

RECORDS OF RADIO AURORA AT SYOWA STATION,

ANTARCTICA IN 1979

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1. Introduction

The observation of ionospheric irregularities has been carried out at Syowa Station, Antarctica, by means of the auroral radar with the fixed frequency of 112.2 MHz (from March 1966 to January 1974) and with the changing four frequencies of 50, 65, 80 and 112 MHz (from February 1974 to date). The intensity for range with the form of A-scope display on the 35 mm film and the time variation in intensity on the chart covering the above period are deposited in the Radio Research Laboratories, Tokyo, Japan.

This report is prepared in order to make the data from January 1979 to December 1979 available to scientists who are interested in this field.

Inquiries about details of the data should be addressed to:

Radio Research Laboratories
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	69.6°S	77.1°E

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4. Method of Measurement

The antenna was fixed in the direction of the magnetic south and at an elevation angle of 25 degrees. The declination and inclination of the geomagnetic field at Syowa Station in 1979 were $46^{\circ}38'$ westward and $64^{\circ}55'$ upward, respectively. The 35 mm film records were taken every minute in the interval between 18:00 and 08:00 LT (45° E.M.T.) and the chart records were continuously made throughout the day.

Characteristics of the system are as follows:

Antenna

An 8-element Yagi with 0.75λ height

	(50 MHz)	(65 MHz)	(80 MHz)	(112 MHz)
Gain	: 12.3 dB	12.3 dB	12.2 dB	12.3 dB
Directivity (Front/Back)	: 16 dB	19 dB	18 dB	17 dB
Polarization	:	horizontal		

Main equipment

Frequency	: 50, 65, 80, 112 MHz
Transmission power	: 20 kW (peak)
Pulse width	: 50 or 100 μ s
Pulse repetition frequency	: 50 Hz
Receiver bandwidth	: 25 kHz
Receiver noise figure	: less than 4 dB

Indicator and recorder

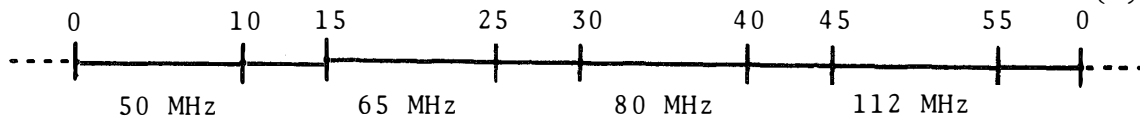
A-scope display on 5-inch oscilloscope
6 channel dot recorder

Recording : 1 frame/10 s on the 35 mm film
for each frequency

Maximum range	: 1000 or 1500 km
Range mark	: every 50 and 100 km

Operating schedule

The following was automatically repeated every minute. Time(s)



5. Explanation of Diagrams

Fig. 1 shows the occurrence of radio auroras and the operation of the aurora radar. The time is 45° E.M.T.(= U.T.+ 3 hours) and the symbols used in the figures are as follows:

———— : occurrence of radio aurora

← C → : non-observation due to adjustments or troubles in instrumentation

Blank : no radar echoes

Fig. 2 shows typical examples of the radio aurora intensity recorded by 6 channel chart recorder. The each data includes the H-component of geomagnetic variation (uppermost), the radio aurora intensities at 112 MHz (second), 80 MHz (third), 65 MHz (fourth), 50 MHz (fifth) and 30 MHz cosmic noise absorption recorded by riometer (lowest).

Bibliography relevant to
records of radio aurora at Syowa Station, Antarctica.

Observing period	Observers	Literature		
		JARE Data Report		
		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

JANUARY 1979

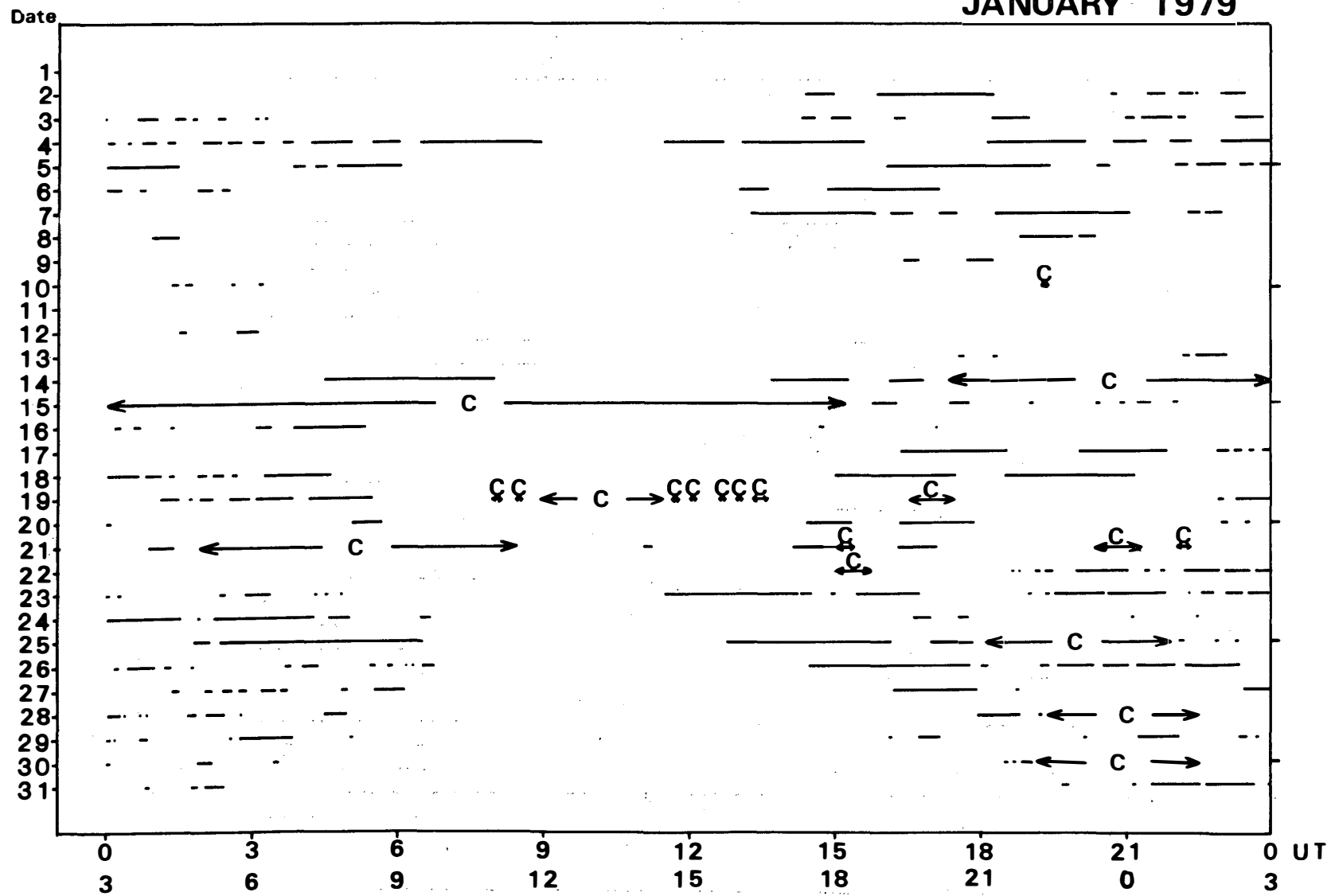


Fig. 1(1).

45° E.M.T.

FEBRUARY 1979

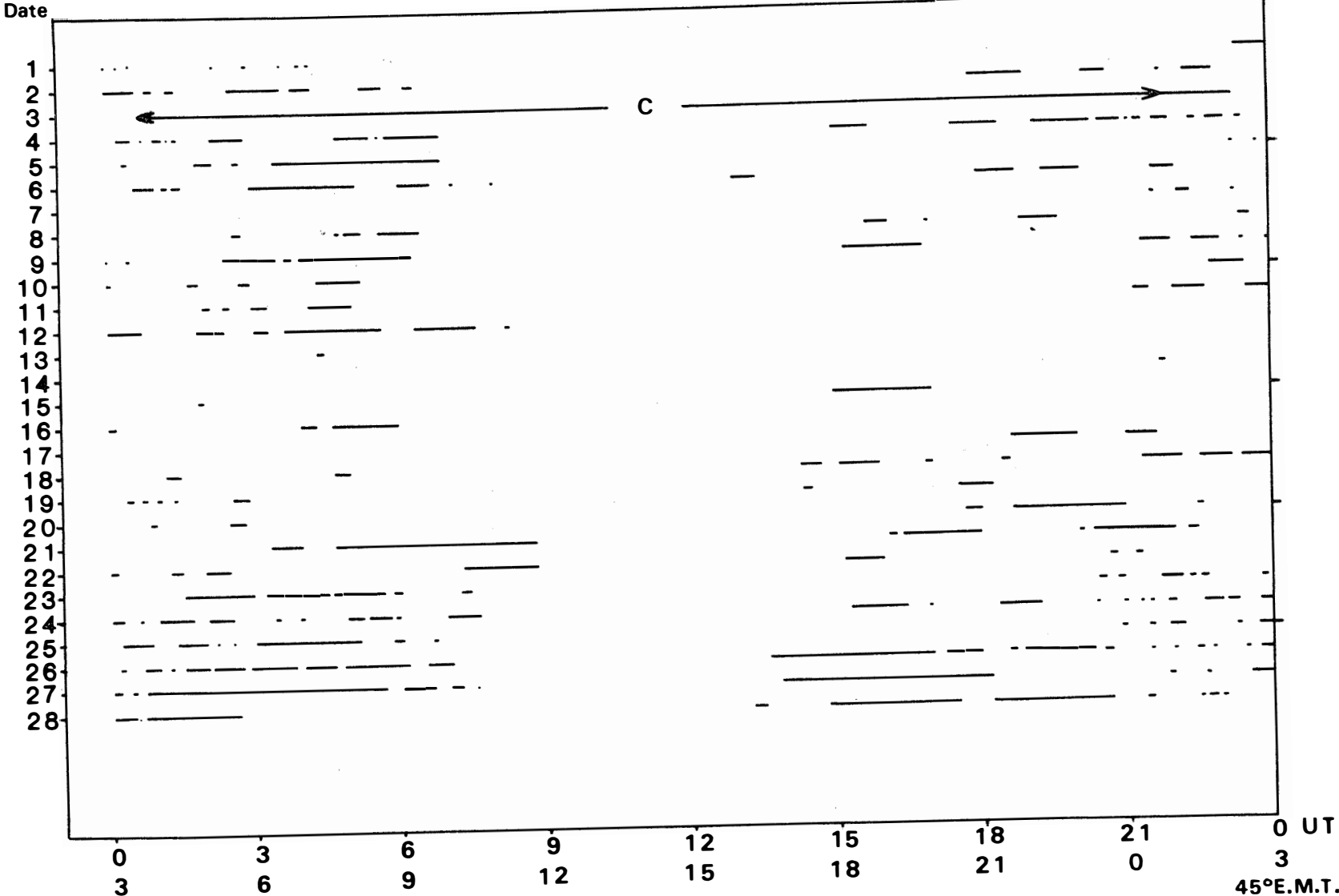


Fig. 1(2).

