

RECORDS OF RADIO AURORA AT SYOWA STATION,

ANTARCTICA IN 1987

Hideo MAENO and Koji INAMORI

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

1. Introduction

Observation of ionospheric irregularities has been carried out at Syowa Station, Antarctica, by means of an auroral radar since March 1966. A report has been prepared which includes the periods of 112 MHz radio auroral echoes detected in 1987.

Inquiries about details of the data should be addressed to:

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

Two kinds of data are available: a) 35 mm film records of radio auroral echo intensity with range (A-scope) and range-time intensity (A'-scope), and b) chart records of the time variation of echo intensity.

2. Location

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

3. Observer

Koji INAMORI (Communications Research Laboratory)

4. Method of Measurement

The newly developed auroral doppler radars at the frequencies of 50 and 112 MHz were installed at Syowa Station in 1982 and 1983, respectively. Each of the two radars has two antenna beams, one directed toward the geomagnetic south (GMS) and the other 32.8° west from the geomagnetic south (GGS). The radar beams were switched every 13 seconds by turns.

The A-scope record was taken every 5 minutes, while A'-scope record and the chart record of the echo intensity were made continuously throughout the day.

The radars were designed to measure the one dimensional distributions of intensities and doppler velocities of radio auroras generated by 3- and 1.34-m irregularities appearing in the disturbed E-region. The intensities and doppler frequency spectra of backscattered signals were stored on digital magnetic tapes after being processed by a mini-computer.

Characteristics of the radar system are as follows:

Frequency	: 50 MHz and 112 MHz
Peak power	: 15 kW
Pulse width	: 100 μ s
Pulse repetition frequency	: 50 Hz (333 Hz for spectrum observation)
Antenna	: Three 14-element coaxial collinear (two-way)
Antenna gain	: 25 dB
Antenna beamwidth	: 4° (half power) in horizontal plane
Receiver bandwidth	: 10 kHz
Receiver noise figure	: less than 4 dB
Display and recorder	: A-scope display, A'-scope display, pen and 6-channel dot recorder

Unfortunately, the 50 MHz radar and computer systems were not operated in 1987 because these were under repairs, and therefore only the periods of 112 MHz radio auroras detected by the GMS radar beam are presented here.

5. Explanation of Diagrams Contained in the Report

Figures 1(1-12) show the periods of radio auroras and operation status of the auroral radar. Time in use is 45° EMT (= UT + 3 h). Symbols used in the figures are as follows:

—————	: occurrence of radio aurora
←— C —→	: no observation
Blank	: no radar echo

Figures 2(1-16) show typical examples of time variations of 112 MHz radio aurora intensity, 30 MHz cosmic noise absorption (CNA) detected by a riometer and geomagnetic H- and D-components at Syowa Station.

Bibliography relevant to
RECORDS OF RADIO AURORA AT SYOWA STATION, ANTARCTICA (1)

Observing Period	Observers	Literature		
		JARE Data Reports		
		Volume	Pages	Year
Mar. 1966 - Jan. 1968	Ose, M. Hasegawa, S. Takeuchi, T. Nishimuta, I. Isobe, T.	5 (Ionosphere 2)	64	1969
Apr. 1970 - Feb. 1971	Shiro, I. Sakamoto, T.	15 (Ionosphere 6)	34	1972
Feb. 1972 - Dec. 1972	Isozaki, S. Miyazaki, S.	23 (Ionosphere 10)	22	1974
Feb. 1973 - Jan. 1974	Nishimuta, I. Yabuuma, H.	26 (Ionosphere 12)	23	1975
Mar. 1974 - Dec. 1974	Shiro, I. Yamazaki, I.	33 (Ionosphere 14)	89	1976
1975	Shiro, I. Sugiuchi, H. Komiya, N.	37 (Ionosphere 16)	105	1977
1976	Shiro, I. Yamakoshi, A. Sasaki, T.	42 (Ionosphere 18)	105	1978
Apr. 1978 - Dec. 1978	Igarashi, K. Tsuzurahara, S.	53 (Ionosphere 21)	23	1980
Jan. 1979 - Dec. 1979	Igarashi, K. Ojima, S. Komiya, N.	58 (Ionosphere 23)	28	1980
1980	Igarashi, K. Nozaki, K.	68 (Ionosphere 24)	28	1982
1981	Ose, M. Kurihara, N.	81 (Ionosphere 28)	28	1983
1982	Igarashi, K. Kuratani, Y.	88 (Ionosphere 30)	28	1984
1983	Igarashi, K. Tanaka, I. Yamazaki, I.	100 (Ionosphere 32)	64	1985
(cont.)				

Bibliography relevant to
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Observing Period	Observers	Literature		
		JARE Data Reports		
		Volume	Pages	Year
1984	Igarashi, K. Tanaka, I. Yamamoto, S.	113 (Ionosphere 34)	33	1986
1985	Igarashi, K. Maeno, H. Ogawa, I.	123 (Ionosphere 36)	56	1987
1986	Igarashi, K. Maeno, H. Suzuki, A.	134 (Ionosphere 38)	59	1988

January 1987

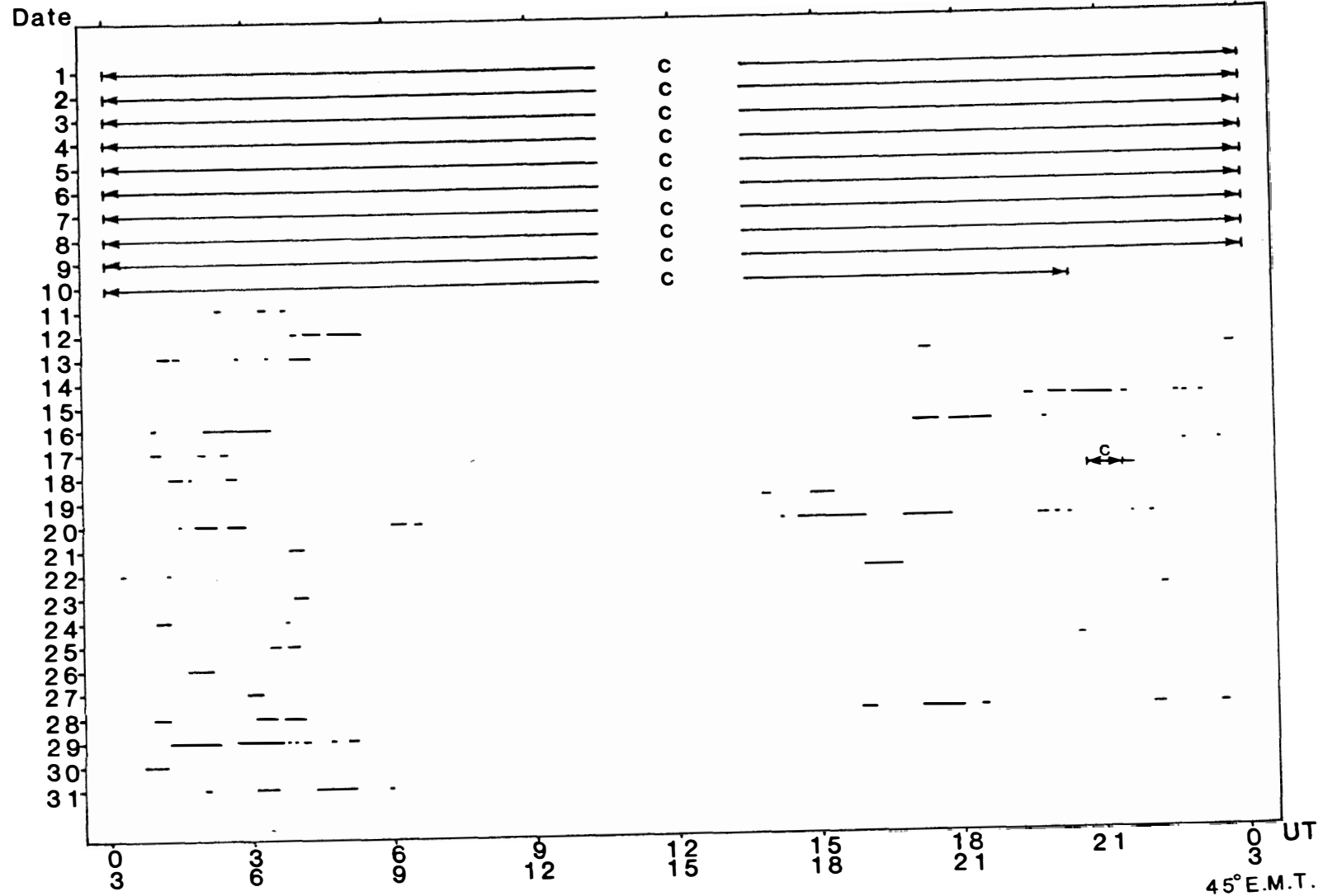


Fig.1 (1).

February 1987

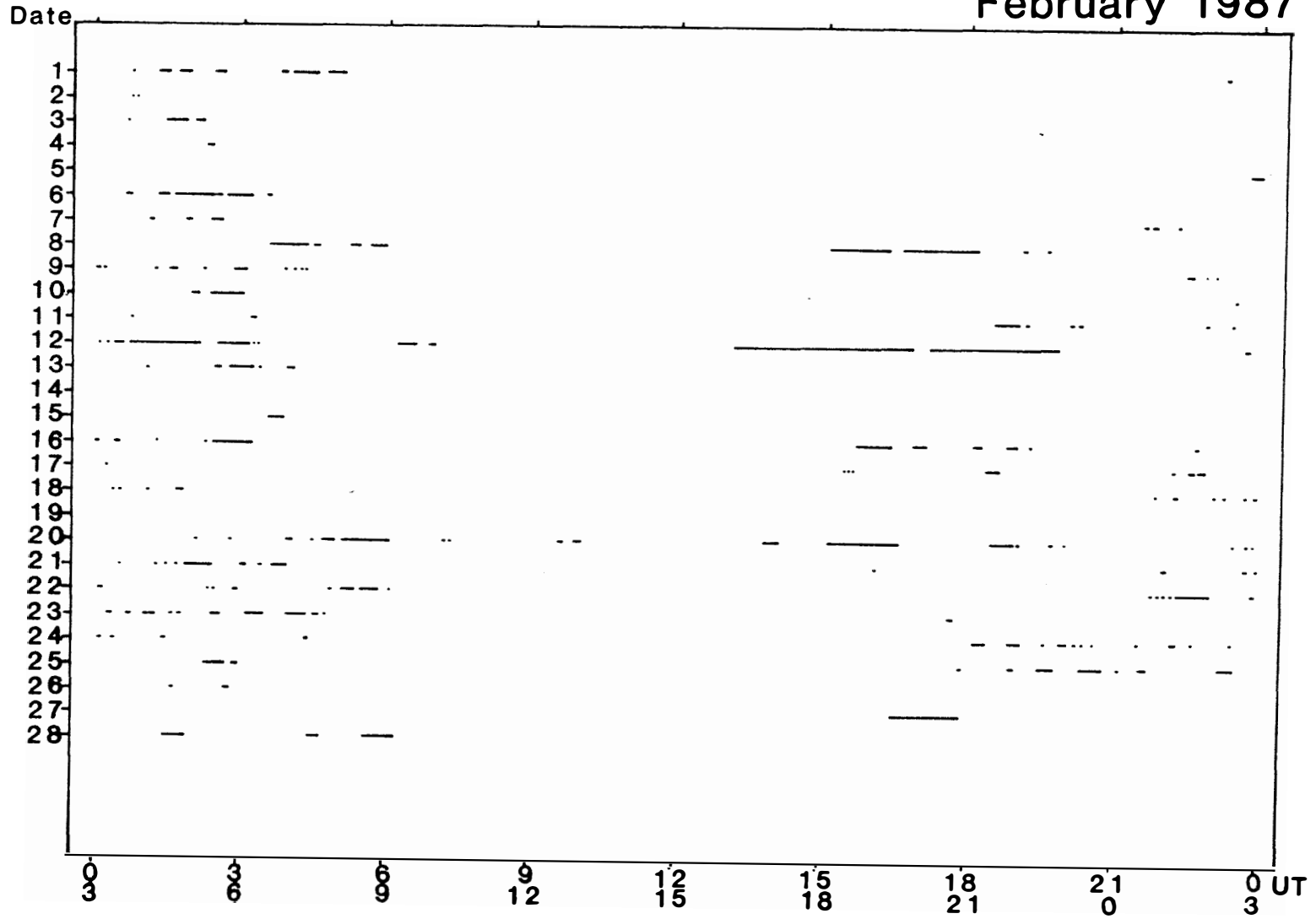


Fig.1 (2).

45° E.M.T.

