

ION.ANT.—50

IONOSPHERIC DATA AT SYOWA STATION  
(ANTARCTICA)

January 1988—June 1988

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## INTRODUCTION

This data book gives summarized results for vertical soundings of the ionosphere at Syowa Station, Antarctica in 1988. 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 effects.
- 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. 1988 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	46	A	A	0 X	0 X	A	0 X	65	71	76	X	0 X	X	X	X	X	73	71	66	61	60	62	55	52
2	X	X	A	A	0 X	A	A	X	S	S	61	A	66	66	X	B	A	A	A	A	A	A	A	A
3	A	0 X	A	S	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
5	B	B	B	B	B	B	B	B	B	B	B	B	0 X	S	S	0 X	46	46	S	0 X	0 X	0 X	0 X	X
6	A	A	A	A	A	A	A	0 X	S	S	X	0 X	B	X	X	0 X	S	S	B	A	0 X	A	A	
7	A	45	45	B	A	B	A	A	A	A	A	0 X	0 X	0 X	0 X	0 X	B	S	0 X	0 X	X	0 X	X	
8	A	B	A	B	0 X	0 X	A	A	B	0 X	A	A	0 X	0 X	0 X	0 X	B	B	B	0 X	A	0 X	A	
9	0 X	A	B	B	A	A		A	0 X	0 X	0 X	0 X	B	B	0 X	S	S	X	S	S	0 X	X	X	
10	X	46	0 X	A	A	X	X	X	0 X	X	X	X	A	X	X	X	X	X	X	X	X	X	X	0 X
11	A	A	A		A	A	A	A	A	A	B	0 X	0 X	0 X	S	0 X	X	X	X	X	X	X	X	X
12	X	X	X	X	A	X	X	X	X	C	C	C	C	C	C	C	C	B	X	0 X	X	X	A	0 X
13	0 X	X	X	X	0 X	X	X	X	X	X	X	X	S	S	S	0 X	0 X	X	X	X	X	X	0 X	0 X
14	X	X	X	B	A	A	A	A	0 X	0 X	0 X	0 X	S	X	X	0 X	0 X	0 X	0 X	X	B	A	A	A
15	A	A	A	A	0 X	A	B	B	A	A	B	B	A	A	B	A	B	0 X	A	0 X	A	46	44	A
16	A	A	A	A	A	X	X	X	X	X	X	X	B	B	X	X	X	X	0 X	0 X	X	X	X	X
17	X	X	A	X	X	X	X	X	0 X	A	A				S	A			X	B	B	A	A	0 X
18	A	A	B	A	B	B	A	X	X	X	X	X	B	X	X	X	X	0 X	0 X	X	A	A	B	A
19	A	A	A	A	B	B		A	X	X	B	0 X	B	B	B	X			X			0 X	X	X
20	A	46	A	A	A	A	A	0 X	X	X	X	X	X	X	0 X	X	X	0 X	X	X	A	A	X	A
21	X	A	A	A	A	A	A		A	A	0 X	0 X	0 X	0 X	X	X	X	S	0 X	0 X	X	X	X	X
22	54	41	43	B	A	A	A	62	66	66		B	B	X	X	X	X	X	0 X	X	55	51	C	C
23	C	C	C	S	54	68	74	70	70		B	B	70	65	65	68	63	61	61	56	56	56	64	68
24	60	65	70	70	78	88	87	88	90	89	85	80	77	73		C	X	X	X	X	X	X	X	A
25	40	A	A	X	56	45		A	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A	A
26	A	A	A	A	A	A	0 X	0 X	71	75	76	72	76	75	76	75	75	79	68	68	58	52	45	A
27	X	A	0 X	0 X	0 X	A	A	A	A	A	A	A	0 X	0 X		X	X	X	X	X	X	X	A	A
28	A	A	A	A	A	A		0 X	A	0 X	S	S	X	X	X	X	X	X	X	X	0 X	X	0 X	X
29	45	A	A	A	S	0 X	S		0 X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30	X	0 X	0 X	0 X	0 X	0 X	X	X	X	X	0 X	X	X	X	X	0 X	0 X	X	X	X	X	X	X	X
31	46	43	45	49	50	59	65	70	76	75	70	70	69	67	66	64	57	58	58	53	55	55	51	48
	40	A	X	X	0 X	0 X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	40	43	51	59	65	66	66	70	70	72	70	71	70	66	65	63	60	62	60	61	59	54	48	
	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	16	12	10	11	10	13	14	18	20	20	17	18	19	20	21	23	22	24	23	24	21	23	19	18
MED	X	X	X	X	0 X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
U O	46	46	47	51	50	56	62	66	68	67	65	64	67	65	63	63	62	60	60	56	55	52	50	49
L O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	52	53	55	54	59	62	66	70	71	73	72	70	71	68	66	67	67	64	66	60	58	55	55	51
	X	X	X	0 X	0 X	X	X	X	0 X	0 X	0 X	0 X	0 X	0 X	X	X	X	X	0 X	X	X	X	X	X
	42	44	45	49	48	50	56	60	60	61	62	51	55	58	60	60	59	58	56	52	52	49	47	45

IONOSPHERIC DATA STATION SHOWA ST.  
 JAN. 1988 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	F 40	A	A	47	42	A	54	55	F	65	70	66	65	63	64	65	65	F	F	60	55	54	56	F	F	49	46	
2	46	46	A	A	45	A	A	54	50	S	F	A	F	60	60	B	A	A	A	A	A	A	A	A	A	A	A	
3	A	38	A	S	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
4	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	
5	B	B	B	B	B	B	B	B	B	B	B	B	B	57		S	S			S					F	F	43	43
6	A	A	A	A	A	A	A	A	49	S	S	57	57	B	56	55	55	S	S	B	A	42	A	A	A	A	A	
7	A	F	F	B	A	B	A	A	A	A	A	A	41	41	41	43	U	R	B	S	43	43	41	40	40	37	F	
8	A	B	A	B	R	R	A	A	B		A	A	A	E	G	E	G	B	B	B	R	A	A	A	F	A	F	
9	40	A	B	B	A	A	F	A	40	44	E	G	E	G	B	B	E	G	S	S	50	S	S	49	45	45	44	39
10	38	40	43	A	A	50	54	54	57	58	59	56	A	53	54	54	53	55	56	55	53	50	51	43	44	45	44	
11	A	A	A	F	A	A	A	A	A	A	B	E	G	E	G	E	G	S	E	G	J	S	46	47	44	45	A	
12	46	48	50	51	A	50	54	56	J	S	C	C	C	C	C	C	C	C	C	B	48	44	34	48	33	33	33	
13	35	36	39	40	42	46	50	53	59	57	57	56	S	S	S	57	60	56	60	57	49	48	44	40	40	40	40	
14	37	41	49	B	A	A	A	A	A	E	G	E	G	E	G	43	54	55	49	43	35	33	B	A	A	A	A	
15	A	A	A	A	A	E	G	A	B	B	A	B	B	A	A	B	A	B	40	37	A	F	F	F	A	A	A	
16	A	A	A	A	A	41	46	50	54	55	57	57	B	B	59	59	56	53	54	50	50	50	50	50	49	49	49	
17	51	50	A	48	55	60	65	70	F	F	A	A	A	F	F	S	A	F	A	F	53	52	B	B	A	A	37	
18	A	A	B	A	B	B	A	62	64	65	63	64	65	B	S	B	B	64	65	58	55	50	48	A	A	B	A	
19	A	A	A	A	B	B	F	A	62	64	65	63	64	65	S	B	B	64	65	58	55	50	48	A	A	B	A	
20	A	F	A	A	A	A	A	A	46	55	56	60	64	61	60	61	63	60	50	46	46	44	44	44	44	44	44	
21	35	A	A	A	A	A	A	F	A	A	E	G	E	G	J	S	S	S	U	R	52	49	51	47	41	30	F	
22	F	F	F	B	A	A	A	F	F	F	B	B	58	59	57	55	54	54	50	49	49	45	C	C	C	C	C	
23	C	C	C	F	S	F	F	F	F	F	B	B	F	F	F	C	68	65	69	60	55	47	42	41	A	A	A	
24	F	F	F	F	F	82	81	82	84	83	79	74	71	67		68	65	69	60	55	47	42	41	A	A	A	A	
25	F	A	A	A	A	A	A	A	46	55	56	60	64	61	60	61	63	60	50	46	46	44	44	44	44	44	44	
26	A	A	A	A	A	A	60	69	F	65	69	70	66	70	69	70	69	69	73	62	62	52	46	39	A	A	A	
27	37	A	R	F	A	A	A	A	A	A	A	A	48	52	54	53	56	54	60	53	51	40	A	A	A	A	A	
28	A	A	A	A	A	A	F	38	A	R	S	S	57	54	60	55	53	54	55	54	48	45	48	44	F	F	F	
29	39	A	A	A	S	R	S	F	F	U	S		61	60	57	57	54	55	50	54	54	49	50	52	52	52	52	
30	40	37	39	43	44	53	59	64	70	69	64	64	63	61	60	58	51	52	53	J	S	49	49	45	42	42	42	
31	F	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	16	12	10	11	10	13	14	18	20	20	17	18	19	20	21	23	22	24	23	24	21	23	19	18				
MED	40	40	41	45	44	50	56	58	62	61	59	58	61	59	57	57	56	54	53	50	49	46	44	43				
U O	46	47	49	48	53	56	60	64	65	67	66	64	65	62	60	61	61	58	60	54	52	49	49	45				
L O	36	37	39	43	42	44	50	54	54	55	56	45	49	52	54	54	53	52	50	47	46	43	41	39				

IONOSPHERIC DATA STATION SHOWA ST.

JAN. 1988 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 <sup>H</sup>	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	52	43	39	37	34	37	41	30	29	35	40	42	37	32	39	36	28	30	27	27	32	32	32	32			
2	41	32	30	67	52	51	46	32	33	27	35	44	37	73	B	36	47	39	89	37	51	28	104	89			
3	46	45	57	32	B	37	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
5	B	B	B	B	B	B	B	B	B	B	B	B	B	20	30	29	25	E	E	E	E	E	B	45			
6	40	45	70	45	35	40	38	45	34	26	28	29	E	B	B	30	30	E	B	E	B	B	42	35	92	51	
7	41	35	37	B	30	B	40	55	37	39	41	38	E	B	B	E	B	B	B	27	29	21	25	34	41	45	
8	55	B	42	B	38	32	36	45	B	37	45	39	31	29	31	29	B	B	B	E	B	32	32	41	41	37	
9	37	37	B	B	42	45	26	43	42	43	38	31	B	B	E	B	35	30	29	27	44	43	32	63	29	20	
10	28	36	30	37	42	32	31	34	27	35	36	39	40	33	37	39	37	39	42	29	25	22	22	22	22		
11	58	46	45	37	45	43	42	37	30	42	B	33	35	36	31	31	35	27	70	43	32	35	41	27			
12	21	30	29	32	131	32	33	36	40	C	C	C	C	C	C	C	C	B	25	28	31	30	41	43			
13	35	39	32	34	35	28	30	32	33	38	44	33	29	32	34	38	41	28	42	31	23	32	32	37			
14	31	35	30	B	41	45	37	37	41	30	31	32	32	31	32	34	30	29	27	26	B	60	42	73			
15	47	42	89	29	45	33	41	B	B	70	B	B	20	39	B	37	B	42	30	35	33	35	89	35			
16	39	60	39	42	36	40	40	32	27	36	32	30	B	B	31	30	29	27	E	B	E	B	27	27	21	32	
17	22	38	36	26	28	26	32	69	71	35	30	41	36	36	58	90	60	67	40	B	B	64	40	35			
18	46	60	B	40	B	B	35	32	27	35	32	28	19	B	32	30	32	28	E	B	30	26	41	42	112		
19	38	38	45	43	B	B	35	49	45	46	B	34	B	B	B	35	29	38	25	40	32	42	39	38			
20	70	42	108	44	42	71	42	42	37	32	38	39	E	B	44	31	30	29	33	28	E	B	33	34	42	42	45
21	41	38	37	37	37	39	45	35	40	41	37	30	29	33	30	35	32	24	28	31	31	43	30	32			
22	29	35	39	B	37	37	42	35	37	E	B	B	B	37	39	40	34	33	34	27	26	26	35	C	C		
23	C	C	C	34	33	42	35	32	33	31	B	B	43	48	53	36	35	33	29	30	26	27	30	16			
24	16	27	15	18	30	30	32	35	68	35	37	36	33	36	C	63	65	37	30	30	26	33	30	45			
25	39	45	47	42	38	32	41	39	33	29	E	B	45	30	30	32	35	32	34	27	29	25	34	36	42	40	
26	57	42	40	31	34	43	40	35	30	34	35	31	34	36	32	32	28	27	32	34	30	33	31	36			
27	71	42	42	33	32	71	47	41	27	43	33	33	28	33	30	29	E	B	31	38	35	104	45	38	41	37	
28	90	59	44	70	46	41	33	35	44	31	32	33	32	34	50	32	35	27	31	42	69	30	19	16			
29	29	35	40	29	35	34	35	35	35	32	33	32	32	37	31	31	35	32	35	42	38	20	45	35			
30	36	31	30	31	32	37	29	32	37	32	37	36	36	60	59	35	35	33	48	37	35	29	32	14			
31	30	44	44	40	41	29	32	36	48	35	35	41	35	60	53	39	42	60	43	48	32	18	31	30			
D <sup>H</sup>	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	27	26	24	26	26	28	27	26	27	22	24	24	23	24	28	25	27	28	27	27	29	27	28			
MED	40	39	40	37	37	37	36	35	36	35	36	33	33	34	32	34	34	31	30	31	32	34	39	36			
U O	50	45	45	42	42	43	41	42	41	39	38	39	36	39	40	36	36	38	41	40	35	42	42	45			
L O	30	35	32	32	34	32	32	32	30	32	32	31	30	32	30	30	30	27	29	28	27	30	30	31			

IONOSPHERIC DATA STATION SHOWA ST.  
 JAN. 1988 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	15	14	18	15	15	15	14	14	10	10	10	12	12	12	13	14	12	16	10	8	10	10	10	15	
2	8	8	16	14	10	9	10	8	9	10	13	13	15	19	B	14	11	12	10	12	13	14	13	13	
3	20	10	11	21	B	23	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
5	B	B	B	B	B	B	B	B	B	B	B	B	B	17	13	17	20	31	30	30	30	23	12	17	
6	19	19	19	20	19	13	16	19	18	19	15	19	35	B	13	18	35	31	30	B	13	13	30	9	
7	13	14	13	B	20	B	15	25	15	13	20	14	36	20	19	34	B	15	17	15	13	13	13	9	
8	15	B	25	B	11	14	18	21	B	21	23	19	15	13	15	13	B	B	B	32	21	10	13	9	
9	15	23	B	B	11	13	13	14	14	14	14	13	B	B	35	21	15	15	12	12	12	11	8	8	
10	8	12	17	18	20	10	11	8	11	8	13	13	15	14	17	14	9	10	10	10	10	10	13	10	
11	15	9	20	9	15	14	8	10	15	21	B	19	16	14	13	15	17	15	17	15	18	18	14	14	
12	13	10	14	9	15	10	11	8	9	C	C	C	C	C	C	C	C	B	18	24	10	10	15	11	
13	13	10	11	13	8	8	13	10	10	11	11	13	14	23	20	25	14	12	13	15	10	11	8	E C 17	
14	8	8	7	B	13	8	15	20	13	14	18	10	12	12	14	11	10	10	15	10	B	7	11	12	
15	11	13	9	18	15	8	15	B	B	29	B	B	17	24	B	25	B	17	9	9	14	13	17	10	
16	11	20	17	16	17	14	12	14	12	9	12	14	B	B	15	10	17	18	30	30	18	17	14	9	
17	8	13	18	13	9	13	9	9	10	10	13	29	19	14	10	9	14	10	13	B	B	23	10	19	
18	23	24	B	15	B	B	21	10	8	9	9	19	16	B	18	14	13	19	30	9	12	15	B	15	
19	17	8	15	20	B	B	9	12	14	12	B	21	B	B	B	18	20	25	19	13	8	13	7	11	
20	12	12	14	14	14	12	15	12	9	10	12	12	44	23	15	14	10	13	29	15	23	10	11	13	
21	11	15	19	18	9	10	18	14	19	20	13	10	14	11	11	9	13	17	13	15	11	11	9	8	
22	8	11	9	B	15	20	14	8	11	35	B	B	13	11	10	10	9	9	11	16	14	14	C	C	
23	C	C	C	10	15	13	10	10	9	13	B	B	11	11	10	13	10	10	9	10	10	8	9	9	
24	10	9	11	12	13	11	10	10	10	14	13	15	21	30	C	17	10	13	11	9	9	9	12	11	
25	12	9	12	13	14	8	11	8	8	11	45	18	15	14	12	14	13	10	10	11	11	19	9	12	
26	7	8	10	13	10	12	11	10	9	10	10	11	10	13	13	9	13	10	18	18	14	10	10	8	
27	12	11	10	10	13	13	11	11	13	14	18	18	14	15	14	18	31	30	18	14	10	11	8	7	
28	13	10	12	9	10	9	9	10	13	15	18	18	20	13	13	23	23	20	18	17	17	16	14	10	
29	8	9	12	13	14	10	15	15	17	10	11	11	13	13	13	15	14	10	13	11	10	13	14	18	
30	8	8	8	10	12	13	13	10	10	10	10	10	9	11	10	10	13	11	10	11	9	10	8	8	
31	8	19	12	10	10	10	9	12	11	9	10	10	11	11	13	10	10	10	10	12	10	11	9	9	
	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	31	31	31	31	31	31	30	30	30	30	30	29	30	30	31	31	31	31	31	31	30	30
MED	12	12	14	15	14	13	13	12	12	13	14	16	16	14	14	14	14	15	15	15	13	13	12	10	
U O	15	19	19	21	B	B	B	B	B	B	B	B	36	30	20	18	23	25	29	24	18	16	14	15	
L O	8	9	11	12	11	10	10	10	10	10	12	12	13	13	13	11	11	10	10	11	10	10	9	9	



IONOSPHERIC DATA STATION SHOWA ST.

JAN. 1988 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 275	A	A	A	E A 265	A E A 250	210	200	200	220	200	A	180	190	190	200	205	200	215	210	220	230	245	250			
2	285	300	A	A	A	A	A	175	180	180	200	A	200	205	B	A	A	270	A	A	A	A	A	A			
3	A	255	A E A 340	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
4	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B			
5	B	B	B	B	B	B	B	B	B	B	B	B	B	200	190	190	230	220	250	240	E B	E B	E B	E A			
6	A	A	A	A	A	A	A	A	E A 250	200	200	210	210	B	215	225	E B 250	230	225	B	A	210	A	A			
7	A	270	270	B	A	B	A	A	A	A	A	A	E B	E A	225	225	B	230	230	245	240	290	E A	E A			
8	A	B	A	B	E A 290	215	A	A	B	E A 250	A	A	A	205	180	210	B	B	B	260	A	A	A	E A			
9	A	A	B	B	A	A	E A 250	A	A	E A 250	225	200	H	B	B	200	210	225	225	220	220	E A	240	H			
10	E A 290	E A 250	E A 350	A	A	E A 300	E A 250	220	200	210	200	200	A	200	190	190	H	H	200	200	220	220	225	240	E A 260		
11	A	A	A	A	A	A	A	A	A	A	B	180	H	190	230	210	210	220	210	H	200	225	225	240	250	255	
12	260	280	280	280	A	250	230	210	195	C	C	C	C	C	C	C	C	C	B	200	230	245	260	A	E A 300		
13	E A 350	E A 375	E A 315	E A 360	A	E A 280	E A 240	220	220	H	E A 215	250	200	200	215	190	240	210	210	210	220	225	250	E A 300	A		
14	E A 260	E A 305	E A 300	B	A	A	A	A	A	A	225	230	220	200	215	225	200	210	260	250	250	B	A	A	A		
15	A	A	A	A	A	E A 340	A	B	B	A	B	B	A	A	B	A	B	E A 250	A	E A 275	A	E A 260	E A 350	A	A		
16	A	A	A	A	A	A	E A 260	H	220	200	205	200	200	B	B	210	210	215	200	225	225	230	250	240	255		
17	280	300	A	E A 390	290	250	210	200	205	200	200	A	A	H	180	200	210	A	E A 250	205	B	B	A	A	E A 400		
18	A	A	B	A	B	B	A	H	H	H	H	H	H	B	H	200	215	210	200	205	250	A	A	B	A		
19	A	A	A	A	B	B	A	A	A	B	B	B	B	B	B	205	210	220	220	A	E A 230	E A 260	E A	A	E A 290		
20	A	A	A	A	A	A	A	A	H	H	A	A	B	H	H	230	180	220	H	195	210	200	225	A	E A 270	A	
21	E A 350	A	A	A	A	A	A	E A 250	A	A	H	210	200	H	H	H	200	200	210	A	200	215	230	245	E A 270	E A 375	
22	E A 275	E A 405	A	B	A	A	A	250	210	250	E B	B	B	200	200	180	210	195	180	H	220	225	220	225	C	C	
23	C	C	C	A	E A 330	E A 370	H	225	200	190	195	H	B	B	E A 200	E A 250	A	200	190	210	H	H	220	220	230	245	230
24	245	255	275	270	250	230	230	205	230	200	190	200	E A 340	E A 360	C	E A 240	E A 230	215	210	220	220	220	250	250	A	A	
25	250	A	A	E A 340	E A 275	220	A	H	H	A	230	225	200	215	200	200	200	205	200	210	255	A	A	A	A		
26	A	A	A	A	A	A	A	A	230	230	210	210	200	210	205	200	240	210	220	225	245	230	250	250	A	A	
27	250	A	A	A	E A 350	A	A	A	A	A	A	A	A	240	230	220	220	225	230	245	250	240	260	A	A		
28	A	A	A	A	A	A	E A 290	E A 225	A	200	210	250	H	E A 215	220	220	220	220	225	225	E A 250	E A 250	250	245	255		
29	250	A	A	A	205	190	220	220	210	180	190	200	205	180	200	205	H	H	200	205	225	E A 250	250	230	240	225	
30	250	E A 290	E A 350	A	E A 380	260	240	225	200	195	200	180	175	200	200	180	180	H	H	225	215	240	225	210	240		
31	E A 320	A	A	E A 350	E A 290	E A 270	E A 250	E A 250	270	200	180	200	200	200	A	200	205	200	210	H	E A 250	240	240	225	E A 270		
	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	15	11	7	7	10	12	14	18	18	22	18	19	19	22	23	26	23	27	26	25	21	22	17	17			
MED	U	U	E A	E A	E A	U	U	225	214	200	200	200	200	200	202	200	210	208	210	219	225	230	242	242	E A 260		
UO	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A	E A		
LO	290	305	350	360	330	290	250	225	220	215	220	210	215	230	220	220	220	220	230	225	250	248	250	270	315		
	250	255	275	280	265	225	225	200	200	200	200	200	H	H	190	200	200	200	205	220	225	230	240	245			