MARCH 1979

Date

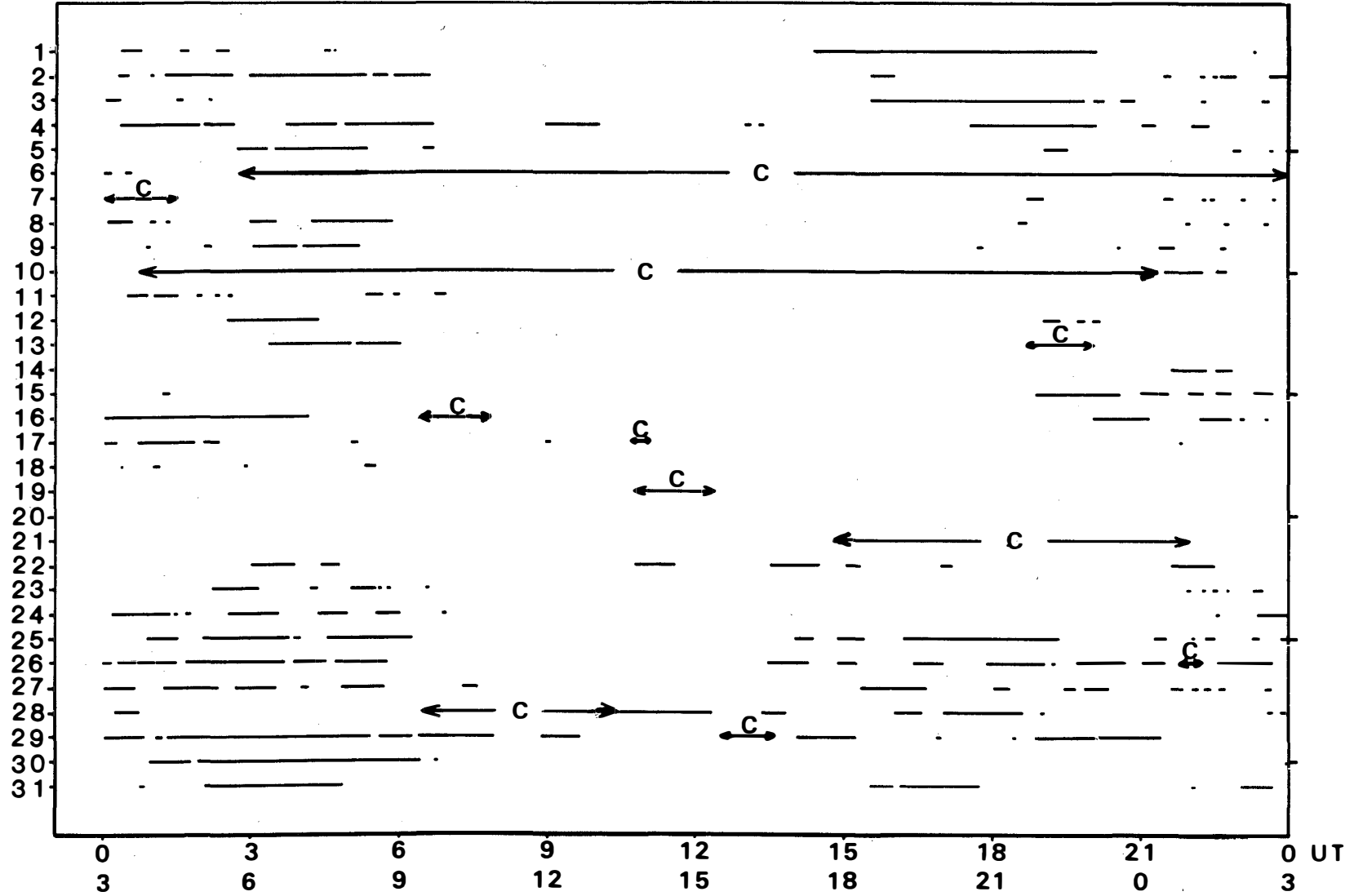


Fig. 1(3).

45°E.M.T.

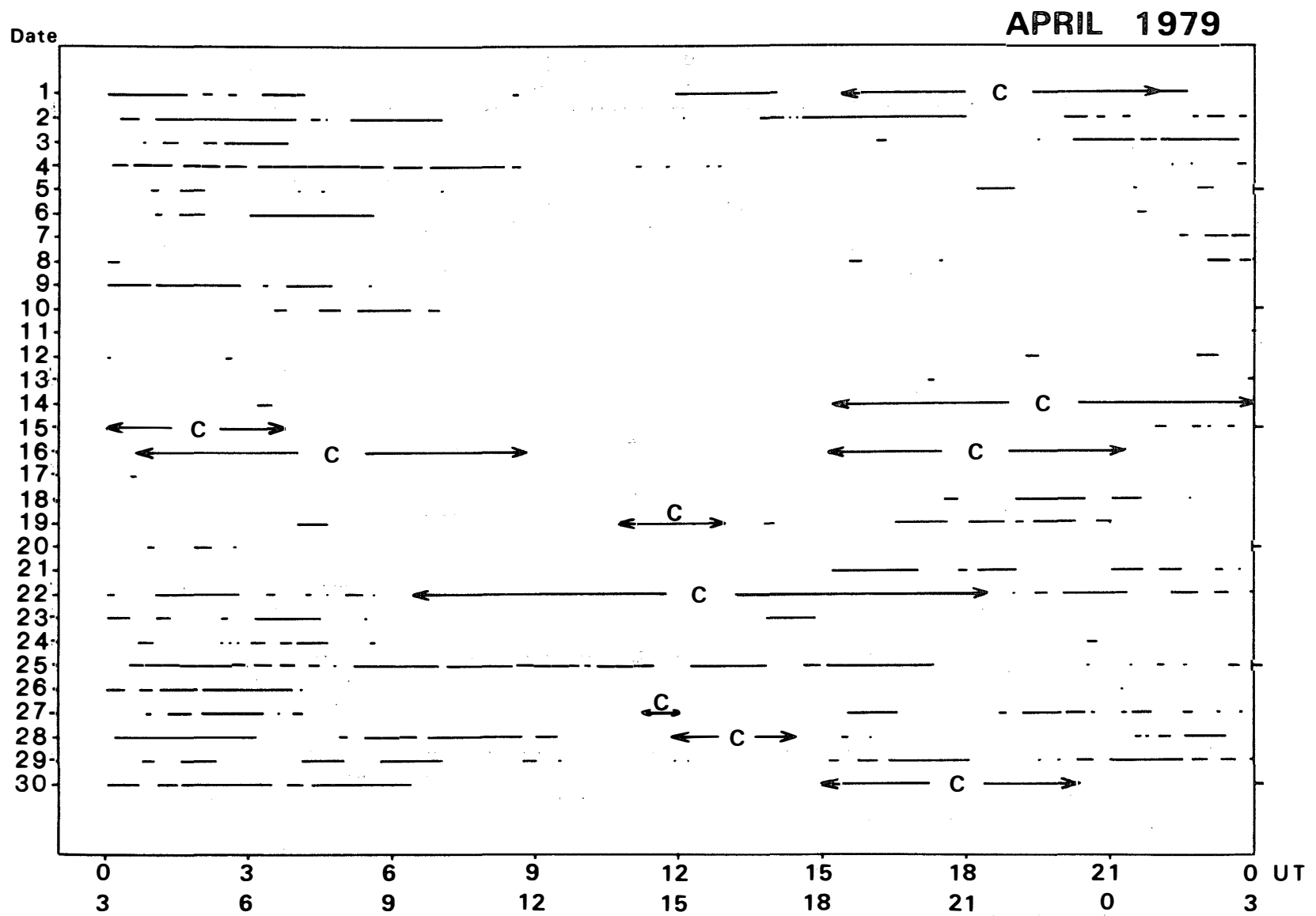


Fig. 1(4).

45°E.M.T.

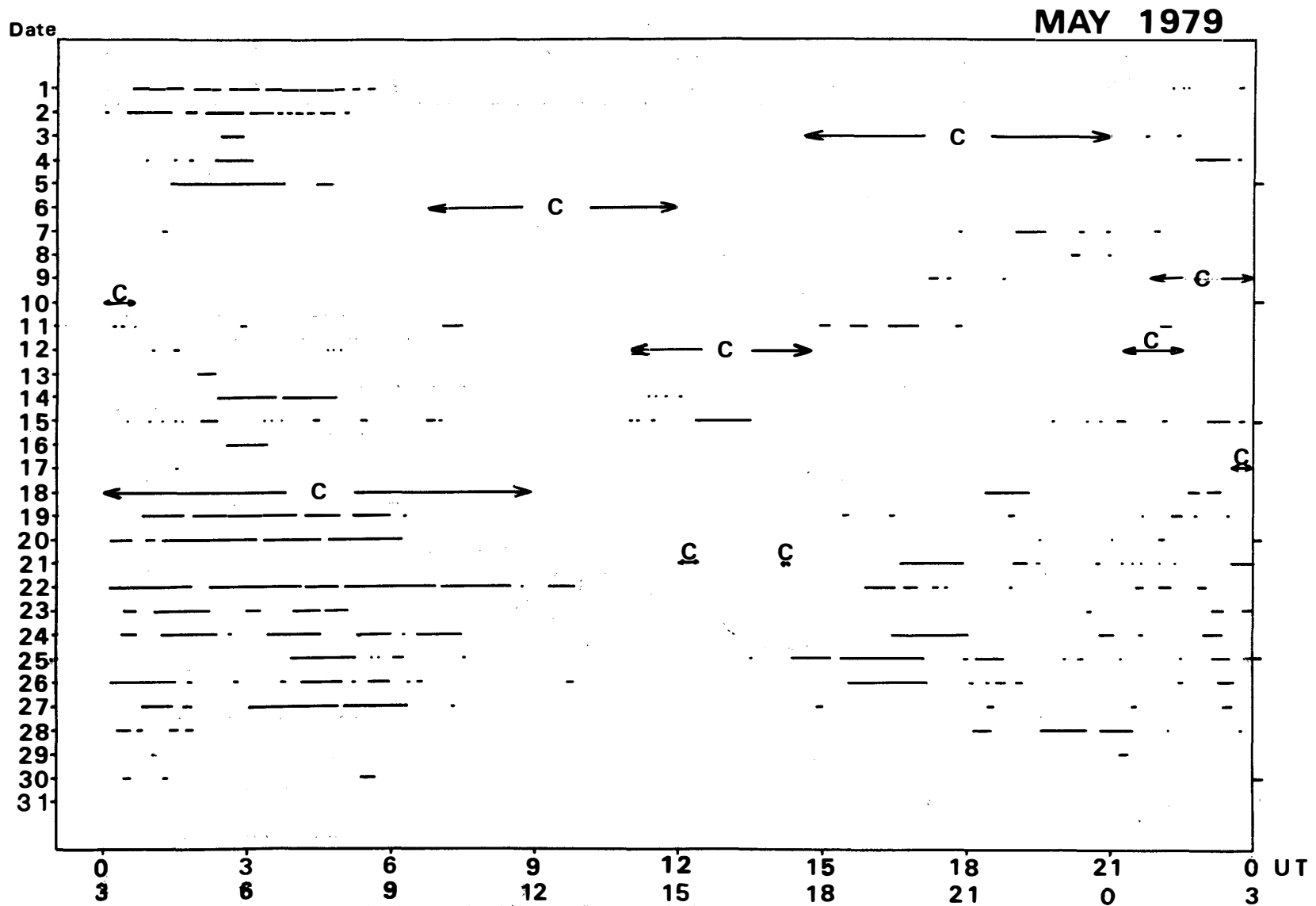


Fig. 1(5).

45° E.M.T.

