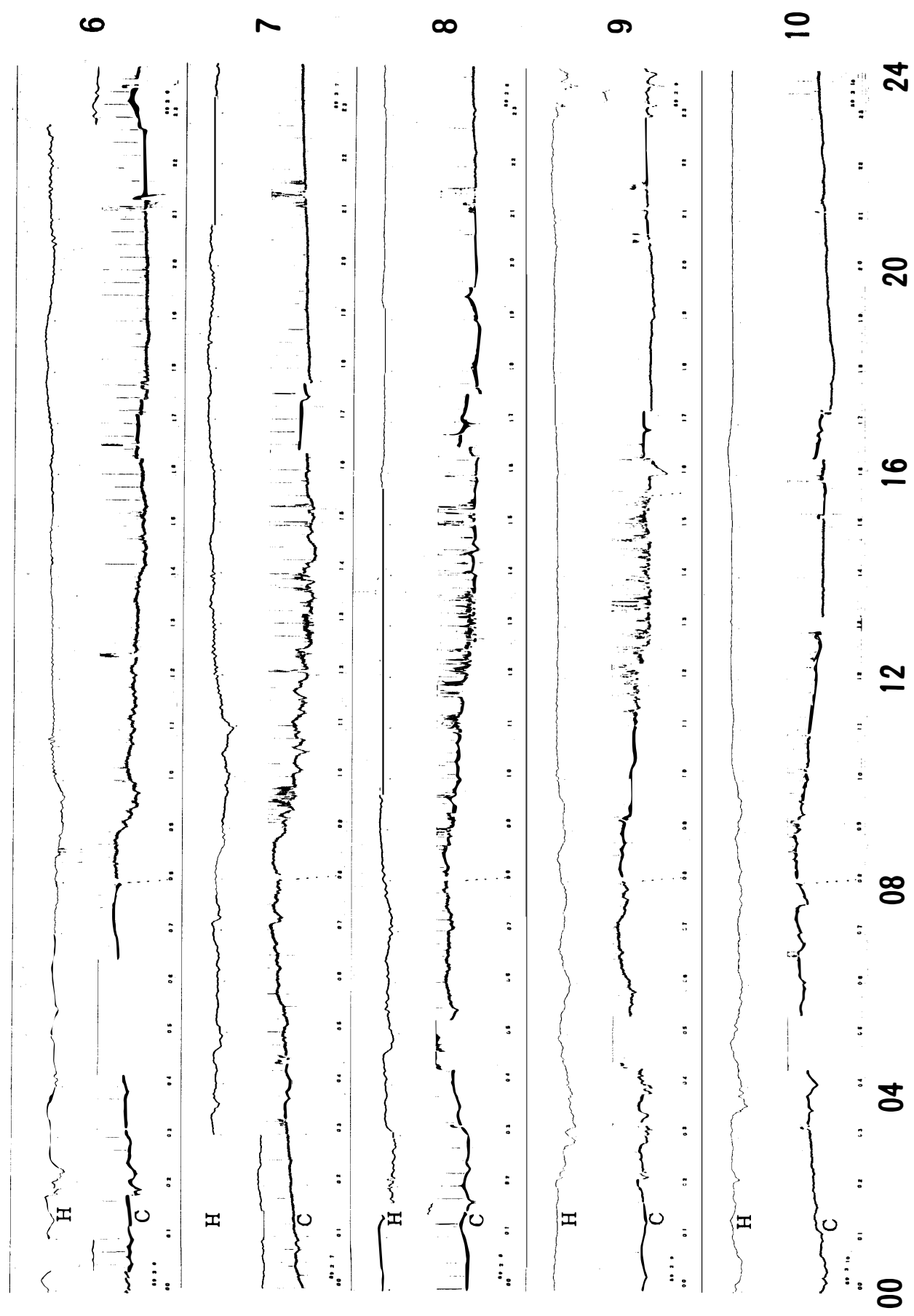
January	Time Range	Reason
1	0259 - 0452	Failure of equipment
5	0420 - 0518	"
9	0421 - 0542	"
10	0420 - 0510	"
11	1620 - 1702	"
19	0415 - 0528	"
20	0419 - 0512	"
21	0418 - 0536	"
22	0420 - 0512	"
23	0420 - 0510	"
24	0422 - 0518	"
25	0420 - 0530	"

FEB. 1989



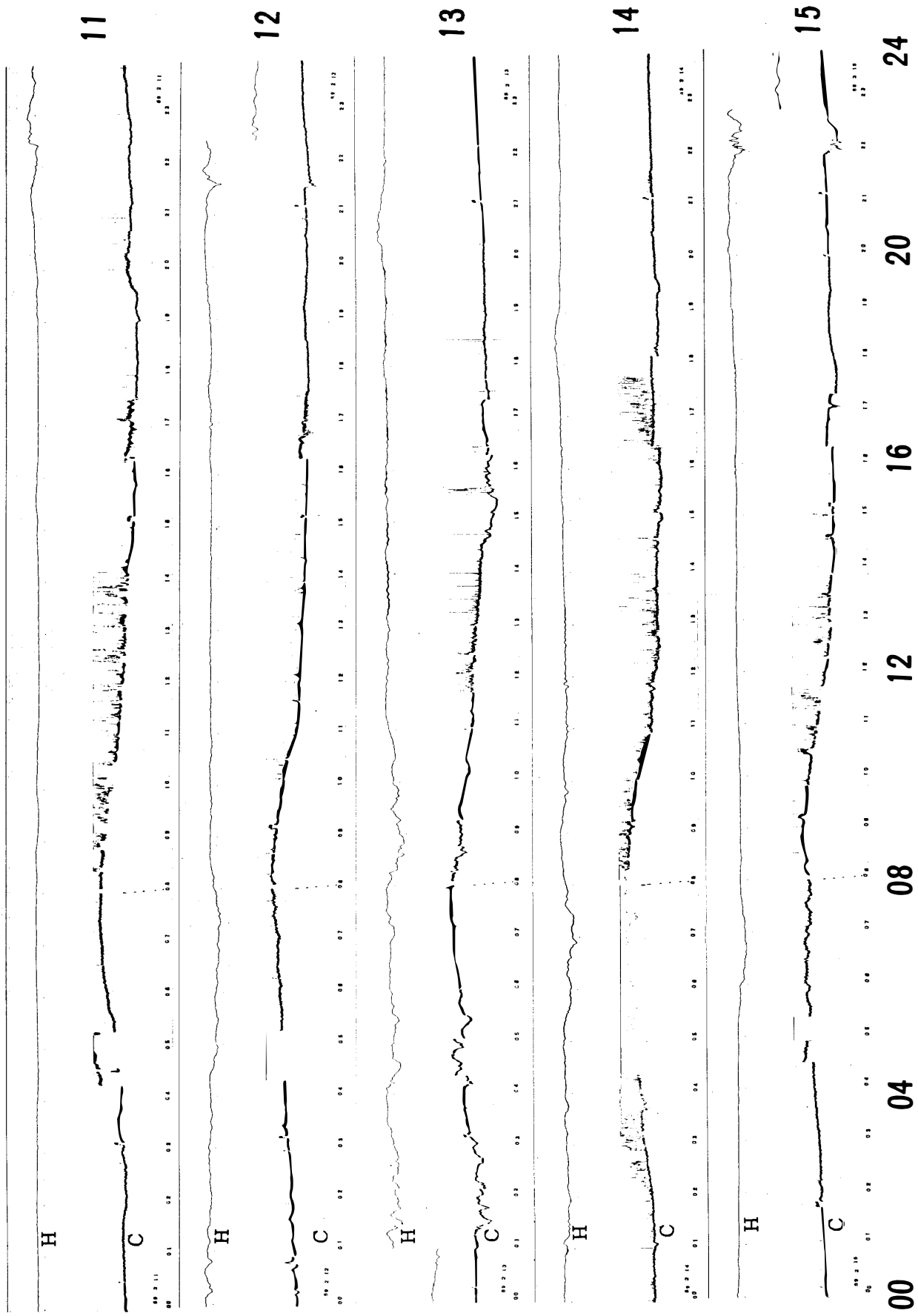
45° EAST MERIDIAN TIME IN HOURS 30 MHz COSMIC NOISE

FEB. 1989



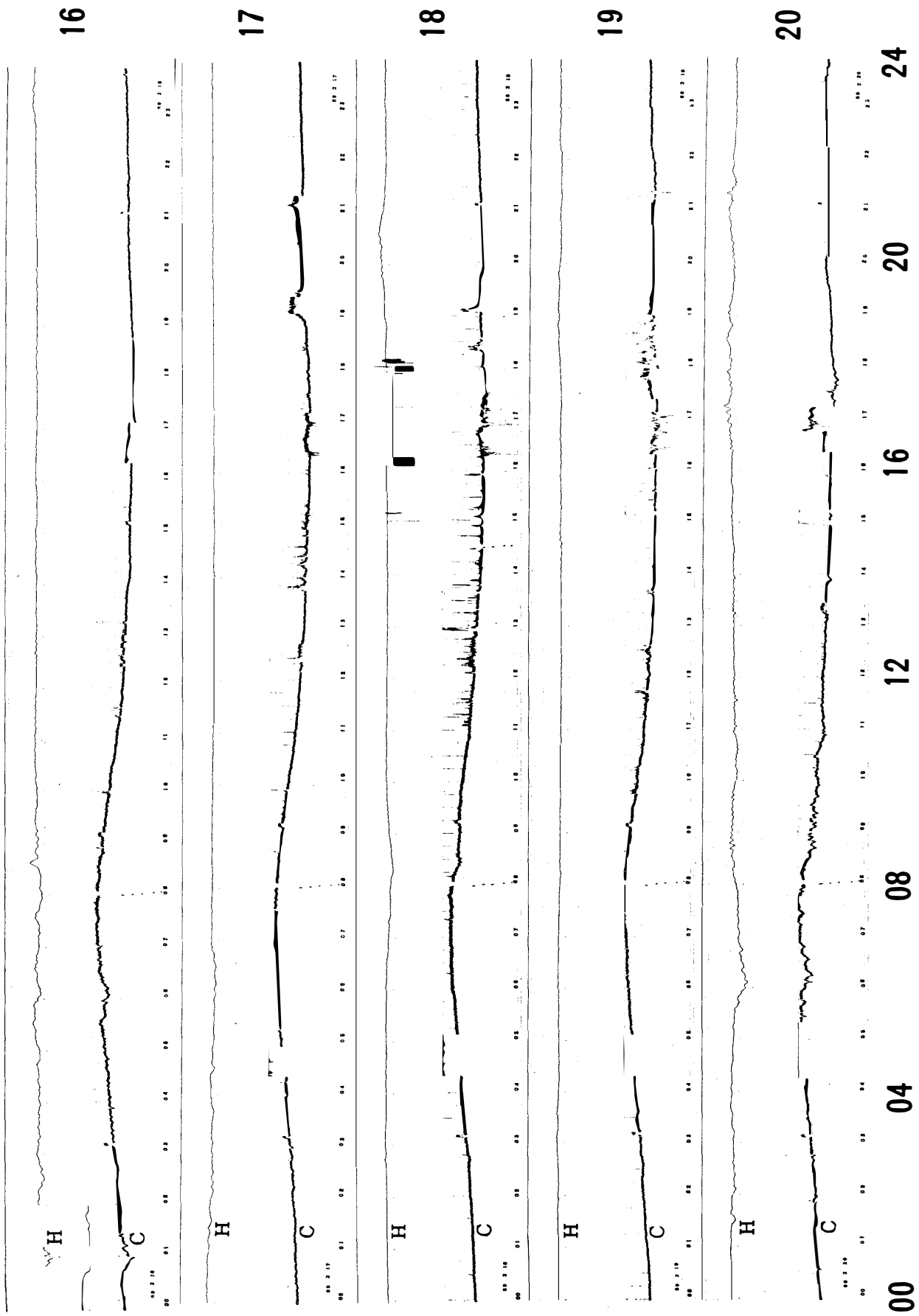
45° EAST MERIDIAN TIME IN HOURS 30 MHz COSMIC NOISE

FEB. 1989



45° EAST MERIDIAN TIME IN HOURS 30 MHz COSMIC NOISE

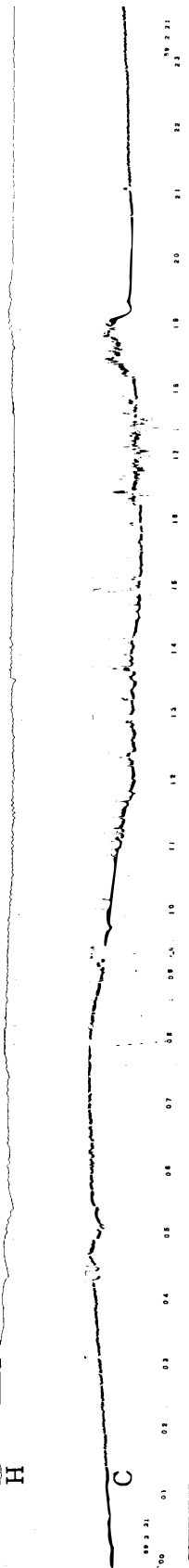
FEB. 1989



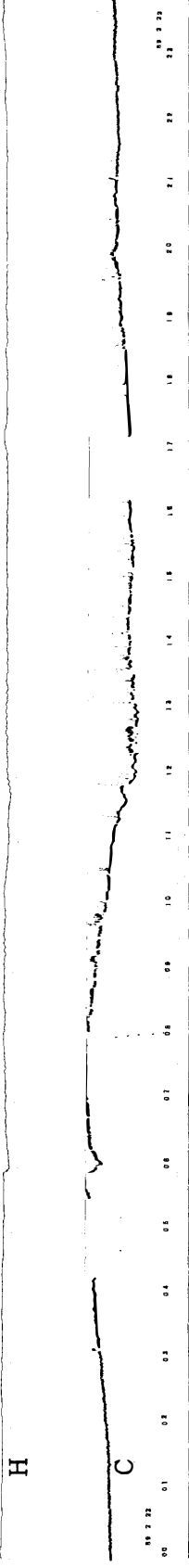
45° EAST MERIDIAN TIME IN HOURS 30 MHz COSMIC NOISE

FEB. 1989

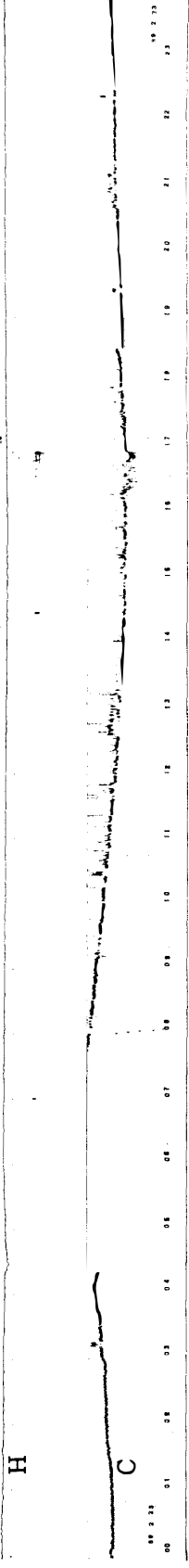
21



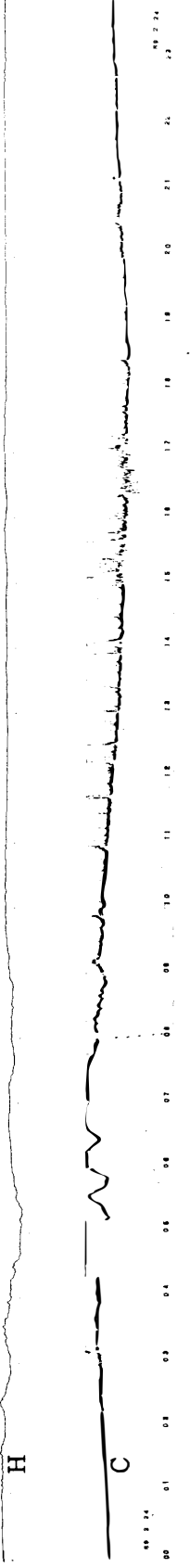
22



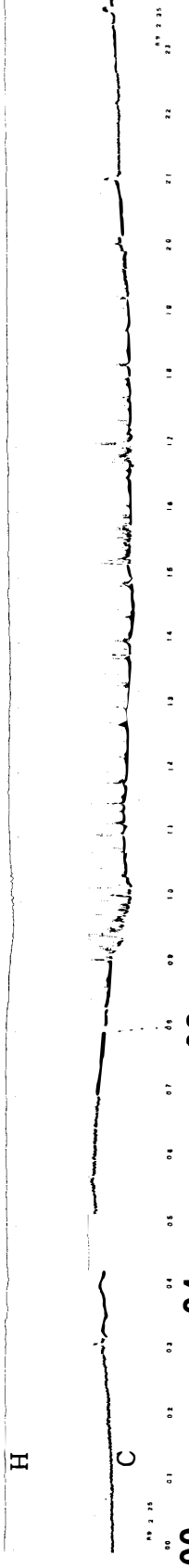
23



24



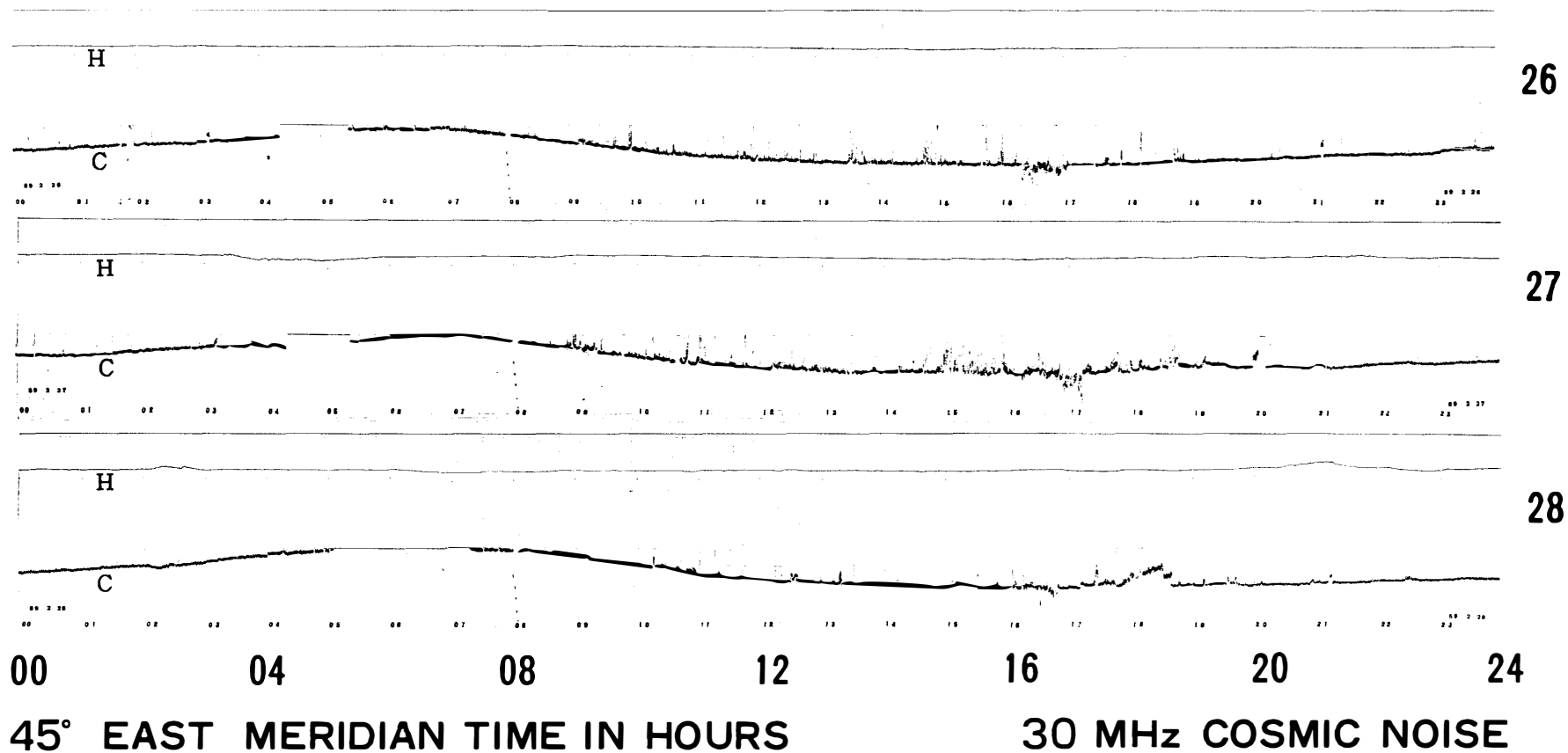
25



00 04 08 12 16 20 24

45° EAST MERIDIAN TIME IN HOURS 30 MHz COSMIC NOISE

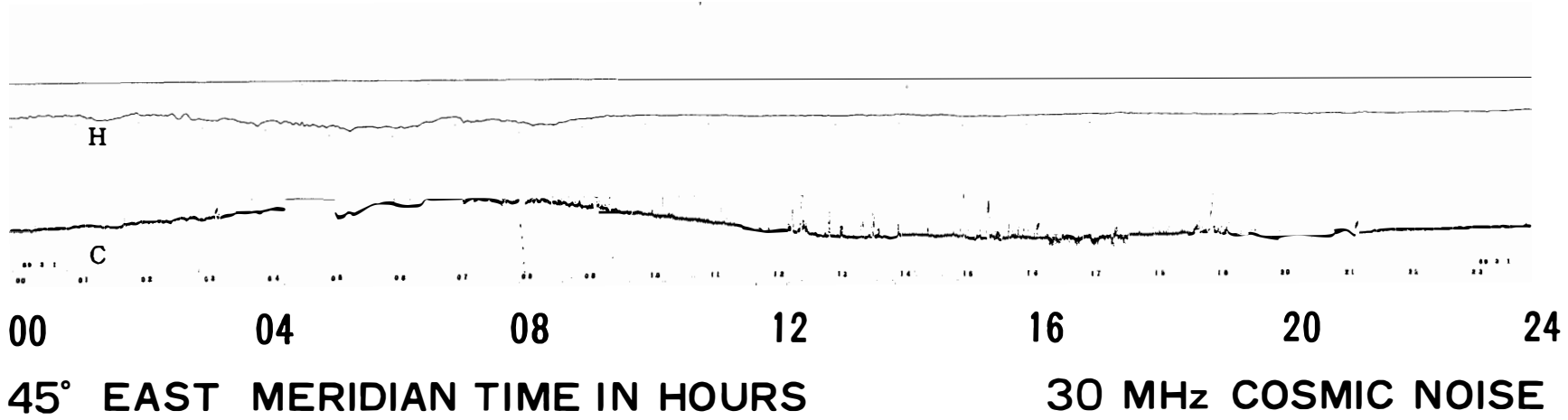
FEB. 1989



Cosmic noise level obscured or equipment malfunction

February	3	0420 - 0532	Failure of equipment	20	0413 - 0520	Failure of equipment
	4	0418 - 0515	"	22	0420 - 0532	"
	5	0422 - 0515	"		1625 - 1714	"
	6	0415 - 0630	"	23	0420 - 0750	"
	9	0423 - 0522	"	24	0417 - 0512	"
	10	0420 - 0523	"	25	0417 - 0510	"
	11	0416 - 0520	"	26	0420 - 0527	"
	12	0415 - 0515	"	27	0420 - 0522	"
	14	0420 - 0820	"	28	0507 - 0720	"

