

ION.ANT.—54

IONOSPHERIC DATA AT SYOWA STATION (ANTARCTICA)

January 1990—June 1990

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COMMUNICATIONS RESEARCH LABORATORY

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TOKYO, JAPAN



INTRODUCTION

This data book gives summarized results for vertical soundings of the ionosphere at Syowa Station, Antarctica in 1990. 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 μ 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 Ω respectively

DESCRIPTION

- a. All symbols and terminology in the tables or figures of ionospheric data are used in accordance with the "URSI Handbook of Ionogram Interpretation and Reduction (Second Edition 1972)"
- b. Ionograms data are printed in the quarter hourly of every days.
- c. Characteristics of Ionosphere

fxI	Top frequency of spread F traces or oblique traces.
foF2	Ordinary wave critical frequency for the F2 layer.
fEs(ftEs)	Top frequency of Es layer as reflected overhead.
fmin	Lowest frequency showing vertical ionospheric reflection.
h'F	Minimum virtual height of the ordinary wave F trace as a whole.

Symbols

(1) Descriptive Letters.

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

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

(ii) Qualifying Letters

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

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

Definitions of the CNT, MED, UQ and LQ

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

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

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

IONOSPHERIC DATA STATION SHOWA ST.

JAN. 1990 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	54	B	0 X	0 X	B	A	A	A	B	B	B	B	B	B	B	B	X	B	X	X	0 X	0 X	50	46		
2		A	B		A	A	A	A		71	75	70	A	A	0 X	B	S	S	S		55	48	51	51		
3	0 X		A	B	A	A	S	B	A	B	B	B	B	B	A	S	S	S	X	X	X	S	S	X		
4	0 X		B	A		B		B	A	A	X	X	X	0 X	X	0 X	X	X	0 X	X	X	X	S	X		
5	S	0 X		B		62	65	65	63	B	S		B	X	B	B	B	X	X	X	X	A	A	A		
6	A		0 X	B	A	A	A		70	70	71	73	70	68	66		67	66	69	66	65	62	60	56	52	
7	0 X		A		0 X	0 X	A	A	A	A	A	S	A	A	0 X	A	0 X		S		X		X	0 X	X	
8	52	60	65	63	A	66	63	70	71	85	90	83	80	75	69	73	73	71	69	52	B	A	A	A		
9	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	S	0 X	S	0 X	X	X	X	0 X	0 X	0 X	
10	0 X		A	A	0 X	A			A	X	0 X	X	B			0 X	0 X	X	X	X	X	X	X	0 X	X	
11	60	58	64	A	X	0 X	0 X	A	X	0 X	0 X	0 X	X	0 X	0 X	B	S	B			X	0 X	0 X	A	60	
12	B	B		A	A	A	B	B	A	B	S	B	B				B	B	B		61	53	54	55	55	52
13	A	A	B		B	A	0 X	A	0 X	X	X	X	0 X	0 X	X	X	0 X	0 X			X	X	X	X	X	
14	A	X	B	B		B	0 X	X		0 X	X	0 X	0 X	0 X	0 X	X	0 X	0 X	0 X	0 X	X	X	X	X	X	
15	X	0 X	B	B	B	B	A	X	X	B	0 X	X	X	X	X	X	X	X	X	X	X	X	X	X	0 X	X
16	X	X			0 X	X	0 X	0 X	0 X	0 X	0 X	0 X	A	0 X	0 X	X	X	X	X	X	X	X	B	X	X	X
17	A	B		A	A	0 X		S	S	X			B	0 X	0 X	S	0 X	0 X	X	X	X	X	0 X	0 X	0 X	
18	0 X	X	A	58	60	61	64	66		66	68	70	70	69	70	70	70	71	61	65	60	55	44	52	0 X	
19	0 X		A	A		0 X	X	0 X	0 X	0 X	0 X	X	0 X	X	X	0 X	0 X	0 X	0 X	0 X	0 X	X	X	X	X	
20	X	0 X			A	A	A	0 X	X	0 X	X	A	0 X	X	0 X	0 X	0 X	0 X	0 X	0 X	B	B	A	A	A	
21	A		A		A	A	A	0 X	B	S	B	B	B	B	B	C	0 X	X	B	0 X	0 X	0 X	X	X	A	
22	B	A	0 X	A	A	A			S	S	S	B	B	B	B	B	0 X		S	0 X	X	0 X	A		61	
23	A	A	A		A	A	A		0 X	B	B	B	B	B	B	S	B	B	X	S	X	X	0 X	0 X	A	
24	A	0 X	A		0 X		A	A	A	A	B	B	B	B	B	B	B	B		B	B	B	A	B	0 X	49
25	A	B	B	B		55	B	A	A	S	B	B	B	B	B	S	S	B	X	X	B	X	X	X	X	
26	53	A	A	A	A	A	X		0 X	A	B	B	A	B	B	B	0 X	S	S		X	0 X	0 X	X	X	
27	55	49	B	0 X	B	B	A	A		74	76	76	72	71	69	68	70	68	69	67	65	64	61	60	53	
28	X	X	0 X	X	X	X	X	X	0 X	X	X	X	X	A	A	X	0 X	X	X	X	X	X	X	X	A	
29	A	A			A	A	0 X	S	A	S	A	B	B	B	S	B	0 X	X	X	X	X	X	0 X	A	0 X	
30	A	A	A	A	A	A	A	A	S	A	B	B	B	B	S	0 X	0 X	0 X	0 X	0 X	0 X	A	A	A	45	
31	A	A	X	A	A		B	B	B	S	B	B	B	B	B	S	0 X	B	S	0 X	X	X	X	X	A	
			43			43											70			60	47	52	52			
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	15	16	13	16	12	12		15	14	14	17	14	12	15	17	15	24	19	26	29	26	24	22	22		
MED	56	56	56	58	60	64	64	66	74	78	79	80	78	75	74	75	70	71	66	61	59	55	54	54		
U O	60	60	64	62	64	66	74	80	86	86	86	86	84	81	80	79	76	76	75	66	64	60	58	60		
L O	54	50	51	46	54	60	62	63	71	75	70	71	70	69	70	70	66	68	61	58	52	52	50	51		

IONOSPHERIC DATA STATION SHOWA ST.
 JAN. 1990 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 44	B	44	48	B	A	A	A	B	B	B	B	B	B	B	B	61	B	58	52	43	U R	F	F
2	B	A	B	F 35	A	A	A	A	F	F	F	A	A	A	61	B	S	S	S	49	F	U S	U S	A
3	45	F 44	A	B	A	A	S	B	A	B	B	B	B	B	A	S	S	S	55	54	U S	S	S	54
4	50	B	A	F 54	B	F	B	A	A	F	66	65	65	70	69	64	69	67	69	69	63	62	53	49
5	S	45	F 45	B	F	F	F	F	B	S	F	B	63	B	B	B	59	60	55	60	A	A	A	A
6	A	F 45	R	B	A	A	A	A	F	F	60	60	65	67	64	62	60	61	60	63	60	59	56	U S
7	U S	F 54	A	F 52	55	60	A	A	A	A	A	A	S	A	A	U S	A	S	F	60	59	59	55	54
8	F	F 45	F	F 57	A	F	F	F	F	F	60	57	64	65	79	84	77	74	69	63	67	67	65	63
9	A	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	S	U S	S	57	54	54	52	57
10	F	52	54	A	A	A	F	F	A	73	76	75	B	F	F	R	70	70	70	60	61	64	48	42
11	F	F 54	58	A	R	52	56	A	70	U R	74	75	74	75	70	B	S	B	F	55	45	43	43	A
12	B	B	55	A	A	A	B	B	A	B	S	B	B	F	60	66	B	B	B	55	47	48	U S	49
13	A	A	B	F 52	B	A	58	A	69	71	70	74	80	74	72	74	R	70	74	70	74	61	58	54
14	A	47	B	B	F	B	70	R	F	F	80	80	80	80	78	80	J S	74	70	74	70	70	64	65
15	61	57	B	B	B	B	A	60	67	B	U R	75	84	78	76	76	J S	74	72	71	75	71	57	53
16	50	60	F	F	F	75	78	85	90	D R	U R	94	90	A	80	75	70	69	66	69	65	F	U R	
17	A	B	F 50	F 50	A	A	56	56	F	S	S	64	64	B	63	68	S	67	70	63	58	45	44	
18	U R	49	A	F	F	F	F	F	S	F	F	60	62	64	64	63	64	64	64	65	55	59	54	49
19	U R	A	A	A	F	F	66	74	R	D R	U R	80	75	73	73	70	68	66	65	63	62	61	60	60
20	55	56	F 53	F 53	F	A	A	A	70	80	79	A	89	73	70	U S	73	70	70	70	B	B	A	A
21	A	F 39	A	F 38	A	A	A	58	B	S	B	B	B	B	C	65	59	B	56	55	52	53	46	A
22	B	A	44	A	A	F	A	F	S	S	S	B	B	B	B	B	55	S	60	J S	52	45	42	A
23	A	A	A	F 40	A	A	A	F 40	45	B	B	B	B	B	S	B	B	B	63	S	J S	U S	49	48
24	A	43	A	F 40	44	33	A	A	A	A	B	B	B	B	B	B	S	B	B	B	52	B	A	B
25	A	B	B	B	F	B	A	A	S	B	B	B	B	B	S	S	B	54	54	B	50	47	44	45
26	F	A	A	A	A	A	54	57	60	A	B	B	A	B	B	B	65	S	S	51	49	40	39	F
27	F	F	B	60	B	B	A	A	F	68	70	70	66	65	63	62	64	R	62	63	61	59	58	55
28	50	54	60	65	U R	74	82	84	U R	88	84	80	84	A	A	80	74	U R	75	74	73	67	65	63
29	A	A	F	F	A	A	S	A	S	A	B	B	B	S	B	72	60	60	60	53	54	46	42	A
30	A	A	A	A	A	A	A	A	S	A	B	B	B	B	S	47	55	56	53	55	A	A	A	F
31	A	A	37	A	A	F	B	B	B	S	B	B	B	B	B	S	U R	B	S	54	41	46	46	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	15	16	13	16	12	12	13	15	14	14	17	14	12	15	17	15	24	19	26	29	26	24	22	22
MED	50	50	F	F	F	F	58	60	68	72	73	74	72	69	68	69	64	65	60	55	53	49	48	46
U Q	54	54	58	56	58	60	68	74	80	80	80	80	78	75	73	73	70	70	69	60	58	54	52	54
L Q	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	60	62	55	52	46	46	44	45

IONOSPHERIC DATA STATION SHOWA ST.

JAN. 1990 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	41	B	34	32	B	37	35	47	B	B	B	B	B	B	B	B	32	B	41	E B	40	32	36	38	87			
2	B	42	B	35	71	51	32	40	31	32	32	33	32	31	33	B	31	31	27	28	33	37	37	45				
3	50	41	31	B	35	40	32	B	40	B	B	B	B	B	23	31	19	19	32	E B	31	33	36	28	35			
4	31	B	41	25	B	31	B	40	42	31	32	31	32	32	90	32	31	31	27	E B	31	28	32	32	27			
5	32	41	29	B	42	45	37	32	B	36	32	B	E B	B	B	B	E B	40	31	30	27	33	41	33	42			
6	41	70	32	B	62	36	45	39	33	41	31	34	28	32	B	31	32	37	32	23	27	31	30	34				
7	31	45	90	92	43	43	46	28	32	43	41	32	33	31	28	31	E B	E B	35	35	33	41	51	70	57	36		
8	31	59	70	37	70	44	39	40	39	28	26	32	40	40	49	41	32	33	27	26	B	41	53	91				
9	90	60	70	60	57	45	45	42	42	42	42	B	B	B	33	31	32	35	30	28	29	29	36	31	34			
10	35	42	48	42	26	31	32	28	43	33	33	E B	E B	B	E B	E B	E B	E B	40	24	29	E B	E B	40	41	42	42	
11	57	65	53	42	43	33	32	43	32	33	55	55	58	55	39	B	32	B	41	33	41	41	40	59				
12	B	B	32	90	41	32	B	41	B	32	B	B	E B	E B	39	32	B	B	32	25	36	36	41	41				
13	41	41	B	31	B	41	32	40	33	30	40	E B	E B	E B	E B	32	30	E B	37	29	27	26	26	24	E B	26		
14	35	34	B	B	33	B	40	32	32	E B	38	30	31	28	31	26	32	32	28	26	22	23	32	31	26			
15	35	29	B	B	B	B	42	38	31	B	E B	E B	E B	E B	54	32	30	28	28	31	29	26	41	23	22	23		
16	24	32	35	E B	30	32	32	31	32	32	40	46	59	70	45	46	38	65	61	31	25	B	32	40				
17	60	B	23	40	51	35	23	31	30	34	38	30	B	41	32	33	31	31	27	26	25	27	31	30				
18	39	36	44	41	36	31	31	31	38	33	33	41	46	61	41	32	32	31	31	26	35	31	27	34				
19	33	90	42	41	36	30	32	30	31	31	32	40	41	31	33	33	41	31	49	61	47	59	57	31				
20	27	E B	30	41	41	65	48	45	45	36	32	45	90	61	41	33	40	33	35	28	B	B	40	45	40			
21	41	36	41	35	41	46	35	32	B	31	B	B	B	B	C	E B	40	32	B	27	21	E B	31	41	41	50		
22	B	45	38	70	41	32	41	42	31	E B	39	33	B	B	B	B	B	61	42	43	29	40	41	43	80			
23	43	51	41	47	90	42	41	30	41	B	B	B	B	B	B	B	B	B	B	E B	34	26	35	21	36	43		
24	42	41	42	31	32	32	40	41	33	31	B	B	B	B	B	B	B	B	B	B	E B	30	90	B	38			
25	43	B	B	B	33	B	16	41	42	B	B	B	B	B	B	B	33	31	B	31	27	B	40	23	22	E B	22	
26	35	34	36	42	33	30	31	32	E B	51	40	B	B	B	B	B	E B	E B	E B	60	40	32	31	E B	30	25	22	20
27	32	29	B	41	B	B	42	38	41	32	E B	36	31	34	32	26	32	32	32	26	24	35	24	22	E B	19		
28	17	20	20	E B	14	23	34	32	E B	31	27	36	41	79	80	41	63	41	32	31	27	31	44	22	22	43		
29	46	41	30	47	51	37	37	45	51	32	41	B	B	B	B	B	E B	E B	35	36	41	34	35	21	36	43		
30	41	38	41	55	42	42	41	28	32	31	B	B	B	B	B	28	31	31	E B	35	26	33	36	90	60	70		
31	90	90	90	60	41	31	B	B	B	33	B	B	B	B	B	E B	E B	E B	B	40	E B	41	31	40	39	35		
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	28	26	25	25	26	27	28	28	27	25	22	17	17	19	23	21	27	25	30	29	28	30	30	31				
MED	40	41	41	41	41	36	36	38	33	32	32	33	U	36	32	32	32	32	31	30	28	34	36	34	38			
U 0	43	51	46	51	51	43	41	41	41	37	41	50	57	41	39	40	E B	37	35	34	33	40	41	41	43			
L 0	32	34	32	35	33	32	32	31	32	31	32	32	32	32	30	31	32	31	27	26	30	25	28	30				

IONOSPHERIC DATA STATION SHOWA ST.

JAN. 1990 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	14	B	15	25	B	15	18	14	B	B	B	B	B	B	B	B	19	B	17	40	9	11	17	23	
2	B	15	B	10	15	18	10	15	15	17	15	20	20	19	24	B	20	19	20	15	11	17	10	20	
3	10	10	10	B	17	20	20	B	19	B	B	B	B	B	16	17	20	17	13	31	10	11	17	14	
4	19	B	18	16	B	10	B	19	18	18	10	18	10	19	15	14	14	13	18	31	13	9	9	10	
5	21	9	9	B	9	10	15	13	B	18	20	B	56	B	B	B	40	15	14	10	10	10	20	20	
6	13	15	20	B	25	15	15	14	15	20	19	20	19	23	B	20	15	15	15	17	14	10	9	10	
7	18	15	25	12	15	20	10	18	17	18	15	19	20	20	18	19	35	35	18	18	B	10	10	9	
8	14	10	10	10	18	9	10	20	19	18	17	15	10	15	13	19	18	18	15	10	B	19	14	10	
9	10	10	10	10	10	10	9	15	18	19	19	B	B	26	10	15	15	18	17	10	10	10	10	10	
10	10	16	14	15	14	15	10	14	20	20	18	55	B	22	39	55	40	19	16	50	40	10	18	19	
11	10	13	15	10	10	9	20	21	16	20	55	55	58	55	39	B	18	B	20	10	10	10	10	10	
12	B	B	10	30	20	20	B	B	19	20	B	B	B	39	15	B	B	B	12	17	10	10	14	14	
13	20	18	B	9	B	26	18	21	16	17	20	40	55	56	23	25	37	20	20	15	15	15	23	15	
14	15	15	B	B	20	17	17	17	38	15	12	19	14	16	19	16	15	15	13	14	15	18	14	14	
15	16	18	B	B	B	B	19	10	10	B	55	22	54	17	19	16	15	18	16	15	10	19	17	9	
16	10	10	11	40	16	10	15	14	16	20	20	37	37	20	18	19	14	14	13	13	14	B	21	17	
17	18	B	17	17	17	20	15	15	15	20	19	19	B	18	21	20	20	14	14	10	10	22	8	25	
18	16	10	14	14	19	18	15	15	17	12	11	17	15	19	20	19	8	17	18	10	14	13	18	14	
19	14	25	15	14	13	14	10	14	15	18	18	15	18	19	17	25	18	14	14	20	B	10	13	10	
20	9	30	10	14	15	10	9	12	14	18	18	18	15	20	14	25	27	18	11	B	B	14	15	20	
21	20	10	10	8	20	14	15	20	B	B	B	B	B	B	C	40	19	B	19	15	31	15	18	14	
22	B	18	10	19	10	15	15	15	18	39	19	B	B	B	B	B	15	23	13	10	14	15	14	15	
23	15	19	10	15	20	15	14	10	18	B	B	B	B	B	24	B	18	34	11	35	13	17	18	18	
24	30	30	20	17	15	14	20	19	17	23	B	B	B	B	B	B	B	B	B	30	B	13	B	21	
25	15	B	B	B	10	B	11	10	10	B	B	B	B	B	B	30	17	B	20	10	B	22	19	11	22
26	10	20	25	24	19	20	19	24	51	20	B	B	24	B	B	B	60	40	10	19	30	14	10	14	
27	10	19	B	25	B	B	30	20	18	17	36	20	18	19	19	14	14	10	11	18	15	10	9	19	
28	9	10	15	14	14	14	15	31	18	16	25	20	30	23	20	30	19	18	14	14	9	15	9	20	
29	15	15	10	10	25	14	13	10	15	20	20	B	B	B	25	B	35	18	21	25	14	10	14	14	
30	15	20	10	14	30	14	20	21	10	24	B	B	B	B	20	18	20	35	19	19	15	14	9	10	
31	14	19	11	12	10	9	B	B	B	18	B	B	B	B	B	35	35	B	20	41	18	9	11	24	
	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	30	31	31	31	31	31	31	31	31	31	
MED	15	18	15	15	17	15	15	15	17	20	20	55	56	26	20	25	20	18	16	17	14	13	14	14	
U O	19	25	25	30	25	20	20	21	19	38	B	B	B	B	39	B	37	35	19	30	22	15	18	20	
L O	10	10	10	12	14	10	11	14	15	18	18	19	19	19	17	19	15	15	13	11	10	10	10	10	

IONOSPHERIC DATA STATION SHOWA ST.

JAN. 1990 H'F (KM)

45°E MEAN TIME (G.M.T. + 3H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	E A 370	B	A	A	B	A	A	A	B	B	B	B	B	B	B	B	240	B	E B 250 350	305 300	380 400	E A 380 400	E A 380 400	E A 380 400	
2	B	A	B	E A 320	A	A	A	A	A	E A 260	230	A	A	A	210	B	225 275	245 245	245 245	E A 310 330	E A 330 250	A	A	A	
3	A	A	A	B	A	A		B	A	B	B	B	B	B	A	E A 230	220 230	245 250	250 340	E A 340	A	250 315	E A 250 315	E A 250 315	
4	E A 320	B	A	280	B	260	B	A	A	A	205 230	225 230	220 215	230 230	220 215	230 230	250 250	E A 275 270	E A 275 270	E A 275 270	E A 275 270	275 280	275 280	275 280	
5	E A 400	A	A	B	A	E A 350	E A 250	E A 260	E A 250	B	E A 260	E A 250	B	B	B	B	B	230 240	240 245		A	A	A	A	
6	A	E A 375	E A 370	B	A	A	A	250 250	A	200	A	A	225		B	A	240 240	230 240	230 240	230 240	230 245	290 290	290 290	290 290	
7	E A 300	E A 350	A	E A 440	A	A	A	A	A	A	210		A	A		A	E B 220 240	E B 245 250	E A 275 270	E A 275 270	E A 275 270	E A 275 270	E A 275 270	E A 275 270	
8	E A 270	A	E A 325	E A 300	A	E A 300	240	A	A	210 200			A	E B 260	210	260 245	230 270	E A 270		B	A	A	A	A	
9	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A		245 230	230 250	230 230	250 230	260 255	275 275	300 300	300 300	
10	A	A	A	A	A	E A 250	220	A	A	240 460	E B	B	B	B	B	B	225 460	240 230	E A 260 425	E A 330 290	E A 430 430	E A 430 430	E A 430 430	E A 430 430	
11	A	300	A	A	A	A	A	A	A	A	B	B	B	B	B	B	220 225	290 340	E A 290 340	E A 290 340	E A 290 340	E A 290 340	E A 290 340	E A 290 340	
12	B	B	A	A	A	B	B	A	B	A	B	B	B	B	B	B	230 240	E A 280 270	E A 300 280	E A 280 240	E A 240 330	E A 240 330	E A 240 330	E A 240 330	
13	A	A	B	E A 360	B	E A 330	A	A	215 225	210 230	A	E B	B	B	E A 240 235	A	225 240	230 240	240 240	260 290	260 260	260 260	260 260	260 260	
14	A	E A 350	B	B	A	B	E A 250	E A 230	240 215	210 220	220 230	240 210	220 230	240 210	220 245	230 240	220 245	230 240	240 250	250 250	260 260	260 260	265 265	265 265	
15	E A 300	E A 340	B	B	B	B	E A 300	E A 230	A	B	B	A	B		A		220 220	210 230	230 245	245 340	E A 290 260	270 270	270 270	270 270	
16	260 290	270 375	E B 375	A	E A 350	E A 260	E A 230	E A 230	230 230	A	A	A	A	A	A	A	210 220	230 370	E A 240 250	E A 250 250	B	E A 380 340	E A 380 340	E A 380 340	
17	A	B	A	A	A	E A 270	240	200 220	230 220	230	A	230	B	A	240 220	230 240	250 250	250 250	290 290	E A 290 310	E A 310 310	E A 310 310	E A 310 310	E A 310 310	
18	A	E A 360	A	E A 370	E A 320	E A 280	E A 260	215 225	250 225	225 250	225	A	A	220 250	230 230	230 230	240 240	240 240	280 260	E A 270 265	E A 260 260	E A 350 325	E A 350 325	E A 350 325	
19	E A 330	A	A	E A 400	E A 360	E A 290	E A 230	230 220	225	A	A		220 220	205 230	240 230	240 230	A	A	E A 270 265	E A 260 260	E A 260 260	E A 260 260	E A 260 260	E A 260 260	
20	E A 310	360	A	A	E A 450	A	A	A	A	250 245	245	A	A	A	A	A	225 225	450 240	E A 250 250	B	B	A	A	A	
21	A	A	A	A	A	A	A	A	B	260	B	B	B	B	B	C E B 230 245	245 270	E A 270 270	275 300	E A 300 320	E A 300 320	E A 300 320	E A 300 320	E A 300 320	
22	B	A	A	A	A	A	E A 290	E A 260	210	E B	B	B	B	B	B	B	E A 250 245	E A 250 250	E A 250 250	E A 350	E A 350	E A 350	E A 350	E A 350	
23	A	A	A	A	A	A	E A 270	E A 255	B	B	B	B	B	B	B	B	230	B	240 260	250 320	E A 310	E A 310	E A 310	E A 310	
24	A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	260	B	A	B	E A 460	E A 460	E A 460
25	A	B	B	B	E A 375	B	A	A	225	B	B	B	B	B	B	B	240 230	230 300	E A 280 260	E A 260 340	E A 340 300	E A 340 300	E A 340 300	E A 340 300	
26	E A 310	A	A	A	A	A	E A 310	B	A	B	B	A	B	B	B	B	B	250 275	260 260	E A 260 260	E A 260 260	E A 360 310	E A 360 310	E A 360 310	
27	E A 260	E A 380	B	E A 345	B	B	A	E A 280	E A 250	220 250	200 230	210 220	225 230	210 220	225 230	210 220	225 230	245 240	240 250	250 260	250 260	290 290	290 290	290 290	
28	275 280	290 300	275 245	250 250	240 240	240 240	240 240	225 225	225 225	225 225	225 225	225 225	225 225	225 225	225 225	225 225	225 225	225 225	230 245	245 250	250 250	250 250	315 315	315 315	
29	A	A	E A 250	A	A	A	E A 300	E A 290	A	225	A	B	B	B	B	B	230	250 260	270 270	275 300	E A 300 330	E A 300 330	E A 300 330	E A 300 330	
30	A	A	A	A	A	A	A	E A 280	A	B	B	B	B	B	B	B	230 225	240 255	E B 250 350	E A 350	A	A	A	A	
31	A	E A 340	A	A	E A 340	B	B	B	A	B	B	B	B	B	B	B	230 240	260 260	E A 275 360	E A 360 310	E A 360 310	E A 360 310	E A 360 310	E A 360 310	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	12	10	6	9	5	6	11	15	15	15	15	8	4	9	20	18	26	24	29	27	25	22	23	17	
MED	E A 305	E A 350	E A 308	E A 345	E A 375	E A 310	E A 275	E A 250	E A 230	E A 232	E A 222	E A 225	E A 220	E A 225	E A 225	E A 224	E A 230	E A 235	E A 248	E A 248	U 262	U 262	U 270	E 300	
U O	E A 325	E A 360	E A 340	E A 372	E A 425	E A 350	E A 300	E A 290	E A 250	E A 260	E A 230	E A 240	E A 222	E A 230	E A 240	E A 230	E A 240	E A 245	E A 265	E A 270	E A 308	E A 300	E A 340	E A 328	
L O	272	300	270	300	298	260	260	230	225	225	210	210	210	220	220	220	225	230	245	240	260	260	260	278	

