

ION.ANT.—52

**IONOSPHERIC DATA AT SYOWA STATION  
(ANTARCTICA)**

January 1989—June 1989

CONTENTS

	Page
Introduction .....	1
Tables .....	4
Monthly plots of foF2, fmin, fEs and h'F .....	34
Monthly median plots of foF2 .....	40
Monthly median plots of fEs .....	46

COMMUNICATIONS RESEARCH LABORATORY

MINISTRY OF POSTS AND TELECOMMUNICATIONS

TOKYO, JAPAN



## INTRODUCTION

This data book gives summarized results for vertical soundings of the ionosphere at Syowa Station, Antarctica in 1989. The observations were conducted by the Communications Research Laboratory under the sponsorship of the National Institute of Polar Research of Japan. The location of the station, specifications of the ionosonde and symbols used in this data book are as follows:

### LOCATION OF SYOWA STATION

Geographic		Geomagnetic	
Latitude	Longitude	Latitude	Longitude
69° 00.4'S	39° 35.4'E	-69.8°	78.2°

### SPECIFICATIONS OF THE IONOSONDE USED AT SYOWA STATION

Items	Specifications
Frequency Range	400 kHz-15 MHz
Transmitting Power	10 kW (peak value)
Duration of Sweep	20 sec
Transmitted Pulse Width	80 $\mu$ sec
Recurrence Frequency of Transmitted Pulse	50 Hz (by power source frequency)
Frequency Scale	every 1 MHz
Height Range	900 km
Height Scale	every 50 km
Total Receiver Gain	120 dB
Recording Method	35 mm film and video fax for ionograms
Power Supply	1000 volt AC, 2.0 kVA
Transmitting Antenna and Receiving Antenna	30 m height vertical delta terminated by 600 $\Omega$ respectively

### DESCRIPTION

- a. All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition 1972)"
- b. Ionograms data are printed in the quarter hourly of every days.
- c. Characteristics of Ionosphere
  - fxI        Top frequency of spread F traces or oblique traces.
  - foF2       Ordinary wave critical frequency for the F2 layer.
  - fEs(ftEs) Top frequency of Es layer as reflected overhead.
  - fmin        Lowest frequency showing vertical ionospheric reflection.
  - h'F        Minimum virtual height of the ordinary wave F trace as a whole.

## Symbols

### (1) Descriptive Letters.

The following letters are entered after, or used to replace, a numerical value on the monthly tabulation sheets.

- A Measurement influenced by, or impossible because of, the presence of a lower thin layer, for example, Es.
- B Measurement influenced by, or impossible because of, absorption in the vicinity of  $f_{min}$ .
- C Measurement influenced by, or impossible because of, any non-ionospheric reason.
- D Measurement influenced by, or impossible because of, the upper limit of the normal frequency range.
- E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range.
- F Measurement influenced by, or impossible because of, the presence of spread echoes.
- G Measurement influenced or impossible because the ionization density of the layer is too small to enable it to be made accurately.
- H Measurement influenced by, or impossible because of, the presence of stratification.
- K Presence of particle E layer.
- L Measurement influenced by or impossible because the trace has no sufficiently definite cusp between layers.
- M Interpretation of measurement questionable because the ordinary and extraordinary components are not distinguishable.
- N Conditions are such that the measurement cannot be interpreted.
- O Measurement refers to the ordinary component.
- P Man-made perturbation of parameters-Presence of polar spur traces.
- Q Range spread present.
- R Measurement influenced by, or impossible because of, attenuation in the vicinity of a critical frequency.
- S Measurement influenced by, or impossible because of, interference or atmospheric.
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
- V Forked trace which may influence the measurement.
- W Measurement influenced or impossible because the echo lies outside the height range recorded.
- X Measurement refers to the extraordinary component.
- Y Lacuna phenomena, severe layer tilt.
- Z Third magneto-electronic component present.

(ii) Qualifying Letters

The following letters are entered in the first column before a numerical value on the monthly tabulation sheets.

D	Greater than.
E	Less than.
J	Ordinary component characteristic deduced from the extraordinary component.
M	Mode interpretation uncertain.
O	Extraordinary component characteristic deduced from the ordinary component.
T	Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
U	Uncertain or doubtful numerical value.
Z	Measurement deduced from the third magneto-electronic component.

Definitions of the CNT, MED, UQ and LQ

Median count (CNT) is the number of values from which a median has been computed. In addition to numerical values, the count may include certain descriptive letters.

Median (MED) of a set of numbers is the middle value when the numbers are arranged in order of magnitude, or the average of the two middle values if there is an even number of values.

Upper quartile (UQ) is the median value the upper half of the values when they are ranked according to magnitude; the lower quartile (LQ) is the median value of the lower half.

IONOSPHERIC DATA STATION SHOWA ST.

JAN. 1989 FXI (0.1MHZ)

45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H	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 X 54	0 X 51	A	A	A	A	A	75	A	B	A	A	B	B	B	B	66	S	B	S	X	X	X	56	
2	0 X 52	0 X 55	A	B	A	A	62	X 71	X 78	X 79	X 81	X 77	A 70	X 72	X 71	X 71	X 70	X 71	68	65	66	62	56	51	
3	0 X 52	A	0 X 61	70	80	75	90	96	104	105	98	91	80	X 74	X 70	X 66	X 66	S	X 67	X 67	X 65	X 65	X 67	X 54	
4	60	60	B	A	A	A	74	71	A	0 X 67	X 73	X 70	X 69	X 70	X 74	X 72	X 71	X 80	X 73	X 74	X 70	X 69	X 66	A	
5	X 66	X 71	0 X 76	A	S	A	A	S	B	B	B	B	B	B	B	B	0 X 50	0 X 50	A	B	0 X 48	60	A	A	
6	0 X 50	0 X 51	40	46	A	50	A	X 61	0 X 62	A	S	S	S	S	S	S	X 65	X 61	S	X 64	X 62	X 67	X 57	X 59	
7	X 59	X 61	X 59	X 60	61	A	A	X 76	X 81	X 82	X 84	X 83	X 77	X 76	X 75	X 68	A	S	X 68	X 67	X 59	X 56	X 57	0 X 56	
8	0 X 56	X 53	0 X 55	A	X 65	A	70	75	68	70	80	81	82	85	75	76	B	0 X 49	0 X 49	B	A	A	A	A	
9	A	46	A	A	0 X 58	0 X 58	R	R	S	A	A	A	A	B	B	B	X 70	0 X 64	R	0 X 49	X 57	0 X 54	X 54	X 59	
10	60	A	A	A	A	A	A	B	B	A	B	A	B	B	B	B	0 X 56	0 X 73	R	R	X 60	X 58	S	55	
11	53	X 57	X 61	63	56	A	X 77	X 83	X 87	X 91	X 88	X 83	X 81	X 76	X 76	X 73	X 69	X 75	X 78	A	0 X 47	46	A	40	
12	50	A	A	A	0 X 51	A	0 X 46	A	A	0 X 56	A	A	B	A	A	0 X 56	0 X 55	0 X 60	X 60	X 60	X 60	X 59	X 56	60	
13	X 53	X 60	0 X 60	0 X 64	0 X 69	76	A	X 94	X 105	X 105	X 99	X 93	X 86	X 82	X 73	B	X 70	B	X 59	A	A	A	A	0 X 56	
14	46	A	A	0 X 49	A	A	58	R	A	R	A	X 64	X R	X R	A	0 X 64	S	S	X 61	X 60	X 60	X 53	X 51	A	
15	X 60	X 57	A	A	A	A	S	0 X 61	A	B	B	A	A	A	A	R	R	A	A	A	0 X 45	A	A	A	
16	46	A	A	A	A	0 X 51	0 X 46	A	A	A	B	B	B	S	A	B	B	B	0 X 51	0 X 48	0 X 46	0 X 44	A	A	
17	50	A	46	52	50	52	A	A	A	A	B	B	B	S	A	B	B	B	0 X 57	0 X 52	0 X 42	A	0 X 46	0 X 51	
18	0 X 51	A	51	51	B	A	A	A	A	A	B	B	B	B	B	S	B	64	65	60	60	56	55	51	
19	X 56	X 55	X 56	60	60	A	65	A	A	X	A	A	X	A	B	X	S	X 64	X 68	X 61	X 57	X 53	X 51	X 55	
20	0 X 51	X 56	X 66	56	A	0 X 66	71	A	X 81	X 86	X 97	X 86	X 80	X 76	X 74	X 74	X 71	A	B	B	A	A	X 45	A	
21	40	A	A	41	53	F	A	A	A	A	B	B	B	B	B	B	X 65	0 X 51	0 X 61	B	A	S	A	B	
22	A	B	A	0 X 49	X 55	B	B	A	A	B	B	B	B	B	B	B	X 66	0 X 50	0 X 51	0 X 51	0 X 61	0 X 52	0 X 47	0 X 56	
23	A	0 X 56	B	B	B	A	B	B	B	B	S	B	B	B	B	B	73	67	65	56	49	49	51		
24	A	46	B	B	B	B	A	A	74	81	77	76	72	X	X	B	S	X 70	B	B	S	X 60	X 51	X 54	
25	X 55	X 52	X 49	B	B	B	A	B	A	X	B	0 X 75	0 X 75	0 X 76	0 X 76	0 X 80	X	B	B	B	B	B	B	X	
26	55	B	B	B	B	B	A	A	70	76	78	86	B	85	81	81	81	80	80	72	60	51	55	54	
27	B	46	56	71	B	B	B	B	A	B	B	B	80	76	76	76	76	76	68	S	0 X 64	0 X 60	0 X 60	0 X 65	
28	60	66	71	A	B	B	A	B	B	B	84	71	77	75	72	76	73	55	X	S	X 53	X 53	A	49	
29	0 X 53	A	0 X 53	58	B	A	0 X 65	0 X 75	0 X 78	0 X 81	0 X 86	0 X 89	0 X 87	0 X 86	0 X 81	0 X 80	0 X 74	0 X 65	X	A	X 48	X 56	X 52	B	
30	X 47	X 53	B	B	A	A	B	X 74	X 81	X 81	X 86	X 90	X 90	X 91	X 95	X 91	B	0 X 67	B	61	60	49	50	51	
31	X 51	A	A	A	A	B	A	A	S	B	B	B	B	B	B	B	0 X 71	0 X 76	S	B	B	B	51	55	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	26	19	15	13	13	8	9	12	13	14	13	16	13	14	13	21	20	19	16	19	24	22	21	21	
MED	X	X	X	56	X	0 X	X	X	X	X	X	X	X	X	X	X	X	0 X	X	X	X	X	X	X	
U Q	53	55	56	56	58	60	70	74	78	81	83	80	76	75	72	70	64	65	61	60	56	55	54		
L Q	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	X	X	X	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71	68	65	60	60	57	58	
	56	60	61	62	67	70	76	80	84	86	92	86	84	85	78	76	74	71							

IONOSPHERIC DATA STATION SHOWA ST.  
 JAN. 1989 FOF2 (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)  
 LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	R 48	R 45	A	A	A	A	A	F 69	A	B	A	A	B	B	B	B	F 60	S	B	S		59	61	63	F 50
2	46	49	A	B	A	A	F 55	65	72	73	J S 75	71	A	64	66	65	64	65	F 62	59	60	56	50	45	
3	46	A	R 55	F 64	F 70	F 69	F 82	90	98	99	92	85	74	A	68	64	60	S	61	61	59	59	61	48	
4	F 50	F 54	B	A	A	A	F 68	F 65	A	F 61	67	64	63	64	68	66	F 65	74	67	68	64	63	60	A	
5	60	65	70	A	S	A	A	S	B	B	B	B	B	B	B	B	E 44	G 44	G	A	B	U 42	R 54	F	A
6	44	45	F 34	F 40	A	44	A	56	55	A	S	S	S	S	S	S	59	55	S	58	56	60	51	53	
7	53	55	53	54	F 55	A	A	70	75	76	78	77	71	70	69	62	A	S	62	60	53	50	51	50	
8	R 50	47	49	A	59	A	F 60	69	62	F 64	74	75	76	79	69	70	B	E 43	G	B	A	A	A	A	
9	A	F 40	A	A	52	52	R	R	S	A	A	A	B	B	B	B	64	58	R	E 43	G	R	48	53	
10	F 50	A	A	A	A	A	A	B	B	A	B	A	B	B	B	E 50	G 67	R	R	R	54	52	49	54	
11	F 47	J S 51	55	F 57	R 50	A	71	77	81	85	82	77	75	70	70	67	63	69	72	A	41	F 40	A	F 32	
12	F 40	A	A	A	R 45	A	E 40	G	A	A	R	A	A	B	A	A	E 49	G 54	G 54	G 54	A	54	53	F 50	F 54
13	47	54	F 54	58	63	70	A	88	99	99	93	87	80	76	67	B	B	64	53	A	A	A	A	50	
14	F 40	A	A	43	A	A	F 52	R	A	R	A	58	R	R	A	58	S	S	55	54	54	47	45	A	
15	54	51	A	A	F 50	A	A	S	55	A	B	B	A	A	A	R	R	A	A	A	E 39	A	A	A	
16	F 40	A	A	A	A	45	E 40	G 44	A	E 44	S	B	B	B	B	B	A	B	E 45	G 42	G 40	G 38	A	A	
17	F 44	A	F 40	F 40	H 44	46	A	A	A	A	A	B	B	S	A	B	B	B	51	46	E 36	A	R 40	R 45	
18	R 45	A	F 45	F 45	B	A	A	A	A	A	B	B	B	B	B	S	B	F 58	59	54	54	50	49	45	
19	50	49	46	54	54	A	A	F 59	A	A	64	59	F	A	A	B	59	58	57	55	51	47	45	49	
20	F 45	R 50	60	F 50	A	R 60	F 65	A	75	F 80	90	80	74	70	68	68	65	A	B	B	A	A	39	A	
21	F 31	A	A	F 35	F 47	A	A	A	A	A	B	B	B	B	B	B	59	45	45	F	B	A	S	A	B
22	A	B	A	43	49	B	B	A	A	B	B	B	B	B	B	B	60	E 44	G 45	G 45	55	46	41	S	50
23	A	R 50	B	B	B	A	B	B	B	B	S	B	B	B	B	B	67	61	59	50	43	S	43	45	
24	A	F 40	B	B	B	B	A	B	A	F 68	75	71	70	66	64	B	S	B	B	S	54	45	F 48	46	
25	49	F 46	43	B	B	B	A	B	A	63	B	69	69	70	70	74	B	B	B	B	B	F 53	B	46	
26	F 46	B	B	B	B	B	A	A	F 63	70	72	80	B	79	75	75	75	B	R 74	66	54	45	U 49	R 48	
27	B	F 40	50	B	F 65	B	B	B	B	A	B	B	F 74	R 70	70	70	70	62	S	U 58	R 54	F 54	F 59	54	
28	F 54	F 60	F 65	A	B	B	B	A	B	B	B	F 78	65	71	69	66	70	67	B	A	S	47	A	F 43	
29	47	A	47	50	F 55	A	59	69	72	75	80	83	81	80	75	74	68	59	A	42	50	46	R	B	
30	41	R 47	B	B	A	A	B	J S 68	74	75	80	84	84	85	U 89	R 85	B	B	B	61	55	49	43	44	45
31	45	A	A	A	A	B	A	A	S	B	B	B	B	B	B	B	65	70	S	B	B	B	F 45	F 45	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	26	19	15	13	13	8	9	12	13	14	13	16	13	14	13	21	20	19	16	19	24	22	21	21	
MED	46	49	50	50	52	54	60	68	72	72	75	77	74	70	69	66	64	58	59	55	52	50	49	48	
U O	50	54	55	56	61	64	70	74	78	80	86	80	78	79	72	70	68	65	62	59	54	54	51	52	
L O	F 44	F 45	F 45	F 42	48	46	E 46	G 62	58	64	73	70	70	70	68	60	E 60	G 45	54	50	42	45	45	F 45	

IONOSPHERIC DATA STATION SHOWA ST.

JAN. 1989 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	36	37	52	59	38	43	37	37	105	B	45	37	B	B	B	B	33	E B	B	37	41	41	40	41		
2	37	37	37	B	41	45	39	32	32	33	33	40	46	42	39	37	34	31	37	65	52	32	34	32		
3	41	39	34	35	35	37	34	37	37	34	34	36	36	33	35	40	40	41	38	38	36	34	23	23		
4	30	26	B	36	36	42	43	40	60	40	36	35	34	42	36	37	35	39	60	45	57	63	74	70		
5	25	41	36	32	35	43	44	36	B	B	B	B	B	B	B	B	34	32	27	B E B	29	46	44	45		
6	30	33	30	35	38	35	38	33	35	41	34	45	36	37	37	36	34	31	35	23	34	29	31	30		
7	31	33	31	37	36	45	32	36	36	37	41	40	37	40	35	35	33	35	37	32	28	37	33	30		
8	40	47	46	32	35	59	37	41	41	55	E B	60	36	36	35	37	61	B	38	B	28	50	52	45	45	
9	46	36	45	42	36	35	35	36	35	45	39	35	B	B	B	B	35	35	40	37	47	35	35	37		
10	42	45	52	42	43	40	37	B	B	33	B	35	B	B	B	34	34	26	31	30	29	33	26	30		
11	30	30	29	30	43	39	31	33	36	34	40	40	39	36	35	37	37	33	E B	35	27	25	55	45	33	
12	51	53	41	90	56	51	36	45	41	52	41	37	B	32	35	36	34	33	44	32	36	34	35	30		
13	34	37	36	E B	33	33	36	33	41	35	36	36	40	40	B	38	B	35	41	28	26	40	42	42		
14	40	105	76	41	37	45	35	36	39	36	35	37	41	37	36	37	35	32	36	31	33	35	41	43		
15	33	68	66	41	35	35	41	36	35	37	B	B	33	38	37	35	32	37	31	25	37	72	46	45		
16	60	38	48	39	36	33	35	33	36	35	B	B	B	B	B	34	B	33	34	35	25	70	70	45		
17	45	35	70	35	36	51	37	58	40	35	46	B	B	36	32	B	B	B	40	35	22	44	70	45		
18	43	40	32	31	B	42	39	37	34	44	B	B	B	B	B	36	B	32	40	33	30	26	37	45		
19	51	70	61	58	25	40	43	45	37	43	35	35	35	36	B	37	34	32	35	37	34	24	26	32		
20	45	39	62	80	65	40	37	46	39	38	36	39	39	41	36	36	40	33	B	B	45	48	35	50		
21	31	44	47	35	31	62	60	47	43	42	B	B	B	B	B	35	37	37	B	24	35	125	B	B		
22	43	B	42	32	26	B	B	37	34	B	B	B	B	B	B	31	31	27	26	29	19	40	45	41		
23	E B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	31	E B	29	26	29	25	27	35		
24	39	45	B	B	B	B	B	41	41	E B	35	27	40	40	60	34	32	B	B	E B	35	35	39	E B	25	
25	27	35	E B	B	B	B	B	41	41	E B	B	E B	E B	E B	E B	E B	B	B	B	B	B	29	B	35		
26	42	B	B	B	B	B	B	37	47	36	40	33	60	E B	E B	E B	E B	E B	E B	31	22	26	23	35	37	
27	B	60	36	B	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	B	E B	E B	30	31	36	34	30	22
28	30	31	30	28	B	B	B	40	B	B	B	B	35	35	35	30	32	37	34	B	35	35	40	37	50	
29	35	42	60	90	B	35	40	46	30	27	27	E B	55	35	34	55	31	27	27	27	29	30	38	B		
30	36	36	B	B	41	53	B	35	35	36	33	55	E B	E B	E B	B	B	E B	B	B	35	40	24	39	42	
31	59	45	45	36	41	B	65	45	35	B	B	B	B	B	B	B	40	40	35	B	B	26	32	51		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	30	29	26	24	24	24	25	27	26	25	20	21	18	21	18	26	24	27	22	27	29	31	29	29		
MED	40	39	44	36	36	41	37	37	36	37	36	36	37	37	36	36	34	33	35	32	34	35	37	41		
U O	45	45	52	42	41	45	41	45	41	44	40	E B	E B	E B	E B	B	36	37	40	35	38	46	44	45		
L O	31	35	35	32	35	36	36	36	35	35	34	36	35	36	35	34	32	32	31	27	28	29	32	31		

IONOSPHERIC DATA STATION SHOWA ST.  
 JAN. 1989 FMIN (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)  
 LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D \ H	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	20	20	14	13	24	17	22	22	S	B	24	24	B	B	B	B	15	37	B	18	11	10	13	12
2	11	14	19	B	23	15	11	10	15	14	13	15	15	23	15	24	14	17	14	13	12	9	14	13
3	13	19	18	14	14	14	13	9	9	13	15	19	10	17	19	20	13	13	10	14	13	13	14	15
4	14	14	B	20	16	19	13	15	15	15	17	17	18	14	15	14	17	15	15	14	15	15	13	15
5	14	14	18	16	21	30	24	22	B	B	B	B	B	B	B	B	20	20	21	B	29	20	19	19
6	19	17	18	15	15	15	15	15	15	15	18	15	15	16	19	20	12	18	24	13	19	22	10	15
7	14	14	14	15	9	15	11	13	15	14	14	18	14	20	18	13	24	14	13	15	12	10	10	15
8	10	10	14	21	11	23	14	15	14	20	60	14	17	14	14	12	B	14	B	13	10	11	14	9
9	9	9	16	15	11	11	9	14	17	14	19	23	B	B	B	B	21	19	13	17	12	9	9	12
10	10	16	14	19	22	16	12	B	B	20	B	19	B	B	B	15	14	19	20	15	13	20	11	14
11	8	15	12	13	19	13	14	15	15	15	20	15	14	19	19	16	14	14	35	14	13	10	10	9
12	9	13	14	10	9	9	8	9	15	14	13	16	B	23	19	15	15	14	25	10	9	9	9	9
13	9	9	10	31	19	18	15	18	13	13	15	10	17	26	B	19	B	17	15	18	15	23	10	9
14	9	11	13	10	13	9	12	13	22	15	15	13	14	15	18	14	11	15	11	9	9	8	8	18
15	9	9	15	18	15	21	9	14	17	18	B	B	21	23	22	19	18	13	11	17	10	9	10	23
16	9	15	9	14	13	9	9	17	15	13	B	B	B	B	B	23	B	22	15	12	10	9	15	10
17	9	16	14	9	9	19	15	12	16	14	20	B	B	18	22	B	B	B	12	10	13	16	13	9
18	13	10	14	9	12	14	9	13	15	B	B	B	B	B	B	17	B	19	15	16	11	10	15	20
19	15	14	14	11	10	15	15	15	15	15	13	14	24	21	B	19	18	14	11	11	12	14	13	12
20	18	10	10	19	20	11	10	16	13	13	12	10	14	14	13	12	12	13	B	B	12	14	9	9
21	9	10	13	13	10	18	13	13	14	18	B	B	B	B	B	18	15	16	B	14	13	15	B	B
22	10	B	19	18	9	B	B	9	13	B	B	B	B	B	B	15	15	23	18	15	15	10	13	12
23	12	25	B	B	B	18	B	B	B	B	19	B	B	B	B	B	18	55	11	13	13	13	14	13
24	15	9	B	B	B	B	B	17	15	35	15	18	14	60	B	18	13	B	B	35	13	15	30	18
25	15	30	35	B	B	B	30	B	19	50	B	56	59	60	55	55	B	B	B	B	14	B	18	
26	13	B	B	B	B	B	25	19	30	17	15	60	B	55	55	35	35	B	31	18	15	19	15	13
27	B	10	14	B	B	B	B	B	22	B	B	B	55	60	40	15	13	13	30	31	25	14	13	13
28	10	10	11	15	B	B	B	18	B	B	B	28	24	19	18	13	15	14	B	27	24	12	15	14
29	14	20	20	15	B	9	19	14	14	13	13	55	15	14	55	19	15	15	13	11	23	19	13	
30	13	12	B	B	24	20	B	20	29	15	15	55	54	55	18	20	B	40	B	12	10	13	13	9
31	9	9	25	11	14	B	24	25	13	B	B	B	B	B	B	40	40	18	B	B	13	10	13	
D \ H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	12	14	14	15	16	18	15	15	15	15	19	24	54	26	55	19	17	17	20	15	13	13	13	13
U O	14	17	20	31	24	30	25	20	22	35	B	B	B	B	B	35	40	23	B	18	15	15	15	18
L O	9	10	14	13	11	13	12	13	14	14	15	15	15	18	18	15	14	14	13	13	11	10	10	10



IONOSPHERIC DATA STATION SHOWA ST.

