

IONOSPHERIC DATA IN JAPAN

FOR MARCH 1988

VOL.40 NO. 3

CONTENTS

	Page
Briefing	1
A. Ionosphere	
Hourly Values at Wakkanai	5
Hourly Values at Akita	19
Hourly Values at Kokubunji	33
Hourly Values at Yamagawa	47
Hourly Values at Okinawa	61
Monthly Median Values of f_oF_2	75
f -plots at Kokubunji Station	78
B. Solar Radio Emission	
a. Daily Data at Hiraiso	86
b. Outstanding Occurrences at Hiraiso	88
C. Radio Propagation	
a. H. F. Field Strength at Hiraiso	89
b. Radio Propagation Quality Figures at Hiraiso	91
c. Phase Variations in OMEGA Radio Waves at Inubo	92
d. Sudden Ionospheric Disturbances	
(i) Short Wave Fade-out (SWF) at Hiraiso	93
(ii) Sudden Phase Anomaly (SPA) at Inubo	93

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TOKYO, JAPAN

BRIEFING

This Series contains data on ionosphere (I), solar radio emis-

sion (S) and radio propagation (P) obtained at the following stations under the Radio Research Laboratory, Ministry of Posts and Telecommunications of Japan.

Station	Geographic		Geomagnetic		Technical Method
	Latitude	Longitude	Latitude	Longitude	
Wakkanai	45°23.5'N	141°41.2'E	35.3°N	206.5°	Vertical Sounding (I)
Akita	39°43.5'N	140°08.0'E	29.5°N	205.9°	" (I)
Kokubunji	35°42.4'N	139°29.3'E	25.5°N	205.8°	" (I)
Yamagawa	31°12.1'N	130°37.1'E	20.4°N	198.3°	" (I)
Okinawa	26°16.9'N	127°48.4'E	15.3°N	196.0°	" (I)
Hiraiso	36°22.0'N	140°37.5'E	26.3°N	206.8°	Radio Receiving (S, P)
Inubo	35°42.2'N	140°51.5'E	25.6°N	207.0°	" (P)

A. IONOSPHERE

Ionospheric observations are carried out at five stations in Japan by means of vertical sounding method.

The published data consist of tabulations of hourly values of the ionospheric characteristics and figures of daily *f*-plot.

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" and its revision of chapters 1-4, published in July 1978.

a. Characteristics of Ionosphere

<i>fxI</i>	Top frequency of spread <i>F</i> trace
<i>foF2</i> <i>foF1</i> <i>foE</i> <i>foEs</i>	Ordinary wave critical frequency for the <i>F2</i> , <i>F1</i> , <i>E</i> and <i>Es</i> including particle <i>E</i> layers respectively
<i>fbEs</i>	Blanketing frequency of the <i>Es</i> layer, e.g. the lowest ordinary wave frequency visible through <i>Es</i>
<i>fmin</i>	Lowest frequency which shows vertical ionospheric reflections
<i>M(3000)F2</i> <i>M(3000)F1</i>	Maximum usable frequency factor for a path of 3000 km for transmission by <i>F2</i> and <i>F1</i> layers respectively
<i>h'F2</i> <i>h'F</i> <i>h'E</i> <i>h'Es</i>	Minimum virtual height on the ordinary wave for the <i>F2</i> , whole <i>F</i> , <i>E</i> and <i>Es</i> layers respectively
Types of <i>Es</i>	See below A. b. (iii)

b. Symbols

(i) 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 *fmin*.
- 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 in use.
- E Measurement influenced by, or impossible because of, the lower limit of the normal frequency range in use.
- 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 a stratification.
- K Presence of particle *E* layer.
- L Measurement influenced 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 perturbations of the observed parameter; or spur type spread *F* present.
- 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 atmospherics.
- 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.

- A Less than. Used only when *fbEs* is deduced from *foEs* because total blanketing of higher layer is present.
- D Greater than.
- E Less than.
- I Missing value has been replaced by an interpolated value.
- J Ordinary component characteristic deduced from the extraordinary component.
- M Mode interpretation uncertain.
- O Extraordinary component characteristic deduced from the ordinary component. (Used for x-characteristics only.)
- 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.

(iii) Description of Types of *Es*

When more than one type of *Es* trace are present on the ionogram, the type for the trace used to determine *foEs* must be written first. The number of multiple traces is indicated after the type letter.

The types are:

- f An *Es* trace which shows no appreciable increase of height with frequency.
- l A flat *Es* trace at or below normal *E* layer minimum virtual height or below the particle *E* layer minimum virtual height.
- c An *Es* trace showing a relatively symmetrical cusp at or below *foE*. (Usually a daytime type.)
- h An *Es* trace showing a discontinuity in height with the normal *E* layer trace at or above *foE*. The cusp is not symmetrical, the low frequency end of the *Es* trace lying clearly above the high frequency end of the normal *E* trace. (Usually a daytime type.)
- q An *Es* trace which is diffuse and non-blanketing over a wide frequency range.
- r An *Es* trace showing an increase in virtual height at the high frequency end similar to group retardation.
- a An *Es* trace having a well-defined flat or gradually rising lower edge with stratified and diffuse traces

present above it.

s A diffuse *Es* trace which rises steadily with frequency and usually emerges from another type *Es* trace.

d A weak diffuse trace at heights below 95 km associated with high absorption and large *fmin*.

n The designation 'n' is used to denote an *Es* trace which cannot be classified into one of the standard types.

k The designation 'k' is used to show the presence of particle *E*. When *foEs* > *foE* (particle *E*) the *Es* type precedes k.

c. 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 of 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.

B. SOLAR RADIO EMISSION

Solar radio observations are carried out on 100, 200 and 500 MHz at Hiraiso. Observation equipments are: a pair of crossed doublet antennas with a 6-meter and a 10-meter parabolic reflectors for 500 MHz and for 100 and 200 MHz, respectively, and three appropriate receivers. Each pair of crossed doublet antennas is used as a polarimeter. Observations are feasible almost from sunrise to sunset.

Time is expressed in hours, minutes and tenths of minutes U.T. and the unit of flux density is $10^{-22} \text{ Wm}^{-2} \text{ Hz}^{-1}$ for both components of polarization.

All symbols and terminology in the table of data are used in accordance with the "Descriptive Text of Solar-Geophysical Data, NOAA" and "Instruction Manual for Monthly Report of Solar Radio Emission, WDC-C2".

a. Daily Data at Hiraiso

Flux density. The three-hourly and daily mean values are given.

Variability. The three-hourly and daily mean values are given at 200 MHz only.

Variability is expressed in the following four grades.

- 0 quiet or no burst,
- 1 a few bursts,
- 2 many bursts,
- 3 very many bursts.

The number of bursts exceeding the mean flux level is counted.

Daily data with parentheses mean that observation time does not exceed one third of the period.

b. Outstanding Occurrences at Hiraiso

The phenomena are picked up on the following criteria:

1. distinct from the prevailing kind of activity,
2. correlated with other known solar phenomena,
3. remarkable change-over from one situation to another.

Type is denoted by numerical code and letter symbol in parallel as follows:

SGD Cord	Letter Symbol	Morphological Classification
1	S	Simple 1
2	S/F	Simple 1F
3	S	Simple 2
4	S/F	Simple 2F
5	S	Simple
6	S	Minor
7	C	Minor+
8	S	Spike
20	GRF	Simple 3
21	GRF	Simple 3A
22	GRF	Simple 3F
23	GRF	Simple 3AF
24	R	Rise
25	R	Rise A
26	FAL	Fall
27	RF	Rise and Fall
28	PRE	Precursor
29	PBI	Post Burst Increase
30	PBI	Post Burst Increase A
31	ABS	Post Burst Decrease
32	ABS	Absorption
40	F	Fluctuations
41	F	Group of Bursts
42	SER	Series of Bursts
43	NS	Onset of Noise Storm
44	NS	Noise Storm in progress
45	C	Complex
46	C	Complex F
47	GB	Great Burst
48	C	Major
49	GB	Major+

Flux density is the increase of flux over the level at which daily flux is calculated, or the increase of flux over the underlying burst when the event is superposed on another burst of long duration.

Polarization is expressed by the polarization degree and sense as follows:

- R or L right- or left-handed polarization,
- W, M or S weak, moderate or strong polarization,
- 0 almost zero or unable to detect polarization due to small increase of flux,
- 00 polarization degree of less than 1 percent.

The following symbols may be attached after numerical values in table, if necessary.

- D greater than, or later than,
- E less than, or earlier than,
- U approximate, or uncertain.

C. RADIO PROPAGATION

a. H.F. Field Strength at Hiraiso

Field strength observation of 15 MHz standard waves transmitted from WWV and WWVH stations which are located respectively at Fort Collins, Colorado and Kauai, Hawaii, is carried out at Hiraiso. In order to avoid interference among the same frequency waves, the upper sideband of WWV or WWVH with the audio tone 660 Hz is picked up by the use of a narrow band pass filter with 80 Hz bandwidth. Particulars of the transmitters and the receiver are summarized in the following table.

Characteristics	Transmitter		Receiver
	WWV	WWVH	
Station Call	WWV	WWVH	Hiraiso, Ibaraki
Location	Fort Collins, Colorado	Kauai, Hawaii	
latitude	40° 41' N	22° 00' N	36° 22' N
longitude	105° 02' W	159° 46' W	140° 38' E
Distance	9150 km	5910 km	—
Carrier Power	10 kW	10 kW	—
Power in each sideband	625 W	625 W	—
Modulation	50 %	50 %	—
Antenna	$\lambda / 2$ vertical	$\lambda / 2$ vertical	4.5 m vertical rod
Bandwidth	—	—	80 Hz for upper sideband
Calibration	—	—	Every an hour

The tabulated *field strength* in dB above one microvolt per meter is the peak average of the incident upper sideband field intensity in 45 seconds after the universal time indicated on the table. Abbreviated symbols are as follows:

CNT	number of observed values,
MED	median,
UD	value of the uppermost decile when they are ranked according to magnitude,
LD	value of the lowest decile when they ranked according to magnitude,
U	uncertain,
E	less than,
C	influenced by, or impossible because of, any artificial accident,
S	influenced by, or impossible because of, interferences or atmospherics.

b. Radio Propagation Quality Figures at Hiraiso

The tabulated six-hourly quality figures are calculated for standard waves WWV transmitted from Fort Collins and WWVH transmitted from Kauai.

Quality figures expressing radio propagation conditions are ranged over five grades as follows:

1	very poor (very disturbed),
2	poor (disturbed),
3	rather poor (unstable),
4	normal,
5	good.

Whole day quality figure ranged in grades of 10, 1+, 2-, 20, 2+, 3-, 30, 3+, 4-, 40, 4+, 5-, 50 stands for an average of six-hourly ones of the two circuits. Abbreviated symbols are as follows:

C	artificial accident,
S	propagation accident,
U	inaccurate.

Radio propagation conditions which can be described with a code in the following

N	normal,
U	unstable,
W	disturbed

are forecast 12 hours in advance and broadcast six times per hour from JJY station.

Data on a *geomagnetic storm* correlated with a radio propagation disturbance are tabulated from observation at Kakioka Magnetic Observatory, Japan Meteorological Agency. *Time* (U.T.) is expressed in unit of hour and minute (or tenth of hour), and *range* in nanotesla. When they are uncertain quantitatively, /'s are used to replace the numerical values. Continuation of a geomagnetic storm is denoted by - - -.

c. Phase Variations in OMEGA Radio Waves at Inubo

Variations in phase and in phase deviation are monthly depicted for four OMEGA radio waves received at Inubo. Particulars of transmitting stations concerned which relate to the measurement are given in the table below.

In each of the four figures, variations in phase (ϕ) and those in phase deviation ($\Delta\phi$) are shown in the lower part and the upper one, respectively. Variations in phase (ϕ) are expressed by relative values at intervals of 30 minutes within every day (U.T.) (48 dots). An increasing value in this case denotes a phase delay. On the other hand, variations in phase deviation ($\Delta\phi$) are expressed by values at intervals of 30 minutes within every day (U.T.)

(48 dots), deviated from average values at the same time for the six quietest days within the month concerned. A negative value in this case denotes a phase advance.

When a polar cap phase anomaly (PCPA) is detected on the Aldra-Inubo and/or the North Dakota-Inubo circuit[s], PCPA's detected only on the Aldra-Inubo circuit are listed, in principle, below the four figures. The list mentions the start, the end, and the maximum times of a PCPA in a form of day/hour & minute in U.T. and its maximum phase deviation as a negative value.

The following letters may be attached to values, if necessary.

D	greater than,
E	less than,
U	uncertain or doubtful.

d. Sudden Ionospheric Disturbances

(i) Short Wave Fade-out (SWF) at Hiraiso

The table of short wave fade-out (SWF) is prepared from the record of field intensities measured at Hiraiso.

Drop-out intensities of the 10 MHz, the 20 MHz, and the 25 MHz waves are respectively distinguished by marks ', ", and "' from these of the 15 MHz wave for WWV and WWVH. Values of *start*, *duration*, *type*, and *importance* are obtained from data of the circuit whose drop-out intensity in dB is underlined as xx. When these quantities are not given correctly, they are accompanied by the following symbols.

D	greater than,
E	less than,
U	uncertain or doubtful.

Types of fade-out are as follows:

S	sudden drop-out and gradual recovery,
SL	slow drop-out taking 5 to 15 minutes and gradual recovery,
G	gradual and irregular in both drop-out and recovery.

Importance of fade-out is scaled according to its amplitude into nine ascending grades as 1-, 1, 1+, 2-, 2, 2+, 3-, 3, 3+.

Correspondence of solar optical flare, solar radio burst, and geomagnetic crochet to SWF is marked by X in accordance with interchange messages of IUWDS and observations at Hiraiso.

In table (i) SWF, *date* indicates the day to which *start-time* of event belongs.

(ii) Sudden Phase Anomaly (SPA) at Inubo

Data of sudden phase anomaly (SPA) are prepared from the records of phase measurement of VLF radio waves received at Inubo. The transmitting stations are listed in the following table.

Phase advance is shown in unit of degree at its maximum stage. No transmission or no reception during the period is indicated by —, and indistinguishable record is spaced out, and multi-peak event is marked by *.

Out of more than two circuits on which the same SPA event is observed, the *phase advance* on the circuit on which the SPA is the most remarkable or distinct is underlined. As for the underlined, *phase advance*, *start*, *end*, and *maximum times* are obtained.

In table (ii) SPA, *date* indicates the day to which *start-time* of event belongs.

The following letters may be attached to the value, if necessary.

D	greater than,
E	less than,
U	uncertain or doubtful.

Transmitting Stations						
Name	Location (Geographic Coordinate)		Call Sign	Frequency (kHz)	Radiation Power (kHz)	Arc Distance from Inubo (km)
Rugby	52° 22'N	001° 11'W	GBR	16.0	60	9550
North West Cape	21° 49'S	114° 10'E	NWC	22.3	1000	6990
Norway	66° 25'N	013° 08'E	Ω/N	13.6	10	7820
North Dakota	46° 22'N	098° 20'W	Ω/ND	13.6	10	9140
Hawaii	21° 24'N	157° 50'W	Ω/H	13.6	10	6100
La Reunion	20° 58'S	055° 17'E	Ω/LR	13.6	10	10970

IONOSPHERIC DATA

MAR. 1988

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI				Lat.	45° 23' 5" N · Long 141° 41' 2" E							Sweep 1 MHz to 25 MHz in 24 sec in automatic operation												
	Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	X	X	X	X	X	X													X	X	X	X	X	X	X
2	X	X	X	X	X	X													X	X	X	X	X	X	X
3	X	X	X	X	X	X													X	X	X	X	X	X	X
4	X	X	X	X	X	X													X	X	X	X	X	X	X
5	X	X	X	X	X	X													X	X	X	X	X	X	X
6	X	X	X	X	X	X													X	X	X	X	X	X	X
7	X	X	X	X	X	X													X	X	X	X	X	X	X
8	X	X	X	X	X	X													X	X	X	X	X	X	X
9	X	X	X	X	X	X													X	X	X	X	X	X	X
10	X	X	X	X	X	X													X	X	X	X	X	X	X
11	X	X	X	X	X	X													X	X	X	X	X	X	X
12	X	X	X	X	X	X													X	X	X	X	X	X	X
13	X	X	X	X	X	X													X	X	X	X	X	X	X
14	X	X	X	X	X	X													X	X	X	X	X	X	X
15	X	X	X	X	X	X													X	X	X	X	X	X	X
16	X	X	X	X	X	X													X	X	X	X	X	X	X
17	X	X	X	X	X	X													X	X	X	X	X	X	X
18	X	X	X	X	X	X													X	X	X	X	X	X	X
19	X	X	X	X	X	X													X	X	X	X	X	X	X
20	X	X	X	X	X	X													X	X	X	X	X	X	X
21	X	X	X	X	X	X													X	X	X	X	X	X	X
22	X	X	X	X	X	X													X	X	X	X	X	X	X
23	X	X	X	X	X	X													X	X	X	X	X	X	X
24	X	X	X	X	X	X													X	X	X	X	X	X	X
25	X	X	X	X	X	X													X	X	X	X	X	X	X
26	X	X	X	X	X	X													X	X	X	X	X	X	X
27	X	X	X	X	X	X													X	X	X	X	X	X	X
28	X	X	X	X	X	X													X	X	X	X	X	X	X
29	X	X	X	X	X	X													X	X	X	X	X	X	X
30	X	X	X	X	X	X													X	X	X	X	X	X	X
31	X	X	X	X	X	X													X	X	X	X	X	X	X
CNT		31	31	31	31	31													21	31	31	31	31	31	
MED	X	X	X	X	X	X													X	X	X	X	X	X	X
UQ	X	X	X	X	X	X													X	X	X	X	X	X	X
LQ	X	X	X	X	X	X													X	X	X	X	X	X	X

MAR. 1988

FXI (0.1 MHz)

IONOSPHERIC DATA

MAR. 1938

FOF2 (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI				Lat. 45° 23' 5" N	Long. 141° 41' 2" E	Sweep 1 MHz to 25 MHz in 24 sec in automatic operation																		
	Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		38	38	36	38	39	F 35	39	60	64	69	79	85	85	89	81	74	75	63	48	45	44	40	39	40
2		41	41	41	41	41	41	47	59	74	76	94	88	83	78	79	79	74	70	54	46	H 47	49	49	47
3		47	47	47	47	51	46	49	59	63	71	86	97	92	91	91	34	34	77	55	F 50	52	52	50	50
4		52	52	51	51	52	52	56	71	72	73	84	104	96	98	93	87	78	74	61	56	47	51	51	54
5		52	50	48	44	45	42	51	76	83	93	84	101	92	92	H 73	H 74	68	70	58	53	45	42	43	43
6		44	43	43	41	41	39	45	61	63	81	93	93	90	89	84	73	74	65	57	54	49	45	49	S 48
7	S	47	45	44	44	39	39	53	64	75	101	100	101	102	91	80	85	75	71	63	53	49	44	43	44
8		45	46	46	47	39	34	44	H 56	78	84	91	90	92	99	91	82	84	84	75	68	47	39	41	40
9		40	41	43	44	29	25	43	H 66	73	94	96	115	105	95	81	73	71	71	63	52	45	41	44	42
10	S	46	44	43	39	37	38	42	H 59	72	74	98	96	85	82	81	79	71	66	58	51	47	44	42	39
11		39	41	36	40	34	31	41	55	68	Z 71	85	93	92	81	81	83	86	73	57	53	54	51	49	43
12		42	45	45	50	37	30	46	68	74	84	85	83	78	80	83	78	77	71	63	54	46	44	43	46
13		46	43	43	42	44	43	55	68	76	78	87	97	82	77	75	75	76	73	68	55	49	47	47	48
14		46	46	45	43	42	43	62	61	72	81	H 84	83	80	84	84	79	72	73	71	61	50	44	42	43
15		42	42	42	44	42	37	53	61	87	94	91	91	97	90	74	81	82	80	75	63	48	44	43	43
16		43	44	44	42	36	36	50	63	74	100	81	79	79	84	38	87	86	84	69	60	53	47	48	46
17		46	43	43	43	42	41	56	73	77	91	88	89	91	87	86	85	85	91	75	55	49	47	44	47
18		44	45	44	44	43	42	55	67	82	90	95	101	86	89	86	85	80	77	72	55	52	50	46	45
19		45	44	44	44	42	42	60	76	85	90	91	93	99	100	90	83	76	73	69	56	51	50	50	49
20		48	46	46	46	44	43	59	71	86	91	83	89	89	91	85	83	79	84	71	54	50	49	47	44
21		46	48	47	45	37	35	55	78	84	102	97	92	84	84	85	81	83	83	67	53	51	49	48	47
22		46	46	45	44	40	42	60	69	75	85	86	81	91	92	87	78	78	77	73	59	55	52	50	47
23		46	46	48	48	46	43	60	72	79	83	84	91	91	89	90	84	81	79	70	64	58	51	50	49
24		45	44	44	44	46	43	62	70	77	80	83	82	84	88	85	85	79	82	76	64	58	57	56	55
25		52	51	51	49	50	49	62	84	84	90	96	89	91	87	73	83	83	85	35	81	72	47	45	44
26		42	43	43	42	41	43	S 76	J R 73	83	83	95	96	91	94	94	94	87	91	98	90	63	48	44	45
27		43	42	43	47	44	38	70	69	H 71	64	H 62	60	59	68	71	70	70	75	F 78	F	F	F	F	65
28		64	F	F	F	F	F	49	59	61	67	H 60	H 66	75	78	78	77	71	70	68	64	56	51	48	47
29		52	48	48	42	F 36	F 31	50	51	64	70	66	72	Z 87	74	84	78	74	69	67	68	67	57	48	47
30		40	40	37	36	42	37	54	63	75	87	91	87	97	99	96	94	87	76	67	69	56	56	54	56
31		51	53	49	44	44	46	64	82	86	100	93	86	91	98	93	90	90	91	92	78	75	63	60	59
		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	30	30	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	30	31
MED		45	44	44	44	42	41	54	67	75	84	87	90	91	89	84	82	78	75	68	56	50	48	48	47
UQ		47	46	47	46	44	43	60	72	82	91	94	96	92	92	89	85	84	82	74	64	56	51	50	48
LQ		42	43	43	42	39	36	48	60	72	75	84	84	84	83	80	78	74	71	62	53	47	44	43	44

The Radio Research Laboratory, Japan

MAR. 1938

FOF2 (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FOF1 (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI							Lat.	45° 23' 5" N				Long.	141° 41' 2" E				Sweep	1 MHz to	25 MHz in	24 sec in	automatic operation			
Hour Day	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									L 350		H 440	L 450	L 430	L 420	L 430	L 390									
2										L 400	L 430	L 450	L 430	L 430	L 420	A									
3										L 410	L 450	L 440	L 440	L 430	L 390										
4									H 400	L 420	L 460	L 440	L 440	L 410		C									
5									L 430	L 430	L 460	L 450	L 420	L 430	L 380										
6									L 430	L 450	L 460	L 450	L 460	L 410	L 390										
7									L 400	L 430	L 450	L 450	L 440	L 420											
8									L 350	L 410	L 450	L 470	L 440	L 440	L 380										
9									L 490	H 440	H 470	H 450	L 450	L 430	L 380										
10									L 430	L 400	L 460	L 440	L 440	L 420	L										
11										L 440	L 450	L 480	L 430	L 430	L 420										
12									L 410	L 460	L 440	L 430	L 430	L 430	L 400										
13									L 400	L 430	L 420	L 460	L 450	L 420	L 410	L									
14									L 340	L 430	L 420	L 410	L 460	L 430	L 390	L 400									
15									L 410	L 420	L 430	L 500	L 470	L 390	L										
16									L 410	L 430	L 440		B	L 420	L 440										
17									L 430	L 440	L 450	L 440	L 450	L 430	L	L									
18									L 430	L 480	L 430	L 400	L 430	L	L 440										
19									L 430	L 430	L	L 470	L 460	L 430	L 410										
20									L 410	L 430	L 440	L 510	L 450	L 460	L 410	L 340									
21									L 440	L 470	L 460	L 450	L 440	L 480	L 410										
22									L 410	L 430	L 440	L	L 480	L 460	L 430	L 360									
23									L 430	L 440	L 480	L 450	L 450	L 450	L 430										
24									L 490	L 460	L 450	L 510	L 440	L 430	H 410										
25									L	L 440	L 440	L 460	L 460	H	L										
26									L 440	L 460	L 480	L 460	L 490	L 460	L 430	L									
27									L 440	L 510	L 490	L 490	L 480	L 470	L 430	L 340									
28										H 390	L 430	L 440	L 450	L 500	L 450	L 440	L 420								
29										L 380	L 430	L 460	L 430	L 500	L 450	L									
30										L 450	L 510	L 520	L 500	L 490	L 440	L 410	L								
31									L 410	L 440	L 460	L 500	L 510	L 490	L 460	L 410									
	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	12	27	29	27	29	29	26	23	2								
MED								385	L 410	L 430	L 440	L 460	L 450	L 440	L 430	L 410	L 340								
UQ								L 410	L 440	L 460	L 475	L 480	L 460	L 440	L 420										
LQ								L 375	L 430	L 430	L 450	L 440	L 430	L 420	L 390										

MAR. 1988

FOF1 (0.01 MHz)

IONOSPHERIC DATA

MAR. 1988

FOE (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		WAKKANAI											Lat. 45 23.5 N · Long 141 41.2 E											Sweep 1 MHz to 25 MHz in 24 sec in automatic operation			
Hour	Day	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	245	275	305	310	310	305	290	250	225		S								
2							S		200	235	270	300	310	310	300	A	A	A	S								
3							S		195	245	280	A	310	310	305	290	240	A	S								
4							S		200	250	290	305	310	310	305	300	C	225	S								
5							S		205	250	285	A	A	310	305	300	275	215	S								
6							S		195	265	285	305	B	310	305	300	270	220	S								
7							S		200	250	290	305	315	315	310	300	280	215	S								
8							S		205	255	280	A	B	A	310	300	275	225	S								
9							S		210	255	290	305	315	320	310	300	270	235	S								
10							S		210	250	270	A	320	A	315	305	295	230	S								
11							S		210	250	300	310	315	315	310	305	290	235	180								
12							S		215	255	305	A	B	330	315	310	295	245	H	185							
13							S		210	250	295	310	315	320	315	305	290	235	185								
14							S		220	260	300	315	330	335	325	315	290	250	185								
15							S		230	280	310	H	320	335	335	325	315	290	240	S							
16							S		225	280	300	315	330	B	320	310	B	250	185								
17							S		245	280	305	H	A	330	330	320	305	290	245	185							
18							S		220	260	300	315	B	290	325	310	H	A	190								
19							S		225	265	305	H	A	340	335	320	310	295	255	H	200						
20							S		215	260	305	320	335	340	320	310	295	255	195								
21							S		240	290	305	H	325	340	340	340	325	305	260	195	S						
22							S		240	285	305	320	340	345	340	320	295	240	205	S							
23							S		240	285	305	325	345	345	335	320	295	250	205	S							
24							S		255	300	310	H	330	340	340	330	315	300	270	205	S						
25									175	245	295	305	320	330	335	B	310	305	275	205	S						
26							S		245	275	295	320	335	335	330	315	290	265	200	S							
27							S		235	270	295	315	340	335	320	310	290	245	A	S							
28									175	250	275	290	A	335	335	325	A	290	255	195	S						
29							S		240	285	305	320	335	340	325	310	290	245	205	S							
30									190	250	290	305	315	330	A	320	B	295	250	215	S						
31									180	250	285	305	325	335	340	330	310	295	250	210	S						
		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	30	31	31	23	26	27	30	28	28	28	19									
MED							178	222	265	300	315	330	335	320	310	290	245	195									
UQ							185	240	282	305	320	335	338	325	312	295	252	205									
LQ							175	210	250	290	308	315	312	310	300	285	232	185									

The Radio Research Laboratory, Japan

MAR. 1988

FOE (0.01 MHz)

IONOSPHERIC DATA

MAR. 1988

FOES (0.1 MHz)

135 E Mean Time (G.M.T. + 9 h)

Station		WAKKANAI							Lat.	45° 23' 5" N				Long.	141° 41' 2" E				Sweep	1 MHz to	25 MHz in	24 sec in	automatic operation			
Hour	Day	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 S	E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
2		E S	E S	E S	E S	E S	E S	E S	E S	G	G		G	G	G			E S	E S	E S	E S	E S	E S	E S	E S	
3		E S	E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	J A	E S	E S	E S	E S	E S	E S	E S	
4		E S	E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	E C	G	E S	E S	E S	E S	E S	E S	E S	
5		E S	24	25	E S	25	21	E S	G	G	G	34	35	27	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
6		E S	E S	E S	E S	E S	E S	E S	G	G	G	G	E B	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
7		E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
8		E S	E S	E S	E S	E S	E S	E S	G	G		35	43	35	35	G	G	G	E S	E S	E S	E S	E S	E S	E S	
9		E S	E S	E S	E S	E S	E S	E S	G	J A		G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
10		E S	E S	E S	E S	E S	E S	E S	G									E S	E S	E S	E S	E S	E S	E S	E S	
11		E S	20	24	19	E S	E S	E S	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
12		E S	E S		E S	E S	E S	E S	G	G	G	J A	E B	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
13			22	23	E S	E S	E S	E S	25	29	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
14		E S	E S	E S	E S	E S	E S	E S	G	G		34	24	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
15		E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
16		E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	E B	G	E B	G	E S	E S	E S	E S	E S	E S	E S	E S	
17		E S	E S	E S	E S	E S	E S	E S	G	G	G		35	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
18		E S	E S	E S	E S	E S	E S	E S	G	G	G	G	36	34	37	G	G	32	26	27	29	E S	E S	E S	E S	
19		E S	E S	E S	E S	E S	E S	E S	26	33	G	33	27	29	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
20		E S	E S	E S	E S	E S	E S	E S	25	39	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
21		E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
22		E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
23		E S	21	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
24		20	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	26	26	27	22	21	E S	E S	E S	
25		26	21	23	E S	E S	E S	E S	G	G		35	G	G	E B	G	G	G	30	16	16	15	16	16	16	
26		E S	E S	E S	E S	E S	E S	E S	G	G		34	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
27		E S	E S	E S	E S	E S	E S	E S	G	G		43	42	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
28		E S	E S	E S	E S	E S	E S	E S	G	32	35	41	G	G	G	32	23	G	E S	E S	E S	E S	E S	E S	E S	
29		22	20	E S	E S	E S	E S	E S	G	G		35	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
30		20	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
31		E S	E S	J A	J A	E S	E S	E S	G	G	G	G	G	G	G	G	G	G	J A	E S	E S	E S	E S	E S	E S	
		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		E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
UQ		E S	E S	E S	E S	E S	E S	E S	G	G		34	34	E B	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	
LQ		E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	E S	E S	

MAR. 1988

FOES (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FBES (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		WAKKANAI							Lat.	45° 23.5' N		Long.	141° 41.2' E		Sweep	1	MHz to	25	MHz in	24	sec in	automatic operation			
Hour	Day	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 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	G	G	G	G	
2		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	33	34	G	G	33	42	30	12	16	16
3		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	35	G	G	29	G	G	26	26	16
4		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	E C	44	G	E 19	S 19	E 16	16
5		E 17	S 16	E 17	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	31	35	27	G	G	G	G	E 20	S 15
6		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	E B	34	G	G	G	G	G	E 19	S 17
7		E 17	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	G	G	E 18	S 16	
8		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	35	34	35	G	G	G	G	E 19	S 16
9		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	35	34	G	G	G	G	G	G	E 19	S 19
10		E 16	S 16	E 15	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	32	34	G	G	34	24	G	G	E 18	S 16
11		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	G	G	G	E 16	S 16
12		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	E B	33	34	32	G	G	G	G	E 16
13		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	25	G	G	G	G	G	21	E 16	
14		E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	G	G	33	24	G	G	G	G	G	G	E 16	
15		E 16	S 15	E 15	S 15	E 15	S 15	E 15	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	G	G	E 20	S 17	
16		E 16	S 16	E 15	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	E B	48	G	E B	32	G	E 16	S 16	
17		E 16	S 15	E 15	S 15	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	G	G	G	35	G	G	G	G	G	E 16	S 15	
18		E 16	S 15	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	G	G	G	G	36	G	36	G	G	26	E 16	
19		E 16	S 11	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	33	27	29	G	G	G	G	E 16	
20		E 16	S 16	E 15	S 15	E 15	S 15	E 15	S 16	E 15	S 16	E 15	S 16	G	G	G	30	G	G	G	G	G	E 15	S 16	
21		E 16	S 16	E 15	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	G	G	18	E 16	
22		E 16	S 15	E 15	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	31	29	26	24	24	G	G	E 19	
23		E 16	S 15	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	G	G	G	G	G	26	G	G	G	E 16		
24		E 16	S 16	E 16	S 17	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	G	G	20	E 16	
25		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	34	G	E B	35	G	G	G	G	E 16	
26		E 16	S 16	E 15	S 15	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	G	G	34	G	G	G	G	24	G	E 16		
27		E 16	S 16	E 15	S 15	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	G	G	38	39	G	G	29	26	26	22	E 16	
28		E 16	S 13	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	35	G	G	32	23	G	E 16		
29		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	32	26	G	G	E 16	
30		E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	G	G	G	G	35	31	31	G	G	G	E 16	
31		E 16	S 16	E 22	S 18	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	G	G	E 16		
CNT		31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	G	G	E 16		
UQ		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	E G	33	27	28	24	G	G	E 19	
LQ		E 16	S 16	E 15	S 15	E 15	S 16	E 15	S 16	E 15	S 16	E 15	S 16	G	G	G	G	G	G	G	G	G	E 16		

MAR. 1988

FBES (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FMIN (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		WAKKANAI											Lat. 45° 23.5' N		Long 141° 41.2' E		Sweep 1	MHz to 25	MHz in 24	sec in	automatic operation				
Hour	Day	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 16	E 16	E 16	E 16	E 16	E 16	E 16	E 21	18	19	22	27	25	25	25	20	E 18	E 16	E 15	E 16	E 16	E 16	E 16	E 16
2		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 18	17	20	24	27	28	25	24	20	E 20	E 16	E 16	E 16	E 17	E 16	E 16	E 16
3		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 17	19	20	25	27	26	26	21	20	E 18	E 16	E 16	E 16	E 16	E 16	E 16	E 16
4		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	20	24	24	23	24	22	E 44	E 20	E 19	E 16	E 16	E 16	E 16	E 16	E 16
5		E 17	E 16	E 16	E 16	E 16	E 16	E 16	E 17	19	22	21	22	25	25	25	20	E 17	E 20	E 15	E 16	E 16	E 16	E 16	E 16
6		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	20	21	26	34	27	25	24	24	E 16	E 19	E 17	E 16	E 16	E 17	E 16	E 17
7		E 17	E 16	E 16	E 16	E 16	E 17	E 17	E 17	20	24	24	25	27	25	25	21	E 19	E 18	E 16	E 16	E 16	E 16	E 16	E 16
8		E 16	E 16	E 16	E 16	E 16	E 16	E 17	E 17	19	20	25	31	27	26	25	25	E 18	E 19	E 16	E 16	E 16	E 16	E 16	E 17
9		E 16	E 16	E 16	E 16	E 17	E 17	E 16	E 16	16	20	22	25	26	24	25	20	E 16	E 19	E 16	E 16	E 16	E 16	E 16	E 16
10		E 16	E 16	E 15	E 16	E 16	E 16	E 16	E 16	17	18	20	22	24	21	22	20	E 18	E 18	E 16	E 16	E 16	E 16	E 16	E 16
11		E 16	E 16	E 15	E 16	E 16	E 16	E 17	E 16	17	19	24	20	22	21	20	18	E 16	E 16	E 16	E 16	E 16	E 16	E 15	E 16
12		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	16	19	20	34	22	25	20	19	E 16	E 16	E 16	E 16	E 16	E 16	E 16
13		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	16	17	22	22	19	20	24	21	20	E 19	E 16	E 16	E 16	E 16	E 17	E 16
14		E 15	E 16	E 15	E 16	E 15	E 16	E 16	E 16	16	13	18	25	28	25	20	18	E 18	E 16	E 16	E 16	E 16	E 16	E 15	E 16
15		E 16	E 15	E 15	E 15	E 15	E 16	E 16	E 16	19	25	22	22	25	28	21	20	E 17	E 20	E 17	E 16	E 16	E 16	E 16	E 16
16		E 16	E 16	E 15	E 16	E 16	E 16	E 19	E 16	18	23	25	22	48	25	24	32	17	E 16	E 16	E 16	E 16	E 15	E 16	E 16
17		E 16	E 15	E 17	E 15	E 16	E 16	E 18	E 16	17	21	25	26	27	24	20	17	16	E 16	E 16	E 15	E 16	E 16	E 16	E 16
18		E 16	E 15	E 16	E 16	E 16	E 16	E 20	E 16	16	16	24	21	33	21	25	17	17	E 16	E 16	E 16	E 16	E 15	E 16	E 15
19		E 16	E 11	E 16	E 16	E 16	E 16	E 18	E 16	17	18	21	25	20	21	18	17	16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
20		E 16	E 16	E 15	E 16	E 15	E 16	E 19	E 16	17	13	24	23	25	22	24	19	16	E 16	E 15	E 16	E 16	E 16	E 16	E 16
21		E 16	E 16	E 15	E 16	E 16	E 20	E 16	E 16	17	20	26	28	24	26	20	18	18	E 16	E 16	E 16	E 16	E 15	E 16	E 16
22		E 16	E 15	E 15	E 16	E 16	E 16	E 20	E 16	18	20	25	26	22	20	20	19	17	E 17	E 16	E 16	E 16	E 16	E 16	E 16
23		E 16	E 15	E 16	E 15	E 16	E 16	E 20	E 16	19	20	20	25	25	18	19	18	18	E 16	E 16	E 16	E 16	E 16	E 16	E 16
24		E 16	E 16	E 16	E 17	E 16	E 16	E 20	E 16	20	20	25	27	27	21	25	19	19	E 16	E 17	E 16	E 16	E 16	E 16	E 13
25		E 16	E 16	E 15	E 16	E 16	E 16	E 16	E 16	18	24	20	27	25	35	25	22	17	E 16	E 16	E 16	E 16	E 15	E 16	E 16
26		E 16	E 16	E 15	E 15	E 16	E 16	E 20	E 18	19	20	25	21	25	28	21	20	19	E 16	E 16	E 16	E 15	E 16	E 16	E 16
27		E 16	E 16	E 15	E 15	E 16	E 16	E 20	E 19	20	19	23	20	25	20	20	17	19	E 16	E 16	E 16	E 16	E 16	E 16	E 16
28		E 16	E 13	E 16	E 16	E 16	E 13	E 18	E 17	20	22	22	21	25	20	18	17	17	E 16	E 16	E 15	E 16	E 16	E 16	E 16
29		E 16	E 16	E 16	E 16	E 16	E 16	E 20	E 16	18	20	24	26	22	28	19	20	17	E 16	E 16	E 16	E 16	E 16	E 16	E 16
30		E 15	E 16	E 15	E 16	E 16	E 16	E 16	E 16	18	20	21	25	21	18	31	18	16	E 16	E 16	E 15	E 16	E 16	E 16	E 16
31		E 16	E 16	E 15	E 16	E 16	E 16	E 16	E 16	18	20	26	25	22	27	20	20	17	E 17	E 16	E 16	E 16	E 16	E 16	E 16
		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		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	18	20	24	25	25	25	21	20	16	E 16	E 16	E 16	E 16	E 16	E 16	E 16
UQ		E 16	E 16	E 16	E 16	E 16	E 16	E 20	E 16	19	21	25	27	26	26	24	20	E 18	E 18	E 16	E 16	E 16	E 16	E 16	E 16
LQ		E 16	E 16	E 15	E 15	E 16	E 16	E 16	E 16	17	20	21	22	22	22	20	18	16	E 16	E 16	E 16	E 16	E 16	E 16	E 16

MAR. 1988

FMIN (0.1 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAR. 1938 M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI										Lat. 45° 23.5' N		Long 141° 41.2' E		Sweep 1 MHz to 25 MHz in 24 sec in automatic operation												
	Hour	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		295	305	305	300	305	F	315	335	330	355	340	330	320	315	330	325	335	335	345	330	310	300	305	285	285	
2		285	290	290	290	290	285	320	345	345	330	335	335	325	320	315	340	345	345	260	310	H	300	300	295	305	
3		290	280	275	280	315	310	325	335	340	325	315	350	340	330	330	325	335	350	340	F	305	305	295	290		
4		290	290	290	280	305	305	340	350	350	330	310	315	325	320	315	335	330	325	310	320	280	300	300	275		
5		290	290	280	295	290	290	335	320	340	350	330	325	335	340	315	H	325	345	345	325	320	310	285	280	280	
6		295	300	300	295	300	290	330	350	395	325	330	330	320	325	335	325	335	330	305	335	285	275	265	S	280	
7		S	275	290	295	280	325	290	340	335	330	335	330	320	330	330	325	340	345	335	335	305	300	295	280	280	
8		290	285	300	310	330	300	335	H	355	335	335	320	320	315	325	325	315	325	310	320	325	320	280	290	270	
9		275	280	295	340	310	270	315	H	350	320	295	335	320	325	335	345	335	330	330	320	325	315	285	285	280	
10		S	290	295	285	285	295	295	315	H	325	335	330	345	340	330	330	335	335	340	335	330	310	295	295	285	290
11		300	285	305	300	315	295	340	340	Z	340	305	320	320	315	325	325	320	340	335	335	305	310	290	290	275	
12		275	270	295	330	330	285	320	325	325	335	335	330	330	325	325	335	335	345	320	315	295	290	285	280		
13		280	295	295	270	295	285	340	345	340	335	315	330	330	330	330	325	330	335	325	310	290	295	280	285		
14		285	280	295	295	290	295	355	355	330	H	380	335	335	310	320	320	330	335	330	325	320	320	295	285	285	
15		285	280	280	300	330	295	340	335	315	320	330	320	315	325	315	315	330	330	320	305	305	295	280	280		
16		280	285	290	300	300	305	340	305	315	330	335	330	325	310	330	320	325	340	320	315	290	280	290	290		
17		305	280	285	290	295	295	340	340	340	330	325	315	310	320	330	325	330	330	340	325	295	280	290	295		
18		295	295	295	290	300	305	345	325	315	325	315	335	315	320	325	330	335	335	330	325	305	300	285	300		
19		290	285	285	290	310	285	345	340	330	330	330	310	310	330	325	335	330	330	335	320	300	285	285	290		
20		290	285	290	305	295	300	350	340	345	330	320	315	325	320	315	330	320	335	340	320	285	285	280	280		
21		280	295	300	315	310	290	330	335	320	340	320	325	315	315	330	325	325	335	335	305	290	285	285	280		
22		280	295	295	295	300	290	345	345	350	330	325	295	315	320	330	325	325	330	330	320	300	305	290	275		
23		280	280	285	290	315	310	340	335	340	325	320	315	300	320	310	325	330	330	325	305	310	295	285	285		
24		275	270	270	280	305	300	340	345	345	325	320	315	310	310	310	320	320	330	330	305	300	285	295	290		
25		290	280	295	280	285	295	320	335	325	320	320	315	315	320	305	315	310	315	315	315	335	295	275	275		
26		265	280	275	270	275	285	S	330	R	345	320	310	310	295	295	310	315	310	320	325	335	300	290	270	275	
27		260	260	265	280	325	310	330	335	H	280	300	H	260	285	285	285	300	305	305	305	F	F	F	F	290	
28		285	F	F	F	F	F	315	325	310	345	H	325	H	270	305	325	320	310	325	325	315	305	305	280	260	265
29		290	270	290	280	275	F	F	300	315	305	315	305	310	Z	325	295	330	335	325	325	305	290	300	290	270	280
30		275	275	290	275	290	295	350	340	310	335	315	305	300	300	310	315	320	320	320	315	265	265	260	285		
31		275	285	290	295	285	305	330	320	325	320	320	315	305	310	310	310	315	320	325	310	305	300	285	270		
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT		31	30	30	31	30	30	31	31	30	31	31	31	31	31	31	31	31	31	31	31	30	30	30	31		
MED		285	285	290	290	300	295	335	335	332	330	320	320	315	320	325	325	330	330	325	315	300	290	285	280		
UQ		290	290	295	300	315	305	340	345	340	335	330	330	325	323	330	335	335	335	330	320	305	295	290	290		
LQ		278	280	285	280	290	290	323	323	320	322	318	315	310	318	315	318	325	325	320	305	295	285	280	278		