IONOSPHERIC DATA STATION SHOWA ST.
 FEB.1990 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	43	B	A	B	B	61	A	65	B	B	B	B	65	B	69	67	66	X	X	X	B	43	A	A	
2	52	50	56	B	B	B	A	0 X	0 X	A	B	S	B	B	0 X	66	S	0 X	X	A	B	A	53	A	
3	0 X	B	A	A	B	A	A	0 X	X	0 X	X	X	A	0 X	X	B	S	X	X	B	S	A	0 X	47	
4	A	46	0 X	55	70	A	A	A	B	B	B	A	S	S	0 X	X	X	X	X	A	0 X	51	0 X	A	
5	A	A	49	A	34	B	B	A	A	B	B	B	B	B	0 X	B	B	0 X	0 X	0 X	0 X	0 X	47	46	47
6	43	46	B	49	51	A	B	B	B	B	B	B	B	B	B	X	0 X	0 X	X	X	X	X	X	X	X
7	51	61	56	65	61	A	52	66	68	69	B	B	B	B	X	120	90	B	B	B	A	B	A	B	
8	A	F	A	X	A	0 X	A	A	A	B	B	B	B	0 X	S	X	S	S	S	X	X	X	X	X	X
9	X	X	60	60	70	71	76	83	101	96	B	B	B	0 X	X	X	X	0 X	X	X	60	59	58	57	56
10	60	46	45	56	58	B	62	70	71	81	90	90	X	B	0 X	82	74	74	76	71	67	62	65	56	37
11	A	A	S	55	60	65	A	0 X	X	0 X	X	76	76	80	81	83	80	78	72	67	62	52	A	A	A
12	A	0 X	0 X	0 X	B	A	A	A	A	70	71	76	74	74	74	72	71	67	65	67	63	60	60	56	
13	56	57	58	64	56	71	80	91	96	93	90	90	96	99	99	96	96	90	91	83	75	71	62	45	
14	A	60	46	A	A	B	70	A	B	B	A	A	S	S	S	S	0 X	X	X	A	X	X	0 X	46	
15	45	42	46	A	X	0 X	62	66	71	70	76	80	72	76	80	70	60	A	A	60	S	A			
16	B	B	A	A	B	A	B	A	B	B	S	S	B	B	B	B	X	S	B	0 X	46	A	B	B	
17	B	A	B	A	B	A	A	B	B	B	B	B	B	B	B	B	66	50	A	A	A	B	A	A	
18	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	X	B	0 X	X	X	A	A	A	
19	A	B	B	B	0 X	B	B	A	A	A	B	B	B	B	B	S	0 X	B	B	B	42	A	A	A	
20	A	38	B	B	0 X	0 X	B	A	B	A	B	B	B	B	B	B	B	0 X	0 X	0 X	A	A	A	A	
21	A	A	A	A	A	A	A	B	A	B	B	S	S	S	B	S	S	B	X	X	53	44	A	A	
22	A	A	A	A	B	B	B	B	B	B	B	B	B	B	0 X	0 X	0 X	0 X	X	0 X	X	X	A	A	
23	A	A	A	B	A	A	A	A	S	A	B	S	S	B	S	B	S	B	0 X	X	A	0 X	A	A	A
24	A	B	B	A	A	B	B	B	A	A	B	B	B	S	S	S	X	X	B	S	A	45	A	A	
25	A	46	A	A	0 X	B	A	B	B	0 X	0 X	B	B	B	B	0 X	S	S	X	0 X	X	X	A	A	A
26	A	A	A	56	B	A	B	B	B	B	B	S	B	B	B	B	X	X	X	X	X	X	X	A	
27	A	A	A	46	X	B	A	B	B	B	B	B	B	B	X	X	X	X	X	X	0 X	0 X	X	A	
28	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	0 X	X	B	X	X	X	A	A	
29																									
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	9	13	10	11	14	9	6	9	9	8	7	6	5	8	13	16	18	22	21	19	19	17	14	9	
MED	51	48	52	56	54	52	66	70	68	76	71	74	76	80	72	71	70	67	62	60	56	58	54	47	
U O	56	58	58	60	60	68	76	76	84	90	90	90	88	88	86	80	78	71	68	67	63	63	60	56	
L O	44	46	46	49	46	48	60	63	62	68	70	71	70	72	69	67	64	59	54	53	47	45	50	46	

IONOSPHERIC DATA STATION SHOWA ST.

FEB. 1990 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 37	B	A	B	B	F 55	A	F 59	B	B	B	B	F 59	B	F 63	F 61	F 60	53	57	54	B	F 37	A	A		
2	F 46	F 40	F 50	B	B	B	A	E 40	G 40	E 40	G	A	B	S	B	B	B	S	E 41	G 56	R	A	B	A	F 47	A
3	41	B	A	A	B	A	A	55	65	65	65	66	A	65	64			S	58	52	B	S	A	A	41	
4	A	F 40	41	45	F	A	A	A	B	B	B	A	S	S	59	61	63	64	59	50	A	F 47	45		A	
5	A	A	F 43	A	F 28	B	B	A	A	B	B	B	B	B	B	B	B	U 50	R 48	U 44	R 44	R 41	F 40	41	41	
6	F 37	F 40	B	F 43	F 45	A	B	B	B	B	B	B	B	B	B	B	62	56	62	55	55	50	55	54	46	
7	F 45	F 55	F 50	F 59	F 55	A	F 46	F 60	F 58	63	B	B	B	B	114	80	F	B	B	B	A	A	B	A	B	
8	A	F	A	38	A	40	A	A	A	B	B	B	B	60	64	S	S	S	S	S	54	53	52	51	U 50	
9	50	52	F 54	F 54	F 60	F 65	F 70	F 77	95	90	B	B	B	90	84	80	74	U 75	R 65	F 60	F 64	F 59	F 59	F 52		
10	F 54	F 40	F 39	F	F	B	F	F	F	F	F	R	B	F	R	F	68	70	65	60	F	56	59	50	F 31	
11	A	A	S	F 45	F 54	F 59	A	F 64	F 60	80	70	70	74	U 75	U 77	U 74	72	66	61	56	U 46	A	A	A		
12	A	42	F 50	D 50	F 50	B	A	A	A	A	F	F	U 70	U 68	U 68	U 66	65	61	59	61	57	54	54	50		
13	F 50	F 51	J 52	S 58	F 50	F 65	F 74	F 85	R 90	87	84	84	90	93	93	90	90	84	85	77	F	69	65	56	F 39	
14	A	F 54	F 40	A	A	B	F 60	A	B	B	A	A	S	S	S	S	57	61	63	64	F 60	54	48	40		
15	F 39	F 36	F 40	A	F 39	J 46	S 54	F 64	F 56	60	65	64	70	74	66	70	70	64	54	A	A	F 50	S	A		
16	B	B	A	A	B	A	B	A	B	B	S	S	B	B	B	B	B	60	S	B	R 44	F 40	A	F 34	B	
17	B	A	B	A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	U 45	S	B	A	B	A	A	
18	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	58	U 48	S	47	U 39	A	A	A	A	
19	A	B	B	B	33	B	B	A	F 57	A	A	B	B	B	B	B	S	55	B	B	B	F 36	A	A	A	
20	A	F 32	B	B	R 42	U 45	B	A	B	A	B	B	B	B	B	B	B	B	55	45	48	A	A	F 42	A	
21	A	A	A	A	A	A	A	B	A	B	B	S	S	S	B	S	S	S	B	B	R 47	38	A	A	A	
22	A	A	A	A	B	B	B	B	B	B	B	B	B	B	60	64	65	66	56	57	F 50	37	A	A	A	
23	A	F	A	B	A	F 45	A	A	A	S	A	B	S	S	B	S	B	55	44	A	43	A	A	A	A	
24	A	B	B	A	A	B	B	B	A	A	B	B	B	S	S	S	65	65	B	S	A	F 39	A	A	A	
25	A	F 40	A	A	B	A	B	B	41	45	R	B	B	B	B	57	48	47	46	39	A	A	A	A	A	
26	A	A	A	F	B	A	B	B	B	B	B	S	B	B	B	F 56	64	54	54	51	F 50	47	F 44	A	A	
27	A	A	A	F 40	41	F 40	B	A	B	B	B	B	B	B	64	75	84	63	70	60	F 60	65	45	A	A	
28	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	56	48	B	46	41	F 36	A	A	A	
29																										
30																										
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	9	12	10	9	12	9	6	9	9	8	7	6	5	8	13	16	18	22	21	19	19	17	14	9		
MED	F 45	F 40	F 46	F 45	F 44	F 46	F 58	F 60	60	70	65	68	70	72	66	65	64	61	56	54	50	50	48	41		
UO	50	52	50	56	52	62	70	70	78	84	84	84	82	82	80	74	70	65	62	60	57	57	54	50		
LO	F 38	F 40	F 40	F 42	F 40	F 42	F 54	F 57	56	62	64	65	64	66	63	61	58	53	48	47	41	38	44	40		

IONOSPHERIC DATA STATION SHOWA ST.

FEB.1990 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	E B 30	B	39	B	B	70	40	41	B	B	B	B	E B 40	B	33	41	31	E B 31	27	31	B	33	44	41	
2	41	38	32	B	B	B	36	42	32	55	B	37	B	B	B	E B 35	E B 35	33	32	33	B	70	45	42	
3	41	B	41	66	B	41	38	32	27	E B 40	E B 38	E B 40	41	37	41	B	33	32	26	B	E B 35	41	38	41	
4	41	36	58	36	42	35	43	42	B	B	B	33	E B 35	E B 36	33	31	28	28	24	27	40	23	45	44	
5	40	41	40	100	41	B	B	41	41	B	B	B	B	B	E B 37	B	B	E B 35	E B 30	26	36	42	32	37	
6	36	41	B	42	43	43	B	B	B	B	B	B	B	B	B	E B 35	38	31	27	26	23	E B 20	E B 20	E B 18	
7	E B 19	E B 18	29	33	27	33	33	23	28	E B 36	B	B	B	B	32	28	B	B	B	43	90	B	42	B	
8	56	70	41	39	38	29	41	41	42	B	B	B	E B 36	28	27	E B 35	25	E B 30	39	33	E B 20	42	14		
9	27	31	31	31	16	26	26	26	26	30	B	B	E B 56	60	41	41	E B 40	25	32	27	E B 20	22	65		
10	31	31	31	E B 30	25	B	40	32	28	40	33	34	E B 39	E B 37	E B 50	33	30	31	25	E B 30	24	26	35		
11	41	48	28	28	41	60	41	31	39	50	28	35	E B 35	E B 55	E B 55	E B 37	E B 35	E B 30	22	23	36	41	51	86	
12	41	45	45	35	26	B	40	41	41	40	27	31	28	E B 39	31	31	E B 31	E B 30	32	E B 27	23	22	26	31	
13	26	35	35	32	E B 39	41	41	25	23	36	40	33	26	42	42	33	40	22	25	33	E B 20	E B 25	E B 18	31	
14	47	43	E B 17	45	46	B	E B 28	46	B	B	46	43	E B 36	E B 30	E B 35	E B 36	E B 31	32	32	34	42	35	20	30	
15	31	35	31	32	25	22	22	31	31	30	32	E B 40	31	26	33	33	41	33	30	41	51	44	42	42	
16	B	B	45	91	B	31	B	32	B	B	33	38	E B 31	B	B	B	E B 31	E B 30	B	E B 29	E B 25	E B 35	B	28	
17	B	44	B	70	B	33	27	B	B	B	B	B	B	B	B	B	B	B	26	25	26	B	45	45	
18	80	B	B	37	B	B	B	B	B	B	B	B	B	B	B	B	E B 38	E B 30	29	22	56	31	80		
19	90	B	B	B	B	B	B	41	33	39	41	B	B	B	B	32	31	B	B	B	41	85	68	40	
20	80	52	B	B	35	27	B	41	B	41	B	B	B	B	B	B	B	28	31	46	51	42	80	41	
21	41	90	36	43	33	39	40	B	42	B	B	E B 36	31	31	B	E B 32	E B 35	B	36	B	45	20	25	26	
22	81	27	42	41	B	B	B	B	B	B	B	B	B	B	26	37	E B 55	27	E B 40	21	E B 30	37	51	31	
23	58	46	59	B	41	25	45	33	41	41	41	B	E B 39	E B 37	B	31	B	26	32	45	41	31	41	92	
24	41	B	B	70	41	B	B	B	41	26	B	B	E B 36	E B 35	E B 35	E B 35	E B 31	27	B	26	41	45	88	59	
25	41	39	75	32	31	B	41	B	B	38	36	B	B	B	B	28	E B 36	32	36	39	23	92	70	22	
26	57	50	41	31	B	36	B	B	B	B	B	E B 40	B	B	B	E B 36	26	32	30	24	25	22	19	71	
27	52	46	60	40	31	43	B	33	B	B	B	B	B	B	E B 35	E B 40	E B 38	26	E B 36	E B 31	E B 32	E B 38	22	37	
28	40	35	57	40	40	28	B	B	B	B	B	B	B	B	B	B	E B 50	E B 30	B	E B 25	19	17	42	42	
29																									
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	26	22	22	23	20	18	17	19	15	14	11	12	10	13	16	21	23	24	22	25	26	26	28	26	
MED	41	41	40	39	35	34	40	33	32	39	34	34	U 32	E B 37	34	33	E B 35	30	30	29	32	34	42	41	
U O	56	46	45	45	41	41	41	41	41	41	41	40	E B 39	E B 40	39	37	38	32	32	36	41	42	45	45	
L O	36	35	31	32	29	28	30	31	28	36	32	34	31	34	32	31	E B 31	27	27	26	25	22	26	31	

IONOSPHERIC DATA STATION SHOWA ST.

FEB. 1990 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	30	B	11	B	B	15	30	15	B	B	B	B	40	B	30	24	18	31	20	14	B	17	20	19	
2	10	8	13	B	B	B	10	15	15	17	B	19	B	B	B	35	35	20	20	15	B	10	10	20	
3	16	B	27	30	B	28	20	25	20	40	38	40	31	20	31	B	30	19	18	B	35	15	25	15	
4	18	13	15	15	17	15	20	24	B	B	B	20	35	36	18	18	20	20	17	16	22	17	10	9	
5	20	30	9	31	10	B	B	20	16	B	B	B	B	B	B	37	B	35	30	18	15	15	9	10	
6	30	18	B	8	18	20	B	B	B	B	B	B	B	B	B	B	35	18	20	15	18	12	20	20	18
7	10	18	10	10	19	21	19	10	19	36	B	B	B	B	24	20	B	B	B	18	15	B	17	B	
8	16	10	19	10	10	20	10	19	19	B	B	B	B	36	14	20	35	18	30	18	20	20	16	10	
9	10	10	8	10	10	9	10	17	15	16	B	B	B	56	31	19	18	40	13	13	13	20	14	9	
10	9	10	11	30	16	B	19	14	17	14	18	20	B	39	30	50	30	18	15	19	30	11	10	9	
11	14	11	11	11	10	15	20	15	39	50	25	35	35	55	55	37	35	30	8	14	18	25	14	10	
12	14	15	10	14	14	B	20	18	20	18	17	18	20	39	25	20	31	30	27	27	18	15	10	9	
13	10	9	9	11	39	17	17	15	16	14	18	30	10	10	20	18	10	15	10	14	20	25	18	10	
14	20	15	17	24	30	B	28	30	B	B	27	25	36	18	35	36	31	14	14	19	18	15	10	10	
15	10	11	10	10	10	10	13	14	14	14	24	40	20	22	20	18	30	10	10	10	15	10	10	9	
16	B	B	20	11	B	18	B	20	B	B	23	38	B	B	B	B	31	30	B	29	25	10	10	B	
17	B	18	B	30	B	20	20	B	B	B	B	B	B	B	B	B	B	23	B	15	10	B	13	15	
18	10	B	B	10	B	B	B	B	B	B	B	B	B	B	B	B	38	B	30	15	16	20	13	10	
19	10	B	B	B	14	B	B	14	18	22	30	B	B	B	B	15	18	B	B	B	20	20	16	15	
20	18	10	B	B	21	17	B	22	B	20	B	B	B	B	B	B	B	20	20	20	10	15	10	24	
21	10	14	10	14	15	15	15	B	30	B	B	36	19	15	B	32	35	B	18	B	20	10	14	10	
22	20	13	18	19	B	B	B	B	B	B	B	B	B	B	20	32	55	15	40	20	30	9	25	20	
23	10	11	25	B	10	19	25	25	24	24	35	B	39	37	B	18	B	25	15	10	15	20	20	10	
24	30	B	B	18	26	B	B	B	30	19	B	B	B	36	35	35	31	17	B	14	31	10	15	10	
25	10	12	10	15	20	B	23	B	B	18	36	B	B	B	B	21	36	20	17	15	13	24	10	13	
26	14	27	25	9	B	26	B	B	B	B	B	40	B	B	B	36	16	28	26	19	18	10	13	10	
27	10	10	14	8	15	15	B	17	B	B	B	B	B	B	35	40	38	16	36	31	18	38	10	9	
28	13	11	15	11	13	15	B	B	B	B	B	B	B	B	B	B	50	30	B	25	10	9	11	17	
29																									
30																									
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
MED	14	14	15	14	18	20	24	21	34	B	B	B	B	B	36	35	33	22	20	18	18	16	13	10	
U 0	20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	44	30	38	22	24	20	16	18
L 0	10	10	10	10	14	15	19	15	18	18	28	36	36	36	28	20	25	18	15	14	15	10	10	10	

IONOSPHERIC DATA STATION SHOWA ST.
 FEB. 1990 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	B	B	A	B	BE A	AE A	AE A	B	B	B	B	B	230	B	240	240	250	250	260	250	B	A	A	A		
2	A	270	270	B	B	B	AE A	320	225	A	B	210	B	B	B	250	250	240	E A	A	B	AE A	E A	A		
3	E A	B	A	A	B	A	AE A	E AE	E AE	E B	B	E B	A	B	225	B	225	240	250	B	E B	A	A	A		
4	AE A	AE A	AE A	AE A	0	A	A	A	B	B	B	A	210	255	240	230	230	240	250	260	A	290	A	A		
5	A	A	A	A	A	B	B	A	A	B	B	B	B	B	260	B	B	E B	270	240	240	A	A	AE A	290	
6	E AE A	AE A	B	AE A	A	A	B	B	B	B	B	B	B	B	B	B	A	240	240	250	240	240	225	260	250	255
7	280	295	290	E AE A	AE A	A	A	245	220	240	E B	B	B	B	E AE A	E AE A	B	B	B	A	A	B	A	B		
8	A	F	AE A	AE A	AE A	AE A	A	A	A	B	B	B	B	E B	E B	E A	B	B	B	B	A	265	255	260	255	
9	280	300	300	310	E AE A	AE A	AE A	245	240	240	B	B	B	E B	E B	E A	E B	A	B	A	260	225	250	270		
10	E AE A	AE A	AE A	AE A	AE A	B	AE A	AE A	AE A	AE A	AE A	AE A	AE A	AE A	AE A	AE A	AE A	AE A	AE A	AE A	E A	250	250	240	400	
11	A	AE A	AE A	0	A	A	A	230	290	360	240	230	230	400	390	230	240	230	245	225	360	A	A	A	A	
12	A	AE A	AE A	AE A	AE A	B	A	A	A	A	250	240	250	260	240	230	220	240	245	240	250	250	245	255		
13	E AE A	AE A	AE A	AE A	AE B	AE A	AE A	215	230	200	205	200	205	340	230	220	240	230	240	230	230	245	245	E A	310	
14	A	A	250	A	A	BE B	A	B	B	A	AE B	E A	B	B	250	250	230	250	250	255	245	255	270	270	275	300
15	A	AE A	AE A	A	275	280	250	225	210	220	240	260	230	240	250	245	240	255	290	A	A	A	A	A	A	
16	B	B	A	A	B	A	B	A	B	B	AE B	AE B	B	B	B	B	B	250	250	BE B	E B	E B	AE A	AE A	B	
17	B	A	B	A	B	A	A	B	B	B	B	B	B	B	B	B	B	220	B	A	A	B	A	A	A	
18	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	E B	260	BE B	BE A	275	A	A	A	A	
19	A	B	B	B	A	B	B	AE A	A	A	B	B	B	B	B	250	260	B	B	B	A	A	A	A	A	
20	A	A	B	B	AE A	B	A	B	A	B	B	B	B	B	B	B	B	260	E A	320	255	A	A	A	A	
21	A	A	A	A	A	A	A	B	A	B	B	BE B	E A	B	B	B	E B	BE B	B	B	290	320	A	A	A	
22	A	A	A	A	B	B	B	B	B	B	B	B	B	B	BE A	E A	B	250	E B	360	275	290	A	A	A	
23	A	0	A	B	AE A	A	A	AE A	A	B	BE B	E S	B	B	B	B	260	280	E A	AE A	AE A	A	A	A	A	
24	A	B	B	A	A	B	B	B	A	A	B	B	B	B	B	B	250	245	245	245	255	B	A	AE A	A	A
25	AE A	AE A	A	A	A	B	A	B	BE A	305	230	B	B	B	B	B	250	280	280	AE A	E A	E A	A	A	A	
26	A	A	AE A	360	B	A	B	B	B	B	B	BE B	B	B	B	BE B	260	290	290	295	260	280	290	305	A	
27	A	A	A	A	A	A	B	A	B	B	B	B	B	B	BE B	BE B	BE B	BE B	275	275	250	250	260	280	A	
28	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	BE B	300	BE B	320	A	A	A	A	A	
29																										
30																										
31																										
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	6	9	10	8	8	6	4	9	9	9	8	10	9	12	16	20	21	24	21	19	17	12	12	8		
MED	282	325	300	338	315	320	270	230	232	240	232	242	220	250	236	242	242	245	245	248	260	259	250	280		
U 0	E AE A	AE A	AE A	AE A	AE A	AE A	AE A	E AE	E AE	E A	AE BE	BE BE	E	E	E	E	E BE	BE	E AE	E AE	E A	E AE A	E AE A	E AE A		
L 0	280	298	270	310	305	290	250	228	222	218	228	225	220	245	235	235	235	240	242	240	250	250	245	255		

IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1990 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	B	A	A	A	B	0	X	0	X	B	B	A	B	B	S	B	0	X	X	X	0	X	A	A			
2	A	B	B	A	A	55	B	B	B	B	B	B	B	B	B	B	0	X	X	X	X	54	36	A	A		
3	A	X	A	A	60	56	A	A	71	B	B	B	0	X	0	X	0	X	X	X	X	51	A	A	A		
4	A	A	41	40	56	60	S	0	X	0	X	X	0	X	0	X	0	X	0	X	X	51	X	A	A		
5	A	46	A	46	A	67	72	56	A	A	71	80	86	96	100	96	93	86	86	76	75	71	60	55			
6	A	A	A	A	A	B	B	B	B	A	B	B	0	X	72	72	71	71	75	80	46	A	A	A	A		
7	A	A	A	A	45	51	52	A	B	X	62	75	76	75	75	81	80	72	71	71	71	63	60	35	A		
8	A	A	52	50	45	56	70	A	76	88	86	91	91	90	B	0	0	X	X	X	67	67	56	60	45		
9	A	A	42	A	S	A	0	X	0	X	0	X	0	X	X	0	0	X	X	X	78	78	66	61	58		
10	54	A	X	58	50	A	B	A	70	80	80	91	0	X	B	0	0	X	X	X	91	85	70	55	A		
11	41	A	A	A	A	A	B	61	70	75	81	86	87	91	96	90	86	80	81	80	80	B	A	A	A		
12	A	A	F	F	F	46	B	0	X	61	66	74	74	80	80	82	76	75	75	70	70	A	A	A	A		
13	A	A	A	75	A	S	A	B	A	S	0	X	S	B	65	65	60	61	56	50	39	A	A	A	A		
14	A	A	B	A	B	B	A	A	A	A	A	B	B	0	X	47	65	62	64	65	53	58	46	A	A	A	
15	63	42	A	A	A	B	B	B	B	A	B	B	B	0	X	78	76	75	76	76	61	54	A	A	A		
16	B	A	A	A	A	B	A	A	A	B	B	64	S	0	X	B	67	67	68	70	67	60	42	31	A		
17	33	A	A	A	A	A	0	X	0	X	0	X	X	0	X	0	X	X	X	0	X	73	66	58	55	46	
18	43	33	54	43	62	56	70	63	0	X	0	X	0	X	0	X	0	X	0	X	A	A	A	A	A		
19	B	A	A	36	32	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
20	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	
21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	
22	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	X	X	54	51	A	A	A	B
23	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	0	X	81	64	50	50	A	A	A	B	B	
24	B	B	B	A	A	A	B	B	B	B	B	B	B	B	70	78	85	88	86	77	52	A	A	A	B	B	
25	A	A	B	B	B	B	A	B	B	0	X	0	X	B	B	S	105	76	X	A	A	31	A	A	A	A	
26	A	A	B	A	B	A	B	A	B	B	B	B	B	B	B	B	67	67	56	X	X	A	A	A	B	A	
27	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	0	X	0	X	60	54	41	A	B	A	A
28	B	A	A	A	B	39	B	B	B	B	B	B	B	B	B	B	0	X	81	91	75	A	A	A	B	A	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	S	0	X	B	B	B	B	B	B	B	B	
30	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	S	X	X	56	54	49	39	0	X	S	A	56
31	55	50	A	29	35	34	45	A	0	X	60	76	91	100	106	106	116	120	121	116	116	96	80	70	40	26	
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	6	5	6	8	7	12	7	7	10	9	13	12	14	14	17	18	25	27	26	21	19	12	9	6			
MED	48	46	50	44	45	56	52	64	72	76	81	83	86	88	85	80	81	76	71	67	63	59	55	50			
U 0	55	53	54	50	60	58	70	74	76	82	88	90	90	94	98	92	90	86	78	76	72	70	60	56			
L 0	41	38	42	38	35	46	45	61	0	X	61	70	72	75	76	75	71	71	69	67	56	50	51	48	38	45	

IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1990 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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
1		B	A	A	A	B		40	39		B	B	A	B	B	S	B		F	63	64	69	78	64	48	36	30	F	A	A		
2		A	B	B	A	A	F	B	B	B	B	B	B	B	B	B	B		B		60	60	60	54	49	29	F	F	A	A		
3		A	R	A	A	F	F	A	A	F	B	B	B	D	R	D	R	R	R		80	79	79	74	70	67	65	60	45	F	A	A
4		A	A		F	F	F	S	R	U	R	R	R	R	D	R	B	R	D	R	D	R		F		72	67	66	64	50	F	A
5		A	F	A	F	A	F	F	F	F	A	A	F	70	75	74	85	85	80				D	R	R	F	F	F	F	F	F	
6		A	A	A	A	A	B	B	B	B	A	B	B	B	B			F	F	F	F	F	F	F	F	F	A	A	A	A	A	
7		A	A	A	A	F	F	F	A	B		F	F	F	F	F	R	F	F		66	66	65	69	64	40		J	S	F	A	
8		A	A	F	F	F	F	A	F	J	S	F	F			B	B	R	U	R		85	80	68	60	61	50	F	F	F		
9		A	A	F	A	S	A	F	46	58	53		B	68	70	78	80	84	80	80	75	72	72	60	60	55	48	F	F	F		
10		F	A	F	A	A	B	A	F	F	F	F	B	84	85	84	86	84	85	84	85	84	85	84	85	84	85	84	85	84	85	
11		F	A	F	A	A	A	B	F	F	F	R		81	85	90	84	80	74	75	74	74	74		F	B	A	A	A	A		
12		A	A	F	F	F	F	B	U	R	F	F		68	74	74	76	70	69	69	64		A	F	A	A	A	A	A	A	A	
13		A	A	A	F	A	S	A	B	A	S		52			F	F											A	A	A	A	
14		A	A	B	A	B	B	A	A	A	A	A	B	41		59	56	58	59	47	52		40		F	A	A	A	A	A	A	
15		F	F	A	A	A	B	B	B	B	A	B	B	B	B	U	R							B		F	A	A	A	A		
16		B	A	A	A	A	B	A	A	A	B	B		58		65	61	61	62	64	60		F	F	54	34	25	F	F	A	A	
17		F	A	A	A	A	F	A	F	R	U	R	U	R	J	S		R	R				R	78	71	67	60	52	49	40	F	F
18		F	F	F	F	F	F	F	F	F	F	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	D	S	
19		B	A	A	F	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
20		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
21		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
22		A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
23		A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
24		B	B	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
25		A	A	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
26		A	A	B	A	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
27		A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
28		B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
30		A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
31		F	F	A	F	F	F	F	A	F	F	F	F	100	100	110	114	115	110	110	90		F	F	74	64	34	20	F	F	F	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
CNT		6	4	5	7	5	10	6	7	10	9	13	12	14	14	17	18	25	27	26	21	19	12	8	5							
MED		F	F	F	F	F	F	F	F	F	F	F	F	80	78	78	74	75	70	64	60	57	53	49	44							
U O		F	F	F	F	F	F	F	F	F	R			84	85	92	86	84	80	72	70	66	64	52	49							
L O		F	F	F	F	F	F	F	F	F	F	F	F	100	100	110	114	115	110	110	90	74	64	34	20							

IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1990 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	B	35	42	24	B	27	32	B	B	42	B	B	E B	B	E B	E B	E B	E B	E B	E B	E B	E B	23	26	47	41			
2	81	B	B	40	32	32	B	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	19	27	41	45			
3	42	41	70	42	41	20	40	32	35	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	20	39	45	70				
4	45	40	31	33	30	30	25	25	26	27	30	28	30	B	E B	E B	E B	E B	E B	E B	E B	41	32	E B	11	35			
5	45	45	65	34	47	70	35	47	52	45	41	33	35	36	34	30	29	27	28	20	23	13	22	28					
6	40	42	57	45	42	B	B	B	B	42	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	44	40	43	51				
7	39	36	35	35	60	60	35	37	B	30	32	32	29	29	41	31	26	23	23	26	E B	20	31	28	36				
8	34	36	35	47	59	45	22	50	42	46	28	28	27	28	B	B	E B	E B	E B	E B	55	41	16	22	16	20	30	31	
9	36	41	56	59	32	32	43	40	41	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	22	16	25	19		E B		
10	18	32	46	47	41	B	31	41	31	26	35	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	
11	37	40	37	35	38	43	B	51	32	26	26	27	28	29	31	31	27	30	30	17	24	B	41	38					
12	47	32	40	32	78	31	B	E B	E B	40	33	27	31	36	55	40	30	36	27	23	42	45	51	57	52				
13	70	65	50	40	42	42	57	B	26	30	35	30	B	E B	E B	E B	E B	E B	E B	E B	E B	34	42	45	80				
14	70	42	B	35	B	B	40	30	42	41	37	B	32	B	E B	E B	E B	E B	E B	E B	E B	27	35	42	39				
15	43	16	90	80	60	B	B	B	B	40	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	18	16	39	31				
16	B	36	23	43	40	B	32	35	37	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	20	15	27	45				
17	32	60	46	52	53	31	45	25	38	32	27	30	30	28	28	26	25	22	16	15	E B	12	10	27	10				
18	14	31	32	41	22	16	35	31	23	26	26	27	E B	32	29	28	28	24	34	35	25	53	60	41	112				
19	B	52	59	31	54	B	B	B	B	32	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
22	97	31	34	B	41	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	35	90	41	B				
23	67	52	32	B	B	22	B	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	26	22	31	40	70	B		
24	B	B	B	B	31	40	21	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	21	35	40	B				
25	34	32	B	B	B	B	39	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	27	45	38	78				
26	70	52	B	34	B	32	B	32	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	32	85	40	B				
27	35	66	41	35	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	26	22	31	40	70	B		
28	B	32	39	31	B	26	B	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	27	32	27	70	32			
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	35	35	B	B	B	B	B	B
30	45	B	80	B	B	B	B	B	B	B	B	B	B	B	B	B	32	33	36	36	45	36	33	47	42				
31	35	36	26	22	E B	20	26	31	40	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
	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	23	25	23	24	20	17	16	14	14	16	14	13	16	14	17	21	25	27	27	26	27	26	26	25					
MED	42	40	41	35	41	31	35	34	37	32	30	30	30	29	32	34	30	30	29	25	24	24	34	40	41				
U O	67	48	57	44	54	42	40	41	41	42	35	32	36	36	38	35	35	31	31	33	34	42	45	52					
L O	35	32	34	32	35	24	28	31	31	28	27	28	30	29	30	30	26	25	23	21	E B	E B	E B	28	32				

IONOSPHERIC DATA STATION SHOWA ST.
 MAR. 1990 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	B	17	10	10	B	20	20	B	B	30	B	B	37	B	55	34	30	20	34	36	23	10	14	10	
2	9	B	B	13	20	15	B	B	B	B	B	B	B	B	B	B	55	30	23	30	19	10	10	10	
3	10	10	25	17	10	11	25	25	20	B	B	B	60	40	37	20	20	14	24	14	15	10	11	9	
4	30	18	17	10	12	30	25	25	12	18	10	17	22	B	35	39	20	29	14	14	10	10	11	10	
5	12	10	25	11	18	16	20	19	20	12	29	33	35	36	34	30	29	27	28	20	14	13	10	9	
6	10	9	14	17	10	B	B	B	B	25	B	B	B	34	32	16	11	16	15	16	11	15	10	10	
7	10	18	13	15	10	14	15	25	B	20	20	32	20	21	41	31	17	11	15	26	17	20	10	10	
8	10	10	12	9	10	10	12	18	14	22	22	22	24	11	B	B	55	41	12	13	13	10	10	10	
9	10	13	10	18	18	15	13	19	15	B	57	30	20	13	31	35	30	36	16	24	10	12	19	19	
10	14	10	9	11	18	B	20	19	13	19	35	B	35	35	35	30	31	30	30	20	23	15	12	10	
11	10	10	10	10	20	11	B	15	14	15	15	19	19	14	25	25	18	30	30	12	24	B	10	12	
12	13	19	10	13	12	11	B	B	40	19	18	31	36	55	40	30	36	27	12	19	10	14	19	10	
13	25	14	15	13	11	13	14	B	14	15	35	30	B	30	12	30	15	12	13	13	10	12	22	9	
14	20	25	B	11	B	B	19	21	20	21	20	B	22	B	30	15	30	13	13	15	10	10	10	13	
15	10	10	18	10	10	B	B	B	B	20	B	B	B	B	B	56	30	29	27	40	B	18	11	10	8
16	B	20	10	20	14	B	19	20	25	B	B	36	20	32	B	56	30	29	27	20	20	8	9	20	
17	10	10	20	20	18	18	20	20	16	13	13	20	20	15	15	15	15	15	10	10	12	10	9	10	
18	10	10	10	12	10	10	17	18	19	19	15	19	32	18	20	19	17	20	13	13	10	10	10	25	
19	B	18	20	10	10	B	B	B	B	20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
20	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	13	10	20	
22	10	10	10	B	13	B	B	B	B	B	B	B	B	B	B	B	B	B	19	15	10	22	20	B	
23	14	15	25	B	B	10	B	B	B	B	B	B	B	B	B	B	55	30	18	10	9	10	15	B	
24	B	B	B	19	20	15	B	B	B	B	B	B	B	B	35	30	35	20	30	35	13	10	29	B	
25	19	20	B	B	B	B	B	B	B	B	35	31	55	B	B	36	30	27	25	10	8	10	10	28	
26	13	30	B	14	B	23	B	20	B	B	B	B	B	B	B	B	38	20	21	9	13	12	B	20	
27	10	20	13	12	B	B	B	B	B	B	B	B	B	B	B	B	B	30	30	10	10	B	12	10	
28	B	20	24	20	B	12	B	B	B	B	B	B	B	B	B	B	35	23	13	10	12	13	B	20	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	35	B	35	B	B	B	B	B	B	
30	23	B	25	B	B	B	B	B	B	B	B	B	B	B	B	26	15	18	20	14	13	14	13	14	
31	12	10	10	14	13	20	13	15	20	50	31	50	50	50	30	30	24	24	50	30	24	17	10	13	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	13	18	18	14	18	23	25	B	B	50	B	B	60	B	55	34	30	27	23	16	13	12	11	13	
U O	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	55	30	30	30	23	17	20	25	
L O	10	10	10	11	11	14	19	20	19	19	22	31	24	32	32	30	20	20	14	13	10	10	10	10	

IONOSPHERIC DATA STATION SHOWA ST.

MAR. 1990 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	B	A	A	A	B	A	A	B	B	A	B	B	E B 260	B	B	B	B	B	E B 250	E B 400	E B 350	E A 380	A	A	
2	A	B	B	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	260	275	275	290	A	A	A
3	A	A	A	A	E A 300	E A 400	A	A	A	A	B	B	E B 400	E B 260	E B 255	E A 250	250	250	255	260	E A 340	A	A	A	
4	A	A	E A 390	E A 440	E A 410	E B 410	E B 300	260	240	240	230	230	E A 245	B	E B 240	E B 260	225	245	240	240	250	250	265	A	
5	A	A	A	A	A	A	A	A	A	A	E A 270	E B 260	B	B	B	B	240	245	240	245	260	250	250	E B 315	
6	A	A	A	A	A	B	B	B	B	A	B	B	E B 245	240	240	240	240	E A 290	A	A	A	A	A	A	
7	A	A	A	A	A	A	A	A	B	250	240	225	H 220	H E B 200	305	230	245	250	260	250	240	E A 270	E A 350	A	
8	A	A	A	A	A	E A 300	E A 300	E A 270	E A 250	230	250	250	H E A 250	B	B	E B 300	E B 300	270	250	260	275	E A 300	A	A	
9	A	A	A	A	E A 350	A	A	A	A	B	B	250	245	240	245	250	240	250	250	245	240	260	275	270	
10	280	A	E A 340	E A 310	A	B	A	A	270	245	270	E B 270	E B 240	B	B	230	240	240	250	230	225	245	260	A	
11	A	A	A	A	A	A	B	A	E A 275	E A 240	H 200	H E A 225	E A 250	E B 240	E B 240	235	225	230	240	245	240	B	A	A	
12	A	A	F	F	F	A	B	B	B	250	245	225	E B 260	E B 360	E B 270	230	250	250	240	A E A 380	A	A	A	A	
13	A	A	A	Q 340	A	A	A	B	A	E B 240	E B 340	240	B	B	B	245	250	250	250	255	275	310	A	A	A
14	A	A	B	A	B	B	A	A	A	A	A	B	250	B	255	250	270	260	270	280	275	A	A	A	
15	250	280	A	A	A	B	B	B	B	B	A	B	B	B	E B 340	240	250	255	250	B	B	250	260	A	
16	B	A	A	A	A	B	A	A	A	A	B	E B 290	E A 275	250	B	B	250	260	260	250	250	250	E A 325	A	
17	A	A	A	A	A	A	A	A	A	260	245	240	225	245	225	240	245	230	220	220	220	230	230	240	
18	290	E A 360	A	E A 325	Q 325	Q 350	Q 300	A	E A 250	245	240	240	250	240	245	250	250	265	A	A	A	A	A	A	
19	B	A	A	A	E A 420	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B
20	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
21	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A
22	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	290	290	A	A	A	B
23	A	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	E B 390	E B 280	E B 325	E A 300	A	A	A	B	
24	B	B	B	A	A	A	B	B	B	B	B	B	B	B	E B 270	250	270	280	250	250	275	A	A	B	
25	A	A	B	B	B	B	A	B	B	B	B	B	B	B	E B 280	275	250	280	275	250	A	A	A	A	
26	A	A	B	A	B	A	B	A	B	B	B	B	B	B	B	B	E B 300	250	290	A	A	A	B	A	
27	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E B 290	300	A	A	B	A	
28	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	275	300	265	A	A	A	B	A	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E B 280	E B 280	E B 280	B	B	B	B	B	B	
30	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	E A 300	E A 300	A	A	A	A	E A 340	E A 330	A	
31	E A 300	Q 310	A	A	A	B	A	A	E A 340	E B 325	260	E B 275	250	250	230	245	240	230	250	240	240	230	255	E A 300	
	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	2	4	5	3	3	1	6	10	12	13	15	14	16	20	24	26	24	18	17	12	9	5	
MED	275	295	E A 365	E A 332	E A 350	E A 400	E 300	260	E A 272	245	244	235	250	244	242	244	245	251	254	249	245	252	258	E 300	
UO	295	E A 360		390	E A 415	E B 410	Q 300		E A 300	E 260	E 270	E B 260	E B 260	E B 250	E B 262	E B 250	272	265	275	280	E 282	E A 272	E A 312	E A 322	
LO	265	280		E A 318	312	350	300		250	240	240	228	245	240	240	240	240	245	250	245	240	248	252	255	

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1990 FXI (0.1MHZ)

45°E MEAN TIME (G.M.T. + 3H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
1	A	A	B		A	B	A		X		X	X	S	S	S	X	X	X	X		70	56	29	A			
2	46	30	28	A	B	A		0	X	X		X	X	X	X	X	X	X	X	X	95	60	37	35			
3	36	41	A	X		S	S					X	X	X	X	S	S	B					A	A			
4	A	A	A		S	A	0	X	X	A		65	76	80	90	96	103	111	111	101	91	65	38	A	A		
5	A		38	38	35	A	S					X	X	B		B	X		X			A	A	A			
6	A	A	A	A	A	X		47	55	60	63	65	76	76	80	80	83	B	S	X	X	70	50	35	28		
7	A	A	A	A	A						B			S	0	X	X	S	0	X	S	A	A	A			
8	A	A	B	A	A	A	A	B	B	0	X	S	S	S	S	0	X	S	S	0	X	X		S	B		
9	A	B	A	A	A	0	X		A	B	B	B	0	X	S	B	0	X	X		X	B	A		A		
10	A	A	A	A	A	A	A	A	B	B	A	B	B	B	B	B	X	B	B	B	B	B	B	A	A		
11	A	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	A	A	S	S	A	A			
12	A	B	B	S	A	B	B	B	B	B	B	B	B	B	0	X	0	X	X	B		S	A	X	A	B	
13	B	A	A	B	A	B	A	A	B	S	B	B	B	B	B	X	S			X		A	A	A	A		
14	B	A	0	X		B	B	B	A	B	B	B	B	B	B	B	B			X	A	A	B	A	A		
15	A	A	B	A	B	B	B	B	B	A	B	B	B	B	B	0	X	0	X		A		A	A	A		
16	A	A	B	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	0	X		0	X	A	A	A	
17	A	A	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	X		B		A	A	A	A		
18	A	A	B	A	B	A	B	B	B	B	B	B	B	B	0	X	0	X	0	X		0	X	A	A	A	
19	A	B	A	A	B	B	A	B	B	B	B	B	X	X	X	X	X			0	X		B	A	A		
20	A	A	A	B	B	A	B	A	B	0	X	B	B	B	B	0	X	0	X	0	X	0	X	A	A	A	
21	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	0	X			X	X		B	B	A		
22	A	B	A	A	0	X	A	0	X	B	B	B	X		B	0	X	0	X	X		S	B	A	A	A	
23	A	A	A	A	B	B	A	A	A	B	A	B	B	B	B					A		A	A	A	A		
24	46	34		B	A	A	A			X		B	B	B	0	X	0	X	S	0	X		A	A	A	38	
25	A	A	A	B	B	B	A	B	A	B	B	B	0	X	0	X	B	S	S	0	X	S	0	X	A	A	A
26	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	0	X	X		0	X	B		A	A	A	
27	A	0	X		0	X		B	B	B	B	A		X	B	S	0	X	0	X	0	X	S	A	A	A	A
28	A	A	A	B																							
29	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
30	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	3	5	4	6	4	5	6	8	8	8	8	11	9	8	17	17	21	21	23	18	15	10	4	5			
MED	46	38	44	52	41	45	54	58	63	68	76	78	80	93	86	105	96	90	73	76	56	48	34	35			
U 0	46	54	58	55	50	48	60	60	68	76	77	91	94	111	108	112	112	103	101	86	70	52	36	42			
L 0	36	32	33	49	34	42	51	51	59	54	74	71	74	85	73	80	80	70	60	60	45	39	31	29			

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1990 FOF2 (0.1MHZ)

45° E MEAN TIME (G.M.T. + 3H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23							
1	A	A	B	F	A	B	A	F	F	F	F	D	R	S	S	U	S	U	R	U	R	F	F	F	F	A					
2	F	F	F	F	A	B	A	F	F	F	F	F	R	U	R	R	U	R	D	R	U	R	R	D	R	F	F	F	F	F	
3	F	F	A	F	S	S	S	F	F	F	F	F	U	R	U	R	S	S	B	F	F	F	F	F	A	A	A	A	A		
4	A	A	A	F	S	F	A	U	S	J	S	A	F	F	J	S	R	U	R	J	S	F	F	F	A	A	A	A	A	A	
5	A	F	F	F	A	S	F	F	F	F	F	F	F	B	F	B	R	U	R	F	F	F	F	A	A	A	A	A	A	A	
6	A	A	A	A	A	41	45	54	57	59	70	70	74	74	77	U	R	B	S	F	F	F	F	F	F	F	F	F	F	F	
7	A	A	A	A	A	F	F	F	F	B	F	F	S	U	R	D	R	S	U	R	S	S	D	R	A	A	A	A	F	F	
8	A	A	B	A	A	A	A	B	B	U	S	S	S	S	S	S	D	R	S	U	R	R	R	F	S	B	B	B	B	B	
9	A	B	A	A	A	R	F	A	B	B	B	R	S	B	U	R	R	F	F	F	B	A	F	F	A	A	A	A	A	A	
10	A	A	A	A	A	A	A	A	B	B	A	B	B	B	B	B	J	S	B	B	B	B	B	B	A	A	A	A	A	A	
11	A	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	A	A	S	S	A	A	A	A	A	A	A	A	
12	A	B	B	S	A	B	B	B	B	B	B	B	B	B	B	U	R	60	50	49	B	F	S	A	45	A	A	B	B		
13	B	A	A	B	A	B	A	A	B	S	B	B	B	B	B	58	S	F	F	F	F	F	A	A	A	A	A	A	A	A	
14	B	A	R	F	B	B	B	A	B	B	B	B	B	B	B	B	B	80	65	34	A	A	B	A	A	A	A	A	A	A	
15	A	A	B	A	B	B	B	B	B	A	B	B	B	B	B	B	U	S	F	F	A	F	A	A	A	A	A	A	A	A	
16	A	A	B	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	D	R	F	F	A	A	A	A	A	A	A	A	
17	A	A	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	48	47	50	F	B	F	A	A	A	A	A	A	A	
18	A	A	B	A	B	A	B	B	B	B	B	B	B	B	B	D	R	58	68	70	65	46	29	A	A	A	A	A	A	A	
19	A	B	A	A	B	B	A	B	B	B	B	B	70	84	87	96	98	90	95	85	F	F	F	B	A	A	A	A	A	A	
20	A	A	A	B	B	A	B	A	B	R	B	B	B	B	B	J	R	95	100	105	110	110	80	A	A	A	A	A	A	A	
21	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	R	F	F	F	54	41	27	F	B	B	A	A	A	A	A	
22	A	B	A	A	30	A	U	S	B	B	B	F	B	U	R	D	R	F	R	S	B	F	F	A	A	A	A	A	A	A	
23	A	A	A	A	B	B	A	A	A	B	A	B	B	B	B	F	F	80	F	A	F	A	A	A	A	F	F	F	F	F	
24	F	F	B	A	A	A	A	F	F	B	B	B	B	B	B	U	R	D	R	S	D	S	F	A	A	A	A	F	F	F	
25	A	A	A	B	B	B	A	B	A	B	B	B	U	R	B	S	S	D	S	S	S	F	A	A	A	A	A	A	A	A	
26	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	70	74	74	85	B	F	F	F	A	A	A	A	A	A	A	A
27	A	R	F	F	F	F	B	B	B	B	A	F	B	S	R	100	106	110	110	S	A	A	A	A	A	A	A	A	A	A	
28	A	A	A	B	F	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	F	F	F	A	A	A	A	A	A	A	A	A	A	A
30	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	F	F	F	F	A	A	A	A	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	3	5	4	6	4	4	6	7	7	8	8	11	9	8	17	17	21	20	22	17	12	10	4	5							
MED	F	F	F	F	F	F	F	F	F	F	F	F	U	U	U	U	94	82	76	75	50	42	28	29							
U 0	F	48	48	47	F	42	50	54	60	68	71	85	88	105	102	106	105	95	95	80	60	46	30	36							
L 0	30	24	27	43	28	36	45	44	50	48	68	65	68	79	65	74	72	64	58	48	32	33	25	23							