JAN. 1989 H'F (KM)

45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	E A 370	E A 400	A	A	A	A	A	E A 270	A	B	A	A	B	B	B	B	240	270	B	280	300	275	290	E A 300		
2	E A 320	E A 345	A	B	A	A	E A 275	230	230	210	215	225	A	240	225	250	225	200	230	245	245	260	310	310		
3	A	A	A	E A 350	E A 350	280	245	230	215	230	215	220	A	A	A	A	225	250	250	230	250	250	270	290		
4	310	300	B	A	A	A	A	275	A	230	A	200	A	A	200	210	240	225	320	275	300	290	265	A		
5	275	300	E A 325	A	A	A	A	210	B	B	B	B	B	B	B	B	245	245	A	B	275	250	A	A		
6	A	A	A	E A 350	E A 400	A	A	265	250	A	E A 250	225	200	220	240	240	230	225	245	250	250	270	270	300		
7	320	325	300	A	280	A	A	240	240	225	240	225	240	220	240	225	A	245	230	240	260	300	280	265		
8	E A 450	E A 425	A	A	275	A	E A 300	305	275	255	500	260	A	A	230	230	B	255	B	A	A	A	A	A		
9	A	A	A	A	E A 330	240	210	260	245	A	A	A	B	B	B	B	245	250	290	265	E A 280	290	305	305		
10	E A 350	A	A	A	A	A	A	B	B	A	B	A	B	B	B	230	230	240	230	230	280	295	310	255		
11	E A 310	E A 350	A	E A 380	E A 400	A	260	230	225	215	230	A	230	220	A	230	225	250	245	A	A	A	A	400		
12	E A 375	A	A	A	E A 250	A	275	A	A	E A 250	A	A	B	A	A	220	230	230	250	255	270	290	300	310		
13	E A 350	320	340	E A 400	E A 350	300	A	250	240	220	215	200	A	A	B	230	B	250	260	A	A	A	A	A		
14	E A 330	A	A	E A 390	A	A	320	280	225	A	240	215	210	A	230	240	210	230	250	230	E A 360	E A 375	A	A		
15	280	A	A	A	280	A	A	E A 260	220	A	B	B	A	A	A	240	275	A	A	A	E A 250	A	A	A		
16	A	A	A	A	E A 340	260	A	E A 280	E A 250	B	B	B	B	B	B	A	B	E A 260	E A 270	E A 290	E A 320	A	A	A		
17	E A 400	A	A	E A 350	E A 325	A	A	A	A	A	A	B	B	B	240	A	B	B	B	255	280	A	E A 350	E A 400		
18	E A 450	A	195	E A 300	B	A	A	A	A	A	B	B	B	B	B	240	A	240	260	250	275	270	320	280		
19	E A 400	E A 360	E A 320	A	E A 300	A	A	E A 340	A	A	220	200	A	A	B	220	240	215	250	250	280	275	300	300		
20	E A 340	E A 350	E A 340	E A 350	A	E A 400	275	A	E A 250	240	225	220	215	240	225	230	225	A	B	B	A	E A 330	A	A		
21	E A 310	A	A	E A 380	E A 355	A	A	A	A	A	B	B	B	B	B	B	A	E A 230	E A 250	E A 390	B	A	E A 350	A	B	B
22	A	B	A	E A 400	A	B	B	A	A	B	B	B	B	B	B	250	E A 270	250	230	260	300	A	E A 350	A	A	
23	A	300	B	B	B	A	B	B	B	B	210	B	B	B	B	B	240	B	240	250	E A 300	E A 340	E A 320	E A 350		
24	E A 300	A	B	B	B	B	B	A	220	225	A	A	A	B	E A 240	225	B	B	B	325	280	325	325	330		
25	E A 330	E A 405	E A 400	B	B	B	A	B	A	B	B	E B 520	E B 480	E B 490	E B 475	E B 460	B	B	B	B	B	E A 330	B	A		
26	E A 300	B	B	B	B	B	A	A	A	A	225	B	B	B	B	225	225	B	225	230	220	E A 325	E A 300	E A 300		
27	B	E A 350	E A 360	B	280	B	B	B	B	A	B	B	E B 425	E B 470	E B 250	215	210	240	240	255	260	250	255	260		
28	300	325	300	A	B	B	B	A	B	B	A	A	205	205	215	225	240	B	E A 300	A	290	240	A	350		
29	E A 330	A	E A 300	E A 300	B	280	A	A	225	220	225	430	200	230	450	225	215	220	220	A	280	280	A	B		
30	E A 380	A	B	B	A	A	B	275	A	E A 410	215	B	B	B	220	225	B	E B 350	B	E A 275	E A 305	270	A	A		
31	A	A	A	A	A	B	A	A	230	B	B	B	B	B	B	E B 245	E B 260	255	B	B	B	A	260	A		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	21	15	11	11	14	7	9	15	13	14	14	12	8	11	11	24	23	24	20	21	24	21	20	17		
MED	E A 330	E A 345	E A 325	E A 350	E A 312	AU 270	268	250	235	224	222	218	215	225	225	228	228	242	240	250	U 268	270	U 285	295		
UO	E A 372	E A 360	E A 360	E A 390	E A 350	E A 400	288	275	250	250	230	250	332	240	250	240	245	252	258	E 278	E A 300	E A 312	E A 322	E A 340		
LO	310	300	300	E A 350	280	280	252	230	225	220	215	210	208	220	220	225	225	228	230	248	255	265	275	285		

IONOSPHERIC DATA STATION SHOWA ST.  
 FEB. 1989 FXI (0.1MHZ) 45° E MEAN TIME (G.M.T. + 3H)  
 LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	B	A	A	60	A	S	A	B	A	A	A	A	B	B	S	A	A	B	55	B	X	A	43				
2	0	X	X	A	46	56	B	B	A	A	A	S	B	B	B	S	0	X	0	X	X	X	A	B				
3	A	A	A	55	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	A	A	A	A				
4	A	A	41	A	A	0	X	0	X	A	B	B	B	B	B	B	B	X	0	X	0	X	X	0	X	A		
5	B	A	A	56	B	X	B	B	A	A	B	B	B	B	B	B	0	X	X	X	0	X	0	X	B			
6	B	A	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	S	S	A	0	X	X	A				
7	B	A	51	46	B	B	A	X	B	B	B	B	B	B	B	B	B	0	X	0	X	X	X	43				
8	A	B	A	0	X	51	A	0	X	B	B	B	B	B	B	B	X	X	B	B	B	X	X	0	X			
9	A	A	0	X	B	B	B	B	A	B	A	B	B	B	B	B	X	B	X	X	B	X	X	0	X	A		
10	B	B	70	70	0	X	B	B	B	A	B	B	B	B	B	B	X	0	X	B	X	X	0	X	0	X		
11	54	56	58	B	B	B	B	0	X	X	X	0	X	0	X	X	0	X	X	X	X	X	A	A				
12	A	A	A	69	50	A	B	B	A	0	X	0	X	B	B	B	B	X	X	X	X	X	A	A				
13	46	A	A	0	X	56	B	B	B	A	B	B	B	B	S	X	B	X	B	50	X	A	A	X	39			
14	S	A	A	46	46	54	A	B	B	0	X	A	B	B	B	B	B	X	X	X	X	X	0	X	X	41		
15	0	X	0	X	0	X	0	X	S	A	B	A	B	B	B	B	0	X	0	X	X	X	A	A	A	A		
16	A	A	A	60	A	A	A	A	A	A	B	B	B	B	0	X	S	B	0	X	0	X	X	0	X	A		
17	A	A	A	A	A	A	0	X	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
18	X	X	X	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A	
19	A	38	46	A	A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	B	A		
20	43	A	A	58	70	74	X	B	B	A	B	B	B	0	X	X	X	X	B	B	B	X	A	0	X	45		
21	A	A	X	45	51	65	X	A	A	A	X	X	X	B	B	0	X	0	X	0	X	0	X	X	X	X	X	
22	43	42	45	60	60	B	B	A	0	X	0	X	X	X	X	B	0	X	0	X	0	X	X	0	X	0	X	X
23	A	A	60	70	70	A	66	83	86	96	101	109	111	109	105	105	103	90	81	85	76	63	56	49	X	X		
24	36	A	A	A	A	B	B	S	B	B	75	90	90	85	86	86	89	85	81	87	76	76	67	52	X	X		
25	45	36	46	58	A	A	S	X	X	B	B	B	B	B	X	X	99	96	92	86	83	82	87	76	70	60		
26	X	69	66	55	46	51	65	76	92	86	100	106	96	110	106	106	106	100	90	90	85	81	75	70	64	X	X	
27	63	63	53	46	A	A	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
28	32	A	A	A	0	X	52	61	76	86	96	90	91	95	96	97	91	90	89	79	82	86	71	33	35	X	X	
29																												
30																												
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	12	9	14	17	14	9	10	10	11	14	13	12	12	10	15	16	21	21	20	24	24	23	20	16				
MED	46	49	51	56	56	63	72	80	86	90	91	92	90	88	81	81	77	74	76	67	62	56	51	48				
U 0	55	64	58	60	62	66	76	86	91	96	98	96	104	106	97	97	90	86	82	81	72	64	63	58				
L 0	41	38	45	46	51	55	66	65	76	75	78	86	88	85	71	76	72	68	71	59	56	51	46	42				

IONOSPHERIC DATA STATION SHOWA ST.

FEB. 1989 FOF2 (0.1MHZ)

45° E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H/D	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	A	B	A	A	F	A	S	A	B	A	A	A	A	B	B	S	A	A	B	F	B	44	A	F	
2	44	43	A	F	F	B	B	A	A	A	S	B	B	B	S	S	R	F	B	B	49	51	F	B	
3	A	A	A	F	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	A	A	A	A	
4	A	A	F	A	A	A			A	B	B	B	B	B	B	B	B		R					A	
5	B	A	A		B		B	B	A	A	B	B	B	B	B	B	B	45	45	50		R	R	F	B
6	B	A	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	S	S	A		50	45	39	A
7	B	A	F	F	B	B	A	R	B	B	B	B	B	B	B	B	B		B				F	F	
8	A	B	A	B		A		B	B	B	B	B	B	B	B		60	65	65	F	B	B		40	37
9	A	A		B	B	B	B	A	B	A	B	B	B	B	B										R
10	B	B	F	F	B	U	R	B	B	B	A	B	B	B	B	B			R	B				F	R
11	F	F	F	B	B	B	B										F	B				U	R	A	A
12	48	50	52					67	81	85	89	86	84	80	74	73	68		79	68	66	49		A	A
13	A	A	A	F	F	A	B	B	A	E	G	G	B	B	B							R	F	A	A
14	F	A	A	A	U	R	B	B	B	A	B	B	B	S		65	69	71	69	65	62	36	45		
15	40			U	R	B	B	B	A	B	B	B	B	S		60	60			B	S		A	A	F
16	S	A	A	F	F	A	B	B	R	A	B	B	B	B	B								R	F	F
17	R	33	33	37	45	48	S	F	A	B	F	F	70	74			68	69	68	54		A	A	A	A
18	A	A	A	F	A	A	A	A	A	A	B	B	B	B	B	S	60	60							
19	A	A	A	A	A	F	A										60	65	62	60		54	53	54	A
20	A	A	A	A	A	F	A										60	65	62	60					
21				F	R	F	A																		
22	55	58	54	54	56	58	60	74	70	78	84	85	85	83	76	76	72	65	65	66	67	63	60	57	
23	A	F	F	A	A				F	F		J	S	F					R		U	R	A	A	
24	F	A	A	F	F	A	B	B	A	B	B	B	B	U	R	F							B	A	
25	37			52	64	68	B	B	A	B	B	B	B	R					B	B					F
26	A	A	F	A	A	A	A	A	F				B	B					B						F
27	F	F	F	F	A	A	F	S																	
28	39	30	40	52	70				85	96															
29	F	F	F	F	F	B	B	A	80	90	90	90	97	B	B				U	R	F				
30	36	36	39	50	50				80	90	90	90	97						84	72	74	73	74	70	60
31	A	A	F	F	F	A	F	U	R										84	75	79	70	57	50	43
00	F	A	A	A	A	B	B	S	B	B	B	B	B	F	F										F
01	30			52	64	68	B	B	A	B	B	B	B	R					B	B					F
02	F	F	F	F	A	A	F	S																	F
03	A	A	F	A	A	A	A	A	A	A	B	B	B	B	B	S	60	60				45	50	43	36
04	F	F	F	F	A	A	F	S																	F
05	39	30	40	52	70				85	96															F
06	63	60	46	40	45	59	70	86	80	94	100	90	104	100	100	100	94	84	84	79	75	69	64	58	
07	F	F	F	F	A	A	F	U	R																F
08	57	57	46	40			90	100	109	99	105	99	100	100	91	92	94	90	80	83	50	50	27	26	
09	F	A	A	A	46	55	70	80	90	F	80	85	89	90	91	85	84	83	73	76	80	65	A	F	F
10																									F
11																									F
12																									F
13																									F
14																									F
15																									F
16																									F
17																									F
18																									F
19																									F
20																									F
21																									F
22																									F
23																									F
CNT	12	9	14	16	13	9	10	10	11	14	13	12	12	10	15	16	21	21	20	24	24	23	20	16	
MED	40	43	45	50	50	57	64	74	80	82	85	86	84	82	75	75	71	68	70	61	56	50	45	42	
UO	52	58	50	52	58	60	70	80	85	90	92	90	98	100	91	91	84	80	76	75	66	58	58	52	
LO	34	32	39	40	45	49	60	59	70	69	70	78	79	75	70	70	66	62	65	53	50	45	40	35	

IONOSPHERIC DATA STATION SHOWA ST.

FEB. 1989 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4'S LON. 39° 35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	60	B	27	90	33	51	32	44	B	44	42	35	33	B	B	32	32	35	B	35	B	32	60	45			
2	48	35	33	32	34	B	B	40	32	33	41	B	B	B	32	32	31	31	32	31	E B	25	22	70	B		
3	47	38	32	60	40	56	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	46	49	71	62		
4	40	40	27	40	41	30	31	32	40	B	B	B	B	B	B	B	B	30	E B	30	23	27	22	32	42		
5	B	37	50	34	B	40	B	B	41	33	B	B	B	B	B	B	E B	E B	E B	E B	E B	27	40	31	B		
6	B	48	B	35	70	35	B	32	B	B	B	B	B	B	B	B	B	33	30	32	32	32	35	33			
7	B	42	33	32	B	B	36	33	B	B	B	B	B	B	B	B	B	E B	B	B	34	32	21	37			
8	46	B	42	B	35	36	33	B	B	B	B	B	B	B	B	E B	40	32	31	B	E B	E B	E B	E B	E B		
9	33	36	32	B	B	B	B	42	B	44	B	B	B	B	B	34	B	32	31	B	E B	30	32	35	70		
10	B	B	35	26	B	E B	B	B	B	B	B	B	B	B	B	B	34	32	B	44	E B	E B	E B	E B	E B		
11	20	34	22	B	B	B	B	28	31	35	35	E B	E B	40	40	42	34	40	34	B	E B	E B	E B	E B	E B		
12	39	31	50	30	22	37	B	B	27	35	36	B	B	B	E B	54	32	38	35	26	26	26	90	16	43		
13	43	55	40	41	45	B	B	B	35	B	B	B	B	B	B	B	B	E B	B	B	E B	21	33	24	35		
14	32	71	46	34	16	23	42	B	B	35	41	B	B	B	B	B	E B	40	32	23	33	45	35	35	35		
15	35	28	30	32	27	32	32	41	B	40	33	E B	E B	59	60	B	B	E B	E B	E B	33	102	55	45			
16	70	90	70	41	48	45	58	52	44	44	B	B	B	B	E B	39	27	B	E B	E B	E B	21	19	22	39		
17	42	34	35	91	60	33	45	24	E B	34	31	31	32	37	37	37	45	39	36	31	21	20	17	26	21		
18	E B	13	28	30	45	31	23	23	27	33	50	34	35	33	33	34	33	E B	B	E B	E B	30	43	33	37		
19	36	32	35	32	40	32	33	32	34	29	31	60	40	55	40	35	31	30	28	22	23	32	B	34			
20	45	36	95	35	32	22	B	B	43	B	B	B	E B	E B	E B	E B	40	60	55	40	30	31	35	41	41	31	
21	41	70	44	33	28	47	41	42	35	35	32	55	B	B	E B	E B	E B	E B	B	B	36	27	32	26	16	40	
22	45	33	43	29	45	B	B	51	35	30	E B	E B	E B	E B	B	B	E B	35	30	25	27	21	18	16	31		
23	31	38	33	20	22	40	23	24	28	30	E B	34	35	33	32	37	33	41	30	24	25	19	21	21	E B	13	
24	27	42	46	45	60	B	B	E B	50	B	B	34	32	32	35	31	30	E B	E B	E B	E B	E B	E B	E B	E B	E B	
25	31	33	32	44	38	36	35	24	E B	30	29	B	B	B	B	E B	35	33	19	32	27	22	22	20	13	19	
26	22	28	32	35	31	31	31	27	E B	28	31	34	32	32	34	34	42	35	30	17	24	E B	E B	E B	E B	E B	E B
27	E B	E B	E B	12	13	32	45	45	41	40	32	32	32	31	33	36	41	41	32	32	32	33	26	17	30	31	31
28	32	32	36	42	32	29	25	E B	55	41	45	32	35	36	36	34	33	33	26	22	20	E B	24	35	31	21	
29																											
30																											
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	24	25	27	25	23	21	16	20	18	21	16	13	13	11	16	19	22	23	22	25	27	28	27	26			
MED	38	36	35	35	35	35	33	32	34	35	34	34	34	35	35	32	33	31	30	26	26	31	31	34			
U O	45	42	44	44	45	40	40	43	40	42	38	E B	E B	E B	E B	E B	E B	39	35	33	32	33	35	35	40		
L O	31	32	32	32	31	30	31	28	31	31	32	32	33	34	34	32	32	30	26	24	21	22	21	25			

IONOSPHERIC DATA STATION SHOWA ST.

FEB. 1989 FMIN (0.1MHZ)

45°E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4'S LON. 39° 35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	10	B	16	17	13	13	13	21	B	14	30	25	20	B	B	15	13	15	B	25	B	10	10	9	
2	9	16	15	9	9	B	B	30	12	20	18	B	B	B	25	25	18	15	19	15	25	15	10	B	
3	10	15	8	8	9	23	B	B	B	21	B	B	B	B	B	B	B	B	B	B	19	19	19	14	
4	13	14	14	19	19	24	20	20	20	B	B	B	B	B	B	B	B	18	30	18	10	13	10	11	
5	B	12	24	24	B	9	B	B	25	12	B	B	B	B	B	B	39	37	13	30	14	9	9	B	
6	B	30	B	30	30	11	B	13	B	B	B	B	B	B	B	B	B	14	19	19	15	11	9	25	
7	B	25	9	9	B	B	25	11	B	B	B	B	B	B	B	B	B	35	B	15	9	10	12	10	
8	20	B	25	B	10	20	15	B	B	B	B	B	B	B	B	40	18	14	B	B	20	25	25	29	
9	13	24	17	B	B	B	B	10	B	25	B	B	B	B	B	24	B	25	14	B	30	15	10	12	
10	B	B	13	13	B	24	B	B	B	21	B	B	B	B	B	B	25	25	B	29	25	24	21	25	
11	8	9	13	B	B	B	B	13	14	13	23	40	40	13	13	40	24	B	55	30	19	9	9	10	
12	10	12	10	8	10	12	B	B	13	15	15	B	B	B	54	15	13	14	15	13	20	13	12	10	
13	13	17	21	20	9	B	B	B	20	B	B	B	B	18	14	B	55	B	30	27	12	10	10	10	
14	13	13	13	12	13	13	27	B	B	11	25	B	B	B	B	B	40	20	12	14	21	12	10	9	
15	10	12	15	19	16	20	12	30	B	25	25	59	60	B	B	B	55	54	30	14	20	25	32	15	
16	10	30	9	10	10	11	30	20	23	25	B	B	B	B	39	20	B	30	20	30	13	11	14	9	
17	9	10	10	10	10	10	24	18	34	20	27	24	12	14	9	20	11	11	12	13	10	10	7	8	
18	13	10	9	13	10	12	12	14	17	50	15	28	20	21	12	13	33	19	30	13	30	10	10	9	
19	9	10	11	25	15	15	13	10	9	13	25	60	40	55	40	24	14	25	17	13	10	14	B	10	
20	15	8	10	13	10	9	B	B	22	B	B	B	40	60	55	40	15	B	B	13	13	10	13	10	
21	25	10	10	9	10	25	24	15	19	35	12	55	B	B	40	45	60	B	15	18	12	10	9	9	
22	9	9	18	12	24	B	B	20	10	25	40	40	60	B	B	50	14	20	19	13	13	9	11	9	
23	15	15	10	12	12	25	19	18	20	12	34	20	25	24	20	15	25	21	12	12	13	9	8	13	
24	9	10	11	10	20	B	B	50	B	21	25	B	20	25	19	18	30	30	50	30	25	20	12	8	
25	9	9	9	9	21	20	18	14	30	12	B	B	B	B	35	24	10	20	27	12	22	10	10	9	
26	8	7	8	9	9	9	15	14	14	31	22	21	20	13	13	18	13	15	17	24	25	24	24	15	
27	12	13	9	9	21	26	12	13	13	12	19	15	25	25	20	24	15	15	10	12	12	12	9	13	
28	9	10	9	19	12	10	12	55	13	11	14	20	14	30	16	15	10	12	15	15	24	12	9	9	
29																									
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	11	12	11	12	13	20	26	20	22	23	32	B	B	B	47	32	25	20	20	16	19	12	10	10	
U O	15	20	16	20	22	B	B	B	B	B	B	B	B	B	B	B	58	36	52	30	24	15	14	14	
L O	9	10	9	9	10	12	15	14	14	13	22	26	25	25	20	19	14	15	15	13	12	10	9	9	

IONOSPHERIC DATA STATION SHOWA ST.