March 1987

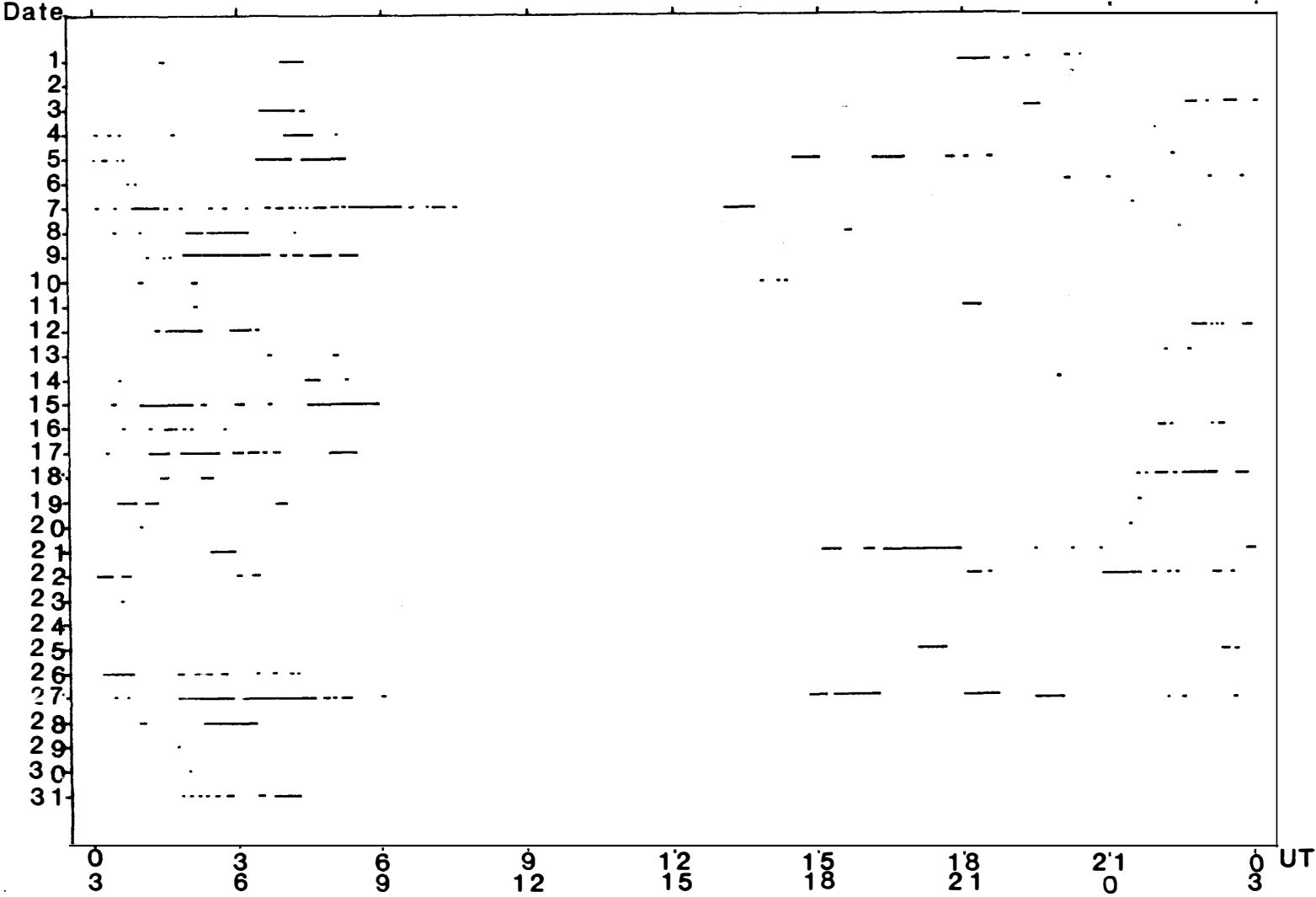


Fig.1 (3).

45°E.M.T.

April 1987

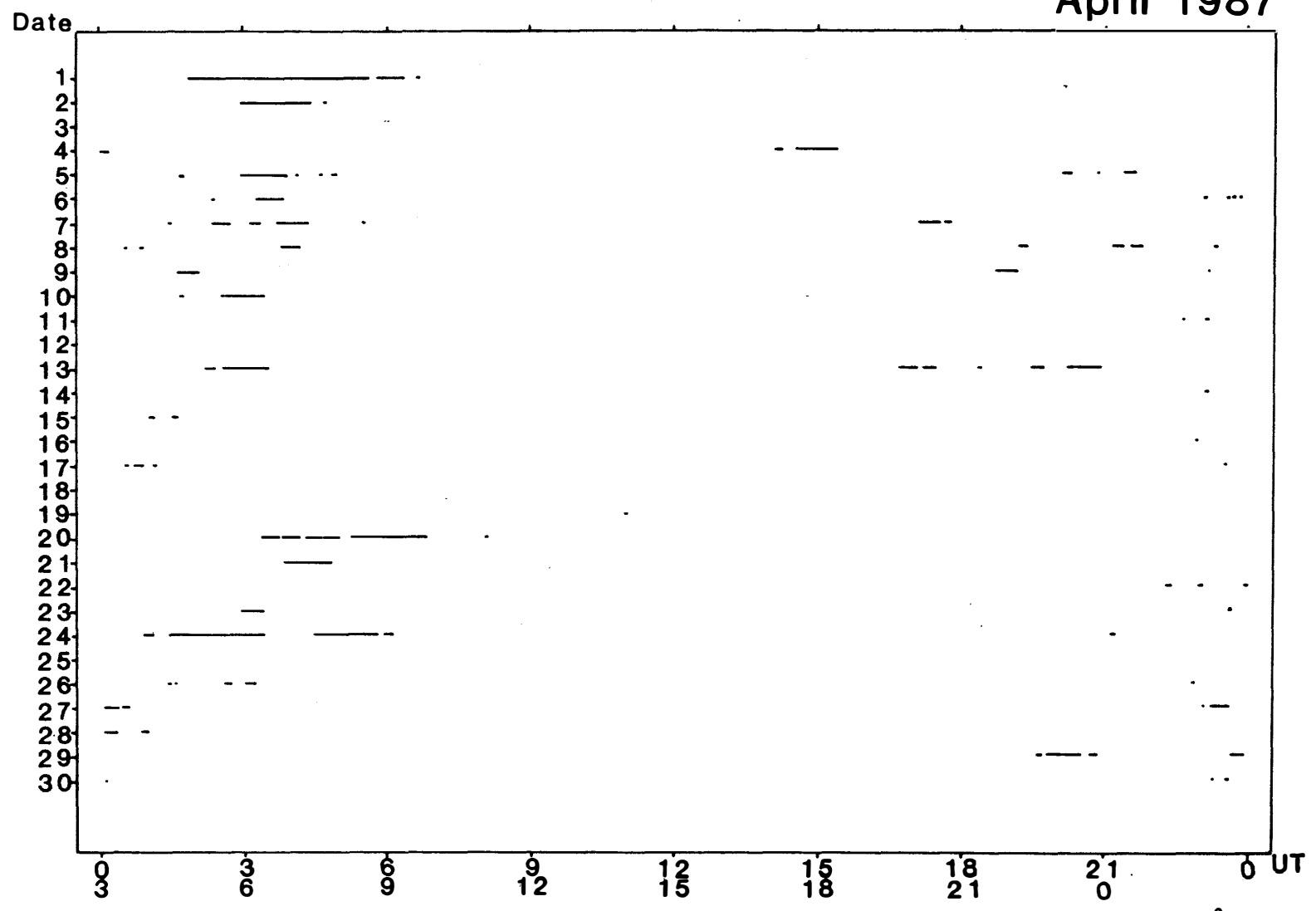


Fig.1 (4).

45°E.M.T.

May 1987

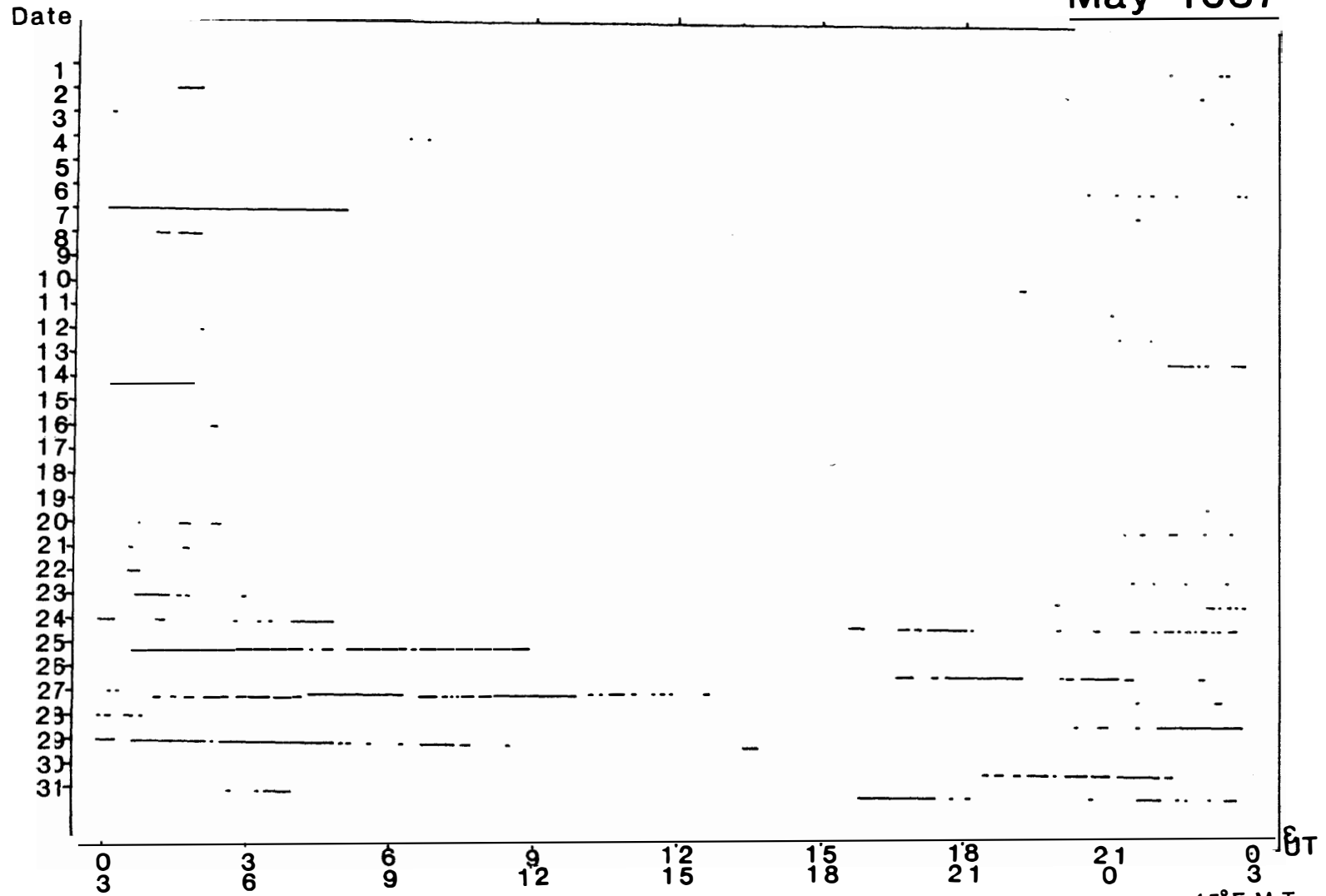


Fig.1 (5).

June 1987

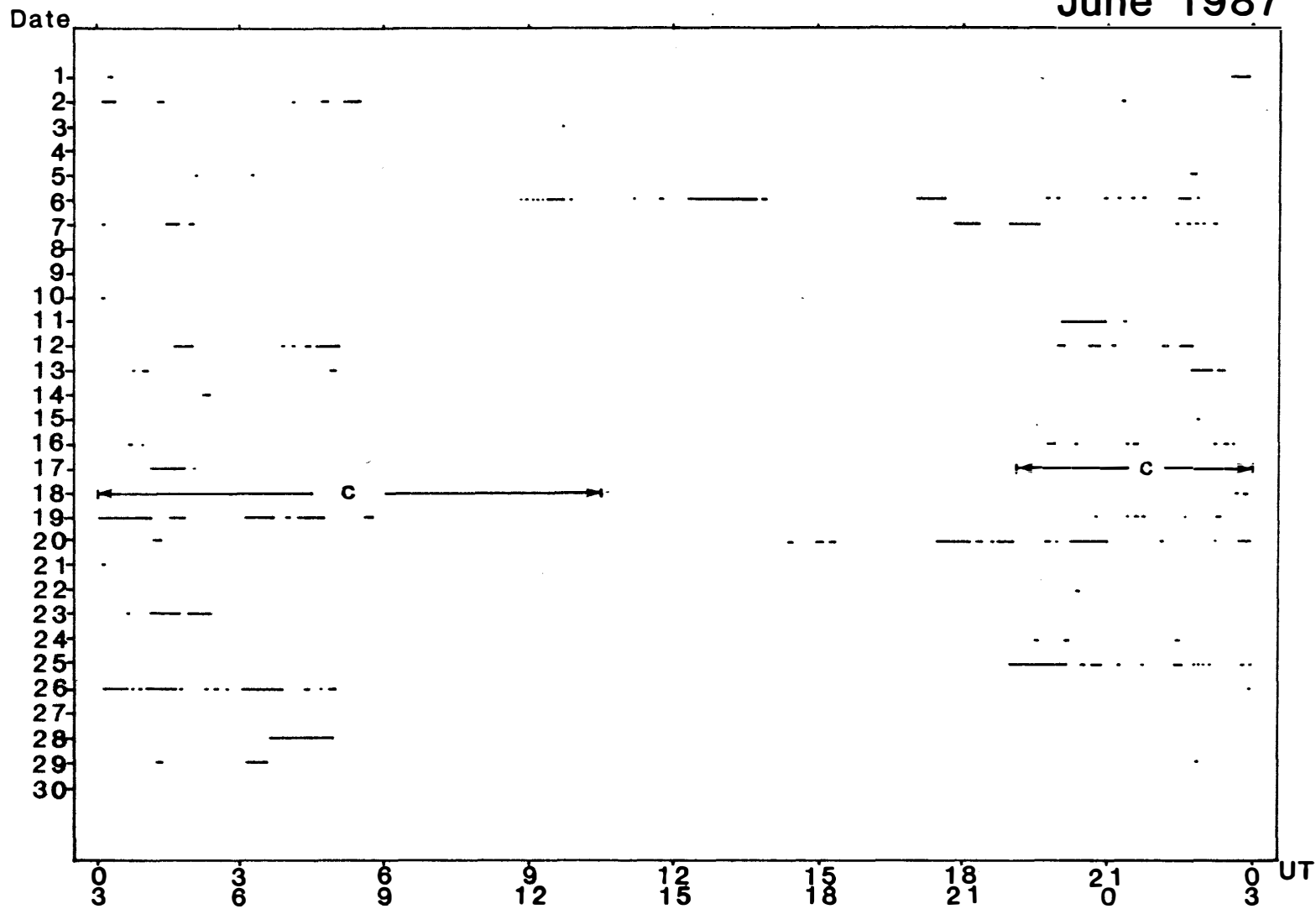


Fig.1 (6).