IONOSPHERIC DATA STATION SHOWA ST.  
 FEB. 1988 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	X 46	A	A	A	A	A	X 58	X 66	X 72	X 72	X 76	X 73	X 72	X 70	X 68	X 66	X 63	X 65	X 61	X 60	X 65	X 64	X 56	X 54
2	X 53	X 49	A	A	A 0	X 63	X 68	X 75	X 61	X 80	X 78	X 79	X 74	X 71	X 72	X 69	X 65	X 63	X 62	X 60	X 60	X 61	X 55	A
3	A	A	A 0	X 50	A	A	X 60	X 70	X 75	X 80	X 80	X 75	X 74	X 70	X 68	X 66	X 65	X 61	X 60	X 60	X 58	X 55	X 58	X 61
4	0 66	X 66	0 65	X 60	0 60	X 66	S 84	X 95	X 99	X 90	X 90	X 86	X 80	X 79	X 77	X 71	X 74	X 66	X 69	X 68	X 65	X 60	X 56	X 56
5	47	A	A	A	A	A	A	A	49	A	B	A	B	B	B	B	X 56	0 54	X 57	X 56	0 48	0 A	0 A	0 A
6	A	A	A	A	A	A	A	A	A	A	X 58	X 59	X 55	X 56	0 49	0 50	0 B	X 54	X 52	X 53	X 50	X 48	X 55	X 39
7	A	36	A	A	45	A 0	X 48	A	A	A	X 60	X 48	X 56	X 60	X 59	X 60	X 56	X 56	X 53	X 56	X 55	X 55	X 51	X 43
8	31	0 38	A	A	A	A	X 65	X 60	X 66	X 70	X 70	X 66	X 65	X 64	X 59	X 56	X 56	X 58	X 56	X 56	X 52	X 51	X 37	X 39
9	35	A	39	50	A	A	S	S	A	62	X 71	X 65	X 61	X 67	X 66	X 65	X 59	0 64	X 61	X 53	X 41	A	A	A
10	A	A	A	A	A	A	A	A	A	A	A	S	S	S	B	X 61	0 57	X 61	0 51	X 55	X 47	X 46	X 37	X
11	32	36	39	43	46	52	62	60	61	61	62	B	X 68	X 76	X 81	X 90	X 92	X 71	X 66	X 58	X 49	X 55	X 44	A
12	A	A	A	49	55	A	A 0	X 51	A	A	B	B	B	0 50	X 47	0 56	X 59	0 53	X 57	0 45	A	A	A	A
13	A	A	A	A 0	X 63	0 51	X A	A	A	B	0 52	X S	B	X 57	0 55	0 55	X 59	X 65	X 63	X 60	A	A	A	A
14	A	A	A 0	X 41	A	54	60	61	61	59	61	64	67	63	64	58	55	56	57	55	53	52	51	49
15	X 46	39	43	A	A	A 0	X 52	0 58	A	A	B	B	B	67	70	78	0 X	B	B	43	A	A	X 43	X 36
16	A	A 0	X 51	A	A	A 0	X 50	57	61	65	66	65	66	63	54	S	X 53	0 51	0 41	A	A	A	A	A
17	A	A	A	B	42	B	B	A	54	59	57	56	53	54	64	66	B 0	X 56	X 56	X 50	X 54	X 61	X 60	A
18	A	A	B	A	56	44	A	A 0	X 55	58	59	60	61	66	B	B	X 60	X 57	X 58	X 54	X 54	X 53	X 42	42
19	A	A	A	A	A	A	A	B	0 52	60	61	65	66	62	64	65	62	59	55	56	40	26	27	A
20	25	34	39	42	45	45	56	60	62	66	69	69	69	67	70	67	70	73	65	61	58	56	49	A
21	39	A	A	A	44	50	61	B	B	A	B	B	B	B	65	64	63	66	63	63	63	46	A	A
22	A	A	A	A	B	B	B	B	A	B	B	B	A	A	44	42	42	41	41	40	A	A	A	A
23	A	A	A	A	B	B	B	B	B	A	B	A	A	B	B	B	B	B	0 51	X 46	A	A	A	A
24	A	A	A	A	A	A	A	A	A	X	B	B	B	B	B	0 56	X 55	0 51	0 56	0 49	X 43	X 32	A	A
25	A	A	A	X 28	A	42	B	B	A	A	A	S	S	B	B	B	S	S	X 61	0 50	X 41	A	A	A
26	A	A	B	A	A	B	B	0 48	X 51	0 52	0 58	X B	B	B	0 46	X S	B	0 55	0 52	0 51	X 39	A	A	A
27	A	A	A	A	A	A	A	B	A	A	B	B	0 43	X 48	0 48	X S	0 55	X 52	0 51	0 51	X 47	X 40	X 31	A
28	A	A	A	A 0	X 39	A	A	A	A 0	X 51	0 50	0 51	S	0 55	0 59	0 56	0 56	0 54	0 54	0 46	0 47	0 44	0 30	A
29	A	A	A	A	A	A 0	X 51	X 55	X 58	0 58	0 59	0 61	X 62	X 61	X 61	X 63	X 61	X 58	X 55	X 52	X 54	X 46	X 40	A
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	10	7	6	8	10	8	13	13	15	17	18	16	17	21	23	21	23	25	27	27	24	21	18	10
MED	42	38	41	46	46	50	60	60	61	61	62	64	65	64	62	64	59	58	57	55	54	51	50	42
U 0	X 47	X 49	0 51	X 50	0 56	X 53	X 64	X 68	X 66	X 71	X 71	X 71	X 70	X 68	X 68	X 66	X 65	X 64	X 61	X 60	X 58	X 56	X 55	X 54
L 0	32	36	39	X 42	44	44	0 52	X 56	0 54	X 58	X 58	X 60	X 58	X 56	X 54	X 56	X 56	X 54	X 52	X 51	X 48	X 44	X 37	X 39



IONOSPHERIC DATA STATION SHOWA ST.  
 FEB. 1988 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	39	70	36	48	60	57	41	34	33	41	41	100	71	54	61	89	36	32	35	31	34	50	31	28					
2	31	24	39	39	44	34	35	31	33	37	63	37	41	43	37	35	35	37	30	39	42	30	29	41					
3	39	68	47	45	42	41	40	31	33	36	36	36	28	36	34	35	38	31	32	30	35	32	28	27					
4	29	32	30	32	35	46	59	32	41	34	42	38	36	31	34	41	71	25	41	42	40	35	29	12					
5	32	71	112	37	52	45	37	72	42	40		B	B	B	B		28	34	32	33	38	71	43	37					
6	A	21	47	60	42	40	34	45	45	40	31	28	31	21	E B	E B	B		30	23	26	21	16	26	27				
7	35	31	60	42	36	37	38	31	46	45	24	37	36	34	33	31	36	27	32	40	43	31	26	39					
8	32	35	37	59	48	40	36	36	34	34	35	36	42	37	33	40	32	32	31	35	29	18	31	39					
9	30	37	31	30	27	35	36	39	47	28	29	41	E B	36	34	45	30	35	31	25	40	26	36	36	61				
10	57	38	55	45	39	39	40	52	46	40	40	36	E B	31	32		E B	30	29	35	B	32	41	40	36	32			
11	35	35	35	35	32	31	21	22	28	34	31	B	E B	28	35	34	33	27	35	32	33	31	60	30	40				
12	93	43	45	45	39	43	43	50	75	45		B	B	B	E B	B	E B	E B		E B	E B		21	50	36				
13	33	50	45	70	42	45	45	50	61		32	35	B		E B			27	24	28	35	45	34	36	43				
14	35	38	38	31	31	31	28	31	26	36	44	33	75	34	45	45	33	39	57	48	60	34	31	15					
15	11	28	33	38	112	45	42	45	45	60		B	B	E B	E B	E B	B	B		40	60	45	32	30	45				
16	45	42	45	36	37	33	33	31	33	32	29	28	35	36	34	28	26	27	21	37	77	42	65	90					
17	41	41	41	B	35	B	B	55	42	32	35	32	61	28	E B	E B	B	E B	B	30	30	34	43	18	30	39			
18	32	46	B	80	67	33	43	38	42	28	34	31	E B	E B	B	B	E B	E B	B	B	E B	25	17	20	70	35			
19	68	60	37	32	32	34	38	B	37	35	38	31	30	35	36	33	26	22	26	24	E B	E B	E B	34	15				
20	31	26	14	15	30	35	35	23	31	25	38	36	53	58	36	42	32	35	25	23	E B	E B	15	16	12	29			
21	25	32	39	39	28	42	36	B	B	49		B	B		31	28	E B	E B	B		19	22	45	48					
22	41	35	51	70	B	B	B	B	45	B	B	B	21	80	27	26	E B	E B	B	30	28	24	24	40	69	70	45		
23	45	81	90	108	B	B	B	B	B	29		B	36	B	B	B	B		27	26	34	42	34	35					
24	27	35	37	33	75	50	30	36	45	36		B	B	B	E B	E B	E B	E B	E B	E B	22	16	37	45					
25	41	32	32	30	E B	B	B		45	40	39	27	E B	B	B	B	E B	E B	E B	E B	29	30	28	22	32	39	43	70	
26	42	42	B	70	42	B	B	42	37	35	32	B	B	B	E B	E B	B	E B	E B	B	30	28	28	30	31	31	70	60	80
27	45	40	45	46	40	39	40	B	41	44		B	E B	E B	B		33	33	28	26	26	29	24	24	18	44	22	39	
28	39	65	51	41	33	45	39	40	44	37	E B	28	32	25	26	26	28	22	24	20	E B	19	14	30	31				
29	29	40	35	42	38	30	31	21	22	26	29	E B	30	34	38	36	35	31	45	69	30	27	13	11	25				
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	29	27	28	27	25	24	23	27	27	21	21	22	23	23	24	24	27	27	29	29	29	29	29					
MED	35	38	39	42	39	39	38	36	42	36	35	36	35	34	34	31	30	30	28	31	32	32	31	39					
U O	42	48	47	54	44	45	40	45	45	40	40	37	41	37	36	35	34	34	32	36	42	42	43	45					
L O	31	32	35	34	33	34	34	31	33	32	30	30	31	31	30	28	28	27	25	E B	24	21	18	29	28				

IONOSPHERIC DATA STATION SHOWA ST.

FEB. 1988 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	9	13	13	9	13	10	9	8	10	10	10	10	12	13	10	13	10	10	9	11	8	8	9	7			
2	8	8	10	14	15	7	8	10	8	11	13	9	10	11	13	10	10	10	9	9	8	9	9	9			
3	10	16	9	18	15	12	9	9	9	13	11	8	9	11	11	8	8	9	10	10	8	8	8	7			
4	8	8	7	7	10	13	12	8	8	9	10	10	12	15	13	13	12	11	10	8	7	8	8	7			
5	9	9	10	13	24	11	8	20	15	24		19					17	15	20	14	8	7	14	12			
6	A	12	16	23	10	10	8	13	15	19	18	14	10	8	31	34		14	15	13	11	8	9	10			
7	20	18	19	20	19	19	14	15	13	14	13	13	11	9	14	10	11	15	13	10	9	8	8	8			
8	8	10	13	11	18	12	10	9	8	11	11	12	10	13	13	12	11	10	9	8	8	9	8	12			
9	8	8	8	9	9	18	9	12	19	15	12	14	15	34	19	19	14	13	11	11	16	12	12	13			
10	8	14	10	12	22	27	23	15	15	20	24	23	19	32		26	29	9		22	20	23	12	8			
11	8	8	8	8	11	8	14	13	13	10	15		24	35	11	15	20	15	25	23	12	9	8	10			
12	8	8	19	10	8	14	11	10	35	13							31	33	23	21	21	12	10	14			
13	24	8	8	8	10	14	13	20	24		19	20					19	30	14	13	14	15	20	15	19	9	8
14	9	8	9	12	11	8	10	11	21	9	13	24	13	20	20	10	9	13	10	14	15	10	8	8			
15	8	8	8	9	15	20	10	13	8	15										23	10	14	12	8	13		
16	8	10	9	23	17	23	13	8	8	14	19	15	12	10	20	24	13	19	14	10	10	16	9	10			
17	14	20	13		15			13	14	10	10	14	9	9	30	34		30	12	11	11	10	8	9			
18	9	15		13	13	10	19	24	13	11	15	25	35	30			30	27		25	10	20	20	8			
19	15	20	25	20	20	34	24		14	9	27	23	20	23	13	14	15	14	15	24	21	19	7	8			
20	9	10	8	8	8	13	14	12	8	10	10	12	10	12	15	11	10	10	10	13	10	16	8	12			
21	8	19	11	12	14	18	21			31							23	24	24	29	23	14	15	12	8	13	
22	7	6	10	7					8				19	20	18	15	30	28	13	13	13	29	10	12			
23	13	9	9	10							13		25	19						20	12	12	13	8	16		
24	12	10	9	8	29	9	20	19	20	11							30	30	13	28	25	22	10	8	8		
25	10	10	8	8	10	26			29	21	29	20	31				29	30	28	22	11	13	10	13			
26	15	13		10	28			18	13	14	22									28	30	18	12	19	8	8	
27	12	8	9	13	13	21	14		20	19			33	33	19	18	19	17	24	24	18	9	8	8			
28	15	8	10	7	8	14	10	16	18	18	28	16	17	21	11	15	16	15	18	17	19	9	7	8			
29	8	8	12	15	15	17	13	9	10	10	17	30	14	12	11	11	12	10	9	9	8	8	8	10			
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	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29			
MED	9	10	10	11	15	14	13	13	14	13	19	20	19	21	20	15	17	15	15	13	12	10	8	9			
U O	12	14	13	14	20	24	22	22	20	19				34	33	32	30	28	24	22	16	16	10	12			
L O	8	8	8	8	10	10	10	10	8	10	12	14	12	12	13	12	12	10	10	10	8	8	8	8			

IONOSPHERIC DATA STATION SHOWA ST.  
 FEB. 1988 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 325	A	A	A	A	A	200	210	200	H	225	E A 350	E A 370	E A 340	E A 330	E A 245	200	H	H	200	230	E A 240	225	225			
2	240	265	A	A	E A 280	E A 220	200	180	H	210	200	200	200	200	200	190	H	H	205	220	235	240	250	A			
3	A	A	A	A	A	A	210	210	180	H	200	180	210	190	180	190	205	200	210	H	H	A	225	245			
4	245	250	260	E A 300	E A 300	245	A	H	220	200	190	195	210	200	205	210	E A 300	200	220	A	250	245	260	240	240		
5	E A 280	A	A	A	A	A	A	A	A	A	B	A	B	B	B	B	220	240	280	255	A	A	A	A			
6	A	A	A	A	A	A	A	A	A	A	225	200	210	210	220	210	B	H	210	220	245	230	250	245	E A 300		
7	A	E A 290	A	A	E A 290	A	A	A	A	A	220	250	200	210	225	200	220	210	225	230	240	240	250	270			
8	E A 360	E A 370	A	A	A	E A 300	225	200	200	200	A	200	205	210	200	200	H	200	220	230	225	225	250	E A 310	225		
9	E A 350	A	E A 375	E A 345	A	A	E A 200	240	A	H	200	180	180	190	225	210	210	200	200	200	A	270	A	A	A		
10	A	A	A	A	A	A	A	A	A	A	A	E A 260	E A 210	H	B	220	220	255	B	260	260	270	310	340			
11	A	A	A	A	E A 240	E A 240	E A 210	200	200	205	B	B	200	210	225	220	240	245	E A 300	E A 260	E A 250	E A 275	E A 320	A			
12	A	A	A	240	220	A	A	A	A	A	B	B	B	B	H	B	230	260	245	225	E B	260	310	A	A		
13	A	A	A	A	E A 260	E A 280	A	A	A	B	H	210	195	B	H	215	210	210	215	225	210	250	A	A	A		
14	A	A	A	E A 350	E A 300	230	225	H	215	210	200	215	E A 230	210	210	200	210	240	E A 300	E A 275	E A 280	240	250	250			
15	280	E A 350	E A 400	A	A	E A 450	A	A	A	A	B	B	B	E B	E B	E B	B	B	E A 300	A	A	E B	E B	A			
16	A	A	A	A	A	E A 245	230	210	210	210	200	200	H	225	230	230	200	230	245	A	A	A	A	A			
17	A	A	A	B	E A 345	B	B	A	E A 320	200	200	200	H	215	210	250	E B	B	B	240	210	255	350	250	250	A	
18	A	A	B	A	E A 350	E A 450	A	A	A	H	225	205	215	E A 250	E B	200	225	230	B	250	250	250	245	355			
19	A	A	A	A	A	A	A	B	230	250	A	230	190	220	195	200	215	200	220	H	240	245	240	340	410		
20	E A 370	E A 295	E A 280	E A 290	E A 345	E A 280	E A 205	200	190	H	H	220	210	H	E A 250	H	H	180	210	H	220	225	220	225	220	A	
21	E A 345	A	A	A	E A 400	A	A	B	B	A	B	B	B	B	B	230	230	A	B	240	250	240	280	275	265	A	A
22	A	A	A	A	B	B	B	B	A	B	B	B	A	A	E A 255	E A 255	250	250	250	245	A	A	A	A	A		
23	A	A	A	A	B	B	B	B	B	A	B	A	A	B	B	B	B	B	250	265	A	A	A	A	A		
24	A	A	A	A	A	A	A	A	A	260	B	B	B	B	B	220	230	220	250	280	260	290	A	A	A		
25	A	A	A	E A 400	E A 320	B	B	A	A	A	200	200	200	B	B	B	220	245	250	250	300	A	A	A	A		
26	A	A	B	A	A	B	B	A	240	E A 300	240	B	B	B	230	220	B	B	E B	225	260	255	A	A	A	A	
27	A	A	A	A	A	A	A	B	A	A	B	B	250	240	240	230	240	240	250	250	240	250	300	E A 300	A		
28	A	A	A	A	A	A	A	A	A	A	220	240	240	230	220	225	250	230	230	245	250	250	300	E A 300	A		
29	A	A	A	A	A	E A 300	225	215	200	200	225	210	200	180	205	200	200	240	220	230	230	255	230	230	255	A	
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	9	6	4	6	8	7	11	11	15	16	18	19	20	22	23	24	24	27	27	26	22	21	18	10			
MED	E A 325	E A 292	E A 328	E A 322	E A 322	E A 280	E A 240	210	212	200	202	205	204	211	210	212	219	225	230	248	244	250	242	251			
U O	E A 355	E A 350	E A 388	E A 350	E A 348	E A 320	E A 300	225	230	210	220	240	220	225	230	230	235	240	250	255	260	262	300	340			
L O	262	265	270	290	E A 275	245	210	205	200	200	200	200	200	200	200	200	200	210	220	225	230	240	240	240	240		

IONOSPHERIC DATA STATION SHOWA ST.  
 MAR. 1988 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	A	A	A	X	X	X	73	67	B	X	X	X	X	X	X	X	X	45	30	A				
2	A	A	A	A	A	60	60	65	64	70	64	66	B	0	X	76	66	72	A	60	60	51	51	53	45	46		
3	0	X	A	A	A	A	A	A	X	81	71	S	0	X	0	X	B	70	66	70	71	63	61	59	50	34	33	A
4	A	A	A	A	A	B	B	A	A	A	B	B	B	B	B	B	B	64	60	54	51	A	A	A	A	A		
5	A	A	A	A	A	B	B	A	0	X	0	X	B	B	B	B	B	B	X	X	X	X	X	X	A	A		
6	A	A	A	A	X	X	B	B	B	A	B	B	B	0	X	0	X	X	X	X	A	A	A	B	A	B		
7	A	A	A	A	B	A	A	B	A	A	B	B	X	X	X	X	X	X	X	X	X	X	X	A	A			
8	A	A	A	A	44	43	A	0	X	B	A	B	0	X	0	X	B	B	0	X	0	X	0	X	A	A		
9	A	A	0	X	X	A	0	X	A	A	B	B	0	X	0	X	S	X	0	X	B	B	A	A	X	A	A	
10	A	A	A	A	A	39	48	51	61	63	66	69	X	X	X	X	X	X	X	X	X	0	X	A	A			
11	A	A	45	B	A	46	B	B	B	B	B	B	68	70	70	67	66	X	X	B	B	B	X	A	A			
12	A	A	A	A	A	A	0	X	0	X	X	B	B	X	X	X	X	X	X	X	X	X	X	0	X	A	A	
13	A	A	A	A	A	0	X	0	X	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14	A	A	A	A	A	49	62	64	X	0	X	B	0	X	X	X	X	X	X	X	X	X	X	X	A	A	A	
15	A	A	A	A	A	A	B	0	X	A	A	S	65	B	X	0	X	B	X	B	X	X	0	X	A	B		
16	A	A	33	A	A	B	B	B	B	B	B	B	B	B	0	X	B	B	0	X	0	X	0	X	A	A		
17	A	A	A	A	A	B	A	0	X	A	B	B	B	0	X	0	X	X	B	0	X	0	X	0	X	B	A	
18	33	38	38	0	X	B	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	A	A	30		
19	A	A	0	X	A	39	45	42	0	X	X	X	X	X	X	X	X	X	X	X	X	X	60	50	44	31		
20	29	25	A	A	A	42	45	51	56	67	74	81	89	91	96	91	91	90	70	71	60	52	37	29				
21	26	A	A	36	56	B	0	X	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	32		
22	31	A	0	X	A	A	A	A	0	X	84	85	75	79	85	90	96	88	81	73	70	68	59	60	55	50	39	
23	32	A	A	A	A	A	60	65	65	70	78	86	95	93	94	87	83	76	66	66	66	56	42	A	A	A		
24	X	A	A	A	A	A	A	0	X	61	71	71	74	77	80	78	76	72	72	66	62	X	0	X	0	X	0	X
25	0	X	A	A	46	50	52	46	50	56	56	65	72	77	89	96	86	72	75	86	74	A	A	A	A	A		
26	A	A	A	A	A	A	A	B	A	A	B	B	B	0	X	0	X	B	0	X	B	0	X	A	A	A	A	
27	A	0	X	A	46	55	B	B	A	S	A	B	B	0	X	0	X	0	X	0	X	0	X	X	A	A	A	
28	B	A	A	A	A	43	38	40	A	B	B	B	B	66	70	75	66	B	B	B	B	52	A	A	A	A		
29	A	A	B	A	A	A	A	B	B	B	B	B	B	42	B	B	B	0	X	0	X	A	A	A	A	A		
30	A	A	A	A	B	A	A	B	B	B	A	B	B	B	0	X	B	B	0	X	0	X	B	A	A	A	A	
31	A	A	B	A	A	A	A	B	A	B	0	X	X	0	X	X	X	X	X	B	X	57	52	A	A	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	8	3	6	5	8	11	12	16	16	16	13	17	23	23	25	26	23	26	27	24	22	19	11	8				
MED	32	38	40	41	44	44	48	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	36	32			
U 0	0	X	0	X	44	45	46	52	49	55	64	66	71	76	78	82	89	90	81	73	71	66	62	56	50	45	42	
L 0	30	25	33	36	42	43	45	51	56	62	66	66	65	66	64	64	61	59	56	52	48	34	31	30				

IONOSPHERIC DATA STATION SHOWA ST.  
 MAR. 1988 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	A	A	A	57	66	66	F	F	B	64	59	63	57	52	54	45	47	F	F	A			
2	A	A	A	A	A	F	54	54	R	F	F	58	60	B	70	F	F	A	F	45	45	F	F	40			
3	35	A	A	A	A	A	A	A	75	65	F	S	60	64	B	F	F	65	57	55	53	44	F	F	A		
4	A	A	A	A	A	B	B	A	A	A	B	B	B	B	B	B	58	54	48	45	R	A	A	A	A		
5	A	A	A	A	A	B	B	A	41	48	B	B	B	B	B	B	B	B	59	55	49	42	32	A	A		
6	A	A	A	A	37	37	B	B	B	A	B	B	B	R	R	60	57	60	65	55	A	A	A	B	A	B	
7	A	A	A	A	B	A	A	B	A	A	B	B	59	56	59	59	60	58	55	50	54	F	F	A	A		
8	A	A	A	A	F	F	A	45	B	A	B	E	G	41	45	B	B	50	45	48	40	F	F	A	A		
9	A	A	F	F	38	37	A	A	A	B	B	40	50	S	57	65	B	B	A	A	37	A	A	A	A		
10	A	A	A	A	A	F	33	42	45	55	57	60	63	68	68	62	58	60	56	49	45	42	F	A	A		
11	A	A	F	B	A	F	B	B	B	B	B	B	F	F	F	61	60	B	B	B	F	F	F	A	A		
12	A	A	A	A	A	A	F	R	51	57	B	B	64	63	62	64	55	54	53	54	43	30	A	A	A		
13	A	A	A	A	A	38	44	59	62	65	66	65	65	70	70	63	55	54	51	47	44	F	F	F	F		
14	A	A	A	A	A	F	F	58	F	54	60	B	61	65	73	68	58	66	60	62	54	F	A	A	A		
15	A	A	A	A	A	A	B	F	55	58	A	A	S	F	B	U	S	B	F	54	45	23	A	B	B		
16	A	A	F	A	A	B	B	B	B	B	B	B	B	B	B	65	B	B	60	56	45	38	A	A	A		
17	A	A	A	A	A	B	A	43	A	B	B	B	U	S	B	69	77	84	66	59	54	58	F	F	B	A	
18	F	F	F	F	F	B	F	45	48	53	62	67	76	90	90	F	F	F	F	F	F	F	A	A	F	24	
19	A	A	27	A	F	F	B	B	F	F	F	F	79	78	84	75	70	65	62	55	54	44	38	25	F	F	
20	F	F	A	A	A	F	F	45	50	61	68	75	83	85	90	85	85	84	64	65	54	46	31	F	F	F	
21	F	A	A	F	F	B	B	45	55	60	74	89	85	91	90	85	73	73	57	56	45	41	30	F	F	F	
22	F	A	35	A	A	A	A	R	F	F	F	F	84	90	82	75	67	64	62	53	54	49	44	33	F	F	
23	F	A	A	A	A	A	F	F	F	F	F	F	89	87	88	81	77	70	60	60	50	36	A	A	A	A	
24	43	A	A	A	A	A	A	A	55	65	65	68	71	74	72	70	66	66	60	56	46	45	45	44	A	A	
25	40	A	A	F	F	F	F	F	F	R	F	F	F	F	F	F	F	F	F	F	A	A	A	A	A	A	
26	A	A	A	A	A	A	A	B	A	A	B	B	B	39	B	58	B	F	U	S	A	A	A	A	A	A	
27	A	49	A	F	F	B	B	A	S	A	B	B	43	45	48	48	45	41	37	27	F	A	A	F	A	A	
28	B	A	A	A	A	F	F	F	A	B	B	B	F	64	69	60	B	B	B	F	A	A	A	A	A	A	
29	A	A	B	A	A	A	A	B	B	B	B	B	F	B	B	B	46	43	37	F	A	A	A	A	A	A	
30	A	A	A	A	B	A	A	B	B	B	A	B	B	B	40	B	B	B	R	B	A	A	A	A	A	A	
31	A	A	B	A	A	A	A	B	A	B	48	46	48	55	54	57	56	B	50	46	F	A	A	A	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	8	3	6	5	8	11	12	16	16	16	13	17	23	23	25	26	23	26	27	24	22	19	11	8			
MED	F	F	34	F	F	F	F	47	55	60	65	65	65	70	64	64	65	56	55	54	45	36	30	F	F	F	
U 0	38	49	39	40	46	43	49	58	60	65	70	72	76	83	84	75	67	65	60	56	50	44	39	36	F	F	F
L 0	F	F	27	30	F	F	F	45	50	57	60	60	59	60	58	58	55	53	50	46	42	28	25	24	F	F	F



IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1988 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	33	34	31	32	35	55	51	42	25	31	19	E B	B	30	28	27	26	25	22	19	15	14	25	35					
2	38	70	75	41	41	28	29	28	30	38	26	33	B	E B	E B	40	61	41	37	20	19	26	25	42					
3	40	41	70	44	45	38	35	41	42	30	25	27	E B	B	E B	28	43	41	45	43	31	30	30	36					
4	35	33	36	50	43	B	B	37	49	70	B	B	B	B	E B	30	25	E B	E B	40	46	45	39	45					
5	41	70	60	45	44	B	B	45	40	32	B	B	B	B	B	B	B	27	21	E B	E B	E B	E B	31					
6	40	40	87	41	30	32	B	B	B	40	B	B	E B	B	E B	E B	36	35	38	37	40	B	42	B					
7	41	46	36	65	B	45	41	B	41	44	B	B	31	40	26	25	24	E B	E B	E B	E B	E B	E B	71					
8	75	70	43	41	37	31	35	37	B	41	B	26	26	27	B	E B	29	38	27	25	26	33	45	46					
9	41	48	37	28	43	41	30	39	40	B	B	26	E B	E B	E B	E B	B	B	B	42	64	30	40	32	41				
10	42	38	35	33	70	28	28	20	22	29	31	28	35	30	39	28	25	21	20	16	27	14	37	31					
11	92	70	30	B	E B	B	B	B	B	B	B	E B	E B	34	36	30	25	24	B	B	B	26	25	24	37				
12	31	40	90	45	50	44	31	37	31	25	B	B	30	31	30	E B	E B	E B	E B	25	23	25	14	12	E B	17	15	37	
13	93	46	60	90	37	38	37	22	22	24	28	36	27	35	35	26	23	19	22	36	25	29	24	25					
14	12	35	32	33	47	36	20	19	22	E B	E B	E B	28	26	36	43	38	30	17	39	40	36	58	46	B				
15	50	43	45	60	40	41	B	42	27	42	42	36	28	B	E B	E B	E B	E B	E B	E B	E B	E B	12	36	90				
16	105	45	33	90	42	B	B	B	B	B	B	B	B	B	E B	56	B	E B	E B	E B	E B	E B	E B	E B	E B	31	36		
17	40	45	80	52	47	B	38	35	35	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	E B	E B	E B	33		
18	31	35	33	36	35	B	31	30	37	26	26	29	27	27	29	26	23	30	27	E B	E B	13	30	40	16				
19	31	32	35	36	30	22	35	B	B	29	27	26	27	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	26		
20	29	31	39	42	32	21	16	16	22	23	26	30	28	26	26	25	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	13	
21	30	31	31	28	E 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	E B	E B	E B	E B	E B	E B	E B	E B	E B	35	
22	31	36	70	92	43	37	41	38	21	22	16	39	36	37	41	25	23	22	18	E B	E B	E B	E B	E B	E B	E B	E B	8	
23	31	35	35	32	45	39	31	22	28	24	34	32	28	27	26	25	22	20	45	E B	12	14	33	26	37	E B	E B	11	
24	43	45	45	36	45	56	43	51	30	24	27	28	35	29	26	25	37	20	16	15	29	32	11	11	E B	E B	E B	11	
25	28	35	42	29	E B	10	13	16	70	41	E B	30	42	35	34	32	24	21	22	E B	E B	E B	E B	E B	E B	E B	E B	45	
26	45	42	30	40	35	40	43	B	42	41	B	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	E B	E B	38
27	41	48	35	57	29	B	B	42	27	35	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	E B	E B	E B	E B	59
28	B	45	37	37	40	33	21	30	35	B	B	B	33	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	43
29	41	41	B	41	35	33	42	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	E B	E B	E B	E B	E B	43
30	46	40	49	45	B	20	42	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	E B	E B	E B	E B	E B	53
31	43	55	B	45	67	39	37	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	E B	E B	E B	E B	E B	40
	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	31	29	30	29	24	23	22	24	23	16	18	23	24	25	26	24	26	29	29	31	30	30	29					
MED	40	41	37	41	41	36	35	36	30	30	27	30	28	29	29	26	25	24	23	21	27	31	34	37					
U 0	43	46	60	50	45	40	41	41	40	41	31	36	33	34	32	E B	32	30	31	36	40	40	45	44					
L 0	31	35	34	36	35	29	29	22	24	25	26	28	28	28	26	25	24	22	20	17	E B	18	16	25	31				

IONOSPHERIC DATA STATION SHOWA ST.  
 MAR. 1988 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	8	8	8	8	10	11	15	9	13	11	18	32	B	25	18	17	18	13	11	10	8	9	9	8	
2	10	8	8	12	10	8	8	8	10	10	10	19	B	35	30	22	22	15	17	10	12	10	8	7	
3	7	8	8	9	19	19	15	10	13	12	10	20	29	B	30	14	17	14	17	10	8	8	8	8	
4	9	12	7	8	7	B	B	11	18	11	B	B	B	B	B	30	19	30	30	26	10	7	15	11	
5	24	19	13	15	15	B	B	20	10	13	B	B	B	B	B	B	B	20	12	20	23	13	10	8	
6	6	16	8	15	13	13	B	B	B	25	B	B	B	B	31	24	29	24	15	21	14	10	B	12	
7	14	13	10	24	B	9	23	B	21	14	B	B	26	21	20	19	17	25	22	20	10	15	13	8	
8	10	22	29	10	9	10	14	18	B	27	B	23	13	17	B	B	29	15	23	17	9	8	11	12	
9	9	8	8	8	12	9	16	18	20	B	B	22	22	31	19	33	B	B	31	18	11	8	8	8	
10	9	9	10	10	9	11	10	12	9	10	10	12	14	13	14	13	13	14	12	13	9	7	8	7	
11	20	18	9	B	30	30	B	B	B	B	B	B	B	34	30	23	13	15	B	B	B	14	9	8	8
12	11	12	13	18	13	11	10	13	13	12	B	B	24	23	19	30	25	23	19	8	9	17	8	8	
13	14	17	9	19	21	22	13	12	12	12	14	15	20	15	15	13	12	12	14	11	10	20	8	8	
14	8	9	10	18	14	18	8	8	13	29	B	40	18	19	15	18	10	10	12	8	10	10	10	12	
15	8	8	23	17	22	22	B	14	13	22	15	24	22	B	32	30	B	24	23	20	12	8	10	B	
16	10	8	8	30	31	B	B	B	B	B	B	B	B	B	B	56	B	B	30	24	23	14	7	8	
17	8	8	20	14	13	B	18	14	21	B	B	B	30	30	50	B	55	30	27	25	17	21	B	8	
18	8	10	11	13	20	B	15	21	15	13	14	14	17	19	15	17	10	14	13	18	13	9	8	8	
19	8	19	13	15	13	13	14	B	B	22	15	20	21	55	30	30	18	15	13	10	10	12	12	9	
20	8	9	9	14	12	9	8	10	11	13	11	13	14	14	20	11	25	35	32	22	12	15	8	13	
21	11	13	21	15	20	B	B	27	24	30	30	23	30	20	18	19	15	13	15	18	10	12	10	8	
22	13	10	13	9	14	13	10	12	11	12	11	11	10	13	13	13	8	11	10	11	9	9	8	8	
23	8	8	10	10	9	8	8	11	9	12	11	13	19	18	13	14	13	10	12	12	8	10	8	8	
24	13	14	12	18	18	19	23	14	10	13	10	12	11	15	14	11	12	11	9	7	9	8	11	11	
25	10	10	12	9	9	10	8	9	10	33	30	19	15	14	11	19	13	14	20	8	15	14	10	10	
26	10	13	11	14	21	15	22	B	15	28	B	B	B	30	B	30	B	15	30	12	11	9	11	21	
27	24	10	15	10	8	B	B	19	19	22	B	B	30	21	32	30	25	20	12	8	8	17	13	14	
28	B	13	8	15	30	10	12	14	18	B	B	B	25	33	28	30	B	B	B	14	9	9	9	14	
29	17	10	B	24	15	10	20	B	B	B	B	B	29	B	B	B	25	24	17	8	8	30	30	11	
30	10	8	8	14	B	14	21	B	B	B	20	B	B	B	B	B	B	27	29	B	10	9	10	18	
31	10	24	B	20	23	19	19	B	24	B	24	23	21	28	25	24	24	B	19	9	10	12	11	14	
	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	10	10	10	14	14	14	16	14	15	22	30	24	25	28	24	24	22	15	19	13	10	10	10	8	
U O	13	14	13	18	21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	29	20	12	15	11	13
L O	8	8	8	10	10	10	10	11	11	12	14	19	18	18	15	14	13	14	12	10	9	9	8	8	

IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1988 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	E A	275	215	180	225	215	B	200	200	220	215	H	200	230	215	225	225	330	0	A					
2	A	A	A	A	A	A	E A	280	215	200	200	200	200	B	240	230	A	A	250	230	245	225	245	240	330	E A	A					
3	E A	A	A	A	A	A	A	A	E A	300	220	215	200	210	B	210	215	240	250	250	240	225	E A	E A	E A	A	A					
4	A	A	A	A	A	B	B	A	A	A	B	B	B	B	B	B	240	230	255	275	A	A	A	A	A	A	A					
5	A	A	A	A	A	B	B	A	A	240	B	B	B	B	B	B	B	B	225	225	225	240	250	A	A	A	A					
6	A	A	A	A	E A	E A	B	B	B	A	B	B	B	250	230	225	240	300	E A	A	A	A	B	A	B	B	A					
7	A	A	A	A	B	A	A	B	A	A	B	B	250	250	225	225	220	230	225	220	220	300	E B	A	A	A	A					
8	A	A	A	A	A	E A	A	A	B	A	B	230	210	200	B	B	E B	E A	290	400	290	290	295	A	A	A	A					
9	A	A	240	240	E A	A	A	A	A	B	B	220	210	230	225	250	E B	B	B	A	A	280	A	A	A	A	A					
10	A	A	A	A	A	E A	E A	250	220	230	210	200	200	200	225	220	225	220	230	240	255	280	A	A	A	A	A					
11	A	A	E A	B	A	E B	B	B	B	B	B	B	E B	E B	B	250	250	230	230	240	B	B	B	240	260	A	A	A				
12	A	A	A	A	A	A	E A	A	E A	255	220	B	B	225	225	240	225	215	210	240	225	250	360	E B	A	A	A					
13	A	A	A	A	A	A	A	270	245	230	210	200	215	210	200	220	225	230	225	225	230	225	340	380	E A	E A	E A					
14	A	A	A	A	A	A	E A	240	240	225	B	E B	320	220	230	225	260	225	240	225	265	280	A	A	A	A	A					
15	A	A	A	A	A	A	B	A	250	A	A	E A	300	240	B	250	225	B	240	260	245	245	450	E A	A	B	B					
16	A	A	E A	A	A	B	B	B	B	B	B	B	B	B	B	E B	B	B	B	250	240	240	255	A	A	A	A					
17	A	A	A	A	A	B	A	E A	400	A	B	B	B	240	225	270	E B	B	E B	250	225	240	240	270	E B	B	A					
18	A	A	E A	E A	E A	E A	B	E A	E A	275	250	230	210	220	230	230	220	210	215	220	210	240	A	A	280	A	A					
19	A	A	E A	E A	E A	E A	B	B	260	240	230	225	290	240	245	230	225	210	210	220	225	230	280	E A	280	E A	A					
20	E A	0	A	A	A	E A	E A	245	245	225	210	210	220	205	200	225	240	225	225	220	220	235	250	295	E B	280	E B					
21	E A	A	A	0	E A	B	B	E B	270	240	240	230	240	225	225	220	225	210	210	210	225	225	225	250	275	E A	E A					
22	E A	A	E A	A	A	A	A	E A	350	200	190	230	230	225	225	220	220	225	220	210	210	225	210	225	240	A	A					
23	E A	A	A	A	A	A	E A	E A	270	240	230	230	230	225	225	225	230	225	225	215	225	275	290	A	A	A	A					
24	260	A	A	A	A	A	A	A	E A	280	245	225	210	230	230	230	230	225	210	205	200	210	245	240	250	A	A					
25	E A	A	A	E A	E A	E A	E A	H	205	240	230	225	250	220	225	215	225	225	240	240	E A	A	A	A	A	A	A					
26	A	A	A	A	A	A	A	B	A	A	B	B	B	250	B	270	B	B	270	340	A	A	A	A	A	A	A					
27	A	A	A	A	250	B	B	A	220	A	B	B	260	265	275	260	250	265	270	340	E A	A	A	E A	A	A	A					
28	B	A	A	A	A	A	A	0	280	A	B	B	B	275	275	260	280	B	B	B	B	280	A	A	A	A	A					
29	A	A	B	A	A	A	A	B	B	B	B	B	270	B	B	B	255	300	355	A	A	A	A	A	A	A	A					
30	A	A	A	A	B	A	A	B	B	B	A	B	B	B	B	B	B	B	E B	E B	B	A	A	A	A	A	A					
31	A	A	B	A	A	A	A	B	A	B	275	230	245	250	230	240	240	B	275	330	A	A	A	A	A	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	7	1	6	4	7	7	9	14	16	16	14	18	23	24	25	25	23	26	27	24	22	18	10	8								
MED	E A	0	E A	U	E A	E A	E A	U	315	400	388	342	330	340	325	256	235	230	225	218	225	228	225	225	225	228	228	228	238	238	242	280
U 0	E A		E A		E A	E A	E A	E A	E A	340	400	430	400	360	360	280	252	240	230	230	245	250	235	248	240	255	260	245	250	290	325	312
L 0	290		320	300	300	300	300	245	220	220	210	210	220	225	218	222	225	220	225	220	225	220	240	262								

IONOSPHERIC DATA STATION SHOWA ST.  
 APR. 1988 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	B	B	A	A	A	B	X	B	B	B	B	X	B	X	X	X	A	A	A	A	A			
2	A	A	A	A	A	A	A	B	B	B	B	B	B	S	B	B	B	X	X	36	30		A	A	A		
3	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	49		B	A	A	A		
4	A	A		A	A	A	A	A	A	B	B	B	B	B	B	S	B	B	B	A		30	A	A	B		
5	A	A	A	A	A	B	A	B	B	B	B	B	B	B	X	X	B	X	X	30	23		A	A			
6	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	X	A	A	A	A	A			
7	A	A		A	X	A	A		B	B	B	B	B	B	S	X	X	X	0	X	A	A	A	A			
8	A	A	A	A	A	A	X	45	50	55	65	72	84	88	90	96	76	73	55	45	45	45	26	A			
9	A	A	A	B	B	B		44	46	48	54	65	74	80	88	94	96	86	78	63	50	46	40	33	25		
10	A	A	A	A		35	38	38	A	60	61	66		70	80	86	86	90		98	39	29	A	A	A		
11	A	A	A	X	A	B		49	50	53	61	75	94	100	113	106	111	99	84	80	68	38	34	28	26		
12	A	A	A	A	A	B	B	B		64	67	72	76	82	81	92	94	94	90	86	60		A	B	A	A	
13	A	X	A	A	A	A	A		43	B	X	X	X	X	X	X	X	X	X	X	0	X		B	A		
14	A	B	A	A	A	A	A	B	0	X	X		45	51	66	72	74	84	92	92	80	82	76	67	56	29	33
15	X	A	A	A	A	A		46	46	51	62	72	81	91	94	95	96	95	86	65	62	45	34	30	29		
16	28	A	A	A	43	50	54	53	56	66	76	90	96	101	111	98	90	77	69	51	41		A	A	A		
17	A	A	A		31	32	38	46	54	60	77	90	100	96	113	115	115	106	84	67	56	51	41	41	30		
18	25	24	A	A	A	A	A	A	B	A	B		82	96	94	98	104	90	80	60	53	33	25		B	B	
19	B						B			X	X	X	X	X	X	X	X	X	X	X	0	X		A		A	
20	A	A	A	A	0	X	X	52	47	54	63	76	95	105	100	110	115	104	82	60	66	43		A	0	X	A
21	A	A	A	B	A	A	A	A	A	0	X	X	X		X	X	X	X	X	X	0	X	B	24	24		
22	A	A	A	A	B	B	A	B	B	A	A	A		39	36		90		B	S		A	A	0	X	A	
23	A	A	A	A	A	A	A	A	A	A	B	B	B	0	X	X	X	X	X	48			A	A	A		
24	A	A	A	A	A	A	A		31	41	53	51	66	69	71	76	77	60	53	54	44	26	17		B	A	
25	A	A	A	B	A	A		39	42	45	49	63	64	76	90	88	87	76	65	55	47	34		A	A	A	
26	A	A	A	A	A	A	B	B	B	B		64	72	90	90	90	88	72	52	43	40	28		B	B	B	
27	A	A	A	A		35	33	41	48	56	68	73	80	88	88	90	76	56	51	46		S	A	A	A		
28	X	A	A	A	A	A	A	A	A	A	A	0	X	0	X	0	X	0	X	X	31		A	A	A	A	
29	A	A	A	A	A	A	A	A		37	45	46	B	B	0	X	0	X	0	X	S	0	X	B	B	B	B
30	X	A	A	A	A	A	A		45	A	0	X	B		B	0	X							A	A	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	5	3	3	3	7	6	9	14	15	19	18	19	20	23	24	24	23	25	27	25	21	11	10	5			
MED	28	27	36	38	38	40	46	45	50	61	67	75	85	88	92	93	86	74	60	50	38	34	30	26			
U 0	41	40	36	54	43	43	50	47	56	63	75	90	96	95	104	101	95	82	67	61	46	41	33	30			
L 0	24	24	34	31	35	38	38	42	45	51	64	72	75	80	81	86	74	52	46	40	30	25	28	24			

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1988 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	B	B	A	A	A	B		B	B	B	B	U R	B			R	A	A	A	A	A	
2	A	A	A	A	A	A	A	B	B	B	B	B	B	S	B	B	B		45	35	30	F	F	A	A
3	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	F	B	A	A	
4	A	A	F	A	A	A	A	A	A	B	B	B	B	B	B	S	B	B	B	A		F	A	A	
5	A	A	A	A	A	B	A	B	B	B	B	B	B	B	B		B				F	F	A	A	
6	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	R	A	A	A	A	A	
7	A	A	F	A	A	A	F	B	B	B	B	B	B	S						F		A	A	A	
8	A	A	A	A	A	A	F										80	76	70	60	50		F	A	
9	A	A	A	B	B	B	F	39	44	49	59	66	78	82	84	90		R		F	F	F	F	F	
10	A	A	A	A	F	F	F	A				S	F	F	F	F	F		B	F	F	F	A	A	
11	A	A	A	A	A	B	F	F	F	F	F	F	94	107	100	105	83	78	74	62	F	F	F	F	
12	A	A	A	A	A	B	B	B	F									J S		F	A	B	A	A	
13	A	U S	A	A	A	A	A	F	B														F	B	
14	A	B	A	A	A	A	A	B															F	A	
15	38	A	A	A	A	A	F	F	45	56	66	75	85	88	89	90		F		F		F	F	F	
16	F	A	A	A	F	F	F	F	F													F	A	A	
17	A	A	A	F	F	F	F	F	50	60	70	84	90	95	105	92	84	71	63	45				F	
18	F	F	A	A	A	A	A	A	B	A	B	F	F	F	F								B	B	
19	B	F	F	F	F	F	B	F	F								U S	U S	J S	F	F	F	F	A	
20	A	A	A	A	U S	F	F	F	F	F	F	F	99	99	108	109	105	82	70	57	F	F	A	A	
21	A	A	A	B	A	A	A	A	A				F	F	R	R	R					B	F	F	
22	A	A	A	A	B	B	A	B	B	A	A	A	F	F	B	F	B	S	F	A	A	A	A	A	
23	A	A	A	A	A	A	A	A	A	A	B	B							F	F	F	F	A	A	
24	A	A	A	A	A	A	A	F	F										F	F	F	F	B	A	
25	A	A	A	B	A	A	F	F	F										F	F	F	F	A	A	
26	A	A	A	A	A	A	B	B	B	B	F											B	B	B	
27	A	A	A	A	F	F	A	F	F	R												R	A	A	
28	38	A	A	A	A	A	A	A	A	A	A											F	A	A	
29	A	A	A	A	A	A	A	A	F													B	B	B	
30	16	A	A	A	A	A	A	F	A													F	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	5	3	3	3	7	6	9	13	15	19	18	19	20	23	24	24	23	25	27	25	20	11	10	5	
MED	22	21	30	32	32	34	40	39	44	55	61	69	79	82	86	87	80	68	54	44	30	28	24	20	
U O	38	34	30	48	37	37	44	42	50	57	69	84	90	89	98	95	88	76	60	55	40	35	27	24	
L O	18	18	28	25	29	32	32	36	39	45	58	66	69	74	75	80	68	46	40	34	24	19	22	18	

IONOSPHERIC DATA STATION SHOWA ST.  
 APR. 1988 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	46	41	44	B	B	42	62	43	B	29	B	B	B	B	E B	B	E B	E B	E B	E B	36	29	40	35	40			
2	41	45	35	36	35	29	39	B	B	B	B	B	B	E B	B	B	B	33	41	37	27	40	46	40				
3	45	45	23	41	40	40	B	B	B	B	B	B	B	B	B	B	B	B	B	E B	19	59	90	57				
4	44	32	36	80	36	43	43	69	110	B	B	B	B	B	B	E B	B	B	B	B	28	43	71	108				
5	43	40	43	41	35	B	35	B	B	B	B	B	B	B	E B	E B	B	E B	E B	E B	E B	E B	E B	E B				
6	46	60	70	B	B	B	38	B	B	B	B	B	B	B	B	B	B	B	E B	B	24	39	30	29	45	45		
7	34	26	31	30	29	28	33	31	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	B	37	37	39	40	39		
8	37	37	42	39	36	34	31	15	21	E B	21	37	23	25	26	E B	24	22	26	36	28	18	18	30	29	31		
9	36	35	35	B	B	B	40	39	E B	20	26	25	26	26	27	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B			
10	18	37	80	41	35	28	40	45	42	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	38	29	45	40	35	30			
11	37	56	50	43	52	B	41	46	25	24	24	30	35	30	E B	E B	E B	E B	E B	E B	11	13	29	20	18	21		
12	40	39	70	70	45	B	B	B	35	27	22	26	24	25	32	18	E B	17	30	E B	13	42	19	25				
13	41	37	31	40	36	45	45	41	28	32	28	34	69	26	35	35	30	20	27	16	13	E B	B	32				
14	57	B	41	40	42	59	43	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	15	13	41	29	28	30		
15	20	46	43	45	39	40	35	19	E B	17	17	25	36	24	22	24	26	E B	19	12	13	10	13	10	16	12		
16	24	58	40	47	46	20	12	11	14	41	25	29	22	24	24	28	32	26	29	17	20	37	65	16				
17	27	30	28	23	15	41	31	13	15	18	27	30	34	22	25	22	19	35	E B	9	12	9	12	11	37			
18	29	31	47	41	44	67	60	56	B	39	34	27	26	23	26	41	13	13	19	19	13	E B	B	B				
19	B	12	28	12	12	11	B	E B	19	31	19	23	29	29	14	23	23	19	27	16	12	12	32	15	31			
20	39	42	42	48	42	37	20	13	40	19	21	21	23	23	22	36	35	22	13	12	42	40	20	32				
21	71	58	40	B	36	41	44	41	41	44	39	32	29	30	22	22	E B	32	36	12	13	20	E B	E B				
22	36	40	31	44	B	B	45	B	73	42	42	32	43	B	28	B	E B	30	38	44	45	45	52	40				
23	52	62	41	36	36	37	61	46	41	41	B	B	E B	E B	E B	E B	28	22	21	17	17	22	16	14	31	35	36	
24	59	40	37	41	41	41	41	19	35	21	46	22	22	34	20	20	20	12	E B	E B	9	8	30	10	B	34		
25	70	41	35	B	43	37	37	29	33	40	30	30	25	14	22	20	32	15	26	16	30	32	43	41				
26	46	32	41	36	38	35	B	B	B	B	30	37	27	32	17	32	16	E B	E B	E B	E B	10	21	B	B	B		
27	32	36	42	37	31	45	41	42	42	71	23	35	34	21	25	33	15	E B	9	35	20	14	37	46	58			
28	52	42	92	95	18	58	43	45	29	41	37	35	E B	E B	E B	B	E B	E B	E B	E B	30	23	15	17	31	35	35	43
29	47	57	45	41	42	43	43	44	46	26	28	B	E B	E B	E B	E B	E B	E B	E B	B	B	B	B	B	B	B		
30	28	32	25	28	34	30	40	39	38	33	B	E 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																												
	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	29	30	25	26	24	26	22	20	23	20	21	20	24	25	25	24	26	27	29	28	26	25	25				
MED	41	40	41	41	36	40	40	40	34	28	28	30	26	25	E B	24	24	U	U	E B	15	28	32	35	34			
U O	46	46	44	44	42	43	43	45	41	41	34	34	32	31	28	33	32	30	28	28	34	40	46	40				
L O	33	34	35	36	35	32	35	19	23	21	24	26	24	23	22	22	19	E B	E B	E B	E B	E B	E B	20	29			