FEB. 1989 H'F (KM) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4'S LON. 39° 35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	B	A	A	E A 340	A	E A 300	A	B	A	A	A	A	B	B		A	A	B		B		A	A			
2	E A 390	E A 350	A	A	E A 360	B	B	A	A	A	A	B	B	B		220	210	220	240	230	245	265	E A 305	A	B		
3	A	A	A	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A		
4	A	A	E A 300	A	A	A	E A 300	260	A	B	B	B	B	B	B	B	B		240	230	250	270	280	330	A		
5	B	A	A	E A 400	B	E A 325	B	B	A	A	B	B	B	B	B	B	E B 240	E B 250	E B 225	E B 250	E A 310	E A 350	E A 370	B			
6	B	A	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B		240	270	A	E A 330	E A 300	E A 370	A		
7	B	A	A	E A 340	B	B	A	E A 275	B	B	B	B	B	B	B	B	B	E B 270	E B 270	E A 360	A	280	305	E A 350			
8	A	B	A	B	A	A	E A 340	B	B	B	B	B	B	B	B	E B 250	240	240		B	B	275	275	270	E B 300		
9	A	A	E A 330	B	B	B	B	A	B	A	B	B	B	B	B		230	250	265		B	290	300	405	E A A		
10	B	B	A	E A 340	B	E B 300	B	B	B	A	B	B	B	B	B	B	E A 300	260		E A 275	E A 275	290	275	E B 320			
11	300	325	E A 370	B	B	B	B		250	240	225	240	230	240	240	230	250	245		E B 330	250	270	340	A	A		
12	A	A	A		E A 290	A	B	B	A		225	225		B	B	B		225	230	250	245	245	A	E A 390	A	A	
13	E A 300	A	A	A	E A 325	B	B	B	A	B	B	B	B	A		245	255				260	275	A	A	E A 355	E A 410	
14	E A 290	A	A	A	E A 370	E A 350	A	B	B	E A 255	A	B	B	B	B	B	E B 260	240	275	300	E A 290	300	350	E A 350	A		
15	A	E A 450	E A 450	E A 350	E A 375	A	A	A	B	A	A	E B 500	E B 460				B	E B 430	E B 420	E A 350	E A 290	A	A	A	A	A	
16	A	A	A	E A 400	A	A	A	A	A	A	B	B	B	B		245	240			250	250	275	275	275	300	A	
17	A	A	A	A	A	A	A		220	250	240	225		A													
18	280	310	E A 360	E A 400	A	E A 340	275	250	250		200		230	E A 250	225	240	245	245	230	255	E B 375	E A 250		A	A		
19	A	A	A	A	A	E A 230	300	255	250	240	230	430	240	E B 240	B	B	240	240	240	250	250	E A 290	310	280	B	A	
20	A	A	A	A	A	E A 300	B	B	A	B	B	B	E B 250	E B 490	E B 480	260	250			B	E A 370	295		A	E A 400	E A 425	
21	A	A	E A 480	E A 360	310	A	A	A	E A 300	250	240		B	B	E B 250	B	E B 390		250	260	310	290	310	320	E A 320		
22	E A 350	E A 440	E A 420	E A 320	E A 310	B	B	A		260	230	260		B	B	B	E B 320	240	240	260	265	280	250	260	310	A	
23	A	A	A	E A 360	310			260	255	225	225	230	230	240	230	230	240	225	240	250	240	240	250	250	250		
24	E A 340	A	A	A	A	B	B	B	B	B		225	230	225	250	225	230	240	240	275	250	240	250	250	270		
25	E A 340							270	250	230						225	240	245	240	240	240	240	240	240	230	275	
26	295	290	E A 305	E A 370	E A 350	E A 340	300	260	240	240	360	240	215	240	215	300	230	245	240	240	240	240	240	240	240	250	
27	270	290	310	400	A	A	E A 450	260	250	200	230	210	230	230	240	230	230	240	250	250	265	280			A	E A 375	
28	E A 390	A	A	A	E A 420	E A 370	E A 300	B	280	220	200	230	230	240	240	230	230	250	245	250	275			A	E A 310		
29																											
30																											
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	11	7	9	12	11	8	9	10	11	13	13	9	11	10	15	18	20	22	22	24	22	23	18	14			
MED	E A 300	A 308	E A 360	E A 360	E A 340	E A 332	E A 300	259	250	230	225	230	230	240	228	235	238	242	248	251	270	278	U 276	E 310			
UO	E A 350	E A 440	E A 435	E A 400	E A 370	E A 345	E A 320	260	260	245	240	345	E B 240	E B 250	E A 245	E B 250	248	250	265	275	E A 295	E A 300	E A 355	E A 350			
LO	290	290	E A 308	E A 340	E A 310	E A 300	295	250	250	225	218	230	230	240	225	230	230	240	240	250	265	250	260	270			

IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1989 FXI (0.1MHZ)

45° E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	A	A	A	48	A	A	S	A	A	0 X	0 X	X	0 X	X	X	X	X	X	X	X	69	70	46	31	
2	A	0 X	A		B	B	A	B	B	B	B	B	B	B	B	0 X	64	56	S	0 X	55	55	45	A	A	
3	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	X	B	B	B	A			A	A	A	
4	A	A	A		A	B	B	B	B	B	A	B	B	B	B	0 X	69	S	0 X	B	X	X	42	36		
5	41	33	A	A	A	A	B	B	B	B	B	B	B	B	0 X	76	75	70	X	0 X	X	0 X	A	33		
6	A	A	A	A	60	B	B	A	A	B	0 X	X	B	B	B	0 X	X	B	B	B	X	X	A	A		
7	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	X	81	0 X	0 X	X	51	53	40	A	A	
8	A	A	A	A	A	B	B	B	B	B	B	B	0 X	X	X	0 X	X	X	X	0 X	X	B	A	A		
9	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	B		
10	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A		
11	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A		
12	A	B	B	0 X	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	B	
14	A	B	A	B	A	B	B	B	B	B	B	B	B	B	B	0 X	58	56	62	X	X		28	A		
15	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	0 X	81	92	75	B	52	A	A	B		
16	B	A	A	A	38	60	B	B	B	B	B	B	B	B	B	B	0 X	56	55	X	0 X	B	A	A	A	
17	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	0 X	0 X	0 X		B	B	A	B	
18	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
20	A	A	A	A		B	B	B	B	B	B	B	0 X	X	0 X	0 X	X	0 X	0 X	X	X	B	A	A	A	
21	A	A	A	A	A	B	A	B	B	B	B	B	B	B	B	76	81	111	91	86	80	75	69	A	45	
22	A		B	B	45	A	A	A	X	S	B	B	B	S	0 X	116	S	0 X	0 X	X	0 X	49	41	A	31	
23	B	A	A	A	70	0 X	B	C	B	B	B	B	0 X	0 X	0 X	0 X	S		B	A	40	A	A	A		
24	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	0 X	75	82	81	81	80	X	61	49	43	
25	32	A	A	A	A	A	0 X	0 X	0 X	0 X	0 X	S	0 X	0 X	0 X	X	S	0 X	0 X	0 X	X	A	A	A	A	
26	A	A	A	S	X	S	B	B	B	X	0 X	0 X	0 X	0 X	0 X	0 X	0 X	X	X	116	80	X	50	A	A	
27	A	A	A	A	0 X	A	A	0 X	0 X	0 X	X	X	0 X	0 X	0 X	0 X	0 X	0 X	X	X	95	33	A	A	A	
28	A	A	A	A	A	B	B	A	B	B	0 X	X	0 X	0 X	0 X	X	X	X	X	50	33	A	A	A	A	
29	A	A	A		A	B	B	A	B	A	B	B	B	B	B	B	0 X	B	74	45	A	A	A	B	A	
30	45	A	50	B	0 X	B	A	A	B	B	B	B	B	B	B	B	B	B	0 X	0 X	54	51	45	A	A	A
31	60	50	B	0 X	61	A	A	B	B	B	B	B	B	B	B	X	X	60	44	45	31	A	B	A	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	4	4	1	4	8	4	3	1	3	3	5	6	8	8	12	15	19	19	19	20	16	9	4	6		
MED	43	42	50	42	49	54	49	54	0 X	0 X	0 X	0 X	X	0 X	0 X	0 X	0 X	X	X	X	56	45	44	34		
U 0	52	47		48	60	58	56		0 X	0 X	0 X	X	X	0 X	0 X	0 X	0 X	X	X	X	70	59	44	34		
L 0	36	37		38	44	48	40		0 X	X	X		0 X	X		0 X	0 X				47	40	35	31		

IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1989 FOF2 (0.1MHZ)

45° E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H/D	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	A	A	A	A	F 42	A	A	S	A	A	66	57	68	D R 78	84	84	R 87	84	83	75	63	F 60	F 40	F 25	
2	A U R 35	A	F	B	B	A	B	B	B	B	B	B	B	B	B	B	58	F 50	S 49	49	F 49	F 39	A	A	
3	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	70	B	B	B	A	F 27	A	A	A	
4	A	A	A	F 31	A	B	B	B	B	B	A	B	B	B	B	B	R 63	S	55	B	44	39	36	F 30	
5	F 35	F 27	A	A	A	A	B	B	B	B	B	B	B	B	70	B	F 69	64	R 47	54	52	F 30	A	F 27	
6	A	A	A	A	F 50	B	B	A	A	B	65	65	B	B	B	R 78	84	B	B	45	47	34	F	A	A
7	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	70	F 75	74	U R 75	F 75	60	B	A	A	
8	A	A	A	A	A	B	B	B	B	B	B	F 65	R 90	100	100	100	94	U S 85	J S 79	78	74	B	A	A	
9	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	B	
10	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
11	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
12	A	B	B	46	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	B	
14	A	B	A	B	A	B	B	B	B	B	B	B	B	B	B	52	F 50	F 52	47	52	45	B	F	A	
15	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	U S 75	86	F 68	B	46	A	A	A	B	
16	B	A	A	A	F 32	F	B	B	B	B	B	72	B	B	B	B	B	U S 50	R 49	37	B	A	A	A	
17	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	46	46	41	B	B	A	B	
18	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
20	A	A	A	A	F 38	B	B	B	B	B	B	B	R 70	70	71	70	R 71	U R 75	R 73	66	B	A	A	A	
21	A	A	A	A	A	B	A	B	B	B	B	B	B	B	F 70	F 75	105	J S 85	80	79	F 69	F 60	A	F 38	
22	A	F 35	B	B	F 35	A	A	A	66	S	B	B	B	S	R 110	S	95	U R 80	64	64	F 43	F 35	A	F 25	
23	B	A	A	A	F 60	A D S 50	B	C	B	B	D S D 80	S U S 80	S U S 85	S D S 98	S	F 65	B	A	F 34	A	A	A	A		
24	A	A	B	A	A	F 46	B	B	B	B	B	B	B	B	B	69	76	75	U R 75	74	71	U R 55	F 39	F 35	
25	F 26	A	A	A	A	A	F U R 34	48	R 65	78	80	U R 80	S U R 90	R 105	110	S	99	100	89	78	35	A	A	A	
26	A	A	A	S	44	S	B	B	B	67	78	U R D 80	R 90	90	95	D R U 105	U R 115	114	110	F 70	F 64	F 39	A	A	
27	A	A	A	A	A U S 50	A	A	R U R 76	80	85	65	H 76	U R D 90	R U R 89	95	95	105	89	27	F	A	A	A	A	
28	A	A	A	A	A F 30	F 43	B	B	A	B	B	B	70	70	65	68	F 74	70	44	F 27	A	A	A	A	
29	A	A	A	F 30	A	B	B	A	B	A	B	B	B	B	B	B	68	B	F 39	A	A	A	B	A	
30	F 35	A	F 42	A	A	A	B	B	B	B	B	B	B	B	B	B	B	U S 48	R 45	35	F	A	A	A	
31	F 54	F 44	B	B	D R 55	B	A	A	B	B	B	B	B	B	F 61	75	54	F 38	F 39	F 25	A	B	A	A	
CNT	4	4	1	3	8	3	3	1	3	3	5	6	8	8	12	15	19	19	19	20	16	9	3	6	
MED	F 35	F 35	F 42	F 31	F 43	F 46	F 43	U R 48	R 66	78	78	65	78	U 90	84	75	76	74	64	53	48	F 39	F 39	F 28	
U 0	F 44	F 40		46	F U S D S 52	50	50		R U R U R 76	80	82	72	90	R 95	98	95	R 95	85	80	74	64	58	F 40	F 35	
L 0	F 30	F 31		F 30	F 36	F 30	F 34		R 65	67	66	65	70	74	70	70	68	F 52	F 47	43	F 39	F 34	F 36	F 25	



IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1989 FES (0.1MHZ) 45° E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	32	36	57	42	33	42	35	26	41	36	35	31	E	B	E	B	E	B	E	B	E	B	38	30	28	29				
2	42	45	42	29	B	B	34	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	37	44	44	45				
3	36	40	32	B	45	B	B	B	B	B	B	B	B	B	B	E	B	B	B	B	B	27	34	35	70	32				
4	37	32	34	31	31	B	B	B	B	B	29	B	B	B	B	B	E	B	55	22	35	B	31	30	18	19				
5	30	29	35	35	43	43	B	B	B	B	B	B	B	B	B	30	B	27	27	27	26	21	28	36	31					
6	40	59	45	35	26	B	B	43	37	B	E	B	E	B	B	B	E	B	E	B	B	25	26	28	27	92				
7	42	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	B	32	34		
8	31	42	36	42	41	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	43	62		
9	47	43	45	36	71	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	71	B			
10	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
11	B	43	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	33	B		
12	35	B	E	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B		
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	45	33		
14	31	B	32	B	37	B	B	B	B	B	B	B	B	B	B	B	32	30	28	26	32	27	B	16	70	B	B			
15	46	32	90	65	80	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	35	35	40	B	B		
16	B	39	46	23	21	24	B	B	B	B	B	E	B	B	B	B	B	E	B	E	B	E	B	B	29	56	125	B		
17	43	B	51	52	40	B	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	B	B	41	B	B		
18	56	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
20	41	32	141	26	29	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	B	32	32	32	B	
21	34	59	41	36	70	B	35	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
22	60	67	B	B	16	59	35	41	40	32	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
23	B	51	31	40	34	49	16	B	B	C	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
24	70	90	B	37	60	29	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
25	28	28	32	28	25	30	28	21	23	30	35	30	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
26	40	55	30	40	26	27	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
27	40	80	80	71	37	27	35	35	25	26	25	28	27	27	27	25	24	26	17	33	42	45	41	42	B	B	B	B	B	
28	46	41	40	26	75	17	15	B	B	29	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
29	42	45	30	32	39	B	B	40	B	39	B	B	B	B	B	B	E	B	B	E	B	E	B	E	B	E	B	E	B	
30	45	37	35	36	27	24	B	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B
31	44	42	B	B	36	B	36	43	B	B	B	B	B	B	E	B	30	34	30	34	31	24	100	B	74	45	B	B	B	
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23						
CNT	25	23	21	22	23	11	9	7	5	7	6	7	8	9	12	17	20	20	20	20	23	21	20	25	23					
MED	41	42	40	36	37	29	35	40	37	32	30	U	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
U 0	46	55	48	40	45	43	35	43	40	36	35	40	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B
L 0	34	36	32	30	27	24	22	26	24	29	29	28	30	27	30	31	28	26	26	26	E	B	E	B	E	B	E	B	E	B

IONOSPHERIC DATA STATION SHOWA ST.  
 MAR. 1989 FMIN (0.1MHZ) 45° E MEAN TIME (G.M.T. + 3H)  
 LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	20	9	9	20	10	20	12	10	18	15	12	20	39	61	37	35	30	16	10	20	38	12	10	9
2	13	13	12	9	B	B	24	B	B	B	B	B	B	B	B	B	30	30	30	17	10	10	9	12
3	20	10	9	B	11	B	B	B	B	B	B	B	B	B	B	35	B	B	B	18	9	9	9	15
4	15	13	10	12	9	B	B	B	B	B	15	B	B	B	B	B	55	18	15	B	14	9	9	9
5	9	9	10	19	15	15	B	B	B	B	B	B	B	B	20	B	18	24	15	18	18	10	8	8
6	9	9	19	15	13	B	B	21	24	B	35	55	B	B	B	52	30	B	B	14	14	9	10	20
7	12	B	B	B	B	B	B	B	B	B	B	B	B	B	B	32	30	50	40	55	25	B	9	10
8	10	20	20	25	30	B	B	B	B	B	B	39	50	55	50	39	30	30	30	25	25	B	23	19
9	20	29	20	20	20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	25
10	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
11	B	25	B	20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	24
12	25	B	B	30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	23	18
14	19	B	18	B	20	B	B	B	B	B	B	B	B	B	B	23	22	25	19	20	11	B	10	21
15	20	14	24	14	19	B	B	B	B	B	B	B	B	B	B	50	31	50	B	30	20	20	24	B
16	B	29	15	10	10	14	B	B	B	B	B	40	B	B	B	B	B	35	30	30	B	14	13	18
17	20	B	20	18	29	B	B	B	B	B	B	B	B	B	B	B	B	30	28	29	B	B	12	B
18	14	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20	30	24	24	20	25	B	B	B	B	B	B	B	55	55	53	53	50	55	30	30	B	14	15	15
21	20	12	30	15	30	B	25	B	B	B	B	B	B	B	30	30	22	22	20	15	20	25	9	9
22	9	10	B	B	14	19	23	24	20	32	B	B	B	35	53	33	35	30	21	19	20	10	10	10
23	B	19	20	27	10	18	11	B	B	C	B	B	53	34	55	60	27	27	B	12	8	15	10	11
24	30	24	B	21	20	19	B	B	B	B	B	B	B	B	B	55	30	26	21	18	20	19	15	14
25	12	12	12	18	12	13	15	21	23	30	35	30	20	20	30	55	24	21	15	16	20	19	11	10
26	14	15	12	14	10	40	B	B	B	21	30	17	30	21	20	20	30	30	54	16	14	13	21	12
27	11	17	16	11	10	12	18	19	17	18	20	17	20	17	20	18	17	15	13	13	9	11	10	15
28	26	25	15	10	17	10	11	B	B	19	B	B	55	29	31	30	35	16	21	19	10	11	9	10
29	10	20	14	9	14	B	B	17	B	22	B	B	B	B	B	B	31	B	26	15	9	20	B	17
30	10	29	10	20	15	15	B	B	B	B	B	B	B	B	B	B	B	B	30	21	30	9	11	10
31	9	10	B	B	17	B	22	30	B	B	B	B	B	B	30	22	30	27	10	21	13	B	10	13
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	20	20	20	20	19	B	B	B	B	B	B	B	B	B	B	55	31	30	30	21	20	19	11	15
U 0	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
L 0	11	12	12	14	12	19	24	B	B	B	B	B	55	55	37	33	30	25	20	17	13	11	10	10

IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1989 H'F (KM)

45° E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	A	A	A	A	A	A	280	A	A	E A 250	210	290	E B 360	E B 250	B 240	240	265	250	230	E B 280	245	260	E A 375
2	A	A	A	E A 280	B	B	A	B	B	B	B	B	B	B	B	B	240	300	345	320	E A 350	A	A	A
3	A	A	A	B	A	B	B	B	B	B	B	B	B	B	E B 255	B	B	B	B	A	A	A	A	A
4	A	A	A	A	A	B	B	B	B	B	A	B	B	B	B	B	B	E A 290	E A 300	B	250	310	280	340
5	E A 350	E A 450	A	A	A	A	B	B	B	B	B	B	B	B	245	B	260	275	300	275	255	E A 320	E A 450	A
6	A	A	A	A	E A 380	B	B	A	A	B	260	B	B	B	B	B	255	B	B	290	300	350	A	A
7	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	250	250	E B 275	B E 260	B E 280	250	B	A	A
8	A	A	A	A	A	B	B	B	B	B	E B 250	E B 320	E B 300	E B 275	E B 240	240	240	240	230	240	B	A	A	
9	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	B
10	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A
11	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A
12	A	B	B	E B 400	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	B
14	A	B	A	B	A	B	B	B	B	B	B	B	B	B	E A 300	E A 300	280	260	290	E A 325	B	400	A	
15	A	A	A	A	A	B	B	B	B	B	B	B	B	B	E B 450	E B 270	E A 390	B E 305	B	A	A	A	B	
16	B	A	A	A	Q 325	Q 300	B	B	B	B	B	B	B	B	B	B	B	E B 310	E B 290	E B 360	B	A	A	A
17	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	E B 340	E B 350	E B 410	B	B	A	B
18	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
19	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20	A	A	A	A	Q 450	B	B	B	B	B	B	B	B	B	E B 355	E B 360	E B 330	E B 325	275	270	B	A	A	A
21	A	A	A	A	A	B	A	B	B	B	B	B	B	B	265	260	260	280	290	270	275	290	A	A
22	A	A	B	B	A	A	A	A	A	E B 260	B	B	B	B	E B 275	E B 300	250	285	325	320	300	310	E A 250	
23	B	A	A	A	A	A	A	B	B	C	B	B	E B 375	E B 260	E B 350	E B 350	280	350	B	A	A	A	A	
24	A	A	B	A	A	E A 375	B	B	B	B	B	B	B	B	B	E B 320	270	260	250	240	250	295	295	305
25	E A 350	A	A	A	A	A	E A 350	280	275	260	250	240	245	240	245	270	230	240	240	240	E B 310	A	A	A
26	A	A	A	A	E A 420	290	B	B	B	270	240	200	250	250	240	205	255	245	245	B	240	260	300	A
27	A	A	A	A	A	E A 360	A	A	280	250	240	250	250	250	240	270	240	240	240	A	A	A	A	A
28	A	A	A	A	A	Q 360	E A 320	B	B	A	B	B	E B 400	E B 240	E B 290	E B 275	E B 290	E A 350	E A 320	320	A	A	A	A
29	A	A	A	E A 410	A	B	B	A	B	A	B	B	B	B	B	B	B	B	E B 300	E B 380	A	A	A	B
30	A	A	E A 360	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	E B 275	E B 310	E B 300	A	A	A
31	A	250	B	B	A	B	A	A	B	B	B	B	B	B	B	B	E B 290	E B 290	320	A	E A 400	E A 400	A	A
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	2	2	1	4	4	5	2	2	2	4	5	6	7	8	12	16	19	19	20	19	14	9	4	5
MED	E A 350	350	E A 360	E A 340	U 376	U 330	E A 335	280	278	260	250	235	U 268	250	U 255	U 255	255	280	261	U 260	264	300	288	E A 340
U O			E 405	435	368				265	255	250	375	E B 288	E B 295	E B 310	E B 290	E B 325	E A 322	E B 320	E B 300	E A 335	E A 348	E A 412	
L O				260	352	295				255	240	210	250	245	245	250	240	260	250	240	250	292	270	278

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1989 FXI (0.1MHZ)

45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H	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	A	33	B	A	A	A	B	B	B	0 X	B	B	B	B	B	S	B	0 X	45	A	A	A	B	A	
2	A	B	B	B	B	B	0 X	B	B	B	B	B	B	B	B	X	0 X	63	45	S		A	B	A	B
3	A	B	A	A	B	B	B	B	B	B	B	B	B	0 X	0 X	0 X	0 X	0 X	X	B	B		A	B	
4	A	A		B	B	B	B	A	B	B	B	B	B	B	71	B	0 X	X	A	A	A	B	A		
5	A	A	44	A	A	B	B	B	B	B	B	B	B	B	0 X	B	X					A	A	A	
6	B	B	A	B	B	B	B	B	B	0 X	0 X	B	B	0 X	0 X	0 X	0 X	0 X	0 X	0 X	73	B	B	A	A
7	B	B	B	B	B	B	B	B	B	63	69	B	B	B	X	X	X			A	A	A	A	B	
8		B	B	B	B	B	B	B	B	B	B	B	B	90	116	128	106	70				A	A	A	A
9	A	A	A	A	B	B	B	B	B	B	B	B	B	0 X	B	0 X	0 X	0 X	0 X	0 X	0 X	A	A	A	B
10	A	X	A	X		A	0 X		0 X	B	0 X	0 X	0 X	0 X	0 X	0 X	0 X	X	0 X	0 X		B	A	S	
11	A	B	A	A	S	B	A	A	B	B	0 X	0 X	B	X	S	B	X		X	0 X	0 X	A	A	B	B
12	0 X	0 X	B	B	B	B	B	B	B	B	B	B	S	0 X	0 X	0 X	0 X	0 X	0 X	0 X	0 X	0 X	0 X	0 X	B
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0 X	B	B	B	B	B	A	A	B
14	A	B	B	B	B	B	B	B	B	B	B	B	B	0 X	0 X	0 X	0 X	0 X	0 X	0 X	0 X	B	B	0 X	B
15	S	S	0 X	B	A	B	B	B	B	B	B	B	B	B	B	B	B	S				B	A	A	A
16	A	A	A	A	42	A	A	52	B	0 X	0 X	X	0 X	X	X	X	0 X	0 X	0 X	S	A		B	A	
17	A	B	A	A	A	A	A	46	0 X	X	0 X	X	X	X	X	X	0 X	0 X	0 X		A	A		A	
18	A	A	A	60	51	0 X	B	A	B	0 X	X	X	X	X	X	0 X	0 X	0 X	0 X						
19	0 X	A	A	A	29	33	45	51	73	90	106		106	116	116	116	111	110	108	71	60	38	29	26	
20	A	A	0 X	A	A	0 X	X	B	B	B	B	B	B	0 X	X	X	X	X	X				A	A	
21	34	51	A	A	A	70	66	73	96	103	115	120	128	131	116	106	106	96	71	58	43	35			
22	4	32	32	32	42	B	A	61	65	75	95	116	126	135	136	136	136	130	112	101	85	61	45	28	
23	A	A	S	A	A	A	0 X	47	60	70	75	95	105	111	121	116	124	S		A	A	A	0 X	44	
24	A	A	41	A	A	B	A	A	0 X	X	X	0 X	0 X	B	S	S	0 X	S	0 X		48	45	30	28	
25	A	A	A	A	A	A	A	70	70	76	75	91	95	111		116	130		116	106	A	A	A	A	
26	0 X	A	A	B	A	A	A	B	B	B	0 X	S	B	B	B	B	X	A							
27	A	B	A	B	A	B	B	B	B	B	B	B	B	B	X	B	60	76	66	37	A	A	A	A	
28	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	56	79	A	A	A	A	A	A	
29	B	B	B	B	A	S	45	B	B	B	B	B	B	B	0 X	0 X	0 X	0 X			A	A	A	A	
30	A	B	A	B	A	B	A	B	A	B	B	B	B	B	X	B	0 X	B	B	B		A	A	A	
31																					33				
CNT	6	6	6	4	4	4	5	8	7	12	12	12	11	17	20	21	25	23	27	18	9	10	8	6	
MED	38	42	45	44	46	45	50	51	60	74	80	90	96	111	94	116	116	108	98	90	71	57	44	32	
U 0	49	54	51	58	51	62	73	64	66	76	90	102	106	115	118	120	123	120	110	106	80	61	46	44	
L 0	26	32	41	32	42	35	39	46	51	68	75	85	90	88	78	96	96	97	71	70	41	38	30	28	

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1989 FOF2 (0.1MHZ)