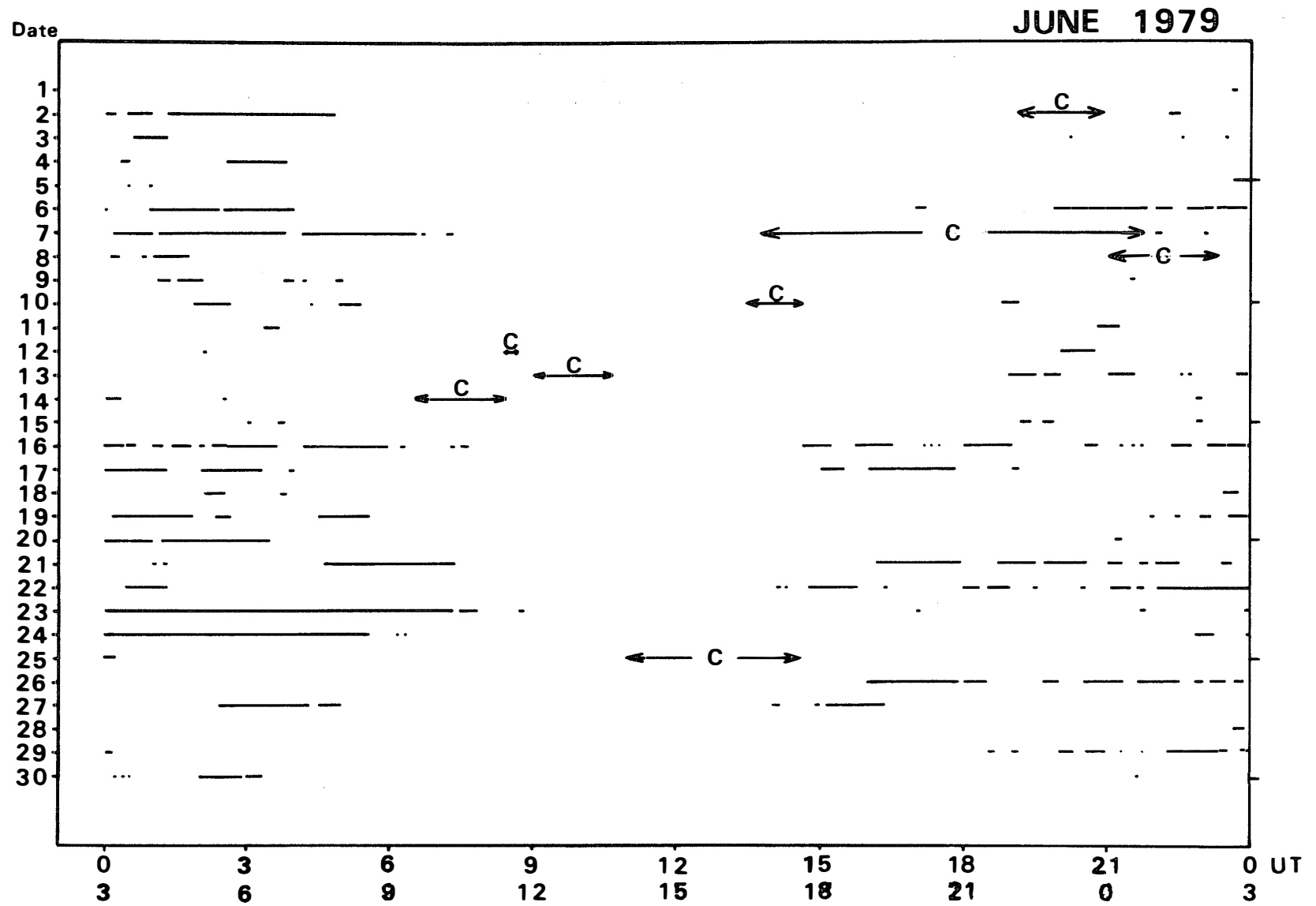


Fig. 1(6).

45° E.M.T.

JULY 1979

Date

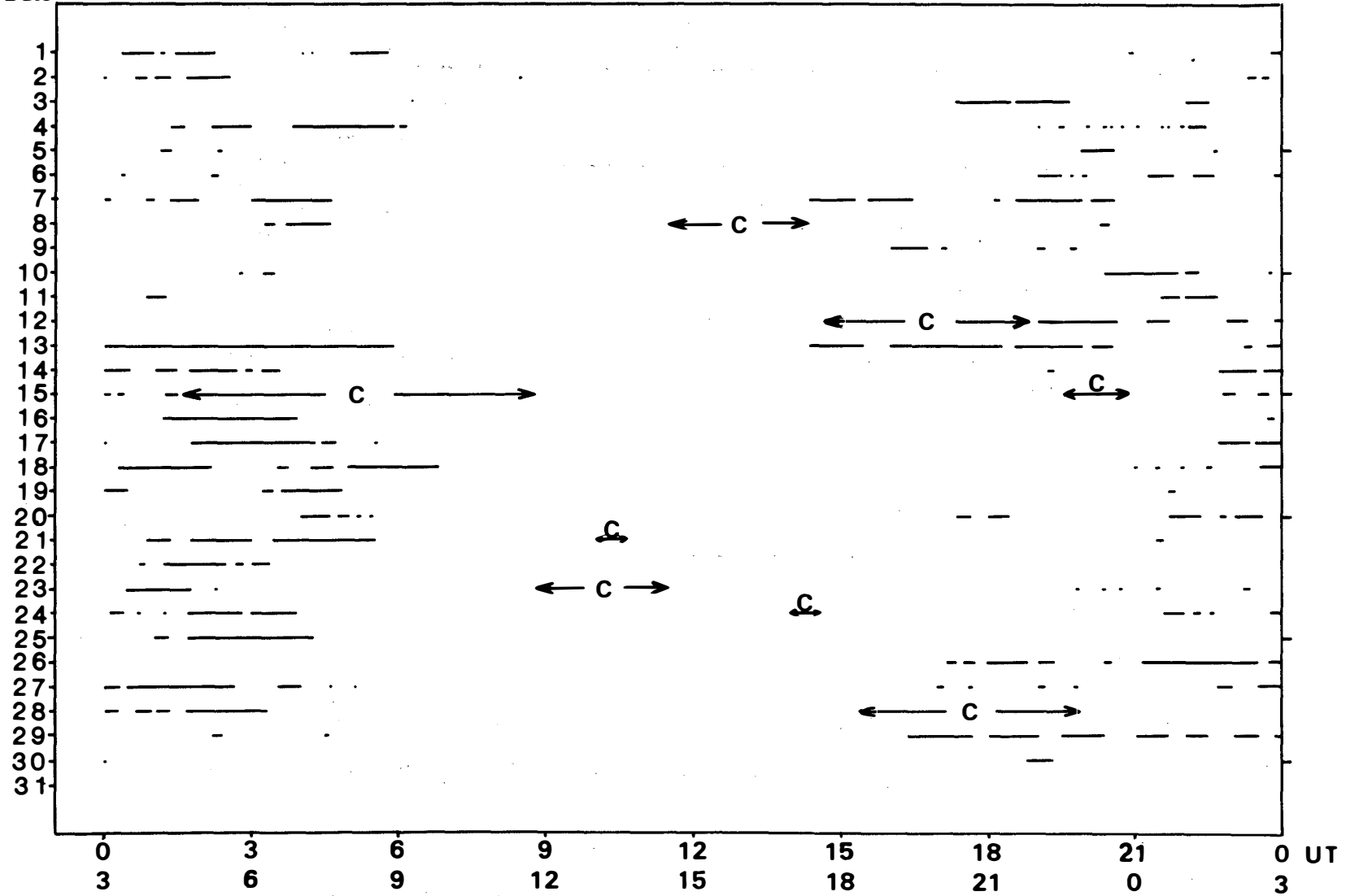


Fig. 1(7).

45°E.M.T.

AUGUST 1979

Date

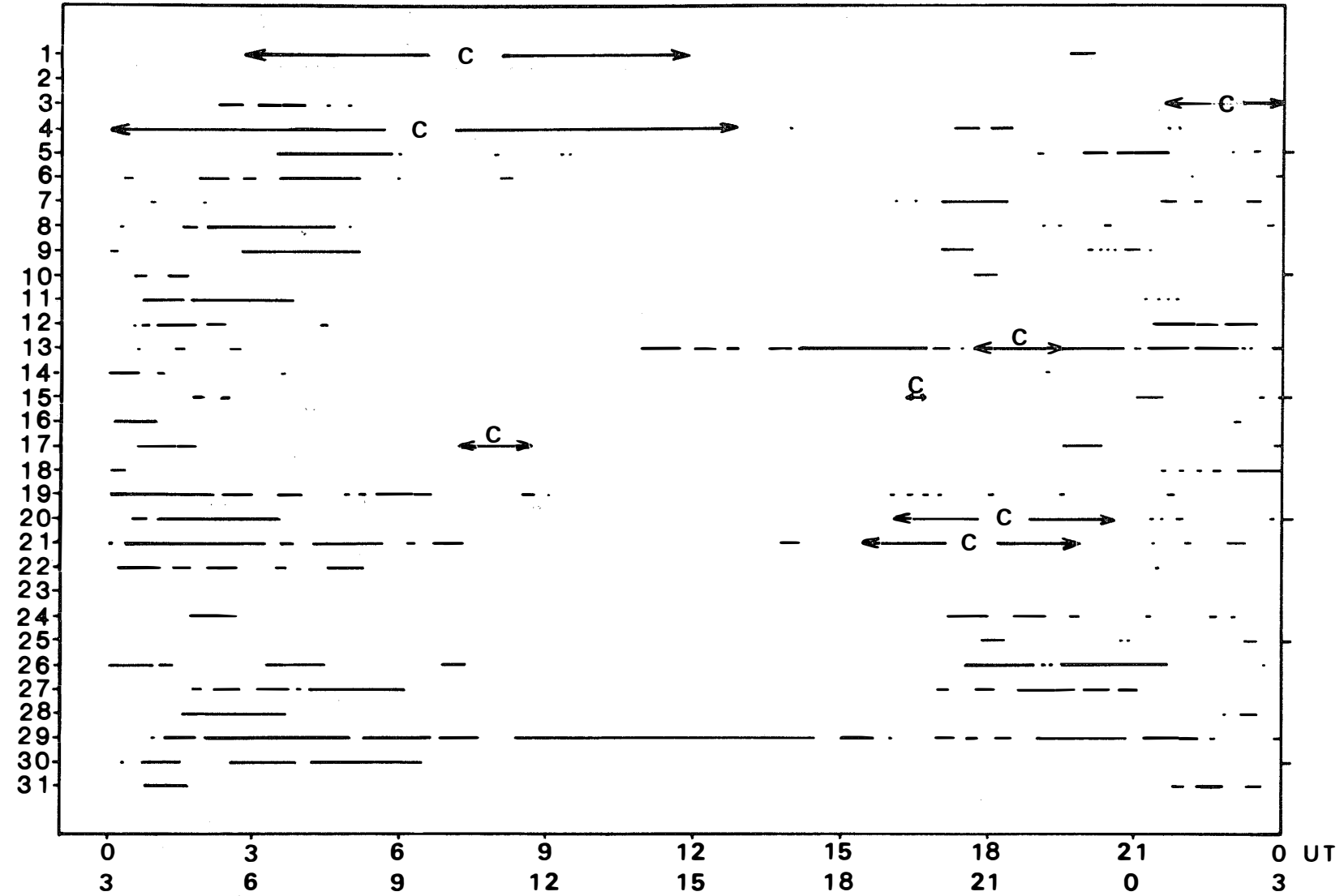


Fig. 1(8).