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1990 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	52	30	B	31	40	B	44	37	E B	24	24	29	25	26	25	26	20	E B E B	21	20	25	E B E B	12	22	35			
2	28	45	26	26	B	42	36	16	E B	19	23	26	30	30	E B E B E B E B E B E B	28	25	24	25	24	22	33	36	36	28	31		
3	28	32	50	31	E B	39	31	25	E B	25	25	35	35	31	22	25	54	B	22	16	28	36	67	46				
4	45	45	40	31	37	31	26	40	37	38	36	E B	28	28	E B E B E B E B E B E B	35	56	35	30	35	20	19	30	12	47	28		
5	22	27	22	31	41	40	31	16	18	20	23	E B	27	27	E B	B	E B	B	E B	21	15	15	19	32	36	31		
6	31	32	32	95	41	36	27	16	18	20	24	26	27	26	E B	B	E B E B E B E B E B E B	36	20	14	26	17	E B	13	26	20		
7	28	32	45	51	40	30	20	17	E B	B	E B	24	26	24	E B E B E B E B E B E B	30	27	24	20	18	15	37	41	25	27			
8	32	32	B	31	60	27	40	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	B	
9	31	B	42	42	E B	E B	E B	E 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	B	
10	27	40	45	52	32	42	33	45	B	B	20	B	B	B	B	E B	E B	B	B	B	B	B	B	B	B	B	40	65
11	60	B	42	33	65	70	B	B	B	B	B	B	B	B	B	B	B	B	B	25	80	70	36	60	74	B		
12	41	B	B	60	73	B	B	B	B	B	B	B	B	B	E B	E B	35	26	32	B	32	29	41	70	80	B		
13	B	56	50	B	21	40	42	B	E B	B	B	B	B	B	E B E B E B E B E B E B	30	55	30	36	24	31	36	60	35	70			
14	B	43	36	31	B	B	B	32	B	B	B	B	B	B	B	B	E B	E B	E B	30	22	20	105	80	B	65	110	
15	41	35	B	37	B	B	B	B	B	B	B	B	B	B	B	E B E B E B E B E B E B	50	30	35	31	36	30	40	31	37			
16	27	36	B	B	B	B	B	B	42	B	B	B	B	B	B	B	B	B	B	E B	E B	20	20	32	32	34	41	
17	32	40	100	66	B	32	40	B	B	B	B	B	B	B	E B	E B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
18	28	44	B	34	40	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
19	34	B	80	45	B	34	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
20	39	32	32	40	B	40	B	32	40	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	
21	B	40	36	31	B	27	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
22	28	B	27	27	E 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	E B	E B	E B	
23	32	78	40	40	B	50	55	40	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
24	32	36	B	34	33	21	32	33	31	27	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
25	52	31	42	B	B	B	90	B	32	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	
26	31	32	46	B	B	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
27	35	28	55	50	27	21	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	E B	
28	42	22	32	B	36	31	B	B	B	B	60	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	
30	42	45	B	B	B	70	B	B	B	B	B	B	B	B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E B	E 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	26	24	21	23	16	18	18	14	11	12	12	12	12	10	21	21	25	24	27	25	28	25	28	27				
MED	32	36	42	34	36	32	34	32	24	28	26	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				
U 0	41	44	48	50	41	40	40	40	37	42	38	35	36	35	39	35	30	30	30	32	38	43	46	64				
L 0	28	32	32	31	32	27	30	17	19	24	24	27	27	26	30	26	25	20	20	19	20	22	28	31				

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1990 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	19	B	18	29	B	19	13	24	20	20	20	20	20	20	15	16	21	20	18	14	12	10	9
2	10	10	9	18	B	15	10	14	19	15	19	25	25	28	25	24	25	24	22	12	10	9	8	10
3	10	10	10	14	11	39	13	12	15	25	25	35	35	31	22	25	54	B	15	10	8	10	10	8
4	9	9	9	8	10	13	14	14	13	15	19	28	19	35	56	35	30	35	20	19	30	12	10	8
5	15	12	10	10	20	13	9	10	10	13	16	27	27	B	35	B	25	15	15	15	19	9	9	10
6	10	10	14	13	10	13	10	10	15	18	15	15	20	13	55	B	36	20	14	13	12	13	12	10
7	10	10	15	12	15	15	11	10	22	B	30	18	15	18	30	27	24	20	18	15	13	13	12	12
8	13	12	B	20	20	19	25	B	B	50	36	50	30	30	20	30	30	30	25	19	20	14	16	B
9	20	B	15	16	15	27	20	30	B	B	B	50	39	B	39	35	30	30	30	B	19	14	20	20
10	15	20	20	20	18	18	20	20	B	B	15	B	B	B	B	38	B	B	B	B	B	B	20	14
11	35	B	13	22	31	B	44	B	B	B	B	B	B	B	B	B	B	B	15	20	19	14	19	20
12	31	B	B	30	50	B	B	B	B	B	B	B	B	B	35	21	14	B	13	19	11	13	14	B
13	B	13	27	B	10	B	24	24	B	35	B	B	B	B	30	55	30	36	24	13	10	10	10	10
14	B	26	19	15	B	B	B	25	B	B	B	B	B	B	B	B	30	13	20	37	10	B	10	13
15	23	13	B	25	B	B	B	B	B	30	B	B	B	B	B	50	30	35	20	10	10	13	10	20
16	19	20	B	B	B	B	B	B	30	B	B	B	B	B	B	B	B	B	20	20	10	10	10	11
17	20	20	20	22	B	20	30	B	B	B	B	B	B	B	B	B	B	20	30	B	17	21	20	24
18	18	30	B	21	B	25	B	B	B	B	B	B	B	B	35	B	31	30	30	19	20	15	19	20
19	18	B	40	20	B	B	20	B	B	B	B	B	36	35	30	31	30	20	20	19	20	B	20	15
20	20	20	20	30	B	30	B	14	B	30	B	B	B	B	39	35	30	25	18	20	13	19	11	15
21	B	15	13	14	B	18	B	B	B	B	B	B	B	B	B	35	40	25	19	20	20	B	B	14
22	13	B	19	14	13	14	30	B	B	B	45	27	B	50	56	31	29	39	30	B	15	10	13	14
23	14	14	25	25	B	B	30	35	25	B	29	B	B	B	35	30	25	20	13	10	14	10	14	10
24	10	10	B	20	13	13	13	11	10	25	B	B	B	B	36	35	50	50	10	9	11	13	9	10
25	20	21	20	B	B	B	45	B	20	B	B	35	38	B	57	30	30	10	25	13	14	10	10	19
26	10	14	30	B	B	B	B	B	B	B	B	B	B	B	30	29	20	20	B	14	11	10	10	10
27	10	20	10	13	15	10	B	B	B	B	31	35	35	B	30	25	24	25	10	13	10	14	10	10
28	10	13	20	B	14	20	B	B	B	25	B	B	B	B	B	B	B	B	B	B	B	B	B	B
29	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	30	20	40	10	12	13	10	10
30	25	19	B	B	B	21	B	B	B	B	B	B	B	B	30	30	37	18	25	10	15	18	10	10
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
MED	16	19	20	20	40	26	30	B	B	B	B	B	B	B	38	35	30	25	20	18	14	13	10	12
U 0	23	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
L 0	10	12	14	14	15	15	19	14	22	25	29	35	35	35	30	30	25	20	15	13	11	10	10	10

IONOSPHERIC DATA STATION SHOWA ST.

APR. 1990 H·F (CKM)

45° E MEAN TIME (G.M.T. + 3H)

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

D	H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1		A	A	B	E A	A	B	A	E A	225	255	250	250	240	245	240	240	230	230	240	240	250	250	280	A	
2		E A	O	E A	A	B	A	A	300	260	245	230	240	230	240	240	245	230	230	250	280	270	E A	A	E A	
3		355	300	430	A	A	A	A	350	200	340	300	250	245	250	250	250	270	B	E A	E A	E A	A	A	A	
4		250	A	A	A	A	A	A	E A	E A	E A	A	280	260	250	250	275	250	230	250	240	240	E B	E B	A	
5		A	A	A	A	A	A	A	E A	450	400											260	290	A	A	
6		A	A	A	A	A	A	A	320	250	240	230	250	240								250		A	A	
7		A	A	A	A	A	A	A	220	255	250	245	250	230	225	300						230	225	220	220	E A
8		A	A	B	A	A	A	A	A	E A	B														E A	
9		A	B	A	A	A	E B	O	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
10		A	A	A	A	A	A	A	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	A	
11		A	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	A	A	E A	E A	A	
12		A	B	B	E A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
13		B	A	A	B	A	B	A	A	B	E B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
14		B	A	A	E A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
15		A	A	B	A	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
16		A	A	B	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
17		A	A	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
18		A	A	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
19		A	B	A	A	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
20		A	A	A	B	B	A	B	A	B	E A	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
21		B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
22		A	B	A	A	A	E B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
23		A	A	A	A	B	B	A	A	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	A	
24		250	250	B	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
25		A	A	A	B	B	B	A	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
26		A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
27		A	E A	E A	E A	A	B	B	B	B	A	E B	E B	B	B	B	B	B	B	B	B	B	B	B	A	
28		A	A	A	B	A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
29		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	
30		A	A	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	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	2	5	1	2	3	6	7	8	9	12	12	10	21	20	25	24	24	17	14	9	3	4	
MED		250	250	E A	E A	E A	E B	U	E A	U	242	247	245	248	238	244	250	242	238	242	238	238	242	290	280	E A
U Q		E A	Q	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
L Q		355	300	395					390	410	300	325	268	280	258	250	300	282	270	288	295	278	300	335	280	330
		250	210		230				200	300	250	248	238	250	235	240	245	240	225	230	228	228	240	240	250	295

IONOSPHERIC DATA STATION SHOWA ST.

MAY 1990 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	F	B	B	A	A	A	A	A	B	B	0 X	X	X	X	X	X	X	X			B	B	A	A		
2	A	A	A	0 X	A	A	60	65	X	60	62	76	71	81	86	106	95	106	80	44	42		A	A	A	
3	A	A	A	A	A	A		56	51	A	70	76	91	91	90	104	90		S	S	B	B	B	A	A	
4	A	A	A	A	B	A	A	55		B	B	B	B	0 X	84	90	86	86	71		B	B	B	A	A	
5	A	A	A	A	A	0 X	40	50	45	49	56		B	B		B	B	0 X	X		B	0 X	A	A		
6	0 X	A	A	A	A	0 X	45	57	54		B		0 X	0 X	X	B		85	70	58	51		B	B	B	
7	A	A	A	A	A	A		60	70	65	74	90	106				S	0 X	X	X		60	B	B	B	
8	B	B	B	A	A	60	60	60		B	0 X	0 X	X	0 X	0 X	0 X	0 X	X	X		S	B	B	B		
9	A	X		A	A	A	X	0 X	B		A	B		0 X	X	X	X	B	0 X		A	A	A	A		
10	A	A	A		A	A	B	B	A	A	B	B	B	B		66	70	70	83	67		A	A	A	A	
11	A	A	A	A	B	A	A	B	B	B	B	B	0 X	56	55	64	70	84			A	A	B	A	A	
12	A	A	A	A	A	B	A	B	B	A	A	B	0 X	64	70	71	62	59	44	35		B	A	A	B	
13	B	A	A	A	A				S		X	X		X		0 X		S		S	A	A	A	A		
14	A	A	B	B	B	0 X	X	B	B	0 X	0 X	S	X	0 X	0 X	0 X	0 X	90	70	50		B	B	B	24	
15	A	A	A		A	A	44	60	73	62	73	100	112	120	126	131	106	101	96	70	35		S	B	B	
16	22		30	28	29	32		33	51	81	106	116	116	136	126	111	96	73	55	28	31	21		S		
17	65	70	70	A	B	B	65	70		B	B	86	110	126	141	126	121	106	96	71	35	B	B	51		
18	0 X	X	F	B	A		60	60	60	46	66	85	76	96	111	116	136	136			B	A	B	A	0 X	
19	A	A	A	A	B	B	A	B	A	A	A	B	B		78	92	101	106		S		B	A	A	A	
20	A	A	A	A	B	B	B	B	B	A	B	70	0 X	96	106	120	110	105	86	44		A	A	A	A	
21	A	A	A	A	B	B	B	B	A		56	60	74	84	96		S	B	S		A	A	A	A	A	
22	A	A			A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	
23	A	A	39	33	A	B	A	A	A	A	A	B	B	0 X	B	S	X	0 X			B	A	A	A	A	
24	A	A	A	A	A	A	A		B		41	51	70	80	100	110	116	116	106	71	65	29		B	B	A
25	A	A	A	B	B	A	B	B	B	B		66	76		B	B	B	0 X	B	B	B	B	A	A	A	
26	A	A	A	A	A	B	A	B	B	B	B	B	0 X	81		76	80	X	91	96	84	B	B	B	B	
27	B	A	A	A	S		A	B	B	B	B	B	B	0 X	S	B		90	71	66		A	A	A	A	
28	A	A	A	A	A	B	A	A		0 X	0 X	0 X	0 X	0 X	X	X	B	0 X	0 X	X	0 X	B	B	B	B	
29	A	B	B	A	B	A	A	0 X		X		56	54	52	55	63	81	104	104	110	100		B	B	B	
30	B	S	S	B	A	A	A	B	B	B	B	B	B	B	B		80	80		S		A	A	A	A	
31	A	A	B	A	A	A	B	B	B		60	56	65	72	80	81	78	66	70		B	B	B	B	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	4	3	5	5	2	6	10	15	11	12	18	19	20	24	23	22	27	23	24	17	7	2	1	3		
MED	37	58	44	38	42	40	56	57	54	54	68	80	82	91	100	105	96	90	71	51	35	30	21	51		
U O	56	70	70	46		51	60	60	66	61	73	90	103	113	116	116	111	106	84	70	49			64		
L O	25	56	34	30		37	44	50	44	50	60	74	74	80	86	80	80	71	66	42	29			24		

IONOSPHERIC DATA STATION SHOWA ST.
 MAY 1990 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	B	B	A	A	A	A	A	B	B	R	61	59	66	74	84	70	69	70	50	35	B	B	A	A			
2	A	A	A	32	A	A	F	F	F	F	F	F	F	F	F	F	J	S	F	F	U	S	A	A	A			
3	A	A	A	A	A	A	A	54	59	60	54	53	70	65	75	80	100	89	100	74	38	36	B	B	A	A		
4	A	A	A	A	B	A	A	50	45	60	70	85	85	84	98	84	D	R	S	D	S	F	B	B	B	A	A	
5	A	A	A	A	A	F	F	49	F	F	B	B	B	B	B	80	80	80	65	F	R	F	B	B	A	A		
6	22	A	A	A	A	31	F	F	F	B	F	F	F	R	R	B	F	F	F	F	F	B	B	B	B			
7	A	A	A	A	A	A	F	F	F	F	F	J	S	F	S	S	S	S	F	F	F	F	B	B	B			
8	B	B	B	A	A	F	F	54	59	59	68	84	100	U	S	R	U	S	D	S	R	U	R	F	B	B	B	
9	A	U	S	F	A	A	A	50	50	B	F	A	B	F	F	F	66	76	88	90	100	B	U	R	A	A	A	A
10	A	A	A	F	A	A	B	B	A	A	B	B	B	B	B	F	F	F	F	F	J	S	S	A	A	A	A	
11	A	A	A	A	B	A	A	B	B	B	B	B	U	S	F	F	F	F	A	A	A	B	A	A	A	A		
12	A	A	A	A	A	B	A	B	B	A	A	B	U	R	B	58	64	65	56	53	38	29	B	A	A	B		
13	B	A	A	A	F	A	F	F	F	S	F	F	F	F	F	U	R	F	S	F	S	A	A	A	A			
14	A	A	B	B	B	F	46	42	B	B	U	R	S	J	S	U	R	R	F	F	F	B	B	B	F	18		
15	A	A	A	F	A	A	F	F	F	F	70	88	110	120	120	110	80	60	44	F	F	F	S	B	B	B		
16	F	A	F	F	F	S	B	F	U	S	27	45	75	100	110	110	130	120	105	90	67	49	22	25	15	F	S	
17	F	F	F	A	B	B	F	59	60	F	B	B	B	F	F	80	100	120	135	120	115	100	90	65	29	F	45	
18	F	50	38	F	B	A	F	F	F	F	U	R	79	70	90	105	110	130	130	R	B	A	B	A	A	58		
19	A	A	A	A	B	B	A	B	A	A	A	B	B	B	F	72	86	95	100	F	F	F	B	A	A	A	A	
20	A	A	A	A	B	B	B	B	B	A	B	F	B	90	100	114	105	F	R	F	F	D	R	F	A	A	A	A
21	A	A	A	A	B	B	B	B	A	F	F	F	F	78	90	S	B	S	F	F	A	A	A	A	A	A	A	
22	A	A	F	F	A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A
23	A	A	B	A	B	A	A	A	A	A	B	B	F	75	85	B	S	R	110	104	F	B	A	A	A	A	A	
24	A	A	A	A	A	A	A	F	B	F	F	F	J	S	F	F	R	110	100	65	55	23	U	R	B	B	A	
25	A	A	A	B	B	A	B	B	B	B	F	F	F	F	B	B	B	B	B	B	B	B	B	A	A	A	A	
26	A	A	A	A	A	B	A	B	B	B	B	B	U	R	B	F	F	75	70	70	85	90	78	R	B	B	B	B
27	B	A	A	A	S	F	A	B	B	B	B	B	B	B	44	S	B	F	F	F	A	A	A	A	A	A	A	
28	A	A	A	A	A	B	A	A	F	22	32	50	U	S	80	84	94	B	70	50	49	35	B	B	B	B	B	
29	A	B	B	A	B	A	A	50	48	46	49	57	F	F	75	98	98	104	94	S	F	F	F	B	B	B	B	
30	B	S	S	B	A	A	A	B	B	B	B	B	B	B	B	B	F	70	70	F	S	F	A	A	A	A	A	
31	A	A	B	A	A	A	B	B	B	F	F	F	F	F	F	U	R	F	F	F	B	B	B	B	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	4	3	4	5	2	5	7	14	11	12	18	19	20	24	23	22	27	22	23	17	7	2	1	3				
MED	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	R	F	F	F	F	F	F	F	F	F	F	F
U 0	50	60	49	40	41	56	54	59	55	67	84	97	107	110	110	105	100	79	62	43								58
L 0	19	50	28	24	28	38	42	35	44	53	68	68	74	80	70	70	65	60	35	23								18

IONOSPHERIC DATA STATION SHOWA ST.

MAY 1990 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	28	B	B	44	43	41	31	27	B	B	E	E	E	E	E	E	E	E	E	E	E	B	B	30	38						
2	33	35	33	37	40	43	35	31	E	B	E	E	E	E	E	E	E	E	E	E	E	B	B	31	42	28	31				
3	39	40	42	42	41	42	40	20	40	44	30	25	25	30	35	30	20	25	23			B	B	B	17	33					
4	59	47	42	42	B	36	36	22	B	B	B	B	B	E	B	B	E	B	E	B	E	B	B	B	B	33	41				
5	38	41	41	35	41	36	23	30	E	B	E	B	B	B	E	B	B	B	E	B	E	B	B	E	B	B	13	31	40		
6	21	28	32	35	34	22	17	24	E	B	B	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B		
7	32	41	42	35	41	45	36	32	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B		
8	B	B	B		32	45	34	25	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B		
9	34	38	80	45	45	45	40	45	E	B	B	E	B	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B		
10	60	48	70	35	46	42			B	B	B	B	B	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B		
11	40	41	32	31	B	45	40		B	B	B	B	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B		
12	32	32	41	31	45		32		B	B	32	40		E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B		
13	B		26	21	32	25	32	32	32	39	31	40	30	25	30	50	18	50	13	12	37	39	37	37							
14	55	28			B	31	22	14	E	B	B	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	
15	16	29	32	34	51	42	31	18	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	
16	11	22	19	16	17	16	23		E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	
17	26	16	20	18	B	B	E	B	E	B	B	B	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	
18	35	35	29	46	B	45	31	16	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	
19	48	63	41	37	B	60			56	48	40			B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	
20	40	26	42	38	B	B	B	B	B		40			E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	
21	38	42	42	32	B	B	B	B	46	34	27	24	27	24	55		55	50	20	31	75	45	45	45							
22	71	57	37	24	80		52	42	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
23	43	29		48	B	42	38	37	40	37			B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	
24	32	46	45	32	40	39	37	32	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B
25	41	40	40		B	65			B	B	B	B	B	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	
26	40	55	32	32	56		45		B	B	B	B	B	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	B
27	B	40	41	56	32	38	35		B	B	B	B	B	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	B
28	71	85	35	27	31		36	26	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	B
29	39		B	B	B	42	45	25	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	B
30	B	36	65		B	36	45	47	B	B	B	B	B	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	B
31	85	48		52	30	45			B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B
	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	27	28	25	28	20	23	26	19	15	19	21	19	21	25	26	24	29	28	26	24	16	18	21	23							
MED	39	40	41	35	41	42	36	26	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	B
UO	48	46	42	42	45	45	40	32	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	B
LO	32	29	32	32	33	36	31	20	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	B	B	B	B

IONOSPHERIC DATA STATION SHOWA ST.