45° E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	F 27	B	A	A	A	B	B	B	33	B	B	B	B	B	S	B	D	S	F	A	A	A	B	A			
2	A	B	B	B	B	B	44	B	B	B	B	B	B	B	B	85	D	R	S	F	F	A	B	A	B			
3	A	B	A	A	B	B	B	B	B	B	B	B	B	D	R	U	R	U	R	98	B	B	F	A	B			
4	A	A	F 38	B	B	B	B	A	B	B	B	B	B	B	F	B	B	U	R	110	84	A	A	A	B	A		
5	A	A	B	A	A	B	B	B	B	B	B	B	B	B	R	B	74	65	42	39	27	F	A	A	A			
6	B	B	A	B	B	B	B	B	B	57	63	B	B	B	84	86	95	100	102	95	60	R	F	B	B	A	A	
7	B	B	B	B	B	B	B	B	B	B	B	B	B	B	84	110	122	100	60	F	F	A	A	A	A	B		
8	F	B	B	B	B	B	B	B	B	B	B	B	B	F	D	R	80	115	120	117	92	60	F	A	F	A	A	
9	A	A	A	A	B	F	B	B	B	B	B	B	B	D	R	B	109	120	116	110	100	A	A	A	B			
10	A	44	A	49	45	A	A	44	54	68	B	D	S	D	S	D	S	D	S	J	S	R	B	A	S	F		
11	A	B	A	A	S	B	A	A	B	B	U	R	75	78	B	S	B	114	110	110	100	A	A	B	B			
12	U	S	B	B	B	B	B	B	B	B	B	B	S	D	S	108	118	120	115	115	110	98	80	60	D	R	B	
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	R	B	B	B	B	A	A	B		
14	A	B	B	B	B	B	B	B	B	B	B	B	100	110	110	122	116	120	114	105	B	B	U	R	B	B		
15	S	S	D	S	B	A	B	B	B	B	B	B	B	B	B	B	B	S	F	65	B	B	A	A	A			
16	A	A	A	A	F	A	A	F	B	U	R	70	85	94	100	110	115	110	110	100	79	S	A	F	B	A		
17	A	B	A	A	A	A	A	F	U	S	F	40	45	60	59	64	69	74	74	74	75	73	68	60	21	F	A	
18	A	A	A	F	F	B	A	B	70	70	84	84	80	84	93	97	91	76	65	54	32	23	20	F	F	F	S	
19	F	20	21	A	A	F	F	F	45	67	84	100	S	100	110	110	110	105	104	102	70	65	38	F	F	S		
20	A	A	R	A	A	R	B	B	B	F	B	B	105	110	114	114	110	100	80	65	26	F	F	A	A			
21	F	A	F	A	A	A	F	F	B	F	F	109	114	122	125	110	100	110	90	65	52	37	29	F	F	F		
22	F	F	F	F	F	B	A	F	F	F	F	120	129	130	130	130	124	106	95	79	55	39	22	F	F	F		
23	A	A	S	A	A	A	A	41	54	60	69	89	99	105	115	110	118	S	F	65	A	A	A	A	38	F	F	
24	A	A	F	A	A	B	A	A	60	70	74	80	90	B	S	S	105	S	100	60	41	34	23	20	F	F	F	
25	A	A	A	A	A	A	A	F	F	F	F	60	59	70	69	85	89	105	S	U	R	S	A	A	A	A	A	
26	F	50	49	A	A	B	A	A	A	B	B	B	44	S	B	B	F	69	54	A	F	A	A	A	B	B		
27	A	B	A	F	B	A	B	B	B	B	B	B	B	B	B	B	B	B	F	F	F	A	A	A	A	A	A	
28	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	F	50	69	60	31	A	A	A	A	A	A	
29	B	B	B	B	A	S	F	B	B	B	B	B	B	B	B	F	U	R	D	R	74	35	A	A	A	A	A	
30	A	B	A	B	A	B	A	B	A	B	B	B	B	B	B	B	69	89	B	B	B	F	A	A	A	A	A	
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	6	6	6	4	4	4	5	8	7	12	12	12	11	17	20	21	25	23	27	18	9	10	8	6				
MED	38	36	39	37	40	39	44	45	54	66	72	86	94	106	92	110	112	104	92	84	65	51	38	26				
U 0	43	48	45	50	44	56	65	58	59	70	84	96	100	109	112	114	117	110	106	100	74	55	40	38				
L 0	28	26	35	24	36	29	30	40	45	60	69	79	84	82	72	90	90	91	65	60	34	32	23	20				

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1989 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

D	H	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		38	26	B	38	33	46		B	B	E	B	B	B	B	B	E	B	B	B	30	30	16	34	30	35	B	43											
2		65	B	B	B	B	B		27	B	B	B	B	B	B	B	E	B	B	E	B	B	E	B	B	B	B	22	B										
3		35	B	46	40	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	B	B	E	B	B										
4		42	45	60	B	B	B	B		42	B	B	B	B	B	B	E	B	B	B	E	B	B	B	35	41	32	42	45	B	40								
5		37	43	B	44	37	B	B	B	B	B	B	B	B	B	B	E	B	B	E	B	B	B	30	30	28	18	40	28	33	36	40							
6		B	B	42	B	B	B	B	B	B		E	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	38	35					
7		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B				
8		58	B	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B				
9		45	40	43	35	B	35	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B				
10		37	36	76	81	33	37	40	40	32	E	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B			
11		40	B	41	35	27	B	48	36	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B			
12		35	E	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B		
13		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
14		32	B	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B		
15		34	42	37	B	31	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
16		33	40	70	33	31	40	42	25	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B		
17		38	B	111	45	40	38	40	30	28	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B		
18		38	42	36	28	34	38	B	45	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B		
19		28	32	30	31	30	30	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	
20		35	34	36	30	71	66	42	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B		
21		33	45	40	65	42	43	39	36	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B		
22		E	B	E	B		B	42	42	45	29	29	27	26	24	22	21	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	
23		60	70	90	56	70	30	35	42	35	21	21	23	56	26	24	23	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	
24		40	40	42	47	60	B	43	46	32	E	B	10	23	39	25	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	
25		36	40	45	42	42	47	40	39	45	41	32	33	22	E	B	23	26	20	E	B	20	21	28	29	39	45	50	60	B	B	B	B	B	B				
26		70	46	52	41	B	42	45	21	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	
27		51	B	31	20	B	45	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	
28		39	40	45	B	B	B	42	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	
29		B	B	B	B	32	27	21	B	B	B	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	
30		70	B	100	B	30	B	32	B	41	B	B	B	B	B	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B
31																																							
CNT		26	18	21	18	17	14	16	13	8	12	12	12	14	17	23	23	25	29	28	26	24	27	25	21														
MED		38	40	43	39	33	39	40	39	34	E	B	U	30	35	30	27	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	
U O		45	43	65	45	42	45	42	42	43	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B
L O		35	34	36	31	31	35	34	28	30	E	B	24	24	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1989 FMIN (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4'S LON. 39° 35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	29	9	B	21	19	19	B	B	B	24	B	B	B	B	B	30	B	30	13	11	12	9	B	20	
2	14	B	B	B	B	B	17	B	B	B	B	B	B	B	B	30	29	55	10	10	9	B	20	B	
3	16	B	10	10	B	B	B	B	B	B	B	B	B	35	30	30	23	21	35	B	B	19	10	B	
4	16	10	20	B	B	B	B	21	B	B	B	B	B	B	30	B	B	35	11	9	9	9	B	20	
5	9	22	B	24	21	B	B	B	B	B	B	B	B	B	B	B	30	21	13	11	13	10	8	29	
6	B	B	15	B	B	B	B	B	B	21	36	B	B	30	29	28	30	30	30	15	B	B	10	18	
7	B	B	B	B	B	B	B	B	B	B	B	B	B	B	28	30	29	25	8	10	9	8	15	B	
8	10	B	B	B	B	B	B	B	B	B	B	B	30	30	35	30	25	20	52	30	10	10	25	10	
9	11	22	21	18	B	B	B	B	B	B	B	B	B	55	B	27	31	23	30	15	9	12	9	B	
10	14	16	13	13	17	19	19	14	18	24	B	26	30	30	30	26	23	14	10	14	B	10	10	12	
11	14	B	20	22	19	B	20	25	B	B	55	51	B	55	55	B	30	25	35	19	20	20	B	B	
12	12	30	B	B	B	B	B	B	B	B	B	B	40	55	39	35	36	35	23	17	20	20	20	B	
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	41	B	B	B	21	20	B	
14	21	B	B	B	B	B	B	B	B	B	B	B	43	50	55	30	30	27	20	24	B	B	25	B	
15	24	24	21	B	20	B	B	B	B	B	B	B	B	B	B	B	B	35	25	B	B	18	20	16	
16	14	10	19	13	15	20	15	13	B	30	50	30	30	42	31	30	23	14	15	15	15	17	B	12	
17	14	B	29	23	16	21	11	14	19	31	30	37	60	35	30	30	60	30	50	13	13	13	12	14	
18	10	20	14	15	12	16	B	26	B	30	35	36	29	55	30	27	21	19	16	19	20	13	14	9	
19	12	10	10	12	10	10	14	10	17	23	24	20	26	20	20	15	15	11	10	10	10	11	10	9	
20	10	10	13	8	10	10	14	B	B	B	15	B	B	55	50	23	19	33	20	15	9	10	14	9	
21	9	10	10	19	17	20	15	15	B	30	15	20	9	20	19	14	10	10	15	11	15	9	9	10	
22	10	13	10	9	10	B	10	10	10	14	20	20	15	14	15	15	20	13	10	10	10	9	10	10	
23	13	10	15	15	11	10	13	10	10	15	15	15	56	26	24	23	20	30	12	15	11	16	10	10	
24	20	24	10	14	19	B	19	18	18	10	18	21	18	B	26	21	19	14	11	11	19	10	14	9	
25	10	10	10	20	17	13	20	13	13	21	20	15	18	23	18	20	20	9	8	10	10	10	10	10	
26	14	9	14	15	B	20	25	12	B	B	B	21	17	B	B	26	13	20	10	9	10	11	B	B	
27	12	B	20	14	B	21	B	B	B	B	B	B	B	B	24	B	20	15	14	9	8	15	15	30	
28	25	14	20	B	B	B	26	B	B	B	B	B	B	B	B	27	B	13	14	9	10	10	15	13	
29	B	B	B	B	15	13	14	B	B	B	B	B	B	B	26	22	25	13	15	13	9	13	15	10	
30	10	B	30	B	19	B	20	B	30	B	B	B	B	B	B	B	29	55	B	B	16	9	10	10	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	14	23	20	22	20	B	26	B	B	B	B	B	B	55	30	30	27	22	15	14	12	12	14	15	
U O	21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	30	30	19	20	18	20	B	
L O	10	10	13	14	16	19	15	14	30	24	30	26	30	30	26	23	20	14	11	10	10	10	10	10	

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1989 H'F (KM)

45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H/D	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	A	Q	B	A	A	A	B	B	E	B	B	B	B	B	B	E	B	B	E	A	A	A	B	A													
2	A	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	260	290	E	B	E	A	A	B	A												
3	A	B	A	A	B	B	B	B	B	B	B	B	B	B	250	240	230	240	245	250	E	A	B	A	B												
4	A	A	A	B	B	B	B	A	B	B	B	B	B	B	E	B	B	B	255	220	A	A	A	B	A												
5	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	E	B	B	250	280	300	300	A	A	A	A											
6	B	B	A	B	B	B	B	B	E	A	E	B	B	B	250	250	250	240	230	240	240	B	B	A	A												
7	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	E	A	A	A	A	A	B												
8	A	B	B	B	B	B	B	B	B	B	B	B	B	B	275	260	270	250	255	220	E	B	E	B	A	A	A	A									
9	A	A	A	A	B	A	B	B	B	B	B	B	B	B	E	B	B	B	320	240	225	240	225	A	A	A	B										
10	A	A	A	A	E	A	A	A	E	A	B	B	B	B	B	B	B	215	230	245	220	B	A	A	250												
11	A	B	A	A	A	B	A	A	B	B	E	B	E	B	B	E	B	B	220	230	250	250	A	A	B	B											
12	280	270	B	B	B	B	B	B	B	B	B	B	B	B	E	B	E	B	250	255	250	230	220	240	225	220	225	230	250	E	B	B					
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	290	B	B	B	B	A	A	B											
14	A	B	B	B	B	B	B	B	B	B	B	B	B	B	270	250	255	240	240	250	210	225	B	B	250	B											
15	A	A	E	A	B	A	B	B	B	B	B	B	B	B	B	B	B	E	B	270	300	B	B	A	A	A											
16	A	A	A	A	A	A	A	A	B	250	270	250	250	250	255	225	220	240	255	A	A	A	B	A													
17	A	B	A	A	A	A	A	A	A	E	B	E	B	E	B	E	B	E	B	340	290	350	290	A	A	A	A										
18	A	A	A	A	A	A	B	A	B	A	260	275	240	320	270	250	240	240	230	225	230	245	260	E	A	350											
19	E	A	E	A	A	A	E	A	E	B	E	A	270	260	240	225	225	235	230	240	210	210	225	210	200	245	225	A	A								
20	A	A	260	A	E	A	A	B	B	B	325	B	B	E	B	250	250	225	220	250	210	215	200	260	A	A											
21	A	A	230	A	A	A	A	A	B	280	250	225	245	225	230	225	220	225	215	210	210	210	210	210	210	210	225	250									
22	275	E	A	A	Q	A	B	A	A	H	260	210	245	220	230	220	215	210	210	200	200	200	200	200	200	200	225	255									
23	A	A	260	A	A	A	A	A	A	A	250	230	250	270	230	220	225	235	270	280	A	A	A	A	240												
24	A	A	A	A	A	B	A	A	E	A	290	250	230	230	245	B	230	240	230	205	200	195	245	225	250	E	A	360									
25	A	A	A	A	A	A	A	A	A	A	280	245	225	245	230	220	225	230	210	250	A	A	A	A	A	A											
26	230	A	A	A	B	A	A	A	B	B	B	A	E	A	B	B	E	B	E	A	A	E	A	A	A	B	B										
27	A	B	A	A	B	A	B	B	B	B	B	B	B	B	B	E	B	B	275	275	345	A	A	A	A	A	A										
28	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	300	A	A	A	A	A	A	A	A										
29	B	B	B	B	A	A	B	B	B	B	B	B	B	B	B	B	245	240	260	275	270	305	A	A	A	A	A										
30	A	B	A	B	A	B	A	B	A	B	B	B	B	B	B	B	250	290	B	B	B	290	A	A	A	A											
31																																					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23													
CNT	4	4	4	1	1	3	1	1	4	10	12	11	14	17	23	22	25	28	27	18	8	8	7	6													
MED	U	U		Q	E	A	E	A	E	B	E	A	280	252	250	240	248	242	245	235	238	244	U	235	224	218	233	250	248								
U 0	325	445	302		E	A	470		E	A	E	B	E	B	E	B	E	B	305	300	310	275	270	262	270	250	258	275	E	A	290	238	252	250	E	A	350
L 0	252	298	245			195			265	250	242	225	240	240	230	225	220	230	220	215	200	218	225	250													



IONOSPHERIC DATA STATION SHOWA ST.

MAY 1989 FXI (0.1MHZ)

45° E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	B	B	B	A	A	A	A	X	B	B	X	X	0	X	X	X	X	X	X	X	A	A	A		
2	A	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	0	X	96	95	90	B	A	A	A	
3	A	A	A	B	B	B	A	A	B	B	B	0	X	0	X	0	X	0	X	0	X	A	A	A		
4	A	A	A	A	B	B	B	B	A	B	B	B	0	X	X	X	0	X	0	X	0	X	A	B	A	
5	A	A	A	B	B	B	B	B	A	B	B	B	B	B	B	B	0	X	0	X	B	B	B	A	A	
6	A	A	A	A	A	A	X	B	B	B	B	B	B	B	B	B	B	B	S	S	B	B	B	B		
7	B	46	A	A	A	S	X	S	70	B	B	B	B	B	B	103	106	X	B	B	B	B	A	A	B	
8	A	B	S	A	A	A	A	A	45	55	91	116	110	116	110	103	104	104	66		B	B	B	A		
9	A	A	A	A	A	A	39	56	48	57	70	126	130	116	126	126	106	104	96	75	S	B	B	B		
10	A	S	X		A	A	B	B	54	55	82	111	131	136	136	126	126	101	91	80	40	B	B	A		
11	S	S	A	A	S	A	70	A	A	70	86	111	124	126	126	121	116	116	105	96	66	S	A	0	X	
12	S	S	S	0	X	X	36	36	31	30	B	A	B	A	0	X	0	X	0	X	0	X	A	X	A	
13	39	A	S	A	A	A	45	B	B	51	91	116	116	124	134	131	126	106	96	86	33	A	0	X	0	X
14	X	46	A	A	A	0	X	0	X	A	B	X	0	X	0	X	0	X	0	X	X	A	44	46		
15	0	X	0	X	A	A	A	A	60	70	70	75	85	86	B	B	0	X	106	106	115	121	116	S	A	A
16	A	A	A	A	A	0	X	A	71	70	72	80	106	B	S	0	X	0	X	0	X	51	31	26	32	
17	38	44	A	39	A	A	B	B	B	B	B	80	86	96	126	116	110	110	80		B	B	A	A		
18	41	40	31	33	A	A	A	A	B	70	80	85	96	126	116	116	116	112	102	85	B	A	0	X	B	
19	0	X	36	35	33	37	40	B	B	B	B	S	0	X	0	X	0	X	0	X	S	B	A	A		
20	56	46	A	0	X	A	A	A	0	X	B	X	116	115	104	96	100	116	80	46	B	A	A	37		
21	31	35	X	33	60	45	51	60	58	60	70	75	75	85	90	96	96	116	106	96	B	33	A	A		
22	X	S	46	A	0	X	0	X	A	B	70	80	95	106	116	136	126	121	75	S	B	0	X	A		
23	A	A	A	A	A	A	56	70	70	B	B	90	106	134	130	96	104	85	80	B	A	A	0	X	42	
24	A	36	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	42	A	A	A	31	B		
25	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	66	76	B	B	B	A	A	A		
26	B	B	A	A	B	B	B	B	A	B	B	0	X	0	X	X	X	X	80	80	70	B	A	A	A	
27	A	A	A	B	B	B	A	B	B	B	B	B	0	X	B	B	B	B	70	71	S	A	B	B	A	
28	A	X	A	B	B	B	B	A	B	B	61	70	79	86	B	B	80	86	81	0	X	S	A	A	A	
29	A	A	B	B	B	B	A	B	A	B	B	B	B	S	0	X	0	X	X	X	B	B	A	A	A	
30	A	B	A	A	A	A	B	B	B	B	0	X	51	75	86	101	80	76	60	36	B	B	A	A		
31	A	B	36	A	B	B	B	51	58	B	B	B	0	X	0	X	S	0	X	B	B	B	B	A	X	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	9	11	5	8	3	6	11	7	11	10	13	17	20	21	20	22	26	25	26	19	8	4	6	7		
MED	43	44	36	38	36	46	51	60	58	65	76	90	0	X	0	X	0	X	X	X	46	32	31	46		
U 0	54	0	X	39	44	60	49	60	70	70	70	81	101	108	125	128	121	116	111	104	86	69	39	44	47	
L 0	38	36	33	34	33	37	40	56	48	55	70	75	78	86	96	96	91	80	76	65	32	31	26	37		

IONOSPHERIC DATA STATION SHOWA ST.  
 MAY 1989 FOF2 (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)  
 LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	B	B	B	A	A	A	A	40	B	B	67	70	85	90	85	80	71	54	50	23	F	A	A	A		
2	A	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	90	R	F	F	B	A	A	A	A		
3	A	A	A	B	B	B	A	A	B	B	B	S	69	66	74	80	86	90	90	65	58	20	F	A	A	A	
4	A	A	A	A	B	B	B	B	A	B	B	B	B	B	70	69	S	D	S	D	S	85	90	90	60		
5	A	A	A	B	B	B	B	B	A	B	B	B	B	B	B	B	70	D	S	B	B	B	B	A	A		
6	A	A	A	A	A	A		B	B	B	B	B	B	B	B	B	B	B	S	S	B	B	B	B	B		
7	B	F	A	A	A	S		S	F	B	B	B	B	B	B	F			B	B	B	B	A	A	B		
8	A	B	S	A	A	A	A	A	39	49		85		S	U	S	J	S	F	100	97	98	60	B	B	B	A
9	A	A	A	A	A	A	F	F	39	51	64			S	120	124	110	120	90	69		S	B	B	B		
10	A	S		F	A	A	B	B	44	49	76	105	125	130	130		D	R	U	R	120	95	85	70	33		
11	S	S	A	A	S	A	F	A	A	F	F	R		U	R	U	R	D	R		U	R	F	S	A		
12	S	S	S			F	F	B	A	B	A	A	D	S	80	90	90	100	98	84	74	A		A	A		
13	F	A	S	A	A	A	F	B	B	F				U	R					F		F	A				
14	44	40	F	A	A	U	S	F	A	B		70	90	105	110	114	105	110	115	100	90	66	F	F	F		
15	R	U	R	A	A	A	A	F	F	F	R	F	F	F	B	B	D	R	F		R	S	A	A			
16	A	A	A	A	A	A	A	F	F	F	F	F	F	B	S			U	R	109	115	110	90	F	F	F	
17	F	F	A	F	A	A	B	B	B	B	B	F	U	R	R	S		R	F	F	F	B	B	A	A		
18	F	F	F	F	A	A	A	A	B	F	F	U	R				120	110	100	95	70		B	A	R	B	
19	F	R	F	F	F	F	F	B	B	B	B	S		F	U	R	R	F		F	F	S	B	A	A		
20	F	F	F	A	A	A	A	D	S	B		F	F	F	F	B	B	B	B		109	55	F	B	F	A	F
21	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	B	F	A	A	
22	R	F	S	F	A	U	S	A	B	F	F	F	100	110	130	120	115		S	F	S	B	B	R	A		
23	A	A	A	A	A	A	F	F	F	B	B	F	F	R	R	F	U	R				B	A	A	B	36	
24	A	F	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	36	F	A	A	A	F	B	
25	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	F	F	B	B	B	B	A	A	A	A	
26	B	B	A	A	B	B	B	B	A	B	B		65	78	85	94	104	90	70	70	60		B	A	A	A	
27	A	A	A	B	B	B	A	B	B	B	B	B		36		B	B	B	B	F	F	S	A	B	B	A	
28	A		A	B	B	B	B	A	B	B	F	F	55	60	73	80		B	F	U	R	S	A	A	A	A	
29	A	A	B	B	B	B	A	B	A	B	B	B	B	S		D	S	F		F	B	B	A	A	A	A	
30	A	B	A	A	A	A	B	B	B	B		B	U	R	U	R	F	B	R	F	F	B	B	A	A	A	
31	A	B	F	A	B	B	B	F	F	B	B	B	69	80	95	70		R	U	R	F	B	B	B	A	A	
			27					43	49				74	79			99	70	74							60	
CNT	9	11	5	8	3	6	11	6	11	9	13	17	20	21	20	22	26	25	26	18	8	2	6	7			
MED	37	38	29	32	30	40	45	50	49	51	70	80	80	102	104	105	100	92	84	70	39	32	25	40			
U O	48	40	33	38	34	43	54	58	60	60	73	95	102	119	122	115	110	103	96	80	63		38	41			
L O	29	30	26	27	25	31	34	50	40	49	62	68	72	80	90	90	85	72	70	58	25		20	31			

IONOSPHERIC DATA STATION SHOWA ST.