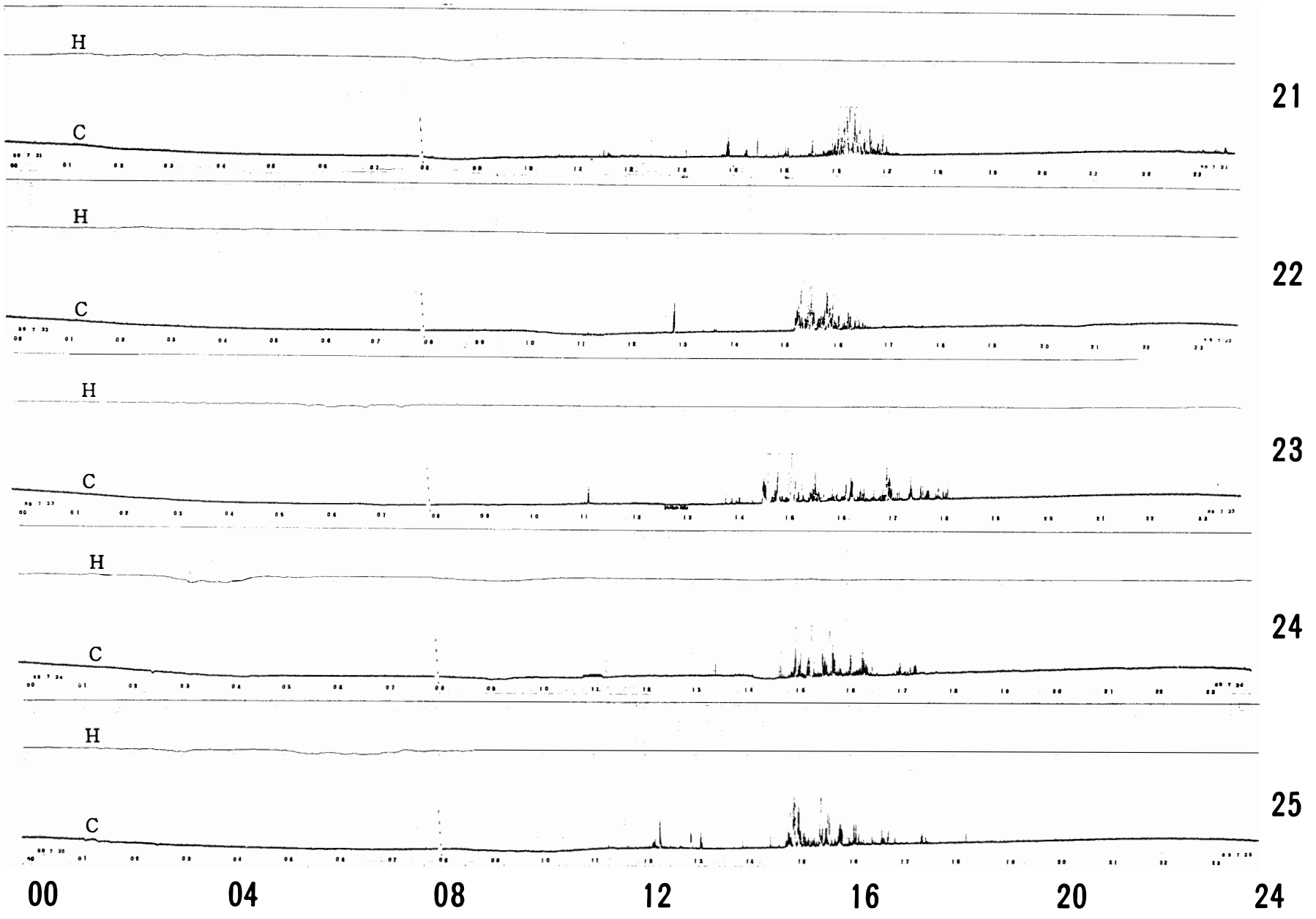
MAR. 1989



Cosmic noise level obscured or equipment malfunction

March 1 0415 - 0505 Failure of equipment

JULY 1989

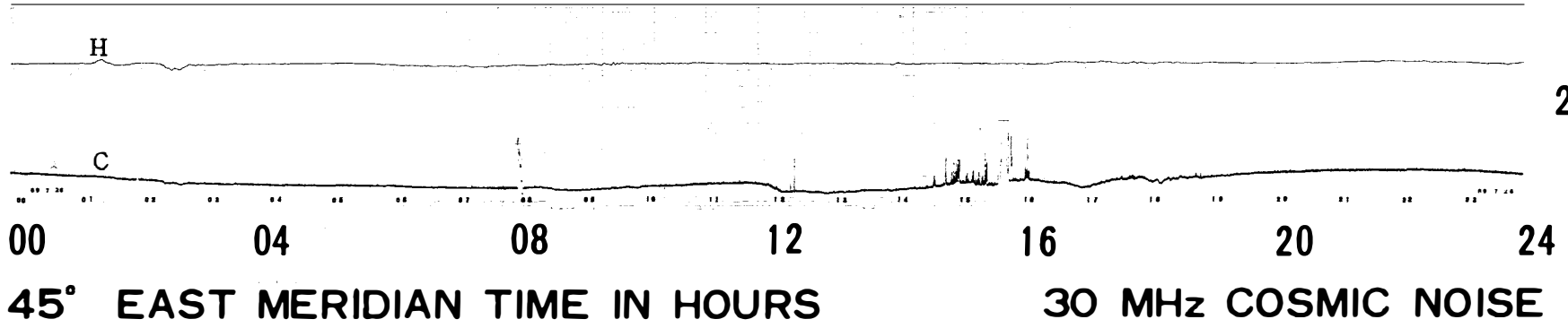


45° EAST MERIDIAN TIME IN HOURS

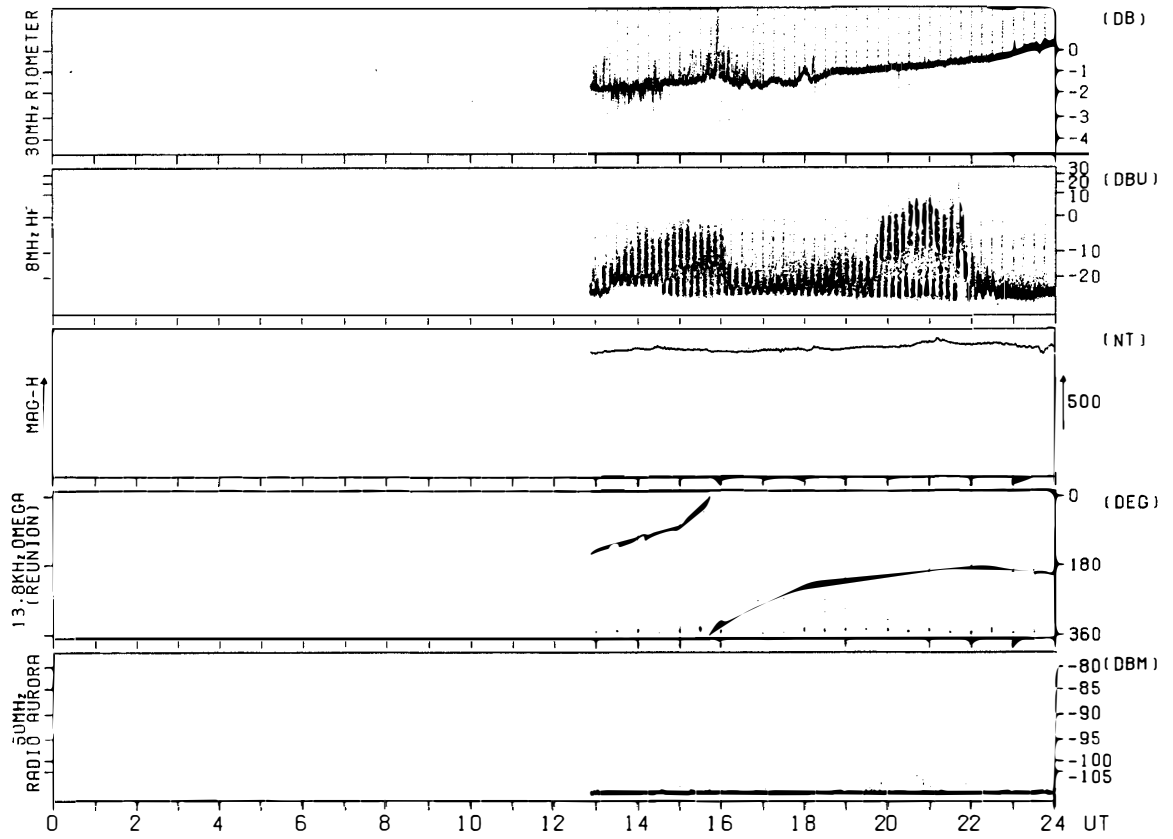
30 MHz COSMIC NOISE

JULY 1989

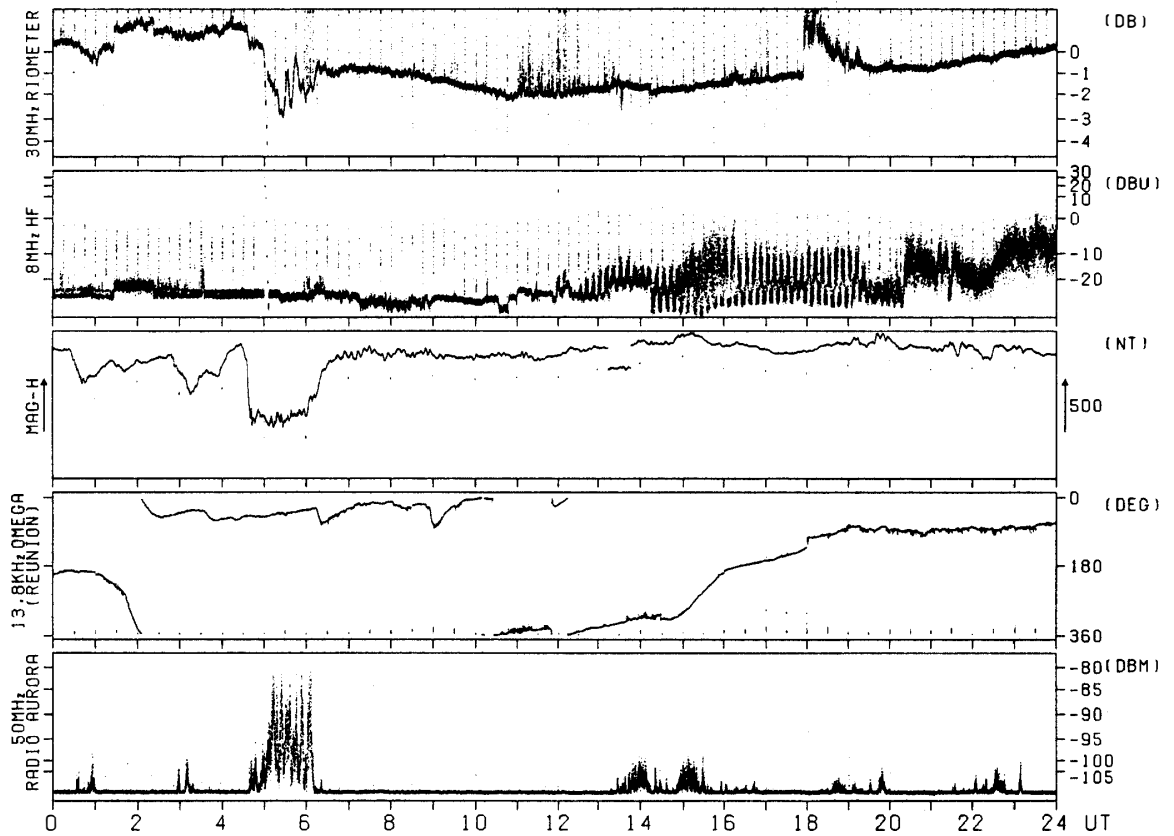
26



SYOWA STATION TOTAL DAY/60 1989/3/1

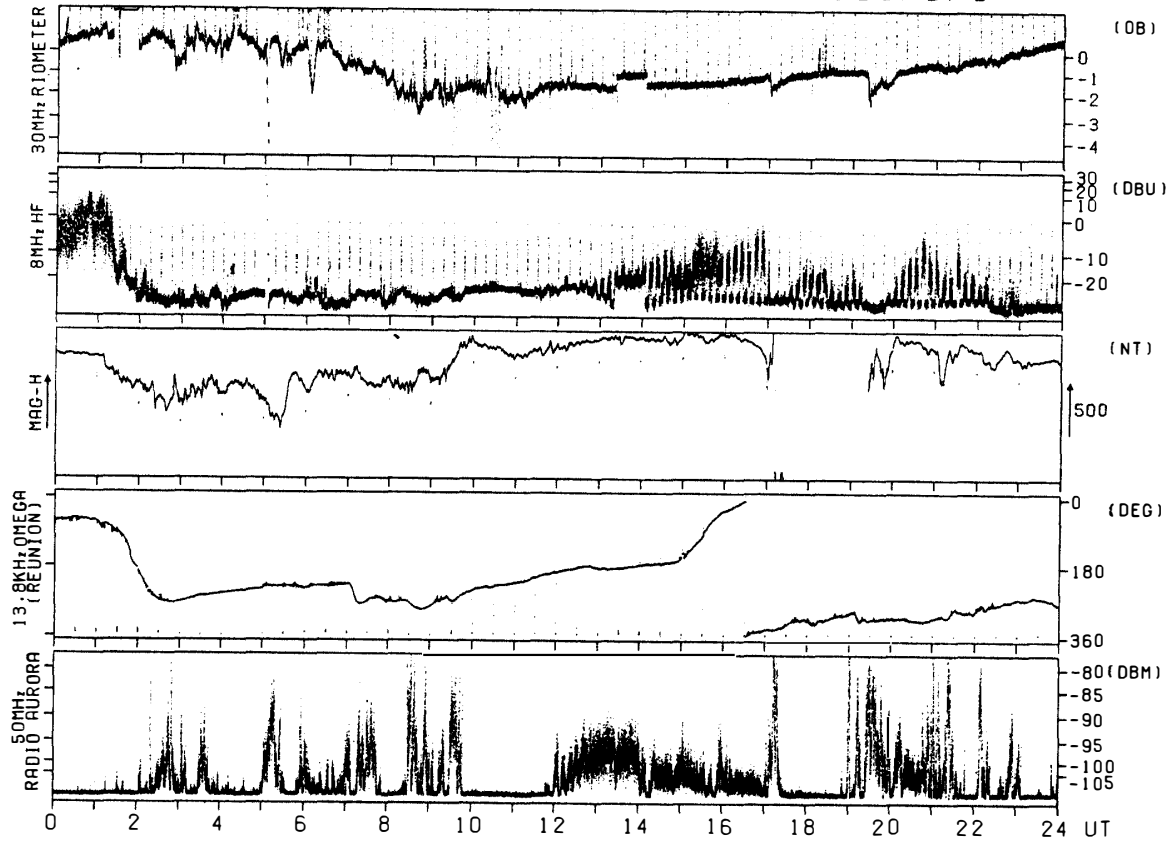


SYOWA STATION TOTAL DAY/61 1989/3/2



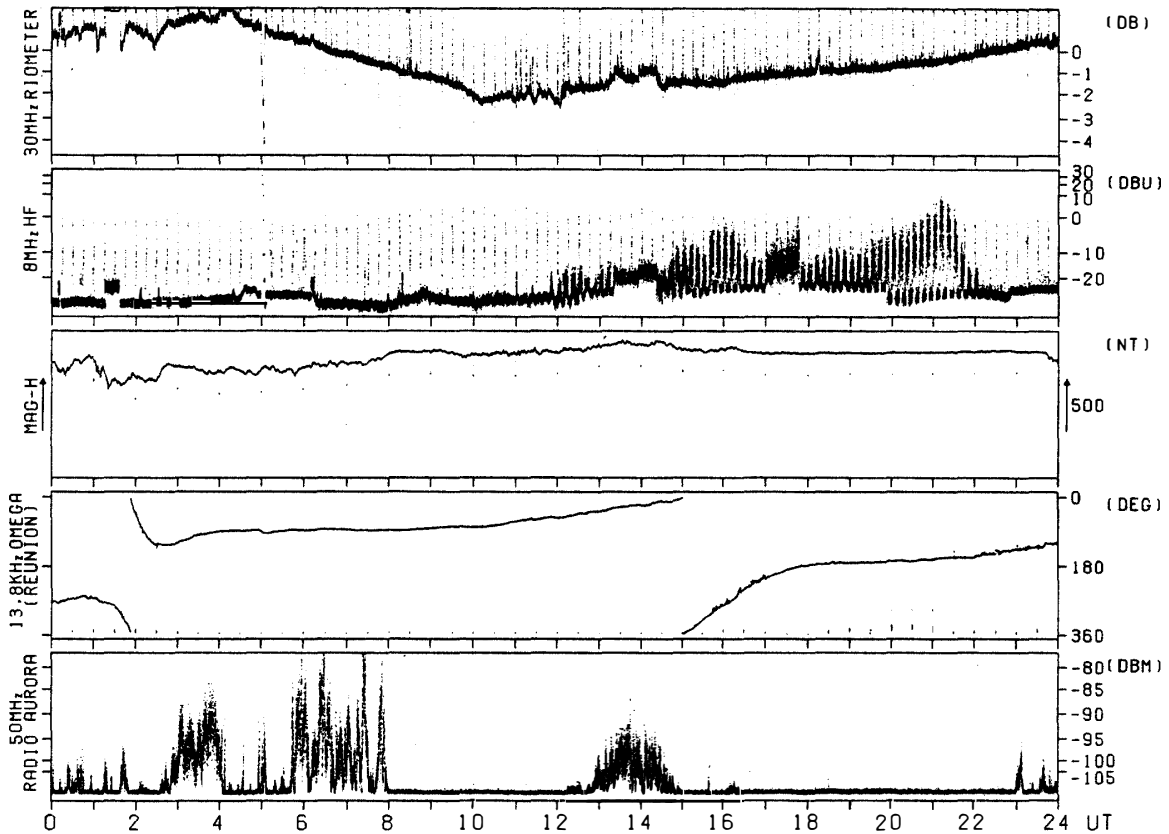
SYOWA STATION

TOTAL DAY/62 1989/3/3



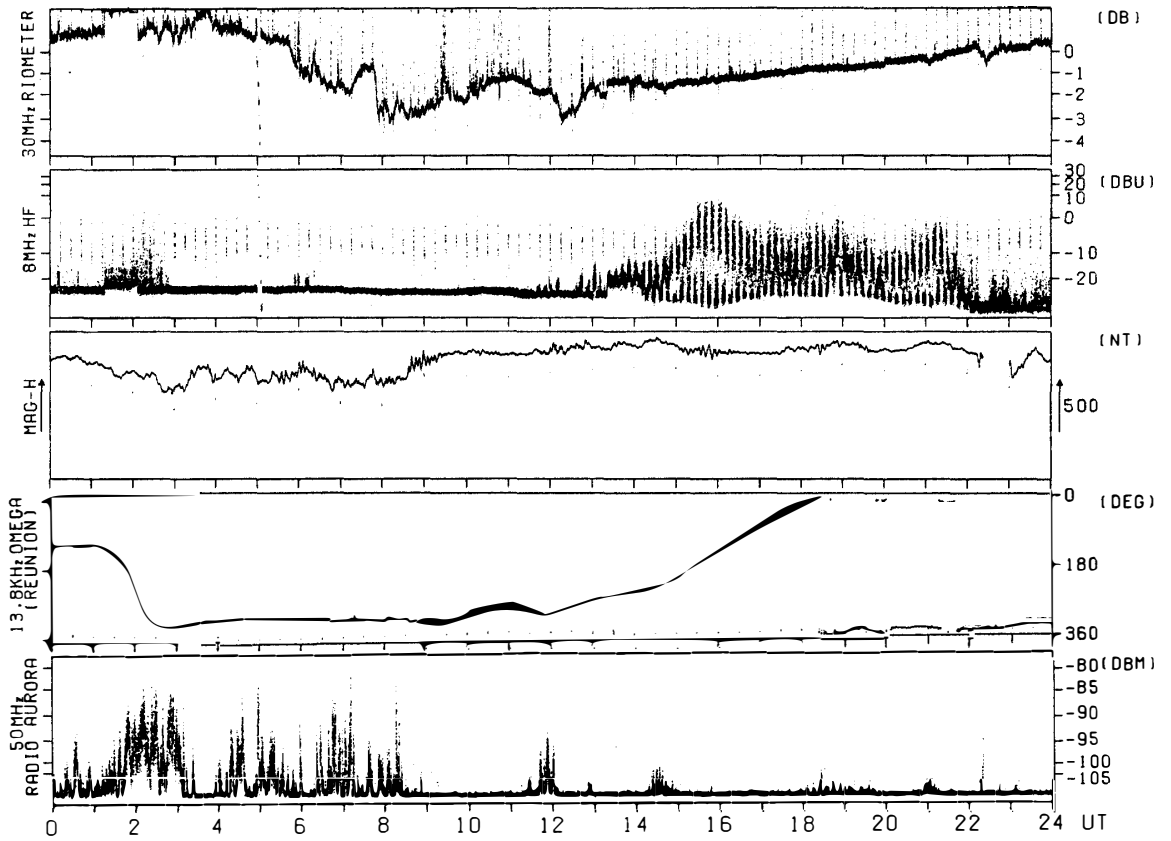
SYOWA STATION

TOTAL DAY/63 1989/3/4



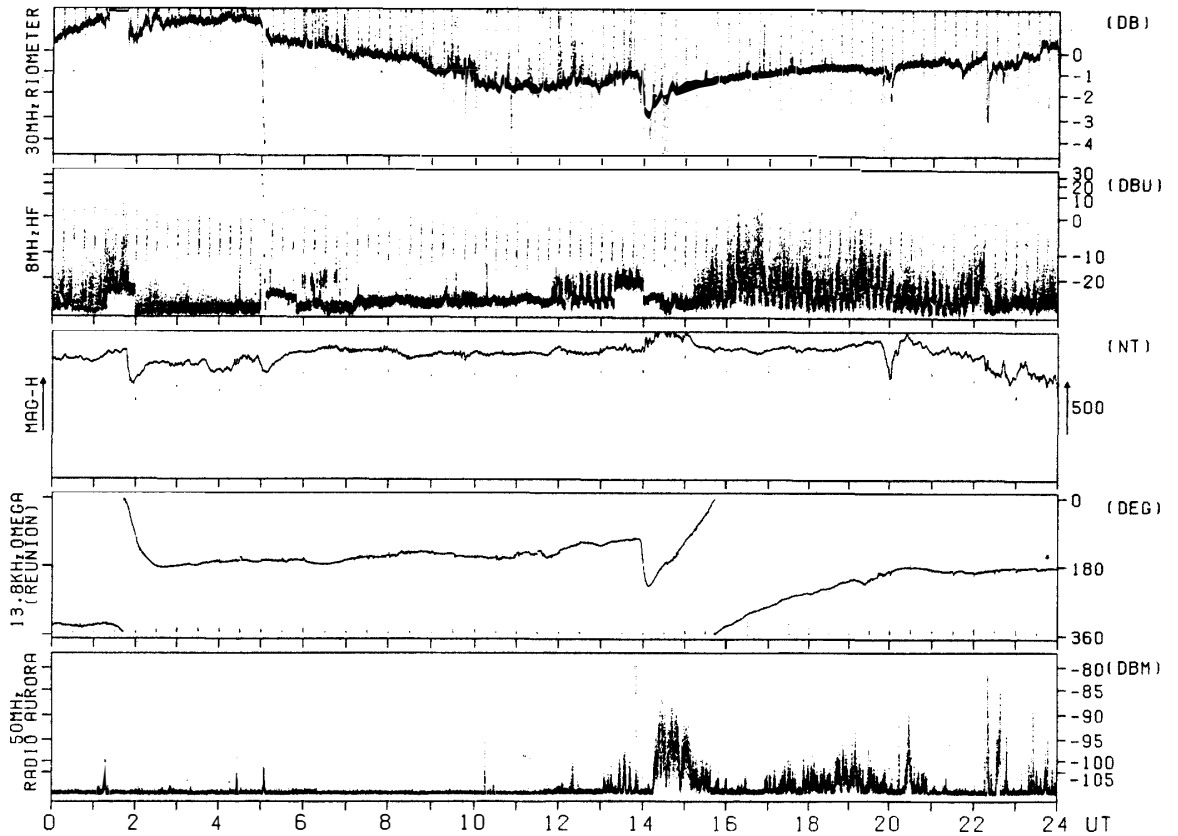
SYOWA STATION

TOTAL DAY/64 1989/3/5



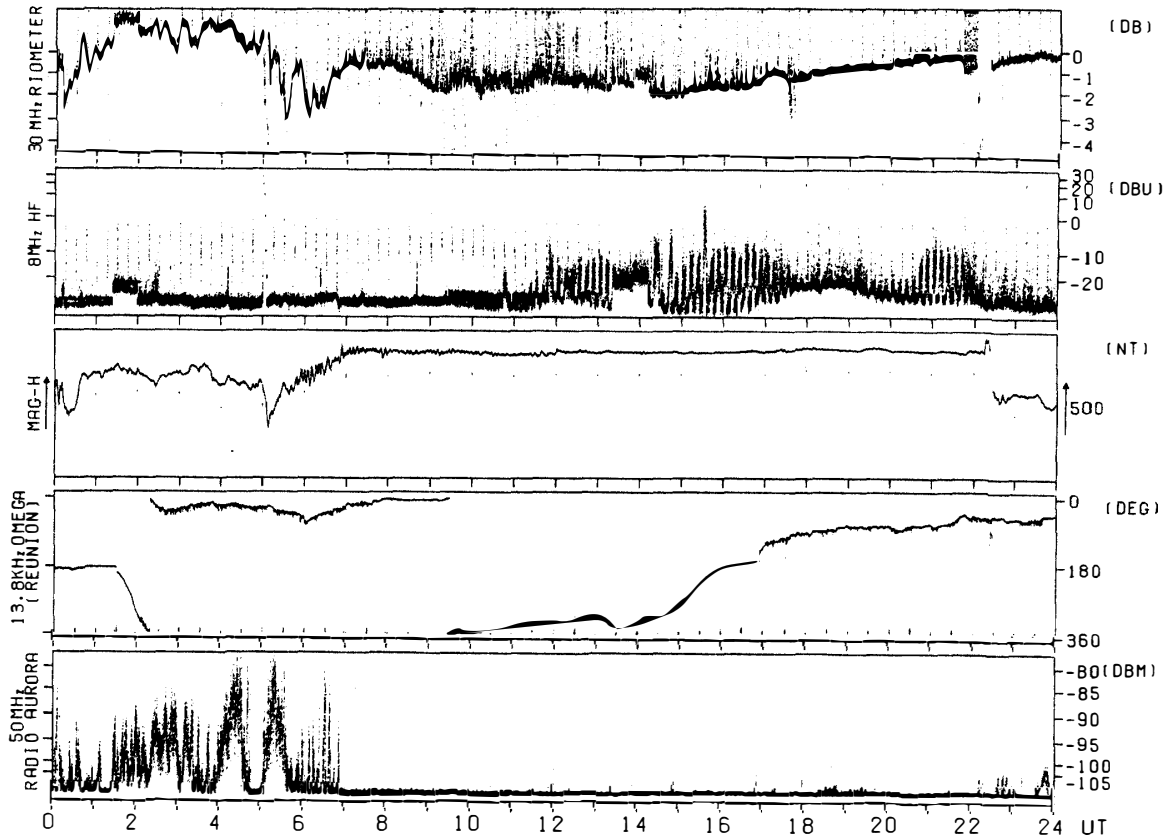
SYOWA STATION

TOTAL DAY/65 1989/3/6



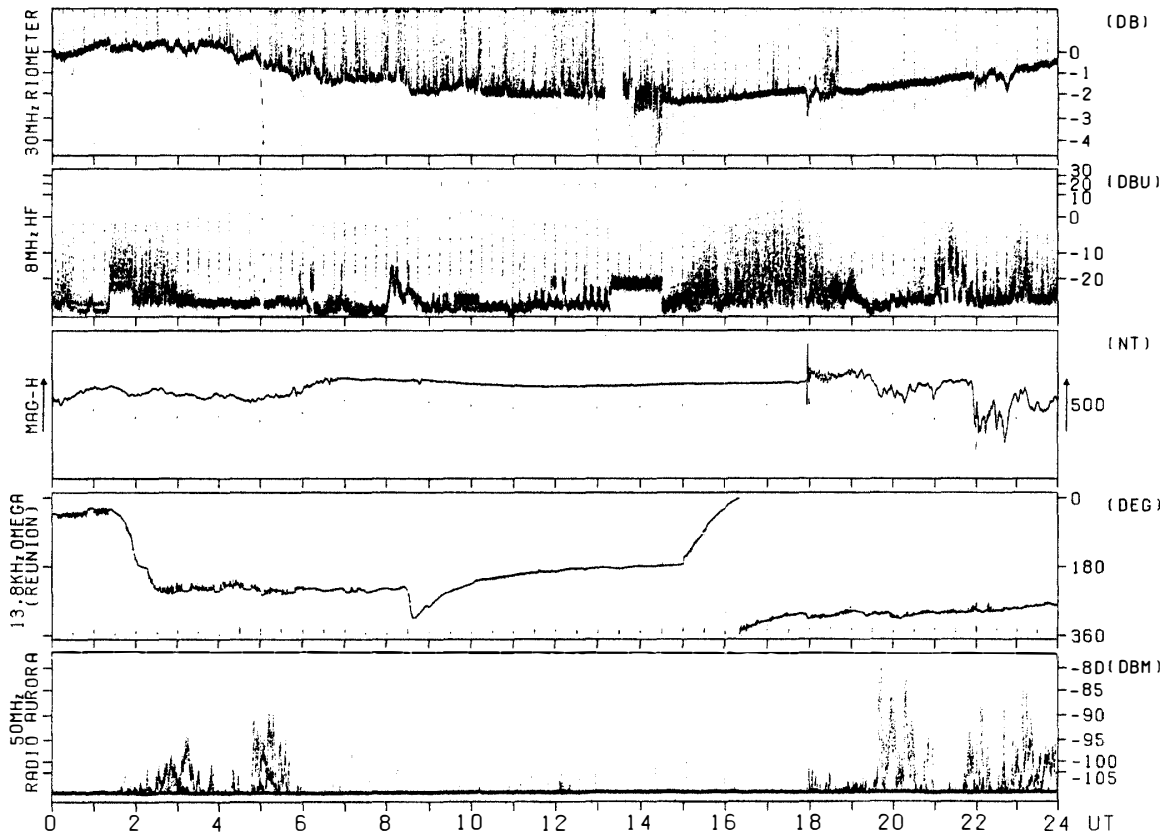
SYOWA STATION

TOTAL DAY/66 1989/3/7



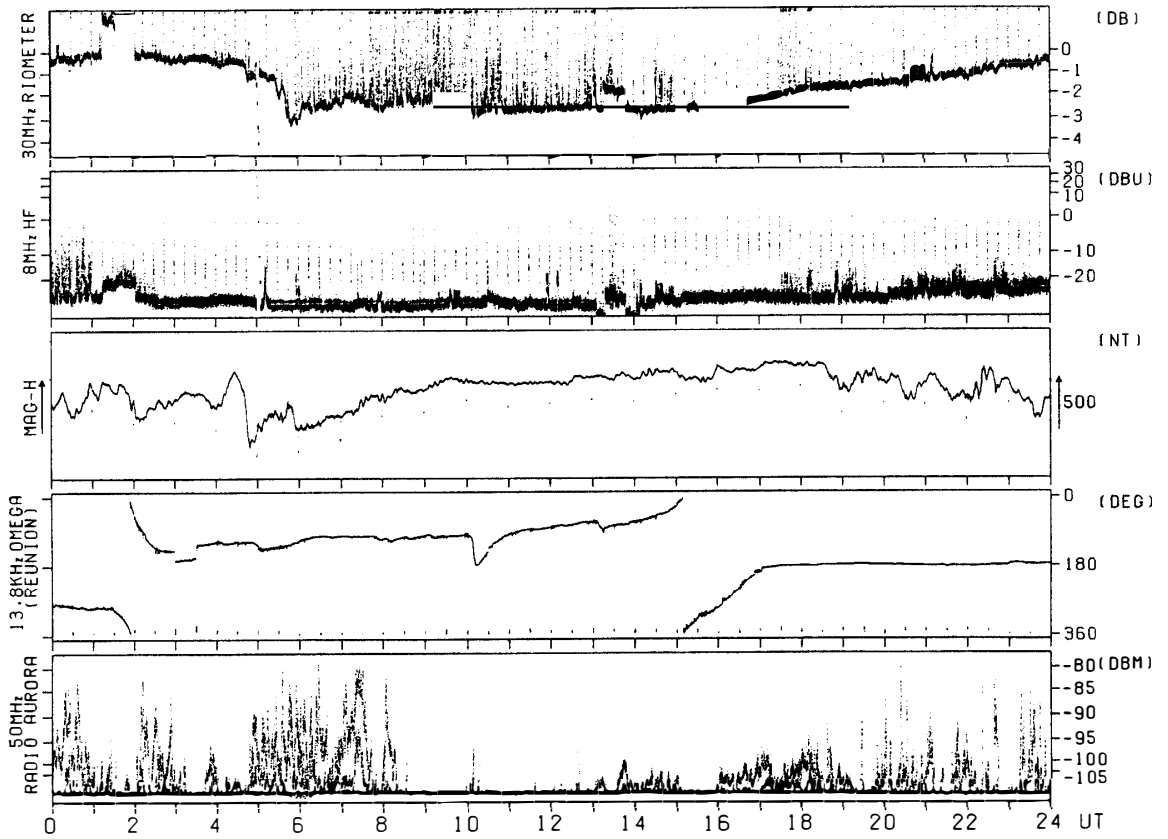
SYOWA STATION

TOTAL DAY/67 1989/3/8



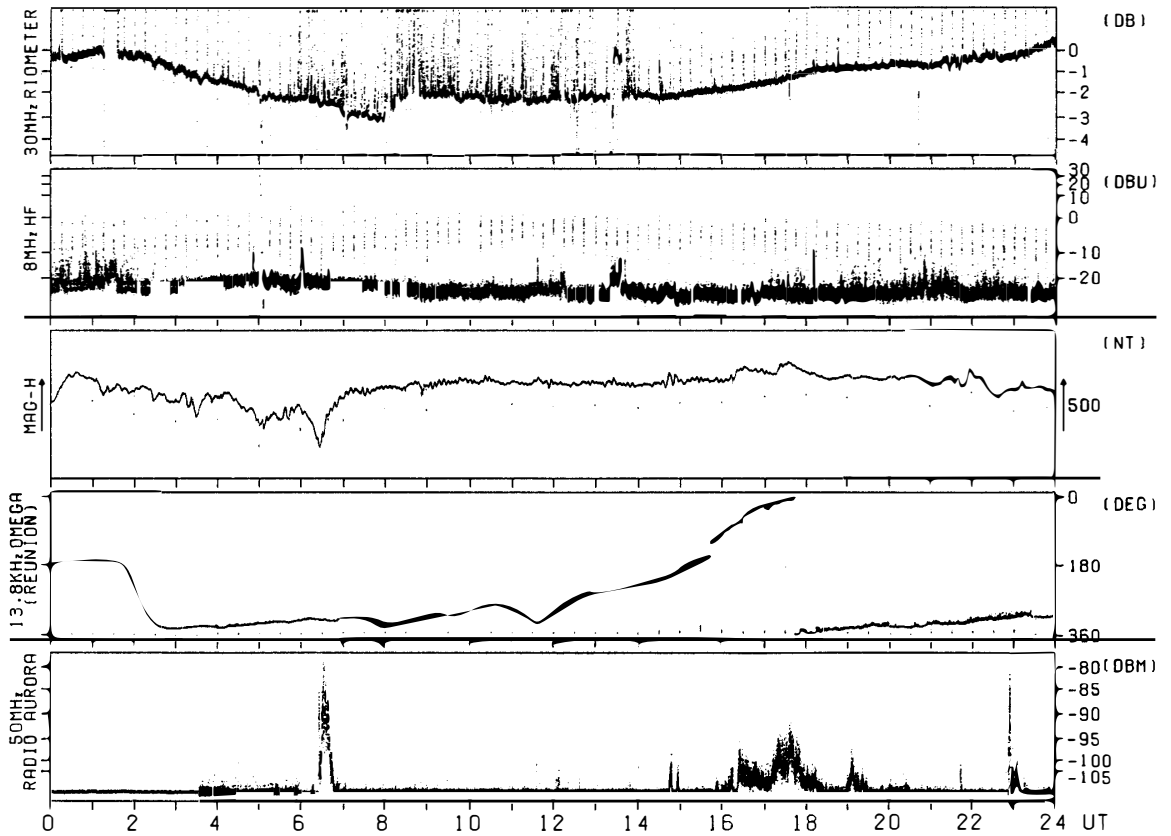
SYOWA STATION

TOTAL DAY/68 1989/3/9

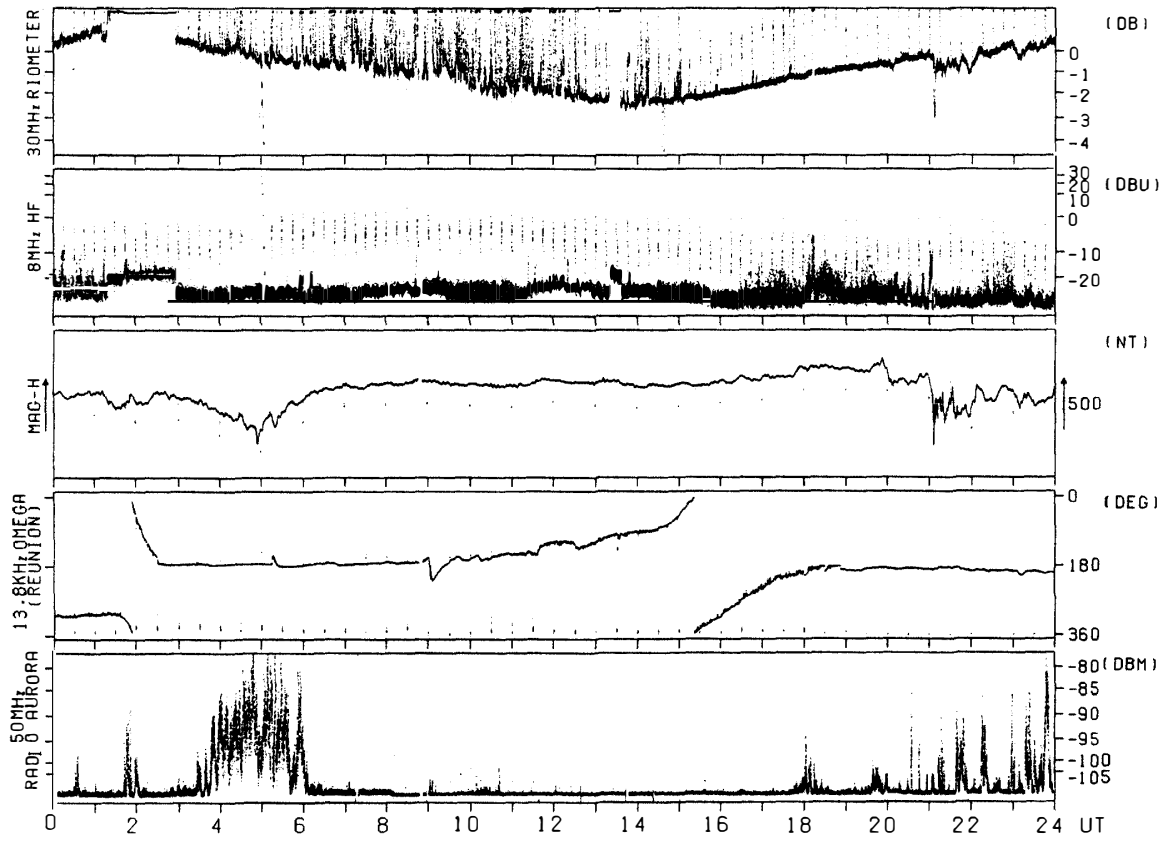


SYOWA STATION

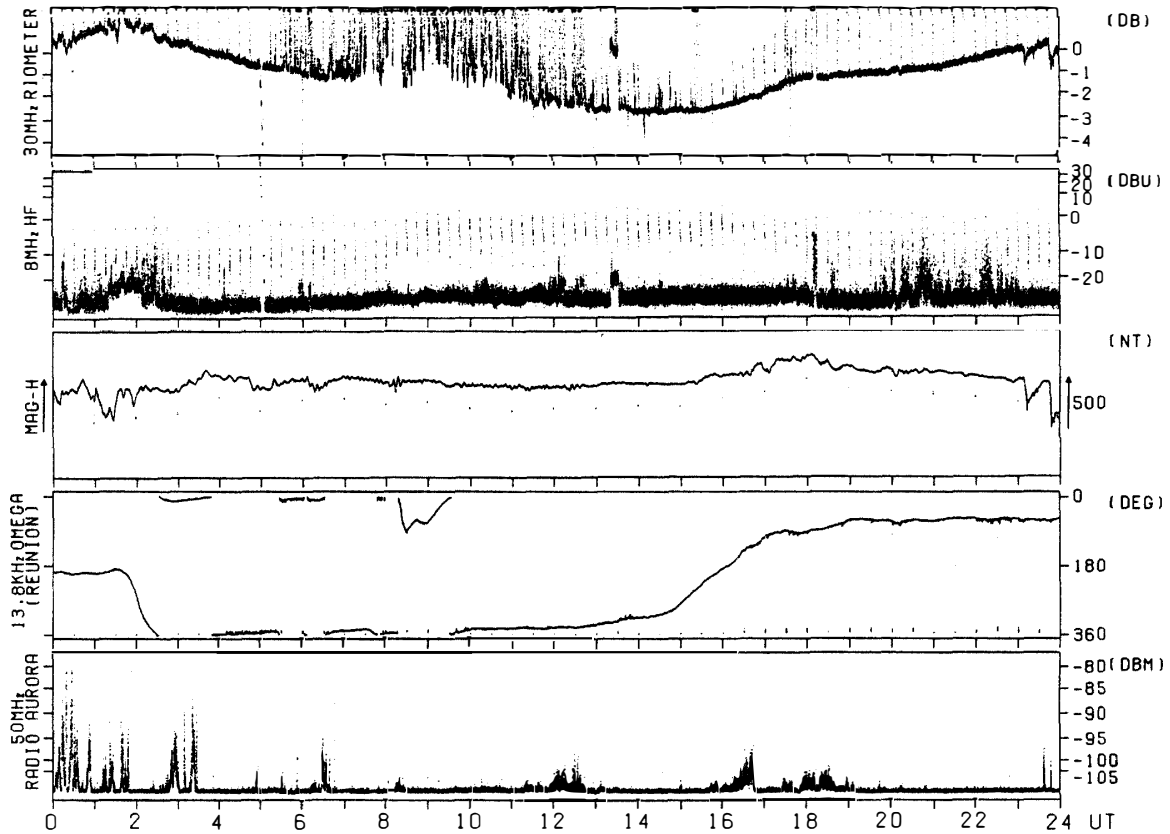
TOTAL DAY/69 1989/3/10



SYOWA STATION TOTAL DAY/70 1989/3/11

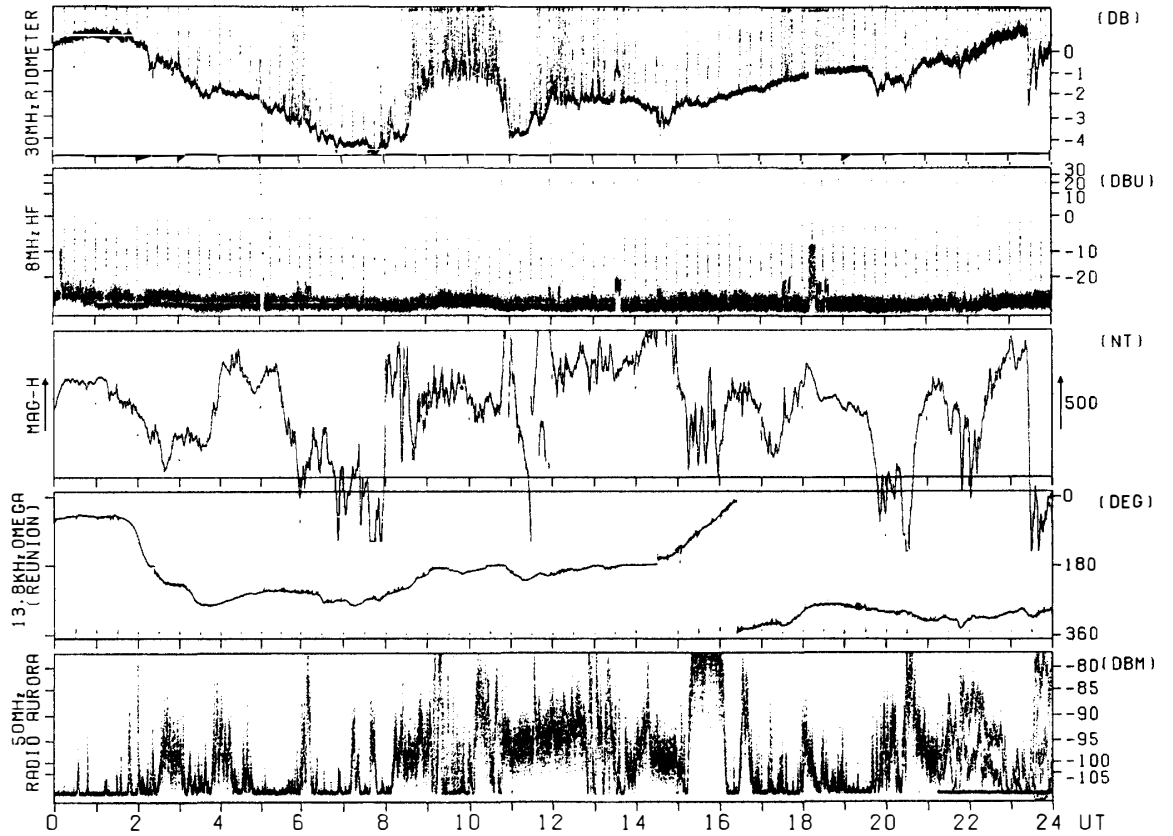


SYOWA STATION TOTAL DAY/71 1989/3/12



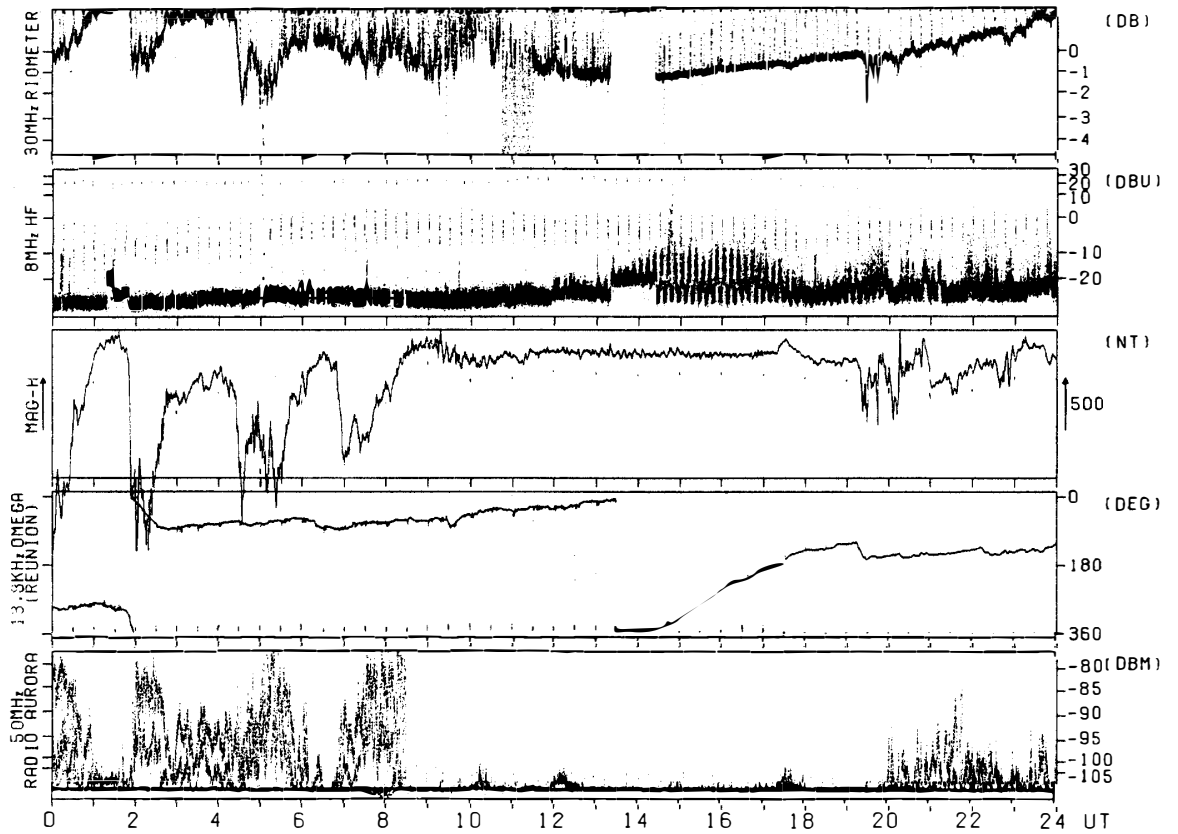
SYOWA STATION

TOTAL DAY/72 1989/3/13



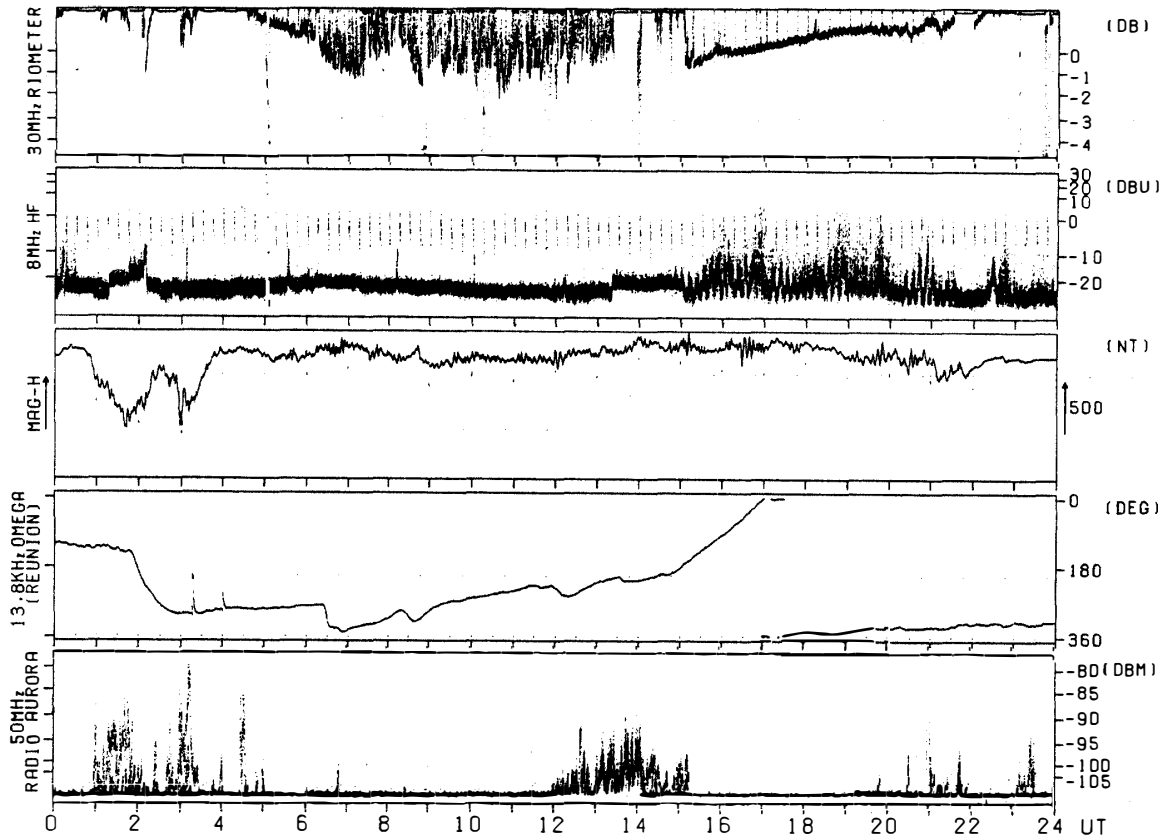
SYOWA STATION

TOTAL DAY/73 1989/3/14



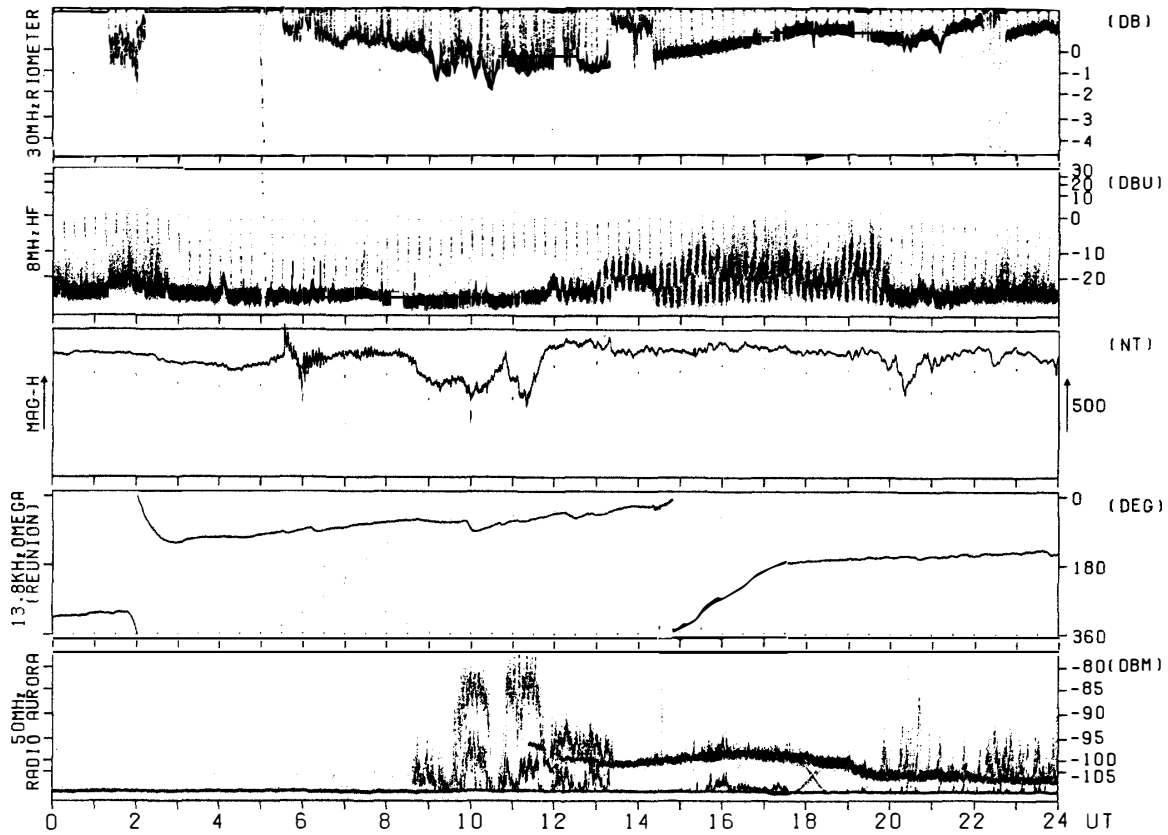
SYOWA STATION

TOTAL DAY/74 1989/3/15

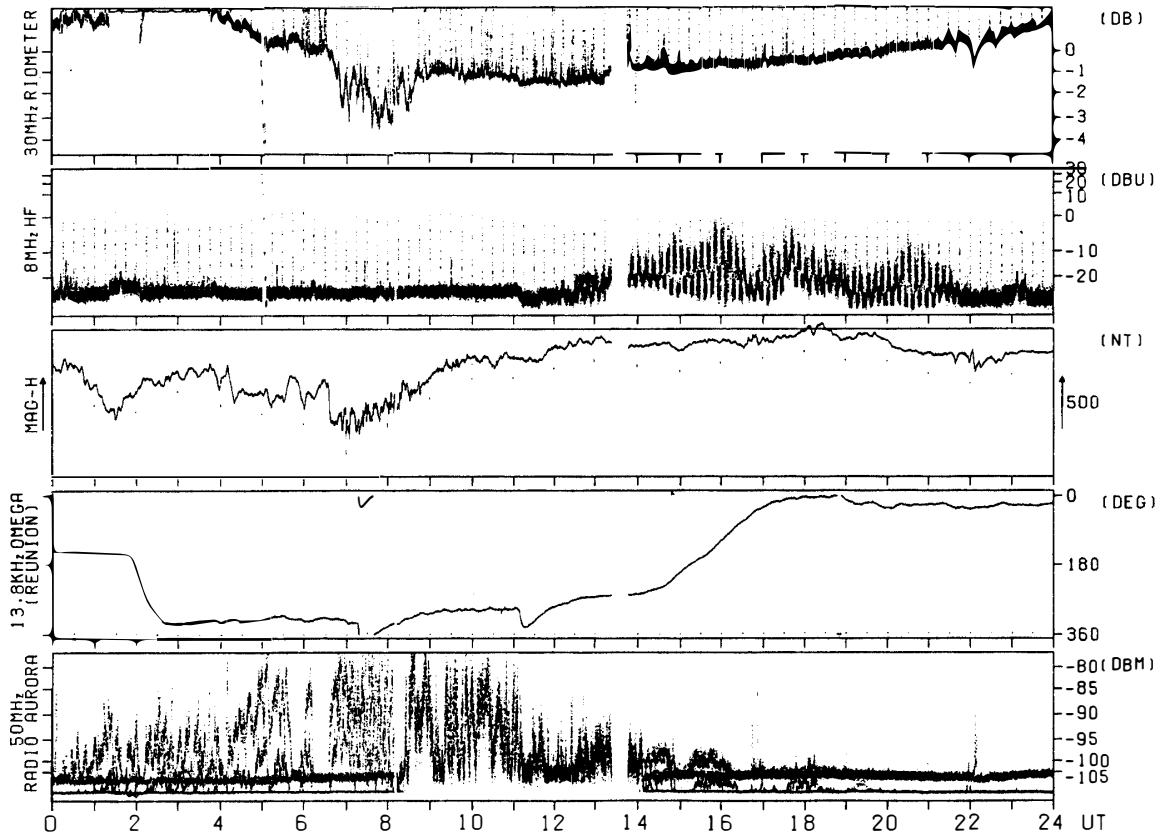


SYOWA STATION

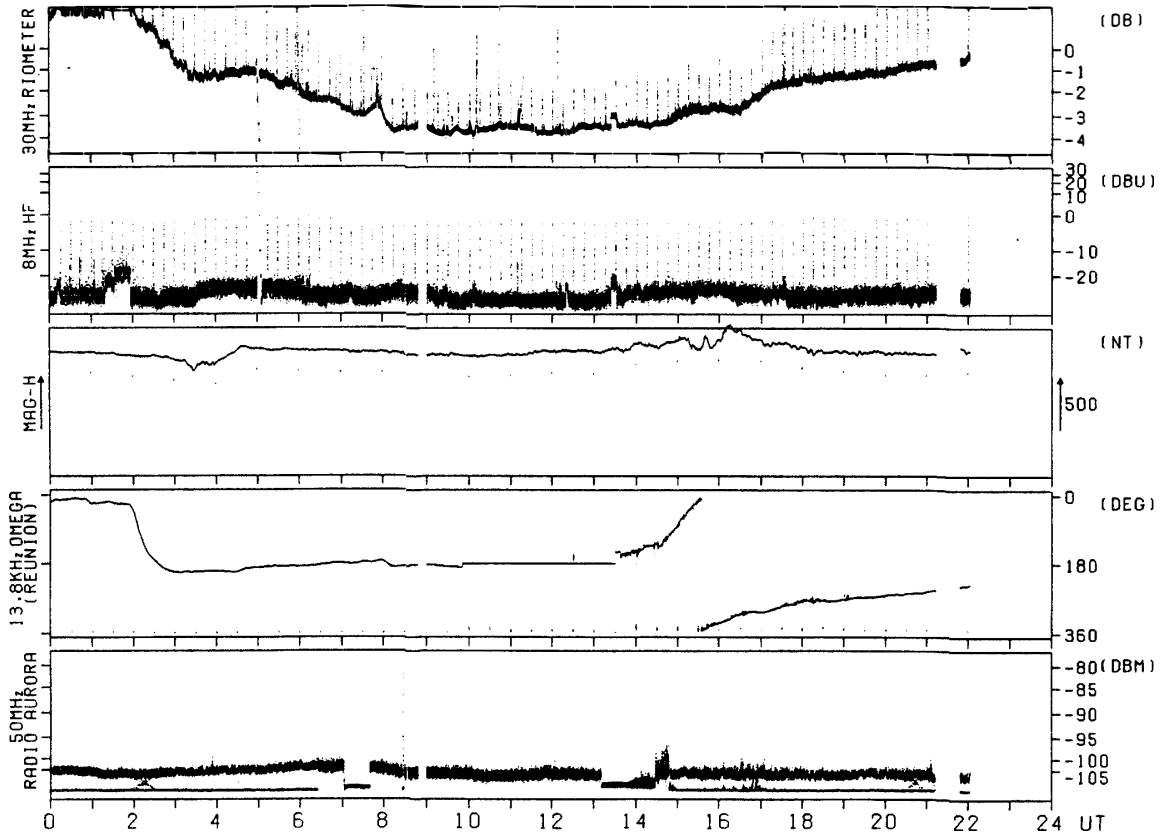
TOTAL DAY/75 1989/3/16



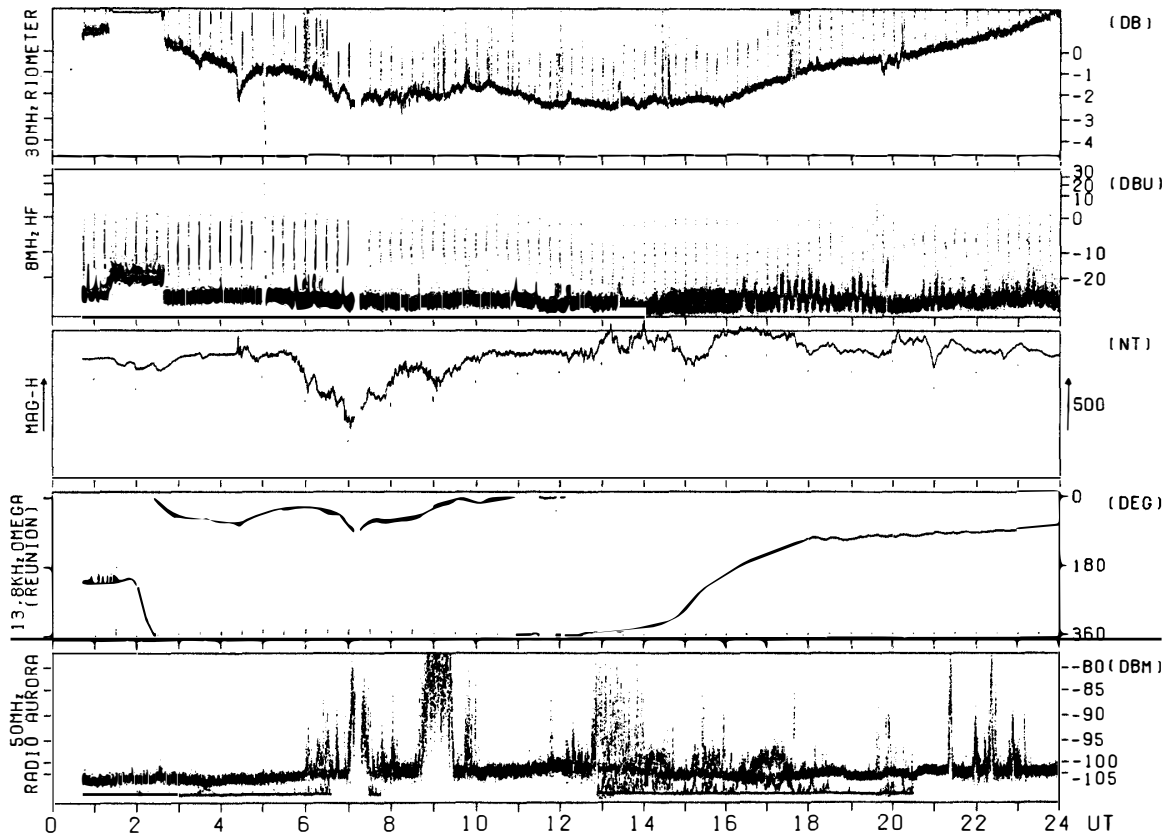
SYOWA STATION TOTAL DAY/76 1989/3/17



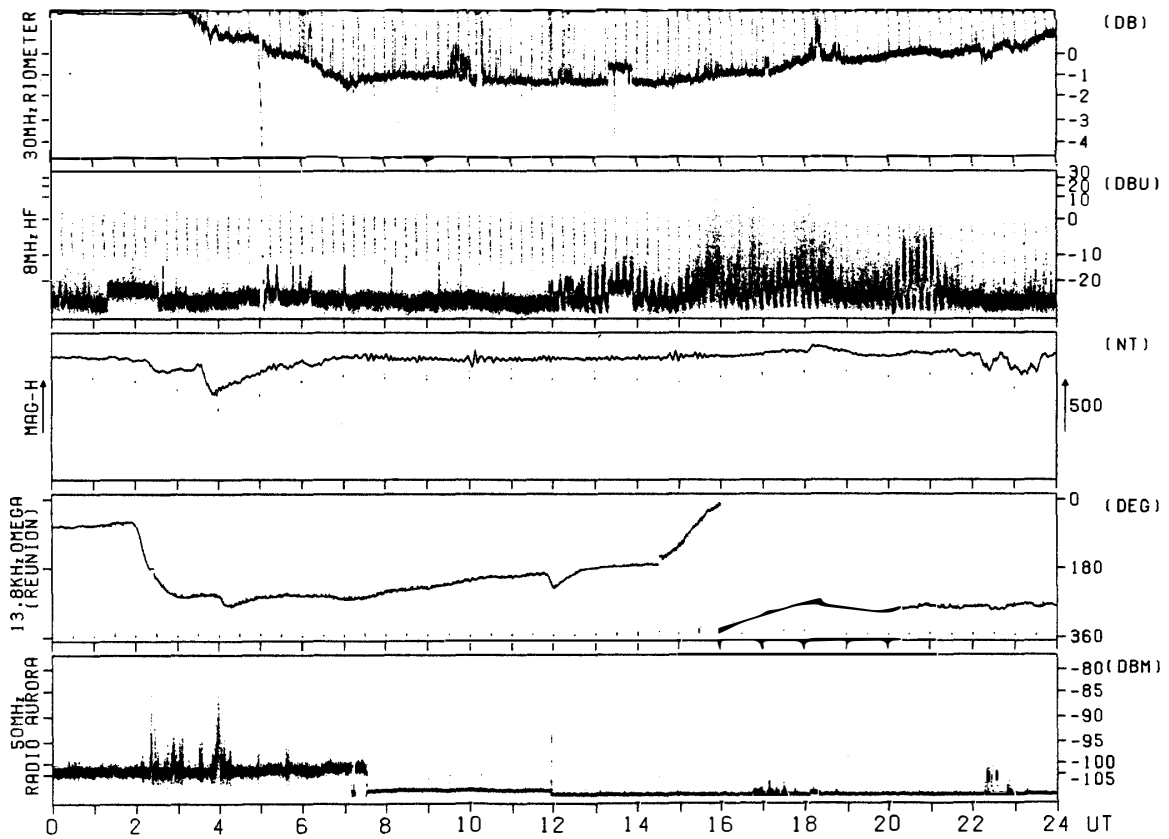
SYOWA STATION TOTAL DAY/77 1989/3/18



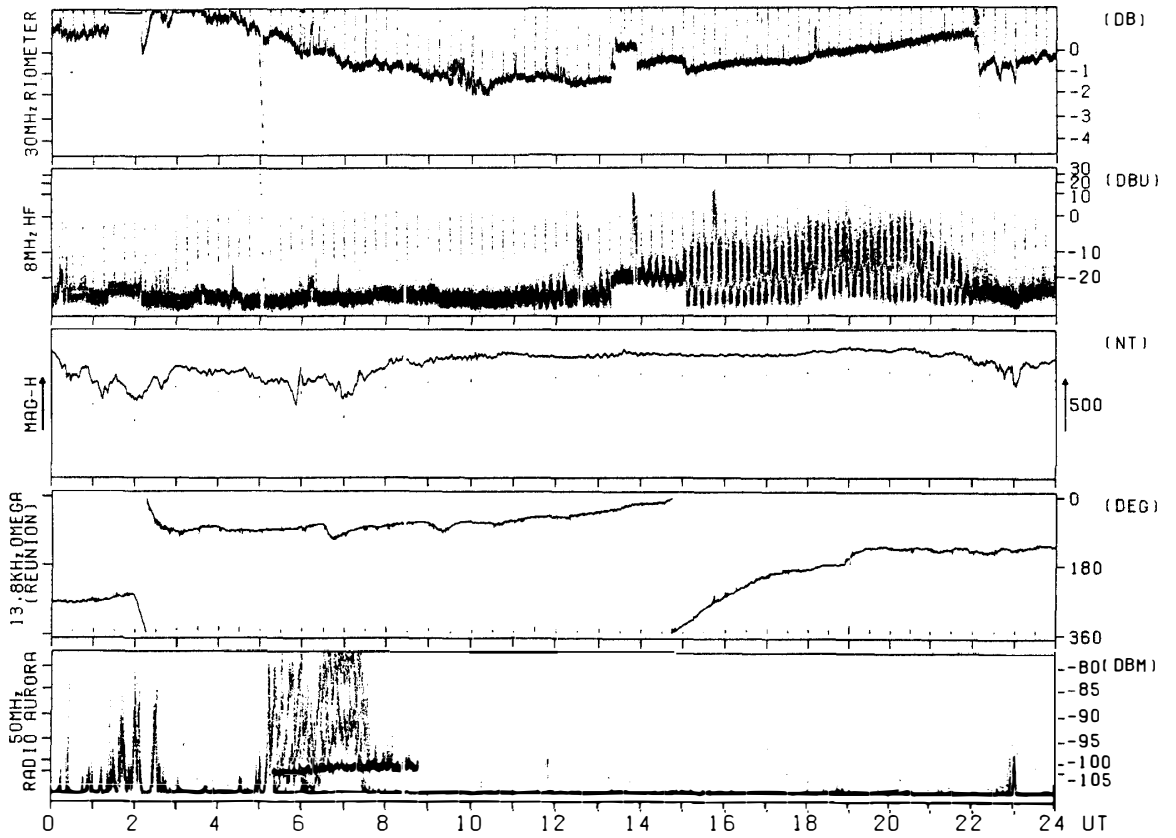
SYOWA STATION TOTAL DAY/78 1989/3/19



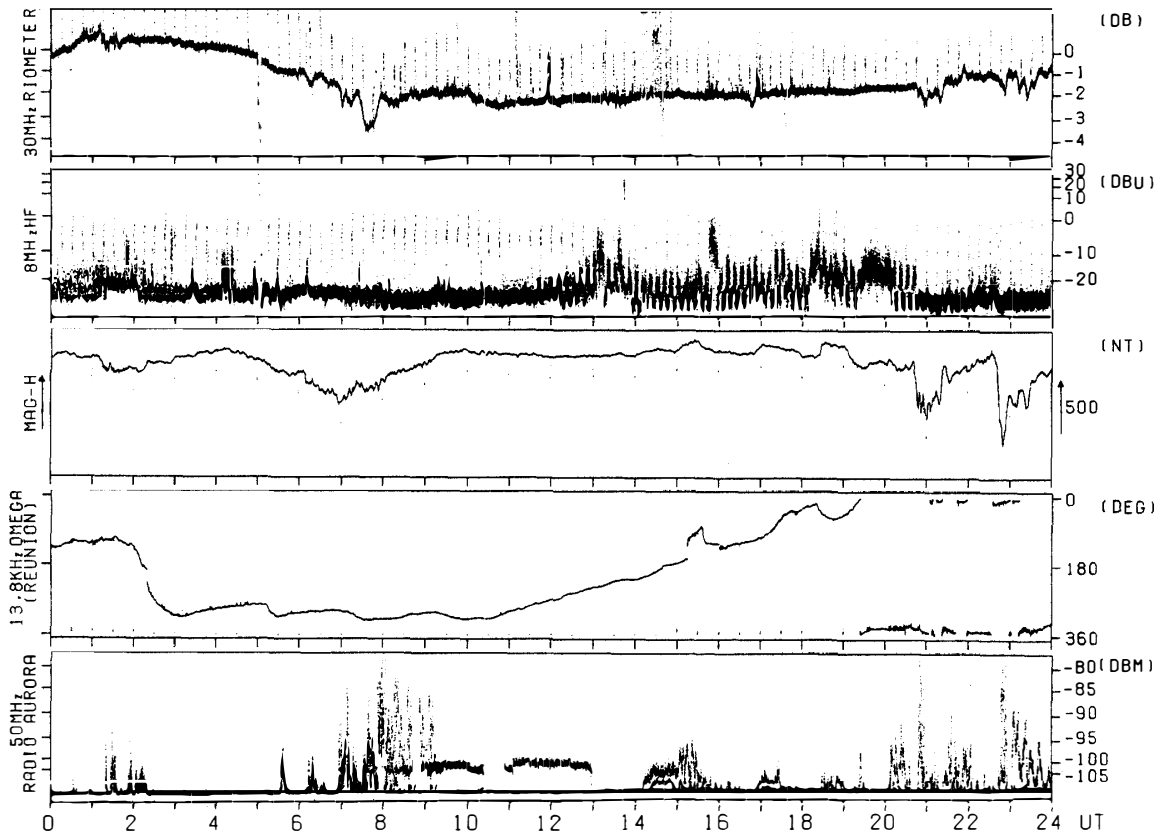
SYOWA STATION TOTAL DAY/79 1989/3/20



SYOWA STATION TOTAL DAY/80 1989/3/21

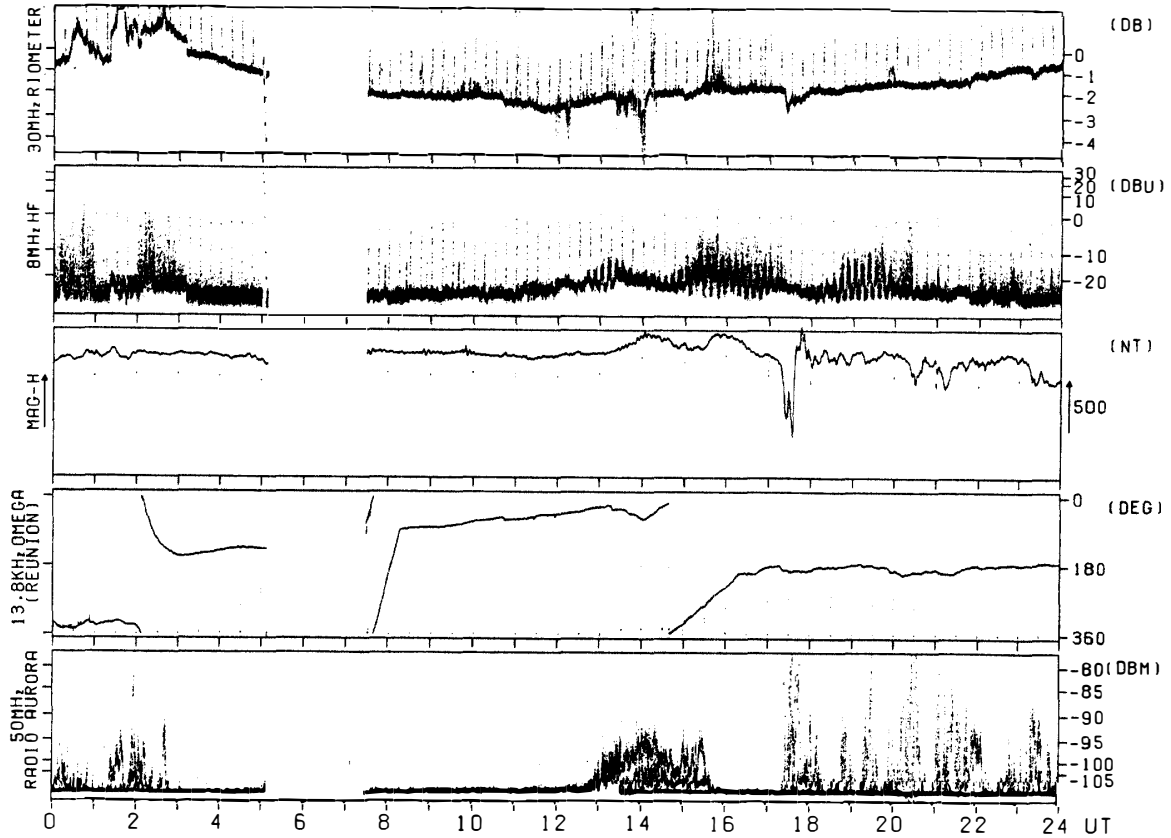


SYOWA STATION TOTAL DAY/81 1989/3/22



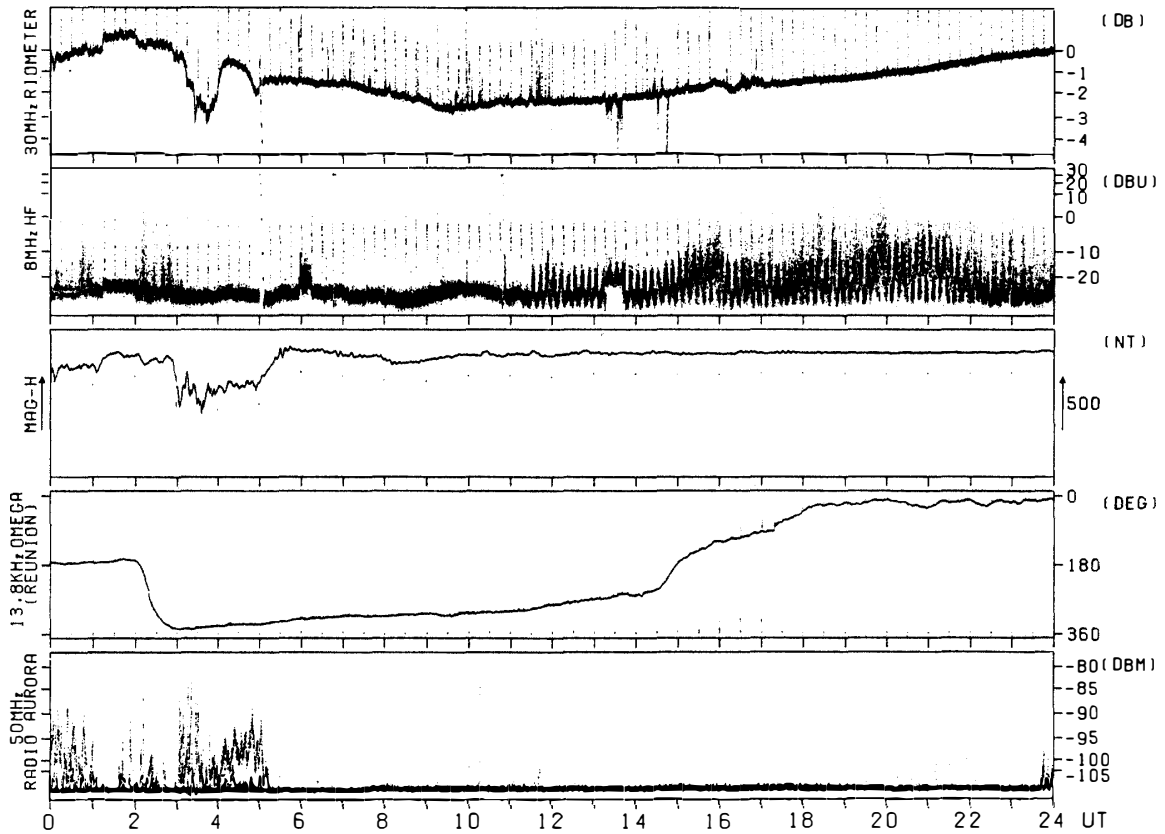
SYOWA STATION

TOTAL DAY/82 1989/3/23

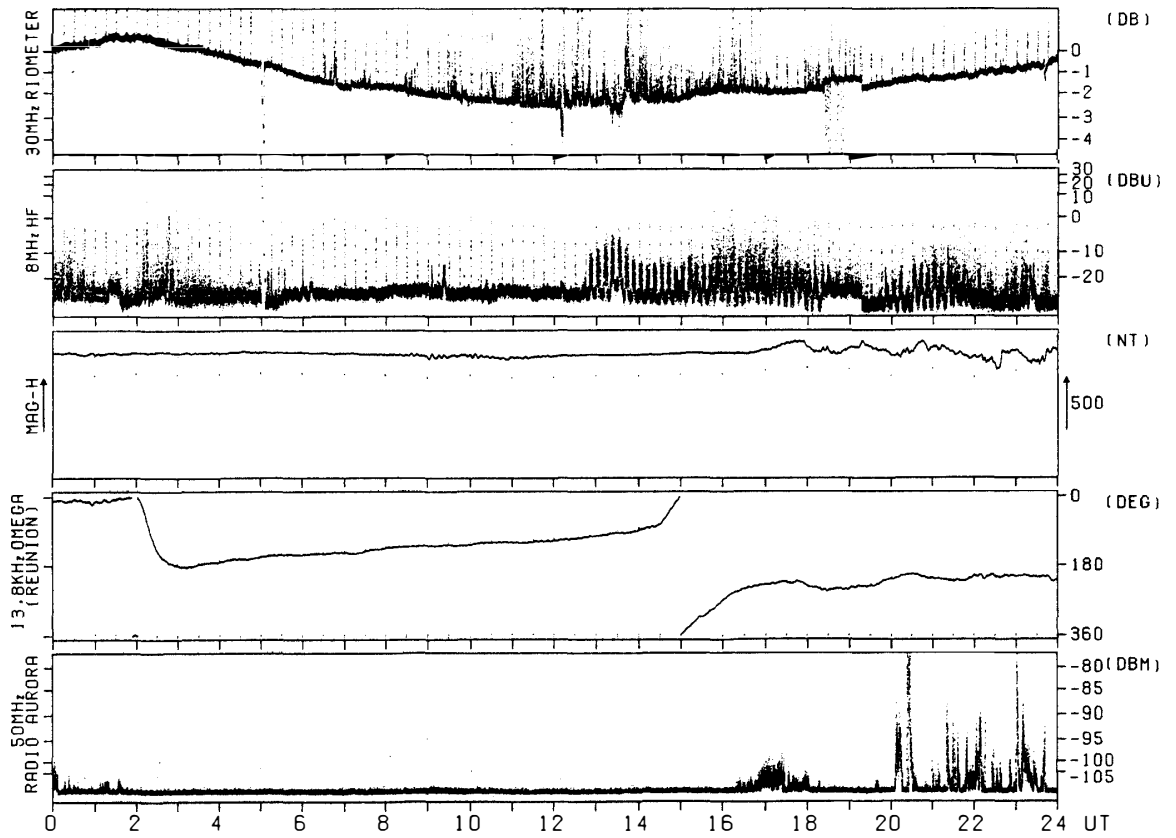


SYOWA STATION

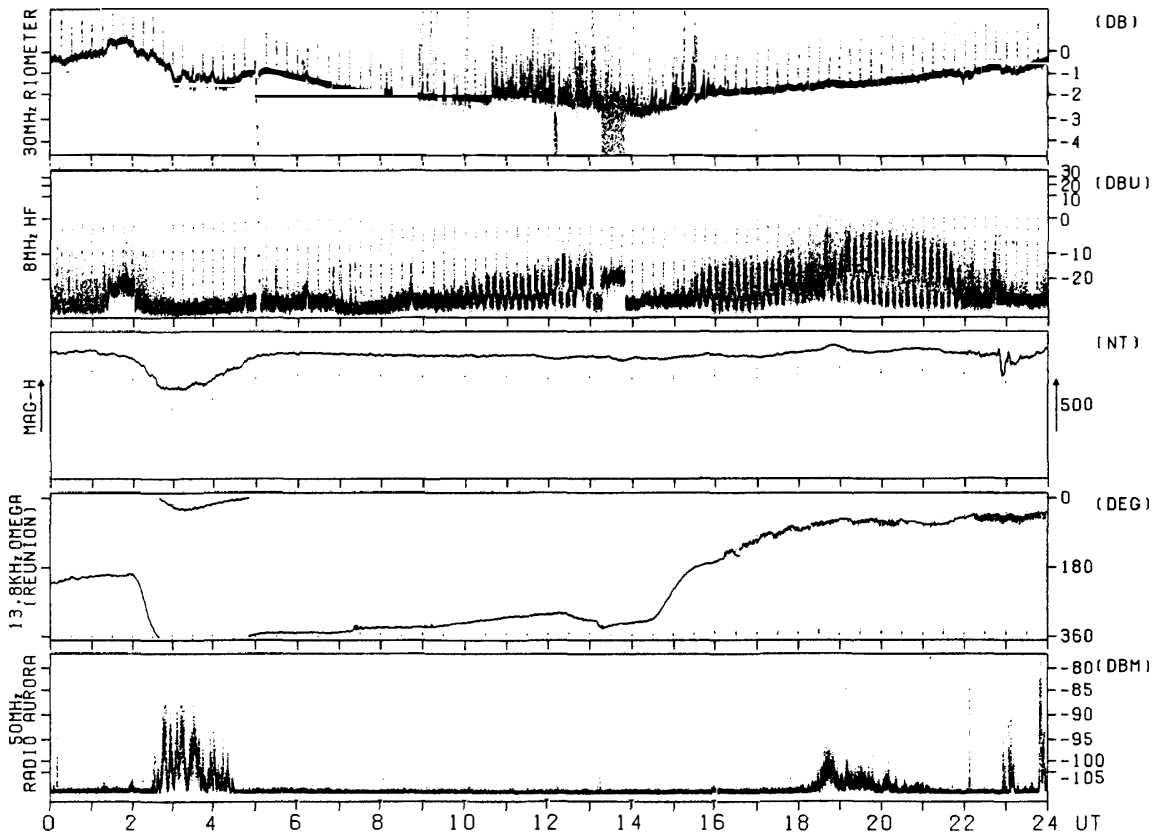
TOTAL DAY/83 1989/3/24



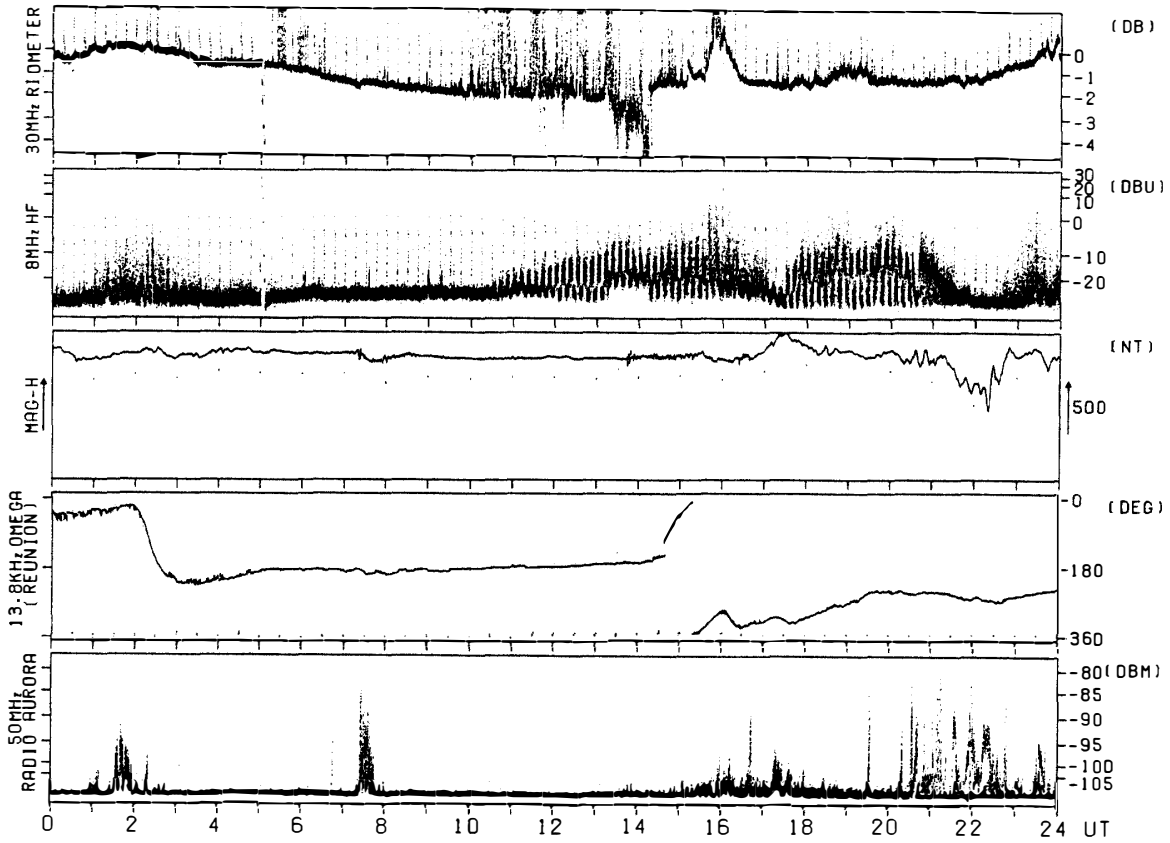
SYOWA STATION TOTAL DAY/84 1989/3/25



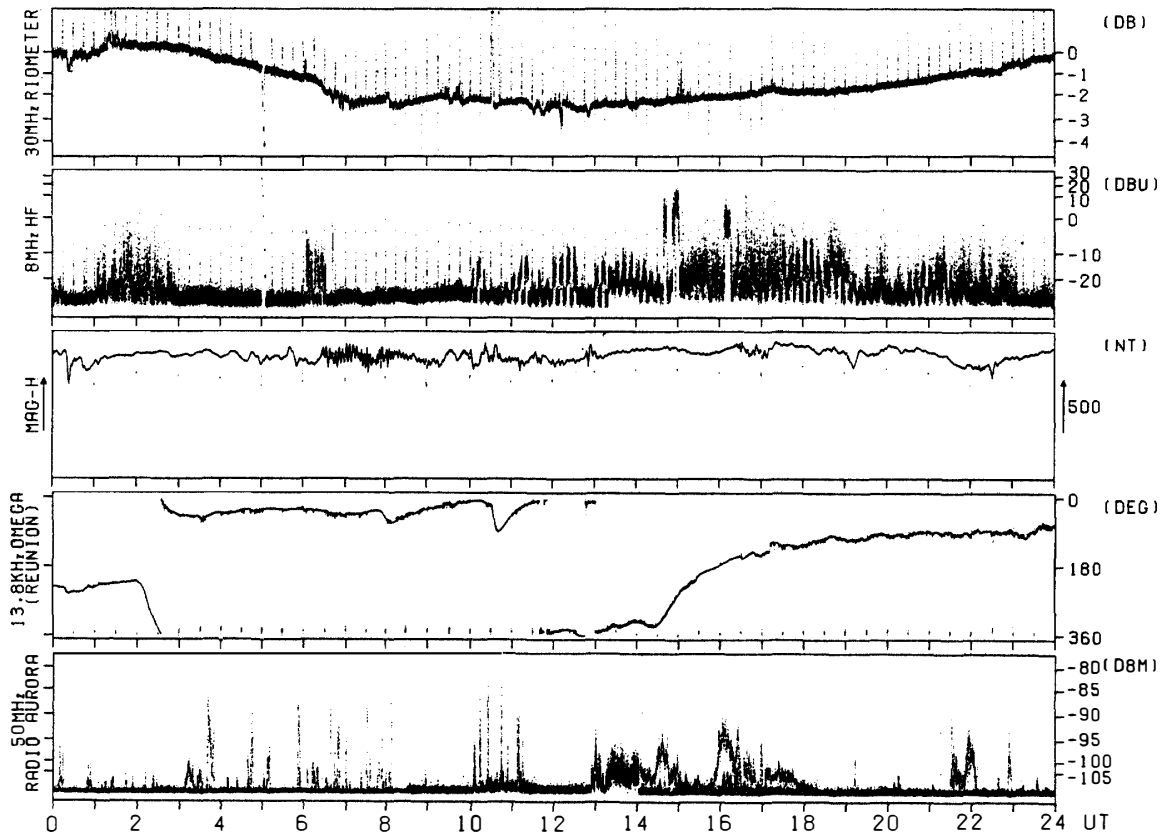
SYOWA STATION TOTAL DAY/85 1989/3/26



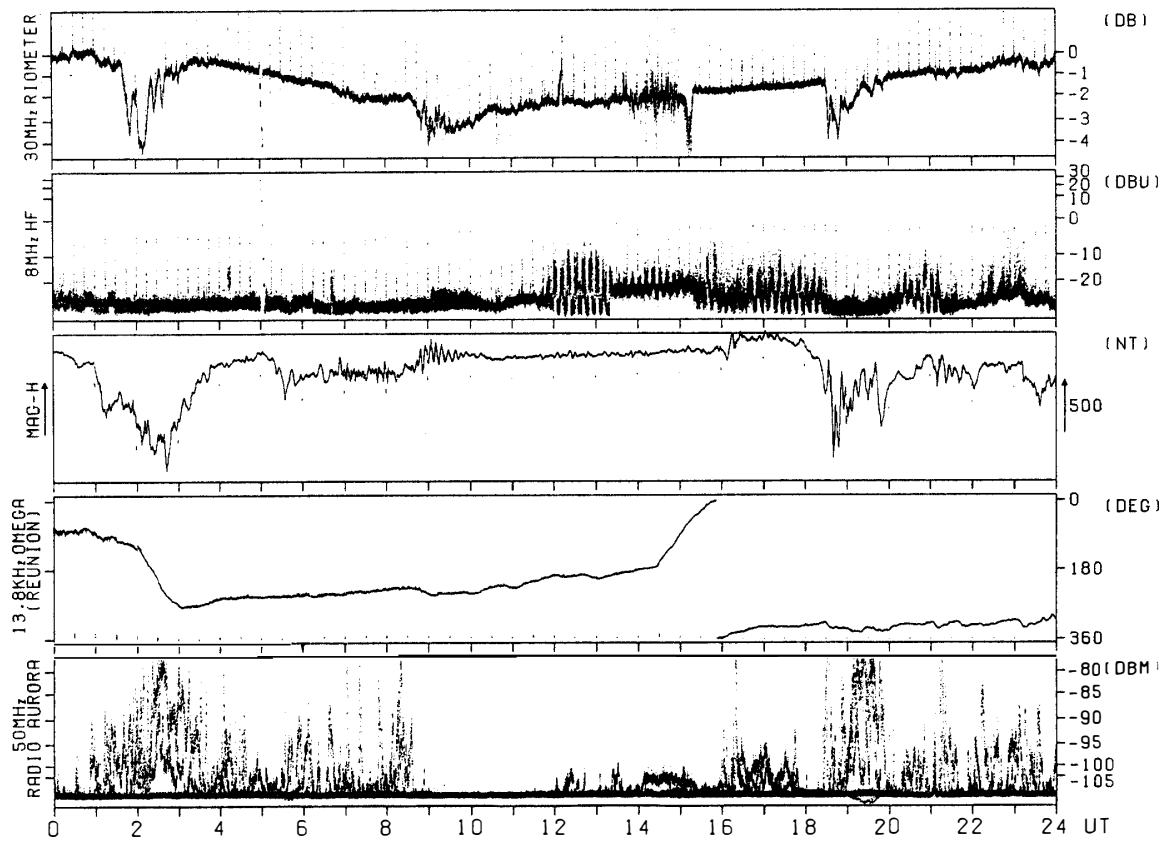
SYOWA STATION TOTAL DAY/86 1989/3/27



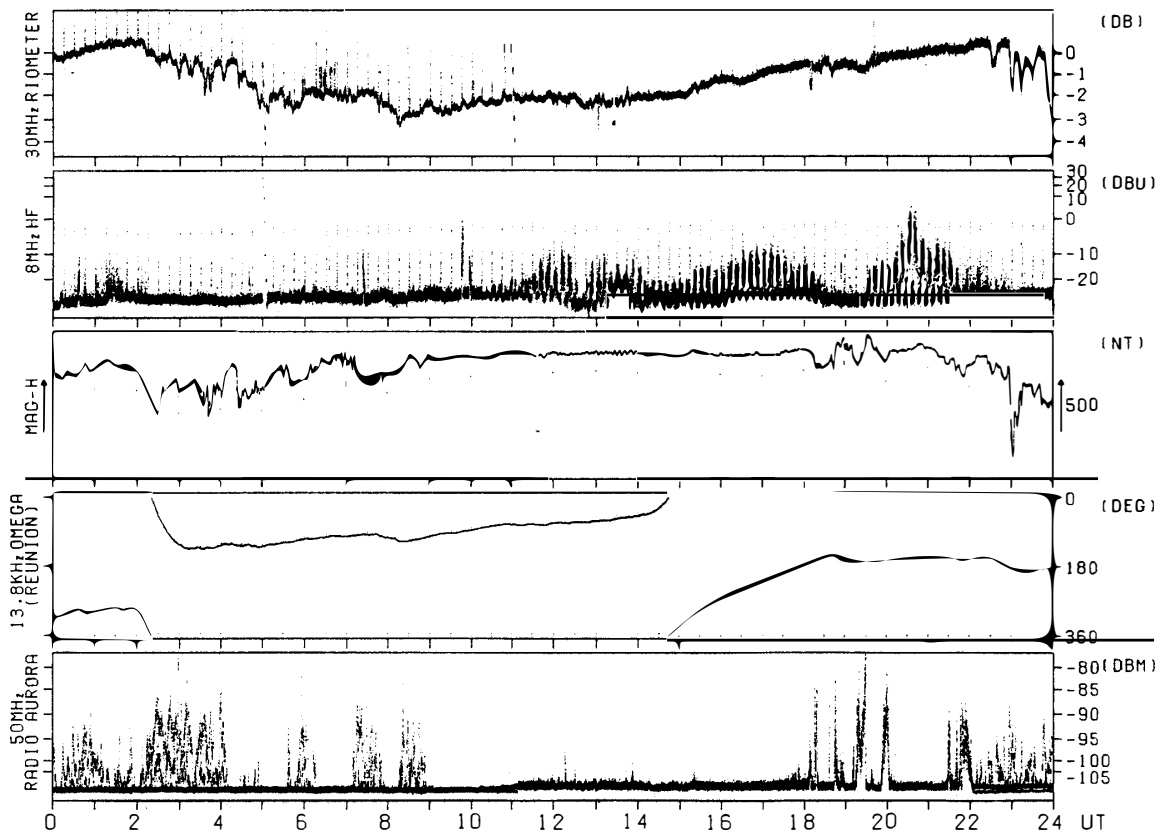
SYOWA STATION TOTAL DAY/87 1989/3/28



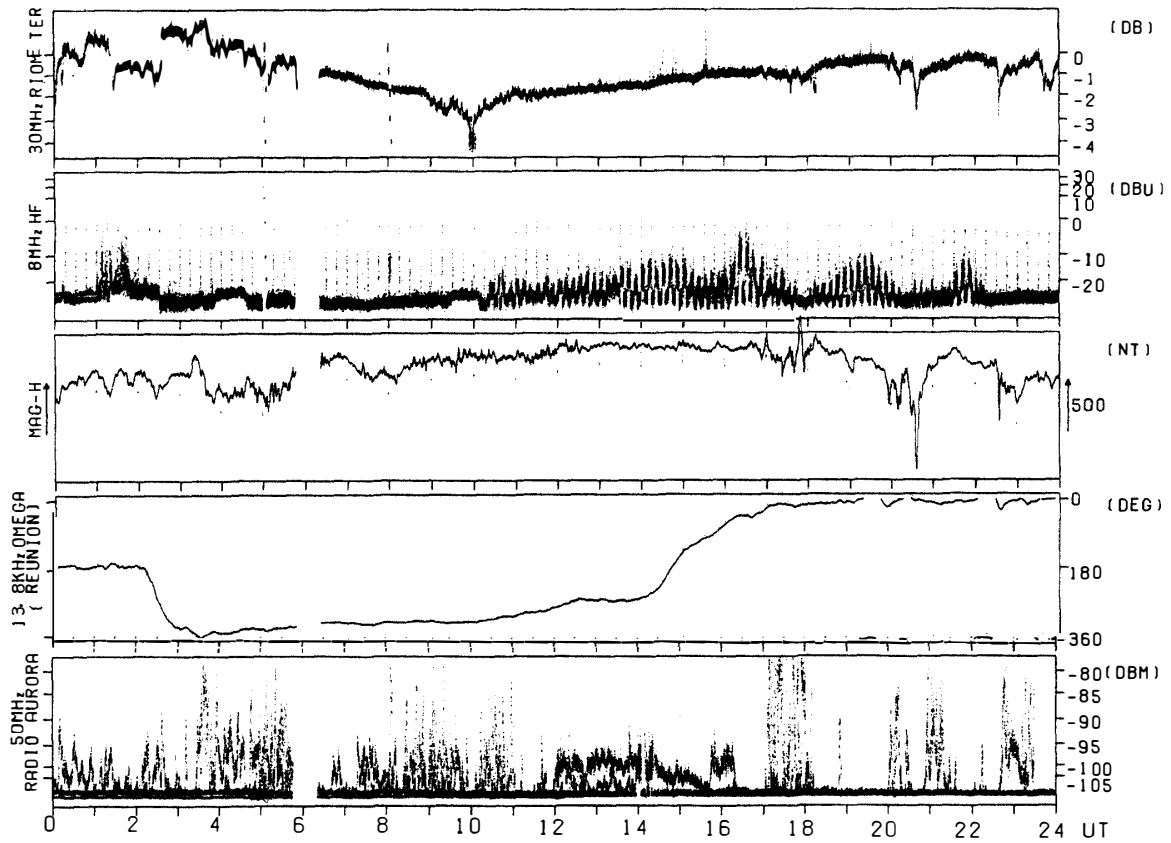
SYOWA STATION TOTAL DAY/88 1989/3/29



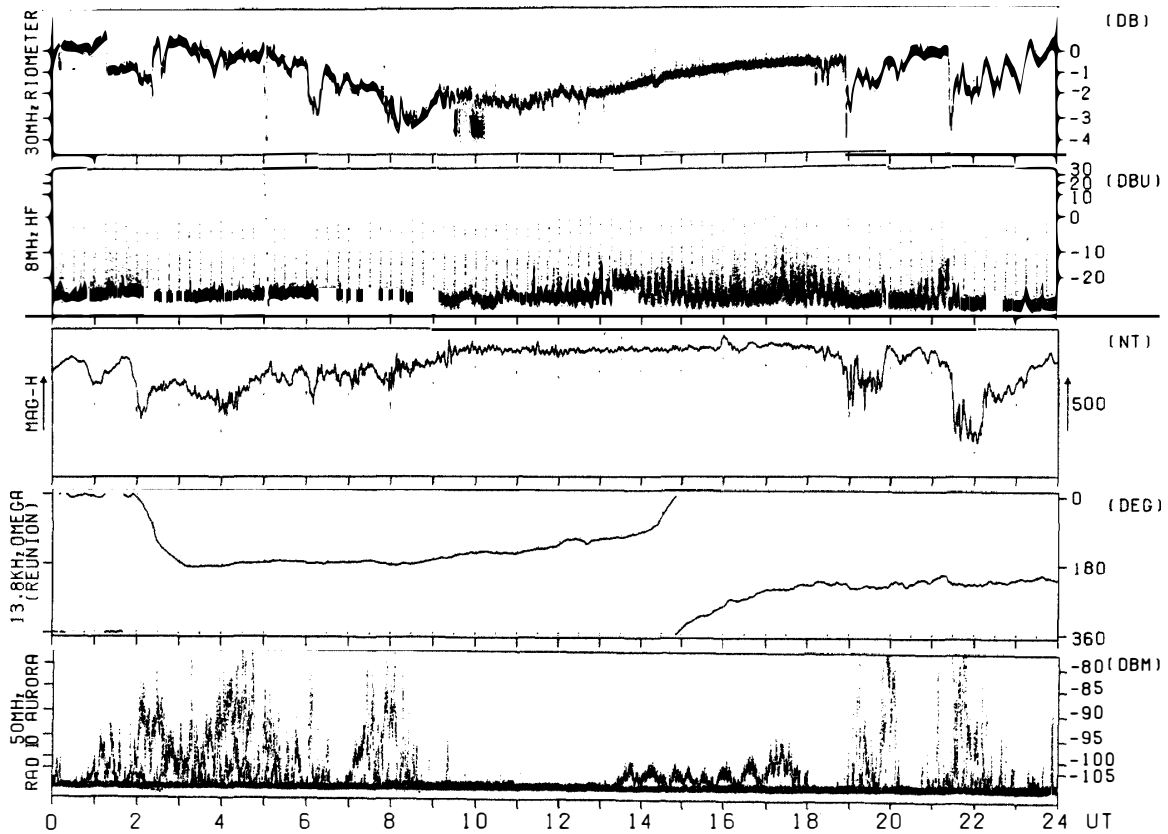
SYOWA STATION TOTAL DAY/89 1989/3/30



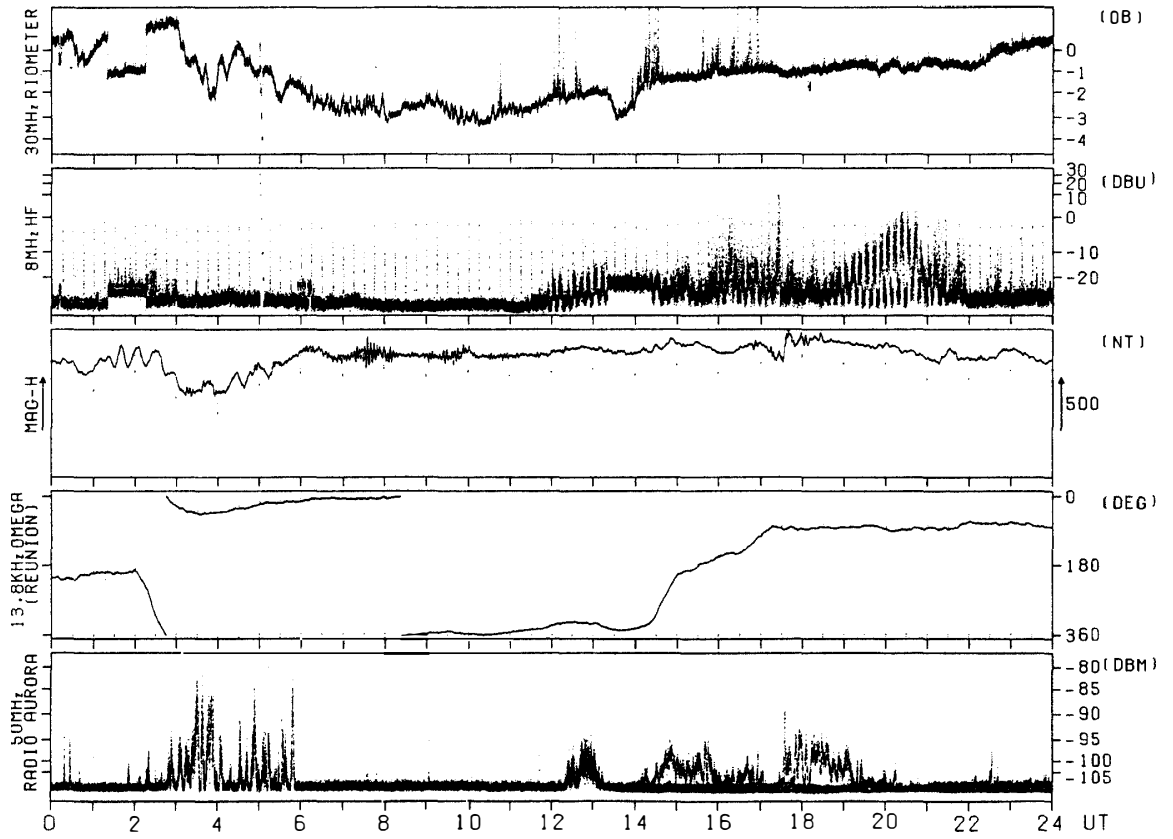
SYOWA STATION TOTAL DAY/90 1989/3/31



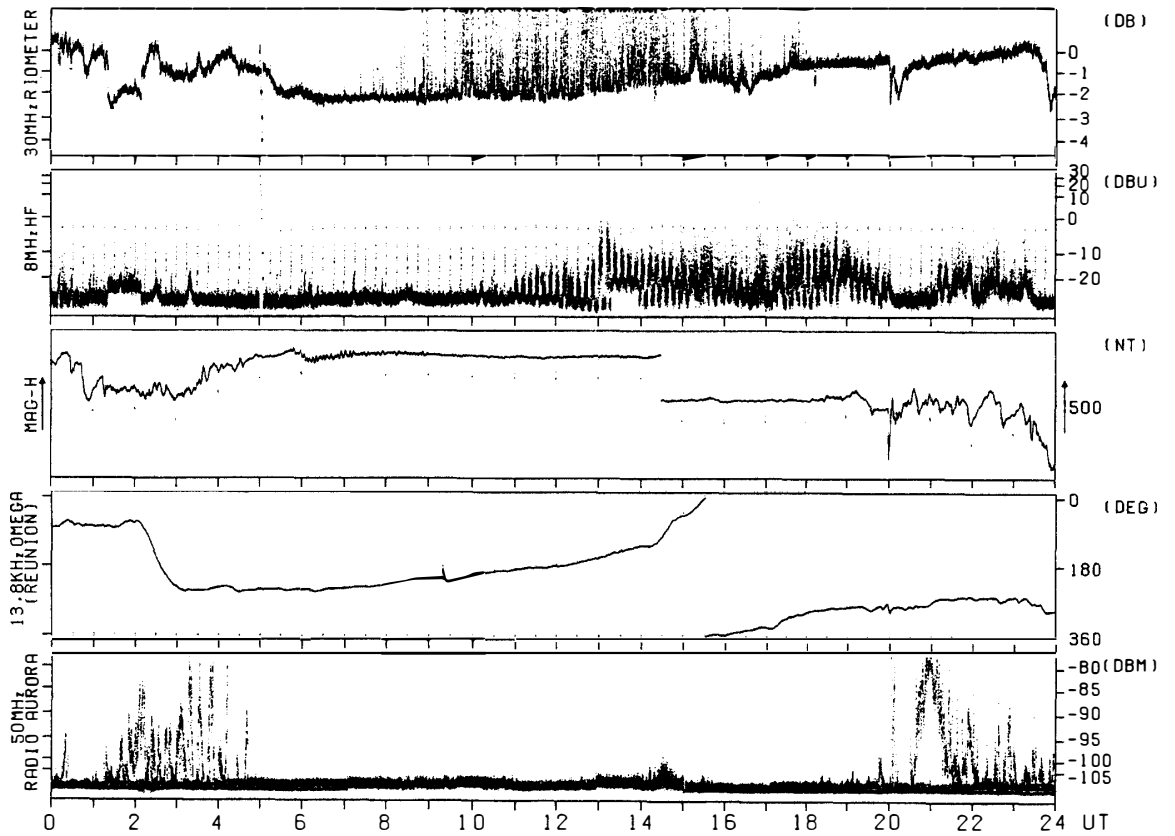
SYOWA STATION TOTAL DAY/91 1989/4/1



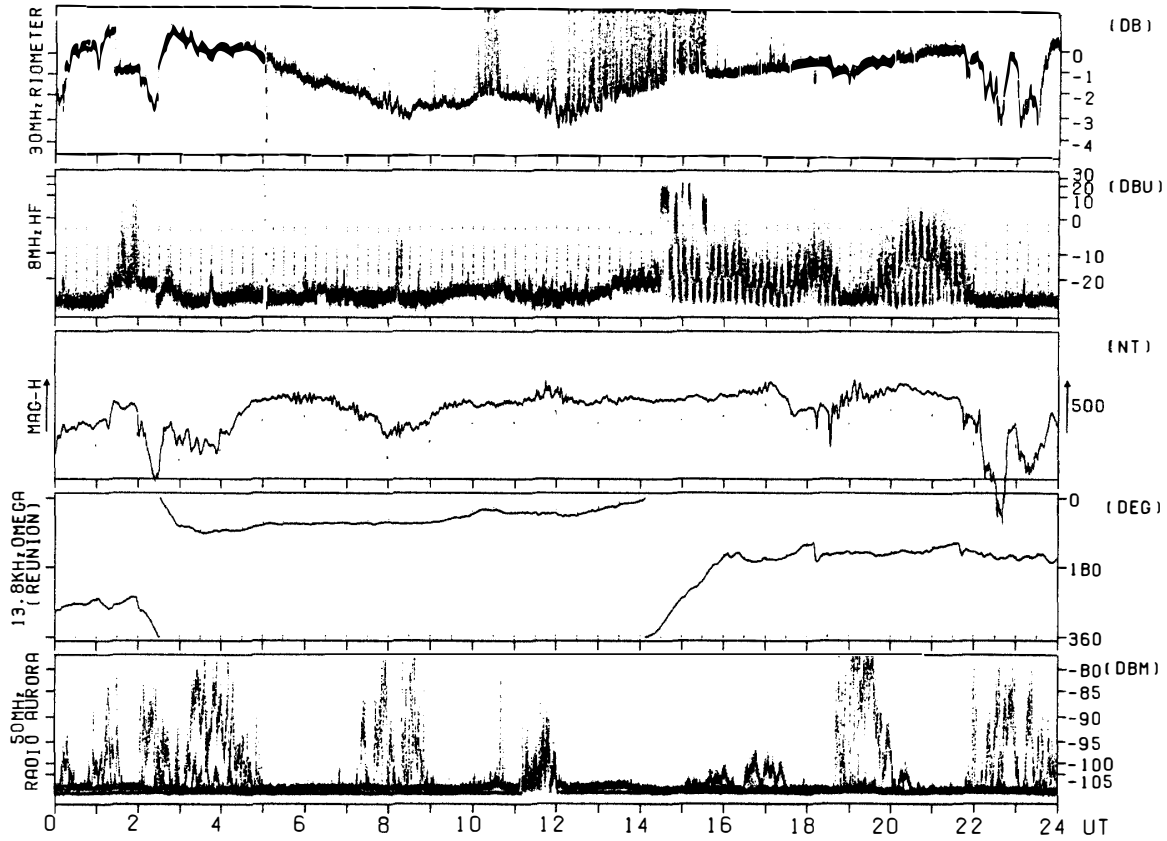
SYOWA STATION TOTAL DAY/92 1989/4/2



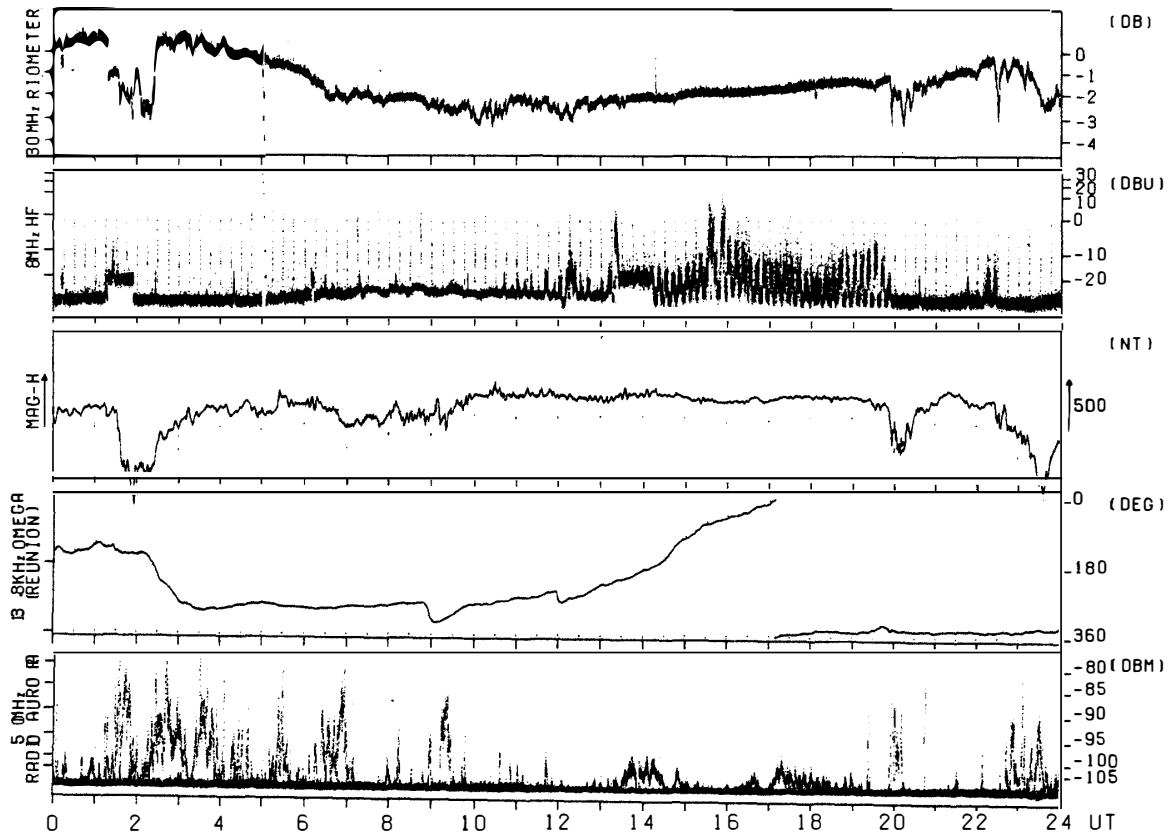
SYOWA STATION TOTAL DAY/93 1989/4/3



SYOWA STATION TOTAL DAY/94 1989/4/4

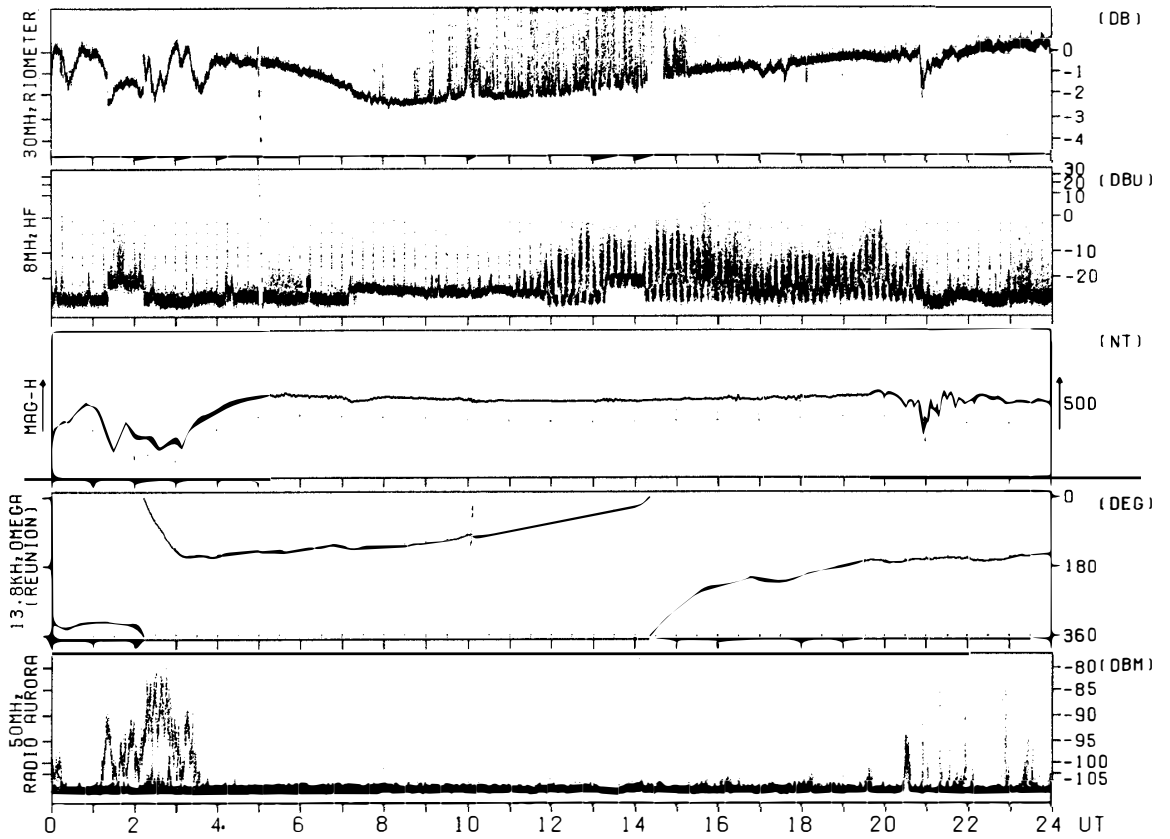


SYOWA STATION TOTAL DAY/95 1989/4/5



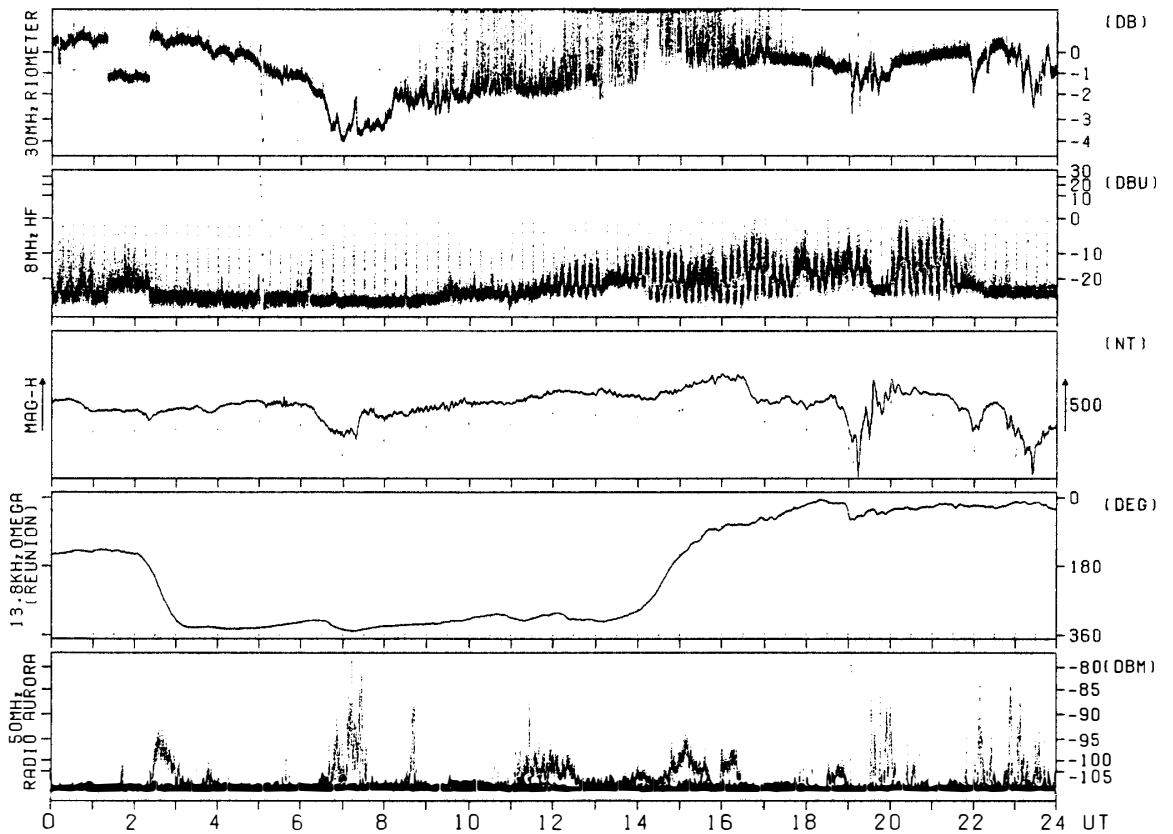
SYOWA STATION

TOTAL DAY/96 1989/4/6

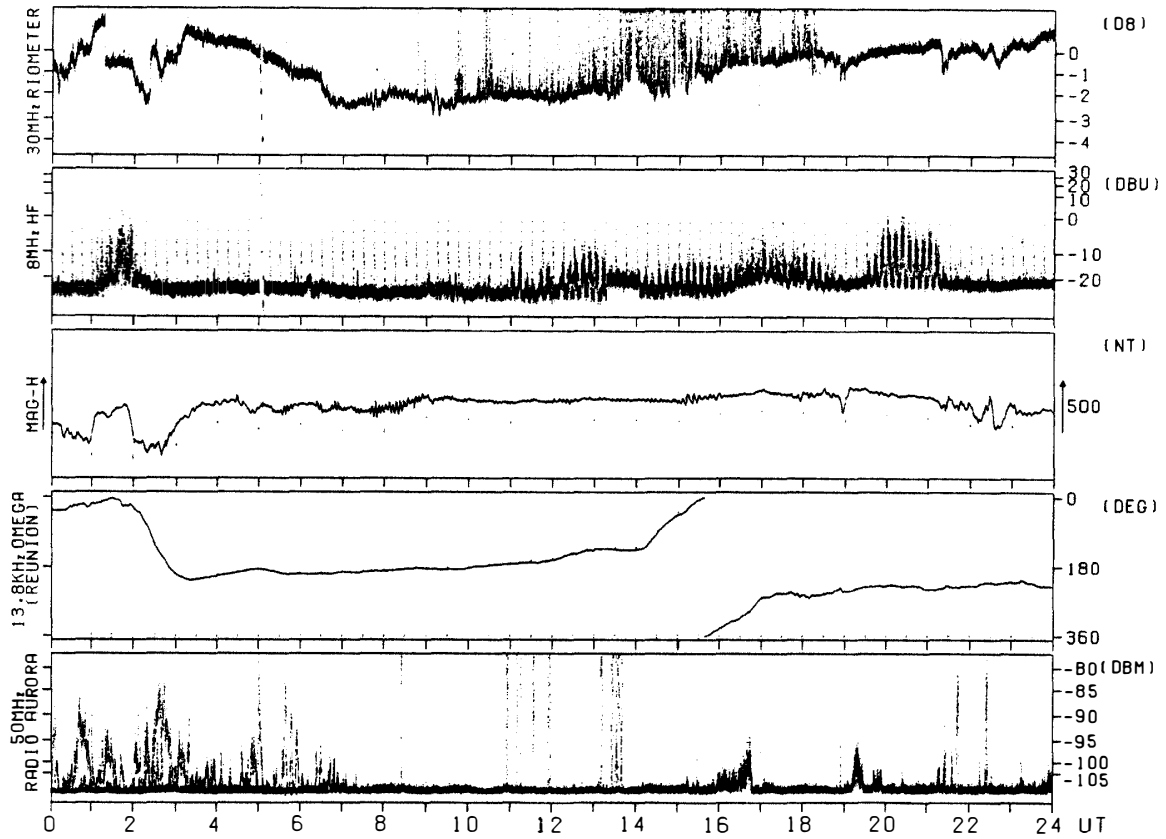


SYOWA STATION

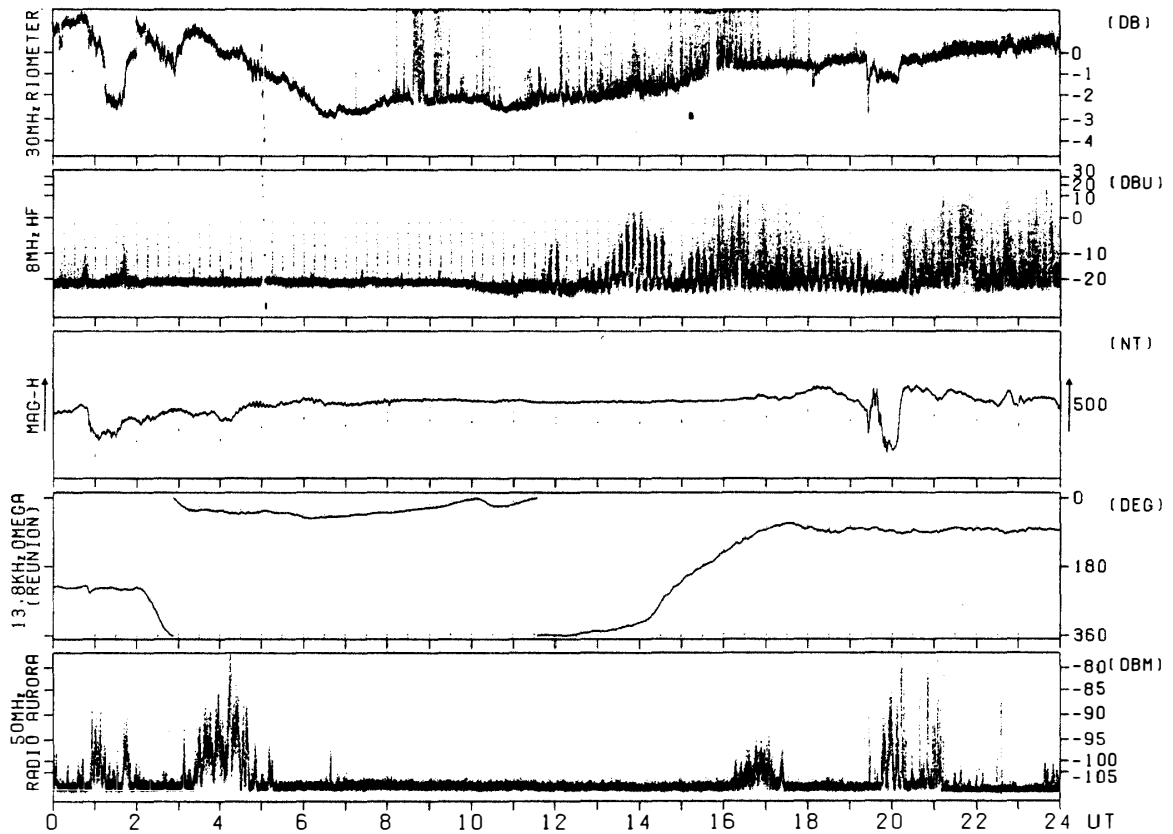
TOTAL DAY/97 1989/4/7



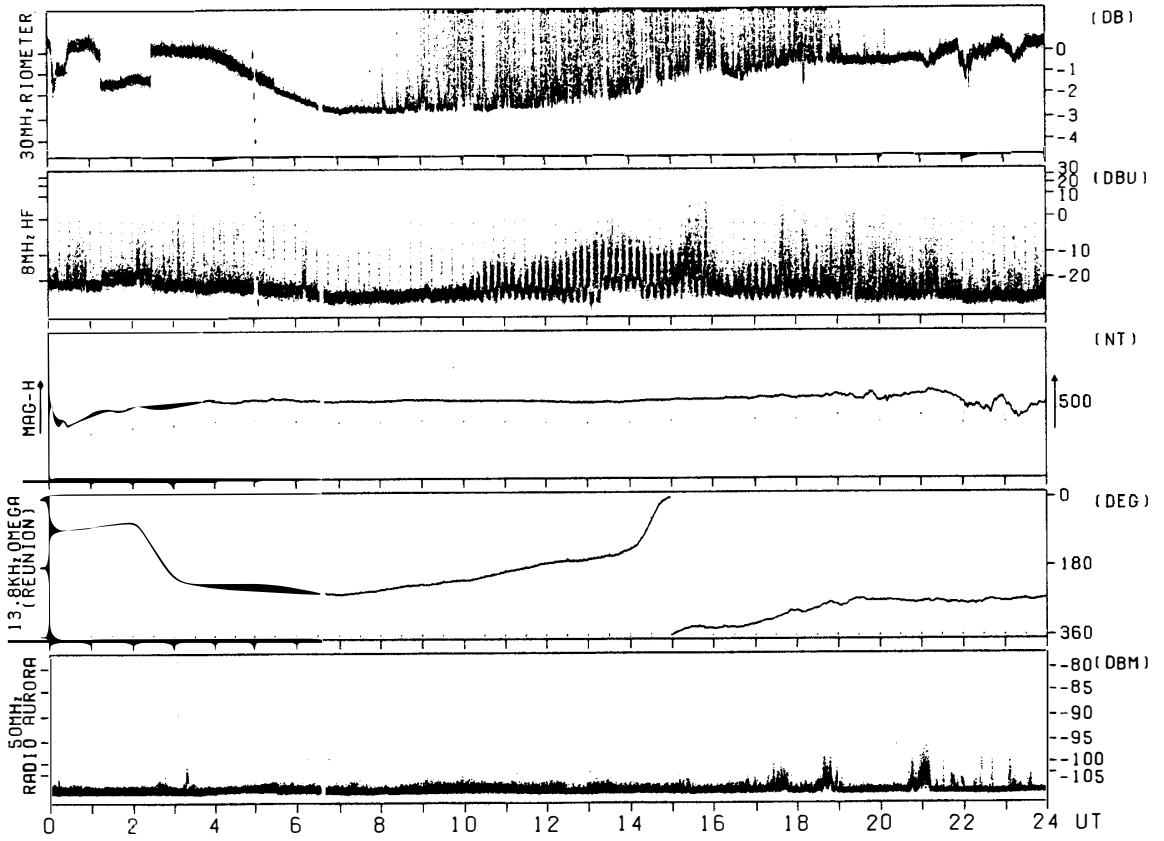
SYOWA STATION TOTAL DAY/98 1989/4/8



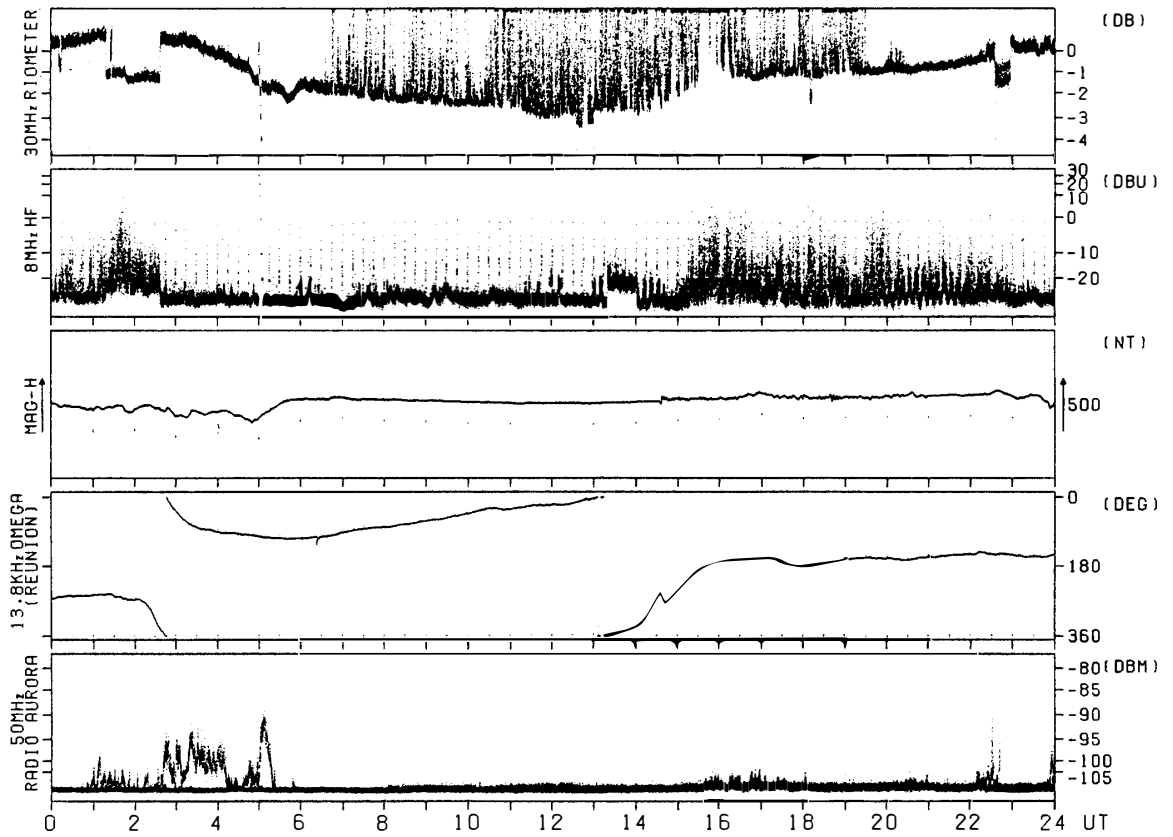