MAR. 1938 M(3000)F2 (0.01)

IONOSPHERIC DATA

MAR. 1988

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI							Lat.	45° 23' 5" N				Long.	141° 41' 2" E				Sweep	1 MHz to 25 MHz		in 24 sec in		automatic operation			
	Hour	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									L		H	L	L	L	L	L										
2									360		350	375	375	370	360	345										
3										L	L	L	L	L	L	A										
4										L	L	L	L	L	L	L										
5										H	L	L	L	L	L	C										
6										365	370	375	375	380	385	375										
7										350	355	370	370	370	355	365	355									
8									L	L	L	L	L	L	L	L										
9									390	360	L	L	L	L	L	L										
10									L	L	H	L	H	H	L	L										
11									L	L	L	L	L	L	L	L										
12										365	365	345	385	350	340											
13									L	L	L	L	L	L	L	L										
14									410	350	400	415	370	380	395	350										
15									L	L	L	L	L	L	L	L										
16									340	330	365		B	L	L	L										
17									L	L	L	L	L	L	L	L										
18									395	355	360	355	385	L	L	L										
19									385	370	L	L	L	L	L	L										
20									L	L	L	L	L	L	L	L										
21									360	390	385	345	375	370	L	L										
22									L	L	L	L	L	L	L	L										
23									370	380	L	L	L	L	L	L										
24									L	L	L	L	L	L	L	L										
25									L	L	L	L	L	L	L	L										
26									L	L	L	L	L	L	L	L										
27									360	375	375	380	345	360	335	L										
28									L	L	L	L	L	L	L	L										
29									305	345	365	395	L	L	L	L										
30									L	L	L	L	L	L	L	L										
31									L	L	L	L	L	L	L	L										
									365	375	370	340	350	340	345	355										
CNT																										
MED																										
UQ									320	358	360	365	365	370	370	360	355	362								
LQ									368	375	380	375	380	380	370	365										
									L	L	L	L	L	L	L	L										

MAR. 1988

M(3000)F1 (0.01)

IONOSPHERIC DATA

MAR. 1988

H*F2 (KM)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI				Lat.	45° 23.5' N				Long	141° 41.2' E				Sweep	1 MHz to 25 MHz		in 24 sec		in automatic operation				
Hour Day	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									230		255	260	255	260	250	235								
2									240	260	245	250	255	255	240									
3									250	255	250	250	255	255	250									
4									250	260	270	255	250	245	250									
5									250	250	265	250	250	240	235									
6									265	250	260	255	255	240	250									
7									260	255	255	255	255	255	255									
8									230	250	275	255	260	255	250	245								
9									290	245	255	245	245	250	250									
10									250	255	250	255	250	255	250	245								
11										265	255	275	255	270	255									
12									245	255	255	255	260	260	245									
13									250	250	255	250	255	255	250	250								
14									230	245	245	255	255	275	250	255								
15									255	245	245	275	280	255	255									
16									260	250	245	270	265	255	265									
17									255	250	255	250	270	255	255	250								
18									250	265	250	270	250	250	255									
19									245	255	250	265	255	255	250									
20									240	245	245	275	260	270	275	255	245							
21									245	255	250	255	255	255	255									
22									230	250	245	250	275	270	260	245								
23									250	255	285	260	255	290	255									
24									230	275	255	255	280	275	255	260								
25									235	250	250	245	265	260	255									
26									250	280	260	270	275	275	260	255								
27									305	440	400	360	370	320	275	260								
28								250	285	255	255	315	275	230	280									
29								315	280	295	260	290	270	250										
30									255	295	300	280	290	265	255	240								
31									240	250	240	255	290	270	255	255								
	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	15	29	30	29	31	30	29	31	5						
MED									282	240	250	255	255	260	255	255	255	250						
UQ									258	255	260	260	275	270	265	255	255							
LQ									230	250	250	250	255	255	250	250	245							

MAR. 1988

H*F2 (KM)

IONOSPHERIC DATA

MAR. 1988

H * F (KM)

135° E Mean Time (G.M.T. + 9 h)

Station	WAKKANAI				Lat. 45° 23' 5" N				Long. 141° 41' 2" E				Sweep 1 MHz to 25 MHz in 24 sec in automatic operation												
	Hour Day	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		295	265	255	280	255	230	230	H 205	220	H 200	H 200	225	215	H 205	230	215	235	205	205	245	250	245	295	285
2		285	275	265	255	280	280	220	210	H 205	210	210	230	205	200	230	A 230	215	205	230	250	250	260	250	
3		275	290	300	295	245	225	200	210	H 200	225	A 245	225	205	225	215	235	205	205	245	255	255	260	265	
4		275	270	265	275	255	255	220	230	225	H 195	220	H 200	205	230	210	C 240	225	205	240	255	270	275	290	
5		275	255	295	250	265	255	215	230	230	225	205	225	230	205	220	220	225	225	225	240	240	275	305	300
6		285	255	255	230	255	255	235	225	235	210	210	220	230	220	225	225	240	225	215	240	255	300	315	295
7		290	295	255	275	230	250	245	H 205	225	H 200	225	205	205	220	230	230	235	240	225	240	240	260	305	300
8		275	285	270	250	215	235	245	H 205	215	215	205	235	205	205	225	225	245	245	205	215	A 245	280	290	335
9		330	295	270	210	E S E S 250 345	250	225	230	210	H 225	H 205	H 200	225	215	205	230	230	220	215	245	275	300	310	
10		295	255	250	270	300	265	235	225	230	H 205	205	200	220	210	210	235	230	225	220	230	250	255	290	290
11		300	290	300	250	235	280	230	225	235	205	200	195	200	225	205	230	240	220	210	250	245	255	255	310
12		330	305	280	235	220	280	245	225	215	225	215	210	220	210	205	225	240	225	225	225	245	285	295	290
13		285	270	280	305	280	255	225	225	215	210	H 195	H 195	210	215	220	220	245	230	215	215	250	250	280	280
14		280	280	275	250	270	265	205	210	200	205	205	195	220	220	H 200	225	235	245	225	225	220	250	280	280
15		290	290	300	250	225	285	225	H 210	H 205	230	210	200	225	225	230	245	245	235	225	205	220	260	290	295
16		285	280	270	250	270	280	240	225	215	H 200	210	225	B 245	210	205	240	230	220	230	245	240	290	260	
17		250	255	285	270	255	275	225	225	210	H 210	220	205	205	205	230	240	240	240	205	205	250	275	295	265
18		290	275	255	270	255	245	230	225	H 225	H 205	H 195	A 245	245	A 220	210	220	235	230	210	225	240	250	275	270
19		275	270	275	275	255	280	225	230	220	215	205	225	205	210	205	230	240	230	210	220	245	265	270	275
20		255	265	275	260	250	250	225	225	220	220	205	200	205	225	225	225	230	240	205	220	260	290	295	300
21		295	255	255	240	205	290	240	235	225	230	225	215	205	205	225	230	240	230	205	225	250	270	280	280
22		285	270	255	255	250	270	225	225	215	215	205	200	205	225	210	225	245	240	225	210	245	255	255	290
23		300	300	280	255	240	240	205	230	230	200	H 195	H 195	210	230	220	240	245	235	215	230	225	245	270	275
24		295	310	305	305	245	250	225	225	235	H 210	H 220	205	195	200	210	230	250	245	225	210	245	280	270	275
25		285	295	275	275	280	255	215	240	230	210	220	205	200	H 200	230	250	245	250	235	225	210	215	300	305
26		325	310	305	295	300	290	205	225	H 225	210	205	215	205	235	235	240	245	245	240	205	225	220	310	300
27		305	330	325	275	230	245	240	240	240	A 250	A 255	210	250	220	240	250	235	250	245	230	250	275	255	250
28		290	290	305	300	270	300	250	230	H 240	225	205	200	205	225	210	215	230	240	240	230	250	270	300	320
29		280	265	280	275	305	350	270	250	240	225	H 220	220	225	220	225	245	235	245	245	270	245	255	300	275
30		325	310	320	305	275	300	250	225	H 220	230	205	205	200	245	225	230	230	240	230	230	315	315	310	275
31		295	275	270	275	275	250	230	235	225	220	210	205	205	205	225	225	235	250	230	225	245	245	285	310
CNT		31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	29	31	31	31	31	31	31	31	31
MED		290	280	275	270	255	260	230	225	225	210	210	205	205	220	225	225	240	235	220	225	245	260	290	290
UQ		295	295	298	275	272	230	240	230	230	225	220	222	220	225	228	235	242	242	225	235	250	275	300	300
LQ		280	268	265	250	240	250	222	225	215	205	205	200	205	205	210	220	235	225	208	218	242	250	272	275

MAR. 1988

H * F (KM)

IONOSPHERIC DATA

MAR. 1988

H'E (KM)

135° E Mean Time (G.M.T. + 9 h)

Station WAKKANAI				Lat. 45° 23' S				Long. 141° 41' 2" E				Sweep 1 MHz to 25 MHz in 24 sec in automatic operation												
Hour Day	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	125	120	120	120	130	125	E B	125	130	S	S					
2							S	S	150	120	120	A	E B	E B	A	A	A	S						
3							S	S	135	130	125	125	E B	125	A	H	115	115	A	S				
4							S	S	130	125	120	120	120	120	120	C	130	S	S					
5							S	S	130	125	110	A	A	A	130	125	125	125	S	S				
6							S	S	130	130	120	125	B	E B	130	125	125	125	S	S				
7							S	S	130	125	115	115	120	E B	125	125	125	125	S	S				
8							S	S	135	125	120	120	B	A	125	130	E B	125	S	S				
9							S	S	125	120	120	120	H	125	120	H	120	125	S	S				
10							S	S	125	115	115	115	H	A	120	120	120	120	S	S				
11							S	S	125	120	110	120	115	110	110	120	120	120	150	S	S			
12							S	S	125	120	120	110	B	A	125	110	110	120	125	S	S			
13							S	S	125	115	115	120	120	115	120	120	120	125	140	S	S			
14							S	S	125	120	110	120	120	125	125	115	115	120	140	S	S			
15							S	S	125	115	115	110	115	120	125	115	115	115	S	S				
16							S	S	120	115	125	120	115	B	120	115	B	115	130	S	S			
17							S	S	125	120	115	120	120	120	115	115	115	115	130	S	S			
18							S	S	125	110	115	115	B	115	120	120	115	A	130	S	S			
19							S	S	120	110	110	A	A	A	130	125	110	110	110	115	130	S	S	
20							S	S	115	110	110	110	110	110	110	115	120	120	130	S	S			
21							S	S	115	110	115	120	125	115	125	115	110	120	A	S	S			
22							S	S	120	110	110	A	A	125	125	120	115	110	115	140	S	S		
23							S	S	115	120	110	110	115	120	120	115	115	120	125	S	S			
24							S	S	120	115	115	125	125	120	110	120	120	120	125	S	S			
25							S	S	140	125	115	125	115	H	115	B	120	120	120	125	S	S		
26							S	S	120	115	115	120	110	H	115	120	120	125	120	125	S	S		
27							S	S	125	115	115	120	110	H	A	110	A	125	120	A	S	S		
28							S	S	120	110	115	A	110	110	120	A	125	115	125	S	S			
29							S	S	120	115	115	115	H	A	120	E B	115	120	120	130	S	S		
30							S	S	130	120	115	115	115	110	A	A	B	110	120	130	S	S		
31							S	S	130	115	115	115	120	120	115	120	115	115	115	130	S	S		
	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	30	31	31	26	25	26	28	28	26	28	18						
MED							S	130	125	115	115	120	120	120	120	119	120	120	130	S				
UQ							S	135	125	120	120	120	120	125	125	121	121	125	130	S				
LQ							S	130	120	115	115	115	115	115	120	115	115	118	125	S				

MAR. 1988

H'E (KM)

IONOSPHERIC DATA

MAR. 1988

H⁺ES (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		WAKKANAI							Lat.	45° 23' 5" N			Long	141° 41' 2" E			Sweep	1 MHz to 25 MHz		in 24 sec in		automatic operation			
Hour	Day	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	S	S	S	105	S	S	S	G	G	G	G	G	G	G	G	S	S	S	S	S	S	S	
2	S	S	S	S	S	S	S	S	G	G	175	170	G	G	G	105	105	105	105	S	S	100	100	100	S
3	S	S	S	S	S	S	S	S	G	G	G	185	G	G	110	G	120	115	105	S	105	105	115	S	S
4	S	S	S	S	S	S	S	S	G	G	G	G	G	G	G	G	G	G	S	S	S	S	S	S	S
5	S	105	105	S	105	105	S	G	G	G	105	105	105	G	G	G	G	S	S	S	S	S	S	S	S
6	S	S	S	E	S	S	S	G	G	G	G	G	G	G	G	G	G	S	S	S	S	S	S	S	S
7	S	S	S	E	S	S	S	G	G	G	G	G	G	G	G	G	125	S	S	S	S	S	S	S	S
8	S	S	S	S	S	S	S	G	G	120	115	115	110	G	G	G	G	S	S	S	S	110	S	S	105
9	S	S	S	S	S	S	S	G	120	120	G	G	G	G	G	G	G	S	S	S	S	S	105	S	S
10	S	S	S	S	S	S	S	G	115	110	110	G	105	105	G	G	G	S	S	S	S	S	S	S	S
11	S	105	105	105	S	S	S	G	G	G	G	G	G	G	G	G	G	S	S	S	S	S	S	S	105
12	S	S	105	S	S	S	S	G	G	G	110	G	105	G	G	G	G	S	S	S	S	S	S	S	S
13	110	110	S	S	S	S	S	155	135	G	105	105	G	G	G	G	100	G	S	S	S	S	S	S	S
14	S	S	S	E	S	S	S	G	G	175	105	G	G	G	G	G	G	S	S	S	S	S	S	S	S
15	S	S	S	S	S	S	S	G	G	G	G	G	G	G	G	G	G	S	S	S	S	S	S	S	S
16	S	S	S	S	S	S	S	G	G	G	G	G	G	G	G	G	G	S	S	S	S	S	S	S	S
17	S	S	S	S	S	S	S	G	G	G	110	G	G	G	G	G	G	120	S	S	S	S	S	S	S
18	S	S	S	S	S	S	S	G	G	G	G	180	135	130	G	G	100	100	125	120	S	S	S	S	S
19	S	S	S	S	S	S	S	125	120	G	105	105	105	G	G	G	G	S	S	S	S	S	S	S	S
20	S	S	S	E	S	S	S	120	105	G	G	G	G	G	G	G	G	S	S	S	S	125	S	S	S
21	S	S	S	S	E	S	S	G	G	G	G	G	G	G	G	G	G	110	S	S	S	S	S	S	S
22	S	S	S	S	S	S	S	G	G	G	110	110	105	105	105	G	G	G	105	100	S	S	S	S	S
23	S	105	S	S	S	S	S	G	G	G	G	G	G	105	G	G	G	G	S	S	S	S	S	S	S
24	105	S	S	S	S	S	S	G	G	G	G	G	G	G	G	G	G	125	125	120	105	105	S	110	S
25	105	105	105	S	S	S	G	G	G	115	G	G	G	G	G	G	G	G	120	S	S	S	S	S	S
26	S	S	S	S	S	S	S	G	G	110	G	G	G	G	G	105	G	G	S	S	S	S	S	S	S
27	S	S	S	S	S	S	S	G	G	115	110	G	105	105	105	105	G	105	105	105	105	S	S	S	S
28	S	S	S	S	E	S	110	G	125	110	105	G	G	G	105	105	G	G	S	S	S	S	S	S	S
29	105	105	S	S	S	S	S	G	G	125	G	105	105	G	G	G	G	G	S	S	S	S	S	S	S
30	105	S	S	120	S	S	G	G	G	G	G	G	G	105	105	G	G	G	S	S	S	S	S	S	S
31	S	S	105	105	S	S	G	G	G	G	G	G	G	G	G	G	G	G	100	120	S	S	S	S	S
	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	S	6	S	3	2	1	1	4	6	10	13	7	10	7	4	5	5	7	6	8	5	4	3	4	
MED	105	105	105	105	105	105	110	140	120	113	110	105	105	105	105	105	105	105	112	120	105	108	105	105	
UQ	105	105	105	112			168	125	125	110	112	105	108	105	105	115	115	125	122	105	112	105	108	108	
LQ	105	105	105	105			122	115	110	105	105	105	105	105	105	105	100	105	105	105	105	105	102	102	105

MAR. 1988

H⁺ES (KM)

IONOSPHERIC DATA

MAR. 1988

TYPES OF ES

135° E Mean Time (G.M.T. + 9 h)

Station		Lat. 45° 23' 5" N Long. 141° 41' 2" E											Sweep 1 MHz to 25 MHz in 24 sec in automatic operation													
Hour	Day	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 ₁																					
2										H ₁	HL ₁₁				L ₂	L ₂	L ₂	L ₁			F ₂	F ₂	F ₂			
3											HC ₁₁			L ₁		C ₁	L ₁	L ₄		F ₂	F ₁	F ₁				
4										H ₁																
5		F ₁	F ₂		F ₂	F ₁					L ₂	L ₂	L ₁													
6																										
7																		C ₁								
8											C ₂	C ₂	C ₁	L ₁							F ₃			F ₁		
9											C ₂	C ₂											F ₂			
10											C ₂	C ₂	C ₁		L ₂	L ₂										
11		F ₁	F ₂	F ₂																				F ₂		
12			F ₂									C ₁		L ₂												
13	F ₁	F ₁							H ₁	C ₁		L ₁	L ₁				L ₂									
14										H ₁		L ₁														
15																										
16																										
17												C ₁							C ₂							
18												H ₁	C ₁	C ₁			L ₂	L ₁	F ₂	F ₁						
19										C ₁	C ₁	L ₂	L ₁	L ₁						F ₁						
20										C ₁	C ₂									F ₁			F ₃			
21																			L ₁				F ₂	F ₂		
22												L ₁	L ₁	L ₁	L ₁	L ₂				L ₂	F ₂					
23			F ₂																							
24	F ₂																		C ₂	C ₁	F ₁	F ₂	F ₂	F ₁		
25	F ₂	F ₁	F ₂									C ₁								C ₃						
26												C ₂					L ₂									
27												C ₂	C ₂		L ₁	L ₂	L ₂	L ₂		L ₂	L ₂	F ₁	F ₁			
28											L ₁	C ₁	C ₁	L ₂			L ₂	L ₂								
29	F ₂	F ₂										C ₁		L ₁	L ₁											
30	F ₂													L ₂	L ₂											
31																					L ₂					
		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																										
MED																										
UQ																										
LQ																										

MAR. 1988

TYPES OF ES

IONOSPHERIC DATA

MAR. 1988

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA							Lat.	39° 43' 5" N					Long.	140° 08' 0" E					Sweep 1 MHz to 25 MHz in 24 sec in automatic operation				
Hour	Day	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		49	48	50	50	46	45	X											X	X	X	X	X	X	
2		X	X	X	X	X	X	X											X	X	X	X	X	X	
3		X	X	X	X	X	X	X											X	X	X	X	X	X	
4		58	58	54	54	58	53	X											X	X	X	X	X	X	
5		X	X	X	X	X	X	X											X	X	X	X	X	X	
6		50	51	48	48	44	40	43											X	X	X	X	X	X	
7		X	X	X	X	X	X	X											X	X	X	X	X	X	
8		X	X	X	X	X	X	X											X	X	X	X	X	X	
9		X	X	X	X	X	X	X											X	X	X	X	X	X	
10		X	X	X	X	X	X	X											X	X	X	X	X	X	
11		X	X	X	X	X	X	X											X	X	X	X	X	X	
12		X	X	X	X	X	X	X											X	X	X	X	X	X	
13		X	X	X	X	X	X	X											X	X	X	X	X	X	
14		X	X	X	X	X	X	X											X	X	X	X	X	X	
15		X	X	X	X	X	X	X											X	X	X	X	X	X	
16		X	X	X	X	X	X	X											X	X	X	X	X	X	
17		X	X	X	X	X	X	X											X	X	X	X	X	X	
18		X	X	X	X	X	X	X											X	X	X	X	X	X	
19		X	X	X	X	X	X	X											X	X	X	X	X	X	
20		X	X	X	X	X	X	X											X	X	X	X	X	X	
21		X	X	X	X	X	X	X											X	X	X	X	X	X	
22		X	X	X	X	X	X	X											X	X	X	X	X	X	
23		X	X	X	X	X	X	X											X	X	X	X	X	X	
24		X	X	X	X	X	X	X											X	X	X	X	X	X	
25		X	X	X	X	X	X	X											X	X	X	X	X	X	
26		X	X	X	X	X	X	X											X	X	X	X	X	X	
27		X	X	X	X	X	X	X											X	X	X	X	X	X	
28		74	79	68	68	64	60												X	X	X	X	X	X	
29		X	X	X	X	X	X	X											X	X	X	X	X	X	
30		X	X	X	X	X	X	X											X	X	X	X	X	X	
31		X	X	X	X	X	X	X											X	X	X	X	X	X	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		31	31	31	31	31	31	10											26	31	31	31	31	31	31
MED		X	X	X	X	X	X	X											X	X	X	X	X	X	X
UQ		X	X	X	X	X	X	X											X	X	X	X	X	X	X
LQ		X	X	X	X	X	X	X											X	X	X	X	X	X	X

MAR. 1988

FXI (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FOF2 (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	AKITA				Lat.	Long							Sweep 1 MHz to 25 MHz in 24 sec in automatic operation												
	00	01	02	03	39 43.5 N	140 03.0 E	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
1	F 41	F 40	F 42	F 42		F 36	F 37	40	59	73	H 71	78	87	91	89	91	73	76	70	48	40	44	45	41	41
2		42	44	44	42	42	42	48	59	71	80	77	99	94	84	82	82	76	74	50	46	46	48	49	50
3		43	44	47	48	49	44	51	62	76	71	90	111	105	92	93	95	91	73	56	46	49	52	51	F 50
4	F	F		48	48	F 49	F 47	52	68	75	71	84	107	118	104	93	90	78	73	63	56	52	48	52	50
5	52	F 52	F	F 52	F	F 45	50	81	91	95	97	99	97	99	87	74	77	64	61	50	47	41	42	42	
6	44	45	42	42	38	34	42	69	62	74	95	99	99	92	89	90	76	70	55	46	46	45	45	46	
7	47	45	44	43	45	40	46	72	81	101	110	102	104	104	84	78	75	69	59	55	52	45	44	43	
8	46	45	45	43	36	32	43	64	73	77	89	92	95	101	96	91	98	84	89	66	49	36	39	30	
9	39	39	41	45	30	26	40	65	90	89	91	107	113	108	89	73	69	72	65	50	45	40	40	41	
10	43	44	40	38	36	38	47	64	78	90	103	106	104	91	87	84	79	76	56	49	49	46	43	42	
11	42	43	42	42	33	30	44	58	69	81	90	91	95	93	81	85	36	31	60	47	50	47	48	44	
12	44	45	48	48	39	30	43	68	76	87	91	91	90	80	79	79	77	76	69	49	49	44	45	46	
13	46	44	43	41	42	40	54	68	78	86	87	95	98	82	76	79	80	82	70	50	50	47	46	42	
14	47	46	46	45	43	43	57	68	70	84	89	84	90	86	90	87	31	75	76	56	49	43	42	43	
15	43	42	40	44	35	32	49	63	80	100	95	91	95	98	93	33	37	92	73	55	50	46	47	47	
16	46	46	47	44	36	38	54	69	H 82	105	97	80	85	89	97	94	39	84	74	55	52	54	49	50	
17	48	44	44	45	43	40	53	83	H 79	86	94	92	89	93	101	36	89	97	79	54	52	45	47	47	
18	46	46	45	45	43	43	56	71	83	88	94	101	98	97	94	86	82	77	31	60	48	45	45	46	
19	46	45	45	45	43	41	57	75	84	86	92	92	104	102	96	90	31	76	78	53	47	45	46	46	
20	47	46	47	45	46	42	59	84	84	81	89	98	95	94	99	92	38	82	79	48	46	47	47	45	
21	45	48	51	50	32	31	49	77	89	102	103	103	94	83	84	86	89	86	71	50	50	51	50	48	
22	48	48	48	45	41	39	59	75	75	81	79	90	100	106	94	88	33	73	72	62	52	51	51	48	
23	49	48	49	50	49	42	52	68	82	87	90	90	96	95	92	90	38	90	78	58	58	52	50	51	
24	50	46	47	46	48	43	67	72	73	79	83	86	85	89	91	92	88	94	37	58	52	53	56	56	
25	53	52	51	51	50	50	66	75	88	90	90	93	94	89	90	82	89	92	98	35	58	64	62	63	
26	42	42	43	42	40	42	75	75	V 81	90	99	108	104	102	103	99	97	102	104	89	49	49	48	49	
27	47	45	45	48	36	29	62	74	82	73	73	84	81	76	91	89	32	86	93	F 84	F	F	F	F	
28	F	F	F	F	F	F	68	67	63	73	76	76	82	87	90	82	31	79	78	70	49	51	50	48	
29	52	50	45	44	42	36	52	64	90	89	79	89	94	89	94	95	92	84	F 87	F 77	S 71	F 56	F 55	F	
30	F	57	54	56	51	43	65	69	80	88	96	98	106	103	104	96	34	37	31	68	51	52	52	54	
31	52	52	51	42	42	42	62	80	89	86	103	99	94	98	93	95	98	102	104	90	65	59	59	58	
CNT	28	29	29	30	29	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	29	
MED	46	45	45	45	42	40	52	69	80	86	90	95	95	95	93	91	36	32	81	74	55	50	47	47	
UQ	48	48	48	48	45	43	59	75	84	90	96	100	102	100	96	90	38	86	31	64	52	51	50	50	
LQ	43	44	43	42	36	34	48	64	74	80	86	90	92	89	87	82	78	76	62	50	48	45	44	43	

The Radio Research Laboratory, Japan

MAR. 1988

FOF2 (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FOF1 (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA							Lat. 39° 43.5' N		Long. 140° 08.0' E		Sweep 1 MHz to 25 MHz in 24 sec in automatic operation											
Hour Day	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									L	L	450	460	L	420	460	L	L	L						
2									L	L	L	L	L	L	460	L	L	L						
3											L	L	L	L	L	L	L							
4									L	L	L	L	L	460	440	L	L	L						
5									L	L	L	L	L	L	L	L	L							
6									L	L	L	L	L	L	L	L	L							
7									L	L	L	L	L	L	L	L	L							
8									L	L	L	L	440	A	L	L	L							
9									L	L	L	L	L	L	L	L	L							
10											L	L	L	L	L	L	L							
11									L	L	L	L	L	L	L	L	L							
12									L	L	L	L	L	L	L	L	L							
13									L	L	L	L	L	L	L	L	L							
14								L	L	L	L	L	L	L	L	L	L							
15									L	L	L	L	L	L	L	L	L							
16									L	L	L	L	L	L	L	L	L							
17									L	L	L	L	L	L	L	L	L							
18									L	L	L	L	L	L	L	L	L							
19									L	L	L	L	L	L	L	L	L							
20								L	L	L	L	L	L	L	L	L	L							
21									L	L	L	L	L	L	L	L	L							
22									L	L	L	L	L	L	L	L	L							
23									L	L	L	L	L	L	L	L	L							
24									L	L	L	L	L	L	L	L	L							
25									L	L	L	L	L	L	L	L	L							
26								L	L	A	L	A	L	L	L	L	L							
27									L	L	L	L	L	L	L	L	L							
28									L	L	L	L	L	L	L	L	L							
29									L	L	L	L	L	L	L	L	L							
30									L	L	L	L	L	L	L	L	L							
31									L	L	L	L	L	L	L	L	L							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										10	5	7	11	11	7	2	1							
MED										L	415	450	450	460	460	440	390	390						
UQ										L	440	450	460	485	465	460								
LQ										L	400	450	425	440	450	435								

MAR. 1988

FOF1 (0.01 MHz)

IONOSPHERIC DATA

MAR. 1988

FOE (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA				Lat.	39° 43' 5" N		Long.	140° 08' 0" E		Sweep	1	MHz to 25		MHz in 24		sec in		automatic operation						
Hour	Day	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									205	A	A	315	330	325	330	325	285	250								
2									205	260	280	300	310	325	325	305	220	240	195							
3									205	270	295	305	320	330	325	305		A	245	185						
4									200	270	305	320	335	345	325	305	235	245								
5									200	270		A	310	330	335	325	310	295		A	S					
6									205	255	300	310	330	335	330	305	295	250								
7									205	265		A	A	330		A	330	325	300	245	190					
8									210	285		A	A	330	345	340	320	295	250	200						
9									205	275	300		A	A	345	330	315	295	250	190						
10									A	285		A	A	A	340	340	320	310	250	190						
11									180	210	255	H	A	325	330	335	325	300	270	210						
12									S	225		A	A	A	350	350	350	340	300		A	A				
13									S	210	265	305	315	330	345	335	330	305	265	205						
14									S	235	280	305	325	340	350	330	320	305		A	A					
15									S	230		A	A	A	345	355	345	325	310		A	A				
16									S	215	280	305		A	340	I ^B	345	340	I ^B	330	265	205				
17									S	250		A	315	330	350	350	345	330	305	260			A			
18									S	220	270	305	320	300	300	345	325	305	280	220						
19									S	250	290		A	335	340		A	345	330	305	275	210				
20									180	245		A	315		A	330	340	330	320	305	285	215				
21									200	250	300	310		A	330	330	330	325	310	280			A			
22									195	235	285	305	320		A	345		A	330	310	265	220				
23									185	A	295	315	320	330	340	330	325	305	H	280	210					
24									210	265	310	325	330	330	R	R	340	340	335	310	280		A			
25									200	265		A	315	325	330	335	340	335	315	285	215					
26									195	255		A	305		A	A		A	310	280	220					S
27									S	235	280	310		A	A	A	A	325	300	275	210					S
28									195	240	285		A	330	340	350	345	325	300		A	210				S
29									190	250	300	310		A	345	350		A	335	305	275	215				S
30									195		A	A	A	A		320	325		A	315	300	275	215			S
31									200	245	290	315	315		A	330	330	325	300	280	220					S
		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	28	23	21	17	25	28	26	30	30	26	21						
MED									195	228	280	305	320	330	340	332	325	305	268	210						
UQ									200	248	288	315	325	340	348	345	330	310	280	215						
LQ									188	205	270	305	315	330	330	330	320	300	250	200						

MAR. 1988

FOE (0.01 MHz)

IONOSPHERIC DATA

MAR. 1988

FOES (0.1 MHZ)

135 E Mean Time (G.M.T. + 9 h)

Station	AKITA																							
	Lat. 39 43' S N Long 140 08' 0 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation																							
Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Day	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 S	E S	J A	E S	E S	E S	E S	G	31	J A	G	G	G	G	G	G	E S	E S	E S	J A	E S	E S	E S	
2	E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
3	E S	E S	E S	E S	E S	E S	E S	G	G	G	34	34	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
4	E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	J A	J A	J A	E S	E S	E S	E S	
5	E S	E S	E S	E S	E S	E S	E S	G	G	J A	G	G	G	G	G	G	J A	J A	J A	J A	J A	J A	J A	
6	J A	J A	E S	E S	E S	E S	E S	G	29	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
7	E S	E S	E S	E S	E S	E S	E S	G	J A	J A	J A	J A	J A	G	G	G	G	E S	E S	E S	E S	E S	E S	
8	E S	E S	E S	E S	E S	E S	E S	G	G	33	J A	G	G	G	G	G	G	E S	E S	E S	E S	J A	J A	
9	E S	E S	E S	E S	E S	E S	E S	G	G	38	84	36	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
10	E S	E S	E S	E S	E S	E S	E S	G	G	35	J A	J A	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
11	E S	E S	E S	E S	J A	E S	G	G	G	G	J A	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
12	E S	J A	E S	E S	E S	E S	E S	G	J A	J A	J A	G	G	J A	G	G	G	E S	E S	E S	E S	E S	E S	
13	E S	E S	E S	J A	E S	E S	E S	G	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
14	E S	E S	E S	E S	E S	E S	J A	G	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
15	E S	E S	E S	E S	E S	E S	E S	G	G	30	J A	G	G	G	G	G	J A	J A	J A	J A	E S	E S	E S	
16	E S	E S	E S	E S	E S	E S	E S	G	31	G	J A	G	E B	G	G	E B	G	E S	J A	E S	E S	E S	E S	
17	E S	E S	E S	E S	E S	E S	E S	G	30	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	J A	
18	E S	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	36	41	38	G	G	E S	J A	J A	E S	E S	
19	E S	E S	E S	E S	E S	E S	E S	G	G	J A	G	G	J A	J A	36	30	G	G	E S	E S	E S	E S	E S	
20	E S	E S	E S	E S	E S	J A	G	G	J A	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
21	E S	E S	E S	E S	E S	E S	G	G	G	37	J A	G	G	37	35	33	31	23	E S	E S	E S	E S	E S	
22	E S	E S	E S	E S	E S	E S	G	G	30	32	G	J A	G	J A	G	G	J A	G	E S	E S	E S	E S	E S	
23	E S	E S	E S	E S	E S	E S	G	J A	G	G	G	G	G	G	G	G	J A	J A	J A	E S	E S	E S	E S	
24	E S	E S	J A	E S	E S	E S	G	G	G	G	G	G	G	G	G	G	G	J A	E S	J A	E S	E S	E S	
25	E S	E S	E S	E S	E S	E S	G	28	35	G	G	G	G	G	G	G	30	J A	E S	E S	E S	E S	E S	
26	E S	E S	E S	E S	E S	E S	G	G	J A	J A	J A	J A	G	J A	J A	G	G	J A	J A	J A	J A	J A	E S	
27	E S	E S	E S	E S	E S	E S	G	G	35	J A	J A	J A	G	J A	G	G	G	E S	E S	E S	E S	E S	E S	
28	E S	E S	E S	E S	E S	E S	G	G	31	35	G	G	G	G	G	G	J A	29	24	E S	E S	E S	E S	
29	E S	E S	E S	E S	E S	E S	G	G	G	35	35	G	G	J A	G	G	G	E S	E S	E S	E S	E S	E S	
30	E S	J A	E S	E S	E S	E S	G	J A	32	36	33	G	G	41	G	G	G	E S	E S	E S	E S	E S	E S	
31	E S	E S	E S	E S	E S	E S	G	J A	49	G	G	41	42	G	G	G	G	E S	J A	E S	E S	E S	E S	
	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	
MED	E S	E S	E S	E S	E S	E S	E S	G	G	G	33	G	G	G	G	G	G	E S	E S	E S	E S	E S	E S	
UQ	E S	E S	E S	E S	E S	E S	E S	G	31	35	J A	E G	G	36	G	E G	25	30	25	18	17	E S	E S	
LQ	E S	E S	E S	E S	E S	E S	G	G	G	G	G	G	G	G	G	G	G	G	E S	E S	E S	E S	E S	

MAR. 1988

FOES (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAR. 1988

FBES (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

Station		AKITA							Lat.	39 43.5 N			Long.	140 08.0 E			Sweep 1 MHz to 25 MHz in 24 sec in automatic operation										
Hour	Day	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 16	S 15	E 15	S 15	E 15	S 15	E 16	G	27	34	G	G	G	G	G	G	18	E 16	S 15	E 15	S 15	E 15	S 15	E 15		
2		E 16	S 16	E 16	S 15	E 16	S 16	E 16	G	G	G	G	G	G	G	G	G	G	16	E 15	S 15	E 15	S 15	E 15	S 15		
3		E 16	S 16	E 16	S 16	E 16	S 16	E 16	G	G	G	33	34	G	G	G	28	G	E 15	S 15	E 15	S 15	E 15	S 15	E 15		
4		E 15	S 16	E 15	S 16	E 16	S 16	E 15	G	G	G	G	G	G	G	G	G	19	22	E 15	S 15	E 15	S 15	E 15	S 15		
5		E 15	S 15	E 15	S 15	E 15	S 15	E 15	G	G	31	G	G	G	G	G	23	26	19	19	26	E 15	S 15	E 15	S 15		
6		E 16	S 15	E 15	S 15	E 15	S 15	E 20	G	28	G	G	G	G	G	G	G	E 18	S 15	E 15	S 15	E 15	S 15	E 15	S 15		
7		E 16	S 16	E 16	S 15	E 16	S 16	E 16	G	30	34	34	29	52	G	24	G	G	E 16	S 15	E 15	S 15	E 15	S 15	E 15		
8		E 16	S 15	E 16	S 16	E 16	S 15	E 15	G	G	33	36	G	G	G	G	G	G	E 16	S 15	E 15	S 15	E 15	S 15	21		
9		E 15	S 15	E 15	S 15	E 15	S 15	E 15	G	G	35	34	35	G	G	G	33	G	E 15	S 15	E 15	S 15	E 15	S 15	E 15		
10		E 15	S 16	E 16	S 15	E 15	S 16	E 16	G	22	34	36	36	G	G	G	G	G	E 15	S 15	E 15	S 15	E 15	S 15	E 15		
11		E 16	S 15	E 16	S 16	E 16	S 16	E 16	G	G	G	34	G	G	G	G	G	G	E 16	S 15	E 16	S 16	E 16	S 16	E 16		
12		E 16	S 16	E 16	S 16	E 16	S 16	E 16	G	28	33	33	G	G	G	G	25	31	26	23	15	15	15	15	15		
13		E 15	S 15	E 15	S 15	E 15	S 15	E 16	G	G	G	G	G	G	G	G	G	29	G	E 15	S 15	E 15	S 15	E 15	S 15		
14		E 15	S 15	E 15	S 15	E 15	S 15	E 15	G	G	G	G	G	G	G	G	G	32	23	16	16	15	15	15	15		
15		E 15	S 15	E 15	S 15	E 15	S 15	E 15	G	30	37	36	G	37	G	G	40	39	35	25	19	E 15	S 15	E 15	S 15		
16		E 15	S 15	E 15	S 15	E 15	S 15	E 16	G	30	G	34	E 38	G	G	E 37	G	24	E 15	S 20	E 15	S 15	E 15	S 15	E 15		
17		E 15	S 15	E 15	S 15	E 15	S 15	E 15	G	30	G	G	G	G	G	G	G	G	22	15	15	15	15	15	15		
18		E 15	S 15	E 15	S 15	E 15	S 16	E 16	G	G	G	G	G	33	40	36	G	G	E 15	S 15	E 20	S 15	E 15	S 15	E 15		
19		E 15	S 15	E 15	S 15	E 15	S 16	E 16	G	G	34	G	G	40	29	23	24	G	G	E 15	S 15	E 15	S 15	E 15	S 15		
20		E 16	S 15	E 16	S 15	E 16	S 16	E 16	G	G	30	G	35	G	G	G	G	G	E 15	S 16	E 15	S 16	E 16	S 16	E 16		
21		E 16	S 16	E 15	S 16	E 16	S 16	E 16	G	G	35	27	G	G	37	35	32	29	22	E 16	S 16	E 16	S 16	E 16	S 16		
22		E 16	S 16	E 15	S 16	E 16	S 16	E 16	G	28	30	G	G	36	40	G	G	G	E 16	S 15	E 16	S 16	E 16	S 16	E 16		
23		E 16	S 16	E 15	S 16	E 16	S 16	E 16	G	25	G	G	G	G	G	G	G	25	25	19	16	16	16	16	16		
24		E 16	S 16	E 16	S 16	E 16	S 16	E 16	G	G	G	G	G	G	G	G	G	G	25	17	16	16	16	16	16		
25		E 16	S 16	E 16	S 16	E 16	S 16	E 16	G	28	34	G	G	G	G	G	G	30	25	E 16	S 15	E 16	S 16	E 16	S 16		
26		E 16	S 16	E 16	S 16	E 16	S 16	E 16	G	G	30	45	41	46	G	42	35	G	20	23	20	E 16	S 16	E 16	S 16		
27		E 15	S 15	E 15	S 15	E 15	S 15	E 16	G	G	33	42	45	36	36	G	G	G	E 24	S 15	E 15	S 15	E 15	S 15	E 15		
28		E 16	S 16	E 16	S 15	E 16	S 16	E 16	G	G	30	34	G	G	G	G	G	28	24	E 15	S 15	E 15	S 15	E 15	S 15		
29		E 16	S 16	E 15	S 16	E 16	S 16	E 16	G	G	34	35	G	G	36	G	G	G	25	E 16	S 15	E 15	S 15	E 15	S 16		
30		E 16	S 15	E 16	S 16	E 16	S 16	E 16	G	27	31	33	33	G	G	37	G	G	23	16	16	16	16	16	16		
31		E 16	S 16	E 16	S 16	E 15	S 16	E 16	G	G	G	G	40	36	G	G	G	G	E 16	S 15	E 15	S 16	E 16	S 16	E 19		
		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		E 16	S 15	E 15	S 15	E 16	S 16	E 15	G	G	G	27	G	G	G	G	G	G	19	E 16	S 15	E 15	S 15	E 15	S 15		
UQ		E 16	S 16	E 16	S 16	E 16	S 16	E 16	G	30	34	34	E 29	G	G	E 23	26	24	E 16	S 16	E 16	S 16	E 16	S 16	E 16		
LQ		E 15	S 15	E 15	S 15	E 15	S 15	E 15	G	G	G	G	G	G	G	G	G	G	G	E 15	S 15	E 15	S 15	E 15	S 15		

MAR. 1988

FBES (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FMIN (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA							Lat.	39 43.5 N			Long	140 08.0 E			Sweep 1 MHz to 25 MHz in 24 sec in automatic operation										
Hour	Day	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 S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
2		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
3		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
4		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
5		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
6		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
7		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
8		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
9		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
10		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
11		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
12		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
13		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
14		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
15		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
16		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
17		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
18		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
19		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
20		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
21		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
22		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
23		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
24		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
25		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
26		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
27		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
28		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
29		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
30		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
31		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
00		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
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		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
UQ		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		
LQ		E S	E S	E S	E S	E S	E S	E S	E S									E S	E S	E S	E S	E S	E S	E S	E S		

MAR. 1988

FMIN (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA		Lat. 39 43.5 N		Long. 140 08.0 E		Sweep 1		MHz to 25		MHz in 24		sec in		automatic operation								
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
1	F	F	F	F	F	F	F	H																
2																								
3																								
4	F	F			F																			
5		F	F	F	F	F																		
6																								
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14																								
15																								
16								H																
17								H																
18																								
19																								
20																								
21																								
22																								
23																								
24																								
25																								
26								V																
27																								
28	F	F	F	F	F	F																		
29																								
30	F																							
31																								
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	28	29	29	30	29	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	29
MED	285	285	295	300	300	292	335	345	335	325	320	315	315	315	325	325	330	335	335	310	300	285	280	280
UQ	290	295	300	310	310	300	340	350	345	335	330	325	330	328	335	330	335	345	345	325	310	295	285	290
LQ	278	280	285	290	290	285	320	335	322	320	310	310	310	305	315	315	325	328	330	300	290	280	270	280

MAR. 1988

M(3000)F2 (0.01)

IONOSPHERIC DATA

MAR. 1988

M(3000)F1 (0.01)

135 E Mean Time (G.M.T. + 9 h)

Station	AKITA				Lat.	39 43.5 N			Long	140 08.0 E			Sweep	1	MHz to 25		MHz in 24		sec in		automatic operation			
Hour Day	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									L	L	390	385	405	380	L	L	L							
2									L	L	L	L	L	L	L	L	L							
3										L	L	L	L	L	L	L	L							
4									L	L	L	L	L	L	L	L	L							
5									L	L	L	L	L	L	L	L	L							
6									L	L	L	L	L	L	L	L	L							
7									L	L	L	L	A	L	L	L	L							
8									L	L	L	L	L	L	L	L	L							
9									L	L	L	L	L	L	L	L	L							
10									L	L	L	L	L	L	L	L	L							
11									L	L	L	L	L	L	L	L	L							
12									L	L	L	L	L	L	L	L	L							
13									L	L	L	L	L	L	L	L	L							
14									L	L	L	L	L	L	L	L	L							
15									L	L	L	L	L	L	L	L	L							
16									L	L	L	L	L	L	L	L	L							
17									L	L	L	L	L	L	L	L	L							
18									L	L	L	L	L	L	L	L	L							
19									L	L	L	L	L	L	L	L	L							
20									L	L	L	L	L	L	L	L	L							
21									L	L	L	L	L	L	L	L	L							
22									L	L	L	L	L	L	L	L	L							
23									L	L	L	L	L	L	L	L	L							
24									L	L	L	L	L	L	L	L	L							
25									L	L	L	L	L	L	L	L	L							
26									L	L	A	L	A	L	L	L	L							
27									L	L	L	L	L	L	L	L	L							
28									L	L	L	L	L	L	L	L	L							
29									L	L	L	L	L	L	L	L	L							
30									L	L	L	L	L	L	L	L	L							
31									L	L	L	L	L	L	L	L	L							
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										10	5	7	11	11	7	2	1							
MED										L	390	385	375	380	390	388	370							
UQ										L	420	395	400	400	390	400								
LQ													385	390	378	370	372	375						