45°E.M.T.

—|—

July 1987

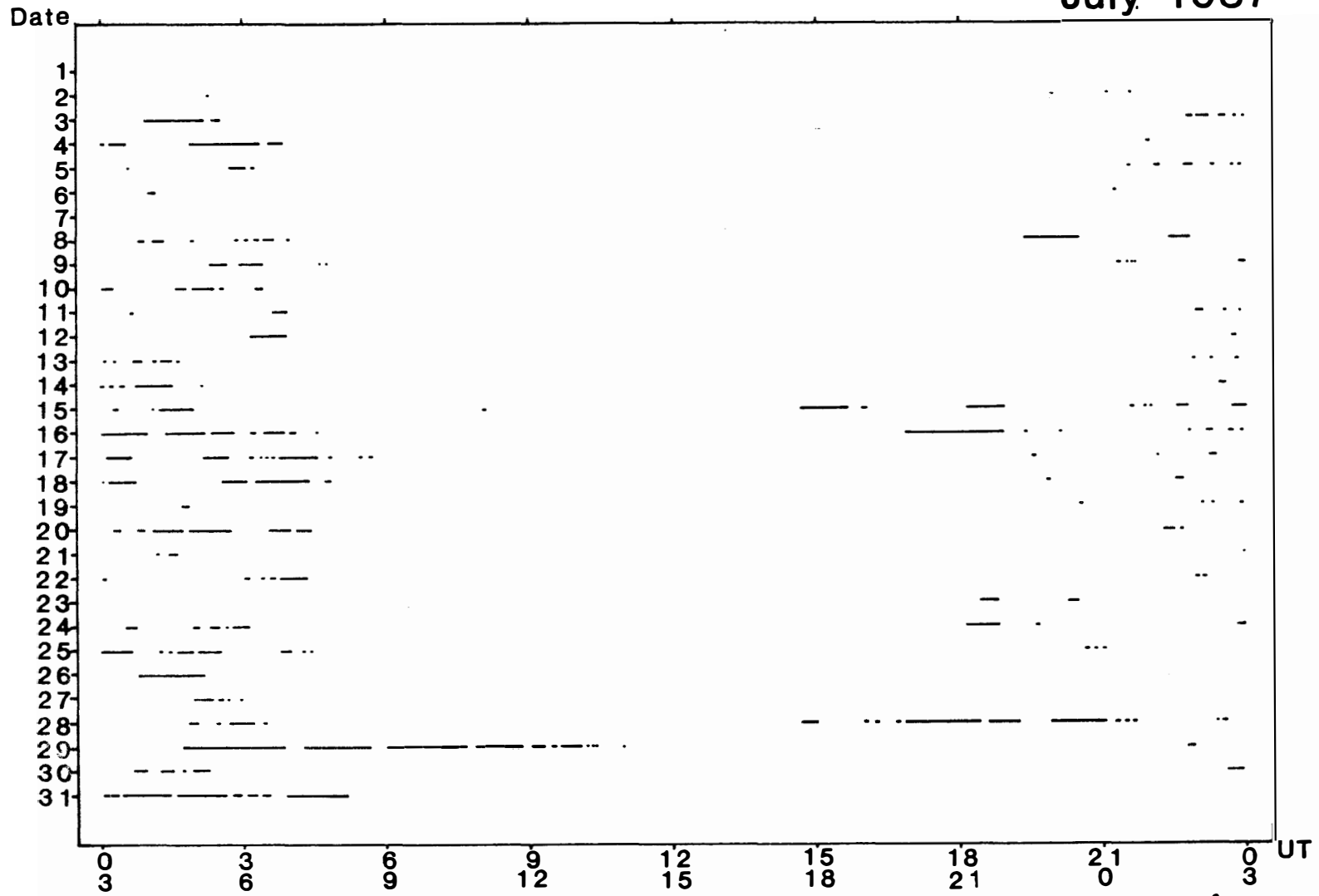


Fig.1 (7).

45°E.M.T.

August 1987

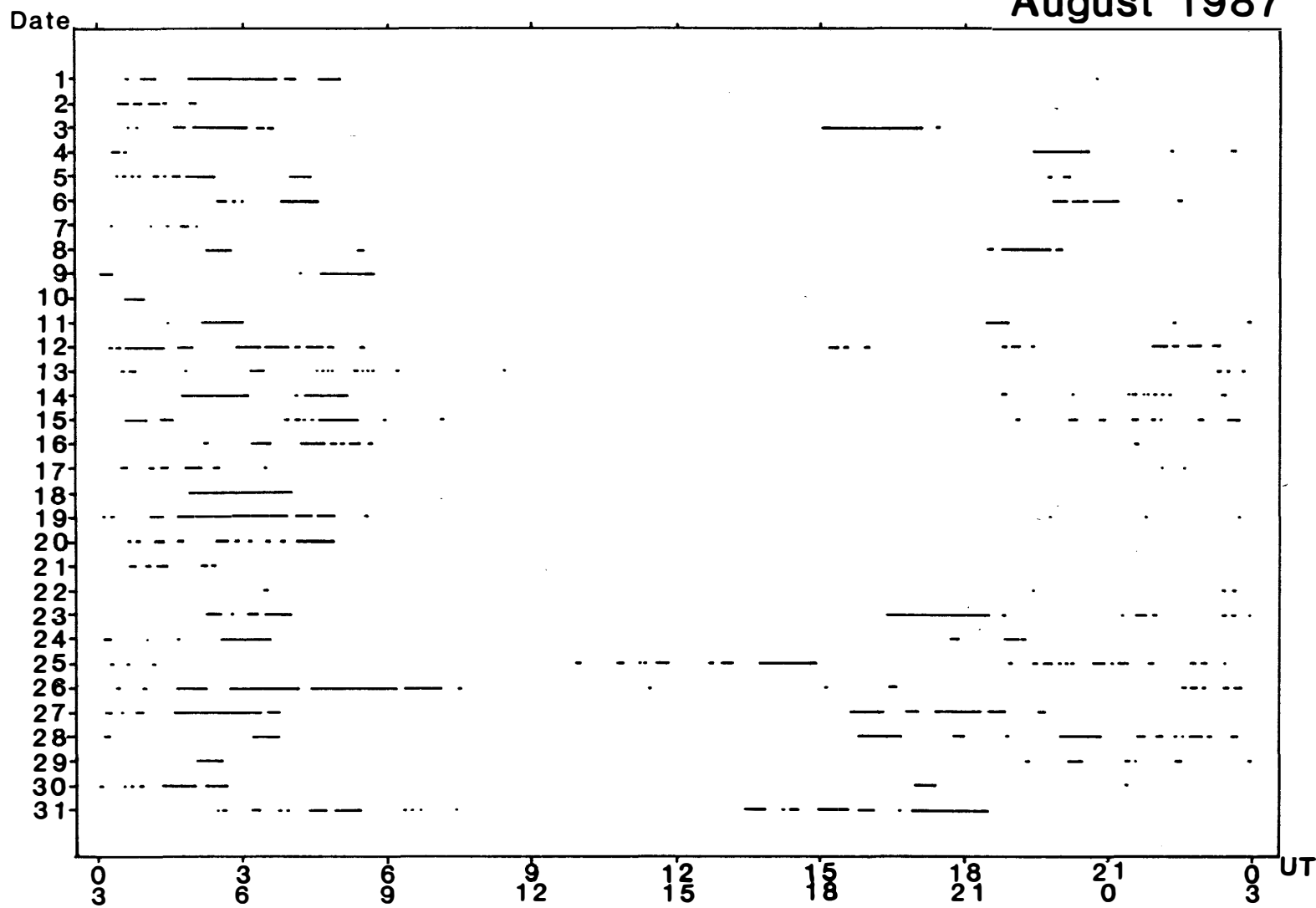


Fig.1 (8).

45°E.M.T.

September 1987

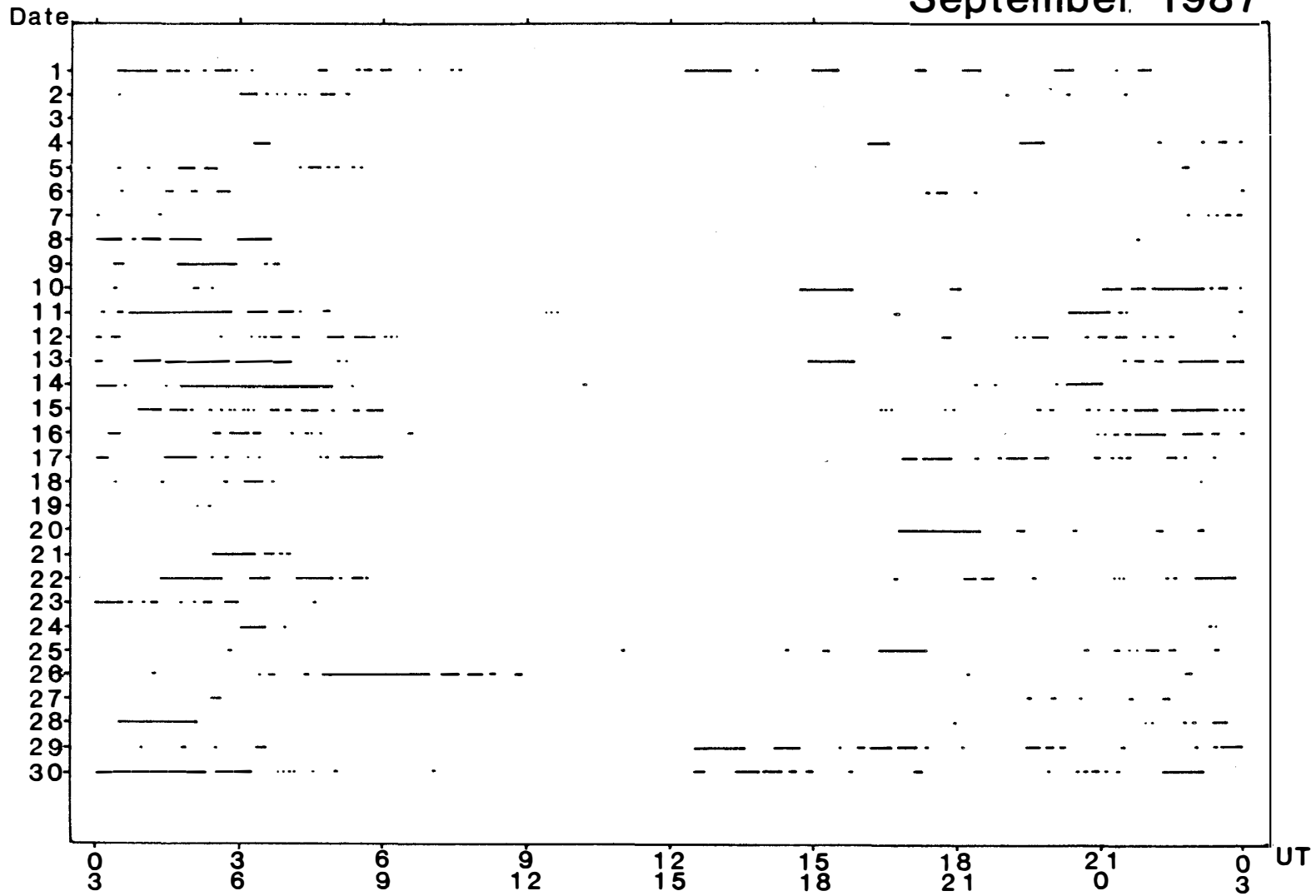
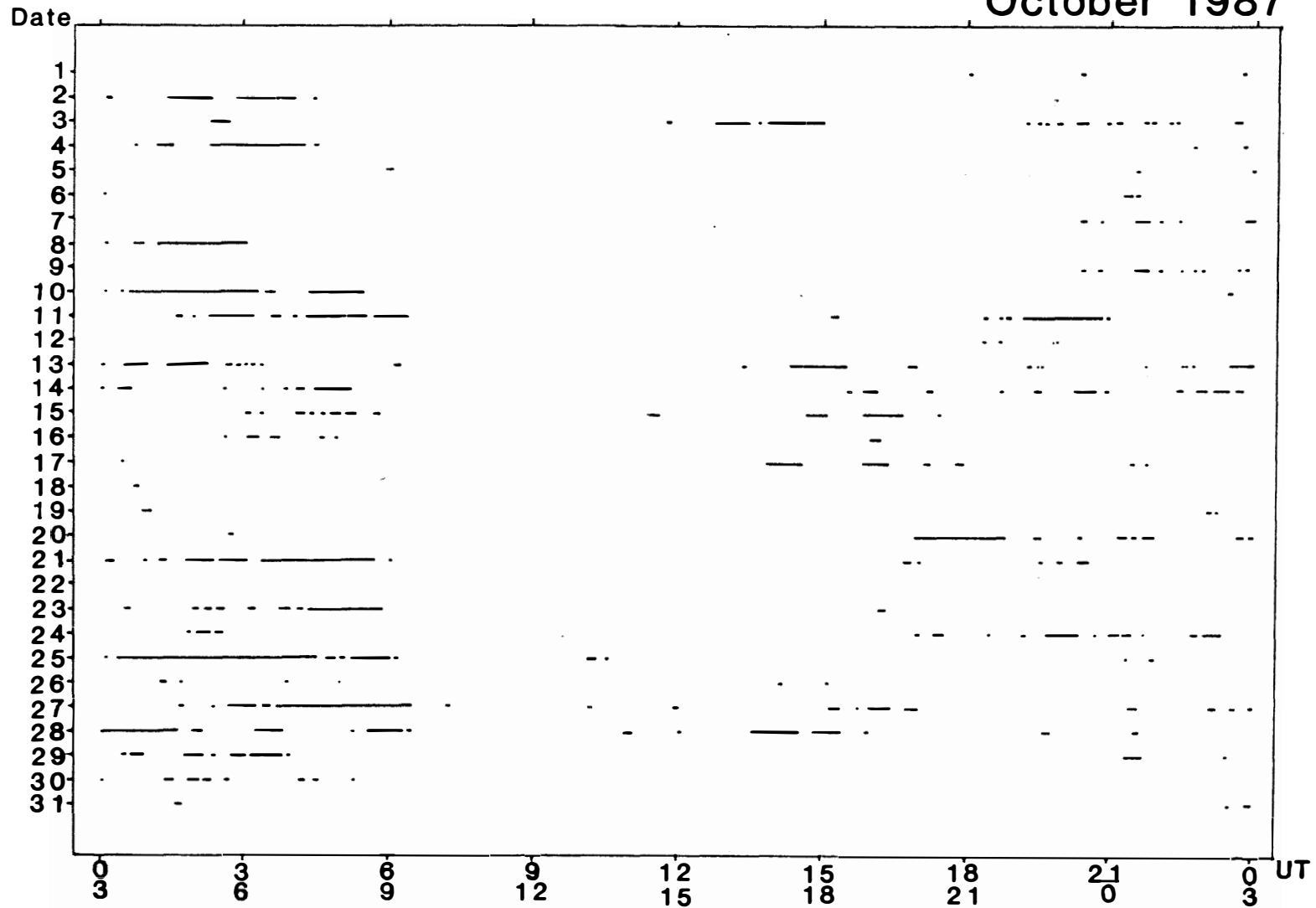


Fig.1 (9).