MAY 1990 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	F	B	B	A	A	A	A	A	B	B												B	B	A	A		
2	A	A	A	A	A	A	A	E A 360	E A 300	E A 300	E B 300	250	280	270	245	250	220	250	210	E B 275	250		A	A	A		
3	A	A	A	A	A	A	A	E A 330	E A 400		250	220	225	250	230	B 265	275	225	225		B	B	B	A	A		
4	A	A	A	A	B	A	A	E A 350	E A B	B	B	B		250	240	E B 280	E B 270	E B 270	B	B	B	B	B	A	A		
5	A	A	A	A	A	A	A	E A 330	E B 320	275	250		B	E B 380	B	B	B	E B 340	240	230		B	E B 300	A	A		
6	E A 300	A	A	A	A	A	A	E A 390	E A 370	E A 370		255	230	250	255	270		230	230	245	250		B	B	B	B	
7	A	A	A	A	A	A	A	A	E A 300	270	240	240	230	220	220	205	200	220	240	220	220		B	B	B	B	
8	B	B	B	A	A	A		310	290		255	230	230	225	220	210	240	230	240	200	250		E B	B	B	B	
9	A		200	225	A	A	A	E B 380	B	E B 305	A	B		275	280	270	250	275		B	E B 340	A	A	A	A		
10	A	A	A	E A 310	A	A	A	B	B	A	A	B	B	B	B	B	300	250	290	300	260	290	A	A	A	A	
11	A	A	A	A	B	A	A	B	B	B	B	B	B	E B 300	E B 290	E B 310	E B 310	E A 300		A	A	B	A	A	A	A	
12	A	A	A	A	A	B	A	B	B	A	A	B	E B 300	B	250	250	230	250	250	240		B	A	A	B		
13	B	A	A	A	A	A	A	A	E A 350	260	250	240	215	240	240	190	290	210	210			A	A	A	A		
14	A	A	B	B	B	A	A		B	E B 200	290	225	210	210	210	200	210	215	215			B	B	B	A		
15	A	A	A	E A 300	A	A	A	E A 380	E A 345	280	250	225	225	210	240	225	190	200	225	205		E B 250	E A 325	B	B		
16	Q 350	E A 390	E A 375	E A 380	E A 400	B	B	E B 350	B	B	B	B	E B 250	225	225	230	200	200	200	220	200	210	250	E B 300	E B 305		
17	E A 350	E A 300	E A 310	A	B	B		275	350		E B 275	B	B	E B 250	225	225	230	200	200	200	210	200	250	B	B	365	
18	E A 280	E A 330	E A 350	F	B	A	A	E A 440	E A 405	E A 355	E B 230	E B 290	260	275	260	240	245	225	250		B	A	B	A	A	250	
19	A	A	A	A	B	B	A	B	A	A	A	B	B	280	260	260	250	250	230	290		E A 290	B	A	A	A	
20	A	A	A	A	B	B	B	B	B	A	B		240	B	250	255	240	E B 275	225	250	310		A	A	A	A	
21	A	A	A	A	B	B	B	B	A	Q 320	270	240	245	245	250		B	E B 270	E B 250	240		A	A	A	A	A	
22	A	A	A	A	A	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A
23	A	A	B	A	B	A	A	A	A	A	B	B	E B 300	E B 300		E B 270	220	230	290		E B	B	A	A	A	A	
24	A	A	A	A	A	A	A	A	B	E B 325	E B 275	230	250	250	220	210	240	230	210	230	230		B	B	A	A	
25	A	A	A	B	B	A	B	B	B	B	E B 275	250		B	B	B	B		200		B	B	B	A	A	A	
26	A	A	A	A	A	B	A	B	B	B	B	B	250		240	225	E B 300	220	270		E B	B	B	B	B	B	
27	B	A	A	A	A	A	A	B	B	B	B	B	B	E B 325	E B 290		E B 255	E B 300	E B 305		A	A	A	A	A	A	
28	A	A	A	A	A	B	A	A	E B 330	E B 325	270	230	230	230	230		B	E B 340	240	250	250		B	B	B	B	
29	A	B	B	A	B	A	A	E B 340	280	240	280	245	230	245	210	230	230	230	210	240	290		E B 290	B	B	B	
30	B		E A 250	E A 320	B	A	A	A	B	B	B	B	B	B	B	B	E B 300	E B 300	E B 300	260		A	A	A	A	A	
31	A	A	B	A	A	A	B	B	B		280	260	225	230	215	275	280	275	250		B	B	B	B	A	A	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	4	4	5	3	1	1	4	12	10	13	18	19	21	25	26	24	29	28	25	19	8	3	1	3			
ME D	U 308	E A 275	E A 320	E A 310	E A 380	E A 400	E A 350	E A 350	E A 338	E A 275	E A 258	E A 235	E A 235	E A 240	E A 238	E A 234	U 220	E A 232	E A 232	E A 222	E A 245	E A 300	E A 300	E A 305			
U 0	E A 350	E A 315	E A 370	E A 375			E A 415	E A 375	E A 355	E A 322	E B 280	E B 250	E B 262	E B 275	E B 260	E B 262	E B 275	E B 260	E B 250	E B 275	E A 250	E A 325			365		
L 0	290	225	268	300			292	330	300	272	250	230	228	222	230	218	210	225	218	210	225	250			250		

IONOSPHERIC DATA STATION SHOWA ST.

MAY 1990 FMIN (0.1MHZ)

45° E MEAN TIME (G.M.T. + 3H)

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

H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	10	B	B	30	10	18	20	12	B	B	33	30	30	30	30	30	20	25	14	12	B	B	10	10
2	10	10	20	10	10	17	12	10	20	23	30	16	50	39	30	33	19	33	24	30	20	13	10	10
3	10	19	10	13	20	25	13	10	19	27	30	25	25	30	35	30	20	25	23	B	B	B	13	13
4	10	10	13	14	B	20	12	15	B	B	B	B	B	40	11	58	55	52	35	B	B	B	10	10
5	13	19	13	20	13	14	13	8	18	18	10	B	B	B	B	B	B	55	25	14	B	13	10	10
6	10	11	17	11	12	10	11	24	17	B	15	25	54	40	56	B	35	30	25	25	B	B	B	B
7	13	19	11	10	14	20	25	13	13	23	10	33	30	30	30	20	20	10	15	13	24	B	B	B
8	B	B	B	13	20	11	25	20	B	B	40	30	25	30	25	20	10	19	30	10	30	B	B	B
9	13	13	15	19	13	19	26	45	B	30	10	B	37	45	37	25	19	B	B	23	14	15	10	10
10	15	13	10	10	8	20	B	B	20	15	B	B	B	B	30	23	11	10	20	20	10	9	13	19
11	27	13	11	13	B	30	30	B	B	B	B	B	B	31	30	19	40	10	10	10	B	11	12	14
12	12	11	15	12	14	B	23	B	B	24	24	B	35	B	25	35	30	30	12	17	B	15	20	B
13	B	12	13	13	13	12	13	13	13	24	18	40	30	25	30	50	18	50	13	12	10	10	17	11
14	13	19	B	B	B	18	13	14	B	B	50	21	23	23	22	17	13	14	11	13	B	B	B	10
15	10	10	12	15	11	13	11	13	13	22	24	24	25	30	30	20	14	13	20	19	20	13	B	B
16	9	9	12	9	11	E	23	B	20	20	24	18	22	24	20	12	10	7	10	12	11	11	11	13
17	10	10	10	10	B	B	23	35	B	B	B	50	29	25	20	10	15	14	19	15	15	B	B	15
18	12	13	13	15	B	15	14	12	14	13	35	25	29	30	23	24	35	14	B	23	B	18	12	12
19	15	18	30	25	B	B	20	B	25	23	20	B	B	30	30	30	20	30	25	14	B	13	14	23
20	25	13	30	24	B	B	B	B	B	24	B	29	B	30	30	47	40	24	30	17	13	24	10	25
21	30	14	13	20	B	B	B	B	18	14	11	24	27	24	55	B	55	50	20	14	15	13	25	10
22	15	13	10	14	23	B	21	19	B	B	B	B	B	B	B	B	B	B	B	B	B	19	20	20
23	17	18	B	19	B	30	20	20	28	23	B	B	50	50	B	55	25	25	20	B	16	15	13	18
24	18	17	14	14	15	17	18	15	B	30	24	30	40	50	20	30	25	30	25	13	13	B	B	11
25	13	14	13	B	B	30	B	B	B	B	36	30	B	B	B	B	35	B	B	B	B	20	20	24
26	19	17	20	25	25	B	30	B	B	B	B	B	35	B	35	25	25	30	31	B	B	B	B	B
27	B	25	25	24	20	25	25	B	B	B	B	B	B	25	30	B	30	30	15	15	45	29	19	15
28	19	25	19	18	25	B	15	17	15	24	20	23	20	30	55	B	55	24	20	22	B	B	B	B
29	20	B	B	16	B	23	20	25	19	23	20	30	25	25	24	25	20	14	19	14	25	B	B	B
30	B	24	24	B	24	17	15	B	B	B	B	B	B	B	B	21	30	55	25	15	14	14	25	23
31	9	9	B	30	13	30	B	B	B	16	18	20	20	21	55	50	30	12	B	B	B	B	10	13
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
MED	13	14	15	15	20	20	20	24	B	24	30	30	35	30	30	30	25	25	23	17	45	20	19	15
U O	20	19	30	24	B	B	B	B	B	B	B	B	B	B	B	B	35	50	30	30	B	B	B	B
L O	10	11	12	13	13	17	13	13	18	23	20	25	25	25	25	21	19	14	15	13	15	13	11	11

IONOSPHERIC DATA STATION SHOWA ST.
 JUN.1990 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	S	S	A	A	A	A	B	B	A	B	B	B	B	B	70	71	67	65	75		B	B	A	A	A	
2	A	A	A	A	A	A	A	A	B	B	B	B		73	81	B	B	B	0 X	51	B	B	B	B	B	
3	B	B	A	A			A	B	A	B	B	B			0 X		0 X		B	B	B	B	B	B		
4	A	A	A	A	34	36			B	B		B		76	71	72	56	55	51		B	A	B	B	B	
5		A	A	A	33	45	55	53			41			B	S		80	71	70	80	53		B	B	A	
6	25	A	A	A	27	38	41	45	41	36	53	70	81	80	80	66	56	46		34		B	B	B	A	
7	A	A	A	A	A	B	A	A	X	X			X	0 X	X	X	X	X	X		B	B	B	B	A	
8		60	A	A	A	A	A	0 X	56	55	51	62	70	70	85	77	66	72	62		B	A	A	A	A	
9	B	A	A	B	B	B	B	B				0 X	B	B		111	96	86	65		S	B	A	B	A	A
10	X	A	A	A	A		B	B	A	0 X	A	B	B	B		76		84	80		0 X	0 X	A	A	A	
11	60	A	A	A	A	38			50			0 X	A	B		70		100		39	0 X	51	A	A	A	
12	A	A	A	A	A	B	B	A	B	B	0 X	0 X	0 X	0 X		S	0 X	X	0 X	S	B	A	A	A	A	
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	0 X		106	100	81							
14	A	0 X	A	A	A	B	B	B	B	B	B	B			X	X	X	X	X		B	B	A	A	A	
15	B	A	A	A	A	A	A	0 X	0 X	X	X	X	0 X	0 X	0 X	0 X	70	65	51	29		B	A	A	A	
16	A	A	A	B	B	B	A	A		S	X	0 X	X	X	X	0 X	0 X	0 X	B	B	B	B	B	B	A	
17	A			0 X					46		51	68	83	95	91	85	62	58		X	B	B	B	B	B	
18	B	31	32	28	34	35	52	51	41	35	54	68	90	96	81	85	67	63	38		B	S	S	A		
19	A	A	A	A	B	A	B	A	B	B	B	B	0 X	0 X	S	X		0 X	B	B	B	B	B	B	A	
20	A	B	A		0 X									S		X		X		B	B	B	B	B		
21	A	A		23	30	30	26	31	32	34	43	71	81		72	71	47	43	44							
22	A	A	45	45	33	35	45		66	56	46	68	81	90	96	85	55	48	41		0 X	B	B	B	B	A
23	A	A	B	A	B	A	B	A			0 X		46	49	55	71	86	82	70	55	42	45		B	A	
24	A	A		A	A	A	A					X				0 X		S	B	B	B	A	B	B		
25	B	X	0 X								S										0 X	S	A			
26	A	A	A	A	A	A	A		60	51	B	B	0 X	X	76	86	76	80	67	60	31		B	B	A	
27	A	A	A	A	A	A		46	46	55	S	51	70	74	81	85	80	73	70		B	A	A	A		
28	A	A	A	A	A	A		46	51	41	46	51	60	85	75	80	71	70		B	B	A	A	A		
29	A	A	A	A	0 X	A	A	A	A	A	B	B	B		76	70	76		S	S	S	S	B	B	B	
30	A	A	A	A	A	A	B	B	B	B	B	B			X			X	0 X	B	B	A	S	A		
31	A	A	0 X	A	A	A	A	A				71	75	100	96	76	67	59	48		B	B	B	B	B	
			44						37	42	48	60	78	80	X	96	71	61	45	36						
	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	5	6	6	9	9	8	12	14	12	15	20	21	21	25	25	26	23	18	4	2	1	1	1	1	
MED	42	43	42	38	33	36	46	48	49	44	51	62	75	86	81	80	70	65	51	32	41	0 X	0 X	0 X	45	
U O		54	44	45	0 X	42	54	57	55	54	53	69	81	96	96	88	76	77	65	34						
L O		34	34	28	30	33	36	39	41	38	46	60	70	80	76	71	62	51	41	27						

IONOSPHERIC DATA STATION SHOWA ST.

JUN. 1990 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	S	S	A	A	A	A	B	B	A	B	B	B	B	B	F	F	F	F	U	S	B	B	A	A	A		
2	A	A	A	A	A	A	A	A	B	B	B	B	F	F	B	B	B	B	U	S	B	B	B	B	B		
3	B	B	A	A	F	F	A	B	A	B	B	B	F	F	F	R	F	F	B	B	B	B	B	B			
4	A	A	A	A	28	26	F	F	B	B	F	B	B	S	F	F	F	F	F	B	A	B	B	B			
5	F	A	A	A	25	39	49	F	F	F	F	F	F	F	F	F	U	S	F	S	U	R	B	B	B	A	
6	A	A	A	A	21	22	35	F	J	S	R	F	F	J	S	F	60	66	56	B	B	B	B	A			
7	A	F	A	A	A	A	A	A	A	B	A	B	B	S	B	105	90	80	55	B	A	A	A	A			
8	B	50	A	A	B	B	B	B	B	B	F	B	B	B	F	S	U	R	F	S	B	A	B	A	A		
9	54	A	A	A	A	F	B	B	A	U	S	A	B	B	B	F	S	F	B	U	S	S	U	S	A	A	A
10	A	A	A	F	A	B	A	B	B	B	B	B	B	B	F	S	D	R	S	B	A	A	A	A			
11	A	B	B	A	A	B	A	B	A	B	B	F	F	B	B	S	B	B	R	F	B	B	A	A	A		
12	A	A	A	A	A	B	B	B	A	B	45	56	B	B	S	B	B	S	B	B	B	B	B	B	A		
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	U	S	B	B	B	B	B	B	A	A		
14	A	R	A	A	A	B	B	B	B	B	B	F	F	F	F	F	J	S	B	S	A	A	A	U	S	F	
15	B	42	A	A	A	A	A	27	41	36	47	65	U	R	J	S	D	S	90	64	F	45	23	B	A	A	A
16	A	A	A	B	B	B	A	A	F	S	45	62	77	J	S	R	F	J	S	B	B	B	B	B	A		
17	A	F	F	F	28	29	30	F	F	F	F	F	F	F	F	F	F	F	F	B	B	B	B	B			
18	B	F	F	F	F	F	F	F	F	F	B	B	F	B	B	R	F	F	R	S	B	S	S	A			
19	A	A	A	A	B	A	B	A	B	B	B	B	D	S	R	S	F	F	B	B	B	B	B	A			
20	A	B	A	17	24	24	20	25	26	28	37	65	80	90	90	68	71	F	R	B	B	B	B	B			
21	A	A	F	F	F	F	F	S	F	F	F	F	F	F	F	J	S	F	B	B	B	B	B	A			
22	A	A	B	A	B	A	B	A	A	F	F	F	F	F	F	F	F	F	F	B	S	B	B	A			
23	A	A	F	A	A	A	A	F	F	F	F	F	F	F	F	D	S	F	S	B	B	B	A	B	B		
24	B	37	36	39	39	F	F	F	F	F	S	F	F	F	F	F	F	F	F	F	F	F	S	A			
25	A	A	A	A	A	A	A	F	F	B	B	B	70	80	70	74	60	50	25	B	B	B	B	A			
26	A	A	A	A	A	A	F	F	F	S	F	F	F	F	F	F	F	F	B	B	B	A	A	A			
27	A	A	A	A	A	A	A	F	F	U	R	J	S	F	F	F	F	F	B	B	B	A	A	A			
28	A	A	A	A	48	A	A	A	A	A	B	B	B	F	70	64	70	B	S	S	S	S	B	B	B		
29	A	A	A	A	A	A	B	B	B	B	B	F	F	F	F	F	F	F	B	B	A	S	A				
30	A	A	38	A	A	A	A	A	F	F	F	F	F	U	R	J	S	F	F	B	B	B	B	B			
31																											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT	1	5	5	6	9	8	7	8	13	11	15	19	21	21	25	25	26	22	17	4	2	1	1				
MED	54	37	36	32	25	28	35	40	41	36	45	56	69	80	75	71	62	58	45	26	34	17	45				
U 0		46	38	39	34	30	40	49	48	46	47	62	75	90	90	82	70	70	60	28							
L 0		28	27	22	24	24	25	26	30	30	40	54	65	72	69	65	56	50	34	21							

IONOSPHERIC DATA STATION SHOWA ST.

JUN.1990 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	41	43	40	47	41		B	B		52		B	B	B	B	E	E	E	E	B	B		22	33	32		
2	36	40	42	48	51	56	43	42		B	B	B	B	E	B		B	B		B	E	B	B	B	B	B		
3	B	B		42	45	27	19	47		B	B	B	B	E	B	E	B	E	B		E	B	B	B	B	B		
4	29	24	36	28	19	70	15	24		E	B	E	B	B	B	B	E	B	E	B	E	B	B	B	B	B		
5	15	40	32	31	26	17	15	12		E	B						E	B	E	B	E	B	E	B	B	B		
6	35	32	41	55	45		46	59		E	B	E	B	E	B	E	B	E	B	E	B		B	B	B	B		
7	40	70	42	45	60	42	47	45		B	B	B	B	B	E	B	B	E	B	E	B	E	B	B	B	B		
8		45	45							B	B		36	25			50	55	55	25	20		31		32	42		
9	50	84	47	37	37	30				B	B		40	31	41		22	15	29		27	31	35	36	37	45		
10	40	31	29	37	62			45		B	B	B	E	B	E	B				E	B	E	E	B	B	B		
11	55		B		39	32		B		B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	15	40	41	
12	59	46	51	29	36			B		B	B	B	46	25	35		50			40						47		
13		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
14	45	41	34	80	100					B	B	B	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	
15		40	41	40	45	32	33	24		E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	
16	34	32	40					43	46	43	30	22	20	22	17	30	25	50	30								18	
17	27	28	40	26	22	19	15	15	14	15	18	20	21	37	33	18	19	21	18								B	
18		31	30	18	16	14	14	14	15				30			25	24	55	30	35	20			36	24	29		
19	33	36	40	51		61		40		B	B	B	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	
20	26		31	26	32	16		E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	
21	17	31	23	16	15	15	17	23	20	24	21	18	28	15	16	18	22	15	14								30	
22	45	45		44		104		54	41	45	34	27	E	B	E	B	E	B	E	B	E	B	B	E	B	B	B	
23	35	42	38	32	52	54	54	34	31	17	19	21	20	40	20	40	50	45						36			B	
24		E	B		27	40	42	70	46	28	45	42	22	15	19	30	21	14	16	14	16	39	41	16	26	31	35	
25	40	50	45	80	71	57	46	40	45				B	B	B	E	B	E	B	E	B	E	B	B	B	B	B	
26	36	36	40	41	51	45	41	32	46	35	31	25	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	
27	36	46	36	36	32	38	46	34	11	14	14	19	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	
28	31	57	75	71	70	57	40	46	51	41			B	B	B	E	B	E	B	E	B	E	B	B	B	B	B	
29	32	31	36	40	41	21			B	B	B	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	
30	34	36	45	42	46	43	35	40	31	19	14	19	E	B	E	B				E	B	E	B	E	B	B	B	
31																												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	24	26	27	27	25	22	20	21	22	15	18	20	21	24	27	28	26	26	22	9	8	13	14	22				
MED	35	40	40	40	45	42	40	40	40	E	B	E	B	E	B	E	B	E	B	E	B	E	B	B	B	B	B	
U O	40	45	43	45	56	56	46	45	46	31	32	28	E	B	E	B	E	B	E	B	E	B	B	B	B	B	B	
L O	32	31	36	31	30	19	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B	E	B

IONOSPHERIC DATA STATION SHOWA ST.

JUN.1990 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

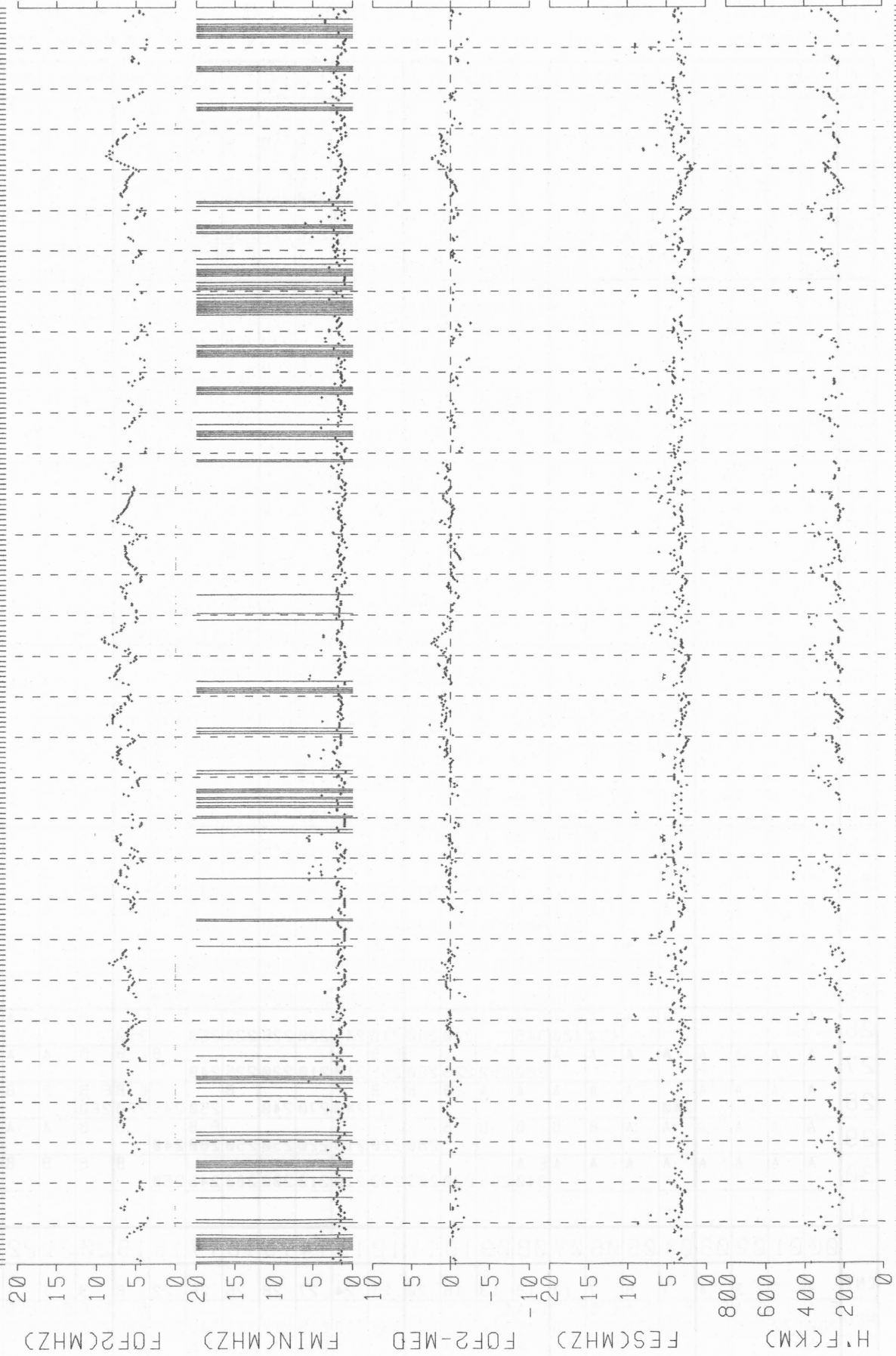
H D	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
1	10	13	10	30	15	24	B	B	30	B	B	B	B	B	30	29	20	14	50	B	B	13	10	11	
2	15	18	12	13	13	36	15	30	B	B	B	B	35	19	B	B	B	B	30	B	B	B	B	B	
3	B	B			10	9	12	10	17	B	B	B	40	30	50	30	20	24	B	B	B	B	B	B	
4	18	15	11	10	10	10	15	24	B	B	20	B	B	50	30	25	20	20	20	B	14	B	B	B	
5	10	10	10	10	13	10	12	12	10	13	10	10	12	10	10	15	30	24	19	14	B	B	B	10	
6	10	10	11	15	20	B	30	19	15	13	14	19	18	16	14	14	16	15	11	B	B	B	B	13	
7	12	10	30	15	19	23	24	14	19	B	30	B	B	55	B	21	15	30	14	B	11	13	11	13	
8	B	20	30	B	B	B	B	B	B	B	24	25	B	B	50	55	55	25	20	B	12	B	10	10	
9	10	17	13	13	20	13	B	B	20	23	19	B	B	B	22	15	29	B	16	12	11	10	12	13	
10	10	19	10	10	25	B	B	25	B	B	B	30	39	19	15	20	18	10	20	15	B	10	10	10	
11	13	B	B	30	13	25	B	B	30	B	B	34	30	28	27	19	13	16	21	B	B	11	10	14	
12	10	13	25	19	19	B	B	B	35	B	25	35	B	B	50	B	40	B	B	B	B	B	B	30	
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	25	B	B	B	B	B	B	24	14	
14	30	25	25	24	30	B	B	B	B	B	B	24	22	24	20	30	19	B	15	14	15	14	14	15	
15	B	15	24	20	18	15	14	14	15	20	19	13	10	22	14	13	15	15	17	14	B	11	11	12	
16	12	22	25	B	B	B	23	18	15	30	22	20	22	17	30	25	50	30	B	B	B	B	B	11	
17	15	14	14	14	22	19	15	15	14	15	18	20	21	13	15	18	19	21	18	B	B	B	B	B	
18	B	10	10	18	16	14	14	14	15	B	B	30	B	B	25	24	55	30	35	20	B	15	24	11	
19	21	20	30	24	B	25	B	20	B	B	B	B	50	55	55	60	40	20	B	B	B	B	B	13	
20	14	B	10	13	15	12	15	9	13	19	19	25	21	14	15	19	11	25	24	B	B	B	B	B	
21	10	9	13	11	15	15	17	23	20	24	21	18	11	15	13	18	14	15	14	B	B	B	B	13	
22	13	19	B	25	B	30	B	25	17	14	25	20	23	23	12	14	20	15	18	B	13	B	B	9	
23	9	15	22	18	23	22	15	13	13	17	15	21	15	14	20	40	50	45	B	B	14	B	B	B	
24	B	27	10	11	10	9	9	10	11	22	15	19	30	21	14	11	14	11	15	10	9	10	10	14	
25	10	10	10	9	10	24	20	10	14	B	B	B	38	35	30	24	20	23	14	B	B	B	B	10	
26	10	10	14	14	24	19	12	15	14	14	20	14	18	35	17	15	12	30	B	12	B	9	10	10	
27	18	15	15	23	24	24	14	11	9	14	14	16	37	25	25	15	23	24	B	B	22	13	13		
28	10	11	10	15	15	20	24	20	21	21	B	B	B	30	45	30	B	30	17	17	12	B	B	B	
29	15	11	13	10	14	15	B	B	B	B	B	30	30	22	12	30	30	28	21	B	B	10	9	14	
30	10	10	10	23	18	18	21	20	14	13	14	11	16	14	10	10	18	18	18	B	B	B	B	B	
31																									
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	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	13	15	13	15	18	22	22	20	20	B	24	28	32	24	24	22	20	24	20	B	B	B	B	13	
U O	B	21	20	25	24	24	B	B	B	B	B	B	B	B	55	45	30	50	30	B	B	B	B	B	
L O	10	10	10	11	14	15	15	14	14	17	19	19	21	17	14	15	16	16	17	17	15	13	11	11	