MAR. 1988

M(3000)F1 (0.01)

IONOSPHERIC DATA

MAR. 1988

H'F2 (KM)

135° E Mean Time (G.M.T. + 9 h)

Station AKITA				Lat. 39° 43.5' N				Long. 140° 08.0' E				Sweep 1 MHz to 25 MHz in 24 sec in automatic operation													
Hour Day	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									240	265	260	280	260	250	255	240	245								
2									235	245	225 ^H	270	255	255	260	245	235								
3									230 ^H	245 ^H	250	250	270	280	245	230									
4									235	240	260	275	255	250	255	245									
5									250	260	245	265	250	255	250	245									
6									230	240	280	260	260	255	260	250	240								
7									250	270	260	255	285	255	250	240									
8									235	235	260	270	265	280	250	250	250								
9									260	245	260	260	270	260	240	240									
10									250	280	245	255	255	250	255										
11									245	270	250	280	270	260	270	270	240								
12									240	260	270	260	260	260	255	250	245								
13									240	250	250	270	260	255	255	250									
14								225	240	255	240	260	270	270	275	260	240								
15									255	265	245	290	270	280	270	250	260								
16									255	260	240	255	280	290	265	255	250								
17									225	250	250	275	255	285	260	250	245								
18									240	260	260	265	275	260	265	255	245								
19									230	250	250	265	260	260	255	255									
20								240	225	240	280	270	285	280	270	260	245								
21									245	260	265	260	250	275	270	270	250								
22									230	240	255	290	290	270	260	260	250								
23									260	240	270	275	285	280	270	275	260								
24									235	250	270	270	280	290	280	270	260								
25									235	265	255	275	265	260	265	280	275								
26								240	225	260	250	270	275	280	280	255	265	255							
27									340	370 ^L	285	320	315	310	270	275									
28								290	285	285	275	300	300	290	270	250	255								
29								280	255	255	260 ^L	285	290	255	270	270	270								
30								240	245	250	275	270	280	280	270	250	255								
31								245	245	255	270	255	290	280	270	275									
	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	28	31	31	31	31	31	31	31	24	1							
MED								240	240	250	260	270	270	270	265	255	250	255							
UQ								280	250	260	270	275	280	280	270	265	260								
LQ								240	235	245	250	260	258	255	255	250	245								

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MAR. 1988

H'F2 (KM)

IONOSPHERIC DATA

MAR. 1988

H*F (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA							Lat.	39° 43' 5" N			Long.	140° 08' 0" E			Sweep	1 MHz to 25 MHz		in 2 sec in		automatic operation								
Hour	Day	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		250	285	255	250	225	250	235	230	H	200	205	200	195	200	220	225	220	210	215	200	250	260	245	270	285				
2		295	280	255	250	260	280	230	215	220	220	200	200	210	215	200	215	230	225	200	225	250	255	260	240					
3		280	295	305	265	245	235	220	215	H	220	200	200	205	220	200	H	240	220	225	200	220	250	255	245	270				
4		290	285	275	265	245	250	230	215	230	210	215	210	205	200	H	200	240	220	240	210	240	230	280	270	280				
5		275	255	275	250	270	240	250	240	215	215	230	220	H	200	200	230	235	220	225	A	250	240	270	E S	290				
6		280	255	245	225	235	250	S	230	220	210	200	220	205	H	205	215	235	225	225	210	220	255	E S	E S	295				
7		285	270	270	270	255	255	235	230	240	220	205	200	A	205	215	225	230	220	220	240	220	250	285	295					
8		300	280	270	230	195	280	230	215	H	210	205	200	210	215	220	220	210	235	245	210	210	195	310	315	A				
9		E S	E S			E S	E S																		E S	300				
10		320	305	275	235	205	310	250	230	220	225	210	200	200	230	230	220	220	240	205	220	240	260	300	300					
11		285	255	240	255	280	280	225	225	240	210	210	195	200	215	210	220	235	230	210	230	240	255	265	290					
12		295	280	275	245	205	280	225	225	225	200	195	H	H	H	225	210	H	230	225	215	220	250	265	280	305				
13		E S																A				240	220	230	245	275	285	275		
14		320	300	260	230	205	270	240	220	210	200	200	215	215	210	200	220													
15		270	265	280	280	285	270	235	225	225	205	200	230	230	220	220	240	235	210	205	255	260	275	280						
16		280	270	250	260	250	255	220	210	200	195	205	230	230	210	210	235	A				235	225	205	230	245	280	275		
17		285	290	285	250	200	300	240	225	220	220	235	200	210	205	225	A	A				240	220	220	245	270	285	280		
18		275	270	265	230	230	285	240	230	220	200	200	200	220	200	225	B		B			230	240	220	220	245	260	270	255	
19		245	255	270	270	245	245	230	235	205	240	220	200	230	225	220	240	235	240	205	220	235	255	280	275					
20		285	270	250	255	250	245	230	225	200	200	210	200	220	210	230	220	235	225	200	250	245	275	280						
21		270	270	270	260	245	250	230	230	215	205	205	210		A	230	215	225	240	235	220	200	245	270	275	270				
22		260	280	275	265	245	240	230	235	220	195	200	H	H	200	H	210	230	220	230	235	215	200	275	285	295	290			
23		295	275	250	220	245	305	235	235	230	215	220	220	210	210	230	235	235	200	215	270	265	280	275						
24		275	280	270	240	240	270	225	230	215	200	200	200	195	A	225	215	230	230	225	220	250	260	270	280					
25		295	285	285	250	230	225	210	225	210	200	200	235	230	220	230	230	245	240	215	205	250	240	280	280					
26		275	310	300	295	250	235	225	225	225	200	210	195	H	H	215	225	250	230	230	250	225	205	275	285	285	270			
27		270	280	280	280	260	255	220	230	A	220	195	195	H	H	195	200	225	225	240	250	230	220	200	250	315	310			
28		320	310	290	275	280	295	230	220	H	A	A	A	H	A	200						220	230	240	240	205	210	290	295	290
29		290	325	320	255	210	240	240	235	240	220		A	A	220	220	225	240	235	250	240	220	230	270	285	255				
30		295	290	310	270	285	305	245	225	225	210	200	200	200	200	215	230	235	240	230	220	240	285	320	320					
31		290	255	255	255	295	320	260	240	235	225	210	220	205	240	230	220	240	250	245	245	210	250	295	275					
32		295	310	310	275	250	280	240	220	225	205	195	230	200	225	235	230	240	240	230	215	H	200	320	325	305				
33		265	270	230	260	270	250	230	235	220	200		A	210	200	215	215	225	220	245	230	215	220	260	300	305				
34		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
CNT		31	31	31	31	31	31	31	31	30	30	28	29	29	29	31	29	28	31	31	31	31	31	31	31	30				
MED		282	280	270	255	245	255	230	225	220	205	200	205	205	215	220	225	230	240	220	220	245	260	282	280					
UQ		294	289	282	268	260	280	240	230	225	220	210	220	215	220	225	230	235	240	225	222	250	275	296	292					
LQ		275	270	255	248	230	248	228	222	215	200	200	200	200	205	210	220	228	230	210	203	230	255	275	275					

MAR. 1988

H*F (KM)

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IONOSPHERIC DATA

MAR. 1988

H⁺E (KM)

135° E Mean Time (G.M.T. + 9 h)

Station	AKITA				Lat.	39° 43' 5" N				Long.	140° 08' 0" E				Sweep	1	MHz to	25	MHz in	24	sec in	automatic operation		
Hour Day	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	110	110	105	105	105	105	105	105	120		S						
2							E S	110	110	105	105	105	105	105	110	110		S						
3							S	110	110	105	110	110	110	110	115	120		S						
4							S	110	110	105	110	105	105	105	105	110		S						
5							S	105	A	110	110	105	105	110	A	A	S							
6							S	110	110	110	110	110	110	110	110	120		S						
7							S	110	110	A	A	A	105	A	105	120		S						
8							S	115	110	110	110	110	105	110	110	110		S						
9								120	110	110	110	A	105	110	110	105	110		S					
10							E S	120	110	105	105	A	105	105	105	120	110		S					
11							S	120	110	110	H	105	105	105	100	110	115	115		S				
12							S	120	A	110	110	110	105	110	105	110	A	S						
13							S	120	110	105	105	105	105	105	110	110	110	110		S				
14							S	115	110	105	110	110	105	105	105	110		S						
15							S	110	110	110	105	105	110	105	110	110	110		S					
16							S	115	110	110	105	105	I ^B	110	105	105	I ^E	110	110		S			
17							S	120	110	110	110	110	105	105	105	110	110		S					
18							S	110	110	105	105	105	105	105	105	110	110	120		S				
19							S	115	110	105	105	105	A	A	A	110	110	120		S				
20							S	110	110	105	105	105	105	105	105	105	110	F ^S	125		S			
21							S	110	110	105	105	105	105	105	105	110	110		S					
22							S	115	110	105	105	105	105	A	105	105	A	E S	125		S			
23							S	110	105	105	105	105	105	105	105	H	A	120		S				
24							S	115	105	105	105	105	105	105	105	105	110		S					
25							S	115	105	105	105	105	105	105	105	110	110		S					
26							S	110	110	105	105	A	105	A	A	105	110	S	S					
27							S	115	110	110	110	105	105	A	105	105	110	S	S					
28							S	110	110	110	110	110	105	105	105	110	110	S	S					
29							S	115	110	105	110	105	105	A	105	105	110	S	S					
30							S	110	110	105	105	105	105	A	100	100	110	115	S					
31							S	110	110	110	105	105	105	105	105	105	105	115	S					
	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	30	30	30	27	29	25	23	30	27	3						
MED								112	110	110	105	105	105	105	105	110	110	113						
UQ								118	110	110	110	110	105	105	110	110	110	121						
LQ								110	110	105	105	105	105	105	105	105	110	115						

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MAR. 1988

H⁺E (KM)

IONOSPHERIC DATA

MAR. 1988

H°ES (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA												Lat. 39° 43.5' N		Long. 140° 08.0' E		Sweep 1 MHz to 25 MHz in 24 sec in automatic operation											
Hour	Day	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	105	S	S	S	S	G	115	110	G	G	G	G	G	G	S	S	S		S	S	S					
2		S	S	S	S	S	S	S	G	G	G	G	G	G	G	G	G	G	S	S	S	95	S	S	S				
3		S	S	S	S	S	S	S	G	G	G	130	130	G	G	G	120	G	G	S	S	S	S	S	S				
4		S	S	S	S	S	S	S	G	G	G	G	G	G	G	G	G	100	100	100	S	S	S	S	S				
5		S	S	S	S	S	S	S	G	G	100	G	G	G	G	G	100	100	105	100	100	100	100	100	S				
6		95	100	S	S	S	S	S	G	130	G	G	G	G	G	G	G	S	S	S	S	S	S	S	100				
7		S	S	S	S	S	S	S	G	140	125	100	100	100	G	100	G	G	G	100	S	S	S	S	S				
8		S	S	S	S	S	S	S	G	G	120	115	G	G	G	G	G	G	S	S	S	S	S	S	S				
9		S	S	S	S	S	S	S	G	G	115	110	105	G	G	G	150	G	G	S	S	S	S	S	100				
10		S	S	S	S	S	S	S	G	125	G	115	110	105	G	G	G	G	G	S	S	S	S	S	100				
11		S	S	S	S	105	S	G	G	G	G	115	G	G	G	G	G	G	S	S	S	S	S	S	S				
12		S	105	S	S	S	S	S	G	105	120	120	G	G	105	G	100	95	95	100	100	S	S	S	S				
13		S	S	S	105	S	S	S	G	G	G	G	G	G	G	G	G	140	G	S	S	S	S	S	S				
14		S	S	S	S	S	S	100	G	G	G	G	G	G	G	G	G	130	120	S	S	S	S	S	S				
15		S	S	S	S	S	S	S	G	115	120	110	G	135	G	G	125	120	110	110	S	S	S	S	S				
16		S	S	S	S	S	S	S	G	145	G	110	G	G	G	G	G	145	S	110	S	S	S	S	S				
17		S	S	S	S	S	S	S	G	115	G	G	G	G	G	G	G	G	120	S	S	S	S	S	130				
18		S	S	S	S	S	S	S	G	G	G	G	G	120	120	125	G	G	G	S	110	110	S	S	S				
19		S	S	S	S	S	S	S	G	G	120	G	G	105	100	100	100	G	G	S	S	S	S	S	S				
20		S	S	S	S	S	S	125	G	G	110	G	115	G	G	G	G	G	G	S	S	S	S	S	S				
21		S	S	S	S	S	S	G	G	G	120	115	G	G	125	135	130	130	120	S	S	S	S	S	S				
22		S	S	S	S	S	S	G	150	140	G	G	105	G	105	G	G	100	G	S	S	S	S	S	S				
23		S	S	S	S	S	S	G	110	G	G	G	G	G	G	G	G	100	125	110	S	S	S	S	S				
24		S	S	115	S	S	S	G	G	G	G	G	G	G	G	G	G	G	125	S	100	S	S	S	S				
25		S	S	S	S	S	S	G	130	110	G	G	G	G	G	G	G	150	130	S	S	S	S	S	S				
26		S	S	S	S	S	S	G	G	115	110	105	105	G	105	105	G	100	100	115	100	95	105	S	S				
27		S	S	S	S	S	S	S	G	G	120	110	105	105	100	G	G	G	130	S	S	S	S	S	S				
28		S	S	S	S	S	S	G	G	125	120	G	G	G	G	G	G	120	130	S	S	S	S	S	S				
29		S	S	S	S	S	S	G	G	G	110	120	G	G	100	G	G	G	140	S	S	S	S	S	S				
30		S	100	S	S	S	S	G	115	115	110	110	G	G	100	G	G	G	130	115	S	S	S	S	S				
31		S	S	S	S	S	S	G	105	G	G	110	110	G	G	G	G	G	G	S	100	S	S	S	S				
		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	3	2	1	1	1	1	6	13	15	16	8	5	9	5	7	12	16	8	7	4	2	1	3				
MED		95	100	110	105	105	125	100	120	115	120	110	105	105	105	105	120	110	122	105	100	98	102	100	100				
UQ			102						130	130	120	115	108	120	105	125	128	130	130	112	105	105			115				
LQ			100						110	115	110	110	105	105	100	100	100	100	103	100	100	95			100				

MAR. 1988

H°ES (KM)

IONOSPHERIC DATA

MAR. 1988

TYPES OF ES

135° E Mean Time (G.M.T. + 9 h)

Station		AKITA		Lat. 39° 43.5' N		Long. 140° 08.0' E		Sweep 1 MHz to 25 MHz in 24 sec in automatic operation																		
Hour	Day	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 ₁							C ₁	C ₂														F ₂	
2																										
3												C ₁	C ₁				C ₁									
4																		L ₁	L ₁	F ₁						
5											L ₂						L ₁	L ₂	L ₁	F ₂	F ₃	F ₁	F ₁		F ₁	
6		F ₂	F ₁							C ₁																
7										H ₁	C ₁	L ₂	L ₂	L ₂		L ₁				F ₁						
8										C ₁	C ₁													F ₁	F ₂	
9										C ₂	C ₁	L ₂					H ₁									
10									C ₁	C ₁	C ₂	L ₂														
11				F ₁							C ₁															
12		F ₁								L ₁	C ₂	C ₁			L ₁		L ₂	L ₂	L ₃	F ₁	F ₁					
13				F ₁															H ₁							
14						L ₁													C ₂	C ₂	C ₂					
15										C ₂	C ₁	C ₁		H ₁			C ₂	C ₃	C ₂	C ₂	F ₃					
16										H ₁		C ₁							H ₁			F ₁				
17										C ₁									C ₂							F ₁
18														C ₁	C ₂	C ₁						F ₁	F ₂			
19											C ₁			L ₂	L ₂	L ₂	L ₁									
20					F ₁						C ₁		C ₁													
21											C ₁	C ₁			C ₁	C ₁	C ₁	C ₃	C ₁							
22										H ₁	H ₁		C ₂		L ₂			L ₂								
23											C ₁								L ₂	C ₃	F ₃					
24			F ₁																	C ₂			F ₃			
25										C ₂	C ₂							H ₁	C ₂							
26											C ₁	C ₂	C ₃	L ₂		L ₃	L ₂		L ₂	L ₂	C ₂	F ₁	F ₁	F ₁		
27												C ₁	C ₂	C ₂	C ₂	L ₂				C ₁						
28											C ₂	C ₁							C ₁	C ₁						
29												C ₁	C ₁		L ₂					H ₁						
30		L ₁									C ₂	C ₂	C ₂	C ₂		L ₂				C ₁	C ₁					
31											L ₁			C ₂											L ₂	
		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																										
MED																										
UQ																										
LQ																										

MAR. 1988

TYPES OF ES

IONOSPHERIC DATA

MAR. 1988

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	Rokubunji TOKYO							Lat.	Long					Sweep 1 MHz to 25 MHz in 24 sec in automatic operation													
	00	01	02	03	04	05	06	07	35	42	4	N	139	29	3	E	12	13	14	15	16	17	18	19	20	21	22
1	X	X	X	X	X	X	X															X	X	X	X	X	X
2	X	X	X	X	X	X	X															X	X	X	X	X	X
3	X	S	X	X	X	X	X															X	X	X	X	X	X
4	X	X	X	X	X	X	X															C	C	C	C	C	C
5	C	C	C	C	C	C	C															X	X	X	X	X	X
6	X	X	X	X	X	X	X															X	X	X	X	X	X
7	X	S	X	X	S	X	S															X	X	X	X	X	S
8	X	S	X	X	X	X	U															X	X	X	X	X	X
9	X	X	S	X	X	X	X															X	X	X	X	X	X
10	X	X	X	X	X	X	X															X	X	X	X	X	X
11	X	X	X	X	X	X	X															X	X	X	X	X	X
12	X	X	X	X	X	X	X															X	X	X	X	X	X
13	X	X	X	X	X	X	X															X	X	X	X	X	X
14	X	X	X	X	X	X	X															X	X	X	X	X	X
15	X	X	X	X	X	X	X															X	X	X	X	X	X
16	X	X	X	X	X	X	X															X	X	X	X	X	X
17	X	X	X	X	X	X	X															C	C	C	C	C	C
18	C	C	C	C	C	C	C																				
19	X	X	X	X	X	X	X															X	X	X	X	X	X
20	X	X	X	X	X	X	X															X	X	X	X	X	X
21	X	X	X	X	X	X	X															X	X	X	X	X	X
22	X	X	X	X	X	X	X															X	X	X	X	X	X
23	X	X	X	X	X	X	X															X	X	X	X	X	X
24	X	X	X	X	X	X	X															X	X	X	X	X	X
25	X	X	X	X	X	X	X															X	X	X	X	X	S
26	X	X	X	X	U	X	X															X	X	X	X	X	X
27	X	X	X	X	X	X	X															X	X	X	X	X	X
28	0	U	X	X	X	X	X															X	X	X	X	X	X
29	X	X	X	X	X	X	X															X	X	X	X	X	X
30	X	X	X	X	X	X	X															X	X	X	X	X	X
31	X	X	X	X	X	X	X															X	X	X	X	X	X
CNT	29	26	28	29	28	29	7															17	28	29	28	29	27
MED	X	X	X	X	X	X	X															X	X	X	X	X	X
UQ	X	X	X	X	X	X	X															X	X	X	X	X	X
LQ	X	X	X	X	X	X	X															X	X	X	X	X	X

MAR. 1988

FXI (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FOF2 (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station **OKUBUNJI TOKYO** Lat. **35 42.4 N** Long. **139 29.3 E** Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
1	38	34	40	41	31	32	S	58	69	U S	S	87	S	99	105	I S	J S	I S	75	62	49	37	41	41	40	40			
2	40	39	40	40	38	38	44	61	65	I S	74	76	94	103	98	21	25	I S	J S	80	66	57	44	43	46	48	44		
3	40	S	40	44	41	40	51	67	77	74	85	109	J S	97	97	114	S	J S	39	72	60	44	43	47	45	44			
4	43	44	S	47	44	42	48	64	68	I S	U S	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
5	C	C	C	C	C	C	C	C	C	C	83	105	95	107	102	U S	J S	90	32	73	70	59	52	47	41	42	43		
6	46	S	44	J S	33	30	39	65	71	77	88	101	104	96	89	79	S	J S	30	69	58	44	43	45	47	S	44		
7	47	I S	46	43	40	I S	36	45	S	92	103	107	103	108	108	88	75	U S	74	67	60	53	53	43	43	I S	42		
8	45	I S	43	42	43	42	26	U S	42	S	69	J S	73	75	I S	90	103	110	101	I C	92	U S	29	68	50	30	35	35	
9	S	33	35	I S	37	42	31	25	38	68	J S	79	88	95	109	111	110	106	J S	30	I S	72	74	71	52	45	39	40	41
10	40	42	40	37	35	37	50	J S	64	S	85	S	79	116	115	106	I C	100	93	94	81	61	50	51	48	44	S	42	
11	S	43	S	44	44	S	43	31	25	42	62	S	69	78	89	88	100	103	89	85	95	92	67	46	47	45	48	45	
12	42	44	49	46	30	27	41	64	79	85	86	95	102	88	73	76	78	79	73	48	S	46	45	43	43	44			
13	45	S	42	41	42	39	41	53	64	82	87	92	94	96	91	81	80	83	82	71	49	49	49	47	47				
14	47	45	45	44	43	42	54	69	77	80	S	86	88	95	95	91	96	91	91	76	55	45	42	42	42				
15	42	42	41	S	43	S	28	46	71	83	82	96	101	93	94	101	90	91	94	U S	75	50	48	47	48	47			
16	48	47	50	47	37	36	I C	52	75	81	96	102	90	85	94	108	96	89	82	72	58	52	55	50	53				
17	48	44	43	42	42	39	54	80	81	84	100	I C	92	100	C	C	C	C	C	C	C	C	C	C	C	C	C		
18	C	C	C	C	C	C	C	C	C	C	86	97	103	108	112	97	90	84	83	82	71	43	40	41	42				
19	43	43	43	43	36	36	53	76	84	84	89	104	111	116	110	99	J R	90	84	79	55	41	42	44	42				
20	44	42	J S	43	46	42	38	55	85	79	76	88	101	96	103	107	106	97	86	75	52	46	46	46	47				
21	46	48	53	54	27	28	48	77	93	95	104	110	104	92	92	92	92	91	73	53	48	52	49	49					
22	46	46	47	46	37	37	57	74	76	76	80	92	106	112	107	93	C	C	C	74	60	53	J S	53	51	50			
23	49	48	47	53	48	36	52	68	82	85	94	95	97	102	103	92	90	94	38	56	50	52	50	51					
24	51	46	S	47	45	46	46	61	69	79	77	83	85	91	91	94	93	96	96	89	54	50	54	56	57				
25	57	53	52	52	50	51	67	75	95	S	95	84	96	97	98	98	92	S	96	105	109	85	49	47	45	S			
26	46	45	48	49	U S	43	43	71	79	73	90	99	107	114	I S	112	109	109	105	111	110	36	H	46	49	49	50		
27	48	45	46	52	38	26	59	71	83	73	83	110	95	89	95	105	S	91	92	97	80	64	I S	67	64	63			
28	62	U S	67	60	57	57	U S	53	60	I S	64	78	76	89	97	90	95	99	91	88	90	89	71	46	49	50	48		
29	51	54	45	40	39	39	56	79	90	85	36	101	97	99	35	31	31	90	99	82	69	60	59	60					
30	53	57	58	59	54	48	62	82	83	88	99	112	113	111	109	102	101	101	101	88	58	54	53	53	55				
31	56	54	54	38	40	39	60	81	89	89	97	109	103	102	103	102	105	R	113	117	98	57	56	57	57				
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
CNT	29	28	29	29	29	29	29	28	28	30	30	30	30	29	29	29	28	28	29	29	29	29	29	29	28				
MED	46	45	45	44	39	37	52	69	79	84	89	99	102	102	97	92	90	84	75	54	43	47	47	46					
UQ	48	48	48	47	43	41	57	76	83	88	97	107	108	108	103	96	94	93	89	68	51	52	50	50					
LQ	43	42	42	42	36	30	45	64	74	77	85	92	96	95	90	84	80	76	67	50	45	43	43	42					

The Radio Research Laboratory, Japan

MAR. 1988

FOF2 (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FOF1 (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		ROKUBUNJI TOKYO							Lat. 35° 42' 4" N		Long 139° 29' 3" E		Sweep 1 MHz to 25 MHz in 24 sec in automatic operation												
Hour	Day	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										L	L	470	L	L	L	L	L								
2										L	L	L	L	L	L	L	L								
3										L	L	L	L	470	L	L	L	L	L						
4										L	C	C	C	C	C	C	C	C	C						
5										C	C	L	470	L	L	L	L	L							
6												L	L	L	L	L	L	L	L						
7										L	L	L	L	470	L	L	L	L	L						
8										L	L	L	L	L	480	L	C	L	L						
9										L	L	L	L	A	L	L	L	L	L						
10										L	L	L	L	L	A	C	L	L	L						
11											L	L	L	480	510	L	L	440	L						
12										L	L	L	L	490	L	L	L	L	L						
13										L	L	L	L	470	L	L	L	L	L						
14										L	L	L	L	L	L	L	L	L	L						
15										L	L	L	L	L	L	L	A	L	L						
16										C	L	L	L	L	L	L	S	L	L						
17										L	L	L	L	C	L	C	C	C	C						
18										C	C	C	L	U	L	L	L	L	L						
19										L	L	L	L	500	L	L	L	L	C						
20										L	U	L	L	510	L	470	510	505	460	L	L	L			
21										L	L	U	L	510	510	L	L	U	L	U	L	L			
22										L	L	L	U	520	530	480	A	L	C	C					
23										L	L	L	L	490	L	L	480	L	L	L					
24										L	L	L	L	L	L	L	L	L	L						
25										L	L	L	L	L	L	L	L	L	L						
26										L	L	L	L	L	L	L	L	L	L						
27												A	L	L	L	L	L	L	L						
28										L	L	L	L	L	L	U	L	L	L	L					
29										L	L	L	L	L	L	490	L	L	L	L					
30										L	L	L	L	L	L	L	L	L	L						
31										L	L	L	L	L	L	L	L	L	L						
		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	7	9	4	3	2								
MED											U	L	L	L	500	L	L	L	L						
UQ											510	470	480	500	435	430	450								
LQ											U	L	L	L	L	L	L								
											500	500	510	495	430	L									
											470	470	470	430	470	L									

MAR. 1988

FOF1 (0.01 MHz)

IONOSPHERIC DATA

MAR. 1988

FOE (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		Tokubunji Tokyo			Lat.	35 42.4 N			Long	139 29.3 E			Sweep 1 MHz to 25 MHz in 24 sec in automatic operation												
Hour	Day	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									175	245	285	A	A	340	330	325	320	255	A						
2									185	255	300	315	320	330	320	315	295	260	A						
3									175	245	285	305	325	335	330	310	A	260	185						
4									185	270	C	C	C	C	C	C	C	C	C						
5									C	C	300	325	335	340	330	325	300	260	130						
6									200	270	300	320	335	340	330	320	300	260	195						
7									200	270	300	315	330	340	335	320	A	A	A						
8									220	280	305	A	335	340	335	S	C	270	185						
9									R	260	305	A	A	A	A	S	300	255	195						
10									B	220	A	300	A	A	A	C	315	A	190						
11									B	200	265	305	340	340	350	350	325	310	275	210					
12									B	240	285	A	325	350	360	355	340	320	275	215	H				
13									B	H	225	275	310	R	330	335	345	350	340	320	275	215			
14									B	240	290	320	330	R	345	R	325	300	270	A					
15									B	225	285	315	S	A	345	340	330	315	A	A					
16									C	205	280	R	335	R	S	R	335	S	280	210					
17									B	235	285	R	335	I	C	A	C	C	C	C					
18									C	C	C	R	345	295	305	355	350	A	280	210					
19									R	150	255	305	A	350	355	A	350	335	320	B	A				
20										170	240	A	340	A	A	355	350	345	320	285	225	B			
21										195	265	310	330	345	345	365	360	345	330	285	210	B			
22										160	255	305	320	A	A	A	375	350	320	C	C	B			
23									B	255	A	A	A	360	365	365	345	310	280	225	B				
24										170	260	315	335	340	A	A	350	345	320	280	A	B			
25										160	250	A	A	340	350	355	355	345	335	I	R	285	220	B	
26										180	250	A	A	A	A	R	A	325	A	A	A	B			
27									B	235	280	315	330	A	A	A	A	A	275	225	B				
28									B	240	290	A	A	A	A	350	340	315	280	230	U	S	135		
29										170	265	310	320	A	A	355	345	330	A	275	225	B			
30									B	250	290	A	A	A	A	350	340	315	230	235	B				
31										175	250	310	335	345	A	A	A	340	320	280	230	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								9	28	24	20	18	15	18	22	26	21	23	20	1					
MED								170	238	282	303	332	335	345	350	335	315	275	212	U	S	135			
UQ								175	250	298	320	340	348	355	355	345	320	280	225						
LQ								160	202	270	300	325	332	340	335	325	300	265	195						

The Radio Research Laboratory, Japan

MAR. 1988

FOE (0.01 MHz)

IONOSPHERIC DATA

MAR. 1988

FOES (0.1 MHz)

135 E Mean Time (G.M.T. + 9 h)

Station		ROKUBUNJI TOKYO		Lat. 35 42.4 N				Long. 139 29.3 E				Sweep 1 MHz to 25 MHz in 24 sec in automatic operation													
Hour	Day	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	J A	17	17	J A	J A	J A	E B	E B	G	30	36	43	J A	G	G	G	J A	J A	J A	J A	21	28	E B		
2	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	28	19	E B	E B	E B	E B	E B	E B	
3	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	25	19	E B	E B	E B	E B	E B	E B	
4	E B	E B	E B	E B	E B	E B	E B	E B	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
5	C	C	C	C	C	C	C	C	C	C	J A	G	G	G	G	G	G	G	J A	J A	J A	J A	J A	J A	
6	18	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	
7	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	
8	21	E B	E B	E B	E B	E B	E B	E B	G	G	34	34	36	G	G	E S	C	G	G	E B	E B	E B	E B	E B	
9	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	J A	J A	J A	G	G	G	G	E B	E B	E B	E B	E B	E B	
10	E B	E B	E B	E B	E B	E B	E B	E B	G	J A	27	36	33	37	J A	J A	C	G	35	G	E B	E B	E B	E B	
11	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	35	38	37	38	G	G	G	G	E B	E B	E B	E B	E B	
12	E B	E B	E B	E B	E B	E B	E B	E B	G	G	36	35	G	J A	G	G	G	G	J A	J A	J A	J A	J A	J A	
13	E B	E B	J A	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	G	J A	J A	J A	J A	J A	J A	J A	
14	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	
15	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	E S	J A	G	G	G	J A	J A	J A	J A	J A	J A	J A	J A	
16	E B	E B	E B	E B	E B	E B	E B	E B	G	G	38	G	E S	G	G	E S	G	E B	E B	E B	E B	E B	E B	E B	
17	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	C	37	C	C	C	C	C	C	C	C	C	C	C	
18	C	C	C	C	C	C	C	C	C	C	28	30	33	36	39	38	J A	G	25	E B	E B	E B	J A	J A	
19	J A	20	20	J A	E B	E B	E B	G	G	G	J A	G	G	G	G	G	C	J A	E B	E B	E B	J A	J A	J A	
20	E B	E B	E B	E B	E B	E B	E B	G	G	J A	31	G	J A	35	38	G	39	36	36	30	30	J A	E B	E B	
21	E B	E B	E B	E B	E B	E B	E B	G	G	33	40	40	36	40	39	37	37	35	32	19	17	19	21	E B	
22	E B	E B	E B	E B	E B	E B	E B	G	G	34	35	34	37	38	33	51	44	C	C	J A	E B	E B	E B	E B	
23	E B	E B	E B	E B	E B	E B	E B	E B	G	J A	31	34	35	G	41	40	36	35	35	33	24	J A	E B	E B	
24	E B	E B	E B	E B	E B	E B	E B	G	29	34	G	38	43	J A	G	G	35	34	36	20	J A	E B	E B	E B	
25	J A	20	20	E B	E B	E B	E B	G	26	34	33	31	G	G	36	36	G	G	30	24	E B	E B	E B	E B	
26	E B	E B	E B	E B	E B	E B	E B	G	30	33	35	34	J A	G	J A	G	35	J A	J A	J A	E B	20	E B	E B	
27	E B	E B	E B	E B	E B	E B	E B	G	32	36	51	48	43	43	42	J A	44	35	28	J A	22	17	E B	E B	
28	E B	E B	E B	E B	E B	E B	E B	G	G	36	35	J A	45	34	G	G	G	G	24	G	E B	E B	E B	E B	
29	E B	E B	E B	E B	E B	E B	E B	G	G	G	38	45	36	33	30	32	36	G	26	17	E B	E B	E B	E B	
30	E B	E B	E B	E B	E B	E B	E B	G	G	38	J A	J A	43	35	28	G	G	34	33	29	21	20	E B	E B	
31	E B	E B	E B	E B	E B	E B	E B	G	27	G	36	40	J A	J A	49	51	40	29	G	25	17	J A	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		29	29	29	29	29	29	28	29	29	30	30	29	30	29	28	28	27	28	29	29	29	29	29	29
MED	E B	E B	E B	E B	E B	E B	E B	E B	G	G	33	34	36	34	33	29	27	27	25	21	17	E B	E B	E B	E B
UQ	E B	E B	E B	E B	E B	E B	E B	E B	G	G	31	36	40	J A	41	40	39	36	36	34	30	J A	J A	E B	E B
LQ	E B	E B	E B	E B	E B	E B	E B	E B	G	G	G	G	G	G	G	G	G	G	E B	E B	E B	E B	E B	E B	E B

MAR. 1988

FOES (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FBES (0.1 MHz)

135° E Mean Time (G.M.T. + 0 h)

Station **R**OKUBUNJI TOKYO Lat. 35 42.4 N Long 139 29.3 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour Day	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 14	E 14	E 18	E 14	E 15	E 14	E 13	G	28	33	34	39	G	G 24	G	G 22	G 22	23	21	19	16	18	E 14	E 15	
2	E 16	E 15	E 12	E 12	E 12	E 12	E 14	G	G	G	G	G	G	G	G	G	27	18	14	14	14	15	14	15	
3	E 15	E 17	E 14	E 14	15	E 14	E 15	G	G	G	G	35	G	36	34	29	24	G	E 14	E 14	E 16	14	E 16	14	
4	E 13	E 14	E 14	E 12	E 14	E 15	E 15	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
5	C	C	C	C	C	C	C	C	C	C	G 27	G	G	G 27	G 24	G 29	G	G	E 16	E 16	20	23	E 15	E 15	
6	E 15	E 14	E 13	E 12	E 14	E 14	E 15	G	G	G	G	G	G	G	G	G	G	G	E 14	E 15	E 13	E 12	E 15	E 14	
7	E 14	E 14	E 15	E 16	E 12	E 15	E 15	27	29	31	36	38	27	25	23	32	29	20	22	14	15	15	15	14	
8	E 15	E 14	E 14	E 16	E 14	E 13	E 14	18	G	33	34	35	G	G	E 46	C	G	G	E 14	E 15	E 14	E 14	E 15	E 14	
9	E 15	E 14	E 15	E 13	E 13	E 14	E 15	G	G	G	34	41	51	34	G	G	G	G	E 14	E 14	E 15	E 14	E 14	E 15	
10	E 14	E 14	E 14	E 14	E 14	E 14	E 14	G	27	36	32	37	37	48	C	G	26	G	E 14	E 14	E 15	E 12	E 14	E 14	
11	E 13	E 12	E 14	E 12	E 13	E 12	E 15	G	G	G	G	37	36	36	27	18	G	G	E 15	E 14	E 14	E 15	E 14	E 14	
12	E 14	E 14	E 13	E 15	E 14	E 12	E 15	G	G	33	35	G	32	G	39	26	G	19	23	18	16	E 14	E 13	E 15	E 14
13	E 13	E 13	E 13	E 13	E 12	E 14	E 14	G	G	G	G	G	G	25	33	36	G	34	30	29	19	E 15	E 14	E 14	E 14
14	E 15	E 14	E 13	E 12	E 13	E 15	E 15	G	G	G	G	G	G	G	G	G	28	22	E 15	E 14	E 15	E 15	E 15	E 14	
15	E 14	E 16	E 14	E 13	E 14	E 14	E 15	G	G	G	E 40	36	27	36	42	50	29	33	16	21	E 14	E 14	E 14	E 14	
16	E 14	E 14	E 15	E 14	E 14	E 14	C	G	G	G	38	G	E 40	G	G	E 43	G	24	E 15	15	E 14	E 14	E 15	E 14	
17	E 14	E 14	E 14	E 14	E 14	E 14	E 17	26	G	G	G	32	C	36	C	C	C	C	C	C	C	C	C	C	
18	C	C	C	C	C	C	C	C	C	28	30	32	35	38	G	33	G	23	E 15	E 15	E 14	18	E 15	E 13	
19	E 14	E 13	E 15	E 13	E 13	E 13	G	G	G	33	G	G	36	G	G	G	C	22	E 14	16	E 15	16	E 15	E 14	
20	E 15	E 14	E 14	E 13	E 13	E 14	G	G	29	G	34	35	G	36	G	33	30	25	23	15	E 14	E 14	E 15	E 15	
21	E 15	E 14	E 14	E 13	E 13	E 15	G	G	33	37	38	36	38	37	36	34	33	28	18	E 14	E 14	E 14	E 13	E 14	
22	E 14	E 12	E 13	E 13	E 13	E 14	G	G	32	34	34	36	38	32	49	38	C	C	E 14	E 14	E 15	E 14	E 15	E 15	
23	E 15	E 14	E 13	E 14	E 13	E 13	E 16	22	31	33	35	G	40	39	35	33	31	29	24	E 14	E 14	E 15	E 14	E 13	
24	E 16	E 16	E 16	E 13	E 13	E 14	G	27	33	G	35	38	43	26	G	34	31	27	16	15	E 14	E 13	E 14	E 14	
25	E 15	E 13	E 13	E 12	E 12	E 14	G	26	31	33	30	G	G	36	36	G	G	29	23	E 14	E 15	E 14	E 15	E 18	
26	E 15	E 14	E 14	E 13	E 15	E 14	G	26	30	33	34	36	G	39	28	35	37	23	24	E 14	E 15	E 15	E 15	E 15	
27	E 14	E 13	E 15	E 13	E 14	E 15	E 15	G	31	35	47	45	39	36	34	40	29	23	20	17	E 15	E 15	E 15	E 13	
28	E 14	E 14	E 15	E 13	E 13	E 16	E 16	G	G	35	35	42	U 34	G	G	G	G	24	G	E 14	E 14	E 14	E 13	E 14	
29	E 14	E 14	E 17	E 14	E 13	E 15	G	G	G	34	41	36	33	29	32	36	G	24	17	E 14	E 15	E 14	E 15	E 15	
30	E 15	E 16	E 13	E 14	E 14	E 14	E 16	G	G	33	35	40	35	26	G	G	32	32	28	20	E 13	E 14	E 13	E 14	E 14
31	E 14	E 13	E 13	E 12	E 16	E 15	G	26	G	35	38	47	43	38	29	G	G	25	17	E 15	17	E 13	E 13	E 14	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT	29	29	29	29	29	29	28	29	29	30	30	29	30	29	28	28	27	28	29	29	29	29	29	29	
MED	E 14	E 14	E 14	E 13	E 13	E 14	E 14	G	G	32	34	36	33	32	27	26	G	24	23	16	E 14	E 14	E 14	E 15	E 14
UQ	E 15	E 14	E 15	E 14	E 14	E 15	E 15	18	29	33	35	38	38	36	35	34	30	28	21	15	15	15	15	15	
LQ	E 14	E 14	E 13	E 13	E 13	E 14	G	G	G	G	G	G	G	G	G	G	G	E 18	E 14	E 14	E 14	E 14	E 14	E 14	

MAR. 1988

FBES (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FMIN (0.1 MHz)

135 E Mean Time (G.M.T. + 9 h)

Station		Tokyo							Rokubunji							Lat. 35° 42' 4" N, Long. 139° 29' 3" E									
Hour	Day	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	14	16	14	15	14	13	13	16	17	18	17	18	18	17	17	16	15	14	12	14	14	14	15
2		16	15	12	12	12	12	14	15	16	17	18	17	17	18	17	16	17	12	14	14	14	15	14	15
3		15	17	14	14	14	14	15	15	17	17	19	18	19	18	18	18	17	14	14	14	16	14	16	14
4		13	14	14	12	14	15	15	15	13	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
5		C	C	C	C	C	C	C	C	C															
6		15	14	13	12	14	14	15	15	16	17	18	18	20	17	17	18	17	14	14	15	13	12	15	14
7		14	14	15	16	12	15	15	13	17	17	19	19	18	18	17	16	16	13	13	14	15	15	15	14
8		15	14	14	16	14	13	14	14	17	17	18	19	18	20	E S 46	C	16	14	14	15	14	14	15	14
9		15	14	15	13	13	14	15	15	15	15	17	17	19	19	18	17	16	14	14	14	15	14	14	15
10		14	14	14	14	14	14	14	14	14	16	17	17	21	17	C	20	15	15	14	14	15	12	14	14
11		13	12	14	12	13	12	15	16	16	15	19	29	19	21	16	13	13	14	15	14	14	15	14	14
12		14	14	13	15	14	12	15	14	14	22	20	25	25	19	20	16	14	14	13	16	14	13	15	14
13		13	13	13	13	12	14	14	14	15	16	17	17	17	17	21	21	15	14	14	14	15	14	14	14
14		15	14	13	12	13	15	15	14	17	20	18	20	26	E S 29	20	17	18	13	15	14	15	15	15	14
15		14	16	14	13	14	14	15	14	16	20	E S 40	24	20	19	23	17	14	14	13	13	15	14	14	14
16		14	14	15	14	14	14	C	13	14	17	25	23	E S 40	22	19	E S 43	17	13	15	12	14	14	15	14
17		14	14	14	14	14	14	17	16	16	21	19	C	17	C	C	C	C	C	C	C	C	C	C	C
18		C	C	C	C	C	C	C	C	C															
19		15	13	15	13	13	13	13	14	17	19	20	23	21	22	18	18	E C 38	13	13	12	15	14	15	14
20		15	14	14	13	13	14	12	14	15	22	18	21	20	21	17	17	15	13	13	15	14	14	15	15
21		15	14	14	13	13	15	13	14	14	19	23	21	26	21	18	17	14	12	13	15	14	14	13	14
22		14	12	13	13	13	14	12	15	15	21	18	19	22	23	18	15	C	C	15	14	14	16	14	15
23		15	14	13	14	13	13	16	15	16	18	19	22	22	23	21	16	13	14	17	14	14	15	14	E S 18
24		16	16	16	13	13	14	14	14	19	20	19	24	19	22	20	17	14	12	13	13	14	13	14	14
25		15	13	13	12	12	14	12	14	17	17	22	19	20	20	20	20	17	14	14	14	15	14	15	18
26		15	14	14	13	15	14	15	15	14	19	13	21	25	26	17	17	13	15	15	14	15	15	15	15
27		14	13	15	13	14	15	15	17	20	17	19	18	21	21	20	16	16	14	13	15	15	15	15	13
28		14	14	15	13	13	16	16	14	17	18	17	19	24	21	17	18	16	15	12	14	14	14	13	14
29		14	14	17	14	13	15	E S 16	14	17	17	19	25	25	20	22	21	18	16	15	14	15	14	15	15
30		15	16	13	14	14	14	16	14	16	17	18	20	20	17	17	16	14	14	15	13	14	13	14	14
31		14	13	13	12	16	15	15	13	16	18	19	24	20	19	18	16	14	13	13	15	14	13	13	14
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		29	29	29	29	29	29	28	29	29	30	30	29	30	29	28	28	28	28	29	29	29	29	29	29
MED		14	14	14	13	13	14	15	14	16	17	19	20	20	18	17	16	14	14	14	14	14	14	15	14
UQ		15	14	15	14	14	15	15	15	17	20	19	23	22	21	20	18	17	14	15	15	15	15	15	15
LQ		14	14	13	13	13	14	14	14	15	17	18	18	19	18	17	16	14	13	13	14	14	14	14	14