45°E.M.T.

October 1987



—15—

Fig.1 (10).

45°E.M.T.

November 1987

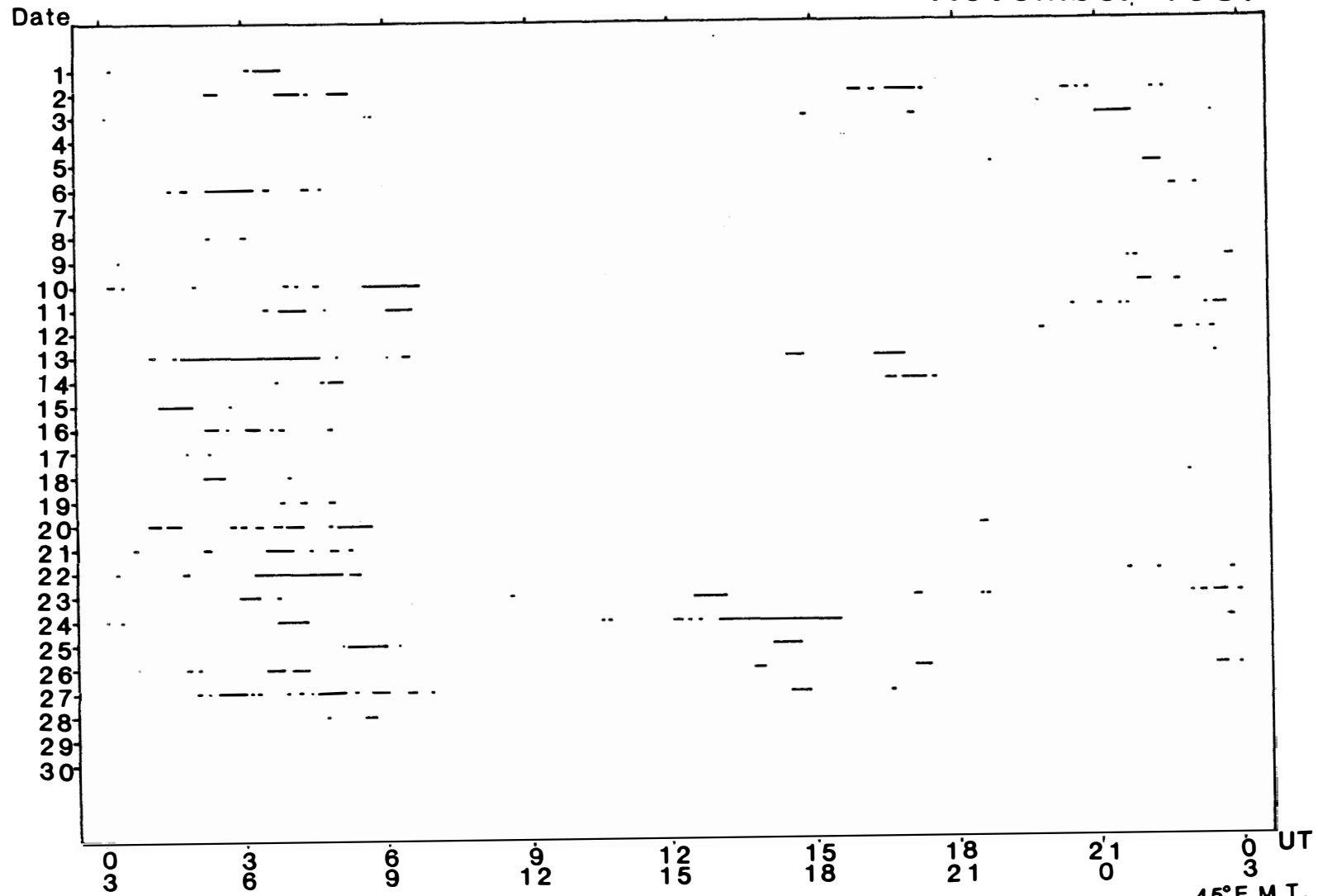


Fig.1 (11).

45° E.M.T.

December 1987

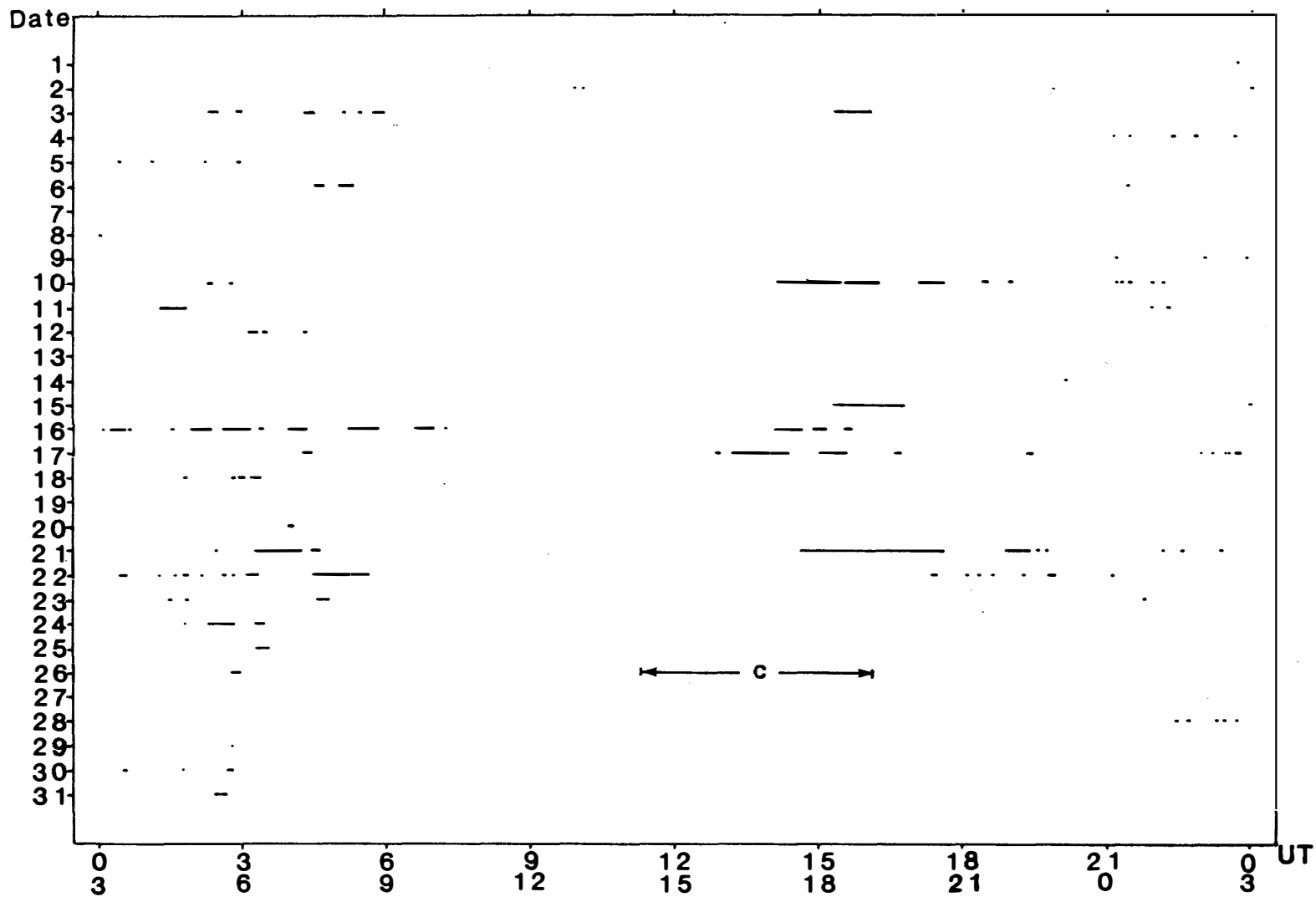


Fig.1 (12).

45° E.M.T.

JAN. 29, 1987

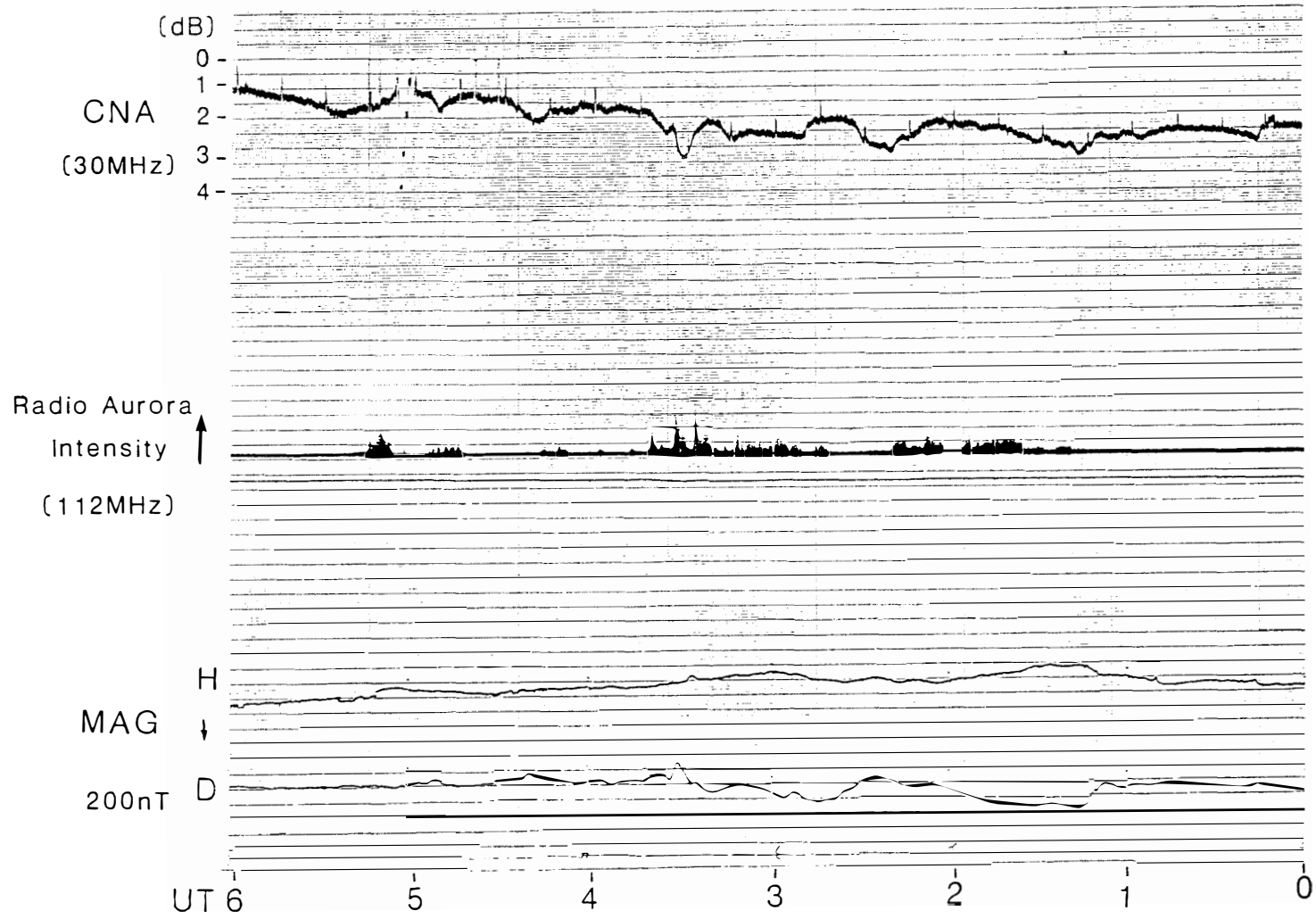


Fig.2 (1).