SYOWA STATION TOTAL DAY/99 1989/4/9



SYOWA STATION TOTAL DAY/100 1989/4/10

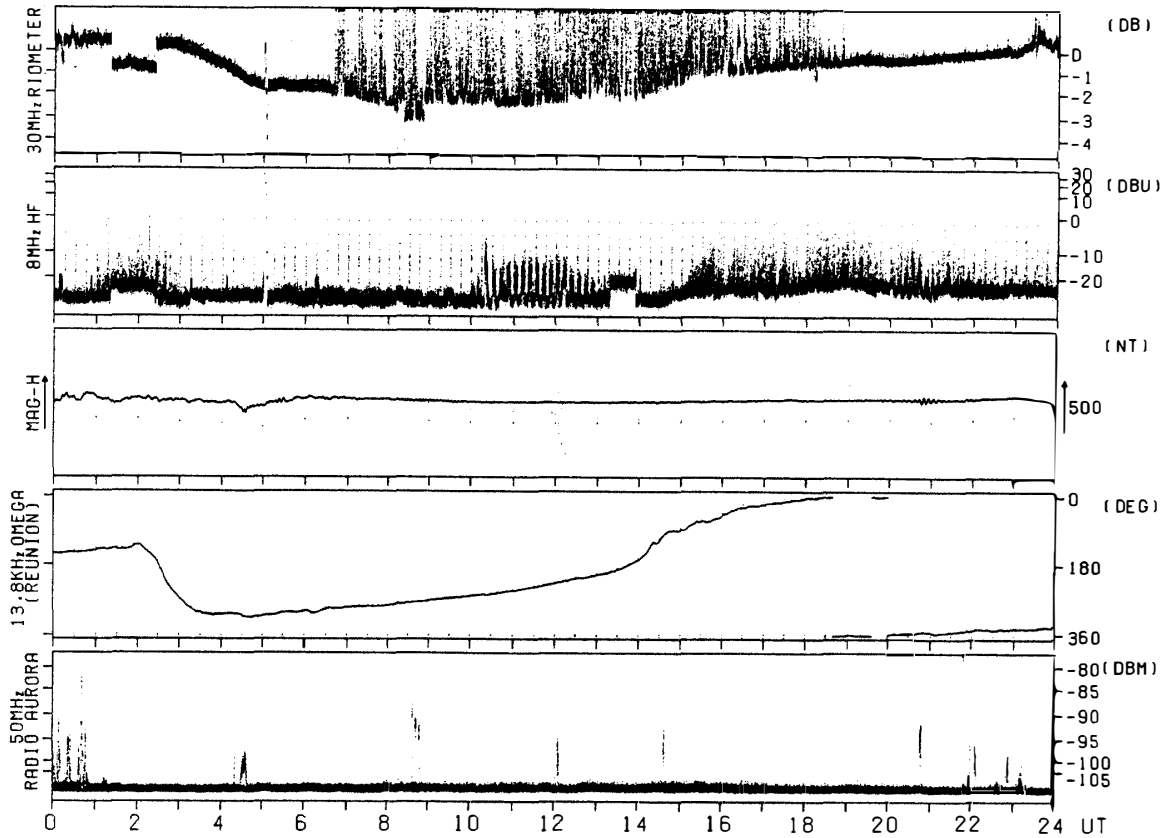


SYOWA STATION TOTAL DAY/101 1989/4/11



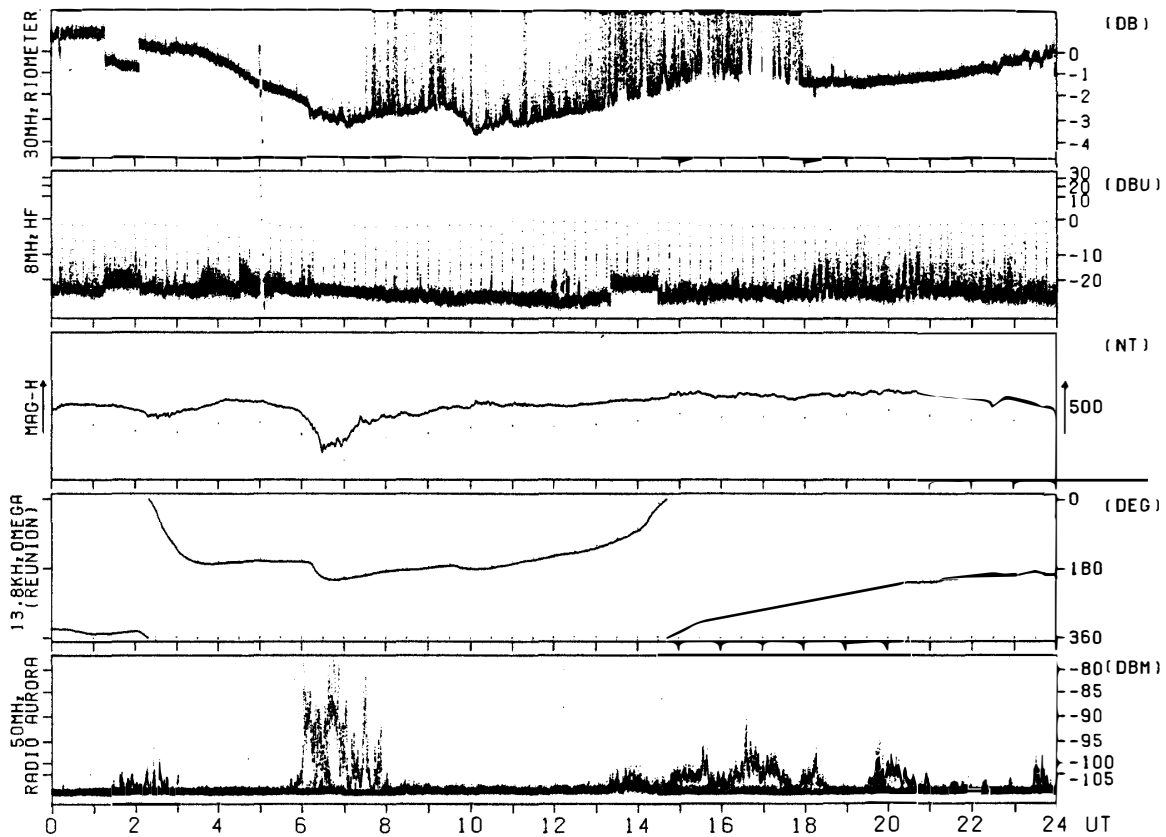
SYOWA STATION

TOTAL DAY/102 1989/4/12

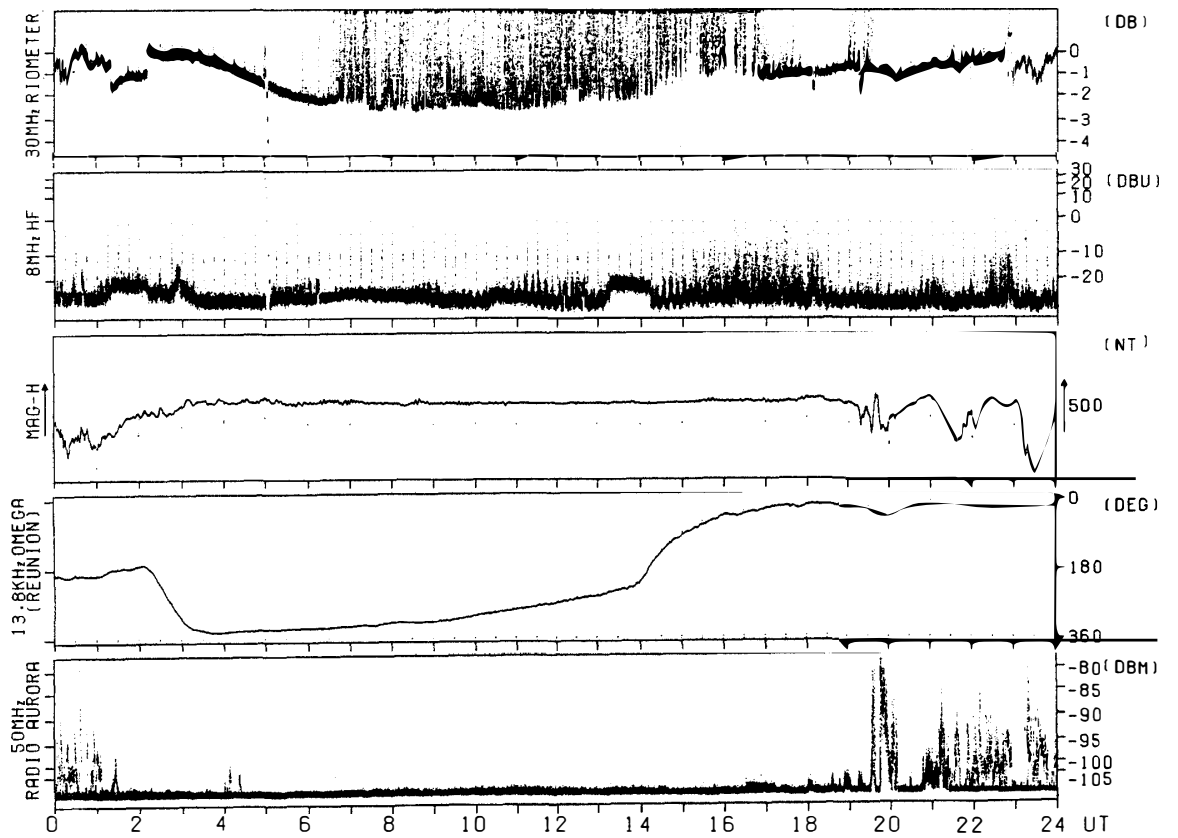


SYOWA STATION

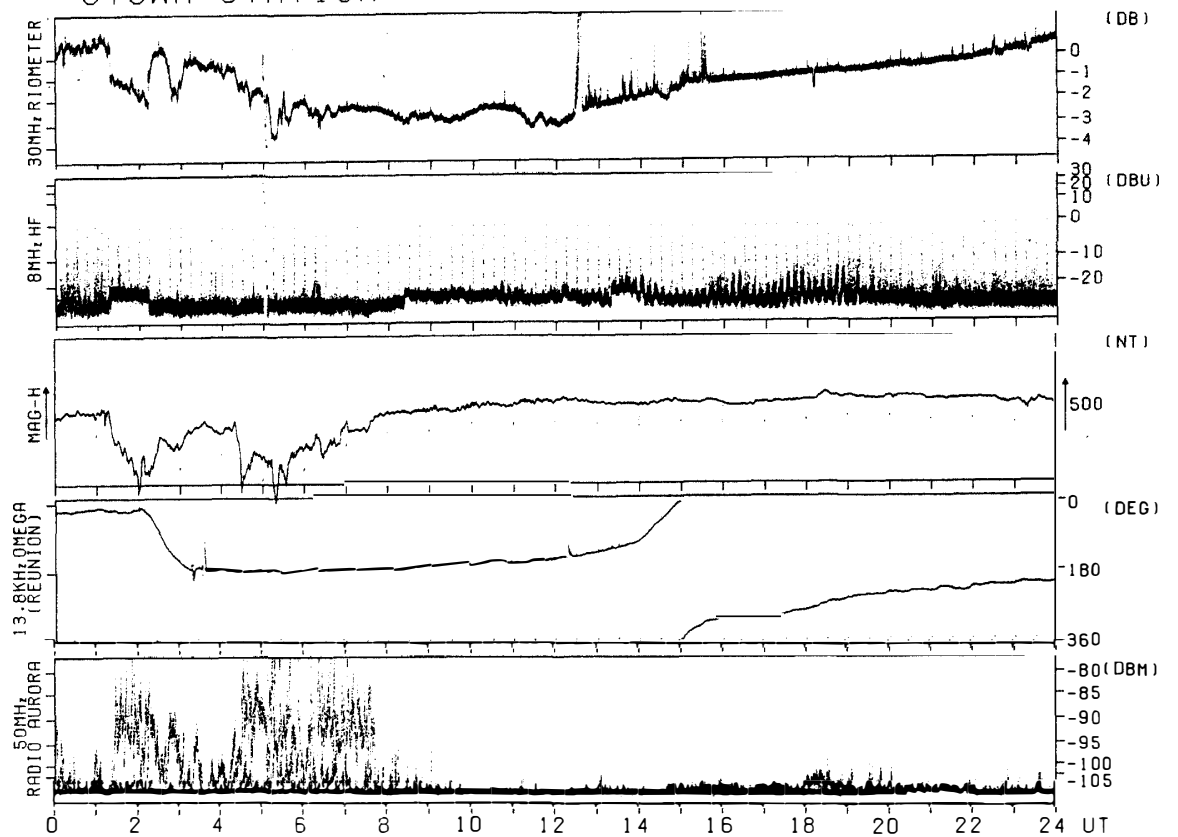
TOTAL DAY/103 1989/4/13



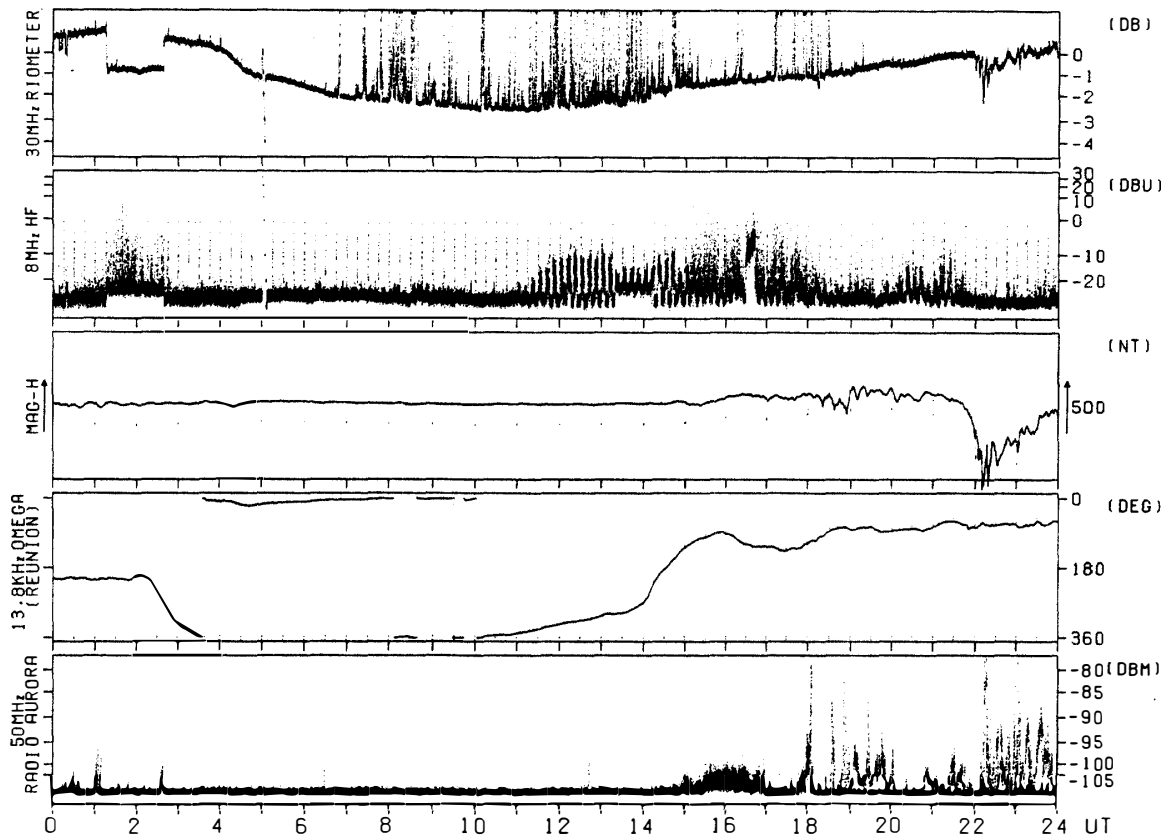
SYOWA STATION TOTAL DAY/104 1989/4/14



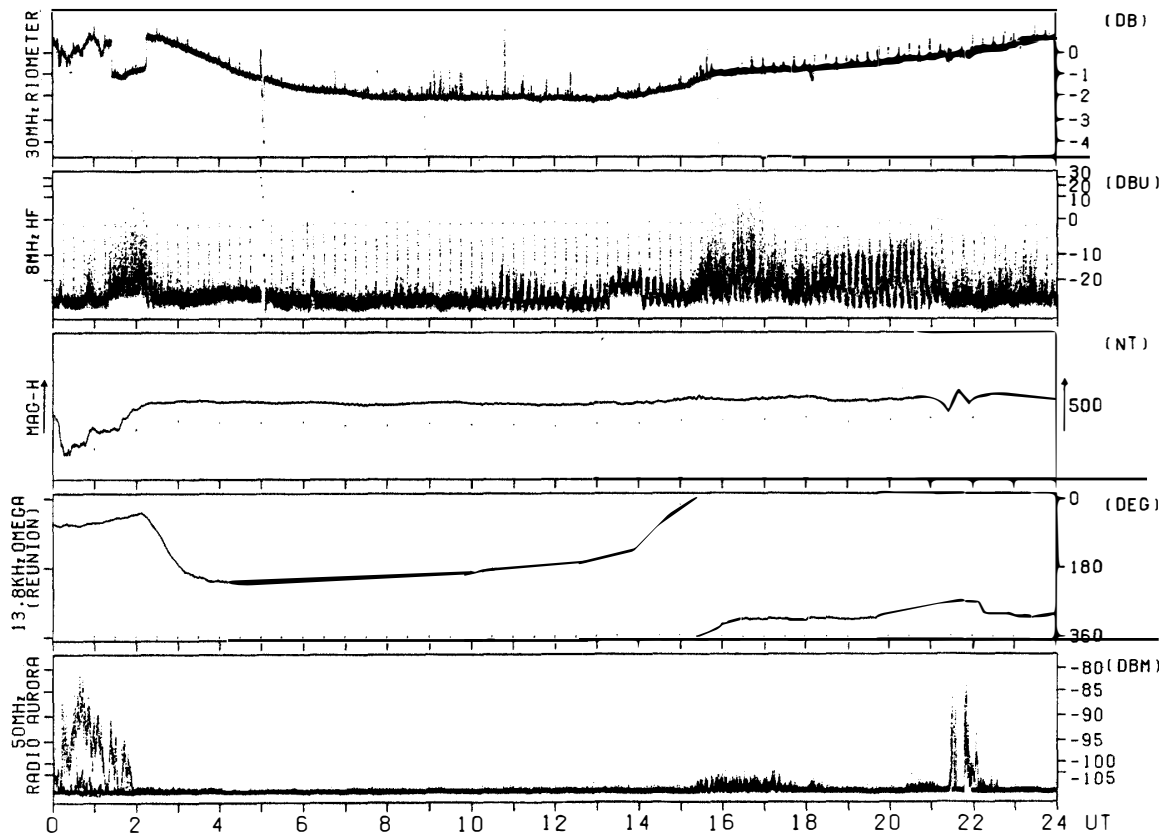
SYOWA STATION TOTAL DAY/105 1989/4/15



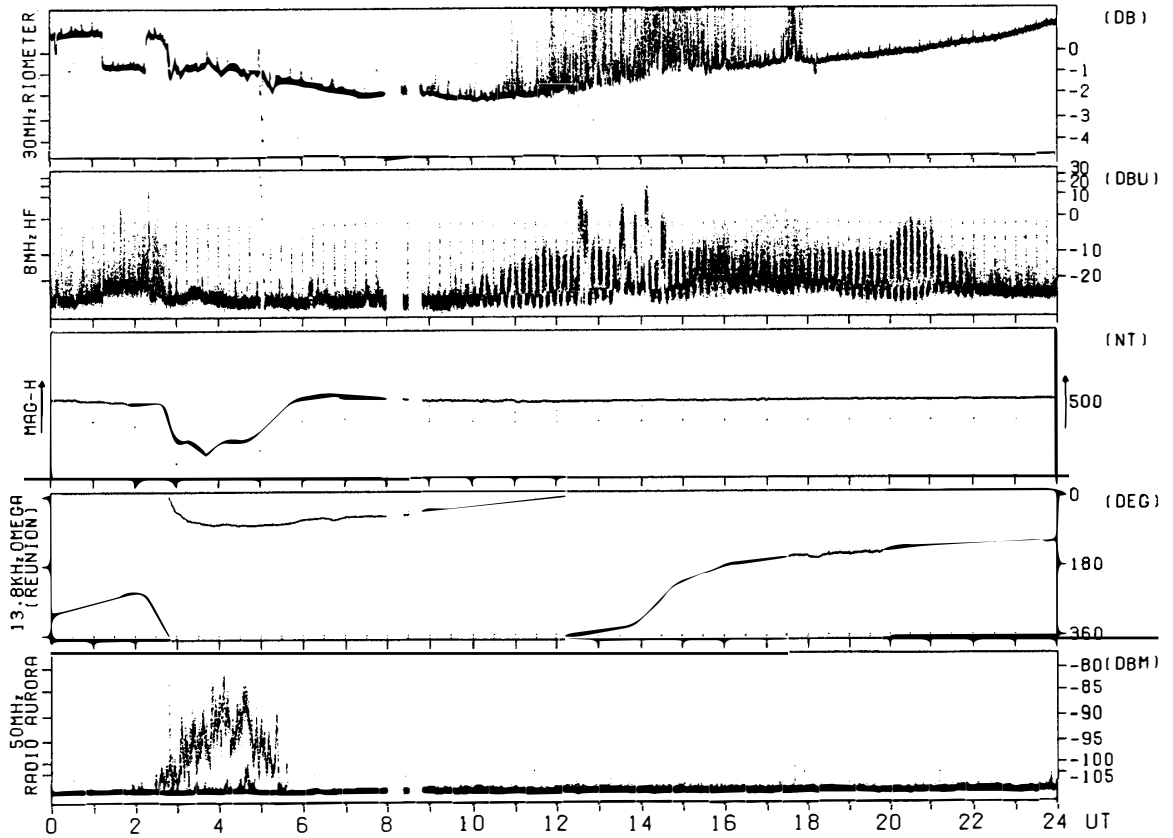
SYOWA STATION TOTAL DAY/106 1989/4/16



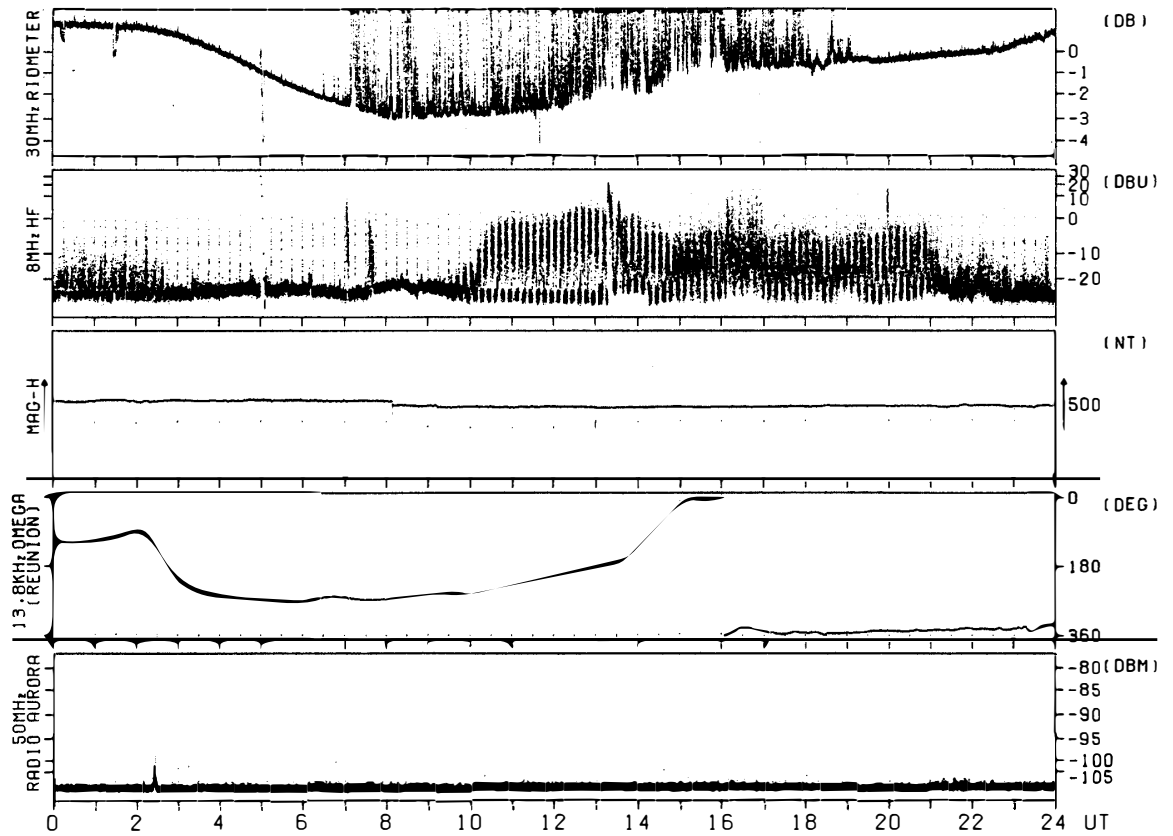
SYOWA STATION TOTAL DAY/107 1989/4/17



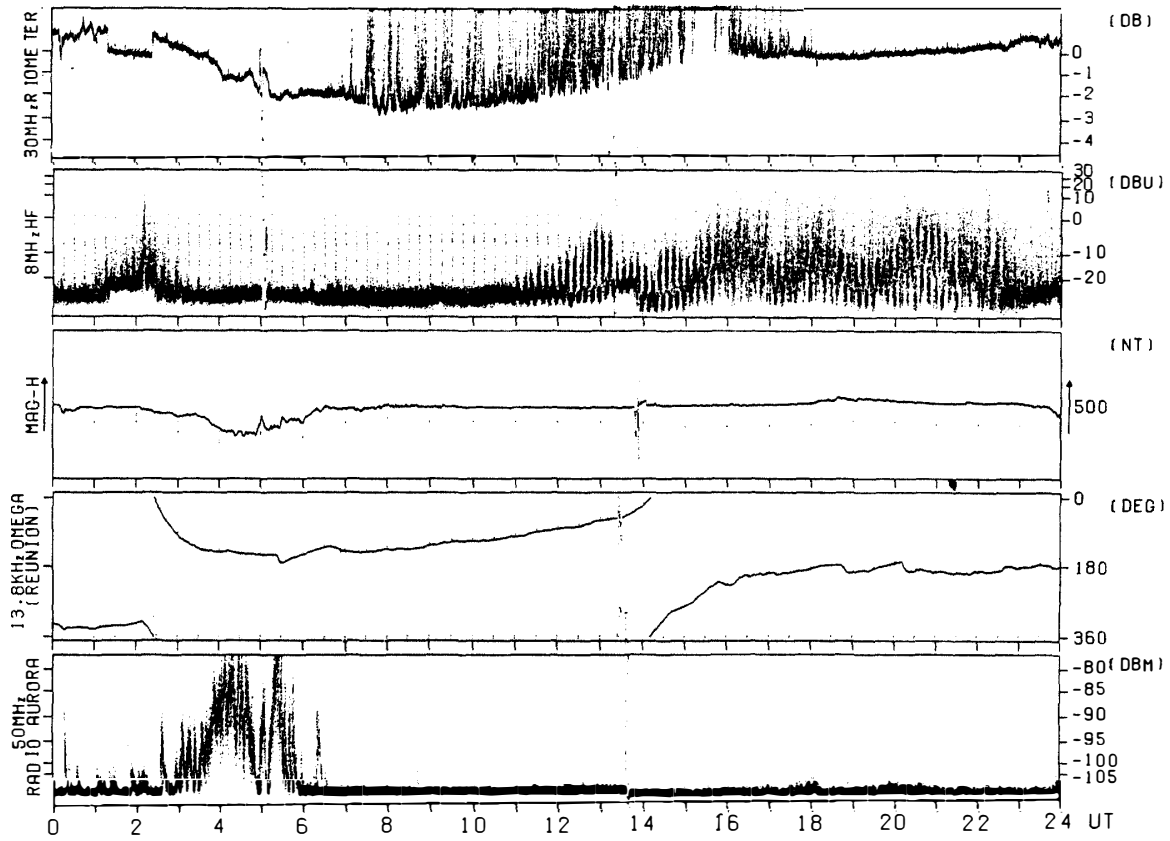
SYOWA STATION TOTAL DAY/108 1989/4/18



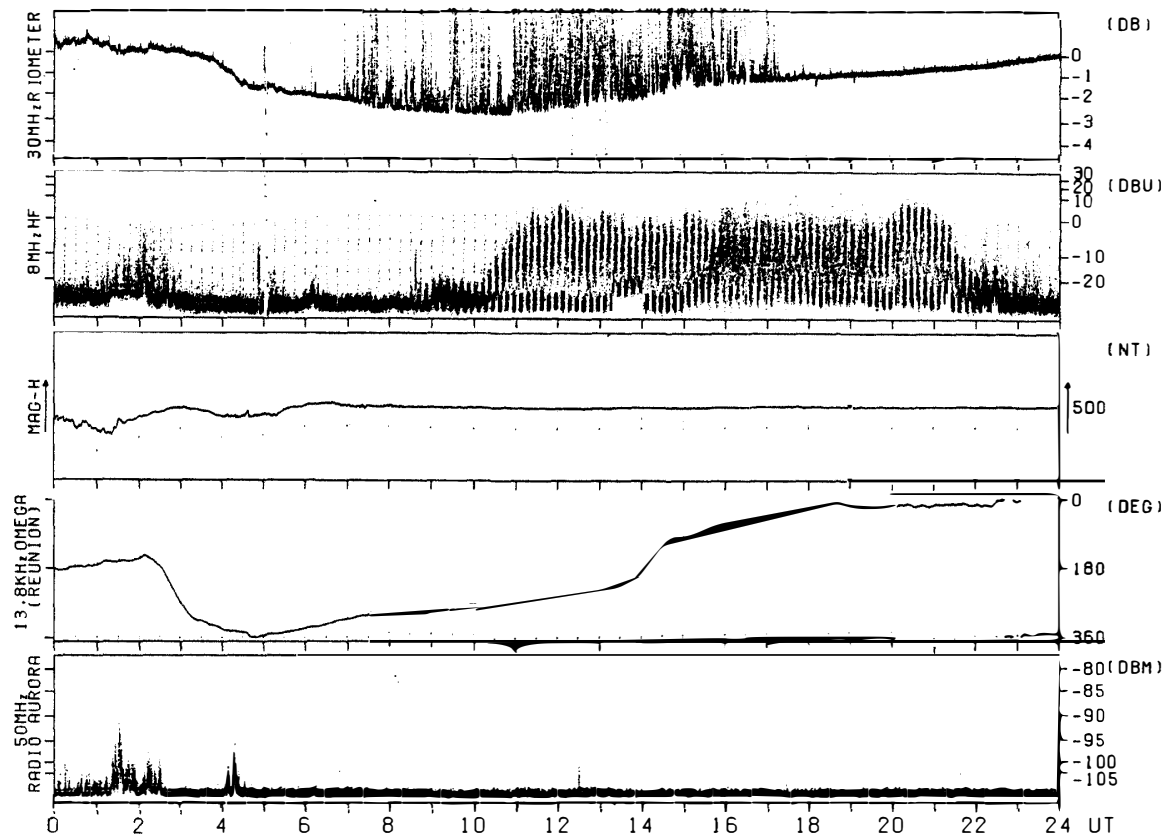
SYOWA STATION TOTAL DAY/109 1989/4/19



SYOWA STATION TOTAL DAY/110 1989/4/20

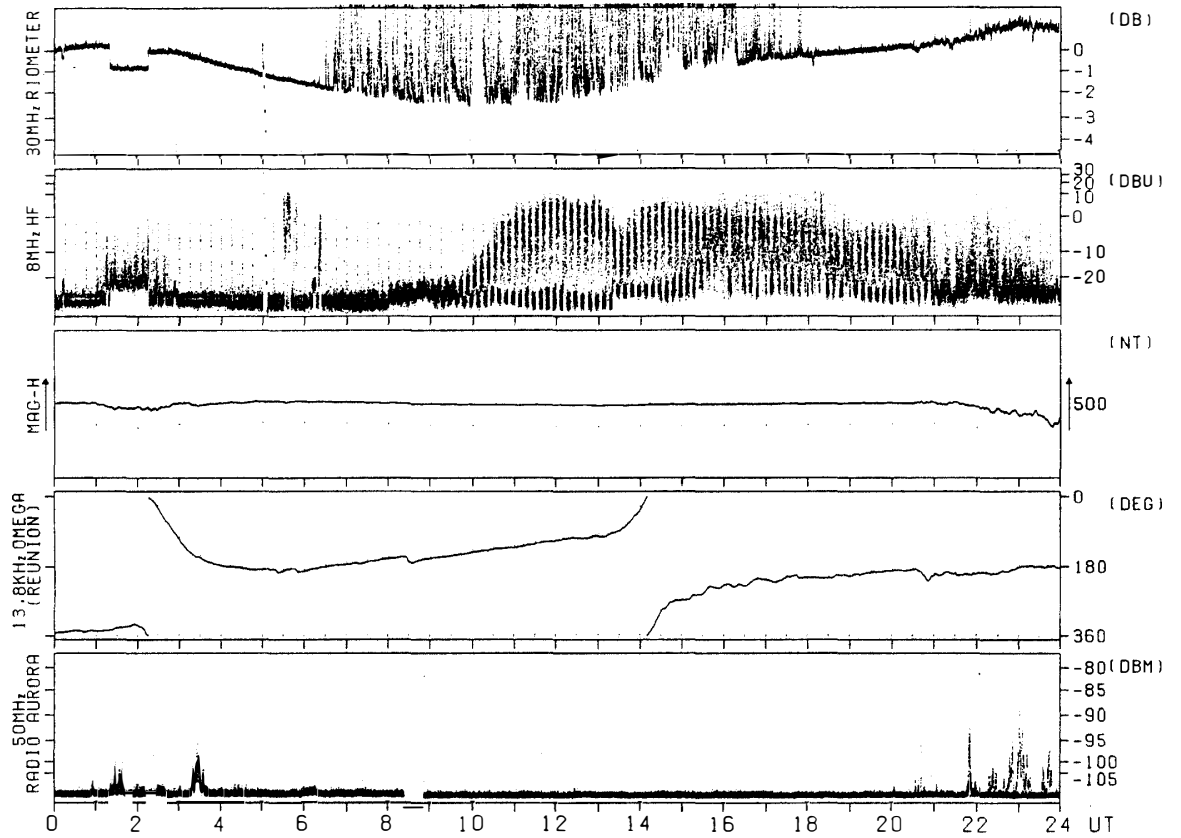


SYOWA STATION TOTAL DAY/111 1989/4/21



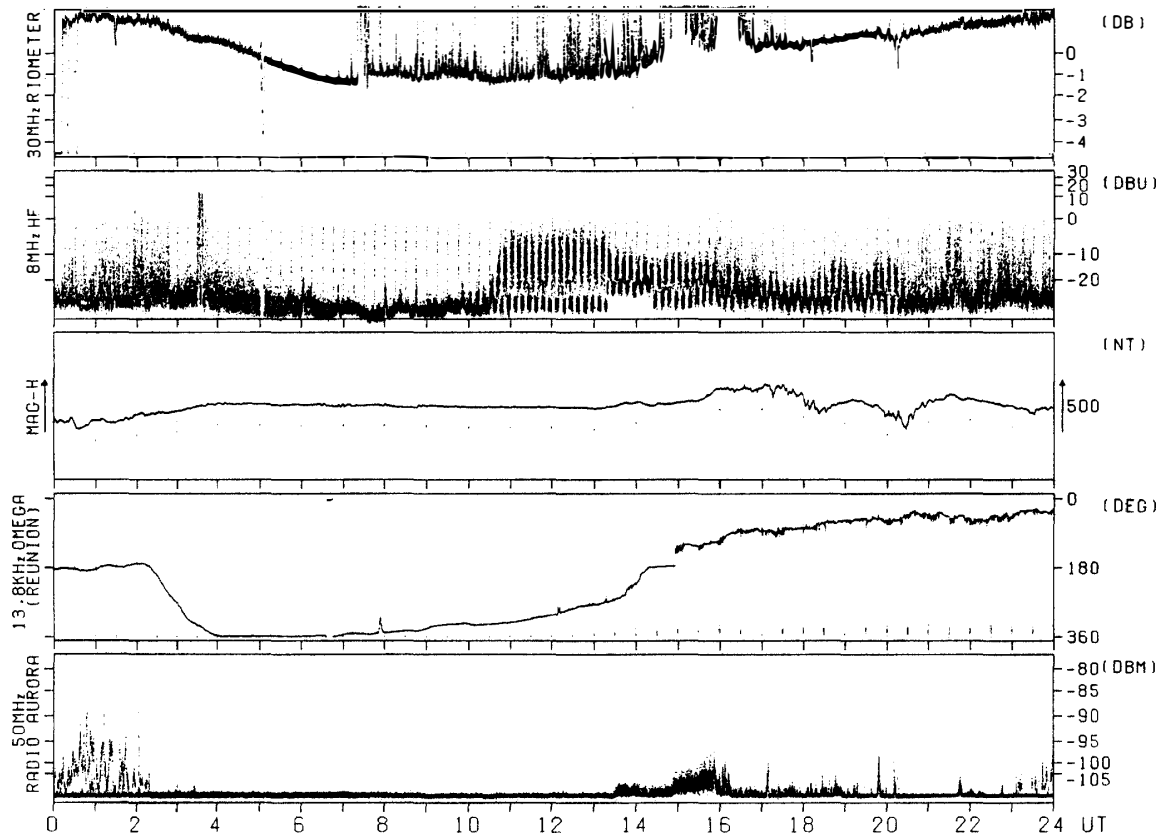
SYOWA STATION

TOTAL DAY/112 1989/4/22

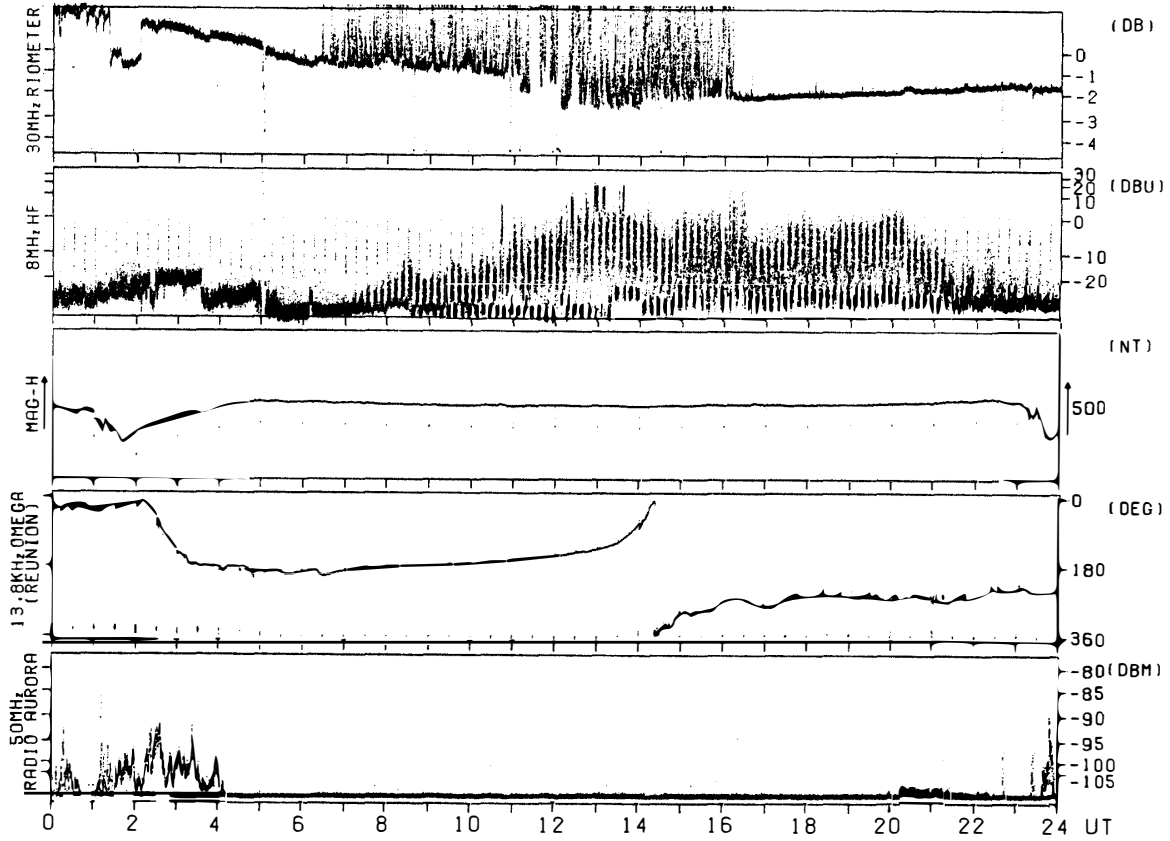


SYOWA STATION

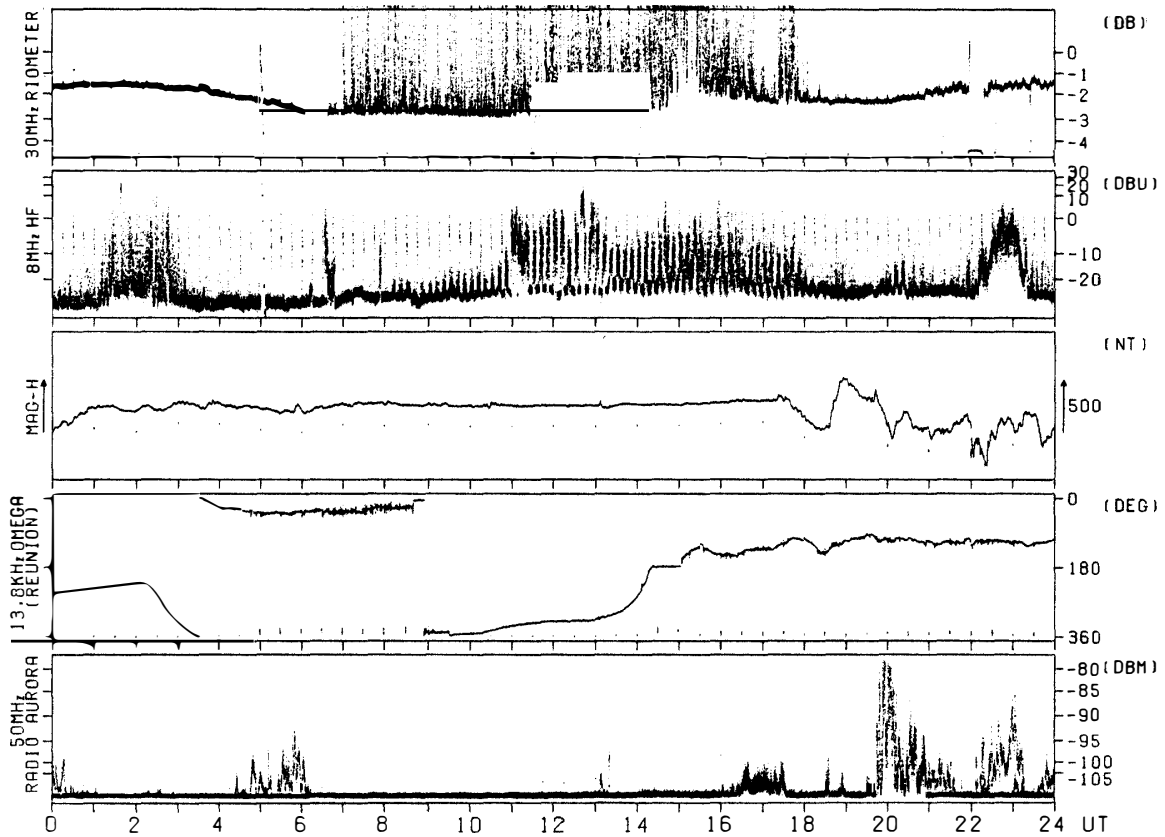
TOTAL DAY/113 1989/4/23



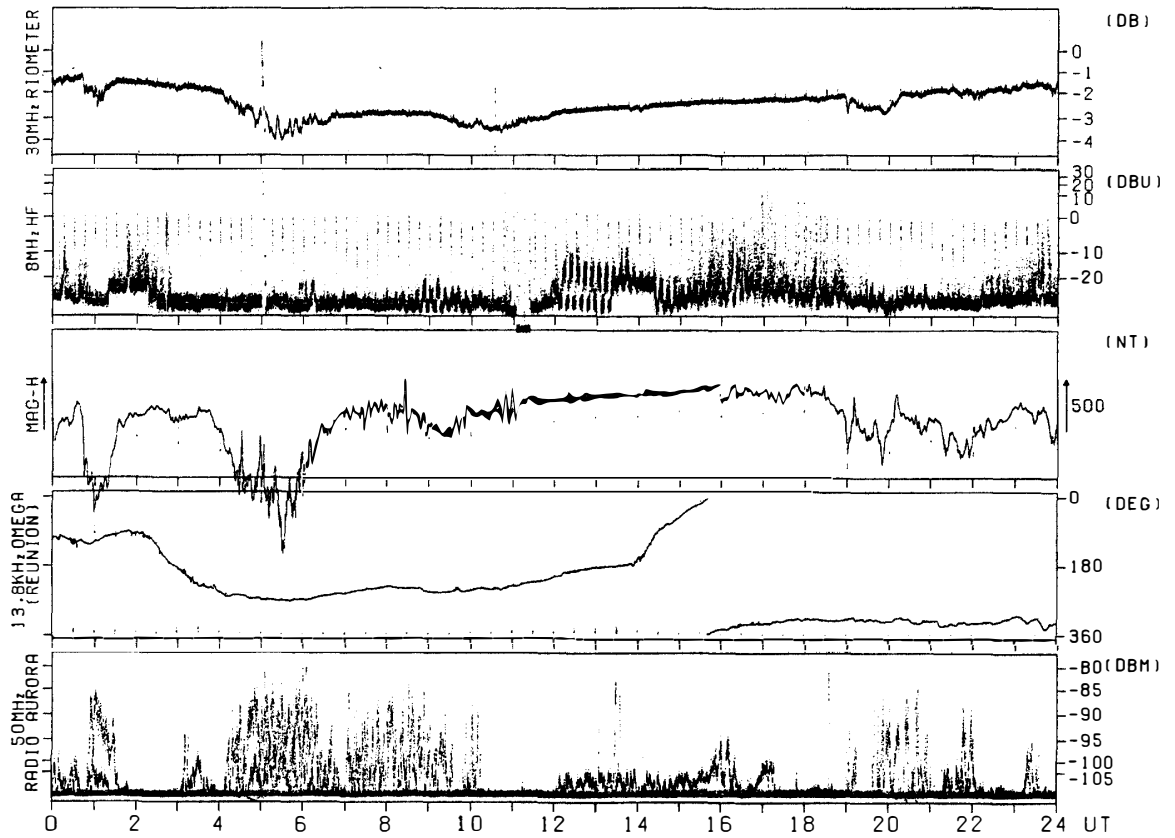
SYOWA STATION TOTAL DAY/114 1989/4/24



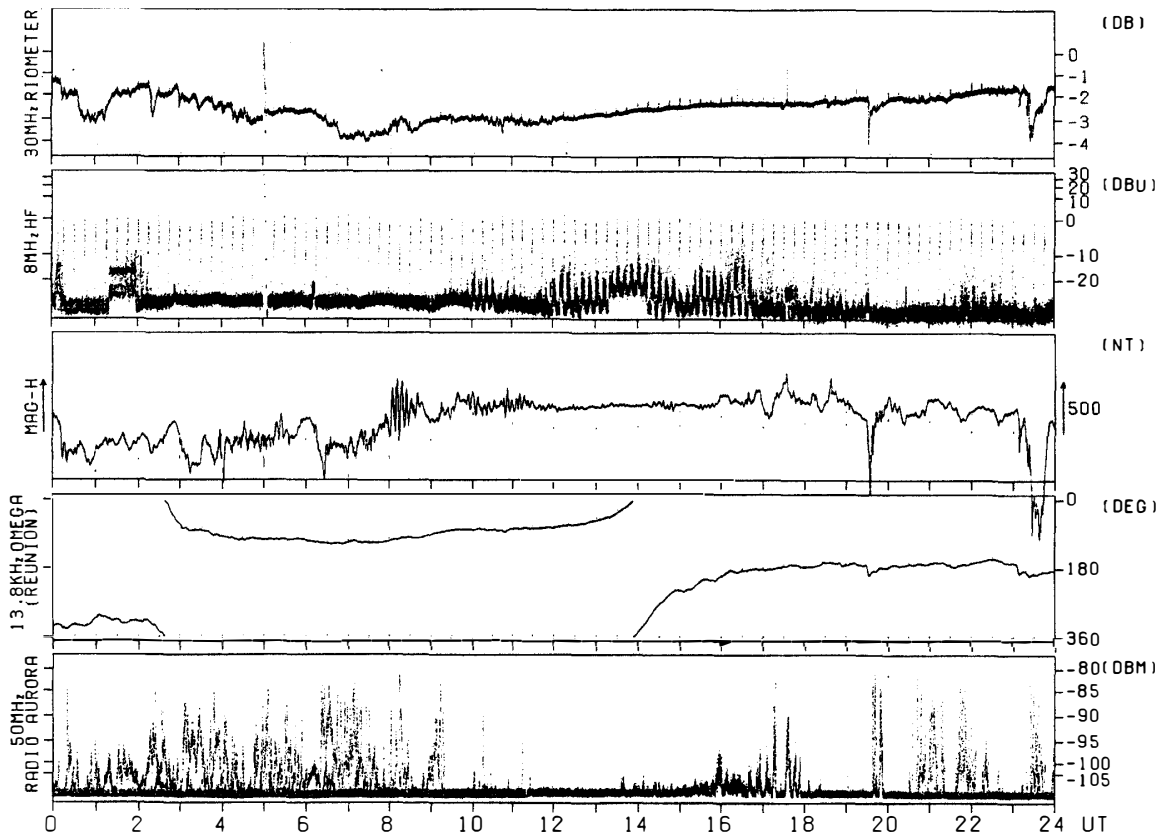
SYOWA STATION TOTAL DAY/115 1989/4/25



SYOWA STATION TOTAL DAY/116 1989/4/26

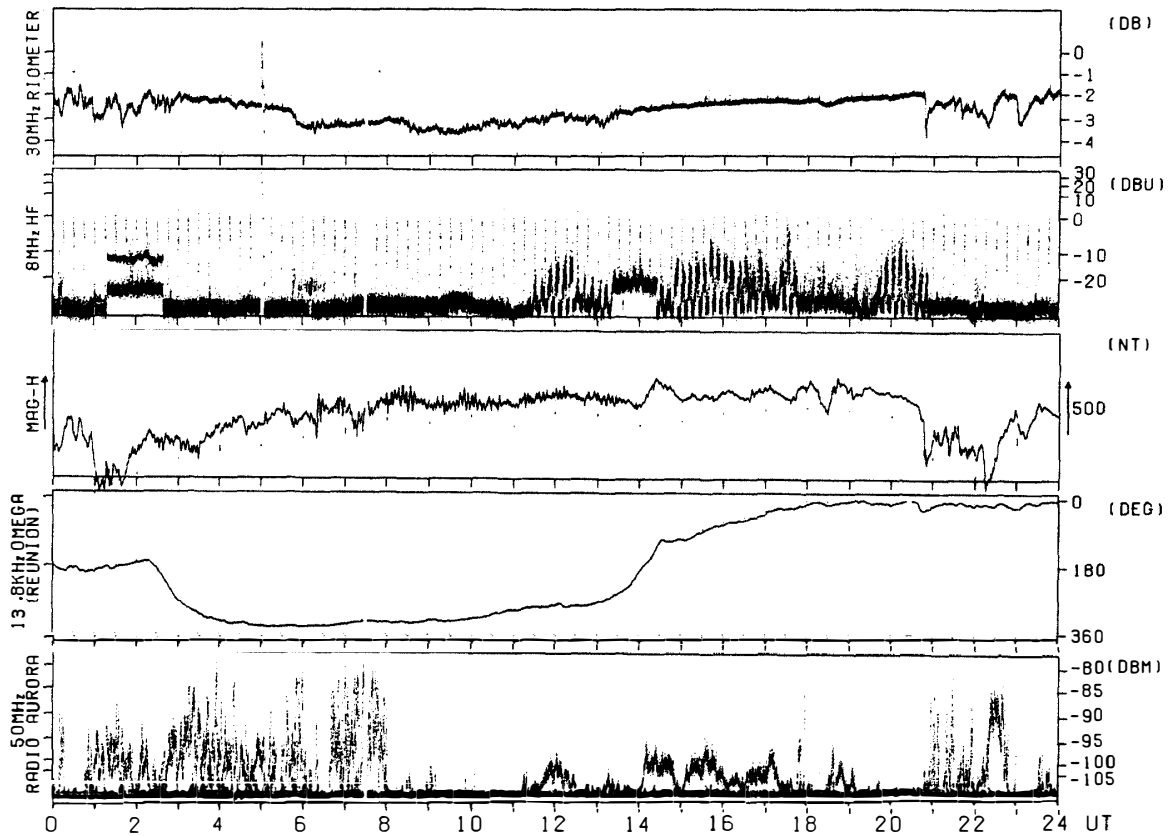


SYOWA STATION TOTAL DAY/117 1989/4/27



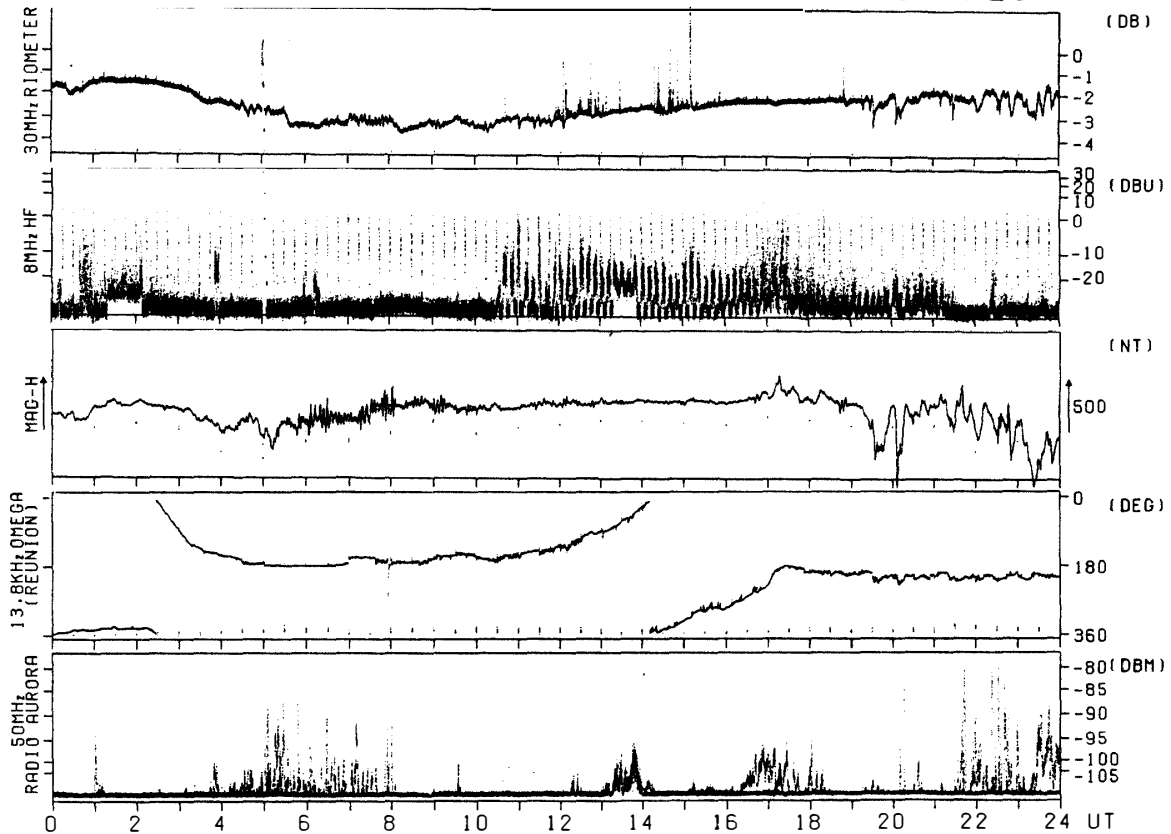
SYOWA STATION

TOTAL DAY/118 1989/4/28

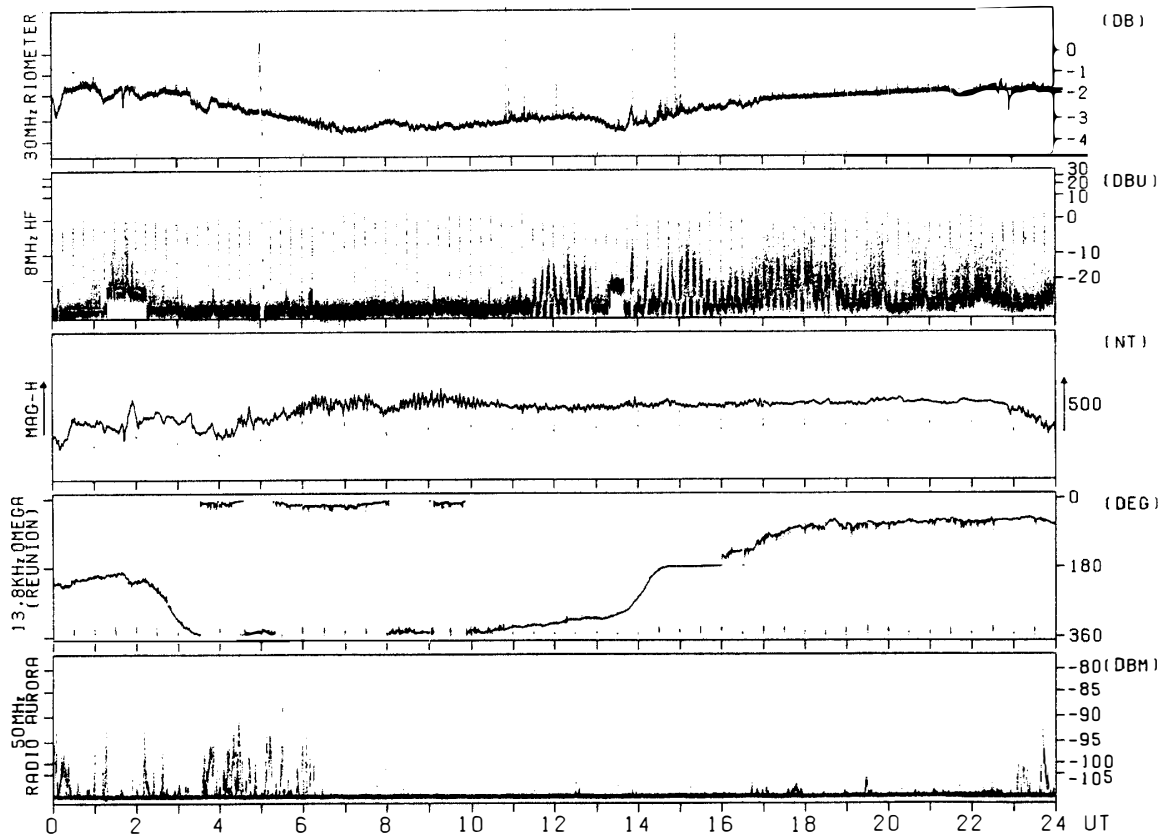


SYOWA STATION

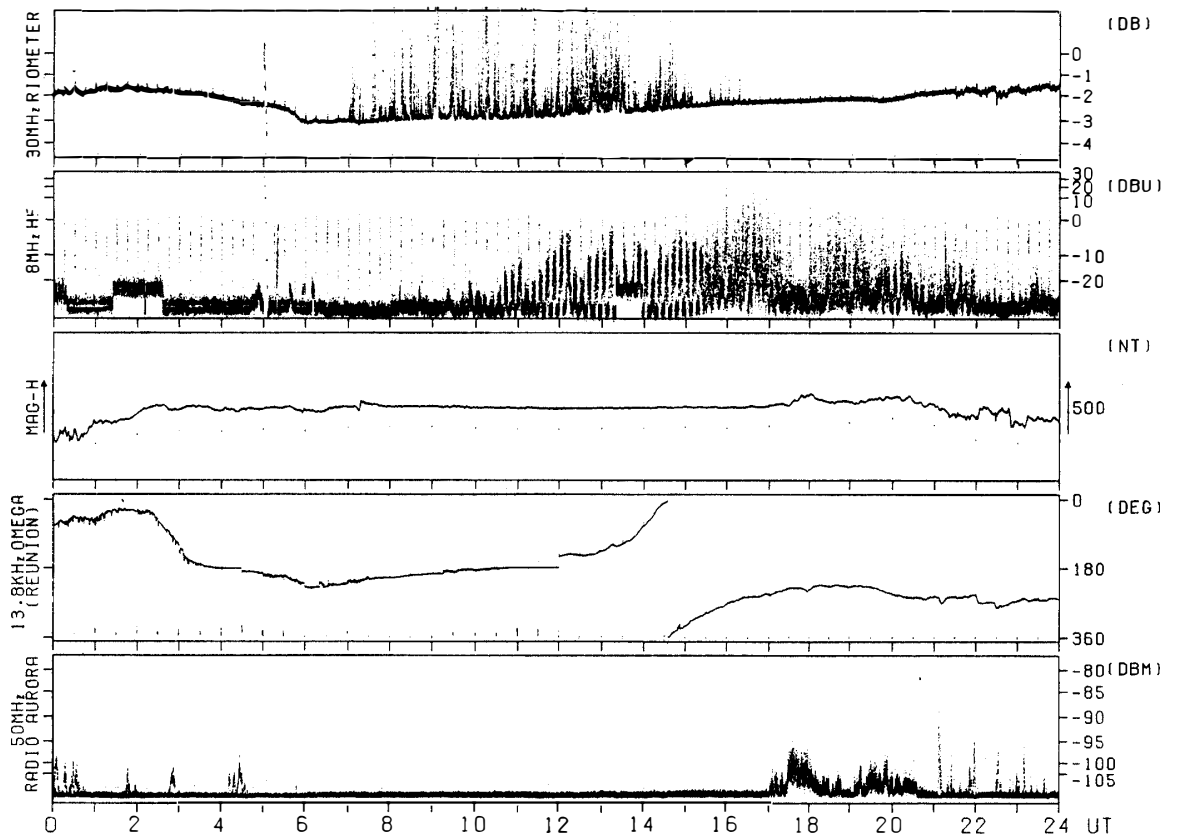
TOTAL DAY/119 1989/4/29



SYOWA STATION TOTAL DAY/120 1989/4/30

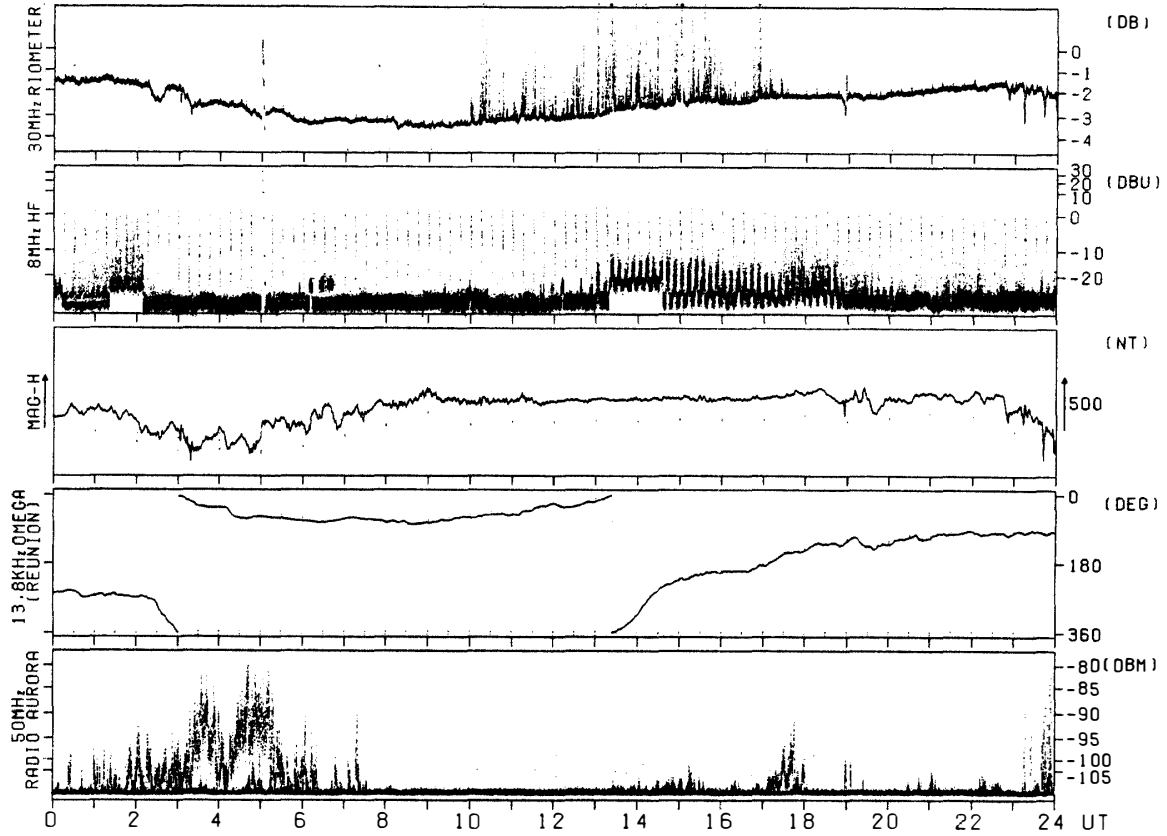


SYOWA STATION TOTAL DAY/121 1989/5/1



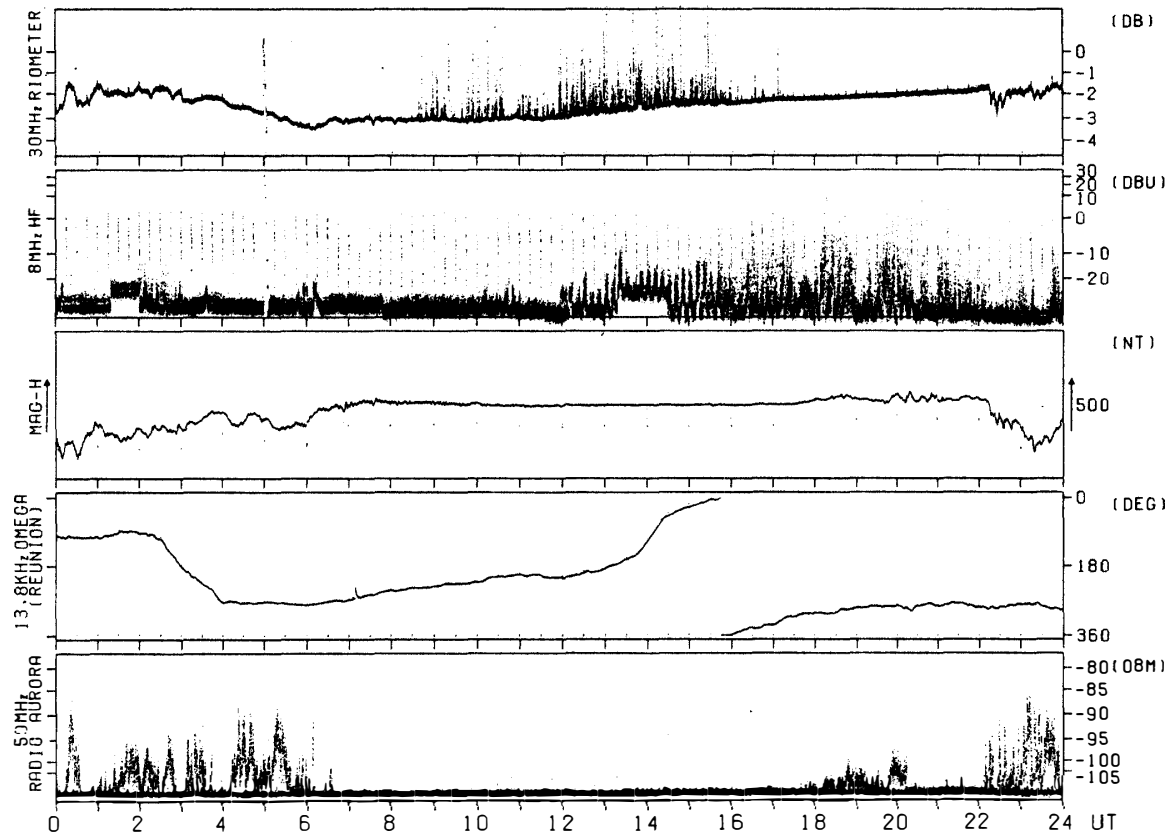
SYOWA STATION

TOTAL DAY/122 1989/5/2

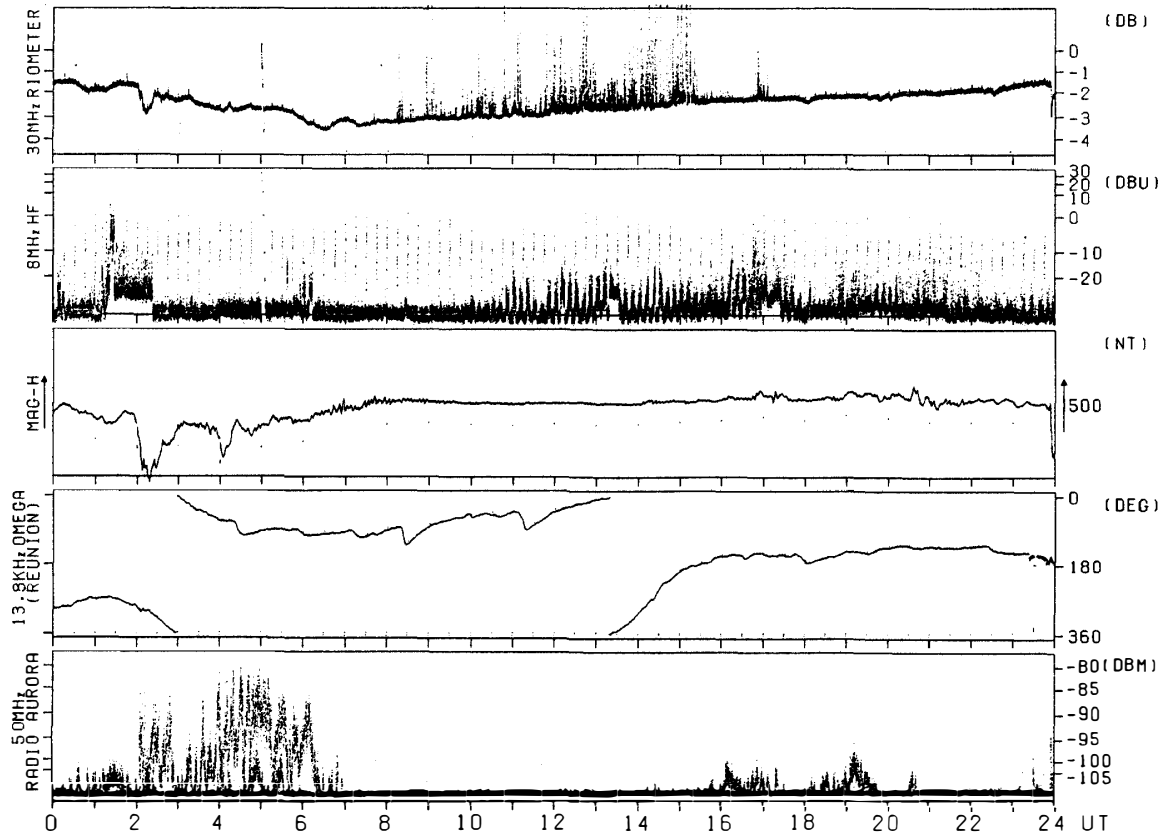


SYOWA STATION

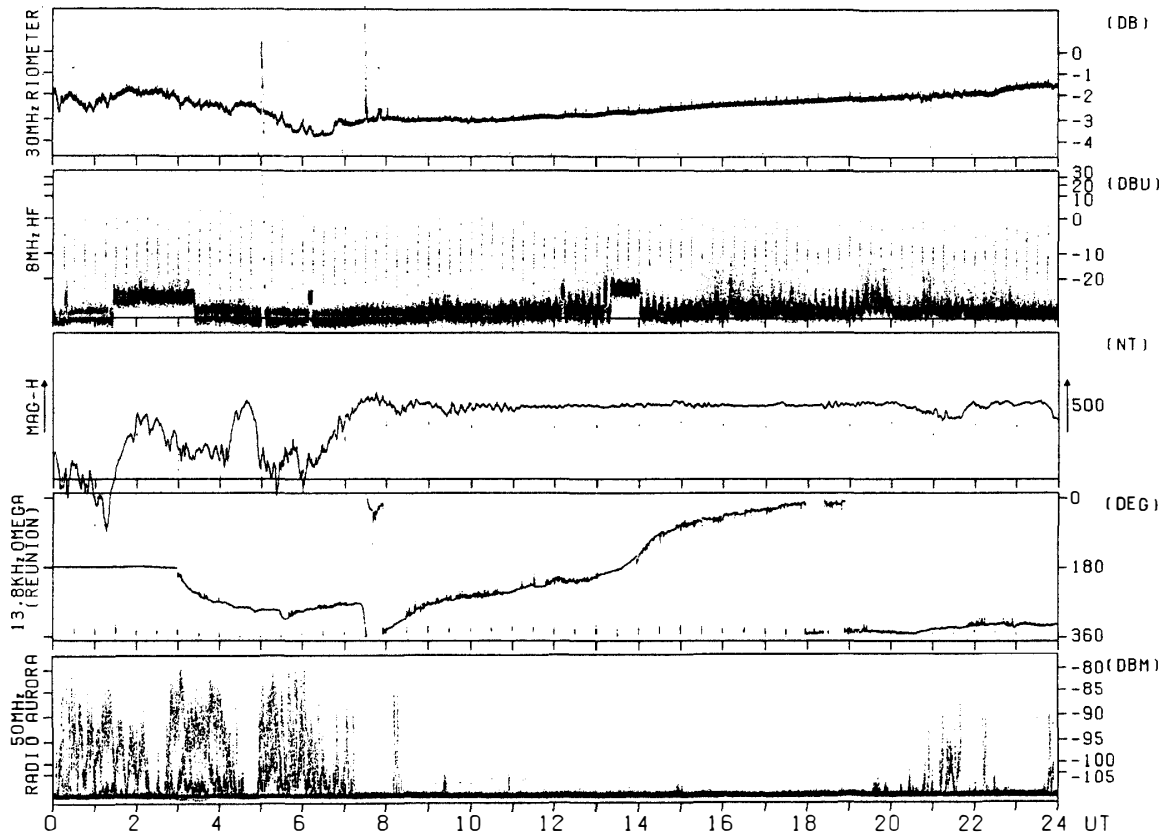
TOTAL DAY/123 1989/5/3



SYOWA STATION TOTAL DAY/124 1989/5/4

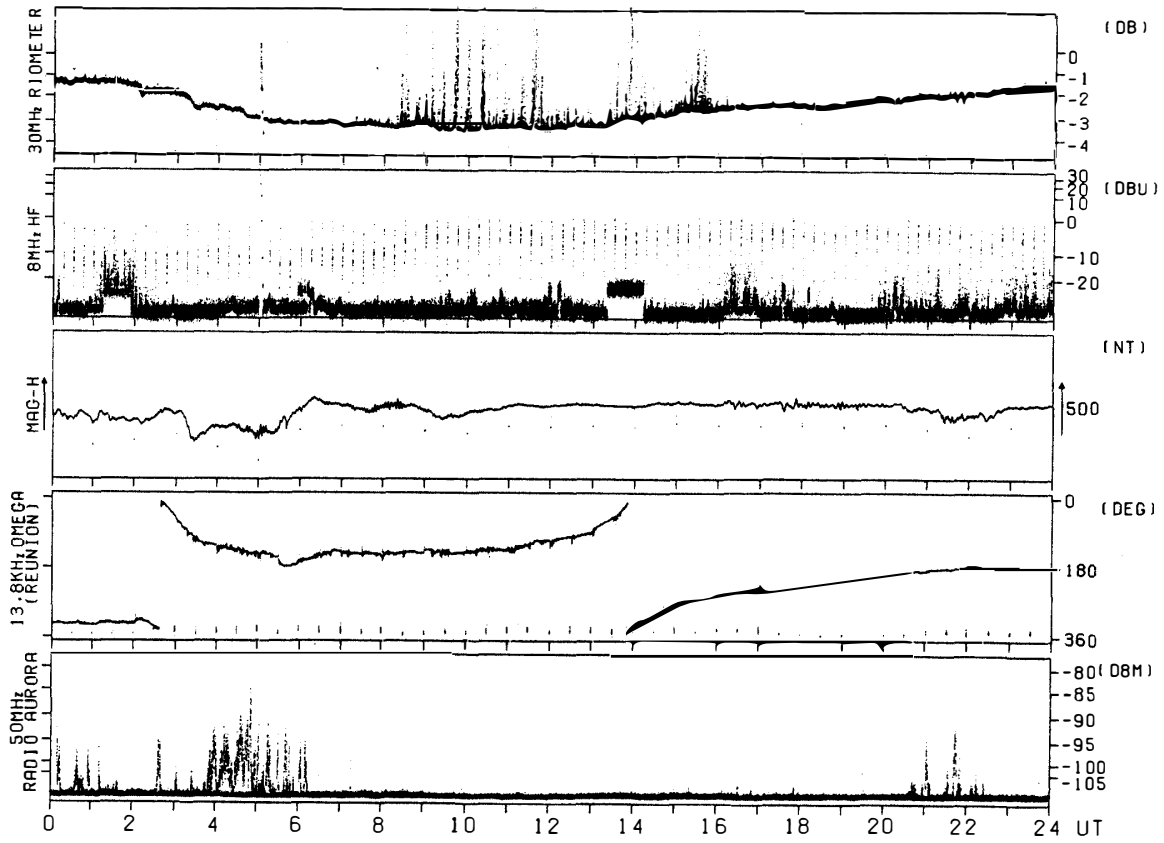


SYOWA STATION TOTAL DAY/125 1989/5/5



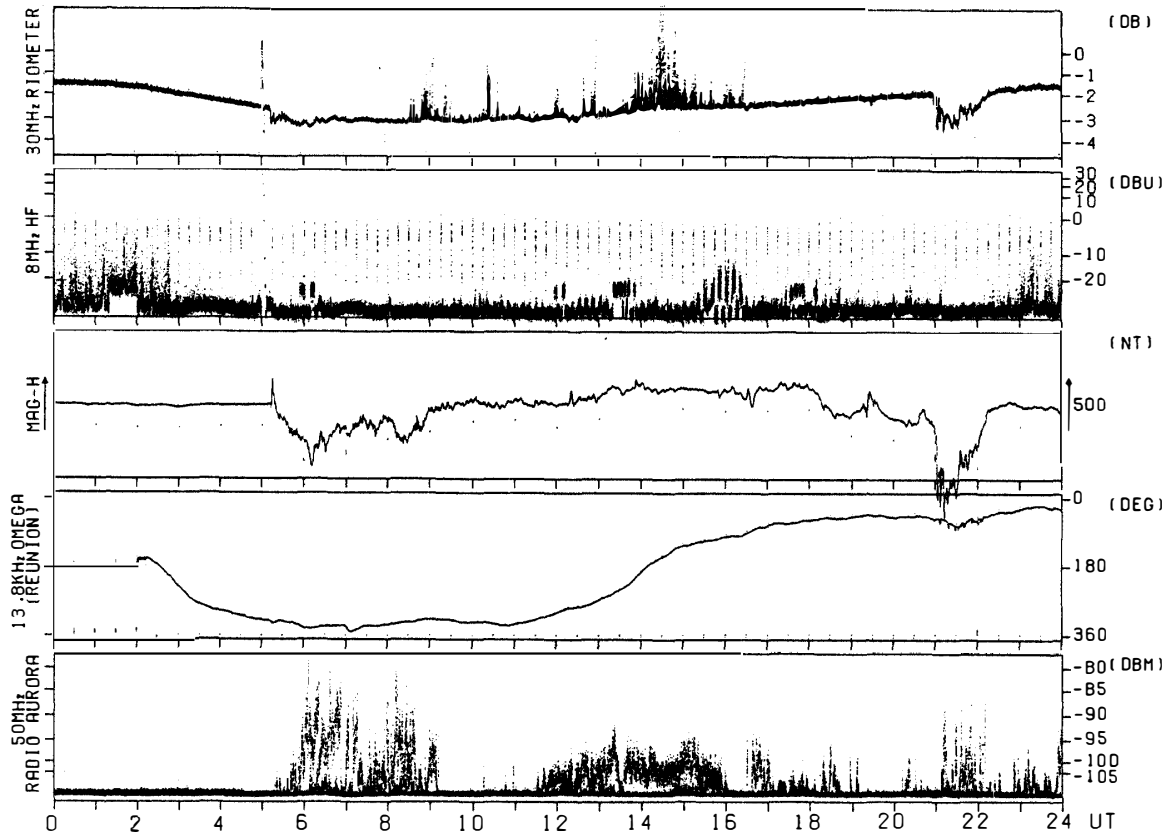
SYOWA STATION

TOTAL DAY/126 1989/5/6

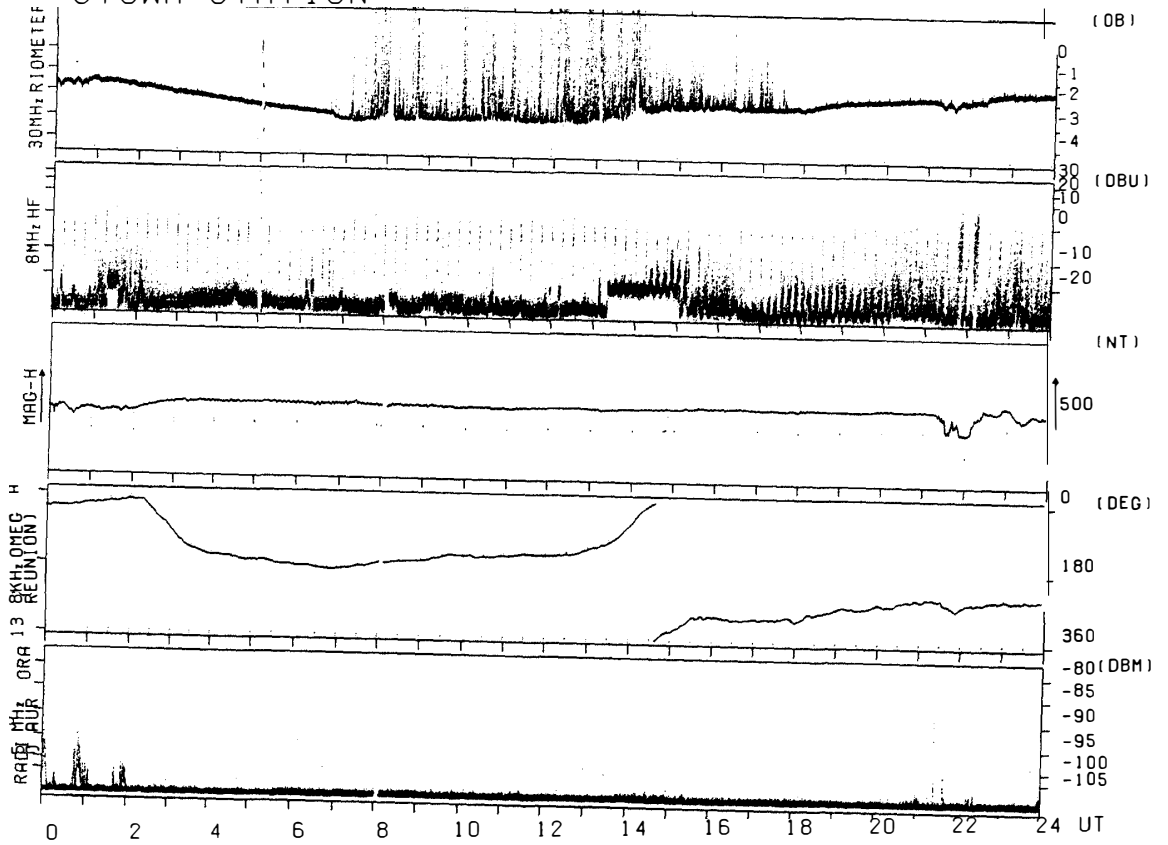


SYOWA STATION

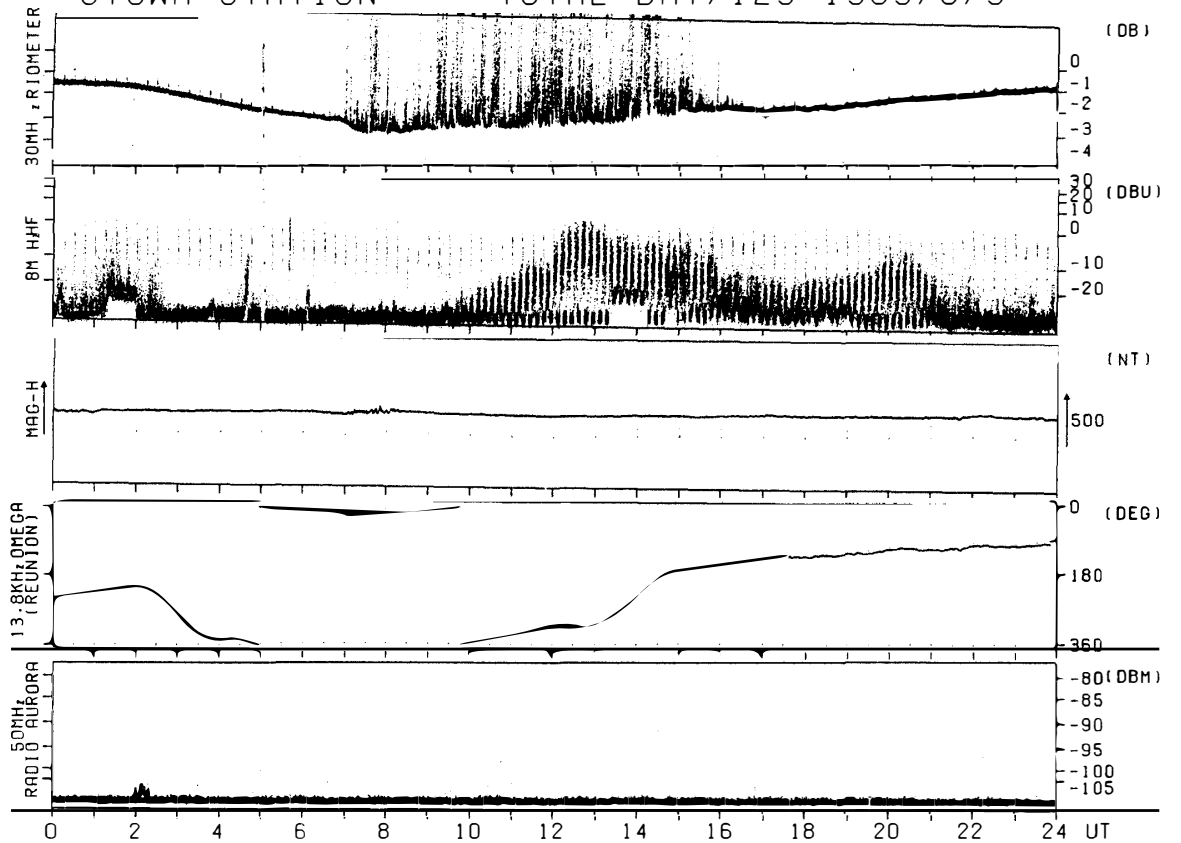
TOTAL DAY/127 1989/5/7



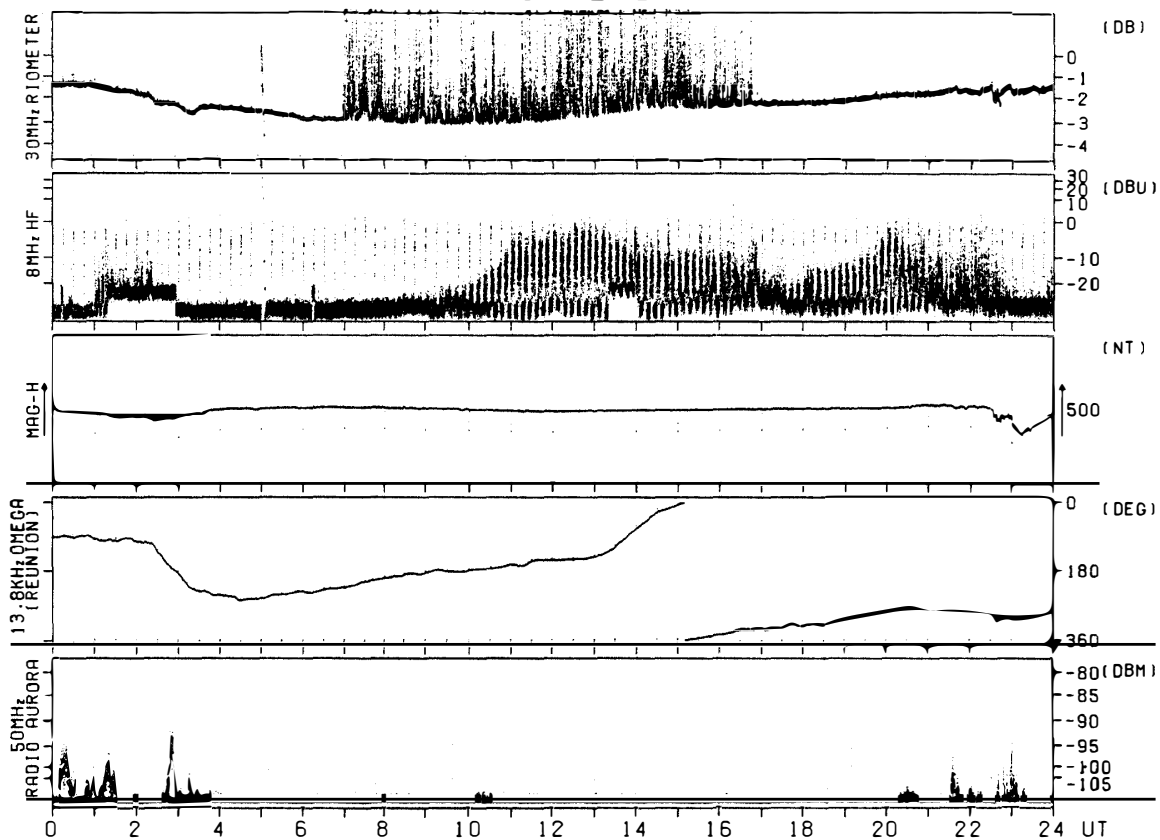
SYOWA STATION TOTAL DAY/128 1989/5/8



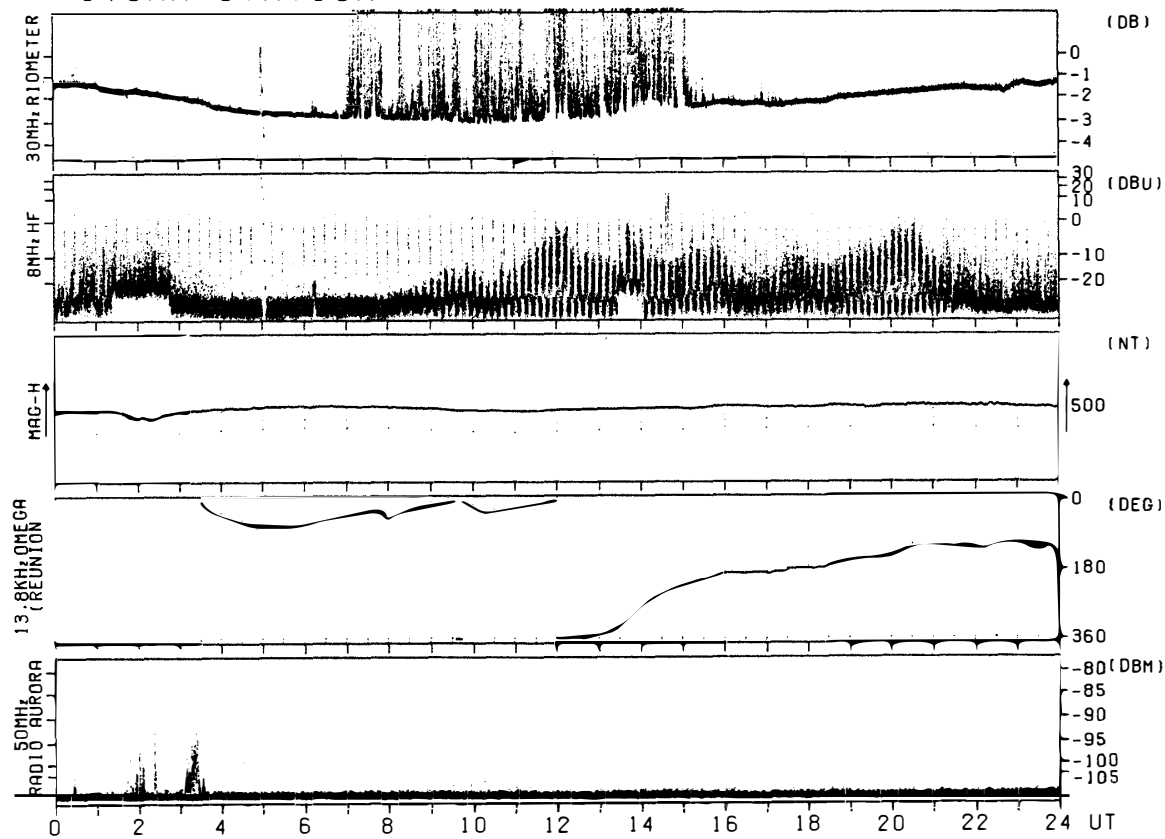
SYOWA STATION TOTAL DAY/129 1989/5/9



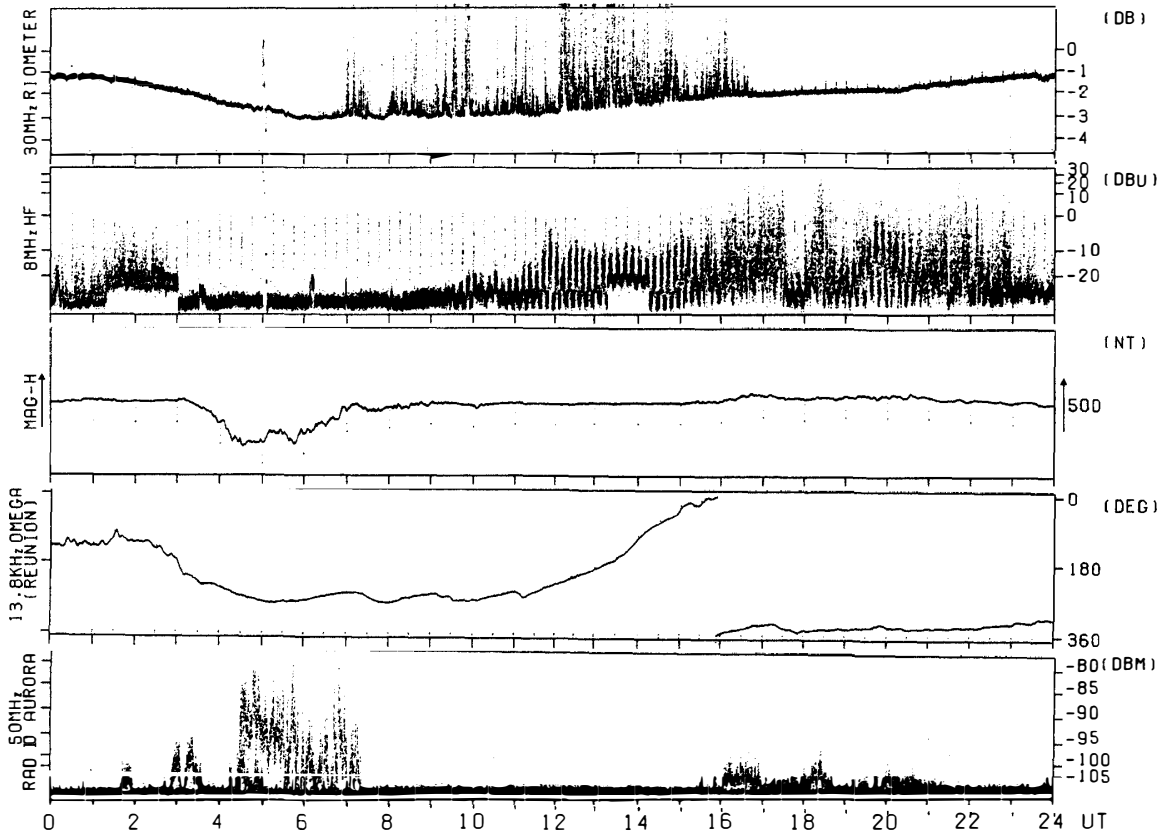
SYOWA STATION TOTAL DAY/130 1989/5/10



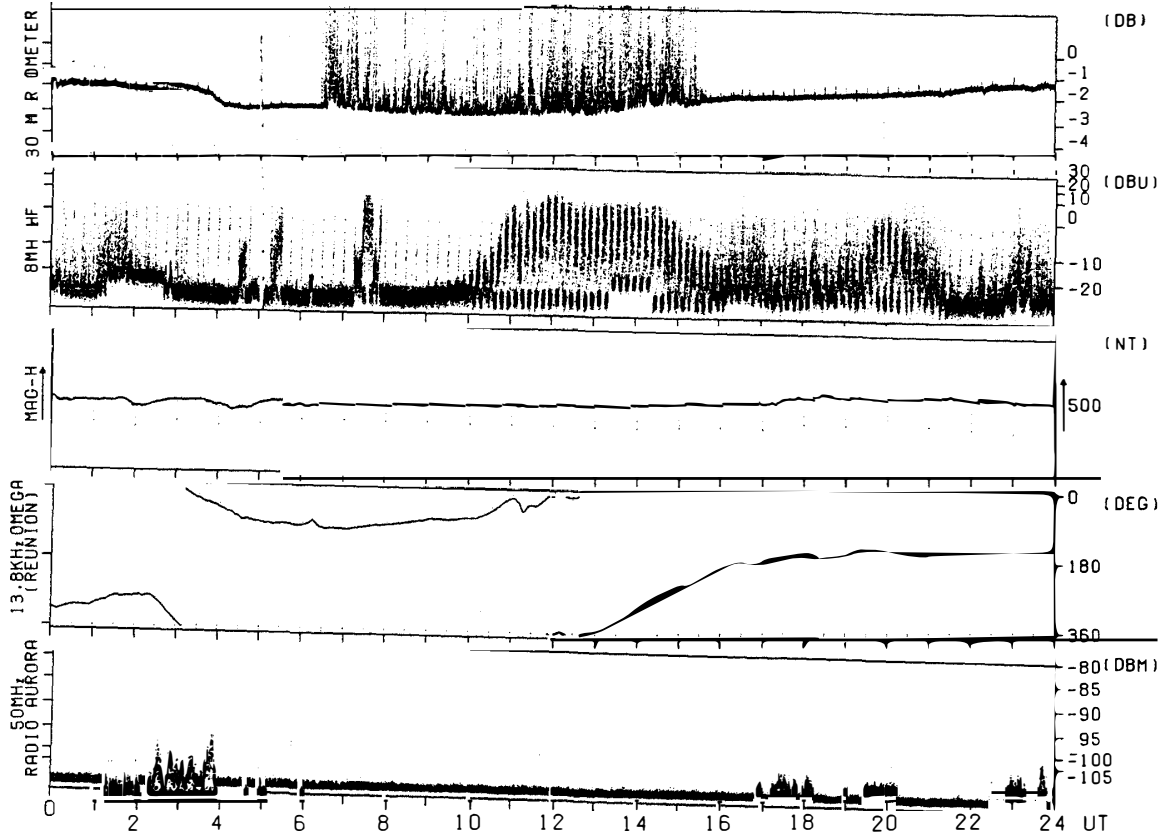
SYOWA STATION TOTAL DAY/131 1989/5/11



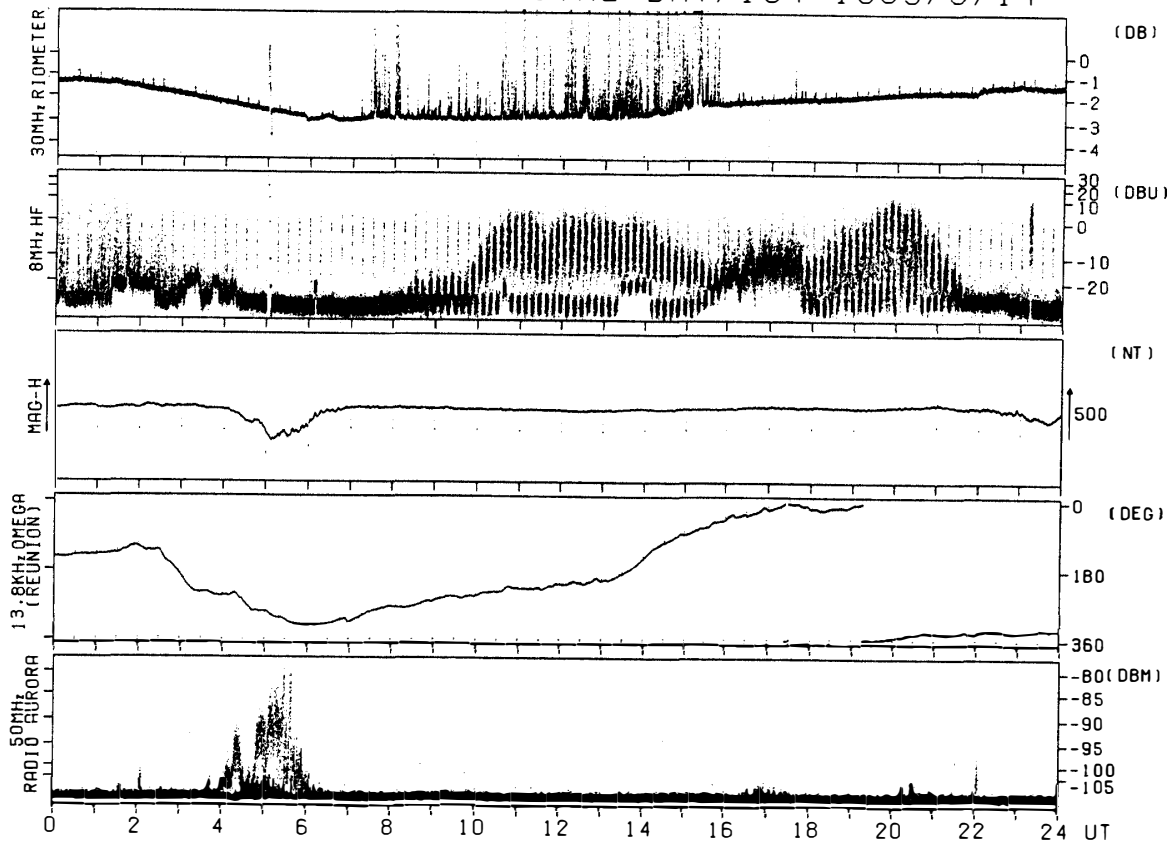
SYOWA STATION TOTAL DAY/132 1989/5/12



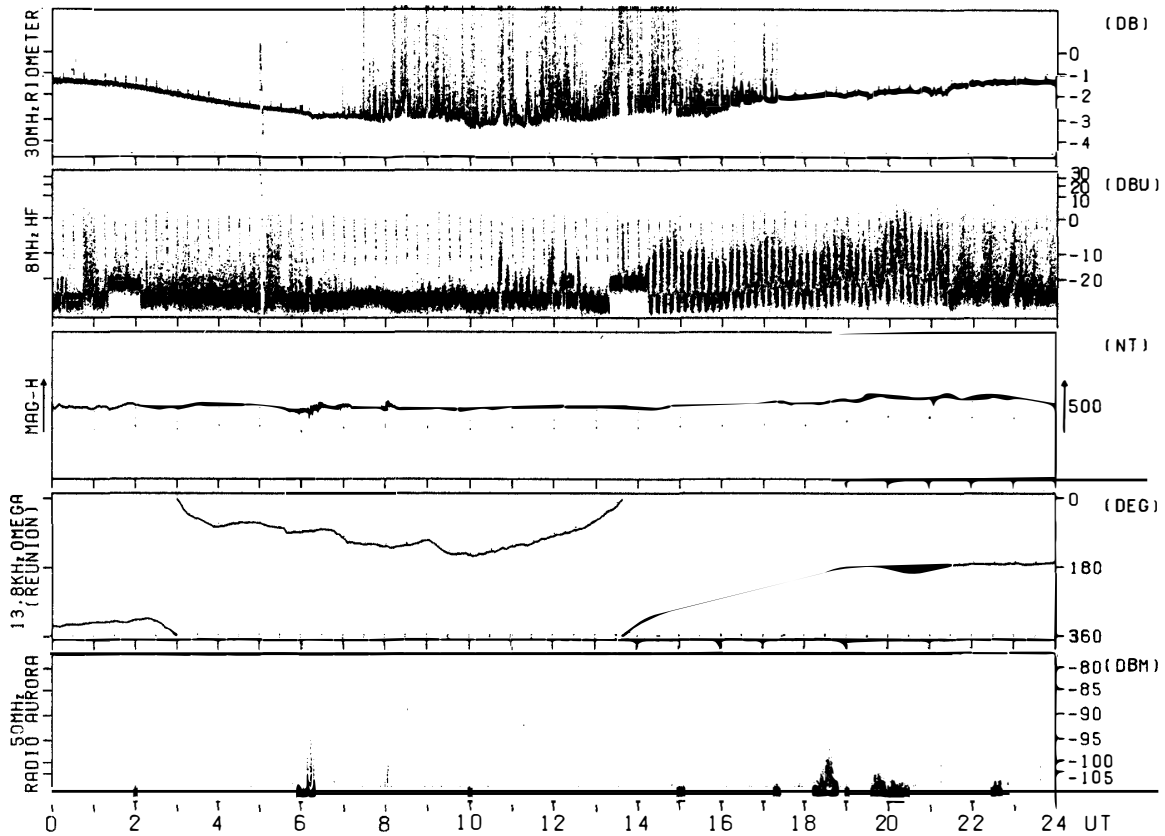
SYOWA STATION TOTAL DAY/133 1989/5/13



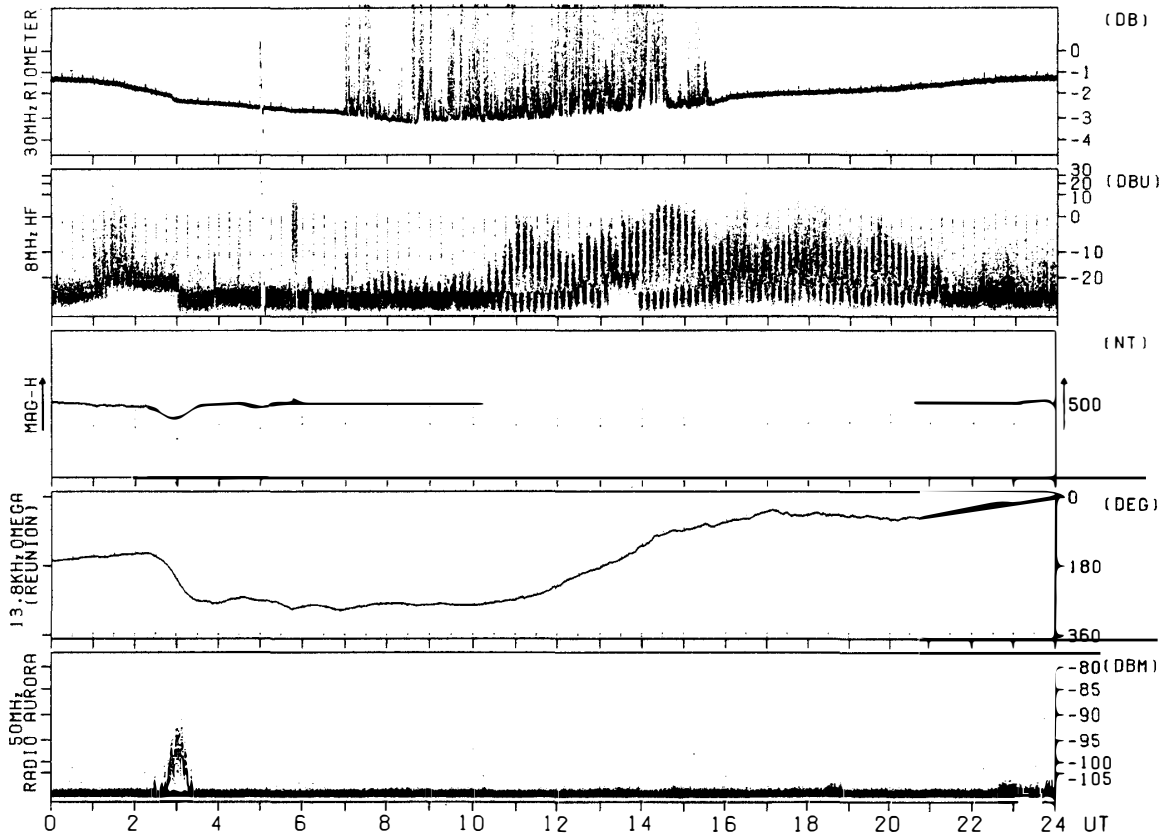
SYOWA STATION TOTAL DAY/134 1989/5/14



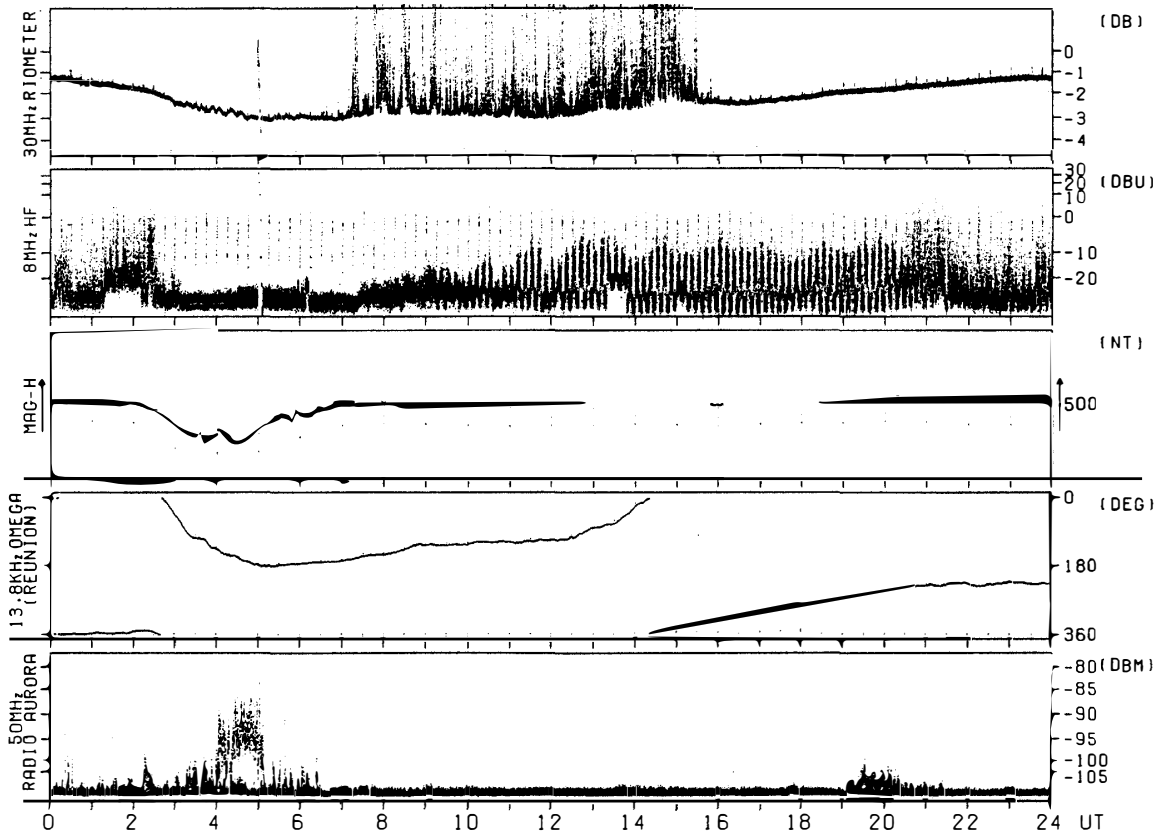
SYOWA STATION TOTAL DAY/135 1989/5/15



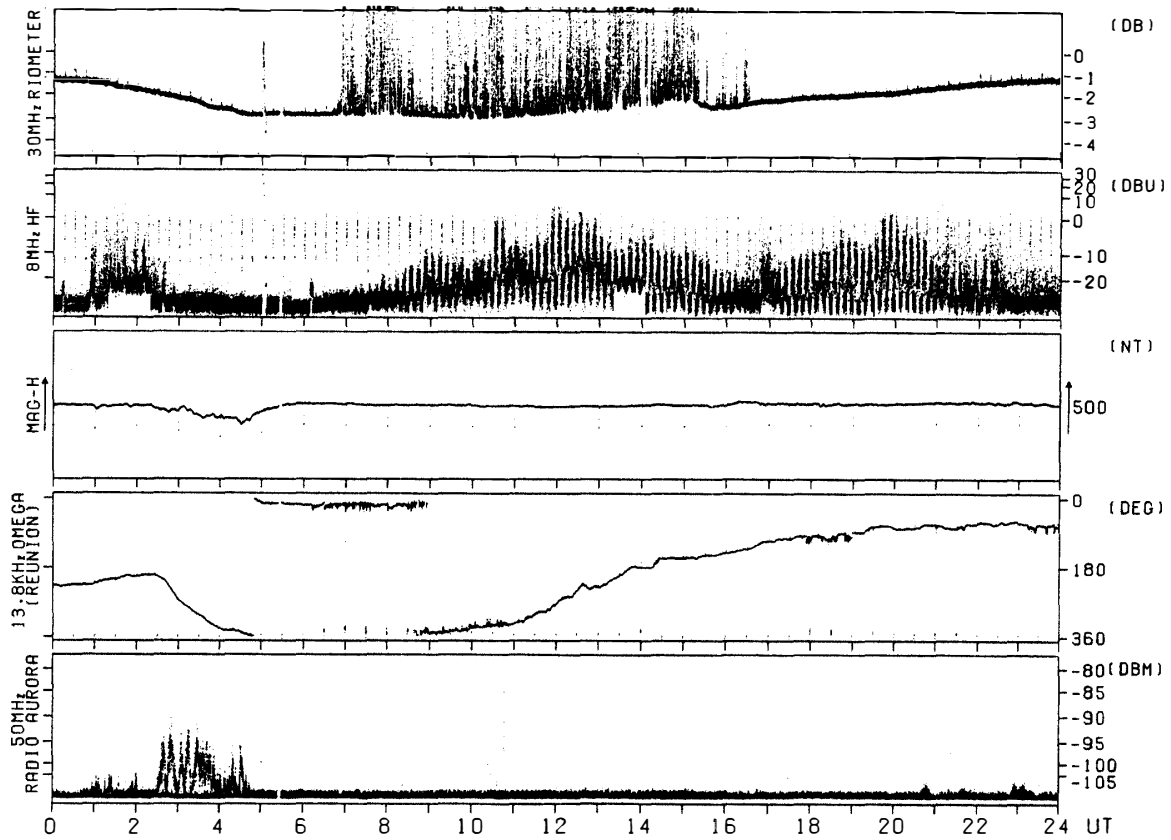
SYOWA STATION TOTAL DAY/136 1989/5/16



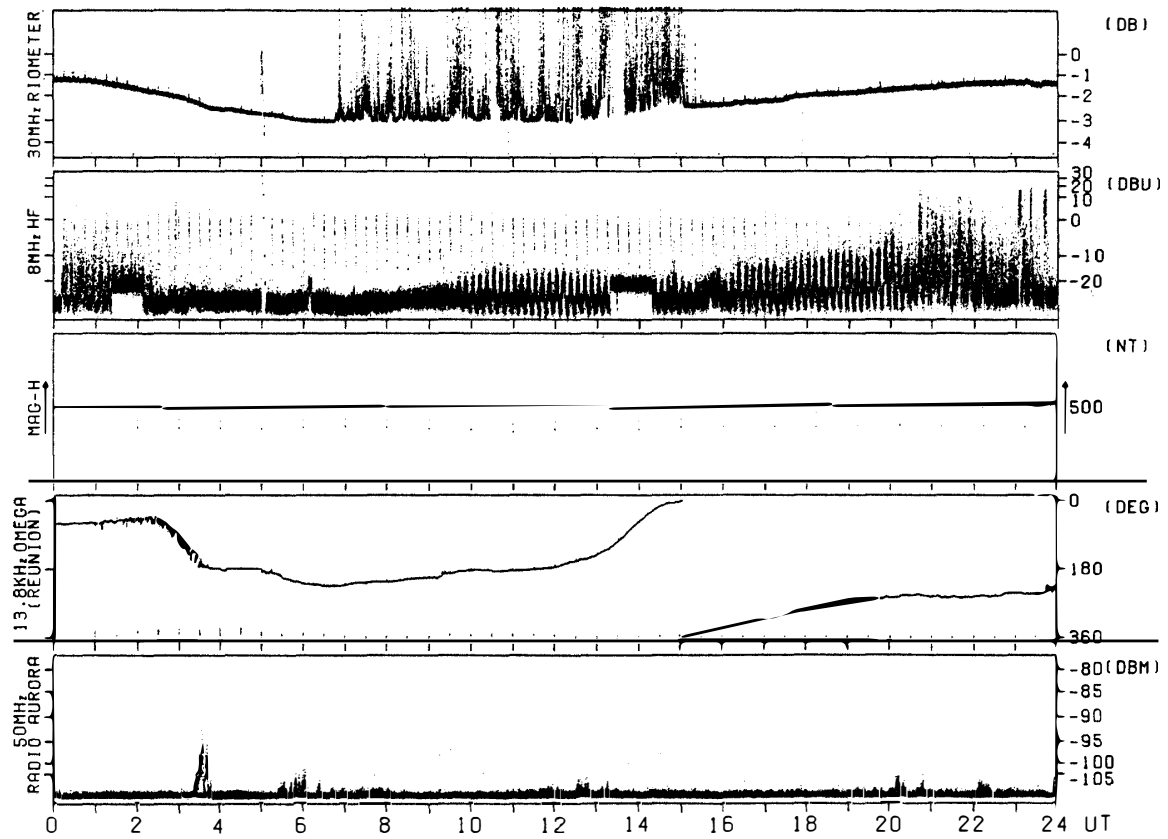
SYOWA STATION TOTAL DAY/137 1989/5/17



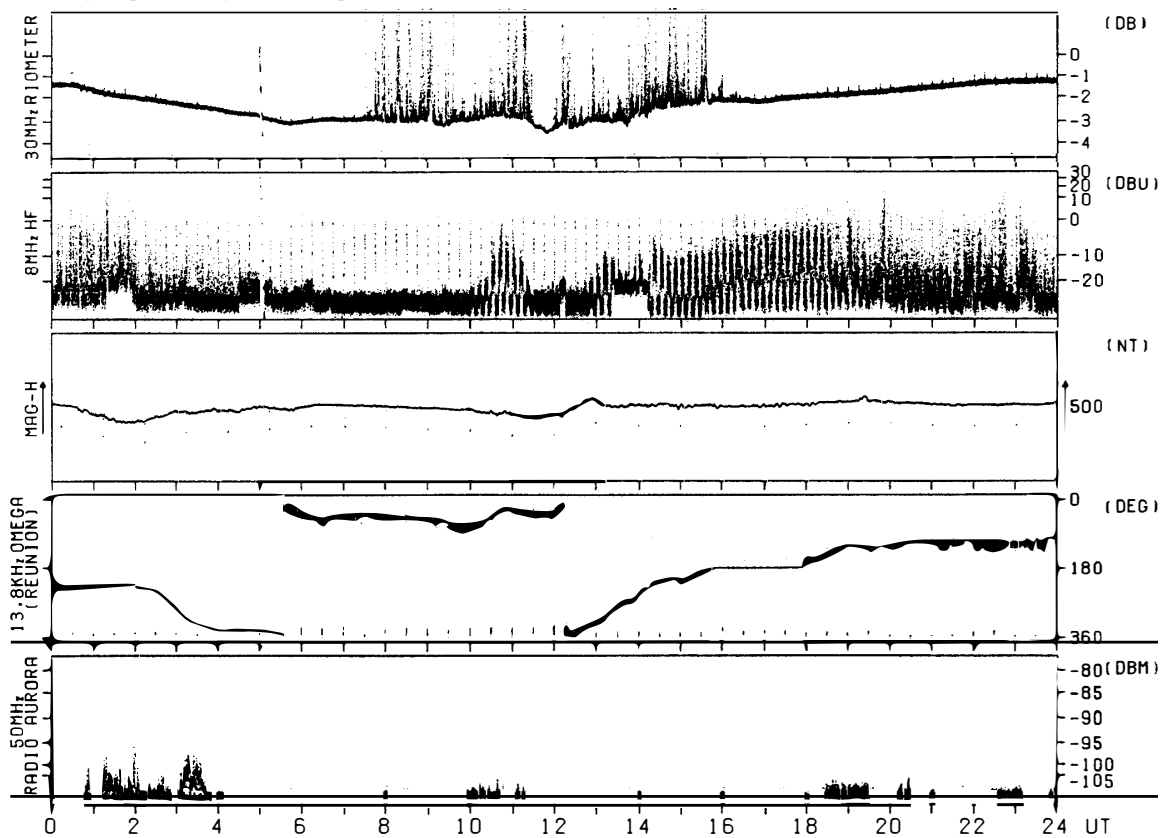
SYOWA STATION TOTAL DAY/138 1989/5/18



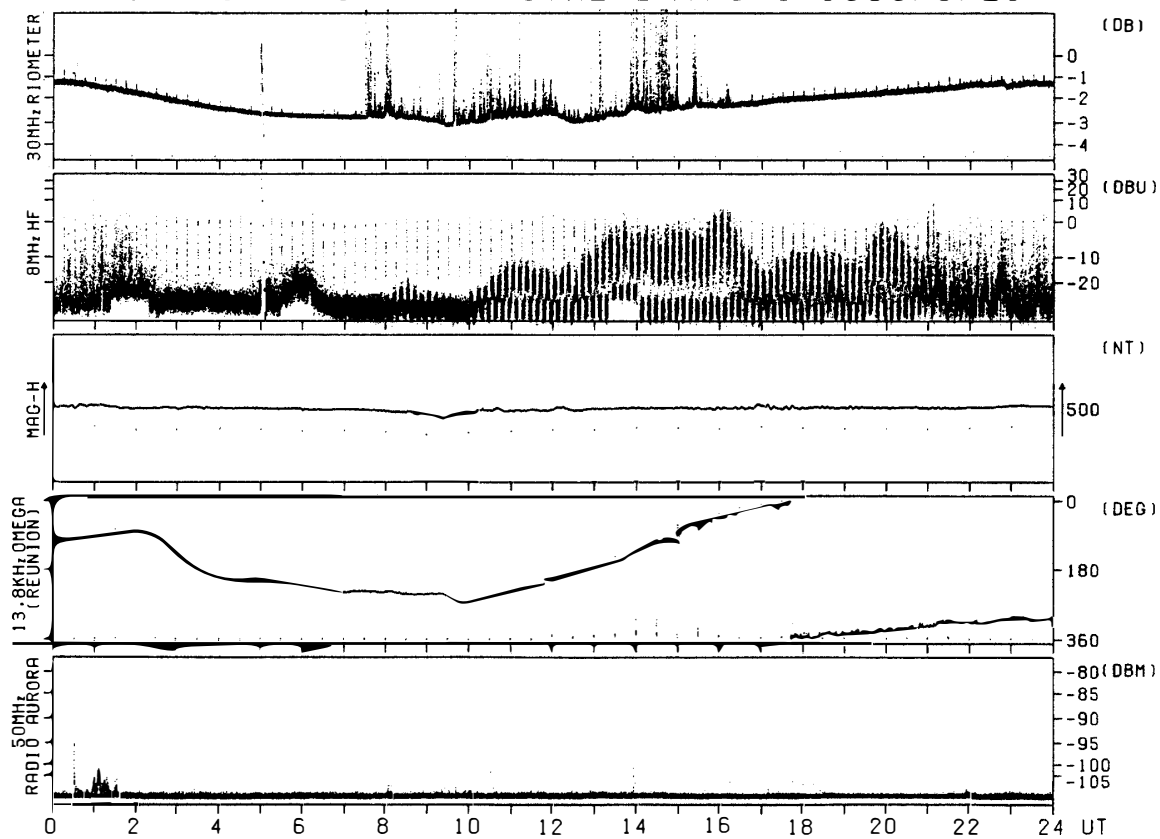
SYOWA STATION TOTAL DAY/139 1989/5/19



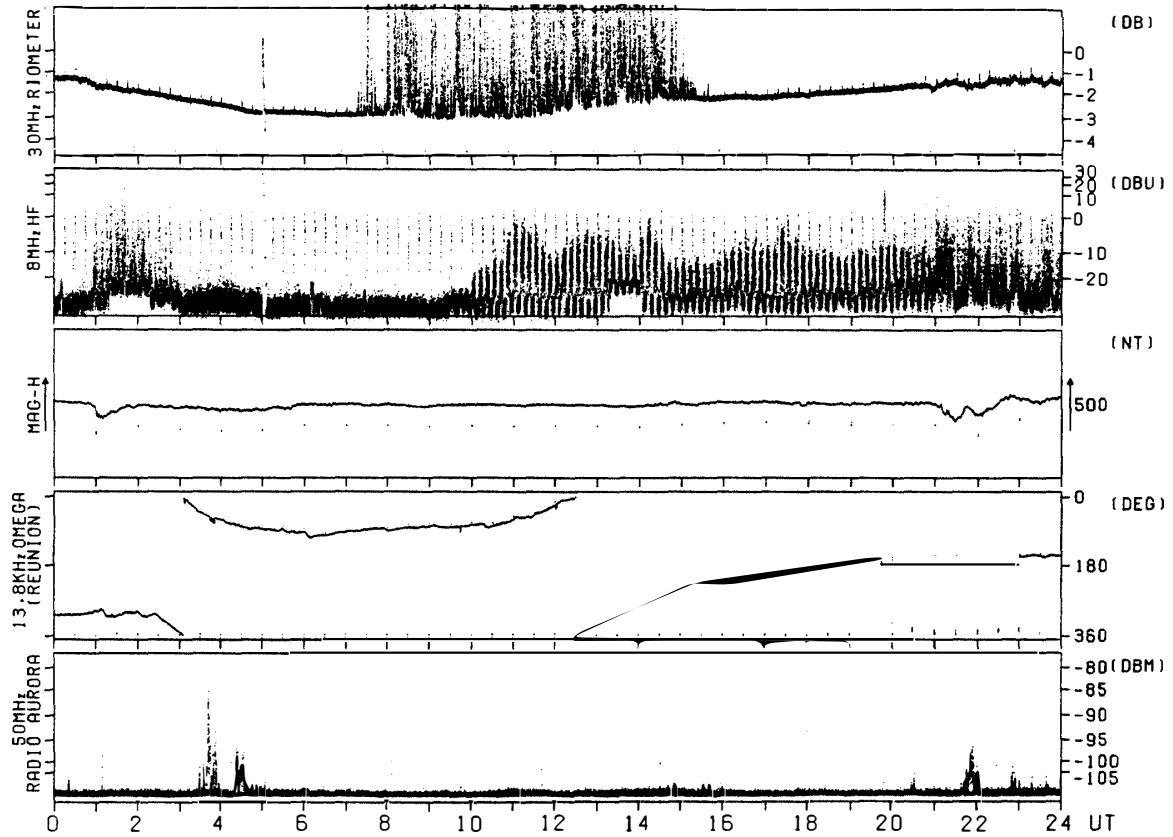
SYOWA STATION TOTAL DAY/140 1989/5/20



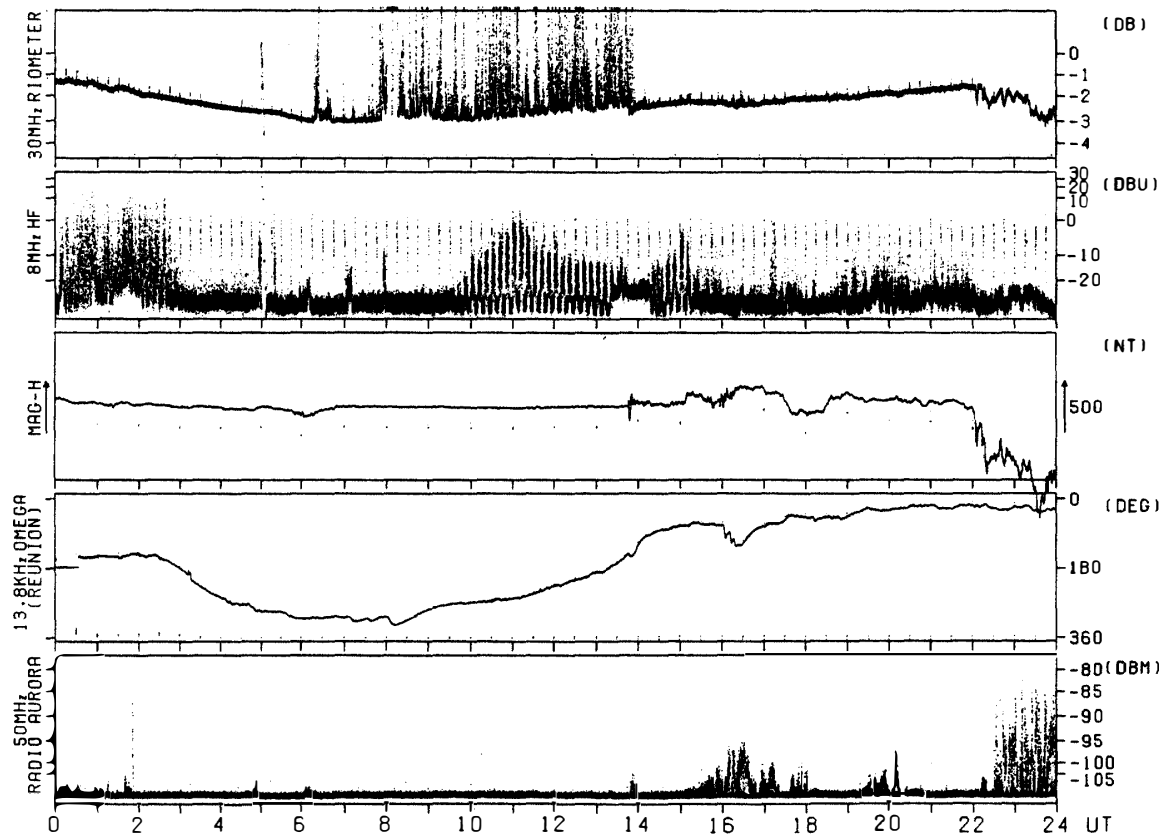
SYOWA STATION TOTAL DAY/141 1989/5/21



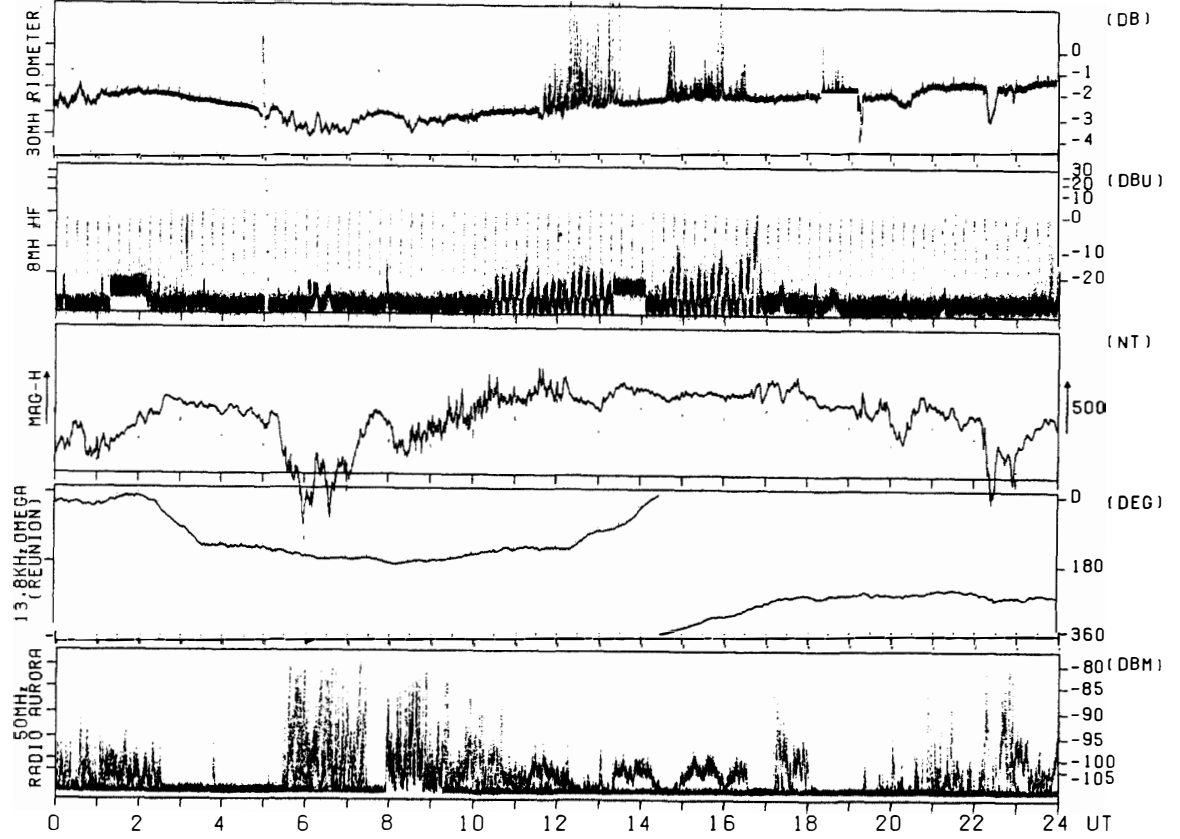
SYOWA STATION TOTAL DAY/142 1989/5/22



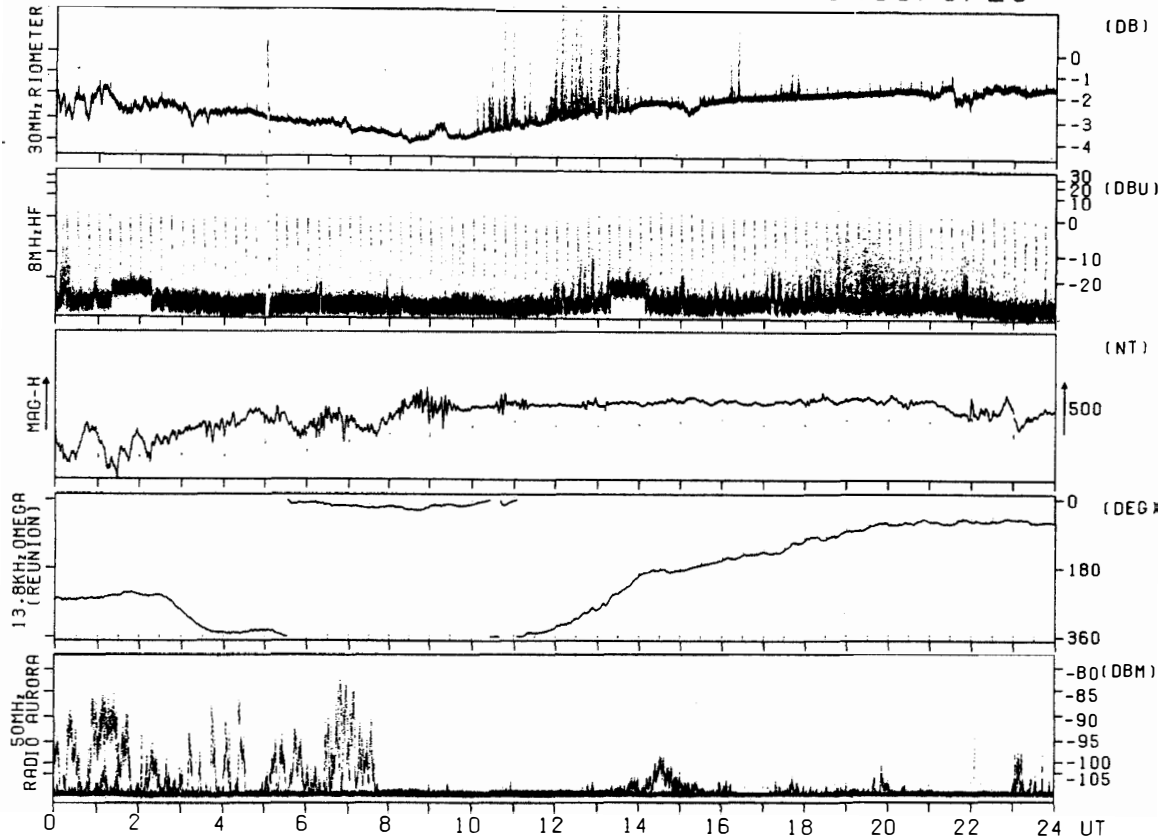
