

IONOSPHERIC DATA IN JAPAN

FOR MAY 1988

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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

fxI	Top frequency of spread F trace
$foF2$ $foF1$ foE $foEs$	Ordinary wave critical frequency for the $F2$, $F1$, E and Es including particle E layers respectively
$fbEs$	Blanketing frequency of the Es layer, e.g. the lowest ordinary wave frequency visible through Es
$fmin$	Lowest frequency which shows vertical ionospheric reflections
$M(3000)F2$ $M(3000)F1$	Maximum usable frequency factor for a path of 3000 km for transmission by $F2$ and $F1$ layers respectively
$h'F2$ $h'F$ $h'E$ $h'Es$	Minimum virtual height on the ordinary wave for the $F2$, whole F , E and Es layers respectively
Types of Es	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 atmospheric.
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful.
- V Forked trace which may influence the measurement.
- W Measurement influenced or impossible because the echo lies outside the height range recorded.
- X Measurement refers to the extraordinary component.
- Y Lacuna phenomena, severe layer tilt.
- Z Third magneto-electronic component present.

(ii) Qualifying Letters

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

- 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 *f_{min}*.
- 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
Station Call	WWV	WWVH	
Location	Fort Collins, Colorado	Kauai, Hawaii	Hiraiso, Ibaraki
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	propagational 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

MAY. 1988

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

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

MAY. 1988

FXI (0.1 MHz)

IONOSPHERIC DATA

MAY. 1988

FOF2 (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

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	46	47	45	45	48	49	52	56	54	55	60	64	65	68	67	67	63	67	68	76	75	68	52	50
2	48	48	47	49	50	59	66	71	64	64	73	71	70	73	75	76	72	71	74	82	76	62	58	58
3	57	58	55	51	49	55	56	69	66	64	69	75	75	72	77	77	78	74	80	85	76	65	60	57
4	58	59	59	56	55	67	71	76	87	80	70	74	72	84	91	86	81	81	78	82	73	66	61	58
5	58	56	57	58	56	62	79	71	81	86	74	81	79	81	82	83	77	71	72	80	84	87	78	74
6	74	67	61	57	55	57	55	57	60	54	56	59	55	56	58	57	56	61	65	84	64	64	47	45
7	36	34	27	26	29	H E G 33	E G 34	E G 37	E G 40	E G 42	E G 41	E G 43	E G 42	E G 42	E G 42	58	E G 41	46	48	51	56	55	49	F 45
8	48	S 47	48	47	41	H 38	43	A	52	51	56	52	56	59	65	71	57	67	66	73	73	68	66	64
9	59	S 61	57	F 52	52	56	73	74	A	55	57	62	67	67	67	C	A	72	72	79	80	74	67	61
10	59	56	52	52	49	56	58	64	61	63	66	64	66	70	71	74	71	71	67	67	72	69	69	65
11	60	60	57	56	54	62	70	Z 65	68	64	67	73	76	75	76	74	73	76	76	79	82	72	69	66
12	63	61	60	57	56	61	75	74	71	74	71	75	77	76	74	76	73	75	80	82	83	33	79	71
13	67	62	60	58	59	76	86	72	72	70	79	83	82	79	79	A	A	A	78	81	A	A	F 68	
14	F	F	F	F 57	F 55	67	A	79	77	70	72	A	A	71	73	71	73	A	72	A	81	74	66	F
15	F 63	56	57	56	54	66	76	71	69	67	76	77	74	72	74	79	84	80	A	A	81	80	69	59
16	57	56	F 58	F 58	F 58	S 75	81	81	68	71	63	75	A	A	70	77	78	83	37	94	92	82	F 85	79
17	79	F	74	63	60	70	70	74	82	A	79	86	71	73	71	72	75	84	84	85	77	78	72	67
18	64	58	62	50	45	56	64	67	76	75	73	68	Z 61	64	70	64	63	67	70	81	83	81	77	67
19	61	56	53	51	54	61	66	70	65	58	72	67	71	75	74	72	70	70	69	77	84	83	66	60
20	57	57	55	54	53	61	53	54	54	51	54	59	R	A	65	68	A	74	A	71	76	74	74	66
21	60	58	55	56	57	61	71	67	69	74	68	71	70	A	A	A	75	76	74	76	72	73	71	66
22	64	59	56	52	56	61	69	69	65	66	A	61	63	65	68	73	68	A	67	76	77	73	70	59
23	57	57	55	54	55	60	66	63	60	58	61	56	59	62	61	65	68	69	71	76	72	79	72	68
24	67	64	64	63	68	59	65	70	77	72	67	67	70	64	69	71	71	71	78	86	83	79	75	69
25	66	65	64	62	60	63	59	68	76	75	70	62	66	66	66	69	70	65	63	70	78	78	75	70
26	64	59	58	56	64	73	36	88	76	A	66	71	71	76	78	77	86	86	A	77	73	79	75	71
27	70	65	63	62	63	73	82	76	72	63	64	61	H 63	64	65	69	71	71	72	76	81	80	75	69
28	64	63	61	60	64	67	75	71	76	70	67	67	69	71	71	71	72	71	75	80	84	82	80	76
29	69	66	62	61	61	73	84	91	91	84	72	72	77	74	69	72	74	73	77	83	84	84	78	72
30	70	68	67	66	64	70	81	83	77	78	77	74	68	66	71	71	78	74	76	90	87	83	71	67
31	64	63	59	61	64	66	63	59	A	A	A	A	A	A	A	A	A	61	A	68	78	A	74	65
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT	30	29	30	31	31	31	30	30	29	28	29	29	27	27	29	27	27	28	27	29	30	29	31	29
MED	62	59	58	56	55	61	70	70	69	66	68	68	70	71	71	72	72	71	72	79	78	78	71	66
UQ	66	63	61	59	60	67	76	74	76	74	72	74	73	74	74	76	76	76	78	82	83	81	75	69
LQ	57	56	55	52	52	53	59	65	64	58	63	62	64	64	67	69	69	68	68	76	75	69	66	59

The Radio Research Laboratory, Japan

MAY. 1988

FOF2 (0.1 MHz)

IONOSPHERIC DATA

MAY. 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 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								400	420	L	L	500	490	500	480	L	L	410	L	390																
2								380	430	L	L	480	520	500	500	480	L	L	430	L	400															
3								430	450	L	L	500	480	500	480	L	L	430	L	430	A															
4								L	450	L	L	450	500	510	L	L	490	L	470	L	470															
5									L	L	L	490	460	490	A	L	530	L	500	L	460	L	380													
6								L	430	L	L	420	440	470	L	L	450	L	470	L	440	L	410	L	330											
7								340	370	L	L	400	420	410	L	L	430	L	420	L	420	L	460	L	410	L	390	L	320							
8								360	A	A	L	460	490	480	L	L	490	L	500	L	480	L	460	A	A											
9								A	A	A	A	L	510	500	L	L	500	L	500	U	A	A	A	C	A	A										
10								L	410	L	L	430	510	L	L	500	L	490	L	500	L	480	L	460	L	430	L	400								
11								L	410	L	L	480	A	L	L	530	L	500	L	510	L	510	L	500	L	L	L	380								
12								L	410	L	L	450	460	L	L	480	L	520	L	510	L	510	L	510	L	500	L	470	L	440	A					
13								L	350	A	A	L	490	500	L	L	500	L	510	L	520	A	A	L	480	A	A	A	A							
14								A	A	A	L	450	470	L	L	A	A	A	A	A	A	A	A	A	A	A	A	A	A							
15								A	A	A	L	500	480	L	L	U	A	L	510	L	500	L	490	L	470	L	460	L	440	A	A					
16								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A							
17								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A							
18								A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A							
19								L	400	L	L	450	L	L	H	L	H	490	L	490	L	510	L	490	L	470	L	480	L	430	L	400				
20								L	390	L	L	470	440	A	L	L	U	A	L	500	L	470	L	480	A	A	A	A	A	A	A					
21								A	L	L	L	430	450	L	L	490	L	480	A	A	A	A	A	A	A	A	A	A	A	A						
22								L	420	L	L	430	470	470	A	A	A	500	L	480	L	480	L	460	L	440	L	L	L	A						
23								L	410	L	L	440	450	L	L	460	L	470	L	480	L	490	L	480	L	470	L	450	L	410						
24								L	440	L	L	450	470	L	L	500	L	500	L	490	L	500	L	450	L	460	A	A	A	340						
25								A	L	L	L	460	460	A	L	L	U	A	A	L	480	L	480	L	500	L	480	L	470	A	A					
26								L	430	L	L	460	A	A	L	L	500	L	490	L	500	L	500	L	510	A	A	A	A							
27								L	420	L	L	450	460	L	L	470	L	480	L	480	L	490	L	490	L	460	L	440	L	L	A					
28								L	400	L	L	450	470	A	L	L	530	L	500	L	480	L	A	L	460	L	440	L	420	L	A					
29								L	440	L	L	460	480	A	L	L	U	A	A	L	500	L	A	A	A	L	480	L	480	A	L	390				
30								L	410	L	L	450	480	L	L	490	L	490	L	500	L	510	L	540	L	530	L	500	L	L	A					
31								L	350	L	L	410	460	A	L	L	U	A	A	L	460	L	460	L	460	L	460	L	460	L	A					
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23											
CNT							2	17	18	25	19	22	23	25	23	26	23	17	12	4																
MED							L	350	L	L	L	410	435	L	L	460	L	470	L	490	L	500	L	500	L	490	L	480	L	460	L	440	L	405	L	335
UQ							L	410	L	L	L	450	470	L	L	490	L	490	L	500	L	505	L	510	L	500	L	490	L	475	L	440	L	415	L	365
LQ							L	400	L	L	L	430	450	L	L	465	L	465	L	480	L	485	L	490	L	480	L	470	L	460	L	430	L	395	L	325

MAY. 1988

FOF1 (0.01 MHz)

IONOSPHERIC DATA

MAY. 1988

FOE (0.01 MHz)

135° E Mean Time (G.M.T. + 9h)

Station	WAKKANAI				Lat.	Long.							Sweep 1 MHz to 25 MHz in 2 sec in automatic operation									
	00	01	02	03	45 23' 5" N	141	41	2	E	12	13	14	15	16	17	18	19	20	21	22	23	
1					S	240	280	310	330	345	355	A	345	330	310	290	250	S				
2						185	245	285	310	335	350	360	355	345	330	310	295	240	H	S		
3					S	245	290	310	335	350	360	360	350	335	315	300	235	S				
4					S	250	295	315	335	345	A	355	345	335	315	300	245	S				
5					S	250	300	320	340	350	360	360	350	335	325	300	260	S				
6						185	250	295	315	330	340	B	355	340	325	310	295	240	185			
7					S	235	280	305	330	335	345	340	335	325	310	290	240	H	S			
8						210	250	290	305	325	335	345	345	335	325	315	290	240	S			
9					S	245	290	305	325	335	350	B	345	330	C	300	245	190	S			
10						200	255	300	315	335	345	355	360	A	H	335	315	300	250	S		
11						195	265	300	320	340	A	A	360	A	345	320	300	250	190	S		
12						195	255	295	315	335	355	360	360	355	340	325	300	255	S			
13						195	255	290	310	320	330	340	350	A	335	315	295	235	175	S		
14						200	260	305	320	335	345	A	A	350	340	320	300	255	195	S		
15						205	260	300	320	335	A	A	A	A	340	330	315	A	S			
16					S	205	255	300	320	335	345	A	A	A	A	A	A	A	A	S		
17					S	205	250	295	320	330	340	345	350	340	330	325	300	255	195	S		
18						155	205	290	305	315	335	345	B	355	345	335	325	295	250	205	S	
19					S	205	255	290	310	320	A	360	360	350	335	320	295	250	195	S		
20					S	220	255	300	315	330	345	A	A	A	A	A	310	255	210	S		
21					S	210	260	305	320	340	350	B	360	B	325	310	A	A	A	S		
22					S	215	260	300	320	335	345	355	355	350	335	320	305	A	200	S		
23					S	200	250	300	325	335	345	A	A	B	340	320	305	265	215	S		
24					S	200	250	295	310	330	345	350	355	350	B	315	305	265	210	S		
25					S	210	255	305	325	340	350	A	A	A	A	A	310	260	A	S		
26					S	220	275	300	B	340	A	A	B	A	340	325	300	265	195	S		
27					S	210	275	305	315	330	345	355	360	345	335	325	300	250	H	S		
28					S	215	275	305	320	335	B	350	350	345	A	330	305	270	H	S		
29					E	H	215	275	310	340	350	360	365	365	A	320	A	A	A	A	S	
30					S	H	215	280	310	340	350	355	360	360	A	A	A	315	275	220	S	
31					S	215	285	310	330	350	360	A	B	A	A	A	A	A	A	S		
CNT						2	25	31	31	30	31	26	18	21	18	24	24	27	25	16		
MED					E	E	155	205	255	300	315	335	345	355	355	345	335	320	300	250	195	
UQ						215	262	305	320	338	350	360	360	350	333	325	305	260	210			
LQ						200	250	292	310	330	345	350	355	345	330	315	295	245	192			

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MAY. 1988

FOE (0.01 MHz)

IONOSPHERIC DATA

MAY. 1988

FOES (0.1 MHz)

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

Station	WAKKANAI				Lat. 45 23 5 N				Long. 141 41 2 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	E S	16	16	E S	E S	E S	23	31	G	36	G	G	G	41	G	G	G	24	G	30	J A	25	20	J A	E S	
2	E S	16	15	E S	E S	E S	16	23	32	36	G	G	42	G	G	G	34	35	40	40	J A	20	21	J A	E S	
3	E S	16	16	E S	E S	E S	21	20	G	39	G	41	G	G	G	G	G	43	26	36	22	20	23	E S	16	
4	E S	16	16	E S	E S	E S	16	23	G	34	G	G	G	J A	54	G	G	35	J A	J A	27	36	27	17	26	E S
5	J A	20	16	16	E S	E S	16	20	G	G	G	51	J A	77	42	G	G	38	40	G	27	E S	16	24	E S	
6	E S	16	16	E S	E S	E S	16	25	31	35	41	40	G	E B	G	G	G	G	G	G	24	E S	16	E S	E S	
7	J A	21	16	20	E S	27	30	G	G	38	G	G	G	G	G	J A	40	49	35	G	J A	22	16	16	16	
8	E S	16	16	E S	24	J A	26	30	32	52	53	38	43	43	G	G	G	31	53	J A	43	J A	55	31	J A	
9	J A	64	29	34	27	J A	50	54	73	93	73	44	42	E B	56	61	J A	83	57	64	J A	40	26	62	20	
10	J A	30	27	54	21	E S	16	31	33	36	43	45	47	46	G	39	G	G	G	32	J A	50	64	53	27	
11		21	23	E S	J A	24	25	G	G	G	41	J A	54	53	42	41	J A	J A	50	53	25	G	31	31	E S	
12	E S	18	16	E S	E S	E S	18	G	G	35	39	41	G	G	G	43	41	38	42	43	41	33	36	25	J A	
13	23	E S	14	16	23	J A	24	G	J A	55	J A	52	J A	50	45	47	J A	43	54	89	J A	127	151	125	J A	
14	J A	73	50	39	29	43	41	J A	74	87	49	54	73	143	126	56	40	38	J A	56	95	73	134	77	62	
15	J A	27	22	E S	J A	E S	16	33	42	49	52	53	J A	51	40	J A	47	40	G	J A	44	42	J A	76	97	
16	J A	24	22	J A	E S	E S	16	41	43	J A	50	56	J A	97	59	59	J A	99	134	J A	47	66	42	74	44	
17	26	23	E S	E S	E S	16	28	49	50	54	83	73	55	G	47	40	54	J A	65	56	60	45	45	J A	24	
18	E S	15	15	E S	J A	J A	32	J A	36	47	59	J A	55	41	J A	52	41	G	G	38	J A	45	45	36	J A	
19	E S	16	16	E S	E S	14	20	30	33	J A	72	41	J A	39	G	G	G	G	G	32	48	18	41	E S		
20	E S	17	26	20	E S	E S	17	G	33	42	J A	46	51	55	40	J A	61	57	60	J A	78	85	J A	67	67	
21	J A	23	J A	J A	E S	E S	17	30	39	39	42	J A	48	53	J A	56	85	J A	93	J A	57	63	71	54	50	
22	J A	27	22	E S	E S	E S	16	G	33	40	51	47	75	53	51	G	G	G	G	87	71	26	56	43	J A	
23	23	25	23	E S	E S	16	25	35	G	40	J A	63	41	J A	50	45	E B	50	G	41	39	J A	41	32	27	
24	E S	16	26	26	E S	16	20	29	J A	64	41	G	43	51	52	G	43	41	42	J A	45	42	32	48	24	
25	J A	23	21	25	J A	J A	43	41	36	53	47	54	54	42	66	50	J A	44	41	J A	47	63	64	J A	26	
26	23	J A	J A	25	25	22	29	G	35	42	J A	75	50	40	42	J A	46	51	53	J A	51	82	98	66	35	
27	J A	26	23	15	20	E S	16	26	41	51	45	42	G	G	G	G	J A	53	36	53	53	22	16	21	E S	
28	E S	16	16	21	J A	35	24	26	G	G	40	J A	51	56	54	G	44	J A	127	42	41	35	J A	70	40	
29	J A	35	15	26	J A	22	26	26	G	G	J A	49	63	47	78	73	54	52	50	J A	47	36	33	37	36	
30	E S	23	15	21	E S	E S	17	G	G	J A	49	41	G	G	J A	51	64	42	43	40	G	54	49	59	69	
31	J A	23	J A	J A	E S	E S	18	G	36	50	J A	67	67	66	J A	80	59	J A	94	110	J A	66	77	147		
	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	30	31	31	31	31	31	31	31	31	31	
MED	21	21	16	E S	E S	18	26	33	40	42	J A	47	43	41	42	40	39	42	J A	45	48	37	34	25	24	
UQ	J A	26	24	25	22	24	30	42	50	52	54	54	53	55	52	52	50	J A	52	71	68	54	J A	50	53	
LQ	E S	16	16	E S	E S	E S	16	G	G	40	39	E S	39	G	G	G	G	29	35	32	26	26	22	21	E S	

MAY. 1988

FOES (0.1 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

FBES (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

Station		WAKKANAI							Lat.	45° 23' S			Long.	141° 41' 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		E 16	S 16	E 16	S 16	E 16	S 21	G	G	G	G	G	G	38	G	G	G	G	G	30	24	E 16	S 16	E 21	S 16			
2		E 16	S 15	E 16	S 16	E 16	S 16	G	G	G	G	G	G	39	G	G	G	G	G	40	36	E 19	S 20	E 16	S 16			
3		E 16	S 16	E 16	S 16	E 21	S 20	G	G	G	G	G	G	40	G	G	G	G	G	40	23	E 16	S 16	E 16	S 16			
4		E 16	S 16	E 16	S 15	E 16	S 22	G	G	G	G	G	G	36	49	G	G	G	G	44	24	E 16	S 26	E 17	S 16			
5		E 18	S 16	E 16	S 16	E 16	S 20	G	G	G	G	G	G	46	75	39	G	G	G	35	G	E 26	S 16	E 16	S 16			
6		E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	E 36	G	G	G	G	G	G	G	16	E 16	S 16	E 16	S 20			
7		E 21	S 16	E 16	S 16	E 19	S 23	G	G	G	G	G	G	G	G	G	41	G	G	26	E 16	S 16	E 16	S 16				
8		E 16	S 16	E 16	S 16	E 24	S 26	A 30	A 48	46	38	41	38	G	G	G	31	45	41	51	55	24	E 16	S 25	46			
9		E 25	S 21	E 24	S 16	E 25	S 46	46	67	A 90	49	40	40	E 40	50	52	C 77	A 55	A 60	A 39	25	50	19	E 17				
10		E 23	S 17	E 32	S 19	E 16	S 30	33	36	41	46	45	46	G	39	G	G	G	G	31	50	52	20	25	E 16			
11		E 11	S 16	E 16	S 21	E 18	S 18	G	G	G	38	52	46	39	G	39	46	G	G	29	E 16	18	21	E 16	S 16			
12		E 18	S 16	E 16	S 16	E 18	S 18	G	G	G	39	G	G	G	G	41	38	41	39	33	32	21	E 16	S 16	E 16			
13		E 16	S 14	E 16	S 16	E 20	S 16	G	47	46	45	45	44	40	54	45	A 34	A 127	A 151	23	E 16	A 101	A 85	E 16	46			
14		41	42	30	28	41	37	A 72	66	40	46	67	126	126	54	40	G	52	A 93	65	A 132	32	44	43	54			
15		E 19	S 16	E 16	S 16	E 16	S 30	41	46	47	46	48	40	45	38	G	39	38	76	A 97	A 123	19	E 16	S 16	E 16			
16		E 16	S 14	E 15	S 16	E 16	S 40	41	46	50	67	59	53	A 99	A 134	A 44	53	40	70	40	34	33	31	29	E 16			
17		E 16	S 15	E 16	S 16	E 16	S 44	46	47	A 83	50	44	G	47	40	50	64	52	57	45	40	E 15	S 15	E 16				
18		E 15	S 15	E 15	S 30	31	30	47	54	39	39	52	48	40	G	G	39	44	39	27	28	43	E 16	S 16	E 16			
19		E 16	S 16	E 16	S 14	E 20	S 27	31	44	G	37	39	G	G	G	G	G	G	G	46	E 12	34	E 16	S 16	E 16			
20		E 17	S 16	E 20	S 16	E 17	S 33	38	40	46	50	38	45	A 54	A 54	57	A 78	A 50	A 67	62	24	33	E 16	S 21				
21		E 18	S 16	E 20	S 16	E 17	S 39	38	41	46	46	51	55	A 81	A 93	A 81	55	55	66	50	40	62	E 16	S 16				
22		E 17	S 15	E 16	S 18	E 16	S 33	39	40	44	75	53	45	G	G	G	G	A 76	55	E 16	50	37	34	E 16				
23		E 17	S 15	E 16	S 16	E 16	S 40	40	39	46	44	50	G	40	39	33	31	21	18	25	16	E 16	S 16	E 16				
24		E 16	S 16	E 16	S 18	E 16	S 18	27	62	38	G	32	48	49	G	G	E 41	36	44	41	G	44	23	30	23	50		
25		E 16	S 20	E 16	S 18	E 38	40	32	51	46	50	50	39	46	44	36	36	45	60	59	E 16	28	18	E 16	S 16			
26		E 15	S 20	E 20	S 15	E 20	S 41	A 76	49	40	39	46	46	46	50	76	A 94	60	31	24	16	E 16	S 16					
27		E 24	S 22	E 16	S 16	E 16	S 40	40	41	42	G	G	G	G	G	G	34	G	39	19	E 16	S 16	E 16	S 16				
28		E 16	S 16	E 16	S 20	E 18	S 40	40	41	42	G	G	G	51	56	52	G	44	52	40	40	35	50	36	28	21	19	E 16
29		E 30	S 15	E 16	S 16	E 20	S 19	G	G	G	48	58	46	52	71	51	46	44	47	30	33	37	31	36	20	19		
30		E 17	S 16	E 16	S 16	E 17	S 40	40	G	G	49	41	41	40	40	G	54	37	50	20	24	21	20					
31		E 16	S 17	E 16	S 16	E 18	S 36	44	A 65	A 67	A 61	A 80	A 59	A 80	A 110	A 66	A 77	54	100	51	62	A 95	24	E 17				
		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	30	31	31	31	31	31	31	31	31			
MED		E 16	S 16	E 16	S 16	E 16	S 18	G	31	33	40	44	46	40	39	38	E 36	37	40	41	39	34	25	20	E 16	S 16		
UQ		E 18	S 16	E 16	S 17	E 20	S 27	40	46	46	50	50	50	45	50	46	44	48	55	58	50	34	32	21	18			
LQ		E 16	S 16	E 16	S 16	E 16	S 16	G	G	G	G	G	E 39	37	G	G	G	G	G	G	28	16	18	E 16	S 16			

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MAY. 1988

FBES (0.1 MHz)

IONOSPHERIC DATA

MAY. 1988

FMIN (0.1 MHz)

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

Station	WAKKANAI				Lat. 45 23 5 N				Long. 141 41 2 E				Sweep 1 MHz to 25 MHz in 2 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	16	16	16	E S	16	17	16	20	19	26	21	24	25	22	21	19	19	19	E S	16	16	16	E S	16				
2	E S	16	15	E	E S	16	16	16	20	19	25	21	25	22	20	20	20	19	17	E S	16	13	16	E S	16				
3	E S	16	16	E S	E S	21	E S	20	15	18	19	28	20	26	23	26	20	21	18	18	E S	16	16	E S	16				
4	E S	16	16	E S	E S	16	16	17	19	20	20	26	25	26	24	21	20	21	17	E S	16	16	E S	16					
5	E S	15	16	16	E S	16	20	18	21	21	27	28	26	26	24	24	26	20	18	E S	16	16	16	E S	16				
6	E S	16	16	15	E S	16	E S	14	18	19	20	21	25	36	27	27	25	24	22	16	E S	16	E S	16	E S	16			
7	E S	12	16	16	E S	16	16	16	18	20	24	26	28	26	27	22	20	19	16	E S	16	16	E S	16	E S	16			
8	E S	16	16	16	E S	16	E S	16	18	19	23	24	23	30	23	24	21	20	16	17	18	E S	16	E S	16	E S	16		
9	E	16	16	E S	E S	16	E S	19	16	17	21	25	27	30	40	25	24	C	20	19	E S	16	E S	16	E S	16			
10	E	17	16	E S	E S	16	19	16	20	16	24	26	30	29	27	25	25	19	17	E S	16	16	E S	16	E S	16			
11	E S	11	16	16	E S	18	E S	16	17	20	19	20	27	28	30	24	20	19	19	17	E S	16	16	E S	16	E S	16		
12	E S	18	16	16	E S	18	16	17	17	19	27	30	22	25	22	20	22	19	16	E S	16	16	E S	16	E S	16			
13	E S	16	14	16	E S	17	E S	16	16	19	23	21	23	26	30	27	21	21	20	17	E S	16	16	E S	16	E S	16		
14	E S	17	E	16	E S	16	16	17	19	24	25	27	26	33	25	26	20	20	20	E S	14	E S	14	E S	E	E S	16		
15	E S	16	16	16	E S	16	15	16	20	22	23	26	28	23	28	20	21	20	20	E S	17	E S	16	E S	16	E S	16		
16	E S	16	14	11	E S	16	E S	16	18	19	19	22	21	23	24	25	26	20	19	18	E S	17	E S	16	E S	16	E S	16	
17	E S	16	15	16	E S	16	16	18	19	21	21	21	25	24	21	25	26	20	17	E S	16	16	E S	16	E S	16	E S	16	
18	E S	15	15	E S	E S	14	E S	20	22	26	26	26	36	26	26	27	25	19	19	E S	16	E S	E	E S	E S	E S	16		
19	E S	16	15	E	E S	16	16	18	19	23	21	24	30	27	26	25	26	20	17	E S	17	18	E	E S	E S	E S	16		
20	E S	17	16	17	E S	17	17	19	24	26	28	30	30	26	27	24	24	22	19	E S	18	16	E S	16	E S	16	E S	16	
21	E S	16	16	16	E S	16	E S	17	17	20	20	30	26	38	30	36	25	26	19	18	E S	16	16	E S	16	E S	16	E S	16
22	E S	15	15	16	E S	15	16	20	20	20	25	26	30	29	26	25	24	19	18	E S	16	16	16	E	E S	E S	16	16	
23	E S	17	15	E S	E S	16	E S	16	16	20	24	31	26	25	50	23	25	20	18	E S	17	16	16	E	E S	E S	16	16	
24	E S	16	16	16	E S	16	17	17	20	21	28	30	30	25	29	41	26	19	18	E S	16	16	16	E S	E S	E S	16	16	
25	E S	16	13	16	E S	14	18	18	20	24	25	26	27	30	26	22	22	20	20	E S	16	16	16	E S	E S	E S	16	16	
26	E S	15	15	E	E S	15	E S	16	16	20	34	27	24	24	37	25	27	24	20	19	E S	16	16	16	E S	E S	E S	16	16
27	E	16	16	16	E S	16	16	17	20	21	24	25	25	27	27	26	26	20	20	E S	16	16	16	E S	E S	E S	16	16	
28	E S	16	16	16	E	16	E S	19	20	21	26	38	25	28	30	29	21	26	19	E S	16	16	E	E S	E S	E S	16	16	
29	E S	16	15	16	E S	16	16	19	20	24	30	32	31	24	28	28	26	20	19	E S	16	16	16	E S	E S	E S	16	16	
30	E S	17	16	16	E S	17	16	19	24	23	26	28	30	26	30	30	26	20	20	E S	17	16	16	E S	E S	E S	16	16	
31	E S	16	17	16	E S	18	16	17	21	25	27	31	30	37	25	31	26	26	19	E S	18	16	16	E S	E S	E S	16	16	
CNT		31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	31	31	31	31	31	31	31	31	31	31	31	
MED	E S	16	16	15	E S	16	16	17	20	21	25	26	28	26	26	25	24	20	18	E S	16	16	16	E S	E S	E S	16	16	
UQ	E S	16	16	16	E S	16	17	18	20	23	27	28	30	30	27	26	26	20	19	E S	17	16	16	E S	E S	E S	16	16	
LQ	E S	15	15	16	E S	16	16	16	19	20	24	24	25	25	24	21	20	19	17	E S	16	16	16	E S	E S	E S	16	16	

MAY. 1988

FMIN (0.1 MHz)

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IONOSPHERIC DATA

MAY. 1988

M(3000)F2 (0.01)

135° E Mean Time (G.M.T. + 9h)

Station	WAKKANAI																								
	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	290	270	285	275	280	290	290	325	335	290	295	300	300	310	315	315	315	315	310	305	305	310	280	280	
2	270	270	270	285	280	320	320	325	335	280	305	290	300	295	295	305	305	300	295	300	315	305	285	275	
3	280	285	270	270	275	330	320	320	320	305	300	310	310	290	300	300	305	310	300	315	315	295	290	285	
4	280	275	280	290	290	315	305	300	310	310	305	300	280	290	305	315	315	310	295	305	300	290	290	280	
5	280	265	280	295	310	315	330	300	310	325	320	A	305	310	310	310	315	305	300	275	265	290	280	270	
6	285	290	280	300	295	290	270	280	315	270	275	275	270	290	305	305	255	280	260	270	300	280	255	265	
7	235	260	220	225	240	270	H	G	G	G	G	G	G	G	G	G	310	G	275	235	280	290	275	265	
8	275	275	285	285	290	285	H	A	280	295	325	280	300	205	300	310	300	305	305	295	295	285	285	275	
9	280	305	285	260	280	270	295	A	A	A	280	305	300	300	295	C	A	305	300	285	290	285	295	290	
10	285	275	275	270	285	305	295	310	295	275	300	305	295	295	295	310	305	310	315	290	280	290	285	295	
11	285	285	300	305	290	305	310	Z	310	305	285	295	295	300	305	300	295	310	300	300	295	285	280	285	
12	280	280	290	295	285	310	295	305	305	300	280	290	300	300	295	305	305	295	305	295	290	295	295	285	
13	285	290	285	295	290	305	330	300	305	285	295	290	300	295	305	A	A	A	300	305	A	A	300	F	
14	F	F	F	F	F	290	295	A	305	310	305	A	A	A	295	300	300	300	A	290	A	300	310	290	F
15	F	290	290	305	300	305	315	305	320	310	310	310	300	295	300	295	300	A	A	A	295	300	315	305	
16	300	290	F	F	F	S	310	345	310	A	A	310	A	A	290	290	280	280	280	300	310	290	260	280	
17	275	F	300	300	295	295	310	295	310	A	295	315	300	300	300	290	280	295	295	310	290	280	280	275	
18	285	290	310	295	275	300	300	300	300	305	315	310	305	305	300	300	300	300	280	280	280	280	285	285	
19	280	345	270	260	275	315	320	300	330	310	305	300	290	295	295	300	300	310	295	285	290	305	295	290	
20	285	265	270	270	295	315	330	320	350	A	260	325	R	A	295	295	A	260	A	300	285	300	290	295	
21	290	290	285	285	310	315	245	300	320	300	315	310	280	A	A	A	295	300	310	310	290	295	295	285	
22	295	305	300	275	305	300	305	310	300	320	A	290	285	300	290	305	295	A	300	290	300	290	290	290	
23	285	295	290	295	295	325	305	310	315	330	310	320	290	305	295	295	295	290	300	280	290	290	290	285	
24	285	295	295	300	320	325	A	300	310	320	320	295	305	295	290	300	300	290	290	305	300	280	290	280	
25	280	280	295	300	315	305	305	295	300	320	305	295	300	300	295	300	305	A	A	285	280	295	295	300	
26	295	290	295	290	295	295	290	320	330	A	305	295	280	290	285	285	300	A	A	310	285	280	285	290	
27	285	300	290	290	285	295	295	290	300	315	305	295	295	300	300	305	300	300	300	290	290	290	295	290	
28	295	300	295	295	295	300	310	310	305	300	315	295	295	310	295	290	305	305	295	295	295	290	285	305	
29	290	295	300	290	295	285	290	305	310	310	285	300	A	295	305	295	295	295	300	285	295	285	295	295	
30	280	285	285	300	300	285	305	315	285	295	295	295	280	285	280	280	295	290	280	290	295	295	280	285	
31	285	285	285	295	300	315	300	275	A	A	A	A	A	A	A	A	A	A	A	A	280	275	A	285	280
CNT	30	29	30	31	31	31	29	29	29	25	27	28	26	27	29	27	27	24	26	29	30	29	31	29	
MED	285	290	285	290	290	305	305	305	310	305	305	298	298	295	295	300	300	300	300	295	292	290	290	285	
UQ	285	295	295	298	298	315	310	310	320	310	310	310	300	300	300	305	305	302	300	305	300	295	295	290	
LQ	280	275	280	278	285	295	295	300	300	295	290	292	285	292	295	295	295	290	290	285	290	285	282	280	