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1988 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	30	25	B	B	11	20	19	B	29	B	B	B	B	30	B	25	23	25	11	11	11	20	21	
2	11	15	22	26	26	12	15	B	B	B	B	B	B	30	B	B	B	20	19	14	9	9	12	22	
3	14	15	9	25	21	29	B	B	B	B	B	B	B	B	B	B	B	B	B	19	B	11	20	13	
4	10	8	9	10	8	22	28	15	22	B	B	B	B	B	B	25	B	B	B	8	8	14	13	B	
5	11	8	13	10	8	B	20	B	B	B	B	B	B	B	28	25	B	30	22	19	13	10	14	10	
6	8	13	14	B	B	B	23	B	B	B	B	B	B	B	B	B	B	B	24	10	8	9	12	13	
7	14	8	8	9	9	11	13	11	B	B	B	B	B	B	32	55	30	26	20	24	9	8	8	9	
8	15	20	18	12	20	20	13	8	15	21	24	15	19	18	24	19	15	10	8	8	8	9	9	8	
9	8	8	8	B	B	B	13	13	20	19	19	21	24	20	24	35	35	24	19	18	32	21	20	11	
10	8	18	8	11	10	10	8	25	14	20	30	27	27	20	25	35	25	B	10	19	9	7	8	7	
11	14	8	12	8	19	B	13	8	14	13	14	30	19	19	24	24	21	13	11	13	8	9	9	10	
12	9	8	50	20	33	B	B	B	26	17	15	14	14	13	13	14	24	13	13	13	8	B	13	9	
13	10	13	15	13	9	20	13	8	B	20	13	14	19	19	13	12	12	30	20	13	10	13	B	8	
14	8	B	12	20	24	19	20	B	28	31	30	34	32	54	50	24	24	15	16	13	22	8	12	9	
15	13	9	14	18	12	12	10	10	17	14	13	13	15	19	18	16	19	8	13	10	13	10	8	8	
16	8	23	10	13	14	10	9	8	10	11	11	11	13	13	13	13	8	8	22	8	8	13	13	10	
17	10	8	8	9	9	17	9	9	9	13	11	13	14	14	14	13	10	22	9	8	9	9	8	8	
18	8	8	14	20	15	15	17	15	B	25	B	24	21	20	23	14	14	13	13	19	10	13	B	B	
19	B	8	8	8	8	8	B	19	10	15	18	19	21	14	23	23	19	9	10	8	8	8	8	8	
20	12	13	12	13	10	14	9	8	8	14	15	15	18	19	18	14	13	8	8	8	12	8	10	9	
21	25	8	29	B	14	23	24	24	25	20	17	20	23	19	18	22	23	24	12	13	20	B	13	8	
22	8	8	8	18	B	B	12	B	B	20	29	19	11	18	B	18	B	30	13	9	8	10	7	8	
23	8	8	10	9	23	10	21	14	12	29	B	B	B	28	22	21	10	9	8	10	8	7	7	8	
24	9	9	20	19	29	16	13	19	15	11	12	14	10	8	9	11	10	9	9	8	8	8	B	8	
25	13	13	11	B	26	12	10	10	13	19	13	30	19	14	22	12	10	15	18	9	9	9	8	8	
26	10	18	18	14	11	14	B	B	B	B	19	19	14	13	15	10	9	13	13	10	10	B	B	B	
27	8	10	11	11	8	12	12	9	13	25	23	10	10	15	13	10	8	9	8	20	14	9	13	8	
28	8	8	14	18	8	19	9	9	23	29	23	20	23	23	29	B	30	23	15	17	11	7	8	8	
29	14	14	24	12	24	21	15	16	8	13	28	B	B	B	30	31	33	29	30	B	B	B	B	B	
30	8	8	8	14	13	14	17	10	17	23	B	25	B	53	22	22	14	18	12	17	12	13	13	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	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	10	9	12	14	14	16	14	15	21	20	24	22	22	20	24	22	22	19	13	13	10	10	12	9	
U O	13	15	18	20	B	B	21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
L O	8	8	9	11	9	12	12	9	13	15	15	15	15	15	18	14	12	10	10	9	8	8	8	8	

IONOSPHERIC DATA STATION SHOWA ST.  
 APR. 1988 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	B	B	A	A	A	B	E B	B	B	B	B	B	B	250	250	240	245	A	A	A	A	A				
2	A	A	A	A	A	A	A	B	B	B	B	B	B	E B	B	B	B	E A	E A	E A	E A	E A	A	A	A				
3	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	240	B	A	A	A				
4	A	A	E A	A	A	A	A	A	A	B	B	B	B	B	B	E B	B	B	B	B	A	E A	A	A	B				
5	A	A	A	A	A	B	A	B	B	B	B	B	B	B	B	260	260	B	B	B	A	E A	A	A	A				
6	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	255	A	A	A	A	A				
7	A	A	E A	A	E A	A	A	E A	B	B	B	B	B	B	B	260	270	245	240	225	250	A	A	A	A				
8	A	A	A	A	A	A	A	E A	260	250	230	245	225	230	225	225	210	200	215	230	230	245	E A	A	A				
9	A	A	A	B	B	B	E A	E A	310	250	230	245	225	230	225	225	210	200	215	230	230	245	E B	0	A				
10	A	A	A	A	A	E A	E A	E A	310	255	250	240	240	230	240	245	225	B	0	E A	A	A	A	A	A				
11	A	A	A	A	A	B	A	A	270	230	240	240	230	225	220	220	210	215	210	215	A	255	E A	E A	E A				
12	A	A	A	A	A	B	B	B	E A	225	240	245	230	230	240	245	215	240	240	225	A	B	A	A	A				
13	A	A	A	A	A	A	A	A	B	265	250	230	230	240	230	240	210	200	210	205	225	255	B	A	A				
14	A	B	A	A	A	A	A	B	E B	E B	B	B	E B	E B	255	230	220	210	205	225	225	260	E A	A	A				
15	250	A	A	A	A	A	A	E A	300	260	240	230	230	230	210	215	215	195	200	205	200	225	270	275	A				
16	300	A	A	A	E A	E A	E A	E A	475	375	330	280	245	225	210	230	215	205	220	210	200	210	E A	A	A				
17	A	A	A	A	E A	E A	E A	E A	400	400	430	350	265	225	230	210	210	205	210	210	200	200	190	200	215	230	230	240	
18	E B	E B	B	A	A	A	A	A	340	400	A	A	B	A	B	230	230	230	220	220	210	205	200	220	225	E B	B	B	
19	B	E A	E A	E A	E A	E A	A	B	0	260	230	220	225	225	220	215	200	210	195	195	200	215	310	300	E A	E A	A		
20	A	A	A	A	A	A	E A	E A	355	290	250	230	225	230	225	220	230	215	205	200	200	225	A	E A	E A	A	A		
21	A	A	A	B	A	A	A	A	A	E A	E A	E A	340	245	240	245	230	230	220	205	220	220	215	240	B	E B	E A	A	
22	A	A	A	A	B	B	A	B	B	A	A	A	E A	E A	A	B	260	270	240	B	E B	E A	A	A	A	A	A	A	
23	A	A	A	A	A	A	A	A	A	A	B	B	B	E B	E B	B	300	270	270	260	250	260	260	275	A	A	A	A	
24	A	A	A	A	A	A	A	E B	E A	400	315	250	240	240	230	225	220	210	200	190	210	200	220	240	B	A	A	A	
25	A	A	A	B	A	A	E A	E A	E A	420	360	290	250	240	240	240	225	225	210	195	220	225	200	300	E A	A	A	A	
26	A	A	A	A	A	A	B	B	B	B	B	B	240	250	230	210	200	200	195	190	200	210	200	B	B	B	B	B	
27	A	A	A	A	E A	E A	A	E A	A	400	425	375	290	250	230	215	215	220	225	200	200	200	220	230	250	A	A	A	A
28	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	E A	305	260	220	275	E B	B	E B	E B	B	A	A	A	A
29	A	A	A	A	A	A	A	A	E A	E A	E B	B	B	B	B	B	245	240	225	225	255	E A	B	B	B	B	B	B	B
30	E B	A	A	A	A	A	A	E A	A	360	400	250	B	240	B	E B	B	250	225	205	200	200	215	E B	E B	A	A	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	4	3	3	2	5	5	6	12	15	19	18	20	20	24	25	25	24	26	27	25	20	11	9	5					
MED	320	360	340	362	400	380	378	325	262	240	238	238	230	226	228	220	210	206	218	222	226	250	E A	U	270				
U 0	E B	E B	E A		E A	E A	E A	E A	E A	E A				E B			E				E A	E A	E A	E A					
L 0	350	400	375		438	428	400	388	315	275	245	242	242	242	245	242	225	240	250	250	272	260	315	328					
	275	270	280		320	370	350	295	260	230	230	230	225	220	220	210	200	200	205	208	222	240	272	258					



IONOSPHERIC DATA STATION SHOWA ST.

MAY 1988 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	0 X 45	A	A	A	A	A	A	0 X 52	49	X	X	X	X	X	X	X	68	65	45	40	40	26	A	A
2	A	A	A	A	31	32	B	A	A	X	54	56	70	80	82	100	100	75	71	54	45	B	A	A
3	36	A	A	A	A	A	A	A	X	0 X	0 X	0 X	X	X	X	X	66	66	0 X	B	B	B	A	A
4	0 X 39	A	A	A	A	B	A	A	A	B	B	B	B	X	X	X	S	S	0 X	0 X	B	B	A	45
5	A	A	A	A	37	41	0 X	0 X	0 X	X	X	X	X	B	B	B	0 X	96	101	46	B	B	B	A
6	A	A	A	B	A	A	A	A	A	A	B	B	B	B	X	A	A	44	40	A	A	A	A	A
7	A	A	A	A	A	A	A	A	A	X	X	X	X	X	X	X	X	X	0 X	0 X	29	24	A	A
8	A	A	A	B	A	A	B	A	40	42	51	B	0 X	X	X	X	96	76	71	49	38	A	A	A
9	A	A	A	A	A	A	0 X	A	44	42	51	66	B	B	B	B	55	61	56	B	B	A	A	A
10	0 X 47	A	A	A	A	B	A	A	47	B	0 X	51	65	70	80	84	90	B	68	65	36	B	B	A
11	A	A	A	A	A	A	A	A	A	A	X	61	66	B	0 X	0 X	X	X	0 X	0 X	33	B	B	B
12	A	X	X	A	A	B	0 X	A	A	X	X	X	X	79	76	76	69	64	51	43	30	B	B	B
13	B	32	A	A	A	A	A	A	0 X	55	56	60	76	88	86	96	72	61	62	62	36	30	21	B
14	B	B	A	A	A	B	B	B	31	39	59	70	76	86	96	72	S	S	51	36	B	A	B	A
15	B	A	A	A	A	A	54	A	A	B	X	X	0 X	0 X	0 X	0 X	X	X	31	20	0 X	0 X	0 X	0 X
16	B	B	B	0 X	X	B	B	A	A	A	B	0 X	50	60	61	86	88	0 X	95	90	76	A	A	A
17	A	A	A	A	A	A	A	A	A	B	B	X	56	53	53	90	86	91	0 X	0 X	A	A	A	A
18	A	A	A	A	A	B	B	A	A	A	B	B	B	B	B	70	B	53	B	B	B	B	B	A
19	A	A	B	B	B	A	A	A	A	35	43	55	X	X	B	B	78	62	46	40	45	0 X	B	A
20	A	A	A	A	A	A	A	A	0 X	36	40	49	54	70	68	70	A	40	49	41	27	B	B	A
21	A	A	A	A	A	A	A	A	A	B	B	B	74	75	76	60	X	47	60	30	24	B	B	A
22	A	A	A	A	A	A	B	0 X	48	51	B	0 X	54	66	61	73	70	53	51	42	31	B	B	B
23	A	X	33	29	30	30	34	X	A	A	0 X	51	60	60	76	73	76	71	46	36	34	B	B	A
24	A	A	B	A	A	A	A	X	X	41	43	B	0 X	46	55	72	81	72	56	50	55	B	B	A
25	A	A	A	A	A	A	A	46	44	44	57	73	80	75	76	65	0 X	0 X	31	B	B	A	B	B
26	A	A	A	A	B	A	A	45	B	A	60	71	61	66	65	67	52	46	41	25	0 X	0 X	B	B
27	A	B	A	A	30	B	B	B	28	31	53	61	62	72	69	56	49	35	A	A	B	A	B	A
28	A	A	A	A	30	47	B	B	B	31	51	A	S	X	61	62	55	35	31	31	0 X	A	B	B
29	B	B	B	B	29	34	B	B	B	B	B	B	X	77	75	61	43	42	36	40	30	0 X	B	B
30	A	36	32	29	A	A	A	B	A	0 X	45	44	56	B	X	85	75	55	53	B	0 X	B	B	A
31	41	A	A	A	B	B	A	X	44	45	43	51	67	X	X	75	75	55	55	57	B	A	B	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	5	3	3	8	6	6	7	13	20	23	24	23	26	27	27	26	29	27	16	6	3	1	2
MED	43	36	33	29	30	38	46	45	43	44	53	65	74	75	76	71	53	55	43	30	28	21	20	33
U 0	0 X 46	X	X	0 X	40	43	54	48	48	46	59	68	76	80	86	76	68	64	51	37	33	26		
L 0	38	33	32	29	30	32	36	44	38	41	51	56	66	68	72	60	47	45	36	26	24	18		

IONOSPHERIC DATA STATION SHOWA ST.  
MAY 1988 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	39	A	A	A	A	A	A	46	F	41	49	60	64	74	84	69	F	F	F	F	F	F	A	A
2	A	A	A	A	F	F	B	A	A	48	50	64	74	76	94	94	69	65	48	39	F	B	A	A
3	F	A	A	A	A	A	A	A	37	40	45	60	70	70	70	69	F	B		B	B	B	A	A
4	A	R	A	A	A	B	A	A	A	B	B	B	B	54	59	52	S	45	31	24	F	B	B	F
5	A	A	A	A	F	F	45	42	F	40	53	55	64	67	B	B	90	95	40	F	B	B	A	A
6	A	A	A	B	A	A	A	A	A	A	B	B	B	B	94	A	A	F	F	A	A	A	A	A
7	A	A	A	A	A	A	A	A	A	37	48	55	60	62	69	65	47	57	43	23	F	F	A	A
8	A	A	A	B	A	A	B	A	F	F	R	B	R	68	69	69	90	70	65	43	32	F	A	A
9	A	A	A	A	A	A	A	A	A	F	U	S	B	B	B	B	F	55	50	F	B	B	A	A
10	41	A	A	A	A	B	A	A	F	B	R	F	F	F	F	F	B	F	F	F	F	B	B	A
11	A	A	A	A	A	A	F	A	A	F	F	60	B	70	70	70	63	58	45	37	F	F	B	B
12	A	32	29	A	A	B	A	A	A	37	47	59	F	70	75	70	F	F	F	F	B	B	B	B
13	B	F	A	A	A	A	A	A	F	R	F	F	F	80	80	90	66	55	56	56	30	F	F	B
14	B	B	A	A	A	B	F	B	F	F	F	F	70	80	90	66	S	45	30	F	B	A	B	A
15	B	A	A	A	A	A	F	A	A	B	F	67	U	R	87	70	45	50	25	F	F	14	12	14
16	B	B	B	37	40	B	B	A	A	A	B	44	F	F	F	F	89	F	U	S	A	A	A	A
17	A	A	A	A	A	A	A	A	A	B	B	50	R	B	B	F	80	85	A	A	A	A	A	A
18	A	A	A	A	A	B	B	A	A	A	B	B	B	B	B	F	64	45	F	B	B	B	B	A
19	A	A	B	B	B	A	A	A	A	F	37	49	B	B	F	F	F	F	F	U	S	B	A	B
20	A	A	A	A	A	A	A	A	A	F	37	49			72	56	40	34	39	F	F	B	B	A
21	A	A	A	A	F	F	A	A	A	B	B	B	F	F	F	F	F	F	F	F	F	B	B	A
22	A	A	A	A	A	A	A	B	42	45	B	D	S	F	F	67	F	F	U	S	F	B	B	A
23	A	F		F	F	F		A	A	45	54	54	F	70	67	70	65	40	30	28	B	B	B	A
24	A	A	B	A	A	A	A	35	37	B	40	49	66	75	66	50	44	49	B	B	B	B	A	A
25	A	A	A	A	A	A	A	F	F	F	F	F	74	69	70	59	F	R	26	F	B	B	A	B
26	A	A	A	A	B	A	A	F	B	A	F	F	55	60	59	61	F	40	35	19	B	B	B	A
27	A	B	A	A	F	B	B	B	F	F	47	55	56	66	63	50	43	29	A	A	B	A	B	A
28	A	A	A	A	F	F	B	B	B	F	25	45	A	S	55	56	49	29	F	F	A	B	B	B
29	B	B	B	B	F	F	B	B	B	B	B	B	70	69	55	37	36	30	34	24	19	B	B	B
30	A	F	F	F	A	A	A	B	A	39	38	50	B	79	F	49	46	B	B	B	B	B	A	A
31	35	A	A	A	B	B	A	38	F	F	45	60	70	68	69	69	49	49	51	F	B	A	B	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	5	3	3	7	6	6	6	13	20	23	24	23	26	27	27	26	29	27	16	6	3	1	2
MED	37	30	27	23	24	32	40	39	37	38	47	60	68	69	70	65	47	49	37	24	22	15	14	27
U 0	40	32	29	37	36	37	48	42	42	40	53	62	70	74	80	70	62	58	45	31	27	20		
L 0	32	27	26	23	24	26	30	38	32	35	45	50	60	65	66	54	41	39	30	20	18	12		

IONOSPHERIC DATA STATION SHOWA ST.

MAY 1988 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	40	44	45	58	59	47	32	16	16	18	E B	E B	E B	41	37	16	E B	10	16	16	27	E B	16	17				
2	36	41	32	37	32	32	B	58	58	42	40	18	21	17	E B	E B	E B	E B	E B	E B	E B	E B	B	43	40	40			
3	80	46	41	40	40	39	59	60	44	32	28	22	29	25	24	23	14		E B	E B	E B	E B	B	B	39	45			
4	41	46	36	35	43		41	43	43		B	B	B		E B	E B	E B	E B	E B	E B	E B	E B	B	B	52	67			
5	39	42	45	45	36	30	35	40	17	36	20	27	E B	E B	B	B	E B	E B			B	B	B		22	32			
6	42	51	85	B	41	41	54	47	70	48		B	B	B	E B	20	25	32	30	27	42	45	52	42	30				
7	90	88	46	42	52	48	41	36	40	34	27	26	42	72	27	22	E B	E B	E B	E B	E B		12	32	36	53			
8	69	70	42	B	42	40		37	E B	E B	E B	B	E B	E B	E B	30	E B	E B	E B	E B	36	43	40	38	44				
9	45	70	56	43	32	45	52	45	37	25	31	24		B	B	B	E B	E B	E B	E B		B	B	21	20	29			
10	41	60	80	48	56		42	45	52		B	E B	E B	E B	E B	E B	E B	E B	E B	E B		B	B		21	35			
11	41	44	45	46	41	45	42	32	41	37	27	30	E B	B	E B	E B	E B	E B	E B	E B	E B	E B	B	B	B	B			
12	29	31	33	42	45		37	37	40	27	18	22	E B	E B	E B		22	21	38	38	37	27	16	B	B	B			
13	B	37	45	37	46	45	42	42	38	21	18	42	20	28	32	31	12	14	16	13	13	13		B	B	B			
14	B	B	26	29	30	E B	E B	B	E B	E B	E B		36	17	17	17	19	26	35	40	E B	E B	B	B	20	20			
15	B	15	22	40	45	42	46	70	38		18	23	E B	E B	E B	E B	17	37	12	E B	E B	E B	E B	11	26				
16	B	B	B	28	E B	B	B		37	42	42	B	E B	E B	E B	E B	E B	E B	E B		43	45	44	45	45	59			
17	41	56	70	50	45	36	34	42	45		B	E B	E B	E B	B	E B	E B	E B	E B	36	46	35	46	69	58	43	80		
18	45	45	44	75	46		B	33	51	65		B	B	B	B	E B	E B	30		32		B	B	B	B	41			
19	36	36	B	B	B		36	62	45	38	16	18	18		B	E B	E B	E B		E B	E B	E B		B	B	33			
20	30	40	42	39	44	42	44	46	33	16	19	19	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	B		14	36		
21	36	32	36	57	42	60	45	38	69		B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	B		37	34		
22	52	60	90	37	36	42	67		34	33		B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	B	B	B	36			
23	34	37	33	32	21	35	19	35	60	34	35	41	E B	B	E B	37	E B	E B	E B	E B	E B	E B	B	B		16	27		
24	40	49	B	42	70	65	55	35	41		36	23	E B	E B	E B	19	23	17	30	E B	20	17	B	B	B	33	45		
25	44	40	30	42	52	48	43	29	20	20	21	18	E B	22	17	17	E B	23	17	13		B	B		15	B			
26	30	47	56	43	B	41	40	30	B	59	40	19	E B	E B	E B	17	12	E B	E B	E B	E B		B	B	B	37			
27	27	B	33	29	17		B	B	28	42	27	27	E B	E B	E B	22	17	30	27	32	21	18	31		13	41			
28	28	31	32	35	32	40		B	27	24	34	37	E B	19	13	14	13	13	19	13	38		B	B	B	B			
29	B	B	B	E B	18	28		B	B	B	B	B	E B	24	26	18	30	28	12	35	12	17		B	B	B			
30	30	41	35	35	43	45	55		37	E B	15	27	E B	E B	E B	34	31	16	18		B	B	B	B		13	14		
31	36	41	44	47	B	B	40	38	30	21	25	20	E B	17	22	20	30	E B	24	35	15		B	B		30	28		
	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	27	27	27	28	23	24	25	28	24	23	25	24	26	27	29	29	29	29	29	20	14	12	19	25				
MED	40	42	42	42	42	42	38	39	30	24	23	E B	E B	E B	E B	26	24	26	E B	E B	E B	E B	E B	28	26	33	36		
UQ	44	51	46	45	46	45	53	45	44	40	31	27	E B	E B	E B	34	34	32	30	31	26	24	28	43	44	40	44		
LQ	32	37	33	35	32	36	40	35	34	20	18	20	E B	E B	E B	19	22	20	20	E B	E B	E B	E B	E B	E B	17	13	16	28

IONOSPHERIC DATA STATION SHOWA ST.  
 MAY 1988 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	17	8	10	11	15	16	13	9	7	10	15	23	23	23	19	15	10	10	9	9	14	9	9	9
2	9	9	8	9	8	10	B	15	15	10	11	11	13	12	31	25	18	14	20	15	B	8	10	8
3	14	15	32	28	23	13	18	16	10	23	28	22	29	25	24	23	14	B	22	B	B	B	9	14
4	18	14	13	19	15	B	21	20	24	B	B	B	B	23	21	19	30	20	22	19	B	B	9	10
5	10	14	13	13	13	10	8	8	8	10	13	14	29	35	B	B	55	21	20	B	B	B	14	8
6	14	9	8	B	27	15	19	8	14	13	B	B	B	B	20	14	10	8	8	8	14	13	8	8
7	9	22	14	17	14	15	14	14	9	13	13	19	19	20	18	15	23	20	23	14	8	8	9	8
8	9	8	20	B	20	27	B	25	20	23	30	B	56	29	21	9	14	19	16	9	9	10	10	10
9	19	8	15	25	24	14	18	13	23	25	31	24	B	B	B	B	20	23	23	B	B	9	10	8
10	14	10	21	13	18	B	21	14	11	B	25	23	54	51	35	23	B	23	14	14	B	B	8	8
11	8	9	10	14	14	25	13	20	25	14	18	30	B	57	55	28	26	18	24	14	22	B	B	B
12	8	8	8	11	19	B	15	8	8	11	18	22	22	21	13	8	9	14	9	8	B	B	B	B
13	B	10	11	17	20	16	20	8	14	11	15	13	12	13	8	8	8	14	13	13	13	13	B	B
14	B	B	14	14	17	B	25	B	11	17	17	17	19	14	18	14	27	22	12	B	13	B	B	10
15	B	9	9	8	8	17	10	14	22	B	15	23	19	25	23	8	8	9	14	8	8	9	8	13
16	B	B	B	14	30	B	B	23	20	12	B	30	23	27	24	32	21	31	14	10	12	10	10	10
17	10	8	10	14	10	13	19	17	25	B	B	25	30	B	B	23	13	10	16	10	10	8	13	13
18	13	15	15	13	13	B	B	20	23	24	B	B	B	B	B	30	B	15	B	B	B	B	B	22
19	9	11	B	B	B	29	19	14	10	11	13	14	B	B	35	25	25	24	24	B	B	B	B	8
20	10	9	9	10	22	22	13	20	14	14	14	19	19	22	19	14	11	14	13	11	B	B	8	8
21	8	20	14	14	13	10	19	23	13	B	B	B	30	35	24	18	14	13	15	11	B	B	14	11
22	9	9	9	23	19	15	20	B	20	22	B	25	40	40	23	15	11	30	24	23	B	B	B	9
23	9	9	10	9	10	8	8	21	23	10	10	24	55	26	20	14	19	14	20	B	B	B	8	9
24	11	8	B	20	20	23	13	10	13	B	23	23	19	14	17	10	20	10	B	B	B	B	11	13
25	10	10	24	21	15	13	17	10	10	8	9	13	13	22	12	13	23	14	13	B	B	B	B	B
26	21	14	13	12	B	33	28	14	B	15	10	14	18	17	11	10	14	13	13	10	B	B	B	8
27	9	B	15	13	15	B	B	B	15	14	14	14	22	17	14	9	10	11	8	10	B	9	23	
28	8	8	8	8	8	8	B	B	B	14	24	14	23	19	10	14	10	13	9	13	8	B	B	B
29	B	B	B	B	18	10	B	B	B	B	B	B	24	10	10	13	13	12	10	8	11	B	B	B
30	10	9	10	9	10	11	16	B	40	15	10	27	BE	B	34	31	16	18	B	19	B	B	13	14
31	8	10	13	14	B	B	15	10	8	11	15	10	17	13	9	17	24	13	15	B	14	B	8	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	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	10	10	13	14	17	16	19	16	15	14	18	23	24	24	21	15	18	14	15	14	B	B	13	10
U O	B	18	15	20	21	22	B	B	B	B	B	B	B	B	B	B	24	22	22	B	B	B	B	B
L O	9	9	10	11	13	13	14	10	10	11	13	14	19	17	14	13	11	13	13	10	12	9	9	8

IONOSPHERIC DATA STATION SHOWA ST.