SYOWA STATION TOTAL DAY/143 1989/5/23



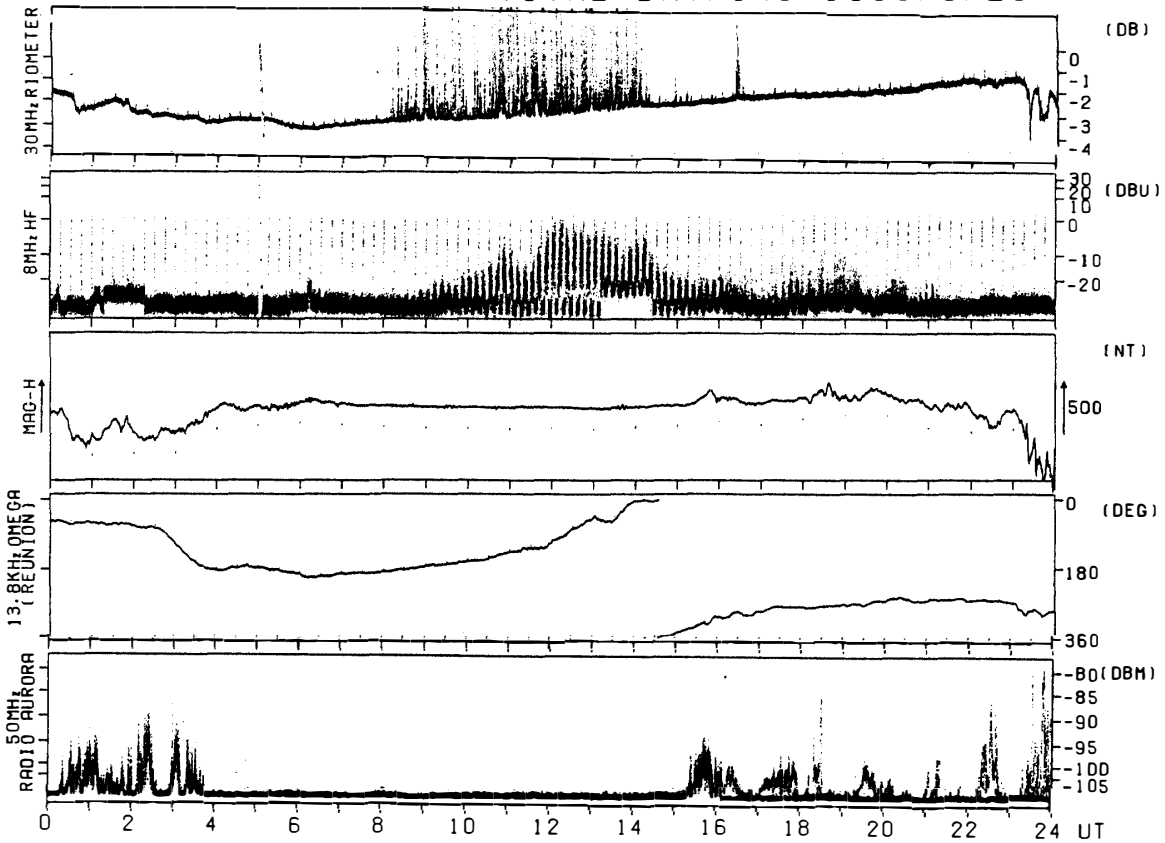
SYOWA STATION TOTAL DAY/144 1989/5/24



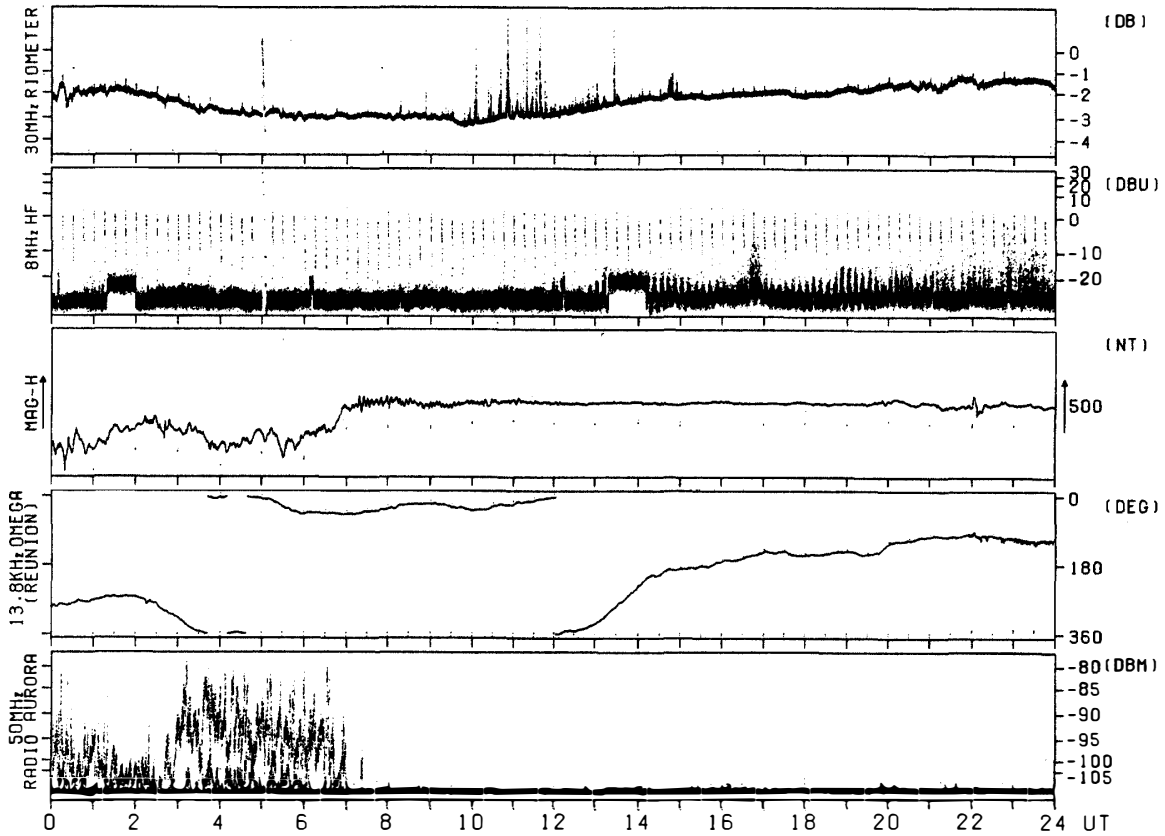
SYOWA STATION TOTAL DAY/145 1989/5/25



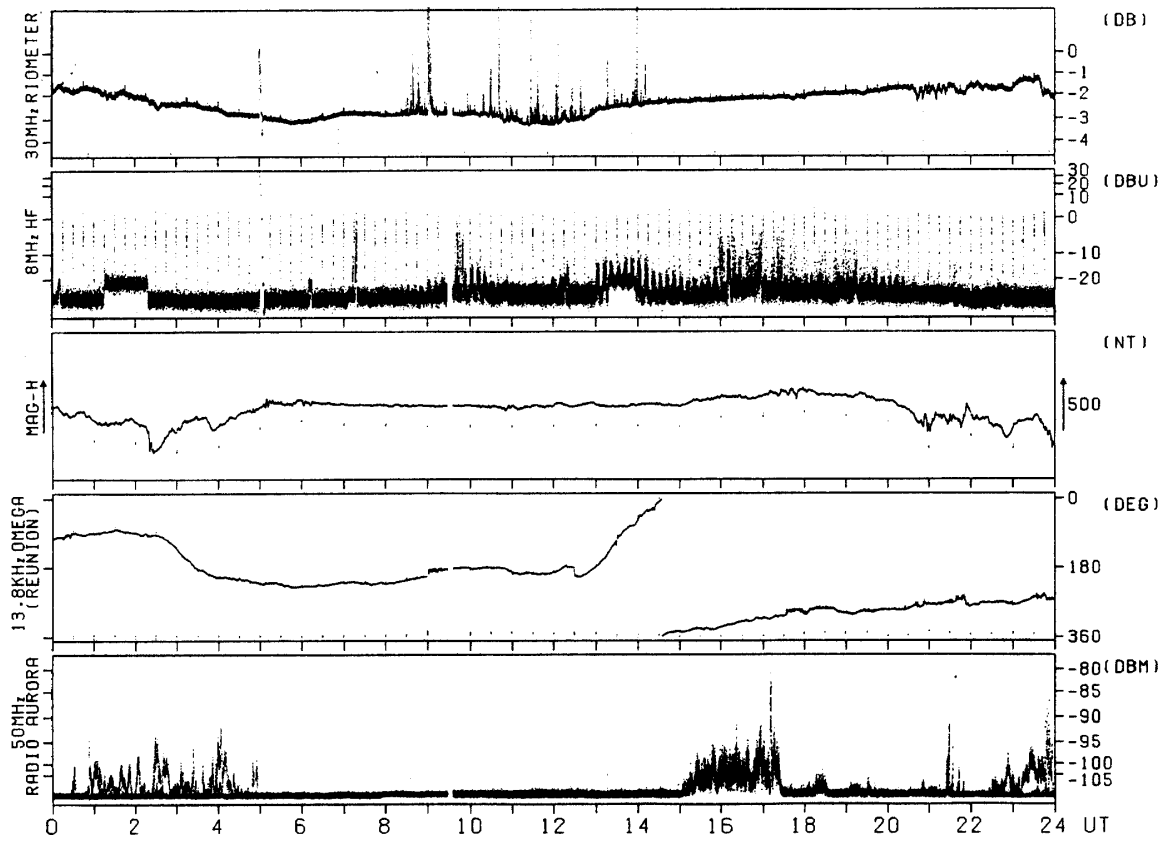
SYOWA STATION TOTAL DAY/146 1989/5/26



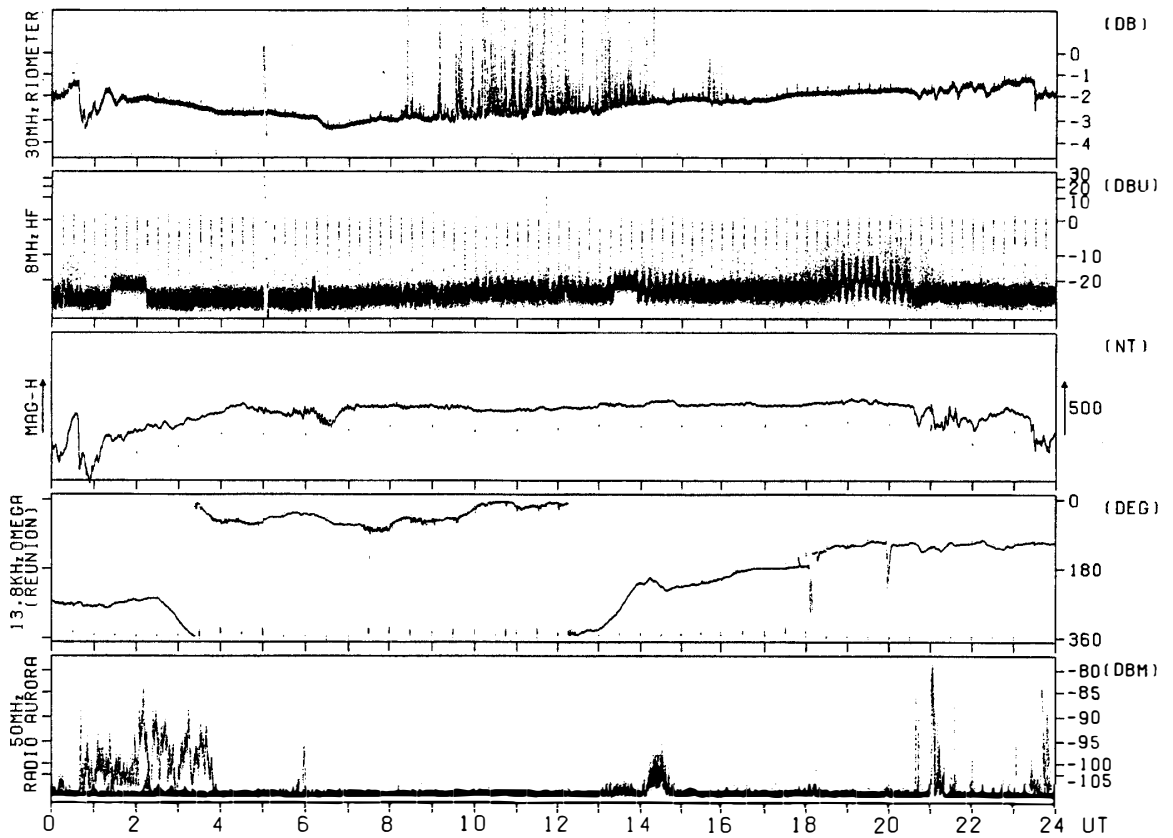
SYOWA STATION TOTAL DAY/147 1989/5/27



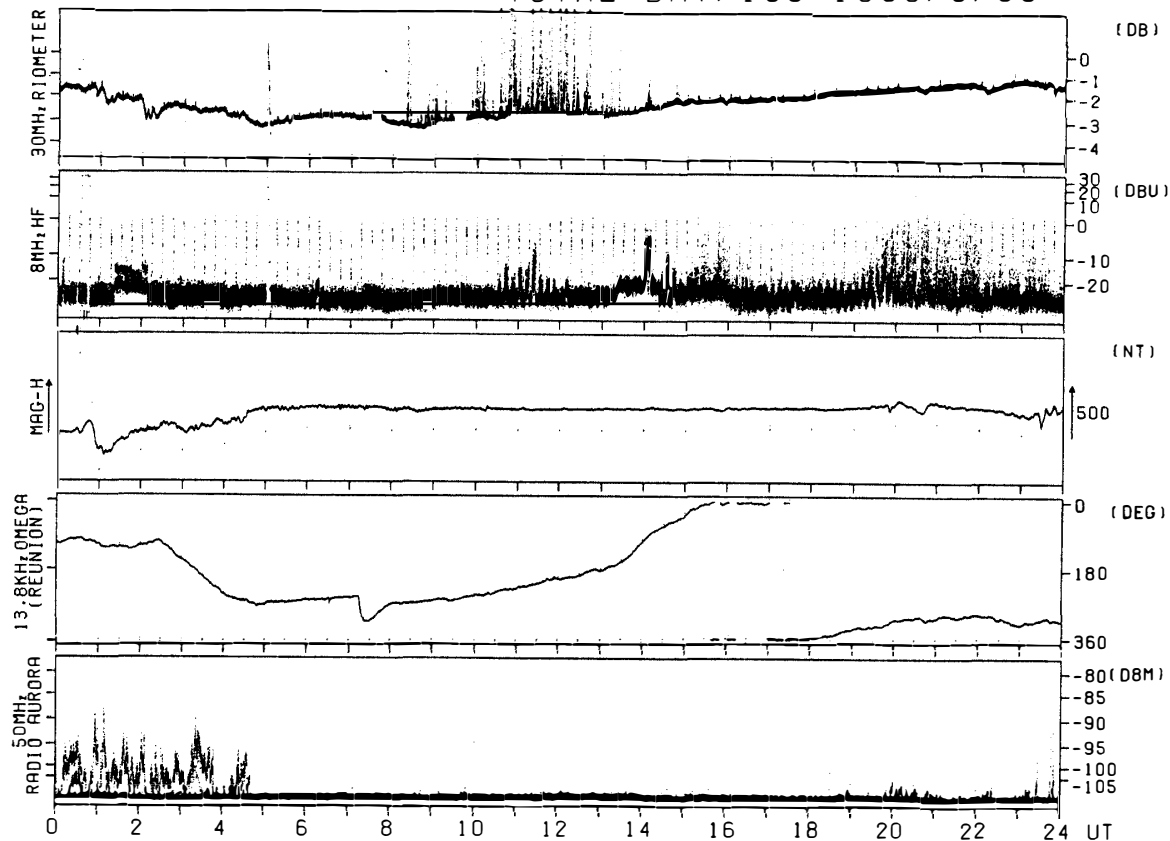
SYOWA STATION TOTAL DAY/148 1989/5/28



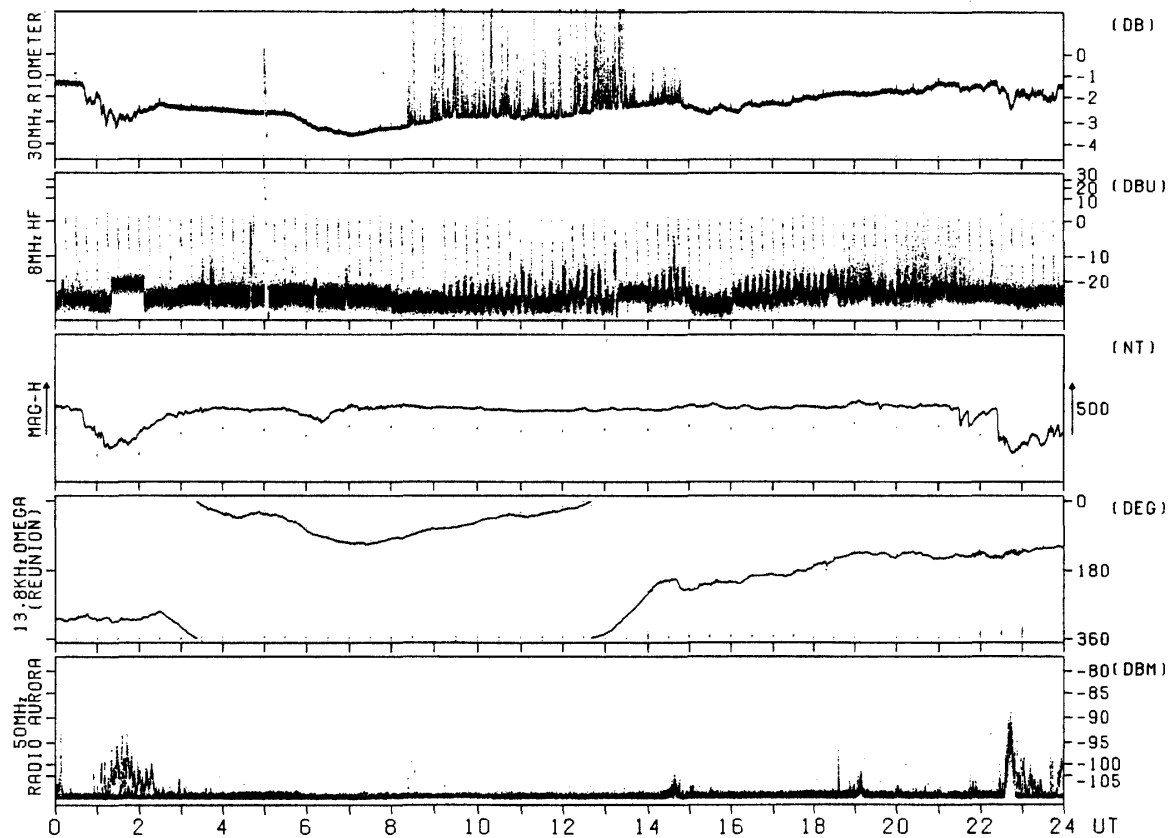
SYOWA STATION TOTAL DAY/149 1989/5/29



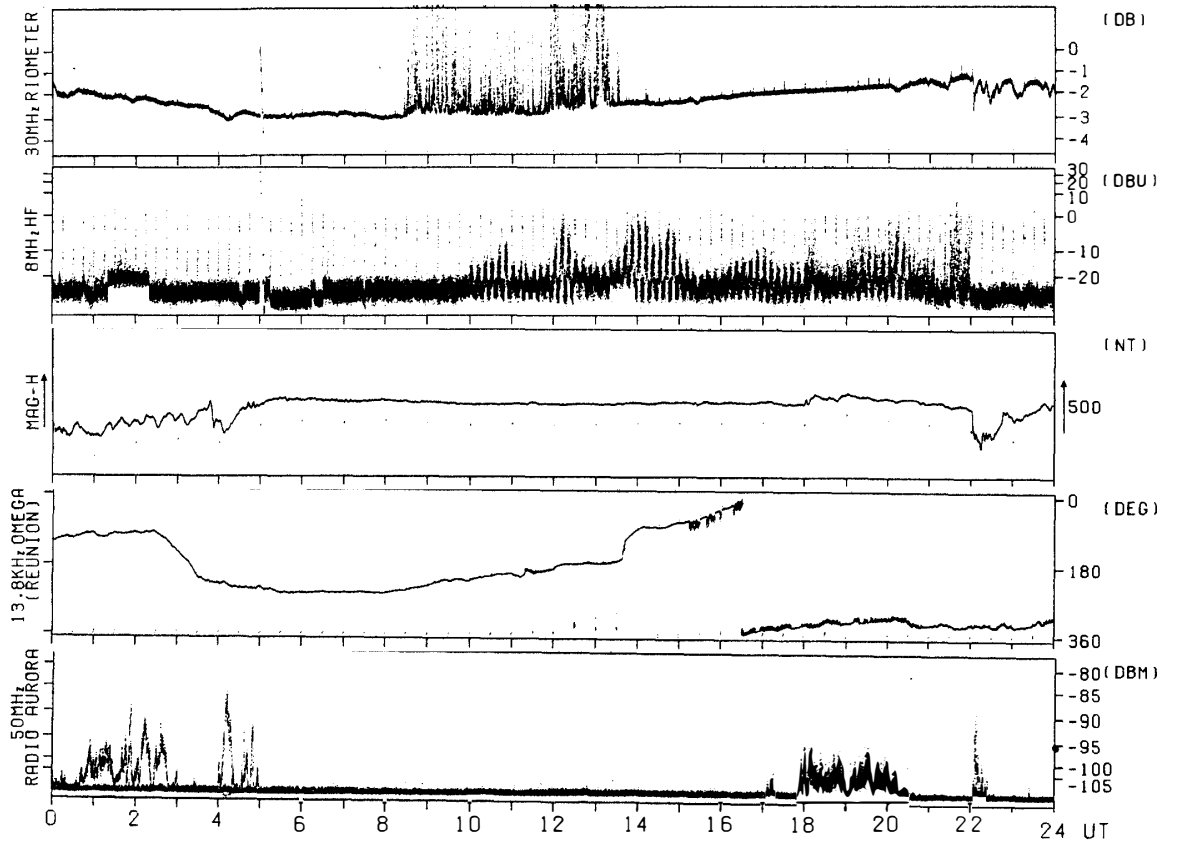
SYOWA STATION TOTAL DAY/150 1989/5/30



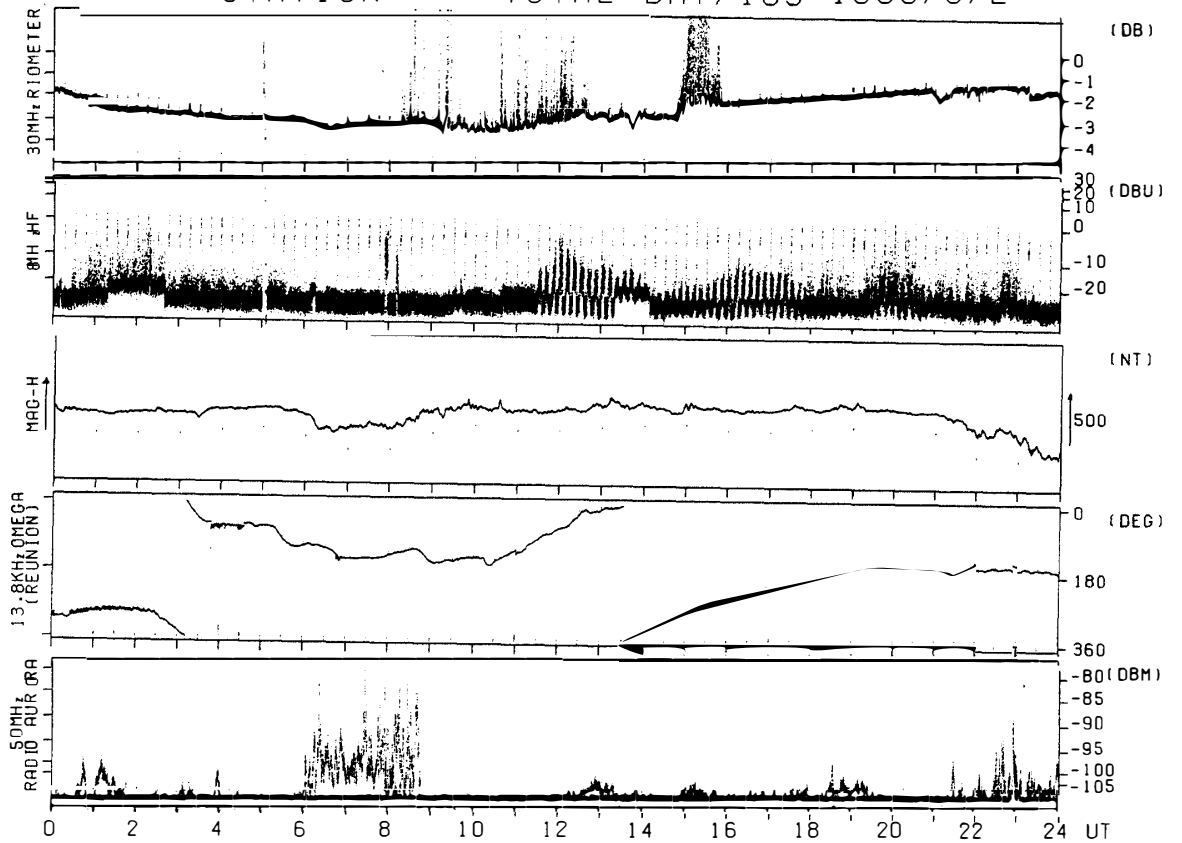
SYOWA STATION TOTAL DAY/151 1989/5/31



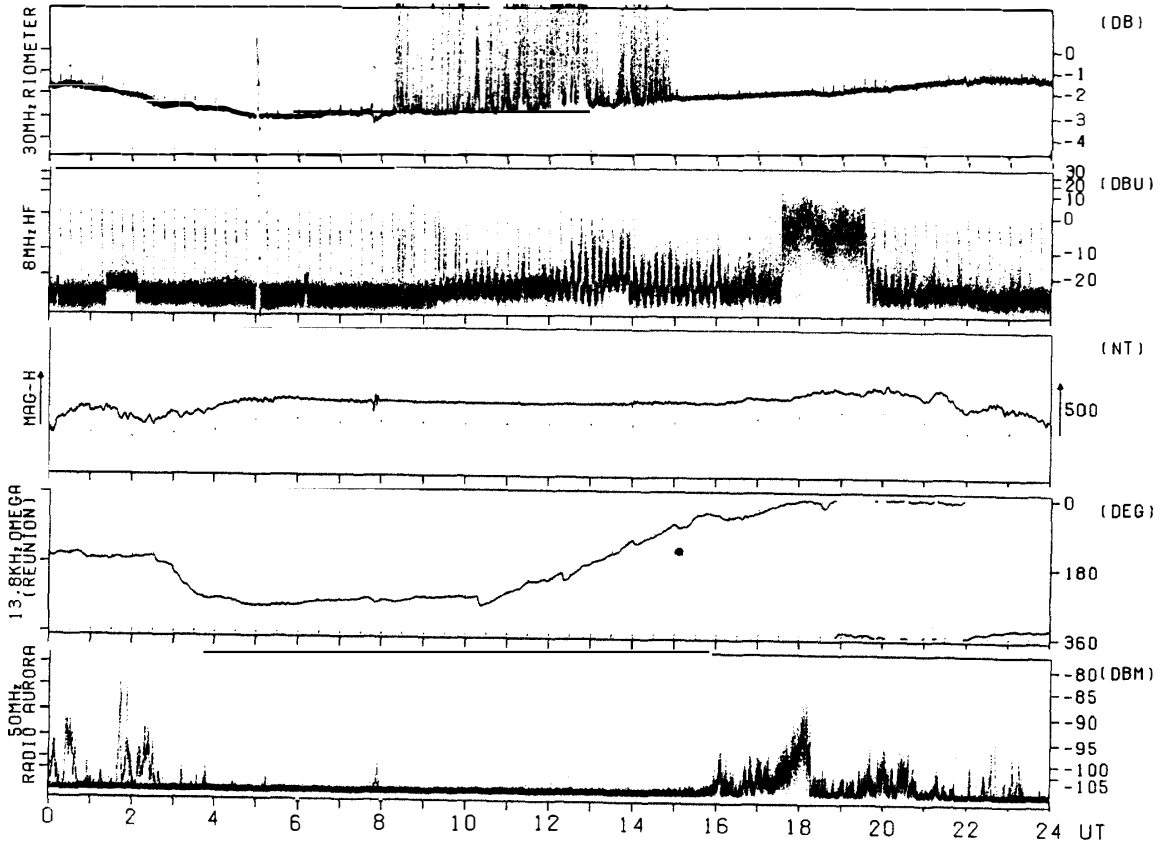
SYOWA STATION TOTAL DAY/152 1989/6/1



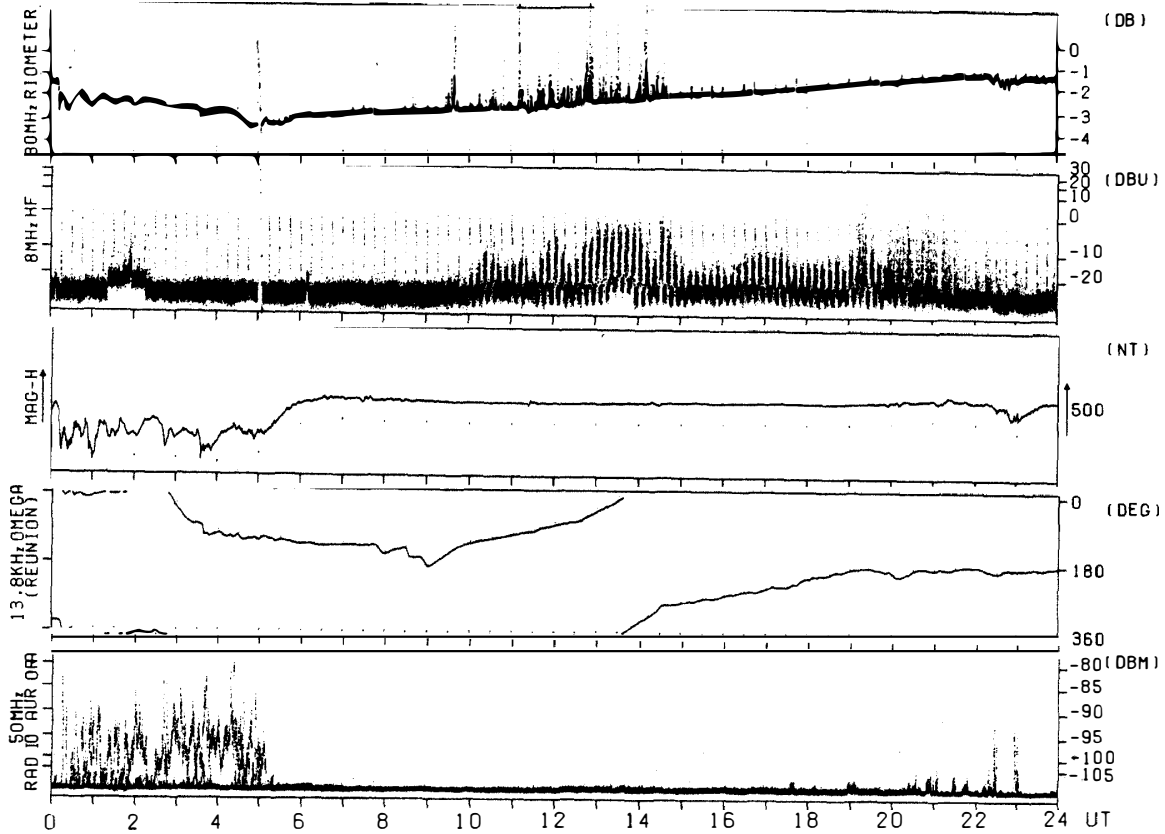
SYOWA STATION TOTAL DAY/153 1989/6/2



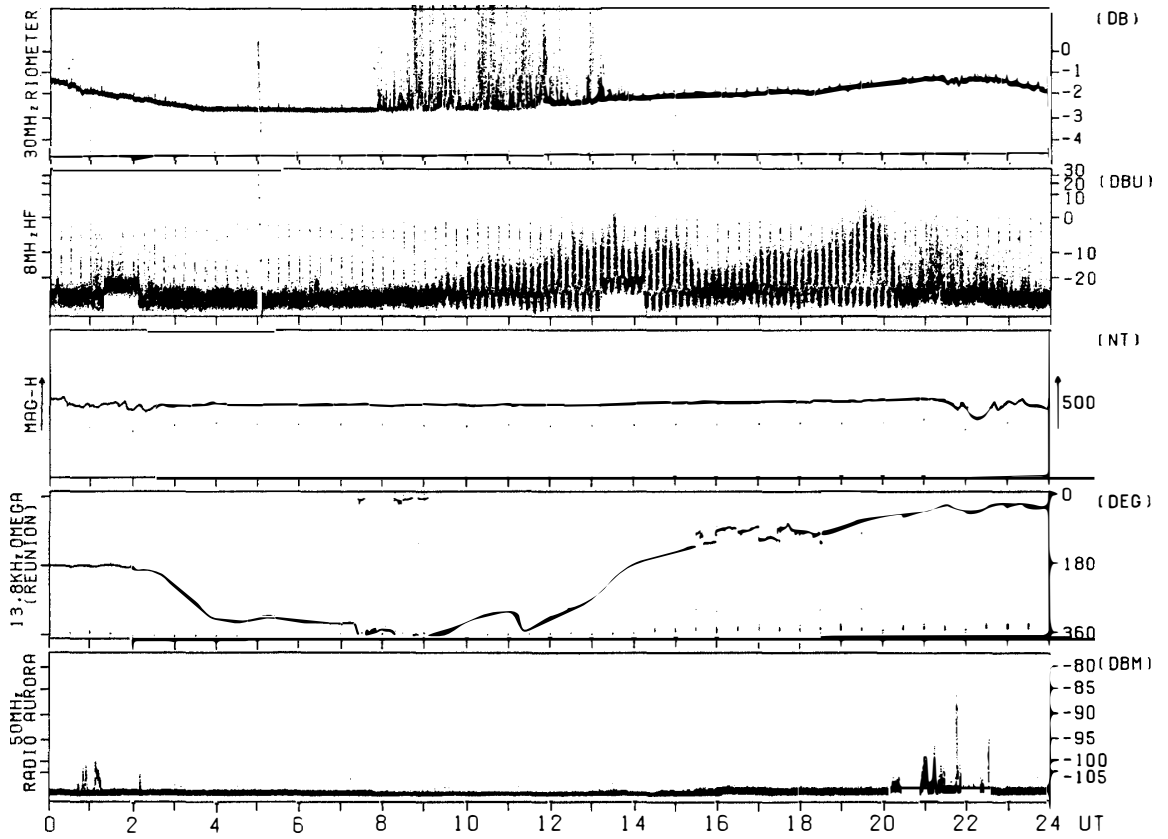
SYOWA STATION TOTAL DAY/154 1989/6/3



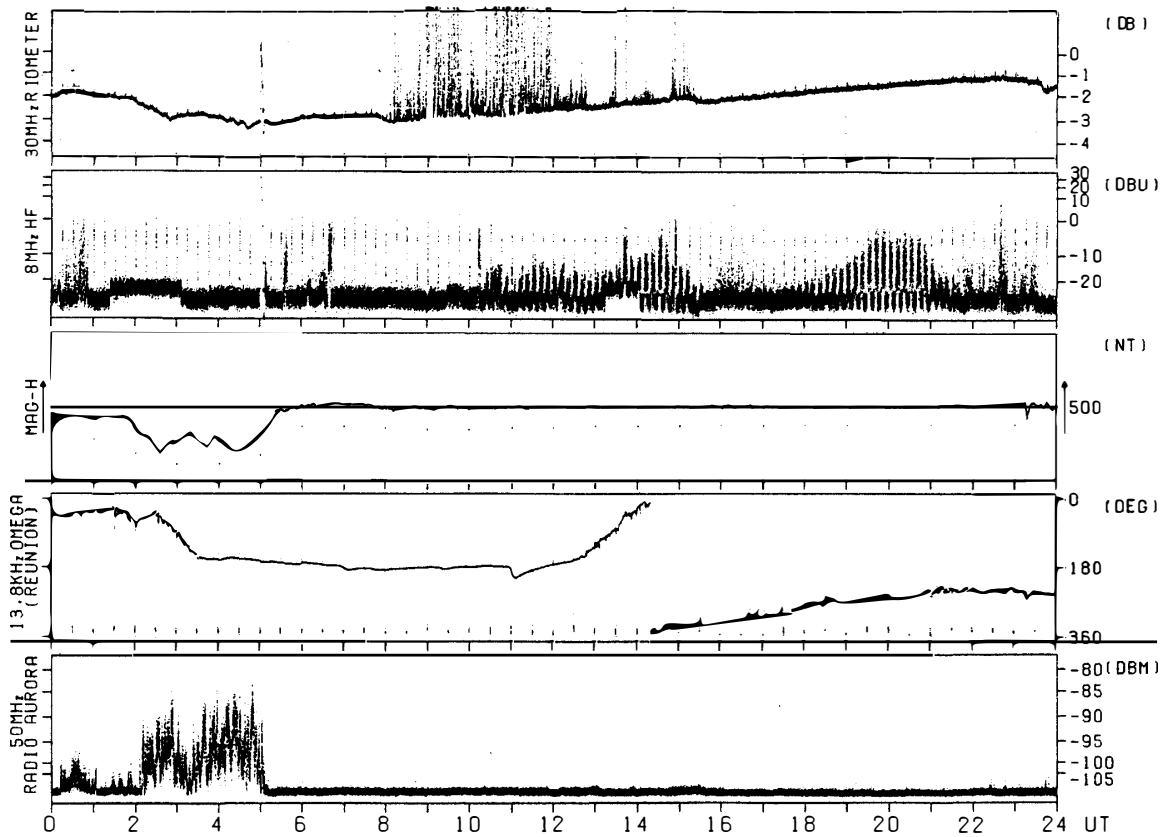
SYOWA STATION TOTAL DAY/155 1989/6/4



SYOWA STATION TOTAL DAY/156 1989/6/5

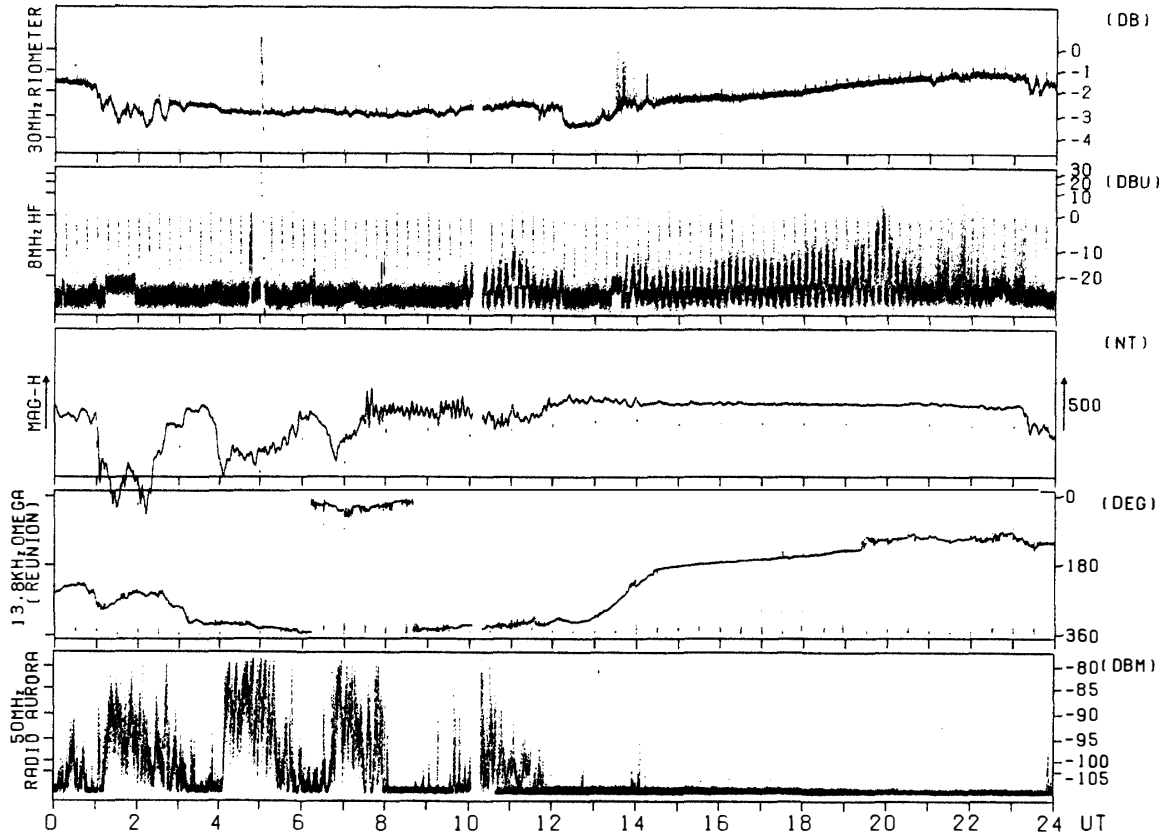


SYOWA STATION TOTAL DAY/157 1989/6/6



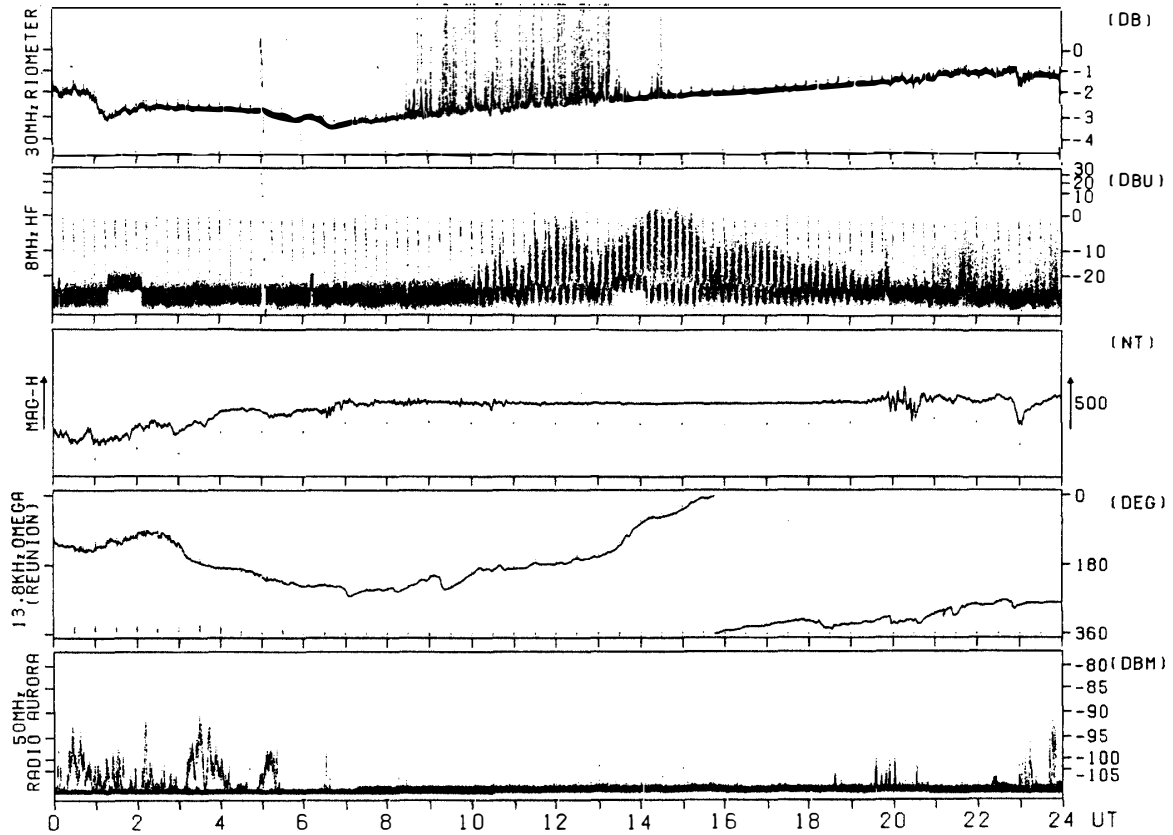
SYOWA STATION

TOTAL DAY/158 1989/6/7

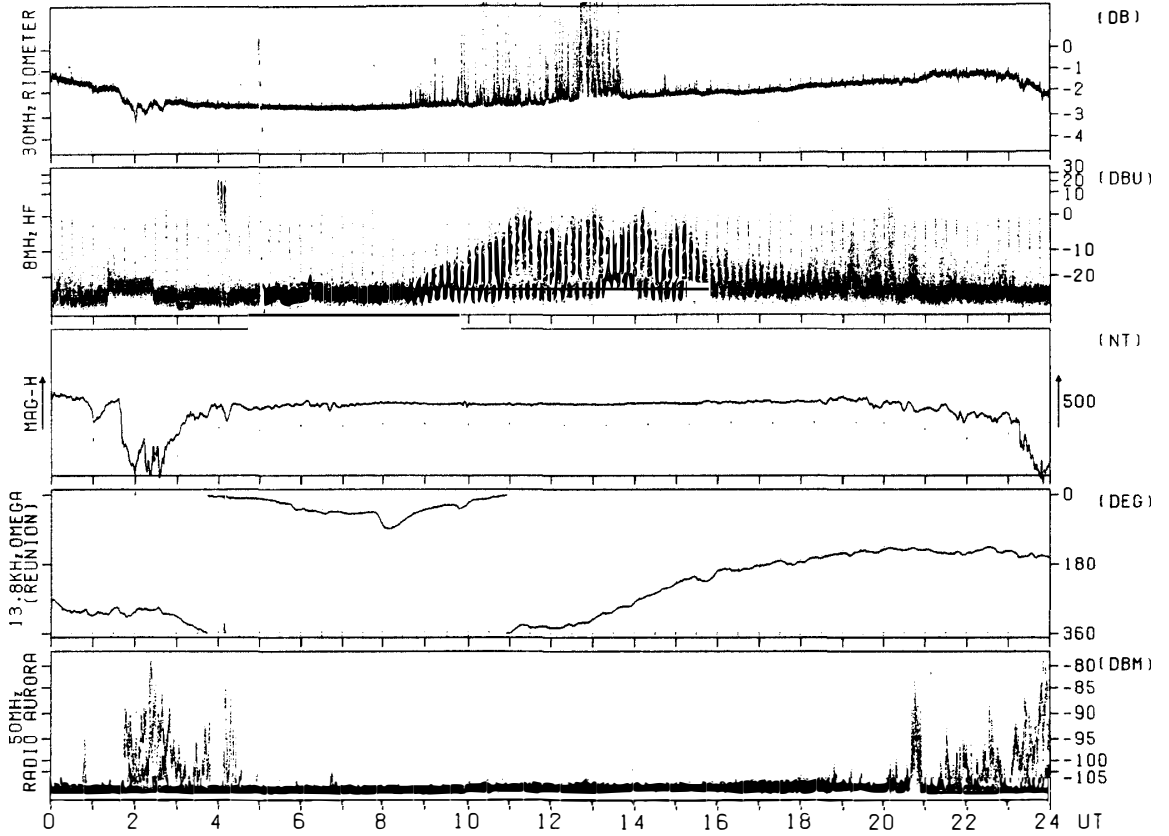


SYOWA STATION

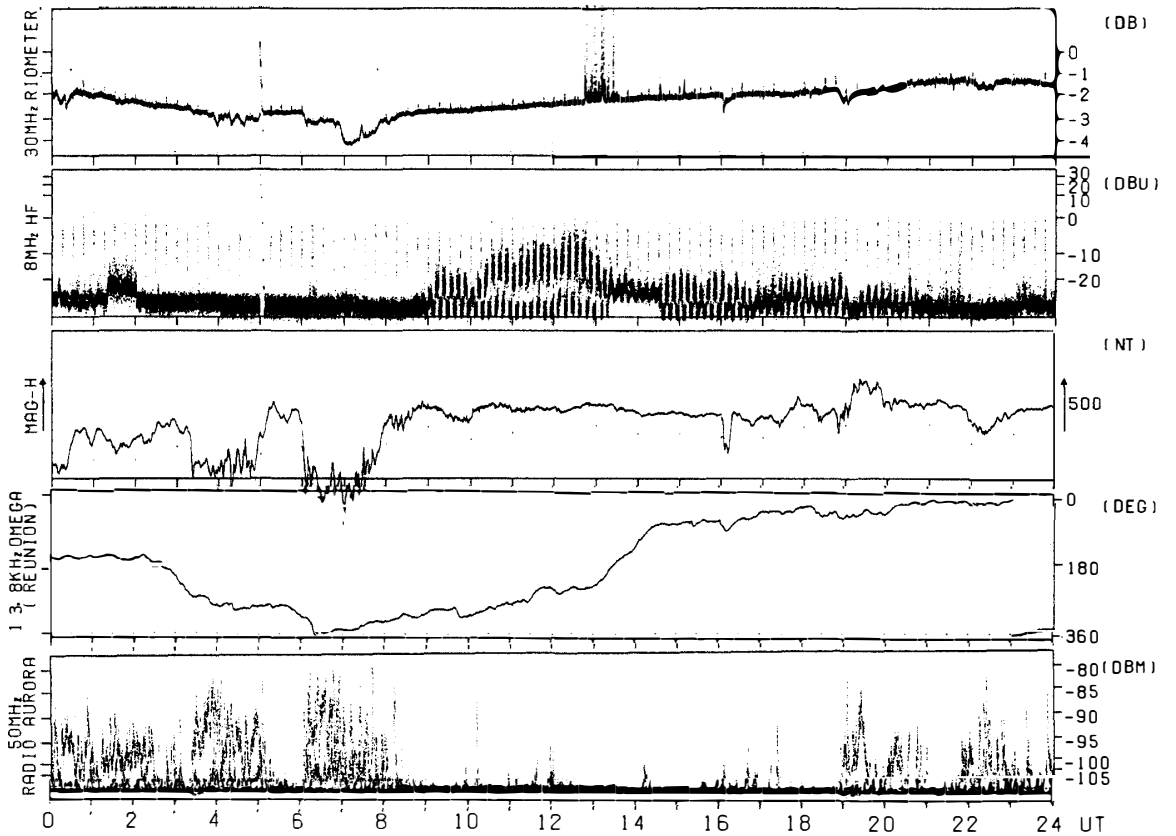
TOTAL DAY/159 1989/6/8



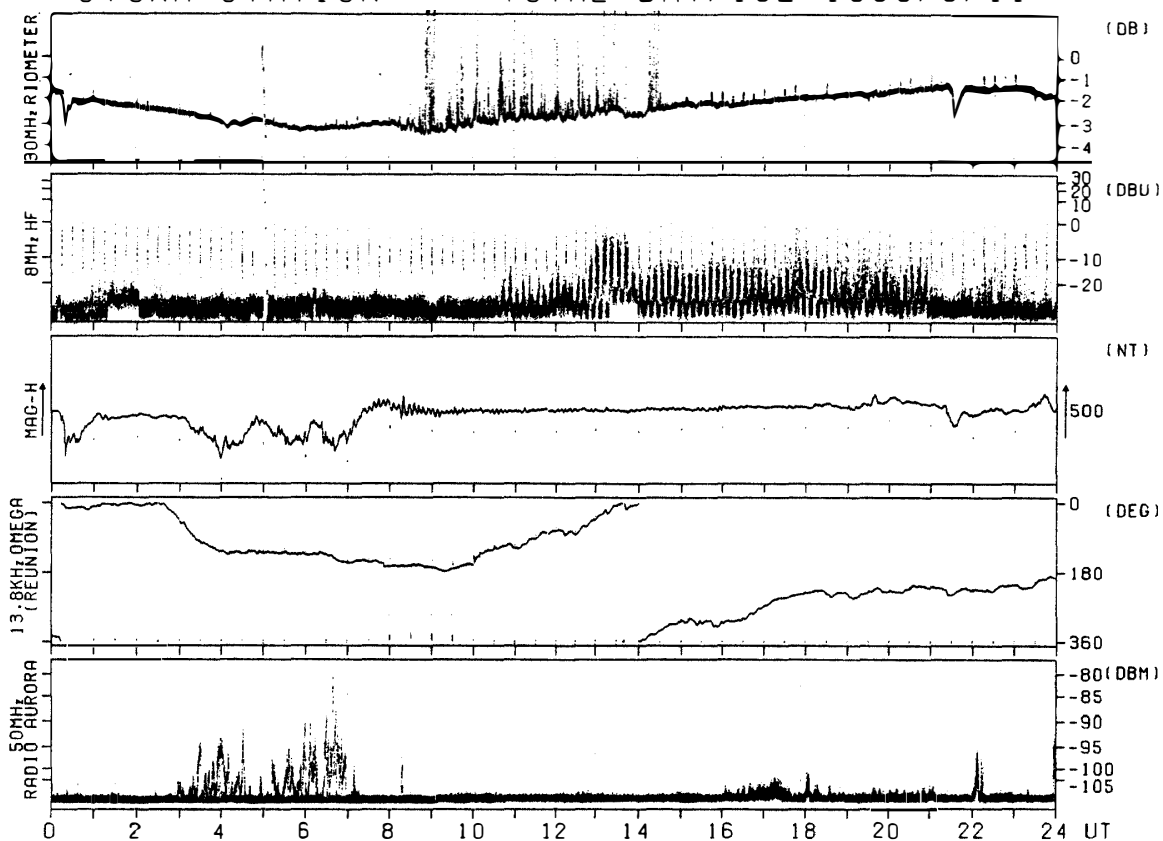
SYOWA STATION TOTAL DAY/160 1989/6/9



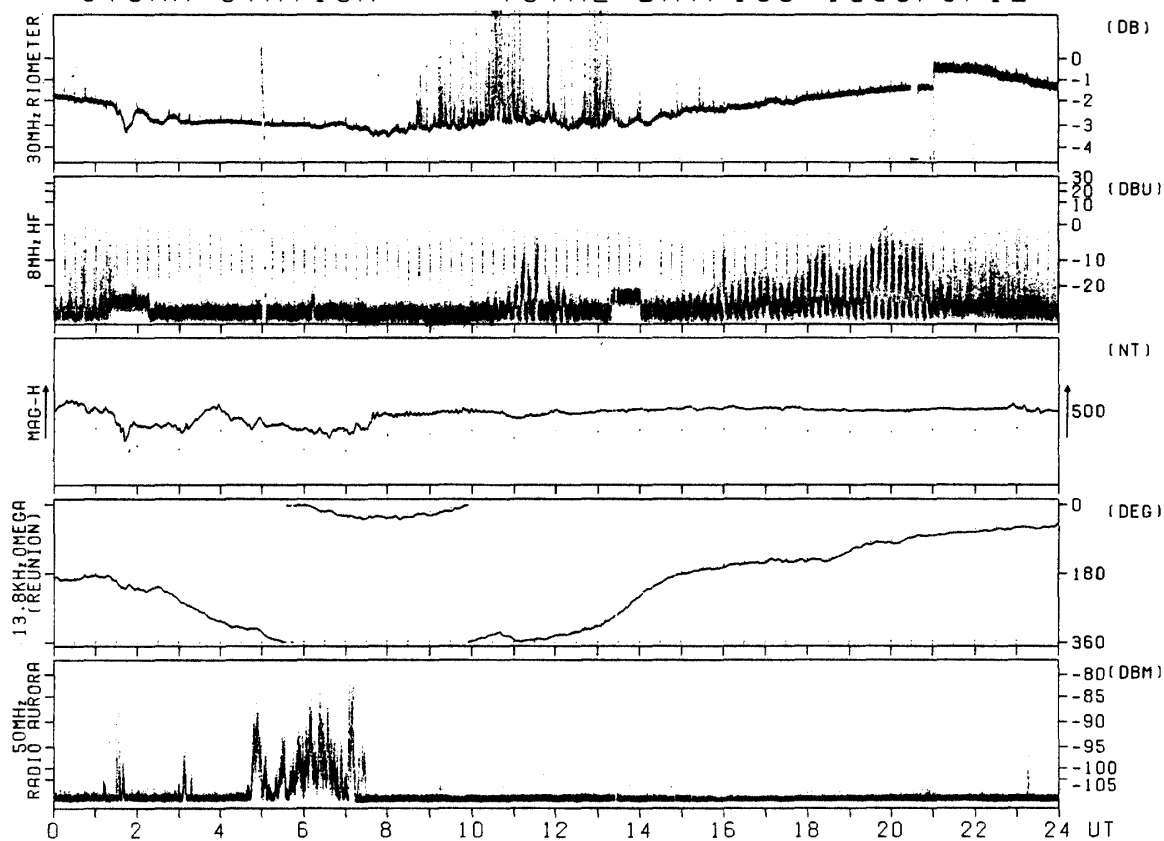
SYOWA STATION TOTAL DAY/161 1989/6/10



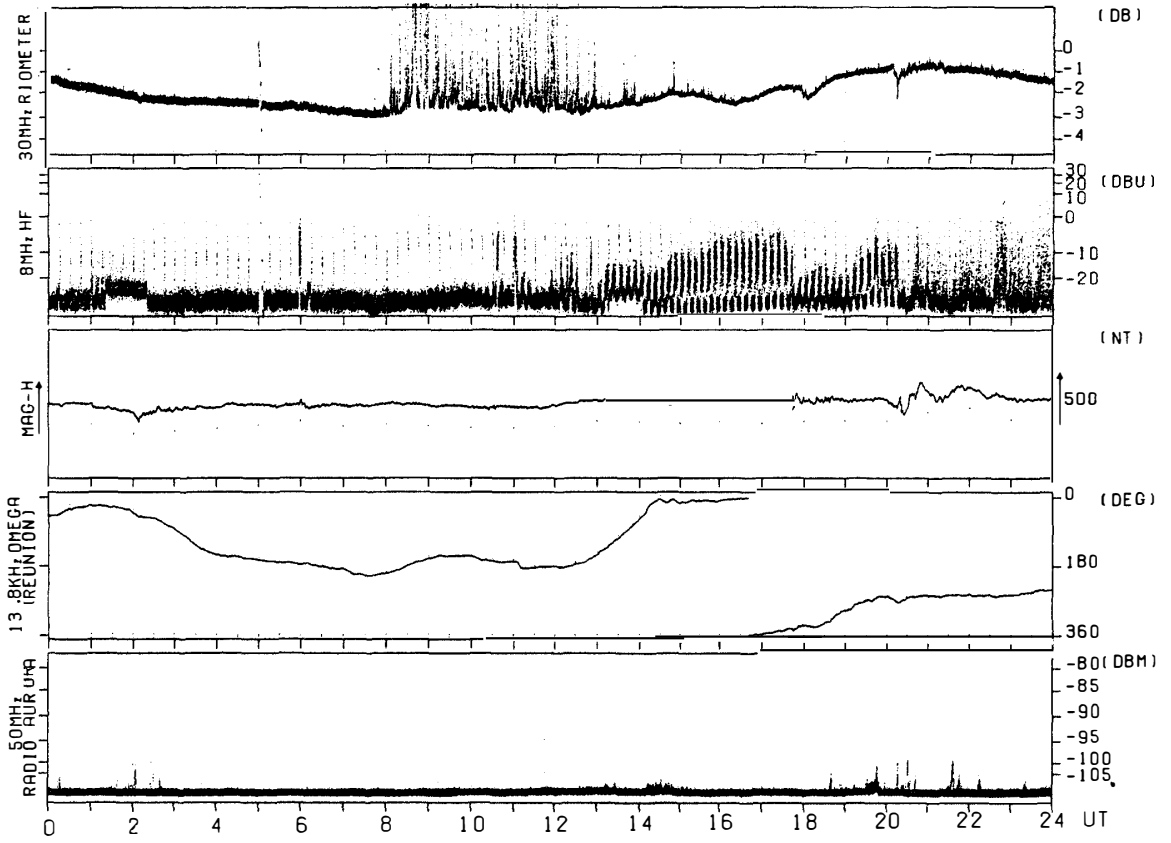
SYOWA STATION TOTAL DAY/162 1989/6/11



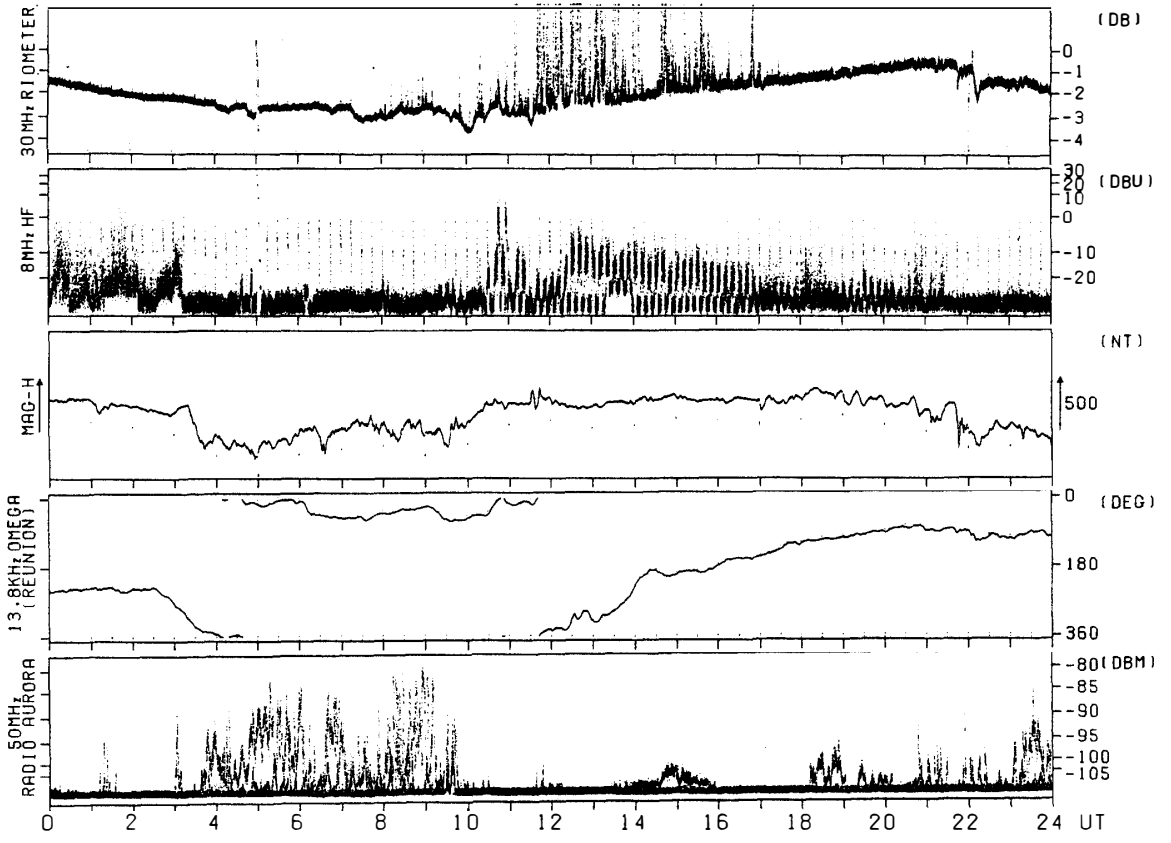
SYOWA STATION TOTAL DAY/163 1989/6/12



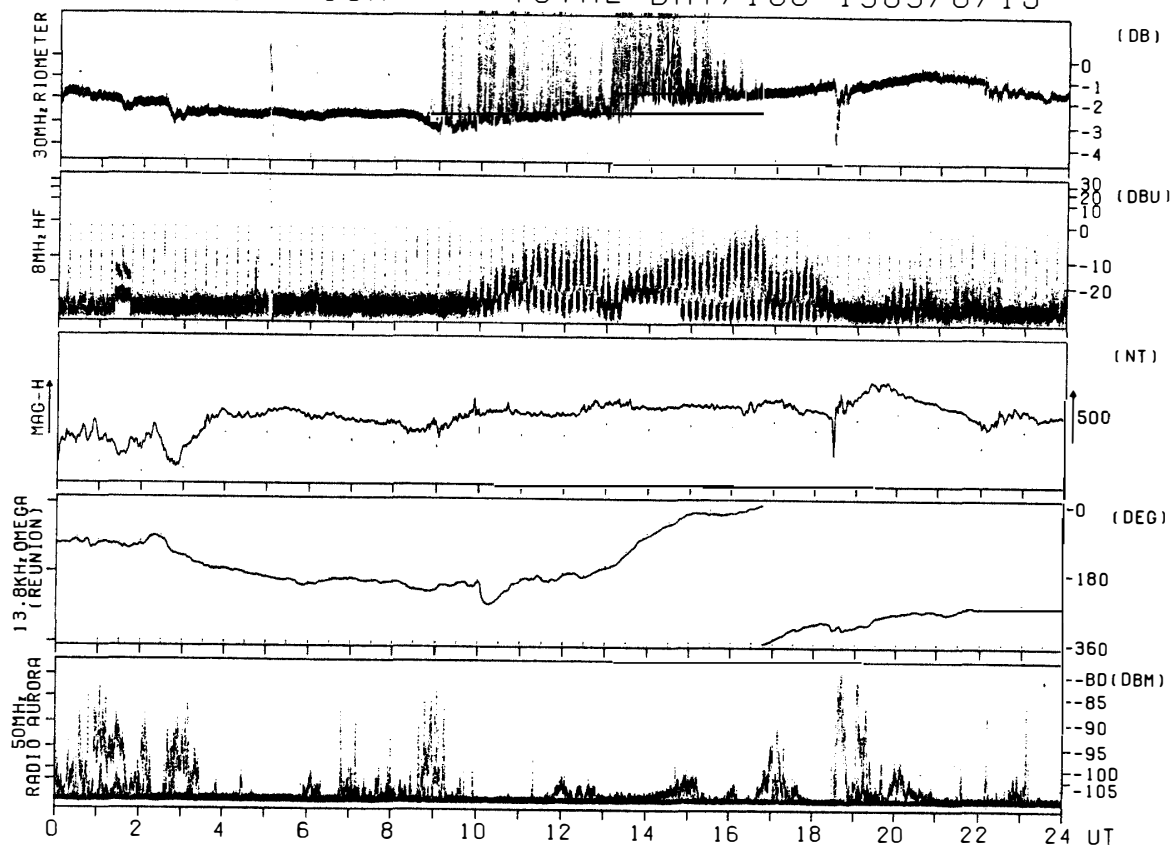
SYOWA STATION TOTAL DAY/164 1989/6/13



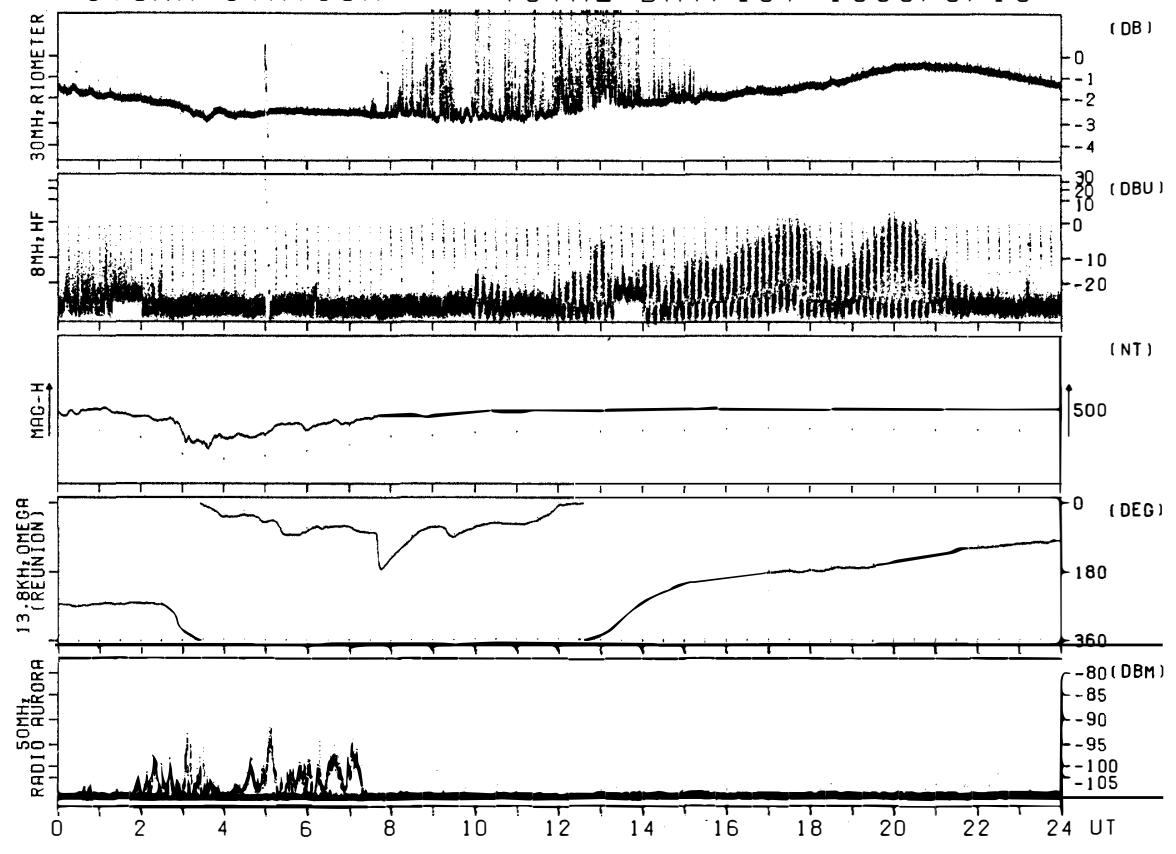
SYOWA STATION TOTAL DAY/165 1989/6/14



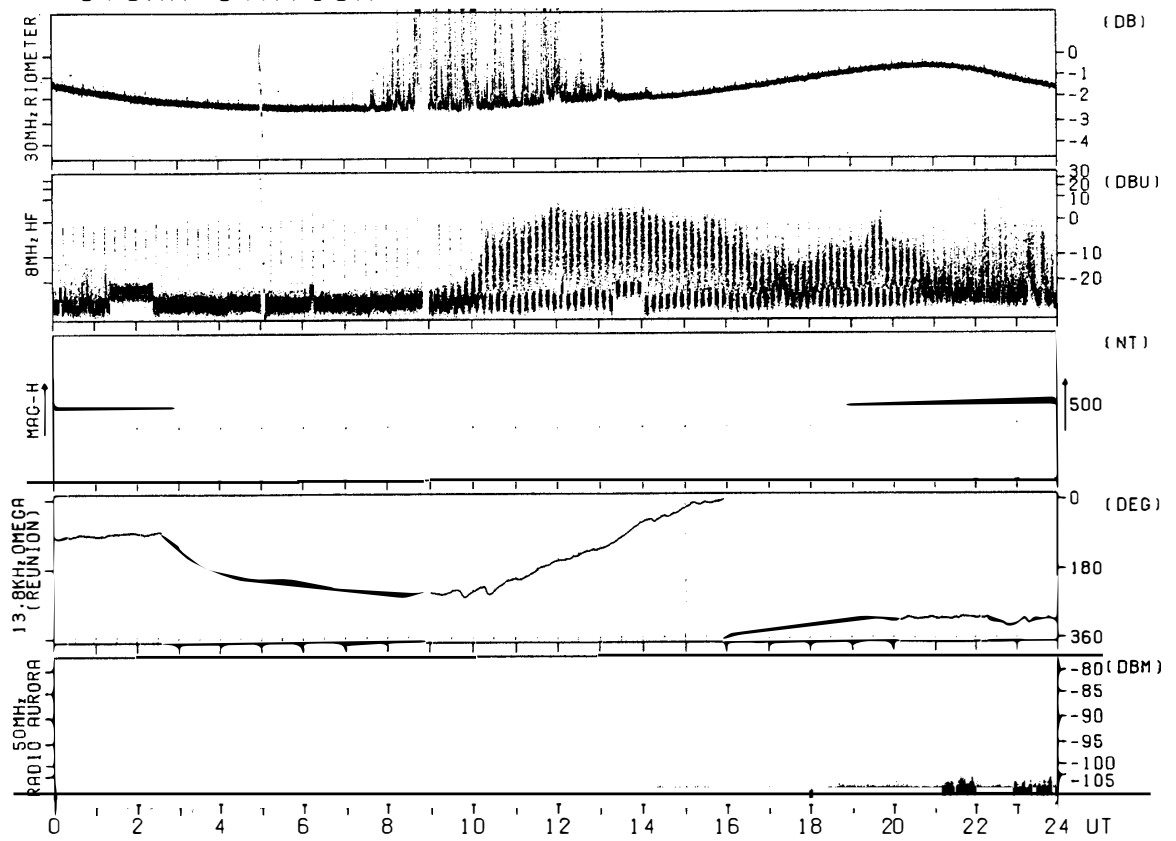
SYOWA STATION TOTAL DAY/166 1989/6/15



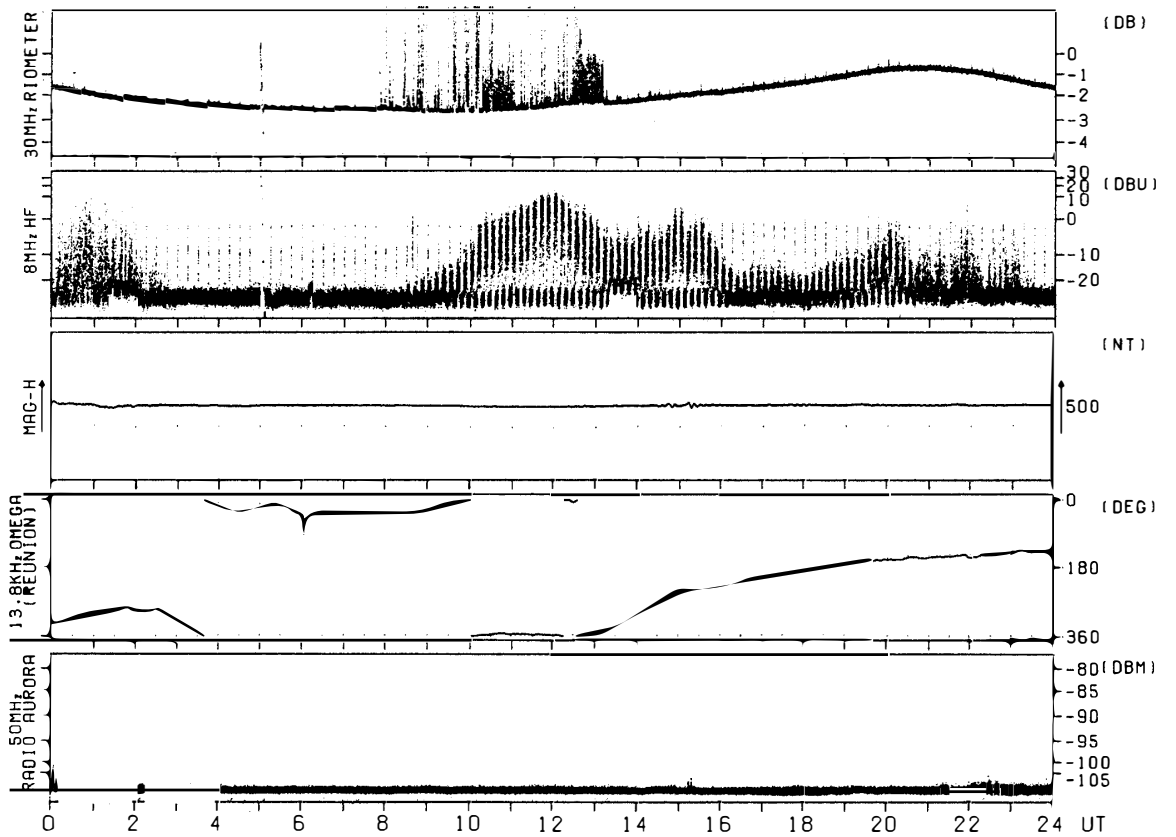
SYOWA STATION TOTAL DAY/167 1989/6/16



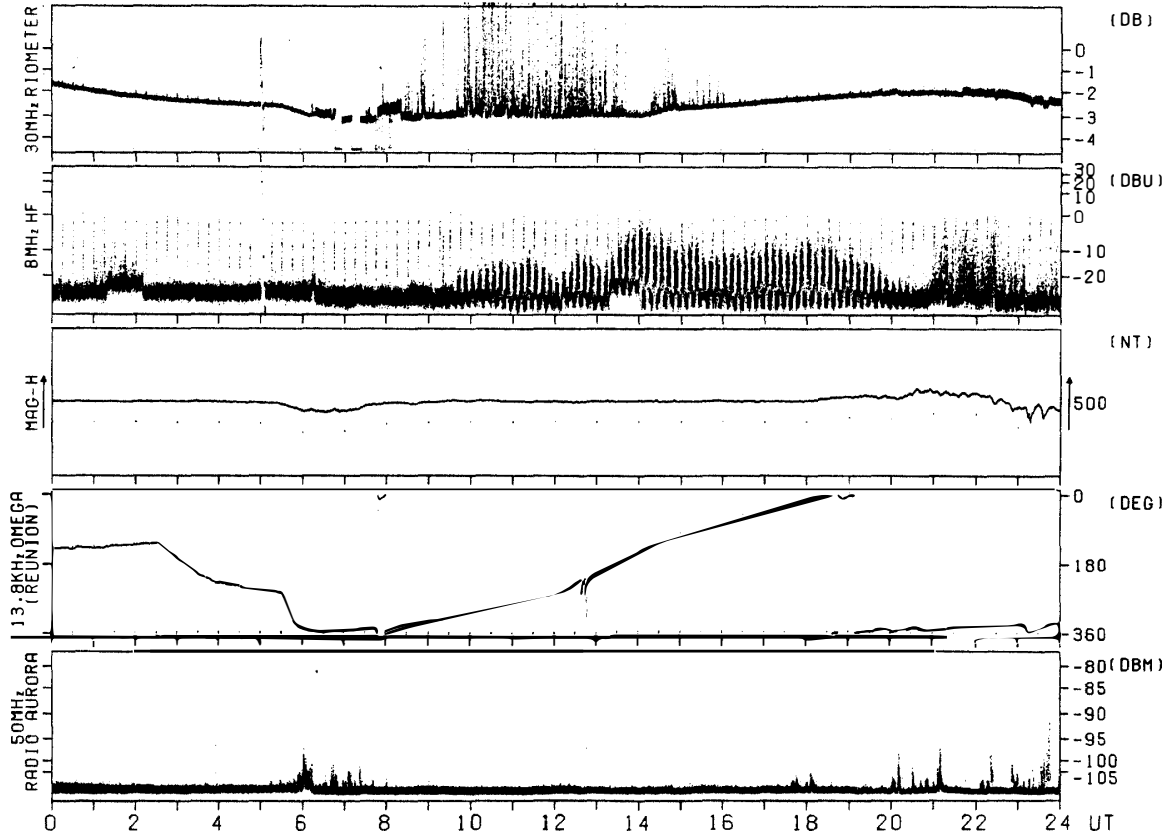
SYOWA STATION TOTAL DAY/168 1989/6/17



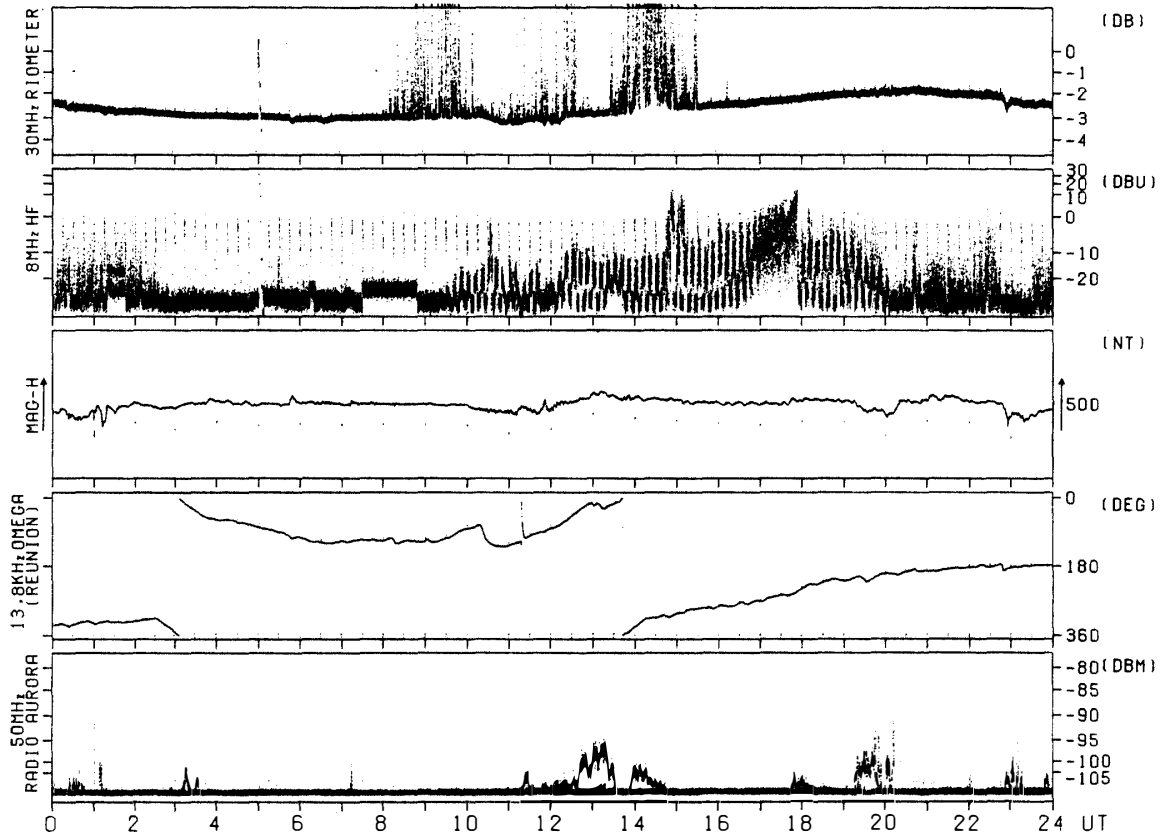
SYOWA STATION TOTAL DAY/169 1989/6/18



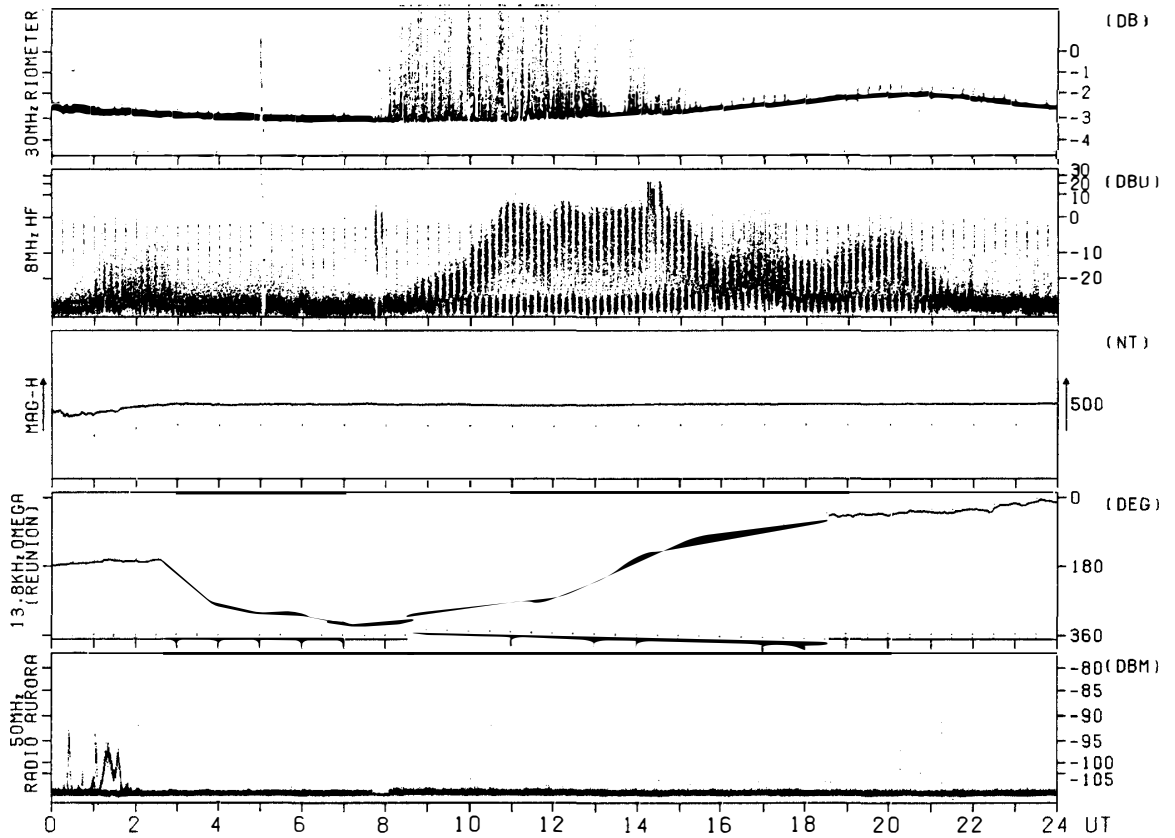
SYOWA STATION TOTAL DAY/170 1989/6/19



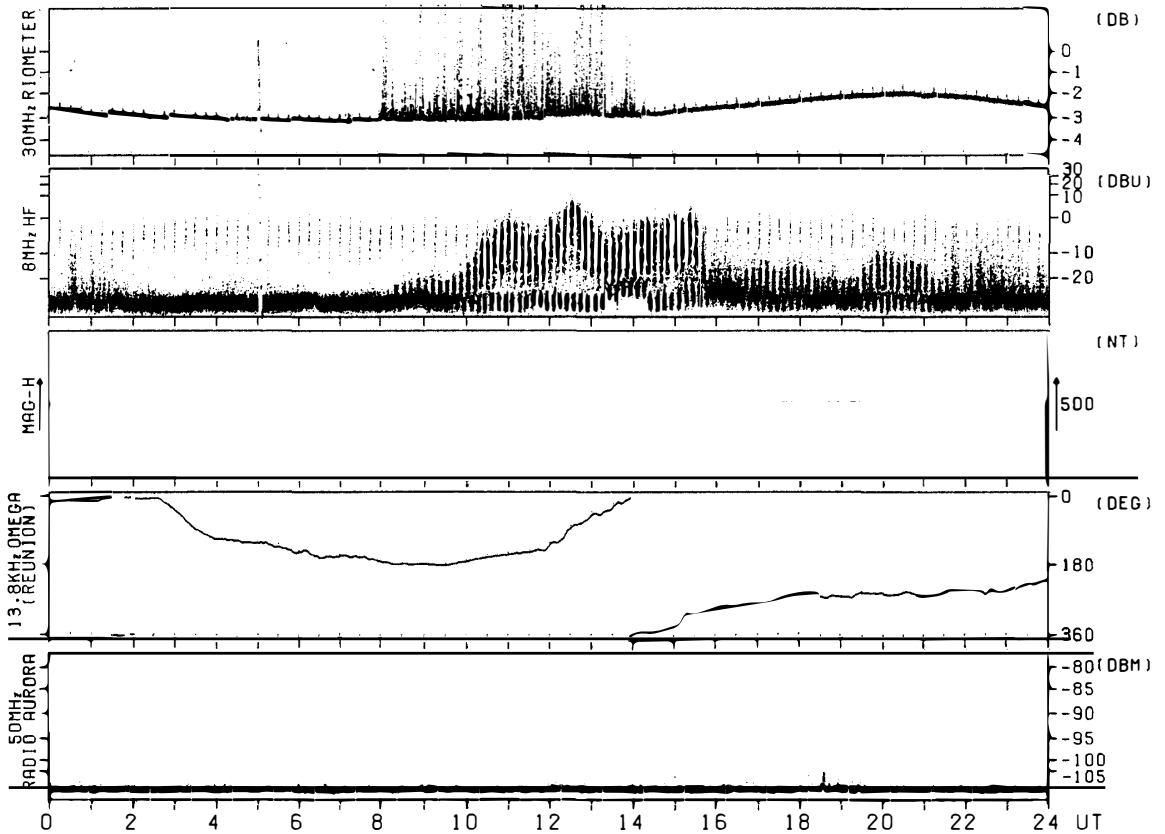
SYOWA STATION TOTAL DAY/171 1989/6/20



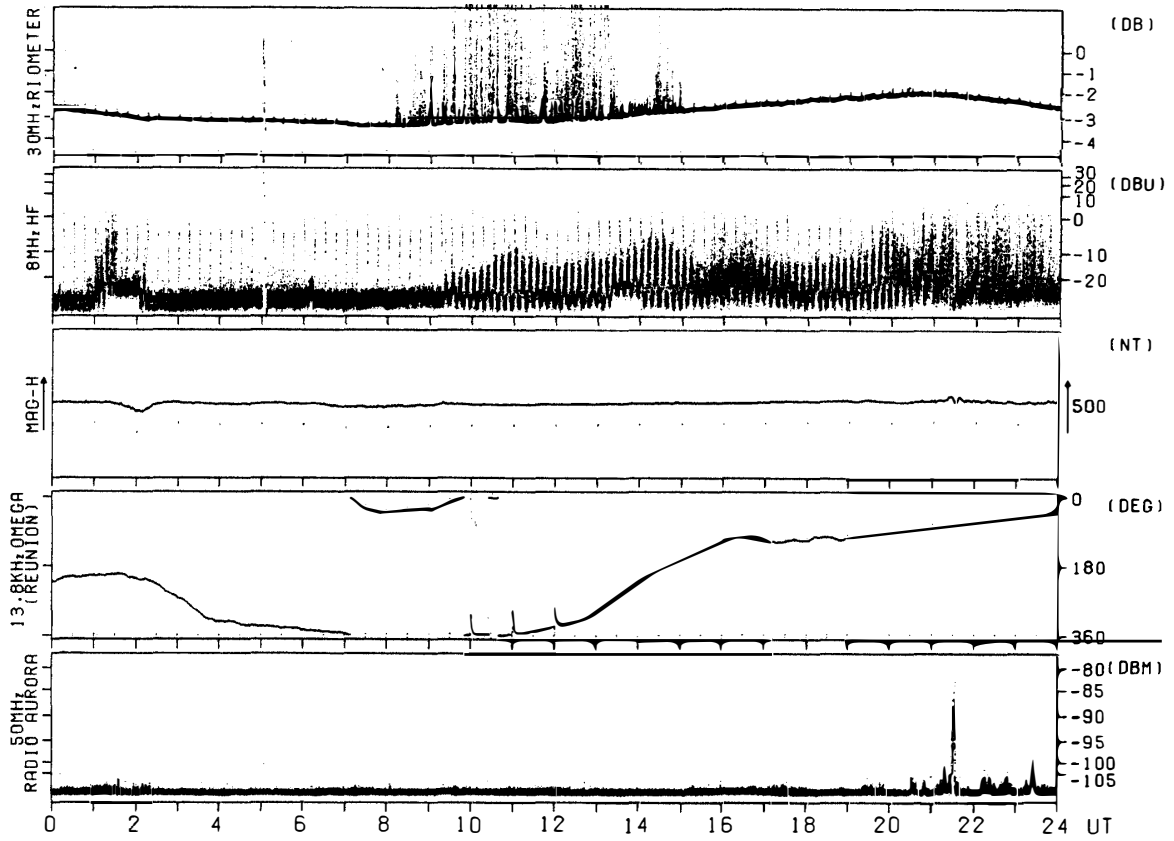
SYOWA STATION TOTAL DAY/172 1989/6/21



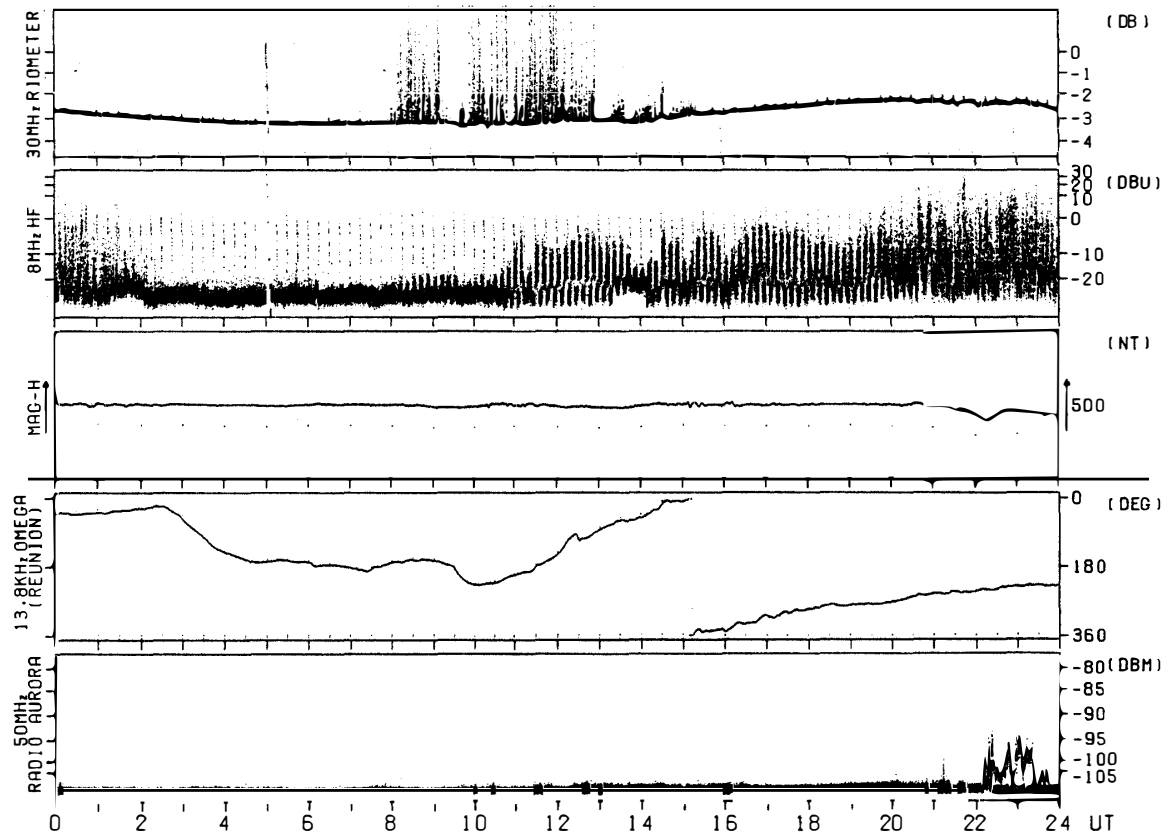
SYOWA STATION TOTAL DAY/173 1989/6/22



SYOWA STATION TOTAL DAY/174 1989/6/23

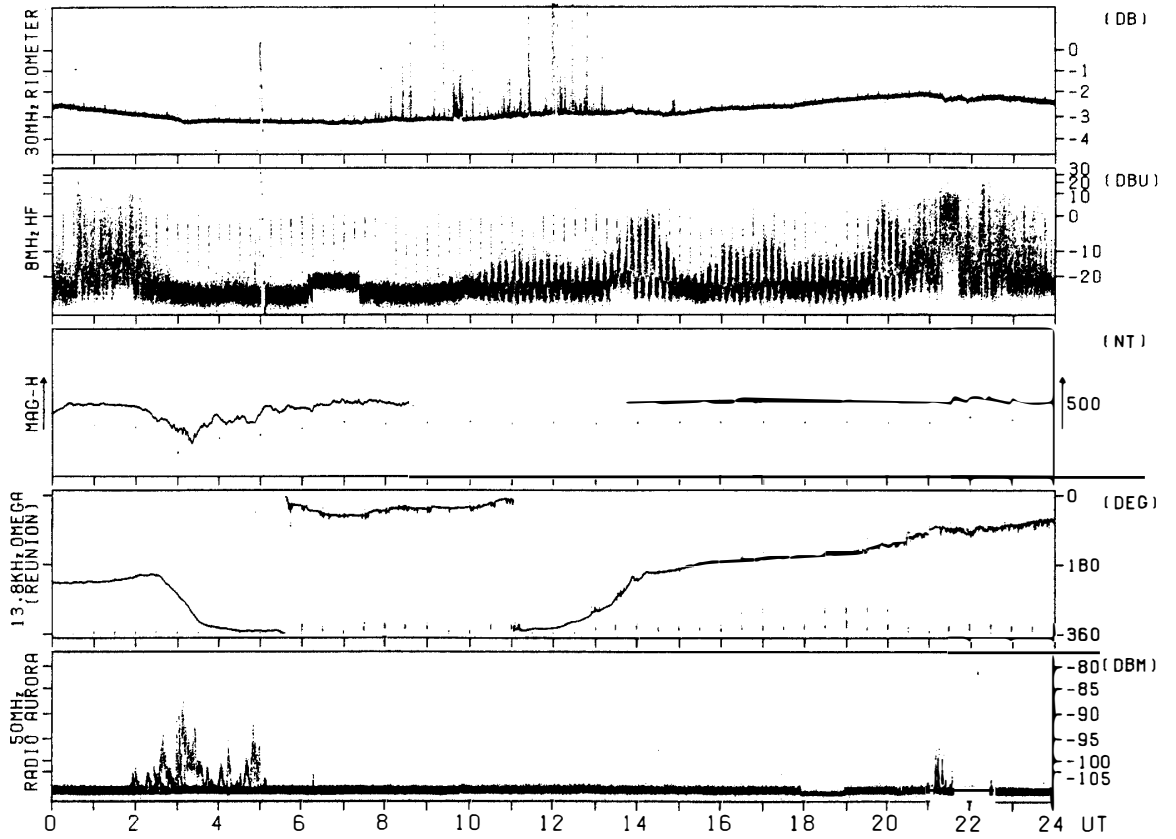


SYOWA STATION TOTAL DAY/175 1989/6/24



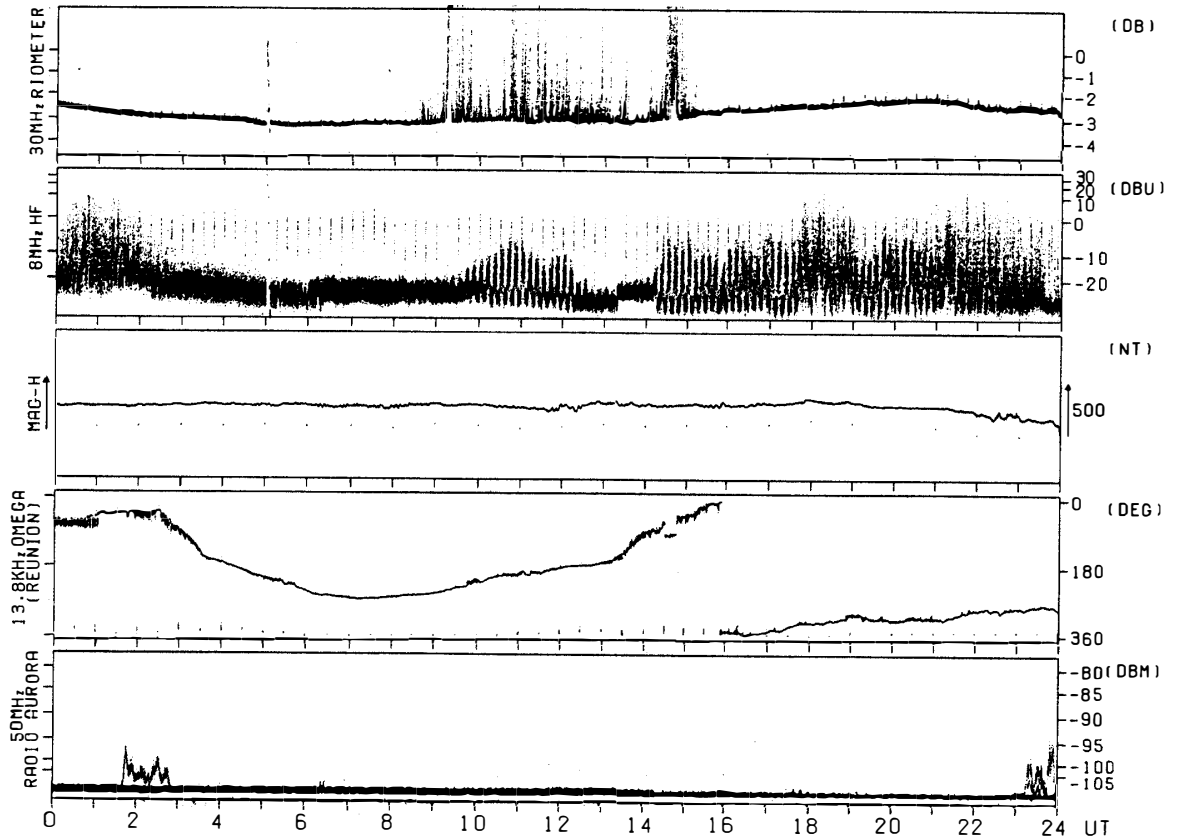
SYOWA STATION

TOTAL DAY/176 1989/6/25

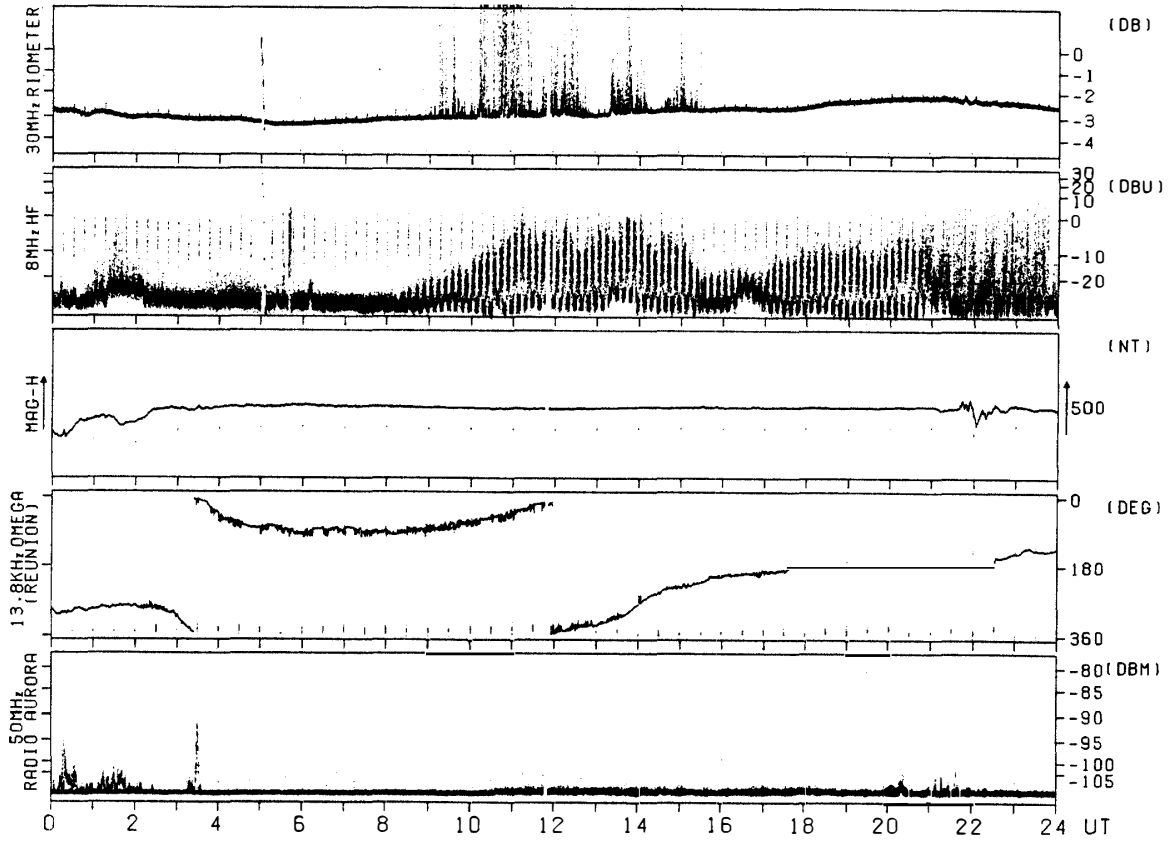


SYOWA STATION

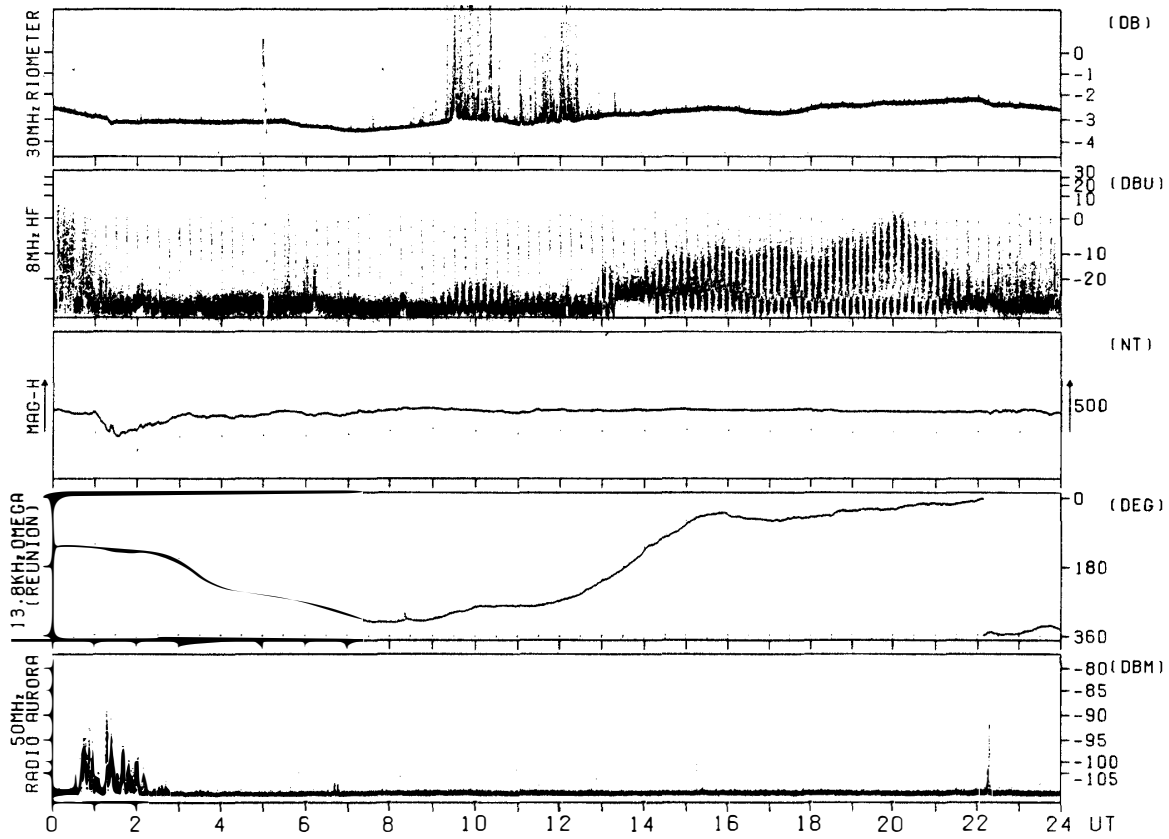
TOTAL DAY/177 1989/6/26



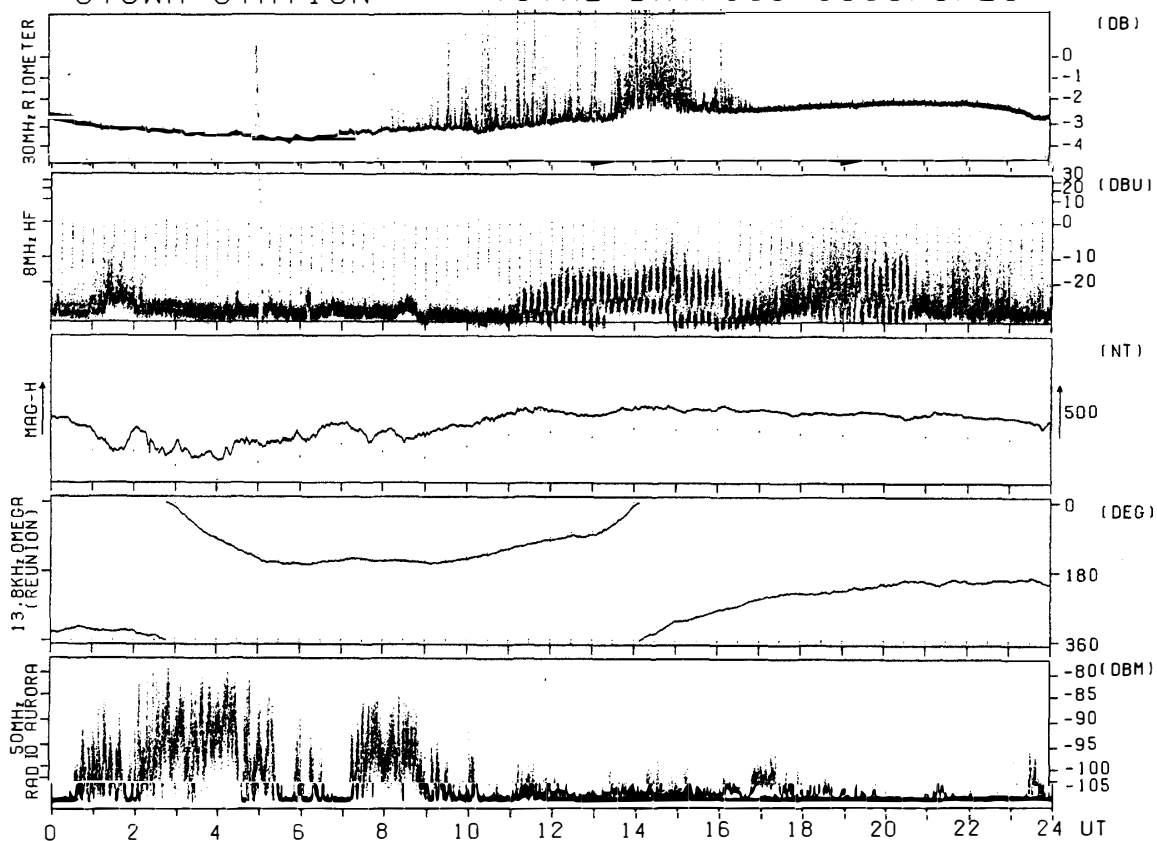
SYOWA STATION TOTAL DAY/178 1989/6/27



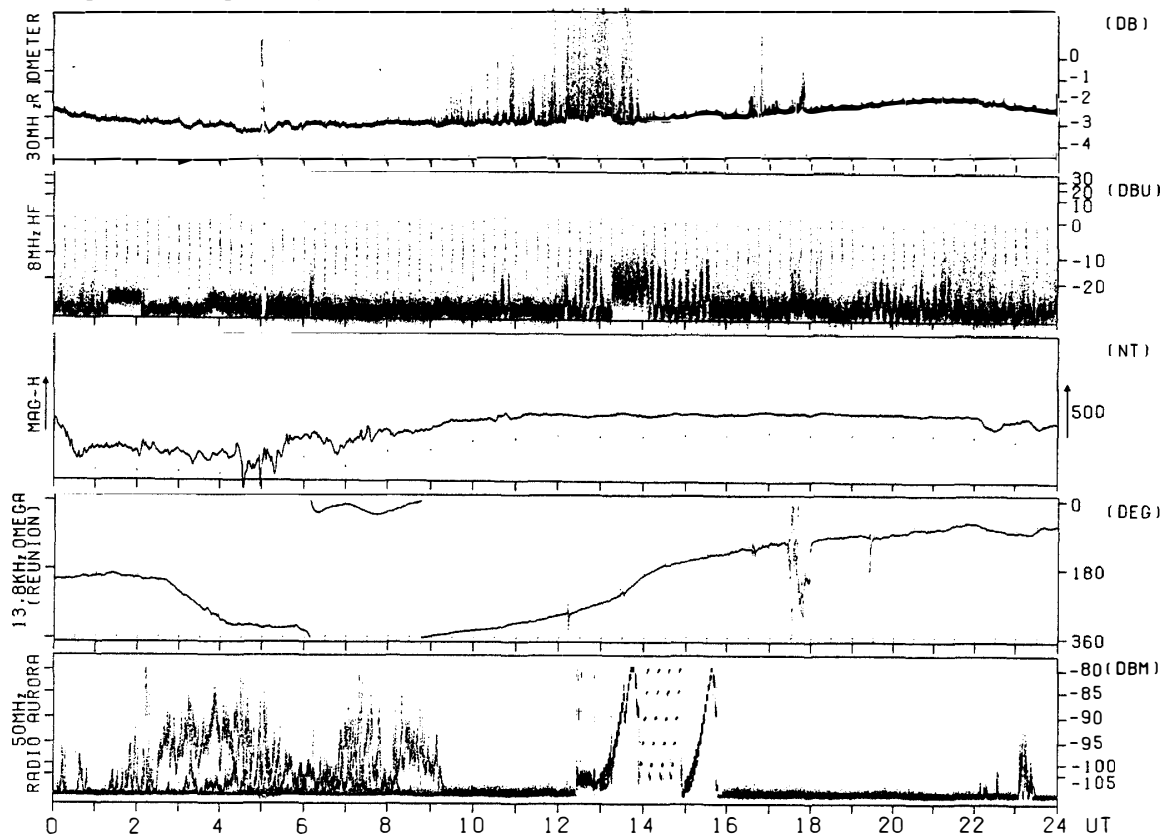
SYOWA STATION TOTAL DAY/179 1989/6/28



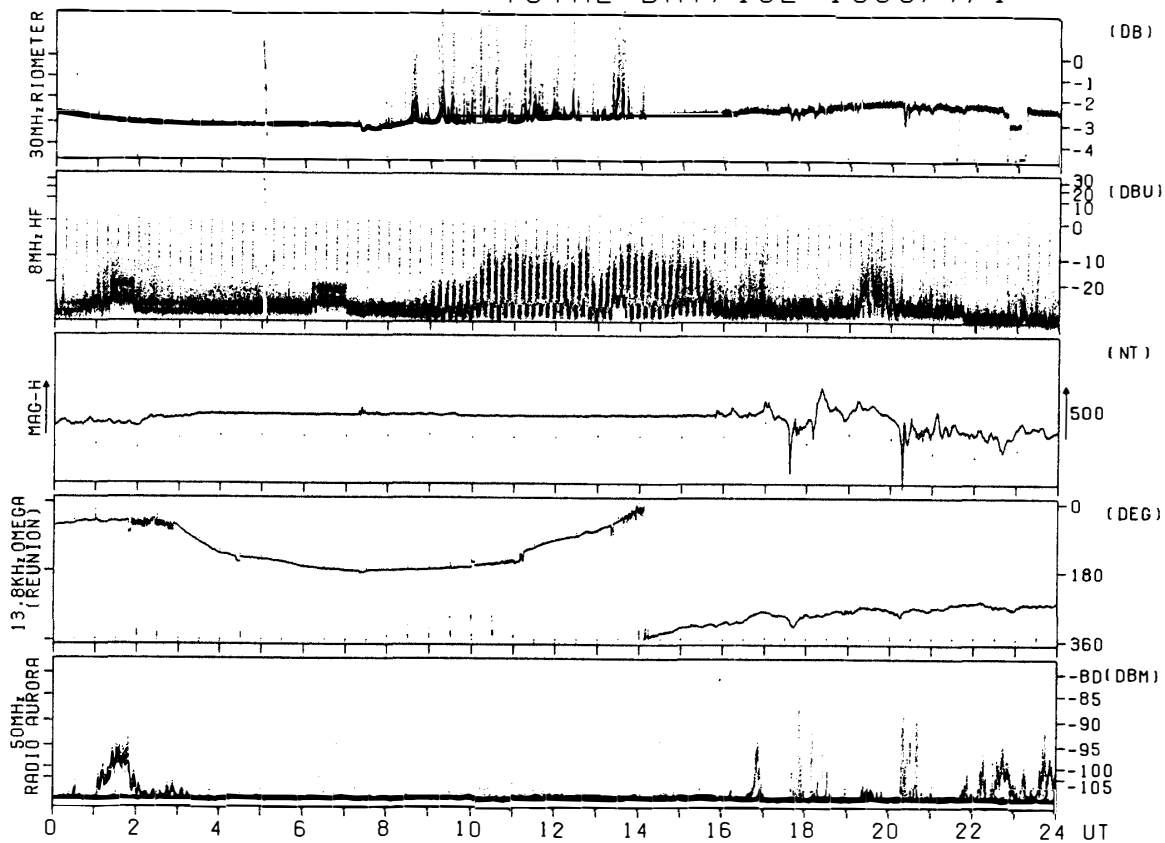
SYOWA STATION TOTAL DAY/180 1989/6/29



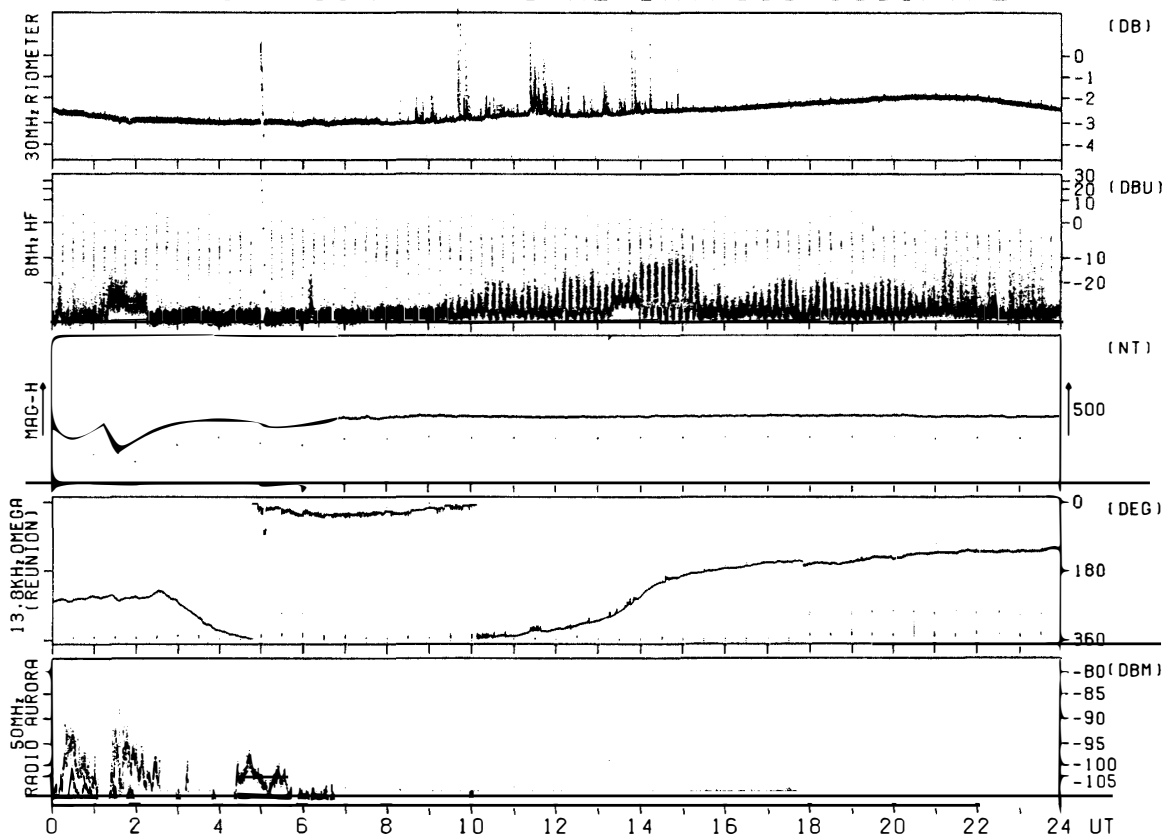
SYOWA STATION TOTAL DAY/181 1989/6/30



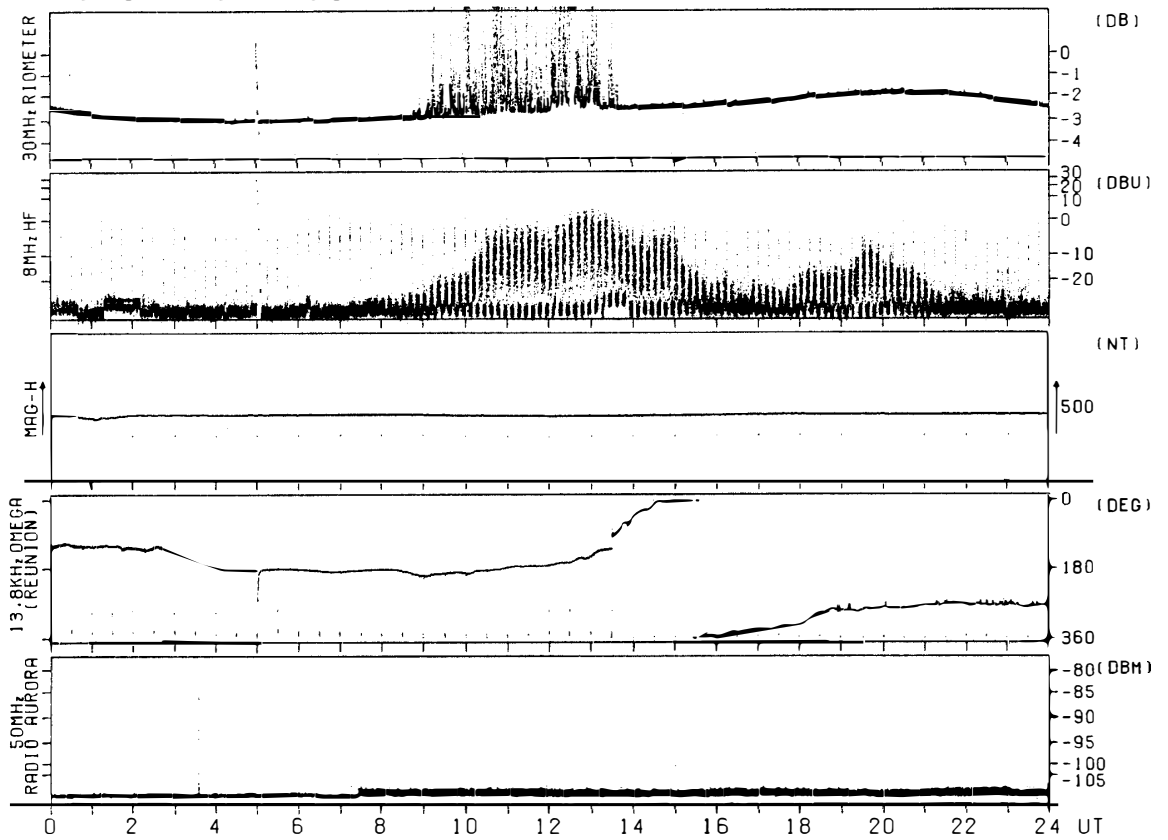
SYOWA STATION TOTAL DAY/182 1989/7/1



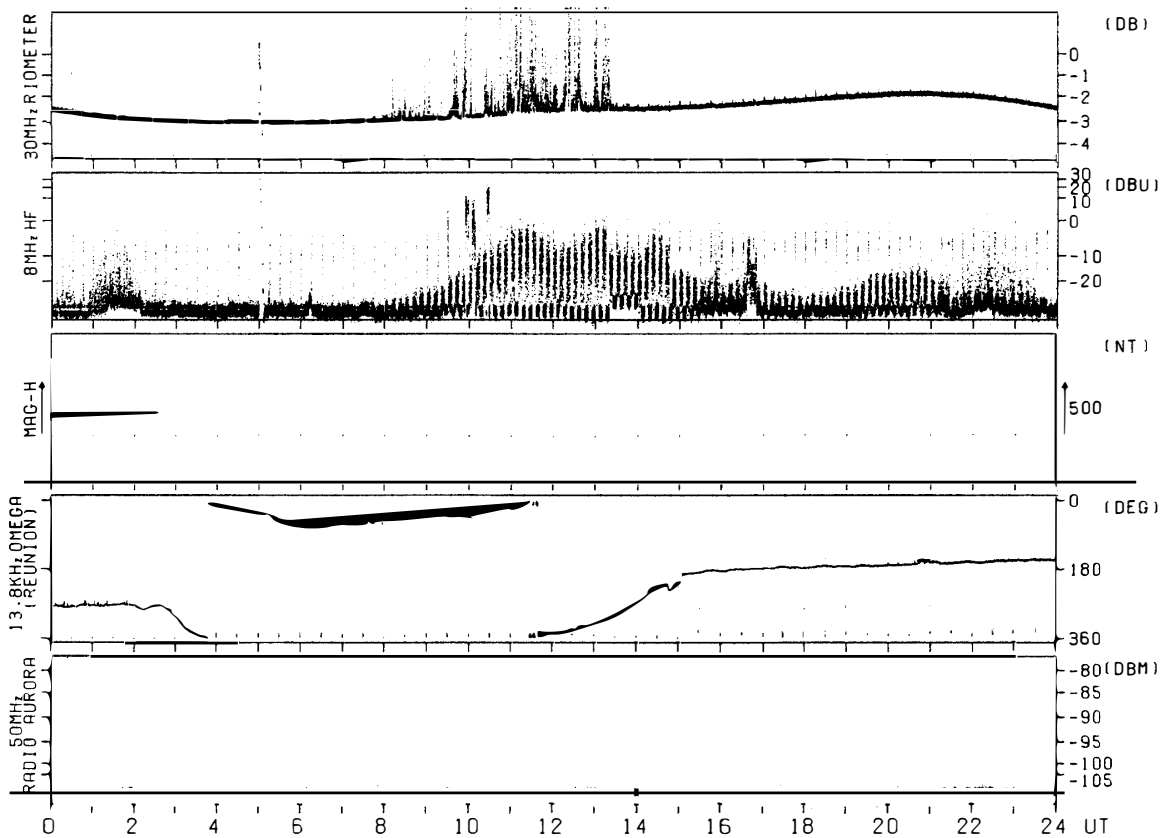
SYOWA STATION TOTAL DAY/183 1989/7/2



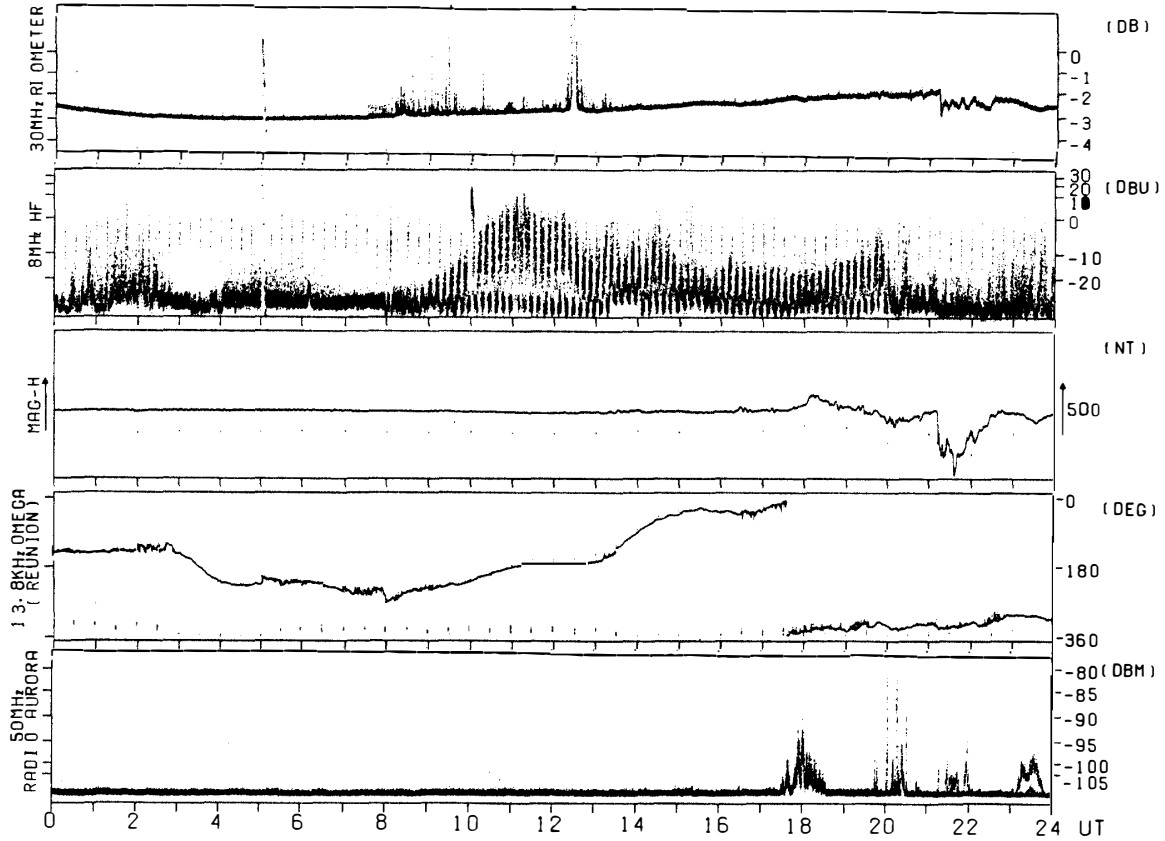
SYOWA STATION TOTAL DAY/184 1989/7/3



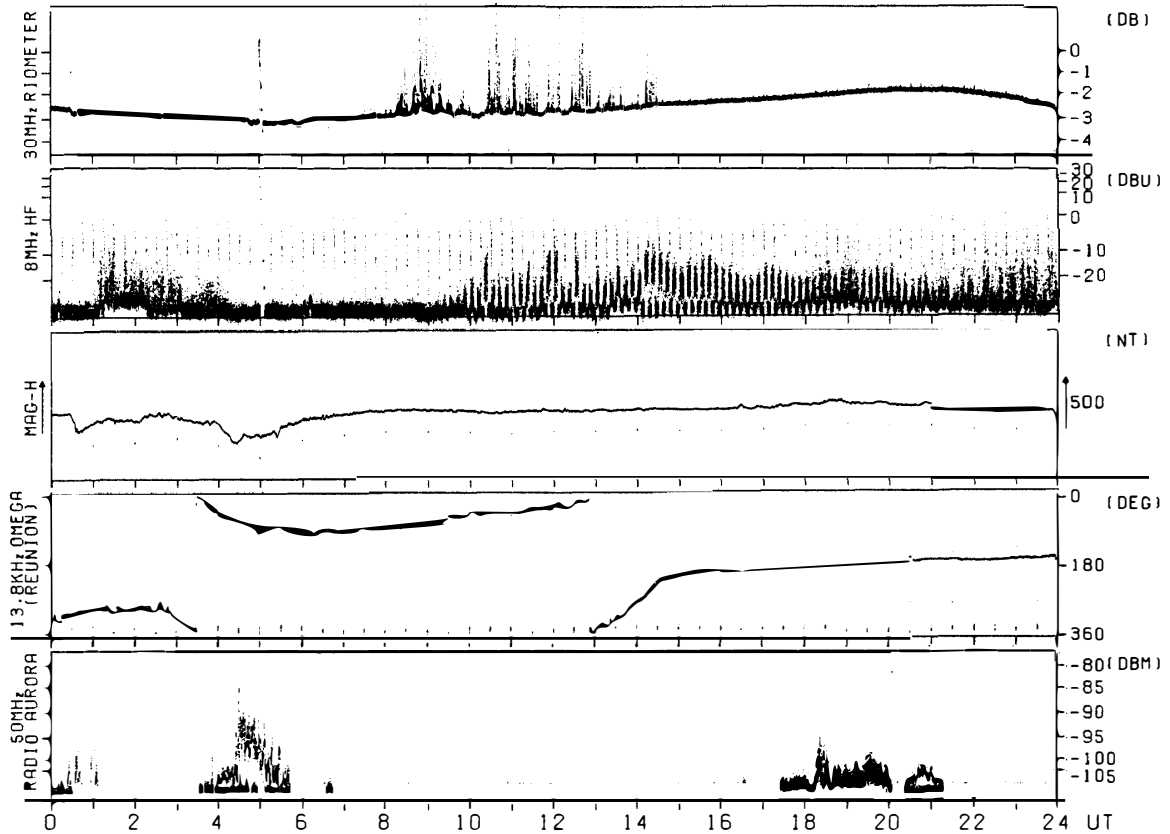
SYOWA STATION TOTAL DAY/185 1989/7/4



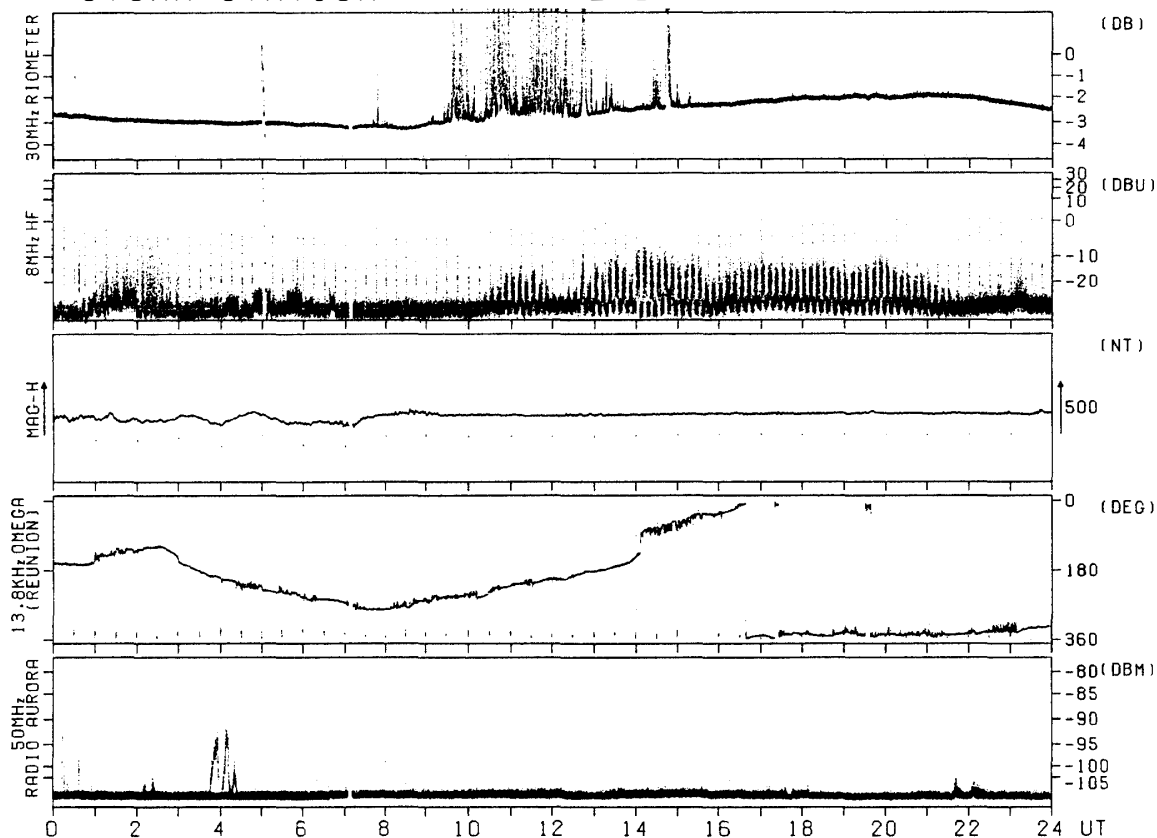
SYOWA STATION TOTAL DAY/186 1989/7/5