MAR. 1988

FMIN (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station		ROKUBUNJI TOKYO		Lat.	35 42.4 N		Long.	139 20.3 E		Sweep	1 MHz to 25 MHz		in 24 sec in		automatic operation													
Hour	Day	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		300	290	315	330	320	290	315	325	325	310	310	300	295	305	305	310	320	330	330	325	295	295	300	290			
2		280	300	310	305	320	285	315	325	320	320	315	300	310	315	320	315	320	345	335	325	305	300	290	315			
3		285	S	280	310	330	305	320	335	325	325	285	290	J S	300	295	305	J S	330	325	325	285	295	S	310	300		
4		285	285	S	315	310	295	320	I S	325	305	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
5		C	C	C	C	C	C	C	C	C	315	305	335	305	315	U S	J S	325	335	320	320	295	300	275	280			
6		295	S	315	J S	325	350	295	320	325	S	315	295	295	300	295	310	320	J S	330	330	305	285	285	S	280		
7		290	I S	295	295	I S	295	315	S	315	300	295	300	290	295	320	325	U S	320	325	320	300	315	300	280	I S	285	
8		285	S	300	320	355	295	U S	S	335	J S	315	310	I S	290	305	295	C	315	U S	315	320	320	320	H	280	275	
9		280	S	I S	300	305	350	300	305	320	J S	305	315	295	290	300	310	J S	I S	S	330	I S	315	300	280	290		
10		290	305	320	315	280	285	325	J S	S	345	S	300	325	295	290	300	C	300	310	325	330	315	295	300	300	S	285
11		275	S	S	305	320	350	320	330	330	S	320	325	315	305	300	315	320	305	325	335	335	335	305	305	295	290	
12		280	285	325	350	340	325	320	340	325	310	325	310	315	325	310	315	325	320	335	335	310	295	295	295			
13		305	315	300	305	290	300	325	345	320	320	315	310	310	315	315	315	325	330	335	320	305	315	300	295			
14		295	305	315	310	315	315	335	350	330	325	290	285	295	300	295	300	315	325	320	330	300	305	285	295			
15		295	285	290	315	S	355	275	300	320	305	310	300	S	305	290	295	305	305	310	320	335	320	285	285	295	285	
16		290	285	295	325	320	290	C	325	315	295	305	315	290	285	300	315	315	320	325	335	285	285	300	300			
17		320	305	300	300	305	310	320	315	325	305	295	I S	295	295	C	C	C	C	C	C	C	C	C	C	C		
18		C	C	C	C	C	C	C	C	C	305	295	305	300	310	320	315	325	320	335	340	350	310	285	300			
19		305	310	305	325	325	325	335	335	335	325	295	295	305	305	315	320	J R	310	335	340	350	330	295	305	310		
20		300	300	J S	310	320	335	325	340	345	350	310	305	305	300	300	315	315	325	335	340	340	305	295	300	300		
21		285	305	325	355	355	305	340	325	325	315	320	305	315	305	315	315	320	325	340	330	305	305	305	305			
22		300	295	310	325	330	315	340	340	345	315	300	290	285	300	315	315	C	C	335	330	320	J S	315	310	300		
23		295	295	300	320	345	350	350	335	335	305	305	305	295	295	305	305	310	320	335	350	305	300	300	S	290		
24		305	285	295	295	305	320	340	340	340	315	315	305	310	295	300	310	320	315	330	335	285	285	290	295			
25		305	300	290	300	305	305	340	325	325	S	320	305	285	295	290	285	290	290	S	295	310	335	360	300	S	285	
26		280	280	290	300	U S	295	290	320	335	325	295	290	285	285	285	285	I S	285	295	305	315	335	330	H	275	280	285
27		285	265	270	305	350	320	320	335	315	325	295	285	285	285	285	290	S	300	305	320	325	300	I S	315	270	280	
28		310	U S	275	270	285	285	U S	I S	300	315	300	300	310	305	300	305	320	310	320	325	335	295	285	270	280		
29		290	320	325	320	290	290	325	325	325	315	295	290	300	310	305	300	295	300	310	315	300	270	270	280			
30		305	260	270	290	305	280	315	320	320	300	300	305	300	295	295	305	305	320	320	350	295	285	275	275			
31		305	320	340	315	310	315	335	330	330	315	285	325	300	305	300	300	P	300	320	320	345	360	280	285	285		
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23			
CNT		29	27	29	29	29	29	28	28	28	30	30	30	30	29	23	28	28	28	28	29	29	29	29	29	23		
MED		295	295	300	315	320	300	325	330	325	315	302	300	300	300	300	305	312	315	320	330	330	305	300	285	290		
UQ		305	305	315	320	345	315	335	338	330	320	315	305	305	310	315	315	322	330	335	335	315	305	300	300			
LQ		285	285	295	305	305	290	320	325	318	305	295	290	290	295	298	302	310	320	320	320	295	285	280	282			

The Radio Research Laboratory, Japan

MAR. 1988

M(3000)F2 (0.01)

IONOSPHERIC DATA

MAR. 1988

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station		Tokyo							Lat. 35° 42' 4" N							Long. 139° 29' 3" E							Sweep 1 MHz to 25 MHz in 24 sec in automatic operation		
Hour	Day	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									L	L	365	L	L	L	L	L	L								
2									L	L	L	L	L	L	L	L	L								
3									L	L	L	L	360	L	L	L	L	L							
4									L	C	C	C	C	C	C	C	C	C							
5									C	C	L	350	L	L	L	L	L	L							
6									L	L	L	L	L	L	L	L	L	L							
7									L	L	L	L	360	L	L	L	L	L							
8									L	L	L	L	L	380	L	C	L	L							
9									L	L	L	L	A	L	L	L	L	L							
10									L	L	L	L	L	A	C	L	L	L							
11									L	L	L	L	L	L	L	L	L	L							
12									L	L	L	L	390	400	L	L	L	L							
13									L	L	L	L	L	385	L	L	L	L							
14									L	L	L	L	L	395	L	L	L	L							
15									L	L	L	L	L	L	L	L	A	L							
16									C	L	L	L	L	L	L	L	S	L	L						
17									L	L	L	L	C	L	C	C	C	C	C						
18									C	C	C	C	L	U L	L	L	L	L	L						
19									L	L	L	L	L	380	L	L	L	C							
20									L	U L	L	L	400	395	390	330	L	L	L						
21									L	L	U L	L	L	L	U L	U L	L	L							
22									L	L	L	L	420	375	380	A	L	C	C						
23									L	L	L	L	425	L	L	385	L	L	L						
24									L	L	L	L	L	L	L	L	L	L							
25									L	L	L	L	L	L	L	L	L	L							
26									L	L	L	L	L	L	L	L	L	L							
27											A	L	L	L	L	L	L	L							
28									L	L	L	L	L	L	U L	L	L	L							
29									L	L	L	L	L	L	L	L	L	L							
30									L	L	L	L	L	L	L	L	L	L							
31									L	L	L	L	L	385	L	L	L	L							
		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	7	9	4	3	2								
MED											U L	L	L	L	L	L	L								
UQ											395	390	395	385	385	385	385								
LQ											U L	L	L	L	L	L	L								
											395	410	395	392	388										
											365	390	380	380	382										

MAR. 1988

M(3000)F1 (0.01)

IONOSPHERIC DATA

MAR. 1938

H^oF₂ (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		ROKUBUNJI TOKYO							Lat. 35° 42' 4" N		Long. 139° 29' 3" E		Sweep 1		MHz to 25		MHz in 24		sec in		automatic operation				
Hour	Day	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										245	270	270	270	280	265	265	260	245							
2										240	250	270	295	260	265	265	260	240							
3										245	255	300	285	270	255	290	270	230	230						
4										260	c	c	c	c	c	c	c	c	c						
5										c	c	240	270	245	265	255	260	260	245						
6														255	290	280	275	285	255	250	245	235			
7										275	260	275	265	260	290	275	255	255	240						
8										230	245	260	290	290	275	280	c	260	245						
9										255	260	260	285	275	275	250	255	250							
10										225	260	255	250	275	265	265	c	260	255						
11														255	275	280	290	275	260	280	250				
12										260	265	255	280	275	255	260	275	250							
13										260	255	265	275	270	275	285	270	240							
14										255	240	255	305	285	270	295	280								
15										265	265	280	275	270	290	270	270	260							
16										c	255	280	265	275	290	315	270	260	250	230					
17										265	240	255	275	c	290	c	c	c	c	c					
18										c	c	c	265	290	280	295	265	265	265	245	250				
19														235	250	280	290	280	270	260	c				
20										225	285	290	280	285	295	270	265	250	235						
21										255	260	265	280	265	285	270	275	255							
22										235	255	300	300	305	280	265	265	c	c						
23										250	265	270	285	310	285	280	265	255	260						
24										240	265	265	270	285	295	285	270	260	250						
25										250	255	255	285	270	290	295	290	280							
26										235	295	285	285	305	295	290	280	280	265						
27														E A 290	295	290	310	320	290	270	260				
28										300	265	280	285	280	285	290	270	255	265	250					
29										260	255	255	285	295	275	275	285	260	265	270					
30										245	280	285	270	275	295	280	270	265							
31										240	260	340	255	300	275	290	280	270	250						
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT										5	26	29	30	29	30	29	28	28	26	13					
MED										265	250	260	271	280	282	275	270	265	252	250					
UQ										275	260	265	285	285	290	290	285	275	265	260					
LQ										260	240	255	265	275	270	270	265	260	245	235					

The Radio Research Laboratory, Japan

MAR. 1938

H^oF₂ (KM)

IONOSPHERIC DATA

MAR. 1988

H*F (KM)

135 E Mean Time (G.M.T. + 9 h)

Station		Rokubunji Tokyo										Lat.	35 42.4 N			Long.	139 29.3 E			Sweep 1 MHz to 25 MHz in 2 sec in automatic operation										
Hour	Day	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		265	305	270	235	235	270	240	240	225	225	230	220	190	220	210	215	220	235	220	260	285	285	275	300					
2		310	275	260	265	250	305	240	225	210	195	195 ^H	190	185 ^H	210 ^H	215	215	220	225	210	210	255	270	270	240					
3		275	300	310	260	225	255	235	225	235	225	215	245	225	230	215	205	225	225	215	225	285	270	250	280					
4		300	295	280	250	250	270	230	220	200	H	C	C	C	C	C	C	C	C	C	C	C	C	C						
5		C	C	C	C	C	C	C	C	C	225	205 ^H	240	205	230	215 ^H	215 ^H	220	225	220	235	275	E A	305	320	305				
6		285	255	250	230	220	280	250	230	245	240	210	225	240	215	235	220	195 ^H	235	220	230	290	295	330	305					
7		290	265	275	265	270	270	255	245	255	230	230	215	230	240	210	230	E A	250	230	240	250	250	250	315					
8		305	290	260	235	205	295	240	230	180 ^H	235	215	250	225	230	E S	290	C	230	245	220	215	215	E B	340	330				
9		320	330	300	260	220	290	265	235	210	230	215	255	A	250	205	220	220	240	215	230	240	260	325	300					
10		290	265	245	255	310	310	230	210	230	220	190 ^H	200 ^H	210	E A	280	C	225	225	230	210	230	260	250	270	300				
11		310	275	265	240	215	250	235	230	230	230	225	215	200 ^H	205 ^H	220	220	225	225	215	260	275	280	305						
12		325	310	255	215	235	260	255	220	230	215	220	220	215	230	A	220	220 ^H	245	225	215	260	275	295	295					
13		280	260	290	275	300	285	235	225	220	200 ^H	210 ^H	215	235	220	240	A	230	220	235	260	260	280	295						
14		290	275	260	265	260	275	235	220	215	220	210	215	235	230	235	220	245	235	230	210	235	270	290	295					
15		295	315	290	260	210	335	255	240	230	225	240	245	235	230	260	A	H	210	245	225	235	275	290	295					
16		285	290	260	235	250	290	I C	260	235	235	235	230	220	225	230	230	S	230	225	225	215	275	275	260					
17		245	255	265	275	260	255	245	205 ^H	225	200 ^H	180 ^H	I C	230	205	C	C	C	C	C	C	C	C	C	C					
18		C	C	C	C	C	C	C	C	C	205	200	210	235	A	A	230	215	240	235	220	210	210	270	310	290				
19		285	275	275	250	250	250	235	230	225	215	205	205	225	205	190 ^H	215	C	235	220	205	230	280	290	265					
20		285	285	275	260	240	255	220	235	220	205	185 ^H	175 ^H	210	220	230	225	230	235	220	210	265	295	300	290					
21		305	275	250	210	230	305	245	235	235	225	220	210	220	220	215	220	245	235	A	220	220	265	265	270					
22		275	285	260	235	240	260	225	230	220	210	200	185	230	225	A	E A	235	C	C	240	220	240	260	265	275				
23		285	290	285	250	220	215	220	230	220	200	200	185 ^H	250	245	220	235	235	A	225	215	255	265	270	295					
24		265	310	305	285	265	235	215	225	230	215	215	220	A	230	230	230	250	245	A	230	210	280	295	290	270				
25		270	270	280	265	270	255	225	225	215	200 ^H	200 ^H	185 ^H	210	210	245	240	255	265	245	215	195	265	290	325					
26		310	310	285	270	255	280	240	225	210	210	195	235	240	240	240	A	A	260	245	205	200	300	305	285					
27		295	340	330	255	215	E B	245	230	245	230	A	270	235	225	235	260	250	245	240	220	225	285	305	275					
28		285	285	305	270	285	270	240	220	225	220	205	E A	235	205	210	215	225	225	250	230	210	235	300	330	320				
29		300	255	240	260	305	315	235	240	225	230	245	225	230	215	230	220	235	255	245	230	220	290	305	285					
30		255	320	305	275	245	265	245	245	225	215	205 ^H	250 ^A	205 ^H	220	230	230	235	245	230	205	260	300	330	320					
31		260	245	220	255	275	260	225	230	215	210	210	A	230	225	220	220	220	245	240	210	205	300	305	305					
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
CNT		29	29	29	29	29	29	29	29	29	30	29	29	28	29	26	26	25	27	29	29	29	29	29	29					
MED		285	285	275	260	250	270	240	230	225	220	210	220	225	228	222	220	228	235	225	215	255	275	295	295					
UQ		300	305	290	265	265	290	245	235	230	230	220	235	232	230	232	230	238	245	230	230	265	292	305	305					
LQ		275	270	260	240	225	255	230	225	215	210	200	210	208	220	215	220	220	230	220	210	230	265	275	280					

MAR. 1988

H*F (KM)

IONOSPHERIC DATA

MAR. 1938

H'E (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		R <small>OKUBUNJI</small> T <small>OKYO</small>		Lat. 35° 42' 4" N		Long. 139° 29' 3" E		Sweep 1 MHz to 25 MHz in 24 sec in automatic operation																	
Hour	Day	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				E A	A						
2														120	120	120	120	130		A					
3														120	120	115	115	120							
4																		E A							
5																		140	125						
6																									
7																									
8																									
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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	29	25	26	21	21	22	24	26	23	23	21	1					
MED								E B																	
UQ								145	120	115	115	115	115	115	115	118	118	120	125	135					
LQ								E B																	
								150	120	120	120	120	118	120	121	120	120	120	125						
								E E																	
								130	115	115	115	115	115	115	115	115	115	120	120						

The Radio Research Laboratory, Japan

MAR. 1938

H'E (KM)

IONOSPHERIC DATA

MAR. 1988

H°ES (KM)

135° E Mean Time (G.M.T. + 9 h)

Station		Rokubunji Tokyo							Lat.	35° 42' 4" N				Long.	139° 29' 3" E				Sweep	1 MHz to 25 MHz		in 24 sec		in automatic operation			
Hour	Day	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		110	100	110	110	115	B	B	G	125	120	115	105	G	105	105	105	110	105	100	100	105	100	B			
2		B	B	B	B	B	B	B	G	G	G	G	G	G	G	G	E G 155	105	B	B	B	B	B	B			
3		B	B	B	B	110	B	B	G	G	G	G	140	G	130	130	120	125	G	B	B	B	B	B			
4		B	B	B	B	105	105	B	G	G	C	C	C	C	C	C	C	C	C	C	C	C	C	C			
5		C	C	C	C	C	C	C	C	C	115	G	G	G	105	105	100	G	G	110	105	105	100	105	105		
6		105	B	B	B	B	B	B	G	G	G	G	G	G	G	G	G	G	B	B	B	B	B	B			
7		B	B	B	B	B	B	B	130	150	145	E G 165	145	105	110	110	110	105	105	100	100	105	105	B	B		
8		125	B	B	B	B	B	B	120	G	130	120	125	G	G	S	C	G	G	B	B	B	B	B			
9		B	B	B	B	B	B	B	G	G	G	G	110	105	110	110	G	G	G	G	B	B	B	B			
10		B	B	B	B	115	B	B	G	115	125	115	115	115	105	C	G	115	G	B	B	B	B	B			
11		B	B	B	B	B	B	B	G	G	G	145	130	150	140	105	105	G	G	B	B	B	B	B			
12		B	B	B	110	B	B	B	G	G	120	120	G	115	110	135	105	100	150	105	120	B	B	B	B		
13		B	B	115	B	B	B	B	G	G	G	G	G	115	E G 180	E G 165	G	125	120	115	115	B	B	B	B		
14		B	B	B	B	B	B	B	G	G	G	G	G	G	G	G	G	125	115	120	B	B	B	B			
15		B	B	B	B	B	B	B	G	G	G	S	110	105	110	125	120	110	115	120	115	110	B	B	B		
16		B	B	B	B	B	B	C	115	G	G	135	G	S	G	G	S	G	145	B	120	115	B	B	B		
17		B	B	B	B	B	B	B	E G 155	G	G	115	C	115	C	C	C	C	C	C	C	C	C	C	C		
18		C	C	C	C	C	C	C	C	115	115	E G 155	130	130	140	120	G	E G 160	B	B	B	110	110	105			
19		110	115	110	B	B	B	G	G	G	120	G	G	120	G	G	G	C	105	B	115	B	115	B	110		
20		B	B	B	B	B	B	G	G	115	G	120	115	G	130	150	135	135	135	115	120	B	B	B	B		
21		B	B	B	B	B	B	G	G	E G 155	125	120	130	125	135	135	130	120	110	115	125	115	110	110			
22		B	B	B	B	B	B	G	G	140	130	115	110	110	110	130	125	C	C	120	B	B	B	B			
23		B	B	B	B	B	B	B	115	110	115	115	G	E G 170	E G 160	E G 175	155	135	130	105	120	B	B	B	S		
24		B	B	B	B	B	B	G	E G 175	E G 155	G	125	110	110	115	G	E G 150	135	125	100	100	100	B	B	B		
25		110	110	B	B	115	B	G	135	120	115	115	G	G	140	135	G	G	125	115	B	B	B	B			
26		B	B	B	B	B	B	G	130	115	120	115	115	G	120	115	110	110	105	105	B	105	B	B	B		
27		B	B	B	B	B	B	B	155	125	115	110	110	110	110	135	130	130	100	105	B	B	B	B			
28		B	B	B	B	B	B	B	G	G	120	115	110	115	G	G	G	G	E G 165	G	B	B	B	B			
29		B	B	B	B	B	B	G	G	G	115	115	110	110	110	110	105	G	140	130	B	B	B	B			
30		B	B	B	B	B	B	B	G	G	125	110	105	110	115	G	E G 160	140	125	120	120	B	B	B	B		
31		B	B	B	B	B	B	G	E G 170	G	130	120	110	115	110	110	G	G	155	125	100	105	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		5	3	3	2	5	1		9	11	18	22	19	19	22	17	17	16	21	19	15	9	7	3	4		
MED		110	110	110	110	115	105		122	120	120	115	110	115	111	122	115	124	122	115	115	105	110	105	108		
UQ		110	112	112		115			E G U 155	142	125	120	124	116	130	135	125	134	135	120	120	110	112	108	110		
LQ		110	105	110		110			120	115	115	115	110	110	110	110	105	110	110	105	102	105	105	102	105		

MAR. 1988

H°ES (KM)

IONOSPHERIC DATA

MAR. 1988

TYPES OF ES

135° E Mean Time (G.M.T. + 9 h)

Station		Lat. 35° 42' 4" N							Long. 139° 29' 3" E				Sweep 1 MHz to 25 MHz in 24 sec in automatic operation												
Hour	Day	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	F	F	F	F				H	C	L	L		L		L	L	L	F	F	F	F	F	F	
2	F	F	F	F	F				H	C	L	L		L		L	L	L	F	F	F	F	F	F	
3												H		H	H	C	L								
4					F	F																			
5					F	F					L			L	L	L			F	F	F	F	F	F	
6	F																								
7							H	H	H	HL	HL		L	L	L	L	L	L	F	F	F	F	F	F	
8	F						L		H	C	H														
9										L	L		L	L											
10					F				L	HL	L	C		L	L		L					F			
11									H	H	H	H	L	L					F						
12				F					C	C			L	L	HL	L	L	HL	F	F					
13			F										L	H	H		H	C	F	F					
14																		C	C	F					
15											L		L	LH	H	C	L	L	F	F	F				
16							L			H								H		F	F				
17							H			L			L												
18									L	L	H		H	H	H	C		H				F	F	F	
19	F	F	F						C				C				L		F			F	F	F	
20									L		L	L		H	HL	H	H	H	L	F					
21									H	H	C	C	C	H	H	H	C	C	F	F	F	F	F	F	
22									H	C	C	L	L	L	H	H			L	L					
23							L		L	L	L		H	H	H	HL	HL	C	L	F					
24							H	H	H	C	C	C	L	L	H	H	HL	CL	L	F	F				
25	F	F		F			H	C	L	L	L		H	H			C	C							
26							C	L	L	L	L		L	L	L	L	L	L	L		F				
27							H	H	C	C	C	L	L	L	L	L	H	H	L	F					
28								C	C	C	L							H							
29								C	L	L	L	L	L	L	L	L		H	H						
30								C	L	L	L	L	L	L	H	H	H	H	C	F					
31							H	C	C	C	C	C	L					HL	CL	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																									
MED																									
UQ																									
LQ																									

MAR. 1988

TYPES OF ES

IONOSPHERIC DATA

MAR. 1988

FXI (0.1 MHZ)

135° E Mean Time (G.M.T. + 9 h)

Station Hour Day	YAMAGAWA				Lat.	31° 12' 1" N · Long						130° 37' 1" E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation											
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
1	X 44	X 42	X 47	X 49	X 36	X 34	X 34												X 59	X 54	X 56	X 64	X 52
2	X 49	X 48	X 46	X 45	X 48	X 38	X 38												X 63	X 53	X 55	X 49	X 45
3	X 42	X 42	X 43	X 45	X 44	X 38	X 39												X 76	X 55	X 53	X 49	X 48
4	X 46	X 45	X 46	X 58	X 48	X 39	X 39												X 80	X 70	X 59	X 52	X 54
5	X 49	X 49	X 48	X 49	X 52	X 43	X 42												X 58	X 57	X 61	X 53	X 53
6	X 53	X 55	X 54	X 56	X 37	X 32	X 26												X 54	X 55	X 58	X 59	X 56
7	X 59	X 59	X 55	X 55	X 52	X 45	X 44												X 73	X 63	X 56	X 53	X 52
8	X 54	X 56	H 65	U 74	X 60	X 29	X 32												X 86	X 71	X 52	X 42	X 47
9	X 49	X 42	X 44	X 48	X 41	X 35	X 36												X 72	X 59	X 50	X 48	X 46
10	X 46	X 46	X 47	X 48	X 41	X 41	X 44												X 117	X 110	X 105	X 96	X 77
11	X 60	X 64	X 67	X 70	X 58	X 35	X 33												X 75	X 63	X 56	X 59	X 58
12	X 50	X 56	X 64	X 61	X 30	X 28	X 32												X 70	X 57	X 54	X 55	X 53
13	X 53	X 55	X 52	X 50	X 45	X 45	X 46												X 76	X 58	X 62	X 59	X 55
14	X 54	X 54	X 53	X 51	X 45	X 39	X 43												X 71	X 53	X 54	X 55	X 50
15	X 46	X 49	X 50	X 50	X 44	X 34	X 36												X 72	X 61	X 57	X 58	X 57
16	X 55	X 55	X 60	X 50	X 35	X 35	X 39												X 76	X 69	X 64	X 62	X 54
17	X 56	X 54	X 54	X 51	X 48	X 47	X 47												X 93	X 71	X 67	X 51	X 51
18	X 53	X 55	X 54	X 52	X 46	X 43	X 44												X 83	X 55	X 48	X 49	X 50
19	U 53	X 50	X 50	X 53	X 45	X 41	X 42												X 88	X 53	X 50	X 51	X 50
20	X 51	X 50	X 47	X 51	X 48	X 45	X 50												X 85	X 68	X 55	X 57	X 56
21	X 53	X 57	X 58	X 61	X 36	X 34													X 85	X 68	X 63	X 60	X 57
22	X 55	X 53	X 53	X 54	X 51	X 42													X 83	X 69	X 64	X 64	X 63
23	X 60	X 56	X 55	X 58	X 58	X 37													X 81	X 62	X 60	X 64	X 63
24	X 62	X 56	X 54	X 54	X 53	X 55													X 78	X 71	X 70	X 73	X 71
25	X 70	X 62	X 58	X 55	X 53	X 53													X 118	X 86	X 88	X 100	X 76
26	X 69	X 65	X 66	X 70	X 66	X 53													X 99	X 66	X 62	X 62	X 62
27	X 62	X 56	X 57	X 66	X 47	X 23													X 102	X 76	X 70	X 74	X 78
28	X 75	X 70	X 69	X 66	X 66	X 60													X 103	X 70	X 85	X 80	X 70
29	X 70	X 70	X 60	X 53	X 45	X 44													X 107	X 76	X 64	X 66	X 65
30	X 64	X 56	X 58	X 59	X 54	X 44													X 73	X 73	X 64	X 62	X 63
31	X 69	X 70	X 59	X 47	X 45	X 44													X 115	X 63	X 61	X 61	X 64
CNT	31	31	31	30	31	31	20												31	31	31	31	31
MED	X 54	X 55	X 54	X 54	X 47	X 41	X 39												X 80	X 66	X 60	X 59	X 56
UQ	X 61	X 56	X 58	X 59	X 52	X 44	X 44												X 90	X 70	X 64	X 64	X 63
LQ	X 50	X 50	X 50	X 50	X 44	X 35	X 35												X 72	X 58	X 55	X 52	X 52

MAR. 1988

FXI (0.1 MHZ)

IONOSPHERIC DATA

MAR. 1988

FOF2 (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

Station	YAMAGAWA				Lat.	31 12.1 N				Long.	130 37.1 E				Sweep 1 MHz to 25 MHz in 24sec in automatic operation										
	Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1		38	36	41	43	30	28	28	47	65	77	87	87	95	101	100	101	98	73	62	53	48	50	58	46
2		43	42	40	39	42	32	32	50	61	64	78	87	104	113	102	96	92	77	67	57	47	49	43	39
3		36	36	37	39	38	32	33	54	67	72	83	100	113	102	104	117	108	38	32	70	49	47	43	42
4		40	39	40	52	42	33	33	53	62	74	81	89	107	109	103	84	34	81	77	74	64	53	46	48
5		43	43	42	43	46	37	36	61	71	82	97	99	117	105	93	93	86	83	73	52	51	55	47	47
6		47	49	48	50	31	26	20	49	71	76	85	90	106	102	104	85	32	81	70	48	49	52	53	50
7		53	53	49	49	46	39	38	61	86 ^H	98	104	105	113	117	105	91	79	62	71	67	57	50	47	46
8		48	50	59 ^{U H}	66	54	23	26	56	65	75	76	94	112	119	120	118	111	100 ^H	100	80	65	46	36	41
9		43	36	38	42	35	29	30	57	76	85	104	123	111	113	121	113	90	81	30	66	53	44	41	40
10		40 ^S	40	41	42	35	35	38	57	68	86	96	108	122	123	130	145	153	147	139 ^R	110	104 ^S	99 ^{U S}	90 ^S	71 ^H
11		54 ^S	58 ^{J S}	63	64	52 ^S	29 ^S	27	54	69	78	77	84	94	112	114	102	106	101	80	69	57	50	53	52 ^{J S}
12		44 ^{U S}	50	58	55	24	22	26	57	75	86	84	100	106	114	98	94 ^P	33	83	77	64	53	48	49	47
13		47	49	46	44	39	39	40 ^S	61	75	85	96	99	106	107	108	102	90	83	79	70	60 ^S	56	53	49 ^S
14		48	48	47	45	39	34	37	67	72	77	78	85	100	105	104	98	22	24	30	66	52	48	42	45
15		40 ^{J S}	43	44	44	39	28	30	60	85	77	84	104	108	100	106	107	98	90	90	66 ^S	55	51	53	51
16		49 ^S	49	54	44	30	30	33	61 ^S	79	88	92	94	96	111	113 ^S	114	92	89	83	70	63 ^S	58	56	50 ^S
17		50	48	48	45	42	41	41	66	80	82	88	104	122	116	123	115	105	103	113	86	65	61 ^{J H}	45 ^{S J S}	45 ^{J S}
18		47	49	48	46	40	37	38	64	79	91	105	110	131	145 ^H	122	110	100	101	89	81	49	42	43	44
19		47 ^S	44	44	47	39	35	36	62	76	89	87	106	118	127	126	115	104	110	99	32	47	44	45	44
20		45	44	44	44	42	38	43	70	70	81	88	98	115	111	119	110	103 ^H	91	34	79	62 ^S	50 ^S	51	50
21		47	51	52	55	30	28	30	63	84	93	94	107	107	118	118	104	105	98	87	79	62	57	54	51
22		49	47	47	48	45	36	39	58	71	79	84	94	107	114	115	103	90	87	83	77	63	58	58	57
23		54	50	49	52	52	31	36	63	73	91	93	91	103	110	108	102	95	92	101	75	56	54	58	57
24		56	50	48	48	47	49	47	59	70	82	81	91	97	90	96	102	105	99	101	72	65	64	67	65
25		64	56	52	49	47	47	52	75	89	79 ^H	84	94	103	110	117	117	120	122	130	112	80 ^{H S}	32 ^S		70
26		63	59	60	64	60	47	50	76	76	87	100	107	121	129	124	118	112	118	113	93	60	56	56	56
27		56	50	51	60	41	22 ^H	37	74	72	75	90	122	126	105	107	120	115	106	112	96	70	64	68	72
28		66 ^F	61 ^F		60 ^S	56 ^F	54	51 ^S	76	79	80	110	119	104	112	121	114	100	99	106	97	64 ^{J S}	79 ^{U H}	74 ^F	64 ^S
29		64	64	54	47	39	39	38	66	76	78	94	113	103	105	97	89	94	101	114	101	70	58	60	59
30		58	50	52 ^S	53	48	38	41	72	88 ^H	83	105	123	126	127	118	107	111	106	96	72	67	58	56	57
31		63 ^S	64 ^S	53	41	40	38	44	67	85	97	92	100	111	113	117	114	115	122	124	109	58	55	56	58
		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	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31
MED		48	49	48	47	41	35	37	61	75	82	88	100	107	112	114	107	100	94	87	74	60	54	53	50
UQ		55	50	52	52	46	38	40	66	79	86	96	107	116	116	120	114	107	104	104	84	64	58	58	57
LQ		44	44	44	44	38	29	31	57	70	77	84	92	104	105	104	100	91	83	80	66	52	50	46	46

The Radio Research Laboratory, Japan

MAR. 1988

FOF2 (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FOF1 (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	YAMAGAWA							Lat.	31 12.1 N				Long.	130 37.1 E				Sweep	1 MHz to 25 MHz		in 24 sec		in automatic operation		
Hour Day	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											L	L	L	L	L	L	L	L							
2											L	L	L	L	L	L	L	L							
3											L	L	L	L	L	L	L	L							
4											L	L	L	L	L	L	L	L							
5											L	L	L	L	L	L	L	L							
6											L	L	L	L	L	L	L	L							
7											L	L	L	L	L	L	L	L							
8											L	L	L	L	L	L	L	L							
9											L	L	L	L	L	L	L	L							
10											L	L	L	L	L	L	L	L							
11											L	L	L	L	L	L	L	L							
12											L	L	L	L	L	L	L	L							
13											L	L	L	L	L	L	L	L							
14											L	L	L	L	L	L	L	L							
15											L	L	L	L	L	L	L	L							
16											L	L	L	L	L	L	L	L							
17											L	L	L	L	L	L	L	L							
18											L	L	L	L	L	L	L	L							
19											L	L	L	L	L	L	L	L							
20											L	L	L	L	L	L	L	L							
21											L	L	L	L	L	L	L	L							
22											L	L	L	L	L	L	L	L							
23											L	L	L	L	L	L	L	L							
24											L	L	L	L	L	L	L	L							
25											L	L	L	L	L	L	L	L							
26											L	L	L	L	L	L	L	L							
27											L	L	L	L	L	L	L	L							
28											L	L	L	L	L	L	L	L							
29											L	L	L	L	L	L	L	L							
30											L	L	L	L	L	L	L	L							
31											L	L	L	L	L	L	L	L							
	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	17	24	29	27	23	17	4	1							
MED										450	480	500	500	500	500	460	405	360							
UQ										490	510	510	525	500	480	425									
LQ										470	480	480	480	480	450	335									

MAR. 1988

FOF1 (0.01 MHz)

IONOSPHERIC DATA

MAR. 1988

FOE (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		YAMAGAWA							Lat.	31 12' 1" N			Long.	130 37' 1" E			Sweep	1 MHz to 25 MHz		in 24 sec		in automatic operation				
Hour	Day	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	225	280	A	A	A	A	340	325	295	A	S						
2									S	225	280	310	330	340	325	320	310	295	240	175						
3									S	225	295	305	335	340	335	A	A	A	A	S						
4									S	240	295	325	330	350	345	330	320	300	245							
5									S	250	300	A	345	350	345	340	320	A	230	S						
6									S	250	290	325	345	350	340	335	320	235	245							
7									S	240	275	320	340	350	350	340	320	290	240							
8									S	250	300	320	330	350	355	345	320	300	250							
9									S	245	305	325	340	350	350	340	325	290	245							
10									S	250	305	330	340	350	350	345	340	A	245	S						
11									S	250	300	320	345	350	350	345	340	305	A	S						
12									S	200	270	305	330	350	355	A	350	330	300	260						
13									S	250	305	320	340	350	350	340	330	300	250							
14									S	180	260	305	330	350	350	350	340	330	300	260	160					
15									S	170	270	305	340	340	355	360	350	340	310	255						
16									S	170	260	300	340	360	B	360	350	B	310	250	170					
17									S	195	270	305	330	350	350	A	355	345	300	250						
18									S	200	265	305	330	300	340	350	340	A	305	255						
19									S	170	265	310	330	350	350	350	350	340	310	260	175					
20									S	180	255	305	330	360	360	360	350	330	305	260	185					
21									S	230	280	315	340	350	360	360	350	340	310	265	170					
22									S	180	275	305	315	340	360	360	A	335	305	260	180					
23									S	200	265	310	325	A	360	350	345	330	305	265	175					
24									S	240	285	315	340	350	355	355	350	345	310	A	A					
25									S	200	280	320	345	355	360	360	350	345	305	260	180					
26									S	205	280	310	340	355	360	350	340	330	310	270	175					
27									S	225	275	305	330	350	360	355	350	335	305	260	175					
28									S	210	275	310	A	345	355	360	350	340	300	260	190					
29									S	220	270	310	340	350	A	360	350	335	305	260	195					
30									S	230	300	330	A	A	A	A	A	U A	A	A	A					
31									S	205	285	325	350	350	355	A	A	U A	A	260	190					
		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									19	31	31	27	28	27	26	27	28	26	26	14						
MED									200	265	305	330	345	350	350	345	332	305	258	175						
UQ									215	275	310	340	350	358	360	350	340	305	260	185						
LQ									180	250	300	322	340	350	350	340	325	300	245	175						

The Radio Research Laboratory, Japan

MAR. 1988

FOE (0.01 MHz)

IONOSPHERIC DATA

MAR. 1988

FOES (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	YAMAGAWA							Lat.	31 12' 1 N			Long.	130 37' 1 E			Sweep	1	MHz to	25	MHz in	24	sec in	automatic operation											
Hour Day	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 S	E S	E S	E S	E S	E S	E S	E S	G	G	J A	39	40	J A	J A	G	G	G	J A	J A	J A	J A	E S	E S	E S	E S								
2	E S	E S	J A	E S	E S	E S	E S	E S	G	G				G	G	G	J A	G	G	G	E S	E S	E S	E S	E S									
3	E S	E S	E S	E S	E S	J A	J A	E S	G	G	G					J A	J A	J A	J A	E S	E S	E S	E S	E S	E S									
4	E S	E S	E S	E S	E S	E S	E S	E S	G	G	G					G	J A	G	E S	E S	E S	E S	E S	E S	E S									
5	E S	E S	E S	J A	J A	J A	E S	E S	G	G						G	J A	G	E S	E S	E S	E S	E S	E S	E S									
6	E S	E S	E S	E S	E S	E S	E S	E S	G	G						G	G	G	G	G	G	G	G	G	G									
7	J A	J A	E S	E S	E S	E S	E S	E S	G	G						G	G	G	G	G	G	G	G	G	E S									
8	E S	E S	E S	E S	E S	E S	E S	E S	G	G						G	G	G	G	G	G	G	G	G	E S									
9	E S	E S	E S	E S	E S	E S	E S	E S	G	G						J A	G	G	J A	G	E S	E S	E S	E S	E S									
10	E S	E S	E S	E S	E S	E S	E S	E S	G	G						G	G	G	J A	G	E S	E S	E S	E S	E S									
11	E S	E S	E S	E S	E S	E S	E S	E S	G	G						G	G	G	G	G	G	G	G	G	E S									
12	E S	E S	E S	E S	E S	E S	E S	G	G	G						G	G	G	G	G	G	G	G	G	E S									
13	E S	E S	E S	E S	E S	E S	E S	E S	G	G						G	G	G	J A	E S	E S	E S	E S	E S	E S									
14	E S	E S	E S	E S	E S	E S	E S	G	G							G	G	G	J A	E S	E S	E S	E S	E S	E S									
15	E S	E S	E S	E S	E S	E S	E S	G	G	G						G	G	G	G	G	G	G	G	G	E S									
16	E S	E S	E S	E S	E S	E S	E S	E S	G	G						G	G	G	E B	G	G	G	G	G	E S									
17	E S	E S	E S	E S	E S	E S	E S	G	G							G	G	G	G	G	G	G	G	G	E S									
18	E S	E S	E S	E S	E S	E S	E S	G	G	J A	23	28	34	33	30	G	J A	40	38	G	30	25	24	E S	E S									
19	E S	E S	E S	E S	E S	E S	E S	E S	G	G						G	G	G	40	51	36	G	29	20	24	E S								
20	E S	E S	E S	E S	E S	E S	E S	G	G	G						G	G	G	40	40	40	45	47	45	J A	E S								
21	E S	E S	E S	E S	E S	E S	E S	G	G							G	G	G	J A	46	G	J A	J A	J A	J A	E S								
22	E S	E S	E S	E S	E S	E S	E S	G	G							G	G	G	J A	43	51	37	33	16	16	E S								
23	E S	E S	E S	E S	J A	E S	E S	G	G	G						G	G	G	J A	48	51	52	55	61	45	28	16							
24	E S	E S	E S	E S	E S	E S	E S	G	G							G	G	G	J A	41	41	25	16	16	16	E S								
25	E S	E S	E S	E S	E S	E S	E S	G	G							G	G	G	J A	42	44	43	43	41	37	36	32							
26	E S	E S	J A	E S	E S	E S	E S	E S	G	G						G	G	G	J A	43	43	41	37	36	32	26	J A							
27	E S	E S	J A	J A	J A	J A	E S	G	G							G	G	G	J A	42	44	16	16	16	16	E S								
28	J A	J A	E S	E S	E S	E S	E S	G	G							G	G	G	J A	42	44	16	16	16	16	E S								
29	E S	E S	E S	E S	E S	E S	E S	G	G							G	G	G	J A	42	44	16	16	16	16	E S								
30	E S	E S	E S	E S	E S	E S	E S	G	G							G	G	G	J A	42	44	16	16	16	16	E S								
31	E S	E S	E S	E S	E S	E S	E S	G	G							G	G	G	J A	42	44	16	16	16	16	E S								
	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	31									
MED	E S	E S	E S	E S	E S	E S	E S	G	G	G						G	G	G	28	34	36	39	40	39	36	32	30	23	17	E S	E S	E S	E S	
UQ	E S	E S	E S	E S	E S	E S	E S	E S	G	G						G	G	G	28	33	35	40	40	41	42	42	38	36	34	J A	24	26	E S	E S
LQ	E S	E S	E S	E S	E S	E S	E S	G	G	G						G	G	G	28	33	35	40	40	41	42	42	38	36	34	J A	24	26	E S	E S

MAR. 1988

FOES (0.1 MHz)

IONOSPHERIC DATA

MAR. 1983

FRES (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		YAMAGAWA							Lat.	31 12.1 N			Long	130 37.1 E			Sweep	1 MHz to 25 MHz		in 24 sec		in automatic operation							
Hour	Day	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 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	33	35	38	37	G	G	25	27	23	27	25	E 16	S 16	E 16	S 16			
2		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	30	26	22	G	G	G	E 16	S 16	E 16	S 16			
3		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	35	37	39	35	34	31	29	16	16	16	E 16	S 16	E 16	S 16			
4		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	34	G	G	E 16	S 16	E 16	S 16	E 16	S 16				
5		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	33	G	G	G	G	31	31	26	16	16	16	E 16	S 16	E 16	S 16			
6		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	20	28	32	G	G	G	G	G	G	27	16	16	25	20	E 16	S 16	E 16	S 16		
7		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	25	29	34	36	42	39	38	27	24	19	18	16	16	24	E 16	S 16	E 16	S 16		
8		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	29	34	35	36	G	G	G	G	29	19	16	16	16	E 16	S 16	E 16	S 16			
9		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	35	39	40	27	30	24	22	G	G	E 16	S 16	E 16	S 16	E 16	S 16			
10		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	33	G	G	39	28	21	23	31	18	16	16	16	E 16	S 16	E 16	S 16			
11		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	24	23	34	37	36	G	12	G	G	26	E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16		
12		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	30	40	40	40	G	G	G	G	22	28	23	E 16	S 16	E 16	S 16		
13		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	29	32	G	30	G	41	40	39	G	33	34	37	E 16	S 16	E 16	S 16	E 16	S 16		
14		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	33	39	36	39	60	25	16	16	16	E 16	S 16	E 16	S 16		
15		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	38	45	G	G	G	17	16	16	19	31	E 16	S 16	E 16	S 16	
16		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	21	G	29	39	39	41	40	37	E 16	20	24	G	E 16	S 16	E 16	S 16	E 16	S 16		
17		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	35	35	G	G	36	26	G	G	27	20	16	16	16	E 16	S 16	E 16	S 16	
18		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	23	G	28	G	32	30	G	G	38	35	G	30	24	21	E 16	S 16	E 16	S 16	
19		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	25	31	33	G	G	G	40	48	35	G	28	20	16	16	16	E 16	S 16	E 16	S 16	
20		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	21	29	29	40	39	39	43	45	44	40	29	30	31	E 16	S 16	E 16	S 16		
21		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	35	41	41	42	40	39	45	G	41	50	37	22	E 16	S 16	E 16	S 16		
22		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	30	33	35	G	G	48	50	48	53	60	44	27	E 16	S 16	E 16	S 16	E 16	S 16	
23		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	37	31	30	42	44	39	41	40	24	E 16	S 16	E 16	S 16	E 16	S 16	
24		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	35	37	40	42	45	40	39	40	39	33	32	E 16	S 16	E 16	S 16	E 16	S 16		
25		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	46	42	42	36	32	23	16	16	16	E 16	S 16	E 16	S 16		
26		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	40	43	43	41	37	36	31	25	25	21	E 16	S 16	E 16	S 16		
27		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	34	34	40	40	38	40	37	36	41	44	16	16	16	E 16	S 16	E 16	S 16	
28		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	30	34	36	34	31	25	G	33	30	21	16	16	16	E 16	S 16	E 16	S 16	
29		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	39	31	31	32	22	G	24	E 16	S 16	E 16	S 16	E 16	S 16		
30		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	35	36	38	45	51	34	44	35	25	17	E 16	S 16	E 16	S 16	E 16	S 16	
31		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	45	61	38	36	31	40	E 16	26	29	35	E 16	S 16	E 16	S 16	
		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	31	31	31	
MED		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	28	30	35	36	38	37	34	26	28	22	E 16	S 16	E 16	S 16	E 16	S 16
UQ		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	24	G	33	35	39	40	40	42	38	36	34	27	19	18	E 16	S 16	E 16	S 16	E 16	S 16
LQ		E 16	S 16	E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	G	G	E 23	G	G	13	16	16	16	E 16	S 16	E 16	S 16	E 16	S 16