MAY 1989 FES (0.1MHZ)

45°E MEAN TIME (G.M.T. + 3H)

LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	35	B	B	B	41	52	45	33	37	B	B	B	B	B	B	B	31	26	14	13	12	40	38	37					
2	41	42	B	31	33	40	B	B	B	B	B	B	B	B	B	B	55	25	20	B	22	40	47	39					
3	37	37	61	B	B	B	B	46	B	B	B	B	B	B	B	B	18	18	19	20	14	37	35	43					
4	45	43	35	32	B	B	B	B	58	B	B	B	B	B	B	B	55	30	60	22	22	30	20	40	37	56			
5	41	40	31	B	B	B	B	B	38	B	B	B	B	B	B	B	30	30	B	B	B	B	B	26	29				
6	71	32	34	29	27	32	31	B	B	B	B	B	B	B	B	B	B	B	55	34	B	B	B	B	B				
7	B	36	32	34	33	28	23	23	E	B	B	B	B	B	B	B	35	56	B	B	B	B	42	33	B				
8	40	B	29	39	44	31	39	30	E	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	31				
9	36	45	38	39	42	37	28	27	E	B	B	B	B	B	B	B	B	B	E	B	B	B	B	B	B				
10	24	37	36	26	37	40	B	B	E	B	B	B	B	B	B	B	B	B	E	B	B	B	B	B	26				
11	42	40	58	41	41	60	52	40	39	27	21	21	21	24	22	26	20	17	20	12	20	15	29	37					
12	43	39	21	30	28	30	27	B	47	B	37	32	E	B	B	B	B	B	B	B	B	B	41	32	45	37			
13	37	37	32	31	60	30	40	B	B	E	B	B	E	B	B	B	B	B	B	E	B	15	41	42	41				
14	41	38	42	37	35	36	31	22	36	B	25	23	E	B	B	B	B	B	B	B	B	28	37	31	31				
15	41	70	47	45	51	46	46	35	21	32	34	55	28	B	B	B	B	B	B	B	B	19	19	45	43				
16	90	67	38	45	44	38	40	37	36	35	17	30	B	E	B	B	B	B	B	B	B	12	13	20	22				
17	30	31	36	40	41	45	B	B	B	B	B	B	27	E	B	B	B	B	B	B	B	B	B	28	36				
18	38	28	27	32	37	41	51	45	B	21	24	24	E	B	B	B	B	B	E	B	B	B	30	38	B				
19	36	35	35	32	30	28	27	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	21	27					
20	28	32	40	45	42	41	46	41	35	B	E	B	B	B	B	B	B	B	B	B	B	B	31	37	37				
21	31	31	40	37	39	39	35	37	36	39	35	25	E	B	B	B	B	E	B	E	B	B	21	27	29				
22	36	39	60	50	41	45	45	47	B	20	28	27	E	B	B	B	E	B	E	B	B	B	25	24					
23	41	69	69	67	42	43	40	29	29	B	B	B	B	B	B	B	B	B	E	B	B	B	B	B	B				
24	70	23	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	40	40	51	B				
25	37	38	B	30	68	B	B	B	B	B	B	B	B	B	B	B	B	B	34	20	B	B	35	33	35				
26	B	B	47	43	B	B	B	B	40	B	B	B	B	29	25	20	20	17	20	28	26	35	B	38	41	40			
27	36	39	32	B	B	B	B	B	B	B	B	B	B	35	B	B	B	B	B	20	21	20	27	B	41				
28	46	24	41	B	B	B	B	51	B	B	17	23	23	28	B	B	B	B	30	19	25	27	41	70	40	49			
29	90	39	B	B	B	B	B	39	40	B	B	B	B	B	B	B	B	B	60	55	55	25	14	21	32	42	31		
30	40	B	41	41	41	39	B	B	B	B	B	25	B	E	B	B	B	B	B	B	B	B	B	B	32	40			
31	40	B	58	68	B	B	B	40	27	B	B	B	B	E	B	B	B	B	B	B	B	B	B	B	40	66			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
CNT	29	26	26	24	22	21	21	16	18	10	14	19	22	23	22	23	26	27	27	24	17	19	25	26					
MED	40	38	38	38	41	39	39	37	36	21	22	E	B	B	B	B	B	B	B	B	B	22	22	21	20	22	37	37	37
UO	42	40	47	44	42	44	45	43	39	32	34	34	35	35	36	50	30	26	27	28	40	40	42	41					
LO	36	32	32	32	35	32	31	30	E	B	B	E	B	B	B	B	E	B	B	B	B	B	B	B	28	29			

IONOSPHERIC DATA STATION SHOWA ST.  
 MAY 1989 FMIN (0.1MHZ) 45° E MEAN TIME (G.M.T. + 3H)  
 LAT.69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	12	B	B	B	23	27	19	19	13	B	B	35	24	24	24	21	13	10	14	13	12	10	9	19
2	10	14	B	19	23	20	B	B	B	B	B	B	B	B	B	B	55	25	20	B	14	20	18	20
3	15	10	25	B	B	B	20	19	B	B	B	35	55	55	24	34	18	18	19	20	14	10	10	12
4	12	14	22	18	B	B	B	B	21	B	B	B	B	55	30	60	22	22	30	20	15	B	19	20
5	21	20	22	B	B	B	B	B	30	B	B	B	B	B	B	B	30	30	B	B	B	B	19	20
6	21	24	20	23	22	21	18	B	B	B	B	B	B	B	B	B	B	B	55	34	B	B	B	B
7	B	24	20	23	23	19	20	23	22	B	B	B	B	B	B	35	56	B	B	B	B	25	20	B
8	21	B	19	24	20	24	20	18	18	21	B	34	30	34	30	24	25	25	20	18	B	B	B	13
9	13	20	12	13	15	20	15	10	15	14	20	B	55	18	14	13	13	19	11	10	20	B	B	B
10	10	10	10	13	13	22	B	B	13	21	23	19	19	18	16	13	9	9	19	20	13	B	B	14
11	14	13	20	15	23	14	15	21	21	14	14	21	14	24	22	15	13	17	20	9	20	15	12	10
12	10	15	19	13	13	10	10	B	20	B	20	24	35	35	30	50	26	20	13	10	9	9	10	21
13	13	10	10	10	19	15	10	B	B	20	15	21	22	22	20	9	11	13	10	12	10	9	10	10
14	13	11	15	14	10	10	12	9	14	B	25	23	18	21	20	12	18	13	13	21	9	12	10	9
15	10	13	11	14	13	15	13	13	9	18	34	55	28	B	B	55	22	20	27	40	19	19	15	10
16	8	9	10	13	13	16	17	15	13	15	17	30	B	59	55	55	20	21	19	23	12	13	11	10
17	10	10	10	10	15	14	B	B	B	B	B	19	21	20	36	23	20	25	18	19	B	B	10	10
18	9	9	10	9	10	15	10	20	B	15	13	20	20	20	15	13	13	11	11	30	B	16	10	B
19	10	10	9	9	9	9	10	B	B	B	B	56	50	28	50	60	34	35	35	20	22	B	10	9
20	9	9	14	12	24	18	15	11	24	B	35	30	28	28	19	B	B	B	40	11	B	9	10	13
21	13	10	9	9	10	10	10	9	9	9	10	15	35	23	25	15	18	12	30	20	B	13	9	9
22	10	9	12	9	13	15	16	14	B	19	15	14	30	30	14	15	10	24	15	14	B	B	14	13
23	15	13	12	14	15	18	13	13	11	B	B	34	20	20	13	12	13	25	14	B	21	20	B	24
24	34	19	B	B	B	B	19	B	B	B	B	B	B	B	B	B	B	B	22	21	55	20	13	B
25	18	20	B	20	23	B	B	B	B	B	B	B	B	B	B	B	34	20	B	B	B	24	14	20
26	B	B	20	18	B	B	B	B	24	B	B	29	25	20	14	13	14	13	19	13	B	14	15	21
27	20	15	20	B	B	B	24	B	B	B	B	B	35	B	B	B	B	20	21	20	10	B	B	15
28	15	13	20	B	B	B	B	20	B	B	14	23	23	28	B	B	30	19	18	15	13	15	15	13
29	20	30	B	B	B	B	18	B	20	B	B	B	60	55	55	25	14	13	B	B	10	14	20	
30	23	B	15	25	24	15	B	B	B	B	17	B	54	35	17	25	B	55	13	17	B	B	10	10
31	10	B	13	15	B	B	B	13	13	B	B	B	30	20	36	30	29	20	B	B	B	B	12	10
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	13	14	19	15	23	20	19	23	24	B	B	35	35	30	30	34	22	20	19	20	22	20	14	14
U O	20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	34	25	30	40	B	B	B
L O	10	10	11	13	13	15	13	14	14	20	17	23	23	21	19	15	13	14	14	14	13	13	10	10

IONOSPHERIC DATA STATION SHOWA ST.

MAY 1989 H'F (KM)

45° E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	B	B	B	A	A	A	A	E A 360	B	B	250	245	240	230	220	205	210	200	230	255	A	A	A	
2	A	A	B	A	A	A	B	B	B	B	B	B	B	B	B	B	280	270	260	B	A	A	A	A	
3	A	A	A	B	B	B	A	A	B	B	B	250	E B 350	E B 300	250	240	245	225	200	225	220	A	A	A	
4	A	A	A	A	B	B	B	B	A	B	B	B	B	E B 300	E B 240	E B 300	250	230	245	245	A	B	A	A	
5	A	A	A	B	B	B	B	B	A	B	B	B	B	B	B	B	255	275	B	B	B	B	A	A	
6	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	E B 270	E B 250	B	B	B	B	B	
7	E A 300	A	A	A	A	A	E A 365	E A 350	E B 300	B	B	B	B	B	B	B	E B 280	E B 330	B	B	B	B	A	A	B
8	A	B	E A 390	A	A	A	A	A	E B 325	270	B	240	245	230	220	225	215	230	230	240	B	B	B	A	
9	A	A	A	A	A	A	A	E A 350	E B 300	225	250	B	E B 250	210	205	200	200	220	200	200	230	B	B	B	
10	A	A	E A 250	E A 300	A	A	B	B	280	260	240	225	220	225	205	220	210	205	240	220	210	B	B	A	
11	A	245	245	A	A	A	A	A	A	275	240	240	245	220	230	215	215	225	230	205	230	240	A	A	A
12	A	A	A	A	A	A	A	B	A	B	A	A	290	260	260	280	240	260	225	255	A	A	A	A	
13	275	A	245	A	A	A	A	B	B	280	220	225	225	215	220	220	210	200	210	220	270	A	A	A	
14	E A 260	260	A	A	A	A	A	A	A	B	300	230	230	210	210	220	225	240	220	230	265	E B	A	A	
15	A	250	A	A	A	A	A	A	E A 310	E A 350	E A 290	E B 280	245	B	B	E B 255	240	250	245	250	215	325	A	A	
16	A	A	A	A	A	A	A	E A 400	A	330	250	230	B	E B 255	E B 240	E B 250	225	230	220	240	210	E B 280	E B 325	E B 325	
17	A	A	A	A	A	A	B	B	B	B	B	260	250	250	240	225	230	230	210	240	B	B	A	A	
18	275	E A 305	E A 325	A	A	A	A	A	B	E A 300	240	210	220	240	210	205	200	230	210	230	B	A	E A 350	B	
19	A	E A 270	A	A	A	A	E A 360	B	B	B	B	E B 280	250	230	260	280	230	225	230	225	250	B	A	A	
20	260	E A 330	A	A	A	A	A	A	E A 360	B	E B 270	250	250	250	255	B	B	B	240	240	B	A	A	A	
21	A	A	A	A	270	A	A	A	330	280	245	250	280	255	230	240	240	220	225	245	B	E A 325	A	A	
22	A	A	275	245	A	A	A	A	B	E B 340	275	230	205	225	225	220	230	205	210	270	E A 270	B	B	E A 340	
23	A	A	A	A	A	A	A	E A 350	E A 350	B	B	B	260	225	210	210	180	230	270	255	B	A	A	E B 390	
24	A	E A 260	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	E A 310	A	A	A	E A 380	B	
25	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	280	290	B	B	B	A	A	A	
26	B	B	A	A	B	B	B	B	A	B	B	240	230	205	205	225	210	210	250	310	E A 310	B	A	A	A
27	A	A	A	B	B	B	A	B	B	B	B	B	E B 325	B	B	B	B	250	225	250	A	B	B	A	
28	A	275	A	B	B	B	B	A	B	B	220	245	240	240	B	B	220	250	240	325	E A 325	A	A	A	A
29	A	A	B	B	B	B	A	B	A	B	B	B	B	E B 300	E B 280	E B 275	260	250	260	B	B	A	A	A	
30	A	B	A	A	A	A	B	B	B	E A 300	B	E B 325	E B 250	E B 210	E B 240	E B	B	E B	270	215	250	B	B	A	A
31	A	B	E A 265	A	B	B	B	A	E A 325	B	B	B	250	220	225	210	E B 245	250	B	B	B	B	A	230	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	5	9	6	2	2		2	4	10	10	13	18	22	23	22	23	26	27	27	23	10	4	4	3	
MED	260	E A 270	E A 270	272	305		E A 362	E A 350	E A 325	272	245	241	238	230	224	220	229	230	228	235	230	E 302	E A 345	E A 325	
U 0	275	E A 302	E A 325				E A 375	E A 350	E A 330	282	250	250	255	240	255	245	250	245	250	255	255	E 325	E A 365	E B 390	
L 0	A	252	255	250			E A 350	E A 300	E B 270	240	230	230	220	210	220	215	220	210	225	215	260	E 332	230		

IONOSPHERIC DATA STATION SHOWA ST.  
 JUN. 1989 FXI (0.1MHZ) 45° E MEAN TIME (G.M.T. + 3H)  
 LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	A	B	A	A	B	A	B	B	B	61		B	X	X	X	X	X	S	S	A	A	A	A
2		A	B	B	B	B	A	A			B	B	B	B	B	B	86	66	S	B	A	A	A	A
3	41	B	A	A	B	A	A	A	A	B	B						101	96			A	A	A	A
4		A	A	A	A	B	B	B	A	B	B	B		X	X		96	76	61	65		A	A	A
5		A	A	A	A	A	A	A		X			55	65	74	76	75	61	56	44	30	27		S
6		A	A	A	A	A	A	A		45	51	67	72	87	96	86	90	75	56	55	45	41	B	B
7		A	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12		C	C	C	C	C	C	C	C	C	C	B	B	B	X	B	R	B	B	R	B	B	B	A
13	A	X	A	A	A	A	A	A	A	B	B	B	X	X	X	X	X	S	X	B	B	B	B	A
14		A	A	A	A	A		A	B	A	A	B	B	B	B		S		A	A	A	X	A	A
15		A	A	B	A	A	B	B	A	B		B	B			90		96		A	X	A	A	A
16		A	A	B	A	A		A	B	B	B	A	B		S	B		X	X		B	B	B	A
17	S		A			43				X	X	X		X	X	X	105	96	76	61				
18		A	A	A	A	A	X			X	X	X	100	116	112	106	80		71	50	38	27	27	26
19	B	42					52	60	71	58	70		86	110	111	116	104	96	91	75	65	34	B	B
20		A	A	A	A	A	A	A					80	75	105	110	110	105	110	80	39			
21		A	A	A	A	A			69	61	70	65	93	92			96	90		A	46	60	55	50
22		A	A	A	A	A							86	96	110	96	70	66	52	33	29	27		A
23		A	A	A	A								81	100	101	116	106	86	73	53	33	26		
24		A	A	A	A	X							X	X	X	X	X	X						
25		A	A	A	X	X							X	S	X	X	X	S	B	B	B	B	B	A
26		A	S	A	A	A	X	X		B	X	X	R		X		X	R	R		B	A	A	A
27		A	B	A	A	A	A	A	B	B	X		80	90	111	96	96		45	S	B	B	B	A
28		A	A	A	A	B	B	A	A	A	B	B	X	86	100	100	86	86	84	52		B	B	B
29		A	X	A	A	A	A	B	A	B	B	B	B	76	90			S	R	A	B	A	A	A
30		A	A	A	A	A	B	A	B	B	B	B	A	B	B	B	X		B	B	B	B	B	B
31																	68	70						
CNT	2	6	4	5	4	7	9	8	10	10	13	12	18	18	16	21	21	16	14	13	8	5	3	2
MED	33	40	32	33	44	40	45	52	48	52	61	70	80	96	110	101	96	85	71	46	34	27	27	27
U O		46	38	46	57	43	54	61	61	58	68	76	87	101	112	110	106	96	76	61	40	50	50	
L O		28	28	29	31	38	39	42	37	45	54	66	76	90	100	90	78	66	55	38	28	26	21	

IONOSPHERIC DATA STATION SHOWA ST.

JUN. 1989 FOF2 (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)  
 LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	A	A	B	A	A	B	A	B	B	B	F	B	U	R	D	R	U	R	D	S	S	S	A	A	A	A	
2	F	A	B	B	B	B	A	A	F	F	B	B	B	B	B	U	R	S	B	A	A	A	A	A	A		
3	B	A	A	B	A	A	A	A	B	B	F	F	F	F	F	F	70	55	55	A	A	A	A	A	A		
4	A	A	A	A	B	B	B	A	B	B	B	F	F	F	F	F	55	50	34	24	21	A	A	S			
5	A	A	A	A	A	A	A	A	F	F	F	F	D	S	F	F	F	F	F	F	F	F	B	B	A		
6	A	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		
12	C	C	C	C	C	C	C	C	C	C	B	B	B	80	B	R	B	B	R	B	B	B	B	B	A		
13	A	A	A	A	A	A	A	A	A	B	B	B	70	80	105	80	92	S	R	B	B	B	B	B	A		
14	A	A	A	A	A	A	F	A	B	A	A	B	B	B	B	F	S	F	A	A	A	A	A	A	A		
15	A	A	B	A	A	B	B	B	A	B	F	B	B	F	F	115	110	F	A	A	A	A	A	A	A		
16	A	A	B	A	A	F	A	B	B	B	A	B	F	S	B	F	99	109	90	70	55	B	B	B	A		
17	S	F	A	F	F	F	F	F	F	J	S	F	U	R	U	R	F	S	F	F	F	F	F	F	F		
18	A	F	A	A	A	A	46	54	65	48	64	80	107	105	110	98	90	85	65	50	28	B	A	A	A		
19	B	F	F	F	F	F	F	F	B	B	F	F	F	F	F	F	F	104	74	33	B	A	A	A	A		
20	A	A	F	A	A	A	A	A	F	F	F	F	F	B	B	B	90	80	F	A	F	F	F	F	A		
21	A	A	A	A	A	A	F	F	F	F	F	F	U	R	U	R	F	F	F	F	F	F	F	B	A		
22	E	G	S	F	S	H	35	41	45	44	56	65	80	90	104	90	64	60	40	27	23	21	F	F	F		
23	A	F	F	F	A	A	F	F	F	F	F	B	F	F	F	R	75	70	65	32	20	15	17	A	A		
24	A	A	A	A	F	F	F	F	F	F	F	F	75	90	95	110	100	80	67	44	27	20	A	A	A		
25	A	A	A	R	F	A	A	A	B	B	F	60	74	S	94	98	100	U	R	S	B	B	B	B	A		
26	A	S	A	A	A	U	R	U	F	B	U	S	R	F	F	F	F	R	R	R	F	B	A	A	A		
27	A	B	A	A	A	A	A	A	B	B	U	S	F	70	80	105	90	90	U	R	F	F	S	B	B	B	A
28	A	A	A	A	B	B	A	A	A	B	B	B	70	80	F	B	B	F	F	F	55	B	B	B	B		
29	A	A	A	A	A	A	B	A	B	B	B	B	B	B	B	F	S	R	A	B	A	A	A	A	A		
30	A	A	A	A	A	B	A	B	B	B	B	A	B	B	B	U	R	F	B	B	B	B	B	B	B	B	
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	2	6	4	5	3	7	8	7	10	10	13	12	18	18	16	20	21	16	14	13	8	5	3	2	F		
MED	27	34	26	27	29	33	35	43	42	44	55	64	74	90	104	96	90	80	65	40	28	21	20	18	F		
U O		40	30	40	48	35	44	54	55	48	60	67	81	95	106	100	100	90	70	52	32	44	41	F			
L O		18	22	22	21	30	32	30	31	37	46	60	70	80	94	86	70	60	49	32	22	20	15	F			

IONOSPHERIC DATA STATION SHOWA ST.

JUN. 1989 FES (0.1MHZ) 45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H	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	58	44	B	38	45	B	37	B	B	B	E B	B	E B	B	E B	B	E B	B	E B	B	E B	B	E B	B				
2	60	50	B	B	B	B	41	41	37	37	B	B	B	B	B	E B	B	E B	B	B	B	28	29	38	42	44		
3	B	80	36	B	42	40	72	31	B	B	E B	E B	E B	B	E B	B	E B	B	E B	B	E B	B	E B	B	40			
4	42	52	60	26	B	B	B	B	B	B	E B	B	E B	B	E B	B	B	E B	B	E B	B	E B	B	E B	B			
5	45	40	60	37	41	32	38	35	28	E B	13	16	21	53	26	25	40	35	27	17	E B	10	17	B	B	33		
6	37	71	41	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
12	C	C	C	C	C	C	C	C	C	C	B	B	B	E B	B	E B	B	B	E B	B	B	B	B	B	B	57		
13	33	31	45	42	70	45	42	45	40	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	B	B	B	B	90			
14	40	47	40	36	40	37	40	32	B	61	38	B	B	B	B	E B	B	E B	B	30	20	35	40	70	70	31	42	
15	51	70	B	81	80	B	B	B	41	B	36	B	B	E B	E B	E B	E B	E B	E B	B	50	19	38	51	50	70	35	32
16	37	70	B	36	41	37	85	B	B	B	47	B	E B	E B	E B	B	E B	E B	E B	E B	B	B	B	B	B	25		
17	26	29	38	15	36	24	12	11	11	26	16	36	31	26	26	E B	13	26	35	32	32	31	13	20	26	B		
18	31	31	54	40	38	43	31	17	E B	11	20	20	31	28	19	27	26	26	E B	E B	E B	E B	E B	B	B	B		
19	B	E B	21	23	22	16	19	11	13	19	B	B	E B	E B	E B	E B	E B	E B	E B	E B	B	B	B	B	B	31	42	69
20	45	41	45	37	107	42	42	47	34	27	E B	18	20	E B	19	20	B	B	28	37	41	31	35	37	40	55		
21	47	46	41	31	36	41	31	23	18	14	13	16	20	19	18	18	40	13	15	19	E B	17	14	B	15	B		
22	15	16	16	21	E B	20	22	13	13	10	18	20	15	19	23	13	32	59	E B	E B	E B	E B	E B	E B	E B	13	13	
23	30	29	65	39	57	36	29	38	40	26	22	E B	B	E B	E B	E B	E B	E B	E B	E B	B	E B	E B	E B	E B	35		
24	31	45	37	41	41	36	27	25	16	22	17	27	23	40	27	13	13	30	35	B	B	40	28	28	27	B		
25	60	47	41	36	41	40	55	42	62	B	B	27	30	35	40	27	21	32	B	B	B	B	B	B	B	27		
26	30	43	46	46	39	48	30	40	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	B	41	38	28	B		
27	39	B	42	42	42	59	47	41	B	E B	E B	25	32	24	22	39	15	35	17	25	20	B	B	B	32	B		
28	37	57	42	37	B	B	42	45	45	B	B	B	E B	E B	E B	B	B	27	E B	E B	E B	B	B	B	B	B		
29	42	37	41	70	43	26	B	42	B	B	B	B	B	B	B	B	22	25	35	28	B	32	34	37	37			
30	46	39	66	26	41	B	36	B	B	B	B	40	B	B	B	E B	E B	E B	B	B	B	B	B	B	B	B		
31																												
CNT	22	23	20	21	20	17	20	19	14	11	15	14	18	20	16	22	23	22	21	18	15	14	14	21				
MED	40	44	42	37	41	37	38	38	31	22	E B	U	E B	E B	E B	E B	E B	E B	E B	E B	27	32	35	35				
U O	46	52	50	42	44	42	42	42	40	27	30	35	39	32	27	40	35	35	35	31	35	41	40	44				
L O	31	31	39	28	38	29	30	23	16	E B	18	17	21	21	20	20	20	22	19	15	14	14	16	28	27			



IONOSPHERIC DATA STATION SHOWA ST.

JUN. 1989 FMIN (0.1MHZ)

45°E MEAN TIME (G.M.T. + 3H)

LAT. 69°00.4'S LON. 39°35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H D	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	10	20	B	20	20	B	19	B	B	B	18	B	21	21	30	30	25	23	24	20	13	10	9	10	
2	10	9	B	B	B	B	30	15	13	14	B	B	B	B	B	55	35	57	B	10	9	9	19	10	
3	B	15	11	B	19	20	19	20	B	B	18	39	25	16	21	20	25	30	14	9	9	9	14	10	
4	9	10	10	13	B	B	B	20	B	B	B	25	20	20	20	19	13	13	10	9	14	9	8	10	
5	9	10	20	16	30	21	20	12	10	13	10	10	15	13	15	10	20	13	10	10	11	B	B	9	
6	10	19	20	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
12	C	C	C	C	C	C	C	C	C	C	B	B	B	60	B	55	B	B	B	B	B	B	B	B	10
13	10	9	20	13	15	20	20	19	15	B	B	B	21	30	20	22	30	55	25	B	B	B	B	10	
14	10	15	13	13	15	20	13	16	B	20	19	B	B	B	B	55	30	12	10	10	13	18	13	15	
15	10	21	B	45	15	B	B	B	19	B	19	B	B	35	20	56	50	19	10	15	12	13	20	10	
16	10	14	B	20	14	13	24	B	B	B	24	B	55	55	B	35	20	22	30	30	B	B	B	9	
17	9	10	10	9	9	10	9	9	9	10	10	13	15	14	13	13	10	9	10	14	10	10	9	9	
18	9	10	10	10	13	15	12	10	11	10	11	10	13	19	14	13	13	13	15	19	14	B	B	B	
19	B	21	13	10	10	19	11	13	19	B	B	30	39	20	21	20	20	35	15	20	B	10	9	19	
20	15	10	15	10	20	14	19	13	13	19	18	13	19	20	B	B	20	14	10	10	10	10	10	9	
21	9	10	24	20	21	15	10	10	18	14	13	10	20	19	18	18	14	13	15	19	10	14	B	9	
22	10	10	12	14	20	11	13	13	10	10	20	15	19	23	13	11	14	20	20	12	13	B	13	9	
23	18	9	9	10	9	30	13	10	10	10	22	B	40	23	15	25	18	14	14	9	9	14	15	13	
24	10	10	15	10	10	10	10	9	10	10	9	10	13	40	20	13	13	30	35	B	10	10	10	9	
25	23	15	13	15	13	9	20	24	20	B	B	21	30	35	40	16	21	32	B	B	B	B	B	11	
26	20	21	15	11	10	12	10	10	B	20	30	35	22	10	20	25	24	35	55	18	B	9	8	8	
27	9	B	19	22	20	24	19	19	B	B	25	14	18	14	12	15	35	17	13	20	B	B	B	9	
28	10	15	13	10	B	B	15	20	14	B	B	B	40	20	B	B	15	20	13	14	B	B	B	B	
29	15	10	13	20	14	15	B	23	B	B	B	B	B	B	B	22	25	35	18	B	10	10	10	12	
30	11	14	15	19	24	B	19	B	B	B	B	20	B	B	B	55	24	B	B	B	B	B	B	B	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	24	24	24	23	23	23	23	23	23	23	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
MED	10	12	15	14	15	20	19	16	19	B	23	32	24	22	20	22	20	21	15	18	13	14	17	10	
UO	15	17	B	20	20	21	B	20	23	B	B	B	B	48	B	55	28	35	32	B	B	B	B	12	
LO	10	10	12	10	13	13	12	10	11	13	18	14	19	19	16	16	14	14	12	10	10	10	10	9	

IONOSPHERIC DATA STATION SHOWA ST.