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MAY. 1988

M(3000)F2 (0.01)

IONOSPHERIC DATA

MAY. 1988

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9h)

Station	WAKKANAI				Lat.	Long.							Sweep	MHz to		MHz in		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																									
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
18																									
19																									
20																									
21																									
22																									
23																									
24																									
25																									
26																									
27																									
28																									
29																									
30																									
31																									
	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	13	16	11	13	15	19	18	19	18	11	10	2						
MED						328	340	350	365	375	375	365	365	360	355	345	340	338	328						
UQ						352	360	375	382	385	370	370	370	360	350	345	345								
LQ						330	340	360	362	365	355	352	355	348	340	332	325								

MAY. 1988

M(3000)F1 (0.01)

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IONOSPHERIC DATA

MAY. 1988

H*F2 (KM)

135° E Mean Time (G.M.T. + 9h)

Hour Day	Station WAKKANAI				Lat. 45° 23' 5" N		Long. 141° 41' 2" 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							345	310	340	400	395	350	350	330	305	300	290	280						
2							275	265	250	350	310	345	320	340	325	295	275	285						
3							285	270	305	325	305	315	310	315	310	290	260							
4							275	260	260	275	325	355	345	305	290	290	300							
5							275	280	295		A	310	300	300	290	275								
6							380	405	335	435	440	440	445	405	370	300	460	350	375					
7							G	G	G	G	G	G	G	G	G	370	G	425	345					
8							495	A	405	395	355	425	400	410	350	305	300	290						
9							305	A	A	A	450	370	345	345	345	C	A	300						
10							345	295	385	410	340	350	375	355	335	305	300	280						
11							275		305	305	380	330	315	320	320	310	255	275						
12							280	295	290	305	340	325	315	330	325	300	295	275						
13							290	245	280	315	350	325	330	305	310	300	A	A	A					
14							A	A	255	295	A	A	A	330	310	320	305	A						
15							255	255	285	320	325	310	305	315	305	320	300	A	A					
16							255	250	300	A	A	305	A	A	345	320	315	A						
17							250	285	300	A	325	290	295	325	335	350	A	285						
18							A	300	320	310	305	350	350	325	340	325	305	305						
19							260	275	255	360	310	325	355	335	320	305	300	295	285					
20							260	335	295	A	510	330	R	A	360	340	A	A	A					
21							255	290	290	305	295	325	A	A	A	A	A	A	A					
22							295	295	335	315	A	405	400	360	355	295	330	A						
23							300	290	310	305	345	350	415	355	395	350	335	320						
24							305	295	290	300	365	330	375	345	335	310	300	285						
25							330	305	290	315	300	L	350	350	345	325	300	A						
26							255	260	255	A	310	335	370	340	335	345	295	A						
27							285	290	275	310	310	345	345	390	355	355	320	300	300	280				
28							275	280	295	305	305	A	355	345	310	345	310	295	295	A				
29							295	280	275	290	305	325	A	335	305	330	315	300	295					
30							275	275	325	300	325	330	375	400	355	355	315	305						
31							260	330	405	A	A	A	A	A	A	A	A	A	A					
CNT							3	24	25	29	25	27	28	26	27	29	27	26	22	7				
MED							285	278	285	300	305	325	330	350	340	335	320	300	300	295				
UQ							285	318	305	315	350	350	352	375	355	350	338	315	300	325				
LQ							272	258	275	275	300	310	325	315	328	315	302	295	285	285				

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MAY. 1988

H*F2 (KM)

IONOSPHERIC DATA

MAY. 1933

H·F (KM)

135° E Mean Time (G.M.T. + 9h)

Station	WAKKANAI																											
	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	275	300	275	275	280	250	225	240	235	205	225	205	205	200	240	225	240	250	260	250	240	235	245	285				
2	300	300	295	270	295	250	235	225	220	200	200	220	205	205	215	230	245	250	275	265	230	235	255	300				
3	310	300	295	300	300	245	235	245	235	205	210	210	205	210	210	235	235	A	250	250	225	240	255	295				
4	310	300	295	260	250	250	235	235	205	225	200	205	A	H	210	205	230	240	A	250	235	250	255	295				
5	280	305	295	255	240	235	H	250	225	225	200	A	A	205	210	205	225	A	245	255	270	295	205	255	265			
6	255	250	255	255	270	260	245	250	245	225	215	205	225	220	235	245	250	250	275	305	230	280	250	350				
7	430	370	445	410	360	305	275	250	220	200	195	200	240	240	240	A	250	245	A	300	260	270	275	325				
8	305	295	285	260	295	A	A	240	A	A	215	220	205	205	205	220	245	A	A	A	A	250	255	300	350			
9	315	255	300	300	300	A	A	A	A	A	200	210	E	B	A	A	C	A	A	A	A	275	255	A	250	255		
10	300	285	325	295	300	A	A	A	A	A	A	A	A	A	A	205	220	210	220	235	235	255	A	A	275	290	255	
11	265	H	290	255	255	275	250	240	230	240	A	A	A	210	210	205	A	225	225	245	250	255	250	250	270	265		
12	280	295	265	260	270	245	235	220	230	205	200	210	205	215	245	240	A	A	A	A	265	255	255	250	250	255		
13	255	280	280	255	285	205	A	A	A	A	A	A	A	A	A	230	A	A	A	A	A	H	255	240	A	A	240	A
14	A	A	300	275	A	A	A	A	A	A	A	A	A	A	A	A	205	A	A	A	A	A	A	250	275	A	A	A
15	290	295	280	255	255	A	A	A	A	A	A	A	A	A	A	210	220	220	240	A	A	A	A	A	250	245	230	260
16	280	275	300	265	285	275	A	A	A	A	A	A	A	A	A	A	A	A	A	A	295	260	255	275	320	280		
17	275	295	250	250	280	240	A	A	A	A	A	A	A	205	A	A	A	A	A	A	A	255	290	260	255	300		
18	300	250	255	280	305	305	A	A	A	A	A	A	A	205	200	195	245	A	A	A	A	280	285	A	275	270	255	
19	290	325	275	305	300	255	A	A	210	215	200	200	220	210	205	220	H	220	255	A	270	265	245	225	255			
20	295	300	300	295	275	H	A	A	A	A	A	A	205	A	A	A	A	A	A	A	A	A	A	300	265	245	255	
21	275	285	295	280	250	245	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	260	295	A	250	255	
22	265	250	270	275	260	240	A	A	255	A	A	A	A	A	205	215	225	225	A	A	255	A	280	275	260			
23	300	285	290	260	255	H	H	225	235	A	A	205	A	A	B	225	265	A	A	A	250	275	255	255	255	250	265	
24	275	280	280	255	250	235	A	245	205	210	A	A	200	200	B	235	A	A	A	270	270	A	250	270	270	A		
25	300	300	275	255	A	A	A	A	A	A	A	A	205	A	A	220	230	A	A	A	A	275	270	255	255	245		
26	250	290	295	255	H	280	235	230	230	A	A	A	210	205	A	A	A	A	A	A	A	A	285	275	255	260		
27	275	265	280	275	255	250	A	A	A	A	200	205	200	205	215	225	230	235	A	250	250	240	245	250				
28	275	275	270	275	255	H	210	210	210	200	A	A	A	210	A	A	A	A	A	A	A	260	255	255	255	250		
29	270	255	260	280	260	245	230	225	A	A	A	A	A	A	A	A	A	A	A	A	230	265	260	235	250	255		
30	280	270	270	255	240	225	245	A	235	220	200	A	230	225	215	A	H	235	A	300	285	245	245	250	275			
31	270	265	270	275	275	250	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	255	290		
CNT	30	30	31	31	29	28	20	16	16	13	13	16	20	18	19	19	12	11	15	24	26	27	30	28				
MED	280	288	280	270	275	250	235	235	232	210	200	205	205	210	215	230	235	245	245	260	255	255	255	262				
UQ	300	300	295	280	295	255	242	245	240	215	210	210	220	220	230	240	242	250	275	272	265	275	270	292				
LQ	275	270	270	255	255	240	230	225	215	205	200	205	205	205	210	225	228	240	255	255	250	245	250	255	255			

MAY. 1933

H·F (KM)

IONOSPHERIC DATA

MAY. 1988

H^oE (KM)

135° E Mean Time (G.M.T. + 9h)

Station	WAKKANAI				Lat.	Long.							Sweep 1 MHz to 25 MHz in 2 sec in automatic operation											
	00	01	02	03	45° 23' 5" N	141° 41' 2" E	12	13	14	15	16	17	18	19	20	21	22	23						
1					S		120	115	110	120	110	110	115	105	110	110	110	125	S					
2					S		135	110	115	110	110	110	110	105	110	110	110	110	115	S				
3					S		110	105	105	120	105	115	105	110	110	110	110	120	S					
4					S		125	115	110	105	115	110	110	110	110	110	120	125	S					
5					S		120	120	110	120	110	115	110	115	120	125	120	125	S					
6					S		120	120	110	110	110	115	B	115	120	120	115	125	120	120				
7					S		125	115	110	110	120	125	115	120	110	105	110	120	S					
8					S		145	115	110	110	110	120	A	110	115	110	A	110	110	S				
9					S		115	110	110	120	115	120	A	B	110	110	C	115	120	S				
10					S		120	115	110	120	110	120	120	115	105	120	120	120	S					
11					S		130	115	120	110	110	120	120	A	A	110	115	110	125	130	S			
12					S		135	110	110	110	125	120	110	110	110	105	110	115	120	S				
13					S		135	110	110	110	105	110	110	115	A	A	110	115	120	120	S			
14					S		140	120	110	115	115	115	115	A	120	120	110	115	125	125				
15					S		130	120	120	110	110	115	110	A	A	110	110	120	125	S				
16					S		130	120	115	110	110	110	A	105	105	120	110	115	A	A	S			
17					S		140	120	115	110	110	110	110	110	105	120	120	110	120	125	S			
18					S		125	135	115	115	115	115	120	B	120	120	115	110	105	120	125	S		
19					S		130	110	110	105	105	110	E B	125	120	115	110	110	115	120	125	S		
20					S		130	125	125	125	125	125	A	A	A	A	A	110	120	120	130	S		
21					S		140	120	125	115	125	120	B	120	A	B	115	120	110	120	A	S		
22					S		135	120	115	110	120	110	125	A	120	120	120	115	110	120	120	S		
23					S		125	110	105	105	115	125	A	A	A	B	105	115	110	110	135	S		
24					S		130	110	110	105	125	125	A	A	A	B	A	120	105	120	130	S		
25					S		120	110	120	110	110	110	A	A	A	A	A	A	A	A	A	S		
26					S		125	110	115	B	120	110	105	B	115	110	115	A	120	125	S			
27					S		130	120	115	110	115	115	110	110	120	120	115	115	115	130	S			
28					S		130	120	110	105	110	B	110	110	120	A	A	115	125	120	125	S		
29					E		125	110	110	110	115	130	125	A	A	110	120	A	A	A	A	S		
30					S		120	115	115	110	115	115	110	105	120	A	A	115	120	120	S			
31					S		125	110	110	110	110	110	B	A	A	A	A	A	A	A	A	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	23	31	31	30	31	30	26	23	23	25	25	28	28	14					
MED					S	S																		
UQ					S																			
LQ					S																			

MAY. 1988

H^oE (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

TYPES OF ES

135° E Mean Time (G.M.T. + 9h)

Station	WAKKANAI				Lat. 45° 23' 5" N				Long. 141° 41' 2" E				Sweep 1 MHz to 25 MHz in 2 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					C2	C1		C1					C1				C1		C3	F2	F1	F2	F2		
2					C1	C1		C1				C1					C2	C2	C4	F6	F4	F2			
3								C1			C2							C3	C2	F1	F1	F1	F2		
4					H1			C1				C1	C1				C1	C3	C2	F1	F2		F2		
5	F2										C1	C2	C1			C1	C1		C2			F2			
6					C1	C1	C1	C2	C1												F1			F5	
7	F3		F1		F2	C1		C1							H1	C2	C1		C2	F2					
8				F1	F2	C2	C2	C3	C1	C1	C2	C1				L2	C2	C2	C4	F6	F2	F3	F2	F3	
9	F4	F2	F3	FF22	F2	C3	C2	C3	C4	C2	C1	C1		C2	C2		C2	C4	C6	F5	F3	F3	F2	F1	
10	F5	F3	F4	F2		C2	C3	C2	C2	C2	C2	C1		C1					CL52	F2	F2	F2	F2	F1	
11	F1	F2		F5	F2				C1	C2	C2	C1	C1	L1	C2	L1		C2	C2		F2	F2	F2		
12								C1	C2	C1				C1	H1	H1	C2	C2	C4	F3	F2	F1	F2	F1	
13	F1			F1	F2		C2	C2	C1	C2	C1	C1	C1	C1	CL22	C2	C2	C2	C2	C2	F1	F4	F5	F2	F5
14	FF25	F7	F6	F4	F3	C2	C4	C4	C1	C2	C3	C3	L5	C2	H1	H1	C3	C2	C4	F6	F3	F3	F6	F5	
15	F1	F1		F1		C2	C2	C2	C2	C1	C1	C1	L2	L2		C1	C1	C3	L5	F6	F3	F1	F1	F1	
16	F3	F1	F1			C2	C2	C1	C2	C3	C2	L2	C3	C4	C2	C2	C2	L3	LC31	L5	F6	F5	F7	F2	
17	F2	F1			C2	C3	C3	C3	C1	C3	C2	C2		C2	H1	C2	C4	C5	C5	C5	F6	F2	F2		
18				F6	C5	C5	C2	C2	C1	C1	C2	L2	C1			C1	C2	C2	C2	L2	F7	F2	F2		
19					C2	C2	C4	C2	C1	C1	C1							C2	C2			F6			
20		F2	F2			C2	C1	C1	C1	C1	C1	C1	L2	L2	L2	C2	C5	C2	C6	L3	F3	F4	FF21	F3	
21	F2	F2	F2		C2	C3	C1	C1	C2	C2	C1	C2	C2	C3	C4	C2	C3	C4	L5	L4	F5	F3	F2	F3	
22	F3	F1			C2	C1		C1	C2	C2	C1	C1					C3	C3	C2		F5	F4	F7	F1	
23	F2	F2	F1		C2	C1		C1	C1	C1	C1	CL12	L1			C1	C2	C2	C2	C2	F2	F3	F1		
24		F2	F1		C2	C3	C3	C2		C1	C2	C1		C1		C1	C2	C3	C2	L2	F3	F6	F3	F4	
25	F2	F2	F2	F2	C3	C4	C4	C3	C2	C2	C2	C1	L2	L1	CL12	L2	CL21	C3	CL52	L2	F5	F2	F2	F1	
26	F2	F2	F2	F1	C1	C2		C2	C1	C2	C2	C1	C1	C1	C1	CL11	CL21	C5	C7	L4	F7	F3		F2	
27	F3	F2		F1	C1	C1	C2		C1	C1					C1		C1	C2	C3	L2		F1			
28			F1	F2	C1	C1			C1	C1	C1	C2		C2	L2	C1	C2	C1	C3	L3	F6	F3	F3	F2	
29	F4		F2	F3	L1	C1			C1	C3	C1	C2	C3	C2	C2	L2	L2	L2	CL32	L5	FF23	F3	F3	F4	
30	F2		F1					C2	C1			C1	C2	C1	L1	L2		C2	C3	L3	F2	F3	F2	F2	
31	F1	F2	F2			C3	C2		C3	C3	C2	C3	L2	CL21	CL12	CL22	CL42	CL34	L4	L4	F5	F5	F3		
	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																									

MAY. 1938

TYPES OF ES

IONOSPHERIC DATA

MAY. 1938

FXI (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		X	X	X	X	X															X	X	X	X	X
2		X	X	X	X	X															X	X	X	X	X
3		X	X	X	X	X															X	X	X	X	X
4		X	X	X	X	X															X	X	X	X	X
5		X	X	X	X	X															X	X	X	X	X
6		X	X	X	X	X															X	X	X	X	X
7		X	X	X	X	X															X	X	X	X	X
8		X	X	X	X	X															A	X	X	X	X
9		X	X	X	X	X															A	X	X	X	X
10		X	X	X	X	X															X	X	X	X	X
11		X	X	X	X	X															X	X	X	X	X
12		X	X	X	X	X															X	X	X	X	X
13		X	X	X	X	X															X	X	X	X	X
14		X	X	X	X	X															X	X	X	X	X
15		X	X	X	X	X															X	X	X	X	X
16		X	X	X	X	X															X	X	X	X	X
17		X	X	X	X	X															X	X	X	X	X
18		X	X	X	X	X															X	X	X	X	X
19		X	X	X	X	X															X	X	X	X	X
20		X	X	X	X	X															X	X	X	X	X
21		X	X	X	X	X															X	X	X	X	X
22		X	X	X	X	X															X	X	X	X	X
23		X	X	X	X	X															X	X	X	X	X
24		X	X	X	X	X															X	X	X	X	X
25		X	X	X	X	X															X	X	X	X	X
26		X	X	X	X	X															X	X	X	X	X
27		X	X	X	X	X															X	X	X	X	X
28		X	X	X	X	X															X	X	X	X	X
29		X	X	X	X	X															X	X	X	X	X
30		X	X	X	X	X															X	X	X	X	X
31		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	6	1		1											29	31	30	31	29
MED		X	X	X	X	X															X	X	X	X	X
UQ		X	X	X	X	X															X	X	X	X	X
LQ		X	X	X	X	X															X	X	X	X	X

MAY. 1938

FXI (0.1 MHz)

IONOSPHERIC DATA

MAY. 1988

FOF1 (0.01 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	2																							
sec in	2																							
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	420	460	C	C	500	510	500	470	L	L	L						
2							L	L	460	L	L	500	540	500	500	490	470	L	L					
3							L	L	L	L	L	510	510	L	500	L	L	L	L					
4							L	L	L	L	L	520	L	L	520	500	480	L	L	L				
5							L	L	L	L	L	510	440	460	L	520	L	L	L	L	L			
6							L	A	A	A	500	L	510	500	500	490	470	A	L	L				
7														A	450	450	440	450	A	A	L			
8																			A	A	A			
9							L												A	A	A			
10																			A	A	A			
11																			A	A	A			
12							L	L	L	L	L	510	520	520	510	510	L	A	A	A				
13							L	A	A	A	A	A	A	A	A	A	A	A	L	L	L			
14																			A	A	A			
15							L	A	A	A	500	510	500	500	490	500	A	450	A	A				
16							A	A	A	A	430	520	500	A	A	460	L	420	L					
17																			L	L	L			
18							L	L	L	A	480	490	L	500	480	480	A	A	A					
19							L	L	L	510	490	500	500	500	500	480	450	L	L					
20							L	A	A	L	500	A	A	A	A	A	A	A	A					
21																			A	A				
22							L	L	L	L	L	L	500	500	A	430	L							
23							L	L	L	A	L	500	510	490	490	470	490	A	A	A				
24							L	L	L	460	490	500	490	480	500	460	A	A	A	L				
25							A	A	A	A	A	A	510	480	490	470	A	A						
26							A	L	L	480	A	A	A	510	A	480	A	A						
27							L	L	A	A	A	520	500	510	490	430	A	A						
28							L	L	L	L	520	500	510	A	A	470	A	A						
29							L	L	L	A	510	A	510	510	A	470	460	L	L					
30							L	A	500	500	500	520	520	520	520	390	470	A						
31							A	A	A	A	A	A	A	A	A	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT							3	6	9	10	16	18	21	22	19	19	9	1						
MED							400	430	470	490	500	510	500	500	490	480	450	420						
UQ							410	450	480	500	510	520	510	510	500	480	460							
LQ							375	420	460	470	485	500	500	500	480	470	450							

MAY. 1988

FOF1 (0.01 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1983

FOE (0.01 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						S	225	290	310		C	C	A	A	A	R	350	330	295	245	S			
2						S	220	290		A	A	A	A		360	355	345	330	300	250	A			
3					190		A	A	A	A		355	360		A	355	350	335	305	250	A			
4						S	245	300	320	350		A	360	375	360	345	340	305		A	S			
5						S		A	A	A	A	A	A	A	A	A			A	S				
6					190	245		A	A	A		345	355		A	A	340	A	300	260	200			
7						S		A	295	315		A	A	A		360	360	350	315	295	255	A		
8					195	235	295	315	340		A	A	A		360	345	335	300		A	A			
9						S	230	285	310	340		A	355		A	365	355	335	300	255	A			
10						A	250	295	315		A	A	A	A	A	A			A	A	S			
11							200	270	300	320	345	355		A	A	A	A	330	305	255	A			
12						S	250	300	315	330	330	335	335		A	350	325		A	265	A			
13					190	240		A	A	A	A	A		A	360	345	330	305		A	A			
14						A	255		A	310		355		A	A	365	355	335	300	255	A			
15						S		A	A	A		355		A	A	A	A		A	A	A			
16						A	250		A	A	A	A	360		A	A	A	340	305	255	A			
17						A	A	A		310	325		A	A	R	350	345	345	320	305		200		
18					190		A	300		A	335	340		P	A	A	A	325	300		A	A		
19						A	A		295		A	330	R	335	340	360	360	355	325	300	250	A		
20						S		A	295	315	335			A	A	A	A	350	325		A	A	A	
21						S		A	300	320	340	360	365	365	360	325		A	A	A	S			
22							185	245	305	325	355	370	375	375	370		A	A	305		A	A		
23							180	250	290	320		A	355		A	380		A	355	350	310	255	A	
24							185	245	285	305		A	355	360	360	360	350	335	305	260	A			
25							180	255	300		A	365		A	A	A	A	A	305		A	A		
26							185	255		A	335		A	A	A		375	360		A	A	A	A	A
27							195	265	300	310		A	345	355	370	360	355	340	305		A	A		
28						A	A	A		330	355		B	A	A	A	A	A	315	280	A			
29						A	260	310	330		A	355		A	A	A	A	A	A	270	A			
30							215	275		A	A	A	355	370	375	360		A	A	315	275	220		
31						A	280	305		A	350		A	A	A	A	A	A	A	A	A	A		
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT						13	22	20	19	15	14	12	13	16	19	21	23	16	3					
MED						190	250	298	315	340	355	360	365	360	350	335	305	255	200					
UQ						195	255	300	320	350	355	362	375	360	355	335	305	262	210					
LQ						185	245	292	310	335	345	355	360	360	345	325	300	252	200					

The Radio Research Laboratory, Japan

MAY. 1983

FOE (0.01 MHz)

IONOSPHERIC DATA

MAY. 1988

FOES (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	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	3.0	3.3	3.8	C	C	4.0	3.9	J A	G	G	3.8	3.5	J A	J A	J A	J A	E S	E S	
2	E S	E S	E S	E S	E S	2.0	2.6	3.0	3.9	3.9	3.8	3.9	G	G	4.1	3.8	3.6	3.4	J A	J A	J A	J A	E S	E S	
3	E S	E S	E S	E S	E S	G	2.8	3.5	J A	J A	G	G	J A	G	G	G	3.8	3.3	J A	J A	J A	J A	E S	E S	
4	E S	E S	E S	E S	E S	E S	G	G	G	G	J A	G	4.3	4.3	4.2	G	3.5	3.0	J A	J A	J A	J A	E S	J A	
5	J A	E S	J A	J A	E S	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	G	3.8	3.8	4.1	2.6	5.0	5.0	4.2	1.5	
6	E S	E S	E S	E S	E S	G	3.1	J A	J A	J A	4.6	4.2	J A	4.2	3.9	4.1	G	3.5	J A	7.0	3.6	G	E S	J A	
7	J A	J A	J A	J A	J A	2.4	2.4	J A	G	3.7	4.6	4.1	4.6	G	4.4	4.2	4.2	J A	J A	5.1	2.8	J A	J A	J A	
8	J A	J A	J A	J A	E S	G	3.1	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	1.0	6.4	9.4	8.4	7.7	
9	J A	J A	J A	J A	J A	J A	3.2	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	6.4	6.4	9.0	8.4	9.6	
10	E S	J A	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	1.0	7.0	4.0	6.3	6.4	
11	J A	J A	J A	J A	J A	J A	3.2	4.2	J A	J A	J A	J A	J A	J A	J A	J A	G	3.7	J A	5.0	4.0	5.0	J A	E S	
12	E S	J A	J A	J A	J A	2.4	3.2	J A	J A	4.2	4.2	4.4	4.1	J A	5.2	5.0	1.3	1.4	J A	J A	J A	J A	J A	E S	
13	E S	E S	J A	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	5.2	4.0	5.0	J A	J A	
14	J A	J A	J A	J A	J A	J A	5.4	7.6	10.4	14.0	6.0	6.4	10.0	G	J A	4.6	4.7	J A	J A	1.1	3.9	7.4	2.4	5.0	
15	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
16	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
17	J A	J A	J A	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
18	E S	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	1.0	7.0	5.2	4.5	J A	E S
19	J A	J A	J A	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
20	E S	E S	E S	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
21	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
22	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
23	J A	J A	J A	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
24	J A	J A	J A	E S	E S	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
25	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
26	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
27	E S	E S	J A	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E S	
28	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
29	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
30	J A	J A	J A	J A	E S	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
31	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
CNT	31	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31	31	31	31	31	31	31	31	
MED	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
UQ	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	
LQ	E S	E S	E S	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E S	

MAY. 1933

FOES (0.1 MHZ)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1938

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 S	E S	E S	E S	E S	E S																		
2		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																		
4		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																		
6		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																		
8		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																		
10		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																		
12		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																		
14		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																		
16		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																		
18		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																		
20		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																		
22		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																		
24		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																		
26		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																		
28		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																		
30		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																		
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																		
UQ		28	24	22	19	E S	E S																		
LQ		E S	E S	E S	E S	E S	E S																		

MAY. 1938

FBES (0.1 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

FMIN (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 2.5 MHz		in 2.4 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	16	16	16	17	17	C	C	21	22	21	20	20	17	17	E S	E S	E S	E S
2		E S	E S	E S	E S	E S	E S	16	16	16	16	19	23	20	20	18	20	19	20	16	16	E S	E S	E S	E S
3		E S	E S	E S	E S	E S	E S	16	16	16	16	17	20	20	24	21	19	24	19	17	16	E S	E S	E S	E S
4		E S	E S	E S	E S	E S	E S	15	17	16	18	13	20	22	19	26	22	17	16	17	16	E S	E S	E S	E S
5		E S	E S	E S	E S	E S	E S	15	17	17	17	18	19	20	21	20	25	20	20	20	17	E S	E S	E S	E S
6		E S	E S	E S	E S	E S	E S	16	16	16	16	16	19	20	20	22	21	20	20	20	17	E S	E S	E S	E S
7		E S	E S	E S	E S	E S	E S	15	16	16	17	19	20	20	20	20	20	21	18	17	17	E S	E S	E S	E S
8		E S	E S	E S	E S	E S	E S	15	17	17	17	17	19	20	20	26	20	20	20	18	17	E S	E S	E S	E S
9		E S	E S	E S	E S	E S	E S	15	16	17	16	22	21	26	26	20	21	21	18	17	E S	E S	E S	E S	
10		E S	E S	E S	E S	E S	E S	16	15	16	15	15	16	17	20	18	20	20	21	20	17	E S	E S	E S	E S
11		E S	E S	E S	E S	E S	E S	16	15	16	16	16	17	17	20	24	24	20	21	18	17	E S	E S	E S	E S
12		E S	E S	E S	E S	E S	E S	15	17	16	17	16	20	20	20	22	20	16	16	16	E S	E S	E S	E S	
13		E S	E S	E S	E S	E S	E S	16	16	15	16	16	13	20	19	25	21	22	18	17	17	E S	E S	E S	E S
14		E S	E S	E S	E S	E S	E S	16	15	16	16	16	20	20	22	23	24	18	13	17	16	E S	E S	E S	E S
15		E S	E S	E S	E S	E S	E S	16	15	16	16	16	16	17	20	20	20	18	17	17	E S	E S	E S	E S	
16		E S	E S	E S	E S	E S	E S	15	16	16	17	17	19	20	20	21	20	20	19	17	16	E S	E S	E S	E S
17		E S	E S	E S	E S	E S	E S	16	16	16	16	20	19	19	19	24	24	16	20	19	16	E S	E S	E S	E S
18		E S	E S	E S	E S	E S	E S	16	15	21	19	20	24	19	36	21	20	17	19	16	16	E S	E S	E S	E S
19		E S	E S	E S	E S	E S	E S	16	16	16	16	16	21	25	20	20	20	20	19	16	16	E S	E S	E S	E S
20		E S	E S	E S	E S	E S	E S	16	15	15	19	18	20	21	20	22	19	24	20	24	16	E S	E S	E S	E S
21		E S	E S	E S	E S	E S	E S	16	15	16	18	13	20	20	23	24	27	19	20	18	16	E S	E S	E S	E S
22		E S	E S	E S	E S	E S	E S	16	15	16	16	18	19	23	20	24	21	23	18	16	15	E S	E S	E S	E S
23		E S	E S	E S	E S	E S	E S	15	16	16	16	17	13	18	20	35	25	20	21	20	17	E S	E S	E S	E S
24		E S	E S	E S	E S	E S	E S	16	15	16	17	20	20	20	21	20	25	23	18	19	17	E S	E S	E S	E S
25		E S	E S	E S	E S	E S	E S	15	16	16	16	16	17	13	23	20	28	22	20	20	17	E S	E S	E S	E S
26		E S	E S	E S	E S	E S	E S	15	15	16	16	20	19	23	24	21	21	20	19	17	17	E S	E S	E S	E S
27		E S	E S	E S	E S	E S	E S	16	16	16	16	13	23	20	22	20	21	22	21	19	16	E S	E S	E S	E S
28		E S	E S	E S	E S	E S	E S	15	15	16	17	20	20	38	24	21	13	20	20	18	20	E S	E S	E S	E S
29		E S	E S	E S	E S	E S	E S	16	15	16	18	13	25	24	25	21	24	24	24	17	17	E S	E S	E S	E S
30		E S	E S	E S	E S	E S	E S	15	15	16	17	17	19	21	23	23	20	23	21	19	17	E S	E S	E S	E S
31		E S	E S	E S	E S	E S	E S	15	15	16	16	17	17	20	24	21	21	21	21	20	16	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	30	30	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	16	15	16	16	17	13	20	20	21	21	21	20	17	16	E S	E S	E S	E S
UQ		E S	E S	E S	E S	E S	E S	16	15	16	16	17	19	20	23	23	24	22	21	20	18	17	E S	E S	E S
LQ		E S	E S	E S	E S	E S	E S	15	15	16	16	17	19	20	20	20	20	18	17	16	16	E S	E S	E S	E S

MAY. 1988

FMIN (0.1 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

M(3000)F2 (0.01)

