

RECORDS OF RADIO AURORA AT SYOWA STATION,
ANTARCTICA IN 1981

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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 radio auroral echoes detected in 1981 and characteristic examples of echo intensity-time variation.

Inquiries about details of the data should be addressed to:

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Tokyo 184, Japan.

Three kinds of data are available: a) 35 mm film records of radio auroral echo intensity with range (A-scope), b) 35 mm film records of range-time intensity (A'-scope), and c) 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°	79.4°

3. Observer

Noriyuki Kurihara (Radio Research Laboratories)

4. Method of Measurement

In 1981, auroral radar was operated continuously with the fixed frequency of 50 MHz. Transmitting and receiving antennas, each of which was a horizontally polarized 8-element Yagi-Uda, were directed towards the magnetic south. The geomagnetic dip angle is $64^{\circ}55'$ so that the radar viewed the ionospheric E layer at about 300 km distant from Syowa Station.

The A-scope record was taken every 5 min. The A'-scope record and the chart record were made continuously throughout the day.

Characteristics of the system are as follows:

Transmitting antenna	(50 MHz)
Gain	: 12.3 dB
Directivity (Front/Back)	: 16 dB
Receiving antenna	(50 MHz)
Gain	: 12.4 dB
Directivity (Front/Back)	: 15 dB
Main equipment	
Frequency	: 50 MHz
Transmitting power	: 20 kW (peak)
Modulation	: Single pulse
Pulse width	: 100 μ s
Pulse repetition frequency	: 50 Hz
Receiver bandwidth	: 25 kHz
Receiver noise figure	: less than 4 dB
Display and recorder	
A-scope display and A'-scope display on 5-inch oscilloscope 6-channel dot recorder	
Maximum range	: 1000 km
Range mark	: every 100 km

5. Explanation of Diagrams Contained in the Report

Figs. 1(1-12) show the periods of radio auroras and operation status of the auroral radar. Time used in 45° EMT (= UT + 3 h).

Symbols used in the figures are as follows:

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

Figs. 2(1-12) show the typical examples of radio auroral echo intensity at the frequency of 50 MHz with the simultaneously recorded geomagnetic H-component and the 30 MHz cosmic noise absorption detected by riometer.

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

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
Jan. 1980 - Dec. 1980	Igarashi, K. Nozaki, K.	68 (Ionosphere 24)	28	1982

January 1981

Date

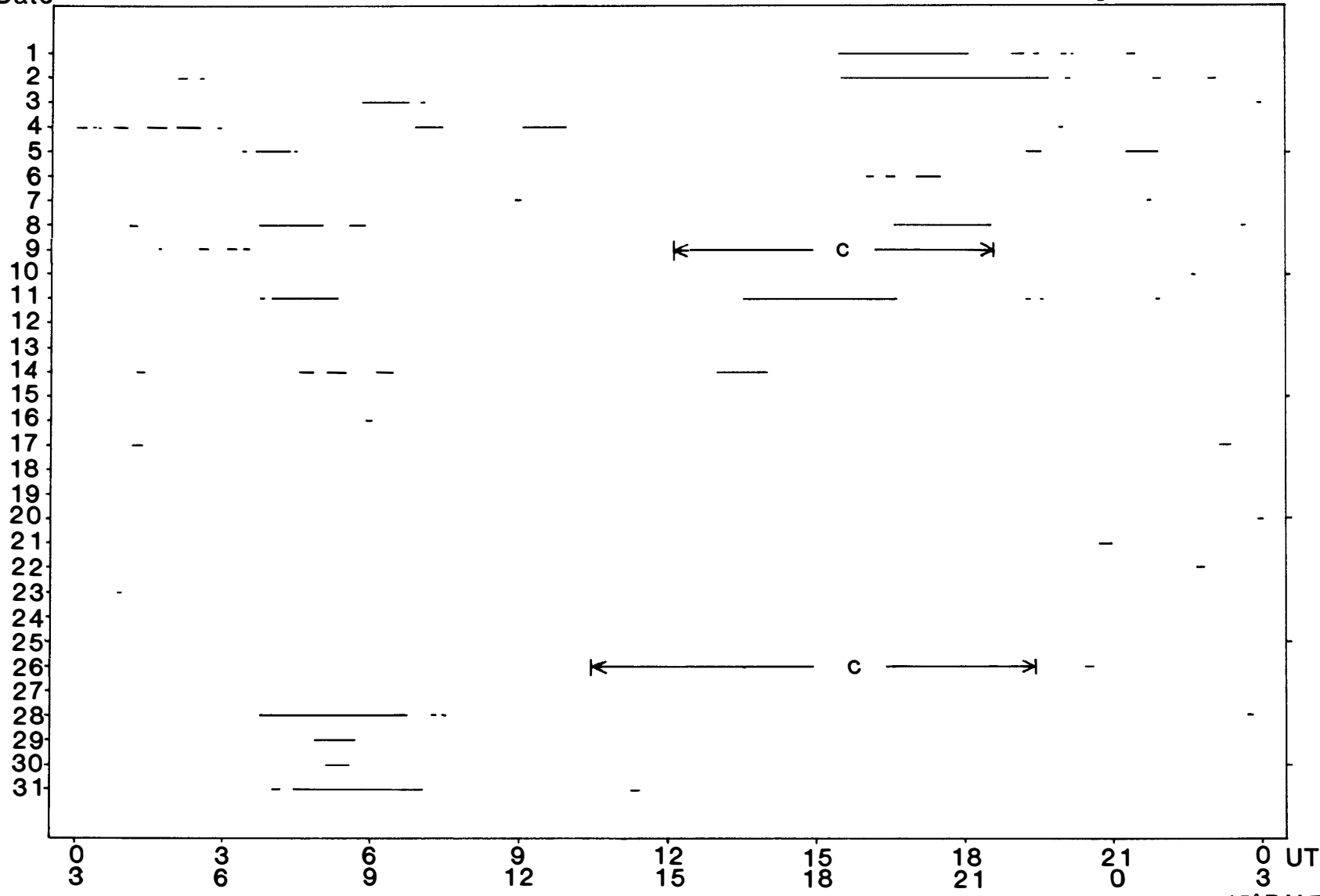


Fig. 1 (1).

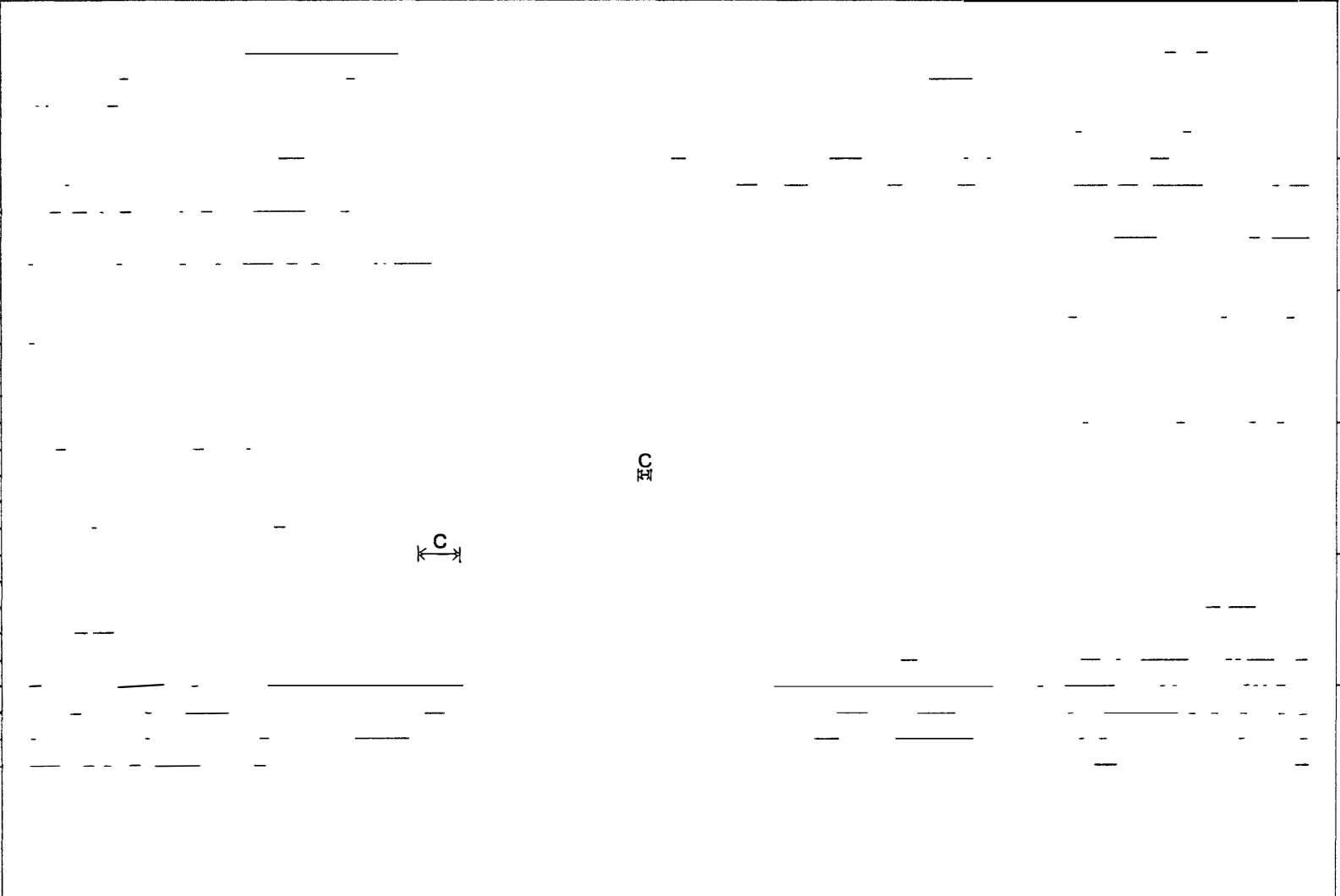
45° E.M.T.

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February 1981

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0 3 6 9 12 15 18 21 0 3 UT

45° E.M.T.

Fig. 1 (2).