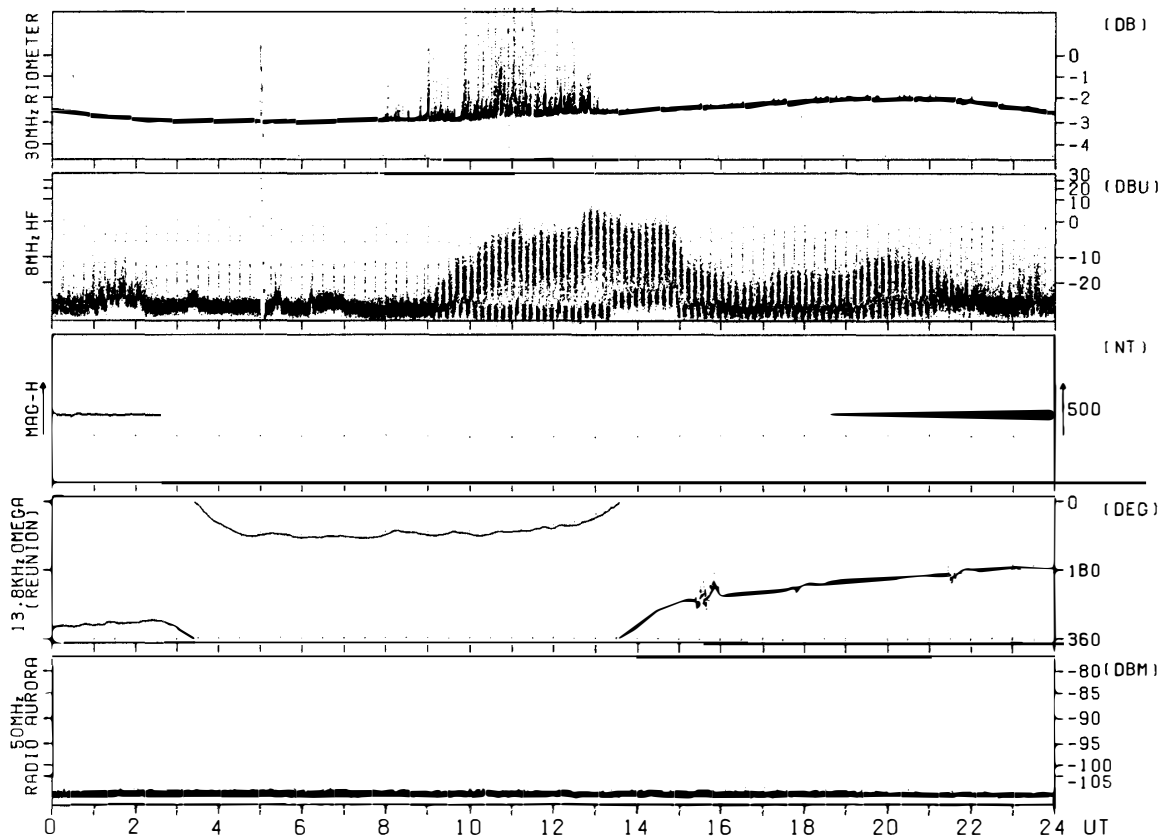
SYOWA STATION TOTAL DAY/187 1989/7/6



SYOWA STATION TOTAL DAY/188 1989/7/7

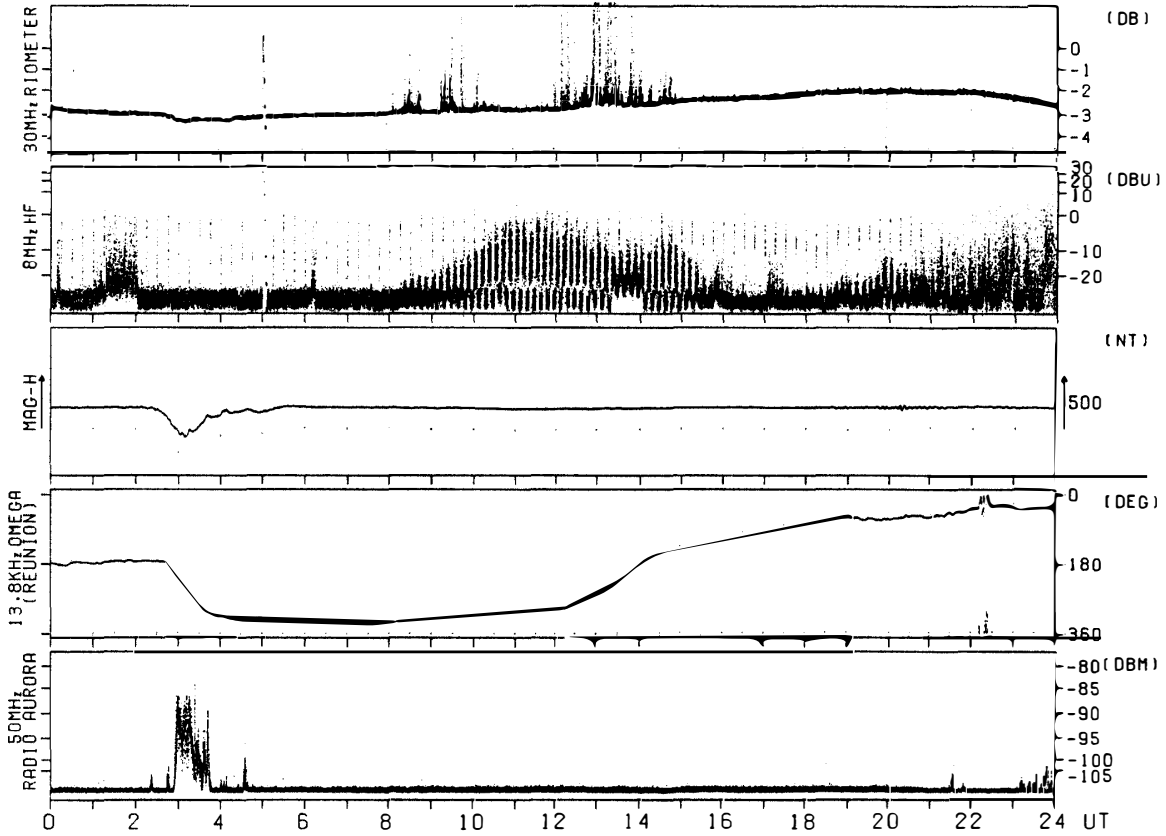


SYOWA STATION TOTAL DAY/189 1989/7/8



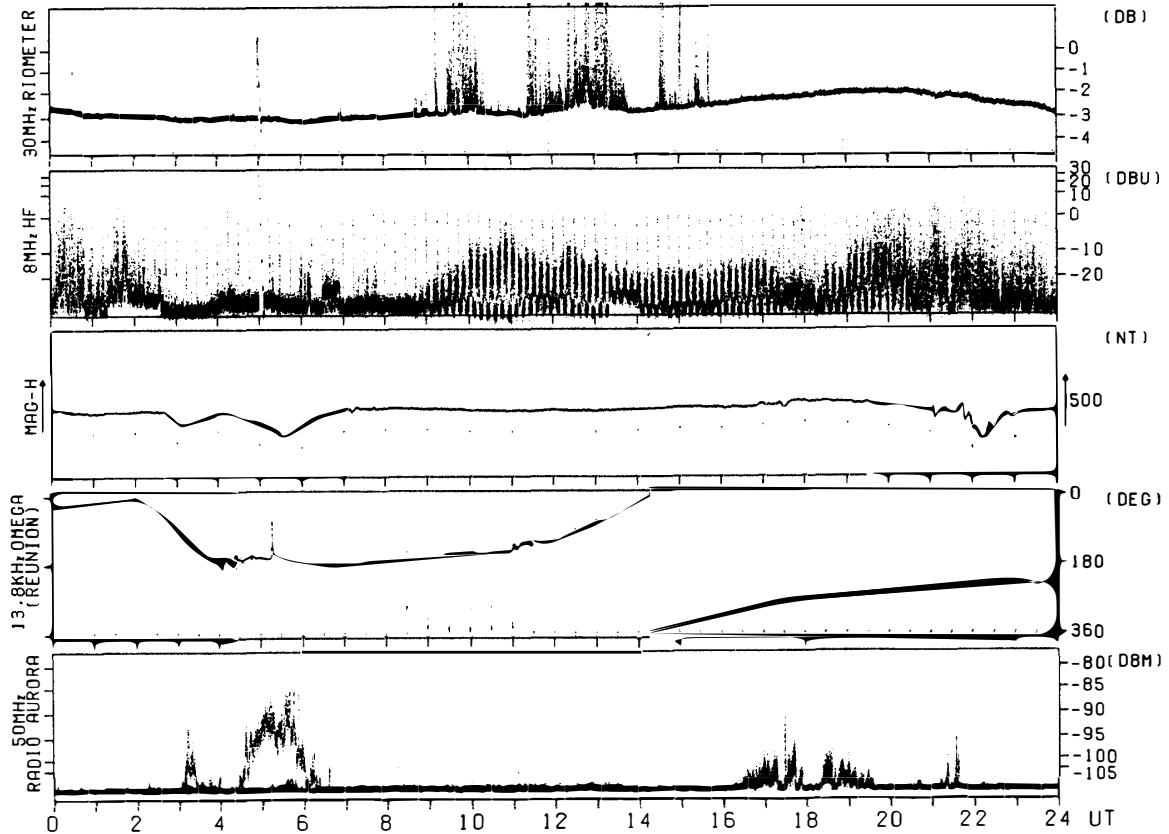
SYOWA STATION

TOTAL DAY/190 1989/7/9



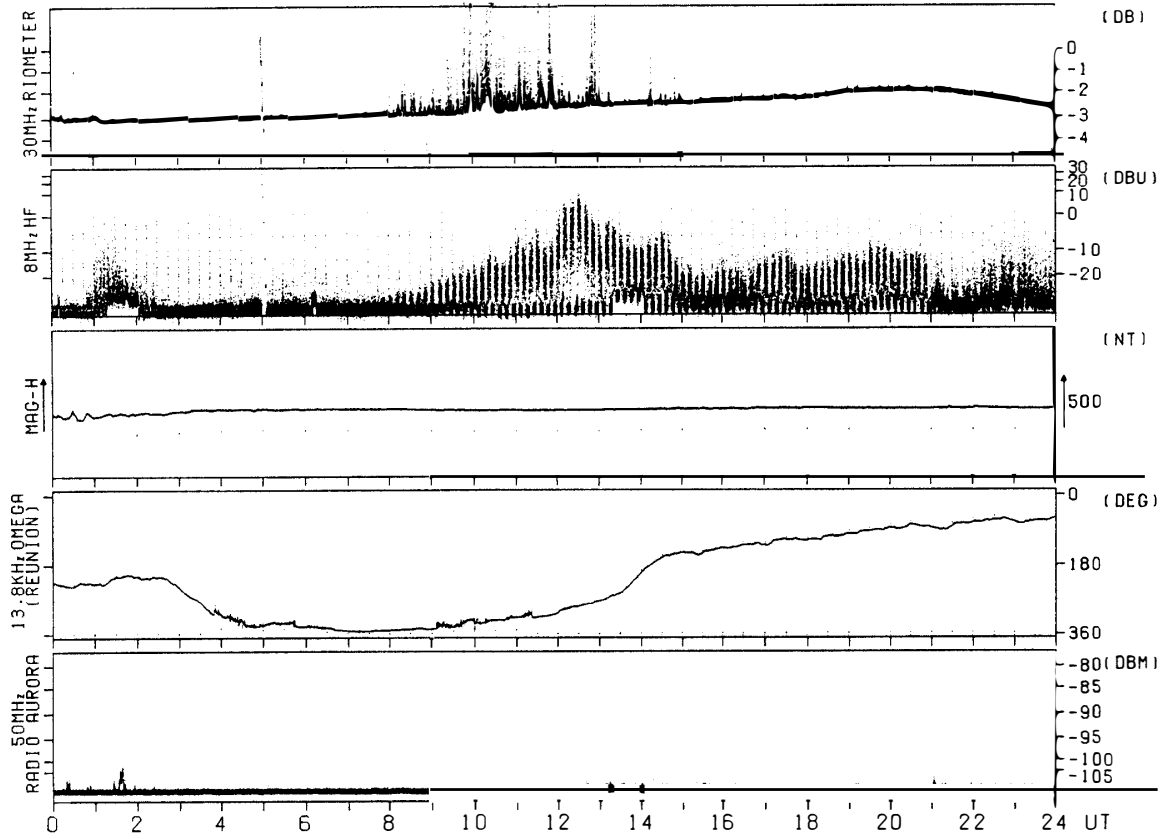
SYOWA STATION

TOTAL DAY/191 1989/7/10



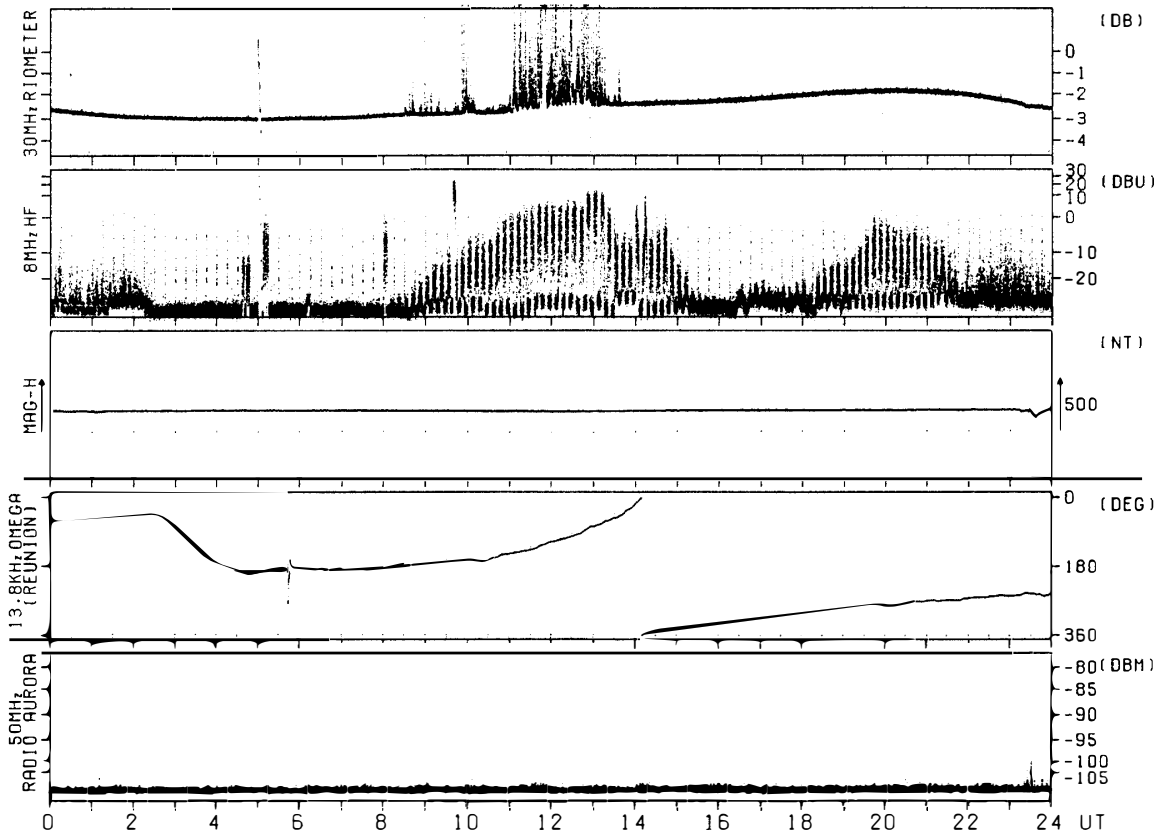
SYOWA STATION

TOTAL DAY/192 1989/7/11

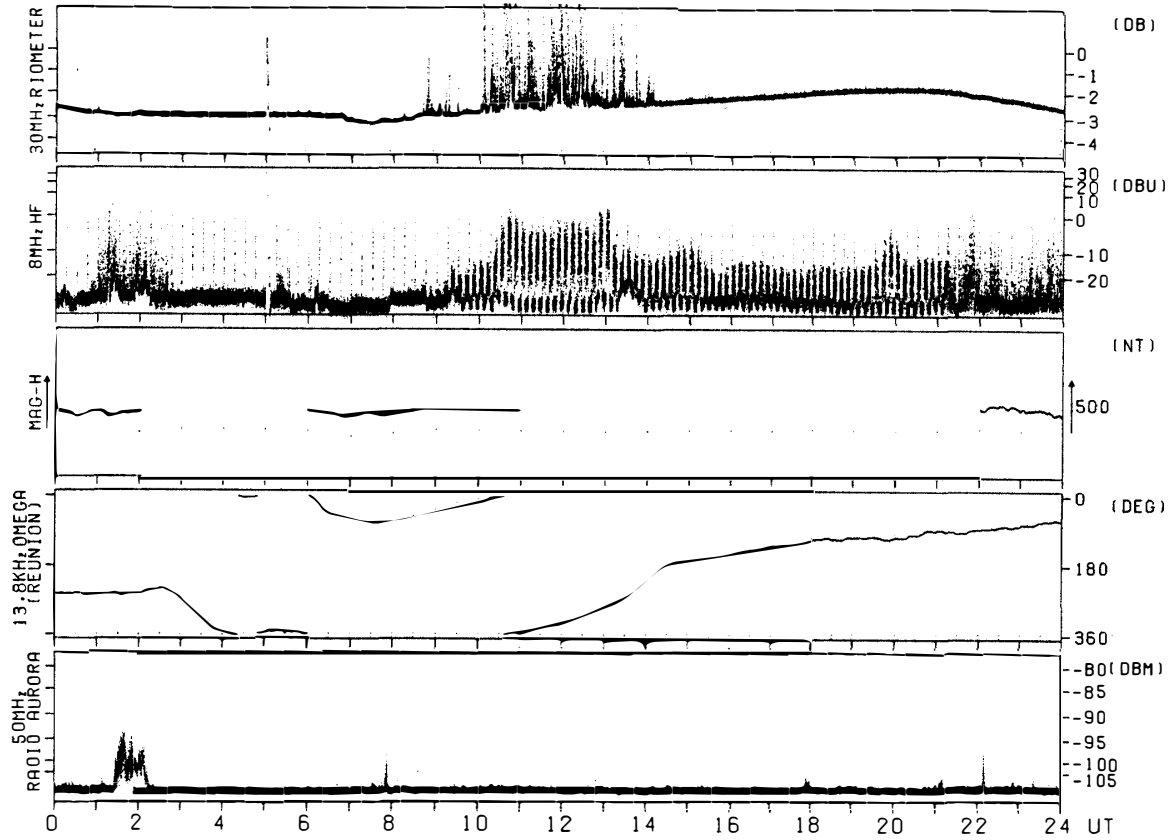


SYOWA STATION

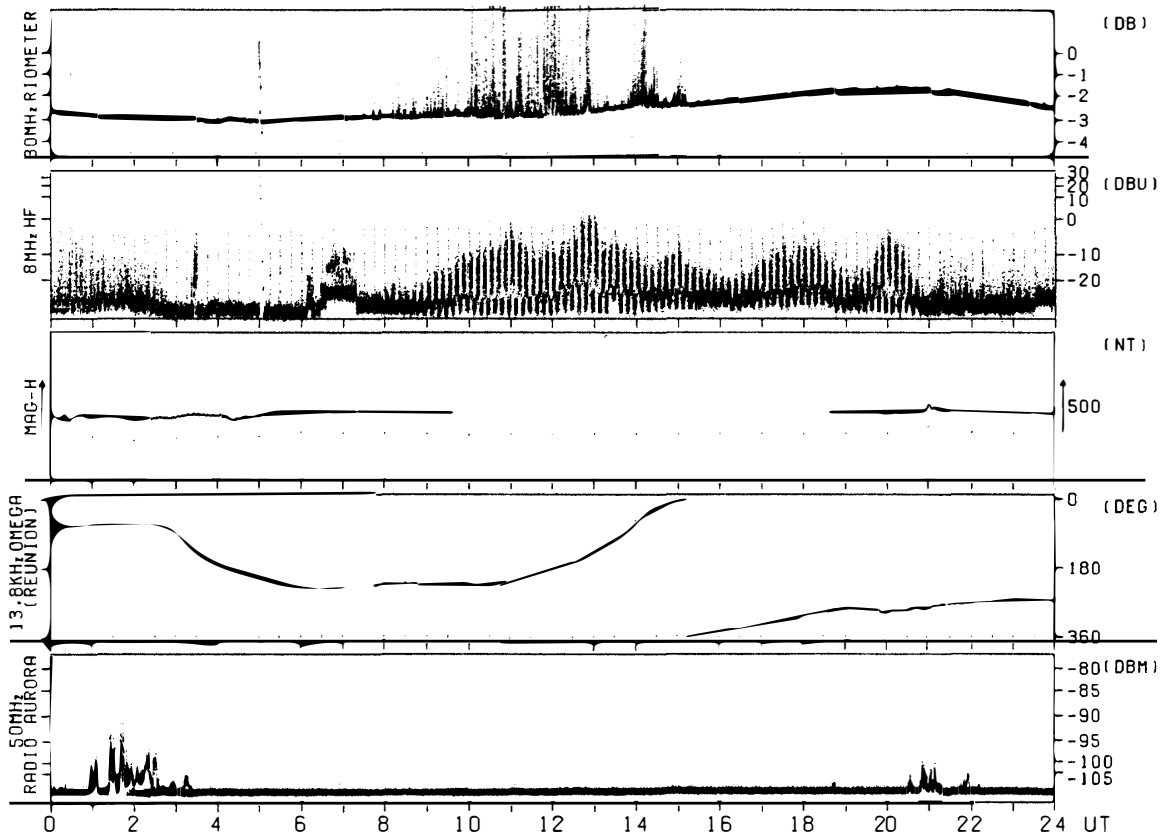
TOTAL DAY/193 1989/7/12



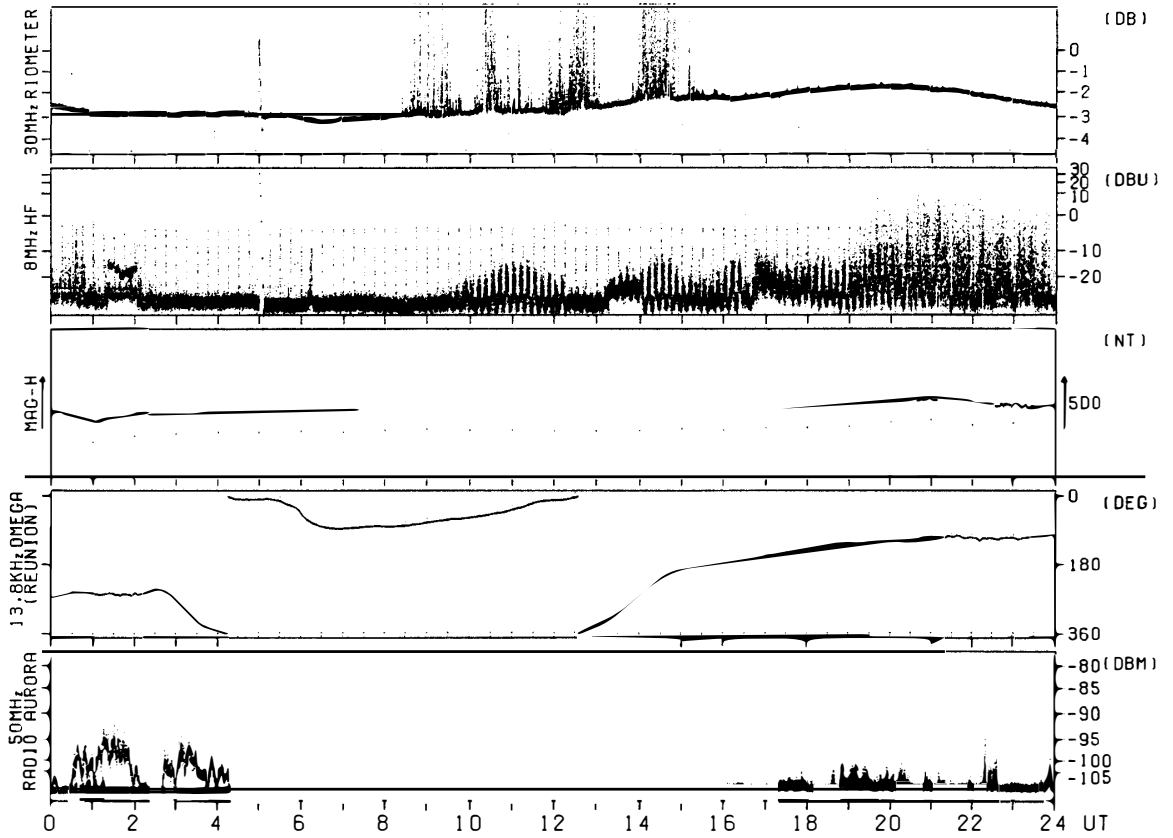
SYOWA STATION TOTAL DAY/194 1989/7/13



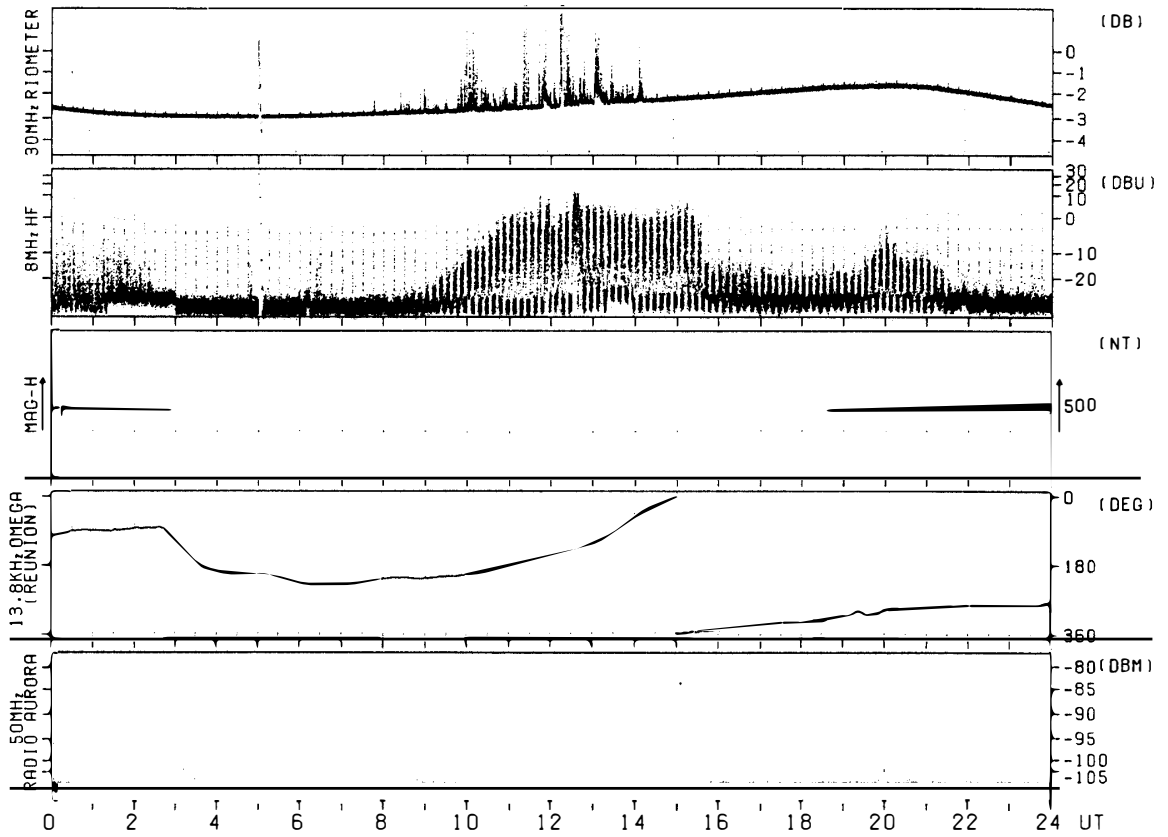
SYOWA STATION TOTAL DAY/195 1989/7/14



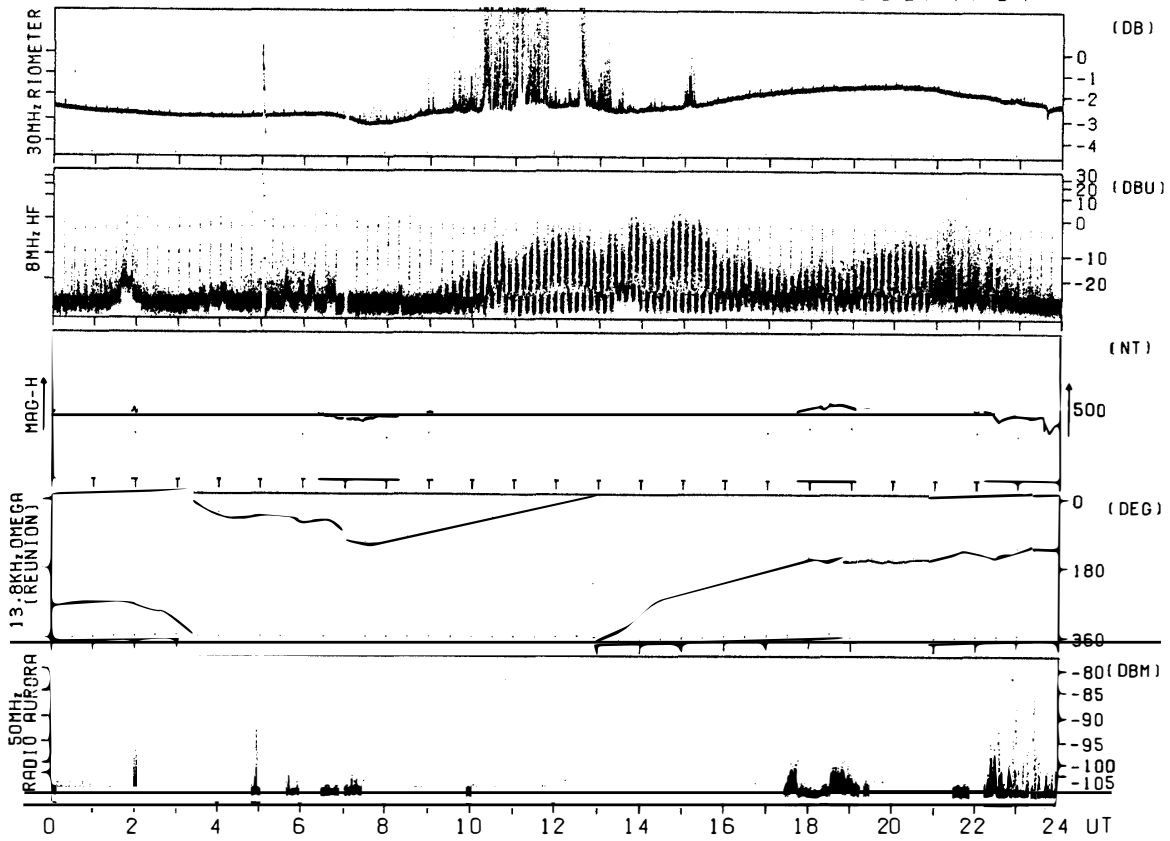
SYOWA STATION TOTAL DAY/196 1989/7/15



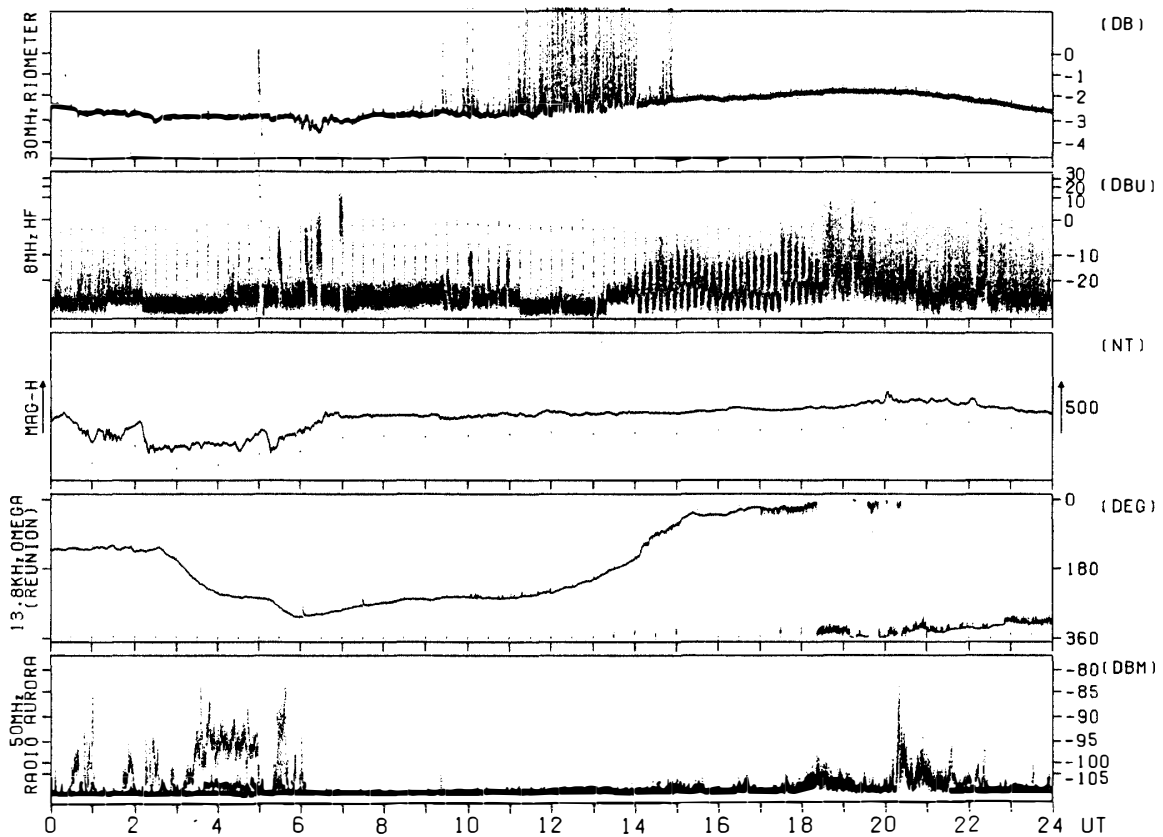
SYOWA STATION TOTAL DAY/197 1989/7/16



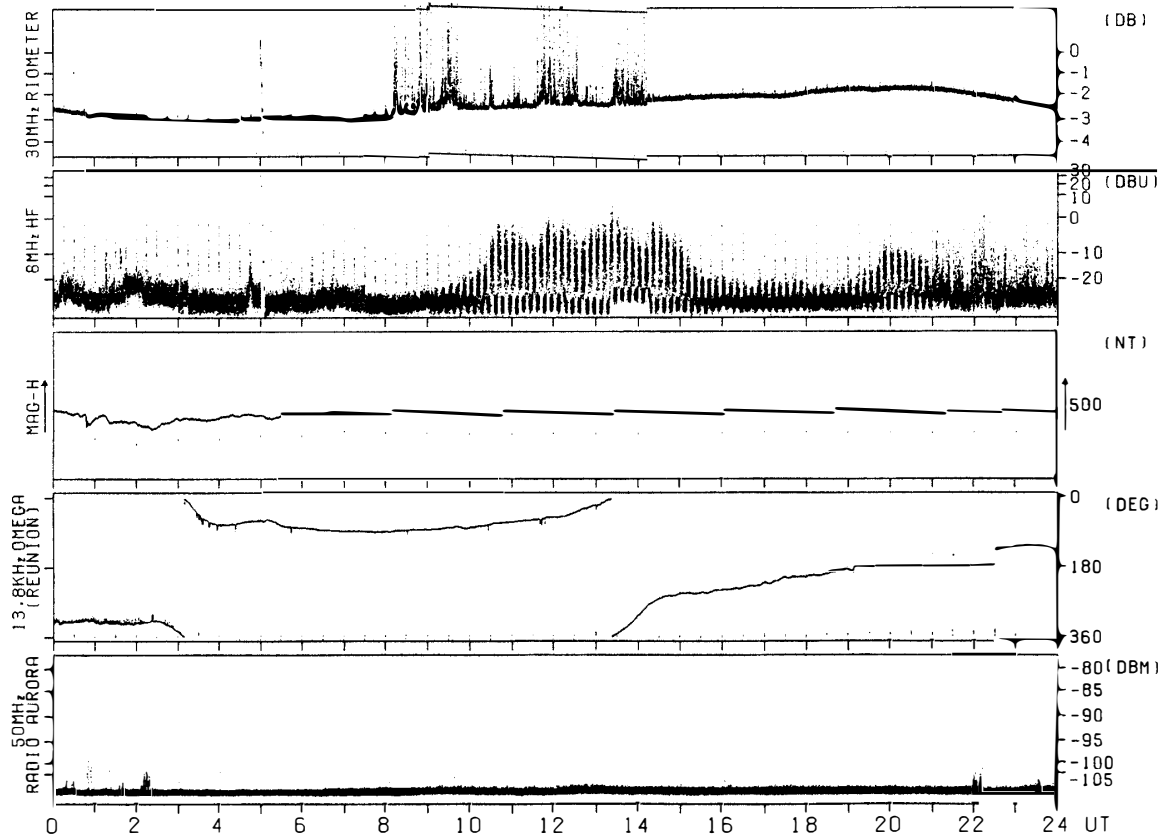
SYOWA STATION TOTAL DAY/198 1989/7/17



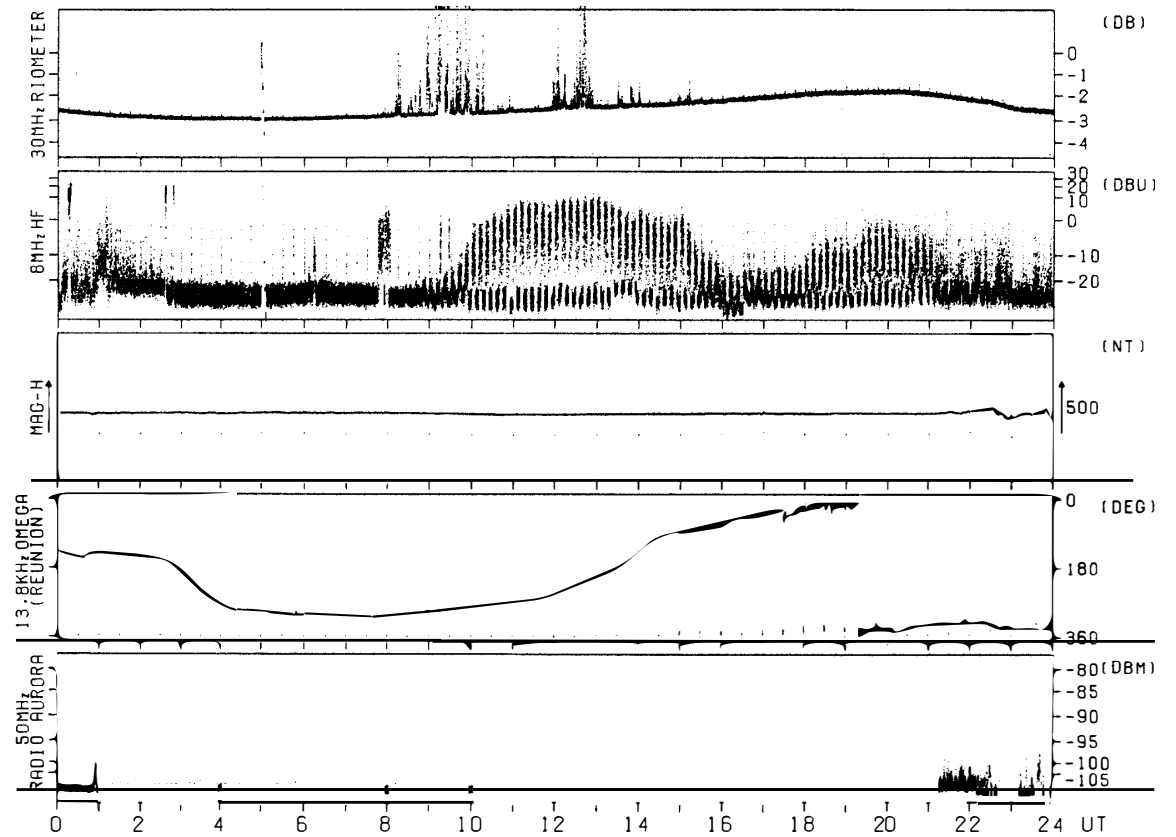
SYOWA STATION TOTAL DAY/199 1989/7/18



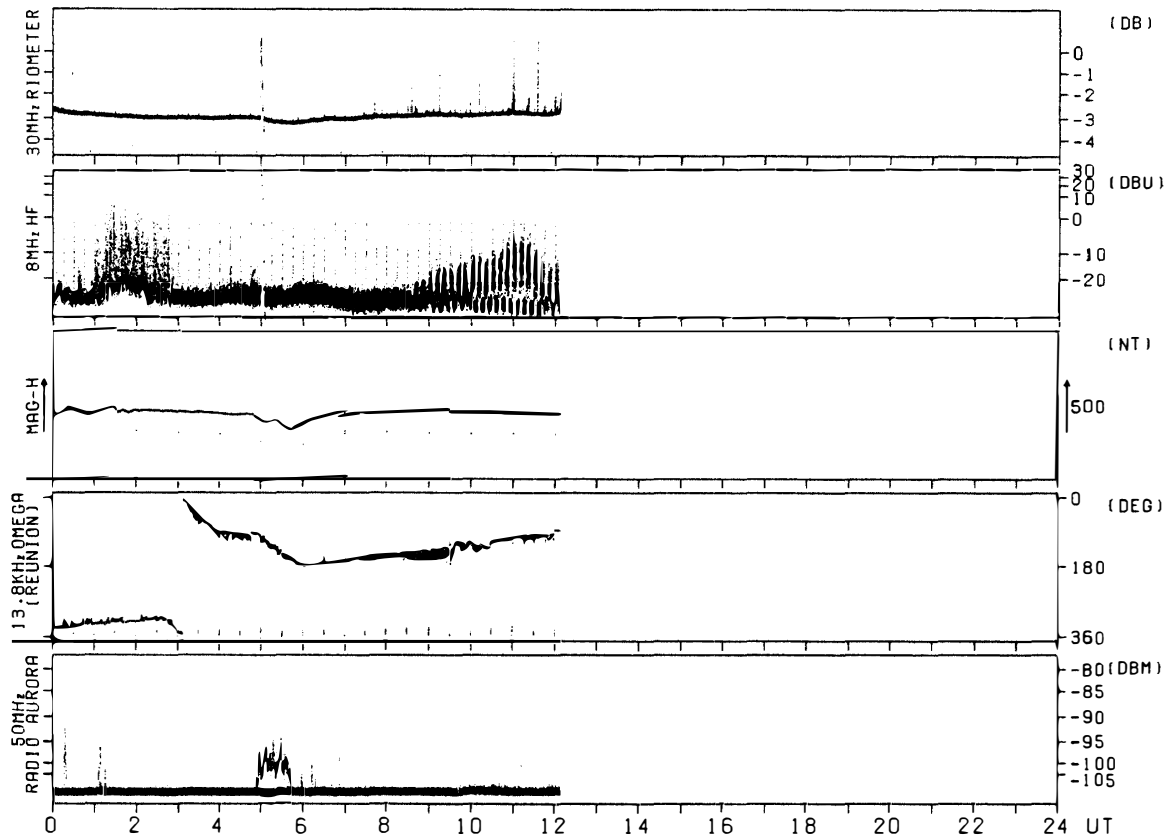
SYOWA STATION TOTAL DAY/200 1989/7/19



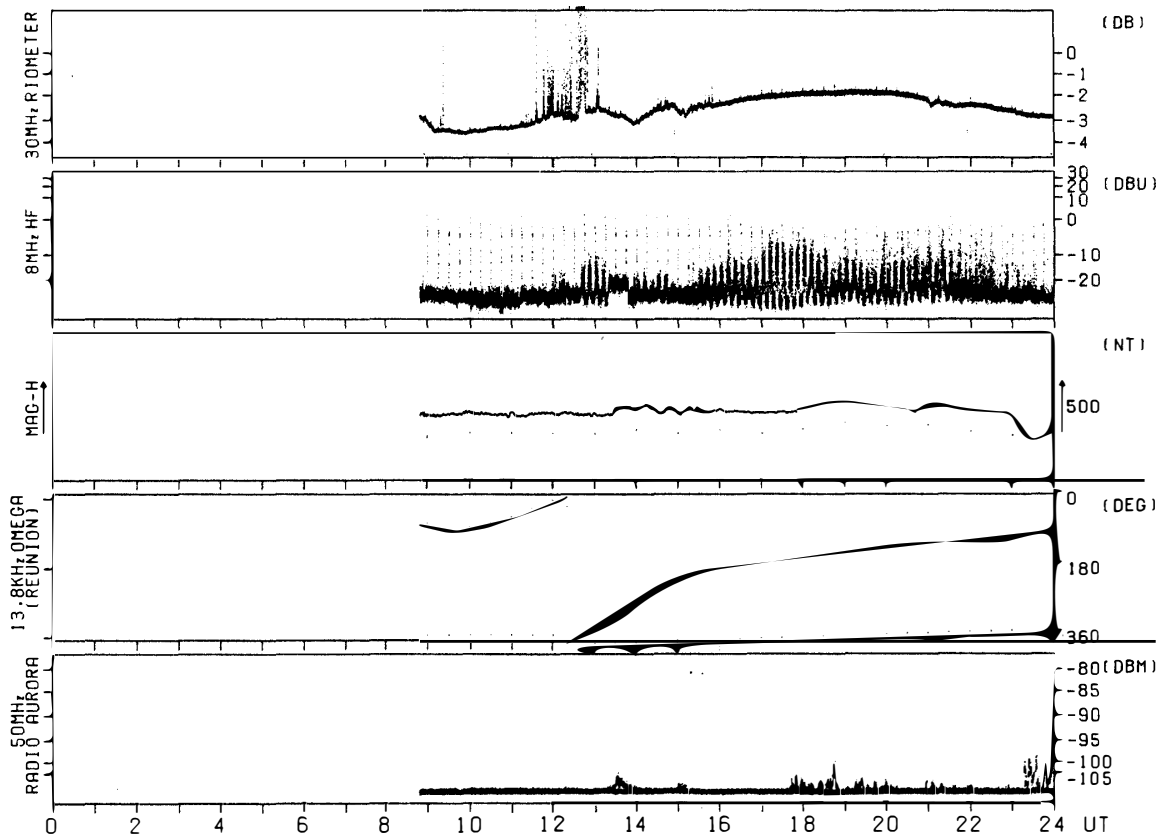
SYOWA STATION TOTAL DAY/201 1989/7/20



SYOWA STATION TOTAL DAY/202 1989/7/21

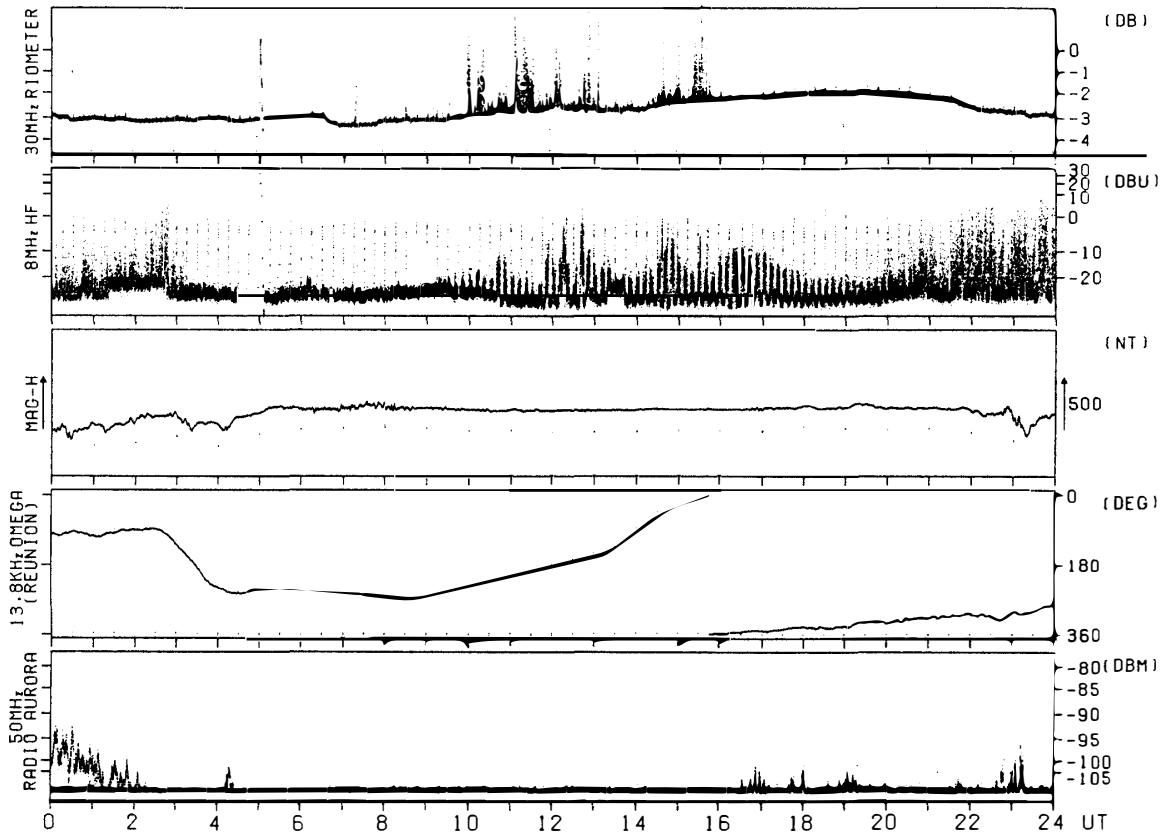


SYOWA STATION TOTAL DAY/207 1989/7/26



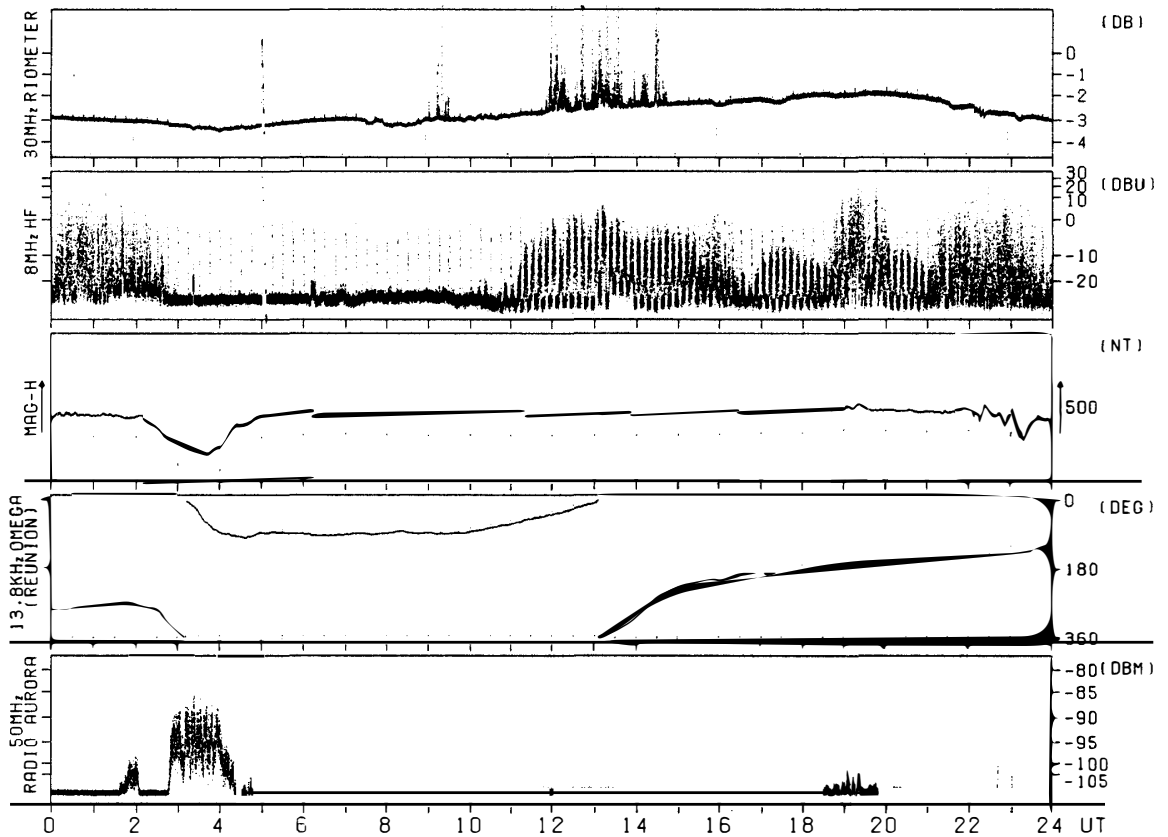
SYOWA STATION

TOTAL DAY/208 1989/7/27

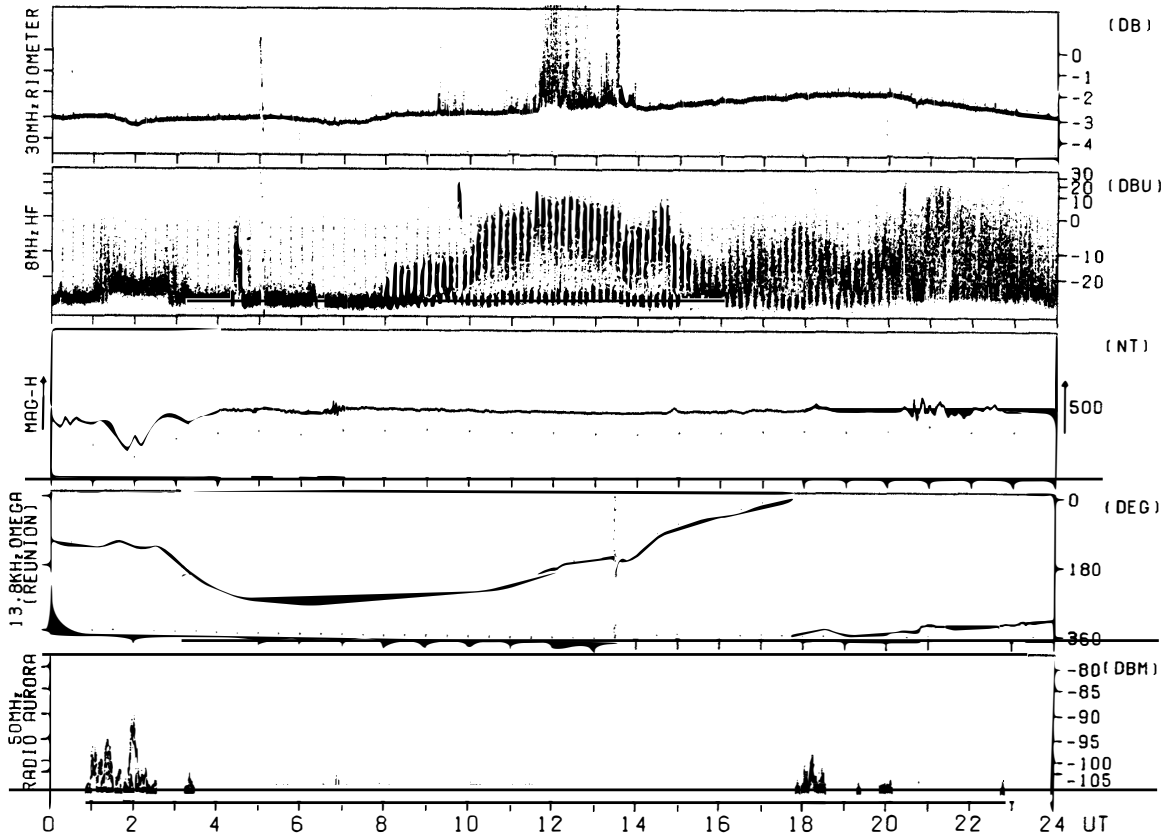


SYOWA STATION

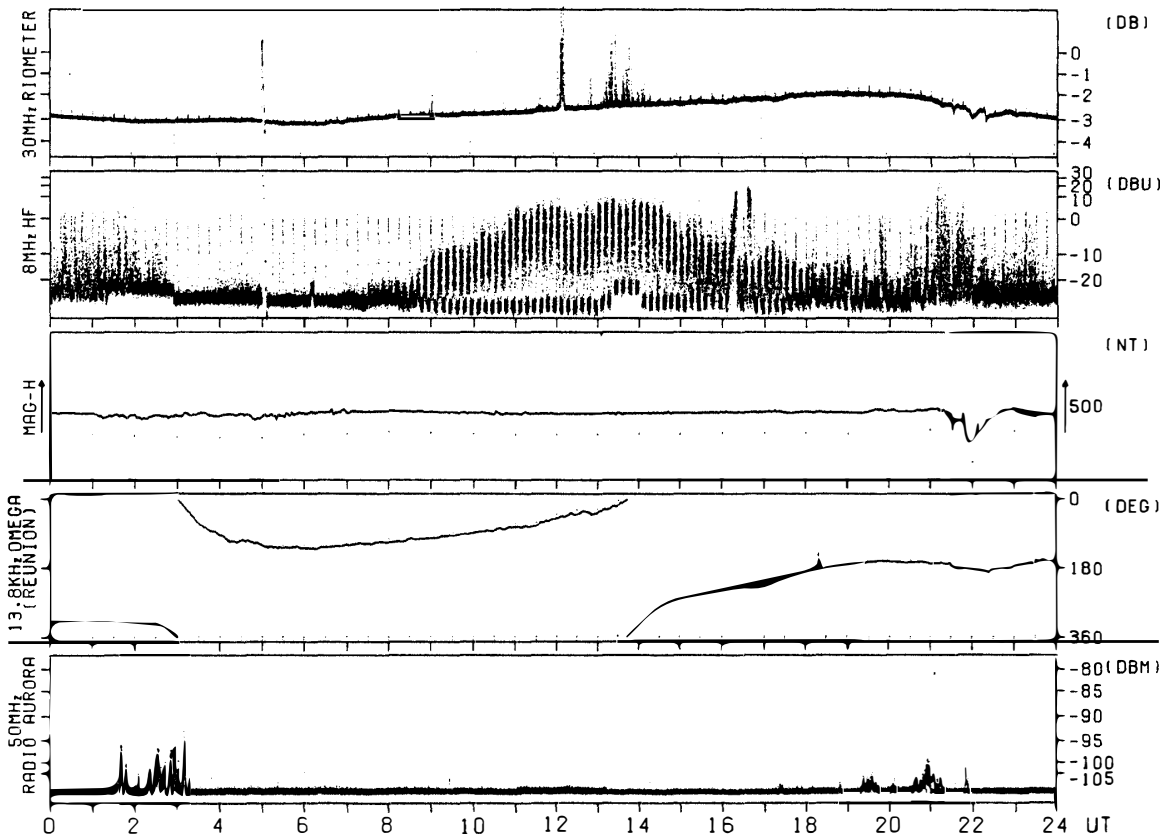
TOTAL DAY/209 1989/7/28



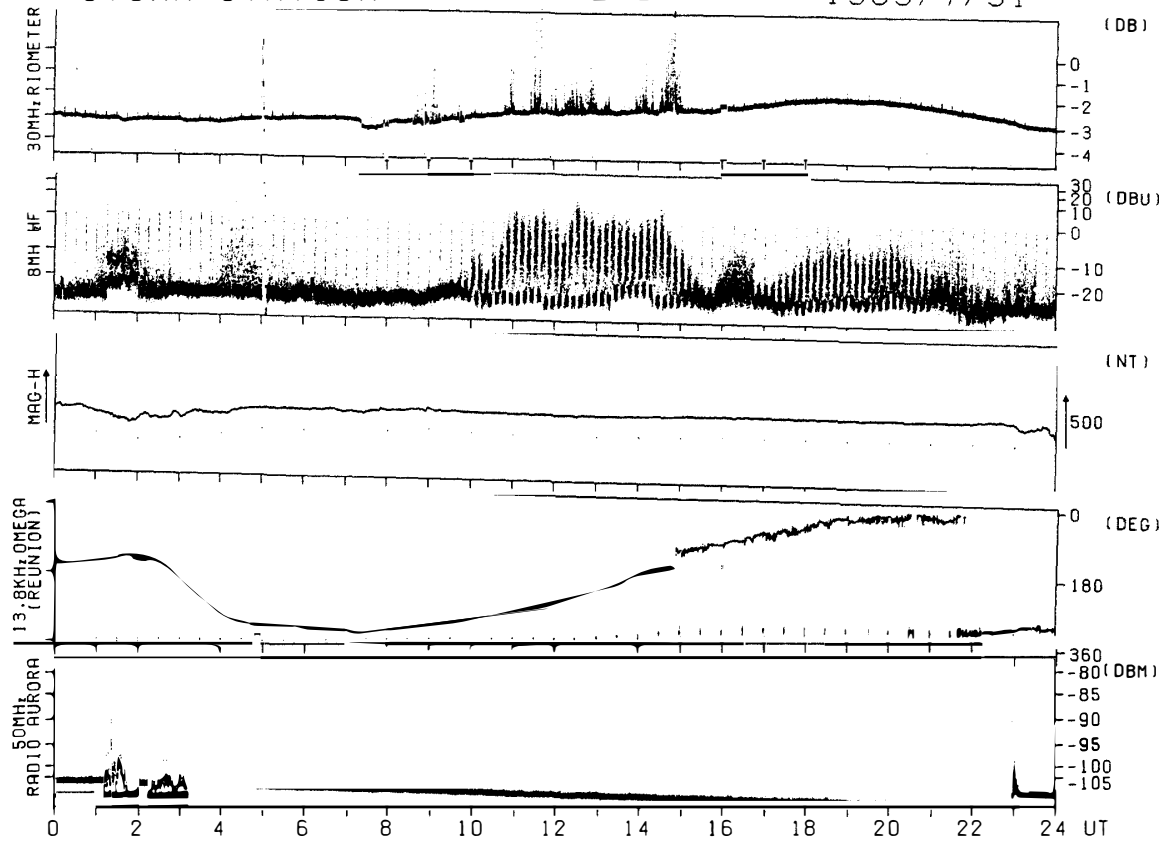
SYOWA STATION TOTAL DAY/210 1989/7/29



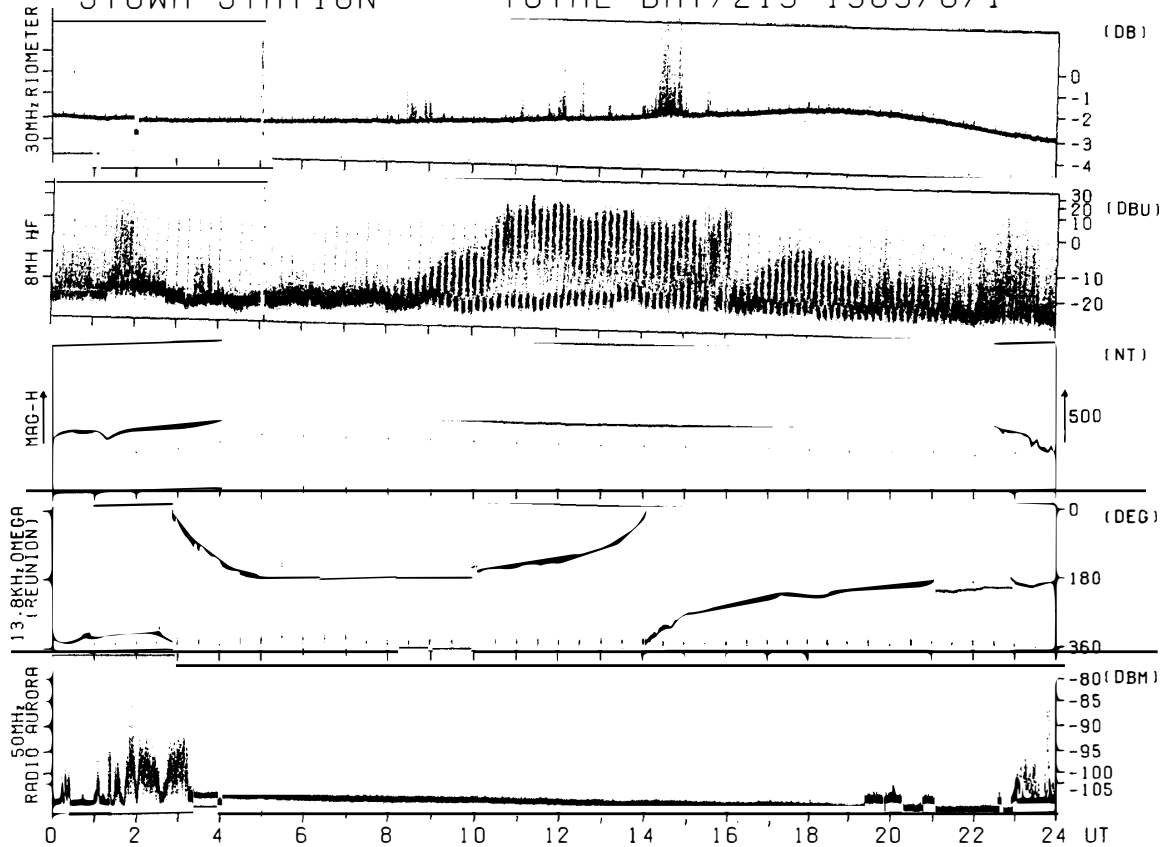
SYOWA STATION TOTAL DAY/211 1989/7/30



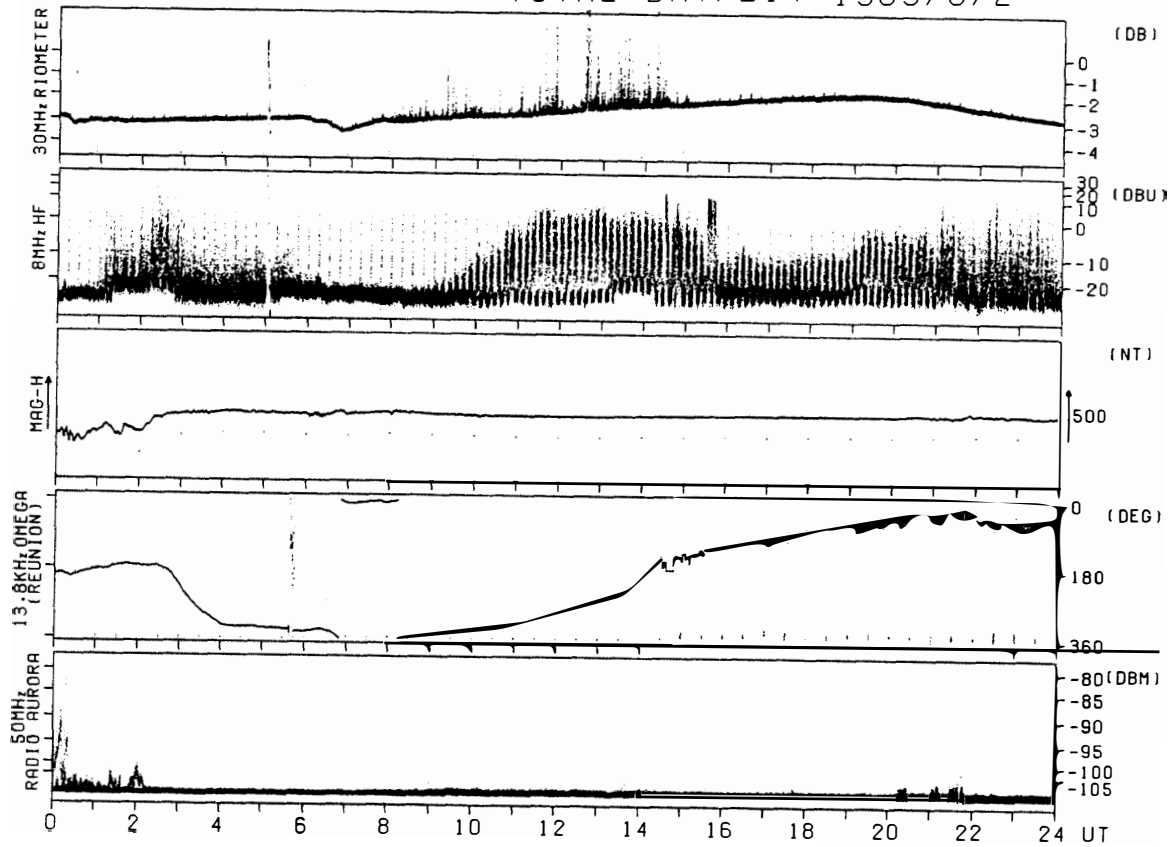
SYOWA STATION TOTAL DAY/212 1989/7/31



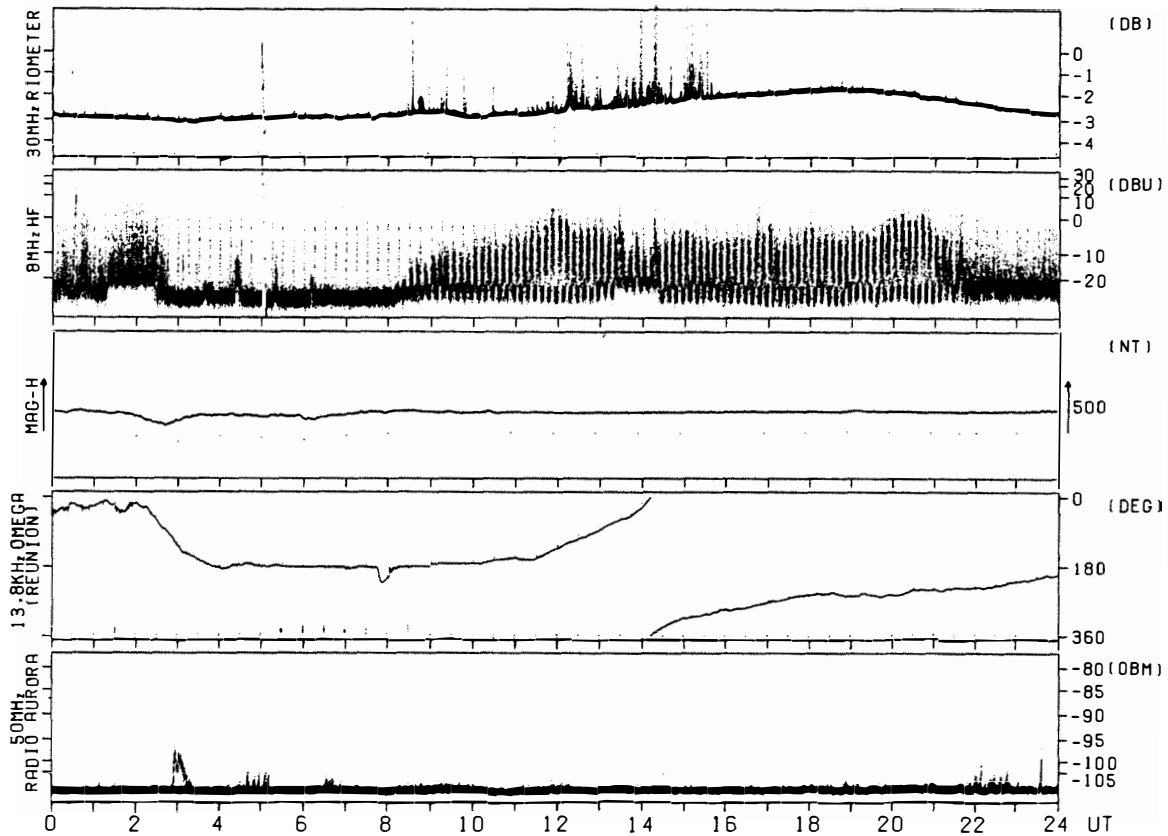
SYOWA STATION TOTAL DAY/213 1989/8/1



SYOWA STATION TOTAL DAY/214 1989/8/2

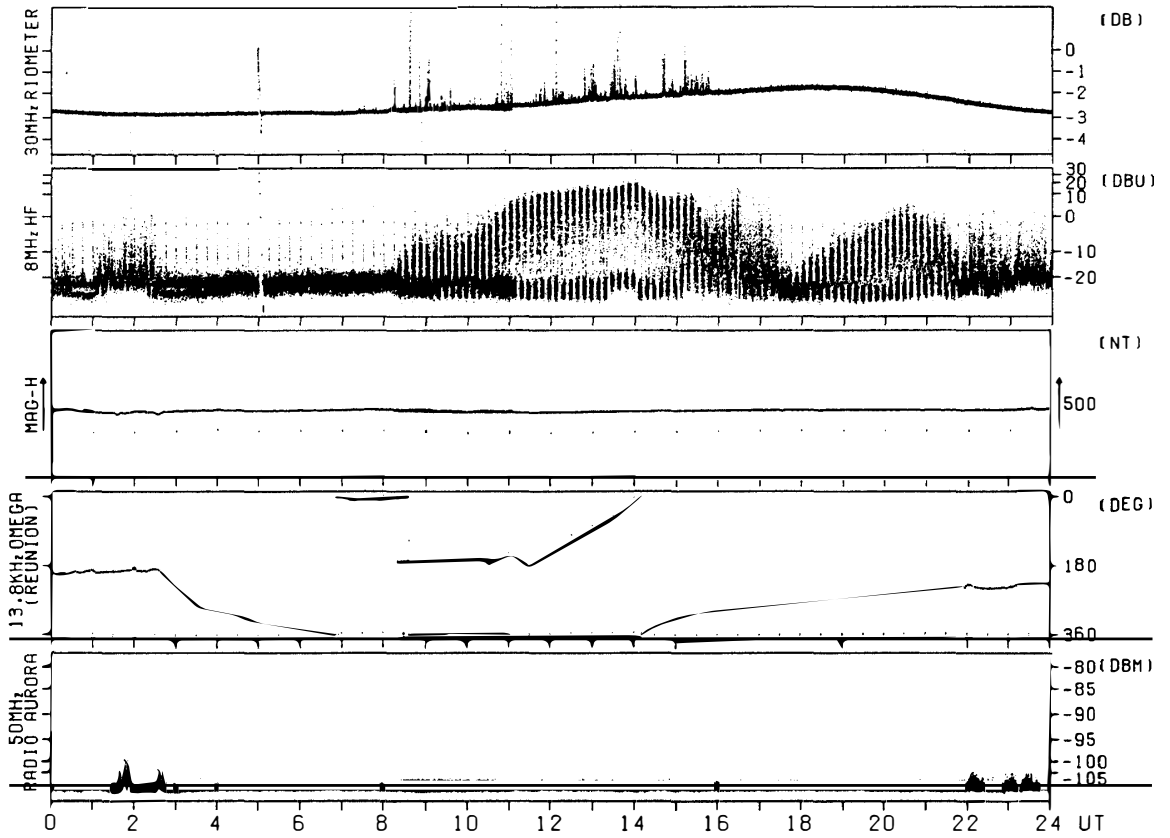


SYOWA STATION TOTAL DAY/215 1989/8/3



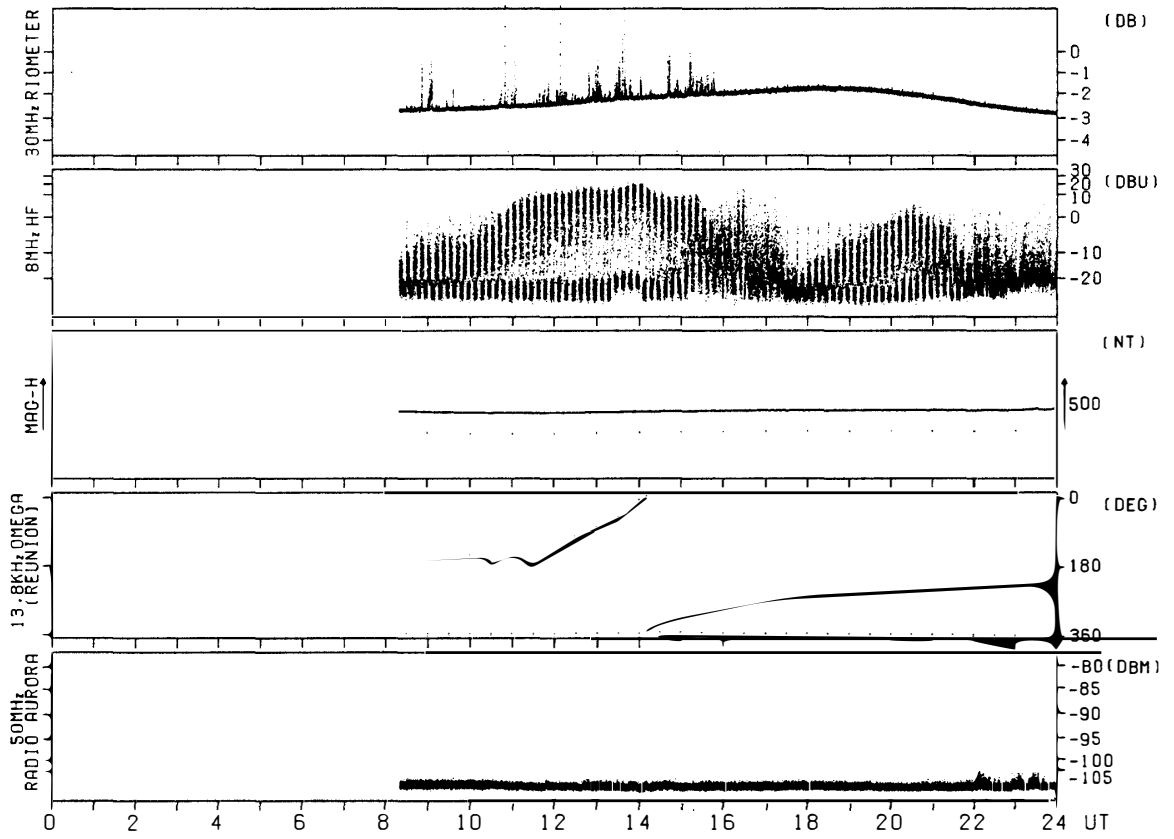
SYOWA STATION

TOTAL DAY/216 1989/8/4

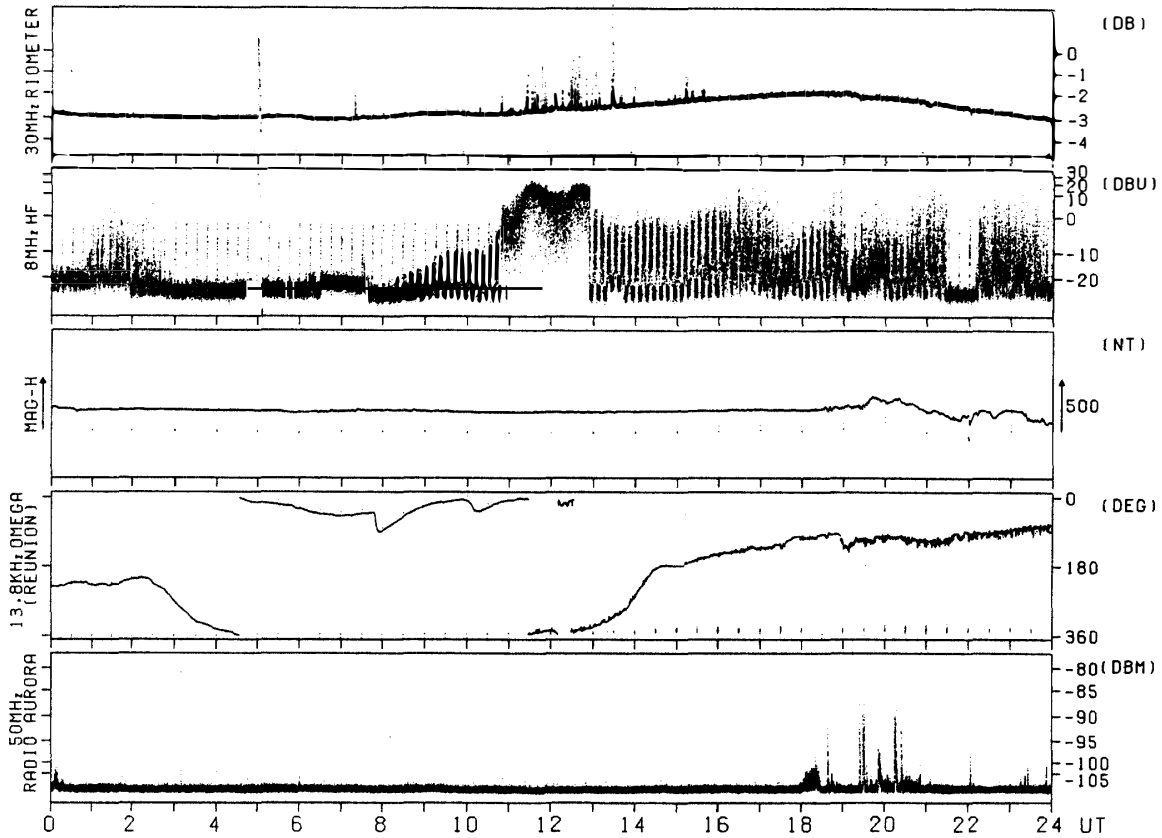


SYOWA STATION

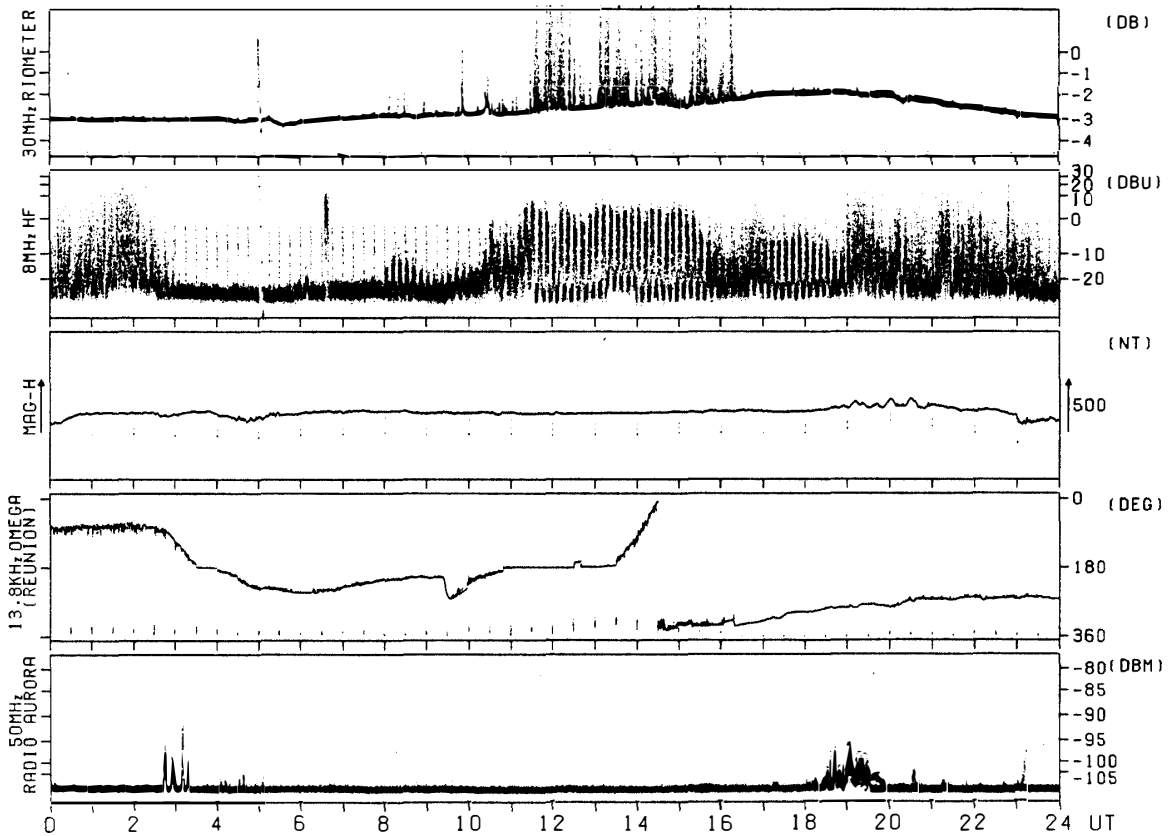
TOTAL DAY/217 1989/8/5



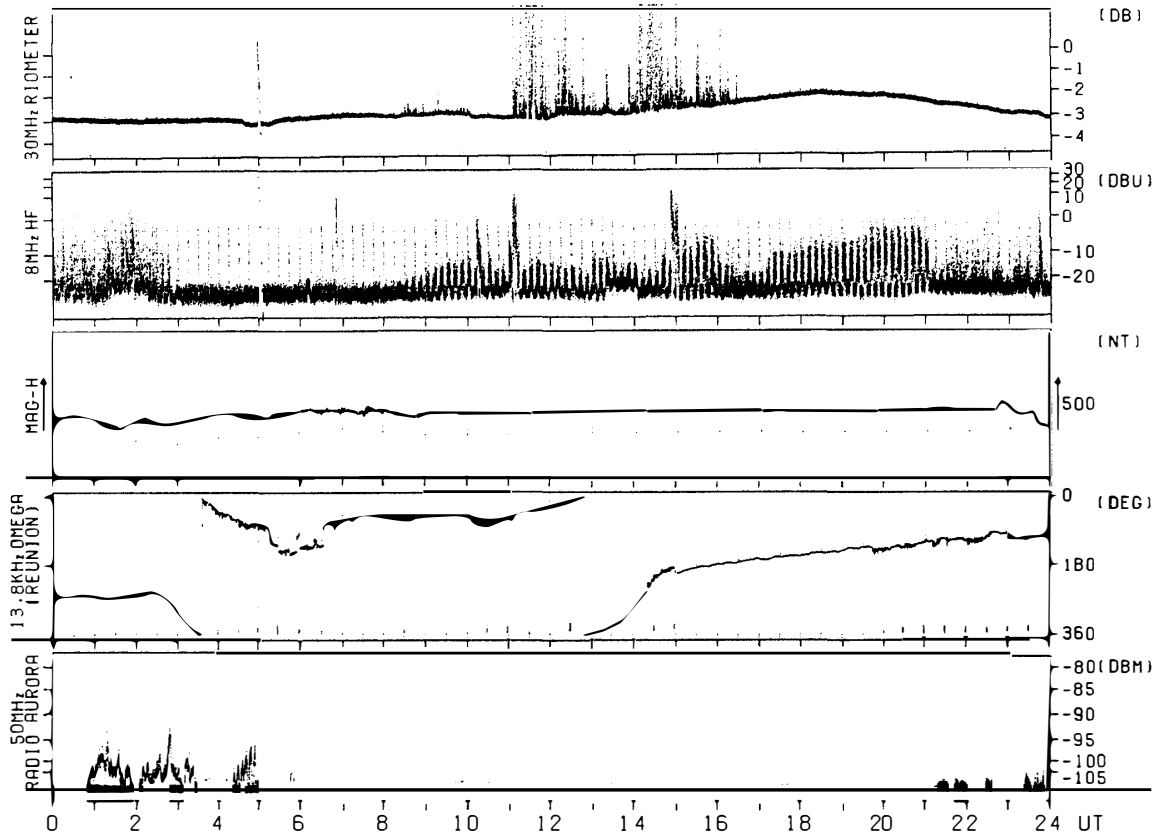
SYOWA STATION TOTAL DAY/218 1989/8/6



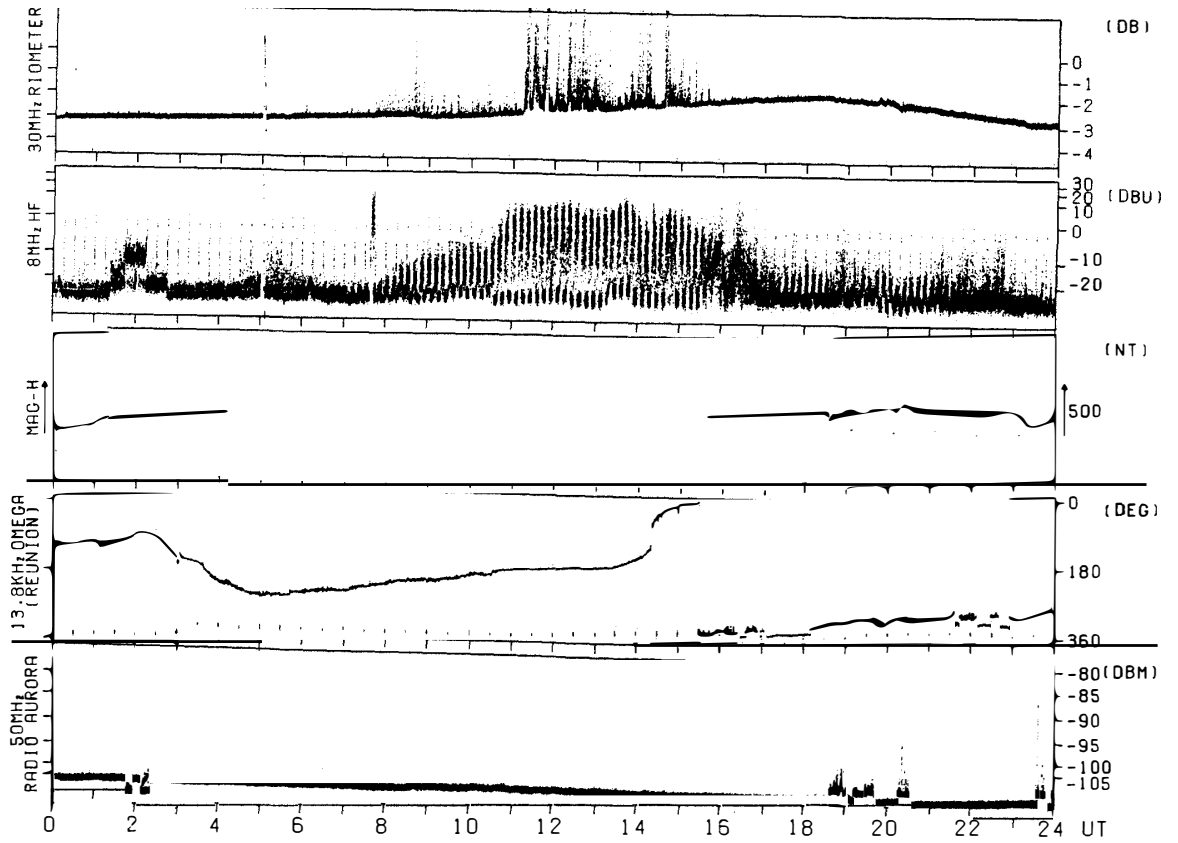
SYOWA STATION TOTAL DAY/219 1989/8/7



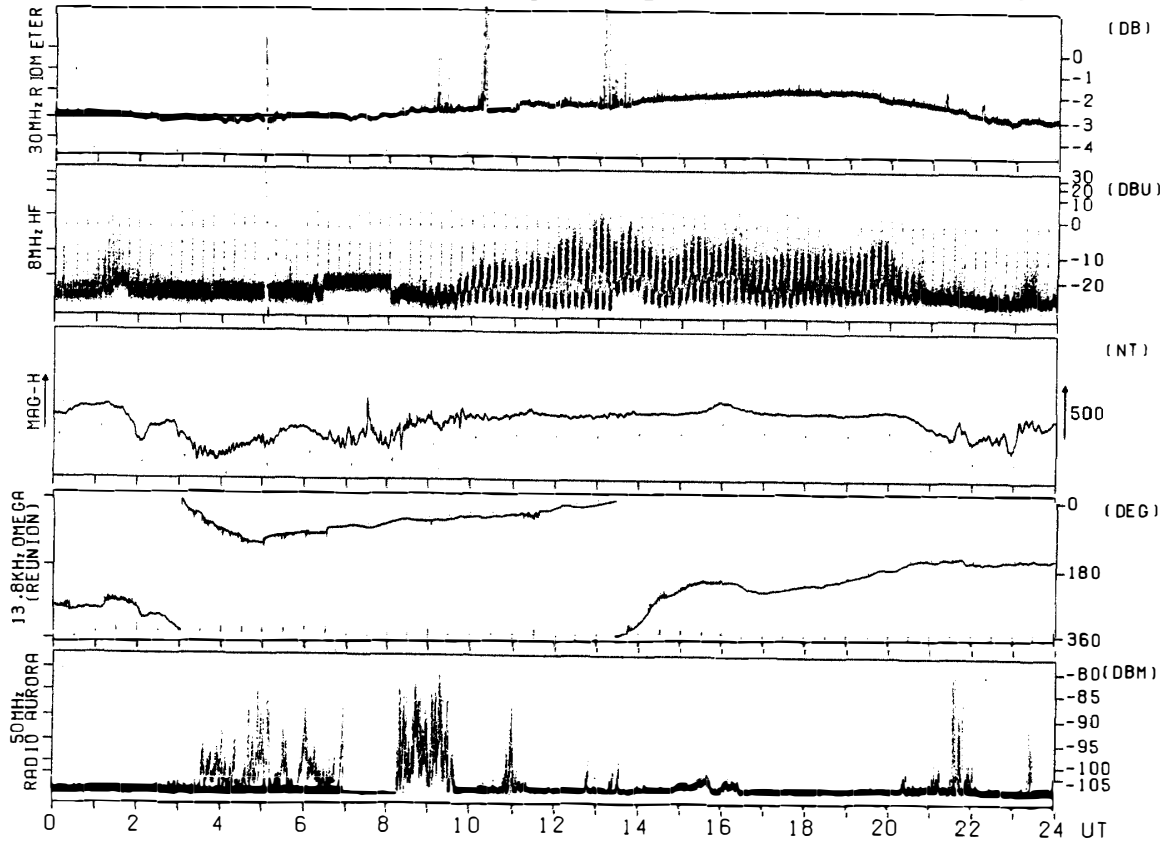
SYOWA STATION TOTAL DAY/220 1989/8/8



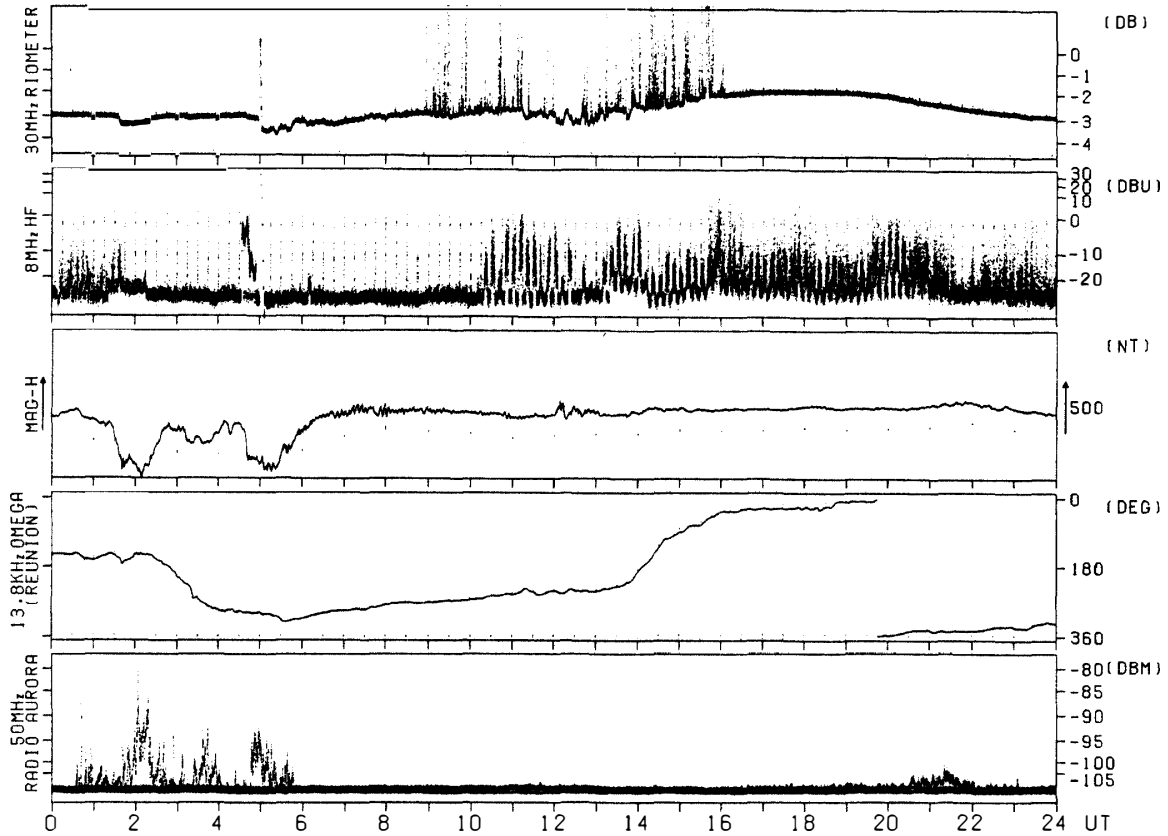
SYOWA STATION TOTAL DAY/221 1989/8/9



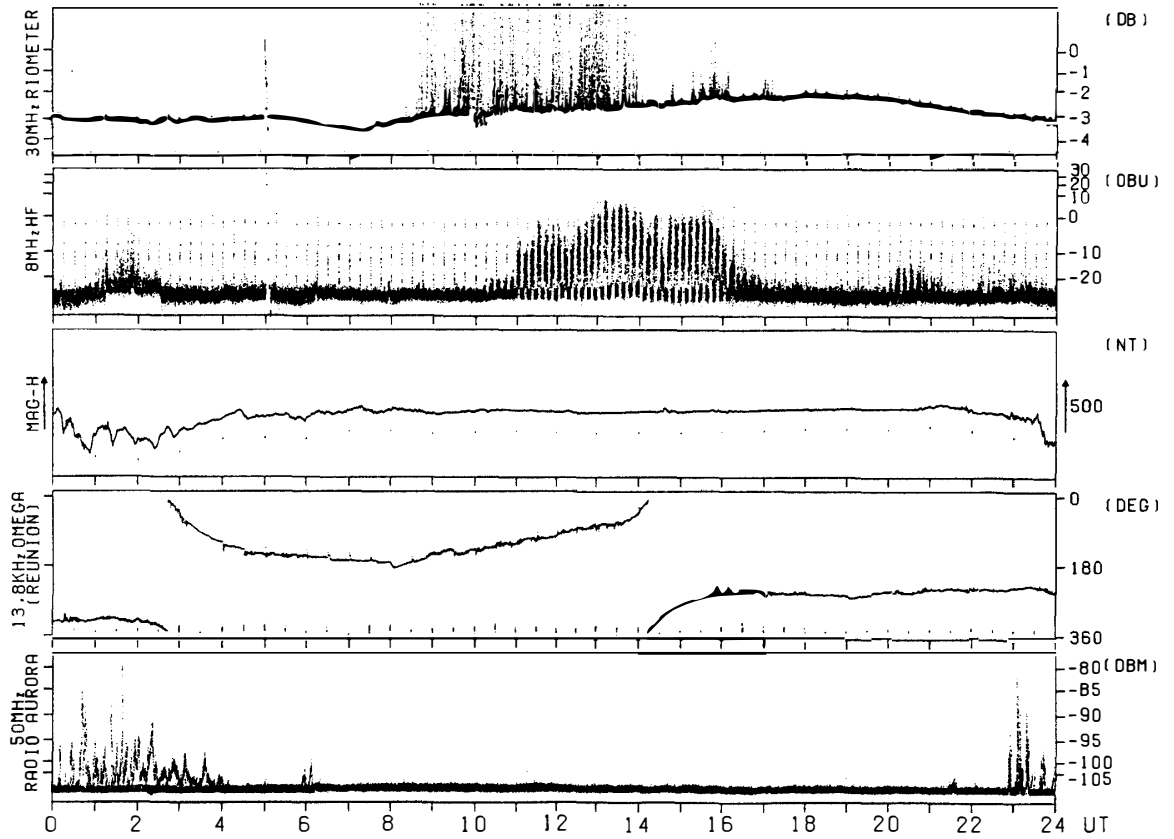
SYOWA STATION TOTAL DAY/222 1989/8/10



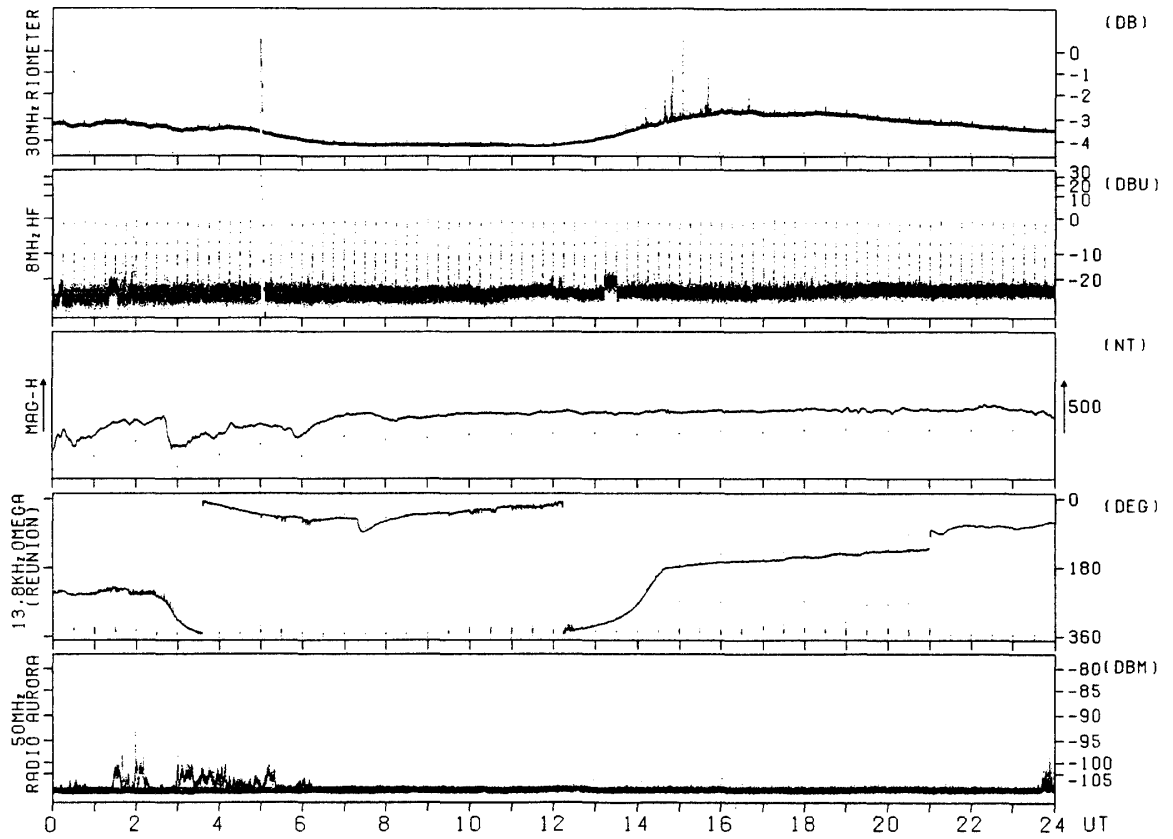
SYOWA STATION TOTAL DAY/223 1989/8/11



SYOWA STATION TOTAL DAY/224 1989/8/12

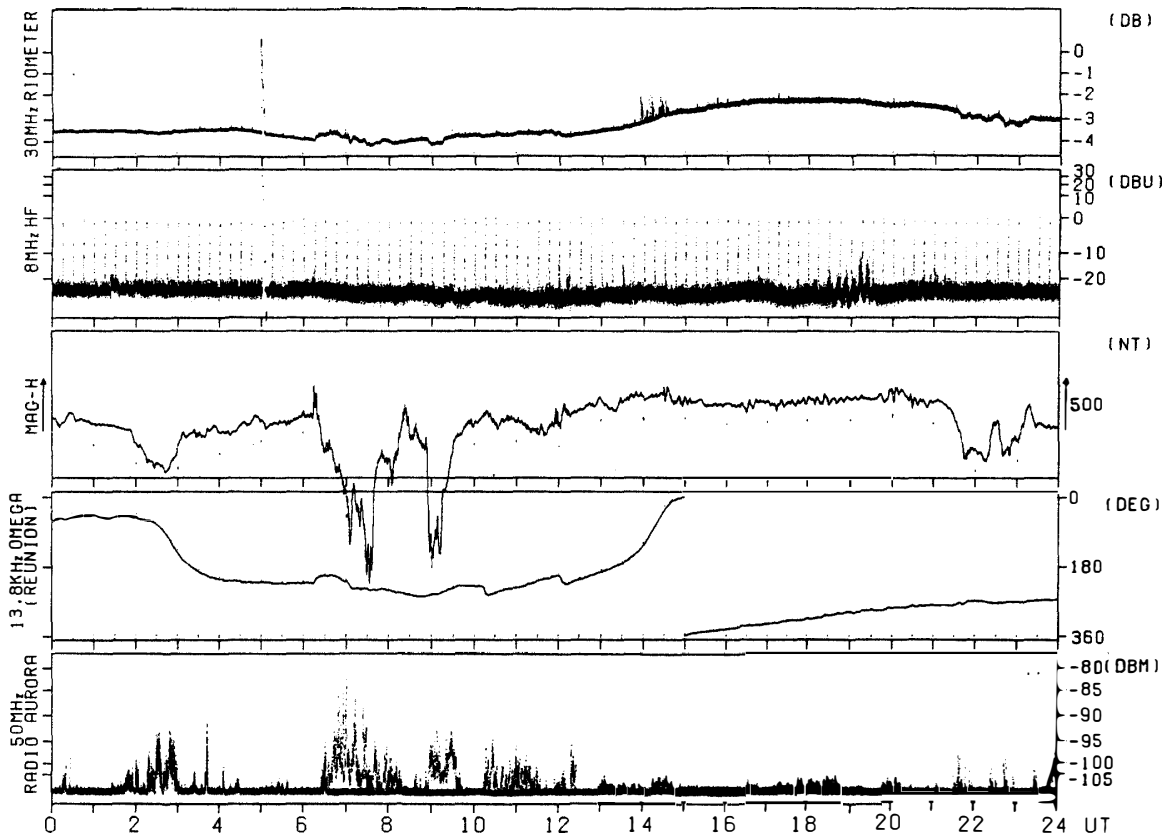


SYOWA STATION TOTAL DAY/225 1989/8/13



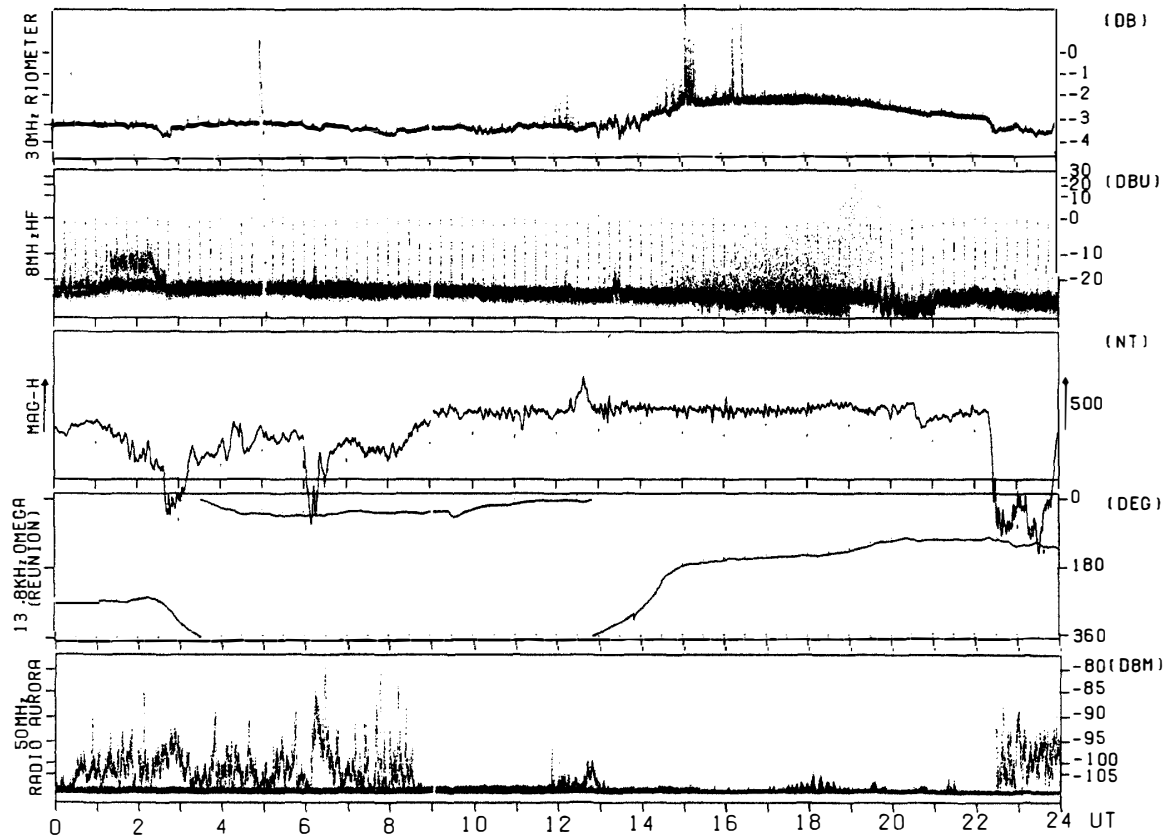
SYOWA STATION

TOTAL DAY/226 1989/8/14



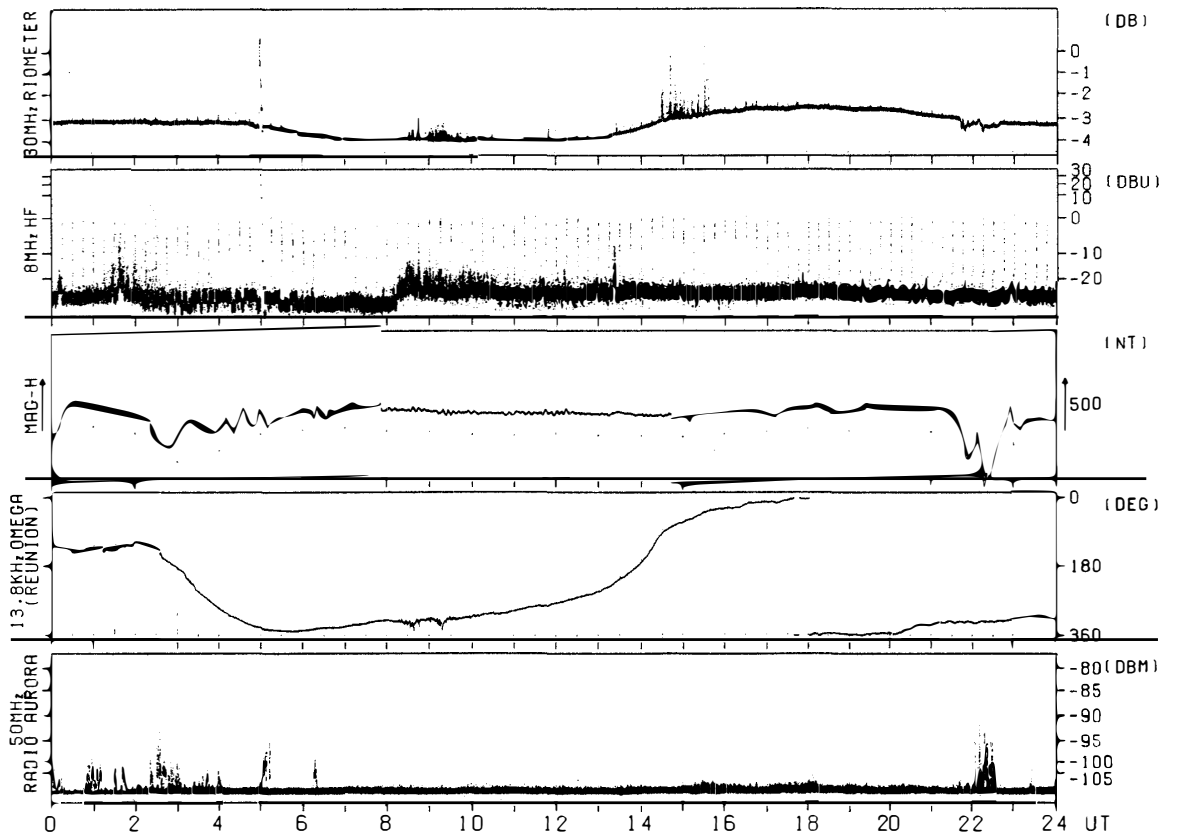
SYOWA STATION

TOTAL DAY/227 1989/8/15



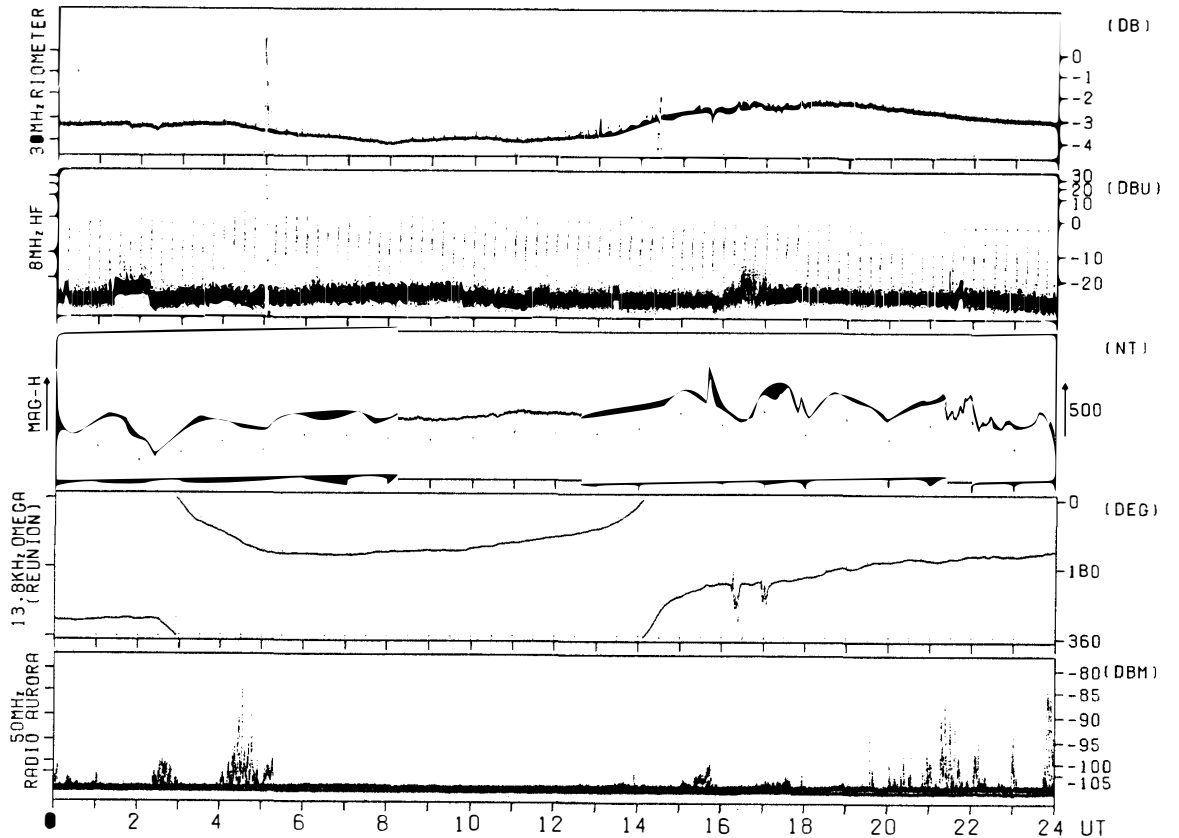
SYOWA STATION

TOTAL DAY/228 1989/8/16

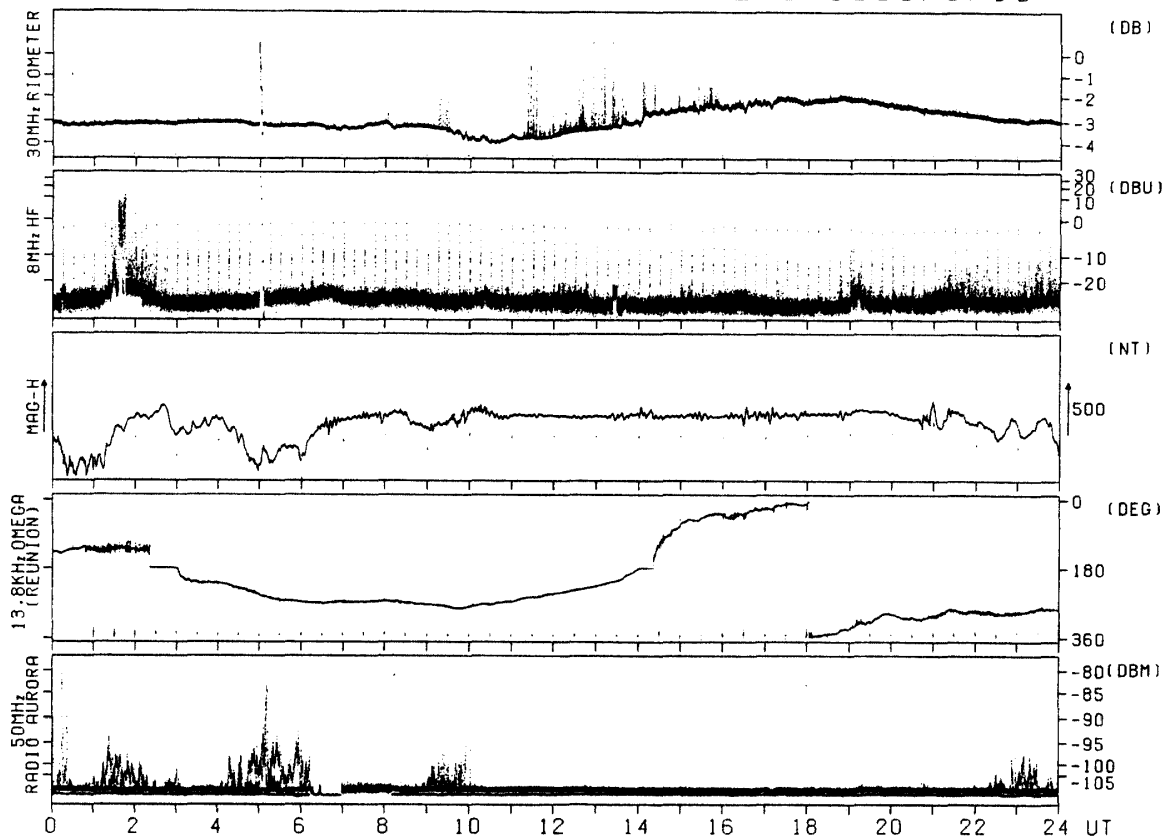


SYOWA STATION

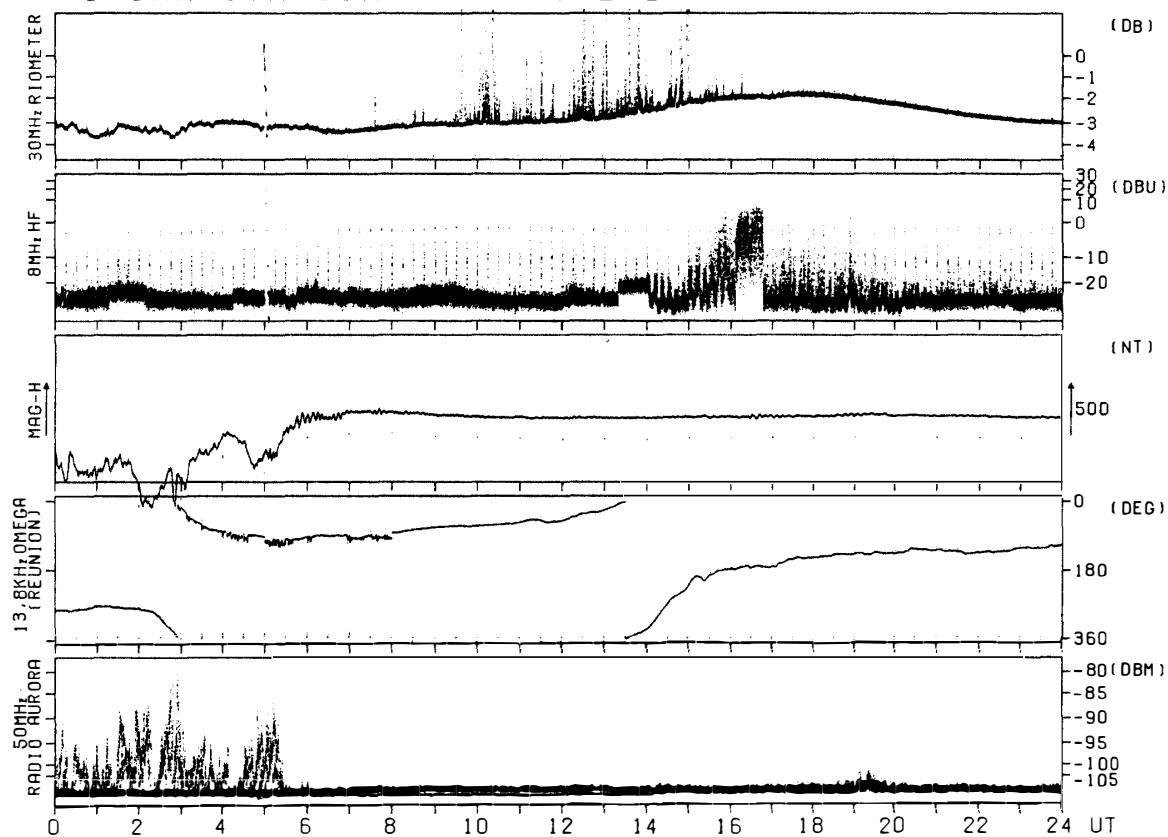
TOTAL DAY/229 1989/8/17



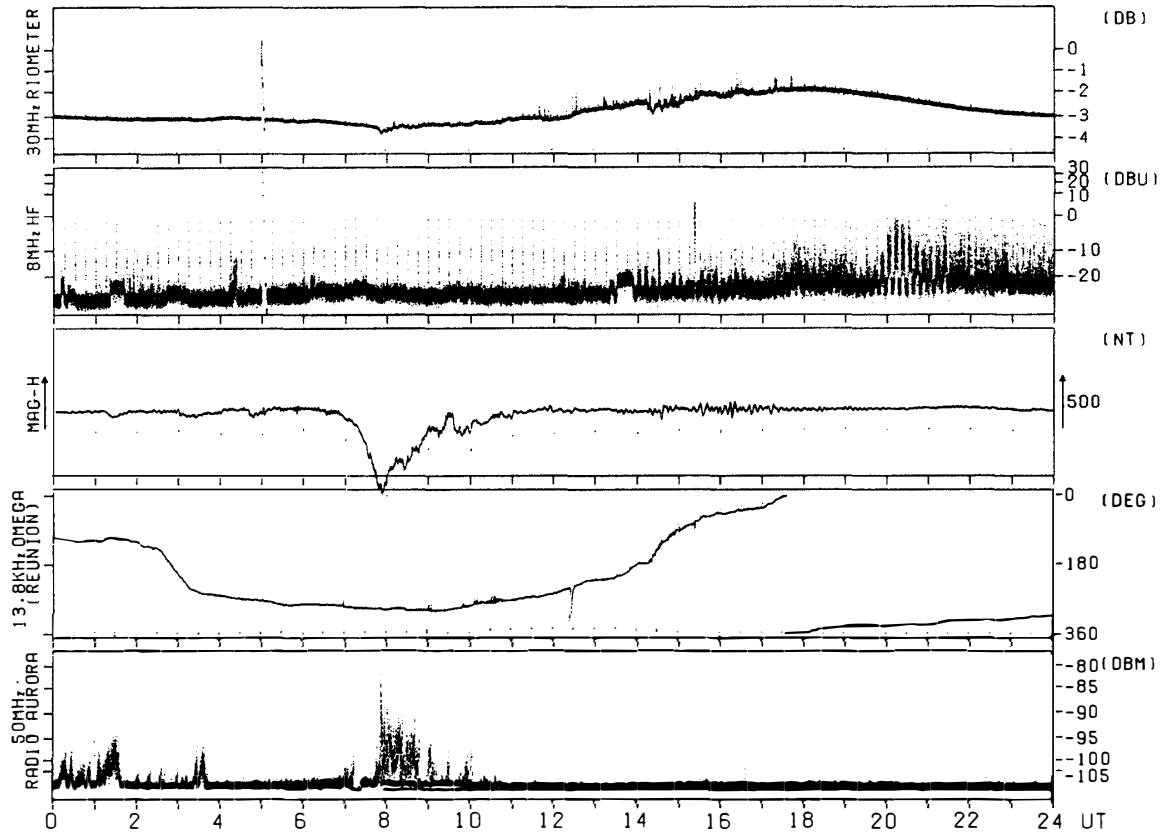
SYOWA STATION TOTAL DAY/230 1989/8/18



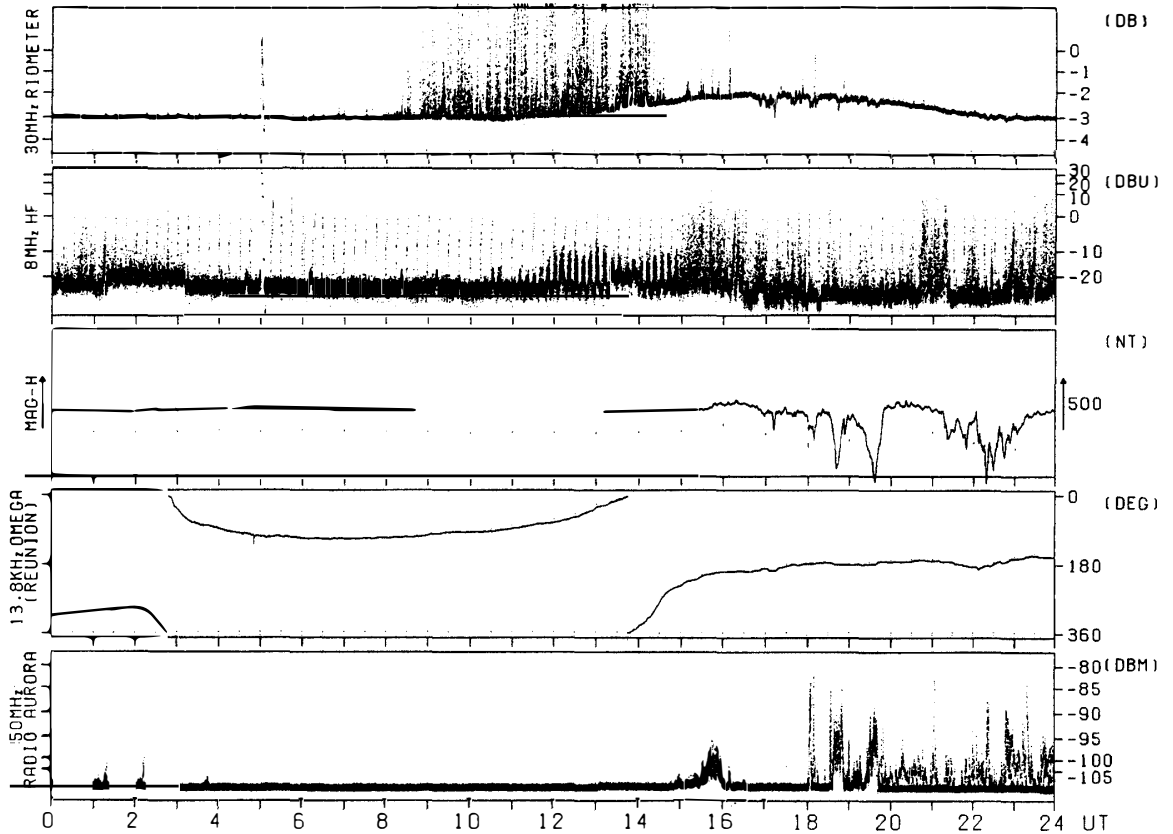
SYOWA STATION TOTAL DAY/231 1989/8/19



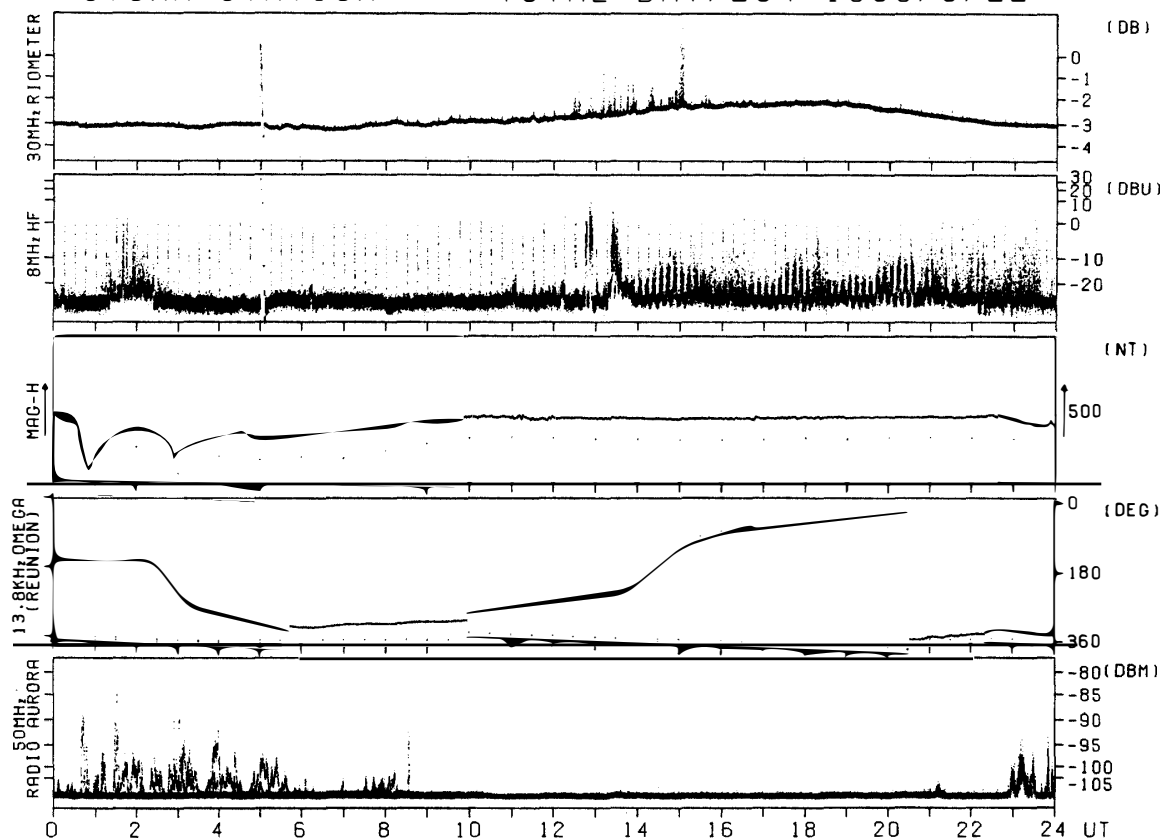
SYOWA STATION TOTAL DAY/232 1989/8/20



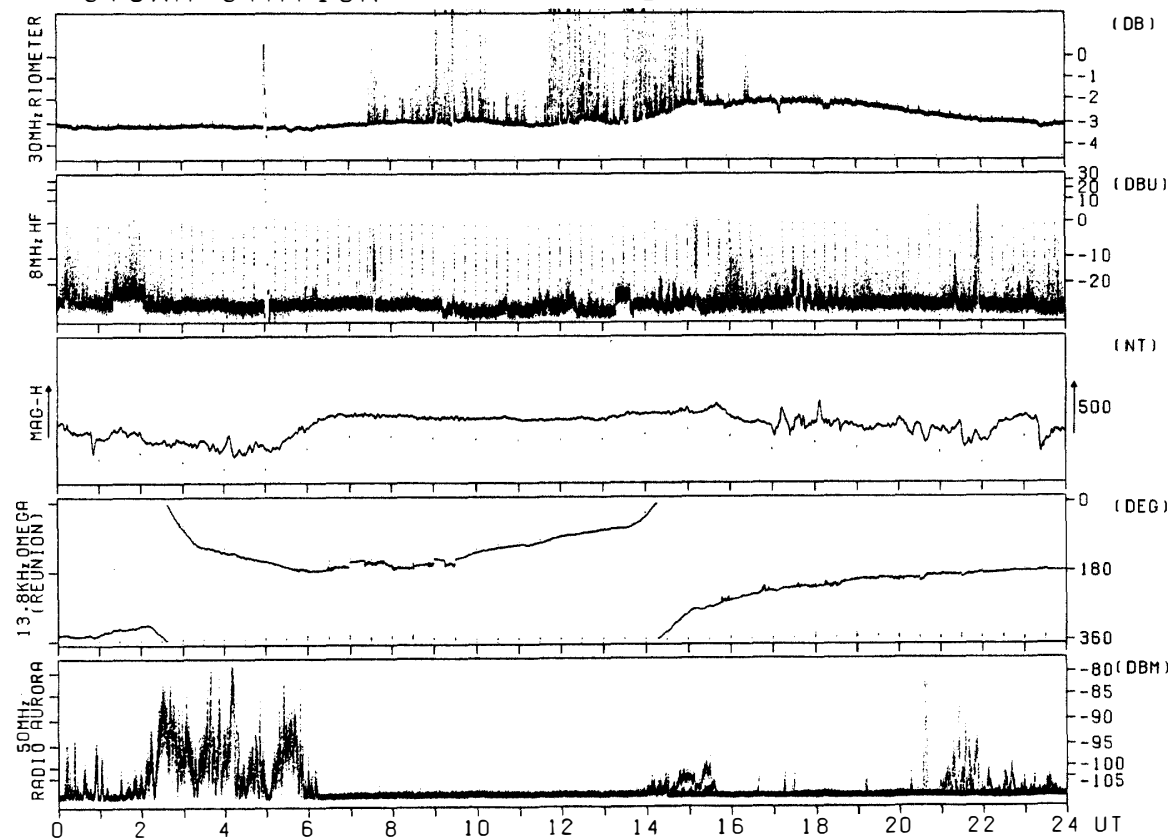
SYOWA STATION TOTAL DAY/233 1989/8/21



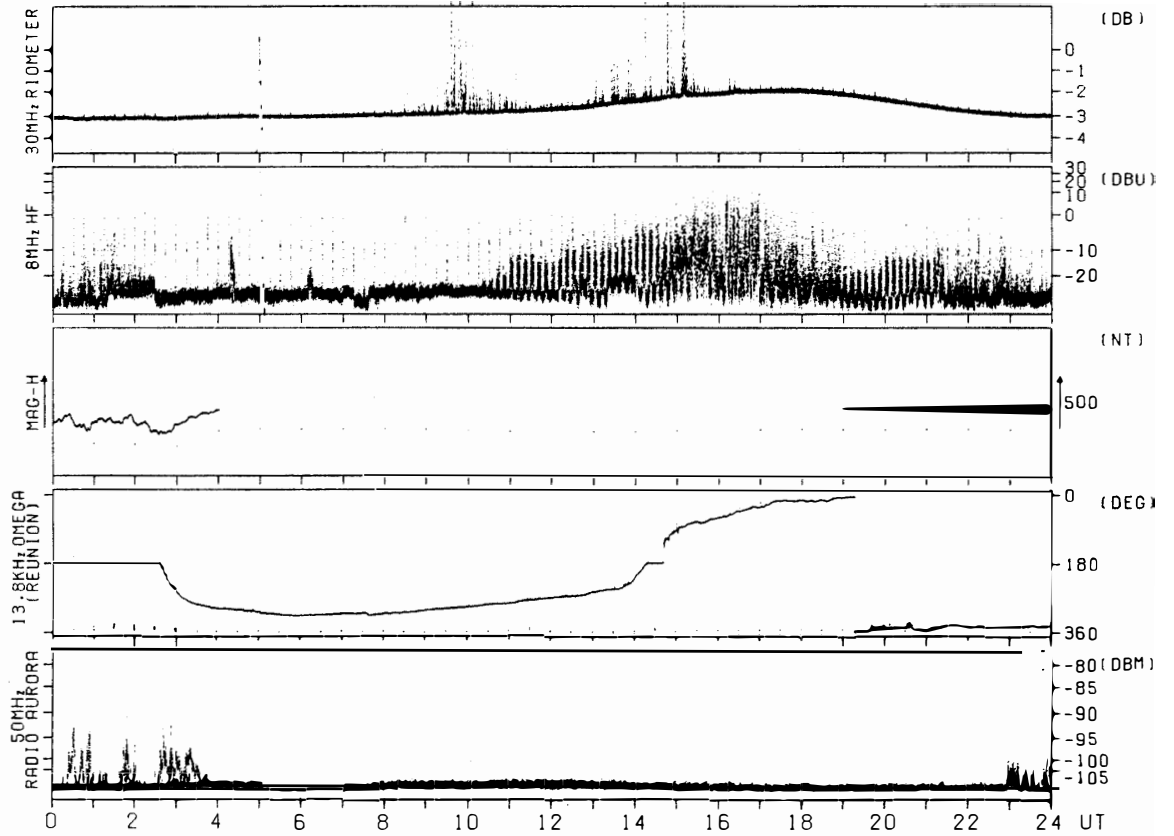