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	265	280	285	285	280	320	330	330	320	C	C	280	300	290	300	305	315	325	325	305	325	315	280	270		
2	275	270	280	280	280	320	330	320	345	310	305	285	290	295	310	300	315	310	305	325	325	270	275	270		
3	265	285	275	275	270	315	315	330	340	305	300	295	290	300	285	300	300	305	315	315	310	295	285	270		
4	275	265	290	285	290	335	295	320	320	345	300	280	260	275	295	310	305	295	290	295	315	275	280	275		
5	275	285	285	305	295	320	345	350	325	315	320	285	310	295	300	305	315	305	290	295	280	280	275	265		
6	290	295	295	310	290	280	310	A	310	315	270	270	290	290	305	320	A	290	255	275	315	255	315	235		
7	F	F	F	F	F	F	260	G	G	G	G	A	G	G	G	265	A	280	235	285	290	280	270	265		
8	F	F	F	F	280	310	270	285	A	290	310	285	275	300	295	305	315	300	295	A	305	285	290	275		
9	265	F	F	F	F	270	275	315	345	A	A	A	300	300	300	305	300	305	310	305	A	290	300	300	285	
10	280	275	265	285	F	F	235	305	290	H	290	305	300	295	280	285	295	305	310	320	A	290	295	F	F	F
11	F	F	F	300	F	280	295	295	325	320	320	300	285	295	295	295	305	325	305	305	315	295	F	270	285	
12	285	285	280	295	290	300	310	320	315	300	305	295	285	295	300	A	A	A	305	300	295	290	285	285		
13	295	275	300	F	F	F	325	325	315	280	290	290	285	290	290	300	300	315	315	300	300	390	R	R	F	A
14	F	F	F	F	F	F	295	330	320	A	A	295	295	A	305	295	315	320	295	300	300	310	F	F	F	
15	F	F	F	F	F	315	335	A	330	300	285	305	300	300	295	295	290	300	295	315	300	295	305			
16	F	F	F	F	F	F	340	345	345	315	335	285	305	A	285	285	285	285	295	300	325	290	F	F		
17	F	F	F	F	F	F	F	320	285	H	295	290	305	310	295	295	295	285	295	310	320	295	F	F	270	
18	280	280	305	315	280	305	265	290	315	295	300	305	290	300	305	315	310	295	275	285	300	285	265	275		
19	265	265	265	275	275	300	320	350	325	290	310	305	295	295	305	310	310	305	285	295	315	310	300	290		
20	285	270	275	270	290	320	350	350	A	310	270	A	A	A	300	A	295	315	300	300	305	F	A	F	F	
21	F	F	F	295	300	325	325	A	315	335	305	290	280	290	280	285	305	305	310	310	305	290	285	290	F	
22	F	F	290	295	280	320	315	335	320	360	270	265	H	280	295	300	315	295	300	300	295	295	F	F	F	F
23	F	F	F	F	305	310	320	315	330	325	285	305	285	295	305	285	300	310	300	300	300	290	295	295		
24	280	285	285	305	310	320	300	300	305	295	H	310	290	285	280	290	305	295	290	290	305	295	F	285	275	
25	F	F	F	310	315	310	290	305	305	295	305	290	275	300	290	300	A	310	A	285	285	F	310	300	285	
26	F	F	F	285	295	305	320	340	310	315	290	285	280	275	285	280	290	305	320	330	F	F	280	285	F	
27	295	295	280	280	290	290	300	305	315	340	300	290	295	295	295	295	305	315	310	290	290	F	F	F		
28	F	F	290	300	300	310	325	315	330	305	300	295	295	290	295	295	300	310	A	295	295	295	295	F		
29	290	290	305	F	F	285	300	315	315	295	310	300	295	295	280	295	295	300	290	290	295	F	300	290		
30	275	285	295	300	F	F	300	295	310	300	295	285	285	290	280	275	270	280	300	295	295	300	300	280	F	
31	F	F	F	290	290	315	305	A	A	A	A	A	A	A	A	A	280	A	A	295	295	290	F	F	F	A
CNT	20	17	21	21	24	27	31	27	26	27	28	28	28	28	30	29	26	29	28	29	30	21	23	20		
MED	275	280	285	295	290	310	315	320	315	305	300	290	290	295	295	300	302	305	300	300	300	290	285	275		
UQ	285	285	295	305	295	320	325	332	325	315	305	298	295	298	300	305	310	310	308	305	310	300	300	285		
LQ	265	275	280	285	280	298	300	308	310	295	288	285	280	290	290	295	295	295	290	295	295	285	280	270		

The Radio Research Laboratory, Japan

MAY. 1988

M(3000)F2 (0.01)

IONOSPHERIC DATA

MAY. 1988

M(3000)F1 (0.01)

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								L				C	C	360	350	360	380	L	L	L							
2								L	L	L	L							A		L	L						
3								L	L	L	L							L	L	L							
4								L	L	L	L							H	L	L							
5								L	L	L	L							L	L	L							
6								L	A	A	A	L						A	L	L							
7																		A	A	A	L						
8								330	380	385	395	405						A	A	A							
9								340	A	A	280	A						A	A	A							
10								L		A	A	A						A	A	A							
11									A	A	L	A						L									
12								L	L	L	L							L	A	A	A						
13								L	A	A	A	A						A	A	L							
14									A	A	A	A						A	A	A	A						
15								L	A	A	A							A	A	A							
16									A	A	A	A						A	A	L	340	L					
17									A	A	A	A						A	A								
18									A	A	A	A						L	360	355	355	A	A				
19								L	L	L	A																
20								L	A	A	L								A	A	A						
21									A	A	A	L	L					A	A								
22								L	L	360	375	L	L					A		335	L						
23								L	A	A	L																
24								L	L	370	380	395	385														
25									A	A	A	A															
26									A	L	L	A	A														
27								L	L	A	A	A															
28									L	L	L	L															
29								380	L	L	A	A															
30								L	A	A																	
31									A	A	A	A															
		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT								3	3	6	6	14	16	17	19	11	14	7	1								
MED								340	375	370	380	388	365	365	360	360	358	355	340								
UQ								360	378	380	395	395	372	375	365	380	365	355									
LQ								335	372	360	375	370	350	360	355	353	350	348									

MAY. 1988

M(3000)F1 (0.01)

IONOSPHERIC DATA

MAY. 1988

H*F2 (KM)

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 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	290	295		C	C	325	315	305	310	285	270	255					
2							265	265	275	325	L	325	380	320	320	295	305	275	275					
3							265	255	295	320	320	325	300	340	300	290	280							
4							265	265	240	330	330	375	345	290	295	275	270							
5							255	245	300	260	270	320	305	310	295	285	280	270						
6							275	A	315	310	435	L	410	335	345	325	300	A	310	370				
7							455	G	G	G	G	A	G	G	G	430	A	A	340					
8							450	360	A	400	350	395	410	325	335	310	295	295						
9							270		A	A	A	360	335	330	325	325	A	280						
10							280	295	335	345	340	350	360	315	295	280	260							
11							270	295	270	310	320	325	310	305	310	330	260							
12							260	255	255	305	325	330	335	325	310	A	A	A						
13							250	275	300	330	330	320	320	A	320	300	290	270						
14							A	A	A	345	320	A	300	330	300	295	305	280						
15							255	A	260	325	300	305	300	310	320	325	305	285						
16							260	240	A	300	280	385	320	A	A	340	320	305	280					
17							265	A	A	330	330	300	295	A	330	320	335							
18							310	280	275	315	295	330	355	320	305	A	A							
19							265	255	300	375	325	330	345	325	325	300	290	280						
20							270	270	A	L	380	430	A	A	A	330	A	305						
21							A	305	290	320	345	380	335	335	325	295								
22							275	260	305	270	415	L	375	355	325	310	290	315						
23							280	270	295	270	H	390	350	380	350	335	360	305	280					
24							295	305	295	280	320	345	325	355	350	300	320	320	285					
25							A	320	280	305	A	310	400	330	325	310	A	A						
26							255	240	290	280	A	A	A	355	A	315	305	275						
27							275	280	280	260	320	370	350	350	325	305	290	A						
28							270	270	260	325	350	305	345	360	330	330	300	265						
29							285	270	265	A	305	A	335	325	350	305	300	290	285					
30							295	270	305	290	310	350	340	350	360	355	320	280						
31							A	A	A	A	A	A	A	A	A	395	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							21	25	24	26	26	26	27	26	29	29	24	21	6					
MED							270	270	295	302	325	330	335	330	325	305	298	280	285					
UQ							280	280	300	330	350	360	352	350	335	325	310	290	340					
LQ							260	265	270	275	315	320	322	320	315	300	290	270	280					

MAY. 1988

H*F2 (KM)

IONOSPHERIC DATA

MAY. 1988

H F (KM)

135° E Mean Time (G.M.T. + 9h)

Station	AKITA																									
	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	310	280	280	280	275	250	240	220	230	C	C	220	220	220	200	245	250	A	A	240	A	220	255	290		
2	300	305	295	290	290	255	230	225	210	200	195	200	200	200	A	230	A	A	A	270	240	225	260	275	295	
3	305	300	295	290	280	250	230	230	A	210	210	210	200	230	200	240	235	245	260	230	210	240	275	290		
4	300	310	270	250	265	230	230	220	220	230	200	200	A	A	210	220	210	220	260	250	220	240	270	290		
5	280	280	295	255	225	245	235	225	230	220	195	200	210	220	195	220	A	A	270	255	275	275	255	300		
6	270	230	245	245	260	245	A	A	A	A	230	225	220	220	220	225	A	245	290	280	230	310	250	A		
7	375	325	A	A	E S	300	300	275	235	220	215	200	A	230	230	A	A	A	A	A	A	285	A	270	285	320
8	A	290	280	235	270	255	240	A	A	205	A	210	210	A	A	A	A	A	A	A	A	A	A	A		
9	A	A	A	A	300	260	245	A	A	A	A	A	215	A	A	A	A	A	A	275	A	A	260	A	280	
10	280	285	300	290	295	250	240	A	A	A	A	A	215	220	200	230	220	235	A	A	A	A	275	280		
11	A	290	275	255	250	280	250	230	A	A	A	A	205	A	205	220	210	A	A	255	245	240	A	280	260	
12	270	270	280	245	260	245	235	A	A	230	195	225	210	210	A	A	A	A	A	270	A	260	260	260	260	
13	265	285	250	270	290	245	A	A	A	A	A	A	A	A	A	A	A	A	A	250	245	250	A	A	A	
14	A	A	A	295	285	245	A	A	A	A	A	A	A	A	220	A	A	A	A	A	A	220	245	A	A	
15	A	A	A	270	250	260	250	A	A	A	A	A	200	220	A	A	A	A	A	A	A	275	250	245	A	
16	A	A	A	290	280	260	A	A	A	A	195	220	205	A	A	A	A	A	A	250	250	220	250	A	A	
17	A	280	245	245	265	A	A	A	A	A	A	A	A	230	A	215	A	A	280	260	235	A	A	A	305	
18	290	250	255	275	250	A	A	A	A	A	A	A	A	A	200	245	240	A	A	A	A	260	A	270	270	
19	320	300	295	295	280	250	240	230	205	A	200	205	200	215	225	200	230	A	A	A	270	240	A	250	280	
20	280	300	290	300	255	245	A	A	A	210	215	A	A	A	A	A	A	A	A	270	A	A	A	265		
21	300	A	A	275	270	245	A	A	A	A	245	A	A	215	A	A	A	A	A	250	275	A	A	A		
22	285	285	265	285	A	245	245	230	225	220	A	A	A	A	250	A	220	A	A	A	A	A	A	A		
23	A	A	280	255	245	250	A	A	A	220	200	200	205	200	A	A	A	A	A	250	230	250	265	270		
24	A	230	260	250	240	245	230	A	A	220	200	200	220	200	200	A	A	A	A	245	245	A	255	280		
25	A	A	275	260	220	235	A	A	A	A	A	A	A	A	220	205	A	A	A	A	A	A	230	A	A	
26	280	A	270	290	260	255	A	230	220	A	A	A	A	A	A	A	A	A	A	230	A	A	A	275		
27	255	255	280	290	295	245	A	230	A	A	A	220	230	205	A	210	A	A	A	A	A	245	245	260		
28	280	275	270	260	A	240	220	200	A	A	A	220	A	A	A	240	A	A	A	A	A	250	250	270		
29	250	A	A	A	280	245	230	A	A	A	A	A	200	A	A	A	230	220	A	250	A	290	A	245		
30	280	230	270	250	270	240	250	A	A	210	195	225	205	220	A	225	235	A	A	A	255	230	255	A		
31	A	260	230	280	275	245	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
CNT	21	23	28	28	29	29	17	11	8	12	15	18	18	19	11	14	7	6	14	19	17	18	18	20		
MED	280	280	278	272	270	245	235	230	220	218	200	212	210	215	210	225	230	240	270	250	240	250	258	280		
UQ	300	300	285	290	280	250	240	230	228	220	205	220	220	220	220	240	235	245	270	252	255	270	275	290		
LQ	280	275	268	250	260	245	230	222	215	210	195	200	205	205	200	220	225	220	260	242	225	240	250	268		

The Radio Research Laboratory, Japan

MAY. 1988

H F (KM)

IONOSPHERIC DATA

MAY. 1988

H*E (KM)

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						S		110	110	105	C	C	105	105	105	105	110	110	110	S					
2						S		115	110	110	110	105	100	105	105	105	115	105	110	S					
3						S		115	110	105	105	105	105	105	105	105	105	105	110	S					
4						S		115	105	105	105	105	105	E B	120	105	105	105	110	115	S				
5						S		115	110	105	105	105	105	105	110	105	105	110	110	S					
6						S		115	110	110	105	105	105	105	105	105	110	110	110	S					
7						S		110	110	110	110	105	105	105	105	110	105	110	110	S					
8						S		110	110	105	105	105	105	110	105	110	110	110	110	S					
9						S		115	110	105	105	105	105	105	105	105	110	105	110	S					
10						S		115	110	105	105	105	105	105	105	105	110	105	105	S					
11						S		115	105	105	105	105	110	110	105	105	105	110	110	S					
12						S		110	110	105	105	105	105	105	105	105	105	105	110	S					
13						S		110	110	105	105	105	105	A	105	105	105	105	110	S					
14						S		115	105	105	105	105	105	110	110	105	110	110	115	S					
15						S		110	110	110	105	105	105	A	100	105	105	105	115	S					
16								110	110	110	105	105	105	100	105	105	105	110	110	S					
17						S		110	105	105	105	105	105	105	110	105	110	110	110	S					
18						S		110	110	105	110	105	B	105	105	105	105	110	115	S					
19						S		110	105	105	105	105	105	105	105	105	105	105	110	S					
20						S		115	105	105	105	105	105	105	105	110	105	110	110	S					
21						S		105	105	105	105	105	105	110	110	105	110	105	105	S					
22						S		110	105	105	105	105	105	105	110	105	105	105	105	S					
23						S		110	105	105	105	105	105	E B	120	A	105	105	105	110	S				
24						S		110	105	105	105	105	105	105	105	110	105	105	110	S					
25						S		110	105	105	105	105	105	110	105	105	105	105	120	S					
26						S		110	105	105	105	105	105	105	105	A	A	A	A	S					
27						S		110	105	105	105	105	105	105	105	105	105	110	105	110	S				
28						S		110	110	110	105	I B	105	105	105	105	105	110	110	S					
29						S		115	110	105	110	105	B	105	105	105	105	110	110	S					
30						S		110	110	105	105	110	105	105	105	105	105	105	110	S					
31						S		110	105	105	105	105	105	105	105	105	105	A	A	A	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	31	31	31	30	30	30	29	30	30	30	29	29	1						
MED						110	110	110	105	105	105	105	105	105	105	105	110	110	110						
UQ						115	110	105	105	105	105	105	105	105	105	105	110	110	110						
LQ						110	105	105	105	105	105	105	105	105	105	105	105	110							

MAY. 1988

H*E (KM)

IONOSPHERIC DATA

MAY. 1938

H°ES (KM)

135° E Mean Time (G.M.T. + 9h)

Station	AKITA				Lat. 39° 43' 5" N				Long. 140° 08' 0" E				Sweep 1		MHz to 2.5 MHz		in 2 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
1	S	S	S	S	S	S	125	130	120	C	C	120	120	115	G	G	140	130	120	120	110	110	S	S
2	S	S	S	S	S	125	130	115	115	115	115	120	G	G	155	145	135	135	125	110	110	S	S	S
3	S	S	S	S	S	G	130	120	115	115	G	G	120	G	G	G	135	125	120	110	115	105	S	S
4	S	S	S	S	S	S	G	G	G	G	110	G	130	125	130	G	130	130	110	110	110	S	105	S
5	100	S	105	105	105	S	G	110	110	110	110	110	110	110	110	G	125	120	110	115	110	110	110	S
6	S	S	S	S	S	G	130	115	115	115	115	110	110	110	G	120	125	130	G	S	S	S	140	130
7	130	125	120	115	130	130	120	G	125	120	120	155	G	135	135	125	120	115	115	110	110	110	110	130
8	110	110	110	140	S	G	130	120	110	110	110	110	110	135	125	120	120	110	115	115	110	110	110	105
9	115	110	105	110	115	120	125	115	115	110	105	110	110	125	125	125	115	110	110	110	110	110	110	105
10	S	100	S	S	100	145	130	115	120	110	110	105	105	110	125	130	120	105	105	110	110	110	105	105
11	100	100	100	100	100	105	130	120	110	110	110	110	110	115	115	G	130	120	110	110	110	110	S	105
12	S	100	100	100	100	145	130	120	115	115	120	110	110	115	125	115	115	120	110	110	110	110	S	S
13	S	S	100	100	S	150	125	115	110	105	105	105	105	125	125	120	120	120	110	110	105	105	105	105
14	105	105	105	100	105	125	115	110	110	110	110	110	G	145	145	130	115	110	110	110	105	110	110	110
15	105	105	100	100	100	120	120	110	110	110	115	120	100	110	115	110	110	115	110	110	110	110	105	105
16	100	100	100	100	100	120	120	110	110	110	110	110	110	110	110	135	140	120	120	115	120	110	110	110
17	105	105	105	S	S	125	115	110	115	110	110	110	125	110	G	140	125	120	120	115	110	120	115	110
18	S	115	S	120	125	125	115	115	115	115	110	115	105	105	105	G	120	115	110	110	105	105	S	S
19	105	105	105	S	S	125	130	115	125	110	115	110	G	G	G	G	G	125	120	110	110	105	110	S
20	S	S	S	S	S	140	130	120	120	115	115	105	105	105	120	110	110	110	110	105	110	110	110	105
21	105	100	100	100	100	105	125	115	115	115	120	115	115	115	110	110	105	105	105	100	100	100	115	110
22	110	105	100	100	100	145	G	G	120	130	125	125	120	115	105	120	120	110	110	110	115	115	110	100
23	100	105	105	S	S	135	130	120	110	120	120	110	G	100	135	135	135	120	120	115	110	110	110	105
24	100	105	110	S	S	G	130	110	110	110	115	G	G	G	G	125	120	110	110	110	105	105	105	105
25	105	100	100	100	105	125	120	120	110	110	105	105	110	105	110	140	120	120	120	110	110	110	105	105
26	105	100	100	100	100	130	120	130	125	110	110	110	115	115	100	105	120	115	110	110	110	105	105	105
27	S	S	100	100	S	125	120	120	110	110	110	115	G	G	125	150	130	120	110	110	110	110	120	S
28	105	100	105	110	110	115	120	115	120	115	110	120	110	110	135	150	125	120	115	110	110	105	105	105
29	100	100	100	100	100	125	125	120	120	110	110	110	120	110	105	105	110	G	130	100	115	110	110	105
30	105	100	100	100	S	G	135	120	110	120	120	120	110	110	105	110	G	120	110	110	110	110	105	105
31	105	100	105	100	110	135	120	115	110	110	110	110	105	125	125	125	120	105	105	100	100	105	110	105
	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	20	22	23	20	17	23	28	26	30	29	29	28	25	25	25	24	29	30	30	30	30	28	25	22
MED	105	102	100	100	100	125	125	115	115	110	110	110	110	110	125	125	120	120	110	110	110	110	110	105
UQ	105	105	105	105	110	135	130	120	120	115	115	115	115	115	125	135	130	120	120	110	110	110	110	110
LQ	100	100	100	100	100	122	120	115	110	110	110	110	110	110	110	112	120	110	110	110	110	110	105	105

MAY. 1938

H°ES (KM)

IONOSPHERIC DATA

MAY. 1988

TYPES OF ES

135° E Mean Time (G.M.T. + 9h)

Station		AKITA							Lat. 39° 43' 5" N		Long. 140° 08' 0" E		Sweep 1		MHz to 2.5		MHz in 2.5		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								C2	C1	C1			C1	C1			H2	C2	C3	F4	F2	F1				
2						C2	C2	C2	C2	C2	C1	C1			H1	H1	H1	H2	C4	F6	F6					
3							C2	C2	C2	C1			C1				H1	C2	C6	F1	F1	F3				
4											C2		C1	C1	C1		C1	C2	C4	F2	F1		F1			
5		F1		F4	F4	F1			C2	C2	C2	C1	C1	C1	C1		C2	C3	C5	F3	F2	F3	F1			
6								C2	C5	C3	C2	C2	C2	C1	C1		C1	C3	C1				F1	F6		
7		F2	F4	F6	F5	F2	C2	C2		C1	C1	C1	H1		H1	H1	C2	C2	C5	C4	F3	F4	F3	F2	F1	
8		F3	F2	F2	F1			C2	C3	C3	C2	C3	C2	C1	H2	C2	C4	C2	C2	C3	F6	F4	F2	F3	F5	
9		F5	F4	F6	F7	F5	C2	C4	C5	C3	C2	C3	C1	C3	C3	C3	C3	C3	C5	C4	F4	F3	F3	F2	F4	
10			F2			F2	H2	C2	C4	C2	C2	C3	C2	C2	C1	C1	C1	C1	C2	L4	F3	F4	F3	F2	F2	
11		F3	F2	F2	F3	F2	L1	C2	C4	C3	C2	C2	C2	C2	C1	C1		C1	C3	C5	F2	F4	F6		F2	
12			F2	F2	F2	F2	H1	C2	C2	C2	C2	C1	C2	C2	C1	C2	C3	C3	C4	C4	F4	F3	F2			
13				F1	F1		H1	C2	C3	C2	C3	C2	C3	L3	C2	C2	C2	C2	C2	C4	F2	F2	F3	F3	F3	
14		F5	F7	F6	F3	F2	C2	C3	C4	C4	C3	C3	C2	C3		H2	H2	C4	C3	C3	F4	F1	F3	F5	F7	
15		F6	F4	F2	F2	F1	C3	C3	C4	C3	C2	C1	C1	L1	C2	C2	C3	C3	C4	C4	F3	F4	F3	F4	F4	
16		F5	F6	F3	F3	F2	C3	C5	C3	C4	C2	C1	C2	C1	C3	C4	H1	H3	C4	C2	F6	F2	F2	F5	F5	
17		F7	F5	F1			C5	C5	C3	C3	C3	C3	C2	C2	C2		H1	C2	C3	C5	F6	F5	F2	F3	F4	
18			F2		F6	FF32	C3	C2	C2	C2	C1	C2	C2	C2	C1	C1		C4	C5	C4	F6	F3	F4			
19		F2	F2	F2			C4	C5	C2	C1	C2	C1	C1						C2	C4	F3	F4	F3	F4		
20							H1	C2	C4	C3	C2	C2	C3	C4	C5	C2	C3	C4	C2	C3	F7	F6	F6	F5	F4	
21		F3	F7	F5	F2	F2	C2	C6	C6	C5	C2	C1	C1	C2	C1	C2	C3	C2	C3	F4	F4	F4	F2	FF33	F3	
22		F3	F2	F2	F6	F5	H1			C2	C1	C1	C1	C2	C1	C3	C1	C2	C4	C4	F4	F5	F4	F3	F4	
23		F3	F5	F1			H2	C2	C3	C3	C1	C1	C1		L1	H1	H2	H1	C3	C3	F2	F1	F2	F3	F3	
24		F3	F1	F1				C1	C2	C2	C2	C1						C2	C3	C5	C4	F3	F5	F3	F2	F2
25		F4	F3	F1	F2	F1	C2	C3	C4	C3	C3	C2	C3	C2	C1	C2	H1	C4	C3	C4	F7	F6	F3	F3	F4	
26		F2	F2	F2	F2	F1	C3	C3	C1	C1	C2	C3	C3	C2	C2	L3	L2	CL42	CL43	C5	F3	F4	F4	F4	F2	
27				F2	F2		C1	C2	C2	C3	C2	C1	C1			C2	H1	C2	C4	C5	F5	F4	F2	F1		
28		F2	F2	F2	F2	F5	C2	C2	C1	C1	C2	C1	C1	C2	C2	HC11	HC11	C3	C3	C3	F3	F4	F3	F3	F3	
29		F2	F3	F2	F3	F2	C2	C2	C2	C2	C3	C2	C3	C1	C1	C3	C2	C2		CC22	F2	F3	F5	F7	F4	
30		F2	F2	F2	F1			H2	C3	C3	C1	C1	C1	C1	C1	C2	C2		C3	C5	F3	F2	F3	F2	F4	
31		F4	F2	F2	F2	F2	H2	C3	C3	C3	C3	C2	C2	C3	C3	C4	CC12	CL34	L3	L3	F3	F4	F4	F6	F3	
		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																										

MAY. 1988

TYPES OF ES

IONOSPHERIC DATA

MAY. 1988

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

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

MAY. 1988

FXI (0.1 MHz)

IONOSPHERIC DATA

MAY. 1988

FOF1 (0.01 MHz)

135° E Mean Time (G.M.T. + 9h)

Station		KOKUBUNJI 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	L	L	L	L	L	L	L	L	A	A	A					
2								L	L	L	L	L	L	L	L	L	L	A	L	A					
3								L		L	U	L	L	L	L	L	L	L	L	L	L				
4									L	L	L	L	L	L	L	L	L	L	L	L	A				
5									L	L	L	L	L	L	L	L	L	L	L	A	A				
6								L	L	A	A	U	L	L	L	L	L	L	C	U	L				
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
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23																									
24																									
25																									
26																									
27																									
28																									
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								2	3	6	3	17	23	23	23	24	20	9	3	1					
MED								390	450	465	495	510	520	520	510	500	490	460	430	350					
UQ								455	470	520	530	530	530	520	505	490	470	430							
LQ								420	460	475	500	510	505	500	490	475	450	420							

MAY. 1938

FOF1 (0.01 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

FOE (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 2.5 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						B	250	290	325	345	360	375		A	365	360	340	305	255	170				
2						B	235	285	315	340	355	370	375	375	360	345	305	260	170					
3						B	245	295	335	345	350		B	380	B	360	335	315	265	165				
4						B	250	A	330	B	370	375	400	380	375	340	305	265		B				
5						B	250	U A	290	A	A	A	A	A	A	A	A	315	265	A				
6						170	250	290	320	345	360	350		A	B	B	A	U A	C	200				
7						B	255	290	320	355	370	380	395	380	365	335	310	260		A				
8						B	260	290	325	350	370	375	380	385	370	340	305	270		A				
9						B	255	300	330	330	355	385	380	U B	375	365	340	315	260		A			
10						A	250	295	335	345		A	A	A	A	A	A	A	A	A				
11						A	260	305	345	360	365	365		A	A	U A	C	315	270	B				
12						190	250	300	325	340	360		A	A	A		370	345	315	270				
13						170	255	300	320		A	A	A		385	375	360	340		C	A	B		
14						B	245	295	330		A	A		370		370		345	305	265				
15						A	A	A	330		A	A	A	A		375	360	345	315	260				
16						180	250	295	330		A	A	A	A		350		345	315	270				
17						170	250	290	330	345		A	375	375	375	370	345	305	260					
18						C	290	310		A	C	C		365		A	A	A		340	310	275		
19						A	250	310	330	340	360		A	375		A	A	U A	I C		340	320	275	
20						180	260		A	340	355		A	A	A		375	370	350	330	275			
21						185	260	315	340		A	365	375	380	370	340	305		A	A	B			
22						210	260	U A	305		A	365	375	380	380	385	355	340	320	265				
23						195	260	305	330	345	360		A	A	A	A			325	265				
24						190	250	295	315	U A	340		A	A		360		U A	A		355	310	270	
25						200	260	305	330	355		A	A	A	A	A		345	320	275				
26						185	245	320	350	355	370	385	380	375	365	345	315	275		A				
27						A	260	300	325	340		A	365	370		A	365	355	330	270	205			
28						A	A	290	325	360		B	A	A	A	A		350	320	285				
29						210	270	315	340	360	375	390		A	A	A	A	A	A	A				
30						210	285	330	355		A	370	380	380		A	360		330	285	215			
31						200	280	315	350	360		B	385		A	A	380	365	340	290	220			
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
CNT						15	29	28	28	22	17	18	15	15	19	24	27	26	7					
MED						190	255	300	330	345	365	375	380	375	365	345	315	270	200					
UQ						200	260	308	338	355	370	380	380	378	370	345	320	275	210					
LQ						180	250	290	325	340	360	370	375	372	360	340	308	265	170					

MAY. 1988

FOE (0.01 MHz)

IONOSPHERIC DATA

MAY. 1988

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9h)

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	L	L	L	L	L	L	L	A	A	A													
2								L	L	L	L	L	L	L	L	L	A	A	A	A												
3								L	L	L	L	L	L	L	L	L	L	L	L	L	L											
4								L	L	L	L	L	L	L	L	L	A	L	L	A												
5								L	L	L	L	L	L	L	L	L	L	L	A	A												
6								L	L	A	A	A	A	A	A	A	L	L	C	U	L											
7								355	350	395	390	390	395	345	A	365	350	A	A	A												
8								L	L	L	L	L	L	L	L	A	A	A	L	L												
9								L	L	L	L	L	L	L	L	A	A	A	A	A												
10								L	A	A	A	A	A	A	A	A	A	A	L	A												
11								A	A	A	A	A	A	A	A	A	A	C	A	A	A											
12								L	L	A	A	L	L	L	L	A	A	A	A	A												
13								L	L	A	A	A	L	L	L	A	A	A	C	A	A											
14								A	A	A	A	A	A	A	A	A	A	A	A	A												
15								A	A	L	A	A	A	A	A	A	A	A	A	A												
16								L	L	A	A	A	A	A	A	A	A	A	L	A	A											
17								A	A	L	A	A	A	A	A	A	A	A	A	A	L											
18								C	A	L	L	C	C	L	A	A	A	A	A	A												
19								A	A	A	A	A	A	A	A	A	A	C	A	A												
20								A	A	A	A	A	A	A	A	A	A	A	A	A												
21								A	A	A	A	A	A	A	A	A	A	A	A	A												
22								L	L	A	L	L	L	L	L	A	A	A	A	A												
23								L	L	L	L	L	L	L	L	A	A	A	L	L												
24								L	385	385	A	A	A	A	A	A	A	A	A	A												
25								L	A	A	A	A	A	A	A	A	A	A	A	A												
26								L	L	L	L	A	A	A	A	A	A	A	A	A												
27								L	A	A	A	L	L	L	L	A	A	A	L	A	L											
28								A	A	A	A	A	A	A	A	A	A	A	A	A												
29								L	L	A	A	A	A	A	A	A	A	A	A	A												
30								L	A	A	A	L	L	L	L	A	A	A	A	A												
31								L	A	A	A	A	A	A	A	A	A	A	A	A												
								365	A	A	A	A	A	A	A	A	A	385	A	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																																
MED																																
UQ																																
LQ																																

MAY. 1988

M(3000)F1 (0.01)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

H^oF₂ (KM)

135° E Mean Time (G.M.T. + 9h)

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							250	260	285	315	340	335	305	320	315	280	260	E A	A					
2							260	235	280	L	L	325	335	310	315	300	300	280	260					
3							260		L	280	290	330	325	345	320	325	305	290	275	255				
4							265	265	280	345	355	370	355	305	290	280	275	270						
5							240	270	335	320	320	325	310	295	295	295	280	275						
6							275	290	A	285	305	395	330	305	305	300		L I C						
7							F	450	710	G	G	G	G	G	G	G	535	A	A	A				
8							325	360	350	L	L	330	385	345	395	340	325	325	320	290	285			
9							295	255	255	295	345	370	315	340	325	320	310	305	285	265				
10							270	255	E A	E A	325	305	360	360	340	330	320	290	270	270	285			
11							A	275	260	330	325	350	350	320	305	295	I C			E A				
12							270	280	260	E A	E A	310	345	320	350	325	305	A	E A	A	A			
13							250	255	290	A	E A	A	350	330	320	325	320	330	310	I C	285	280	260	
14							265	A	A	A	A	A	405	A	290	315	320	A	305	280				
15							A	E A	E A	L	350	305	305	345	315	E A	330	315	310	280	E A	315		
16							290	255	255	A	E A	315	310	385	325	A	E A	E A	E A	A	275			
17							A	E A	A	280	300	285	E A	E A	340	325	300	325	340	330	A	305	265	
18							C	E A	A	350	315	265	I C	260	C	335	315	355	320	305	305	A	A	
19							A	265	255	A	305	355	355	365	315	310	300	I C	E A	E A	E A			
20							250	E A	A	A	A	A	A	355	360	360	310	290	285	290	A			
21							A	330	A	E A	345	325	355	E A	380	345	A	325	295	285	275			
22							265	265	265	L	335	325	410	360	325	325	300	310	E A	A				
23							290	280	280	L	L	330	370	365	360	330	320	290	295					
24							275	295	290	275	A	350	405	360	355	305	A	A	A					
25							325	E A	A	270	325	A	345	335	E A	365	325	310	A	A	E A	285		
26							260	260	240	310	315	335	355	365	360	335	320	310	275	270				
27							315	280	260	275	285	315	405	365	340	330	305	295	280	260				
28							A	E A	A	285	275	265	285	305	320	335	315	H	375	365	325	310	295	A
29							L	315	270	270	270	305	315	365	E A	E A	375	380	335	330	300	265	270	
30							255	270	285	A	365	375	360	355	365	350	325	285	280					
31							290	335	A	A	A	A	A	515	465	A	A	360	310					
CNT							6	27	29	24	27	24	29	30	30	29	29	25	24	26				
MED							292	268	268	281	310	329	350	346	330	325	310	300	282	274				
UQ							315	279	292	291	326	350	362	368	358	340	325	310	290	288				
LQ							285	258	255	270	290	320	335	325	320	315	300	290	279	265				