45°E.M.T.

SEPTEMBER 1979

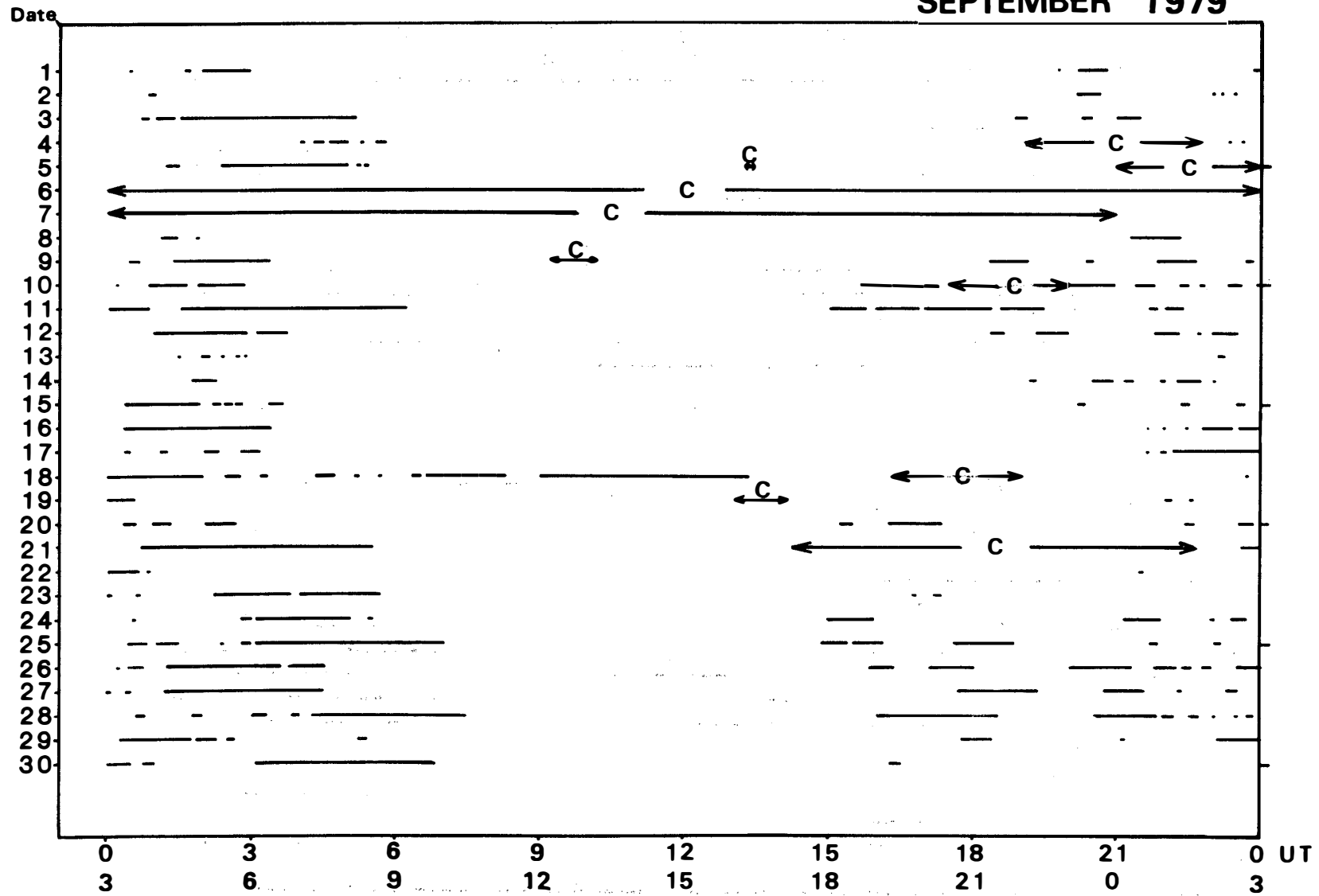


Fig. 1(9).

45°E.M.T.

OCTOBER 1979

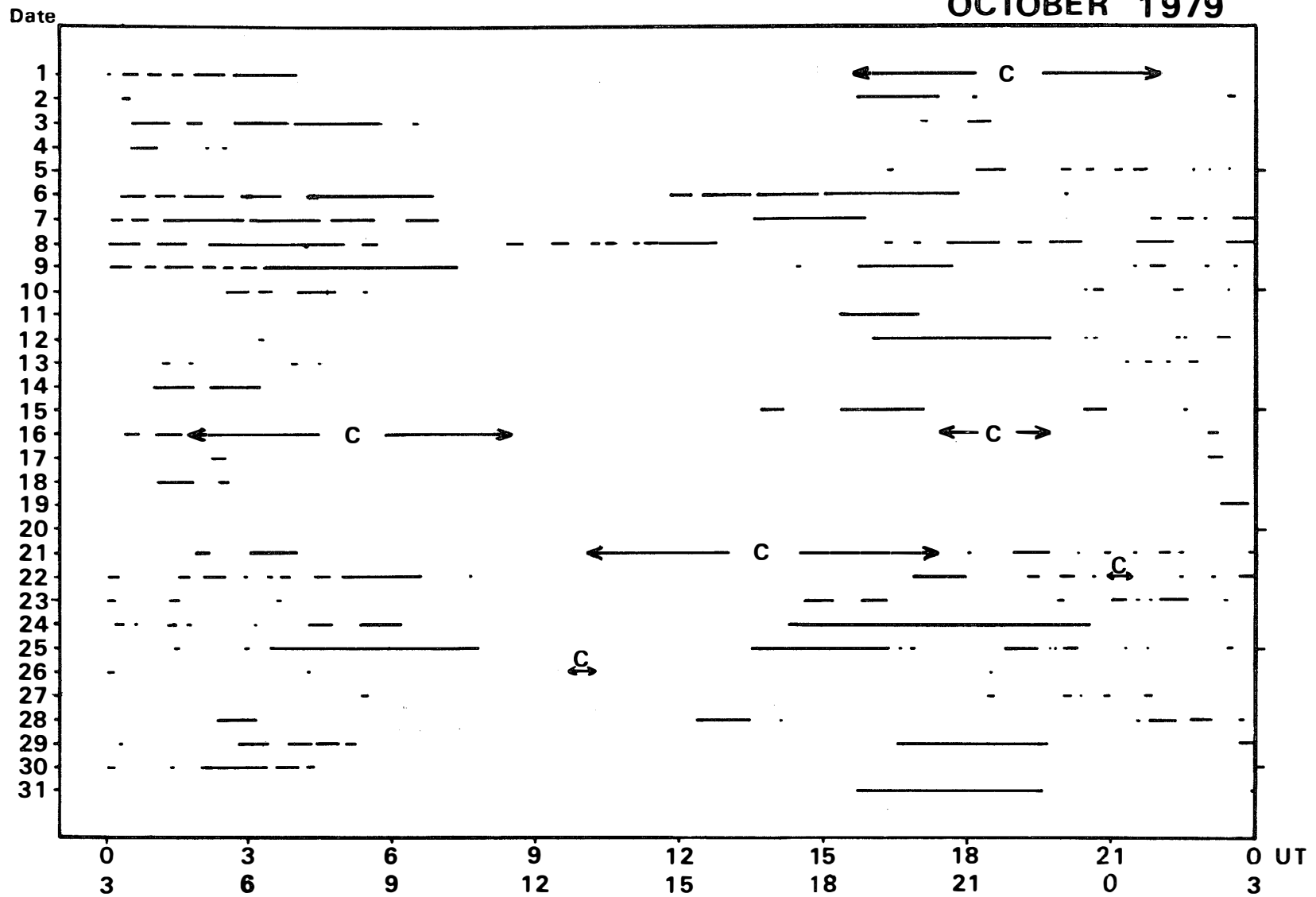


Fig. 1(10).

45° E.M.T.

NOVEMBER 1979

Date

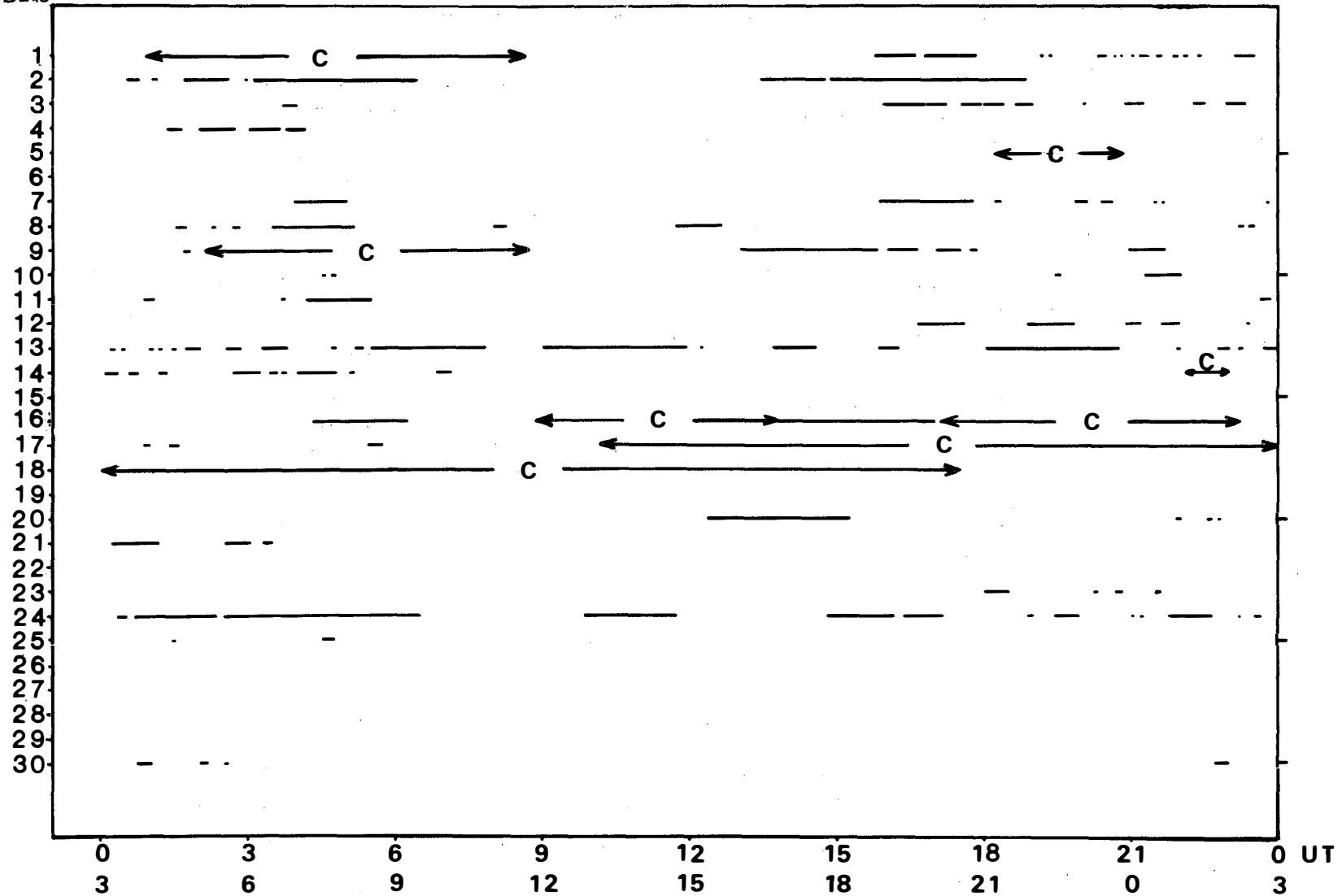


Fig. 1(11).