MAY 1988 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	E A 325	240	250	240	240	230	230	210	200	200	200	200	230	210	230	A	A
2	A	A	A	A	Q 350	0 360	B	A	A	E A 300	230	220	240	215	225	210	200	220	230	220	B	A	A	A
3	225	A	A	A	A	A	A	A	E A 400	E A 300	275	250	250	230	225	220	210	B	B	B	B	B	A	A
4	A	E A 300	A	A	A	B	A	A	A	B	B	B	B	275	230	240	255	240	E B 295	E B 290	B	B	A	240
5	A	A	A	A	A	E A 360	325	295	280	240	240	230	240	300	B	B	E B 300	200	250	B	B	B	A	A
6	A	A	A	B	A	A	A	A	A	A	B	B	B	B	E B 330	A	A	E A 400	350	Q	A	A	A	A
7	A	A	A	A	A	A	A	A	A	E A 300	240	240	230	270	225	205	255	230	220	250	275	A	A	A
8	A	A	A	B	A	A	B	A	E B 325	E B 260	E B 250	B	E B 280	230	215	230	190	230	250	E A 325	A	A	A	A
9	A	A	A	A	A	A	A	E A 420	E A 300	E B 260	245	B	B	B	B	B	210	210	220	B	B	A	A	A
10	A	A	A	A	A	B	A	A	E A 320	B	E A 290	250	280	290	225	215	B	230	200	240	B	B	A	A
11	A	A	A	A	A	E A 450	A	A	A	E A 300	250	240	B	E B 260	E B 260	210	225	245	230	230	E B 300	B	B	B
12	A	A	E A 370	A	A	B	A	A	A	E A 290	230	220	205	220	205	190	195	210	205	220	B	B	B	B
13	B	230	A	A	A	A	A	A	A	270	260	225	220	205	200	220	190	200	240	195	230	210	E B 260	B
14	B	B	A	A	A	B	B	E B 380	E B 310	E B 270	220	200	200	200	210	220	220	230	E A 240	B	A	B	B	A
15	B	A	A	A	A	E A 400	A	A	A	B	225	225	210	200	210	195	175	205	220	200	250	250	270	245
16	B	B	B	A	E B 390	B	B	A	A	A	B	E B 345	270	250	240	240	230	E B 275	E A 270	A	A	A	A	A
17	A	A	A	A	A	A	A	A	A	B	B	240	E B 275	B	B	250	280	310	A	A	A	A	A	A
18	A	A	A	A	A	B	B	A	A	A	B	B	B	B	B	255	B	E A 290	B	B	B	B	B	A
19	A	A	B	B	B	A	A	A	A	E A 300	260	230	B	B	240	220	210	280	275	B	A	B	B	A
20	A	A	A	A	A	A	A	A	A	E A 280	225	205	215	200	205	A	220	210	200	230	B	B	A	A
21	A	A	A	A	E A 350	E A 345	A	A	A	B	B	B	250	220	220	195	245	205	225	245	B	B	A	A
22	A	A	A	A	A	A	A	B	E A 300	A	305	270	E B 270	E B 270	220	220	200	E B 250	240	E B 255	B	B	B	A
23	A	E A 290	E A 290	E A 320	E A 350	E A 355	E A 335	A	A	E A 275	240	220	E B 250	210	195	200	220	215	240	B	B	B	A	A
24	A	A	B	A	A	A	A	E A 360	E A 325	A	B	E A 350	265	230	205	200	210	200	225	B	B	B	A	A
25	A	A	A	A	A	A	A	320	280	250	240	230	210	220	200	200	E B 250	E A 290	220	B	B	A	B	B
26	A	A	A	A	B	A	A	Q 360	B	A	260	230	220	210	210	210	230	230	225	225	B	B	B	A
27	A	B	A	A	E A 400	B	B	B	E A 375	255	205	215	200	200	200	200	200	220	A	A	B	A	B	A
28	A	A	A	A	E A 340	E A 400	B	B	B	E A 290	240	A	190	205	205	200	190	E B 280	225	225	A	B	B	B
29	B	B	B	B	E B 390	E A 290	B	B	B	B	B	B	250	200	200	215	200	225	230	240	250	B	B	B
30	A	E A 350	E A 320	E A 340	A	A	A	A	B	A	E A 325	E A 300	265	B	230	200	200	225	240	B	B	B	A	A
31	E A 310	A	A	A	B	B	A	E B 350	E B 300	E A 280	E A 270	E A 230	220	210	230	215	220	210	225	B	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	2	4	3	2	7	6	5	7	12	20	23	24	24	26	27	27	28	29	27	16	6	3	1	2
MED	268	E A 295	E A 320	E A 330	E A 350	E A 358	E A 380	E A 350	E A 305	E A 285	235	230	221	214	212	210	212	220	228	229	240	240	270	242
U O		E A 325	E A 370		E 390	E 360	E A 425	E A 360	E A 325	E A 300	260	248	E B 250	E B 250	225	220	230	262	240	E 248	E 275	E B 260		
L O		E A 260	E A 290		E A 350	E A 345	E A 330	E A 320	280	260	230	220	210	205	205	200	200	210	220	225	210	230		

IONOSPHERIC DATA STATION SHOWA ST.  
 JUN. 1988 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	X 34	X 37	A	A	33	33	0 X 35	0 X 36	0 X 43	0 X 51	X 63	X 71	X 66	X 72	60	46	51	0 X 54	B	B	B	A	A		
2	29	A	X 37	0 X 26	A	0 X 34	35	33	33	41	55	0 X 71	0 X 79	0 X 78	70	63	45	34	24	24		B	B	B	B	
3	A	33	30	29	35	31	31	31	30	39	58	58	66	75	69	56	28		22	20		B	B	B	B	
4	A	A	30	32	A	A	X 42	37	40	32	50	60	67	76	67	52	46	30	26	24	0 X 24	23	B	A	A	
5	A	A	A	A	0 X 42	30	A	56	53	54	60	66	65	70	76	55	51	53	46	0 X 46	0 X 46	A	B	B	B	A
6	A	A	A	A	A	A	A	A	A	A	X 51	X 61	0 X 70	0 X 76	X 75	X 64	0 X 47	0 X 32			B	A	B	A	A	A
7	A	A	A	0 X 29	0 X 37	S	70	70	S	34	43	51	56	66	66	56	48	42	30		B	B	A	B	A	
8	A	A	A	A	A	B	A	A	A	0 X 53	0 X 50	X 54	69	73	73	77	66	50	44		B	B	B	A	A	
9	A	A	A	33	31	38	39	41	39	42	51	63	71	71	65	56	49	46	45	28	24	0 X 24	A	A	A	
10	A	A	A	A	A	A	B	A	A	X 59	58	58	64	71	70	57	55	60	33	28		B	B	B	A	
11	A	A	A	A	A	A	X 35	B	B	A	A	59	56	70	71	55	44	44	35	30		B	B	B	A	
12	B	0 X 30	X 31	0 X 36	X 31	0 X 38	X 37	0 X 38	0 X 38	42	57	56	68	81	70	64	53	30	30	21		A	B	B	A	
13	A	A	B	A	40	A	A	A	A	58	60	60	71	76	81	71	56	40	45	34		A	A	A	A	
14	A	A	39	A	A	A	A	A	A	B	B	55		B	B	B	0 X 65	0 X 68	0 X 66	B	A	A	A	B	0 X 46	
15	A	A	B	A	B	B	A	A	B	31	35	55	69	0 X 69	0 X 69	B	B	0 X 46	B		B	A	A	B	A	A
16	A	B	A	A	A	B	B	A	A	32	B	B	B	0 X 70	0 X 63	51	53			B	B	B	B	A	A	
17	A	A	A	A	B	A	B	A	A	B	A	A	46	B	S	B	0 X 47			B	B	B	B	A	A	
18	26	A	A	A	A	A	A	A	B	S	0 X 37	0 X 48	B	B	S	53	38	36	42	39		A	A	A	A	
19	40	A	A	A	A	B	B	A	B	A	B	B	55	B	B	B	B	70	50		A	A	A	A	A	
20	A	B	A	A	A	A	A	B	B	A	B	B	B	0 X 50	0 X 51	0 X 49	B	B		34		B	B	B	B	
21	A	A	A	A	32	45	A	B	A	35	45	55	65	64	61						B	B	A	A	B	
22	A	A	A	A	A	A	A	0 X 41	0 X 36	A	B	B	60	70	B	0 X 56	43	44			B	B	A	A	A	
23	A	A	A	A	A	A	A	B	A	39	42	50	X 59	0 X 51	X 60	45	31	36	38	22		B	A	A	A	
24	A	A	A	A	A	A	A	A	A	37	50	61	51	52	60	43	51	51	56		A	A	A	A	A	
25	A	A	A	A	A	A	A	A	A	B	B	B	B	B	0 X 45	46				A	A	A	A	A	A	
26	A	A	A	A	A	A	A	A	A	X 36	44	B	0 X 51	0 X 61	72	B	0 X 38	B		B	B	A	A	A	A	
27	A	A	A	A	A	A	A	A	A	A	X 35	X 44	0 X 53	0 X 51	0 X 51	44	30	35	26		B	A	B	A	A	
28	A	A	A	A	A	B	A	A	B	B	B	X 51	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	A	A	A	A	A	A	X 46	X 50	A	0 X 44	B	51	X 46	X 69	X 87	76	76	65	52		A	A	A	A	A	
30	A	B	B	B	B	A	B	B	0 X 45	B	B	B	B	B	B	0 X 56	0 X 58	0 X 56	B	A	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	3	3	6	6	7	7	9	10	10	17	19	22	23	22	22	25	24	22	20	10	2			1		
MED	29	X 33	34	30	35	34	X 37	40	38	41	50	X 56	X 65	X 70	X 70	X 56	X 46	X 44	X 36	X 26	0 X 24			0 X 46		
U O	40	X 34	37	33	40	38	X 44	50	45	48	57	X 61	X 69	X 75	X 72	X 62	X 53	X 53	X 46	X 30						
L O	26	0 X 30	30	29	31	31	34	35	36	34	42	X 51	X 56	X 64	X 61	X 52	42	35	30	22						

IONOSPHERIC DATA STATION SHOWA ST.

JUN. 1988 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	28	31	A	A	F	F	29	30	37	45	57	65	60	J	S	F	F	F	U	R	B	B	B	A	A	
2	F	A	31	20	A	28	29	27	27	F	F	35	49	65	73	72	64	57	39	28	18	18	B	B	B	B	
3	A	F	F	F	F	F	F	F	F	F	F	33	52	52	60	69	63	50	22	F	B	F	F	B	B	B	B
4	A	A	F	F	A	A	36	31	F	F	F	44	54	61	70	61	46	41	24	20	18	17	B	A	A	A	
5	A	A	A	A	36	F	A	F	F	F	F	54	60	59	64	70	49	45	47	40	A	B	B	B	A	A	
6	A	A	A	A	A	A	A	A	A	A	45	55	64	70	69	58	41	26	B	A	B	A	A	A	A	A	
7	A	A	A	23	31	S	F	F	S	F	47	44	48	63	67	67	71	60	44	38	F	B	B	A	B	A	
8	A	A	A	A	A	B	A	A	A	47	44	48	63	67	67	71	60	44	38	F	F	F	B	B	B	A	A
9	A	A	A	F	F	F	33	35	33	36	45	57	65	65	59	50	43	40	39	22	18	B	B	B	A	A	A
10	A	A	A	A	A	A	B	A	A	53	52	52	58	65	64	51	49	54	27	22	B	B	B	B	A	A	A
11	A	A	A	A	A	A	29	B	B	A	A	F	53	50	64	65	49	38	38	29	24	B	B	B	A	A	A
12	B	H	24	25	30	25	32	31	32	32	36	51	50	62	75	64	58	47	24	24	15	F	A	B	B	A	A
13	A	A	B	A	F	A	A	A	A	F	F	F	F	F	F	65	50	34	39	28	F	B	A	A	A	A	A
14	A	A	F	A	A	A	A	A	A	B	B	F	B	B	B	59	62	60	B	A	A	A	A	B	40	A	A
15	A	A	B	A	B	B	A	A	B	F	F	25	29	49	63	40	B	F	27	B	A	A	B	A	A	A	A
16	A	B	A	A	A	B	B	A	A	F	B	B	B	F	64	57	45	47	B	B	B	B	B	B	A	A	A
17	A	A	A	A	B	A	B	A	A	B	A	A	F	B	S	B	41	B	B	B	B	B	B	B	A	A	A
18	F	A	A	A	A	A	A	A	B	S	F	U	S	B	B	S	F	F	F	F	F	A	A	A	A	A	A
19	F	A	A	A	A	B	B	A	B	A	B	B	F	B	B	B	B	F	64	44	F	A	A	A	A	A	A
20	A	B	A	A	A	A	A	B	B	A	B	B	B	U	S	44	45	43	B	B	F	B	B	B	B	B	B
21	A	A	A	A	F	F	A	B	A	F	F	F	F	F	U	R	B	B	B	A	A	A	B	A	A	B	B
22	A	A	A	A	A	A	A	35	30	A	B	B	F	F	B	U	R	F	F	B	B	A	A	A	A	A	A
23	A	A	A	A	A	A	A	B	A	F	F	33	36	44	53	45	54	39	25	30	32	16	B	A	A	A	A
24	A	A	A	A	A	A	A	A	A	A	F	F	31	44	55	45	46	54	37	45	45	50	A	A	A	A	A
25	A	A	A	A	A	A	A	A	A	A	B	B	B	B	39	40	B	B	A	A	A	A	A	A	A	A	A
26	A	A	A	A	A	A	A	A	A	30	38	45	55	66	B	32	B	F	30	B	B	A	A	A	A	A	A
27	A	A	A	A	A	A	A	A	A	A	29	38	47	45	45	38	24	29	20	F	B	A	B	A	A	A	A
28	A	A	A	A	A	B	A	A	B	B	B	45	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29	A	A	A	A	A	A	40	44	38	B	F	45	40	63	81	70	70	59	46	A	A	A	A	A	A	A	A
30	A	B	B	B	B	A	B	B	39	B	B	B	B	B	B	U	S	50	52	50	B	A	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	3	3	5	6	6	6	8	8	9	17	19	22	23	22	22	25	24	22	20	10	2				1		
MED	F	23	27	31	24	30	F	30	32	34	33	F	35	44	50	58	64	64	50	41	F	F	20	18		40	
U O	F	34	28	32	27	34	F	32	38	40	F	43	42	51	55	63	69	66	56	47	47	40	F	24			
L O	F	H	24	24	23	25	F	F	F	30	F	F	28	36	45	50	58	55	46	F	F	F	F				

IONOSPHERIC DATA STATION SHOWA ST.  
 JUN. 1988 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	37	36	40	35	35	16	13	14	12	20	18	26	30	23	E B	E B	E B	E B	B	B	B	30	32		
2	25	35	44	53	41	34	19	17	17	12	16	26	16	27	31	16	16	16	16	E B	B	B	B	B		
3	27	29	32	35	41	66	32	31	31	12	14	E B	16	18	13	31	E B	B	E B	E B	B	B	B	B		
4	12	28	28	27	30	27	32	39	E B	10	11	12	31	36	38	35	16	32	11	12	21	12	B	31	26	
5	26	31	28	57	31	47	31	20	13	11	16	28	16	42	16	14	28	32	16	30	B	B	B	72		
6	68	55	70	83	72	41	51	46	41	41	37	16	E B	E B	E B	E B	E B	E B	B	B	B	16	28	26		
7	27	31	32	31	31	16	23	E B	E B	E B	10	9	9	12	17	E B	E B	E B	E B	E B	E B	B	24	32		
8	40	40	41	59	53	B	45	46	58	E B	30	35	30	31	19	19	E B	E B	18	21	B	B	32	40		
9	57	48	39	34	22	16	30	27	30	63	60	52	32	71	33	35	23	30	25	E B	11	28	32	45	70	
10	55	46	118	58	90	45	B	58	37	36	33	16	20	17	E B	E B	E B	E B	E B	B	B	B	B	16		
11	35	36	42	42	50	47	41	B	B	37	36	16	20	E B	E B	E B	16	12	30	15	B	B	B	28		
12	B	45	90	22	30	32	70	65	12	32	36	16	35	35	16	30	27	30	37	16	32	B	B	30		
13	41	32	B	15	29	40	41	41	31	29	15	17	16	16	34	27	31	34	60	B	27	31	16	26		
14	27	44	40	45	44	57	51	45	59	B	E B	18	B	B	B	E B	E B	E B	B	32	36	42	B	59		
15	58	51	B	37	B	B	59	45	B	33	29	16	E B	B	B	E B	B	B	B	16	16	B	21	31		
16	40	B	39	42	42	B	B	43	42	47	B	B	B	E B	E B	E B	E B	B	B	B	B	B	27	36		
17	34	47	38	45	B	B	43	71	B	43	41	33	B	E B	B	B	E B	B	B	B	B	B	35	30		
18	38	35	42	43	43	37	78	37	E B	E B	32	36	31	E B	B	50	23	18	32	30	30	32	32	41	45	
19	40	44	44	80	69	B	B	57	B	37	B	B	E B	B	B	B	B	B	E B	32	15	42	42	45	46	47
20	44	B	43	36	60	44	107	B	B	37	B	B	B	E B	E B	E B	B	B	E B	B	B	B	B	B	B	
21	40	26	43	35	29	30	40	B	37	37	37	33	E B	22	33	25	B	B	B	32	32	42	B	27		
22	29	44	36	49	52	46	59	55	59	42	B	B	E B	E B	B	E B	E B	E B	B	B	B	45	43	39	45	
23	40	39	57	45	47	49	54	B	40	39	16	18	18	E B	E B	E B	E B	E B	E B	B	B	30	42	37		
24	33	45	42	43	45	36	46	45	52	37	35	E B	19	19	70	19	32	10	E B	E B	31	35	23	38	45	
25	80	53	42	55	58	29	33	45	43	40	B	B	B	B	E B	E B	B	B	B	35	36	40	43	38	45	
26	43	41	41	46	43	43	43	31	34	43	16	B	31	32	27	B	E B	B	E B	B	B	20	37	62		
27	67	44	81	48	38	65	35	51	35	29	19	20	21	26	19	30	22	20	14	B	15	B	30	42		
28	59	47	48	60	70	B	52	58	B	B	B	33	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	37	46	41	50	45	39	18	30	E B	B	32	43	28	21	E B	20	16	19	39	27	32	41	58	45		
30	60	B	B	B	B	60	B	E B	E B	B	B	B	B	B	E B	E B	E B	E B	B	B	35	45	50	40	45	
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	29	27	27	29	27	25	25	25	24	26	21	23	23	22	24	25	24	22	22	19	15	14	20	25		
MED	40	44	42	45	43	40	41	43	34	34	29	18	22	27	E B	E B	E B	19	20	27	32	32	36	40		
U O	56	46	44	54	53	47	53	48	42	39	36	31	32	34	28	30	25	30	30	32	42	43	40	45		
L O	31	35	38	36	31	33	32	30	22	26	16	16	19	21	19	E B	E B	B	E B	E B	27	24	29	30		



IONOSPHERIC DATA STATION SHOWA ST.