IONOSPHERIC DATA STATION SHOWA ST.
 JUN. 1990 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	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 E A 300 270	A	A	A	A	A	B	B	A	B	B	B	B	B	240	220	230	230	E B 350	B	B	A	A	A
2	A	A	A	A	A	A	A	A	B	B	B	B	230	215	B	B	B	B	250	B	B	B	B	B
3	B	B	A	A	E A E A 325 350	A	B	A	B	B	B	B	250	210	E B E B 250 260	E B	260	225	B	B	B	B	B	
4	A	A	A	A	E A E A 380 370	E B	Q	B	B	E B	B	B	E B	245	210	225	230	240	210	B	A	B	B	B
5	E A 280	A	A	A	A	E A 390	A	E B 305	E A E A 300 320	245	225	205	200	200	200	250	250	220	240	B	B	B	B	A
6	A	A	A	A	A	B	A	A	E A 340	250	250	245	225	225	230	240	200	240	245	B	B	B	B	A
7	A	225	A	A	A	A	A	A	A	B	A	B	B	E B 325	B	240	250	245	245	B	A	A	A	A
8	B	A	A	B	B	B	B	B	B	E A E B 320 270	B	B	E B E B 320 265	300	240	205	B	A	B	A	A	A	A	
9	205	A	A	A	A	A	B	B	A	E A 390	A	B	B	E B 360	290	290	B	E A 330	E A 360	A	A	A	A	A
10	A	A	A	A	A	B	B	A	B	B	B	270	270	250	225	230	215	230	250	E B 255	B	A	A	A
11	A	B	B	A	A	B	A	B	A	B	B	E B 290	255	230	240	220	220	255	225	B	B	A	A	A
12	A	A	A	A	A	B	B	B	A	B	E A 300	E A 290	B	E B 330	B	B	E B 390	B	B	B	B	B	B	A
13	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	260	B	B	B	B	B	B	A	A
14	A	A	A	A	A	B	B	B	B	B	Q	400	275	320	320	290	310	B	225	A	A	A	A	A
15	B	A	A	A	A	A	A	A	A	E B 350	260	225	240	210	200	200	205	230	230	E B 250	B	A	A	A
16	A	A	A	B	B	B	A	A	E A E B 425 310	260	260	245	225	215	210	E B E B 250 240	B	B	B	B	B	B	A	
17	A	Q	E A E A 290 350	400	450	380	350	320	275	290	250	210	210	220	210	210	230	210	250	B	B	B	B	B
18	B	E A E B 280 300	300	390	375	370	360	350	E B 350	B	B	E B 290	B	B	E B E B 220 230	300	260	255	250	B	A	E B 325	A	
19	A	A	A	A	B	A	B	A	B	B	B	B	E B E B 280 245	275	270	250	245	B	B	B	B	B	A	
20	A	B	A	E A 420	400	400	320	325	300	330	295	245	225	200	190	200	210	E B 270	245	B	B	B	B	B
21	A	A	A	E A 330	350	350	240	360	325	310	270	230	215	210	210	210	200	250	230	B	B	B	B	A
22	A	A	B	A	B	A	B	A	A	E A E A 370 325	270	250	230	205	200	205	245	200	B	E B 275	B	B	A	B
23	A	A	A	A	A	A	A	E A 345	300	275	250	245	230	240	205	250	325	280	B	B	A	B	B	
24	B	B	A	A	A	E A E A 390 325	325	340	310	275	230	245	200	210	210	230	230	230	E A 275	A	E A 240	A	A	A
25	A	A	A	A	A	A	A	E A 330	325	B	B	B	230	250	210	225	230	205	220	B	B	B	B	A
26	A	A	A	A	A	A	E A E A 430 400	345	A	E A 340	240	240	E B 245	220	225	220	250	B	250	B	A	A	A	A
27	A	A	A	A	A	A	A	A	280	250	225	250	255	210	210	220	225	240	B	B	B	A	A	A
28	A	A	A	A	240	A	A	A	A	A	B	B	B	240	270	240	B	250	245	E B 260	E B 260	B	B	B
29	A	A	A	A	A	A	B	B	B	B	B	280	220	215	220	250	250	E B 280	240	B	B	A	A	A
30	A	A	A	A	A	A	A	A	E A 340	295	230	205	230	210	210	200	200	245	250	B	B	B	B	B
31																								
H	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	3	5	2	4	7	8	7	10	13	13	16	20	21	24	27	28	26	26	22	8	3	1	1	
MED	E A 280	270	325	365	380	378	325	338	325	310	265	242	235	218	215	222	221	240	236	E 252	E B 260	E A 370	E B 325	
U O	E A 300	285		E A E 410 400	390	370	360	342	340	300	275	252	245	250	250	250	250	250	250	E B 268	E A 275			
L O	205	232		E 315	325	360	310	325	300	282	250	230	225	210	210	210	215	230	225	250	A 240			

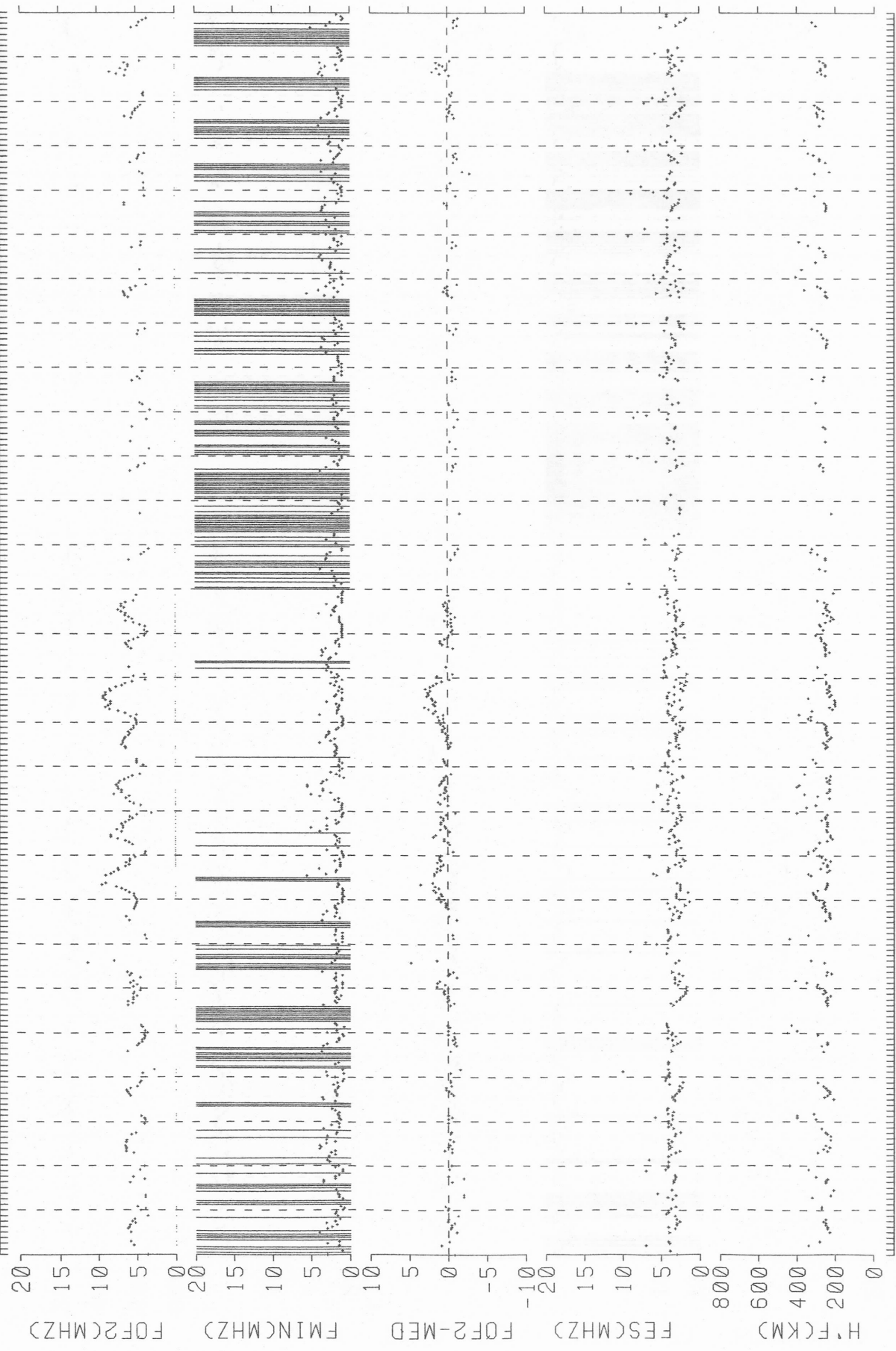
SHOWA ST.

19900101 -> 19900131



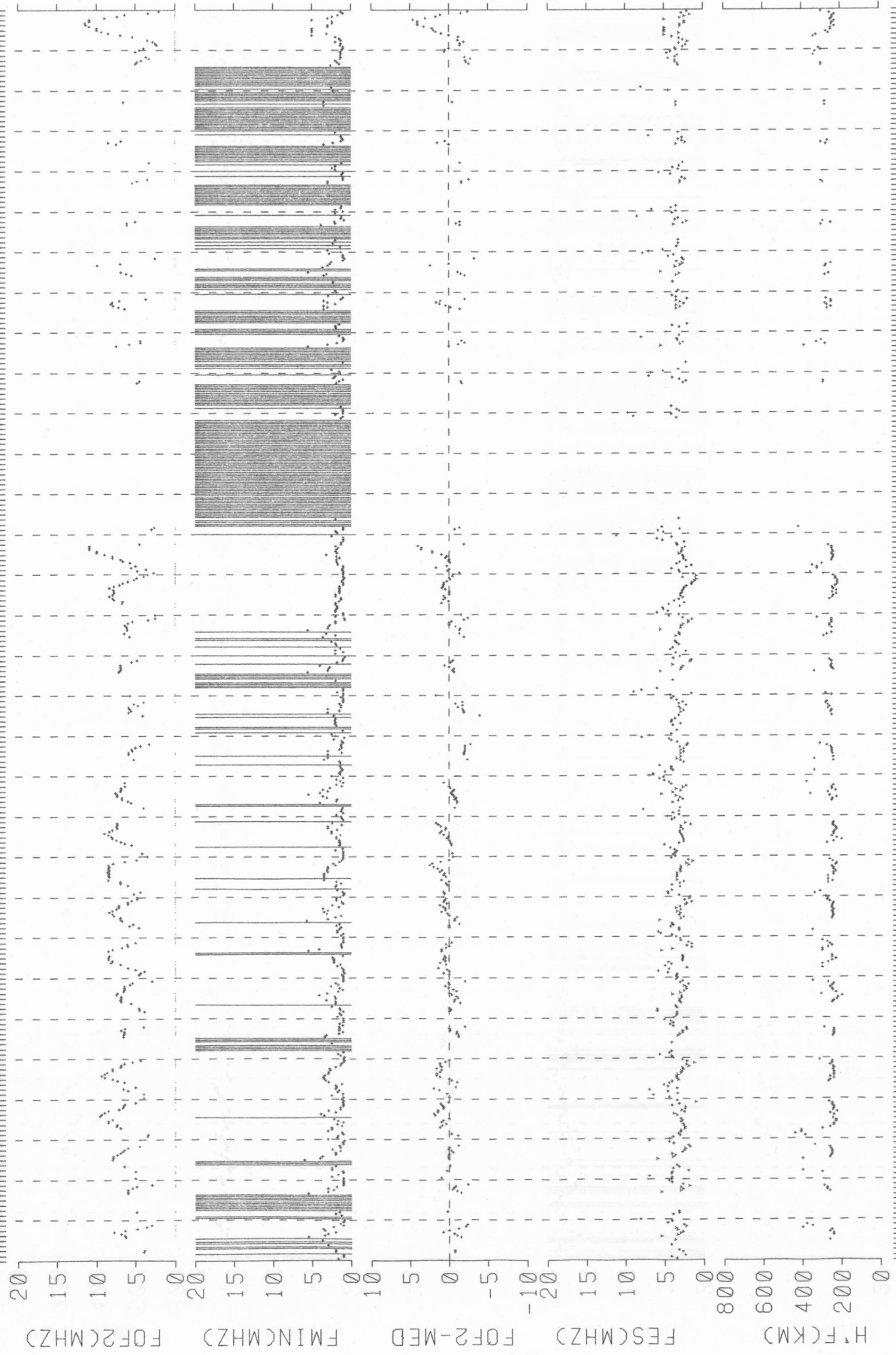
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 DAY

19900201 -> 19900228 SHOWA ST.



SHOWA ST.

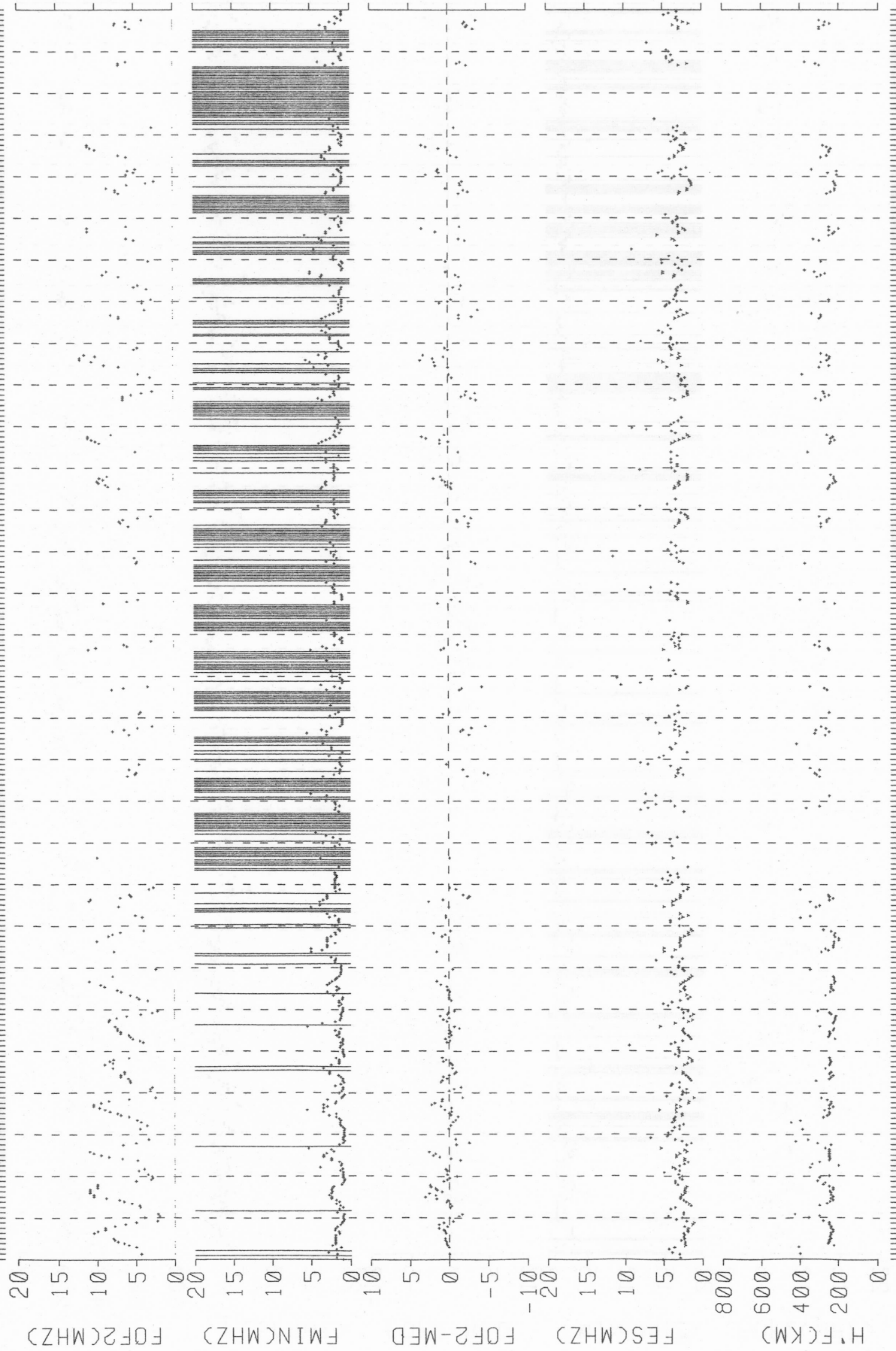
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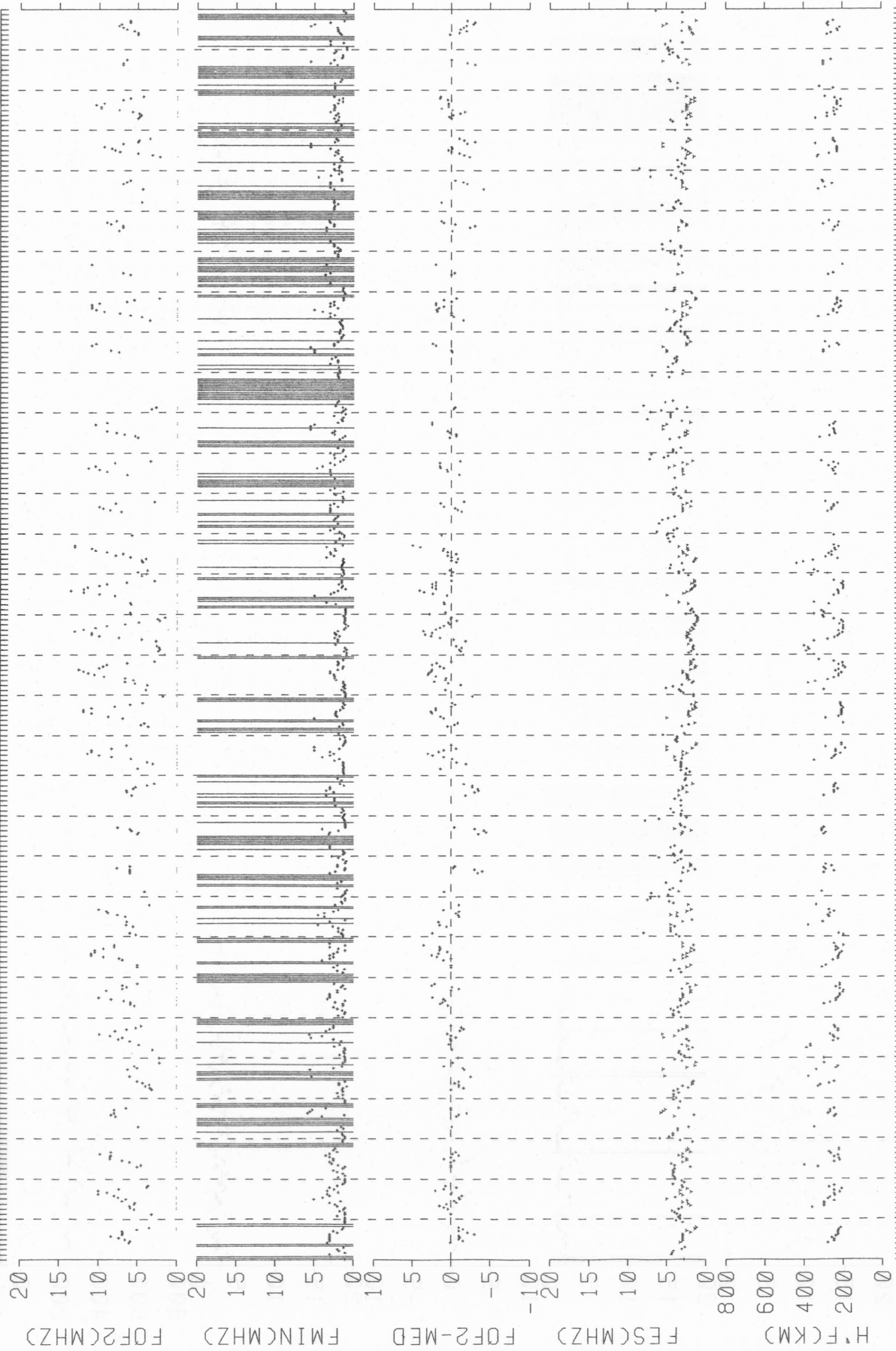
19900401 -> 19900430

SHOWA ST.