FEB. 16, 1987

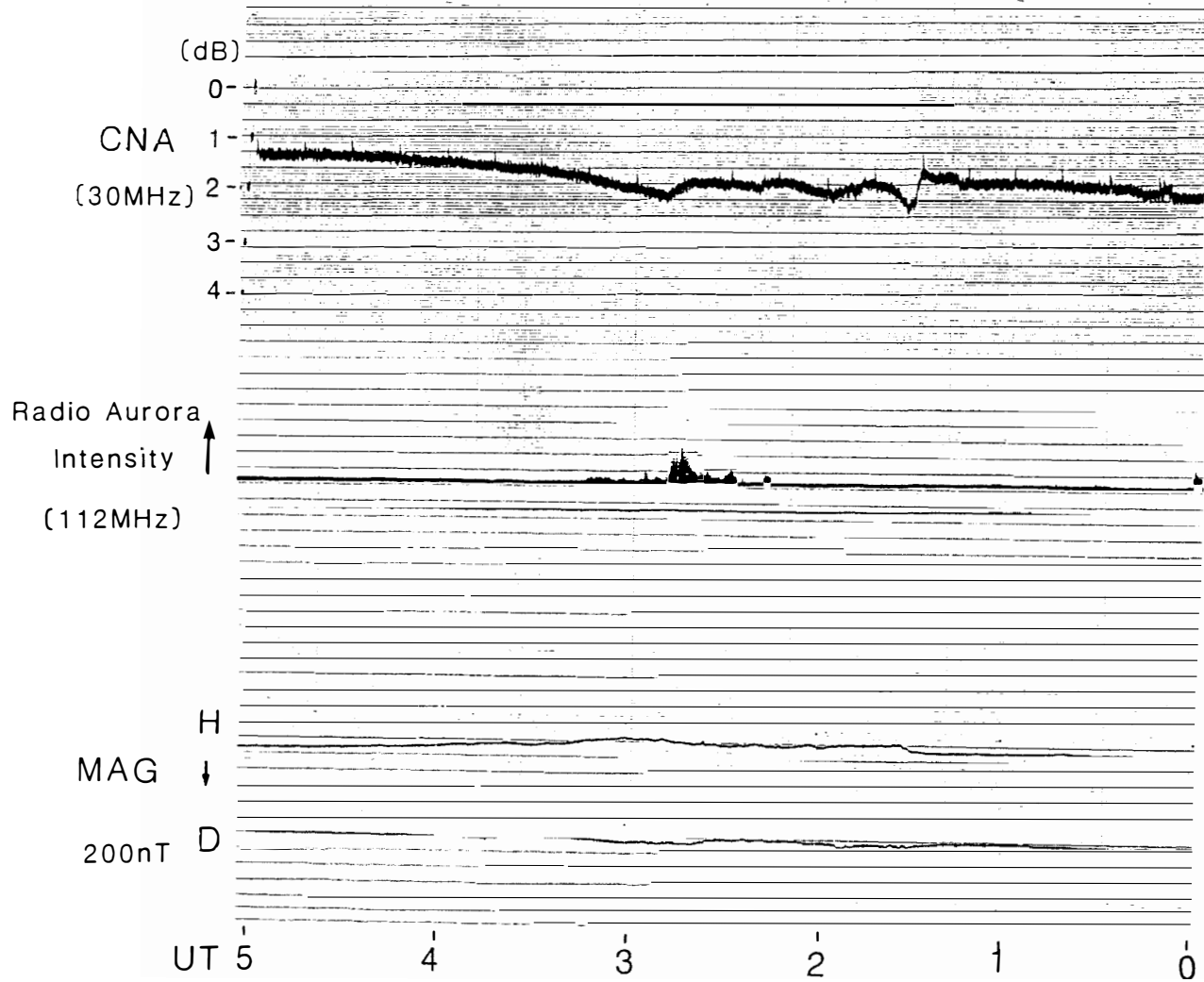


Fig.2 (2).

MAR. 22, 1987

MAR. 21, 1987

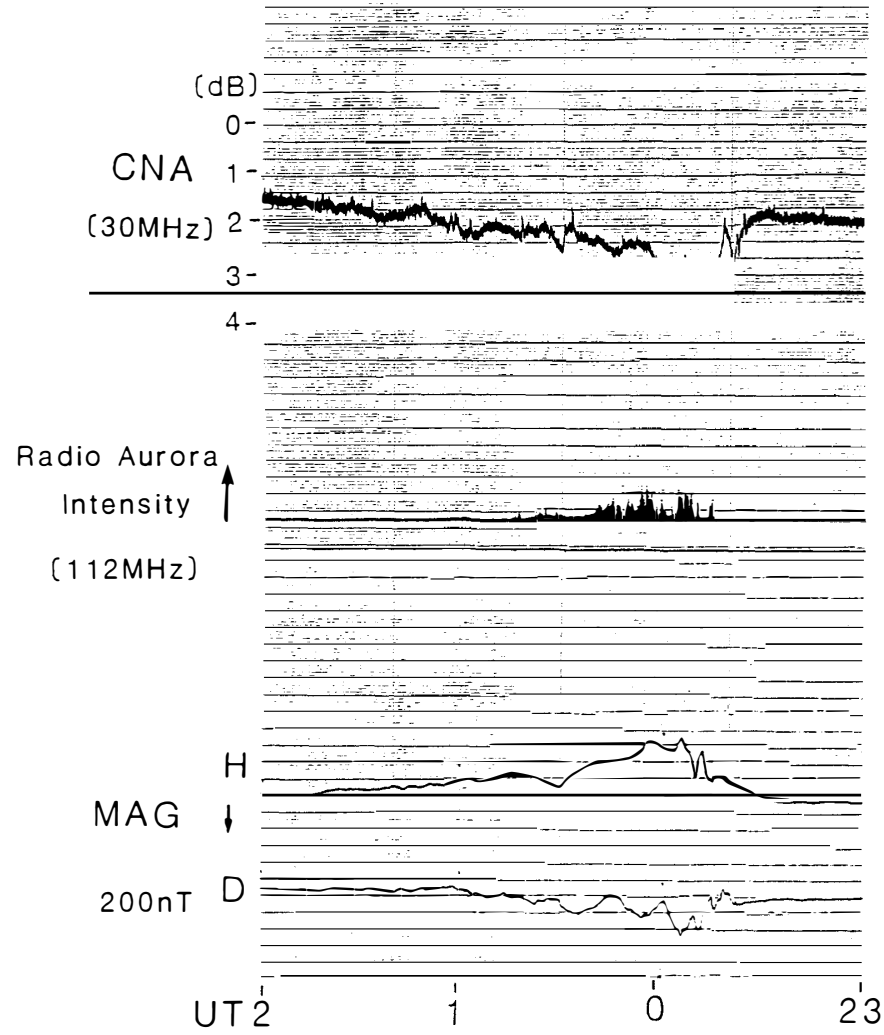


Fig.2 (3).

APR. 10, 1987

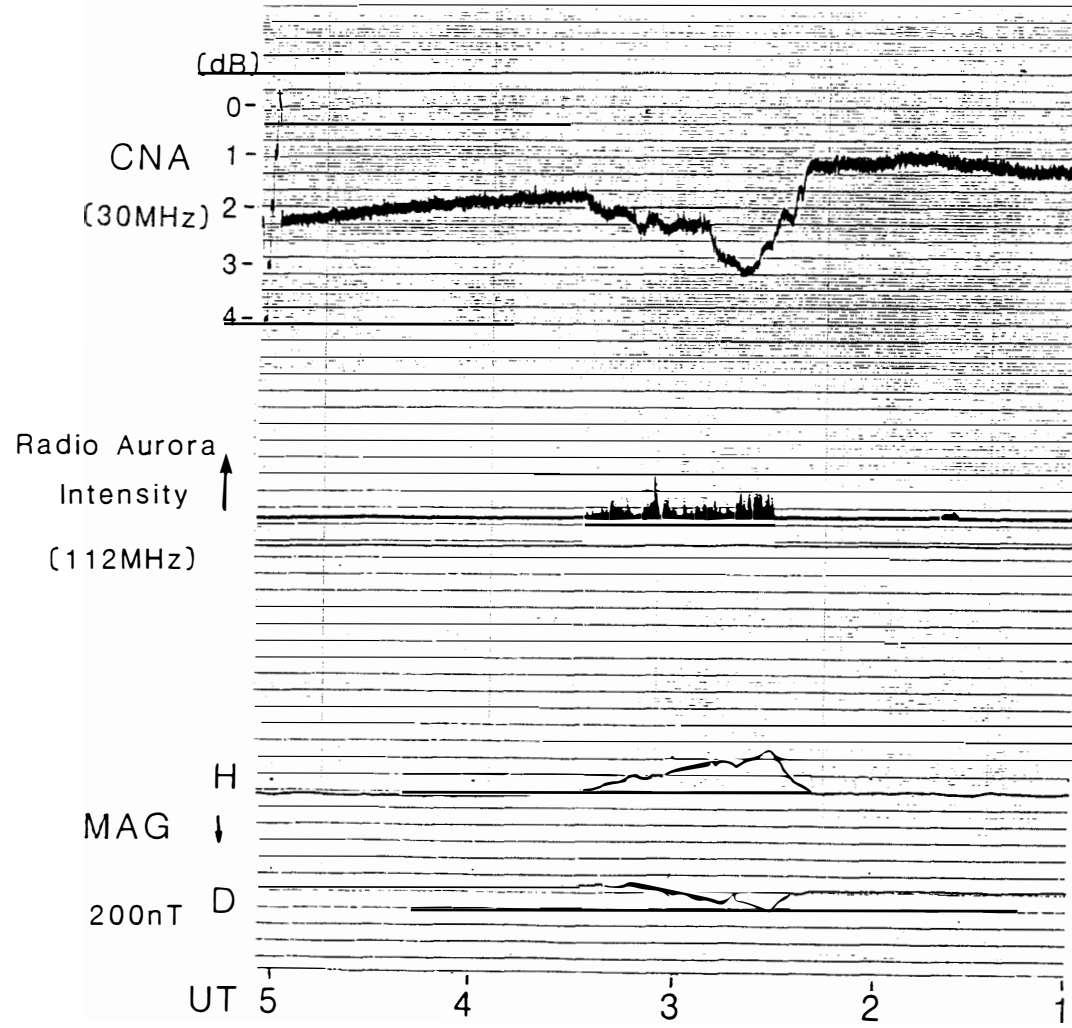


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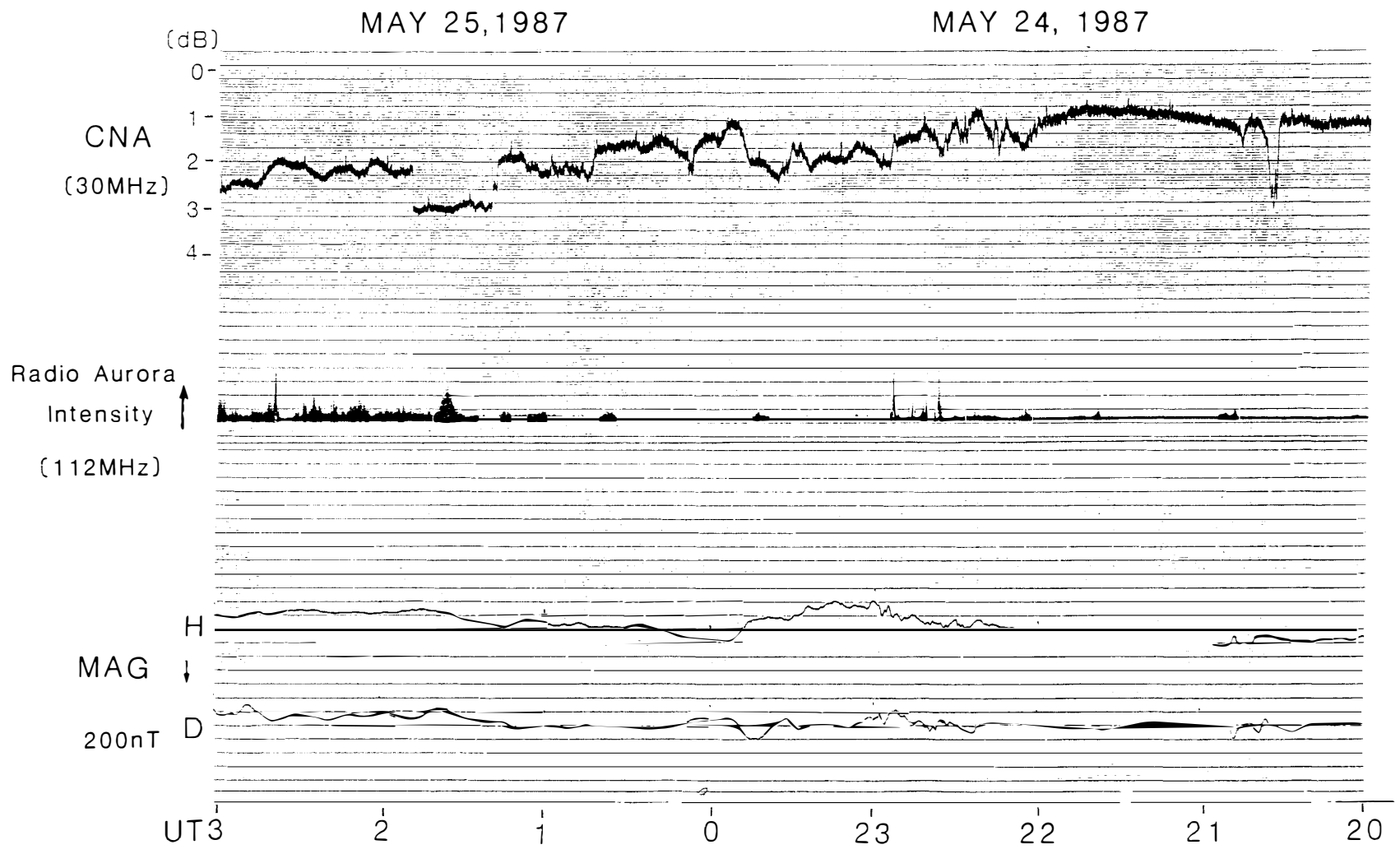


Fig.2 (5).