45° E.M.T.

DECEMBER 1979

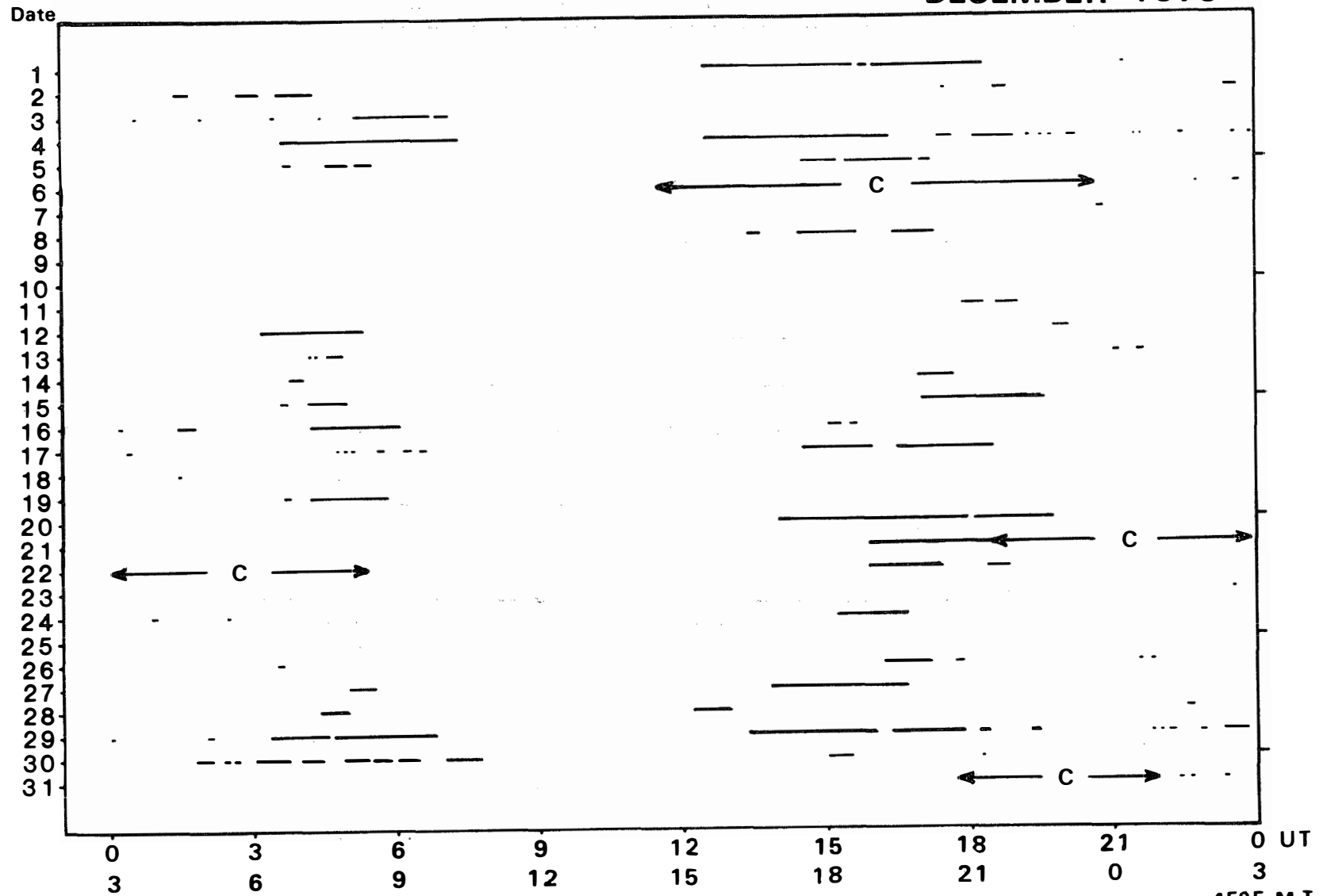


Fig. 1(12).

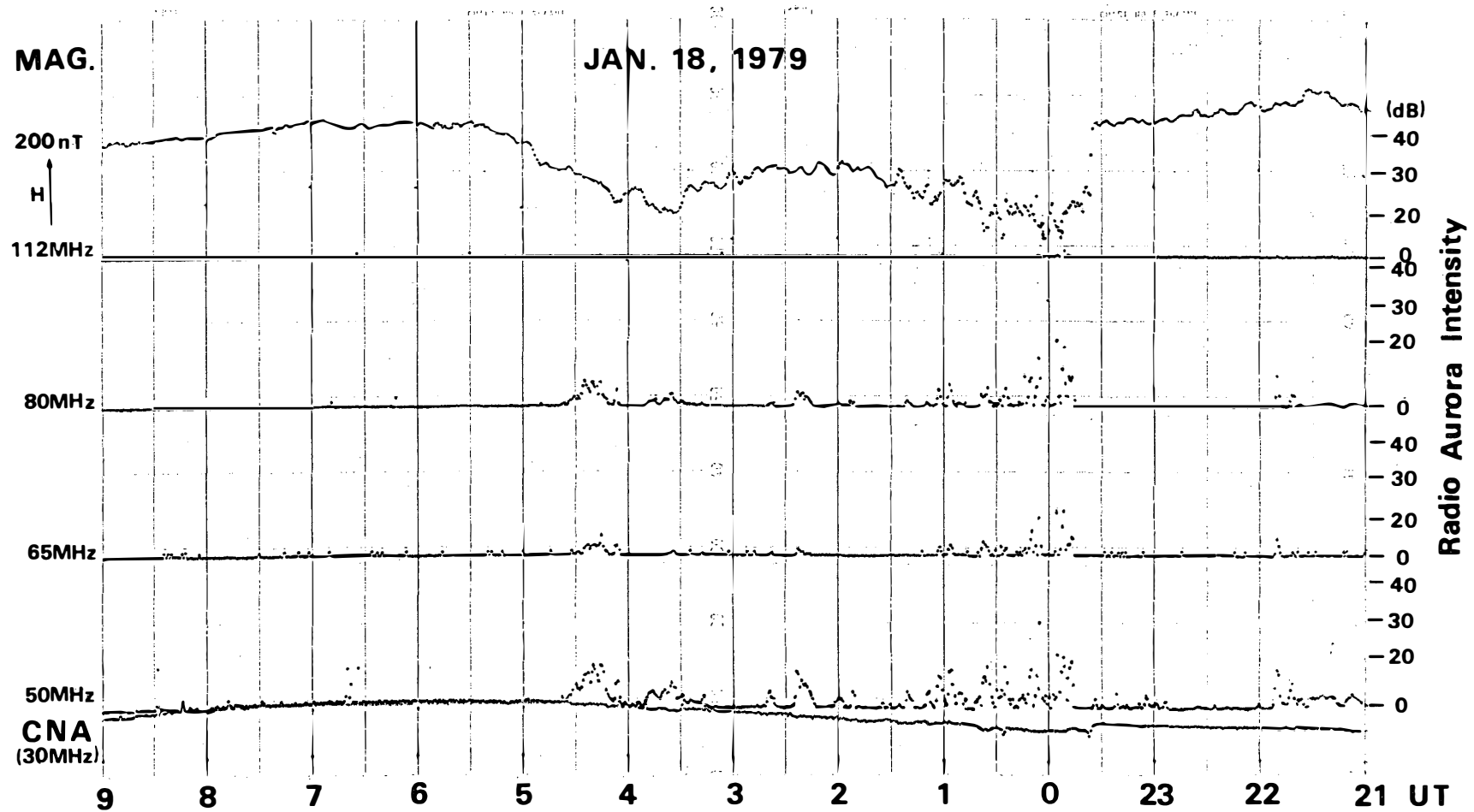


Fig. 2 (1).