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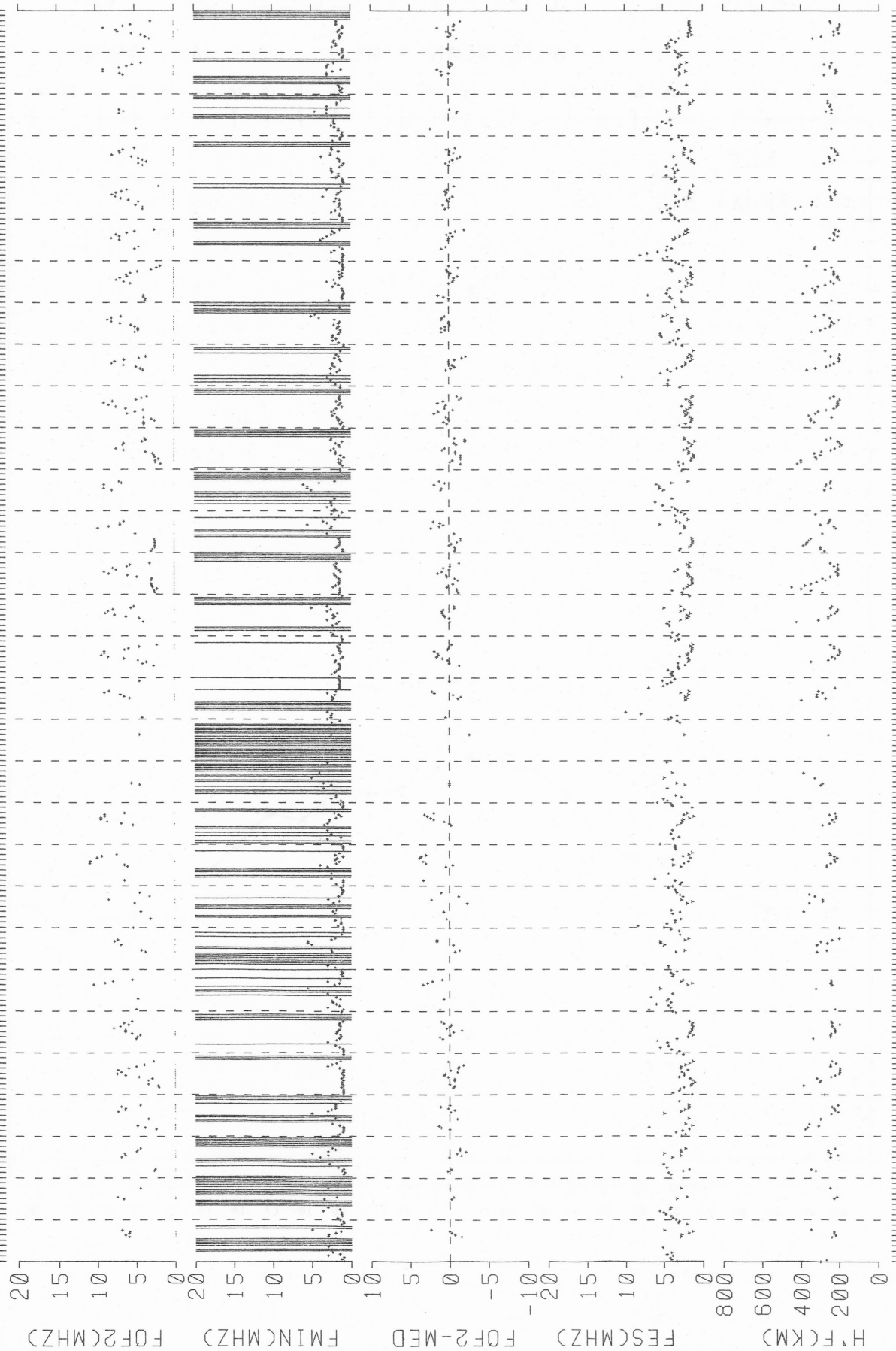
19900501 -> 19900531 SHOWA ST.



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

19900601 -> 19900630

SHOWA ST.