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March 1981

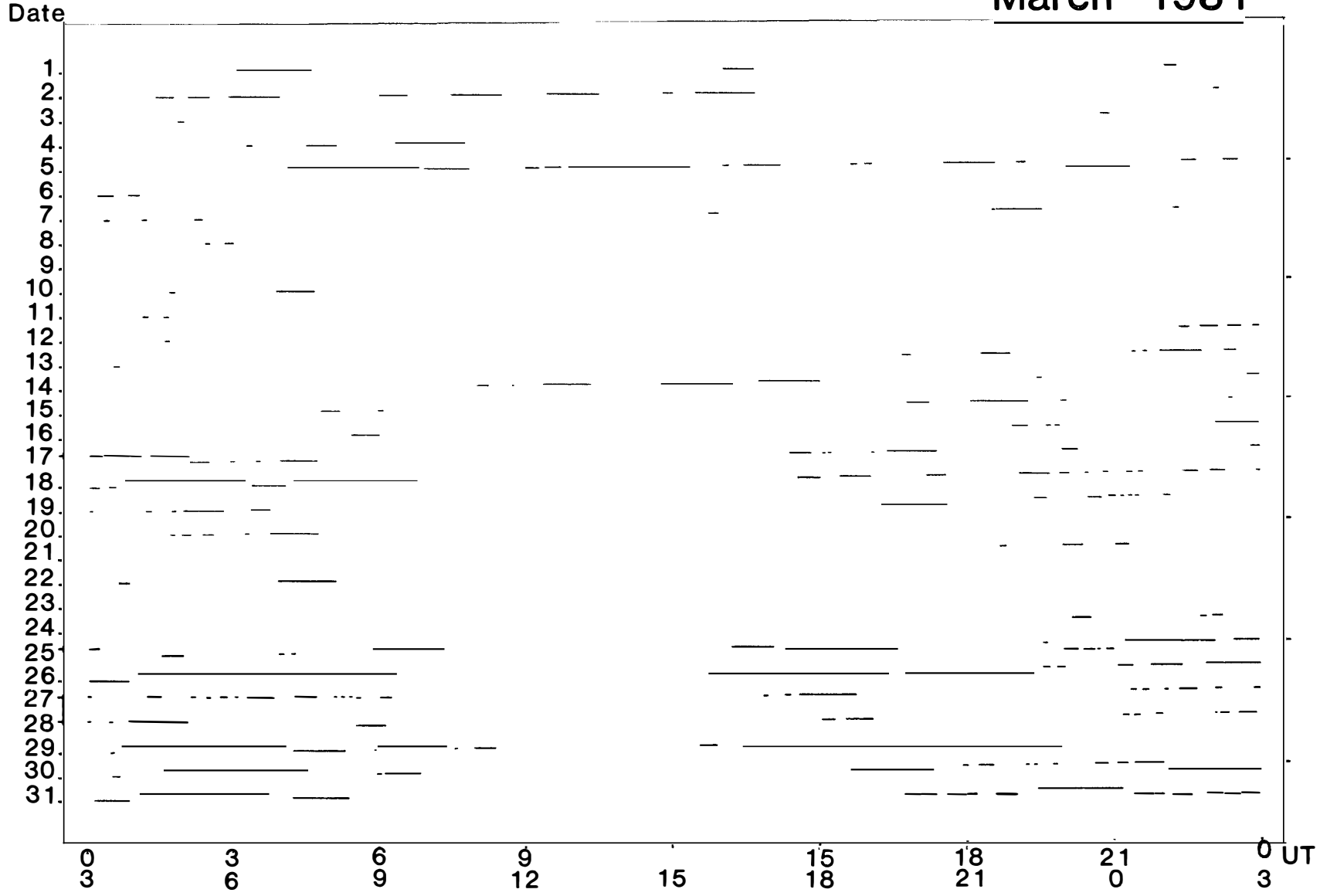


Fig. 1 (3).

45° E.M.T.

7

April 1981

Date

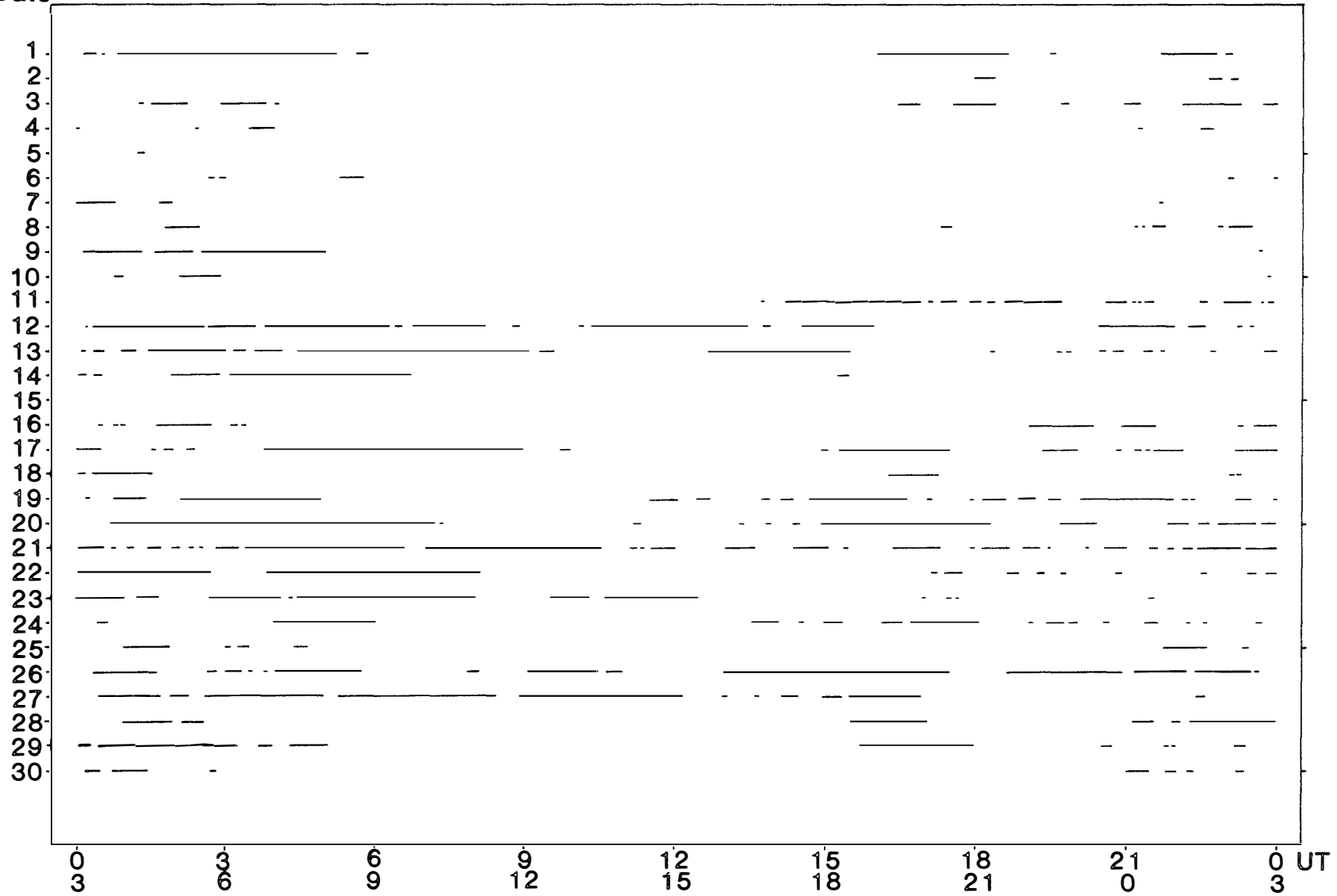


Fig. 1 (4).

45° E.M.T.

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May 1981

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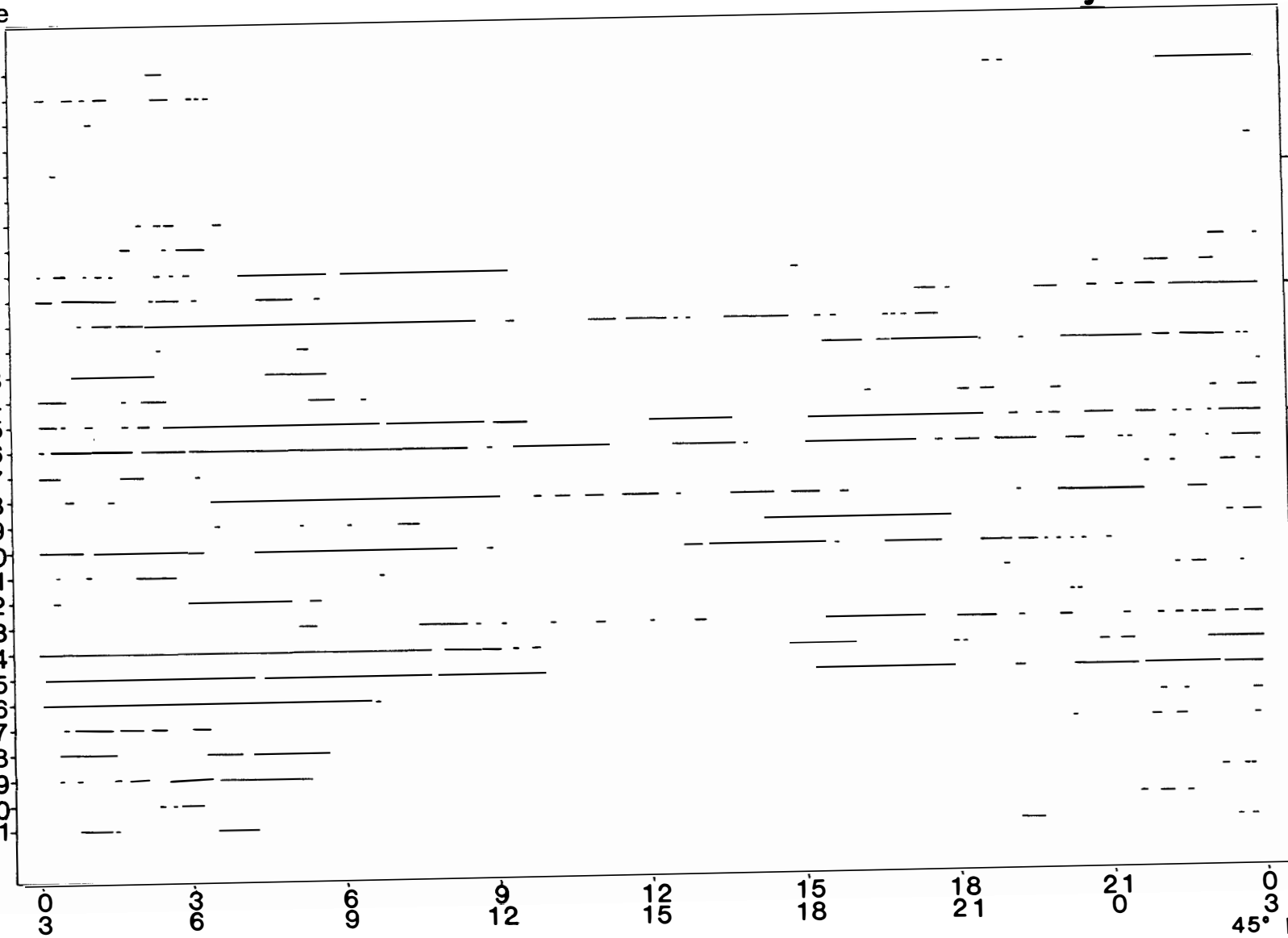


Fig. 1 (5).