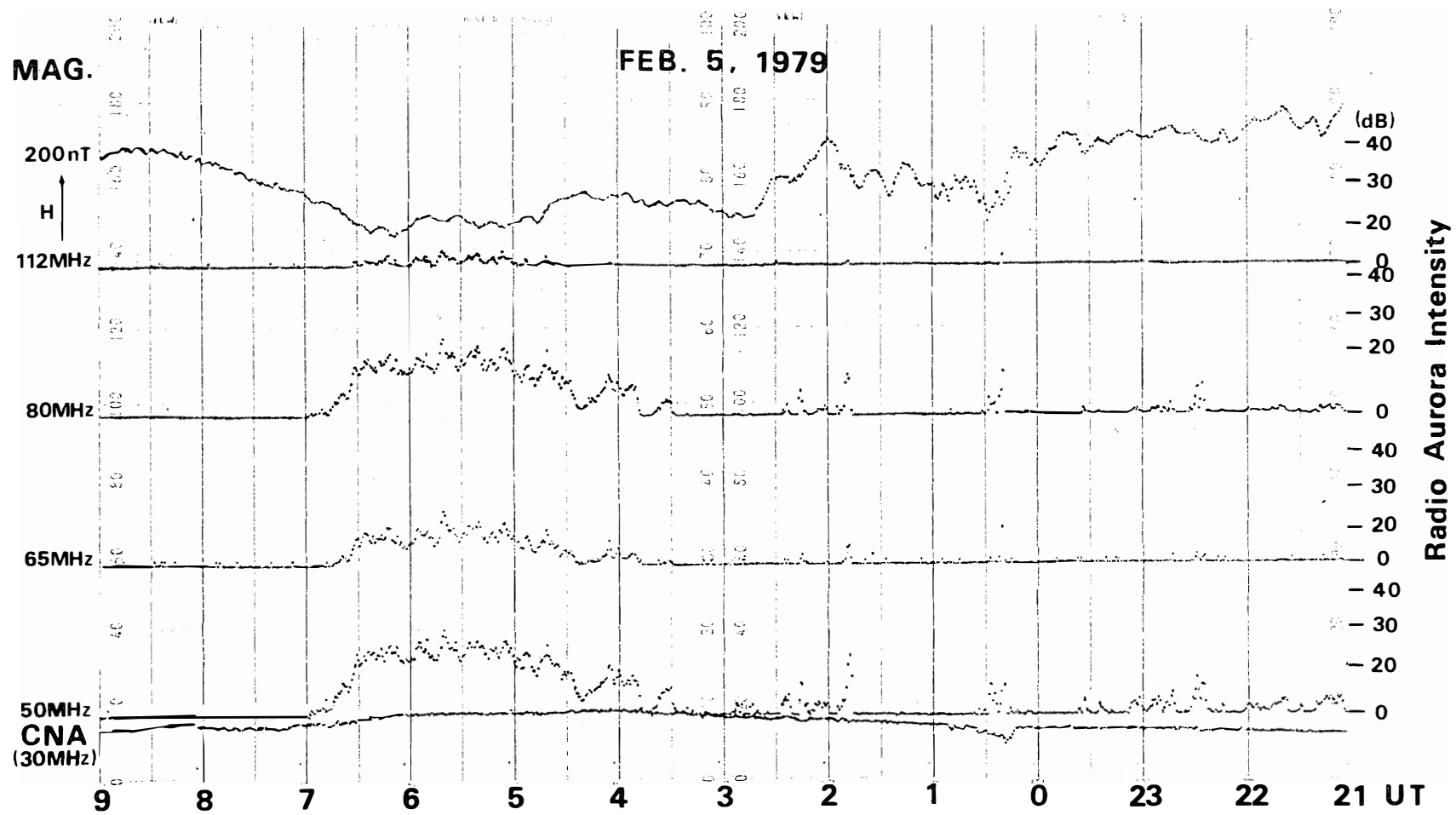


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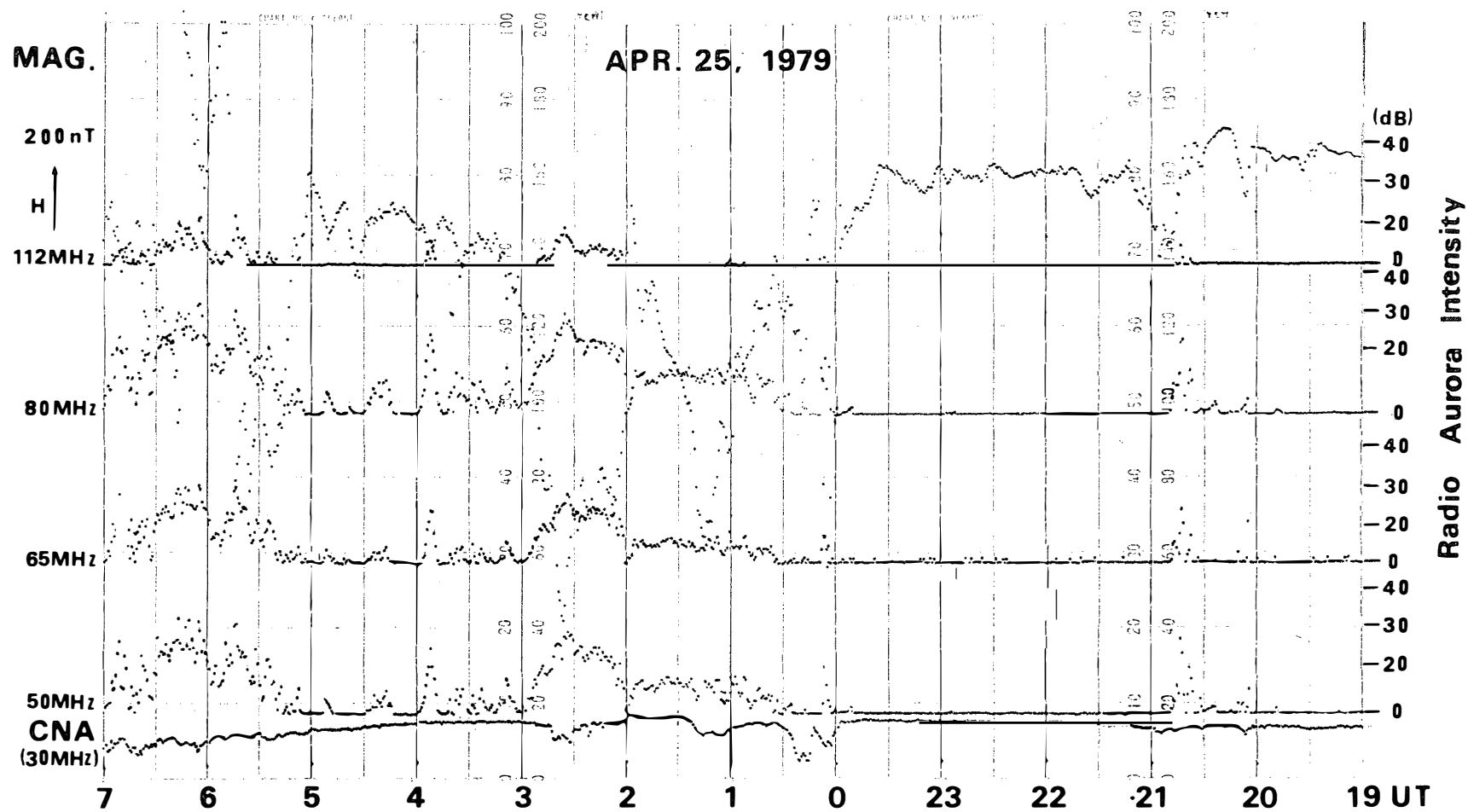


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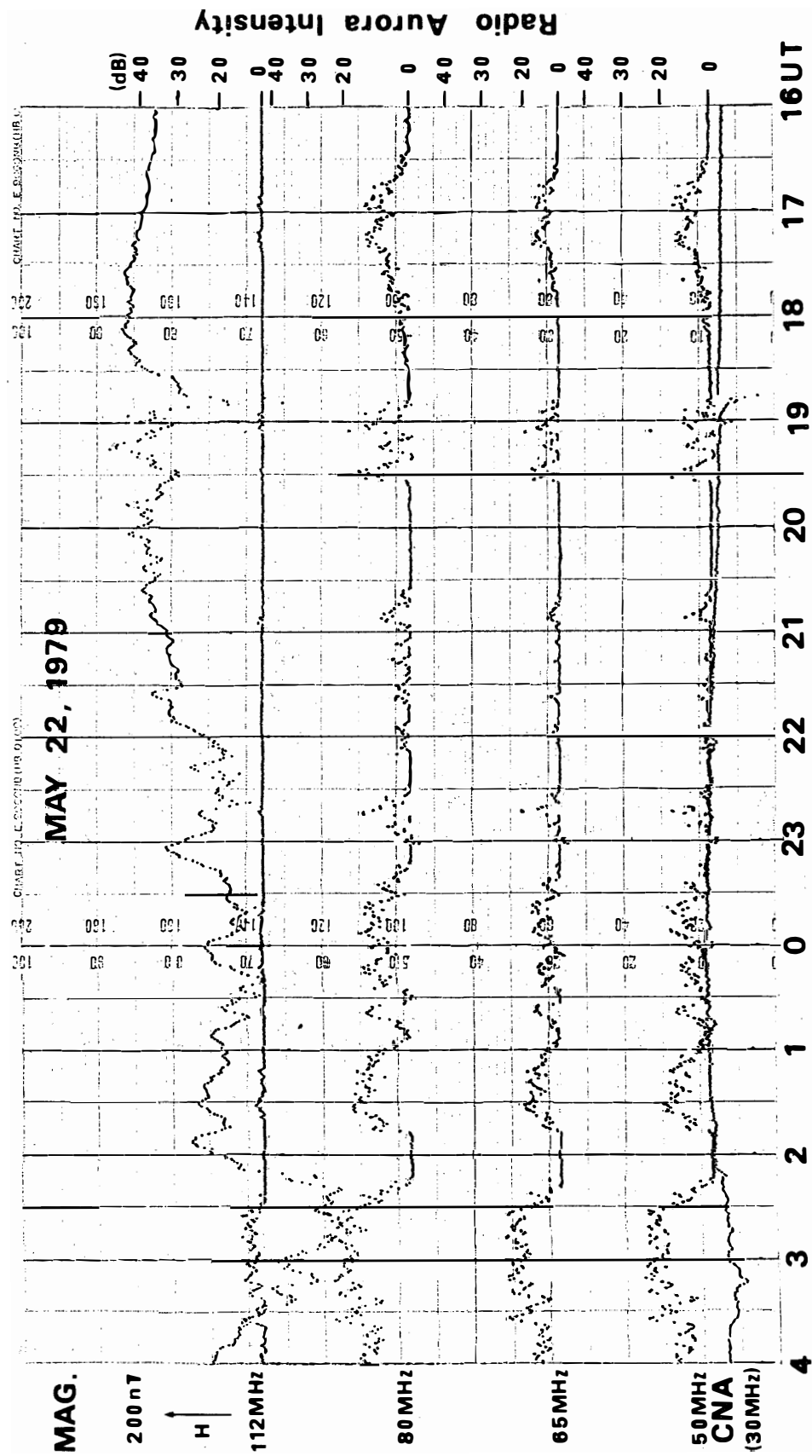


Fig. 2(5).

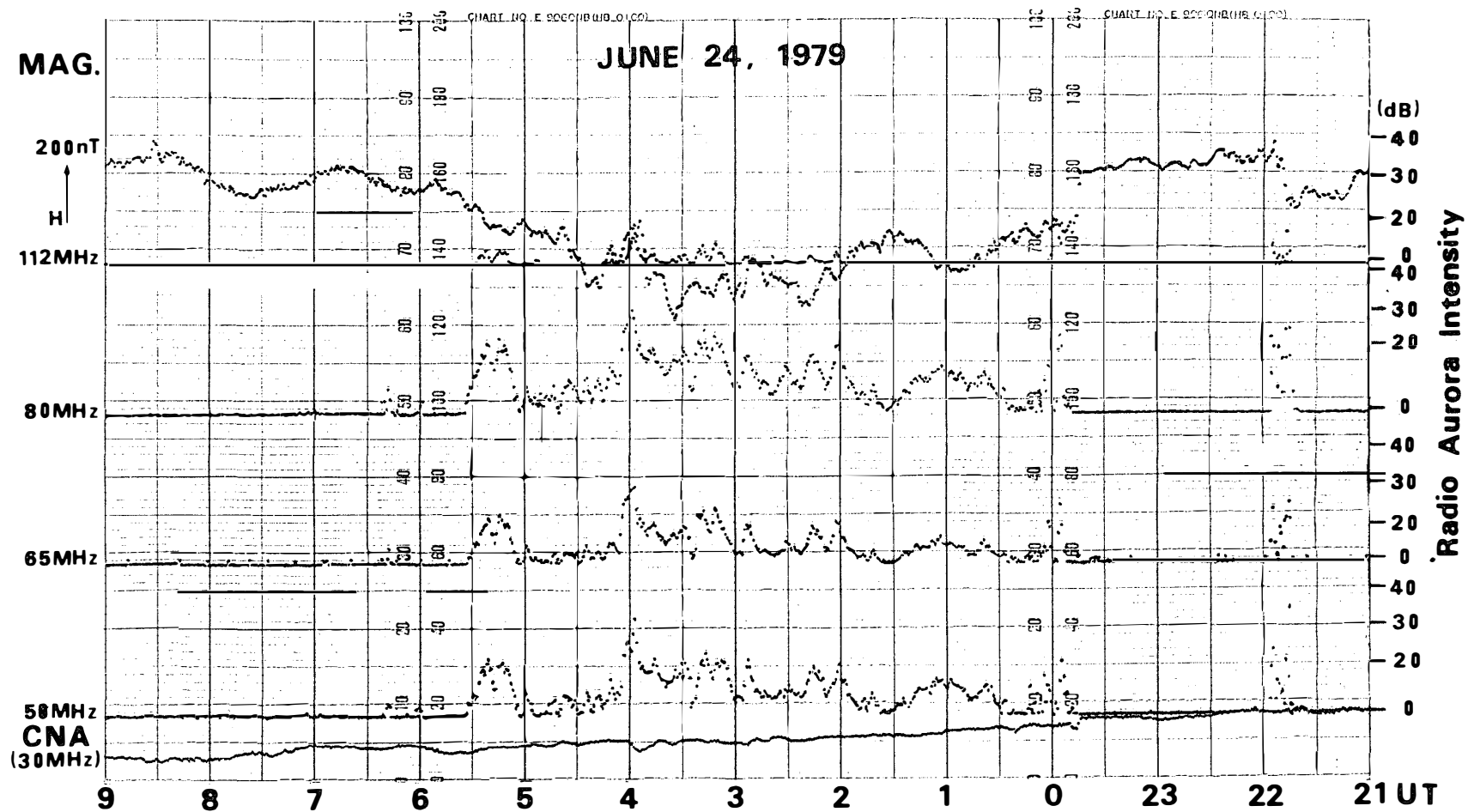


Fig. 2(6).