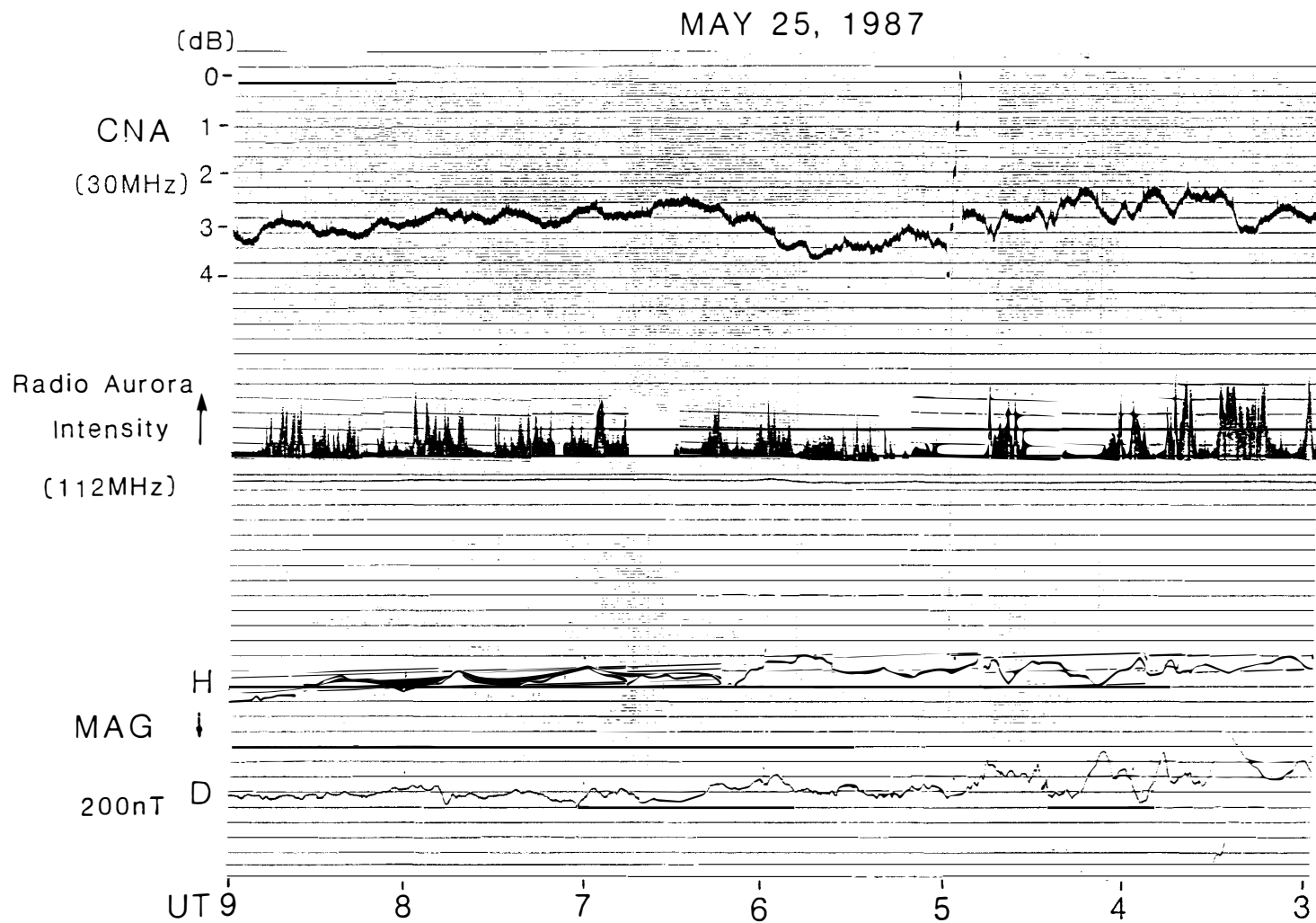


Fig.2 (6).

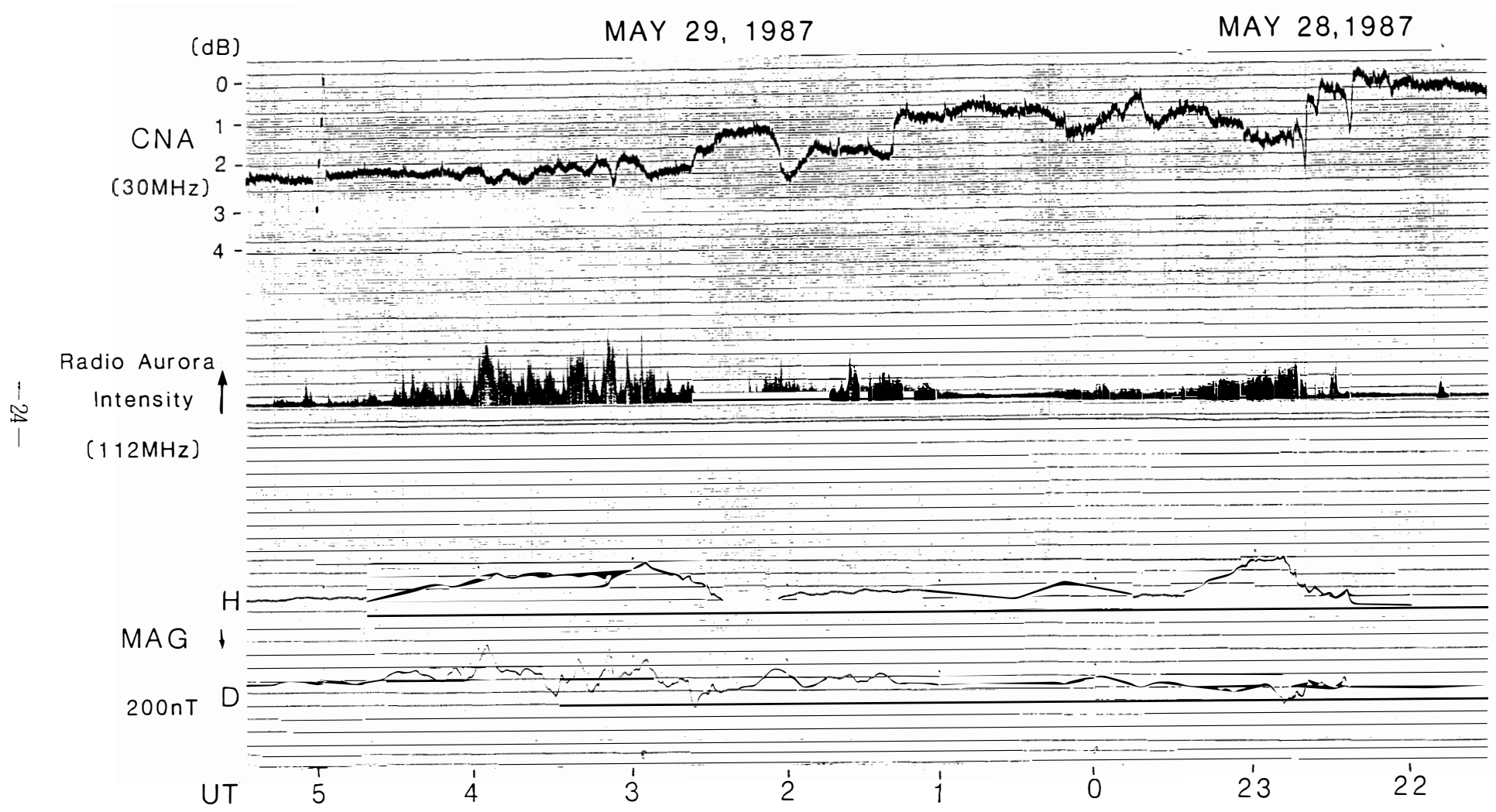


Fig.2 (7).

JULY 15, 1987

JULY 14, 1987

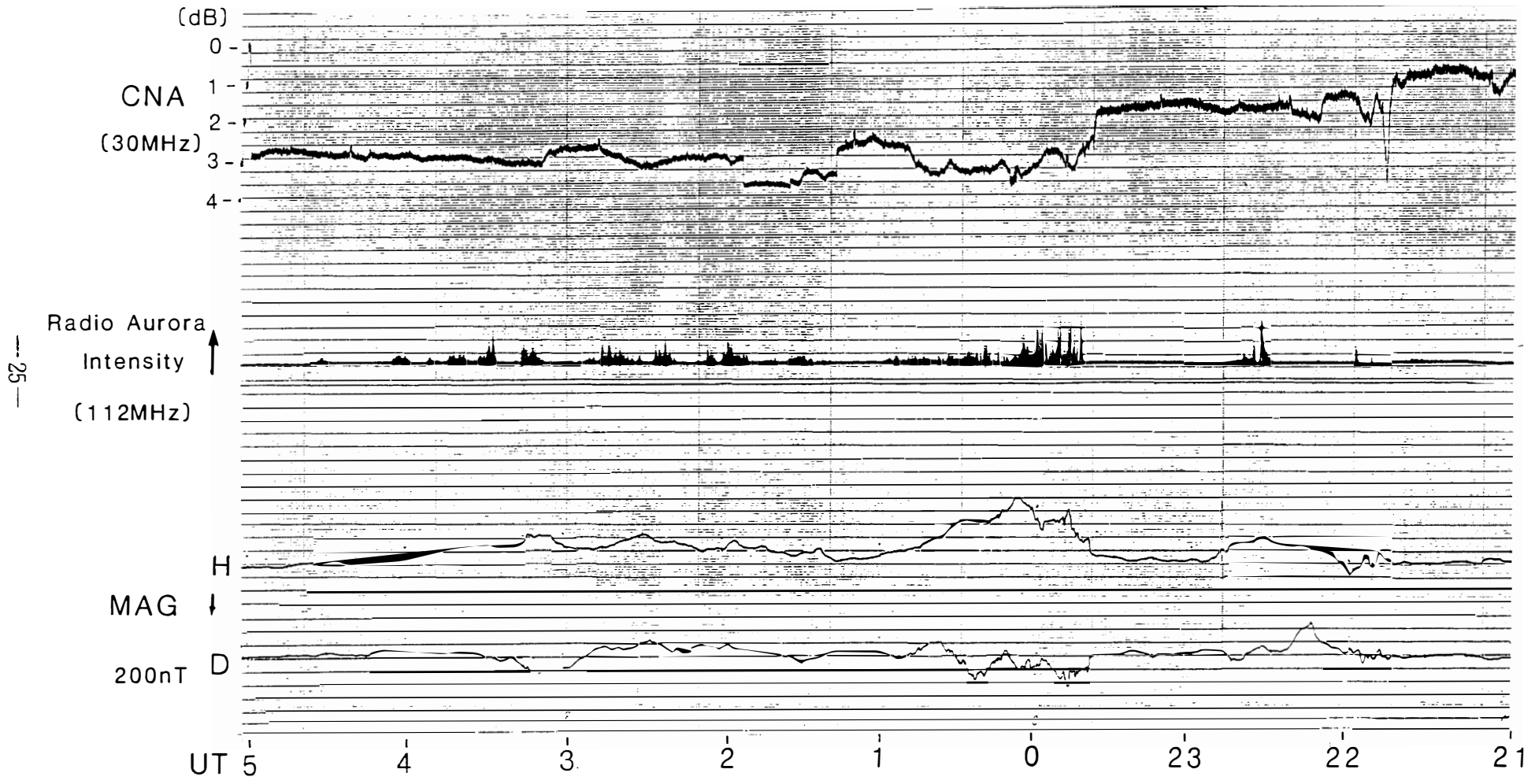


Fig.2 (8).

JULY 29, 1987

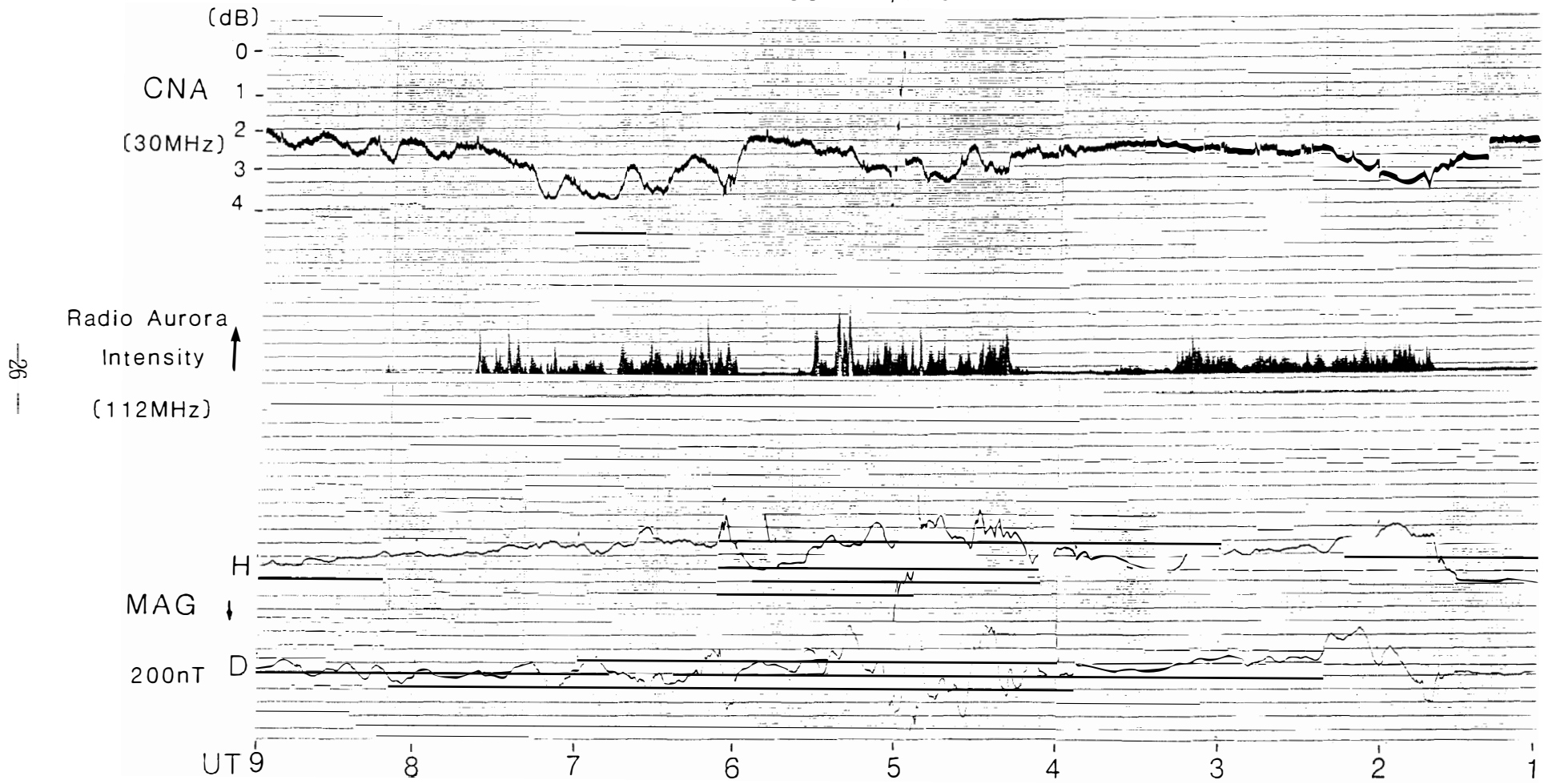


Fig.2 (9).