The Radio Research Laboratory, Japan

MAR. 1988

FRES (0.1 MHz)

IONOSPHERIC DATA

MAR. 1938

FMIN (0.1 MHZ)

135° E Mean Time (G.M.T. + 9 h)

Station		YAMAGAWA				Lat.	31 12' 1" N					Long	130 37' 1" E					Sweep 1 MHz to 25 MHz in 24 sec in automatic operation							
Hour	Day	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 S	E S	E S	E S	E S	E S	E S	E S	16	16	18	17	17	18	22	18	17	15	16	16	E S	E S	E S	E S
2		E S	E S	E S	E S	E S	E S	E S	E S	16	17	16	20	18	18	18	16	16	16	E S	E S	E S	E S	E S	
3		E S	E S	E S	E S	E S	E S	E S	E S	15	15	16	18	20	18	18	17	16	17	E S	E S	E S	E S	E S	
4		E S	E S	E S	E S	E S	E S	E S	E S	16	15	16	16	17	18	17	16	16	16	E S	E S	E S	E S	E S	
5		E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	18	18	16	13	18	16	15	E S	E S	E S	E S	E S	
6		E S	E S	E S	E S	E S	E S	E S	E S	15	16	18	17	20	20	19	16	16	16	E S	E S	E S	E S	E S	
7		E S	E S	E S	E S	E S	E S	E S	E S	16	17	17	19	22	20	17	16	16	16	E S	E S	E S	E S	E S	
8		E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	18	20	19	21	17	16	16	E S	E S	E S	E S	E S	
9		E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	17	19	20	18	17	16	15	E S	E S	E S	E S	E S	
10		E S	E S	E S	E S	E S	E S	E S	E S	16	15	16	17	17	19	18	17	14	14	E S	E S	E S	E S	E S	
11		E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	18	17	19	16	16	16	16	E S	E S	E S	E S	E S	
12		E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	23	18	21	23	17	18	17	E S	E S	E S	E S	E S	
13		E S	E S	E S	E S	E S	E S	E S	E S	16	16	17	18	16	16	17	17	16	16	E S	E S	E S	E S	E S	
14		E S	E S	E S	E S	E S	E S	E S	E S	16	16	18	20	20	19	18	20	16	15	15	E S	E S	E S	E S	
15		E S	E S	E S	E S	E S	E S	E S	E S	15	15	16	20	19	21	21	21	19	15	16	E S	E S	E S	E S	
16		E S	E S	E S	E S	E S	E S	E S	E S	16	15	19	22	39	20	20	40	18	16	16	E S	E S	E S	E S	
17		E S	E S	E S	E S	E S	E S	E S	E S	16	16	17	19	20	25	22	20	16	15	16	E S	E S	E S	E S	
18		E S	E S	E S	E S	E S	E S	E S	E S	16	16	17	18	20	24	20	16	16	16	E S	E S	E S	E S	E S	
19		E S	E S	E S	E S	E S	E S	E S	E S	16	16	17	19	20	20	20	19	16	16	15	E S	E S	E S	E S	
20		E S	E S	E S	E S	E S	E S	E S	E S	15	15	15	21	21	18	21	21	18	16	15	16	E S	E S	E S	
21		E S	E S	E S	E S	E S	E S	E S	E S	16	16	20	21	22	23	20	17	17	16	15	E S	E S	E S	E S	
22		E S	E S	E S	E S	E S	E S	E S	E S	16	15	16	17	18	20	18	17	15	16	E S	E S	E S	E S	E S	
23		E S	E S	E S	E S	E S	E S	E S	E S	15	15	16	18	19	20	17	17	16	16	E S	E S	E S	E S	E S	
24		E S	E S	E S	E S	E S	E S	E S	E S	16	16	20	22	21	22	20	20	17	16	15	E S	E S	E S	E S	
25		E S	E S	E S	E S	E S	E S	E S	E S	16	17	17	18	20	20	21	20	16	15	E S	E S	E S	E S	E S	
26		E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	20	20	20	17	18	18	16	E S	E S	E S	E S	E S	
27		E S	E S	E S	E S	E S	E S	E S	E S	16	16	18	18	19	18	20	20	17	17	E S	E S	E S	E S	E S	
28		E S	E S	E S	E S	E S	E S	E S	E S	15	16	16	16	20	21	19	22	20	20	16	15	E S	E S	E S	
29		E S	E S	E S	E S	E S	E S	E S	E S	15	15	16	21	20	20	20	18	30	16	16	16	E S	E S	E S	
30		E S	E S	E S	E S	E S	E S	E S	E S	16	15	15	17	21	19	21	19	17	16	16	13	E S	E S	E S	
31		E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	20	24	24	18	16	16	15	15	E S	E S	E S	
		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	
MED		E S	E S	E S	E S	E S	E S	E S	E S	16	16	17	19	20	20	19	17	16	16	E S	E S	E S	E S	E S	
UQ		E S	E S	E S	E S	E S	E S	E S	E S	16	16	18	20	20	21	20	20	16	16	E S	E S	E S	E S	E S	
LQ		E S	E S	E S	E S	E S	E S	E S	E S	16	16	16	18	18	19	18	17	16	16	E S	E S	E S	E S	E S	

MAR. 1938

FMIN (0.1 MHZ)

IONOSPHERIC DATA

MAR. 1988

M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9h)

Station	YAMAGAWA																							
	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	300	305	315	360	335	285	305	340	345	345	355	320	325	315	320	325	340	365	340	340	310	300	275	295
2	290	295	300	320	335	310	310	350	360	345	320	305	310	325	325	335	340	350	345	335	295	315	315	320
3	290	275	285	305	340	310	305	340	350	345	320	310	330	320	305	320	335	335	335	330	305	310	300	295
4	285	295	285	305	335	320	320	350	355	335	340	295	315	315	335	335	320	325	310	315	320	320	295	320
5	300	290	285	300	345	310	305	350	345	340	320	320	320	340	325	325	330	350	355	300	295	310	295	265
6	295	305	300	340	320	325	300	345	350	340	345	320	325	315	330	330	335	350	355	290	285	280	275	280
7	285	290	290	305	295	295	290	320	325	320	325	315	310	315	310	320	335	335	325	330	305	300	275	270
8	270	290	295	325	365	315	290	350	355	345	315	295	305	315	310	310	310	305	325	325	315	310	265	275
9	290	275	275	315	340	290	280	320	330	305	300	315	315	295	315	330	315	325	330	320	315	295	270	300
10	300	285	295	315	285	285	315	350	330	325	305	310	320	305	305	305	305	315	310	310	290	285	260	255
11	270	265	275	295	335	295	275	335	345	345	330	315	305	305	320	310	315	330	335	310	305	270	275	280
12	285	280	320	370	375	275	285	325	335	335	315	320	310	315	310	310	320	330	345	320	290	280	285	295
13	275	290	295	300	295	300	305	350	340	330	330	310	305	310	315	320	325	330	335	315	290	295	300	285
14	280	290	320	310	335	295	295	360	360	335	325	295	330	310	315	315	325	335	350	320	305	280	295	290
15	325	265	285	305	320	285	285	335	340	345	310	335	315	290	310	315	325	320	335	310	290	285	285	285
16	285	285	315	350	335	285	305	335	330	330	325	315	290	300	315	325	325	335	335	315	300	295	305	290
17	300	290	290	300	310	315	290	350	345	330	310	300	280	305	310	315	315	325	335	330	290	280	265	255
18	285	305	310	315	310	310	315	345	330	305	310	285	300	315	305	315	315	365	335	360	305	305	300	285
19	285	305	295	320	320	315	305	345	340	335	300	300	295	305	315	315	305	335	345	345	310	285	290	285
20	290	295	295	310	320	315	325	380	340	335	310	305	305	295	315	310	310	330	325	320	305	290	295	290
21	275	295	325	345	350	285	300	340	340	345	320	315	300	305	315	300	320	330	340	320	320	305	295	295
22	295	285	285	310	320	335	320	360	350	340	320	305	300	305	310	315	320	325	330	325	310	295	300	300
23	285	290	285	305	365	305	320	350	330	315	320	295	300	310	305	315	315	315	335	360	285	285	300	305
24	295	280	290	290	295	325	330	345	350	340	320	320	320	300	300	310	325	335	340	310	290	280	300	300
25	305	305	290	285	285	295	305	355	335	315	340	315	305	290	295	295	295	305	335	345	235	245	280	280
26	275	270	285	295	310	310	300	340	335	320	305	295	290	300	300	310	310	315	245	340	285	275	275	285
27	265	260	275	325	355	320	285	350	345	315	275	290	315	295	280	310	315	310	320	330	300	275	270	285
28	285	280	290	290	285	285	295	355	330	295	300	320	300	295	315	310	310	315	320	345	290	205	255	275
29	280	295	315	320	280	280	290	335	340	320	305	320	305	310	315	295	310	305	325	335	290	265	275	280
30	295	260	260	320	310	290	290	335	320	300	295	305	300	300	295	295	315	320	335	290	285	275	260	260
31	285	330	320	325	300	290	320	345	330	330	335	295	310	290	300	300	300	315	320	350	345	270	265	275
CNT	31	31	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31
MED	285	290	292	310	320	300	305	345	340	335	320	310	305	305	310	315	315	330	335	325	300	285	285	285
UQ	295	295	310	322	338	315	312	350	348	340	325	318	315	315	315	320	325	335	340	338	308	300	300	295
LQ	282	280	285	302	305	288	290	338	330	320	308	298	300	300	305	310	310	315	325	315	290	278	270	278

MAR. 1988

M(3000)F2 (0.01)

IONOSPHERIC DATA

MAR. 1938

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station		YAMAGAWA							Lat. 31° 12' 1" N		Long 130° 37' 1" E		Sweep 1 MHz to 25 MHz in 2 sec in automatic operation												
Hour	Day	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											L	L	L	L	L	L	L	L	L						
2											L	L	L	L	L	L	L	L	L						
3											L	L	L	L	L	L	L	L	L						
4											L	L	L	L	L	L	L	L	L						
5											L	L	L	L	L	L	L	L	L						
6											L	L	L	L	L	L	L	L	L						
7										L	L	L	L	L	L	L	L	L	L						
8											L	L	L	L	L	L	L	L	L						
9											L	L	L	L	L	L	L	L	L						
10											L	L	L	L	L	L	L	L	L						
11											L	L	L	L	L	L	L	L	L						
12											L	L	L	L	L	L	L	L	L						
13											L	L	L	L	L	L	L	L	L						
14											L	L	L	L	L	L	L	L	L						
15											L	L	L	L	L	L	L	L	L						
16											L	L	L	L	L	L	L	L	L						
17											L	L	L	L	L	L	L	L	L						
18											L	L	L	L	L	L	L	L	L						
19											L	L	L	L	L	L	L	L	L						
20											L	L	L	L	L	L	L	L	L						
21											L	L	L	L	L	L	L	L	L						
22											L	L	L	L	L	L	L	L	L						
23											L	L	L	L	L	L	L	L	L						
24											L	L	L	L	L	L	L	L	L						
25											L	L	L	L	L	L	L	L	L						
26											L	L	L	L	L	L	L	L	L						
27											L	L	L	L	L	L	L	L	L						
28											L	L	L	L	L	L	L	L	L						
29											L	L	L	L	L	L	L	L	L						
30											L	L	L	L	L	L	L	L	L						
31											L	L	L	L	L	L	L	L	L						
		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	17	24	28	27	22	17	4	1						
MED											L	L	L	L	L	L	L	L	L						
UQ											L	L	L	L	L	L	L	L	L						
LQ											L	L	L	L	L	L	L	L	L						

MAR. 1938

M(3000)F1 (0.01)

IONOSPHERIC DATA

MAR. 1988

H*F2 (KM)

135° E Mean Time (G.M.T. + 9 h)

Station **YAMAGAWA** Lat. **31° 12' 1" N** Long **130° 37' 1" E** Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour Day	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										265	255	280	270	280	275	260	250	230							
2										230	290	295	290	270	270	260	250								
3										250	280	290	270	255	290	270	245	230							
4										250	255	275	280	275	250	255	270	240							
5										250	290	280	280	250	270	275	250	235							
6										250	250	275	280	280	270	250	255	245							
7										245	255	250	270	280	270	270	245								
8										245	270	295	285	270	280	270	250	240							
9										250	280	270	255	295	270	255	240								
10										255	270	270	260	260	275	260	255	235							
11										250	255	280	285	295	270	270	260	240							
12										255	255	275	275	265	260	255	250								
13										230	250	260	270	280	280	280	265	245							
14										235	240	250	305	290	295	270	265	260	245						
15										245	245	280	290	280	270	285	265	255	250						
16										260	260	265	295	290	270	260	250	245							
17										240	270	255	280	285	270	255	255	250							
18										245	275	280	305	290	255	255	260	275							
19										250	270	295	285	275	265	260	270	250							
20										270	280	285	290	300	280	270	265	245							
21										250	250	270	280	300	290	270	270	275	250						
22										230	260	275	280	300	290	280	270	270	270						
23										245	270	250	270	300	300	280	280	280	265						
24										255	265	280	270	275	300	280	270	250							
25										245	230	260	280	300	300	290	290	290	270						
26										250	255	280	305	320	295	290	280	280	270						
27											290	315	275	280	315	290	275	270							
28										240	255	280	250	270	295	270	270	260	260						
29											300	270	265	280	280	260	280	270							
30											L 250	290	265	295	275	265	270	255							
31											250	245	310	275	320	290	270	270	260						
CNT										11	28	31	31	31	31	31	31	25							
MED										245	250	270	280	280	280	275	265	260	250						
UQ										245	255	280	292	290	295	280	270	270	260						
LQ										238	250	255	270	272	270	270	260	250	240						

The Radio Research Laboratory, Japan

MAR. 1988

H*F2 (KM)

IONOSPHERIC DATA

MAR. 1988

H F (KM)

135° E Mean Time (G.M.T. + 9 h)

Station Hour Day	Station YAMAGAWA				Lat.	Long.							Sweep 1 MHz to 25 MHz in 24 sec in automatic operation																		
	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 S 270	E S 270	E S 250	220	215	E S 275	E S 290	230	H 190	H 190	205	180	220	215	215	195	H 220	220	225	E A 235	E A 255	E S 255	E S 245	E S 280							
2	E S 290	E S 275	E S 275	E S 260	240	240	E S 290	220	H 200	H 190	H 190	H 200	H 185	H 190	H 200	210	210	H 220	H 220	E S 245	E S 245	220	E S 250								
3	E S 300	E S 330	E S 320	E S 275	220	E S 245	E S 270	230	H 200	H 180	225	220	215	210	H 200	H 200	220	225	A 220	210	E S 240	E S 250	E S 245	E S 270							
4	E S 290	E S 295	E S 300	E S 275	240	220	E S 245	225	H 180	H 190	H 180	H 180	220	220	H 200	H 200	220	220	E S 245	220	230	230	E 270	E S 250							
5	E S 270	E S 275	E S 280	E S 290	230	270	E S 250	230	H 220	H 220	215	215	H 190	H 205	H 210	H 190	H 200	230	220	215	E S 250	E S 250	E S 240	E S 310							
6	E S 295	E S 255	E S 260	230	215	230	E S 330	235	240	235	225	200	H 180	H 180	220	230	220	225	220	S 230	E A 325	E A 300	E S 295	E S 290							
7	285	270	275	245	255	245	E S 275	250	235	245	225	210	H 220	H 200	H 195	H 200	205	H 225	H 230	225	235	260	E S 280	300							
8	300	270	255	220	200	E S 225	E S 305	225	220	225	215	195	H 180	H 195	H 190	225	220	H 225	230	200	210	215	E S 350	305							
9	270	E S 300	E S 305	250	225	E S 285	E S 305	240	240	210	205	230	230	H 200	H 200	205	215	245	230	210	220	230	E S 305	290							
10	255	260	255	250	260	S 325	E S 250	215	240	220	200	H 200	H 195	H 215	H 190	H 210	225	230	205	205	210	230	230	255							
11	280	275	255	245	200	245	E S 300	235	230	225	215	205	200	H 200	H 190	240	225	235	225	210	210	275	280	290							
12	310	305	245	200	200	E S 330	E S 315	240	230	H 200	210	245	225	240	220	H 200	220	H 225	225	A 230	245	E S 270	E S 275	E S 275							
13	E S 295	E S 275	265	260	260	255	250	220	220	220	200	235	225	235	230	230	235	240	225	220	A 255	255	245	275							
14	295	270	250	250	220	270	285	225	230	220	205	205	185	H 200	230	230	A 220	A 220	225	210	205	280	265	285							
15	295	305	280	255	200	E S 310	E S 330	245	240	220	205	H 195	H 200	225	A 220	210	220	235	205	245	270	E A 310	290								
16	285	280	250	210	230	E S 265	E S 300	230	240	225	230	210	230	225	220	B 230	220	240	H 220	245	250	250	270								
17	265	260	270	275	240	S 250	270	230	220	H 215	205	H 210	200	200	205	H 230	220	225	230	H 205	210	230	S 280	320							
18	295	270	255	245	230	245	265	240	220	H 200	200	230	195	195	205	195	240	245	H 220	215	200	245	300								
19	280	260	280	250	230	240	270	225	225	220	210	185	230	225	A 220	225	230	230	210	205	260	270	290								
20	295	280	280	255	220	250	240	215	215	H 195	H 240	245	210	H 205	E A 245	A 220	A 220	A 220	A 230	A 230	245	250	280	280							
21	E S 310	E S 280	E S 245	225	200	E S 300	E S 295	240	230	225	225	E A 240	225	220	230	A 210	H 245	A 245	E A 230	E A 250	E S 250	E S 265	E S 275								
22	E S 280	E S 275	E S 280	E S 245	230	240	E S 250	215	220	220	195	H 200	220	A 220	A 220	A 220	A 245	A 245	E A 230	220	E S 250	E S 270	E S 270								
23	E S 280	E S 280	E S 290	E S 260	220	215	E S 255	230	H 200	H 220	215	H 195	H 195	H 195	E A 250	E A 270	A 245	A 210	225	250	270	E S 260									
24	E S 260	E S 290	E S 300	E S 270	E S 250	E S 240	220	220	235	225	220	210	A 225	225	225	E A 255	E A 250	A 210	H 220	E S 240	E S 270	E S 265	E S 255								
25	E S 255	E S 260	E S 280	E S 280	E S 270	E S 260	E S 255	230	225	210	H 200	H 190	H 180	A 245	E A 265	E A 265	E A 240	E A 245	240	215	190	E S 245	E S 280	E S 270							
26	E S 295	E S 300	E A 290	E S 260	E S 240	225	E S 270	210	220	220	220	205	H 250	E A 255	E A 240	E A 240	E A 240	E A 250	245	215	240	280	300	295							
27	E S 295	E S 330	E S 330	245	210	E S 280	E S 300	225	230	235	230	250	230	205	230	A 230	E A 250	A 250	E A 215	210	E S 245	E S 300	E S 290								
28	280	290	310	280	265	240	290	230	H 215	205	H 200	H 200	H 200	220	215	220	225	240	245	215	220	300	300	295							
29	280	240	235	240	270	S 295	280	225	230	H 220	H 205	210	215	210	230	220	H 220	H 245	H 250	235	205	290	300	290							
30	250	320	330	255	230	265	285	230	H 230	215	H 190	H 205	205	H 245	A 230	A 230	A 240	A 240	240	210	250	250	335	335							
31	280	230	240	230	265	S 260	255	230	H 220	H 210	H 215	H 195	H 185	H 235	A 230	240	255	240	210	200	E A 320	E A 370	E A 325								
CNT	31	31	31	31	31	31	31	31	31	31	31	31	30	29	26	27	26	23	31	31	31	31	31								
MED	U 270	U 258	U 258	240	228	U S 238	E S 275	230	225	220	210	205	205	208	212	215	220	228	228	215	220	240	E S 280	U 272							
UQ	290	284	S 290	E S 255	242	E S 272	E S 298	232	230	222	220	215	222	222	225	230	230	240	240	221	233	261	E 300	292							
LQ	268	260	252	238	218	240	U 238	225	H 220	H 208	H 200	H 198	H 195	H 200	H 200	H 202	H 220	H 225	H 225	210	210	U 230	E S 265	E S 270							

MAR. 1988

H F (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAR. 1988

H^oE (KM)

135° E Mean Time (G.M.T. + 9 h)

Station	YAMAGAWA				Lat. 31° 12' N			Long 130° 37' E			Sweep 1		MHz to 25		MHz in 24		sec in		automatic operation					
	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	115	105	110	105	110	110	115	110		A	A	S					
2							S	115	110	110	110	110	110		A	A	A	115	130	E	S			
3							S	115	110	110	110	110	110	110	110	110	110	115		S				
4							S	115	110	110	110	110	110	110	110	110	110	115		S				
5							S	110	110	110	110	110	110	110	110	E 130	110	110		S				
6							S	115	110	110	110	115	110	110	110	110	110	120		S				
7							S	110	110	110	110	110	110	120	115	A	A	A	A	S				
8							S	115	105	105	105	105	105	105	105	105	115	E A	A	S				
9							S	A	A	A	A	E A	E A	A	A	A	A	A	S					
10							S	115	110			120	115	115	115	120	115		S					
11							S	110	105	105	105	E A	A	A	A	A	A	115		S				
12							S	A	A	E A	130	105	105	105	110	105	110	A	S					
13							E S	145	105	105	130	140	130	115	105	105	105	110		S				
14							S	110	A	A	A	A	A	105	105	105	110	115		S				
15							E B	130	110	110	110	110	110	110	110	110	110	110		S				
16							S	110	A	A	120	110	B	E A	A	B	A	A	E B					
17							E B	130	110	110	110	110	110	115	120	115	110	115		B				
18							B	120	A	A	120	A	120	110	110	110	110	115		B				
19								120	110	110	110	110	105	110	110	110	110	120	120					
20							B	120	A	A	115	A	115	A	120	A	120	A	E B					
21							S	E S	130	110	110	110	110	110	110	110	110	110	E S					
22							S	E S	125	110	110	110	110	110	110	A	A	A	E S					
23							S	S	120	110	110	110	110	A	A	110	110	110	E S					
24							S	S	120	110	110	110	110	110	110	A	110	A	A					
25							S	S	120	110	110	110	110	110	110	110	110	110	E S					
26							S	S	120	110	110	110	110	110	110	A	110	A	E S					
27							S	E S	120	110	110	110	110	110	110	A	A	E A	E S					
28							S	115	110	A	A	A	120	A	E A	A	120	110	115	130				
29							S	115	110	110	110	110	A	120	130	A	115	110	E B					
30							S	115	110	110	110	110	A	A	A	A	A	A	A					
31							S	115	110	110	110	110	110	A	A	A	A	E A	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								16	30	28	29	29	25	28	26	23	23	25	13					
MED								118	110	110	110	110	110	110	110	110	110	115	E S					
UQ								E E	128	115	110	110	110	110	111	112	A	114	112	115	130			
LQ								116	110	110	110	110	110	110	110	110	110	110	E S					

The Radio Research Laboratory, Japan

MAR. 1988

H^oE (KM)

IONOSPHERIC DATA

MAR. 1988

H⁺ES (KM)

135 E Mean Time (G.M.T. + 9 h)

Station	YAMAGAWA				Lat. 31 12.1 N				Long. 130 37.1 E				Sweep 1 MHz to 25 MHz in 24 sec in automatic operation													
	Hour	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	S	S	S	S	S	S	S	G	G	120	120	115	110	G	G	100	100	100	100	110	S	S	S	
2	S	S	105	S	S	S	S	S	S	G	G	E G 170	E G 170	G	G	100	100	100	G	G	S	S	S	S	S	
3	S	S	S	S	S	105	105	S	S	G	G	G	140	130	125	125	120	115	110	110	100	S	S	S	S	
4	S	S	S	S	S	S	S	S	S	G	G	G	G	G	G	170	140	G	140	S	S	S	S	S	S	
5	S	S	S	S	100	100	100	S	S	G	G	125	G	G	G	G	110	120	125	S	S	S	S	S	S	
6	S	S	S	S	S	S	S	S	E G 160	E G 170	E G 160	150	G	G	G	G	G	E G 160	130	S	120	100	100	100	S	
7	120	95	S	S	S	S	S	S	145	150	145	145	140	145	145	105	105	105	100	100	100	S	110	S	S	
8	S	S	S	S	S	S	S	S	E G 175	E G 170	E G 170	135	G	G	G	G	105	105	S	S	S	S	S	S	S	
9	S	S	S	S	S	S	S	S	105	105	E G 175	155	150	105	105	105	100	G	S	S	S	S	S	S	S	
10	S	S	S	S	S	S	S	S	G	E G 170	G	G	E G 150	105	105	105	100	100	S	S	S	S	S	S	S	
11	S	S	S	S	S	S	S	S	105	105	145	130	120	G	100	G	G	115	S	100	S	S	S	S	S	
12	S	S	S	S	S	S	S	S	G	G	G	105	E G 180	120	125	G	125	G	G	145	115	110	S	130	S	
13	S	S	S	S	S	S	S	S	E G 170	E G 170	105	105	E G 170	160	170	G	155	125	110	S	110	145	S	S	S	
14	S	S	S	S	S	S	S	S	G	E G 160	E G 165	E G 160	G	E G 170	E G 160	E G 160	135	120	120	S	S	110	S	S	S	
15	S	S	S	S	S	S	S	S	G	G	G	G	G	E G 165	130	G	G	G	110	S	S	110	110	S	S	
16	S	S	S	S	S	S	S	140	G	105	130	130	130	125	120	B	105	115	G	S	S	S	S	S	S	
17	S	S	S	S	S	S	S	S	G	G	140	E G 145	G	G	120	105	G	E G 165	130	115	S	S	S	S	S	
18	S	S	S	S	S	S	S	S	G	110	110	110	155	110	G	125	120	G	155	135	120	S	S	S	105	
19	S	S	S	S	S	S	S	S	145	140	135	G	G	G	E G 175	140	155	G	155	150	130	110	S	S	S	
20	S	S	S	S	S	S	S	S	G	105	110	110	E G 170	E G 165	150	135	130	125	120	120	110	110	S	110	S	
21	S	S	S	S	S	S	S	S	G	E G 170	135	125	130	125	130	130	130	G	125	115	110	105	S	S	S	
22	S	S	S	S	S	S	S	S	G	160	150	125	G	G	140	130	130	120	120	120	110	S	S	S	S	
23	S	S	S	S	110	S	S	S	G	G	G	G	100	100	100	145	130	130	125	120	115	S	S	S	S	
24	S	S	S	S	S	S	S	S	G	140	130	130	130	130	130	E G 140	130	130	130	100	100	S	S	S	S	
25	S	S	S	S	S	S	S	S	G	G	G	G	G	G	E G 170	E G 170	150	150	140	130	S	S	S	130	S	
26	S	S	105	S	S	S	S	S	E G 160	G	G	G	E G 165	E G 160	150	150	150	140	130	120	110	110	S	S	S	
27	S	S	105	120	110	110	S	S	E G 170	145	140	140	140	140	E G 160	140	140	130	125	125	S	S	S	S	S	
28	110	110	S	S	S	S	S	S	G	G	110	110	E G 150	105	105	105	G	E G 145	135	125	S	S	S	S	S	
29	S	S	S	S	S	S	S	S	G	G	G	G	G	105	105	105	105	105	G	130	S	S	S	S	S	
30	S	S	S	S	S	S	S	S	G	G	G	G	115	110	105	105	100	100	100	100	120	115	S	S	S	S
31	S	S	S	S	S	S	S	S	G	G	G	G	G	G	105	105	140	105	165	130	125	115	115	110	110	
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT	2	2	3	2	3	3	1	6	13	13	21	20	19	25	25	22	24	26	22	16	9	6	6	2		
MED	115	102	105	110	110	105	105	145	U 128	U 124	U 122	U 132	U 122	U 120	U 115	U 126	U 112	U 125	U 120	U 110	U 110	U 110	U 110	U 108		
UQ		105		110	103			E G 160	E G 170	E G 160	E G 132	E G 158	U 132	U 145	U 135	U 135	134	130	130	118	110	115	130			
LQ	105			105	102			145	110	110	115	130	112	105	105	105	105	115	110	100	110	110	110			

MAR. 1988

H⁺ES (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAR. 1938

TYPES OF ES

135° E Mean Time (G.M.T. + 9 h)

Hour Day	Station YAMAGAWA				Lat. 31° 12' N				Long. 130° 37' E				Sweep 1 MHz to 25 MHz in 24 sec in automatic operation											
	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										C ₁	C ₂	C ₃	C ₂			L ₃	L ₃	L ₄	F ₅	FF ₆₂				
2		F ₂								H ₁	H ₁			L ₂	L ₂	L ₂								
3					F ₂	F ₂					H ₁	H ₂	C ₁	C ₁	C ₂	C ₁	C ₃	C ₁	F ₂					
4							H ₃							H ₂		H ₁		H ₁						
5			F ₂	F ₂	F ₂					C ₁					L ₁	C ₂	C ₁							
6							H ₃	H ₃	H ₂	H ₂						H ₁	H ₂		F ₁	F ₅	F ₅	F ₁		
7	F ₂	F ₂	F ₂	F ₁	F ₁	F ₁	H ₄	H ₂	HC ₂₁	HL ₂₁	HL ₂₁	HL ₁₁	HL ₁₁	L ₂	L ₂	L ₁	L ₂	L ₁	F ₂	F ₁	FF ₄₁			
8								H ₁	H ₂	H ₁	H ₁					L ₁	L ₂							
9								L ₂	L ₁	HL ₁₁	HL ₁₁	HL ₁₁	L ₁	L ₁	L ₁	L ₁	L ₂				F ₁	F ₁		
10				F ₁					H ₂			HL ₁₁	L ₂	L ₁	L ₁	L ₂	L ₂	L ₁				F ₁		
11								L ₂	L ₂	HL ₁₁	H ₁	C ₁		L ₁			L ₂		F ₂	F ₁				
12										L ₁	HHL ₁₁	CL ₁₁	CL ₁₁		C ₁			H ₂	FF ₅₂	F ₇		FF ₁₂	F ₁	
13								H ₂	HL ₁₂	L ₁	L ₁	HL ₁₁	H ₁	H ₁		H ₁	C ₃	L ₄		F ₄	F ₂	F ₁		
14								H ₂	H ₁	H ₁	H ₁		H ₁	H ₁	H ₁	H ₁	C ₆	C ₄	F ₁	F ₁	FF ₂₁	F ₁		
15													H ₁	C ₂				L ₁			F ₄	F ₂		
16							H ₂		L ₂	CL ₁₁	C ₁	C ₁	CL ₁₁	CL ₁₂		L ₁	L ₂							
17									H ₁	H ₁			C ₁	L ₁		H ₁	HL ₁₁	C ₃						
18								L ₂	L ₁	L ₁	HL ₁₁	L ₁		C ₁	C ₁		H ₂	H ₃	FF ₇₁				F ₁	
19							H ₃	H ₂	H ₁				H ₁	H ₂	H ₁		H ₁	H ₂	F ₃	F ₁	F ₁			
20			F ₁	F ₁	F ₁			L ₂	L ₁	L ₁	HL ₁₁	HL ₁₁	HL ₁₁	H ₂	HL ₂₂	HL ₃₂	CL ₃₂	C ₄	F ₃	F ₂	F ₁	F ₂		
21								H ₁	H ₁	C ₂	C ₂	C ₁	C ₁	C ₁	C ₂		C ₄	C ₆	F ₇	F ₃				
22								H ₂	H ₁	C ₁			H ₁	HL ₂₂	HL ₃₂	C ₆	C ₅	C ₅	F ₇					
23				F ₄							L ₁	L ₂	L ₂	H ₁	H ₂	H ₃	C ₄	C ₆	F ₇					
24								H ₂	H ₂	H ₂	H ₂	H ₁	H ₁	H ₁	HL ₁₁	HL ₃₂	HL ₃₃	L ₇	F ₃					
25													H ₂	H ₂	H ₂	H ₁	H ₂	H ₄					F ₁	
26			F ₆				H ₂				H ₁	H ₂	H ₂	HL ₁₂	H ₁	H ₂	H ₂	C ₄	F ₇	F ₅				
27			F ₄	F ₁	F ₂	F ₂		H ₁	H ₁	H ₁	H ₁	H ₁	H ₁	H ₁	HL ₁₂	HL ₂₂	C ₂	C ₆						
28	F ₂	F ₂						L ₂	L ₁	HL ₁₁		L ₁	L ₁	L ₁		H ₁	H ₁	C ₃					F ₁	
29												L ₂	L ₂	L ₂	L ₁	L ₁		C ₃	F ₁	F ₁				
30		F ₁								C ₁	L ₁	L ₂	L ₃	L ₃	LH ₃₁	L ₄	L ₅	CL ₅₃	FF ₂₃	FF ₁₁				
31												L ₂	L ₃	HL ₁₂	L ₂	HL ₂₂	C ₆	FF ₃₁	F ₄	F ₇	F ₇	F ₈		
	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																								
MED																								
UQ																								
LQ																								

MAR. 1938

TYPES OF ES

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAR. 1983

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		OKINAWA							Lat.	26° 16' 9" N				Long.	127° 48' 4" E											Sweep 1 MHz to 25 MHz in 2 sec in automatic operation	
Hour	Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1		X	X	X	X	X	X	X													X	X	X	X			
2																					X	X	X	X			
3		X	X	X	X	X	X	X													X	X	X	X			
4		X	X	X	X	X	X	X													X	X	X	X			
5		X	X	X	X	X	X	X													X	X	X	X			
6		X	X	X	X	X	X	X													X	X	X	X			
7		X	X	X	X	X	X	X													X	X	X	X			
8		X	X	X	X	X	X	X													X	X	X	X			
9		X	X	X	X	X	X	X													X	X	X	X			
10		U	X	X	X	X	X	X													X	X	X	X			
11		X	X	X	X	X	X	X													X	X	X	X			
12		X	X	X	X	X	X	X													X	X	X	X			
13		X	X	X	X	X	X	X													X	X	X	X			
14		X	X	X	X	X	X	X													X	X	X	X			
15		X	X	X	X	X	X	X													X	X	X	X			
16		X	X	X	X	X	X	X													X	X	X	X			
17		X	X	X	X	X	X	X													X	X	X	X			
18		X	X	X	X	X	X	X													X	X	X	X			
19		X	X	X	X	X	X	X													X	X	X	X			
20		X	X	X	X	X	X	X													X	X	X	X			
21		X	X	X	X	X	X	X													X	X	X	X			
22		X	X	X	X	X	X	X													X	X	X	X			
23		X	X	X	X	X	X	X													X	X	X	X			
24		X	X	X	X	X	X	X													X	X	X	X			
25		X	X	X	X	X	X	X													X	X	X	X			
26		X	X	X	X	X	X	X													X	X	X	X			
27		X	X	X	X	X	X	X													X	X	X	X			
28		X	X	X	X	X	X	X													X	X	X	X			
29		X	X	X	X	X	X	X													X	X	X	X			
30		X	X	X	X	X	X	X													X	X	X	X			
31		X	X	X	X	X	X	X													X	X	X	X			
CNT		31	30	31	31	31	31	31	1												31	31	31	30			
MED		X	X	X	X	X	X	X													X	X	X	X			
UQ		X	X	X	X	X	X	X													X	X	X	X			
LQ		X	X	X	X	X	X	X													X	X	X	X			

MAR. 1983

FXI (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FOF2 (0.1 MHz)

135° E Mean Time (G.M.T. + 0 h)

Station	OKINAWA				Lat.	26 16.9 N				Long.	127 48.4 E				Sweep 1 MHz to 25 MHz in 24 sec in automatic operation											
	Hour	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	42	44	41	25	22	22	45	72	77	88	93	107	107	117	137	133	122	104	103		F	F	F	F
2		F	F	F	F	F	F	36	51	62	67	74	89	108	120	117	109	102	89	77	63	57	48	42	35	
3		35	33	33	35	33	26	26	48	66	71	83	103	121	118	110	125	127	123	123	103	86	73	65	51	
4		43	44	43	43	46	36	33	42	67	81	88	96	114	116	116	105	101	108	107	117	103	84	65	53	
5		44	42	44	43	45	32	29	51	78	82	89	112	117	113	109	109	116	110	85	87	90	105	100	70	
6		61	54	52	45	43	25	20	46	72	81	90	108	117	122	120	120	101	92	75	68	57	65	67	63	
7		60	59	56	53	43	42	34	53	92	96	116	113	135	157	155	138	117	80	79	80	77	85	91	84	
8		73	F	F	J S	F	F	27	52	67	78	79	95	U R	120	132	142	151	144	141	134	135	124	117	83	77
9		77	61	61	65	45	36	33	52	75	90	112	120	130	147	154	148	137	122	115	107	81	58	47	42	
10	U S	46	39	41	42	36	33	36	56	65	83	109	116	132	150	U R	172	U R	170	164	154	142	142	124	120	113
11	J S	98	F	F	F	F	42	F	F	78	71	87	92	99	113	128	125	118	120	105	98	96	92	J S	78	88
12	F	F	87	U S	87	31	22	24	52	76	91	94	103	121	134	135	134	129	119	104	97	94	84	64	58	
13	54	53	42	42	38	34	53	75	91	103	108	118	132	132	136	126	111	105	94	90	90	92	90	88		
14	S	F	S	S	48	31	34	60	71	77	90	96	105	116	123	115	106	107	90	78	68	65	60	59		
15	S	U S	52	54	52	31	28	29	56	83	83	96	104	118	124	133	127	115	98	95	97	87	84	84	77	
16	65	61	73	57	27	26	29	59	77	87	98	99	108	132	132	126	120	97	98	86	81	82	68	53		
17	S	52	50	49	42	40	36	60	82	87	95	117	135	149	152	158	148	149	151	122	122	120	89	69		
18	S	S	F	F	59	38	36	58	77	95	110	130	S	U R	168	152	137	132	140	130	102	81	65	54	52	
19	55	56	52	56	46	35	31	59	73	83	92	113	131	J	U R	160	161	160	152	139	120	103	94	64	57	
20	56	54	52	57	42	39	36	55	69	81	95	103	116	131	140	135	U R	130	121	109	110	115	93	77	71	
21	S	62	72	66	38	28	31	60	79	89	99	104	117	136	142	147	U R	138	124	118	108	103	86	79	F	
22	S	F	F	F	52	41	32	58	69	91	100	103	113	130	135	127	120	109	102	89	85	86	84	73		
23	67	61	58	58	47	39	34	62	73	88	98	97	108	120	130	123	U R	120	113	104	90	87	82	77	77	
24	74	68	57	60	55	62	44	62	79	86	99	97	104	110	100	110	114	108	101	96	87	84	77	89		
25	84	74	61	56	52	51	49	77	88	93	94	107	123	143	157	167	178	178	173	165	129	128	F	F	U S	
26	U S	108	93	91	U S	92	66	55	84	82	88	104	113	133	148	140	140	133	130	115	100	84	72	74	66	
27	S	62	57	58	63	54	24	32	77	71	78	102	124	138	120	116	129	127	115	121	97	82	66	65	68	
28	70	65	64	60	60	61	50	70	82	87	125	132	110	130	141	137	132	134	138	124	U S	117	F	F	S	
29	F	S	U S	85	55	39	37	34	67	70	83	105	125	109	116	112	112	119	120	126	119	83	73	67	66	
30	66	56	53	57	48	32	33	71	90	85	116	137	148	148	144	146	137	123	106	94	88	80	68	61		
31	69	78	50	45	33	32	34	64	87	105	102	104	117	129	140	136	127	132	139	117	80	80	71	79		
CNT		28	25	26	27	28	29	30	30	31	31	31	31	30	31	31	31	31	31	31	31	30	28	28	28	
MED		64	57	55	56	44	36	34	58	75	85	98	104	117	130	135	134	127	120	107	100	87	84	72	68	
UQ		72	65	64	62	50	40	36	62	80	90	104	114	130	145	143	143	135	131	128	117	103	92	84	78	
LQ		53	52	50	45	37	28	29	52	70	81	90	98	109	119	118	124	116	103	100	90	81	72	65	59	

MAR. 1988

FOF2 (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

FOF1 (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	OKINAWA				Lat.	26 16.9 N				Long.	127 48.4 E				Sweep	1 MHz to	25 MHz in	24 sec in	automatic operation					
Hour Day	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									L	L	L	480	U L	490	500	500	470	A	L					
2										L	U L	480	500	500	480	490	480	L	L					
3										L	L			500	500	500	450	L	L					
4										L	L	L	U L	U L	U L	L	L	L						
5										L	L	L	U L	L	L	L	L	L						
6										L	L	L	U L	U L	L	L	L	L						
7										L	L	L	U L	L	L	L	L	L						
8										L	L	L	U L	U L	U L	U L	L	L						
9										L	500	500		L	U L	L	U L	L						
10										L	L	500	510	U L	510	520	450	L	L					
11										L	L	L	U L	500	U L	500	480	L	L					
12										L	U L	U L	U L	U L	U L	U L	L	L						
13										L	L	L	L	L	L	U L	L	L						
14										L	L	L	L	U L	U L	L	L	L						
15										L	L	L	500	500	510	510	U L	U L	L					
16										L	L	L	U L	L	520	500	B	L	L					
17										L	L	L	500	520	500	500	460	L	L					
18										L	480	U L	520	500	500	U L	U L	L	L	L				
19										L	500	500	550	500	510	L	U L	L						
20										L	L	L	520	500	520	500	U L	L	L					
21										L	L	U L	500	500	510	520	500	510	500	L	L			
22											U L	420	480	A	L	520	500	480	460	L				
23										L	U L	U L	460	470	500	U L	530	500	500	L	L	L		
24										L	U L	L	500	L	L	L	L	A	L					
25										L	L	L	L	L	L	L	L	L	L					
26										L	L	L	L	L	L	L	L	L	L					
27										L	L	L	L	L	L	L	L	L	L					
28										L	L	L	L	L	L	L	L	L	L					
29										L	L	L	L	L	L	L	L	L	L					
30										L	L	L	L	L	L	L	L	L	L					
31										L	L	L	L	L	L	L	L	L	L					
	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	9	15	13	20	19	16	5							
MED										U L	U L	L	U L	U L	L	U L	U L							
UQ										440	480	500	500	500	500	490	460							
LQ										500	500	510	520	500	500	U L	U L							
										480	500	500	500	500	475	450								

MAR. 1988

FOF1 (0.01 MHz)