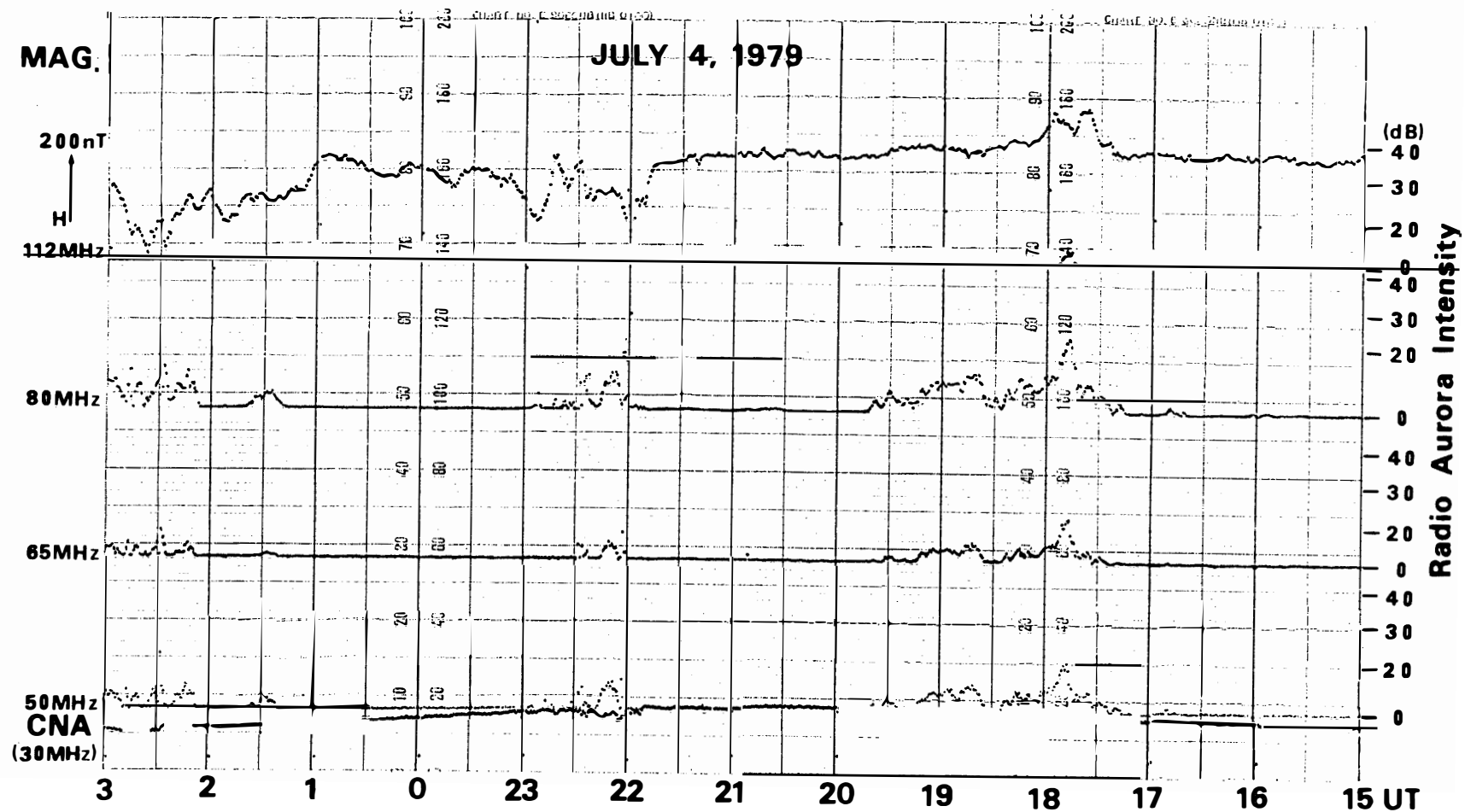


Fig. 2(7).

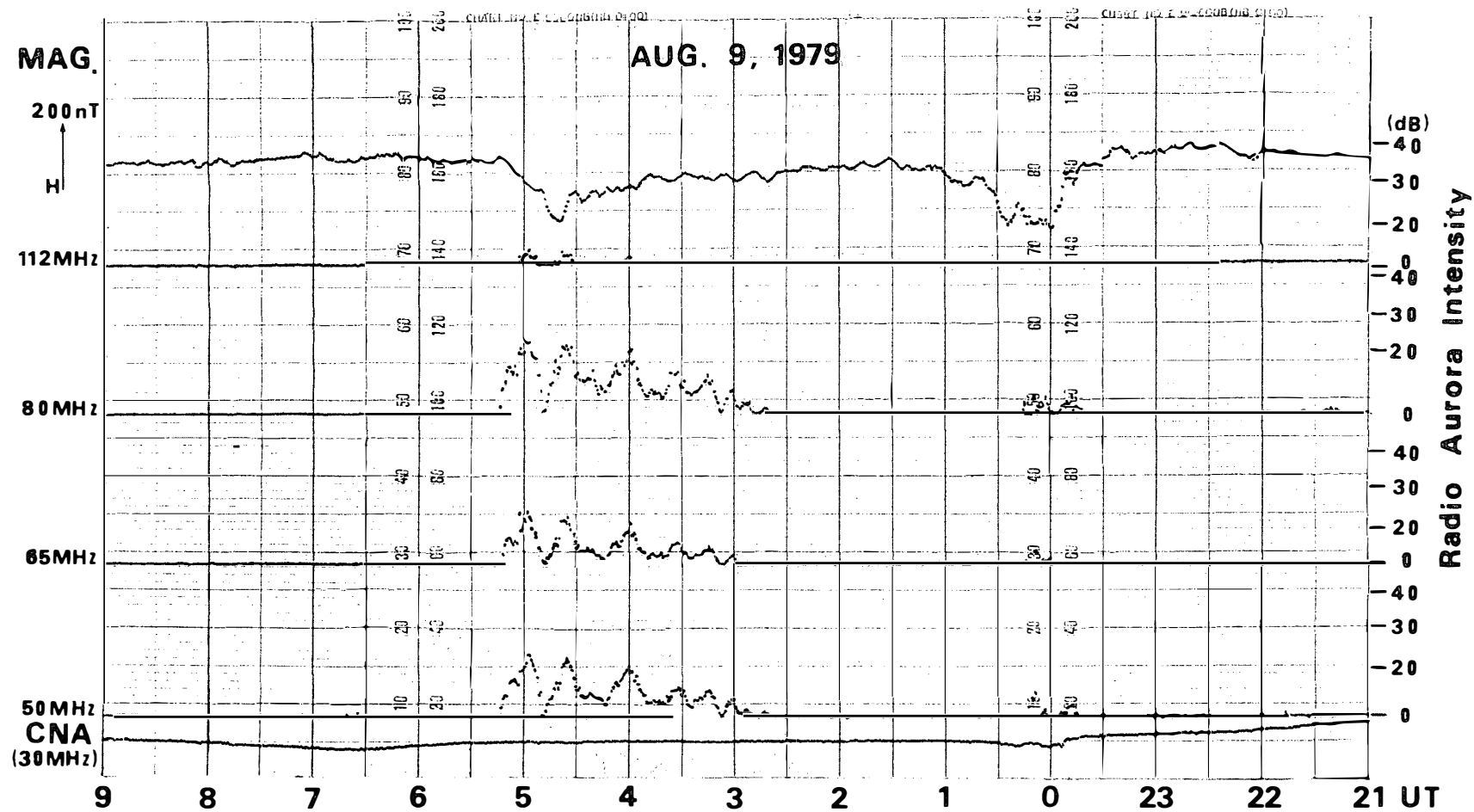


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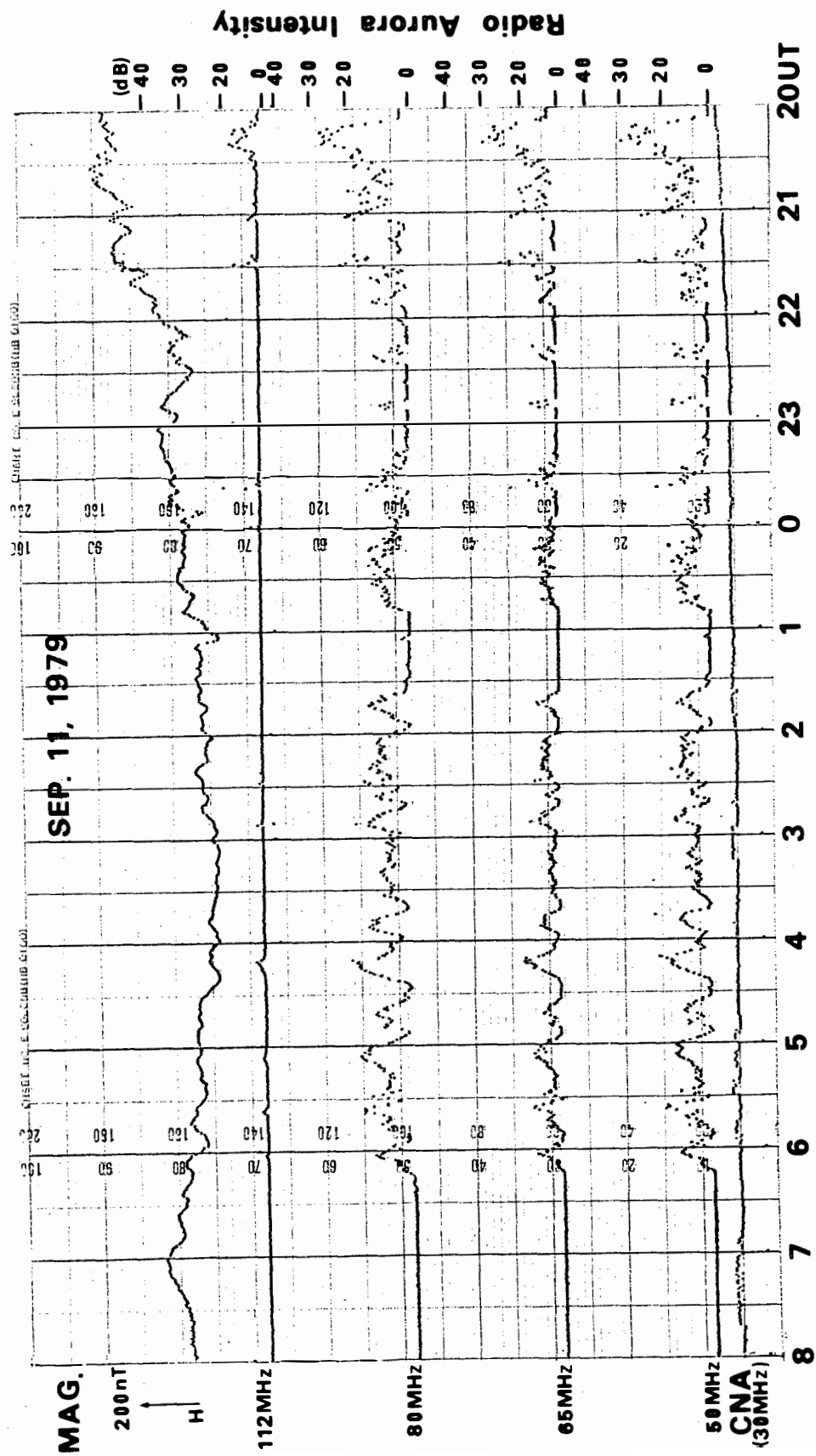