0 UT
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45° E.M.T.

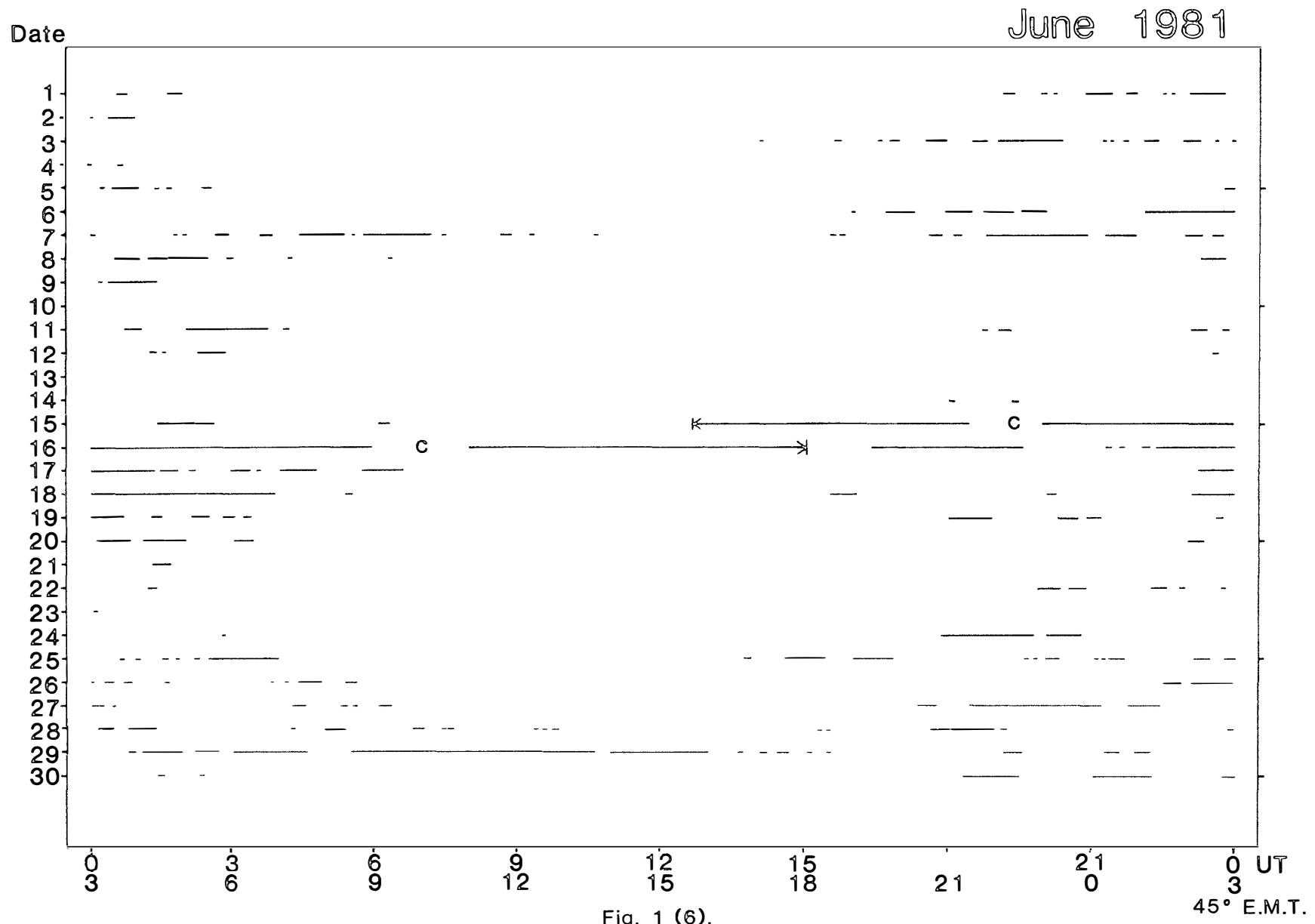


Fig. 1 (6).

July 1981

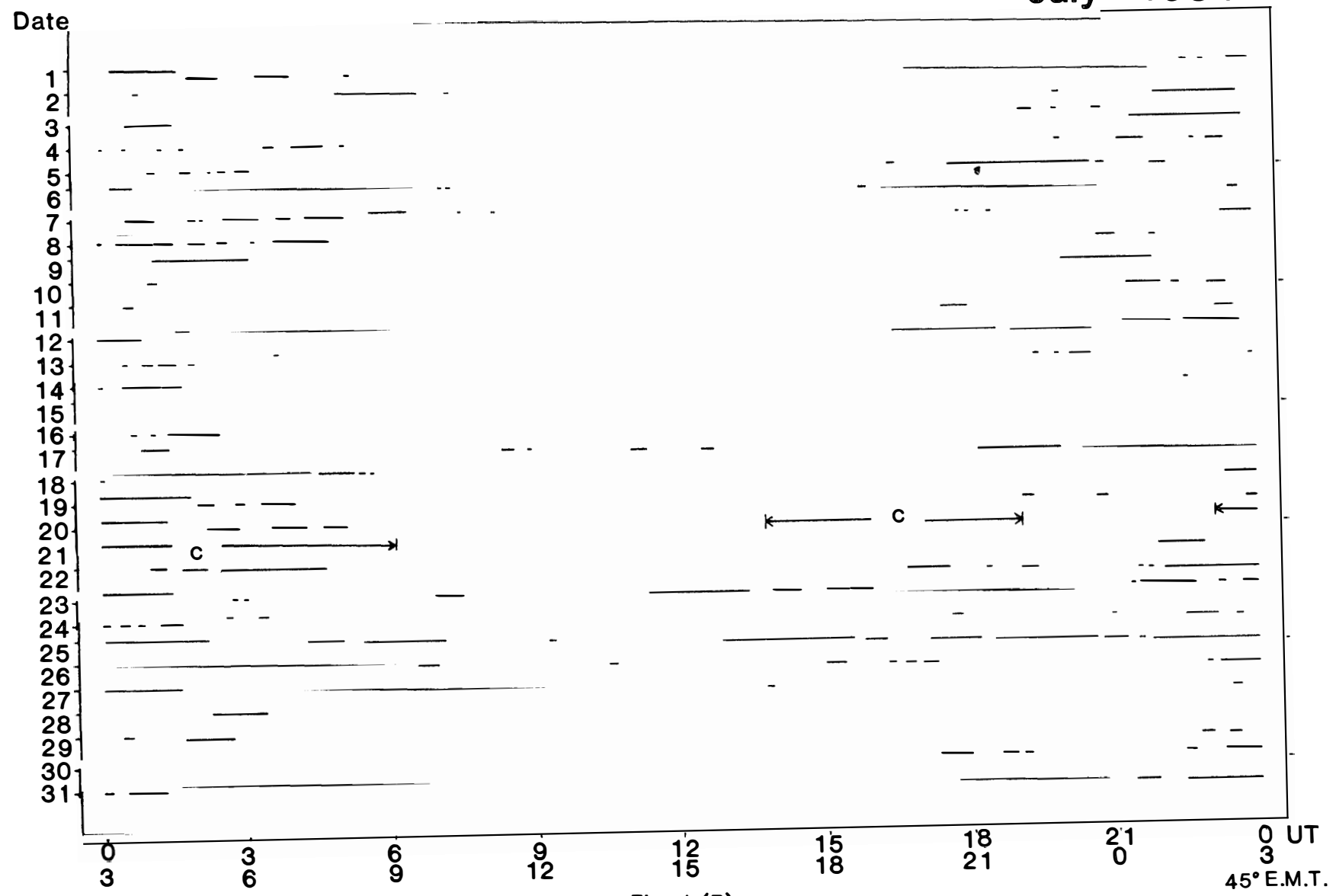


Fig. 1 (7).

45° E.M.T.

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August 1981

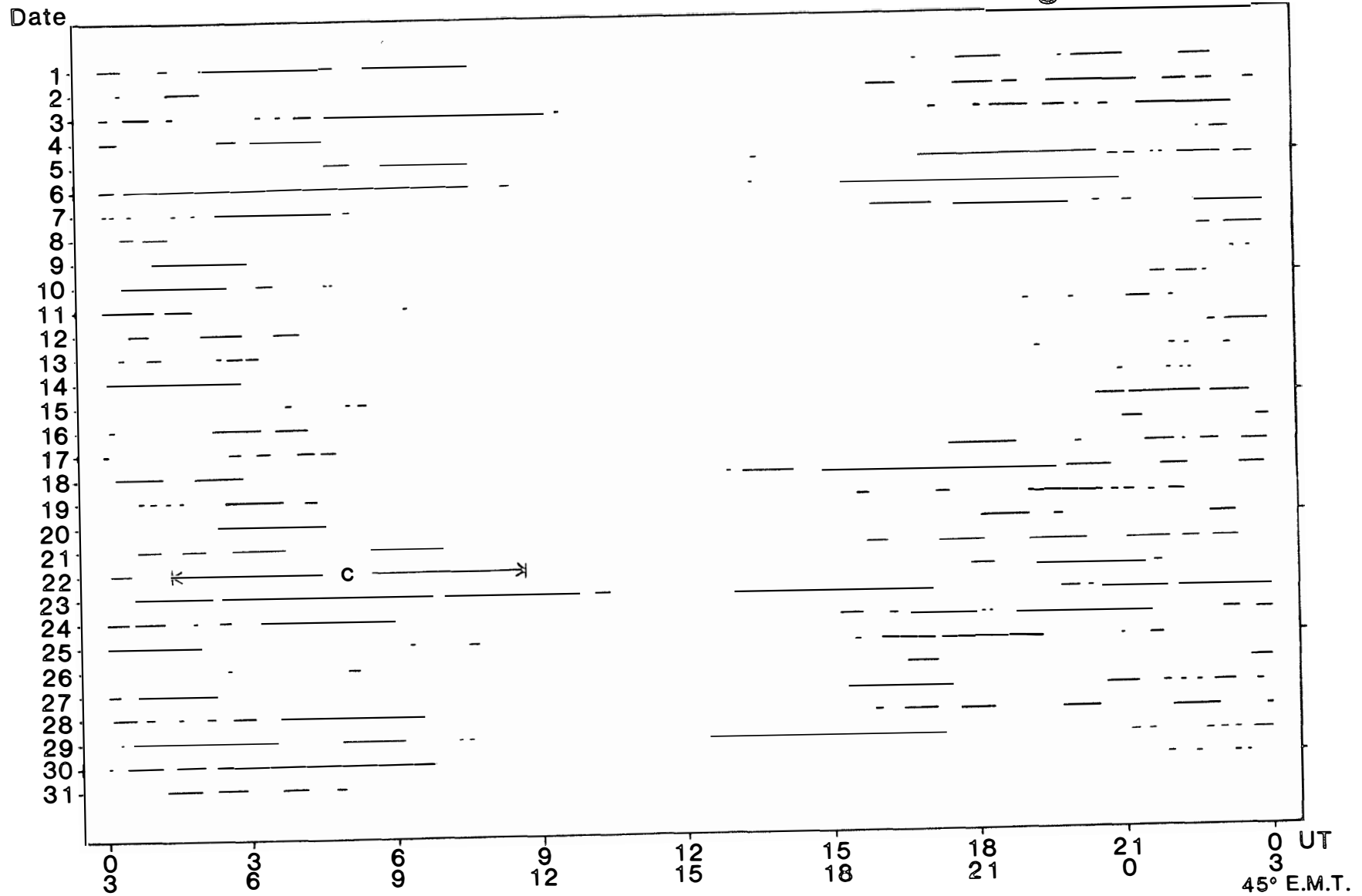


Fig. 1 (8).