The Radio Research Laboratory, Japan

MAY. 1988

H^oF₂ (KM)

IONOSPHERIC DATA

MAY. 1988

H[°]E (KM)

135° E Mean Time (G.M.T. + 9h)

Station	RUKUBUNJI 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						B	120	115	115	120	120	120	120	120	115	115	120	115	130						
2						B	120	115	110	120	115	115	115	115	115	115	115	120	130						
3						B	120	115	115	110	115		B		B		120	120	115	120					
4						B	125	120	115		B	E B	E B	E B		120	115	120	120						B
5						B	120		A	115	115		A	A	A	A	A	A							A
6							150	130	115	115	120	115	115		A	B	B	115	A	C					135
7						B	120	120	115	115	115	120	115	120	115	120	115	120	120						
8						B	120	120	115	115	115	115	115	120	120	115	110	125	130						
9						B	120	120	115	115	115		A		B		115	110	120	120	125				
10						A	120	115	115	110	110	115	110		A	A	A	A	A	A					
11						A	120	110	110	115	115	135	E B	120	110		A	C							B
12						E A	155	A	115	115	110	115	115	110		A		115	120	120	120	120			
13							125	115	115	115	110	115	110	115	110	115	115								B
14						B	125	115	115	110	115	115	120	115	125	120	115	115	125						
15						A	115	115	115	115	115	115	110	115	115	115	115	115	115	120					
16							130	115	115	115	115	115	110	115	115	115	115	120	115	130					
17						E B	135	125	115	115	110	120	120	120	120	125	125	120	125	125					
18						C	120	120	115		C	C	120	115		A		120	120	115	120	125			
19						A	120	120	115	120	115	110	115	115	115	115									I C
20						E B	150	120	115	120	120	115	115	115	120	120	115	120	120	120					
21							135	120	115	115		A	120	115	120	120	115	115	115						A B
22						E A	160	110		A	115	120	120	115	115	120	120	120	120	115					A
23						E B	145	120	120	110	110	105	110	115		A	A	A							
24							135	115	115	115	110	115	110	115	115		A	A	115	115					A
25							140	120	110	110	115		A	110	110	115	115	120	115	120	125				
26							130	120	115	115	115	120	115		E B	125	115	120	115	120	120	125			
27							130	120	115	115	115	115	115	115	115	120	120	125	130						E A A
28						A	120	115	115		E A	B		115	115	115		A							E B A
29							130	120	110	110	115	110		E B	125	115	115	115	120	115	110				A
30							140	120	120	120	115	115	120	120		A		115	110	115	115	125			
31						E A	140	115	115	115	110		B	115	115	115	120	115	130	115	125				A
	00	01	02	03	04																				
CNT							16	30	29	31	28	26	28	29	22	24	26	28	28	21					
MED							134	120	115	115	115	115	115	115	115	115	115	119	115	125					
UQ						E E	148	120	120	115	116	115	118	120	120	120	120	120	120	120	128				
LQ							130	120	115	115	110	115	115	115	115	115	115	115	115	120					

The Radio Research Laboratory, Japan

MAY. 1988

H[°]E (KM)

IONOSPHERIC DATA

MAY. 1988

TYPES OF ES

135° E Mean Time (G.M.T. + 9h)

Hour Day	Station				Lat.				Long.				Sweep				MHz				sec				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	F2		F1	F1		C1	H1	C3	C2	C3	C2	C1	C1	C1	C1	H1	H3	C4	C5	F5	F4	F2	F3	F2				
2	F2					L1	C2	C3	C2	C1	C1		C1		H1	H2	H3	H3	C3	F4	F4	F4	F2	F2				
3							C2	C3	C2	C2	C1						H1	C3	C4	F3	F3	F2						
4	F2						H1	C1					H1	H1	H1	C2	C2	C3	C3	F4	F3	F3	F1	F2				
5						H1		HL12	C1	C1	L1	L1	L2	L1	L2	L1		C3	C4	F3	F2	F2	F3	F3				
6	F1			F2			H1	C1	C3	C3	C1	C1	C1	C1	C1	C2	HL22		H1	F1		F5	F5	F3				
7	F2	F5	F4	F3	F2	L1	C2	C2	C1	H2	H1	HL11	CH11	H2	H1	H2	H4	C5	C5	F5	F4	F6	F2	F3				
8	F2	F2		F1		C2	H2	H2	C2	C2	C2	C1	HC11	H2	H2	C3	C3	H2	C3	F4	F2	F3	F3	F2				
9	F2		F2	F3		H1	H1	H2	C3	C2	C2	HL11	H1	H1	H2	C3	C3	C4	C2	F3	F4	F3	F4	F3				
10	F4		F2	F2	F3	L1	C3	C4	C3	C3	C2	C2	C2	L2	L2	LH21	L3	CL23	CL33	F4	F4	F3	F2	F4				
11	F3	F3	F3	F2	F3	HC11	H3	C4	C4	C3	C3	C3	C2	C2	HL11		C3	C5	C4	F5	F4	F3	F4	F2				
12	F1	F1	F2	F3	F3	L2	HL12	C3	C3	C3	C1	C1	C2	LH21	H3	C3	C4	C5	C4	FF13	F3	F4	F4	F5				
13	F4	F4	F4	F2	F2	H2	H3	C3	C4	C3	C2	C2	H1	H2	H2	C3		C4	C5	F4	F5	F4	F3	F5				
14	F5	F3	F4	F3	F3	C2	C4	C4	C3	C3	C3	C3	C3	C3	C2	H2	H3	C4	C3	F4	F4	F4	F4	F6				
15	F5	F4	F4	FF23	F3	L2	C4	C5	C3	C2	C2	C2	C3	C3	C3	C2	C3	C4	C5	F6	F2	F5	F4	F5				
16	F3	F4	F3	F2	F2		H2	C3	C3	C2	C2	C2	C2	C3	C3	C4	C3	C4	C4	F5	FF11	F5	FF21					
17	F5	F5	F4	F3	F1	C2	C5	C3	C3	C3	C3	C3	C2	H1	HL21	H2	C3	C3	C2	F4	F4	FF14	F4	F4				
18	F3	F3	F4	F5	FF25		C3	C3	C1			C2	C3	L3	C2	H2	H4	C4	C3	F4	F4	F3	F4					
19	F1				F1	C3	C4	C3	C3	C2	C2	C1	C3	C2	C2	L1		C5	C4	F3	F3	F5	F4	F5				
20	F1	F1	F1		F1		H3	C2	C3	C3	C3	C3	C3	C2	C2	H1	C2	C4	C4	F5	F4	F4	F3	F4				
21	F5	F5	F5	F4	FF14	H1	H2	C4	C3	C3	C2	C3	C3	C3	C3	C3	C4	L4	L5	F5	F3	F4	FF24	F3				
22	F3	F4	F4	F3	F3	LH21	H2	CL22	C3	C1	H1	H3	C2	C3	C2	C2	C4	C4	C4	F4	FF23	FF22	F3	F4				
23	F5	F2	F5	F2	F1	H1	H2	C3	C3	C2	C2	C1	C1	L1	L3	L2	H1	H3	C3	F4	F4	F4	F3					
24			F2				C4	C3	C2	C2	C3	C3	C2	C2	L3	HL31	C5	C4	C3	F5	F5	F3	F3	F4				
25	F5	F5	F3	F3	F3		H3	C4	C3	C3	C2	C3	C3	C3	C3	H3	H5	C3	C3	F4	F5	FF14	F4	F3				
26	F3	F2	F2	F4	F3	C2	C2	H2	C2	C3	C2	C1	C2	H1	H2	H2	H1	H4	C4	F5	FF24	F5	F5	F5				
27	F4	F5	F2	FF23	F3	C1	C4	C4	C3	C2	C2	C2	C2	C2	C2	C2	H1	CL32	CL22	F5	F4	FF24	F5	F5				
28	F3	F4	F3	FF23	F5	L3	C5	C2	H1	HL11	C1	C1	C1	C2	C2	C2	H4	H4	C5	F3	F4	F4	F4	F1				
29	F2	FF24	FF24	F3	F2		C3	C4	C4	C3	C2	H2	C2	C2	C2	C2	C1	C1	L3	FF23	FF24	FF23	F5	F3				
30	F5	F4	F3	F5	F4	H1	H3	C3	C4	C3	C3	C1	C2	C2	C2	C4	H1	H4	C5	F5	F3	F5	F4	F5				
31	F5	F3	FF35	FF24	F3	CL31	C2	C4	C3	C2	C1	C3	C2	HC22	H3	H3	HL22	C3	CL41	F2	F4	F3	F3	F3				
	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																												

MAY. 1988

TYPES OF ES

IONOSPHERIC DATA

MAY. 1938

FXI (0.1 MHZ)

135° E Mean Time (G.M.T. + 9h)

Station Hour Day	YAMAGAWA				Lat. 31° 12' 1" N		Long. 130° 37' 1" E					Sweep 1 MHz to 25 MHz in 2 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	X 62	X 60	X 65	X 63	X 65	X 68															X 86	X 70	X 67	X 65
2	X 63	X 65	X 62	X 60	X 59	X 56															X 66	X 61	X 63	X 67
3	X 66	X 69	X 71	X 69	X 66	X 65															X 81	X 71	X 72	X 73
4	X 72	X 72	X 73	X 72	X 64	X 61															X 106	X 70	X 67	X 69
5	X 70	X 72	X 75	X 78	X 72	X 65															0 93	X 85	X 86	X 87
6	X 92	X 99	X 83	X 59	X 59	X 59															X 103	X A	X 105	X 109
7	X 83	X 32	X 37	X 35	X 79	X 72	X 66	X 52													X A	X 69	X 69	X 66
8	A 0	X 65	X 56	X 46	X 48	X 48															X 100	X 84	X 81	X 84
9	X 81	X 76	X 72	X 60	X 58	X 61															X 95	X 90	X 92	X 91
10	X 94	X 89	X 85	X 78	X 73	X 85	X 86														X 84	X 83	X 85	X 82
11	X 94	X 92	X 86	X 80	X 75	X 68															X 90	X 85	X 85	X 83
12	X 81	X 81	X 76	X 71	X 63	X 62															X 102	X 88	X 91	X 100
13	X 96	X 90	X 86	X 69	X 66	X 69															X 95	X 89	X 89	X 84
14	X 79	X 77	X 72	X 72	X 68	X 67															X 89	X 85	X 94	X 90
15	X 92	X 75	X A	X 70	X 62	X 58															X 123	X 93	X 95	X 96
16	X 90	X 91	X 89	X 79	X 80	X 84															X 97	X 87	X 90	X 90
17	X 87	X 86	X 93	X 88	X 67	X 67															X 95	X 89	X 97	X 103
18	X 100	X 90	X 87	X 88	X 59	X 57															X 105	X 97	X 100	X 99
19	X 93	X 90	X 89	X 90	X 70	X 66															X 114	X 74	X 68	X A
20	A A	A A	X 68	X 66	X 57	X 61															X 96	X 75	X 66	X 77
21	X 80	X 80	X 81	X 75	X 72	X 63															X 91	X 88	X 83	X 77
22	X 69	X 63	X 63	X 61	X 59	X 60															X 99	X 90	X 85	X 86
23	X 88	X 90	X 91	X 87	X 81	X 81															X 97	X 96	X 88	X 93
24	X 91	X 91	X 88	X 83	X 71	X 65															X 89	X 84	X 86	X 90
25	X 90	X 87	X 91	X 80	X 70	X 69															X 110	X 79	X A	X 85
26	X 88	X 90	X 27	X 80	X 72	X 69															X 86	X 84	X 88	X 84
27	X 78	X 78	X 67	X 57	X 59	X 61															X 107	X 99	X 90	X 97
28	X 94	X 97	X 93	X 91	X 82	X 78															X 112	X 110	X 116	X A
29	X 102	X 91	X 90	X 90	X 82	X 78	X 83														X 99	X 92	X 80	X 85
30	X 81	X 87	X 90	X 72	X 66	X 66															X 104	X 96	X 90	X 90
31	X 90	X 90	X 87	X 89	X 90	X 90															X 76	X 78	X 78	X 80
CNT	28	30	30	31	31	31	3	1	2												30	30	30	29
MED	X 88	X 86	X 86	X 75	X 67	X 66	X 83	X 66	X 70												X 97	X 85	X 86	X 85
UQ	X 92	X 90	X 89	X 84	X 72	X 69	X 84														X 104	X 90	X 91	X 91
LQ	X 78	X 75	X 72	X 68	X 60	X 61	X 72														X 89	X 78	X 78	X 80

MAY. 1938

FXI (0.1 MHZ)

IONOSPHERIC DATA

MAY. 1988

FOF1 (0.01 MHz)

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

Station Hour Day	YAMAGAWA				Lat. 31 12 1 N				Long. 130 37 1 E				Sweep 1 MHz to 25 MHz in 2 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							A	A	A	L	L	L	U	A	U	L	U	L	L					
2							L	L	L	U	L	L	U	L	U	L	U	L	L	A				
3								A	U	L	L	L	A	L	L	L	L	L	L					
4								L	U	L	L	U	L	H	L	L	L	L	L					
5								L	U	L	U	L	U	L	L	L	L	L	L					
6								L	L	A	L	U	L	U	L	L	U	L	L					
7						320	360	A	U	A	A	A	A	A	A	A	A	A	A					
8							A	L	L	L	L	U	A	L	L	L	U	L	U	L				
9								A	U	L	L	L	A	A	L	U	A	A	A					
10								A	L	A	A	L	U	A	U	A	U	A	A					
11								L	L	A	A	A	A	A	L	L	L	L	L					
12								L	L	L	L	A	A	A	L	L	L	L	L					
13								L	A	A	A	A	L	U	A	L	U	A	L					
14								L	A	A	L	L	U	L	L	U	A	A	L					
15								A	A	A	A	A	A	L	A	A	A	L	A					
16						L	L	L	L	L	L	L	U	A	U	A	L	A	A					
17								A	A	A	A	A	A	U	A	A	A	A	A					
18								A	A	A	L	A	U	A	A	A	A	A	A					
19								A	A	A	A	A	A	U	A	A	A	A	A					
20								A	A	A	A	A	A	U	A	L	A	L						
21								A	L	A	A	A	U	A	A	A	A	L	A					
22								A	A	L	A	U	A	A	L	U	A	A	A					
23								A	L	A	A	A	U	A	A	A	A	A	A					
24						L	L	L	L	A	L	A	U	A	U	A	L	A	A					
25						L	L	A	A	A	A	U	A	U	U	L	L	L	L					
26								A	A	L	L	A	A	U	A	U	A	L	L					
27								L	A	A	A	U	L	A	U	A	U	A	A					
28								A	A	L	A	A	A	A	A	U	A	U	A					
29								A	A	A	A	A	A	A	A	U	A	U	A					
30								L	A	A	A	A	A	A	A	U	A	A	A					
31								A	L	L	A	A	A	A	H	U	A	U	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							1	1	2	11	10	13	16	22	25	23	22	12						
MED							320	360	495	490	520	530	530	520	520	500	480	455						
UQ																								
LQ																								

MAY. 1988

FOF1 (0.01 MHz)

IONOSPHERIC DATA

MAY. 1988

FOE (0.01 MHZ)

135° E Mean Time (G.M.T. + 9 h)

Hour Day	Station YAMAGAWA				Lat. 31° 12' 1" N				Long. 130° 37' 1" E				Sweep 1 MHz to 25 MHz in 2 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	250	300	330	340	350	A	360	A	340	320	290	230	S					
2						A	170	260	A	325	345	A	380	A	A	350	310	270	A	S				
3						A	180		A	A	A	A	A	A	A	A	280	225	S					
4						A	200	270	305	335	A	A	A	A	380	350	S	290	A	S				
5						A	175	275	310	A	A	A	A	A	A	R	350	330	295	A	S			
6						A	210	250	315	340	350	A	A	A	R	380	370	A	A	A	S			
7						S	260	310	330	350	A	A	A	A	A	370	350	325	290	A	A			
8						A	220	270	300	325	350	A	A	A	370	340	320	290	A	S				
9						A	190	260	305	350	365	R	375	390	390	375	350	320	300	220	A			
10						A	270	305	A	A	A	A	A	A	A	U	A	U	A	A				
11						A	195	260	310	340	A	A	A	A	A	A	A	295	A	S				
12						A	A	A	A	A	A	A	A	A	370	360	335	295	225	S				
13						A	195	250	A	A	A	A	390	380	370	345	325	280	A	A				
14						A	190	A	A	A	A	A	A	R	370	A	355	325	290	225	S			
15						A	190	A	A	A	A	A	A	A	370	360	340	320	295	A	S			
16						A	190	A	A	340	A	A	A	A	A	A	A	280	210	S				
17						A	260	300	A	A	360	360	370	370	370	350	330	280	220	A				
18						A	270	310	330	340	A	A	A	A	A	350	330	290	240	A				
19						A	200	280	315	340	350	360	360	A	A	A	340	A	230	S				
20						B	260	300	A	A	A	A	A	A	370	360	340	290	220	S				
21						A	200	260	305	330	350	360	370	370	360	340	300	A	A	A				
22						A	A	A	A	A	A	390	390	390	380	340	U	A	310	280	A	S		
23						A	230	270	300	340	A	A	B	R	U	A	A	R	330	290	230	S		
24						A	200	260	A	A	A	A	A	A	360	350	330	290	230	S				
25						A	200	260	290	330	350	A	A	370	360	350	330	300	200	S				
26						R	200	250	310	350	360	370	R	370	390	370	350	320	290	220	S			
27						A	200	250	300	320	A	A	A	390	390	380	360	330	290	A	S			
28						A	190	250	280	A	B	A	A	A	A	R	A	A	A	A				
29						A	210	270	310	340	A	360	A	A	A	A	A	A	A	A				
30						A	195	295	A	360	375	A	A	A	A	U	A	340	300	A	A			
31						A	210	A	A	360	A	A	A	A	A	R	U	A	U	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							23	24	20	19	12	8	9	12	18	24	24	26	16					
MED							200	260	305	340	350	360	380	375	370	350	328	290	225					
UQ							200	270	310	340	355	372	390	390	380	360	330	295	230					
LQ							190	255	300	330	348	360	370	370	370	348	320	290	220					

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MAY. 1988

FOE (0.01 MHZ)

IONOSPHERIC DATA

MAY. 1938

FOES (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 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	J A	41	25	38	19	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	G	34	J A	J G	J A	J A	J A	J A	J A
2	J A	20	24	18	18	J A	J A	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
3	E S	16	16	16	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	E S	16
4	E S	16	16	16	E S	E S	E S	G	G	35	37	41	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
5	E S	16	15	16	E S	E S	E S	E S	E S	J A	J A	J A	J A	J A	J A	J A	G	G	37	34	33	41	J A	J A	J A
6	J A	41	16	60	J A	E S	J A	G	31	38	48	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
7	J A	84	65	26	50	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
8	J A	64	37	42	29	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
9	J A	51	95	35	85	J A	E S	G	38	93	G	43	41	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
10	J A	61	44	44	31	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
11	J A	36	33	31	19	E S	E S	E S	E S	36	35	44	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
12	J A	18	109	50	34	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
13	J A	33	20	J A	E S	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
14	J A	33	21	18	16	J A	E S	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
15	J A	77	67	85	76	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
16	J A	51	25	33	24	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
17	J A	28	52	31	23	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
18	J A	45	48	47	42	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
19	J A	78	52	51	28	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
20	J A	87	98	84	36	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
21	J A	51	61	61	46	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
22	J A	41	61	50	34	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
23	J A	41	38	51	61	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
24	J A	25	16	16	15	E S	E S	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
25	J A	20	33	25	20	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
26	J A	61	82	61	44	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
27	J A	85	34	36	24	J A	E S	G	34	71	64	91	72	47	49	93	51	53	76	95	199	77	51	44	32
28	J A	50	23	36	73	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
29	J A	51	25	33	27	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
30	J A	40	54	139	61	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
31	J A	87	65	44	41	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
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	J A	41	38	38	28	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
UQ	J A	61	63	51	43	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
LQ	J A	30	24	26	19	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A

MAY. 1938

FOES (0.1 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1938

FMIN (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

Station Hour Day	YAMAGAWA							Lat.	Long.	Sweep 1 MHz to 25 MHz in 2 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	E S	E S	E S	E S	E S	16	16	17	20	24	23	27	21	20	18	17	16	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	16	16	18	13	20	21	20	20	24	22	17	17	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	16	16	17	17	21	32	24	23	29	22	19	16	16	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	16	16	16	16	17	16	20	20	27	29	26	25	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	16	16	16	16	16	16	17	24	25	23	32	21	23	18	16	16	E S	E S							
6	E S	E S	E S	E S	E S	E S	E S	16	16	15	15	16	18	17	19	21	22	23	30	24	22	18	16	16	E S	E S						
7	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	17	20	21	25	22	20	18	18	18	15	14	E S	E S							
8	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	17	23	32	26	23	32	20	17	16	16	E S	E S	E S							
9	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	17	17	20	24	22	22	21	21	18	16	16	E S	E S	E S							
10	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	18	20	21	20	22	22	22	22	22	22	16	17	15	E S	E S						
11	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	17	18	13	21	26	22	35	21	23	18	18	16	E S	E S							
12	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	16	13	21	24	27	22	22	18	17	16	15	E S	E S							
13	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	15	16	16	20	20	21	20	25	18	18	18	15	E S	E S							
14	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	18	18	20	21	24	33	22	18	18	17	16	E S	E S							
15	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	16	17	16	22	18	25	19	18	17	16	16	E S	E S							
16	E S	E S	E S	E S	E S	E S	E S	16	16	15	15	16	15	17	21	27	24	26	21	19	17	17	15	E S	E S							
17	E S	E S	E S	E S	E S	E S	E S	16	16	15	15	16	15	17	17	17	19	25	20	22	23	18	16	14	E S	E S						
18	E S	E S	E S	E S	E S	E S	E S	16	16	15	15	16	15	17	13	20	22	27	22	22	23	19	18	17	E S	E S						
19	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	16	19	18	24	24	23	22	24	20	18	17	16	E S	E S						
20	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	17	16	16	22	21	21	21	22	22	22	23	16	15	E S	E S						
21	E S	E S	E S	E S	E S	E S	E S	16	16	15	15	16	16	17	20	20	23	27	25	27	21	18	17	14	E S	E S						
22	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	16	17	20	23	32	32	32	23	22	20	17	15	E S	E S						
23	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	16	16	20	20	38	35	22	25	21	16	15	E S	E S							
24	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	13	16	17	17	22	21	33	35	24	23	16	16	16	E S	E S						
25	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	15	17	16	23	22	25	22	21	22	17	17	15	E S	E S							
26	E S	E S	E S	E S	E S	E S	E S	16	16	15	15	16	15	19	21	21	27	35	24	23	22	17	17	18	E S	E S						
27	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	15	16	20	19	24	22	22	22	26	17	15	15	E S	E S							
28	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	18	16	17	20	35	25	25	26	13	20	18	17	14	E S	E S						
29	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	17	18	21	26	22	24	24	25	25	20	21	16	17	E S	E S						
30	E S	E S	E S	E S	E S	E S	E S	16	16	15	15	16	16	18	17	22	26	35	22	29	22	18	17	15	E S	E S						
31	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	17	13	25	24	33	21	21	24	19	17	15	16	E S	E S						
00																																
CNT	30	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	F S	E S	16	16	16	16	17	13	21	24	24	23	22	22	18	17	16	16	E S	E S							
UQ	E S	E S	E S	E S	E S	E S	E S	16	16	16	16	16	18	20	22	26	27	26	24	23	18	17	16	16	E S	E S						
LQ	E S	E S	E S	E S	E S	E S	E S	16	16	15	15	16	16	16	17	20	21	22	22	21	20	17	16	15	E S	E S						

MAY. 1938

FMIN (0.1 MHz)

IONOSPHERIC DATA

MAY. 1988

M(3000)F1 (0.01)

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 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									A	A	A	L	L	L	A	A	U	L	U	L	L					
2									L	L	U	L	U	L	L	A	U	L	U	L	L	A				
3									A	U	L	L	L	L	A	L	L	L	L	L	L					
4									L	U	L	L	L	L	H	A	A	A	A							
5									L	L	L	U	L	L	U	L	L	U	L	L	L					
6									L	L	A	L	U	L	U	L	A	U	L	A	A					
7																										
8									A	L	L	L	L	A	A	A	A	A	U	L	L					
9									A	L	L	L	L	A	A	A	A	A	A	A	A					
10									A	L	A	A	L	A	A	A	A	A	A	A	A					
11									L	L	A	A	A	A	A	A	L	A	A	A	A					
12									L	L	L	A	A	A	A	L	L	L	A	A	A					
13									L	A	A	A	A	L	A	A	A	A	A	A	L					
14									L	A	A	A	L	360	365	A	A	A	A	A	A					
15									A	A	A	A	A	A	L	A	A	A	A	L	A					
16									L	L	L	L	L	390	395	400	360	380	A	375	355	A	A			
17									A	A	A	A	A	A	A	A	A	A	A	A	A					
18									A	A	A	L	A	385	380	A	A	A	A	A	A					
19									A	A	A	A	A	A	A	A	A	370	A	A	A					
20									A	A	A	A	A	A	370	A	L	365	375	A	L					
21									A	L	A	A	A	A	A	A	A	A	A	360	A					
22									A	A	L	A	375	A	A	395	A	375	A	A	A					
23									A	L	A	A	A	370	A	375	A	A	A	A	A					
24									L	L	L	A	395	L	A	A	375	375	A	A	A					
25									L	L	A	A	A	A	A	U	L	395	390	385	385	L	L			
26									A	A	L	L	A	A	A	A	A	385	380	L	A					
27									L	A	A	A	405	395	A	A	A	A	A	A	A					
28									A	A	L	A	A	A	A	380	385	395	380	A	A					
29									A	A	A	A	A	A	A	A	A	A	385	A	A					
30									L	A	A	A	A	A	A	A	A	A	A	A	A					
31									A	L	A	A	A	A	A	H	285	330	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
CNT								1	1	2	9	9	12	12	13	13	13	12	9							
MED								310	335	345	365	365	360	360	365	355	350	370	380							
UQ																										
LQ																										

MAY. 1988

M(3000)F1 (0.01)

IONOSPHERIC DATA

MAY. 1988

H^oF₂ (KM)

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 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										A	A														
2									240	250	260	335	335	315	305	310	275	270	255	250					
3									235	245	290	300	365	330	270	310	300	285	270	250					
4									E A	A	L														
5									270	275	295	305	305	295	320	300	295	270	245						
6									240	270	325	325	325	330	300	270	305	300	A	A					
7									245	345	295	315	320	310	285	305	295	295	275						
8									270	275	280	365	320	300	285	285	355	350	300						
9									420	415	555	645	A	A	G	A	495	410	A	A	A				
10									A																
11									255	270	335	375	355	305	305	325	305	300	280						
12									A	A															
13									300	300	310	325	E A	A	330	320	310	315	A	295	295				
14									250	255	E A	A													
15									250	255	350	A	370	340	340	330	300	290	295	270					
16									E A	A															
17									250	265	340	320	A	E A	A	360	330	310	305	300	300	275			
18									E A	E A	E A		A	L											
19									230	275	315	330	A	325	340	330	305	290	280	270					
20									250	260	300	A	A	L											
21									E A	A	A		A	A											
22									260	340	A	A	A	A	325	320	320	300	290	275					
23									240	230	240	270	360	370	330	330	340	350	325	300	A				
24									A	E A	E A	E A	A	E A	A										
25									280	300	350	335	370	330	335	310	310	E A	A	A					
26									280	245	270	440	350	330	340	340	310	325	A	A					
27									A	A	A	E A	A	E A	A										
28									260	275	A	A	E A	A	350	345	320	310	290	A	290				
29									A	A	E A	A	A	A	A										
30									260	275	280	A	A	A	410	385	320	280	275	270					
31									E A	A															
									255	255	340	A	415	380	345	340	345	320	295	A					
									285	290	285	A	A	A	A	395	375	330	305	295					
	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	23	28	28	19	24	27	30	30	31	29	25	23	1						
MED						285	252	260	282	318	345	338	330	326	315	305	295	275	275						
UQ						358	265	274	A	340	374	354	345	340	328	320	300	290							
LQ						258	245	255	270	305	328	330	315	310	302	290	290	270							

MAY. 1988

H^oF₂ (KM)

IONOSPHERIC DATA

MAY. 1988

H F (KM)

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 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 A	A	A	A	260	270	235	240	A	A	A	A	A	A	A	A	215	200	230	240	240	A	A	S	E A				
2	A	A	E A	E A	E A	E A	245	230	225	250	250	195	195	200	195	235	225	E A	A	A	255	230	E S	E A	S				
3	S	305	285	270	250	270	235	220	A	210	220	190	H	225	A	220	H	230	225	240	250	230	250	S	310				
4	300	300	280	245	245	245	240	220	H	220	210	200	195	205	205	200	H	E A	A	A	A	A	E A	E A	E A				
5	300	265	255	225	225	225	230	225	H	220	205	195	195	200	195	210	200	225	245	A	250	245	300	330	E A				
6	A	230	215	200	S	280	245	240	230	E A	255	A	215	E A	250	E A	A	H	A	A	A	E A	A	A	A				
7	A	320	240	305	E S	E A	295	E A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	A	A				
8	A	295	E A	295	295	285	275	A	215	205	190	E A	255	A	200	245	A	A	E A	255	230	255	245	250	285	300			
9	E A	E S	E A	A	E A	E A	255	225	220	A	200	200	220	A	A	A	A	A	A	A	250	E A	E A	E A	A				
10	E A	E A	E A	E A	E A	E A	250	A	230	A	A	A	A	A	A	A	A	A	A	A	270	275	310	320	350				
11	270	275	270	S	230	280	250	230	E A	A	A	A	A	A	A	A	H	A	A	A	A	A	260	275	300	300			
12	280	290	330	265	255	270	240	235	230	220	A	A	A	A	A	A	H	A	A	A	250	275	A	A	265				
13	270	275	255	250	270	250	235	225	A	A	A	A	A	A	A	A	A	A	E A	260	245	240	E A	270	290				
14	280	280	290	265	275	255	250	H	240	A	A	A	245	H	200	220	A	A	A	A	250	250	A	A	E S				
15	A	E A	A	E A	A	E A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	270	240	230	E A	E S				
16	290	290	260	265	275	265	240	A	220	220	210	A	A	A	225	A	A	A	A	A	240	230	E A	E A	300				
17	290	300	275	240	225	240	240	A	A	A	A	A	A	A	A	A	A	A	A	A	E A	260	235	300	300	300			
18	280	290	300	240	240	E A	E A	A	A	A	A	A	220	A	A	A	A	A	A	A	280	270	A	E A	345				
19	335	A	330	270	250	275	250	A	A	A	A	A	A	A	A	A	A	A	A	A	240	A	260	235	E A	E A	A		
20	A	A	E A	A	275	260	260	215	A	A	A	A	A	A	A	A	220	A	A	A	260	250	235	230	270	340			
21	285	325	330	A	290	260	235	250	A	A	A	A	A	A	A	A	A	A	A	A	240	A	A	275	280	290	280	275	
22	290	A	A	280	300	315	A	A	A	A	A	A	A	A	A	A	A	A	A	A	240	A	240	265	290	280	305		
23	325	330	275	320	260	265	240	A	220	A	A	A	230	A	220	H	A	A	A	A	275	270	245	260	310				
24	280	275	260	240	225	240	250	A	A	A	190	H	200	A	A	H	E A	A	A	A	A	250	280	290	310				
25	270	320	280	230	255	260	240	260	A	A	A	A	A	A	A	A	H	H	H	H	250	215	215	225	240	260	250	240	350
26	A	310	295	265	240	260	A	A	A	225	A	A	A	A	A	A	A	H	A	A	220	220	240	240	245	330	270	E A	290
27	270	315	300	290	280	270	240	225	A	A	A	200	210	A	A	A	A	A	A	A	A	E A	280	265	260	275	310	A	
28	270	265	260	270	240	230	235	H	A	A	A	250	A	A	A	A	220	220	230	A	270	270	290	290	A				
29	240	260	270	270	270	290	235	H	A	A	A	A	A	A	A	A	A	A	A	A	225	A	A	270	240	A	350	A	
30	295	300	270	255	275	270	245	E A	A	A	A	A	A	A	E A	A	A	A	A	A	A	A	E A	A	A	A	A	A	A
31	A	A	295	300	275	245	245	A	A	A	A	A	A	A	A	A	225	E A	A	A	A	A	A	E A	A	A	A	A	A
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23					
CNT	27	29	29	30	31	31	29	15	13	12	8	13	11	12	12	12	12	10	7	22	29	27	27	27					
MED	288	295	275	266	262	262	240	228	228	212	200	200	208	216	222	222	225	228	240	251	248	262	230	305					
UQ	305	310	298	278	274	272	250	236	235	244	225	218	225	225	235	234	230	238	245	265	268	285	305	318					
LQ	230	280	265	250	243	243	240	222	220	203	192	195	200	202	205	218	H	H	A	A	220	225	240	250	240	246	275	296	