IONOSPHERIC DATA

MAR. 1988

FOE (0.01 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		OKINAWA							Lat. 26 16.9 N		Long. 127 48.4 E		Sweep 1 MHz to 25 MHz in 24 sec in automatic operation												
Hour	Day	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	240	R 280	325	330	A	A	R 370	A	A	A	190					
2									180	A	290	320	330	A	340	340	A	310	A	200					
3									190	R 220	270	310	340	345	350	345	325	280	A	190					
4									S	225	280	320	325	345	A	A	A	A	A	S					
5									S	245	285	315	340	A	A	A	A	300	A	A					
6									S	240	300	330	345	355	360	350	335	300	245	S					
7									S	230	280	A	A	355	R 350	R 335	300	260	170						
8									190	230	280	320	330	340	350	350	A	310	270	180					
9									180	240	A	A	A	A	A	330	340	310	260	190					
10									190	R 230	A	A	340	350	R 350	340	330	320	280	190					
11									200	240	A	A	340	A	350	340	330	300	A	200					
12									195	R 265	305	330	370	370	365	A	A	A	A	S					
13									200	240	295	330	R 340	A	360	R 345	335	310	275	205					
14									195	255	300	330	R 350	R 365	360	R 355	R 340	R 315	R 275	R 205					
15									190	250	310	R 335	R 350	R 360	370	R 360	R 350	R 315	R 280	R 215					
16									R 190	260	300	R 330	350	B	A	370	B	320	280	A					
17									190	250	300	325	345	355	350	R 350	340	315	270	185					
18									195	240	300	R 320	A	355	R 365	R 345	325	315	270	200					
19									200	A	A	R 330	R 345	365	R 370	R 365	350	330	280	200					
20									190	240	A	A	A	R 370	380	R 370	350	320	A	210					
21									215	R 280	320	360	370	375	380	375	340	320	280	200					
22									200	R 245	R 300	335	A	A	380	370	345	315	285	200					
23									190	260	320	340	A	360	370	360	R 350	320	R 280	R 200					
24									225	280	315	R 335	R 365	R 365	R 370	R 370	R 345	320	290	S					
25									200	270	310	340	A	A	R 380	A	R 350	320	275	A					
26									210	270	305	325	R 355	R 360	R 360	R 350	R 345	315	275	A					
27									215	R 265	R 305	R 335	R 350	R 355	R 360	R 365	345	320	280	R 210					
28									R 205	R 255	310	R 350	360	R 360	R 360	R 355	R 345	305	275	A					
29									185	A	R 315	R 340	R 355	R 360	A	A	R 340	320	270	215					
30									190	A	R 315	R 340	R 355	R 360	A	A	A	A	U A 315	U A 270	U A 205				
31									195	R 280	320	350	R 350	R 370	R 370	R 355	A	R 320	290	A					
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									26	27	25	25	22	19	23	25	22	28	23	21					
MED									195	245	300	330	345	360	360	355	340	315	275	200					
UQ									200	262	310	335	R 355	365	370	365	345	320	280	205					
LQ									190	240	290	325	340	355	355	345	335	310	270	190					

The Radio Research Laboratory, Japan

MAR. 1988

FOE (0.01 MHz)

IONOSPHERIC DATA

MAR. 1938

FOES (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station		OKINAWA							Lat.	26 16' 9" N			Long.	127 48' 4" E			Sweep	1 MHz to 25 MHz in 24 sec in automatic operation							
Hour	Day	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 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 27	G 38	G 37	J A 41	G 47	G 39	J A 47	G 33	G 21	E 16	E 16	E 16	E 16	E 16	E 16	
2		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 77	G 38	J A 90	G 37	G 36	G 35	G 33	G 30	G 16	E 16	E 16	E 16	E 16	E 16	E 16	
3		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 16	G 16	G 16	G 37	G 37	G 40	G 37	J A 36	J A 34	G 40	J A 40	E 16	E 16	E 16	E 16	
4		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	J A 30	E 16	E 16	E 16	E 16	E 16	E 16	
5		E 16	E 16	E 16	E 16	E 20	E 18	E 16	E 16	G 16	G 33	G 36	G 40	J A 47	J A 47	J A 34	G 31	J A 26	E 16	E 16	E 16	J A 22	J A 39	J A 33	
6		J A 24	E 16	E 15	E 16	E 16	E 16	E 16	E 21	30	34	39	J A 45	J A 43	G 36	G 34	G 33	G 35	G 22	J A 23	J A 31	E 16	E 16	E 16	
7		E 16	E 16	E 16	E 16	E 16	E 18	E 16	E 16	G 33	G 37	G 41	G 42	G 38	G 19	G 20	J A 24	J A 24	E 16	E 16	E 16	E 16	E 16	E 16	
8		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 16	G 16	G 16	G 16	G 40	G 36	G 16	G 16	G 16	J A 22	E 16	J A 20	J A 24	J A 26	J A 26	
9		J A 24	J A 30	J A 27	J A 21	E 18	E 16	E 16	E 16	G 30	J A 38	G 40	J A 54	J A 42	G 16	G 16	G 16	G 16	G 20	J A 30	J A 25	J A 22	J A 40	J A 40	
10		E 16	E 16	E 16	E 16	E 16	E 16	E 22	E 16	G 40	J A 40	J A 34	G 16	G 16	G 16	G 16	G 16	G 16	J A 22	E 18	J A 24	E 18	E 16	E 16	
11		E 16	E 16	E 16	E 16	E 15	E 16	E 22	E 28	30	32	38	G 42	G 42	G 42	G 38	G 36	G 29	G 21	E 16	J A 23	J A 32	J A 23	J A 23	
12		J A 22	E 22	E 16	E 16	E 15	E 16	E 16	E 16	G 30	G 37	G 40	G 40	G 39	G 42	J A 37	J A 37	J A 30	G 24	E 21	E 16	E 16	E 16	J A 26	
13		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 16	G 16	G 16	G 16	J A 36	G 16	G 16	G 16	G 16	G 16	E 16	E 16	E 16	E 16	E 16	
14		E 16	E 16	E 16	E 15	E 15	E 16	E 16	E 16	G 16	G 16	G 16	G 16	G 40	G 41	G 43	G 43	G 33	G 29	E 16	E 16	E 16	E 25	J A 26	
15		E 16	E 16	E 16	J A 20	E 18	E 16	E 16	E 16	G 33	G 38	G 42	G 16	G 16	G 16	G 16	G 16	G 16	G 16	E 16	E 16	E 16	J A 37	J A 21	
16		J A 20	E 16	E 21	E 19	E 22	E 16	E 16	E 16	G 28	34	39	G 40	E B 42	G 41	G 40	E B 50	G 31	J A 23	E 33	E 16	J A 26	E 22	J A 24	
17		E 22	E 18	E 16	E 16	E 16	E 16	E 16	E 16	G 32	35	39	G 38	G 39	G 16	G 16	G 16	G 29	E 22	E 19	E 16	E 16	E 16	E 16	
18		E 16	E 20	E 17	E 16	E 16	E 16	E 16	E 16	G 34	G 34	G 34	J A 34	G 16	G 16	G 16	G 16	G 32	E 26	E 23	E 16	E 16	E 22	J A 22	
19		J A 20	E 23	E 16	E 16	E 16	E 16	E 16	E 23	30	33	37	G 40	G 50	G 41	G 16	G 16	G 30	E 22	E 18	J A 19	J A 42	E 16	E 16	
20		E 16	E 16	E 16	E 16	E 16	E 18	E 22	E 16	G 32	J A 32	J A 38	G 40	G 43	G 44	G 41	G 38	E 25	J A 37	E 23	E 22	E 16	E 16	E 16	
21		E 16	E 16	E 22	E 20	E 18	E 18	E 16	E 16	G 30	34	37	G 38	G 42	G 40	G 41	G 38	G 32	E 27	E 23	J A 26	J A 22	E 22	E 16	
22		E 16	E 16	E 16	E 16	E 16	E 20	E 16	E 16	G 34	36	J A 52	G 49	G 48	G 46	G 42	G 39	G 36	J A 35	J A 35	J A 26	J A 33	J A 30	E 16	
23		E 16	E 16	E 16	E 16	E 18	E 18	E 22	E 16	G 35	37	37	G 43	G 46	G 44	G 39	G 36	G 34	J A 32	J A 26	E 23	E 16	E 16	E 16	
24		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 33	40	42	G 44	G 40	G 50	G 48	J A 48	J A 39	J A 30	E 19	E 22	E 16	E 16	E 16	
25		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 35	J A 35	J A 36	J A 35	G 33	G 35	G 32	E 22	J A 20	E 16	E 16	E 16	E 16	E 16	E 16	
26		E 16	E 16	E 16	J A 24	J A 26	E 16	E 16	E 16	G 31	37	41	G 46	G 45	G 43	G 40	G 37	G 34	G 32	E 25	E 23	J A 18	E 21	E 16	
27		E 16	E 16	E 16	E 15	J A 23	J A 26	E 20	E 16	G 32	34	38	G 43	G 44	G 44	G 42	G 43	G 40	G 36	J A 30	J A 30	E 18	E 21	E 21	
28		E 22	E 16	J A 32	E 16	E 16	E 16	E 16	E 16	G 33	G 33	G 33	G 33	G 32	G 32	G 26	G 16	G 16	E 23	E 16	E 16	E 16	J A 22	E 16	
29		E 16	E 16	E 15	E 16	E 16	E 16	E 16	E 16	G 27	39	43	G 48	G 43	G 39	G 29	G 24	G 32	J A 34	J A 32	E 16	E 16	E 16	E 19	
30		E 16	E 18	E 16	E 16	E 16	E 16	E 16	E 16	G 33	G 33	G 33	G 39	J A 37	G 42	G 39	G 37	G 39	J A 40	J A 34	J A 24	E 20	E 16	E 16	
31		E 16	E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 33	G 33	G 33	G 33	G 42	G 41	G 54	G 25	G 26	E 28	E 20	E 18	E 16	J A 23	J A 40	
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT		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		E 16	E 16	E 16	E 16	E 16	E 16	E 16	G 32	G 36	G 38	G 40	G 40	G 33	G 36	G 25	G 31	G 22	E 22	E 16	E 16	E 21	E 16	E 16	
UQ		E 16	E 16	E 16	E 16	E 17	E 16	E 16	G 30	34	38	G 40	G 43	G 42	G 42	G 38	G 36	G 34	J A 24	E 23	J A 20	J A 22	J A 22	J A 22	
LQ		E 16	E 16	E 15	E 16	E 16	E 16	E 16	G 34	G 36	G 37	E 36	E 37	G 16	G 16	G 16	G 16	G 28	G 19	E 16	E 16	E 16	E 16	E 16	

MAR. 1938

FOES (0.1 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAR. 1988

FBES (0.1 MHz)

135° E Mean Time (G.M.T. + 9 h)

Station	OKINAWA				Lat. 26° 16' 9" N				Long. 127° 48' 4" E				Sweep 1 MHz to 25 MHz in 24 sec in automatic operation																								
	Hour	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	S	E	S	E	S	E	S	E	S	G	38	37	41	40	G	39	47	32	G	E	S	E	S	E	S	E	S									
2	E	S	E	S	E	S	E	S	E	S	G	25	G	G	38	38	37	36	35	33	30	G	E	S	E	S	E	S	E	S							
3	E	S	E	S	E	S	E	S	E	S	G	G	G	G	37	37	38	37	37	32	30	G	22	E	S	E	S	E	S	E	S						
4	E	S	E	S	E	S	E	S	E	S	G	G	G	G	G	36	35	33	30	28	16	16	16	16	16	16	16	16	16	16							
5	E	S	E	S	E	S	E	S	E	S	G	G	33	35	38	42	39	U	Y	G	27	21	E	S	E	S	E	S	E	S							
6	E	S	E	S	E	S	E	S	E	S	20	29	34	34	44	39	G	36	34	33	32	19	20	24	E	S	E	S	E	S	E	S					
7	E	S	E	S	E	S	E	S	E	S	G	33	37	39	42	38	G	G	G	G	18	16	16	16	16	16	16	16	16	16							
8	E	S	E	S	E	S	E	S	E	S	G	G	G	G	G	33	G	36	G	G	G	E	S	E	S	E	S	E	S	E	S						
9	E	S	20	22	18	E	S	E	S	E	S	G	G	30	38	40	42	38	G	G	G	G	G	E	S	E	S	E	S	E	S						
10	E	S	E	S	E	S	E	S	E	S	G	G	31	34	G	G	G	G	G	G	G	G	E	S	E	S	E	S	E	S	E	S					
11	E	S	E	S	E	S	E	S	E	S	28	30	32	38	40	41	40	42	38	35	29	G	E	S	E	S	E	S	E	S	E	S					
12	E	S	E	S	E	S	E	S	E	S	G	27	G	37	40	40	38	38	36	34	29	23	F	S	E	S	E	S	E	S	E	S					
13	E	S	E	S	E	S	E	S	E	S	G	G	G	G	G	35	G	G	G	G	G	G	E	S	E	S	E	S	E	S	E	S					
14	E	S	E	S	E	S	E	S	E	S	G	G	G	G	G	40	41	42	43	33	29	22	16	16	16	16	16	16	16	16	16						
15	E	S	E	S	E	S	E	S	E	S	G	G	33	G	38	42	G	G	G	G	G	G	E	S	E	S	E	S	E	S	E	S					
16	E	S	E	S	E	S	E	S	E	S	G	28	34	39	40	42	41	40	E	B	G	31	23	19	E	S	E	S	E	S	E	S					
17	E	S	E	S	E	S	E	S	E	S	G	G	32	35	39	38	39	G	G	G	G	29	22	E	S	E	S	E	S	E	S	E	S				
18	E	S	E	S	E	S	E	S	E	S	G	G	G	G	41	G	G	G	G	G	G	32	26	E	S	E	S	E	S	E	S	E	S				
19	E	S	E	S	E	S	E	S	E	S	23	30	33	37	40	50	41	G	G	G	G	30	22	E	S	E	S	E	S	E	S	E	S				
20	E	S	E	S	E	S	E	S	E	S	G	G	32	38	40	43	44	41	38	G	25	30	22	E	S	E	S	E	S	E	S	E	S				
21	E	S	E	S	E	S	E	S	E	S	G	29	34	37	38	42	40	41	38	G	32	27	E	S	E	S	E	S	E	S	E	S	E	S			
22	E	S	E	S	E	S	E	S	E	S	G	G	34	36	52	49	48	46	42	39	34	33	20	19	26	22	E	S	E	S	E	S	E	S			
23	E	S	E	S	E	S	E	S	E	S	G	G	35	37	37	43	46	44	39	36	34	27	26	E	S	E	S	E	S	E	S	E	S	E	S		
24	E	S	E	S	E	S	E	S	E	S	G	32	39	41	42	40	G	49	45	47	38	28	16	16	16	16	16	16	16	16	16	16	16				
25	E	S	E	S	E	S	E	S	E	S	G	G	35	G	U	Y	U	Y	G	U	Y	G	35	31	22	E	S	E	S	E	S	E	S	E	S		
26	E	S	E	S	E	S	E	S	E	S	G	31	37	41	46	45	43	40	37	34	31	24	E	S	E	S	E	S	E	S	E	S	E	S			
27	E	S	E	S	E	S	E	S	E	S	G	29	34	38	43	44	44	42	42	39	34	30	33	26	16	16	16	16	16	16	16	16	16	16			
28	E	S	E	S	E	S	E	S	E	S	G	G	33	G	G	G	G	G	G	G	G	G	23	E	S	E	S	E	S	E	S	E	S	E	S		
29	E	S	E	S	E	S	E	S	E	S	G	27	G	38	43	47	43	39	29	G	G	31	30	33	32	E	S	E	S	E	S	E	S	E	S		
30	E	S	E	S	E	S	E	S	E	S	G	30	G	G	G	38	37	42	38	37	39	40	34	24	E	S	E	S	E	S	E	S	E	S	E	S	
31	E	S	E	S	E	S	E	S	E	S	G	G	G	G	G	42	41	39	25	G	G	28	19	E	S	E	S	E	S	E	S	E	S	E	S		
	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	31	31	31	31	31	31	31	31	31	31			
MED	E	S	E	S	E	S	E	S	E	S	G	G	32	35	39	40	38	37	36	25	G	30	22	E	S	E	S	E	S	E	S	E	S	E	S		
UQ	E	S	E	S	E	S	E	S	E	S	G	28	34	38	40	42	42	41	38	34	32	26	19	E	S	E	S	E	S	E	S	E	S	E	S	E	S
LQ	E	S	E	S	E	S	E	S	E	S	G	G	G	G	E	G	G	G	G	G	G	26	G	E	S	E	S	E	S	E	S	E	S	E	S	E	S

MAR. 1988

FBES (0.1 MHz)

IONOSPHERIC DATA

MAR. 1988

M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station	OKINAWA																									
Lat.	26 16.9 N																									
Long	127 48.4 E																									
Sweep	1 MHz to 25 MHz in 24 sec in automatic operation																									
Hour Day	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	305	315	345	360	360	320	295	325	340	350	330	320	315	315	320	235	310	320	305	300		F	F	F	F	
2	F	F	F	F	F	F		290	350	355	345	325	315	310	325	300	310	335	335	350	335	340	335	335	315	
3	300	285	285	315	350	305	290	345	365	325	300	300	295	320	295	305	300	310	310	310	300	290	305	305	295	
4	290	285	290	300	350	290	305	355	335	340	310	300	310	360	350	315	300	315	310	320	310	305	325	310		
5	305	285	295	290	345	295	295	335	350	340	310	315	315	315	310	305	330	340	340	310	25	27	30	270		
6	270	295	335	335	350	320	275	325	340	340	310	320	305	310	310	325	315	330	325	300	315	285	290	295		
7	290	295	295	300	290	310	280	300	335	335	320	300	295	300	290	295	295	335	330	330	285	275	285	275		
8	300	F	F	J S	F	F		295	335	360	335	315	280	285	305	295	280	290	295	315	320	300	350	280	285	
9	300	280	280	S	330	335	300	305	335	320	300	305	290	300	275	280	300	295	305	310	310	295	285	295		
10	U S	335	305	305	335	335	300	290	355	345	315	320	315	305	300	280	310	305	305	290	300	280	305	310	320	
11	J S	F	F	F	F	335	F	F	360	340	335	315	310	300	305	320	305	315	325	315	320	U S	J S	U S	285	
12	F	F	S	U S	370	295	290	335	340	340	325	300	315	315	305	315	315	315	310	300	315	265	290	295		
13	295	300	S	370	320	330	325	330	335	320	305	300	295	305	310	320	315	325	325	310	315	270	285	290		
14	S	F	S	S	365	305	295	340	345	325	310	305	300	305	320	315	325	335	340	315	310	285	300	300		
15	U S	300	305	S	345	295	295	320	350	330	290	290	300	300	310	315	315	300	315	320	29	28	27	290		
16	290	295	300	360	315	290	275	340	335	320	325	305	310	305	310	325	330	320	355	320	300	300	315	300		
17	S	300	310	315	310	325	290	340	355	310	305	305	305	295	300	295	305	310	330	305	295	310	280	270		
18	S	S	F	F	340	330	305	325	310	305	290	300		U R	315	310	305	320	330	320	345	275	295	J S	270	
19	300	285	300	330	335	340	300	340	340	325	290	300	290	J R	285	295	280	295	315	315	310	300	290	285	275	
20	320	305	305	335	330	335	345	365	340	320	305	295	285	305	310	305	U R	310	310	305	305	U S	U S	310		
21	S	300	320	350	350	305	290	335	350	325	320	300	290	295	275	305	305	305	295	315	300	S	U S	F		
22	S	F	F	F	335	340	310	350	340	320	310	290	290	300	305	300	300	310	315	315	280	290	280	295		
23	290	305	300	325	330	320	310	355	355	325	305	300	285	290	305	300	U R	310	320	325	310	285	285	300		
24	295	300	270	300	300	320	320	345	350	325	325	310	300	315	295	295	325	335	285	310	300	305	285	305		
25	305	310	295	285	290	295	305	350	350	335	310	290	285	285	285	290	310	J R	325	320	300	295	F	F	U S	290
26	U S	S	285	280	295	310	335	310	290	335	355	295	300	280	290	295	300	305	310	325	320	310	280	270	275	280
27	S	265	265	335	285	290	280	330	345	280	275	280	305	300	280	300	305	300	320	300	315	270	270	285		
28	290	275	280	285	290	335	270	330	335	285	315	330	290	295	310	305	315	315	R	325	U S	F	F	S		
29	F	S	U S	275	345	305	295	265	360	340	315	310	325	305	305	305	300	315	325	325	265	260	270	280		
30	295	265	S	255	315	355	295	285	340	345	295	285	300	295	290	290	235	310	315	315	295	285	280	250	260	
31	290	350	330	345	285	280	295	345	335	340	325	285	290	290	300	310	305	315	330	350	270	270	260	265		
	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	25	26	27	28	29	30	30	31	31	31	31	30	31	31	31	31	31	31	31	30	28	28	28		
MED	290	295	300	325	335	305	295	340	345	325	310	300	300	300	305	305	305	345	320	310	300	285	285	290		
UQ	300	300	310	335	350	325	305	350	350	338	320	312	305	308	310	312	315	325	328	320	310	300	298	300		
LQ	S	285	285	312	308	295	290	330	338	315	305	292	290	295	295	295	302	310	310	305	285	275	275	278		

MAR. 1988

M(3000)F2 (0.01)

IONOSPHERIC DATA

MAR. 1988

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9 h)

Station		OKINAWA							Lat.	26 16' 9" N				Long	127 48' 4" E				Sweep	1 MHz to 25 MHz		in 24 sec in		automatic operation				
Hour	Day	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										L	L	L	395	U L	375	380	330	370	A	L								
2											L	U L	375	370	380	395	390	335	L	L								
3											L	L	375	370	380	380	390	L	L									
4											L	L	L	U L	U L	U L	L	L	L	L								
5											L	L	L	U L	L	L	L	L	L	L								
6											L	L	L	U L	U L	L	L	L	L	L								
7											L	L	L	L	U L	L	L	L	L	L								
8											L	L	L	U L	U L	U L	U L	L	L	L								
9											L	370	380	L	U L	U L	U L	U L	L	L								
10											L	L	L	370	375	U L	370	375	L	L								
11											L	L	L	U L	U L	L	L	L	L	L								
12											L	U L	U L	U L	U L	U L	U L	L	L	L								
13											L	L	L	L	L	L	U L	L	L	L								
14											L	L	L	L	U L	U L	L	L	L	L								
15											L	L	L	380	370	380	360	U L	U L	L								
16											L	L	L	U L	L	375	330	B	L	L								
17											L	L	L	380	365	375	370	400	L	L								
18											L	365	355	380	380	U L	U L	L	L	L								
19											L	370	380	390	400	390	L	U L	L	L								
20											L	L	L	375	370	405	380	U L	L	L								
21											L	L	U L	380	400	U L	U L	L	L	L								
22											U L	U L	A	L	A	380	385	U L	L	L								
23											L	U L	U L	380	U L	U L	370	L	L	L								
24											L	U L	L	L	L	L	L	A	L	L								
25											L	L	L	L	L	L	L	L	L	L								
26											L	L	L	L	L	L	L	L	L	L								
27											L	L	L	L	L	L	L	L	L	L								
28											L	L	L	L	L	L	L	L	L	L								
29											L	L	L	L	L	L	L	L	L	L								
30											L	L	L	L	L	L	L	L	L	L								
31											L	L	L	L	L	L	L	L	L	L								
		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	9	15	13	19	16	5								
MED											U L	U L	L	U L	U L	L	U L	U L										
UQ											380	380	380	380	380	380	338	395										
LQ											370	372	370	372	370	372	330											

MAR. 1988

M(3000)F1 (0.01)

IONOSPHERIC DATA

MAR. 1988

H*F2 (KM)

135° E Mean Time (G.M.T. + 9 h)

Station OKINAWA Lat. 26 16.9 N Long 127 43.4 E Sweep 1 MHz to 25 MHz in 24 sec in automatic operation

Hour Day	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									235	245	280	275	280	280	280	260	245	235						
2									240	290	290	300	270	270	270	260	240							
3									230	290	290	270	260	290	280	260	245							
4									245	285	285	280	275	280	255	270	270							
5									250	285	290	280	270	280	275	255	245							
6									250	280	280	275	285	290	260	260	250							
7									260	255	280	285 ^L	315	290	280	280	270	250						
8									240	250 ^L	290	290	300	310	280	260	260							
9									290	290	280	290	290	280	260	260	240							
10									260 ^L	275	275	290	290	310	305	285	260							
11									240	240	275	280	290	260	280	260	270	245						
12									255	270	300	285	270	260	255	255	240							
13									270	280	265	320	300	280	265	265	245							
14									260	295	270	310	290	270	270	255	240							
15									265	270 ^L	280	290	290	280	260	260	240							
16									250	260	280 ^L	310	305	270	260	250	250							
17									240	255 ^L	280	290	290	290	280	265	260	255						
18									260	315	335	310	285	255	260	265	260	230						
19									255	295	300	275	290	280	230	260	240							
20									260	265	280	310	290	310	290	275	260	255						
21									240	260	270	295	310	260	280	280	265	250						
22									275	275	280	335	310	280	275	265	260							
23									245	275	270 ^L	275	320	305	280	230	230	255	230					
24									250	270	280	300	280	290	300	270	250							
25									240	260	270 ^L	305 ^{U L}	295	330	315	315	280	260						
26									300 ^{U L}	275	325	325	300	295	290	275	260							
27									L	L	L	295	280	285	L	300	280	275						
28									245	L	280	255	275	300 ^L	285	230	275	255						
29									245	L	L	275	270	280	275 ^L	290	285	270						
30									245 ^L	L	L	280	280	290 ^L	280	305	285	255	255					
31									250 ^L	255	265	280 ^L	320 ^L	315	300	230	280	270	250					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT									11	28	30	31	31	31	30	31	31	31	3					
MED									245	255	280	280	290	290	280	275	265	250	230					
UQ									248	262	285	292	310	300	290	280	272	260	240					
LQ									240	248	270	280	280	280	280	260	260	245	230					

The Radio Research Laboratory, Japan

MAR. 1988

H*F2 (KM)

IONOSPHERIC DATA

MAR. 1988

H * F (KM)

135 E Mean Time (G.M.T. + 9 h)

Station	OKINAWA																				Lat.	26 16' 9" N			Long	127 48' 4" E			Sweep	1 MHz to 25 MHz		in 2 sec in		automatic operation		
Hour Day	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	240	210	210	S	S	240	H	220	A	215	A	190	210	200	A	A	230	215	225	225	210	225	240											
2	240	240	240	245	220	200	240	235	230	190	190	H	190	H	190	200	210	A	220	225	210	220	235	E	S	260										
3	E	S	S	S	275	220	225	S	240	225	190	H	H	210	210	200	190	H	A	230	230	210	200	230	220	S	250									
4	S	S	S	275	225	230	E	S	225	230	230	220	220	H	H	H	245	215	205	245	235	215	215	225	250											
5	S	S	S	295	225	255	E	S	240	240	190	195	205	195	A	220	205	200	H	A	220	215	250	S	250	250	260									
6	280	250	240	235	220	E	S	S	250	230	235	215	A	190	185	180	240	235	A	220	230	275	290	265	260											
7	280	265	260	245	220	S	S	280	255	240	230	225	225	200	210	195	200	215	230	245	230	230	235	260	270											
8	280	260	240	215	190	215	S	S	240	215	H	200	H	200	H	190	195	H	200	220	230	235	210	225	215	E	S	300								
9	260	E	A	E	A	230	210	E	S	270	E	S	240	235	200	220	220	H	A	A	H	H	H	210	210	220	235	210	215	230	A	S	300			
10	240	250	270	240	230	S	280	220	220	200	H	190	H	190	H	190	H	210	H	200	H	225	220	210	220	240	230									
11	240	250	235	235	200	210	S	240	A	225	215	220	210	200	190	190	H	H	A	230	240	215	210	210	E	A	275	255								
12	280	285	230	200	190	S	S	250	230	220	220	220	200	200	205	205	220	225	220	225	225	205	250	265												
13	265	255	245	245	230	230	235	225	220	200	220	205	200	250	235	230	215	220	230	220	230	220	240	230												
14	265	250	245	220	200	S	280	225	230	210	215	220	205	215	240	A	230	230	220	205	210	235	255	250												
15	S	S	270	240	190	S	S	240	240	A	220	230	215	225	A	H	215	225	210	220	240	230	220	240	260	A	260	260								
16	270	S	240	210	230	S	S	240	240	A	225	240	220	230	220	A	A	B	215	A	220	240	230	240	240	240	A	260								
17	E	S	S	240	230	240	250	240	220	210	210	200	200	215	210	210	215	215	230	210	235	240	240	E	S	300										
18	E	S	260	240	225	210	210	E	S	260	240	220	190	200	190	H	190	H	200	H	A	A	210	200	240	S	E	S	290							
19	S	270	260	265	240	215	220	E	S	265	230	230	215	200	190	H	A	H	H	225	230	235	210	200	220	270	A	S	275							
20	E	S	275	260	240	205	230	215	210	200	190	A	220	A	A	A	A	A	A	240	230	235	215	210	210	260	255									
21	S	S	240	210	200	E	S	S	235	225	220	210	200	200	190	240	220	230	220	240	230	240	225	240	260	A	260									
22	260	265	260	240	220	215	235	220	190	190	200	A	A	A	A	A	235	A	240	235	260	260	A	265	265											
23	270	260	265	240	210	230	245	240	230	220	210	190	230	A	A	A	A	A	A	A	A	A	220	220	260	250										
24	250	255	290	250	220	220	205	230	230	235	230	220	200	200	A	A	A	A	E	A	250	230	245	230	245	250	250									
25	240	245	250	270	265	S	250	S	240	230	210	215	200	190	H	180	175	185	240	230	240	210	230	215	245	255										
26	255	230	270	250	225	210	250	230	240	225	225	A	A	A	A	230	230	230	240	245	225	210	280	250	S	285										
27	S	S	S	230	205	A	E	S	305	240	230	240	245	A	A	A	A	A	A	A	A	250	205	230	250	S	300	290								
28	275	235	295	275	255	S	230	250	230	220	210	200	195	210	190	220	225	215	230	250	220	245	225	285	280											
29	250	220	215	210	245	S	275	E	S	325	220	225	205	A	A	A	240	215	200	230	230	250	235	225	260	S	S	290								
30	S	S	S	250	215	250	S	310	240	230	195	180	230	210	H	180	A	230	A	A	235	245	255	240	S	E	S	340								
31	290	225	215	215	250	E	S	275	230	225	235	225	220	205	200	245	A	A	220	230	A	215	195	255	S	S	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	31	30	30	31	31	24	22	31	30	31	29	26	24	25	27	25	27	25	28	31	31	31	31	30												
MED	268	264	258	240	220	226	249	240	230	210	215	212	200	200	210	205	215	230	235	220	225	230	255	259												
UQ	S	S	280	270	248	228	242	S	270	240	230	225	225	220	210	210	225	225	230	230	240	230	232	242	266	278										
LQ	252	250	240	222	208	218	S	238	230	220	200	200	200	193	190	190	200	210	220	228	210	210	220	240	250											

MAR. 1988

H * F (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAR. 1988

H^oE (KM)

135° E Mean Time (G.M.T. + 9 h)

Station	OKINAWA				Lat.	26 16' 9" N				Long.	127 48' 4" E				Sweep	1	MHz to	25	MHz in	24	sec in	automatic operation			
Hour Day	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	110	110	110	110	A	105	110	105	105	105	120						
2								S	A	110	110	110	105	110	110	A	110	A	E	S					
3								E S	135	110	110	110	110	110	110	110	110	110	E	S					
4								S	110	105	105	105	105	110	110	110	110	115		S					
5								S	110	110	110	110	110	110	110	110	110	110	120						
6								S	120	105	105	110	110	110	105	E A	E A	125	125	110					
7								S	110	105	110	110	A	110	110	110	110	110	A	S					
8								S	110	110	110	110	110	110	110	105	110	110	110						
9								S	110	A	A	A	A	A	110	110	110	110	E	S					
10								S	110	110	110	110	110	110	110	110	110	110	E	S					
11								S	110	A	A	110	A	105	110	110	110	110	110						
12								S	110	105	105	110	105	105	110	110	105	110		S					
13								S	105	105	105	105	105	105	110	110	105	110	115						
14								S	110	105	105	105	105	105	105	105	110	105	115		S				
15								E S	135	110	110	110	110	110	110	110	110	110	120	B					
16								E S	135	110	110	110	110	B	110	110	B	115	110	A					
17								S	110	110	110	110	110	110	110	110	110	105	120	B					
18								S	110	110	110	A	110	110	110	110	110	110	120	B					
19								S	A	A	110	110	110	110	110	110	110	110	110						
20								S	110	A	A	105	110	110	110	110	115	A	115						
21								120	110	110	110	110	110	110	110	110	110	110	120	B					
22								S	110	110	110	A	A	115	110	110	105	110	120	B					
23								S	110	120	120	110	120	110	110	110	115	110	115	B					
24								S	120	105	105	105	110	105	105	105	105	110		S					
25									115	105	105	105	105	105	105	A	105	110	110	120					
26								E B	125	105	105	105	105	105	105	105	115	B	B	110	120				
27								B	105	110	110	110	110	110	110	110	110	A	S						
28								S	110	110	110	110	105	105	105	110	105	110	E	B					
29									115	110	105	110	110	110	105	110	105	A	110	120					
30									120	110	110	110	110	A	A	A	A	A	A	A					
31									115	110	110	110	110	110	110	110	A	110	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									10	29	27	28	28	24	29	29	27	29	26	22					
MED									118	110	110	110	110	110	110	110	110	110	110	118					
UQ								E S	135	110	110	110	110	110	110	110	110	110	110	120	B				
LQ									115	110	105	105	110	105	105	110	110	110	110	115					

The Radio Research Laboratory, Japan

MAR. 1988

H^oE (KM)

IONOSPHERIC DATA

MAR. 1988

H^oES (KM)

135 E Mean Time (G.M.T. + 9 h)

Station		OKINAWA							Lat.	26 16' 9" N				Long.	127 48' 4" E				Sweep	1 MHz to 25 MHz		in 24 sec		in automatic operation				
Hour	Day	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	S	S	S	S	S	S	S	E G 165	G	E G 160	E G 160	E G 160	G					G		S	S					
2	S	S	S	S	S	S	S	S	G	110	G	G	E G 165	115	140	E G 140	135	E G 160	E G 135	G	S	S	S	S	S			
3	S	S	S	S	S	S	S	S	G	G	G	G	E G 140	E G 145	125	125	120	120	115	G		S	S	S	S			
4	S	S	S	S	S	S	S	S	S	G	G	G	G	G		120	115	115	115	120	S		S	S	S			
5	S	S	S	S	110	105	S	S	G	G	E G 145	125	120	115	115	115	G	115	125	S	S		170	100	95			
6	100	S	S	S	S	S	S	S	150	145	150	135	120	125	G	E G 140	E G 130	170	130	120	100	100	S	S	S			
7	S	S	S	S	S	S	150	S	G	165	150	145	140	E G 160	G	G	G	100	100	100	S	S	S	S	S			
8	S	S	S	S	S	S	S	S	G	G	G	G	G	G	125	G	115	G	G	G	100		110	110	100			
9	100	100	100	100	110	S	S	G	G		110	160	160	110	110	G	G	G	G	G	110	110	110	110	110			
10	S	S	S	S	S	S	110	G	G	125	125	G	G	G	G	G	G	G	G	G	100	100	110	110	S			
11	S	S	S	S	S	S	145	140	150	E G 165	E G 150	135	125	125	125	125	120	120	G		S		115	115	110			
12	100	100	S	S	S	S	S	G	125	G	E G 170	E G 175	130	130	120	120	115	120	130	100	S	S	S	105				
13	S	S	S	S	S	S	S	G	G	G	G	G	G	115	G	G	G	G	G	G	S	S	S	S	S			
14	S	S	S	S	S	S	S	S	G	G	G	G	G	E G 165	145	150	145	E G 165	150	140	S	S	S	105	105			
15	S	S	S	100	100	S	S	G	G	E G 145	G	E G 160	E G 165	G	G	G	G	G	G	G	S	S	S	110	110			
16	110	S	110	105	100	S	S	G	E G 160	140	130	130	B	125	E G 130	B	G	130	125	110	S		110	110	110			
17	110	110	S	S	S	S	S	G	G	E G 155	E G 150	140	140	E G 140	E G 140	G	G	G	135	120	100	S	110	S	S			
18	S	110	S	S	S	S	S	G	G	G	G	110	G	G	G	G	G	E G 165	150	110	100	S	100	110	S			
19	110	110	S	S	S	S	S	140	140	130	E G 130	125	140	E G 160	G	G	G	E G 150	140	S	110	110	100	S	S			
20	S	S	S	S	S	110	110	G	G	110	110	115	160	150	150	150	100	100	125	110	S	S	S	S	S			
21	S	S	105	110	110	110	S	G	150	150	145	E G 155	140	E G 160	E G 160	145	G	140	120	110	110	110	110	110	S			
22	S	S	S	S	S	110	S	G	G	160	140	140	140	140	140	135	135	130	120	110	110	110	100	S	S			
23	S	S	S	S	110	110	110	G	G	150	150	115	150	140	140	140	140	A	120	120	110	110	S	S	S			
24	S	S	S	S	S	S	S	G	145	130	130	130	150	G	130	120	115	115	110	105	105	105	S	S	S			
25	S	S	S	S	S	S	S	G	G	135	G	105	100	G	100	G	E G 165	E G 165	125	110	S	S	S	S	S			
26	S	S	S	105	100	S	S	G	170	E G 175	160	155	155	160	E G 160	E G 155	E G 150	125	120	120	110	105	105	S	S			
27	S	S	S	S	105	105	115	G	150	150	150	135	130	150	145	130	130	125	120	115	115	115	100	100	S			
28	110	S	105	S	S	S	S	G	G	E G 155	G	G	G	G	100	100	G	G	E G 135	S	S	S	110	S				
29	S	S	S	S	S	S	S	G	120	G	175	150	145	150	E G 175	100	105	145	125	115	110	S	S	105	S			
30	S	130	S	S	S	S	S	G	115	G	G	G	110	105	E G 160	150	140	125	120	115	115	120	S	S	S			
31	S	S	S	S	S	S	S	G	G	G	G	G	G	E G 170	E G 150	100	105	100	100	125	100		105	105	S			
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23				
CNT	7	6	4	5	8	6	6	3	13	13	19	23	24	23	21	21	18	25	21	24	15	13	17	13				
MED	110	110	105	105	108	110	112	140	142	140	140	132	132	132	123	122	120	122	120	110	110	110	105	105				
UQ	110	110	108	105	110	110	145	145	150	152	152	143	145	145	E G 150	138	U	140	132	125	110	110	115	110	110			
LQ	100	100	102	100	100	105	110	140	125	130	130	124	120	124	120	115	115	115	120	100	100	110	100	100	100			

MAR. 1988

H^oES (KM)

IONOSPHERIC DATA

MAR. 1988

TYPES OF ES

135° E Mean Time (G.M.T. + 9 h)

Station Hour Day	Station OKINAWA				Lat. 26° 16' 9" N				Long. 127° 43' 4" E				Sweep 1		MHz to 25		MHz in 24		sec in		automatic operation			
	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								H ₁	H ₁	H ₁	HL ₁₁	C ₁		C ₁	C ₃	C ₃		F ₂			F ₁	F ₂		
2								L ₁		H ₁	C ₁	H ₁	C ₁	CL ₁₁	H ₁	CL ₁₂								
3										H ₁	H ₁	C ₁	C ₁	C ₂	C ₁	C ₂		F ₃						
4												C ₁	C ₁	C ₁	C ₁	C ₂		F ₂		F ₁				
5				F ₁	F ₁				H ₁	C ₁	C ₁	CH ₁₁	CH ₁₁	C ₁		C ₁	C ₁				FF ₁₃	F ₄	F ₄	
6	F ₂					H ₃		H ₂	H ₃	H ₂	C ₂	C ₁		C ₁	CL ₁₅	HL ₁₃	H ₃	L ₁	F ₁	F ₄				
7					F ₁				H ₁	HL ₂₁	HL ₁₁	HL ₁₁	H ₁				L ₁	L ₂	F ₂					
8												C ₁		C ₂					F ₁		F ₁	F ₁	F ₂	
9	F ₁	F ₅	F ₃	F ₂	F ₁				L ₁	HL ₁₁	HL ₁₁	L ₁	L ₁						F ₁	F ₅	F ₅	F ₄	F ₄	
10						F ₂			C ₂	C ₂									F ₁	F ₁	F ₅	F ₁		
11					F ₂	H ₄		H ₂	HL ₁₃	HL ₂₁	H ₁	CL ₁₁	C ₁	C ₂	C ₂	C ₂	C ₂		F ₁		F ₄	F ₅	FF ₁₂	
12	F ₃	F ₁						C ₂		HL ₁₁	H ₁	C ₁	C ₁	C ₁	C ₁	C ₂	C ₂	C ₂	F ₁				F ₂	
13												C ₁												
14												H ₁	H ₁	H ₁	H ₁	H ₁	H ₁	H ₁				F ₂	F ₂	
15				F ₂	F ₁				H ₁		H ₁	H ₁										F ₅	F ₄	
16	F ₃		F ₁	F ₁	F ₂			H ₁	H ₁	C ₁	C ₁		C ₁	C ₂			C ₁	CL ₁₂	FF ₄₂		F ₄	F ₂	F ₂	
17	F ₂	F ₂							H ₁	H ₁	H ₁	C ₁	C ₁				H ₁	C ₁	F ₁		F ₁			
18		F ₂									L ₁						H ₁	H ₁	FF ₁₁	F ₁		F ₁	F ₂	
19	F ₃	F ₃					H ₁	HL ₁₁	CL ₂₁	C ₂	C ₁	H ₁	H ₁				H ₁	H ₃		F ₁	F ₁	F ₄		
20					F ₁	F ₁			L ₁	L ₁	C ₁	H ₁	H ₁	H ₁	H ₁	L ₁	L ₃	CL ₁₁	F ₁					
21		F ₄	F ₁	F ₁	F ₁			H ₂	H ₁	H ₁	H ₁	H ₁	H ₁	H ₁	H ₁		H ₂	C ₂	F ₁	F ₃	F ₅	F ₁		
22					F ₁				H ₁	H ₁	HL ₁₁	HL ₁₁	HL ₁₁	H ₁	H ₂	H ₁	C ₁	C ₄	F ₅	F ₃	F ₄	F ₆		
23				F ₁	F ₁	F ₁			HL ₁₁	HL ₁₁	C ₁	HL ₁₁	H ₁	H ₁	H ₁	HL ₂₁	C ₃	C ₃	F ₇	F ₁				
24								H ₁	C ₃	C ₁	C ₁	H ₁		C ₁	C ₂	C ₄	C ₄	C ₃	F ₂	F ₂				
25									H ₂		C ₁	L ₁		L ₁		HL ₂₁	HL ₃₁	C ₂	F ₃					
26			F ₄	F ₅				H ₂	HL ₁₁	H ₁	H ₁	H ₁	H ₁	H ₁	H ₁	H ₁	C ₁	C ₂	F ₁	F ₃	F ₂	F ₃		
27				F ₃	F ₅	F ₁		H ₁	H ₁	H ₁	H ₁	H ₁	H ₁	H ₁	H ₂	HL ₁₁	CL ₂₁	C ₃	F ₅	F ₄	F ₁	F ₂	F ₂	
28	F ₁		F ₄						H ₁					L ₁	L ₁				C ₁				F ₂	
29								C ₁		H ₁	H ₁	H ₁	HL ₁₂	HL ₁₂	L ₁	L ₁	H ₁	C ₃	F ₇	F ₅			F ₁	
30		F ₁						C ₂				L ₁	L ₁	HL ₁₁	HL ₁₃	HL ₃₄	CL ₃₃	CL ₆₃	FF ₇₃	F ₅	F ₁			
31												H ₁	H ₁	L ₃	L ₁	L ₂	LH ₃₂	FF ₂₂	F ₁		F ₄	F ₄		
	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																								
MED																								
UQ																								
LQ																								