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45° E.M.T.

September 1981

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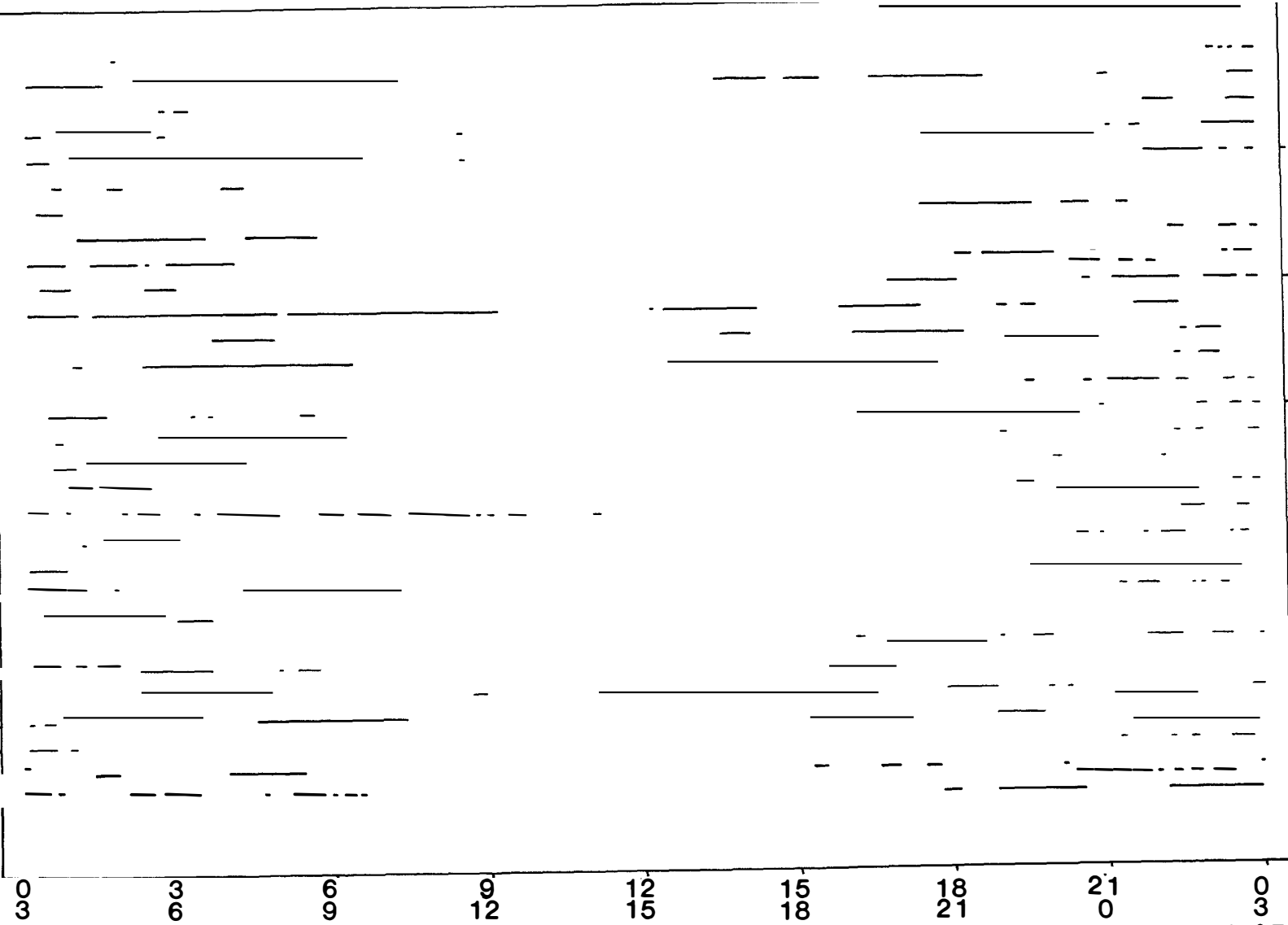


Fig. 1 (9).

45° E.M.T.

October 1981

Date

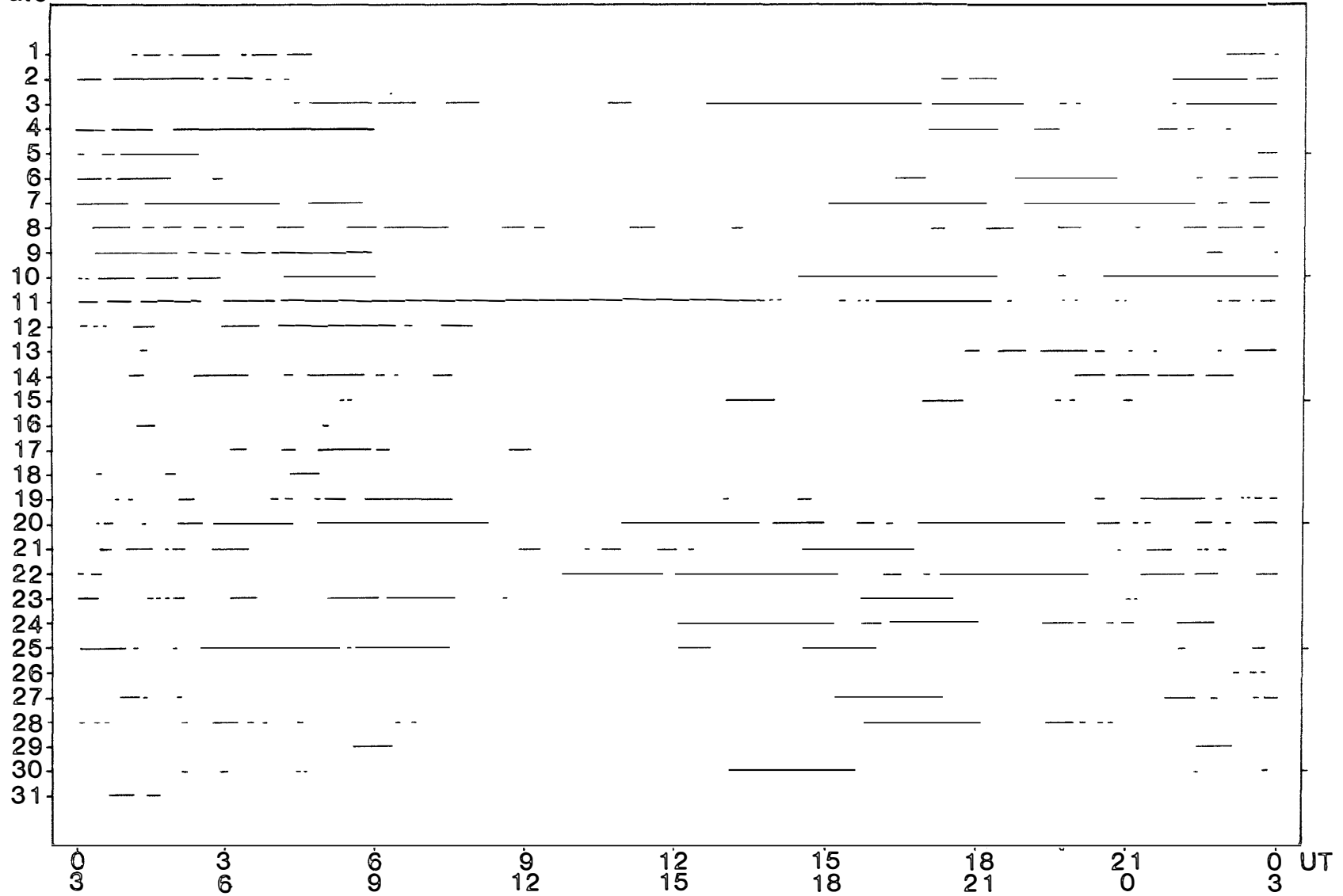


Fig. 1 (10).

45° E.M.T.

November 1981

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Fig. 1 (11).

45° E.M.T.

December 1981

Date

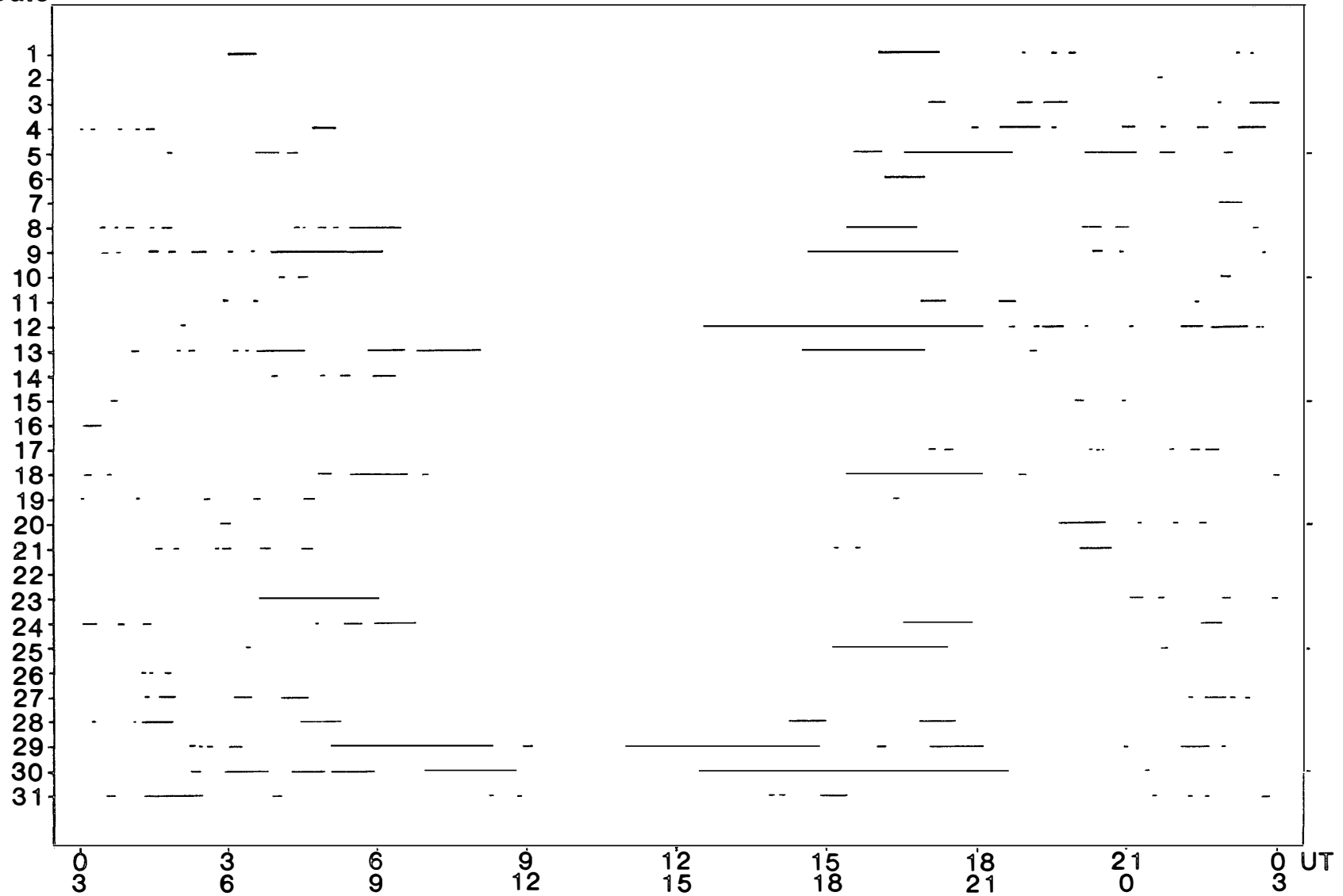


Fig. 1 (12).