MAY. 1988

H F (KM)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

H^oE (KM)

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 2.5		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						S	110	110	110	110	110	110	110	105	110	110	110	115		A	S		
2						A	115	105	105	105	105	105	105	110	105	105	110	120			S		
3						E S	130	110	105	105		A	A	A	A	A	A	E A	125	115		S	
4						E S	120	105	105	110	110		A	A	A	110	110	S		A	S		
5						E S	135	A	105	A	A	A	A	A	A	105	105	110	120		S		
6						E S	135	110	120	110	105		A	A	A	110	110	105	115		A	S	
7						S	110	105	105	105	105	110		A	A	110	110	115	115			A	
8							125	110	105	105	110	115		A	A	120	105	105	110	120		S	
9							120	115	110	110	110	110	110	110	115	110	115	120			A		
10						A	110	110	110	110	110		A	A	A	A	A	A	E B		A		
11						E B	125	115	110	110	115	110		E B	120	115	A	110	115	115		S	
12						A	A	A	110	110		A	A	A	110	110	110	110	115		S		
13							115	110	105	105	110		A	110	110	115	110	110	120		E B	A	
14						S	125	110	110	110		A	A	A	E B	120	115	110	110	120		E B	S
15						E B	130	110	110		A	A	A	105	E B	115	110	110	115		E B	S	
16						B	120	110	A	110	110	110		A	A	A	A	110	110	120		B	S
17						A	110	110	105	110	110	110	110	110	115	115	110	120		B	A		
18						B	125	115	110	110	110		A	A	A	A	110	110	115	120		B	A
19						B	110	110	110	110	110	110		A	A	A	110	115	120		B	S	
20						B	115	110	110	110	110	110	110	110	110	110	110	110	120		B	S	
21						B	120	115	110	110	110	110	110	110	110	110	110	A	A		A		
22						A	A	A	A	A		115	115	115	120	A	A	A	A		S		
23						E A	130	120	110	110	110	110		B	110	A	110	110	115		B	S	
24						A	120	120	A	A	A	A	A	A	110	110	110	110	120		B	S	
25						S	120	110	110	110	110		A	A	110	110	110	110	115		B	S	
26						S	120	110	110	110	115	120		B	110	110	110	110	120		B	S	
27						S	115	120	110	110	110	110	110	110	120	120	110	110		A	S		
28						B	115	110		A	B	A	A	A	A	A	A	A	110		A	A	
29						E S	120	115	115	110	110	110		A	A	A	A	A	A		A	A	
30							115	110	110	105	105	115		B	E B	125	105	115	A	105	105		A
31						E A	125	105	105	105	110	105	120		E B	105	105	105	A	A	E A	A	
CNT							22	28	27	26	24	19	17	17	21	23	24	28	23				
MED							118	110	110	110	110	110	110	110	110	110	110	110	120		B		
UQ						E E	125	115	110	110	110	112	110	110	115	110	110	115	120		B		
LQ							120	110	105	105	110	110	110	110	110	110	110	110	115				

The Radio Research Laboratory, Japan

MAY. 1988

H^oE (KM)

IONOSPHERIC DATA

MAY. 1938

H°ES (KM)

^o 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 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	110	105	115	100	110	S	125	125	120	120	125	125	120	120	115	G	150	130	100	100	100	110	110	110
2	110	105	100	105	105				120	115	110	105	105		G	115	105	170	150	125	115	110	110	110
3	S	S	S	S	110	105	125	115	110	110	105	105	105	105	105	105	110	105	125	110	110	110	135	S
4	S	S	S	S	S	S	G	G	120	125	115	105	110	110	G	145	115	115	110	105	105	105	105	105
5	S	S	S	S	S	S			150	145	145	105	105	105	105	105	105	G	G	125	115	105	105	105
6	105	S	115	130	S	G	140	120	115	115	105	105	110		G	135	145	115	120	115	115	110	110	110
7	110	110	125	115	115	115	120	120	120	120	125	130	125	130	135	130	130	115	110	110	110	105	110	105
8	105	105	105	105	105	S	130	110	120	125	120	105	105	105	130	125	125	120	120	110	110	110	110	110
9	110	110	110	110	105	S	G	130	120		G	140	150	130	140	135	135	120	120	115	110	110	105	105
10	100	100	95	95	100	100	105	125	120	110	110	110	105	100	105	125	130	120	120	115	110	110	100	105
11	100	100	100	100	S	S	130	130	120	115	110	105	105	105	105	140	125	120	115	110	110	100	105	105
12	105	105	105	100	105	105	105	105	105	120	110	105	105	105	150		150	125	120	110	110	110	115	110
13	100	130	130	S	S	S	125	120	110	105	105	100	135	130	130	130	120	115	120	110	110	105	105	105
14	100	100	105	S	110	S	E G	140	120	115	110	105	105	105	125	120	140	125	120	115	110	110	105	110
15	105	100	100	100	100	100	120	115	110	105	105	105	105	125	120	115	115	125	115	110	110	110	105	105
16	110	110	110	110	100	105	120	120	110	G	115	110	110	110	135	135	130	125	115	115	110	110	110	110
17	110	110	110	110	110	110	120	120	115	110	110	115	115	120	150	125	120	120	115	115	110	110	110	110
18	110	105	105	105	110	120	120	115	115	110	110	105	105	110	155	145	130	125	120	110	110	110	115	110
19	110	100	100	100	100	100	125	120	120	115	115	115	110	110	110	110	160	115	120	120	115	110	115	115
20	110	110	100	100	105	110	130	120	120	115	115	115	115	135	130	140		G	120	120	110	110	100	110
21	110	110	105	105	105	110	120	120	12	120	120	115	115	120	115	110	110	110	105	100	100	100	100	115
22	105	100	100	100	110	105	105	110	110	110	110	135	120	120	E G	160	120	125	120	120	120	100	110	110
23	110	110	100	100	105	110	E G	140	125	120	120	120	115	120	140	140	120	120	120	120	110	110	105	105
24		S	S	S	S	S			120	120	115	110	110	110	110		G	135	135	120	120	110	110	110
25	105	105	100	100	100	105	130	120	115	115	115	110	110	125	140		G	G	125	120	120	110	105	110
26	115	115	110	110	110	110	120	115	115	120	120	115	120	125	115	115	140	135		G	125	110	110	110
27	105	100	100	100	105	S	G	120	115	115	110	125	135	150	140	140	135	120	115	125	100	100	100	95
28	120	95	110	110	120	110	115	110	115	105	105	105	105	105	140	105	105	125	110	110	110	110	110	105
29	100	95	95	95	95	100	135	120	120	120	110	110	110	105	105	105	105	105	105	100	100	100	100	105
30	115	115	110	105	105	110	130	120	110	105	105	105	105	110	110	120	135	120	105	110	115	115	110	105
31	105	100	95	95	95	120	145	115	120	115	105	105	105	105	155	130	125	115	115	100	100	100	100	100
CNT																								
MED	110	105	105	100	105	110	122	120	115	115	110	108	110	110	125	128	125	120	115	110	110	110	110	105
UQ	110	110	110	110	110	110	130	120	120	120	115	115	120	125	139	136	135	125	120	115	110	110	110	110
LQ	105	100	100	100	100	105	120	115	112	110	105	105	105	105	110	118	120	115	115	110	108	105	105	105

MAY. 1938

H°ES (KM)

IONOSPHERIC DATA

MAY. 1988

TYPES OF ES

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 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	F3	F1	FF14	F1	F2		C4	C3	C5	C3	C2	C1	C2	C1	L2		H1	C2	L1	L5	F4	F6	F2	F3
2	F2	F3	F2	F2	F5	F6		C3	C2	C2	C2	C1		C1	C2	H1	H1	C2	C5	LL31	F2	F2	F4	F2
3	F1	F1			F1	F3	C2	C5	C4	C2	L2	L1	L2	L2	L2	L1	L2	LC21	C3	L4	F2	F2	FF11	
4									C1	C1	C1	L1	L1	L1		H1	C4	C4	L5	L6	F4	F4	F4	F4
5							H2	HL12	H1	L1	L1	L1	L1	L1	L1	L5		C1	C3	L5	F5	F5	F3	F4
6	F6		F1	F1	F1			C2	CL21	C2	C2	L1	L2	CL12		H1	HC11	C6	CL43	LL74	FF66	F6	F6	F5
7	F6	F3	F6	F6	F2	F2	C3	C2	C3	C2	C2	C2	C2	CL11	CL21	C2	C3	C3	C7	L7	F4	F3	F6	F4
8	F5	F5	F4	F2	F2	F1	C4	C7	C1	C1	C1	C3	L2	L1	H3	C3	C3	C2	C2	L4	FF42	FF24	FF23	F7
9	F7	F3	FF38	F7	F6			C2	C6		H2	H1	H3	H3	H2	H3	C4	C5	C6	L7	F4	F5	F5	F4
10	F4	F7	F6	F4	FF22	F3	L3	C4	C2	C5	C4	C2	L3	L2	L2	CL22	CL41	CL62	C5	CL72	FF72	F7	F5	FF35
11	F5	F5	F5	F2			C4	C3	C4	C5	C7	C3	C3	C4	C2	HL12	CL62	C7	C7	C6	F3	F3	F5	FF23
12	F2	F4	F7	F5	F4	F2	L3	L3	L2	C2	C2	L3	L4	L5	H1		H1	C2	C5	C7	F4	F5	F7	F5
13	F7	FF32	FF21				C2	C3	C4	C5	C5	C5	H2	H2	H1	H2	C3	C3	C4	L5	FF63	F8	F7	F5
14	F2	F2	F2		FF11		H1	C2	C4	C2	L2	L2	L1	C1	C2	H1	C2	C4	C4	C6	F3	F4	F5	F2
15	F7	F3	F6	F3	F3	F2	C5	C5	C5	L7	L3	L5	C4	C5	C3	C3	C5	C5	C7	C5	F5	F4	F4	F3
16	F3	F5	F6	F5	F5	F2	C5	C2	L3		C3	L3	L2	L2	CL22	CL22	C2	C4	C5	C5	F6	F4	F6	F7
17	F2	F4	F3	F3	F2	F4	CL31	C5	C5	C4	CL41	C3	C6	C2	H1	C2	C4	C6	C7	L6	F8	F8	F4	F8
18	F7	F6	F8	F6	F6	F6	C5	C5	C5	C4	C3	L3	L2	L2	HL22	H3	H5	C7	C7	L7	F3	F3	F7	FF44
19	FF55	F3	F4	F4	F2	F2	C3	C5	C5	C4	C4	C3	C5	L3	L3	L7	H1	C3	C7	C6	F3	F3	F6	F8
20	F5	F6	F3	F5	F2	F2	C3	C5	C6	C3	C4	C3	C3	C1	C2	H1		C4	C3	L4	F6	F3	F4	F5
21	F7	F6	F5	F6	F3	F4	C4	C4	C5	C5	C5	C3	C2	C3	C3	C4	C5	L2	L4	L4	F5	F3	F3	FF31
22	F5	F4	F6	F3	FF13	F3	L6	L3	L6	L3	L2	H1	C2	C2	H1	CL21	CL21	CL31	CL31	CL33	F5	FF73	FF42	FF52
23	FF73	F6	F4	F5	FF22	FF21	HL21	H4	C3	C3	C3	C3	C1	H1	HL11	C3	C3	C7	C5	C4	F3	F4	F4	F2
24	F2						CL21	CL32	CL12	L3	L1	L2	L3	L2		H1	H3	C4	C7	L6	F4	F5	F3	F5
25	F2	F7	F5	F6	F2	F5	C3	C6	C5	C5	C5	L5	L7	C1	H2			C2	C1	C3	F3	F3	F3	F3
26	F6	F5	F8	F8	F5	F4	C6	C4	C3	C2	C2	C4	C3	C2	C3	C3	H1	H2		C1	F4	F2	F2	F6
27	F3	F3	F3	F1	F2		CL21	C4	C4	C5	C2	H1	H2	HL51	HL21	H2	C4	CL74	CL15	F5	F3	F4	F4	
28	FF21	F3	FF32	F6	F3	F3	C2	C4	C3	L3	L3	L4	L4	L2	HL21	L1	L1	C1	L5	L6	F4	F5	F3	F4
29	F4	F4	F3	F6	F4	F1	C2	C3	C5	C3	C5	C7	C6	L5	L3	L2	L3	L3	L5	L5	F5	F4	F1	F2
30	F6	F7	F3	F2	F3	F3	C4	C2	C3	C3	C4	C3	C4	C2	C2	CL41	C2	C4	L3	LL35	FF26	FF25	FF32	F7
31	F8	F5	F6	F7	F6	FF16	HL21	C7	C2	C2	C6	C4	C5	C3	H1	H1	HL31	CL42	CL32	L6	F8	F8	F7	F4

The Radio Research Laboratory, Japan

MAY. 1988

TYPES OF ES

IONOSPHERIC DATA

MAY. 1988

FXI (0.1 MHz)

135° E Mean Time (G.M.T. + 9h)

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	X	X	X	X	X	X															U X	S	U X	U X
2	S		U X	X	X	X															C	C	C	67
3			X	X	X	X															X	U X	X	
4			X	X	X	X															U X	X	X	
5			X	X	X	X															U X	S	S	U X
6	X	X	X	X	X	X															X	X	X	X
7	U X		X	X	X	X															X	X	X	X
8	X		X	X	X	X															X	X	X	X
9	X		X	X	X	X															X	X	X	X
10	X	X	S	X	X	X															X	X	S	S
11	S	S	X	X	X	X															X	C	93	92
12	X		X	X	X	X															X	X	89	90
13	X		X	X	X	X															U X	X	X	X
14	X		X	X	X	X															X	X	X	X
15	X		X	X	X	X															X	X	X	X
16	U X		X	X	X	X															X	X	X	X
17	X		X	X	X	X															X	X	X	X
18	X		X	X	X	X															U X	X	X	X
19	X		X	X	X	X															X	X	X	X
20	U X		X	X	X	X															X	X	X	X
21	X		X	X	X	X															X	X	X	X
22	X		X	X	X	X															X	X	X	X
23	X		X	X	X	X															X	X	X	X
24	X		X	X	X	X															X	X	X	X
25	X		X	X	X	X															X	X	S	X
26	X		X	X	X	X															U X	X	X	X
27	X		X	X	X	X															X	X	X	U X
28	X		X	X	X	X															X	X	X	X
29	X		X	X	X	X															X	X	X	X
30	X		X	X	X	X															X	X	X	X
31	X		X	X	X	X															X	X	X	X
CNT	29	30	29	31	31	31			2	3	1										30	27	28	30
MED	91	92	91	89	72	69			74	33	57										X	X	X	X
UQ	X		X	X	X	X															X	X	X	X
LQ	X		X	X	X	X															X	X	X	X

MAY. 1988

FXI (0.1 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

FOF2 (0.1 MHz)

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

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	F	F	F	F	75	81	82	71	33	95	110	130	143	160	U R	172	U R	155	143	138	S	S	U	S			
2	S	F		89	68	61	54	67	85	79	84	94	102	118	134	135	129	125	120	108	C	C	C	F				
3	F	F		71	71	64	58	68	70	69	84	95	114	131	137	142	145	137	130	118	R	S	S	F				
4	F	F	S	J S	J S	58	60	75	80	68	78	81	98	U R	118	123	131	137	126	120	125	96	85	78	70			
5	F	F	F	F	80	69	62	73	73	91	106	120	J R	133	147	145	138	141	138	145	140	U S	S	U	S			
6	U S	S	S	113	60	48	F	58	71	80	96	93	94	118	S	130	130	124	112	107	R	154	124	U S	S	U	S	142
7	J S	F	U S	104	67	66	F	F	F	F	R	A	48	50	54	60	61	65	74	R	H	84	88	78	83	79	U	77
8	68	F	F	52	44	33	S	F	49	68	68	67	A	78	103	110	110	107	A	J R	112	133	139	118	114	108	95	S
9	90	F	F	F	F	65	R	72	64	80	96	94	95	111	124	124	127	136	149	U R	R	156	151	120	108	107	121	S
10	U S	S	S	S	S	F	F	78	82	76	81	85	98	110	121	126	140	140	151	141	127	U S	S	S	S	S	S	
11	S	S	F	74	70	64	71	88	87	A	77	78	94	108	123	127	R	120	R	R	118	U R	S	C	F	F	S	
12	S	F	76	66	56	50	58	74	85	82	84	95	104	110	113	117	110	110	113	113	S	93	83	80	F	F	S	
13	F	F	F	79	72	75	S	79	76	83	84	94	92	94	104	110	120	119	110	110	118	96	92	87	83	S		
14	83	79	74	73	S	69	66	80	83	R	74	84	104	113	120	119	126	134	136	140	120	89	88	90	100	U	S	100
15	F	F	F	F	F	F	F	70	82	81	A	98	118	138	153	158	161	164	167	168	144	110	113	118	U	S	U	S
16	J S	F	F	F	F	F	R	88	80	66	69	79	90	100	105	108	110	R	R	A	128	83	84	90	F	F	S	
17	F	F	F	F	F	F	F	F	84	84	89	A	111	118	123	120	113	109	116	R	P	114	108	104	114	140	S	
18	U R	S	S	91	F	48	52	95	U R	R	R	P	84	105	97	100	115	116	104	A	P	113	104	93	88	F	S	
19	F	F	F	F	66	F	F	69	81	A	72	94	U R	110	126	141	R	158	164	133	174	138	103	105	104	J	S	104
20	U S	F	A	F	F	F	F	64	57	69	A	76	89	99	102	104	112	117	120	124	123	88	80	74	F	S		
21	F	F	F	F	F	F	F	67	69	R	72	77	82	A	100	114	124	140	134	R	110	104	106	104	91	S		
22	F	F	F	F	F	F	F	69	84	71	62	69	83	97	105	110	114	112	113	108	102	90	89	89	F	S		
23	F	S	S	F	F	F	F	75	81	74	84	84	82	89	88	94	95	94	98	97	A	U S	F	F	F	S		
24	F	F	F	F	79	70	71	77	90	79	67	68	77	80	92	97	99	108	103	105	U R	84	80	83	83	S		
25	88	F	F	F	F	F	F	69	66	71	70	74	80	88	96	105	106	111	113	R	R	120	126	145	125	65	64	65
26	F	F	F	F	F	F	F	56	71	71	A	73	84	95	104	111	118	123	120	R	108	U R	95	93	89	83	80	S
27	F	F	F	F	F	F	F	71	82	77	67	70	87	104	103	100	107	114	120	R	124	U R	104	90	90	91	S	
28	90	S	S	S	F	F	F	F	F	85	92	90	85	A	A	110	122	124	126	109	108	R	S	95	93	90	F	S
29	F	S	S	S	F	F	F	F	F	82	74	74	78	88	101	113	114	115	123	122	113	104	102	100	88	F	S	
30	F	F	F	F	F	F	F	80	78	75	76	A	75	84	93	94	104	110	86	79	R	76	75	74	77	F	S	
31	F	F	F	F	F	F	F	80	78	75	76	A	75	84	93	94	104	110	86	79	R	76	75	74	77	F	S	
CNT	14	9	13	17	18	15	25	30	30	27	28	28	30	30	31	31	29	31	28	28	30	26	26	20	S			
MED	90	90	88	74	69	64	69	80	76	81	82	91	104	109	114	120	120	120	119	120	101	90	88	91	S			
UQ	U S	S	S	104	81	74	70	75	82	82	84	92	98	113	124	128	128	136	132	140	133	110	104	105	114	S		
LQ	83	80	76	67	61	54	62	71	71	74	76	84	95	103	107	112	113	110	108	109	R	89	83	81	77	S		

MAY. 1988

FOF2 (0.1 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

FOF1 (0.01 MHz)

135° E Mean Time (G.M.T. + 9h)

Station Hour Day	OKINAWA				Lat. 26 16 9 N				Long. 127 48 4 E				Sweep 1		MHz to 25		MHz in 2		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								A	A	L	L	A	A			L	L	L						
2								L	L	L	L	L	U L 590 540	L	U L 520 500	L	L	A	L	A	C			
3								A	L	A	A	U L 530	L	A	U L 520	A	A	A	A					
4								L	L	L	L	L	580	A	L	A	A	A	A					
5								A	L	L	L	L	L	L	L	L	L	L	L	A				
6								L	A	A	A	A	U L 560	A	U L 540	L	L	A	A					
7								L	410	430	A	460	470	470	460	430	460	A	A					
8								L	L	L	A	500	A	A	A	A	A	L	A					
9								L	L	L	L	L	U L 530	510	L	L	L	L	L					
10								A	A	A	A	L	U L 540	A	L	A	L	L	L					
11								A	A	L	A	L	560	540	520	L	L	L	L					
12								L	L	L	A	L	L	U L 530	510	510	L	L	L					
13								L	L	L	L	L	L	U L 540	L	A	A	A	A					
14								L	L	U L 430	L	L	U L 500	U L 530	L	L	U L 500	L	A					
15								A	L	L	A	L	A	U L 550	U L 510	L	L	L	L					
16								L	A	L	L	L	A	A	A	A	A	A	A					
17								A	A	L	L	A	A	L	A	A	A	A	A					
18								L	A	A	A	A	L	L	L	L	A	A	A					
19								L	A	A	A	A	A	A	A	A	L	A	A					
20								A	A	A	A	L	U L 530	A	A	L	A	L	L					
21								A	A	A	L	A	A	A	A	L	A	L	A					
22								L	A	A	L	U L 520	U L 530	U L 530	L	A	L	A	A					
23								L	A	L	A	A	A	A	A	A	A	A	A					
24								L	L	L	L	U L 530	U L 490	510	490	510	A	A	A	A				
25								L	L	L	L	L	510	A	L	L	A	A	A	A				
26								L	A	A	A	A	L	510	490	500	460	L	L	L	A			
27								L	L	L	L	L	U L 520	A	L	U L 500	A	U L 480	L					
28								L	L	L	L	L	A	U L 530	L	U L 520	U L 500	A	A	A	A			
29								L	A	L	A	A	A	A	A	A	A	A	A					
30								L	A	L	L	A	L	L	A	A	A	A	A					
31								L	L	A	L	A	U L 440	U L 440	480	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT								1	1	2	1	8	12	17	12	8	3	1						
MED								370	410	430	U L 530	515	U L 530	520	L	510	500	460	U L 480					
UQ												555	U L 535	530	U L 520	U L 505	480							
LQ												495	U L 505	510	495	500	460							

MAY. 1988

FOF1 (0.01 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

FOE (0.01 MHz)

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

Station	OKINAWA				Lat.	Long.							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	A	A	A	A	A	A	A	U R	R	320	285		A	S			
2							190	A	A	A	A	A	A	A	A	R	A	A	A	C				
3							A	A	A	A	A	A	A	A	A	A	350	A	A	A	A			
4							S	R	R	A	A	A	A	A	A	U R	R	335	290	220	S			
5							S	A	A	A	A	A	A	U R	U R	R	340	310	A	S				
6							180	R	A	A	A	A	A	A	A	A	370	A	300	205	A			
7							S	R	A	U R	U A	375	U R	U A	A	A	330	295	230	S				
8							180	255	A	U R	R	R	R	R	A	355	330	290	R	R	S			
9							A	R	300	335	R	A	365	R	R	380	360	335	295	225	S			
10							A	A	R	305	A	R	A	A	A	U A	R	325	295	R	S			
11							S	U R	A	A	R	A	U R	U R	A	A	330	300	235	S				
12							S	A	A	A	A	A	A	A	R	R	385	360	325	295	240	S		
13							A	A	R	A	A	U A	390	385	375	350	325	A	A	A				
14							180	A	A	A	A	A	355	U A	R	380	360	330	300	230	A			
15							S	R	A	A	A	A	365	U R	R	370	350	330	A	A	A			
16							S	R	A	A	A	A	A	A	A	A	A	290	A	A	A			
17							S	A	A	A	A	R	370	375	365	350	320	A	U R	A				
18							S	A	A	A	A	A	370	365	365	360	335	295	230	S				
19							S	A	R	300	330	340	A	R	A	360	350	340	300	235	S			
20							S	235	290	A	A	U A	U A	R	U R	R	345	R	A	R	A			
21							S	240	A	A	355	A	A	375	365	A	A	A	A	A	A			
22							A	R	A	A	A	A	A	400	U R	R	365	340	300	A	A			
23							S	A	A	R	U R	U R	B	B	U R	U R	R	305	245	R	S			
24							180	U A	A	A	A	A	A	U R	R	385	380	355	330	A	A	S		
25							A	R	A	A	A	R	370	R	R	370	350	330	A	A	S			
26							S	A	A	A	A	U R	R	375	380	375	360	A	A	S				
27							A	A	300	A	U A	370	A	R	R	345	300	R	A	A	A			
28							S	A	A	A	B	A	A	A	A	A	A	295	A	A	A			
29							S	R	270	305	335	345	360	R	A	A	A	A	A	A	A			
30							S	A	A	A	A	A	A	R	R	400	395	370	335	305	255	S		
31							S	A	R	330	355	A	A	R	R	385	400	395	370	345	310	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							S	13	9	7	10	9	15	19	21	23	23	20	15					
MED							180	250	300	330	348	370	370	R	R	R	360	330	298	230				
UQ							180	255	305	335	355	375	380	R	R	380	360	335	300	235				
LQ							180	235	300	328	345	360	362	R	R	R	370	350	325	295	225			

The Radio Research Laboratory, Japan

MAY. 1988

FOE (0.01 MHz)

IONOSPHERIC DATA

MAY. 1988

FOES (0.1 MHz)

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

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	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	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	S	G	G	G	G	33	24	E S	J A			
2	J A	J A	J A	J A	J A	E S	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	C	C	C	C	J A
3	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
4	J A	E S	E S	E S	E S	E S	G	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
5	J A	J A	J A	J A	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
6	J A	J A	J A	J A	E S	E S	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
7	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
8	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
9	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
10	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
11	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
12	J A	E S	E S	E S	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
13	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
14	J A	J A	J A	J A	J A	J A	G	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
15	J A	J A	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
16	J A	J A	J A	J A	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
17	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
18	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
19	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
20	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
21	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
22	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
23	J A	J A	J A	J A	E S	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
24	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
25	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
26	J A	J A	J A	J A	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
27	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
28	J A	J A	J A	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
29	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
30	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
31	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
CNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	30	30	30	31
MED	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
UQ	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A
LQ	J A	J A	J A	J A	J A	E S	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A	J A

MAY. 1988

FOES (0.1 MHz)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

FMIN (0.1 MHZ)

135° E Mean Time (G.M.T. + 9h)

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	E S 16	E S 16	E S 16	E S 15	E S 15	E S 14	E S 15	E S 15	16	18	23	24	25	24	25	27	24	13	16	E S	E S	E S	E S	E S				
2	E S 16	E S 16	E S 16	E S 16	E S 15	E S 16	E S 15	16	16	19	24	26	27	28	26	24	24	18	17	C	C	C	C	E S 16				
3	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	E S 15	17	16	21	27	27	32	28	30	27	22	16	14	15	E S	E S	E S	E S				
4	E S 14	E S 16	E S 16	E S 16	E S 15	E S 16	E S 16	15	13	23	26	29	30	30	28	28	24	18	16	E S	E S	E S	E S	E S				
5	E S 15	E S 15	E S 15	E S 16	E S 16	E S 17	E S 16	15	26	13	23	30	26	29	26	26	24	17	16	E S	E S	E S	E S	E S				
6	E S 16	E S 15	E S 15	E S 16	E S 16	E S 16	E S 16	16	20	22	22	26	26	28	28	25	23	18	E S	E S	E S	E S	E S					
7	E S 16	E S 15	E S 15	E S 15	E S 15	E S 15	E S 15	15	15	21	22	23	27	27	26	26	26	17	14	E S	E S	E S	E S	E S				
8	E S 16	E S 16	E S 16	E S 16	E S 15	E S 16	E S 15	16	16	19	23	27	27	27	26	23	22	17	16	E S	E S	E S	E S	E S				
9	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	14	18	23	23	27	30	28	27	27	24	24	14	E S	E S	E S	E S	E S				
10	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	16	18	19	22	26	26	27	23	25	25	19	16	E S	E S	E S	E S	E S				
11	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	19	22	24	25	27	29	26	27	26	22	16	15	E S	E S	E S	E S				
12	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	15	16	20	25	27	29	28	30	22	22	16	14	E S	E S	E S	E S	E S				
13	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	15	16	19	25	24	27	24	27	22	20	16	15	E S	E S	E S	E S	E S				
14	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	16	22	21	27	27	27	25	28	24	18	15	14	E S	E S	E S	E S				
15	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	18	20	19	24	25	26	28	24	22	22	16	14	14	E S	E S	E S	E S				
16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	15	16	18	21	22	25	27	25	20	18	16	14	16	E S	E S	E S	E S				
17	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	14	16	13	21	21	24	22	23	23	19	14	15	16	E S	E S	E S	E S				
18	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	16	18	20	23	26	27	27	26	24	23	16	14	E S	E S	E S	E S	E S				
19	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	14	17	24	22	27	29	27	27	24	24	19	16	E S	E S	E S	E S	E S				
20	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	14	21	23	25	25	25	27	24	22	29	27	16	16	E S	E S	E S	E S				
21	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	E S 16	16	17	23	26	27	28	28	23	24	23	17	14	15	E S	E S	E S	E S				
22	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	14	16	22	22	30	29	30	29	26	24	14	15	14	E S	E S	E S	E S				
23	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	14	16	17	21	23	39	40	30	30	22	13	16	E S	E S	E S	E S	E S				
24	E S 16	E S 16	E S 15	E S 16	E S 16	E S 15	E S 16	13	16	13	21	24	24	27	24	23	23	17	16	E S	E S	E S	E S	E S				
25	E S 14	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	17	17	20	26	25	25	26	23	19	17	17	14	E S	E S	E S	E S				
26	E S 16	E S 16	E S 15	E S 16	E S 16	E S 16	E S 16	16	16	17	13	26	24	30	29	27	24	18	16	13	E S	E S	E S	E S				
27	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	14	17	17	24	28	28	27	23	24	18	17	14	14	E S	E S	E S				
28	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	16	15	13	35	28	29	24	27	24	21	18	15	14	E S	E S	E S	E S				
29	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	23	23	27	27	32	28	30	22	27	22	16	14	E S	E S	E S	E S				
30	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	22	24	27	28	27	27	23	26	24	21	14	16	E S	E S	E S	E S				
31	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	15	22	23	27	23	31	27	28	27	23	19	14	15	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	30	30	30	30	31				
MED	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	15	17	20	23	26	27	27	26	24	23	17	15	E S	E S	E S	E S	E S				
UQ	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	16	18	22	26	27	29	23	23	26	24	13	16	16	E S	E S	E S	E S				
LQ	E S 16	E S 16	E S 16	E S 16	E S 16	E S 16	E S 15	14	16	13	22	24	26	27	25	23	22	16	14	14	E S	E S	E S	E S				

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MAY. 1988

FMIN (0.1 MHZ)

IONOSPHERIC DATA

MAY. 1988

M(3000)F1 (0.01)

135° E Mean Time (G.M.T. + 9h)