SYOWA STATION TOTAL DAY/234 1989/8/22



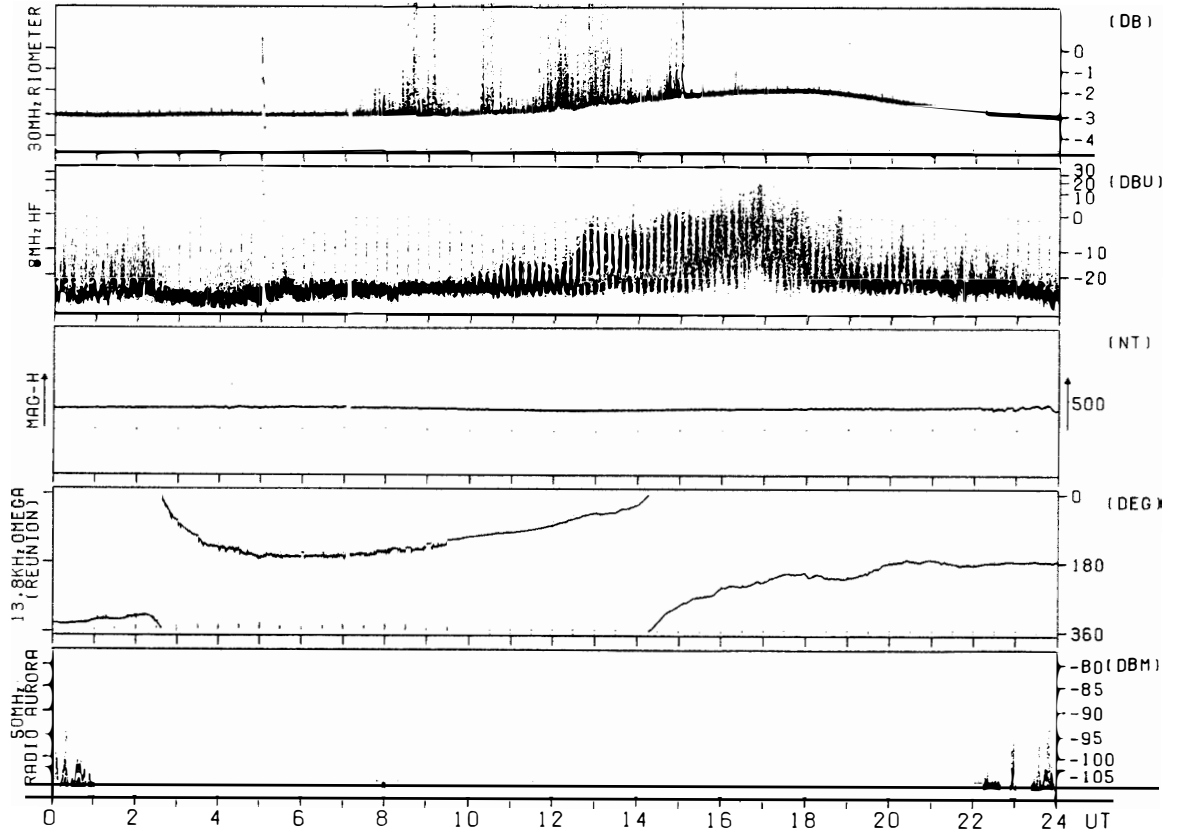
SYOWA STATION TOTAL DAY/235 1989/8/23



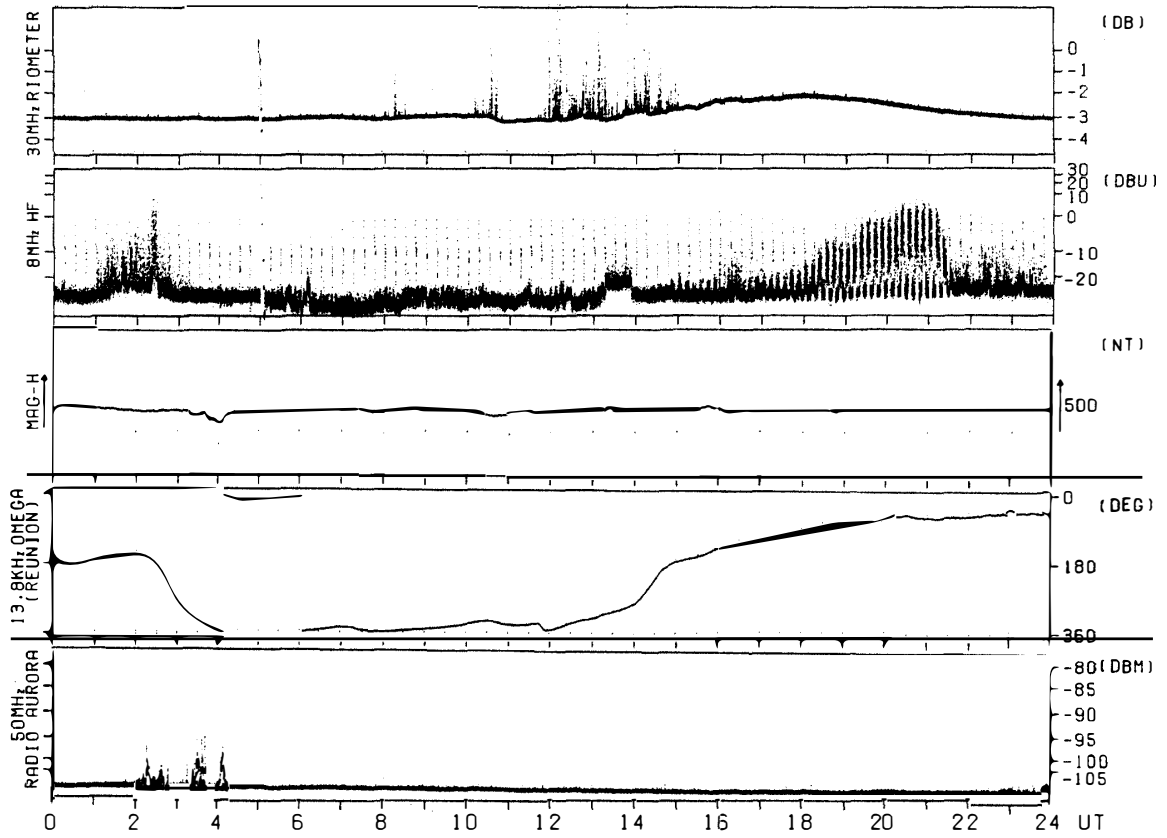
SYOWA STATION TOTAL DAY/236 1989/8/24



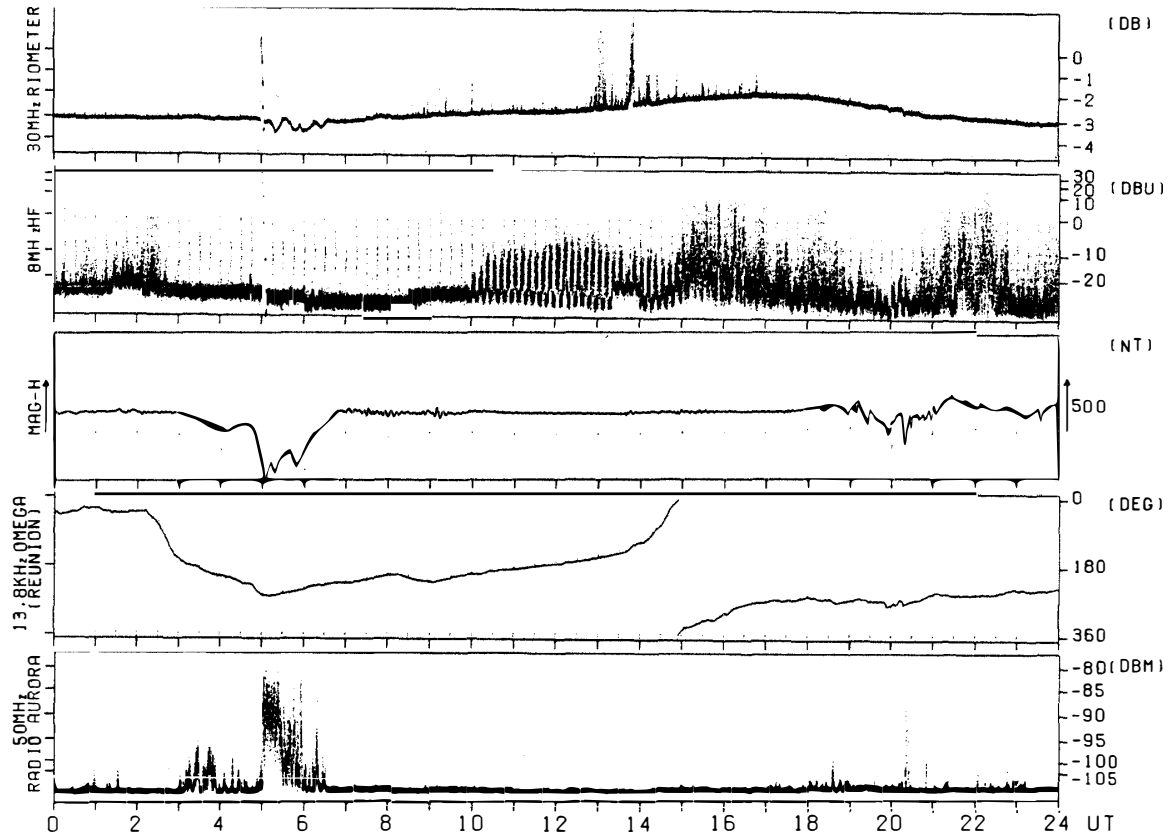
SYOWA STATION TOTAL DAY/237 1989/8/25



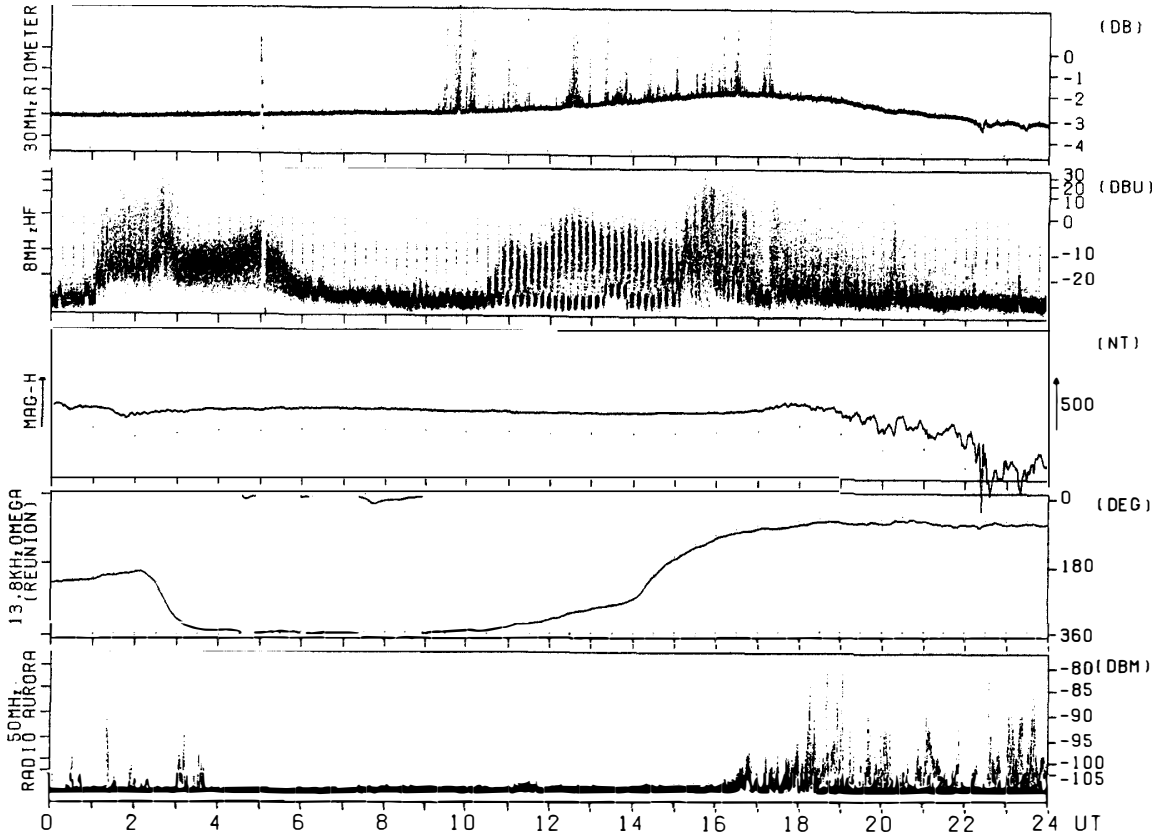
SYOWA STATION TOTAL DAY/238 1989/8/26



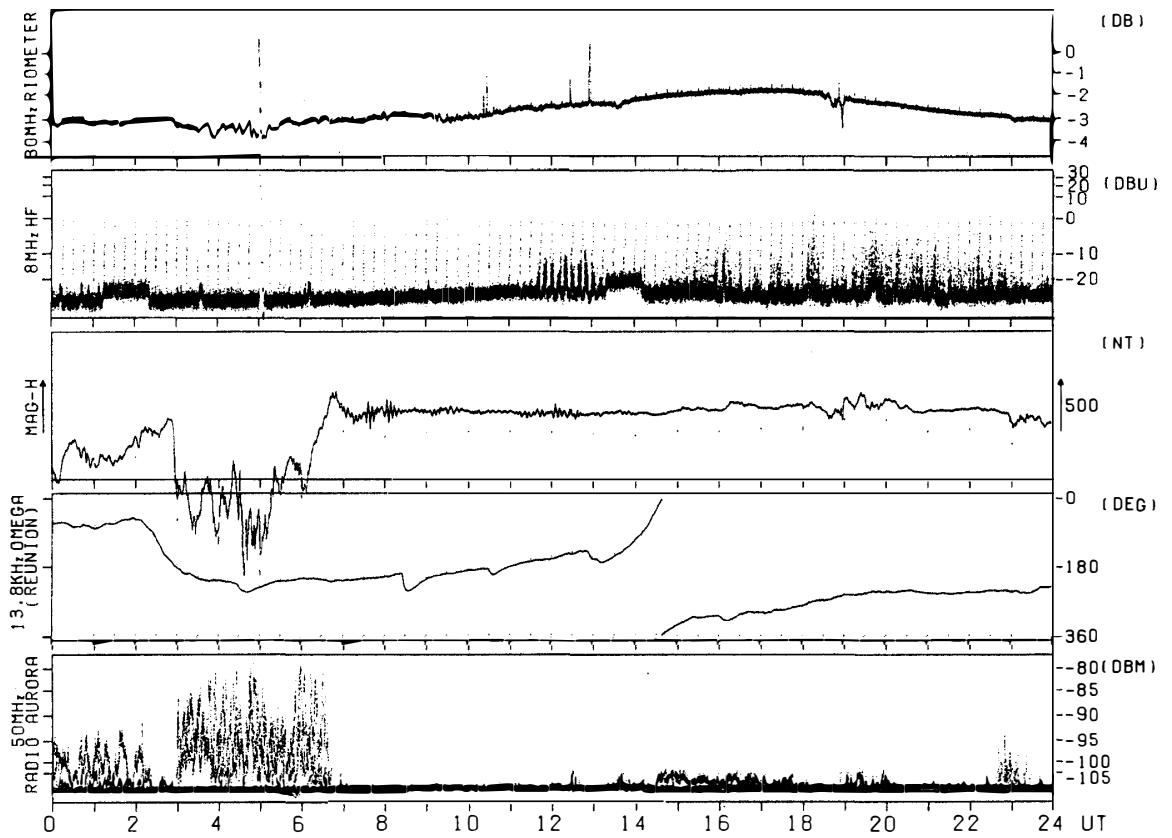
SYOWA STATION TOTAL DAY/239 1989/8/27



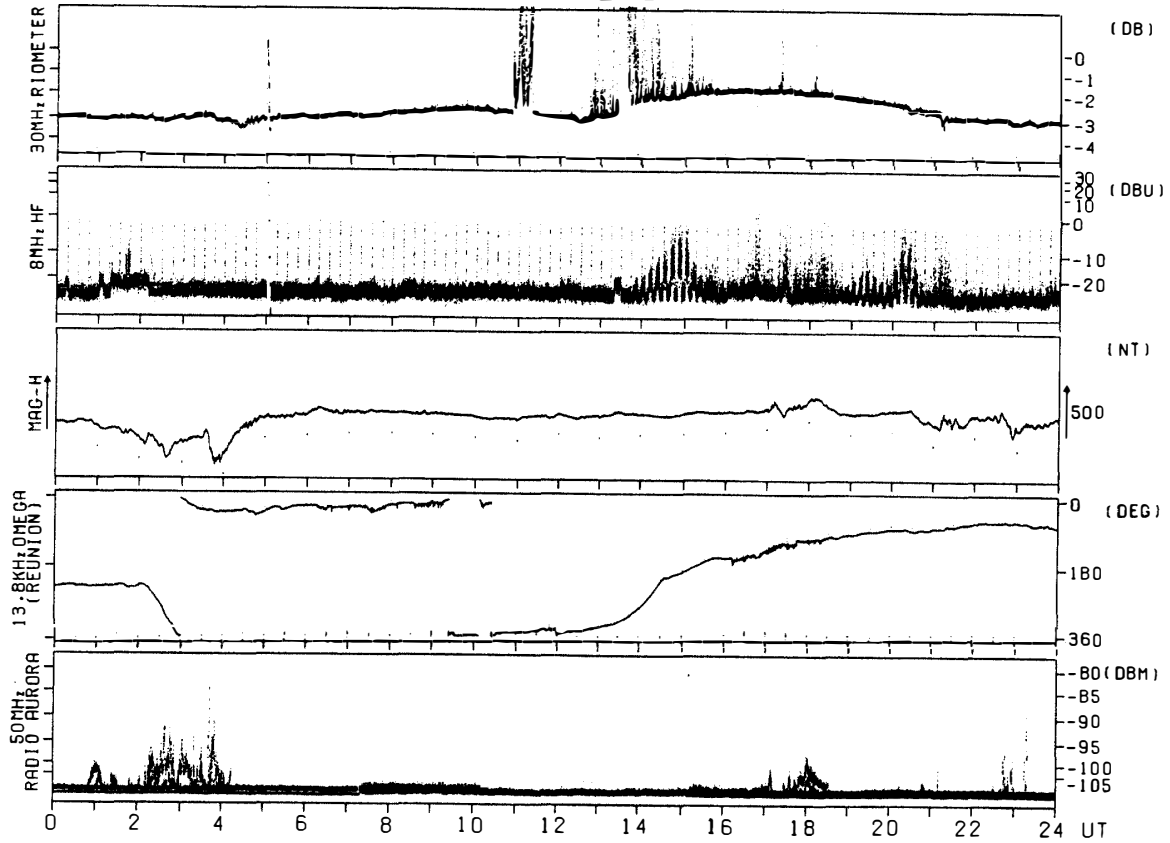
SYOWA STATION TOTAL DAY/240 1989/8/28



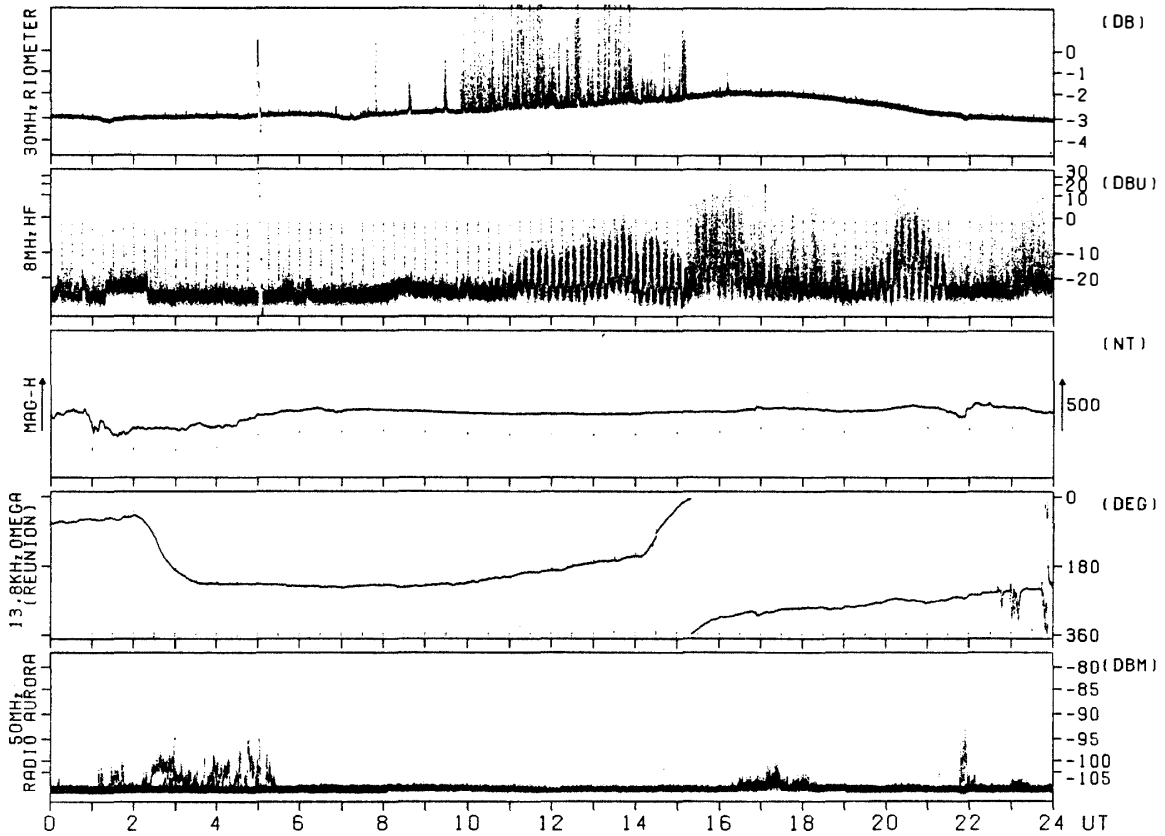
SYOWA STATION TOTAL DAY/241 1989/8/29



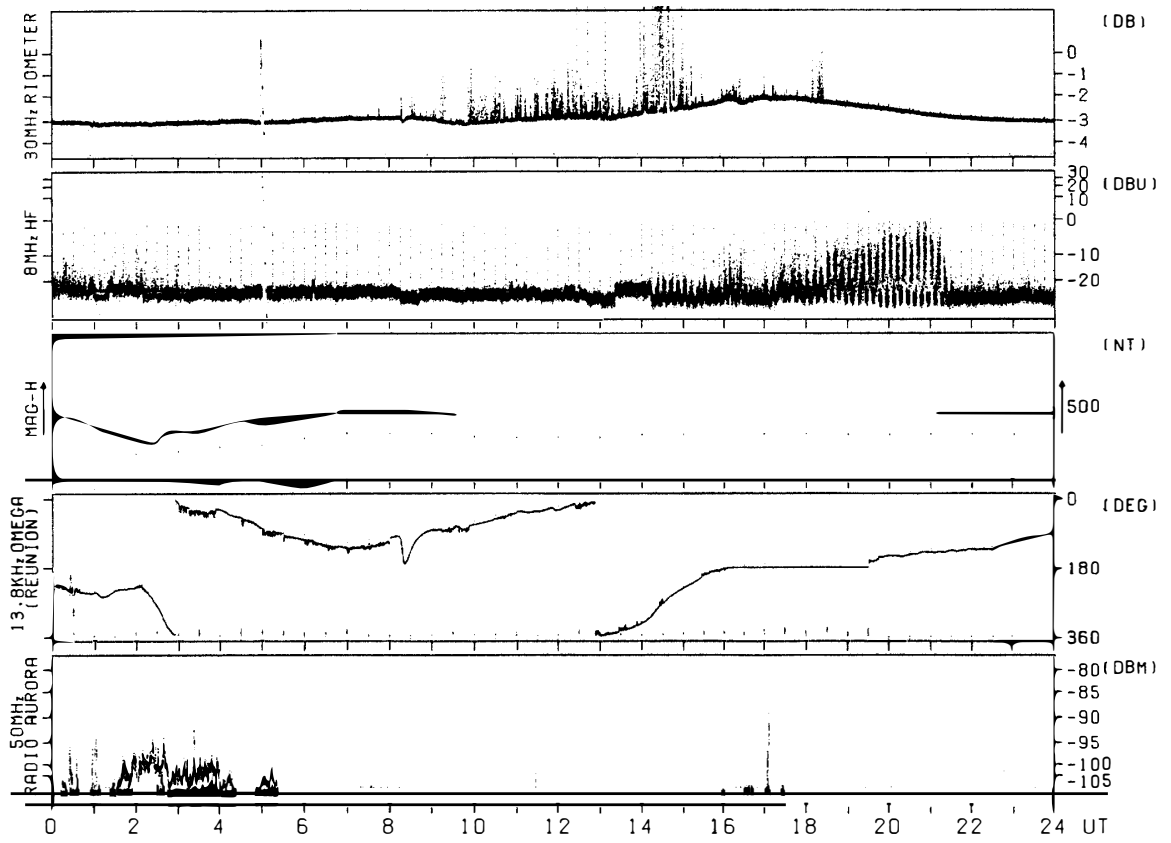
SYOWA STATION TOTAL DAY/242 1989/8/30



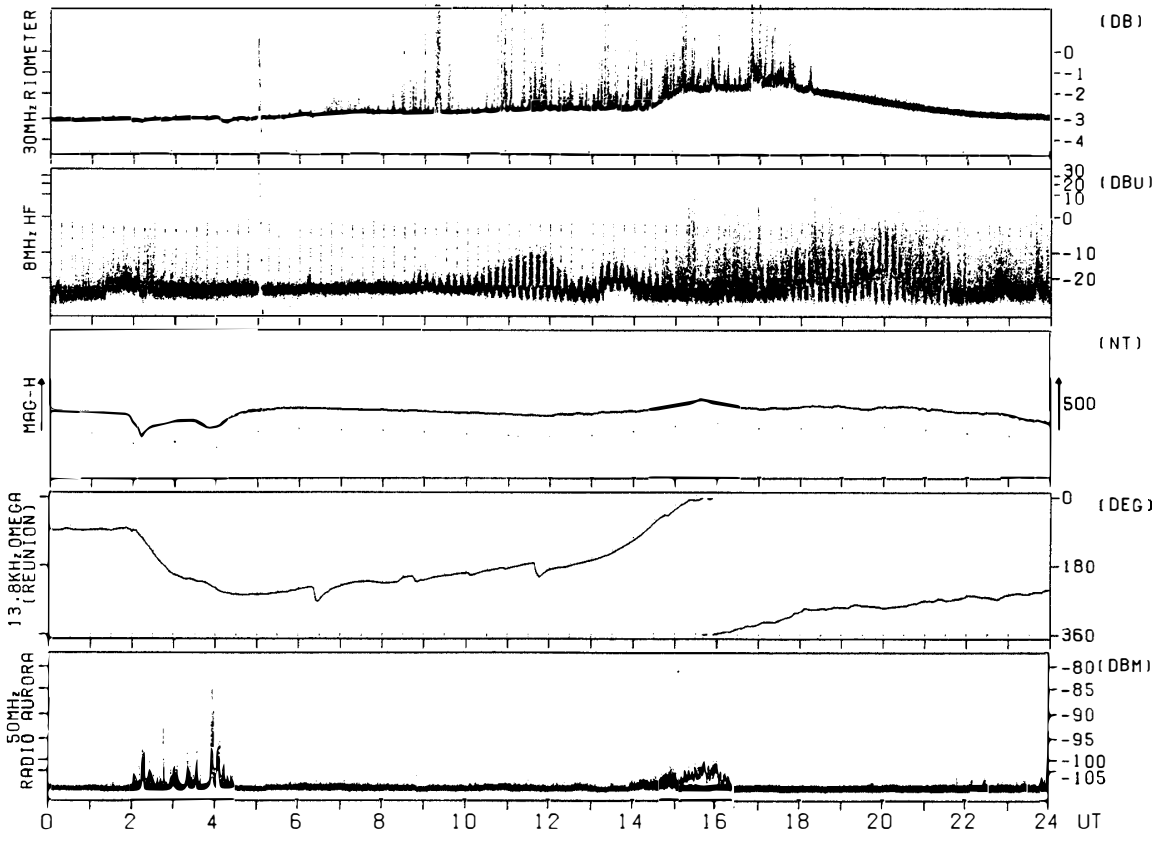
SYOWA STATION TOTAL DAY/243 1989/8/31



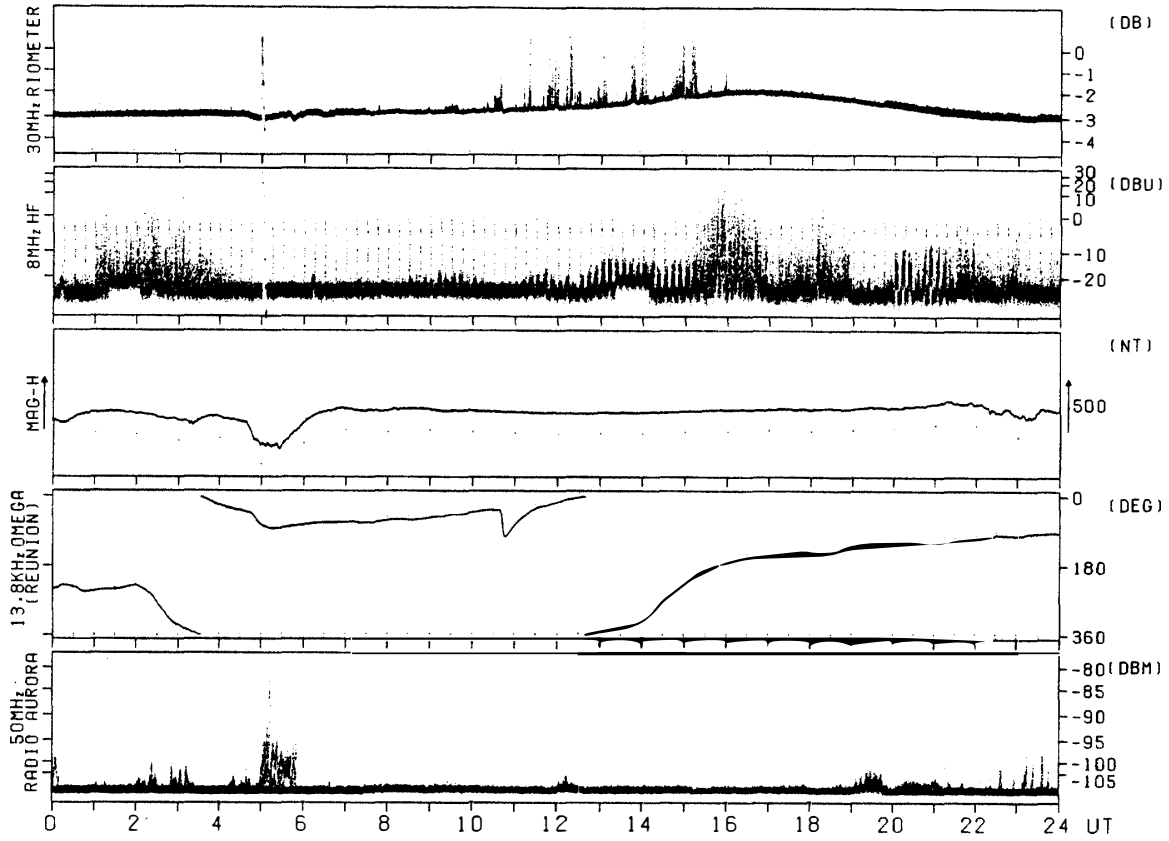
SYOWA STATION TOTAL DAY/244 1989/9/1



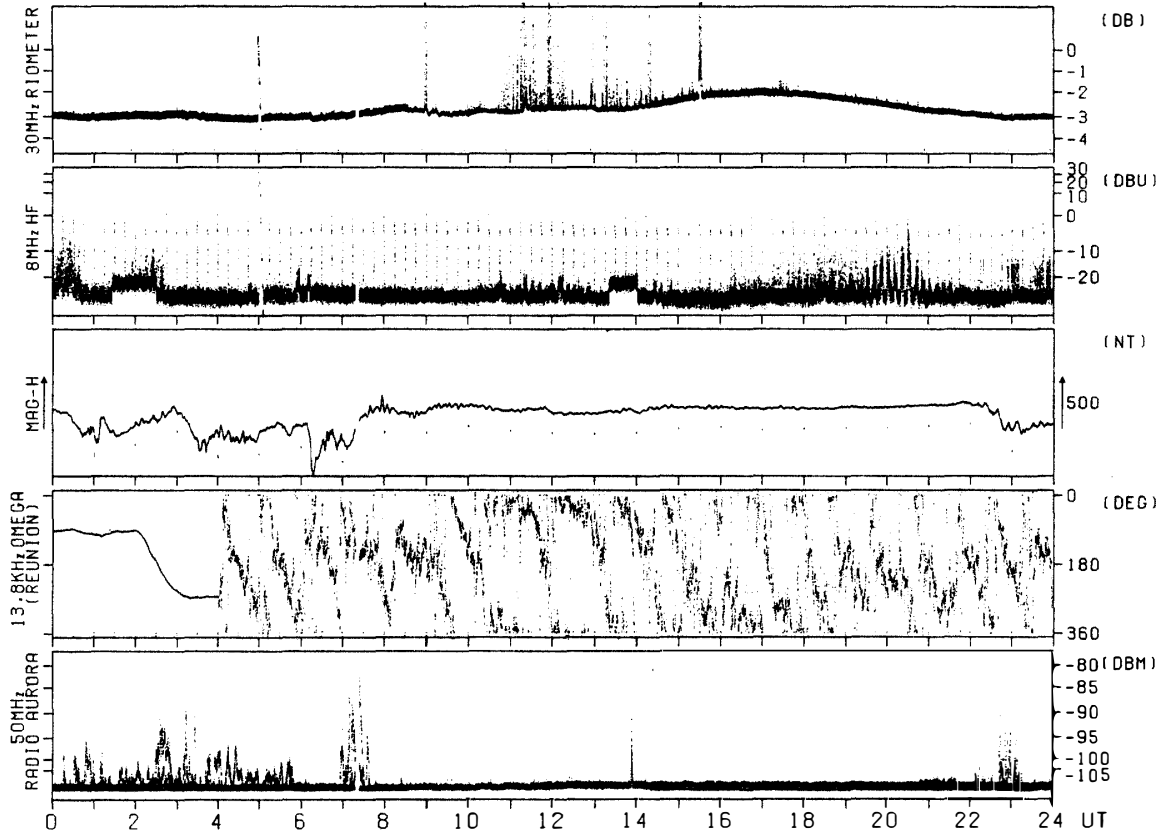
SYOWA STATION TOTAL DAY/245 1989/9/2



SYOWA STATION TOTAL DAY/246 1989/9/3

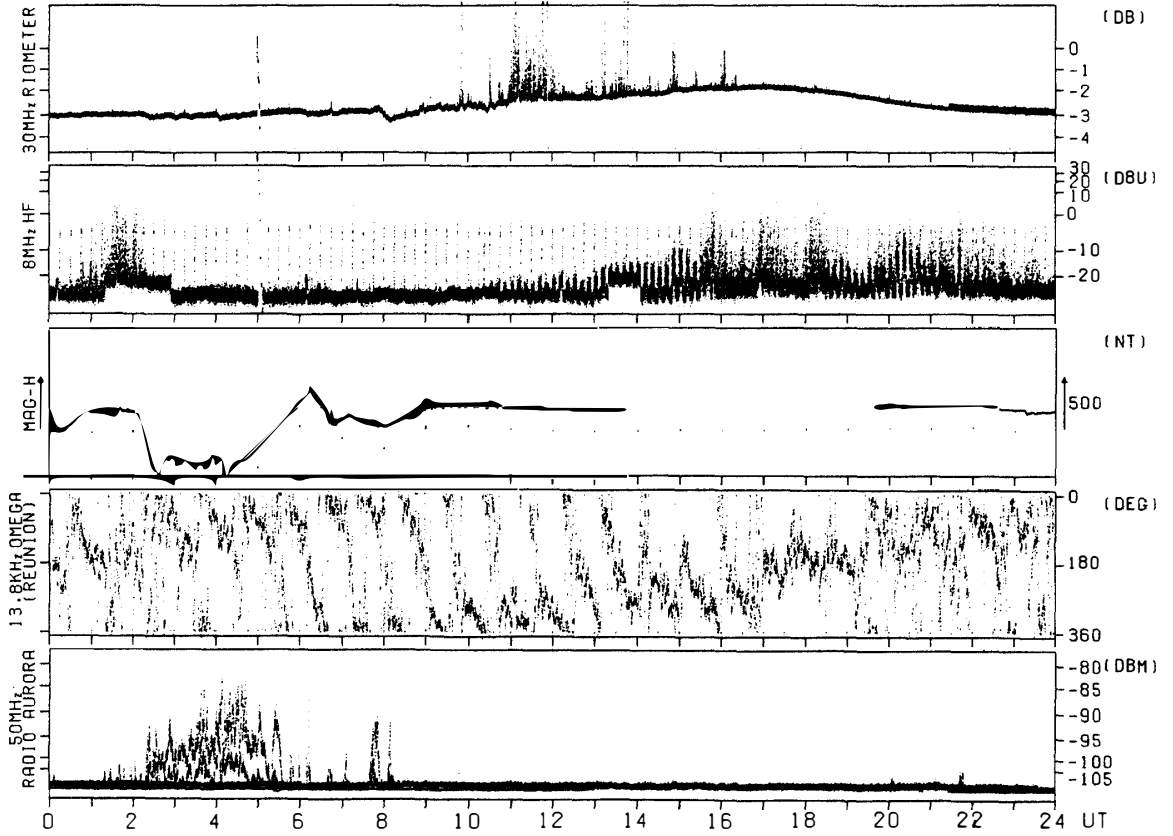


SYOWA STATION TOTAL DAY/247 1989/9/4



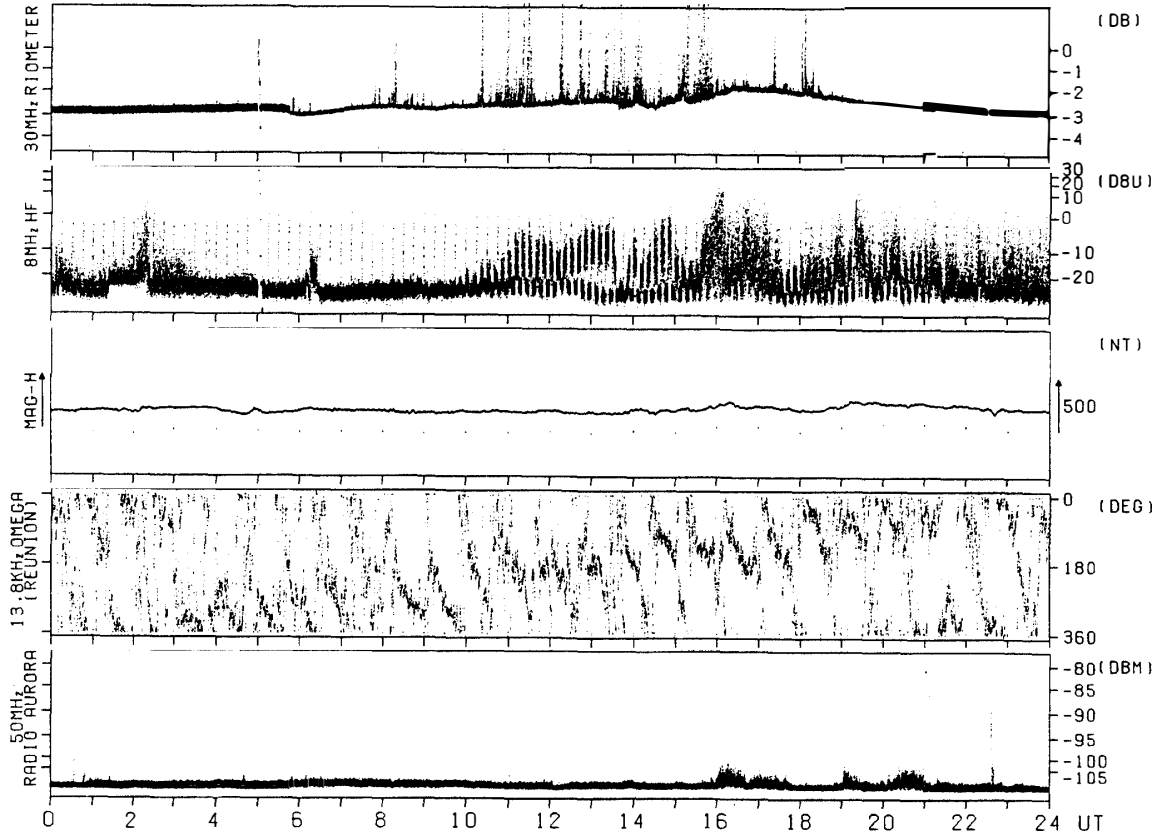
SYOWA STATION

TOTAL DAY/248 1989/9/5

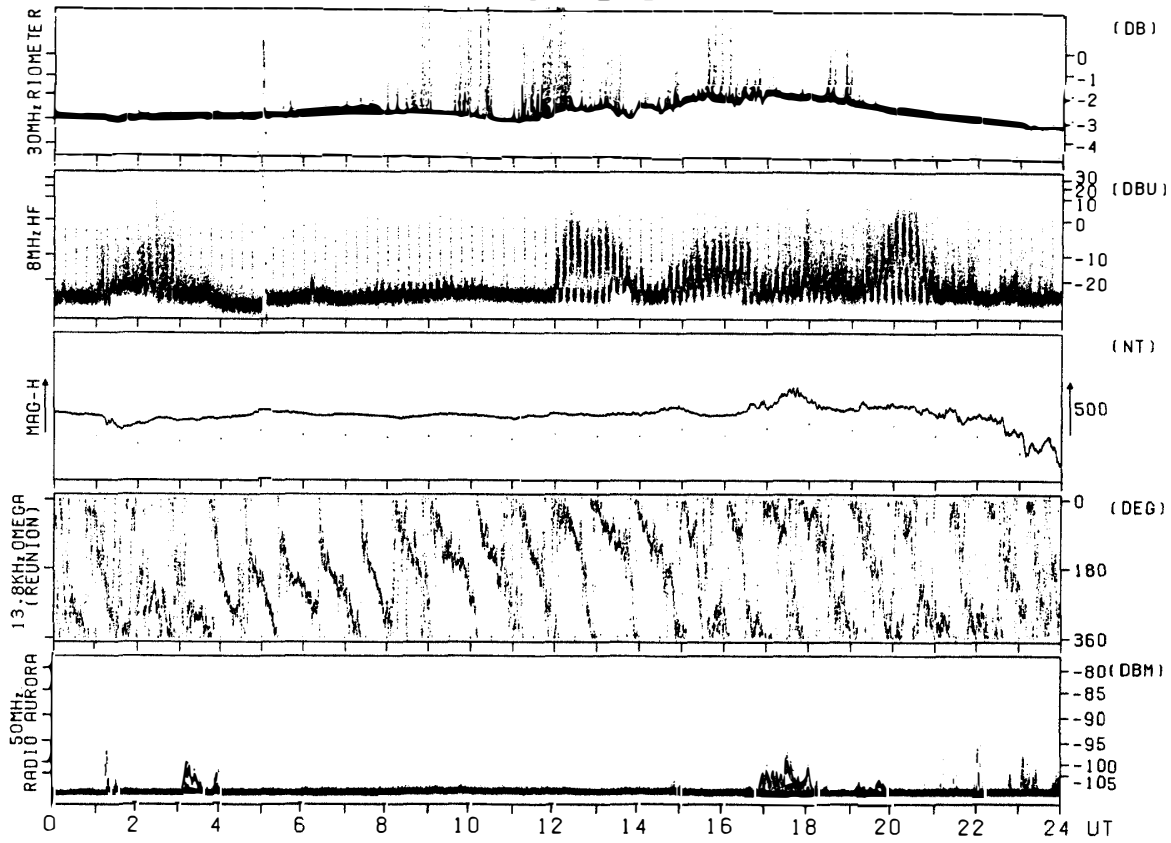


SYOWA STATION

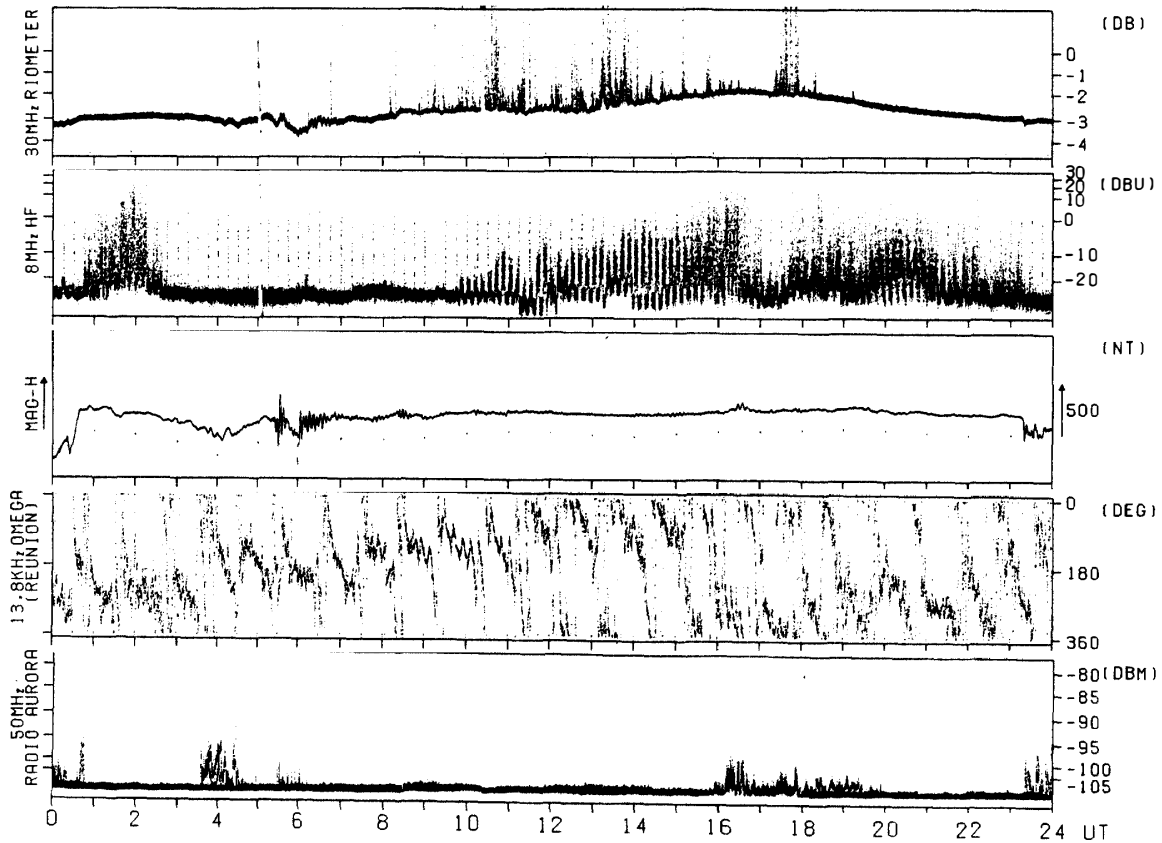
TOTAL DAY/249 1989/9/6



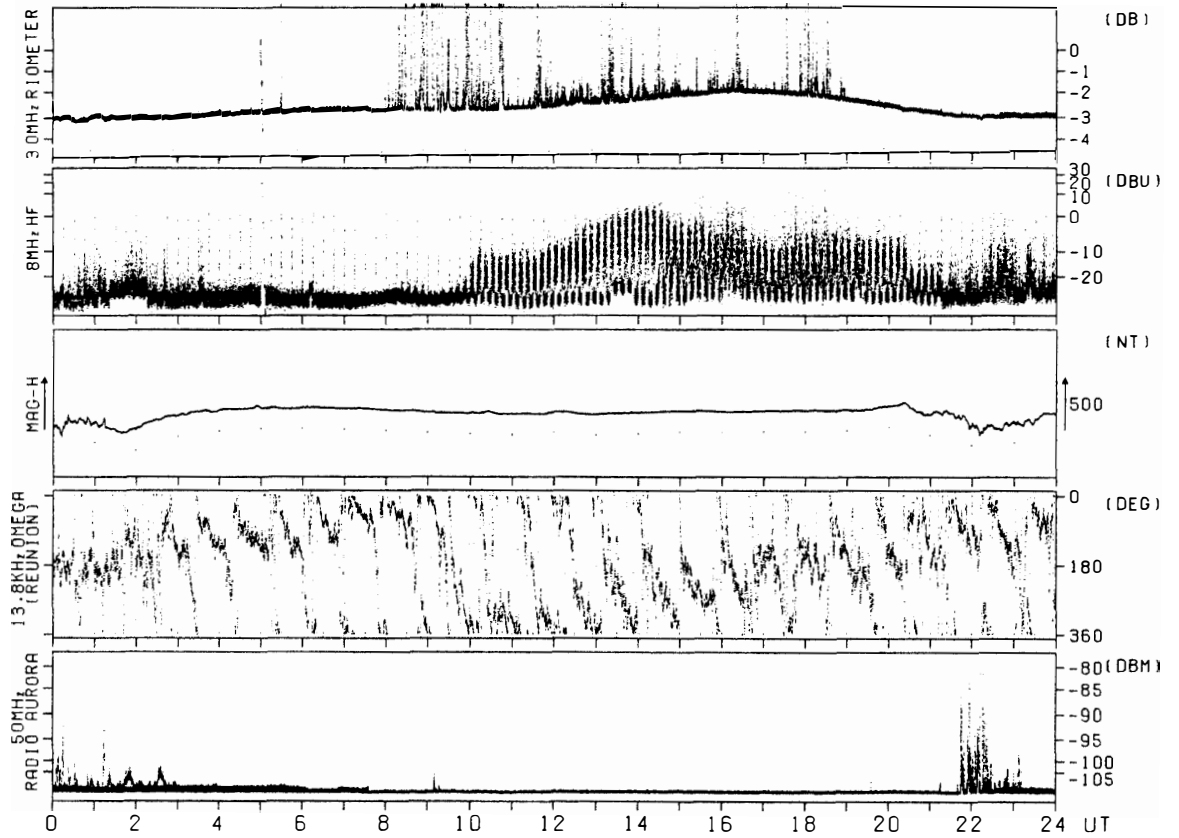
SYOWA STATION TOTAL DAY/250 1989/9/7



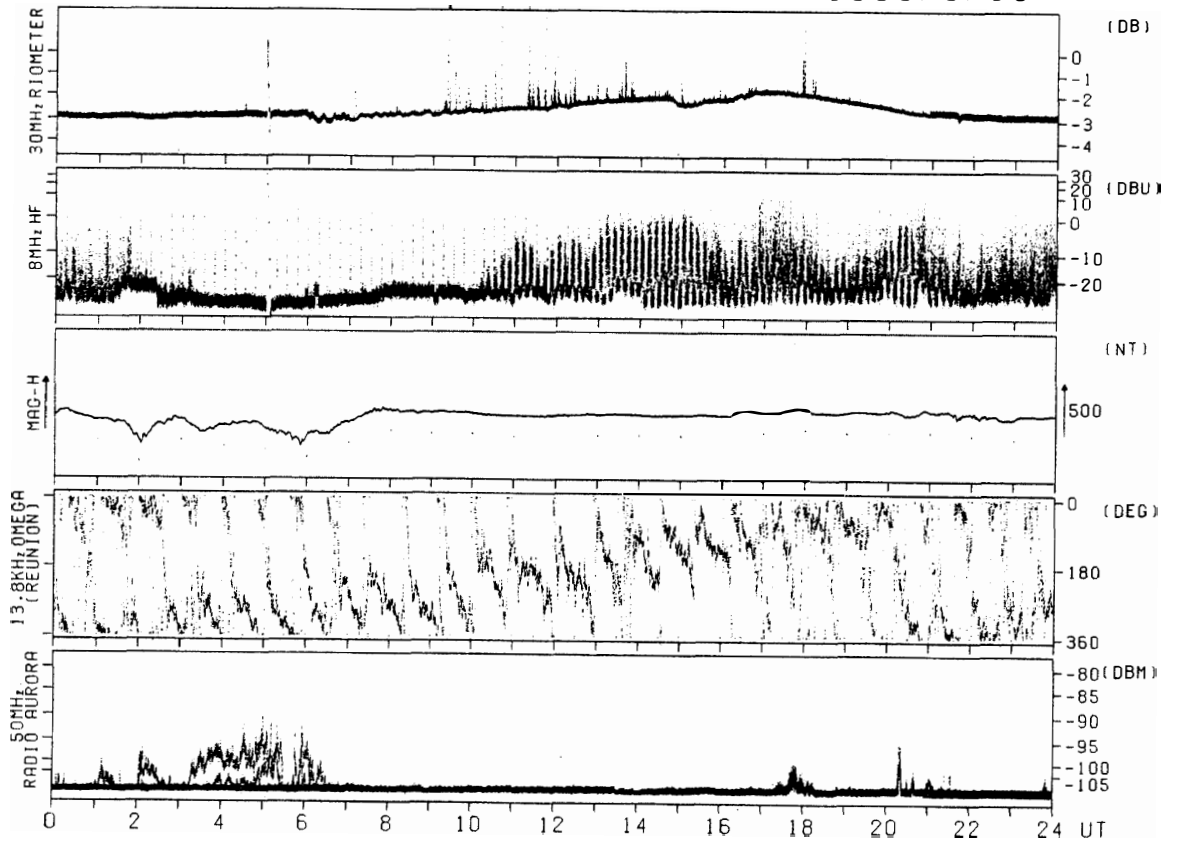
SYOWA STATION TOTAL DAY/251 1989/9/8



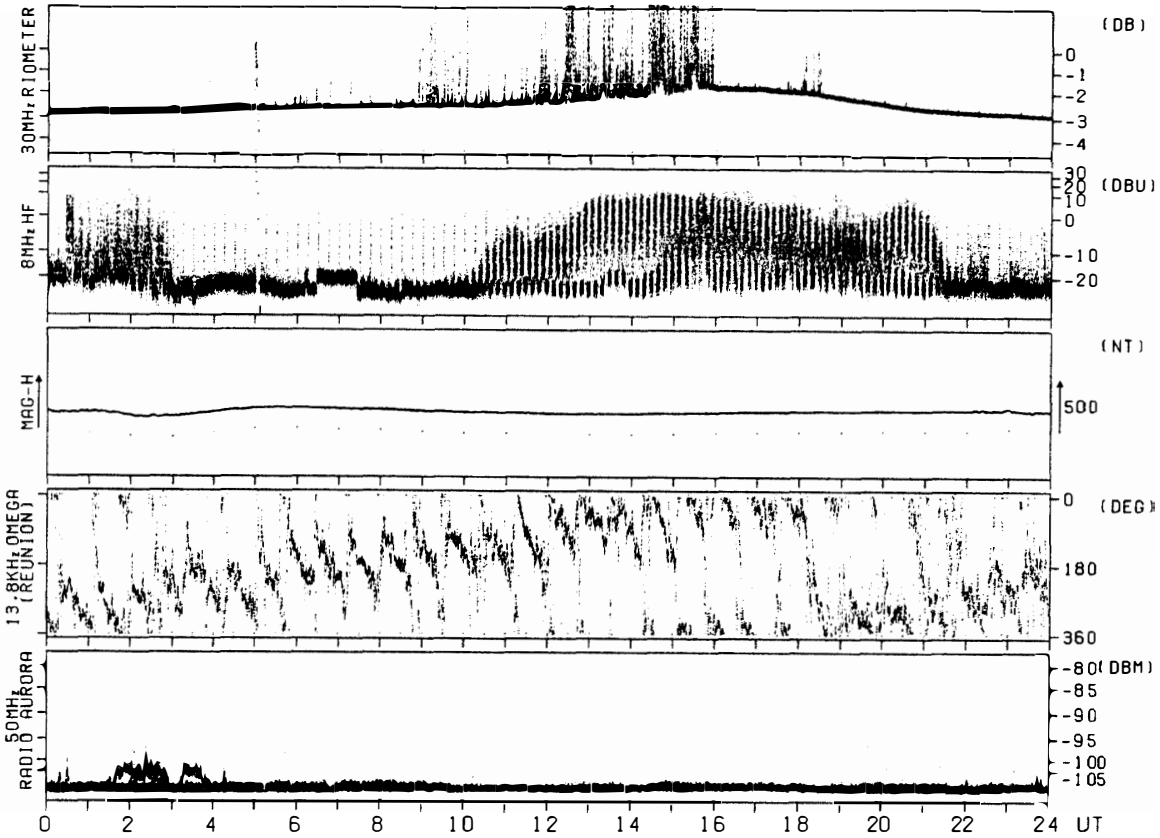
SYOWA STATION TOTAL DAY/252 1989/9/9



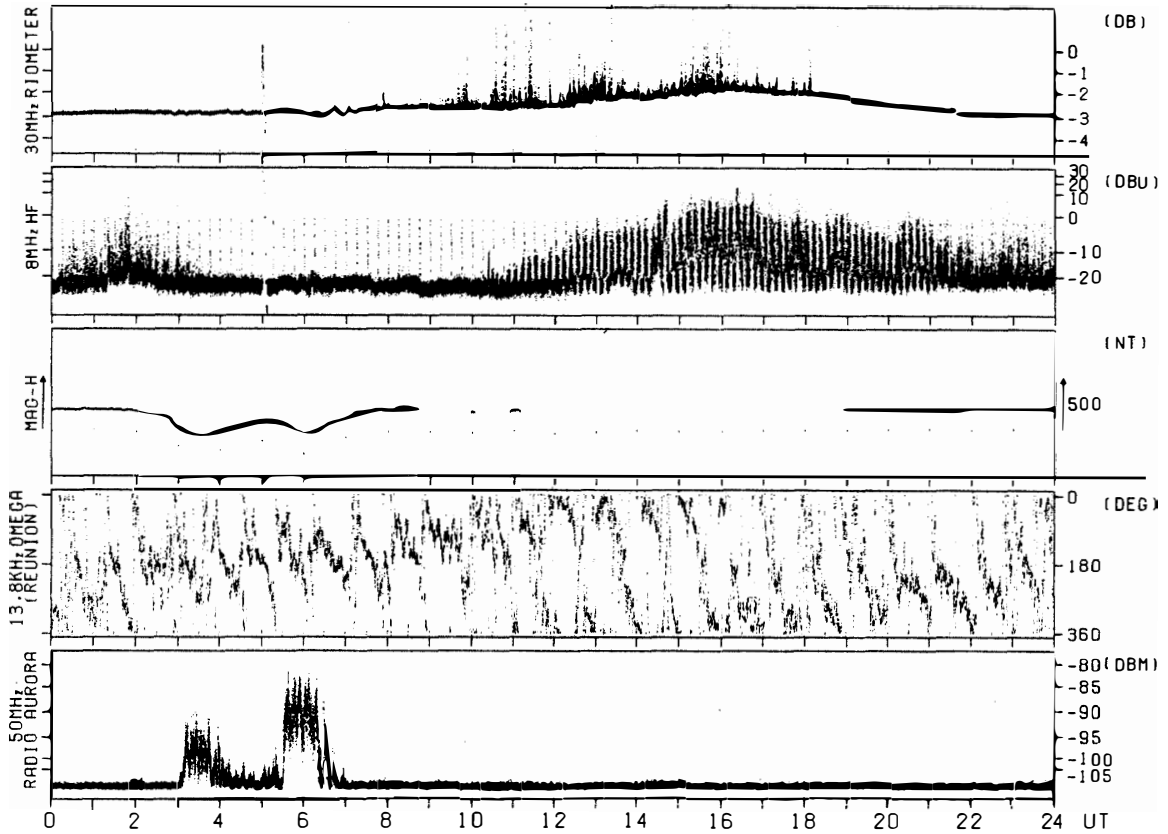
SYOWA STATION TOTAL DAY/253 1989/9/10



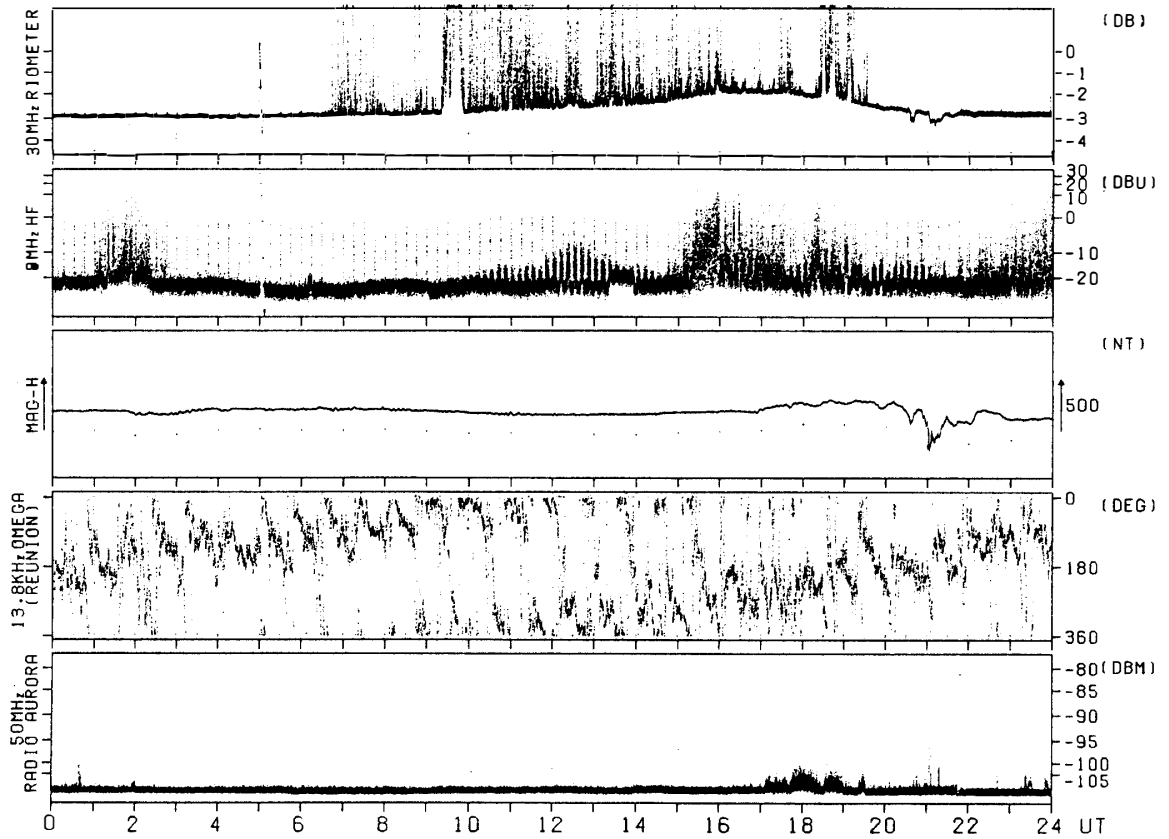
SYOWA STATION TOTAL DAY/254 1989/9/11



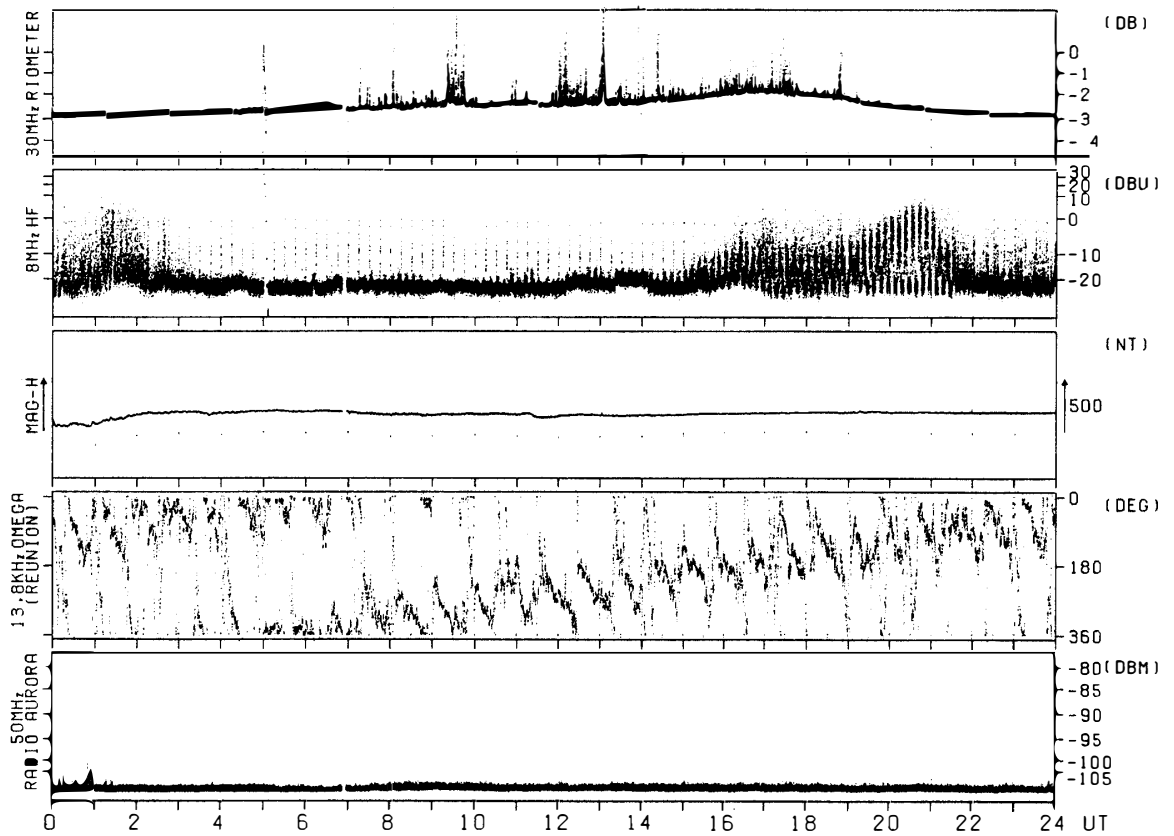
SYOWA STATION TOTAL DAY/255 1989/9/12



SYOWA STATION TOTAL DAY/256 1989/9/13

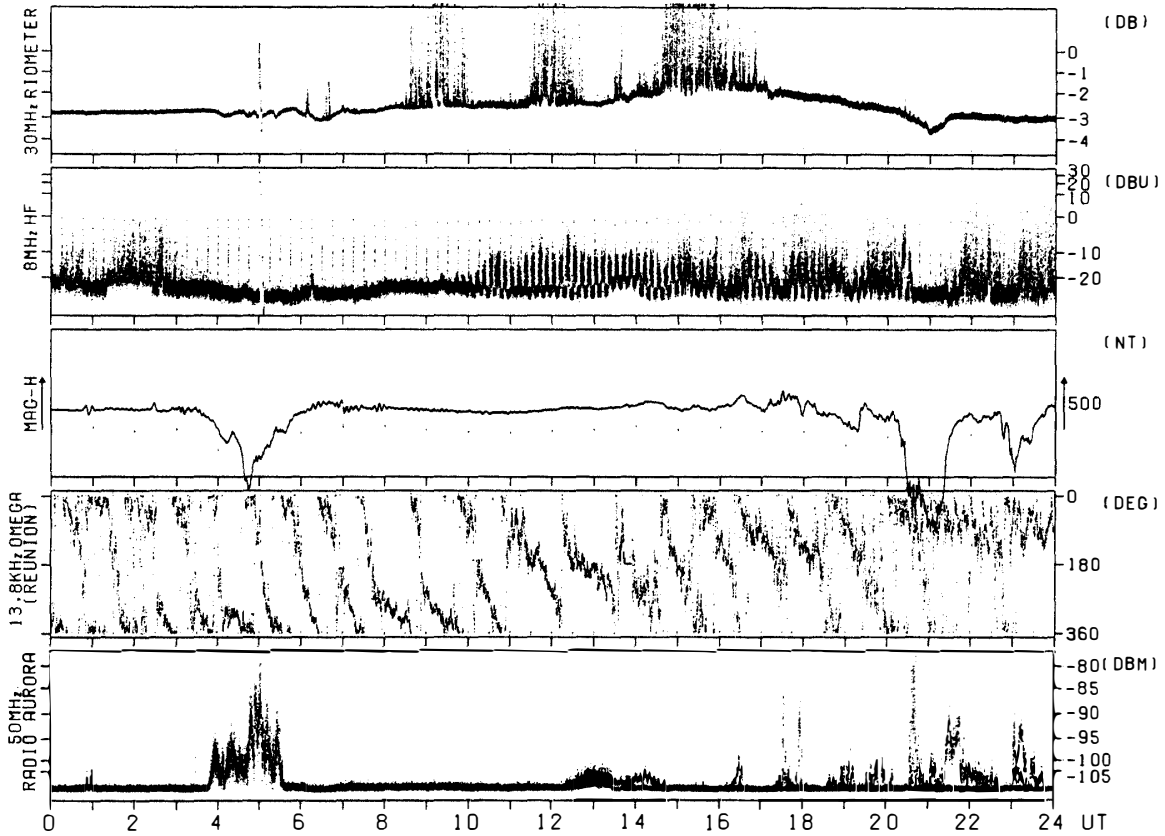


SYOWA STATION TOTAL DAY/257 1989/9/14



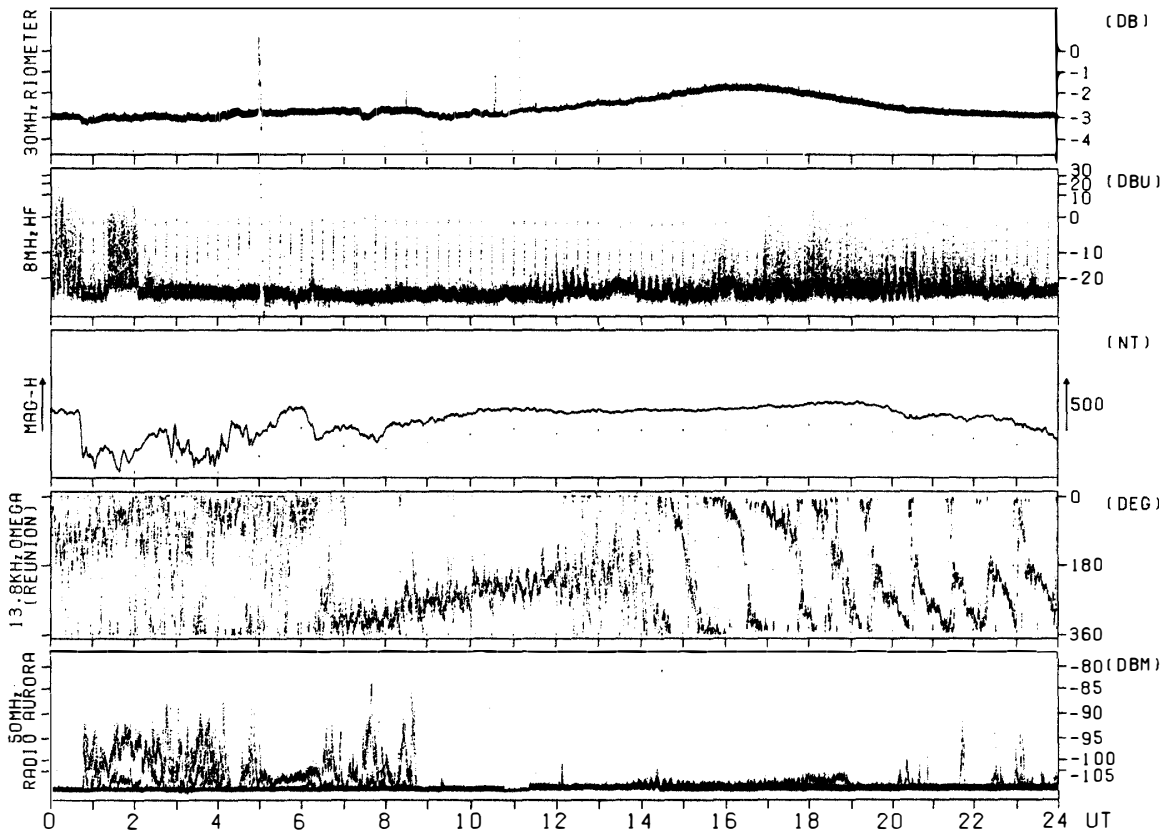
SYOWA STATION

TOTAL DAY/258 1989/9/15

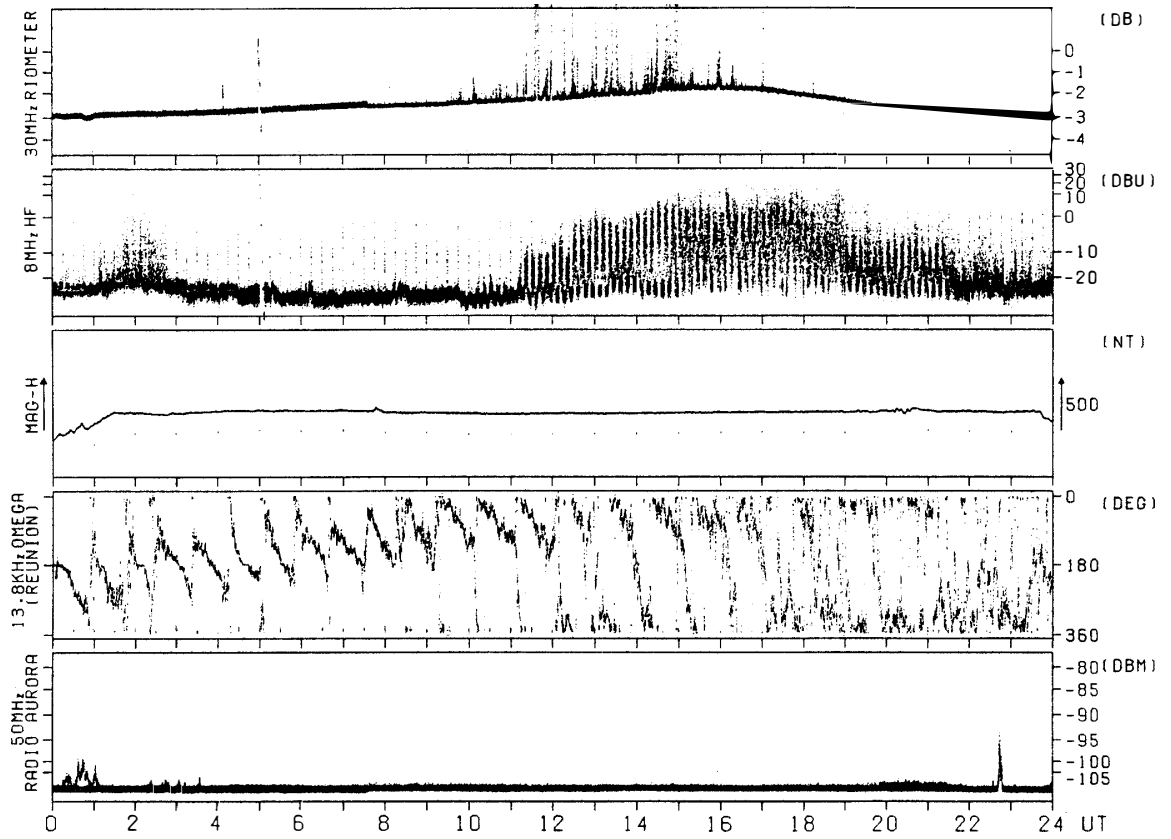


SYOWA STATION

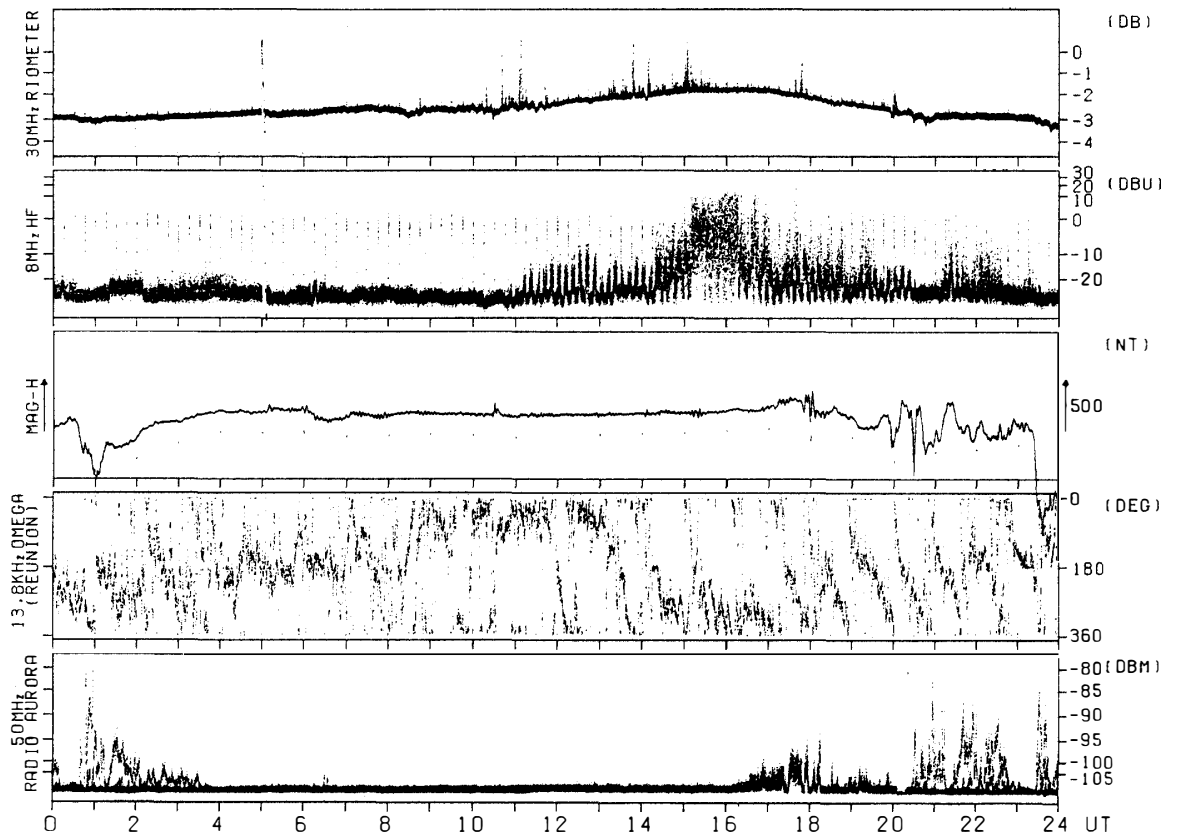
TOTAL DAY/259 1989/9/16



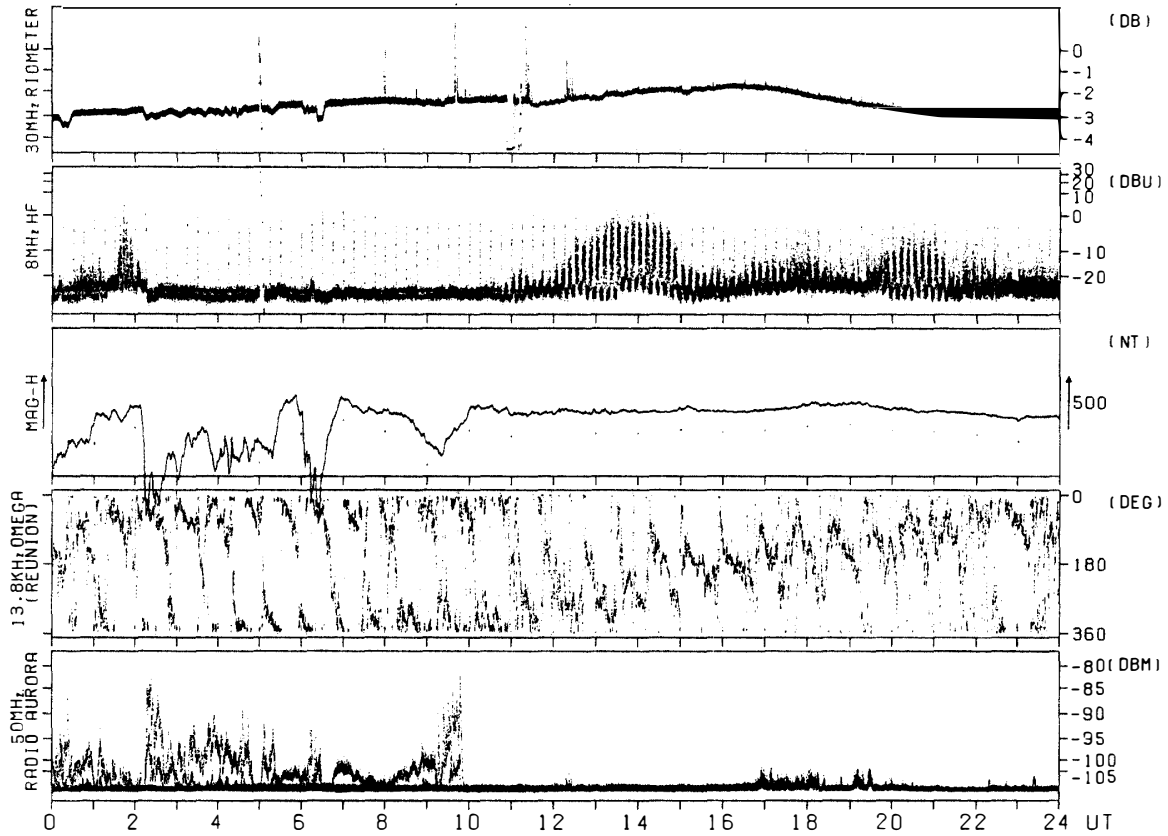
SYOWA STATION TOTAL DAY/260 1989/9/17



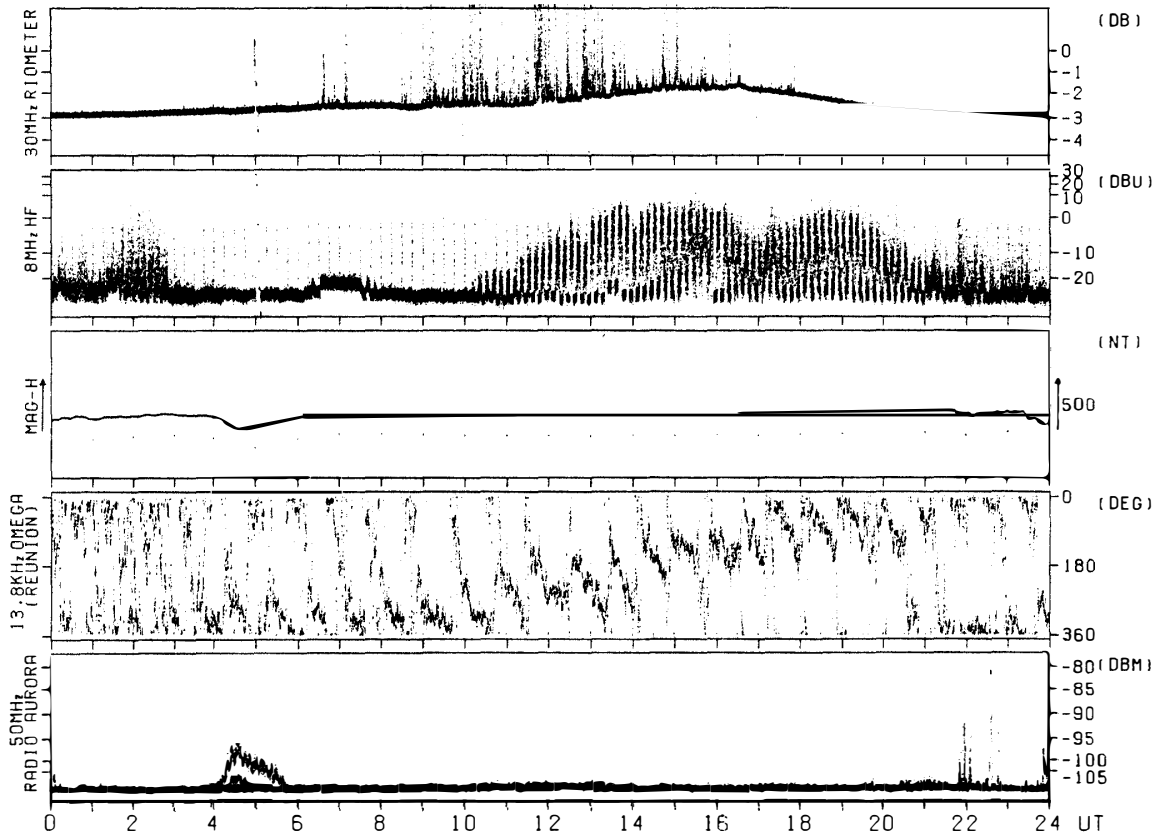
SYOWA STATION TOTAL DAY/261 1989/9/18



SYOWA STATION TOTAL DAY/262 1989/9/19

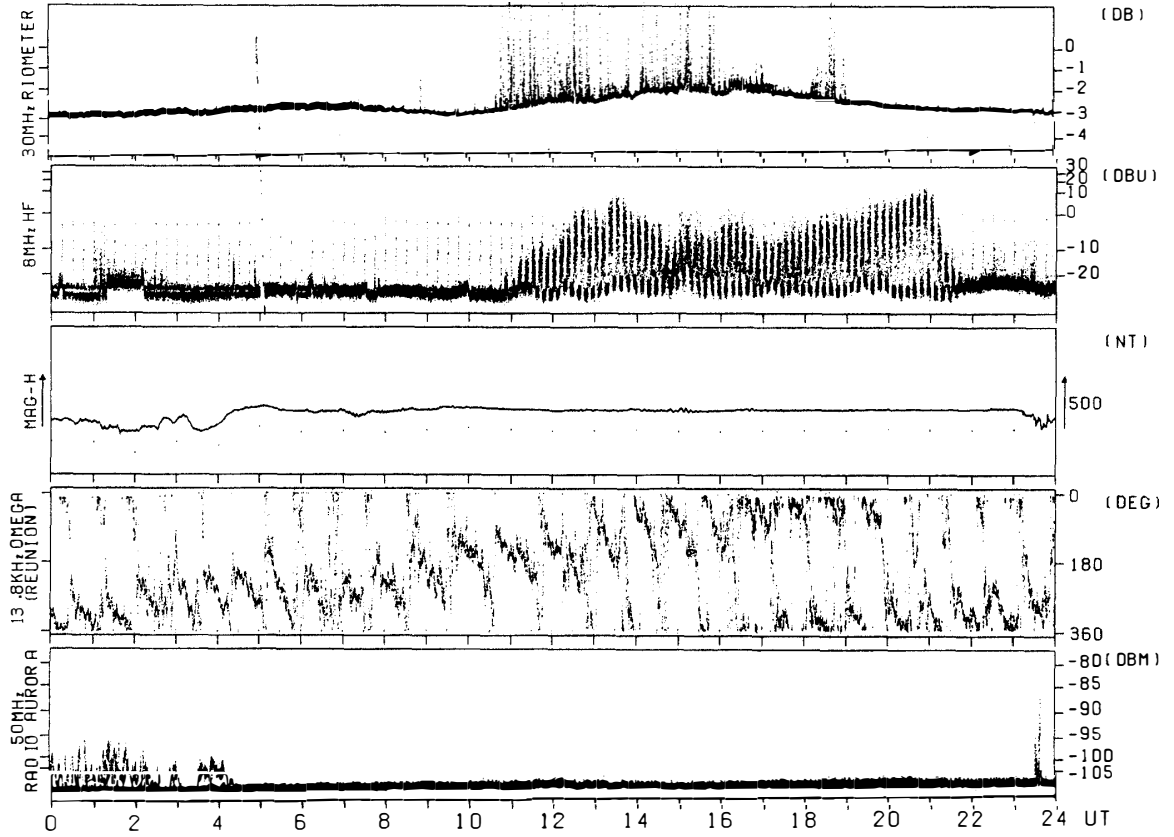


SYOWA STATION TOTAL DAY/263 1989/9/20



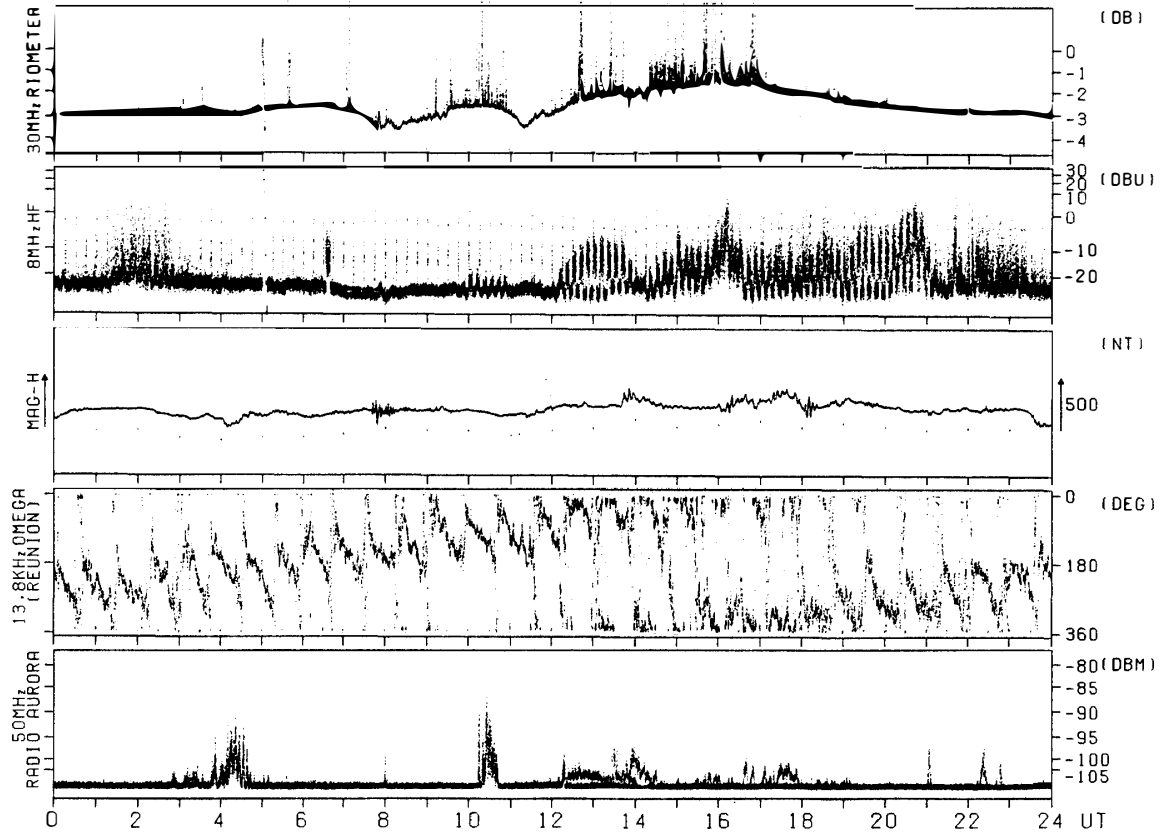
SYOWA STATION

TOTAL DAY/264 1989/9/21



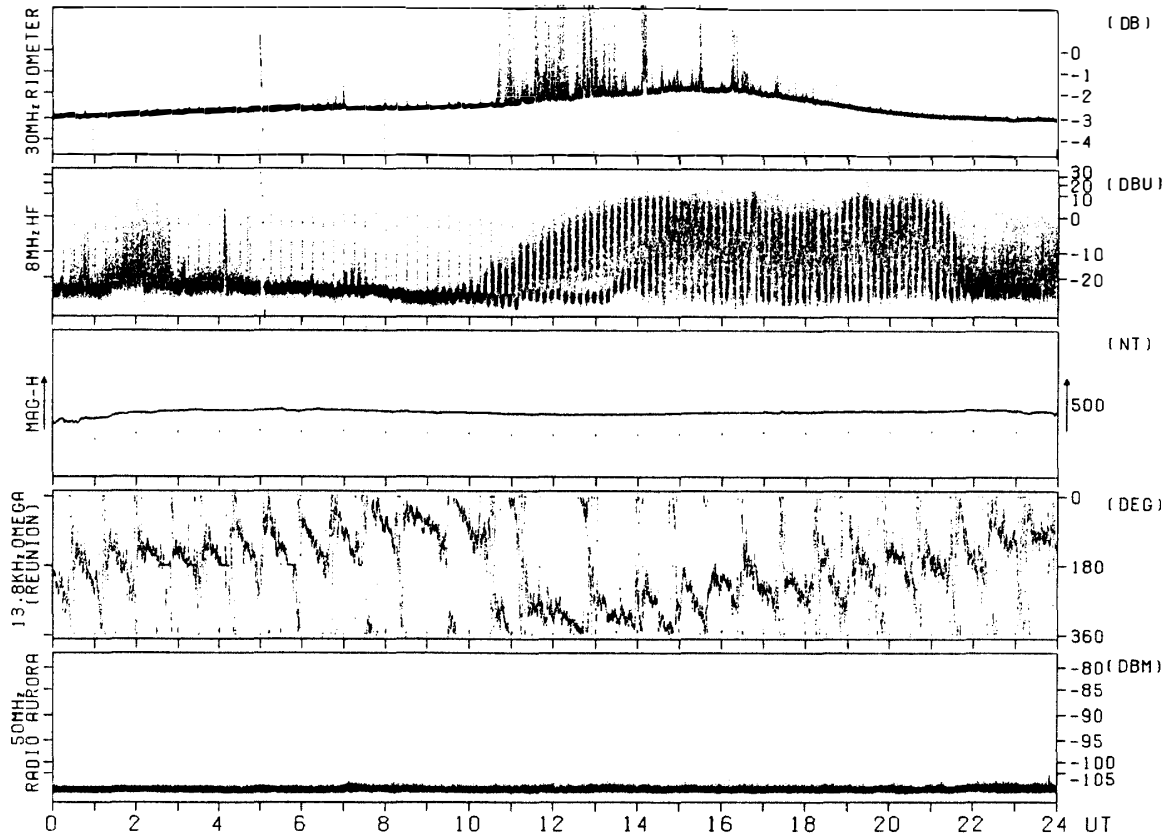
SYOWA STATION

TOTAL DAY/265 1989/9/22



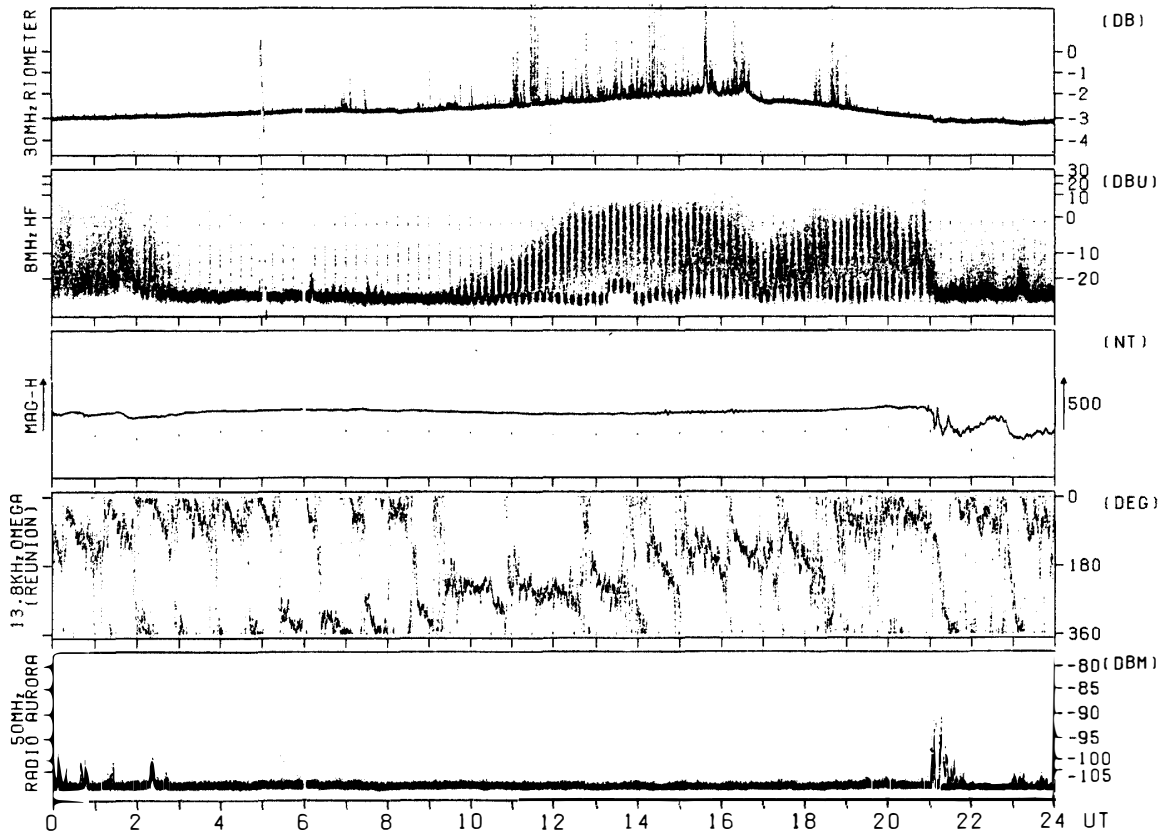
SYOWA STATION

TOTAL DAY/266 1989/9/23

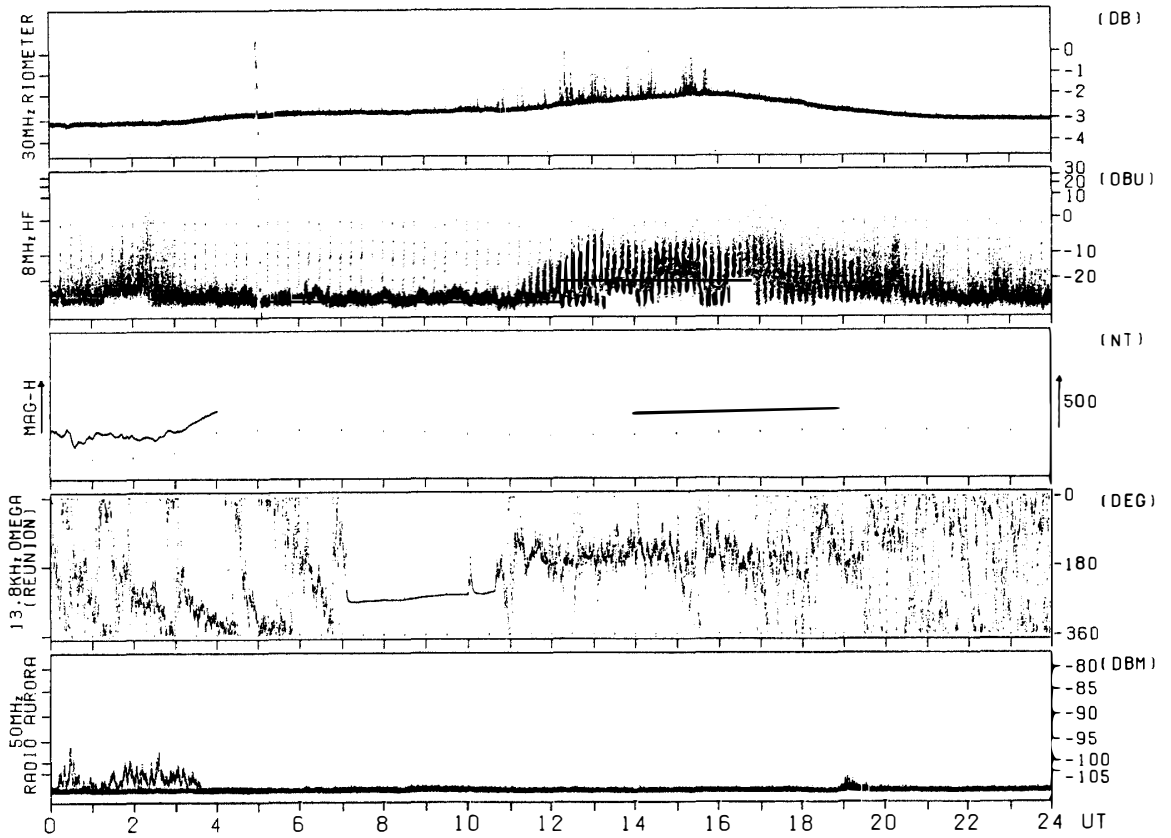


SYOWA STATION

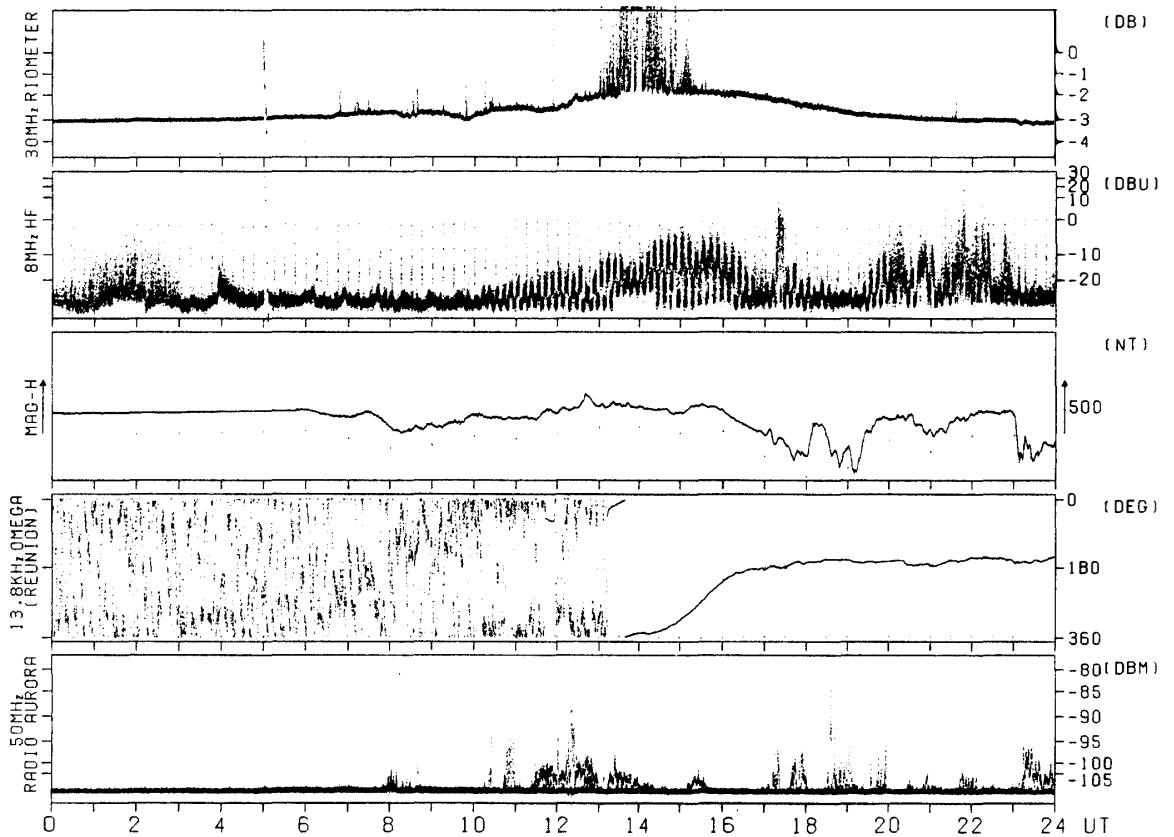
TOTAL DAY/267 1989/9/24



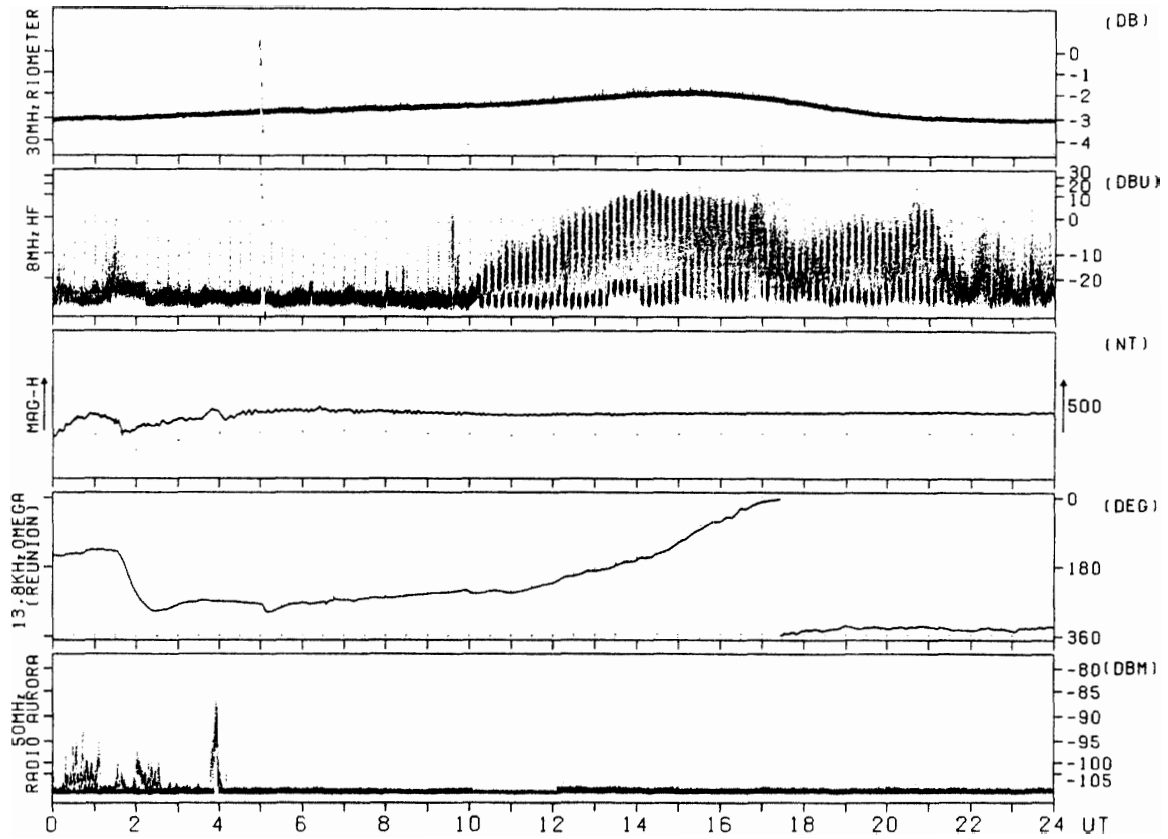
SYOWA STATION TOTAL DAY/268 1989/9/25



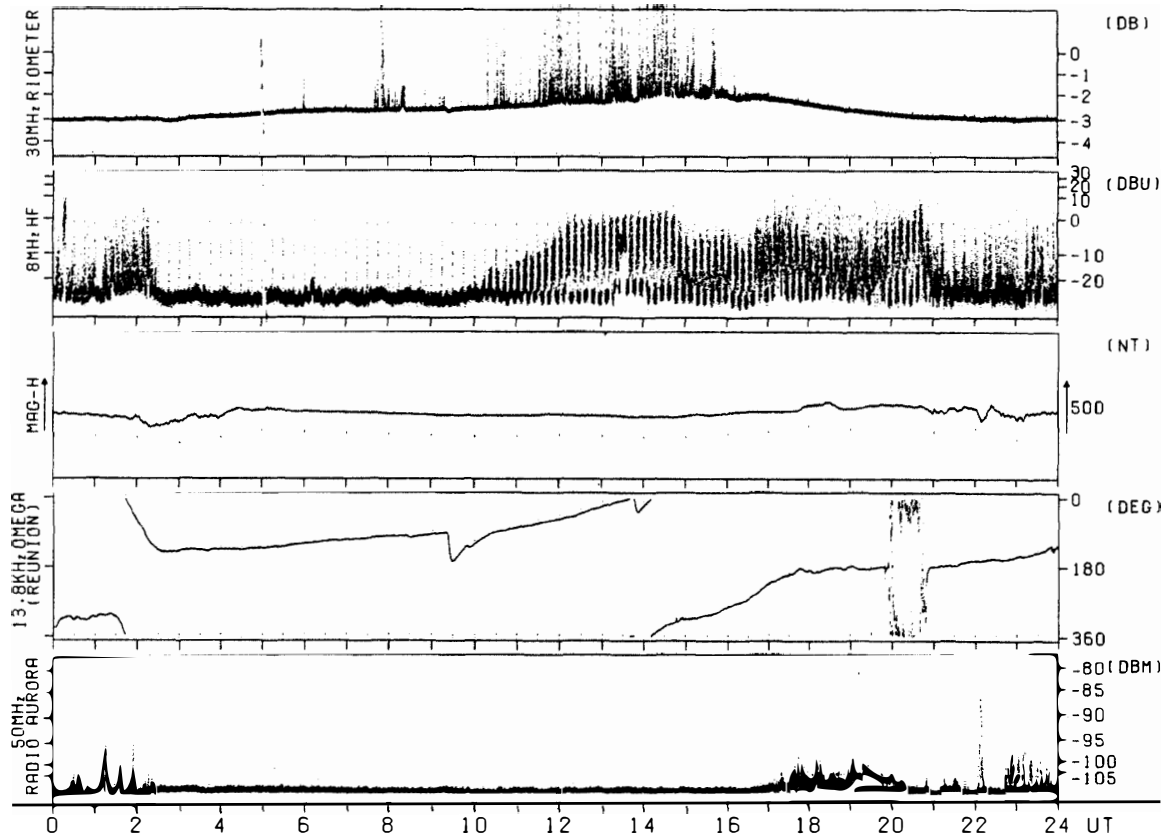
SYOWA STATION TOTAL DAY/269 1989/9/26



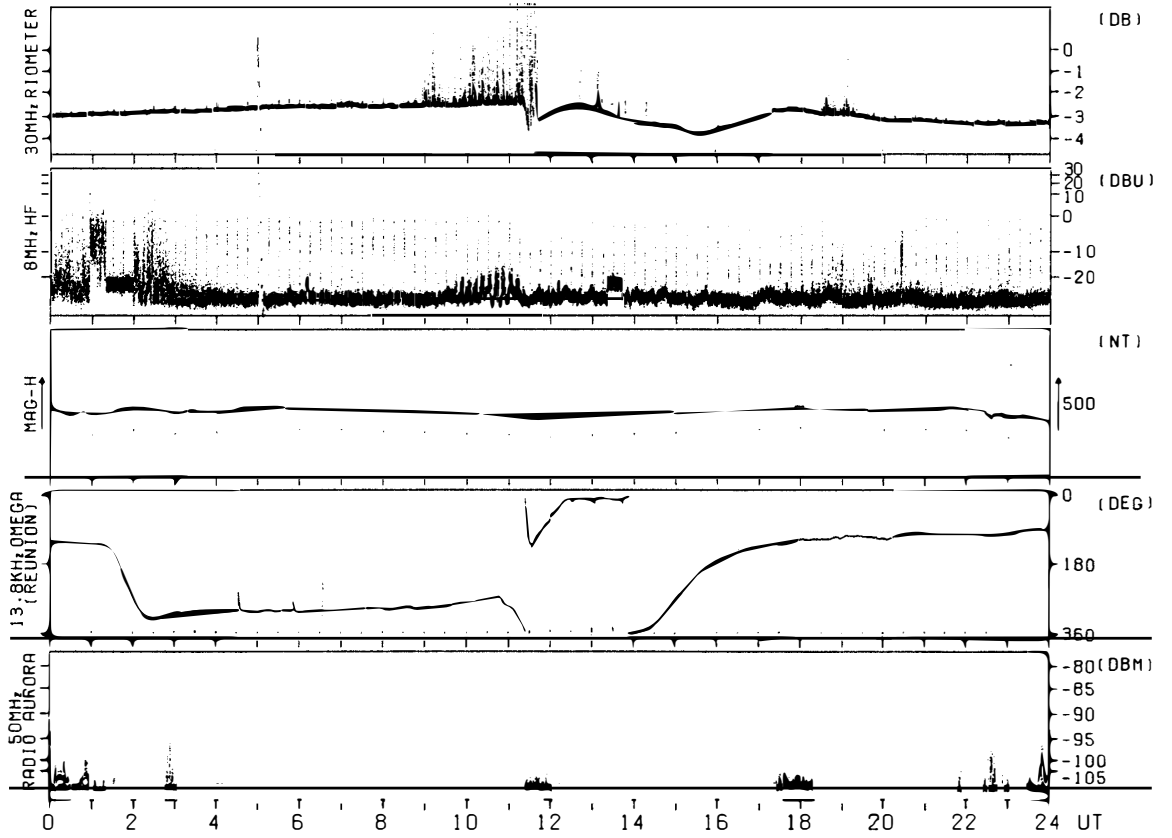
SYOWA STATION TOTAL DAY/270 1989/9/27



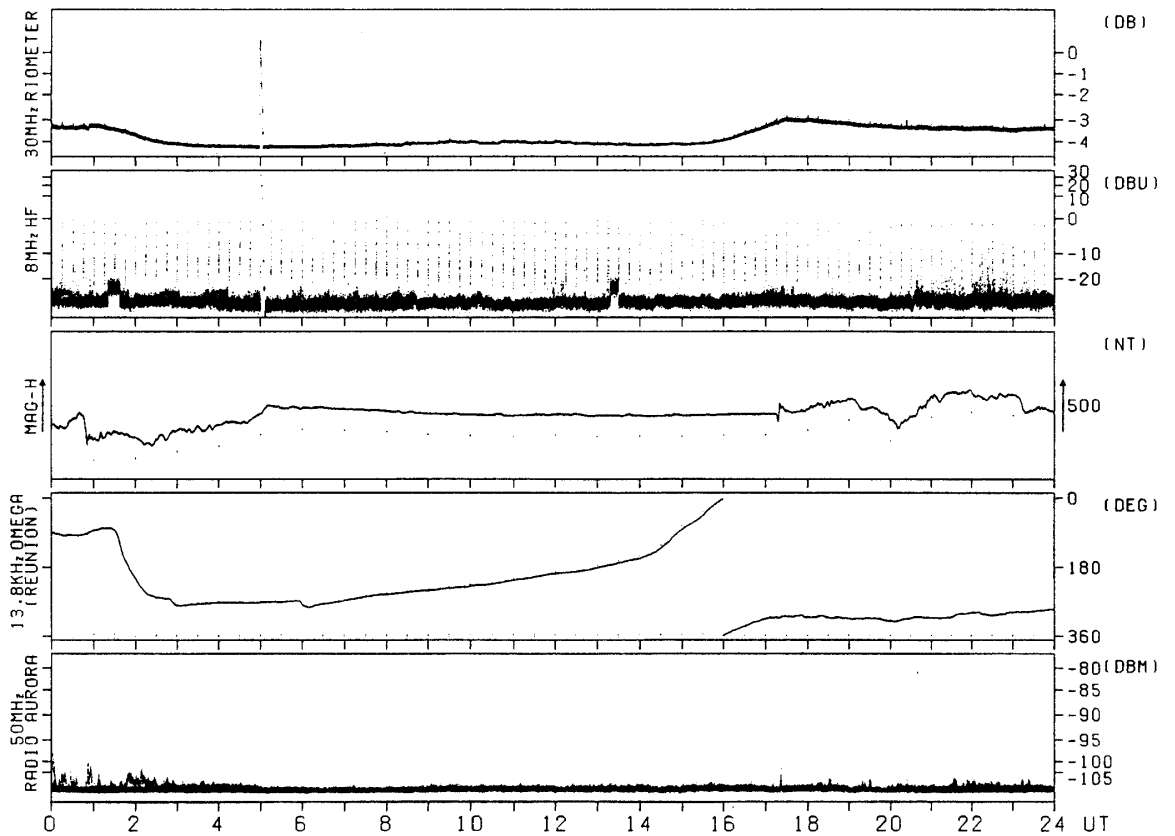
SYOWA STATION TOTAL DAY/271 1989/9/28



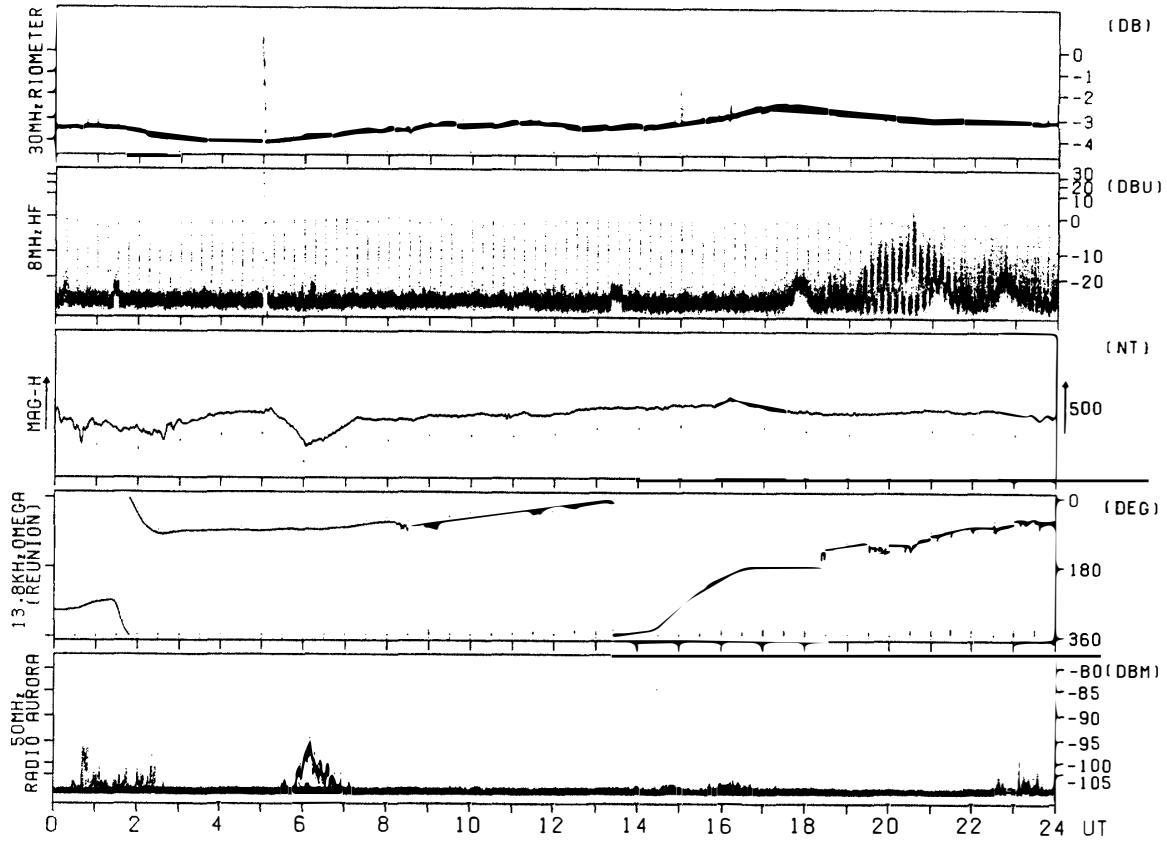
SYOWA STATION TOTAL DAY/272 1989/9/29



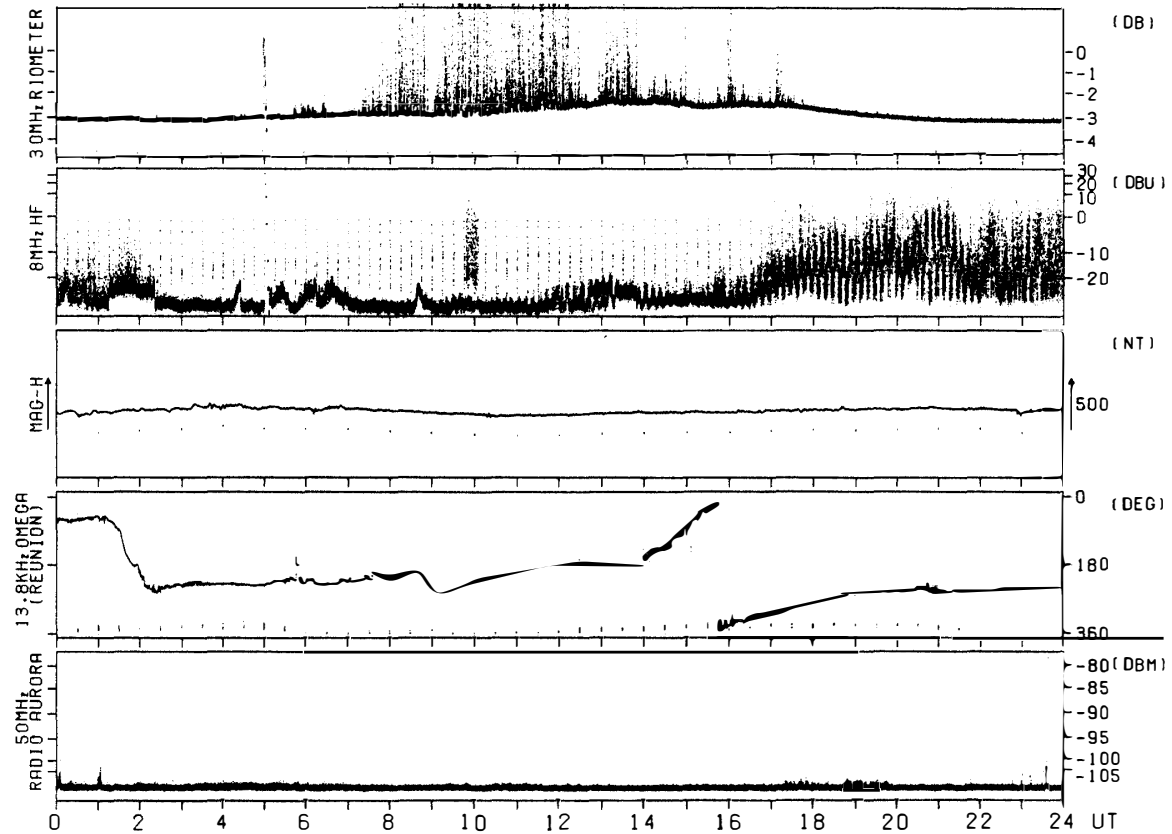
SYOWA STATION TOTAL DAY/273 1989/9/30



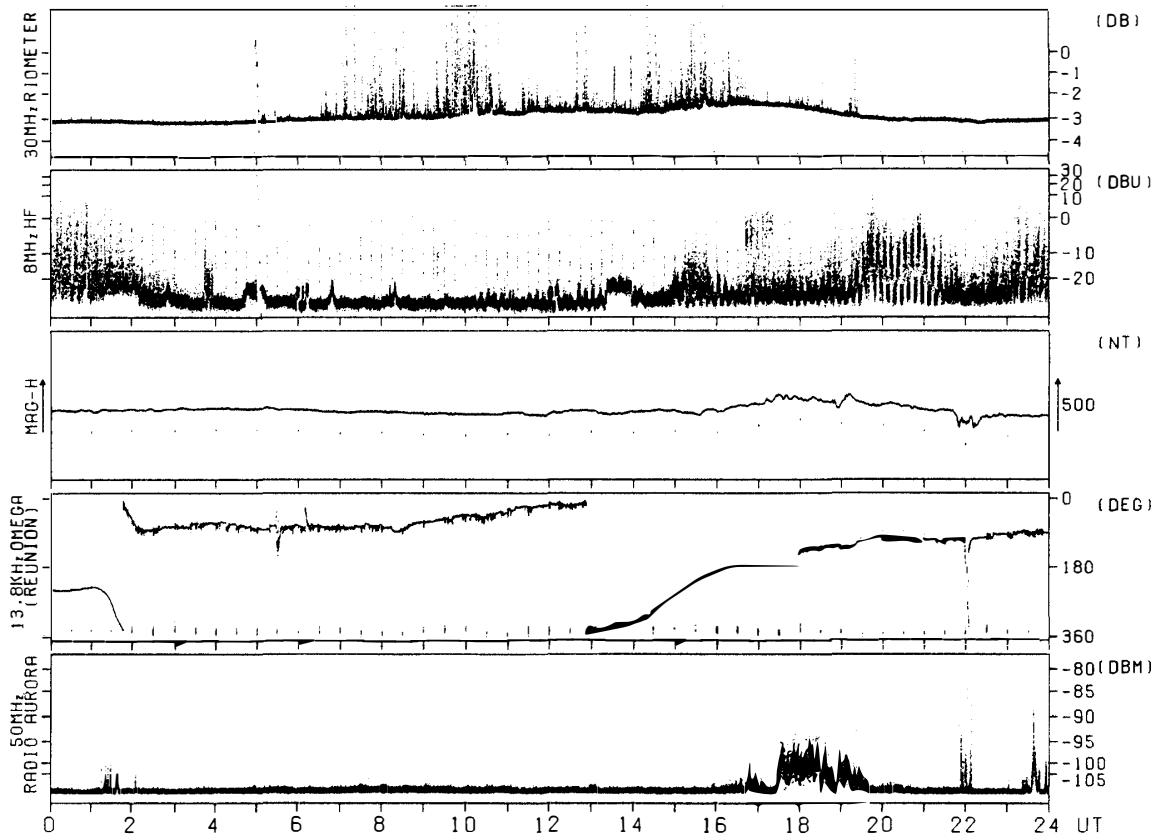
SYOWA STATION TOTAL DAY/274 1989/10/1



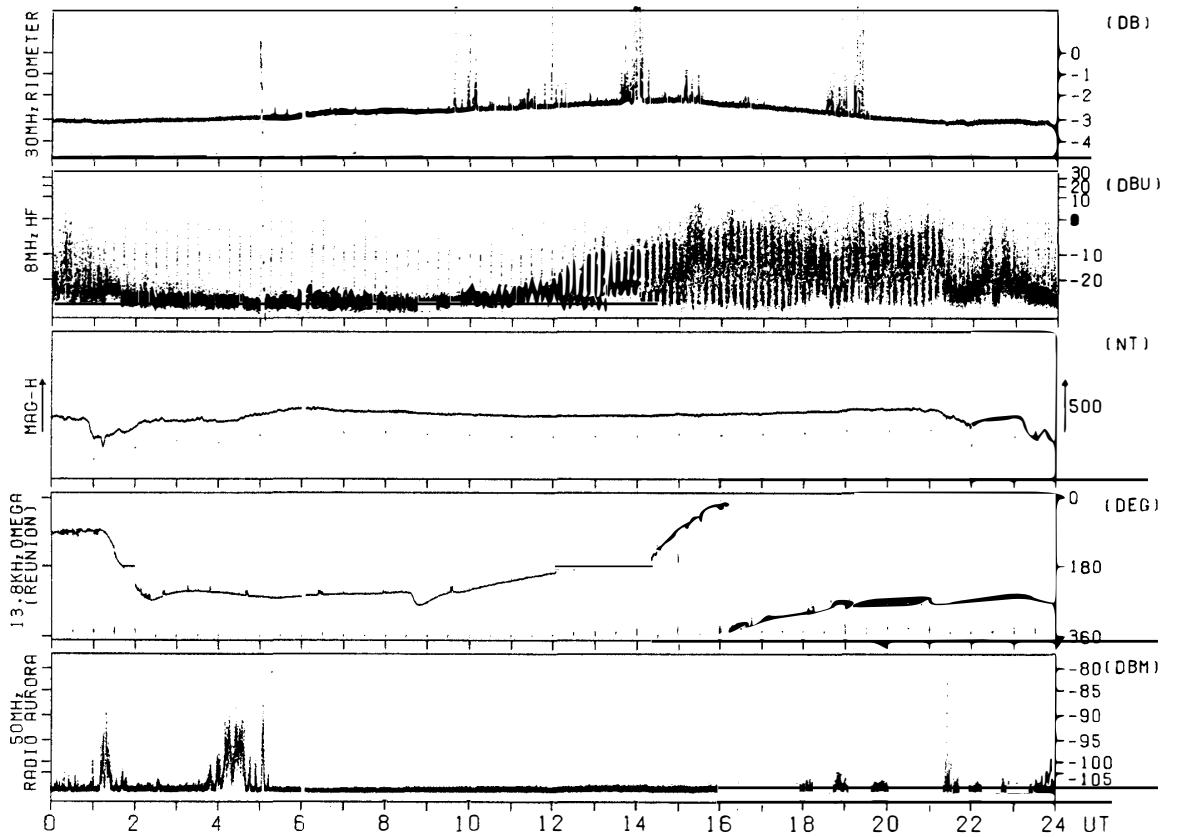
SYOWA STATION TOTAL DAY/275 1989/10/2



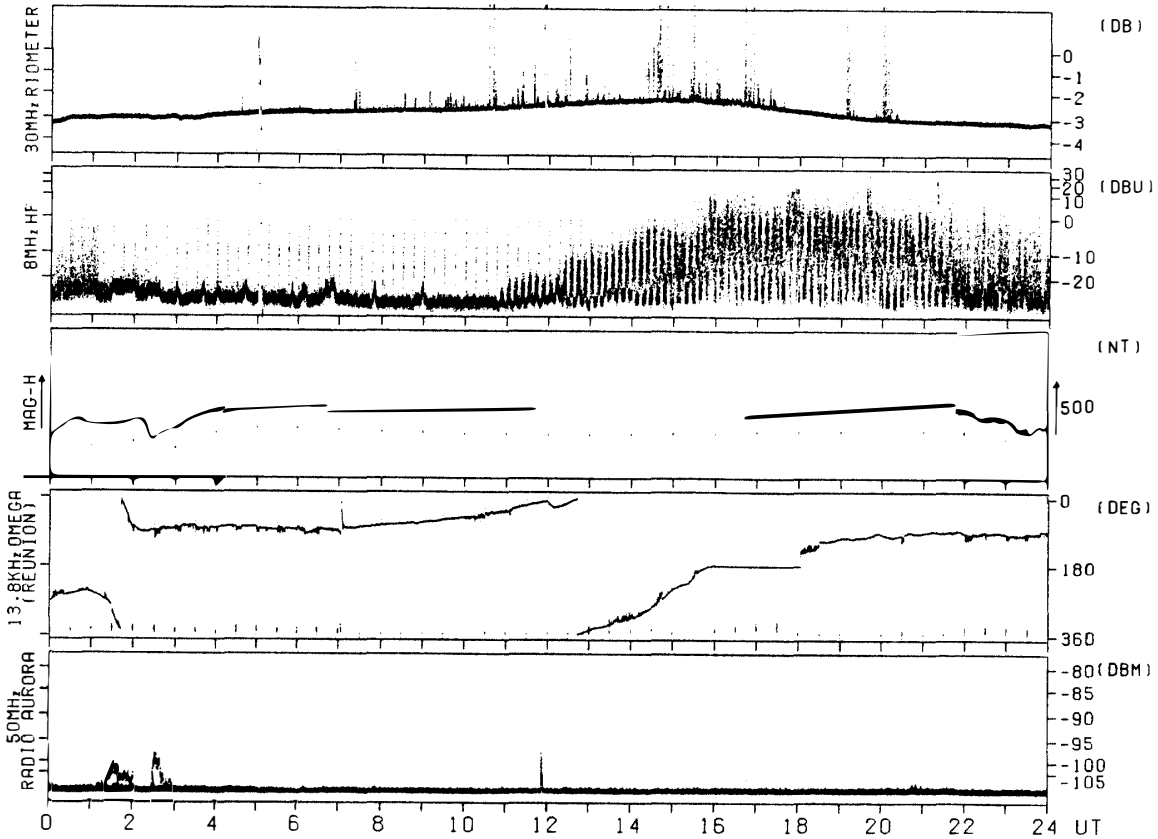
SYOWA STATION TOTAL DAY/276 1989/10/3



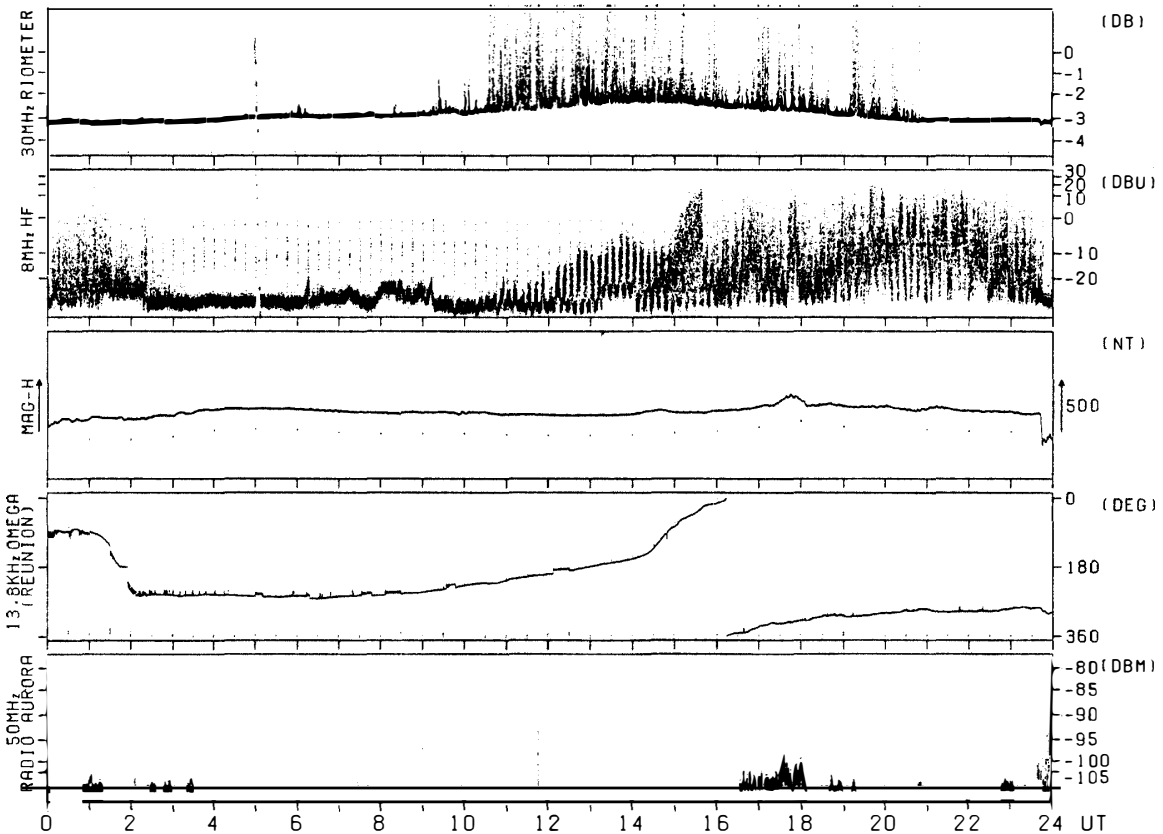
SYOWA STATION TOTAL DAY/277 1989/10/4