45° E.M.T.

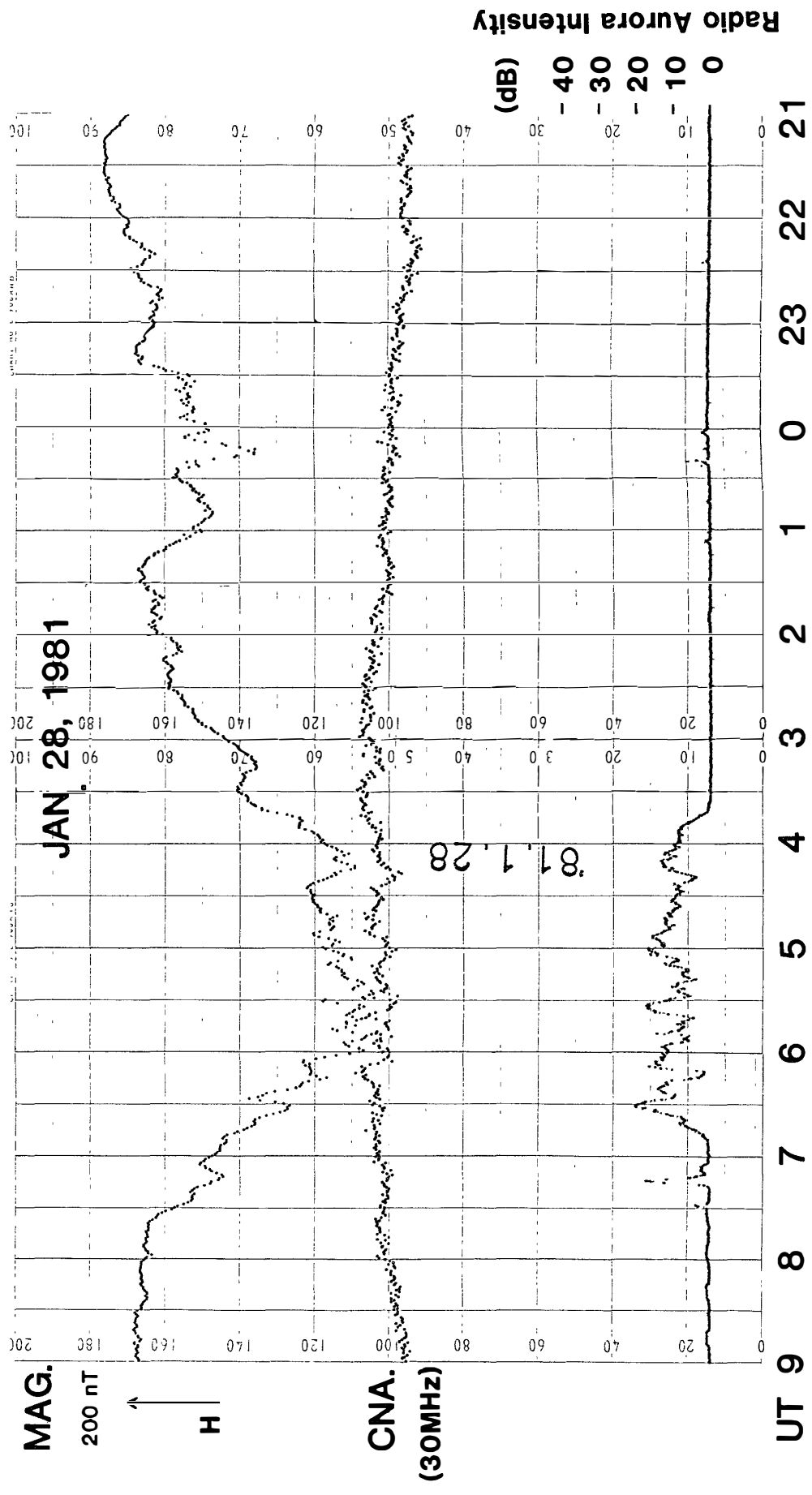


Fig. 2 (1).

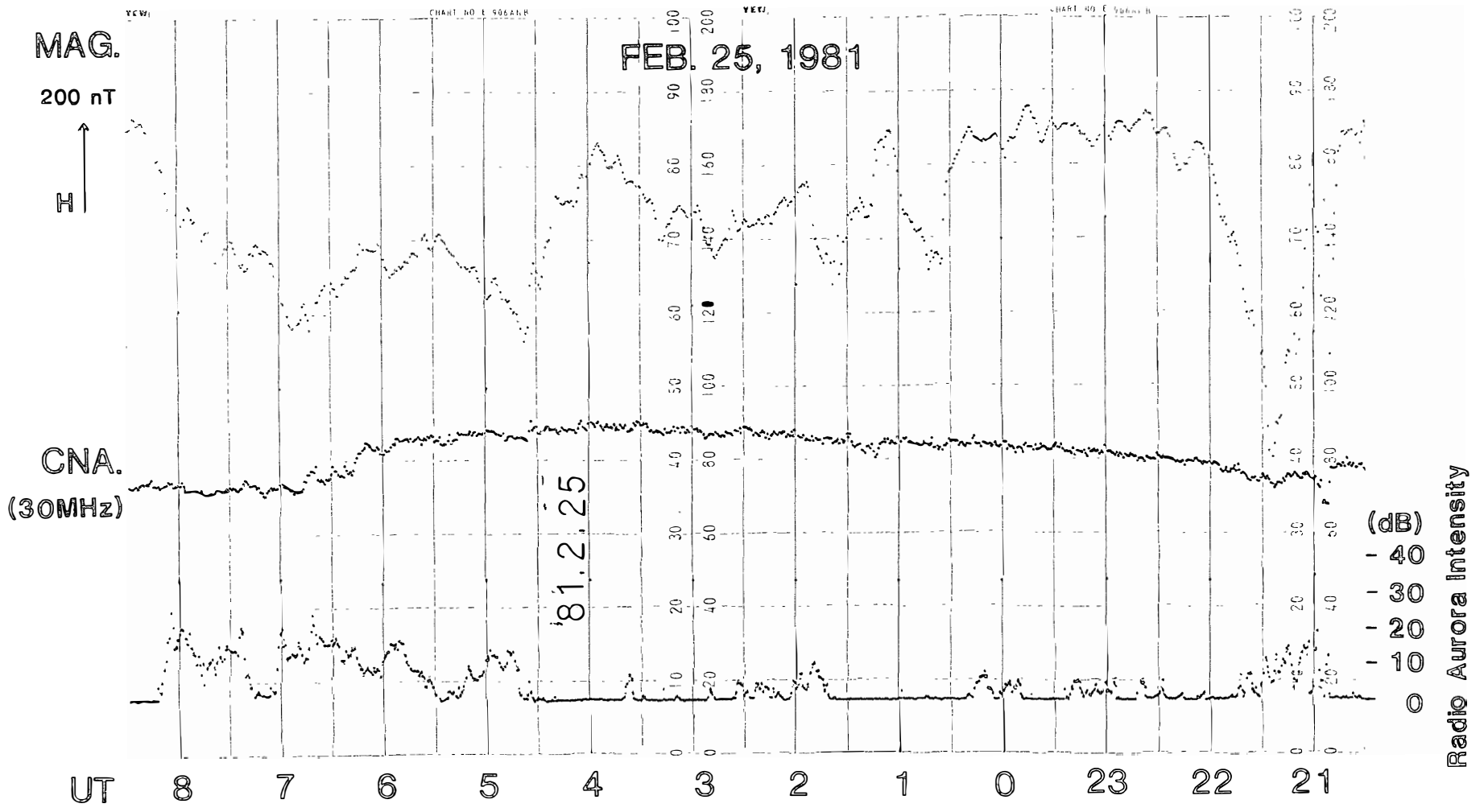


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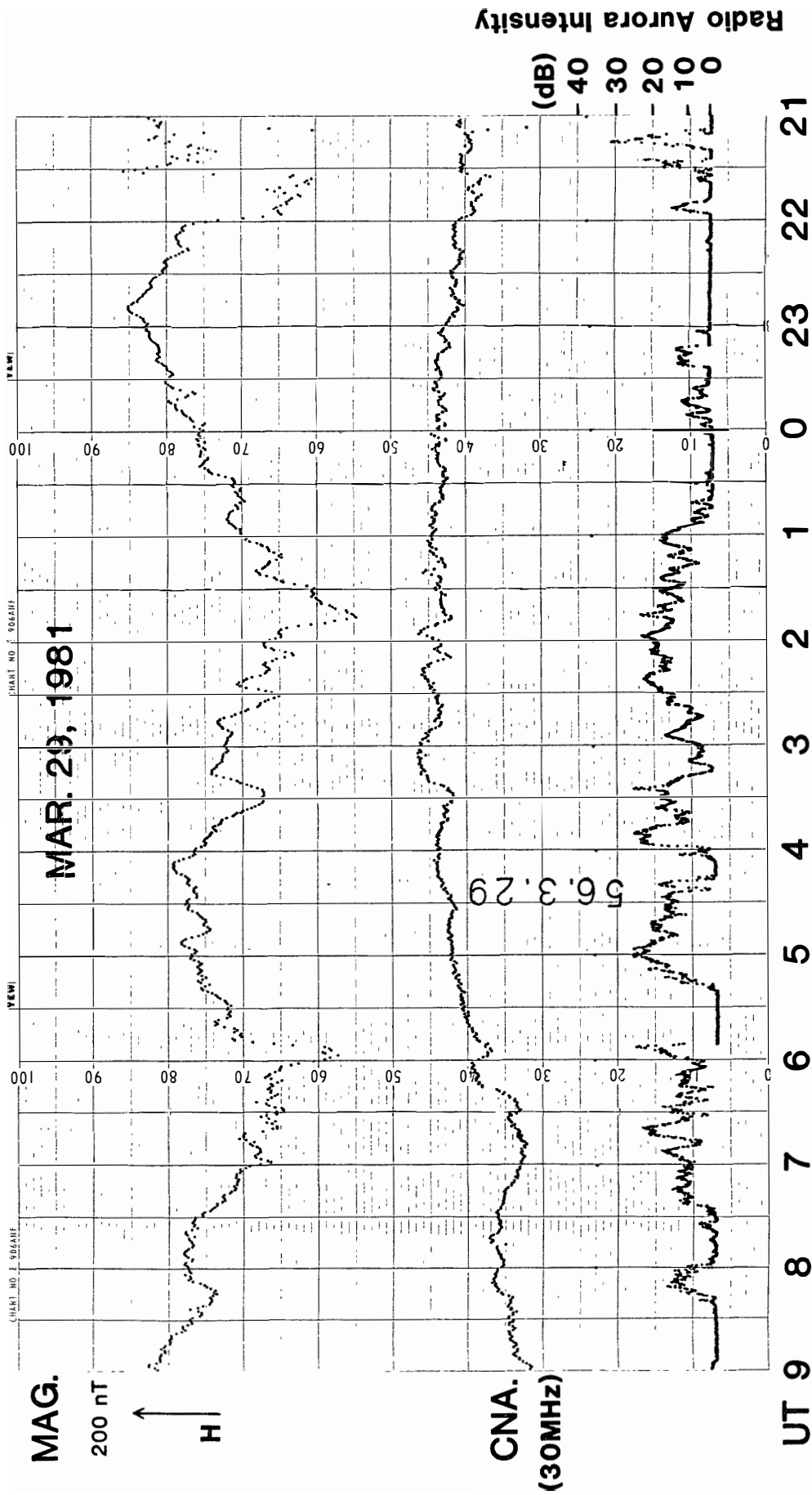