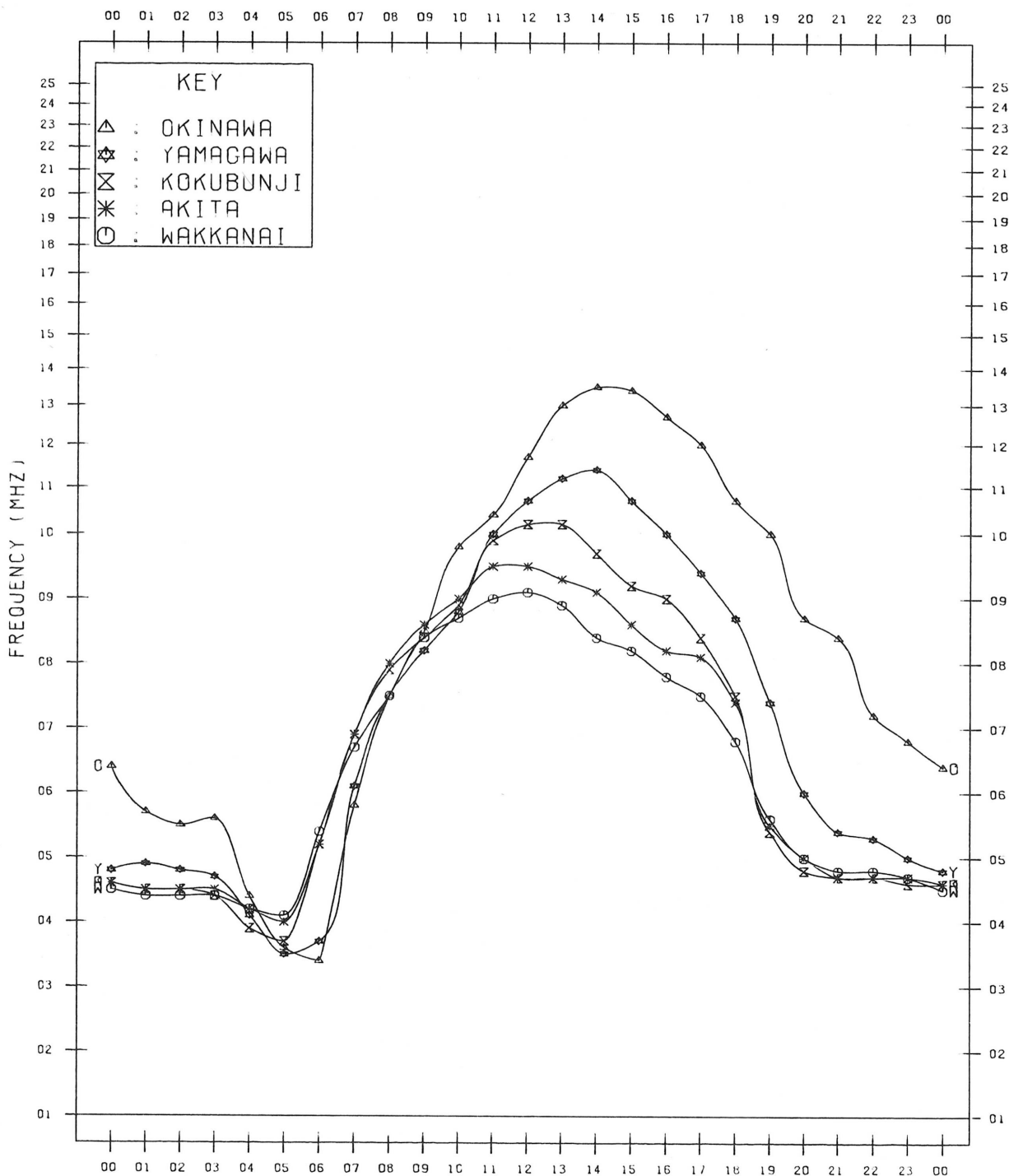
MAR. 1938

TYPES OF ES

MONTHLY MEDIAN VALUES OF FOF2

135 °E MEAN TIME

MAR. 1988



f-PLOTS OF IONOSPHERIC DATA

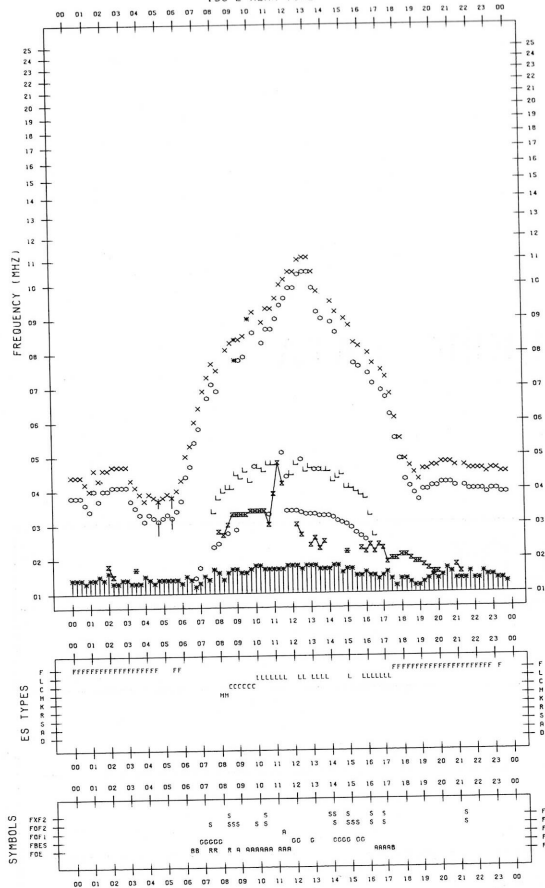
KEY OF F-PLOT	
I	SPREAD
◇	F ₀ F ₂ , F ₀ F ₁ , F ₀ E
×	F _X F ₂
*	DOUBTFUL F ₀ F ₂ , F ₀ F ₁ , F ₀ E
⊗	F _B E _S
L	ESTIMATED F ₀ F ₁
*.Y	F _{MIN}
^	GREATER THAN
v	LESS THAN

F-PLOT DATA

SCALER : H.SUGIUCHI

STATION : KOKUBUNJI TOKYO
135°E MEAN TIME

DATE : 1988/ 3/ 1

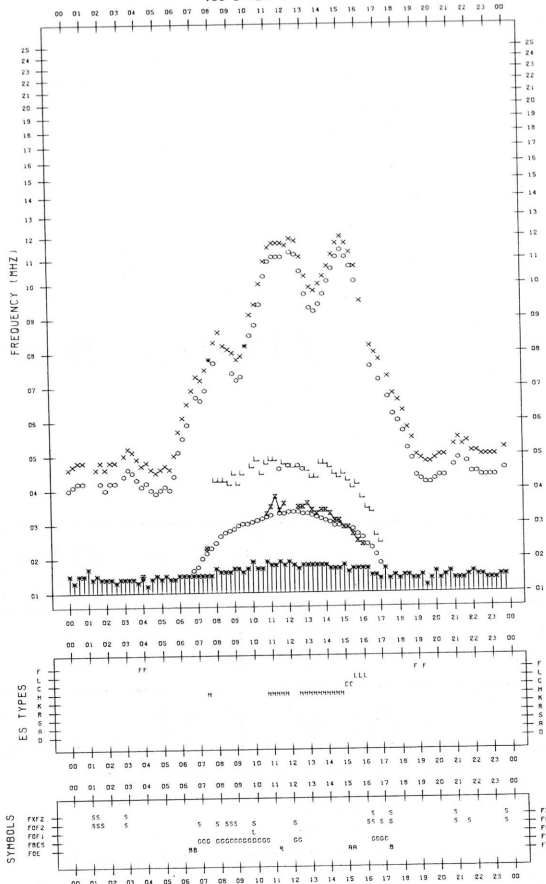


F-PLOT DATA

SCALER : H.SUGIUCHI

STATION : KOKUBUNJI TOKYO
135°E MEAN TIME

DATE : 1988/ 3/ 3

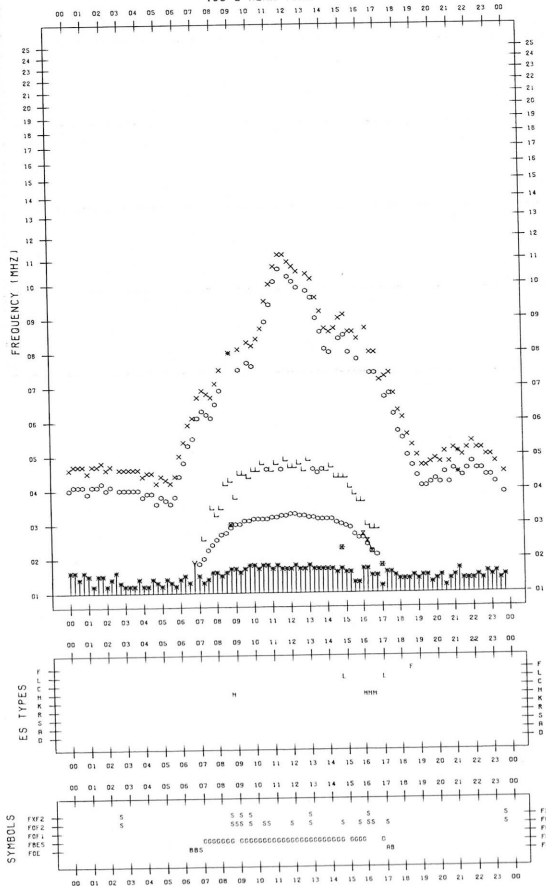


F-PLOT DATA

SCALER : H.SUGIUCHI

STATION : KOKUBUNJI TOKYO
135°E MEAN TIME

DATE : 1988/ 3/ 2

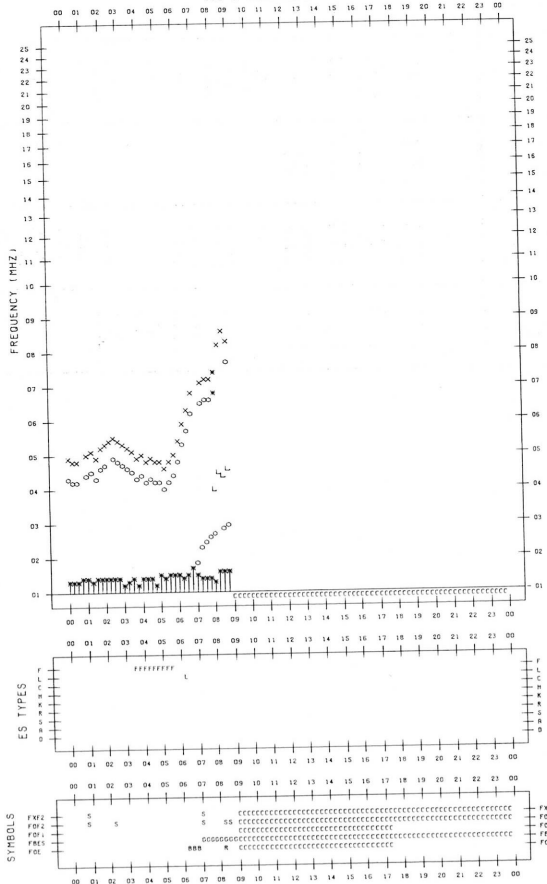


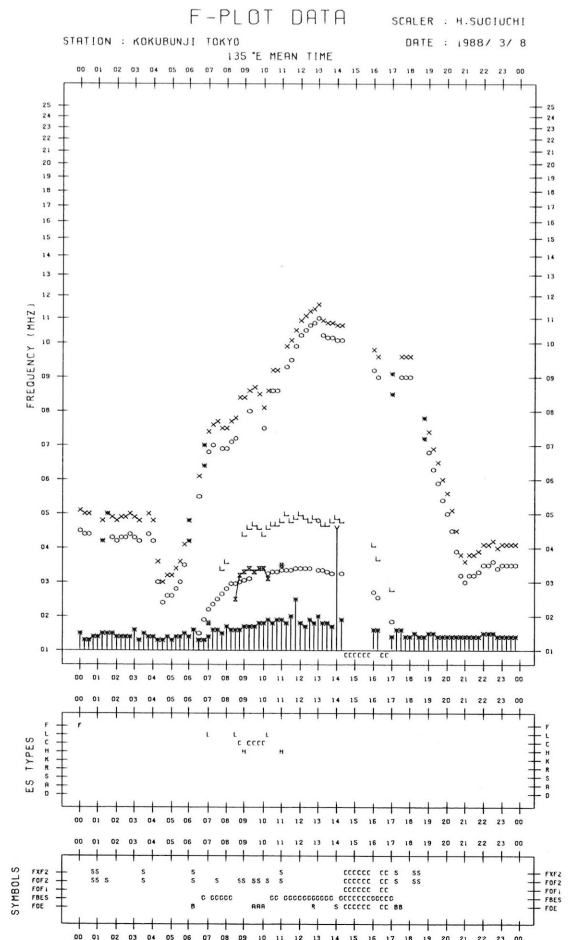
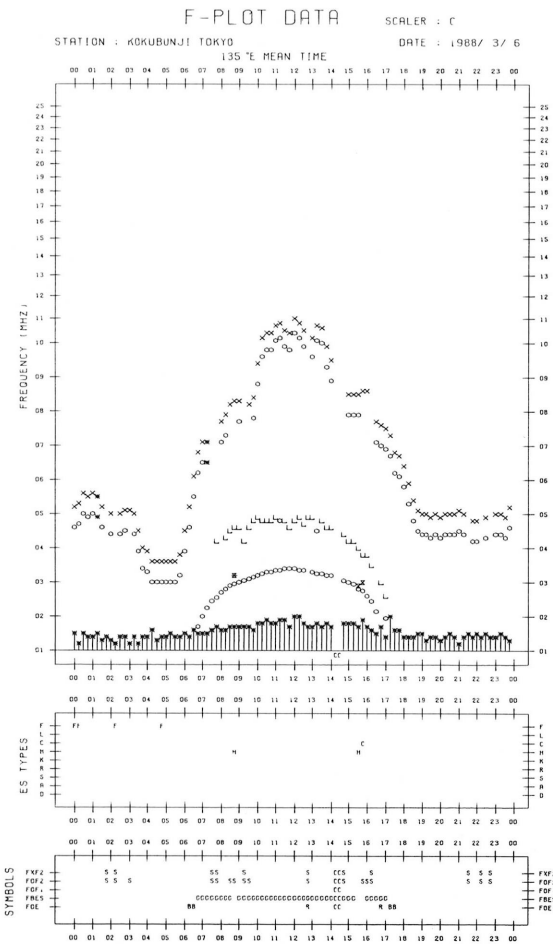
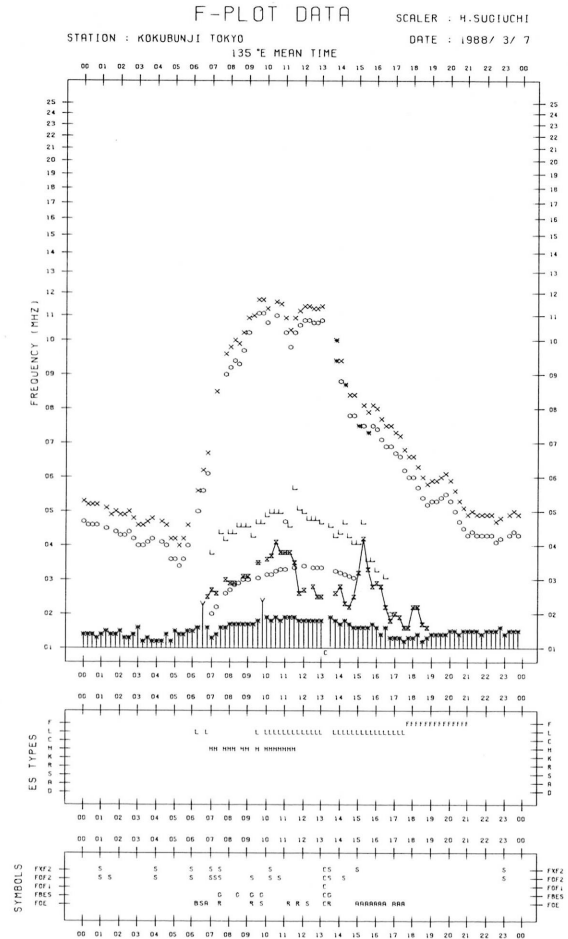
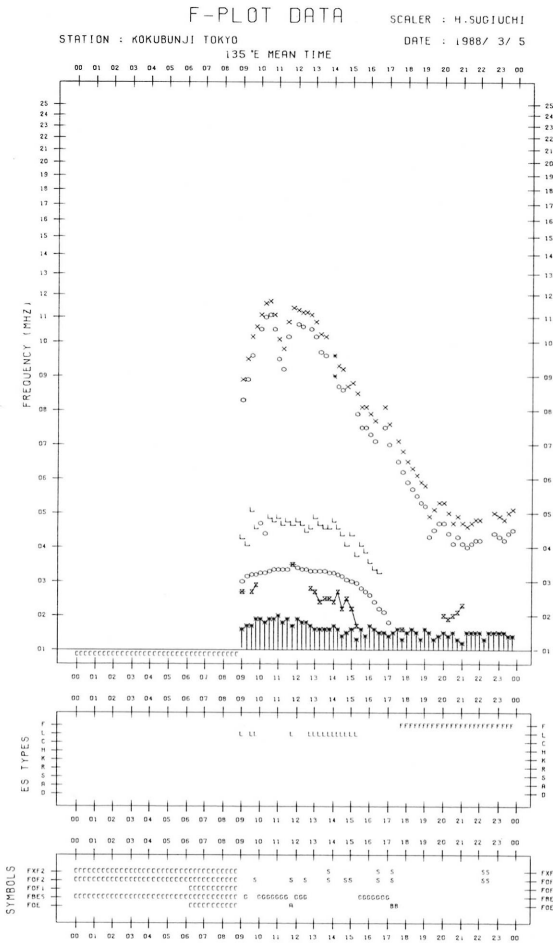
F-PLOT DATA

SCALER : H.SUGIUCHI

STATION : KOKUBUNJI TOKYO
135°E MEAN TIME

DATE : 1988/ 3/ 4



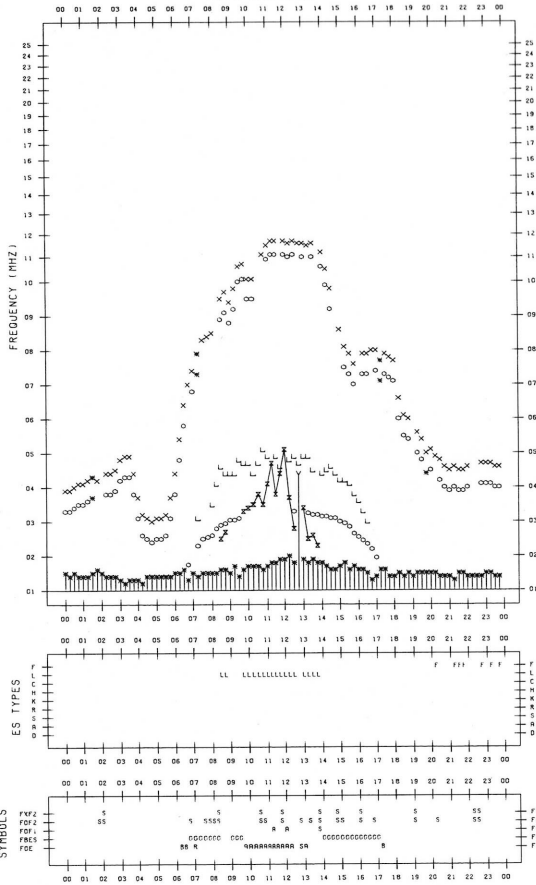


F-PLOT DATA

SCALER : H.SUGIUCHI

STATION : KOKUBUNJI TOKYO DATE : 1988/ 3/ 9

135°E MEAN TIME

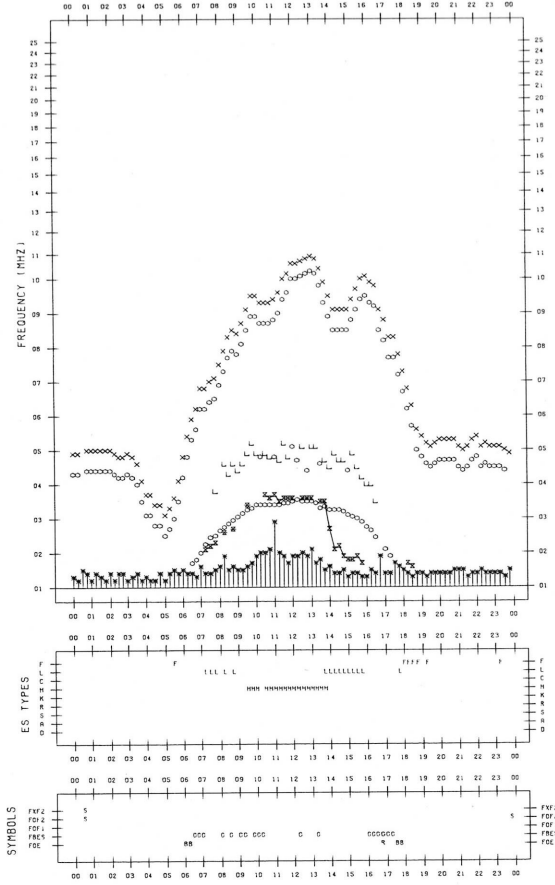


F-PLOT DATA

SCALER : H.SUGIUCHI

STATION : KOKUBUNJI TOKYO DATE : 1988/ 3/11

135°E MEAN TIME

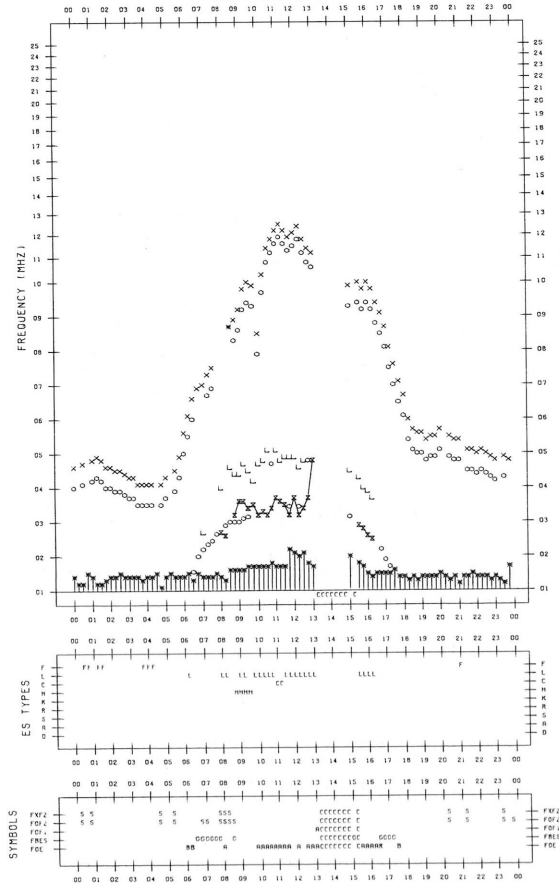


F-PLOT DATA

SCALER : H.SUGIUCHI

STATION : KOKUBUNJI TOKYO DATE : 1988/ 3/10

135°E MEAN TIME

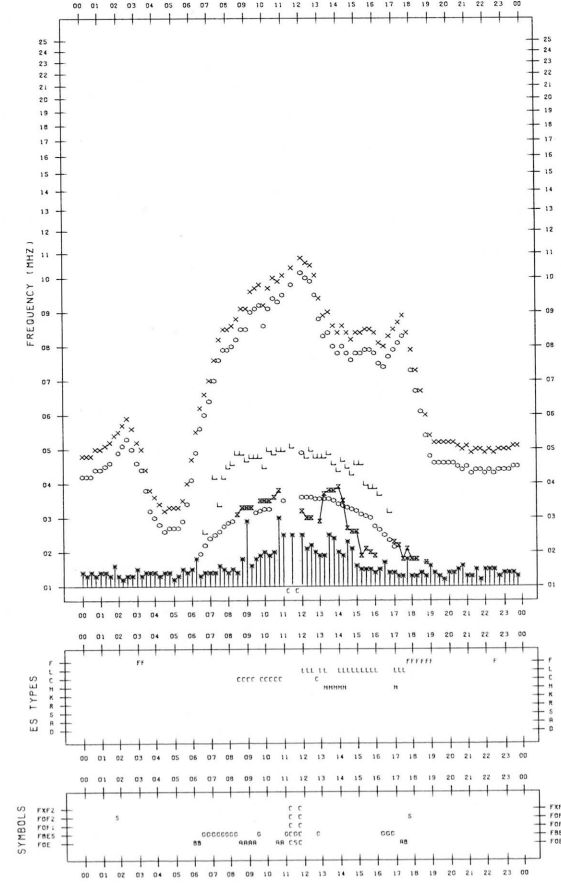


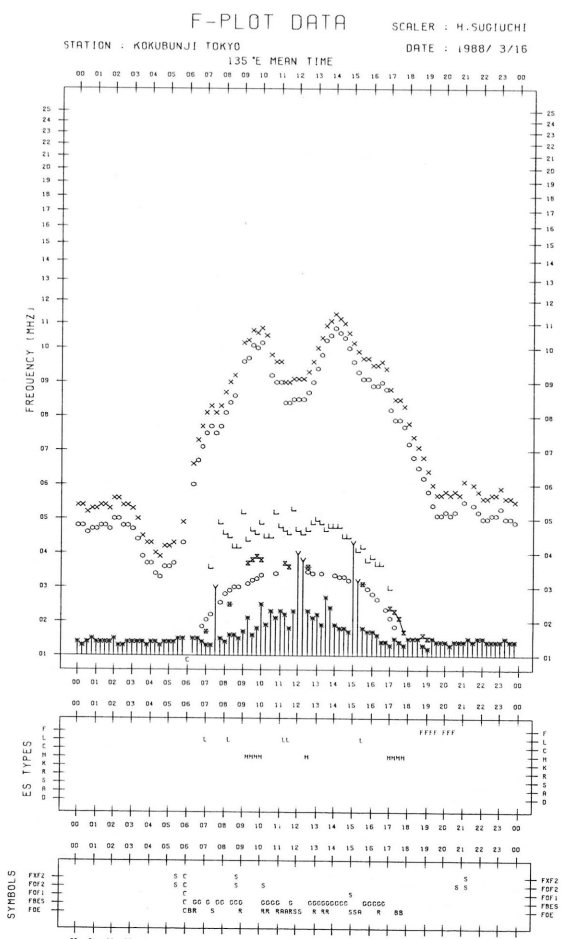
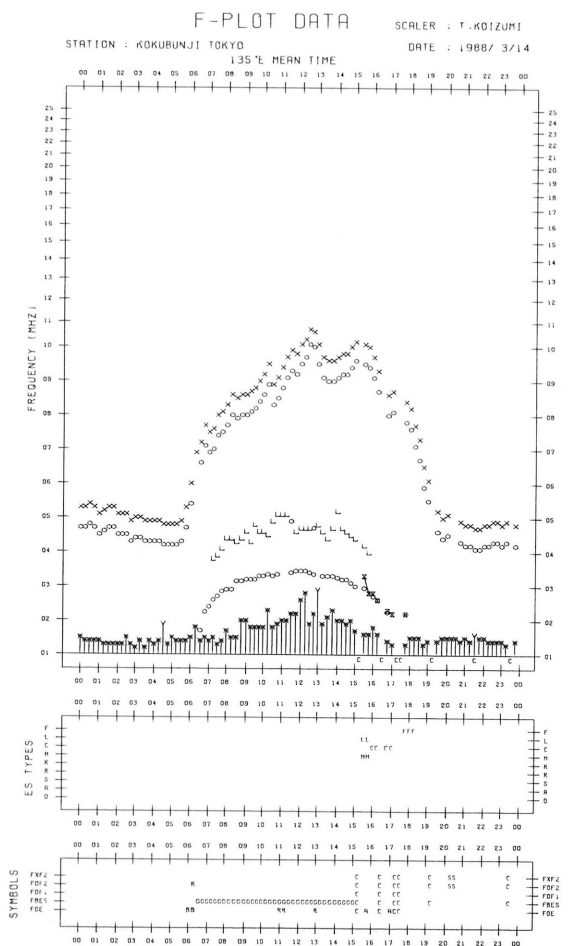
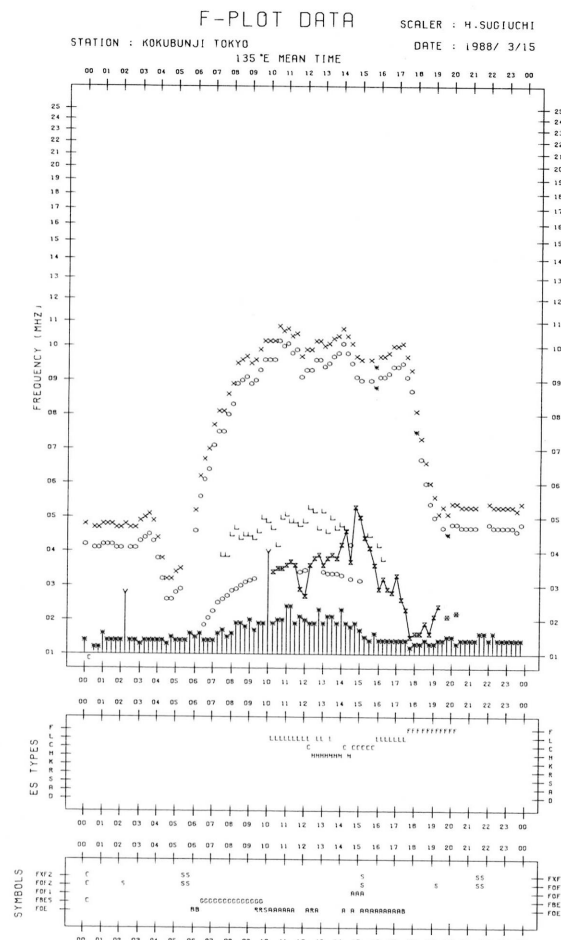
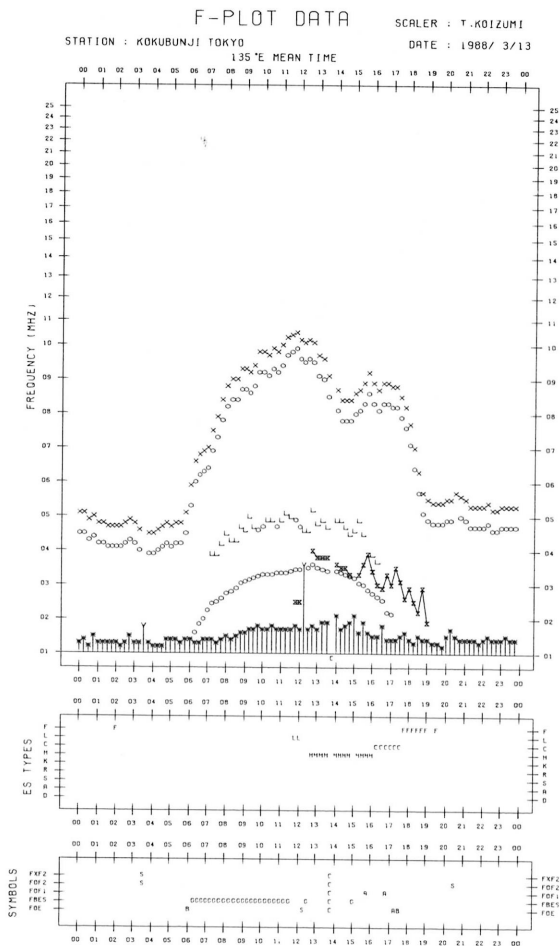
F-PLOT DATA

SCALER : T.KOJZUMI

STATION : KOKUBUNJI TOKYO DATE : 1988/ 3/12

135°E MEAN TIME



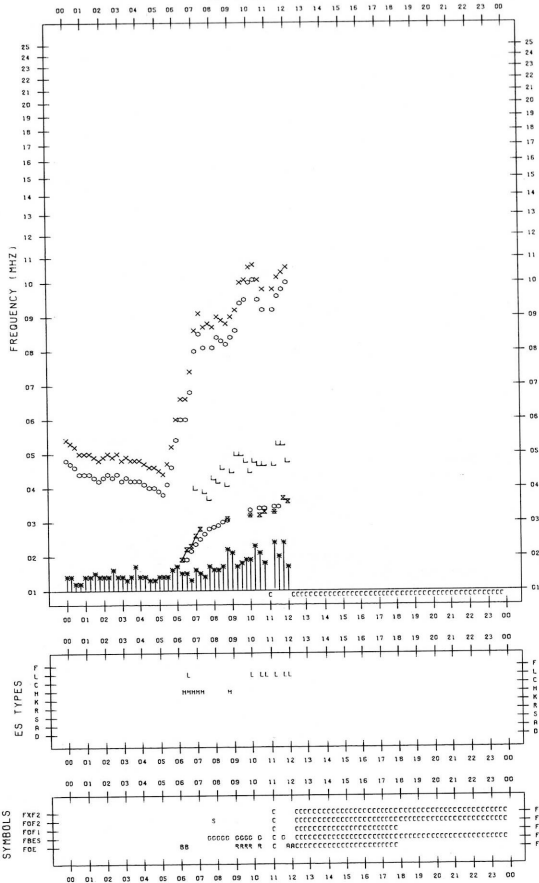


F-PLOT DATA

SCALER : H.SUGIUCHI

STATION : KOKUBUNJI TOKYO 135°E MEAN TIME

DATE : 1988/ 3/17

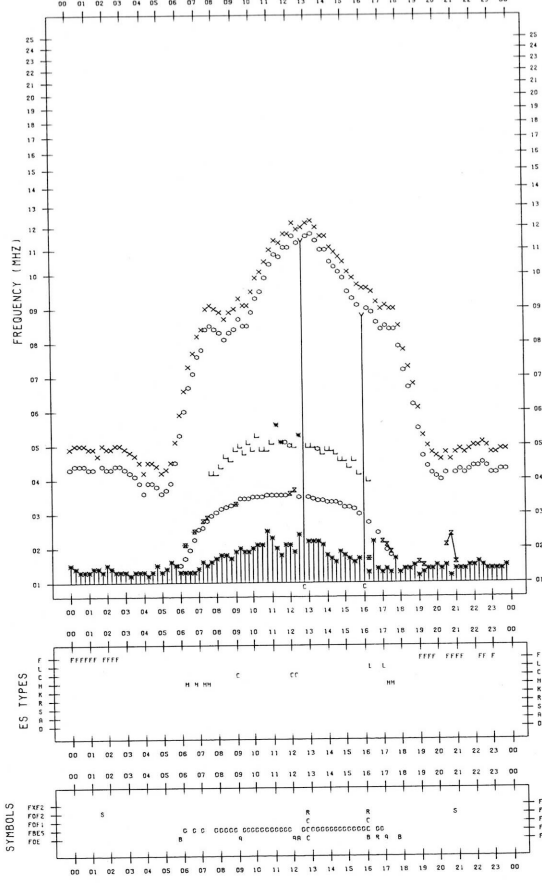


F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO 135°E MEAN TIME

DATE : 1988/ 3/19

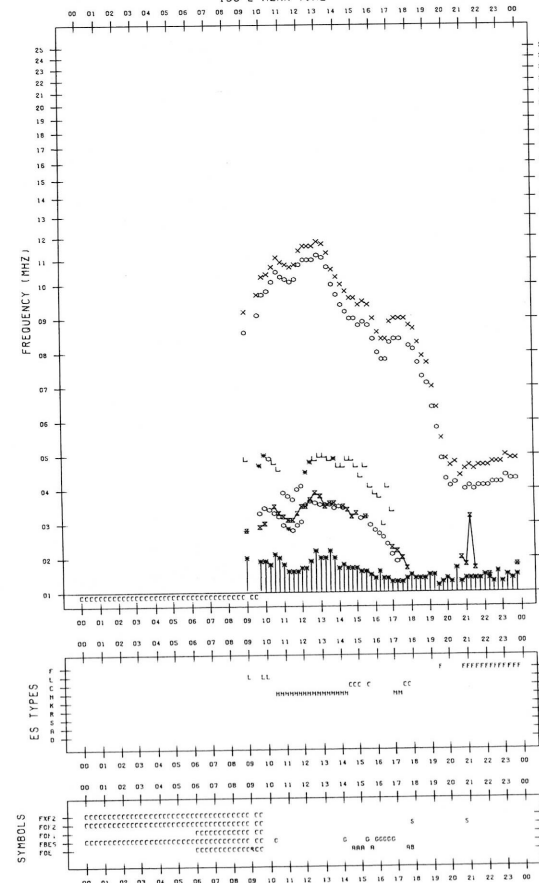


F-PLOT DATA

SCALER : H.SUGIUCHI

STATION : KOKUBUNJI TOKYO 135°E MEAN TIME

DATE : 1988/ 3/18

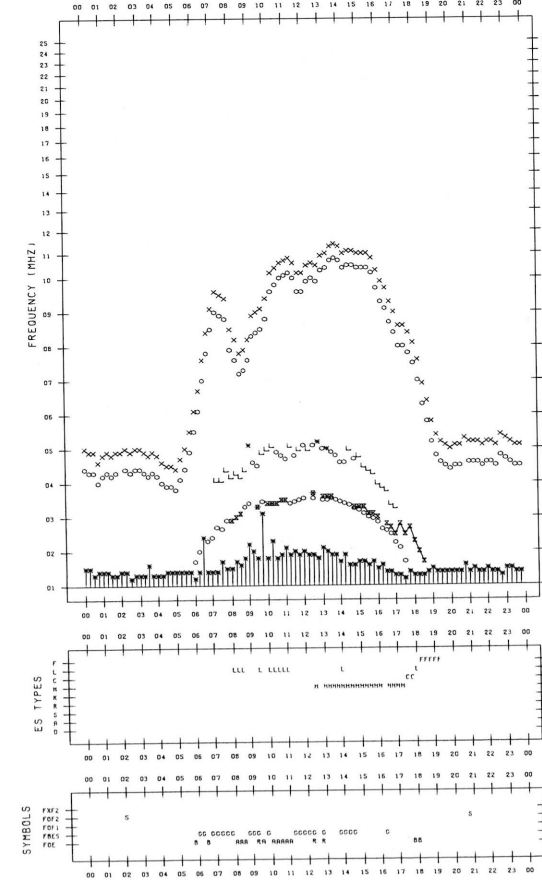


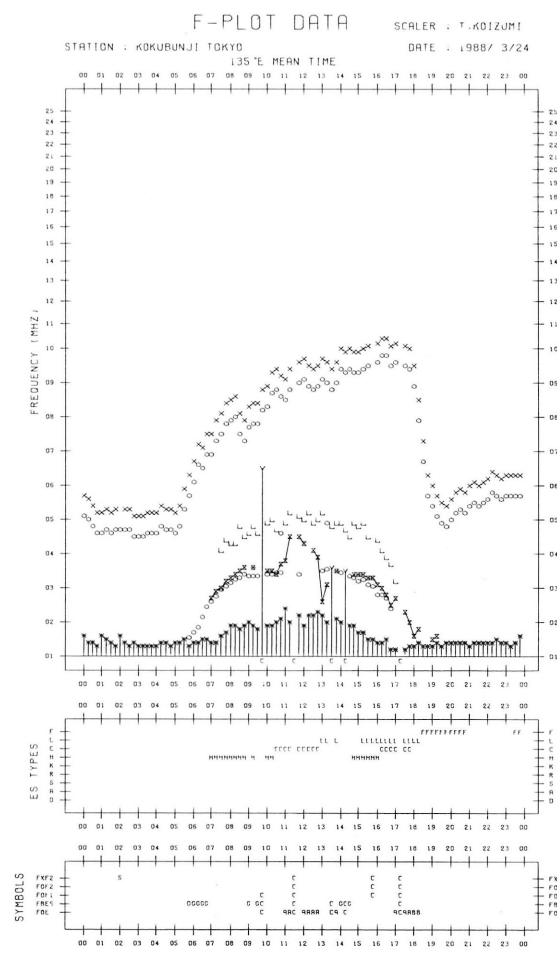
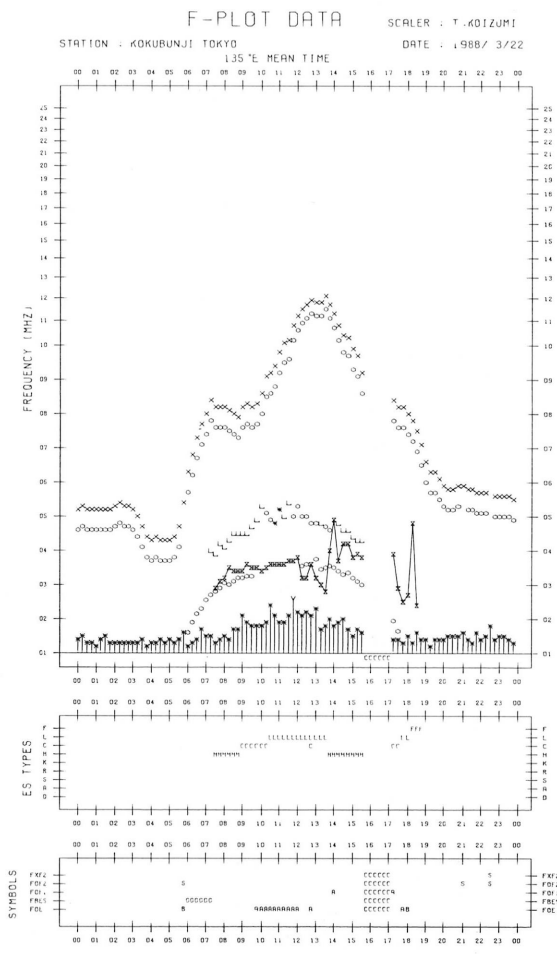
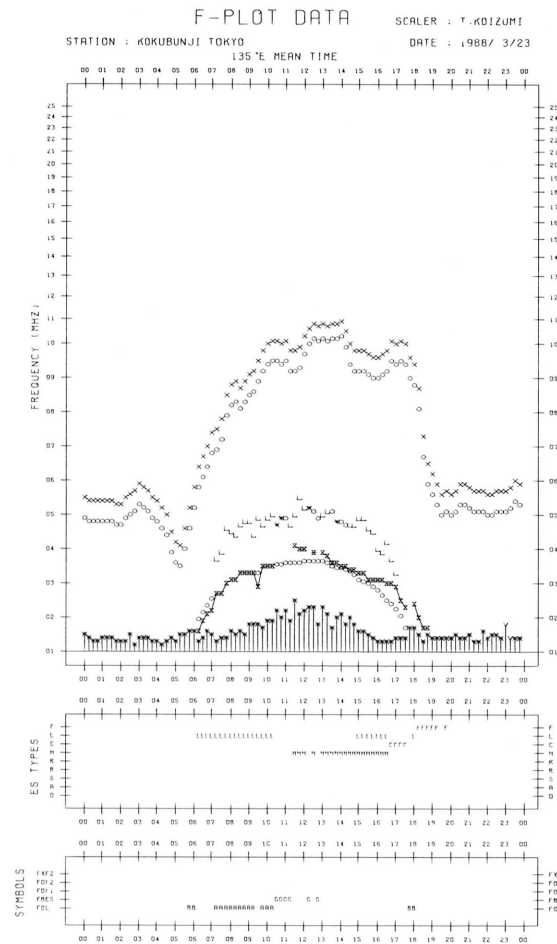
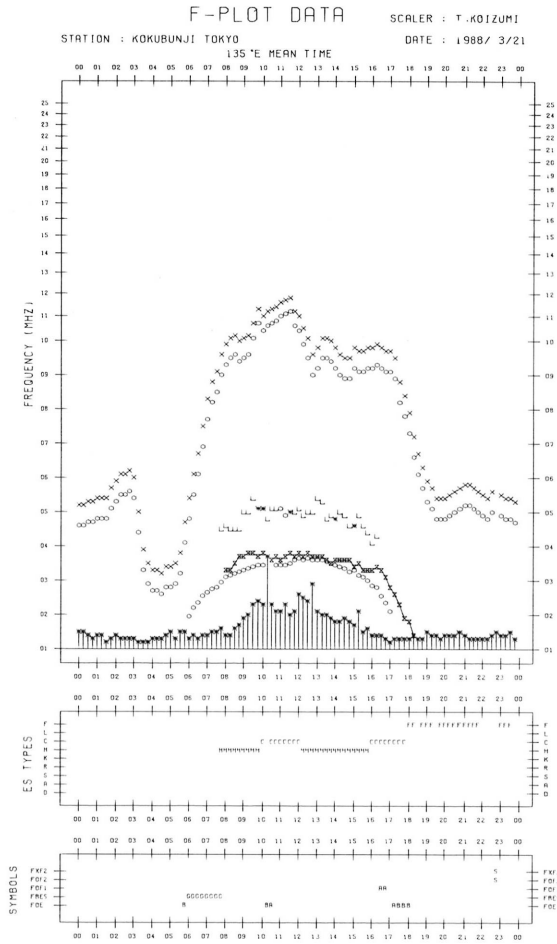
F-PLOT DATA