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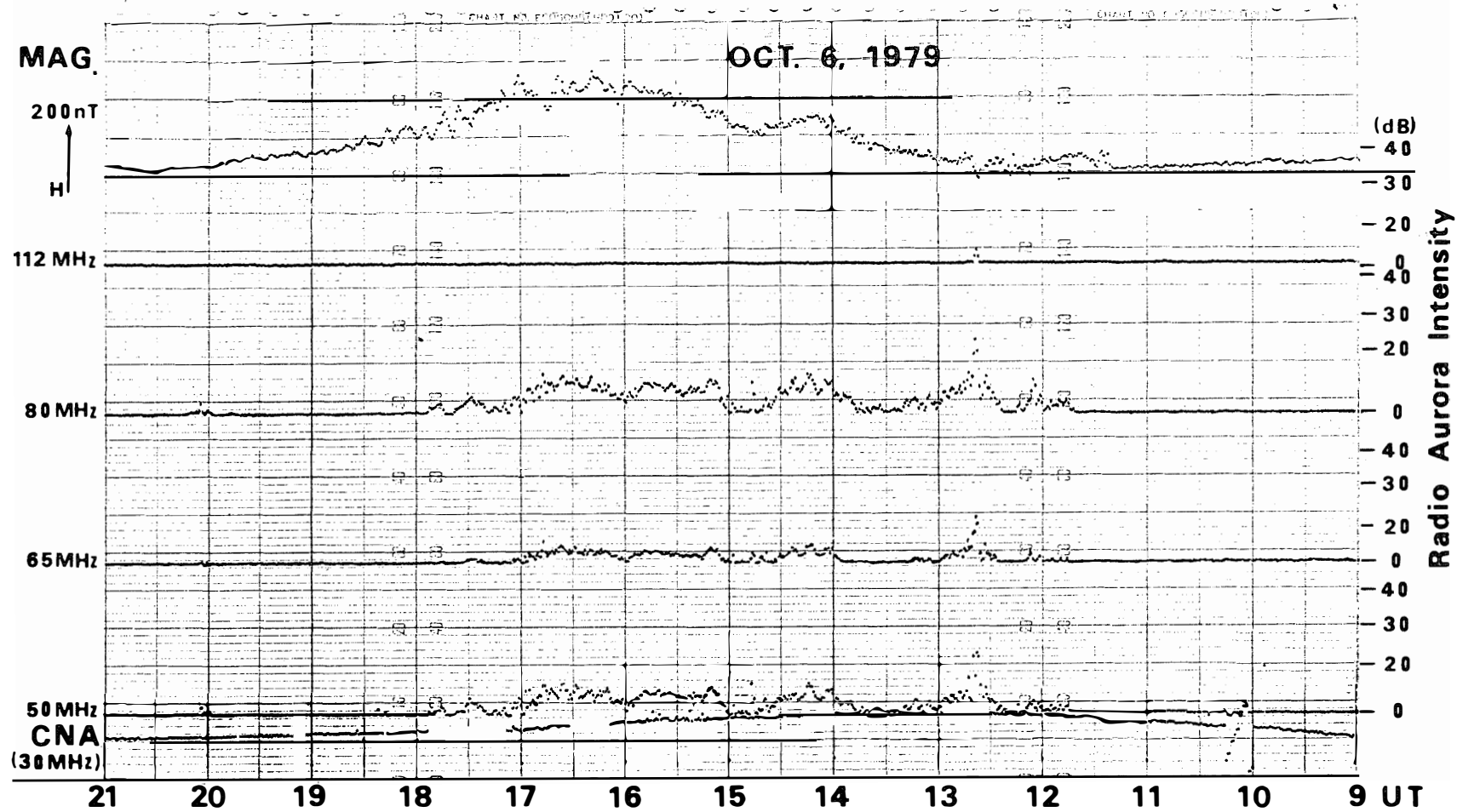


Fig. 2(10).

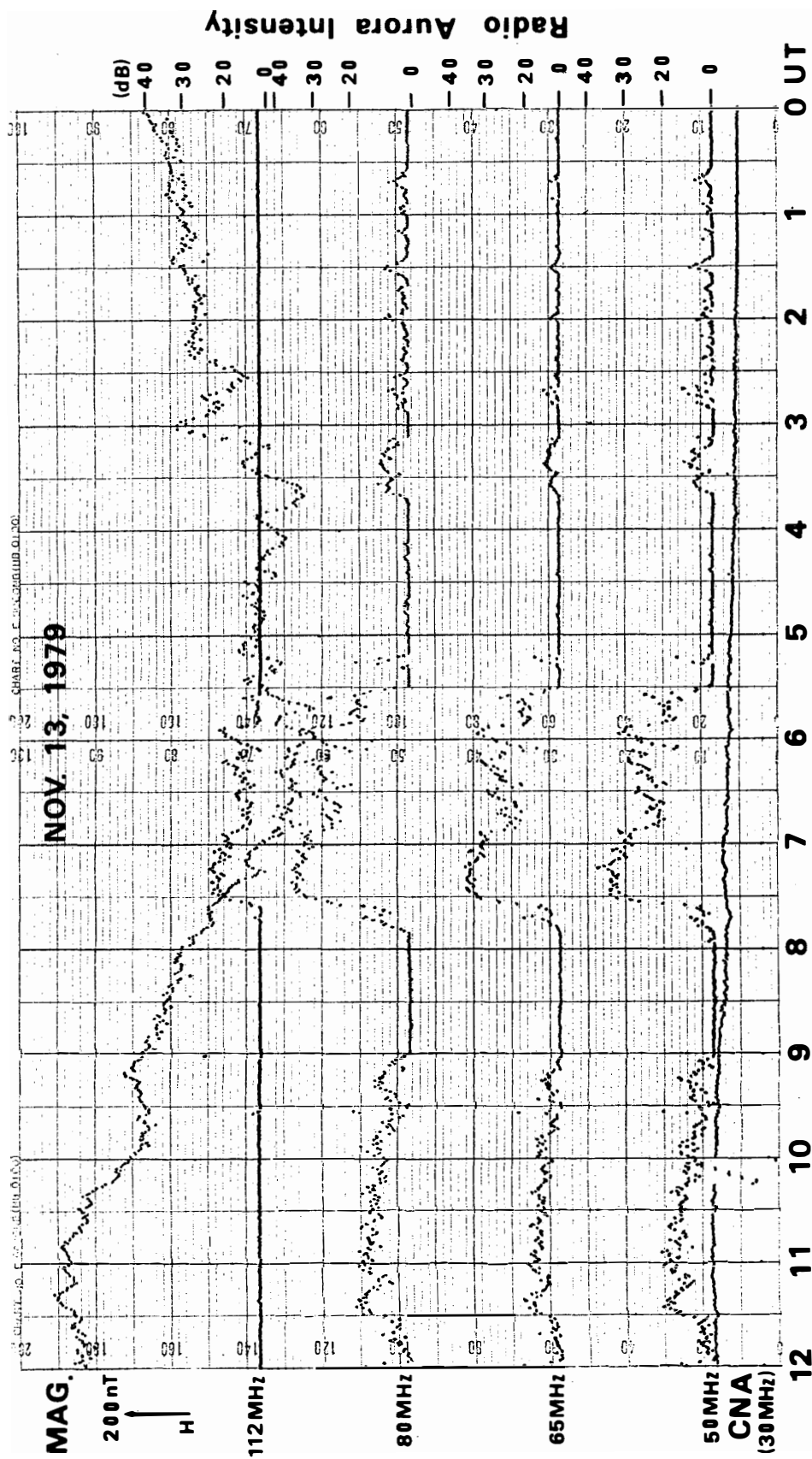


Fig. 2(11).

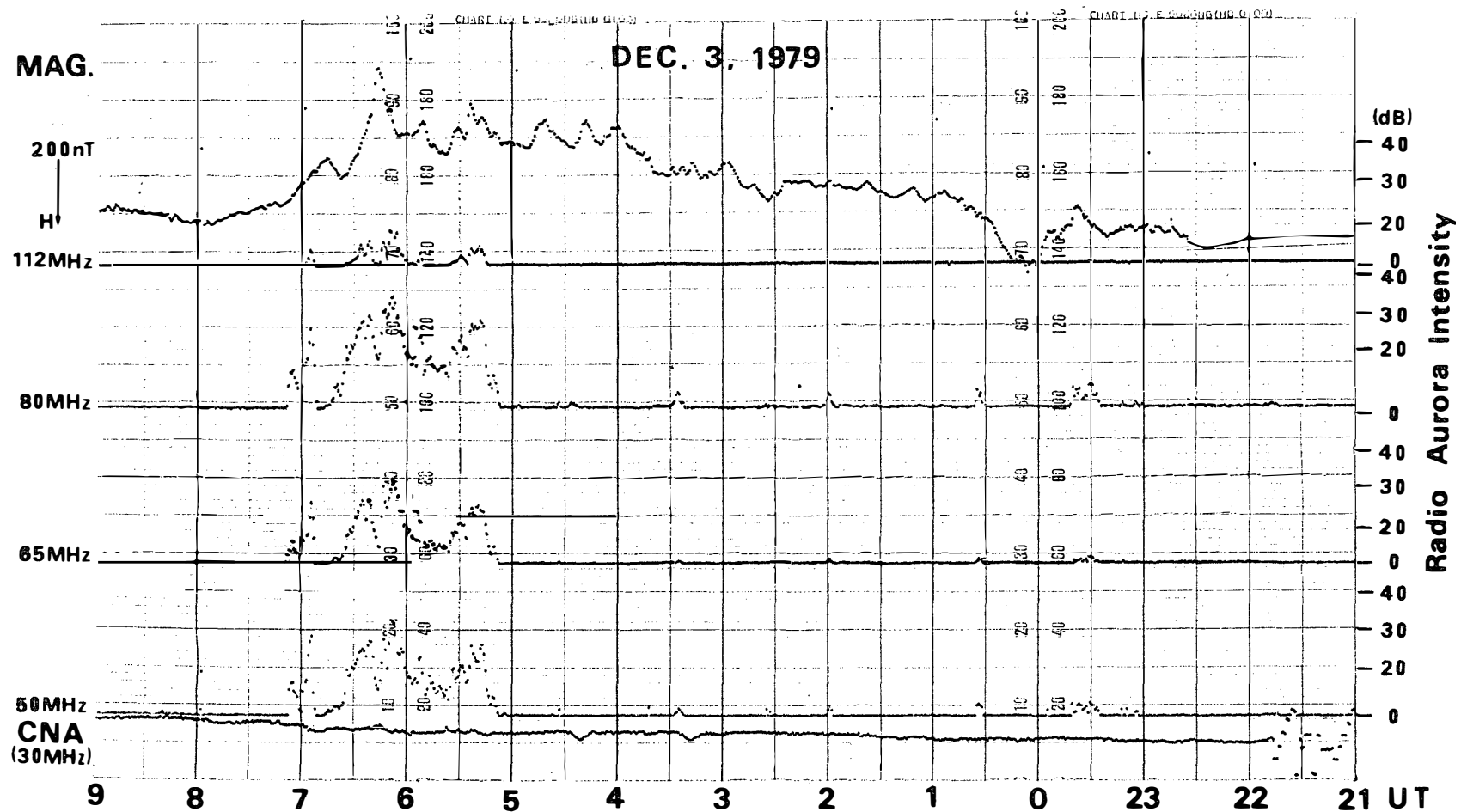


Fig. 2(12).