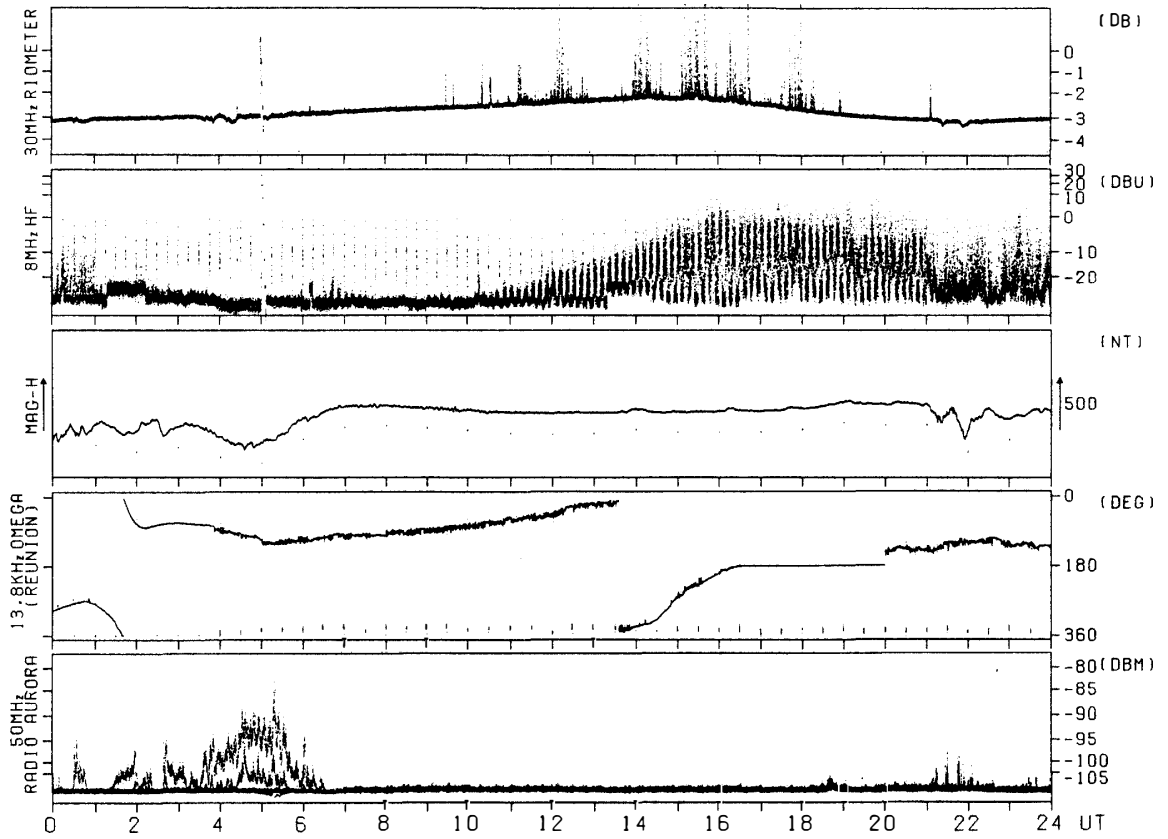
SYOWA STATION TOTAL DAY/278 1989/10/5



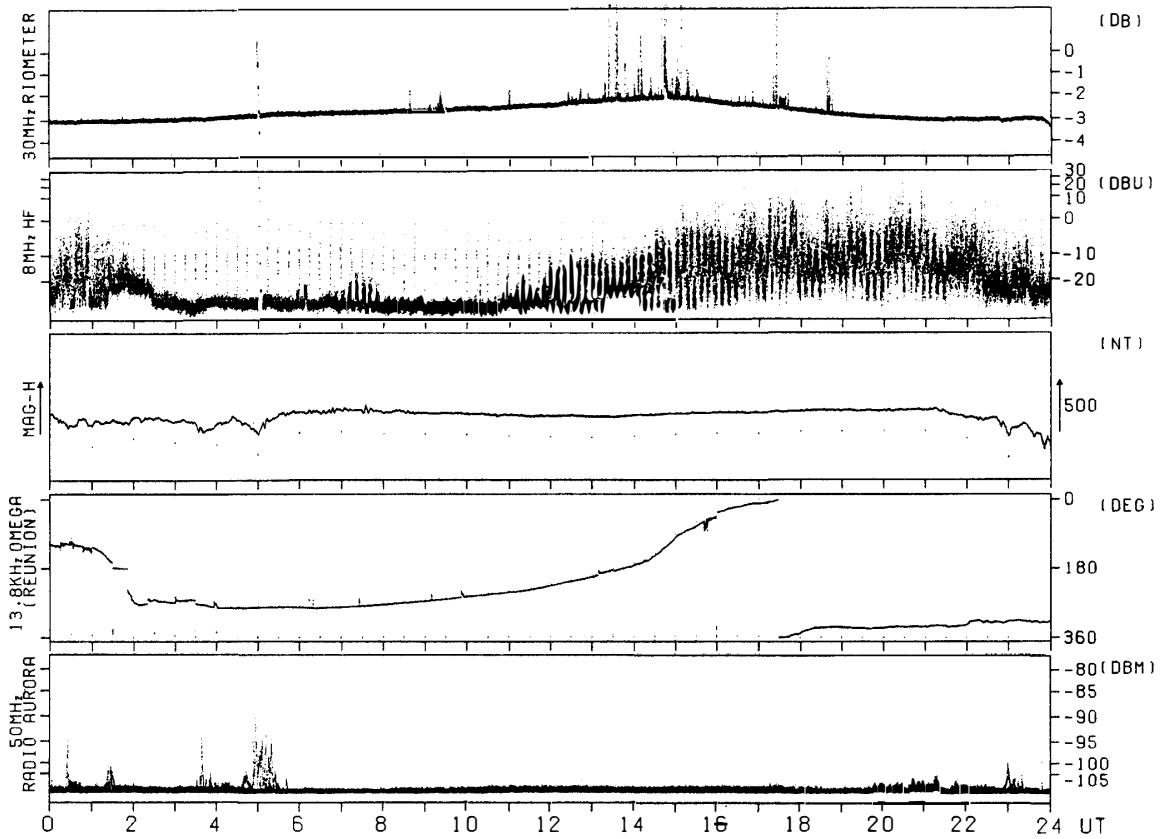
SYOWA STATION TOTAL DAY/279 1989/10/6



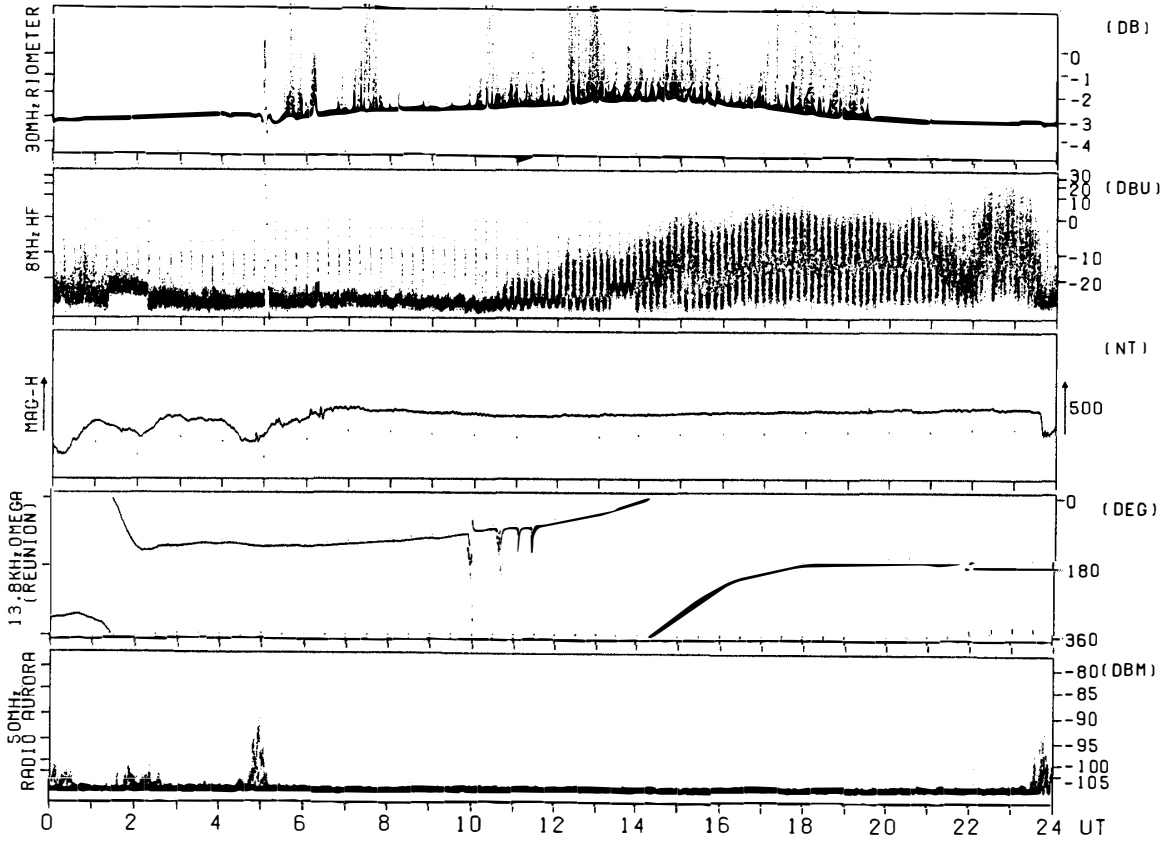
SYOWA STATION TOTAL DAY/280 1989/10/7



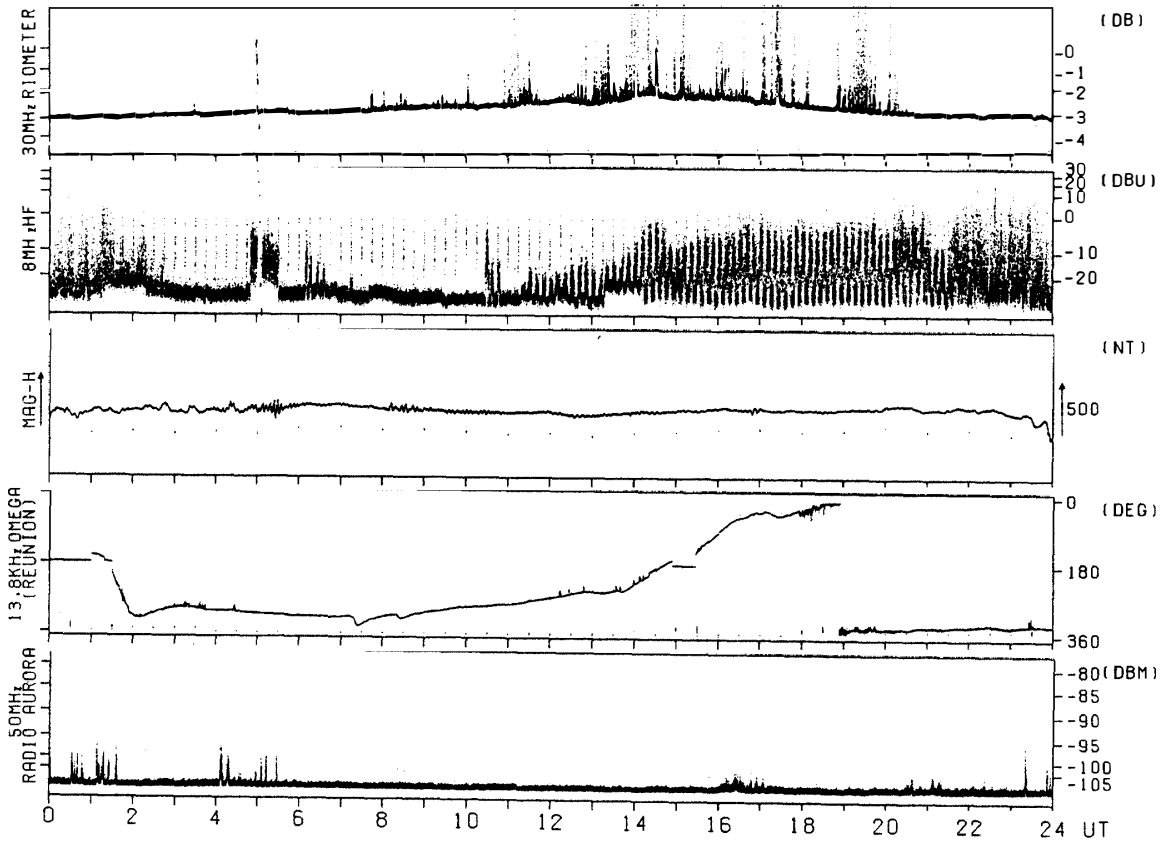
SYOWA STATION TOTAL DAY/281 1989/10/8



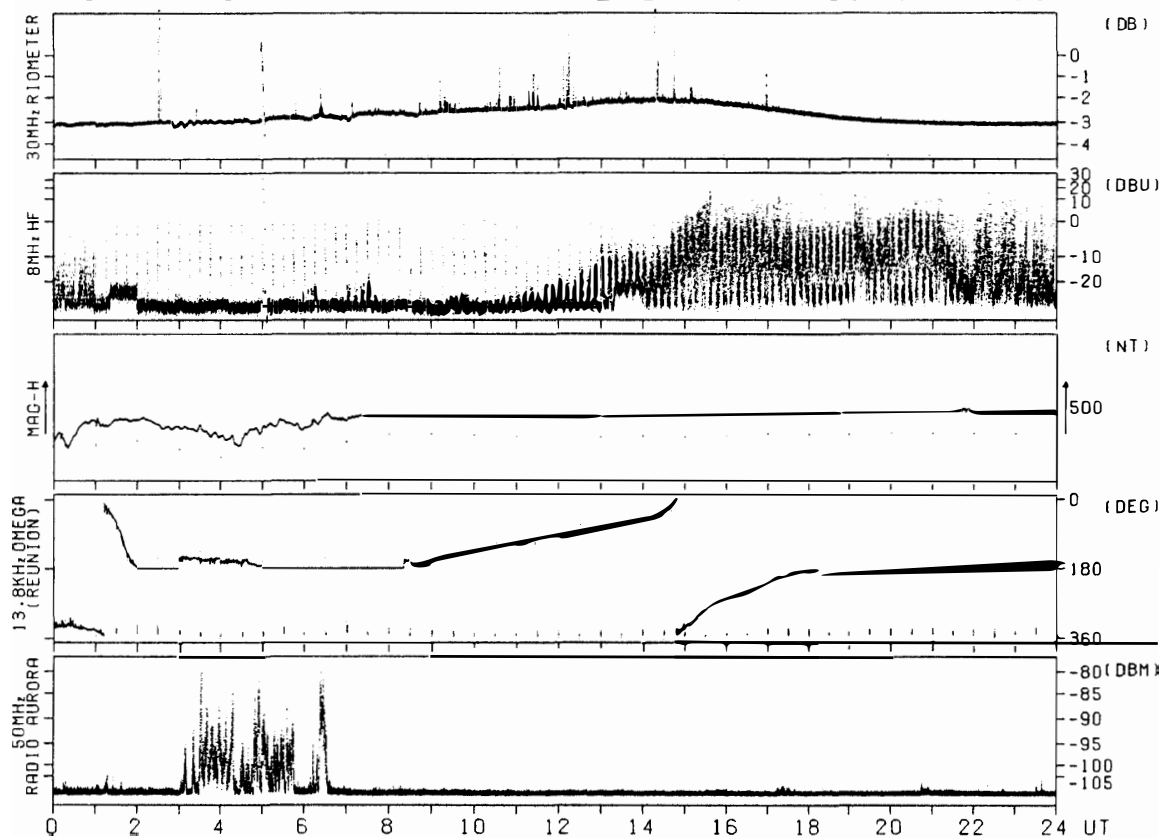
SYOWA STATION TOTAL DAY/282 1989/10/9



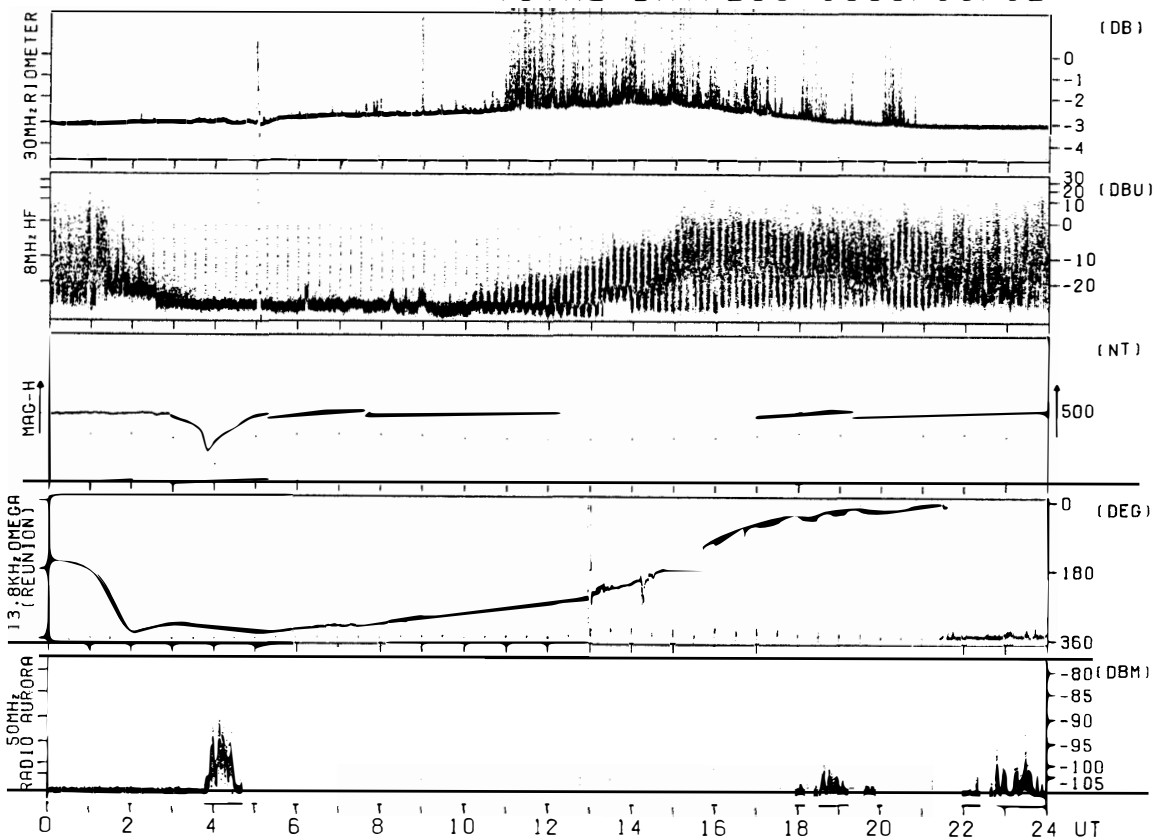
SYOWA STATION TOTAL DAY/283 1989/10/10



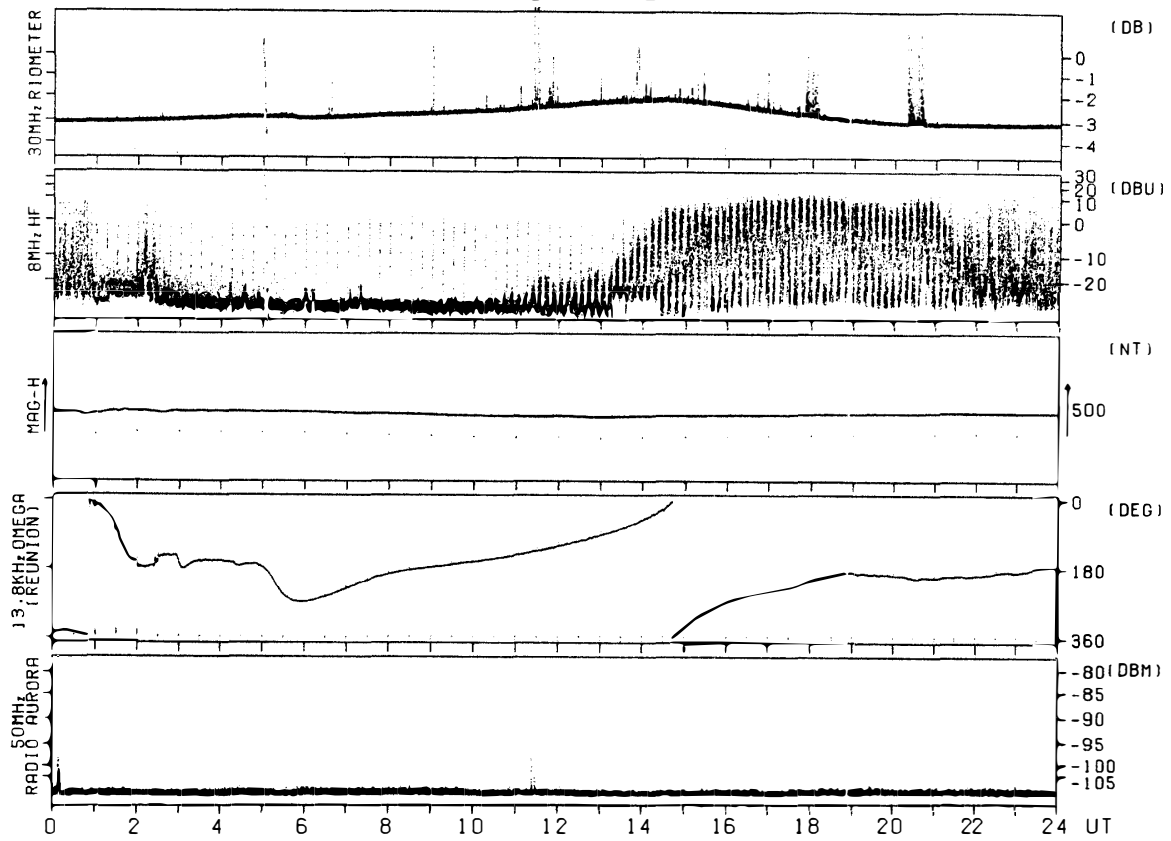
SYOWA STATION TOTAL DAY/284 1989/10/11



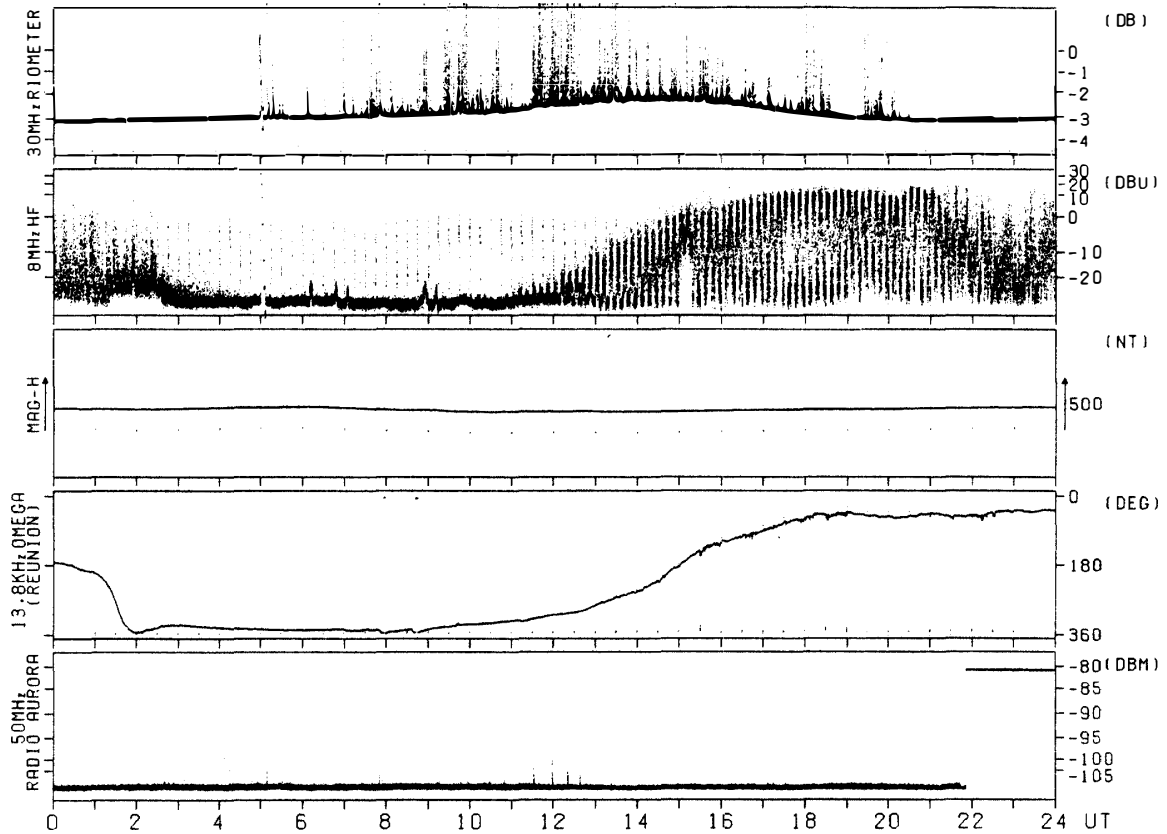
SYOWA STATION TOTAL DAY/285 1989/10/12



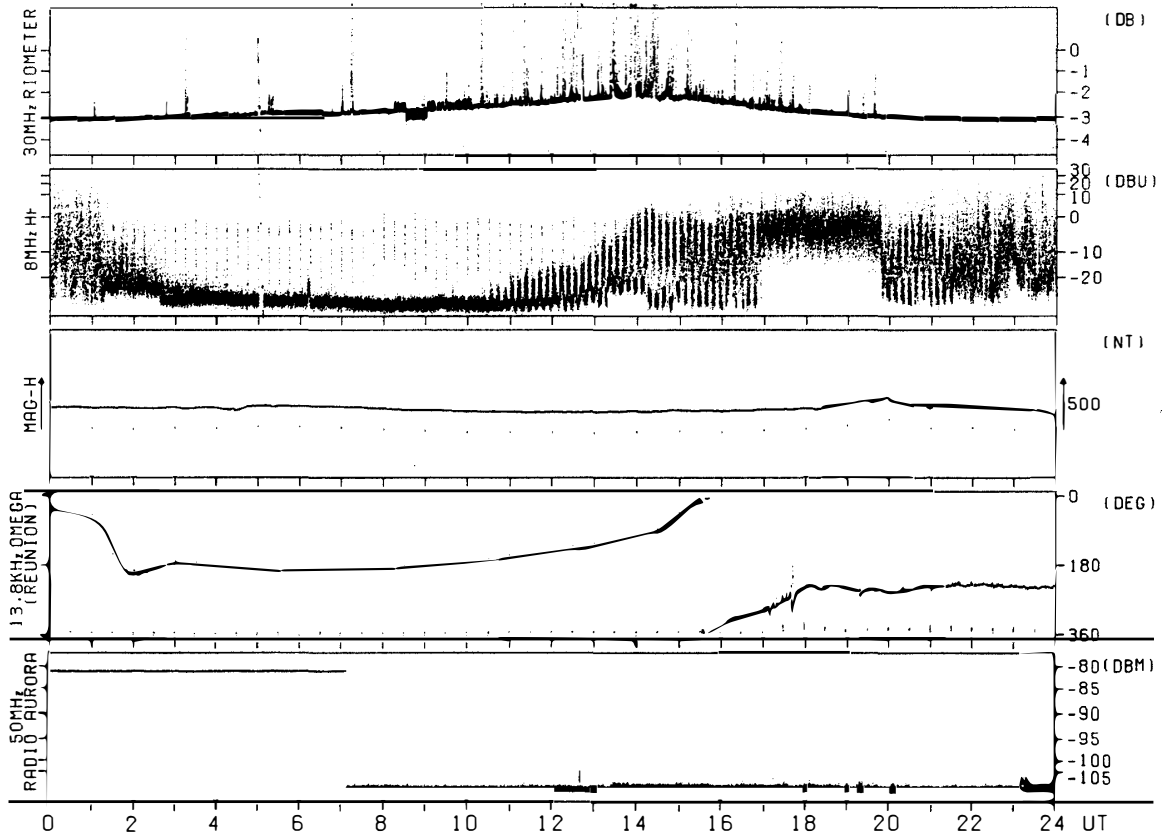
SYOWA STATION TOTAL DAY/286 1989/10/13



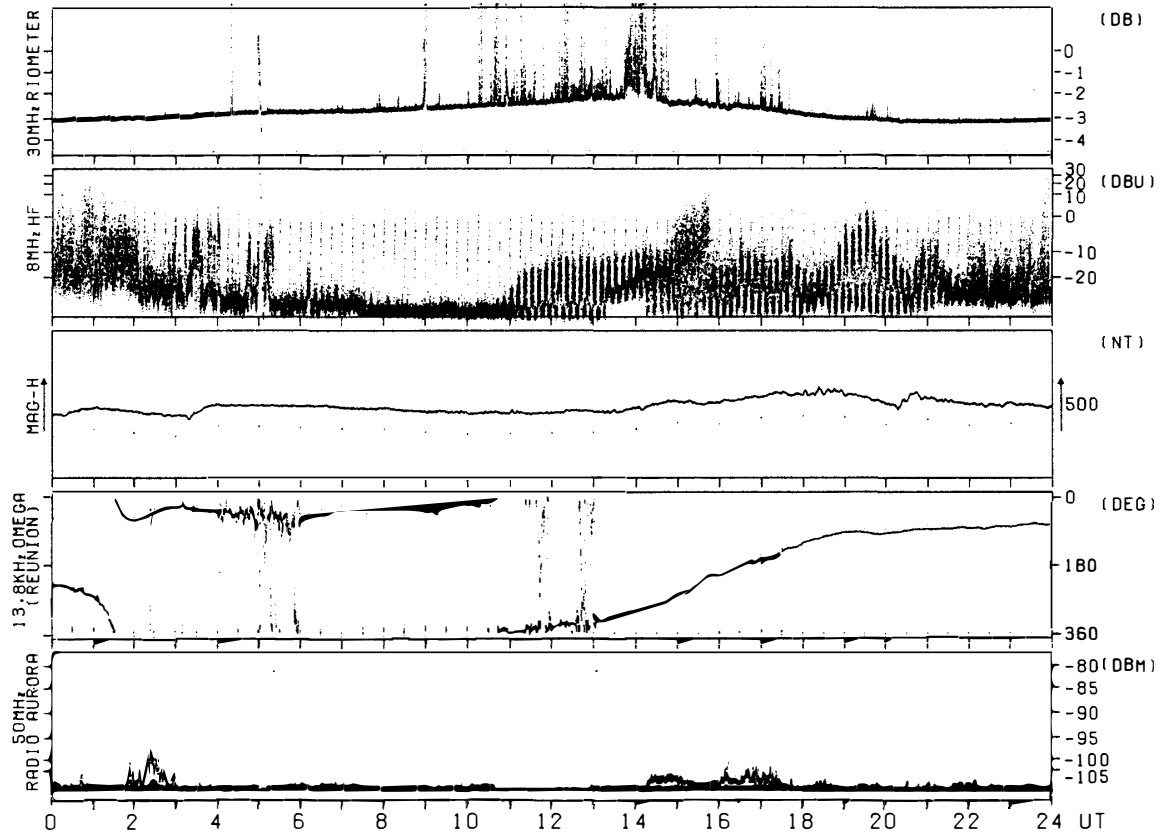
SYOWA STATION TOTAL DAY/287 1989/10/14



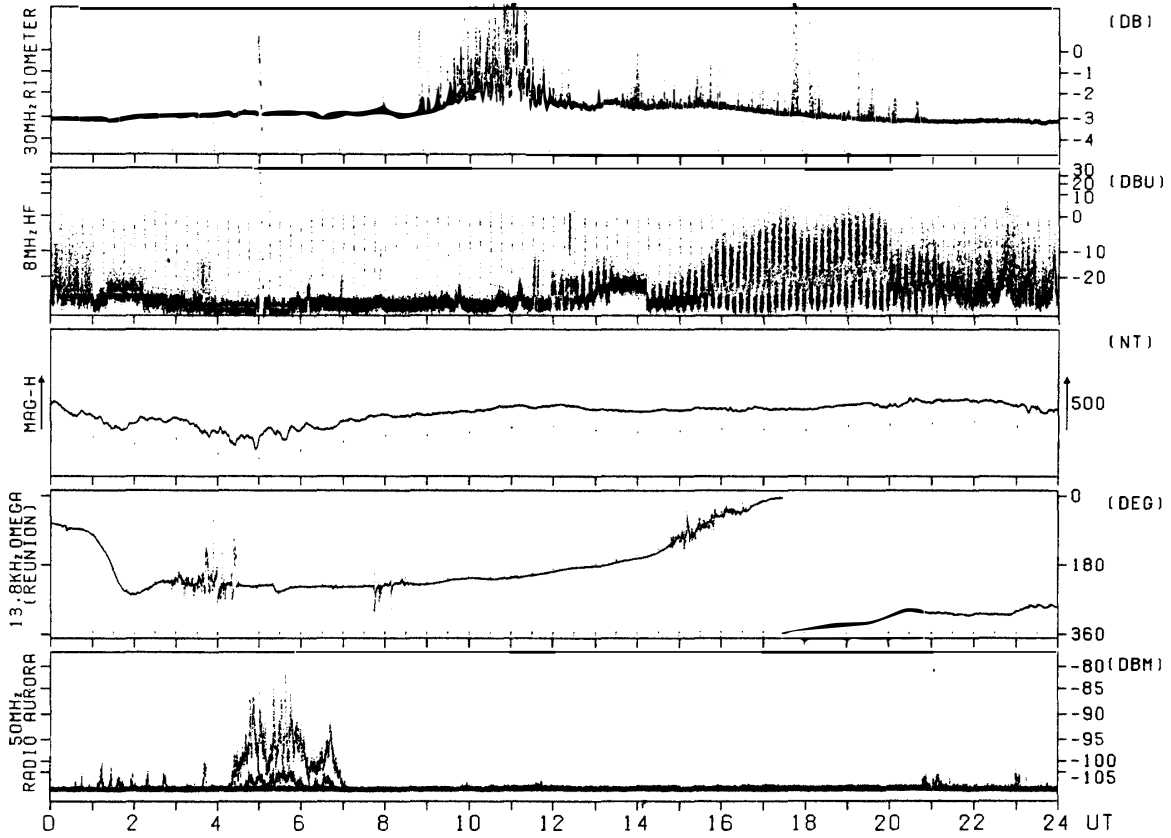
SYOWA STATION TOTAL DAY/288 1989/10/15



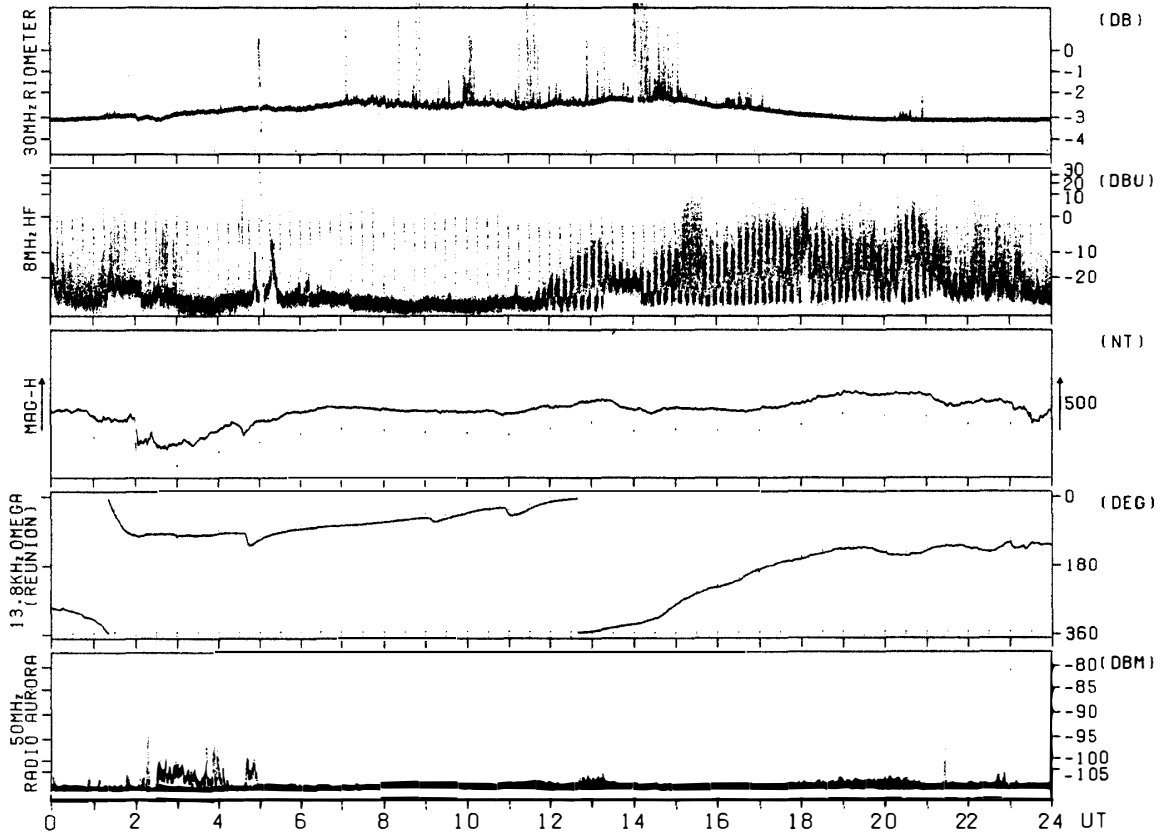
SYOWA STATION TOTAL DAY/289 1989/10/16



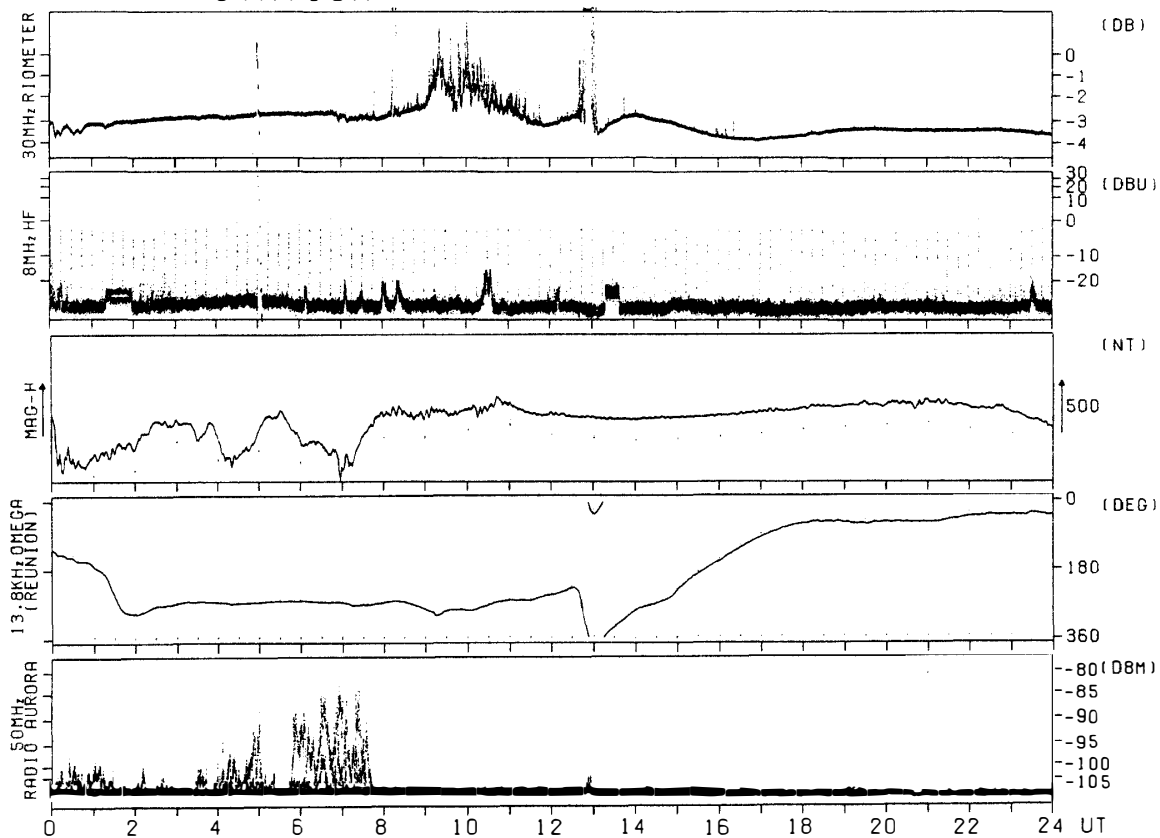
SYOWA STATION TOTAL DAY/290 1989/10/17



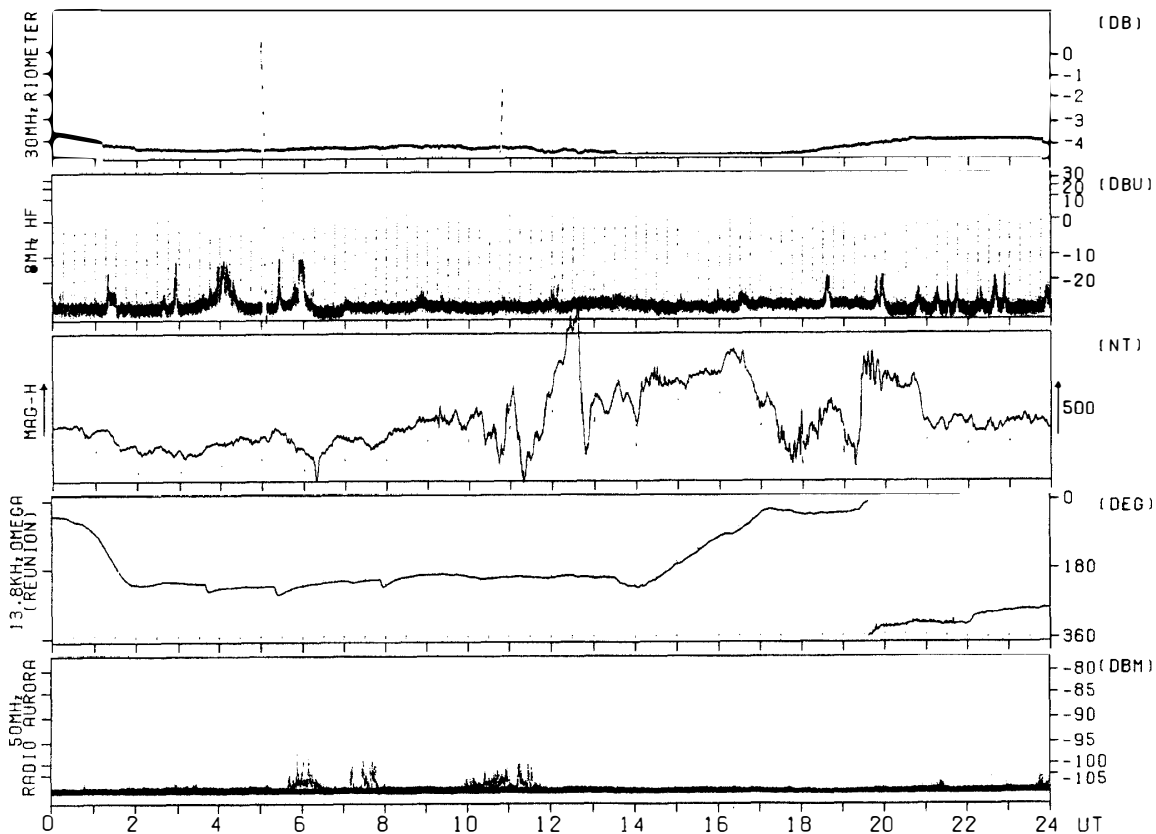
SYOWA STATION TOTAL DAY/291 1989/10/18



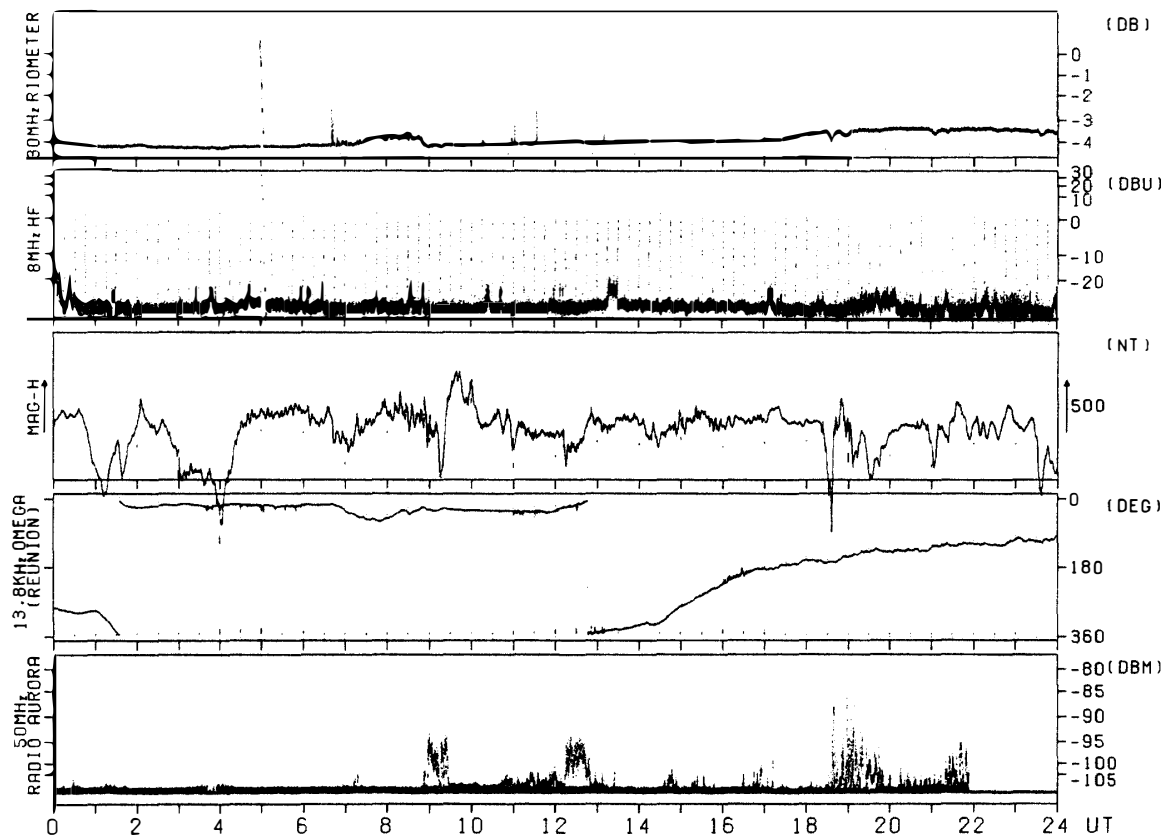
SYOWA STATION TOTAL DAY/292 1989/10/19



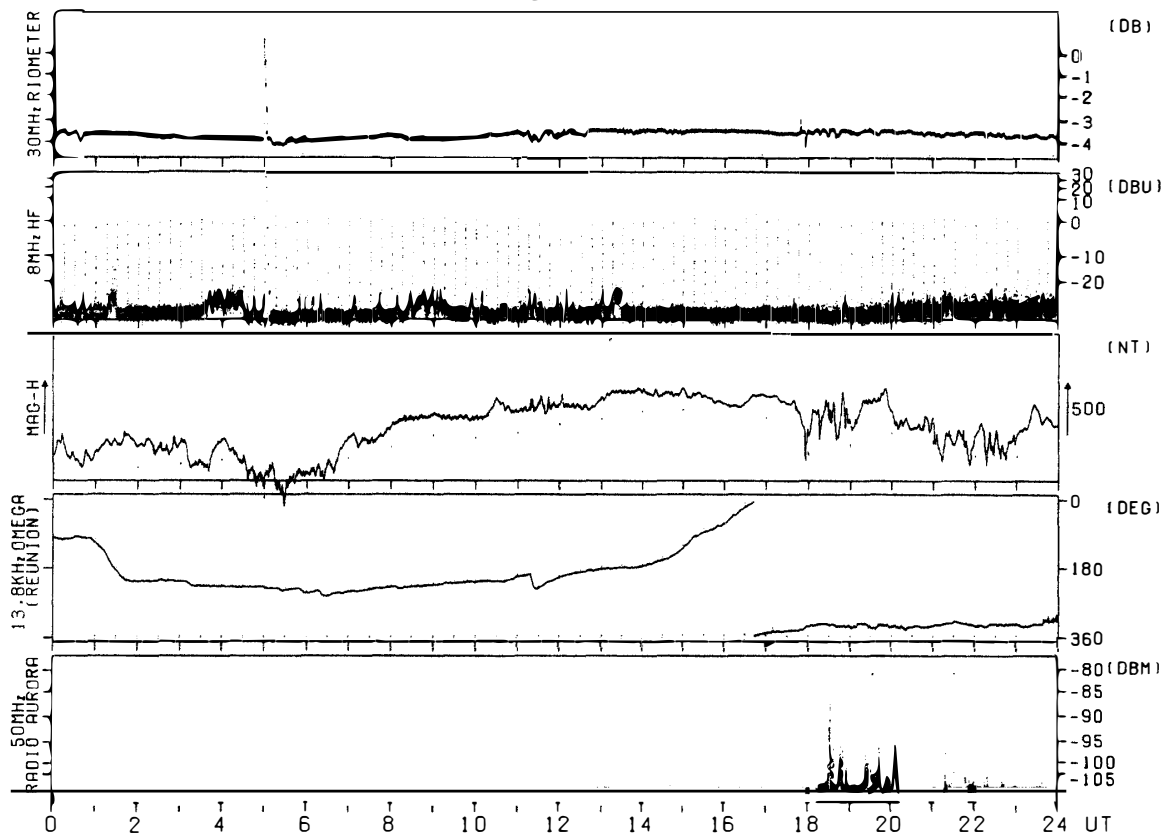
SYOWA STATION TOTAL DAY/293 1989/10/20



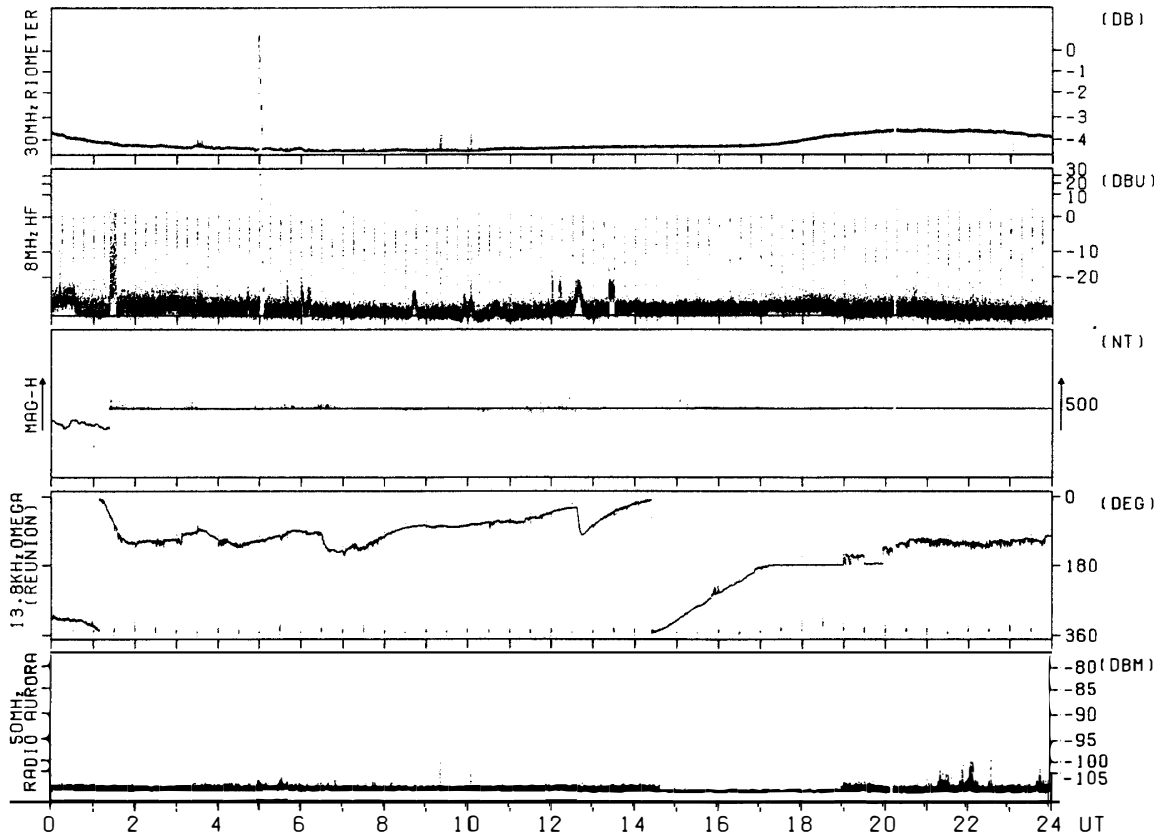
SYOWA STATION TOTAL DAY/294 1989/10/21



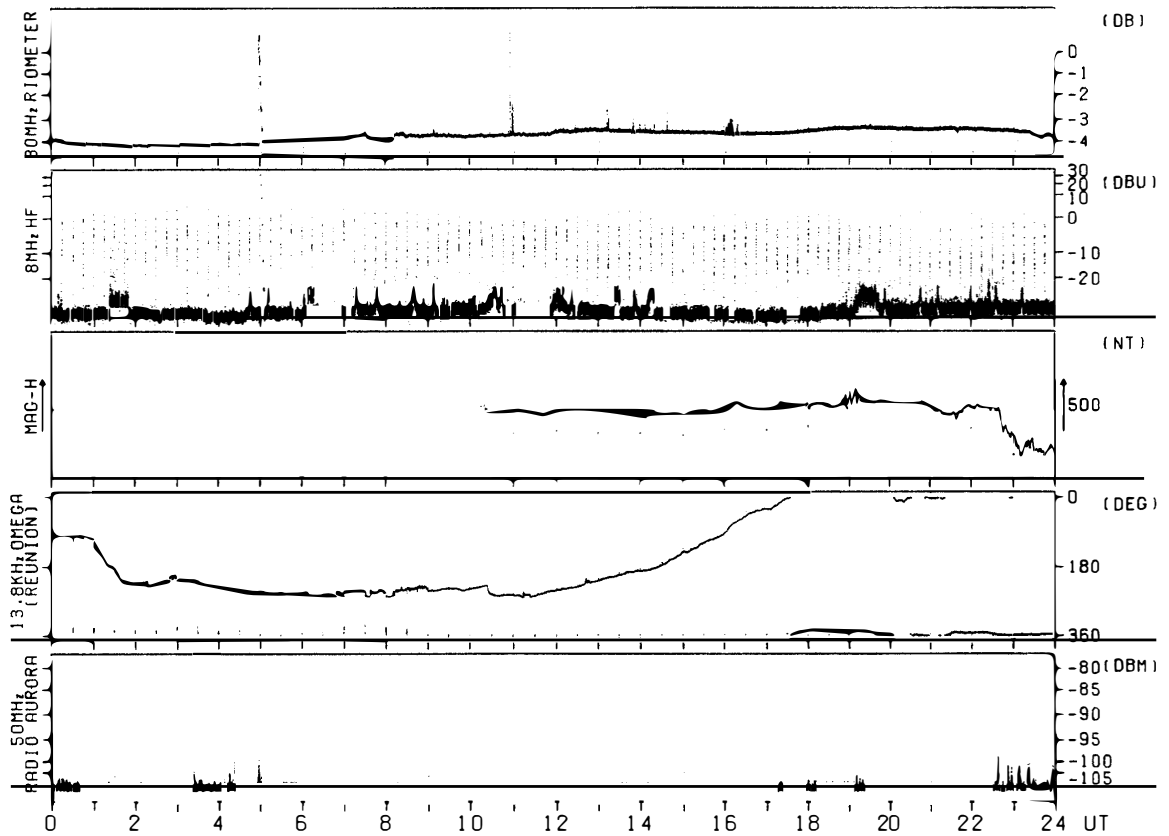
SYOWA STATION TOTAL DAY/295 1989/10/22



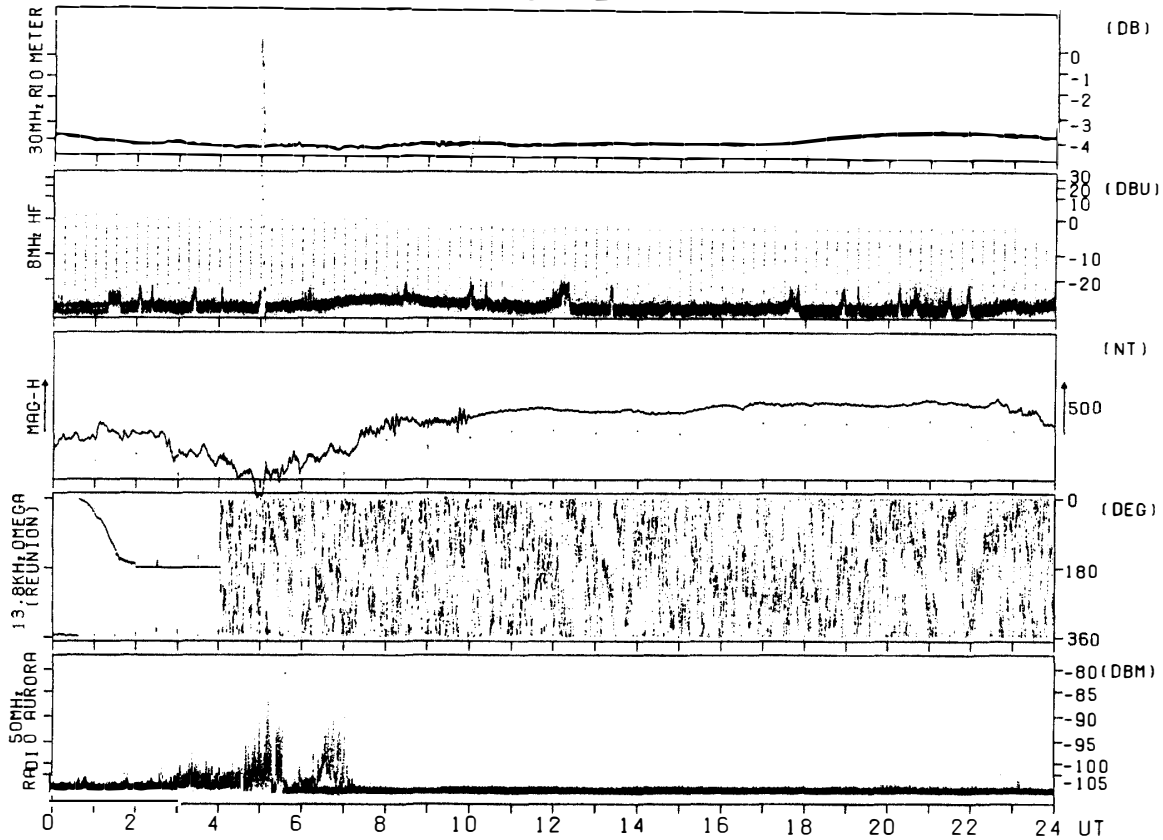
SYOWA STATION TOTAL DAY/296 1989/10/23



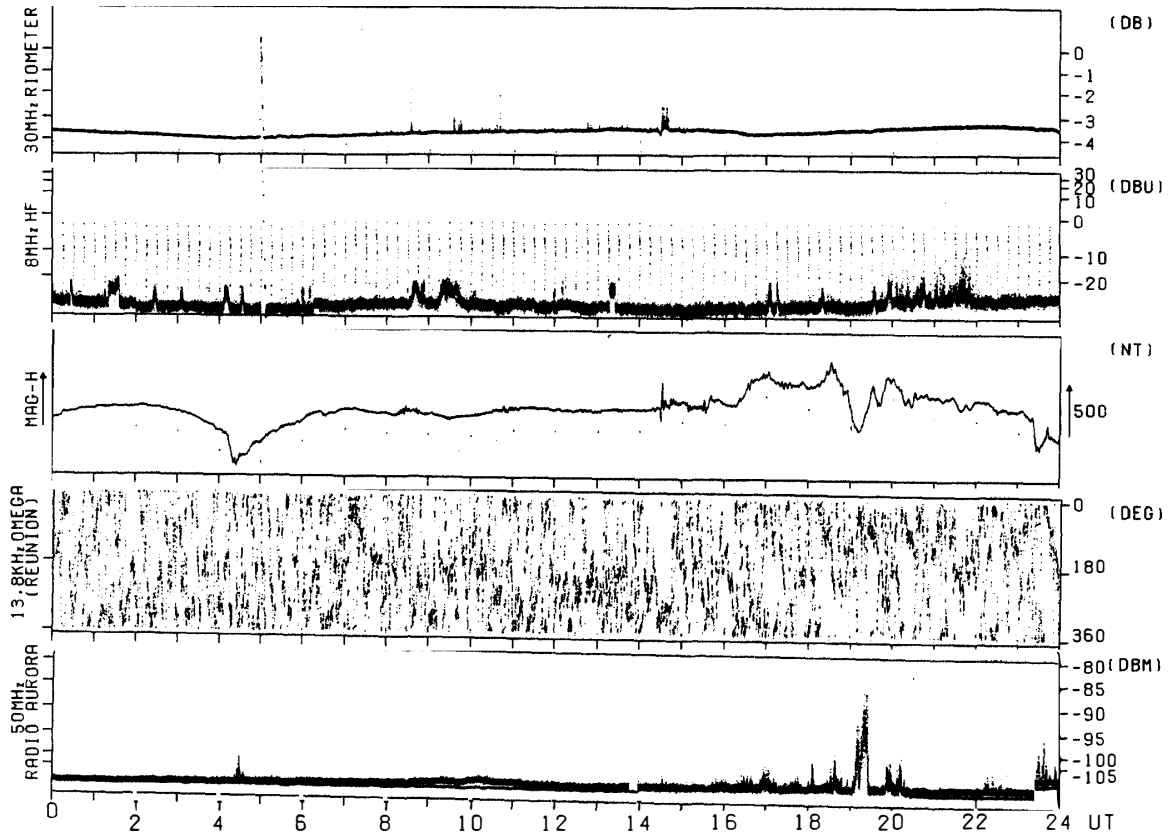
SYOWA STATION TOTAL DAY/297 1989/10/24



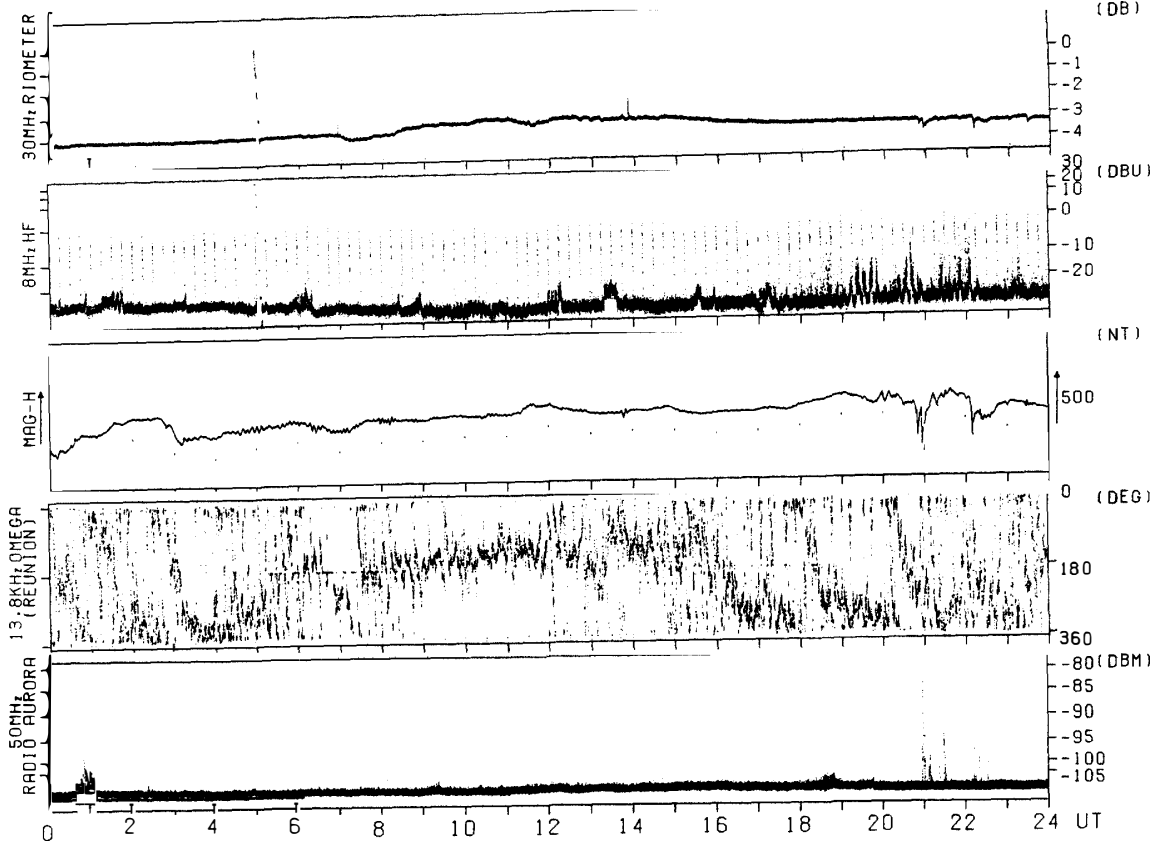
SYOWA STATION TOTAL DAY/298 1989/10/25



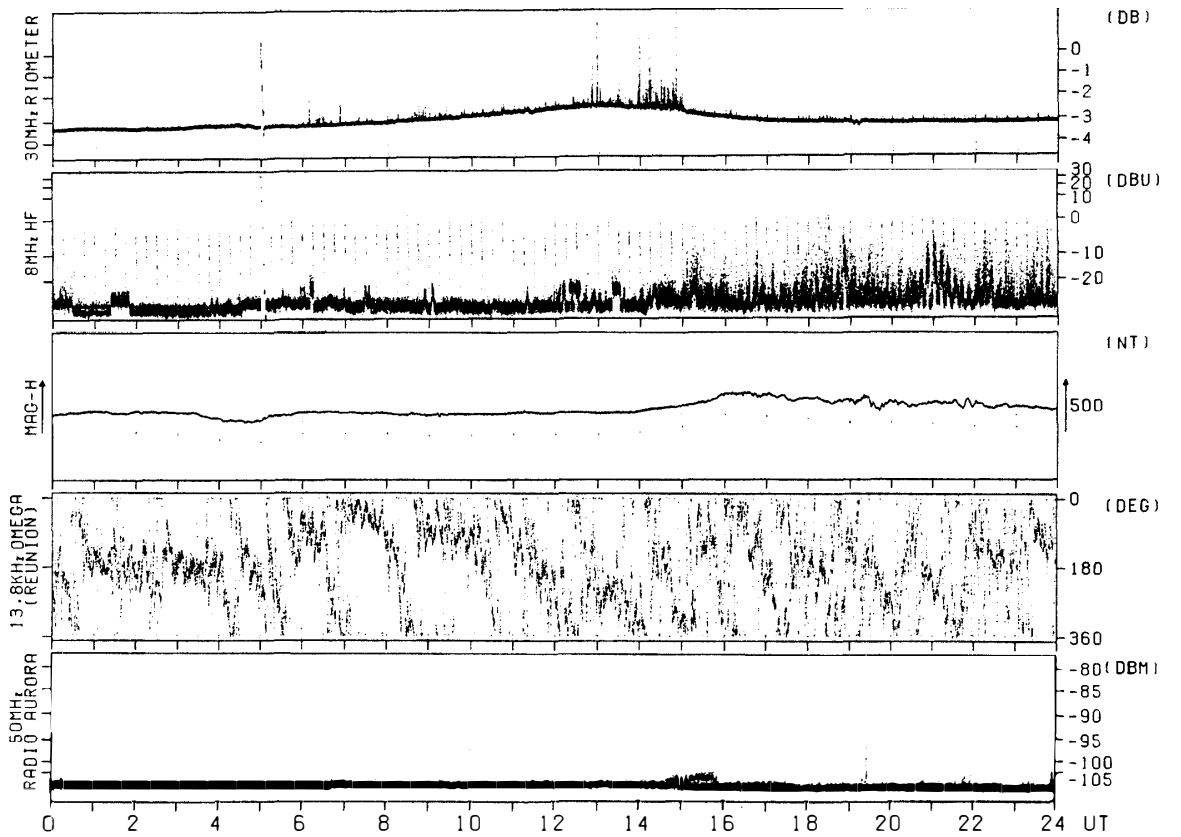
SYOWA STATION TOTAL DAY/299 1989/10/26



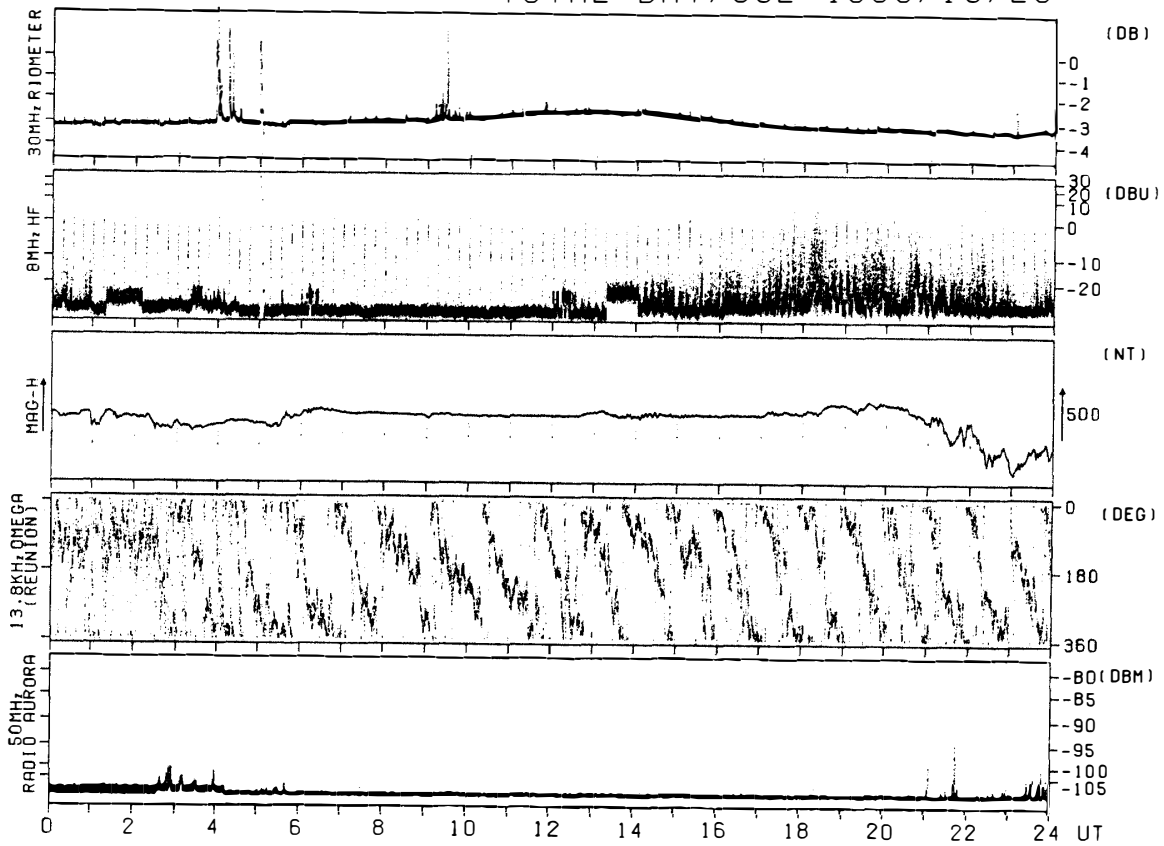
SYOWA STATION TOTAL DAY/300 1989/10/27



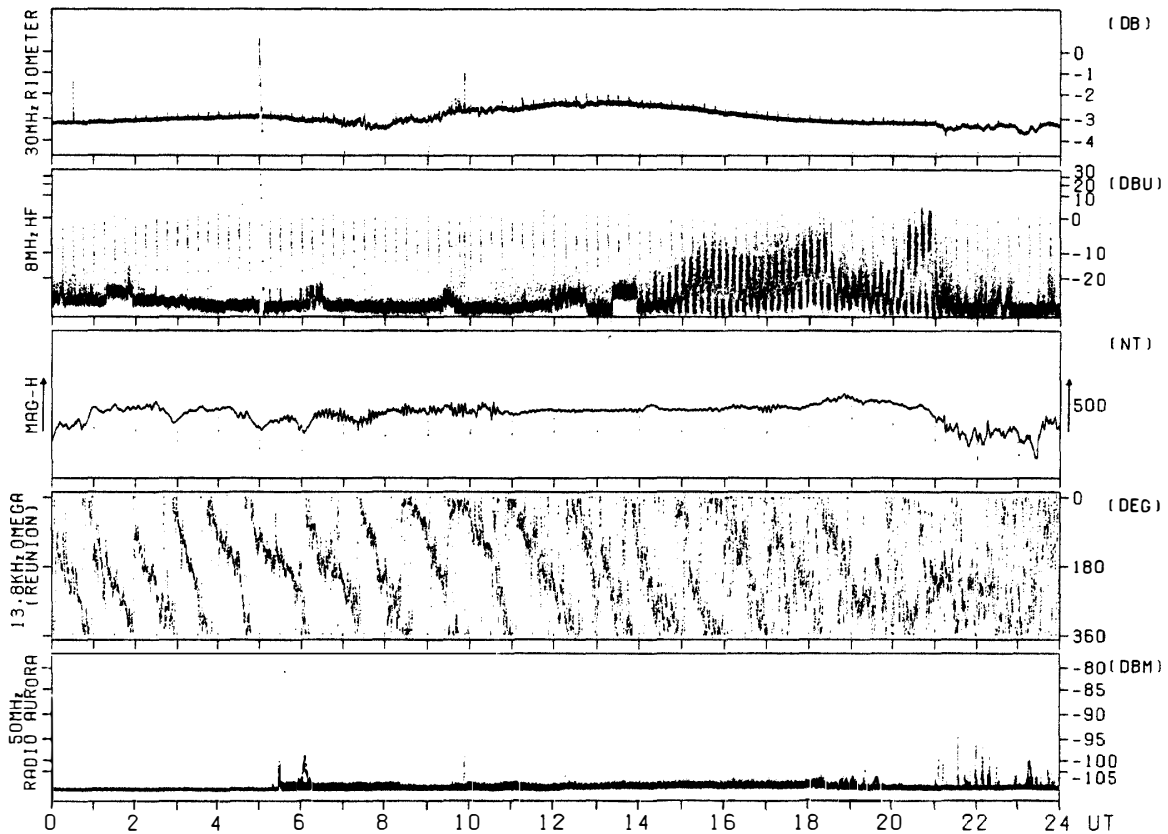
SYOWA STATION TOTAL DAY/301 1989/10/28



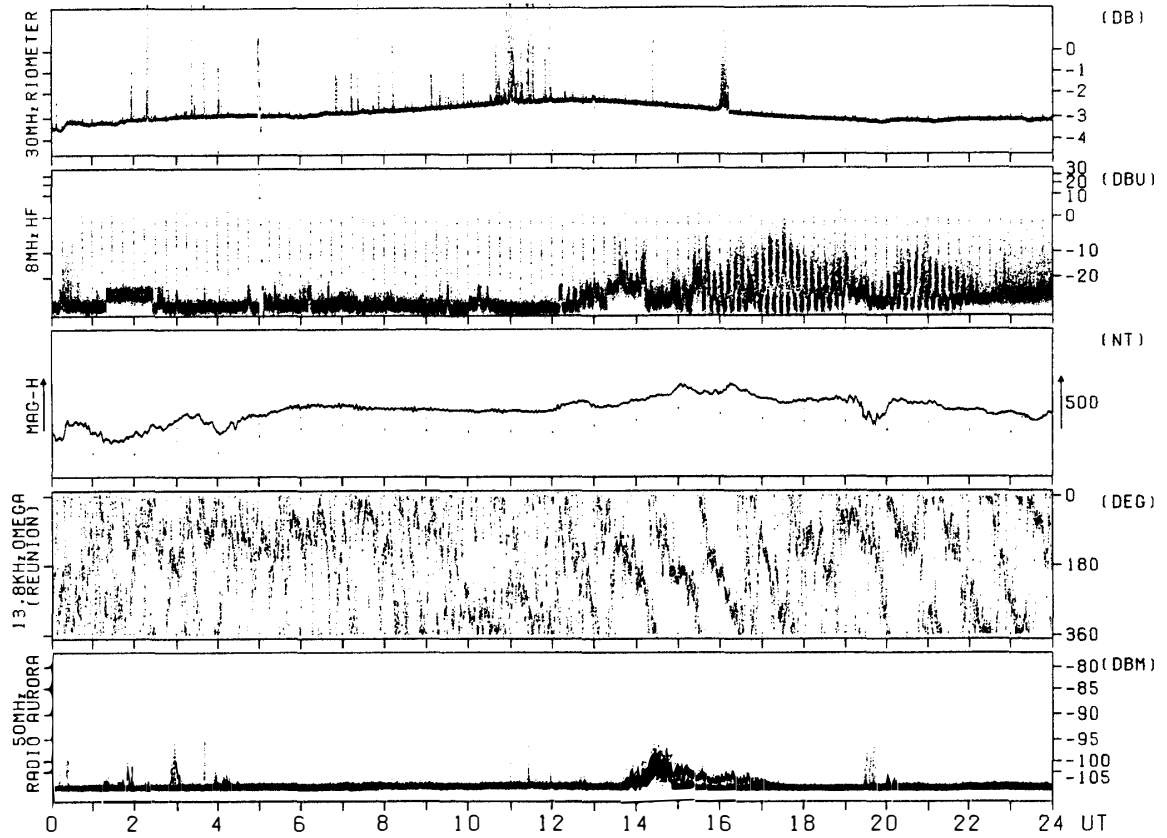
SYOWA STATION TOTAL DAY/302 1989/10/29



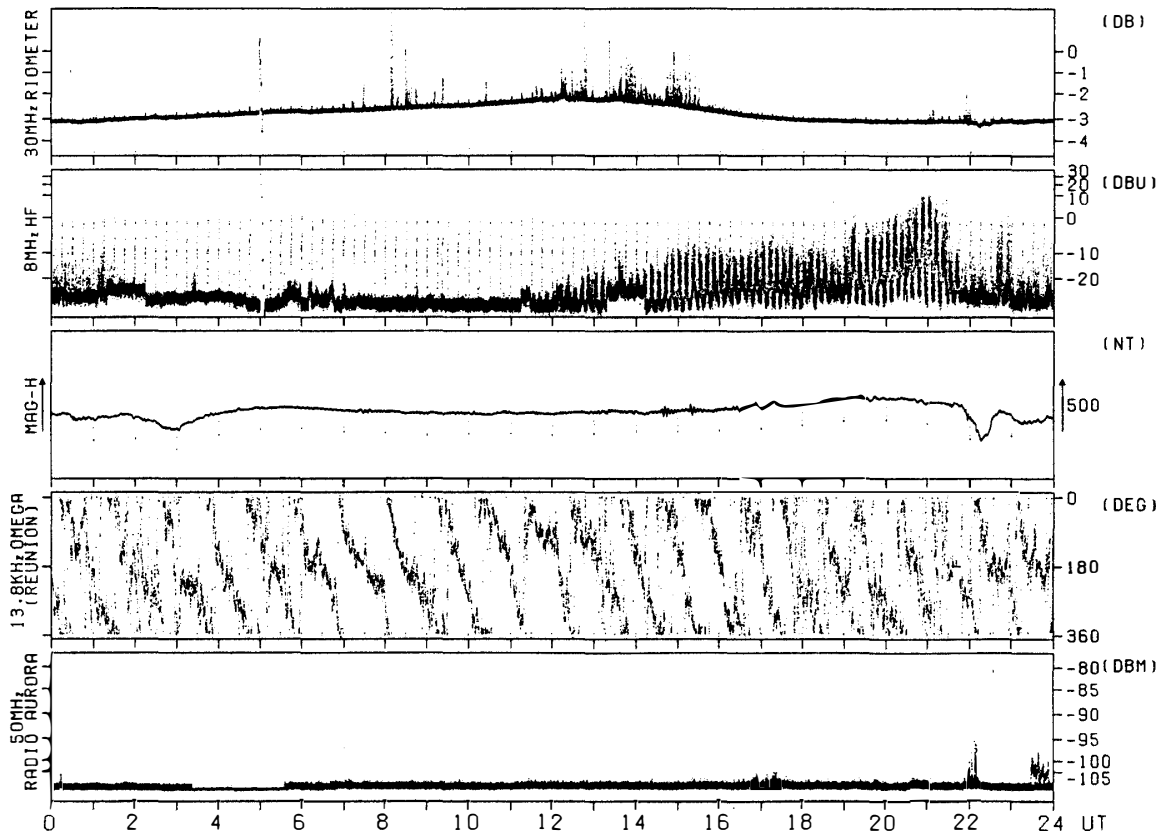
SYOWA STATION TOTAL DAY/303 1989/10/30



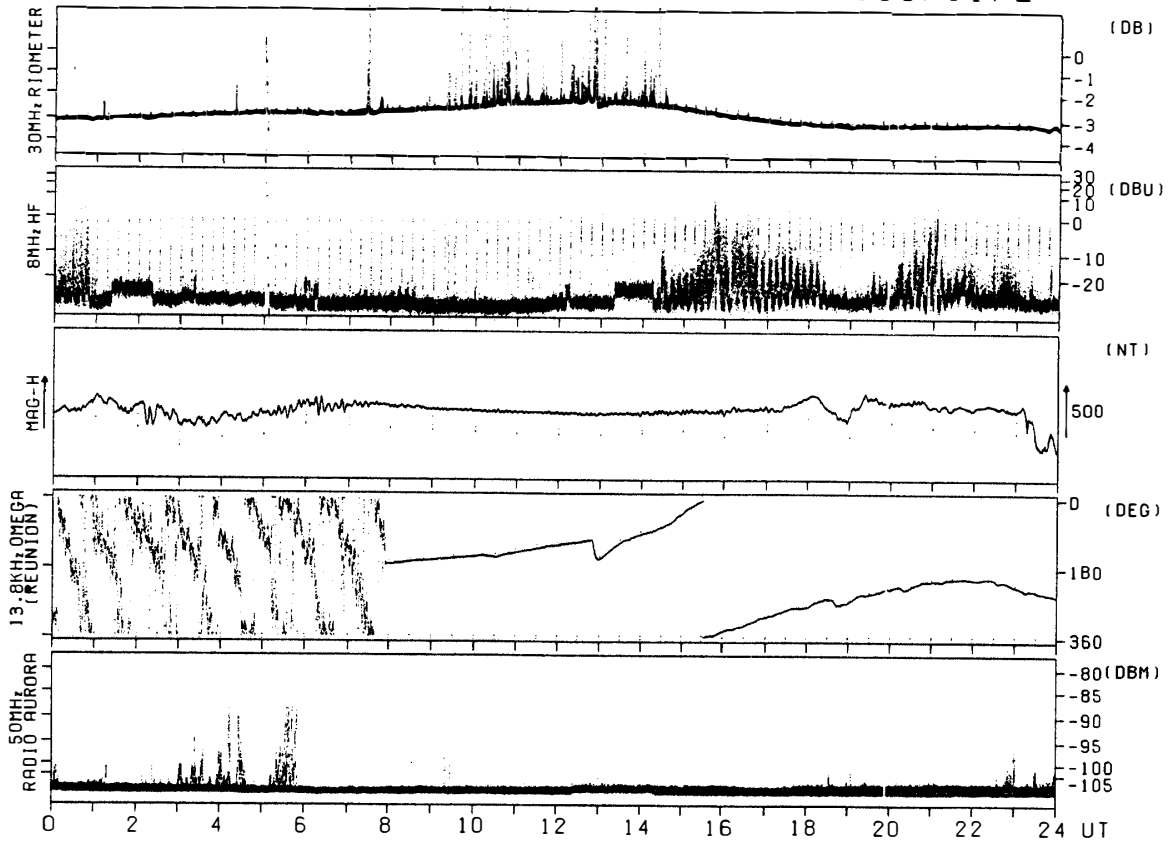
SYOWA STATION TOTAL DAY/304 1989/10/31



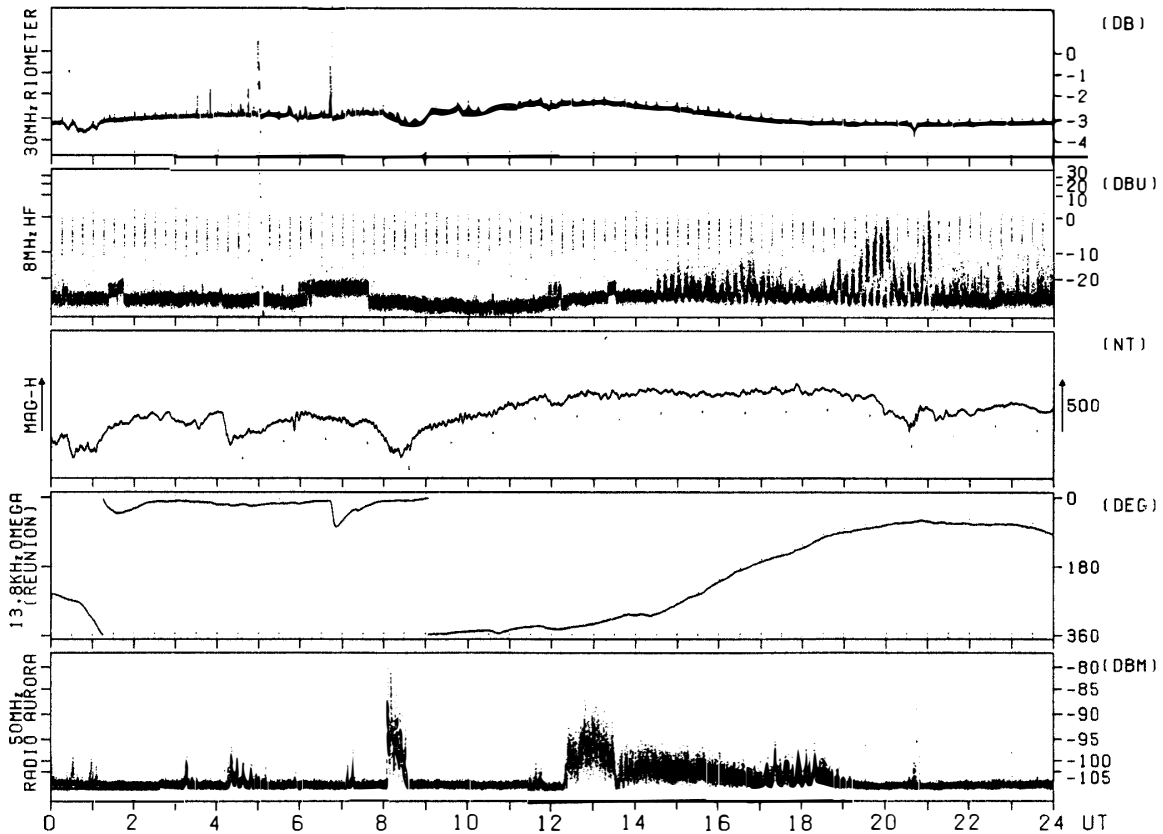
SYOWA STATION TOTAL DAY/305 1989/11/1



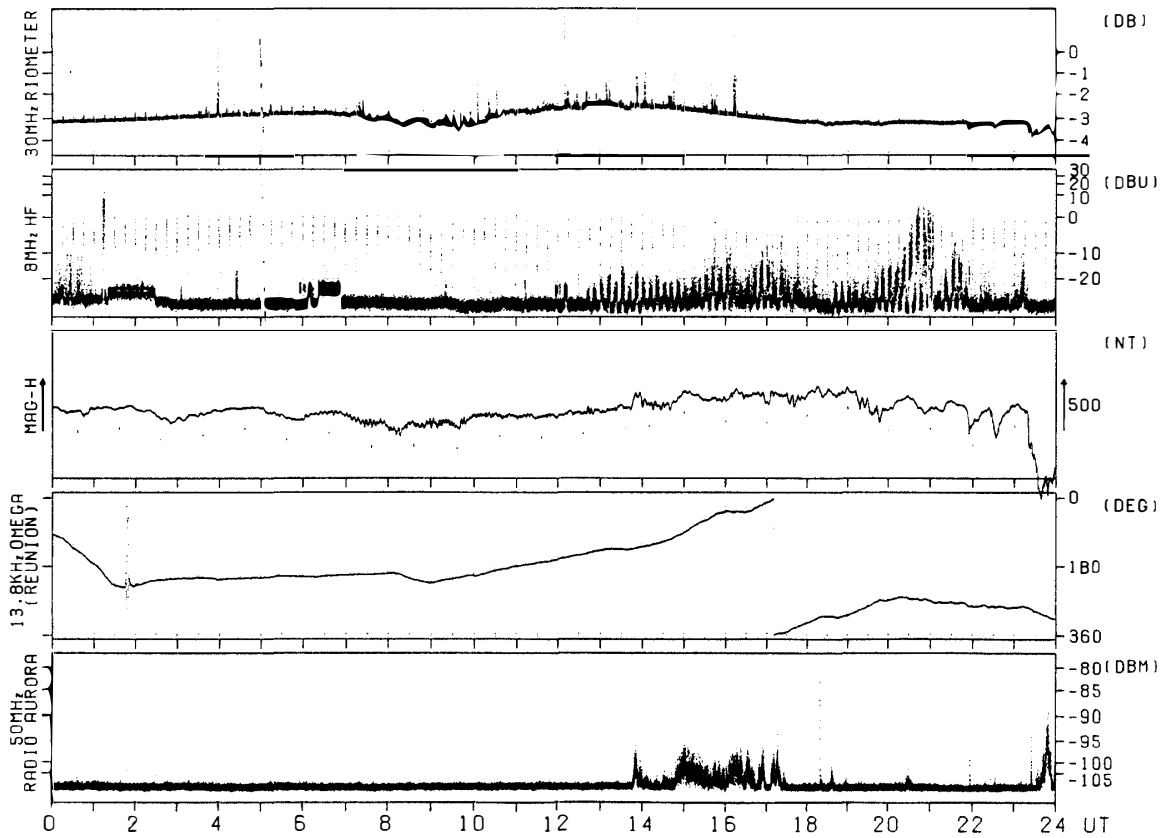
SYOWA STATION TOTAL DAY/306 1989/11/2



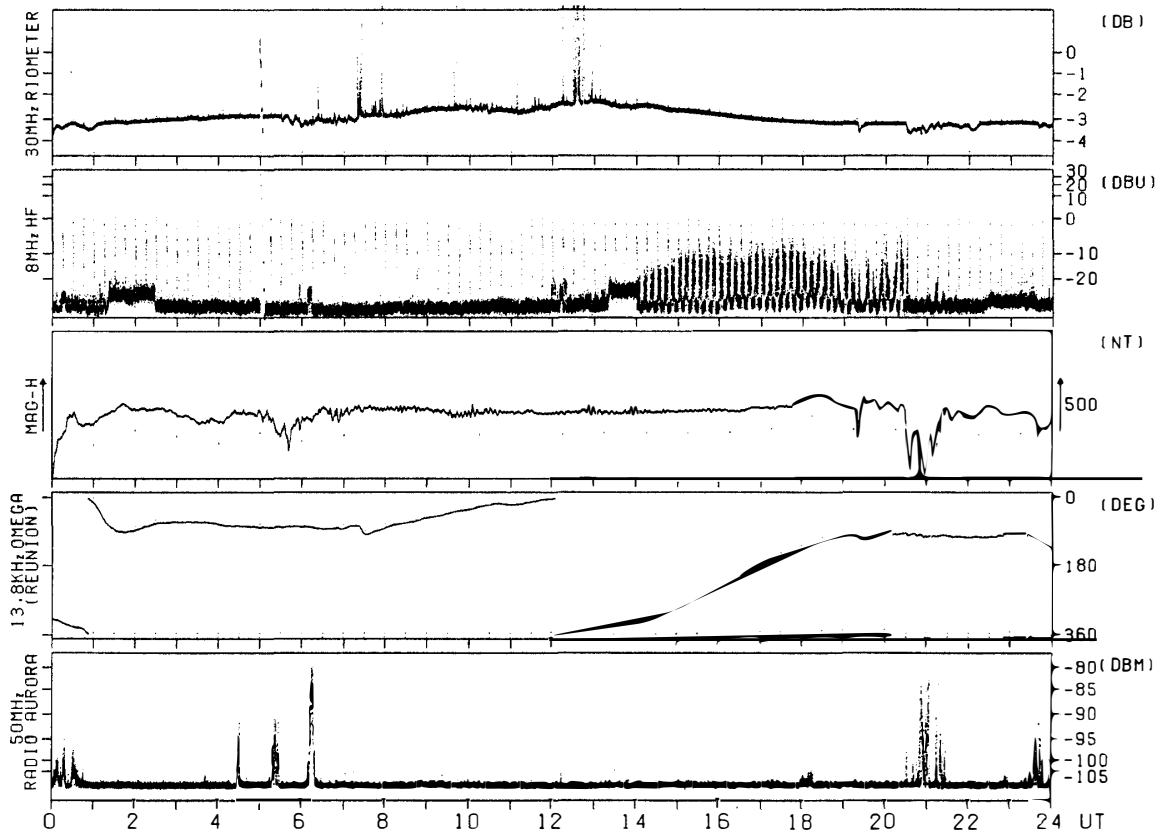
SYOWA STATION TOTAL DAY/307 1989/11/3



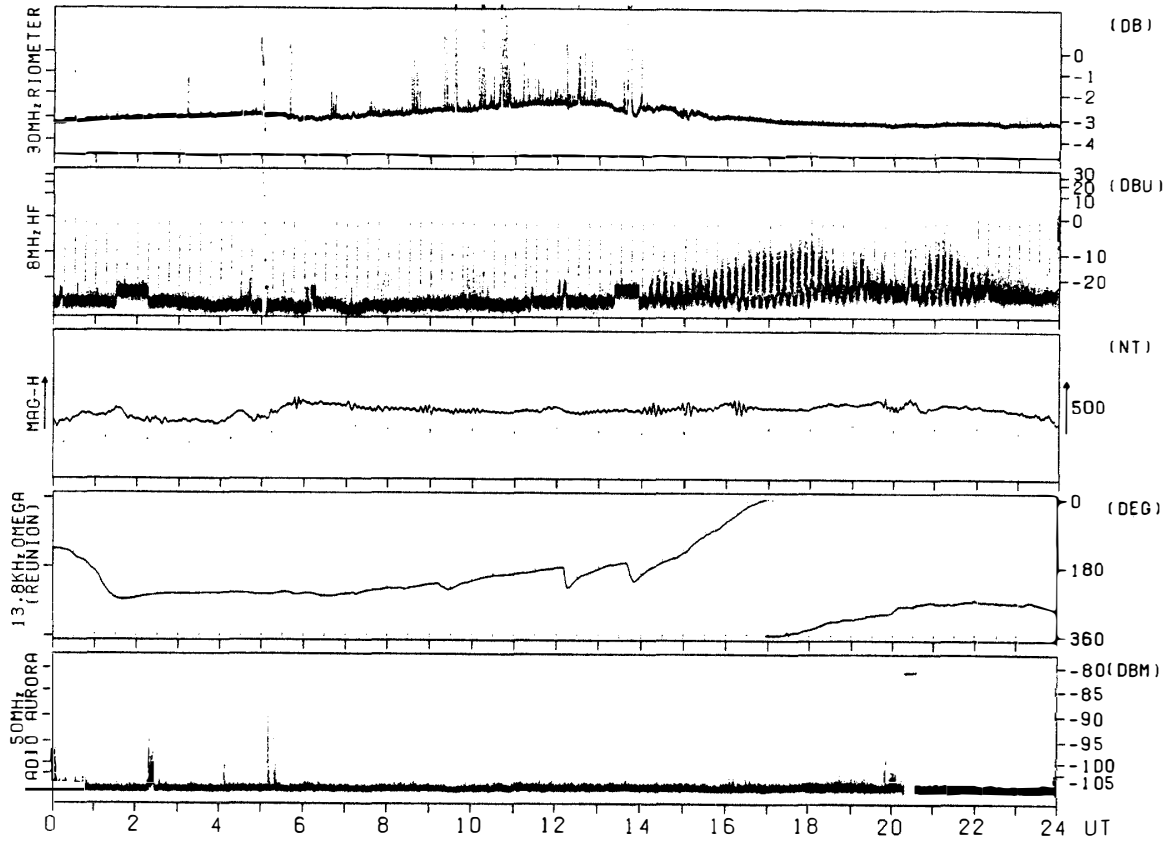
SYOWA STATION TOTAL DAY/308 1989/11/4



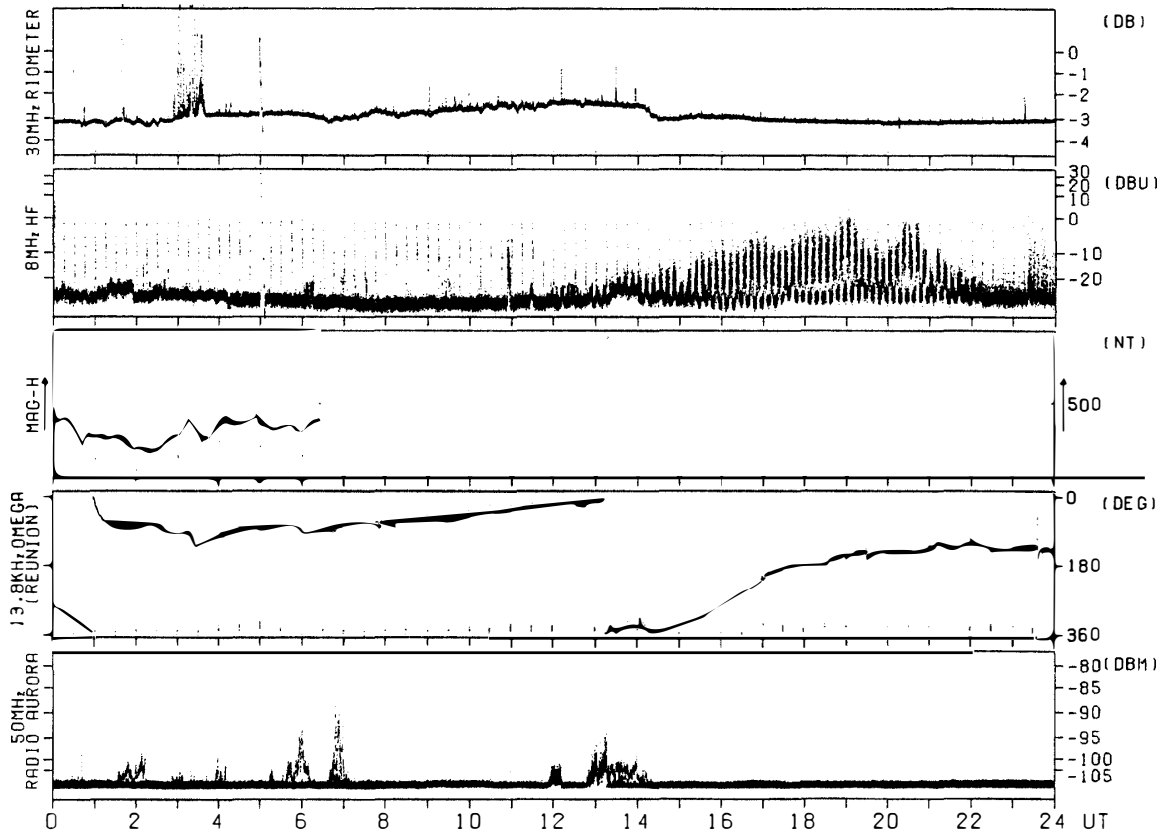
SYOWA STATION TOTAL DAY/309 1989/11/5



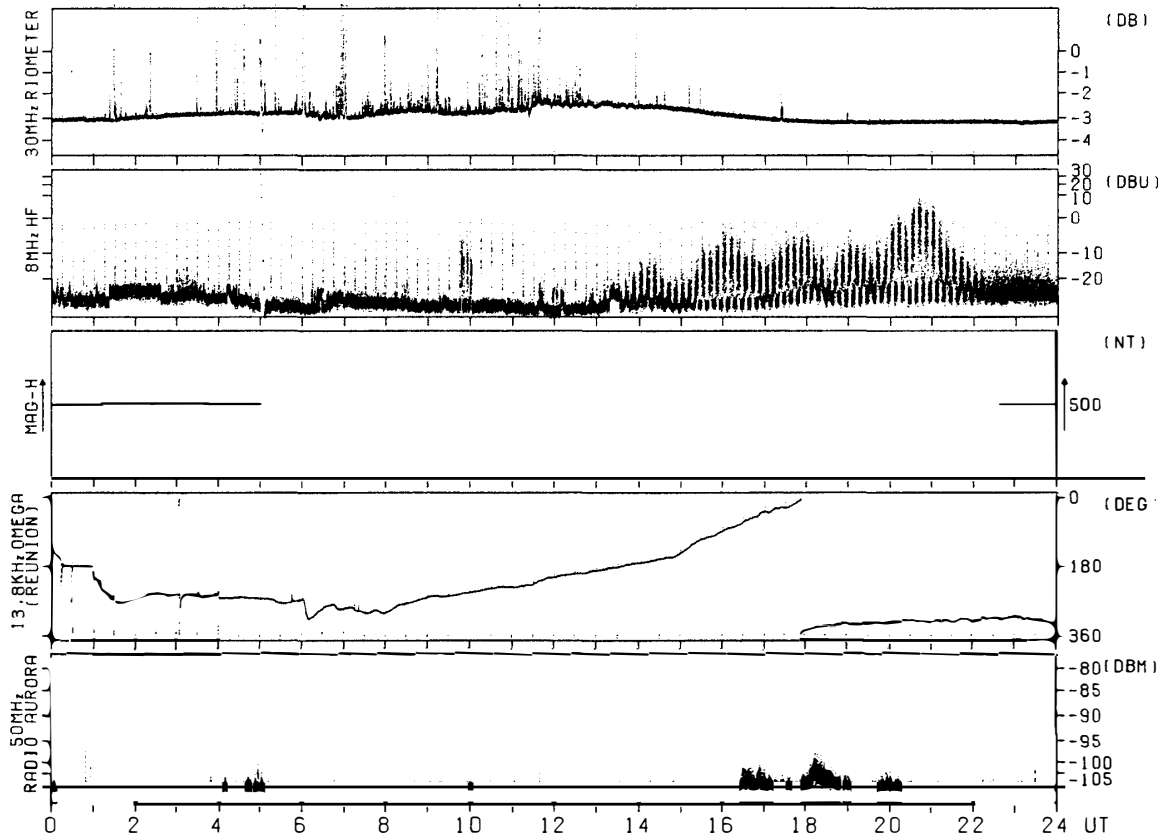
SYOWA STATION TOTAL DAY/310 1989/11/6



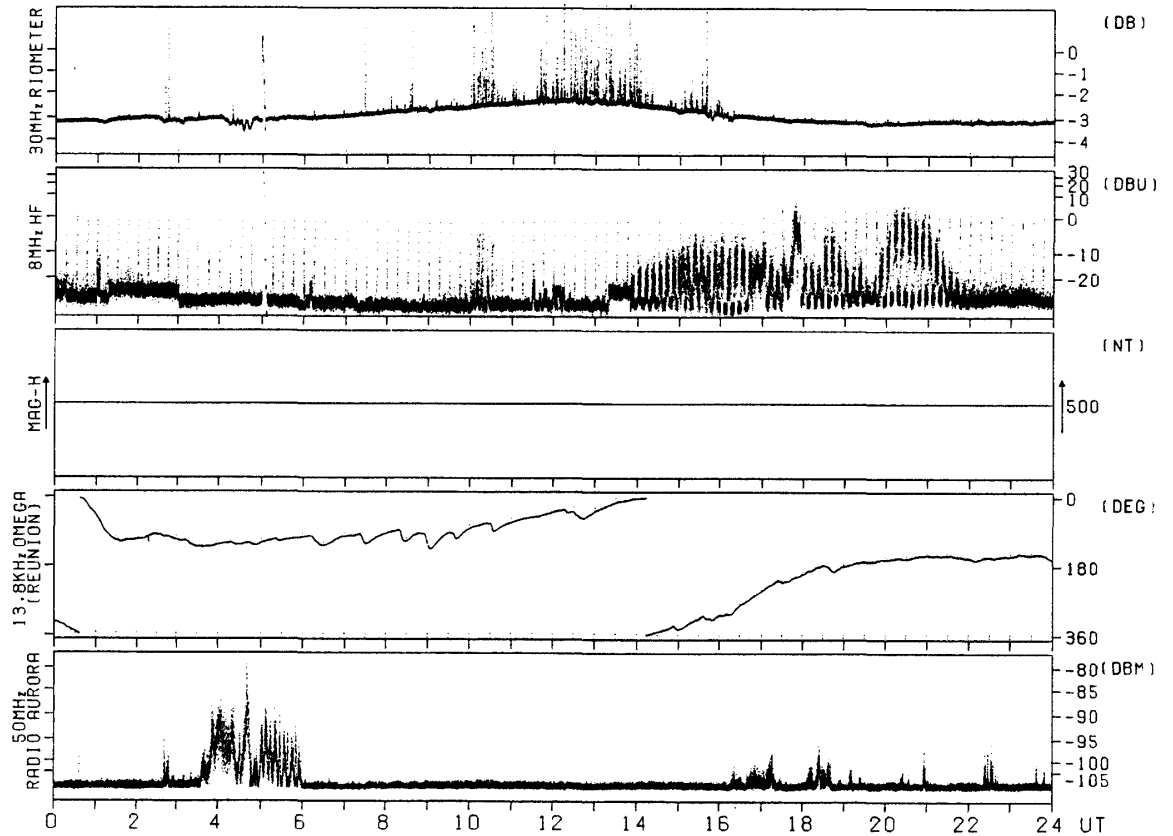
SYOWA STATION TOTAL DAY/311 1989/11/7



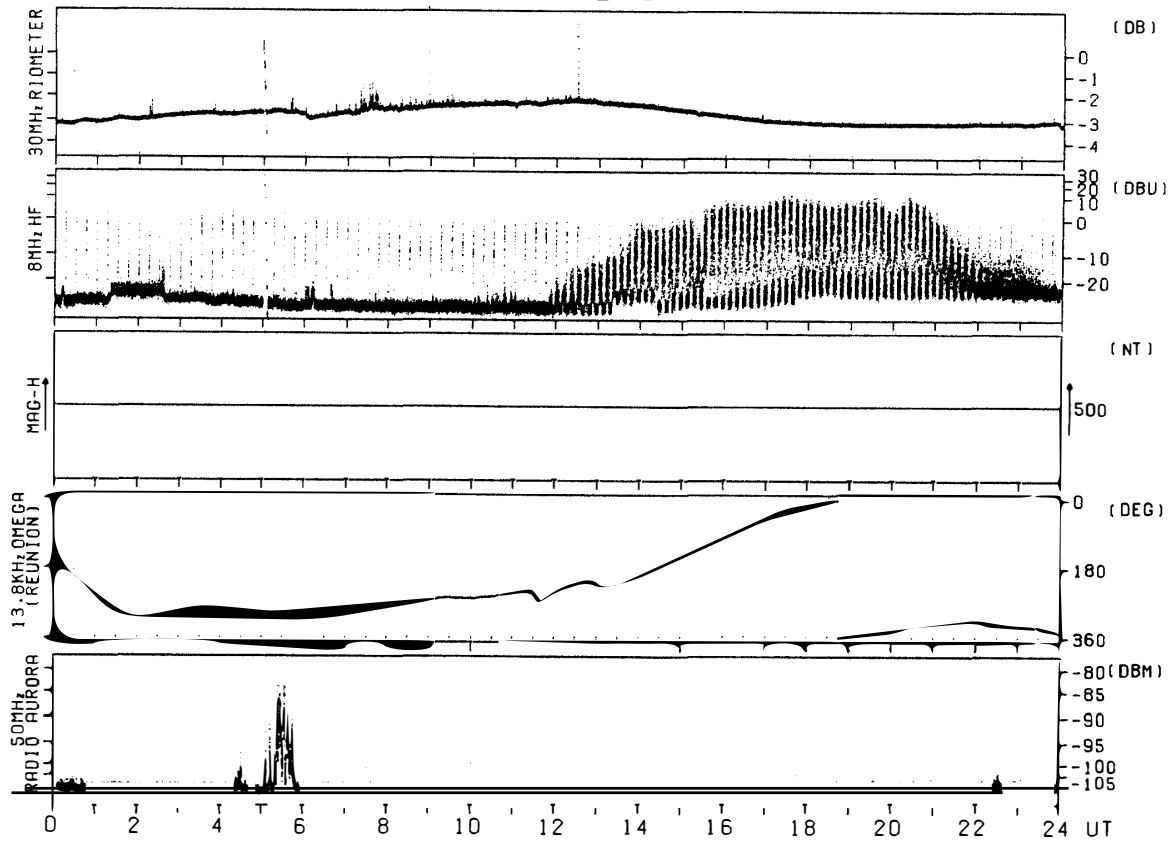
SYOWA STATION TOTAL DAY/312 1989/11/8



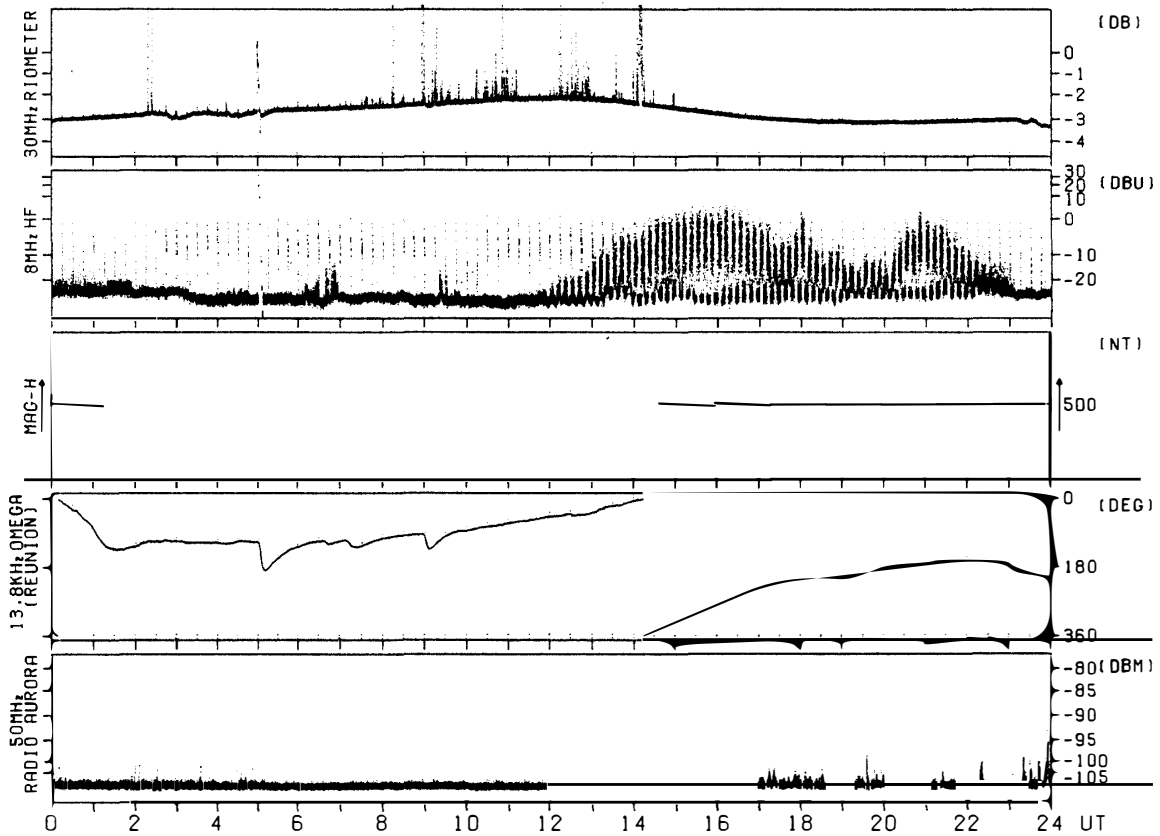
SYOWA STATION TOTAL DAY/313 1989/11/9



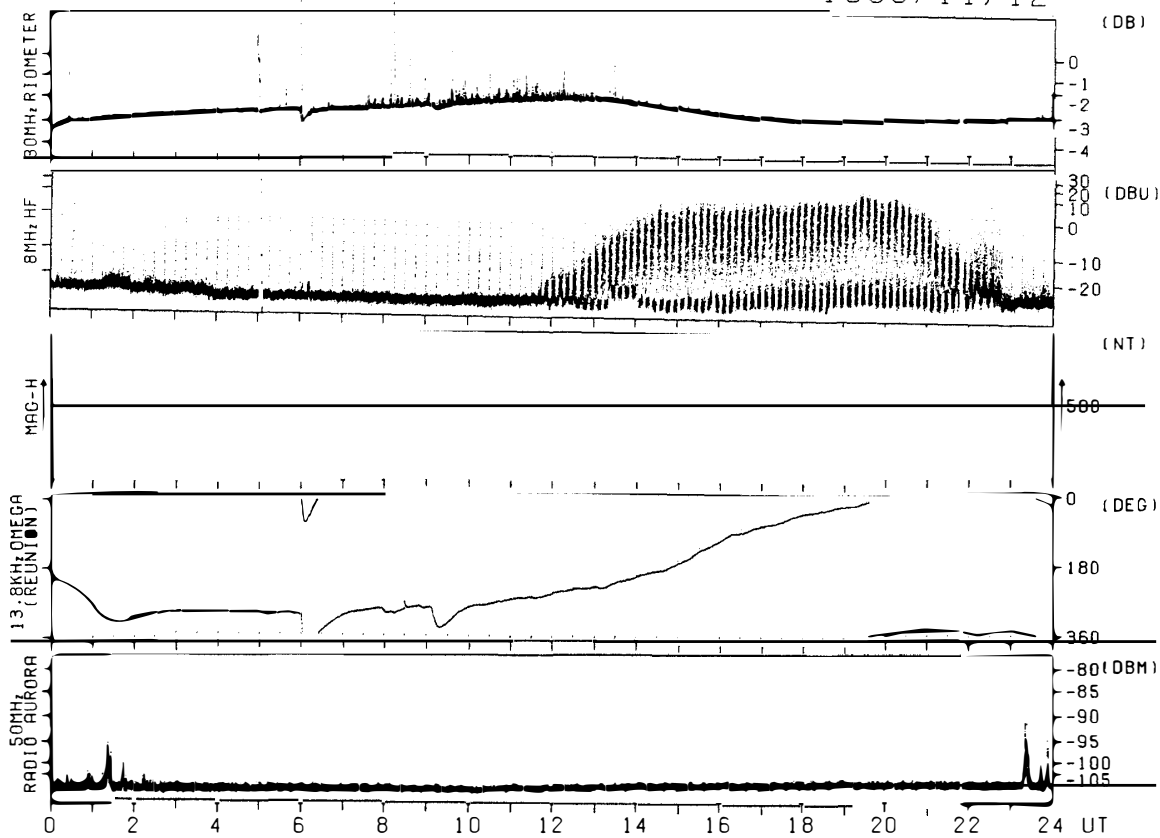
SYOWA STATION TOTAL DAY/314 1989/11/10



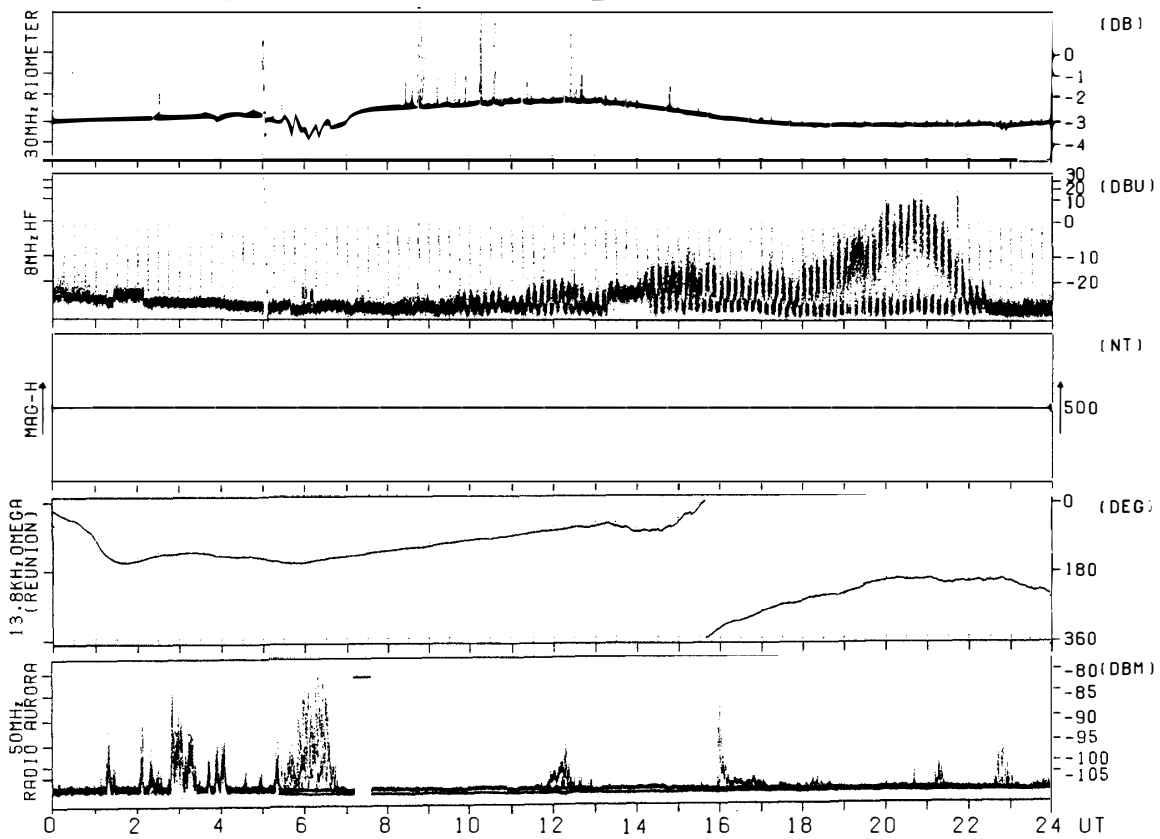
SYOWA STATION TOTAL DAY/315 1989/11/11



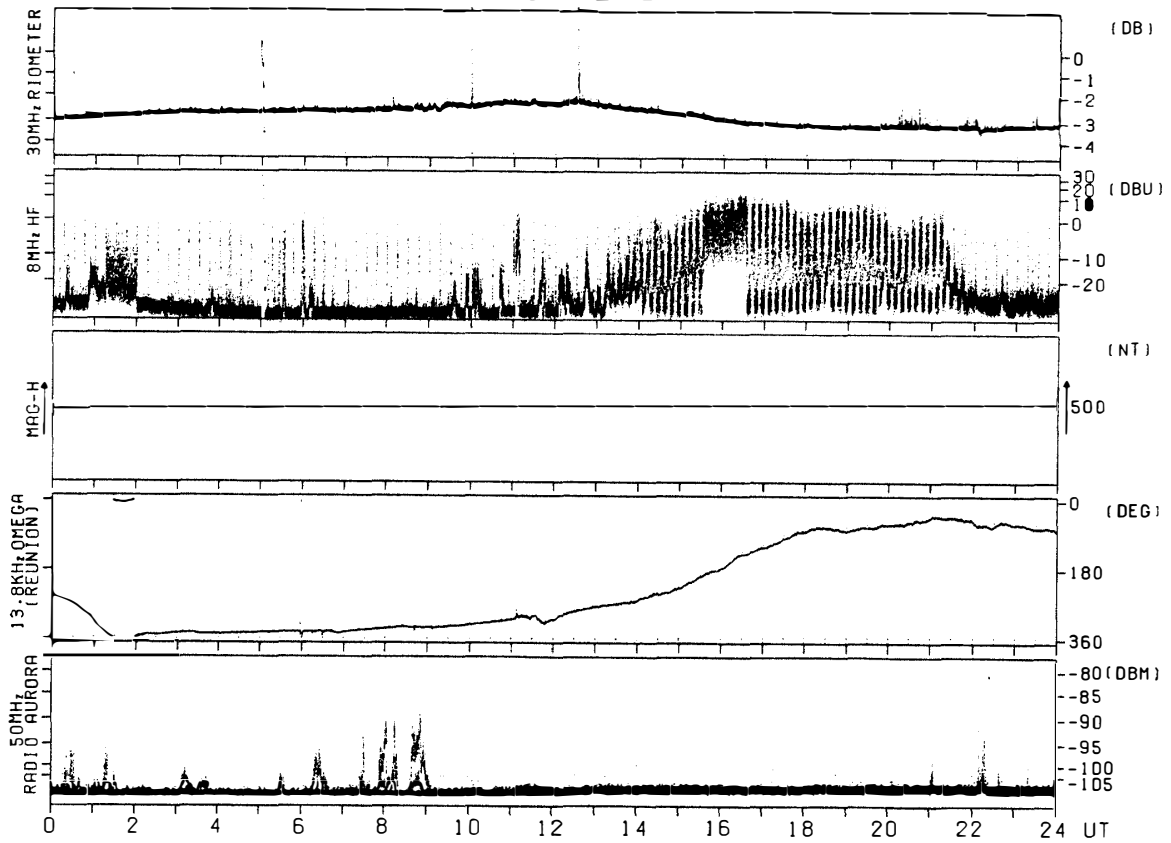
SYOWA STATION TOTAL DAY/316 1989/11/12



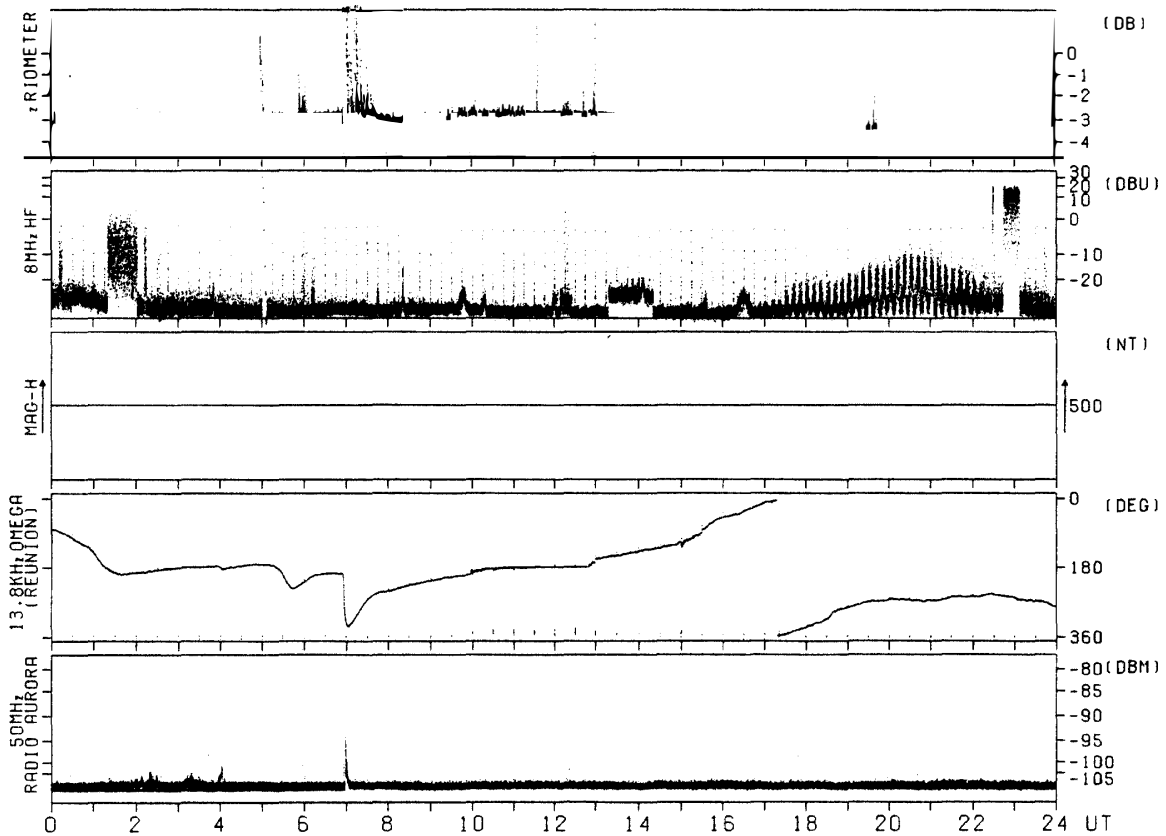
SYOWA STATION TOTAL DAY/317 1989/11/13



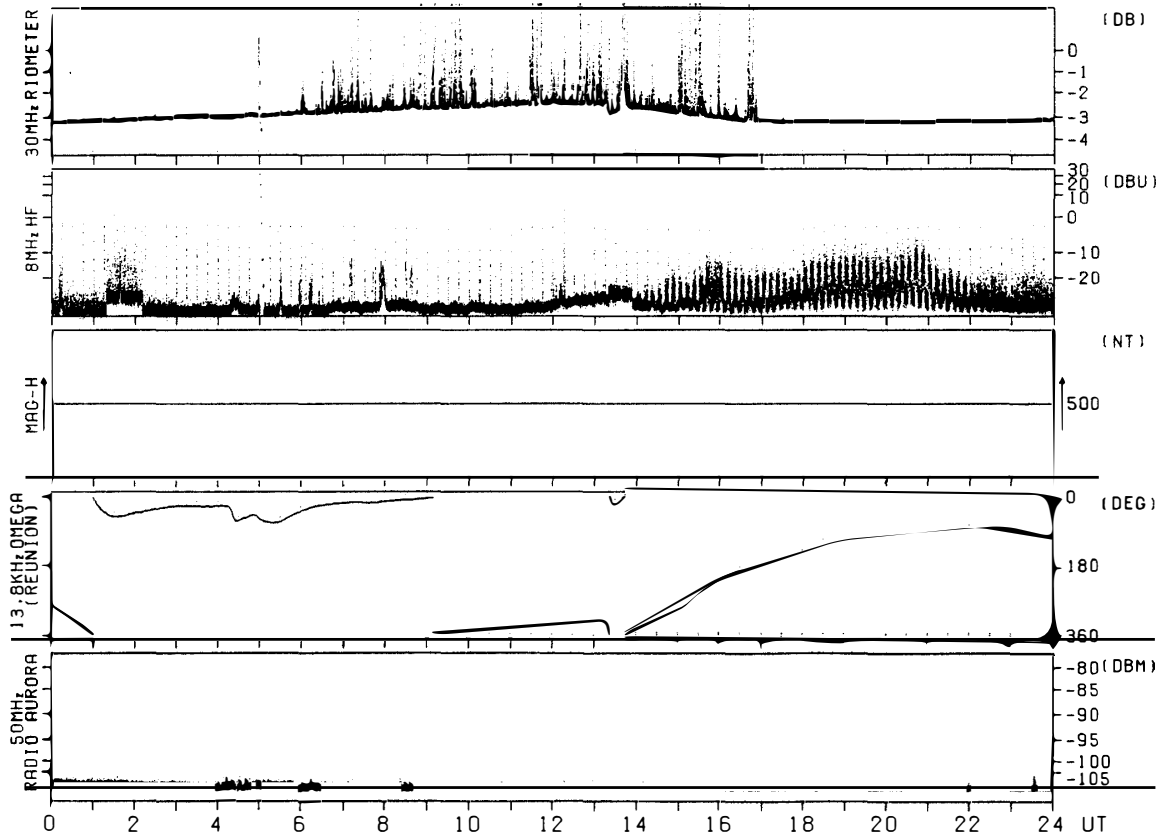
SYOWA STATION TOTAL DAY/318 1989/11/14



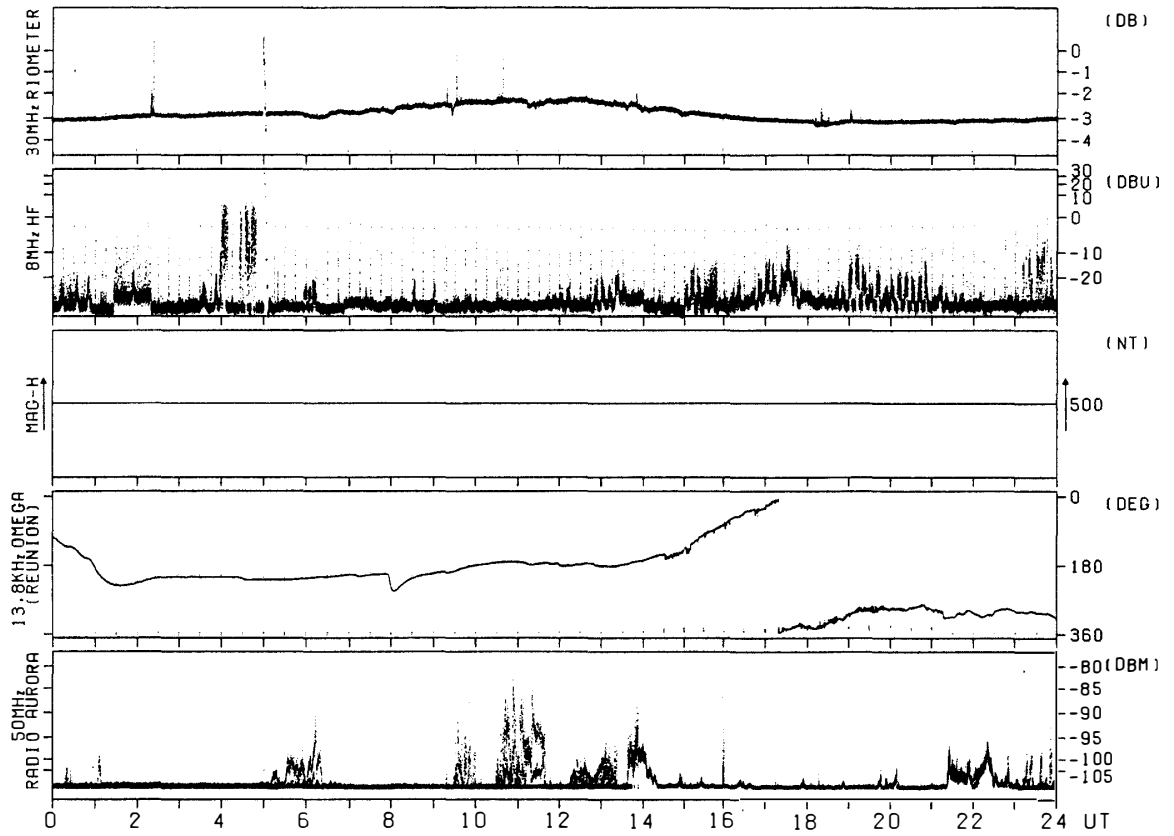
SYOWA STATION TOTAL DAY/319 1989/11/15



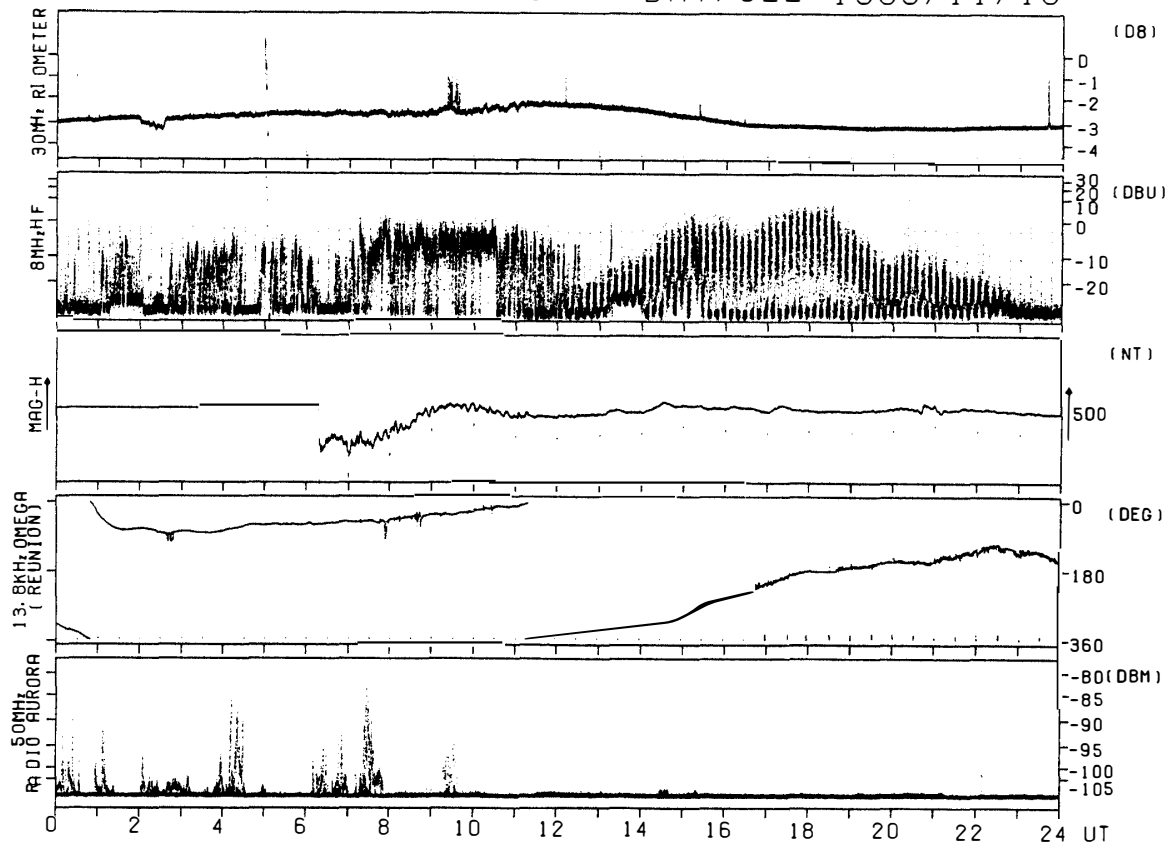
SYOWA STATION TOTAL DAY/320 1989/11/16



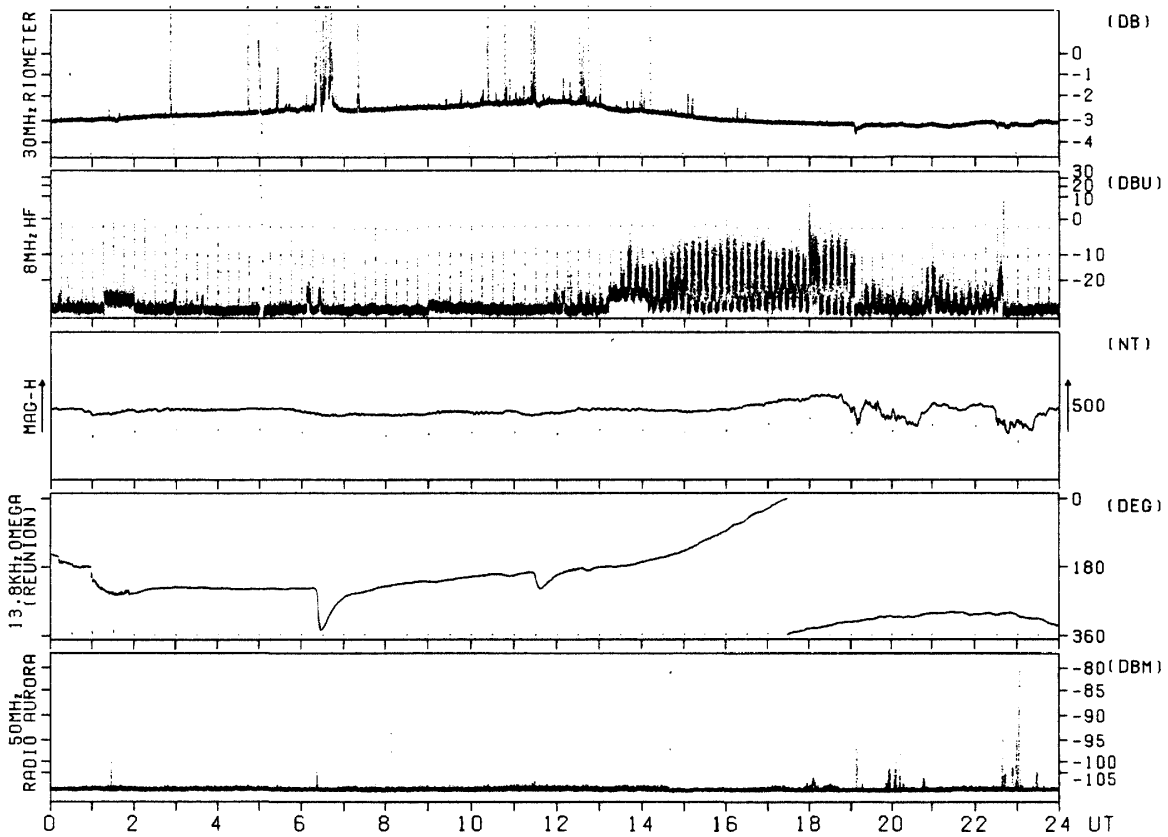