AUG. 28, 1987

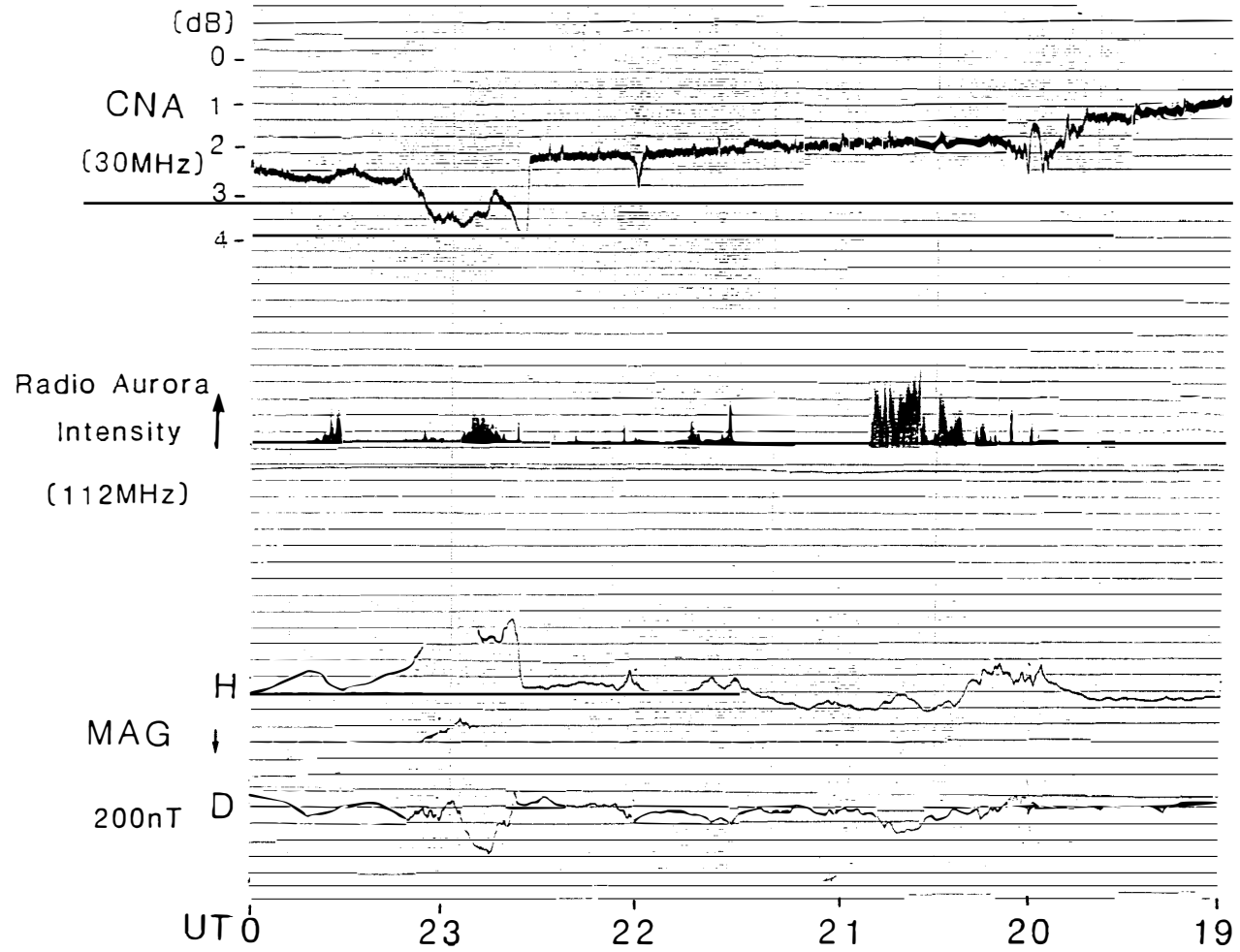


Fig.2 (10).

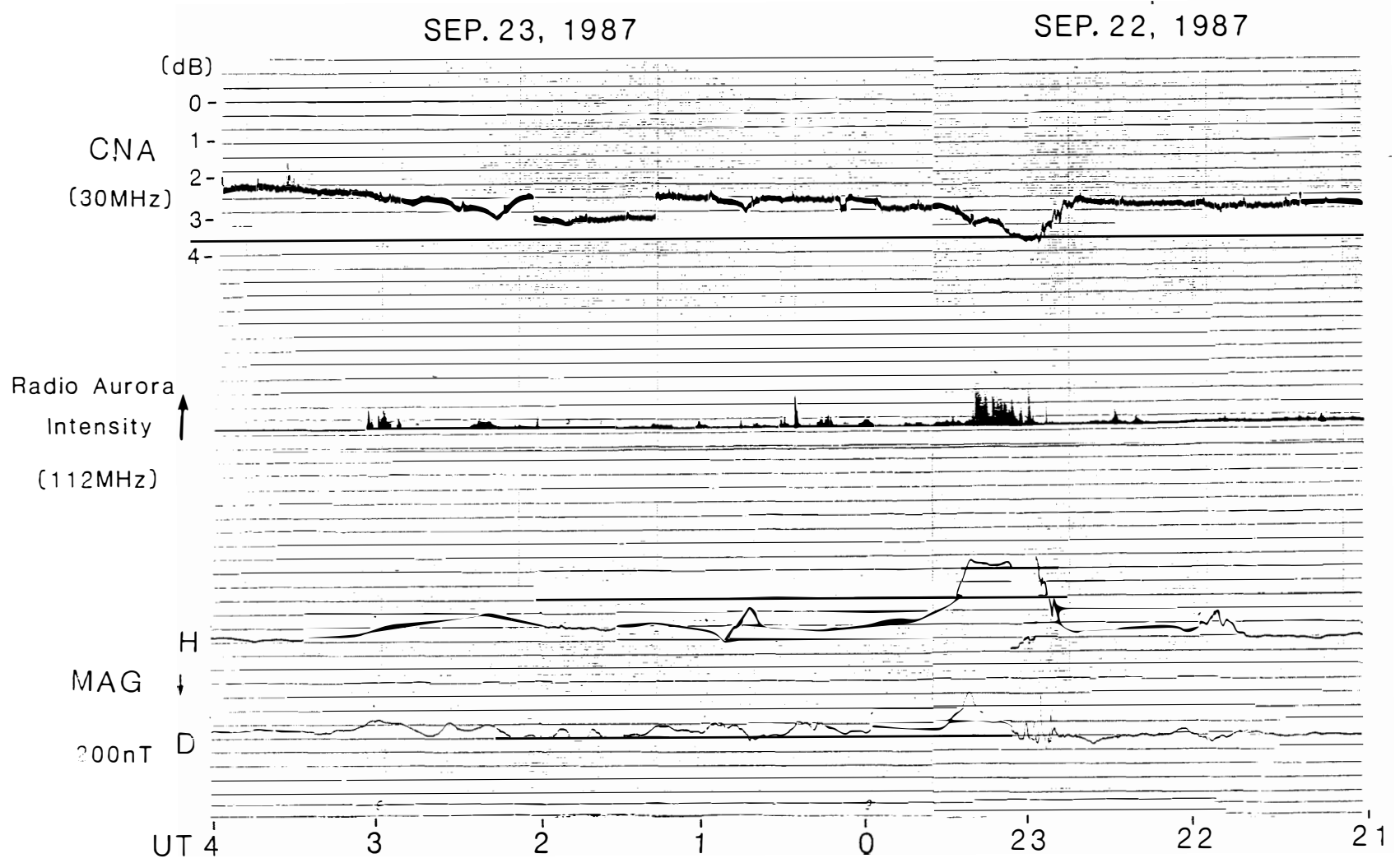


Fig.2 (11).

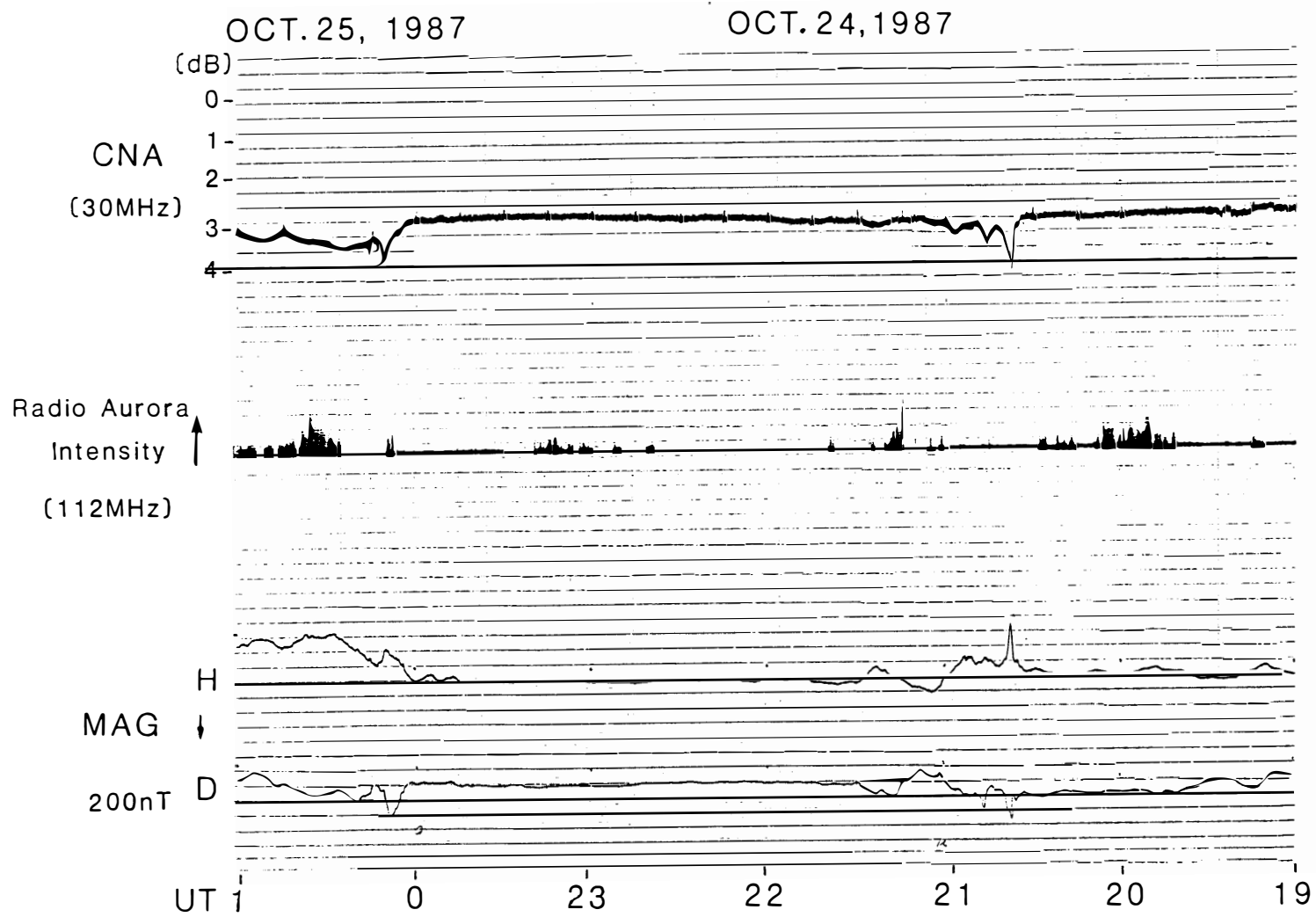


Fig.2 (12).