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								A	A	L	L	A	A	370	L	360	L	L	L						
2								L	L	L	L	L	U L	320	360	375	380	350	A	L	A				
3								A	L	A	A	A	L	A	A	A	A	A	A	A					
4								L	L	L	L	L	L	A	L	A	A	A	A	A					
5								A	L	L	L	L	L	L	L	L	L	L	L	L	A				
6								L	A	A	A	A	U L	330	A	U L	L	L	A	A					
7								L	325	390	385	A	390	380	405	400	355	360	A	A					
8								L	L	L	A	A	380	A	A	A	A	A	L	A					
9								L	L	L	L	L	U L	420	380	L	L	L	L	L					
10								A	A	A	A	L	U L	350	A	L	A	L	L	L					
11								A	A	L	A	L	L	340	L	350	345	L	L	L					
12								L	L	L	A	L	L	U L	360	360	360	L	L	L					
13								L	L	L	L	L	L	U L	350	L	A	A	A	A					
14								L	L	U L	420	L	L	U L	390	360	L	L	U L	340	L	A			
15								A	L	L	A	L	A	U L	410	U L	360	L	L	L					
16								L	A	L	L	L	A	A	A	A	A	A	A	A	A				
17								A	A	L	L	A	A	L	A	A	A	A	A	A					
18								L	A	A	A	A	L	L	L	L	A	A	A	A					
19								L	A	A	A	A	A	A	A	A	A	L	A	A					
20								A	A	A	A	L	U L	360	A	A	L	A	L	L					
21								A	A	A	L	A	A	A	A	L	A	L	A						
22								L	A	A	L	U L	355	360	350	L	A	L	A	A					
23								L	A	L	A	A	A	A	A	A	A	A	A	A					
24								L	L	L	L	U L	350	A	370	385	U L	345	A	A	A	A			
25								L	L	L	L	L	L	370	A	A	A	A	A	A	A				
26								L	A	A	A	A	L	370	385	360	370	L	L	L	A				
27								L	L	L	L	L	A	A	L	U L	360	A	U L	335	L				
28								L	L	L	L	L	A	U L	360	A	U L	365	360	A	A	A			
29								L	A	L	A	A	A	A	A	A	A	A	A	A					
30								L	A	L	L	A	A	L	A	A	A	A	A	A					
31								L	L	A	L	A	U L	455	A	405	A	A	A	A					
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
CNT								1	1	2	1	6	11	14	10	8	3	1							
MED							325	390	402	350	362	362	360	370	362	360	360	360	335						
UQ													380	385	380	385	360	365							
LQ													325	360	350	350	352	350							

MAY. 1988

M(3000)F1 (0.01)

The Radio Research Laboratory, Japan

IONOSPHERIC DATA

MAY. 1988

H*F2 (KM)

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

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									A	A	L	U	L	E	A																	
2									240	240	300	350	350	350	320	300	230	260	255	240												
3									240	255	265	300	385	350	325	295	295	290	265	250												
4									A	U	L	U	L							A												
5									240	235	300	345	340	325	330	320	300	290	270	255												
6									230	230	295	310	390	325	330	325	275	290	315	300												
7									E	A	L																					
8									245	260	300	320	330	335	330	300	325	315	295	280												
9									270	290	300	A								A												
10									390	490	515	A																				
11									260	320	270	A							A													
12									240	280	335	325	330	320	320	325	310	295	265													
13									245	250	270	320	360	355	330	325	295	300	285	245												
14									270	A	U	L	A																			
15									265	250	280	320	330	350	340	320	305	310	280	280												
16									245	275	290	290	315	350	355	330	320	280	280	280												
17									220	260	255	270	355	345	330	330	305	290	260													
18									250	280	305	A																				
19									225	250	280	340	370	345	365	365	350	A	315	A				275								
20									265	280	305	325	A							A				320								
21									260	270	285	330	A							A				320								
22									255	265	A	A	A											275								
23									250	295	A	A	A											270								
24									295	265	295	320	A	A	A									280								
25									245	280	275	380	380	365	330	325	320	305	305	280												
26									245	255	285	320	295	335	350	350	345	340	360	370				A								
27									265	240	250	260	U	L										270								
28									250	245	265	285	L											265								
29									250	255	A	A	A											250								
30									240	245	270	390	415	350	335	350	330	310	315	280												
31									270	265	280	A	A	A	A																	
									240	290	270	300	A																			
									270	245	320	320	A																			
									00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
CNT													4	28	31	27	24	22	28	30	30	31	29	30	28	6						
MED													258	245	260	285	320	345	350	338	330	325	310	295	280	268						
UQ													280	260	278	300	342	330	368	365	350	335	320	315	280	275						
LQ													250	240	250	272	305	330	335	330	320	305	300	285	268	265						

The Radio Research Laboratory, Japan

MAY. 1988

H*F2 (KM)

IONOSPHERIC DATA

MAY. 1988

H·F (KM)

135° E Mean Time (G.M.T. + 9h)

Station Hour Day	OKINAWA				Lat. 26° 16' 9" N				Long. 127° 48' 4" E				Sweep 1 MHz to 25 MHz in 2 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	A	A	A			A		A	A	A	A	A				H	H	A		S							
2																											
3	S	S				A		A	A	A	A	A	A	A	A	A	A	A	A	A	S	A	A				
4	Q					S		S																			
5	A																										
6																											
7	A	A																									
8																											
9	A																										
10																											
11		S	S			S		A	A	A	A	A															
12																											
13	A	A																									
14																											
15																											
16																											
17																											
18																											
19	A	A	A																								
20																											
21	A	A																									
22																											
23																											
24																											
25																											
26	Q																										
27																											
28																											
29																											
30																											
31	A																										
CNT	30	30	30	31	30	31	29	21	13	14	13	10	11	12	13	9	10	10	5	22	28	29	28	28			
MED	300	288	258	250	250	250	225	220	208	200	209	U	222	220	220	222	225	225	235	255	245	265	300	305			
UQ	315	305	290	268	275	260	255	235	225	220	228	A	A	A	A	U	A	A	A	245	245	235	270	270	275	320	325
LQ	280	280	250	230	230	232	235	220	205	200	200	205	205	210	215	220	220	220	230	235	230	250	280	288			

MAY. 1988

H·F (KM)

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IONOSPHERIC DATA

MAY. 1988

H⁺E (KM)

135° E Mean Time (G.M.T. + 9h)

Station Hour Day	OKINAWA				Lat.	Long.							Sweep 1 MHz to 25 MHz in 24 sec in automatic operation											
	00	01	02	03	26° 16' 9" N	127° 48' 4" E	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23		
1							S	110	110	110	110	110	110	115	110	115	115	115	120				S	
2							B	135	115	110	115	A	110	110	110	110	110	A	E	B		C		
3							A	110	110	110	110	110	B	115	110	110	115	115	110	A		A		
4							S	115	110	110	110	A	A	A	115	115	115	110	115			S		
5							S	110	115	110	110	B	110	110	105	105	110	115	115			S		
6							S	110	105	105	105	A	A	A	A	110	115	110	120	S		A		
7							S	110	105	105	105	105	110	105	A	105	110	110	110			S		
8							S	110	105	105	105	110	105	105	A	105	110	105	110			S		
9							A	105	105	105	105	105	105	110	105	105	110	110	110			S		
10							A	A	105	110	110	A	110	105	A	110	110	115	115			S		
11							S	115	115	115	115	115	115	B	120	A	A	A	120	115		S		
12							S	105	105	105	110	110	110	110	110	110	110	110	110			S		
13							A	A	105	105	105	A	105	105	105	105	105	105	105	A		A		
14							S	105	105	105	A	A	105	A	105	110	110	105	110			A		
15							S	105	105	105	A	105	105	110	105	105	105	A	A			A		
16							S	105	A	A	A	A	A	A	A	105	105	A	A			A		
17							S	105	105	A	105	105	110	105	105	105	105	105	105			A		
18							S	105	105	105	105	105	105	105	110	110	105	110				S		
19							S	105	105	105	105	105	105	105	105	105	105	105	110			S		
20							S	105	105	A	A	A	A	105	105	105	100	E	B			A		
21							S	105	105	105	105	105	105	105	105		A	A	A			A		
22							A	A	A	A	A	A	100	105	105	105	100	100	105			A		
23							S	105	100	105	105	105	B	B	105	105	105	105	110			S		
24							B	110	105	105	105	105	105	110	110	110	115	115	120			S		
25							A	105	110	105	105	110	110	105	110	110	115	115	B			S		
26							S	115	115	110	115	115	115	115	115	115	110	110	110			S		
27							A	A	105	105	105	110	105	105	105	105	105	A	A			A		
28							S	105	105	105	B	A	A	A	A	A	105	105	A			A		
29							S	110	110	105	105	105	105	A	A	A	A	A	A			A		
30							S	105	A	A	A	A	A	110	105	105	110	105	100			S		
31							S	105	105	105	105	105	105	105	105	105	105	105	100			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							1	27	28	26	23	20	24	24	23	27	28	26	22					
MED							B	135	105	105	105	105	105	105	105	105	110	109	110					
UQ								110	110	110	110	110	110	110	110	110	110	112	115					
LQ								105	105	105	105	105	105	105	105	105	105	105	110					

MAY. 1988

H⁺E (KM)

IONOSPHERIC DATA

MAY. 1988

TYPES OF ES

135° E Mean Time (G.M.T. + 9h)

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	F3	F2	F5	F6	F3	F3	L3	C5	C5	C4	C2	C4	C3	C1				C1	C1		F3	F2	F1	F3	
2	F4	F7	F7	F2	F3			C2	C4	C2	L1	C1	C1	C2	CH21	H1	HC31	CL21	C5					F2	
3		F1	F2	F2	F2	F4	L3	C3	C1	C5	C5	C2	C2	C3	C1	H4	HC22	HC22	CL65	CL45	FF25	FF31	F2	F3	
4	F2							C1		C2	C1	L2	L2	L1	CL22	C3	C3	C6	C6	C5	F3	F5	F4	F3	
5	F3	F2	F1	F1	F1			C2	C2	C1	C2	C2	C1	C1	H1	H1	H1	H1	C2	C6	C7	F4	F5	F4	F2
6	F4	F2	F2	F1				H1	C2	C5	C4	L3	L3	L4	L1	H1	C2	C5	C3	L2	F5	F6	F4	F4	
7	F4	F5	F8	F6	F4	F3	C5	C4	C3	C1	C2	H1	C2	HL11	L1	C1		C3	C4	C3	F5	F3	F3	F2	
8	F2	F5	F6	F6	F4	F2	C4	C1	C2	C2	C7	C2	C3	C3	CL32	C3	C4	C3	C4	C3	F1	F7	F6	F5	
9	F7	F6	F3	F6	F5	F7	L4	C1	C1	C1	C2	H1	H1	HL11	H2	C2	C2		C3	C4		F7	F3	F4	
10	F7	F6	F5	F4	F1	F8	L7	CL66	C3	C3	C3	L2	C1	C3	LH21	C3	C2	C1	C1		F3		F4	F2	
11			F2	F2	F2	F3	C3	C3	C3	C3	C2	C3	C1	H1	CL21	HL11	HL11	H3	C4	C3	F3	F4	F5	F4	
12	F1	F2					H1	C2	C3	C2	C3	C2	C2	C1	H1	H1				C3	F3	F3	F3	F5	
13	F5	F4	F5	F4	F3	F4	L3	L4	C3	C2	C1	LH21	H1	H2	C2	C3	C5	C4	CL63	LL43	FF73	F7	F3	F4	
14	F4	F3	F2	F2	F2	F2		C2	C1	C2	L1	L2	C1	HL11	H1	H2	C1	C1	C3	L7	F4	F5	F3	F2	
15	F3	F4	F2		F1	F2	C3	C5	C3	C3	L7	C2	C5	C1	C1	C2	C2	L2	CL42	L7	F7	F7	F3	F2	
16	F2	F3	F1	F3	F1		C1	C3	L4	L1	L2	L2	LH22	L4	L4	L4	C6	C7	L4	L5	F3	F4	F3	F5	
17	F5	F3	F3	F4	F4	F3	C1	C5	C5	L3	C3	C4	C2		C4	C4	C5	C7	C7	L7	F5	F4	F5	F7	
18	F7	F2	F4	F3	F3	F3	C4	C4	C6	C3	C4	C3	C2	C1	C2	H1	C4	C5	C6	C7	F5	F6	F6	F5	
19	F7	F7	F5	F5	F1	F3	C6	C5	C5	C3	C5	C4	C5	C5	C7	C7	H1	C2	C3	C3	F6	F5	F4	F7	
20	F4	F8	F4	F2	F5	F4	C3	C6	C5	L6	L4	LH11	HL11	C3	C4	C2	C3	C2	C3	L3	F3	F5	F1	F6	
21	F5	F5	F3	F2	F5	F4	C6	C5	C3	C2	C4	C5	C7	C3	C3	C2	L3	L3	L6	L5	F4	F3	F4	F2	
22	F2	F5	F4	F2	F6	F4	L6	L4	L6	L3	L3	L2	C1	H1	C2	C4	C1	C4	C5	CL55	F3	F4	F7	F3	
23	F4	F3	F3	F2			C3	C2	C5	C3	C4	C2	C3	C4	C2	C5	C5	C7	C7	C7	F5	F4	F4	F4	
24	F5	F3	F4	F1	F2	F4	H1	C1	C1	C2	C2	C2	C2		H1	C2	C4	C3	C5	C4	F3	F3	F3	F3	
25	F4	F4	F5	F3	F3	F3	L2	C3	C2	C3	C2	H1	C3	C2	C2	C3	C2	C4	C4	C5	F3	F4	F5	F3	
26	FF12	F2	F2	F3	F7		C5	C3	C3	C6	C3	C3	C1	LC11	C1		C1		C1	C5	F5	F4	FF44	F2	
27	F2	F5	F7	F5	F5	F4	L3	L2	C1	C1	C2	C2	C1	H2	H2	C2	C3	L3	L4	L7	F6	F3	F3	F4	
28	F1	F1	F2	F1	F1		C2	C2	C2	C3	C1	L4	L2	L3	L2	HL12	C5	C5	L7	L4	F6	F8	F7	F7	
29	F7	F8	F8	F4	F3	F1	H2	C2	C4	C3	C5	C6	C4	L4	L4	L6	L7	L7	L6	L6	F8	F5	F4	F4	
30	F1	F3	F4	F4	F4	F3	C6	C3	L5	L3	L2	L3	L2	H1	C2	C2	C6	C4	C6	CL62	F6	FF57	F4	F4	
31	F3	FF34	F4	F5	FF43	FF43	C6	C6	C3	C3	C1	C5	C1	C2	H1	C3	C4	C5	CL42	L4	F6	F7	F3	F6	
	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																									

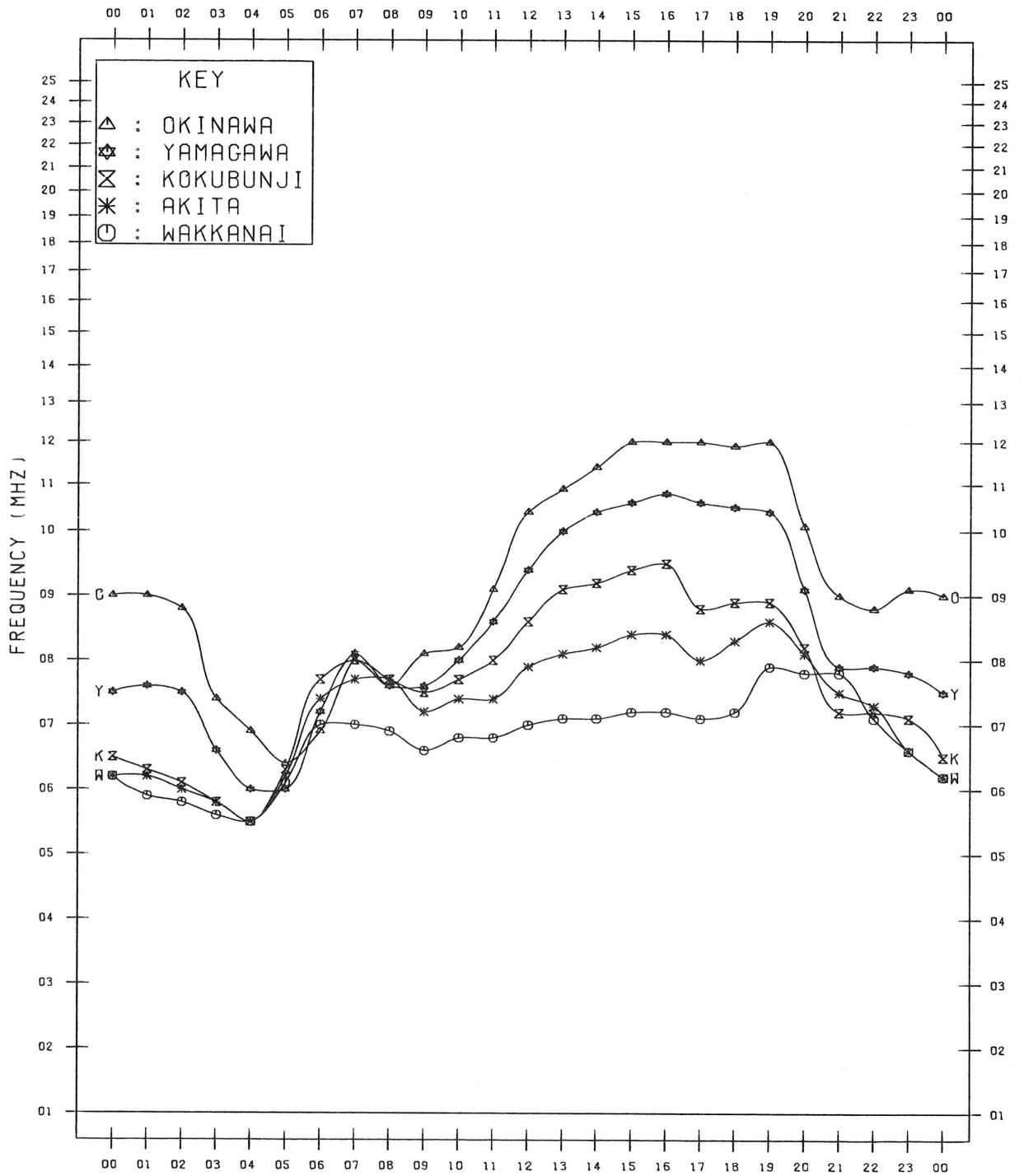
MAY. 1988

TYPES OF ES

MONTHLY MEDIAN VALUES OF FOF2

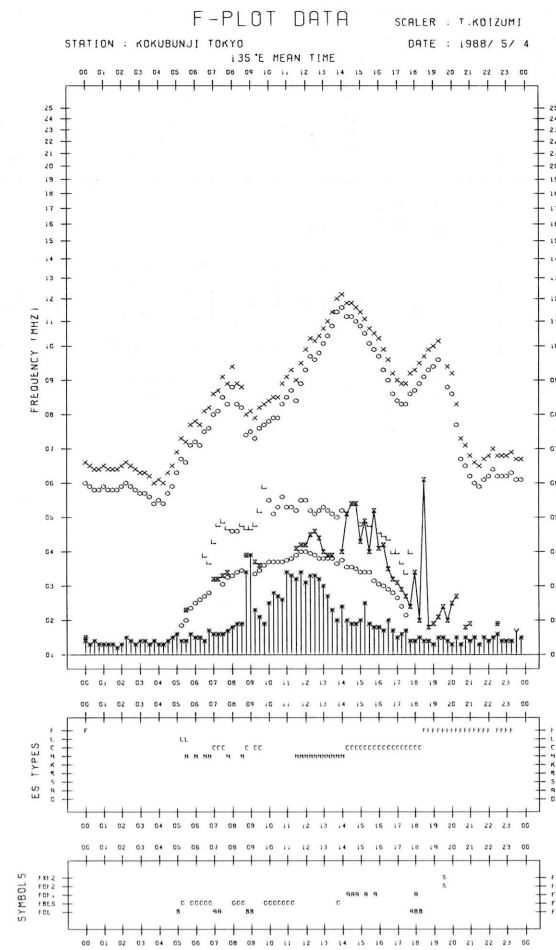
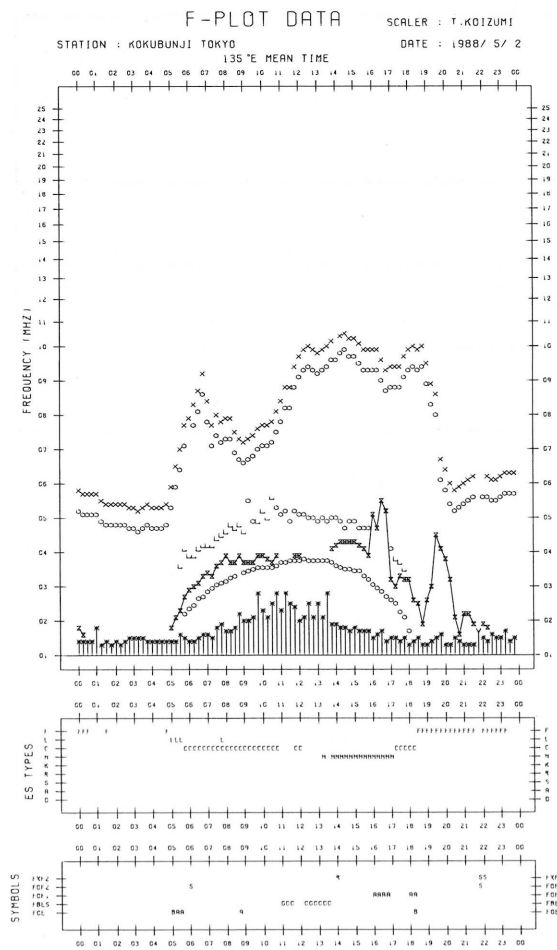
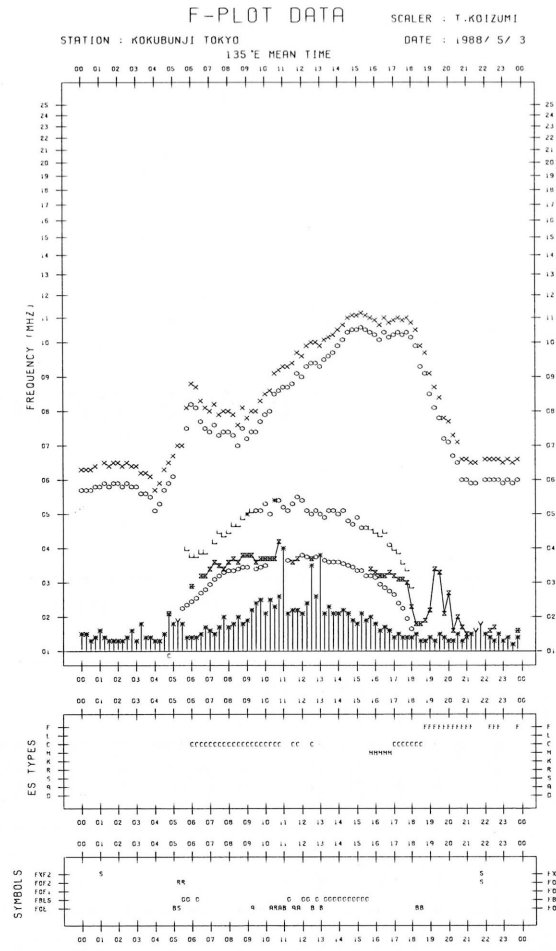
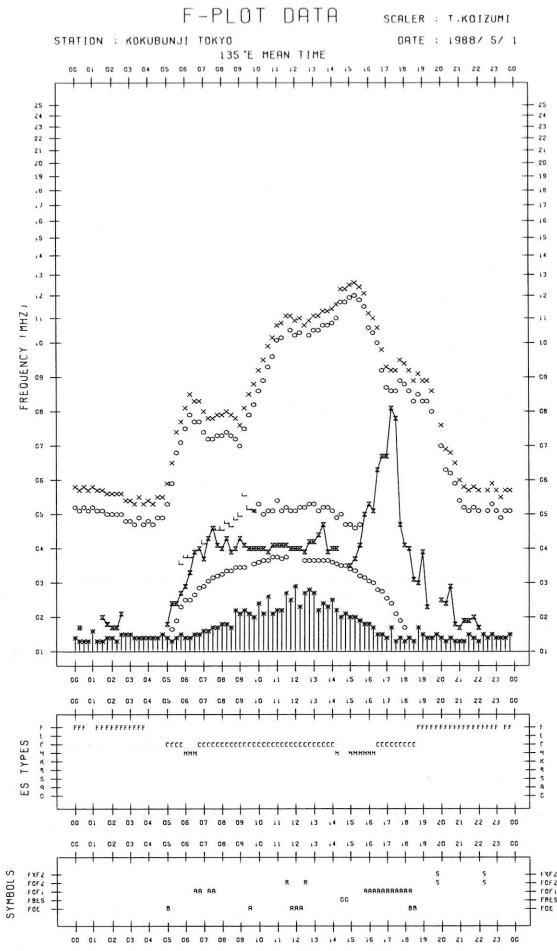
135 °E MEAN TIME

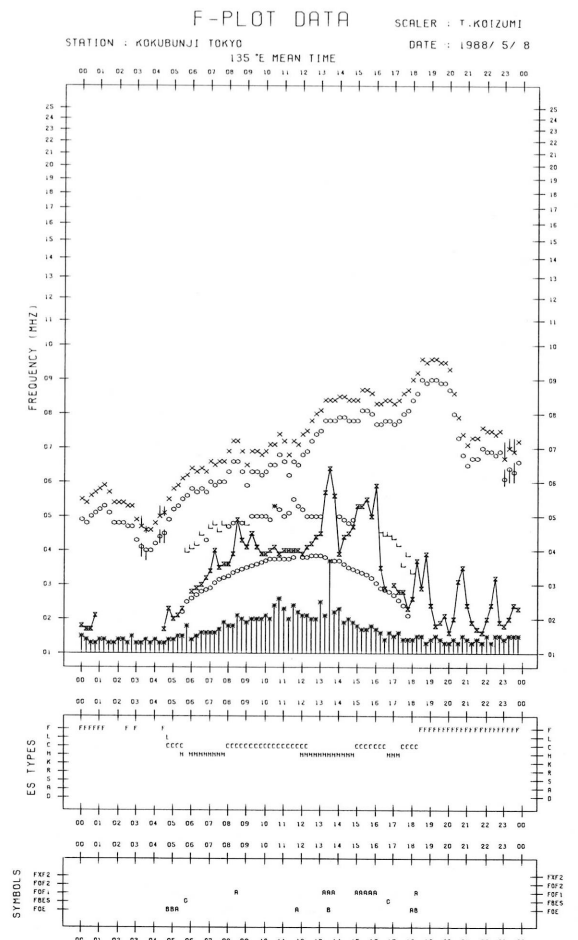
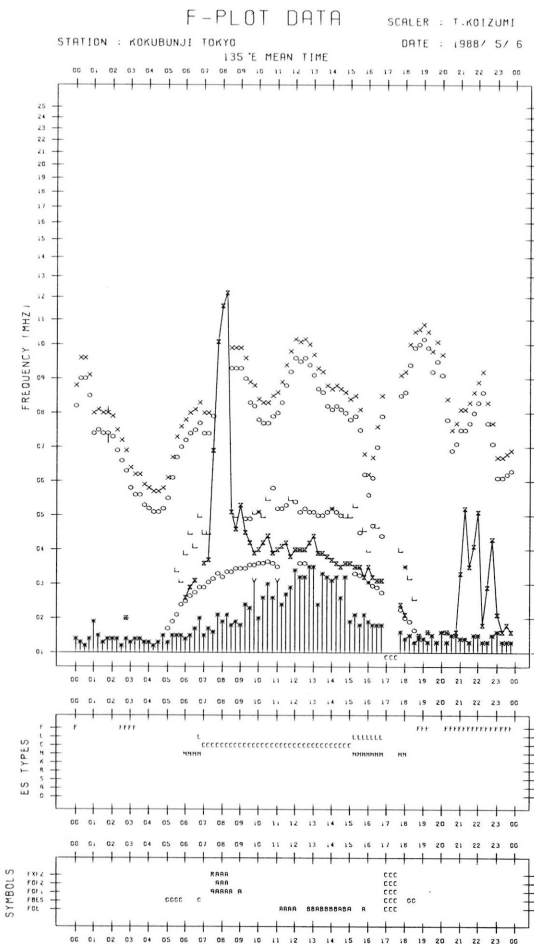
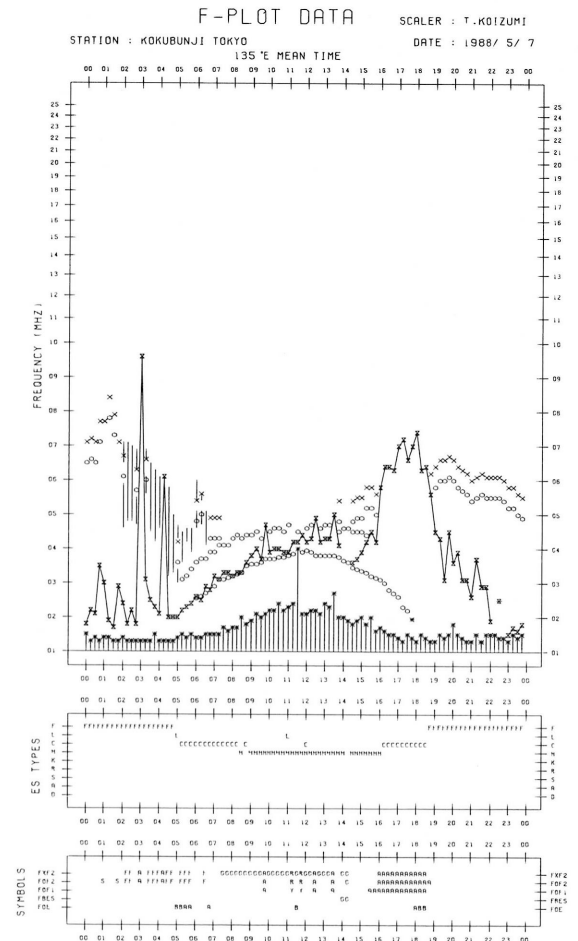
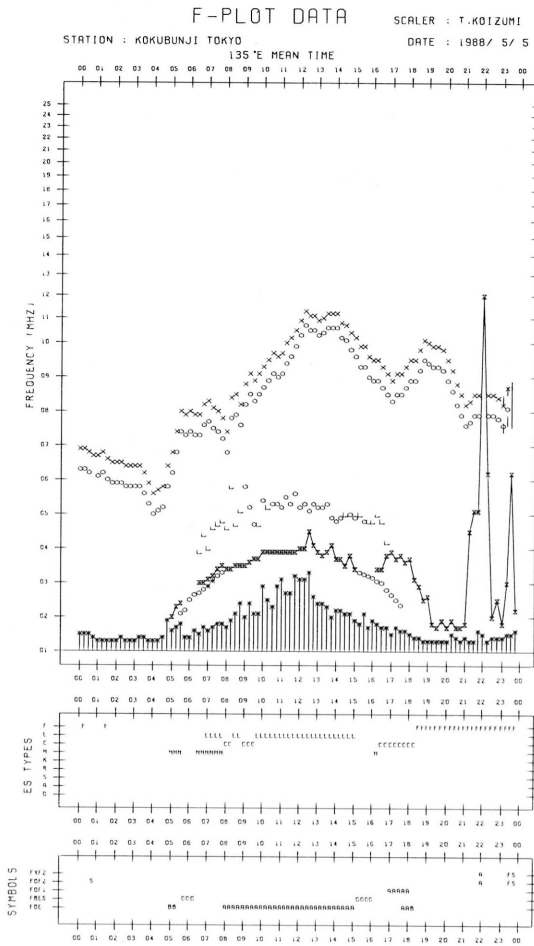
MAY. 1988