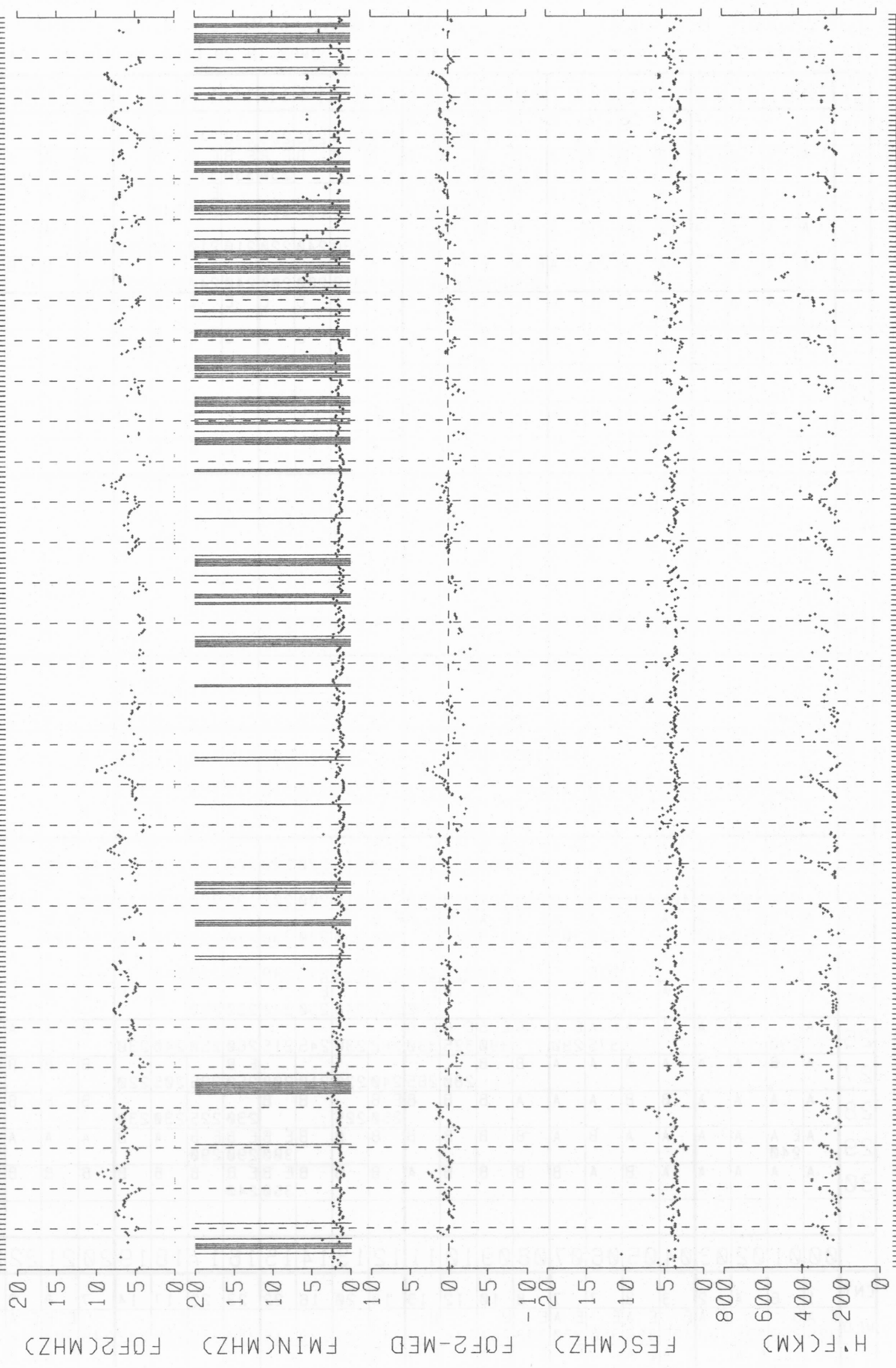
JUN. 1989 H'F (KM)

45°E MEAN TIME (G.M.T. + 3H)

LAT. 69° 00.4'S LON. 39° 35.4'E SWEEP 0.4MHZ TO 15.0MHZ IN 20.0SEC IN MANUAL SCALING

H/D	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	A	A	B	A	A	B	A	B	B	B		B										A	A	A	A
2	A	A	B	B	B	B	A	A	Q	Q	B	B	B	B	B	E	E	E	E	B	B	A	A	A	A
3	B	A	A	B	A	A	A	A	B	B		E	B							E	B		A	A	A
4	A	A	A	A	B	B	B	A	B	B	B												A	A	E
5	A	A	A	A	A	A	A	A	E	A														B	B
6	A	A	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
11	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
12	C	C	C	C	C	C	C	C	C	C	B	B	B	E	B	B	B	B	E	B	B	B	B	B	A
13	A	A	A	A	A	A	A	A	A	B	B	B							E	B	E	B	B	B	A
14	A	A	A	A	A	A	Q	A	B	A	A	B	B	B	B	Q						A	A	A	A
15	A	A	B	A	A	B	B	A	B	A	B	B	B	E	B	B	E	B	E	B		A	A	A	A
16	A	A	B	A	A	A	A	B	B	B	A	B	E	B	E	B	B					B	B	B	A
17	E	A	E	A	A	E	A	E	A	E	A	E	A										E	A	Q
18	A	A	A	A	A	A	A	E	A	E	B												B	B	B
19	B	250	300		A	Q	E	B	E	B	E	B	B	E	B							E	B	A	
20	A	A	230	A	A	A	A	A	A													A	A	A	A
21	A	A	A	A	A	A	A	E	A	E	B	E	B	B								E	B	B	A
22	A	E	A	E	A	E	A	E	B	E	B												E	B	E
23	A	Q	E	A	E	A	A	E	A	E	A	E	B	B	E	B							E	B	A
24	A	A	A	A	A	B		A	A														A	A	A
25	A	A	A	A	A	A	A	A	A	B	B	B	B	B	E	A	E	B				B	B	B	A
26	A	290	A	A	A	A	E	A	E	A	B	E	B	E	B	E	B					B	A	A	A
27	A	B	A	A	A	A	A	A	B	B													B	B	B
28	A	A	A	A	B	B	A	A	A	B	B	B	E	B									B	B	B
29	A	E	A	A	A	A	B	A	B	B	B	B	B	B	B	B	E	B	E	B	E	B	A	B	A
30	A	A	A	A	A	B	A	B	B	B	B	A	B	B	B	E	B	E	B	B	B	B	B	B	B
31																									
CNT	1	6	4	2	3	3	7	7	8	10	12	13	18	20	16	22	23	22	17	14	7	3	3	3	
MED	E	A	U	E	A	E	E	A	E	U	U											E	B	E	A
U Q		350	375		440	400	375	340	368	300	278	268	280	252	245	250	260	255	240	250	250	320	340	300	
L Q		250	265		375	390	320	305	300	250	240	222	240	220	212	200	220	225	218	230	230	240	270	290	

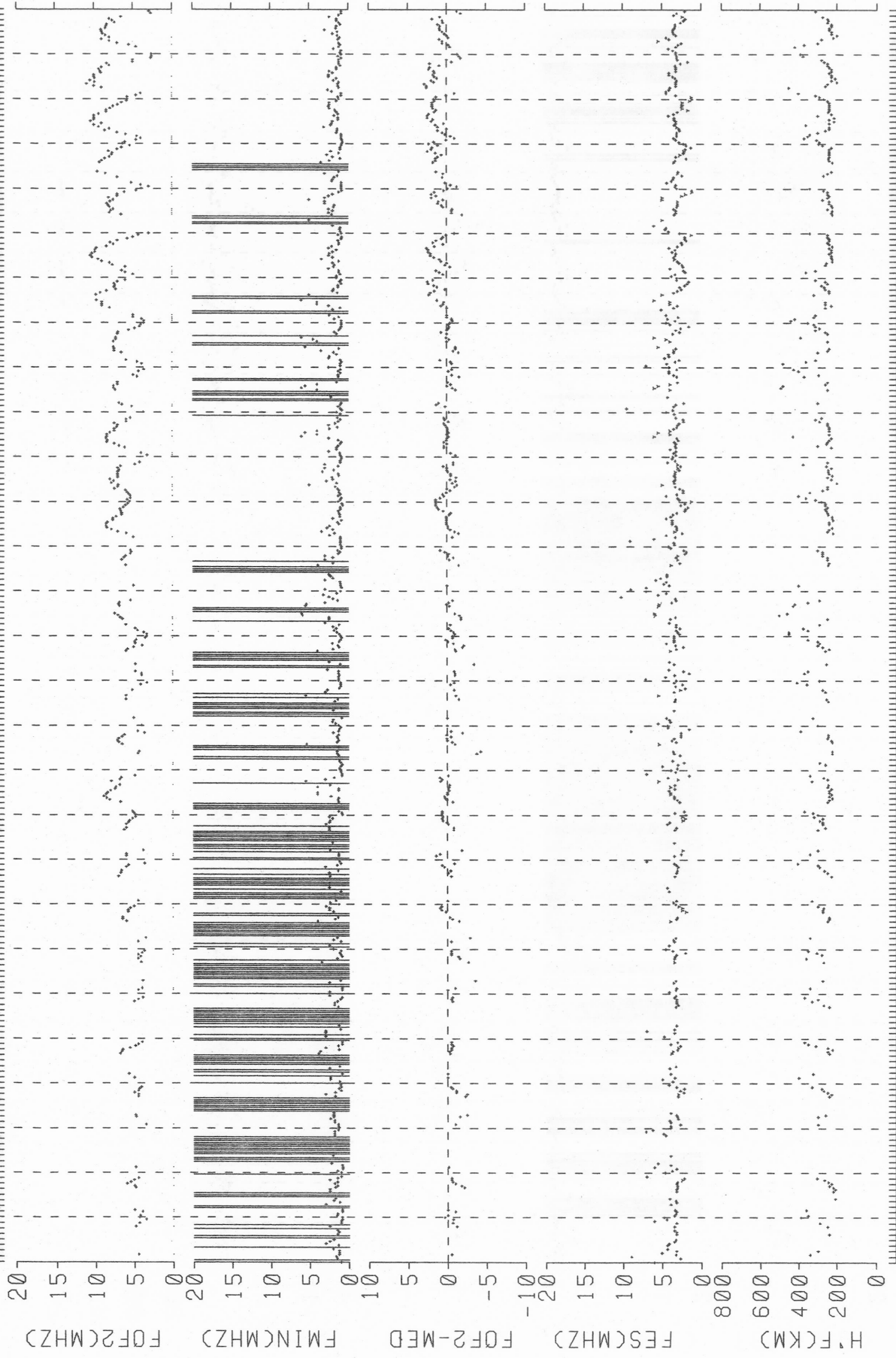
19890101 -> 19890131 SHOWA ST.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DAY

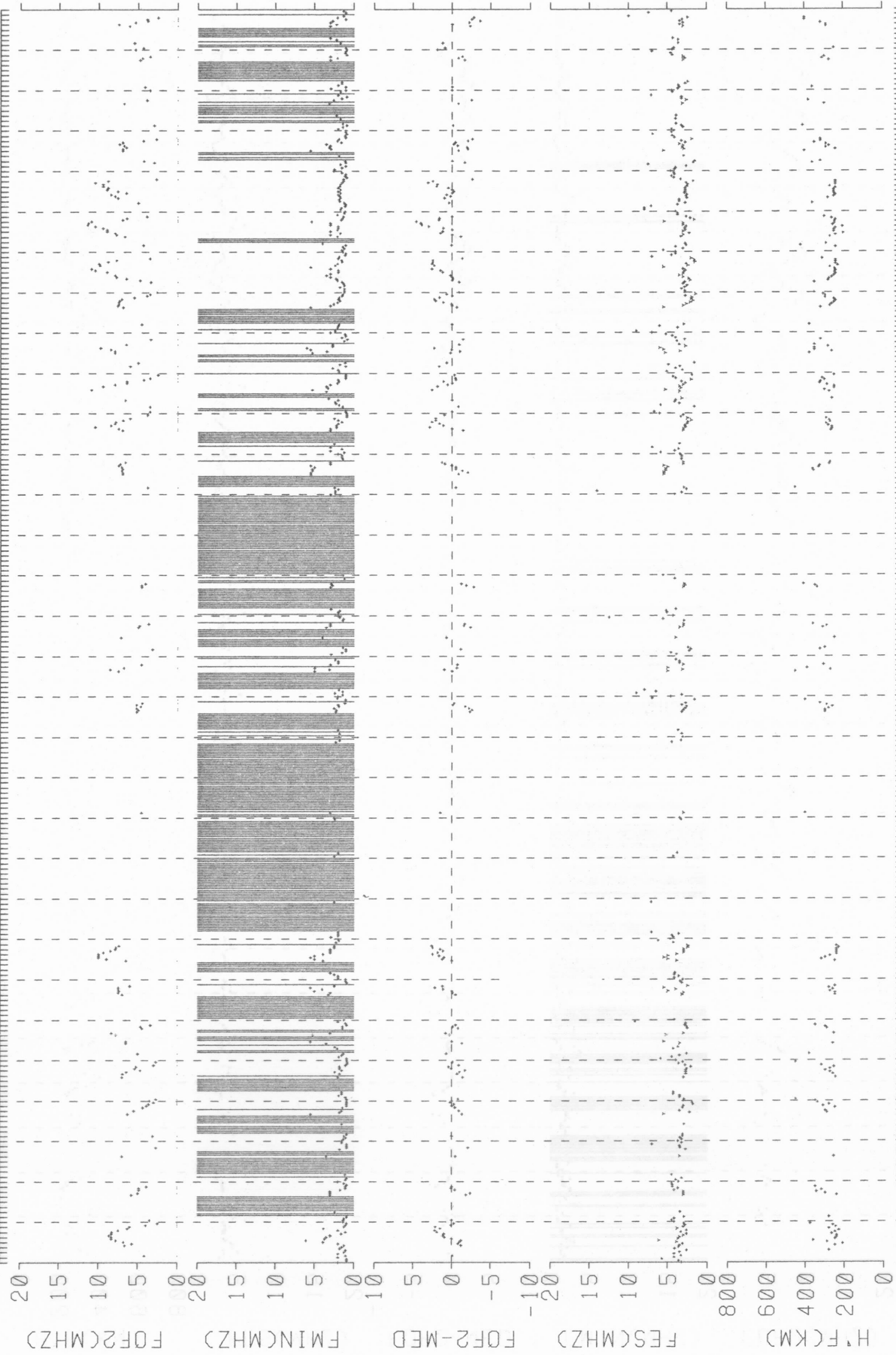
19890201 -> 19890228

SHOWA ST.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 DAY

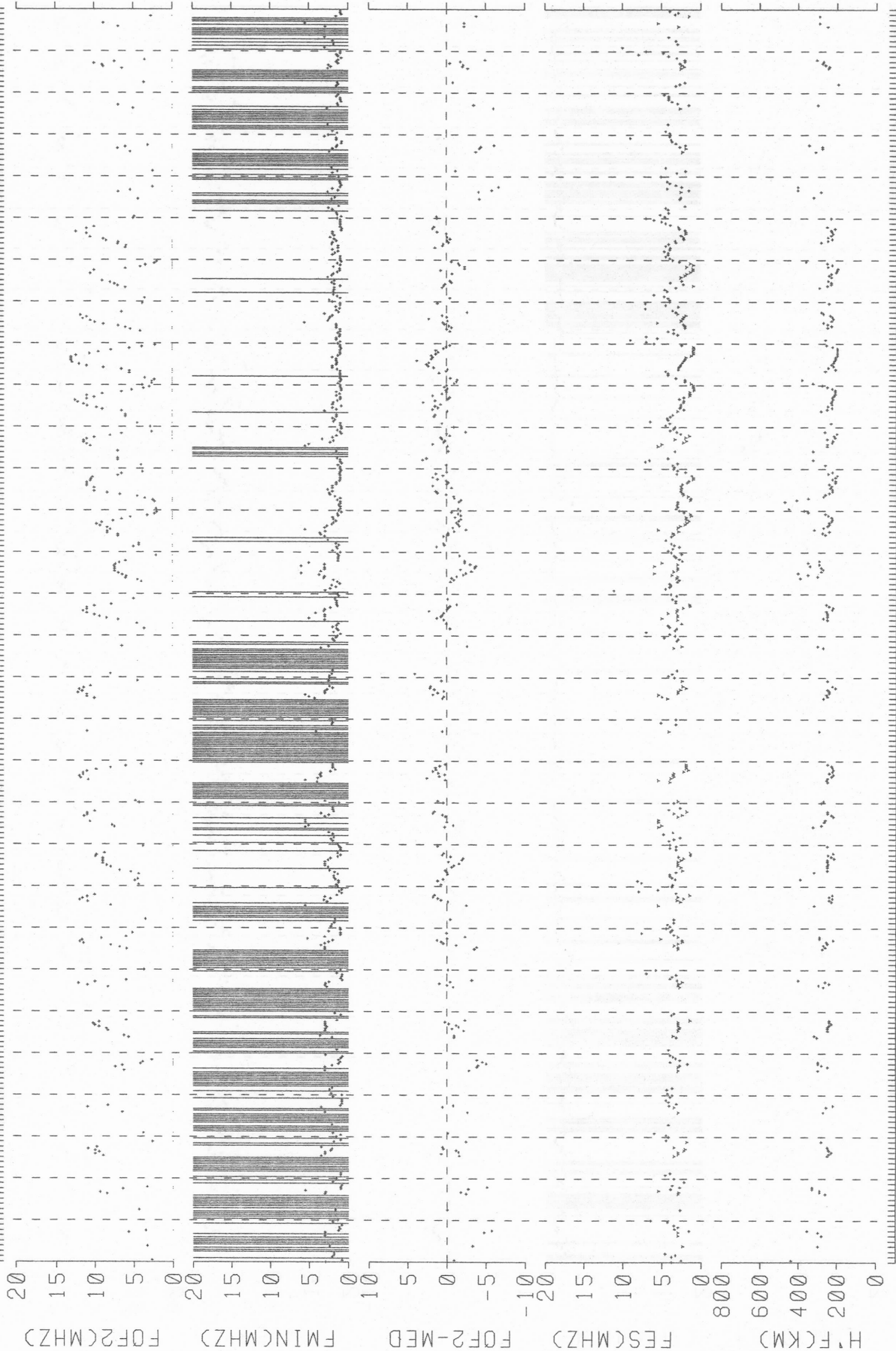
19890301 -> 19890331 SHOWA ST.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DAY

19890401 -> 19890430

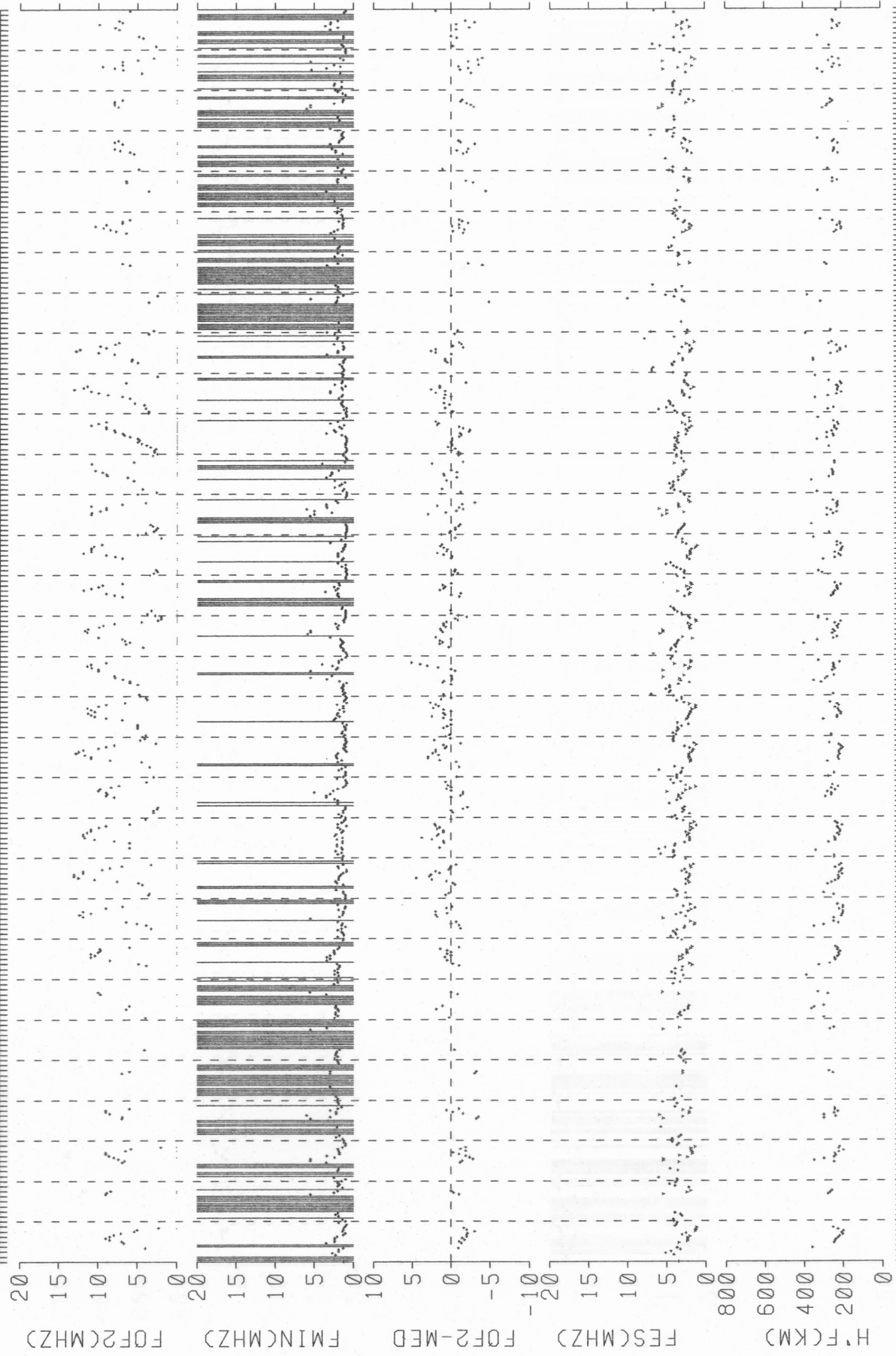
SHOWA ST.



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 DAY

SHOWA ST.