Fig. 2 (3).

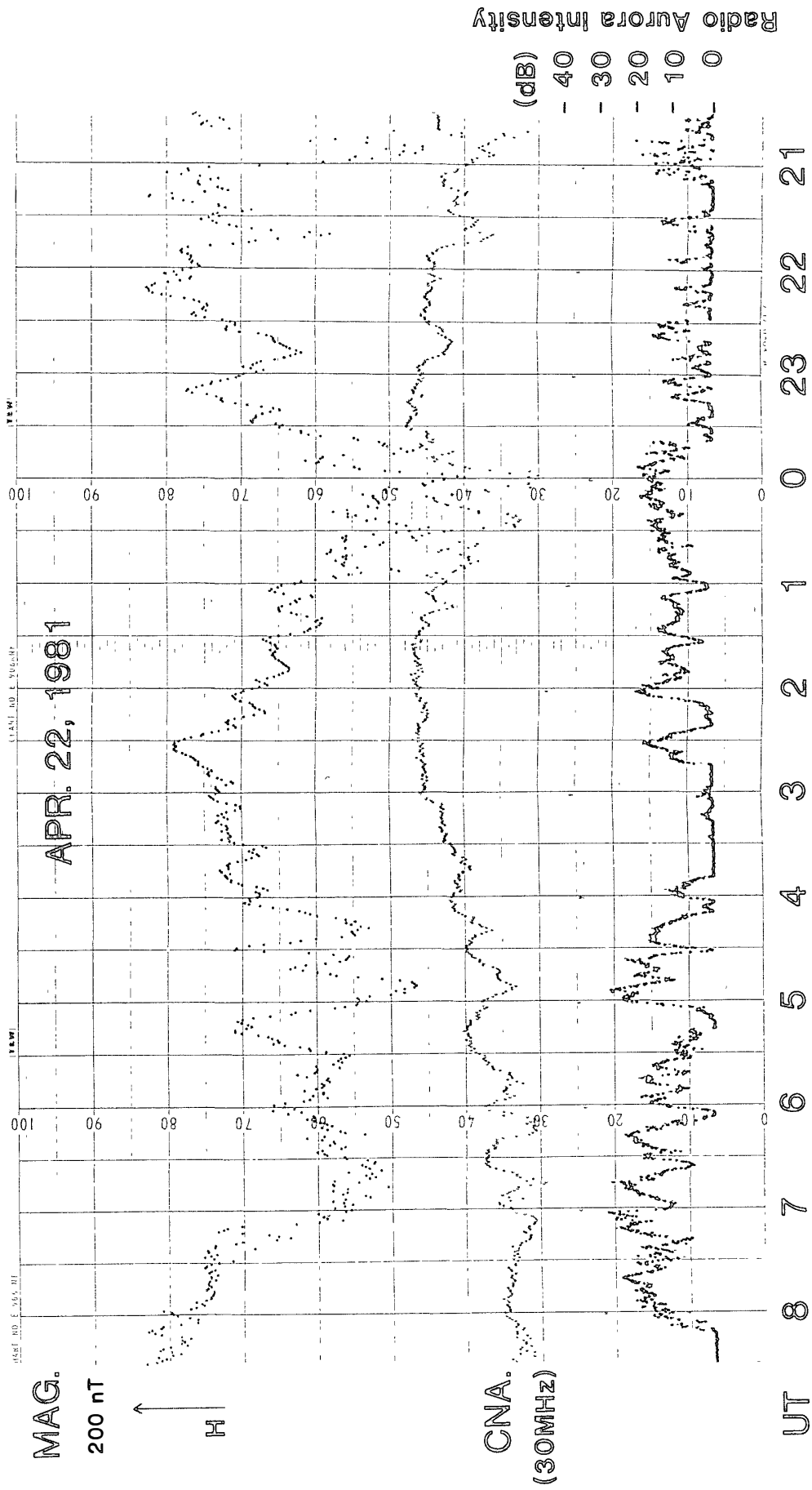


Fig. 2 (4).

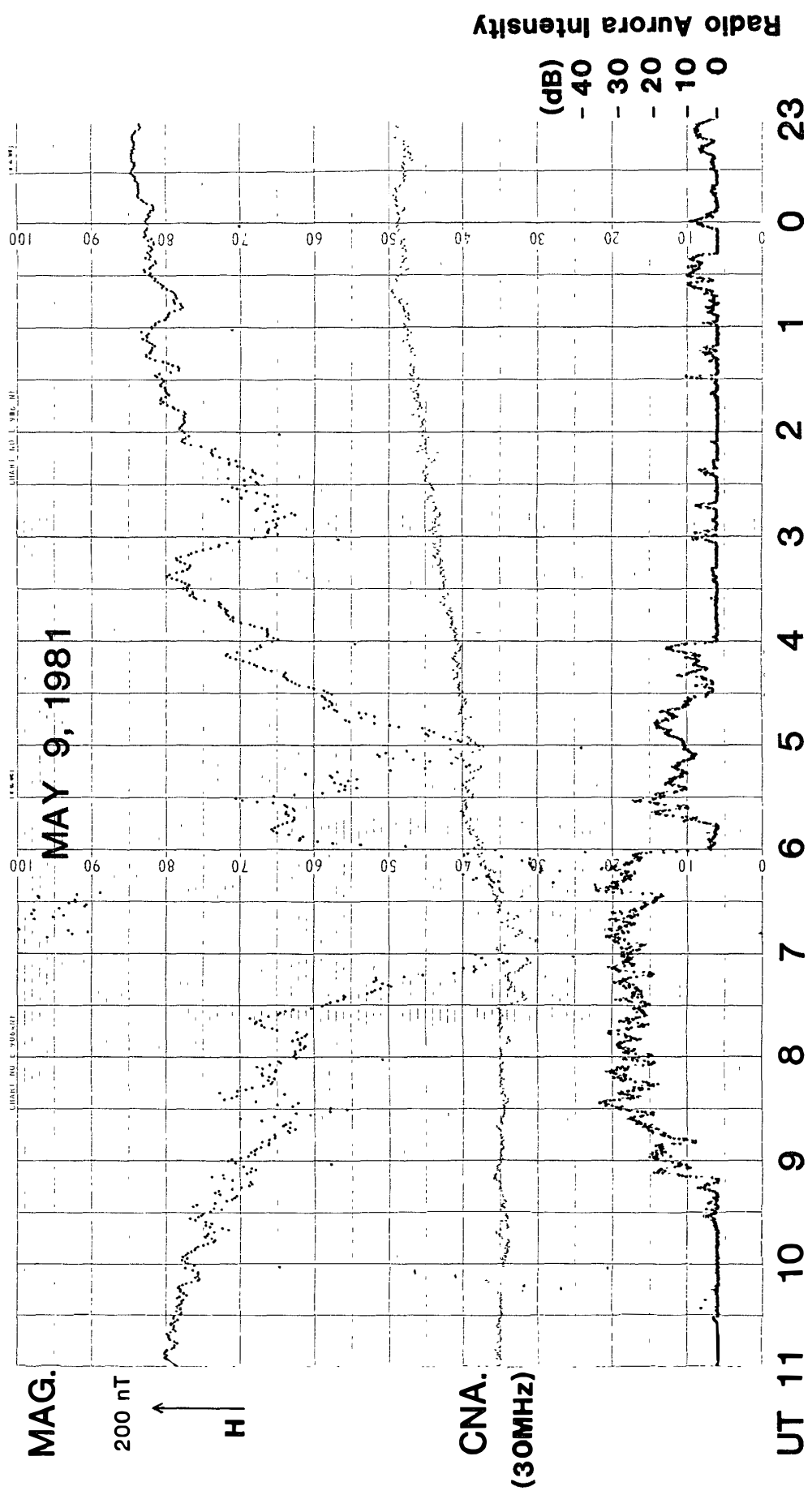


Fig. 2 (5).