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
⊗	FBES
L	ESTIMATED F ₀ F ₁
*.Y	F _{MIN}
^	GREATER THAN
v	LESS THAN

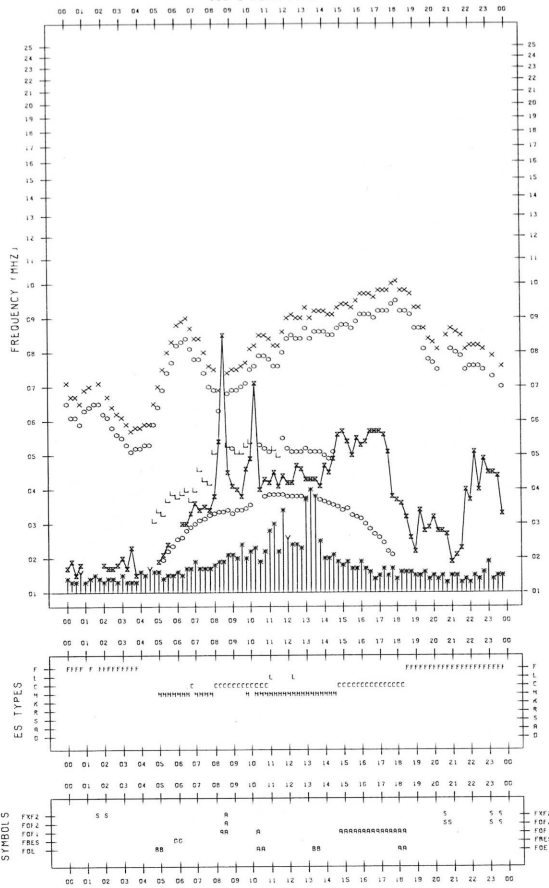




F-PLOT DATA

SCALER : T.KOIZUMI

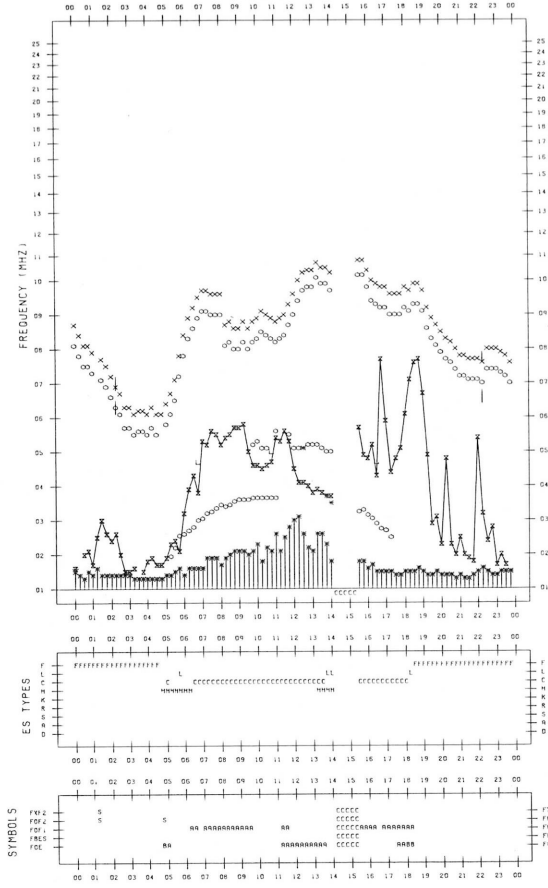
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1988/ 5/ 9



F-PLOT DATA

SCALER : T.KOIZUMI

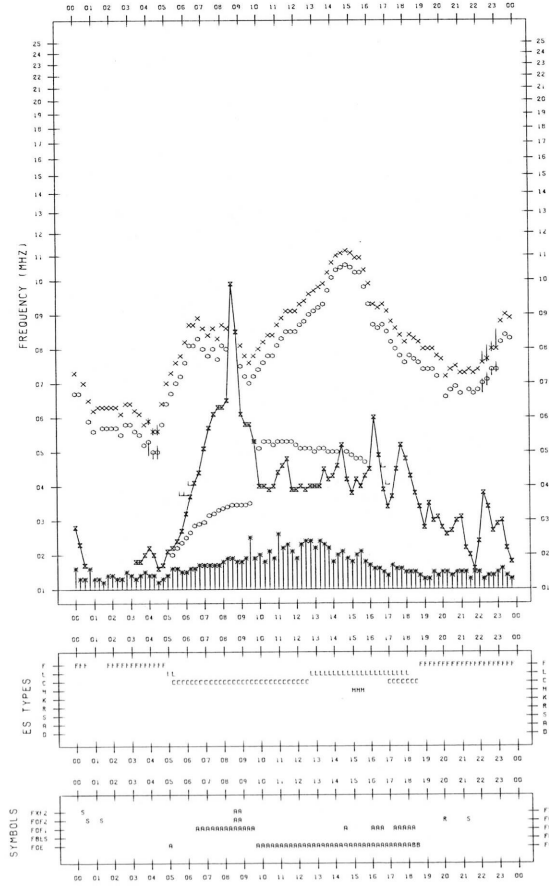
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1988/ 5/11



F-PLOT DATA

SCALER : T.KOIZUMI

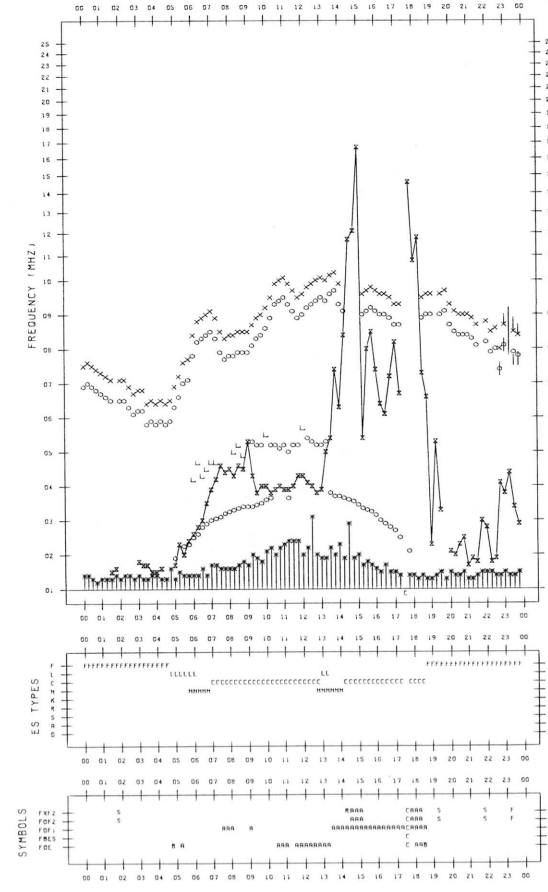
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1988/ 5/10

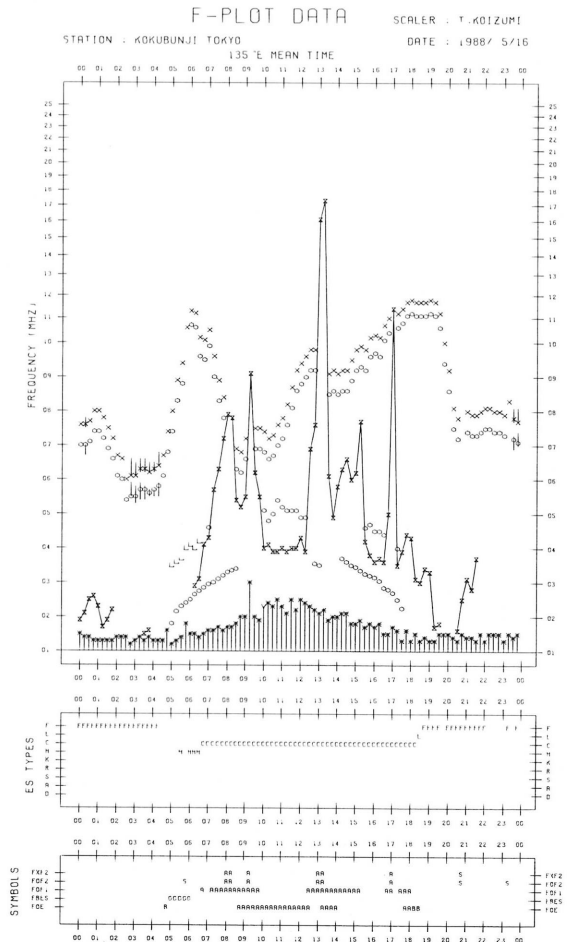
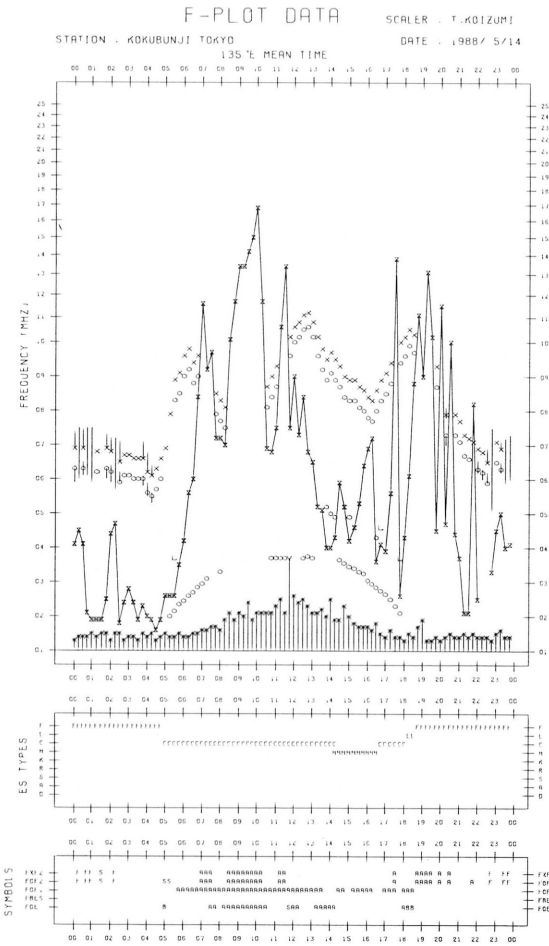
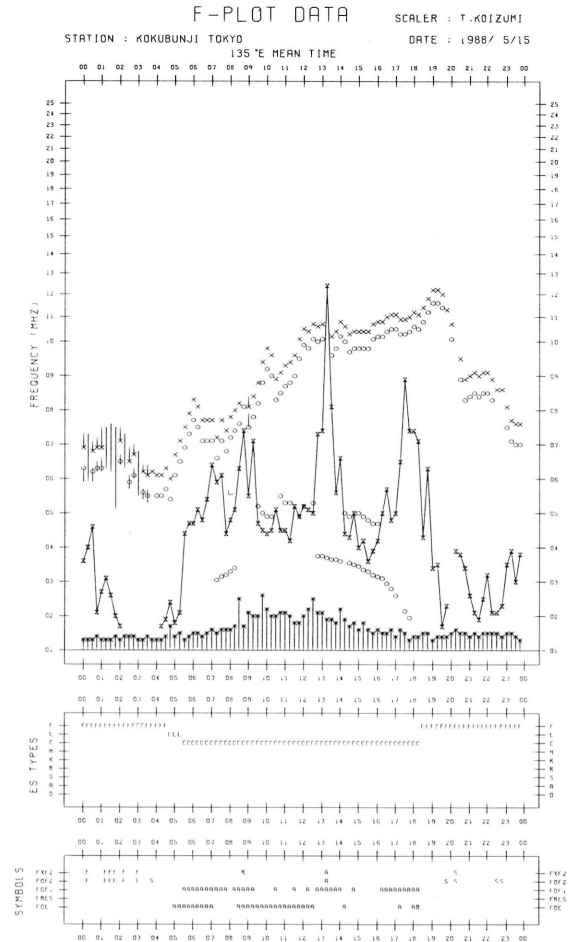
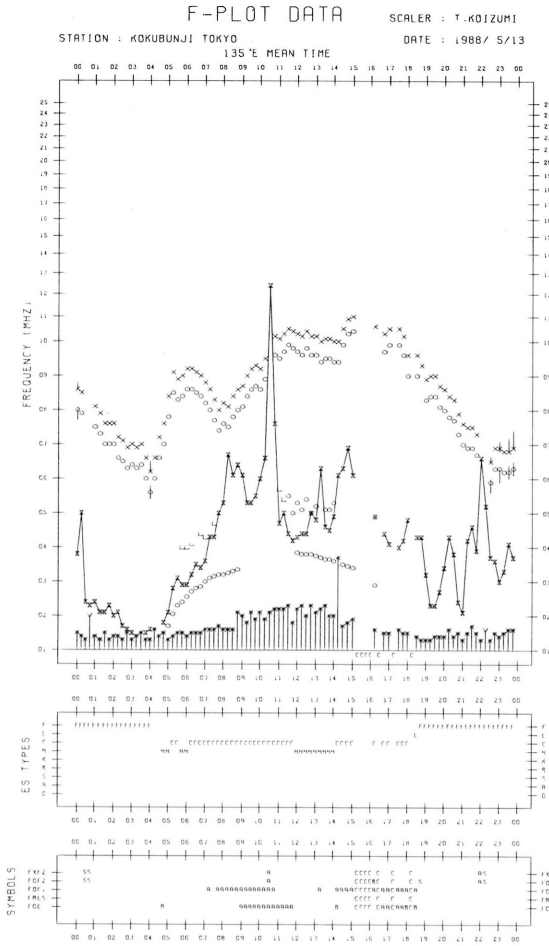


F-PLOT DATA

SCALER : T.KOIZUMI

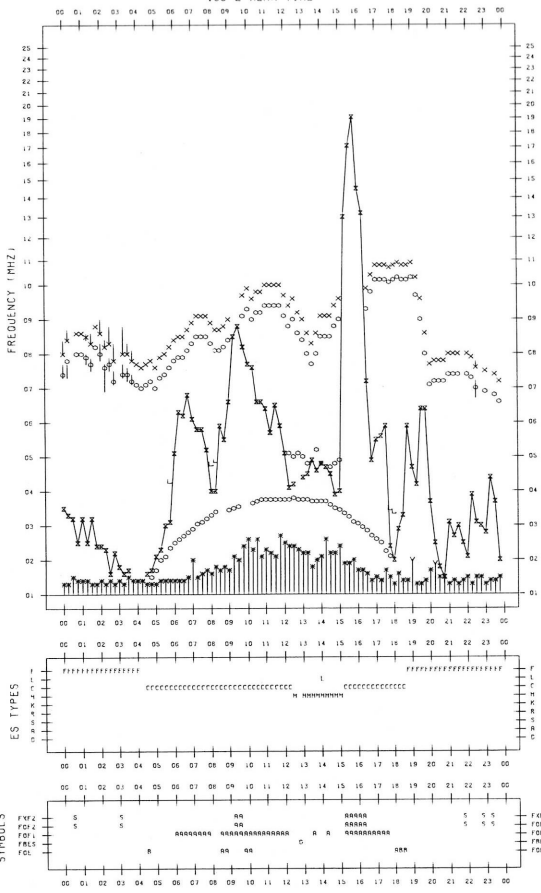
STATION : KOKUBUNJI TOKYO 135°E MEAN TIME DATE : 1988/ 5/12





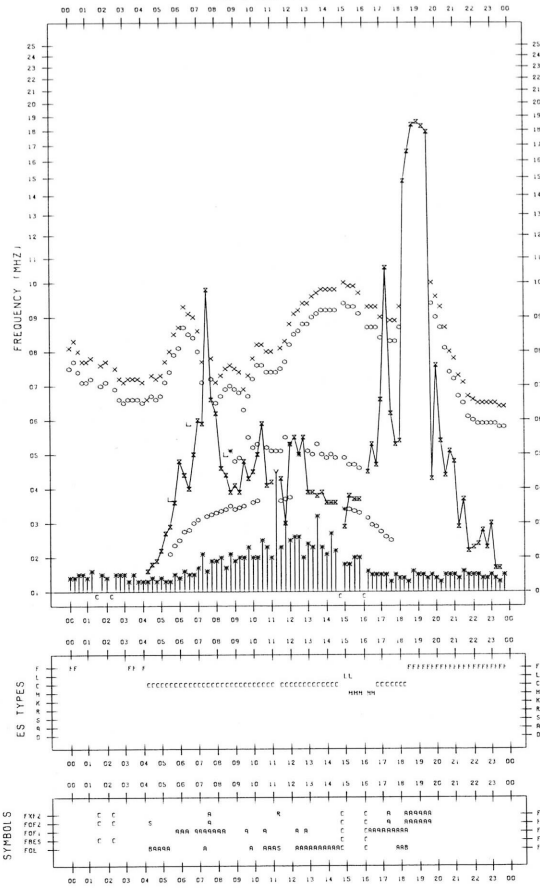
F-PLOT DATA

SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 5/17
135°E MEAN TIME



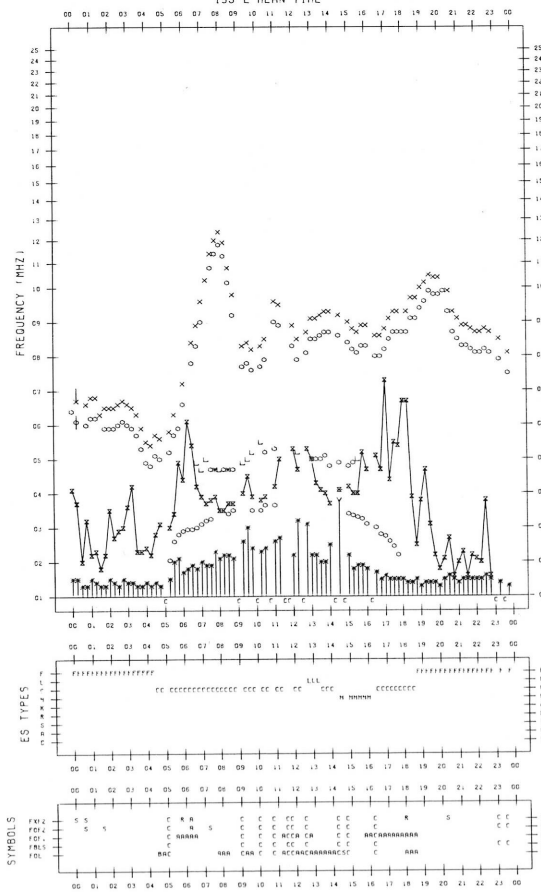
F-PLOT DATA

SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 5/19
135°E MEAN TIME



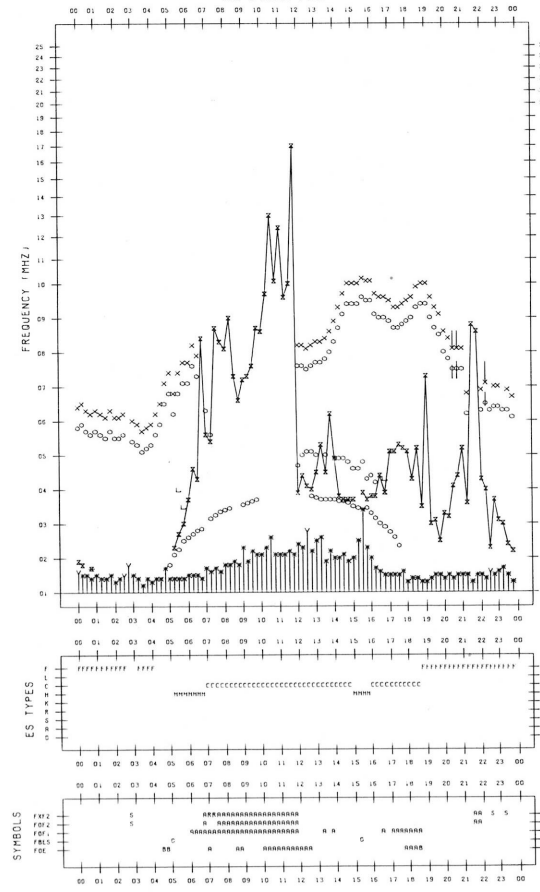
F-PLOT DATA

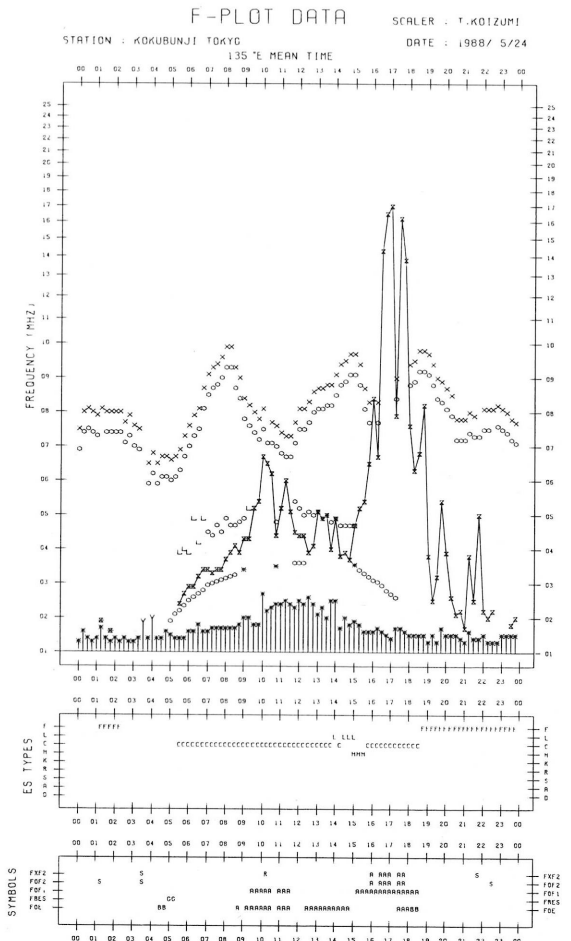
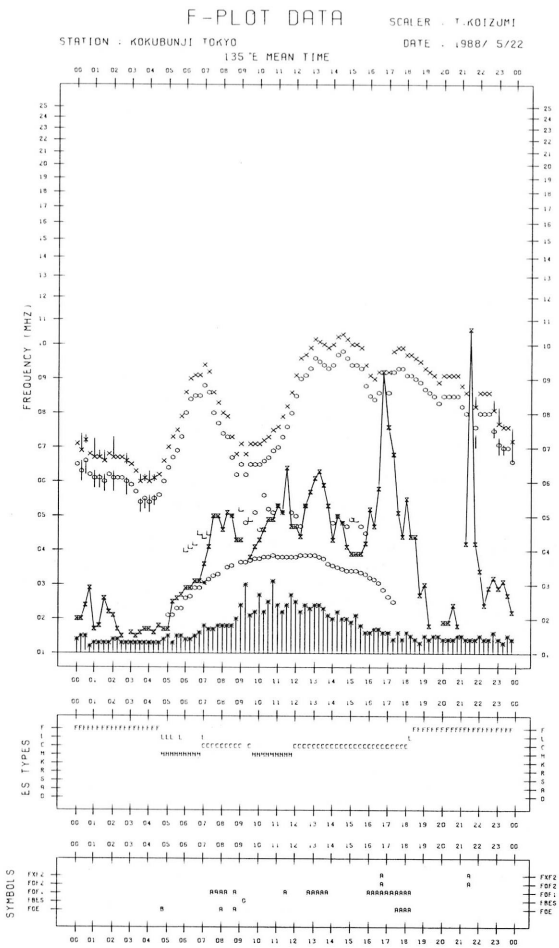
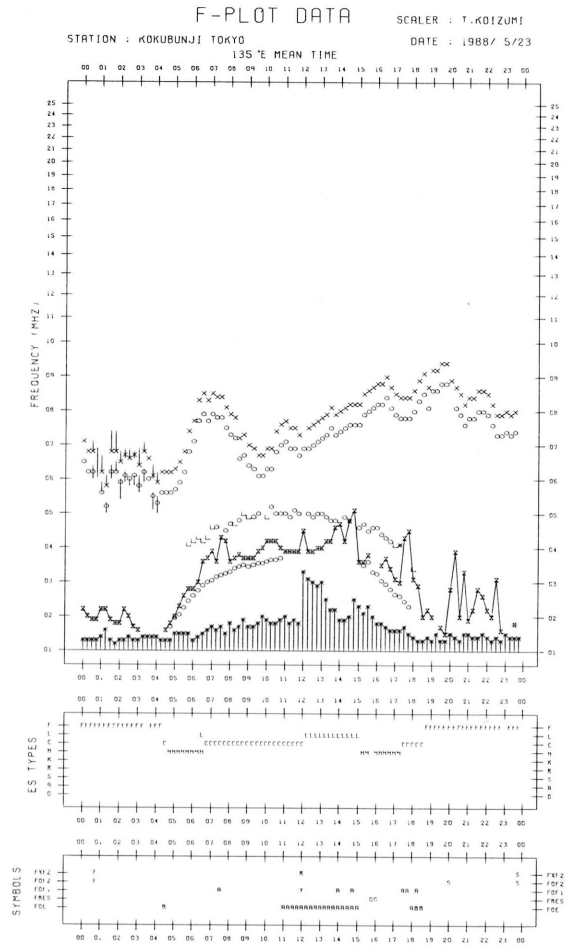
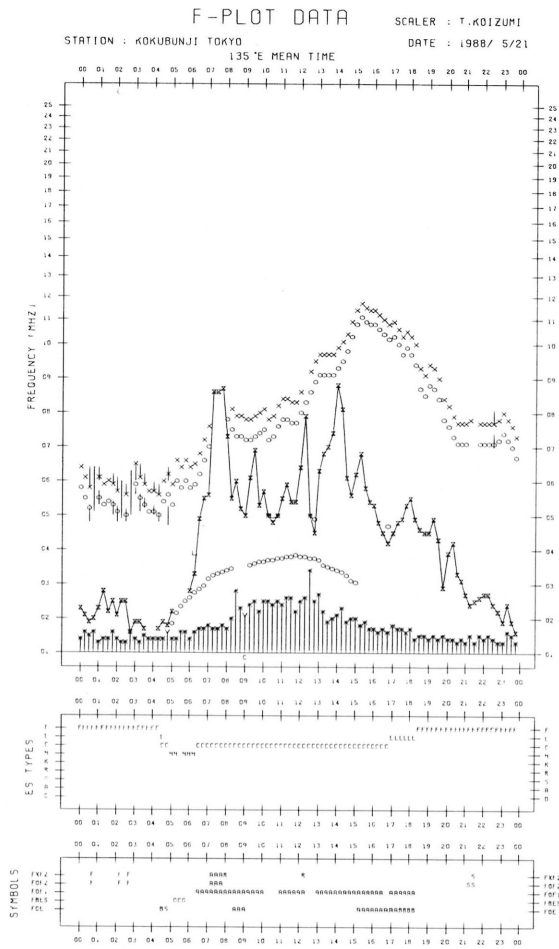
SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 5/18
135°E MEAN TIME



F-PLOT DATA

SCALER : T.KOIZUMI
STATION : KOKUBUNJI TOKYO
DATE : 1988/ 5/20
135°E MEAN TIME



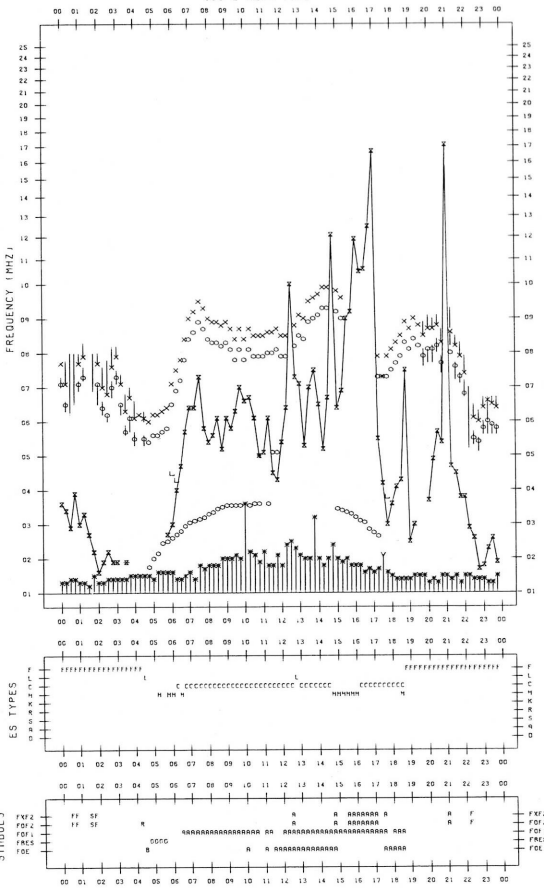


F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO
135°E MEAN TIME

DATE : 1988/ 5/25

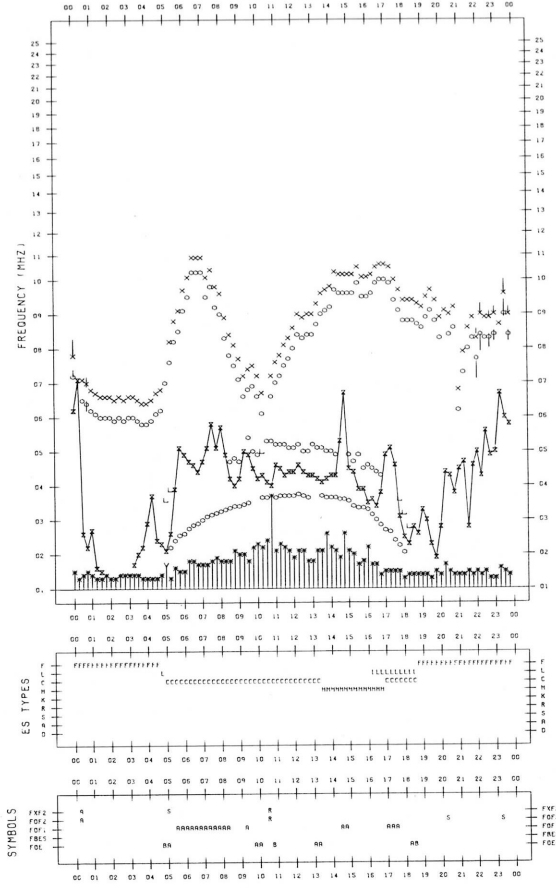


F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO
135°E MEAN TIME

DATE : 1988/ 5/27

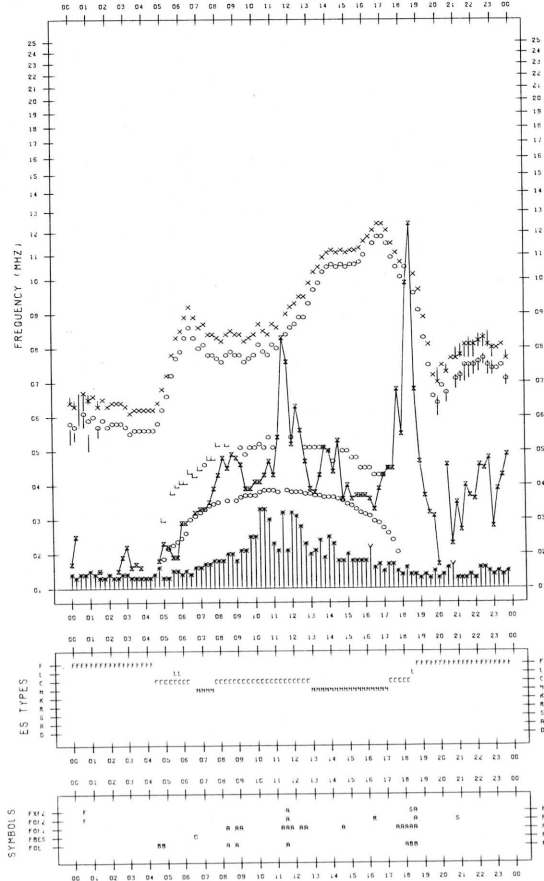


F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO
135°E MEAN TIME

DATE : 1988/ 5/26

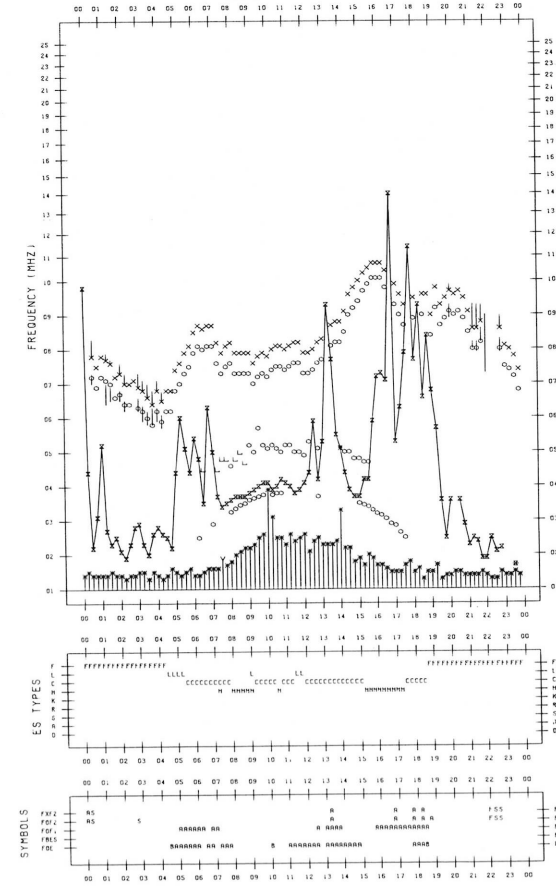


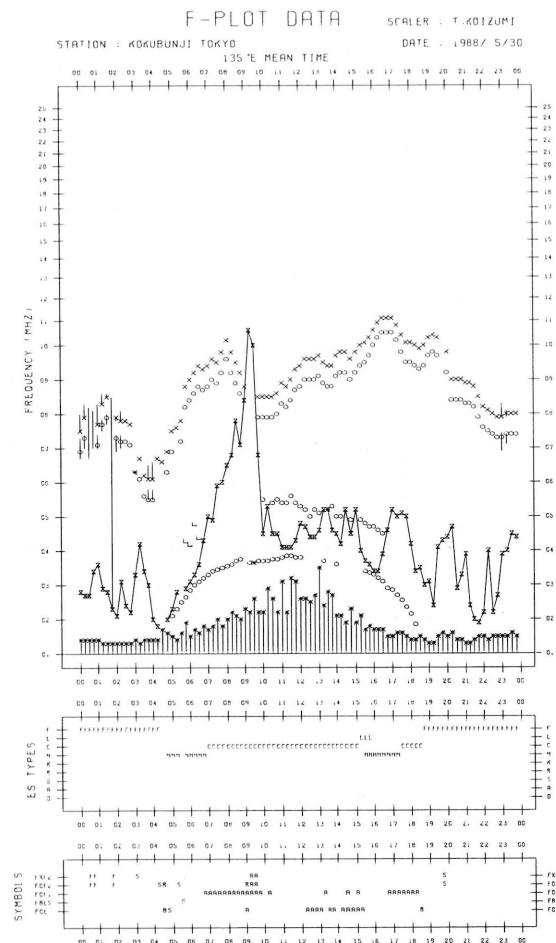
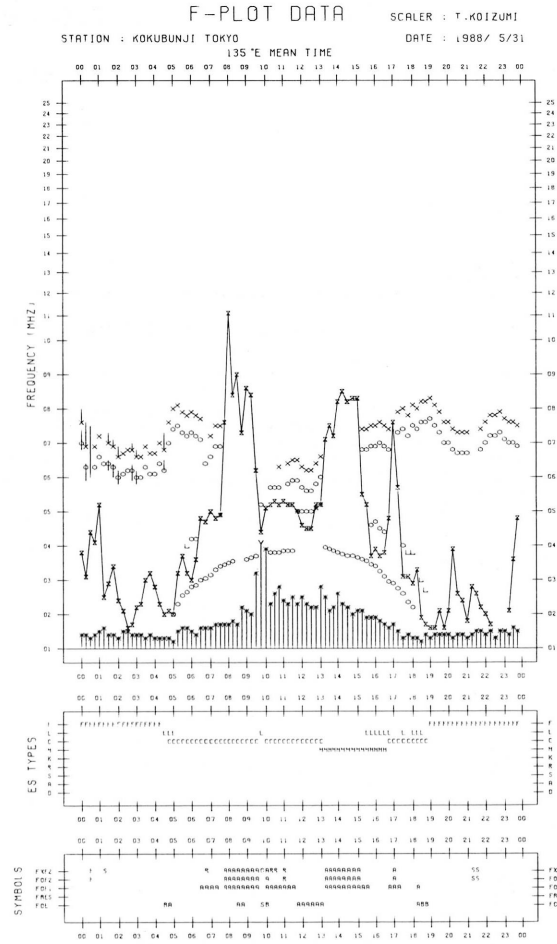
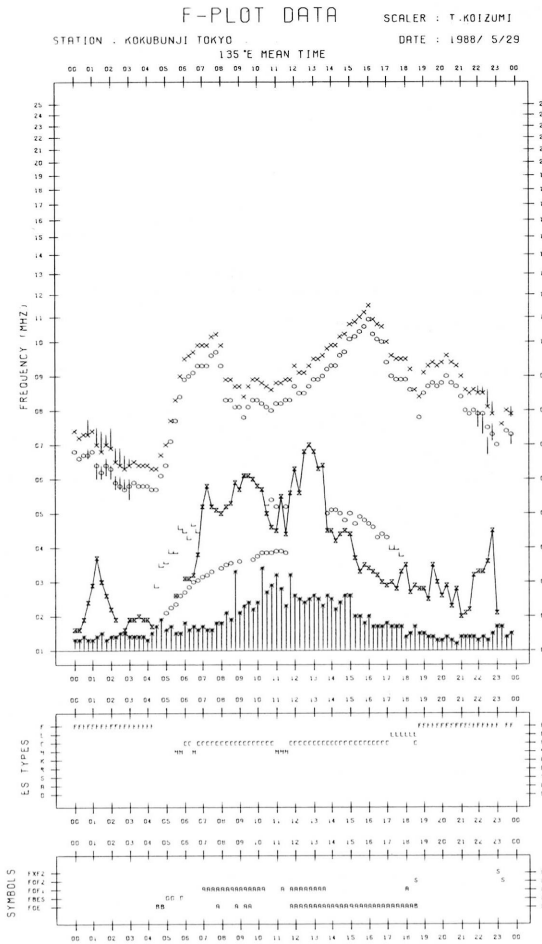
F-PLOT DATA