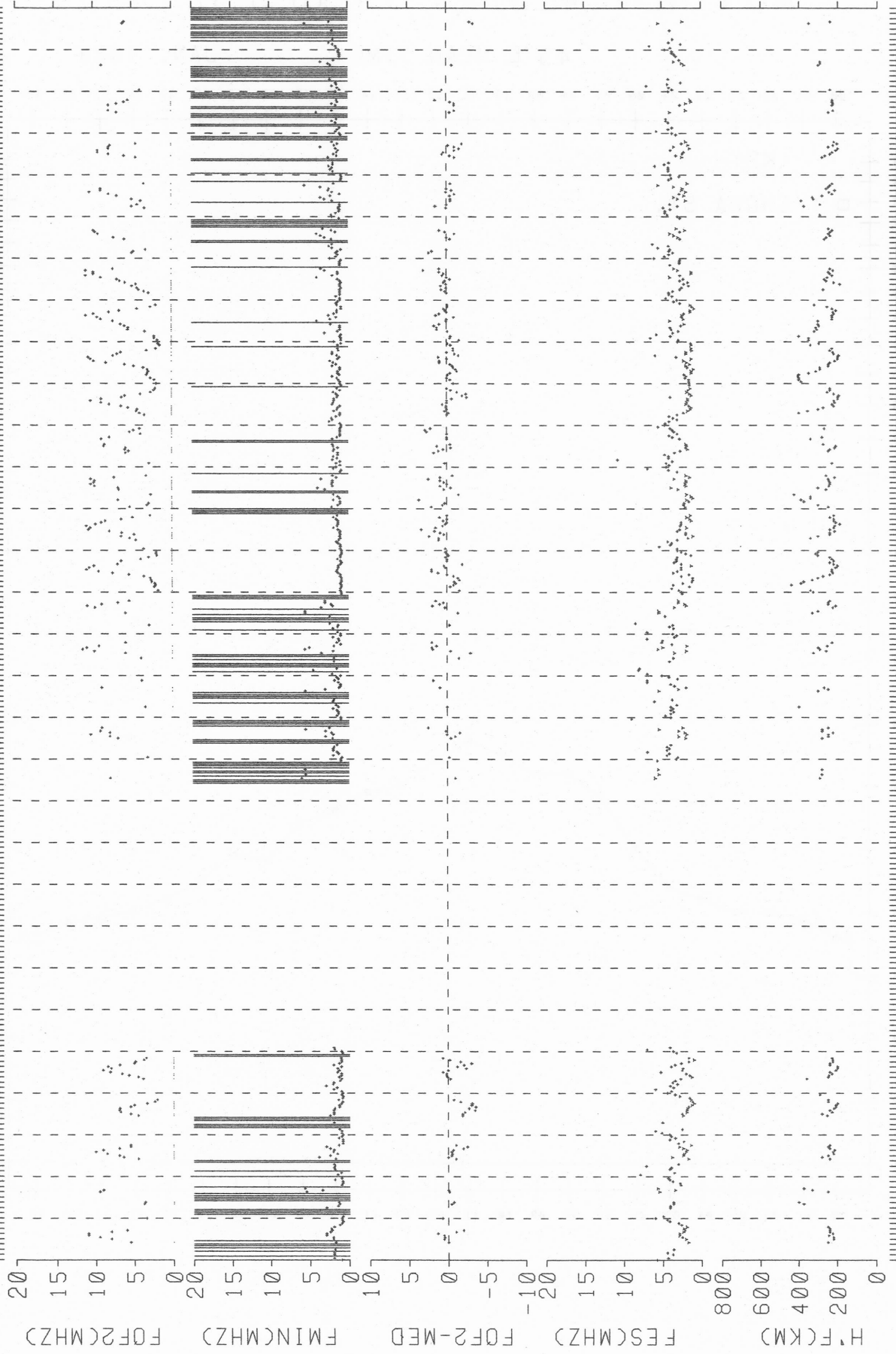
19890501 -> 19890531



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DAY

19890601 -> 19890630

SHOWA ST.