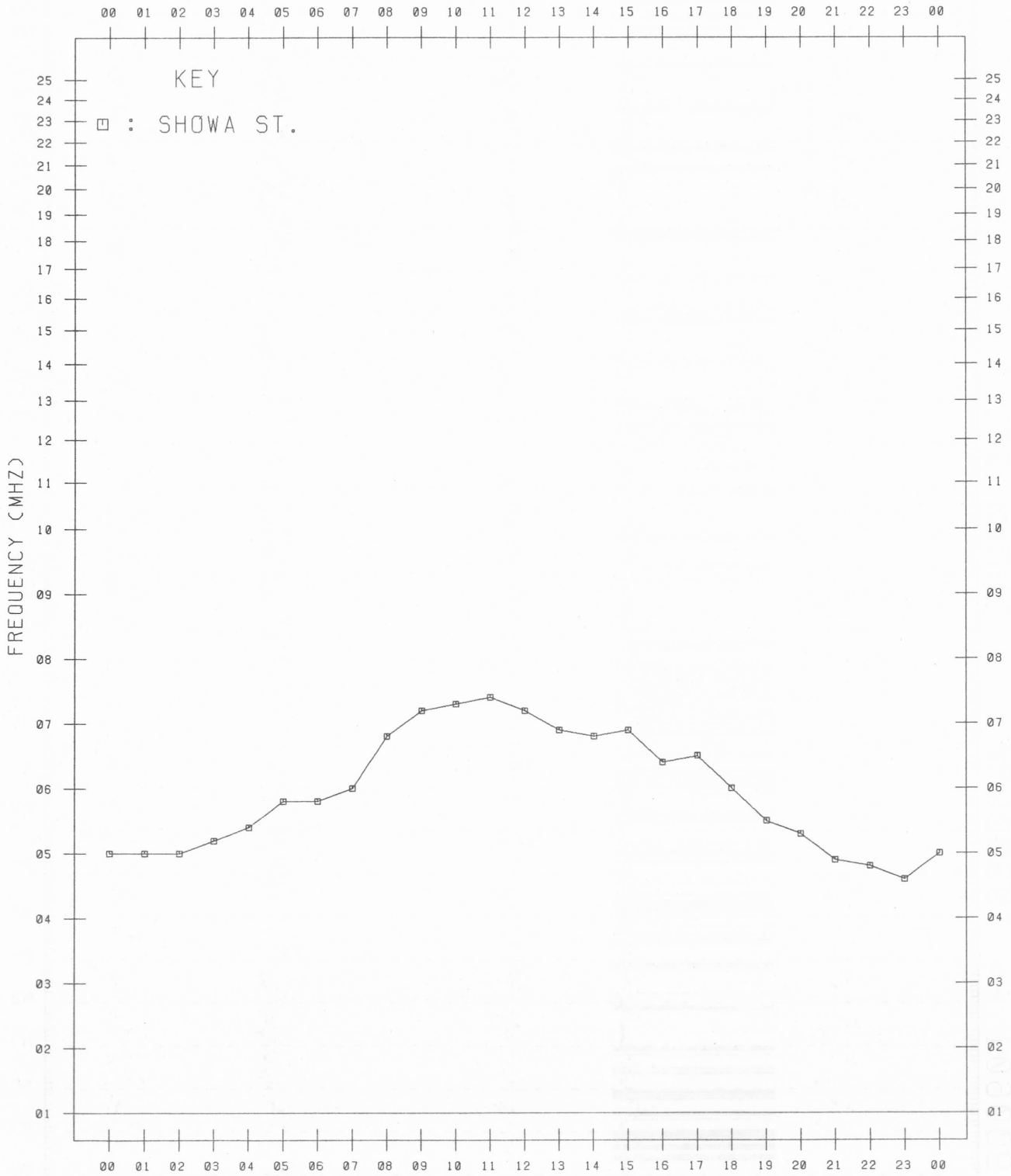


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 DAY

MONTHLY MEDIAN VALUES OF FOF2

45 °E MEAN TIME

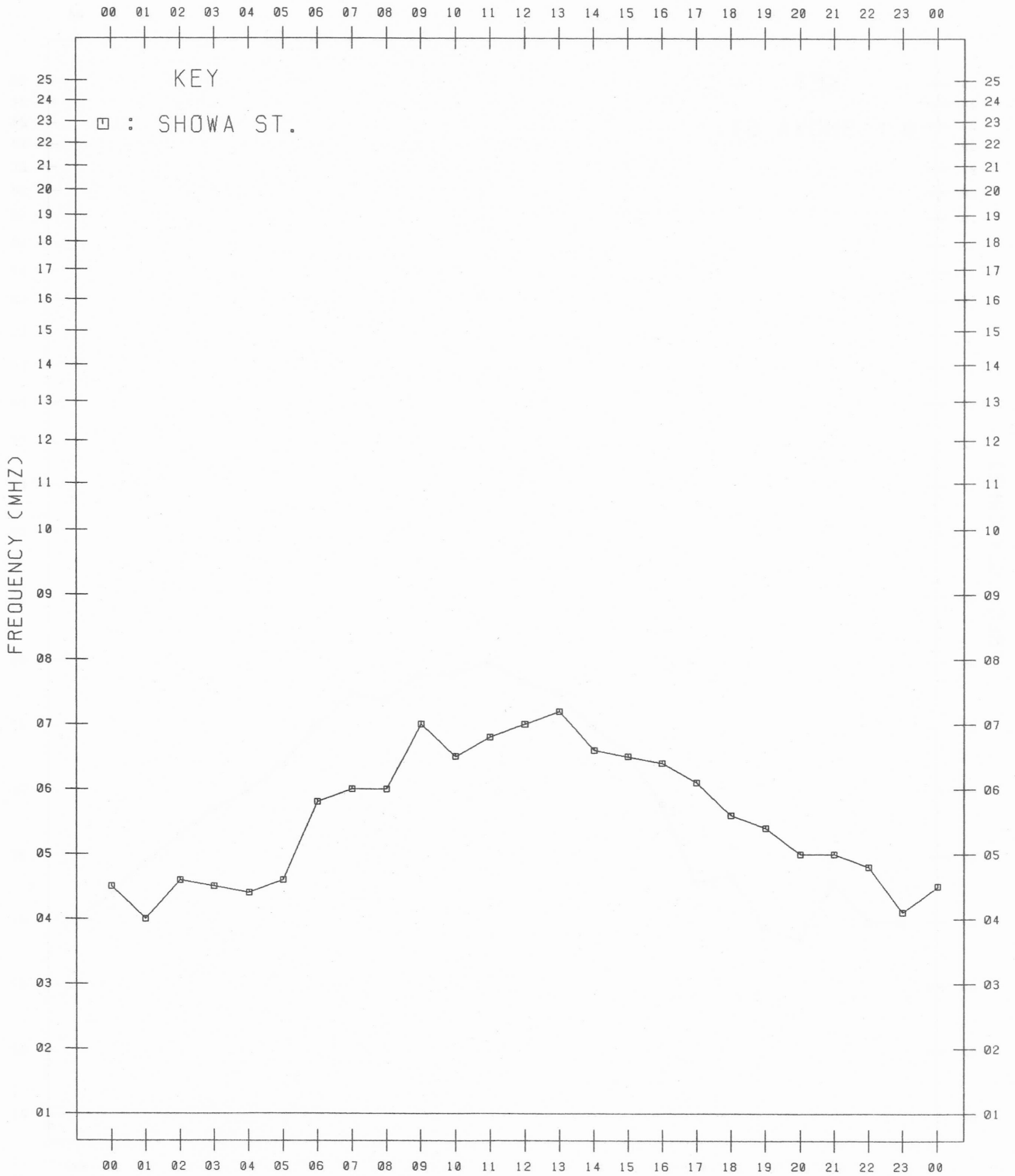
JAN. 1990



MONTHLY MEDIAN VALUES OF F₀F₂

45 °E MEAN TIME

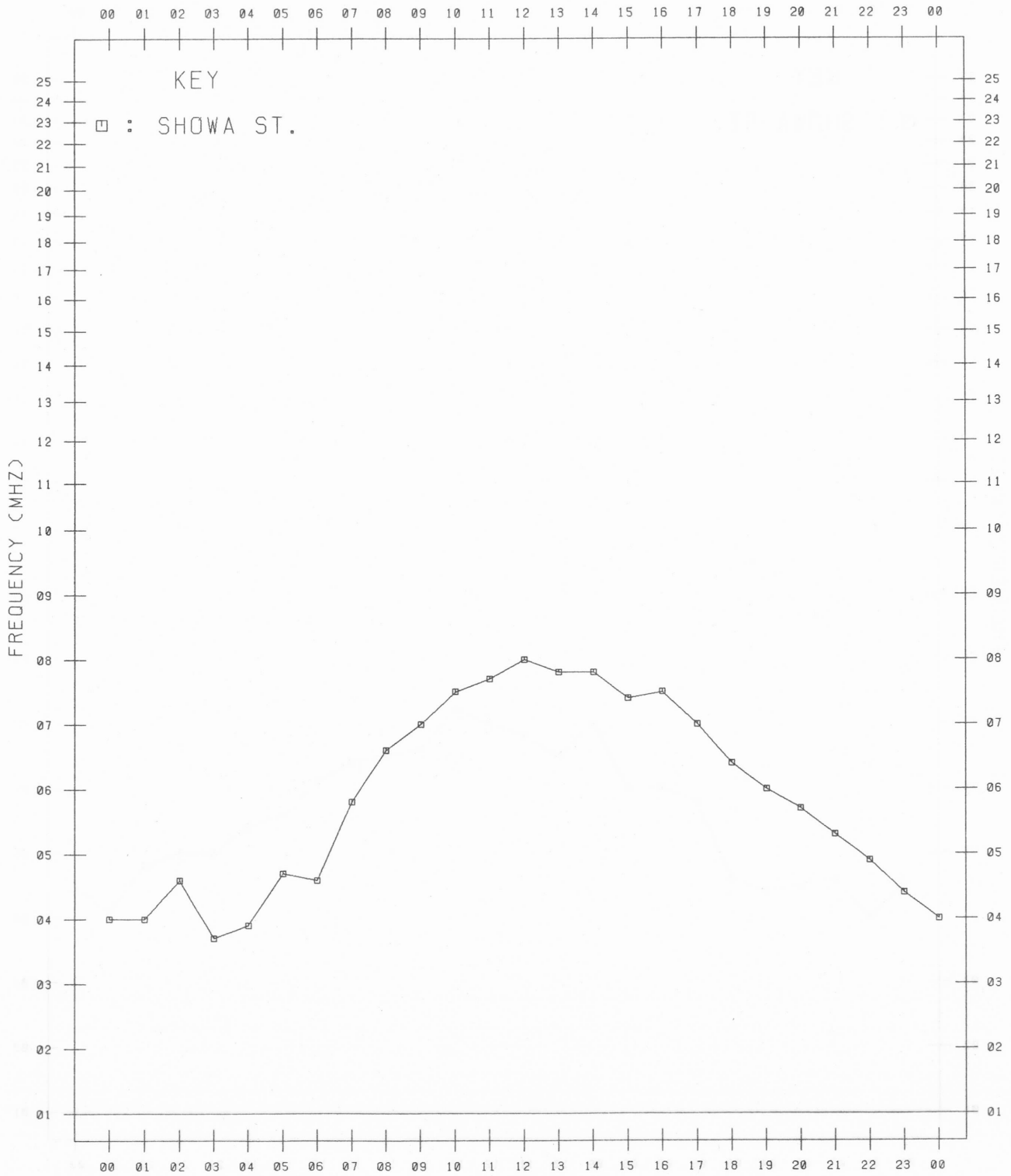
FEB. 1990



MONTHLY MEDIAN VALUES OF FOF2

45 °E MEAN TIME

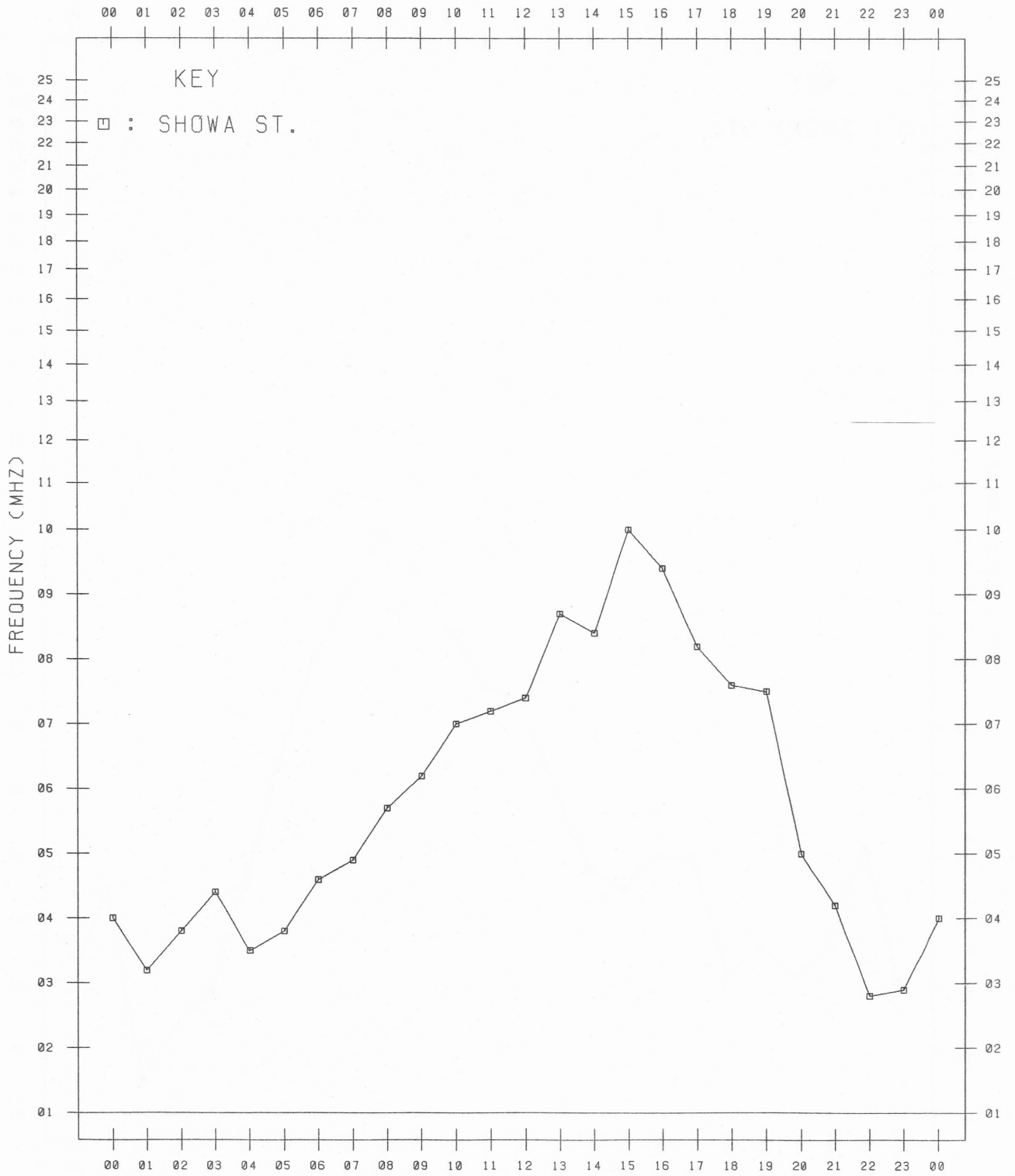
MAR. 1990



MONTHLY MEDIAN VALUES OF F₀F₂

45 °E MEAN TIME

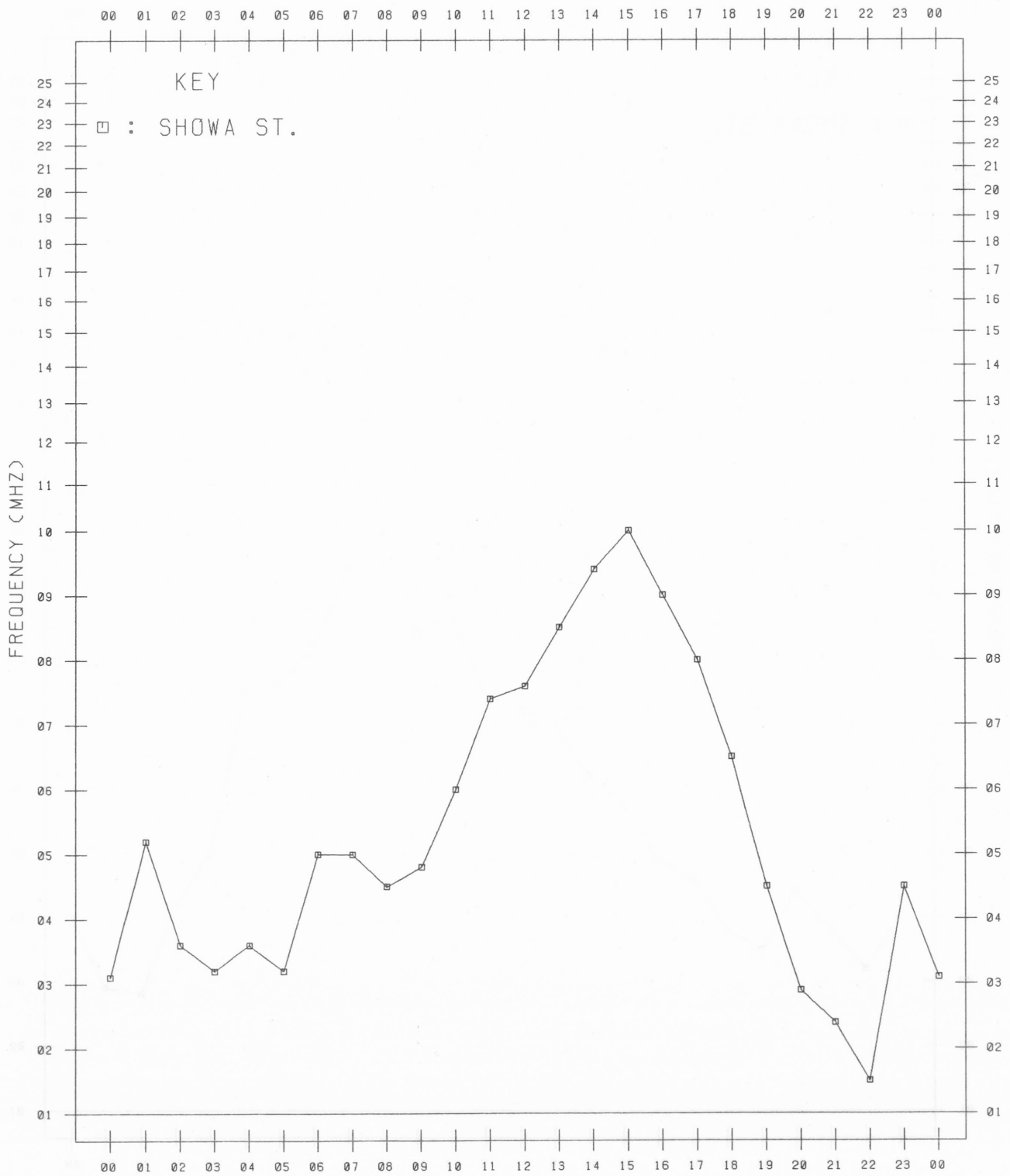
APR. 1990



MONTHLY MEDIAN VALUES OF FOF2

45 °E MEAN TIME

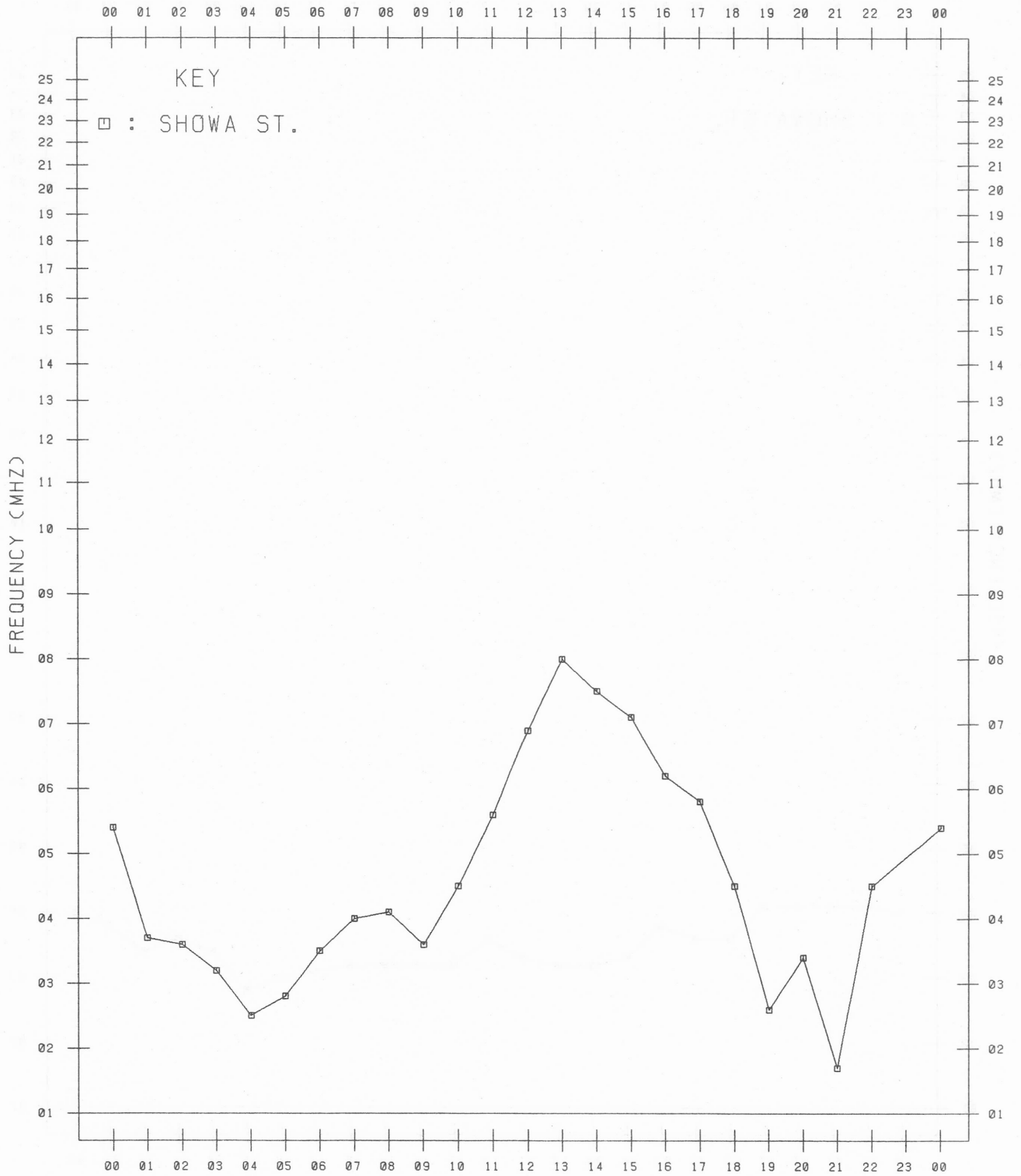
MAY. 1990



MONTHLY MEDIAN VALUES OF F₀F₂

45 °E MEAN TIME

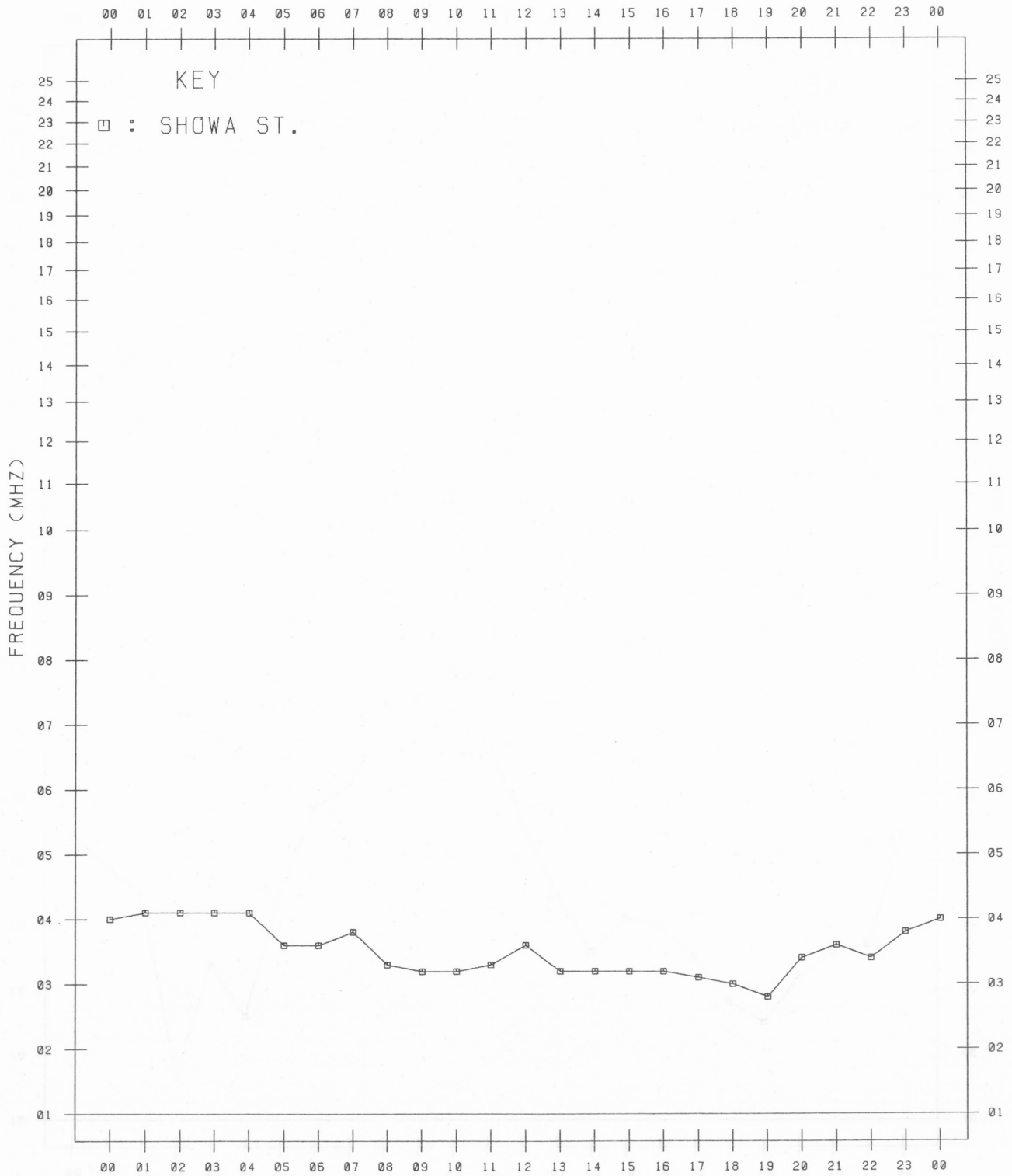
JUN. 1990



MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

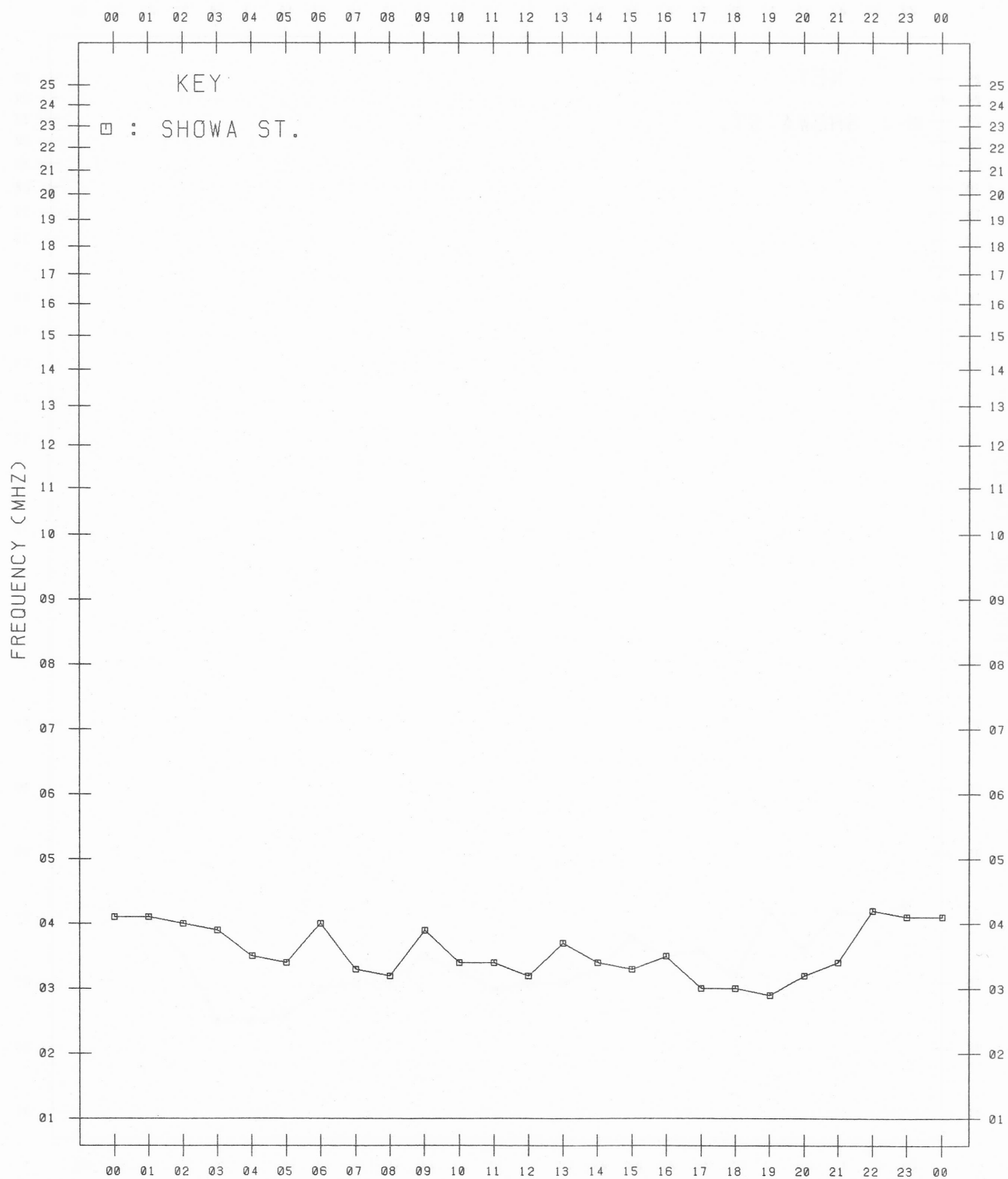
JAN. 1990



MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

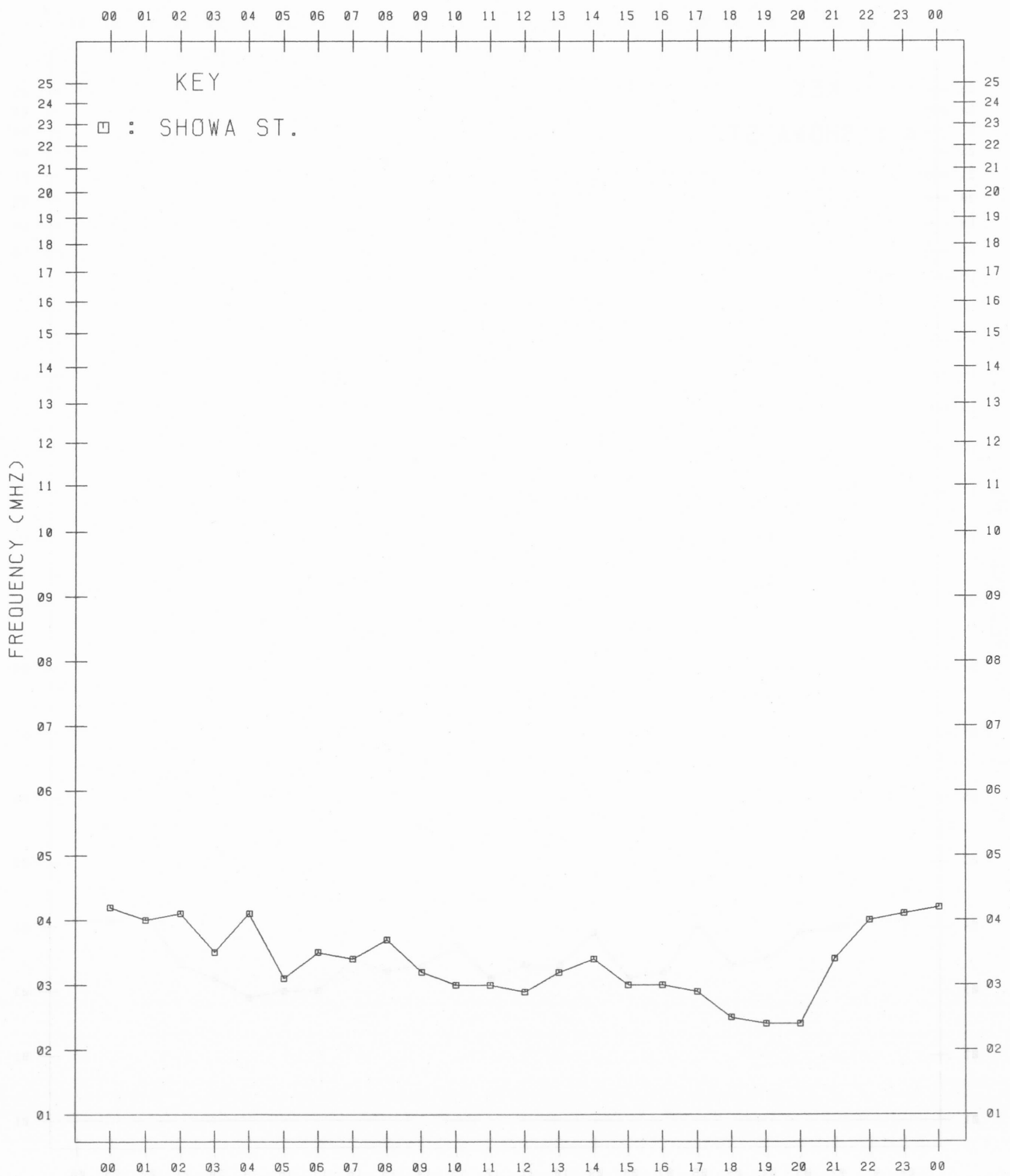
FEB. 1990



MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

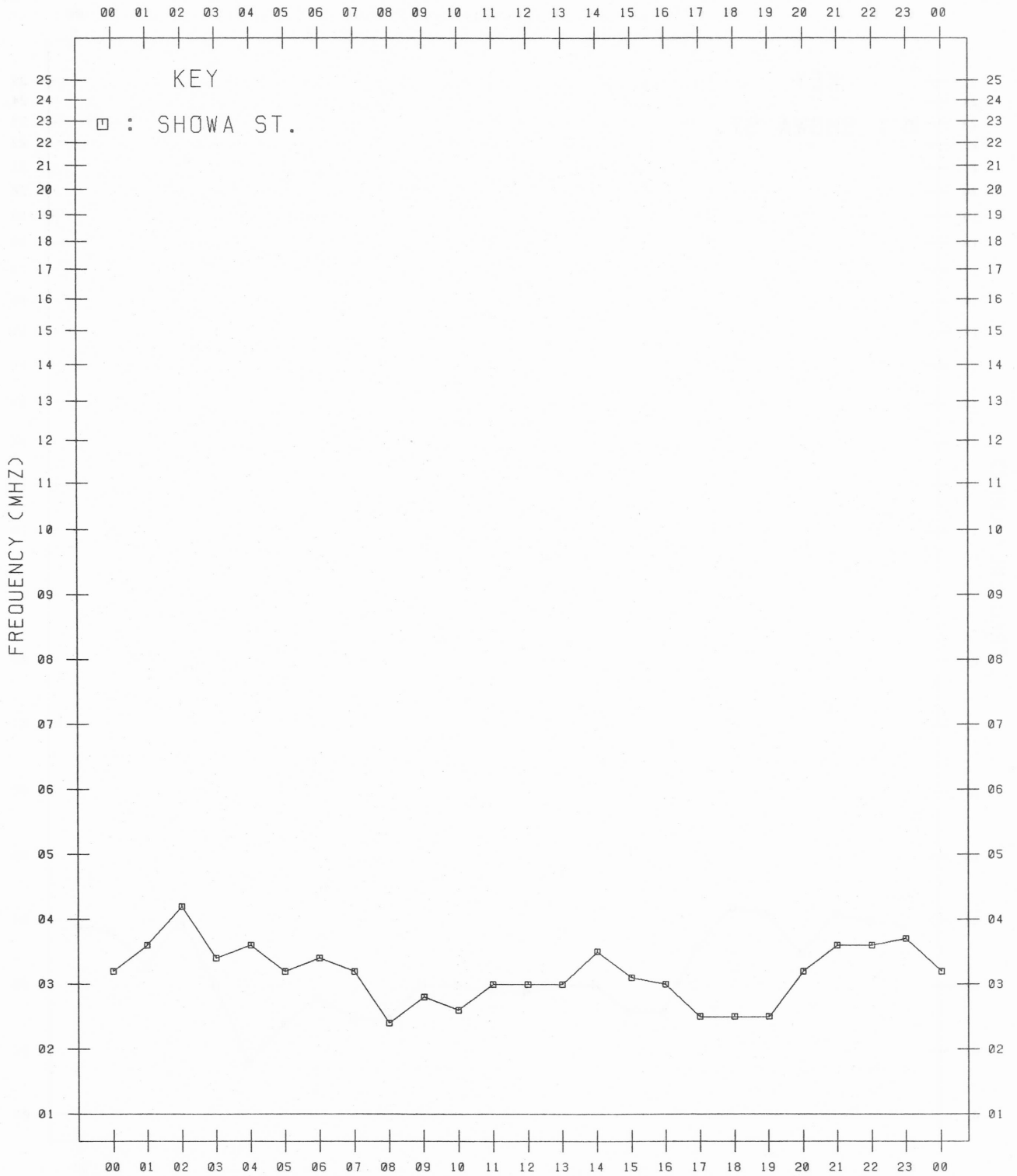
MAR. 1990



MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

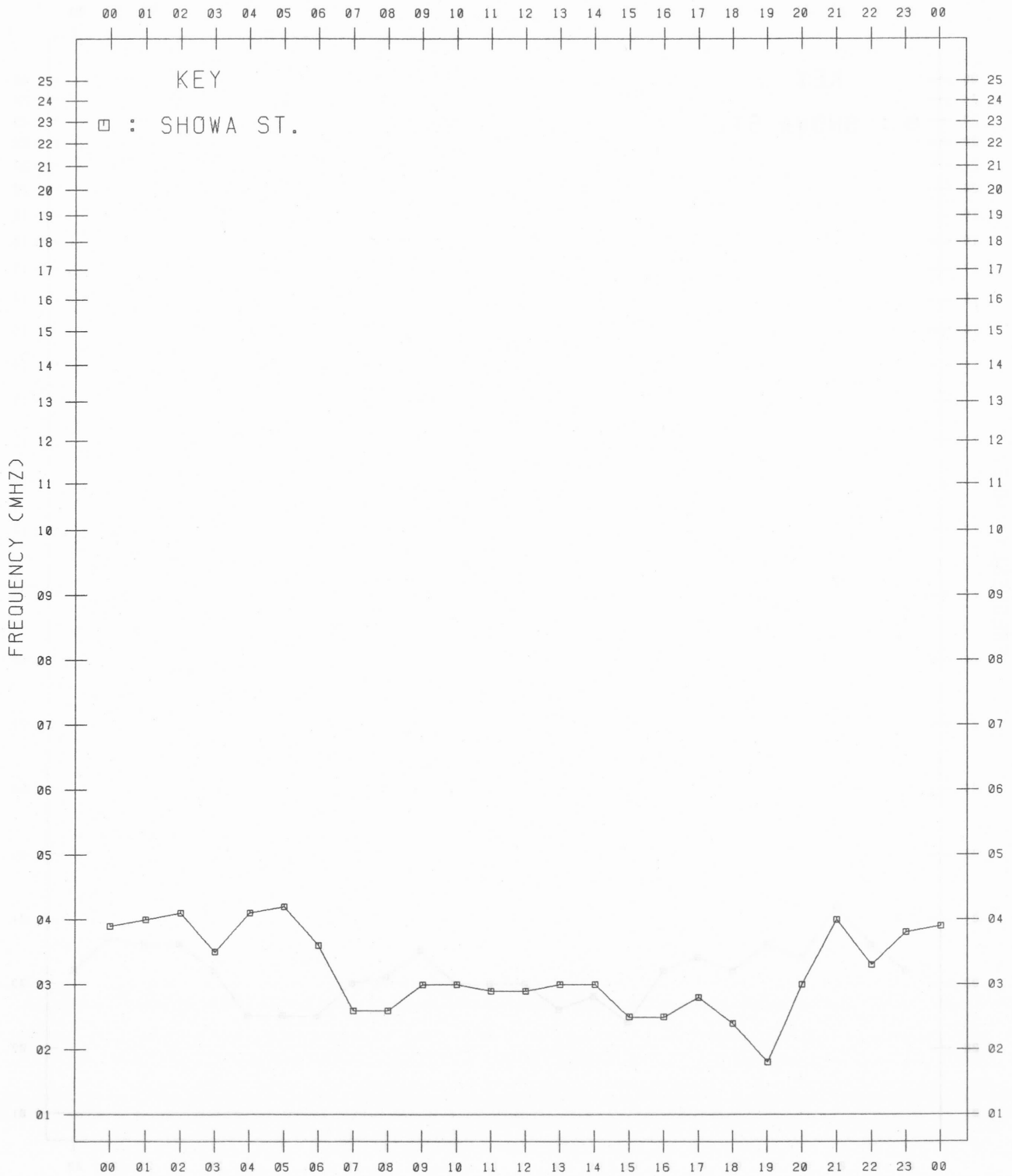
APR. 1990



MONTHLY MEDIAN VALUES OF FES

45°E MEAN TIME

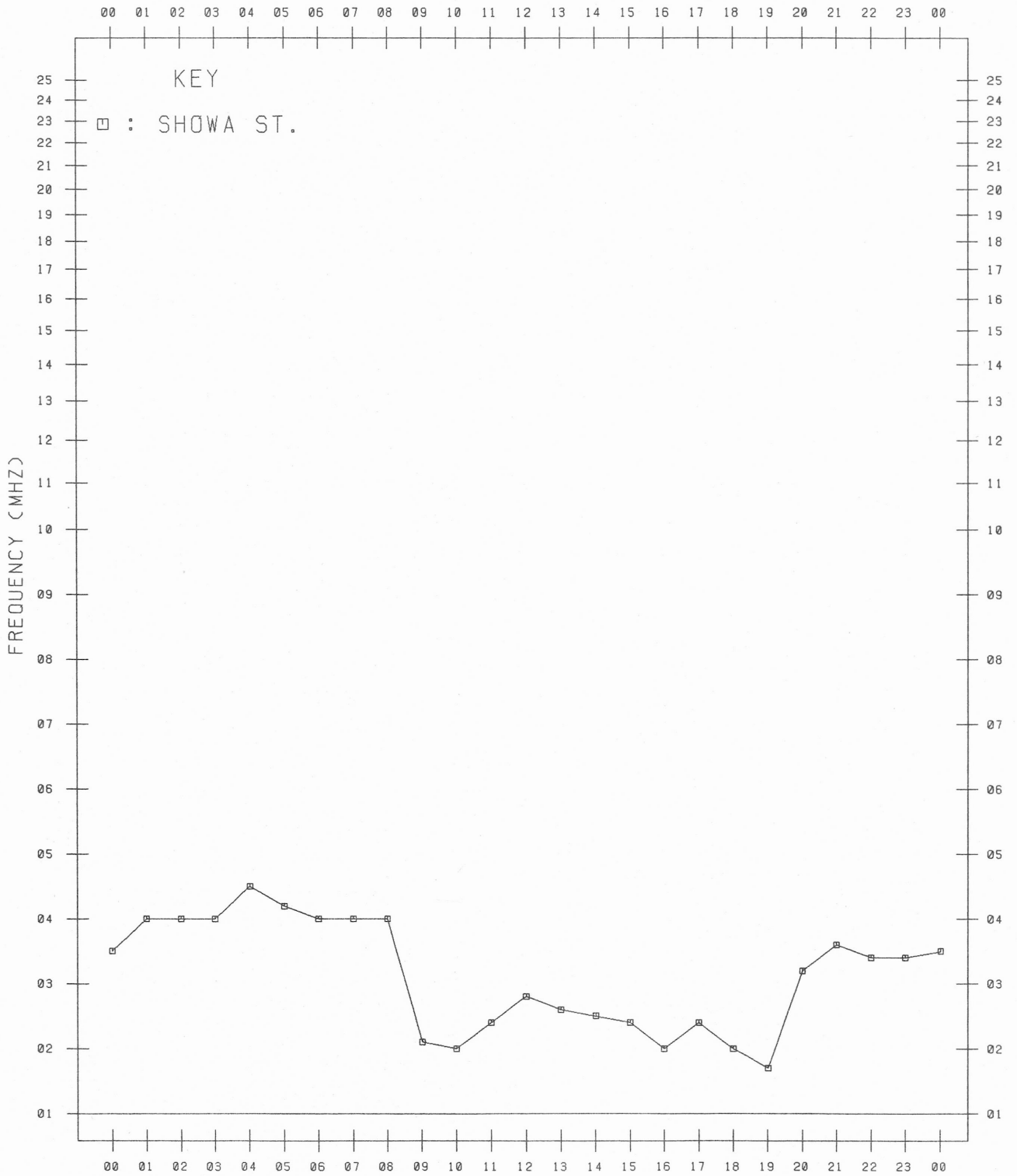
MAY. 1990



MONTHLY MEDIAN VALUES OF FES

45 °E MEAN TIME

JUN. 1990





IONOSPHERIC DATA AT SYOWA STATION (ANTARCTICA)
ION.ANT.—54 January 1990—June 1990 (Not for Sale)

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