JUN. 1988 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

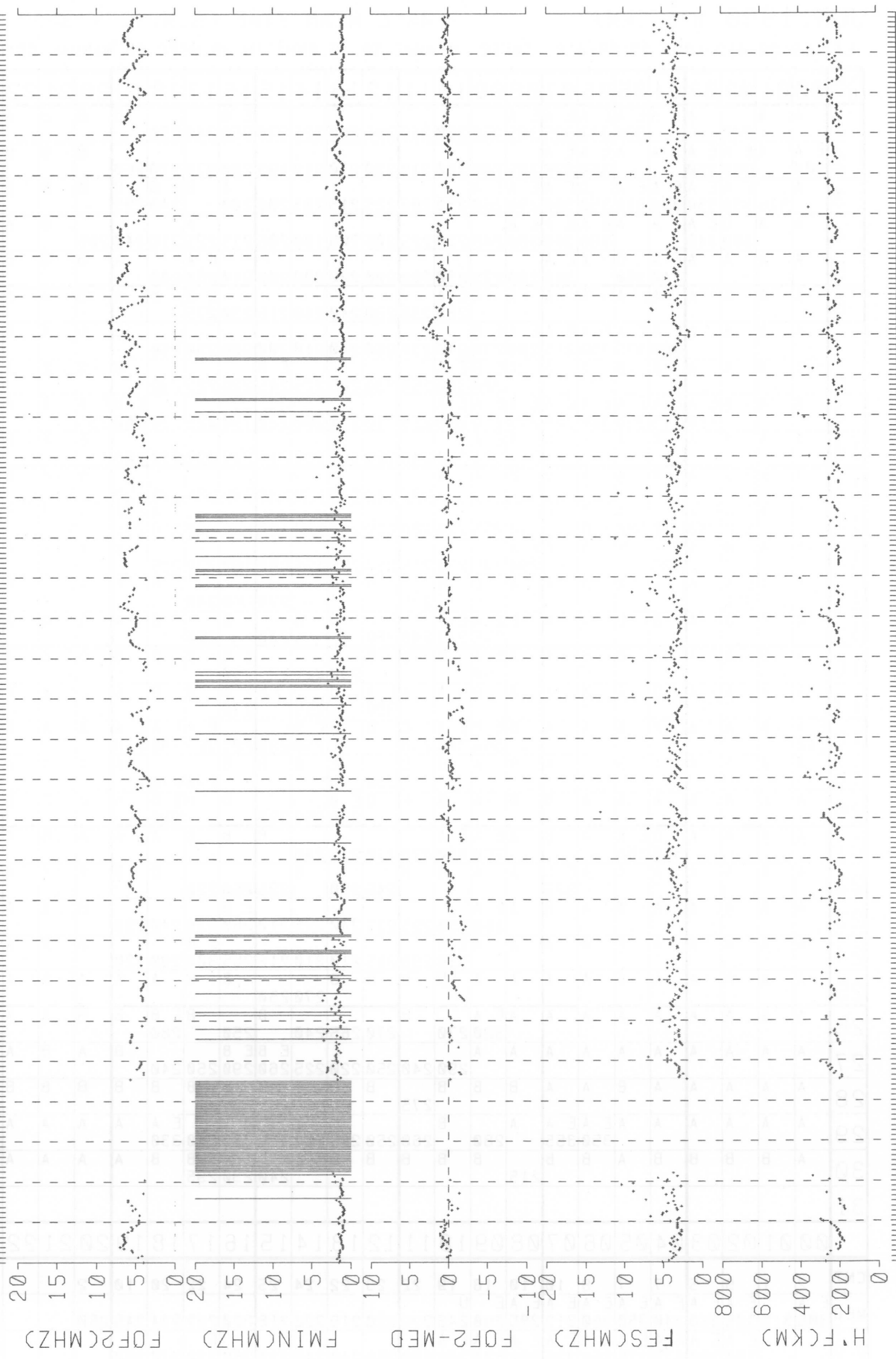
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	8	8	12	9	9	10	9	10	9	10	10	10	9	10	14	19	20	18	24	B	B	B	9	8	
2	8	9	12	13	15	12	14	9	10	8	9	8	9	8	8	9	8	9	9	10	B	B	B	B	
3	8	8	8	7	8	9	8	8	8	8	10	14	14	14	13	14	14		14	13	B	B	B	B	
4	8	8	8	8	8	8	8	8	10	8	9	8	8	8	8	9	8	8	9	8	8	B	8	8	
5	8	8	8	8	8	8	13	10	8	8	8	13	13	9	8	8	8	8	8	8	B	B	B	10	
6	14	8	20	23	14	20	15	14	24	19	8	13	20	21	25	19	21	19		13	B	9	8	8	
7	8	8	8	11	8	8	8	10	9	9	8	8	25	24	23	19	19	20	15	B	B	10	B	8	
8	10	8	24	14	23	B	29	25	9	30	22	24	15	13	13	51	16	13	21	B	B	B	9	8	
9	14	10	10	9	11	9	8	8	8	7	8	7	8	8	8	8	6	8	8	11	8	8	8	8	
10	8	8	10	8	8	8		15	23	13	9	9	10	9	21	15	12	13	13	8	B	B	B	9	
11	9	8	8	17	10	10	7		B	B	23	24	13	11	22	25	18	8	9	8	8	B	B	40	
12	B	9	8	8	8	8	8	8	8	8	8	8	8	8	10	9	9	9	14	9	10	B	B	10	
13	9	9	B	8	8	8	22	11	9	9	8	9	8	8	8	8	9	9	13	B	11	13	8	8	
14	8	8	8	9	10	28	21	25	15	B	18		B	B	B	24	30	32		10	9	7	B	8	
15	11	19	B	14	B	B	20	14	B	22	14	13	55	B	B	29		14	B	11	13	B	8	8	
16	8	B	14	24	24	B	B	20	22	16	B	B	B	17	23	23	26	B	B	B	B	B	B	8	8
17	11	13	21	20	B	B	22	14	B	24	30	20	B	B	30		24	B	B	B	B	B	B	9	8
18	9	8	19	25	17	14	19	24	B	32	14	31	B	B	50	17	11	10	13	10	19	9	9	9	
19	9	10	14	22	13	B	B	15	B	10	B	B	24	B	B	B	B	14	15	13	13	8	14	13	
20	13	B	9	9	15	14	23	B	B	10	B	B	B	34	25	20	B	B	21	B	B	B	B	B	
21	9	20	11	11	8	9	20	B	21	14	14	15	22	14	25	B	B	B	25	25	19	B	14	B	
22	10	10	14	14	14	14	14	13	13	4	B	B	24	22		24	15	18	B	B	25	8	8	9	
23	9	23	12	13	10	15	14	B	20	14	13	14	15	17	15	11	14	17	19	9	B	8	8	8	
24	8	14	9	13	10	14	19	14	15	25	15	19	11	10	9	8	8	18	19	9	9	13	8	13	
25	8	10	19	23	14	10	23	10	15	28	B	B	B	B	25	15	B	B	22	25	9	8	10	9	
26	8	8	9	10	25	10	9	8	9	13	10	B	24	24	14	B	14		24	B	B	10	9	10	
27	8	19	14	24	14	8	24	18	11	10	10	9	15	15	19	30	22	20	14	B	8	B	8	23	
28	8	8	8	8	10	B	15	14	B	B	B	15	B	B	B	B	B	B	B	B	B	B	B	B	
29	8	9	8	10	10	11	9	9	14	26	B	10	10	18	14	20	14	19	9	11	8	10	13	13	
30	21	B	B	B	B	13	B	B	26	B	B	B	B	B	B	24	20	24	B	19	13	13	13	15	
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	8	9	12	12	10	12	17	14	14	14	14	14	18	18	22	19	16	18	19	13	B	B	10	9	
U O	10	14	19	20	15	15	23	24	24	26	B	31	55	B	30	29	26	B	B	B	B	B	B	15	
L O	8	8	8	9	8	9	9	10	9	9	9	9	10	10	13	11	9	10	13	10	10	9	8	8	

IONOSPHERIC DATA STATION SHOWA ST.  
 JUN. 1988 H'F (KM) 45° E MEAN TIME (G.M.T. + 3H)  
 LAT. 69° 00.4' S LON. 39° 35.4' E SWEEP 0.4 MHz TO 15.0 MHz IN 20.0 SEC 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	240	A	E A	E A	E A	E A	E A	250	230	210	205	200	225	230	E B	240	230		B	B	B	A	A			
2	E A	A	E A	E A	A	A	E A	E A	E A	250	230	210	230	210	210	195	200	270	270	260		B	B	B	B			
3	A	315	E A	E A	E A	E A	O E A	E A	E A	280	230	200	225	215	205	200	200	A	B	O	O	B	B	B	B			
4	A	A	O E A	300 345	A	A	E A	E A	E A	245	230	225	205	205	180	205	215	225	210	240	205		B	A	A			
5	A	A	A	A	E A	O	A	E A	E A	280	275	230	200	200	220	200	200	210	E A	A	A	B	B	B	A			
6	A	A	A	A	A	A	A	A	A	E A	280	230	230	240	240	215	230	E B	B	A	B	A	A	A	A			
7	A	A	A	A	E A	E A	E A	E A	E A	E B	240	230	250	240	210	200	200	250	250		B	B	A	B	A			
8	A	A	A	A	A	B	A	A	A	E B	300	300	250	230	225	225	E B	245	220	225	230		B	B	A	A		
9	A	A	E A	E A	E A	E A	E A	E A	E A	E A	275	270	260	225	210	210	200	220	190	225	230	E B	E A	A	A	A		
10	A	A	A	A	A	A	B	A	A	E A	300	260	240	220	215	215	215	225	220	220	200		B	B	B	A		
11	A	A	A	A	A	A	A	B	B	A	A	240	210	210	230	230	195	225	225	250		B	B	B	A			
12	B	A	E A	E A	E A	E A	E A	E A		250	255	210	200	210	200	190	180	220	200	E A	E A	A	B	B	A			
13	A	A	B	A	E A	A	A	A	E A	290	245	230	215	210	220	195	200	190	230	225		B	A	A	A	A		
14	A	A	E A	A	A	A	A	A	A	B	B	275		B	B	B	270	260	240		B	A	A	A	B	E A	400	
15	A	A	B	A	B	B	A	A	B	E A	E A	375	310	240	280	230		250		B	A	A	B	A	A	A		
16	A	B	A	A	A	B	B	A	A	E A	B	B	B	230	225	225	E B	B	B	B	B	B	B	B	A	A		
17	A	A	A	A	B	A	B	A	A	B	A	A	E A	B	255		E B	B	B	B	B	B	B	B	A	A		
18	E A	A	A	A	A	A	A	A	B	E B	E A	E B	B	B	E B	250	220	225	E A	E A	E A	A	A	A	A	A		
19	A	A	A	A	A	B	B	A	B	A	B	B	250		B	B	B	270	270		A	A	A	A	A	A		
20	A	B	A	A	A	A	A	B	B	A	B	B	B	E B	290	250	230		B	E B	B	B	B	B	B	B		
21	A	A	A	A	O E A	A	B	A	E A	E A		260	290	220	210	215	240		B	B	B	A	A	A	B	A	B	
22	A	A	A	A	A	A	A	E G	A	A	B	B	245	250		225	250	220		B	B	A	A	A	A	A		
23	A	A	A	A	A	A	A	B	A	E A		350	250	225	215	240	225	210	E B	260	230	240	250		B	A	A	A
24	A	A	A	A	A	A	A	A	A	A	E A	330	250	215	210	210	215	E B	300	290	320		A	A	A	A	A	
25	A	A	A	A	A	A	A	A	A	A	B	B	B	B	270	250		B	B	A	A	A	A	A	A	A	A	
26	A	A	A	A	A	A	A	A	A	E A	B	320	270	270	265	240		250	B	E B	B	B	B	A	A	A	A	
27	A	A	A	A	A	A	A	A	A	A	290	240	250	220	225	260	E B	E B		B	A	B	A	A	A	A		
28	A	A	A	A	A	B	A	A	B	B	B	275		B	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	A	A	A	A	A	A	E A	E A	A	B		280	260	250	280	210	225	250	240	E A	A	A	A	A	A	A	A	
30	A	B	B	B	B	A	B	B	215	B	B	B	B	B	B		240	230	E B	B	A	A	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	2	1	6	5	7	7	8	10	10	18	19	22	23	22	24	25	24	22	20	10	2				1			
MED	E A	305	315	E A	E A	E A	E A	E A	E A	E A	U	245	229	220	219	222	218	220	232	234	248	250			E A	400		
U O			E A	E A	E A	E A	E A	E A	E A	E A		300	320	290	250	250	240	240	230	250	270	270	260					
L O			280	342	330	320	325	300	275	260	230	215	210	210	208	202	205	225	228	240								

SHOWA ST.

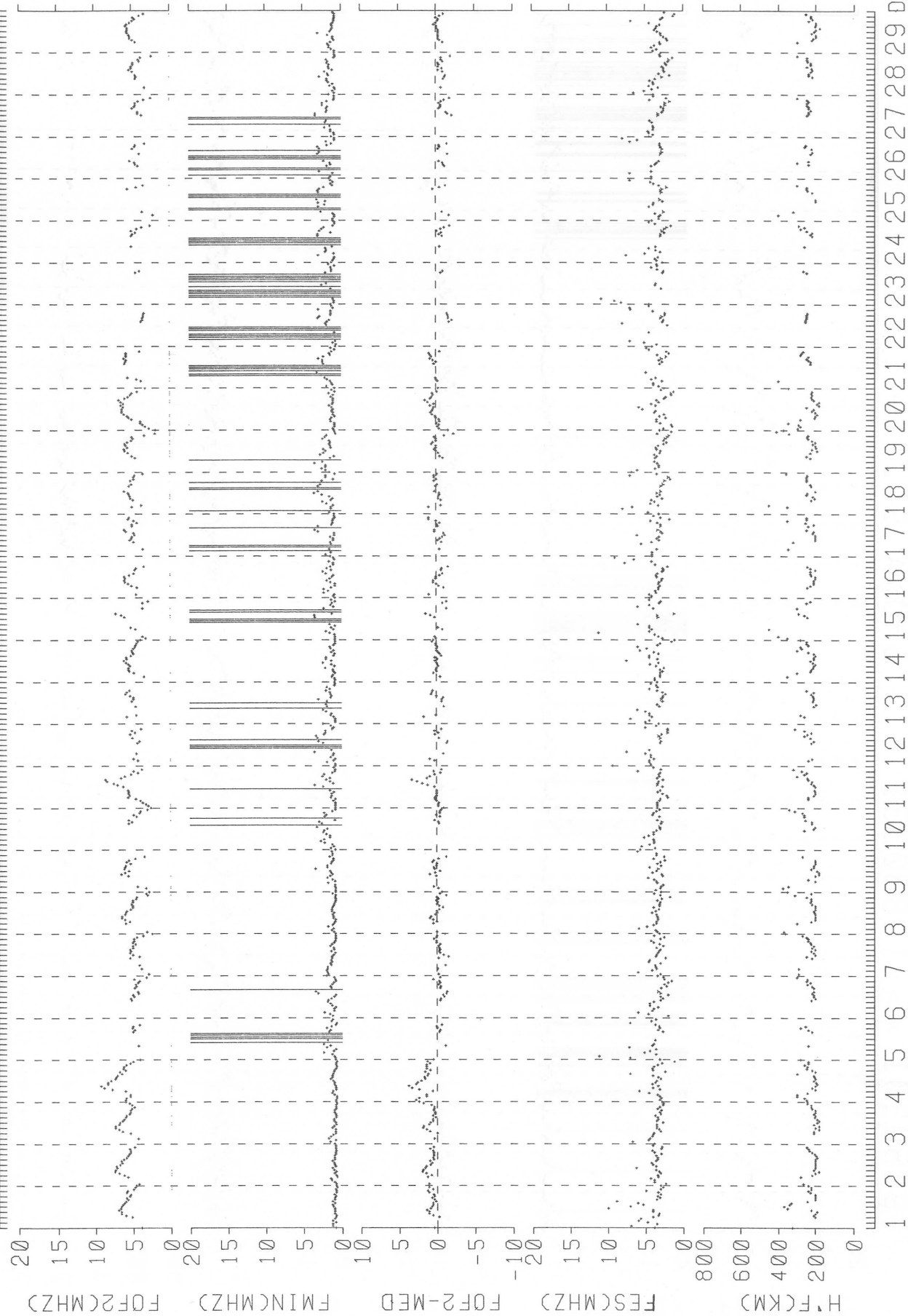
19880101 -> 19880131



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

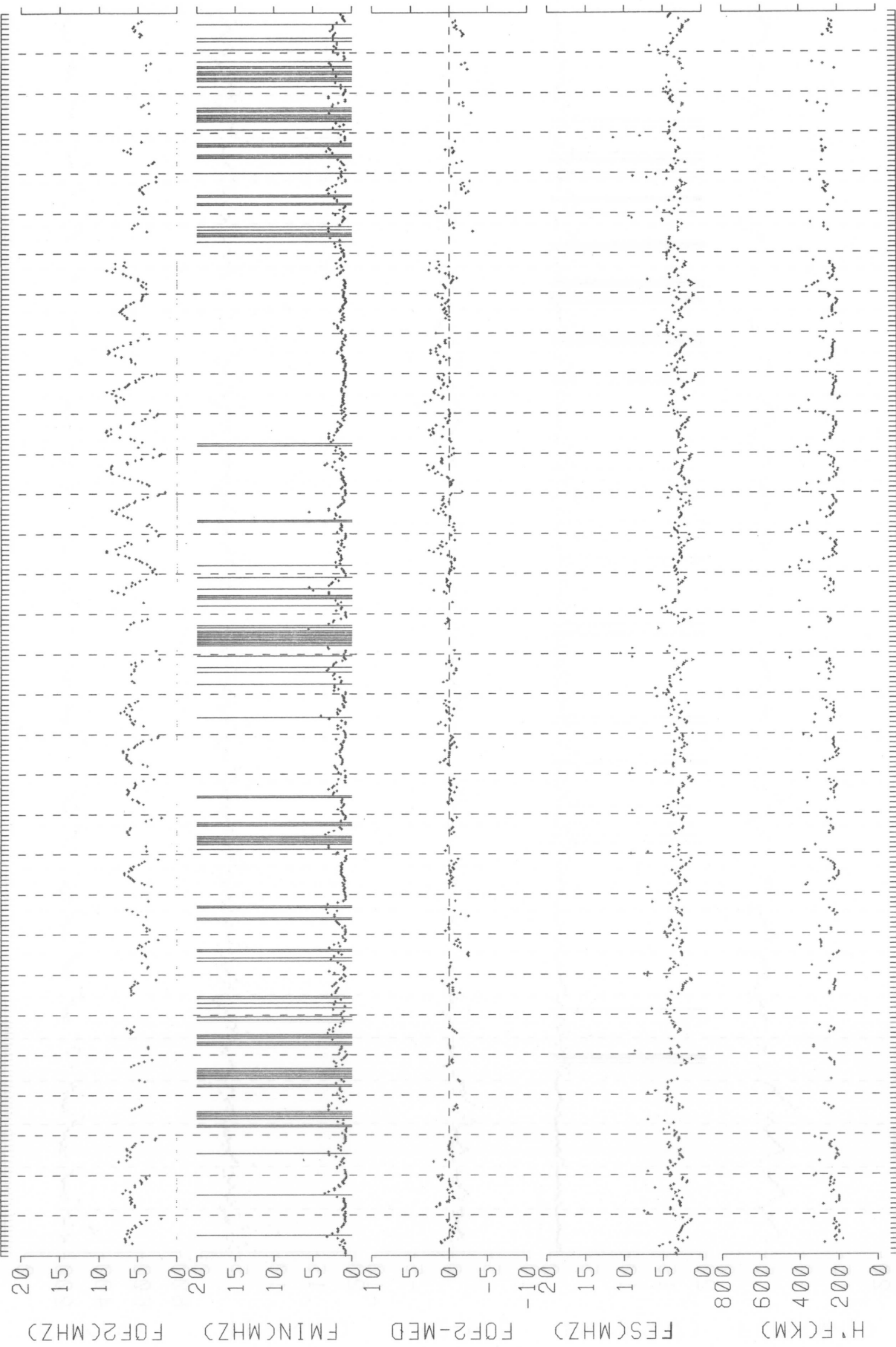
19880201 -> 19880229

SHOWA ST.



19880301 -> 19880331 SHOWA ST.

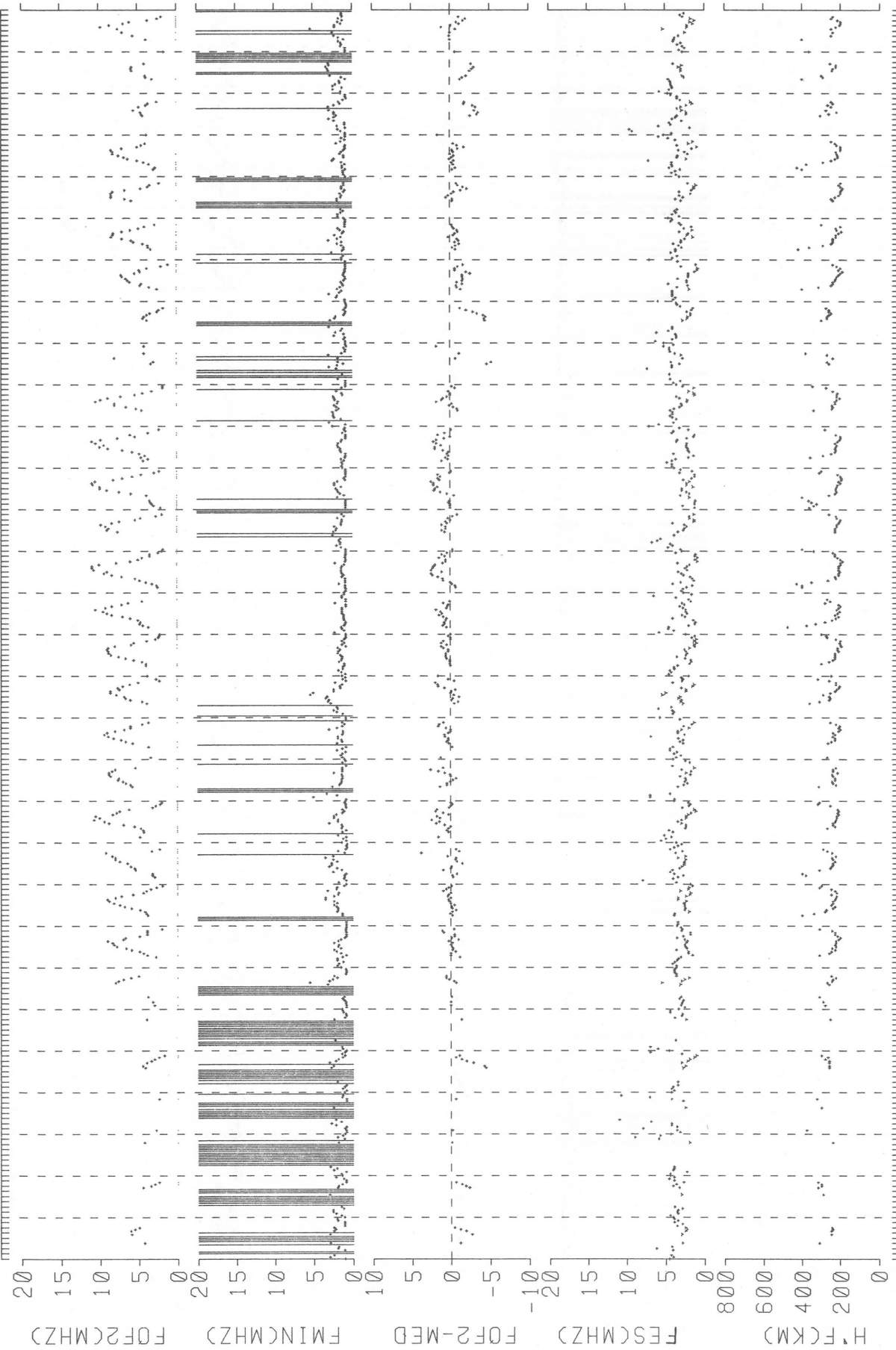
19880301 -> 19880331



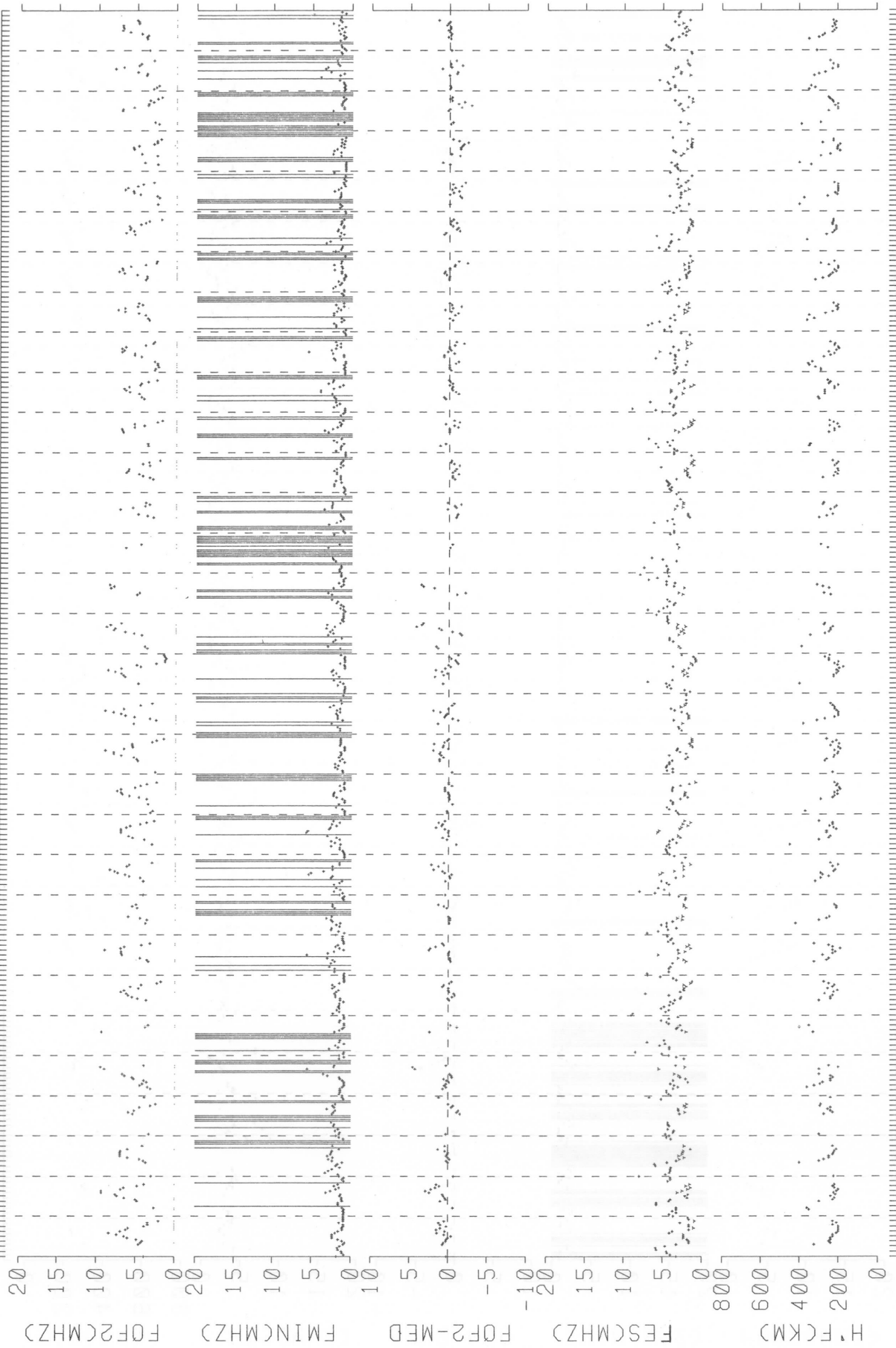
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DAY

19880401 -> 19880430

SHOWA ST.