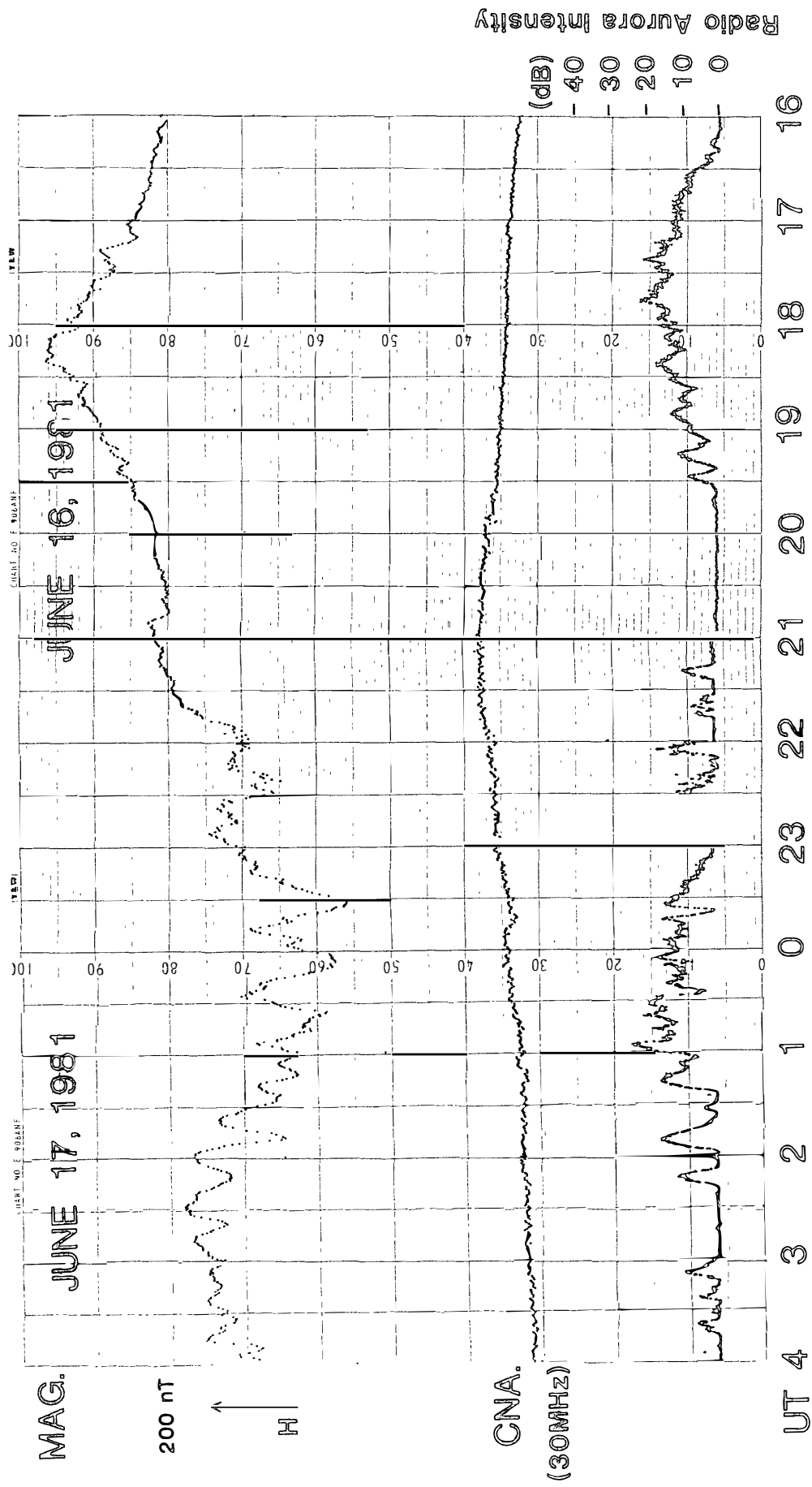


Fig. 2 (6).

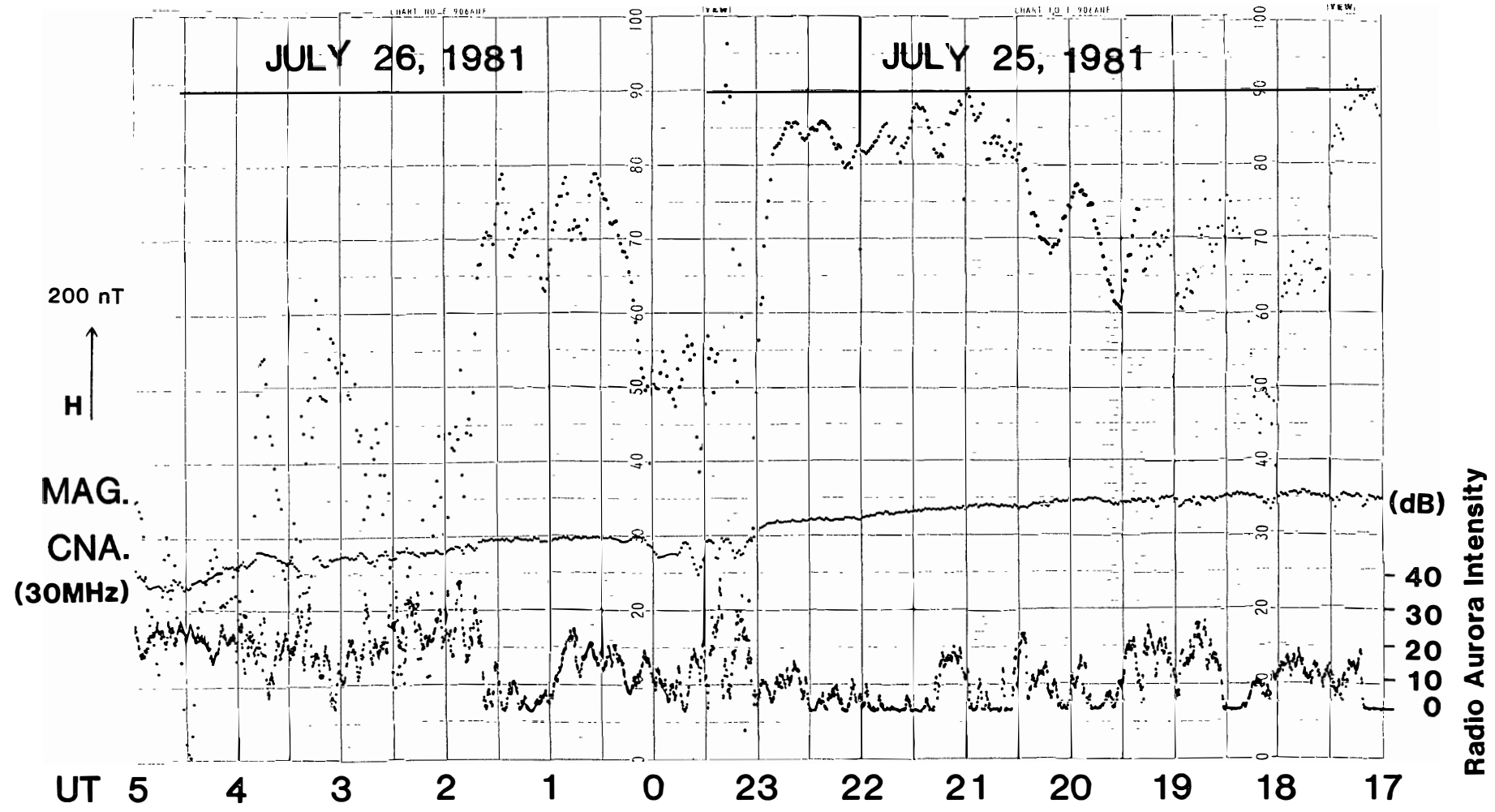


Fig. 2 (7).

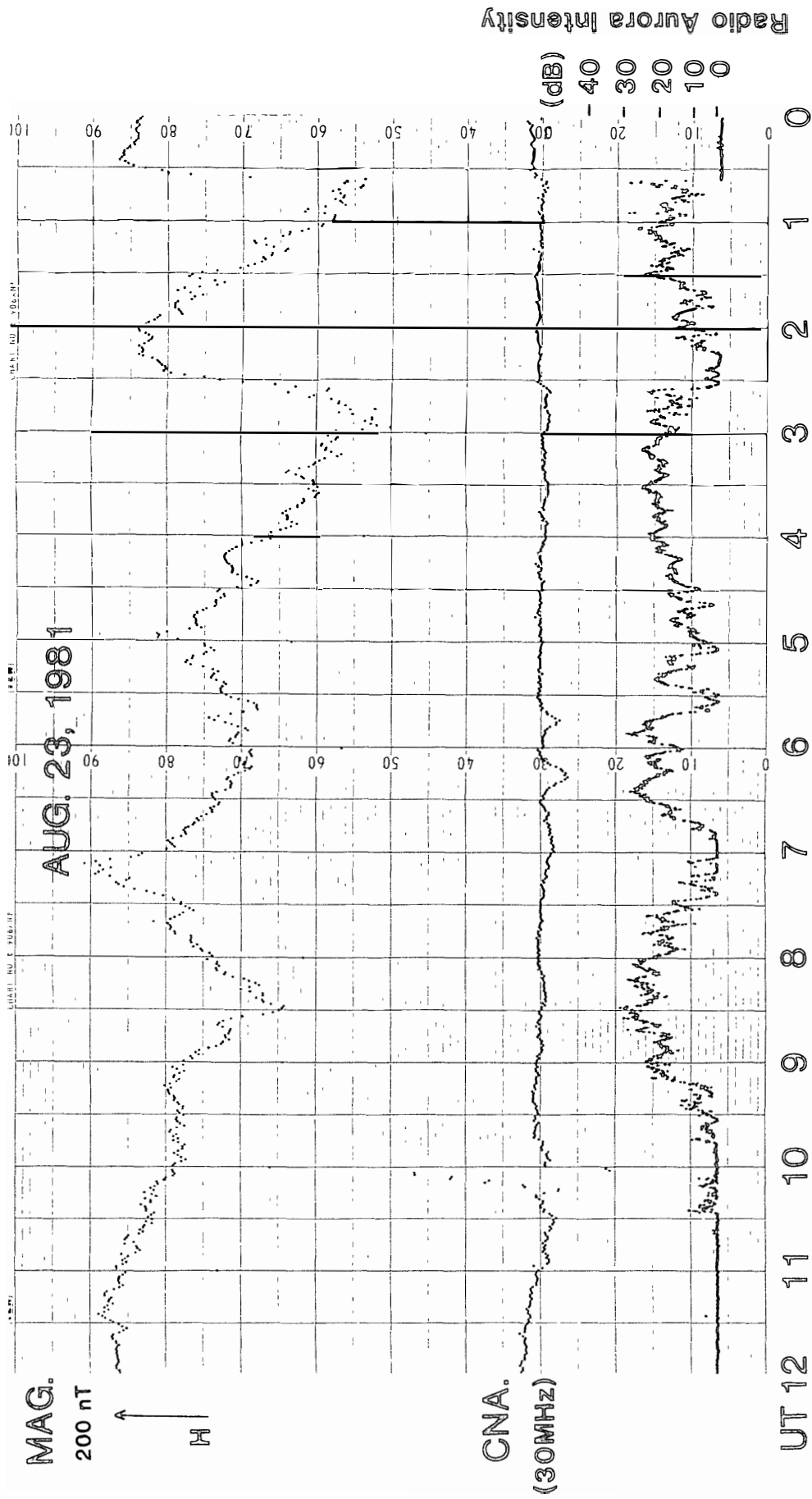


Fig. 2 (8).