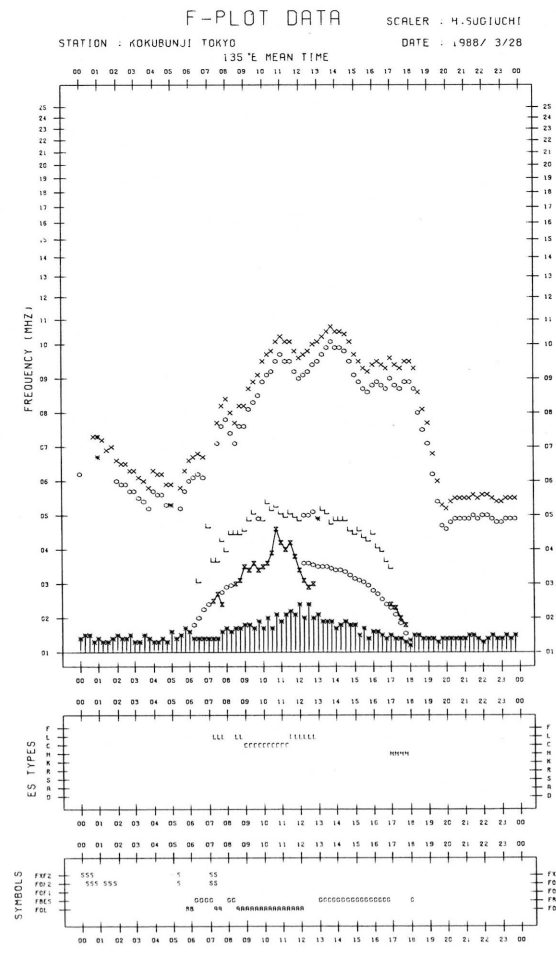
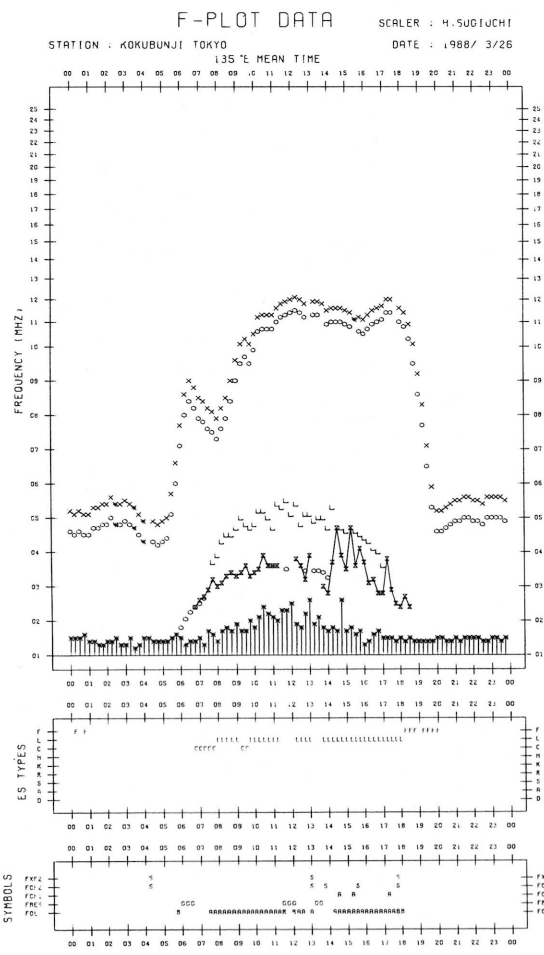
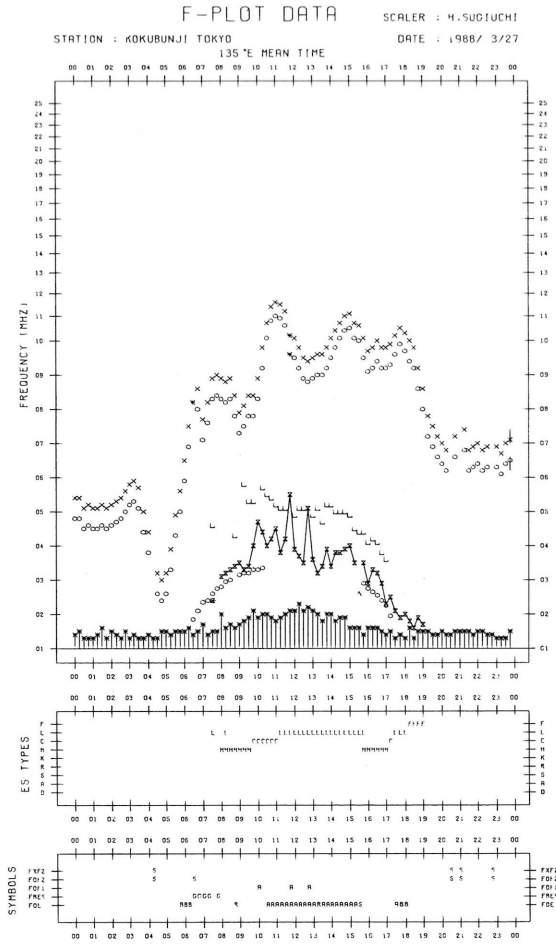
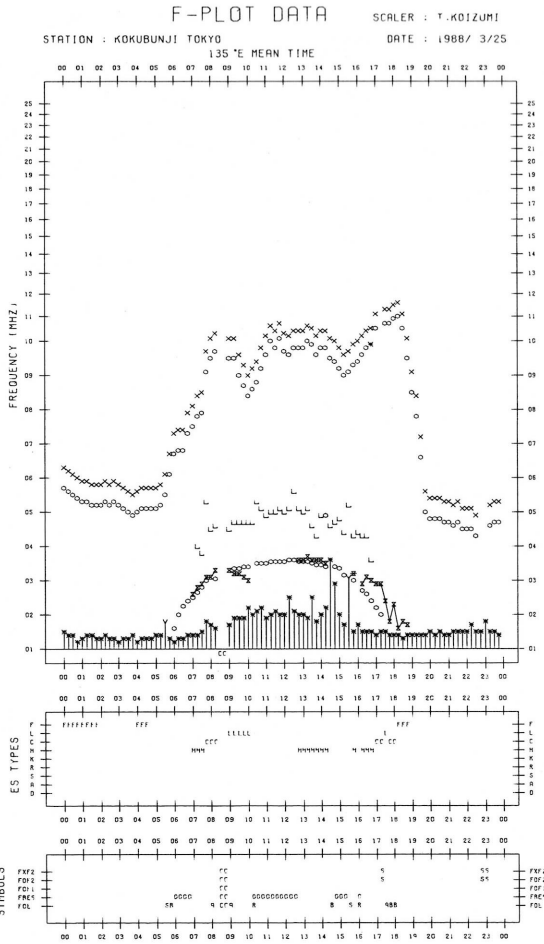
SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO 135°E MEAN TIME

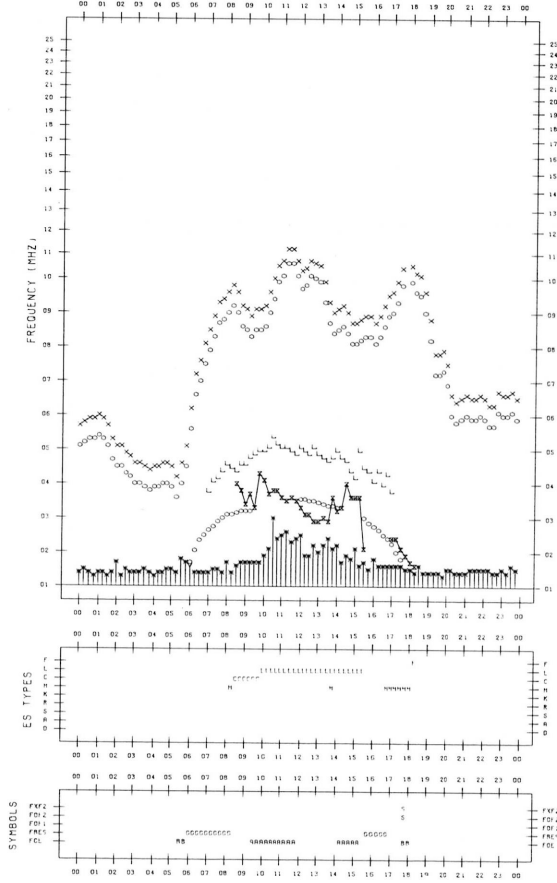
DATE : 1988/ 3/20



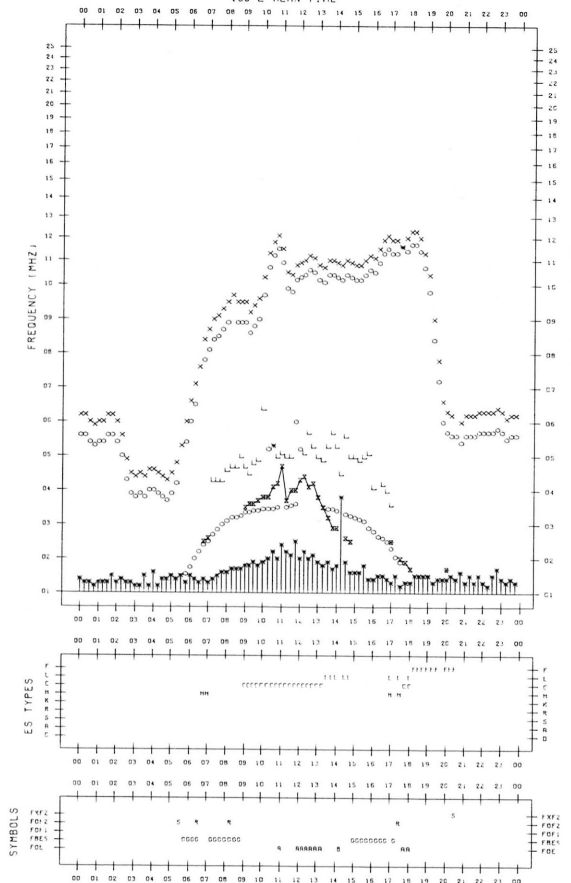




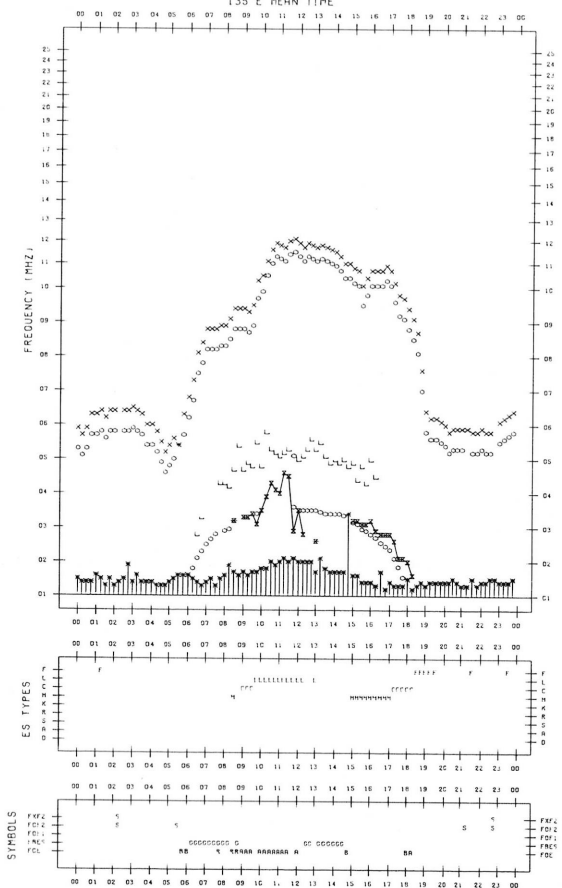
F-PLOT DATA SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1988/ 3/29



F-PLOT DATA SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1988/ 3/31



F-PLOT DATA SCALER : H.SUGIUCHI
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1988/ 3/30



B. Solar Radio Emission
 a. Daily Data at Hiraiso
 200 MHz

Hiraiso

March 1988

Single-frequency total flux observations at 200 MHz										
FLUX DENSITY: $10^{-22} \text{Wm}^{-2} \text{Hz}^{-1}$						VARIABILITY: 0 TO 3				
UT	00-03	03-06	06-09	21-24	DAY	00-03	03-06	06-09	21-24	DAY
DATE										
1	9	9	9	(9)	9	2	3	3	*	2
2	9	9	9	9	9	2	2	2	*	2
3	9	9	9	9	9	*	1	2	1	1
4	9	9	9	9	9	1	1	1	*	1
5	9	8	8	8	8	*	*	0	0	*
6	8	8	8	8	8	0	0	0	0	0
7	9	9	9	9	9	0	1	1	0	0
8	9	9	9	9	9	0	0	0	0	0
9	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-
11	9	9	9	8	9	*	*	*	0	*
12	8	8	8	8	8	0	*	0	0	0
13	8	9	9	8	9	0	0	0	0	0
14	8	8	8	8	8	*	*	2	3	*
15	8	8	8	8	8	3	3	3	3	3
16	8	8	8	q	8	2	1	1	*	2
17	8	8	8	8	8	*	*	*	0	*
18	6#	8	8	8	8	*	0	0	3	0
19	8	8	8	8	8	3	2	2	2	2
20	8	8	8	9	8	1	2	3	3	2
21	q	9	9	9	9	*	*	1	3	*
22	9	9	9	9	9	3	3	3	3	3
23	9	9	9	9	9	3	3	3	0	3
24	9	9	9	q	9	0	0	0	*	0
25	q	q	q	9	q	*	*	*	*	*
26	9	9	9	9	9	*	0	0	1	*
27	9	9	9	-	9	1	1	0	-	1
28	-	-	10	9	-	-	-	0	3	-
29	9	9	9	9	9	3	3	3	1	3
30	q	q	q	9	q	*	*	*	0	*
31	9	9	9	9	9	0	1	3	1	1

Note: 1. No observations during the following periods.

8th 2343 - 9th 0836
 10th 2057 - 11th 0017

9th 2057 - 10th 0836
 27th 2100 - 28th 0615

2. (q) likely quiet.
3. (*) interference.
4. (#) eclipse.

B. Solar Radio Emission
 a. Daily Data at Hiraiso
 500 MHz

Hiraiso

March 1988

Single-frequency total flux observations at 500 MHz					
FLUX DENSITY: $10^{-22} \text{Wm}^{-2} \text{Hz}^{-1}$					
UT DATE	00-03	03-06	06-09	21-24	DAY
1	36	37	39	35	37
2	37	38	37	35	37
3	36	36	37	35	36
4	36	36	35	35	36
5	35	35	36	36	35
6	35	35	36	34	36
7	34	36	36	35	35
8	36	36	36	35	36
9	-	-	-	-	-
10	-	-	-	-	-
11	(36)	35	35	34	35
12	36	36	35	35	35
13	37	37	36	-	36
14	38	38	40	39	39
15	40	39	38	35	39
16	37	37	37	35	37
17	36	36	35	34	36
18	29#	30#	35	35	32
19	35	35	36	35	35
20	36	37	39	38	37
21	38	38	38	34	38
22	35	35	34	36	35
23	37	36	36	35	36
24	37	38	37	35	37
25	37	38	37	38	37
26	38	38	37	37	38
27	39	39	39	36	39
28	37	37	37	38	37
29	39	39	38	37	38
30	38	38	37	36	38
31	36	37	37	37	37

Note: No observations during the following periods.

8th 2340 - 9th 0837
 10th 2053 - 11th 0135
 23th 0447 - 0555

9th 2053 - 10th 0837
 13th 2047 - 2345

#: Eclipse.

B. Solar Radio Emission
b. Outstanding Occurrences at Hiraiso

Hiraiso

March 1988

Single-frequency observations								
Normal observing period: 2100 - 0845 U.T. (sunrise to sunset)								
MAR 1988	FREQ. (MHz)	TYPE	START TIME (U.T.)	TIME OF MAXIMUM (U.T.)	DUR. (MIN.)	FLUX DENSITY ($10^{-22} \text{ Wm}^{-2} \text{ Hz}^{-1}$)		POLARIZATION REMARKS
						PEAK	MEAN	
2	200	43 NS	0043U	0411	480D	20	4	MR
	500	27 RF	0337	0426.5	70	6	3	WR
3	200	43 NS	0216	0546	390D	18	4	WR
	200	44 NS	2105E	0338	660D	10	3	0
6	500	6 S	0357.4	0357.7	1.5	26	-	WR
	200	46 C	0711.7	0711.9	1.5	240	-	0
14	200	43 NS	0453	0640	230D	7	4	0
	200	46 C	0805.7	0828U	44D	140U	43U	0 SUNSET
	100	46 C	0809.9	0815.8U	26D	180U	40U	- SUNSET
	200	44 NS	2050E	0006	710D	90	21	0
	500	27 RF	2308	0043	232	6	2	0
	100	43 NS	2337	0024	248	340	84	-
15	200	44 NS	2045E	2300	610D	3	1	0
	500	41 F	2218.2	2220.5	3.5	83	-	0
16	500	27 RF	2330	0030	270	3	1	0
18	200	44 NS	2044E	0510U	720D	15U	9U	WR
	500	27 RF	2203	0055	420	45	18	MR
	200	27 RF	2205	0134	390	390	120	SR
	100	27 RF	2209	2306	360	280	85	-
19	100	43 NS	0448	0610	220D	75	26	-
	200	44 NS	2044E	0743	720D	48	9	MR
20	200	44 NS	2044E	2125	720D	18U	4U	MR
21	200	44 NS	2043E	0636	720D	14	6	MR
	200	42 SER	2138	2319.7	200	460	-	SR
22	200	42 SER	0235	0400	86	250	-	SR
	200	42 SER	0558	0647	60	110	-	SR
	200	44 NS	2043E	0238	720D	16	6	MR
	500	6 S	2058.3	2059.0	1.7	43	-	0
	100	42 SER	2310.8	2313.2	12.5	1000D	-	-
	200	42 SER	2311.9	2313.2	10.6	15	4	MR
23	200	42 SER	0048.2	0152.8	68	710	-	0
	100	41 F	0048.6	0051.7	40	690	-	-
	500	42 SER	0054.0	0054.5	3.0	38	-	0
	100	42 SER	0147.3	0152.1U	6.9	1000D	-	-
	500	42 SER	0151.4	0154.4	5.5	210	-	WR
23	100	42 SER	0416.9	0423.4U	8.7	1000D	-	-
	200	46 C	0421.8	0422.1	4.6	830	115	WR
	100	42 SER	0605.9	0612.2	16.5	740	-	-
24	100	46 C	0818.5	0819.8	2.0	980	-	-
	200	46 C	0819.1	0819.8	1.5	810	-	MR
25	100	42 SER	0033.5	0052.1U	63	1000D	-	-
	200	42 SER	0033.7	0152.4	65	1500	-	0
	500	41 F	0134.2	0134.5	4.0	28	-	0
	200	42 SER	0311.2	0317.6	6.6	105	-	0
	100	41 F	0311.4	0311.6	3.0	890	-	-
	200	46 C	0515.2	0525.7	32	170	13	0
	500	46 C	0517.0	0521.2	6.0	4	2	0
	100	46 C	0527.7	0532.1	8.6	1100	240	-
	200	46 C	2136.9	2137.6	12.5	2200	157	0
				2140.7		510		0
	100	48 C	2137.6	-	14.5	1000D	535D	-
				2137.8		730		-
	500	46 C	2137.8	2138.0	11.0	130	15	0
	200	41 F	2207.3	2208.9	9.2	3200	-	0
	100	41 F	2207.3	2209.2	4.2	1000D	-	-
	500	41 F	2214.8	2215.0	1.8	110	-	WR
26	200	27 RF	2243	0244	320	21	13	WR
27	200	8 S	0403.9	0404.2	1.0	670	-	0
	500	27 RF	0442	0513	155	6	2	0
	500	27 RF	2300	2354	180	5	2	0
28	500	6 S	0107.3	0107.8	1.2	66	-	0
	500	42 SER	0211.4	0213.6	2.5	15	-	WR
	100	44 NS	2031E	2110	190	130	40	-
	200	44 NS	2031E	2220	730D	110	34	WL
	500	27 RF	2219	2242	78	35	8	WL
	500	27 RF	2353	2347	310	11	3	WL
29	100	46 C	0241.6	-	2.6	1000D	450D	-
	200	44 NS	2031E	-	200D	-	4	WR
	200	42 SER	2134.1	2134.7	3.8	430	-	0
	500	6 S	2134.7	2135.5	1.5	11	-	WR
	500	42 SER	2353.5	2354.3	2.2	10	-	0
30	500	42 SER	0330.6	0339.5	9.5	26	-	0
	200	8 S	0336.2	0336.8	0.9	110	-	0
	500	6 S	0604.0	0604.6	0.9	9	-	0
	200	8 S	0604.2	0604.4	0.5	500	-	0
	200	24 R	2030E	-	720D	-	2	WR
31	200	43 NS	0424	0643	270D	19	8	WR
	100	43 NS	0426	0713	300D	28	17	-
	200	44 NS	2024E	-	760D	-	21U	MR
	100	44 NS	2024E	-	760D	-	70U	-

RADIO PROPAGATION

MEASUREMENT OF H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWV)

MAR 1988		FREQUENCY 15 MHZ														BANDWIDTH 80 HZ				RECEIVING ANTENNA ROD 4.5 M				MEASURED AT HIRAI SO					
UT DAY	00H 15M	01H 15M	02H 15M	03H 15M	04H 15M	05H 15M	06H 15M	07H 15M	08H 15M	09H 15M	10H 15M	11H 15M	12H 15M	13H 15M	14H 15M	15H 15M	16H 15M	17H 15M	18H 15M	19H 15M	20H 15M	21H 15M	22H 15M	23H 15M					
1	0	1	1	ES -2	ES -2	ES -2	ES 0	ES 0	ES 5	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	1	5	3	0	1	-2	0					
2	0	0	ES -3	ES -1	ES -1	ES -3	ES -1	ES 1	ES 2	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	0	16	8	8	2	1	1					
3	-1	ES -1	1	ES -2	ES -22	ES 1	ES 0	ES 1	ES -5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	2	7	6	-11	7	4	-1					
4	5	7	10	6	5	ES -21	ES -6	ES 2	ES 2	ES 2	ES 2	ES -21	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22					
5	8	8	1	0	ES -2	ES 0	ES 0	ES -2	ES 1	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	10	ES -22	ES -22	-14	5	0	0					
6	0	1	1	0	ES -8	ES -2	ES -22	ES -22	ES -2	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	1	7	7	10				
7	8	7	1	ES 0	ES -2	ES 0	ES -2	ES -2	ES 3	ES -8	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22					
8	9	5	7	4	ES -5	ES -5	ES -3	ES -3	ES -3	ES -11	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	0	ES -23	ES -23	ES -23	-19	-5					
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C					
10	C	C	C	C	C	C	C	C	ES -3	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22					
11	5	10	3	13	ES -3	ES -3	ES -9	ES -3	ES -1	ES -3	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22					
12	4	4	5	10	ES -22	ES -22	ES -22	ES -2	ES -2	ES 3	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22					
13	7	6	10	13	11	ES -6	ES -6	ES 0	ES 6	ES 0	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20					
14	6	8	12	8	0	ES -21	ES -21	ES -21	ES -12	ES 5	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
15	8	11	11	9	10	ES -5	ES 0	ES -8	ES -2	ES -23	ES -14	ES -23	ES -23	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22					
16	0	2	8	3	ES -10	ES -9	ES -22	ES -4	ES -3	ES -2	ES -3	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22					
17	6	6	4	ES -21	ES -21	ES -21	ES -21	ES -4	ES 1	ES -4	ES -4	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
18	2	4	11	10	ES -21	ES -21	ES -6	ES -6	ES -6	ES -4	ES -2	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
19	4	7	9	10	ES -6	ES -21	ES -21	ES -6	ES -6	ES -6	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
20	-2	7	13	11	10	ES -3	ES -22	ES -7	ES -7	ES 0	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
21	4	2	5	6	8	ES -9	ES -6	ES -6	ES -6	ES -6	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	1	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
22	-2	9	5	10	12	11	2	ES -6	ES -6	ES -6	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	2	ES -3	ES -2	ES -5	ES -2	ES -8				
23	4	6	9	19	10	UC 0	ES -21	ES -21	ES 4	ES 2	ES 2	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
24	1	6	5	10	11	ES -3	ES -3	ES 0	ES 0	ES -2	ES 0	ES -21	ES -21	ES -21	ES -3	ES -21	ES -4	ES 10	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
25	3	3	9	9	11	5	ES -21	ES -21	ES -6	ES -21	ES -6	ES -6	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
26	5	6	6	9	15	2	ES -4	ES 1	ES -6	ES -21	ES 6	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -6	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
27	1	ES -6	ES -6	ES -6	ES -21	ES -21	ES -3	ES -3	ES -2	ES 0	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	2	ES 4	ES 0	ES -21	ES -21	ES -1	ES -9	ES -1				
28	-2	ES -6	11	6	4	ES -6	ES -21	ES -6	ES -6	ES 4	ES -5	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
29	ES -22	-13	-3	-3	-1	ES -22	ES -3	ES -3	ES -1	ES -1	ES -9	ES -5	ES -22	ES -5	ES 2	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22					
30	-2	-9	-11	ES -11	ES 6	ES 5	ES -9	ES -9	ES -5	ES -11	ES -4	ES -11	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23					
31	5	-4	-5	ES -11	ES -11	ES -11	ES -11	ES -5	ES -2	ES -3	ES -4	ES -11	ES -23	ES -23	ES -10	ES -2	ES -11	ES 13	ES -23	ES -23	ES 7	ES 0	ES 0	ES -3					
CNT	29	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30					
MED	4	5	5	6	US -1	ES -5	ES -6	ES -4	ES -2	ES -5	ES -21	ES -21	ES -22	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21					
UD	8	9	11	13	11	ES 5	ES 0	ES 1	ES 4	ES 3	ES 2	ES -11	ES -21	ES -21	ES -10	ES -21	ES -4	ES 10	ES 7	ES 3	ES 8	ES 10	ES 8	ES 8					
LD	-2	ES -6	ES -5	ES -11	ES -21	ES -21	ES -22	ES -21	ES -6	ES -22	ES -22	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -22	ES -22	ES -23	ES -22	ES -21	ES -5					

RADIO PROPAGATION

MEASUREMENT OF H.F. FIELD STRENGTH (UPPER SIDE-BAND OF WWVH)

MAR 1988 FREQUENCY 15 MHZ BANDWIDTH 80 HZ RECEIVING ANTENNA ROD 4.5 M

MEASURED AT HIRAISSO

UT DAY	00H 45M	01H 45M	02H 45M	03H 45M	04H 45M	05H 45M	06H 45M	07H 45M	08H 45M	09H 45M	10H 45M	11H 45M	12H 45M	13H 45M	14H 45M	15H 45M	16H 45M	17H 45M	18H 45M	19H 45M	20H 45M	21H 45M	22H 45M	23H 45M		
1	17	18	18	21	20	25	0	27	9	-3	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	3	ES -21	9	18	18	18		
2	17	15	17	17	16	27	18	5	ES 2	-3	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	-3	1	15	5	20	10	15	14		
3	14	16	16	16	24	25	0	ES 1	ES -5	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-5	-2	6	20	16	17	6		
4	12	18	21	24	24	25	5	5	6	6	37	-3	ES -22	ES -22	ES -22	ES -22	ES -22	-2	ES -22	-5	3	8	17	11		
5	16	18	17	20	28	20	1	ES 1	ES 1	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	17	17	19	19		
6	14	12	19	19	27	27	9	0	ES -2	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	-1	13	23	23	12	
7	10	17	17	22	25	29	28	1	-2	-2	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	16	20	19	10	
8	13	13	14	21	20	24	20	1	35	27	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	12	16	16	7		
9	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
10	C	C	C	C	C	C	C	2	ES -22	ES -22	-9	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	-1	16	17	14	14	
11	12	5	19	18	22	24	20	27	ES -1	ES -9	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	21	ES -22	ES -22	6	11	10	6		
12	9	3	16	17	20	23	-1	2	3	0	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	17	20	13	17	10	
13	11	11	20	21	25	25	22	6	ES 4	-6	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	ES -20	6	19	11	15	6	
14	12	11	15	21	27	22	27	7	2	-9	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	14	ES -20	13	24	20	3		
15	13	14	10	12	19	20	29	4	3	-12	10	ES -23	ES -23	ES -22	ES -22	ES -22	ES -22	25	ES -22	ES -22	17	2	5			
16	3	6	8	15	21	20	13	16	-2	-2	-8	-5	-4	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	-2	9	-1	3	5		
17	6	11	11	24	20	24	29	8	1	1	-8	-8	-8	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	5	16	11	16	1	
18	9	17	18	16	20	27	12	2	2	25	0	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	8	19	10	17	11	
19	6	7	12	23	23	23	27	21	2	0	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	7	19	14	11	-6	
20	10	12	17	20	22	23	26	2	-1	-9	-9	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	13	ES -21	19	13	9	11	7
21	1	9	13	19	23	28	22	10	2	-9	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	6	15	24	15	10	
22	9	10	12	23	28	30	27	6	6	5	0	9	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	10	8	-3	9	5	3	ES -5	
23	10	8	17	24	25	29	30	31	28	2	-6	-4	-6	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	19	21	17	9	1	
24	8	3	14	15	23	25	23	30	3	-6	-9	-6	-3	ES -21	ES -21	1	ES -21	ES -4	ES -21	-4	3	-3	3	3		
25	9	8	11	21	25	23	28	29	34	29	25	7	-6	ES -21	ES -21	ES -21	ES -21	-6	-3	18	16	6	6	11		
26	10	11	14	19	25	20	31	33	33	29	-1	-2	-6	-9	ES -21	ES -21	ES -21	-3	ES -21	3	17	30	6	11		
27	9	14	18	13	25	28	30	34	17	-6	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	0	-3	11	10	14	4	9		
28	10	8	13	18	25	29	29	29	10	16	-2	-6	-9	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	18	13	20	0	7	
29	2	12	12	17	24	27	30	35	UC 25	24	30	0	1	-1	-2	ES -22	-13	11	5	13	19	16	7	9		
30	5	8	10	12	22	30	28	22	0	ES -8	U -5	-15	ES -23	ES -23	-11	-11	-11	ES -23	ES -23	13	11	6	6	2		
31	2	5	13	16	17	19	22	24	21	11	ES -11	ES -11	ES -23	ES -23	ES -23	-11	-15	-11	ES -23	ES -23	10	5	5	11	5	
CNT	29	29	29	29	29	29	29	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
MED	10	11	15	19	23	25	23	8	US 2	-2	US -10	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	ES -21	5	16	14	12	3	
UD	16	18	19	24	27	29	30	33	33	27	25	0	-4	ES -20	ES -20	-11	-13	13	3	18	20	24	19	14		
LD	2	5	10	13	19	20	0	ES 1	ES -2	ES -22	ES -22	ES -23	ES -23	ES -23	ES -23	ES -22	ES -22	ES -22	ES -22	ES -22	ES -22	5	5	3	1	

C. Radio Propagation

b. Radio Propagation Quality Figures at Hiraiso

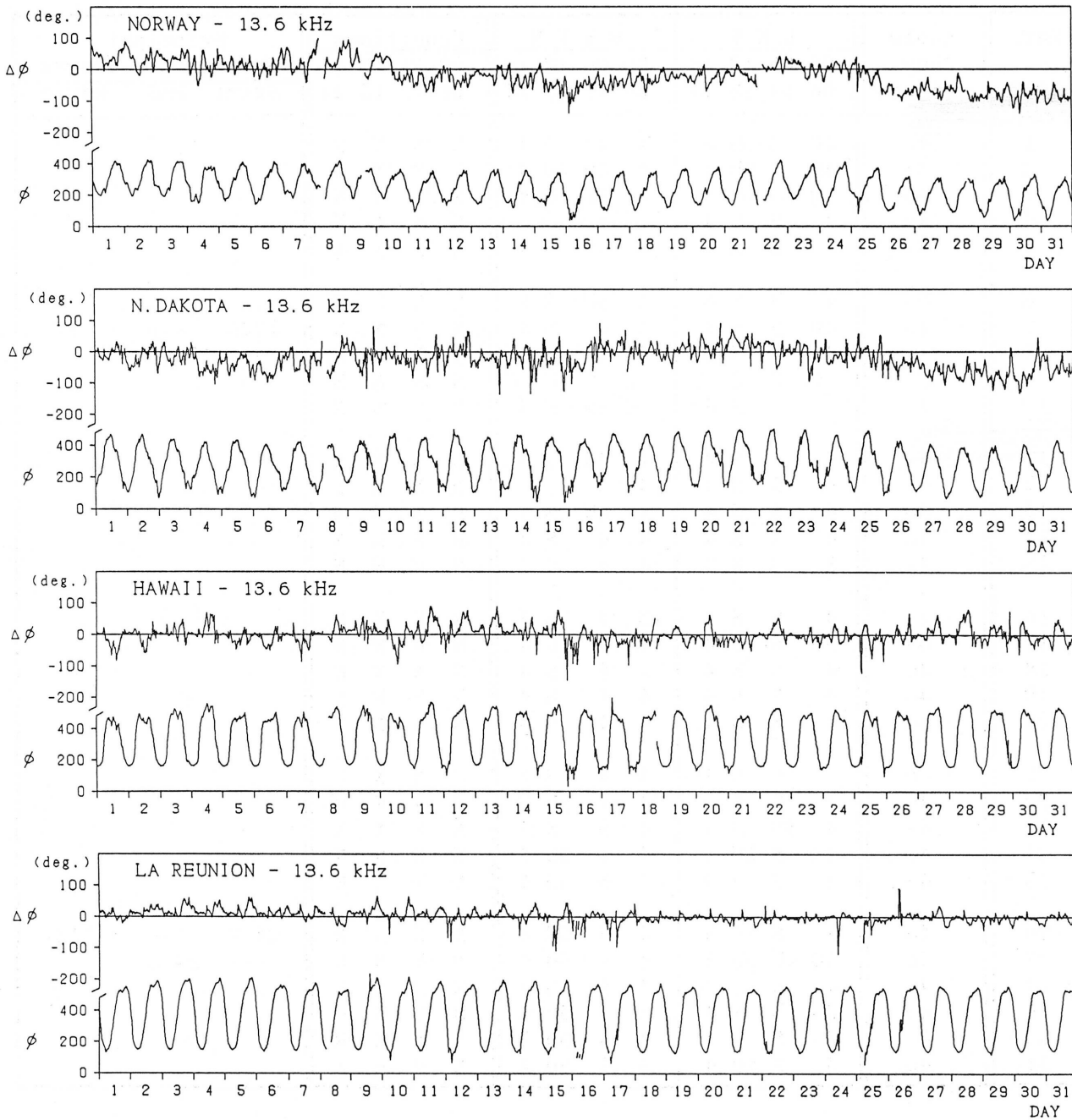
Hiraiso		Time in U.T.														
Mar. 1988	Whole Day Figure	W W V				W W V H				Conditions				Principal Geomagnetic Storms		
		00 06	06 12	12 18	18 24	00 06	06 12	12 18	18 24	00 06	06 12	12 18	18 24	Start	End	Range
1	4o	4U	S	5U	4	4	4	S	4	N	N	N	N			
2	4+	4U	S	5U	4	4	4U	5U	4	N	N	N	N			
3	4o	3U	S	5U	4	4	3U	5U	4	N	N	N	N			
4	4o	4	S	S	4	4	4	S	4	N	N	N	N			
5	4-	4	S	S	4	4	3U	S	4	N	N	N	N			
6	4-	4	S	S	4	4	3U	S	4	N	N	N	N			
7	4o	4U	S	S	4	4	4	S	4	N	N	N	N	1726	---	77
8	4-	4	S	S	3U	4	4	S	3	N	N	N	N	---	21.0	
9	C	C	C	C	C	C	C	C	C	N	N	N	N			
10	4-	C	S	S	4	C	3U	S	4	N	N	N	N			
11	4-	4	S	S	4	4	4U	S	3	N	N	N	N			
12	4-	4	S	S	4	4	3	S	4	N	N	N	N			
13	4o	4	S	S	4	4	4U	S	4	N	N	N	N			
14	4o	4	S	S	4	4	4	S	4	N	N	N	N			
15	4-	5	S	S	3	4	4	S	3	N	N	N	N			
16	4-	4	S	S	4	3	4	S	3	N	N	N	N			
17	4-	3U	S	S	4	4	4	S	4	N	N	N	N			
18	4o	4	S	S	4	4	4	S	4	N	N	N	N			
19	4o	4	S	S	4	4	4	S	4	N	N	N	N			
20	4o	4	S	S	4	4	4	S	4	N	N	N	N			
21	4o	4	S	S	4	4	4	S	4	N	N	N	N			
22	4o	4	S	S	4	4	4	5U	3	N	N	N	N			
23	4+	4	5U	S	4	4	5	S	4	N	N	N	N			
24	4o	4	S	5U	4	4	4	5U	3	N	N	N	N			
25	4+	4	S	S	4	4	5	5U	4	N	N	N	N			
26	4o	4	S	S	3	4	5	5U	4	N	N	N	N	04.8	---	113
27	4o	3U	4U	5U	3	4	4	5U	4	N	N	N	N	---	24.0	
28	4-	4	S	S	2U	4	5	S	4	N	N	N	N			
29	4o	3	S	S	4	4	5	5U	4	U	U	U	U			
30	4-	3U	S	S	4	4	4	5U	3	N	N	N	N			
31	4o	3	S	5U	4	3	5	5U	4	N	N	N	N			

C. Radio Propagation

c. Phase Variations in OMEGA Radio Waves at Inubo

Inubo

March 1988



Polar Cap Phase Anomaly (PCPA) on Norway-Inubo Circuit

Start (U.T.)	End (U.T.)	Max. (U.T.)	Max. Phase Deviation (negative value, deg.)
Mar. 25/2240	Mar. 26/0800D	Mar. 26/0215	97.9

C. Radio Propagation

d. Sudden Ionospheric Disturbance

(i) Short Wave Fade-out (SWF) at Hiraiso

Hiraiso

Time in U.T.

Mar. 1988	S W F						Correspondence				
	Drop-out Intensities (dB)				Start	Duration	Type	Imp.	Solar Flare	Solar Noise	Geomag. Crochet
	CO	HA	1)	2)							
15			22		0824	21	1	2-			
15	x	x	20		2219	xx	1	2-	2219	x	
16	x	x	25		0250	30	2	2	0244		
16			25		0420	18	1	2			
16		x	13		2134	2	1	1	2134		
24				21	1020	28	2	1+	1019		
25	x	x	27	x	0518	39	2	2			

Notes CO: Colorado(NWV) HA: Hawaii(NWWH) 1): Australia 2): London

(ii) Sudden Phase Anomaly (SPA) at Inubo

Inubo

Mar. 1988	S P A						Time (U.T.)		
	Phase Advance (degrees)						Start	End	Maximum
	Date	Ω/N	Ω/LR	NWC	Ω/H	Ω/ND			
1			—	7		0100	0124	0102	
1		<u>22</u>	15			0446	0619	0508	
1		9				0825	0904	0833	
5				5		0024	0041	0027	
10	16	<u>61</u>	51	32	17	0554	0702	0600	
11	15		46	<u>38</u>	34	0126	0241	0142	
11			37	<u>39</u>	27	2225	2306D	2233	
11			39	<u>22</u>	10	2306E	2340	2317	
12	24	<u>94</u>	76	63	40	0132	0302	0152	
12	24	<u>93</u>	66	50	37	0421	0549D	0433	
12		<u>19</u>	9			0549E	0638D	0554	
12		<u>19</u>	8			0638E	0730	0647	
12		<u>27</u>	17			0755	0903	0812	
12			6	<u>5</u>	—	2338	2355	2341	
13		9	<u>6</u>			0444	0512	0451	
13				44		2105	2211	2117	
13			4	<u>7</u>		2324	2340	2330	
14			—	11		0014	0041	0020	
14			—	5		0116	0136	0122	
14		<u>55</u>	34			0809	0858	0827	
14			8	<u>18</u>		2235	2303D	2242	
14		28	47	<u>83</u>		2303E	0058	2320	
15		<u>14</u>	13			0431	0507	0435	
15		<u>22</u>	11			0518	0624	0542	
15	29	<u>184</u>	94			0821	0921D	0830	
15		<u>162</u>	54			0921E	1100	0930	
15		36				1117	1146D	1128	
15		<u>95</u>				1146E	1306	1157	
15				<u>123</u>		2039	2218D	2047	
15	42	34	72	<u>153</u>	129	2218E	0024	2227	
16			<u>8</u>	7		0035	0055D	0038	
16		17	<u>40</u>	32		0055E	0117D	0059	
16	27	38	<u>75</u>	50	47	0117E	0155D	0126	
16	17		<u>51</u>	23		0155E	0246D	0200	
16	59	<u>157</u>	141	90	84	0245	0419D	0258	
16	47	<u>143</u>	128	76	48	0419E	0552D	0428	
16	64	<u>202</u>	162	90	44	0552E	0732D	0603	
16	22	<u>51</u>	56			0732E	0839	0740	
16		64				0946	1049	0952	
16				98		1852	1949	1900	
16	21	10		<u>94</u>	93	2133	2237D	2138	
16	16		14*	<u>31</u>	20	2237E	2325	2248	
16	23	26	35	<u>35</u>	34	2340	0035	2345	
17	21	31	<u>69</u>	25	17	0207	0323D	0216	
17	22	<u>32</u>	34	24	18	0322	0355	0328	

Inubo

Mar. 1988	S P A					Time (U.T.)		
	Phase Advance (degrees)					Start	End	Maximum
Date	Ω/N	Ω/LR	NWC	Ω/H	Ω/ND			
17	31	<u>113</u>	92	60	41	0407	0526D	0419
17	17	<u>76</u>	61	61		0526E	0739D	0530
17		<u>25</u>	8			0739E	0815	0744
17		9				0827	0847	0830
17		103				1054	1208D	1100
17		29				1208E	1302	1213
17				<u>94</u>	108	2054	2232D	2107
17	11		16	<u>31</u>	23	2232E	2250	2241
17	10	25	21	<u>22</u>	24	2346	0035	2353
18				4		0051	0116	0058
18	32	32	23	<u>41</u>	33	0159	0251	0203
18		7				0336	0435	0338
18		12				0609	0717	0618
18		9				0817	0840	0821
18		68				1003	1108	1010
18				9		2135	2155	2143
19	7		<u>14</u>	11		0137	0254	0142
19		<u>14</u>	8			0547	0659	0614
19		<u>8</u>	5			0703	0723	0710
19			6	<u>5</u>		2304	2326	2311
19	21	17	25	<u>30</u>	21	2334	0055	2344
20				<u>40</u>	35	2111	2248	2130
21	17	31	—	<u>43</u>	40	0017	0212	0036
21	11	<u>23</u>	—	12	21	0320	0438	0329
21				14		2119	2157	2127
22	13	<u>25</u>				0712	0815	0719
22				27		2049	2203	2100
23			6	4		0152	0211	0157
23		<u>19</u>	14	8		0357	0513	0417
23		8		<u>35</u>	43	2143	2220D	2151
23				<u>27</u>	25	2220E	2330	2248
24	6		<u>11</u>	9		0117	0145D	0122
24	8		<u>18</u>	12		0145E	0223	0150
24		7	<u>10</u>	4		0348	0426	0355
24		4				0445	0510	0455
24		4				0544	0558	0549
24		<u>10</u>	8			0812	0827	0819
24	16	<u>12</u>				0936	1003	0947
24	32	<u>140</u>				1016	1200	1030
24				43		1909	1923	1911
24				47		1932	1947	1937
24				29		2010	2027	2015
24				16		2032	2057	2036
24				<u>18</u>	20	2141	2153	2147
25			6	5		0135	0154	0139
25	11		<u>5</u>	3		0313	0327	0315
25	13	<u>9</u>	14	7		0358	0433	0409
25	103	<u>203</u>	128	90	55	0517	0717	0526
25		<u>19</u>	9			0723	0748	0728
25		<u>29</u>	12			0846	0924	0852
25		68				1117	1235	1122
25	16			<u>81</u>	76	2137	2321	2154
26			6	<u>4</u>		0107	0118	0110
26	10	<u>12*</u>	16*	<u>7</u>	14	0541	0630	0546
26			6			2220	2240	2223
26	8			<u>6</u>	13	2246	2315	2253
27		<u>13</u>	8			0734	0820	0742
29			—	41		0048	0320	0123
29		5	8			0509	0534	0516
29		<u>46</u>	30			0625	0734	0635
29				9		2240	2303	2251
30				5		2312	2332	2317

IONOSPHERIC DATA IN JAPAN FOR MARCH 1988

F-471 Vol. 40 No. 3 (Not for Sale)

電離層月報 (1988年3月)

第40卷 第3号 (非売品)

1988年7月25日 印刷

1988年7月30日 発行

編集兼 郵政省通信総合研究所

発行所 〒184 東京都小金井市貫井北町4丁目2-1

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