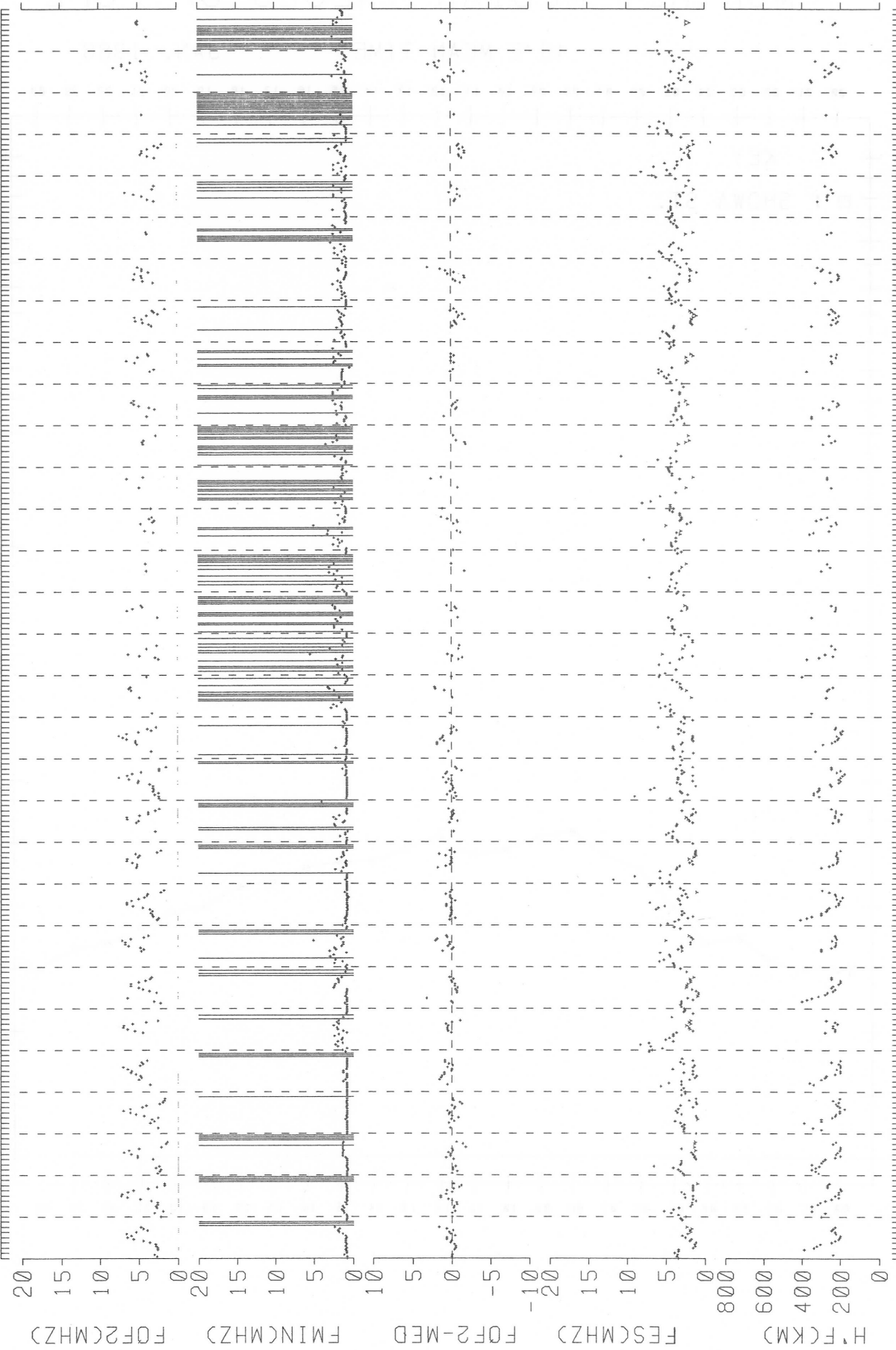
19880501 -> 19880531 SHOWA ST.



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

19880601 -> 19880630

SHOWA ST.