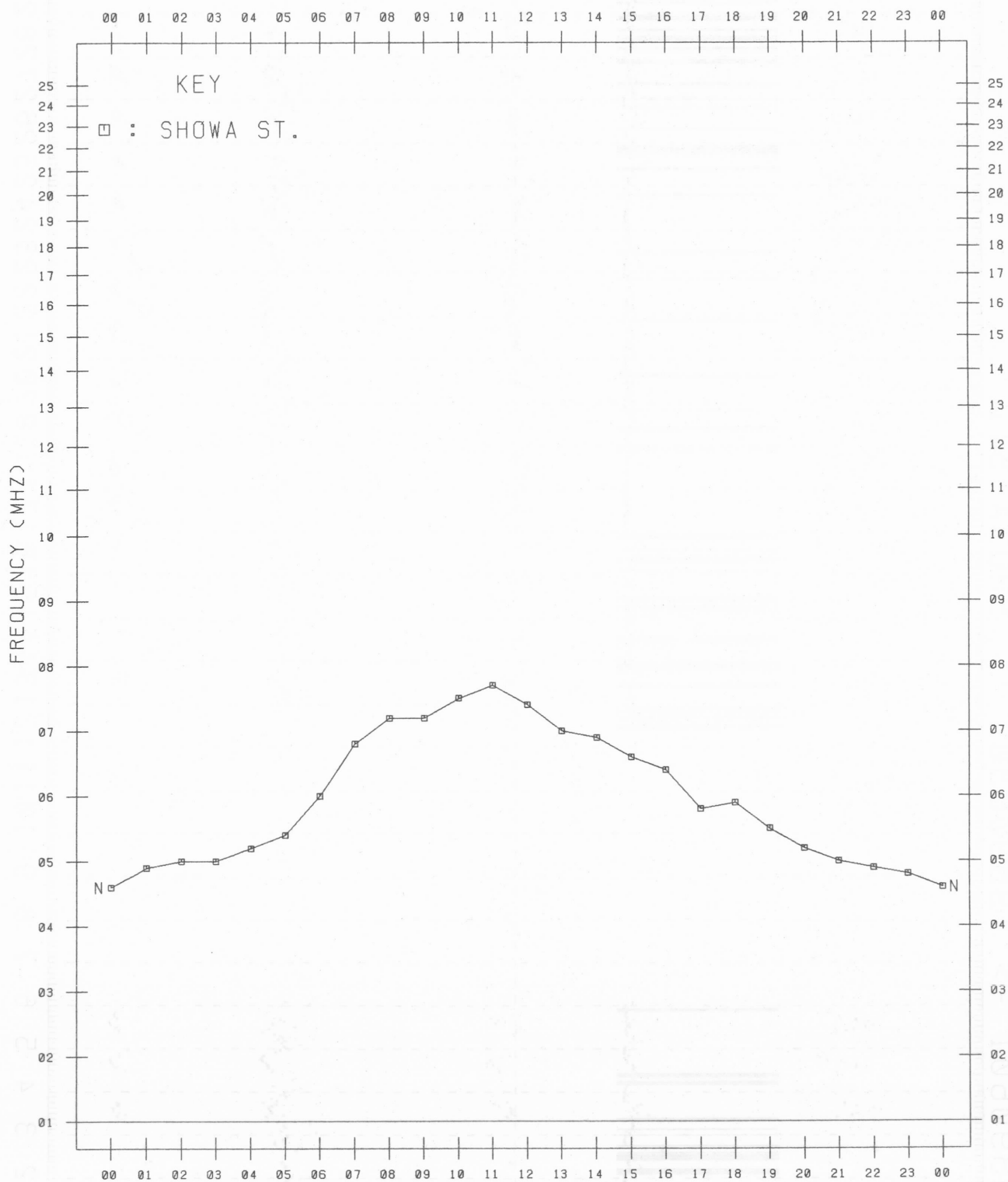




# MONTHLY MEDIAN VALUES OF F<sub>0</sub>F<sub>2</sub>

45°E MEAN TIME

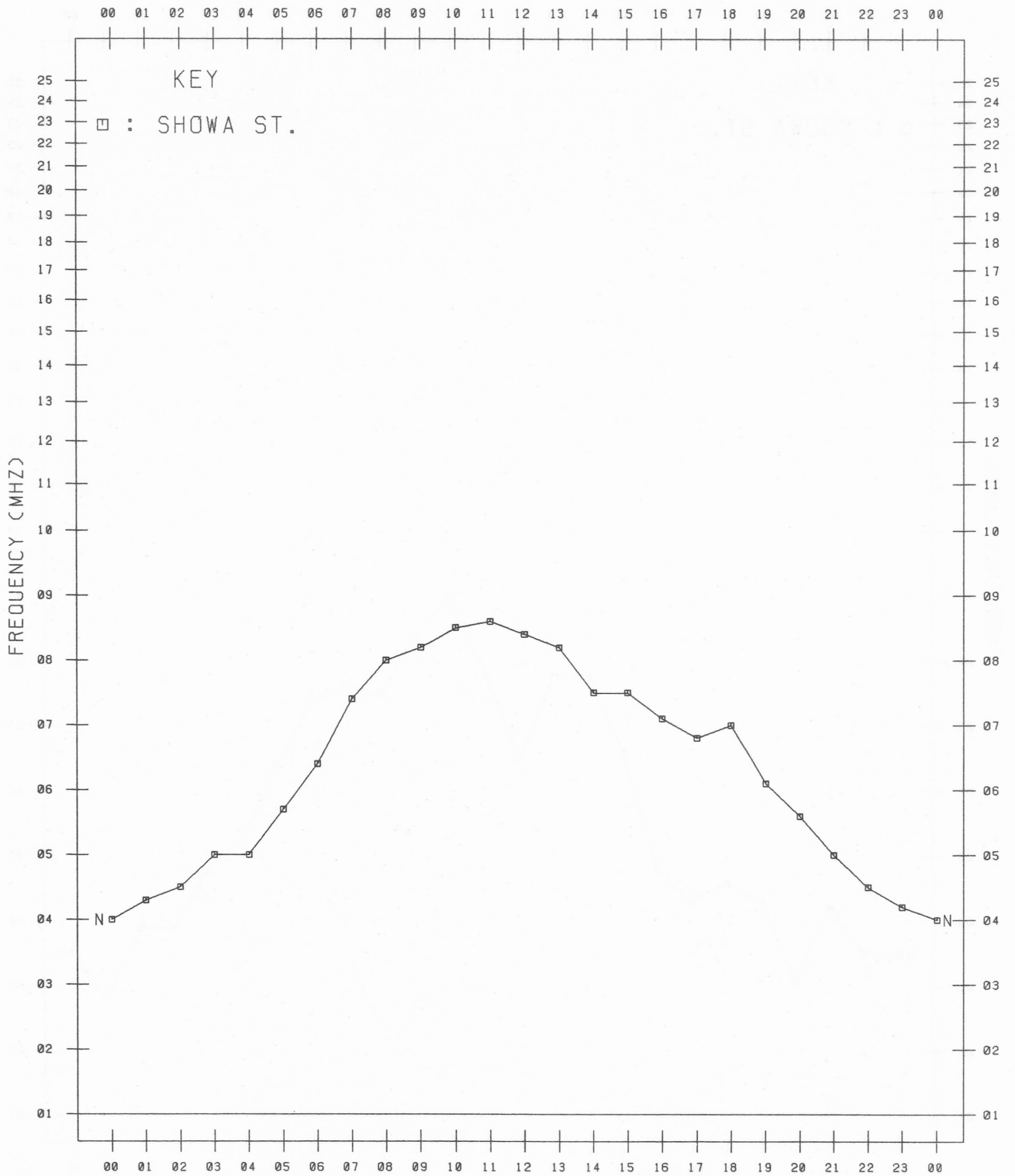
JAN. 1989



# MONTHLY MEDIAN VALUES OF FOF2

45 °E MEAN TIME

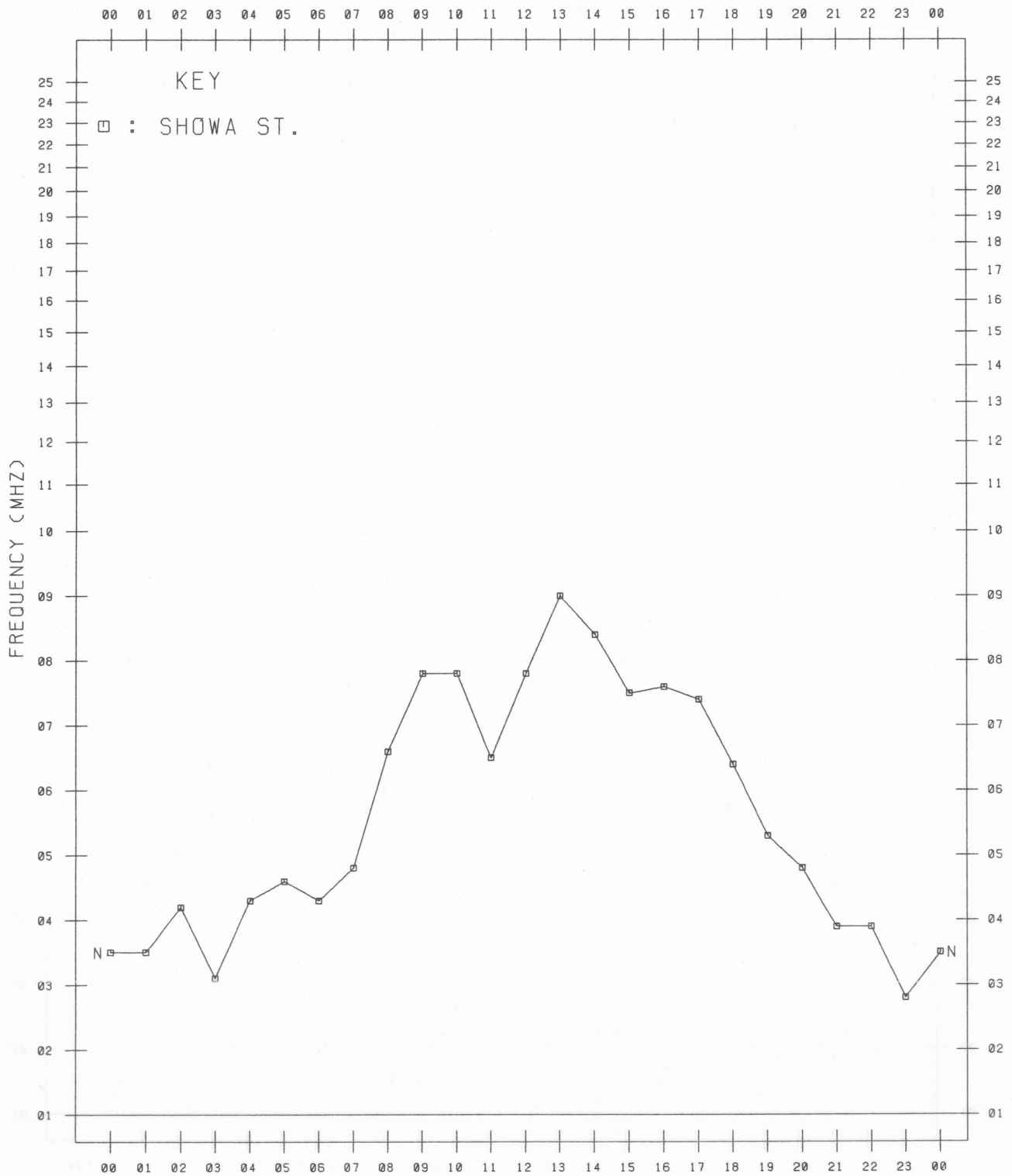
FEB. 1989



# MONTHLY MEDIAN VALUES OF F<sub>0</sub>F<sub>2</sub>

45 °E MEAN TIME

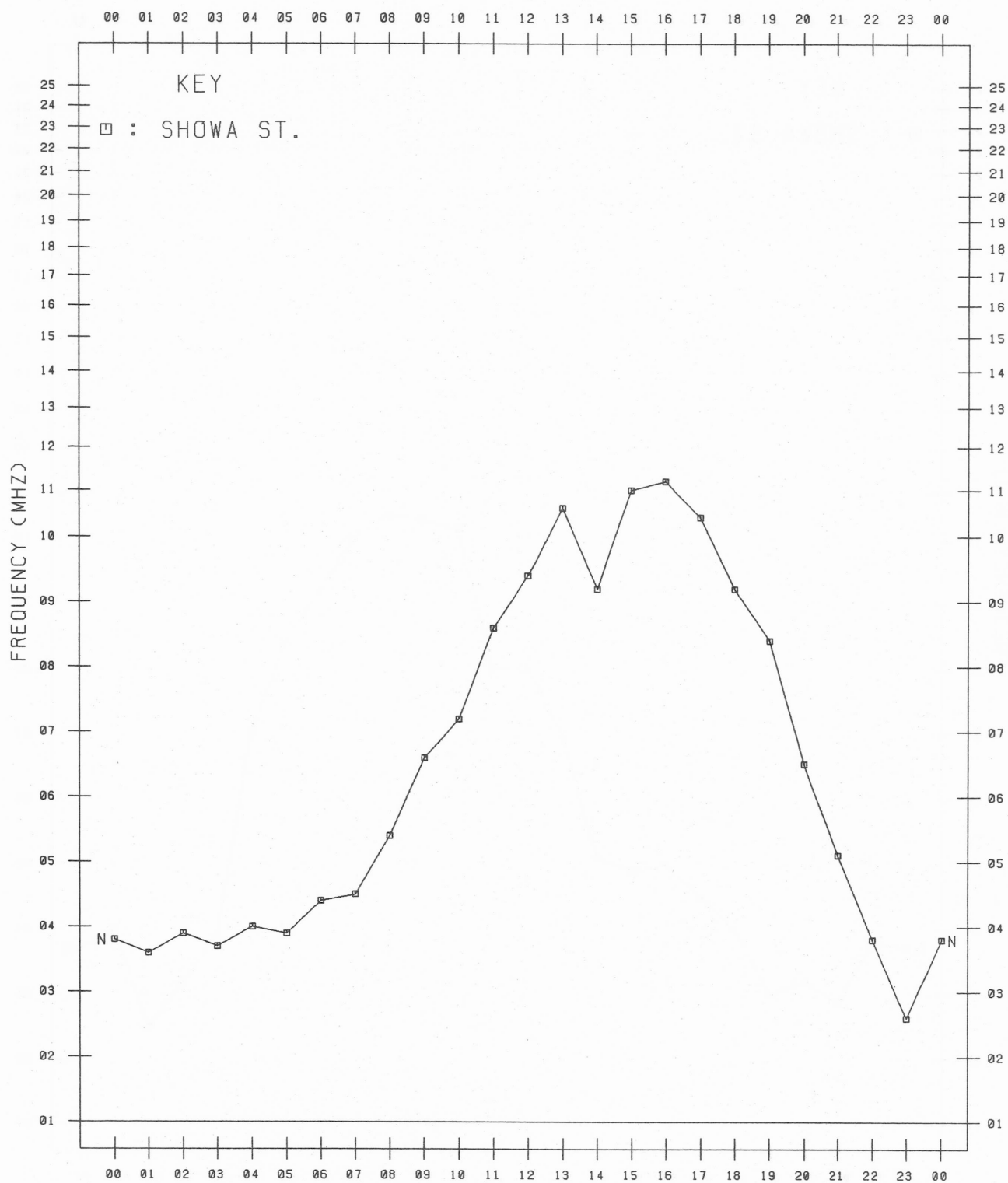
MAR. 1989



## MONTHLY MEDIAN VALUES OF FOF2

45 °E MEAN TIME

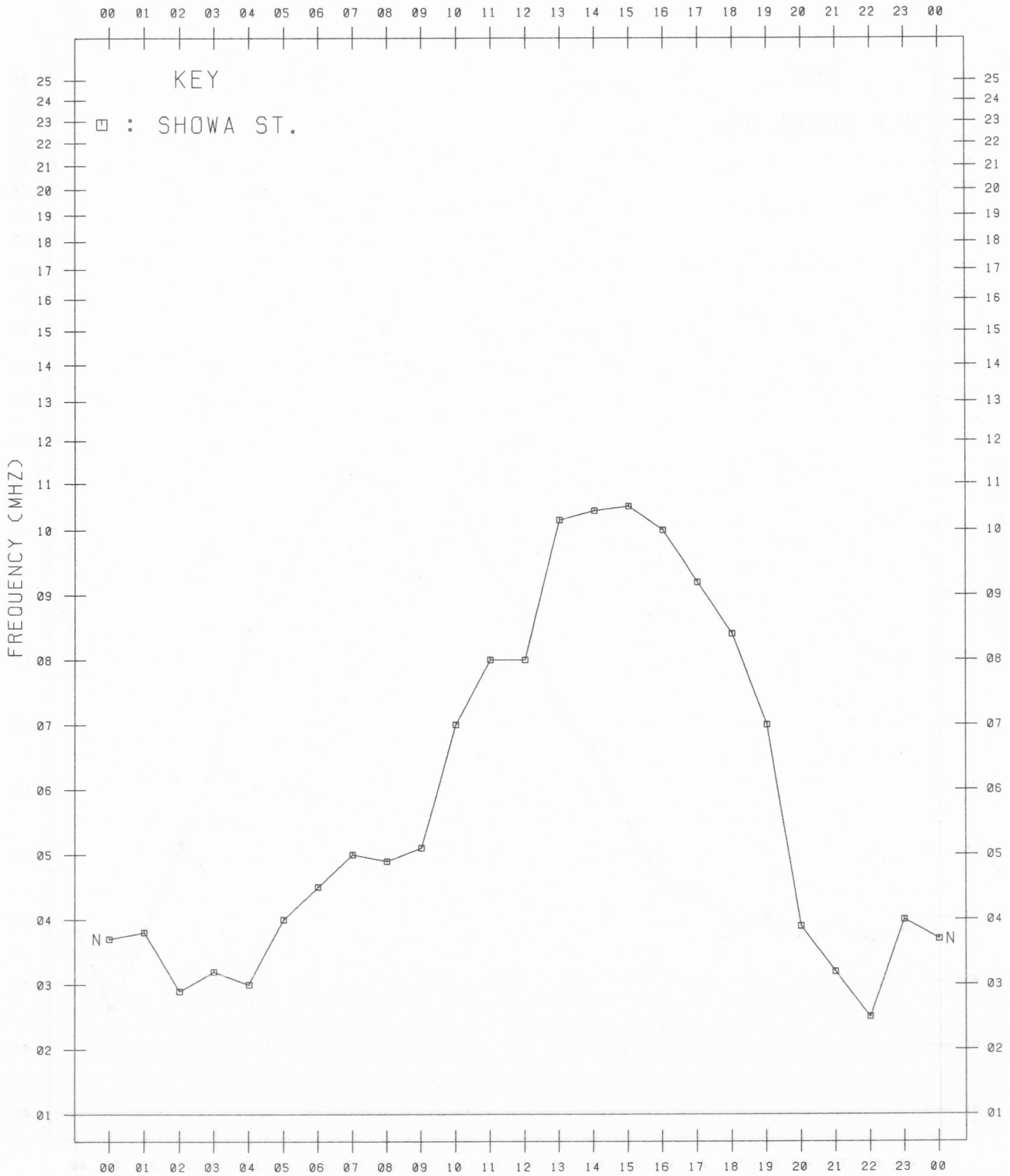
APR. 1989



# MONTHLY MEDIAN VALUES OF FOF2

45 °E MEAN TIME

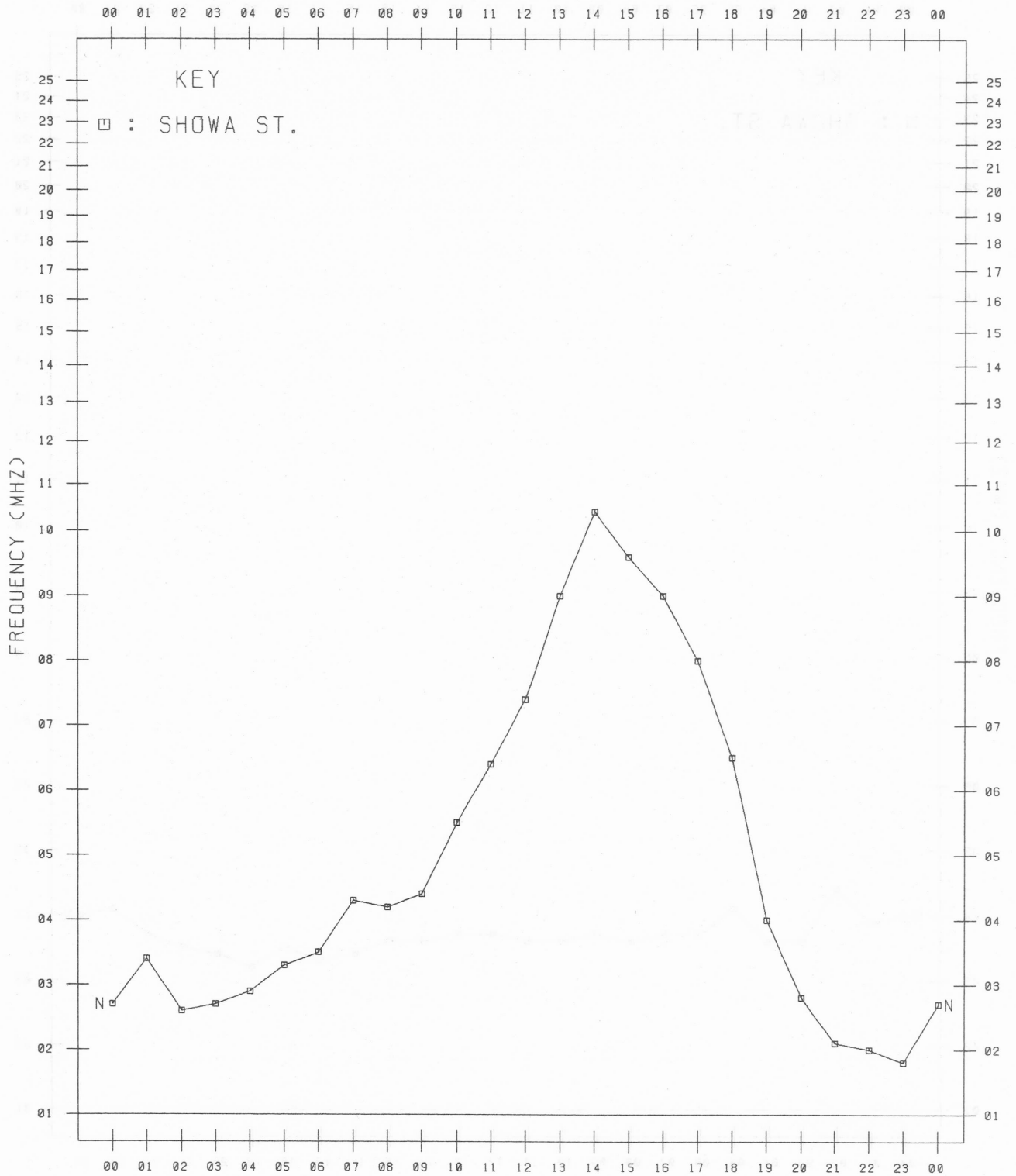
MAY. 1989



# MONTHLY MEDIAN VALUES OF FOF2

45 °E MEAN TIME

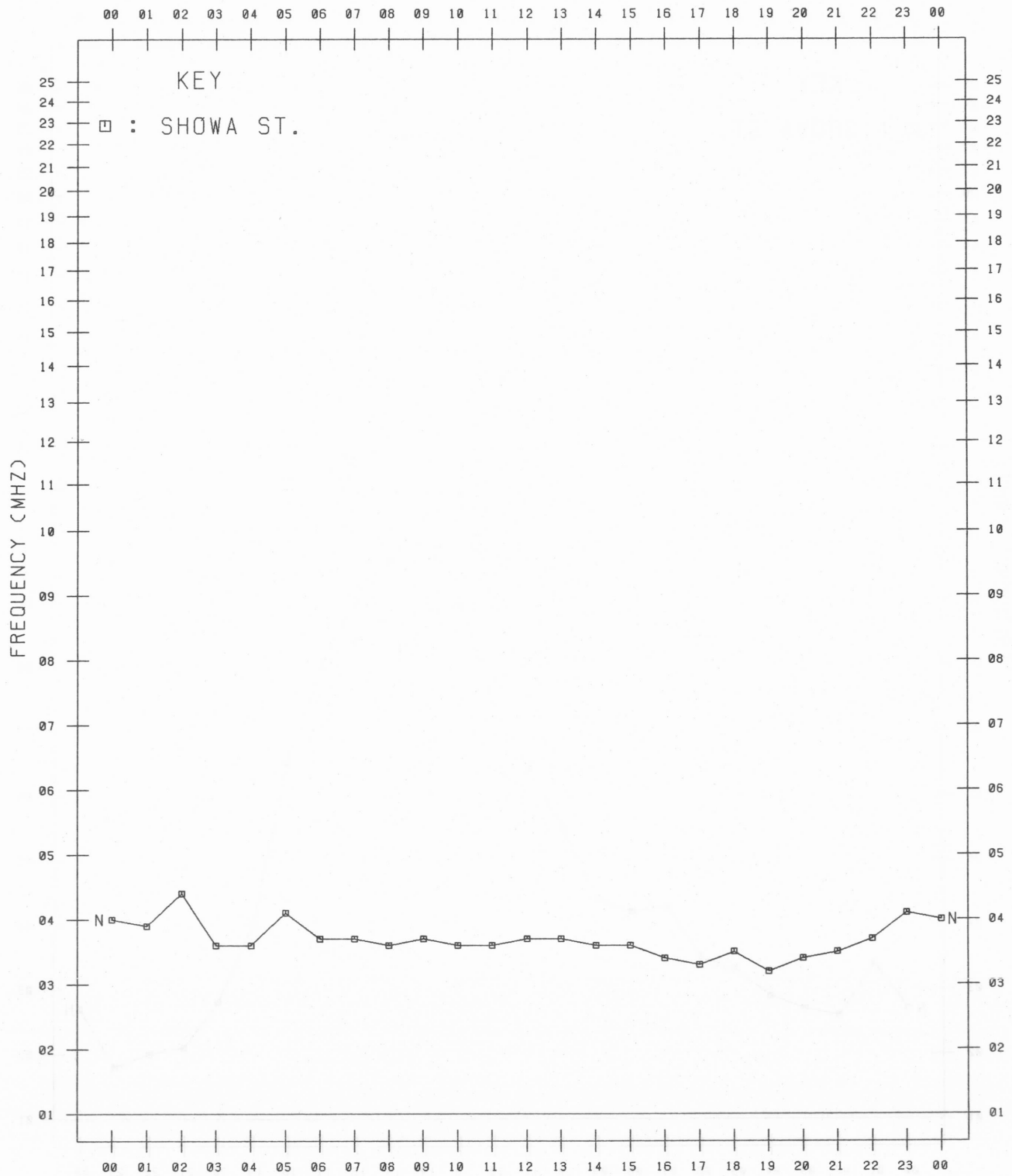
JUN. 1989



# MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

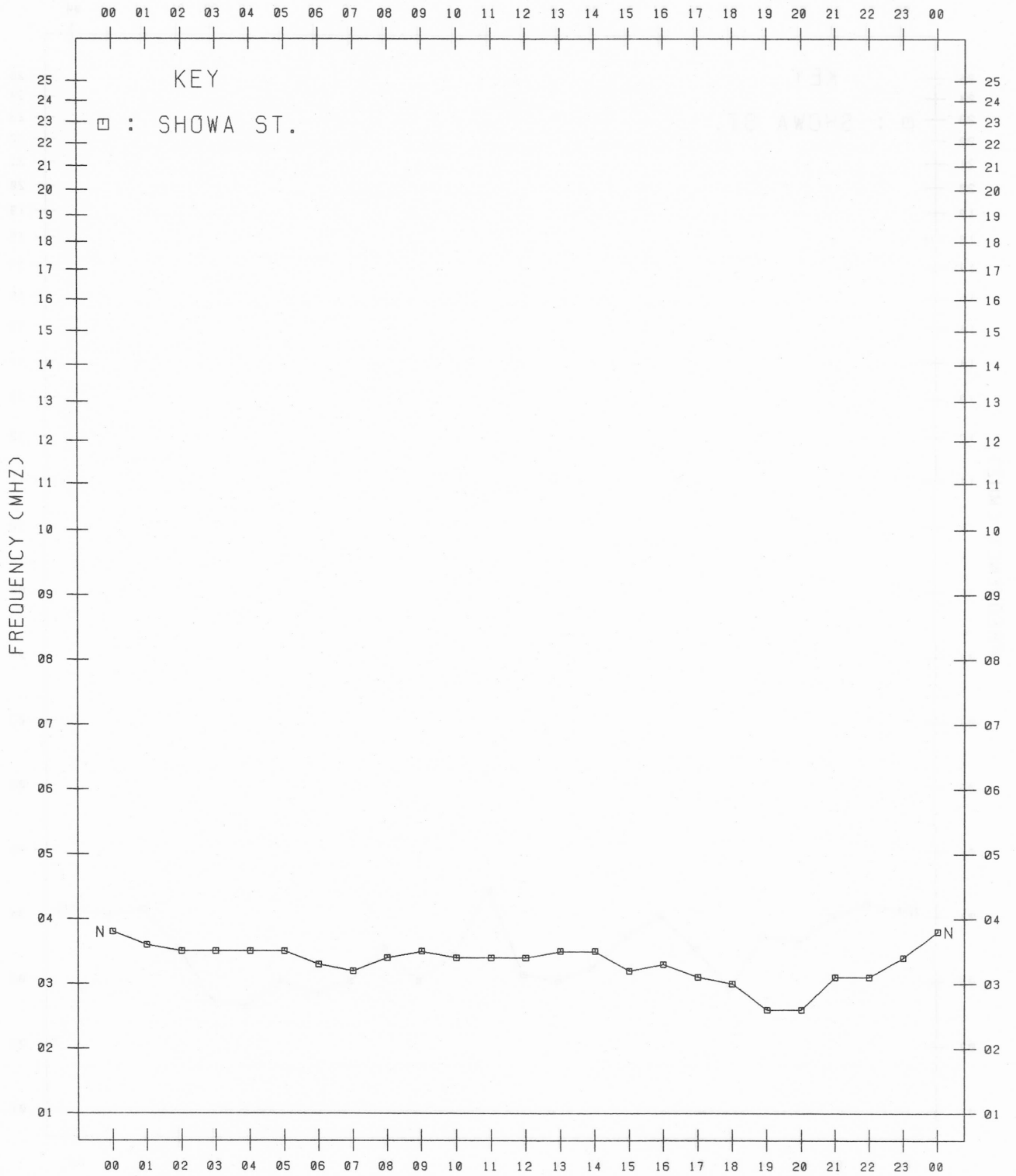
JAN. 1989



# MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

FEB. 1989

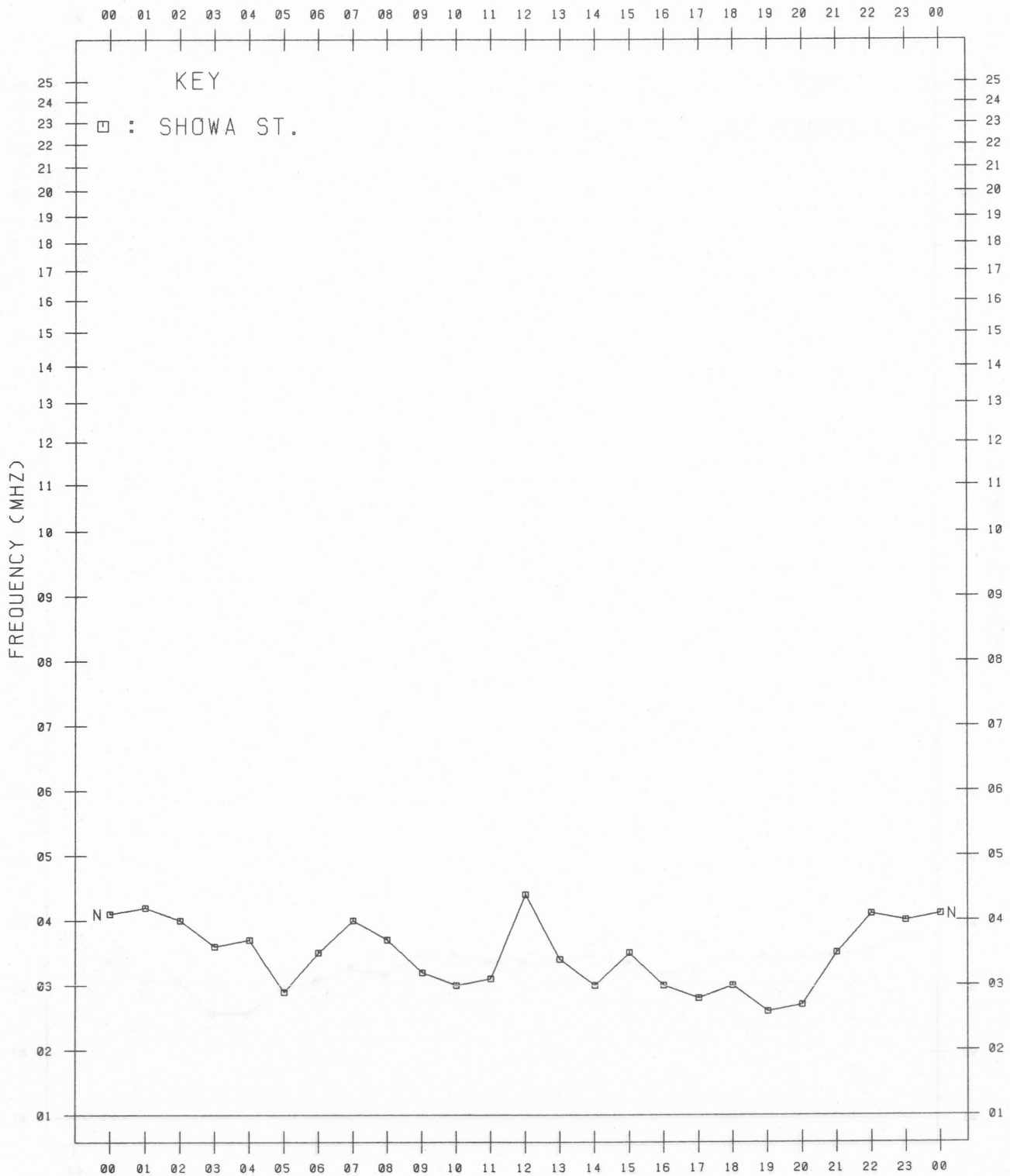




# MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

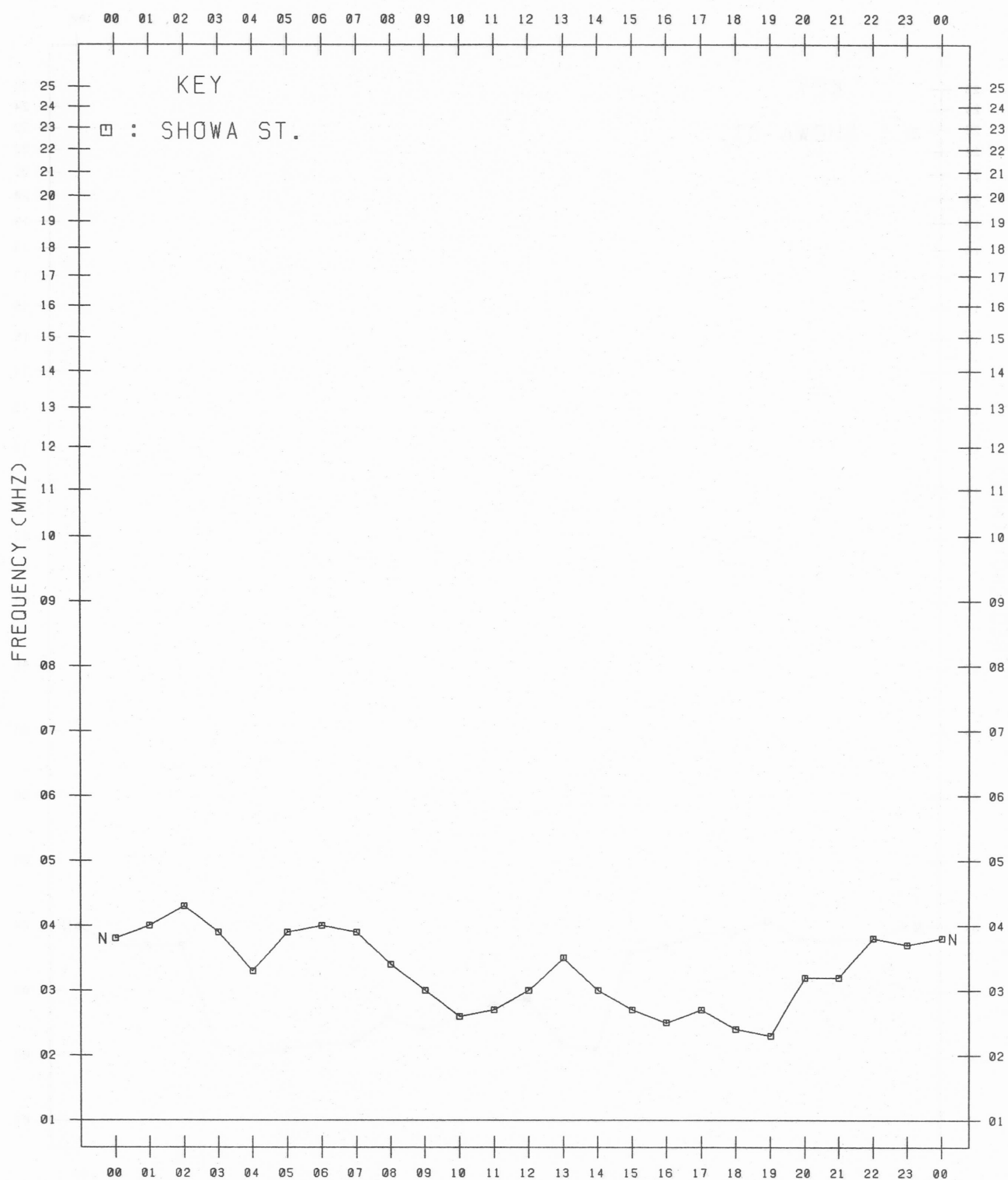
MAR. 1989



## MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

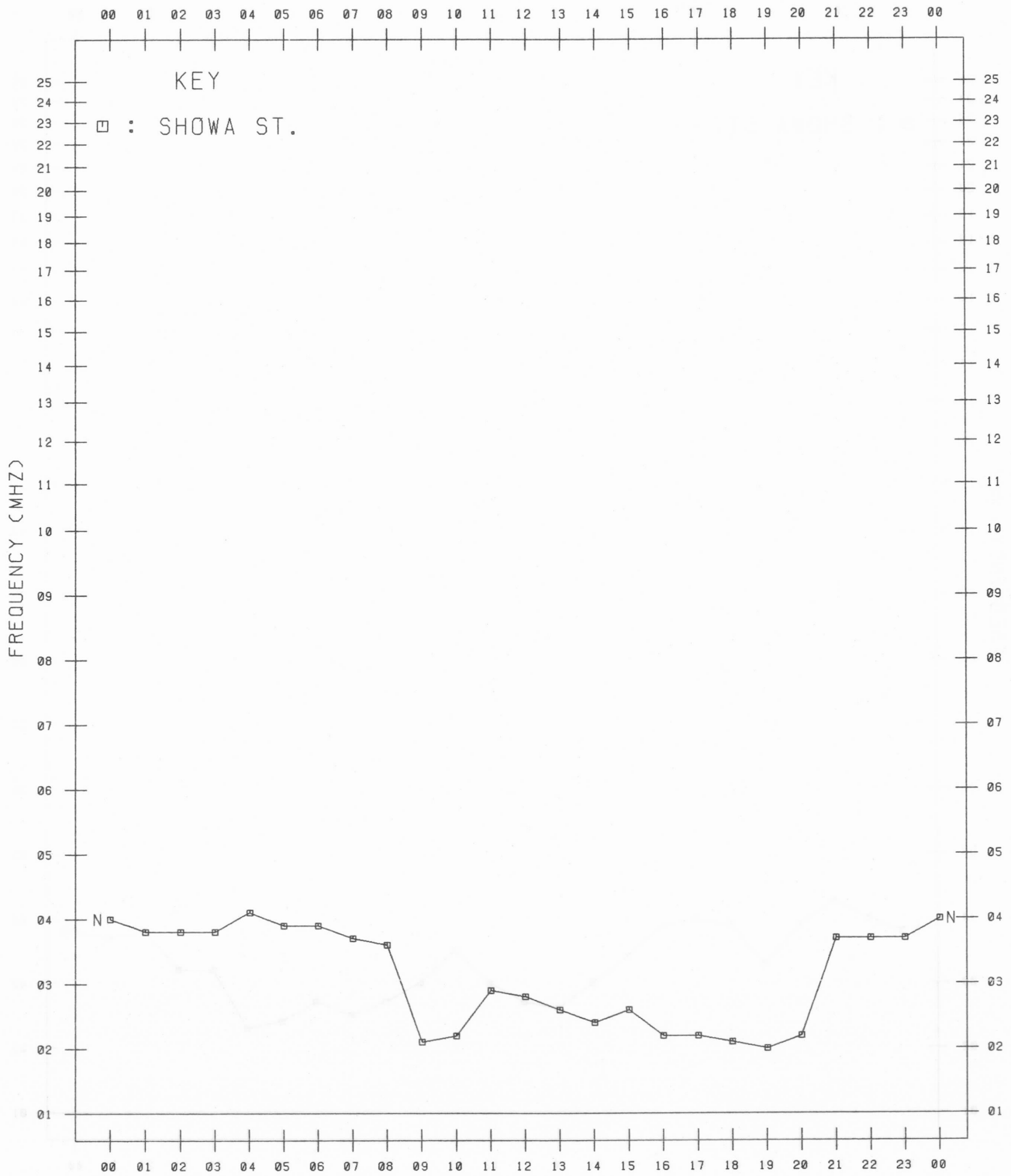
APR. 1989



# MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

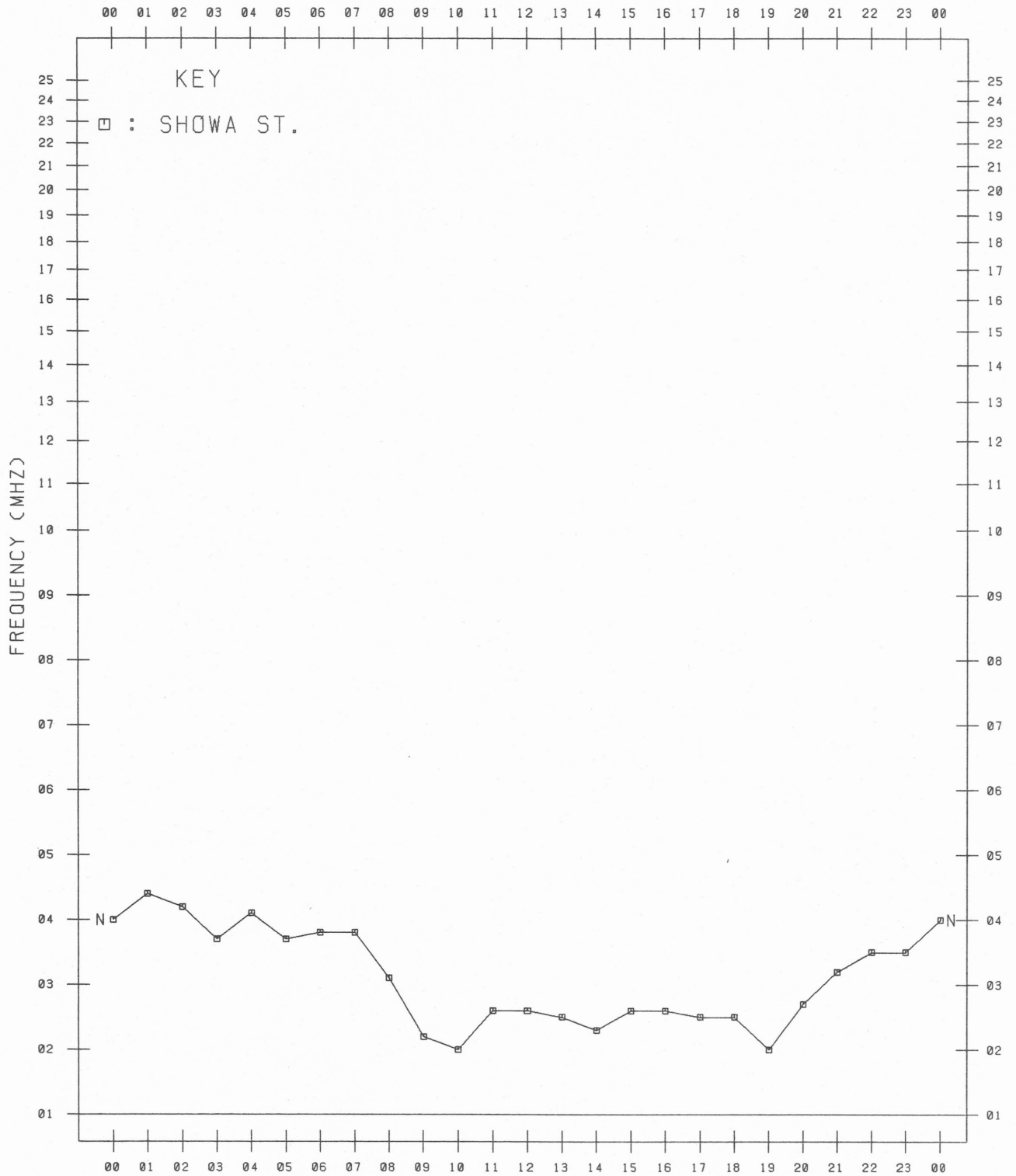
MAY. 1989



# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

JUN. 1989



---

IONOSPHERIC DATA AT SYOWA STATION (ANTARCTICA)  
ION.ANT.-52 January 1989—June 1989 (Not for Sale)

---

昭和基地電離層資料(南極)

(1989年1月—1989年6月)

1993年2月19日 印刷 (非売品)

1993年2月25日 発行

編集兼発行所

郵政省通信総合研究所

〒184 東京都小金井市貫井北町4丁目2-1

☎ 0423 (21) 1211 (代)

---

Queries about "Ionospheric Data at Syowa Station" should be forwarded to: The Communications Research Laboratory,  
Ministry of Posts and Telecommunications, 2-1 Nukui-Kitamachi 4-chome, Koganei-shi, Tokyo 184 JAPAN.