OCT. 25, 1987

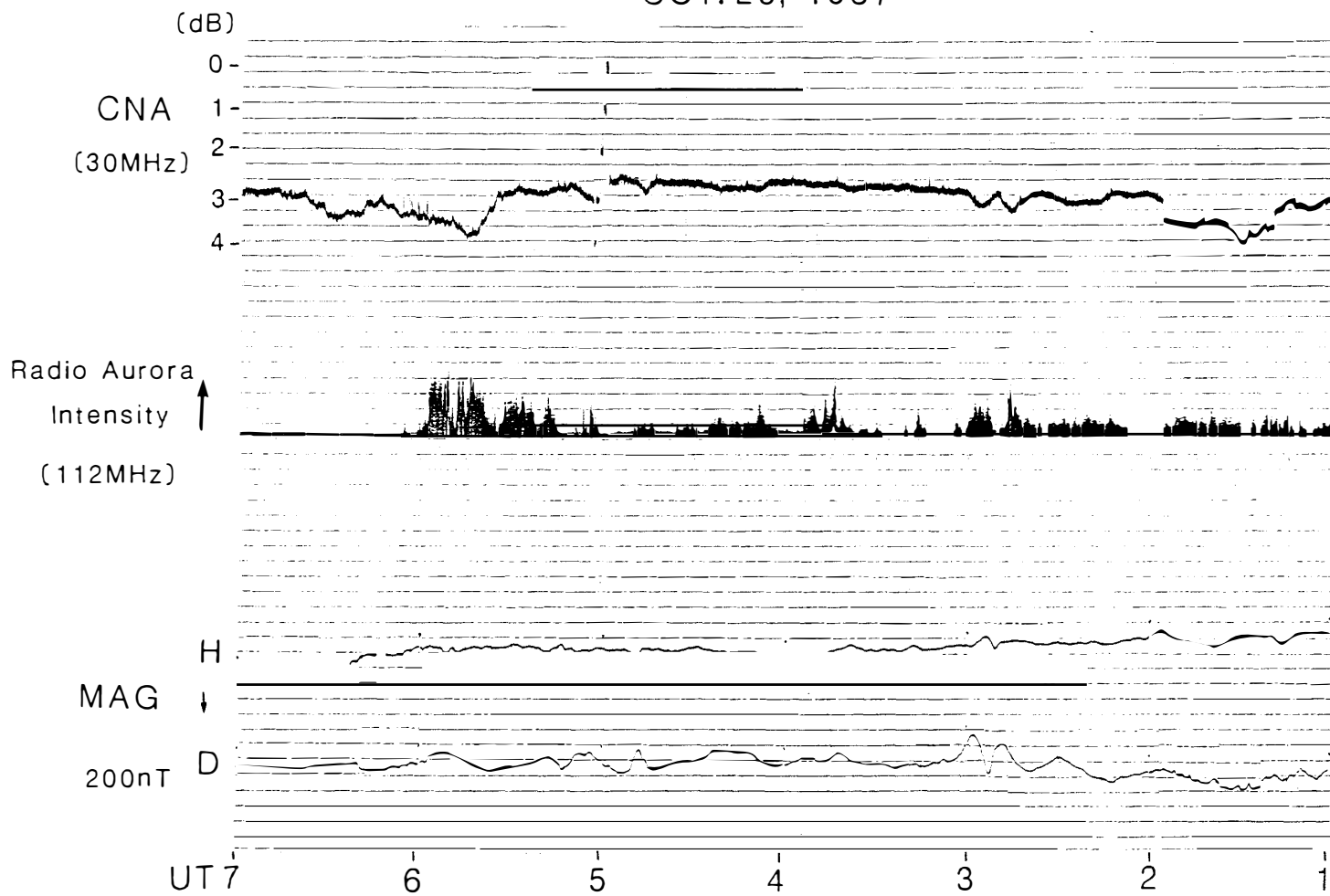


Fig.2 (13).

OCT. 27, 1987

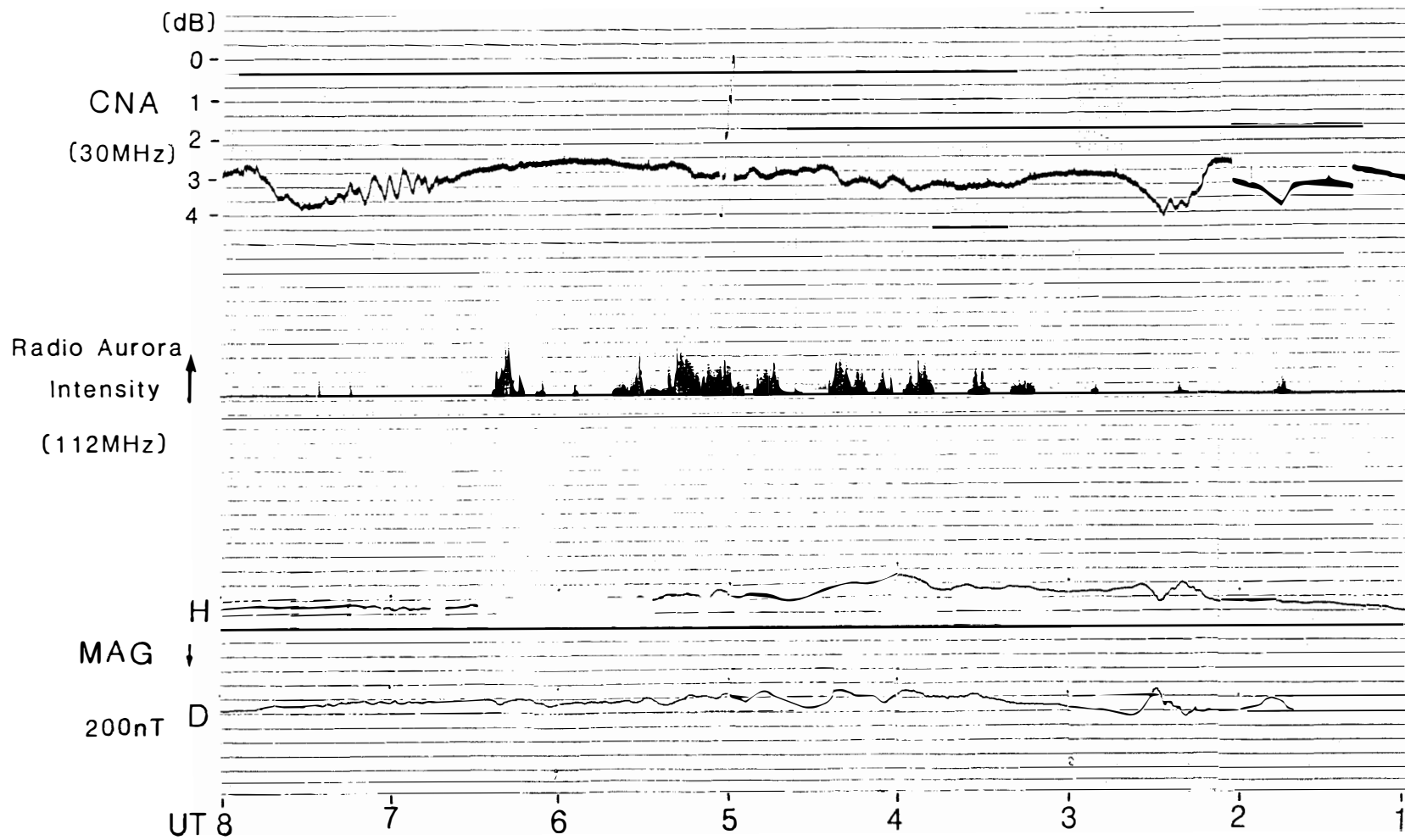


Fig.2 (14).

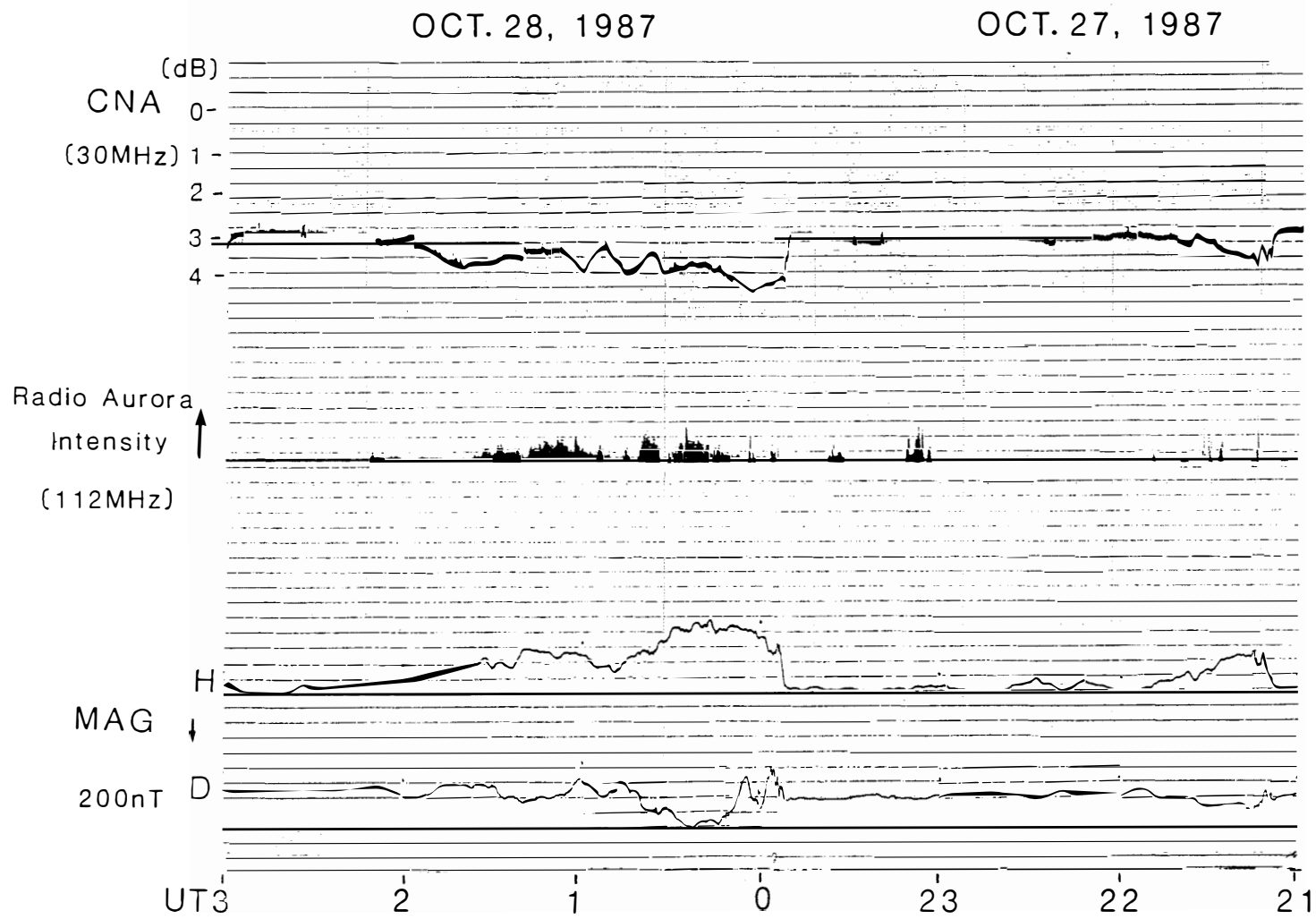


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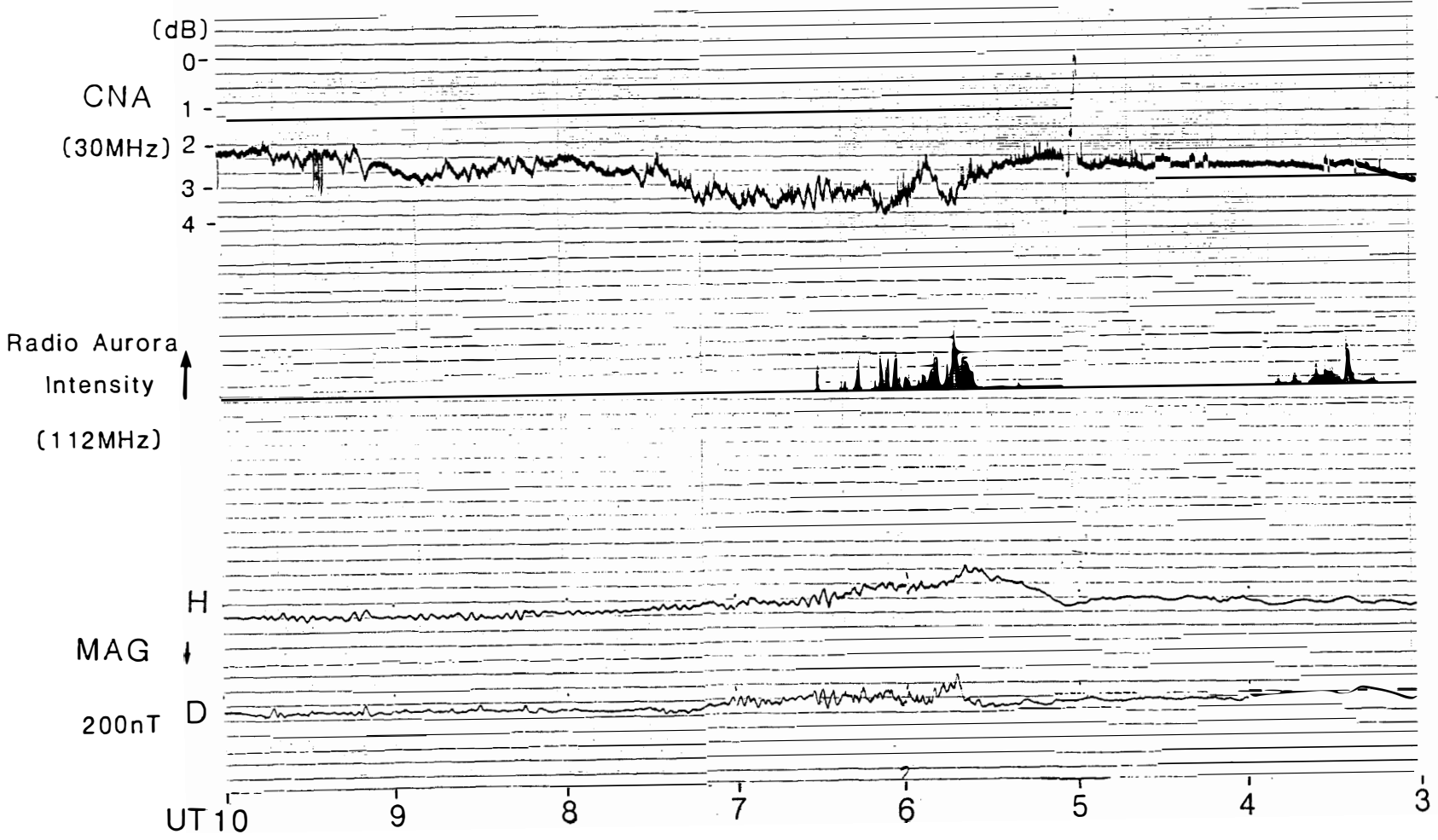


Fig.2 (16).