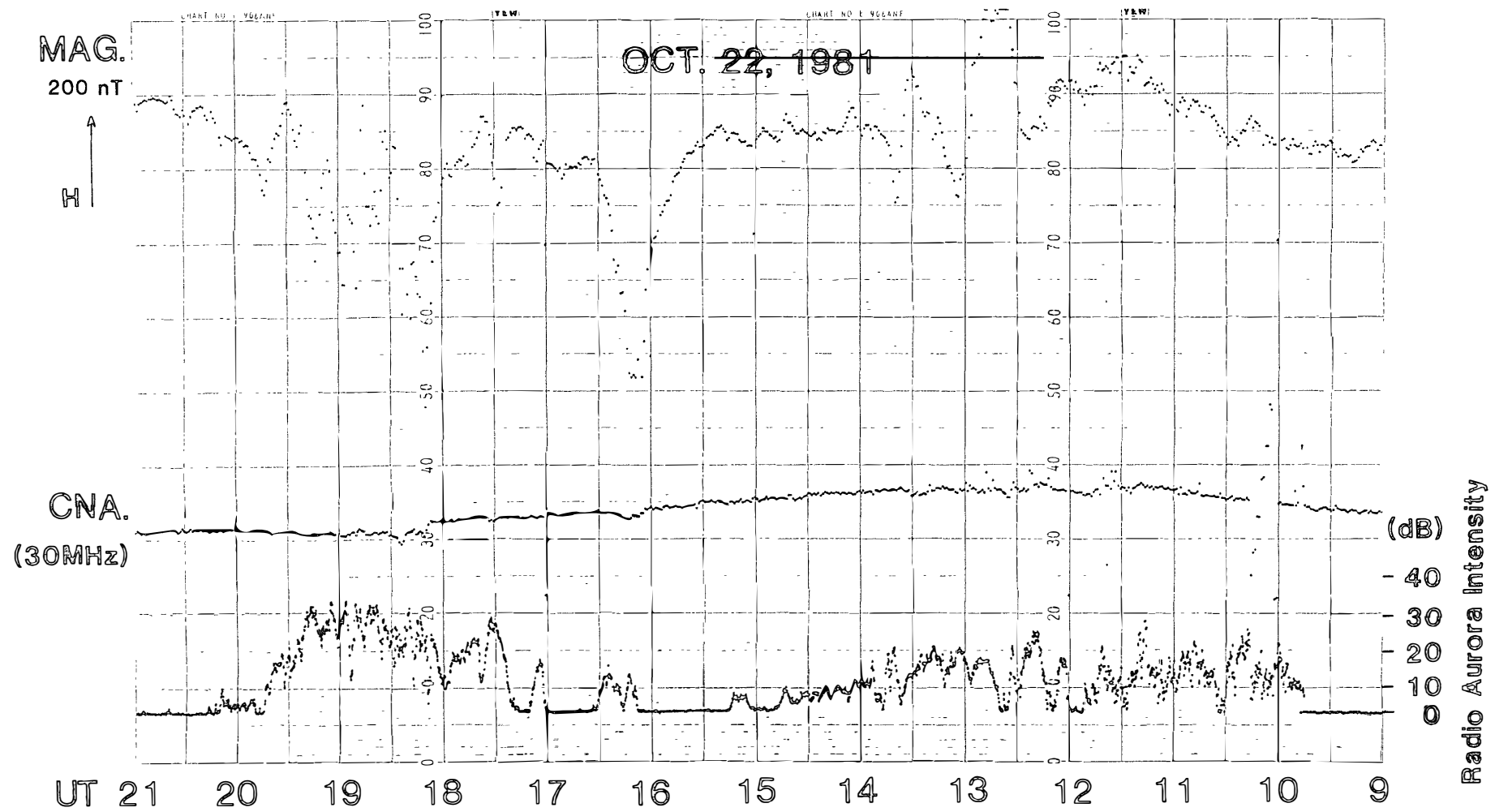


Fig. 2 (10).

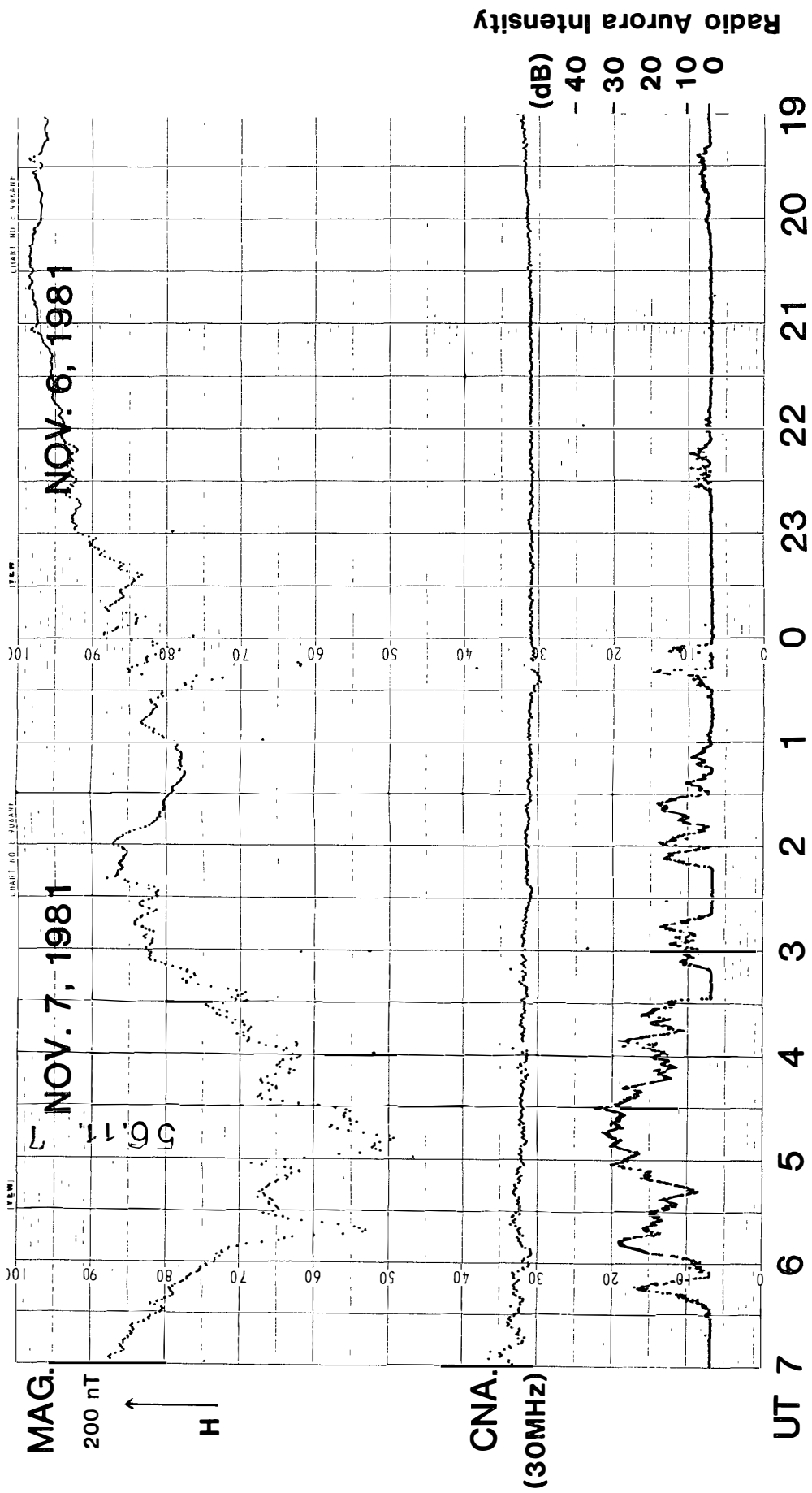


Fig. 2 (11).

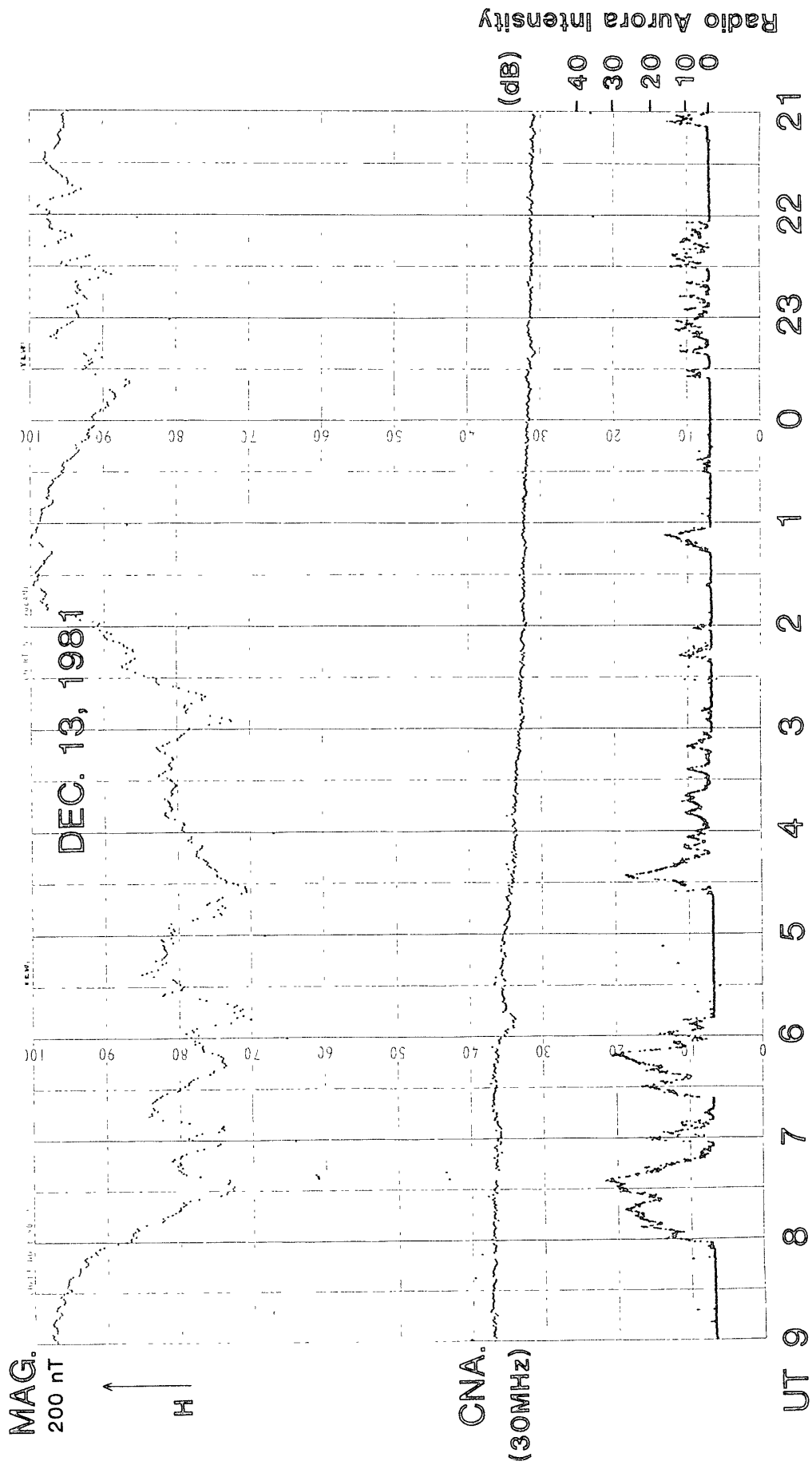


Fig. 2 (12).