SYOWA STATION TOTAL DAY/321 1989/11/17



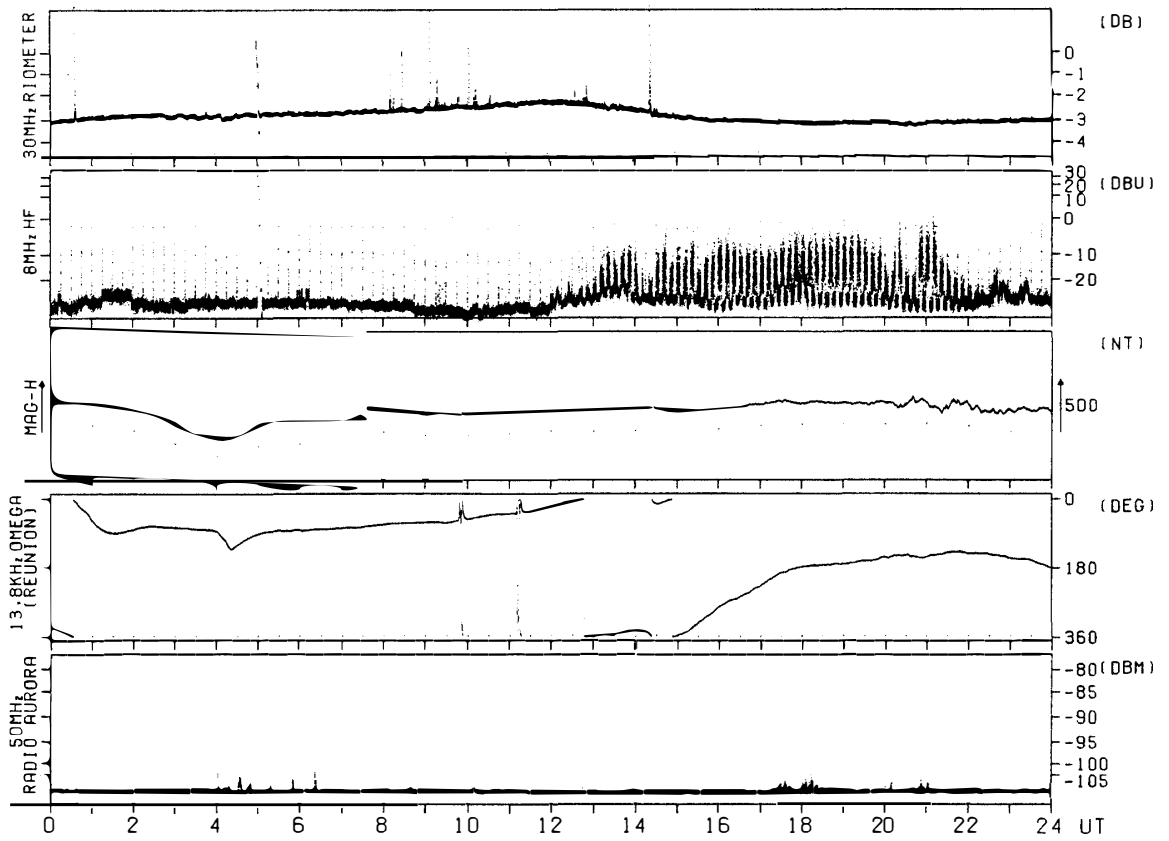
SYOWA STATION TOTAL DAY/322 1989/11/18



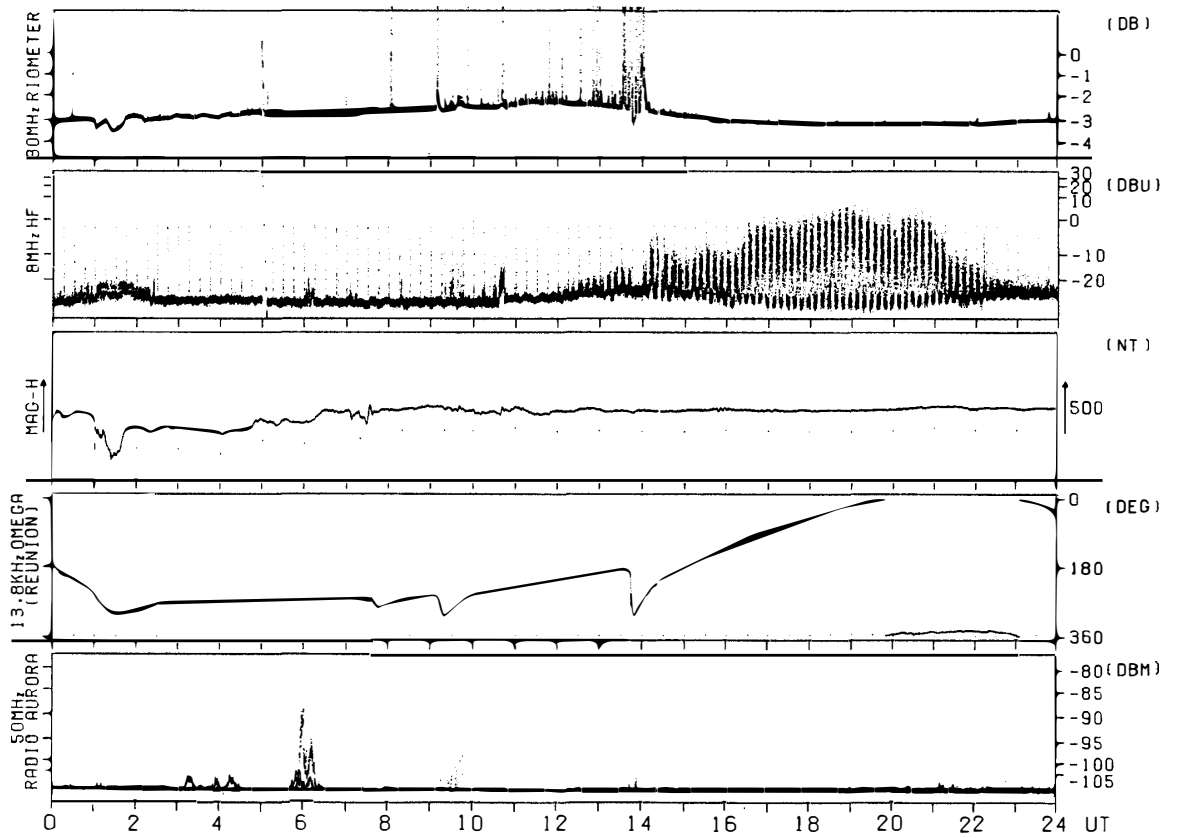
SYOWA STATION TOTAL DAY/323 1989/11/19



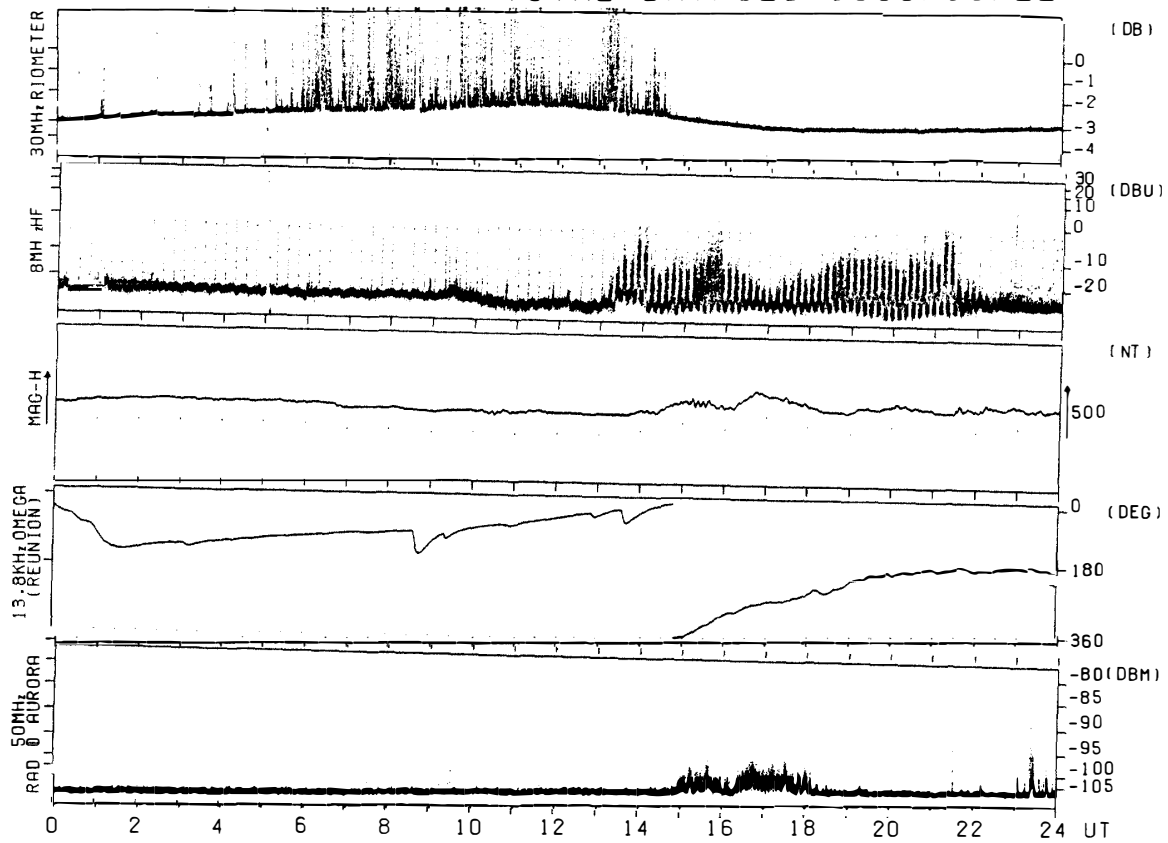
SYOWA STATION TOTAL DAY/324 1989/11/20



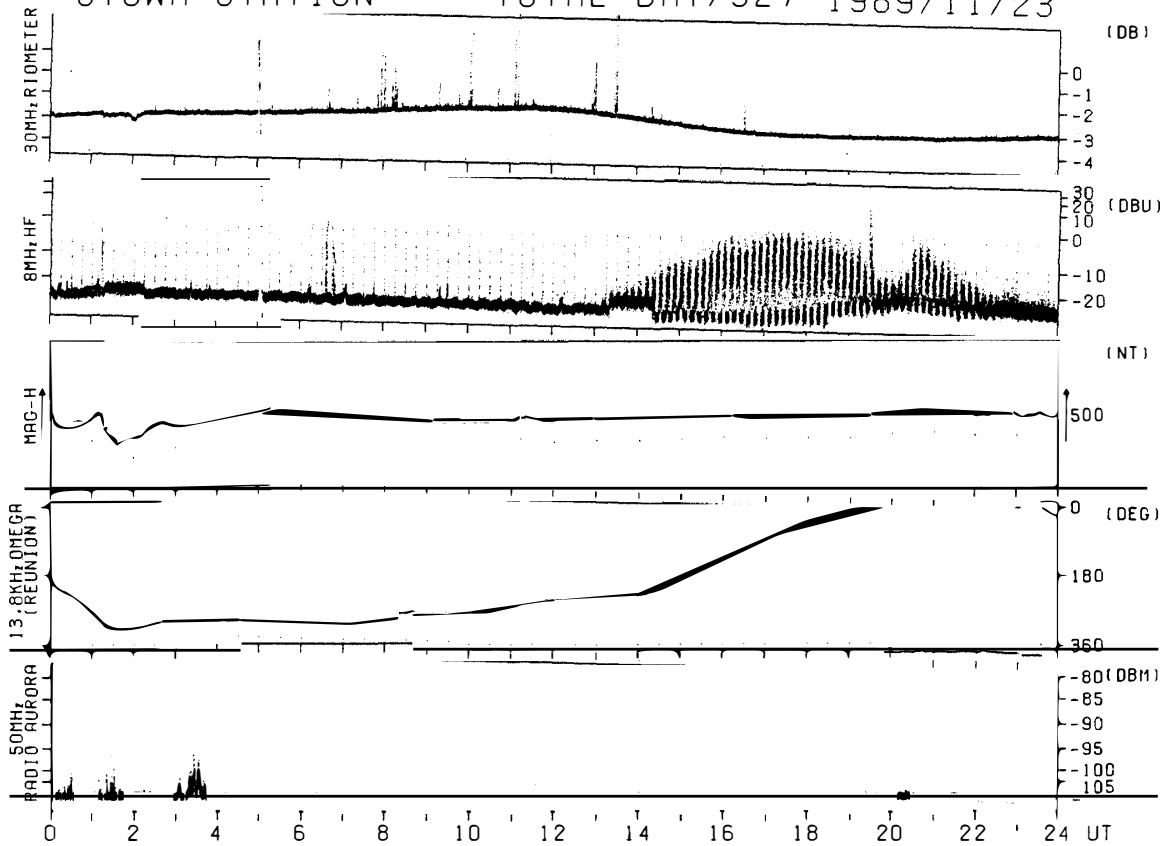
SYOWA STATION TOTAL DAY/325 1989/11/21



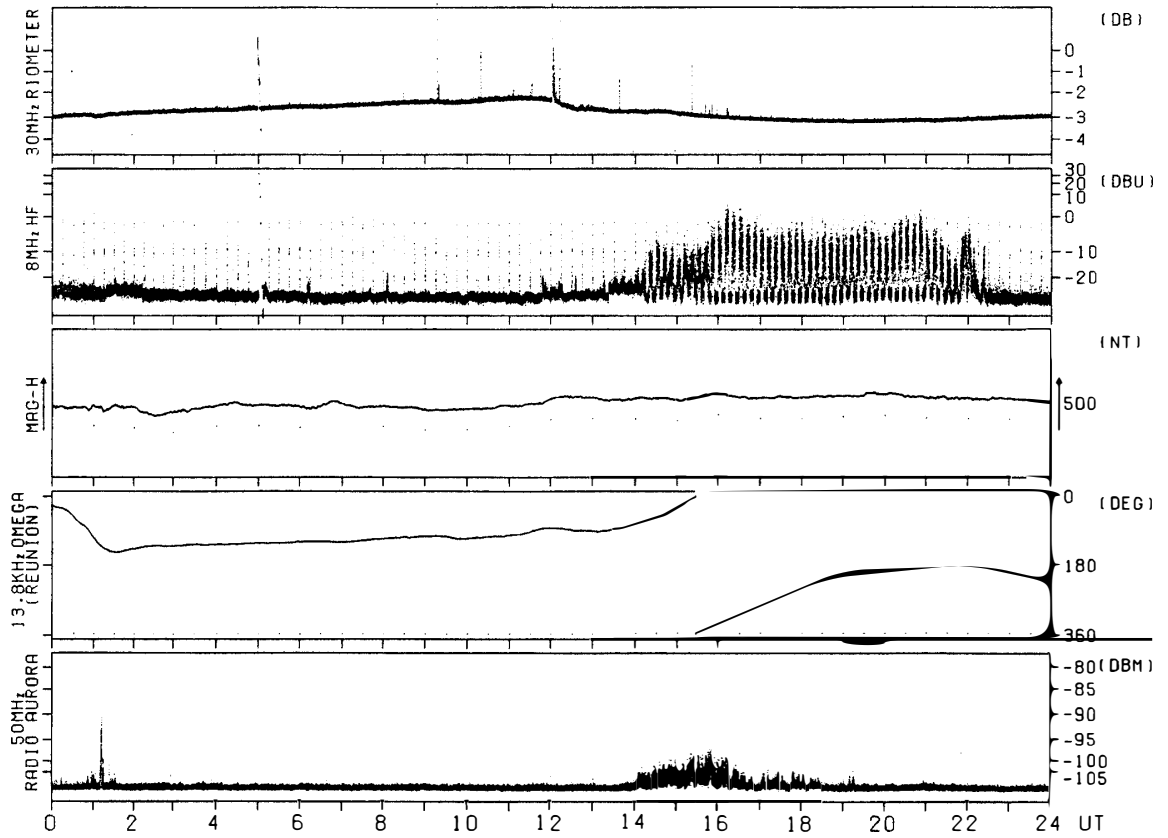
SYOWA STATION TOTAL DAY/326 1989/11/22



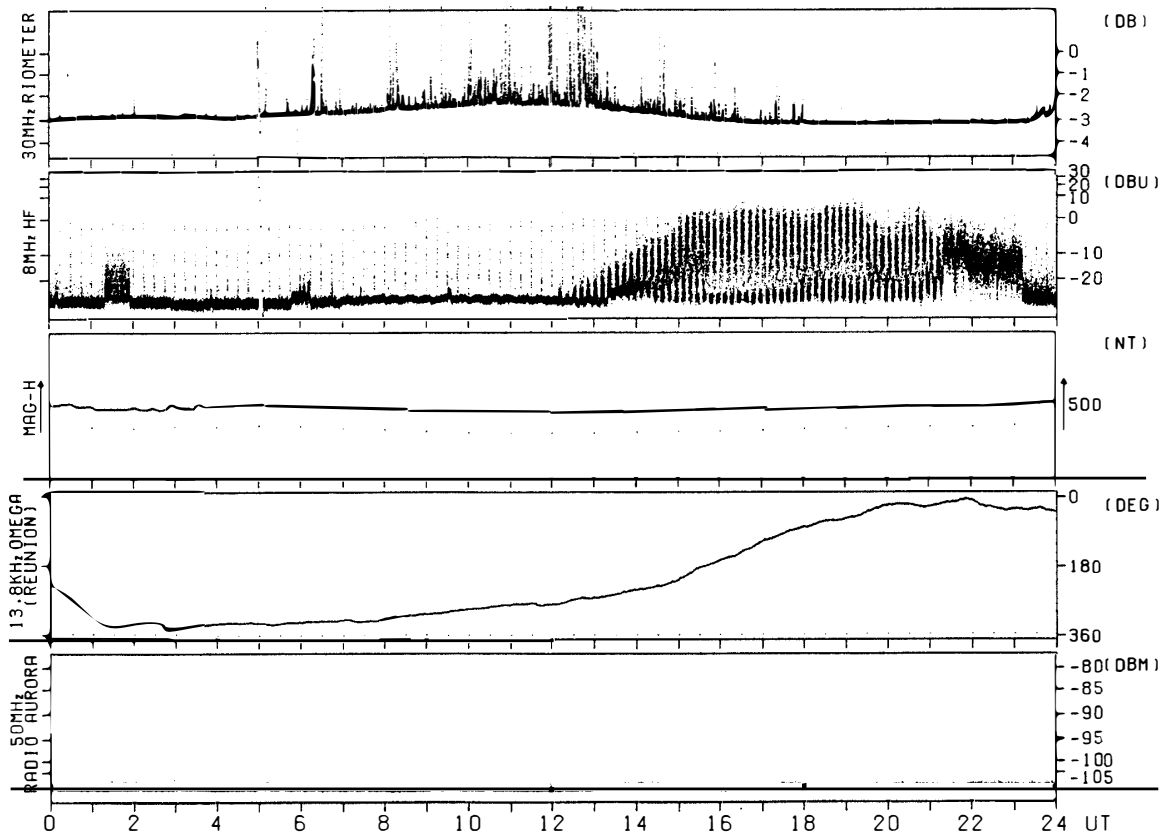
SYOWA STATION TOTAL DAY/327 1989/11/23



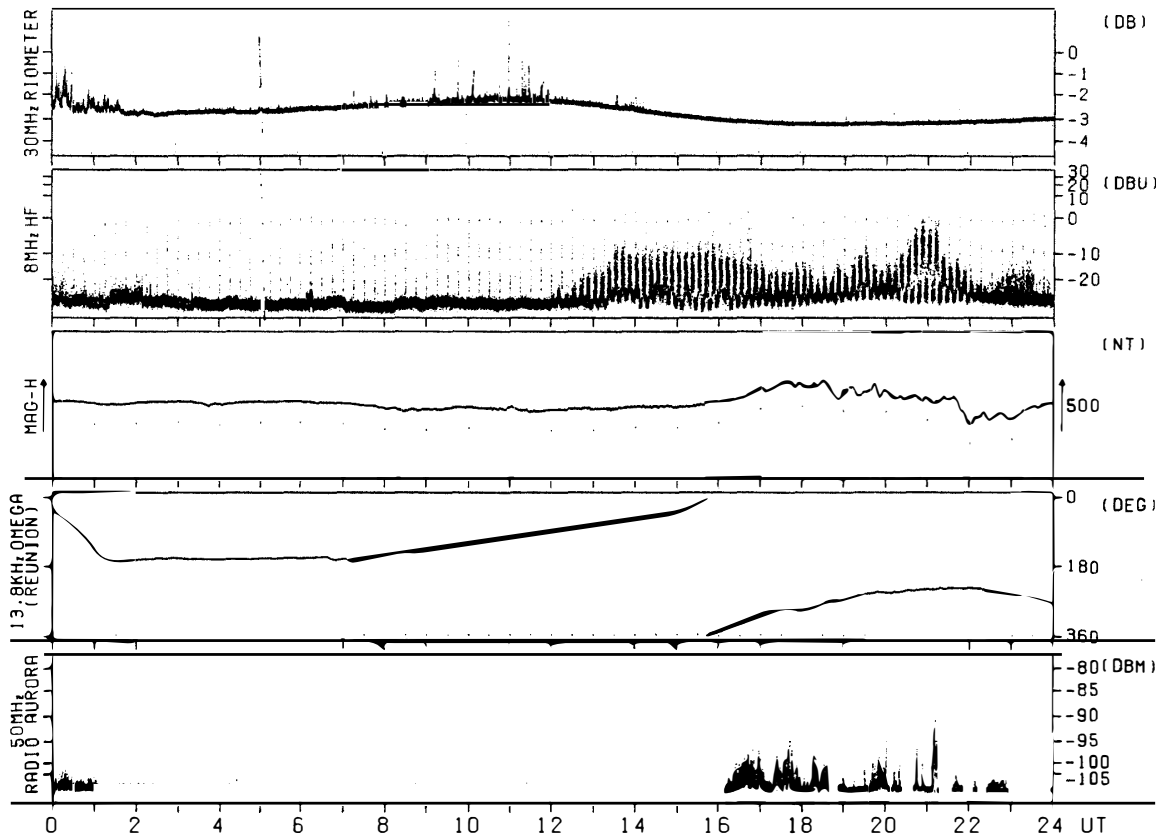
SYOWA STATION TOTAL DAY/328 1989/11/24



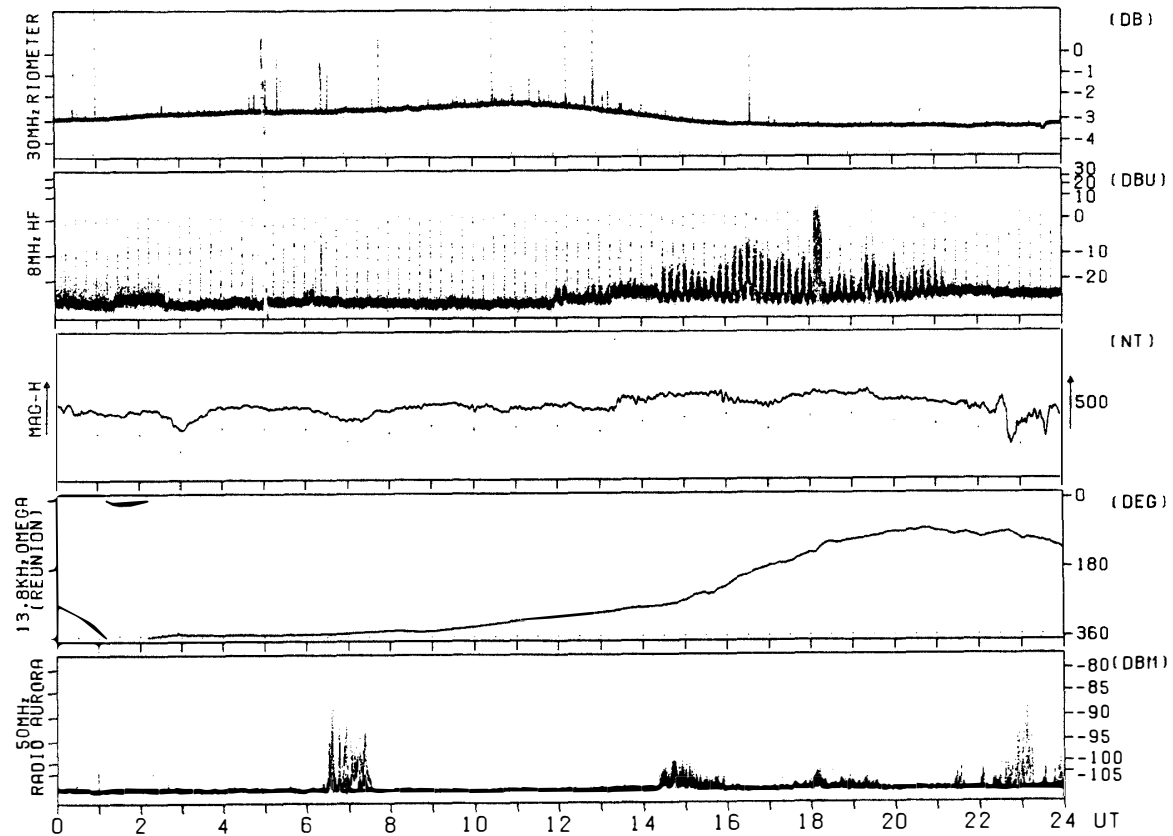
SYOWA STATION TOTAL DAY/329 1989/11/25



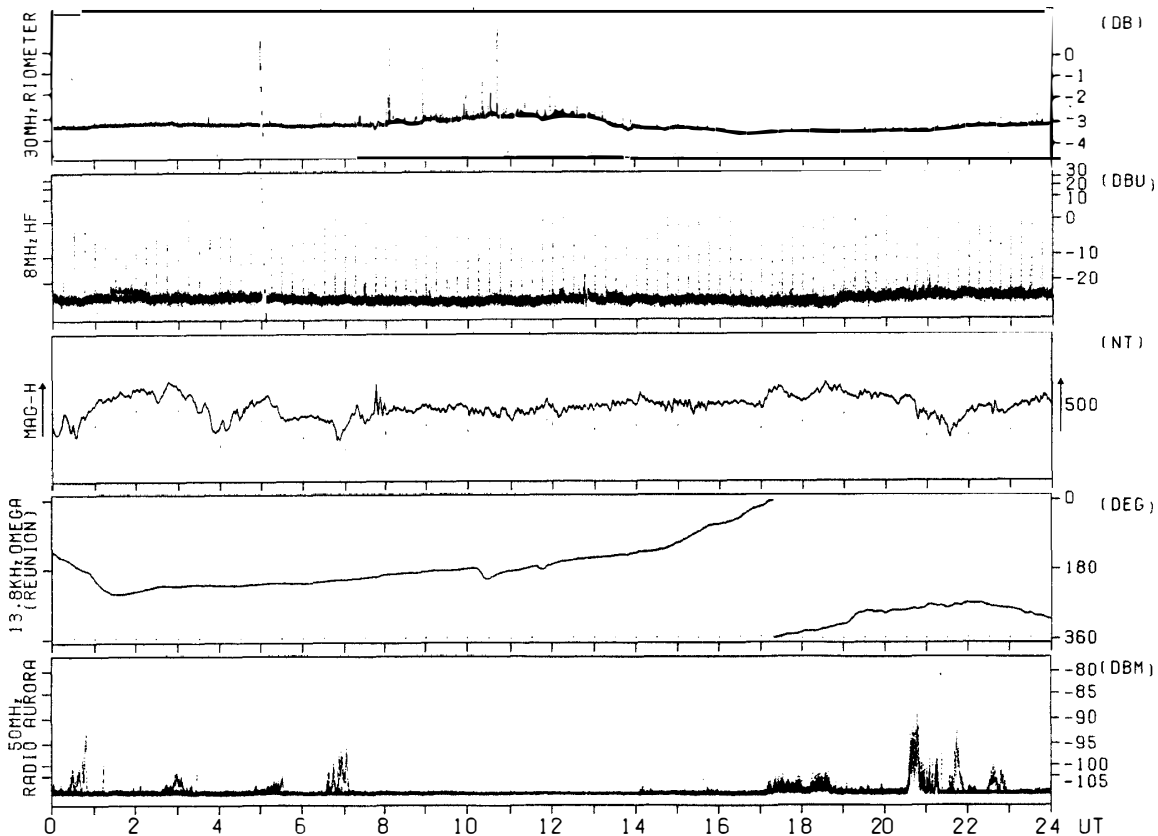
SYOWA STATION TOTAL DAY/330 1989/11/26



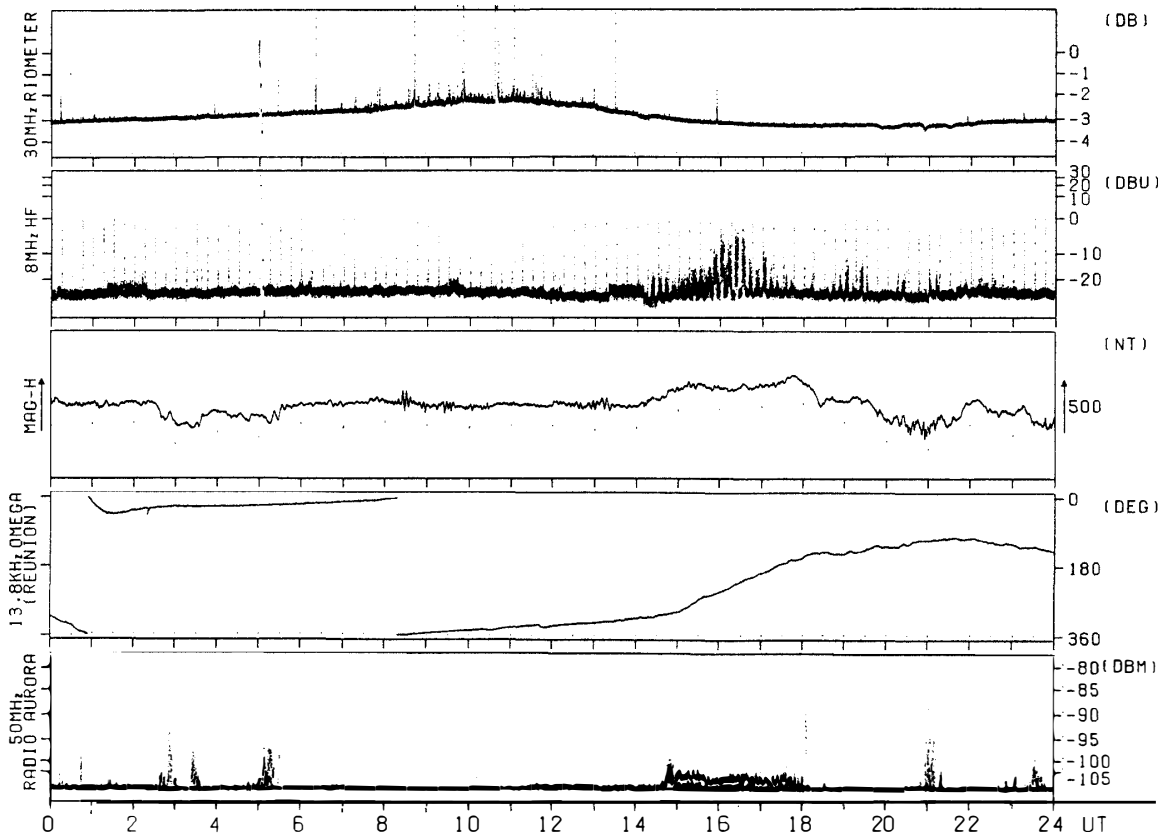
SYOWA STATION TOTAL DAY/331 1989/11/27



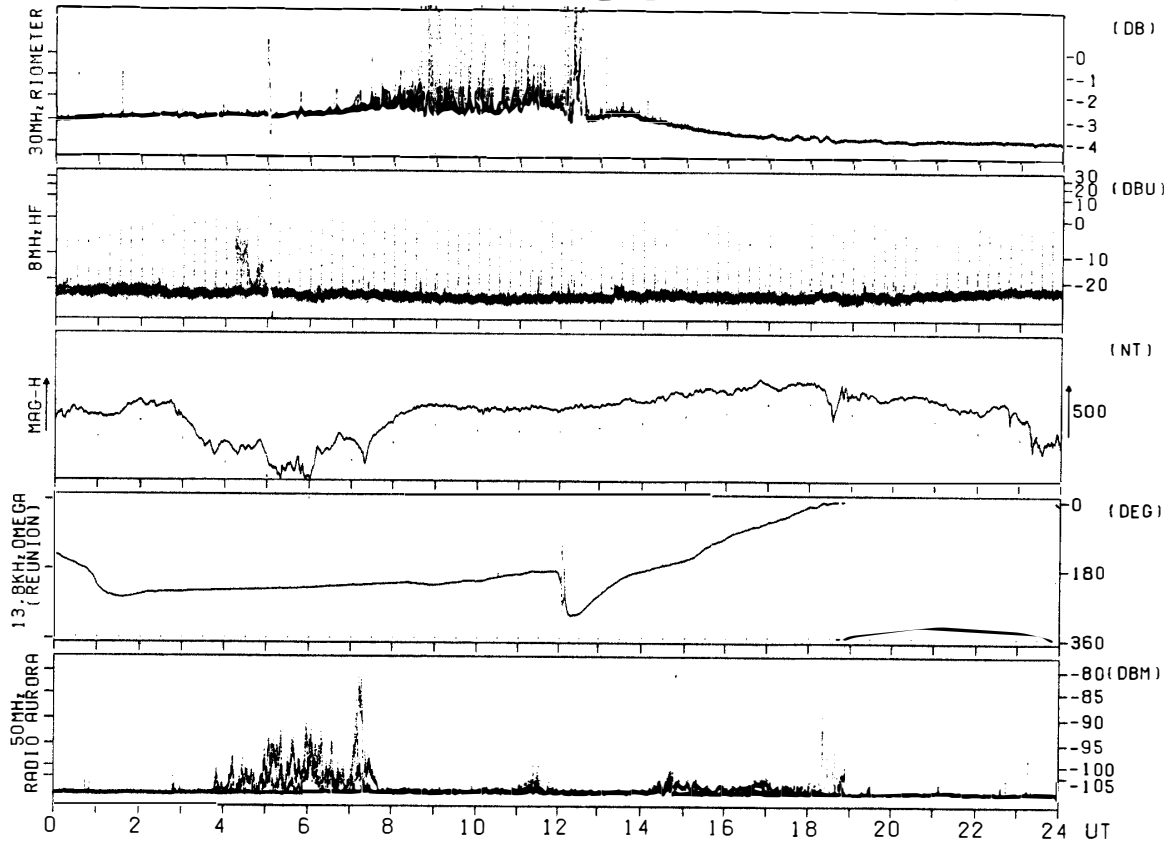
SYOWA STATION TOTAL DAY/332 1989/11/28



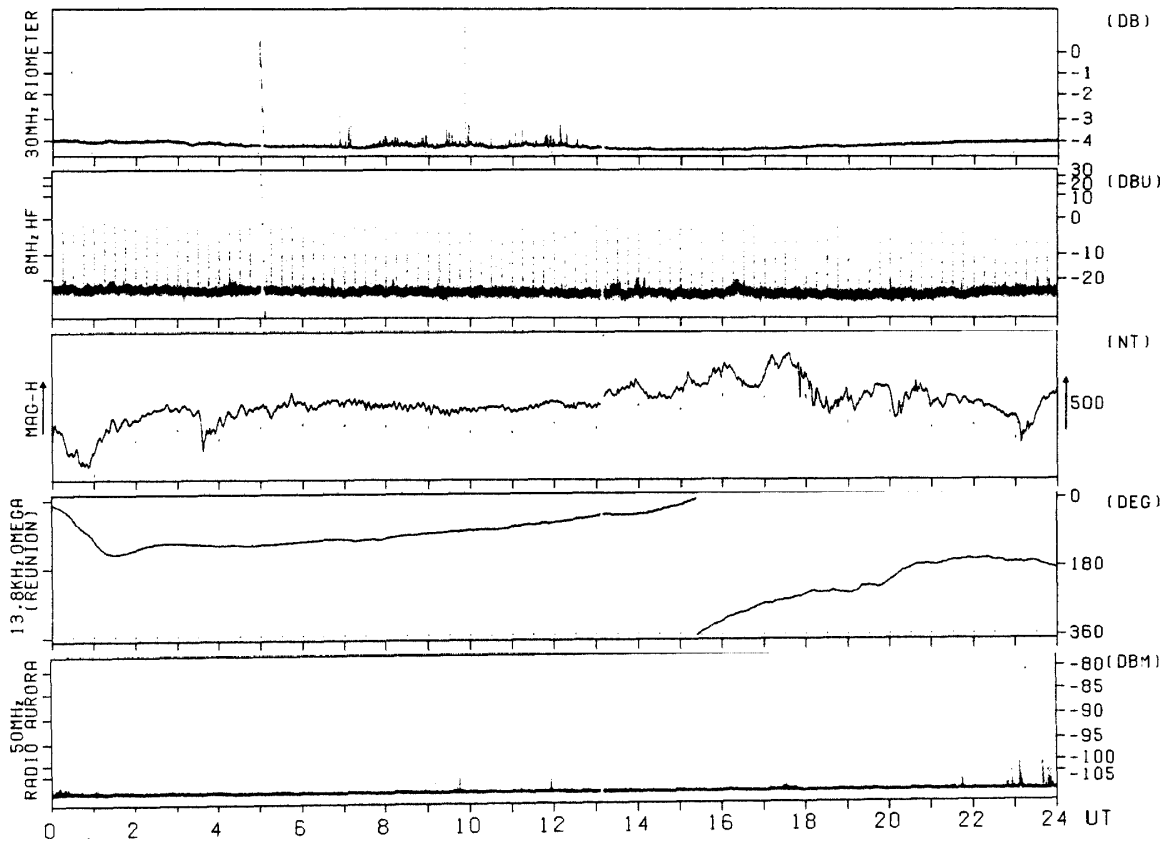
SYOWA STATION TOTAL DAY/333 1989/11/29



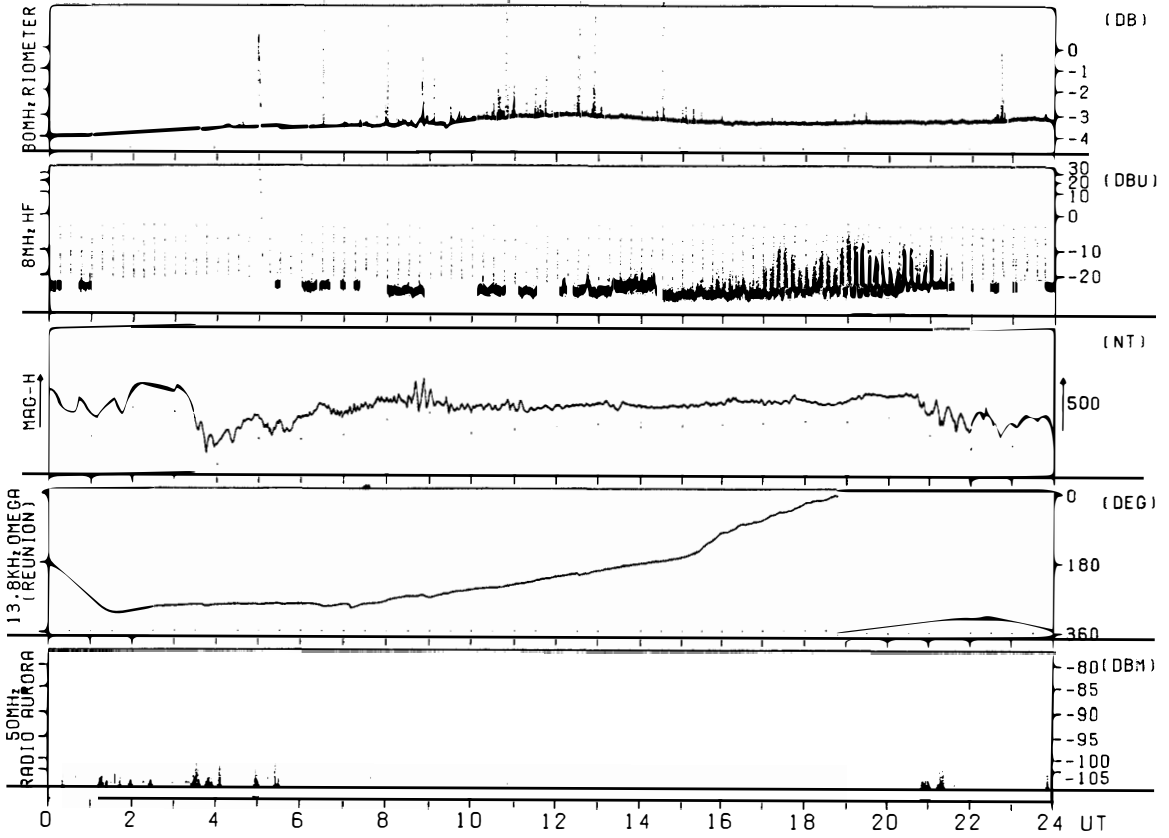
SYOWA STATION TOTAL DAY/334 1989/11/30



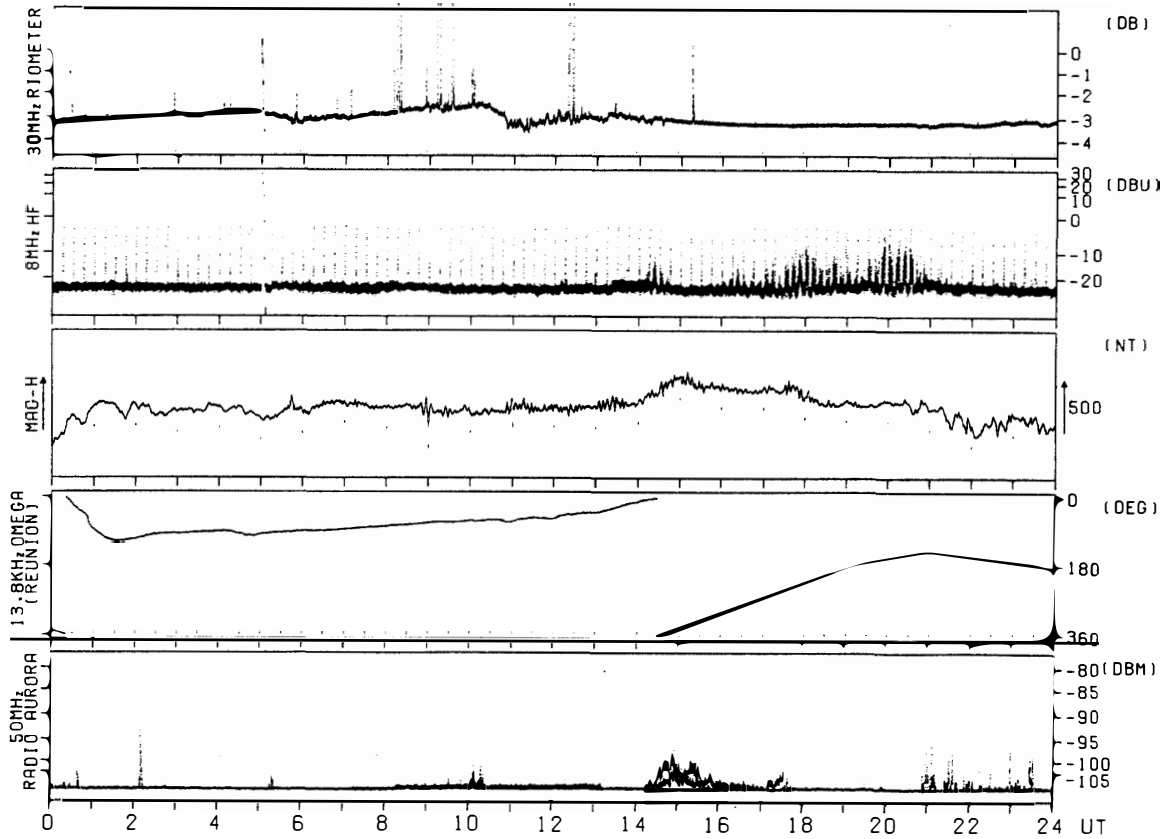
SYOWA STATION TOTAL DAY/335 1989/12/1



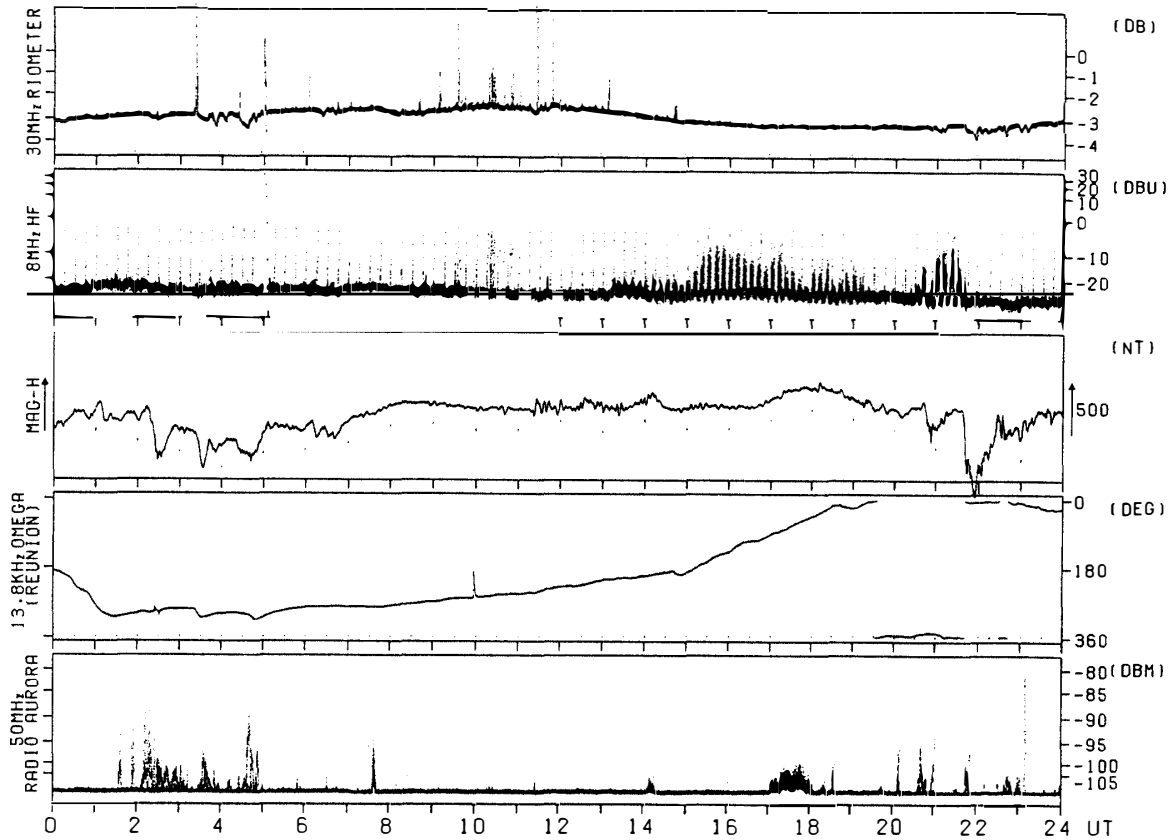
SYOWA STATION TOTAL DAY/336 1989/12/2



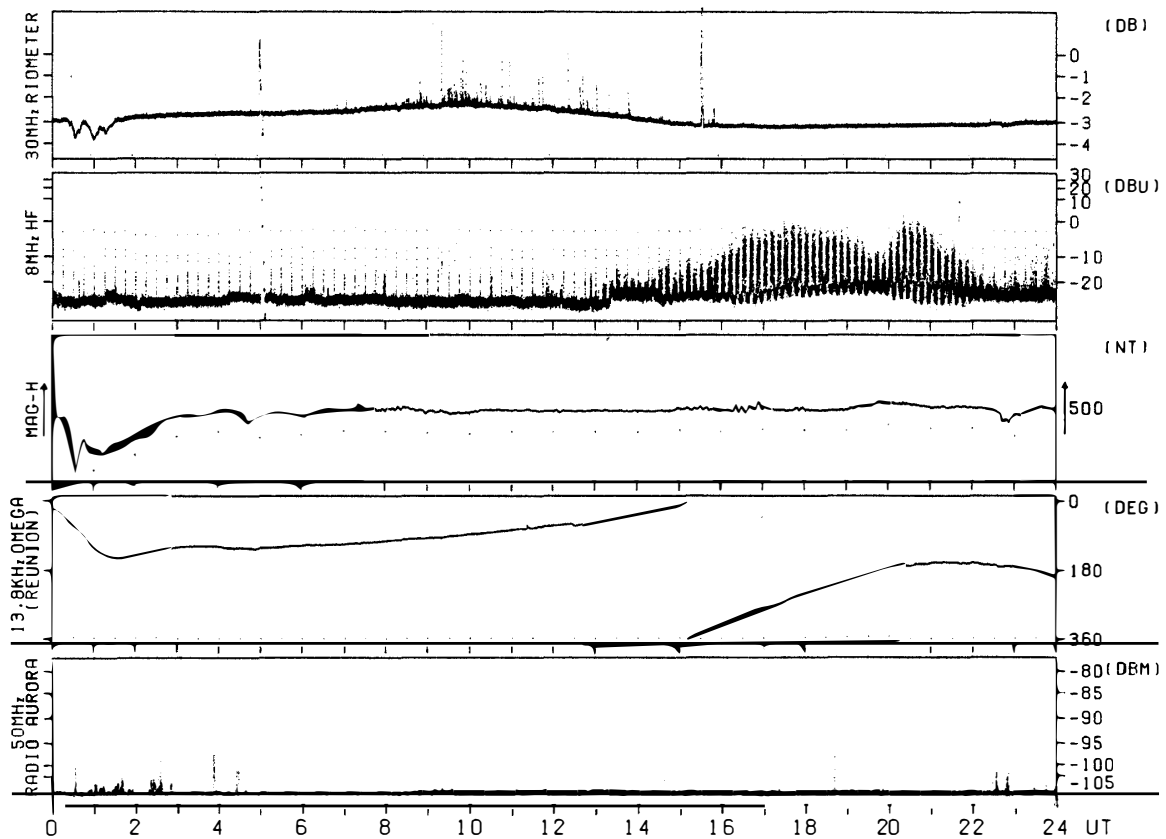
SYOWA STATION TOTAL DAY/337 1989/12/3



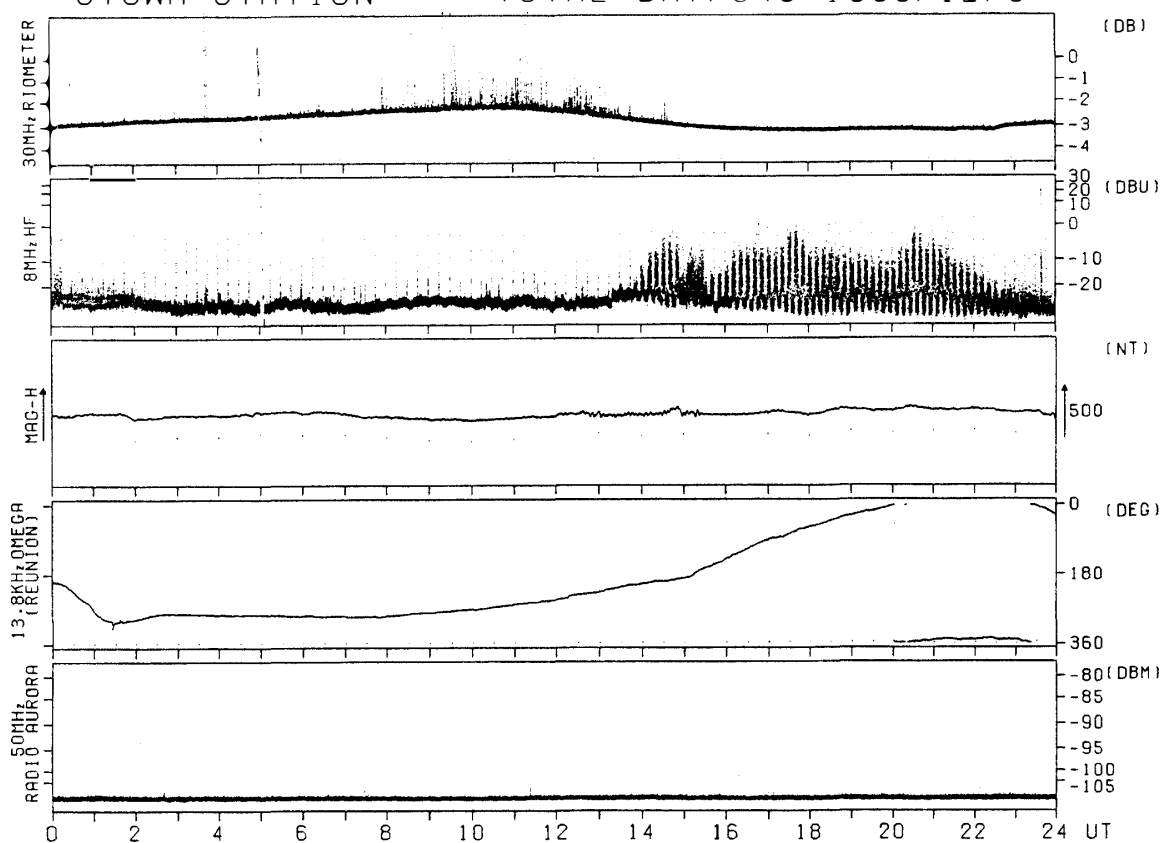
SYOWA STATION TOTAL DAY/338 1989/12/4



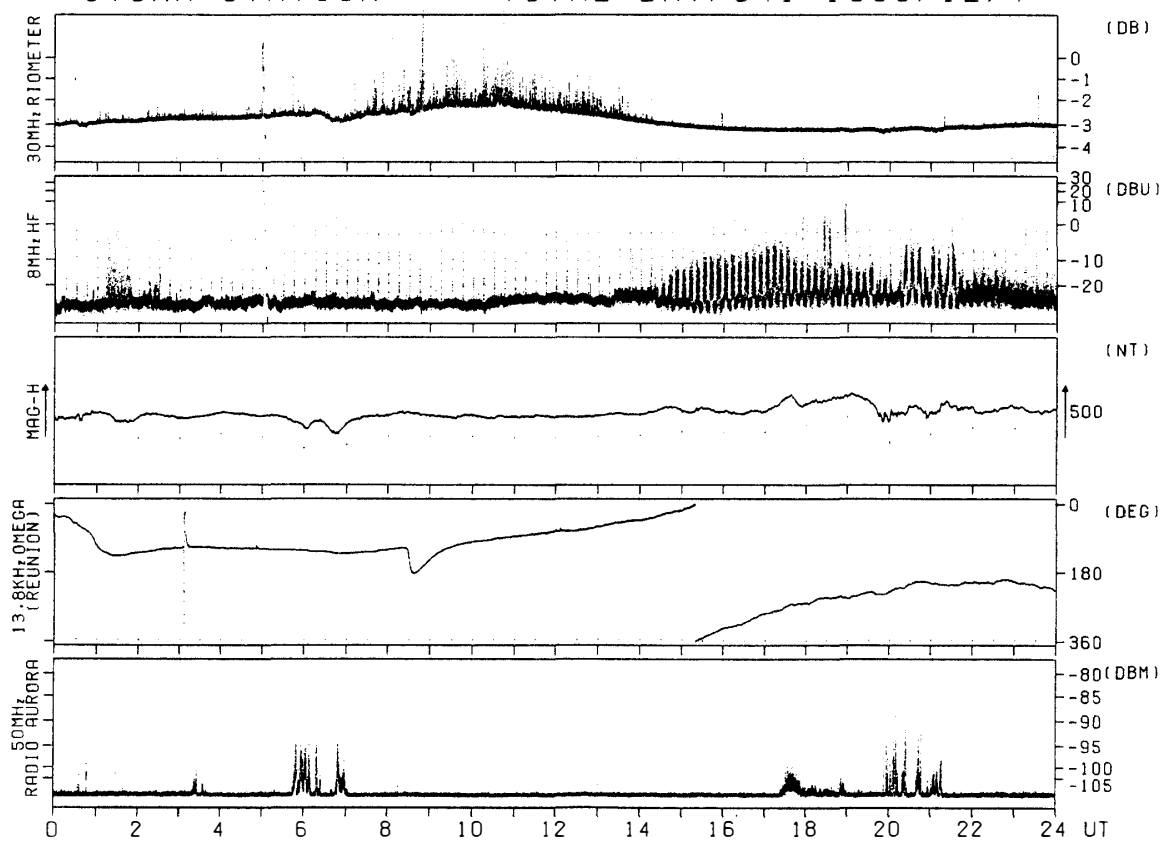
SYOWA STATION TOTAL DAY/339 1989/12/5



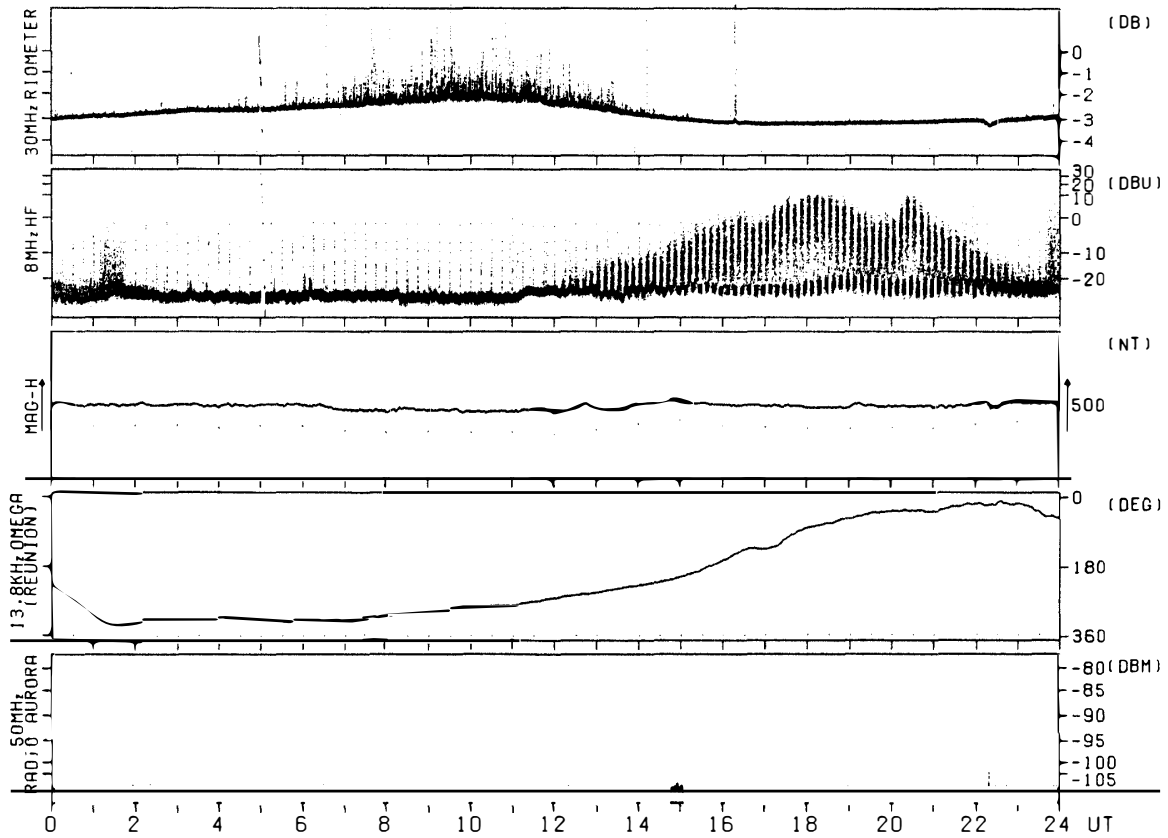
SYOWA STATION TOTAL DAY/340 1989/12/6



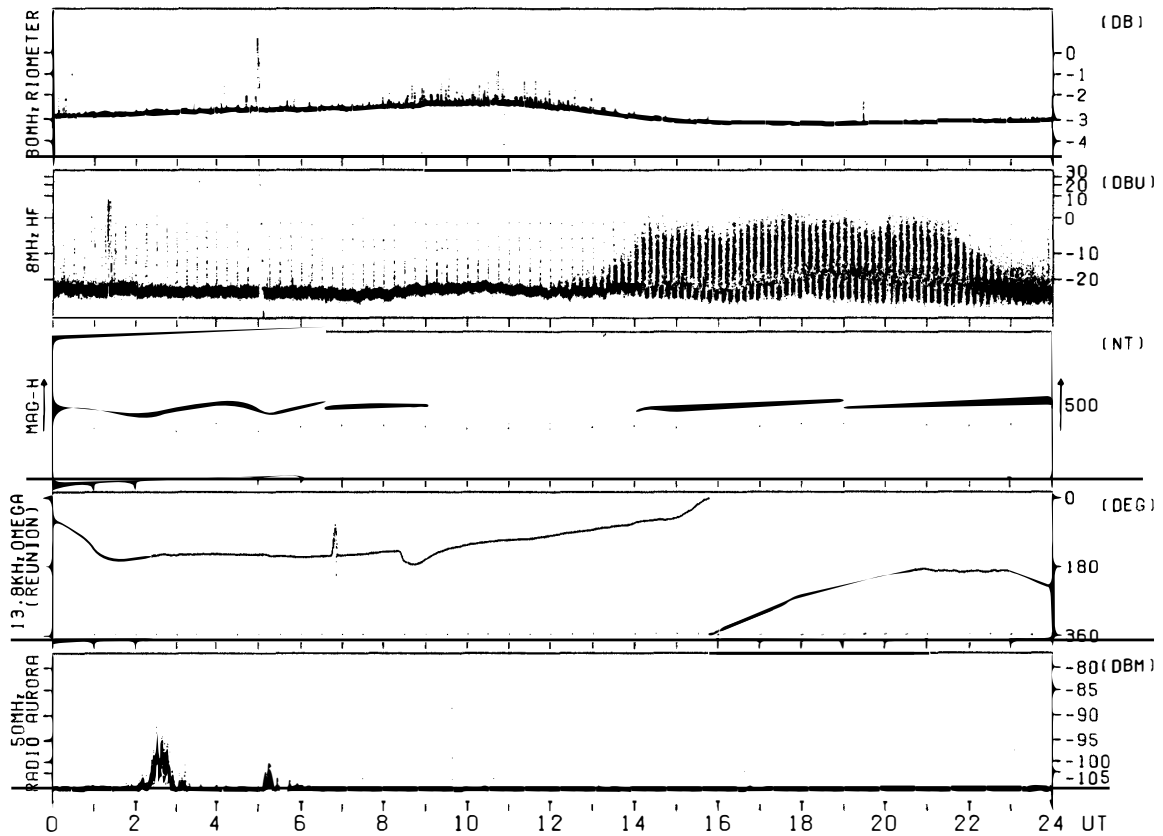
SYOWA STATION TOTAL DAY/341 1989/12/7



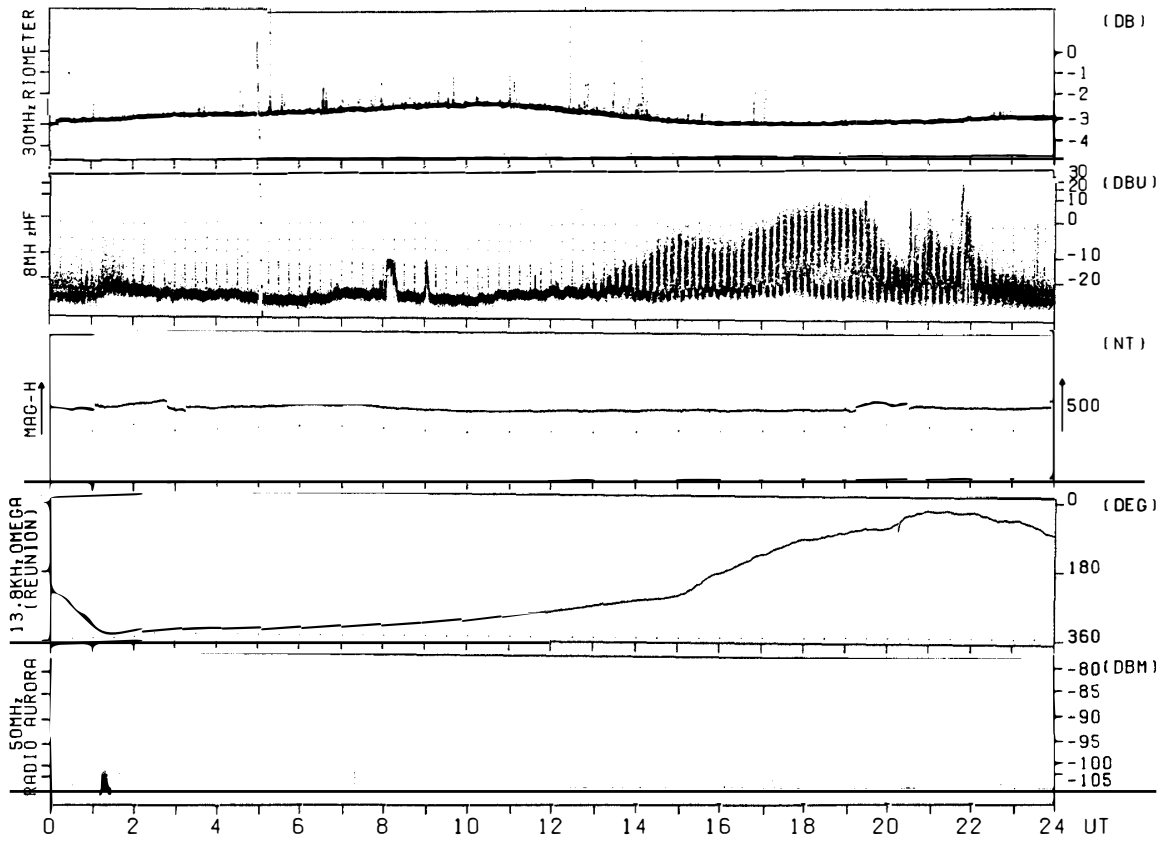
SYOWA STATION TOTAL DAY/342 1989/12/8



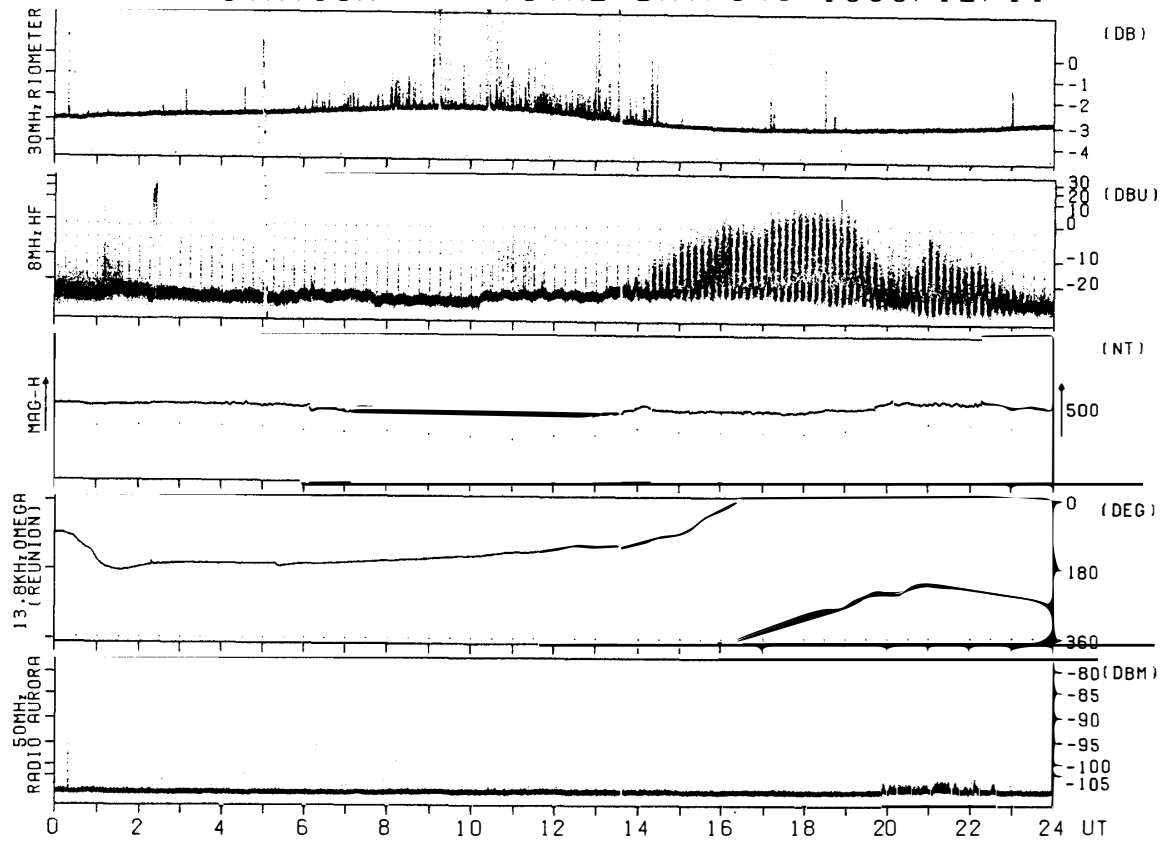
SYOWA STATION TOTAL DAY/343 1989/12/9



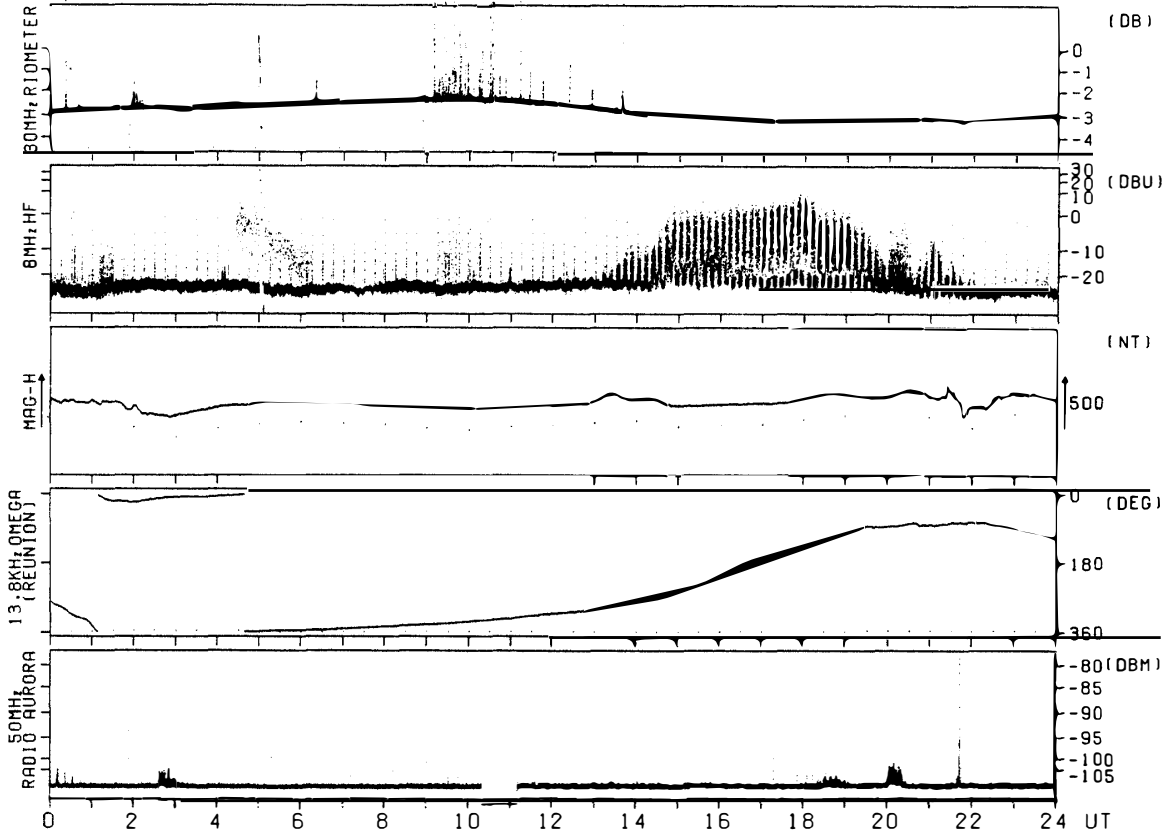
SYOWA STATION TOTAL DAY/344 1989/12/10



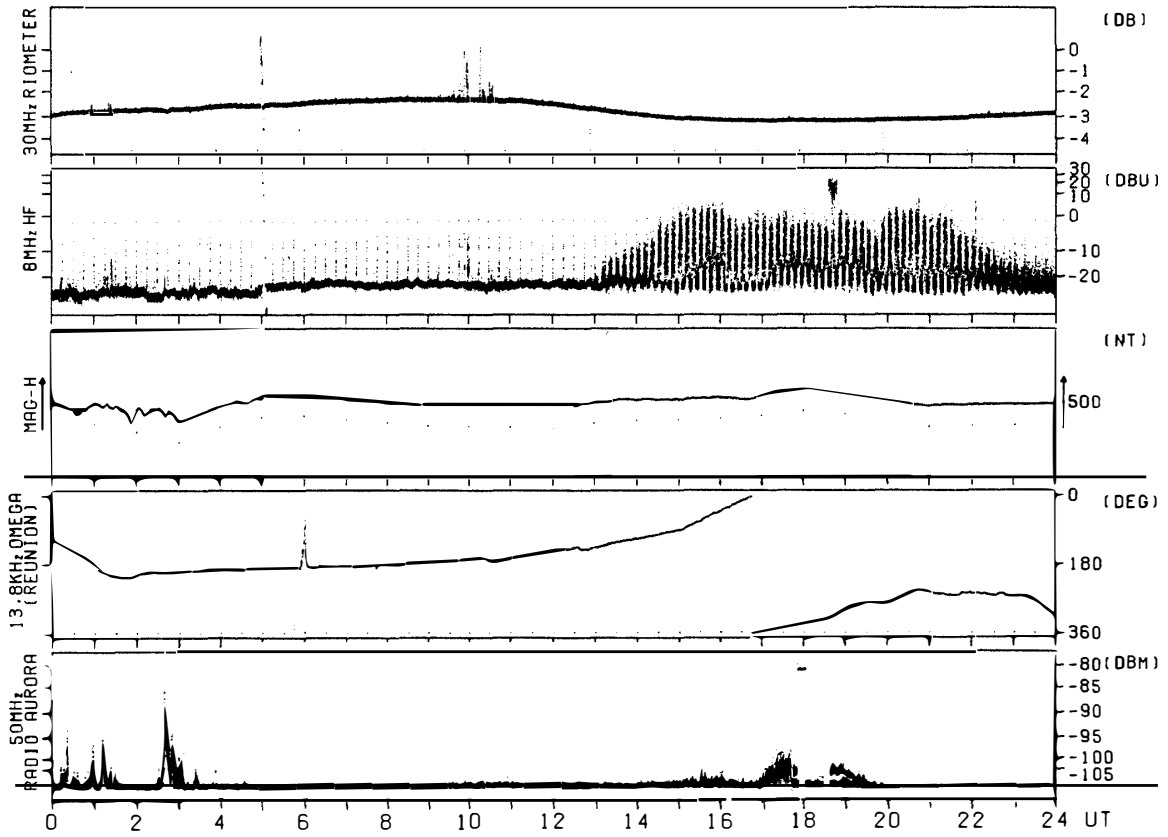
SYOWA STATION TOTAL DAY/345 1989/12/11



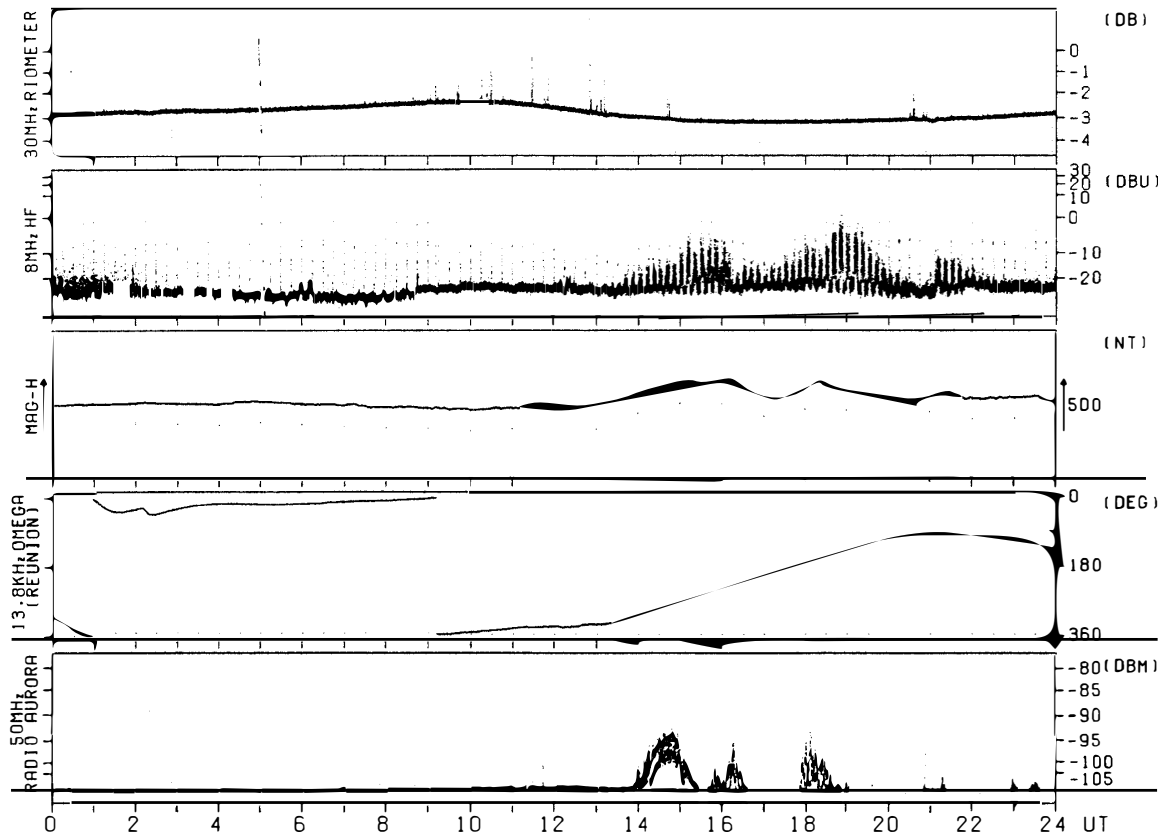
SYOWA STATION TOTAL DAY/346 1989/12/12



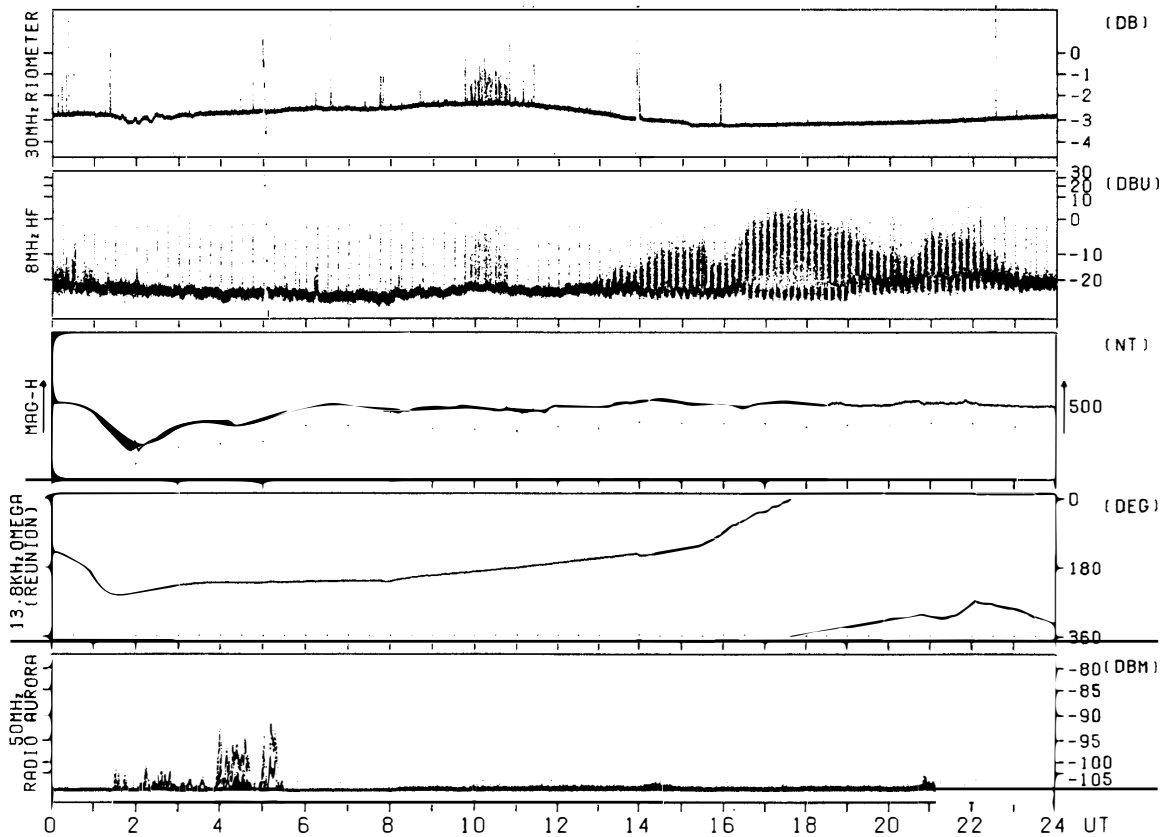
SYOWA STATION TOTAL DAY/347 1989/12/13



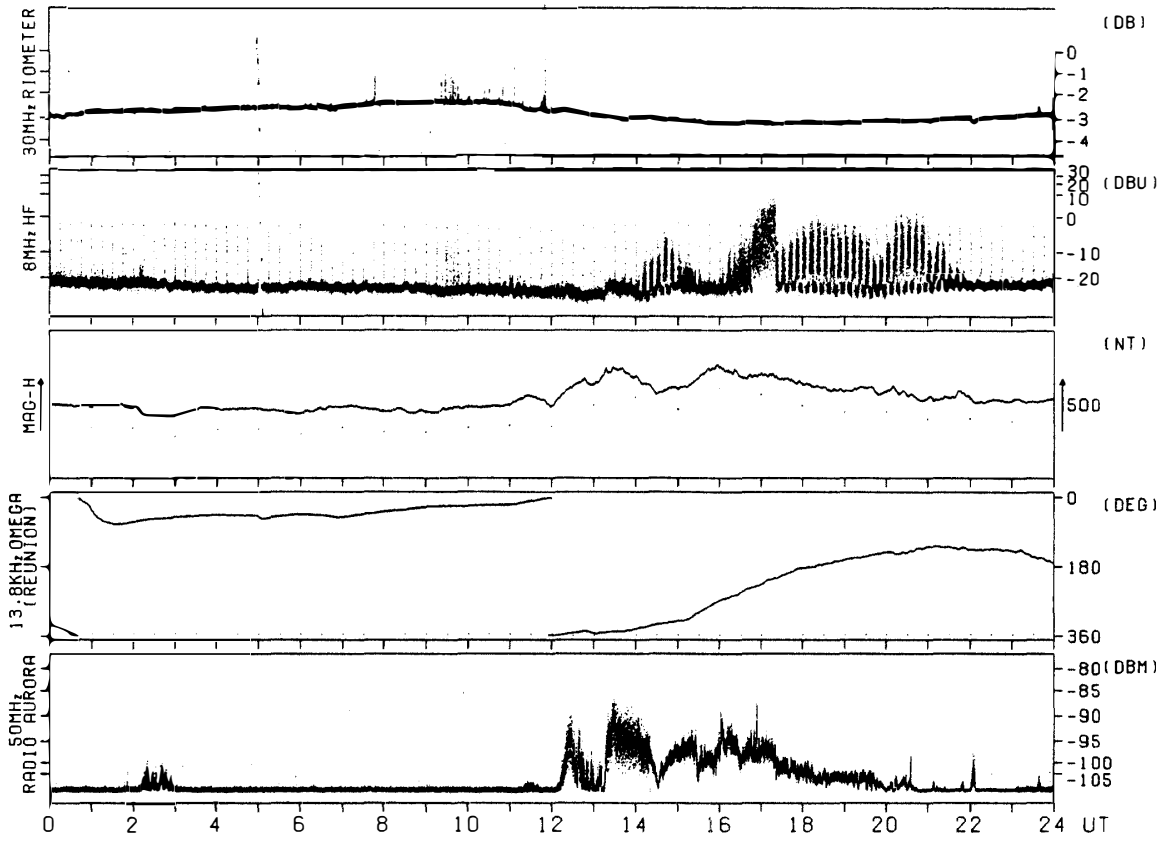
SYOWA STATION TOTAL DAY/348 1989/12/14



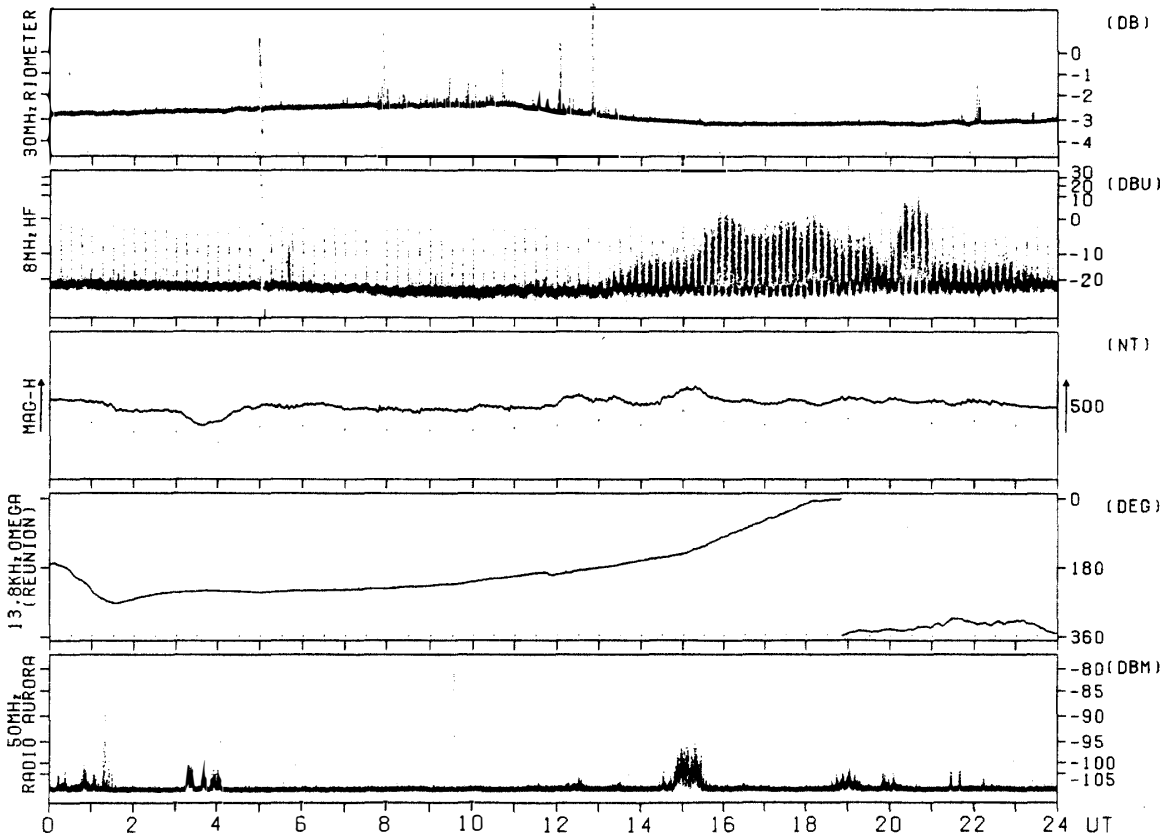
SYOWA STATION TOTAL DAY/349 1989/12/15



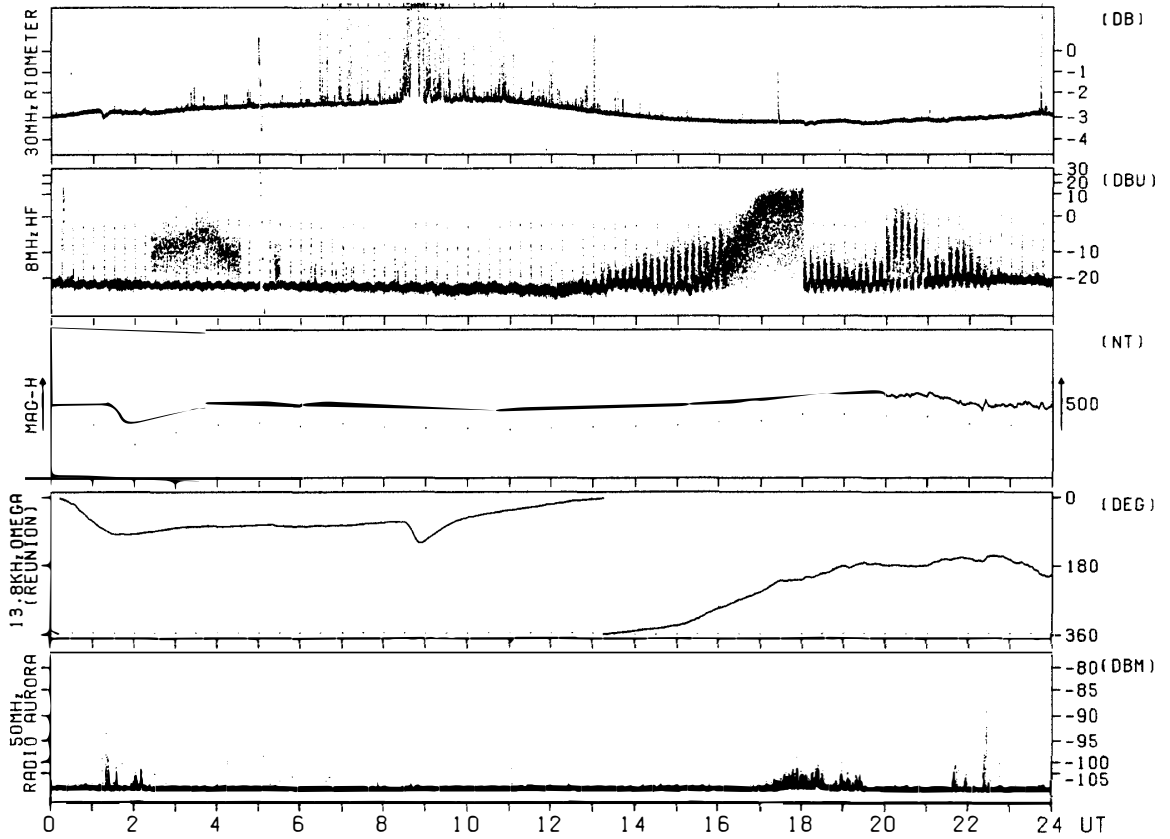
SYOWA STATION TOTAL DAY/350 1989/12/16



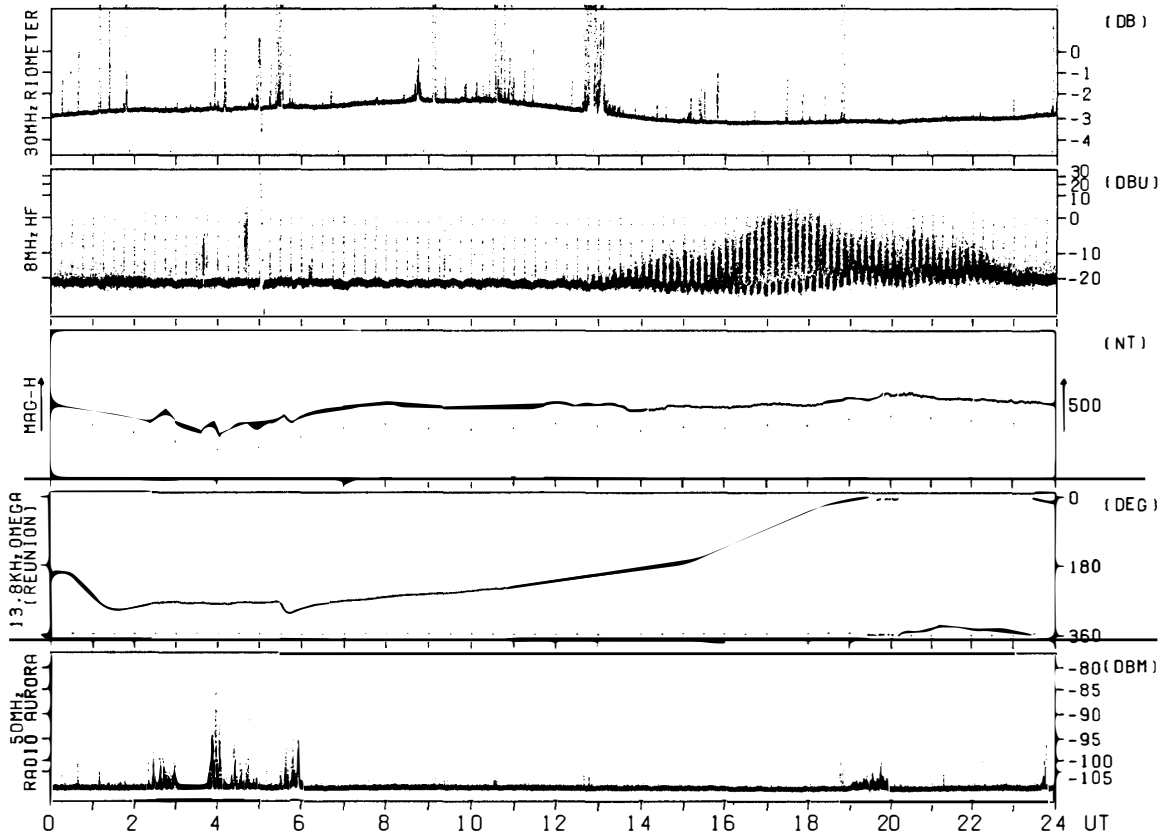
SYOWA STATION TOTAL DAY/351 1989/12/17



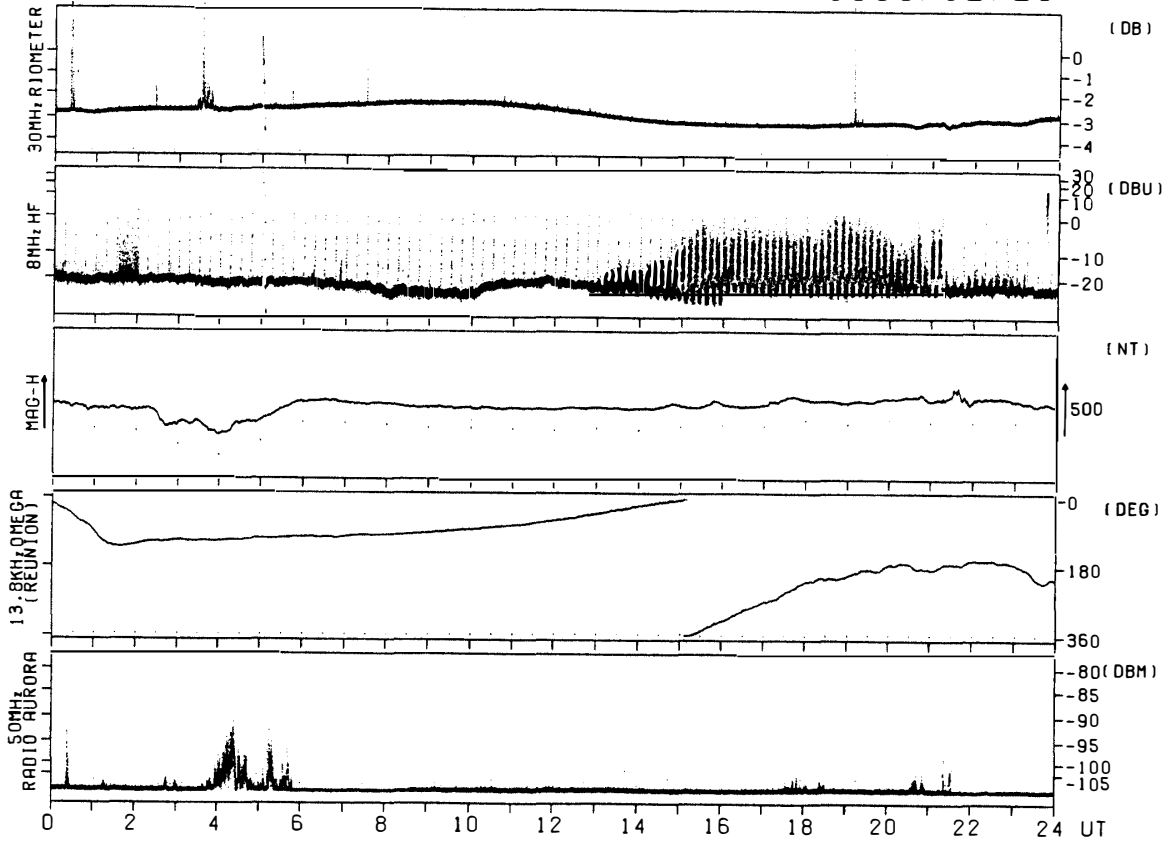
SYOWA STATION TOTAL DAY/352 1989/12/18



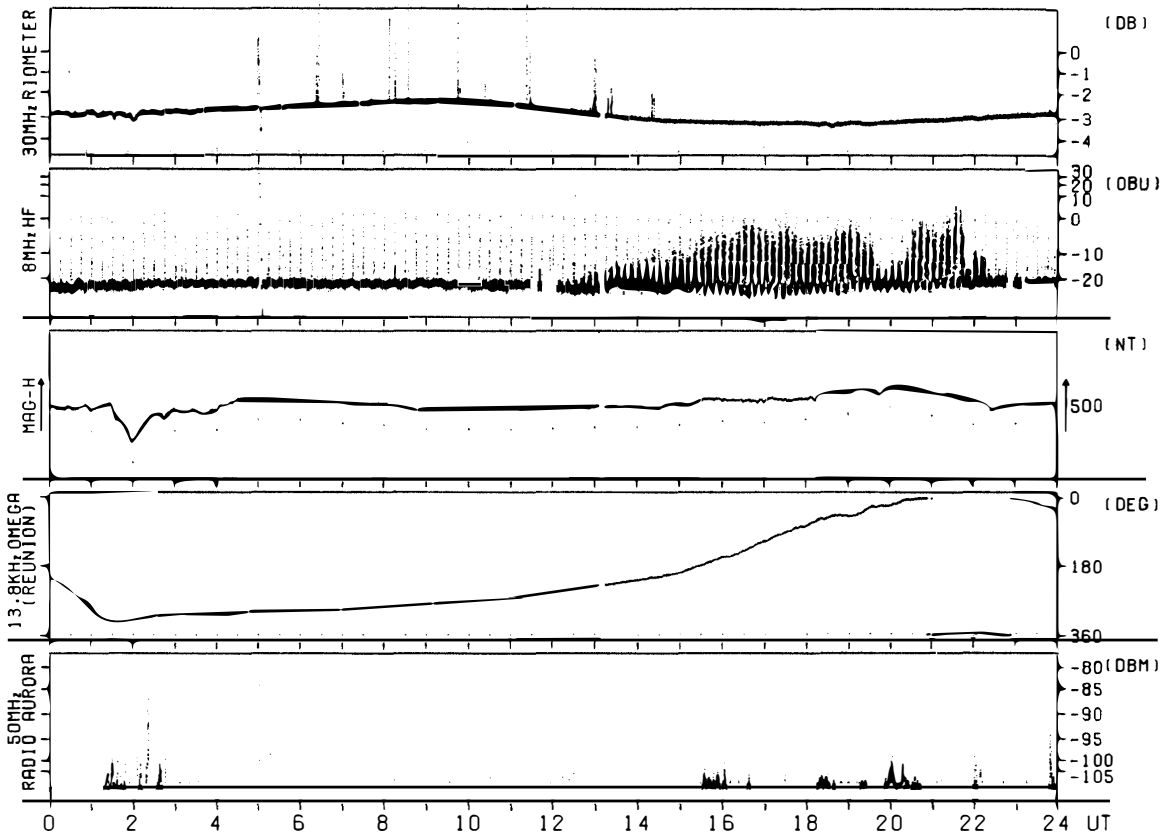
SYOWA STATION TOTAL DAY/353 1989/12/19



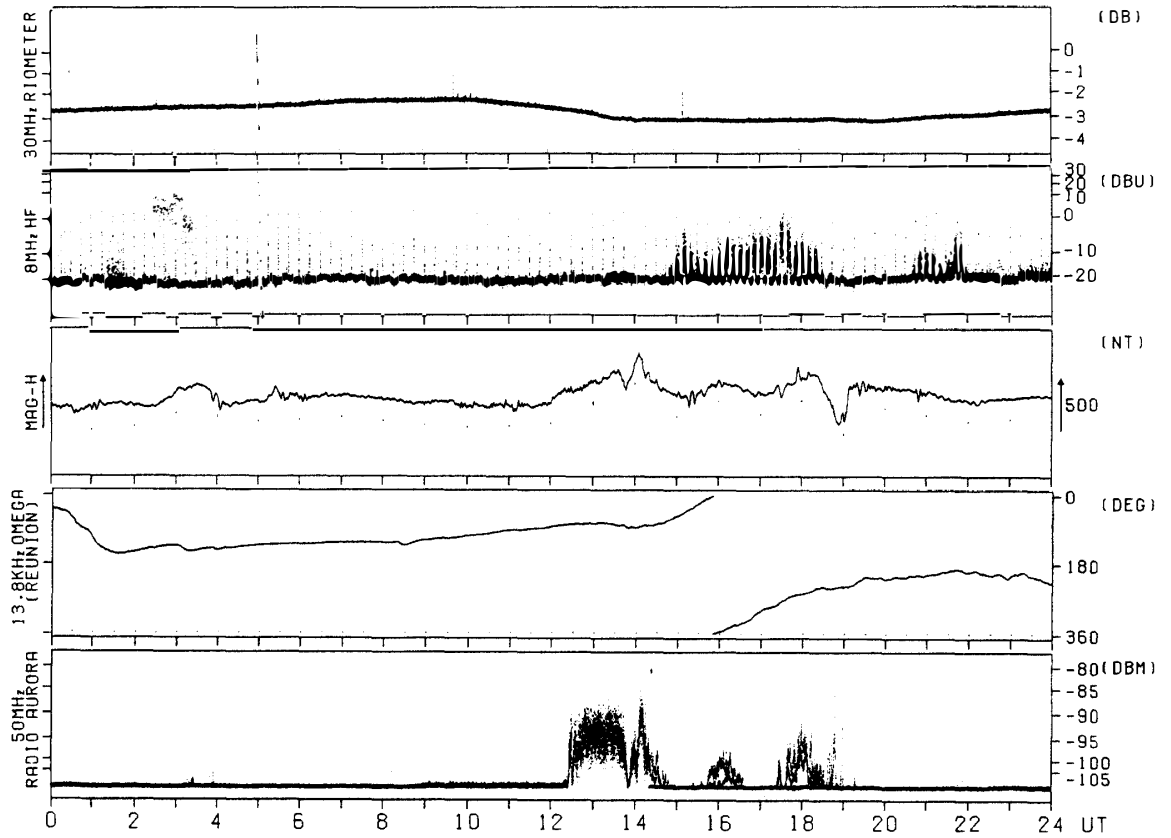
SYOWA STATION TOTAL DAY/354 1989/12/20



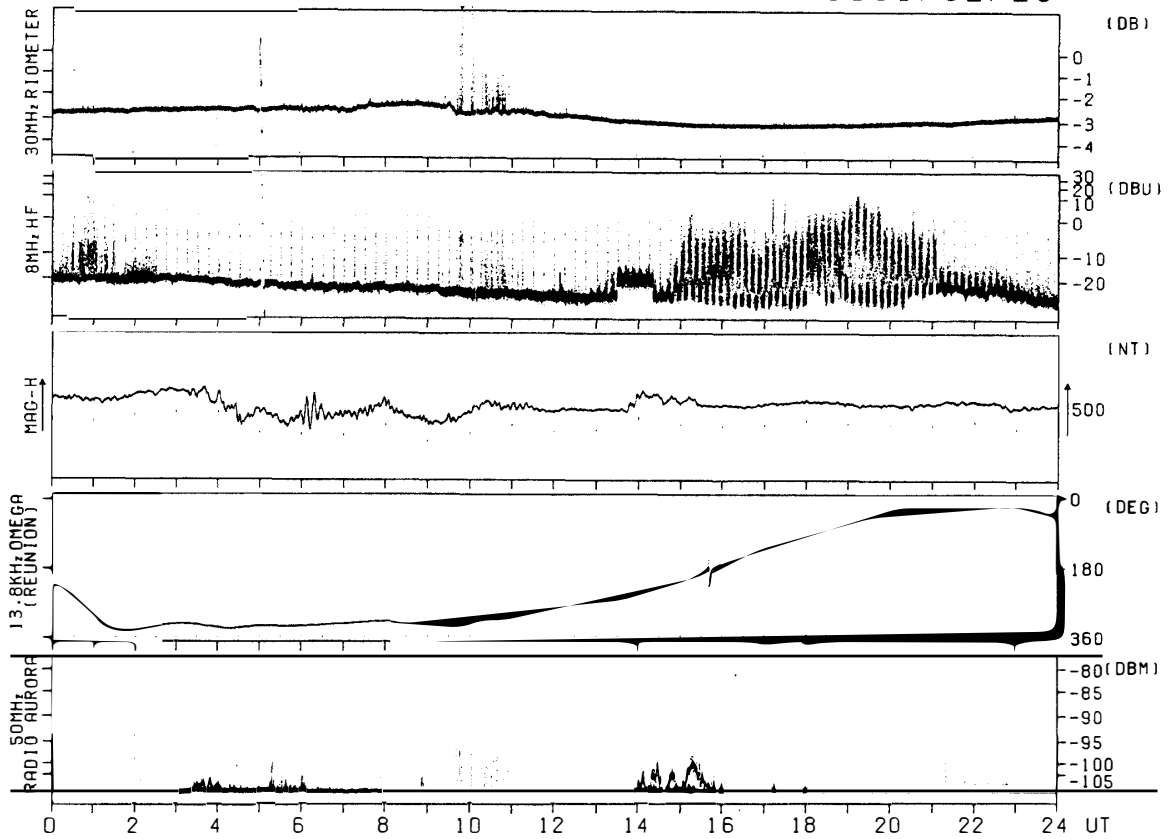
SYOWA STATION TOTAL DAY/355 1989/12/21



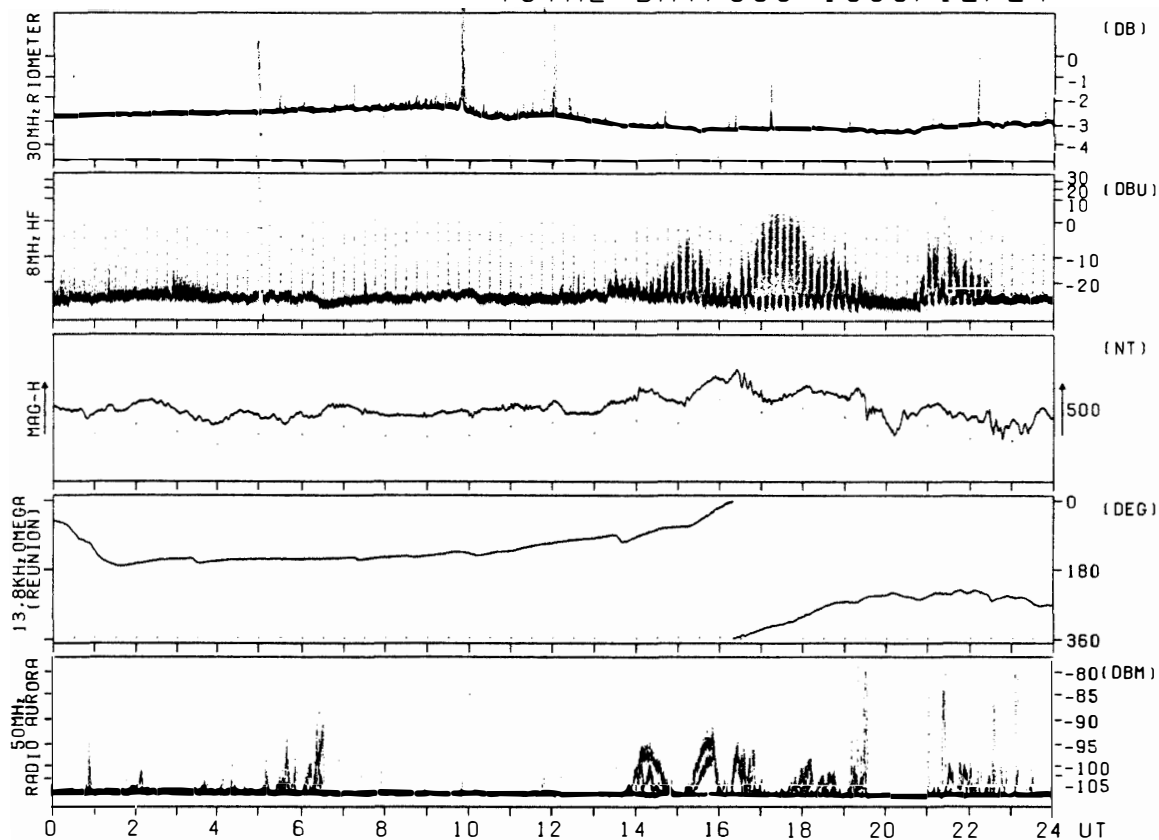
SYOWA STATION TOTAL DAY/356 1989/12/22



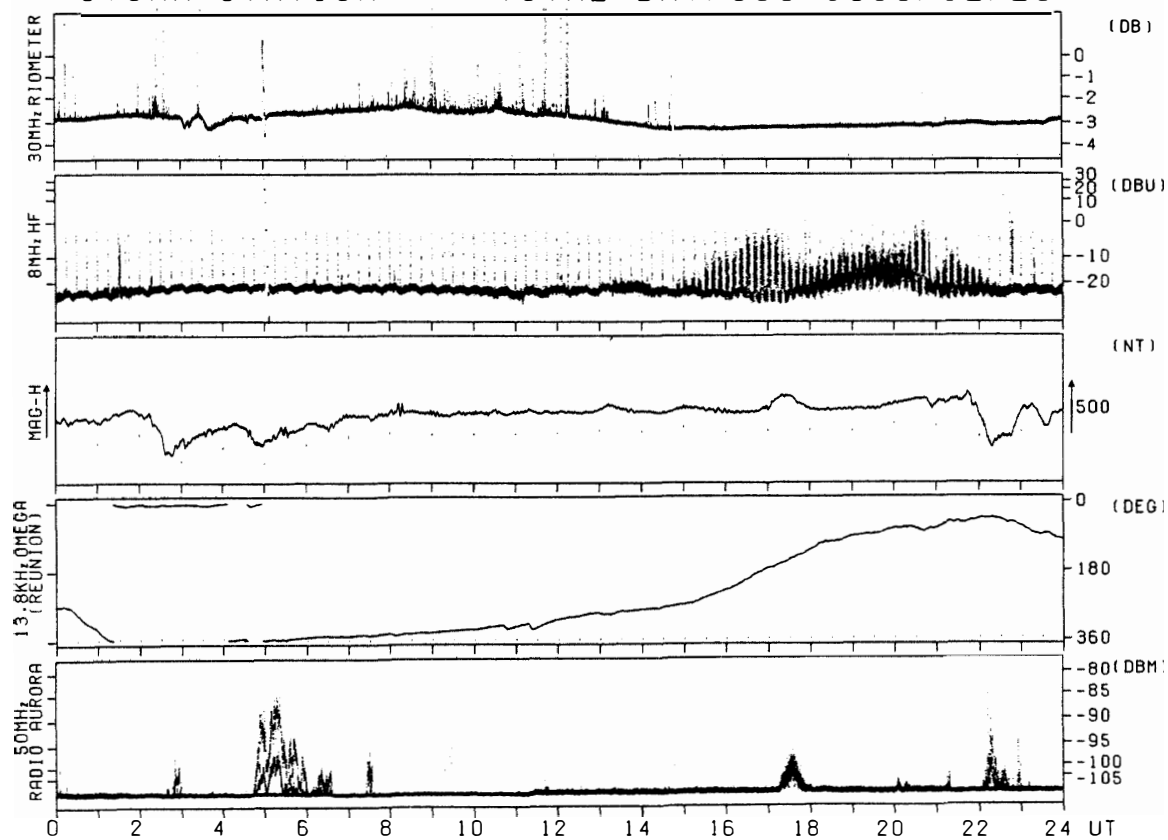
SYOWA STATION TOTAL DAY/357 1989/12/23



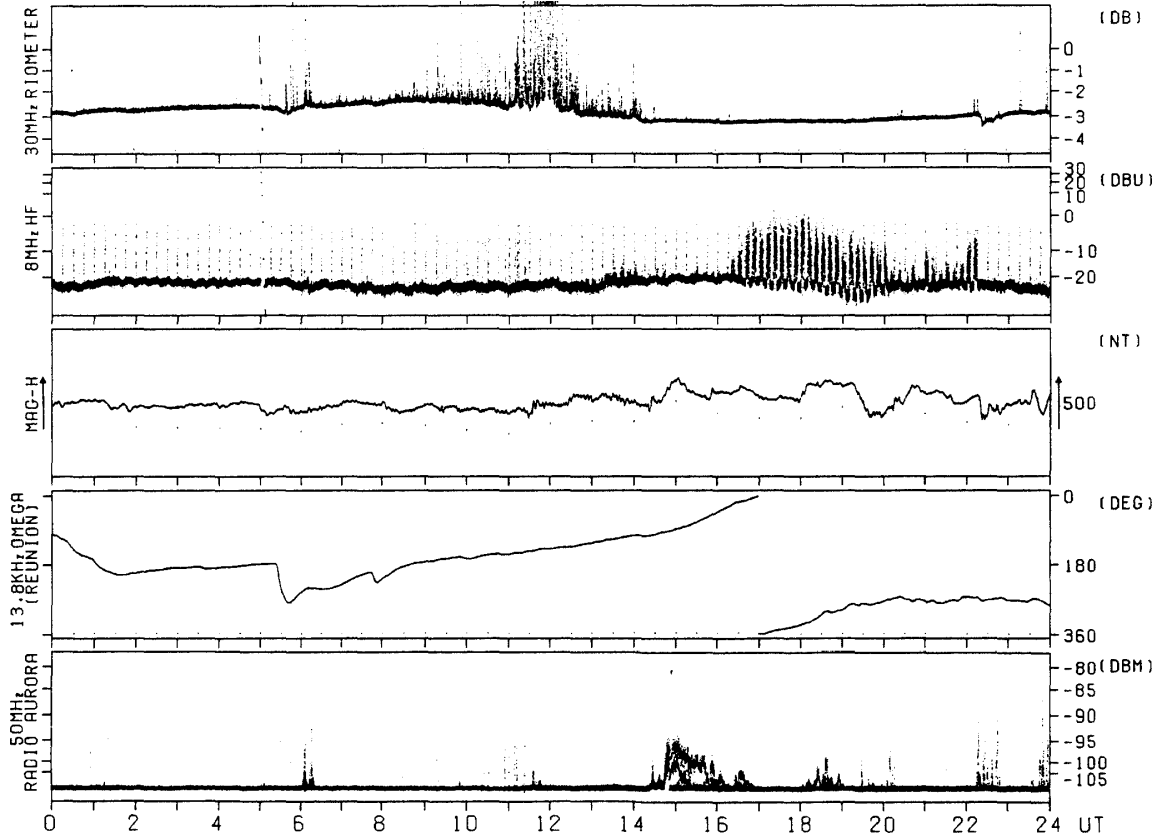
SYOWA STATION TOTAL DAY/358 1989/12/24



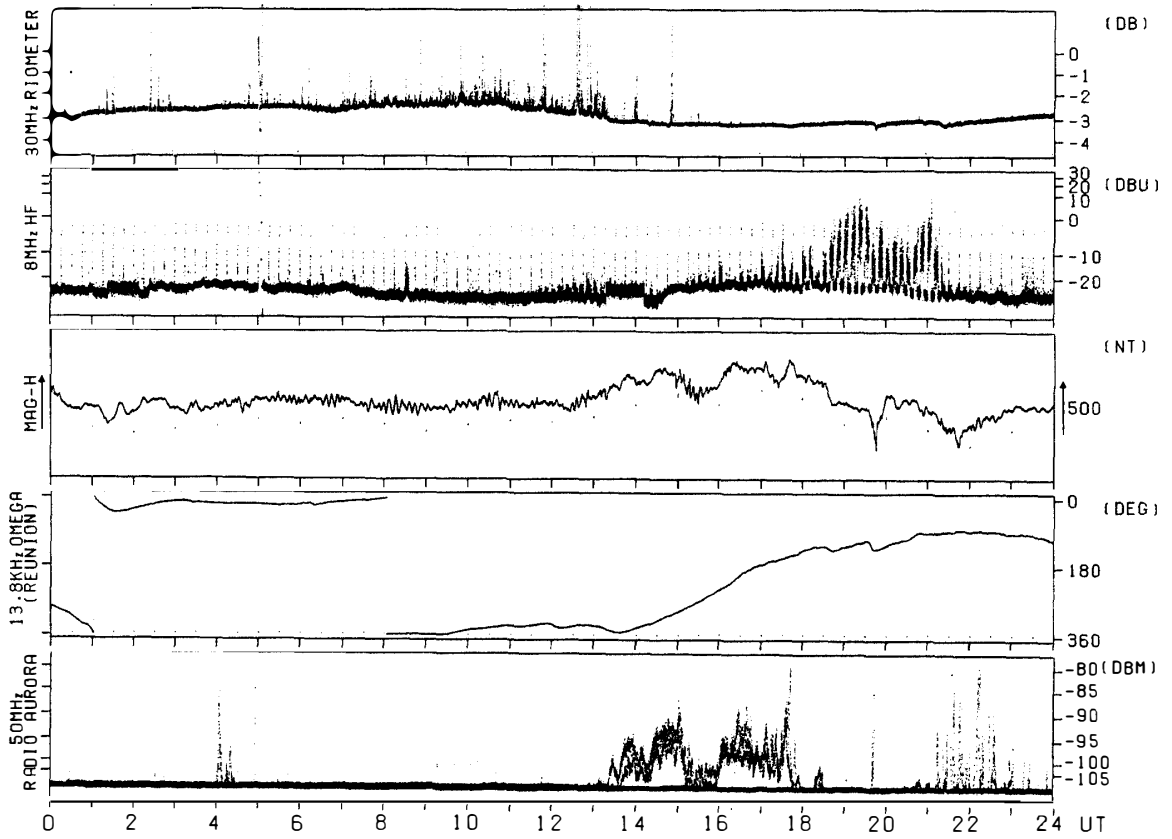
SYOWA STATION TOTAL DAY/359 1989/12/25



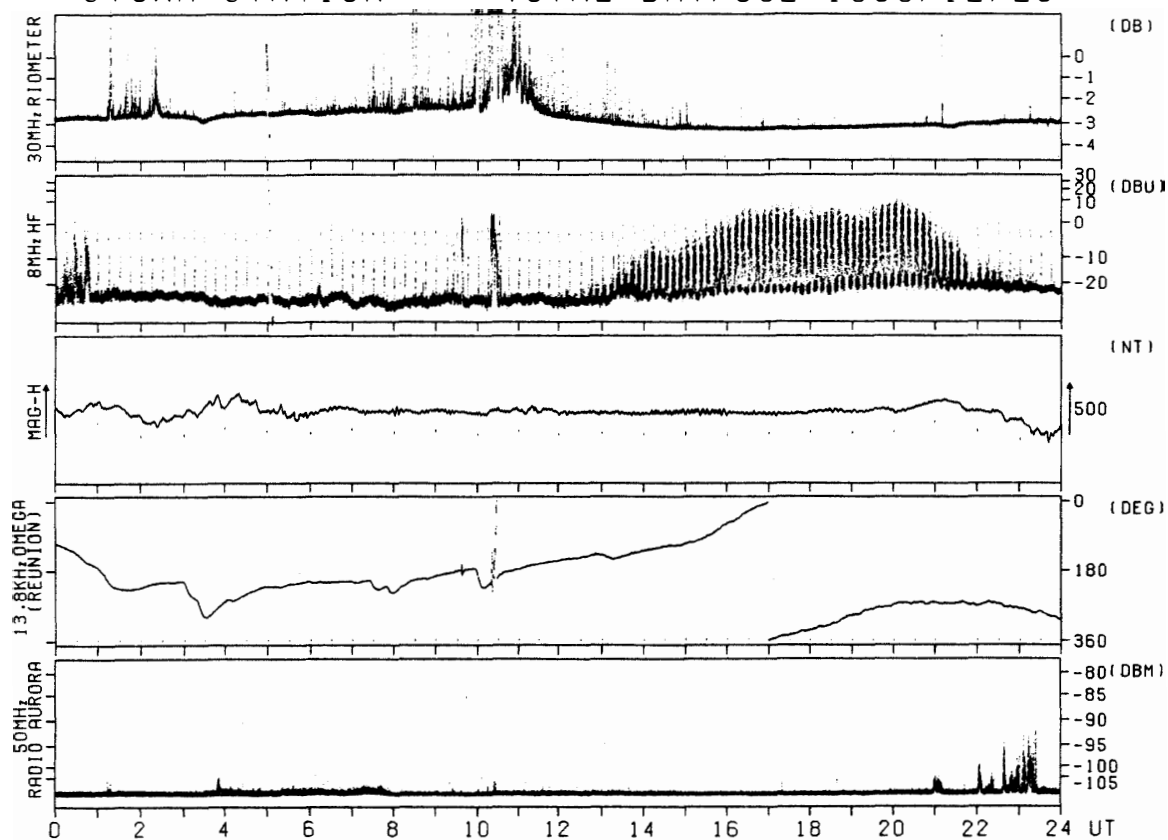
SYOWA STATION TOTAL DAY/360 1989/12/26



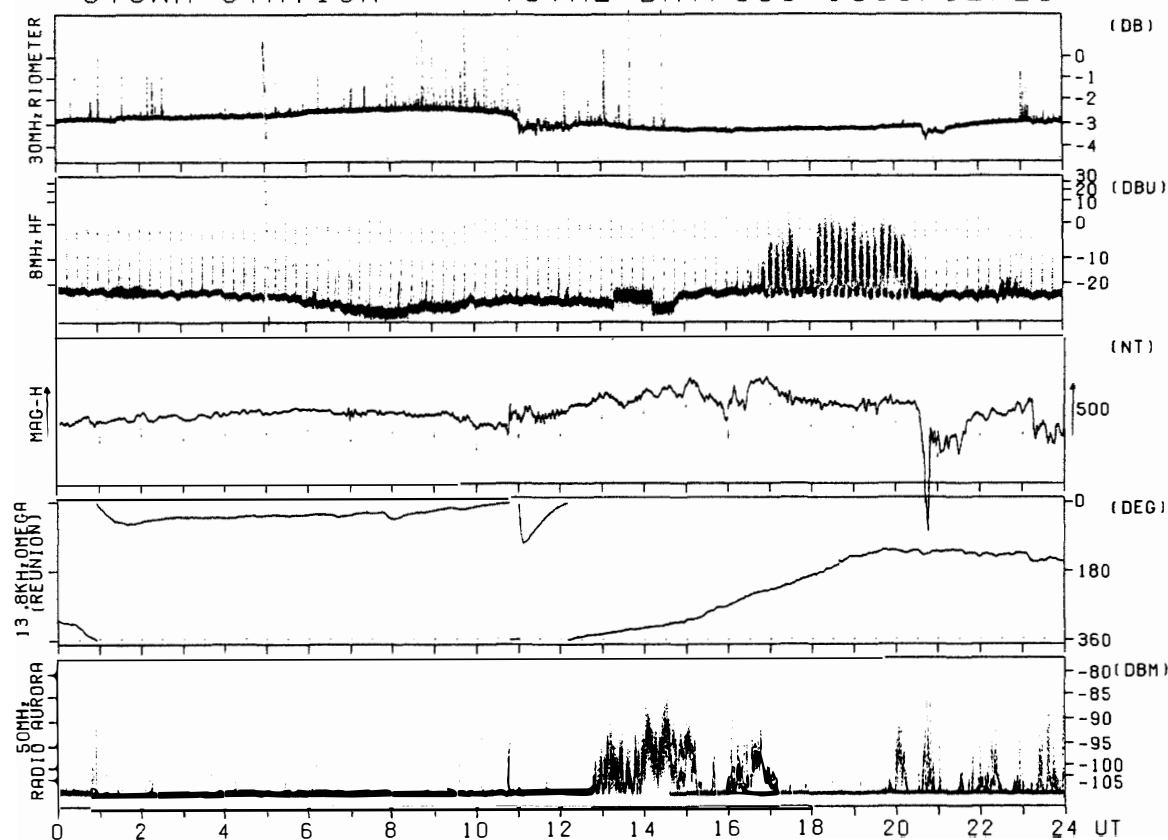
SYOWA STATION TOTAL DAY/361 1989/12/27



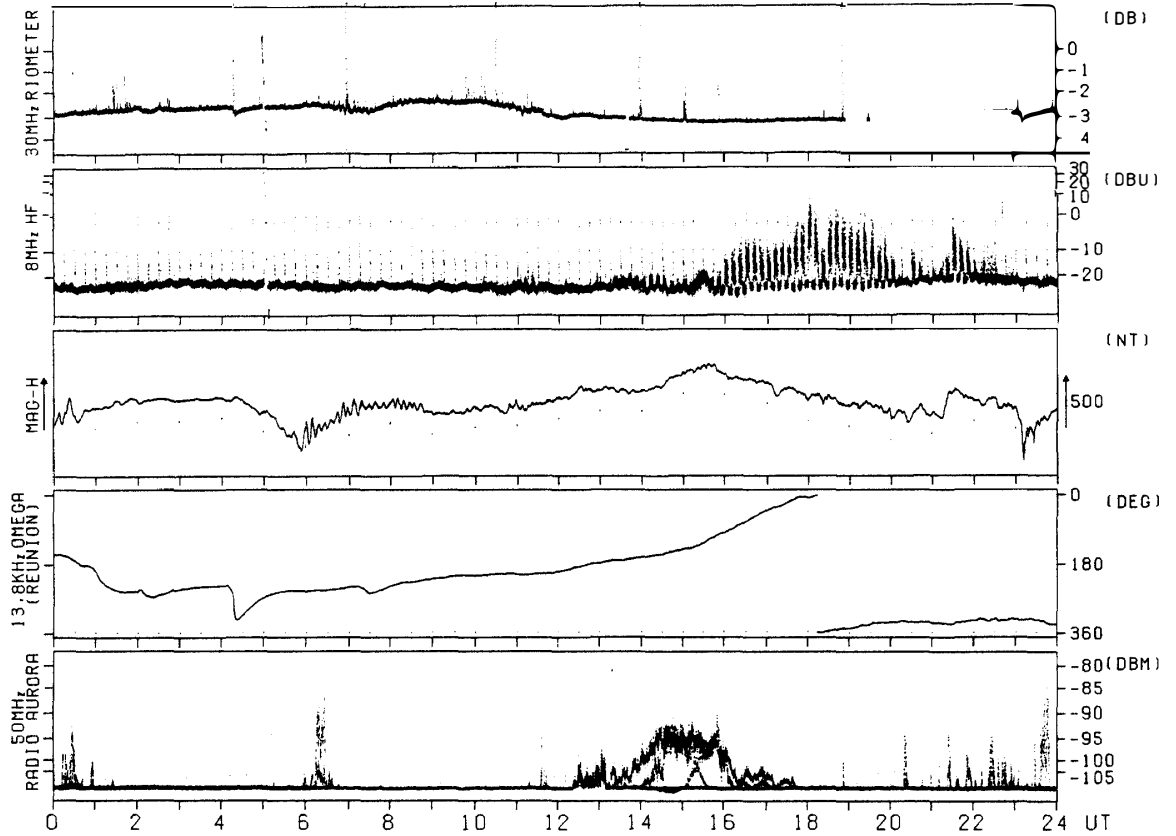
SYOWA STATION TOTAL DAY/362 1989/12/28



SYOWA STATION TOTAL DAY/363 1989/12/29



SYOWA STATION TOTAL DAY/364 1989/12/30



SYOWA STATION TOTAL DAY/365 1989/12/31