SCALER : T.KOIZUMI

STATION : KOKUBUNJI TOKYO
135°E MEAN TIME

DATE : 1988/ 5/28





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

Hiraiso

May 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	3	3	3	3	3
2	9	9	9	9	9	3	3	3	3	3
3	9	9	9	9	9	3	3	2	0	3
4	9	10	8	8	9	0	0	0	0	3
5	9	8	8	9	8	0	1	0	0	0
6	9	9	9	(8)	9	*	0	0	*	0
7	q	q	8	q	q	*	*	*	*	1
8	9	9	9	8	9	0	0	0	0	0
9	8	8	8	8	8	*	0	0	0	0
10	8	8	8	8	8	0	0	0	0	0
11	q	q	8	8	8	*	*	0	0	*
12	8	8	8	8	8	0	0	0	0	0
13	8	8	8	8	8	*	0	0	0	0
14	8	8	8	8	8	*	*	0	0	*
15	(8)	8	8	8	8	*	*	0	0	0
16	8	8	8	8	8	*	0	0	1	0
17	8	8	8	8	8	2	2	(2)	3	2
18	8	8	8	9	8	2	1	1	0	2
19	9	9	8	8	9	0	0	0	0	0
20	(8)	8	8	8	8	*	0	0	0	0
21	9	9	9	9	9	*	0	0	0	0
22	10	10	10	10	10	*	1	1	*	1
23	10	10	10	10	10	1	2	2	*	2
24	q	q	q	q	q	*	*	*	*	*
25	q	q	q	10	q	*	*	*	1	*
26	10	10	10	10	10	1	1	1	2	1
27	10	10	10	10	10	1	3	3	2	2
28	10	10	(10)	10	10	2	2	*	2	2
29	10	10	10	10	10	2	*	*	2	*
30	10	10	10	10	10	2	3	3	2	3
31	10	10	10	10	10	2	1	1	0	1

Notes: 1. No observations during the following periods.

none

2. (q) likely quiet.

3. (*) interference.

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

Hiraiso

May 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	35	35	35	37	35
2	37	36	35	35	36
3	35	34	34	34	35
4	34	33	34	36	34
5	35	35	34	35	35
6	35	35	34	37	35
7	36	37	35	36	36
8	37	37	35	38	36
9	37	37	35	37	37
10	37	37	35	-	37
11	35	34	33	34	34
12	35	34	32	-	34
13	38	37	34	35	36
14	36	35	34	35	35
15	35	35	34	35	35
16	34	34	33	35	34
17	35	34	33	35	34
18	35	34	33	35	34
19	34	33	33	(34)	34
20	34	34	32	33	33
21	33	33	32	33	33
22	34	33	32	34	33
23	34	33	33	35	33
24	35	34	33	34	34
25	34	35	33	35	34
26	34	35	34	35	35
27	35	35	35	35	35
28	35	35	34	36	35
29	36	37	36	37	36
30	37	37	36	37	37
31	38	37	36	39	37

Note: No observations during the following periods:

10th 1935 - 2335
 12th 1935 - 2340
 19th 1930 - 2310

B. Solar Radio Emission

b. Outstanding Occurrences at Hiraiso

Hiraiso

May 1988

Single-frequency observations									
Normal observing period: 1940 - 0935 U.T. (sunrise to sunset)									
MAY 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		
1	200	44 NS	1945E	0043	810D	55	29	ML	
	100	43 NS	2028	2138	600D	53	21	-	
2	200	44 NS	1945E	0000	810D	26	12	ML	
3	200	27 RF	2018	2043	56	9	3	WL	
4	500	46 C	0202.3	0213.0	27.5	146	22	WL	
	200	46 C	0207.9	0213.2	57	130	11	WL	
	100	7 C	0209.2	0213.2	98	870	25	-	
				0256.8		60		-	
5	200	43 NS	0200	0436	300	4	1	0	
6	100	8 S	0710.8	0710.8	1.0	350	-	-	
11	500	6 S	0309	0310.5	6.0	3	-	0	
16	200	44 NS	1930E	0200	840D	11	5	WR	
17	200	44 NS	1930E	2055	840D	37	9	MR	
	200	46 C	200.6	2009.4	4.6	190	47	WR	
	100	46 C	2006.6	-	16.5	1000D	-	-	
	200	46 C	2316.5	2319.1	5.0	150	-	WR	
	100	46 C	2318.5	2318.7	2.4	280	-	-	
	100	41 F	0136.3	0138.3	4.0	450	-	-	
	500	46 C	0213.7	0230.5	19	305	34	SR	
18				0216.0		35		WR	
	100	42 SER	0214.5	0215.6	13.2	510	-	-	
	200	46 C	0214.9	0226.5	23.8	310	32	MR	
	21	500	8 S	0114.2	0114.5	0.6	21	-	0
		500	8 S	2112.9	2113.0	0.7	14	-	0
	200	45 C	2323.1	2323.8	1.8	980	-	0	
	100	46 C	2323.8	2324.4	1.9	1000D	-	-	
	500	6 S	2324.0	2324.4	1.4	850	-	0	
	22	500	8 S	2208.5	2209.0	0.7	110	-	0
	23	200	43 NS	0023	0318	540D	7	3	0
24	200	41 F	0302.9	0303.4	3.0	28	-	0	
25	200	24 R	1930E	2351	840D	3	1	WR	
	100	42 SER	2133	2135	17	1000D	-	-	
26	500	41 F	0100	0102	7.5	460	-	0	
	200	44 NS	1930E	0757	840D	17	11	MR	
27	200	44 NS	1930E	0515	840D	16	10	MR	
27	100	45 C	2344.4	-	3.5	1000D	-	-	
	200	45 C	2344.6	2344.9	1.8	610	-	0	
	500	45 C	2345.0	2345.8	8.0	13	6	0	
	28	200	8 S	0434.8	0435.0	0.9	580	-	WR
500		6 S	0435.1	0436.3	4.0	4	-	0	
100		44 NS	1930E	2219	840D	170	64	-	
200		44 NS	1930E	2336	840D	49	30	MR	
29	200	44 NS	1930E	2333	840D	24	11	MR	
	200	44 NS	1930E	0105	800D	19	6	MR	
30	200	44 NS	1930E	0105	800D	19	6	MR	
31	500	42 SER	2053	2154	69	24	-	WR	
	500	27 RF	2300	2308	74	4	2	WR	

RADIO PROPAGATION

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

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

MEASURED AT HIRAISSO

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	-5	-1	-2	2	12	12	10	-2	ES -9	ES -9	ES -6	ES -6	-3	ES -24	-6	-4	ES -9	ES -9	ES -24	4	4	2	-2	0
2	-5	-1	0	3	8	7	0	ES -7	ES -9	ES -9	ES -6	ES -5	ES -24	ES -15	0	ES -9	ES -6	-2	ES -9	ES -6	ES -7	-3	-7	-3
3	ES 3	-4	-5	2	10	10	12	8	2	-2	ES -5	ES -7	ES -4	-5	-5	-1	9	5	ES -15	5	-5	0	0	-1
4	-2	-6	-8	-4	10	-1	-6	-3	-2	-1	ES -3	ES -4	ES -23	ES -23	0	1	-4	2	10	3	-4	1	3	-4
5	-1	2	0	-1	3	4	8	-1	6	ES 0	US 2	ES 2	ES -1	ES -10	-6	ES 4	-8	ES -10	ES -23	ES -23	4	5	1	4
6	0	2	1	-1	-8	ES -23	ES -23	ES -2	ES 0	ES 2	3	ES -8	ES -23	ES -5	ES -10	ES -1	ES -5	ES -14	ES -23	ES -8	ES -23	ES -23	ES -23	ES -23
7	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	-6	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23	ES -23
8	-14	-8	ES -23	ES -23	ES -23	4	-8	ES -10	ES -10	-8	ES -4	ES -5	ES -14	-4	-5	ES -10	-5	ES -1	ES -23	ES -8	-5	-8	ES -10	ES -23
9	ES -23	ES -23	ES -23	ES -23	-4	4	-14	ES -8	ES -5	ES 0	ES -5	ES -8	ES -8	2	5	-2	0	4	ES -4	4	-2	-4	-6	-14
10	ES -8	-4	-2	ES -8	-8	5	12	1	ES -1	ES 2	ES -3	ES -8	C	C	C	C	C	C	C	C	C	C	C	C
11	ES -23	-14	-3	-14	7	8	3	0	-5	ES -5	ES -5	-5	0	0	3	0	0	-3	2	-5	-8	-3	-2	-8
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	-4	1	-13	-9	-4	2	2	3	-3	ES -9	ES -12	ES -12	-7	-1	6	15	11	10	-1	15	10	1	-9	-9
14	-5	-5	-11	2	7	5	8	-1	-8	-11	-13	-9	-11	8	10	3	12	2	-11	4	-3	-1	-5	-6
15	-6	-1	-1	-7	5	6	13	14	3	-11	-7	ES -11	ES -7	-9	13	7	-3	1	-4	-9	-25	C	C	-11
16	4	C	C	1	-2	11	8	9	21	13	12	-1	7	13	6	11	3	8	-5	-5	-1	1	-7	-9
17	-1	1	3	2	10	-2	-9	ES -9	ES -1	ES -1	ES -3	ES -9	ES -9	1	-3	3	-1	ES -22	ES -22	ES -22	ES -22	ES -3	ES -9	6
18	8	-1	-3	ES -22	ES -22	ES -22	ES -9	ES -22	ES 5	ES -16	ES -9	1	4	4	-9	-1	ES -3	ES -22	ES -22	ES -22	ES -4	ES -22	ES -22	-9
19	-2	0	1	-5	1	-1	-1	3	2	2	1	ES -1	ES -9	15	4	0	-7	-3	1	8	11	7	-1	ES -22
20	ES -22	-3	4	2	-1	9	2	ES -3	ES 0	ES 0	ES 3	ES 2	ES -3	17	21	19	17	17	9	5	9	4	2	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	7	ES -19	1	1	7	9	13	ES 1	ES -19	ES -19	ES -19	ES -19	ES -19	ES 1	ES 1	8	9	ES -19	3	4	ES -19	ES -19	1	1
23	7	ES -19	1	ES -19	ES -19	15	14	9	ES 1	ES -19	ES -19	ES 4	ES -19	23	11	6	8	1	5	5	5	ES -19	0	ES -19
24	ES -19	ES -19	0	0	7	9	6	10	19	15	14	10	10	20	23	15	16	10	14	3	8	3	3	5
25	0	0	0	-1	12	11	9	7	ES -4	ES 0	ES -19	ES -19	ES -19	32	16	13	6	9	4	8	0	ES 0	ES -19	0
26	ES -19	ES -19	ES 2	6	12	10	21	24	16	15	ES -19	ES -19	ES -19	2	16	11	16	16	8	8	9	2	5	5
27	-4	1	2	-1	9	9	16	8	8	4	2	6	8	16	16	4	3	8	7	2	2	1	-1	-1
28	-6	-12	0	5	3	11	15	17	17	9	1	-4	20	16	20	13	11	6	3	1	1	2	-3	-14
29	-10	-8	-5	-2	9	7	9	14	13	8	8	3	-2	8	4	6	7	8	3	3	3	3	0	-6
30	1	-7	0	-1	6	3	8	9	10	10	0	ES -3	ES -3	2	6	-1	1	3	-3	6	-3	0	-6	ES -24
31	ES -14	ES -10	-11	-10	-2	3	8	-2	-5	-3	0	-6	ES -5	5	8	8	8	10	-2	4	9	4	-2	ES -8
CNT	29	28	28	29	29	29	29	29	29	29	29	29	23	28	28	28	28	28	28	28	28	27	27	27
MED	US -5	-4	US 0	-1	5	6	8	US 1	ES 0	ES -1	ES -5	ES -5	ES -7	2	4	US 4	2	2	-2	3	-2	0	-2	-8
UD	7	1	2	3	12	11	15	14	17	13	8	ES 4	8	20	20	15	16	10	9	8	9	4	3	5
LD	ES -23	ES -19	ES -23	ES -23	ES -22	ES -22	ES -14	ES -10	ES -10	ES -19	ES -19	ES -19	ES -23	ES -15	ES -9	ES -9	ES -8	ES -22	ES -23	ES -22	ES -23	ES -22	ES -22	ES -23

RADIO PROPAGATION

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

MAY 1938 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	3	2	6	14	16	21	25	24	19	22	16	17	14	1	0	ES -9	-1	-3	14	10	12	6	6	2
2	0	6	8	16	16	21	26	23	23	20	22	16	20	12	2	6	8	1	13	16	21	12	2	2
3	3	10	3	16	17	19	23	26	24	2	14	17	7	-3	2	-1	11	16	22	14	4	3	2	3
4	3	3	1	11	9	20	22	23	21	21	24	17	17	22	22	14	18	14	22	16	11	11	4	5
5	0	3	5	12	17	22	22	27	27	24	21	8	22	19	10	18	12	17	4	6	17	3	4	7
6	10	8	8	9	12	8	7	11	11	22	5	1	-5	ES -2	ES -23	ES -5	ES -5	ES -14	ES -23	ES -8	-5	-14	-14	-14
7	-14	-10	-10	-3	1	11	12	15	12	2	2	2	2	-17	ES -23	-14	9	-11	-3	4	16	3	0	3
8	2	3	3	11	16	17	18	23	24	26	24	17	21	23	-2	6	16	-1	1	-1	11	3	1	-2
9	1	3	0	12	16	19	22	22	21	23	22	23	22	19	15	14	4	18	ES 3	12	11	3	3	-3
10	3	4	7	9	16	16	24	27	27	27	23	25		C	C	C	C	C	C	C	C	C	C	C
11	-1	3	4	9	16	17	21	27	25	28	16	17	21	16	-2	17	10	12	5	9	9	3	3	C
12	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
13	3	11	6	10	10	8	20	21	23	23	21	21	26	14	16	10	22	14	2	-3	-3	-4	-4	-4
14	-1	1	6	4	11	19	18	22	23	23	16	14	14	15	10	3	20	18	15	14	6	3	1	3
15	2	-1	3	4	14	20	24	21	23	20	24	19	15	14	9	10	21	18	16	9	-3	C	C	-1
16	4	C	C	15	19	25	23	31	31	31	31	25	26	26	27	25	25	18	14	11	14	13	10	17
17	7	11	8	21	17	20	25	30	32	27	21	23	10	17	-1	16	23	25	7	-5	ES -22	7	22	8
18	5	5	6	8	21	17	24	26	29	26	28	25	27	20	13	22	23	25	27	17	14	15	11	7
19	6	6	13	15	15	21	21	25	24	19	19	18	20	21	16	8	2	15	20	16	8	-1	-3	ES -22
20	0	-5	7	8	12	19	24	31	30	30	27	25	28	23	21	21	26	15	20	20	7	8	6	C
21	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
22	8	13	15	19	20	23	25	25	28	29	21	31	30	25	16	7	7	24	26	20	15	6	12	7
23	7	13	14	9	21	23	25	25	30	31	30	30	28	26	28	21	26	22	20	14	13	12	7	10
24	5	1	12	13	23	26	25	26	28	31	29	31	27	26	27	26	26	24	29	22	15	13	3	11
25	6	13	14	15	16	22	26	28	27	26	29	29	23	18	6	19	19	23	32	18	19	10	10	6
26	9	8	15	16	21	27	32	32	34	29	30	26	25	28	27	23	25	22	17	18	12	8	9	5
27	1	7	5	13	18	19	25	32	28	22	26	25	19	16	20	17	24	22	16	16	14	9	6	4
28	-2	-1	9	14	16	20	23	22	21	20	25	25	25	20	18	15	20	21	15	11	14	12	7	2
29	2	4	7	12	20	17	21	30	27	29	25	24	27	23	24	21	23	22	13	15	16	9	1	2
30	7	9	6	10	17	19	23	26	26	26	25	24	20	24	19	14	4	17	22	14	11	-3	-3	-9
31	-8	-8	2	-3	7	12	21	25	26	25	22	18	20	22	17	23	24	20	21	12	20	13	11	1
CNT	29	28	28	29	29	29	29	29	29	29	29	29	28	23	23	23	23	28	28	28	28	27	27	26
MED	3	4	6	12	16	19	23	25	26	25	23	23	21	20	16	14	20	18	16	14	12	7	4	3
UD	8	13	14	16	21	25	26	31	31	31	30	30	28	26	27	25	26	24	27	20	19	13	11	10
LD	-2	-5	1	4	9	11	18	21	19	19	14	8	7	ES -2	ES -2	ES -5	2	-3	ES 1	-3	-3	-3	-3	-9

C. Radio Propagation

b. Radio Propagation Quality Figures at Hiraiso

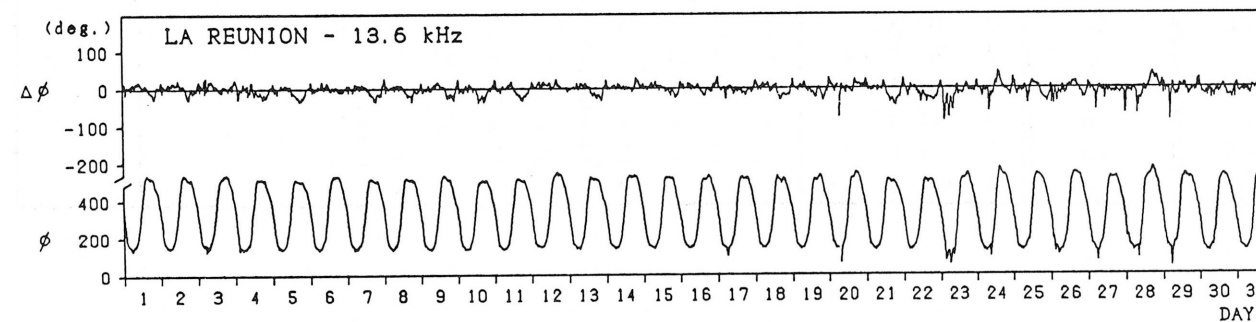
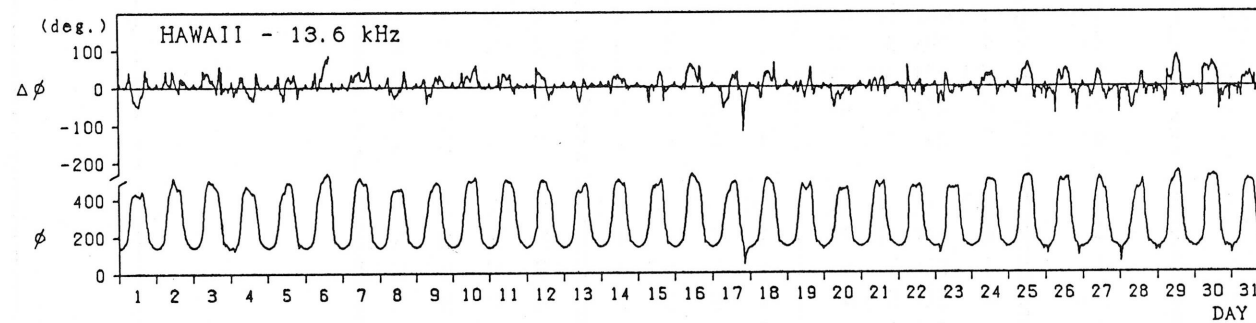
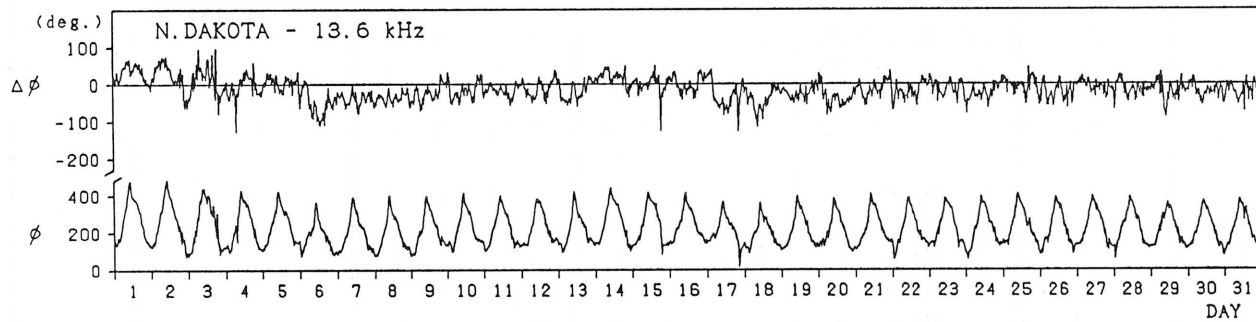
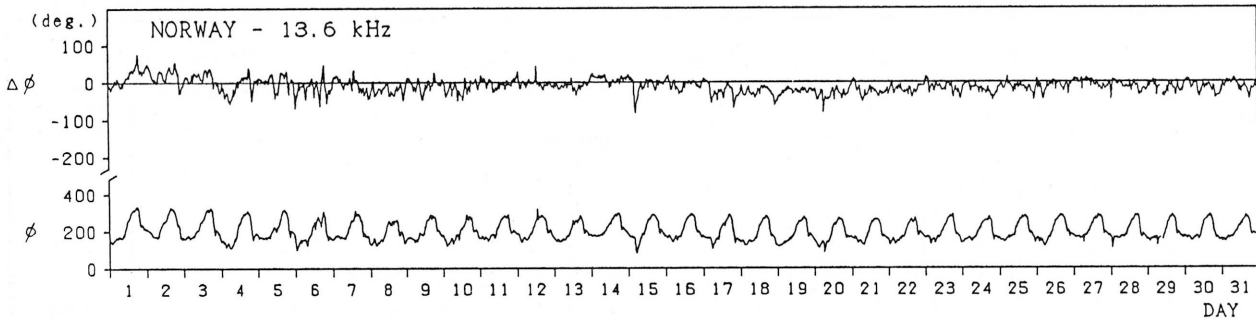
Hiraiso		Time in U.T.														
May 1988	Whole Day Figure	W W V				W W V H				Conditions				Principal Geomagnetic Storms		
		00	06	12	18	00	06	12	18	00	06	12	18	Start	End	Range
		06	12	18	24	06	12	18	24	06	12	18	24			
1	3+	4	4U	2U	4	4	3	2	4	N	N	N	N	22.2	---	229
2	3+	4	3U	3U	3U	4	4	3	4	N	N	N	N			
3	4-	4	4U	3	4	4	3	3	4	N	N	N	N			
4	4o	4	4U	3	4	4	4	4	4	N	N	N	N			
5	4-	4	4U	3U	3	4	4	4	4	N	N	N	N			
6	2+	3	3U	3U	2U	4	2	1U	2	N	U	U	U			
7	2o	2U	2U	1U	2U	2	2	2	4	U	U	U	U			
8	3+	3	3U	3U	3U	4	4	3	3	N	N	N	N			
9	4-	2U	3U	4	4	4	4	4	4	N	N	N	N			
10	4o	4	4U	C	C	4	4	C	C	N	N	N	N			
11	4-	3	4U	4	4	4	4	3	4	N	N	N	N			
12	C	C	C	C	C	C	C	C	C	N	N	N	N			
13	4-	3	4U	4	4	4	4	4	3	N	N	N	N			
14	4-	4	4U	4	4	3	3	3	4	N	N	N	N			
15	4o	4	4U	4	4	4	4	4	3	N	N	N	N			
16	4+	4	5U	5	4	4	4	4	4	N	N	N	N			
17	3+	4	3U	3	3U	4	4	4	3	N	N	N	N			
18	4-	3U	3U	3U	3U	4	4	5	4	N	N	N	N			
19	4o	4	4U	4	4	4	4	4	3	N	N	N	N			
20	4o	3	4U	5	4	4	4	4	4	N	N	N	N			
21	C	C	C	C	C	C	C	C	C	N	N	N	N			
22	4o	4	3U	4U	4	4	4	4	4	N	N	N	N			
23	4+	4	5U	5	4	4	5	5	4	U	U	U	U			
24	5-	4	5U	5	4	4	5	5	5	N	N	N	N			
25	4+	4	4U	5	4	4	4	4	5	N	N	N	N			
26	5-	4	5U	5	5	5	5	4	4	N	N	N	N			
27	4+	4	5U	5	4	4	4	4	4	N	N	N	N			
28	4+	4	5U	5	4	4	4	4	4	N	N	N	N			
29	4o	4	5U	4	4	4	4	4	4	N	N	N	N			
30	4o	4	5U	4	4	4	4	4	3	N	N	N	N			
31	4-	3	4U	4	4	3	4	4	4	N	N	N	N			

C. Radio Propagation

c. Phase Variations in OMEGA Radio Waves at Inubo

Inubo

May 1988



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

NONE

C. Radio Propagation

d. Sudden Ionospheric Disturbance

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

Hiraiso		Time in U.T.									
May 1988	S W F				Correspondence						
	Drop-out Intensities (dB)				Start	Duration	Type	Imp.	Solar Flare	Solar Noise	Geomag. Crochet
CO	HA	1)	2)								
20			11	x	0612	30	SL	1-			
26	x	x	13		0101	29	SL	1	x	x	
27			3		0544	16	SL	1-	x	x	
27			14		1230	39	SL	1	x		
27			21		1444	41	SL	1+			
28	x	x	18		0044	32	SL	1+	x		
29			18		0532	43	SL	1+	x		

Notes CO: Colorado(WWV) HA: Hawaii(WWWH) 1): Australia 2): London

(ii) Sudden Phase Anomaly (SPA) at Inubo

Inubo

May 1988	S P A					Time (U.T.)		
	Phase Advance (degrees)					Start	End	Maximum
Date	Ω/N	Ω/LR	NWC	Ω/H	Ω/ND			
3				8		2251	2357	2259
4		37	56*	23*	63*	0202	0413	0243
4			8			0418	0432	0421
4		<u>23</u>	14			0459	0537	0509
4		<u>45</u>	8			0851	0950	0906
5		9	<u>12</u>	7		0319	0407	0330
5				<u>30</u>	40	1945	2042	1953
6		<u>12</u>	10		26	0512	0539	0519
7		<u>16</u>	14	6		0424	0509	0438
12		7				0613	0634	0616
12				8		2336	0009	2343
17		<u>42</u>	31	15		0528	0700	0544
17				104*	<u>135</u>	2004	2155	2024
19				10		2340	0030	2358
20	54	<u>189</u>	112	50	37	0612	0745	0624
21				16		1858	2000	1908
22				6		0137	0210	0146
22		<u>23</u>				1102	1130	1108
23	45	<u>96</u>	—	54	33	0235	0442	0312
23	31	<u>82</u>	—	16	11	0529	0743	0543
23		13				0757	0813	0801
23	23	<u>65</u>				0826	0924	0841
23		<u>18</u>				1205	1237	1211
24		<u>24</u>	22	7	18	0400	0445	0409
24		<u>12</u>	9			0551	0632	0601
24		<u>59</u>	14			0811	0905	0827
24				5		2104	2123	2106
24			7	<u>13</u>		2232	2317	2237
25		13				0327	0350	0329
25		12				0614	0640	0619
25		60				0928	1033	0940
25				7		2056	2126	2113
25				8		2156	2238	2202
25			10	<u>16</u>		2250	2328	2300
26	10		<u>14</u>	12		0000	0034	0003
26	44	70	<u>87</u>	61	33	0100	0230	0108
26	20	30	<u>26</u>	9		0244	0354	0255
26	18	<u>46</u>	40	15	16	0455	0612	0504
26				<u>32</u>	22	2030	2110D	2054
26	18			<u>66</u>	50	2110E	2246	2117
27	31	<u>84</u>	67	20	13	0543	0700	0553
27		9				0948	1015	0953
27		29				1136	1220	1142
27				8		2000	2030	2009
27		12	<u>14</u>	15	12	2345	0013	2347

Inubo

May 1988	S P A					Time (U.T.)		
	Phase Advance (degrees)					Start	End	Maximum
Date	Ω/N	Ω/LR	NWC	Ω/H	Ω/ND			
28	54	59	101	<u>79</u>	46	0043	0230	0100
28		<u>12</u>	10	6		0437	0524	0439
28		19				0803	0816	0806
28		<u>57</u>	12			0822	0900	0831
28		53				0905	0941	0917
28			<u>13</u>	<u>23</u>	9	2304	0016	2327
29			<u>26</u>	15	13	0113	0205	0128
29	44	<u>126*</u>	80*	31	24	0535	0712	0543
29		22				0912	1002	0919
29			6	<u>8</u>		2253	2310	2255
30			<u>16</u>	7		0106	0143	0113
30		17	<u>14</u>			0441	0527	0455
30		<u>13</u>	10			0622	0700	0626
30		29				0841	0941	0854
30				<u>31</u>	29	1950	2104	2014
30				<u>12</u>		2200	2246	2214
31	16	31	—	<u>36</u>	21	0018	0143	0029
31				<u>11</u>		2044	2130	2053

IONOSPHERIC DATA IN JAPAN FOR MAY 1988

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