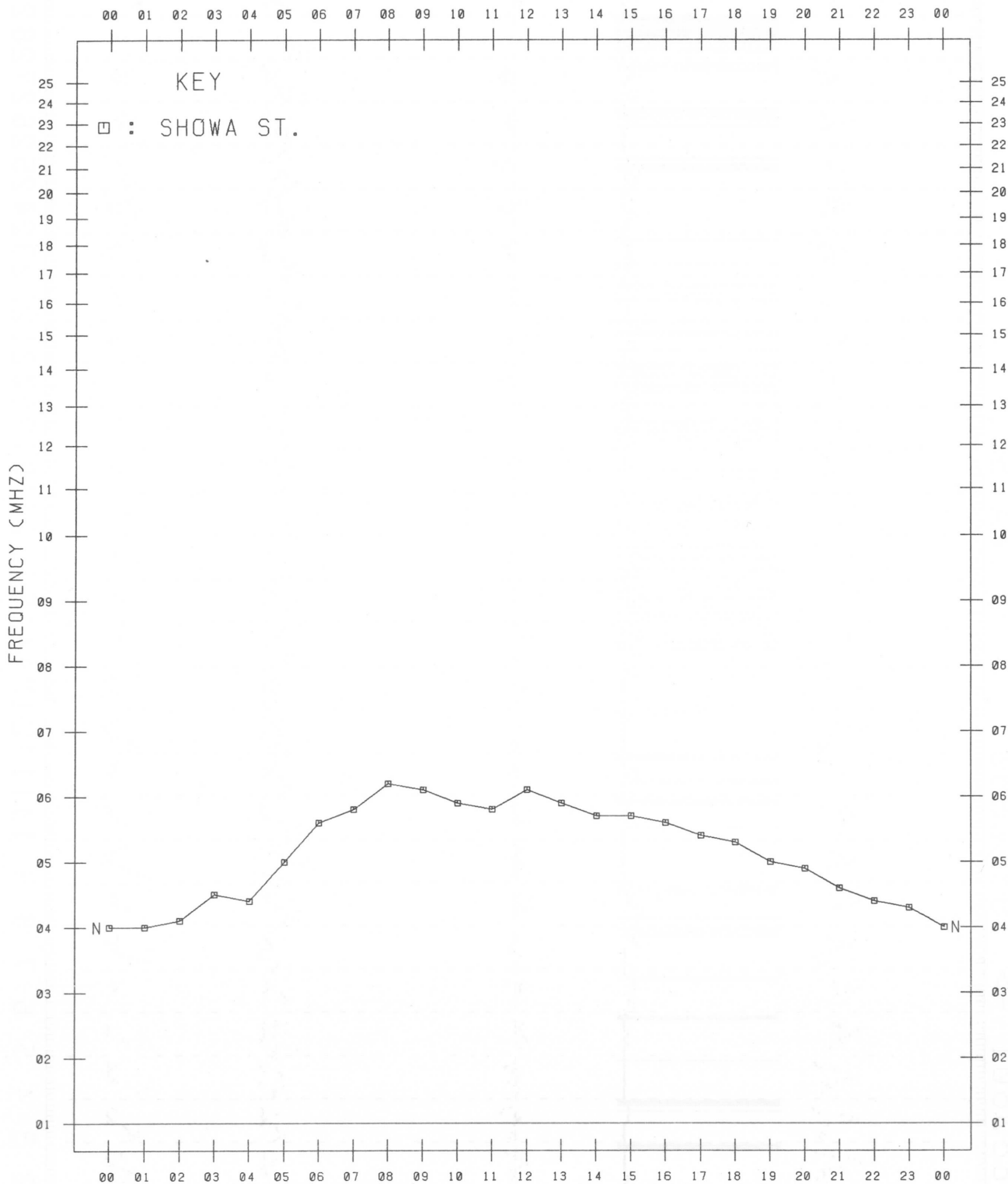




# MONTHLY MEDIAN VALUES OF FOF2

45 °E MEAN TIME

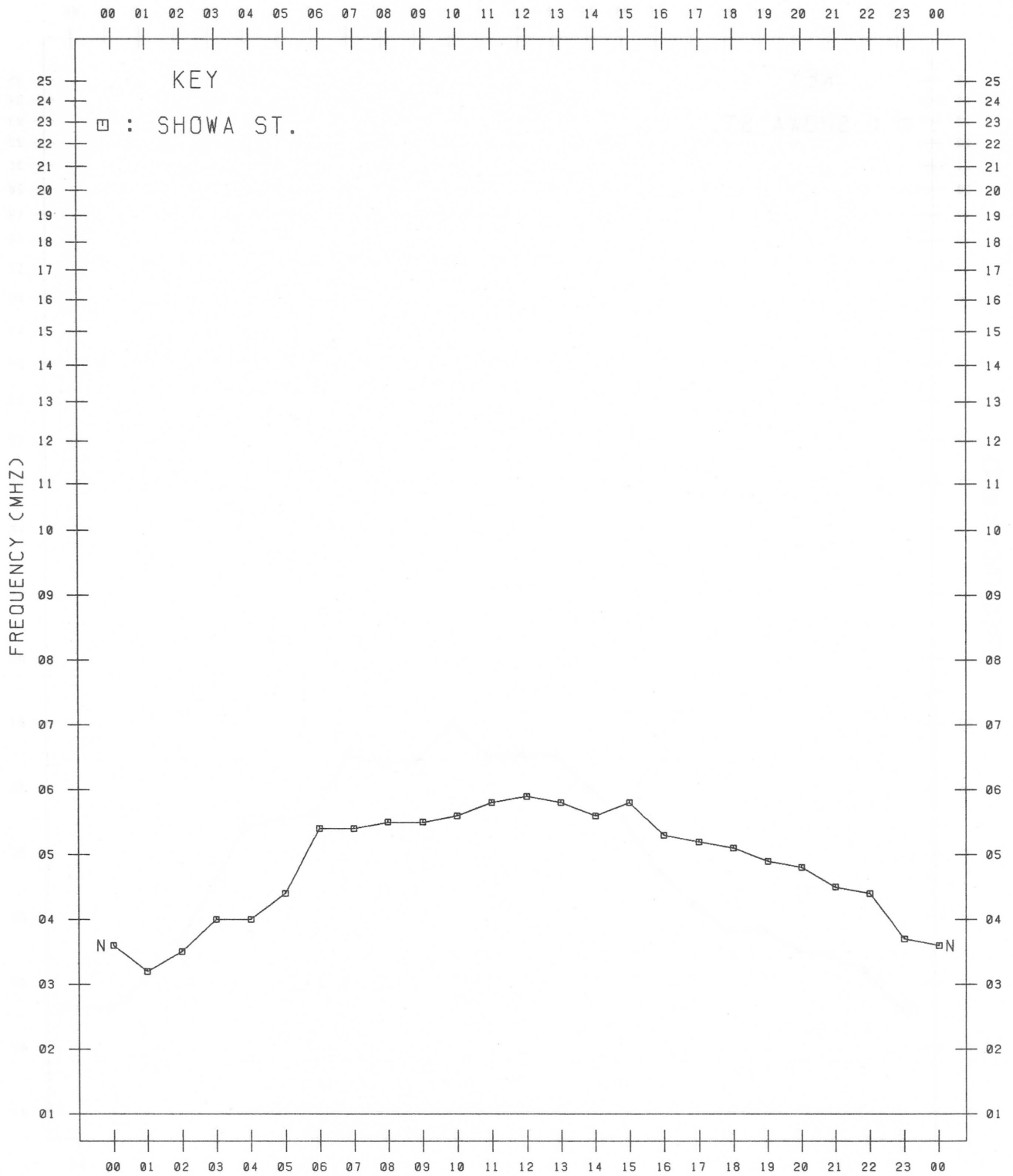
JAN. 1988



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

45 °E MEAN TIME

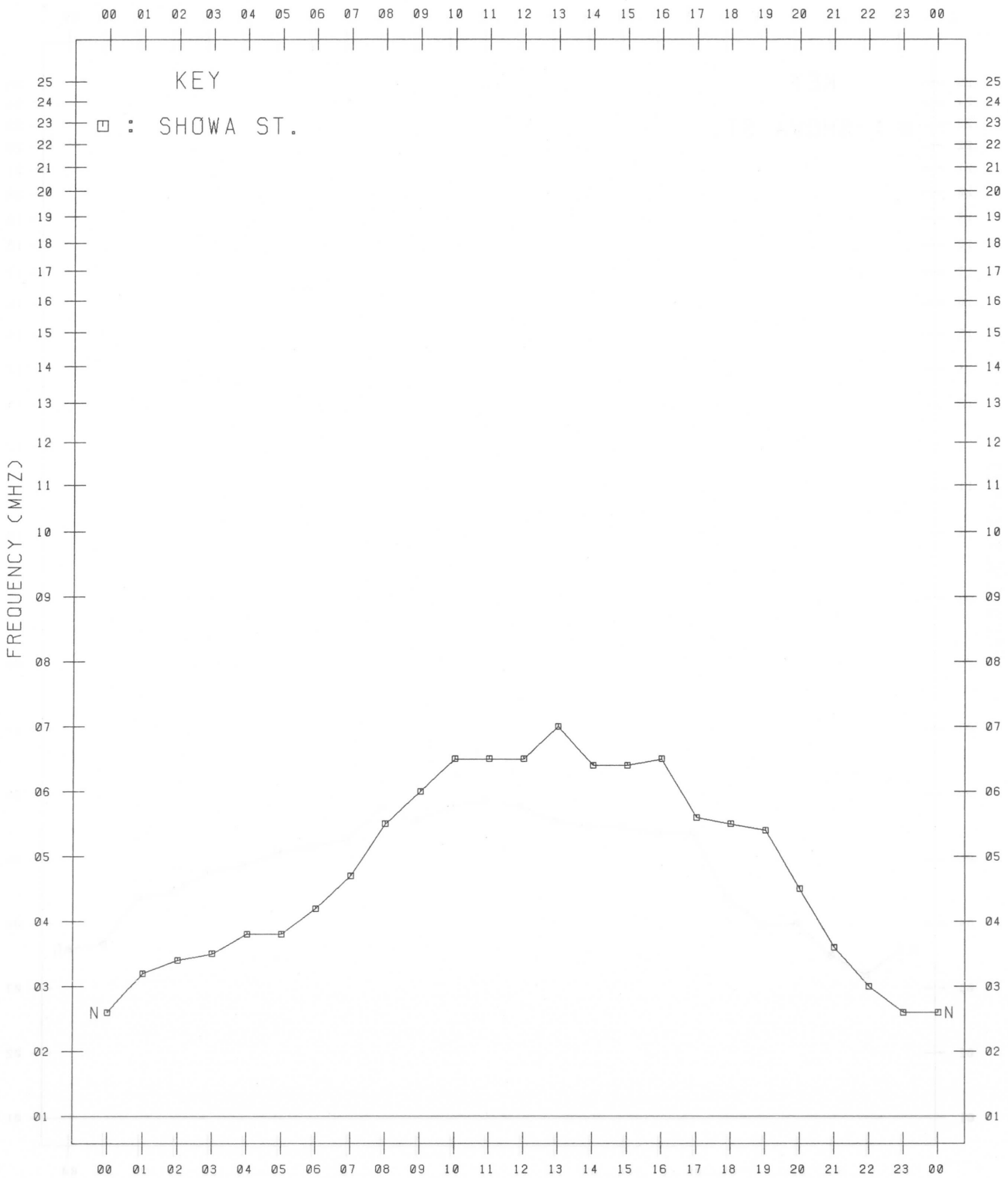
FEB. 1988



# MONTHLY MEDIAN VALUES OF FOF2

45°E MEAN TIME

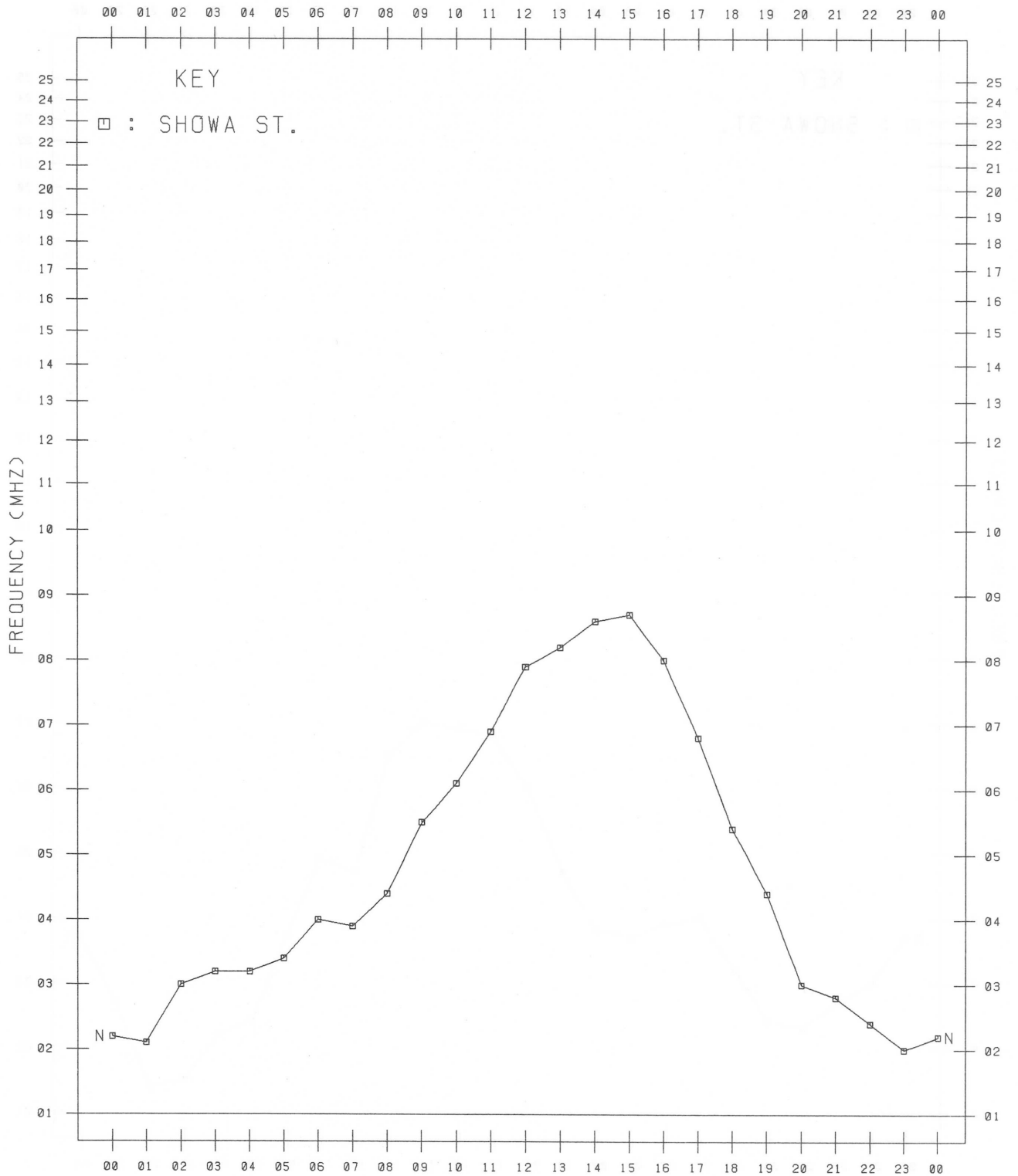
MAR. 1988



# MONTHLY MEDIAN VALUES OF FOF2

45°E MEAN TIME

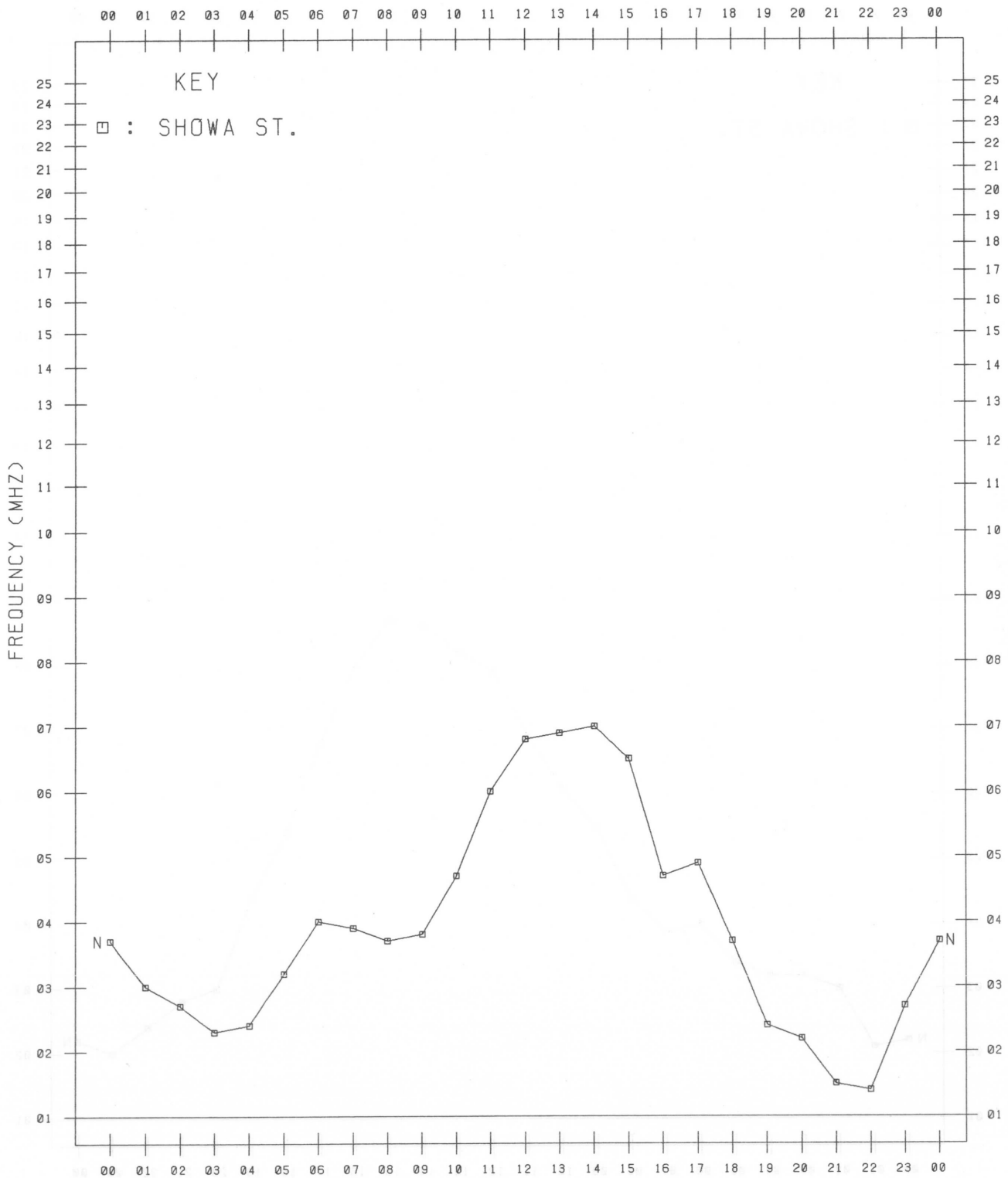
APR. 1988



# MONTHLY MEDIAN VALUES OF FOF2

45°E MEAN TIME

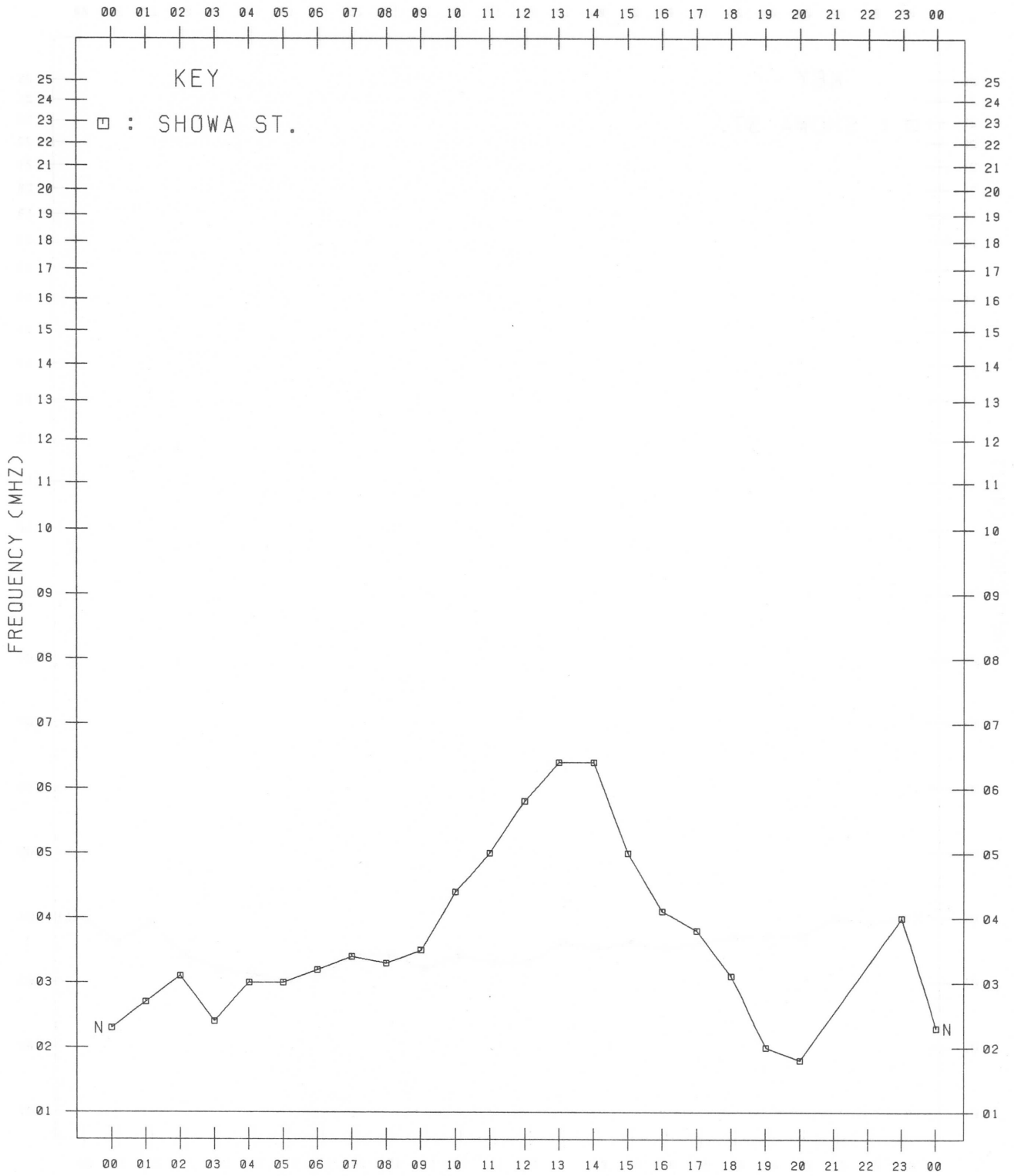
MAY. 1988



# MONTHLY MEDIAN VALUES OF FOF2

45°E MEAN TIME

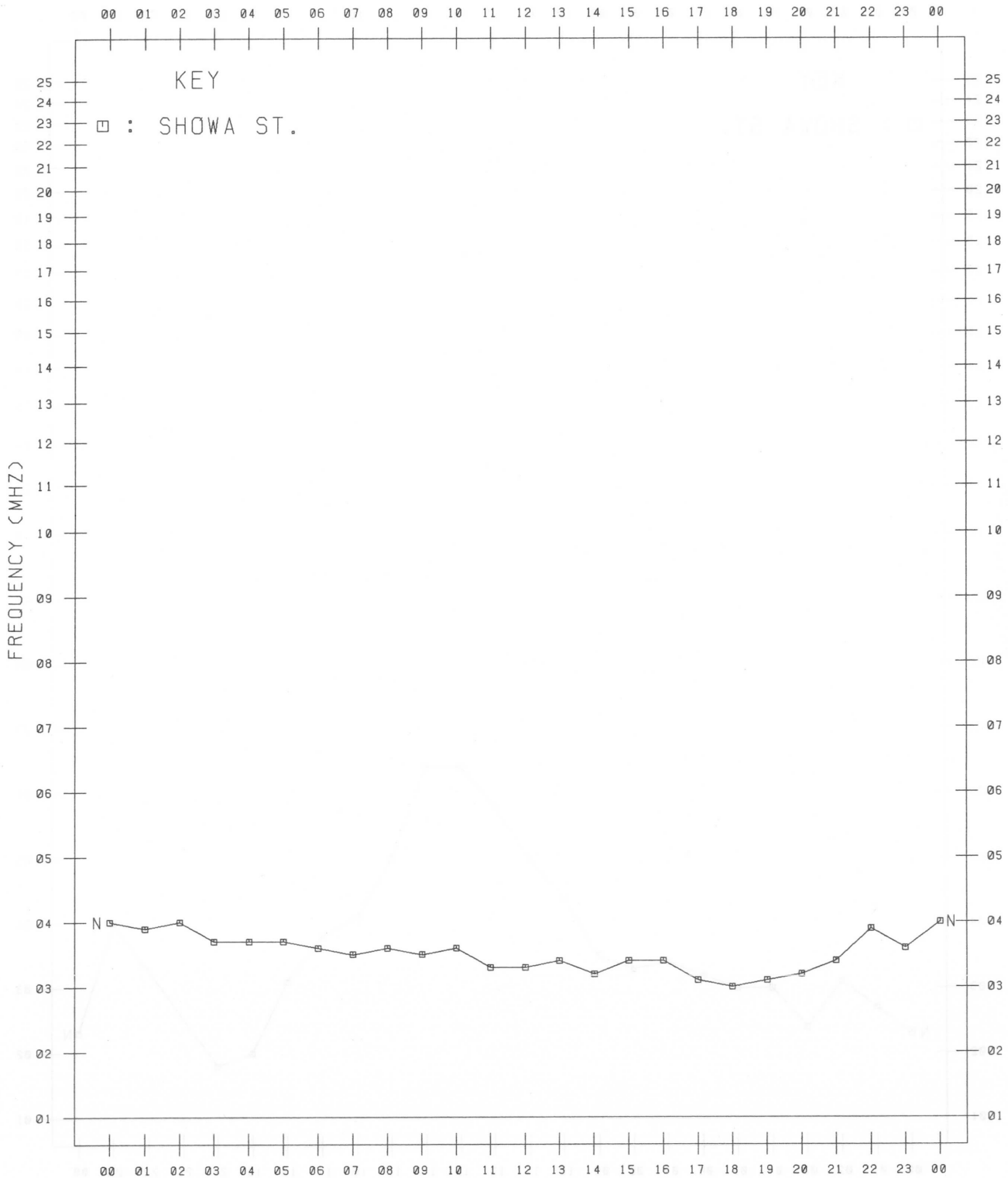
JUN. 1988



# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

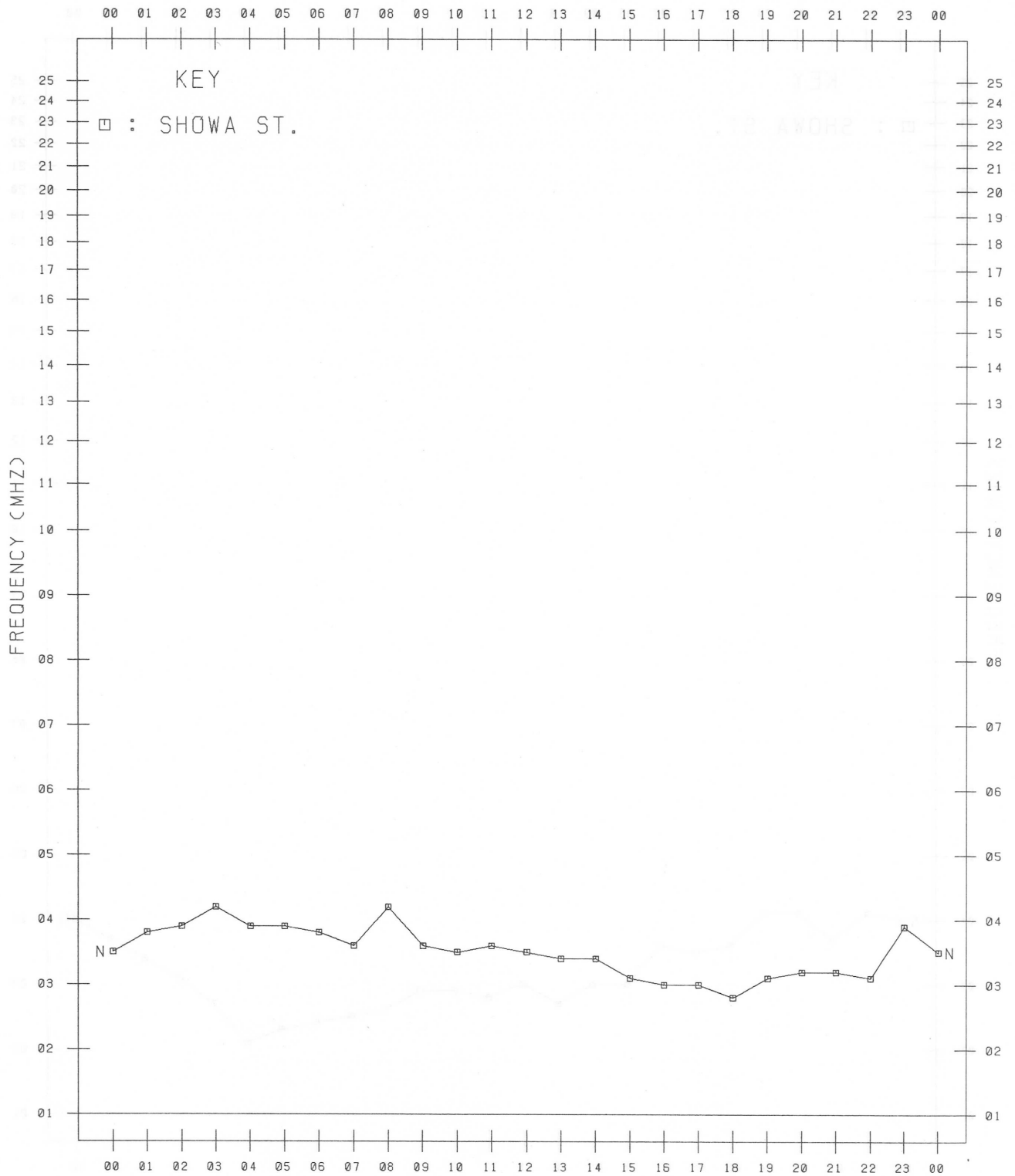
JAN. 1988



# MONTHLY MEDIAN VALUES OF MFES

45 °E MEAN TIME

FEB. 1988

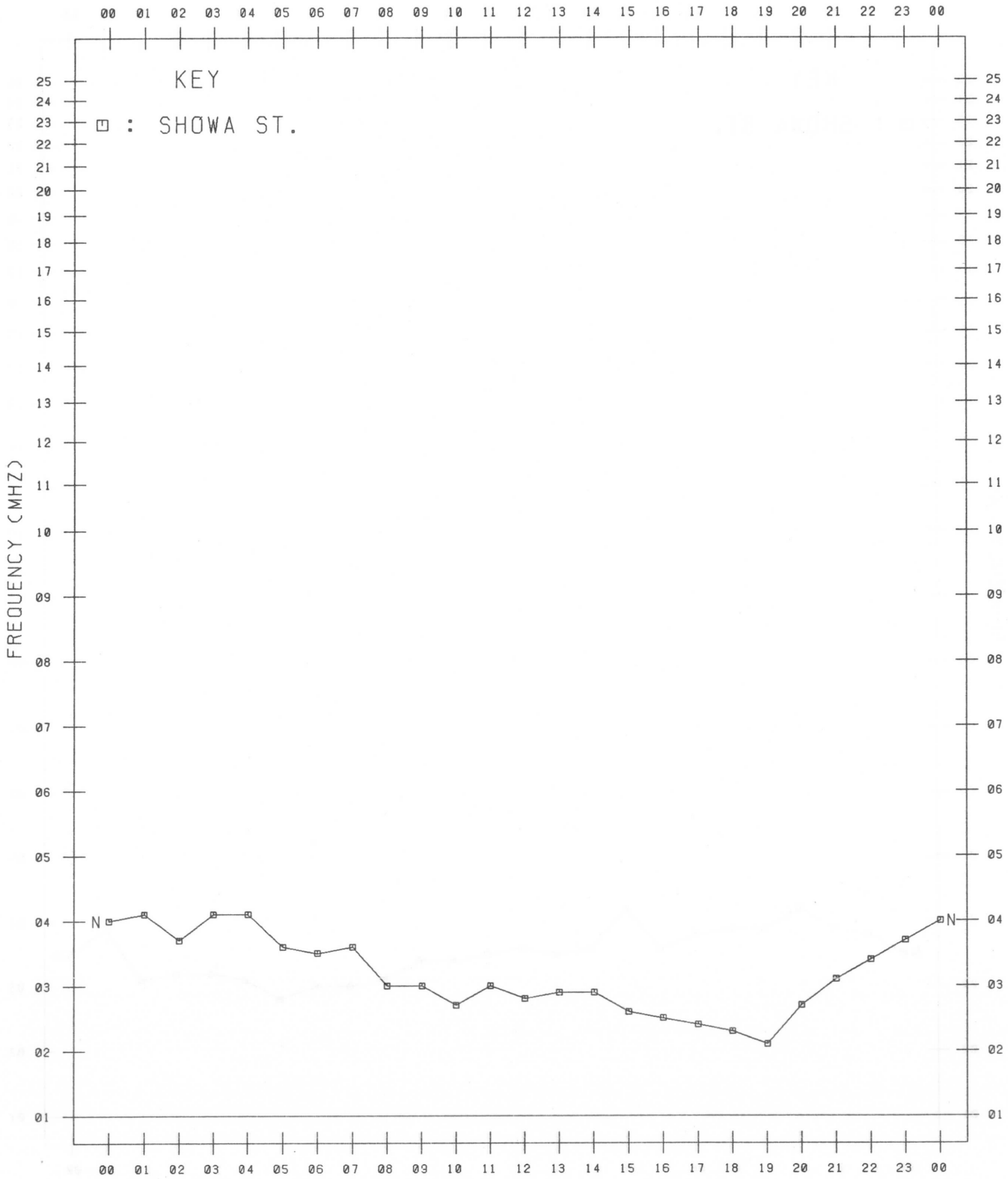




# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

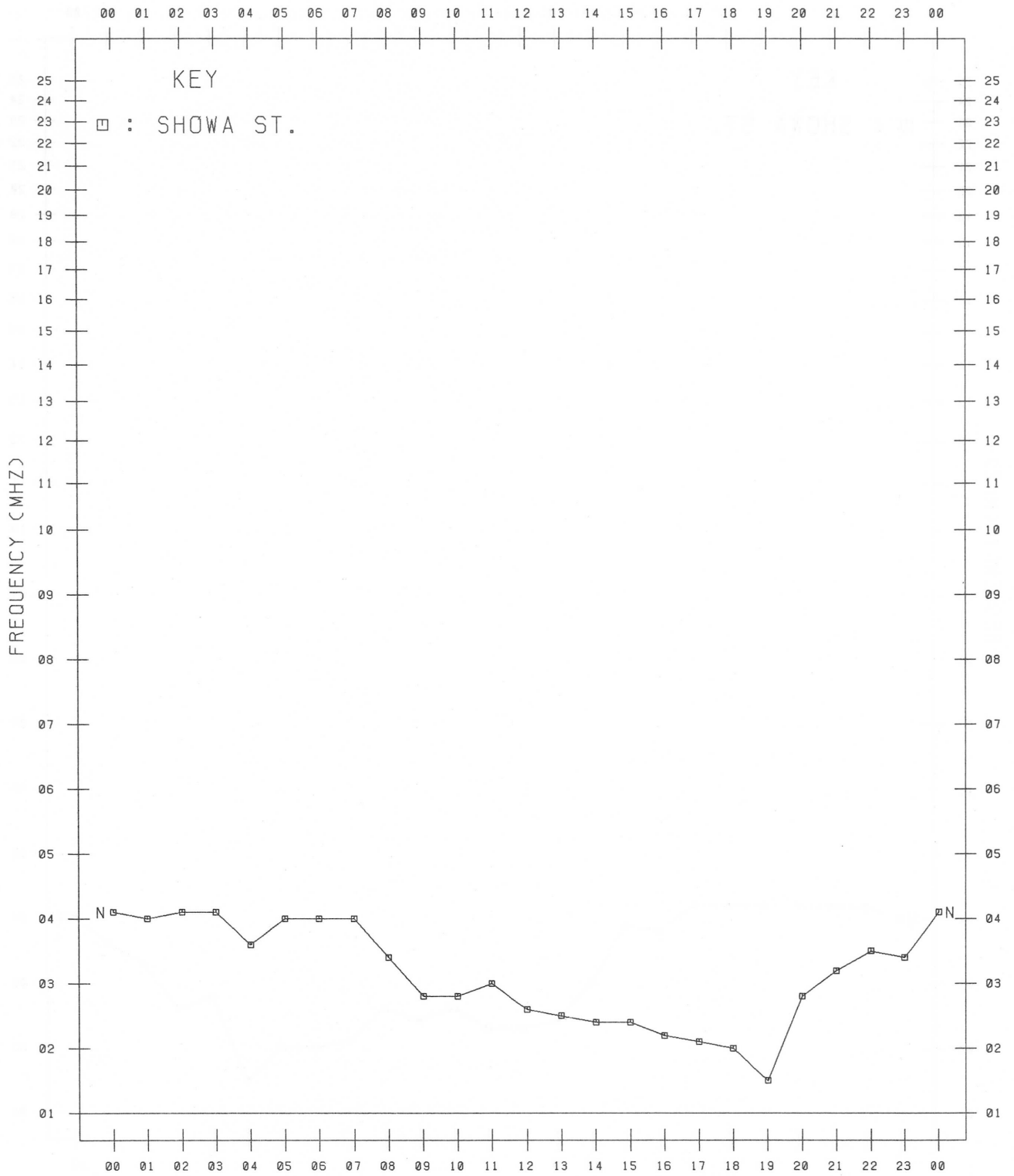
MAR. 1988



# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

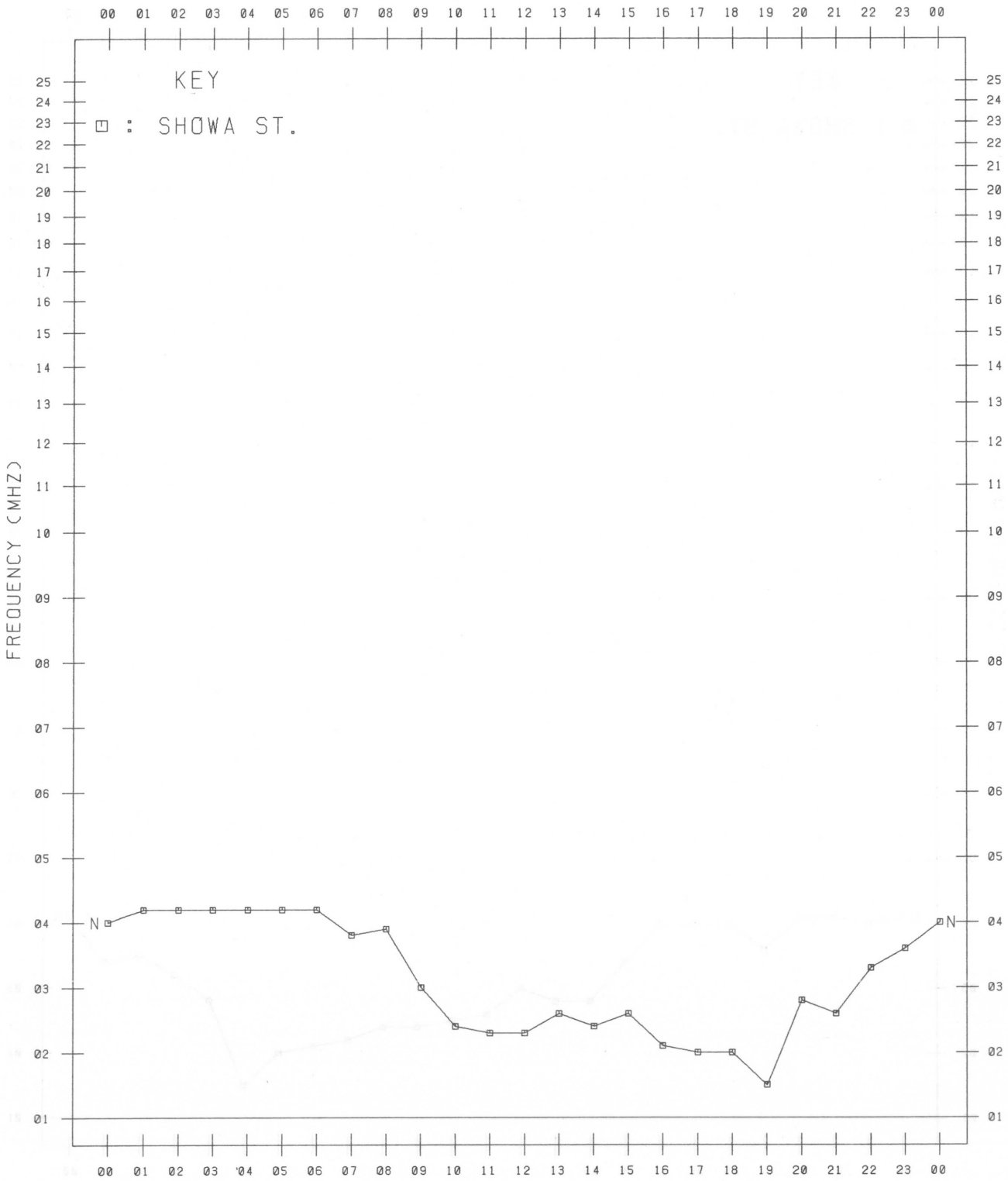
APR. 1988



# MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

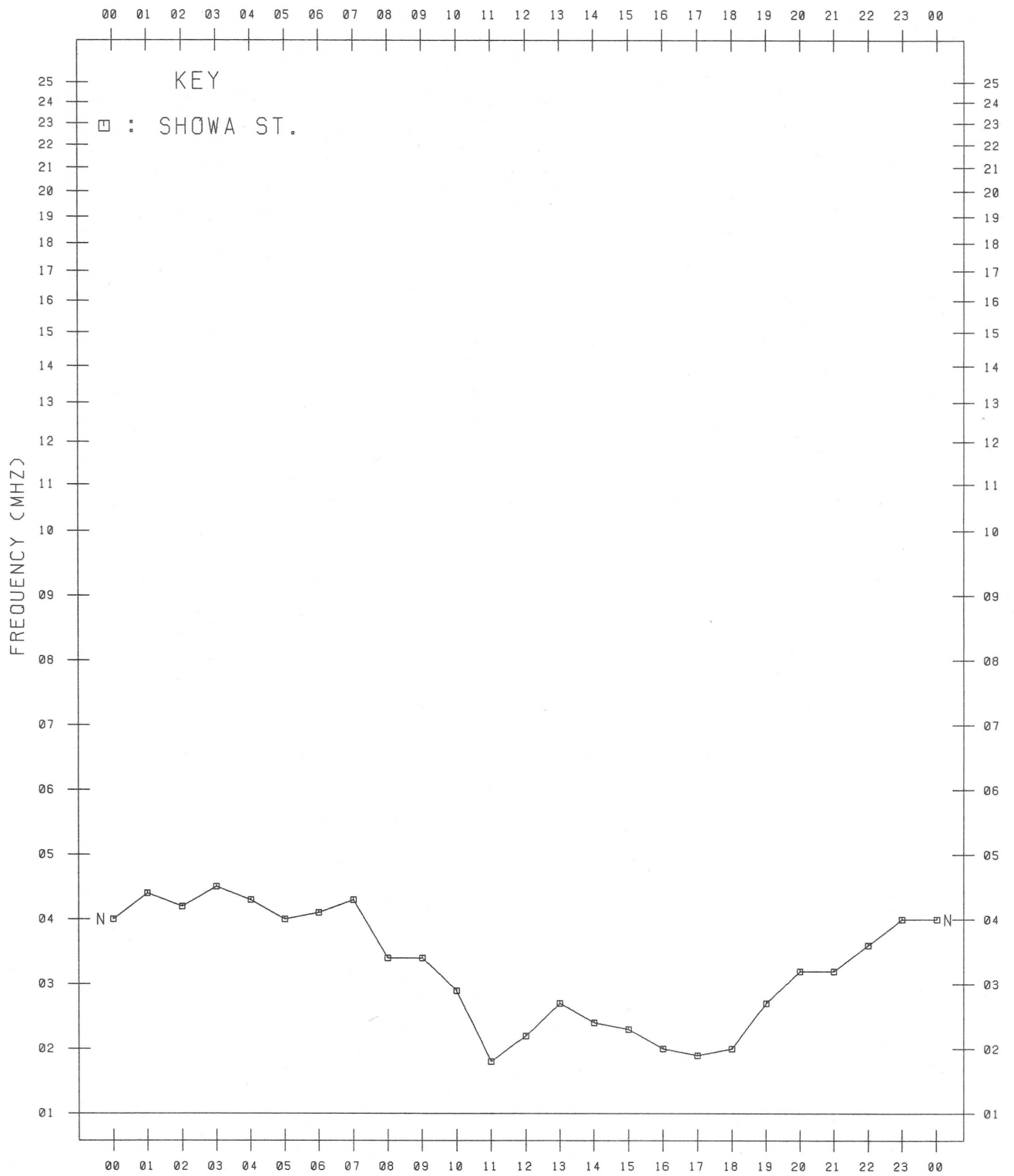
MAY. 1988



# MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

JUN. 1988



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IONOSPHERIC DATA AT SYOWA STATION (ANTARCTICA)  
ION.ANT.— 50 January 1988—June 1988 (Not for Sale)

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昭和基地電離層資料 (南極)

(1988年1月—1988年6月)

1992年3月2日 印刷  
1992年3月5日 発行 (非売品)

編集兼発行所

郵政省通信総合研究所

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